

# R&S® TSMS53DC

## Ultracompact Downconverter Manual



4902016002

Version 03

**ROHDE & SCHWARZ**

Make ideas real



This manual applies to the following downconverter models:

- R&S®TSMS53DC (4902.0001.02)

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4902.0160.02 | Version 03 | R&S®TSMS53DC

Throughout this manual, products from Rohde & Schwarz are indicated without the ® symbol , e.g. R&S®TSMS53DC is indicated as R&S TSMS53DC.

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# 1 Safety information (multilingual)

This option or accessory is designed for a specific Rohde & Schwarz product. Multilingual safety information is delivered with the product. Follow the provided installation instructions.

Esta opción o este accesorio están diseñados para un producto Rohde & Schwarz concreto. El producto va acompañado de información de seguridad en varios idiomas. Siga las instrucciones de instalación puestas a disposición.

Diese Option oder dieses Zubehör ist für ein bestimmtes Rohde & Schwarz Produkt vorgesehen. Mit dem Produkt werden mehrsprachige Sicherheitsinformationen geliefert. Befolgen Sie die mitgelieferten Installationsanweisungen.

Cette option ou cet accessoire est conçu pour un produit Rohde & Schwarz spécifique. Des informations de sécurité multilingues sont fournies avec le produit. Suivez les instructions d'installation fournies.

Questa funzione opzionale o accessoria è progettata per un prodotto Rohde & Schwarz specifico. Con il prodotto sono fornite informazioni sulla sicurezza in formato multilingue. Seguire le istruzioni di installazione allegate.

Esta(e) opção ou acessório foi concebida(o) para um produto específico da Rohde & Schwarz. Serão fornecidas informações de segurança multilingues com o produto. Siga as instruções de instalação fornecidas.

Αυτή η προαιρετική επιλογή ή εξάρτημα έχει σχεδιαστεί για συγκεκριμένο προϊόν Rohde & Schwarz. Μαζί με το προϊόν παρέχονται πληροφορίες ασφαλείας σε πολλές γλώσσες. Ακολουθήστε τις παρεχόμενες οδηγίες εγκατάστασης.

Din l-għażla jew aċċessorju huma mfassla għal prodott Rohde & Schwarz speċifiku. L-informazzjoni multilingwi dwar is-sikurezza hija pprovduta mal-prodott. Segwi l-istruzzjonijiet ipprovduti għall-installazzjoni.

Deze optie of dit accessoire is ontwikkeld voor een specifiek product van Rohde & Schwarz. Het product wordt geleverd met veiligheidsinformatie in meerdere talen. Volg de meegeleverde installatie-instructies.

Denne mulighed eller tilbehørsdel er designet til et specifikt Rohde & Schwarz produkt. En flersproget sikkerhedsanvisning leveres sammen med produktet. Følg de medfølgende installationsanvisninger.

Detta tillval eller tillbehör är avsett för en särskild produkt från Rohde & Schwarz. Säkerhetsinformation på flera språk medföljer produkten. Följ de medföljande installationsanvisningarna.

Tämä vaihtoehto tai lisävaruste on suunniteltu tietyille Rohde & Schwarz -yrityksen tuotteelle. Tuotteen mukana on toimitettu monikieliset turvallisuusohjeet. Noudata annettuja asennusohjeita.

Dette alternativet eller ekstrautstyret er utformet for et spesifikt Rohde & Schwarz produkt. Flerspråklig sikkerhetsinformasjon leveres med produktet. Overhold installasjonsveiledningen som følger med.

See valik või lisaseade on mõeldud konkreetsele Rohde & Schwarz tootele. Tootegea on kaasas mitmekeelne ohutusteave. Järgige kaasasolevaid paigaldusjuhiseid.

Šī opcija vai piederums ir izstrādāts īpaši Rohde & Schwarz produktam. Produktam pievienota drošības informācija vairākās valodās. Ievērojiet sniegtos uzstādīšanas norādījumus.

Ši parinktis ar priedas skirti konkrečiam Rohde & Schwarz gaminiui. Su gaminiu pateikiama saugos informacijos keliomis kalbomis. Laikykitės pateikiamų montavimo nurodymų.

Þessi auka- eða fylgibúnaður er hannaður fyrir tiltekna Rohde & Schwarz vöru. Öryggisupplýsingar á mörgum tungumálum fylgja með vörunni. Fylgið meðfylgjandi uppsetningarleiðbeiningum.

Tá an rogha nó an oiriúint seo ceaptha le haghaidh táirge Rohde & Schwarz sonrach. Cuirtear eolas sábháilteachta ilteangach ar fáil leis an táirge. Lean na treoracha suiteála a thugtar.

Эта опция или принадлежность предназначена для конкретного продукта Rohde & Schwarz. В комплект поставки продукта входят инструкции по технике безопасности на нескольких языках. Соблюдайте прилагаемые инструкции по установке.

Ця опція або приладдя призначені для конкретного виробу Rohde & Schwarz. Інструкції з техніки безпеки кількома мовами постачаються разом із виробом. Дотримуйтеся наданих інструкцій зі встановлення.

Ta opcja lub akcesorium jest przeznaczona do określonego produktu Rohde & Schwarz. Dostarczany produkt zawiera informacje w wielu językach dotyczące bezpieczeństwa. Należy postępować zgodnie z dostarczonymi instrukcjami instalacji.

Tato varianta nebo příslušenství je určeno pro konkrétní produkt Rohde & Schwarz. S produktem jsou dodávány vícejazyčné bezpečnostní informace. Řiďte se příloženými pokyny k instalaci.

Táto verzia alebo príslušenstvo je navrhnutá pre špecifický výrobok Rohde & Schwarz. S výrobkom sa dodávajú viacjazyčné bezpečnostné pokyny. Riadte sa dodanými pokynmi na inštaláciu.

Ta možnost ali dodatek je zasnovan za določeni izdelka podjetja Rohde & Schwarz. Izdelku so priložena varnostna navodila v več jezikih. Upoštevajte priložena navodila za namestitvev.

