MMWAVE

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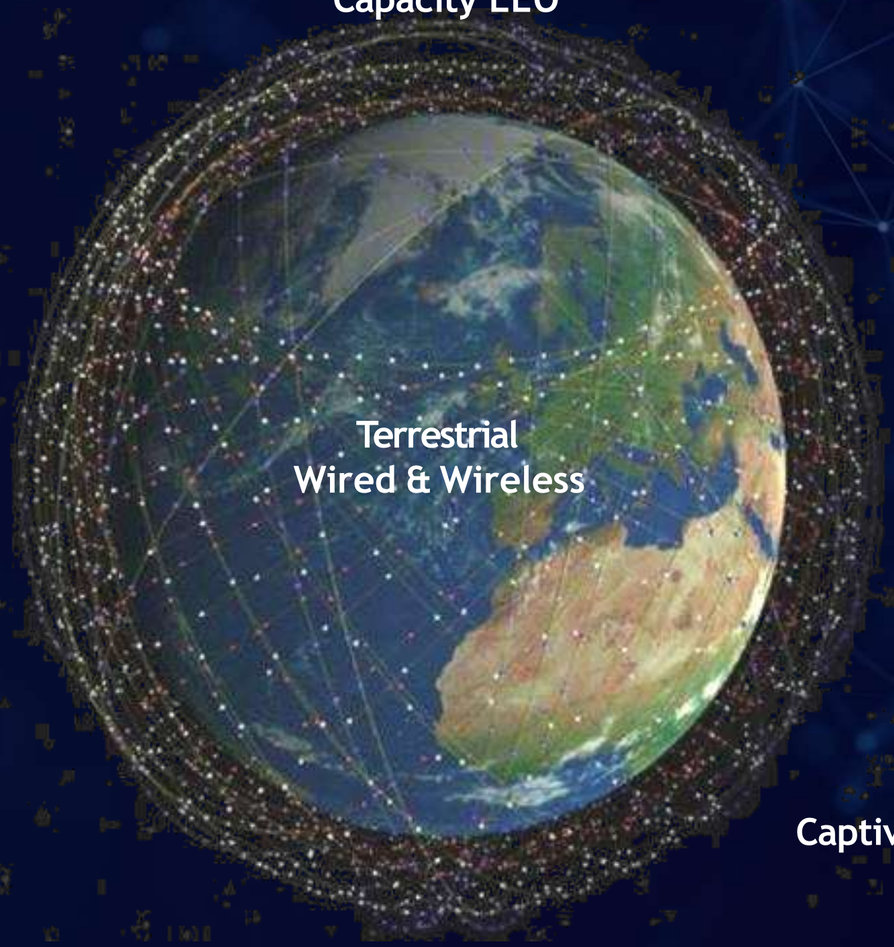
Head Business Development

