

F9641A Rack Mountable Test Chamber (RMTC)

Millimeter-Wave Over-the-Air Measurement Chamber

Introduction

The Keysight F9641A Rack Mountable Test Chamber (RMTC) is a shielded anechoic chamber which is suitable for Protocol, Functional, and Throughput testing of FR2 frequency bands.



Overview

The Keysight F9641A Rack Mountable Test Chamber (RMTC) is a shielded anechoic chamber which is suitable for Protocol, Functional, and Throughput testing of FR2 frequency bands. It supports 2x2 MIMO direct far-field measurements over one Angle of Arrival.

There are options to choose mounting brackets based on the RRH used, and both the antennas are installed on the ceiling of the chamber. The 600-8000 MHz dual polarization antenna offers polarization rotation to provide maximal signal de-correlation.

There is an option to neatly mount all the system components in a rack.

Key Features

The key features of Keysight F9641A RMTC are:

- FR2 protocol, functional, and 2x2 MIMO throughput testing
- FR1 protocol, functional, and 4x4 MIMO throughput testing in conducted mode
- Fully shielded and filtered
- Low path loss
- LED lights to facilitate working inside the chamber
- USB camera to monitor inside the chamber
- Laser-guided crosshair for accurate DUT placement
- Optional rack to neatly mount all the system components

Contact Keysight to discuss further use cases as the OTA Test Bed performance is a task to evaluate with care.

System Specifications

F9641A: Anechoic Chamber

Description	Specification (Nominal)	Supplemental Information
Construction	NA	Aluminum frame and aluminum panels
Height (external / internal)	1292 mm / 988 mm	With RRHs and feet
Width (external / internal)	472 mm / 324 mm	With doorstopper and door latch
Depth (external / internal)	552 mm / 328 mm	With door handle and panels
Weight	40 kg (88 lb)	Base configuration
Anechoic treatment	50 mm at Ceiling and on Walls	Corrugated anechoic foam
Enclosure frequency range	700 MHz to 68 GHz	
Minimum isolation at 2.5 GHz	70 dB	From DUT to the outside of the chamber
Minimum isolation at 5.0 GHz	70 dB	
Minimum isolation at 28 GHz	70 dB	
Minimum isolation at 40 GHz	70 dB	
Operating voltage	AC, 100-120, 220-240 V, 50/60 Hz, 250 W	External
Power consumption	<220 W	
Ventilation	Two honeycomb structures with 1x fan for forced air flow	To the rear of the chamber
Power ports	1x AC power, 100-120 or 220-240 V, 50/60 Hz, 150 W Max	Internal
	2x DC power, 5 A	2.1 x 5.5 mm
Connectivity ports	1x USB 3.0	For camera
	1x USB 3.0	
	1x RJ45 Ethernet	RJ45, 10G PoE+
Illumination	2x LED-based lights	
Camera	USB output	
Crosshair laser for exact positioning of the DUT	Laser-based Wavelength: 630-680 nm Max power: 1.3 mW	
Operating temperature	15-35 °C (59-95 °F)	
Relative humidity	95 % RH	

Connector Panels – Order 1 For Each Panel

Description	Specification (Nominal)	Supplemental Information
Roof-top connector panel	4x SMA, 2x 2.4mm	F9641A-RT2
Rear center connector panel	Blank panel	F9641A-RC0
	1x 2.4mm, 4x SMA	F9641A-RC1
	1x 2.4mm, 8x SMA	F9641A-RC2
Rear left connector panel	Blank panel	F9641A-RL0
	1x USB 3.1 Gen 2 Type C	F9641A-RL1
	8x SMA	F9641A-RL2
Rear right connector panel	Blank panel	F9641A-RR0
	1x USB 3.1 Gen 2 Type C	F9641A-RR1

F9641A-RL1 & F9641A-RR1: USB 3.1 Gen 2 Type C

Description	Specification (Nominal)	Supplemental Information
Connectivity port	1x USB 3.1 Gen 2 Type C	SuperSpeed+, 10 G
Power delivery	Downstream Facing Port	Red LED, Power Indicator
	Supports 4 Power Profiles over CC1 and CC2:	Yellow LED, High Power
	15W (5VDC 3A)	High Voltage Indicator Off
	27W (9VDC 3A)	High Voltage Indicator On
	45W (15VDC 3A)	High Voltage Indicator On
	60W (20VDC 3A)	High Voltage Indicator On
Data cables	2x USB 3.1 Gen 2 M-M 10 Gbps	

F9641A-AA1: 0.6-8 GHz Antenna

Description	Specification (Nominal)	Supplemental Information
Antenna type	Dual Polarization Vivaldi Antenna	
Antenna frequency range	0.6-8 GHz	
Connector type	SMA (f)	
Terminal	50 Ω	
VSWR	< 3.5 @ 0.6 ~ 8 GHz	

FR2 RF Characteristics

Description	Specification (Nominal)	Supplemental Information
Cross-polarization	< -30 dB	Max for DP antenna
Free space path loss	$FSPL = \frac{(4\pi R)^2}{\lambda^2}$	e.g., 58.3 dB for 78 cm, at 28 GHz
Reflectivity	< -50 dB	Measured with an empty chamber

F9641A-AB1: 22-50 GHz Dual Polarization Antenna

Description	Specification (Nominal)	Supplemental Information
Antenna frequency range	22-50 GHz	
Connector type	2x 1.85 mm (f)	
Return loss	12 dB	Min
Gain	9.5 dBi at 28 GHz 11 dBi at 40 GHz	
Beamwidth vs frequency	52 ° at 28 GHz 40 ° at 40 GHz	
Cross port isolation	< -40 dB	Coupling H to V OR V to H within a pair of SP antennas
Cross-polarization	< -25 dB	Coupling to cross-polarized mode compared co-polarized mode
Cable loss to the RF head	~ 2 dB	Varies with frequency

F9641A-Cxx: Cables

Description	Specification (Nominal)	Supplemental Information
RF cable (RRH to chamber)	2.4 mm, M-M, 0.5 m	F9641A-CA0
RF cable (Calibration kit)	2.4 mm, M-M, 2.0 m	F9641A-CA2
RF cable (Chamber to DUT)	SMA-SMA, M-M, 1.2 m	F9641A-CB1
RF cable (UXM to RRH)	N-SMA, M-M, 3.0 m	F9641A-CC3
DC cable (for DUT, internal)	2.1 x 5.5 mm, 1.0 m	F9641A-CD1
DC cable (for DUT, external)	2.1 x 5.5 mm, 3.0 m	F9641A-CD3

F9641A-Mxx: Accessories

Description	Specification (Nominal)	Supplemental Information
Rack, 42U, with stability brackets	2045 mm x 600 mm x 757 mm 60 kg	F9641A-M04
Mounting brackets for RRHs	For 2x M1740A	F9641A-M05
	For 2x M1749B	F9641A-M06

F9641BA1A: Calibration Kit

Description	Specification (Nominal)	Supplemental Information
Antenna frequency range	6-67 GHz	Antenna holding fixture with the cable
Antenna connector	1.85 mm (f)	

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