



NXR-ZGW-PRO Theory of Operation

The NXR-ZGW-PRO is a wireless device that acts as a gateway between a ZigBee Pro wireless network and a Ethernet wired network. The ZGWPRO uses the AMCC PC405EP processor as the main processor. The PC405EP does the majority of the data processing and provides the Ethernet interface via its internal Ethernet MAC. The NXR-ZGW-PRO also utilizes the Ember EM250 Zigbee radio transceiver chip. The EM250 contains both an 802.15.4 radio transceiver and a small microprocessor that runs the ZigBee Pro networking stack. The gateway has a reverse SMA connector that provides the interface to an external antenna.

The EM250 chip uses an on-chip 4.8 GHz VCO. A 24 MHz crystal oscillator is used to establish the PLL reference signal. The radio transmitter utilizes an efficient architecture in which the data stream directly modulates the VCO. A PA (RFMD RF2172) boosts the output power by +23 dBm. A LNA (CEL uPC8233TK) boosts the receive power by as much as +22.5 dBm (178 mW). The calibration of the TX path as well as the output power is controlled by digital logic internal to the EM250.

The radio receiver is a low-IF, super-heterodyne receiver. It utilizes differential signal paths to minimize noise interference, and its architecture has been chosen to optimize co-existence with other devices within the 2.4 GHz band (namely, IEEE 802.11b/g and Bluetooth). After amplification and mixing, the signal is filtered and combined prior to being sampled by an ADC.

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Data transmission rate is 250 kbps. Channels are numbered 11 – 26 and are centered on the frequencies below.

Channel	Center Frequency (MHz)
11	2405
12	2410
13	2415
14	2420
15	2425
16	2430
17	2435
18	2440
19	2445
20	2450
21	2455
22	2460
23	2465
24	2470
25	2475
26	2480

Channel bandwidth is 2 MHz. Occupied bandwidth is 1.6 MHz.

The recommended operating range is -40 to +85 degrees Celsius. Over this frequency range the frequency stability is rated at +/- 40 ppm which would be a maximum drift of 99.2 kHz.

Modulation is O-QPSK (Offset Quadrature Phase Shift Key) and the rf carrier is spread using Direct Sequence spreading.

RF power output is +20 dBm. The nominal gain of the supplied antenna is +2 dBi.

The NXR-ZGW-PRO is designed as a stand-alone gateway and is intended to be used by AMX in their line of remote control devices.

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