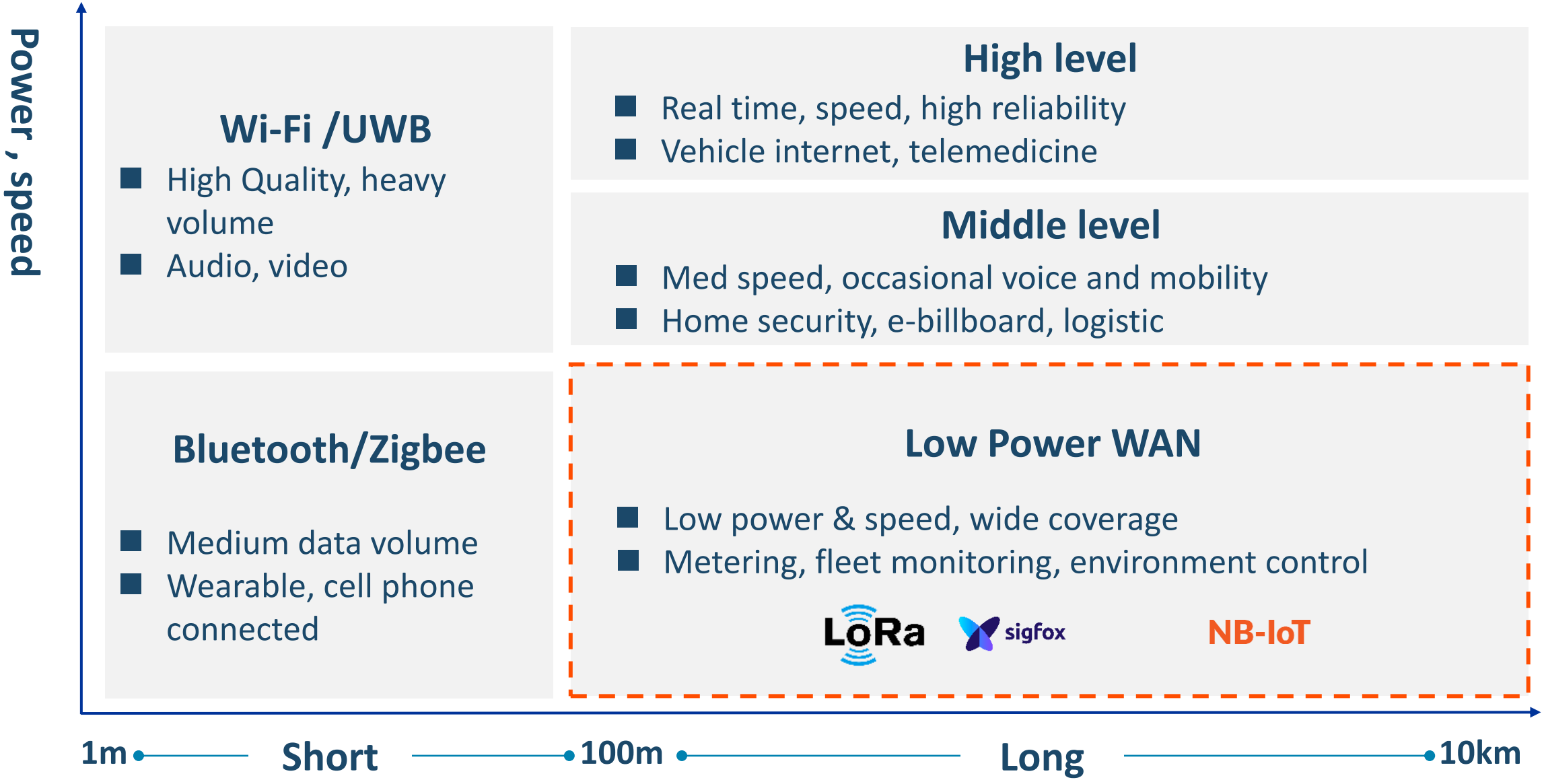
IoT Test Solution

GW INSTEK

Emerging growth of LPWAN among IoT



LPWAN key player

	LoRa / LoRaWAN	Sigfox	NB-IoT	LTE-M	RPMA	Weightless-P	Symphony Link
Origin	France	France	USA (Global)	USA (Global)	USA	UK	USA
Proprietary or open	LoRa – prop LoRaWAN -	Net – proprietary Devices – open	O	Open			proprietary
Cellular	No		Yes	Yes	No	No	No
Spectrum	Unlicensed	censed	Licens	Licensed	Unlicensed	Unlicensed	Unlicensed
Range, km	urban: 2-5 rural: 15	3-10 0-50	urban: rural: 10	urban: 2-5	urban: 1-3 rural: 25-50	urban: 2	urban: 2-5 rural: 15
Speed, uplink / downlink	50 kbps / 50 kbps	/	250 kbps / 250 kbps	1 Mbps / 1 Mbps	634 kbps / 156 kbps	100 kbps / 100 kbps	100 kbps / 100 kbps
Power consumption	●●●	●	●	●●●	●●	●	●●
Security	●●	●●	●●●	●●●	●●●	●●●	●●●
Availability of devices	●●	●●●	●●	●	●●	●	●●
Price*	●●	●	●●	●●●	●●●	●	●●
Areas of application	Precision farming, manufacturing automation, pipeline monitoring	Predictive maintenance, capacity planning, demand forecasting	Electric metering, manufacturing automation, retail PoS	tracking objects, wearables, energy management, utility metering, city infrastructure	Digital oilfield, connected cities, usage-based insurance, agriculture	Smart grid, healthcare, automotive, smart cities, asset tracking	Industrial control systems, lighting control, alarm systems
