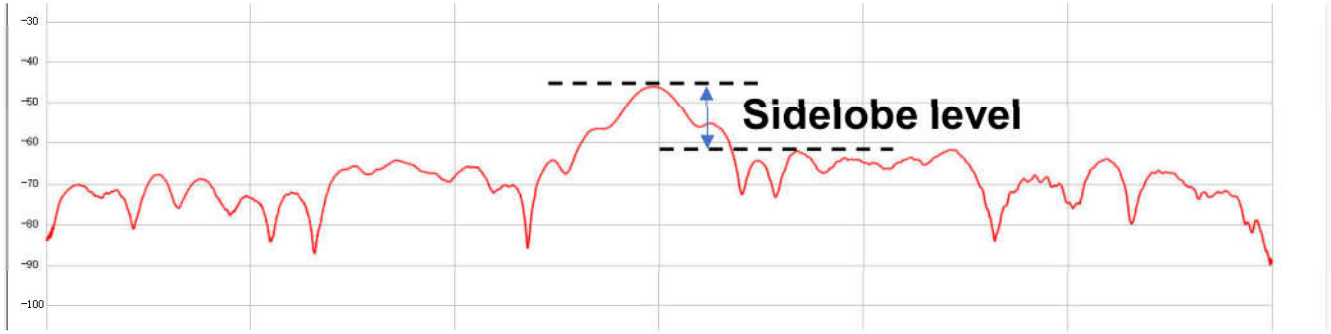
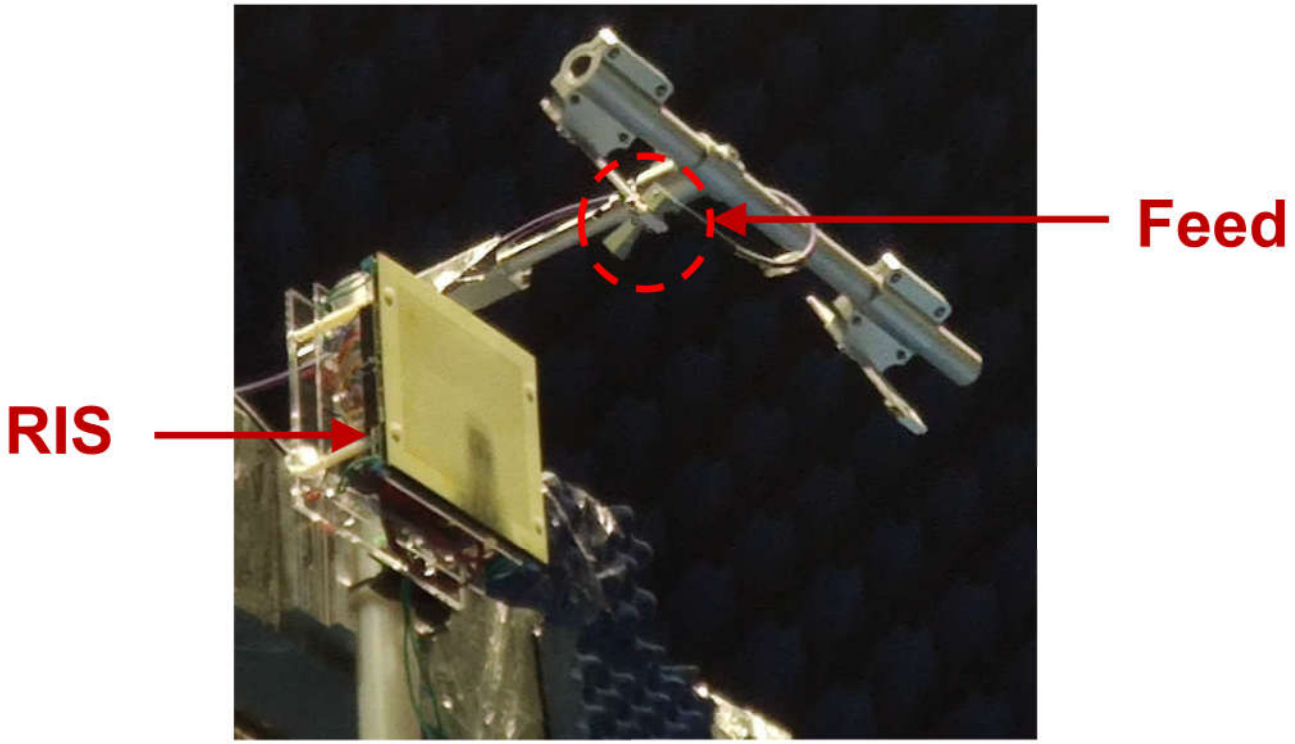
RIS-based antenna: Antenna performance

- **RIS-based antenna**
  - RIS + feed (horn antenna)
  - Capable of beam sweeping, just like the phased array
  - More energy and cost efficient than conventional phased array
- **Performance indicator**
  - Antenna gain flatness: flatness of the curve of antenna gains versus frequency
  - Sidelobe level: difference between the strongest sidelobe and the main lobe
  - Beam steering precision: the deviation of the main lobe from the desired direction



