

Insight SiP

It's **all** in the **package**

**SMART MODULES**

**OCTOBER 2020**



**Insight SiP**  
It's **all** in the **package**

# **COMPANY OVERVIEW**

# COMPANY PROFILE

**Experts in RF System-in-Package (SiP) and Antenna-in-Package (AiP)  
in response to ultra miniature wireless solution demand**

## ESTABLISHED IN 2005

Founded by actual CEO and CTO

Core team of PhD and MSc from  
National Semiconductor

Electromagnetic simulation, antenna  
design and  $\mu$ W & RF circuit theory skills

Unique set of design techniques &  
industrialization expertise

Fabless company



## LOCATIONS

Europe – HQ & Technical team  
in Sophia-Antipolis

North America  
Subsidiary in Denver

Asia – Sales office in Tokyo

Global network of distributors

Manufacturing  
Taiwan and Philippines



# COMPANY EXPERTISE

## SIP APPROACH

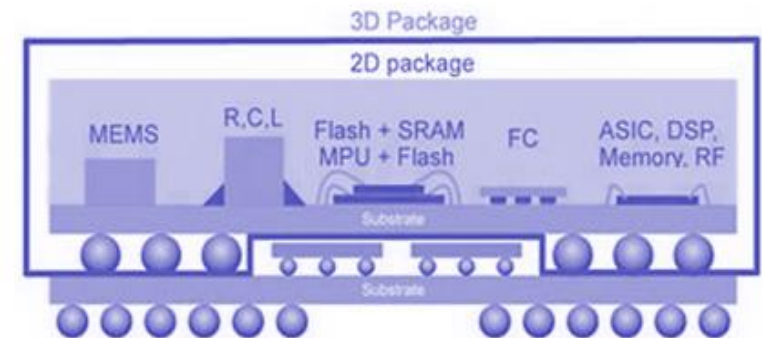
**SiP approach consists of integrating several different components into a single miniaturized module**

- From different semiconductor and passive technologies
- Unique ability to embed functions within the package
- RF know-how
- Irrespective of the technology
  - Organic substrates (BT, FR4...)
  - Multi-layer ceramic substrates (LTCC, HTCC, Thick film...)
  - Thin film Integrated Passive Devices (IPD) on silicon or glass
- Extremely rapid and low cost development cycles

## ANTENNA in PACKAGE

**Addition of ultra-miniature antennas to the RF SiP create a so called "Antenna in Package" product (AiP)**

- Fundamental part of long term Insight SiP's research program
- Combining electromagnetic simulations and circuit level optimization
- Based on a user extendable library of physical objects
- R&D work has already been implemented in products for **Bluetooth Low Energy** and **Wireless High Definition Interface** products



