Discover What's Possible® **Anritsu**

ELECTRONIC
MEASURING INSTRUMENTS

Handheld/Portable Field Instruments
Product Catalog 2005

Contents

Handheld/Portable Field Instruments

◼ OUTLINE OF ANRITSU CORPORATION

Anritsu Corporation's predecessor, Anritsu Electric Co. Ltd., was created by the 1931 merger of Kyoritsu Denki, which grew out of Sekisansha Co., founded in 1895 as a manufacturer of wire communication equipment, and Annaka Denki Seisakusho, established in 1900 as a pioneer in wireless communication equipment. The company name was changed to Anritsu Corporation in 1985 to reflect the firm's status as an international enterprise.

With a history in wire and wireless communications equipment, Anritsu has contributed to the enhancement of society through its numerous products, which include equipment for "original and high-level" communication equipment, instrumentation and control equipment, information terminals, and manufacturing equipment. In particular, Anritsu has grown to be recognized as a world leader in measurement systems for wireless communications as well as optical and super high-speed digital communications. Customers in well over 100 countries use Anritsu products in a diverse range of industrial areas.

To ensure that Anritsu products are of the highest quality, the Anritsu Group is establishing a quality system conforming to international standards, and has become registered as an ISO9001 quality assurance corporation by JQA.

Meanwhile, Anritsu head office and Tohoku Anritsu Corporation have earned ISO14001 environmental management certification, demonstrating our dedication to preserving the natural environment.

It is now apparent that the focus of Anritsu's attention, the mobile and Internet areas, are about to evolve even further. In addition to broadband and IP, the entrance of digital broadcasting and intelligent home appliances, mean the arrival of an ubiquitous network society where people are able to communicate anytime, anywhere, with everything as seamless connection between networks developed.

In order to be both the best partner for our customers and to continue to evolve, Anritsu is putting the "original and high-level" technology and intelligence coming from our 100-year history toward this ubiquitous network society. We have transformed ourselves into an "Intelligent Solution Creator." By providing electronic, information communication and measurement solutions that directly contribute to the success of our customers' businesses, Anritsu is supporting the evolution of a ubiquitous network society.

Established	March 17, 1931
Paid-up capital	¥14,043,000,000
Employees	3,568 (worldwide)

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See page 6 for sales network.

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For the latest product updates visit *www.anritsu.com*

Keep up to date on the latest product specifications, literature and Anritsu news on *www.anritsu.com*. Access Anritsu's regional websites to see local events, training and upcoming conferences.

Below is a list of other Anritsu Electronic Measuring Instruments Catalogs you can order by filling out the inserted Business Reply Card or visiting *www.us.anritsu.com/emicatalog*
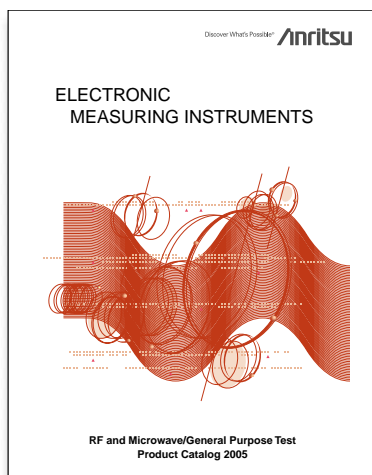
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- Automatic Calibrators
- Frequency Counters
- Vector Network Analyzers
- PIM-S System
- Power Amplifier Test System
- Power Meters
- Scalar Network Analyzers
- Signal Analyzers
- Synthesized Level Generators
- Signal Generators
- Spectrum Analyzers
- Tower Mounted Amplifier Test System
- Vector Network Analyzers

Digital, SONET/SDH, IP and Optics Test
Multiple test instruments including:
- Bit Error Rate Testers
- Optical Test Instruments
- SONET/SDH and
- Internal Protocol Testers

3G/Wireless Test
- WCDMA TRX/Performance Test System
- Digital Modulation Signal Generator
- WCDMA Signaling Tester
- Signaling Tester
- WCDMA Rapid Test Designer (RTD)
- WCDMA Protocol Test System (PTS)
- WCDMA Virtual Signaling Tester (VST)
- Digital Mobile Radio Transmitter Tester
- WLAN Test Set
- Radio Communication Analyzer
- Bluetooth™ Test Set
- Bluetooth™ Prequalification Test System (PQTS)
- WCDMA Area Tester
- Spectrum Analyzer
- Bit Error Rate Tester
- Signature™ High Performance Signal Analyzer
- 3GPP Protocol Analyzer

2005 Anritsu EMI Catalog CD ROM
Visit *www.us.anritsu.com/emicatalog* to download the full version of the 2005 Electronic Measuring Instruments Catalog in PDF format, or to order the catalog on CD ROM.

Order by model number

When ordering, please specify the model number and name of the instrument desired, for example, "MP1570A SONET/SDH/PDH/ATM Analyzer." To ensure accuracy, please include all necessary specifications and provide specific instructions in your order; include special options, features, nonstandard power line voltage, etc. To expedite your order we suggest that you contact us directly.

Shipment

Generally, instruments will be shipped within two months of receipt of your order. In the case of "Custom-made products" mentioned in the footnotes, shipment may take from 4 to 7 months. Every endeavor will be made to maintain delivery dates, but no liability is accepted for loss, damage, or delay of instruments, for reasons which are out of our control.

Terms

Unless previous terms have been arranged, we will use one of the following:
- Full payment in advance of shipment
- Sight draft against an irrevocable confirmed letter of credit

Quotations and pro forma invoices

FOB, CIF, C&F, etc., quotations, and pro forma invoices are available upon request. The instrument price includes a packing charge.

Inspection surcharge

An inspection surcharge is applied to all orders requiring inspection by government agencies or individually appointed inspectors at our factory.

Special products made-to-order

Requests for remodeling standard products for special use will be accepted, but only after detailed discussions.

Returning instrument for repairs

When returning an instrument to Anritsu for repairs, the following suggestions will help us return it back to you in the shortest possible time:
- Send complete instructions about what you would like done to the instrument.
- If possible, include the "symptoms" or "defects."
- Indicate the return address along with the address to be used for billing purposes.

Extended warranty service

Extended Warranty Services, Option ES, provide extension of the normal product warranty and may be purchased for many Anritsu products. These services may include repair and/or routine calibration and may be available for delivery on-site or on a return to Anritsu Service Center basis. Consult your local Anritsu Sales Office or Sales Representative for price and availability.

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Bluetooth and the Bluetooth logos are trademarks owned by the Bluetooth SIG, Inc., U.S.A. and licensed to the Anritsu Corporation.

WARRANTY

All other expressed warranties are disclaimed and all implied warranties for this product, including the warranties of merchantability and fitness for a particular purpose, are limited in duration to a period of one year from the date of delivery. In no event shall all Anritsu group be liable to the customer for any damages, including lost profits, or other incidental or consequential damages arising out of the use or inability to use this product.

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FAX: +971-2-6458907

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200 Capability Green, Luton, Bedfordshire
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• United States

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FAX: +1-408-776-1744

ANRITSU COMPANY
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Richardson, TX 75081, U.S.A.
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FAX: +1-972-671-1877

ANRITSU COMPANY
(SALES AND SERVICE, NJ OFFICE)
10 New Maple Avenue, Unit 305
P. O. Box 836,
Pine Brook, NJ 07058-0836, U.S.A.
Toll Free: 1-800-ANRITSU (267-4878)
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FAX: +1-973-575-0092

• Uruguay

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Santa Lucia 5890
CP 11700
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FAX: +598 2 3095776

• Venezuela

RADIOCOMUNICACIONES CRUZ C.A.
Calle la Colina, quinta Elison
Colina de los Caobos
Caracas 1050, Venezuela
TEL: +58-212-7932322
FAX: +58-212-7933429

• Vietnam

**SYSTEM & TECHNOLOGIES
VIETNAM LTD**
Unit # B236, Binh Minh Hotel
27 Ly Thai To St.
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TEL: +84-4-8-264-728
FAX: +84-4-9-344-111

A Multi-Function Base Station Test Tool for Greater Flexibility and Technician Productivity

MT8212B Cell Master
25 MHz to 4.0 GHz

Cell Master MT8212B is a comprehensive, one-box base station test tool for deploying, maintaining and troubleshooting wireless base stations. Combining the functionality of a cable and antenna analyzer (25 MHz to 4.0 GHz), spectrum analyzer (100 kHz to 3.0 GHz), power meter, interference analyzer, channel scanner, transmission measurement, transmitter measurements (CDMA and GSM), GPS and T1/E1 analyzer into one lightweight, handheld test set - eliminates the need for the field engineer and field technician to carry, manage and learn multiple test sets. MT8212B measurement capability includes precision return loss, VSWR, cable loss, distance-to-fault, signal identification, interference analysis, channel power, adjacent channel power ratio, field strength, occupied bandwidth, burst power, code domain power, noise floor, voltage peak to peak, listen to DS0 or VF channel access. Patented RF interference rejection enables accurate, repeatable measurements in the presence of high RF activity. PC data analysis software enables assessment of system trends, problems, and performance in addition to professional report generation. Built-in GPS stores traces with location information.

(For further information see page 16)

An Ultra Portable Handheld Field Test Tool for Node B Analysis

MT8220A UMTS Master High Performance Node B Analyzer
100 kHz to 7.1 GHz

The Anritsu MT8220A UMTS Master is a dedicated WCDMA transmitter analyzer used to verify node B transmitter performance during network installation and maintenance. The MT8220A UMTS Master is light weight, handheld and battery operated and has been specifically designed for field applications. The MT8220A UMTS Master is a low cost, easy to use, and rugged solution that performs like a bench top instrument. The MT8220A UMTS Master adds the functionality of a transmitter analyzer (WCDMA) to the MS2721A Spectrum Master spectrum analyzer. The MT8220A UMTS Master transmitter analyzer frequency range is 824 to 894 MHz, 1710 to 2170 MHz and 2300 MHz to 2700 MHz with three WCDMA options - RF, Demodulator and Over The Air (OTA) measurements. The MT8220A spectrum analyzer frequency range is 100 kHz to 7.1 GHz with the ability to measure very low level signals with incredible accuracy.

(For further information see page 17)

High Performance Handheld Spectrum Analyzer
MS2721A Spectrum Master
100 kHz to 7.1 GHz

The MS2721A Spectrum Master is the first handheld spectrum analyzer to deliver the ability to measure very low level signals with a displayed average noise level of ≤ -153 dBm typical @ 1 GHz in a 10 Hz RBW. Coupled with a wide range of resolution bandwidth choices, you can configure the Spectrum Master to meet your most challenging measurement needs. As the spectrum becomes more and more congested, the ability to measure low level, closely spaced signals becomes more and more important not only for interference detection but also for wireless system planning.

(For further information see page 19)

All-New Field Measuring Instrument for FTTx
MT9080 Series ACCESS Master™
1.31/1.55/1.65 μm (SM)

The functions and performance required for field measuring instruments are changing according to network trends.
Access providers are now starting broadband optical access services such as FTTB, including Gigabit Ethernet for enterprises, FTTC, and FTTP for general homes.
The MT9080 Series ACCESS Master is a compact and high-performance OTDR for installation and maintenance of FTTx optical fibers.

(For further information see page 28)

SITE MASTER
S100C/S200C/S300D/S800D Series
2 MHz to 20 GHz

$C\,\epsilon$ **GPIB**

For Analyzing Cable and Antenna Problems
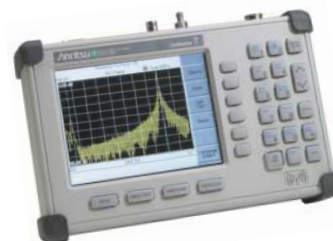
S331D

S332D

S251C

S113C

S114C

S810D/S820D

Site Master is the instrument of choice for transmission line (coax and waveguide) and antenna installation and maintenance. It is the best way to reduce maintenance expenses and improve quality. It replaces stacks of heavy, expensive, and complex test equipment. Site Master's frequency domain reflectometry technique allows it to locate faults and degradations before they become catastrophic failures, thereby creating huge cost and time savings.

The Site Master is a precision hand-held return loss/SWR and fault location measurement instrument. OSL calibration can be applied to all 1-port measurements (RL/VSWR/cable Loss/DTF) enabling accurate vector corrected measurements. The Site Master series offers wide frequency coverage, from 2 MHz to 20 GHz. Built-in fault location, RF power monitor, bias tee, and spectrum analysis capabilities are available. Site Masters' SPA has dedicated routines for one-button measurements of field strength, channel power, occupied bandwidth, adjacent channel power ratio (ACPR), Carrier-to-Interference, and interference analysis. Light weight, rugged design, and wide temperature range make them ideal for field applications. Site Master's proprietary design provides superior immunity to on-channel RF interference, which is important for live site testing.

Handheld Software Tools is a Windows® compatible software program provided with every Site Master unit. This software program provides many useful features, including a database for Site Master measurements, Smith Chart display of S11, zoom capability, a "drag-n-drop" overlay for measurement comparison, the capability to download data to a PC, and the capability to upload data such as custom cable list or traces to selected Site Master models. Advanced printing capabilities are provided by Handheld Software Tools including user definable plot scaling and a multiple plots per page option.

Site Master is the first test tool to provide the required accuracy, interference immunity, and repeatability for transmission line/antenna commissioning, and maintenance of today's wireless systems infrastructures.

Standard Features
- Accurate return loss/SWR and fault location measurements
- Accurately tests RF transmission lines and antennas
- Superior immunity to on-channel interference for testing at co-located antenna sites
- Multilingual user interface: English, German, Spanish, French, Chinese, Japanese
- TFT color display (S810D and S820D)
- Accurate 2-port vector measurements to measure gain, antenna-to-antenna isolation (S251C)

- Spectrum analysis (S114C and S332D)
- 130, 259, or 517 data points
- Synthesizer accurate to 75 ppm
- Internal memory saves up to 200 traces
- Instrument configuration up to 25 configurations
- Alphanumeric trace naming
- Time, Date stamp
- Field replaceable battery
- Segmented limit lines
- Six markers
- Graticule lines
- Trace overlay
- Direct printing via RS232 serial port
- Remote operation via RS232 serial port
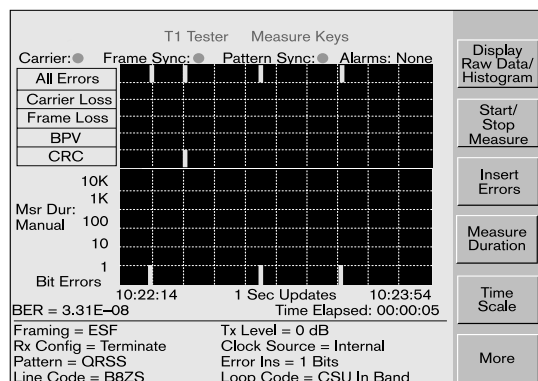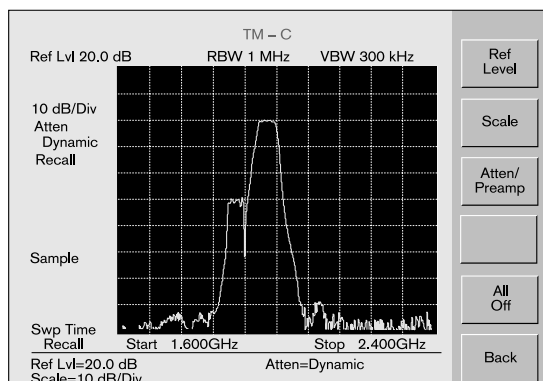
Optional Features
- Option 3: Color daylight viewable TFT display (S331D and S332D)
- Option 5: Power Monitor to measure power – external detector needed (S113C, S114C, S251C, S810D, and S820D)
- Option 10/10B: Built-in bias tee (S251C and S332D)
- Option 21: 2-port scalar transmission measurements (S332D)
- Option 29: Power Meter from 3 MHz to 3 GHz (S331D and S332D)
- Option 31: Built-in GPS receiver provides latitude, longitude, altitude information with trace data (S810D and S820D)
- Option 50: T1/E1 Analyzer (S331D)

Applications
Cellular, ISM, PCS/PCN, paging service, safety service, avionics, two-way radio, military, and microwave point-to-point radio.

