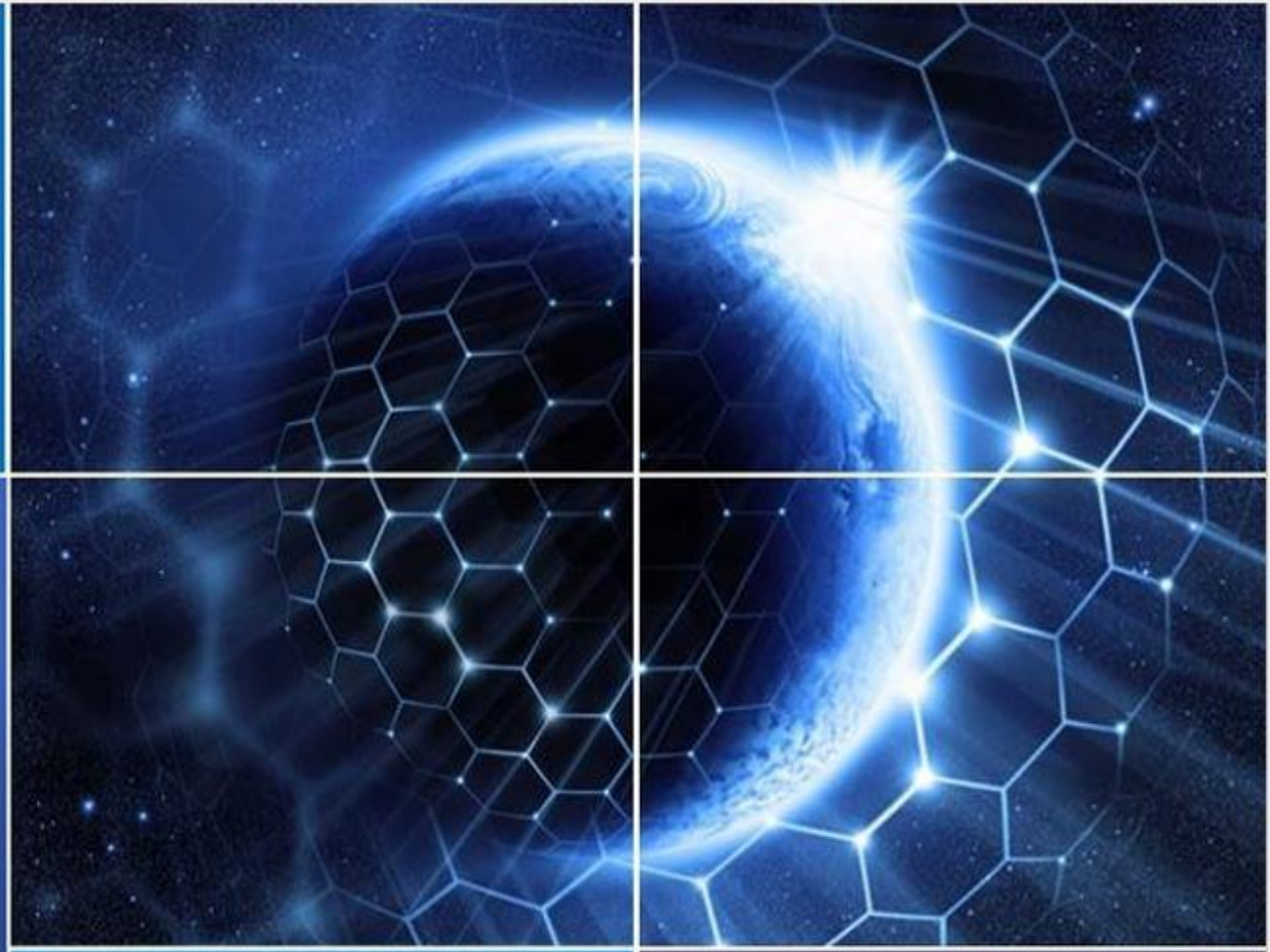
Passive Components and Antennas for LoRa Applications



