

Auray Technology Corp.

www.auray.com.tw

Agenda

- 01 Company Introduction
- 02 OTIC Testing Capabilities
- 03 RIC Testing Capabilities
- 04 Security Testing Capabilities
- 05 Sustainable Environment Tech. Capabilities
- 06 Our Achievements

Company Introduction

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Auden Group



Company	Auden
Founded	1981
Headquarter	TW
IPO (TWSE)	2020.12 (3138)
Revenue (TWD)	1.7 billion (Est.2022)
Laboratory	3
Global Footprint	9
Employees	400+
Service	<ul style="list-style-type: none">• Antenna design & MFG• Measurement equipment• Testing & certification• Green consulting



Customer Portfolio

EMS partners



Data solution providers



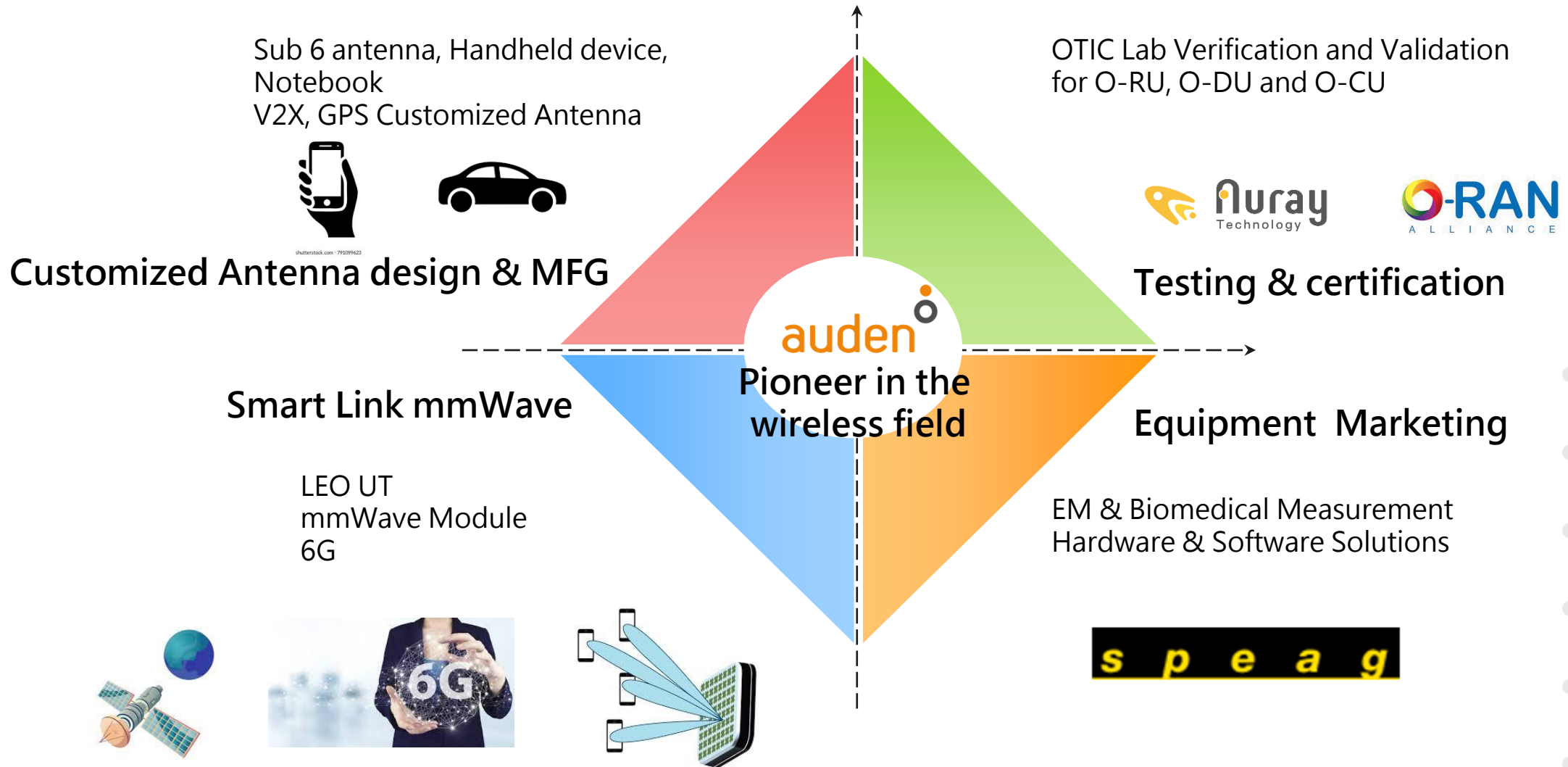
Govt. Institute



Consumer brands



Core Competence



Org.



Daniel Chang
Chairman & CEO

auden^o



Alan Tang

Wireless Comms. BU

- Sub 6 antenna
- Handheld device
- Notebook
- V2X
- GPS



Selena Hsu

Equipment Marketing BU

- Specific Absorption Rate (SAR)
- OTA measurement
- EM & Bio EM simulation
- Medical device testing
- Others



Sampson Duan

Smart Link BU & CMO

- O-RAN Radio Unit designed
- mmWave RF front-end antenna module
- LEO User terminal
- Up/Down Converter



Sam Wen

Smart Green Energy BU& CFO

- Advanced Research
- Carbon Footprint Verification & consulting



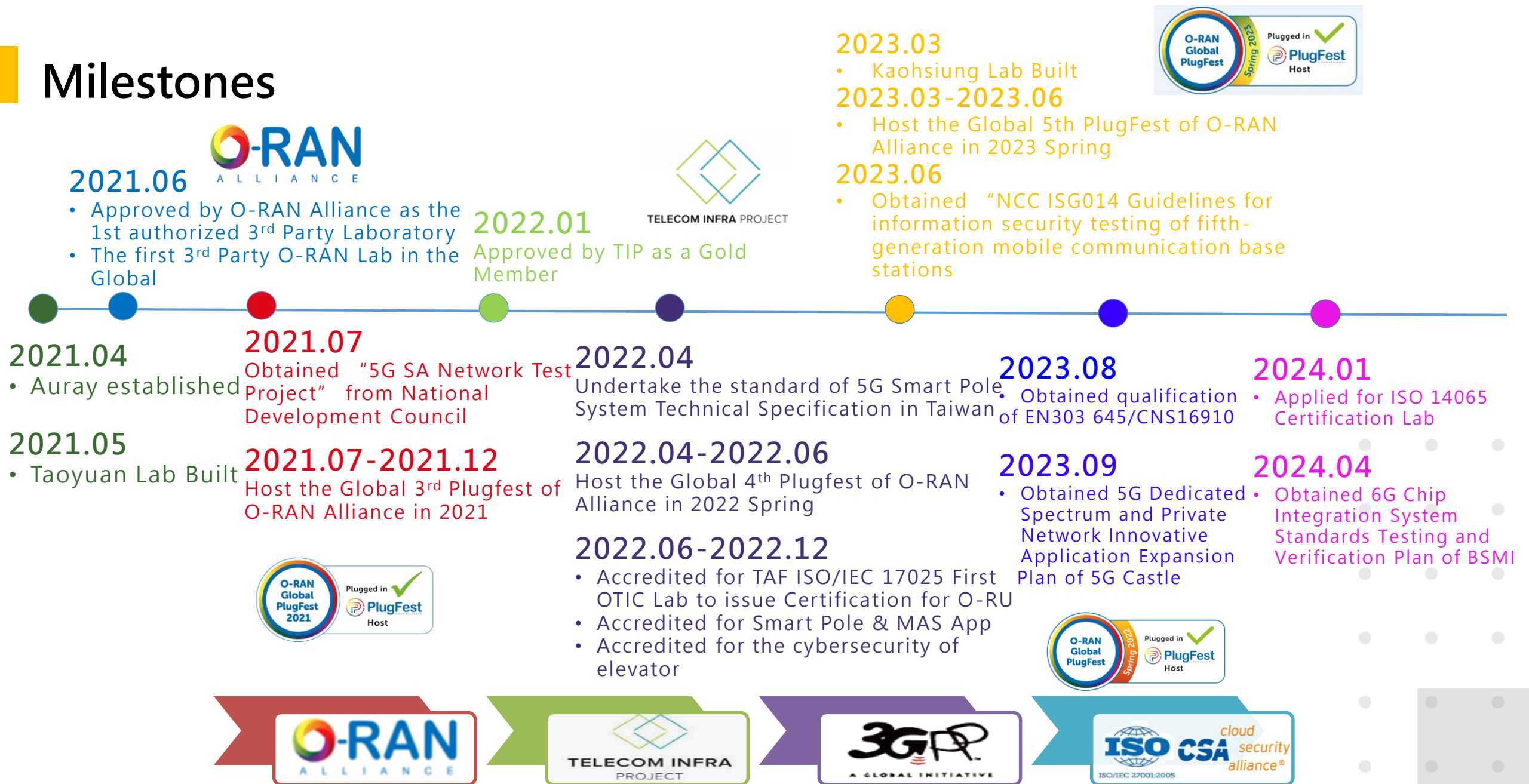
Daniel Chang

Auray Technology Corp.