Supporting companies	IBM, Semtech, Cisco, HP, Orange, Kerlink, Actility	STMicroelectronic, Texas Instruments, Atmel, Silicon Labs	Huawei, Ericsson, Qualcomm, Vodafone	Verizon, AT&T, Nokia	Ingenu	Accenture, Sony Europe, uniik, ARM, Telensa	Link Labs

unlicensed

Licensed

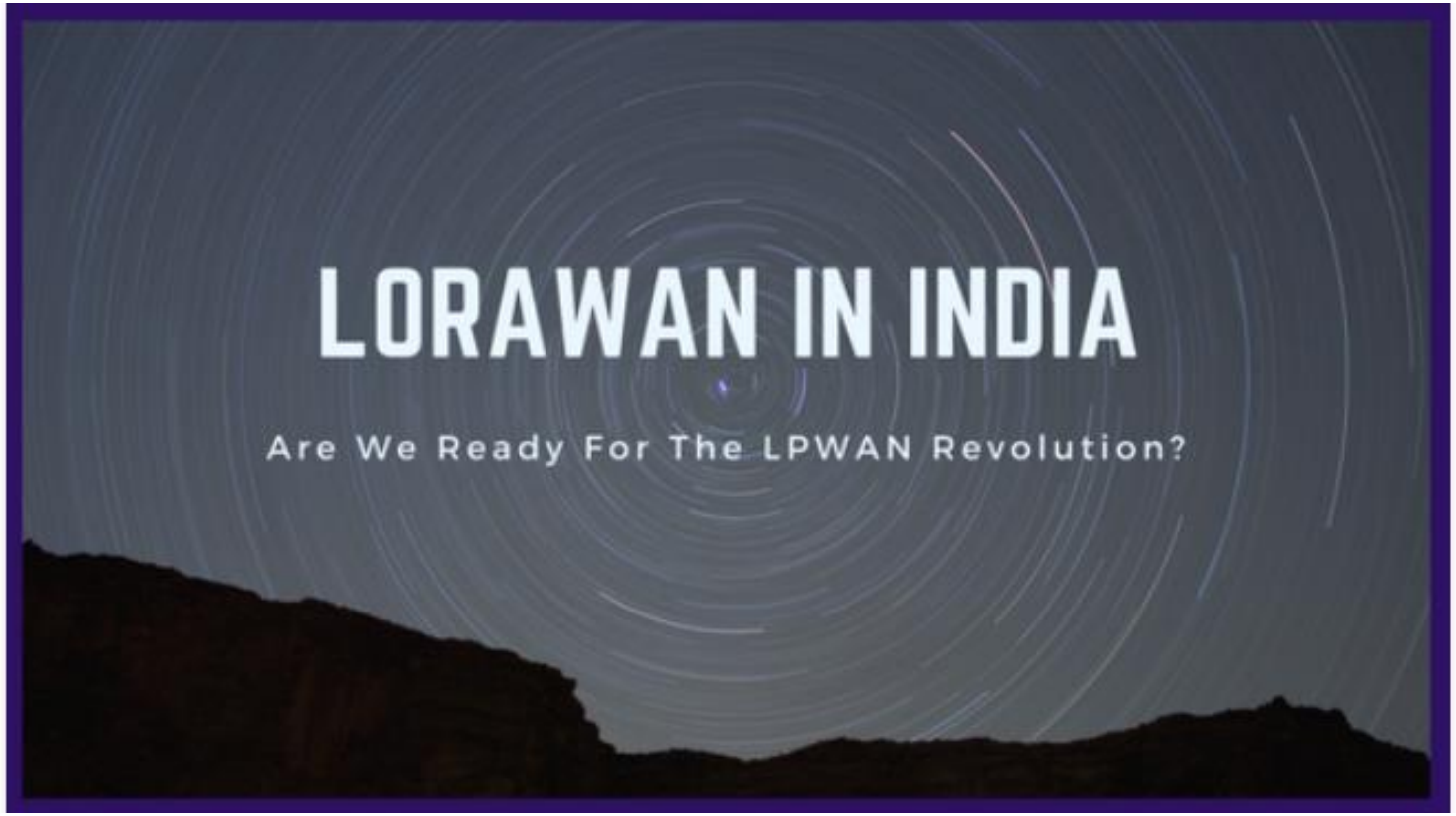
LPWAN key player

Applied fields of LoRa

Smart City

Industry

LoRaWAN In India: Developments, Opportunities & More



According to reasonable estimates, the world will have close to ***76 billion connected devices by the end of 2025***. Internet of Things (IoT) has already started to make its presence felt in diverse fields – affecting and improving the lives and operations of both general customers (*the random Joe-s*) as well as governmental bodies. While North America, Greater China and Europe are, expectedly, the runaway leaders – ***India is moving ahead at a fast clip in this domain***. A recent report pegged the ***annual IoT growth rate in India (for the 2017-2020 period) at ~41%*** – well over the worldwide growth rate.

