Frequency Components and Antennas for Electric Vehicle Charger

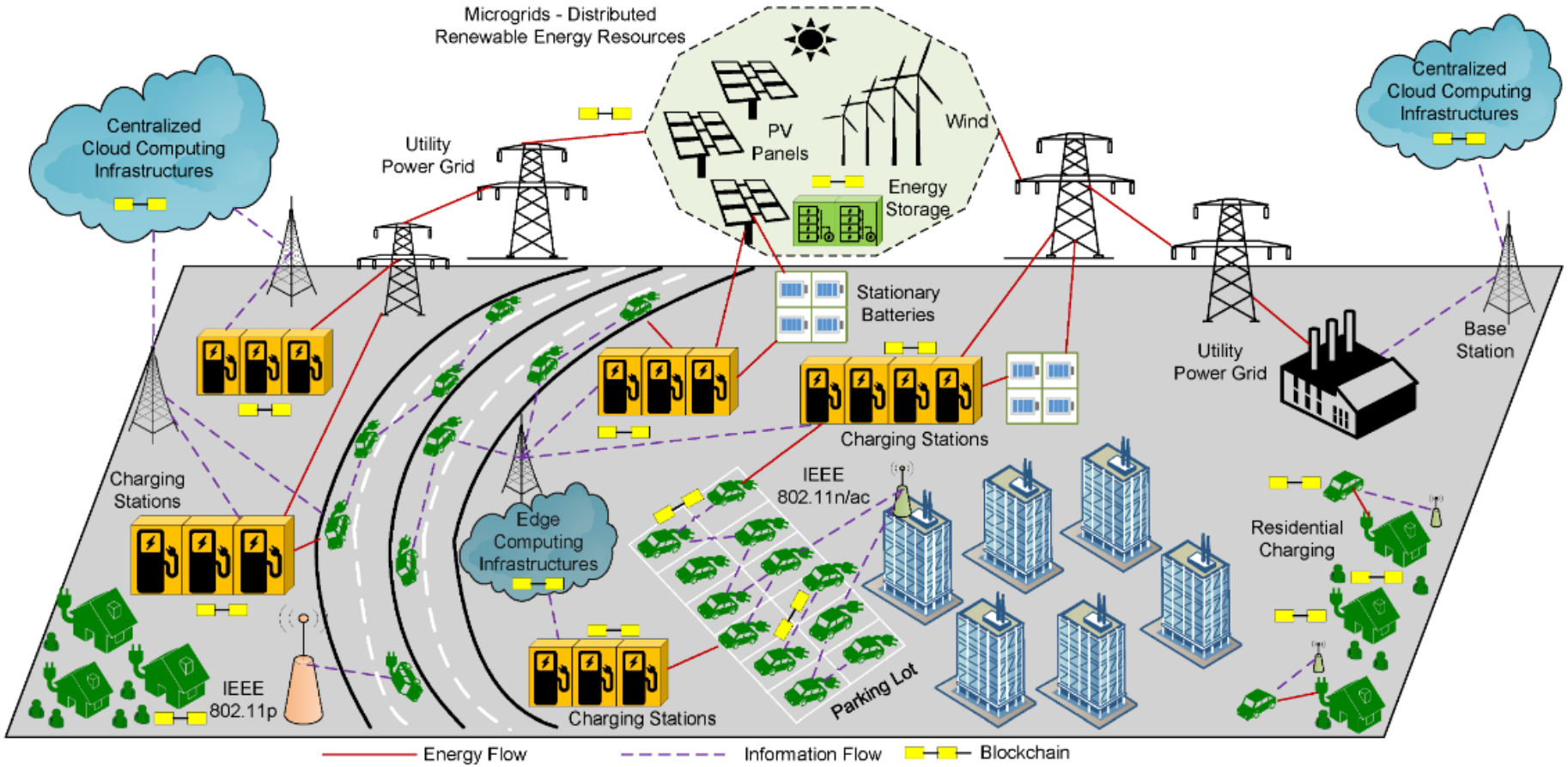
Dec. 2022

RALTRON

Introduction

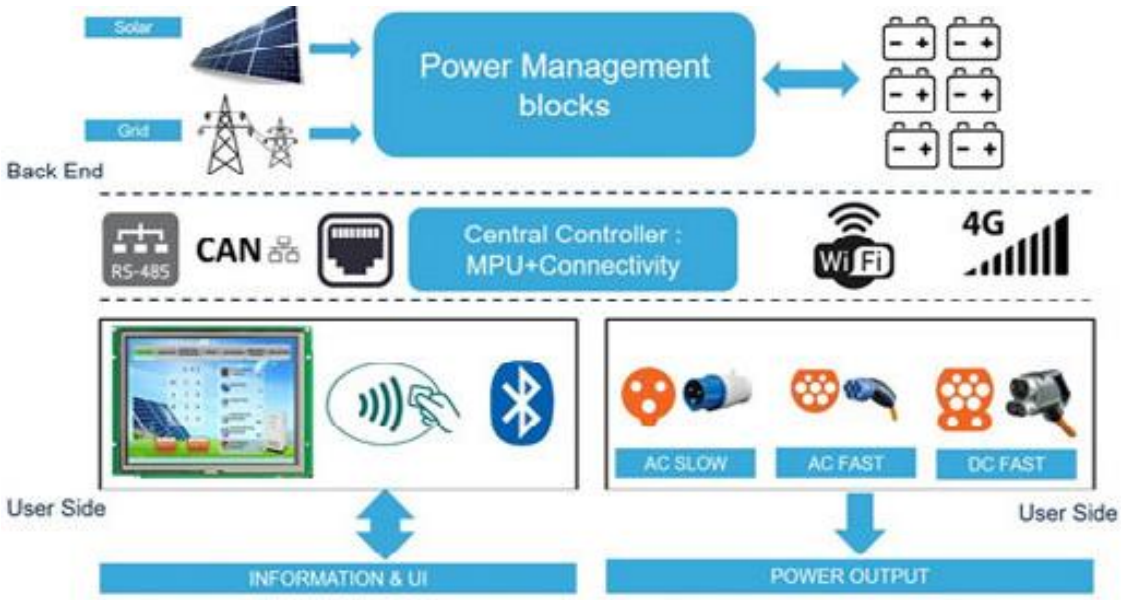
Raltron offers the most comprehensive line of frequency management components for EV Charger, from simple tuning fork crystals to high stability temperature compensated crystal oscillators and antennas. These products are designed to satisfy the ultra-low power, small footprint, and low-cost requirements of this growing market.

The Internet of Vehicles Vision



Source: https://www.mdpi.com/1996-1073/15/5/1908/htm

Solar EV Charging Station Functional Blocks



There is the user side, which basically depicts the functionalities visible to the end user. Information exchange and the user interaction is taken care of, here. It would typically consist of a TFT screen with touch sensing, **NFC** card readers for authentication or payments, and also a **Bluetooth** interface for more advanced features.

Source: https://www.saurenergy.com/ev-storage/solar-energy-and-ev-charging-infrastructure

Solutions for Wi-Fi Protocol

The Wi-Fi/IEEE 802.11 has three frequency bands, 2.4/5/6 GHz.

