

R&S® TSMS53DC

Ultracompact Downconverter Manual



4902016002

Version 04

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 04 | R&S®TSMS53DC

Throughout this manual, R&S® is indicated as R&S.

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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 bzw. dieses Zubehör ist für ein bestimmtes Rohde & Schwarz Produkt konzipiert. Mit dem Produkt werden mehrsprachige Sicherheitshinweise geliefert. Befolgen Sie die in diesem Handbuch beschriebenen 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 tietylle 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. Tootele 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 приладу Rohde & Schwarz. Інструкції з техніки безпеки кількома мовами постачаються разом із приладом. Дотримуйтеся наданих інструкцій зі встановлення.

Ta opcja lub akcesorium jest przeznaczone 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 přiloženými 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 določen izdelek podjetja Rohde & Schwarz. Izdelku so priložena varnostna navodila v več jezikih. Upoštevajte priložena navodila za namestitve.

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 üçün niyetlenilen. Dürli dil-däki howpsuzlyk barada maglumat önüm bilen bile üpjün edilyär. Üpjün edilen gurnama ugrukdyrmalaryny 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.

本选件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 aksesoris ini direka bentuk untuk produk Rohde & Schwarz yang tertentu. Maklumat keselamatan berbilang bahasa disertakan bersama produk. Ikut arahan pemasangan yang diberikan.

Opsi atau aksesoris 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 توفير معلومات السلامة متعددة اللغات مع المنتج. اتبع تعليمات التركيب الموضحة.

این قابلیت یا وسیله جانبی منحصرأ برای محصول به خصوص Rohde & Schwarz طراحی شده است. اطلاعات ایمنی چند زبانه همراه این دستگاه ارائه شده است. دستورالعمل‌های نصب ارائه شده را دنبال کنید.

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

2 About the R&S TSMS53DC

Intended use

The R&S TSMS53DC ultracompact downconverter is intended to upgrade the R&S TSMx6 and R&S TSMS8 scanners to measure 5G NR signals in the mmWave frequency range. The downconverter extends the latest generation mobile network scanner family and provides 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
- User manual of R&S TSMS8
- Installation instructions of the R&S TSMS-OMN70 OMNI antenna

The user manuals of R&S TSME6, R&S TSMA6/6B and R&S TMS8 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 TSMx network scanners to simplify operation and maximize the performance
- Simultaneous mmWave and sub 8.5 GHz measurements with a single scanner
- Customized mechanical concept, fully compatible with the latest R&S TSMx 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.
See [Section 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 a 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 a 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 power supply. Ensure that the polarity is correct. (See [Figure 3-1](#)).

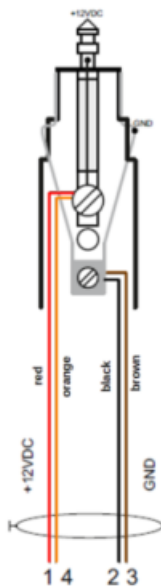


Figure 3-1: Supplied power cable with cigarette lighter adapter

- 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 specification. 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 R&S TSMx and one R&S TSM53DC.
 - R&S TSMA6-Z1 has an output power of 105 W and is suitable for multiple R&S TSMx products.
 - R&S TSMS-Z1 has an output power of 65 W.
1. Ensure that the required ratings listed in the specification 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 the 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 the 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 TSMx.
Follow the instructions as described under ["To connect to the SMA connector"](#) on page 14.

To connect to IF2 and IF3 (SMA) connector

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

3.5 Connecting to Aux

To connect to the 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 scanner and the additional R&S TSME6 scanners, connect these instruments via the "Aux" connectors.
See [Section 6, "Measurement setup"](#), on page 23.

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.

