Software User Manual TMXLAB Kit

v 3.6.4

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0. Network Environment Setup

• Network environment settings: If the IP address of the device and PC is assigned by DHCP, this step can be skipped. If the IP address cannot be obtained through DHCP, the domain must be set to 192.168.100.xxx.

(1). Go to Windows Settings/Network & Internet/Ethernet/Change adapter options.

Setting	s					-	×
			Find a setting	3	Q		
	旦	System Display, sound, notifications, power	E	Devices Bluetooth, printers, mouse		Phone Link your Android, iPhone	
		Network & Internet Wi-Fi, airplane mode, VPN	<u>é</u>	Personalization Background, lock screen, colors		Apps Uninstall, defaults, optional features	
	8	Accounts Your accounts, email, sync, work, other people	。 A字	Time & Language Speech, region, date	\bigotimes	Gaming Game bar, DVR, broadcasting, Game Mode	
	Ģ	Ease of Access Narrator, magnifier, high contrast	0	Cortana Cortana language, permissions, notifications	ß	Privacy Location, camera	
	C	Update & Security Windows Update, recovery, backup					
\$	Home			Ethernet			
Fir	nd a set	ting	Q	Ethernet			
Netv	vork & I	Internet		Ethernet Not connect	cted		
₽	Status						
ſ.	Wi-Fi			Related settin Change adapter o	-	1	
臣	Etherne	et		Change advanced	sharing o	ptions	
(Dial-up)		Network and Shar	ring Cente	r	
ంజం	VPN			HomeGroup			



(2). Right click on "Ethernet"/Properties

😻 Network Conn	ections					_		×
$\leftarrow \rightarrow \checkmark \uparrow$	💐 « Network and Internet	> Network Connec	tions	~ Ü	Search Net	twork Con	nection	s 🔎
Organize 🔻	Disable this network device	Diagnose this co	nnection	»				?
×** ***	Bluetooth Network Connection Not connected Wi-Fi Not connected Killer Wireless-n/a/ac 1535		(ea) (*) (*) (*) (*)	Eable unpluge Disable Status Diagnose Bridge Conn Create Shor Delete Rename Properties	nections			
7 items 1 iten	n selected							

(3). Click "Internet Protocol Version 4 (TCP/IPv4)", and then click "Properties".

Ethernet 2 Properties	×						
Networking Sharing							
Connect using:							
ASIX AX88179 USB 3.0 to Gigabit Ethemet Adapter							
Configure							
This connection uses the following items:							
Client for Microsoft Networks File and Printer Sharing for Microsoft Networks GoS Packet Scheduler Image: Scheduler							
Install Uninstall Properties							
Description Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.							
OK Cancel							



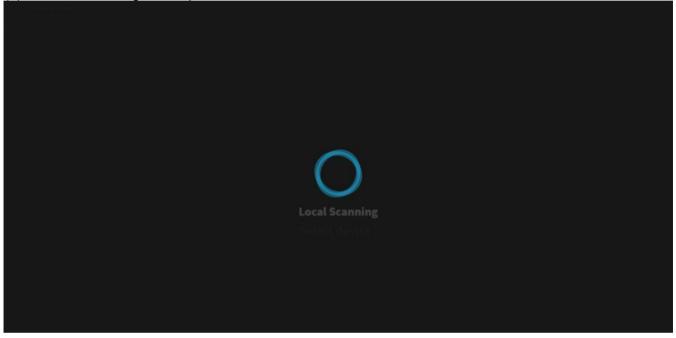
(4). Enter the IP address 192.168.100.xxx (please avoid 192.168.100.100 ~ 192.168.100.120)

Internet Protocol Version 4 (TCP/IPv4) Properties								
General								
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.								
Obtain an IP address automatical	Obtain an IP address automatically							
• Use the following IP address:								
IP address:	192 . 168 . 100 . 150							
Subnet mask:	255.255.255.0							
Default gateway:								
Obtain DNS server address autom	natically							
• Use the following DNS server add	resses:							
Preferred DNS server:								
Alternate DNS server:								
Ualidate settings upon exit	Advanced]						
	OK Cancel							

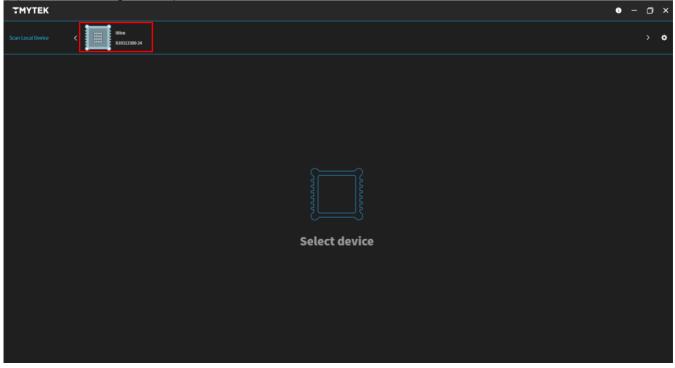


1. BBox One

- (1). Connect BBox One and PC with Ethernet, and then turn on the power of BBox One.
- (2). Open TMXLAB Kit.
- (3). Wait till scanning is completed.



(4). After scanning is completed, click the device icon above.



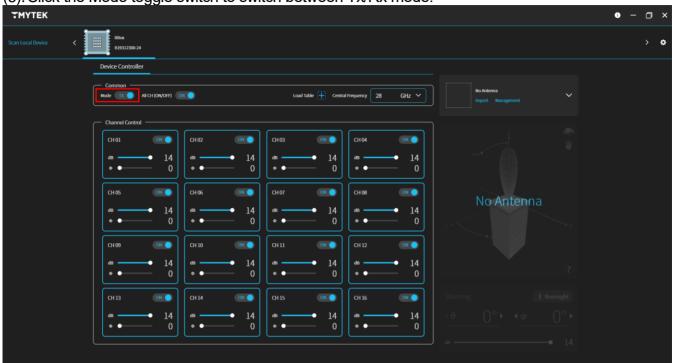


(5). If the table of the clicked device has not been imported, the screen will show "No Calibration Table." Click anywhere to open the file selection window, choose the file(s) to be imported, and then click "Open" to import the table and expand the control panel.

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(6). Click the Mode toggle switch to switch between Tx/Rx mode.

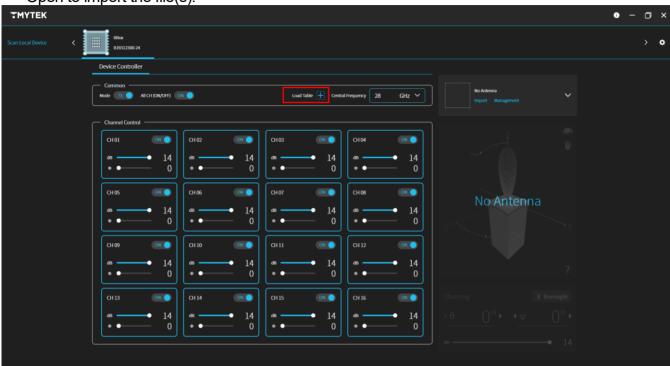


(7). Toggle All CH (ON/OFF) can switch all channels on/off.





(8). Click "Load Table" to import the calibration table. After selecting the file(s) to be imported, click Open to import the file(s).

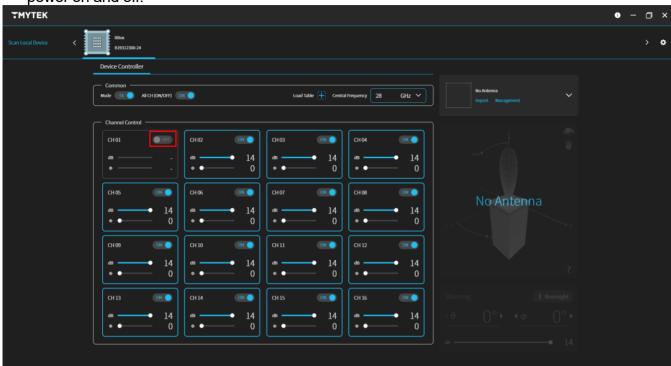


(9). All available frequency points are listed in the Central Frequency drop-down menu. You can choose the desired one.

NOTE: The Dynamic Range of each frequency point may be different.

тмутек								0 – 🗇 ×
Scan Local Device <	BBax B19312300-24							> o
	Device Controller							
	Common Mode All CH (ON/OFF)	DN 🔵	Load Table	Central Frequency 28	GHz 🗸	No Antenna Import Management	~	
	Channel Control				GHz			
	СНОІ ОК	CH 02 ON O	CH 03 ON	28	GHz 오			
	ds <u>→ 14</u> • • 0	^{dв} — 14 Ф • 0	dB● Φ ●	14 dв 0 Ф •	→ 14 ─ 0			
	СН 05 ОН О	Снос он •	Снот ом			No Antenna		
			dΒ• Φ •	14 0 • •	• 14 0			
	СН 09 ОЛ 🔵	CH 10 ON O	CH 11 ON	CH 12				
	ds <u>→ 14</u> ◆ • 0	dB <u>→ 14</u> • • 0	dB•	14 0 dB	• 14 - 0			
	CH 13 ON 🔵	CH 14 ON O	CH 15 ON	СН 16	ON 🌔			
	dB 14 ● ● 0	dB <u>→ 14</u> • • 0	dB	14 0 dB	• 14 • 0			

(10). Click the toggle switch in the upper right corner of the channel card(s) to switch the channel power on and off.



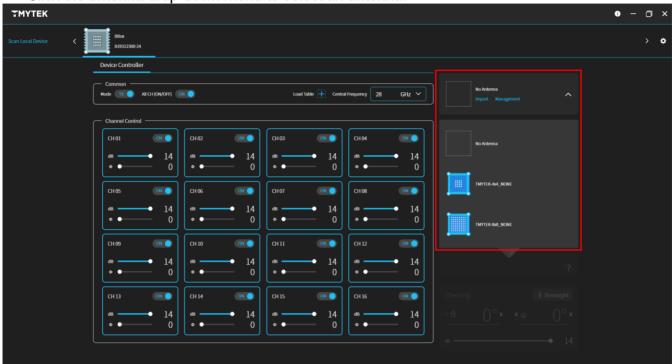
(11). Adjust the sliders of dB and Φ in the channel card(s) to control the channel gain and phase.



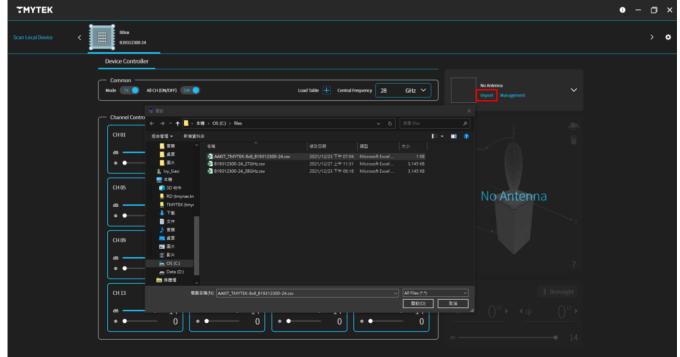


(12). If no antenna is selected, only the channel control mode is functional. The beam steering function is only available after an antenna is selected.

Click the antenna drop-down menu to select an antenna.

