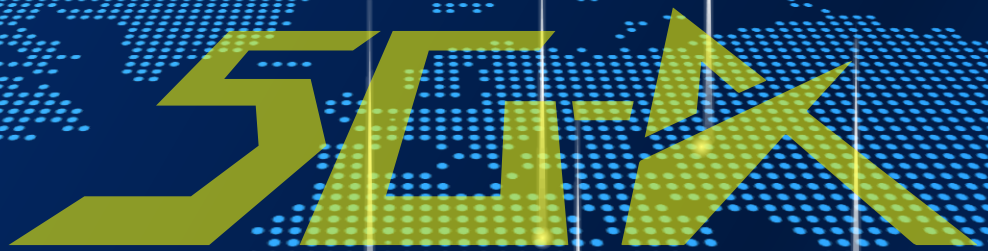
2026

Mobileheroes

Antenna Systems Design Competition For 5G/5G-A Communication

Competition Guidelines 2026.05.04



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工業技術研究院 Industrial Technology Research Institute

SIMUTECH 士盟科技

Organizer : 經濟部產業發展署 Industrial Development Administration Ministry of Economic Affairs

Co-organizer : NSYSU ANTENNA LAB

Implementer : IDA 網通產業發展推動辦公室 Communications Industry Development Project Office

By sponsorship tier and stroke count.

2026

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2026 Antenna Competition

Competition Theme

Now in its 13th year, the Antenna System Design Competition has remained at the forefront of communication technology. From 3G, 4G, and 5G to the latest 5G-A, we continue to lead antenna innovation and drive the future of Taiwan's communication industry.

2 Track

Track A【5G/5G-A Communication Application】

This track **focuses on next-generation antenna innovations, including 5G-A/6G expansion bands (e.g., 6~8 GHz), Non-Terrestrial Networks (NTN), and MIMO technologies for low/mid/high-frequency bands to enhance transmission rates and system integration.** Participants will have the opportunity to compete for high-value prizes and connect with leading enterprises through talent matchmaking for exclusive internship and full-time career opportunities.

Track B【Deepened Collaboration】 (Registration Closed)

This track focuses on antenna system development tailored to industry trends and wireless system integration for end-product applications. Participants tackle **challenges issued by enterprises or self-defined topics**, **fostering synergy between academia and startups.** Although registration is closed, selected teams are currently engaged in a 6-month industry-academic exchange with major ICT firms, competing for the Deepened Collaboration Award and the Co-Creation Award.

