

Raltron Electronics

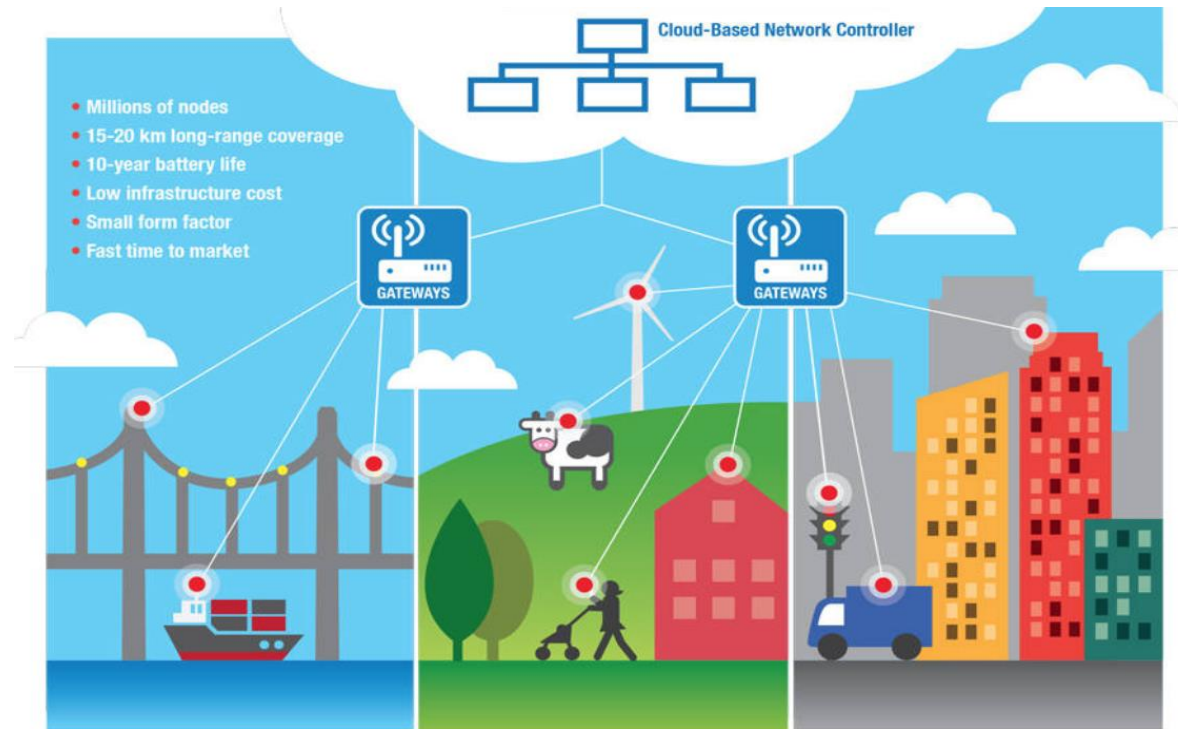
Raltron Products for LoRa Applications

December 2018

LoRa Frequency Bands

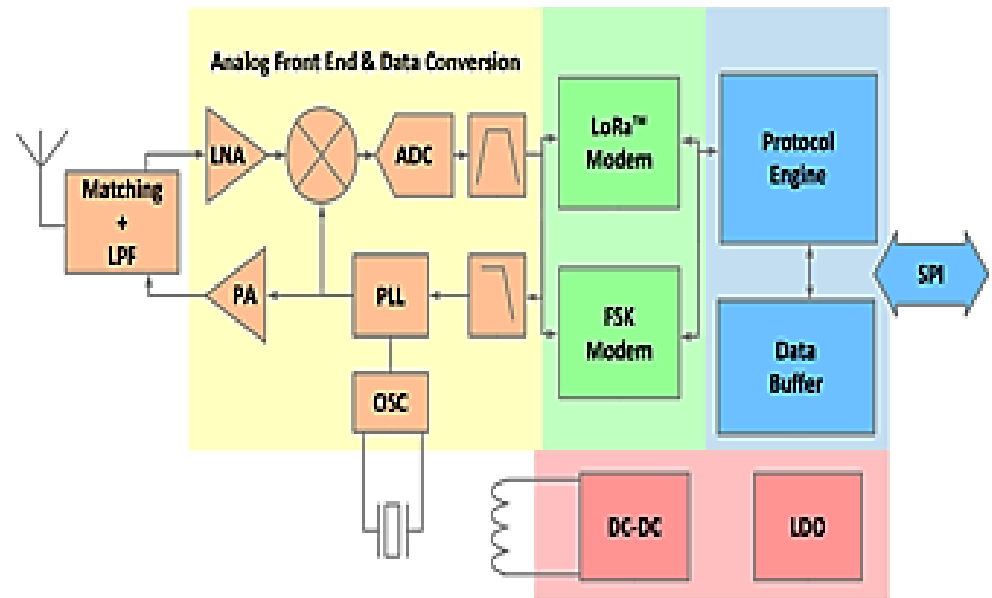
Frequencies/bands used for LoRa:

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



Typical Solutions ICs for LoRa

- SEMTECH-SX1261
- SEMTECH-SX1262
- SEMTECH-SX1272
- SEMTECH-SX1273
- SEMTECH-SX1276
- SEMTECH-SX1277
- SEMTECH-SX1236



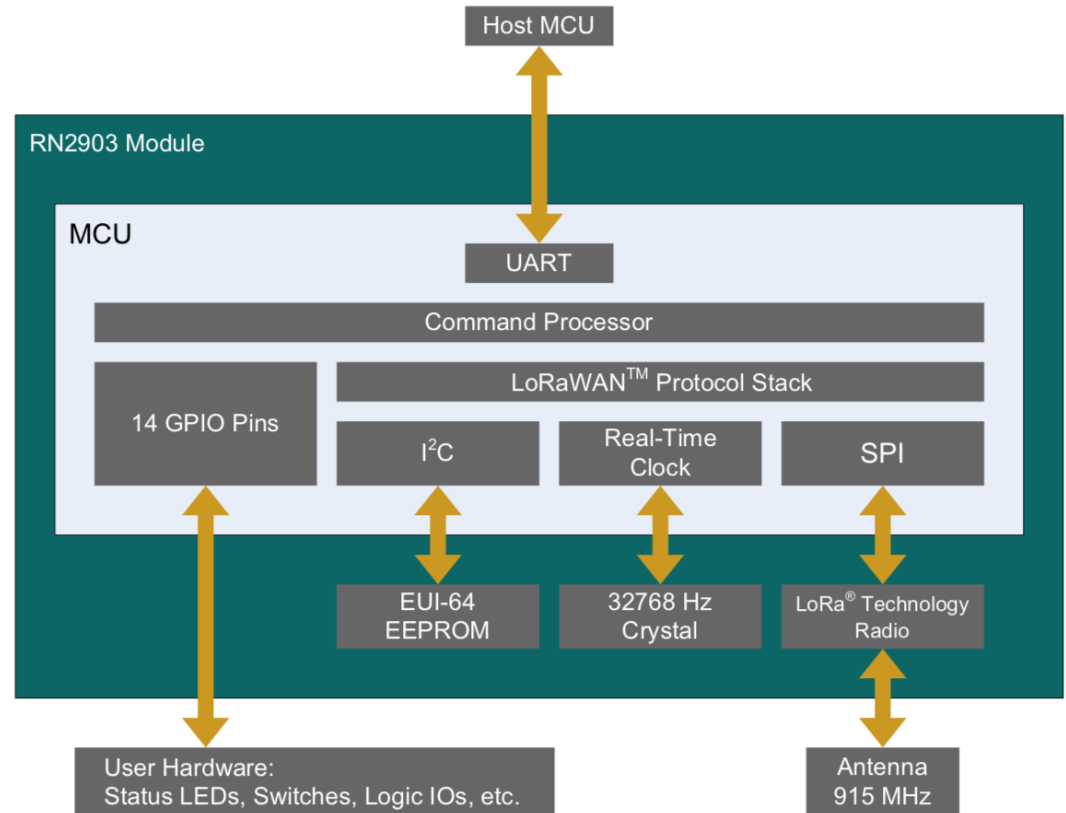
Example: SX1261/2 Block Diagram

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