# MARKET SEGMENT



Smart Home



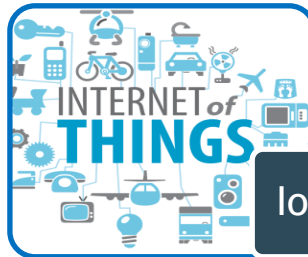
Cellular  
Connectivity



Smart Secure



Healthcare  
and Wellness



IoT and M2M



Connected  
Cars



Industrial

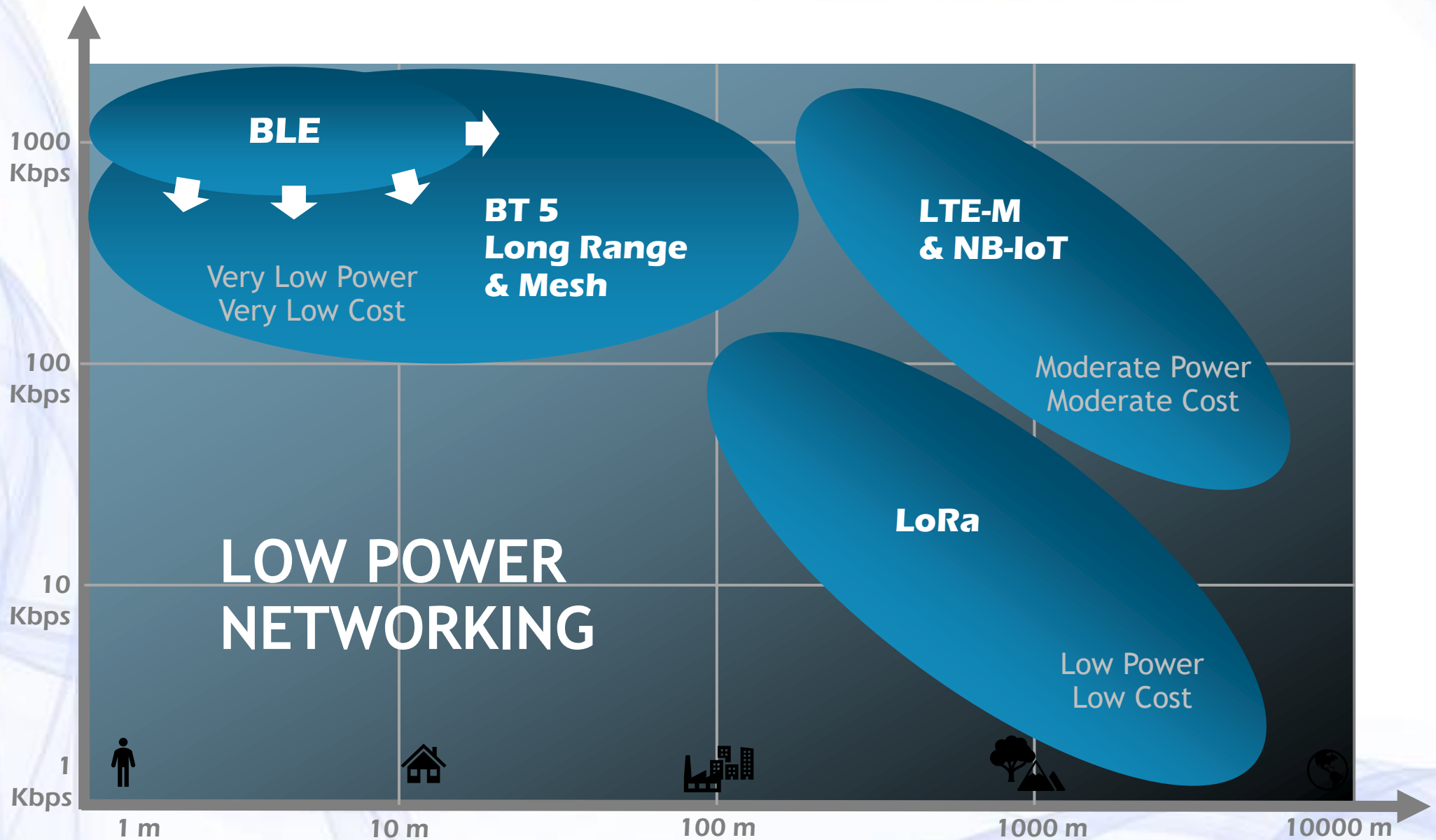


Smart  
Lighting

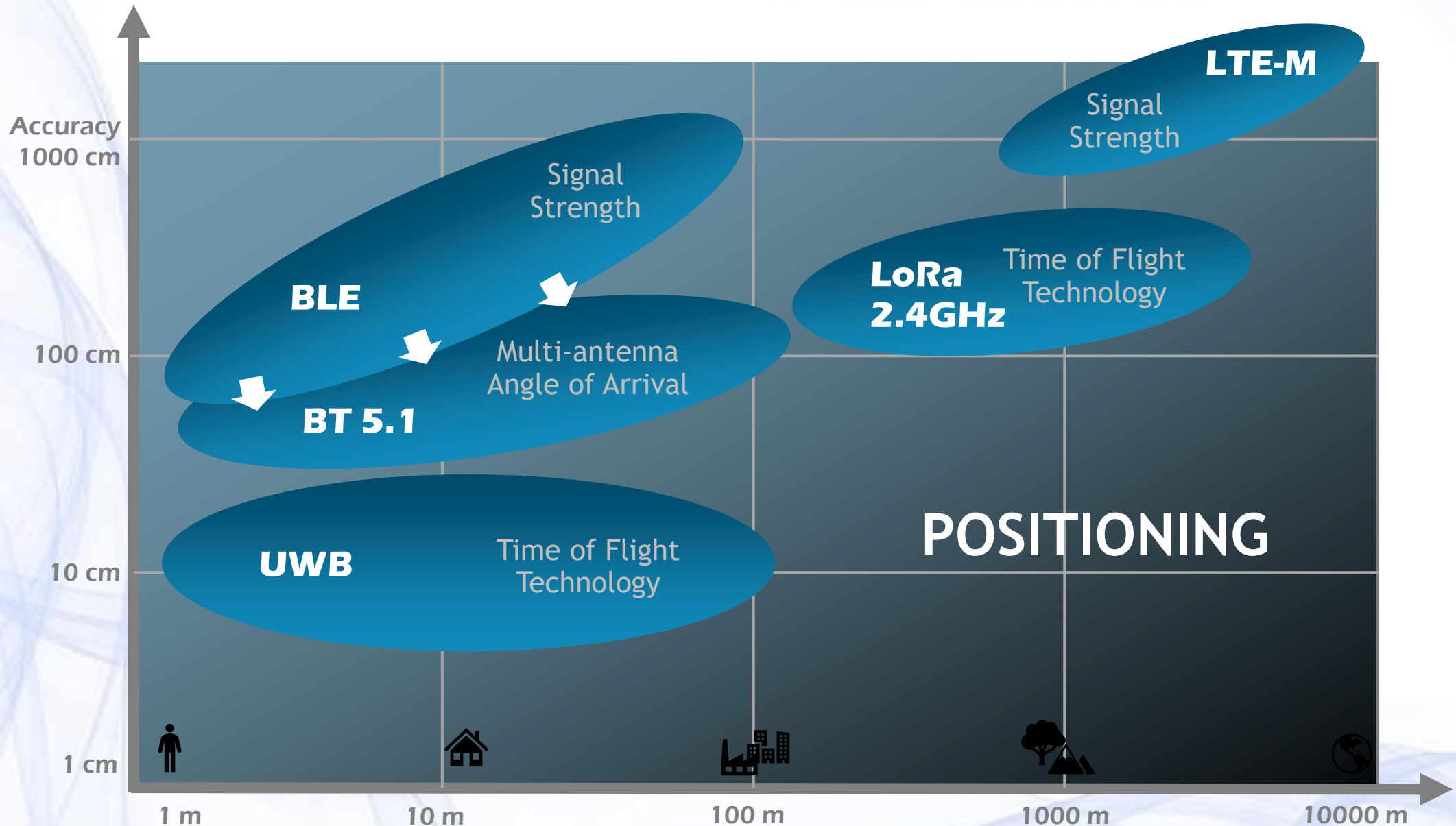


Defence  
Avionics Space

# TECHNOLOGY FOCUS



# TECHNOLOGY FOCUS





# MODULE RANGE & ROADMAP

**Insight SiP is the leading provider of Smart, Low Power and Built-in Antenna Connectivity Modules for advanced IoT solutions**

- Our portfolio includes a diverse set of solutions to meet different IoT use cases
  - Our modules provide class leading miniaturization
  - Our modules are designed with superb radio performance



**Short Range  
Modules**



**Wide Area  
Modules**



**Positioning  
Modules**



**Custom  
Modules**



# MODULE RANGE & ROADMAP

Positioning	BT5.1	iSP19 BT 5.1 Direction Finding	
	UWB	iSP30 UWB Precise Position	
LP-WAN	NB-IoT		iSP60 NB-IoT
	LoRa	iSP45 LoRa 800/900 Europe USA & Asia	
Bluetooth	BT Secure		iSP19 BT 5.1 + Secure Element
	BLE BT5	iSP09 BLE 4.0 iSP13 BLE 4.2 iSP15 BT 5.0 iSP18 BT 5.0 Long Range iSP19 BT 5.1 Long Range	iSP20 BT 5.2 Dual Core
		2009	2020   2021



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# **BEST IN CLASS MODULE SOLUTION**



# MODULE OR DISCRETE SOLUTION

Make  
or  
Buy ?

## Industrialized Discrete Design

Design Efforts  
+ 3 to 6 months

Certification  
3 months + 30-50k\$ cost

PCB Requirement  
Larger Dimension

Purchasing  
About 20 components

Yield  
Rework needed

Technical risk management



## Module Based Design

Time to market  
3 to 9 months saving  
No NRE

Size Optimization

Unique component

100% tested

Modules are proven components



In most of the case,  
even volume can't justify discrete design effort



# WHY CHOOSING INSIGHT SiP

- No need for RF knowledge, design effort for RF design is very often underestimated
- Minimum electronic skills for digital connection

**Ready  
to Go**

**Fast Time to  
Market**

- Time to market reduced by 3 to 6 months
- Module is certified, avoiding lengthy and expensive certification process

- Small and integrated solution
- Single component replaces many, supply chain simpler

**Smaller**

**Improved  
performance**

- Optimized antenna performance
- BLE function concentrated in one single component

