

POWER METER WITH RF COMMUNICATIONS: OVERVIEW

The Wi-SUN Alliance provides sub-GHz communication standards for meter AMR applications, as well as smart home appliance applications, due to its low power consumption and smart network connection.

Our Renesas solution uses a combination of the RL78/G1H MCU with a sub-GHz radio, an RX651 MCU, and RF products such as the F1420 PA and the F2914 switch. The ISL85413 buck converter ensures a stable voltage supply for applications where RF transmission, multiple peer accessing, and networking communication are required.

The 16-bit RL78/G1H acts as an RF transceiver to transmit and receive the data from the antenna. The signal is then amplified by an LNA or a PA. The entire process is fully compliant with the Wi-SUN Alliance-based PAN/FAN profile (IEEE802.15.4g/4e).

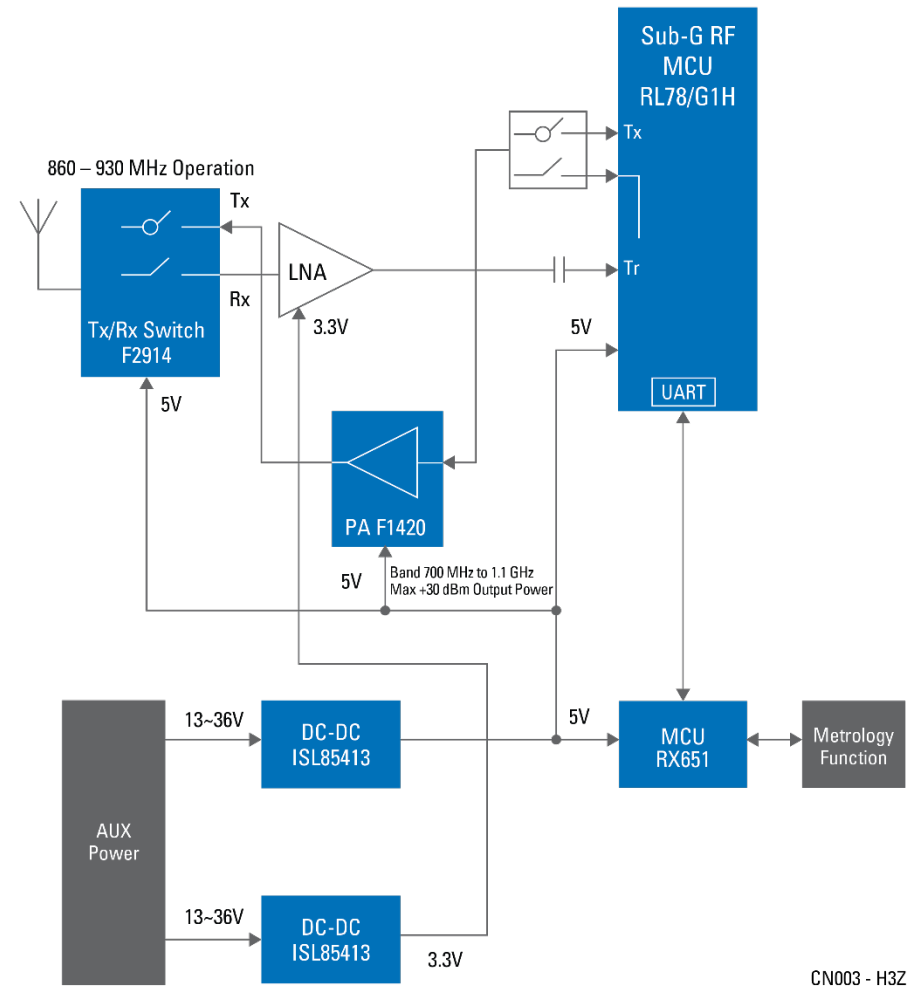
Key Features:

- Full solution level support for the Wi-SUN standard
- Provide hardware package design support
- High output power and receive performance

WC#: CN003-H3Z

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POWER METER WITH RF COMMUNICATIONS: BLOCK DIAGRAM



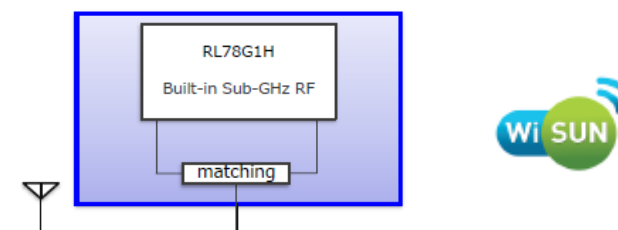
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R5F11FLLANA: HIGH PERFORMANCE RF TRANSCEIVER