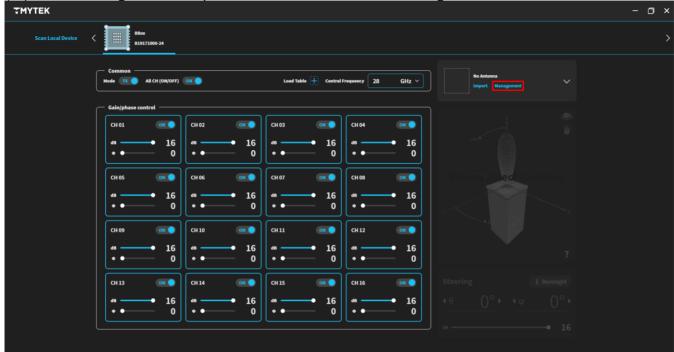


(13). Click "Import" to open the file selection window. Select the file(s) to be imported and click "Open" to use the imported antenna data in the antenna menu.





(14). Click "Management" to open the customized antenna management interface.



(15). Click "Add" to enter the add mode.

Enter following in order: antenna name (for identification, the name cannot be repeated), SpacingX (the pitch-to-pitch spacing between two adjacent antenna elements on the Xcoordinate, Unit: mm), SpacingY (the pitch-to-pitch spacing between two adjacent antenna elements on the Y-coordinate, Unit: mm), theta max angle, and phase offset of each channel. Click the arrow on the right to expand/collapse the offset input box.

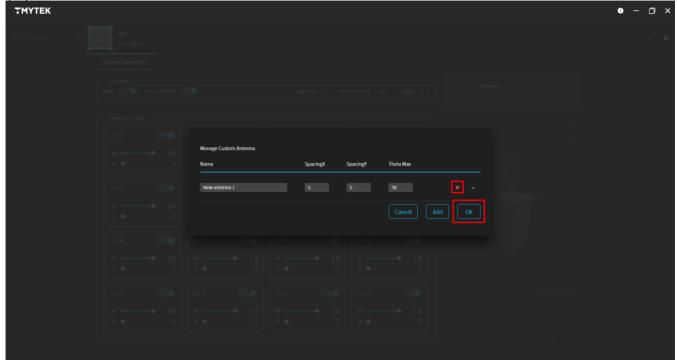
After completing the above action, click "Ok" to save the input data and return to the main control interface. You will see that the antenna option has been added to the antenna menu.

тмутек		• – 🗆 ×
Scan Local Device C		
Device Controller		
Common — All CH (ON/OFF)		
- Channel Control	Manage Custom Antenna	
CHOL	Name SpacingX SpacingY Theta Max	
dis 14	New antenna 1 5 5 30 × ^	
• •0	RX Offset TX Offset	
CH 05		
CH 09		
as <u>14</u> • • 0		
• • • 0		

тмутек					0 – 🗇 ×
Scan Local Device C Bibox B19312300-24					> 0
Device Controller					
Common	ж 🔵	Load Table 🕂 Central Fre	equency 28 GHz 💙	No Anterna Import Management	~
Channel Control					
CH 01 ON O	Сног Сно		сно4 оч 🌔	No Antenna	
dB <u>→ 14</u> • • <u>0</u>	dB <u>−−−</u> 14 dB · • •		dB <u>14</u>		
Сноз ОП	Сное Сно	л ом 🔵	СН 08 СМ 🔵	New antenna 1	
			^{d8} <u> </u>		
			dB 14		
CH 13 ON •	CH 14 ON O	5 ON O	CH 16 ON 🔵		
	dB <u>−−−</u> <u>14</u> dB • • • 0 • •		dB <u>14</u>		

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(16). Click the red "X" and then "OK" to delete the antenna data.

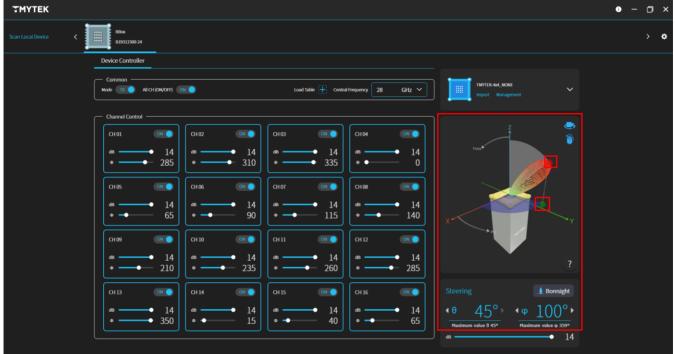




- (17). Press and hold the red dot on the tip of the Beam to rotate the Beam and adjust θ and ϕ . Press and hold the green dot on the xy-plane to adjust ϕ .
- NOTE: θ is the angle between the positive Z-axis and the vector in question ($0 \le \theta \le$ Theta max angle).

 φ is the angle between the projection of the vector onto the xy-plane and the positive X-axis (0 $\leq \varphi < 360^{\circ}$).

Take this screenshot as an example, the theta max is 45°.



(18). Pressing "Boresight" can set θ and ϕ back to 0 degree.

тмутек			• – 🗆 ×
Scan Local Device C Bibox B19312300-24			> ¢
Device Controller			
Common Mode Tx AllCH(ON/OFF) Cox	Load Table 🔆 Central Frequency 28 GHz 🗸	TMYTER-64_NONE	
Channel Control CH 01 CH 02 ON dt - 14 dt -		The P	
	$\begin{bmatrix} 14\\ 0 \end{bmatrix} \begin{bmatrix} 4s & \bullet & 14\\ \bullet & \bullet & 0 \end{bmatrix} \begin{bmatrix} 4s & \bullet & 14\\ \bullet & \bullet & 0 \end{bmatrix}$ $(H11) (H12) (H$	X	
	$\begin{bmatrix} 14\\ 0 \end{bmatrix} \begin{pmatrix} as & & 14\\ \bullet & & 0 \end{pmatrix} \begin{pmatrix} as & & 14\\ \bullet & \bullet & 0 \end{pmatrix}$?	
	CH 15 CM • 14	Steering	



14350

ON 🔵

14 125

ON 🔵

dB

• ---•

dB

Φ -

dв — Ф —

Φ-

dB Φ -

14 35

ON 🔵

ON 🔵

dВ _____

φ -

•

۰ 🗕

ON 🔵

14 270

ON 🔵

14 45 💧 Boresight

•• 110° •

45°

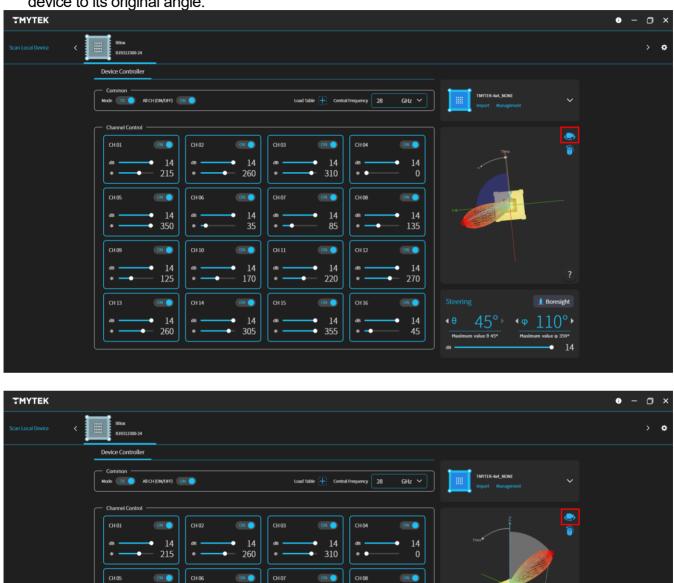
ON 🔵

14 220

ON 🔵

• 355

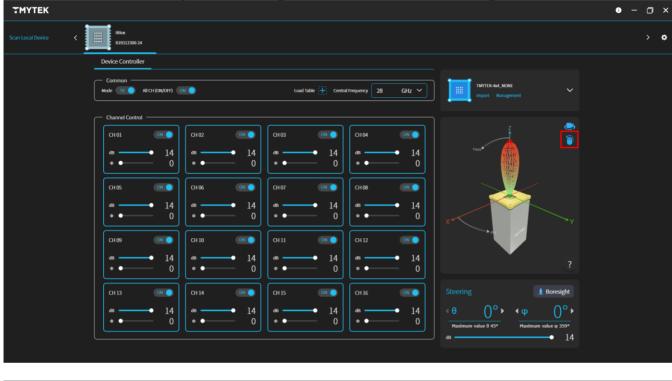
(19). When the device is rotated to an arbitrary angle, pressing the "Reset Angle" button can set the device to its original angle.





(20). This button can quickly adjust the device to the upright or horizontal position.

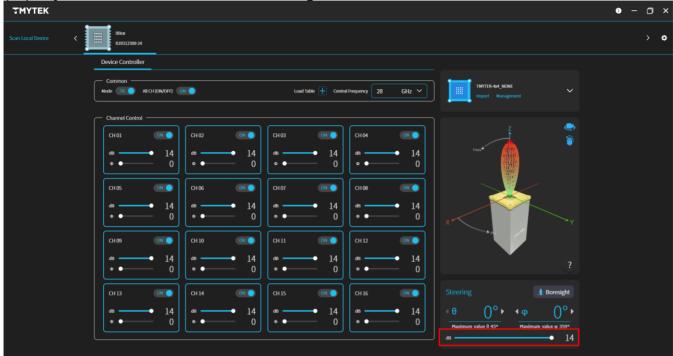
NOTE: Users can manually rotate the angle of the device instead of using this function.







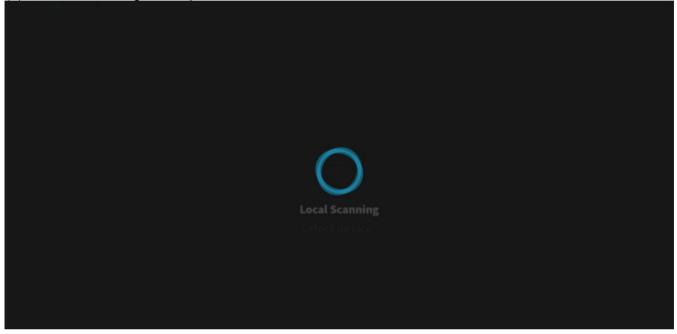
(21). Adjust the dB value to control the Beam gain.



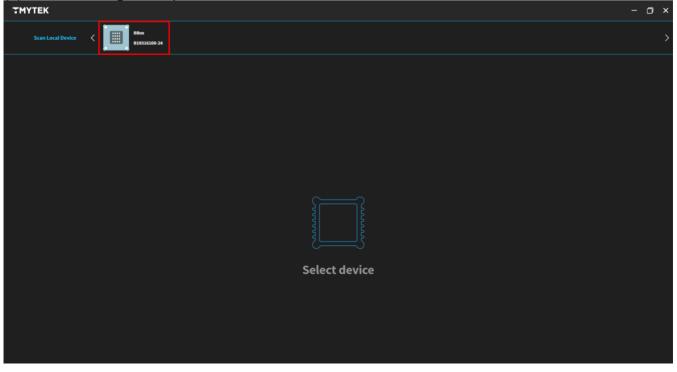


2. BBox One 5G

- (1). Connect BBox One and PC with Ethernet, and then turn on the power of BBox One.
- (2). Open TMXLAB Kit.
- (3). Wait till scanning is completed.



