Consolidated Profile of VoICE Consortium Exhibitors

Bangalore Tech Summit

16-18 November 2022

Brief Profile of VoICE CONSORTIUM Exhibitors

Brief Profile of VoICE and Telecom Companies under VoICE Consortium is given below:

1	VoICE
2	Coral Telecom
3	Lekha Wireless
4	Niral Networks
5	Signalchip
6	Signaltron
7	Optimus Logic
8	Astrome Technologies Private Limited
9	C-DOT
10	Qnu Labs
11	SOOKTHA Consulting Private Limited
12	Innominds Software (Part of Sooktha)
13	ITI
14	Resonous
15	USHVA CLEAN TECHNOLOGY
16	Telimart

1. VoICE

VoICE (Voice of Indian Communication Technology Enterprises) represents a Society having members from Indian registered companies with domestic design led solutions covering 5G, 4G, IoT/ M2M and many new innovative based on India IPR from Start- ups and others.

Why VoICE

a. First and only society for Indian Deep tech and communication technology company.

b. Single platform for end-to-end telecommunication eco-system covering all aspects of the network.

c. Funding Research and Development and Pilot Network for different use cases

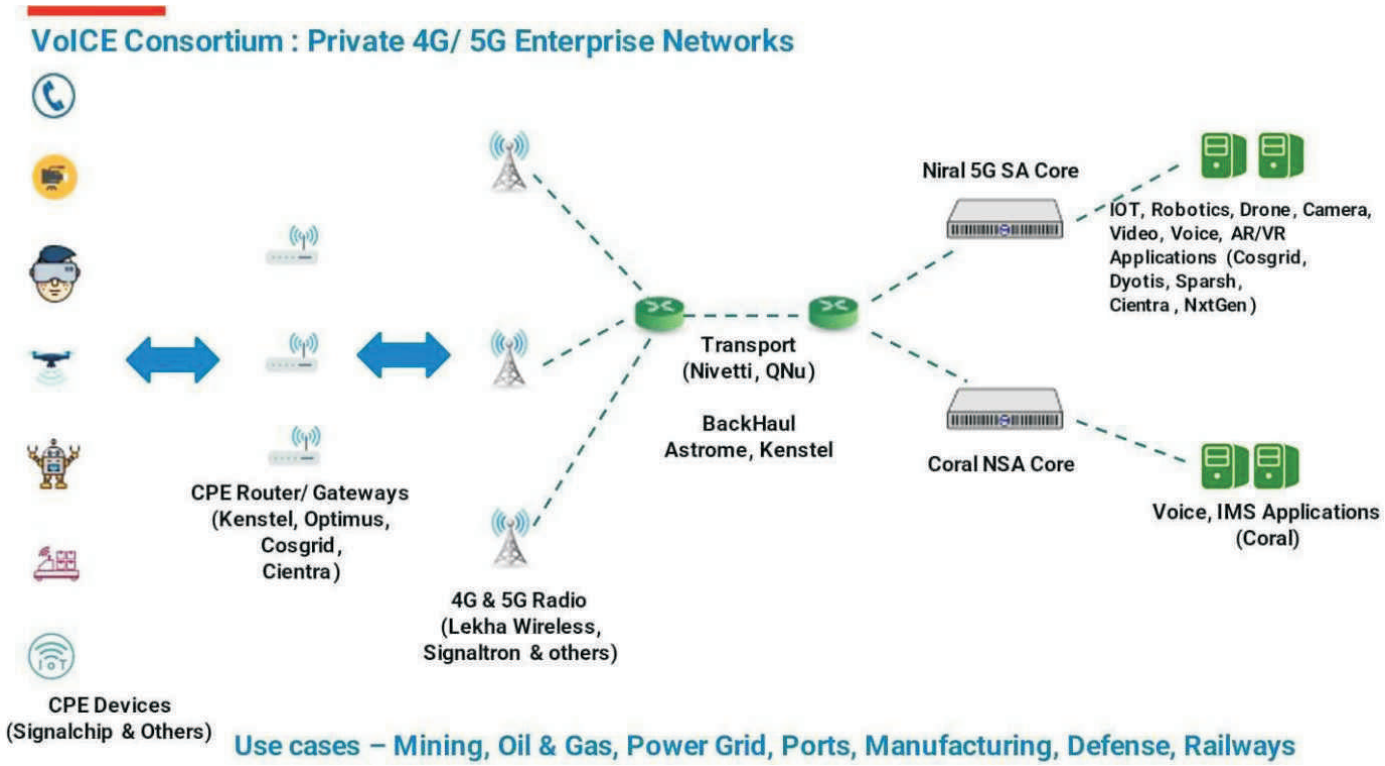
d. Society has member companies with entrepreneurs, technology experts with vast industry experiences who share the spirit of prime minister's AtmaNirbhar Bharat vision.

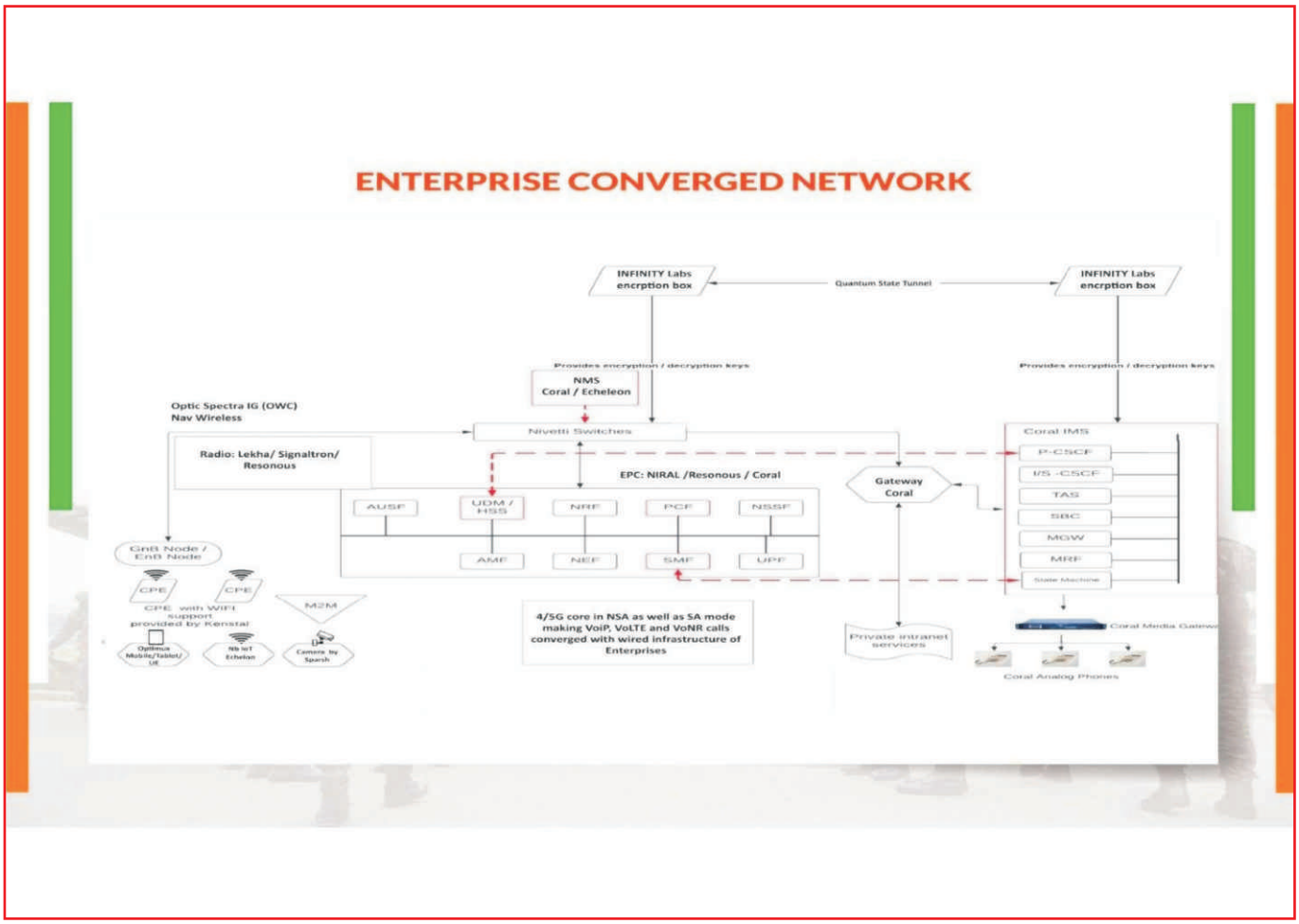
e. Members ready to work with domain experts to create telecom network specific to use- case for example Railways, mining etc.

f. Consultation for decision making in all aspects of policy towards R&D, startups, nurturing new ideas, piloting products, and adopting new trends.

Consortium Based Solutions on 5GEnterprise Networks

One typical Consortium with equipment/ solutions coming from multiple players are possible for setting up Private 5G Enterprise Networks is shown in Figure below.





	5G NW	4G NW
Technology		
Live Demo	Converged cellular and wired communication network. "Network in a Box" seamless with Army IMS	~~Video Streaming, Mission Critical, PTT,~~ Video broadcast, VoLTE, IOT, Unified Communication. NMS
Semiconductor	5G RU Chip, SDR Chip	4G Baseband, Integrated 4G BB+RF
RAN Products	Outdoor Macro RU, Indoor Small cell RU, CU , DU and gNodeB, Network In a Box	Outdoor Macro eNodeB, Femto Cell, Network In Box
Core	Enterprise Core, Compact Core, Disaggregated Cloud Native	Enterprise Core, Telco Grade

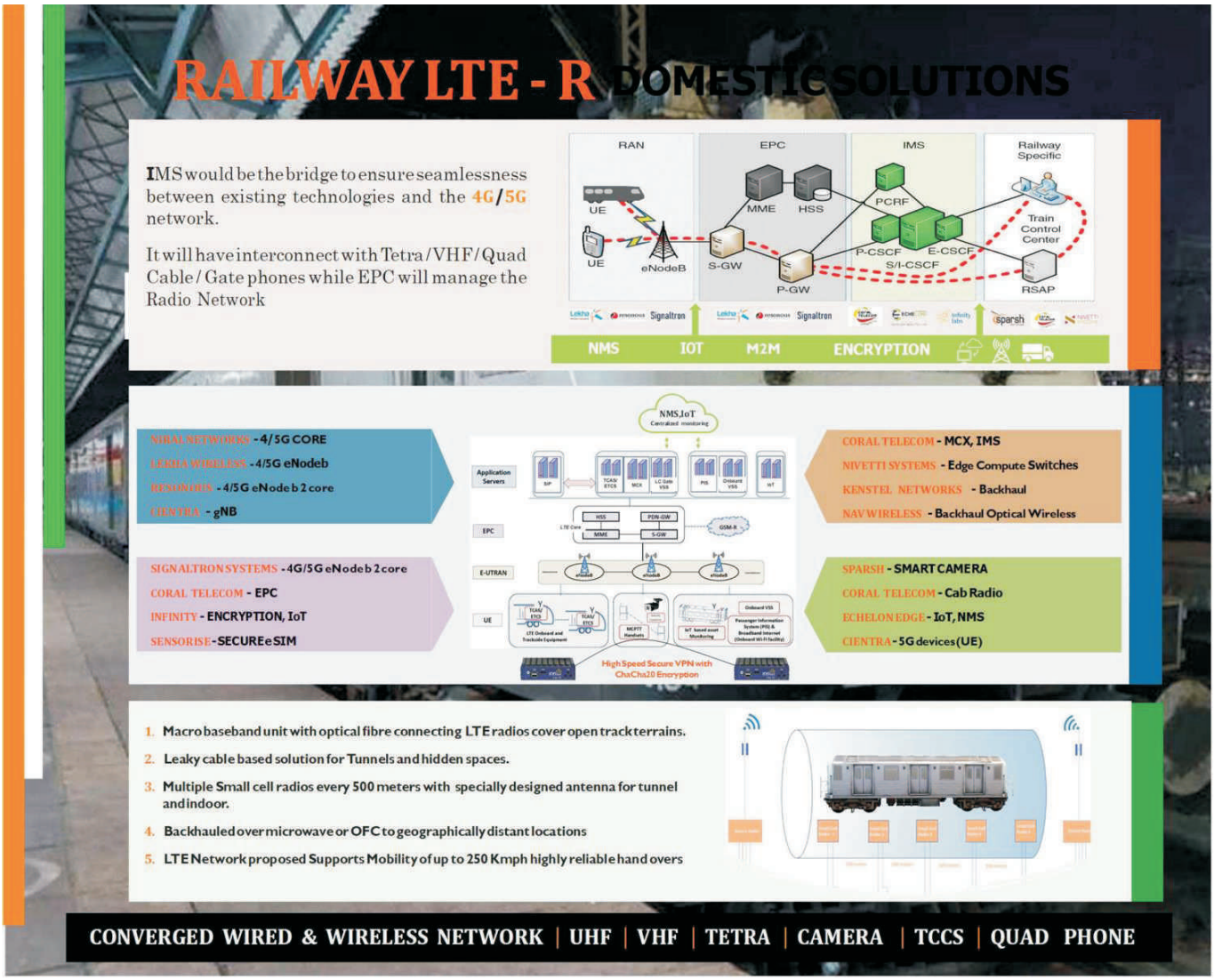
INDIGENOUS INDUSTRY MEMBERS/ TECHNOLOGY Providers with VoICE Consortium

(All are not in VoICE Consortium as exhibitors)

1	4G/5G Core	Lekha Wireless, Resonous, Niral Network, Coral Telcom
2	4G/5G Radio	Lekha Wireless, Resonous, Signaltron
3	Network in a Box	BigCat Wireless, Lekha Wireless, Resonous, Signaltron
4	Chipsets 5G/4G/3G	Signalchip
5	Data Centre/ IOT	NextGen Data Centre, Cientra IOT Aggregation
6	UE, CPE	Kenstal FWA, OptimusLogic, Tablet Phones
7	Backhaul	Kenstel, NAV Wireless, Astrome Technologies
8	NMS	Coral Telecom, Echelon
9	IMS	Coral Telecom
10	Switches	Nivetti Systems
11	Encryptions	Infinity Labs, Scytale Alpha
12	E Sims	Sensorise
13	Camera	Sparsh (Samriddhi)
14	Applications (marine)	Innogle
15	Applications (Banking and Finance)	IDRBT, Finaara