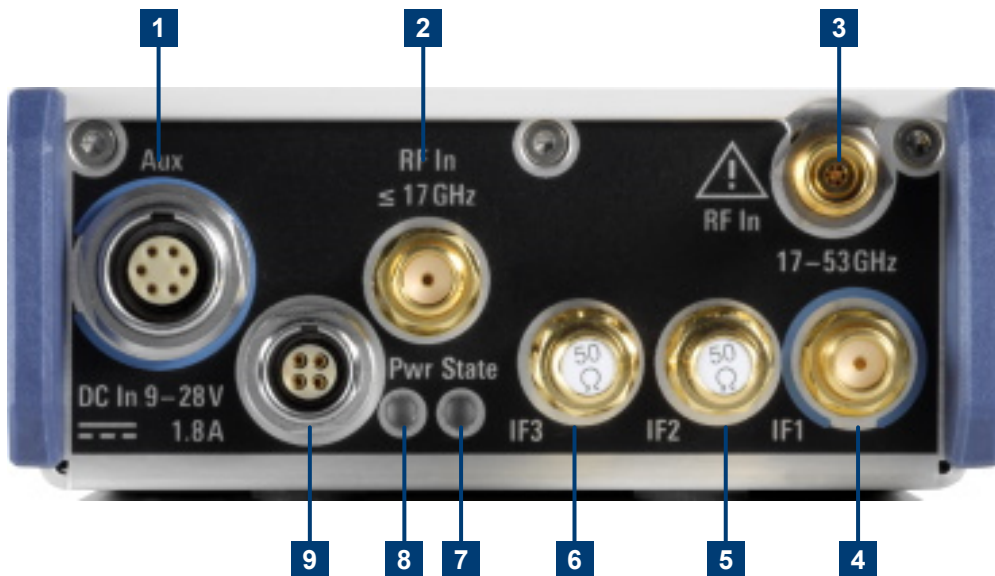


Figure 4-2: R&S TSM53DC rear panel

- 1 = Aux connector
- 2 = RF In ≤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 scanner R&S TSMx. To synchronize the master scanner and the additional scanners, connect the scanners via the "Aux" connectors.

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

4.2.2 RF In ≤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 the 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 TSMx.

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



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

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

4.2.5 Status LEDs

LEDs for indicating status information, see [Section 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: [Section 3.2, "Connecting to power"](#), on page 12.

5 Mounting the R&S TSMS53DC

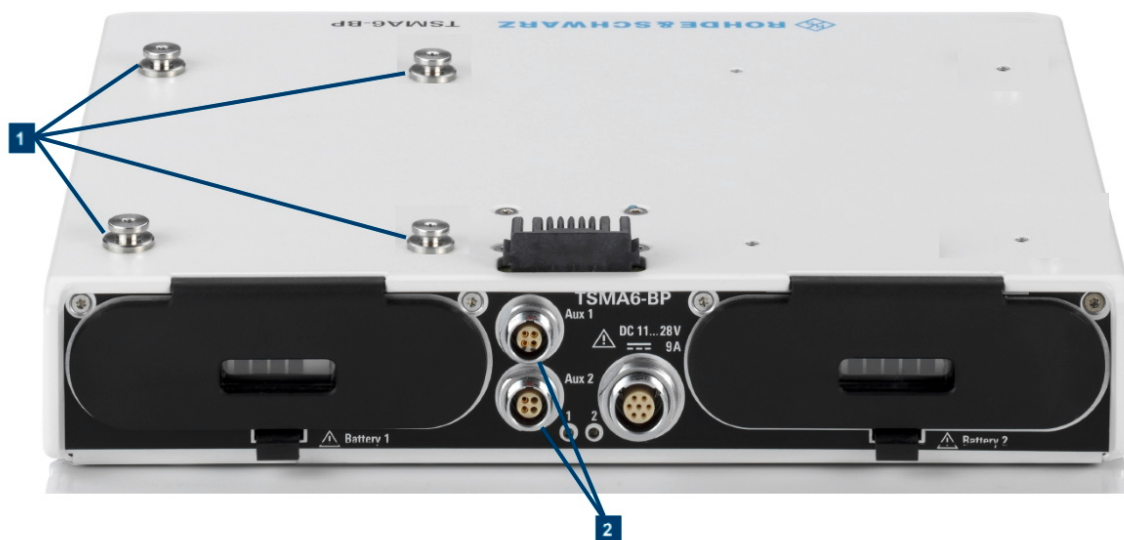
5.1 Connecting R&S TSMA6/6B-BP with R&S TSME6 and R&S TSMS53DC