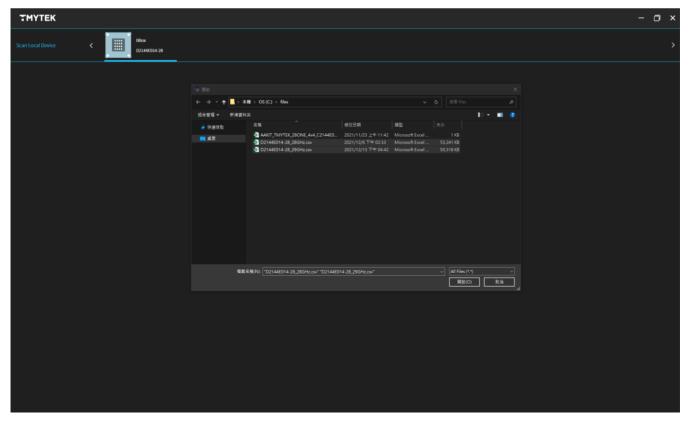
(4). After scanning is completed, click the device icon above.





(5). If the table of the clicked device has not been imported, the screen will show "No Calibration Table." Click anywhere to open the file selection window, choose the file(s) to be imported, and then click "Open" to import the table and expand the control panel.

тмутек	- 🗆 ×
Scan Local Device < DILAMENIA - 28	>
No Calibration Table	
Click here and import the table file to open BBox UI	

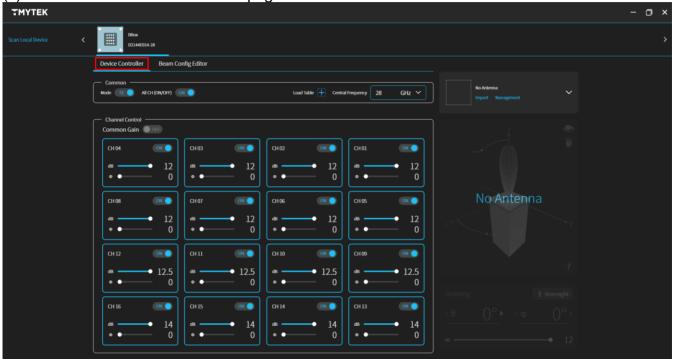


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2.1 Device Controller

• The device controller is designed to switch between Tx/Rx mode, change central frequency, control the power/gain/phase of each channel and set beam angle.





(2). Click the Mode toggle switch to switch between Tx/Rx mode.

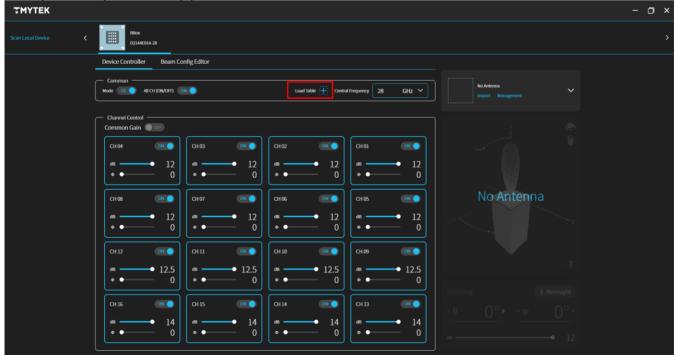
тмутек							- 0 ×
Scan Local Device 🗸	BBox 02144E014-28						
	Device Controller Beam C	Config Editor					
l	Common Mode TX All CH (ON/OFF)		Load Table 🕂 Centra	al Frequency 28 GHz V	No Antenna Import Management	~	
	Channel Control						
	СН 04 🔍 🔵	СН 03 💿 💽	СН 02 ОМ 🔵	СН01 ОМ 🔵			
	dB 12	dB 12	dB 12 ⊕ ● 0	dB 12 ◆ ● 0			
	СН 08 ОН 🔵	СН07 ОМ 🔵	СН 06 ОМ О	СН 05 ОМ 🌒	No Antenna		
	dB 12 ♥ ● 0	ds <u>12</u> ⊕ ● 0	dB 12 ⊕ ● 0	dB 12 ♥ ● 0			
	СН 12 ОН 🔵	СН 11 ОМ 🔵	CH 10 ON O	СН 09 ОН 🔵			
	dB 12.5	d8 <u>→ 12.5</u> ⊕ ● 0	dB 12.5 ⊕ ● 0	^{dB} → 12.5 • • 0			
	СН 16 ОМ О	CH 15 ON O	CH 14 ON •	CH 13 CN 🔵			
	dB <u>↓ 14</u>	da <u>14</u> ⊕ ● 0	dB <u>↓ 14</u> ⊕ ● 0	dB <u> </u>			



(3). Toggle All CH (ON/OFF) can switch all channels on/off.



(4). Click "Load Table" to import the calibration table. After selecting the file(s) to be imported, click Open to import the file(s).



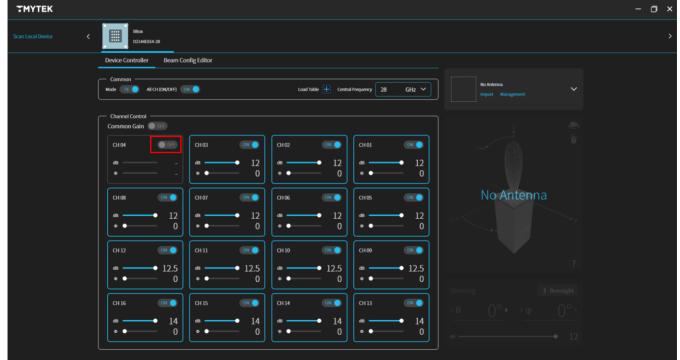


(5). All available frequency points are listed in the Central Frequency drop-down menu. You can choose the desired one.

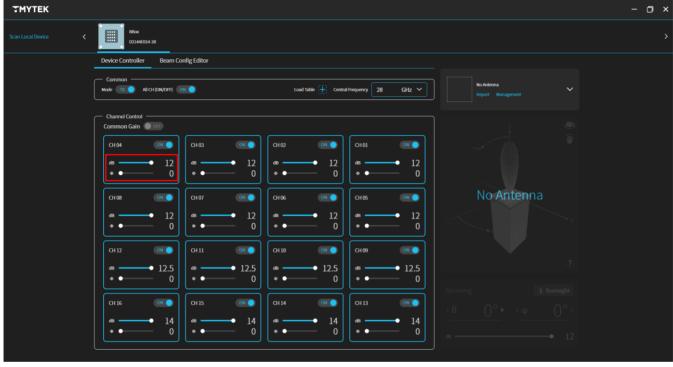


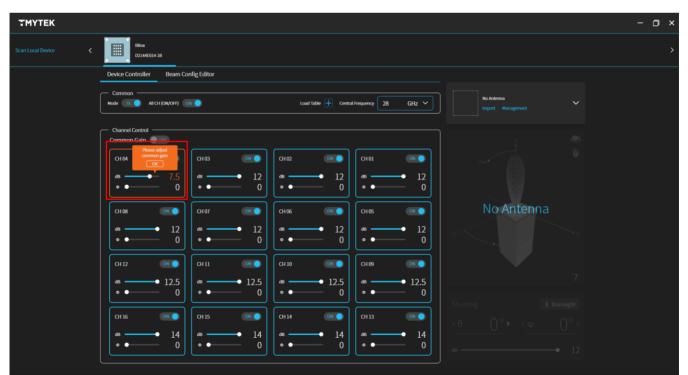
NOTE: The Dynamic Range of each frequency point may be different.

(6). Click the toggle switch in the upper right corner of the channel card(s) to switch the channel power on and off.

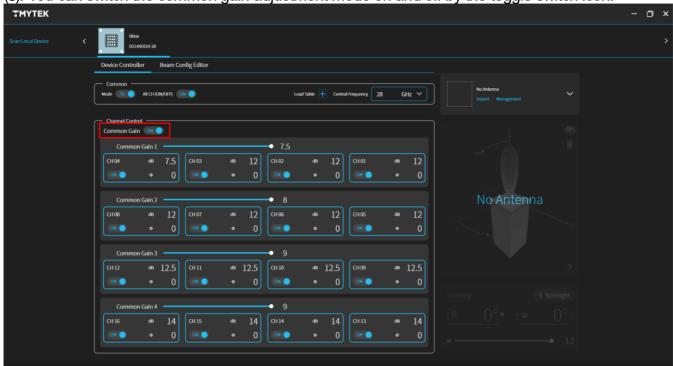


(7). Adjust the sliders of dB and Φ in the channel card(s) to control the channel gain and phase. When the element gain is minimal/maximal, the screen will show "Please adjust common gain." You need to adjust the common gain before you can continue to lower/higher the channel gain. Click "OK" to switch to the common gain adjustment mode.





(8). You can switch the common gain adjustment mode on and off by the toggle switch icon.



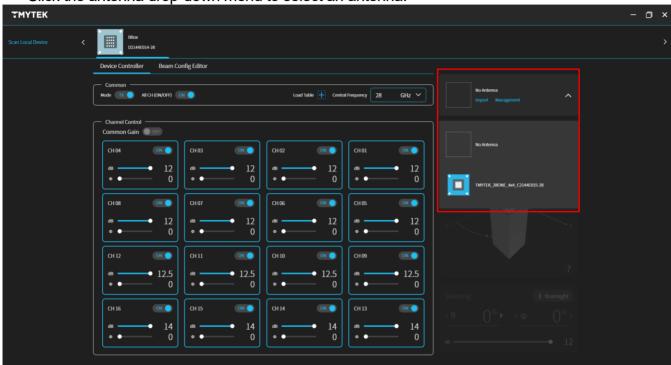
(9). Adjusting the common gain will simultaneously affect the gain of the 4 channels on the board. Take this screenshot as an example, if the common gain is changed to 0, the Channel01 is 4.5 dB, Channel04 is 0 dB. Then, the common gain and channel gain can be adjusted separately.

тмутек		- 🗆 >
can Local Device < III Blox 1021446314-28		;
Device Controller Beam Config Editor		
Common Mode TR All CH (ON/OFF) OR ALL CAI Table 🕂 Central Frequency 28 GHz V	No Anterna 🗸 🗸	
Channel Control		
Common Gain 1 7.5 CH 04 dB 7.5 CH 03 dB 12 CH 02 dB 12 CH 01 dB 12		
Image: Common Gain 2 Image: Common Gain 2 8	No Antenna	
CH08 d8 12 (M) ● • 0 (M) ● • 0		
Common Gain 3 9		
CH12 ds 12.5 CH12 ds 12.5 CH10 ds 10.5 CH10		
Common Gain 4 9 4 A		
CH16 de 14 CH15 de 14 CH14 de 14 CH13 de 14		

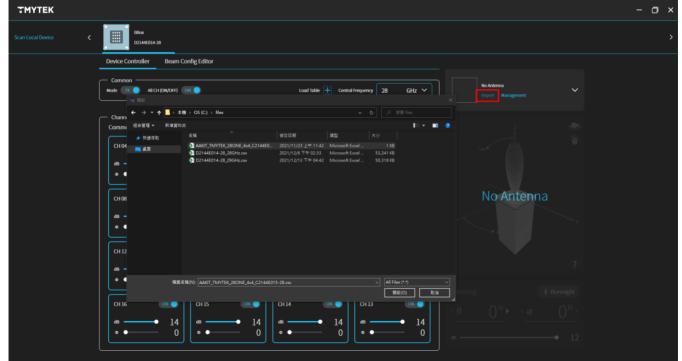


(10). If no antenna is selected, only the channel control mode is functional. The beam steering function is only available after an antenna is selected.

Click the antenna drop-down menu to select an antenna.