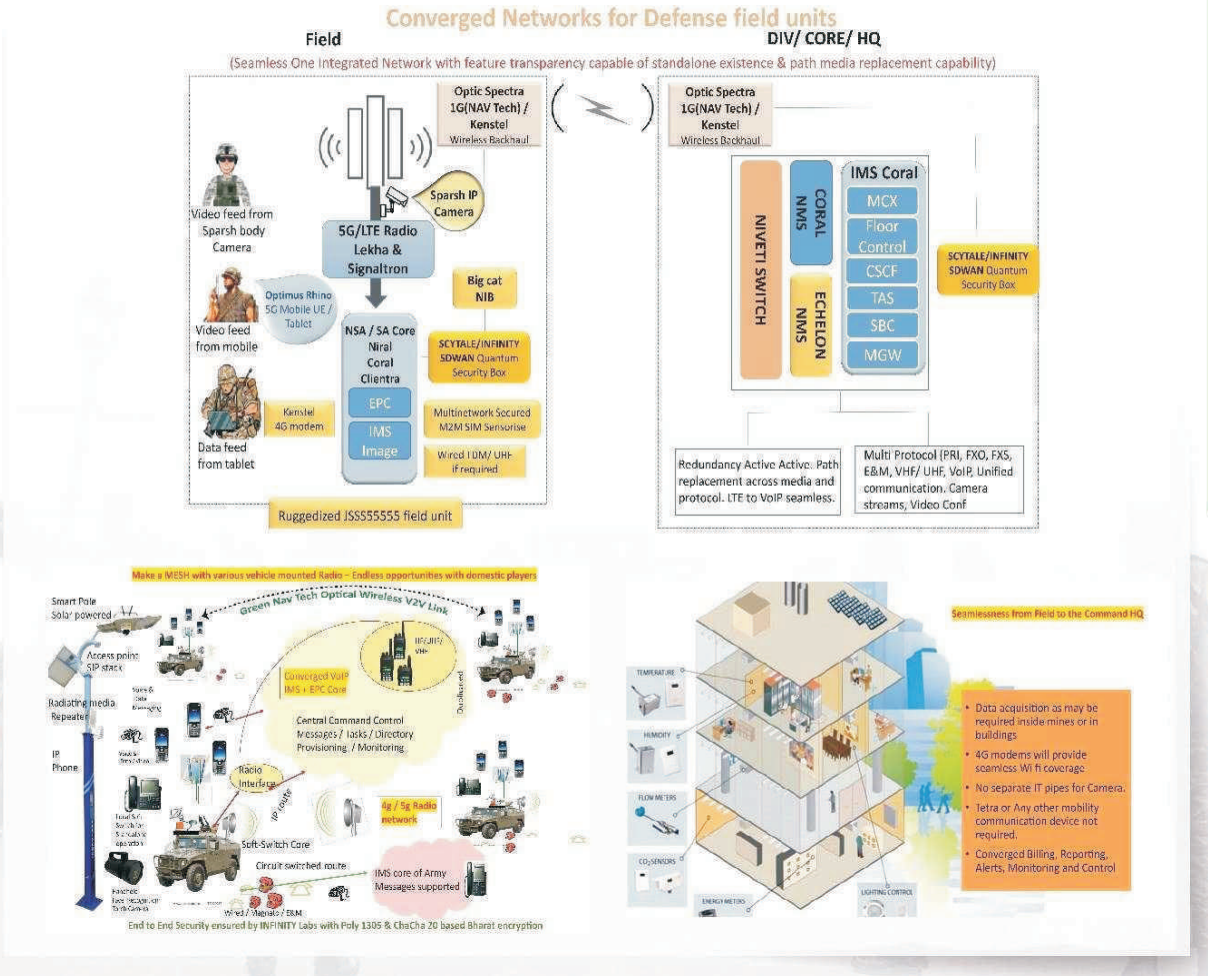
RAILWAYS/ ARMY/ MINING AUTOMOBILE CASES

RAILWAYS



ARMY

CONVERGED NETWORKS FOR DEFENCE FIELD UNIT



AUTOMBILES


M2M SOLUTIONS FOR AUTOMOBILES
Intelligent M2M IoT Connectivity
+ Secure by design
+ Always on
+ Standards compliant – TEC, DoT, AIS-140, BIS16833
sensorise
Telco, Technology and device agnostic solution with end-to-end data encryption (QoSec)
Intelligent multi-network M2M SIM (QoSim) with unique capabilities to switch the network for seamless connectivity. Industrial grade eSIM with Remote Management feature for downloading the new subscription on the same SIM card on the go, Over the Air
Backhaul & IT solutions
Infinity labs
SP/Enterprise class NextGen Secured 5G Edge SDWAN based on 5G CPE Use case
Indigenous Encryption for 5G Security
Secure 5G Backhaul Use case for Automobiles, Mines, Ports etc.
sparsh
Device , Platform services
ROSMERTA
Complete Surveillance solutions
Inside & outside, Above vehicle camera
Bodyworn camera
IP speaker
Monitor consumption
Forecasting & Trend analysis
Route tracking
AIS -140 & IS: 16833 Certified Vehicle Location Tracking Devices (VLTD) with Emergency Button
AIS018 Speed Limiting Devices (SLD)
Approved supplier of VLTD and SLD to Vehicle Manufacturers
Software platform for Intelligent Transport Management for STUs, Mining, Ambulances, Petroleum, PDS and many more
NxtGen
NIRAL NETWORKS
IP Backhaul – IP/MPLS Routing and Forwarding Software containing OSPF, ISIS, BGP, LDP, PIM. The routing software can be integrated to a COTS appliance to route the private 5G traffic between 5G Radio to the Edge Applications
5G Core and SDN Controller – 5G core software for Mobility, Authentication, Security, Session and Policy Management.
Intelligent M2M eSIM and lifecycle management platform | AIS -140 certified Vehicle tracking device and Telematics solutions | Edge Computing & Private 5GaaS | Network automation and orchestration platform


Intelligent & Secure M2M IoT Connectivity
Multi-profile eSIMs with automatic network switching and end-to-end data encryption for seamless connectivity
sensorise
Device , Platform services
Backhaul & IT solutions
Infinity labs
SP/Enterprise class NextGen Secured 5G Edge SDWAN based on 5G CPE Use case
ROSMERTA
Technologies Limited
+ 80,000 Vehicle tracking devices
Trip monitoring, surveillance and reporting software
Control room in mining HQ and 14 regional circle offices
Mobile application with over 1 lakh downloads for administrative officer, Trucker & Miners
IP Backhaul
5G Core and SDN controller
NxtGen
Infinite Datacenter
NIRAL NETWORKS
Device , Platform services
sparsh
CORAL TELECOM
Complete Surveillance solutions
Lider base autonomous vehicles with camera and
Intelligent M2M eSIM and lifecycle management platform | AIS -140 certified Vehicle tracking device and Telematics solutions | Edge Computing & Private 5GaaS | Network automation and orchestration platform | Lider based autonomous vehicles with camera and sensors

Private 5G networks

Enterprise communication, in future will require reliable, high performance, high bandwidth & low latency 5G networks that are devise, media and protocol agnostic. Converged core will connect mobiles as well as wired devices offering common management and provisioning interface. These private 5G networks, would converge Voice, Data, IOT & M2M communication within the enterprise and will open a plethora of applications to address diverse customer requirements. Private networks are already being deployed in a wide range of industries for indoor and outdoor applications but private 5G networks will accelerate the process as every industry including mining, ports, automotive, durable goods and chemicals would need them for their digital transformation that would include IOT & M2M applications. Voice and data communication may be peripheral use cases.

“Voice”, as a platform has taken the initiative to integrate various subsystems developed by our Startups and SMEs to provide a complete end to end system that will open opportunities in Utility companies, Railways, Mines, Oil and Gas as well as Defense applications. Collectively, this would be a large market that can resurrect domestic telecom design & manufacturing industry.

Use cases

1. Campus deployment as an extension of the enterprise PABX where Private 5G can support mobility requirements within large campus, of an integrated factory with residential blocks, Hotels, Hospital & institutions where some staff is on the move. Offshore drilling rigs, construction and mining sites are potential customers. Once high-speed low latency network is established, it would double up for IOT & M2M applications for plant monitoring maintenance and predictive alerts on impending fault

2. Ships / Islands and Forest guards need quick deployment of complete networks that may be backhauled on Satellite / Optical Wireless/ UHF or VHF where such 5G based private networks would be an ideal choice for basic communication.

3. Submarines would need it for communication as well as predictive fault alerts by use of appropriate sensors and AI algorithms. Time-Sensitive Networking (TSN) and real-time-based decision making is rapidly finding role in several mission- critical applications across many industries, including manufacturing, oil and gas, aerospace, and transportation that will require such 5G networks.

4. Battery powered, Tactical Deployments mounted on vehicle in a compact single box for quick deployment of wired and RF Optical wireless service could be an ideal communication box for Disaster management teams or for defense setups. These could be housed in jeeps or ships with onboard gensets and can cover 5 to 7 Kms radius. Deployment of half a Dozen such mobile communication systems can cover a larger area seamlessly communicating between each other as part of Tactical deployment. UN peacekeeping forces or troops stationed in any part of the word can be customers for such applications. IOT devices tightly intertwined on the 5G network will help identify, locate threats, and protect critical assets as well as enhanced predictive preventive maintenance of critical equipment and services.

5. Utility companies, Railway stations, Airports & Accident sites will need these private 5G network for support on all legacy communication including communication on Quad cable, E&M, BWT & even magneto trunks. Railway accident relief trains can provide immediate voice and data communication that will work seamlessly with their laid- out communication system. Railways could use it for specialized Train control and communication system (TCCS).

6. It can be an effective replacement for imported Tetra based communication systems with 5G based high bandwidth low latency communication. Metro projects, Airports, Disaster management teams will find them cost effective and far more efficient. PTT and broadcast communication modes for the system shall address these requirements.

7. Disaster Management is expected to cater to emergency services & rapid deployment of mobile network at sites where existing GSM network is destroyed due to natural calamity such as hurricane & earthquake. These private networks can quickly set up reliable communication facilities that can be used by all agencies working on the site viz NGO, Red Cross, Paramilitary, Army, State departments, Fire service etc. Security agencies including Police & National Security groups will find many applications to extend emergency services during natural disasters or man- made crisis like terror strikes where need of the hour would be to provide voice, video text and high-speed low latency data services.

8. Construction sites & mining sites in far flung areas with no or l imited existing telecom networks could deploy these private networks to cater for all type of reliable high-speed communication needs within the private campus. Oil rigs, Oil wells and large construction sites or mining areas could be ideal customer for such private network deployments. They would need high speed low latency 5G networks to use IOT devices for automated / robotic or remote managed applications that are sensitive & mission critical.

9. In-building solution to enhance mobile coverage in the building thereby releasing load on the macro BTS network, local switching and intelligence will provide enhanced coverage & additional subscriber density. This would also help effective use of scarce spectrum as each private cell would reuse the same spectrum band.

10. Greenfield deployments in Rural areas by providing cost effective & quick deployment methodology that can help local youth to manage and run these networks on commercial basis. This will create jobs and entrepreneurs who would ensure upkeep and maintenance at remote locations. These private networks can also be used for temporary deployment in a Games village or for a temporary holiday camp over a few kilometers that can be powered from solar energy.

11. International Deployments

VoICE team members have excellent competencies to implement 4G/ 5G Private Enterprise Networks as per the requirements of any country or organization.

12. International TrainingCentres

VoICE is submitting some Pilot Projects on training covering 5 countries in Africa, 1 in Arab Region and 4 in ASEAN countries. The Project shall include Projects with Live 4G/ 5G Private Enterprise Network like the one represented in Figure 1 with possible support from Indian Government and foreign partners. Each Centre can provide support to a few neighboring countries as well.

2. CORAL TELECOM

Coral Telecom Limited is a leading design and manufacturing company that provides converged “enterprise communication solutions” with focus on applications for Railways, Metro, Mines, Défense and other similar private communication networks. Converged platforms will provide wired as well as wireless subscribers for enterprise customers as both type of networks will always co-exist in real life. IMS switching core will seamlessly provide call control function for legacy TDM devices as well as modern day IP desk phones as well as to mobile customers on 4 /5 G handsets.

Primarily engaged in design, development & re-engineering of IMS based, Unified Communication solutions that handle voice, video, and data requirements of a modern enterprise. Specialized software applications have been designed to provide integrated communication solutions with Paging, Video conferencing and Despatcher applications that find use on Railways, Metro Projects, and Smart city applications.

Solutions includes converged 4/5 G core that provides seamless communication with LTE / 5G based radio networks such as to facilitate private enterprise communication across wired as well as wireless devices. We support mission critical and MCX based floor control services to facilitate PTT (push to talk) features for audio and video broadcast, so critical for applications i n Utility companies, Police and Paramilitary forces. Solution supports Autonomous vehicles, Robotic arms, IOT and M2M applications for Mines, Submarines, Oil rigs and can cater to needs of Industry 4.0 in general.