http://teks.co.in/site/blog/lorawan-in-india-developments-opportunities-more/?utm_content=74612540&utm_medium=social&utm_source=facebook

Tata Communications bets big on growing partner ecosystem to drive enterprise growth

"With digital transformation, more enterprises are now looking at service providers that can offer cross-border connectivity and collaboration services, differentiated offerings as per markets and superior customer experience," he added.

Danish Khan | ETTelecom | September 25, 2017, 15:28 IST

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NEW DELHI: Tata Communications is looking at growing its ecosystem of partnerships to drive growth for enterprise business within India and globally. Besides, these partnerships, the company is creating an open infrastructure, and platforms for businesses to help enterprises stay competitive.

"We build strategic partnerships with other players that enable us to expand our portfolio, and access and deploy services faster. Our ecosystem of partnerships currently drives around 28% growth for our enterprise business," Rahul Mathur, Vice President, Global Enterprise Strategy, Tata Communications, told ET.

Mathur said that the enterprise market is at a stage where most businesses are in the middle of digital transformation, and enterprises are constantly looking for service providers that can offer them flexible, scalable, super-high bandwidth and global connectivity.

"With digital transformation, more enterprises are now looking at service providers that can offer cross-border connectivity and collaboration services, differentiated offerings as per markets and superior customer experience," he added.

Tata Communications recently partnered with Semtech to launch the first applications centre dedicated to LoRa Technology in Mumbai, India.
The executive said that the Semtech partnership has helped the company reach out to enterprise customers to develop strong, LoRa-based PoCs for a wide range of IoT applications in India.

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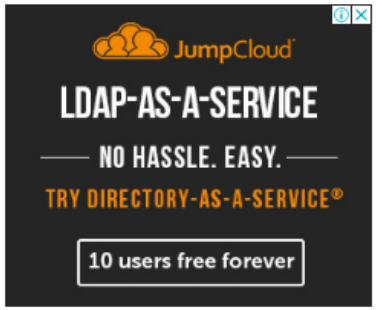

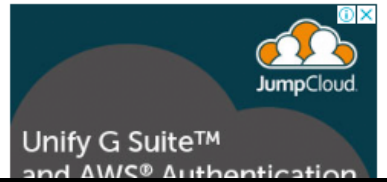

https://telecom.economictimes.indiatimes.com/news/tata-communications-bets-big-on-growing-partner-ecosystem-to-drive-enterprise-growth/60826533?utm_content=74628954&utm_medium=social&utm_source=facebook