Competition Architecture

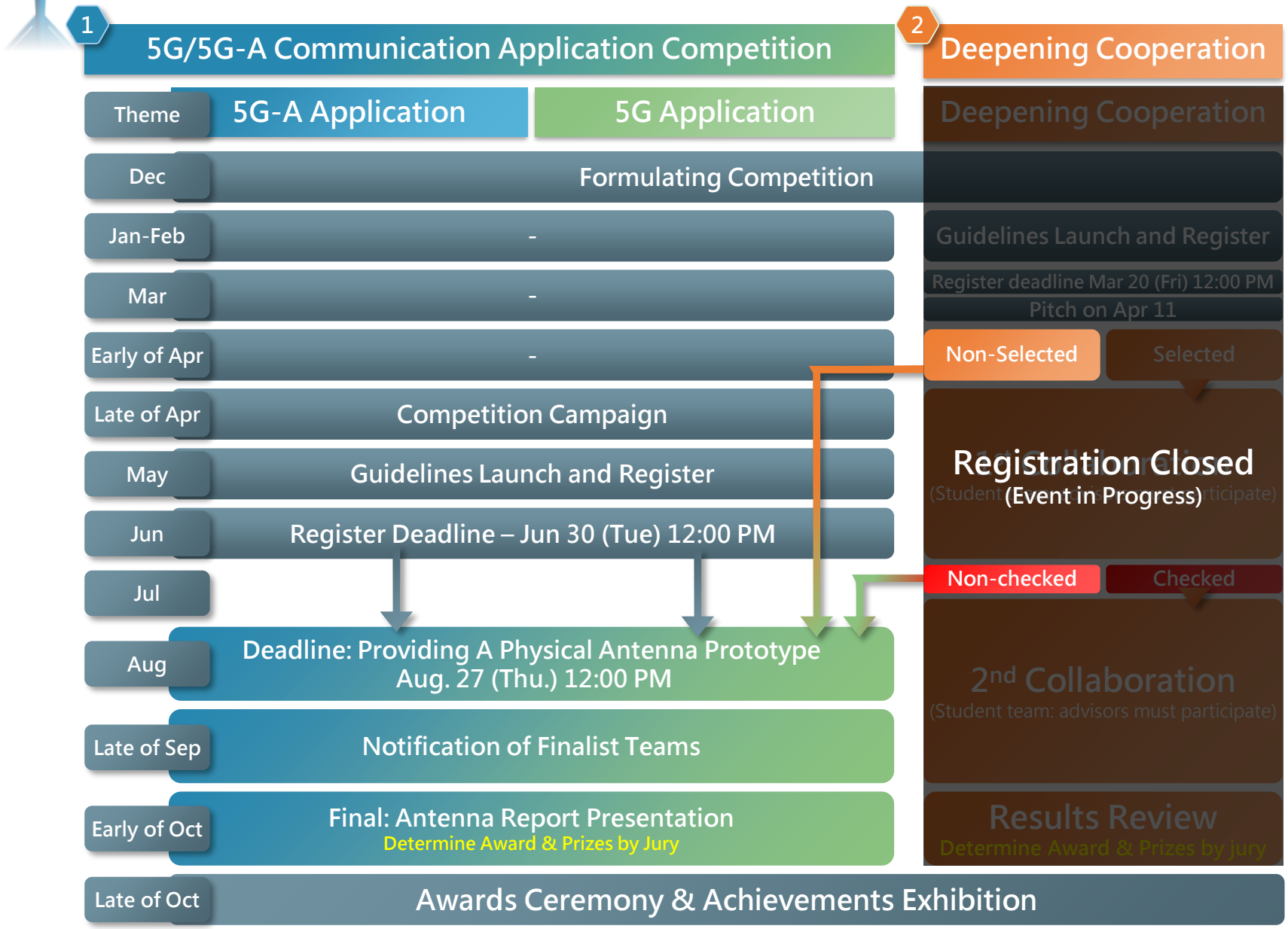
Antenna Systems Design Competition

Call for Entries

Name	① 5G/5G-A Communication Application Competition		② Deepening Cooperation
Theme	5G-A Application Competition	5G Application Competition	Deepening Cooperation
Axis	1.Next-generation 5G-A/6G Antenna challenge. 2.Integration of Non-Terrestrial Network and terrestrial network antenna technologies.	1.Industry trends. 2.Communication system integration.	1.Company and team one by one does technical exchange for 6 months.
category			1.Companies specifications challenge. (please refer to page 11) 2.Custom categories.
Call for submissions	• Physical antenna prototype is required, the "Smart AI Collaborating" category is except. • (Bonus) 5G-A/6G extended frequency bands (e.g., 6~8 GHz) challenges. • (Bonus) NTN (Non-Terrestrial Network) antenna technology. • (Bonus) Improving system throughput low/mid/high-frequency MIMO antenna technologies.	• To Integrate of 4G/5G antennas frequency bands. • (Bonus) Providing physical antenna prototype	Registration Closed (Event in Progress) • Proof-of-concept research and development for technologies with industrial potential. • Products or applications tailored to specific situation meets needs. • Optimization of antenna systems for existing device or fabricated antenna.
Eligibility	Undergraduate Students 1~2 members (Thesis advisor is not included)		Undergraduate Students 3~4 members (Thesis advisor is included) Startup Company /Social People 2~4 members
Registration	May 4 (Mon) – Jun 30 (Tue) 12:00 PM		Late Jan – Mar 20 (Fri) 12:00 PM
Frequency	Operating frequency as long as your antenna application scenario.		

※ Undergraduate Students are pursuing Graduate/ Master's/ Doctor/ International degrees.
※ The Organizers/ Implementer reserves the right of final decision of the competition.

Competition Procedure



※ The Organizers/ Implementer reserves the right of final decision of the competition.

Awards and Prizes

Total prizes up to NT$1,000,000

5G/5G-A Communication Application Competition

Superb Award
Trophy & Maximum NT$300,000

Outstanding Award
Trophy & NT$150,000

Wonderful Award
Trophy & NT$100,000

Company Special Award
Communication Application Award
Jury Special Award
Certificate of merit & NT$60,000

✓**Finalist Teams** NT$10,000/per team

Deepening Cooperation

Deepening Cooperation Award
Trophy & Maximum NT$300,000

Collaborate Award
Trophy & NT$100,000

✓**Checked team by company** NT$30,000/per team
✓**The** winning Deepening Cooperation award **team includes foreign students**. Additional maximum prizes NT$60,000/per team.

※「5G/5G-ACommunication Application Competition」detail matter:
①The jury panel will adjust the awards and the number of finalist teams according to the level of the physical antenna prototype.
②The Superb, Outstanding and Wonderful Award must has physical antenna prototype.
③The "Smart AI Collaborating" category can compete Superb, Outstanding and Wonderful Award without physical antenna prototype.

※「Deepening Cooperation」detail matter:
①Eligibility for awards and subsidies will be evaluated by the judging panel based on co-creation outcomes and subsequent collaborative developments, such as technology transfer, continued technology development, talent recruitment, provision of laboratory resources, and internship or industry–academia collaboration programs.
②Including international students are required to participate in a six-month co-creation program. If the team passes the outcome evaluation by the judging panel in mid-October and receives an award, each team may be granted additional funding of up to NT$60,000.

※ The Organizers/ Implementer reserves the right of final decision of the competition.

Competition Resource-Measurement

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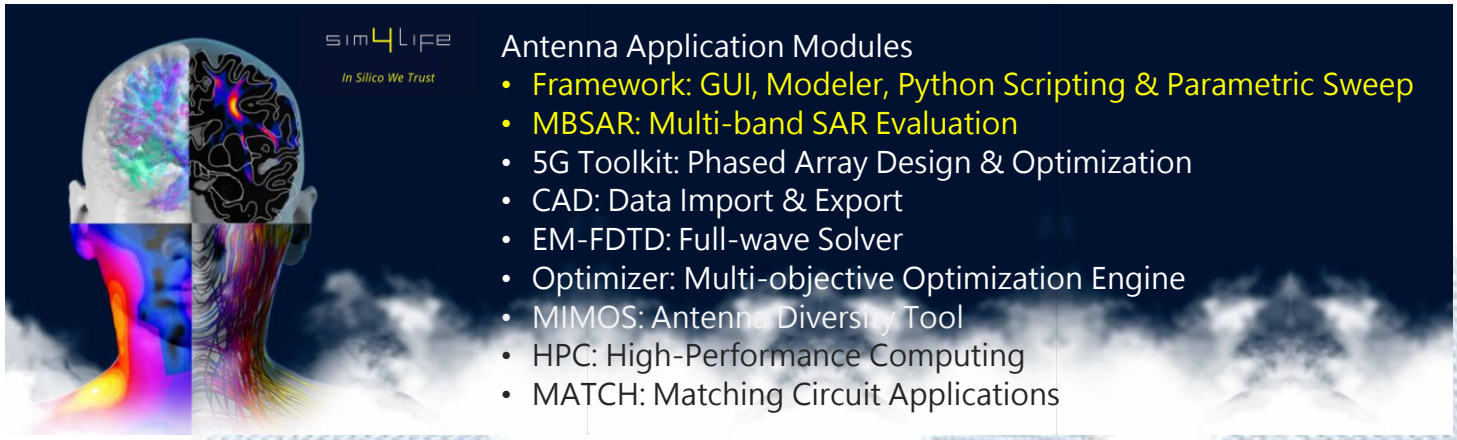
DAK-TL Material Characteristic Measurement

(Pre-booking required; on-site measurement provided)

The DAK Dielectric Assessment Kit is designed for precise, non-destructive measurement of the real and imaginary parts of relative permittivity (ε ' and ε ") for liquids, solids, and semi-solids across a wide frequency range. It is widely utilized in communication technology, material science, bio-electromagnetics, and biomedical research, as well as the automotive, electronics, and food industries.