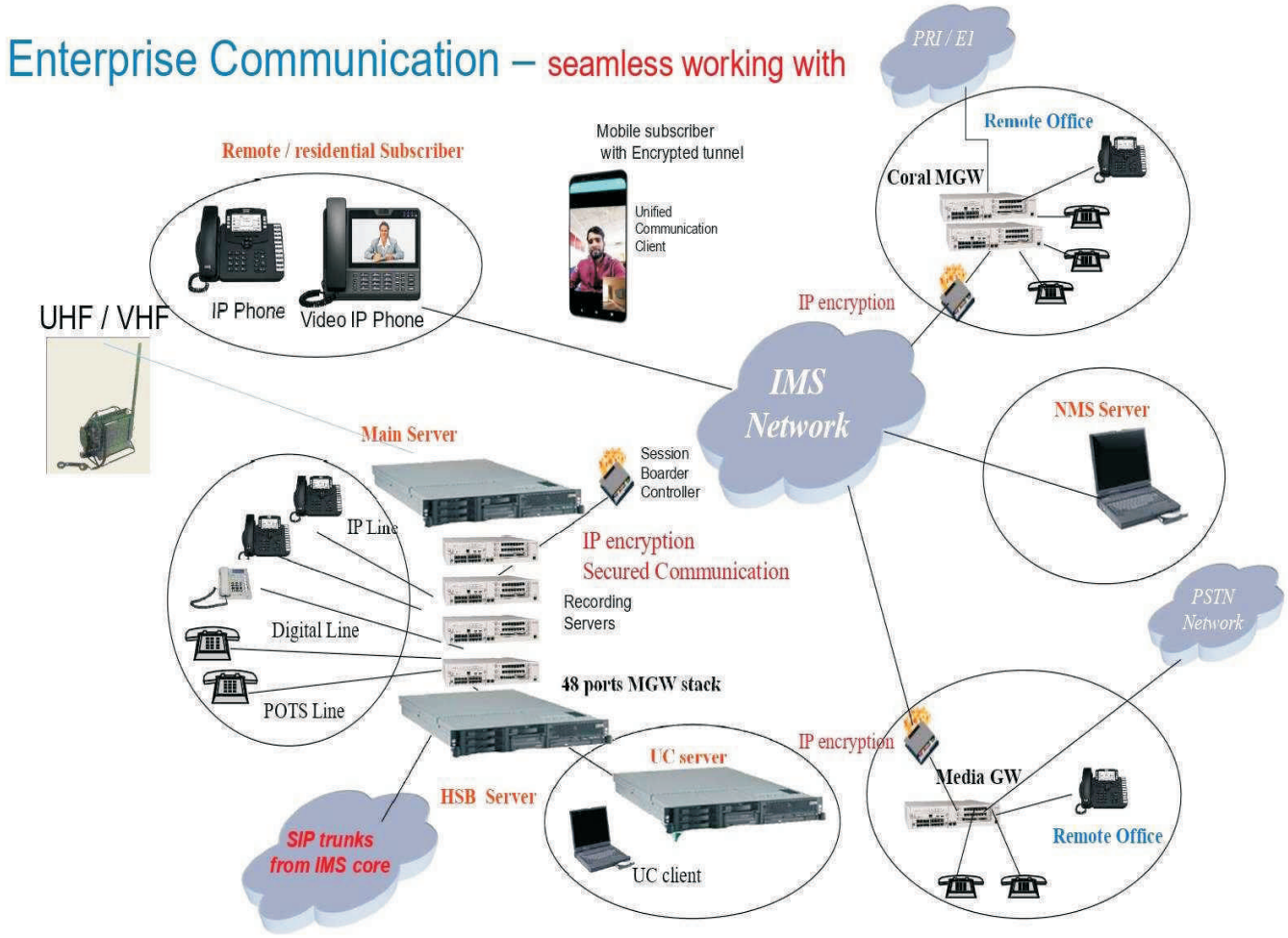
Common NMS facilitates simple user-friendly management and configuration of all network elements. Ability of our solution to support plug and play function for Gateways, Wired phones, Mobile phones, Cameras, IOT devices with centralised control and common alerts makes it a preferred choice of users.

Coral has designed and manufactures associated embedded hardware or media gateways to provide seamless inter- operability with legacy protocols like FXS, FXO, PRI, GSM, E&M etc. with emphasis on converged multi- service, multi- protocol access gateways that can work as part of an IP Multimedia subsystem yet capable of standalone existence.

Coral’s specialization lies in the fact that it has total control on technology thus offering a unique ability for customization. Its diverse experience in the fields of telecommunication, convergence technology, software, hardware, application development and project management, places it as an ideal provider of solutions across the value chain.

Coral is prepared to forge strong ties with telecom design companies in friendly countries by transfer of technology and knowledge for setting up converged 4 / 5 G networks for enterprise customers. In true spirit of friendship, India will commit to invest in capability and capacity building of friendly countries so that they also walk on the path of “Self reliance” that our Prime Minister has charted for us.

Coral can conduct projects that will enhance knowledge base of telecom professionals involved in design creation and building of 4 / 5 G mobile telecommunication networks in ASEAN & African countries. Trainees shall have better understanding and knowledge of each module of such networks and they would be able to integrate certain modules available locally or from open source communities. Trainees will get opportunity for hands on training on these modules and they will set up live captive networks at identified locations.



Elements of the Converged enterprise network

Radio Access Network : 4G & , 5G radios (RAN). These could be integrated radio which are cost effective or could be as per open RAN architecture (CU DU & RU) they could be Base band unit with four radio heads connected over OFC.

Antenna and mounting structure : RAN would require appropriate antenna and support structure to radiate.

CORE EPC cores could be NSA or SA core for 4G and 5G communication respectively. These would provide mobility across various radios (RANs).

Application and voice Switching IP based multimedia Switching or IMS, Soft Switches that would support voice switching or call control features and functions. MCX server and Floor control servers will support mission critical functions like PTT Video PTT voice and Video Broadcast. All voice features of the network including Billing, Voice recording features are supported. Redundancy duplication and path replacement features can be supported.

Network Management System (NMS) to monitor health of each of the network devices in each testbed.

Media gateways for converting IP to conventional TDM protocols so that a converged communication network can be set up for captive communication in a campus.

Backhaul radio to interconnect each of theseradio networks withthe central Core.

CPE Devices : Various CPE devices will be supported on these private networks that would include Mobile phones, Camera of different varieties (Bullet camera,

Body strap Camera and plain outdoor camera) with capabilities to operate on 4 / 5 G network as well on WiFi backhaul.

Several IOT & M2M applications can be supplied with Lidar based communication and remote controls that will have thermal & seismic sensors that can be controlled and managed on 4/5 G networks.

Contact Person:	Mr. Anil Nagpal	Mr. Rahul Gupta
Designation:	Director (Operations)	AGM
Telephone No:	9891499302	9990803109
Email ID:	anilnagpal@coraltele.com	rahul.gupta@coraltele.com
Landline No:	0120 -2595 815	
Address:	Coral Telecom Limited, E-2, Sector- 63, Noida, UP - 201 301	
Web:	www.coraltele.com	

Lekha Wireless Solutions is a Bengaluru based deep tech company in wireless telecom and defence communication. Started in the year 2010, we are a team of 200 + Engineers, with leadership team comprising of telecom experts with over 2 decades of experience in end-to-end product development and deployment. We are OEM for Telecom RAN infrastructure products, SDR Products and we License Protocol Software Stacks for 4G and 5G. We have filed / received multiple patents in 4G, 5G and Industrial communication technologies.

Lekha Wireless has a strong Research and Development team, combined with Engineering expertise in software and hardware for delivering complete system. We work with System Integrators and operators to deploy private and public telecom networks. Lekha's experience has always helped customers in creating quick proof of concept and accelerate network rollout. Our unique expertise in the Wireless ecosystem makes us the first choice and trusted partners in delivering next generation wireless products to the market.

5G Products

Lekha is among the leading 5G technology player in the country. Lekha has offer ORAN based 5G RAN solution that includes RU, CU and DU products. The radio solution includes RU for macro and indoor deployment in most of the popular 5G bands. 5G RAN solution is powered by Indigenously developed software stack. We offer 5GNR compliant gNodeB small cell and Network in Box solution.

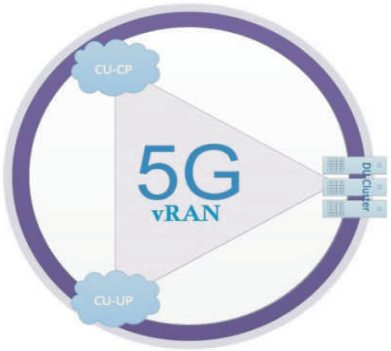
Lekha's 5G product targets private 5G Network for Digital Transformation of Enterprises network and IoT services, enabling accelerated adoption of 5G network. We provide turnkey 5G Network solution with RAN application coming from Lekha Wireless along with partner's core network. We work with eco system, partners, SI or Private network operators create 5G networks where smart applications can be hosted at edge or cloud to enable use case with quicker time to market and a competitive TCO of the network.

MaRUT O-RU

For details scan QR code

- Support for FR1 (Sub-6 GHz)
- ORAN Compliant Option 7-2x
- Compact, Lightweight and Power efficient
- Stable quality of service with Hybrid BeamForming Technology
- Supports multiple bands with TDD/ FDD options

ORAN Solution



For details scan QR code

- ORAN compliant disaggregated
- Multi-vendor friendly with open-interfaces
- Software-centric and modular design
- Bare-metal OR cloud-native
- SA and NSA, TDD and FDD

4G Products

Lekha brings unique proposition of complete indigenous 4G technology, built grounds up. The Lekha's LTE product named "Vyapi" employs the indigenously developed software stacks and hardware design.

We work with system integrators and operators deploying 4G network for addressing green and brown field deployments, Vyapi eNodeB is integrated and tested with multiple EPC vendors. Along with EPC partners we offer turnkey solution private enterprise network use cases and Network in a Box (NIB) type solution. 4G Unit supports both TDD and FDD bands with RF power up to 40 W covering small cell and Macro cell requirements. Contact our sales for your 4G network requirements.

Vyapi NIB

- Compact and power-efficient design
- On-the-go network coverage
- Quick to deploy and take down
- Portable man-pack operation

For details scan QR code

Vyapi LTE eNodeB

- End-to-End proven solution
- Rugged form factor
- Flexible Business model
- Reduced cost of ownership
- Supports telecom and private LTE deployments

For details scan QR code

4G LTE last mile for rural coverage

About Defence Communication Products

Lekha provides data link solutions on SDR based HW platforms ruggedized to meet requirements of industrial network, defence systems and airborne applications. We work closely with customers to integrate wireless data links to varieties of applications. We have built library of waveforms for example OFDM, SOQPSK, Spread Spectrum etc. The SDRs are deployed in point to point (P2P), P2MP and as mobile ad hoc network (MANET) with large number of end points. SDRs support Vehicle mount, man pack and handheld form factors. Our data link products are designed to be compliant to industrial and military standard specifications. We also support customization of hardware and software to suit unique customer needs. Lekha has several products and solutions in deployment through customers and partners.

AI Powered Antares Software Defined Radio

For details scan QR code

Laksha Telemetry

For details scan QR code

ANTARES Tactical Wireless Backhaul

For details scan QR code

WaveDyut PtP Links

For details scan QR code

WaveDyut PtP IP Radio

Lekha

VOICE
Voice of Indian Commtech Enterprises

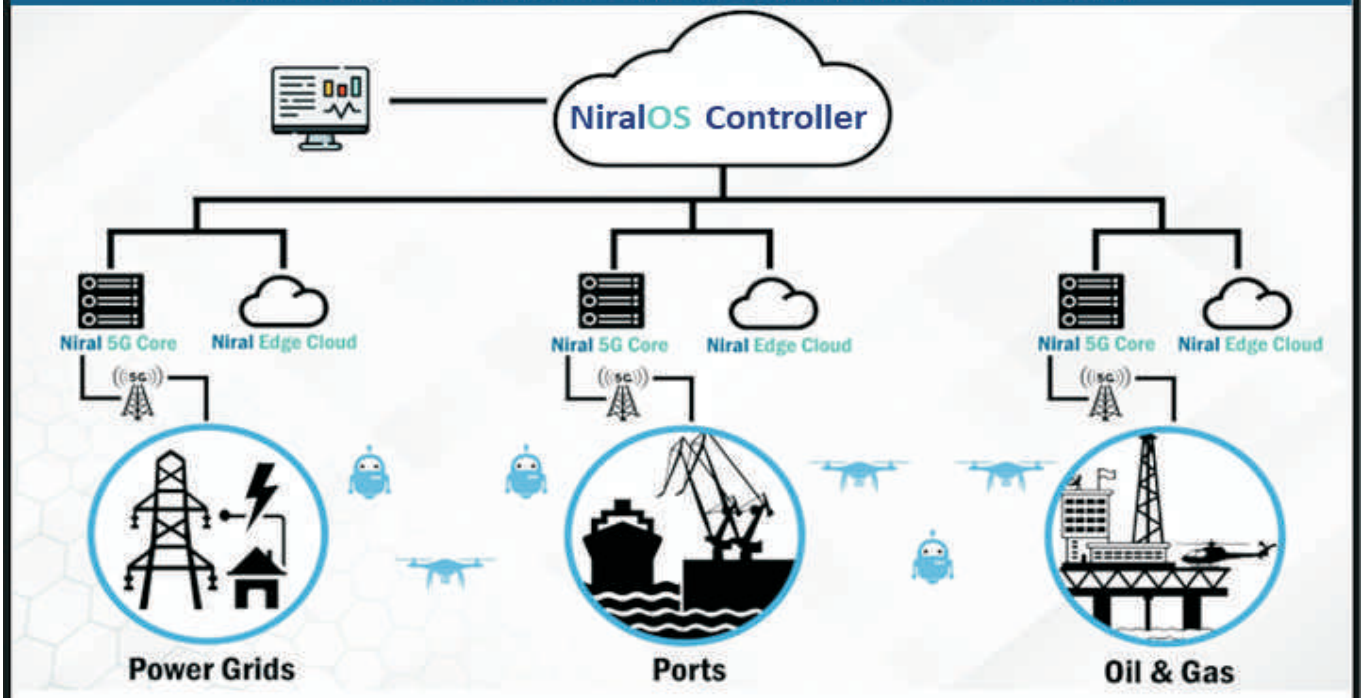
4. NIRAL NETWORKS

NIRAL NETWORKS

NiralOS

Network Operating System for Private Network & Edge

NiralOS for 5G Mobile Cellular Communication Systems



Key Components:

1. Niral 5G SA Core

Cloud-Native Private 5G SA core for enterprises that contains 5G functions - AMF, SMF, AUSF, NRF, UPF, PCF, UDM. Niral 5G core provides a compact UPF for local breakout within Enterprise for integrated with TSP Network. Also, support 4G Core Functions

2. Niral Edge Platform

Kubernetes and Virtualized infrastructure to create a Mobile Edge Cloud (MEC) using existing commodity servers and open APIs to host defence applications like IOT, Robotics, Drones, IMS, AR/VR for low latency, high bandwidth, mobility and privacy.

3. Niral Controller

Centralized management, orchestration, zero touch provisioning & monitoring of multi-site Private Network and On-premise Edge Cloud. The controller can be hosted in a data center to centrally manage & monitor multiple private networks.

