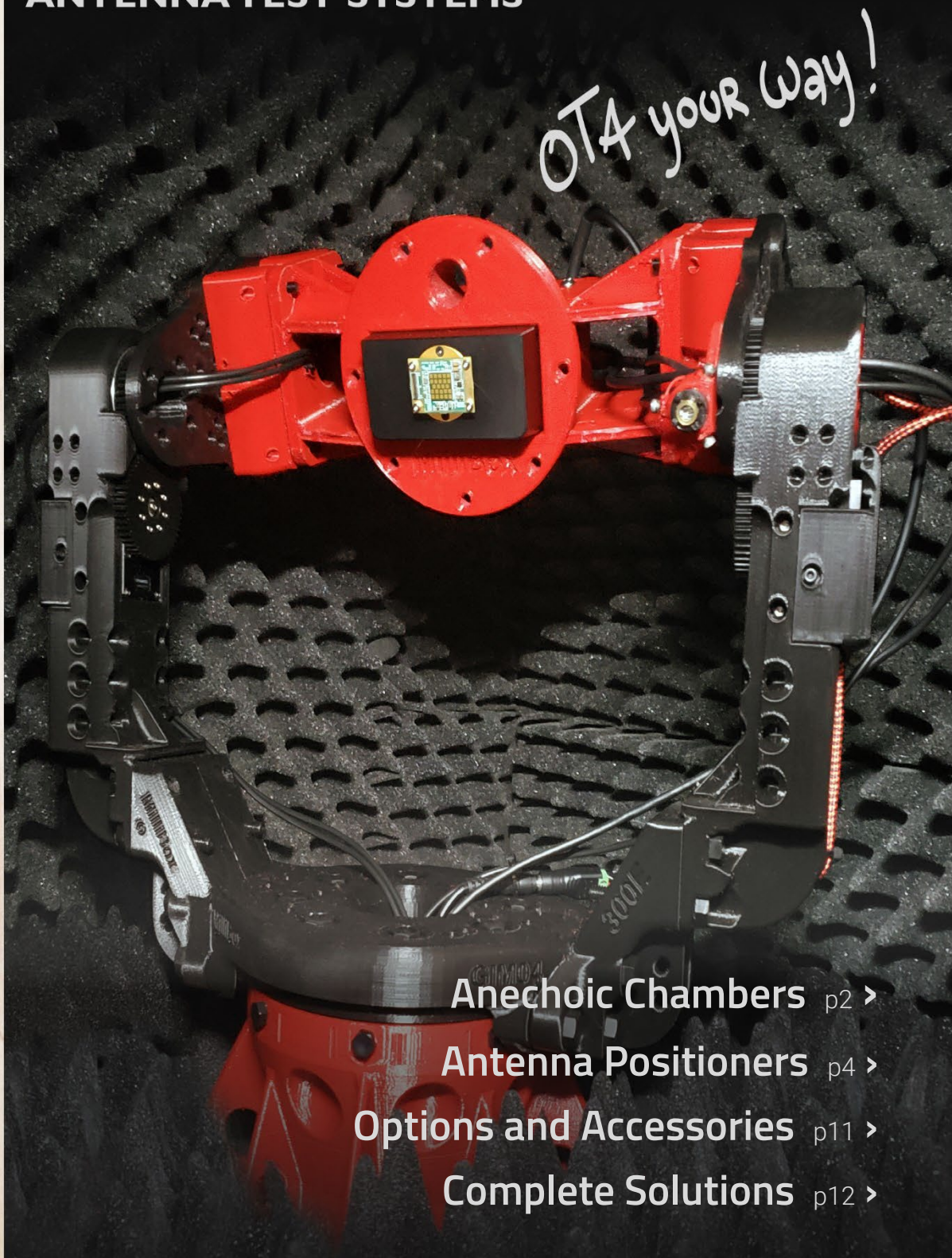
MilliBox®

ANTENNA TEST SYSTEMS

OTA your way!



Product Guide

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millibox.org

Anechoic Chambers

COMPACT- The device under test (DUT) antenna size and operating frequency dictates the far-field distance requirement for over-the-air (OTA) testing and drives the chamber dimensions. At mmWave frequencies, the far-field dimension is small enough so that MilliBox chambers can comfortably fit on a lab benchtop.

The deck has multiple measurement positions with 8cm (3") passthrough holes for direct wiring without connector ports. Conveniently, measurement instruments can be placed just below the MilliBox chamber deck, which reduces the RF coax length and cable loss.

The horn post and the DUT positioners are placed on opposite ends of the chamber deck. Access to the inside is granted through the front doors that close to seal the chamber during test.

MODULAR- MilliBox chambers are built of modular construction components allowing the creation of several configurations to address differing needs. The MBX0x series is made of 60cm (24") cubic modules and the MBX3x series of 80cm (30") cubic modules. The chamber size is selected to satisfy your far-field requirements, and extension "cubes" can be added later, if the need arises.

AFFORDABLE- Compared to "Do-It-Yourself" systems, MilliBox are complete solutions that are priced advantageously, offer better performance, and do not waste scarce engineering resources to develop and maintain.

MBX0x 24" Cube Benchtop Chambers

MBX0x CHAMBERS- are compact and convenient for testing up to 2m of far-field. The inside cavity of 40cm/16" is sufficient for chip and board level testing of DUTs up to 23cm. MBX01 is a single cube addition that can be added to an existing setup to extend its measurement distance.

	MBX02	MBX03	MBX04
			
Exterior Dimensions (W x H x D)	128 x 95 x 66cm (50" x 37" x 26")	188 x 95 x 66cm (74" x 37" x 26")	245 x 95 x 66cm (96" x 37" x 26")
Interior Cavity (W x H x D)	101 x 40 x 40cm (40" x 16" x 16")	161 x 40 x 40cm (63" x 16" x 16")	221 x 40 x 40cm (87" x 16" x 16")
Far Field (GIM01/GIM1D)	77cm (30")	138cm (54")	198cm (78")
Far Field (GIM03/04/05))	72cm (28")	133cm (52")	193cm (76")
Measurement Positions	2	4	6
Instrument Bay Height	29cm (12")		
Absorber Performance	–50dB from 18GHz to 330GHz		
Manufacturer Warranty	1 year all parts		

MBX3x 30" Cube Benchtop Chambers

MBX3x CHAMBERS– have the advantage over the MBX0x series to provide a larger interior cavity of 56cm/22". This is particularly useful when testing larger DUTs or test cases requiring more room like radar testing, for instance. Whenever positioners like GIM04H-300, GIM04H-380 and GIM05H-440 are needed, MBX3x chamber should be used.

COMPLETE TEST SOLUTIONS– like MBX33R and MBX32E also use MBX3x base chambers because of their ideal sizes.