**Application development is focused on customer's added value**

# LEADING CHIPSET

**Market leading chipset particularly suited to module segment**

Bluetooth  
NB-IoT



LoRa



UWB



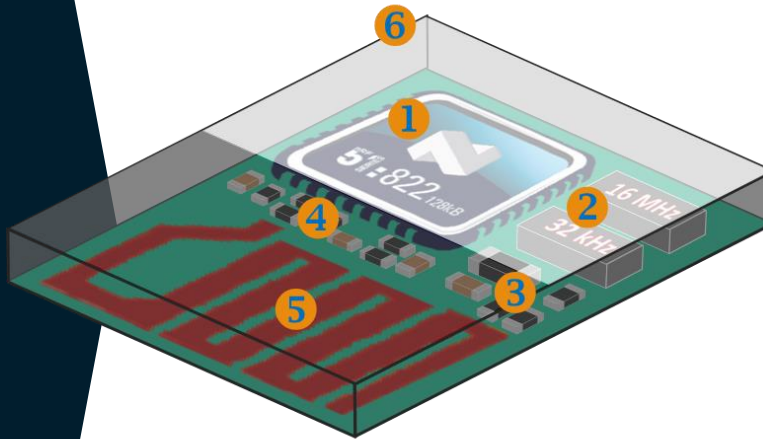
Leading &  
Established  
Players

Firmware  
Library  
Support

Proven and  
Sustained  
Hardware

# SMALL & BUILT-IN TECHNOLOGY

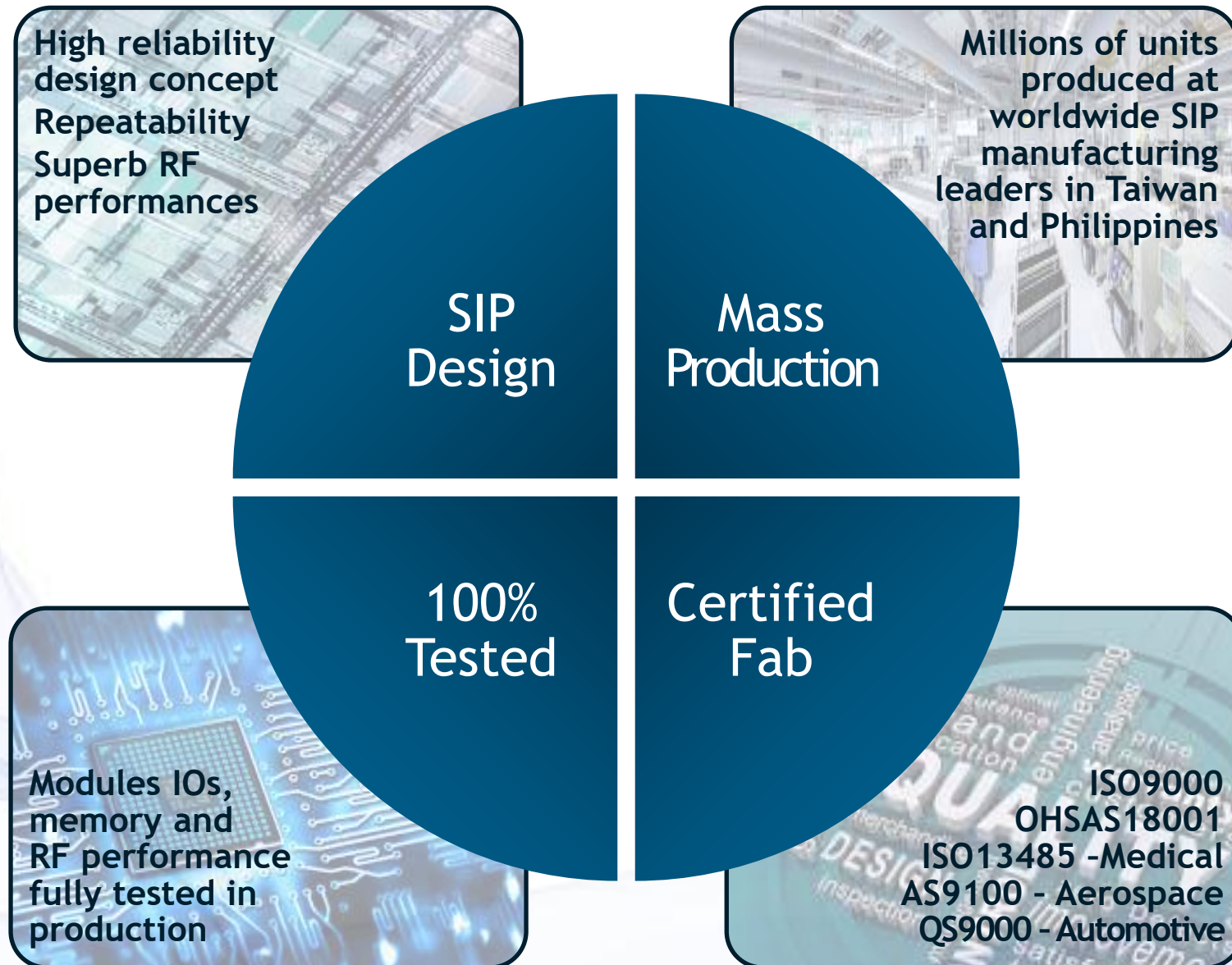
All in one  
module  
with  
superb  
RF  
performance  
despite  
miniature  
size



- 1 SoC Inside**  
WLCSP wireless SoC with multiple analog and digital functions
- 2 Both crystals included**  
Radio & Synchronization  
Reduced power consumption
- 3 Power supply decoupling**  
For both DC-DC enable or disable  
operating mode
- 4 Antenna matching circuit**
- 5 Integrated Antenna**  
Proprietary antenna offering best reproducibility  
and performance, insensitive to environment
- 6 Integrated shielding**  
Avoiding external metallic covers  
Reduces height and size



# QUALITY & RELIABILITY



## Module certification



Qualified List



DoC based on test reports



Certification with antenna



Certification with antenna

## End user actions

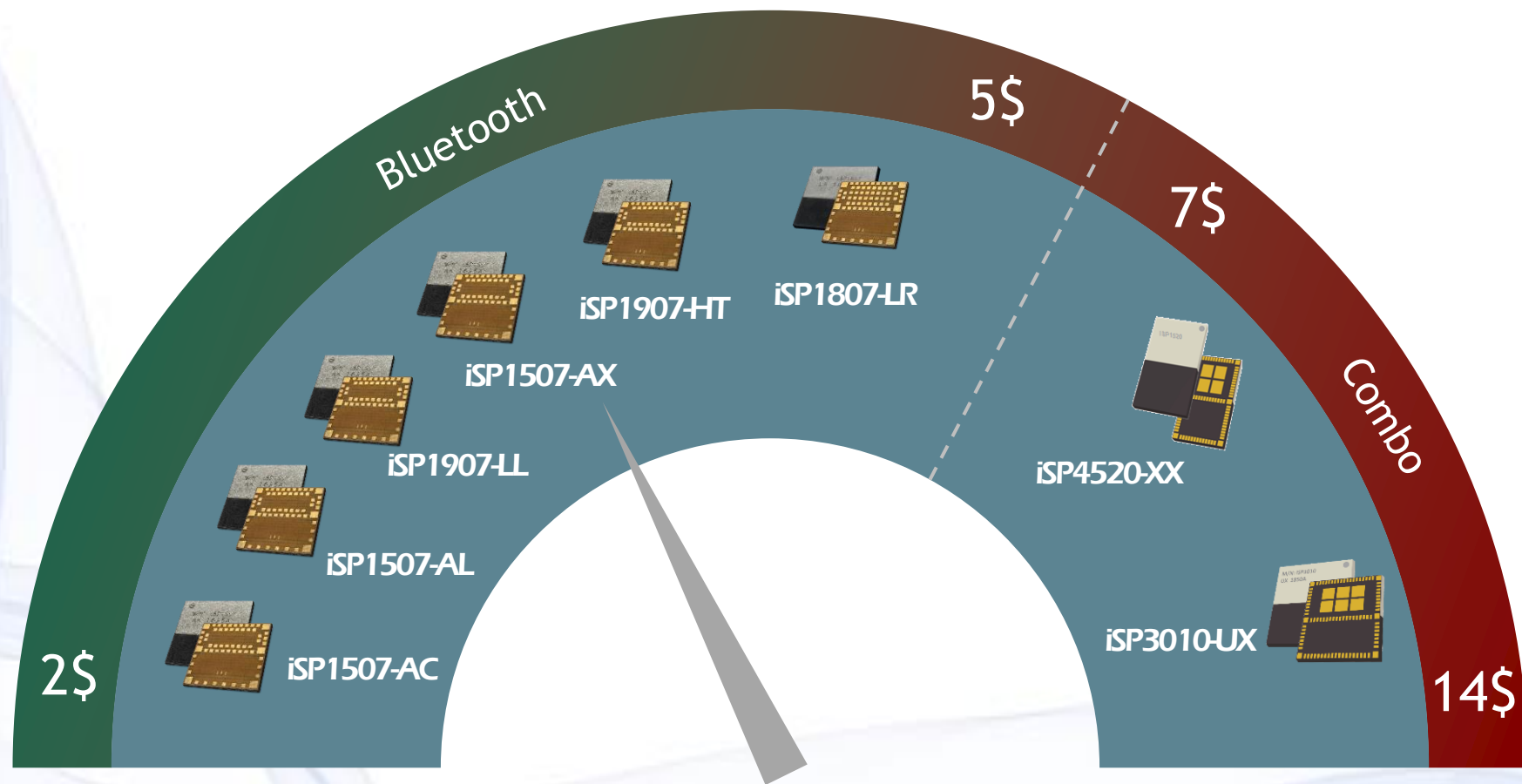
BT SIG  
End Product Listing  
Declaration

EMC and Safety tests  
CE declaration  
CE marking

EMC tests  
FCC & IC ID marking  
Notice on product manual

No additional task

# COMPETITIVE VOLUME PRICES






Responsive and high-quality  
technical support



**Hardware  
Design  
Review**



**RF  
& Range  
Simulation**



**Software  
Support  
& Examples**



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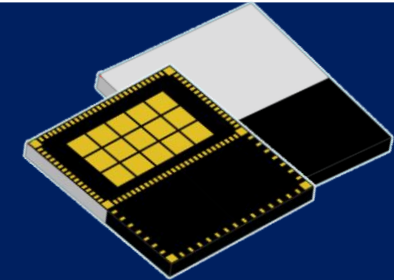
# **DEVELOPMENTS IN PROGRESS**



