KUMIHIMO
Tech Camp with Murata

Murata Electronic Components List
2025

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INNOVATOR IN ELECTRONICS

High-performance 2-axis (xy) inclinometer

SCL3400

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2-axis MEMS sensor offering best-in-class stability over lifetime and temperature range

Performance

- Ultra-low noice density 16 µg/√Hz
- Typical offset drift over lifetime ≤ 0.05°
- Sensitivity error ±0.7 %
- Temperature range -40...+85°C
- Resolution up to 32768 LSB/g
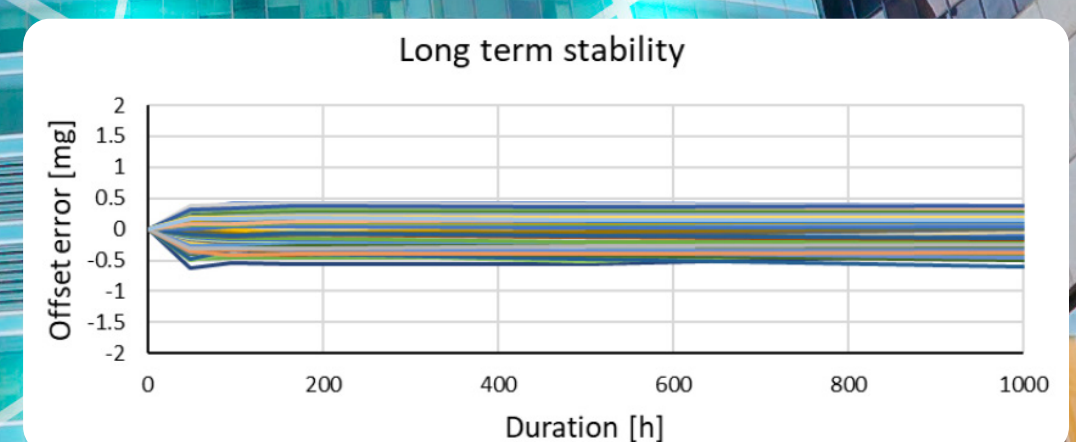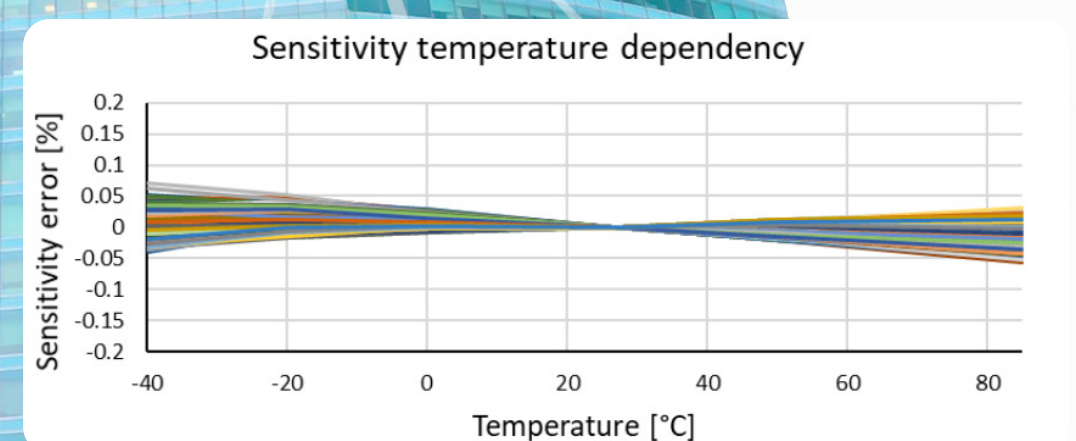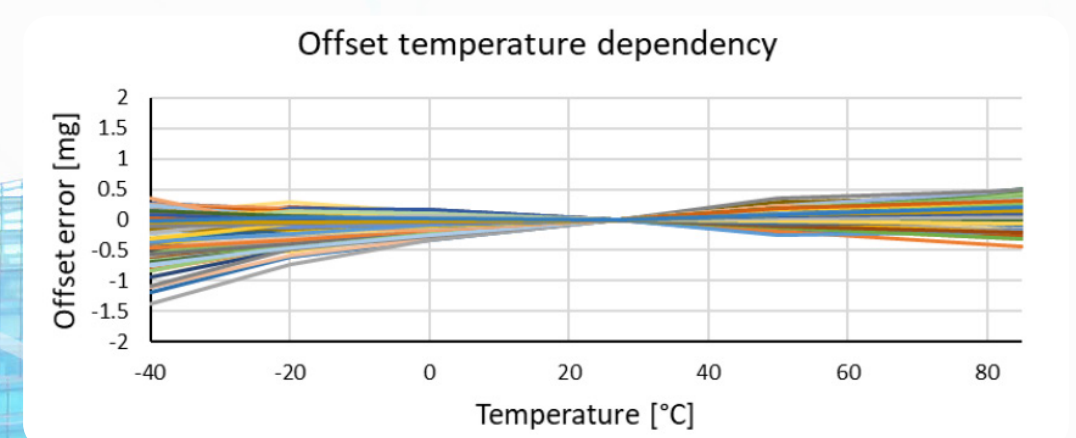
Applications

- Structural Health Monitoring (SHM)
- Leveling & Platform Stabilization
- Tilt sensing
- Inertial Measurement Units (IMUs)
- Positioning and guidance systems

Features

- Single package 2-axis High Performance inclinometer sensor
- Based on Murata's proven 3D-MEMS technology
- Extremely stable output over wide range of temperature and vibration
- 3.0V - 3.6V supply voltage
- Two user selectable measurement modes:
  ±30° (0.5 g) with 10 Hz LPF
  ±90° (1.1 g) with 40 Hz LPF
- Advanced self-diagnostics features
- 12 pin pre-molded housing, suitable for SMD mounting
- Size 8.6 x 7.6 x 3.3 mm (l × w × h)
- Compatible with RoHS and EV directives

Offset temperature dependency

Sensitivity temperature dependency

Long term stability

High Performance Gyro Sensor + Accelerometer

SCH16T-K01

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Applications

SCH16T is targeted at applications demanding high performance with tough environmental requirements.

- Typical applications include:
- Inertial Measurement Units (IMUs)
- Navigation and positioning
- Machine control and guidance
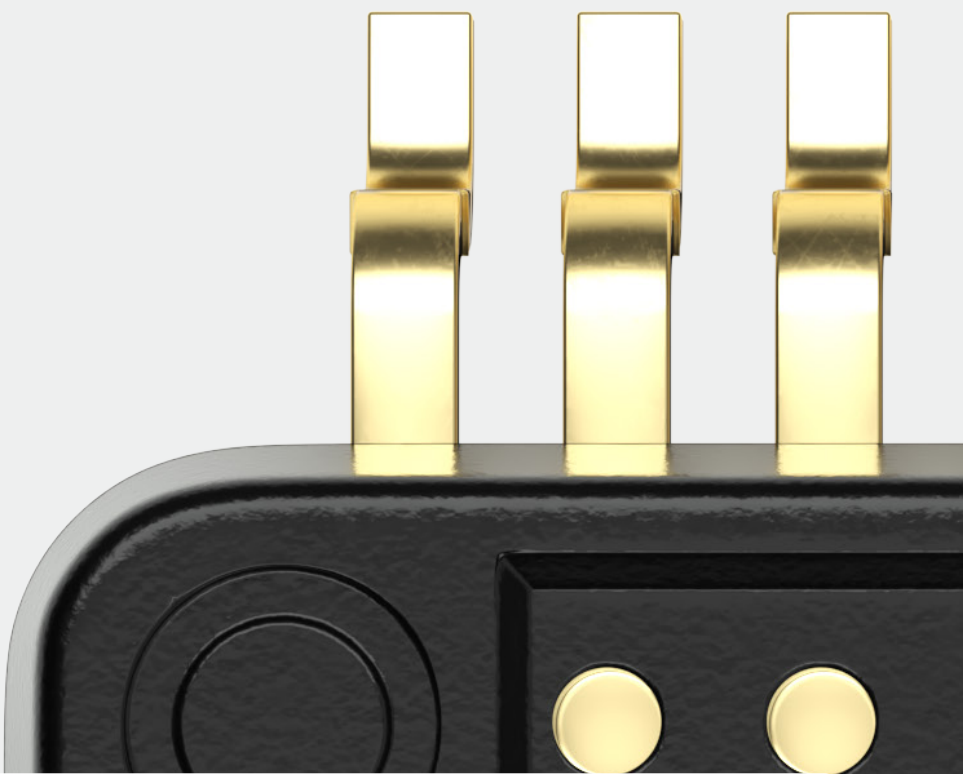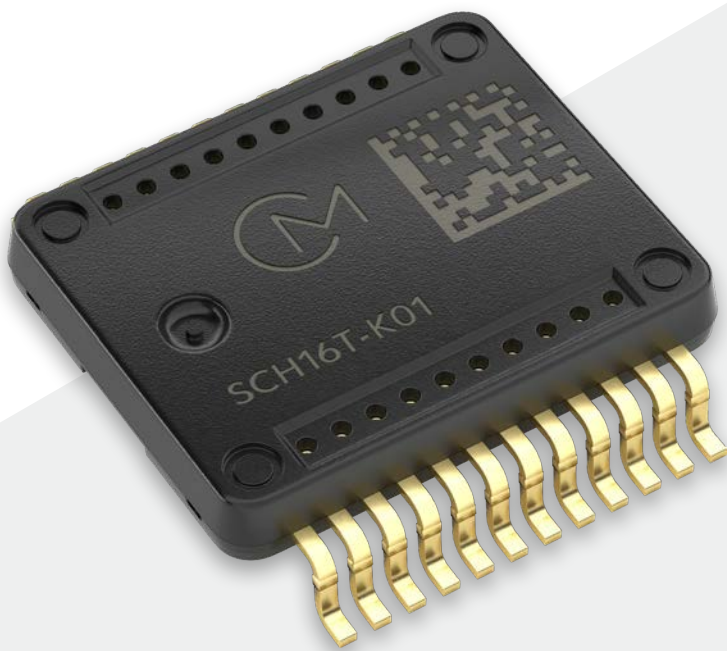- Dynamic inclination
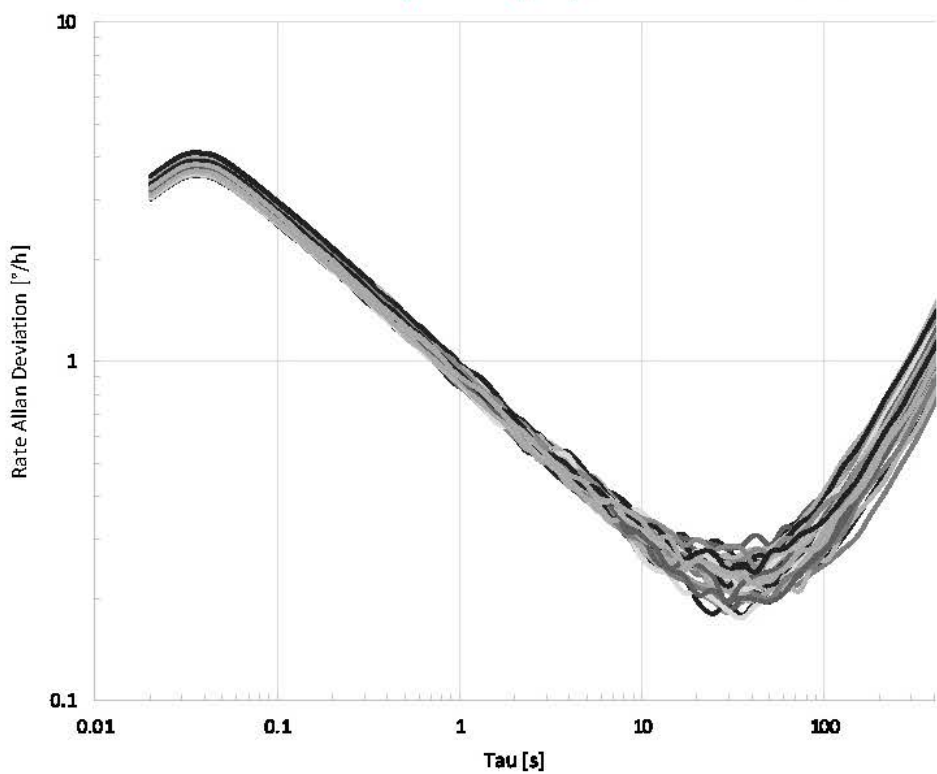- Robotic control, Drones and UAVs
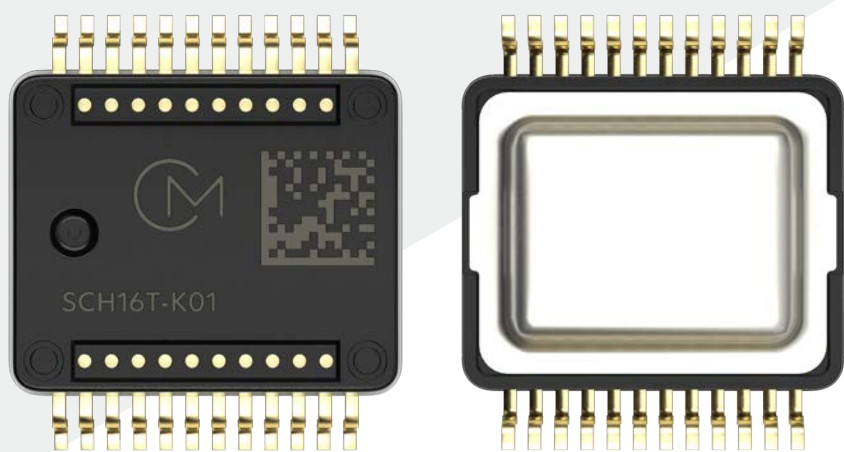
Features

