

CMA5 Series

Fiber Optic Power Meters



Anritsu Advancing beyond
ANRITSU CORPORATION

January 2023 (15th Edition)

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■ General

Thank you for purchasing a CMA5 Series Fiber Optic Power Meter. These lightweight, hand held units are precision meters designed to meet many testing applications. The CMA5 Series Fiber Optic Power Meters have wavelengths at 850, 1300, 1310, 1490, 1550 and 1625 nm. These units can measure absolute power in dBm, and microwatts (μW) along with attenuation (relative power) as dB. The general purpose 5P100 has a range of +10 to -60 dBm, while the 5P100C has a range of +23 to -50 dBm, which is ideal for CATV testing. All models have the ability to store the currently displayed dBm power level reading as a reference for subsequent measurements.

■ Features

- +10 to -60 dBm range (5P100 - standard models)
- +23 to -50 dBm range (5P100C - high power models)
- 2 kHz Modulation detection
- dB Reference store facility
- Measurements in dBm, dB, and microwatts
- 40 hours minimum of battery life, continuous use

■ Applications

- Cable Acceptance Testing
- Bi-Directional Testing
- Pass Fail Testing
- Splice and Connectorization Optimization
- Fiber Identification

■ Precautions

Use care when working with any optical transmission equipment. Avoid looking directly at any optical fibers or optical sources. Refer to your company's safety procedures when working with optical systems and components. It is important to keep all optical connections and surfaces free from dirt, oils or other contamination to ensure proper operation. This applies to all connectors that are connected to the unit's optical port. Scratched or contaminated connectors can reduce system performance. Refer to your company practices for cleaning optical connectors. Always replace the protective dust cap when not in use.

Location of Hazard symbol

The following labels are located on the backside.

WARNING:

Replacing Battery When replacing the battery, use the specified battery and insert it with the correct polarity. If the wrong battery is used, or if the battery is inserted with reversed polarity, there is a risk of explosion causing severe injury or death.



CAUTION:

Battery Fluid

DO NOT short the battery terminals and never attempt to disassemble the battery or dispose of it in a fire. If the battery is damaged by any of these actions, the battery fluid may leak. This fluid is poisonous. DO NOT touch the battery fluid, ingest it, or get in your eyes. If it is accidentally ingested, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, rinse them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly with clean water.

Battery Disposal

DO NOT expose batteries to heat or fire. This is dangerous and can result in explosions or fire. Heating batteries may cause them to leak or explode.

Electrical Safety:

To reduce risk of equipment damage, injury or death, adhere to the following warnings:

- Use only the optional AC adapter available from Anritsu for use with this product.
- Do not use the CMA5 Series Fiber Optic Power Meter or the optional AC adapter if the CMA5 Series Fiber Optic Power Meter or the optional AC adapter's case is cracked or damaged.
- Use the CMA5 Series Fiber Optic Power Meters only with the optional AC adapter available from Anritsu for the CMA5 Series Fiber Optic Power Meters. Anritsu does not guarantee the safety and functionality of other AC adapters.
- The CMA5 Series Fiber Optic Power Meters optional AC adapter is not intended for use in outdoor or wet environments.
- Ensure that the AC input to the optional AC adapter is within the voltage marked on the power supply's case.
- Do not attempt to service the product in any way other than the routine maintenance as described in this manual.

Batteries:

Batteries may contain lead, cadmium, lithium or other toxic substances. Batteries must be disposed of, or recycled, in accordance with their label instructions and local regulations.

Crossed-out Wheeled Bin Symbol:

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2012/19/EU (the “WEEE Directive”) in European Union.



For Products placed on the EU market after August 13, 2005, please contact your local Anritsu representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.

