



XRifle Dynamic RIS FR3

Scalable Programmable Reconfigurable Intelligent Surface for the 7.125–8.4 GHz 6G FR3 Research

Built on TMYTEK's proven XRifle Dynamic RIS platform — reflection research without a new control infrastructure to build or learn. XRifle Dynamic RIS FR3 is a **16×16, 256-element PIN-diode array** with **1-bit phase control (0°/180°)** — purpose-built for the 7.125–8.4 GHz FR3 upper mid-band. New array, proven infrastructure: it runs on TMYTEK's existing RIS controller and software API control stack.

Programmable, Standards-Ready, and Built to Scale

- **Programmable Propagation Control:**
NLoS, multipath, and blockage effects become software-programmable — no more physically moving reflectors, absorbers, or antennas between runs.
- **High RCS Gain, Narrow-beam Reflection:**
45–50 dB RCS gain with a 6–13° 3 dB beamwidth (at 7.7 GHz) — a strong, tightly focused reflected signal for precise NLoS link engineering.
- **Scalable Reflective Aperture:**
Tile-up architecture lets a team build as large or complex a controlled-reflection scenario as the research calls for.

Fast, Precise, and Cable-Free — Engineered to Scale

- **Sub-10 μ s Beam Switching:**
< 10 μ s array-level reconfiguration — turns the propagation environment into a controlled, repeatable variable.
- **256-element Wide-angle Control:**
16×16 PIN-diode array, $\pm 60^\circ$ incident/reflection coverage (3D steering) — built for flexible NLoS and beam-redirection research.
- **Tile-up Scalability without Grating Lobes:**
 $\lambda/4$ bezel design enables seamless $\lambda/2$ tiling, grating-lobe-free — one controller drives up to 4 tiles.
- **Cabling-free RF Path:**
Passive OTA reflection — just 12 V DC + Ethernet / SPI, zero RF cabling.

Target Use Cases

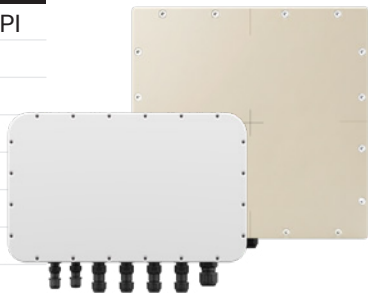
- **6G FR3 OTA** channel sounding & propagation measurement
- **RIS beamforming validation** for 3GPP R18/IMT-2030 standardization
- **ISAC prototype research**
- **6G lab research:** coverage extension, multi-user MIMO, spatial multiplexing

RIS (Array) Specifications

Parameter	Conditions	Unit	Typ.
Frequency Band	—	GHz	7.125 – 8.4
Polarization	—	—	Linear
Number of Antenna Arrays	—	—	16 × 16 (256)
Element Pitch	$\lambda/2$ @ 8.4 GHz centre	mm	≈ 17.5
Antenna Array Dimensions	—	mm	280 × 280
Phase States	1-bit, PIN Diode	—	0° / 180°
Angle of Incident	Vertical	deg	±60
	Horizontal	deg	±60
Angle of Reflection	Vertical	deg	±60
	Horizontal	deg	±60
RCS Gain	Incident angle is 0, 7.7 GHz	dB	45-50
3 dB Beamwidth	Incident angle is 0, 7.7 GHz	deg	6-13
Distance from transmitter	—	cm	>65
Module Dimensions (L×W×D)	—	mm	≈ 279 × 279 × 50
Weight	Aluminum	kg	2
VESA Mount Standard	—	mm	100 × 100

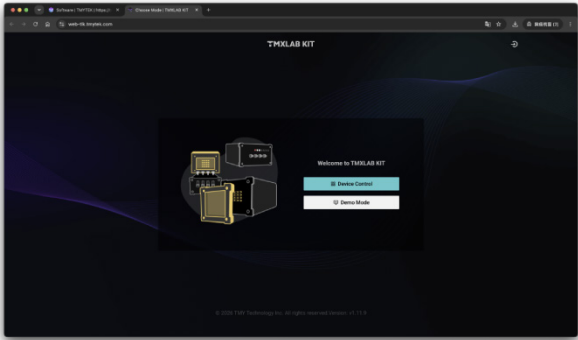
Controller Specifications

Parameter	Conditions	Unit	Typ.
Control Interface	—	—	10/100 Mbps Ethernet / SPI
Pattern Switching Time	Ethernet	ms	5
Power Consumption	Integrated w/ single RIS Module	W	11
Supply Voltage	—	Vdc	12
Dimension	—	mm	334 × 215 × 55
Weight	Aluminum	kg	2
VESA Mount Standard	—	mm	100 × 100



Drop-in Software, Zero Learning Curve

TMXLAB Kit GUI gives point-and-click control over reflection pattern and beam angle – no code required for quick setup – while the TLKCore Python API drives the same 10/100 Mbps Ethernet interface for scripted, repeatable test automation. Same software stack as TMYTEK's existing XRifle Dynamic RIS series – zero new learning curve for teams already on TMYTEK tools.



Turn NLoS Into a Scalable, Programmable, Controlled Variable

Sub-10 μ s reflection switching, grating-lobe-free tiling, built on TMYTEK's proven XRifle controller and software stack.

- Contact us: sales@tmytek.com
- Website: [TMYTEK.com](https://www.tmytek.com)

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