

VoIP Network Assessment Report

Prepared on:

2009-06-11 14:33

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Executive Summary

A VoIP assessment has been completed for your network. Using advanced network analysis techniques, the voice quality (MOS) on each of the targets has been measured and predictive best and worst case voice quality have been determined.

In addition to predicting voice quality, the assessment testing has identified any network performance issues that exist that may affect voice quality and other performance critical demands on the network such as backups and video.

The **voice trunk** paths have been tested with a varying number of concurrent calls up to the specified value (**10**). **67%** of the **voice trunks** tested are fully ready for voice at the anticipated load, while **33%** are marginally ready.

Testing to the **handsets** has found that **all** of the network paths support satisfactory or good voice quality under the current conditions.



Testing Overview

Assessment Test Started: 2009-03-16 20:40:25
 Assessment Test Completed: 2009-03-16 21:38:00
 Voice Assessment Name: VOIP Assesment
 Number of Concurrent Calls for Voice Trunks: 10

Paths Tested by Type



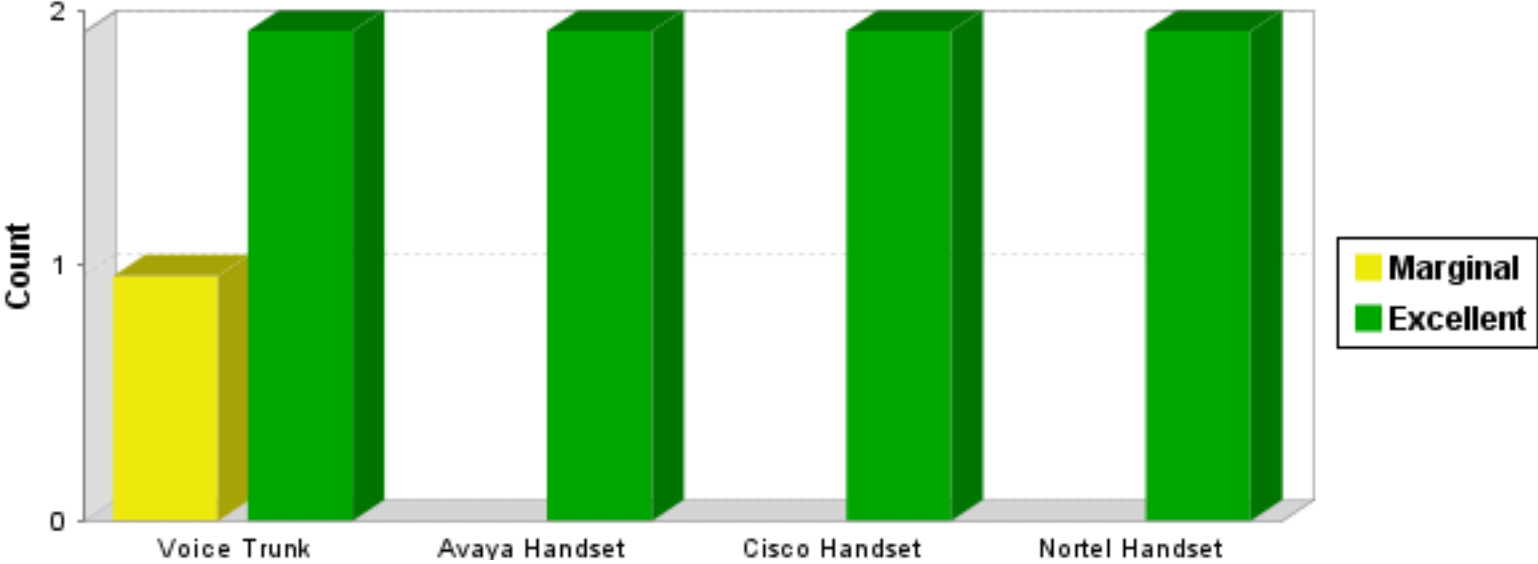
| | | |
|----------------|----------|---------------|
| Avaya Handset | 2 | 22.2% |
| Cisco Handset | 2 | 22.2% |
| Nortel Handset | 2 | 22.2% |
| Voice Trunk | 3 | 33.3% |
| Total: | 9 | 100.0% |

The following ranges have been used, based on ITU G. 107.