Sim4Life (5G/5G-A Communication Only)



- Eligibility: For registered teams only. Parameters must be self-verified.
- Professional Conduct: Please value these laboratory resources. No-shows are strictly prohibited.
- Application: Register via the signup link and contact the organizers:07-9700910 Ms. Lin ext. 67/ Mr. Chen ext. 34)

Competition Resource-Measurement

DAK-R - Low-loss material dielectric measurement system

(Appointment required; available starting 2026/Q2)

auden
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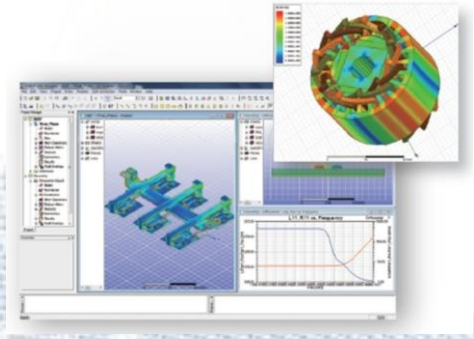
- DAK-R: 10, 17, 26, 35, 45 GHz
- Standards: Compliant with IPC-TM-650 2.5.5.13

Key Features

① Advanced Cavity Design: Suppresses unwanted resonance; non-destructive to materials.
② Vertical Configuration: Innovative design for easy sample handling during measurement.
③ Q > 25,000, εr < 100, tan δ < 0.01
④ Precision: εr：±1%、tan δ：0.0001
⑤ Multi-Frequency: Single cavity covers 5 frequency points (10, 17, 26, 35, 45 GHz)

Ansys HFSS + optiSLang (5G/5G-A Communication Only)

CYBERNET 思渤科技
CYBERNET SYSTEMS TAIWAN



Ansys HFSS: High-Frequency EM

- Diverse Solvers: Multi-solver support & sensitivity analysis.
- Hybrid Computing: Multi-algorithm hybrid simulation.
- HF & Radiation: Advanced modeling for radiation and HF.
- Co-Simulation: Bi-directional circuit/system coupling.
- More Info: https://reurl.cc/qVzGdR

Ansys optiSLang: Optimization Integration PlatformAI Automation

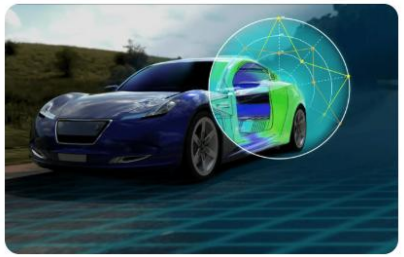
- Automates search workflows with interactive visualization and AI.
- Analysis: Design of Experiments (DoE) and Sensitivity
- Analysis.Optimization: Robust optimization and Uncertainty Quantification.
- More Info: https://reurl.cc/269gW9

Workshops: Kaohsiung (Apr. 18) and Taipei (May 26) to provide detailed operational guidance.
Software Licensing: Short-term licenses only (2-week installation lead time). Limit one application per laboratory.

Competition Resource-Measurement

CST Studio Suite (5G/5G-A Communication Only)

Antenna Application Modules(Multi-Solver & Full-Band Support)



- Integrated Framework: GUI, Modeling, Solving, & Visualization.
- Antenna Magus: Design wizard with 350+ antenna models.
- Solver Tech: Frequency/Time Domain, MoM, TLM, & Hybrid Solvers.
- Wideband Design: Multi-band simulation & 3D pattern tuning.
- Analysis: Gain, Axial Ratio, Efficiency, & S-parameters.
- Array Design: Beamforming, Phase Control, & Mutual Coupling.
- System Integration: PCB/CAD import for environmental impact.
- SAR Analysis: Human body models & regulatory compliance.

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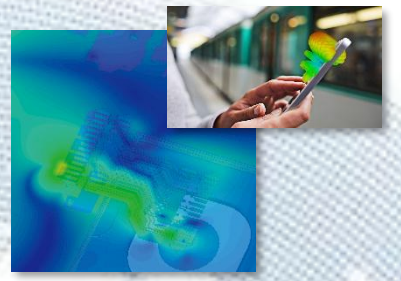
Intelligent Automated Design

- Python Control: Scripting for automated modeling, simulation, and post-processing.
- Optimization: Parametric sweep and heuristic algorithms (GA, PSO) via CST; extended DoE via SIMULIA/Isight.
- Topology Optimization: Generate novel antenna concepts using SIMULIA/Tosca.
- HPC Support: High-performance computing enabled.

More Info: https://simutech.com.tw/product/SIMULIA/CST

(Limit one license per lab; includes online video tutorials)



Application: Register via the signup link or contact Ms. Lin (ext. 67) /Mr. Chen (ext. 34) at 07-9700910.

Companies Suggestions and Challenges

No.	Theme	Content	Companies
Suggestion 1	5G-A Application Competition	Advanced Base Station Antenna	WNC
Suggestion 2	5G-A Application Competition	A Compact 4-Element Array Antenna System for Wi-Fi 7 UAV Applications	WNC
Suggestion 3	5G-A Application Competition	5G/6G terminal antenna system design	MEDIATEK
Suggestion 4	5G-A Application Competition	5G/5G-A/6G antenna system design for laptops/tablets	AUDEN
Suggestion 5	5G-A Application Competition	Full-size functional antenna design (for laptops)	INVENTEC
Suggestion 6	5G-A Application Competition	Integration of terminal devices with 6G technology applications	AWAN
Suggestion 7	5G-A Application Competition	5G-A/6G terminal handheld devices (Slim Industrial Phone)	WISTRON

5G/5G-A Application Competition: May 4 (Thu) – Jun 30 (Tue), 12:00 PM

Challenge 1	Deepening Cooperation	5G UAV antenna	WNC
Challenge 2	Deepening Cooperation	AI Driven Synthesis of Arbitrary Antenna Radiation Patterns	WNC
Challenge 3	Deepening Cooperation	No topic limitation; participating teams are encouraged to propose ideas toward 6G/NTN	MEDIATEK
Challenge 4	Deepening Cooperation	5G/5G-A mobile phone antenna system design	AUDEN
Challenge 5	Deepening Cooperation	Suppress system noise and optimize antenna architecture	INVENTEC
Challenge 6	Deepening Cooperation	Antenna design and antenna characteristic optimization technology in metallic environments	AWAN
Challenge 7	Deepening Cooperation	Wi-Fi 7 cavity antenna design integrated with the speaker cavity for full-metal CD parts in laptops	QUANTA
Challenge 8	Deepening Cooperation	Antenna design for a low-earth-orbit satellite ground receiving station	WISTRON

Registration closed (Event in progress).

Review corporate challenges; submit entries in May/June.

Deepening Cooperation: Late Jan – Mar 20 (Fri), 12:00 PM

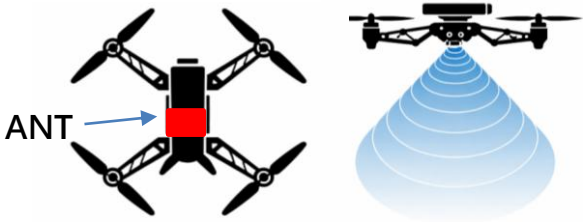
By sponsorship tier and stroke count.