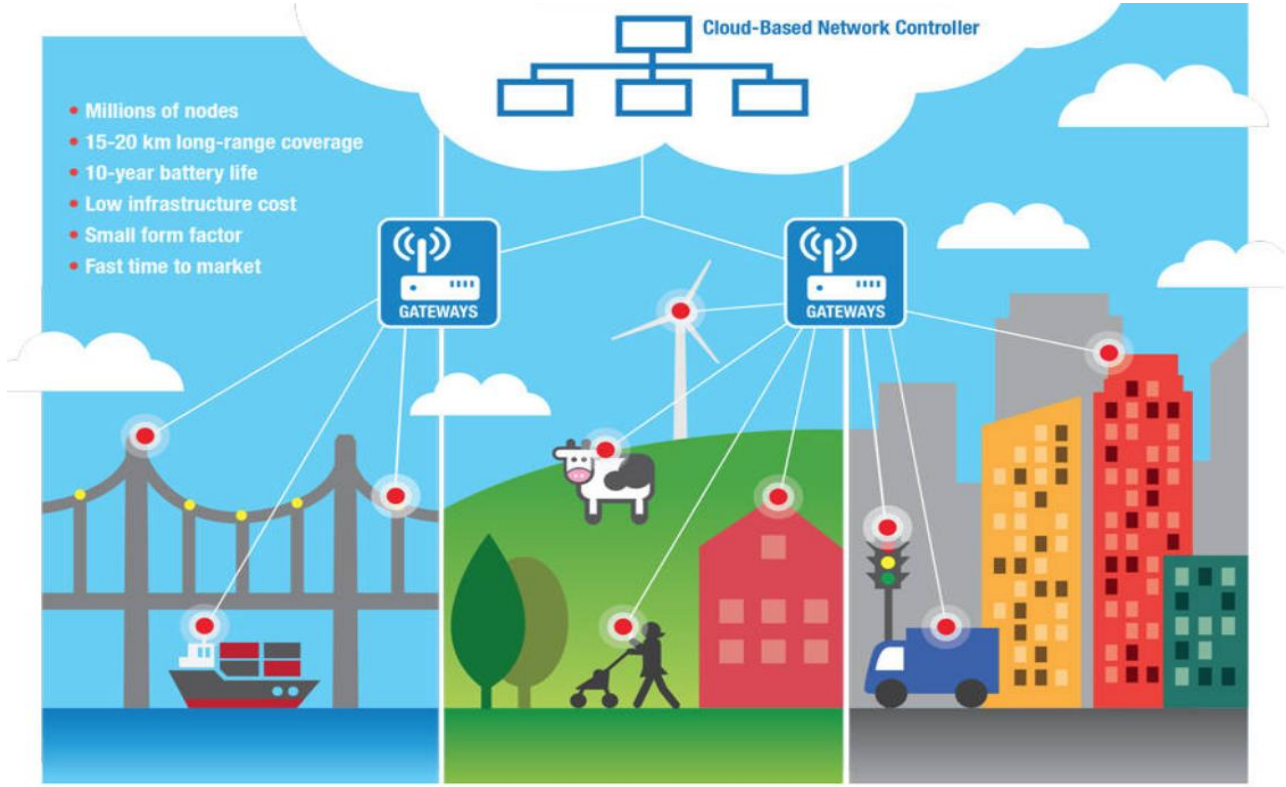
LoRa

RALTRON

LoRa Frequency Bands

Frequencies/bands used for LoRa:

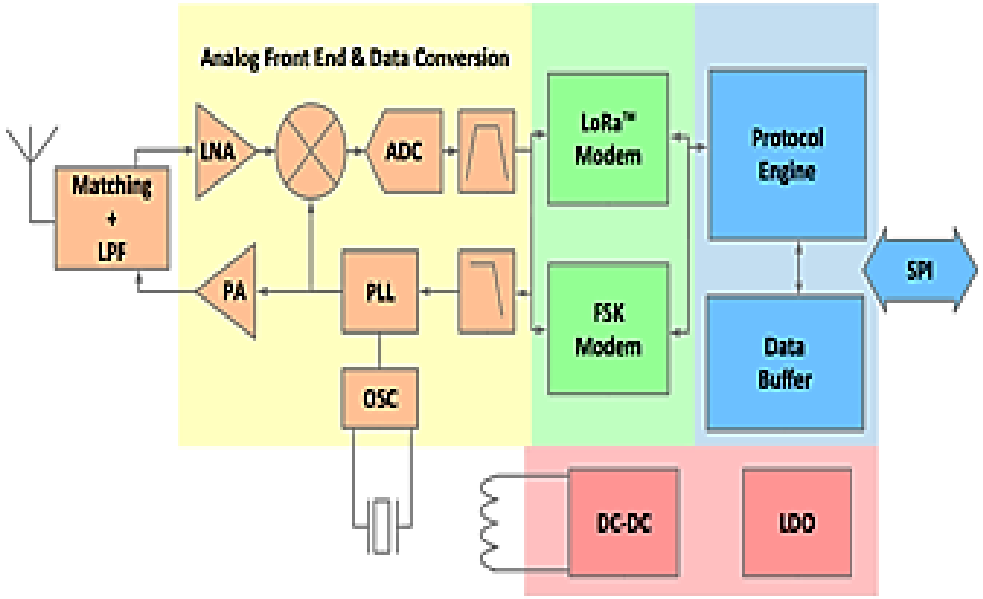
- 433 MHz band for Asia
- 868 MHz for Europe
- 915 MHz for North America



Typical Solutions ICs for LoRa

- SEMTECH SX1302
- SEMTECH SX1303
- SEMTECH SX1255
- SEMTECH SX1257
- SEMTECH SX1250
- SEMTECH-SX1261
- SEMTECH-SX1262
- SEMTECH-SX1272
- SEMTECH-SX1273
- SEMTECH-SX1276
- SEMTECH-SX1277
- SEMTECH-SX1236