■ Operating Controls

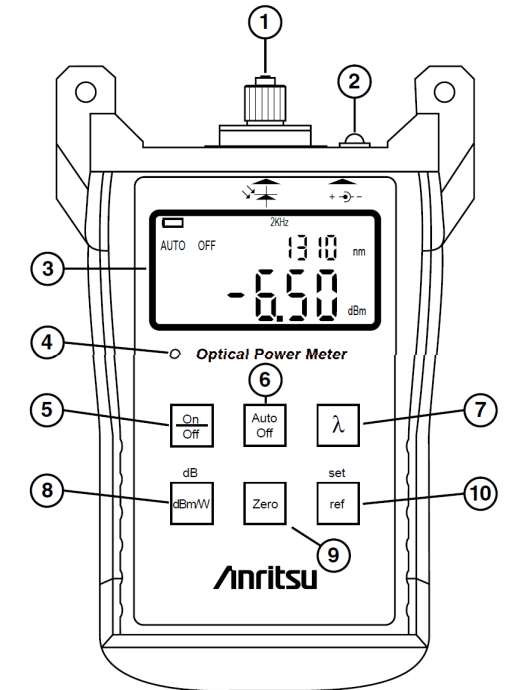


Figure 1 CMA5 Series Power Meter Operating Controls

NOTE: The CMA5 Series Power Meters have the same features and controls. The units differ in dynamic range only. The front panel is identical for all models.

1. Fiber Optic Input

The units are equipped with a universal connector. A variety of adapter caps are available. Units include one adapter cap.

CAUTION: For 5P100 and 5P100C Power Meters, be sure to use adapter caps specifically made for these units. Power Meter adapter caps for these units are marked “OPM” Do not use CMA5 Light Source adapter caps on 5P100 and 5P100C Power Meters.

Change the connector adapter once the optical fiber connector or the conversion adapter has been removed from it. Removing the connector adapter may damage the optical input port components while it is still being attached to the optical fiber or the conversion adapter.

2. External AC Power Jack

Attach the optional AC Power adapter to this jack.

3. Liquid Crystal Display (LCD)

Measurements are displayed in absolute power (dBm), relative loss (dB), and microwatts (μW). Indicators define wavelength, low battery (), AUTO OFF (when Auto Off is active) and REF (indicates stored reference value). For an optical power measurement less than -60 dBm (5P100) or less than -50 dBm (5P100C), the LCD will display “LO”.

4. Ext. Power

The External Power indicator lights up green when you are operating the unit on the optional external AC adapter.

5. On/Off Key

Power the unit on by pressing this key.

6. Auto Off Key

This key enables the Auto Off function, which will power down the unit when no keys have been pressed for 5 minutes.

7. λ(Wavelength) Key

Press this key to cycle through the wavelengths (850, 1300, 1310, 1490, 1550, and 1625 nm).

8. dBm/W Key

Press the dBm/W key to toggle the unit's measurement mode between dBm (absolute power) and μ W (microwatts). Hold the key until "HELD" is displayed (about 2 seconds) to switch to dB (relative power).

9. Zero Key

Press the Zero key to automatically zero the power meter. See "Auto Zeroing" on page 2 for details.

10. Ref Key

Pressing the **Ref** key momentarily will display the current dBm reference power level for approximately 2 seconds. Holding down the **REF** key until "HELD" appears in the display (approximately 3 seconds) will store the current dBm reference level. Separate reference values can be saved for each wavelength. These will be retained when power is turned off.

■ Operation

The following procedures use the recommended standards as outlined by the Electronics Industry Association in its publication EIA-445-171.

NOTE: Clean all optical ports and connectors, according to your company's procedures, prior to performing any tests.

Verifying Test Jumpers

Use the following procedure to test all reference jumpers in both directions.

1. Use a short jumper to connect the CMA5 Series Power Meter to an optical light source.
2. Activate both units.
3. Set both units to the same wavelength.
4. Set the CMA5 Series Power Meter to **dBm** mode. The measured level should closely match the output level specified for the optical light source, if not clean the connections again or check for bends in the fiber.
5. Press the **Ref** key on the CMA5 Series Power Meter until the display reads "HELD"
6. Reverse the connections and set the CMA5 Series Power Meter to dBm mode. If the loss displayed is 0.5 dB, the jumper is good and will provide a valid test. Otherwise clean the connectors or, if necessary, replace the jumper and repeat steps 4 and 5 until a reading of 0.5 dB or less is achieved.
7. Repeat as required for all wavelengths to be tested.

