Huaxia Shares Limited

A 6G Communication using Terahertz (THz) &

Bio / Object Penetrating Inspection Tech Company

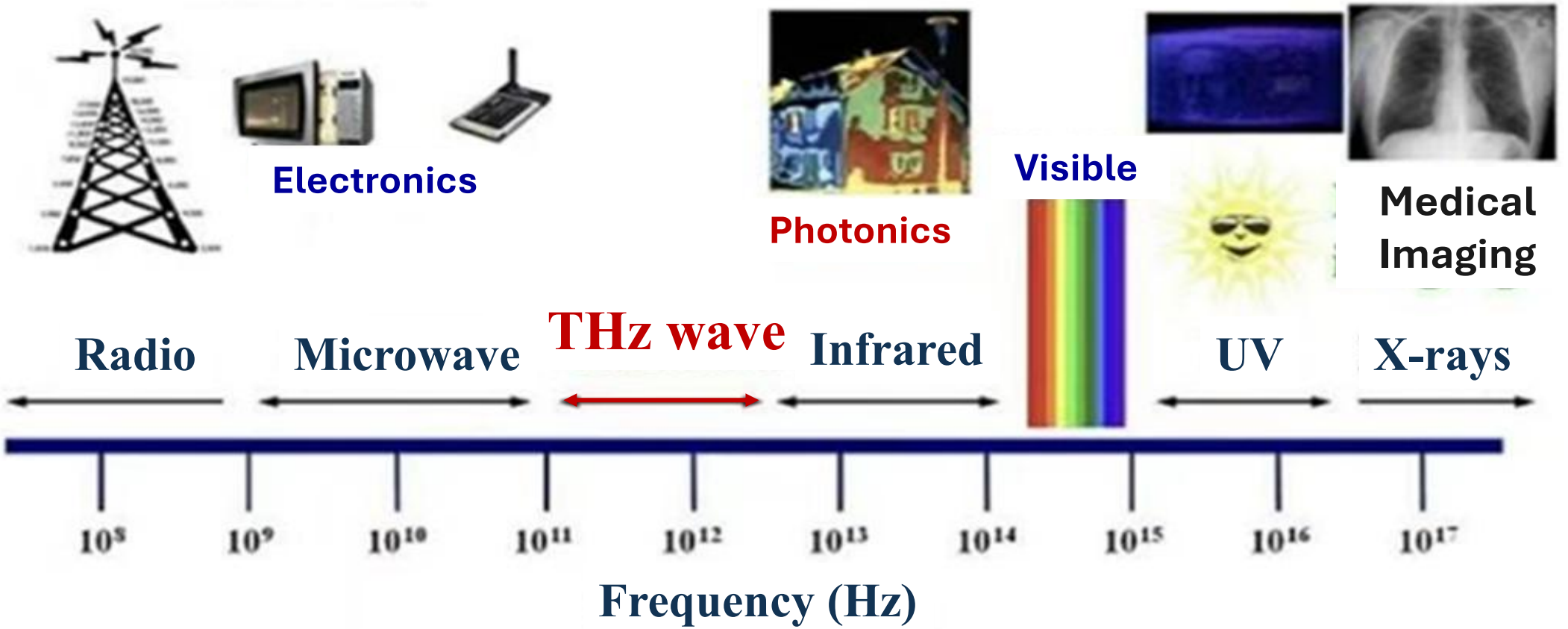


Replacing WiFi – Patented miniature THz Transceivers

Replacing X-Ray & MRI machines – airport security / medical body scanner

Tera Hertz Wave is defined with Frequency Range of o.1 to 10 THz

"One of Ten Technologies about to Change the Future World".



100 GHz~10 THz or 3mm~ 30μm

1THz~1ps~300μm~33cm^{-1}~4.1meV~48K

Huaxia Shares Ltd. – a THz 6G Wireless Communication Company

1. Huaxia Shares Ltd. is focusing on developing Terahertz (THz) Transceiver Chip, which will enable the next generation **6G THz wireless communication** and **bio-sensing medical applications**.

2. With in-depth knowledges and experiences of core team in telecommunication and optical photonics technologies, Huaxia is pioneering to develop **the core architecture of transceiver** built-in with both **transmitter** and **receiver (detector)** and associated with new meta surface material-based antenna array for wireless communication.

3. Huaxia has filed a variety of patents applications in US and China. Up-to-date, **Company has obtained the fundamental 6 key US invention patents issued in THz transceiver technology and its related applications**, which include core architecture based on different frequency generation (DFG), resonant tunneling diode and Gunn diodes or Schottky diodes, .., etc.

4. **THz Transceiver chip** is **the most key element for THz wireless communication and 6G tele-communications** with **ultimate high speed for bi-directional wireless communication** far superior to Bluetooth chip and WiFi capability.

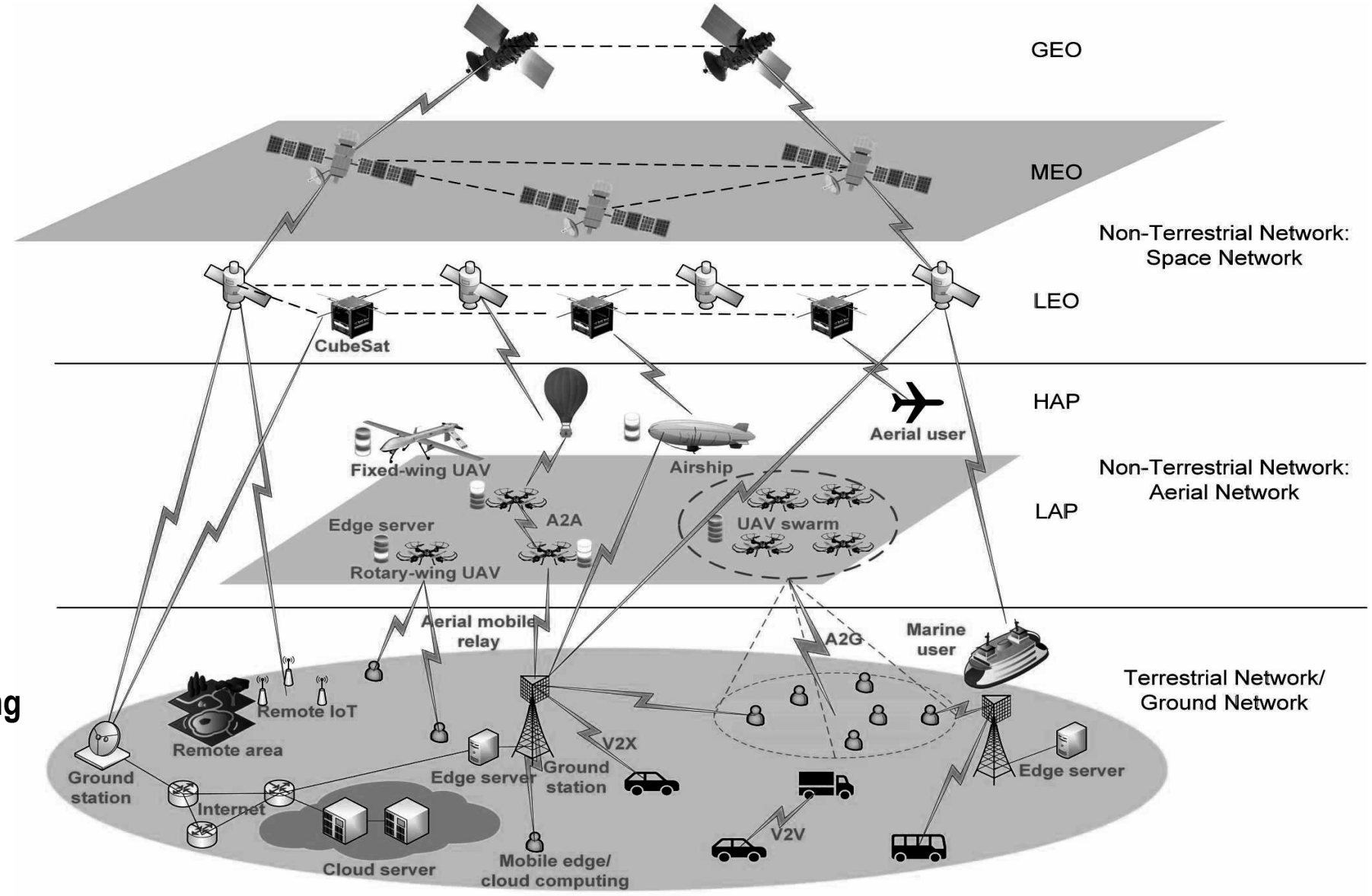
5. Huaxia has built the foundation for 6G Thz wireless communication and will enable and expand to its customers in arena of system applications such as, **wireless communication**, **bio-sensing, security screening and inspection and medical imaging** and **early disease detection**, and other applications.

6G Wireless + Terahertz + Star Link in the Global Communications

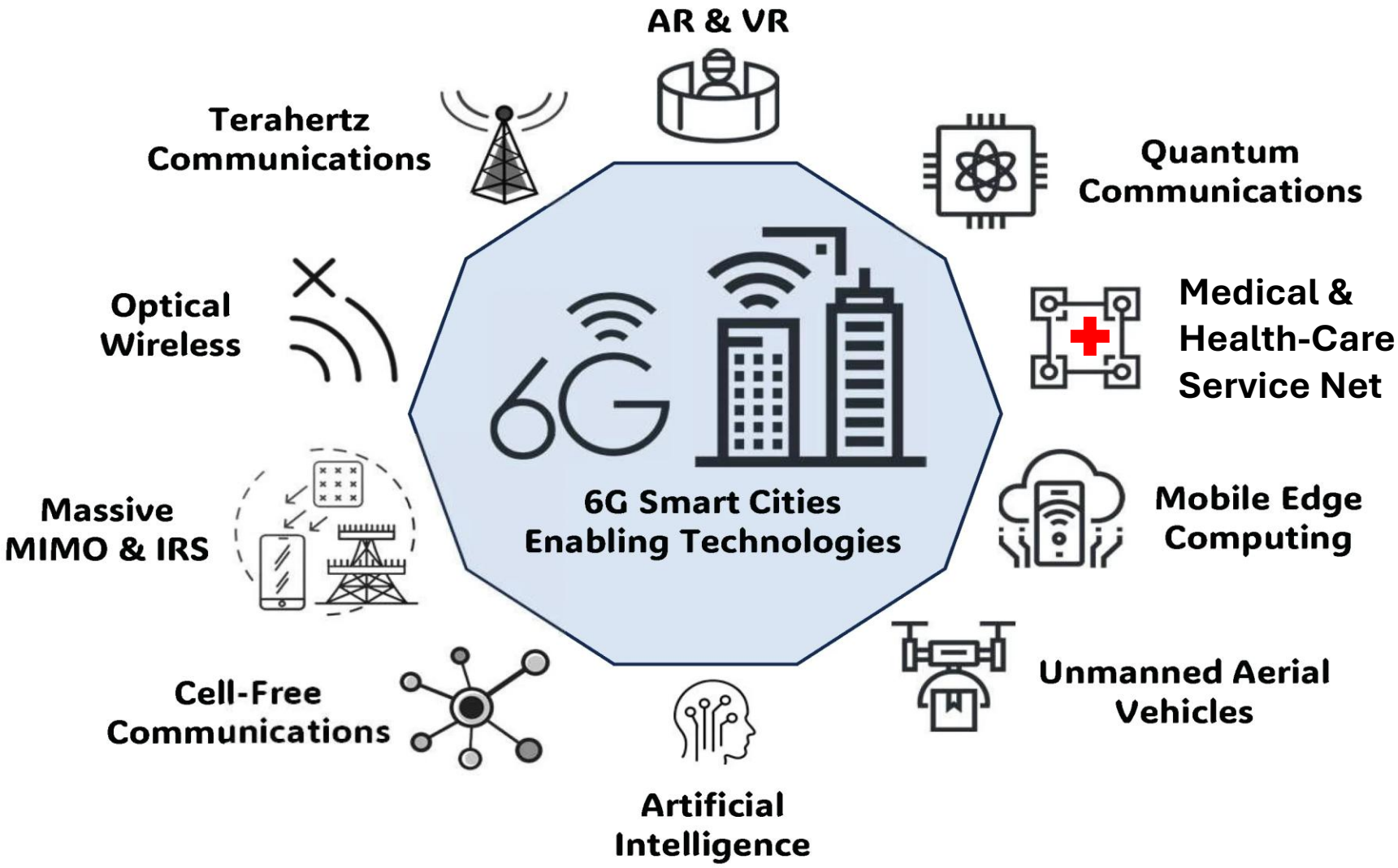
Space-based Network

Air-based Network

Ground-based including Sea-Based Network



The Application of 6G Global Communication and Medical / Health-care Intelligent Service Cloud Platform



Development of Future of Terahertz Real-Time Space-Ground Communication

Key Technologies of THz (6G):

This includes potential architecture-oriented technologies such as distributed networking, integrated space–air–ground networking, network-native intelligence, security-native capabilities, digital twin networks, and compute force networking. It also includes capability-oriented technologies such as programmable networking, integrated communication and sensing networks, deterministic networking, data services, immersive multisensory networking, and semantic communication.

Five-Element Construction:

6G adds two new elements—Intelligence and Sensing—to the original triad of eMBB (enhanced Mobile Broadband), uRLLC (ultra-Reliable Low-Latency Communication), and mMTC (massive Machine-Type Communication). All technological innovations in the 6G era will revolve around these five elements.

Sensing:

In addition to connecting people, machines, and things, the 6G network integrates sensing, effectively becoming a massive sensor network that can perceive the world ubiquitously. In such a world, scenarios such as digital twins, holographic projection, on-body sensors, and satellite internet can all be realized.

Intelligent Connectivity of Everything:

THz (6G) adds intelligence and sensing, introducing new dimensions of “consciousness” and “spirit.” THz (6G) enables communication among people, machines, things, and spiritual/mind-connected entities.

Company Positioning:

Focusing on the THz Transceiver as the core, the company aims to develop the THz (6G) strategic industry, facilitate the transformation and industrialization of cutting-edge technologies, and support the high-quality development of companies driving THz (6G) industrialization.

System Integration:

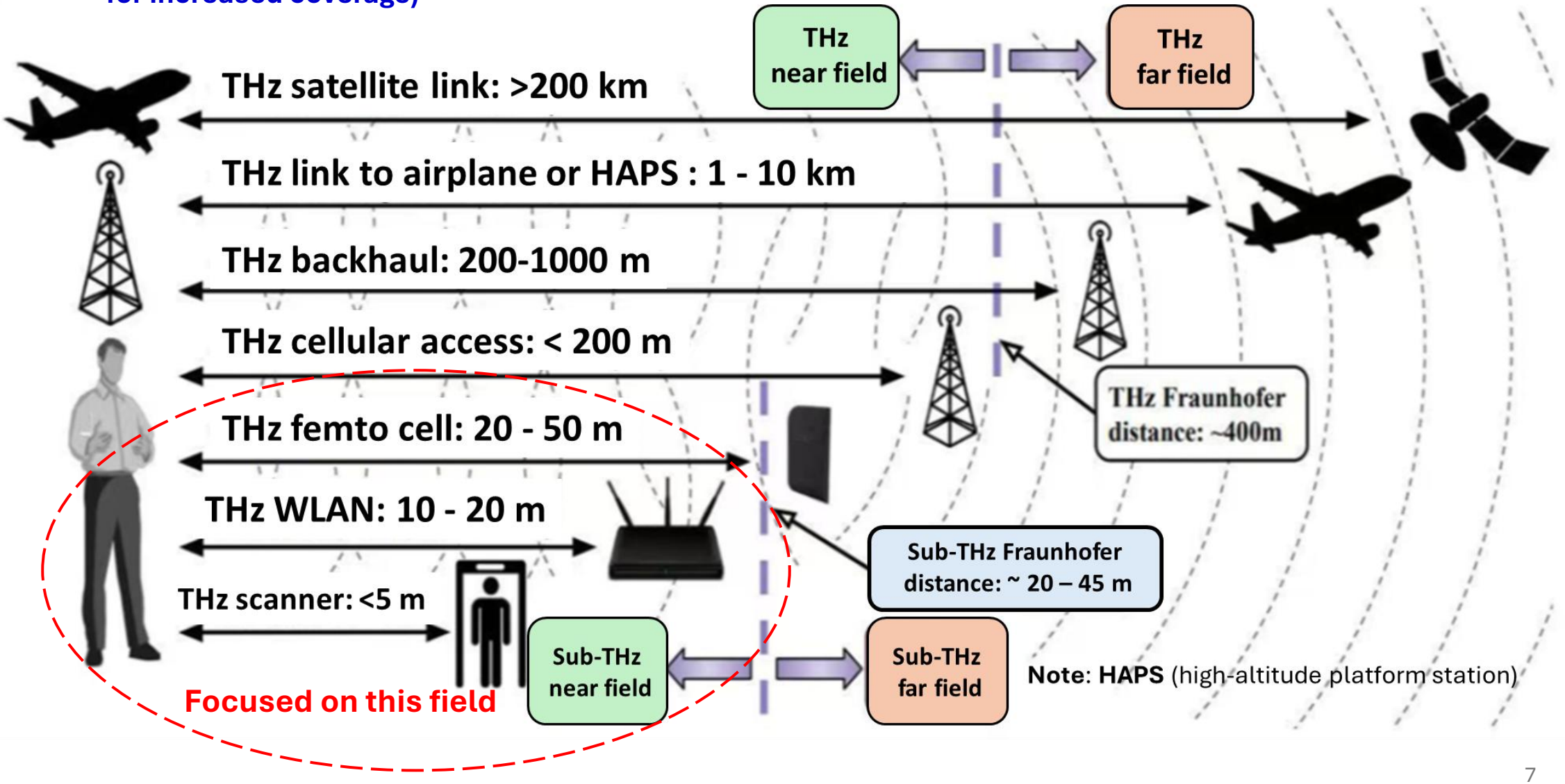
Integrating various technology involving optics, material, electronics, communications, liquid crystals, thin-film optics/quantum technologies, metamaterials, integrated circuits, and holography into physical system products with AI and software drivers.

AI XR Holographic Communication Device:

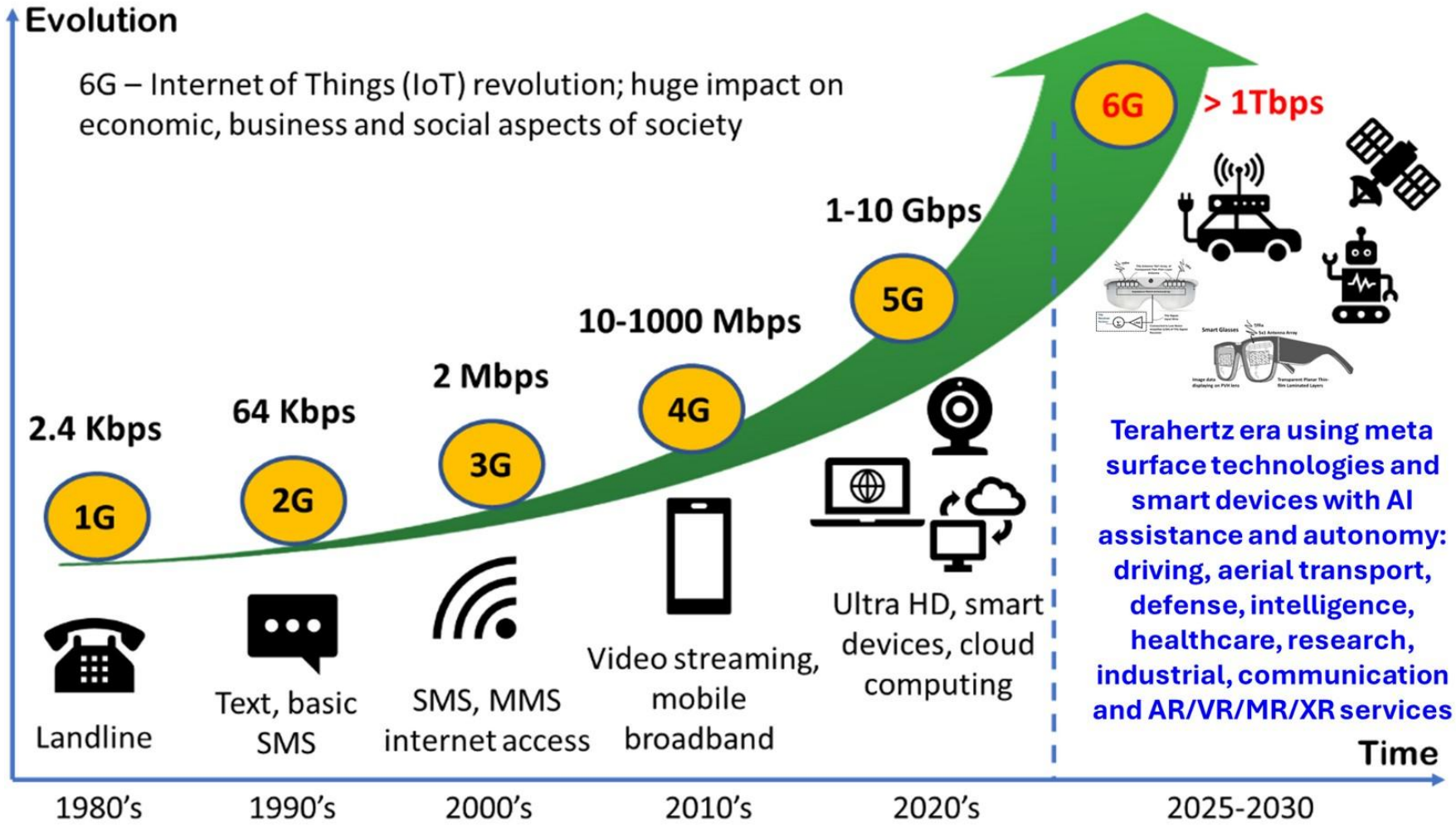
With 6G, all hardware and software will be fully integrated into a new generation of AI XR holographic communicator.