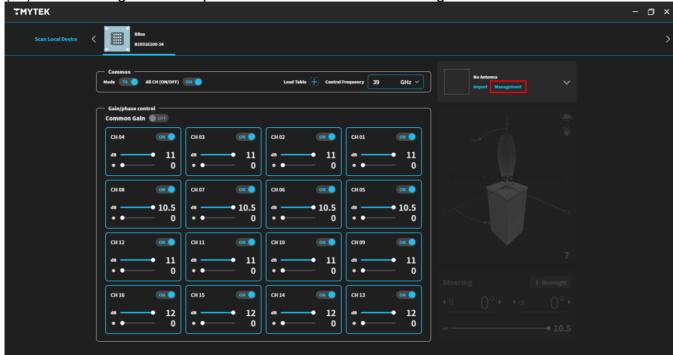


(11). Click "Import" to open the file selection window. Select the file(s) to be imported and click "Open" to use the imported antenna data in the antenna menu.





(12). Click "Management" to open the customized antenna management interface.



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(13). Click "Add" to enter the add mode.

Enter following in order: antenna name (for identification, the name cannot be repeated), SpacingX (the pitch-to-pitch spacing between two adjacent antenna elements on the Xcoordinate, Unit: mm), SpacingY (the pitch-to-pitch spacing between two adjacent antenna elements on the Y-coordinate, Unit: mm), theta max angle, and phase offset of each channel. Click the arrow on the right to expand/collapse the offset input box.

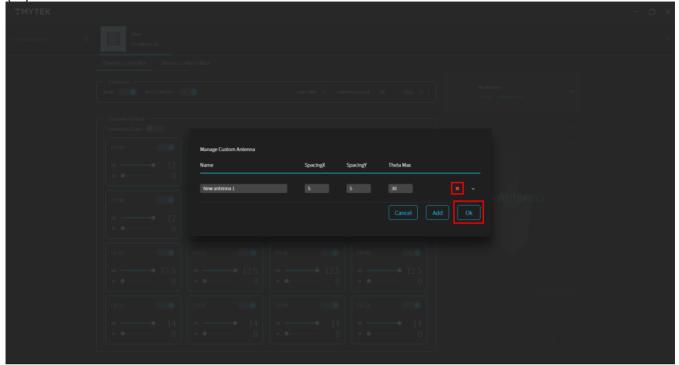
After completing the above action, click "Ok" to save the input data and return to the main control interface. You will see that the antenna option has been added to the antenna menu.

тмутек		
Scan Local Device		
	Manage Custom Antenna	
	Name SpacingX SpacingY Theta Max	
	New antenna 1 5 5 30 X ^	
	RX 0ffset TX 0ffset	

тмүтек		- 0 ×
Scan Local Device 🗸	EBox 021446014-28	
	Device Controller Beam Config Editor	
	Common Mode TE At CH (DN/OFF) CH CH CANOFF CH CANADATION CH CH CANADATION CH CH CH CANADATION CH	
	Common Gain CH03 CH02 ON CH01 CH01 CH01 CH01	
	$\begin{bmatrix} a_3 & & & 12 \\ \bullet & \bullet & & 0 \end{bmatrix} \begin{bmatrix} a_3 & & & 12 \\ \bullet & \bullet & & 0 \end{bmatrix} \begin{bmatrix} a_3 & & \bullet & 12 \\ \bullet & \bullet & & 0 \end{bmatrix} \begin{bmatrix} a_3 & & \bullet & 12 \\ \bullet & \bullet & & 0 \end{bmatrix} \begin{bmatrix} a_3 & & \bullet & 12 \\ \bullet & \bullet & & 0 \end{bmatrix} \begin{bmatrix} a_3 & & \bullet & 12 \\ \bullet & \bullet & & 0 \end{bmatrix}$	
	CH12 CH 11 CH 10 CH 10 CH 09 C	
	$\begin{bmatrix} a_{3} & \longrightarrow & 12.5 \\ \bullet & \bullet & 0 \end{bmatrix} \begin{bmatrix} a_{3} & \longrightarrow & 12.5 \\ \bullet & \bullet & 0 \end{bmatrix} \begin{bmatrix} a_{3} & \longrightarrow & 12.5 \\ \bullet & \bullet & 0 \end{bmatrix} \begin{bmatrix} a_{3} & \longrightarrow & 12.5 \\ \bullet & \bullet & 0 \end{bmatrix}$	
	$\begin{bmatrix} a_{0} & \textcircled{\bullet} & 14 \\ \bullet & \textcircled{\bullet} & 0 \end{bmatrix} \begin{bmatrix} a_{0} & \textcircled{\bullet} & 14 \\ \bullet & \textcircled{\bullet} & 0 \end{bmatrix} \begin{bmatrix} a_{0} & \textcircled{\bullet} & 14 \\ \bullet & \textcircled{\bullet} & 0 \end{bmatrix} \begin{bmatrix} a_{0} & \textcircled{\bullet} & 14 \\ \bullet & \textcircled{\bullet} & 0 \end{bmatrix} \begin{bmatrix} a_{0} & \textcircled{\bullet} & 14 \\ \bullet & \textcircled{\bullet} & 0 \end{bmatrix} \begin{bmatrix} a_{0} & \textcircled{\bullet} & 12 \\ \bullet & \textcircled{\bullet} & 0 \end{bmatrix}$	



(14). Click the red "X" and then "OK" to delete the antenna data.

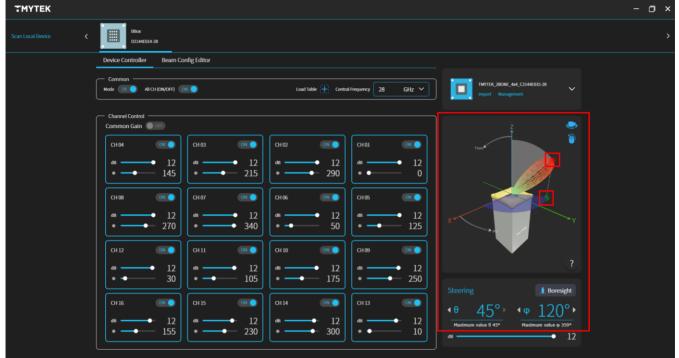




- (15). Press and hold the red dot on the tip of the Beam to rotate the Beam and adjust θ and ϕ . Press and hold the green dot on the xy-plane to adjust ϕ .
- NOTE: θ is the angle between the positive Z-axis and the vector in question ($0 \le \theta \le$ Theta max angle).

 φ is the angle between the projection of the vector onto the xy-plane and the positive X-axis (0 $\leq \varphi < 360^{\circ}$).

Take this screenshot as an example, the theta max is 45°.



(16). "Pressing "Boresight" can set θ and ϕ back to 0 degree.

тмутек		- o ×
Scan Local Device	EBox 021446014-28	
	Device Controller Beam Config Editor	
	Common Mode 📧 🕢 All CH (DN/CHT) CK 🔹 Load Table 🕀 Central Frequency 28 GHz 🗸 International Common Com	
	Channel Control	
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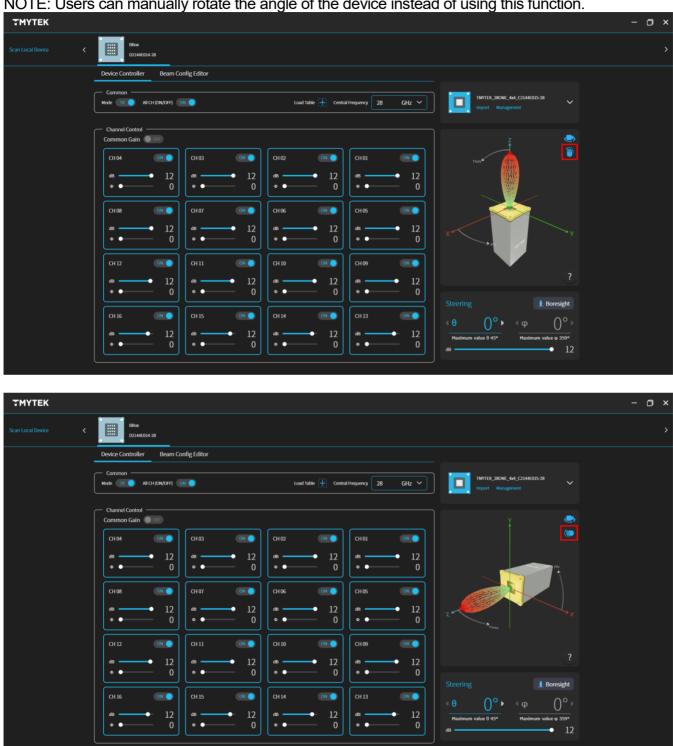
(17). When the device is rotated to an arbitrary angle, pressing the "Reset Angle" button can set the device to its original angle.





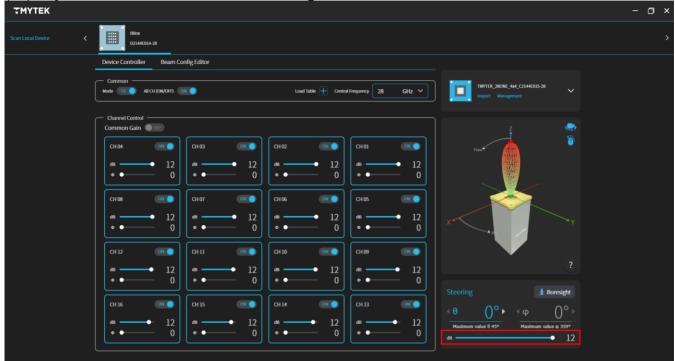
(18). This button can quickly adjust the device to the upright or horizontal position.

NOTE: Users can manually rotate the angle of the device instead of using this function.



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(19). Adjust the dB value to control the Beam gain.



2.2 Beam Config Editor

 The Beam Config Editor can pre-edit up to 64 sets of beams in Tx/Rx mode each, and can write the beam table into the BBox. In the same power cycle, the user can switch the prewritten beam ID through the SPI interface.

(1). Switch to the "Beam Config Editor" page

тмутек							- 0
	BBox D2144E014-2	8					
	Device Controller	Beam Config Editor					
						No Anterina Import Management	~
	тх			RX			
			Please sele	ct antenna	a _{o o} .		

(2). If no antenna is selected, the beam table cannot be edited, and "Please select antenna" will pop up on the screen.

тмутек											- 🗆 ×
Scan Local Device	BBax D2144E014-	28									
	Device Controller	Beam Config Editor									
								No An Impor	tenna t Manage	~	
	тх					RX					
			P Gai	lease	e sele	ect antenna	a _{e o} .				



(3). After selecting an antenna, you can edit the beam table.

тмүтек									- 0
	BBox D2144E014-	28							
	Device Controller	Beam Config Editor							
	🖉 Save Config	Control Method					TMYTEK_28ONE_ Import Manag	4x4_c2144E015-28 perment	
	хт				RX				
	BeamID 1	θ ο -	Φ 0.	Gain 12 da	BeamID 1	θ Ο	Ф 0	Gain 2.5 an	
	BeamID 2	θ	ф [0	Gain 12 as	BeamID 2	θ ο	Ф 0	Gain 2.5 an	
	BeamID 3	e	¢ 0	Gain 12 as	BeamID 3	θ ο	ф О	Gain 2.5 da	
	BeamID 4	e	¢ 0.	Gain 12 da	BeamID 4	θ ο	ф 💽 -	Gain 2.5 as	
	BeamID 5	θ ο	ф О	Gain 12 da	BeamID 5	θ ο	ф 💽-	Gain 2.5 as	
	BeamID 6	e o	ф 0	Gain 12 da	BeamID 6	θ Ο	ф 🚺 .	Gain 2.5 as	
	BeamID 7	e o	ф 0	Gain 12 da	BeamID 7	0 .	ф 0	Gain 2.5 da	
	BeamID 8	e o	ф <u>о</u> .	Gain 12 da	BeamID 8	e o -	ф 0	Gain 2.5 da	
	BeamID 9	e o	ф <u>о</u> .	Gain 12 as	BeamID 9	θ ο	Ф О	Gain 2.5 an	
	BeamID 10	θ ο	ф о	Gain 12 ds	BeamID 10	θ ο -	ф <u>о</u> -	Gain 2.5 a	

(4).64 sets of beams can be stored in the Tx/Rx mode each, and the range of values that can be entered will be prompted below the input box.