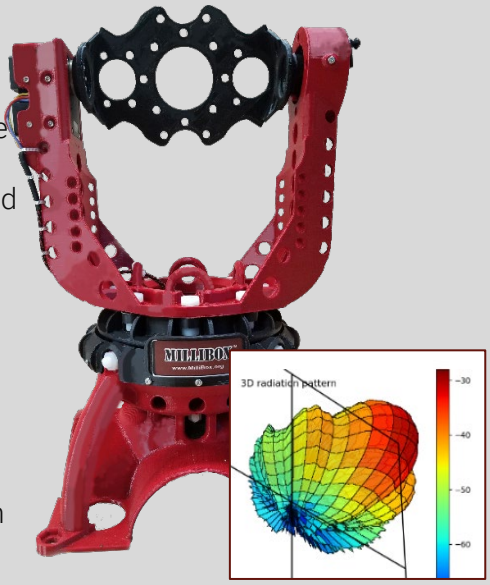
MBX3x 30" CUBE BENCHTOP CHAMBERS COMPARISON TABLE

	MBX32	MBX33	MBX34
			
Exterior Dimensions (W x H x D)	162 x 112 x 82cm (64" x 44" x 32")	240 x 112 x 82cm (95" x 44" x 32")	318 x 112 x 82cm (125" x 44" x 32")
Interior Cavity (W x H x D)	135 x 57 x 57cm (54" x 22" x 22")	213 x 57 x 57cm (85" x 22" x 22")	291 x 57x 57cm (115" x 22" x 22")
Far Field	98cm (39")	176cm (69")	254cm (100")
Measurement Positions	5	10	15
Instrument Bay Height	29cm (12")		
Absorber Performance	–50dB from 18GHz to 330GHz		
Manufacturer Warranty	1 year all parts		

Antenna Positioners

PRACTICAL- MilliBox offers many types of positioners for different DUT size and weight requirements. The positioners are built of high-performance printed PLA biomaterial with low dielectric constant limiting stray reflections. The wiring to the DUT is done using a passthrough in the rotation axis bearings to prevent wire tangling during operation. The body of the positioners provide numerous anchor points to keep the wiring tidy during motion.

ACCURATE- In addition to the electronic auto-alignment feature, a laser crosshair guide helps align the initial DUT boresight direction to the measurement horn. Instead of standard motors, MilliBox positioners all use robotics smart-actuators offering complete motion control like velocity, acceleration, and blockage protection. Real-time position control is achieved with the feedback of a built-in absolute position encoder. For tighter backlash reduction and long-term robustness, external gears are made of precision machined Delrin™ parts.

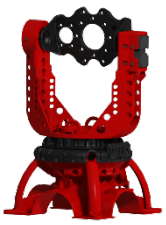


OPEN FRAMEWORK- MilliBox positioners are controlled over USB with Python software delivered in source. The software also controls any SCPI-compatible instrument connected by LAN, GPIB, or USB. All this helps to seamlessly integrate MilliBox into your existing RF testing environment. Many radiation pattern types like HV plots or 3D plots are standard and can be easily modified and augmented as desired.

Original Positioners

GIM01, GIM03, and GIM1D were MilliBox first line-up of HV positioners. They are still widely in use today but are slowly getting supplanted by new modular positioners like GIM04 and GIM05 series. GIM01, GIM03, and GIM1D are still available for purchase. The mounting footprints, most of the DUT mounting platform, and the software are compatible across all MilliBox positioner models.

ORIGINAL POSITIONERS COMPARISON TABLE

	GIM01	GIM03	GIM1D
			
Max DUT Width	11cm (4”)	27cm (10”)	–
Max DUT Weight	0.5kg (1lb)	3kg (6lb)	3kg (6lb)
Position Range	360˚ x 360˚	360˚ x 360˚	360˚ Azimuth only
Angular Resolution	<0.1˚		
Variable Velocity	0 to 11 RPM	0 to 9 RPM	0 to 11 RPM
Measurement Height	32.7cm (13”)		
Wiring Passthrough Diameter	20mm (0.79”)	24mm (1”)	–

MBX Software Controller and Tools

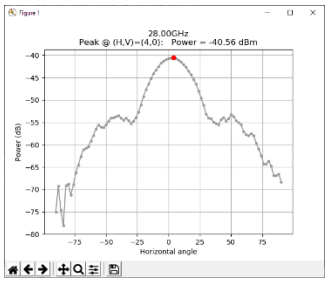
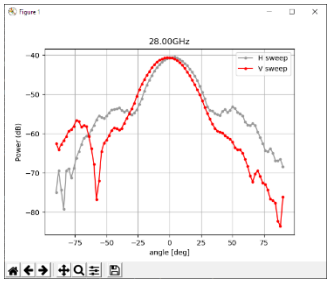
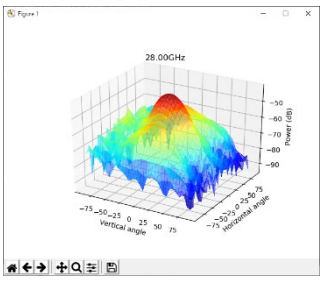
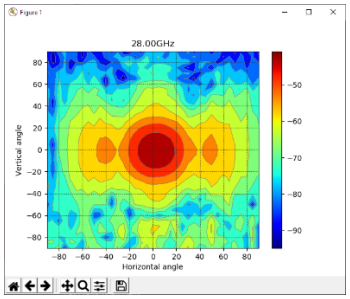
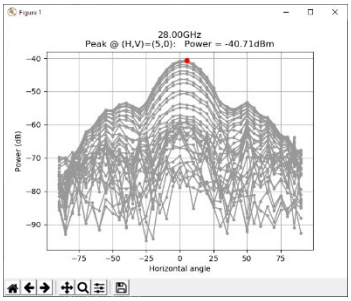
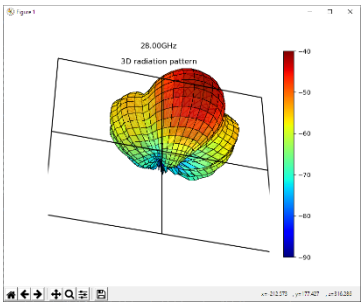
MBX SOFTWARE CONTROLLER- is entirely written in Python which allows for installation on any Operating System and ease of integration in any automation infrastructure. The main User Interface menu invokes keys pressed on the user's computer keyboard. For instance, the arrow keys on the keyboard move the DUT platform up, down, left, and right. Many aspects of the positioner are configurable such as step size, velocity, acceleration, position limiter, accuracy modes, instrument connection, absolute calibration, and of course sweep configuration. The same software auto detects and seamlessly interfaces to any MilliBox positioners.

MOTORS- are smart robotics actuators that provide much more capabilities than just standard motors. The actuators are addressable by their ID and controlled in a daisy-chained manner on a single USB interface. This simplifies wire routing. Those actuators have built-in safety auto-shut down features like torque limiter which prevent accidental motion blockage from ending up in fracture of the positioner. Temperature, Voltage, and Current are also monitored for automatic shut-down. But most importantly, all actuators are equipped with absolute position magnetic encoders providing position feedback to the main software controller for ultimate accuracy.