- Single package 6DOF component
- Cross-axis calibration enables better than 0.15 ° orthogonality error
- Gyro bias instability level down to 0.3 °/h
- Gyro noise density level down to 0.0004 (°/s)/√Hz
- Stable offset and sensitivity over full temperature range
- Excellent linearity and vibration performance
- Extensive self-diagnostics features utilizing over 200 monitoring signals
- ±300 °/s angular rate measurement range
- ±8 g acceleration measurement range with default dynamic range of ±26 g
- –40 °C...+110 °C operating temperature range
- 3.0 V...3.6 V supply voltage
- SafeSPI2.0 interface with 20-bit data frame
- Data ready, timestamp index and SYNC functions for clock domain synchronization
- RoHS compliant robust 24-pin SOIC housing
- 11.8 mm x 13.4 mm x 2.9 mm (l x w x h) SOIC-24

Gyroscope, Allan deviation in °/h

Accelerometer, Offset drift over lifetime in mg

Accelerometer, Sensitivity error over temperature in %

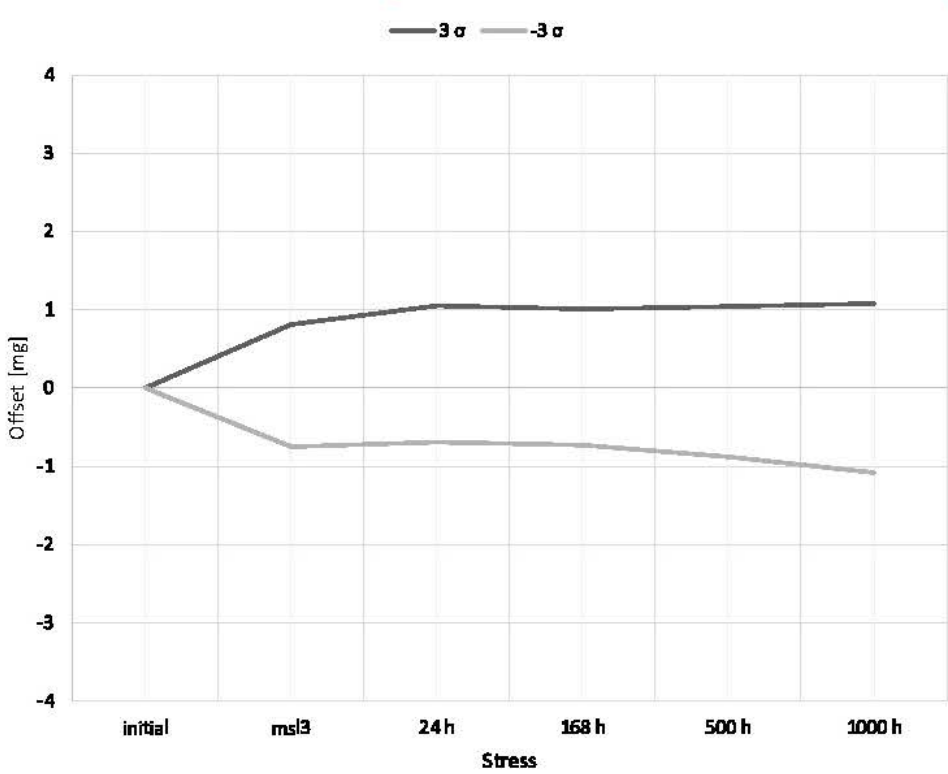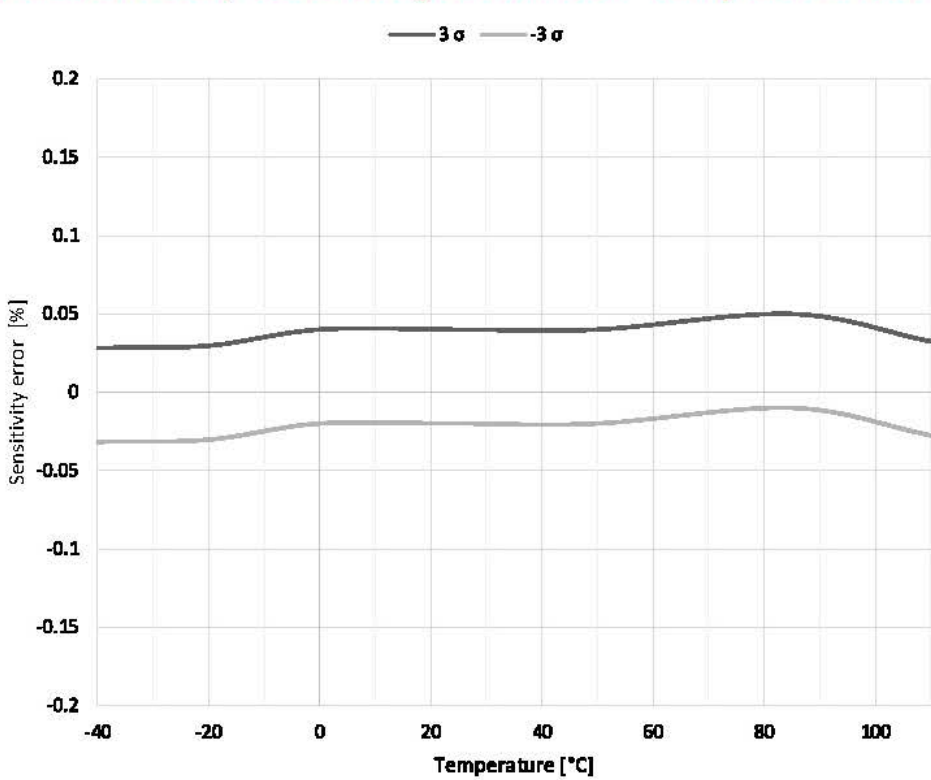| Measurement characteristics	Ω xyz	Acc xyz
Measurement range	±300 °/s	MGN1D050603MC MGN1D120603MC
Dynamic range	±328 °/s	MGN1D0508MC MGN1D1208MC
User selectable low pass filter	13, 30, 68, 235, 280, 370 Hz	
Default sensitivity	1600 LSB/(°/s)	3200 LSB/(m/s²)
Offset Temperature Dependency –40°C...+110°C (3σ)	±0.2 °/s	±4 mg
Noise density (typ)	XY: 0.0004 (°/s)/√Hz Z: 0.0006 (°/s)/√Hz	80 µg/√Hz
Bias instability (typ) Allan deviation minimum divided by 0.664	0.3 °/h	15 µg

CO2 Sensor

with High Accuracy & Long-term Stability
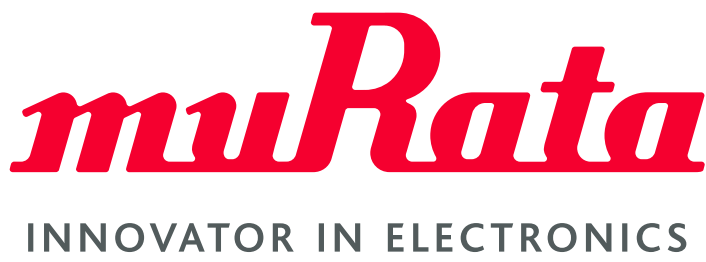
Hight accuracy using unique algorithm and long-term stability using automatic calibration
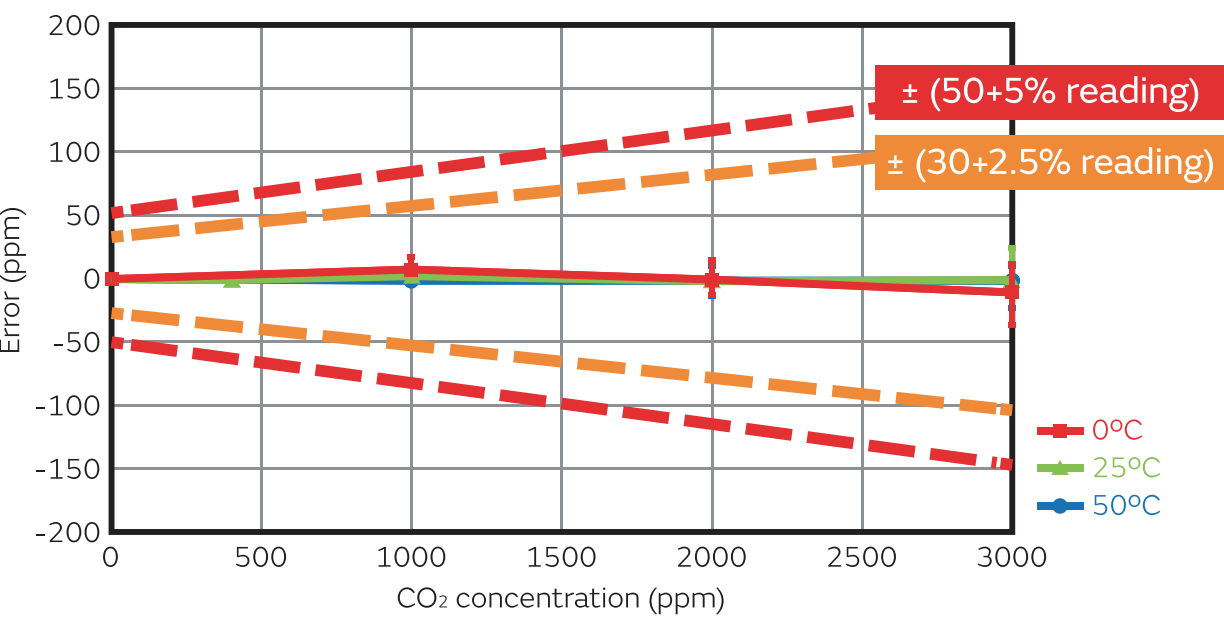
Applications

- **Smart agriculture**
  Promotion of photosynthesis by CO2 concentration control in greenhouse and plant factory