Site Master allows implementation of preventative maintenance procedures. Unlike TDRs and spectrum analyzers/tracking generators, Site Master can spot RF degradation before failures occur. Problems can be fixed before expensive cables or waveguides are ruined.

Site Master is designed for field requirements. Its rugged construction survives rough field treatment. Battery power, light weight, small size, wide temperature range, and simple user interface are exactly what field technicians want today. Technicians can test antennas from ground level because Site Master's distance-to-fault measurement compensates for cable insertion loss. Furthermore, spectrum analysis, available in certain Site Master models, allows technicians and field engineers to quickly identify and solve common RF system problems, such as coverage, interference, and other path related signal problems. Site Master offers a new and better method to install and maintain transmission lines and antennas.

RL — RL1
FlexCal ON   Recall   259 Points
0.00 dB

60.00 dB
1550.0   Freq (MHz)   2150.0
M1:13.76,1708.1MHz   M3:22.91,1777.9MHz
M2:36.36,1761.6MHz   M4:29.34,1926.7MHz
M5:15.39,1982.6MHz   M6=Off

M1
M2
M3
M4
All Off
More

Return Loss

DTF — DTF1
FlexCal ON   Recall   259 Points
0.00 dB

60.00 dB
0.0   Dist (ft)   65.0
M1:34.89dB, 0.3ft   M3:35.60dB,37.8ft
M2:41.83dB,17.4ft   M4:34.56dB,58.7ft

M1
M2
M3
M4
All Off
More

DTF

CL — CL-S21
FlexCal ON   Recall   259 Points
0.00 dB

5.00 dB
1550.0   Freq (MHz)   2150.0
F1=1550.0 MHz   Avg Cable Loss = 1.80 dB
F2=2150.0 MHz

F1
F2
Signal Standard

Cable Loss

BIAS 15.1V78mA   INSERTION GAIN
CAL ON   −30dBm   259 POINTS
20.0 dB

−73.3 dB
1825.00   FREQ (MHz)   2025.00
M1:12.5,1894.77MHz   M3=OFF
M2=OFF   M4=OFF

M1
M2
M3
M4
M5
M6

2-port TMA Gain using 251C and bias tee

SA—IA1
Ref Lvl − 70.0 dBm   RBW 3 kHz   VBW 1 kHz

8 dB/Div
Atten
 Dynamic
Recall

RMS Avg

Swp Time
Recall   Center 1.932GHz   Span 3.874MHz
IA Free=1932.48 MHz   Cell Standard = 1250 kHz CDMA

Set IA Freq
Measure
IA Freq To Center
IA Freq As Marker M1
Back

Interference Analysis S332D

SA—1
Ref Lvl 70.0 dB   RBW 3 kHz   VBW 1 kHz

8 dB/Div
Atten
 Dynamic
Recall

ACPR
RMS Avg

          Center 1.932GHz   Span 3.874MHz
Main Ch Pwr: −67.15 dBm   Main Ch BW: 1.230 000 MHz
Lower ACPR: −27.30 dB   Adj Ch BW: 1.230 000 MHz
Upper ACPR: −22.92 dB   Ch Spacing: 1.230 000 MHz

Center Freq
Main Channel BW
Adj Channel BW
Channel Spacing
Measure
Back

ACPR using S332D

TM – C
Ref Lvl 20.0 dB   RBW 1 MHz   VBW 300 kHz

10 dB/Div
Atten
 Dynamic
Recall

Sample

Swp Time
Recall   Start 1.600GHz   Stop 2.400GHz
Ref Lvl=20.0 dB   Atten=Dynamic
Scale=10 dB/Div

Ref Level
Scale
Atten/ Preamp
All Off
Back

2-port gain of TMA using Option 21 and Option 10

T1 Tester   Measure Keys
Carrier:●   Frame Sync:●   Pattern Sync:●   Alarms: None
All Errors
Carrier Loss
Frame Loss
BPV
CRC
              10K
Msr Dur: 1K
Manual   100
              10
               1
Bit Errors
          10:22:14   1 Sec Updates   10:23:54
BER = 3.31E−08   Time Elapsed: 00:00:05
Framing = ESF   Tx Level = 0 dB
Rx Config = Terminate Clock Source = Internal
Pattern = QRSS   Error Ins = 1 Bits
Line Code = B8ZS   Loop Code = CSU In Band

Display Raw Data/ Histogram
Start/ Stop Measure
Insert Errors
Measure Duration
Time Scale
More

T1/E1 Measurement using Option 50

Models	S113C	S114C	S331D	S332D	S251C	S810D	S820D
Frequency Range	2 to 1600 MHz	2 to 1600 MHz	25 to 4000 MHz	25 to 4000 MHz	625 to 2500 MHz	25 MHz to 10.5 GHz	25 MHz to 20 GHz
Display Points	130, 259, 517	130, 259, 517	130, 259, 517	130, 259, 517	130, 259, 517	130, 259, 517	130, 259, 517
Interference Immunity							
On-Frequency	+10	+10	−5	−5	+10 RF Out +30 dBc RF In	−10	−10
On-Channel	+17	+17	+17	+17	+17	+13	+13
Calibration Setups	10	10	15	25	10	25	25
Memory Locations (max.)	200	200	200	200	200	200	200
Measurement Characteristics							
Return Loss	√	√	√	√	√	√	√
SWR	√	√	√	√	√	√	√
Cable Loss	√	√	√	√	√	√	√
DTF	√	√	√	√	√	√	√
Insertion Gain					√		
Isolation					√		
Insertion Loss					√		
TFT Color Display (Option 3)			√	√		Standard	Standard
Power Monitor (Option 5)	√	√			√	√	√
Built-in Bias Tee (Option 10)				√			
Built-in Bias Tee (Option 10B)					√		
Tranmission Measurement RF Source (Option 21)				√			
Power Meter (Option 29)			√	√			
GPS Receiver–requires external antenna (Option 31)						√	√
T1/E1 (Option 50)			√				
Spectrum Analysis (MHz)		0.1 to 1600		0.1 to 3000			

InstaCal® Calibration Module*

The InstaCal calibration module is available for specified one-port Site Master models (S113C, S114C, S331D and S332D). With InstaCal, users can cut the time required to calibrate the Site Master by as much as 50%. Moreover, InstaCal reduces the potential for calibration error. With discrete calibration components users are required to connect, disconnect, and reconnect the various calibration components during the calibration process, which greatly increases the potential for calibration/measurement error. With InstaCal, users are only required to connect the InstaCal calibration module once – the calibration process sequences automatically, ensuring an accurate calibration of the Site Master. The benefit is calibrated measurements in much less time.

∗The InstaCal® Calibration Module exhibits slightly degraded directivity performance compared to precision loads. Users having applications that require DTF-RL measurements > | 38 dB | may want to consider using precision load calibration components in place of the InstaCal calibration module for greater measurement accuracy.

InstaCal® Module ICN50

Universal Waveguide Component Accessories

	Part number[2]	Freq. range	Waveguide type	Compatible flanges
Precision waveguide calibration components[1]	XXUM70	5.85 to 8.20 GHz	WR137, WG14	CAR70, PAR70, UAR 70, PDR70
	XXUM84	7.05 to 10.00 GHz	WR112, WG15	CBR84, UBR84, PBR84, PDR84
	XXUM100	8.20 to 12.40 GHz	WR90, WG16	CBR100, UBR100, PBR100, PDR100
	XXUM120	10.00 to 15.00 GHz	WR75, WG17	CBR120, UBR120, PBR120, PDR120
	XXUA187	3.95 to 5.85 GHz	WR187, WG12	CPR187F, CPR187G, UG-1352/U, UG-1353/U, UG-1728/U, UG-1729/U, UG-148/U, UG-149A/U
	XXUA137	5.85 to 8.20 GHz	WR137, WG14	CPR137F, CPR137G, UG-1356/U, UG-1357/U, UG-1732/U, UG-1733/U, UG-343B/U, UG-344/U, UG-440B/U, UG-441/U
	XXUA112	7.05 to 10.00 GHz	WR112, WG15	CPR112F, CPR112G, UG-1358/U, UG-1359/U, UG-1734/U, UG-1735/U, UG-52B/U, UG-51/U, UG-137B/U, UG-138/U
	XXUA90	8.20 to 12.40 GHz	WR90, WG16	CPR90F, CPR90G, UG-1360/U, UG-1361/U, UG-1736/U, UG-1737/U, UG-40B/U, UG-39/U, UG-135/U, UG-136B/U
	XXUA62	12.40 to 18.00 GHz	WR62, WG18	UG-541A/U, UG-419/U, UG-1665/U, UG1666/U
	XXUA42	17.00 to 26.50 GHz	WR42, WG20	UG-596A/U, UG-595/U, UG-597/U, UG-598A/U
Precision waveguide-to-coaxial adapters[1]	35UM70N	5.85 to 8.20 GHz	WR137, WG14	CAR70, PAR70, UAR 70, PDR70
	35UM84N	7.05 to 10.00 GHz	WR112, WG15	CBR84, UBR84, PBR84, PDR84
	35UM100N	8.20 to 12.40 GHz	WR90, WG16	CBR100, UBR100, PBR100, PDR100
	35UM120N	10.00 to 15.00 GHz	WR75, WG17	CBR120, UBR120, PBR120, PDR120
	35UA187N	3.95 to 5.85 GHz	WR187, WG12	CPR187F, CPR187G, UG-1352/U, UG-1353/U, UG-1728/U, UG-1729/U, UG-148/U, UG-149A/U
	35UA137N	5.85 to 8.20 GHz	WR137, WG14	CPR137F, CPR137G, UG-1356/U, UG-1357/U, UG-1732/U, UG-1733/U, UG-343B/U, UG-344/U, UG-440B/U, UG-441/U
	35UA112N	7.05 to 10.00 GHz	WR112, WG15	CPR112F, CPR112G, UG-1358/U, UG-1359/U, UG-1734/U, UG-1735/U, UG-52B/U, UG-51/U, UG-137B/U, UG-138/U
	35UA90N	8.20 to 12.40 GHz	WR90, WG16	CPR90F, CPR90G, UG-1360/U, UG-1361/U, UG-1736/U, UG-1737/U, UG-40B/U, UG-39/U, UG-135/U, UG-136B/U
	35UA62N	12.40 to 18.00 GHz	WR62, WG18	UG-541A/U, UG-419/U, UG-1665/U, UG1666/U
	35UA42K	17.00 to 26.50 GHz	WR42, WG20	UG-596A/U, UG-595/U, UG-597/U, UG-598A/U

[1] Call or contact Anritsu sales representative for other frequency waveguide calibration components and waveguide-to-coaxial adapters.
[2] Part number   Ordering information
Prefix (XX)   23 for 1/8 λ offset short
24 for 3/8 λ offset short
26 for Precision waveguide load
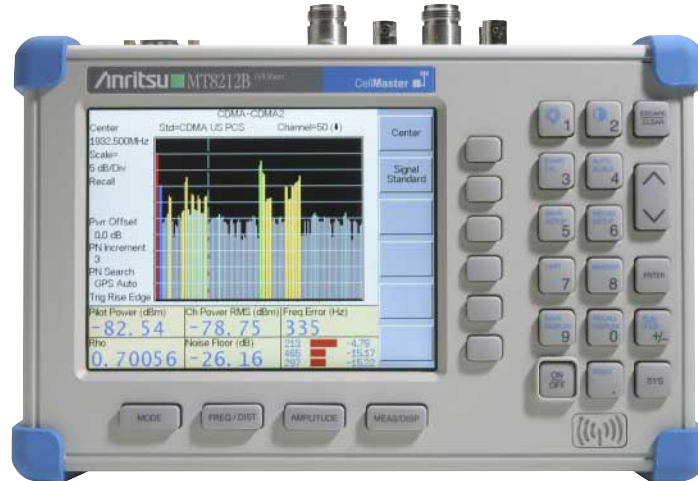35 waveguide to coaxial adapter

CELL MASTER
MT8212B
25 MHz to 4.0 GHz

CE

A Multi-Function Base Station Test Tool for Greater Flexibility and Technician Productivity

NEW

Cell Master MT8212B is a comprehensive, one-box base station test tool for deploying, maintaining and troubleshooting wireless base stations. Combining the functionality of a cable and antenna analyzer (25 MHz to 4.0 GHz), spectrum analyzer (100 kHz to 3.0 GHz), power meter (4.5 MHz to 3.0 GHz), interference analyzer, channel scanner, transmission analyzer for 2-port devices, transmitter analyzer (CDMA and GSM), GPS receiver and T1/E1 analyzer into one lightweight, handheld test set - eliminates the need for field engineer and field technician to carry, manage and learn multiple test sets. MT8212B measurement capability includes precision return loss, VSWR, cable loss, distance-to-fault, signal identification, interference analysis, channel power, adjacent channel power ratio, field strength, occupied bandwidth, burst power, code domain power, noise floor, voltage peak to peak, listen to DS0 or VF channel access. Patented RF interference rejection enables accurate, repeatable measurements in the presence of high RF activity. PC data analysis software enables assessment of system trends, problems, and performance in addition to professional report generation. Built-in GPS to store traces with location information (latitude, longitude and altitude).

The MT8212B includes PC data analysis software, soft carrying case, rechargeable battery, AC/DC power supply, 12V automotive cigarette lighter adapter, RS232 null modem serial cable and user's guide.

