

R&S® CMU-Z10/-Z11

Antenna Coupler/ RF Shielding Cover

Simple interference-free testing of all mobiles



75 Years of
Driving
Innovation


ROHDE & SCHWARZ

R&S®CMU-Z10 /-Z11/-Z12/-Z13/-Z14

At a glance

Anyone engaged in mobile phone testing knows how difficult it is to obtain a suitable RF adapter, suppress RFI that would otherwise corrupt measurement results, and overcome other such problems. The R&S®CMU-Z10/-Z11/-Z12/-Z13/-Z14 setup from Rohde & Schwarz provides the solution to these problems for all mobile phones in all frequency bands – whether GSM, US Cellular or WCDMA.

Key facts

R&S®CMU-Z10 broadband antenna coupler

The antenna coupler can be used alone or combined with the R&S®CMU-Z11 RF shielding cover to create a fully enclosed RF shielded chamber.

R&S®CMU-Z11 shielding cover

- ▮ Upgrades the antenna coupler to a high-grade RF shielded chamber
- ▮ No interference affecting the measurement results

R&S®CMU-Z12 Bluetooth® antenna

- ▮ Frequency range from 2.4 GHz to 2.5 GHz
- ▮ Bluetooth® or WLAN antenna

R&S®CMU-Z13 USB feedthrough

- ▮ Enables control of a DUT by means of cable

R&S®CMU-Z14 additional N connector

- ▮ Allows user antennas to be connected



Grid fixation system for reliable measurement results and greater flexibility in placing mobile phones with diverse designs.

R&S®CMU-Z10

Broadband Antenna Coupler

Key features

Fig. 1: Power measurement at different positions of the antenna coupler without the R&S®CMU-Z11 in the GSM 900 band.

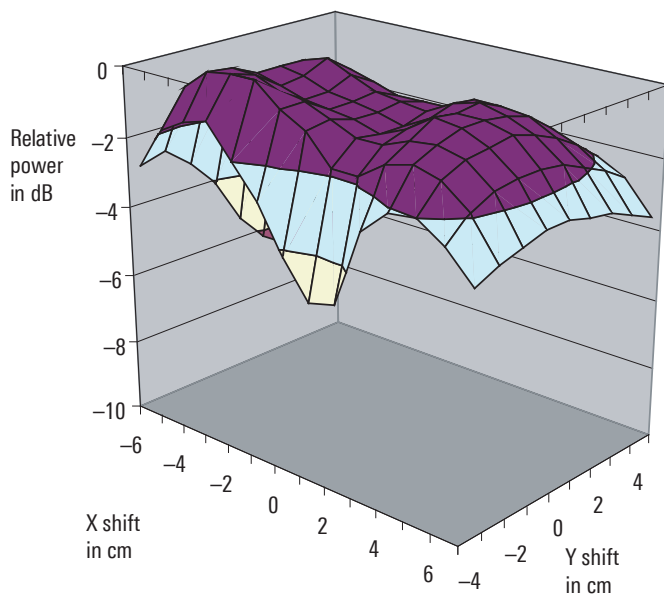
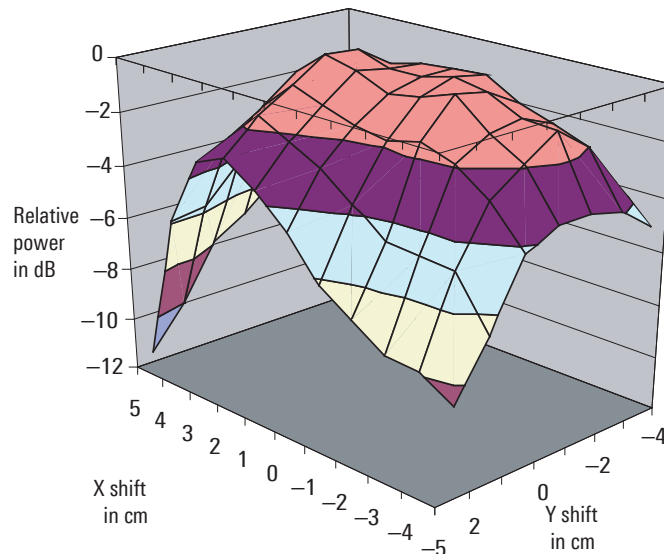


Fig. 2: Power measurement at different positions of the antenna coupler without the R&S®CMU-Z11 in the GSM 1800 band.