6G Telecommunication Impacts

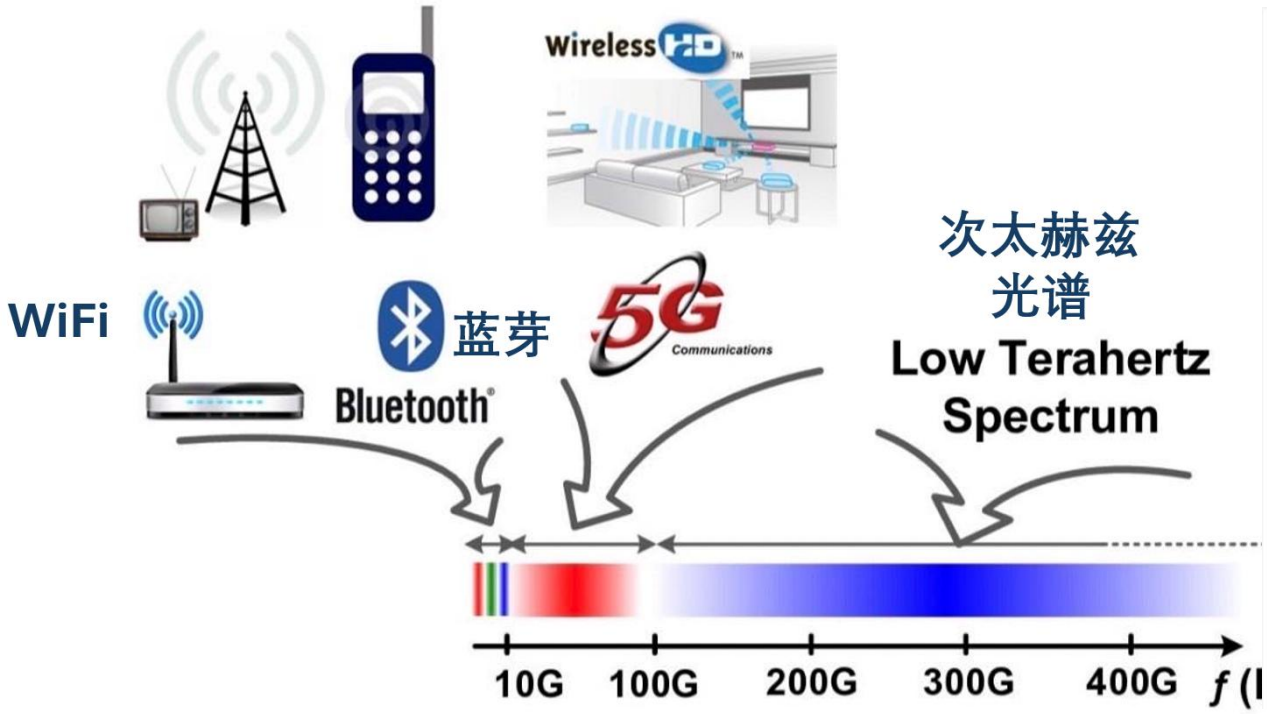
- Near-Field and Far-Field 6G-Grade Sub-THz Prospective Use Case (300Hz carrier & a10-15 cm aperture at the large unit or base station and Beyond-6G true THz setup (1THz carrier and a 25cm aperture at the base station for increased coverage)

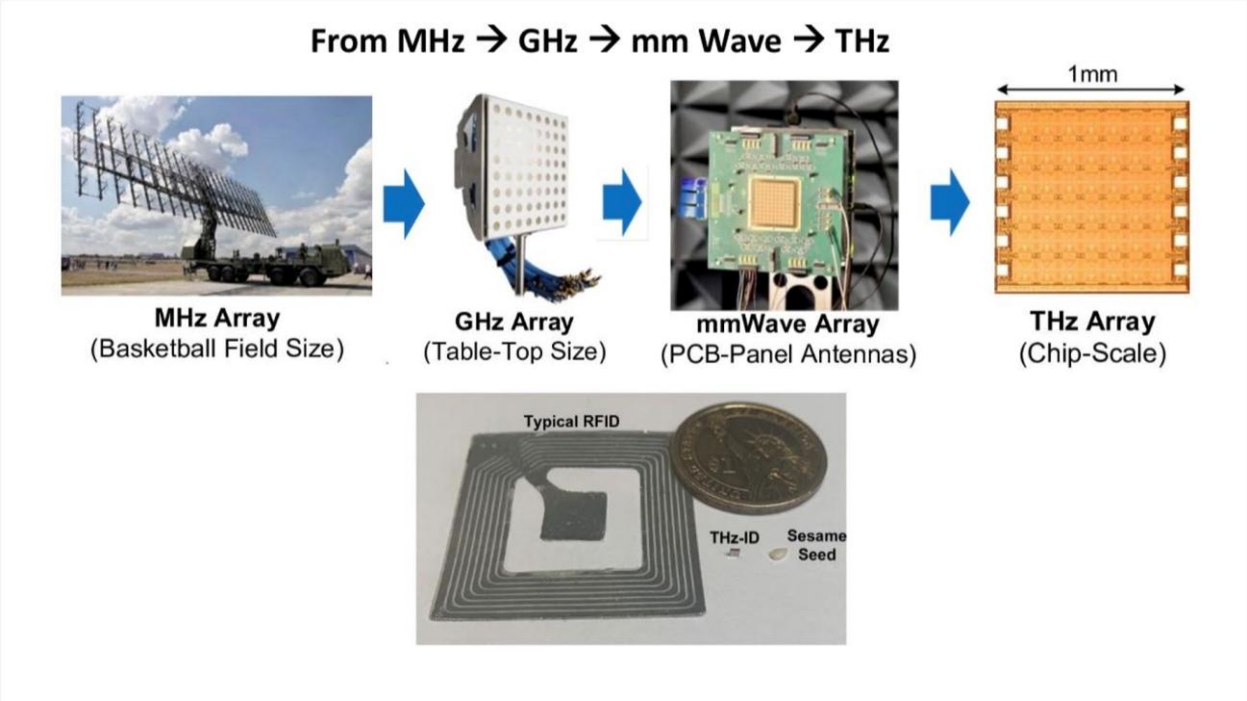


6G Internet of Thing (IoT) & LLM Revolution and Impacts



Wireless Communication of the Past, Present and Future Applications





Huaxia's Core Competence :

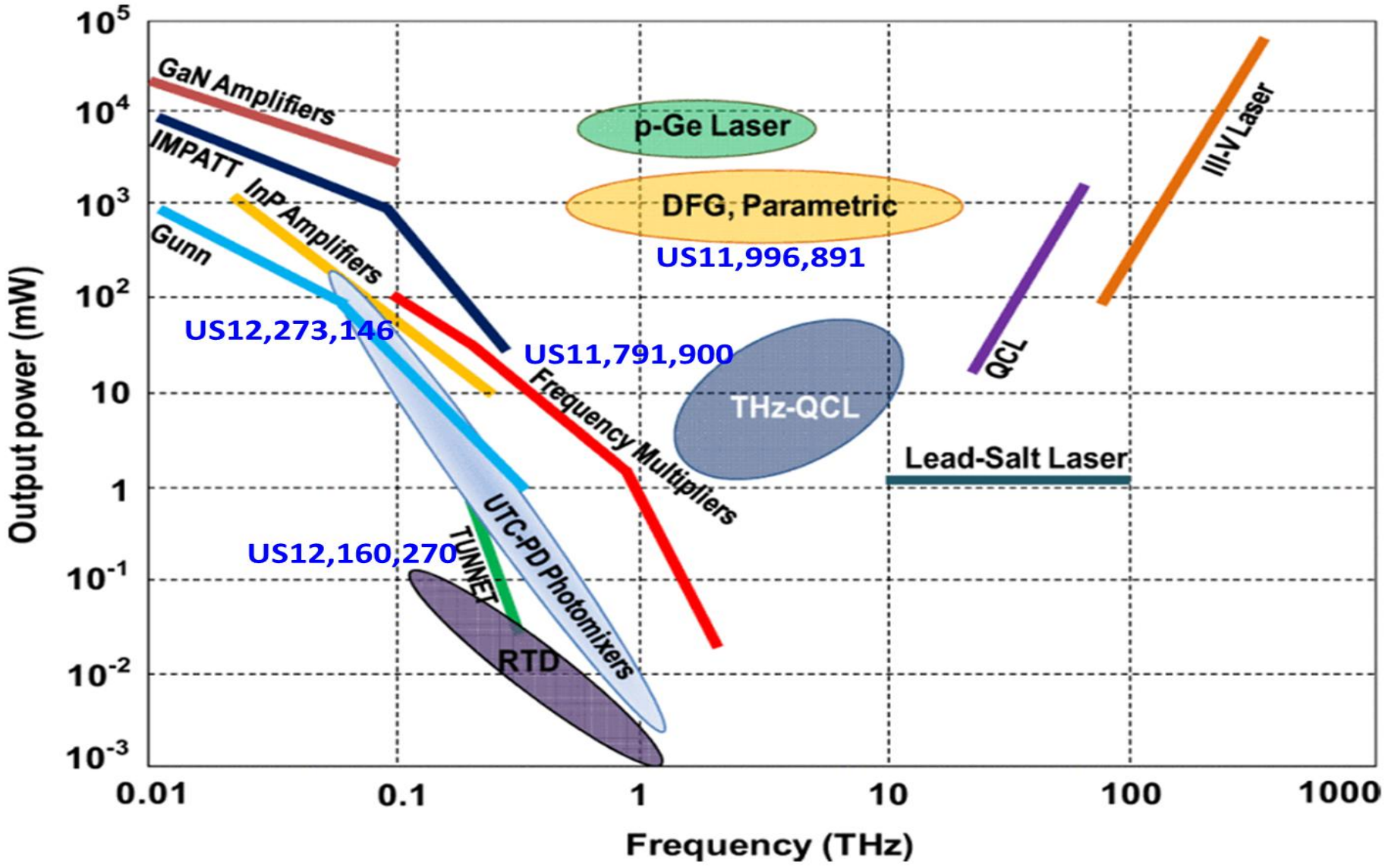
IP Patents, Product Advantage, Market Potentials, and Strategic development

The core technology of terahertz (THz) wireless communication lies in overcoming the "THz gap"—the frequency range (0.1–10 THz) where electronics become too slow and photonics lack efficiency. Key enabling technologies include:

1. **THz Transceivers: Using photonic methods (e.g., photomixing of two lasers) or electronic methods (e.g., Schottky diodes, resonant tunneling diodes, or CMOS transistors pushed to their limits).**
2. **Antennas & Arrays: On-chip antennas and beamforming phased arrays to combat severe path loss and atmospheric absorption.**
3. **Modulation & Signal Processing: Ultra-wideband modulators and low-noise amplifiers, often leveraging plasmonic or graphene-based components for high-speed operation.**
4. **Beam Steering & Tracking: Hybrid beamforming and reconfigurable intelligent surfaces (RIS) to maintain line-of-sight links in mobile scenarios.**

In essence, the core is generating, detecting, and manipulating signals at ~0.3–3 THz with sufficient power, bandwidth, and energy efficiency for real-world communication systems.

Huaxia's Terahertz Invention Patent Summarized Table

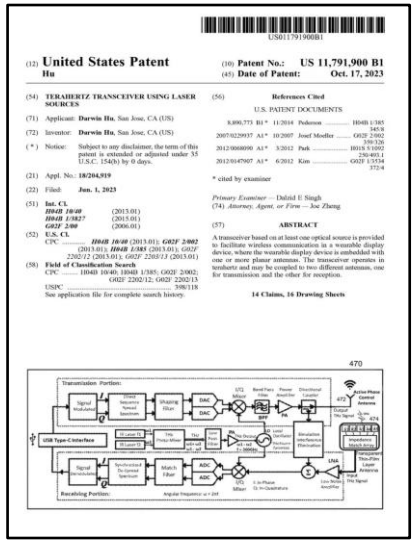


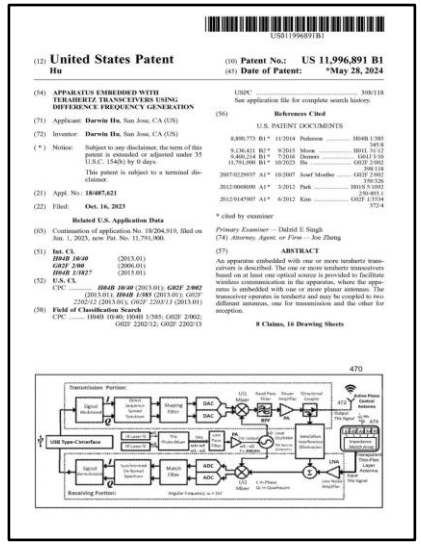
Huaxia's Terahertz Invention Patent Summarized Table

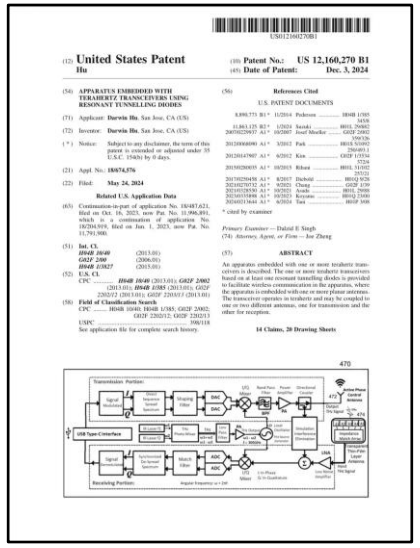
Patent Title	Nation	Patent Application #	Application Date(D/M/Y)	Patent # Issued	Patent Granted Date(D/M/Y)
Terahertz transceiver using laser sources	**USA**	18204919	1/6/2023	**11,791,900**	17/10/2023
Terahertz transceiver using difference frequency generation	**USA**	18487621	16/10/2023	**11,996,891**	28/05/2024
Apparatus embedded with terahertz transceivers using resonant tunnelling diodes	**USA**	18674576	24/05/2024	**12,160,270**	03/12/2024
Display glasses in wireless terahertz communication	**USA**	18914165	12/10/2024	**12,231,167**	18/02/2025
Apparatus embedded with terahertz transceivers using Gunn diodes	**USA**	18964448	01/12/2024	**12,273,146**	08/04/2025
Wearable display device with Terahertz wireless interface	**USA**	18204909	01/06/2023	**20240402501**	05/12/2024
用于操作太赫兹收发器的系统和方法	**China**	2024103151897	19/03/2024	**Pending**	Sysview-102CN
Display glasses with wireless THz transceiver for bio-sensing	**USA**	19055451	17/02/2025	**12,308,888**	20/05/2025

Huaxia's Terahertz Invention Patents Already Issued by USPTO

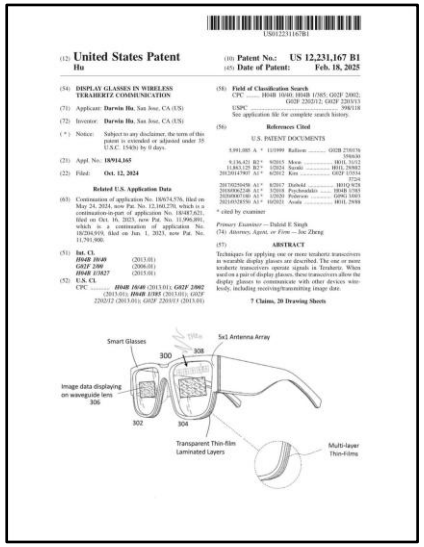


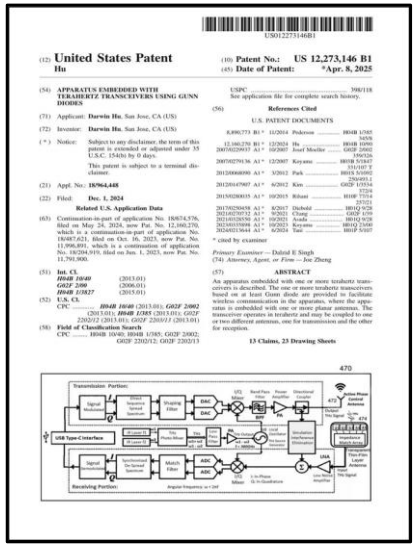


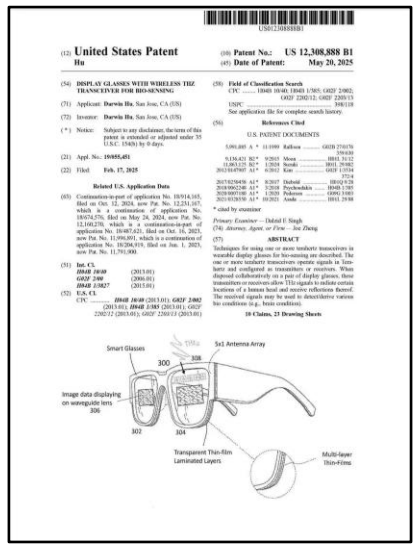














Huaxia's Development Strategy:

1. Our unique THz transceiver is developed by built-in terahertz wave generation and both transmitter and receiver as a core unit, it provides not only high capacity, high speed, low latency of transmission, but also to facilitate off-loading computation and for example, if applied on display lie AI AR /VR smart glasses, allowing display glasses to communicate real-time and to reduce weight and form factors as well as battery power consumption, while remaining immersive and interactive.
2. In addition to communication function, advancements in the area of THz bio-sensing ability with display function, can further revolutionize the healthcare industry and potentially enable applications such as remote diagnostics & surgeries and regeneration of self stem cells activation in medical therapy and other applications.
3. With core technology of "Transceiver Chip" is potentially future expand to many other application arena.
4. Business is inconceivable of its usage and will realize even a pair of wearable display glasses with wireless THz communication capability won't only as a glass but also smart glasses device with internet of thing (IoT), sensors, display and communication tools all-in one.