Features
- Handheld, battery-operated, under 5 lbs (2.28 kg), including battery
- Rechargeable, snap-in field replaceable battery
- Withstands repeated drops and rough handling
- Built-in worldwide signal standards and frequency channels
- Multilingual user interface: English, French, Chinese, Japanese, Spanish, German

- Intuitive and easy to use with on-screen test set-ups and single key functions
- No external power sensor required for power meter measurements
- Store/Recall 25 setup configurations and up to 200 traces
- Alphanumeric labeling and automatic time/date stamp of saved measurements
- Six markers, limit line, and segmented limit lines
- Trace overlay, trace math
- Superior immunity to RF interference
- 130, 259 and 517 data points for optimal resolution and long range fault locations
- FlexCal™ allows troubleshooting cable and antenna systems without multiple calibrations and calibration setups
- < 500 msec per sweep to identify real time intermittent cable problems
- ± 0.5 dB typical amplitude accuracy power measurements
- −135 dBm typical DANL
- Interference analysis
- T1 and E1 histograms
- Store traces with location information using the built-in GPS
- Demodulate CDMA signals using Over-The-Air measurements while sitting in a vehical

Handheld PC Software Analysis Tools Features
- Transfer traces with a single menu selection
- Stores an unlimited number of data traces for comparison to historical performances
- Cable editor supports downloading and uploading cable list and saving the list as a file
- Distance-to-fault and Smith Chart analysis

HIGH PERFORMANCE NODE B ANALYZER
MT8220A UMTS Master
100 kHz to 7.1 GHz

CE

An Ultra Portable Handheld Field Test Tool for Node B Analysis

NEW

The Anritsu MT8220A UMTS Master is a dedicated WCDMA transmitter analyzer used to verify node B transmitter performance during network installation and maintenance. The MT8220A UMTS Master is light weight, handheld and battery operated and has been specifically designed for field applications. The MT8220A UMTS Master is a low cost, easy to use, and rugged solution that performs like a bench top instrument. The MT8220A UMTS Master adds the functionality of a transmitter analyzer (WCDMA) to the MS2721A Spectrum Master spectrum analyzer. The MT8220A UMTS Master transmitter analyzer frequency range is 824 to 894 MHz, 1710 to 2170 MHz and 2300 MHz to 2700 MHz with three WCDMA options - RF, Demodulator and Over The Air (OTA) measurements. The MT8220A spectrum analyzer frequency range is 100 kHz to 7.1 GHz with the ability to measure very low level signals with incredible accuracy.

Features
Light Weight
Weighing about seven pounds fully loaded, including a Li-Ion battery, the MT8220A UMTS Master is light enough to take anywhere, including up a tower.
Transmissive Color Display
Bright Color Transmissive LCD, full SVGA, 8" viewable in direct sunlight.
Rugged and Reliable
The Anritsu MT8220A UMTS Master is specifically designed for field environments and can easily withstand the day-to-day punishment of field use. The analyzer is almost impervious to the bumps and bangs typically encountered by portable field-based equipment. The battery can be changed in seconds when necessary to help extend measurement time in the field.
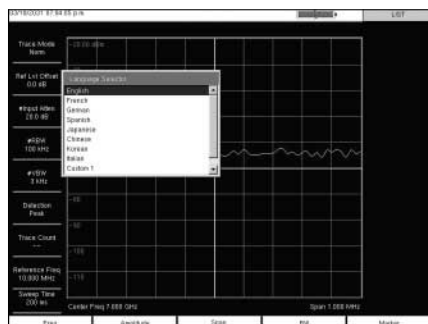

Local Language Support
The MT8220A UMTS Master features eight languages (English, Spanish, German, French, Japanese, Chinese, Italian and Korean), and two custom user-defined languages can be uploaded using Master Software Tools which is supplied with the instrument.
+43 dBm Maximum Safe Input Level
Because the MT8220A can survive an input signal of +43 dBm (20 watts) without damage, you can rest assured that the MT8220A can survive in even the toughest RF environments.
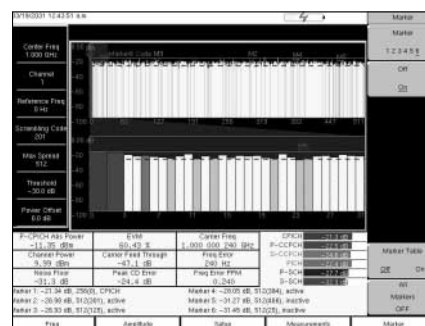

Multiple Markers
The MT8220A UMTS Master in transmitter analyzer mode displays six markers and the marker table. In Spectrum Analyzer mode, six markers can be displayed, each with delta marker, noise marker and frequency counter marker capabilities.

WCDMA Measurements
The MT8220A UMTS Master offers three WCDMA measurement options: RF Measurements, Demodulator and Over The Air (OTA) measurements. Connect the MT8220A to any Node B for accurate RF and demodulator measurements. The UMTS Master can also receive and demodulate a WCDMA signal over the air. Traditionally, technicians and RF engineers had to bring down the sector or site to test the Node B performance. Now technicians can sit in a vehicle and make these measurements.

For the most recent specifications visit: www.anritsu.com

RF Measurements

RF measurements give a general idea of how strong the transmitted signal is, and whether the base station is transmitting at the designated frequency. The UMTS Master RF measurement has four screens - spectrum, ACLR, spectral emission mask and RF summary.
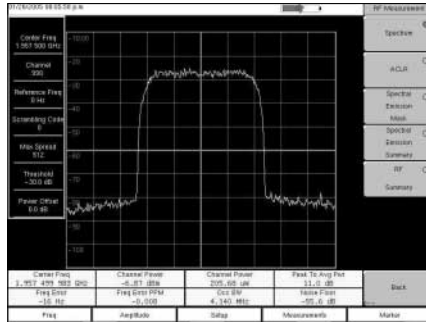
The RF spectrum screen displays the selected channel signal and the following measurements: carrier frequency, channel power in dBm and watts, frequency error in kHz and PPM, occupied bandwidth, peak to average power and noise floor measurements.
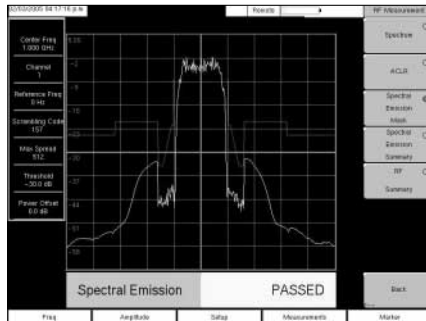
The Spectral Emission Mask displays the selected signal and the mask as defined in the 3GPP specification. The mask varies depending upon the input signal. The UMTS Master also indicates if the signal is within the specified limits by stating PASSED or FAILED. The emission mask is also displayed in the table format with different frequency ranges and whether the signal PASSED/FAILED in that region.
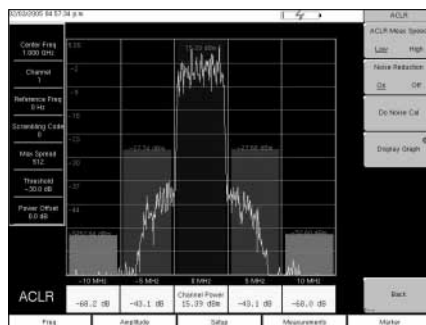

The ACLR screen displays the main channel power and the power of two adjacent channels on each side as a bar graph. The channel spacing is −10 MHz, −5 MHz, +5 MHz and +10 MHz and the channels are color coded.

Demodulator – Direct Connect or Over The Air

The UMTS Master demodulates WCDMA signals and displays detailed measurements to analyze transmitter modulation performance. The WCDMA demodulator has Code Domain Power (CDP), Codogram, and Modulation Summary screens.

The Code Domain Power (CDP) display includes 256 or 512 codes with zoom in on codes, common pilot power (P-CPICH), channel power, EVM, carrier frequency, carrier feed through, frequency error in kHz and PPM, Peak CD error and noise floor. The UMTS Master can zoom to
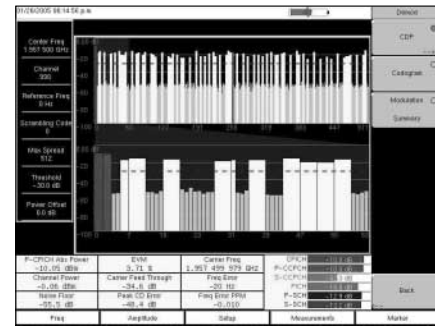
32, 64 or 128 codes and the user can input the zoom code to zoom in on the scrambling codes. The demodulator also displays CPICH, P-CCPCH, S-CCPCH, PICH, P-SCH and S-SCH power in a table format.

Over The Air (OTA)

OTA displays six scrambling codes in a bar graph format. For each scrambling code, CPICH in dBm, Ec/Io in dB, Ec in dBm, and pilot dominance in dB are displayed in table format. The OTA total power is also displayed in dBm.
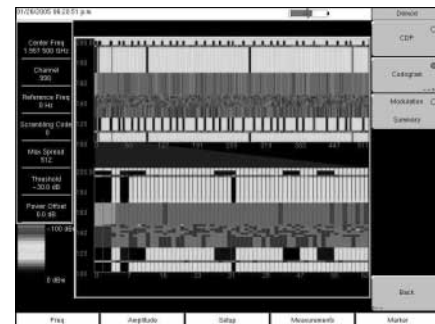
The Codogram displays how code levels are changing over time. The UMTS Master codogram screen displays 256 or 512 codes with zoom codes. The unit can zoom to 32, 64 or 128 codes and the user can input the zoom code to zoom to the scrambling codes of interest. Using this measurement makes it easier to monitor traffic, faults and hand off activity over time.

The Modulation Summary displays the critical transmitter performance measurements in a table format, showing carrier frequency, frequency error, channel power, P-CPICH absolute power, carrier feed through, peak code domain error, EVM, P-CCPCH power, S-CCPCH power, PICH and PSCH absolute power.

Spectrum Analysis – Anywhere, Anytime
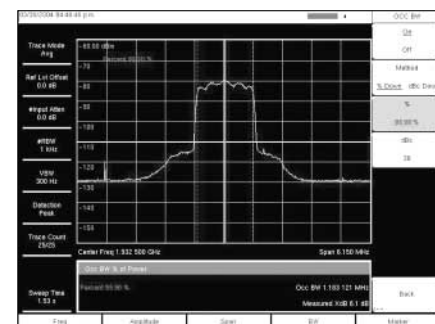
Smart Measurements

The MT8220A UMTS Master has dedicated routines for smart measurements of field strength, channel power, occupied bandwidth, Adjacent Channel Power Ratio (ACPR) and Carrier to Interference Ratio (C/I). The simple interface for these complex measurements significantly reduces test time and increases analyzer usability.

Fast Sweep Speed

The MT8220A in spectrum analyzer mode can do a full span sweep in <900 milliseconds, and sweep speed in zero span can be set from 50 microseconds to 4294 seconds. This is faster and more flexible than any portable spectrum analyzer on the market today, simplifying the capture of intermittent interference signals.

SPECTRUM MASTER
MS2721A
100 kHz to 7.1 GHz

High Performance Handheld Spectrum Analyzer   NEW

The MS2721A is the first handheld spectrum analyzer to deliver the ability to measure very low level signals with a displayed average noise level of ≤ -153 dBm typical @ 1 GHz in a 10 Hz RBW. Coupled with a wide range of resolution bandwidth choices from 10 Hz to 3 MHz and exceptional SSB phase noise better than –100 dBc/Hz at 10 kHz offset, you can configure the Spectrum Master to meet your most challenging measurement needs. As the spectrum becomes more and more congested, the ability to measure low level, closely spaced signals becomes more and more important not only for interference detection but also for wireless system planning. Video bandwidth range is 1 Hz to 3 MHz.

Operating convenience is of paramount important importance when equipment is used in the field. The input attenuation value can be tied to the reference level, reducing the number of parameters a field technician may have to set. The RBW/VBW and the span/RBW ratios can be set to values that are best for the measurements being made, further easing the technician's burden and reducing the chances of errors. Thousands of traces with names up to 15 characters long may be saved in the 64 MB non-volatile compact flash memory. These traces can later be copied into a PC using the built-in USB 2.0 connector or the 10/100 MHz Ethernet connection, or by copying them to an external Compact Flash card. The MS2721A Spectrum Master has a very wide dynamic range (>80 dB), allowing measurement of very small signals in the presence of much larger signals.

Resolution bandwidth and video bandwidth can be independently set to meet a user's measurement needs. In addition the input attenuator value can be set by the user and the preamplifier can be turned on or off as needed. For maximum flexibility, sweep triggering can be set to free run, or to do a single sweep.

Light Weight
Weighing about six pounds, including a Li-Ion battery, this fully functional handheld spectrum analyzer is light enough to take anywhere, including up a tower.

With the supplied Remote Access Software you can control an MS2721A that is miles away, seeing the screen display and operating with an interface that looks exactly like the instrument itself.

The MS2721A features eight languages (English, Spanish, German, French, Japanese, Chinese, Italian and Korean), plus two custom, user defined languages can be uploaded into the instrument using Master Software Tools, supplied with the instrument.

Fast Sweep Speed
The MS2721A can do a full span sweep in ≤900 milliseconds, and sweep speed in zero span can be set from less than 50 microseconds up to over 4000 seconds. This is faster and more flexible than any portable spectrum analyzer on the market today, simplifying the capture of intermittent interference signals.

+43 dBm Maximum Safe Input Level
Because the MS2721A can survive an input signal of +43 dBm – 20 watts – without damage, you can rest assured that the MS2721A can survive in even the toughest RF environments. Maximum continuous input for measurements is 30 dBm.

Spectrum Monitoring
A critical function of any spectrum analyzer is the ability to accurately view a portion of the RF and microwave spectrum. The MS2721A performs this function admirably thanks to the wide frequency range and excellent dynamic range. A built-in 64 MB compact flash memory module allows over 1000 traces to be stored. An external compact flash socket allows additional compact flash memory to expand the trace storage without limit.

Multiple Markers
Display up to six markers on screen, each with delta marker capability. In addition, you may select a marker table that simultaneously shows the status of all markers. In the table you can see the frequency and amplitude measurement value for all markers along with delta frequency and delta amplitude. Each marker can have not only a measurement reference frequency but also a delta frequency and delta amplitude, effectively giving you up to twelve markers if you need them!

Noise Markers
The capability to measure noise level in terms of dBm/Hz or dBµV/Hz is a standard feature of the MS2721A.