The miniaturization of mobile phones has led to the antenna being concealed inside the enclosure. In the latest mobile phone models, the antenna has been replaced by a metallic-printed ceramic rod on the PC board or a printed structure in the cover. This radiating element is usually accommodated in the upper rear part of the phone. The emitted fields can ideally be picked up by an extensive coupling structure such as the R&S®CMU-Z10.

Polarization

A $\lambda/4$ radiator vertically mounted on the mobile phone generates a vertically polarized electromagnetic field. The coupling element in the R&S®CMU-Z10 is arranged such that a mobile phone with a vertically mounted $\lambda/4$ radiator achieves minimum coupling attenuation. The coupler is of asymmetric design so that measurements can also be performed on mobile phones with horizontal polarization.

Position

The blue circle in Fig. 3 shows the active coupling zone for frequencies from 770 MHz to 960 MHz, the green circle that for frequencies from 1.7 GHz to 2.2 GHz. Depending on the radiation center of the phone, the optimum position is different for each model. Since the coupling zone is a defined area, the phone can be shifted somewhat out of the optimum position without dramatically increasing coupling attenuation (see Fig. 1). These zones are marked on the coupler by means of the antenna elements, which are visible through the transparent base plate.

To facilitate the handling of DUTs, the mounted transparent flat base plate has a grid with numbers from 1 to 26 and alphabetic characters from A to R. The grid contains holes at all intersection points to make it easy to fixate an L-shaped bracket. The ideal position for the bracket is usually the position with minimum coupling factors.

You can move and turn the bracket to determine the ideal position for each mobile phone type and note the coordinates of the corresponding reference points. Stabilization pieces are also supplied if better fixation of the mobile phone on the plate is necessary. This base plate can accommodate DUTs of up to 280 mm × 50 mm × 200 mm in size.

R&S®CMU-Z10

Broadband Antenna Coupler

Key features

Placing the mobile phone directly above the antenna within the coordinate system offers several advantages including:

- Coupling loss reduction between coupler and mobile phone antenna due to the minimum distance between both
- Definable and reproducible results since the mobile phone can be exactly positioned with minimum coupling loss; the grid can be used to define the position of the mobile phone at 10 mm accuracy in both the vertical and horizontal axes
- The grid fixation system makes it possible to create a database for several mobile phones and their positions in the R&S®CMU-Z10/-Z11/-Z12/-Z13/-Z14 with minimum coupling factors

Mismatch

To minimize RF power loss en route to the radiocommunications tester (e.g. the R&S®CMU200), the high-quality cable that comes with the R&S®CMU-Z10 should be used.

Radiated interference

Interference from other transmitters corrupts the measurement results. Interfering transmitters may be neighboring base stations as well as other mobile phones and test sets in the same service shop or repair line. Distinctly differing results of bit error ratio (BER) measurements in different channels are a clear sign of interference. Therefore, the antenna coupler should be used in combination with the R&S®CMU-Z11 shielding cover.

Country-specific regulations may stipulate that the test set be protected against unwanted radiated emissions. Please check the regulations in your country or use the shielding cover for all your measurements.

