IP TELEPHONY REQUIREMENTS AND DISCLAIMERS

There are many factors to consider in ensuring Quality of Service (QoS) on an IP enabled telephone system outside of the phone switch. All factors combined add to voice quality, including echo, chop, and dropped calls.

- Network Assessment: Required for any installation using more than 5% of installed telecommunications devices/service for IP telephony/trunking or critical applications.
- Data patch panels, cabling, and jacks: Must be tested and approved for AT LEAST 100 MB bandwidth. Gigabit speeds may be required in some large VoIP configurations.
- Data switches and routers: QoS enabled protocols included to prioritize voice traffic on ALL data infrastructure hardware. Documented proof that all switches and routers have QoS mechanisms included and are ***enabled*.**
    - Actual bandwidth needed will be calculated at 150 kbps per maximum call paths. This bandwidth should be reserved and dedicated to voice traffic.
    - Ensure that all SIP ALG helpers are turned off in routers/firewalls.
- NO HUBS
- External (WAN) calls use a compressed codec (vs. internal LAN calls) and result in lower voice quality.
- For IP trunking to another site, a dedicated circuit is REQUIRED to ensure QoS
    - MPLS
    - Frame
    - PPP
    - ATM
- PoE. Consider whether you require a PoE switch, power injector, or local power transformers.
- IP over Cable/DSL using VPN will give variable results which could include intermittent choppy speech and dropped calls. No guarantees are made for call quality over DSL.

A lack of ANY one of these components will degrade the entire IP experience and compromise voice quality. I understand that "high speed" Internet connections, including DSL, satellite, or even non-dedicated partial or Full T-1 circuits DO NOT ensure acceptable voice quality across a WAN (due to the inherent lack of QoS on these "best effort" services). I also am aware of how IP phones react differently to e911 issues than Digital phones. Do not dial 911 from any of the remote IP phones if they reside at a separate physical address from the main Phone system/telco lines unless you have ensured proper E911 compliance with a dedicated DID for that phone which provides the proper location information.

- ___I understand that all of these factors must be addressed and will comply completely to ensure QoS for voice traffic.
- ___I understand that I have chosen to overlook/cannot comply with one or more of the above QoS components and accept "best effort" voice quality and do not hold FCCS responsible for unacceptable results.

***Please also note: Changing of Service Providers, public, internal private IP addresses (whether Static or DHCP) may affect the ability to make or receive phone calls. Please consult with FCCS before making any Service Provider changes or internal IT/network IP address changes.