- Microchip – RN2903 32.768 kHz Crystal
- Microchip – RN2483 32.768 kHz Crystal



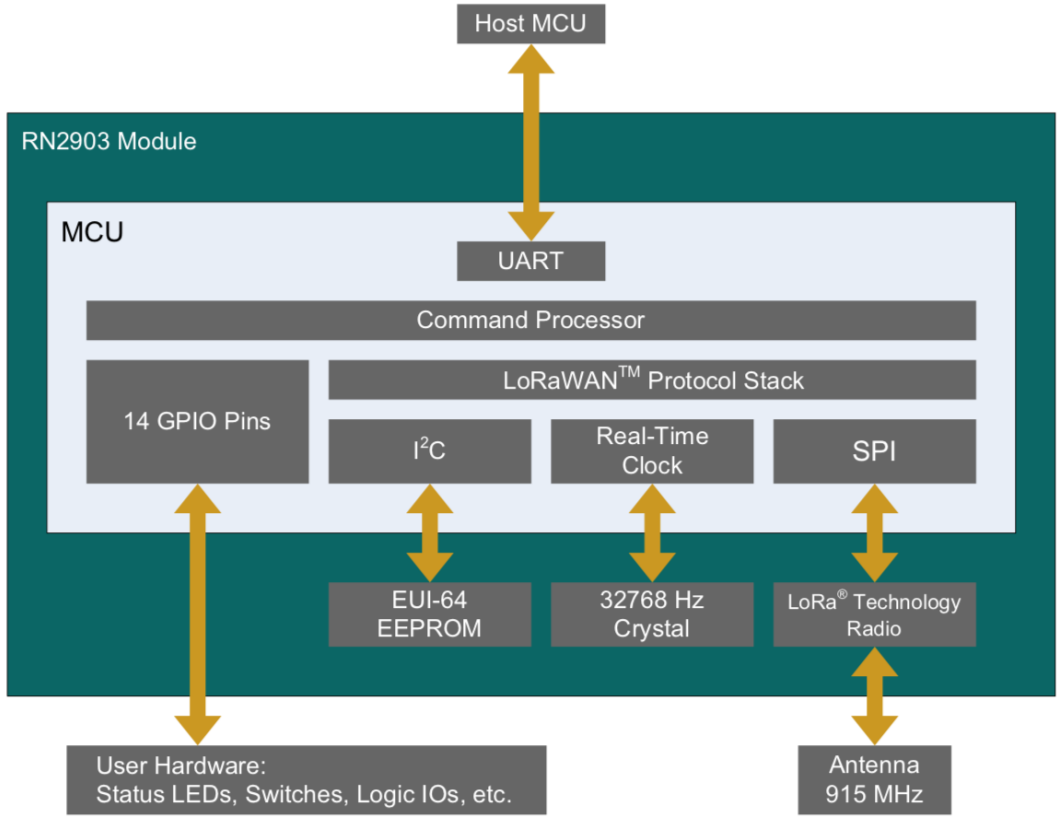
Example: SX1261/2 Block Diagram

- 32.000MHz Crystals or TCXOs
- 433 / 868/ 915 MHz SAW Filters
- Antennas

Typical Solutions Module for LoRa

- MICROCHIP RN2903

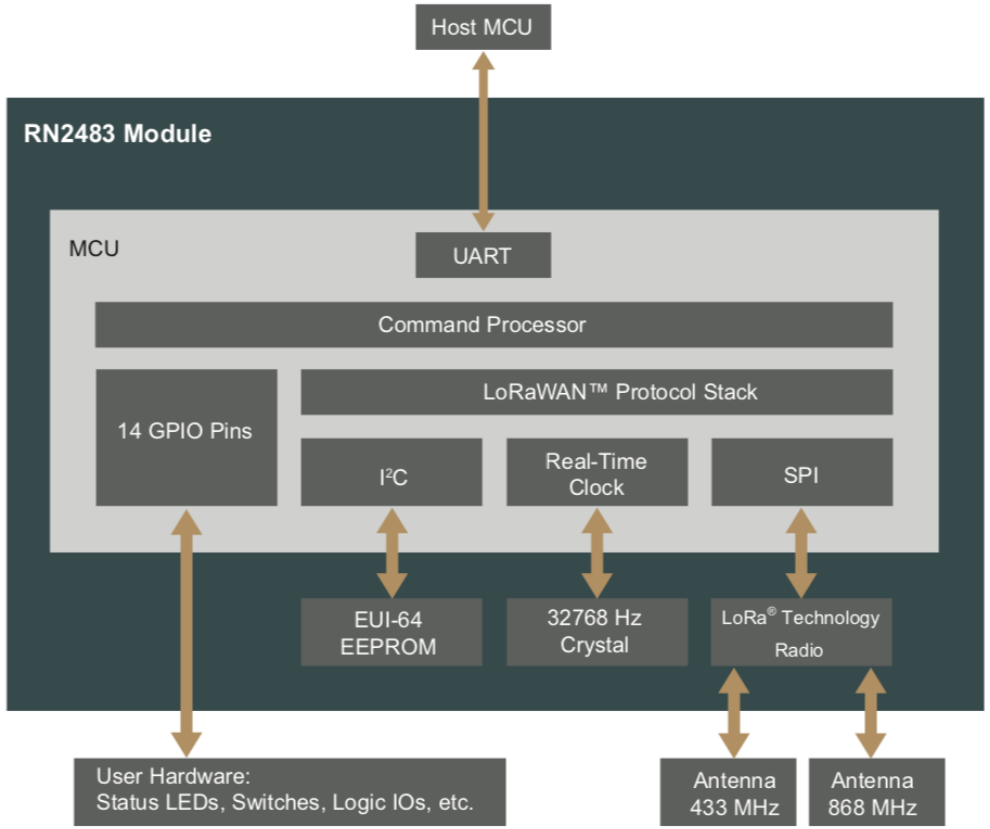
- 32.768 kHz Crystal
- 915MHz Antenna



Typical Solutions Module for LoRa

- MICROCHIP RN2483

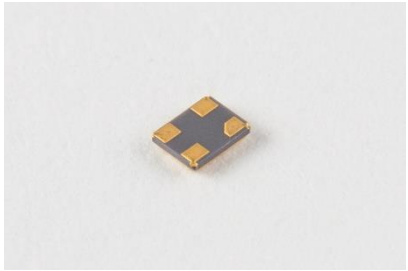
- 32.768 kHz Crystal Oscillators
- 433 MHz Antenna
- 868 MHz Antenna

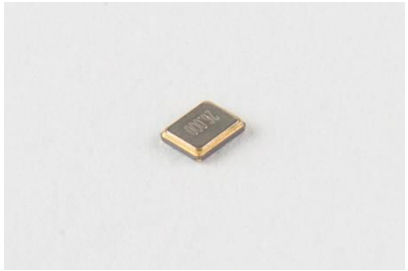


Raltron Products– MHz Crystals

Part#	Size
R1612-32.000-10-F-1010-TR-B1B	1.6x1.2mm
R2016-32.000-10-F-1010-TR-B1B	2.0x1.6mm
R2520-32.000-10-F-1010-TR-B1B	2.5x2.0mm
RH100-32.000-10-F-1010-TR-B1B	3.2x2.5mm

- Frequency temperature characteristics fully compatible with LoRa standard requirements
- Low-G sensitivity compatible with LoRa standard requirements