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

For the cabling of the instruments, 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: $0.66 \text{ Nm} \pm 0.05 \text{ Nm}$



1 = Collar screws for connecting R&S TSME6/TSMS53DC

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

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

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

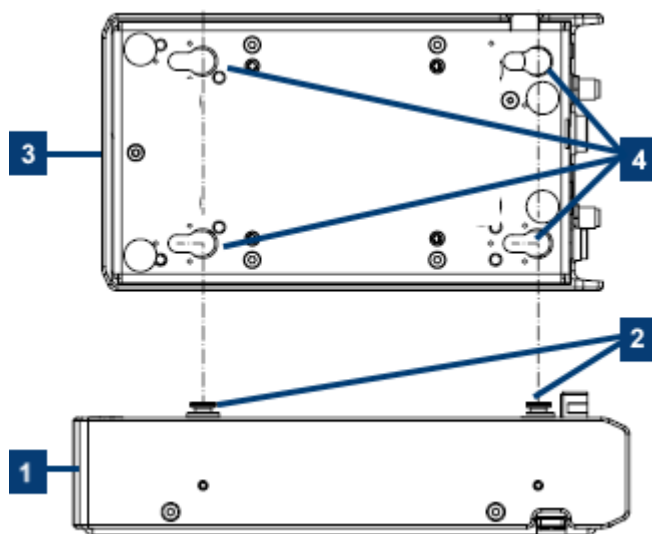


Figure 5-1: Example: Aligning R&S TSMA6/6B-BP and R&S TSME6/TSMS53DC

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

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

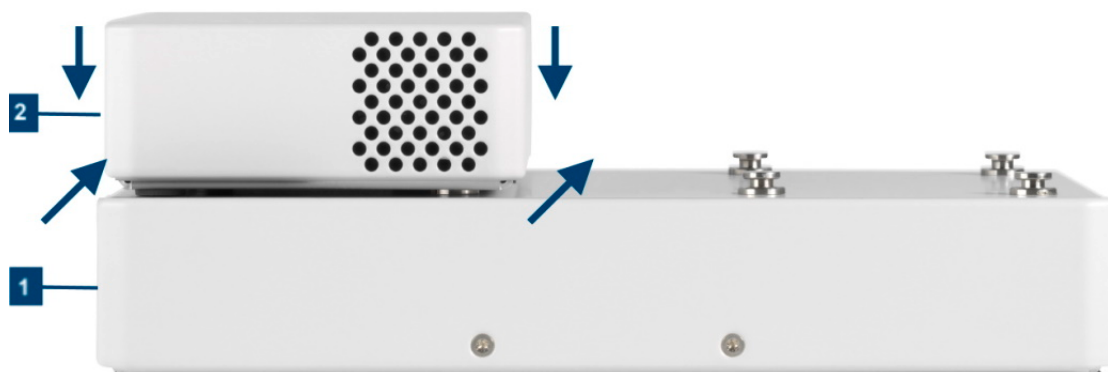


Figure 5-2: Connected R&S TSME6/TSMS53DC and R&S TSMA6/6B-BP

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 scanners.