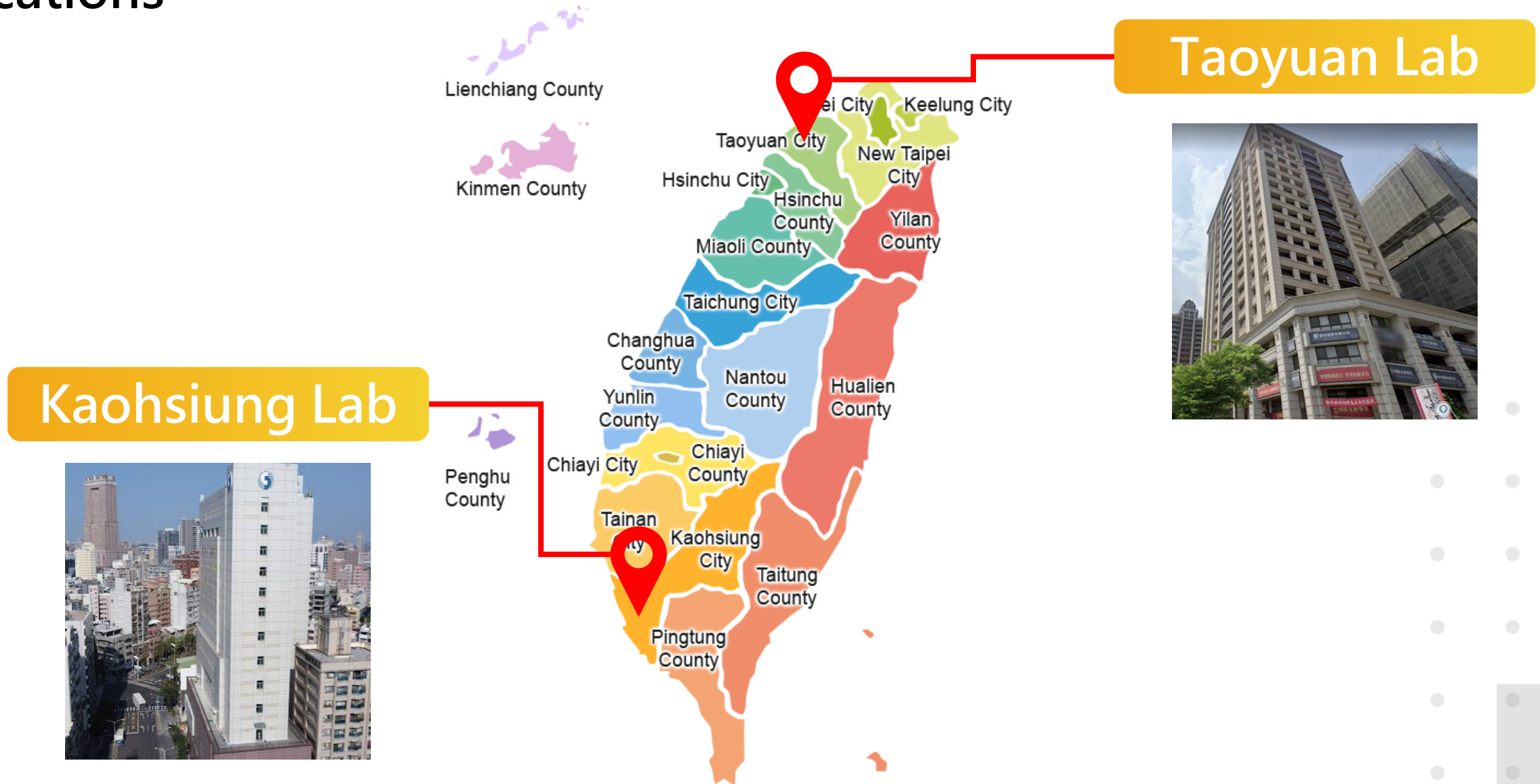
- Open Testing and Integration Centre (OTIC)
- ORAN and IOT security validation



Milestones



Locations



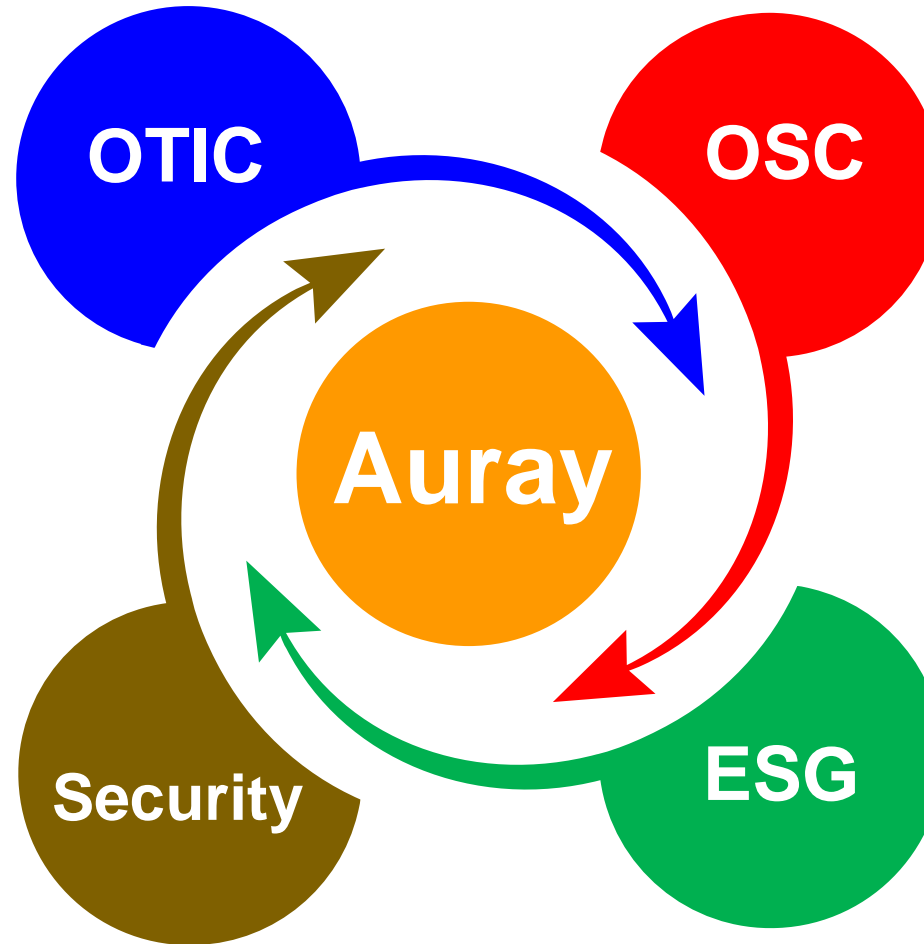
Auray Main Services

OTIC Test

- ◆ O-RU Conformance Test
- ◆ O-CU & O-DU Test
- ◆ O-RAN E2E IOT Test
- ◆ Private Network Interoperability/5G Core Network

Security Test

- ◆ 3GPP 5G / O-RAN Alliance Security Standard
- ◆ App & SSDLC Test
- ◆ EN 303 645 Cyber Security for IoT Requirements
- ◆ IEC62351 Network Information Security Testing Service
- ◆ SSDLC Source Code Review/SDLC Consulting
- ◆ ISO27001 Security Consulting Services



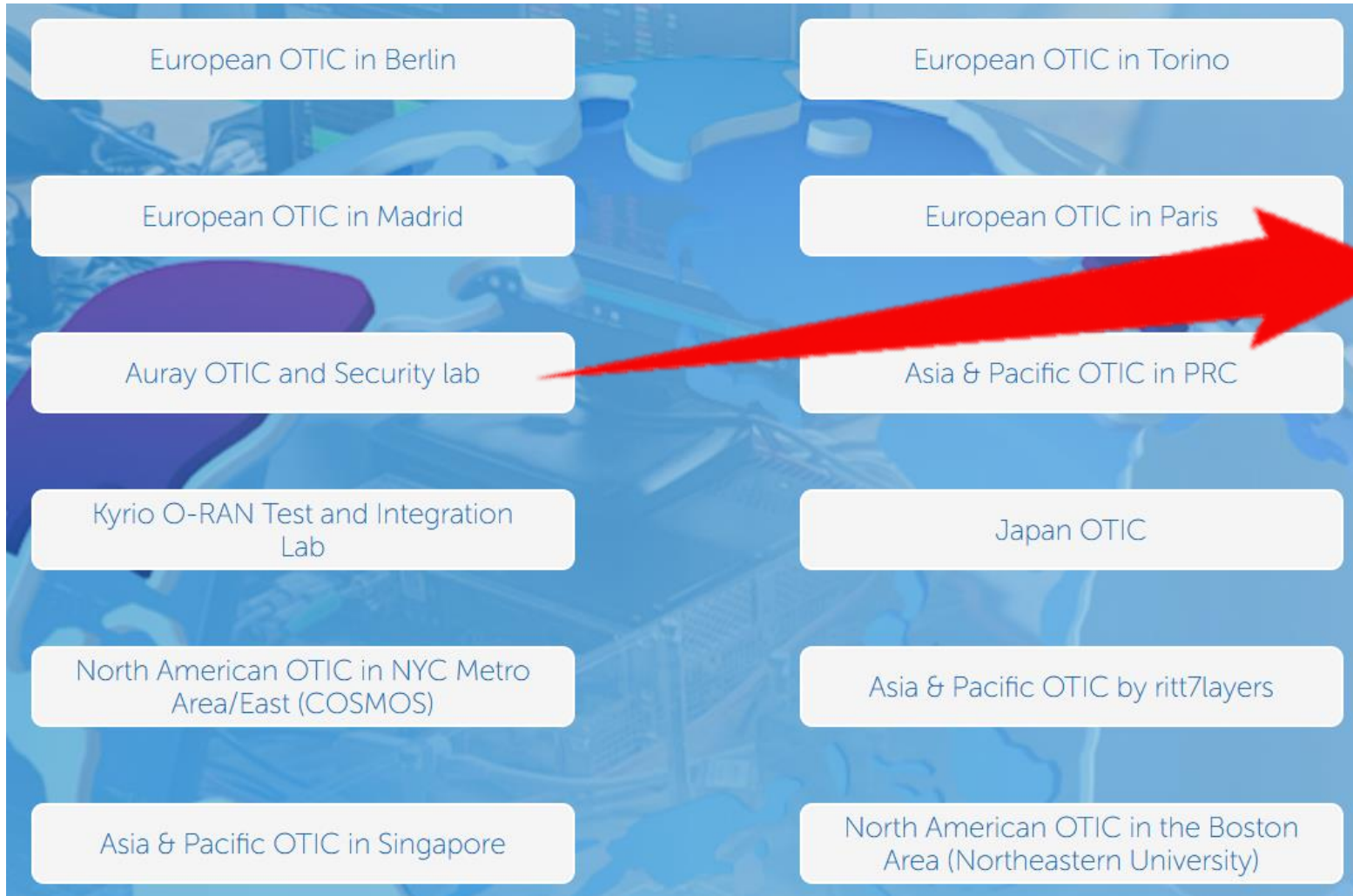
OSC Lab

- ◆ Non-RT RIC Interface Compliance Verification
- ◆ Near-RT RIC Interface Compliance Verification

Sustainable Env. Tech.