INSTRUMENT CONTROL- MBX Software Controller, has drivers for a wide majority of instruments. Popular Spectrum Analyzers and Vector Network Analyzers from Keysight, Rohde & Schwarz, Anritsu, and Copper Mountain Technologies come fully integrated within the existing software. In addition, the provided open framework can be expanded to any new type of instrument so long as it supports VISA and SCPI automation methods over USB, LAN, or GPIB interfaces.

OTHER USEFUL TOOLS- are provided with the software package. The first is a stand-alone sweep capture playback application which allows for the graphic presentation of an older sweep, for instance to compare it to a newer capture. The second is a simple SCPI editor and sandbox, which allows the user to develop, test, and integrate new SCPI commands to augment the instrument automation.

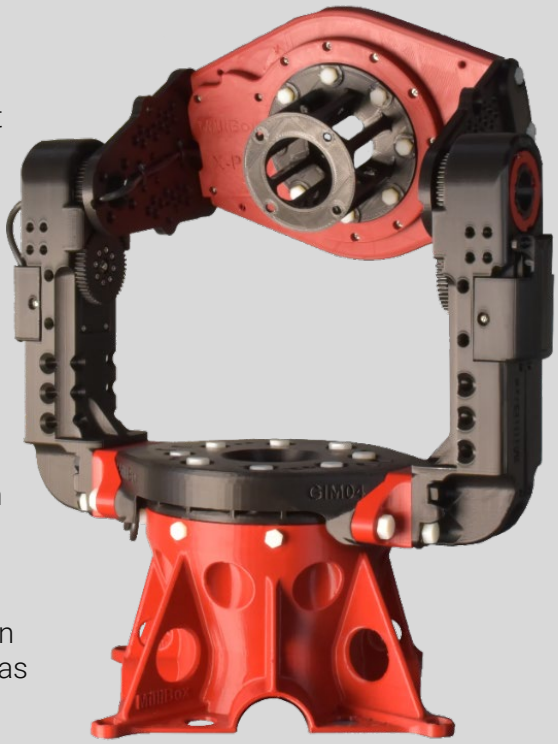
EXAMPLE OF PLOT TYPES AVAILABLE WITH MILLIBOX POSITIONERS

1D Line	HV Plot	2D surface
		
2D Heatmap	**2D Multi-Line Slice**	**3D Radiation Pattern**
		

GIM04 HV Modular Positioners

GIM04 is MilliBox new generation of HV positioners, offering a wide range of configuration and customization potential.

ROBUST AND ACCURATE- All gears in GIM04 are made of precision machined Delrin material for higher strength, precision, and long-life span. Two compatible base types are available: one has standard resolution with 12-bit absolute encoder, the other one (H-Base) with a 20W motor has a 20-bit absolute encoder built-in.



POLARIZATION CONTROL OPTION- To configure GIM04 as a 3-axis positioner, a polarization axis controller called X-Pol can be added to GIM04 for models 230 and above.

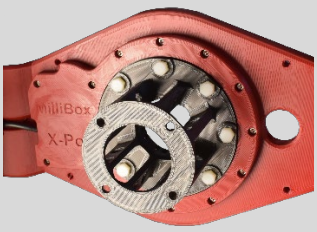
ADJUSTABLE PLATFORM DEPTH- The DUT platform can be placed at 2 depths from rotation axis: This makes it easier to accommodate various DUT thickness and form factors.

SUB-THZ EXTENSION- For sub-THz applications, the E version of GIM04H-300E has been specifically designed to mount frequency extenders on its DUT platform and probe mount.

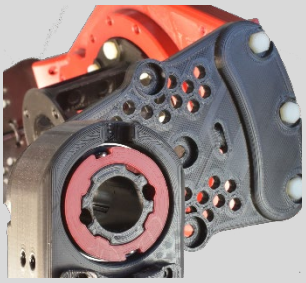
MODULAR SIZE- GIM04 comes in 4 standard sizes all based on the same components. Upsizing and downsizing are possible as DUT requirements evolve over time.

CABLE ROUTING- To bring power, control, or RF to the DUT efficiently, GIM04 provides pass-thru channels at the center of each rotation axis and numerous anchor points along the path. This way, no connectors or slip rings are needed from source to DUT.

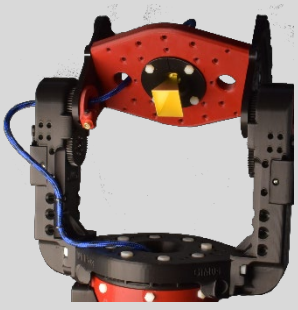
GIM04 KEY FEATURES



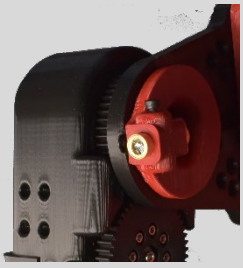
X-Pol: polarization control option



2 platform depths



Tangle free wiring



Laser Guide

GIM04 HV MODULAR POSITIONERS COMPARISON TABLE

	GIM04-200	GIM04-230	GIM04H-300	GIM04H-380
				
Max DUT Width	200mm / 8”	230mm / 9”	300mm / 12”	380mm / 15”
Max DUT Weight	3kg	3kg	3kg	3kg
Azimuth Resolution	0.017˚	0.017˚	0.0003˚	0.0003˚
Elevation Resolution	0.088˚	0.088˚	0.088˚	0.088˚
Azimuth - Elevation Range	-180 ˚/+180 ˚	-180 ˚/+180 ˚	-180 ˚/+180 ˚	-180 ˚/+180 ˚
DUT Depth	108mm / 4.5” 50mm/ 2”	108mm / 4.5” 50mm/ 2”	124mm / 5” 66mm/ 2.6”	124mm / 5” 66mm/ 2.6”
Measurement Height	327mm / 12.8”	327mm / 12.8”	386mm / 15.2”	386mm / 15.2”
X-Pol Option	✗	✓	✓	✓
X-Pol Resolution	N/A	0.044˚	0.044˚	0.044˚
X-Pol Range	N/A	-180 ˚/+180 ˚	-180 ˚/+180 ˚	-180 ˚/+180 ˚
Fits in MBX0x Chambers	✓	✓	✗	✗
Fits In MBX3x Chambers	✓	✓	✓	✓
Manufacturer Warranty	1 year all parts			

GIM04-230X with CUS02 and WR28 horn antenna

GIM05 Spherical Roll Modular Positioners

GIM05- brings a revolutionary solution for antenna over-the-air (OTA) mmWave and THz measurement with a spherical roll design offering the widest possible unobstructed field of view. Traditional Azimuth-Elevation positioners have arm structures on the sides of the device under test which blocks the measurement path at some high angles. Instead GIM05 holds the DUT from the back which completely clears the sides from obstruction and stray reflections coming from the positioner body.