тмутек	ľ	ł							- 0 ×
Scan Local Device 🖌	BBox D2144E014	28							
	Device Controller	Beam Config Editor							
	Save Config	Control Method					THYTEK, 280NE Import Mana	4x4_c2)44E015-28	
	x				RX				
	BeamID 1	e d.	¢ 0.	Gain 12	BeamID 1	9 0	¢ 0	Gain 25 *	
	BeamID 2	e o	¢ 0	Gain 12 🛎	BeamID 2	9 0	¢ 0	Gain 25 *	
	BeamID 3	e 💽-	¢ 0	Gain 12 a	BeamID 3	0 <u>.</u> .	¢ 0	Gain 25 *	
	BeamID 4	e 💽 -	¢ 0	Gain 12 a	BeamID 4	0 .	ф <u>о</u> .	Gain 25 #	
	BeamID 5	e	ф <u>о</u> .	Gain 12 =	BeamID 5	θ 0	¢ 0	Gain 25 *	
	BeamID 6	6 0	¢ 0	Gain 12 📾	BeamID 6	9 <u>o</u> .	¢ 0	Gain 25	
	BeamID 7	e o	¢ [0	Gain 12≄	BeamID 7	9 0.	ф <u>о</u> .	Gain 25 a	
	BeamID 8	θ [0	¢ 0	Gain 12 a	BeamID 8	e <u>o</u> .	∲ <u>0</u> .	Gain 25 *	
	BeamID 9	e <u>o</u> -	∲ 0	Gain 12 as	BeamID 9	e <u>o</u> .	<u>م</u> .	Gain 25 *	
					BeamID 10	0	¢ 0	Gain 25	



(5). After editing, click "Save Config" to save the configuration file.

NOTE: At this moment, the configuration file is only written on the PC and has not been written to BBox yet.

DDOX yet.									
тмутек									- 0 ×
Scan Local Device 🖌	BBox D2144E014	-28							
	Device Controller	Beam Config Editor							
	Z Save Config	Control Method — TLK SF					IMYTEK_28ONE_ Import Manag	4x4_c2144E015-28 V gement V	
	хт				RX				
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	BeamID 2	θ 0	ф <u>о</u> .	Gain 12 as	BeamID 2	e o	ф О	Gain 2.5 an	
	BeamID 3	9 0	¢ 0	Gain 12 da	BeamID 3	0 .	ф 💽 .	Gain 2.5 da	
	BeamID 4	θ	ф <u>о</u> -	Gain 12 da	BeamID 4	θ ο	Ф 0	Gain 2.5 au	
	BeamID 5	θ	Ф 0	Gain 12 ds	BeamID 5	e	ф О	Gain 2.5 as	
	BeamID 6	θ 0	Ф 0	Gain 12 ds	BeamID 6	e	Ф 0	Gain 2.5 as	
	BeamID 7	θ 0	ф [0	Gain 12 as	BeamID 7	e	ф О	Gain 2.5 an	
	BeamID 8	θ 0	φ	Gain 12 as	BeamID 8	e	ф О	Gain 2.5 an	
	BeamID 9	θ 0	φ	Gain 12 as	BeamID 9	e 0.	ф О	Gain 2.5 an	
	BeamID 10	θ 0	Ф О	Gain 12 da	BeamID 10	θ ο	Ф О	Gain 2.5 as	

(6). Control Method shows how BBox is controlled. In the "TLK" mode, the device is controlled by Ethernet.

тмутек									- 🗆 ×
Scan Local Device <	BBox D2144E014	-28							>
	Device Controller	Beam Config Editor							
	🖉 Save Config	Control Method — TLK SP					TMYTEK_280NE_ Import Manag	4x4_c2144E015-28 🗸	
	тх				RX)
	BeamID 1	θ ο -	¢ 0	Gain 12 das	BeamID 1	θ Ο	ф <u>о</u> .	Gain 2.5 da	
	BeamID 2	θ ο	φ	Gain 12 as	BeamID 2	θ Ο	¢ 0	Gain 2.5 at	
	BeamID 3	θ ο	φ .	Gain 12 da	BeamID 3	θ ο	Ф О	Gain 2.5 as	
	BeamID 4	θ ο	ф [0	Gain 12 da	BeamID 4	0 .	ф <u>о</u> *	Gain 2.5 au	
	BeamID 5	θ	ф О	Gain 12 da	BeamID 5	θ ο	ф [0	Gain 2.5 an	
	BeamID 6	θ	ф 0	Gain 12 da	BeamID 6	θ ο	ф [0	Gain 2.5 m	
	BeamID 7	θ [0	Ф 0	Gain 12 ds	BeamID 7	e	Ф 0	Gain 2.5 da	
	BeamID 8	θ ο	Ф 0	Gain 12 as	BeamID 8	₿	Ф 0	Gain 2.5 an	
	BeamID 9	θ ο	Ф 0	Gain 12 as	BeamID 9	θ ο	ф <u>о</u> -	Gain 2.5 as	
	BeamID 10	θ [0].	ф [0	Gain 12 da	BeamID 10	θ ο	ф <u>о</u> .	Gain 2.5 as]

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(7). Toggling the Control Method button can switch the control method of BBox. In the "SPI" mode, Beam Config is written to BBox and BBox cannot be controlled by TLK. All function is locked and "Please switch control method to TLK" will pop up on the screen.

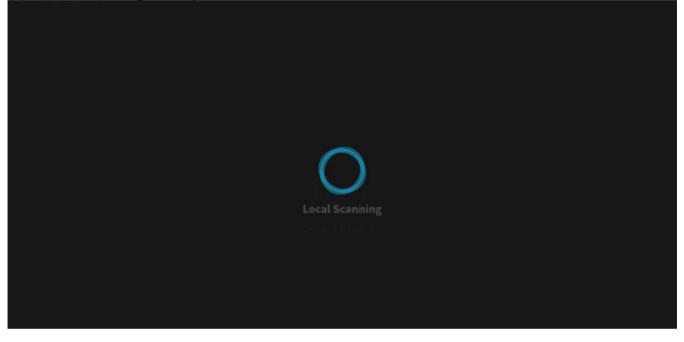
NOTE: If you switch to the "Device Controller" page now, the Control Method will be set to "TLK" automatically.

тмутек									- 🗆 ×
Scan Local Device <	BBox D2144E014-2	18							>
	Device Controller	Bearn Config Editor							
		Control Method TLK SPI				I	TMYTEK_28ONE_4x		
	хт				— RX ———				
			Please	switch contr	ol method	l to TLK			



3. BBox Lite

- (1). Connect BBox Lite and PC with Ethernet, and then turn on the power of BBox Lite.
- (2). Open TMXLAB Kit.
- (3). Wait till scanning is completed.



(4). After scanning is completed, click the device icon above.

тмутек	- o ×
Scan Local Device K Bibox D2104.024-28	
Select device	



(5). If the table of the clicked device has not been imported, the screen will show "No Calibration Table." Click anywhere to open the file selection window, choose the file(s) to be imported, and then click "Open" to import the table and expand the control panel.

тмутек		- 🛛 ×
	BBox 02104.024-28	>
	No Calibration Table Click here and import the table file to open BBox UI	

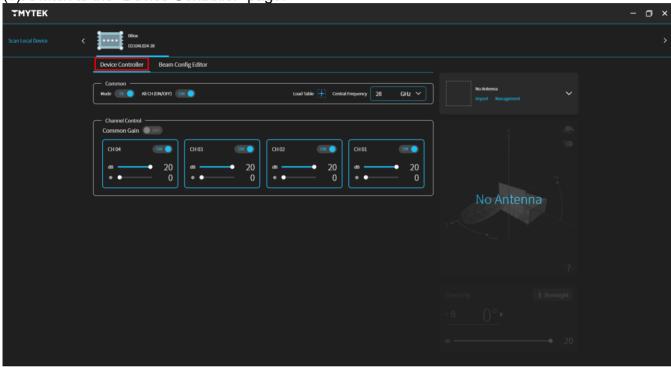
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					開歓(O)			

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3.1 Device Controller

• The "Device Controller" is designed to switch between Tx/Rx mode, change central frequency, control the power/gain/phase of each channel and set beam angle.

(1). Switch to the "Device Controller" page.



(2). Click the Mode toggle switch to switch between Tx/Rx mode.

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	Device Controller Beam Config Editor		
Common Gain Common Gain Child		\sim	
	Common Gain © 07 CH04 OX © CH03 OX © CH02 OX © CH01 OX © d8 - 20 d8 - 20 d8 - 20		



(3). Toggle All CH (ON/OFF) can switch all channels on/off.

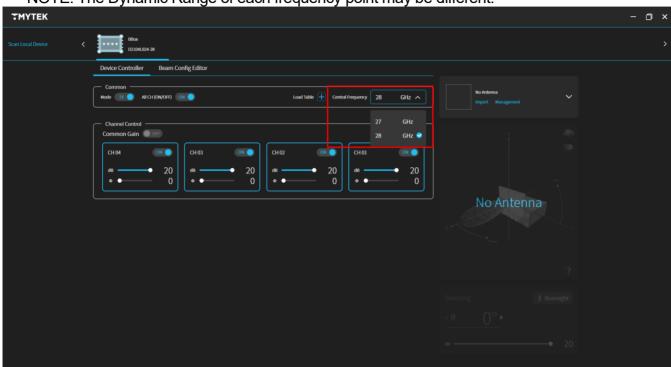
тмутек			- 🛚 ×
Scan Local Device <	10104.024-28		
	Device Controller Beam Config Editor		
	Continon Mode TI Control Frequency 28 GHz V	No Anterna 🗸	
	Channel Control Common Gain Gr CH04 CH03 CH02 CH01 CH01		
	$\begin{array}{c} \mathfrak{ss} & \longrightarrow & 20 \\ \bullet & \bullet & & 0 \end{array} \begin{array}{c} \mathfrak{ss} & \longrightarrow & 20 \\ \bullet & \bullet & & 0 \end{array} \begin{array}{c} \mathfrak{ss} & \longrightarrow & 20 \\ \bullet & \bullet & & 0 \end{array} \begin{array}{c} \mathfrak{ss} & \longrightarrow & 20 \\ \bullet & \bullet & & 0 \end{array} \begin{array}{c} \mathfrak{ss} & \longrightarrow & 20 \\ \bullet & \bullet & & 0 \end{array}$		
		No Antenna	

(4). Click "Load Table" to import the calibration table. After selecting the file(s) to be imported, click Open to import the file(s).