- ◆ GHG/Carbon footprint Inventory Consulting
- ◆ ISO 14064 GHG Inventory Consulting
- ◆ ISO 14067 Product GHG/Carbon footprint Inventory Services
- ◆ ISO 14065 GHG /Carbon footprint Inventory Certificate
- ◆ Third Party Verification Unit
- ◆ Personnel Training/Validation/Technical Consultation

Auray in O-RAN Alliance

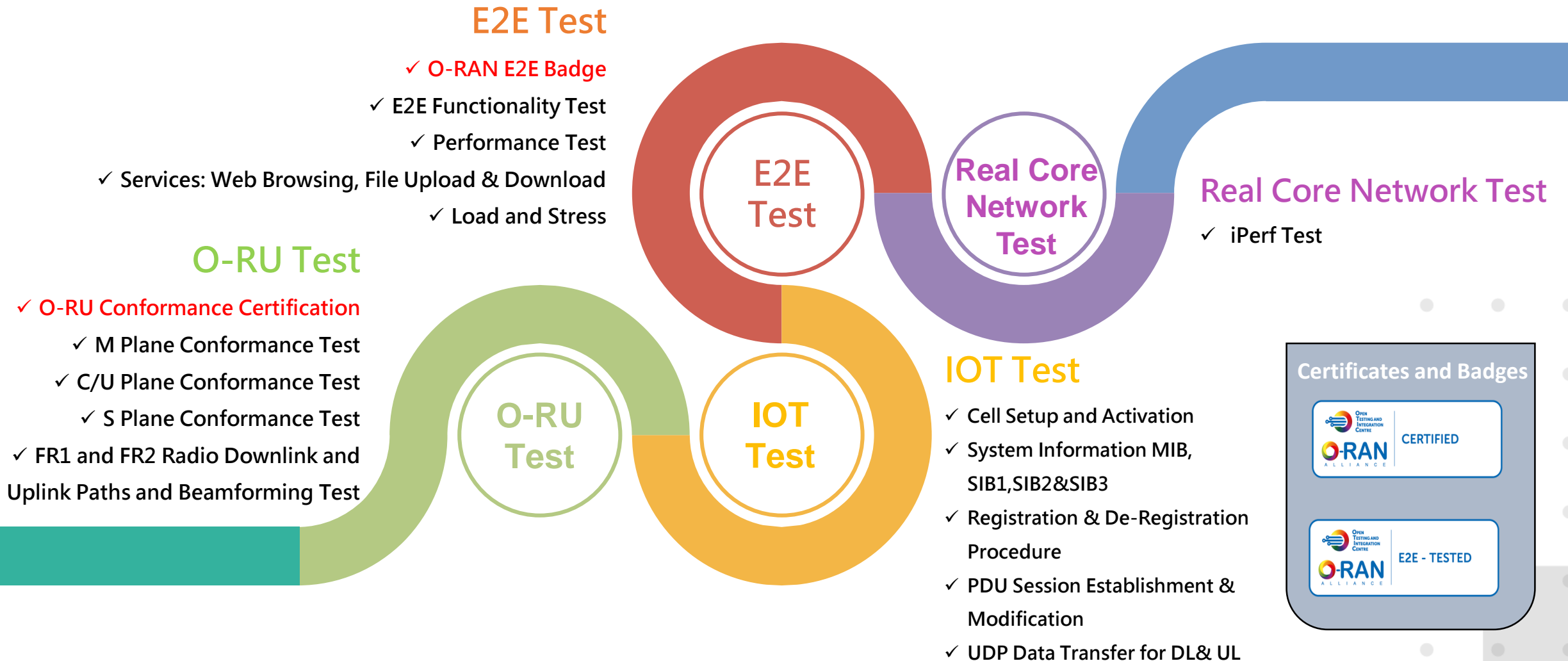


**The 1st OTIC
third-party testing Lab
in Asia !!**

OTIC Testing Capabilities

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Overall



O-RU Test

M Plane Conformance Test

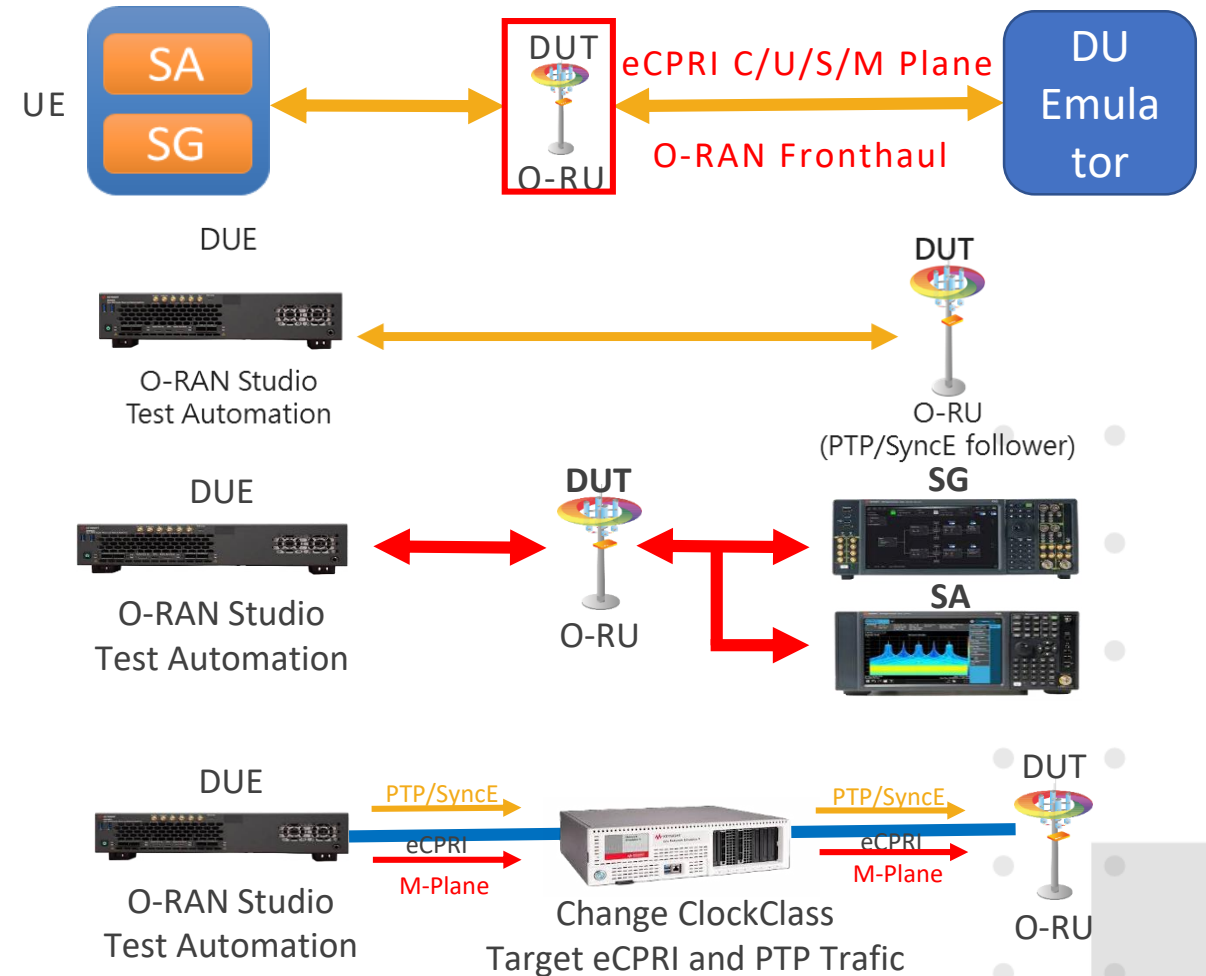
- Support a NETCONF server
- Collect NETCONF & RPC message and scenarios comparison

U/C Plane Conformance Test

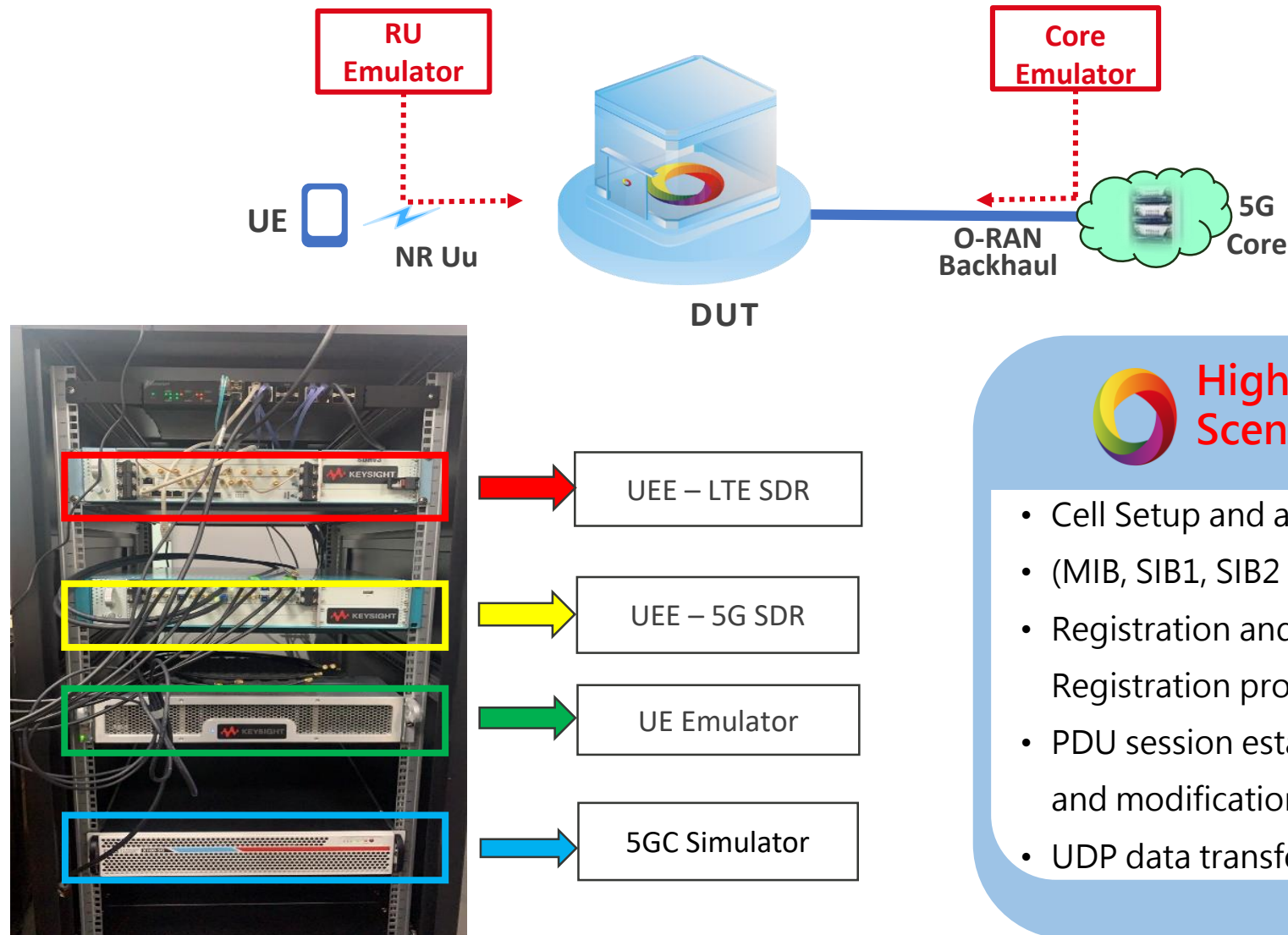
- NRG: Verify the basic uplink and downlink requirements
- DLM: Verify correct transmission of test data within the delay interval
- CMP: Verify difference measurements between compressed and uncompressed
- ST3: Correct decoding of C-Plane information of 5G NR section type 3 (PRACH)