ROBUST AND ACCURATE- All gears in GIM05 are made of precision machined Delrin material for higher strength, precision and long life span. GIM05 is activated by smart actuators with absolute encoders resolution below 0.1º.

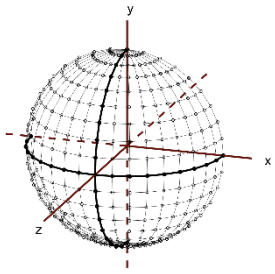
POLARIZATION CONTROLLER- The probe side is motorized such that the probe can match the polarization of the DUT during the rolling capture sweep. It can also be programmed for any other cross polarization measurement.

MODULAR SIZE- GIM05 design allows the depth and the height to be mechanically adjusted, to accommodate various DUT size requirement. Two standard sizes are 340mm and 440mm representing the maximum width of the DUT.

CABLE ROUTING-To bring power, control or RF to the DUT efficiently, GIM05 provides pass-thru channels at the center of each rotation axis and numerous anchor points along the path. This way, no connectors or slip rings are needed from source to DUT.

AZIMUTH ONLY OPTION- GIM05A are positioners with only the azimuth axis motorized. Overall dimensions are the same as fully motorized versions. GIM05A is nothing else than a turntable.

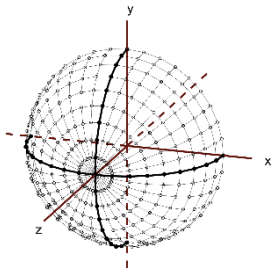
HV VS. SPHERICAL ROLL COORDINATES



Typical Azimuth/Elevation coordinates

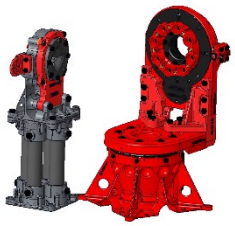
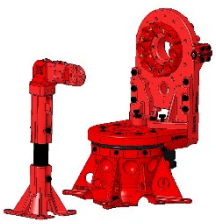
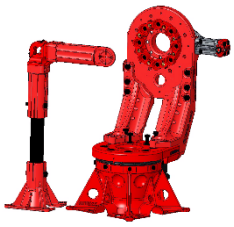
GIM05 uses a new set of coordinates for its rotation which eliminates the need for side arms. This coordinate system can cover the entire sphere around the DUT but the measurement paths are different.

Because the DUT is rotating on its radiation axis, the measurement probe must always follow the polarization of the DUT to capture the desired polarization.

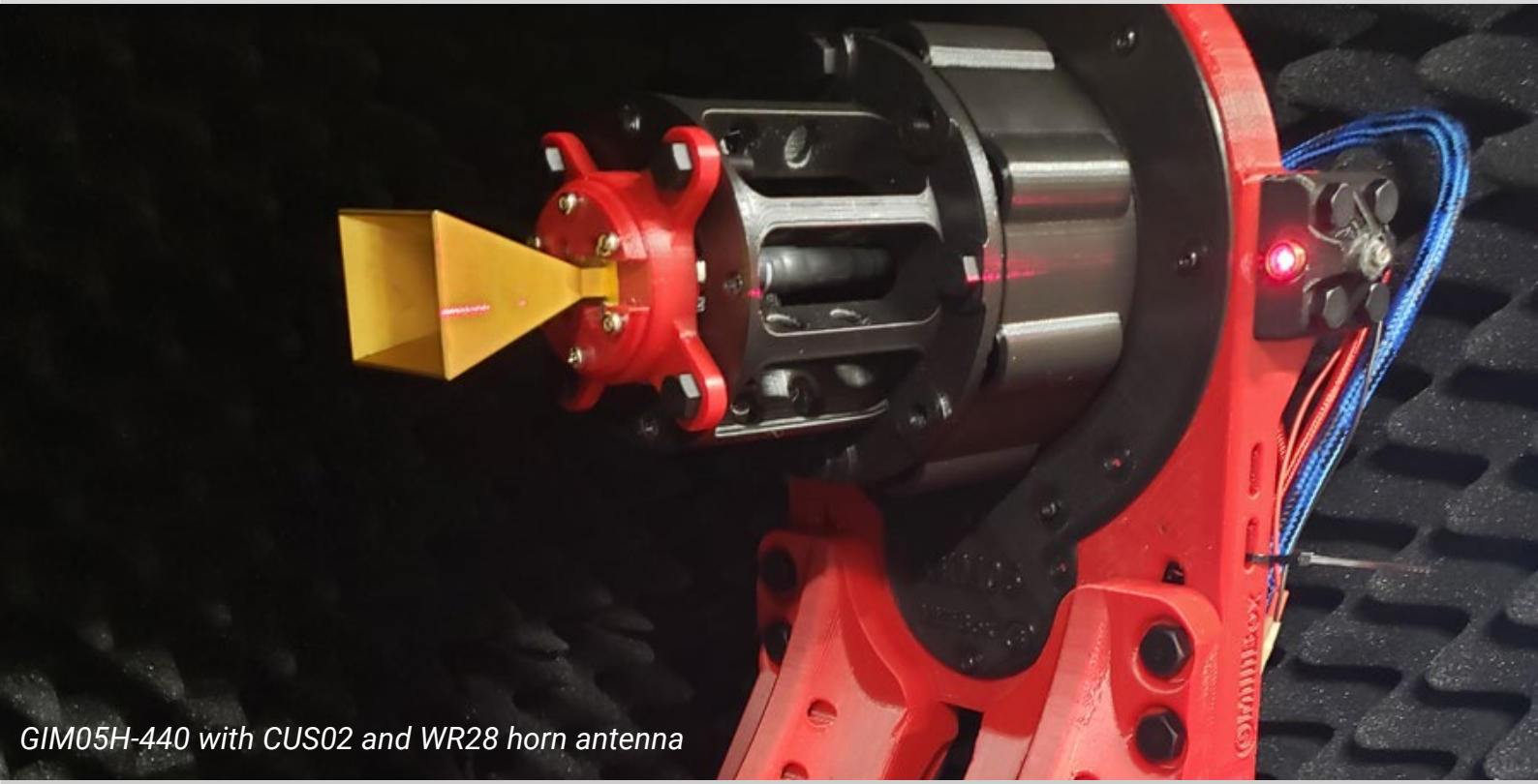


GIM05 Spherical Roll coordinates

GIM05 SPHERICAL ROLL POSITIONERS COMPARISON TABLE

	GIM05-340	GIM05-340A	GIM05H-440	GIM05H-440A
				
Max DUT Width *	340mm / 13”	340mm / 13”	440mm / 17”	440mm / 17”
Max DUT Weight	5kg	5kg	5kg	5kg
Theta Resolution	0.017˚	0.017˚	0.0003˚	0.0003˚
Phi Resolution	0.044˚	✗	0.044˚	✗
Theta Phi** Pol** Range	-180 ˚/+180 ˚	-180 ˚/+180 ˚	-180 ˚/+180 ˚	-180 ˚/+180 ˚
DUT Depth	113mm / 4.5”	113mm / 4.5”	175mm / 7”	175mm / 7”
Measurement Height	327mm (12.8”)	327mm (12.8”)	386mm (15”)	386mm (15”)
Polarization Control	✓	✗	✓	✗
Fits in MBX0x Chambers	✓	✓	✗	✗
Fits In MBX3x Chambers	✓	✓	✓	✓
Manufacturer Warranty	1 year all parts			