тмутек		- 0 ×
Scan Local Device K Bisox 021040004-38		
Device Controller Beam Config Editor		
Contrad Table 🔆 Central Prequency 28 GHz V	No Anterna Import Management	
$\begin{bmatrix} Channel Control \\ Common Gain \\ \hline \\ cH04 \\ \hline \\ cs \\ \bullet \\ \bullet \\ \bullet \\ \bullet \\ ch02 \\ \hline \\ ch03 \\ \hline \\ ch03 \\ \hline \\ ch03 \\ \hline \\ ch03 \\ \hline \\ ch02 \\ ch02 \\ \hline \\ ch02 \\ ch02$		
	No Antenna	

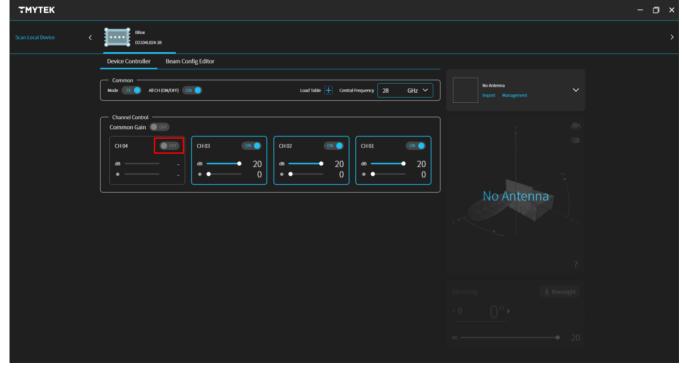


(5). All available frequency points are listed in the Central Frequency drop-down menu. You can choose the desired one.



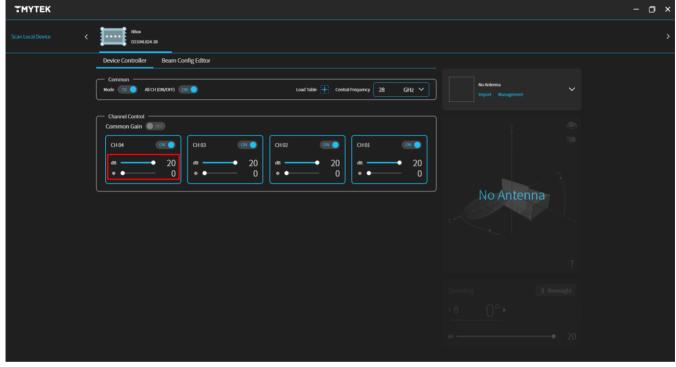
NOTE: The Dynamic Range of each frequency point may be different.

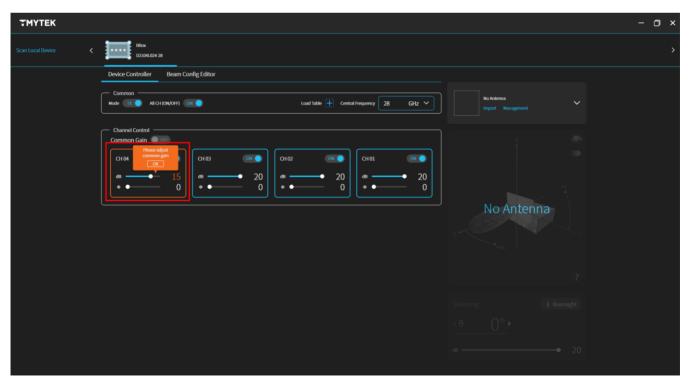
(6). Click the switch button in the upper right corner of the channel card(s) to switch the channel power on and off.



TMXLAB Kit Software User Manual

(7). Adjust the sliders of dB and Φ in the channel card(s) to control the channel gain and phase. When the element gain is minimal/maximal, the screen will show "Please adjust common gain." You need to adjust the common gain before you can continue to lower/higher the channel gain. Click "OK" to switch to the common gain adjustment mode.







(8). You can switch the common gain adjustment mode on and off by the toggle switch icon.

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Scan Local Device <	890x 1021041024-28	
	Device Controller Beam Config Editor	
	Continion - Load Table 🕀 Central Prequency 28 GHz V Inport Management V	
	Common Gain Cot Col	
	Сотитион Gain 1 Сноч dв 15 Сноз dв 20 Сноз dв 20	
	No Antenna	

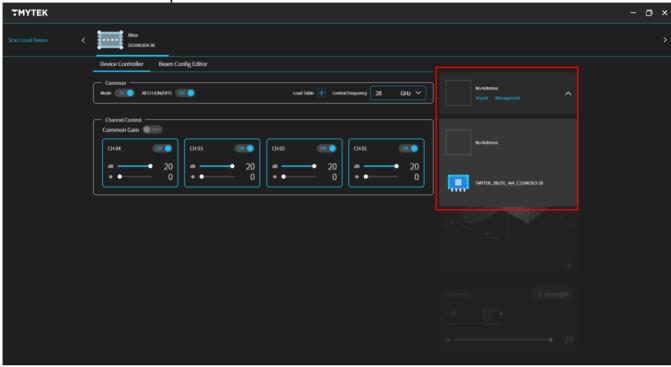
(9). Adjusting the common gain will simultaneously affect the gain of the 4 channels on the board. Take this screenshot as an example, if the common gain is changed to 0, the Channel01 is 5 dB, Channel04 is 0 dB. Then, the common gain and channel gain can be adjusted separately.

cancel device image: margine device image: device device device image: device device image: device device device image: device device device image: device d	тмутек			- 0 ×
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2 2 Steering Δ Boresight 4 θ 0° M 0 2 M 1.8 09			No Antenna	
Control Contr				
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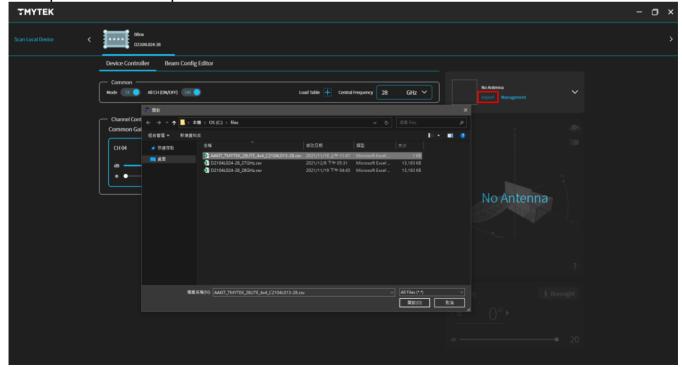


(10). If no antenna is selected, only the channel control mode is functional. The beam steering function is only available after an antenna is selected.

Click the antenna drop-down menu to select an antenna.



(11). Click "Import" to open the file selection window. Select the file(s) to be imported and click "Open" to use the imported antenna data in the antenna menu.





(12). Click "Management" to open the customized antenna management interface.

тмутек			- 🗆 ×
Scan Local Device <	EBox 02104.024-28		
	Device Controller Beam Config Editor		
	- Common Mode TR AI CH (CN/OFF) CK C Load Table 🔆 Central Frequency 28 GHz V	No Arterna Import Management	
	Channel Control Common Gain \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc	No Antenna 2	

(13). Click "Add" to enter the add mode.

Enter following in order: antenna name (for identification, the name cannot be repeated), SpacingX (the pitch-to-pitch spacing between two adjacent antenna elements on the Xcoordinate, Unit: mm), SpacingY (the pitch-to-pitch spacing between two adjacent antenna elements on the Y-coordinate, Unit: mm), Beam steering range, and phase offset of each channel. Click the arrow on the right to expand/collapse the offset input box. After completing the above action, click "Ok" to save the input data and return to the main control interface. You will see that the antenna option has been added to the antenna menu.

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Scan Local Device <		
Devio		
Com		
Com	net Control Manage Custom Antenna	
Сн	Name Spacingx Spacingr	Theta Max
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	Device Controller Beam Config Editor	
	Common Load Table 🕂 Central Trequency 28 GHz V	
	Channel Control Common Gain CH04 CH03 CH02 CH01 CH04 No Antenna	
	$ \begin{array}{c} as \\ \bullet \end{array} \\ \bullet \end{array} \\ \hline 0 \\ as \\ \bullet \end{array} \\ \hline 0 \\ \bullet \end{array} \\ \hline 0 \\ \bullet \end{array} \\ \hline 0 \\ as \\ \bullet \end{array} \\ \hline 0 \\ \hline 0 \\ \bullet \end{array} \\ \hline 0 \\ \hline 0 \\ \bullet \\ \bullet \end{array} \\ \hline 0 \\ 0 \\$	
	ТМТЕК 281/15_44_02104.013-28	



(14). Click the red "X" and then "OK" to delete the antenna data.

тмутек				- 🗆 ×
Scan Local Device 🗸				
	Manage Custom Antenna			
	Name 	SpacingX Spacing	Y Theta Max	
	New antenna 1			



- (15). Press and hold the red dot on the tip of the Beam to rotate the Beam and adjust θ and ϕ . Press and hold the green dot on the xy-plane to adjust ϕ .
- NOTE: θ is the angle between the positive Z-axis and the vector in question ($0 \le \theta \le$ Theta max angle).

 φ is the angle between the projection of the vector onto the xy-plane and the positive X-axis (0 $\leq \varphi < 360^{\circ}$).

Take this screenshot as an example, the theta max is 45°.

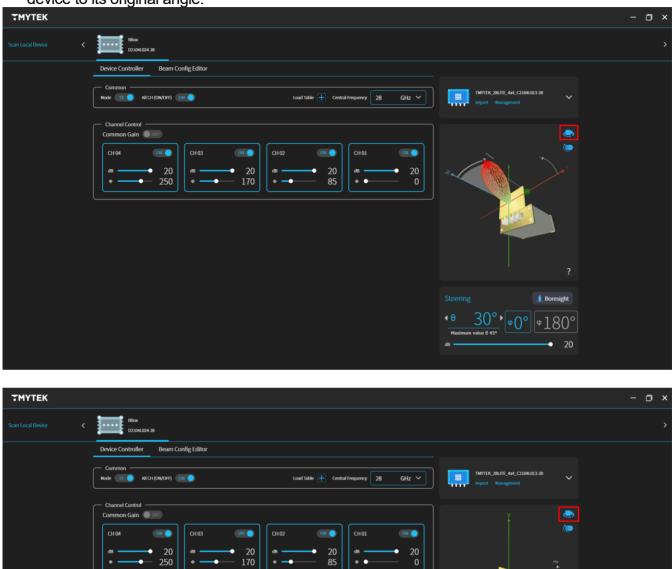
ТМУТЕК - 🛛 × Beam Config Editor All CH (ON/OFF) ON Load Table 🕂 Cer ncy 28 ON 🔵 сно ON 🔵 ON 🔵 сно ON 🔵 20 170 20 85 20 0 250

(16). "Pressing "Boresight" can set θ and ϕ back to 0 degree.

тмутек			- 0 ×
Scan Local Device 🗸	FBXx 102104L024-28		
	Device Controller Beam Config Editor Common	THYTEK 2011FL 444_C2100.033-28	
	Channel Control Common Gain \bigcirc		
		Steering θ 0° Boresight Maximum value θ 45° dB 20	



(17). When the device is rotated to an arbitrary angle, pressing the "Reset Angle" button can set the device to its original angle.



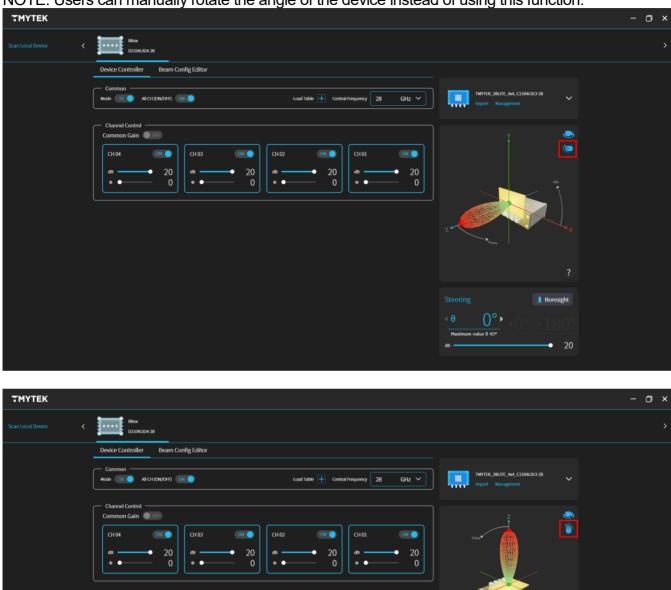
🔔 Boresight

<u>30°</u>, 0° 9180°



(18). This button can quickly adjust the device to the upright or horizontal position.