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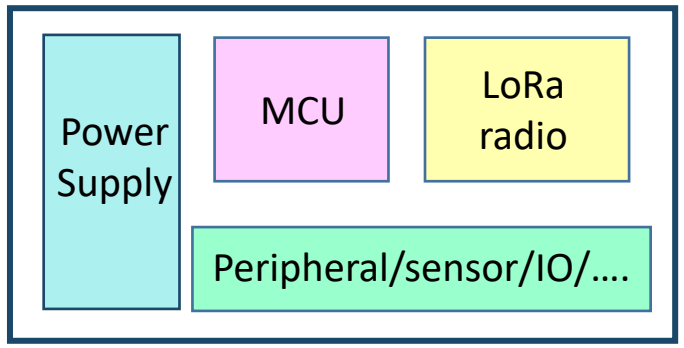
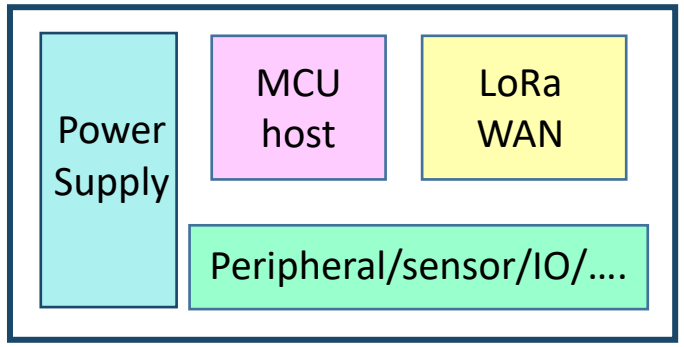
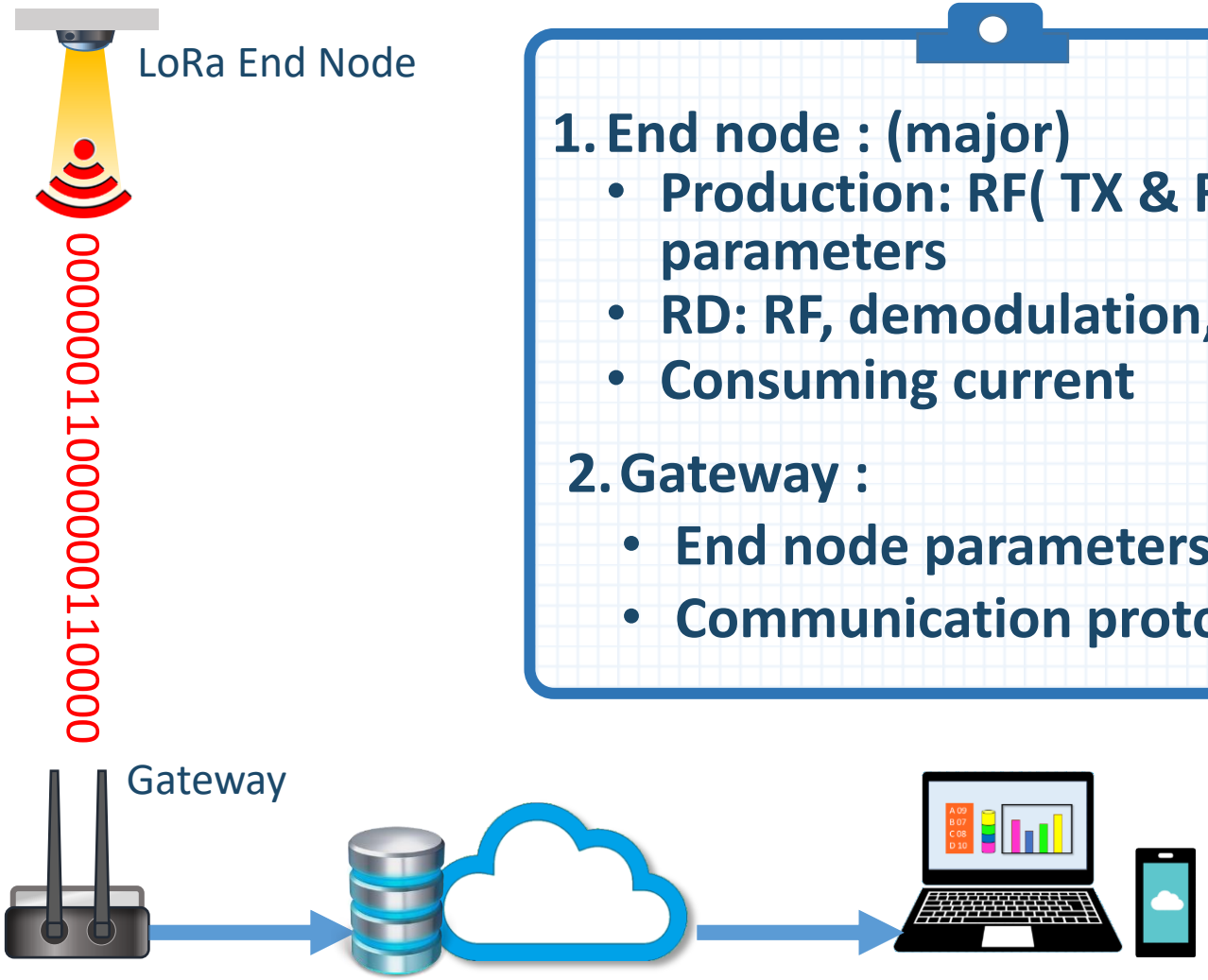
LoRa Test



Target customer





1. End node : (major)
   - Production: RF(TX & RX) parameters
   - RD: RF, demodulation, decode
   - Consuming current
2. Gateway :
   - End node parameters
   - Communication protocol

LoRa Test Solution

- RF parameters measurement, CSS demodulation and LoRa decoding
- Current consumption measurement