* diameter of a disk when the array boresight is on rotation center
** on models where those axes are available



GIM05H-440 with CUS02 and WR28 horn antenna

Positioner Selector

POSITIONER PART NUMBERING

Antenna Positioner Ordering Information

GIM	04	H	-	300	X

Category	Series	Base Type	Width	Options
GIM: Positioner	01: Original 03: Original 1D: Azimuth Only 04: Modular HV 05: Mod. Spherical	: Standard H: High Resolution	200: 200mm 230: 230mm 300: 300mm 340: 340mm 380: 380mm 440: 440mm	: Standard A: Azimuth Only E: Frequency Ext. X: X-Pol Controller

STANDARD PRODUCT LIST

GIM	01				
GIM	1D				
GIM	03				
GIM	04		-	200	
GIM	04		-	230	
GIM	04		-	230	X
GIM	04	H	-	300	
GIM	04	H	-	300	X
GIM	04	H	-	300	E
GIM	04	H	-	380	
GIM	04	H	-	380	X
GIM	05		-	340	
GIM	05		-	340	A
GIM	05	H	-	440	
GIM	05	H	-	440	A

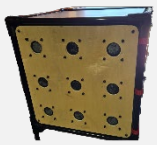
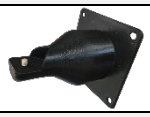
STANDARD PACKAGE CONTENT

- Positioner
- Matching horn post
- Software In Python source
- Laser guide
- Matching laser target
- Probe mount/horn clamp
- USB interface and cable
- Power supply 12V/24V
- Power cable US/EU
- Detailed User Manual
- Unlimited access to software releases
- Mounting CAD files on demand

See accessory page for additional options.

Options and Accessories

OTHER PRODUCTS FOR A COMPLETE SETUP

	Category	Description	
SUP01	Support	1-year advanced **software integration** support	
CUS01	Mounts and Clamps	**Custom horn post mount**. When a Standard Gain Horn is not used, MilliBox can design a custom clamp for your probe	
CUS02	Mounts and Clamps	**Custom DUT mount**. MilliBox can provide reference CAD for the user to design your own DUT mount. Instead, if you want MilliBox to design a custom mount for your DUT, this option is required.	
REF01	Radar	Trihedral corner **reflector horn post mount** up to 3.5".	
WLL05	Radar	Accessorized **wall panel mount,** with 5x (for MBX0x only) positions where reflector mounts or probing accessories can be installed. Absorber and absorber plugs are included	
WLL09	Radar	Accessorized **wall panel mount,** with 9x (for MBX3x only) positions where reflector mounts or probing accessories can be installed. Absorber and absorber plugs are included	
REF02	Radar	**Fixed wall mount** for Trihedral corner reflector	
TRI14	Radar	**Trihedral Corner reflector** of 1.4" edge, SAJ-014-S1	
TRI24	Radar	**Trihedral Corner reflector** of 2.4" edge SAJ-024-S1	
LIN04	Radar	Motorized and software **programable wall mounted linear actuator for trihedral corner reflector**, oscillating motion, from 0.1Hz to 2Hz oscillation rate, from 1mm to 25mm course. This system is recommended for target emulation and radar performance testing.	
SGH28-20-24FE	OTA	**WR-28 20 dBi Rectangular Horn Antenna** 2.4mm Female, 26 to 40GHz, SAR-2013-282F-E2	
SGH15-20-18FR	OTA	**WR-15 20 dBi Rectangular Horn Antenna** 1.85mm Female 50 to 70GHz, SAR-2013-15VF-R2	
CLP24-048MF	OTA	**Flexible low profile cable** assembly 48" Male to Female 2.4mm: SP-24-MF-48-LP	
CLP18-048MF	OTA	**Flexible low profile cable** assembly 48" Male to Female 1.85mm: SP-185-MF-48-LP	
CLP35-060	OTA	**Flexible low profile cable** assembly 60" Male to Male 3.5mm/SMA: SP-35-MM-60-LP	

Many other customizations are possible contact MilliBox for more options

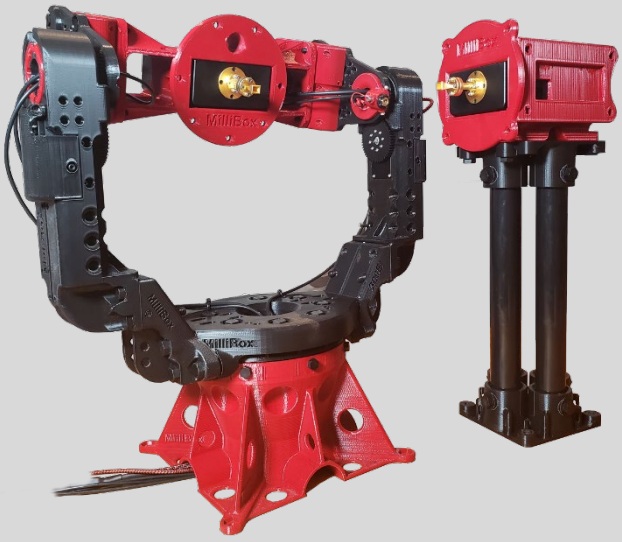
Complete Solutions

MilliBox offers complete solution packages tailored to specific applications. For instance, MBX32E for other-the-air (OTA) sub-THz antenna measurement and MBX33R for mmWave radar performance testing.

Sub-THz Complete OTA Solutions – MBX32E

MBX32E- is a complete OTA solution for frequency ranges starting at 50GHz up to 330GHz. For those frequencies, it becomes impractical to run coaxial cables to the DUT and to the probe. Therefore, compact frequency extenders from Eravant can be mounted on-board the DUT platform and the probe post, providing a local waveguide interface. As a full system, MBX32E starts with a standard MBX32 chamber and a GIM04H-300E positioner. Then it is completed with a frequency extension kit (EXTxx), where xx is the standard waveguide size needed.

MBX32 CHAMBER- provides 4 measurement distances 50cm, 60cm, 70cm and 80cm. If necessary, the MBX32 chamber can be substituted with MBX33 or MBX34 for longer measurement distance. MBX32 is ideally placed on a lab bench with a footprint of 34” by 64”.