■ Optical Loss Measurement

Patch Panel to Patch Panel Test Method

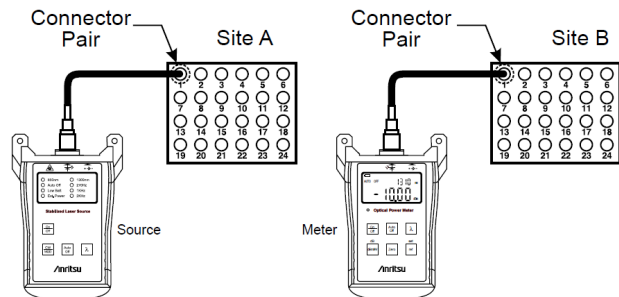


Figure 2 Patch Panel to Patch Panel

1. Use the procedure in "Verifying Test Jumpers" to verify two test jumpers.
2. Use one of the verified jumpers to connect the CMA5 Series Power Meter to an optical light source.
3. Activate both units and set both to the desired test wavelength.
4. Set the CMA5 Series Power Meter to dBm mode. The measured level should closely match the output level specified for the optical light source, if not clean the connections again or check for bends in the fiber.

5. Press the **Ref** key on the CMA5 Series Power Meter until the display reads "HELD". This eliminates the loss in the lead-in jumper.
6. Repeat as required for all wavelengths to be tested.
7. Disconnect the end of the test jumper connected to the CMA5 Series Power Meter. Leave the other end connected to the light source.
8. Connect the light source to one end of the system to be tested.
Use the second test jumper to connect the CMA5 Series Power Meter to the opposite end of the system to be tested. Power Meter readings will be in dB (hold the **dBm/W** key for 2 seconds to set the unit to dB mode) and include two connector pairs and loss across the fiber.

NOTE: The system under test has two connector pairs. The referencing steps above do not eliminate either connector pair.

Patch Panel to Connector Test Method

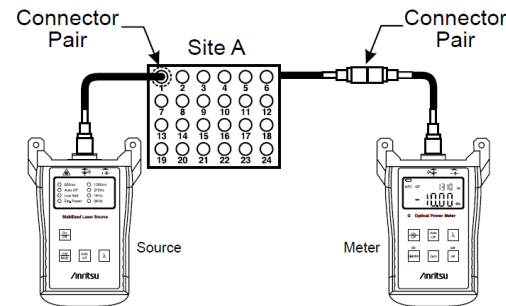


Figure 3 Patch Panel to Connector

1. Verify two test jumpers.
2. Connect the CMA5 Series Power Meter to the optical light source using the two jumpers and an in-line adapter (use the in-line adapter to connect the two jumpers).
3. Activate both units and set both to the desired test wavelength.
4. Set the CMA5 Series Power Meter to dBm mode and press the **Ref** key until the display reads "HELD" This eliminates the loss of the lead-in jumper and references out one connector pair.
5. Repeat as required for all wavelengths to be tested.
6. Disconnect the test setup at the in-line adapter. Leave the jumpers connected at both the Power Meter and light source, leaving the in-line adapter attached to the jumper that will be attached at the connector end of the fiber under test.
7. Connect the light source to one end of the system to be tested. Connect the Power Meter to the opposite end of the system to be tested. Power Meter readings will be in dB (hold the **dBm/W** key for 2 seconds to set the unit to dB mode) and include one connector pair and loss across the fiber.

NOTE: The system under test has one connector pair only. One of the two pairs is referenced out.