- **Building Energy Management System**
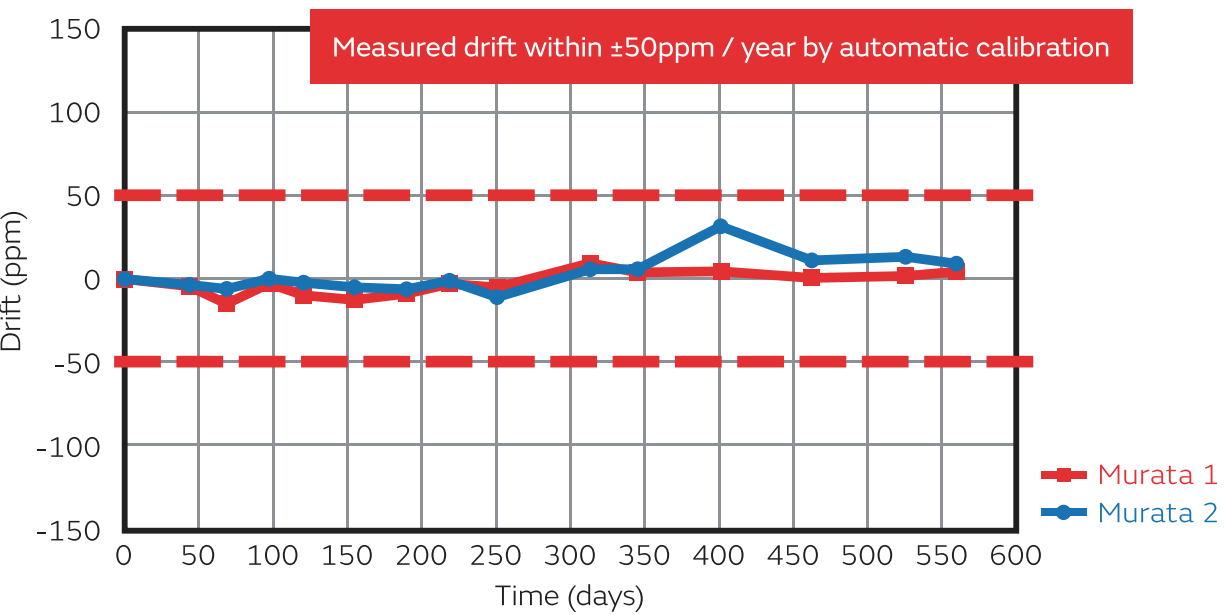 Ventilation control in building

Features

- Low influence of other gases by NDIR principle
- Excellent temperature characteristlcs and high accuracy
- Excellent long-term stability and high reliability | by automatic calibration

Measurement Accuracy

± (50+5% reading)
± (30+2.5% reading)

Error (ppm) vs CO_2 concentration (ppm)

- 0ºC
- 25ºC
- 50ºC

Long-term Test in Building

Measured drift within ±50ppm / year by automatic calibration

Drift (ppm) vs Time (days)

- Murata 1
- Murata 2

Tested by TODA Corp.
Tested by standard gas@1000ppm (Measurement error included)
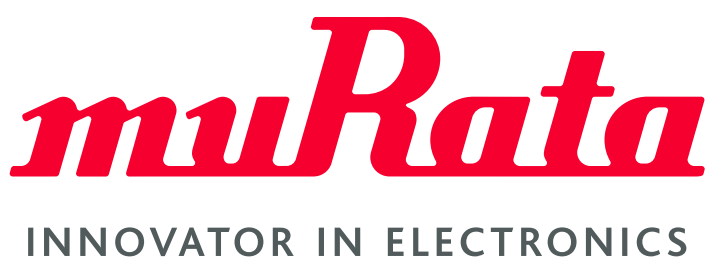
Specifications

Item	Specifications
Operating temperature	0 to +50ºC
Measurement range	0 to 2,000ppm, 0 to 3,000ppm
Accuracy	± (50ppm+5% of reading)
	Typ. ± (30ppm+2.5% of reading)
Long-term stability (Drift)	±50ppm / year @1000ppm
Power input	AC / DC24V, DC12V
Peak power consumption	Avg. 0.5W / Max. 2.0W
Outfit interface	Analog 0~5V
Dimensions	67×92×20mm

Soil Sensor

Murata will continue to make efforts to realize global SDGs by utilizing its unique sensing and wireless technologies.

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SUSTAINABLE DEVELOPMENT GOALS

Soil Sensor
High Accuracy
EC Sensor by unique
circuit and algorithm

EC

Temperature | Water content

2 ZERO HUNGER
- To improve yield of crops in W/W
- Sustainable Agriculture in W/W

6 CLEAN WATER AND SANITATION
- To prevent ground water pollution
- Efficient use of water in agriculture

15 LIFE ON LAND
- Soil condition restoration
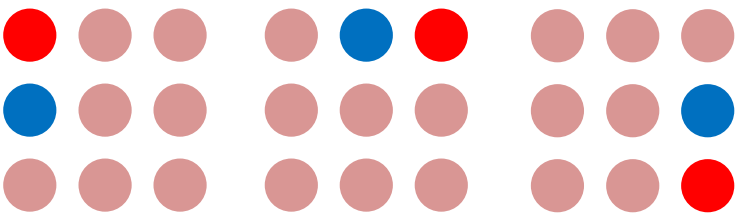- Maintenance of forests and ecosystems
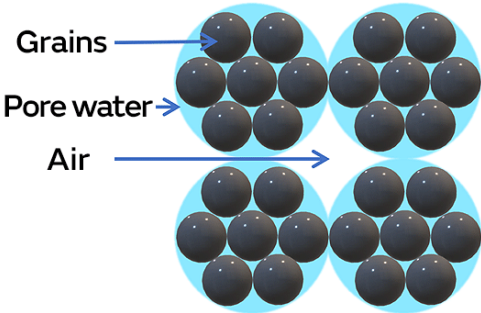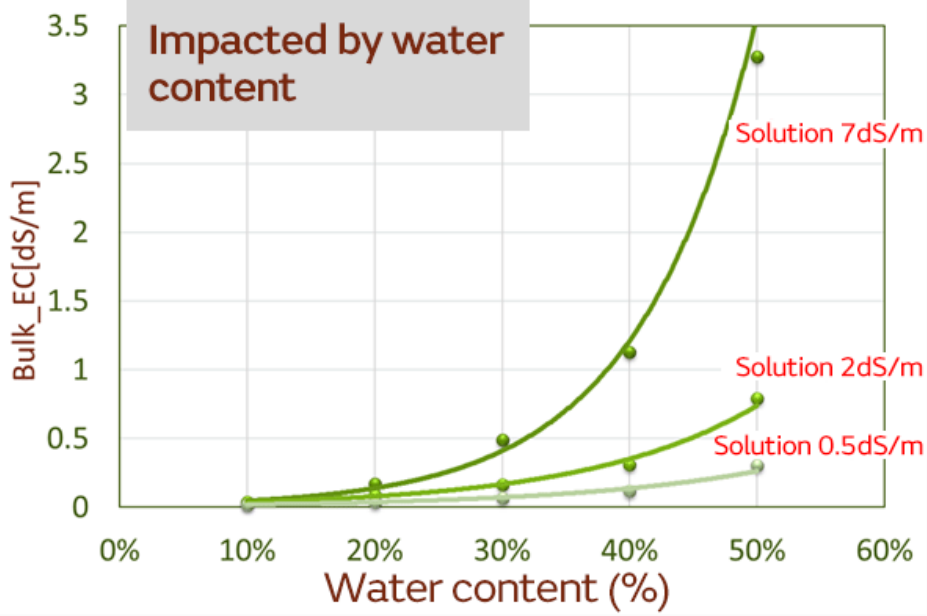
Features

- 3 Sensors:
  EC, Temperature, Moisture in 1Unit 132mm

High Accuracy EC detectionby unique circuit and algorithm

- Elimination of uncertainty by multi-pattern measurement using nine electrodes

- Measurement of ion concentration in pore water

Grains →
Pore water →
Air →

EC Sensor Measurement of pore water EC

COMPETITORS - Behavior image (Un-stable)

Impacted by water content

Solution 7dS/m
Solution 2dS/m
Solution 0.5dS/m

$Bulk\_EC[dS/m]$ — Water content (%)

MURATA - High accuracy sensor (Stable)

Not impacted by water content

Solution 7dS/m
Solution 2dS/m
Solution 0.5dS/m

$Pore\_EC[dS/m]$ — Water content (%)

Specifications

Power Supply Voltage	Consumption Current	EC Measuring Range	Moisture Measuring Range	Temperature Measuring Range	Dust and Waterproof	Interface
3.0~6.0V	50mA(Max)	0~5dS/m	0~60% (in soil)	-20 to+60°C	IP68	UART, RS232, RS485, RS485Modbus
9.6~16V	15mA(Max)					SDI-12

Vibration Sensor Device

PKGM-200D-R

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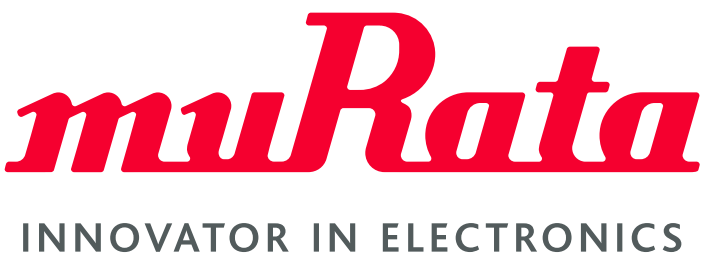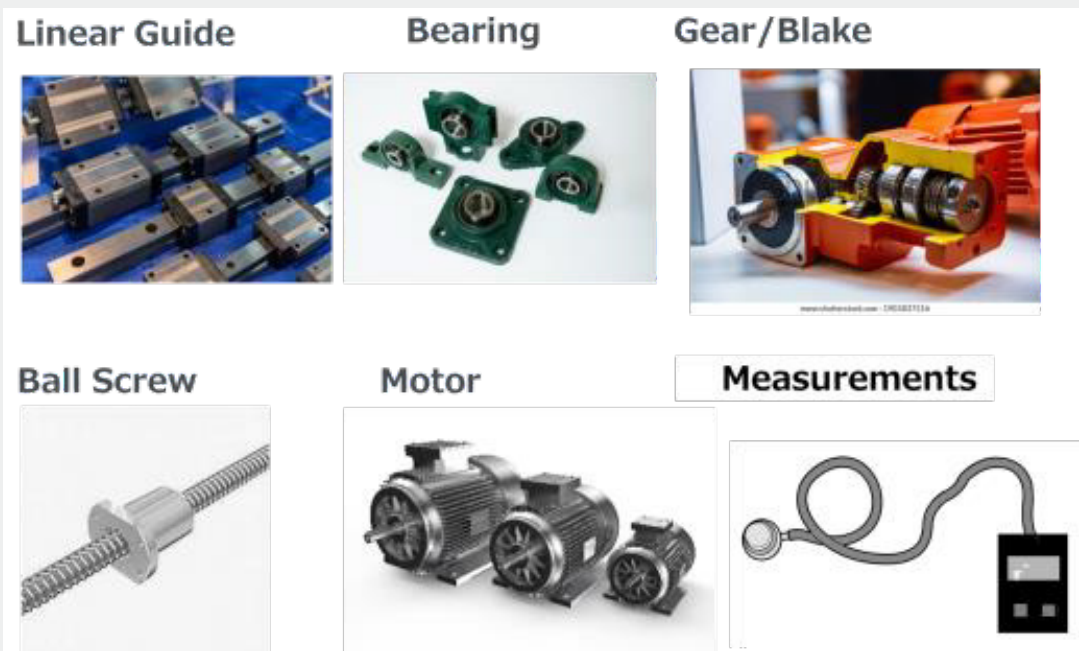Available to prediction of production equipment trouble by analyzing vibration. Suitable to install Factory Automation component by small SMD device. High frequency vibration detection (up to 11kHz) to contribute preventive maintenance for early stag failure of Bearing etc.
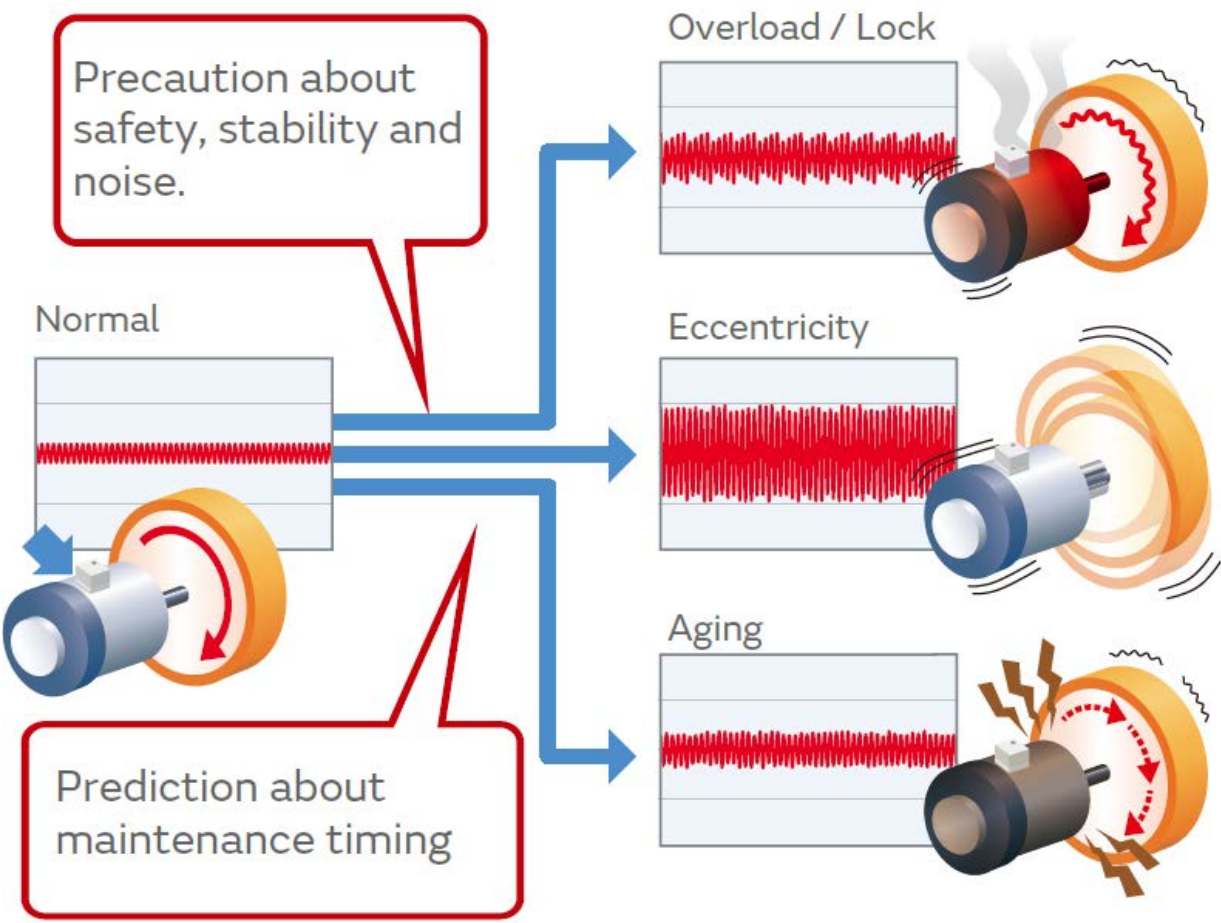
Features