Companies Suggestions (For 5G-A Application Competition)

Suggestion 1	Advanced Base Station Antenna
Design Recommendations	With the evolution of 6G and 5G-A, base station antennas face challenges in capacity, spectral efficiency, and deployment flexibility. Proposals should focus on: Advanced Architectures: Massive MIMO arrays, beam coverage, and interference suppression. Private Network Scenarios: Performance-driven, deployable solutions for factories, campuses, and warehouses. AI Integration: Utilizing AI for Massive MIMO beamforming optimization, enhancing beam selection efficiency, tracking, and overall system throughput.
other	Explain your design principles and optimization methods, supported by simulation or measurement data (e.g., beam coverage, gain, isolation, or throughput). Use commercial antennas or public specs as a benchmark to highlight your project's innovation and competitive advantages.

WNC
啓碁科技股份有限公司

Companies Suggestions (For 5G-A Application Competition)

Suggestion 2	A Compact 4-Element Array Antenna System for Wi-Fi 7 UAV Applications
Design Recommendations	Wi-Fi 7 drone communication applications. ANT area : 100 × 100 mm WNC 啓碁科技股份有限公司 • Antenna Integration: 4-element array within limited dimensions. • Performance: Maximize gain and isolation under space constraints. • Practicality: Account for drone body effects and array feasibility. • Goal: Ensure the design has real-world potential for drone communication systems.
other	• Height: Must be a key parameter; evaluate its impact on efficiency, forward gain, and isolation.  • Placement & Pattern: Refer to the diagram for antenna positioning and radiation orientation. • Technical Integration: Must demonstrate advanced techniques such as Phase Shifter Design、Pin diode、Antenna Array.

Companies Suggestions (For 5G-A Application Competition)

Suggestion 3	5G/6G terminal antenna system design
Design Recommendations	Define the proposed project's Communication System (e.g., Cellular, Connectivity, Satellite), and Frequency Bands (e.g., Mobile Phone · CPE), Proposals should introduce an innovative antenna system design for the specified terminal. Reference Bands: ■ Cellular : • 3GPP n104 (U6G) : 6,425~7,125 MHz • WRC-23 Approved Research Bands: 7~8.4 GHz ■ Satellite : • 3GPP n508/n509 (Ku) : ➢ DL : 10.7~12.75 GHz ➢ UL : 13.75~14.5 GHz • 3GPP n510/n511/n512 (Ka) : ➢ DL : 17.3~20.2 GHz ➢ UL : 27.5~30.0 GHz
other	Teams are encouraged to maintain compatibility with 4G/5G while focusing on 6G innovation. Shift from individual antenna design to system/module integration, focusing on enhancing user experience. Your goal is to solve current pain points or pioneer breakthrough applications that deliver tangible value to the end user.

Companies Suggestions (For 5G-A Application Competition)

Suggestion 4	5G/5G-A/6G antenna system design for laptops/tablets
Design Recommendations	1. The project must feature a multi-antenna, multi-band system including at least 2 WWAN and 2 MIMO antennas. The design must simultaneously cover 4G/5G/5G-A/6G operations, specifically including the frequency bands listed below : 617~960 MHz/1,427~1,510 MHz/1,695~2,690 MHz/ 3,300~5,925 MHz/6,000~8,000 MHz. 2. Recommendation: Include 2x2 or 4x4 Wi-Fi antennas to enhance project completeness. Required frequency bands must include: 2.4~2.5 G/5.15~7.125 GHz. 3. Recommendation: Implement impedance tuning or switching components for WWAN low-band frequency switching. This should cover the 617~960 MHz range while achieving antenna miniaturization. 4. Integration: Antennas can be integrated with structural components or hardware, such as camera modules, speakers, metal frames, or screen hinges. 5. Designs must meet FCC/CE SAR standards and performance goals while encouraging non-conventional approaches—such as integrated tuning, metal-body integration, cavity techniques, or innovative materials—to achieve high-performance, miniaturized antenna modules.
other	Continued on next page.

auden 耀登集團 Auden Techno Corp

Companies Suggestions (For 5G-A Application Competition)

Suggestion 4	5G/5G-A/6G antenna system design for laptops/tablets
other	auden 耀登集團 Auden Techno Corp 1. Teams should benchmark against commercial laptop/tablet designs to propose breakthrough solutions. 2. Proposals must include comparative data to prove superiority over standard designs. 3. The system requires at least two full-band WWAN (Main/Aux) antennas and two MIMO antennas (excluding 617~960 MHz).

Companies Suggestions (For 5G-A Application Competition)

Suggestion 5	Full-size functional antenna design (for laptops)
Design Recommendations	ANT1 ： WLAN1+WWAN1+WWAN4 (90 x 7.5 x 1mm) ANT2 ： WLAN2+WWAN2+WWAN3 (85 x 7.5 x 1mm) Chassis: Metal case with window cutouts (100x7.5mm & 95x7.5mm) Cable: 500mm, O.D. 1.13 Low Loss Priority: Focus on low-cost design optimization.
other	WLAN1/WLAN2： 2,400~2,500 MHz，5,150~7,125 MHz WWAN1 ： 617~960 MHz，1,710~8,400 MHz WWAN2 ： 617~960 MHz，1,710~8,400 MHz with GNSS L1 band WWAN3 ： 1,805~5,500 MHz WWAN4 ： 1,710~5,500 MHz

英 業 達
Inventec

Companies Suggestions (For 5G-A Application Competition)

Suggestion 6	Integration of terminal devices with 6G technology applications
Design Recommendations	Benchmarking against commercial products, teams are encouraged to explore 6G integration and future use cases. Suggested directions include, but are not limited to: • (6~8 GHz) core band antenna challenges. • AI-powered beamforming algorithms. • NTN/TN network integration. • High-order MIMO for enhanced throughput. • Future 6G application scenarios.
other	• Market Realism: Benchmark against commercial specs; higher integration and feasibility will earn bonus points. • 6G Use-Cases: Define specific 6G scenarios and map out the hardware implementation logic. • Solving Future Pain Points: Address the "missing links" in current designs when integrating 6G, encouraging hypothetical yet innovative problem-solving.

Companies Suggestions (For 5G-A Application Competition)

Suggestion 7	5G-A/6G terminal handheld devices (Slim Industrial Phone)
Design Recommendations	■ Detailed Operating Band Requirements: 1. Wireless WAN : ➢ LTE/NR LB : 617~960 MHz (2x2 MIMO) ➢ LTE/NR MB/HB: 1,710~2,690 MHz (4x4 MIMO) ➢ NR UHB: 3,300~4,200 MHz，4,400~5,000 MHz (4x4 MIMO) ➢ NR NTN: 1,525~1,660.5 MHz，1,980~2,200 MHz (2x2 MIMO) ➢ 6G-FR3: 7,125~8,400 MHz(8x8 MIMO)(4T/8R) 2. RFID : ➢ UHF RFID: 865~928 MHz(Dual Polarization-V/H) (EU/US) 3. Wireless LAN : ➢ Wi-Fi : 2.4G/5G/6G (2x2 MIMO) 4. GNSS : ➢ GPS : L1/L2/L5 5. UWB : UWB : 6,489.6~7,987.2 MHz (Channel-5/9) (1T/3R)
other	Continued on next page.