S Plane Conformance Test

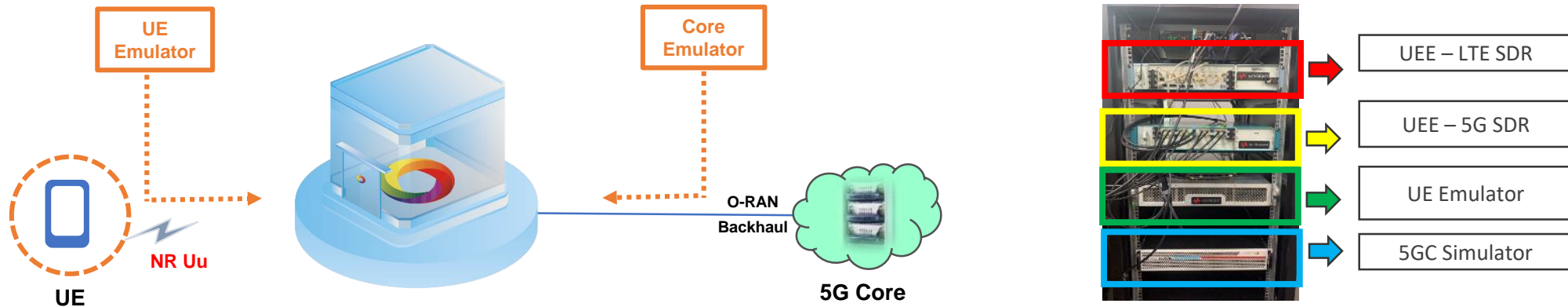
- O-RU time synchronization testing : Functional test :Confirm the synchronization management status according to the PTP input condition
- Performance test: Verify the consistency of the O-RU recovered clock



gNB(O-DU+O-CU) Interoperability Test



E2E Test



Functionality Test

- 5G SA Registration and deregistration
- Inter-Distributed Unit mobility
- 5G SA registration and deregistration to Single network slices



Performance Test

- Downlink peak throughput
- Uplink peak throughput
- Bidirectional throughput
- Base station signals cover performance verification



Services & Security

- Data Services
- Video Streaming



Load and Stress Tests

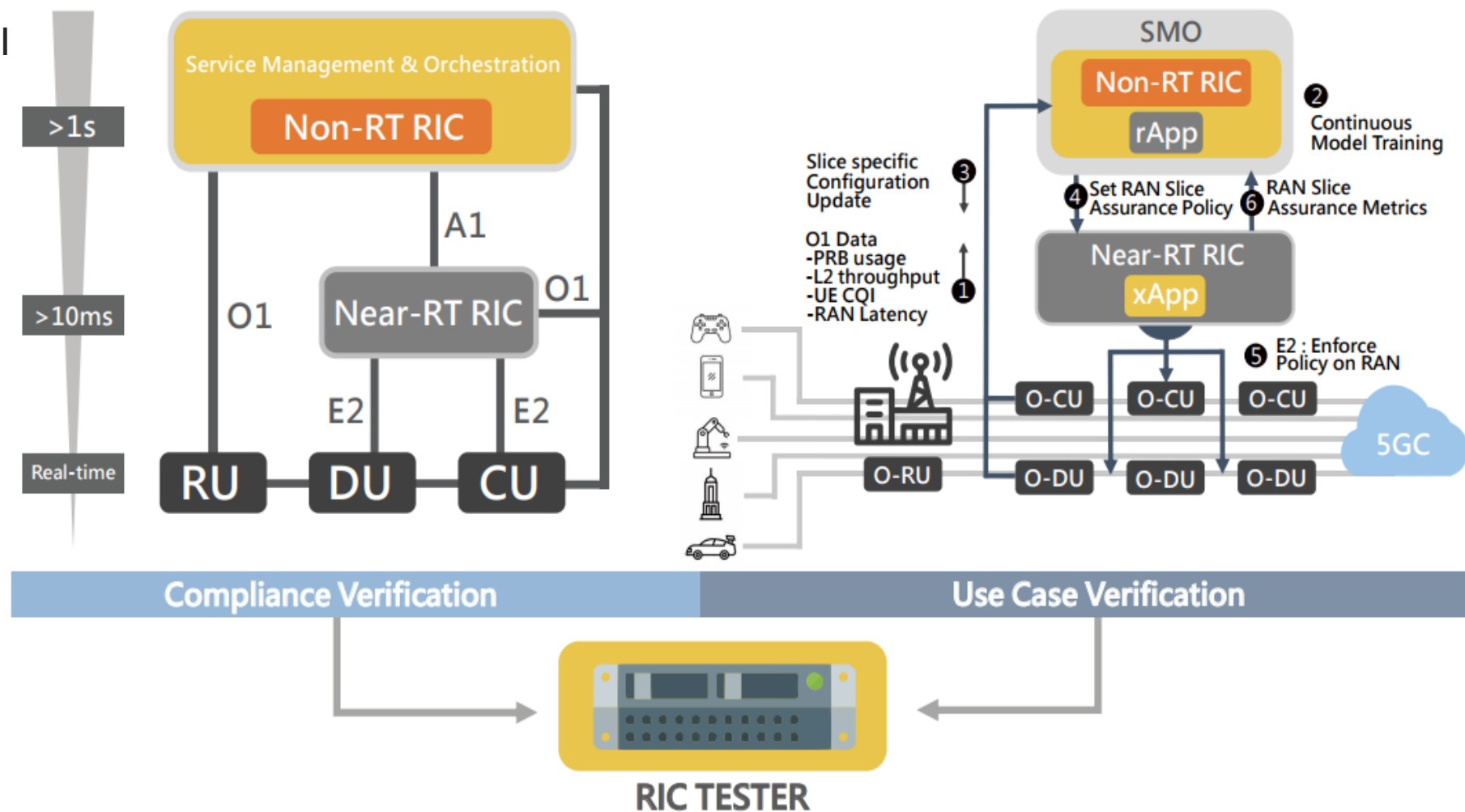
- Simultaneous RRC_CONNECTED UE (up to 256 users)
- Traffic Load Testing
- Long hours stability Testing

RAN Intelligent Controller(RIC) Testing Capabilities

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RIC Compliance Verification and Use Case

- Machine learning model
- Detect network load
- Closed loop
- Configure resource



RIC Interfaces

O1 interface

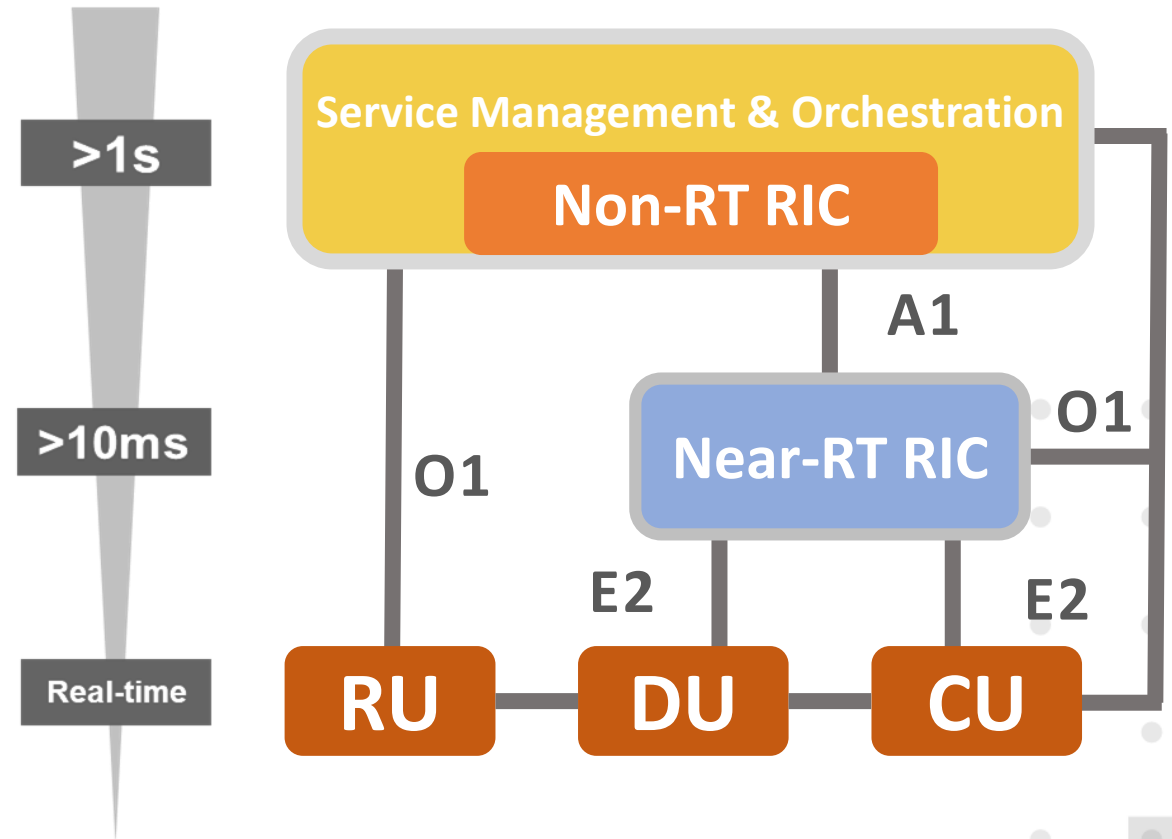
- To operate and management

A1 interface

- Monitor and provide feedbacks from Near-RT RIC
- Update the ML model of Near-RT RIC