- Available to detect Z axis vibration in wide frequency range
- Including driver circuits
- Differential analogue output for cancelling line noise
- With temperature sensor

Applications

Linear Guide   Bearing   Gear/Blake

Ball Screw   Motor   Measurements

Motor Application

Precaution about safety, stability and noise.

Normal

Prediction about maintenance timing

Overload / Lock

Eccentricity

Aging

Specifications

Dimensions: 5.0 x 5.0 x t3.5mm

Construction: SMD device with 7 terminals with acceleration and temperature senor

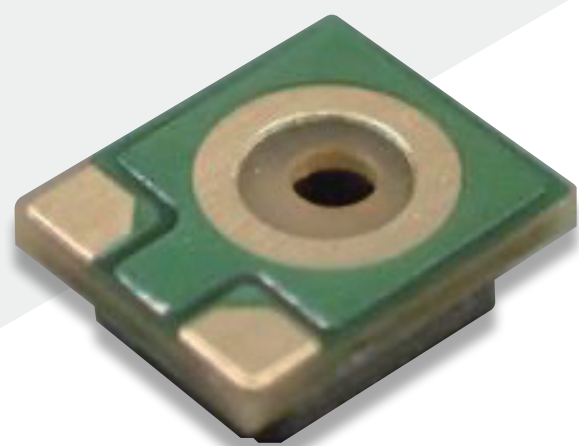| items	unit	Typical value
Output		Differentials analog output
Detection angle		Z axis
Supply voltage	VDC	3.0 to 5.2
Acceleration (1kHz)	mV/G	118
Statistic noise	mG	4.3
Frequency range [±3dB]	Hz	6Hz to 11kHz
Min.Detecting DetectingG range(1kHz)	G	±10.2
Consumption current	mA	3.5
Operating temperature range	Deg. C	-20~+85
Temperature output		On board

MEMS Ultrasonic Transducer pMUT

Piezoelectric Micromachine Ultrasound Transducer

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The smallest MEMS Ultrasonic Transducer

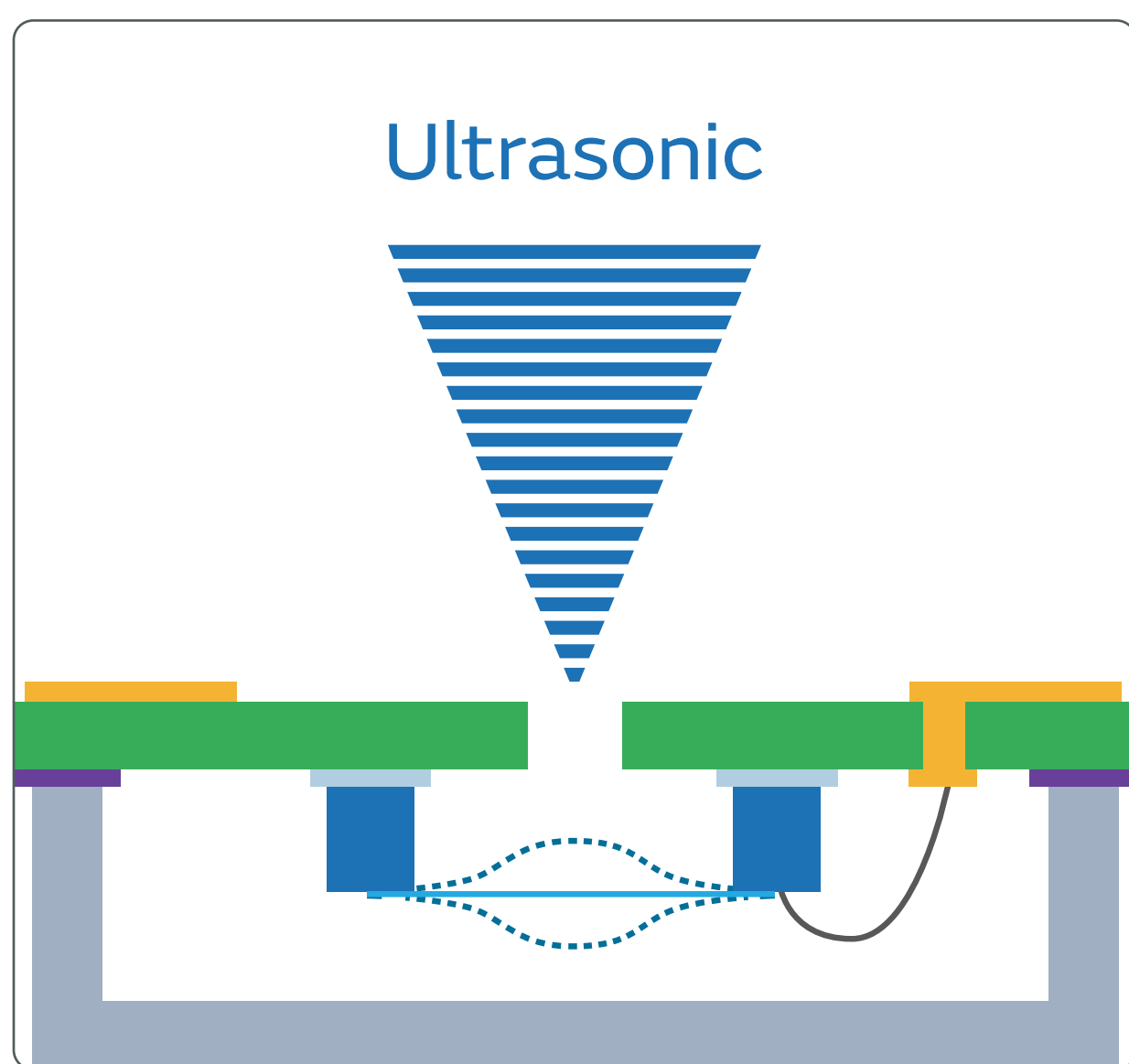## Applications

- Measure the distance of up to 6m by Time-of-Flight technology
- Independent of color, light and target's transparency
  - Object detection
  - Human detection
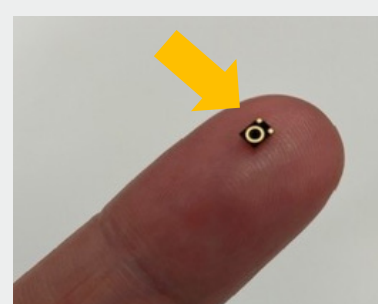 - Distance detection

Size image

Top View

Bottom View

Specifications

- Size: W2.8mm×D2.3mm×t0.81mm (Acoustic port size 0.6 mmΦ)
- Field-of-View (FOV) of up to 180 degrees
- User-friendly frequency 40kHz

Ultrasonic

Features

- Excellent design flexibility and solderability as the same way as MEMS Microphone
- Extremely Low power consumption (μW~)
- Enable both Transducer and Receiver
- Higher Sound Pressure Level /SPL(90dB)
  * Condition: 6Vp-p, sine wave, at distance of 15cm)
- If the application has an audio circuit which pMUT frequency can be detected, there is no need to set additional receiver

UWB Modules
Wireless communications

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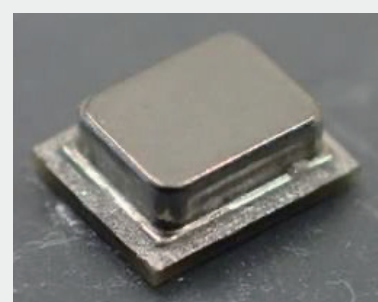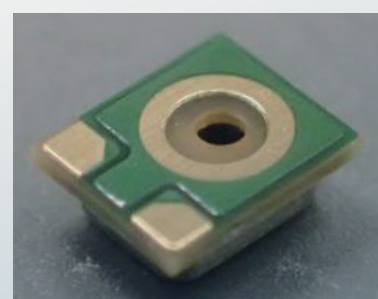**Ultra-wideband (UWB) technology provides a highly effective means for providing secure and precise distance measurement**

Benefits:

- Smallest/highly integrated UWB module available in the market
- 75% less square area than CoB solution
- Frequency, Tx power and Antenna delay are calibrated for each device
- Support Multi Antenna design and evaluation

Features:

- Ultra-small dimensions
- Lower power consumption
- High quality
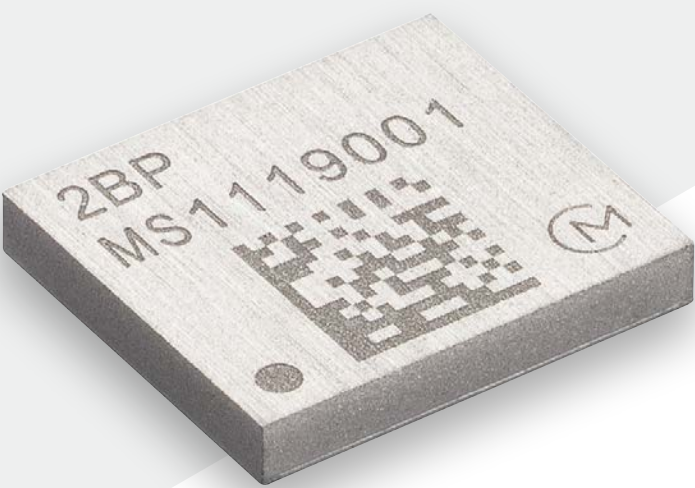
Type 2BP
NXP