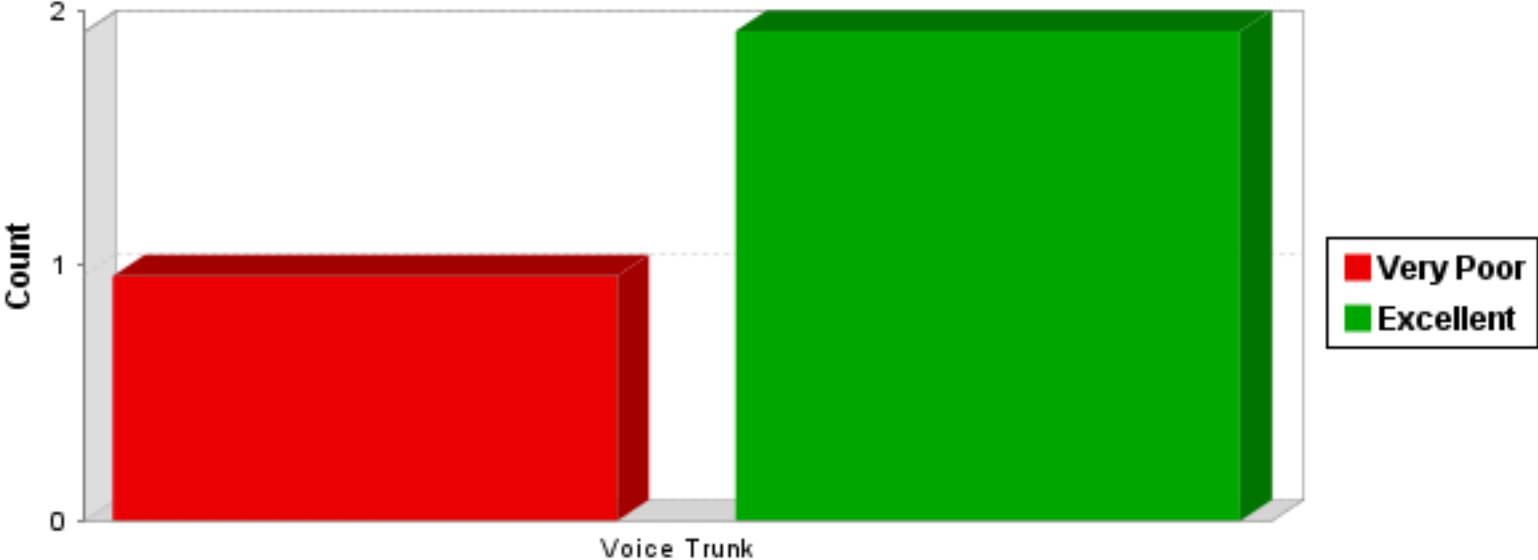
| MOS | Quality | Meaning | Color |
|------------|------------|-----------------------------------------------|--------|
| Good | 4.0 - 5.0 | Most or all users satisfied or very satisfied | Green |
| Acceptable | 3.6 - 3.99 | Some users satisfied | Yellow |
| Poor | 1.0 - 3.59 | Many or all users dissatisfied | Red |

Readiness Summary

The following chart summarizes the Voice readiness for the Voice paths tested.



The following chart summarizes the Data readiness for all paths tested.