Some Typical Crystal or TCXO frequencies for **EV Charger** Applications ICs:

Infineon - CYW43012 - 37.4 MHz, 32.768 kHz
CY8C62xA - 16 to 35 MHz , 32.768 kHz

Silicon Labs - WF200 - 38.4 MHz, 32.768 kHz
RS9116 - 40 MHz, 32.768 kHz

Microchip - ATWINC3400A-MU - 26 MHz, 32.768 kHz

Raltron Stub Antennas Solutions

RST-2400-P-190-IPEX-H
RST-MB-P-153-SMA-G

The Wi-Fi 6/IEEE 802.11ax has two frequency bands, 2.4/5 GHz.

The Crystals for lower frequencies of Wi-Fi 6 such as 38.4 and 48 MHz, and for higher are 76.8 and 96 MHz

Some Typical Crystals or TCXO frequencies for **Wi-Fi 6** Wireless EV Charger Applications ICs:

SparkLan - WNFB-266AXI(BT) - 37.4 MHz, 32.768 kHz
AP6281 - 59.97 MHz, 32.768 kHz

See All Crystal Products

See Antenna Products for Wi-Fi

Solutions for Bluetooth & BLE Protocol

Bluetooth Low Energy uses the same 2.4 GHz radio frequencies as classic Bluetooth
Some Typical Crystal or TCXO frequencies for **Bluetooth & BLE** EV Charger ICs:

Infineon - PSoC 6 MCU: CY8C63x6, CY8C63x7 - 16 MHz/32 MHz Crystal Oscillator
16 to 35 MHz, 32.768 kHz On-chip Crystal Oscillators
- 2.4 GHz Chip Antenna