ASTROME TECHNOLOGIES

A VisiON fOr 2047

INTEGrATED NETWOrks

Commercial High Capacity LEO



Interplanetary LEO

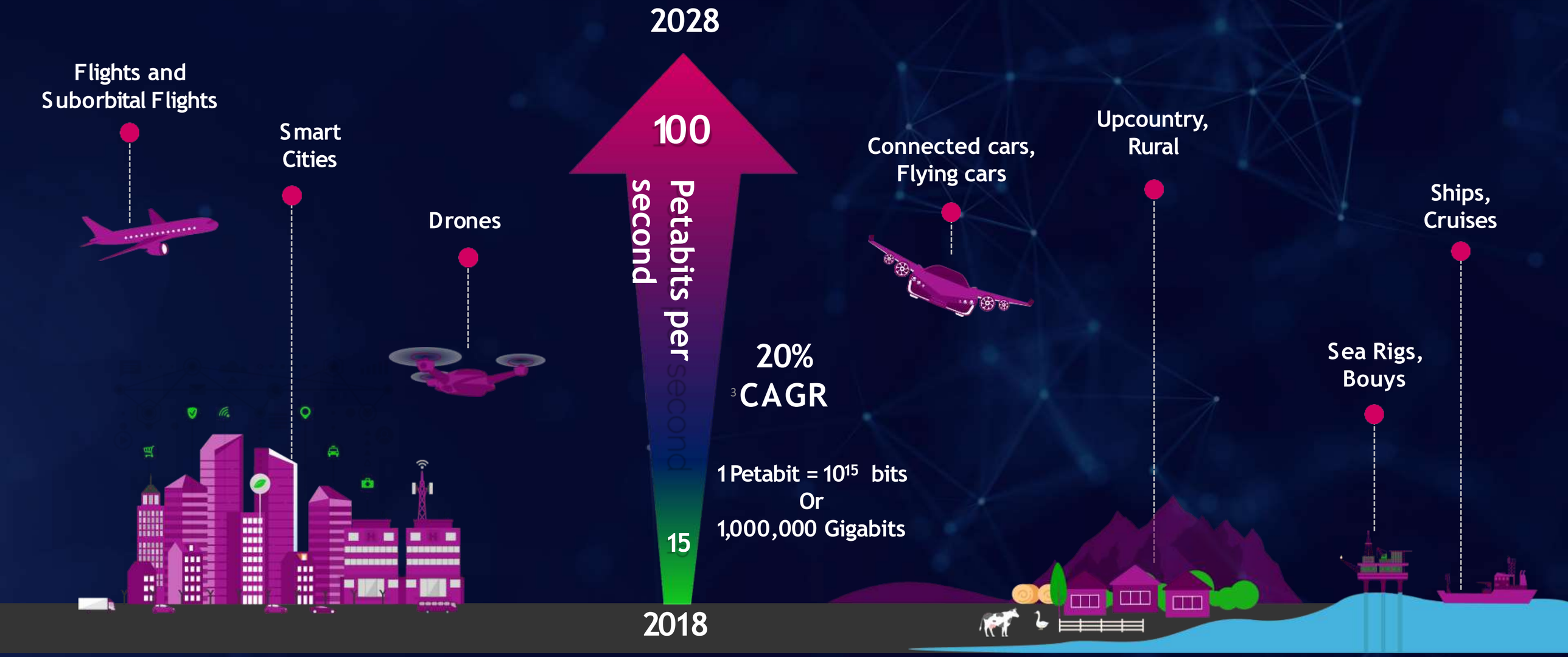
Terrestrial Wired & Wireless

Deep Sea Communication

Captive LEO

FUTURE COMMUNICATION

100 PETAbITs/SEc by 2028



WHAT WE NEED?

HIGH CAPACITY

High Speed Connectivity

OMIPRESENT

Connectivity Everywhere

ON DEMAND

On Demand Connectivity

HIGH CApAcITY

In the future, communication systems must handle vast data capacities for both individuals and machines, ensuring seamless interactions and connectivity.

OMNIpREsENT

In the future, networks must be Omnipresent

Following Humanity wherever it ventures

Ensuring Connectivity across Land, Air, and Sea

Reaching even the Remotest Corners of the Globe

ON DEMAND

In the Future, Demand for communication would have to be serviced Anytime and Every Time

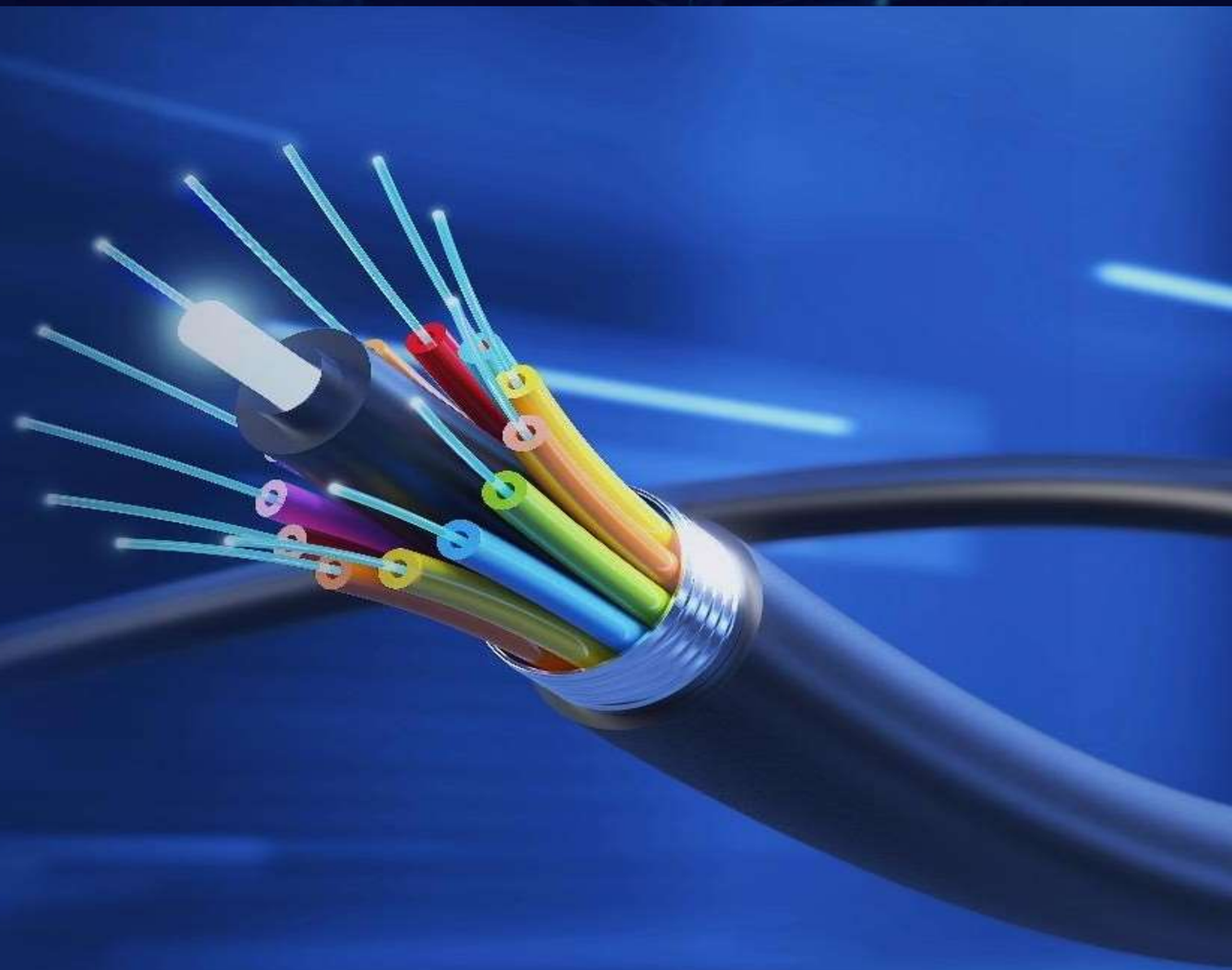
For Everyday and Mission Critical Requirements