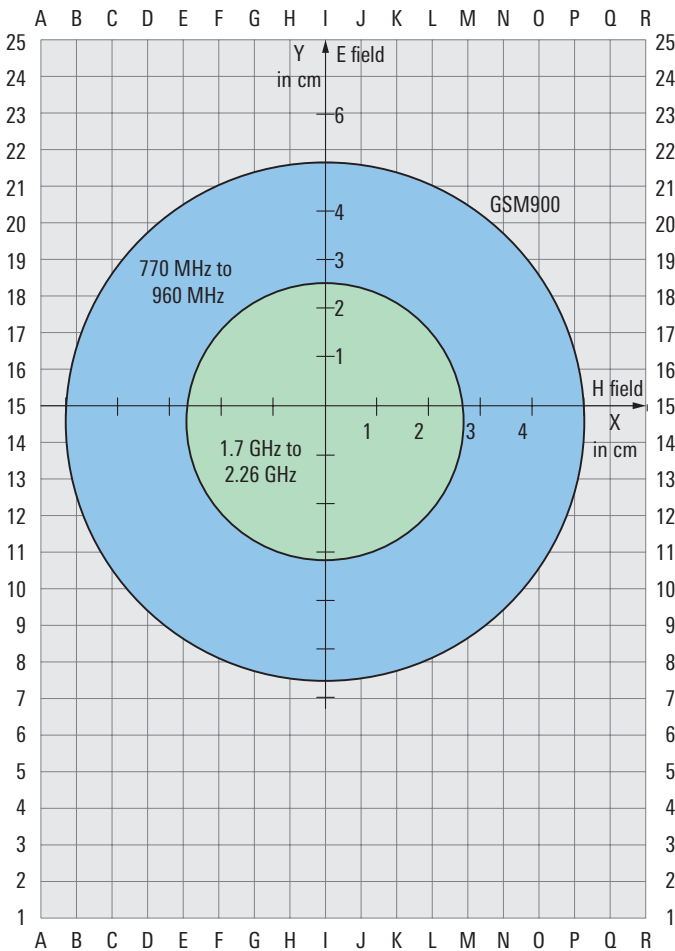


Fig. 3: Active coupling zone above the coupling antenna of the R&S®CMU-Z10/-Z11 in reference to the shift in the x- and y-axis, shown in the figures on page 3.

R&S®CMU-Z11

R&S®CMU-Z12

R&S®CMU-Z13

R&S®CMU-Z14

Key features

R&S®CMU-Z11 shielding cover

If the antenna coupler and shielding cover are closed, a standing wave may be generated between the floor of the coupler and the ceiling of the shielding cover. To reduce this effect, the ceiling of the shielding cover is lined with a foam material to attenuate the magnetic field, which is at its maximum at the metal surface. In addition, the electric field component is attenuated by a pyramid-shaped absorber. The shielding cover upgrades the antenna coupler to a high-grade RF shielded chamber that prevents interference radiated by base stations or other neighboring test and service sets from affecting the measurement results of the DUT. This is particularly important in BER measurements. The closing mechanism can easily be operated with only one hand and ensures very high shielding effectiveness of >50 dB by producing a defined contact pressure.

R&S®CMU-Z12 Bluetooth® antenna

The R&S®CMU-Z12 Bluetooth® antenna is designed as a universal antenna to cover the frequency range from 2.4 GHz to 2.5 GHz with a VSWR of <2.5. Some wireless LAN applications are also performed within this frequency range. The R&S®CMU-Z12 can, therefore, also be used for WLAN applications.

R&S®CMU-Z13 USB feedthrough

There are two ways to control a DUT in the shielding system: by means of a 15-pin through-connector or the R&S®CMU-Z13 USB feedthrough. Both connectors can be mounted together.

R&S®CMU-Z14 additional N connector

This option makes it possible to route additional RF signals into the interior of the shielded chamber. In this way, users can easily connect their own antennas, or they can connect the DUT directly via an RF cable. Thus, two N connectors are available.

Specifications

R&S®CMU-Z10

VSWR without the R&S®CMU-Z11, without DUT, with cable supplied

| | |
|----------------------|------|
| 0.77 GHz to 0.87 GHz | <5.0 |
| 0.87 GHz to 0.96 GHz | <3.5 |
| 1.7 GHz to 2.0 GHz | <3.5 |
| 2.0 GHz to 2.2 GHz | <3.5 |

Coupling factor

| | |
|--------------------|------------------------------|
| 770 MHz to 960 MHz | 5 dB to 8 dB ¹⁾ |
| 1.7 GHz to 2.2 GHz | 10 dB to 15 dB ¹⁾ |

Connectors

| | |
|--------------|---|
| RF IN/OUT | N female/N female |
| RF THROUGH | N female/N female |
| DATA THROUGH | 15-pin HDD female filter adapter/ 15-pin HDD male filter adapter |

R&S®CMU-Z11

Shielding effectiveness (R&S®CMU-Z10 and R&S®CMU-Z11 closed)

| | |
|------------------------------------|--------|
| Antenna coupler | >50 dB |
| In conjunction with | |
| R&S®CMU-Z12 Bluetooth® antenna | >30 dB |
| R&S®CMU-Z13 USB feedthrough | >50 dB |
| R&S®CMU-Z14 additional N connector | >50 dB |

R&S®CMU-Z12

VSWR

| | |
|--------------------|----------|
| 2.4 GHz to 2.5 GHz | <2.5 |
| Connector | N female |

The R&S®CMU-Z12 Bluetooth® antenna can be integrated into the R&S®CMU-Z10 or used separately.