Typical Solutions ICs for LoRa

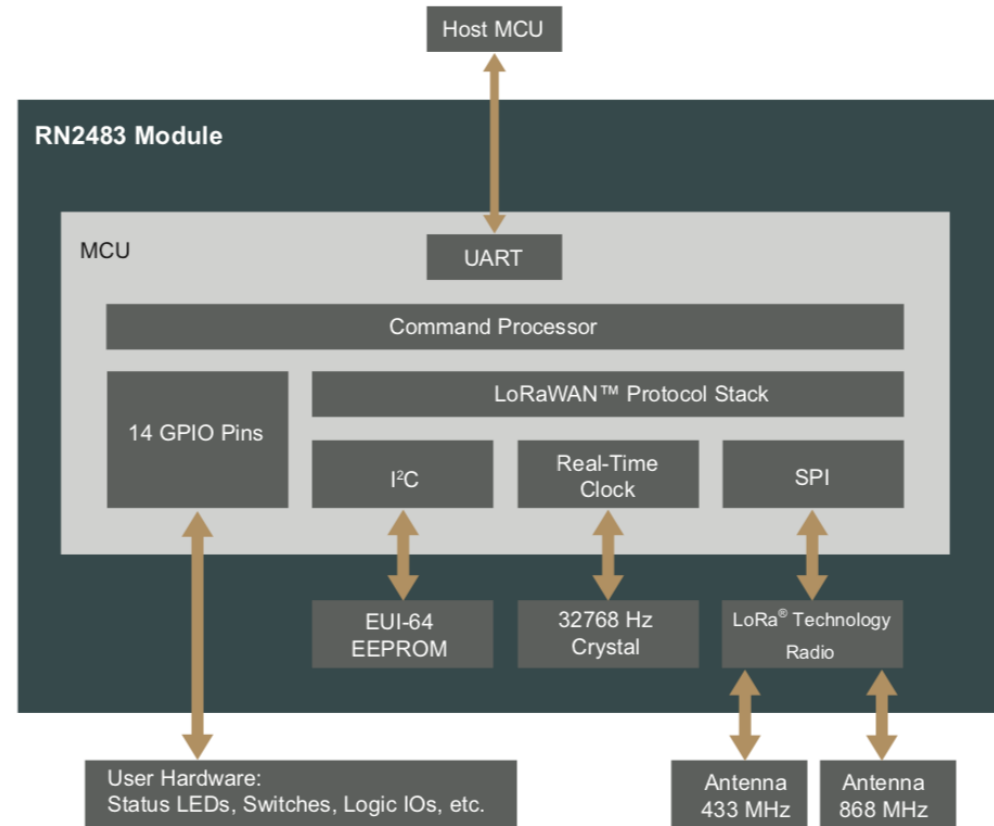
- MICROCHIP RN2903

- 32.768 kHz Crystal
- 915MHz Antenna



Typical Solutions ICs for LoRa

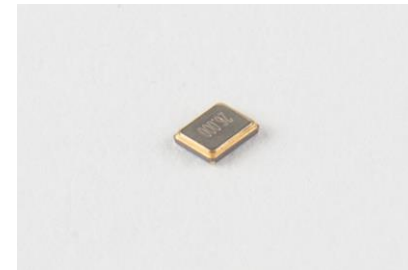
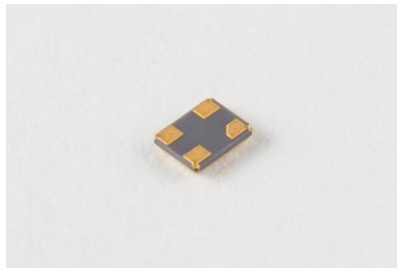
- MICROCHIP RN2483
- 32.768 kHz Crystal Oscillators
- 433 MHz Antenna
- 868 MHz Antenna