# COMBO NB-IoT & BLE - PRELIMINARY

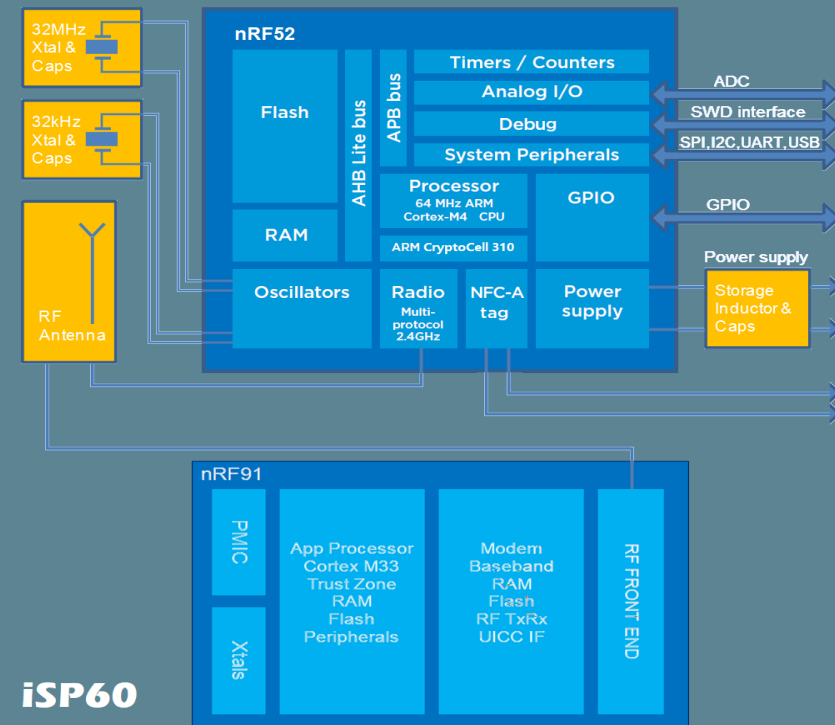
## iSP6091

**Dual NB-IoT and BLE chips**  
**Built-In antennas**  
**Timeline – mid 2021**



### Key Features

- ✓ NB-IoT Functions based on nRF91 series
- ✓ Ultra Low Power IoT Modem
- ✓ Internal Antenna Band 20 (800 MHz)
- ✓ 64MHz ARM Cortex M33 CPU
- ✓ 1MB Flash & 256 kB RAM
- ✓ 20 GPIOs
- ✓ BLE Functions based on nRF52833
- ✓ BT 5.1 RF Transceiver
- ✓ Internal Antenna 2.4 GHz
- ✓ 32bit ARM Cortex M4 CPU
- ✓ 512 kB Flash & 128 kB RAM
- ✓ 20 GPIOs including 5 ADC inputs & 1 reference
- ✓ Ultra Low Power Consumption
- ✓ Single 3.3 to 5.5 V supply
- ✓ Small size 16 x 20 x 1.8 mm





# BLE SECURE - PRELIMINARY

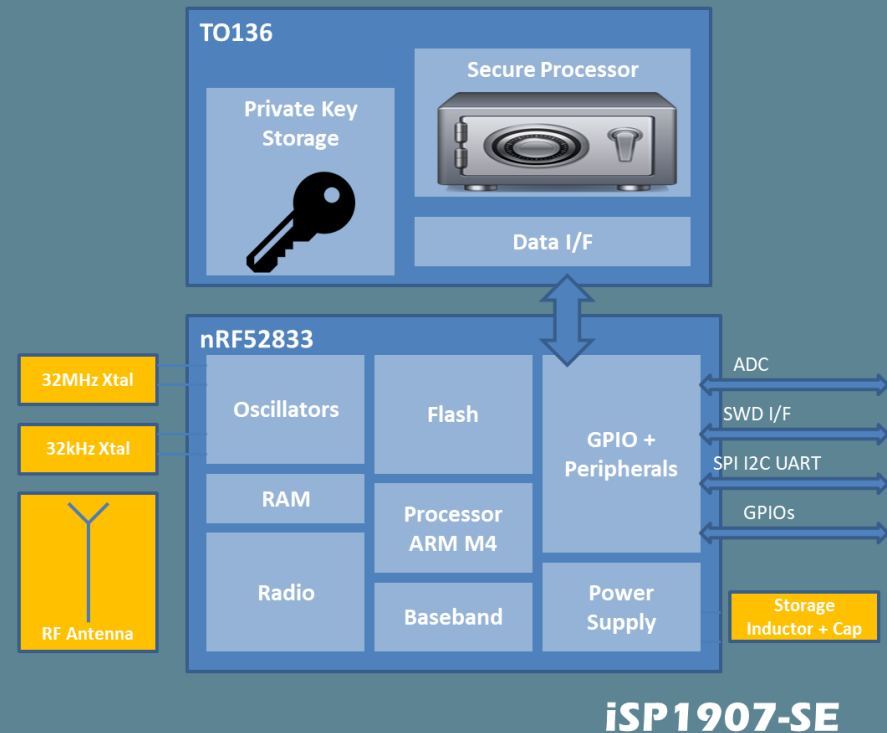
## iSP1907-SE

**BLE & Secure Element  
Built-In antenna  
Timeline – mid 2021**



### Key Features

- ✓ Ultra Low Power Consumption
- ✓ Single 1.8 to 3.6 V supply
- ✓ Small size 8 x 8 x 1 mm
- ✓ BT 5.1 Transceiver based on nRF52833
- ✓ 32bit ARM CPU
- ✓ 512 kB Flash – 128 kB RAM
- ✓ Large set of GPIOs
- ✓ Integrated Antenna
- ✓ Secure Element based on Trusted Objects TO136
- ✓ Storage of Private Keys
- ✓ Storage of Code/encode Apps













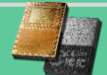


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# **SHORT RANGE MODULES**

## **BLUETOOTH**

# BLE OVERVIEW

## Large Choice of Platforms and Options with Integrated Antenna

Standard	Series	Part Number	Chipset	Status	Description
<b>BT 5.2</b>	<b>iSP20</b>	iSP2053-AX <b>NEW</b>	nRF5340	Development	Dual Core Multi protocol 
<b>BT 5.1</b>	<b>iSP19</b>	iSP1907-HT <b>NEW</b>	nRF52833	Samples	Long range - Direction finding – High Temp 
		iSP1907-LL	nRF52811	Mass Prod	Long range – Direction finding – Low cost 
<b>BT 5.0</b>	<b>iSP18</b>	iSP1807-LR	nRF52840	Mass Prod	Long range – Large memory – Multi protocol 
	<b>iSP15</b>	iSP1507-AX	nRF52832	Mass Prod	Multi purpose – Best seller 
		iSP1507-AL	nRF52810	Mass Prod	Low cost 
		iSP1507-AC <b>NEW</b>	nRF52805	Samples	Ultra low cost 
<b>BLE 4.2</b> <b>BLE 4.1</b>	<b>iSP13</b>	iSP130301-BL	nRF51822	Mass Prod	Extended memory 
		iSP130301-BM	nRF51822	Mass Prod	Multi purpose 
		iSP1302-BM	nRF51822	Mass Prod	Low cost 
<b>BLE 4.0</b>	<b>iSP09</b>	iSP091201-BN	nRF8001	Mass Prod	No application memory 



# NEW GENERATION BT 5.2

## iSP2053-AX

**NEW**

**Dual Core M33 & Large Memory  
Multi-protocol, Direction Finding  
Extended Temperature**



### Key Features

- ✓ Based on nRF5340
- ✓ BT 5.2 transceiver supporting BLE, Long Range, Mesh, Direction Finding, NFC, Thread, Zigbee
- ✓ ARM Cortex – M33 application CPU with 1 MB Flash & 512 KB RAM
- ✓ ARM Cortex – M33 network CPU 256 KB Flash & 64 KB RAM
- ✓ Advanced security ARM TrustZone & Cryptocell
- ✓ Radio 32 MHz & Synchro 32 kHz Xtals
- ✓ Complete 46 IOs set included
- ✓ USB interface
- ✓ Decoupling and DCDC circuit on board
- ✓ Extended temperature 105°C
- ✓ Ultra Small LGA 8 x 10 x 1 mm

### Applications

- ✓ Professional Lighting
- ✓ Advanced wearables
- ✓ Complex IoT applications

### Market Introduction

- ✓ Currently in development
- ✓ Samples & Kits in Q1-2021
- ✓ Certification & Mass prod in Q2-2021

# COMPLETE BT 5 & BT 5.1 OFFER

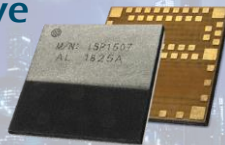
## Common features

Pin to Pin compatible

- ✓ Form Factor 8 x 8 x 1 mm
- ✓ BLE
- ✓ BT Mesh
- ✓ Built-in Antenna
- ✓ Cortex M4
- ✓ DC/DC
- ✓ 32 MHz Xtal
- ✓ 32kHz Xtal
- ✓ Balun
- ✓ SPI, I2C, UART, ADC interfaces