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

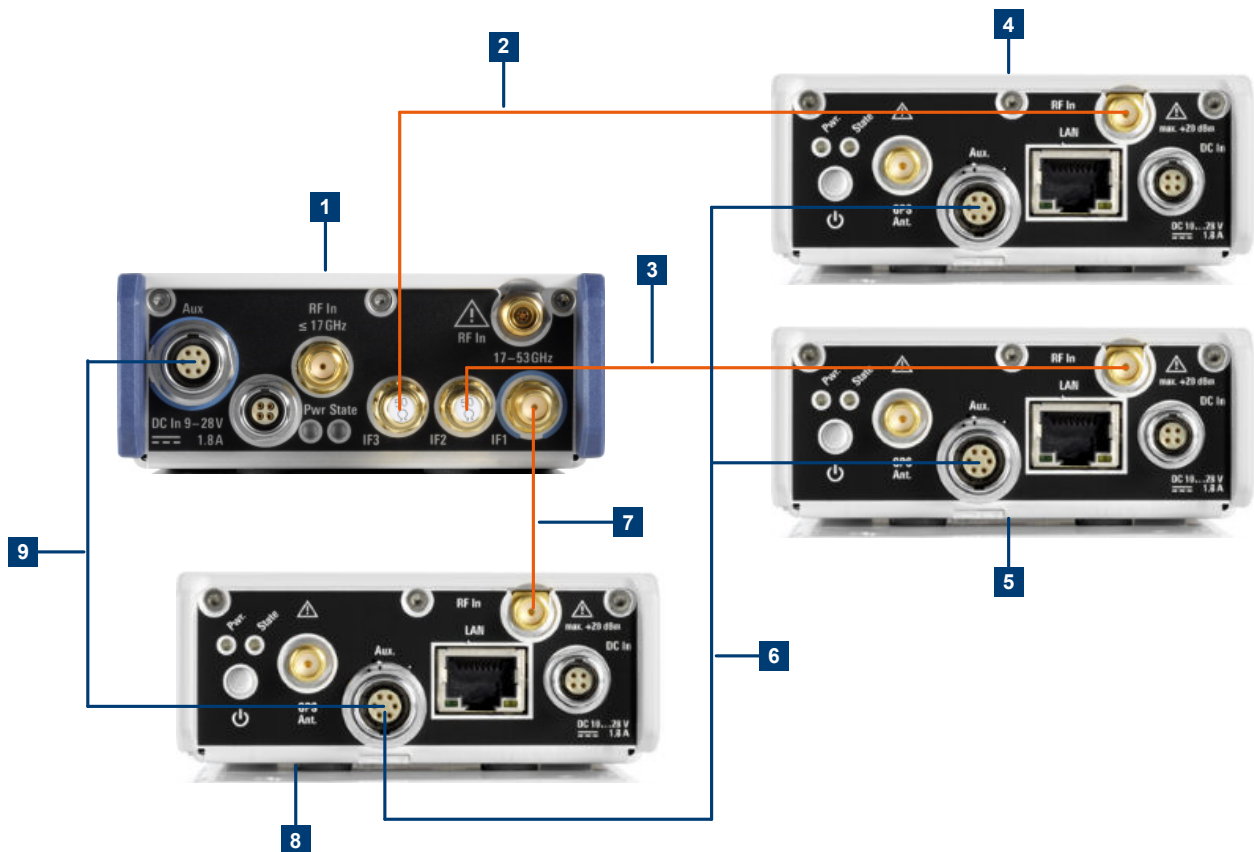


Figure 6-1: Example: Measurement setup R&S TSMS53DC with three R&S TSME6 scanners

- 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 TSMx](#).

The R&S TSMS53DC supports up to 3 scanners.



The R&S TSMS53DC supports R&S TSME6, R&S TSMS8 and R&S TSMA6/6B scanners. A measurement setup supports only scanners from the same product family (R&S TSMx6 or R&S TSMx8).

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 TSMx.

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

Note: "IF1" (blue frame) is the only IF output supporting the bypass (frequencies ≤ 17 GHz).