Frequency Counter Markers
The MS2721A Spectrum Master has frequency counter markers with resolution to 1 Hz. Tie this capability to an external precision time base to get complementary accuracy and resolution.
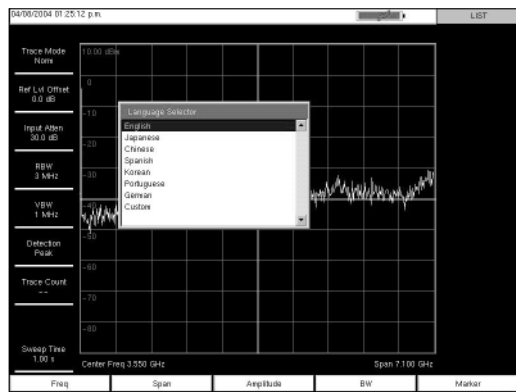
Smart Measurements
The MS2721A has dedicated routines for smart measurements of field strength, channel power, occupied bandwidth, Adjacent Channel Power Ratio (ACPR) and C/I.
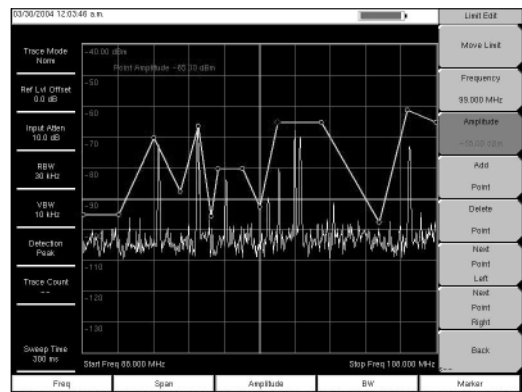
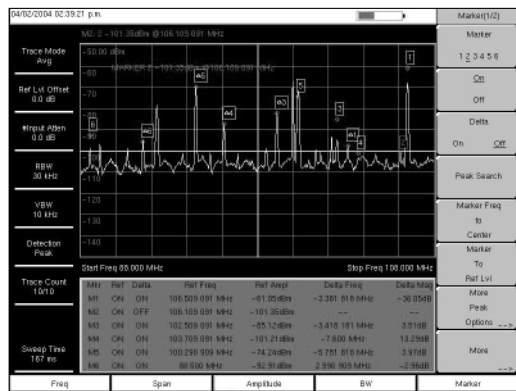**Anritsu**
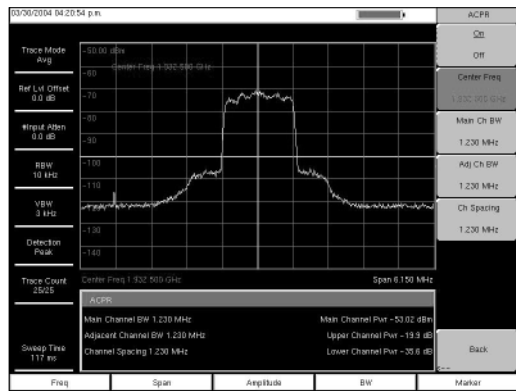
Adjacent Channel Power Ratio
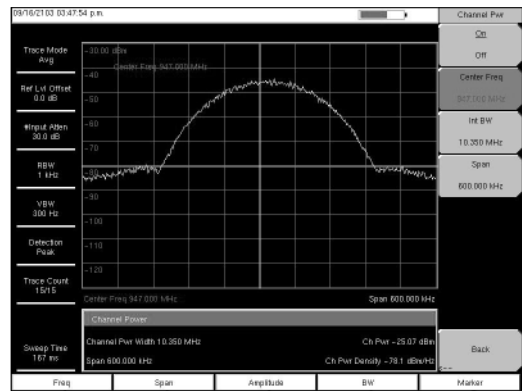
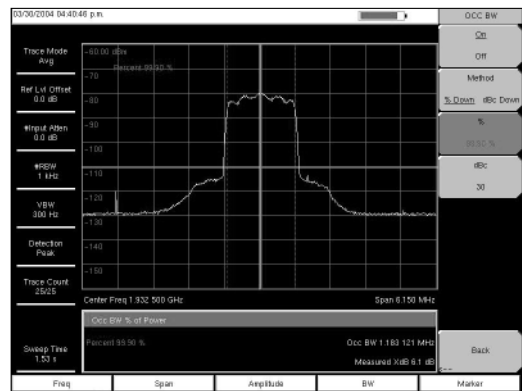**Measurement of Channel Power for a GSM Signal**

Multiple Language Support

Segmented Limit Line

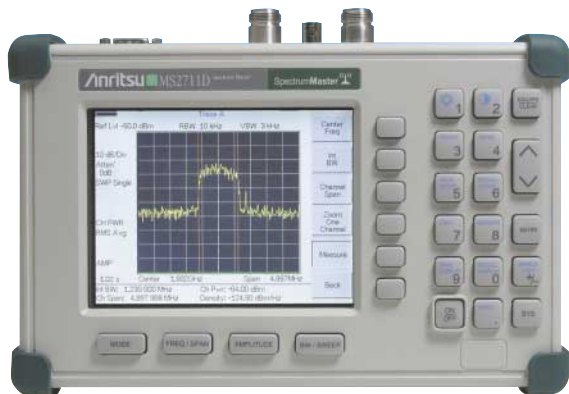**Multiple Markers plus Multiple Delta Markers**

Occupied Bandwidth

SPECTRUM MASTER
MS2711D, MS2711B
100 kHz to 3.0 GHz

Fast, Accurate, Repeatable, Portable Spectrum Analysis

The MS2711B/D Handheld Spectrum Analyzers provide excellent measurement flexibility for field environments and applications requiring mobility. Unlike traditional spectrum analyzers, the MS2711B/D feature a rugged, ultra-lightweight, battery-operated design that enables users to conduct spectrum analysis measurements anywhere, anytime.

Providing complete freedom from AC/DC power requirements, the MS2711B/D enable you to locate, identify, record and solve communication systems problems quickly and easily, without sacrificing measurement accuracy.

Whether you are installing, maintaining, or troubleshooting a modern wireless communication system, the MS2711B/D provide exceptional performance combined with ease-of-use and broad functionality – making them the ideal solution for engineers and technicians who conduct field measurements in the 100 kHz to 3.0 GHz frequency range. In fact, they are ideal for finding the source of interfering signals in modern wireless systems.

Rugged and Reliable
Because the MS2711B/D were designed specifically for field environments, they can easily withstand the day-to-day punishment of field use. Rugged packaging keeps the MS2711B/D performing in harsh environments.

Easy-to-Use
Not only are the MS2711B/D the lightest fully-functional spectrum analyzers available at 4.5 pounds (base model including battery), operation is straight-forward and driven by firmware that simplifies the process of making measurements and interpreting the results shown on the large, high-resolution LCD display. The menu-driven user interface is easy to use and requires little training.

A full range of marker capabilities such as peak, center and delta functions are also provided, giving users a faster and more comprehensive measurement of displayed signals. Limit lines simplify amplitude measurements, giving users the capability to create quick, simple, pass/fail measurements. Frequency, span and amplitude functions are easily configured for optimum performance. Used together with the Save Setup feature, these functions can help to make testing easier and faster for less experienced users.

Powerful Trace Management
Users are able to store ten test setups along with 200 measurement traces internally in the unit's memory. The stored data can be easily downloaded to a personal computer (PC) or a printer via an RS232 serial cable for further analysis. A computer can be used with the RS232 interface for automated control and data collection in the field.

A preamplifier (standard in the MS2711D, Option 8 for the MS2711B) plus a number of available options including an internal tracking generator (option 20, MS2711B) or transmission measurement (option 21, MS2711D) expand the MS2711B/D's capabilities.
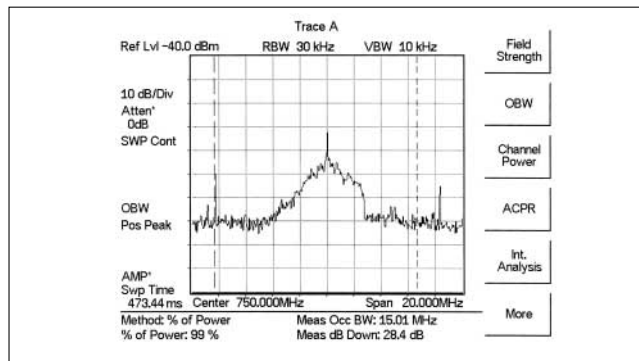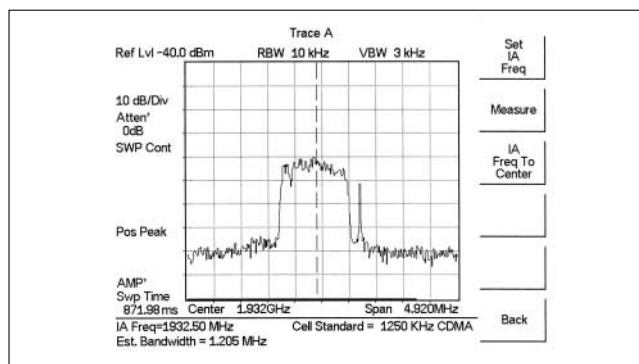
To meet the challenges of today's wireless market, Anritsu Company has incorporated a pre-amp (standard) for its revolutionary MS2711B/D Handheld Spectrum Analyzers which increases the analyzer's sensitivity and dynamic range while improving measurement time. With the built-in pre-amp feature, the MS2711B/D are particularly effective in measuring low-level signals. The handheld spectrum analyzer's sensitivity is improved to –115 dBm for MS2711B and –135 dBm for MS2711D (100 Hz RBW). With this option, the MS2711B/D can identify and make measurements on low-level signals much faster than previously possible.

The improved sensitivity, dynamic range, and measurement speed complement the existing benefits of the MS2711B/D. Weighing only 4.9 pounds (including a NiMH battery, fully loaded, base model only 4.5 pounds), the MS2711B is the world's lightest fully functional handheld spectrum analyzer with the built-in tracking generator option (option 20).

The MS2711B/D have been enhanced so that they can make highly accurate channel power measurements, occupied bandwidth and Adjacent Channel Power Ratio (ACPR) measurements. These are increasingly critical measurements, particularly for power amplifiers used in wireless communication systems. With the enhancements, the MS2711B/D have dedicated one button channel power, occupied bandwidth, and ACPR measurement capability to significantly reduce test time and expense. The MS2711B/D also feature local language graphical user interface support (English, Chinese, Japanese, French, German, and Spanish).

Features

- Lightweight (4.5 lbs - base model, 4.9 lbs with tracking generator - MS2711B option 20, or transmission measurement, MS2711D option 21)
- Synthesizer-based performance
- Wide dynamic range
- One button, ACPR, OBW, channel power, C/I measurement
- Quick zoom-in, zoom-out display
- Five minute warm up
- Manual and automatic attenuator control
- Improved user interface, with local language support in five different languages
- Automatic overload and ESD protection
- Built-in AM/FM demodulation
- Built-in field strength measurement
- Built-in interference analysis in MS2711D
- Ability to store and recall up to six sets of antenna factors
- Full range of marker capabilities including peak, center, and delta functions
- Limit lines for quick, simple pass/fail measurements
- Rugged, reliable packaging
- Battery operated design
  - 2.5 hours of continuous operation
  - Built-in energy conservation that extends battery life beyond an eight-hour workday
  - Operation using a 12.5 Vdc source AC-DC adapter or automotive cigarette lighter adapter, which simultaneously charges the battery
  - Field replaceable battery

- Built in clock and calendar
- Low cost ownership, global warranty
- Data storage and memory
  - Store up to ten test setups and 200 measurement traces in non-volatile memory
  - Stored data is easily and quickly downloaded to a personal computer (PC) or printer
- Powerful trace management
  - Automatically date/time stamped
  - Alphanumeric labeling
- PC reporting software
  - Windows® 95/98/2000/ME, XP, NT Workstation compatible
  - Supports long file names for descriptive labeling
  - Can display an unlimited number of traces for comparison to historical performance
- Monochrome or optional Color LCD display (MS2711D) with backlight capability
- Direct printer control via RS232 serial port

Applications

Convenient operating procedures, high sensitivity, and excellent repeatability enable the MS2711B/D to pinpoint the smallest system performance degradation and allow for easy verification of system compliance. Typical applications include:

- Transmitter Spectrum Analysis – occupied bandwidth, power, modulation measurements, location and identification of in-band, out-of-channel spurious and out-of-band spurious signals
- Receive Signal Analysis – locate and identify sources of interfering signals
- Modulation identification, modulation depth, deviation, and spectral mask
- Signal Strength Mapping – to determine the most suitable location for antennas, base stations, and repeaters; or pinpoint electromagnetic (EM) leakage in broadcast systems

WIDEBAND PEAK POWER METERS
ML2480A Series
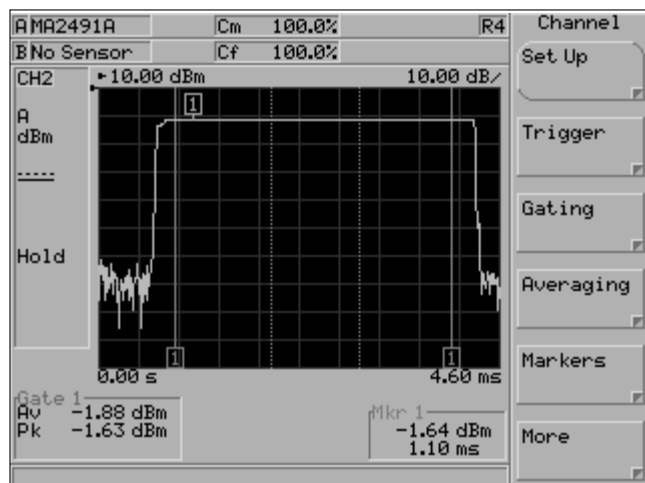**10 MHz to 50 GHz***

CE **GPIB**

For High Speed Modulated and Pulsed Power Measurements

The ML2480A Series Power Meters are especially designed for accurate power measurements on high speed modulated measurements. The power meter combines advances in diode sensor technology with DSP to produce a compact and economical high speed peak power meter. A new color display is used to display the results in graphical or numerical format. The power meter incorporates features normally found in digital oscilloscopes to produce an easy to use high speed peak power meter. A high speed GPIB interface can be used for rapid automation of the power measurement.

The ML2480A series has been designed to use the new MA2491A Wideband Sensor. The ML2480A is fully compatible with the wide range of Anritsu diode, fast thermal and universal sensors. See the section on the ML2430A Series Power Meters for more details on these sensors. Two versions of the product are available; the ML2487A Single Input unit and the ML2488A Dual Input unit.

The new MA2490A/91A wideband sensors have been designed for a variety of applications. With a selectable 5/20 MHz bandwidth, measurements can be made on the rising edges of pulsed systems as well as CDMA waveforms. The new sensors have a dynamic range of –60 dBm to +20 dBm in CW mode and a range of –25 dBm to +20 dBm in pulse modulated mode.

The new power meter combines the very best of high-speed measurement technology and CW stability.
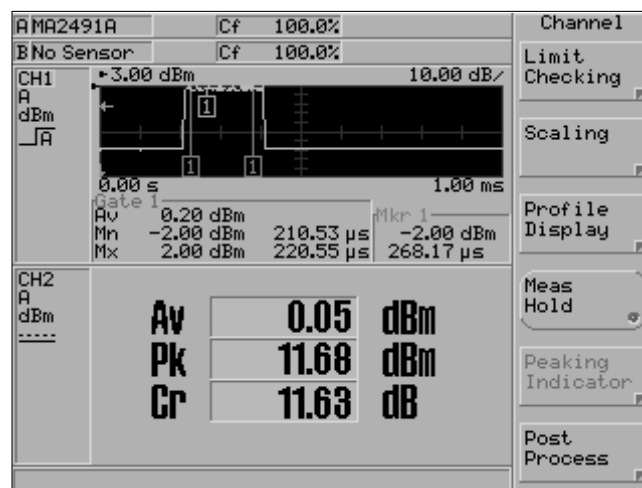
Profile or Readout Displays can be chosen

Features

● **Dual Display Channel**

The ML2480A series supports dual display channels. Each display channel is a measurement set up and can use any selection or combination of the sensor inputs. The instrument can be configured to view one display channel or two. The instrument can be switched between display channels quickly and simply via the CH1/CH2 "hot" key on the front panel. The user can choose to view the measurement results as a graph profile or numerical readout.