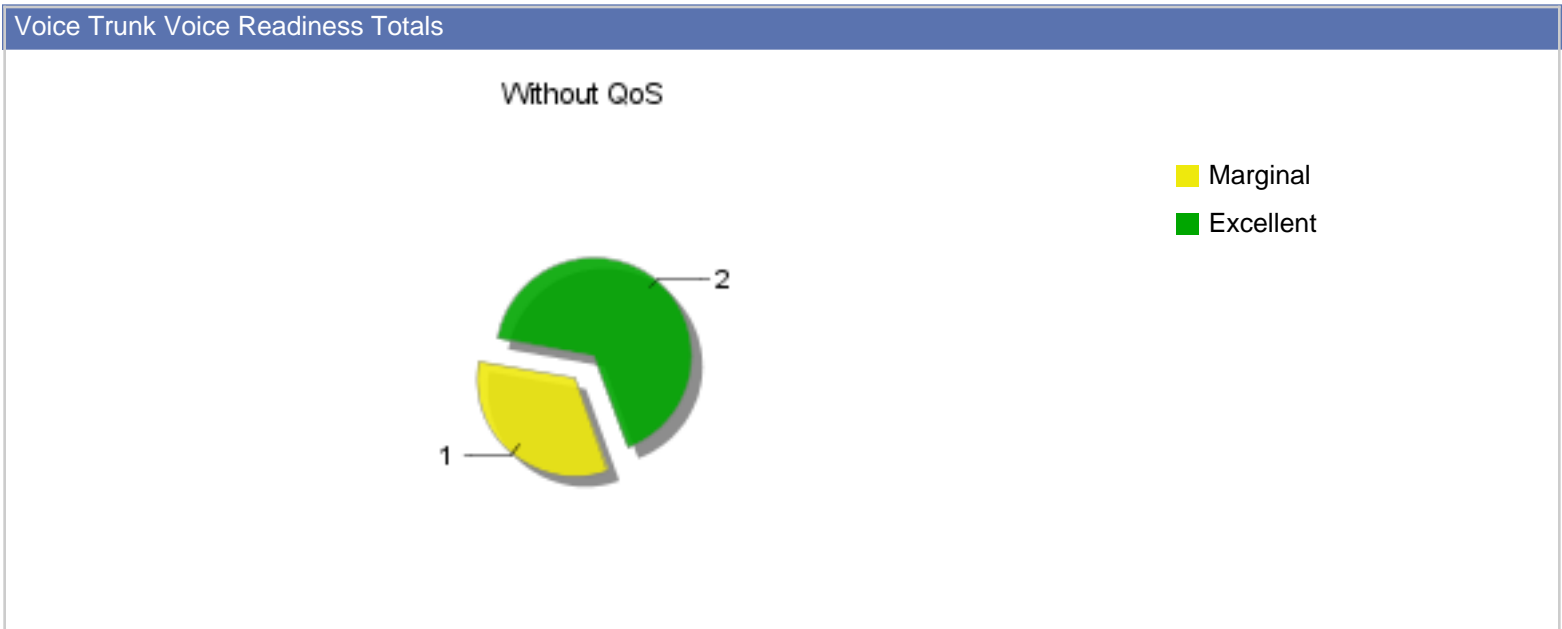


Voice Trunk Testing Results

The following summarizes details of the Voice Trunk testing parameters.

Codec: G.711 with a maximum MOS value of 4.4 at approximately 64 kbps
 QoS: Not Tested
 Concurrent Calls: 10

The following chart shows the Voice readiness for the Voice Trunks tested.



The following paths have been tested for voice readiness and quality. Click on the Path address to drill down to detailed test results.

cisco-ucmgr (Cisco Call Manager)