Driven by Individuals and Machines

Via Directed or Automated Processes

FIBER NETWORKS COME WITH CHALLENGES

- *Expensive*
- *Longer Deployment cycle*
- *High Downtime*



GOING TO HIGHER FREqUENcIEs IN THE spEcTRUM

HIGHER FREQUENCIES
have large unused spectrum that can deliver high capacity

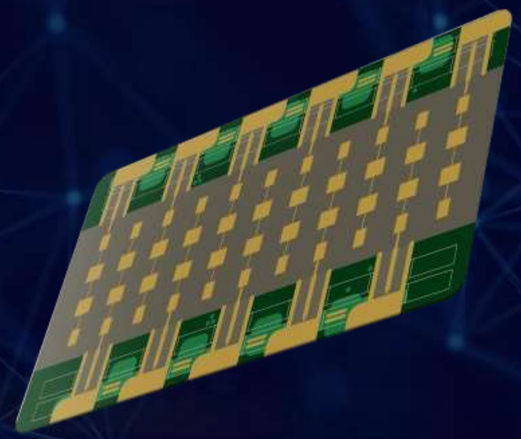
REGULATORY FRAMEWORK
can help by making higher bands self-coordinated or unlicensed

e.g. Millimeter Wave (mmWave), also known as Millimeter Band or EHF (Extremely High Frequency)

PrIMArY DrIVErs

Higher Frequencies

- Large Bandwidth
- High Gain
- Low Inteference



Smart Antenna

- Electronic Beams
- High Power
- Multi-Links

MM WAVE Is FROM 30GHZ TO 300 GHZ

- High Frequency
- Short Wavelength
- Narrow Beam
- Good Directivity

Q Band 30-50GHz	W Band 75-110GHz
U Band 40-60GHz	F Band 90-140GHz
V Band 50-70GHz	D Band 110-170GHz
E Band 60-90GHz	G Band 110-300GHz

NDCP OF INDIA

NATIONAL DIGITAL cOMMUNIcATION pOLIcY

NDCP doesn't refer explicitly to DELICENSING SPECTRUM, but contains CRITICALLY RELEVANT TEXT

It speaks about "Recognizing MID-BAND spectrum, particularly the 3 GHz to 43 GHz range, as central to India's strategy for Next-Generation Networks".

It also invokes "International Best Practices" in the context of V band, which is Delicensed in over 80 countries

There is a significant "UNKNOWN" as regards the Licensing of the full range of mmWave and beyond

E-BAND IN INDIA – LIMITED USE

Total Available 10 GHz (5+5)

Licensed to 5G Operators = 250MHz + 250 MHz

A Very Large Spectrum is Still UNUSED

MUST be AVAILABLE for

INTERNET SERVICE PROVIDERS (ISPs)