Raltron Products –MHz Crystals

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

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

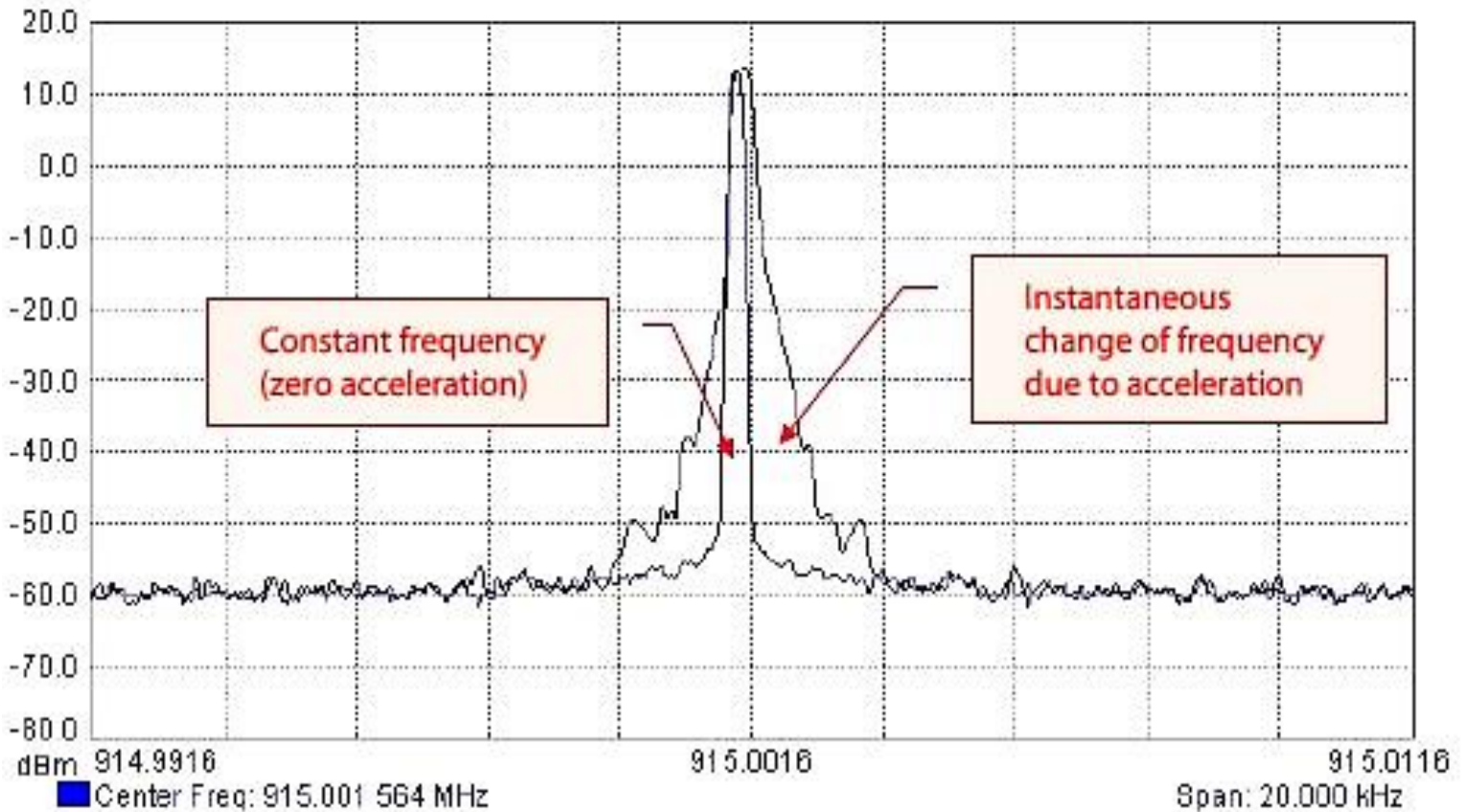


Raltron Products –MHz Crystals

Since LoRa modulations contains both relative time and frequency information it can be deduced that any short-term frequency variance could lead to incorrect detection of encoded data.

Thus it is recommended that for those applications which may be subject to acceleration forces, such as shock or vibration, for example where the SX1272 transceiver is implemented in a mobile link (such as a hand-held or vehicle mounted application) a low-G sensitivity crystal should to be used as the reference oscillator.