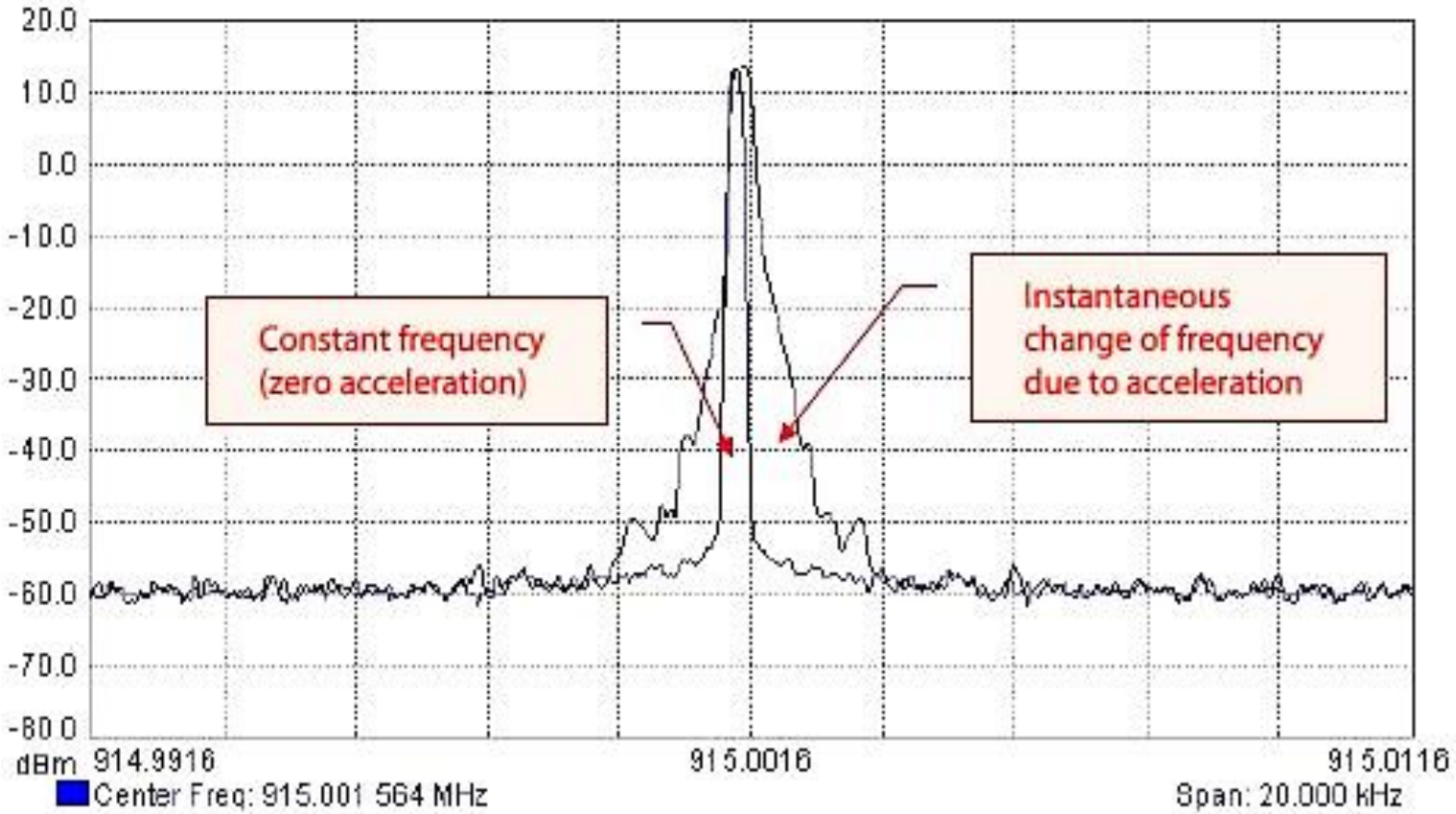


Raltron Products– MHz Crystals

Since LoRa modulations contain both relative time and frequency information, any short-term frequency variance can lead to incorrect detection of encoded data

For applications subjected to acceleration forces, including shock and vibration, a low-G sensitivity crystal should be used as the reference oscillator.
For example, smartphone and in-vehicle mobile link applications using a SX1272 transceiver

