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1 Introduction

1.1 Synopsis

The XYZ Power Company requires a point-to-multipoint wireless communication link between the main control centre (NAIT HP Centre) and multiple sub-stations located throughout Edmonton, Alberta. The radio link must carry SCADA signaling between multiple AltaLink sub-stations to ensure power grid data is consistently available main control centre, and assure timely control of key system parameters. The radio link must be designed such that it has a high reliability and will remain operational regardless of annual cyclic weather conditions.

1.2 Objectives

The wireless SCADA radio link must carry a data rate of 100 kbps. The radio equipment must have a 10/100 Ethernet network interface at the main control centre and have remote management capability with an IP addressable web based HTML interface. The remote end interfaces are typically low speed serial. There is a need to expand to have multiple RTUs at each site in the future.

Initially there will be one RTU at each field site, containing three discrete sensors, two analogue sensors, one actuator and two relays.

2 Detail of design components

2.1 RF design

For the frequency designed for the system, since this system is operating in the 900 MHz unlicensed band(902 MHz to 928 MHz), there is no limitation of choosing which frequency for which purpose in the band. Hence, the transmit frequency is designed simply as shown in table 1.

Table1 : Frequency design of the link

Site Name	Transmit frequency	Receive frequency
NAIT	902 MHz	927 MHz
Altalink	927 MHz	902 MHz

2.2 Radio equipment supplier

We choose FGR2 Ethernet Series 900MHz Industrial Radio. Its speed is up to 154 Kbps over the air throughput. It support Frequency Hopping Spread Spectrum technology for the security and 100% compatible with all existing 900MHz Freewave FGRplus radios. Transmitter output power is 5mW to 1 Watt. Bandwidth 230.4 KHz. Receiver 's power sensitivity is -108 dBm for BER 10^{-4} for 115 Kbps.



Figure 1: FGR2 Ethernet Series 900MHz Industrial Radio

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