Performance

The ML2480A series has a 20 MHz signal amplifier bandwidth and a sampling rate of 64 MS/s. This makes the power meter especially suitable for measuring signals with high modulation rates such as WLAN, 3G or EDGE signals as well as providing fast rise times for examining pulsed signals such as radar.

* Frequency range is sensor dependent.

• Measurement Gates

At the heart of the new power meter's signal processing lies the measurement gate facility. The new power meter supports up to four independently set gates or eight gates repeated in a pattern. The gate allows the user to capture the relevant information from the signal under test. The wide bandwidth and high speed A/D allow the positioning of the gate very accurately within the signal profile. The user can choose between several measurements performed within the gate. Average, peak, crest, max and min are available as selections for the output.

The max and min data are time stamped so that the position of these signals is recorded within the gate and can be used to record the overshoot and undershoot of a pulsed signal.

Exclusion zones within the measurement gate are also available. Termed fences, these can be used to exclude sections of the signal from the measurement gate. Particularly useful for excluding mid-burst training sequences. Each gate has a switchable fence associated with it.

• Markers

Four independent markers are available for denoting points of interest on the signal profile. The active marker can be scrolled directly from the front panel. A delta marker can be set independently from the active marker to read the difference or the average power result. The delta marker can be linked to provide continuous scrolling through the signal.

A set of specialized automatic marker functions has been provided to ease the measurement of pulsed systems. These functions are automatic pulse rise time, pulse fall time, off time and pulse repetition interval.

• Trigger facilities

High speed measurements require precise triggering. The ML2480A series offer the following trigger modes:

Continuous, internal trigger on the rising or falling edge of either input A or input B and external TTL trigger. The external trigger allows the power meter to be synchronized to external equipment. Data collection can be delayed for a pre-determined time after the trigger point. The trigger facility incorporates a settable hold off facility which prevents the trigger from being re-armed and re-triggering on a noisy signal. A pre-trigger facility allows the capture and display of pre-trigger information on the signal.

The single shot trigger facility can be used to capture specific one off events.

• Test Limits

The ML2480A series has two different types of automatic test limits. For many applications a simple power limit can be set up to test the upper and /or lower boundaries of the signal. For pulsed systems such as RADAR, TDMA phone systems or WLAN, a time varying limit line can be set up to test all aspects of the pulse profile. The power meter can be set up to indicate pass or fail and to hold the measurement display on failure which is important when trying to track down intermittent faults. An internal limit editor enables the user to create and select their own limit profiles.

• Presets

The ML2480A series offers a number of radio system presets. Each preset configures the power meter settings to measure a radio system. GSM, GPRS, WCDMA, WLAN and Bluetooth are some of the examples of radio systems supported by this facility.

• Settings stores

The ML2480A series power meter has 20 settings stores. These provide a convenient way of having application specific measurement set ups for easy recall by the user.

• Remote Interfaces

The ML2480A series supports GPIB and RS232 as standard.

• Secure mode

The ML2480A series has a secure mode for operations in security sensitive areas. Once activated the secure mode deletes all information stored in the non-volatile RAM on power up.

Applications

• Radar

The high bandwidth and sample rate of the ML2480A series provide accurate peak measurements on a variety of RADAR, radio navigation and radio location systems.

The ML2480A series has a number of features tailored for peak power measurement on pulsed systems. The power meter can be easily set up to trigger on a pulse or sequence of pulses. Up to four independent gates can be set to measure the average, max and min powers on a sequence of pulses. The data for the max and min includes the timestamp and gives the user an automatic display of the position and value of the maximum overshoot and minimum undershoot in each pulse.

A set of automatic marker functions gives pulse rise time, fall time, off time and Pulse Repetition Interval. The Delta marker can be set up to measure the droop of the pulse top.

A single shot trigger is available to capture one-off pulse events.

The offset table function corrects the power meter reading to read the true output power when the power meter is being used with a coupler or high power attenuator in the radar test system.

• WLAN

The ML2480A series is the ideal power meter for all variants of the 802.11 WLAN specification. The 20 MHz bandwidth allows users for the first time to get an accurate peak power reading without having to resort to manual correction of the peak reading due to bandwidth limitations. The wide bandwidth of the signal channel allows for the accurate placement of the gate to measure precise selections of the signal such as the OFDM training sequence at the start of the 802.11g signal.

• GSM/EDGE/GPRS

The graphical display and the measurement gates make the measurement of GSM and PCS systems straightforward.

The ML2480A series power meter is set up to trigger on the GSM pulse. The active gate is set up to measure the power within the 10% to 90% section of the burst profile. An automatic limit can be used to give pass or fail indication. The display shows the results from the active gate, indicating the average power within the burst.

GPRS and GSM test modes can be tested easily with the use of the multiple gates. A GSM gate pattern can be repeated up to eight times to allow the power meter to capture and read back the power from each of the slots, giving up to eight simultaneous measurements. EDGE measurements are quick and simple to make. The high sample rate leads to improved settling time and the use of the trigger hold off facility prevents re-triggering on the symbol transitions. PHS and IS-136 systems can also be measured effectively and quickly in this way.

• 3G-CDMA

The ML2480A series has been designed to measure the peak power of all the major CDMA systems in the world including those that use Time Division Duplexing such as TD-SCDMA. The display can be configured to measure Average, Peak and Crest Factor. The measurement period can be set for accurate results. TDD systems can be displayed as a graph profile and the measurement gates can be set to measure and display the peak and crest factor during the transmission. CCDF, CDF and PDF statistical functions are supported on the CDMA measurements and enable the designers of power amplifiers to correctly estimate the margins on the peak power handling capabilities of the amplifiers.

• Amplifier and Return Loss Measurements

Use the dual input ML2488A to measure the gain or the return loss of an amplifier under its correct operating conditions. Power amplifiers designed for peak applications, whether pulsed or CDMA , cannot operate at full peak power with CW test inputs. The gain and output power can only be measured accurately using a peak power meter under representative conditions. The return loss of amplifiers and other devices can only be evaluated under high power pulsed conditions with a peak power meter connected to a high directivity coupler.

• MA2490A and MA2491A Wideband Sensors

The MA2490 series sensors are wideband sensors suitable for pulse and CDMA applications. They have a selectable 5/20 MHz bandwidth. The MA2490A covers the range 50 MHz to 8 GHz and the MA2491A extends the range to 18 GHz. Rise time on this sensor is 18 ns. The sensor incorporates a 'chopper' which extends the RMS measurement range to –60 dBm. Upper limit is +20 dBm.

• MA2411A Pulse Sensor

The MA2411A Pulse sensor is specifically designed for fast measurements on pulsed systems. The bandwidth of this sensor is 50 MHz and has a rise time of 8 ns. This sensor covers the frequency range 300 MHz to 40 GHz. Requires 1 GHz Calibrator option ML2400A/15.

OPTICAL TIME DOMAIN REFLECTOMETER
MW9076 Series
1.31/1.45/1.55/1.625 µm (SM), 0.85/1.3 µm (GI)

CE

Simple Measurement of Chromatic Dispersion


Features
- 45 dB high dynamic range
- 8m short dead zone
- Simple measurement of chromatic dispersion from one end of optical fiber
- Measurement in 10s (Full-Auto mode), 0.15s real-time sweep
- 5 cm high resolution, 50,000 sampling points
- 8.4 inch TFT-LCD color display

Model	MW9076B1	MW9076B	MW9076C	MW9076D1	MW9076J	MW9076K
Optical fiber	SM	SM	SM	SM	GI	GI
Wavelength	1.31/1.55 µm ± 25 nm	1.31/1.55 µm ± 25 nm	1.31/1.55/ 1.625 µm ± 25 nm	1.31/1.45/1.55/ 1.625 µm ± 3 nm	0.85 µm ± 30 nm	0.85/1.3 µm ± 30 nm
Dynamic range	40.5/38.5 dB (typical value)	45/43 dB (typical value)	41.5/39.5/37 dB	34.5/33.5/32.5/30.0 dB	21 dB	21/25 dB
Dead zone (Fresnel/back-scattered)	1.6/8 m	1.6/8 m	1.6/8 m	3/25 m	2/7 m	2/7 m
Chromatic dispersion				√		
Light source function		√	√			
Options — Visible LD	√	√	√	√	√	√
Options — Optical power meter	√	√	√			
Options — High power optical power meter	√	√	√			
Options — Optical channel selector	√	√	√			
Features	• High cost performance • Short dead zone • Low cost	• Highest class model • Wide dynamic range • Short dead zone	• Three wavelengths • L-band measurement	• Chromatic dispersion measurement • Four wavelengths • Wavelength accuracy: ±3 nm	• For GI fiber • Short dead zone	• For GI fiber • Dual wavelengths • Short dead zone

For the most recent specifications visit: www.anritsu.com

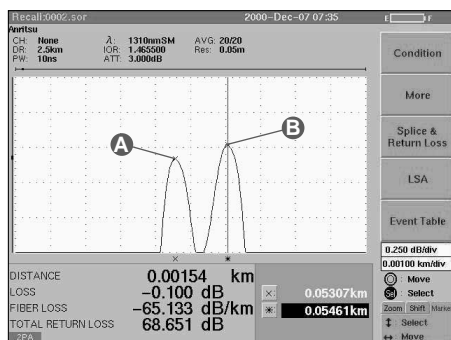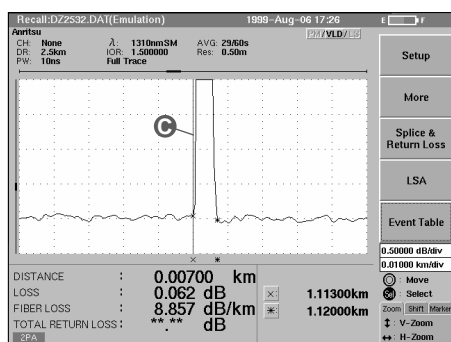## Performance and functions

• High dynamic range
When using a wavelength of 1.55 μm, a point about 190 km distant can be measured.
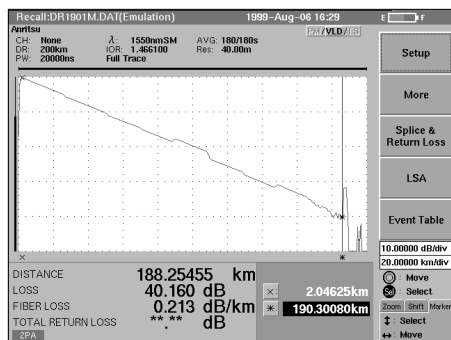
• Short dead zone
Clearly measure up to near end by 8m dead zone (back-scatter, SM unit).

• Chromatic dispersion measurement
The MW9076D1 has a built-in function for measuring chromatic dispersion, even outdoors. The chromatic dispersion can be measured automatically over a wide range from 1300 to 1660 nm from one end of the fiber. The dispersion reproducibility is ±0.05 ps/(nm · km)[*] and the dynamic range is 30 dB. The MW9076D1 can be operated from an external PC using remote commands to measure the chromatic dispersion. For details of the chromatic dispersion measurement, refer to the document "Product Introduction MW9076 Series Optical Time Domain Reflectometer."

[*] Measured with 25 km of 1.3 μm zero-dispersion fiber (ITU-T G.652) at 1550 nm.

• Fresnel reflection
The far-end Fresnel reflection can be measured for four wavelengths (1310/1450/1550/1625 nm).

• Group delay characteristics
The fitting formula supports cubic or quintic Sellmeier, and polynomials can be applied to various types of fibers.

• Chromatic dispersion characteristics
The zero and total dispersion can be displayed along with the delay, dispersion and dispersion slope at 0.1 nm steps.
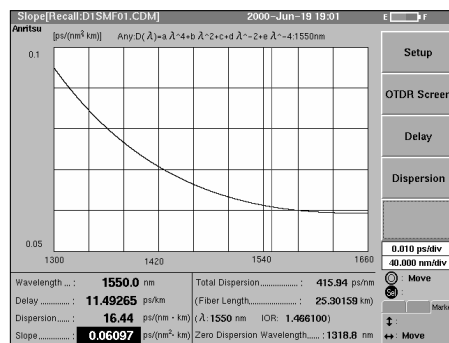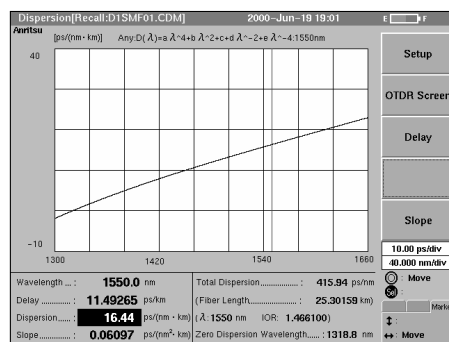
• High-speed measurement
It takes only 10 seconds to measure and display the waveform and connection loss on one screen. Just one press of the Start key is all that is needed to make the measurement.

• Full automatic mode
Measurement results are displayed by simply pressing the Start key. All complicated settings of distance range, pulse width, attenuator, and maker can be automatically executed. Measurement speed in this mode was significantly increased. When the wavelengths are set to ALL, wavelengths are automatically changed.

• Repeated measurement
A series of operations, such as measurement, wavelength switching, data saving, optical channel switching, and next optical fiber measurement, can be executed automatically under preset measurement conditions. This mode is ideal for measuring a multi-core optical fiber.

• Waveform comparison function
Measured and saved data can be compared on the same screen. In addition, differences can be displayed as a waveform for simple observation of distance and level differences. This is useful for checking aging changes or comparing several fibers.
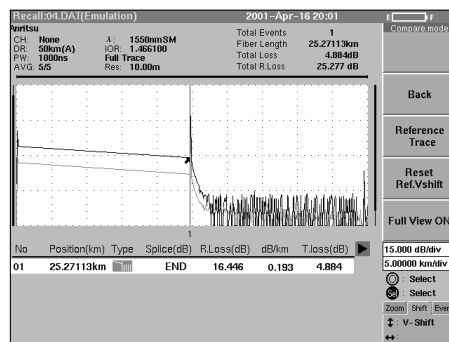
• Warning level setup function

In automatic measurement mode, an event warning value can be set in addition to a detection threshold value. For example, the threshold value can be set to the acceptance level, and the warning value to a pass/rejection decision level. In this case, all events will be detected, and those exceeding the warning value are displayed in another color, therefore, enabling the operator to easily identify possible "border-line" events.
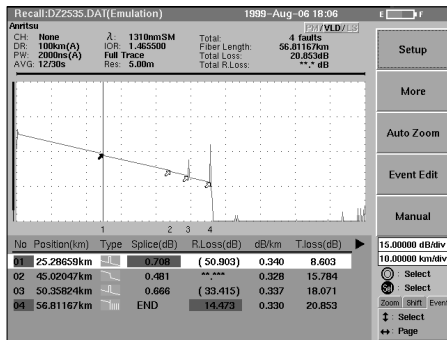
• Communication light check function

When measuring a fiber in service, there is a possibility of mis-measurement by an OTDR. To guard against the risk of mis-measurement, this function checks for the presence of light other than the OTDR optical measurement pulse.