Chip Architecture of USB-C to Wireless THz Transceiver (Adapter)

Any Wired Cable like USB with Input Data



USB - Type C to Wireless THz Transceiver (Adapter)

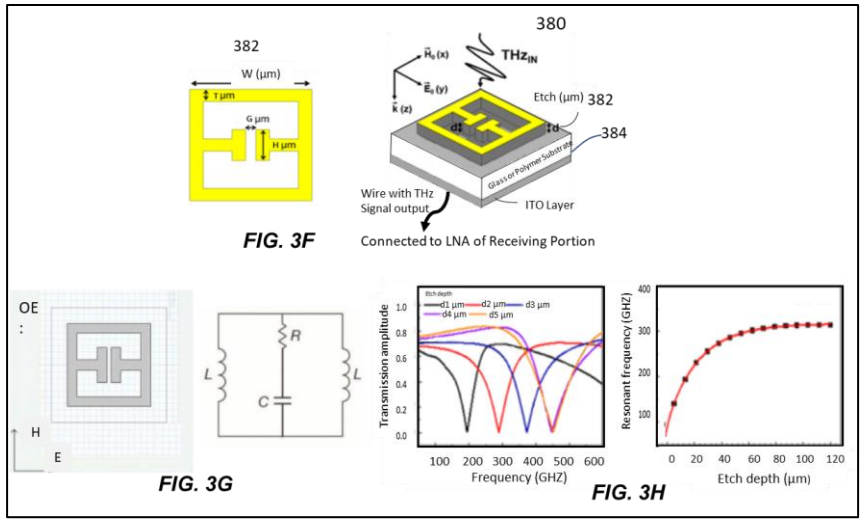
Wireless Tera Hertz Data

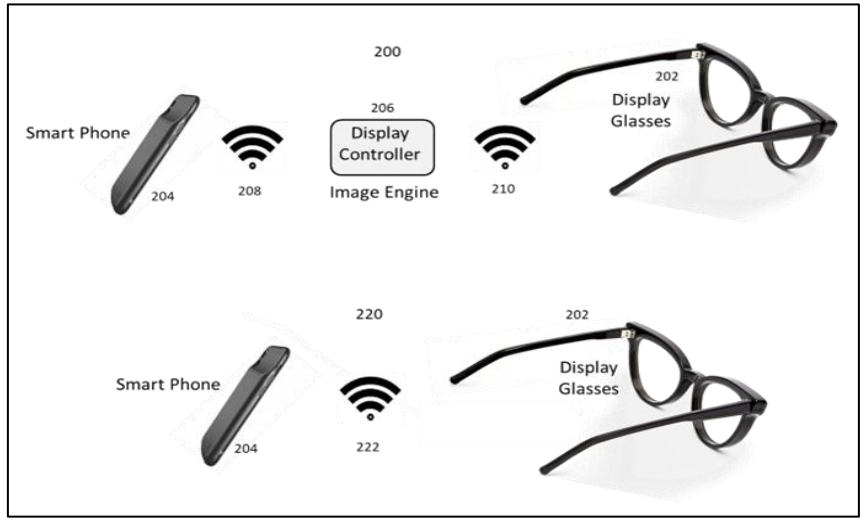
THz In



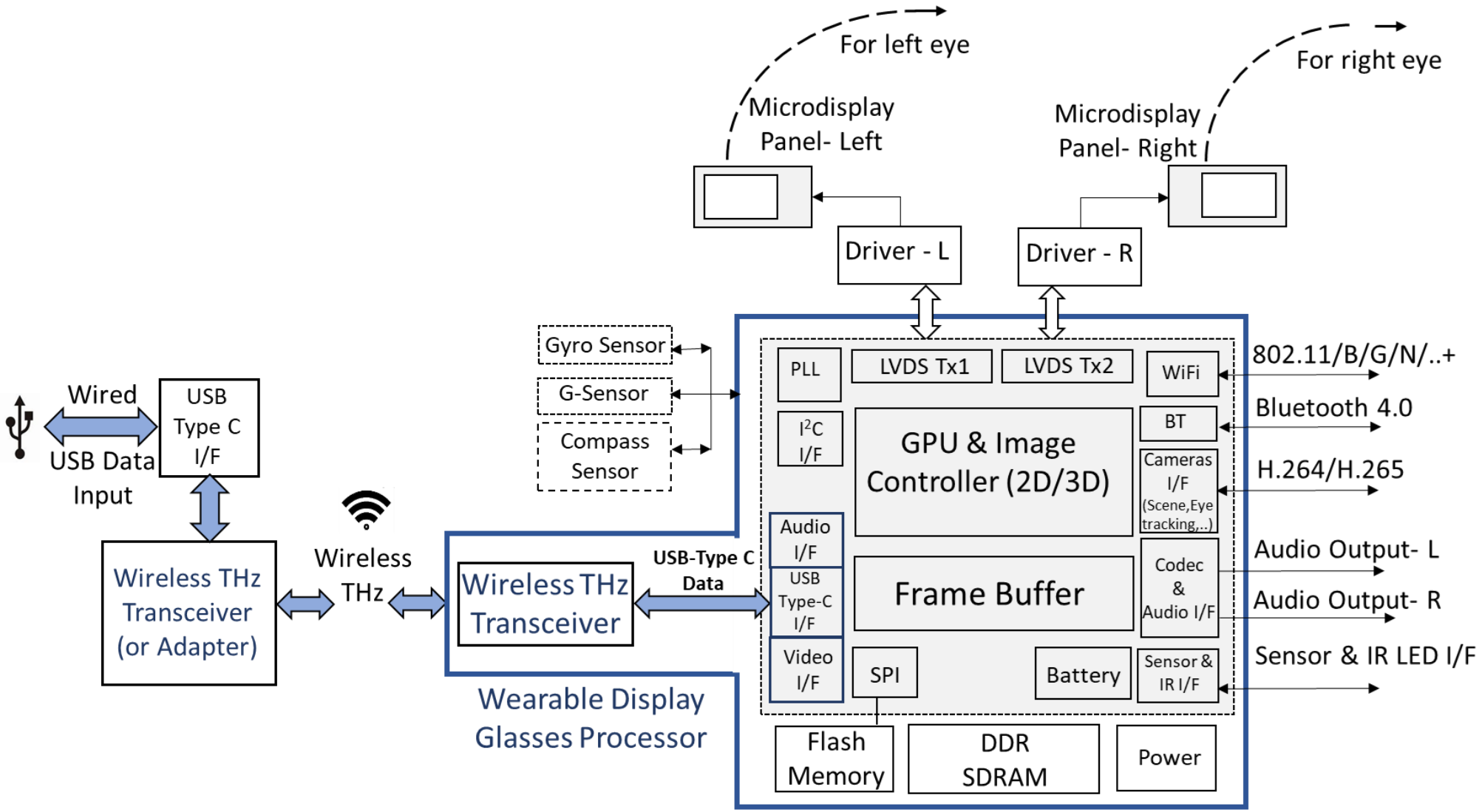
THz out

Meta Surface Material



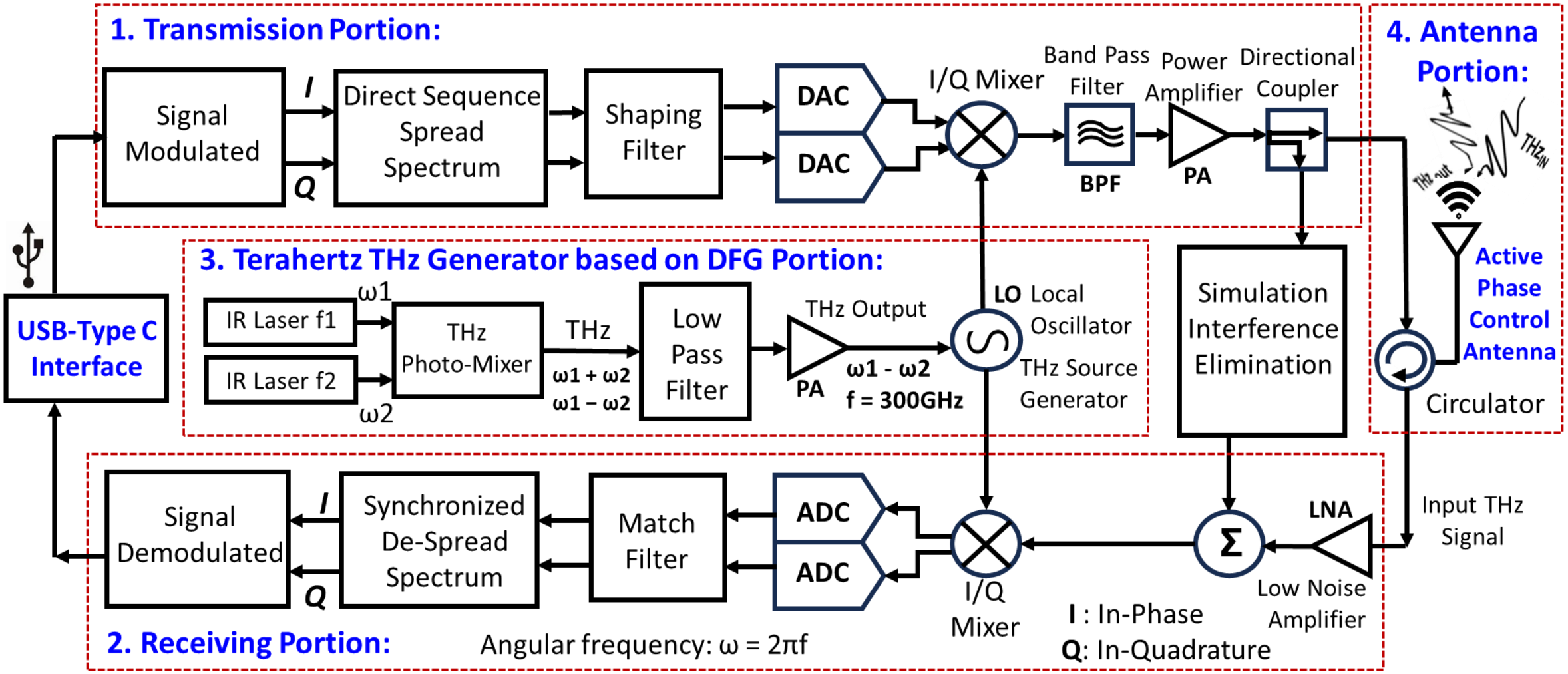


The architecture of wearable display glasses built-in wireless THz for communication



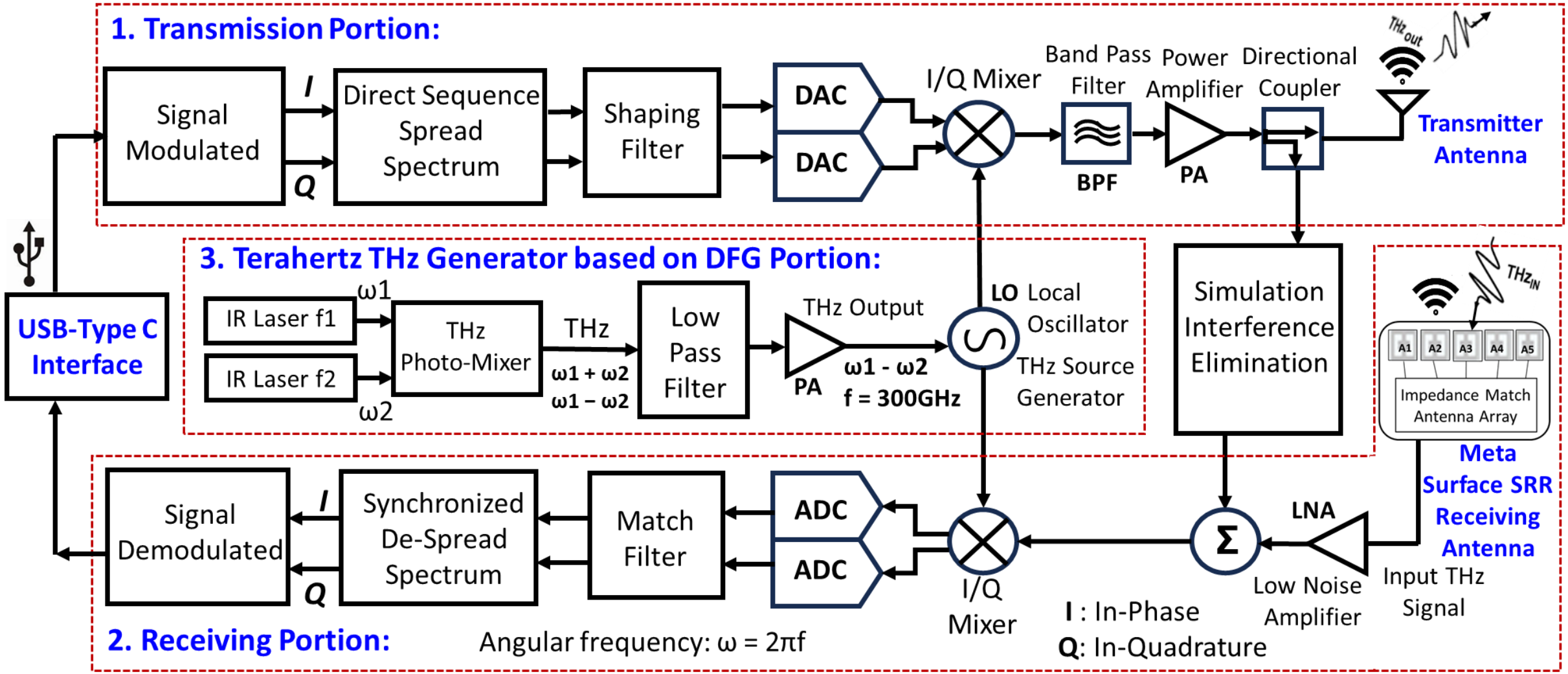
Core Competence: Chip Architecture of USB-C to Wireless Terahertz Transceiver

Integrated major 4 portions: Transmitter, Receiver, THz Generator & Active Phase Control Antenna



Other Format of USB-C to Wireless Terahertz Transceiver

Here, we combine 3 portions to integrate Transmitter, Receiver & THz Generator



Market Space and Market Size Prospects

- The market potential for 6G-driven Terahertz (THz) communication is substantial, with forecasts predicting it will evolve from a nascent phase worth several hundred billion dollars .
- in 2025 to a multi-billion-dollar industry by the early 2030s — part of an even larger 6G ecosystem .

Market Size Estimates:

Although figures vary by scope, the overall trend is strongly upward:

1. THz Technology Market (Including all applications like imaging and sensing):

- **2025 Market Size: ~$0.78 – $0.82B**
- **2030/2031 Projection: ~$1.71 – $3.50B**
- **Growth Rate (CAGR): 15.8% – 23.0%**

2. 6G Technology Market (Future-focused, total ecosystem):

- **2025/26 Market Size: $0.5B – $11.7B** (varies by scope, from R&D-only niches to broader hardware)
- **2033/34/36 Projection: $6.14B – $300B** (long-term forecasts vary widely)
- **Growth Rate (CAGR): 24.3% – 59.3%** (early-stage projections)

Three Core Applications of 6G Terahertz Technology

1.Skynet Communication:

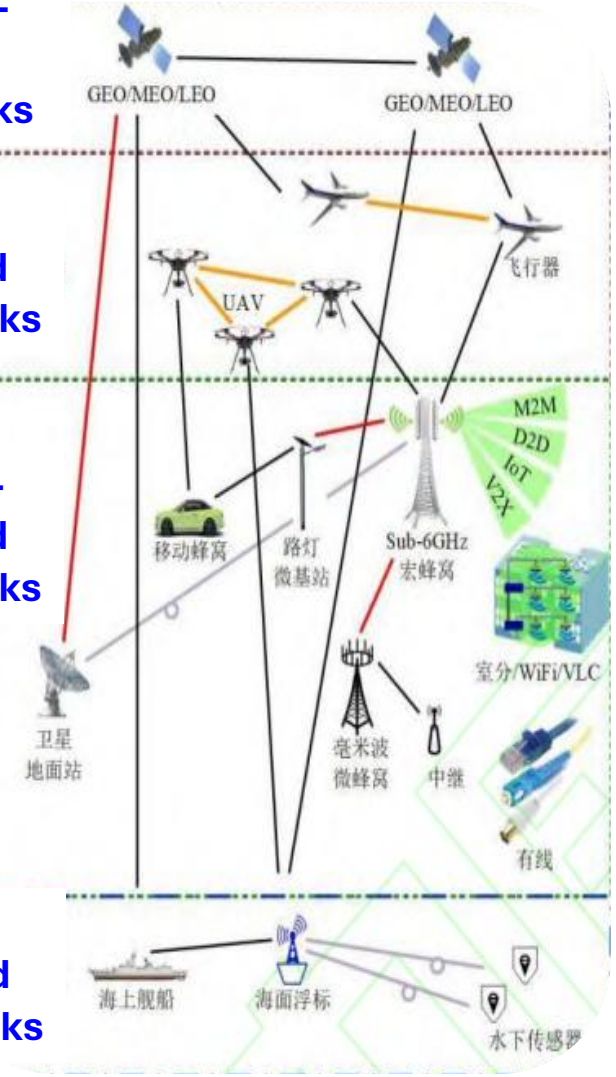
Smart 6G Internet Architecture

Space-based Networks

Air-based Networks

Land-based Networks

Sea-based Networks



2. Medical Devices:

6G Medical Service Platform

Comprehensive advantages of intelligent and accurate Chinese and Western medicine clinics



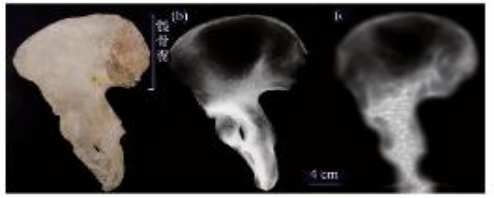
Traditional Chinese and Western medicine diagnosis and treatment robots and drug self-service machines



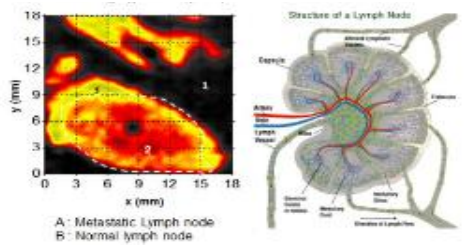
Artificial intelligence-assisted diagnosis & treatment system of traditional Chinese and Western medicine

3. Terahertz Body Domain Sensor Network

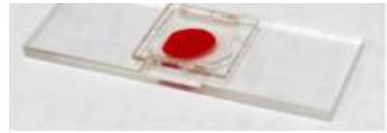
Biomedical imaging



Early cancer detection and treatment



Time-domain spectroscopy used to detect blood glucose

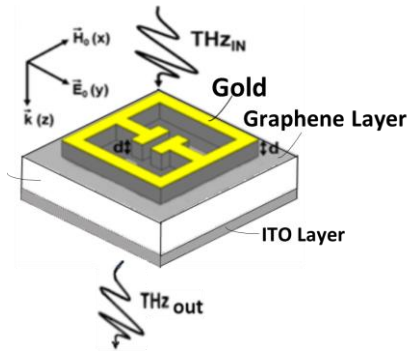


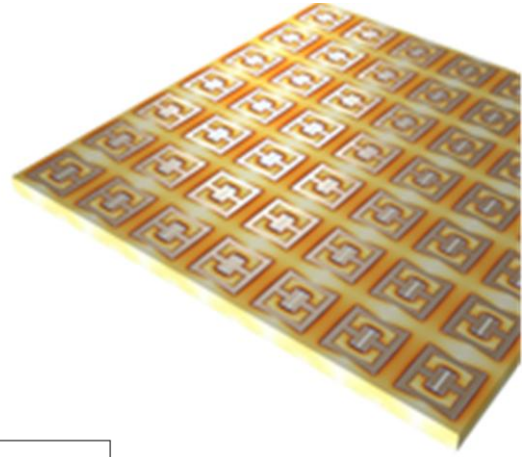
Polymethyl methacrylate (PMMA) container with blood

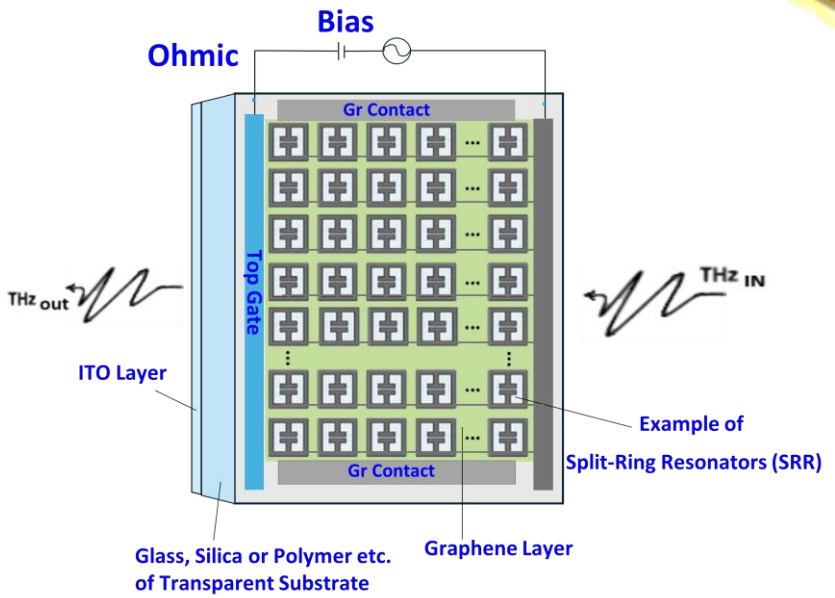
THz Wireless Communication Quantum Jump at the Cornerstone from 1G-5G to 6G