Companies Suggestions (For 5G-A Application Competition)

Suggestion 7	5G-A/6G terminal handheld devices (Slim Industrial Phone)
other	■ Product Dimensions : 178.5mm(L) x 77.9mm(W) x 15.2mm(H) ■ Antenna Carrier Dimensions : 1. Top : 55mm(L) x 70mm(W) x 12mm(H) 2. Bottom : 88mm(L) x 70mm(W) x 8mm(H) ■ Target: Total antenna count under 9 (WWAN/WLAN/RFID), covers the above operating frequency bands. 1. 5G-NR sub-6G/RFID : 4~6 Antennas 2. Wireless LAN/GNSS : 2 Antennas 3. 6G-FR3 : 1 Antenna or 4~8 Antennas ■ For LTE/NR LB and RFID, aperture tuners/switches can be utilized to increase bandwidth. ■ Consider NFC & UWB antenna placement. ■ NFC & UWB antenna designs are included within the Top Carrier area. Continued on next page.

Companies Suggestions (For 5G-A Application Competition)

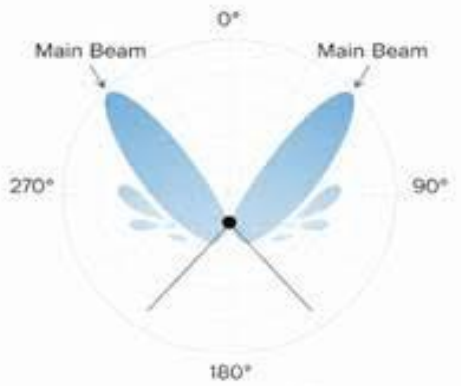
Suggestion 7	5G-A/6G terminal handheld devices (Slim Industrial Phone)
other	wistron ■ WAN NR sub-6G & NR NTN/LAN/GNSS Antennas:Return Loss < -10dB, Efficiency > -4dB, Isolation > 20dB ■ WAN NR sub-6G Antenna Envelope Correlation Coefficient (ECC) < 0.2 ■ 6G-FR3 Antennas: Return Loss < -6dB, Efficiency > -4dB, Isolation (S21) < -25dB ■ 6G-FR3 Antenna Envelope Correlation Coefficient (ECC) < 0.1 ■ RFID Antenna: Return Loss < -10dB, Efficiency > -3dB, Isolation > 20dB ■ RFID 3D radiation pattern: focus on Theta 0°~ 90° and Phi 210°~330°, with radiation oriented toward the -X axis. (Display panel is +X axis_Phi 90°; back cover is -X axis_Phi 270°) ■ UWB Antenna: Return Loss < -7dB, Return Loss Bandwidth > 500 MHz, Gain > 0dBi, Isolation > 20dB, HPBW 90°, Cross-Polarization Ratio > 20dB

Companies Suggestions (For 5G-A Application Competition)

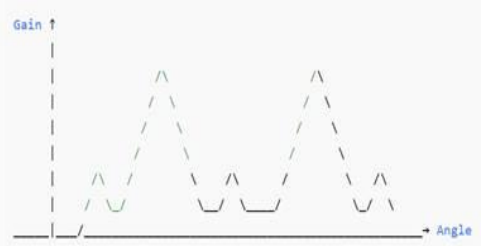
Challenge 1	5G UAV antenna
Project Description	As drone applications move toward 5G communication and low-latency control, UAVs demand higher integration and stricter size/weight constraints for antenna systems. This topic invites participating teams to propose innovative design solutions for a highly integrated 4x4 MIMO antenna system tailored for UAVs. The design should cover full sub-6G band integration while balancing antenna performance, isolation, and mechanical installation constraints. We expect entries to demonstrate practical systemic integration capabilities and solve real-world UAV communication challenges.
other	None

WNC 啓碁科技股份有限公司

Companies Suggestions (For 5G-A Application Competition)

Challenge 2	AI Driven Synthesis of Arbitrary Antenna Radiation Patterns
Project Description	WNC 啓碁科技股份有限公司 As the number of antennas in wireless products grows, Beamforming has become essential for enhancing coverage beyond simply increasing antenna counts. By adjusting the input phase of each element, radiation patterns can be steered to concentrate energy in specific directions. This challenge focuses on using an Antenna Array to create controllable beams directed at target locations. Participants are encouraged to integrate AI algorithms to automate and optimize phase configurations for target coverage. Specifications: Antenna Type: Dipole Quantity: 32 elements Frequency: Single band (2.4, 5, or 6 GHz Wi-Fi 7) Demonstration: 2D radiation pattern analysis 
other	Continued on next page.

Companies Suggestions (For 5G-A Application Competition)

Challenge 2	AI Driven Synthesis of Arbitrary Antenna Radiation Patterns
other	WNC 啓碁科技股份有限公司 Project Objectives • **AI Phase Optimization:** Solve for optimal phase inputs to match any 2D radiation pattern. • **Similarity Scoring:** AI-based evaluation with a target score of 90+. • **Design Standard:** 32-element array as the primary benchmark. • **Validation:** Pattern fidelity is the key KPI; simulation-to-measurement comparison is a plus. 

Challenge 3	No topic limitation; participating teams are encouraged to propose ideas toward 6G/NTN
Project Description	Reference can be made to page 14. MEDIATEK
other	Reference can be made to page 14.

Companies Suggestions (For 5G-A Application Competition)

Challenge 4	5G/5G-A mobile phone antenna system design
Project Description	1. Modern mobile antennas support multi-band 4G/5G/Wi-Fi/GNSS (617~960/GNSS: L1,L2,L5/1,710~2,200/2,300~2,700/3,300~5,000/5,150~7,125 MHz). While these standard designs are not mandatory this year, participants must address the following challenges based on this foundation: 2. Challenge 1: UHF RFID Directional Antenna Frequency : US (902~928 MHz) / EU (865~867 MHz). Requirement: Provide vertical and horizontal polarization patterns. Design: Integrated with 4G/5G antennas or standalone. 3. Challenge 2: NTN Satellite-to-Phone Antenna Frequency : L/S band. Requirement: Provide upper-hemisphere radiation patterns. Design: Integrated with 4G/5G antennas or standalone.
other	Teams are not required to provide a complete mobile antenna system; please focus solely on solutions for the specific scenarios. You do not need to address both challenges simultaneously. • Active Tuning: The use of antenna tuners is permitted. • Human Factors: Designs must account for the impact of hand-holding on antenna performance and SAR (Specific Absorption Rate).

auden 耀登集團 Auden Techno Corp

Companies Suggestions (For 5G-A Application Competition)

Challenge 5	Suppress system noise and optimize antenna architecture
Project Description	Propose an antenna architecture that effectively suppresses system noise and enhances transmission quality. 英業達 Inventec
other	Focus on Wi-Fi 7 bands and use simulation software for preliminary verification. Using 2.45 GHz or 5.6 GHz as example system noise frequencies (with the noise source within 5 cm of the antenna), suppress the noise level received by the antenna system. Priority should be given to low-cost designs.