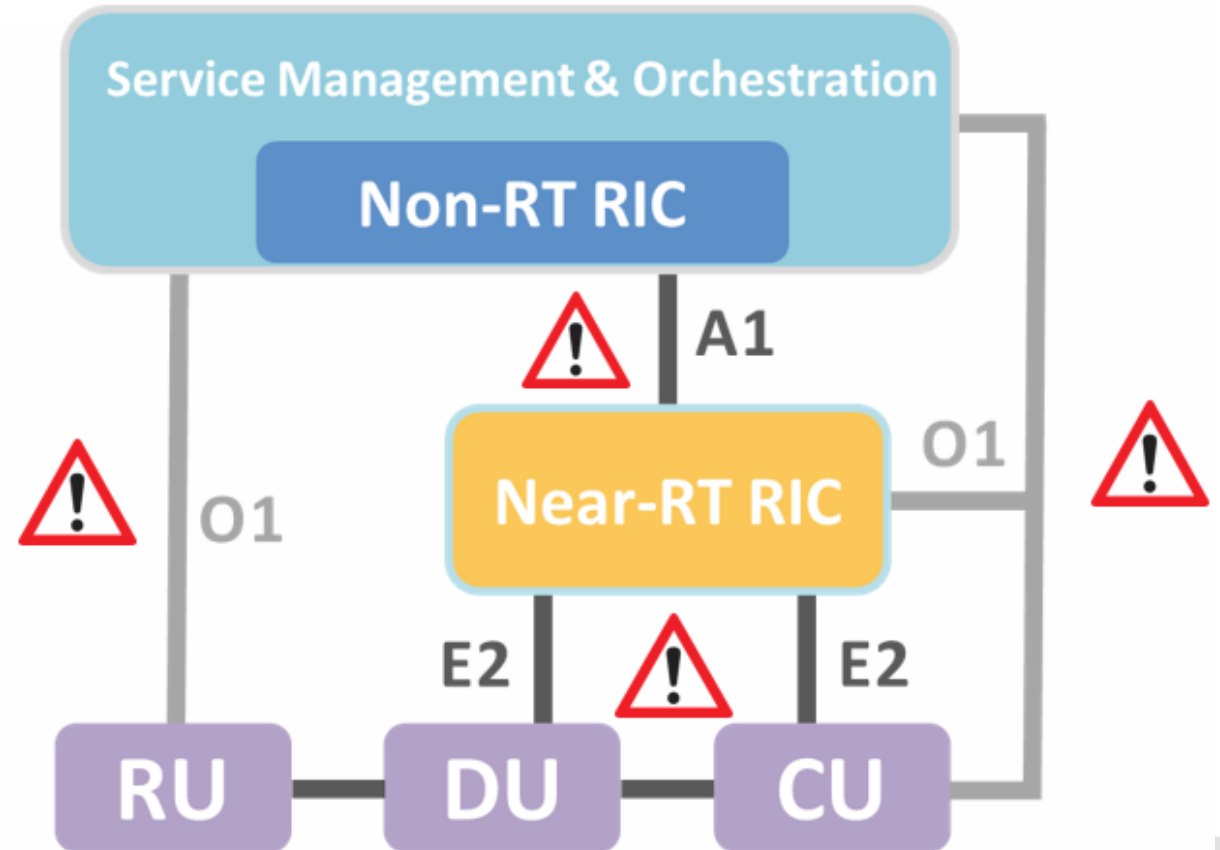
E2 interface

- Optimization of RAN decision-making and control with Near-RT RIC



Security in RIC

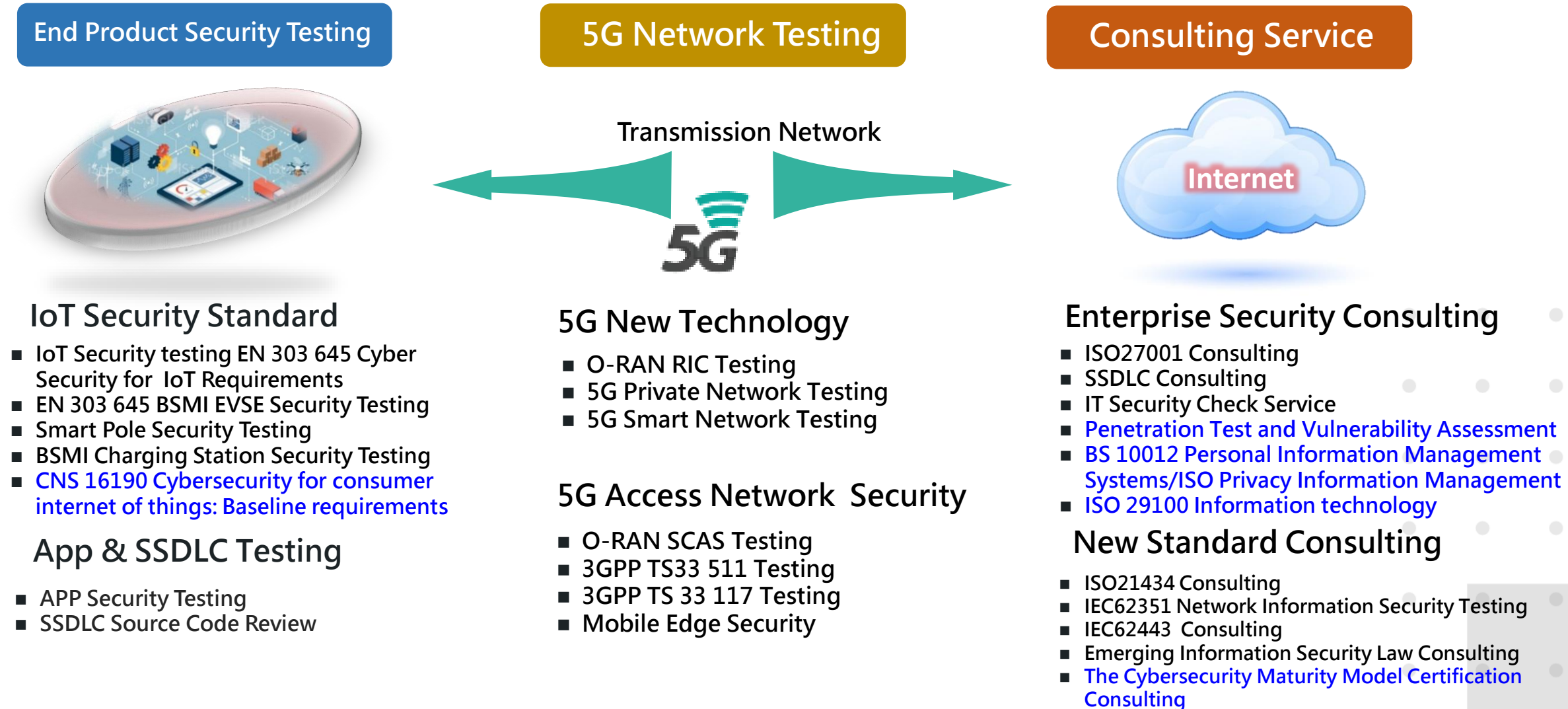
- Anomaly detection
- Prediction of Radio Resource Utilization
- Hardware Failure Prediction
- Energy saving parameter Prediction
- Conflict Prediction for xApps