Raltron Products –MHz Crystals



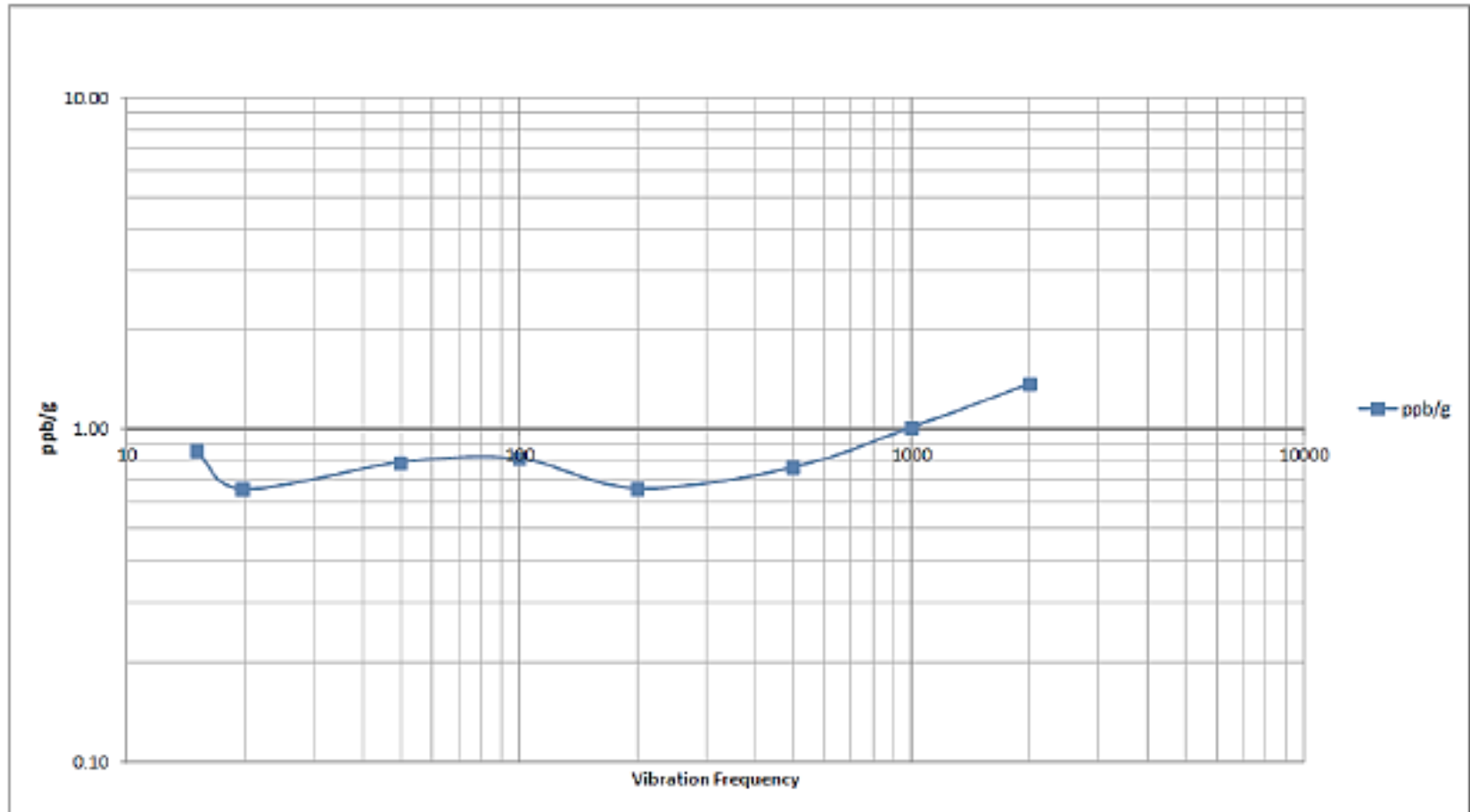
Effect of Acceleration due to Shock on a Crystal-Referenced PLL Transmitted Carrier

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

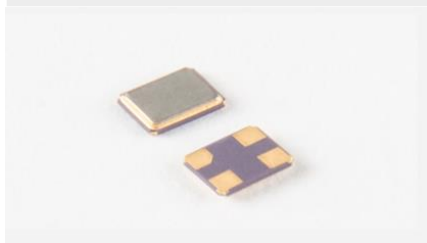
Raltron Products –MHz Crystals



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

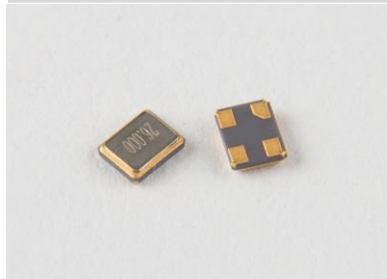
Raltron Products–TCXO

Part#	Size
<u>RTX-1612BD32-S-32.000- TR</u>	1.6x1.2mm
<u>RTX-1612BD32-S-52.000- TR</u>	1.6x1.2mm
<u>RTX-2016BD32-S-32.000-TR-NS1</u>	2.0x1.6mm
<u>RTX-2016BD32-S-52.000-TR-NS1</u>	2.0x1.6mm