Challenge 6	Antenna design and antenna characteristic optimization technology in metallic environments
Project Description	Design an antenna for a laptop or tablet within a hexahedral space where five sides must be metal. Consider a Cavity Antenna or other designs, ensuring the overall antenna size and metal environment are as compact as possible to meet product application requirements.
other	As consumer product designs trend toward all-metal structures, a conflict arises between antenna requirements (which need non-metal environments) and structural needs. A balance must be struck to meet minimum antenna performance while minimizing size, as smaller antennas enable thinner, lighter, and more compact product designs.

Companies Suggestions (For 5G-A Application Competition)

Challenge 7	Wi-Fi 7 cavity antenna design integrated with the speaker cavity for full-metal CD parts in laptops
Project Description	Antenna Design Requirements: Wi-Fi/BT=> support Wi-Fi 7 & BLE (2.4~2.5 GHz，5.15~5.85 GHz，6~7.125 GHz) Dimensional Requirements: The antenna is located within the all-metal base (C/D parts). It should utilize a cavity-backed design and may be integrated with the speaker cavity.
other	Antenna designs for all-metal base units (C/D parts) typically use slot configurations filled with plastic. Since speakers require specific ID designs for sound output and a minimum cavity volume, the antenna can be integrated with the speaker cavity using a resonant cavity design.

Challenge 8	Antenna design for a low-earth-orbit satellite ground receiving station
Project Description	The entry must include TX/RX antennas with the following specifications: • Operating Frequency: Ka-band (TX: 27.5~31 GHz, RX: 17.7~21.2 GHz) • Antenna Elements: 256 Elements • Polarization: RHCP / LHCP • Scan Angle: ±60° • Gain: 28 dBi • Sidelobe Level (SLL): < 15 dB • Cross-Pol Isolation: > 20 dB
other	1. The design must include a complete feed network. 2. It is recommended to design the array elements to be scalable (e.g., combining four 256-element antenna boards to form a 1,024-element large array).

Corporate Judge Departments

auden
耀登集團
Auden Techno Corp

Wireless Communication Div.

Provides antenna module design and tech integration for wireless products.

5G Expertise Handheld/Laptop/Wireless Terminals

MEDIATEK

A leading global fabless semiconductor company at the forefront of mobile, smart home, wireless connectivity, and IoT markets.

5G Expertise Mobile chips and related solutions.

WNC
啓碁科技股份有限公司

Automotive · Module and Antenna Group

Provides integrated active/passive antenna solutions for laptops, networking, automotive, IIoT, and SATCOM.

5G Expertise Networking, Automotive, IIoT, and Laptop Antennas

wistron

Industrial & Automotive Group

R&D and manufacturing for industrial PCs, automotive electronics, and smart industrial/commercial products.

5G Expertise Industrial Smart Devices

廣達電腦
Quanta Computer

R&D Communication Design Dept.

Antenna system design, noise suppression, and wireless performance verification.

5G Expertise Laptops / Tablets / IoT

By sponsorship tier and stroke count.

Corporate Judge Departments

Antenna design, diverse product solutions, and application support.

5G Expertise Laptops / Tablets / Networking

PC Group R&D Center

Design and manufacturing of commercial/consumer laptops and IoT wireless devices.

5G Expertise Laptops / Tablets / IoT

Ansys Business Development Dept.

Dedicated to Ansys simulation, covering structural, thermal, fluids, electromagnetics, and circuit system analysis.

5G Expertise EM & Circuit Simulation

SIMULIA Reseller (Simutech) Expert in CAE simulation, providing high-efficiency analysis for structural, thermal, fluid, and multiphysics systems.

5G Expertise EM / Circuit / High-Frequency Antenna Simulation

By sponsorship tier and stroke count.

2026

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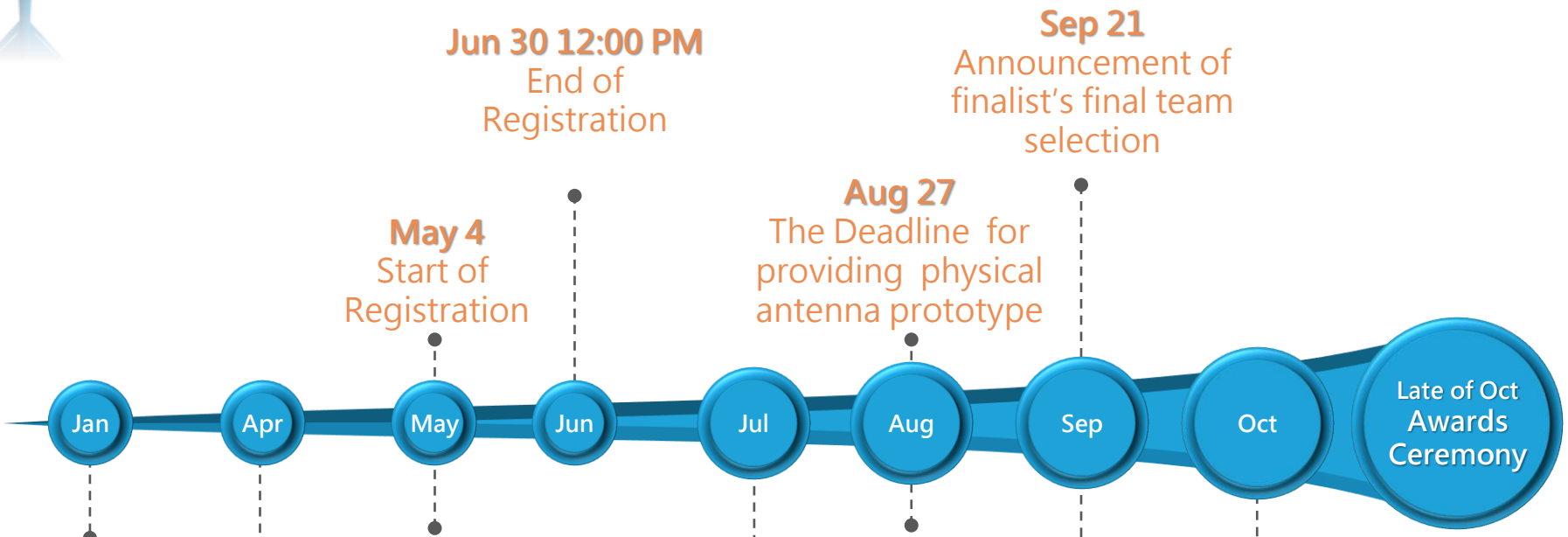
5G-A Application Competition Description