Security Testing Capabilities

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Overall



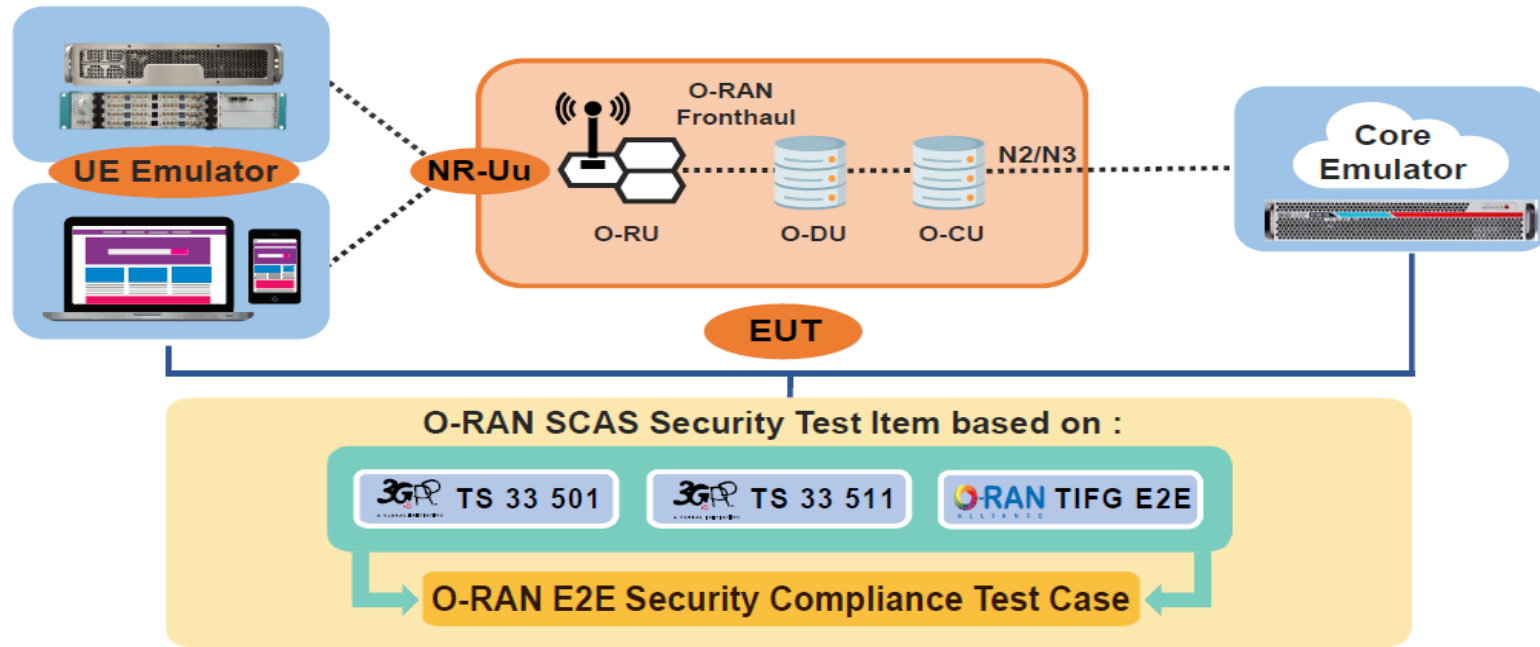
Security Testing in 5G O-RAN

■ O-RAN Security Testing

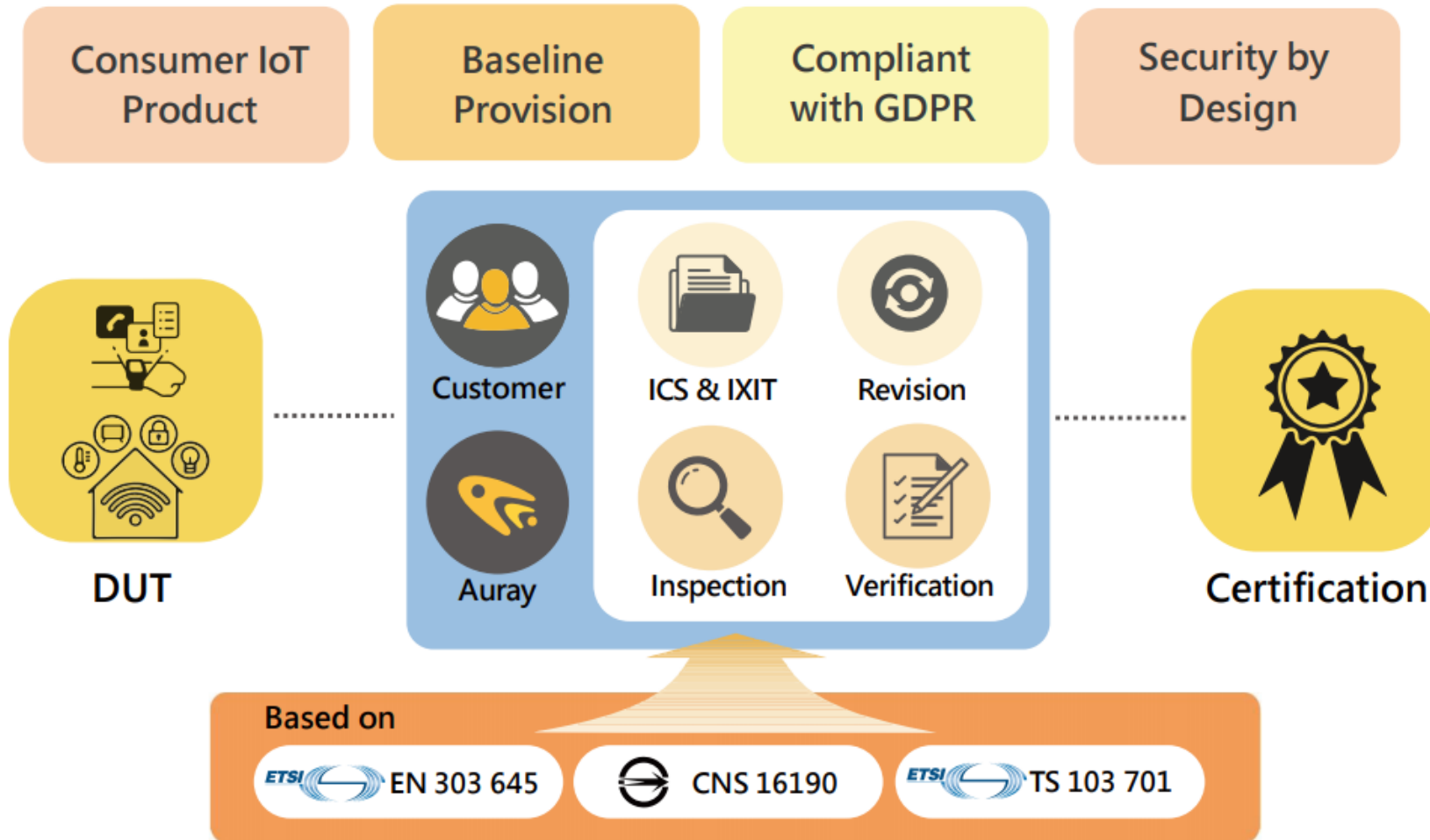
- TS 33.117 General Security
- TS 33.501 Security Architecture
- TS 33.511 gNB SCAS

■ Network Function Virtualization (NFV)

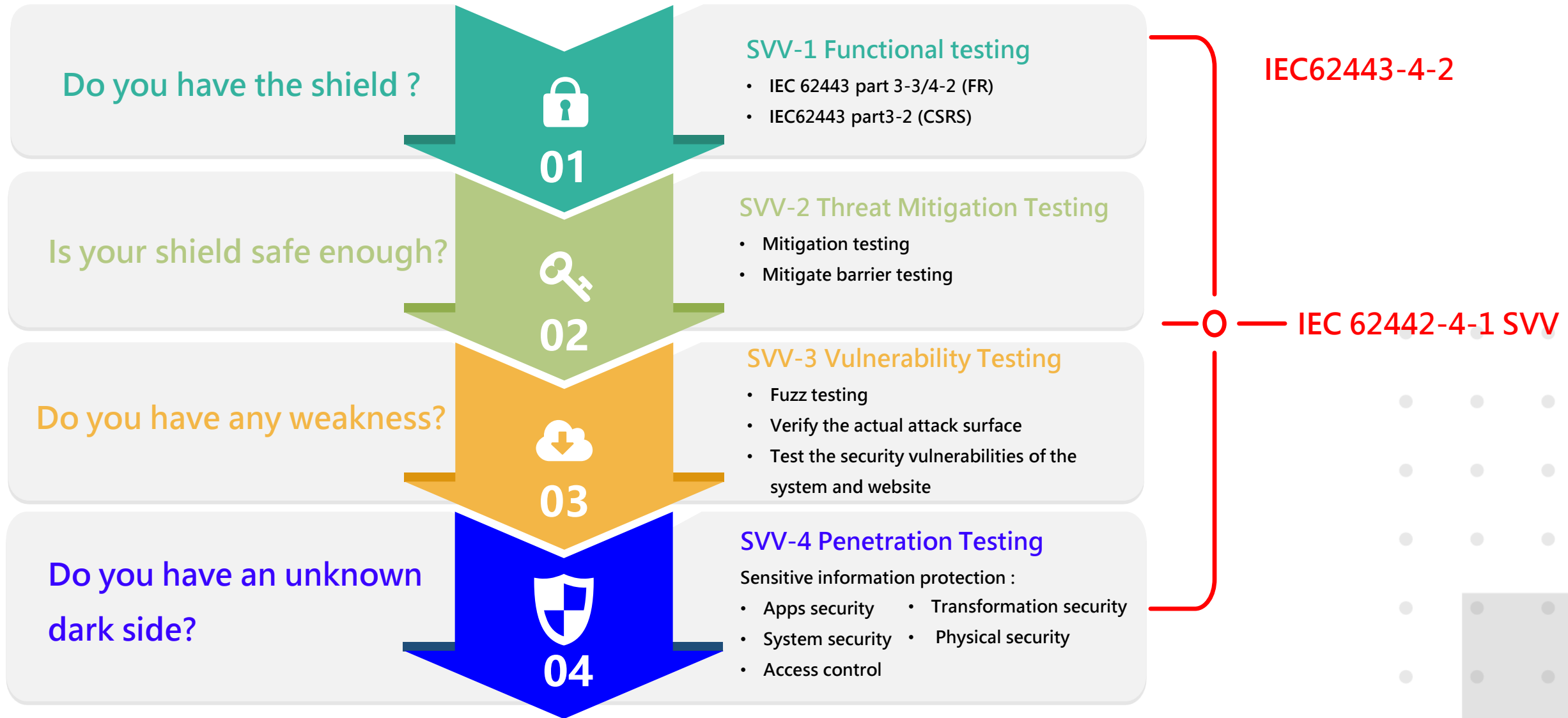
- TR 33.818 General Security
- TR 33.848 Virtualization Impacts