R&S®CMU-Z13 ²⁾

Connectors

| | |
|-----------------------------------|------------------------------|
| Connector inside antenna coupler | USB-A |
| Connector outside antenna coupler | USB-B |
| Data rate | full/low speed ³⁾ |

R&S®CMU-Z14

Frequency range

| | |
|-----------------|----------------|
| Frequency range | 0 GHz to 6 GHz |
|-----------------|----------------|

General data

| | |
|-----------------------------|------------------|
| Operating temperature range | -10 °C to +45 °C |
|-----------------------------|------------------|

Dimensions (W x H x D)

| | |
|------------------------------|--|
| R&S®CMU-Z10 | 230 mm x 100 mm x 320 mm (9.06 in x 3.94 in x 12.60 in) |
| R&S®CMU-Z10 with R&S®CMU-Z11 | 250 mm x 180 mm x 430 mm (9.84 in x 7.09 in x 16.93 in) |
| Usable test space | 280 mm x 50 mm x 200 mm (11.02 in x 1.97 in x 7.87 in) |
| R&S®CMU-Z12 | 56 mm x 56 mm x 50 mm (2.21 in x 2.21 in x 1.97 in) |
| R&S®CMU-Z13 | 38 mm x 32 mm x 52 mm (1.5 in x 1.26 in x 2.05 in) |

Weight

| | |
|------------------------------|-------------------|
| R&S®CMU-Z10 | 2.7 kg (5.95 lb) |
| R&S®CMU-Z10 with R&S®CMU-Z11 | 4.8 kg (10.58 lb) |
| R&S®CMU-Z12 | 0.1 kg (0.22 lb) |
| R&S®CMU-Z13 | 0.25 kg (0.55 lb) |
| R&S®CMU-Z14 | 0.1 kg (0.22 lb) |

Mounting positions at the rear of the antenna coupler

| | 1 | 2 | 3 |
|------------------------|---|---|---|
| Bluetooth® antenna | - | - | ● |
| USB feedthrough | ● | - | ● |
| Additional N connector | - | - | ● |
| D-Sub | ● | - | - |

¹⁾ The specified coupling factor is based on measurements carried out on several mobile phones from different manufacturers. The values cannot be assured since they also depend on the antenna pattern of the mobile phone.

²⁾ The 15-pin data through-connector has to be removed if the R&S®CMU-Z12 and R&S®CMU-Z13 are mounted simultaneously.

³⁾ The R&S®CMU-Z13 supports the data rates specified in the USB 1.1 standard. At present, USB 2.0 is not supported.

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Ordering information

| Designation | Type | Order No. |
|---|-------------|--------------|
| Antenna Coupler | R&S®CMU-Z10 | 1150.0801.10 |
| RF Shielding Cover for the R&S®CMU-Z10 | R&S®CMU-Z11 | 1150.1008.02 |
| Bluetooth® Antenna | R&S®CMU-Z12 | 1150.1043.02 |
| USB Feedthrough | R&S®CMU-Z13 | 1159.1200.02 |
| Additional N Connector | R&S®CMU-Z14 | |
| Spare RF sealing cord for the R&S®CMU-Z11 | | 1158.9514.00 |
| Spare parts for the R&S®CMU-Z10 mobile phone fixation for: | | |
| Grid positioning plate | | 1158.9789.00 |
| L-shaped bracket | | 1158.9808.00 |
| Stabilizing pieces | | 1158.9820.00 |

¹⁾ If you order the R&S®CMU-Z10 antenna coupler plus the R&S®CMU-Z11 shielding cover and/or the R&S®CMU-Z12 Bluetooth® antenna, the shielded chamber comes ready-mounted. All components are also available individually for upgrading. If the R&S®CMU-Z11 and/or R&S®CMU-Z12 are not to be factory-fitted on the R&S®CMU-Z10 antenna coupler, please order these options separately. The R&S®CMU-Z13 is always delivered separately.

| Equipment supplied | |
|--------------------|--|
| R&S®CMU-Z10 | coupler (base for shielded chamber), RG-214 cable with two N male connectors, length approx. 120 cm, 2nd base plate made of plexiglass with a fixed holder for optional use instead of the mounted plate provided with the grid positioning system |
| R&S®CMU-Z11 | shielding cover for the antenna coupler, hinges for fastening it to the coupler |

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About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

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Certified Quality System

ISO 9001

Certified Environmental System

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