- Ultra small UWB module which includes NXP's SR150 UWB chipset, clock, filters and peripheral components
- 3 Antenna support (3D AoA or 2D AoA support)
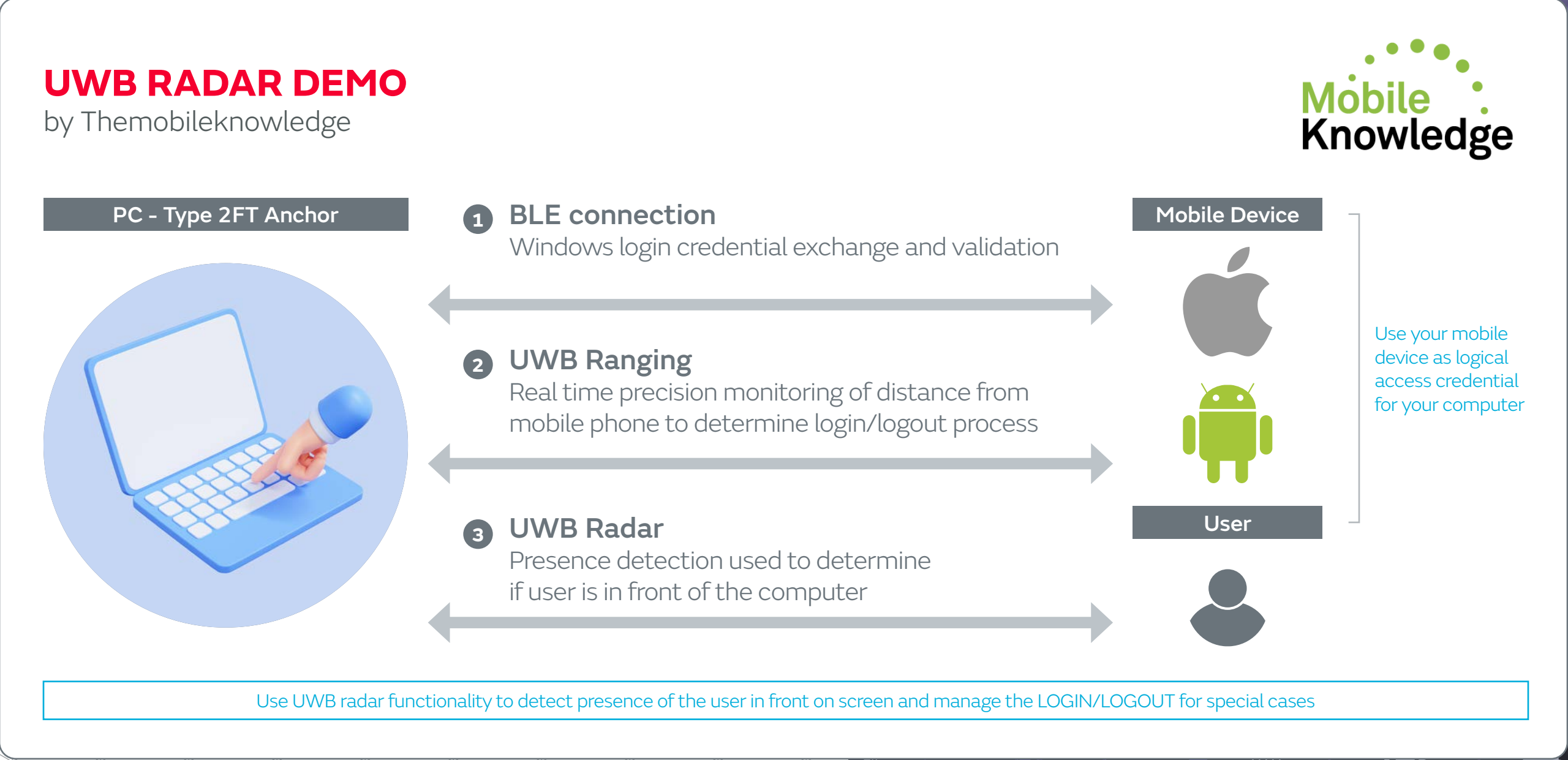- UWB Chip set: NXP Trimension SR150
- Antenna: External
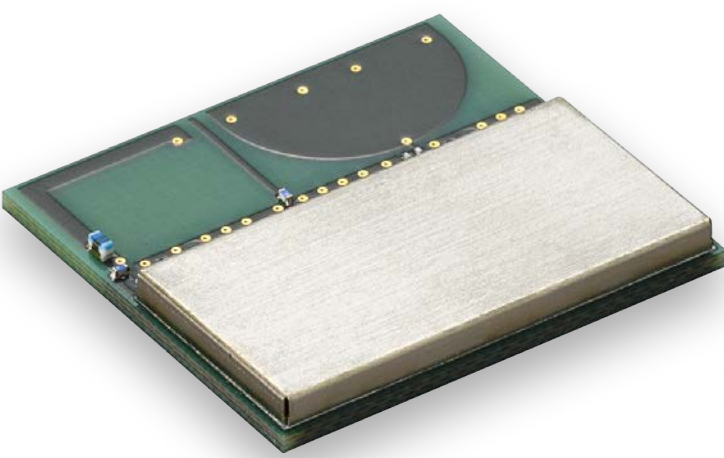
Type 2DK
NXP

- All-in-one UWB + Bluetooth LE combo module which integrates NXP Trimension™ SR040 UWB Chipset, NXP QN9090 Bluetooth LE + MCU chipset, On board antenna and peripheral components.
- Ideally suited for UWB Tag/Tracker which operates by coin-cell battery, and general IoT devices.
- UWB Chip set: NXP Trimension™ SR040
- Antenna: Integrated

Logical access - High level architecture

UWB RADAR DEMO
by Themobileknowledge

Mobile Knowledge

PC - Type 2FT Anchor

Mobile Device

1. **BLE connection**
   Windows login credential exchange and validation

2. **UWB Ranging**
   Real time precision monitoring of distance from mobile phone to determine login/logout process

3. **UWB Radar**
   Presence detection used to determine if user is in front of the computer

User

Use your mobile device as logical access credential for your computer

Use UWB radar functionality to detect presence of the user in front on screen and manage the LOGIN/LOGOUT for special cases

UWB+BLE Combo Module

Type2AB module

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Ultra small, high quality and lower power

Module features channels 5 & 9, low current consumption, and battery life of 10+ years. Ideally suited for small, battery operated IoT devices and applications.

Features:

- Interface : USB,UART,SPI, I2C
- IC P/N: Qorvo QM33120W
- Hostless module Integrated Nordic IC / nRF52840 which also have BLE function for waking up UWB and updating FW
- Integrated 3 Axis sensor for saving battery
- Work with CR2032 battery
- Reference clock embedded
- Package: Resin mold
- RoHS: This component can meet with RoHS compliance
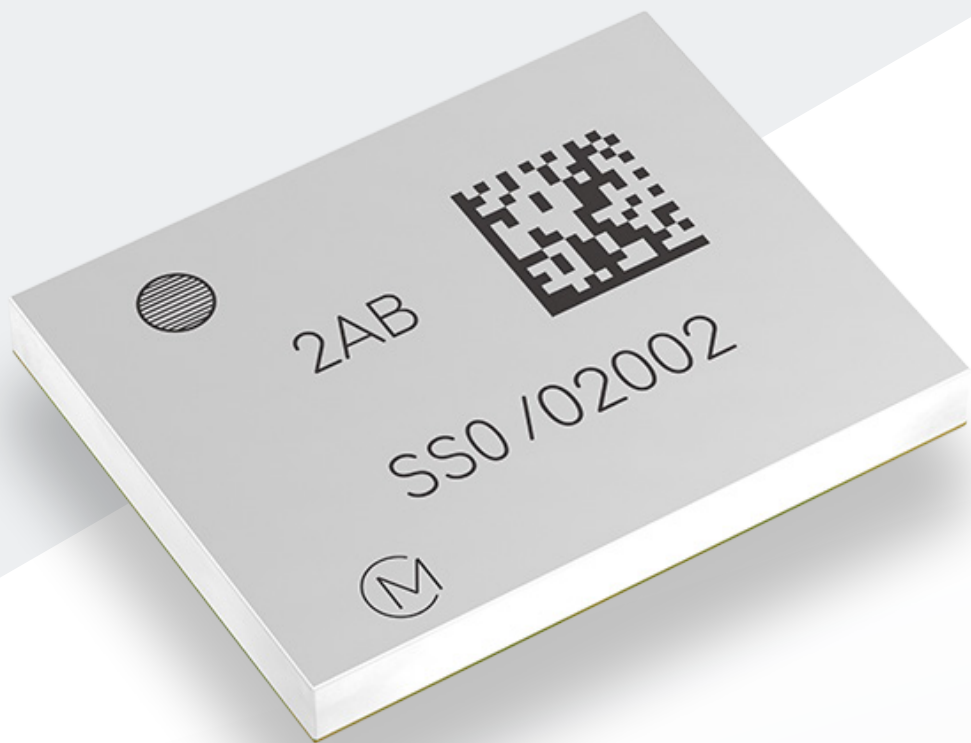
Benefits:

- Smallest/highly integrated UWB module available in the market
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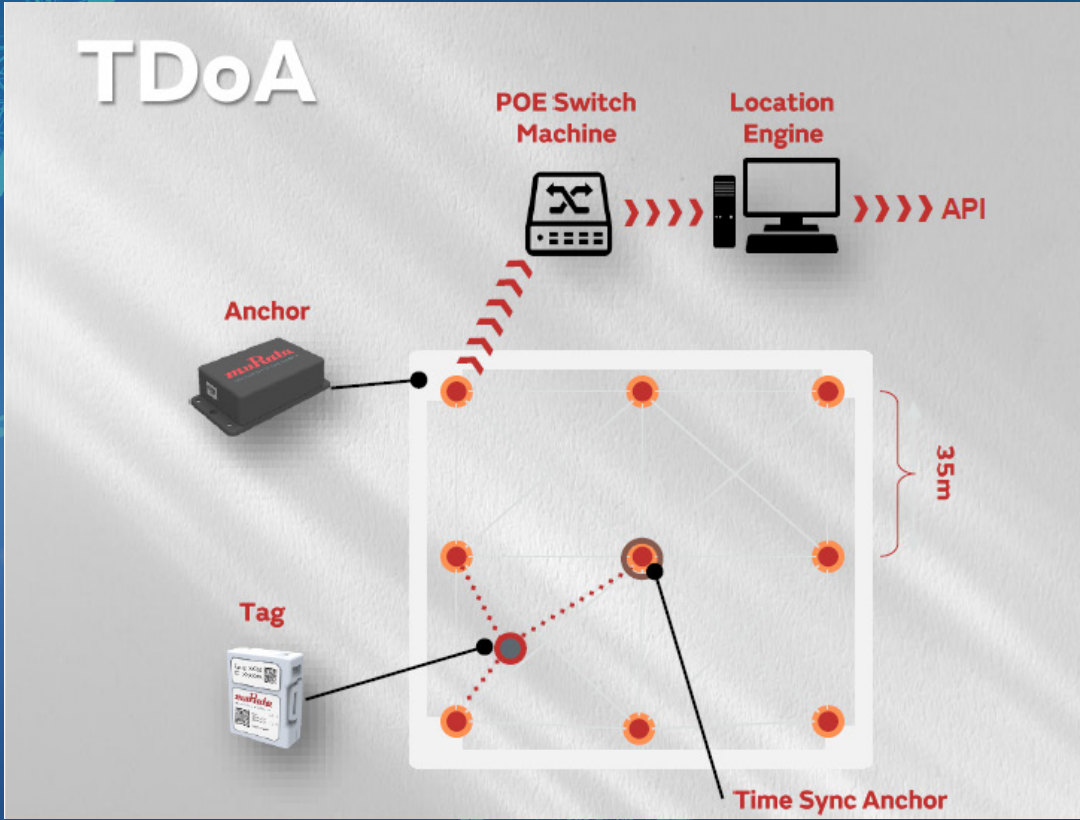- Support Multi Antenna design and evaluation
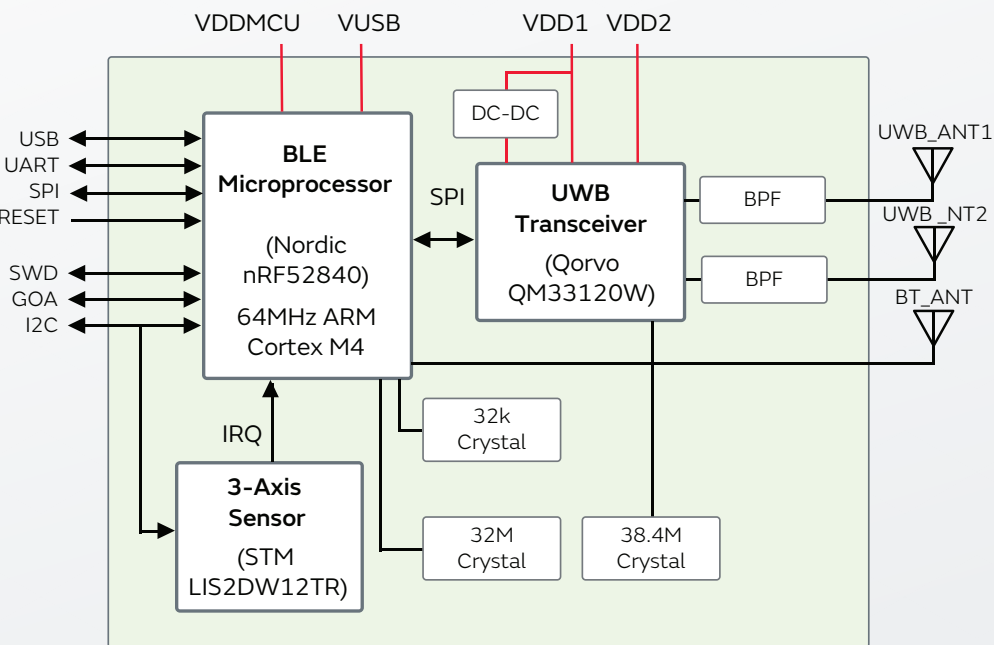
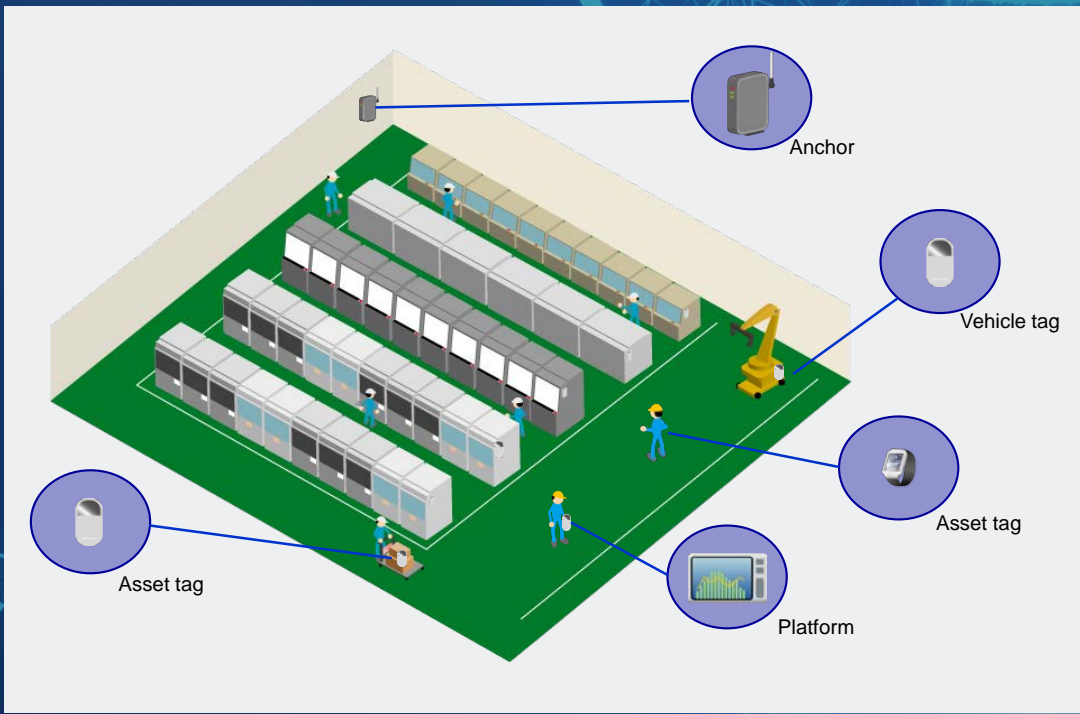| CPU Core	ARM Cortex-M4
Flash/RAM	1MB/256kB
RF Technology	UWB Ch 5 & 9 + BLE 5.2
Dimensions	10.5 x 8.3 x 1.44(max) mm
Supply Voltage (V)	VDD1: 2.5~3.6 / VDD2: 2.5~3.6 VUSB: 4.35~5.5 / VDDMCU:2.5~3.6
Target Accuracy	Ranging accuracy : +/- 9[cm] PDoA accuracy: +/- 5[deg] AoA accuracy: +/- 2.5[deg]
Operating Temperature	-40°C to 85°C
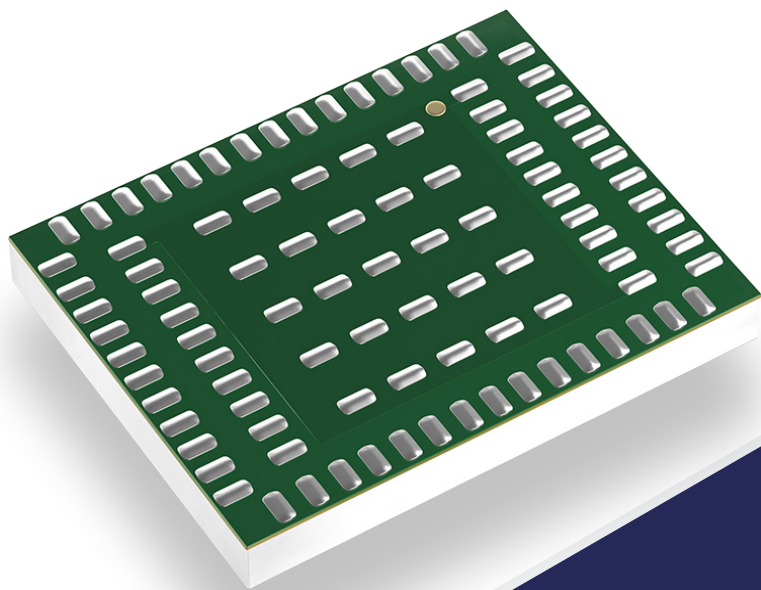
UWB Typical Application

TDoA

Industrial RTLS Indoor Navigation
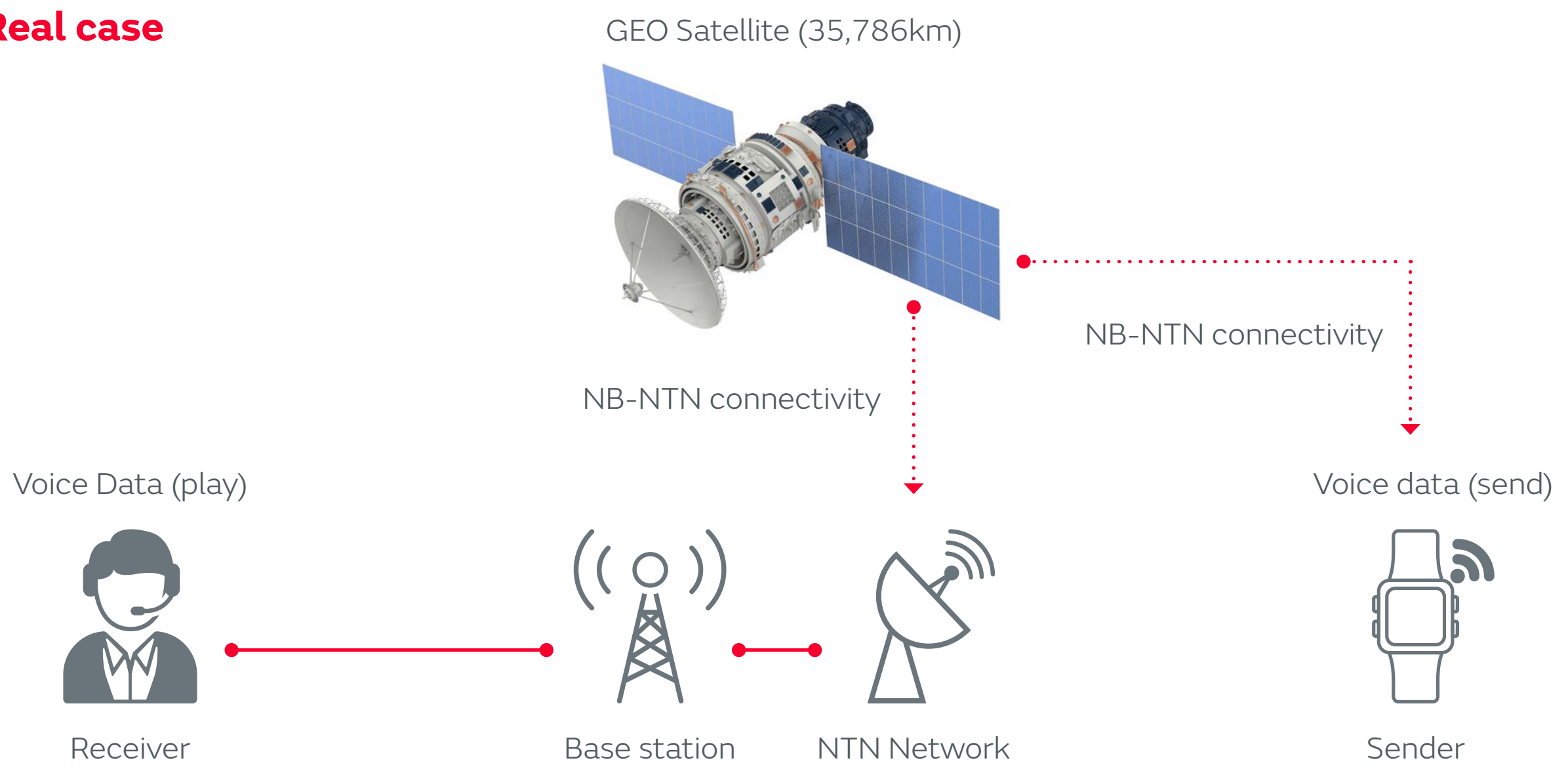
World First Voice Over NB-NTN testbed

Narrowband Non-Terrestrial Network

SCAN ME!

Push-to-talk like application will enhance safety and communication capabilities in areas without terrestrial network access.