Ezt a beállítást vagy tartozékot egy adott Rohde & Schwarz termékhez tervezték. A termékhez többnyelvű biztonsági információkat mellékelünk. Kövesse a mellékelt szerelési utasításokat.

Тази опция или аксесоар са проектирани за специфичен продукт на Rohde & Schwarz. Многоезикова информация за безопасност се доставя с продукта. Следвайте предоставените инструкции за монтаж.

Ova opcija ili oprema namijenjena je za određeni proizvod tvrtke Rohde & Schwarz. Uz proizvod su dostavljene sigurnosne napomene na više jezika. Pratite isporučene upute za ugradnju.

Ova opcija ili pribor je dizajniran za određeni Rohde & Schwarz proizvod. Proizvodu su priložene sigurnosne informacije na više jezika. Slijedite priložena uputstva za instalaciju.

Ova opcija ili dodatni pribor je projektovan za određeni Rohde & Schwarz proizvod. Bezbednosne informacije na više jezika se isporučuju uz proizvod. Sledite dostavljena uputstva za instalaciju.

Această opțiune sau acest accesoriu a fost conceput pentru un produs specific Rohde & Schwarz. Informațiile multilingve privind siguranța sunt livrate împreună cu produsul. Urmați instrucțiunile de instalare furnizate.

Ky opsion ose aksesori është krijuar për një produkt specifik Rohde & Schwarz. Bashkë me produktin jepen edhe informacionet e sigurisë në shumë gjuhë. Ndiqni udhëzimet e dhëna të instalimit.

Оваа опција или додаток се наменети за одреден производ на Rohde & Schwarz. Со производот се испорачани повеќејазични безбедносни упатства. Следете ги дадените упатства за инсталација.

Bu opsiyon veya aksesuar, belirli bir Rohde & Schwarz ürünü için tasarlanmıştır. Çok dilli güvenlik uyarıları ürünle birlikte teslim edilir. Size sağlanan kurulum talimatlarına uyun.

Şu opsiya ya-da esbap Rohde & Schwarz anyk önüm için niyetlenilen. Dürli dil-däki howpsuzlyk barada maglumat önüm bilen bile üpjün edilyär. Üpjün edilen gurnama ugrukdymalaryny ýerine ýetiriň.

इस विकल्प या एक्सेसरी को एक विशेष Rohde & Schwarz उत्पाद के लिए डिज़ाइन किया गया है. उत्पाद के साथ बहुभाषी सुरक्षा जानकारी दी जाती है. प्रदान किए गए इंस्टालेशन अनुदेशों का पालन करें.

本选项或附件专门设计用于特定的 Rohde & Schwarz 产品。产品随附多种语言版本的安全资讯。谨遵文件中的安装说明。

本オプションアクセサリは、特定の Rohde & Schwarz 製品向けに設計されています。多言語で記載された安全情報が製品に付属します。付属のインストール手順に従ってください。

이 옵션 또는 액세서리는 특정 Rohde & Schwarz 제품용으로 설계되었습니다. 제품과 함께 다국어로 작성된 안전 정보가 제공됩니다. 함께 제공된 설치 지침을 따르십시오.

本選配或配件專門設計用於特定的 Rohde & Schwarz 產品。產品隨附多種語言版本的安全資訊。遵守文件中的安裝說明。

Tùy chọn hoặc phụ kiện này dành riêng cho một sản phẩm Rohde & Schwarz cụ thể. Thông tin an toàn đa ngôn ngữ được cung cấp kèm theo sản phẩm. Thực hiện theo hướng dẫn lắp đặt kèm theo.

ตัวเลือกหรืออุปกรณ์เสริมนี้ออกแบบมาสำหรับผลิตภัณฑ์ Rohde & Schwarz โดยเฉพาะ โดยจะมีการจัดส่งข้อมูลด้านความปลอดภัยหลายภาษามาให้พร้อมกับผลิตภัณฑ์ ปฏิบัติตามคำแนะนำในการติดตั้งที่ให้ไว้

Pilihan atau aksesori ini direka bentuk untuk produk Rohde & Schwarz yang tertentu. Maklumat keselamatan berbilang bahasa disertakan bersama produk. Ikut arahan pemasangan yang diberikan.

Opsi atau aksesori ini dirancang untuk produk Rohde & Schwarz tertentu. Informasi keamanan dalam beberapa bahasa juga disertakan bersama produk. Ikuti petunjuk pemasangan yang disediakan.

Esta opción o este accesorio están diseñados para un producto Rohde & Schwarz en concreto. El producto va acompañado de información de seguridad en varios idiomas. Siga las instrucciones de instalación proporcionadas con el producto.



Esta opção ou acessório foi desenvolvido para um produto Rohde & Schwarz específico. Informações de segurança em vários idiomas acompanham o produto. Siga as instruções de instalação disponibilizadas.

אפשרות זו או האביזר מיועדים למוצר ספציפי של Rohde & Schwarz. מידע רב-לשוני בנושא בטיחות מצורף למוצר. יש לפעול בהתאם להנחיות ההתקנה המצורפות.

تم تصميم هذا الخيار أو الملحق لمنتج معين من منتجات Rohde & Schwarz. يتم تزويد معلومات السلامة متعددة اللغات مع المنتج. اتبع تعليمات التركيب الموضحة.

این قابلیت یا وسیله جانبی منحصراً برای محصول به خصوص Rohde & Schwarz طراحی شده است. اطلاعات ایمنی چندزبانه همراه این دستگاه ارائه شده است. دستور العمل‌های نصب ارائه شده را دنبال کنید.