NOTE: Users can manually rotate the angle of the device instead of using this function.

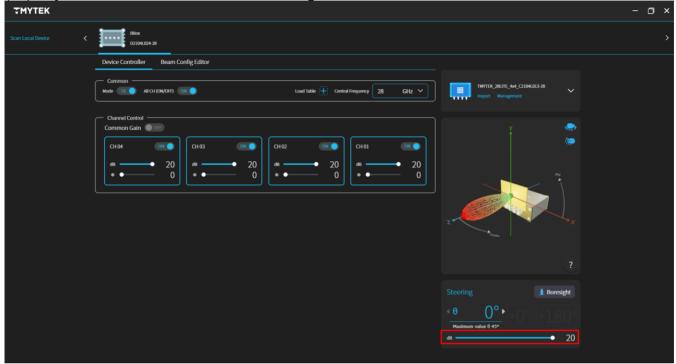


💧 Boresight

• 20



(19). Adjust the dB value to control the Beam gain.



3.2 Beam Config Editor

 The Beam Config Editor can pre-edit up to 64 sets of beams in Tx/Rx mode each, and can write the beam table into the BBox. In the same power cycle, the user can switch the prewritten beam ID through the SPI interface.

(1). Switch to the "Beam Config Editor" page.

TMYTEK								- 0
	< BBox 02104L024	-28						
	Device Controller	Beam Config Editor						
						No Antenna Import Manaj	germent	
	XT			RX				
			Please sele	ect antenn	a _{。 .} .			

(2). If no antenna is selected, the beam table cannot be edited, and "Please select antenna," will pop up on the screen.

тмутек									- 🗆 ×
Scan Local Device <	BBox D2104L024-3	28							
	Device Controller	Beam Config Editor							
							No Antenna Import Management	~	
	хт				RX				
				Please sele	ct antenna				
	BeamID 10	θ 0	φ 🔴 σ	Gain 20 da	BeamID 10	θ Ο	φ 🔵 σ Gain 135		

(3). After selecting an antenna, you can edit the beam table.

тмутек									- 0
	BBax D2104L024	-28							
	Device Controller	Beam Config Editor							
	Z Save Config	Control Method					TMYTEK_28LIT	E_4x4_C2104L013-28	
	<u>х</u>				RX				
	BeamID 1	θ ο -	ф 🔵 🖤	Gain 20 as	BeamID 1	9 0 -	ф 🔵 🖤	Gain 13.5 m	
	BeamID 2	θ ο	ф 🔵 🖉	Gain 20 m	BeamID 2	e	ф 🔵 🕫	Gain 13.5 an	
	BeamID 3	e .	ф 🔵 🕝	Gain 20 m	BeamID 3	θ ο	ф 🔵 🖛	Gain 135 a	
	BeamID 4	θ ο	ф 🔵 🕫	Gain 20 da	BeamID 4	θ ο	ф 🔵 с	Gain 13.5 au	
	BeamID 5	θ ο	ф 🔵 🕫	Gain 20 de	BeamID 5	e	ф 🔵 от	Gain 13.5 de	
	BeamID 6	θ ο	ф 🔵 🕐	Gain 20 de	BeamID 6	€	ф 🔵 🖻	Gain 13.5 ⁴⁸	
	BeamID 7	θ ο	ф 🔵 🕫	Gain 20 da	BeamID 7	θ ο	ф 🔵 от	Gain 13.5 da	
	BeamID 8	e o	ф 🔵 🕐	Gain 20 es	BeamID 8	€	ф 🔵 от	Gain 13.5 an	
	BeamID 9	e o	ф 🔵 🔊	Gain 20 as	BeamID 9	θ ο	ф 🔵 от	Gain 13.5 an	
	BeamID 10	θ ο	ф 🔵 🕫	Gain 20 es	BeamID 10	θ ο	o 🔵 🐨	Gain 13.5 a	

(4).64 sets of beams can be stored in the Tx/Rx mode each, and the range of values that can be entered will be prompted below the input box.

тмутек	, i								- 🗆 ×
Scan Local Device <	BBox D2104L024	-28							>
	Device Controller	Beam Config Editor							
	🖉 Save Config	Control Method					TMYTEK, 28LITE	_4x4_C2104L013-28	
	<u></u>				RX				
	BeamID 1	θ <mark>0'~45°</mark> •	ф 🔵 от 0° or 180°	Gain 20 ds 0-20	BeamID 1	0 .	ф 🔵 🖝	Gain 13.5 du	
	BeamID 2	e o .	ф 🔵 🕫	Gain 20 as	BeamID 2	e	ф 🥥 🕫	Gain 13.5 ^{de}	
	BeamID 3	θ	ቀ 🔵 🐨	Gain 20 da	BeamID 3	θ Ο	ф 🥥 🕐	Gain 13.5 m	
	BeamID 4	e	ф 🔵 🖤	Gain 20 da	BeamID 4	e o	ф 🥥 🕫	Gain 135 at	
	BeamID 5	e	ф 🔵 🖤	Gain 20 da	BeamID 5	θ ο	ф 🥥 🖛	Gain 13.5 at	
	BeamID 6	e o	ф 🔵 🔊	Gain 20 das	BeamID 6	0 .	ф 🔵 🕫	Gain 13.5 m	
	BeamID 7	e o	ф 🔵 🔊	Gain 20 da	BeamID 7	θ 0	ф 🔵 🕫	Gain 135 m	
	BeamID 8	e o	ф 🔵 🔊	Gain 20 da	BeamID 8	θ ο	ф 🔵 🕫	Gain 135 at	
	BeamID 9	e o	ф 🔵 🕐	Gain 20 da	BeamID 9	θ ο	ф 🥥 🕫	Gain 13.5 at	
					BeamID 10	θ ο	ф 🔵 🐨	Gain 13.5 a	

(5). After editing, click "Save Config" to save the configuration file.

NOTE: At this moment, the configuration file is only written on the PC and has not been written to BBox yet.

DDOX yet.									
тмутек									- 🗆 ×
Scan Local Device	K BBox D2104L0	124-28							
	Device Controller	Beam Config Editor							
	Z Save Config	Control Method — TLK SPI					Import Mana	E_4x4_C2104L013-28	
	XX				RX)	
	BeamID 1	e	ф 🔵 🕫	Gain 20 da	BeamID 1	e	¢ 🔵 🚥	Gain 13.5 ^{da}	
	BeamID 2	e	ф 🔵 🕖	Gain 20 m	BeamID 2	e o	ф 🔵 🕐	Gain 13.5 m	
	BeamID 3	e o	ф 🔵 🕝	Gain 20 das	BeamID 3	0 .	ф 🔵 о	Gain 13.5 de	
	BeamID 4	θ ο	ф 🔵 🕫	Gain 20 da	BeamID 4	θ ο	o 🕒 م	Gain 13.5 as	
	BeamID 5	e	ф 🔵 🕝	Gain 20 da	BeamID 5	e o	ф 🔵 🐨	Gain 13.5 de	
	BeamID 6	e	ф 🔵 🕫	Gain 20 da	BeamID 6	e	ф 🔵 с	Gain 13.5 a	
	BeamID 7	θ ο	ф 🔵 🕫	Gain 20 da	BeamID 7	θ ο	ф 🔵 🕐	Gain 13.5 an	
	BeamID 8	8 0	ф 🔵 🕫	Gain 20 dat	BeamID 8	θ ο	ф 🔵 🕐	Gain 13.5 an	
	BeamID 9	e o	ф 🔵 🕫	Gain 20 da	BeamID 9	θ ο	ф 🔵 от	Gain 13.5 a	
	BeamID 10	θ ο	ф 🔵 🗉	Gain 20 da	BeamID 10	θ ο	۰ 🔵 م	Gain 13.5 a	

(6). Control Method shows how BBox is controlled. In the "TLK" mode, the device is controlled by Ethernet.

тмутек					- 🗆 ×
Scan Local Device	BBox D2104L024-28				>
	Device Controller Beam Config Editor				
	Save Config			TMYTEK_28LITE_644_C2104L013.28	
	XT		RX		Г
	BeamID 1 θ 0.	ф 🔵 📧 🛛 Gain 🛛 🕫	BeamID 1 0 0	- φ Ο σ Gain 13.5 da	
	BeamID 2 0 0	ф 🔵 🐨 🛛 Gain 🛛 🗠 🗠	BeamID 2 0 0	- φ () σ Gain 135 α	
	BeamID 3 0 0	ф 🔵 σ Gain 20 🗠	BeamID 3 0 0	- φ (σ) Gain 135 α	
	BeamiD 4 0 0	ф 🔵 σ Gain 20 🗠	BeamID 4 0 0	- φ ()σ Gain [135 α	
	BeamID 5 0 0	ф 🔵 🕜 🦷 Gain 20 🔤 🕫	BeamID 5 0	- φ)σ Gain 135 a	
	BeamID 6 0 0	ф 🔵 🕜 🦳 Gain 20 🔤 🕫	BeamID 6 0 0	- φ () σ Gain 135 a	
	BeamID 7 0 0	ф 🔵 🕐 🛛 Gain 20 🔤 da	BeamID 7 0 0	- φ () σ Gain 135 a	
	BeamiD 8 0 0	ф 🔵 🕫 🛛 Gain 20 🗖 🗠	BeamID 8 0	- φ () σ Gain <u>135</u> a	
	BeamiD 9 0 0	ф 🔵 🕜 🦳 Gain 20 🔤 🕫	BeamID 9 0 0	- φ 🌒 σ Gain 135 💩	
	BeamID 10 0 0	ф 🔵 σ Gain 20 🗠	BeamID 10 0 0	- φ 🌒 σ Gain 135 💩	



(7). Toggling the Control Method button can switch the control method of BBox. In the "SPI" mode, Beam Config is written to BBox and BBox cannot be controlled by TLK. All function is locked and "Please switch control method to TLK" will pop up on the screen.

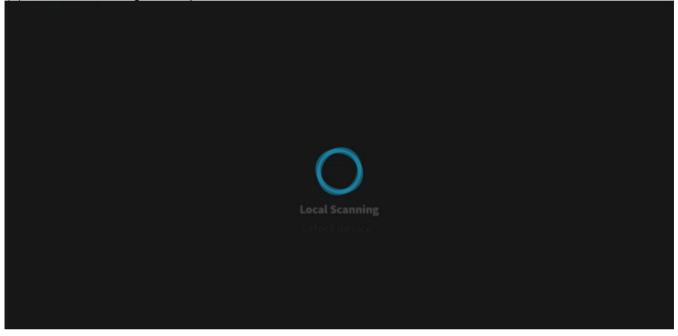
NOTE: If you switch to the "Device Controller" page now, the Control Method will be set to "TLK" automatically.