Raltron Products–SAW Filters

Part#	Size
<u>RSF-433.920-1600-3030-TR-NS2</u>	3.0 x 3.0 mm
<u>RSF-866.000-7000-2015-TR-NS1-RevB</u>	2.0 x 1.5 mm
<u>RSF-866.500-7000-3030-TR-NS2</u>	3.0 x 3.0 mm
<u>RSF-868.300-7000-3030-TR</u>	3.0 x 3.0 mm
<u>RSF-915.000-26000-3030-TR-NS6</u>	3.0 x 3.0 mm
<u>RSF-915.000-26000-3030-TR-NS7</u>	3.0 x 3.0 mm
<u>RSF-915.000-26000-2015-TR-NS3-RevB</u>	2.0 x 1.5 mm



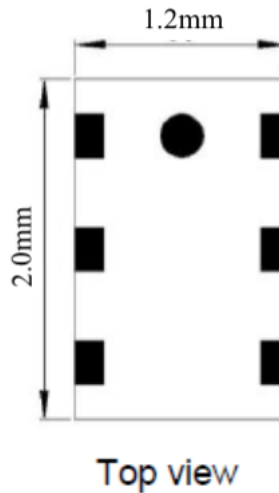
Raltron Products –Ceramic Filters

Part#	Size
<u>RCF-868.000-20000-2012-TR</u>	2.0 x 1.2 mm
<u>RCF-915.000-26000-2012-W-TR</u>	2.0 x 1.2 mm



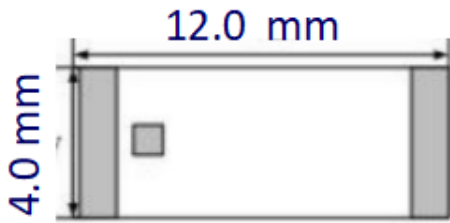
Raltron Products–LTCC Filters

Part#	Frequency	Size
<u>RBB-2012-G9-TR</u>	863-928MHz	2.0 x 1.2 mm
<u>RBL-2012-G9D4-TR</u>	915 MHz	2.0 x 1.2 mm

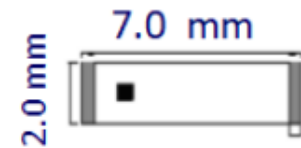


Raltron Products– Chip Antennas

Part#	Frequency	Size
<u>RCA-W1A0-1204-Z-001</u>	433 MHz	12.0 x 4.0 mm
<u>RCA-868-P-1204-A37-G</u>	868 MHz	12.0 x 4.0 mm
<u>RCA-915-7020-S1-S-TR</u>	915 MHz	7.0 x 2.0 mm



RCA-868-P-1204-A37-G



RCA-915-7020-S1-S-TR

Raltron Products–Dipole Antennas

Part#	Frequency	Length
<u>RDP-GS-P-255-MMCX-3000-G</u>	824 ~ 960 MHz	286.5 mm
<u>RDP-915-P-750-SMA-3000-M-Y</u>	915 MHz	750 mm
<u>RDP-GPRS-P-300-SMAM-3000-A-H</u>	915 MHz	300 mm
<u>RDP-GPRS-P-300-SMAM-3000-M-H</u>	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-GS-90-FME-Y	915 MHz	7 dBi	90 x 6.5 mm
RST-MB-P-157-SMA-G	868/915 MHz	3 dBi	157 x 21 mm
RST-GP-P-240-SMA-Y	868/915 MHz	7 dBi	240 x 25 mm

Raltron LoRa Kit



- MHz CRYSTALS
- TCXO
- SAW FILTERS
- CERAMIC FILTERS
- ANTENNAS

Raltron LoRa Kit

32.000 MHz
CRYSTAL



32.000 MHz
52.000 MHz
TCXO



ANTENNA
868 MHz



433 MHz
868 MHz
915 MHz

SAW FILTER



ANTENNA
915 MHz



ANTENNA
915 MHz



ANTENNA
433 MHz



ANTENNA
868 MHz



868 MHz
915 MHz
CERAMIC FILTER



Contact



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