اس اختیار یا حصے کو مخصوص Rohde & Schwarz پروڈکٹ کے لئے تیار کیا گیا ہے۔ پروڈکٹ کے ساتھ کثیر السانی زبانوں میں تحفظ کی معلومات فراہم کی جاتی ہیں۔ فراہم کردہ تنصیب کی ہدایات پر عمل کریں۔

## 2 About the R&S TSMS53DC

### Intended use

The R&S TSMS53DC ultracompact downconverters are intended to upgrade the R&S TSMx6 scanners to measure 5G NR signals in the mmWave frequency range. The downconverters extend the latest generation mobile network scanner family and provide all features for drive and walk testing.

Observe the operating conditions and performance limits stated in the data sheet.

### Target audience

This document targets at all users, including technicians, operators, administrators and maintenance personnel. The required skills and experience of the users depend on the test setup and application in which the R&S TSMS53DC is used.

### Safety information in the documentation

Safety information warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

The documentation helps you use the R&S TSMS53DC safely and efficiently. Keep the documentation nearby and offer it to other users.

### Related manuals

This manual describes the installation of the R&S TSMS53DC. For information on all other topics, refer to the following manuals:

- User manual of the R&S TSME6
- User manual of the R&S TSMA6
- User manual of the R&S TSMA6B
- Installation instructions of the R&S TSMS-OMN70 OMNI antenna

The R&S TSME6 user manual and the R&S TSMA6/6B user manual include basic setups and typical measurement examples.

The R&S TSMS-OMN70 OMNI antenna installation instructions describe how to connect the antenna to the R&S TSMS53DC.

**Key features**

- Ultra broadband RF frequency range for downconversion from 17 GHz to 53 GHz
- Fully controlled by R&S TSMx6 network scanners to simplify operation and maximize the performance
- Simultaneous mmWave and sub 6 GHz measurements with a single scanner
- Customized mechanical concept, fully compatible with the latest R&S TSMx6 network scanner generation
- Future-proof concept (support of multiple scanners)
- Low power consumption

## 3 Preparing for use

Here, you can find basic information about setting up the product for the first time.

### 3.1 Unpacking and checking

1. Unpack the product carefully.
2. Retain the original packing material. Use it when transporting or shipping the product later.
3. Using the delivery notes, check the equipment for completeness.
4. Check the equipment for damage.

If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

### 3.2 Connecting to power

This section describes how to connect the R&S TSMS53DC to a power supply unit.

#### 3.2.1 Connecting to power via power splitter (Y) cable

The power splitter cable R&S TSME-ZYC (order no. 1514.7290.02) is provided with your delivery.

1. Connect the single end of the cable to the power supply, e.g. R&S TSME-Z1. See [Chapter 3.2.4, "Connecting to an AC power supply"](#), on page 14.
2. Connect one of the Y-ends of the cable to "DC In" of the R&S TSMS53DC.

### 3.2.2 Connecting to a vehicle DC power supply via cigarette lighter

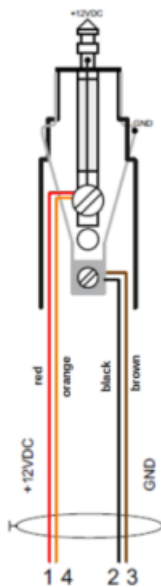
You can connect the R&S TSMS53DC via cigarette lighter cable R&S TSME6-ZCC (order no. 4900.1900.02).

1. Check the rating of the vehicle DC power supply. It has to be 12 V/24 V.
2. Connect the 4-pin connector to DC IN.
3. Connect the cigarette lighter adapter to the 12 V/24 V outlet of the vehicle.

### 3.2.3 Connecting to the vehicle power supply via terminal

#### To connect vehicle power supply via terminal

1. Demount the cigarette lighter adapter from the cable.
2. Connect the open ends of the cable to the DC supply. Ensure that the polarity is correct. (see [Figure 3-1](#)).



*Figure 3-1: Supplied power cable with cigarette lighter adapter*

- 1 = +12 V DC (red cable)
- 2 = GND (black cable)
- 3 = GND (brown cable)
- 4 = +12 V DC (orange cable)

### 3.2.4 Connecting to an AC power supply

If you operate the product with an external power supply, you can use it indoors only in pollution degree 2 environments where nonconductive contamination can occur. Suitable AC power supplies are listed in the data sheet. They differ in the output power:


- R&S TSME-Z1 has an output power of about 30 W, sufficient for up to two products, one TSME6 and one TSM53DC.
  - R&S TSMA6-Z1 has an output power of 105 W and is suitable for multiple TSMx products.
1. Ensure that the required ratings listed in the data sheet are matched.
  2. Connect the round connector to DC IN.
  3. Insert the AC power plug into the power outlet.

## 3.3 Connecting to RF In

### To connect to SMA connector

1. Use an RF cable with an SMA plug connector.
2. **NOTICE!** Excessive tightening can damage the connectors.  
To connect to the "RF In ≤ 17 GHz" (RF bypass) connector, proceed as follows:
  - a) Carefully align the connector of the cable along a common axis.
  - b) Mate the connectors along the common axis until the male pin of the inner connector engages with the female socket of the outer connector.
  - c) Turn the nut of the outer connector until the connectors are firmly coupled.
  - d) Torque the nut to the specified limit using a calibrated torque wrench.

## Connecting to IF1-IF3 (IF outputs)


 The SMA connector is sensitive to mechanical stress. Use the following handling precautions.

- Always use a torque wrench and mount the cable end with 60 Ncm to 90 Ncm.
- Do not stack adapters directly at the SMA connector. If you need to use adapters, then always use a specific adapter cable (order no. 4900.1700.00).

**To connect to 1.85 mm (V) connector**


1. Use an RF cable with an 1.85 mm (V) plug connector.
2. **NOTICE!** Risk of cable damage.
  - Use only cables with V plugs for the connection to the V connector.
  - Use the port saver (V-Adapter Male-Female, order no. 5009.5859.00) for the V connector.

Connect the RF cable with V plug to the "RF In 17-53 GHz" connector. Follow the instructions as described under "[To connect to SMA connector](#)" on page 14.

 The V connector is sensitive to mechanical stress. Use the following handling precautions.