### ISP1907-LL

Price Sensitive Home and Building Networks



- ✓ Based on nRF52811
- ✓ BT 5.1 Long Range
- ✓ Direction Finding
- ✓ 192 kB Flash & 24 kB RAM
- ✓ 13 IOs

### ISP1907-HT

Long Range High Temperature for Smart Home & Lighting

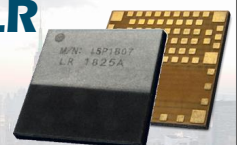


NEW

- ✓ Based on nRF52833
- ✓ BT 5.1 Long Range
- ✓ Direction Finding
- ✓ 512 kB Flash & 128 kB RAM
- ✓ 30 IOs + USB

### ISP1807-LR

Home and Building Networks and Secure Solutions



- ✓ Based on nRF52840
- ✓ BT5 Long Range
- ✓ 1 MB Flash & 256 kB RAM
- ✓ ARM Cryptocell
- ✓ 46 IOs + USB

### ISP1507-AC

Ultra Low Cost Solution for Simple IoT Applications



NEW

- ✓ Based on nRF52805
- ✓ BT 5.0
- ✓ 192 kB Flash & 24 kB RAM
- ✓ 10 IOs
- ✓ No 32 kHz Xtal

### ISP1507-AL

Perfect for Mesh Relay Nodes and Price sensitive Solutions



- ✓ Based on nRF52810
- ✓ BT 5.0
- ✓ 192 kB Flash & 24 kB RAM
- ✓ 13 IOs

### ISP1507-AX

All-purpose BLE Solution for Sensor & Mesh Connectivity

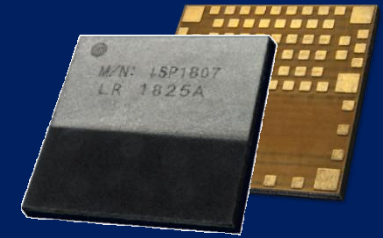


- ✓ Based on nRF52832
- ✓ BT 5.0
- ✓ 512 kB Flash & 64 kB RAM
- ✓ 30 IOs

# COMPLETE BT 5 & BT 5.1 OFFER

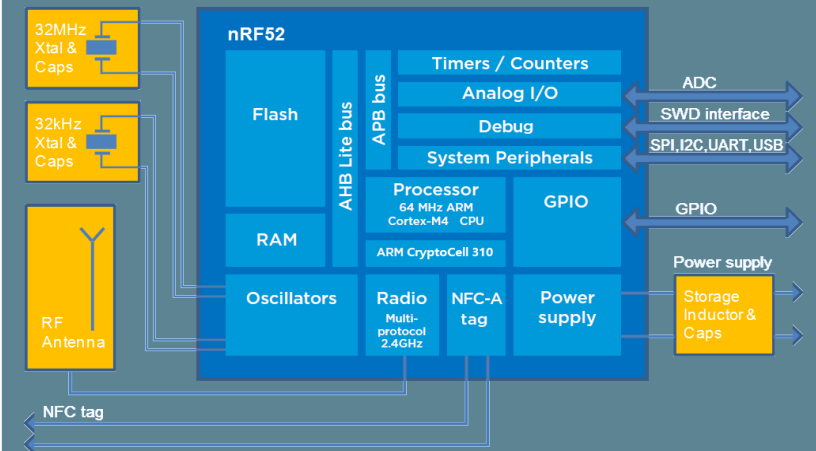
**iSP15  
iSP18  
iSP19 series**

**Large choice of performances  
with built-in Antenna  
Unique pin compatible range**



## Key Features

- ✓ Ultra Small LGA 8 x 8 x 1 mm
- ✓ BT 5.0 or BT 5.1 transceiver
- ✓ From core BLE to Multiprotocol Thread, Zigbee, NFC and Mesh, Long Range, Direction finding
- ✓ 32-bit ARM Cortex – M4 or M4F CPU
- ✓ From 192 KB to 1MB Flash
- ✓ From 24 KB to 256 KB RAM
- ✓ 10 to 46 GPIOs
- ✓ Optional ARM CryptoCell
- ✓ Optional USB interface
- ✓ Radio 32 MHz & Synchro 32 kHz Xtals
- ✓ Decoupling and DCDC circuit on board



## Market Introduction

- ✓ ISP1507-AX, ISP1507-AL, ISP1807-LR and ISP1907-LL fully available and certified
- ✓ ISP1907-HT engineering samples available, mass production and certification scheduled end Q4-2020
- ✓ ISP1507-AC mass production available end Q4-2020

## Certifications





# COMPLETE BT 5 & BT 5.1 OFFER

**iSP15  
iSP18  
iSP19 series**

**Evaluation Board  
Test Board  
Demo Board**



## Test Board

- ✓ Specific test board of required P/N compatible with any Kit
- ✓ Test Boards integrate a "Connector Debug In" port compatible with Nordic Dev kits
- ✓ All IOs "Test Point" on board



## Evaluation Board

- ✓ 1 interface board with J-Link Cortex emulator
- ✓ 1 test board



## Demo Board ISP1880

- ✓ BT5 nRF52840 transceiver
- ✓ Accelero /Gyro / Magneto
- ✓ Temperature/Barometer
- ✓ Humidity Sensor
- ✓ Sensor Demo available on iTunes and Google Play



# PRODUCT SELECTION GUIDE

## RF and Protocol requirements

- Does the application need other protocols than pure BLE ? ANT, Zigbee, Thread ?
- Is BLE Mesh needed ?
- Should the radio be Long Range ?
- Any need for Direction Finding ? Tag ? Anchor ? Both ?

Module Type	iSP1507-AC	iSP1507-AL	iSP1507-AX	iSP1807-LR	iSP1907-LL	iSP1907-HT
Multi Protocol			ANT+	ANT, Thread Zigbee		ANT, Thread Zigbee
NFC Pairing			OK	OK		OK
Mesh			BEST	BEST		BEST
Long Range				BEST	BEST	BEST
Direction Finding					Tags only	Tags & Anchors

# PRODUCT SELECTION GUIDE

## Desired CPU performance

- Does the application need an embedded MCU or use an external host ?
- Does it need many calculation with floating point capability ?
- What is the requirement in term of memory ?
- Any additional security required ?

Module Type	iSP1507-AC	iSP1507-AL	iSP1507-AX	iSP1807-LR	iSP1907-LL	iSP1907-HT
External Host Micro	BEST	BEST			BEST	
Floating point computing			YES	YES		YES
Memory requirement	LIGHT 192 / 24 kB	LIGHT 192 / 24 kB	MEDIUM 512 / 64 kB	LARGE 1 MB / 256 kB	LIGHT 192 / 24 kB	MEDIUM 512 / 128 kB
Cryptocell security				YES		



# PRODUCT SELECTION GUIDE

## Module interfaces

- How many IOs are required ?
- Any Analog port ?
- Any USB interface ?

Module Type	iSP1507-AC	iSP1507-AL	iSP1507-AX	iSP1807-LR	iSP1907-LL	iSP1907-HT
IOs including I2C, SPI, UART, PWM	LIGHT 10	LIGHT 13	MEDIUM 30	LARGE 46	LIGHT 13	LARGE 40
ADCs	LIGHT 2	LIGHT 3	LARGE 8	LARGE 8	LIGHT 3	LARGE 8
USB				YES		YES

# PRODUCT SELECTION GUIDE

## Price range

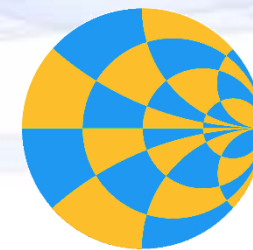
- Is the target price aligned with the chosen module options ?
- Or what performance can I relax to achieve the desired cost ?