• Optical channel selector control function

In addition to using the built-in optical channel selector, an external MN9662A/9664A Optical Channel Selector can be controlled via the RS232C interface from an OTDR. By using these selectors, an optical fiber cable consisting of up to 32 cores can be measured automatically.

• Visible LD

A 635 nm visible LD option is available for the detection of breaks and loss points along the fiber to be measured.

• Light source, power meter

Optical fiber loss can be measured using the optical power meter function and light source function. Two types of optical power meters are supported: measurement range of –70 to +3 dBm (MW9076B/B1/C-02 option), measurement range of –50 to +23 dBm (MW9076B/B1/C-03 option).
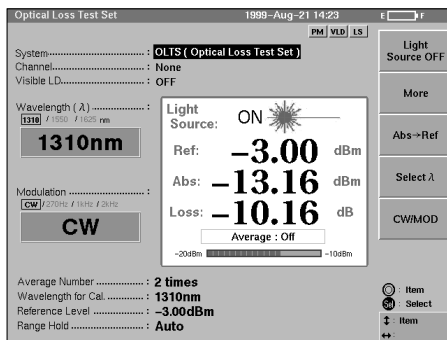
* Light source function is mounted on the MW9076B/C as standard. The power meter function is optional for the MW9076B/B1/C.

• VGA output terminal

The VGA connector outputs the screen interface to a CRT monitor, which is very useful for production-line applications.

• Large internal memory

About 18 MB internal memory is provided as standard. The following table shows the number of waveforms which can be saved in each media.

Media	GR196	Analysis
FDD (1.4 MB)	123	67
PC-ATA card (256 MB)	16000	10600
Hard disk (1 GB)*	32700	32700

Number of data points: 5,000

* The hard disk is for the PC card slot (IBM Microdrive DSCM-11000 + PC card adapter)

MX907600A OTDR Emulation Software

• Emulation function

Measured waveform data can be analyzed using a PC.

• Data transmission function

Data files recorded by the MW9076 series can be transferred to a PC via the RS232C port.

• Both-end measurement function

A new waveform can be composed by averaging data measured at both ends of an optical fiber.

ACCESS MASTER™
MT9080 Series
1.31/1.55/1.65 µm (SM)

$C \in$

All-New Field Measuring Instrument Integrating Functions Required for FTTx Optical Fiber Installation and Maintenance in One Unit

NEW

- SM 1310 nm/1550 nm/1650 nm OTDR for optical fiber installation and maintenance
- Functions and performance supporting FTTx (FTTB, FTTC, FTTH, PON)
- Short dead zone of 1m (event)
- Light source and optical power meter function provided as standard
- Effective performance and functions for installation and maintenance of optical fibers

User-friendly operation and all-in-one

- **Simple operation from the top menu**

The top menu shown below appears when the MT9080 Series AC-CESS Master is activated. You can return to this screen any time by pressing the top menu button (panel key) even if the measurement window is displayed in the selection area. Necessary test items for the user can therefore be executed smoothly.
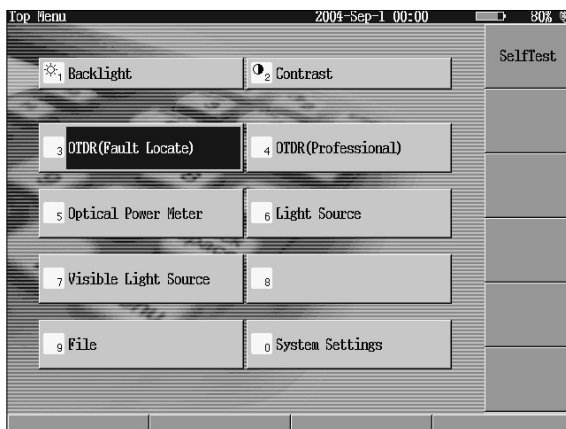
- **Easily identifies failure location with enhanced maintenance function**

If a failure occurs, the failure location should be identified immediately and recovery should be made as soon as possible. The MT9080 Series ACCESS Master offers a fault failure locate mode for identifying the failure location easily.

A pulse test is automatically started by pressing the measurement button, and the failure location is displayed enlarged on the screen.
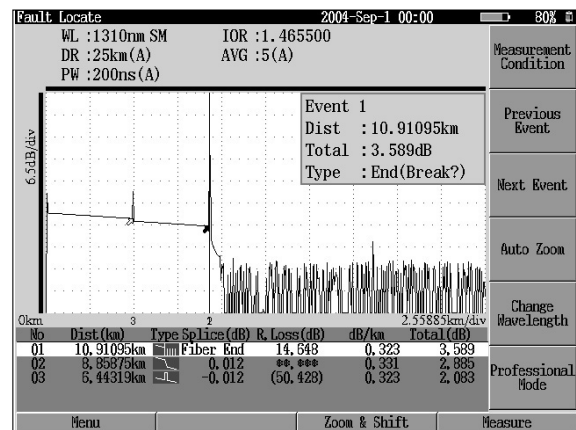
• **Provides light source and optical power meter functions as standard, as well as optionally available visible light source**

The concept of the MT9080 Series ACCESS Master is to support the functions required for optical fiber installation and maintenance as standard. The MT9080 Series ACCESS Master comes equipped with a light source for fiber identification and an optical power meter function as standard. Together with the optional visible light source, optical fiber installation and maintenance are supported with only one MT9080 Series unit.

Short dead zone

• **Short dead zone of 1m (event)**
  Effective for FTTx

The MT9080 Series ACCESS Master has achieved an event dead zone of 1m and a high sampling resolution of 5 cm, so the connection status in a building and the failure location, which were hard to analyze, can be analyzed and identified.

This OTDR is small but has a high performance.
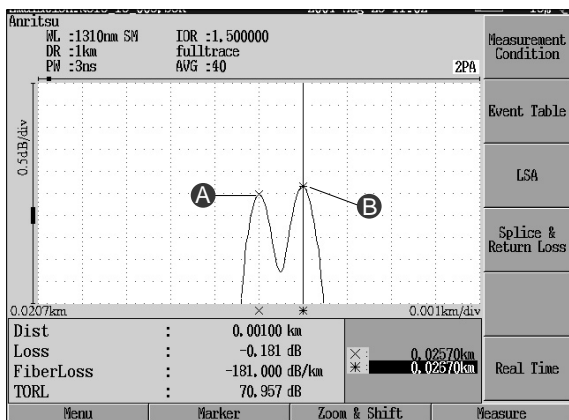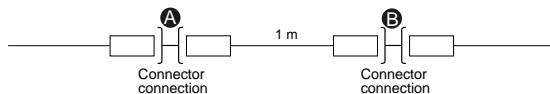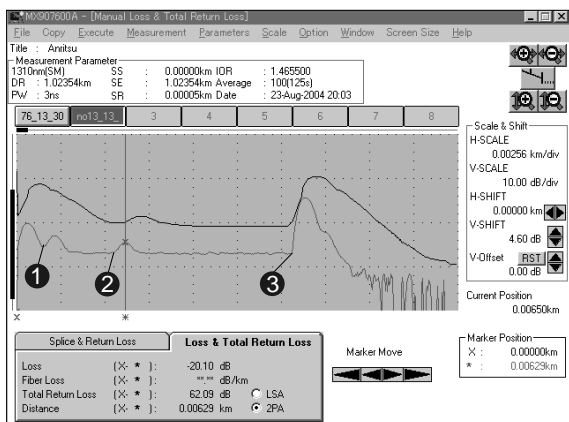
Compact, lightweight, and convenient functions

• **Compactness, lightweight (2.2 kg), and non-HDD**

One of the requirements for field measuring instruments is that they can be carried into any field location such as the top of a telephone pole or in a manhole; in other words, they must be able to be used in any measurement location. The MT9080 Series ACCESS Master is smaller and lighter than the traditional MW9076 Series. The user can concentrate on measurements without worrying about the location. Further, the MT9080 Series ACCESS Master is a non-hard-disk measuring instrument, so the system is not started from the hard disk. Stable operation is thus ensured regardless of shock and vibration. Since this compact unit can be brought into any field location, the MT9080 Series ACCESS Master can accommodate sudden problems and support installation and maintenance of optical fibers to the customer's satisfaction. The MT9080 Series ACCESS Master is handy and convenient in the field.

• **Dynamic range supporting FTTx**

The MT9080 Series ACCESS Master realizes a dynamic range performance for installation and maintenance of optical fibers up to approximately 50 km.

• **High-speed start-up of 15 seconds or less**

The MT9080 Series ACCESS Master displays the top menu within 15 seconds of power on, making it ready to go to work without a wait.

• **Telcordia format (SR-4731) supported**

The Telcordia format (SR-4731), the common format for OTDRs, is supported.

• **More than 1,000 waveforms can be recorded in the internal memory; more than 30,000 waveforms can be recorded with additional USB memory[1]**

The MT9080 Series ACCESS Master can record files of more than 1,000 waveforms in the internal memory. If a USB memory module is inserted into the USB port, files of more than 30,000 waveforms[1] can be recorded.

[1] When a 512 MB USB memory module is used.

• **Communication light check**

If the fiber being tested contains communication light, the OTDR cannot perform measurements successfully. Also, the pulse light from the OTDR may damage the receiver of a system such as WDM or PON that performs transmission and reception through one fiber.

The MT9080 Series ACCESS Master executes a communication light check before emitting a pulse, and displays the check result on the screen. This function is provided to ensure normal measurement and protect the communication system.

• **Waveform comparison function**

Measurement data is compared with the saved data by reading it. If measurement data is compared with the data provided when the optical fiber was installed, this function can be used to check aging and identify the failure location in the event of a failure.

• **Warning level setting function**

Events of loss and reflection at or above the set level are highlighted in the event table. At a glance, whether the line is acceptable can be identified when connection loss at each point is evaluated in installation or maintenance of the optical fiber.

• **Emulation software MX907600A**

This PC software is used to analyze and edit the recorded data on a Windows-based PC. A report can also be created.

OPTICAL HANDY POWER METER
ML9002A
0.38 to 1.8 µm

$C\epsilon$

For Easy Optical Power Measurement

The ML9002A is a compact handy power meter with a measurement level as wide as other more expensive instruments. Optical sensors are available for different wavelengths, measurement levels, and optical input types. Each can be calibrated for three common wavelengths so absolute optical power can be read directly. Each optical sensor can either be incorporated directly in the main frame or connected using a connecting cord. The ML9002A can be used to check optical disks, optical printers and optical communications systems and can back-up on-side operations as a powerful multifunctional measuring instrument for maintenance.

Features

• Accurate optical power measurement
The power of a narrow beam can be accurately measured even when an adapter is changed because an anti-reflection optical sensor is used.

• Long-distance measurement with wide measurement level range
An unprecedented wide measurement level has been achieved in this handy optical power meter. Optical power of –70 to +3 dBm (MA9621A Optical Power Sensor) in the 1.3 µm band and –70 to +10 dBm (MA9423A Optical Power Sensor) in the 0.85 µm band can be measured.

• Direct absolute power readings for three wavelengths
Each optical sensor is calibrated at three wavelengths (0.633/0.78/0.85 µm or 0.66/0.78/0.85 µm for short wavelengths, and 0.85/1.3/1.55 µm for long wavelengths). The absolute power is indicated automatically just by switching to the measured wavelength.

• Flexible measurements
Two types of connections, a plug-in system (sensor incorporated into main frame) or a cord system (sensor connected using connecting cord), are possible so that measurement capabilities are flexible.

• Compatible with various connectors
The ML9002A can be quickly connected to FC, ST, DIN, HMS-10/A, and SC connectors just by replacing the connector adapter.
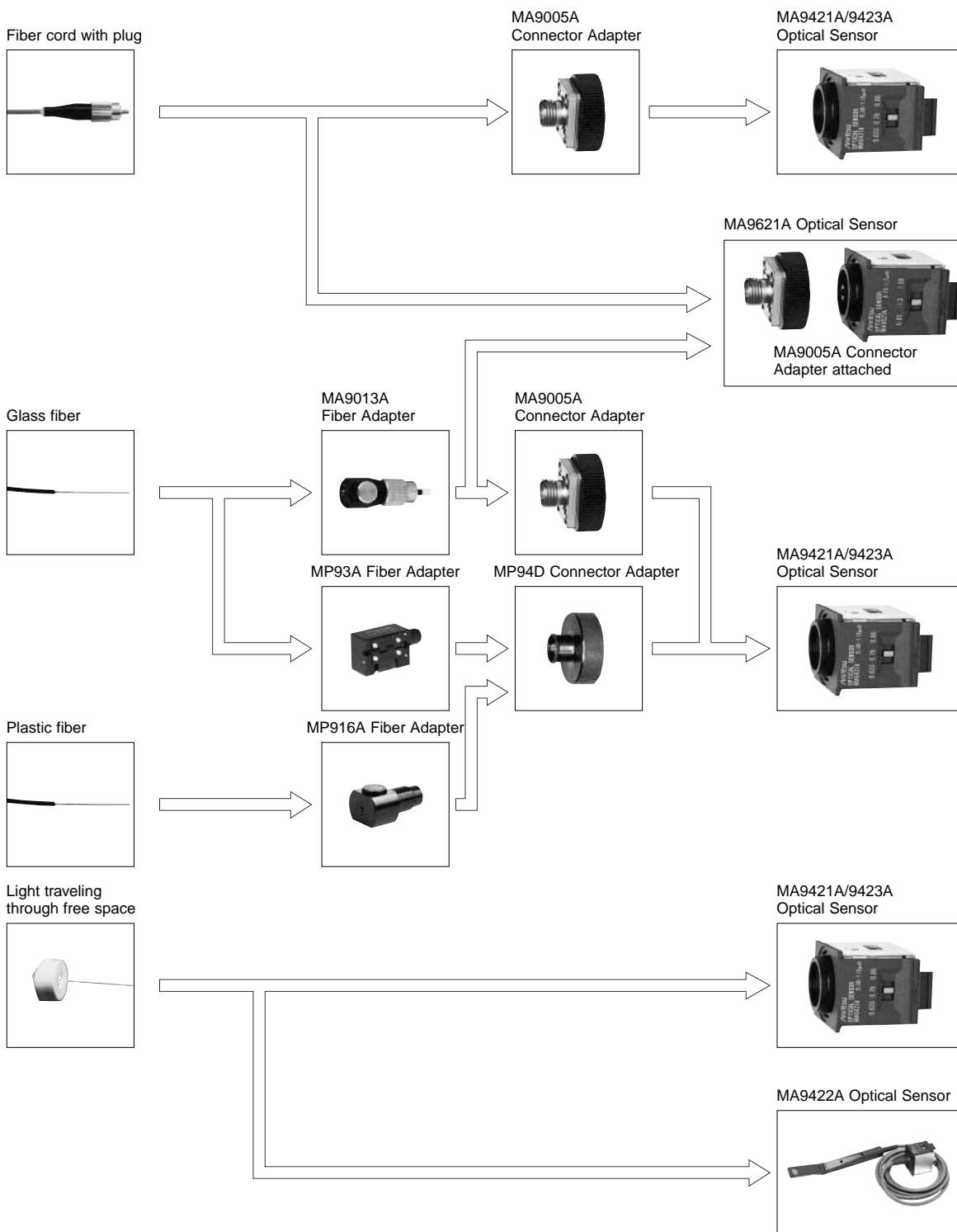
Optical Sensors
MA9421A, MA9423A, MA9621A