5G-A Application Competition Schedule



Jan
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Government-industry-academia-institute Symposium
Technology Workshop

Late of Aug
Judges Consensus Meeting

Early of Jul
Companies Mentoring Event
(Depending on actual needs)

Early of Sep
Preliminary Proposal Review

Sep 19
Semi-finals Meeting

Oct 3
Finals Meeting

Implementation Measurement Camp
(Depending on actual needs)

Meddle of Apr
Emerging Tech Exchange
Trend Technology Workshop &
Companies Mentoring Event

※ The Organizers/ Implementer reserves the right of final decision of the competition.

5G-A Application Competition Description

Focusing on terminal antenna development for 5G-A and 6G spectrum expansion (e.g., 6~8 GHz), addressing NTN (Non-Terrestrial Network) technical challenges, and enhancing system throughput via low/mid/upper-mid band MIMO technologies.

Application Category:
Handheld device, Wearable, Laptop/Tablet, Precision positioning, Biosensor, AR/VR, LEO, V2X, IoT, Small Cell, System Testing, Smart AI Collaborating.

Application Scenarios:
Indoor, outdoor, smart light pole, car, satellite ground station, etc.

Application frequency Band:
Please choose the appropriate operating frequency band based on your specific antenna work scenario.

5G-A/6G Applications:
Please explain how the antenna design surpasses the 5G performance.

Technical highlights:
Highlights of the self-recommendation, such as beamforming technology, MIMO Antenna decoupling technology, the application of Handheld devices, direct-to-cell, V2X, etc.

Participating teams must explain according to the application category, application scenarios, application frequency band, 5G-A/6G application, technical highlights, etc., and consider the design principle, antenna structure, electrical characteristics, innovation, progress, practicability, commercialization, and other factors in the written report.

5G-A Application Competition Register for Dummies

Step 1 Participating team register by **June 30 (Tue) before 12:00 PM**, and submit the following documents.			
Eligibility	Undergraduate students 1~2 members (thesis advisor is not included) 1~2 thesis advisor (thesis advisor can cross different teams, but contestants are not allowed)		
Register Website	https://www.stipc.org/tw/actregister/126		
Application documents	A. Preliminary Proposal (Write in English, up to 20 pages, PDF file)	• Abstract: Include an antenna structure diagram or system design schematic. • Design Motivation: Describe the motivation behind the design, target users, and the selection of operating frequency bands. • Industrial Applicability: Explain the industrial applications and commercial potential of your antenna. • Simulation and Measurement Data: Provide reports and discussions on simulations and measurements (including S-parameters, antenna efficiency, etc.).For the system testing (design/measurement projects) category, the overall system's cost, including supporting instruments, and the plan for off-site display must be explained separately. • Simulation Software: Specify the name of the simulation software used.	• Structure and Principles: Describe the design's antenna structure and underlying principles. • Please explain how the antenna design surpasses the 5G performance. • (Smart AI Collaborating) Explain how to use commercial software or self-developed software to achieve antenna design or performance optimization. • Innovation and Practicality: Highlight the innovation, progress, and practicality of your ANTENNA WORK. • Literature and Patent Review: Include a review of related research papers and patents. • Conclusion.
	B. Participation Agreement	Attach both sides of your ID card or passport, and Enrollment Letter.	
	C. Matching Resume	Provide a resume for talent matching opportunities with participating companies.	
	D. Antenna Photos	Provide antenna photos of physical antenna prototype or simulated.	

Note 1: The same antenna design has participated in our previous competitions, it must be pointed out the different items and technology in the Preliminary Proposal of semi-finals.

Note 2: The register website couldn't upload any files, please email each application document to mills.chen@g-mail.nsysu.edu.tw on time.

5G-A Application Competition Register for Dummies

Step 2 Participating team renews and submits the following documents **before Aug 27 (Thu) 12:00 PM.**		
Application documents	A. Preliminary Proposal (Write in English, Maximum 20 pages, PDF file)	• This report can be updated before Aug 27 (Thu) 12:00 PM
	B. Send an physical antenna prototype (The postmark date will be regarded as the date of submission.)	• The physical antenna prototype must be able to be measured and verified, and it is recommended to use conventional connectors. • Judges of companies may send your physical antenna prototype to the testing laboratory for checking measurement data (including S-parameters, antenna efficiency, etc.) again if it is necessary. The measurement data results will be reviewed and discussed by all judges in the semi-final meeting. Note 1: If you choose the system testing (design/measurement projects) category, it is allowed to record a 5-minute video (mp4, under 100 MB) to demonstrate the system’ s Operation and results. Note 2: If you chose the smart AI collaborating category, sending an physical antenna prototype is not necessary.

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5G-A Application Competition Register for Dummies

Step 3 The listed teams of finals must submit the following documents by **Sept 30 (Wed) before 12:00 PM.**

Application documents	A. Finals Presentation	• **Abstract of Finals Presentation** A review of the key points from the finals presentation. • **Parametric Study and Optimization Process** Please explain how the relevant parameters of the work (such as antenna length and width) affect characteristics like resonance frequency, impedance matching, and bandwidth. Additionally, indicates how the optimal parameters for the antenna were determined during the design process. • **Process and Material Analysis Applicable to the Work Structure** Analyze the processes applicable for mass production of the work (e.g., FR4 printed circuit boards, ceramic materials, metal processing, etc.), and also propose solutions for potential issues (such as production yield and precision). • **Compatibility Explanation with Communication Devices** Explain the compatibility of the work with communication devices, including the casing and other components or circuits. • **How the Antenna Design Surpasses 5G Performance** Explain how to use commercial software or self-developed software to achieve antenna design or performance optimization. • **physical antenna prototype with Smart AI Collaboration** Clarify whether commercial software or self-developed software is used to achieve antenna design or performance optimization. • **Patentability Analysis (Novelty, Inventiveness, and Industrial Applicability)** Analyze the work and determine its patentability. Please attempt to outline the technical scope intended for protection when applying for a patent in the future. • **Relevant Literature and Patent Search Explanation** The team needs to confirm the references and technical sources cited, and specifically explain the advancements of the work compared to previous technologies. • **Conclusion**
	B. Reference Letter of Thesis advisor	• Within one page, explain the performance and division job of team members, as well as the recommended reasons for physical antenna prototype. • The organizing committee will provide a separate format.