Features	Benefits	Applications
<ul style="list-style-type: none"> • 512KROM/48KRAM • IEEE802.15.4g standard specification SubGHz-band transceiver • RF frequency range: 863 to 928 MHz • Modulation method: 2FSK/GFSK, 4FSK/GFSK • Data rate: 2FSK/GFSK 10 to 300 kbps, 4FSK/GFSK 200/400 kbps 	<ul style="list-style-type: none"> • Transceiver and MCU integrated, PCB size and cost reduced • No need additional PA if 16dBm required • Wi-SUN solution complied by F/W into this MCU, shorten development cycle 	<ul style="list-style-type: none"> • Smart meter AMR • Smart home appliance

Typical application and key performances

- 1: Integration of RF peripheral circuit
2. Rx receiving current realizes the world's top class low power current
 - Receiving current in RF portion is 6.3mA*1, RX wait is 5.8mA*1.
 - Receiving sensitivity is -105dBm*2 regardless of ultra low power consumption
3. IEEE802.15.4g/4e-compliant H/W reduces CPU load
- 4: Renesas G1H Wi-SUN designer and partner:
 - Echonet B profile: H/W&F/W By Renesas
 - FAN profile:
 - H/W By Neona (<http://www.neonaembeddedlabz.com/career-details-sales-engineer.html>)
 - By Vizmonet (vizmonet pte ltd)
 - FW By Nuratech (<https://www.nuratechlabs.com/>)

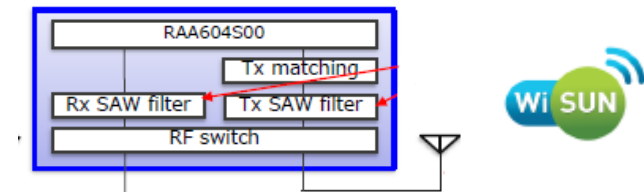


F2914: HIGH PERFORMANCE RF SWITCH

Features	Benefits	Applications
<p>High performance RF</p> <ul style="list-style-type: none"> ◦ Isolation of 54 dB @ 2700 MHz ◦ Insertion Loss of 1.15 dB @ 2700 MHz <p>High continuous RF CW Power Handling</p> <ul style="list-style-type: none"> ◦ Selected RF path: 33dBm ◦ Terminated RF path: 27dBm 	<ul style="list-style-type: none"> • 50-8000MHz operation have better broadband coverage • Provide a good linearity and isolation performance 	<ul style="list-style-type: none"> • Smart meter AMR • Smart home appliance

Typical application and key performances

- 1: high reliability, low insertion loss, 50 Ω SP4T absorptive RF switch designed for a multitude of wireless and other RF applications.
- 2: covers a broad frequency range from 50 MHz to 8000 MHz.
- 3: providing low insertion loss, excellent linearity and isolation performance while providing a 50 Ω termination to unused RF ports

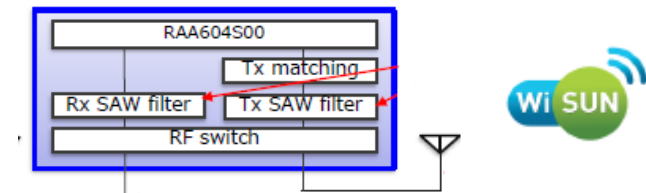


F1420: HIGH PERFORMANCE RF TRANSCEIVER

Features	Benefits	Applications
<p>High gain / high linearity RF amplifier Broadband 700MHz to 1.1GHz</p> <ul style="list-style-type: none"> • +42dBm OIP3 at 960MHz • +23.2dBm output P1dB at 960MHz <p>Uses a single 5V supply and 105mA of ICC.</p>	<ul style="list-style-type: none"> • Use one chip to cover enough output power • Very simple connect circuit 	<ul style="list-style-type: none"> • Smart meter AMR • Smart home appliance

Typical application and key performances

- 1: F1420 is a high-gain/high-linearity RF amplifier used in high-performance RF applications.
- 2: F1420 provides 17.4dB gain with +42dBm OIP3 and 4.5dB noise figure at 960MHz



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■ System benefits

- High performance PLC. Certified from G3/PRIME alliance
- High performance line driver

Device Category	P/N	Key Features
MCU	R5F11FLLANA	<ul style="list-style-type: none"> • 512KROM/48KRAM • IEEE802.15.4g standard specification SubGHz-band transceiver • RF frequency range: 863 to 928 MHz • Modulation method: 2FSK/GFSK, 4FSK/GFSK • Data rate: 2FSK/GFSK 10 to 300 kbps, 4FSK/GFSK 200/400 kbps
MCU	R5F5651EHDFP	Up to 2MB flash, enable store 1024nodes routing table Ethernet I/F, extend outside communication
Power	ISL85413	<ul style="list-style-type: none"> • High efficiency buck converter • Wide input voltage range 3V to 40V • Capable of 300mA output current in small 3x3 DFN
Analog	F2914	• Switch, 50-8000MHz operation have better broadband coverage
	F1420	<ul style="list-style-type: none"> • High gain / high linearity RF amplifier • +42dBm OIP3 at 960MHz • +23.2dBm output P1dB at 960MHz