PC software

NEW

C-1200 LoRa Tester

- RF(TX & RX) parameters
- Demodulation/ decode
- Consuming current

PPH-1503, High precision DC Power Supply

- DC Power supply and current readback
- High DCI resolution: 0.1uA

GDM-9061, 6 1/2 digits digital multimeter

- High DCI resolution: 0.1nA

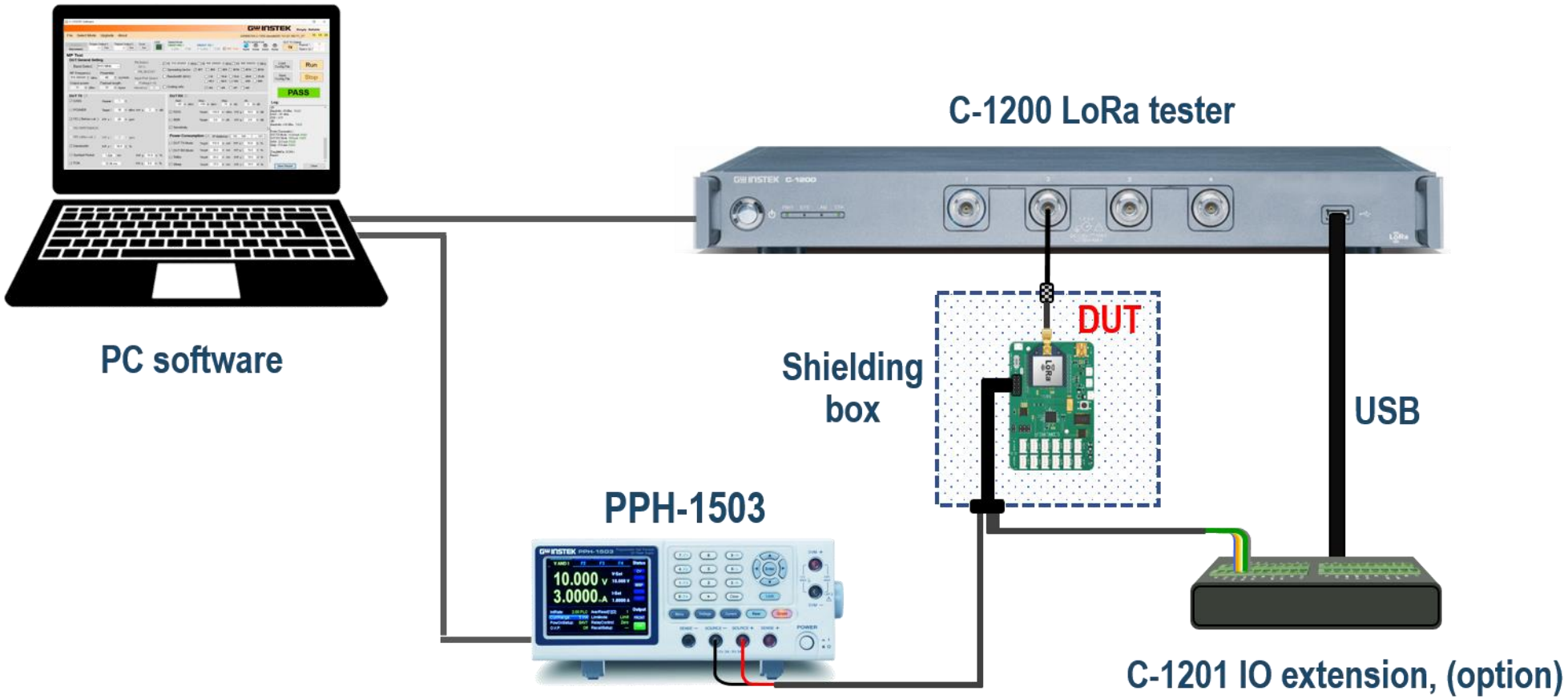
NEW

C-1200, LoRa Tester

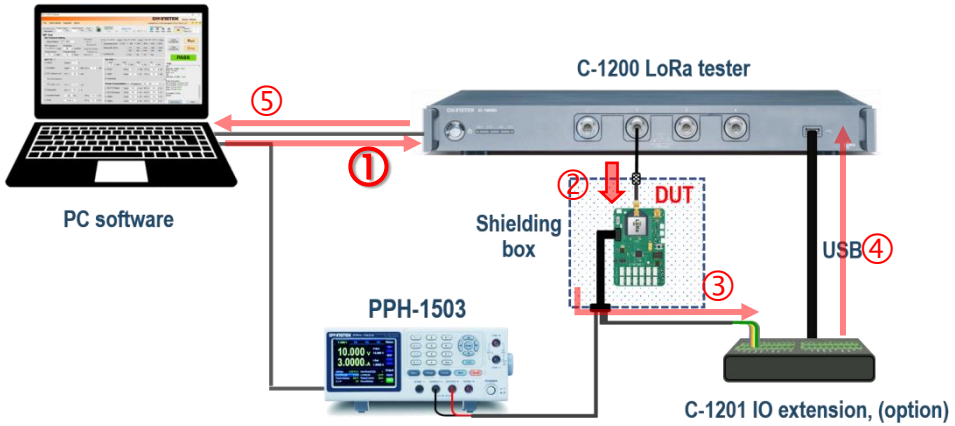
- ✓ **Half-duplex** channel design allow to test DUT-RX and DUT-TX on every single channel.
- ✓ 1 Low Power TX Port and 3 RF TRX Ports are based on **switching type** and the polling time can be controlled.
- ✓ Support LoRa **Sub-GHz 2.4GHz** bands.
- ✓ Direct control interface by C-1200, includes **SPI**, **UART**, **I²C**.
- ✓ Remote Control by **LAN port**.
- ✓ Support 2 Trigger output ports, 1 Trigger input port.
- ✓ Providing External 10 MHz Reference Signal.