- Always use a torque wrench and mount the cable end with 90 Ncm.

### 3.4 Connecting to IF1-IF3 (IF outputs)

 The SMA connector is sensitive to mechanical stress. Use the following handling precautions.

- Always use the torque wrench provided with the delivery and mount the cable end with 60 Ncm to 90 Ncm.
- Do not stack adapters directly at the SMA connector. If you need to use adapters, then always use a specific adapter cable (order no. 4900.1700.00).

**To connect to IF1 (SMA) connector**

- ▶ Connect the "IF1" to the master R&S TSMx6.  
Follow the instructions as described under "[To connect to SMA connector](#)" on page 14.

**To connect to IF2 and IF3 (SMA) connector**

- ▶ Connect the "IF2" and "IF3" to additional R&S TSMx6 devices.  
Follow the instructions as described under "[To connect to SMA connector](#)" on page 14.  
For level-accurate measurements, screw the supplied 50  $\Omega$  terminations onto the unused IF outputs.

## 3.5 Connecting to Aux

**To connect to Aux connector**

1. Use the AUX cable provided with the delivery.
2. To connect the AUX cable to the "Aux" connector, proceed as follows:
  - a) Carefully align the connector of the cable along a common axis.
  - b) Fit the guide lug of the connector cable into the guide gap of the "Aux" connector and align the pins properly.
  - c) Carefully push the connector of the cable into the "Aux" connector until the connection locks.
3. To synchronize the master R&S TSME6 device and the additional R&S TSME6 devices, connect these devices via the "Aux" connectors.  
See [Chapter 6, "Measurement setup"](#), on page 25.

**To disconnect the Aux connector**

1. Pull the middle part of the connector cable back until the connection unlocks.  
**Note:** Do not pull on the cable.
2. Carefully remove the connector cable from the "Aux" connector.



## 4 R&S TSMS53DC tour

### 4.1 Front panel view

This section provides an overview of the front panel elements of the R&S TSMS53DC.



**Figure 4-1: R&S TSMS53DC front panel**

- 1 = Power LED
- 2 = State LED
- 3 = Kensington lock (nano security slot)

#### 4.1.1 LEDs

The R&S TSMS53DC provides LEDs for power ("Pwr") and status ("State") on the front panel.

**Table 4-1: Pwr and State LED states and their meaning**

Pwr LED	State LED	Meaning
off	off	No power supply connected at DC IN Power supply off Power supply < 9 V
yellow	off	Standby

Pwr LED	State LED	Meaning
green, blinking (2 Hz)	off	FPGA configuration in progress
green	off	R&S TSMS53DC ready, not connected
green	green, blinking rapidly	Connected or measuring
green	green, blinking 2 Hz	Instrument is identified by the software
green	red, blinking 2 Hz	Temperature warning (controller board temperature = 65° C to 70° C)
green	red (continuous)	Temperature error (controller board temperature above 70° C)

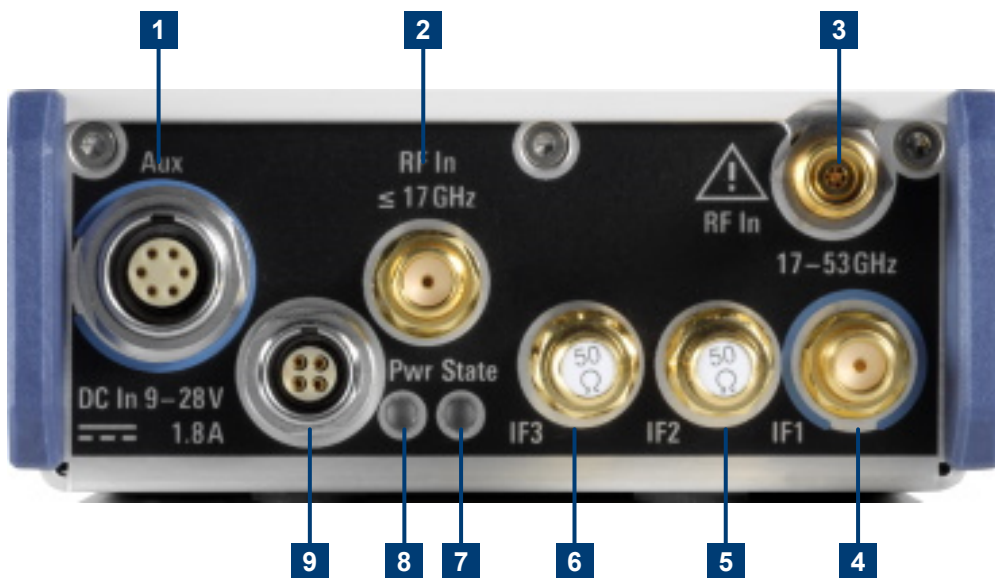
The fan is temperature-controlled. Below a temperature of 40° C on the controller board, the fan is in status OFF.

### 4.1.2 Kensington lock

Connector for a Kensington lock (nano security slot) to secure a mobile device against theft.

## 4.2 Rear panel view

This section provides an overview of the rear panel elements of the R&S TSMS53DC.



**Figure 4-2: R&S TSMS53DC rear panel**

- 1 = Aux connector
- 2 = RF In  $\leq 17$  GHz connector (RF bypass)
- 3 = RF In 17-53 GHz connector
- 4, 5, 6 = IF1 to IF3 connectors
- 7, 8 = Status LEDs
- 9 = DC In connector

### 4.2.1 Aux connector

6-pin connector (blue frame) for connecting the master device R&S TSMx6. To synchronize the master device and the additional devices, connect the devices via the "Aux" connectors.

How to: [Chapter 3.5, "Connecting to Aux"](#), on page 16.

### 4.2.2 RF In $\leq 17$ GHz connector (RF bypass)

SMA connector for connecting a second antenna. This antenna is switched automatically to "IF1" and is used for measurements below 17 GHz.

How to: ["To connect to SMA connector"](#) on page 14.