To MEET the MARKET NEEDS

Channels should ALSO be

RESERVED FOR

Defence, Security and Disaster Management

INTELLIGENcE –RF cHIps

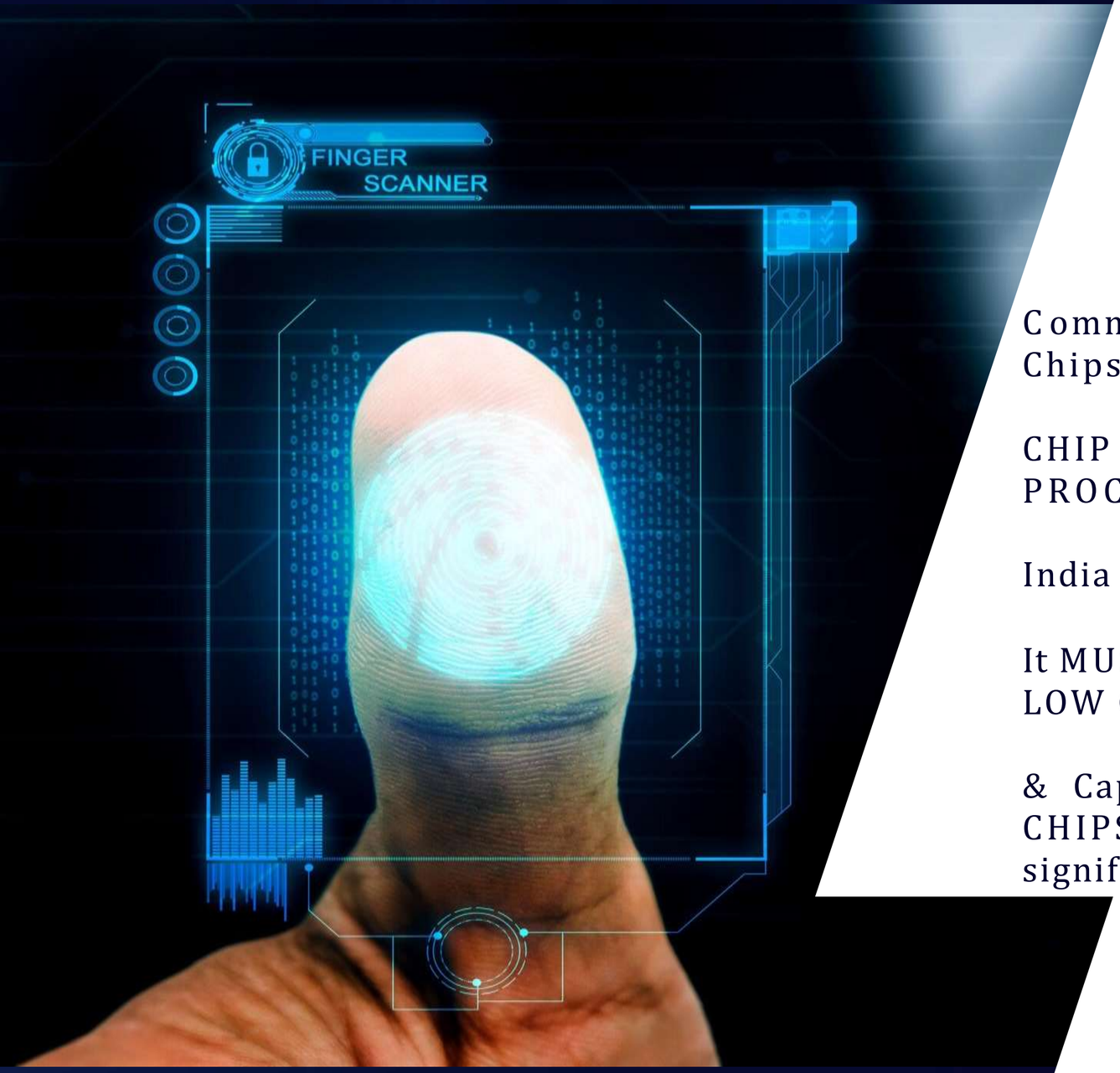
World’s Leading Economies are already using mmWave based solutions for backhaul

Growth of E-band has already overtaken that of MW (Microwave) in US and many European countries

V-band is in use in a much larger group of countries

Satcom is also embracing mmWave frequencies

One of the Major Factors is Ownership of RF CHIPs, the most critical component for driving down the cost and enhancing acceptability



RF CHIPS
DEVELOpED & FABRIcATED IN INDIA

Communication Systems cannot exist without Chips

CHIP DESIGN AND CHIP MANUFACTURING PROCESSES REQUIRE UPGRADATION

India is currently focusing on Digital Chips

It MUST look at Developing Capabilities for LOW COST RF CHIP PROTOTYPING

& Capability to FABRICATE LOW NANOMETER CHIPS in the country to be a Global Player of significance in the future

GOOD REGULATION Is A MUsT

UNLOckING THE pOTENTIAL OF HIGHER FREqUENcIEs

ENcOURAGING UsE IN ALL INDUsTRY DOMAINs

ENABLING “rF” cHIp DEVELOpMENT & prODucTION

THANK YOU

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