Sensor connecting
cord S

MA9006A
Sensor Adapter

MA9422A
Optical
Sensor

Fiber cord with plug

MA9005A
Connector Adapter

MA9421A/9423A
Optical Sensor

MA9621A Optical Sensor

MA9005A Connector
Adapter attached

Glass fiber

MA9013A
Fiber Adapter

MA9005A
Connector Adapter

MP93A Fiber Adapter

MP94D Connector Adapter

MA9421A/9423A
Optical Sensor

Plastic fiber

MP916A Fiber Adapter

Light traveling
through free space

MA9421A/9423A
Optical Sensor

MA9422A Optical Sensor

31   *For the most recent specifications visit: www.anritsu.com*

OPTICAL LOSS TEST SET
MS9020D

$C \in$

For Measuring Optical Loss and Checking Optical Parts

The MS9020D is a handy optical measuring instrument that incorporates an LD or an LED light source and an optical power meter. It can also be used for return loss measurement. Every unit of the LD light source, LED source, the sensors and the return loss measurement unit is a plug-in type, for easy exchange and highest suitability for field use.

The MS9020D covers 0.66 µm, 0.85 µm, 1.3 µm, and 1.55 µm bands for optical loss measurement. In addition to the CW mode, it provides a modulated light mode with 270 Hz, 1 kHz, and 2 kHz modulation signals. Therefore, it is possible to measure optical loss over a wide dynamic range without stray light effects. This is the most suitable for single mode fiber measurement. For return loss, 1.3 µm band single mode fibers can be measured in the 0 to 40 dB range. As a power meter, every sensor has a wavelength calibration function of 5 nm steps at 3 wavelengths, so absolute values can be read directly.

Features
- Measures optical loss up to 67 dB
- Measures CW and modulated light
- Provides calibration function of 5 nm steps at 3 wavelengths
- Also measures optical return loss (0 to 40 dB)
- Operates in 3 modes; AC, rechargeable battery, and dry cells
- Various connectors

Applications
• Optical fiber loss measurement
When measuring optical fibers, it is convenient to provide one MS9020D at both the near and far ends. By using switchable light source units (MS0909A), one-touch measurement of 0.85/1.3 µm and 1.3/1.55 µm can be done.

More accurate loss measurement is possible by using the modulated light function. When an LD light source is used, it is possible to measure optical loss up to 67 dB.

• Optical parts performance check
A light source and optical power meter are provided, and an optical parts performance check is possible at low cost.

• Optical return loss measurement
Return loss of connectors or optical devices can be measured easily using return loss measuring units.

Optical Sensor
(MA9421A/9423A/9621A/
9622A)

LED Source
(MS0901A/0902A/0906A)

LD Source
(MS0902D/0903D)
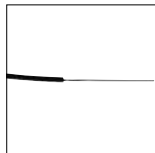
Optical sensor
(MA9422A)
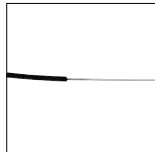
LD Source
(MS0908A/0909A)

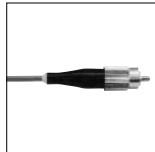(Photograph
includes a sensor)

MS9020D

Fiber cord with plug

MA9004A Connector Adapter attached
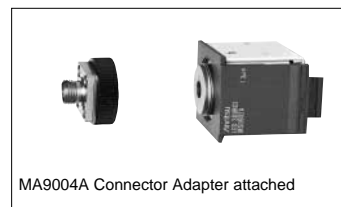
LED Source
(MS0901A/0902A/0906A)

Bare fiber

MA9014A
Bare Fiber Connector

Pigtail fiber

Bare fiber

MA9013A Fiber Adapter

LD Source
(MS0902D/0903D)

FC/SC type (integrated with connector)

Fiber cord with plug

Optical Sensor
(MA9421A/9423A/9621A)

MA9005A Connector Adapter

Fiber cord with plug

Bare fiber

MA9014A
Bare Fiber Connector

Pigtail fiber

LD Source (MS0908A/0909A)

(Replaceable connector)

(Photograph includes a sensor)

Fiber cord with plug

MA9622A Optical Sensor

(Replaceable connector)
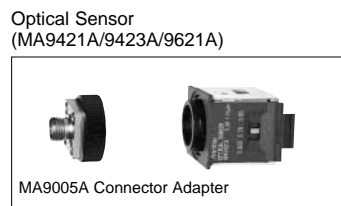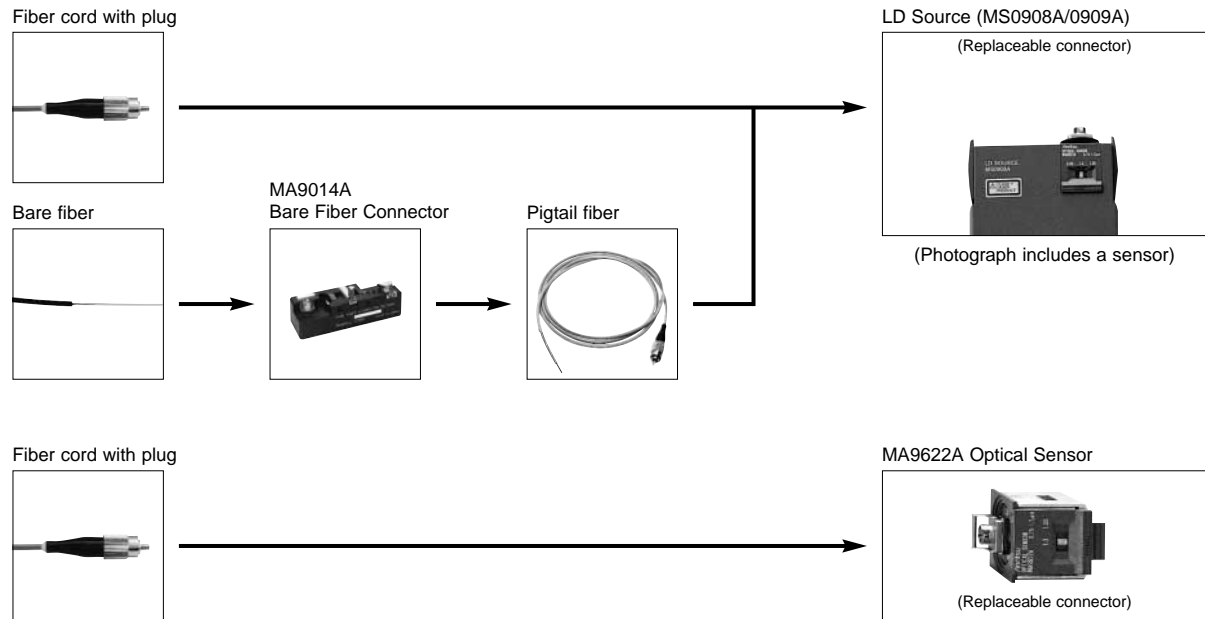
NETWORK DATA ANALYZER
MD6430A
50 bit/s to 10 Mbit/s

CE **GPIB** OPTION

One Instrument for Installation and Maintenance

The MD6430A Network Data Analyzer can measure errors on 13 different interfaces for leased lines (64 kbit/s to 6.3 Mbit/s), ISDN (BRI, PRI), and V/X series interfaces, making it suitable for installation and maintenance of a variety of networks.

Measurements include bit errors, alarms, delay time, frequency, digital level measurements, user pattern send/trace, etc., all of which can be displayed on the large color LCD.

Error performance (ITU-T G.821, G.826, M.2100) is available with various pseudorandom patterns and user patterns up to 1024 characters. Frame Relay measurement function, ISDN signaling function (optional), and a simultaneous two-channel monitoring function are also provided. Single button "quick" function and touch-screen ensure easy operation. This unit offers the user sophisticated functions required for installation and maintenance in a small compact unit.

Features
- One unit supports installation and maintenance of leased lines, ISDN, and frame relay
- Single button quick test operation
- Lightweight, with a battery-operated function

Applications
- **Many applications ranging from low-speed modems to high-speed digital lines**
The MD6430A can evaluate the quality of lines ranging from low-speed modems to high-speed digital lines spanning 50 bit/s to 10 Mbit/s.
- **Support for various interfaces**
The MD6430A supports G.703 64k, I.430/I-430a 192k, G.703/G.704/I.431 1.5M, 2M, 2M CMI, 6.3M, V.24/V.28, V.35, V.36, RS-449, X.20, X.21, TTL/CMOS interfaces in a number of optional units designed to meet customer needs.

Units	Interfaces	Uses
MU643000A	G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 1.5M, G.703/G.704/I.431 2.0M, 2M CMI, G.703/G.704 6M	Europe and Japan
MU643000B	G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 1.5M, 2M CMI, G.703/G.704 6M	Japan
MU643000C	G.703 64k, I.430/I430-a 192k, G.703/G.704/I.431 2.0M	Europe

Note: All interface units support V.24/V.28, V.35, V.36, RS-449, X.20, X.21, and TTL/CMOS.

- **Wide variety of measurement functions**
Various measurements, such as error, alarm, clock slip, delay, frequency, and digital level can be performed. Also, the unit can send user patterns with tracing functions.
- **Frame relay measurements**
Frame relay network connections (conforming to PVC and ITU-T Q.933 Annex A) can be tested by the MD6430A. The user can also monitor the congestion status such as FECN, BECN, and CLLM.
- **Optional ISDN signaling functions (BRI, PRI)**
The unit can be connected to ISDN networks so that both voice communication and error measurement can be performed.
- **Error data analysis and storage functions**
Error data can be collected in log or histogram format. This data can also be stored in internal memory or on a floppy disk for later analysis.
- **Touch-screen**
The touch-screen, large color LCD, and pop-up menus provide a much better GUI operating environment.
- **Battery operation**
When a commercial power supply is not available, the optional battery pack provides operation for up to three hours, and five hours in power save operation.
- **Full range of error measurement screens**
Various measurement items can be displayed simultaneously for error count, error rate, block error count, clock slip count, character error count, error performance (G.821, G.826, M.2100), HDLC error (bad frame, abort frame), and various types of alarms. The user can select the desired items and can display them using the zoom function.

For the most recent specifications visit: www.anritsu.com
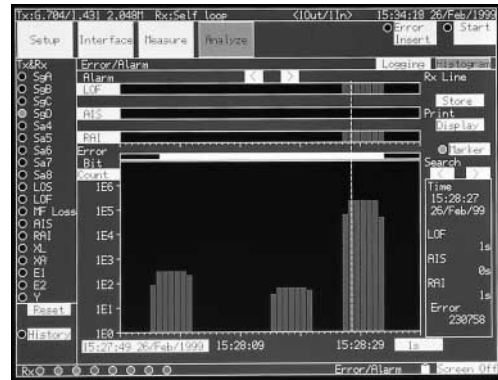
● **Supports frame relay measurements**

Specific DLCI connections can be checked. PVC status checking procedures are supported.

Frame relay measurement sequence
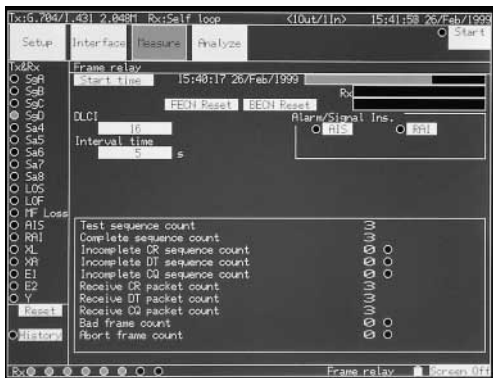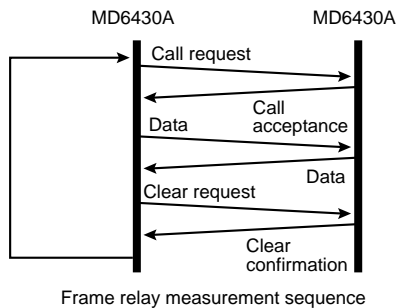
● **Supports ISDN networks (BRI, PRI)**

The unit can be connected to the ISDN public telephone network. Return testing using one unit can be done by using the call loop function.

● **Voice channel function**

The CODEC function permits voice communications over a specified channel. Simultaneous voice communications and measurements are possible.

● **Substantial analysis functions**

Error status and alarm condition can be logged and displayed as histograms. The received data can also be captured.

● **Easy operation**

The touch-screen and pop-up menus are quick and user-friendly, making operation easy for all levels of expertise.

WCDMA AREA TESTER
ML8720B
2110 to 2200 MHz

$C\epsilon$

For WCDMA Base Station Area Investigation and Maintenance

The ML8720B is used for investigation and maintenance to evaluate the radio wave propagation characteristics in the area of a WCDMA base station. When it is connected to a GPS receiver, the measured data can be correlated with positioning information (latitude and longitude).

The measurement items include functions for measuring the RSCP[1], Ec/No[2] and SIR[3], which is used to evaluate the strength of the radio wave received from each base station, and the delay profile, which is used to evaluate the delay characteristics of the radio wave caused by multipath propagation.

There are two measurement modes: the unspecified base station measurement mode, and the specified base station measurement mode. The CPICH[4] and SCH from the base station are measured in both cases. The unspecified base station measurement mode is used when the base station scrambling code is unknown. Search methods of scrambling code include SCH search method with SCH[5] and P-CPICH search method to directly search P-CPICH[6] without depending on SCH. The specified base station measurement mode is used when the base station scrambling code is known.

[1] RSCP (Received Signal Code Power)
[2] Ec/No (Ratio of desired receive power per chip to receive power density in the band.)
[3] SIR (Signal Interference Ratio)
[4] CPICH (Common Pilot Channel)
[5] SCH (Synchronization Channel)
[6] P-CPICH (Primary CPICH)

● High-speed and high-accuracy area analysis
RSCP, Ec/No and SIR can be measured at 30 cm intervals (at specified base station and single-channel measurement) while travelling at 100 km/h in a monitoring vehicle to provide fast and accurate area analysis.