### 4.2.3 RF In 17-53 GHz connector

1.85 mm (V) connector for connecting a mmWave antenna. The downconverter input supports the frequency range from 17 GHz to 53 GHz.


How to: ["To connect to 1.85 mm \(V\) connector"](#) on page 15.

### 4.2.4 IF1 to IF3 connectors

SMA connectors for intermediate frequency output.

The "IF1" connector (blue frame) is the only IF output which supports measurements below 17 GHz. The "IF1" is always connected to the master R&S TSMx6.

The connectors "IF2" and "IF3" are connected to additional devices. The synchronization of the master device and the additional devices is done via the Aux connector.

 For level-accurate measurements, screw 50  $\Omega$  terminations onto the unused IF outputs. The 50  $\Omega$  terminations are provided with the delivery.

How to: [Chapter 3.4, "Connecting to IF1-IF3 \(IF outputs\)"](#), on page 15.

### 4.2.5 Status LEDs

LEDs for indicating status information, see [Chapter 4.1.1, "LEDs"](#), on page 17.

### 4.2.6 DC In connector

4-pin DC power supply connector.

- DC input voltage = 9 V to 28 V

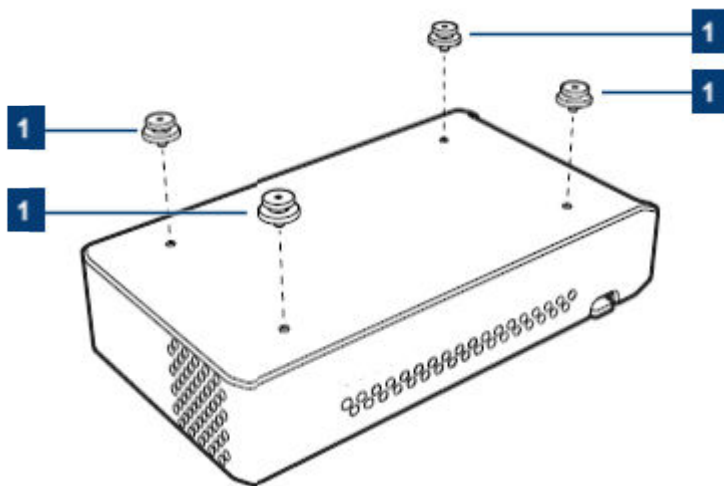
How to: [Chapter 3.2, "Connecting to power"](#), on page 12.

## 5 Mounting the R&S TSMS53DC

### 5.1 Mounting R&S TSMS53DC or R&S TSME6 to R&S TSMA6/6B

#### To connect R&S TSMS53DC or R&S TSME6 and R&S TSMA6/6B

1. Screw the connecting elements (collar screws) (order no. 4900.0804.00) on the top of the R&S TSMA6/6B.
  - Torque: 0.66 Nm ± 0.05 Nm
  - Secure with liquid plastic



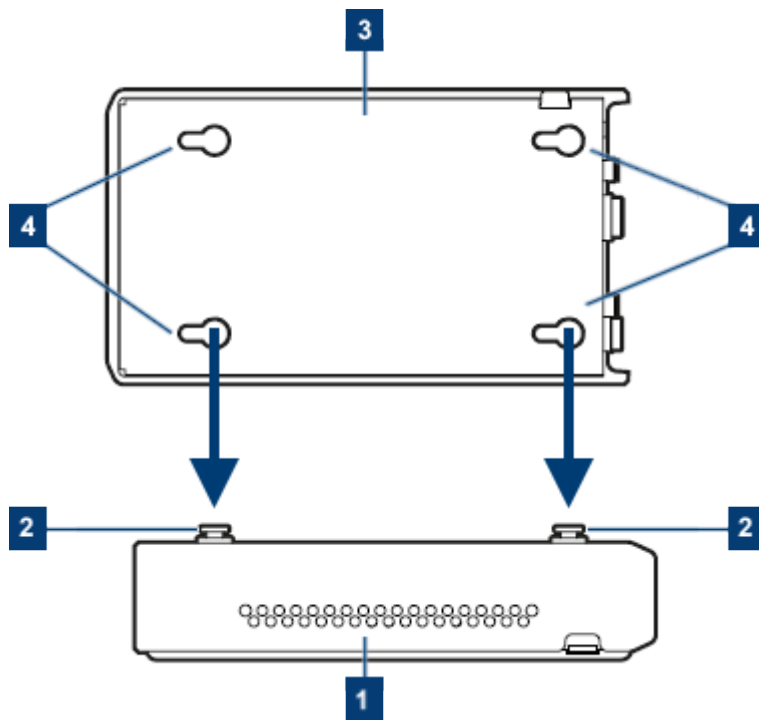
**Figure 5-1: Connecting elements**

1 = Connecting elements (order no.4900.0804.00)

2. **NOTICE!** An insufficient airflow can cause the instrument to overheat, which may disturb the operation and even cause damage. Make sure that all fan openings are unobstructed and that the airflow perforations are unimpeded, particularly when the instrument is installed in a rack or packed in a backpack. Ensure that the following surrounding spaces to the instrument are kept clear:
  - Front pane: minimum 2 cm
  - Left/right panes: minimum 1 cm

Align the collar screws with the snap-in holes on the bottom of an R&S TSMS53DC and press the R&S TSMS53DC down.

