WAVE-GLIDETM

PRODUCT MANUAL





TABLE OF CONTENTS

TABLE OF CONTENTS
LIST OF FIGURES
LIST OF TABLES
INTRODUCTION
Wave-Glide [™]
PRODUCT SPECIFICATIONS
Mechanical Specification6
Mechanical Outline
Compatible VNA Extender Models7
PART LIST & ACCESSORIES
Part List9
Additional Accessories9
PRODUCT ASSEMBLY INSTRUCTIONS
STEP 1: Assemble VNA Extender onto the Extender Plate
STEP 1: Assemble VNA Extender onto the Extender Plate (CONTINUED)12
STEP 2: Add Springs and Washers
STEP 3: Assemble VNA Extender onto the Rail14
STEP 4: VNA Extender Alignment
STEP 4: VNA Extender Alignment (CONTINUED)16
PRODUCT OPERATION
Useful Tips and Limitations



LIST OF FIGURES

Figure 1: Wave-Glide [™]	4
Figure 2: Proxi-Flange [™]	5
Figure 3: Product Outline	6
Figure 4: Pre-Assembled Rail	10
Figure 5: Extender Assembly	11
Figure 6: Manufacturer's Denotation	
Figure 7: Spring, Washers assembly	
Figure 8: Alignment Screw Assembly	14
Figure 9: Alignment Step 1	15
Figure 10: Alignment Step 2	15
Figure 11: X-Y-Z Adjustment	
Figure 12: Slot for movement	
Figure 13: Best Practices	

LIST OF TABLES

Table 1: Mechanical Specification	6
Table 2: Compatible Extender Model	7
Table 3: Compatible Extender Model (Cont.)	8
Table 4: Parts Included in kit	9



INTRODUCTION

Wave-Glide[™]

To enhance the functioning of Proxi-Flange[™] and streamline component testing, Wave-Glide[™] test fixture (the rail) is developed. The rail provides fast and reliable testing system when the frequent connecting and discounting of the device under test (DUTs) with millimeterwave vector network analyzer (VNA) extenders that are mounted on sliding rails are required.

The fixture is constructed using a set of mechanical rails and sliding mounts as shown in the image below. It also consists of plates that have various mounting holes compatible with a wide range of VNA extenders including Eravant's STO series and many other manufacturers. Check the datasheet or product specifications page for more detail.

For the proper functioning of extenders after they are mounted on the rails, it is important to have good alignment of the flanges on the extenders. Since no attention was paid on mechanical tolerance when the extenders were designed and manufactured, their RF ports will vary from part to part and from manufacturer to manufacturer. Therefore, a combination of roll, pitch and yaw movements are required to align the two flanges.

To aid this process, a simple mechanism with screw guided springs along with an alignment fixture has been developed. The screws are easily accessible from the top and can be tightened or loosened causing the springs to contract or retract thus providing the adjustment required along the x, y or z axis.

More information and datasheet can be found here under <u>Wave-Glide[™]</u>



Proxi-Flange[™]

Figure 1: Wave-Glide[™]



A family of contactless waveguide flanges called Proxi-Flange[™], is developed to interface with the conventional flanges. The key feature of these flanges is their choking action on the flange so that it provides the RF short between the test system and DUT even there is slight cocking and gap between the interfaces. These have an inbuilt array of pin structure which forms a highly effective RF choke surrounding the waveguide junction. This RF choke presents a low RF impedance and will help in tolerating small gaps between the flanges.

Conventional flanges require use of waveguide screws and are prone to waveguide flange cocking if they are not properly screwed together. This leads in poor return loss and may leave small gaps causing high insertion loss. Also, the cocking and gap between the flanges would cause the testing uncertainties and results inconsistent DUT performance and ultimate DUT false rejection. Proxi-Flange[™] helps in eliminating the need of waveguide screws for firm mechanical connection to avoid the RF leaking, and hence in removing the variability and fatigue encountered when testing large numbers of waveguide components.

The Proxi-Flange[™] are available covering wide frequencies from 18 to 220 GHz in 11 waveguide bands, from WR-42 to WR-05. More information and details regarding these flanges can be found on our website under Proxi-Flange[™]



Figure 2: Proxi-Flange[™]



PRODUCT SPECIFICATIONS

Mechanical Specification

ltem	Mechanical Specification		
Rail Length	41" (104 cm)		
Rail Weight	14.4 Pounds		
Rail Material	Aluminum		
Base plate Material	Aluminum		
Outline	TL-RS-M1		