GIM04H-300E POSITIONER- features a specially designed DUT platform which can mount compact transmit frequency extenders from Eravant. The special probe post is designed to mount compact receiver frequency extenders. It has a laser target for initial alignment.

See a video demonstration of MBX32E here

EXTxx- are frequency extender kits completing the MBX32E. The kit comprises a transmitter frequency extender, a receiver frequency extender, power supplies, two 20dBi standard gain horns, 1" or 2.5" straight waveguides, and a set of five 60" 3.5mm cable assemblies to connect the extenders to a 20GHz bandwidth capable VNA. Supported VNA models include modern lineups from Keysight, Rohde & Schwarz, Anritsu, and Copper Mountain Technologies.

FREQUENCY EXTENDERS SELECTOR GUIDE

	Waveguide	Range (GHz)	Band	Dynamic Range (up to)	DUT Test mode	Output Power
EXT15	WR-15	50 – 75	V-band	120dB	S12, S21	5dBm*
EXT12	WR-12	60 – 90	E-band	120dB	S12, S21	5dBm*
EXT10	WR-10	75 - 110	W-band	120dB	S12, S21	5dBm*
EXT08	WR-08	90 - 140	F-band	100dB	S12, S21	-5dBm
EXT06	WR-06	110 - 170	D-band	100dB	S12, S21	-5dBm
EXT05	WR-05	140 - 220	G-band	90dB	S12, S21	-5dBm
EXT03	WR-03	220 - 330	J- band	80dB	S12, S21	-12dBm

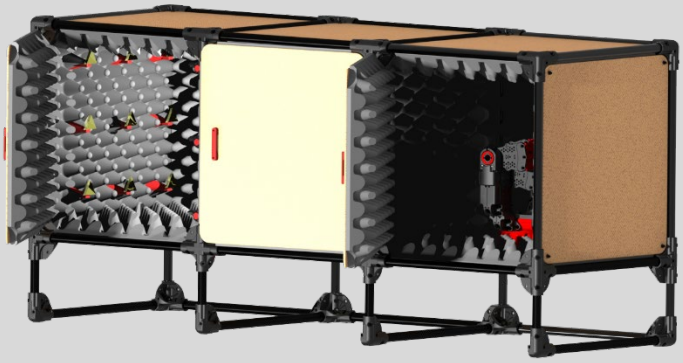
** higher output power versions available*

MBX32E SPECIFICATIONS

	MBX32E
Frequency Range	50GHz to 330GHz (based on extender capabilities)
Max DUT Width	280mm /.11"
Max DUT Weight	1kg / 2lb
Azimuth Resolution	0.0003˚
Vertical Resolution	0.088˚
Measurement Height	383mm / 15"
Chamber Size (WHD)	161cm / 5'3" x 112cm / 3'8" x 83cm / 2'9"
Coax Termination	SMA/3.5mm Male
Measurement Distances	50cm / 20", 60cm / 24", 70cm / 27.5", 80cm / 31"

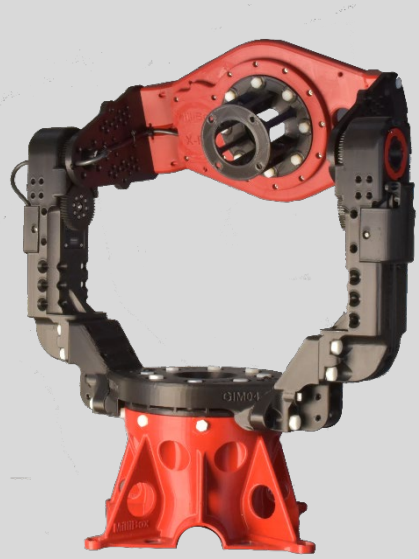
mmWave Radar Performance Testing Solution – MBX33R

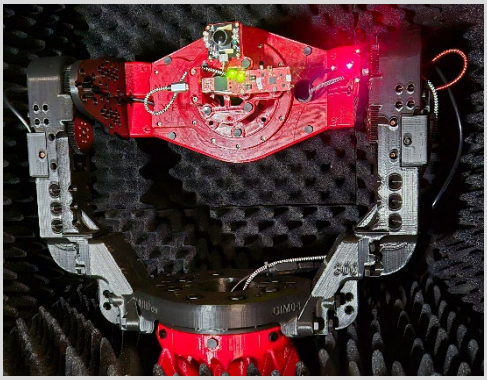
MBX33R- is a complete solution for mmWave and sub-THz radar performance testing. This package includes a large chamber, a 3-axis positioner, and a set of accessories specifically designed for radar performance evaluation.



MBX33 CHAMBER- provides 10 discrete measurement probe positions. If necessary, the MBX33 chamber can be substituted with MBX32 or MBX34 for shorter or longer measurement distances. MBX33 is ideally placed on an 8-ft lab bench. Its 22" cavity size, which is the free space between absorber panels, provides enough space for multiple corner reflector radar targets.

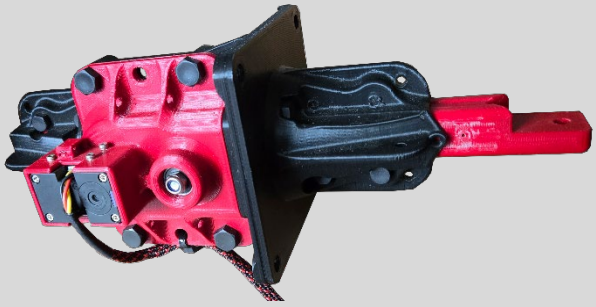
GIM04H-300X POSITIONER- is a 3-axis positioner with a 30cm DUT platform capable of holding radar modules up to 3kg. This positioner allows for independent DUT positioning along Azimuth, Elevation, and Polarization axes, at resolutions below 0.1˚. It is useful for standard radiation pattern measurements, but installed in a MBX33R it can also be programmed for radar performance evaluation.