Connector to Connector Test Method

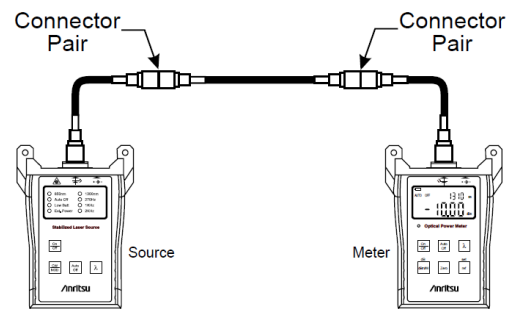


Figure 4 Connector to Connector

1. Verify three test jumpers.
2. Use two in-line adapters to connect the three jumpers.
3. Use the three connected jumpers to connect the CMA5 Series Power Meter to the optical light source.
4. Activate both units and set both to the desired test wavelength.
5. Set the CMA5 Series Power Meter to dBm mode and press the **Ref** key until the display reads "HELD" This eliminates the loss of the lead-in jumper and references out two connector pairs.
6. Repeat as required for all wavelengths to be tested.
7. Remove the middle jumper, leaving the in-line adapters attached to the jumpers connected to the Power Meter and the light source. Leave the jumpers connected to the Power Meter and light source in place.
8. Connect the light source to one end of the system to be tested. Connect the Power Meter to the opposite end of the system to be tested. Power readings will be in dB and include only the loss across the fiber.

■ Modulation Detection

When the instrument is connected to a fiber which has a 2 kHz modulated signal (as is often used in Fiber Identification), the "2 kHz" indicator on the CMA5 Series Power Meter will be on.

NOTE: The power readings at a modulated signal will reflect the average power, not the peak power. Assuming that the modulation has a 50% duty cycle and is fully modulated (full on and full off cycles), the meter reading will be approximately 3dB less than peak (full on) value.

■ Auto Zeroing

Use the following procedure to auto zero the unit:

1. Cover the attached fiber connector cap with its dust cap. This will prevent ambient light from entering the power meter's detector.
2. Power up the unit.
3. Press the **Zero** key until the display reads "SUCC" indicating successful auto zeroing.

NOTE: If the display reads "ERR" the auto zeroing is not successful. Make sure that the dust cap and connector adapter are securely in place, then press and hold the **Zero** key again. If still unsuccessful, contact Anritsu Technical Support (see page 15 for details).

■ Maintenance

The CMA5 Series Power Meters require no periodic maintenance other than replacing the battery and periodic calibration (once every 3 years).

Battery Replacement

Under normal use one 9 volt alkaline battery will provide a minimum of 40 hours of continuous use.

To replace the battery:

1. Remove the unit from its protective boot by pulling down on the bottom of the boot to release the unit. Then slide the unit out of the boot.
2. Open the battery compartment, located on the lower back side of the unit, by pressing down on the arrow on its cover and sliding the cover off the unit.
3. Replace the battery with a fresh 9 volt alkaline battery.
4. Replace the battery compartment cover.
5. Replace the protective boot.

Calibration

The recommended calibration interval on the CMA5 Series Power Meters is once every 3 years.

General Care

To avoid damage to the CMA5 Series Fiber Optic Power Meters, do not use cable connectors that are dirty or faulty. A dust cap is provided for the optical port, and should be in place when the unit is not in use to prevent foreign material from entering the

port.

To clean the optical connector, use only a small diameter non-cotton swab lightly moistened with pure isopropyl alcohol. Be sure to follow your company's procedures if different. Clean the CMA5 Series Power Meter's body with a damp cloth. Do not use solvents or abrasives.

■ Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories, including the National Institute of Advanced Industrial Science and Technology, and the National Institute of Information and Communications Technology, and was found to meet the published specifications.

■ Anritsu Warranty

Anritsu Corporation provides the following warranty against stoppages arising due to manufacturing error, and against problems with operation occurring even though the procedures outlined in the operation manual were followed.

Hardware:

Problems occurring within a period of three years from the date of delivery will be corrected by Anritsu Corporation at no cost to the user.

Software:

Software reported as faulty within a period of three years from the date of delivery will be corrected or replaced by Anritsu Corporation at no cost to the user.

Following correction or replacement the software will remain under warranty for either the remainder of three years from the date of initial delivery, or for a period of 30 days, whichever is shorter.

The hardware and software warranties are not valid under any of the following conditions:

- The fault is outside the scope of the warranty conditions separately described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster, including fire, wind or flood, earthquake, lightning strike, or volcanic ash, etc.
- The fault is due to damage caused by acts of destruction, including civil disturbance, riot, or war, etc.
- The fault is due to explosion, accident, or breakdown of any other machinery, facility, or plant, etc.
- The fault is due to use of non-specified peripheral or applied equipment or parts, or consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.
- The fault is due to use in unusual environments^(Note).
- The fault is due to activities or ingress of living organisms, such as insects, spiders, fungus, pollen, or seeds.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for damage or financial loss of the customer due to the use of or a failure to use this equipment, unless the damage or loss is caused due to Anritsu Corporation's intentional or gross negligence.