For Connectivity Solution

Contact Us

91 98861 79612

info@niralnetworks.com

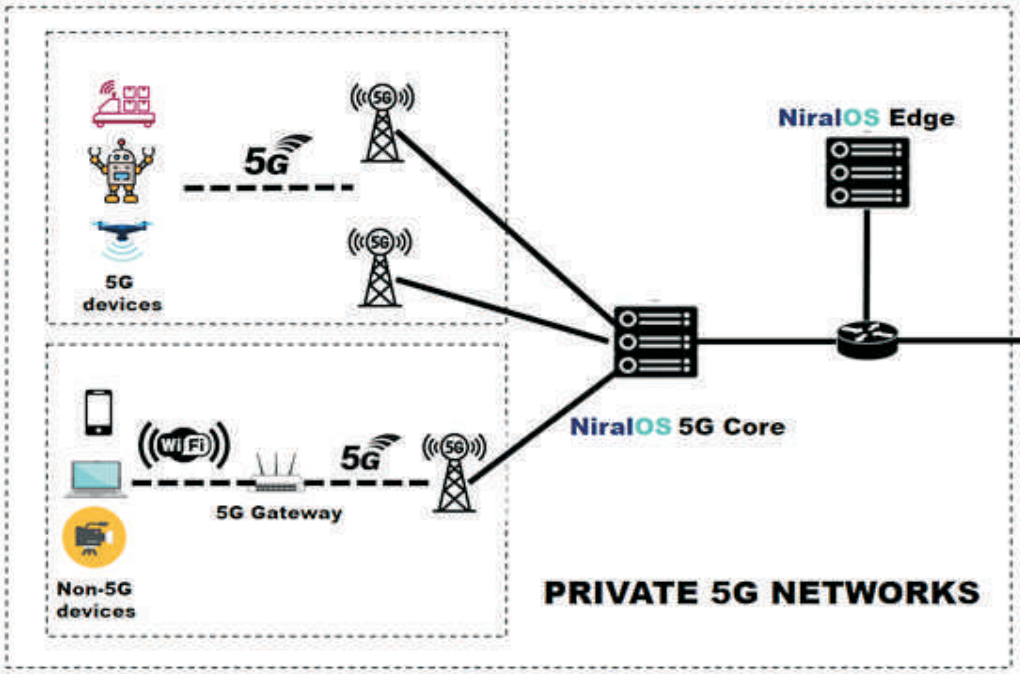
www.niralnetworks.com

NIRAL NETWORKS

NiralOS

Network Operating System for Private Network & Edge

NiralOS for 5G Mobile Cellular Communication Systems



NiralOS 5G & Edge Specification

Release -16	5G SA Core with Network Functions – AMF, SMF, NRF, NSSF, AUSF, UDR, UDM, BSF, UPF N1, N2, N3 and N4 Interface Service Based Interface HTTP/2 PFCP interface on v16.9.1
Distributed User and Control Plane and Interworking	Supports CUPS (Control Plane and User Plane Separation). Niral UPF can be used for local breakout of user plane traffic with a Centralized 3GPP Compliant from other vendor. Similarly, Niral Control Plane core can interwork with 3GPP Complaint UPF from other vendor.
Network Slicing and Network Segmentation	Supports Network Slicing based on S-NSSAI , SST , SD UPF selection based on S-NSSAI , DNN Network Segmentation based on DNN. Single UPF supports multiple DNN.
Cloud-Native Network Functions	Cloud-Native Control Plane and User Plane Functions for Horizontal Scaling and Distributed Processing. And User Plane Acceleration using DPDK, VPP with CPU Core.

5. SIGNALCHIP

Signalchip is an exciting Indian fabless semiconductor company established in 2010 with the vision of building an organization of highly motivated people working on cutting edge technologies creating differentiated semiconductor products. They work on extremely innovative chips to enable high speed wireless communication standards like 4G-LTE/3G-WCDMA and 5G-NR. Signalchip's devices provide extreme performance while being optimal owing to its slim baseband and RF architectures that are designed from grounds up with modern-day high-performance systems in mind and carry no baggage of legacy systems. Signalchip have the Agumbe series of Chipsets for Radio Access networks.

Agumbe series of Chipsets for Radio Access network

Single chip SoC	Baseband SoC	RF Transceivers	
LTE-LAA + WCDMA Dual Carrier 2X2 MIMO Single Chip	LTE Dual Carrier MIMO 4X4 Baseband Chip	2X2 MIMO Analog-RF Transceiver: 350MHz-6GHz with aux receiver	2X2 MIMO Analog-RF Transceiver: 350MHz-6GHz 5G-FR1 capable!
Ultra compact cost sensitive small cells	Local Area and Macro Base Stations	LTE Basestation, WiFi, SDR/Wireless Systems	5G NR, LTE Basestation, WiFi, SDR/Wireless Systems

Multisystem and Multiband RF Transceiver

Signalchip's RF Transceiver chips SCRF4502 and SCRF3402 integrates all the necessary components for 5G-NR/ 4G/ 3G/ 2G, Wi-Fi systems and a wide range of SDR applications. Integrated CPRI/JESD link support enables unique and compact RRU designs.

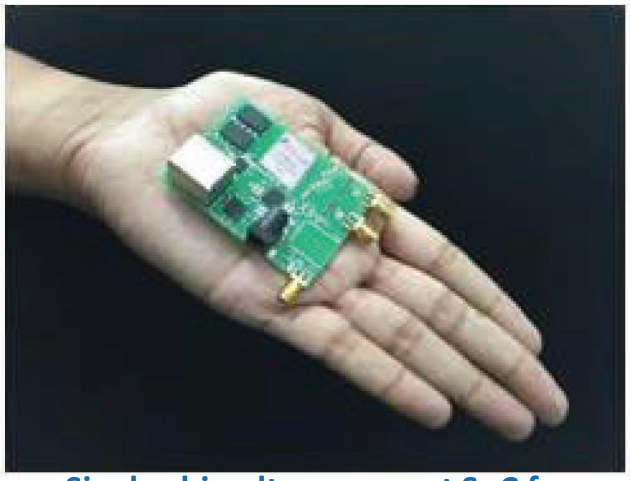
Complete LTE Base station in one chip

SCBM3412 is a highly optimized device built for residential and enterprise class base stations from scratch with a CPE (Customer Premise Equipment) mindset. A platform that carries no baggage of legacy systems brings together the performance and robustness of enterprise class equipment with the cost sensitivity of mass market equipment. Powerful processing engines for L1/ L2/ L3 layers of LTE Advanced systems, LTE and WCDMA have been built with innovative hardware-software partitioning and optimal analog-digital partitioning of the functionalities. SCBM3412 provides the long-awaited low-cost small cell solution with best-in-class performance.

High performance LTE Baseband

SCBM3404 is a highly optimized device built for enterprise and local area/macro base stations. A platform that carries no baggage of legacy systems brings together the performance and robustness of enterprise class equipment at a competitive price point. Powerful processing engines for L1/L2/L3 layers of LTE Advanced systems, LTE and WCDMA have been built with innovative hardware-software partitioning to support 4x4 and advanced signal processing functionality.

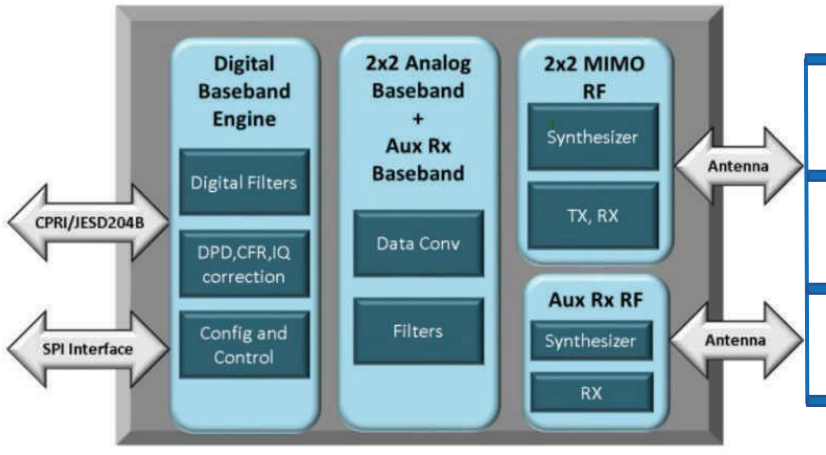
SCRF4502: 5G-FR1 capable RF Transceiver



Single chip ultra-compact SoC for a Feature Rich 5G Radio Unit!

Integrated DPD, CFR and Quadrature correction

Digital communication Interface with integrated CPRI/eCPRI and JESD



Supports 5G-NR, LTE, 3G, 2G and Wi-Fi

Advance Signal Processing

Ultra-low Noise RF Synthesizers

High Fidelity Data-Converters

contact@signalchip.com http://www.signalchip.com/ T: 91-80-41140123

6. SIGNALTRON

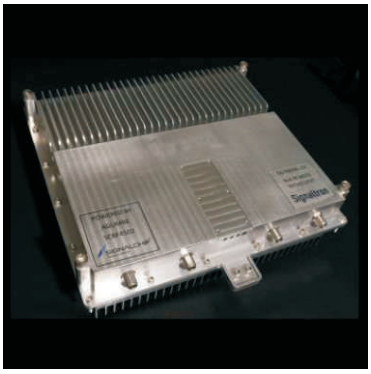
Signaltron is an Indian original equipment manufacturer of Wireless communications systems established in 2019 with the vision of building complete end to end technology ownership within India in ubiquitous networking devices. Founders of Signaltron have spent many years developing solutions to some of the most complex problems in networking, computation, wired and wireless communication domains. Signaltron specializes in providing radio access network solutions for 5G, LTE, GSM and WCDMA

Focus areas of expertise:

- Wired and wireless networking solutions: Indigenous 4G, 5G, Wi-Fi, NavIC
- Wireless Infrastructure
- Enterprise and Consumer equipment
- Secure networking

Sahyadri Series of RAN systems from Signaltron

Femtocell



5G-NR RU

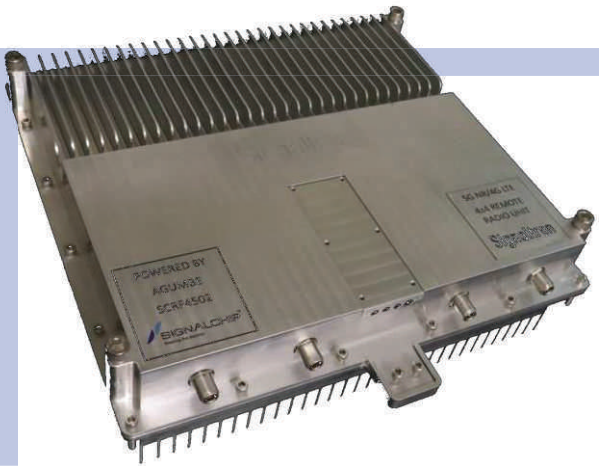
4G/5G BBU/DU

Compact NIB

O-RU

Micro Cell

STRRU4415-160W-OD: High power High Capacity 5G RU



O-RAN 7.2 interface

O-RAN Compliant with 10G eCPRI Interface

4 x 40W per Antenna

Lower PHY & Beam Forming

Signaltron's Sahyadri series of Radio Access Network Equipment featuring highly integrated, compact and versatile 5G/4G Base Stations deliver high capacity to enable ubiquitous connectivity to all. A key part of Sahyadri RAN, the STRRU4415 Remote Radio Unit is easy to install and gives the flexibility to run all functions of O-RU facilitating multiple interface splits of the macro gNodeB/eNodeB in a single enclosure.

Sahyadri Base Stations enabled by the new Agumbe Chipsets from Signalchip deliver high throughput providing industry leading performance in extremely compact form factors, which will allow operators to meet the huge growing densification demands as well as provide low-cost coverage to rural regions, thus providing a common deployment platform that bridges the diverse rural-urban deployment requirements.

Sahyadri STRRU4415 O-RU features energy efficient high power 4x4 radio that performs all the functions from lower-PHY of gNodeB/eNodeB's L1 layer to RF in a single compact enclosure. This helps the service providers to reduce the site space requirement and allow faster roll out while lowering the total cost of ownership. These can support carrier aggregation to maximize the cell throughput and capacity for an enhanced overall user-experience.

Sahyadri STRRU4415 is powered by the highly integrated 5G/4G RF transceiver chipset Agumbe SCRF4502 from Signalchip featuring high fidelity mixed-signal analog RF and integrated advanced signal processing functions such as DPD, CFR and QEC. The compact unit performs all functions of the lower PHY of L1 of the gNodeB/eNodeB solution. It connects to the DU over a 10G CPRI/eCPRI/ORAN 7.2x interface.

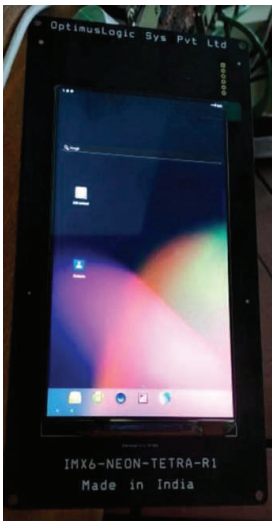
7. OPTIMUS LOGIC

- **OptimusLogic**, India's 1st smartphone startup, is building 7 **India's 1st global 5G Mobile**, **"optimus rhino 1"**, in association with **IIT Hyderabad**, supported by **TCoE, DoT, Govt. of India** under DCIS-2022 scheme.
- The **"optimus rhino 1"** is Made in India, Made for the World, Made for Everyone to create social convergence with 5G.
- The **"optimus rhino 1"**, will be followed by Tablets, Laptops and more, built on the new "Mukth" convergence platform co-developed by OptimusLogic & IIT Hyderabad.

the "optimus rhino 1"

- Tough, Rugged, Reliable & Eco-friendly 5.5" inch Smartphone with stock Android 12, with support & upgrades for 3 years
- Industry matching "regular" features for 5G, Calls, CPU, Memory, Camera, Music/Video, Navigation, Messaging, Apps etc.
- Industry first 4G to 5G swappable upgrade support for savings, practicality & optimisation; upgrade only when necessary
- Inbuilt "Ekalavya" Laptop mode for students & young minds to skill themselves for industry jobs and career opportunities
- Learn, Code & Master skills across Software, Hardware, VLSI, Digital Design, Computer Architecture, Embedded

OPTIMUS RHINO 1 5G



Proof-of-Concept: May 2022
5.5 inch Proto: October 2022
Design for Mfg: December 2022

ABOUT OPTIMUSLOGIC

OptimusLogic Systems, since **2013**, with operations in **Hyderabad** & **Bengaluru** in India, is now a growing global Original Device Manufacturer (**ODM**) and Independent Design House (**IDH**) in India, for Mobile & Wearable AI systems, Industrial IoT solutions, Signal Intelligence Radars and Ad-hoc Radios.

OptimusLogic is global design partner for **QuickLogic Corporation** since 2017, working on their low power sensor hubs for **Rugged Android Mobile customers in US & Japan.**

OptimusLogic contributes actively in the development of open source "Arnold" **RISC-V 22nm chipset** with eFPGA for edge compute.

OptimusLogic has R&D partnership with **IIT Hyderabad** since 2016 to tap into the latest academic research & talent across engineering and research disciplines.

OptimusLogic and **TiHAN-IIT Hyderabad** jointly develop solutions for autonomous navigation in aerial and terrestrial vehicles.