Technology Overview

Real case

GEO Satellite (35,786km)

NB-NTN connectivity

NB-NTN connectivity

Voice Data (play)

Voice data (send)

Receiver

Base station

NTN Network

Sender

Testbedcase

Rohde & Schwarz CMW500

Murata Type1SC-NTN

Speaker

LAN

RF

UART

Type1SC-EVK

Laptop

Laptop
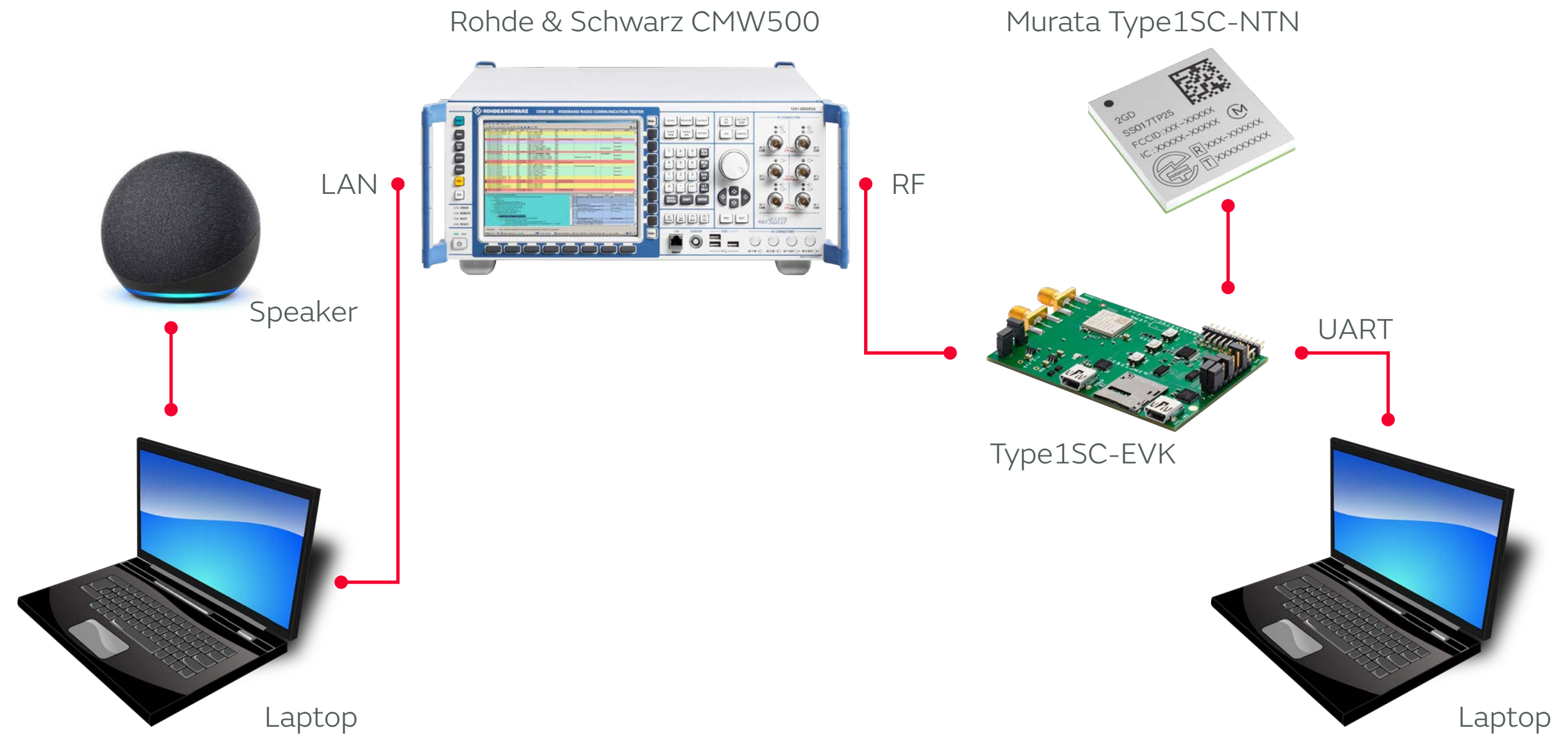
Use case

Emergency SOS Alert

Push-to-talk

Automotive

Ionizer - Ozonizer
Ionissimo, modules for air purification

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ionissimo

SCAN ME!

IONIZER
Small, low-voltage ionizer

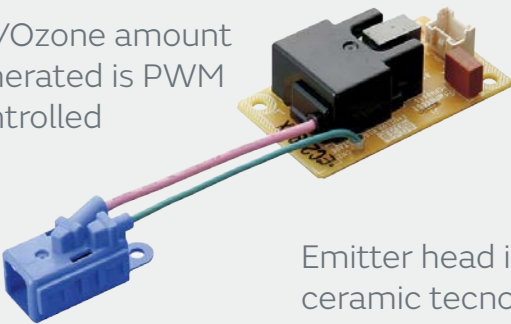**The Ionissimo can effectively generate ions for a comfortable environment**

- Ionizer's Ions clean the air dust (PM2.5) and keep moisture on the skin.
- Ionizer's Ions remove static charged from objects.
- Ionizer's ozone kill virus/bacteria, sterilize any surface and prevent odor.
- Ionizer's ozone keep vegetable/fruits stay for long life and increase Vitamin.

Items	Parts number	Input voltage	Ion amount at 20cm	Ozone density
Ionizer	MHM305 series	12Vdc	-5Mpcs/cc	0.04mg/h
	MHM306 series	12Vdc	-5Mpcs/cc	0.6mg/h
	MHM314 series	12Vdc	-8Mpcs/cc	0.1mg/h
	MHM400 series (*1)	12Vdc	+5Mpcs/cc	0.1mg/h
	MHM402 series	230Vac	-4Mpcs/cc	0.4mg/h

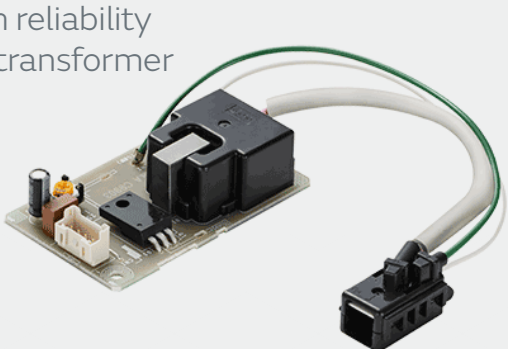*MHM400 series is for static eliminating application. If you would like to use other application, please contact us.

Technical Specification

Ion/Ozone amount generated is PWM controlled

Emitter head in ceramic tecnology

High reliability HV transformer

POWER	**WORKING TEMP**	**WORKING HUMIDITY**
0.6W to 4.6W	-10~70°C	20~95%RH (no condensation)

ACTIVE OXYGEN MODULE
Small, low-voltage ozonizer

Reduce **90.5%** virus after 20min with very low ozone density **0.1ppm**

Active Oxygen module will help you to create clean space

- AO module's ozone kill virus/bacteria, sterilize any surface and prevent odor.
- AO module's ozone clean water and sterilize it.
- AO module's ozone keep vegetable/fruits stay for long life and increase Vitamin.
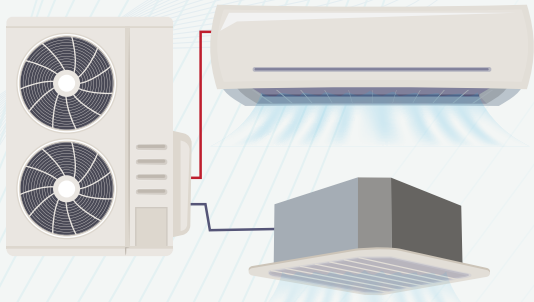
Items	Parts number	Input voltage	Ozone density
Active Oxygen (Ozonizer)	MHM500-00A	12Vdc	1.1mg/h
	MHM501-00 (High reliability)	12Vdc	1.0mg/h
	MHM502-01A (High density Ozone)	12Vdc	45mg/h

Applications Examples

Air Conditioner
Clean air from dust and smell

Air Purifier

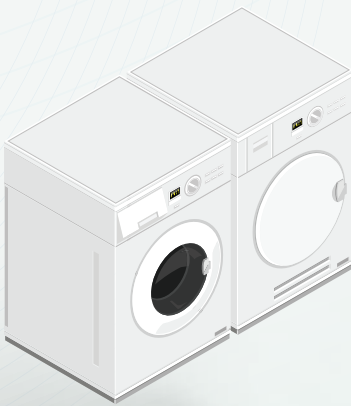**Refrigerator**
Sterilize refrigerator and improve food freshness

Dishwasher

Washing Machine Dryer Machine
Sterilize clothes and dish, preventing mold

Circulator and Electric fan

Ionizer

MHM330 series can reduce static electricity quickly

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MHM330 series (Ionissimo) will be ultra small size and generate positive and negative ion with auto-balanced function (Patent protection)

Features

MHM330 will help you for statics electricity problem.

- Auto-balanced for +/- ion (Patent protection)
  - (1) Very quick elimination for positive & negative statics electricity
  - (2) Keep to closed "0Vdc"
  - (3) High reliability due to auto balanced technology
- It's possible to clean ion head

Specification

- Dimension:
  53(L)×21.3(H)×36(W) mm (Power unit)
- Rating:
  Input voltage: 12Vdc +/- 10%
  Power: 1.6W typ.
  Generating: Positive ion and Negative ion with auto-balanced function

Principle for very quick statics elimination

Time	General +/- ionizer	Murata Auto-balanced +/- ionizer
0sec	Negative ion head / Air flow / Positive ion head	Charged "-15kVdc" on plate
1sec	- 3Mpcs ion / + 3Mpcs ion / A general +/- ionizer / No change ion amount for road	-3Mpcs => - 2Mpcs ion / +3Mpcs =>+ 4Mpcs ion / Change ion amount automatically based on road as "-15kVdc"
1sec		-2Mpcs => - 3Mpcs ion / +4Mpcs => + 3Mpcs ion / Quick elimination as "0Vdc"
3-5sec	- 3Mpcs ion / + 3Mpcs ion / Close to "0Vdc"	Very quick elimination vs general +/- Ionizer

Microblower
Air Pump

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Murata offers compact, high-performance air pumps that utilize the vibration and deformation characteristics of piezoelectric ceramics.
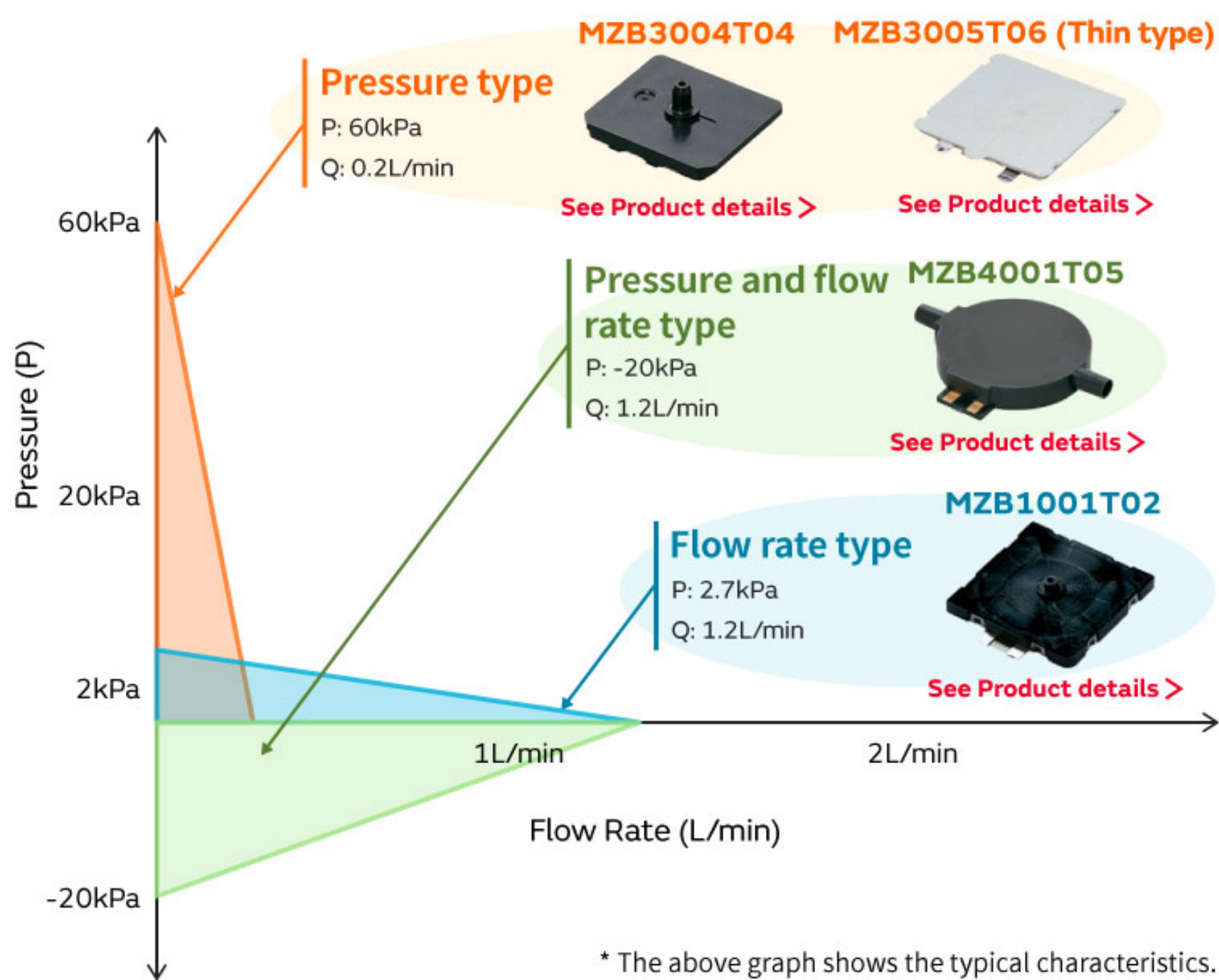
Applications

- Blood Pressure Measuring (Smart Watch)
- Breast Pumping Device
- Asthma (Gas) sensing
- Endoscope (lens defogging)
- Suction pump
- Diffuser pump

Features

- Small and Thin size (19mm / Thickness : 2.3 mm)
- High Air performances
  (Pressure: 50kPa / Flow rate: 1L/min)
- Allow pumps to be used in quiet environments
- Comfortable pumps even when worn
- Smooth supply with discharge without pulsation

MZB3004T04   **MZB3005T06 (Thin type)**

Pressure type
P: 60kPa
Q: 0.2L/min

See Product details >   See Product details >

Pressure and flow rate type   **MZB4001T05**
P: -20kPa
Q: 1.2L/min

See Product details >

MZB1001T02

Flow rate type
P: 2.7kPa
Q: 1.2L/min

See Product details >

Pressure (P)

60kPa

20kPa

2kPa

-20kPa

1L/min   2L/min

Flow Rate (L/min)

* The above graph shows the typical characteristics.

