

| Constants                                   |               | Standard |         | Decibels |                                                    |
|---------------------------------------------|---------------|----------|---------|----------|----------------------------------------------------|
| Boltzmann Constant, k                       | 1.381E-23     | J/K      | -228.60 | dB       |                                                    |
| Speed of Light in Vacuum, c                 | 3.00E+08      | m/s      |         |          |                                                    |
| Earth Radius, RE                            | 6378.14       | km       |         |          |                                                    |
| Earth Mu                                    | 3.99E+05      | km^3/s^2 |         |          |                                                    |
| Frequency                                   |               |          |         |          |                                                    |
| Frequency of Signal, f                      | 437           | MHz      |         |          |                                                    |
| Wavelength of Signal, λ                     | 0.686         | m        |         |          |                                                    |
| Orbit                                       |               |          |         |          |                                                    |
| Altitude, h                                 | 400           | km       | 400     | km       | ← Orbital altitude during pass goes here           |
| Minimum Elevation Angle, φ                  | 60            | deg      | 60      | deg      | ← Minimum Elevation Angle Goes Here                |
| Line of Sight Range, S                      | 457.4         | km       |         |          |                                                    |
| Orbital Period, T                           | 92.6          | min      |         |          |                                                    |
| S/C Velocity in Circular Orbit, v           | 7.7           | km/s     |         |          |                                                    |
| S/C Velocity Relative to Ground Station, vr | 3.8           | km/s     |         |          |                                                    |
| Maximum Estimated Doppler Shift, df         | 5.6           | kHz      |         |          |                                                    |
| Transmitter                                 |               |          |         |          |                                                    |
| Transmitting Antenna Gain, Gt               | 3.98          |          | 6.00    | dB       | ← Transmitter antenna gain goes here               |
| Transmitter Power, P                        | 13.9794000867 | dBW      | 25.000  | W        | ← Transmitter power goes here                      |
| EIRP, W                                     | 99.527        | W        | 19.98   | dBW      |                                                    |
| Path Losses                                 |               |          |         |          |                                                    |
| Link Loss (or free-space loss), Ls          | 1.4E-14       |          | -138.5  | dB       |                                                    |
| Atmospheric Attenuation, La                 | 0.631         |          | -2.0    | dB       | ← Atmospheric attenuation goes here                |
| Receiver                                    |               |          |         |          |                                                    |
| Gain of Receiving Antenna, Gr               | 3.98          |          | 6.0     | dB       | ← Receiver Antenna Gain Goes Here                  |
| Polarization Losses, Lp                     | 0.89          |          | -0.5    | dB       | ← Anticipated polarization loss goes here          |
| Receiver System Temperature, Ts             | 27.5          | dBK      | 560.00  | K        | ← Receiver system noise temperature goes here      |
| Receiver Noise Factor/Figure                | 3.162         |          | 5       | dB       | ← Receiver noise figure goes here                  |
| Gain of LNA                                 | 1000.00       |          | 30      | dB       | ← Low Noise Amplifier (LNA) gain goes here         |
| LNA Noise Figure                            | 1.175         |          | 0.7     | dB       | ← Low Noise Amplifier (LNA) noise figure goes here |
| Bandwidth, B                                | 44.0          | dBHz     | 25.0    | kHz      | ← Receiver bandwidth goes here                     |
| System Noise, N                             | 8.38E-16      | W        | -157.14 | dBW      |                                                    |
| Signal Encoding / Convolution               |               |          |         |          |                                                    |
| Baud Rate, R                                | 2400.00       | bps      | 2400.00 | bps      | ← Data rate goes here                              |
| Link Quality                                |               |          |         |          |                                                    |
| Received Power, Carrier Power, C            | 3.18E-09      | W        | -84.99  | dBW      |                                                    |
| Carrier to Noise, C/N                       | 3790917.920   |          | 65.79   | dB       |                                                    |
| Eb/N0                                       | 39488728.3    |          | 75.96   | dB       |                                                    |
| Minimum Eb/N0                               | 10.0          |          | 10.00   | dB       |                                                    |
| Margin, M                                   | 35539855.50   |          | 65.96   | dB       |                                                    |

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