● High-speed search with SCH
When SCH search is selected in unspecified base station mode, CPICH can be searched at high speed using the same SCH search method as user equipment. As one measurement example, 10 channels are searched for 4 seconds on average and then the measurement is started.

● Correlation with GPS positioning data
The measured data can be correlated with GPS positioning data (latitude and longitude) and saved to a memory card. In addition, the measured data and positioning information can be downloaded in real time to an external PC via the RS232C interface.

● High-accuracy measurement using diversity function
When used in combination with the optional diversity function, even higher-accuracy measurements, such as CPICH transmit diversity format and receive antenna diversity can be performed.

● Simultaneous measurement of two carrier frequencies
The optional Two Carrier Measurement function enables simultaneous measurement of two carrier frequencies in the specified base station measurement or the unspecified base station measurement.

● Indoor measurement support
Useful functions are offered for indoor measurement use; the fixed-point measurement for saving the data of specific measured points, the addition of comments to measured data and the automatic naming of data files before saving them.

● Handy type
At only 4 kg, the ML8720B is easily portable for both outside and inside work. The 8.4 inch transparent color TFT-LCD display is standard.
For the use under direct sunlight, 7.8 inch reflective color STN-LCD display model is also available (Option 02)*.
* Factory option (Display units can not be exchanged by customers.)

● 3-hour battery operation
In the case of standard composition, the lithium-ion battery pack provides more than 3 hours of operation and a spare battery pack solves even long-term measurement problems.

● Large-capacity memory cards
Large amounts of measured data can be saved to large-capacity flash-memory cards.

● Standalone operation
The control PC is not required externally. Basic measurements and data collection can be performed only by the ML8720B mainframe. Of course, the system can be extended in combination with area analysis software.

Measurement examples

• Unspecified base station measurement

This screen is used to search for a receivable common pilot channel (CPICH) and to measure received signal code power (RSCP), ratio of desired receive power per chip to receive power density in band (Ec/No), and signal interference ratio (SIR) for up to 32 channels. Search method can be selected from either [SCH search] method to search in the same way as user equipment using SCH or [P-CPICH search] method to in order search 512 types of P-CPICH (Primary CPICH). Furthermore, hybrid measurement function, simultaneous measurement of searched CPICH and specified scrambling code's CPICH, is also available. With this function, the other receivable channels can be searched and measured with measuring known channels.
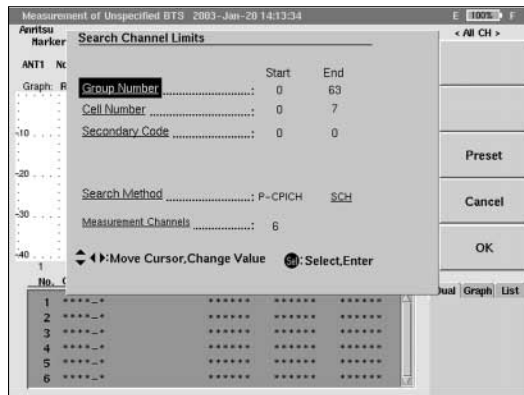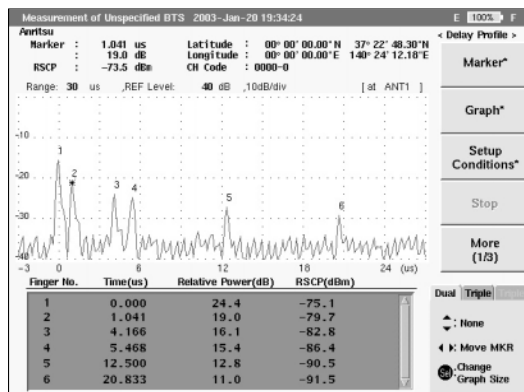

• Channel display

The measured results for all received channels (32 max.) can be simultaneously displayed with a graph and data. Additionally, measurement interval setting and the cumulative processing (max., min., median, average) for the internally accumulated data within the span can be selected. However, in SCH, only average value can be chosen.
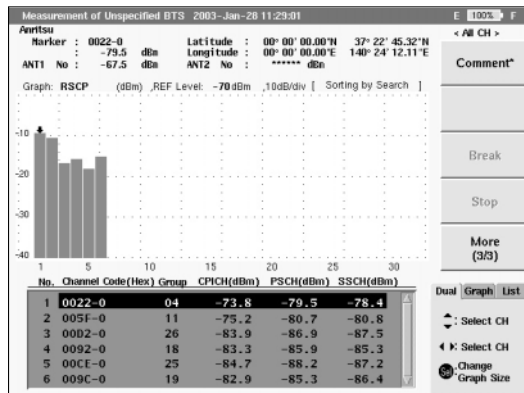

• Delay profile display

This displays the delay profile for one selected channel and the multipath can be visually confirmed. Furthermore, time, distance or the number of chips is selected for the horizontal axis.


• Finger display

This displays the measured data for one selected channel path (finger). The RSCP for up to 12 paths can be simultaneously evaluated when the diversity option is installed.
RSCP per Finger can be output to a file for all channels under measurement when the measurement is performed in activated Each Finger data output. This is effective for multi-path environment analysis and indoor simulation based on acquired data.
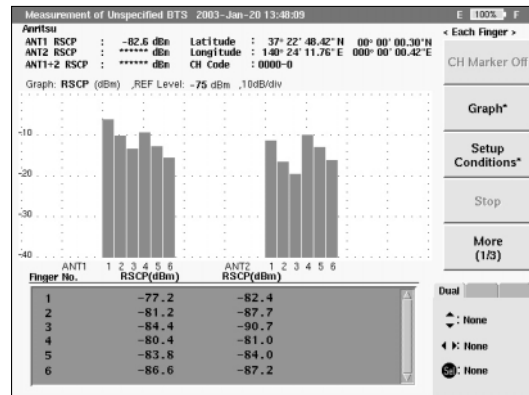

• Time/Distance variation display

A time/distance variation of the RSCP, Ec/No and SIR are displayed for the selected channel (6 max.). The time variation can be measured in 10 ms intervals for 10 ms to 500s and the max., min., median or average value of the cumulative totals can be displayed. The distance variation can be measured using the vehicle wheel pulse (external trigger) for 1 to 500 pulses and the max., min., median or average value of cumulative totals can be displayed.
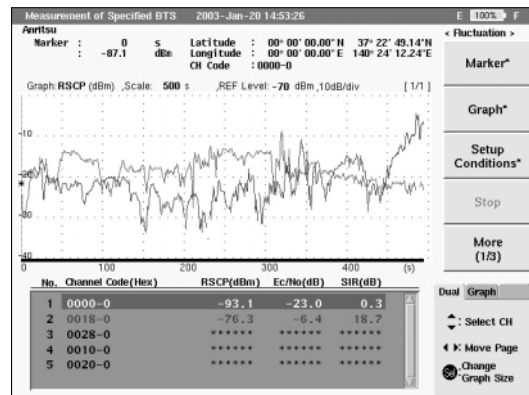

• SCH delay profile display

This displays the relative delay status between each base station with correlative value of P-SCH. This screen is used to confirm frame transmission timing gap or overlap between base stations.
Group No. is displayed on the graph to recognize base stations. Time or the number of chips can be selected for the horizontal axis.
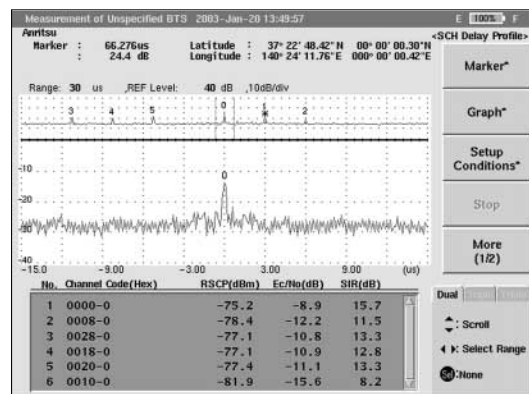
● **Screen display of two carrier frequency measurement (all channel display)**

The number of channels to be measured is 32 at max. for two carrier frequencies.

Simultaneous measurement of multiple carrier frequencies enhances the measurement efficiency. Also, carrier frequencies of others can be simultaneously measured for comparison.
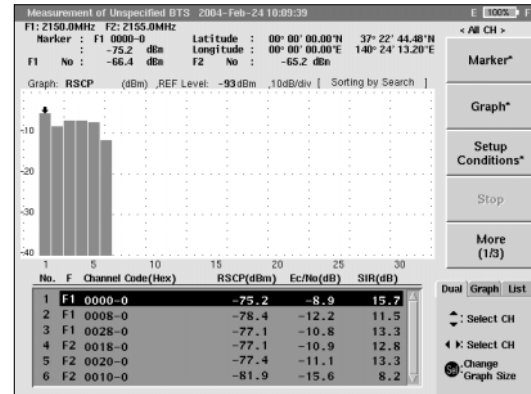
ISO9001/14000

IP Network, Wireless and Precision products contained in this catalogue are manufactured under a quality system and environment management system in conformance to the ISO international standard.

Factory name	Conformed standard	Qualification number	Qualified date	Qualification organization
Atsugi factory	ISO9001	JQA-0316	Nov. 15, 1993	Japan Quality Assurance Organization (JQA)
	ISO14001	JQA-EM0210	Aug. 28, 1998	
Tohoku Anritsu	ISO9001	JQA-0737	Dec. 28, 1994	
	ISO14001	JQA-EM0560	Oct. 22, 1999	
England factory	ISO9001	FS22679	May 24, 1999	BSI Quality Assurance
	ISO14001	EMS54120	Mar. 15, 2000	
U.S.A factory	ISO9001:2000	6495	Apr. 27, 1995	The Seal of National Quality Assurance Limited Registered to A2LA
	ISO/IEC 17025	2160.01	Mar. 18, 2004	

Quality and Reliability Assurance for Products

• Planning stage

Management resources are focused on measuring instruments related to growing fields such as mobile Internet, WDM and digital broadcasting, System solutions, precision measurement business and device businesses. New products are planned to provide solutions whenever required by users.

• Design stage

To realize a design with high-safety and high-reliability, several levels of design assessments are performed. Power consumption is reduced from the viewpoint of environment considerations, starting with evaluation of specifications, legal regulations and parts used. Evaluations are also implemented for improving the recycling ratio, and the design quality is improved.

Anritsu utilizes a design process that targets customer satisfaction.

• Evaluation stage

In addition to safety, reliability and environment considerations of test models for new products, functions and performance are verified by an operating environmental conditions test and operability, uncertainty, maintainability and flexibility of design are evaluated fully. After passing these tests, the products can be commercialized.

• Manufacturing and inspection stages

Based on our policy, "post-processing is the customer," the product is manufactured by experienced employees according to the workmanship standards. In the adjustment and inspection stage, automatic measurement is promoted. An expert will be in charge of the adjustment if high-skilled adjustment is required.

• After sold

In each service department, traceability assurance by calibrations based on high-technical capabilities, as well as rapid repair and preventive maintenance are performed.

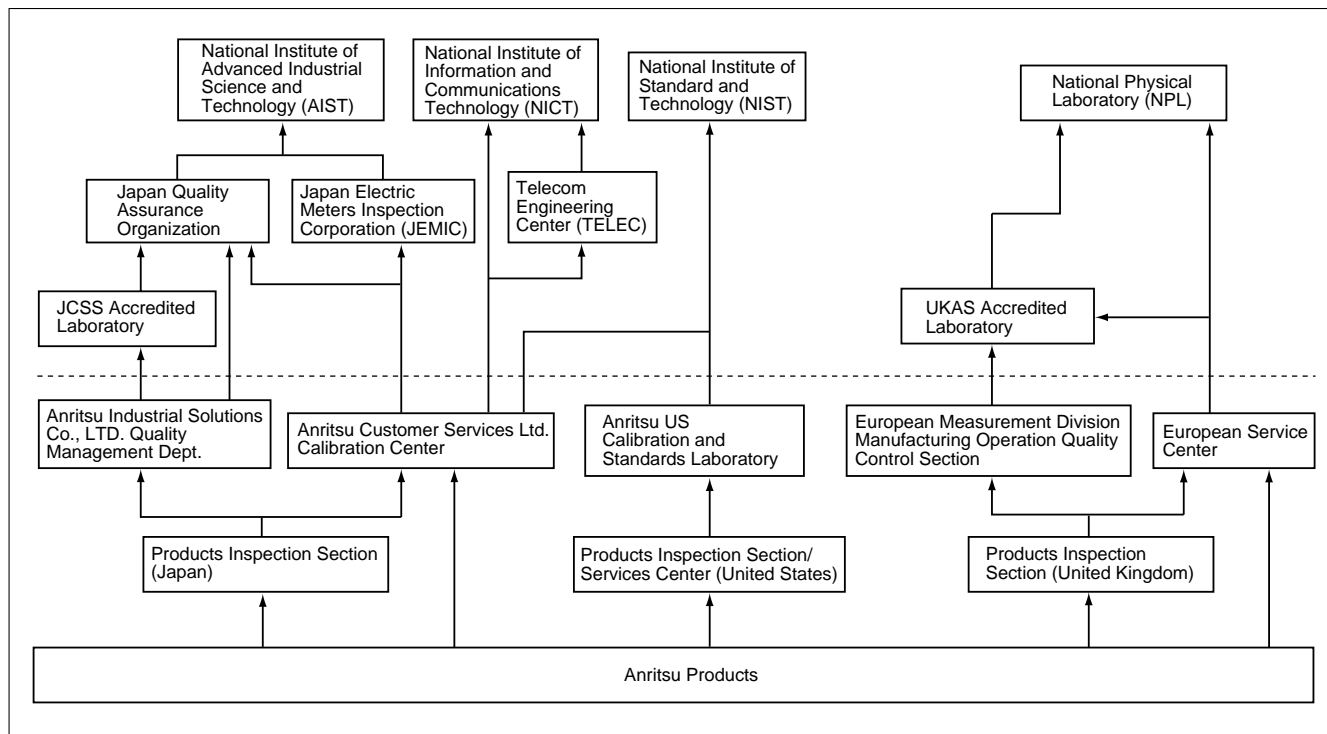## Parts standardization and improving activities for quality and reliability

For parts generally used in each measuring instrument, quality improvement and standardization are actively promoted. All field data is analyzed, arranged and completely made known to each department while required actions are taken for reliability improvement.

In addition, failure rate, MTBF observation and parts failure rate are calculated based on this information.

Traceability assurance

As defined in the International Vocabulary of Basic and General Terms in Metrology (VIM; 1993), traceability is defined as "the property of the result of a measurement or the value of a standard whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons." Anritsu's system to ensure traceability is shown below.

Measurements made by Anritsu's laboratory's are traceable to national, international, or intrinsic standards, where such standards are available.

ANRITSU CORPORATION