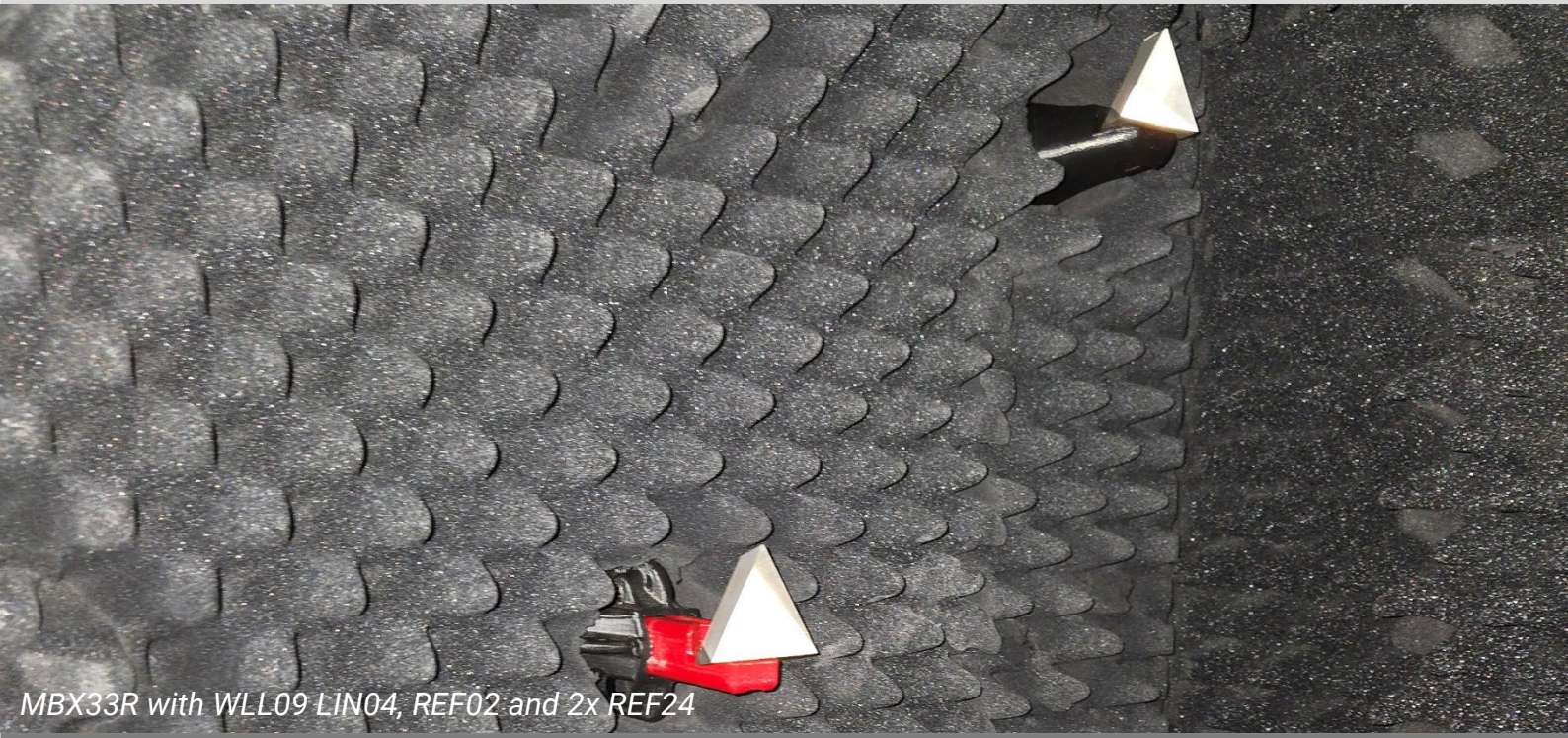
DUT CONTROL INTEGRATION- because MilliBox software controller is provided in Python, in source, it is convenient to integrate a DUT controller within MilliBox software framework. This way, rather than connecting the MilliBox software to a traditional instrument like a VNA or spectrum analyzer, the radar DUT itself can be declared as an instrument and provides useful data directly as the sweep proceeds within the framework. As a result, for example, FFT, time-of-flight or doppler data could be plotted and rendered in 3D for easy visualization.

ACCESSORIZED TARGET WALL WLL09- MBX33R comes with a wall of up to 9 accessories. Each accessory port is made of a 3" hole with mmWave absorber plugs and 4x pre-installed ISO M8 bolts. These 9 positions can be used in many ways, but for MBX33R, they are used to install fixed and moving radar targets. A similar design comprising 5 accessory ports called WLL05 is available for the smaller MBX0x series of chambers.



LIN04 LINEAR ACTUATOR- is a user programmable radar reflector mount which can be mounted on the target wall. It can hold trihedral corner reflectors of sizes up to 2.4". The oscillation course can be programmed from 0.1mm to 25mm, and the rate is adjustable from 0.2Hz to 2Hz. The size of the reflector, the rate and course of the oscillation are configured to emulate the reflection of life-size targets like human heartbeat, walking pace, pets and many more. Up to 9x LIN04 can be daisy chained to be controlled by a single USB connector. The software controller is coded in Python and provided in source.

REF02 FIXED CORNER MOUNT- REF02- is a simple trihedral corner mount which can be equipped on the accessory wall. It supports corner reflectors up to 2.4". In addition, many custom mounts can be designed for your project.



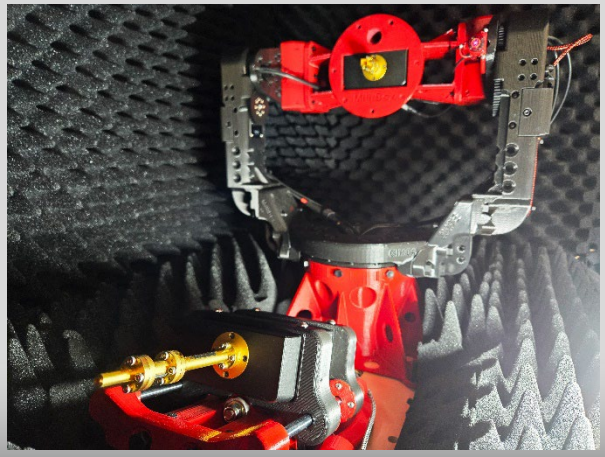
MBX33R with WLL09 LIN04, REF02 and 2x REF24

Compact Antenna Test Range – MBX32CTR

MBX32CTR COMPACT ANTENNA TEST RANGE- is the right solution when the desired far-field distance exceeds dimensions that can be achieved by standard sized systems like MBX34. Because it uses a parabolic reflector and a matching probe antenna placed at the focal point, the measurement distance between the probe and the DUT becomes virtually infinite and allows for RF measurements to be done using chambers that are much smaller than the calculated far-field distance of the DUT. This innovative solution is offered from 18GHz to 54GHz with coaxial wiring of the DUT and probe, while from 54GHz to 330GHz, it is equipped with built-in VNA frequency extenders with wave-guide interfaces. MBX32CTR is a complete solution for mmWave and sub-THz OTA measurement with a quiet zone of 150mm. This package includes an MBX32 chamber, a GIM04H-300E 2-axis positioner, a laser alignment system, a 300mm parabolic reflector, and its focus probe antenna.

MBX32 CHAMBER- MBX32 is ideally placed on a 6-ft lab bench. Its 22" cavity size, which is the free space between absorber panels, provides enough space for the 300mm reflector and GIM04H-300E positioner. As with other configurations, the wiring of the probe and the DUT is done through the chamber deck and conveniently attach to the measurement instrument placed in the two available bays.