Raltron Products– MHz Crystals



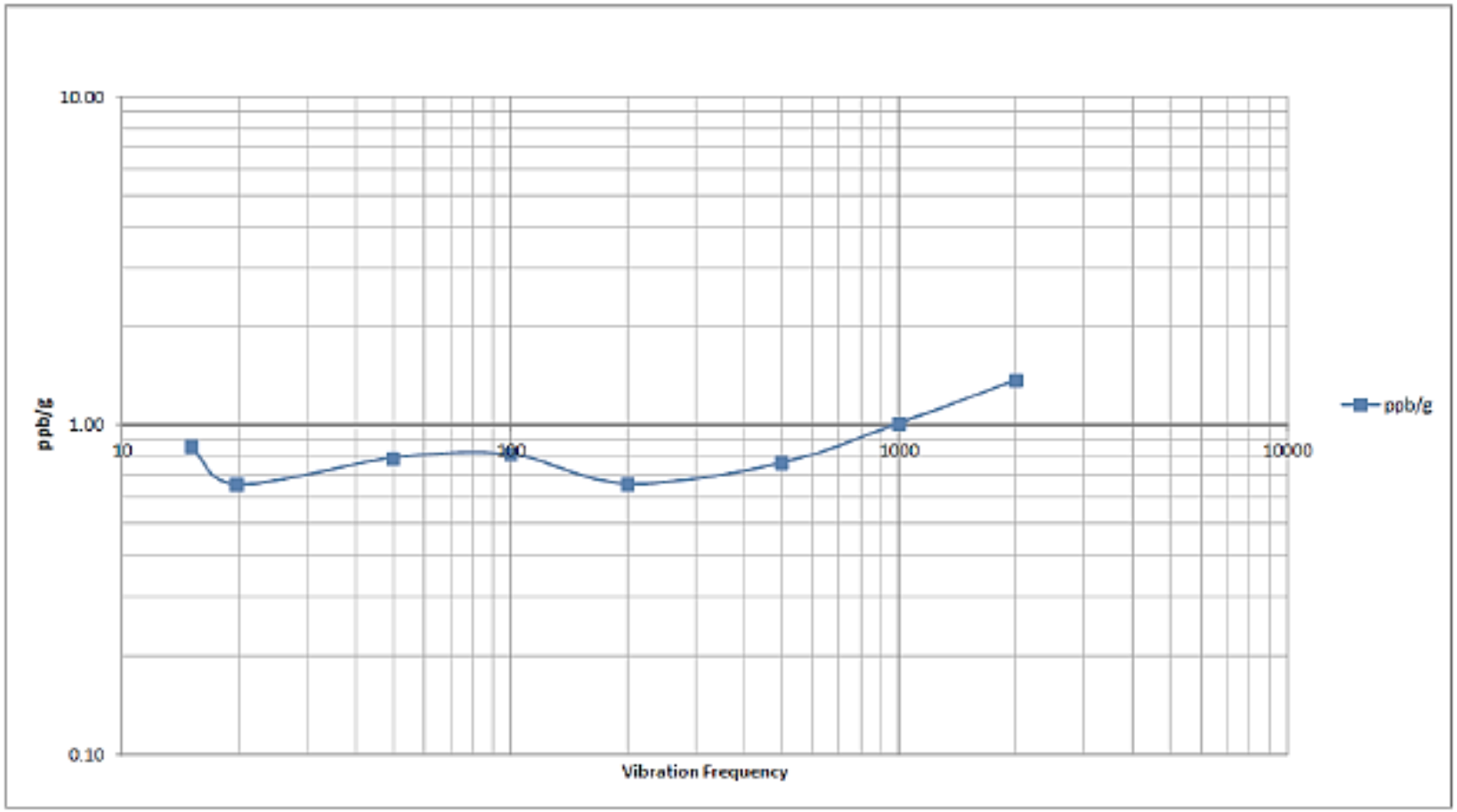
Effect of Acceleration due to Shock on a Crystal-Referenced PLL Transmitted Carrier

Raltron Products– MHz Crystals

A G-Sensitivity test was conducted to prove that a crystal RH100-32.000-10-F-1010-TR-B1B is rugged enough to stay below 2ppb/g when exposed to vibration in all three perpendicular axis X,Y and Z.
Below the results, PSD (Power Spectral Density) vs Vibration Frequency,
1 hour in each of three mutually perpendicular axis.

Frequency (Hz)	PSD (g^2/Hz)
15	0.02
30	0.08
1000	0.08
2000	0.02

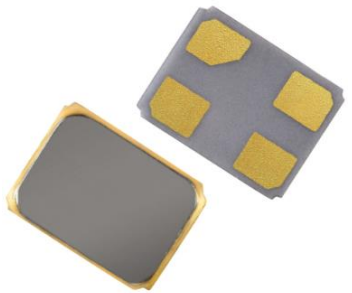
Raltron Products– MHz Crystals



Graph of the X-axis ppb/g over frequency shows that the worst-case axis still stays well below the 2.0 ppb/g

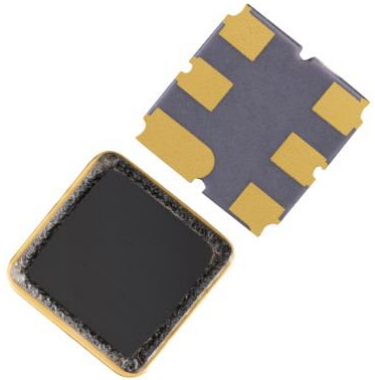
Raltron Products– TCXO

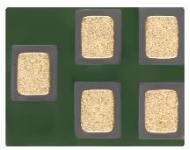
Part#	Size
RTX-1612BD32-S-32.000-TR	1.6x1.2mm
RTX-2016BD32-S-32.000-TR-NS1	2.0x1.6mm