ТМҮТЕК									- 0
	<	BBox D2104L024-2	28						
	Dev	vice Controller	Beam Config Editor						
			Control Method TLK SPI					TMYTEK_28LITE	
	ر _ ا	x				RX			
				Pleas	e switch cont	rol methc	d to TLK		

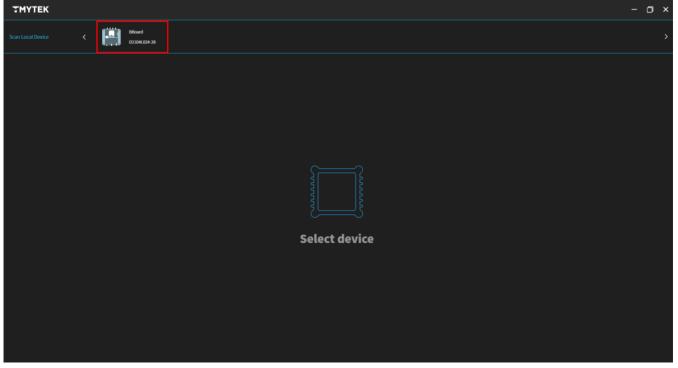


4. BBoard

- (1). Connect BBoard and PC with Ethernet, and then turn on the power of BBoard.
- (2). Open TMXLAB Kit.
- (3). Wait till scanning is completed.



(4). After scanning is completed, click the device icon above.





(5). Click the Mode toggle switch to switch between Tx/Rx mode.

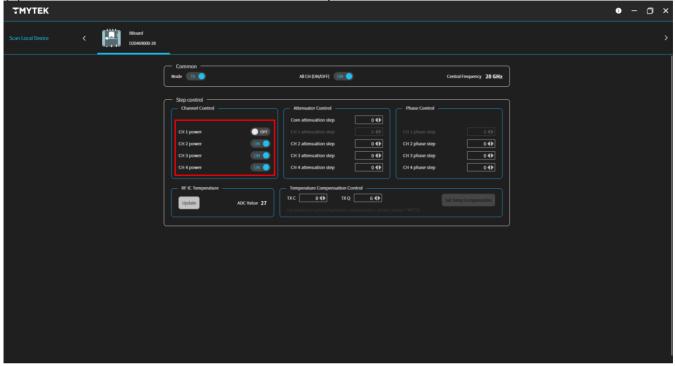
тмутек									0	- 🛛 ×
Scan Local Device 🖌	144	38oard 020469000-28								
			Mode TX O		All CH (ON/OFF)	N 🔵		Central Frequency 28 GHz		
			Step control Channel Control Channel Control Ch1 power Ch2 power Ch3 power Ch4 power RF IC Temperatum Update	Cri	Attenuator Control — Com attenuation step CH 1 attenuation step CH 2 attenuation step CH 3 attenuation step CH 4 attenuation step CH 4 attenuation step CH 4 attenuation step CH 5 attenuation step	TX Q 6 €	Phase Control – CH 1 phase step CH 2 phase step CH 3 phase step CH 4 phase step	0 () 0 () 0 () 0 () 0 () 0 () 0 () ()		

(6). Toggle All CH (ON/OFF) can switch all channels on/off.

тмутек		• - 🗆 ×
Scan Local Device < Bioard		
	Common Mode IX Central Firequency 28 GHz	
	Step control Attenuation Step 00 CH 1 power Cm Cm 000 CH 2 power Cm Cm 000 CH 3 power Cm Cm 000 CH 4 power Cm CH 4 attenuation step 000 CH 4 power Cm CH 4 attenuation step 000 CH 4 power Cm CH 4 attenuation step 000 CH 4 power Cm CH 4 attenuation step 000 CH 4 power Cm CH 4 attenuation step 000 CH 4 power Cm CH 4 power CH 4 power CH 4 power Cm Cm Cm Cm BF K 1 emperature Temperature Compensation Control Txc Step to 0 CH 4 power Tot Laborated ands temperature compensation Control Txc Step to 0 CH 4 power CH 4 power Tot Laborated ands temperature compensation Cm encompensation CH 4 power CH 4 power CH 4 power	



(7). Click the switch button to switch the channel power on and off.



(8). Adjust the Attenuation step to set PA/LNA gain. Step range is 0-15.

тмутек		• - 🗆 ×
Scan Local Device < EBoard 12046200	28	
	Common Mode IX ALCH (ON/OFF) OK Central Prequency 28 GHz	
	Channel Control - Attenuator Control - Phase Control CH 1 power CM - CM 1 power 0 (1) CH 2 power CM - CM 2 power - CM 2 phase step 0 (1) CH 3 power CM - CM 2 phase step 0 (1) - CM 2 phase step 0 (1) CH 4 power CM - CM 2 phase step 0 (1) - CM 2 phase step 0 (1) CH 4 power CM - CM 4 phase step 0 (1) - CM 4 phase step 0 (1)	
	RF IC Temperature Temperature Compensation Control Update ADC Value 27 Cet advanced axis temperature compensation, please context TMYTEX	



(9). Adjust the phase step to set the phase of each channel. Step range is 0-63.

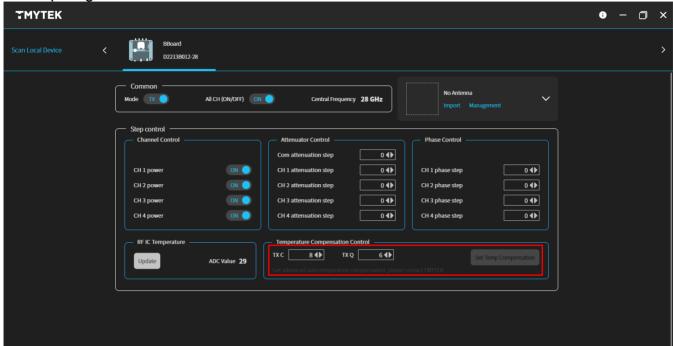
тмутек								• – 🗆 ×
Scan Local Device 🗸	BBoard D20469000-28	_						
		Common		ALI CH (ON/OFF)		Central Frequency 28 GHz]	
		Step control Channel Control CH 1 power CH 2 power CH 3 power CH 4 power CH 4 power BF K2 Temperature — Update	ADC Value 27	Attenuator Control Com attenuation step CH 1 attenuation step CH 2 attenuation step CH 3 attenuation step CH 4	CH 1 phase Step 0 (+) 0 (+) 0 (+) 0 (+) 0 (+) CH 1 phase step CH 2 phase step CH 3 phase step CH 3 phase step CH 4 phase step 0 (+) CH 4 phase step 0 (+) CH 4 phase step 0 (+) 0 (+)	G O O O O O O O O O O O O O O O O O O O		

(10). Click "Update" to update the real-time ADC Value.

тмутек		• – • ×
Scan Local Device 🖌	BBoard D22138012-28	>
l	Common Mode TX All CH (ON/OFF) ON Central Frequency 28 GHz Import Management	
	Channel Control Com attenuation step	
	CH 1 power ON CH 1 attenuation step 0 () CH 1 phase step 0 () CH 2 power ON CH 2 attenuation step 0 () CH 2 phase step 0 ()	
	CH 3 power ON CH 3 attenuation step 0 4 CH 3 phase step 0 4 CH 3 phase step CH 4 power ON CH 4 attenuation step 0 4 CH 4 phase step 0 4 CH 4 phase step	
	RF KC Temperature Temperature Compensation Control Update ADC Value 29 Cet advanced auto temperature compensation, please contact TMYTEK	



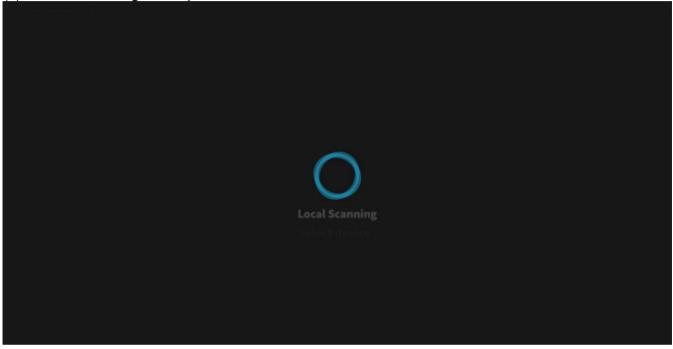
(11). TX C/TX Q (Tx mode) and RX C/RX Q (Rx mode) are temperature compensation coefficients. TX C and RX C contribute about 1dB gain, and TX Q and RX Q contribute about 0.5 dB gain. Step range is 0-15.





5. UD Box 5G

- (1). Connect the UD Box and PC with Ethernet, and then turn on the power of the UD Box.
- (2). Open TMXLAB Kit.
- (3). Wait till scanning is completed.



(4). After scanning is completed, click the device icon above.

тмутек		• - 🗆 X
Scan Local Device C UD Box UD-8020233000-24		
	Select device	



(5). "Current Value" displays the current setting of connected device.

тмутек		i -	- 0) X
Scan Local Device C UD Box	8213005-34			
	Current Value ME 26000 MIZ MAIN MAIN F 2000 MIZ to 28000 MIZ Cock Harmonic			
L	Frequency Setting 100MHz Bandwidth Image: Comparison of the set of the s			
	Channel Control CH1 CH2 Ref Control Output Voltage +SV ext Port Port Port Port Port Port Port Por			

(6). Changing the value in the bandwidth drop-down list would modify the value in the calculation of harmonic.





(7). The LO frequency can be set in the Frequency Setting.

After entering RF, click the arrow below or Enter to enter the IF input box.

After entering the IF, click the arrow below or Enter to automatically compute LO, and Bandwidth will be used to calculate the reference value of frequency range. Click "Save" to set the UD Box. Click "Reset" to clear all input values and return to the RF input box.

тмутек	• - • ×
Scan Local Device C UD Box UD-B020233000-24	
Current Value BE 26000 MHz MERINAN IF 2000 MHz LO 28000 MHz Frequency Setting Bandwidth MME Compared Frequency Rappe 26,000 - 26,000 MHz RF 26000 MHz IF 2000 MHz LIS 24000 HZ LIS 24000	• Lock • Harmonic 1000Htz 1
Channel Control CH1 CH2 CH1 CH	

(8). If the input frequency is the same the in-band harmonics, the Current Value will turn yellow and the Harmonic icon in the upper right corner will also turn yellow to signal warning. NOTE: When the yellow warning is shown, UD Box will still execute this setting.

тмутек	0 – 🗆 ×
Scan Local Device K UD Box UD Box UD Box UD BOX20230000-34	
Current Value 8° 30000 Mitz ¹⁰ 10000 Mitz ¹⁰ 20000 Mitz ⁰ Lock Harmonic	
Frequency Setting 100MHz Bandwidth Image: Setting in the set of the se	
Channel Control CH1 CH2 CH1 CH2 CH2 CH1 CH2 CH2 CH2 CH1 CH2 CH2 CH2 CH2 CH2 CH2 CH2 CH2 CH2 CH2	



(9). You can click the toggle switch to switch each item on and off.

тмутек		• – 🗆 ×
Scan Local Device C UD Box UD Box UD BOX223000 24		
Gurrent Value	■■ # 2000 mu ¹⁰ 28000 mu	Lock Harmonic
Frequency Setting Bandwidth @Mir v RF 0 24,000-44,000 >		
Channel Control CH1 CH2	Ref Source 10MHz Output Voltage Ref Source +5V ext +9V ext Internal O External	

(10). You can choose either internal source or external source in the Ref Source section.

тмутек	• - • ×
Scan Local Device C UD Box UD-803/0223000-34	
Сиггенt Value из 26000 мнг стана живная и 2000 мнг со 28000 мнг	● Lock ● Harmonic
Frequency Setting Bandwidth Ø# Ø 24,000-44,000 >	
Channel Control Channel Control CH 1 CH 2 CH 1 CH 2 CH 2	