OptimusLogic is a proven R&D vendor-partner for **Indian Defence PSUs - Bharat Electronics Limited (BEL) & DRDO** since **2014,** contributing towards radars & radios.

OptimusLogic delivers solutions to companies like **Micron Technology** across fluidic partitions of software, hardware, VLSI & Apps.

OPTIMUSLOGIC
India's Global Electronics Solutions Company
DEFEND • CONNECT • CONSERVE

Optimus Rhino 1 (⊠⊠⊠⊠) : 100% India Designed, Developed and Manufactured (IDDM) Mobile Phones and Accessories

Proof-of-Concept: May 2022

5.5 in. Prototype: October 2022

Design for Mfg: December 2022

Available for Sales: March 2023

Operation Rhino is our 9-year dream and mission to design, build and launch indigenous electronic products globally from India. Optimus Rhino 1 seeks to be the 1st mobile phone towards this goal of aatmanirbharta with a sales target of 1Mu+ in 2023.

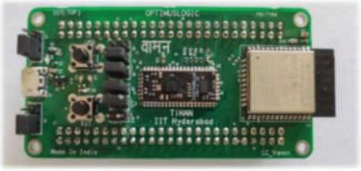
We want Rhino to be a global Indian brand for electronics and OptimusLogic to be known across the world as India's global electronics solutions company.

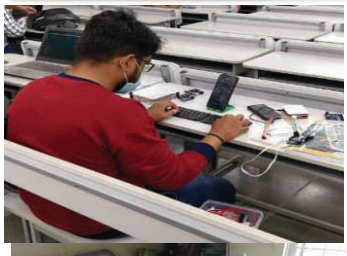
Our journey to build the 4G/5G Optimus Rhino 1 phone from scratch in India without active support from the global chip manufacturers is the greatest challenge to fulfil; And we are working hard to meet this challenge and launch the Optimus Rhino 1 in 2023.

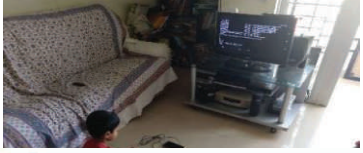
Our journey to Rhino is built-on our extensive experience since 2013 in the following pillars of technology and revenue driven business:

1. **RF Communication since 2013** for Defence Radios and Radars for BEL and DRDO including field trials and our own Dory Adhoc ISM Band Radio for tactical comm.
2. **Android & Sensor Hubs since 2017** for Rugged Japanese phones from Concept to Production
3. **Turnkey Product Development since** 2016 for Secure Storge, Connected Lighting, IoT, Wearables with Sports/Industrial AI and more
4. **Memory Technology** & Optimisation for memory leader company since 2020, for Mobile business unit

Vaman (⊠⊠⊠⊠): Affordable Skill Development across India in latest Semicondutor Technology using Mobile phone, to make true our Hon'ble PM's mission for India to become a hub for semiconductors for the world







DORY Ad-hoc Mesh Radio
ISM 865-867 MHz

The **Vaman** ecosystem developed by OptimusLogic in association with IIT Hyderabad & TiHAN-IIT Hyderabad, has enabled affordable Open Source VLSI Development on Android Smartphones without need for a Laptop/PC to drive India's next semiconductor revolution in talent and chipsets.

The Vaman ecosystem consists of:

- The "Pygmy" FPGA+ARM+AI Made-in-India Module
- 100% Open-Source VLSI, Hardware, Software and AI/ML Tools chains supported on the Android Mobile phone

Anyone across our country, cutting across economic and social divides, now can learn, master, and build solutions to real-world problems with a hardware-software co-design thought process from prototypes to product. Please see https://youtu.be/bRrJqL3NGlg.

"Vaman" will have significant impact across the engineering curriculum and mindset, and contribute to the rising semiconductor ecosystem in India and the world.

Vaman / Pygmy is also used in commercial products for Sensor AI & security in mobile phones including Optimus Rhino, Wearables, UAVs/UGVs, 5G BTS and more.

Contact us today:

Chandrakumar Chettiar, Managing Director, CEO
+91-9866677117, ck@optimuselectronics.com

Someshwar MS, Director, Products & Systems
+91-6361691933, someshwar.ms@optimuselectronics.com

Krishnakumar A, Director, Software & Applications
+91-9731945533, krishnakumar.a@optimuslogic.in

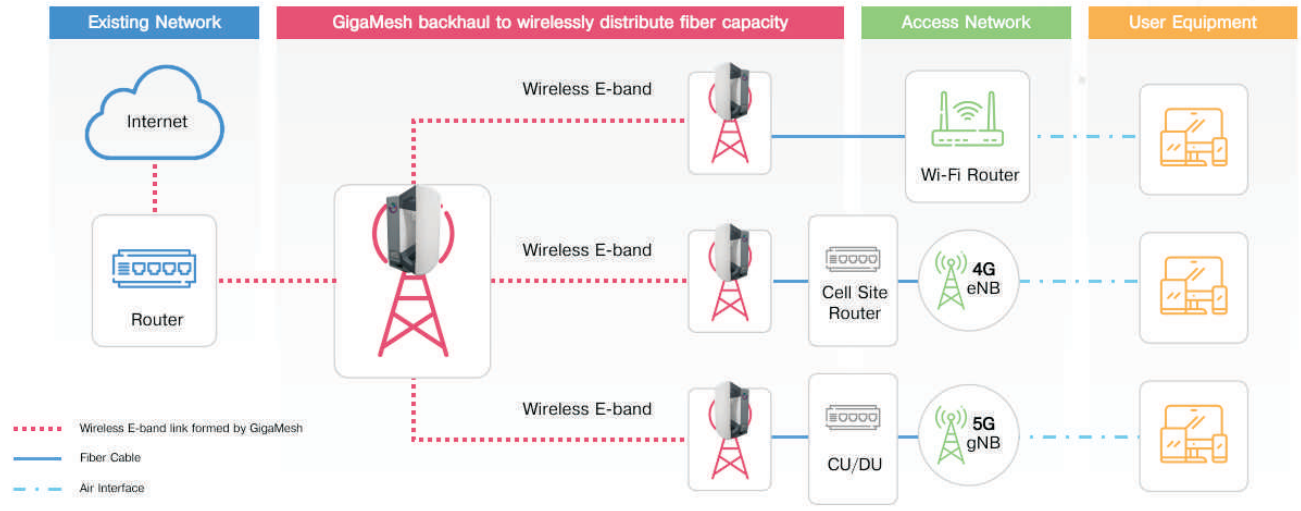
8. ASTROME

Astrome is a deep tech startup that is accelerating the deployment of 5G and backhaul telecommunication infrastructure through its patented millimeter-wave E-band radios and satellite communication products.

Astrome is pioneering the future of millimeter-wave wireless communication – be it on earth or from space. The company is a DPIIT recognized startup, incubated at the Indian Institute of Science, Bangalore which is India's premier R&D school. The company is also incubated at EvoNexus, a 5G accelerator program sponsored by Qualcomm and Verizon. In the last seven years, the company has carved itself a niche by winning prestigious grants and awards, including the national award given by the **Honorable President of India.** Astrome's solution also received the Most Promising Connectivity Solution award by **International Telecommunication Union (ITU)** in the year 2020.

Astrome has started deployment of its E-Band radios - **GigaMesh** in the pilot project awarded by Universal Service Obligation Fund(USOF) arm of Department of Telecommunications (DoT) through ITI to provide internet services to the remote villages from Gram Panchayats connected through E-Band Radio utilizing BahrateNet fiber.

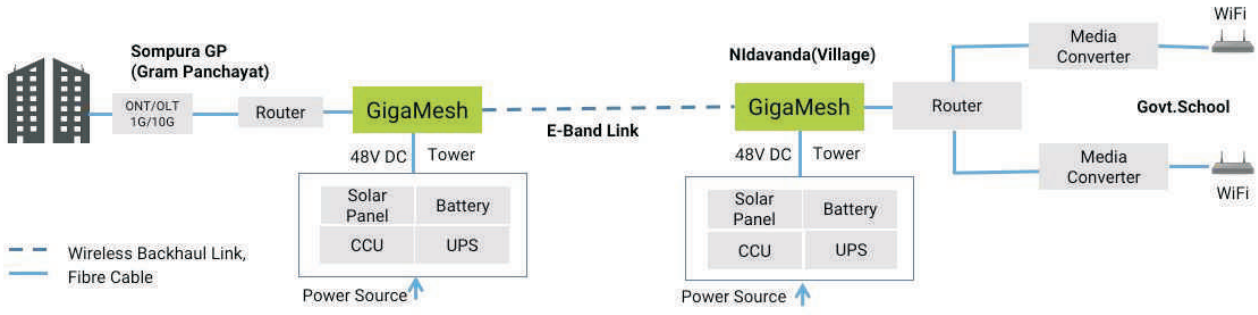
Deployment
Scenario



ASTROME

Universal Service Obligation Fund

Indigenous E-BAND Radio for wireless backhaul for internet connectivity from Gram Panchayat to remote Village



भारत दूरसंचार
DOT
INDIA TELECOM

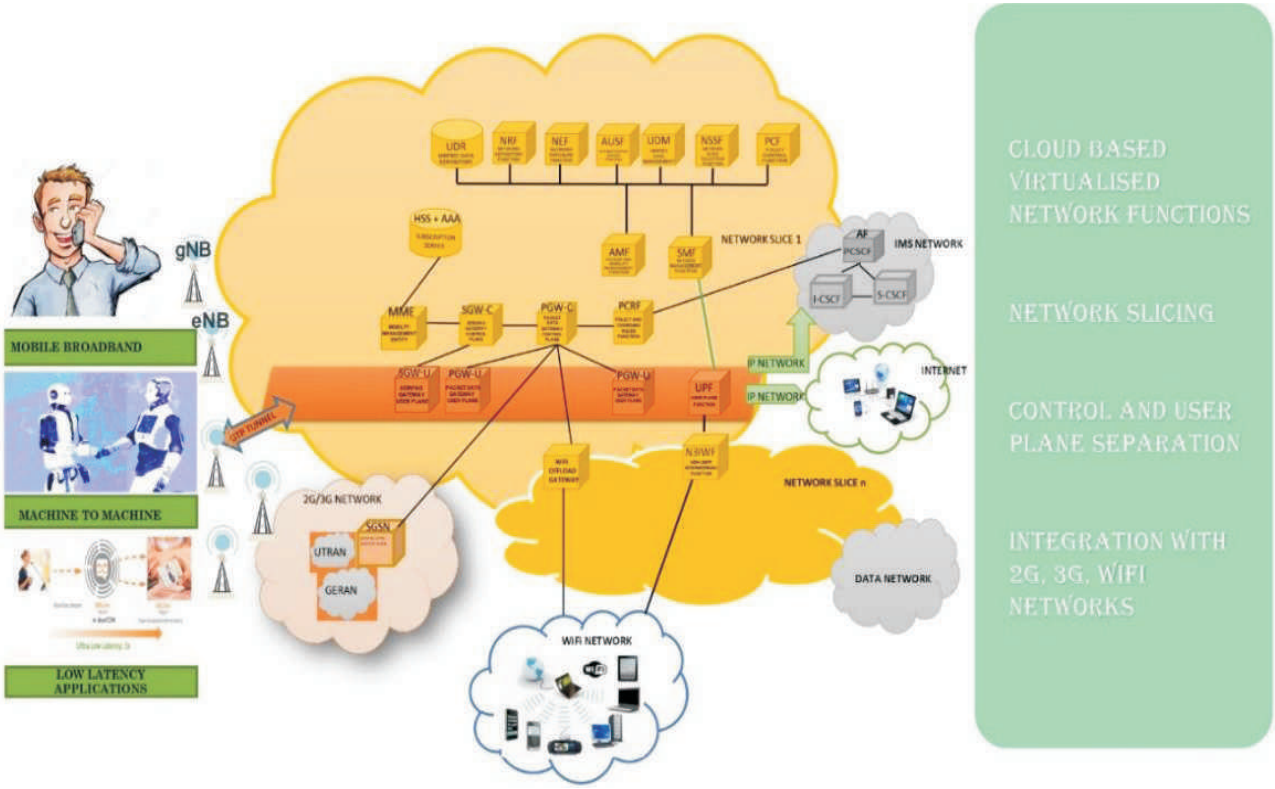
www.astrome.co

9. Centre for Development of Telematics (C-DOT)
Telecom R&D Centre of the Government of India

Centre for Development of Telematics (C-DOT), established in 1984 as an autonomous R&D centre of the Department of Telecommunications, Ministry of Communications, Government of India has been widely known for its monumental role in ushering in the indigenous Telecom revolution in the nation. With its world-class research labs equipped with the state-of-the-art infrastructure and a pool of the brightest engineers from the top institutes of the nation, C-DOT has been strongly committed to fulfilling the overarching objectives of national development through its targeted research initiatives aimed at addressing the specific connectivity needs of our diverse country.