Table 1: Mechanical Specification

Mechanical Outline



Figure 3: Product Outline



Compatible VNA Extender Models

Extender Manufacturer	Specification	Model Number		
Eravant(E)		Configuration Guide		
	Frequency [GHz]	TX/RX Set	TX/RX Single	TX/RX Single w/Attenuator
	220-330	STO-03203N05-CMC-S1	STO-03203N05-C-E1	STO-03203N05-CM-E1
	140-220	STO-0509300-CMC-S1	STO-0509300-C-E1	STO-0509300-CM-E1
	140-220	STO-0520300-CMC-S1	STO-0520300-C-E1	STO-0520300-CM-E1
	110-170	STO-0609300-CMC-S1	STO-0609300-C-E1	STO-0609300-CM-E1
	110-170	STO-0620300-CMC-S1	STO-0620300-C-E1	STO-0620300-CM-E1
	90-140	STO-0809300-CMC-S1	STO-0809300-C-E1	STO-0809300-CM-E1
	90-140	STO-0820300-CMC-S1	STO-0820300-C-E1	STO-0820300-CM-E1
	75-110	STO-1009305-CMC-S1	STO-1009305-C-E1	STO-1009305-CM-E1
	75-110	STO-1009313-CMC-S1	STO-1009313-C-E1	STO-1009313-CM-E1
	75-110	STO-1020305-CMC-S1	STO-1020305-C-E1	STO-1020305-CM-E1
	75-110	STO-1020313-CMC-S1	STO-1020313-C-E1	STO-1020313-CM-E1
	75-110	STO-10203N08-CMC-S1	STO-10203N08-C-E1	STO-10203N08-CM-E1
	60-90	STO-1209305-CMC-S1	STO-1209305-C-E1	STO-1209305-CM-E1
	60-90	STO-1209315-CMC-S1	STO-1209315-C-E1	STO-1209315-CM-E1
	60-90	STO-1220305-CMC-S1	STO-1220305-C-E1	STO-1220305-CM-E1
	60-90	STO-1220315-CMC-S1	STO-1220315-C-E1	STO-1220315-CM-E1
	50-75	STO-1509305-CMC-S1	STO-1509305-C-E1	STO-1509305-CM-E1
	50-75	STO-1509315-CMC-S1	STO-1509315-C-E1	STO-1509315-CM-E1
	50-75	STO-1520305-CMC-S1	STO-1520305-C-E1	STO-1520305-CM-E1

Table 2: Compatible Extender Model



Extender Manufacturer	Frequency [GHz]	Model Number
Rohde and Schwarz(R)	750 to 1100	RPG ZTXR1100
	500 to 750	ZC750, RPG ZTXR750
	325 to 500	ZC500, RPG ZTXR500
	260 to 400	ZC400, RPG ZTXR400
	220 to 330	ZC330, RPG ZTXR330
	170 to 260	ZC260, RPG ZTXR260
	140 to 220	ZC220, RPG ZTXR220
	110 to 170	ZC170, RPG ZTXR170
	90 to 140	ZC140, RPG ZTXR140
	78 to 118	ZC118
	75 to 110	ZC110
	60 to 90	ZC90, ZC90E, RPG ZTXR90
	53 to 78	ZC78
	50 to 75	RPG ZTXR75
Virginia Diodes(V)	500-750	WM-380 VNAX (TxRx and TxRef)
	330-500	WM-570 VNAX (TxRx and TxRef)
	260-700	WM-710 VNAX (TxRx and TxRef)
	220-330	WR-3.4 VNAX (TxRx and TxRef)
	170-260	WR-4.3 VNAX (TxRx and TxRef)
	140-220	WR-5.1 VNAX (TxRx and TxRef)
	110-170	WR-6.5 VNAX (TxRx and TxRef)
	90-140	WR-8 VNAX (TxRx and TxRef)
	75-110	WR-10 VNAX (TxRx and TxRef)
	60-90	WR-12 VNAX (TxRx and TxRef)
	50-75	WR-15 VNAX (TxRx and TxRef)
	40-60	WR-19 VNAX (TxRx and TxRef)
	26-40	WR-28 VNAX (TxRx and TxRef)
Farran(F)	75-110	FEV-10-TR-0006
	60-90	FEV-12-TR-0006
	50-75	FEV-15-TR-0006

Table 3: Compatible Extender Model (Cont.)

The abbreviation letters, E, R, V and F are engraved on the mounting plates to assist the proper identifications.



PART LIST & ACCESSORIES

Part List

Below table shows the list of the part that are included with the product.

Parts Description Sr.No 1 2 X Extender Plate 8 X M8 Flat head 2 Screws for Extenders 16 X Washers for 3 Alignment 8 XCompression Springs 4 MM for Alignment 8 x M8 Screws for 5 Alignment 8 X 1/4"-20 Flat head Screws for the 6 Extenders (To be used for extenders with 1/4-20" mounting threads) 7 8 x Set Screws 8 Fixture for Alignment 5mm Hex Head 9 Screwdriver 5/32 Hex head 10

Table 4: Parts Included in kit

Additional Accessories

Replacement parts will be available under a set of hardware kits under PHW-HK04-RPS-1 or PHW-HK06-RPS-1-P40



www.eravant.com | 501 Amapola Avenue, Torrance, CA 90501 Phone: 424-757-0168 | Fax: 424-757-0188 | Email: support@eravant.com

Screwdriver

PRODUCT ASSEMBLY INSTRUCTIONS

• The Wave-Glide is provided partially pre-assembled which includes the carriages mounted on the rails ensuring their smooth sliding motion. It also includes the stoppers preinstalled as shown below.