THz Applications that can Benefit from Simulation

- Communication
- Antennas
- Photonics devices and metamaterials
- Detectors
- Security screening
- Medical diagnostics and biosensing
- Geographic and atmospheric sensing
- Qubit control for quantum computers
- Spectroscopy for chemical analysis
- Astronomy studies
- THz lasers
- Semiconductor electronics quality control







Application: AI XR Holographic Communicator

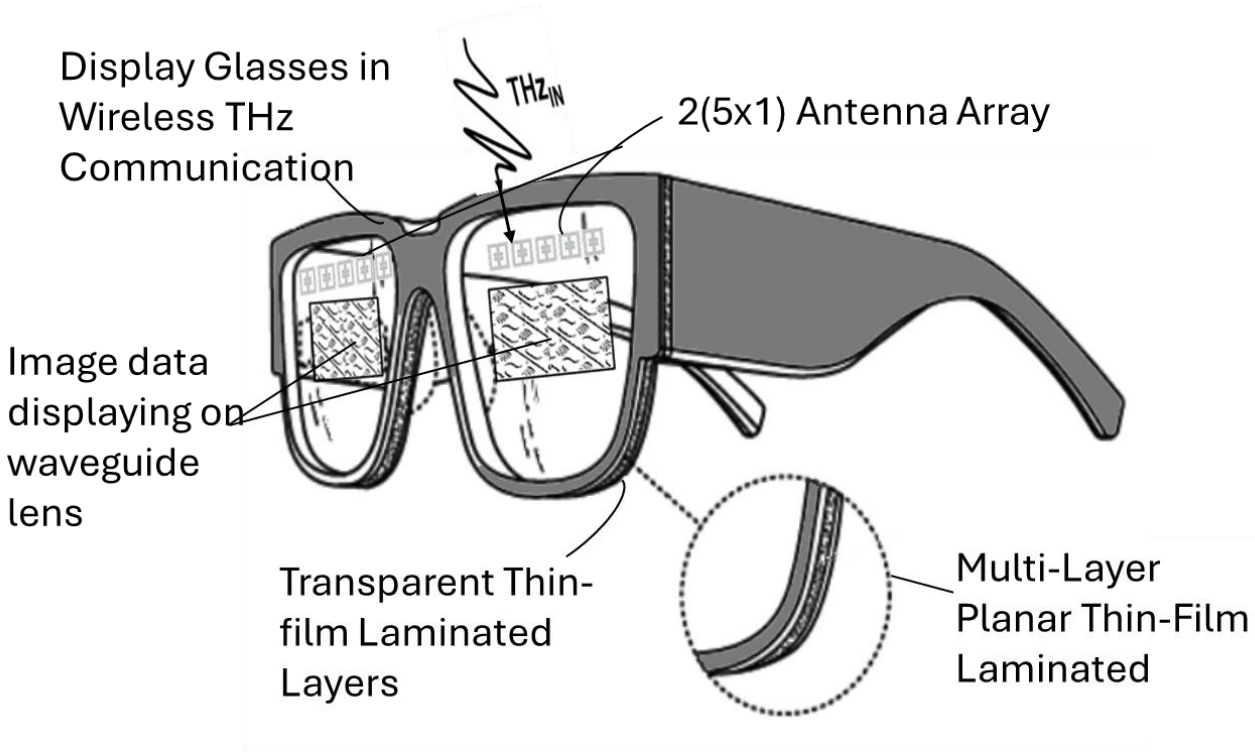
- This includes innovative technologies such as metamaterials used in XR glasses, nano-diffractive optical technology, thin-film transparent planar optics, THz (6G) communication technology, and holographic 3D display. These are integrated with existing, mature smartphone control technology, freeing up users' hands and combining the five senses—eyes (sight), ears (hearing), mouth (speech), brain意念 (intention), and body (touch)—into a single device, creating a revolutionary communication tool: the “AI XR Holographic Communicator“.
- Once this product is launched, there will be no more smartphones, smart glasses, tablets, or wireless communication phones. Instead, it will be known as the "THz (6G) Real-Time Space-Earth Full-Interaction AI Holographic Communication Device," or simply the “AI XR Holographic Communicator“.
- This will deliver a brand-new, fully wireless, holographic, high-speed, ubiquitous connectivity experience built on a space-based, air-based, ground-based, and sea-based architecture.

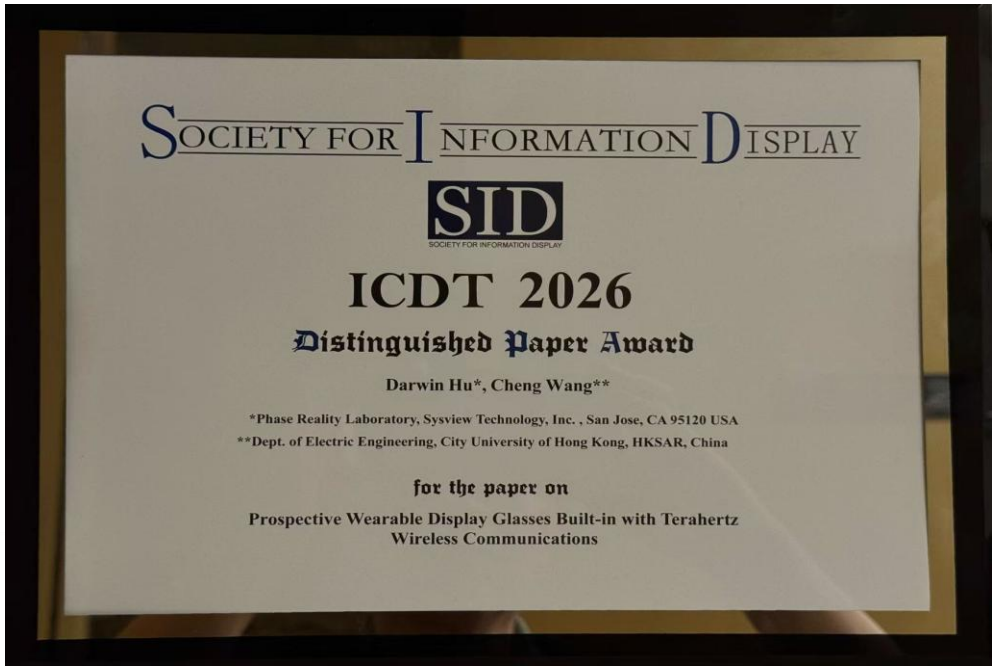




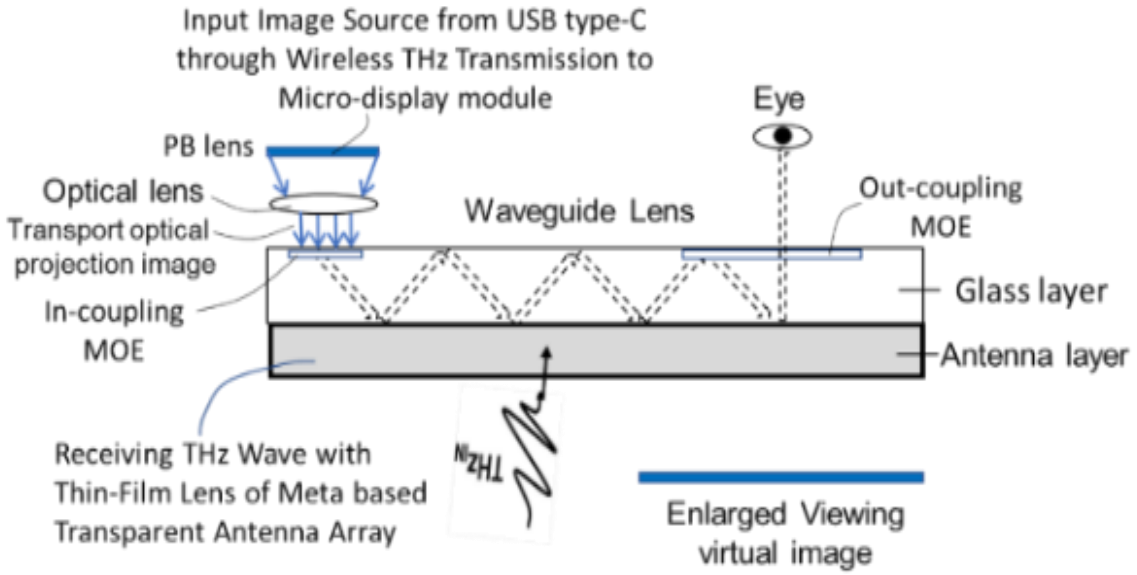
Application: Basic configuration of wearable display glasses built in with THz transceiver for communications

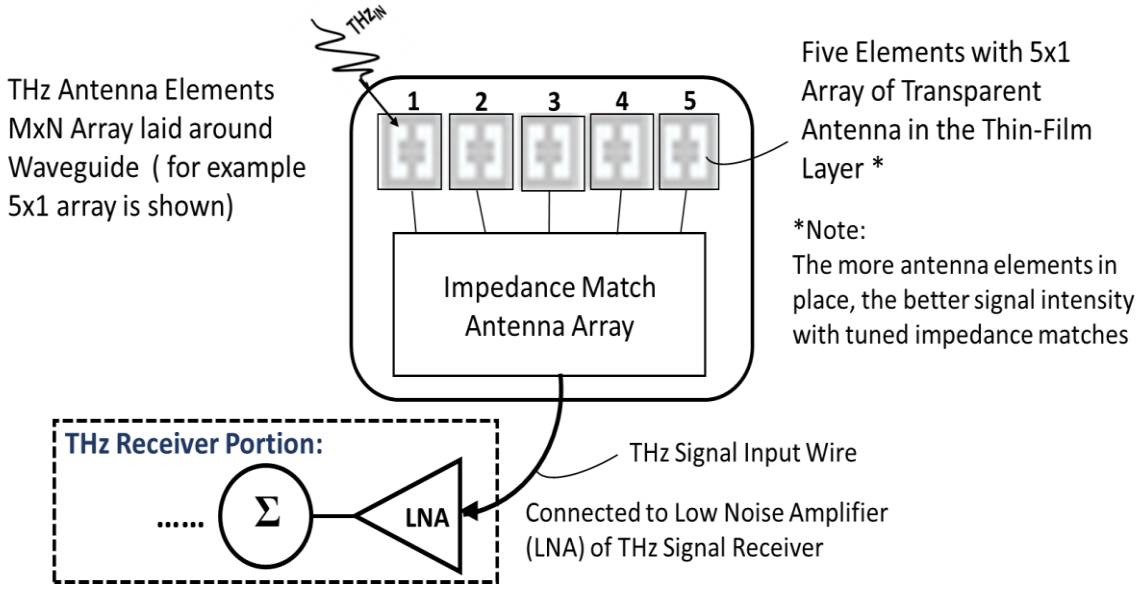
- The emerging technologies of wireless terahertz communication and AR/VR/MR/XR wearable display glasses might be potentially emerged as a new integrated device or system.
- As techniques migrated from the wireless 5G mobile communication and Wi-Fi to the next generation 6G terahertz (THz) technology, the wearable display glasses will integrate THz technology as a new breed wireless platform foreseeing its coming.





Integration both waveguide layer and laminated antenna layer for wearable display glasses

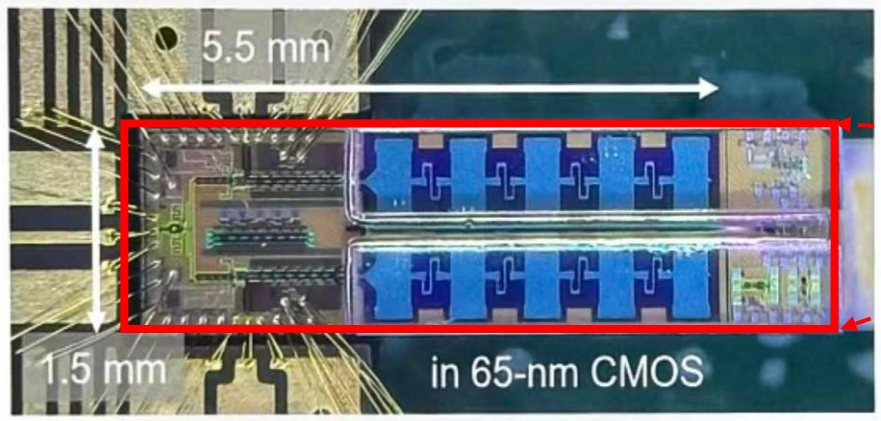


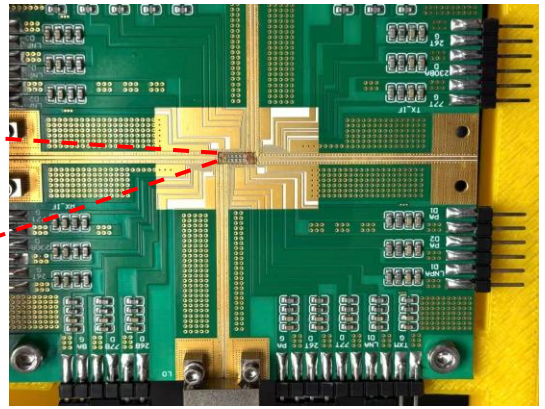


An antenna layer built-in at 5x1 plus array of Split Ring Resonant (SRR) THz antenna elements on each viewing optical lens based on meta surface material designs with impedance match to enhance resonant signals and connected to LAN of receiver portion of THz transceiver

Product I. 200GHz THz Transceiver:

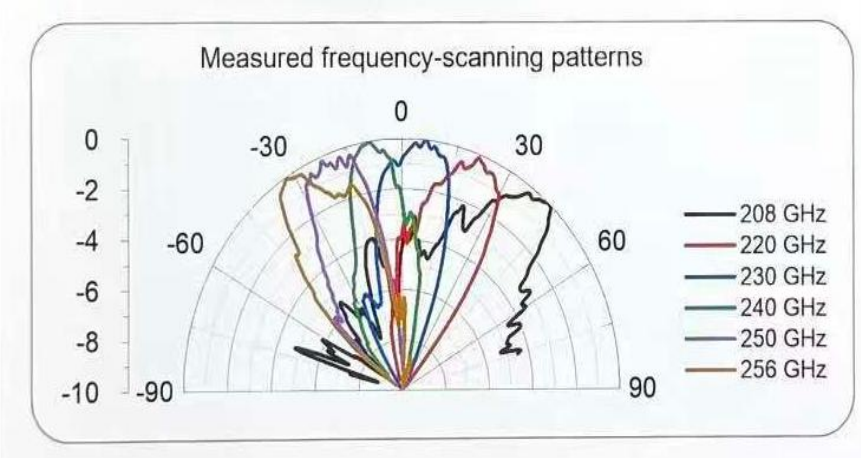
- **200GHz (100+Gbps) speed** including transmitter, receiver and antenna design based on CMOS process **technology chip.**





Chip Size at
5.5mm X 1.5mm
(less than 1/10 of a little finger nail)

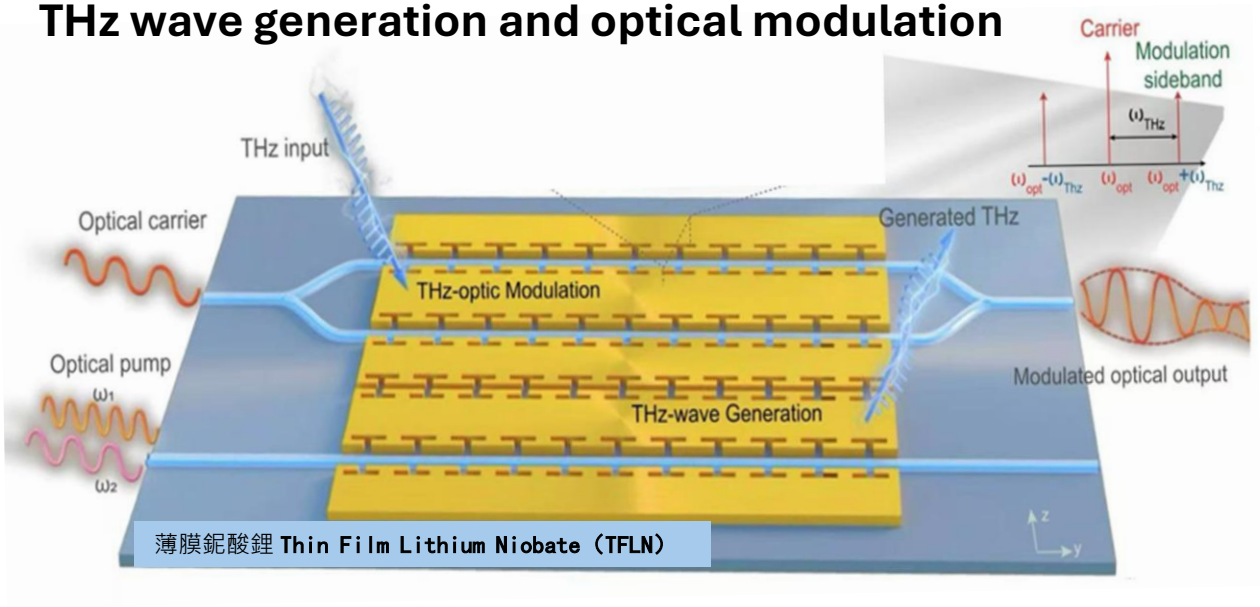
- **Application:** Multi-user communication Target sensing & location
- **Advantage:**
  - Rapid beam scanning without the need for calibration
  - Low power consumption and improved thermal management
  - Simplified architecture & eliminating complex control

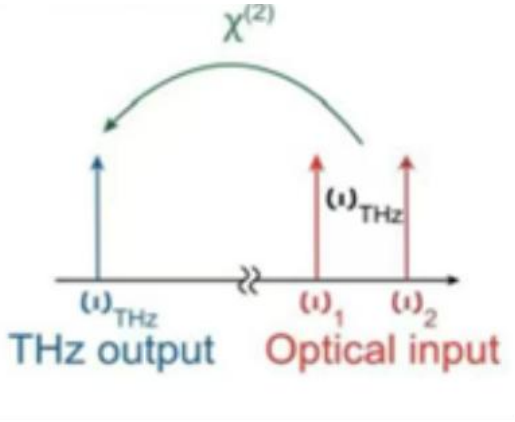


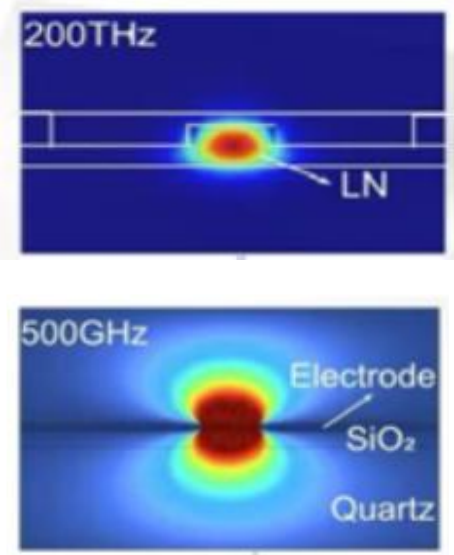
Product II. THz Transceiver 300GHz ~ 800GHz: Thin Film Lithium Niobate (TFLN) chip design

- By using two tunable lasers with different frequency generation (DFG) method for THz generation and modulation

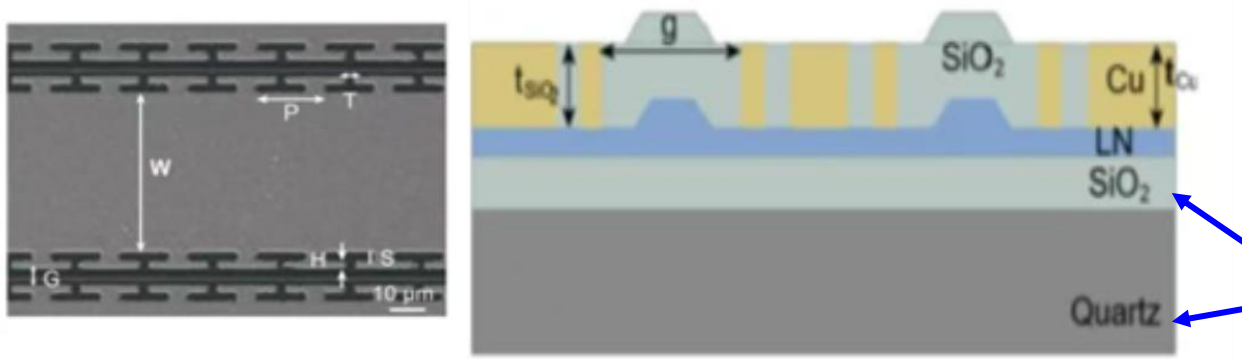
THz wave generation and optical modulation





