

Why Feed Line Matters: Hearing and Being Heard from 50 MHz to 1296 MHz

An Amateur Radio perspective on VHF, UHF, and SHF performance

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Introduction

At HF, antenna height and propagation often dominate the conversation. At VHF, UHF, and SHF (50 MHz through 1296 MHz), **feed line quality becomes just as important as the antenna itself**. Many otherwise excellent stations are quietly handicapped by high-loss coaxial cable and poor connectors, throwing away precious signal before it ever reaches the antenna—or the receiver front end.

On these bands, **every dB matters**. Weak-signal work, satellite operation, EME, contesting, and even FM simplex all benefit dramatically from low-loss feed line and high-quality connectors. This article explains *why* feed line is so critical, *how much* you can lose with poor choices, and *where* the improvements pay off across the VHF/UHF/SHF spectrum.

Feed Line Loss: The Silent Power Thief

Coaxial cable loss increases rapidly with frequency. The same feed line that works “fine” on 50 MHz can be a serious liability at 432 MHz—and completely unacceptable at 1296 MHz.

Typical Loss (dB per 100 ft)

Cable Type	50 MHz	144 MHz	432 MHz	1296 MHz
RG-58	~1.4 dB	~3.0 dB	~6.5 dB	~12 dB
RG-213 / RG-8	~0.8 dB	~1.6 dB	~3.5 dB	~7 dB
LMR-400	~0.7 dB	~1.5 dB	~2.7 dB	~5.8 dB
1/2" Heliac	~0.3 dB	~0.7 dB	~1.4 dB	~3 dB
7/8" Heliac	~0.15 dB	~0.4 dB	~0.8 dB	~1.7 dB

(Values are approximate but representative.)

Transmit Side: Power You Never Radiate

Feed line loss applies **before your signal reaches the antenna**.

- 3 dB loss = **50% of your power gone**
- 6 dB loss = **75% gone**
- 10 dB loss = **90% gone**

Example at 1296 MHz:

You run 100 W into 100 feet of RG-58 with ~12 dB loss.

- Power at antenna: **~6 W**
- The other 94 W? Converted to heat in the coax.

Now compare that to 7/8" Helix with ~1.7 dB loss:

- Power at antenna: **~68 W**
- That's more than **11 dB stronger**, equivalent to increasing transmitter power by nearly **16 times**.

Receive Side: Weak Signals Disappear First

Feed line loss is **just as damaging on receive**.

Unlike transmitter power, you cannot "turn up" weak signals. Every dB of loss in your feed line:

- Raises the effective noise figure of your system
- Reduces your ability to copy weak stations
- Cancels out the advantage of low-noise preamps

At UHF and above, it is common for the feed line loss to exceed the noise figure of the receiver itself. This is why serious VHF/UHF/SHF stations often place preamps **at the antenna**, before the feed line loss occurs.

Band-by-Band Impact

50 MHz (6 meters)

- Loss is manageable but still significant for weak-signal DX
- RG-213 or LMR-400 is usually acceptable
- Poor coax can erase marginal openings

144 MHz (2 meters)

- Feed line quality becomes critical for SSB, CW, and EME
- 3 dB of extra loss can mean the difference between copy and no copy
- Low-loss coax noticeably improves both TX and RX

222 / 432 MHz

- Loss accelerates rapidly
- “HF-grade” coax becomes marginal
- Hardline or very low-loss coax shows dramatic improvement

902 / 1296 MHz

- Feed line is often the **dominant system limitation**
- Ordinary coax can lose more signal than the antenna gain provides
- Hardline, short runs, and excellent connectors are essential

Connectors: Small Parts, Big Consequences

At VHF and especially UHF/SHF, **connectors are no longer transparent.**

Connector Issues at High Frequencies

- Impedance discontinuities
- Reflections (VSWR increase)
- Added insertion loss
- Intermodulation and noise

Common Connector Performance

- **UHF (PL-259/SO-239):** Poor impedance control, unsuitable above ~150 MHz
- **Type N:** Excellent to 11 GHz when properly installed
- **7/16 DIN:** Very low loss, high power handling

- **SMA / SMB:** Excellent for microwave when precision types are used

A single poor connector can add:

- 0.2–0.5 dB loss at UHF
- Over 1 dB loss at 1296 MHz
- Reflections that degrade amplifier and preamp performance

Now multiply that by **every adapter, barrel connector, relay contact, and patch cable** in the system.

VSWR and Loss: A Double Penalty

Mismatch increases feed line loss. A high VSWR:

- Causes reflected power
- Increases current and heating in the coax
- Further raises effective loss at higher frequencies

At SHF, even a modest mismatch combined with lossy feed line can turn a good antenna into a poor system.

The Real Payoff of Low-Loss Feed Line

Upgrading feed line often delivers **more improvement than upgrading the radio or antenna.**

Benefits include:

- Stronger transmitted signal
- Lower receive noise floor
- Better weak-signal copy
- Improved EME and satellite performance
- More consistent contest results
- Reduced need for higher transmitter power

In many cases, replacing lossy coax with hardline yields a **5–10 dB system improvement**, equivalent to:

- Quadrupling antenna gain, or
- Increasing transmitter power by 4–10×

Practical Recommendations

1. **Use the best feed line you can justify** for the highest frequency band.
2. **Minimize feed line length**—especially above 432 MHz.
3. **Avoid UHF connectors** above 2 meters.
4. **Use quality Type N or better connectors**, properly installed.
5. **Eliminate unnecessary adapters and jumpers.**
6. For UHF/SHF weak-signal work, **place preamps at the antenna.**
7. Treat feed line and connectors as part of the antenna—not accessories.

Conclusion

From 50 MHz through 1296 MHz, feed line and connectors are not afterthoughts—they are **critical system components**. Poor choices quietly steal signal strength, mask weak stations, and limit your station's true potential.

Investing in high-quality, low-loss feed line and precision connectors is one of the most effective upgrades you can make. On VHF, UHF, and SHF, the difference is not subtle—you will **hear more, be heard farther, and get the full performance your antenna and radio are capable of delivering.**

In the end, the best station is not always the one with the most power—but the one that wastes the least.