Figure 4: Pre-Assembled Rail

• The rest of the assembly can be performed using the below steps



STEP 1: Assemble VNA Extender onto the Extender Plate

• Using the 8 Flat head screws (ITEM 2), attach the extender plate to the extenders using the 5mm hex screwdriver (ITEM 9).

Depending on the thread type for mounting for the extender, select M8 or 1/4"-20 screw can used. For Example: Eravant Extender uses M8 screws, VDI extenders use 1/4"-20 screws



Figure 5: Extender Assembly



STEP 1: Assemble VNA Extender onto the Extender Plate (CONTINUED)

- For the location of the holes, letters representing different VNA extender manufacturers have been inscribed on the plate as shown below.
 - E: Eravant R: Rohde and Schwarz F: Farran V: Virginia Diodes
- The extender plate for VNA extenders other than listed or with other mounting hole size and locations can be ordered under the custom model numbers.



Figure 6: Manufacturer's Denotation



STEP 2: Add Springs and Washers

- Place the compression springs, ITEM 4 in the recesses provided at the 4 corners or each plate.
- Next, place the washer, ITEM 3, on all the springs as shown.



Figure 7: Spring, Washers Assembly



STEP 3: Assemble VNA Extender onto the Rail

- Carefully place the extender assembly from step 1 on the spring washer assembly from step 2
- Place the washers, ITEM 3, on all 8 counterbores and lock them in place using the M8 screws, ITEM 5.
- DO NOT fully tighten the screws.



Figure 8: Alignment Screw Assembly



STEP 4: VNA Extender Alignment

- Use the fixture provided to center one of the extenders. This can be done by slightly moving the top plate until the flange smoothly passes thru the grooved section for center alignment on the fixture as shown
- Maintain uniform pressure on the fixture to hold its leg perfectly straight and flush with the rails.



Figure 9: Alignment Step 1

- Once the Flange is approximately centered, flip the fixture as shown so that the dowel pin can sit in the slots for the pins and flange surface is flush with the flat side of the fixture as shown.
- Adjust the top plate such that the flange is as closely flush with the fixture as possible. A little angular adjustment might also be necessary to get the flange flush with the fixture.
- Tighten all the screws to a point where the top plate becomes stable.



Figure 10: Alignment Step 2



STEP 4: VNA Extender Alignment (CONTINUED)

- Ideal case for the flange is when it sits perfectly flush with the fixture. However, due to the uncertainty and machining tolerances, the axis of the flange can be off in X, Y or Z axis or a combination of all compared to the rails which means that pitch, yaw or roll adjustment is necessary.
- To make the flange flush with the fixture surface, start tightening or loosening the screws as needed. For instance, as shown, the flange might be slightly tilted on the Y axis.
- This suggests that the back screws need to be relatively tightened more compared to the front screws to raise the flange



Figure 11: X-Y-Z Adjustment

- This makes it necessary to first make the flange sit flush as much as possible with the fixture before tightening the screws.
- Once one of the extenders has been aligned to the fixture, perform the same procedure on the other extender.
- Finally, bring both the extenders together to check the alignment.

NOTE: The fixture is provided only for the aid of alignment. It is not a guaranteed fix since the machining tolerances will vary from part to part and from manufacturers to manufacturer. The fixture will assist in alignment. However, further micro adjustment might be needed to eliminate any dowel pin interference among the mating flanges. In certain cases, the fixture cannot be used if the alignment requires the assembly to be off-centered.



PRODUCT OPERATION

Useful Tips and Limitations

- The top plate has been provided with a slotted thru hole as shown to incorporate any angular adjustment for alignment purpose.
- This makes the top plate vulnerable to micro movements if it experiences a sudden force or if the screws are loose.
- It is advisable to start the alignment with some tension on the springs to avoid movement on the top plate



Figure 12: Slot for movement

• Keeping the micro movement in our mind, it is advisable to perform the movements of the extenders using the bottom plate, which will eliminate any chance of sudden movements on top plate.



Figure 13: Best Practices



• Once the alignment has been successfully achieved, 4 pair of set screws have been provided that can be installed to avoid any accidental movement of the screws.





NOTE: The set screws are optional. The product can be used with or without the set screws.

Author: Dhanraj Doshi

Reviewed by: Yonghui Shu

Rev. 1.3

Date: 2023-05-03