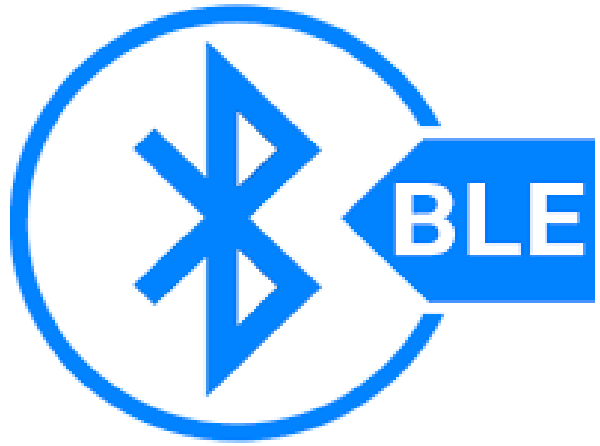
Nordic Semiconductor - nRF52810 - 64 MHz Crystal Oscillator, 32 MHz Crystal
32.768 kHz Crystal Oscillator, 32.768 kHz Crystal
1 MHz/16 MHz/32 MHz Peripheral Clock
- 2.4 GHz Antenna

Texas Instruments - CC2640R2F - 32.8 kHz/48 MHz RC Oscillator, 24 MHz Crystal Oscillator
32.768 kHz Crystal Oscillator
- 2.4 GHz Antenna

NXP Semiconductors - MKW39/38/37 - 26 MHz/32 MHz Crystal, 32.768 kHz Crystal Oscillator
- 2.4 GHz Antenna

Dialog Semiconductor - DA1469x - 32 MHz Crystal, 32.768 kHz Crystal Oscillator
- 2.4 GHz Antenna

STMicroelectronics - BlueNRG-LPS - 32 MHz Crystal, 32.768 kHz Crystal
- 2.4 GHz Antenna



See All Crystal Products

See Antenna Products for Bluetooth

Solutions for Near-field Communication Protocol

NFC operates at 13.56 MHz on ISO/IEC 18000-3 air interface. The technology is a simple extension of the ISO/IEC14443 proximity-card standard(contactless card, RFID).

Some Typical Crystal or TCXO frequencies for **Near-field communication** EV Charger ICs:

NXP Semiconductors - PN7160_PN7161 - 27.12 MHz Crystal, 40 MHz Oscillator
PN7150 - 27.12 MHz Crystal, 40 MHz Oscillator

STMicroelectronics - ST25R3916 - 27.12 MHz Crystal, 27 kHz RC Oscillator, 32.768 kHz Crystal
ST25RU3993 - 20 MHz TCXO
ST95HF - 27.12 MHz Crystal

See All Crystal Products

Solutions for GNSS

Global Navigation Satellite System (GNSS) is the standard generic term for all navigation satellites systems like GPS, GLONASS, GALILEO, BeiDou, QZSS, NAVIC.

Some Typical Crystal or TCXO frequencies
for **GNSS** EV Charger ICs:

Unicore Communications - UC6228CI - 26 MHz TCXO, 32.768 kHz Crystal

STMicroelectronics - STA8100GA - 32.768 kHz Crystal

Maxim Integrated - MAX2769 - 16.368 MHz Crystal

GPS	**BeiDou**
L1: 1575.42 MHz / L2: 1227.6 MHz / L5: 1176.45 MHz	B1: 1561.098 MHz – 1589.742 MHz / B2: 1207.14 MHz / B3: 1268.52 MHz
GALILEO	**NAVIC**
E1: 1575.42 MHz / E6: 1278.75 MHz / E5: 1176.45 – 1204.14 MHz	L5: 1176.45 MHz / S: 2492.028 MHz

See Antenna Products for GNSS

Solutions for ZigBee Protocol

The ZigBee/IEEE 802.15.4 has three frequency bands, allowing operation in all regions of the world: 2.4 GHz for worldwide applications, 868 MHz for Europe and 915 MHz for the American.