Connecting R&S TSMA6/6B-BP with R&S TSME6 and R&S TSMS53DC



**Figure 5-2: Aligning R&S TSMA6/6B and R&S TSMS53DC**

1 = R&S TSMA6/6B

2 = Collar screws

3 = R&S TSMS53DC

4 = Snap-in holes on the bottom pane of R&S TSMS53DC

## 5.2 Connecting R&S TSMA6/6B-BP with R&S TSME6 and R&S TSMS53DC

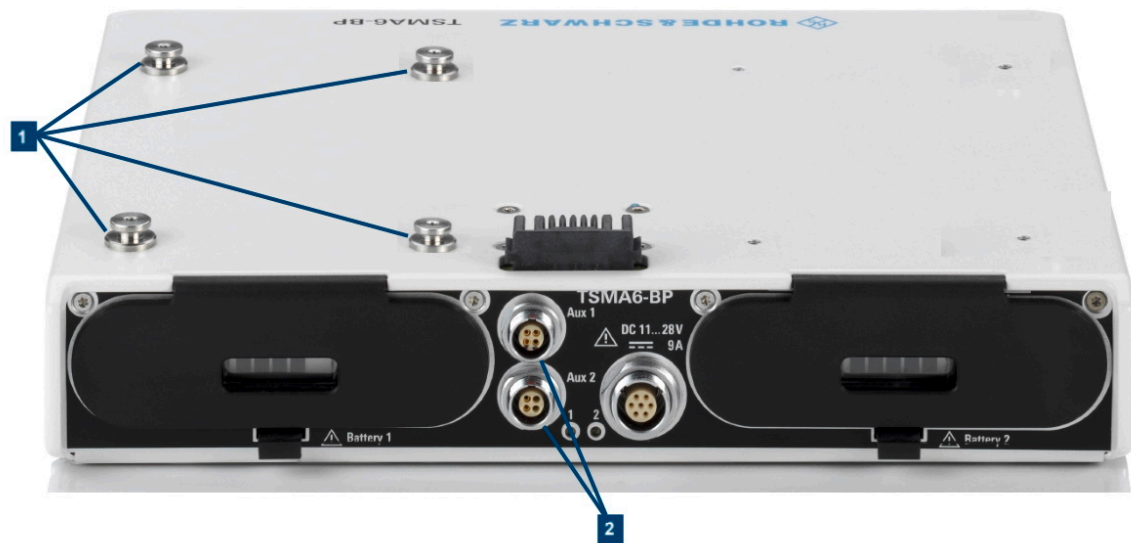


The following steps are valid for R&S TSME6 and downconverter R&S TSMS53DC.

For the cabling of the devices, the accessory cables R&S TSMA6-BPPT or R&S TSMA6-BP2T are necessary.

1. Screw the collar screws (1) on the top of the R&S TSMA6/6B-BP with a Torx 8 screw driver.
  - Torque: 0.66 Nm  $\pm$  0.05 Nm

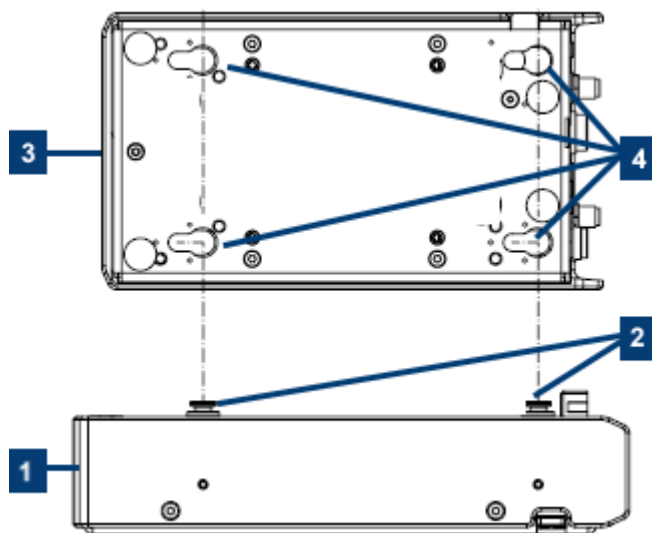
## Connecting R&amp;S TSMA6/6B-BP with R&amp;S TSME6 and R&amp;S TSMS53DC



1 = Collar screws for connecting R&S TSME6

2 = Aux 1 / Aux 2 (auxiliary power out for connecting R&S TSME6/TSMS53DC via power cable R&S TSME-ZYC)

- Align the collar screws with the snap-in holes on the bottom of an R&S TSME6/TSMS53DC and press the device down.