Raltron Products– SAW Filters

Part#	Size
RSF-433.920-1600-3030-TR-NS2	3.0 x 3.0 mm
RSF-866.000-7000-2015-TR-NS1-RevB	2.0 x 1.5 mm
RSF-866.500-7000-3030-TR-NS2	3.0 x 3.0 mm
RSF-868.300-7000-3030-TR	3.0 x 3.0 mm
RSF-869.000-2000-1411-TR-NS3	1.4 x 1.1 mm
RSF-915.000-26000-3030-TR-NS6	3.0 x 3.0 mm
RSF-915.000-26000-3030-TR-NS7	3.0 x 3.0 mm
RSF-915.000-26000-2015-TR-NS3	2.0 x 1.5 mm
RSF-915.000-26000-1411-TR-NS3	1.4 x 1.1 mm





Raltron Products– Dipole Antennas

Part#	Frequency	Length
RDP-GS-P-255-MMCX-3000-G	824 ~ 960 MHz	286.5 mm
RDP-GPRS-P-300-SMAM-3000-A-H	915 MHz	300 mm
RDP-GPRS-P-300-SMAM-3000-M-H	915 MHz	300 mm

RDP-915

RDP-GPRS

RDP-GS

Raltron Products– Stub Antennas

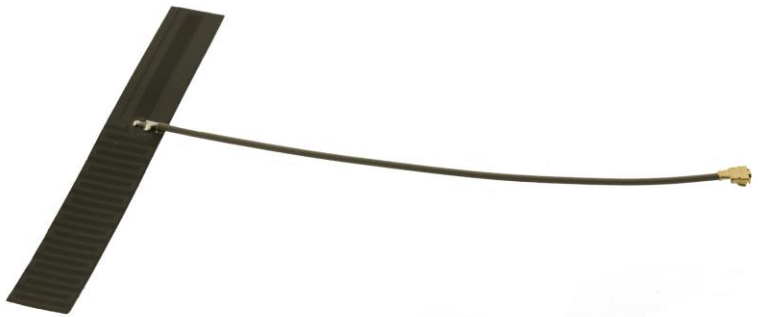
Part#	Frequency	Gain	Size
RST-W1A0-10608-22M-FY-002	433 MHz	1 ~ 2 dBi	104 X 8 mm
RST-MA11-10808-22M-FY-001	868 MHz	2 dBi	108 x 8 mm
RST-MA16-5008-23M-FY-001	868 MHz	2 dBi	50 x 8 mm
RST-868-P-48-SMA-G	868 MHz	3 dBi	48 x 8 mm
RST-W1B6-5008-23M-FY-002	915 MHz	2 dBi	50 x 8 mm
RST-W1B6-10808-22M-FY-001	915 MHz	2 dBi	108 x 8 mm
RST-MB-P-157-SMA-G	868/915 MHz	3 dBi	157 x 21 mm
RST-MB10-175022-1M-A-001	902 ~ 928 MHz	5 dBi	175 x 22 mm

Raltron Products– Dome Antenna

Part#	Frequency	Gain	Size
RDM-MB10-8347-1M-A-001	902 ~ 928 MHz	3 dBi	Φ47 x 83 mm

Raltron Products– Flexible PCB Antenna

Part#	Frequency	Gain	Size
RPCF-W1B1-7910-O-W-001	863 ~ 928 MHz	1.77 dBi	79 x 10mm



Raltron LoRa Kit

- MHz CRYSTALS
- TCXO
- SAW FILTERS
- ANTENNAS

Raltron LoRa Kit

Contact

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