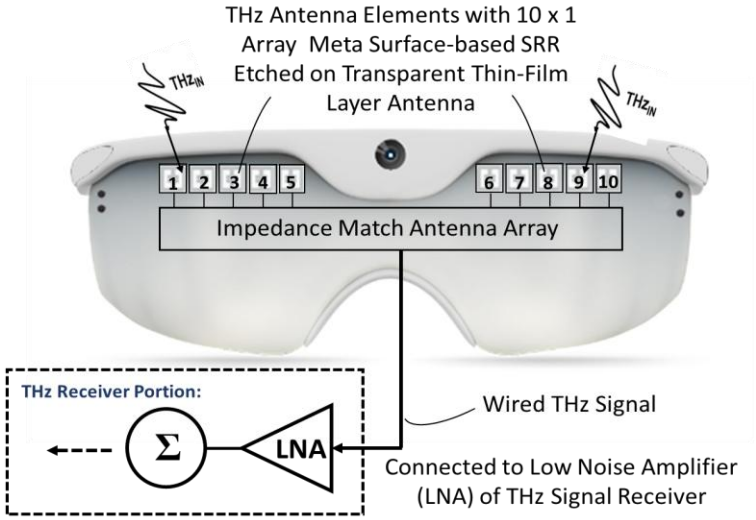


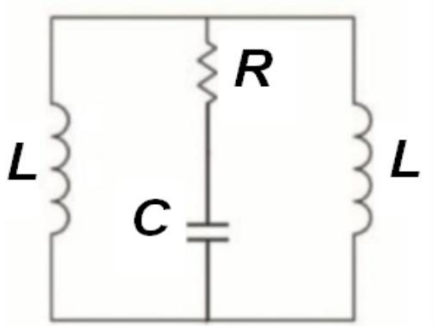
THz (200GHz ~500GHz) Generation based on DFG

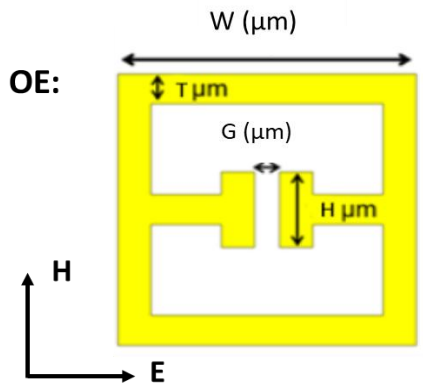


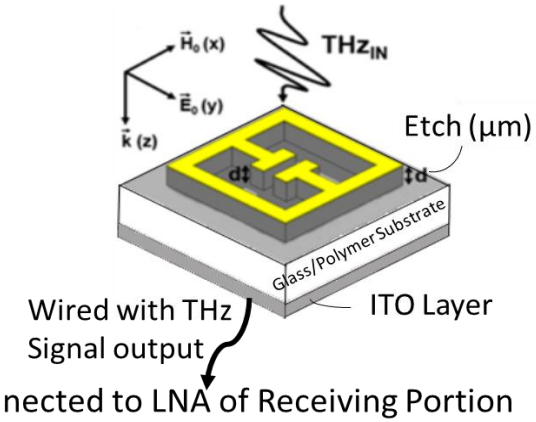
Quartz and SiO_2 Substrate

II-1. Wearable display glasses built-in with wireless transceiver and also THz antenna and on the waveguide optics

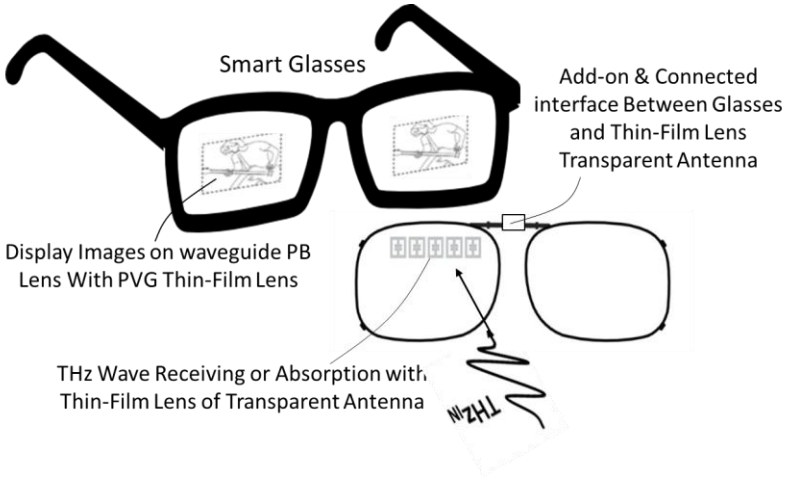


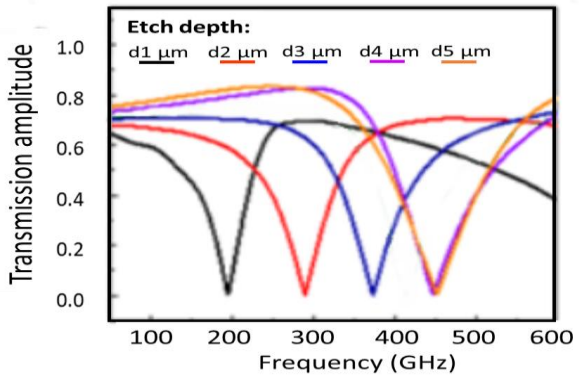


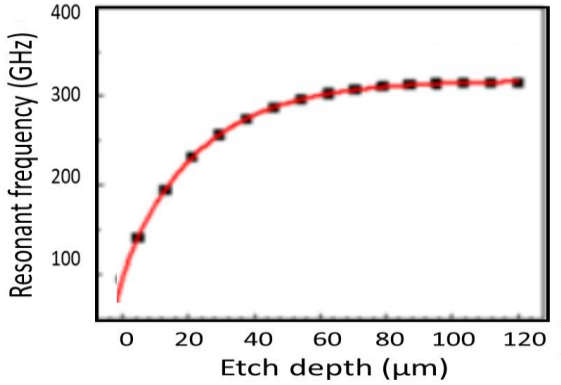




Optional add-on connection for meta surface material with Transparent Antenna





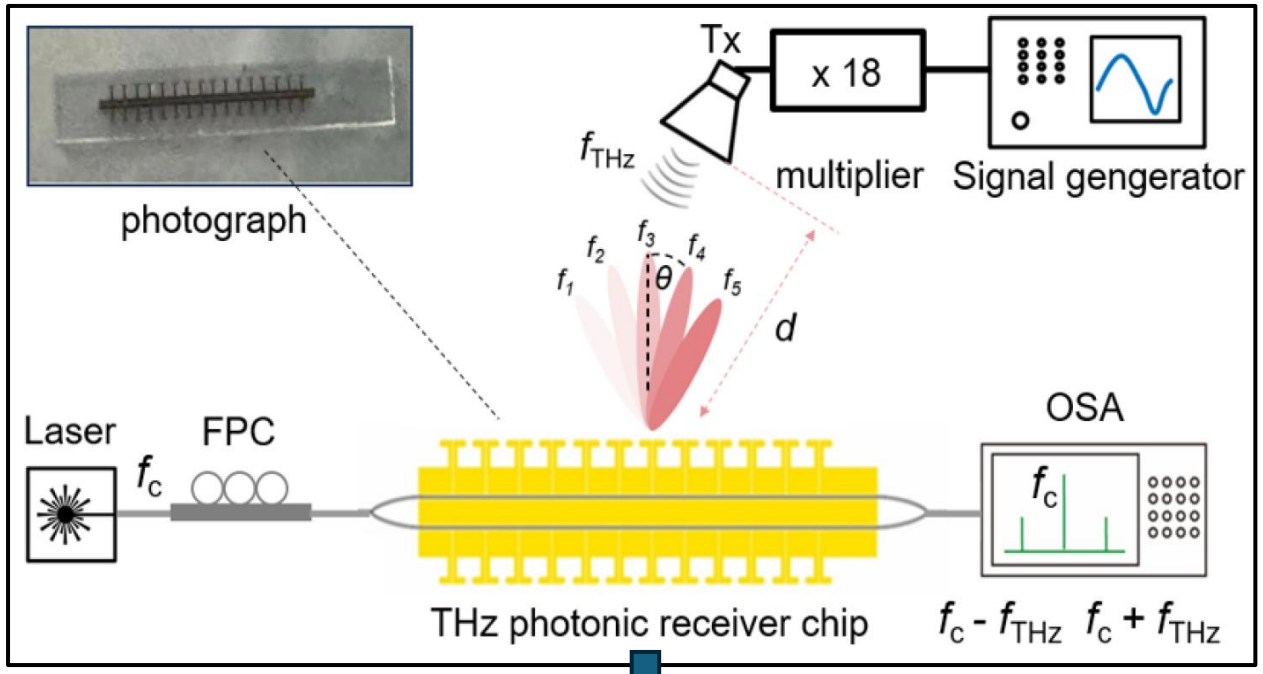


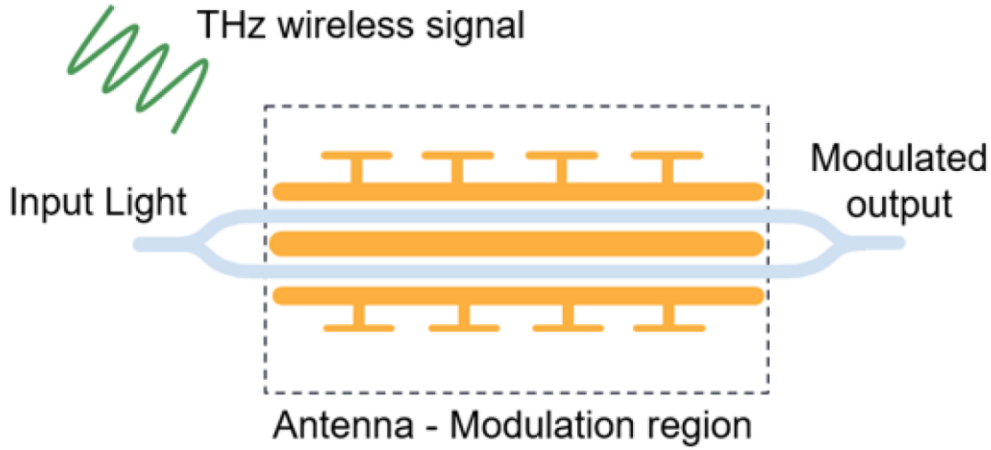
THz antenna cell based on meta surface design and equivalent RLC resonant circuitry at the predefined terahertz resonant frequency

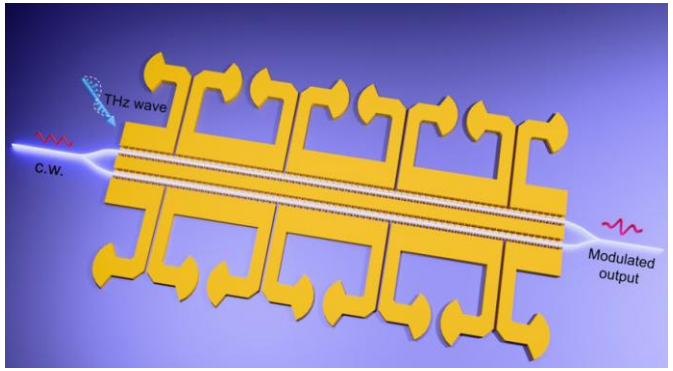
II-2. Antenna & Modulator Coupled Photonic Receiver on TFLN for Wireless THz Transceiver

Experimental setup and photograph of the fabricated chip with 10.8-mm-long modulation electrodes.

- **Through co-design of the antenna and modulator, the device achieves efficient THz detection and strong THz–optical coupling within a broad frequency range between 220–300 GHz .**





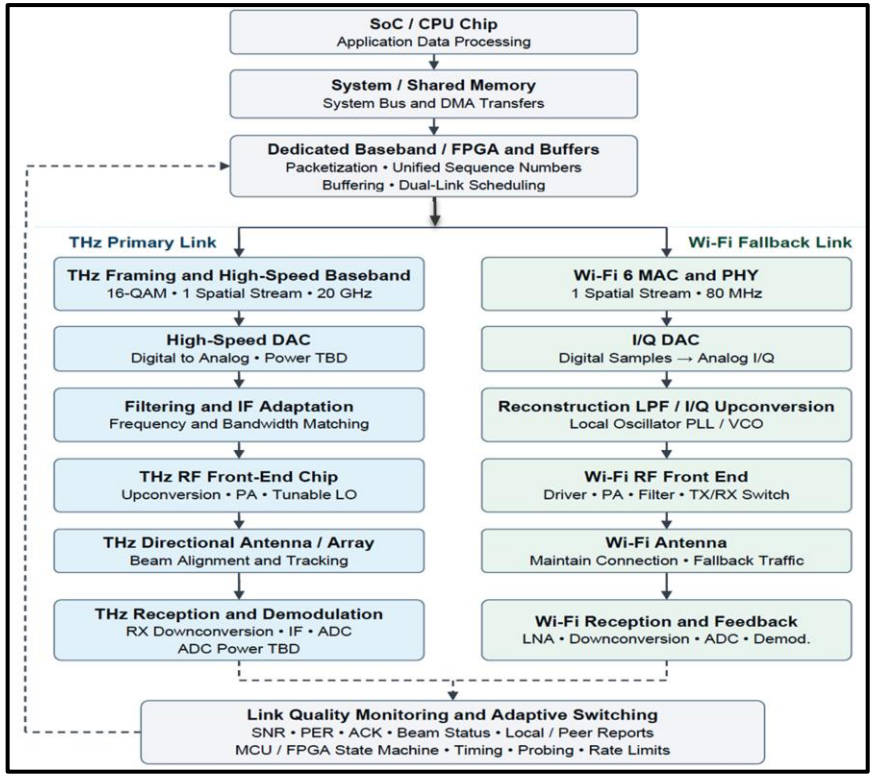


Product III. Wireless Front-end Terahertz Chip:

with Dual-Link Switching Integrated with Wi-Fi – THz Wireless Router

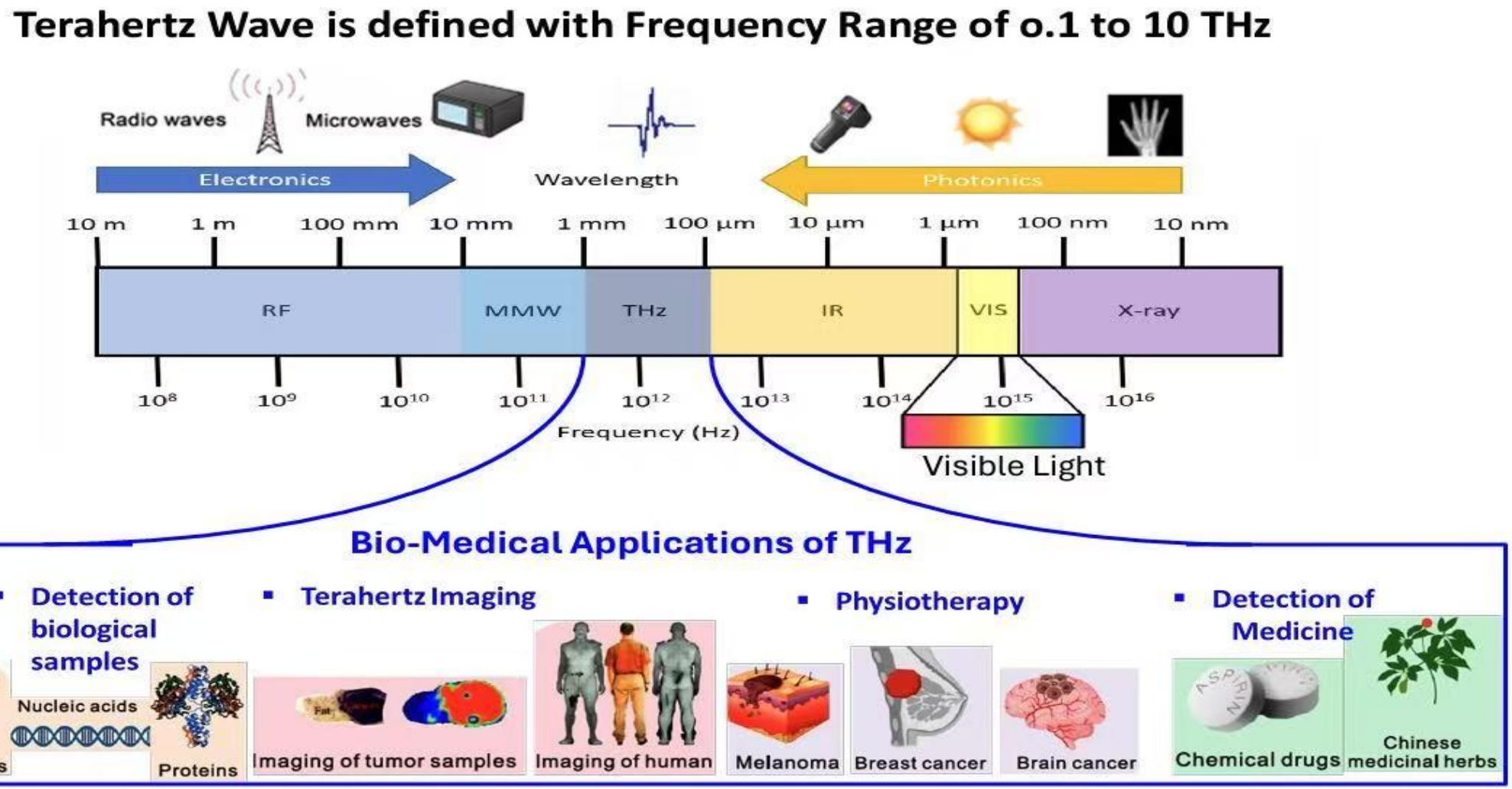
1. This project targets smart glasses and companion computing devices, focusing on integrating an existing THz RF front-end chip into a complete communication system.
2. Commercial ADCs/DACs, a dedicated communication baseband, clock and power circuits, antennas, and data interfaces will form an end-to-end high-speed THz link. Coordination with Wi-Fi will enable fallback during blockage and switching back after recovery.
3. With one spatial stream and an ideal 20 GHz signal bandwidth, the THz RF front-end chip link can theoretically deliver raw rates of 80 Gb/s with 16-QAM and 100 Gb/s with 32-QAM.
4. Actual rates depend on commercial ADC/DAC capabilities, baseband throughput, and system power, within the glasses' thermal and battery-life limits. The SoC/CPU supports application processing and control; the focus is THz RF front-end chip integration and sustained high-speed communication.