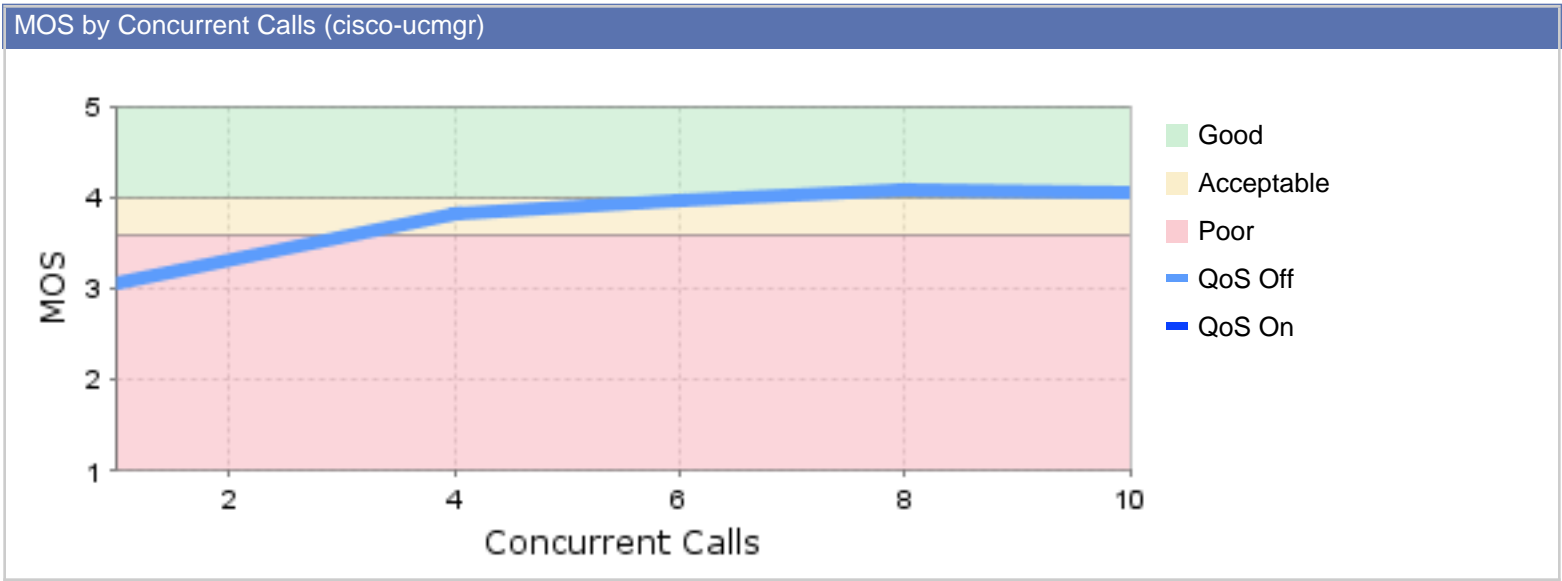
Testing of the network path from 212429-WEB2 (207.97.192.167) to cisco-ucmgr has revealed the following:

| Path | QoS | Readiness | | MOS | | | Measurements | | | | |
|---------------------------------------------------|-----|-----------|------|------|----------|-------|--------------|--------|------------------|----------------------------|--------|
| | | Voice | Data | Best | Measured | Worst | BW Mb 2-way | Loss % | Prop. Delay (ms) | Jitter (Avg/Max, 1 way ms) | Util % |
| cisco-ucmgr Cisco Call Manager | Off | ➔ | ⬇ | 4.0 | 4.0 | 3.5 | 133 | 0 | 17.3 | 17.2 / 91.0 | 94.4 |