**Figure 5-3: Example: Aligning R&S TSMA6/6B-BP and R&S TSME6/TSMS53DC**

1 = R&S TSMA6/6B-BP

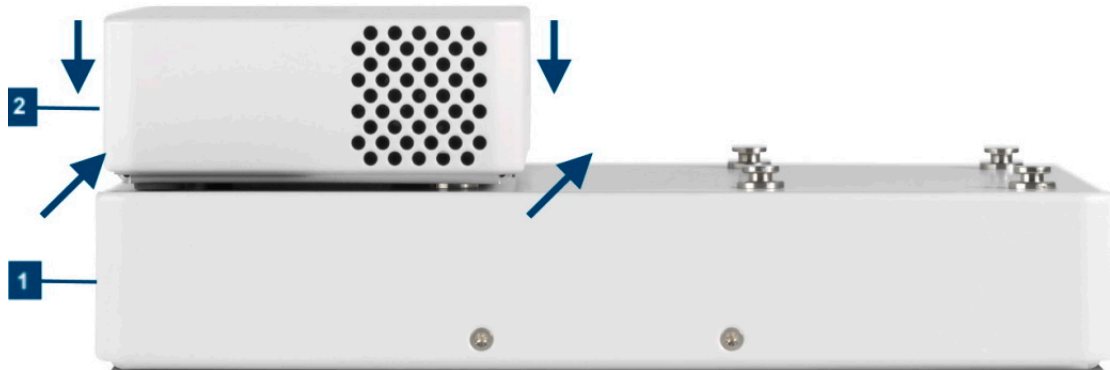
2 = Collar screws

3 = R&S TSME6/TSMS53DC

4 = Snap-in holes on the bottom pane of R&S TSME6/TSMS53DC

Connecting R&S TSMA6/6B-BP with R&S TSME6 and R&S TSMS53DC

3. Move the R&S TSME6/TSMS53DC to the back side, until you hear a click when the collar screws are locked in.



**Figure 5-4: Connected R&S TSME6/TSMS53DC and R&S TSMA6/6B-BP**

1 = R&S TSMA6/6B-BP

2 = R&S TSME6/TSMS53DC

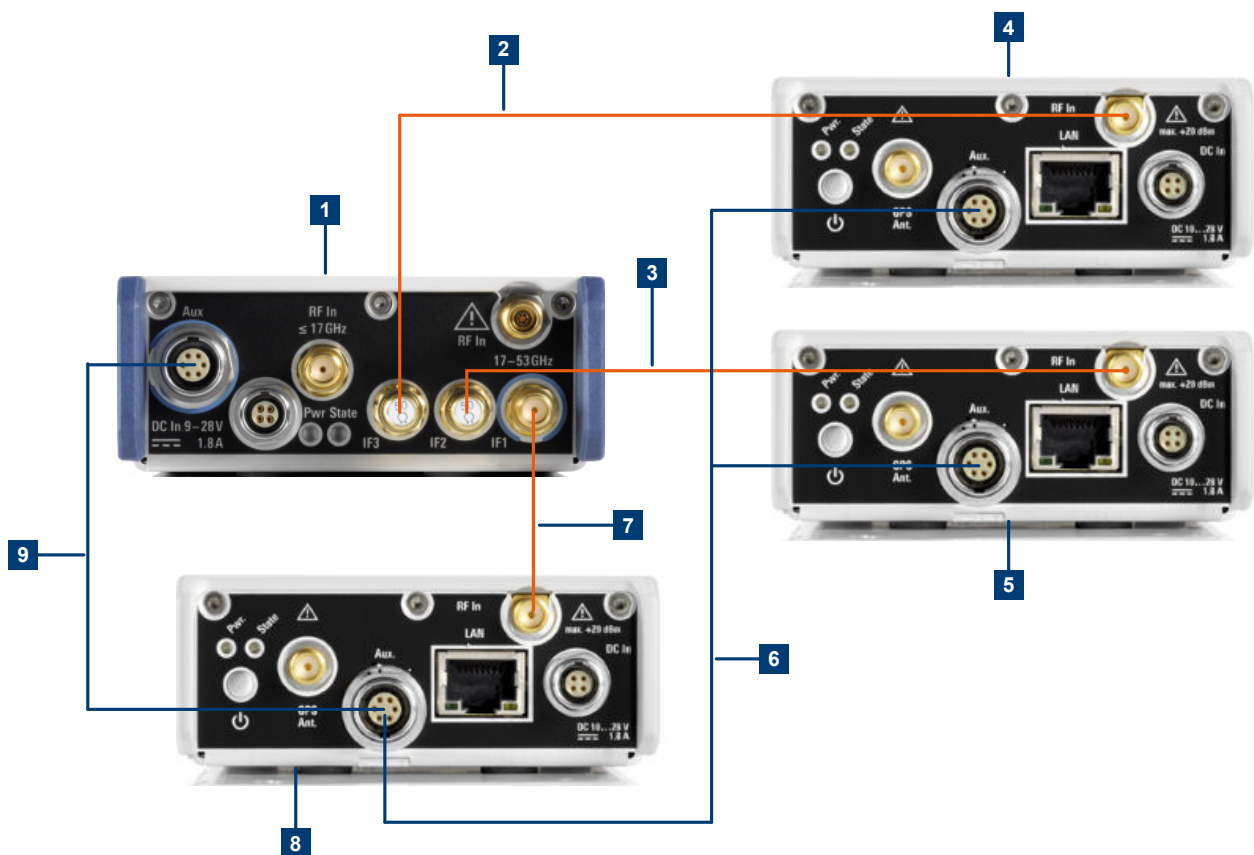
4. Connect the power cable R&S TSMA6-BPPT resp. R&S TSMA6-BP2T from AUX1 resp. AUX2 to DC IN of R&S TSME6/TSMS53DC.



## 6 Measurement setup

Figure 6-1 shows a measurement setup with one R&S TSMS53DC and three R&S TSME6 devices.

In this measurement setup, one R&S TSME6 is connected as master device and two R&S TSME6 are connected as additional (satellite) devices.




**Figure 6-1: Example: Measurement setup R&S TSMS53DC with three R&S TSME6 devices**

- 1 = R&S TSMS53DC
- 2 = R&S TSMS53DC "IF3" - R&S TSME6 "RF In" (Satellite 3)
- 3 = R&S TSMS53DC "IF2" - R&S TSME6 "RF In" (Satellite 2)
- 4 = R&S TSME6 (Satellite 3)
- 5 = R&S TSME6 (Satellite 2)
- 6 = Synchronization R&S TSME6 (Master) - R&S TSME6 (Satellite 2 and Satellite 3)\*
- 7 = R&S TSMS53DC "IF1" - R&S TSME6 "RF In" (Master)
- 8 = R&S TSME6 (Master)
- 9 = Synchronization R&S TSMS53DC - R&S TSME6 (Master)

\*The cable to synchronize R&S TSMS53DC and the master R&S TSME6 exists as separate cable, see [To synchronize the R&S TSMS53DC and R&S TSME6](#).

The R&S TSMS53DC supports up to 3 scanners.

 Only R&S TSME6 and R&S TSMA6/6B devices are supported.

### To connect the RF connectors

1. Connect the "IF1" connector of the R&S TSMS53DC to the "RF In" connector of the master R&S TSMx6.

See ["To connect to SMA connector"](#) on page 14.

**Note:** "IF1" (blue frame) is the only IF output supporting the bypass (frequencies  $\leq 17$  GHz).

2. Connect the "IF2" connector of the R&S TSMS53DC to the "RF In" connector of satellite 2R&S TSMx6.
3. Connect the "IF3" connector of the R&S TSMS53DC to the "RF In" connector of satellite 3R&S TSMx6.

**Note:** Use "IF2" and "IF3" to enhance the measurement bandwidth. "IF2" and "IF3" cannot operate independent from "IF1".