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5G-A Application Competition Judging Method

【Jury Panel】

Invite professionals from industry and academia to form the Jury Panel. They will first conduct a Preliminary Proposal review based on the registration categories and the submitted Preliminary Proposal of Semi-finals. Each judge will provide a list of recommended participating teams. Subsequently, during the Semi-finals Meeting, they will discuss the nominations together and select outstanding teams to advance to the finals.

【Preliminary Proposal Review & Semi-finals】

Criteria	Description	Weight
Design Innovation	Antenna design effectiveness, system integration, and space utilization.	40%
Practical Functionality	Applicability in the industry or potential for commercialization	40%
Technical	Difficulty of the design and manufacturing process	20%

When registering, please conduct a self-assessment on design innovation and practical functionality, totaling 100%, limited to one A4 page

1. Design Innovation Percentage: _____%. Briefly explain the innovative design concept.
2. Practical Functionality Percentage: _____%. Briefly explain the degree of industrial applicability.

【Finals】A presentation to explain the concept of antenna work, and then engage in a Q&A session with the jury panel.

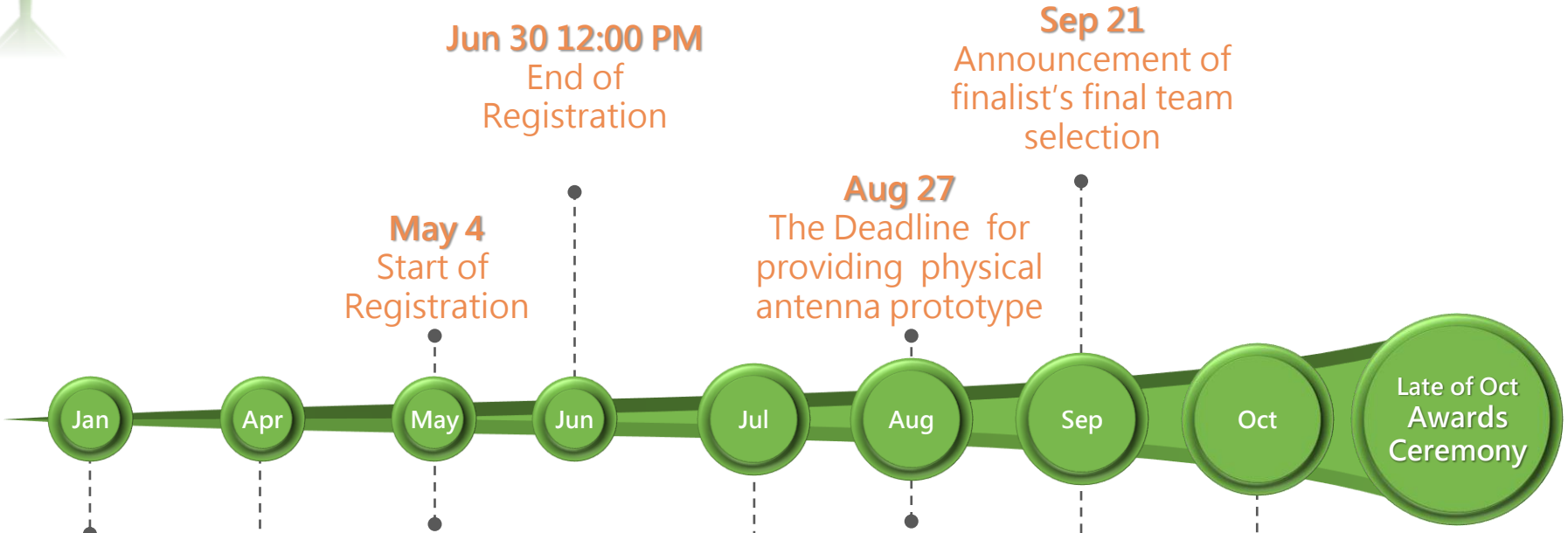
Description	Weight
• Overall Performance (Antenna design innovation, functional integration with communication devices, commercialization potential, patentability analysis)	80%
• Presentation Ability	20%

2026

Mobileheroes

5G Application Competition Description

5G Application Competition Schedule



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Detailed Rules

1. To ensure fair evaluation by the jury panel, **the summit info of the team's name, title of the antenna works, and other submitted materials, or any information that could identify the contestant's schools/departments must not include or imply**.
2. **The antenna works that have previously been submitted to other competitions or have won awards in other competitions may not be submitted to this Competition with identical or similar content.**
3. Antenna works **must disclose their intended future use or any prior submissions for purposes** such as graduation projects, journals, theses, or technical reports, and this must be indicated in the report.
4. Participating teams must submit simulation or measurement results. The jury panel may select key measurement data for verification by a measurement laboratory, comparing the original measurement data of the work with the laboratory' s data.
5. If the submitted work involves funding agencies or technical cooperation partners, detailed explanations of the assistance provided by these entities and their relevance to the submitted work must be provided.
6. Team works must be independently designed, conceptualized, and implemented, without infringing on the intellectual property rights of others, and must not be completed by others on behalf of the team.
7. If a winning work is found to infringe on intellectual property rights such as copyrights or patents, and there is concrete evidence, the organizer reserves the right to disqualify the team from participation or revoke their award. The team must return any awarded prize money, trophies, or prizes and bear all legal responsibilities.
8. Participating teams must properly safeguard any information they obtain or hold from relevant entities due to this Competition. Without written consent from the relevant stakeholders, such information must not be disclosed or transferred to any third party.
9. If a winning team' s work is commercialized, they must not use the fact that they won an award in the Antenna Competition as part of their promotion.
10. If participants intend to patent their work, they should first apply to the relevant authorities to protect the intellectual property rights of their work.
11. The intellectual property rights, such as patents and copyrights, generated from the submitted works do not belong to the Competition. The Competition may assist winning teams in participating in related promotional activities.
12. For outcomes generated through this Antenna Competition and collaboration with partner companies, licensing matters may be negotiated and agreed upon between the rights holder and the partner company based on mutual benefit principles and relevant legal regulations.
13. For Undergraduate Students in the event, the Competition will compile talent matching data to provide to sponsoring organizations. The sponsoring organizations will contact the participating teams to facilitate talent matching.
14. Teams that fail to submit materials on time in accordance with the registration rules may be disqualified from the event by the organizing committee.
15. In the event of natural disasters (e.g., typhoons, earthquakes, floods), whether the event proceeds as planned will follow announcements from the local county or city government regarding office closures. No separate notification will be provided, and the rescheduled date will be announced later.

Contact

National Sun Yat-sen University
Southern Taiwan Industry Promotion Center (STIPC)

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