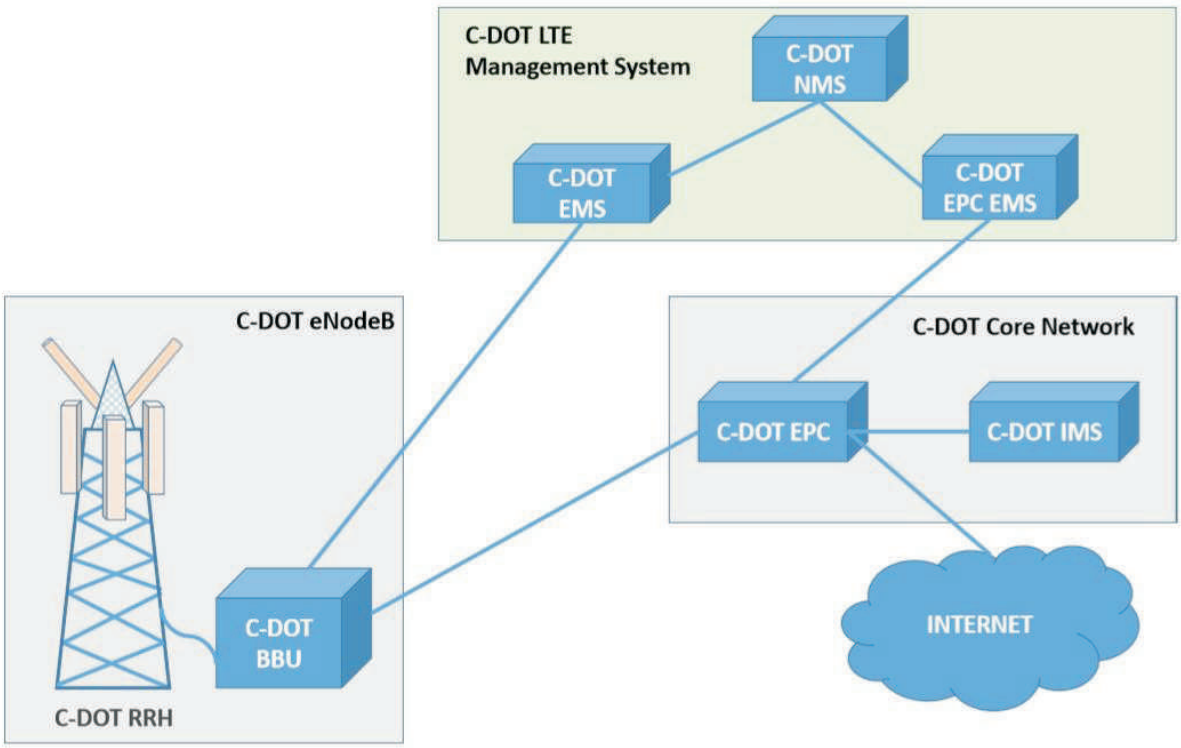
C-DOT's technologies aim at augmenting the broadband infrastructure of the nation and addressing the specific requirements pertaining to rural, security and strategic applications. C-DOT's diverse product portfolio spans a wide array of technologies that include Switching & Routing, Optical Communication, Wireless Communication, 4G LTE, 5G, Network Security, advanced encryption techniques and Post-Quantum Cryptography based solutions, Disaster management, Network Management, M2M/IOT, AI, and a host of other telecom software applications that is a manifestation of its unrelenting desire to capture the unexplored dimensions of the vast Telecom firmament. A brief description of C-DOT's 4G/5G offerings is given below:

C-DOT 4G /5G Converged Core

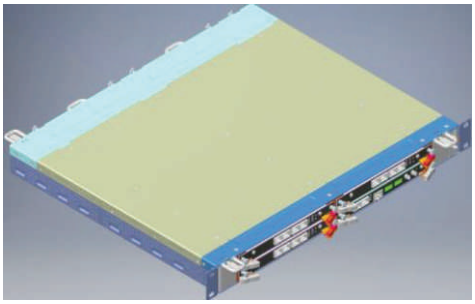
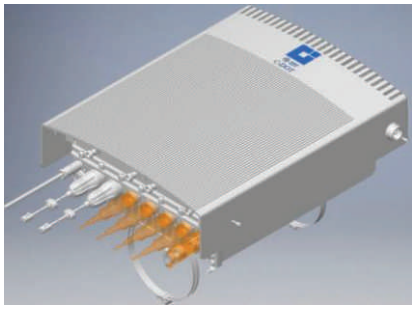


1. Simplified Network Topology & Scalable cloud-based Architecture.
2. Supports 3GPP defined interfaces; Seamless interworking with existing 2G/3G mobile networks.
3. 4G Evolved Packet Core Network providing mobile native VoLTE / VoIP / data services through seamless integration with IMS and legacy mobile services.
4. IP Multimedia Subsystem (IMS) for access independent and service independent delivery with provision for services/features portfolio expansion using 3rd party plugin servers.
5. Wi-Fi Offloading & IoT Services.
6. 5G Non-Stand Alone (NSA) and Stand Alone (SA) Packet Core Network providing 5G Data Services.
7. Flexible data center switch fabric & Element Management System.
8. Security implementation through embedded Firewall, Security Gateway and CGNAT.

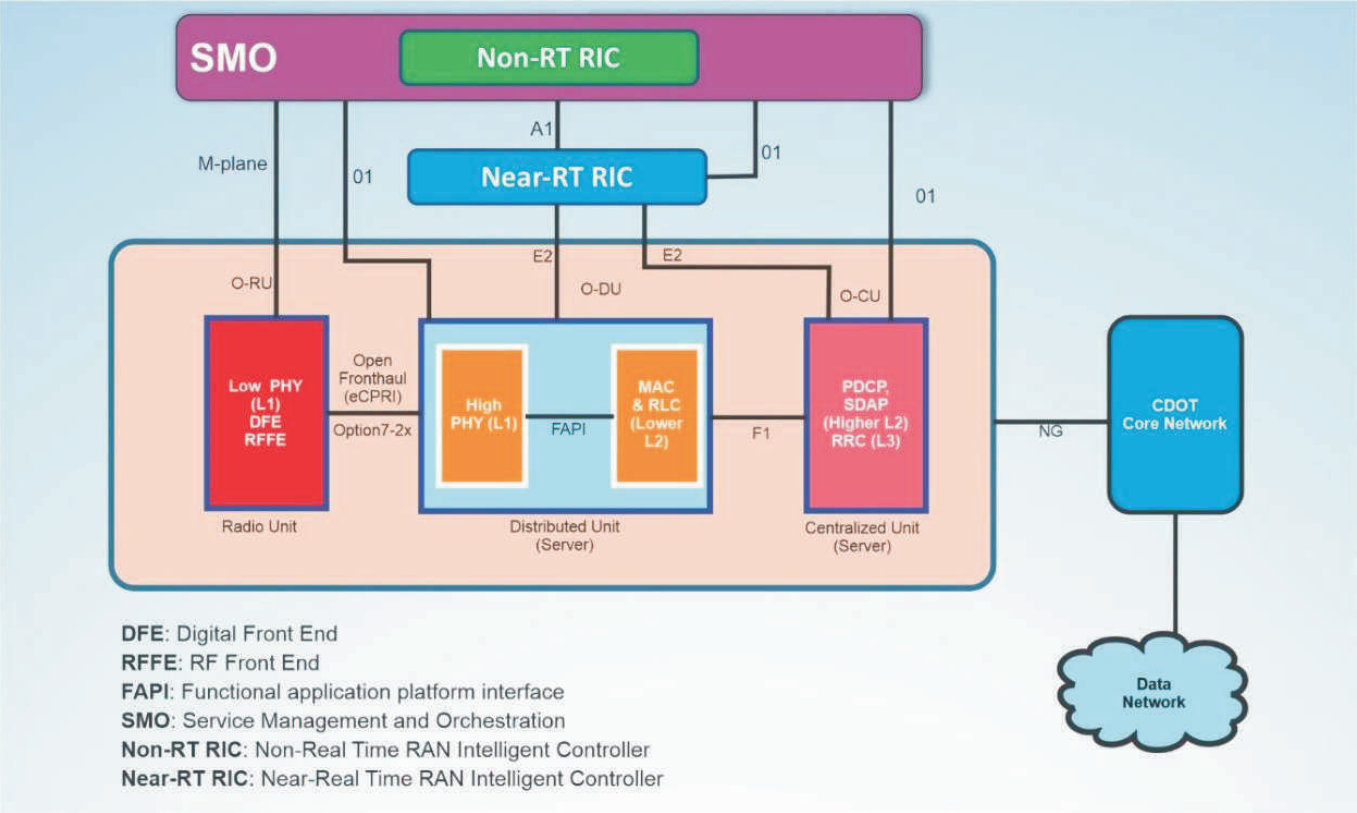
C-DOT LTE Radio Access Network (RAN) Solution



C-DOT provides complete carrier grade LTE Radio Access Network (RAN) Technology which is a part of C-DOT LTE Solutions.

C-DOT RAN	C-DOT Core Network
1. C-DOT eNodeB a. Baseband Unit (BBU) b. Remote Radio Head (RRH) **2.** C-DOT RAN Element Management System (EMS)	1. C-DOT Evolved Packet Core (EPC) *2.* C-DOT IP Multimedia System (IMS) *3. C-DOT Core Network EMS* **C-DOT Network Management System (NMS)**
RAN Specification	**RAN Features**
1. Multi sector macro eNodeB 2. Bands supported: a. FDD: B3, B28, B1, B5 and B8 b. TDD: B40, B41 3. Bandwidths supported: 5, 10, 15, 20 4. Supported CPRI version: up to 4.2	1. Carrier Grade Solution 2. Indoor BBU and outdoor RRH 3. Scalable 4. Modular 5. Long term Support 6. Complete End-to-end solution from C-DOT
BBU Features  1. Scalable up to 3 sectors 2. Modular Architecture. Multi-technology capable 3. Maximum users: 1000 connected and 384 active users across 3 sector 4. 12 CPRI interfaces 5. 2x10 Gbps uplink capacity 6. Management Ethernet, USB, Alarm 7. GPS and IEEE 1588 synchronization 8. 1U and 19-inch Rack compatible 9. Equipment Category: QM 333 Type A 10. IP Category: IP30 11. Operating temperature: 0°C to 40°C	**RAN Features**  1. Both FDD and TDD support a. FDD: B3, B28, B1, B5 and B8 b. TDD: B40, B41 2. Output Power: 20W and 40W per antenna port 3. Antenna configuration: 4x4 MIMO for high bands and 2x2 for Low bands 4. IP Category: IP 67 5. Operating temperature: -10°C to +60°C 6. Control and Management Protocol: ORI 7. Rugged Design 8. Daisy chain up to 3 RRH

C-DOT 5G RAN System



1. O-RU processes Lower L1, Digital Front End (DFE) and RF Front End (RFFE)
2. O-DU processes Higher L1 and Lower L2 (MAC, RLC protocol layers) with FAPI interface
3. defined between higher L1 and Lower L2
4. O-CU processes higher L2 (PDCP, SDAP layers) and L3 (RRC layer)
5. O-DU and O-CU are implemented using general purpose processor-based Server Hardware
6. Higher L1 of O-DU implemented on Server with Channel coding functionality of L1 offloaded
7. to Accelerator (FPGA) card.
8. SMO is responsible for RAN domain management. The key capabilities of the SMO that provide
9. RAN support in O-RAN are FCAPS (Fault, Configuration, Accounting, Performance, Security)
10. interface to O-RAN Network Functions, Non-RT RIC for RAN optimization and O-Cloud
11. Management, Orchestration and Workflow Management.
12. Non-RT RIC supports intelligent RAN optimization by providing policy-based guidance,
13. ML model management and enrichment information to the near-RT RIC function. It can also
14. perform intelligent radio resource management function in non-real-time interval (> 1second).
15. Near-RT RIC enables near real-time control and optimization of E2 Nodes functions and resources via fine-grained data collection and actions over the E2 interface.

10. QuNu Labs Private Limited

Introduction

QuNu Labs Private Limited (QNu Labs) is a leader in developing quantum cryptography based products and solutions; Founded in 2016, through an incubator at Indian Institute of Technology-Madras, QNu Labs now based out of Bangalore provides quantum safe data encryption, secure key generation and distribution solutions to the financial industry, telecom service providers, large and medium enterprises, defense and government organizations worldwide to protect their assets from current vulnerabilities and future attacks. QNu Labs has also developed an ecosystem of partners with capabilities to carry out R&D, manufacturing, testing and certifications for the new and emerging quantum technology.

Problem Statement

The following are the industry challenges being addressed by QNu:

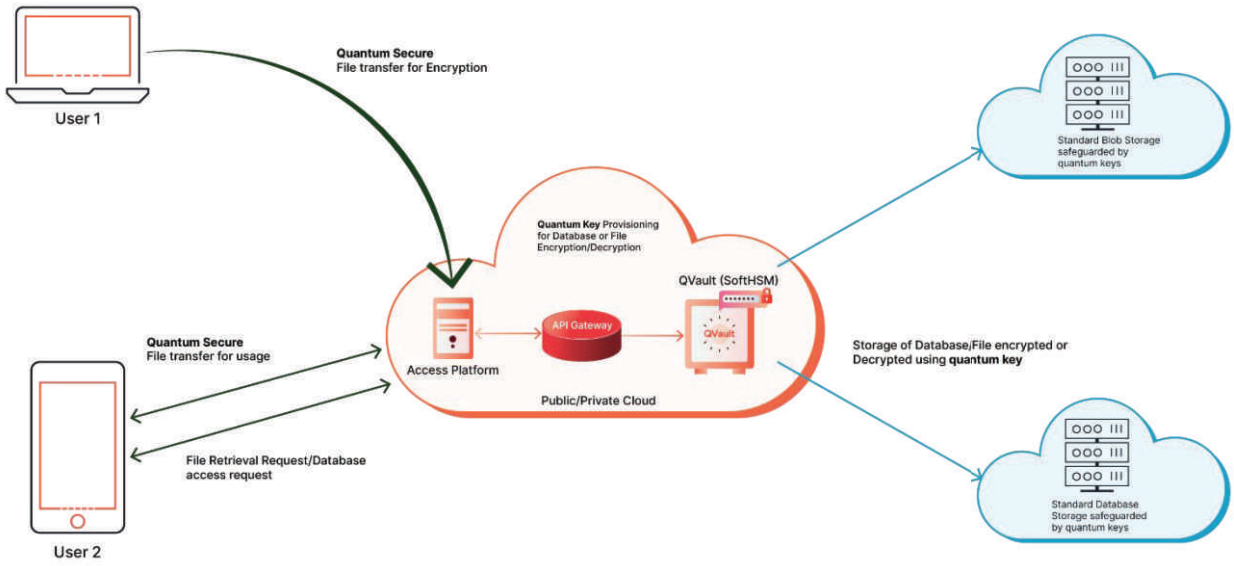
- Lack of perfect randomness for encryption keys, digital signatures and other cryptography material which is misused by hackers to get access to the secret keys (and thus to confidential data)
- Vulnerabilities and risk of distribution of encryption keys over public networks
- Compromise of credentials such as passwords and data via phishing, ransomware attacks and unauthorized hackers stealing sensitive information via eavesdropping
- Millions of IoT devices that will be installed in the next few years will be highly insecure to new quantum computing inspired attacks

Offerings

QNu offers an umbrella of Quantum Products and Solutions

- Armos (Quantum Key Distribution)
- Tropos (Quantum Random Number Generator)
- Qosmos (Entropy as a Service)
- QVault (Quantum Secure Vault)
- mCarp (Critical Analysis Research Platform)
- QVPN (Quantum Secure Virtual Private Network)
- QVerse (Quantum Secure Messenger)

Use Case



A quantum secure remote workplace platform providing PQC (Post Quantum Cryptography) hardened site to site secure communication with fine grained policy-based access control. Integrated Quantum vault secured and powered by QRNG (Quantum Random Number Generator). Provides encryption/decryption, signing and key generation as a service using standard FIPS compliant algorithms as well as NIST finalized Post Quantum Cryptography algorithms.