Parameter	THz Primary Link	Wi-Fi Fallback and Benchmark Link
Spatial streams	One spatial stream	One spatial stream
Signal bandwidth	20 GHz	80 MHz
Modulation	16-QAM; 32-QAM as an extension Single-carrier operation evaluated first	Wi-Fi 6, 1024-QAM, MCS 11
Coding and guard interval	Code rate, pulse-shaping roll-off, and frame overhead TBD	Code rate 5/6; guard interval 0.8 µs
Reference rate	16-QAM: 80 Gb/s 32-QAM: 100 Gb/s Ideal theoretical raw rates	Approximately 0.6 Gb/s PHY rate [1]
Actual data rate	Limited by commercial ADCs/DACs and system power; validate end to end	Measure net throughput for the selected commercial module under actual conditions
ADC and DAC	Devices and sample rates to be selected; power consumption TBD	Converters integrated in the Wi-Fi module
RF front end	THz RF front-end chip; LO adjusted as required	Commercial Wi-Fi 6 module; model TBD

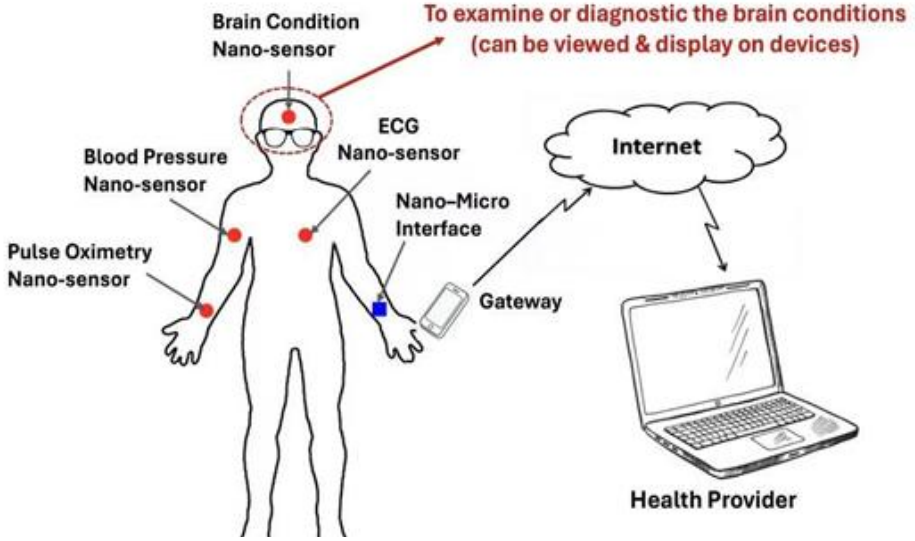


Application:

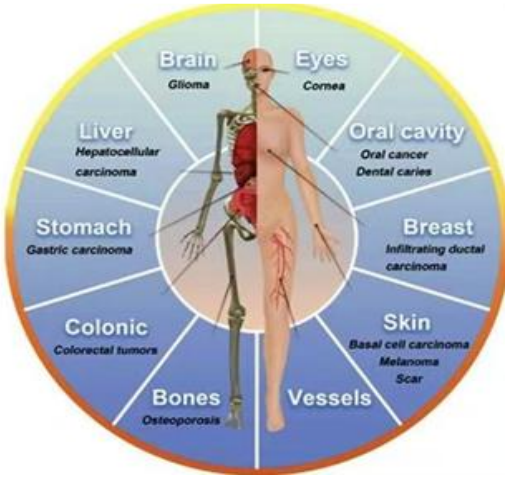
Bio-Medical (Bio-sensing，medical imaging，Medicine detection and monitoring



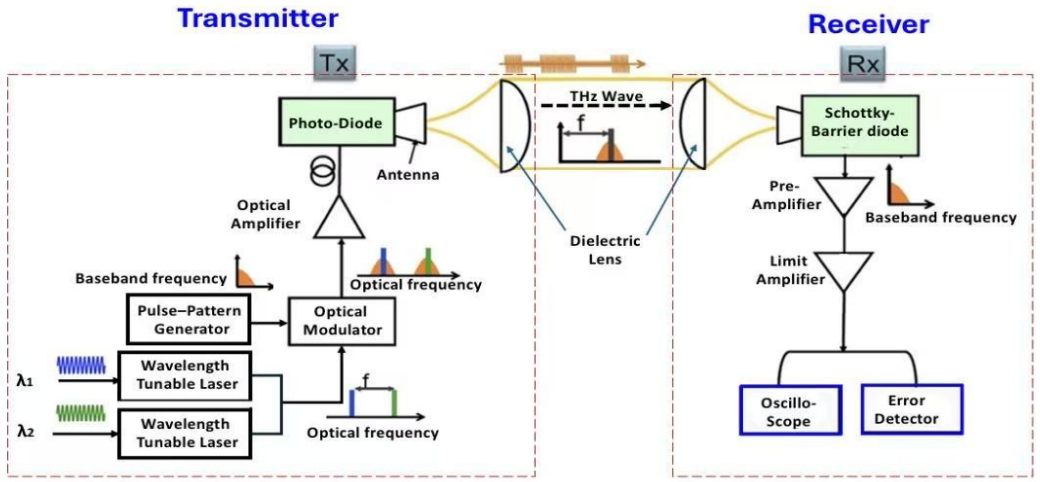
Typical Medical Inspection



THz Bio-Sensing for Human Body Examination and Diagnostics

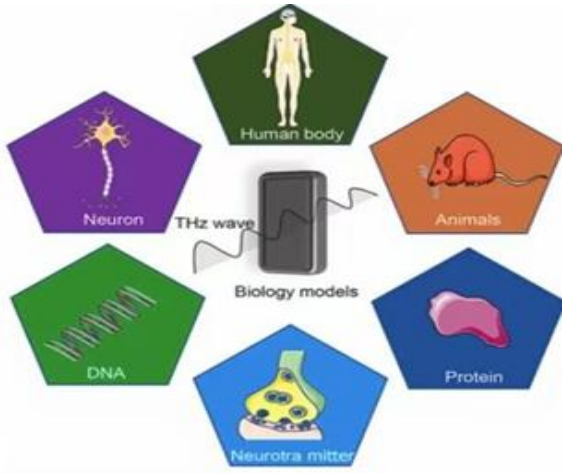


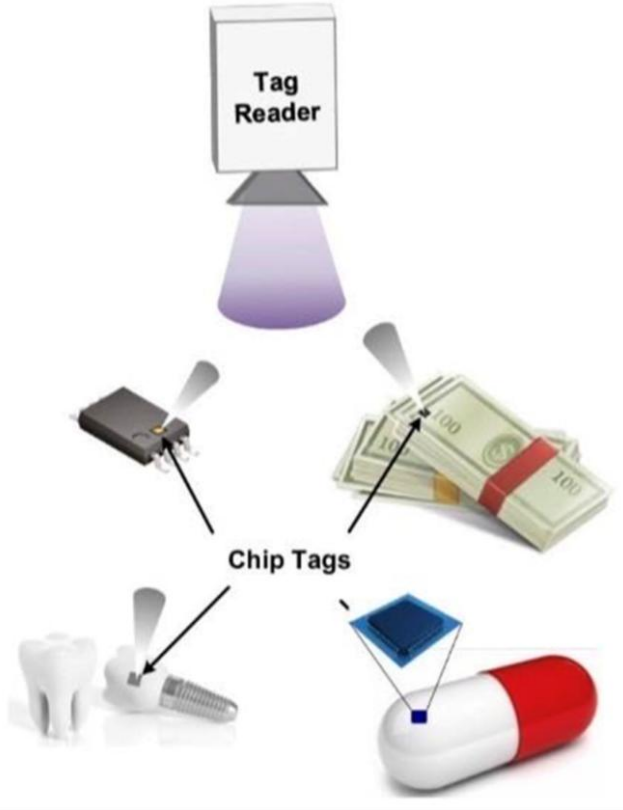
Implementation of a Single Unit of THz Transmitter and Receiver Cell



12

Advances in THz Technology of Neuroscience



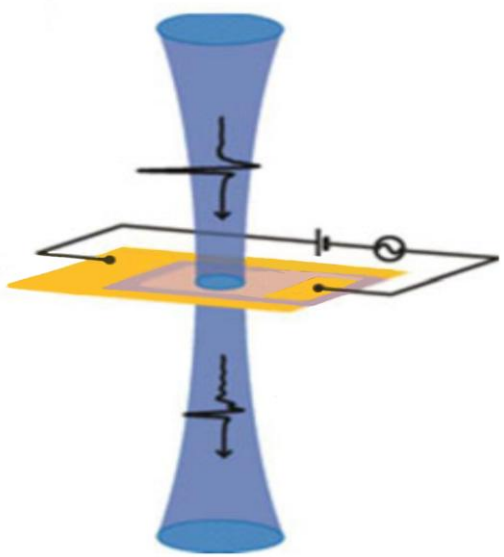


Schematic of an electronically Driven Metamaterial-based THz Wave Modulator

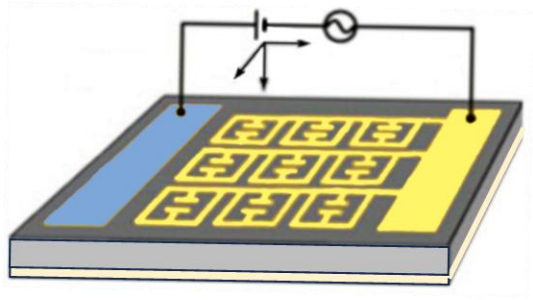
For Split-Ring Resonator (SRR) cell array at a reversed bias with ohmic contacts

(1)-T and (2)- R:
A pair of corresponding layers with enhanced function of Thz transmitters and Thz receivers based on unit cell of split-ring resonators (SRR) antennas to form a layer of 2-D arrays

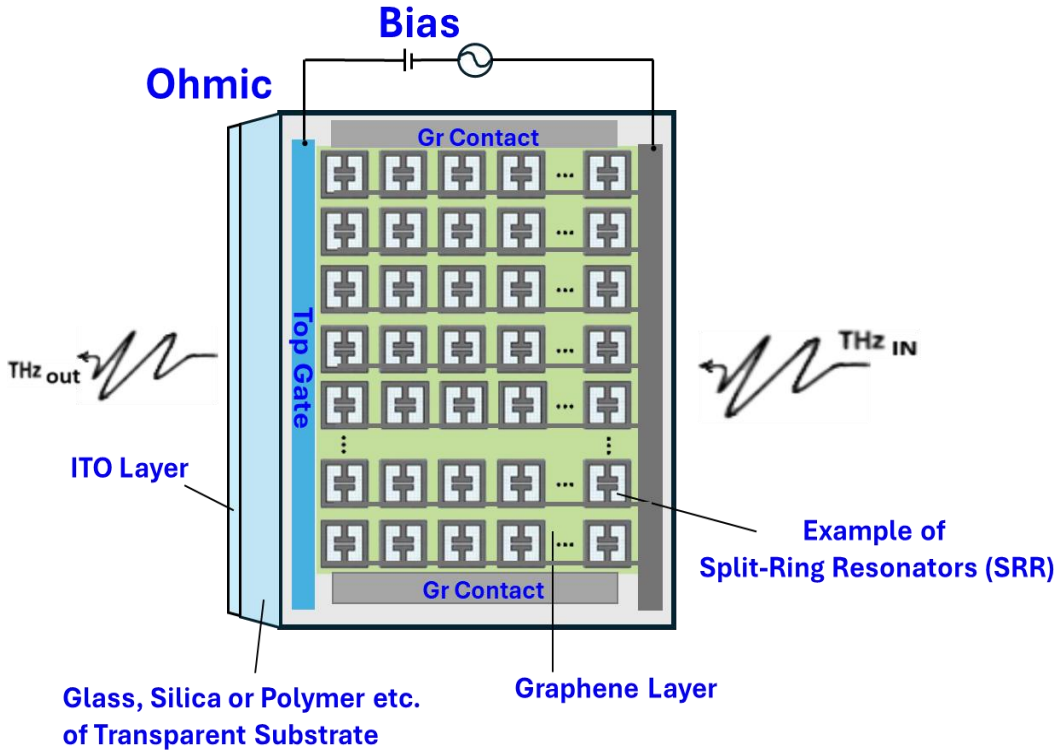
Incident Thz wave



Transmitted Output Thz wave

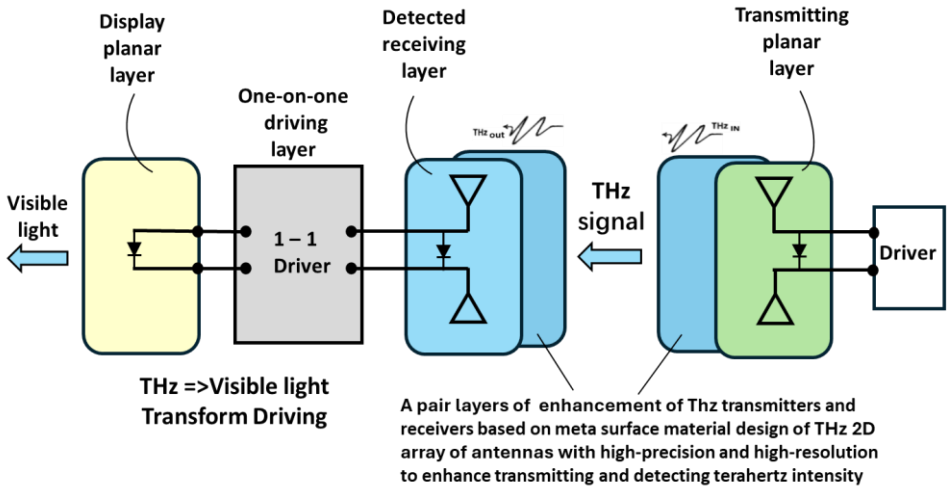


A small section of split-ring resonator (SRR) cell array



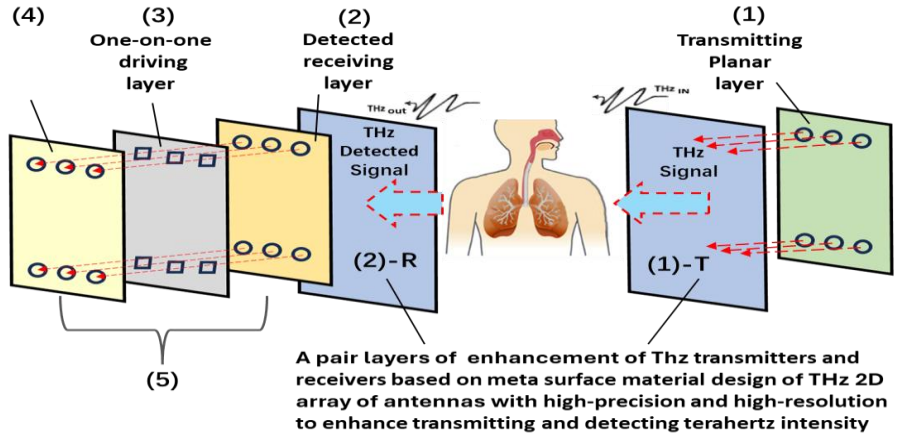
A Single See-Through Planar Array Screen of Mobile THz Bio-Sensing System with Meta Surface Material

- **A Single Pixel of Basic Planar Array System Configuration**



- **Used for Chest , Lung, Pharynx Monitoring and Inspection**

A Single See-Through Planar Screen of THz Bio-Sensing Array with Meta Surface Material



- **System Architecture and Functional Principle :**

(1) : THz Transmitting Uniformly Planar Layer: based on micro-Gunn diodes resonant array, resonant tunnelling diodes (RTD) array or other methods like uni-traveling-carrier photodiode (UPC-PD), dual lasers using difference-frequency generation (FDG) or optical laser pulse excited onto nonlinear crystal materials to generate frequency identified within 0.3 THz to 10.0 THz electromagnetic signals with 2-D uniformed intensity.

(2): THz Detected Receiving Layer: Schottky diode resonant 2-D array or other methods to detect and receive terahertz signals after passed through human body or objects or specimens under test.

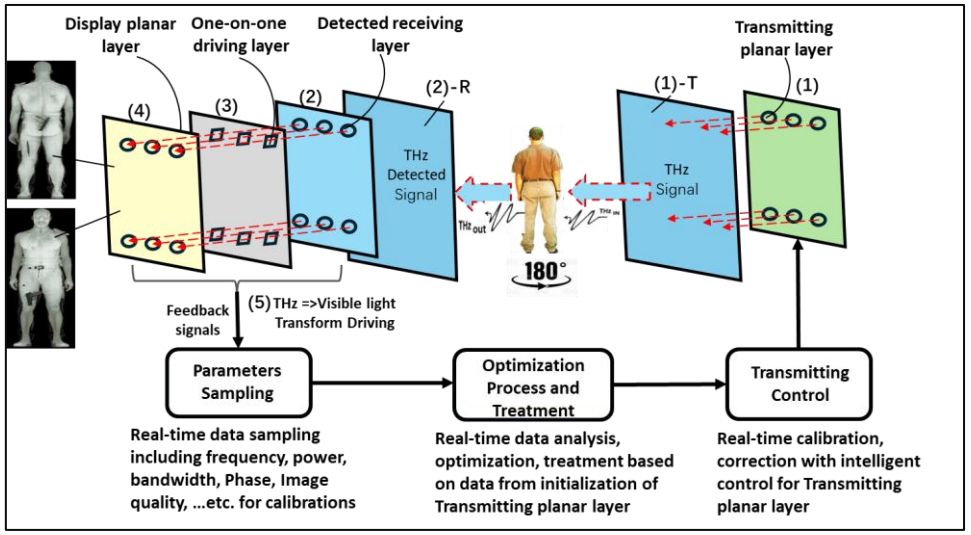
(1)T and (2)R: A pair of corresponding layers with enhanced function of Thz transmitters and Thz receivers based on unit cell of split-ring resonators (SRR) antennas to form a layer of 2-D arrays, which are constructed with meta surface material and graphene on transparent substrate at high-precision and high-resolution to enhance both transmitting and detecting terahertz intensities through controllable (or programmable) band-pass-filtering and amplification.

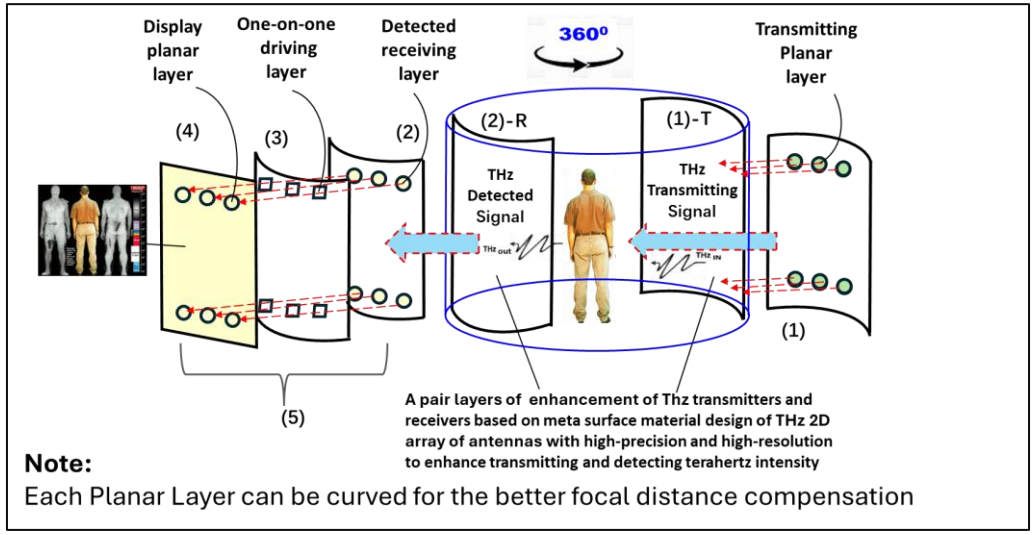
(3): One-on-One Display Driving Layer with 2-D Array: to receive one-on-one driving signals to Display Planar 2-D array with terahertz signals corresponding to the signal intensity for driving LCD.

(4): LCD/LED/OLED Display Matrix Array: driving signals to drive the display matrix array with one-on-one corresponding intensity of visible light for viewing.

(5): THz Direct Drive Display Panel: To Integrate (2),(3) and (4 organized as single panel array.