Module Type	iSP1507-AC	iSP1507-AL	iSP1507-AX	iSP1807-LR	iSP1907-LL	iSP1907-HT
Price Sensitivity	ULTRA LOW COST	LOW COST	MEDIUM RANGE	HIGH END	LOW COST	HIGH END

# PRODUCT SELECTION GUIDE

Module Type		iSP1507-AC	iSP1507-AL	iSP1507-AX	iSP1807-LR	iSP1907-LL	iSP1907-HT
Connectivity	Specification	BT 5.0			BT 5.0 Long Range	BT 5.1 Long Range & Direction Finding	
	Features	BLE	BLE	BLE & Mesh	BLE & Mesh	BLE	BLE & Mesh
	Other protocol	-	ANT	ANT	Thread, Zigbee, ANT	Thread	Thread, Zigbee
	Tx Power	+4 dBm	+4 dBm	+4 dBm	+8 dBm	+4 dBm	+8 dBm
	Rx sensitivity	-97 dBm	-96 dBm	-96 dBm	-103 dBm (BT5)	-104 dBm (BT5)	-103 dBm (BT5)
	Tx current	4.6 mA @ 0 dBm	4.6 mA @ 0 dBm	5.3 mA @ 0 dBm	4.8 mA @ 0 dBm	4.6 mA @ 0 dBm	4.9 mA @ 0 dBm
	Rx current	4.6 mA	4.6 mA	5.4 mA	4.6 mA	4.6 mA	4.6 mA
	Data rate	2 Mbps	2 Mbps	2 Mbps	2 Mbps	2 Mbps	2 Mbps
	Range	80 m	80 m	80 m	400 m	300 m	400 m
	SoftDevice	S112/S113	S112/S113	S112/S113/S132	S113/S140	S112/S113/S140	S113/S122/S140
CPU	Chip	nRF52805	nRF52810	nRF52832	nRF52840	nRF52811	nRF52833
	Processor	32-bit ARM Cortex M4	32-bit ARM Cortex M4	32-bit ARM Cortex M4F	32-bit ARM Cortex M4F	32-bit ARM Cortex M4	32-bit ARM Cortex M4F
	Security	-	-	-	ARM Cryptocell 310	-	-
	Flash / RAM	192 kB / 24 kB	192 kB / 24 kB	512 kB / 64 kB	1 MB / 256 kB	192 kB / 24 kB	512 kB / 128 kB
Interfaces	GPIOs	10	13	30	46	13	30
	ADCs	2	3	8	8	3	8
	SPI	Standard	Standard	Standard	High speed / QSPI	Standard	High speed
	NFC tag	No	No	Yes	Yes	No	Yes
	USB	No	No	No	Yes	No	Yes
	Other	UART, PWM, PDM	UART, PWM, PDM	UART, PWM, PDM	UART, PWM, PDM	UART, PWM, PDM	UART, PWM, PDM
Misc.	Power Supply	1.7-3.6 V + LDO/DCDC	1.7-3.6 V + LDO/DCDC	1.7-3.6 V + LDO/DCDC	1.7-5.5 V + LDO/DCDC	1.7-3.6 V + LDO/DCDC	1.7-5.5 V + LDO/DCDC
	Crystals	32 MHz	32 MHz & 32 kHz	32 MHz & 32 kHz	32 MHz & 32 kHz	32 MHz & 32 kHz	32 MHz & 32 kHz
	Size (mm)	8 x 8 x 0.95	8 x 8 x 0.95	8 x 8 x 0.95	8 x 8 x 0.95	8 x 8 x 0.95	8 x 8 x 0.95
	Temperature	85°C	85°C	85°C	85°C	85°C	105°C

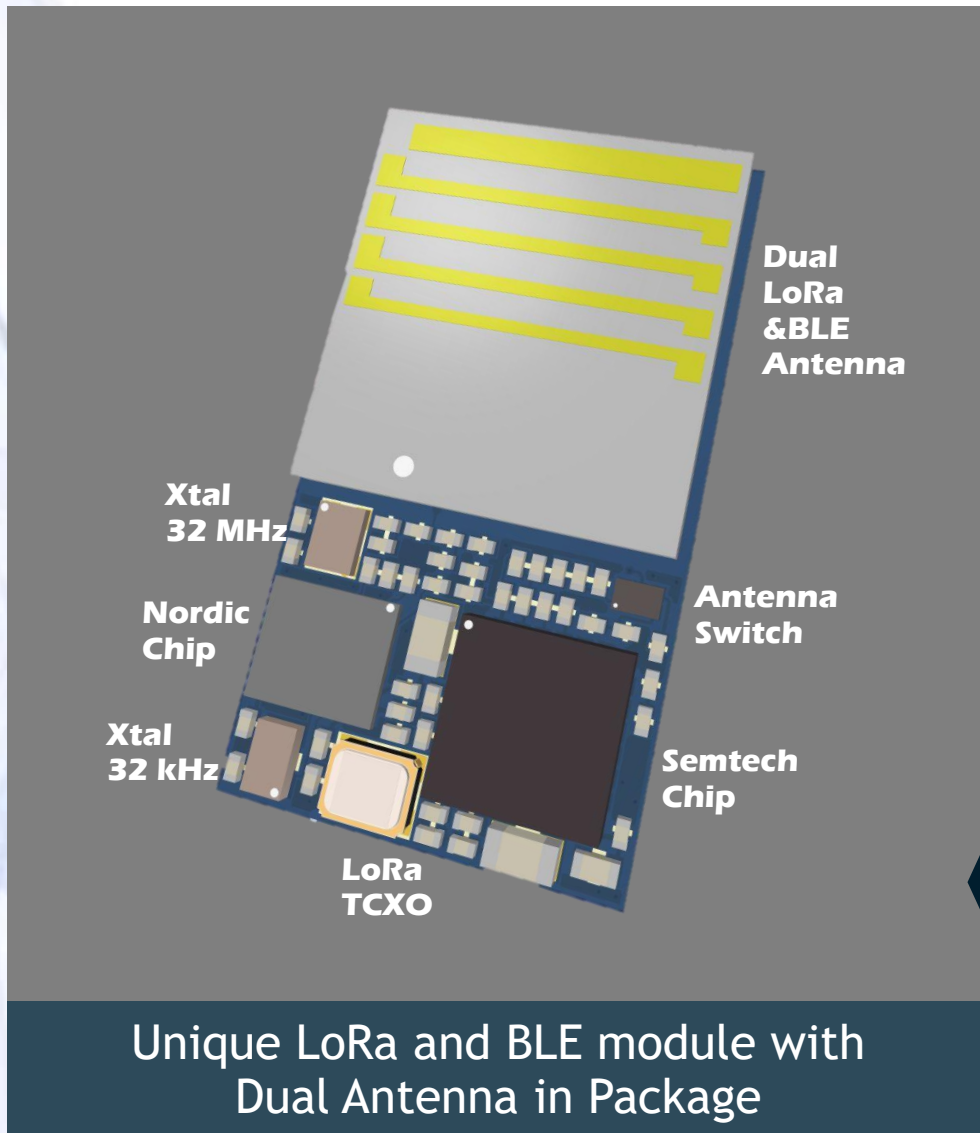




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# **WIDE AREA NETWORK LORA**

# LoRA OVERVIEW



Spreading Factor @ 125 kHz	Bit Rate	Indicative Range	Time on Air @ 10 Bytes
SF7	5470 bps	2 km	56 ms
SF8	3125 bps	4 km	100 ms
SF9	1760 bps	6 km	200 ms
SF10	980 bps	8 km	370 ms
SF11	440 bps	11 km	740 ms
SF12	290 bps	14 km	1400 ms