NOTE:

For the purpose of this Warranty, "unusual environments" means use:

- In places of direct sunlight
- In dusty places
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere

- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- In places where high-intensity static electric charges or electromagnetic fields are present
- In places where abnormal power voltages (high or low) or instantaneous power failures occur
- In places where condensation occurs
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes

■ Anritsu Corporation Contact

In the event of this equipment malfunctions, please contact an Anritsu Service and Sales office. Contact information can be found on the other sheets of the printed version of this manual, and is available in a separate file on the PDF version. Also, the Anritsu website provides you with contact information and a contact form.

■ CE Conformity Marking

Anritsu affixes the CE conformity marking on the following products in accordance with the Decision 768/2008/EC to indicate that they conform to the EMC and RoHS directive of the European Union (EU).



| | | |
|------------------|--------|--------------------------|
| 1. Product Model | | |
| Model: | 5P100 | CMA5 Optical Power Meter |
| | 5P100C | CMA5 Optical Power Meter |

| | |
|----------------------|-------------------------------------|
| 2. Applied Directive | |
| EMC: | Directive 2014/30/EU |
| RoHS: | Directive 2011/65/EU, (EU) 2015/863 |

| | |
|----------------------|--|
| 3. Applied Standards | |
| • EMC: | Emission: EN 61326-1: 2013 (Class A) Immunity: EN 61326-1: 2013 (Table 2) |

Performance Criteria*

| | |
|------------------------------|------|
| IEC 61000-4-2 (ESD) | B |
| IEC 61000-4-3 (EMF) | A |
| IEC 61000-4-4 (Burst) | B |
| IEC 61000-4-5 (Surge) | B |
| IEC 61000-4-6 (CRF) | A |
| IEC 61000-4-11 (V dip/short) | B, C |

*: Performance Criteria

A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as

intended.

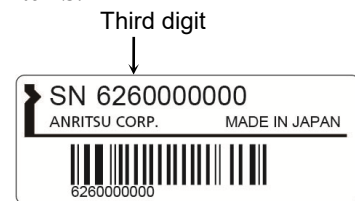
C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Harmonic current emissions:
EN 61000-3-2: 2014 (Class A equipment)
No limits apply to this equipment with an active input power under 75 W.

- RoHS: EN IEC 63000:2018 (Category 9)

If the third digit of the serial number is "7", the product complies with Directive 2011/65/EU as amended by (EU) 2015/863.

(Pb, Cd, Cr6+, Hg, PBB, PBDE, DEHP, BBP, DBP, DIBP)
If the third digit of the serial number is "6", the product complies with RoHS.



Serial number example

| | |
|----------------|---|
| 4. Contact | |
| Name: | Anritsu GmbH |
| Address, city: | Nemetschek Haus, Konrad-Zuse-Platz 1 81829 München, Germany |
| Country: | Germany |

■ UKCA Marking

Anritsu affixes the UKCA marking on the following products in accordance with the guidance to indicate that they conform to the EMC and RoHS regulations in the United Kingdom.



| | | |
|------------------|--------|--------------------------|
| 1. Product Model | | |
| Model: | 5P100 | CMA5 Optical Power Meter |
| | 5P100C | CMA5 Optical Power Meter |

| | |
|------------------------|--------------------|
| 2. Applied Regulations | |
| EMC: | S.I. 2016 No. 1091 |
| RoHS: | S.I. 2012 No. 3032 |

| | |
|----------------------|--|
| 3. Applied Standards | |
| • EMC: | Emission: EN 61326-1: 2013 (Class A) Immunity: EN 61326-1: 2013 (Table 2) |
| • RoHS: | EN IEC 63000:2018 (Category 9) |

| | |
|----------------|--|
| 4. Contact | |
| Name: | ANRITSU EMEA Ltd. |
| Address, city: | 200 Capability Green, Luton Bedfordshire, LU1 3LU |
| Country: | United Kingdom |