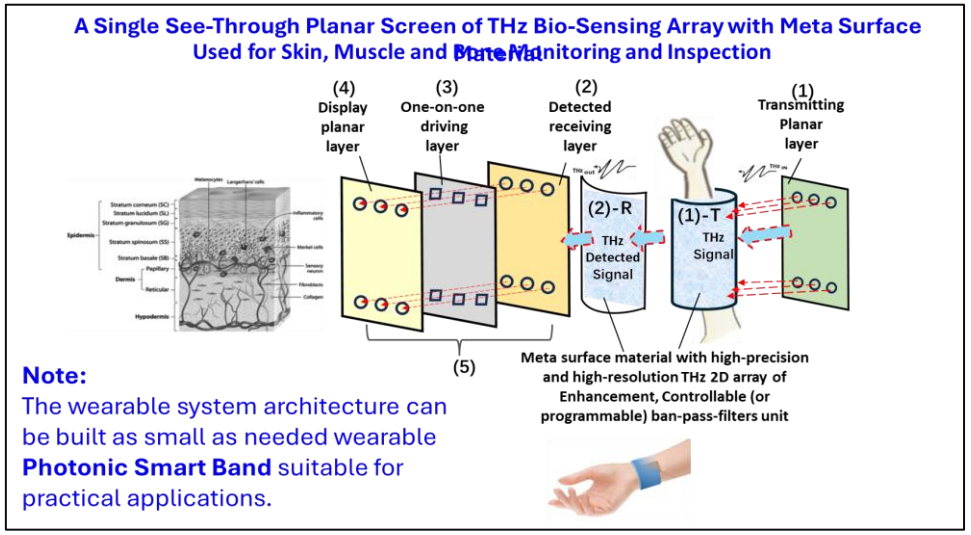
Application: **Security Inspection Rotation System**





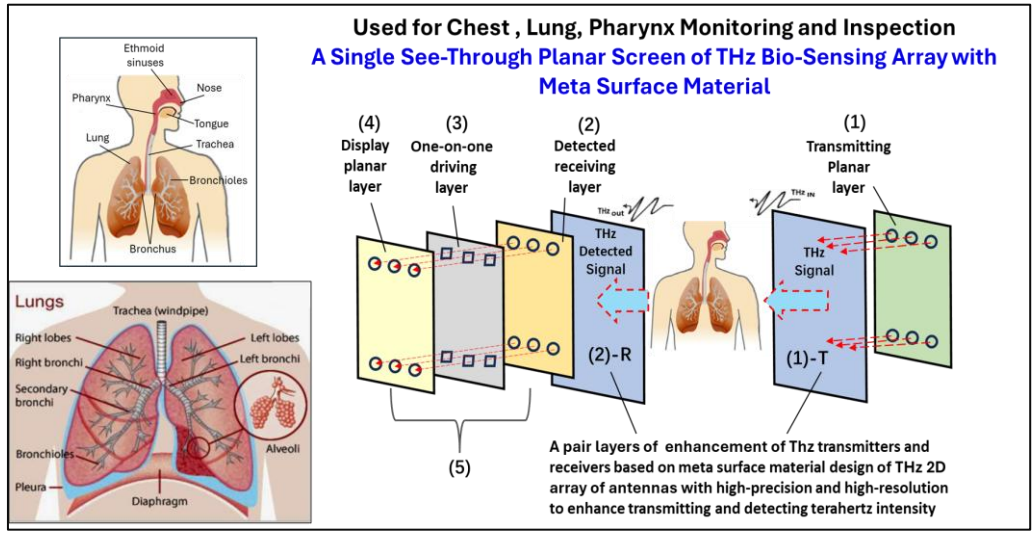
Note:
Each Planar Layer can be curved for the better focal distance compensation

Medical Bio-Sensing Wearable System:



Note:
The wearable system architecture can be built as small as needed wearable **Photonic Smart Band** suitable for practical applications.

Medical Bio-Sensing System:



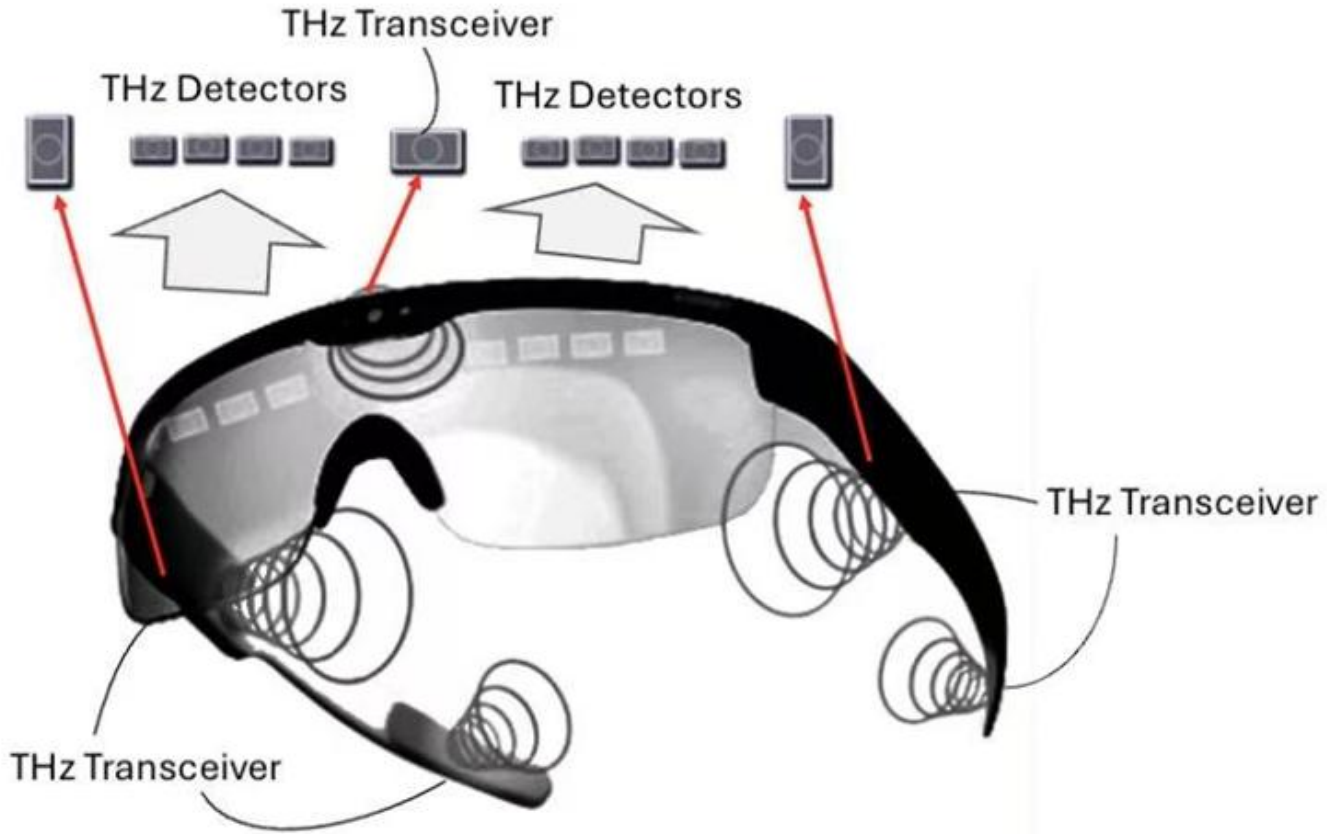
Application:

Wearable display glasses using a plurality of THz sensors to detect the brain conditions of a wearer

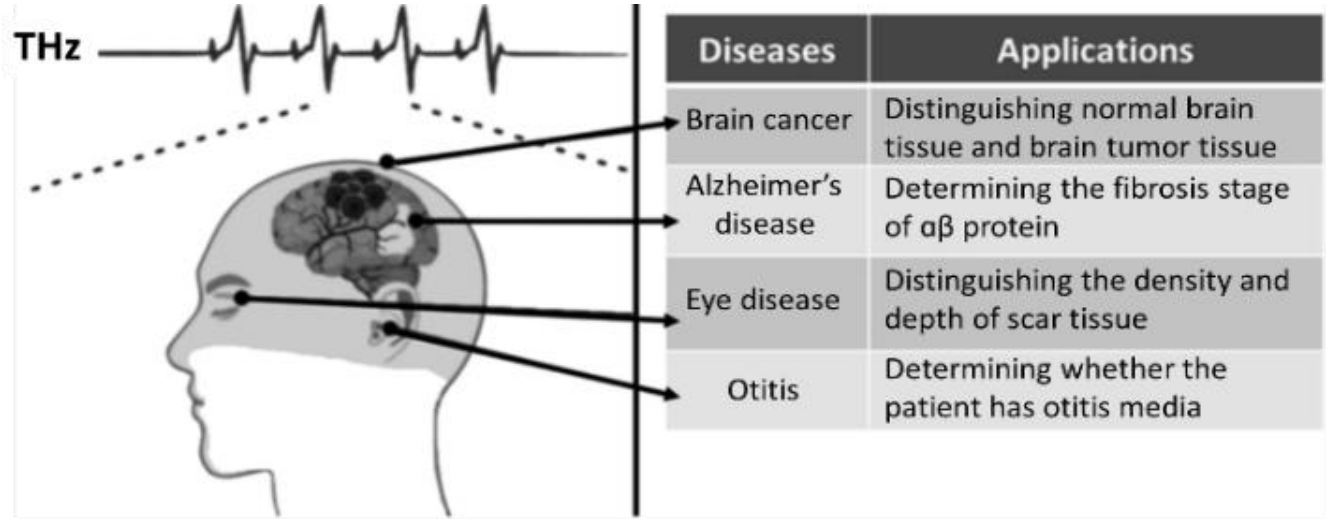




THz antenna 10x1 array of transparent thin-film layer meta surface antenna



- **Brain conditions might be measured and detected when a user is wearing a wireless THz display device resembling a pair of reading glasses.**



Diseases	Applications
Brain cancer	Distinguishing normal brain tissue and brain tumor tissue
Alzheimer's disease	Determining the fibrosis stage of αβ protein
Eye disease	Distinguishing the density and depth of scar tissue
Otitis	Determining whether the patient has otitis media



Note:
A head-mount adapter that may be optionally used in conjunction with an exemplary display device.

Display glasses with wireless THz transceiver for bio-sensing

It describes the techniques for using one or more terahertz transceivers in wearable display glasses for bio-sensing such as, brain conditions are described. The one or more terahertz transceivers operate signals in Terahertz and configured as transmitters or receivers. When disposed collaboratively on a pair of display glasses, these transmitters or receivers allow THz signals to radiate certain locations of the brain and receive reflections thereof. The received signals may be using to detect the brain conditions."

- THz display glasses built-in with THz transceiver or spectroscopy can be used to distinguish between normal and tumor tissue that is dehydrated.
- The refractive index, absorption coefficient, and dielectric constant of paraffin-embedded gliomas and normal brain tissue were measured in the range of 0.2–2.0 THz using the THz-TDS system.
- Brain tumors normally contain a higher concentration of proteins, which have a higher absorption of THz radiation, and a lower concentration of lipids, THz imaging has a higher contrast to distinguish brain cancer.

Conclusion:

1. The integration of wireless THz transceivers into wearable display glasses are an emerging communication and multidisciplinary field with significant potentials.
2. It offers major benefits for AI, AR, VR, MR, or XR applications and introduces powerful new capabilities in bio-sensing for healthcare, including non-invasive BCI and HMI research more in depth at the early disease detection and healthcare.
3. While the neurobiological effects of THz radiation require further study, the technology's unique properties position it as a valuable tool for communication, security, and medicine.
4. The convergence of THz technology with AI and big data paves the way for precision medicine, heralding a new era that will dramatically change how we interact with technology.
5. Prospective wearable display glasses built-in with THz wireless communication and bio-sensing is at the dawn of a new era that is just arising and will open the brighter vision in front of us soon.

Application: Self-Stem Cells activation with Terahertz waves stimulated cell gene for medical regenerative therapies and self-healing

Medical applications using Terahertz (THz) waves to activate self-stem cells are a rapidly evolving frontier in regenerative medicine. By harnessing non-ionizing, low-energy THz pulses, researchers can selectively interact with cell gene networks and zinc ions to promote tissue regeneration, heal wounds, and stimulate hair and motor neuron growth without damaging DNA. For an example, traditionally, there are four variables form the exact core of the physical and biological blueprint for acoustic energy delivery in tissue regeneration. These parameters of key factors are:

1. **Energy Flux Density (EFD):** in millijoules per square millimeter which staying within a low-energy window - typically \$0.01 to 0.08 mJ/mm^2 .
2. **Depth of Tissue Penetration:** configured to target the precise depth of the lesion or tissue plane with focal zone deep within the tissue (up to 10–12 cm).
3. **Energy Attenuation:** managing attenuation ensures the device has enough energy left by the time it reaches the target depth for an acoustic wave travels through biological mediums, its amplitude decreases due to scattering and absorption.
4. **Heat Production: i**n regenerative acoustic therapy, heat production is a variable to be strictly minimized or eliminated unlike therapeutic ultrasound which use continuous waves to deliberately heat collagen fibers, low-energy shock wave therapies rely on a low pulse repetition frequency (typically 3–5 Hz) and a very low duty cycle.

When research engineers and clinicians optimize these treatments, balancing these parameters is what allows to trigger cellular healing while preventing thermal or structural injury.

Application: Self-stem cells activation with Terahertz waves stimulated cell gene for medical regenerative therapies and self-healing

As shifting from acoustic modalities (like shock waves) to Terahertz (THz) devices, the fundamental physics changes completely. Terahertz devices emit electromagnetic radiation (sitting between microwaves and infrared on the spectrum) rather than mechanical sound waves through medium. it is an electromagnetic wave, the clinical and scientific literature transitions away from the term **Energy Flux Density** and instead quantifies the energy using **Power Density** (also called **Irradiance**), measured in milliwatts per square centimeter (mW/cm^2). The power density applied to human skin varies dramatically depending on whether the THz device is an advanced diagnostic scanner, a laboratory research setup, or a commercial wellness device:

1. Diagnostic and Imaging Systems (Ultra-Low Exposure): When THz waves are used for non-invasive medical imaging-such as evaluating skin hydration levels, measuring the thickness of the stratum corneum, or mapping out border margins for skin cancers-the energy must be kept extremely low to ensure safe, non-destructive observation. Standard Power Density: Less than 1 mW/cm^2 (often micro-watt levels, ranging from 10 to 500 $\mu W/cm^2$). With Impact level provides just enough reflected signal for real-time sensors without causing any measurable thermal shift in the tissue.

2. Therapeutic and "Wellness" Devices (Low-to-Moderate Exposure): Handheld consumer wellness blowers or clinical devices designed for targeted peripheral stimulation utilize higher power outputs to interact with biological tissues. Standard Power Density: 1 mW/cm to 10 m.J/cm (typically settling around 2 to 4 mW/cm at a standard operating distance). With Impact at this range, THz waves induce mild non-thermal molecular alignments and very subtle localized warmth.

Application: Self-stem cells activation with Terahertz waves stimulated cell gene for medical regenerative therapies and self-healing

3. High-Intensity Laboratory Research (Extreme Exposure): In laboratory settings studying cellular mechanics, scientists use high-intensity pulsed systems (like Quantum Cascade Lasers or Picosecond THz pulses) to analyze the boundaries of genetic expression or cellular stress in dermal fibroblasts.
Average Power Density (Iave) is from 50 mW/cm^2 to 140 mW/cm^2.
Peak Pulse Intensity (Ipeak) is generally compressed into picosecond bursts; the instantaneous peak energy can skyrocket to Megawatts (MW/cm^2) or even Gigawatts(GW/cm^2)for a fraction of a second.
With Impact at this tier can alter cell membrane permeability, trigger histone changes, or induce visible thermal spikes in the skin (> 2.5° C temperature rise) if not tightly regulated.

- **How THz Dynamics Connect to 4 Essential Variables unique physical profile:**

Evaluating THz technology through the lens of the four core treatment variables highlights are described as follows:

1. Energy Flux Density (Power Density): Kept within 2 to 10 m W/cm" for safe human exposure. Going beyond 20 m W/cm" begins to cross into an intensity threshold that can introduce cellular stress or adverse neurovascular reactions in animal models,
2. Depth of Tissue Penetration: Extremely shallow (0.1 mm to 0.5 mm). Because water molecules absorb terahertz frequencies exceptionally well, 99% of the emitted THz energy is completely absorbed within the first 500 microns of the skin (the epidermis and upper dermis). It cannot natively penetrate deep muscles or internal organs.

Application: Self-stem cells activation with Terahertz waves stimulated cell gene for medical regenerative therapies and self-healing

3. Energy Attenuation: Ultra-high. The absorption coefficient of water at 1 THz is massive (200 cm1). The wave attenuates almost instantly upon contacting the moisture barrier of the skin, making hydration levels the single primary factor controlling how far the wave can travel. SPIE Digital Library

4. Heat Production: Highly concentration dependent. At diagnostic levels (<1 m W/cm2), heating is negligible. However, because the energy attenuates so rapidly in a thin superficial layer, rising to therapeutic or prolonged exposures can quickly convert that concentrated electromagnetic energy into local thermal energy, warming the surface tissue by 1.4°C to 2.8°C.

- **Highlights specific therapeutic mechanisms as follows:**

1. **Gene Manipulation & Cell Differentiation:** Studies (such as those at Kyoto University iCeMS) show THz light pulses can generate electric fields that alter the activity of specific gene networks in stem cells. This can be used to activate genes involved in motor neuron survival or mitochondrial function while turning off differentiation genes, allowing for precise control of stem cell behavior.
2. **Tissue & Skin Regeneration:** Localized, short-duration THz exposure (e.g., 0.2 THz for 10 minutes) has been proven to safely penetrate tissue and promote active cell proliferation, activating skin and hair follicle stem cells. The use of THz radiation to elicit particular cellular responses that can expedite self-healing mechanisms is one of the most promising lines. THz waves, for example, might be used to stimulate and guide stem cells, encouraging them to regenerate tissue, providing a new way to treat wounds or degenerative illnesses.

Application: Self-stem cells activation with Terahertz waves stimulated self-gene for medical regenerative therapies and self-healing

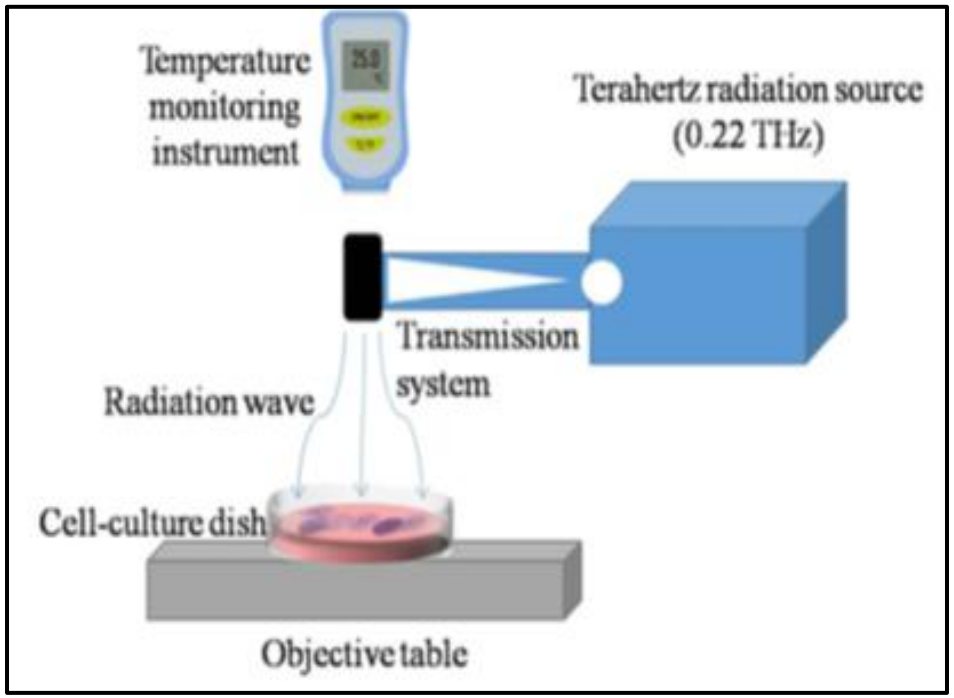
Additionally, by utilizing these waves to control the inflammatory response, chronic inflammatory disorders may be less severe and inflammation may resolve more quickly.
Through the manipulation of biological mechanisms like migration, proliferation, and gene expression, THz technology holds the potential to transform wound healing by reducing scarring and enhancing tissue restoration. Furthermore, because THz radiation is non-destructive, it may be used to monitor tissue characteristics and cellular changes in real time, providing medical professionals with important new information. THz imaging, for example, can be used to monitor the status of wound healing without interfering with the healing process, or to evaluate the viability of donated organs.