LoRa Test Solution

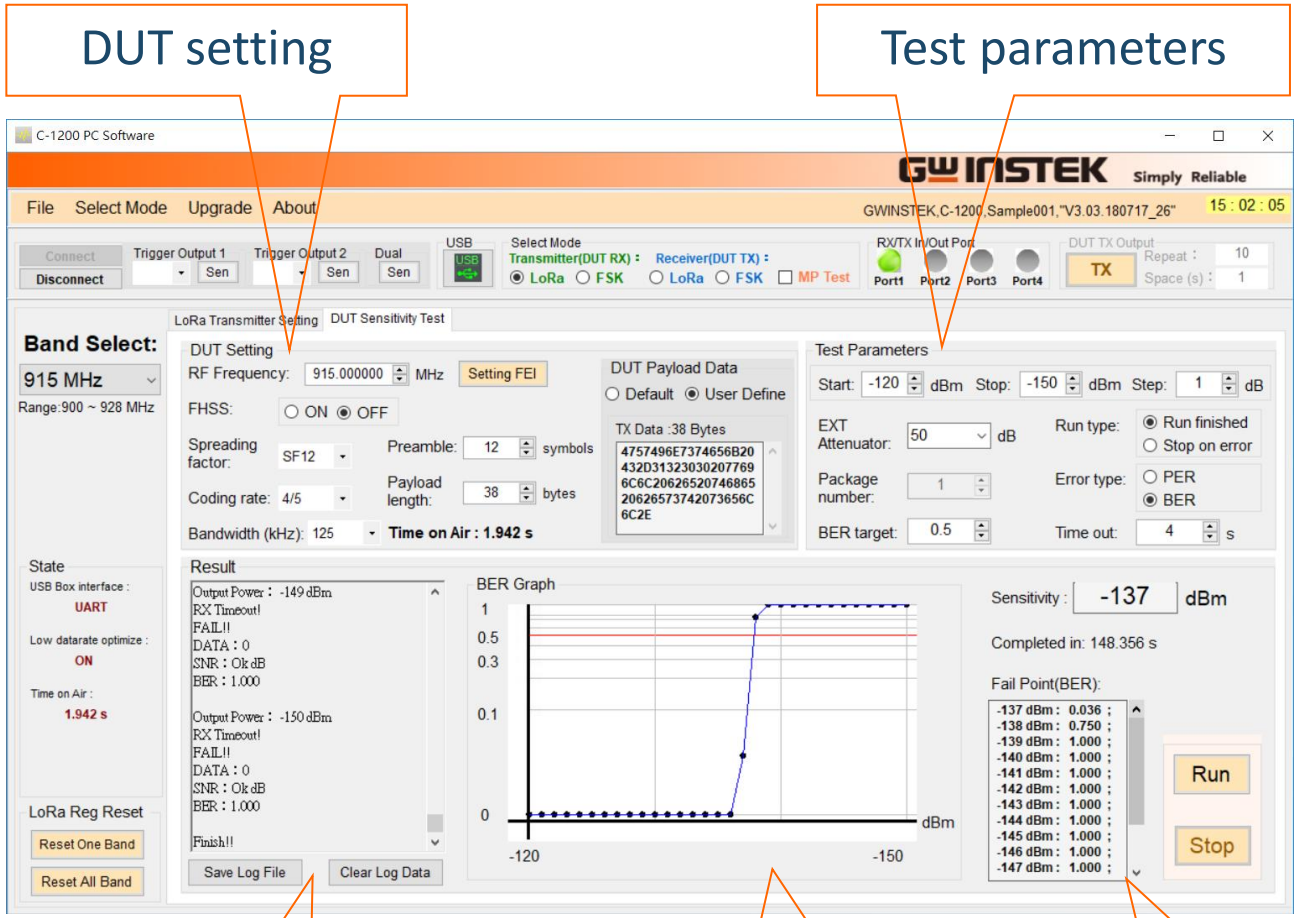
- RF parameters measurement, CSS demodulation and LoRa decoding
- Current consumption measurement