■ RCM Conformity Marking

Anritsu affixes the RCM mark on the following products in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.



| | | |
|------------------|--------|--------------------------|
| 1. Product Model | | |
| Model: | 5P100 | CMA5 Optical Power Meter |
| | 5P100C | CMA5 Optical Power Meter |

| | |
|----------------------|---|
| 2. Applied Standards | |
| EMC: | Emission: EN 61326-1: 2013 (Class A equipment) |

■ Specifications

| Model | CMA5 Optical Power Meter | |
|-------------------------|--|--|
| | 5P100 | 5P100C |
| Constitution | | |
| Main Frame | 5P100-YY*1 5P100C-YY*1 | |
| Standard Accessories | Operators Manual, Rubber Protective Cover 9V Alkaline Battery | |
| Fiber Type | SM/MMM | |
| Detector Type | InGaAs | Filtered InGaAs |
| Guaranteed Power Range | -60 to +5 dBm (-50 to +10 dBm @ 850 nm) | -40 to +23 dBm |
| Setting Wavelengths | 850, 1300, 1310, 1490, 1550, 1625 nm | |
| Accuracy*2 | +/- 0.2 dB @ 1300/1310/1550 nm *3 *4 +/- 0.5 dB @ 850 nm *5 | |
| Linearity*6 | 1550/1310 nm: ±0.2 dB, between -60 to +5 dBm 850 nm: ±0.5 dB, between -50 to +5 dBm | 1550/1310 nm: ±0.2 dB, between -40 to +23 dBm 850 nm: ±0.5 dB, between -40 to +23 dBm |
| Resolution | 0.01 dB | |
| dB Reference | Yes | |
| Modulation Detection | 2 kHz - visual indicator | |
| Display Indicators | 4 digit, 7-segment LCD | |
| Low Battery Indicator | visual indicator | |
| Auto Power-Off | AUTO OFF - visual indicator | |
| Power supply | One 9V Alkaline battery | |
| Warm Up Time | 60 s | |
| Connector Adapters | FC, ST, SC | |
| AC Adapter (Accessory) | Input: 100-240 V, 50-60 Hz*7 Output: 7.5 V | |
| Battery Life (Alkaline) | 40 hours minimum, continuous use | |
| Auto Shut Off | 5 minutes | |
| Operating Temperature | -10° to 50 °C (+14 to +122 °F) | |
| Storage Temperature | -25° to 60 °C (-13 to +140 °F) | |
| Relative Humidity | 0 to 95 % (Non-condensing) | |
| Mass | 250 g (0.56 lbs) or less | |
| Dimensions (H×W×T) | 145 × 75 × 25 mm (5.70" (H) x 2.95" (W) x .98" (D)) (Excluding Rubber Protective Cover) | |
| Warranty | 3 years | |

*1: T Specify one of FC, SC or ST connector adaptor for YY

*2: @ -10 dBm and 25 °C

*3: When GI fiber (62.5/125 μm, PC-polished) is connected with CW at 1300 nm.

*4: When SM fiber (10/125 μm, ITU-T G.652, master connector, PC-polished) is connected with CW at 1310 or 1550 nm.

*5: When GI fiber (62.5/125 μm, PC-polished) is connected with CW.

*6: @ 25 °C

*7: Operating voltage: within the range of +10 % to -10 % from the rated voltage

■ Accessories

| Model | Description |
|-----------------|--|
| GN-3HH-CASE | Hard Case (for two CMA5 series) |
| CMA5-POUCH-A | Carrying Pouch/Shoulder Strap |
| CMA5-BAT | 9V Alkaline Battery |
| Z1525A | AC Adapter (CMA5) |
| CMA5-AD-PM-FC | FC Connector Adapter (for Power Meter Port) |
| CMA5-AD-PM-SC | SC Connector Adapter (for Power Meter Port) |
| CMA5-AD-PM-ST | ST Connector Adapter (for Power Meter Port) |
| CMA5-AD-PM-ALL3 | Connector Adapter (for Power Meter Port, FC, SC and ST) |

Anritsu Corporation
5-1-1 Onna, Atsugi-shi, Kanagawa,
243-8555, Japan