Cybersecurity Standard for Consumer IoT Devices



IEC 62443 Industrial Communication Networks



Sustainable Env. Tech. Capabilities

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Overall

Personnel Training & Technical Consulting

- Personnel Training/ Verify Qualification
- Organization/Project Consult



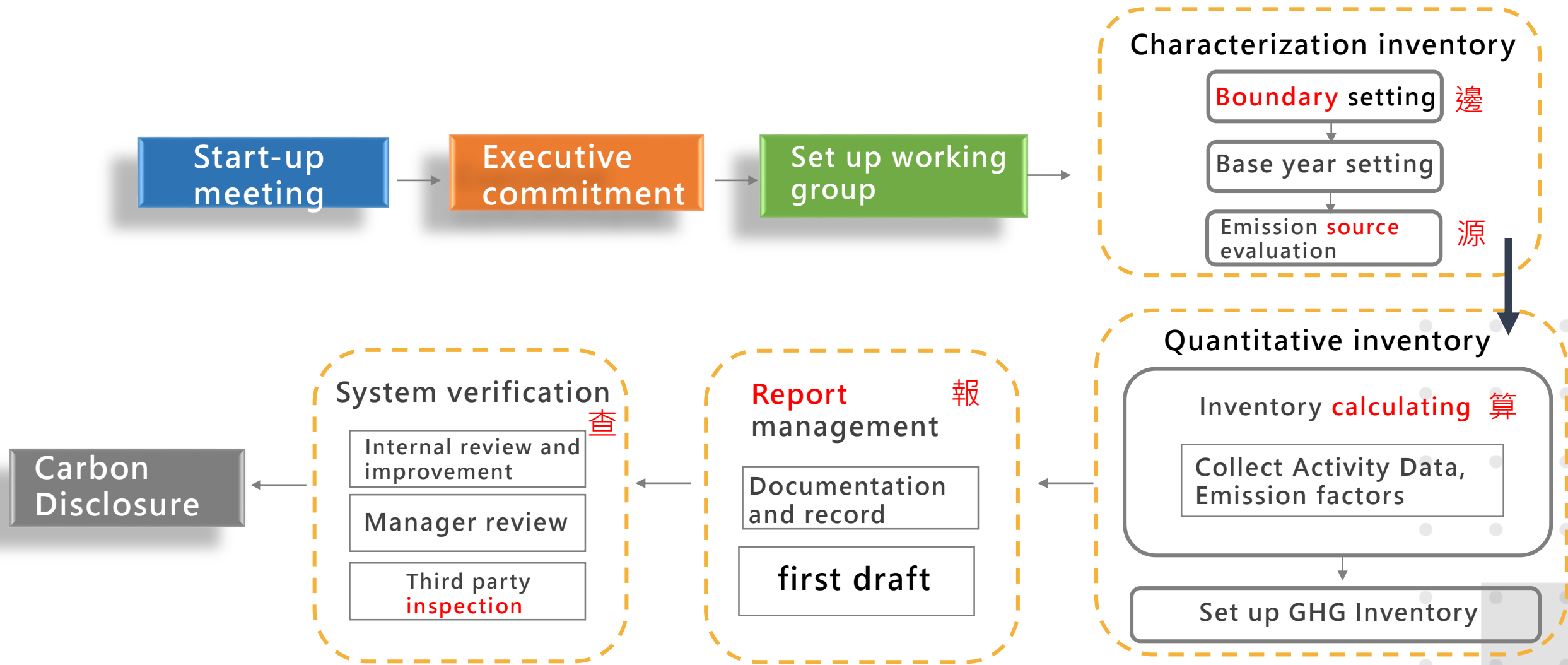
Industry Counseling Service

- GHG/Carbon Footprint Inventory
- ESG consulting service
- ISO 14064-1 GHG Inventory
- Sustainability Report

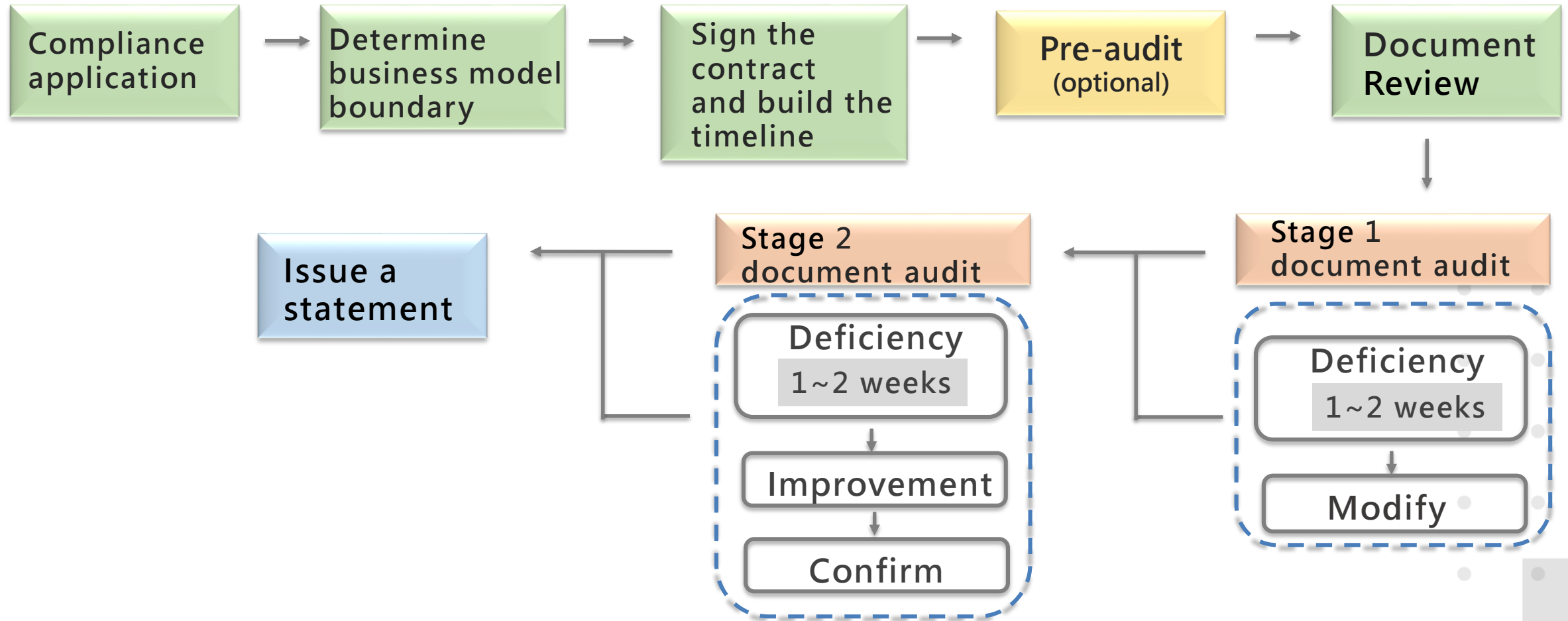
Certification services

- ISO 14065 Validation& Verification Body
- Third-party Agency

GHG Inventory Counseling (ISO 14064-1:2018)



GHG Inventory Verification Timeline (ISO 14064)



ESG Counseling Service

ESG Report Counseling

- Materiality assessment
- Report writing and counseling
- Report visual design and typesetting
- Industry sustainability website planning and setting
- SASB implementation
- TCFD implementation

Industry consulting and strategic planning

- Business consulting
- Corporate governance evaluation consulting
- ESG short, medium and long target and planning
- Domestic ESG award application

Organization construction and Personnel Training

- Sustainable committee/WG implementation
- Executive consensus meeting
- ESG education training
- Non-financial risk issue identification

Company Inspection Capabilities

EPA Greenhouse Gas Verification Agency team

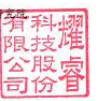
附件三



112年新設溫室氣體查驗機構團隊輔導協議書

廠商： 耀睿科技股份有限公司，參與行政院環境保護署環境檢驗所（以下簡稱主辦單位）委託工業技術研究院（以下簡稱協辦單位）辦理之「新設溫室氣體查驗機構團隊遴選與輔導工作」，同意以下事項，願遵守相關輔導規範與相關活動參與之規定。

- 接受之輔導內容包括：(1)查驗人員與品質管理人員相關之共通性課程30小時（得申請免修）、(2)品質管理人員相關之管理系統建置諮詢課程25小時。
- 輔導期間，依據協辦單位安排之期程，配合如下事項：
 - 提交查驗資源資訊與相關查驗規劃。
 - 提交一份輔導成果簡報（格式由協辦單位提供），並於成果說明會中說明。
 - 建立與產出品質手冊與相關作業程序書等文件，提交一頁式成果簡報，並以附件方式說明內容與提出溫室氣體查驗機構認證申請之期程規劃。
- 依據112年新設溫室氣體查驗機構團隊遴選須知要求，於輔導活動啟動（112年7月17日）後1個月內（8月16日前）提交如下佐證資料：至少3人、個別完成溫室氣體相關 ISO 國際標準及國內相關法規之訓練，時數達25小時(含)以上^{註1}。無法符合者，因未能實現遴選申請之承諾，將自動喪失接受輔導之資格。
- 除上述要求外，輔導活動啟動後，未能配合訓練課程等相關活動達三次且情節重大者，取消輔導資格，且不得再次申請相關輔導活動。

針對活動參與期間提交給協辦單位之資料，協辦單位依據與主辦單位簽訂之「112年淨零排放之國內認證及查驗品質管理計畫」契約要求，將盡保密責任。必要時，廠商：耀睿科技股份有限公司可主動向協辦單位提出保密契約簽訂需求，並由協辦單位依據「工業技術研究院保密契約簽訂及管理須知」辦理。

此致
工業技術研究院 

廠商印章：  負責人印章： 

中華民國 112 年 6 月 12 日

備註：提交遴選申請書時已提供相關佐證資料之擇選廠商無需提交。

ISO 14065 Quality document

 耀睿科技股份有限公司
Auray Technology Corp.

溫室氣體查驗與查證機構 品質管理手冊

REV	DESCRIPTION	DATE	INITIAL	APPROVED
01	初版發行	2023.05.15	黃永慶	



ISSUE
發行文件

This drawing and the specification and/or details are the property of AURAY and are not to be used or reproduced, modified, duplicated, disclosed or copied for any purpose without the written consent of AURAY.