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

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 TSMx

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

If more than one R&S TSMx 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 the 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 TSM53DC

The configuration of the R&S TSM53DC is done via the connected R&S TSMx with the "R&S TSMx 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 TSM53DC.

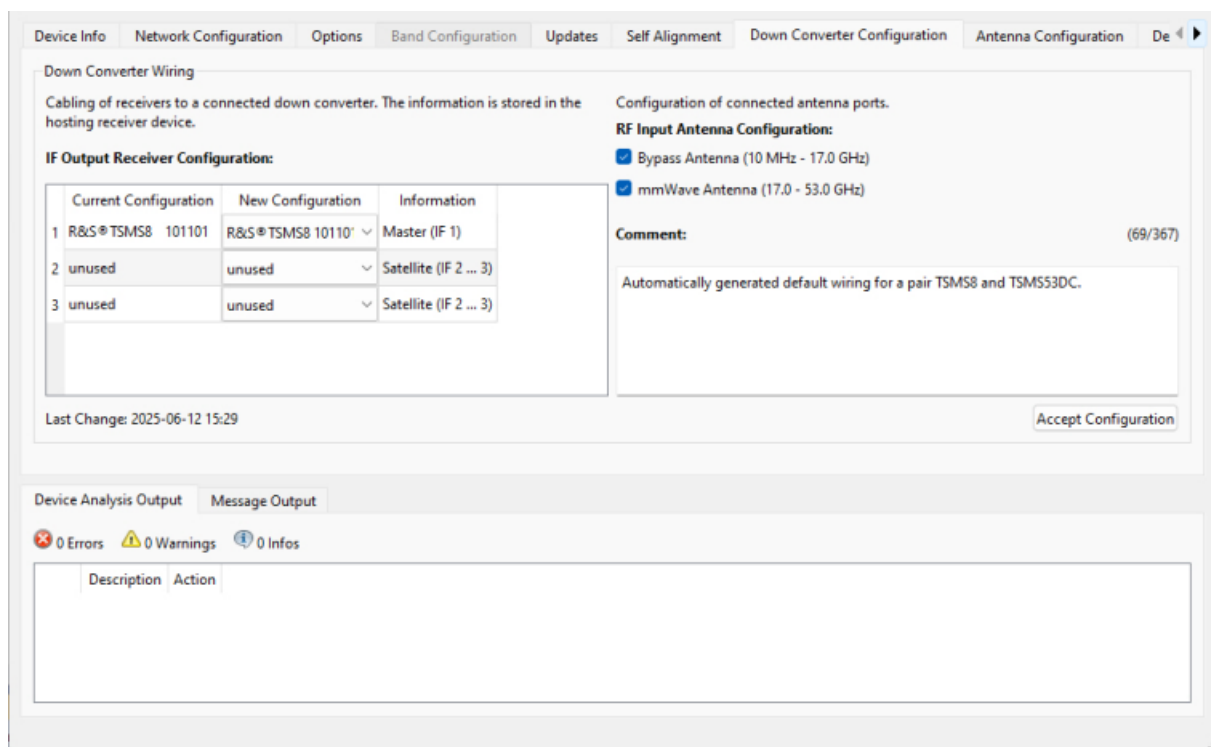


Figure 6-2: Example: Configuring R&S TSM53DC with R&S TSME8 (Down Converter Configuration tab)

1. Under "IF Output Receiver Configuration", specify the configuration of the IF output connectors of the R&S TSM53DC.
2. Under "RF Input Antenna Configuration", specify the configuration of the RF input antenna connectors of the R&S TSM53DC.
 - a) Activate "Bypass Antenna (10 MHz - 17.0 GHz)".
 - b) Activate "mmWave Antenna 1 (17.0 - 53.0 GHz)".

For R&S ViCom and 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 TSMx Device Manager".

For details about the "R&S TSMx Device Manager", refer to the user manual of the R&S TSMx scanner.

7 Korea certification class B



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

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