Recognitions

QNu has received significant recognition for its efforts and has won following prestigious awards:

- “Technology Start-up” award by Ministry of Science and Technology in 2022
- Raksha Mantri's “Raksha Anveshan Ratn” award for Innovation Excellence in Defence and Aerospace Sectors in 2022
- NASSCOM’s “Emerge 50" and "League of 10" in Cyber Security category for the year 2019
- DSCI’s “Most Innovative Product of the Year-2019”

QNu with its super specialized team of 45 engineers and scientists is playing an important role in India’s National Mission on Quantum Technologies & Applications (NM-QTA) to build indigenous capability in this space to make India ‘Self Reliant’ in this game changing technology. QNu has filed for six patents in protocols, schemes, and hardware design (of which two are awarded) and has further augmented its intellectual property and innovation with 10+ trade secrets that provide an edge over other competing solutions globally.

Registered Office:
QuNu Labs Private Limited
Centenary Building, 2nd Floor, East Wing, MG Road
Bengaluru 560025
CIN: U72900KA2016PTC096629

email: info@qnulabs.com
web www.qnulabs.com

+91 80 4851 4013
+91 98860 41133

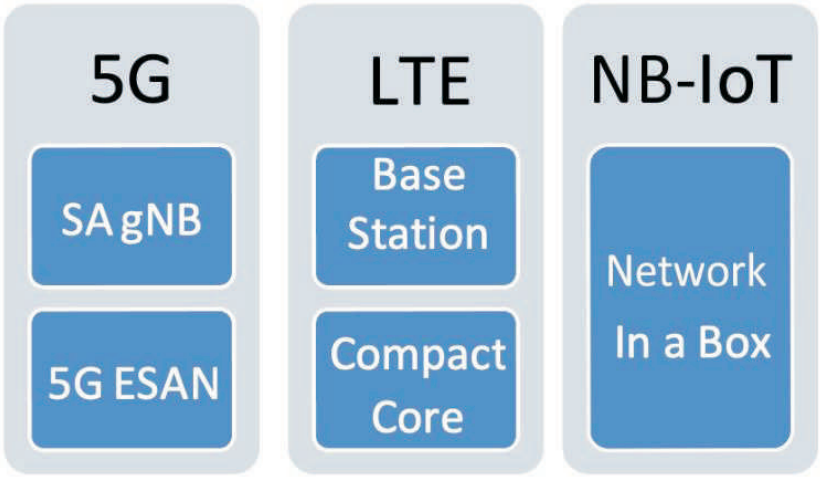
11. SOOKTHA

We offer software and solutions for cellular wireless access infrastructure. In the Radio Access Network (RAN), we offer the 5G NR gNB, the 4G LTE eNB, and the NB-IoT eNB. We believe we can unlock the full potential of cellular wireless access by combining deep domain knowledge, well-engineered software, and agile development practices.

We are a cellular wireless access software and solutions company. Our core team has worked across the globe over the last two decades, developing and deploying cellular wireless access solutions for both Infrastructure and Test & Measurement (T&M) segments. The team brings a combination of technology, specifications, software, systems, and ecosystem expertise and insight that rivals the best in the world.

Our core beliefs are in Simplicity, Excellence, and Value Creation. We strive to reflect these beliefs in every interaction with each one of our stakeholders.'

Our Solutions Include below:



5G NR gNB:

5G NR gNB for use in Enterprise, Industry, and Campus. Integrated small cell as well as split deployments (CU, DU) to match specific needs.

a. 5G NR gNodeB Software for SA Mode
b. 3GPP Release 15 Compliant
c. O-RAN Compliant
d. Up to 128 Users per sector
e. Up to 16 Users per slot
f. Up to 100 MHz Operating Bandwidth
g. Downlink 8 layers and Uplink 4 layers
h. QoS Aware Scheduler
i. FAPI complaint
j. CLI and GUI based EMS support
k. Multiple Layer 1 options available
l. Multiple hardware platform options available

5G NR End-to-End Application Test Bed

Our End-to-End Software Access Network (ESAN) includes the multi-UE (MUE), Smart Base Station (SBS), and the Integrated Core Network (ICN) software. A real- time simulation of the baseband and RF allows this to be deployed on COTS servers.

a. 3GPP Release 15 Compliant
b. O-RAN compliant
c. Up to 128 Users per sector
d. Up to 16 Users per slot
e. Up to 100 MHz Operating Bandwidth
f. Downlink 8 layers and Uplink 4 layers
g. QoS Aware Scheduler
h. FAPI complaint
i. Virtualization/Containerization ready
j. CLI and GUI based EMS support

LTE Base Station

a. 3GPP Release 13 Compliant
b. Up to 32 Users per sector
c. Transmission modes 1 to 4
d. VoLTE support (SPS, RoHC and TTI Bundling)
e. QoS Aware Scheduler
f. CLI and GUI based EMS support
g. TR69/TR196 support

NBIoT Network-in-a-Box

a. LTE Cat-NB1
b. 3GPP Release 13 Compliant
c. Standalone, Inband, and Guardband
d. CP-CIoT and UP-CIoT
e. Paging, eDRX, and PSM support
f. Uplink Single-Tone and Multi-Tone
g. Integrated USRP/Lime SDRs
h. CLI and GUI based EMS support

12. Innominds Software Private Limited

Innominds has proven expertise across Devices, Apps and Analytics, backed by technologies like Wi-Fi, NB-IoT, Cloud, 5G, LTE, AI, ML, Mobility, and Edge Computing. We build customized products and solutions for our clients in the Automotive, MedTech, Industrial, Transportation & Logistics verticals. We accelerate custom product development cycles by leveraging our pre-built, production-ready Cloud Connected Compute Platforms & our Device to Cloud solutions. Innominds powers the Digital Next initiatives of Global Enterprises and OEMs.

List of Key Offerings (Products & Solutions):

1. ISQ8250 System-on-Module: A ready-to-use small form factor, low power, heterogenous compute and connectivity module for complex AI-on-the-Edge applications. It enables OEMs to build next-gen AI enabled IoT systems for industrial & enterprise verticals.

2. ISQ 450 System-on-Module: A value-tier platform for building connected android-based edge devices.

3. ISQ 9207 System-on-Module: Provides low power compute & connectivity for building custom headless IoT “nodes”, “things” or “gateways”. It integrates an ARM Cortex A7 processor running Linux, WiFi, BT & LTE connectivity in a small form factor. The ISQ9207 module supports popular interfaces to connect to sensors and other special function peripherals.

4. Vehicle Telematics Unit – An AIS 140 compliant LTE enabled Telematics Control Unit for intelligent fleet management. The device supports vehicle tracking, performance monitoring through onboard sensors & interfacing to vehicle systems and realtime assistance to the driver and fleet manager.

5. iDhi™ : An AI-on-the-Edge platform based on Qualcomm’s Snapdragon 800 coupled with a customizable carrier board supporting 5G connectivity, NVMe storage, Wi-Fi connectivity and multiple interfaces to cameras, displays and sensors. The platform delivers up to 10TOPS for next gen AI inferencing, through its CPUs, DSPs, GPU, and the Neural Processing Engine.

6. Caora ID Scanner: Contactless facial biometric document authentication & verification device for access management.

7. Device Lifecycle Management: Enterprise grade, AWS/Azure cloud hosted, IoT device provisioning & management solution.

8. iFusion™ – An autonomous AI platform accelerating enterprise AI adoption by enabling full lifecycle AI management.

9. Smart Terminal – A multi-user system for education & skill development applications. Each user gets their own independent session with video and graphics, interactivity, and audio.

10. Dynamic Routing Platform – Dynamic Routing Platform has capabilities to augment the fleet management operations for logistics, supply chain and retail industries.

11. iNNTACT™ – An end-to-end solution for tracking and monitoring transportation of environment-sensitive produce, via road and air.

Key working technology domain:

- ✓ LTE
- ✓ 5G
- ✓ Enterprise/Private/Captive Network (LTE/5G)
- ✓ IoT/NB-IoT/M2M
- ✓ Devices/CPEs/UEs
- ✓ Wi-Fi
- ✓ Cloud Platforms/Applications
- ✓ Others: Transportation, Logistics, MedTech, Vision Intelligence

Deployment Details (Project/Trials/Field Trials):

1. Vehicle Telematics Unit/ISQ 9207 SOM (India and Brazil)
2. iDhi™/ISQ 8250 SOM (North America, India, Middle East, West Indies)
3. OWL/ISQ 450 SOM (Japan)
4. DLCM (North America and India)

Collaboration/Partnership Opportunities:

Collaborations:

- IISc Bangalore for 5G Test Bed
- Vaidyuthi Mobility Pvt Ltd. on Tele-Operated Guided EVs

Partnership Opportunities:

- We are open to collaborations on developing next-gen AI-on-the Edge solutions using our iDhi™ EdgeAI platform.

Awards/Recognitions/Certifications:

1. One of the top three finalists of the 12th Aegis Graham Bell Awards 2022 under the 'Innovation in HealthTech' category.
2. Received award for clocking the fastest growth in the INR 100 Cr revenue category at the HYSEA 29th Annual Innovation Summit.
3. Shortlisted amongst the Top 100 in the 5G Hackathon 2021.
4. Innominds was a proud finalist in the 'Established Product' award category at the HYSEA Product Awards and Expo 2021 for showcasing the latest innovation built around its iFusion™ platform: 5G Powered AI and Computer Vision-Based Robotic Guidance System for Medical Surgeries.
5. Innominds' iFusion™ Analytics won 2020 Data Breakthrough Award for the "Data Monitoring Solution of the Year".

Application/Business Verticals (mapped to products & solutions offering):

- ✓ Digital Health (MedTech Devices and Solutions)
- ✓ Agriculture and Animal Husbandry
- ✓ Logistic Hubs/ Supply chain management
- ✓ Digital Education and Skill Development
- ✓ Industry 4.0 (Advanced Manufacturing)

- ✓ Ports & Airports
- ✓ Automobiles/ Intelligent Transport System/ V2

Smart Cities & Communities

Contact Details (Name, Mobile, Email) of two key members:

1. Name: Murali K Ramanathan
   Mobile: +91-9900048049
   Email id: mramanathan@innominds.com
2. Name: Parvathi Chandrasekaran
   Mobile: +91-8105567825
   Email id: pchandrasekaran@innominds.com

13. ITI Limited

ITI Limited is a public sector undertaking in the telecommunications technology segment established as a departmental factory in 1948. The company has manufacturing facilities in Bengaluru, Naini, Rae Bareli, Mankapur and Palakkad along with an R&D centre in Bengaluru and 25 Marketing, Services & Projects (MSP) centers in India, which are located at Bengaluru, Bhubaneshwar, Chennai, Hyderabad, Kolkata, Lucknow, Mumbai, New Delhi and 17 other places spread across the country.

The company has a diverse suite of products including manufactured products like Gigabit Passive Optical Network (GPON), Managed Leased Line Network (MLLN) products, Stand Alone Signaling Transfer Point(SSTP), Wi-Fi Access Point, Radio Modem, SMPS, Set Top Box, Defence products like multi-capacity encryption units, Bulk encryption Units (BEU), Terminal End Secrecy Devices (TESD), Passive infrastructure products such as Optical Fiber Cable, HDPE duct, Antenna, diversified products such as smart energy meters, smart cards, solar panels, mini personal computers.

Besides offering the telecom turnkey solutions and customized support, ITI has a dedicated Network System Unit for executing turnkey projects for installation and commissioning of telecommunication networks. The company intends to upgrade and invest in the technology, through the acquisition of technology from strategic partners with a specific focus on high growth industry segments. The company operates a data center at Bengaluru and currently expanding the same to offer cloud based services to government institutions/departments, banks etc.

The company is manufacturing a diverse range of Information and Communication Technology (ICT) products/solutions to hone its competitive edge in the convergence market by deploying its rich telecom expertise and vast infrastructure. Company is diversifying towards IOT, Smart city, other allied telecom products and services including turnkey project execution to offer solutions in diversified fields. Encryption Products are the company's forte. Extensive in-house R&D work is devoted towards design and development of encryption solutions to Indian Defence forces.

PRODUCTS

Smart energy meters
GPON OLT and ONT
PCM multiplexers
Electronic push button telephones
Ruggedized telephones for defence forces
Smart cards and banking cards
Hand held terminals for smart card authentication
Set top boxes, Wi-Fi equipment
Multiple types of encryption devices for defence
Solar power module
Switched mode power supply system
Internet of things (IOT) products
Radio modems
AN Rack hardware
Mini personal computers
Bank automation products
Optical Fiber Cable
HDPE pipe

TRADED PRODUCTS

Optical transport network products, like, DWDM
Managed leased line network (MLLN) products
Signalling Transfer Point (STP) network products
IP/MPLS routers and switches
Network management system solution
Microwave and satellite communication equipment
Next generation network equipment
IT products and solutions.