Linear Resonant Actuator
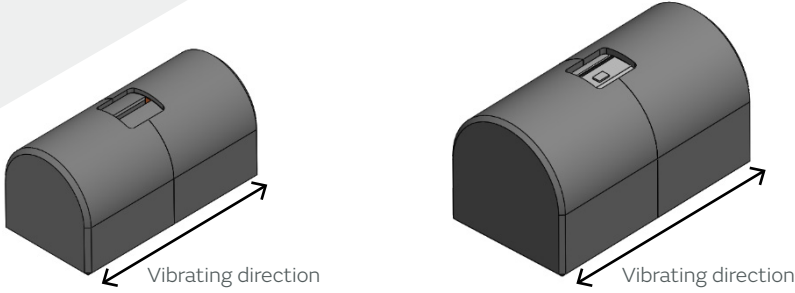## (LRA)

muRata
INNOVATOR IN ELECTRONICS

High output and customized vibration frequency "Linear Resonance Actuator"

Applications

- Replacing sound notification devices in noisy areas
- Power may be increased to obtain strong vibration
- Vibration actuator with features that can be used outdoors

Specifications

Vibrating direction | Vibrating direction

| Size [mm]	12 x 12 x 24	16 x 16 x 29
Frequency(f0) [Hz]	100~170*	100~150*
Acceleration (@100g) [Gp-p]	12~18*	20~30*
Input voltage [Vp-p]	8~16*	12~24*
R(DC) [Ω]	TBD*	TBD*
Rising time [msec]	< 20 (0 to 50%)	< 20 (0 to 50%)
Falling time [msec]	< 20 (100 to 50%)	< 20 (100 to 50%)
Weight [g]	9	22
Other features	Dustproof & Waterproof	

*Customizable
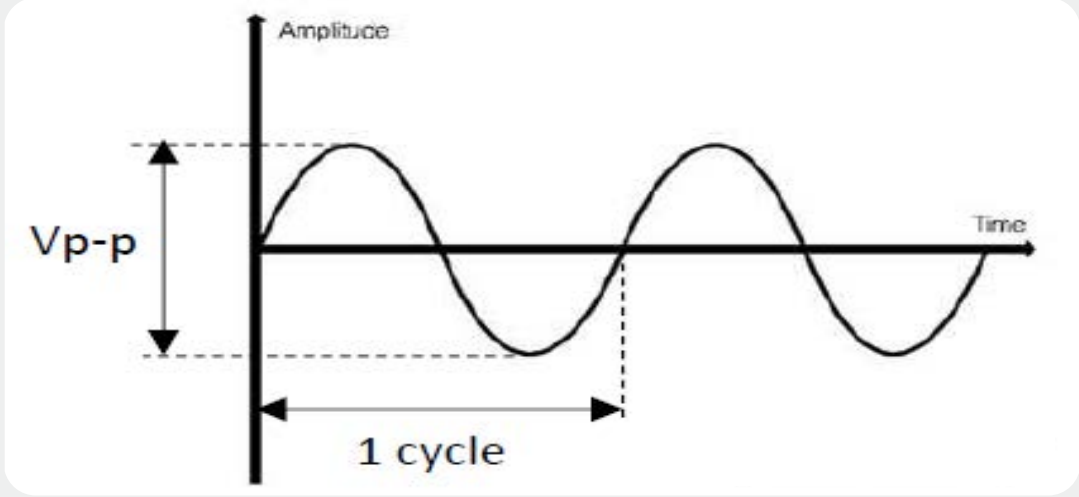
Characteristic

16 x 16 x 29 mm
(Vol. 7,424 mm3)

muRata-10Ω
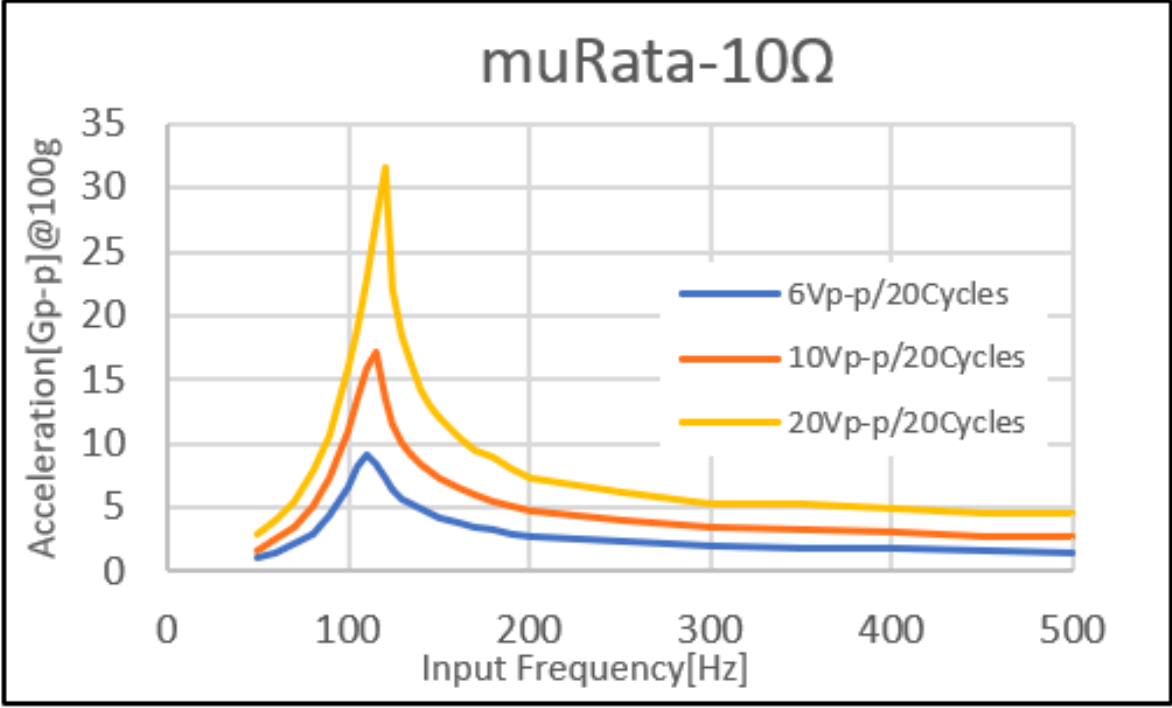
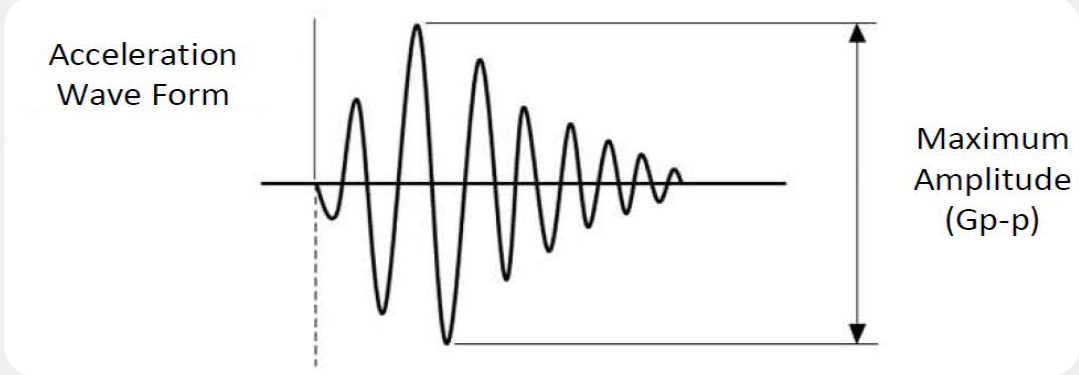- 6Vp-p/20Cycles
- 10Vp-p/20Cycles
- 20Vp-p/20Cycles

Acceleration measurement conditions
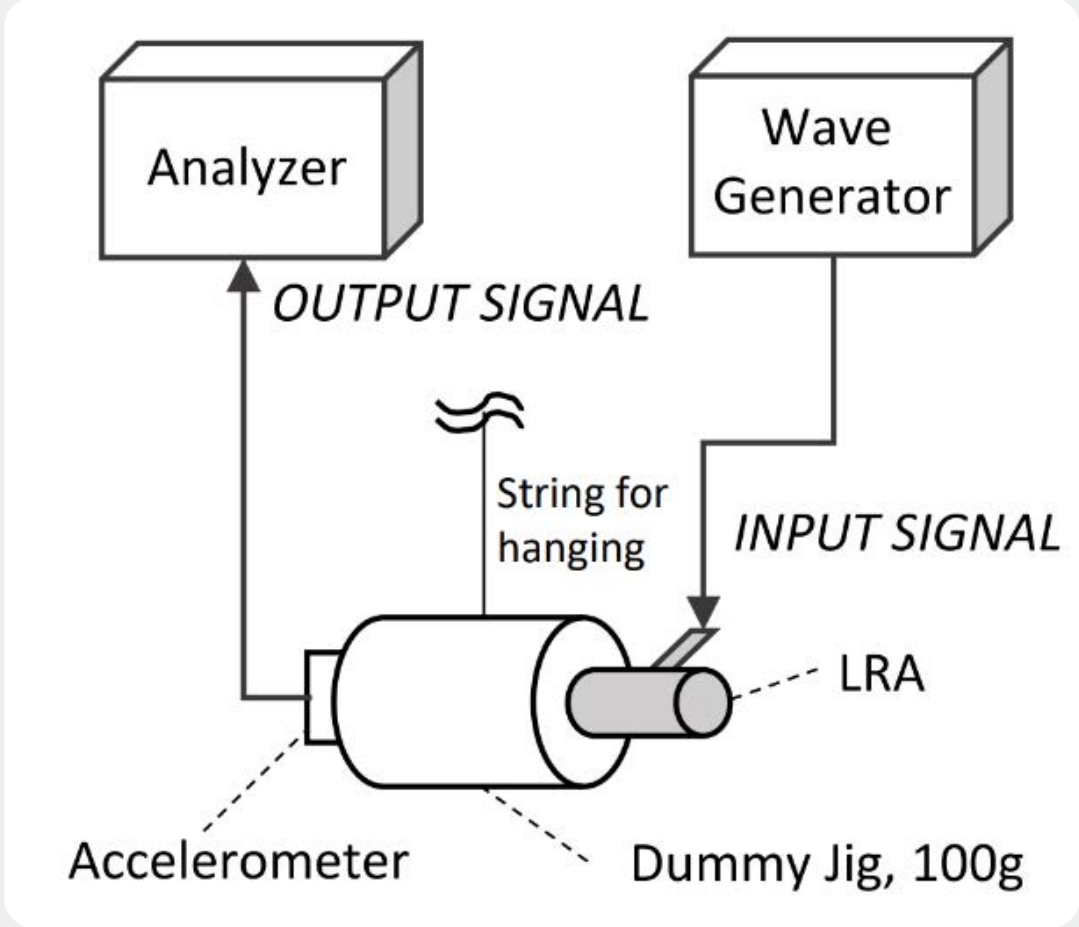
Input

Output

Features

- Strong vibrating
- Custom design of peak frequency and actuator size
- Waterproof and Excellent drop shock durability