PARABOLIC REFLECTOR AND PROBE - are the key elements of MBX32CTR. The reflector and the probe are carefully designed by Eravant and are aligned with the laser alignment kit provided to ensure the probe is exactly at the focus point of the reflector. This allows for the direct conversion of near field signal from the DUT on the positioner into far field measurements. The reflector is edge roll type precision machined and polished. The probe selection must match the waveguide size suitable for the desired frequency, typically 18GHz to 330GHz.



DIRECT COAXIAL OR INTEGRATED VNA FREQUENCY EXTENDERS- are available with MBX32CTR. This mainly depends on the frequency band desired, and the type of test instrument used. The table below shows the different configurations and their connector type that must be specified upon ordering this system.

MBX32CTR FREQUENCY SELECTOR GUIDE

	Interface	Range (GHz)	Band	Extender Needed
MBX32CTR-42	Coax 2.4mm	18 – 26.5	K-band	n/a
MBX32CTR-28	Coax 2.4mm	24 - 43.5	Ka-band	n/a
MBX32CTR-19	Coax 1.85mm	40 - 60	U-band	n/a
MBX32CTR-15	WR-15	50 – 75	V-band	EXT15
MBX32CTR-12	WR-12	60 – 90	E-band	EXT12
MBX32CTR-10	WR-10	75 - 110	W-band	EXT10
MBX32CTR-08	WR-08	90 - 140	F-band	EXT08
MBX32CTR-06	WR-06	110 - 170	D-band	EXT06
MBX32CTR-05	WR-05	140 - 220	G-band	EXT05
MBX32CTR-03	WR-03	220 - 330	J- band	EXT03

MBX32CTR COMPACT ANTENNA RANGE SYSTEM- has the same great features as all our direct far-field solutions, the main advantage is for larger antenna aperture where more than 2.5m far field distance is required. This is a situation frequently encountered in applications like mmWave satellite communication and mmWave automotive radar where distance up to 10m far-field is seen.

MBX32CTR SPECIFICATIONS

	MBX32CTR
Frequency Range	18GHz to 330GHz (based on extender capabilities)
Max DUT Width	150mm /.6”
Max DUT Weight	1kg / 2lb
Azimuth Resolution	0.0003˚
Vertical Resolution	0.088˚
Measurement Height	383mm / 15”
Chamber Size (WHD)	161cm / 5'3" x 112cm / 3'8" x 83cm / 2'9"
Reflector Size	300mm / 12”
Quiet Zone	150mm /.6” diameter on center axis

MBX32CTR with GIM04H-300E and EXT06

ORDERING

Ordering Information

MilliBox System Part Numbering

MBX	3	3	R	-	G4300

Category
MBX: Test Systems

Cube Size
0: 24" Cube Unit
3: 30" Cube Unit

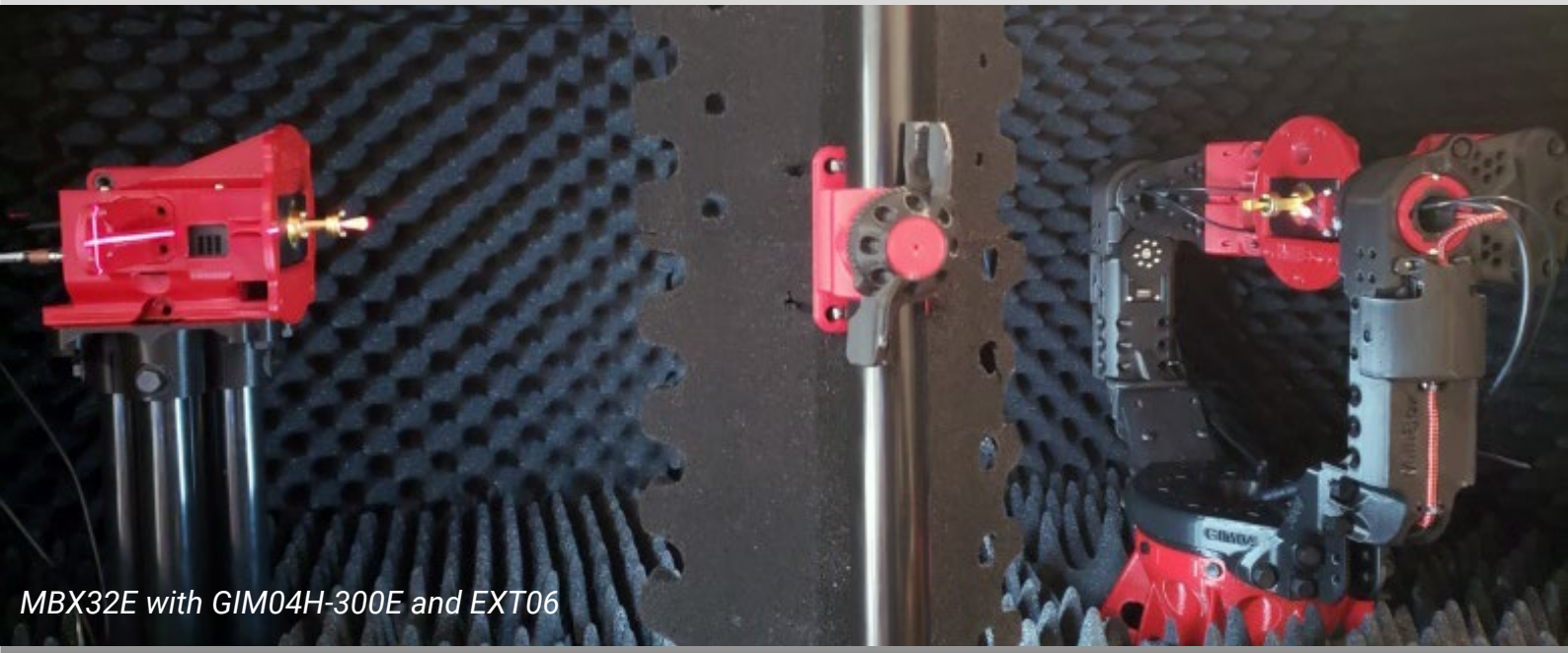
Nb. of Cubes
1: Extension Cube
2: 2 Cubes
3: 3 Cubes
4: 4 Cubes

Setup Type
: Standard
L: No Positioner
E: Sub-THz Ext.
R: Radar Setup
2: Double Depth
CTR: Compact Range

Positioner Options

:	Default positioner*
G3:	GIM03
G1D:	GIM1D
G4200:	GIM04-200
G4230:	GIM04-230
G4230X:	GIM04-230X
G4300:	GIM04H-300
G4300X:	GIM04H-300X
G4380:	GIM04H-380
G4380X:	GIM04H-380X
G5340:	GIM05-340
G5340A:	GIM05-340A
G5440:	GIM05H-440
G5440A:	GIM05H-440A

* GIM01 is the default positioner for all configuration except MBX32E and MBX32CTR where GIM04-300E is the default.



MBX32E with GIM04H-300E and EXT06

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