SERVICES

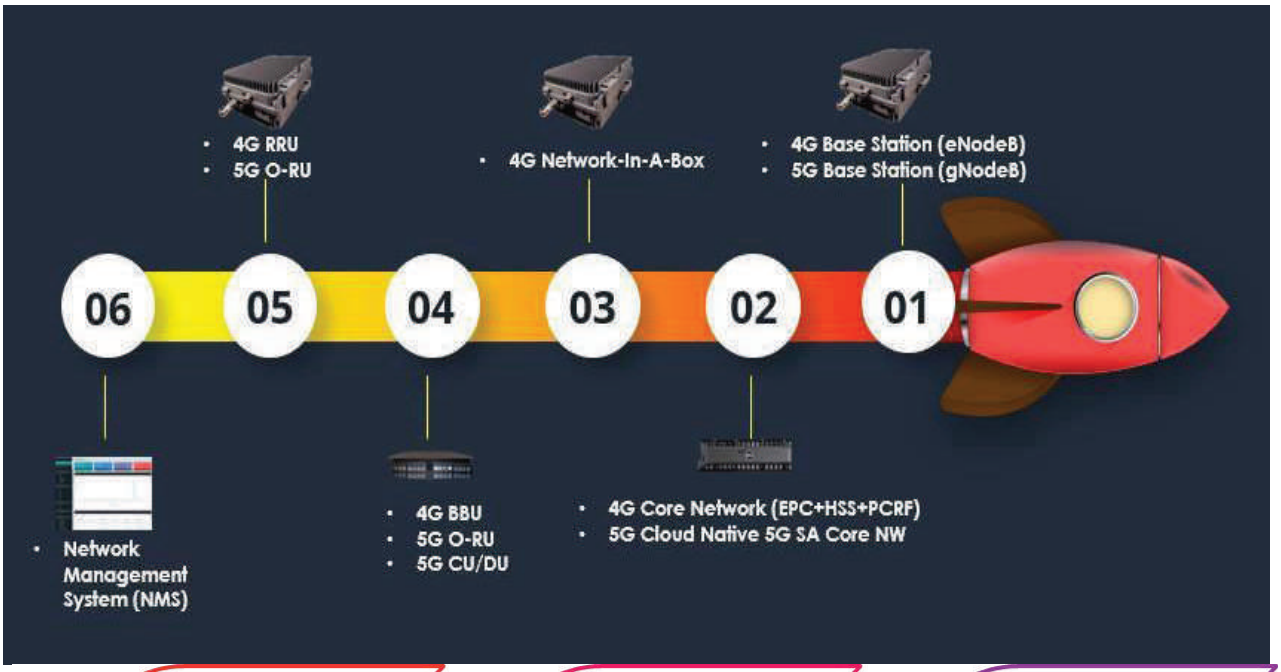
Installation, Commissioning and Maintenance services for Telecom and other supplied equipment
Contract manufacturing services
Component screening services
Data Centre hosting services etc

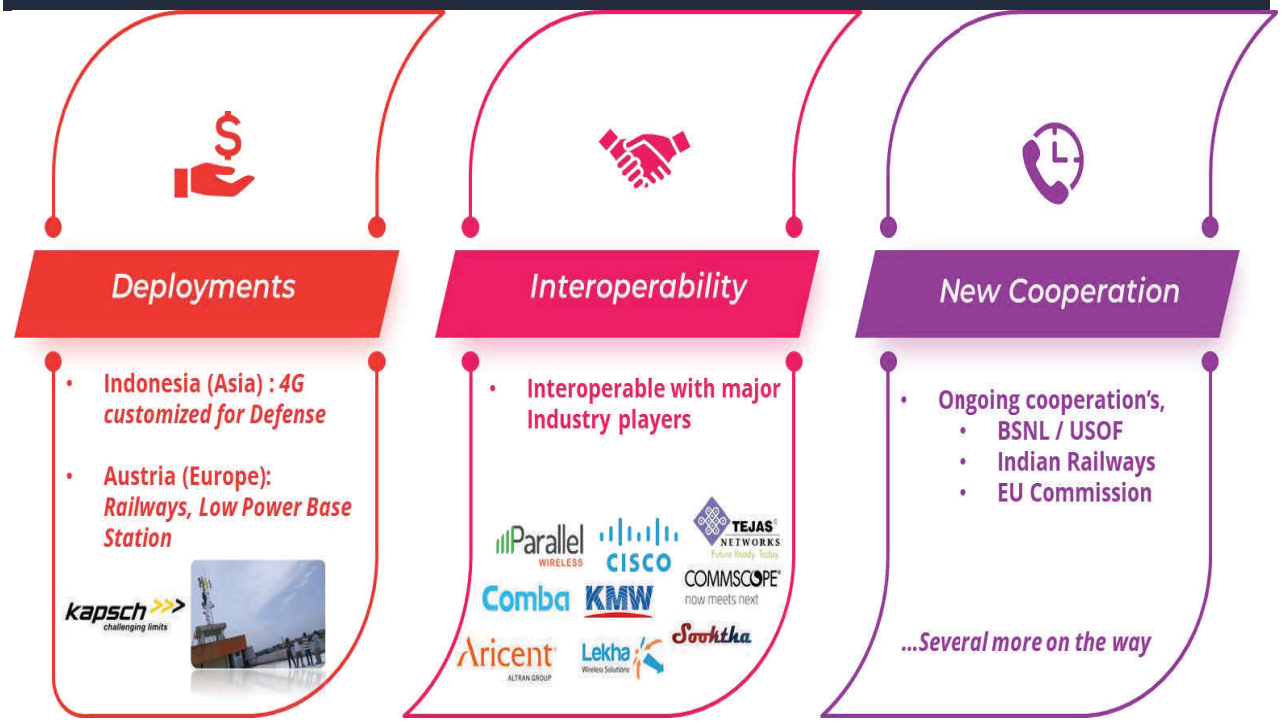
14.

resonous TECHNOLOGIES

Indigenous 4G / 5G Wireless Network Solutions

Resonous technologies is a Bangalore based 4G and 5G Wireless Network Solutions Supplier with strong R&D focus for nearly 10 years, delivering cutting edge solutions with secure, reliable, and cost-effective end to end portfolio, we are specialized to serves the industry-tailored needs of Voice, Broadband Data, and IoT. Our main focused domains are Rural Telecom, Defense, and Industry 4.0 Communications.





15. Ushva Clean Technology Pvt Ltd (IIT Bombay Alumni startup)

Launched: 2015 & **founded by:** IIT Bombay Alumni Member

Vision: Fast Forwarding the worlds transition to sustainable and connected infrastructure

Area: Our innovation is a next-generation Industry 4.0 IoT edge device / gateway branded as Flowlinc and dashboard flowlinc.io used for remote data control equipped with device management and analytics. The device is Industry and communication agnostic (5G, 4G, WIFI, Lora, NbIoT, Satellite) and can work along with all kinds of sensors, meters, devices, etc.

List of Top Award:

- UN Industrial Development Organization (UNIDO) – Industrial IoT Innovation (2021)
- Globally among top 10 hardware start-ups (Hong Kong Trade Show by start-up Launchpad) (2019)
- Top 9 teams complete Asia Pacific in the Power & Energy Sector (by Schneider Electric) Singapore (2018)
- Awarded by DOT under digital communication innovation square initiative (DCIS 2022)
- Runners up - Smart Communication Module for national smart meter program by Intelli smart – EESL –
  Government of India (2022)

Product Features: Flowlinc – Industry Agnostic IoT Edge device/ gateway/ data logger

1. **Built in Connectivity:** Gain visibility and control into hard to wire locations with built in GSM (2G, 4G & 5G), NBIoT, LoRa, Satellite Network, Wi-Fi & Bluetooth
2. **Open Platform:** Easy to integrate with existing Device via any common industrial protocol: Modbus RTU, DLMS, Serial, MQTT and **Built in I/O:** Analog and digital I/Os for direct monitoring and control
3. Storage: On-device storage for mission critical data to ensure data continuity and integrity in the case of network outages and **Server Agnostic:** It is a cloud/ IoT platform agnostic device
4. **Compact Device:** Dimensions of the device allow its use in limited space with all conditions.

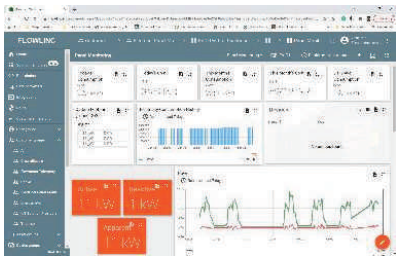
Software Dashboard Features: flowlinc.io- Industry Agnostic real time dashboard

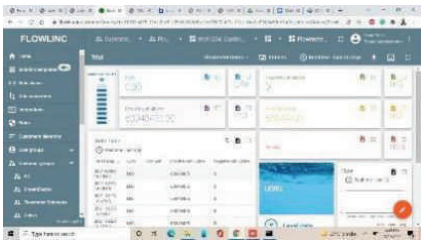
1. Device Management: Provision, monitor and control IoT entities in secure way using rich server-side APIs. Define relations between your devices, assets, customers, or any other entities
2. Collect and Visualize Data: Collect and store telemetry data in scalable and fault-tolerant way. Visualize data with built-in or custom widgets and flexible dashboards.
3. Server Agnostic: Server hosting options are available for the end users based on their need and requirements (Cloud as well as On Premise servers.

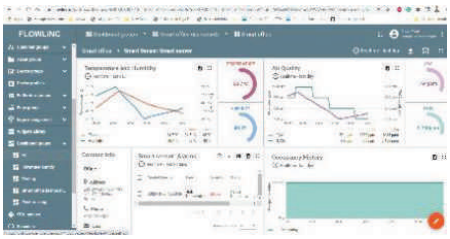
Through our Hardware and software solution we have been able to install the same in 22 active use cases across industries and having clients across the Globe. We have won multiple awards and recognitions both within India (Govt and Non Govt agencies) as well as from international organizations.

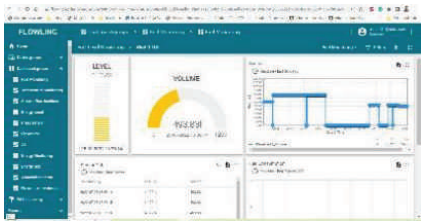












Name – Ashutosh Kumar , Contact: ashutosh@ushva.com/+91-9969800285

16. TELIMART INDIA PVT LTD

Telimart India Pvt Ltd established in the year 2006. Is a young and dynamic organization involved in manufacturing, supplying, and exporting a highly advanced range of RF microwave antennas and components. Evolving rapidly since then, we have managed to excel and craft a name in this realm and are capable of catering to a wide spectrum of communication service providers.

Advances in wireless technology has redefined the way the world communicates. Businesses can expand globally & develop new markets, thanks to seamless communication becoming a reality. Whilst the globe is getting unwired exponentially, expectations are high on enhancement of lifestyles through Wireless Services and Virtual need to deliver high quality wireless solutions to the world community. High quality & efficient Wireless Microwave Antennas are critical for seamless communication. Telimart India Pvt Ltd, addresses this important part of telecom infrastructure. With its manufacturing facility and corporate office located in Bangalore, India, Telimart services its customers spread all over world. They include some of the leading Wireless System Integrators, Network Operators, Wireless Equipment Manufacturers, Telecom Companies and Service Providers with OEM/ODM Partners. Our product portfolio comprises of a wide range of Antennas for Back Haul, Access Points and CPE Devices, Cable assembly and weatherproof Cabinets. Specialized in Wi-FI, WiMAX, MIMO Antennas with core competencies in many niches' wireless applications like HF, VHF, UHF, L, S, C Band, RFID and SCADA. TELIMART pioneers an indigenous product range of Wireless LAN/WAN using WIFI or WIMAX in 2.3 - 2.9 GHz, 3.3 - 3.7 GHz, 4.9 - 6.1 GHz and GSM/CDMA BTS Antennas in 800-900 & 1800- 1900 MHz. Our latest product addition is Dual Polarization, X-Polarization, Multi Polarized and MIMO Antennas for different Wireless licensed and Unlicensed Bands. As an ISO 9001:2015 certified organisation, we comply with RoHS.

TELIMART INDIA PVT LTD - DELIVERYING PRODUCTS TO ENHANCE YOUR CONNECTIVITY

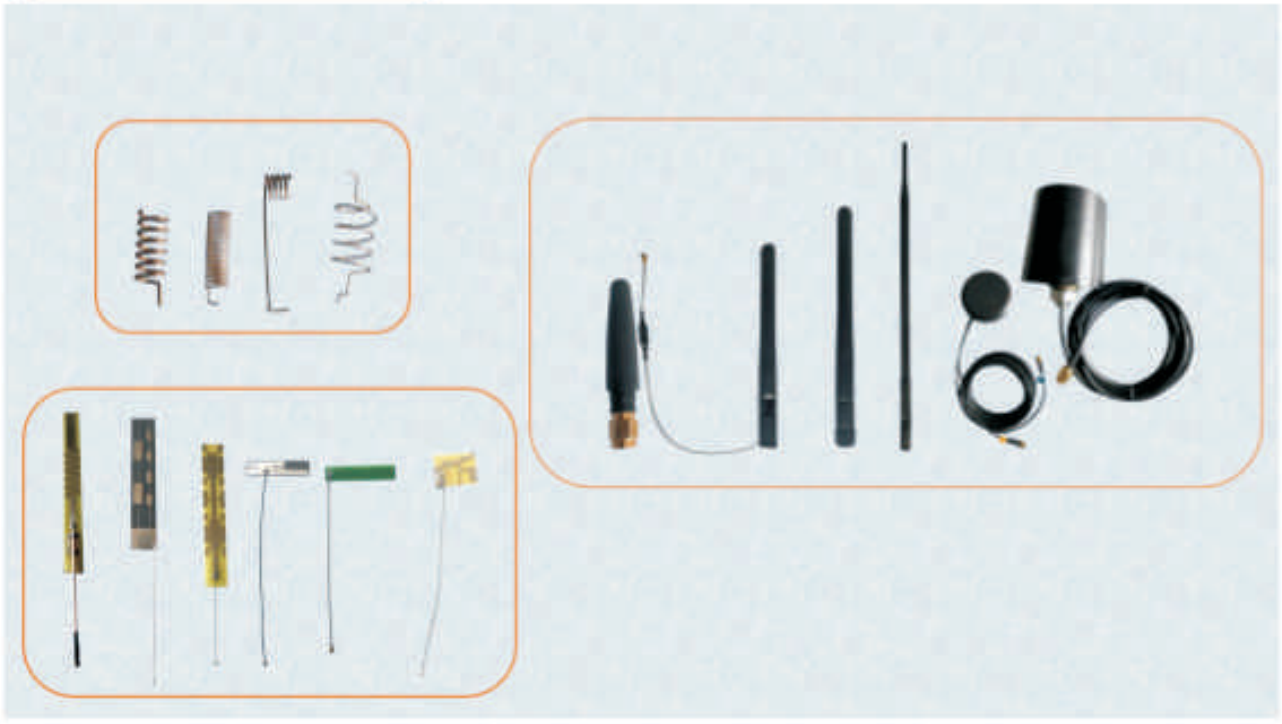
Since its inception, Telimart India Pvt Ltd has been one of the pioneer manufacturers & suppliers of high-quality microwave antennas and passive components across India, South-East Asia & South Africa. The company is constantly focused on adding customer value through technological development and better business processes. This has been made possible through the in-house state-of-the-art research and development center, cutting edge design and manufacturing technology aided by highly skilled professionals and technocrats. The company has been successfully catering to the domestic and international markets with its wide range of high-quality products at an affordable cost.

Products

1. UBR Band Antennas
2. Defense/Military/Police Critical Communication Antennas
3. Broadcasting Antennas
4. Airborne Antennas
5. Marine Grade Antennas
6. Smart Antennas
7. Cellular band antenna 4G/LTE and 5G antennas base station and Indoor antennas
8. RFID Antennas
9. IoT and LoRa Band antennas
10. SCADA And TETRA band Antennas

UBR PTP and PTMP Antennas

IoT, M2M & LoRa Antenna



5G Indoor and Outdoor Antennas

VoICE
Voice of Indian Commtech Enterprises

Defense And Aerospace Antennas

Voice of Indian Commtech Enterprises

Contact for all queries:

RAKESH KUMAR BHATNAGAR
DIRECTOR GENERAL, VOICE

+91 9350836103
rkbhatnagar.dg.voice@gmail.com

Web : www.voiceofindiancomm.com