### To synchronize the R&S TSMS53DC and R&S TSME6

To synchronize the R&S TSMS53DC and the R&S TSME6 in a test setup, connect the "Aux" connectors of the devices via an AUX cable.

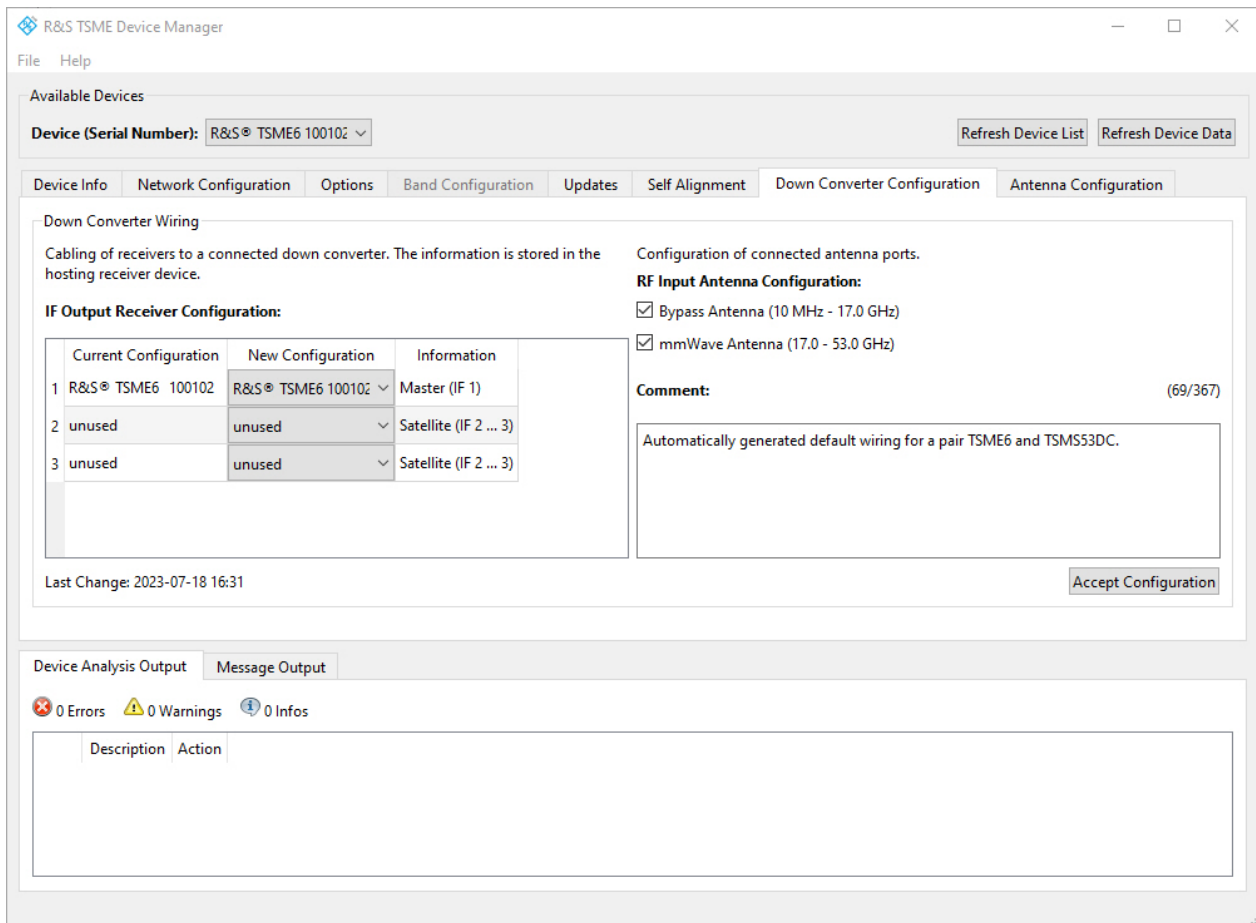
If more than one R&S TSME6 is used, the synchronization connection requires a specific cable. For example, when working with three R&S TSME6 in the test setup, the AUX cable R&S TSME6-ZC4 (Order No. 4900.1817.02) is required. When using this cable, use the blue marked cables for synchronization connection between the R&S TSMS53DC and the master R&S TSME6.

1. Connect the "Aux" connector (blue frame) of the R&S TSMS53DC to the "Aux" connector of the master R&S TSME6.  
See ["To connect to Aux connector"](#) on page 16.
2. Connect a blacked marked cable from the AUX cable to the "Aux" connector of R&S TSME6 satellite 2.
3. Connect a blacked marked cable from the AUX cable to the "Aux" connector of R&S TSME6 satellite 3.

## Configuring the R&S TSMS53DC

The configuration of the R&S TSMS53DC is done via the connected R&S TSME6 / R&S TSMA6 with the "R&S TSME Device Manager" software.

In the "Down Converter Configuration" tab, you can configure the IF output receiver and the RF input antenna of the R&S TSMS53DC.



**Figure 6-2: Example: Configuring R&S TSMS53DC with R&S TSME6 (Down Converter Configuration tab)**

1. Under "IF Output Receiver Configuration", specify the configuration of the IF output connectors of the R&S TSMS53DC.
2. Under "RF Input Antenna Configuration", specify the configuration of the RF input antenna connectors of the R&S TSMS53DC.
  - a) Activate "Bypass Antenna (10 MHz - 17.0 GHz)".
  - b) Activate "mmWave Antenna 1 (17.0 - 53.0 GHz)".

For R&S ViCom and R&S ROMES, the API allows only the configuration of frequencies of activated antenna ports.

3. Click "Accept Configuration" to confirm the settings.
4. Close the "R&S TSME Device Manager".

For details about the "R&S TSME Device Manager", refer to the user manual of R&S TSMA6 or R&S TSME6.

## 7 Korea certification class B



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*Figure 8-1: QR code to the Rohde & Schwarz support page*