Some Typical Crystal or TCXO frequencies for **ZigBee** EV Charger ICs :

Texas Instruments - CC2652RSIP - 48 MHz Crystal
48 MHz Crystal Oscillator
32.768 kHz Crystal Oscillator
- 2.4 GHz Inverted F Antenna

Nordic Semiconductor - nRF52832 - 64 MHz Crystal Oscillator
32 MHz Crystal, 32.768 kHz Crystal Oscillator
- 2.4 GHz Chip Antenna

NXP Semiconductors - JN5189 - 32 MHz Crystal Oscillator
32.768 kHz Crystal Oscillator
- 2.4 GHz Antenna

Raltron Stub Antennas Solutions

RST-2400-P-190-IPEX-H
RST-MB-P-153-SMA-G

See All Crystal Products
See Antenna Products for Zigbee

Raltron Solutions - MHz Crystals

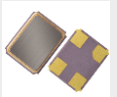
Available Crystal Packages

Part #	Size(mm)
R1612-27.120-8-F-3030-EXT-TR	1.60 x 1.25 x 0.32
R2016-48.000-8-F-1030-EXT-TR	2.00 x 1.60 x 0.50
R2520-27.120-8-F-3030-EXT-TR	2.50 x 2.00 x 0.65
RH100-24.000-9-1010-TR	3.20 x 2.50 x 0.70

See All Crystal Products

Typical Frequencies:
16 MHz, 26 MHz, 32 MHz, 37.4 MHz, 38.4 MHz, 40 MHz, 48 MHz, 59.97 MHz , 64 MHz

Stock at our Distributors

Product Series	Datasheet	Image	Contact Us / Buy Now
R1612 View products in stock	PDF		Buy Now
R2016 View products in stock	PDF		Buy Now
R2520 View products in stock	PDF		Buy Now
RH100 View products in stock	PDF		Buy Now

RoHS Compliant

Raltron Solutions - Tuning Fork 32.768 kHz

Available Tuning Fork Crystal Packages

Part #	Size(mm)
RT1210-32.768-9-TR	1.2 x 1.0
RT1610-32.768-12.5-TR	1.6 x 1.0
RT2012-32.768-7-20-EXT-TR	2.0 x 1.2
RT3215-32.768-12.5-TR	3.2 x 1.5
RSE-32.768-12.5-H14-TR	6.9 x 1.4
RSM200S-32.768-12.5-TR	8.0 x 3.8

Load capacitance values: 6 pF, 7 pF, 9 pF and 12.5 pF

Frequency Tolerances: ±20 ppm and ±10 ppm

RoHS Compliant

Stock at our Distributors

Product Series	Datasheet	Image	Contact Us / Buy Now
RT1210 View products in stock	PDF		Buy Now
RT1610 View products in stock	PDF		Buy Now
RT2012 View products in stock	PDF		Buy Now
RT3215 View products in stock	PDF		Buy Now
RSE H14	PDF		Buy Now
RSM200S View products in stock	PDF		Buy Now

Typical example of IC for Matter using a 32.768 kHz crystal as frequency reference:

Texas Instruments - CC1352P7

Using 32.768 kHz crystal

CL: 6, 7 or 12 pF

ESR: 90 kΩ max

Raltron Solutions - TCXO s and VCTCXOs

Raltron TCXOs IC Solutions

Part #	Size(mm)
RTX-1612BD32-S-52.000-TR	1.6 x 1.2
RTX-2016AD333-S-26.000-TR	2.0 x 1.6
RTX-2520AD31-S-26.000-TR	2.5 x 2.0
RTX-2520AF32-S-48.000-TR	2.5 x 2.0

See All TCXOs Products

- Tighter Stability: ±0.5 ppm ~ ±2.5 ppm, -40 ~ +85°C
- Improved Frequency Tuning Characteristic
- Superior Phase Noise Performance (-130 dBc/Hz on the floor)
- Range Supply Voltage: 1.8 V ~ 3.3 V
- Typical Frequencies: 10.0 MHz, 16.0 MHz, 19.2 MHz, 20.0 MHz, 26.0 MHz, 32.0 MHz, 38.4MHz, 48.0 MHz, 50.0 MHz, 52.0 MHz

Stock at our Distributors

Product Series	Datasheet	Image	Contact Us / Buy Now
RTX /RTV-1612	PDF		Buy Now
RTX /RTV-2016 View products in stock	PDF		Buy Now
RTX /RTV-2520 View products in stock	PDF		Buy Now