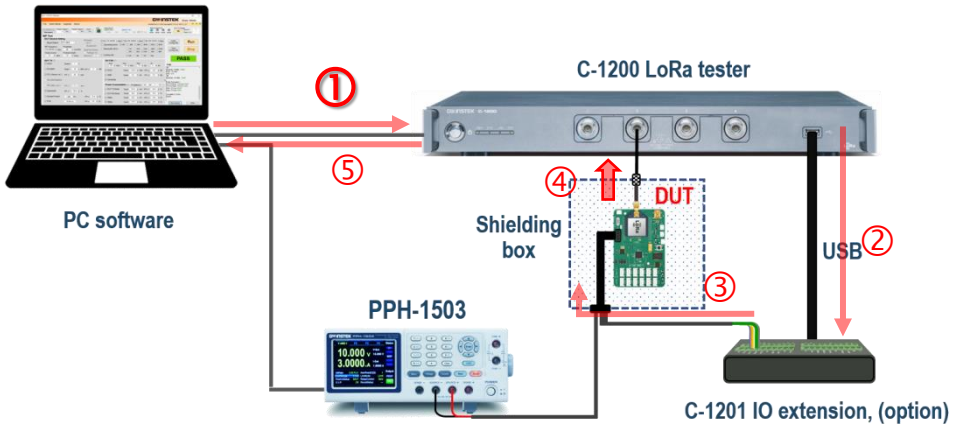
DUT RX measurement: BER & Sensitivity



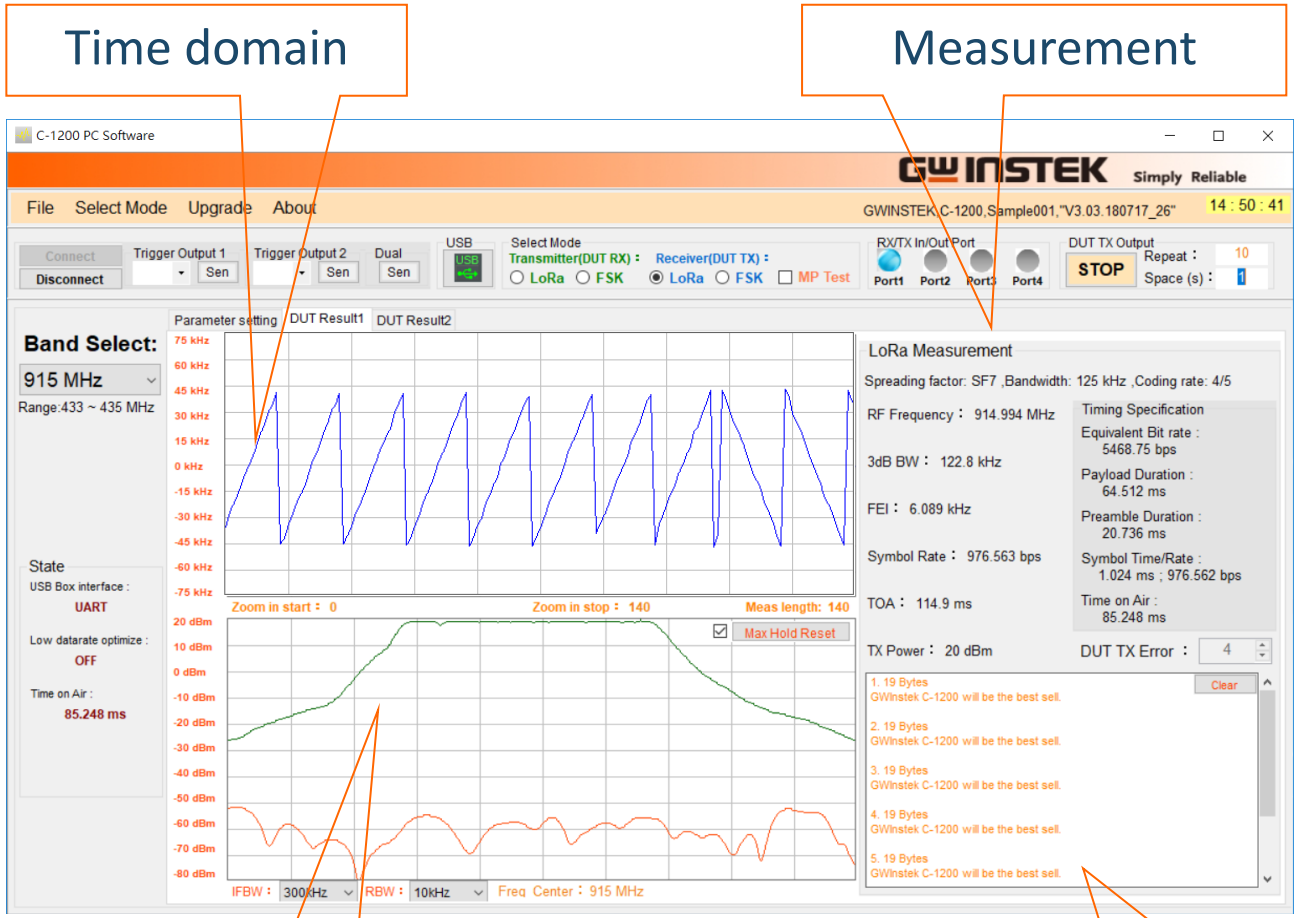
C1200 mode	Transmitter	Receiver
	⇩	
DUT mode	RX	TX



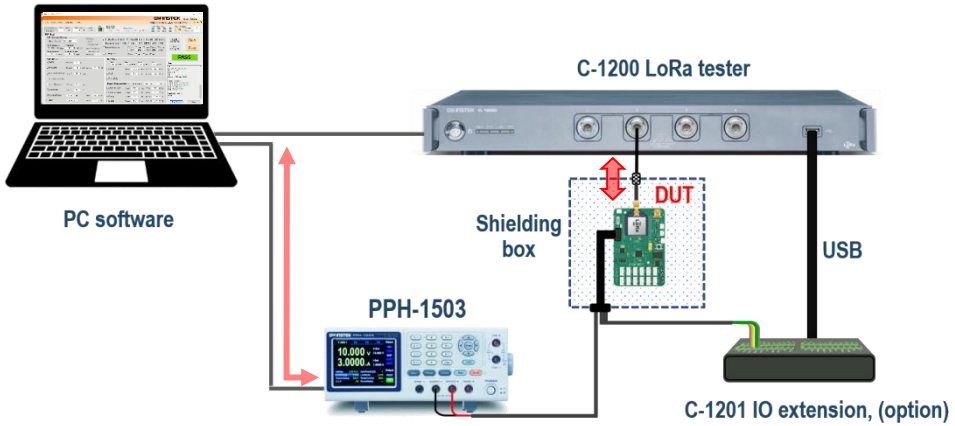
DUT TX measurement: Demodulation and Decode