SIZE	DOCUMENT NO.	REV
A4	AR14065-C-QM-01-01	01

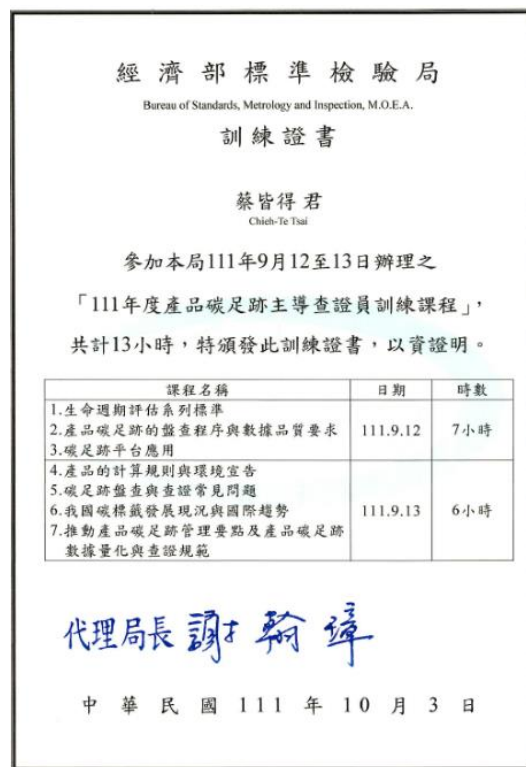
COVER PAGE PAGE 1 OF 29

Selected to the EPA Inspection Agency team

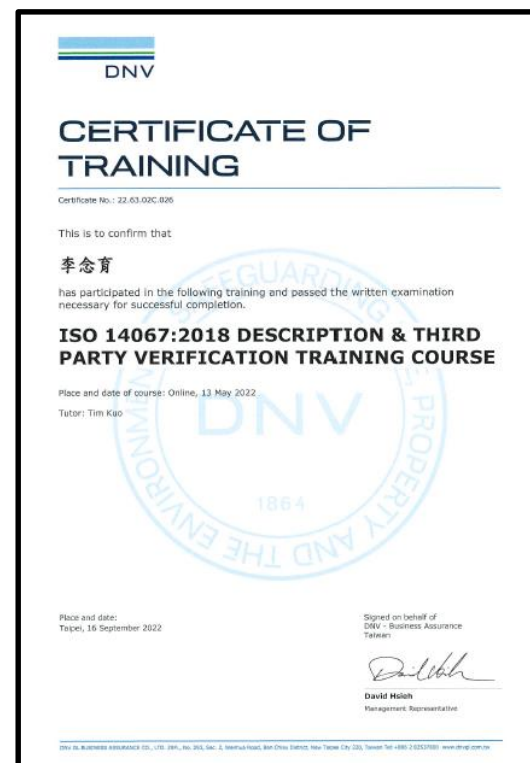
Team Qualifications



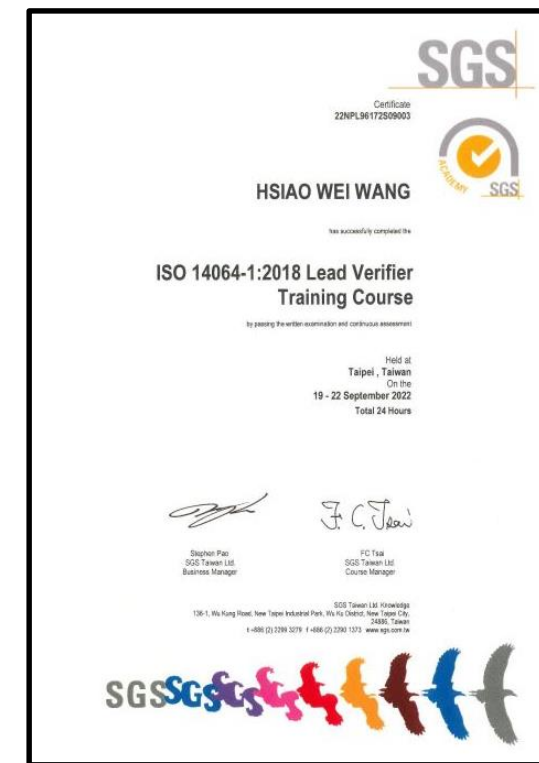
ISO/IEC17029:2019、
ISO 14065:2020、
ISO 14064-3:2019：
Requirements for bodies
performing validation and
verification of environmental
information statements



ISO 14067：
Carbon footprint of products
Requirements and guidelines
for quantification



ISO 14067：
Carbon Product Lead
Auditor



ISO 4064-1：
Lead Auditor

Our Achievements

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O-RAN Alliance Certificates and Badges



WHO WE ARE WHAT WE DO O-RAN ECOSYSTEM NEWS & EVENTS

Certification / Badge ID	Date of issued certificate yyy-mm-dd	Type	Interface under test	RAT under test	Device under test	Vendor name	Model name	FW release	SW release				OTIC name	Detailed report
AOSL220001	2022-06-30	Certificate	OFH	5G NR	O-RU	Foxconn	RPQN-7801E	V1.0	v3.1.1q.524	 INTEROPERABLE  E2E - TESTED	S2	AURAY OTIC and Security Lab	Email request	
AOSL220003	2022-11-30	Certificate	OFH	5G NR	O-RU	Wistron NeWeb Corp.	R1220-078L	0x1010251B	1.1.0			AURAY OTIC and Security Lab	Email request	
AOSL220002	2022-11-30	E2E Badge	-	5G NR	O-DU/O-CU	Pegatron	PG5100 PR1400-78I	L2.04E 1.0.1	0.1.2.2-RC3 1.0.1			AURAY OTIC and Security Lab	Email request	
AOSL220002	2022-11-30	E2E Badge	-	5G NR	O-RU	Wistron NeWeb Corp.	PR1400-78I	PR1400-78I	1.0.2-RC5			AURAY OTIC and Security Lab	Email request	
AOSL230001	2023-03-31	Certificate	OFH	5G NR	O-RU	Compal Electronic, Inc.	Teak AON1F-NB1	201.00.048	201.00.048			AURAY OTIC and Security Lab	Email request	
AOSL230002	2023-05-19	Certificate	OFH	5G NR	O-RU	Foxconn	RHON-7901	v2.1.8o.524	v2.1.8o.524			AURAY OTIC and Security Lab	Email request	
AOSL230003	2023-08-01	Certificate	OFH	5G NR	O-RU	Inventec	NX-R2110	V2110.92	lvRRU_FR1_3.0.8_58261	6031B0237301		AURAY OTIC and Security Lab	Email request	
AOSL230004	2023-08-21	Certificate	OFH	5G NR	O-RU	Pegatron	PR1200-79I	FR2.6	1.0.0.1-RC1	V01		AURAY OTIC and Security Lab	Email request	
AOSL240001	2024-03-27	Certificate	OFH	5G NR	O-RU	Actiontec Electronics	SC-705(e)	S70XR05B067	CG-SC70X-R2.2.16	AM5		AURAY OTIC and Security Lab	Email request	



* 7 Certificates & 1 Badges; coming more in the following months

Global No. 1



1st O-RU Certificate to Foxconn in 2022/Jun.



1st E2E Badge to Pegatron in 2022/Nov.

Global PlugFest Host



O-RAN Global PlugFest 2021



O-RAN Global PlugFest Spring 2022



O-RAN Global PlugFest Spring 2023

Private Network Verifications

- 🐟 **Operator-Chunghua Telecom:** Chunghua Telecom has many private network deployments, using Taiwan local vendor's devices, and authorized Auray to verify their interoperability and cybersecurity in National Theater Hall, National Concert Hall, and Kaohsiung Exhibition Center.
- 🐟 **Pagatron:** Delivered their own O-RU+O-DU+O-CU solution(certificates issued by Auray for marine cargo transportation for YangMing Marine Transport Corp.
- 🐟 **Inventec:** Used certificated O-RU for the private network in their smart factory.
- 🐟 **Compal:** Used their certificated device for 5G smart pole (2023 PlugFest spring).
- 🐟 **Other deployment sponsored by Taiwan government for smart cities applications.**

O-RAN Alliance F2F Meetings



Opening Ceremonies

2021/August in North of Taiwan



2023/March in South of Taiwan



Press Releases

Money.udn (2023-07)

Auray tech. host the 2023 spring Plugfest -Asia's No.1 O-RAN lab to verify the O-RAN Alliance RIC standard
https://money.udn.com/money/story/5710/7299030?from=udnamp_storysns_line

ioiotimes (2023-06)

Auray Technology assisted D-Link to pass the international information security standard certification to obtain Nemko ETSI EN 303 645 Consumer IoT Network Security Certificate
<https://www.ioiotimes.com/?p=34042>

TTV NEWS (2023-03)

The first 5G O-RAN lab opening in Kaohsiung!
<https://www.youtube.com/watch?v=jZUhkszelQE>

National Kaohsiung Technology University (2023-01)

NKTU Power and industrial control system safety cooperated with Auray Lab
<https://www.nkust.edu.tw/p/406-1000-65480,r1363.php?Lang=zh-tw>

CNA (2022-08)

Auray issued 1st O-RU Certificate to Foxconn
<https://www.cna.com.tw/news/afe/202208160327.aspx>

Business wire (2021-10)

The global first O-RAN Lab in Taiwan. Auray host the 3rd global Plugfest and show new technology
<https://www.businesswire.com/news/home/20211025005861/zh-HK/>

Auray Tech. (2021-08)

The global first O-RAN Lab in Taiwan
<https://www.auden.com.tw/%e8%80%80%e7%99%bb5g%e4%bd%88%e5%b1%80%e5%86%8d%e4%b8%8b%e4%b8%80%e5%9f%8e%e5%85%a8%e7%90%83%e9%a6%96%e5%ba%a75g%e9%96%8b%e6%94%be%e6%9e%b6%e6%a7%8b%e7%ac%ac%e4%b8%89%e6%96%b9%e5%af%a6%e9%a9%97/>

Future Plans

1. Enhance abilities by developing lab testing automation
2. Continue to follow up the standards of O-RAN Alliance, hoping to bring domestic RAN technology in line with international standards
3. Accelerate the link of domestic O-RAN devices to international markets via assisting Taiwanese manufactures to obtain certificates and Badges
4. Host O-RAN Alliance Global PlugFest every year to increase the exposure of Taiwan's Netcom industry in the international market

THANK YOU



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