RoHS Compliant

Raltron Solutions – Antennas

Raltron Stub Antennas Solutions

Part #	FREQUENCY(MHz)
RST-W2-P-195-RPSMA-G	2400 ~ 2500
RST-W2A1-20022-17M-TE-001	2400 ~ 2500
RST-W7-30-A-G	2400 ~ 2500

Raltron Chip Antennas Solutions

Part #	FREQUENCY(MHz)
RCA-3216-A1-TR	2450

Raltron GPS Antenna	FREQUENCY(MHz)
RPA-GP-A-16-IPEX-25-G	1575.42

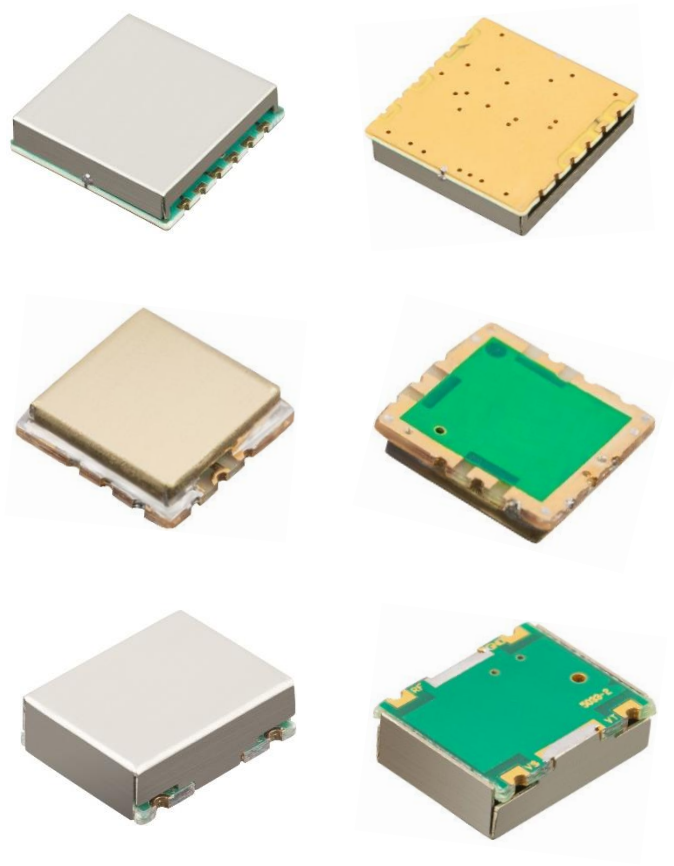
See Antenna Products for Wi-Fi
See Antenna Products for Bluetooth
See Antenna Products for GNSS
See Antenna Products for Zigbee

RoHS Compliant

Raltron Solutions – VCOs

Raltron VCOs Solutions

VCO SIZE (mm)	FREQUENCY(GHz)
5 x 4	300 to 2.6
8 x 6	Up to 12
7.6 x 7.6	Up to 12
12.5 x 12.5	Up to 12



Raltron VCOs:

Frequency Range: up to 12.00 GHz

Low Phase Noise and Fast Settling Time

Excellent Return Loss

Supply Voltage: +2.2 to +12.0 VDC

Ultra Wide Tuning Ranges

Packages: 5 x 4 to 20 x 20 mm footprint

See All VCOs Products

Raltron Products – LTCC Filters, Baluns and Diplexers

Raltron LTCC Filters, Baluns and Diplexers Solutions

Part #	Size(mm)
RCF-5500.000-700000-1005-W-001	1.00 x 0.50
RBL-2430.000-1005-EV-001	1.00 x 0.50 x 0.40
RCDI-24-49-1608-W-TR	1.60 x 0.80 x 0.60
RCDI-W2A1-W5A17-1608-W-TR	1.60 x 0.80 x 0.60

See All LTCC Filters, Baluns and Diplexers Products

RoHS Compliant

Raltron Solutions RF Connectors and RF Cable Assemblies

Raltron RF connectors with low insertion loss and excellent voltage standing wave ratio support the high-level performance demanded by Smart City Applications.

SMA CONNECTORS - RCN-1M-21419-K-001

BNC CONNECTORS - RCN-3F-3108-K-001

MCX CONNECTORS - RCN-4F-28012-K-001

MMCX CONNECTORS - RCN-5F-33106-K-001

TNC CONNECTORS - RCN-9M-16205-K-001

N CONNECTORS - RCN-17M-12816-K-001

Raltron cable assemblies range from simple jumpers to power and high-speed data cables.

SMA TO IPEX CABLE - RCB-16-F-95-11-SD

MCX TO MCX CABLE - RCB-21-174-150-DO-001

MCX TO SMA CABLE - RCB-14-H-100-12-SD

MMCX TO SMA CABLE - RCB-15-A-100-12-SD

TNC TO SMA CABLE - RCB-13-J-600-13-SD

CABLE ASSEMBLIES SHORT FORM CATALOG

Contact

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