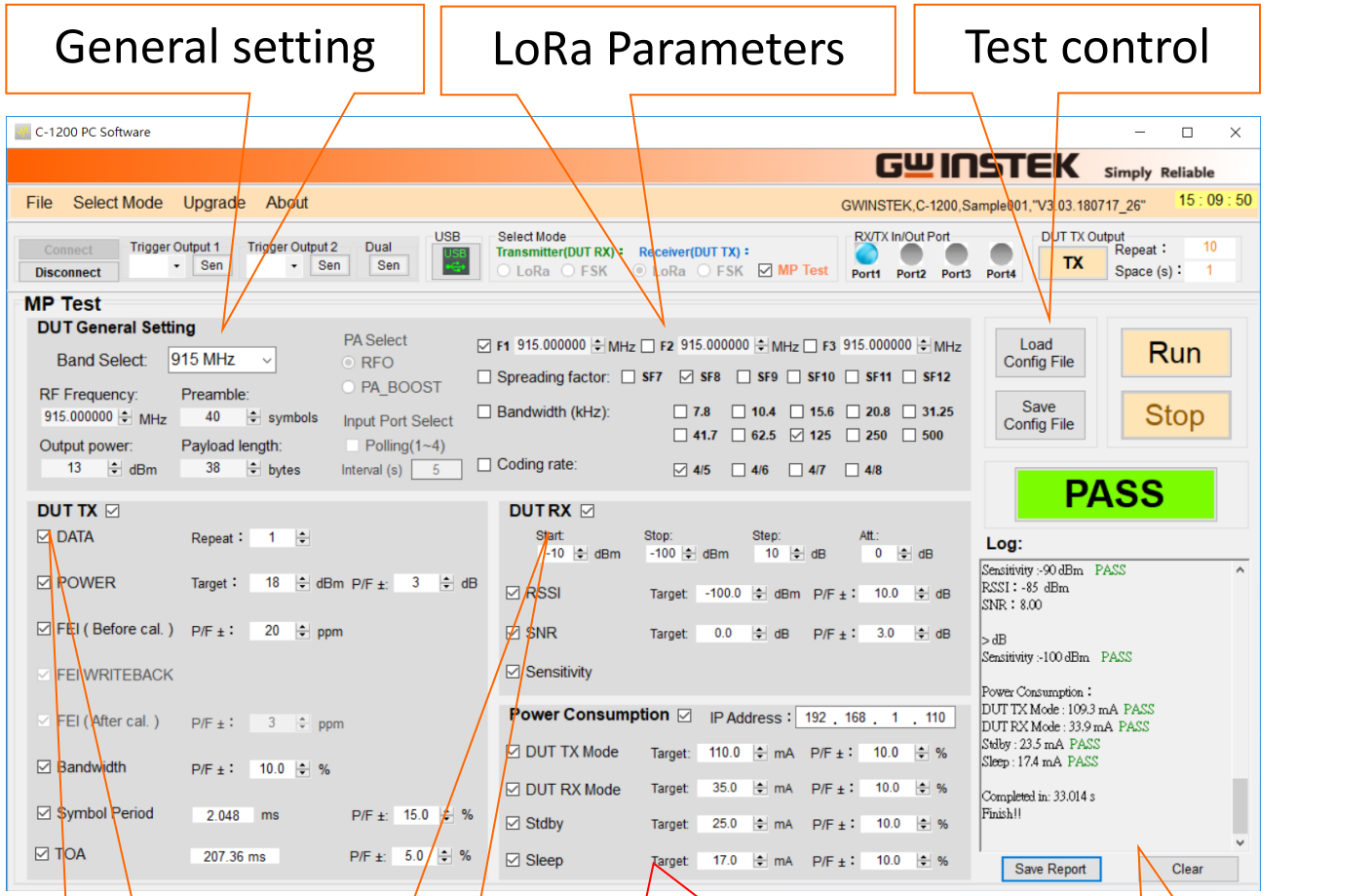
C1200 mode	Transmitter	Receiver
		⇧
DUT mode	RX	TX



Production Test and Power Consumption Test



	C-1200 Transmitter	C-1200 Receiver	PPH-1503	PPH-1503
	⇩	⇧	-	-
DUT	RX	TX	Standby	Sleep



GW Instek Product Portfolio Introduction

Thanks for Listening!

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