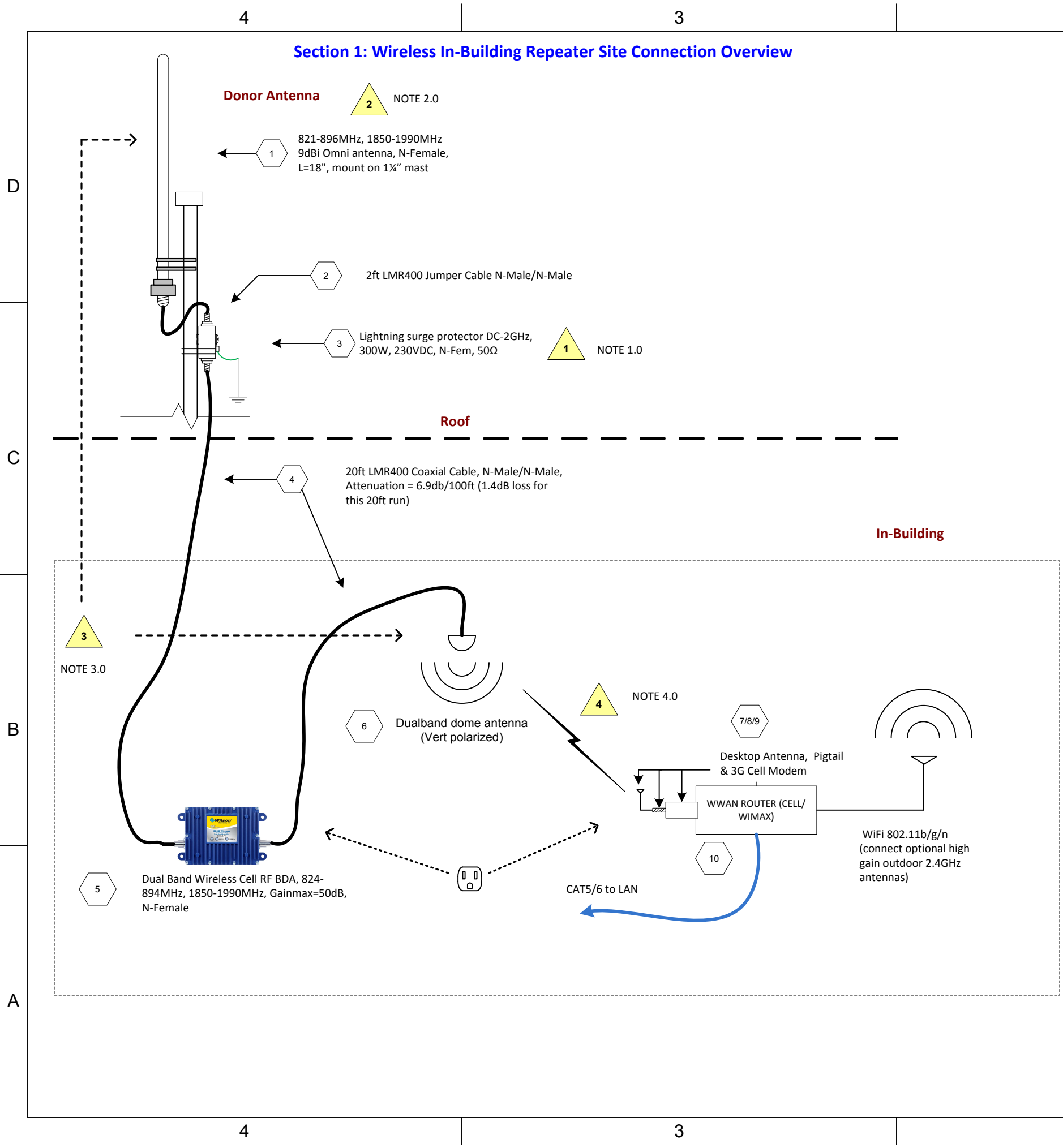


Section 1: Wireless In-Building Repeater Site Connection Overview



Dual-Band Cellular 800MHz, 1900MHz Wireless Repeater for Indoor Coverage Improvement
 Outdoor Omni-Directional Antenna, Indoor Wireless Repeater, Cellular 3G Router, Optional Lightning Protection
 JOB # BWA-40850-xxxx
 Section 1.0: Wireless In-Building Repeater Site Connection Overview

| | | | | |
|--|-------|-----------------|------------------|--------------|
| DRAWN BY: RT (Engr) | SIZE | LIC NO | DWG NO | REV |
| APPROVED BY: | | AZ ROC # 253407 | BW-40850xxxx-001 | 2A |
| FREQ(s): 850MHz Cellular, 1.9GHz PCS, 2.4GHz ISM | SCALE | NO SCALE | FRN: 0018086041 | SHEET 1 OF 1 |

| Bill of Materials | | | | |
|-------------------|------|--------------|---|--|
| ITEM | QTY. | RFWEL SKU | DESCRIPTION | |
| 1 | 1 | TSCL288-PW | 9dBi Dual Band Omni-Directional Cellular Antenna, N-Female Jack | |
| 2 | 1 | 952302 | 2ft LMR-400 low loss coaxial cable (N-Male/N-Male) | |
| 3 | 1 | 859902 | Coax Lightning protector DC-2GHz, IL<0.2dB, 300W, 230VDC, N-Fem | |
| 4 | 2 | CA3N020 | 20ft LMR-400 low loss coaxial cable (N-Male/N-Male) | |
| 5 | 1 | CL801245 | 50dB Wireless dualband Amp. (N-female) | |
| 6 | 1 | CL301121 | Dualband Dome Antenna, Vert Pol, N-female | |
| 7 | 1 | 359927 | Sierra USB 888 External Antenna Adapter, FME-male | |
| 8 | 1 | ANFRDM-STALN | Freedom cellular Booster Antenna, Tabletop, FME-female | |
| 9 | 1 | CL888U-UNLK | Sierra Wireless Compass 888 Broadband USB Modem HSPA 7.2 | |
| 10 | 1 | MBR1200 | CradlePoint MBR1200 Failsafe Cellular/WiMax/WiFi Router | |

NOTES:

- 1.0 Ground per NEC-2005 Art820 using 14AWG+ grounding electrode
- 2.0 For higher antenna gain consider using directional Yagi antenna which will help make up for coaxial cable losses. High gain Yagi antennas are typically single band but one may use power splitter/combiner or diplexer to attach multiple single-band antennas to same coaxial cable. NOTE - need to be careful not to exceed regulatory EIRP limits when adding external antennas.
- 3.0 To avoid positive feedback between outside donor antenna and inside server antenna which would cause oscillations a minimum isolation of at least 10dB greater than the antenna gain of the repeater is required. Typical separation distance of **20ft** is required but this distance may be relaxed if traversing RF-shielding barriers such as thick walls.
- 4.0 Max distance between in-building dome server antenna and mobile unit (cellphone/ datacard) is limited by
 - i) outside RSS
 - ii) coaxial cable length E.g for 20ft cables and -90dBm outside RSS gives ~50ft indoor coverage. Less if traversing walls or other in-building obstructions.