Configurable Long Distance Networking

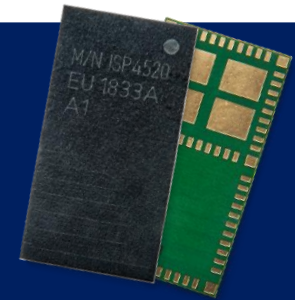




# MULTI BAND COMBO LoRa

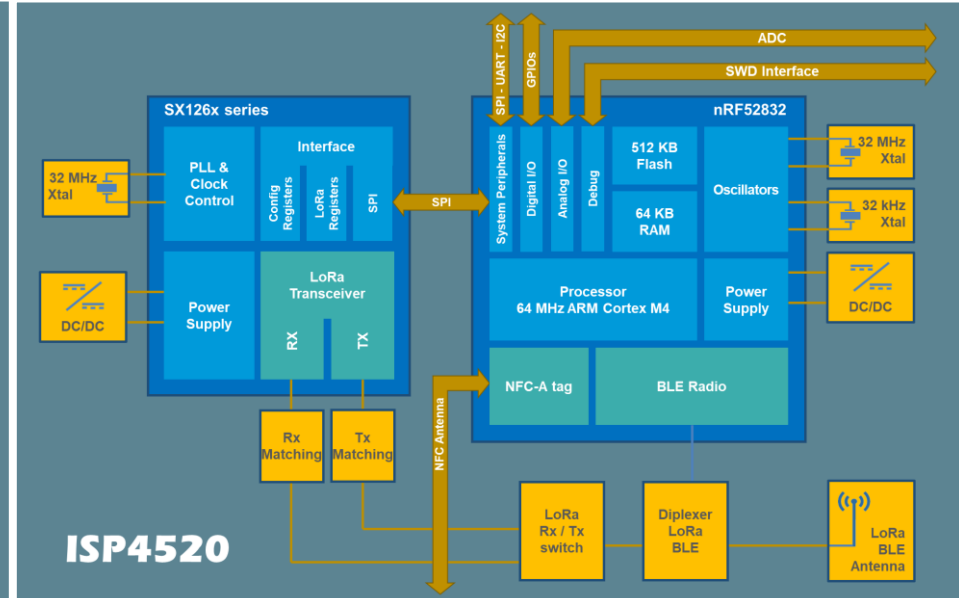
## iSP4520

### Combo LoRa / BLE module With Integrated Antenna Europe, America, Asia Bands



#### Key Features

- ✓ LoRa Alliance
- ✓ BT 5 Ready
- ✓ NFC-A Tag for OOB pairing
- ✓ Fully integrated LoRa & BLE Antennas
- ✓ Integrated LoRa TCXO & BLE Xtals
- ✓ LoRa based SX126x
- ✓ BLE based nRF52
- ✓ EU Variant  
863-870 MHz - 14 dBm
- ✓ US Variant  
902-928 MHz - 22 dBm
- ✓ AS Variant  
920-923 MHz - 14 dBm
- ✓ Externally Controlled or using embedded 32-bit ARM M4F CPU
- ✓ 512 kB Flash - 64 kB RAM
- ✓ DC/DC converters
- ✓ Analog, Digital peripherals
- ✓ SPI interface
- ✓ Supply 2.8V-3.6V
- ✓ Temp. -40 to +85 °C
- ✓ Size 9.8 x 17.2 x 1.7 mm



#### Certifications





# MULTI BAND COMBO LoRA

## iSP4520

## Test Boards Mote & Gateway Development Kit



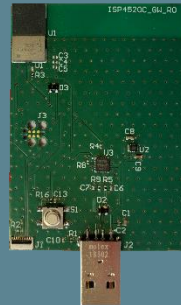
### Tx Test Board / Mote

- ✓ Consists of a module mounted on a PCB
- ✓ Includes a connection to the Insight SiP generic Interface Board
- ✓ Offers test points for all IOs and can be used in conjunction with a Nordic Development kit.



### Rx Test Board / Gateway

- ✓ Consists of a PCB integrating an ISP4520 module and a USB plug for connection to a PC port com
- ✓ Enables to communicate with a Mote in a point to point connectivity mode through LoRa standards.



### Development Kit

- ✓ Offers the perfect solution to start with ISP4520, including ...
- ✓ 1 x Interface Board with integrated J-Link Emulator
- ✓ 1 x Tx Test Board / Mote
- ✓ 1 x Rx Test Board / Gateway
- ✓ Example firmware codes for both Mote & Gateway demonstrating temperature sensor application
- ✓ Including LoRaWAN stack ported on nRF52 platform



## iSP4580

### LoRa & BLE Multi Sensor Demo Based on iSP4520



#### Key Features

- ✓ LoRa Alliance based on SX1261
- ✓ BT 5 Ready based on nRF52
- ✓ Fully integrated LoRa & BLE Dual Matching and Antenna
- ✓ Integrated Xtals LoRa 32 MHz, BLE 32 MHz & 32.768 kHz
- ✓ Supply 2.8V-3.6V
- ✓ Temp. -40 to +85 °C
- ✓ Coin cell battery CR2032
- ✓ Accelero / Gyro / Magneto Sensor
- ✓ Temperature / Barometer
- ✓ Light Sensor
- ✓ Humidity Sensor
- ✓ Sensor Transmission with LoRa







**Insight SiP**  
It's **all** in the **package**

# **POSITIONING MODULES ULTRA WIDE BAND**

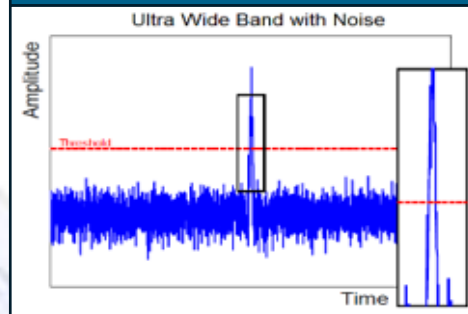


## UWB offers the best precise positioning performances

- WiFi and Bluetooth using RSSI method are sensitive to Multipath and Interference
- UWB using Time of Flight method, is unsensitive to both, and offers precision in 10 cm range

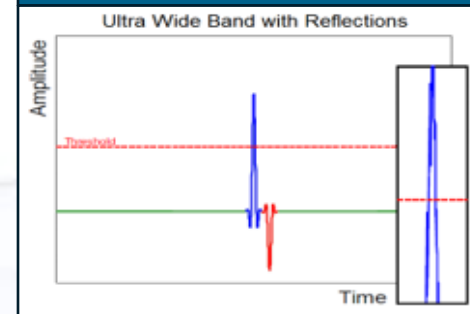
### Noise

RF pulse straight edges give precise determination of arrival time



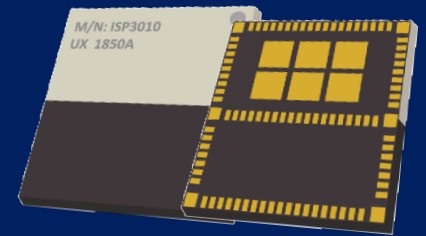
### Multipath

Short pulses avoid combination with reflected signals



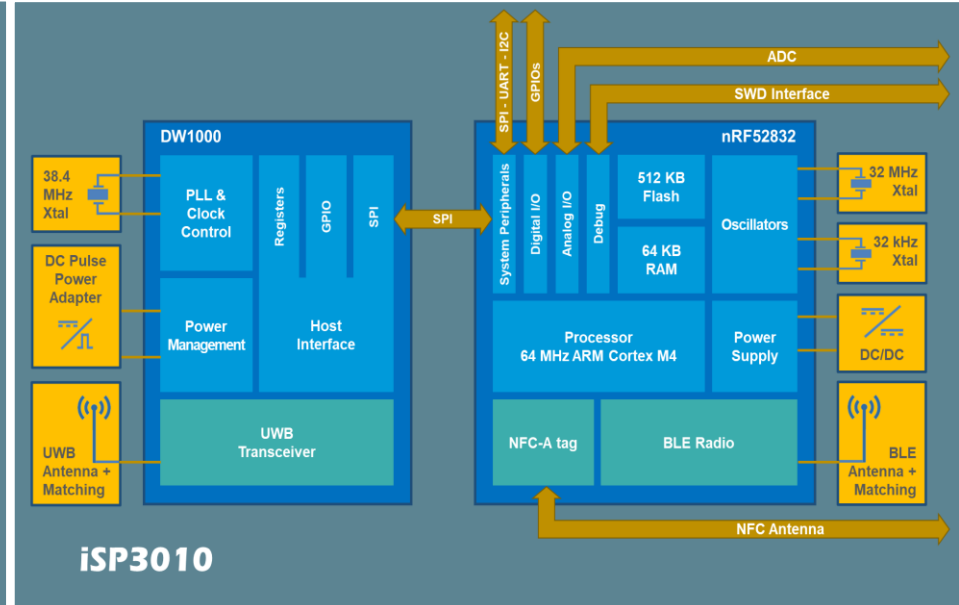
## iSP3010

## High Performance Combo UWB / BLE module With Integrated Antennas



### Key Features

- ✓ IEEE802.15.4-2011
- ✓ BLE V4.2
- ✓ NFC-A Tag for pairing
- ✓ Resolution < 10 cm
- ✓ Fully integrated UWB & BLE Antennas
- ✓ Integrated Xtals UWB 38.4 MHz, BLE 32 MHz & 32.768 kHz
- ✓ UWB based DW1000
- ✓ BLE based nRF52
- ✓ Compact Size 14.0x14.0x1.5 mm
- ✓ Temp. -40 to +85 °C
- ✓ Supply 2.8V-3.6V
- ✓ Externally Controlled or using embedded 32-bit ARM M4F CPU
- ✓ 512 kB Flash
- ✓ 64 kB RAM
- ✓ DC/DC converters
- ✓ Analog, Digital peripherals
- ✓ SPI interface