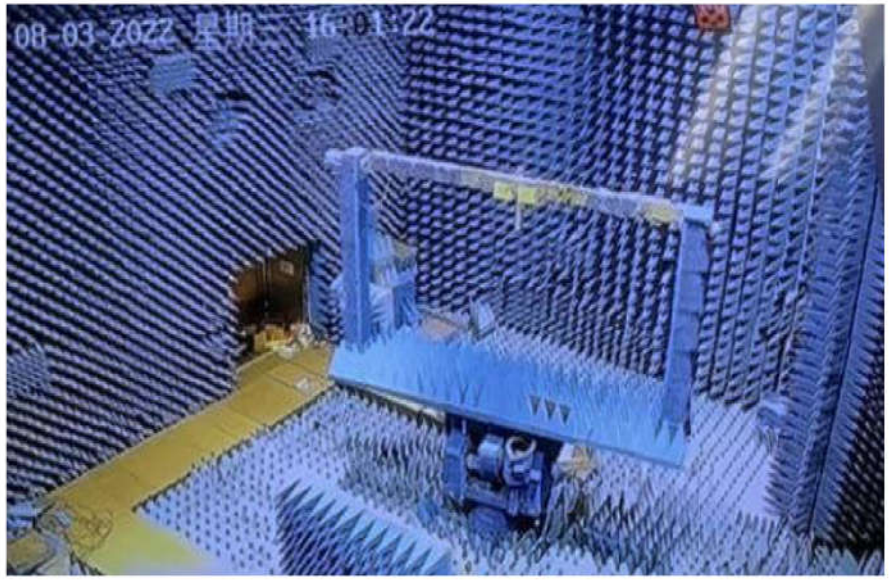
RIS-based antenna: Antenna performance

- **Implemented RIS-based antenna**
  - **RIS**: 32*32 elements, 1bit, 25~27GHz
  - **Feed**: horn antenna LB-34-10-C-KF, 10 dBi

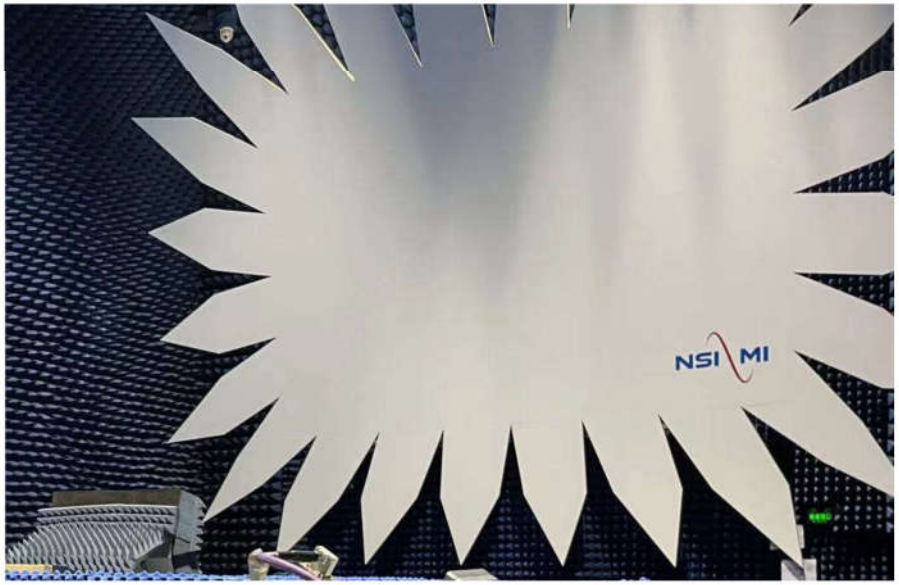


RIS-based antenna: Antenna performance

- **Experimental setup**
  - Test the antenna within an anechoic chamber in order to measure the performance metrics accurately



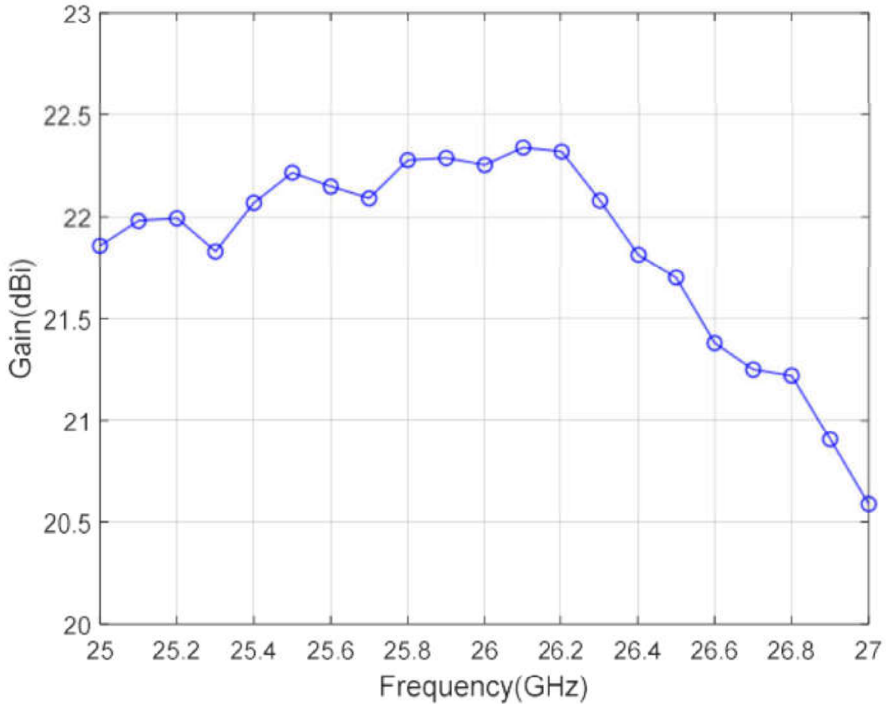
Turn table for supporting RIS-based antenna



Spherical-to-plane wave transformation plate

RIS-based antenna: Antenna performance

- **Experimental results**
  - Antenna gain flatness (beam direction=0°)



RIS-based antenna: Antenna performance

- **Experimental results**
  - Sidelobe level (@26GHz)

Beam direction (degree)	-10	0	10
SLL (dB)	-14.5	-14.2	-12.2

  - Beam steering precision (@26GHz)

Target Beam direction (degree)	-10	0	10
Deviation (degree)	0.66	0	1.08