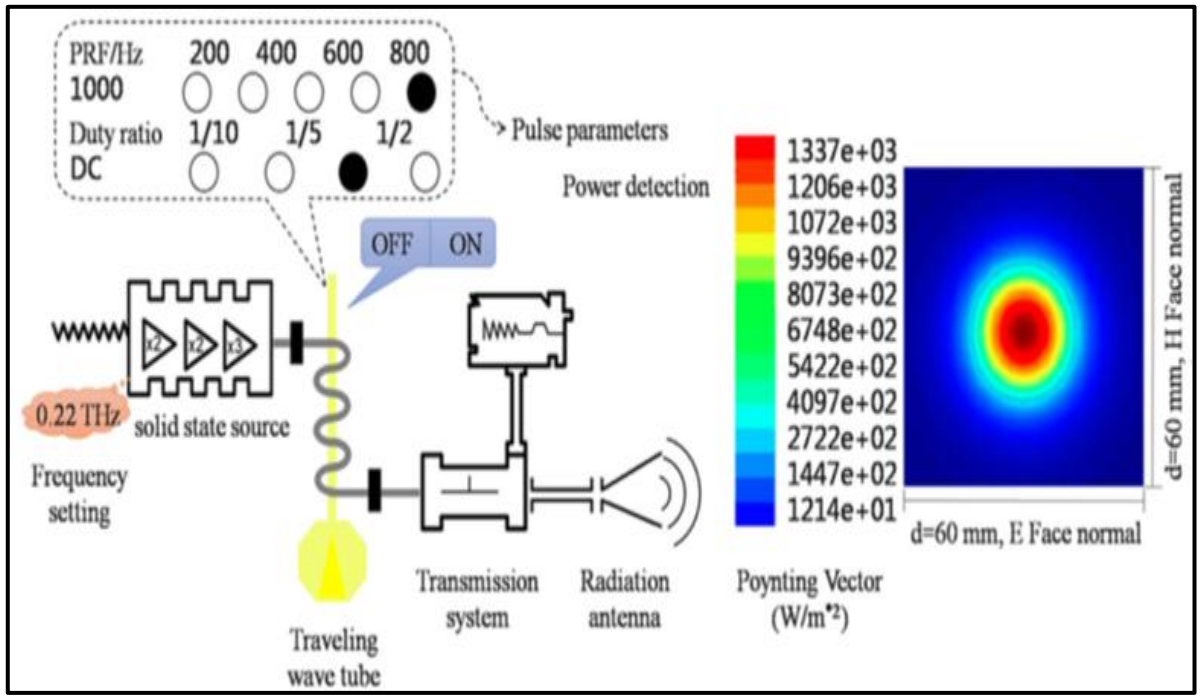
3. **Neurological & Muscular Repair:** THz radiation has been researched as a tool to stimulate self-healing processes in neurodegenerative conditions and muscle diseases (like muscular dystrophy) by manipulating induced pluripotent stem cells (iPSCs).

4. **Safety Profile:** Because THz waves fall between microwave and infrared bands, they are non-ionizing. They do not cause the radiation-induced damage associated with X-rays or gamma rays, making them a safe and non-invasive modality for cellular therapeutics.

More details on the molecular mechanisms (e.g., zinc-dependent transcription factors), Clinical study protocols and research parameters (exposure time, frequency limits) Information on research of specific diseases currently being targeted by THz regenerative therapies.

Example 1: Gene Manipulation & Cell Differentiation:



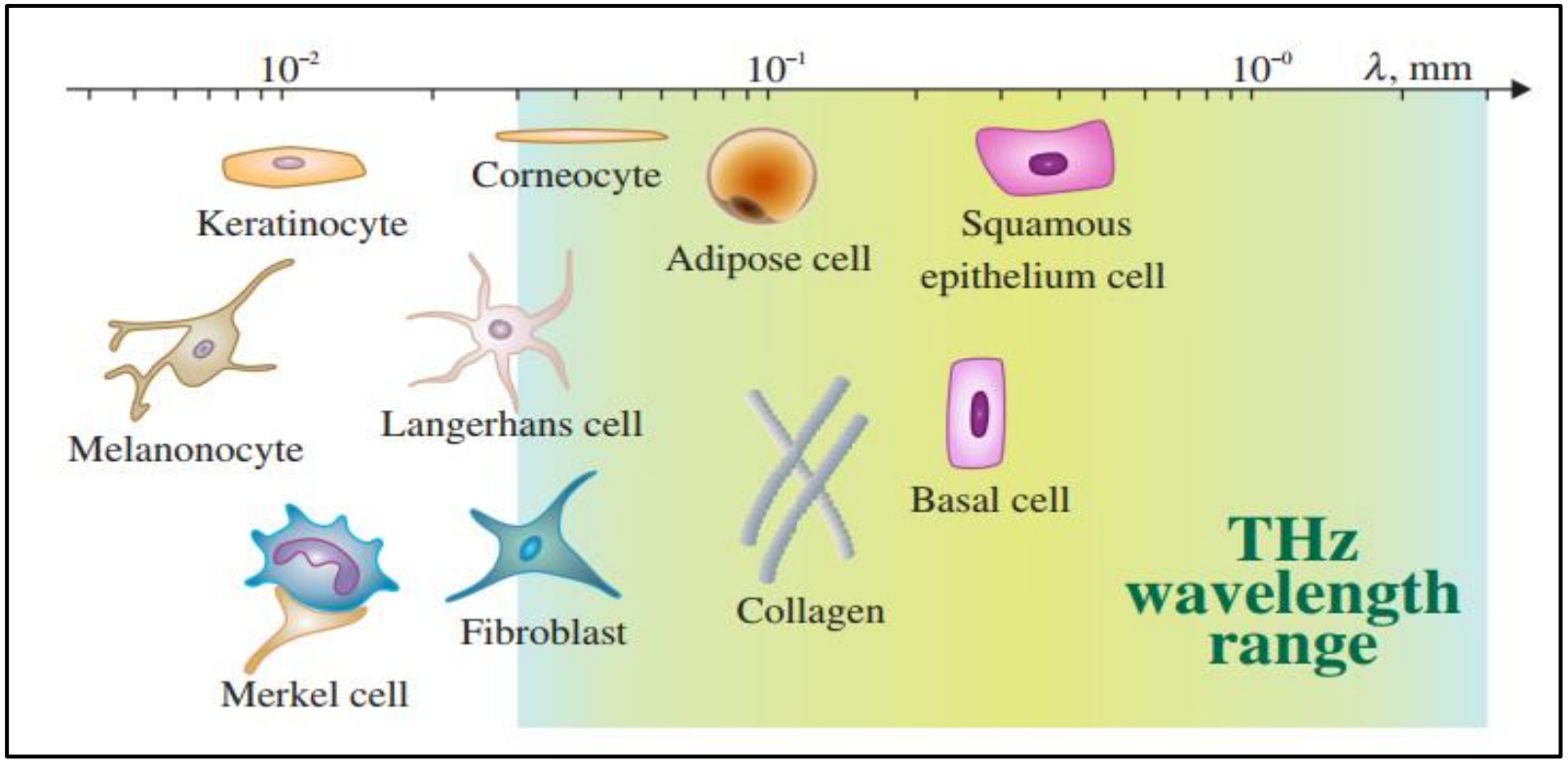


- Schematic diagram of the THz irradiation apparatus. The cells were kept in a microwell of polydimethylsiloxane (PDMS) in a glass-bottom dish in a handmade incubator. The generated THz pulses are focused by a parabolic mirror and irradiated onto the microwell.
- During the irradiation experiment, fresh air and water were supplied to the water bath in the incubator at 370.3C, and humidity of higher than 95% was maintained at all times by a feedback control. The CO_2 concentration was not controlled, and the pH in cell culture media was maintained using 25 mM of 2- [4-(2-hydroxyethyl) piperazin-1-yl] ethane sulfonic acid.
- The inset shows a magnified cross section of the culture dish.

Example 2: Tissue & Skin Regeneration:

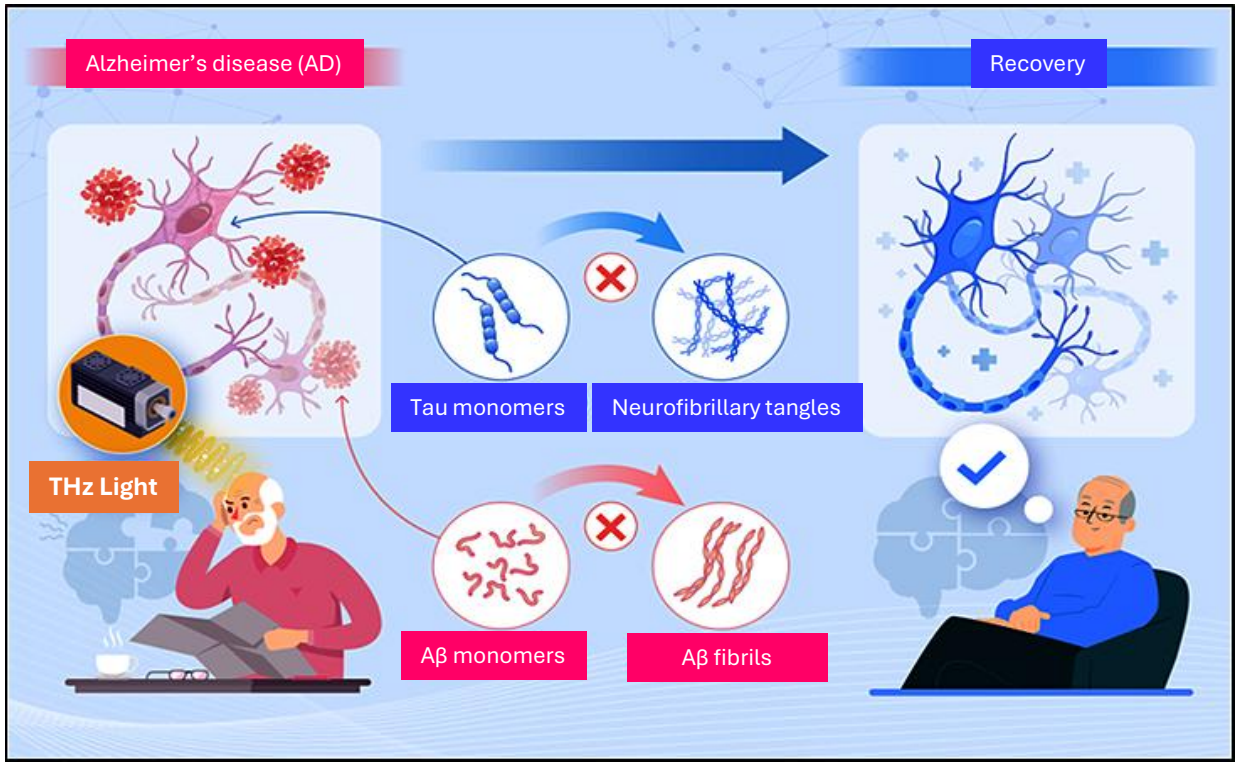
Comparison of typical skin components with the THz wavelength ranging from 0.03 to 3 mm.

(Courtesy of I. N. Dolganova)



The impacts of THz radiation on biological cells, tissues, and organisms have been significant since the inception of THz sources, but comprehensive exploration is still lacking. Notably, safety limits for energy density, do not extend beyond 300 GHz. Investigations indicate that THz radiation induces both thermal effects (resulting in the heating of objects through absorption) and non-thermal effects on biological entities. Similar to other electromagnetic waves, THz radiation heats biological tissues, with the extent of heating contingent on applied power. The substantial absorption capacity of water is a pivotal factor influencing the heating process. Modeling studies have demonstrated the capability of THz waves to heat tissue, primarily associated with continuous wave (CW) radiation sources and high-power densities. However, with pulsed sources, the average power is typically insufficient to induce noticeable changes.

Example 3: Neurological & Muscular Repair:



1. Overview of the Neurobiological Effects of Terahertz Waves on Alzheimer's Disease (AD) Pathology

Terahertz waves can modulate AD-related pathology by regulating neuronal excitability, influencing synaptic plasticity, and interfering with the aggregation process of Aβ proteins. Their effects include improving mitochondrial function, reducing oxidative stress, regulating calcium homeostasis, and potentially affecting the central immune microenvironment through alterations in blood–brain barrier permeability.

2. Biological Mechanisms and Molecular Basis of Terahertz Therapy for AD

Mechanistically, the energy of terahertz waves can resonantly excite the vibrational or rotational energy levels of specific biological macromolecules (such as Aβ peptides, tau proteins, and ion channels), thereby interfering with the Aβ fibrillization pathway and promoting the disaggregation of misfolded proteins. Concurrently, terahertz waves can modulate cell membrane capacitance and ion channel kinetics, activate the Nrf2/ARE antioxidant pathway, inhibit NF-κB–mediated neuroinflammation, and upregulate the expression of neurotrophic factors such as BDNF, synergistically improving synaptic function and neuronal survival.

3. Applications of Terahertz Technology in Neuroscience and Biosafety Considerations

In terms of applications, terahertz imaging can be used for label-free detection of Aβ plaques and lipid metabolic abnormalities in brain tissue pathology sections, terahertz spectroscopy enables real-time monitoring of neurotransmitter changes, and terahertz stimulation devices are being explored for non-invasive neuromodulation. Regarding biosafety, low-power terahertz radiation (< 1 mW/cm^2) has not shown significant cytotoxicity or DNA damage in in vitro and animal experiments; however, high-power or prolonged exposure may induce thermal effects and membrane perturbations. Therefore, strict adherence to international non-ionizing radiation protection standards (e.g., ICNIRP guidelines) is required, and further assessment of the potential risks of long-term exposure on neural network development and cognitive function is warranted.

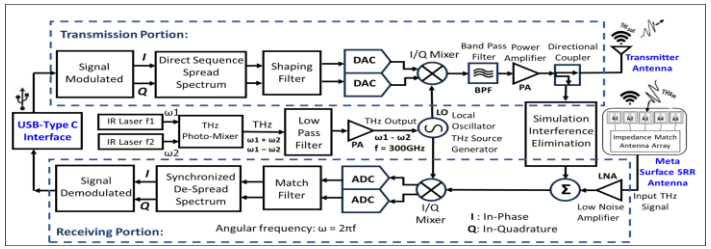
Founder & CEO Bio - Darwin Hu



- **President & CEO, Sysview Technology, Inc.**
- **CSU, MS CST**
- **NCKU, BS ES**

- **Over 40 years in high-tech business experiences:** had led a key R/D team from semiconductor & color micro-display chips design, product release to production and launch the products and business market &Sales..
- **With entrepreneur's spirit in startup and international business management:** related to CMOS image sensor & scanning, laser projection display technology with companies in the US (AVR & Xerox), China (STH), Germany (GRUNDIG), Japan (OKI), Italy (Olivetti-AT&T) and other countries and regions.
- **IPO companies and reverse M&A experiences:**
  - Advanced Vision Research Inc. / AVR System / Syscan · Inc. – M&A
  - Syscan Technology Holding Ltd. - IPO at HKSE YR 2000.
  - Sysview Technology, Inc. merged with WSOT.
  - Document Capture Technology, Inc. IPO at Nasdaq 2005;
  - Jasper, Inc. - acquired by Google / Raxium.
- **Owned over 100 invention patents:** including USA, China, Japan, Korea, India etc.
- **Patents & Technology** : - LCoS, SLM, Meta Surface lens, CMOS Image sensor & scanning, Terahertz transceiver for communication & biosensing, AR/VR/MR glasses, & Fingerprint recognition,.. etc.





Chip Architecture of USB-C to Wireless Terahertz Transceiver

THz Core Team Members



Aaron Tsai
Chief Capitalist



Darwin Hu
Founder & CEO



Leif Tang
Co-Founder



Maxwell Hu
COO



Cheng Wang
THz Partner



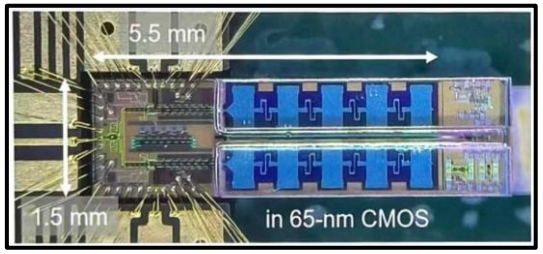
Xin Wang
Telecom Expert

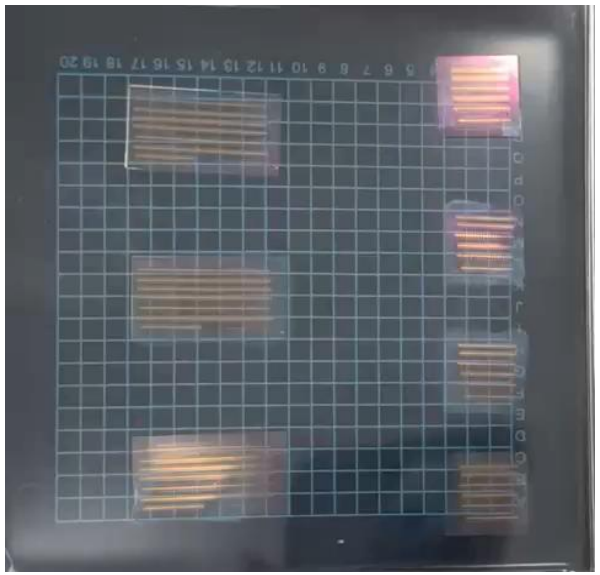


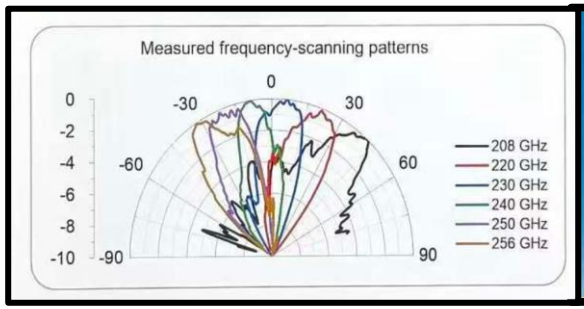
Tom F. Lue, MD
Sr. Medical Advisor

Co-Development THz Transceiver with THz Laboratory









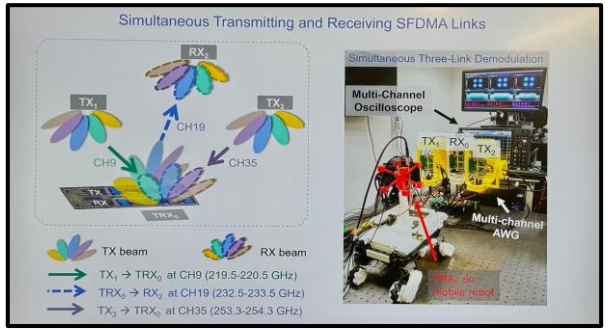




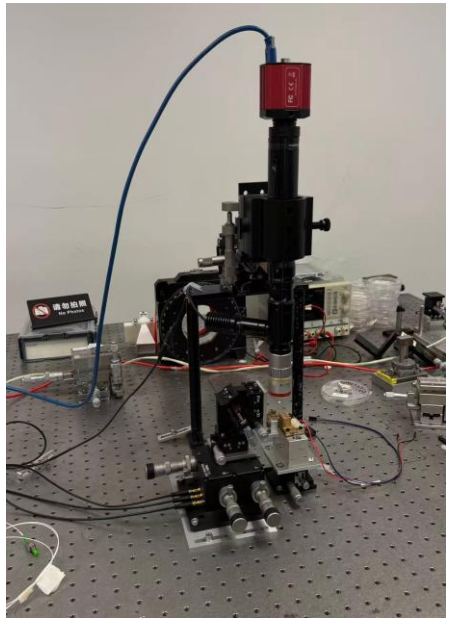






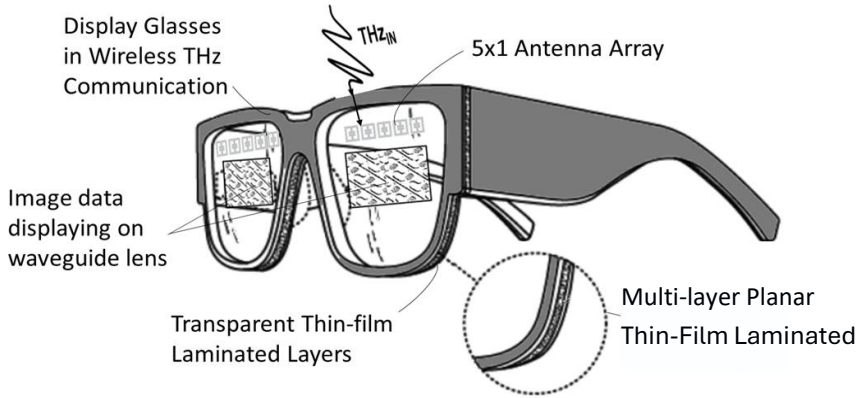






AR 眼镜耀中天，
太赫兹波系前沿，
许我耀眼凭无线，
感通天地也瞬间。

Thank You!



Groundbreaking Wireless Terahertz Transceiver Technology that will Redefines the Future of Communication

MAS capital

In Partnership with MAS Capital