iSP3010

### Certifications



## iSP3010

## Test Board Anchor & Tag Boards Development Kit



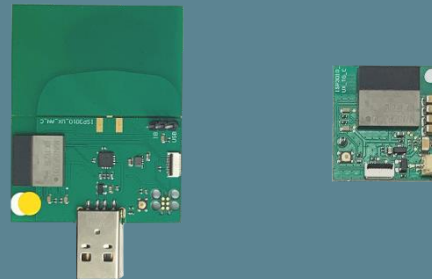
### Test Board

- ✓ Consists of a module mounted on a PCB
- ✓ Includes a connection to the Insight SiP generic Interface Board
- ✓ Offers test points for all IOs and can be used in conjunction with a Nordic Development kit



### Anchor & Tag Boards

- ✓ Anchor Board consists of a PCB integrating an ISP3010 module and a USB plug for connection to a PC port com
- ✓ Tag Board consists of a small PCB integrating an ISP3010 module powered by a coin cell



### Development Kit

- ✓ Offers the perfect solution to start with ISP3010, including ...
- ✓ 1x Interface Board with integrated J-Link Emulator
- ✓ 1x Test Board connected to the Interface Board for testing purpose
- ✓ 1x Anchor Board
- ✓ 1x Tag Board
- ✓ 1x NFC antenna
- ✓ A ranging demonstration including the embedded firmware and the Android App





## iSP3080

### Social Distancing Application Precise accuracy of few cm Tag HW & SW Demo



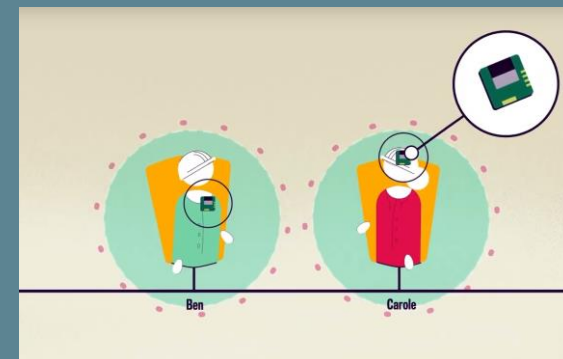
#### Tag Hardware

- ✓ Combo UWB BLE ISP3010 module
- ✓ Accelerometer
- ✓ Buzzer
- ✓ LEDs
- ✓ Wireless charging for small batteries
- ✓ Programming interface



#### Tag Firmware

- ✓ Far BLE detection of tags in a large area around the Security Bubble
- ✓ Close and precise UWB detection to alert if another tag comes into the Security Bubble
- ✓ Conform to GDPR regulations





**Insight SiP**  
It's **all** in the **package**

# **POSITIONING MODULES BT 5.1**



# BT 5.1 OVERVIEW

## Enhanced low cost location services with BT 5.1

- Former BT location systems was based on RSSI only, with poor precision
- Direction finding provide improved precision at Bluetooth cost for asset tracking and people location

Angle of Arrival (AoA) and Angle of Departure (AoD) makes use of the angular phase-shifts that occur between antennas as they receive or transmit RF signals

This full system is made of anchor units positioned in line of sight manner

Antenna arrays at both side of the communication link are providing phase

Position of tagged items are calculated by triangulation from different anchors

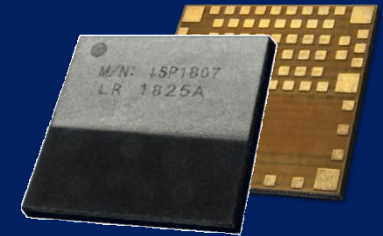




# BT 5.1 DIRECTION FINDING

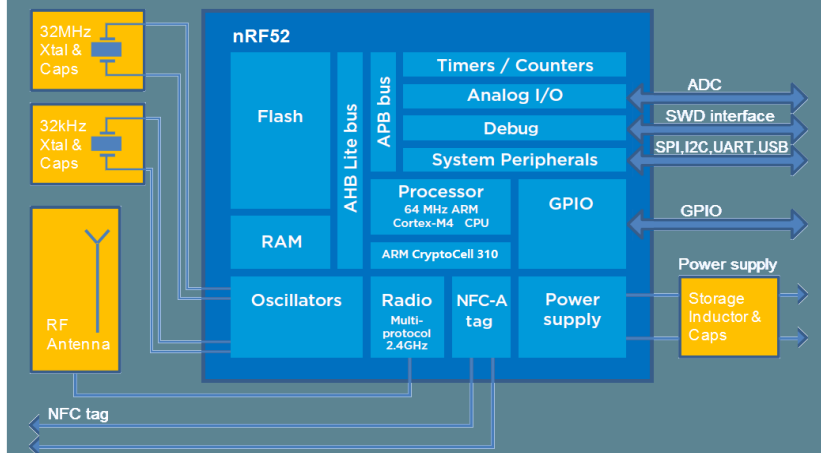
## iSP1907

### AoA BT 5.1 Complete Extended Solution For Tags and Anchors



#### Key Features

- ✓ Ultra Small LGA 8 x 8 x 1 mm
- ✓ BT 5.1 Long Range BLE transceiver
- ✓ 32-bit ARM Cortex – M4 or M4F CPU
- ✓ 192 MB or 512 MB Flash
- ✓ 24 KB or 128 KB RAM
- ✓ Set of 13 or 30 IOs included
- ✓ Radio 32 MHz & Synchro 32 kHz Xtals
- ✓ Decoupling and DCDC circuit on board



#### ISP1907-LL

- ✓ Best suited for Tags
- ✓ Price sensitive & simple applications

#### ISP1907-HT

- ✓ Required for Anchors
- ✓ Large computing capabilities
- ✓ More interfaces

#### Certifications



Industry  
Canada



# BT 5.1 DIRECTION FINDING

## iSP1907

### Evaluation Board Test Board AoA Kit



#### Test Board

- ✓ Specific test board of required P/N compatible with any Kit
- ✓ Test Boards integrate a "Connector Debug In" port compatible with Nordic Dev kits
- ✓ All IOs "Test Point" on board



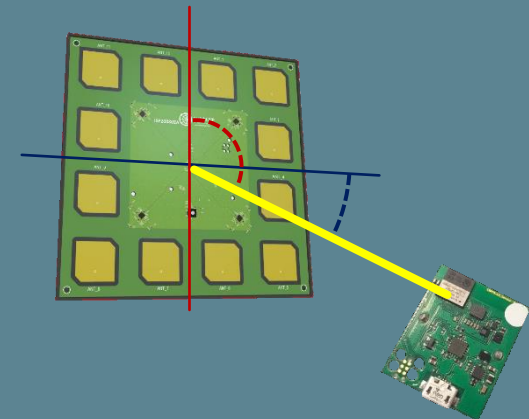
#### Evaluation Board

- ✓ 1 interface board with J-Link Cortex emulator
- ✓ 1 test board



#### AoA Kit

- ✓ ISP1907 Anchor Board based on ISP1907-HT with 3D Array Antenna
- ✓ 2x ISP1907 Tag Boards based on ISP1907-LL with sensors



# ANY QUESTION ?

**... FEEL FREE TO  
CONTACT US**  
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