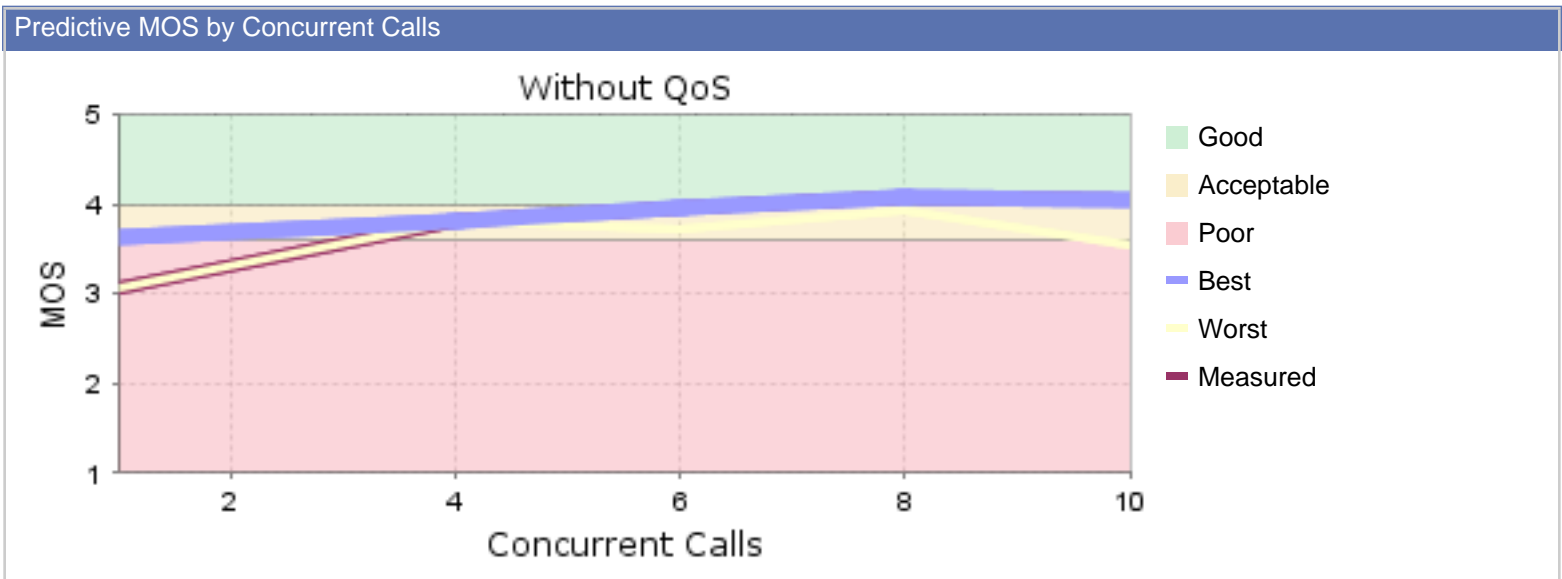
The recommendations for this Voice Trunk are as follows:

- Limit the number of concurrent calls for this path to 10 call(s).
- Address the network problems detected for improved voice quality and data performance.

The following chart illustrates the effect of the MOS as the number of concurrent calls is increased on this path.



Predictions for the best, worst and expected MOS for this path are illustrated in the charts below.



ms-ocs2k7 (Microsoft OCS2k7)

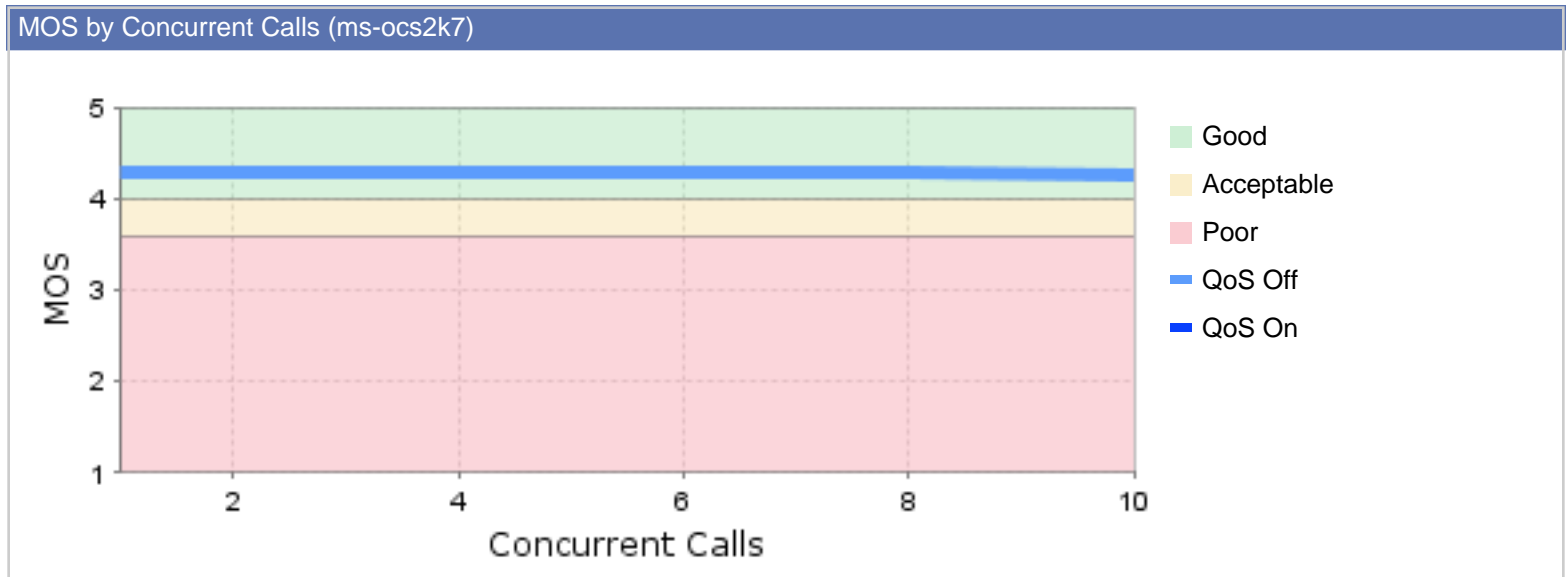
Testing of the network path from Dallas-DC (174.143.4.166) to ms-ocs2k7 has revealed the following:

| Path | QoS | Readiness | | MOS | | | Measurements | | | | |
|-----------------------------------------------|-----|-----------|------|------|----------|-------|--------------|--------|------------------|----------------------------|--------|
| | | Voice | Data | Best | Measured | Worst | BW Mb 2-way | Loss % | Prop. Delay (ms) | Jitter (Avg/Max, 1 way ms) | Util % |
| ms-ocs2k7 Microsoft OCS2k7 | Off | ↑ | ↑ | 4.3 | 4.3 | 4.3 | 193 | < 1 | 16.6 | 0.17 / 0.69 | 10.7 |

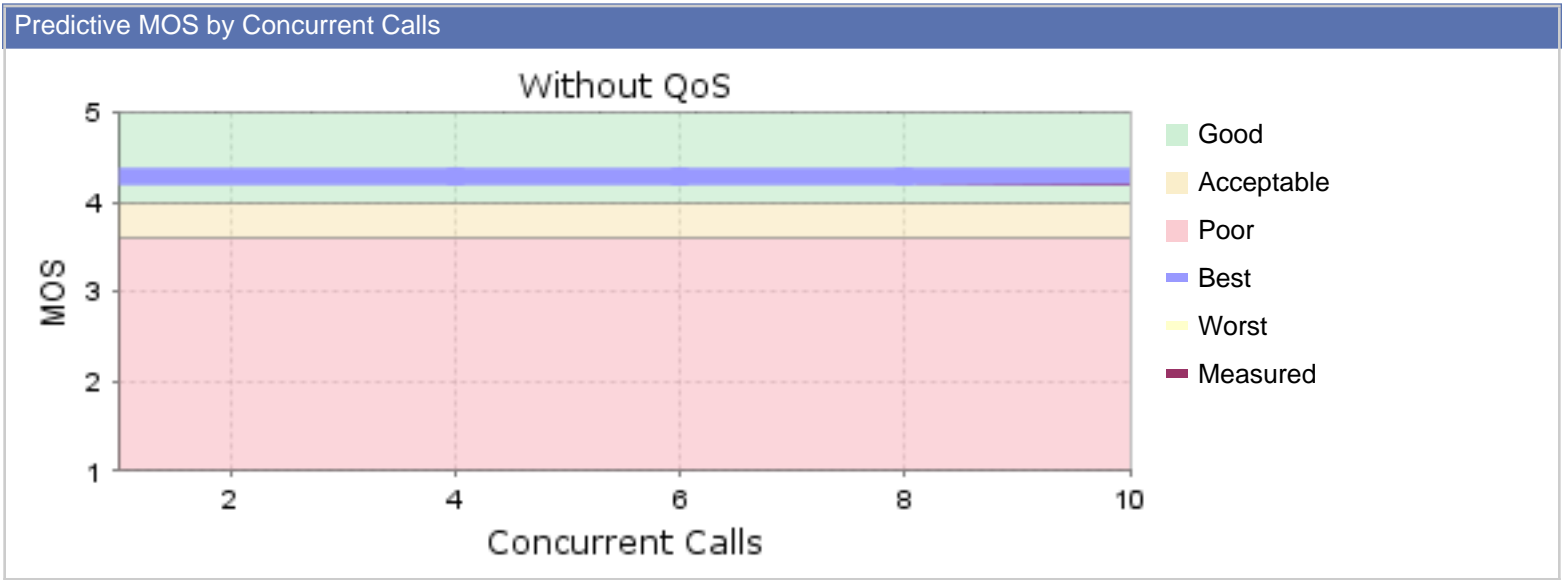
The recommendations for this Voice Trunk are as follows:

- This path supports at least 10 concurrent call(s).

The following chart illustrates the effect of the MOS as the number of concurrent calls is increased on this path.



Predictions for the best, worst and expected MOS for this path are illustrated in the charts below.



voice-cs1k (Nortel CS1k)

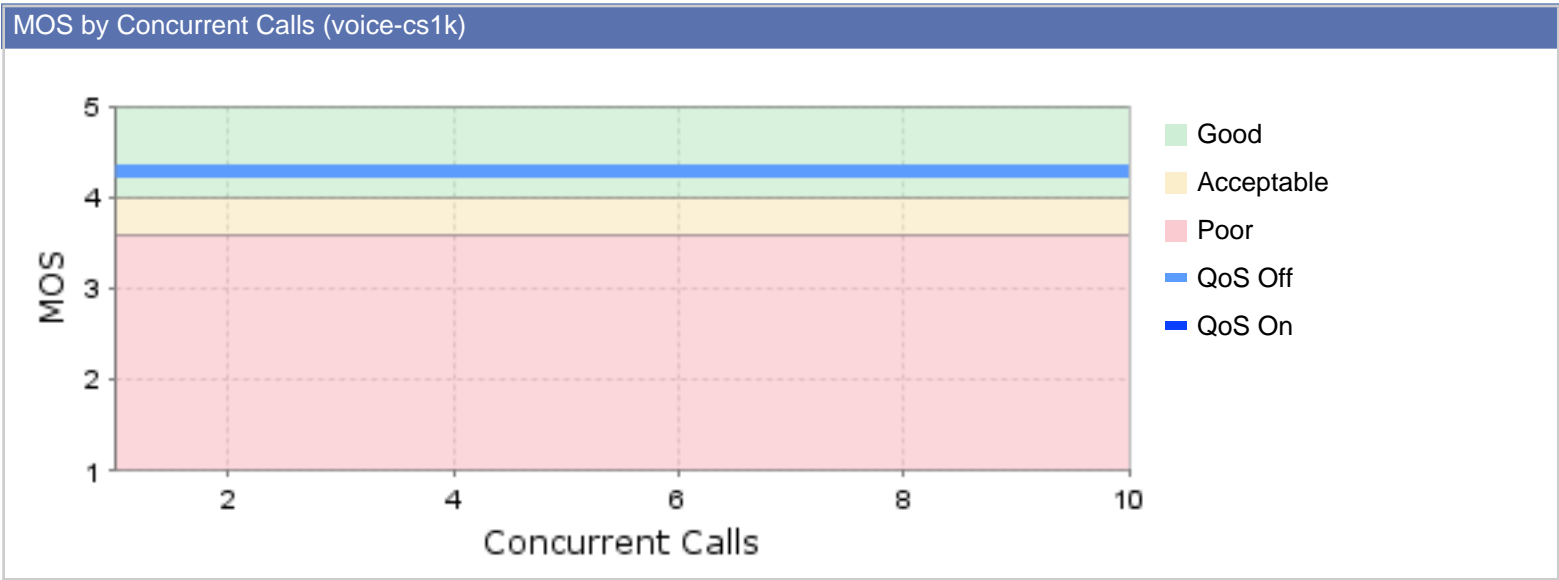
Testing of the network path from Dallas-DC (174.143.4.166) to voice-cs1k has revealed the following:

| Path | QoS | Readiness | | MOS | | | Measurements | | | | |
|-------------------------------------------|-----|-----------|------|------|----------|-------|--------------|--------|------------------|----------------------------|--------|
| | | Voice | Data | Best | Measured | Worst | BW Mb 2-way | Loss % | Prop. Delay (ms) | Jitter (Avg/Max, 1 way ms) | Util % |
| voice-cs1k Nortel CS1k | Off | ↑ | ↑ | 4.3 | 4.3 | 4.3 | 193 | 0 | 16.6 | 0.16 / 1.11 | 6.95 |

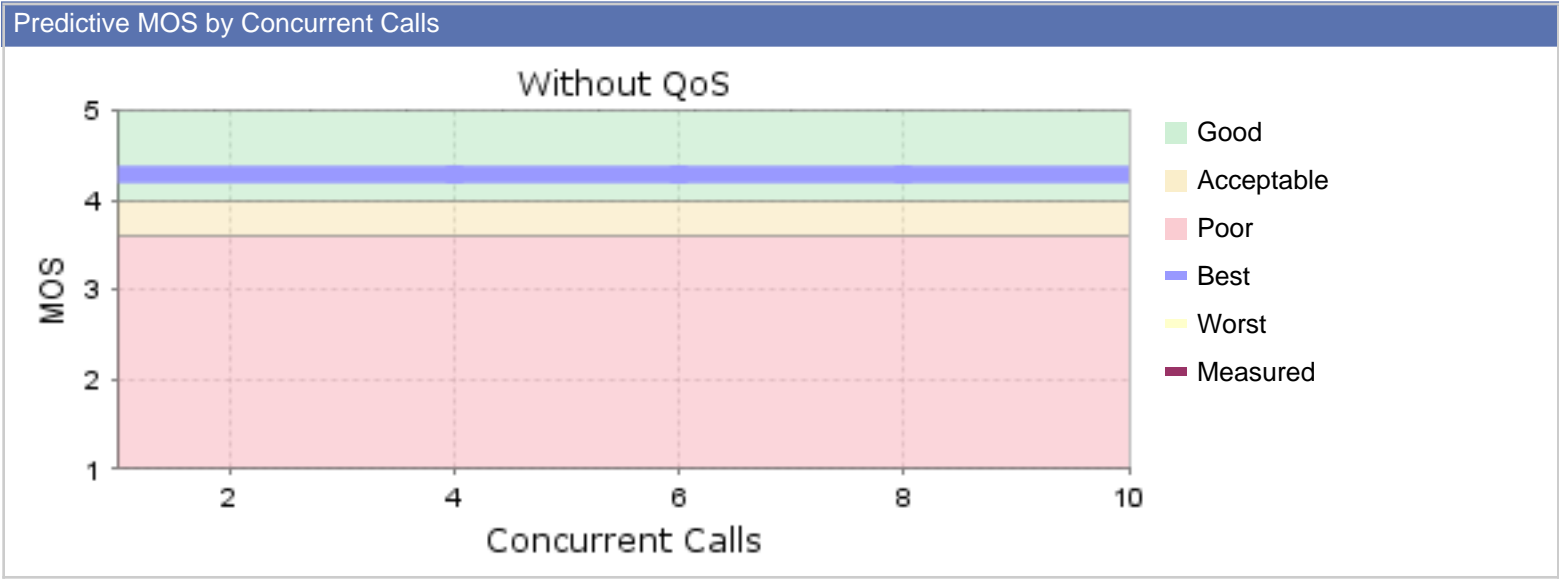
The recommendations for this Voice Trunk are as follows:

- This path supports at least 10 concurrent call(s).

The following chart illustrates the effect of the MOS as the number of concurrent calls is increased on this path.



Predictions for the best, worst and expected MOS for this path are illustrated in the charts below.

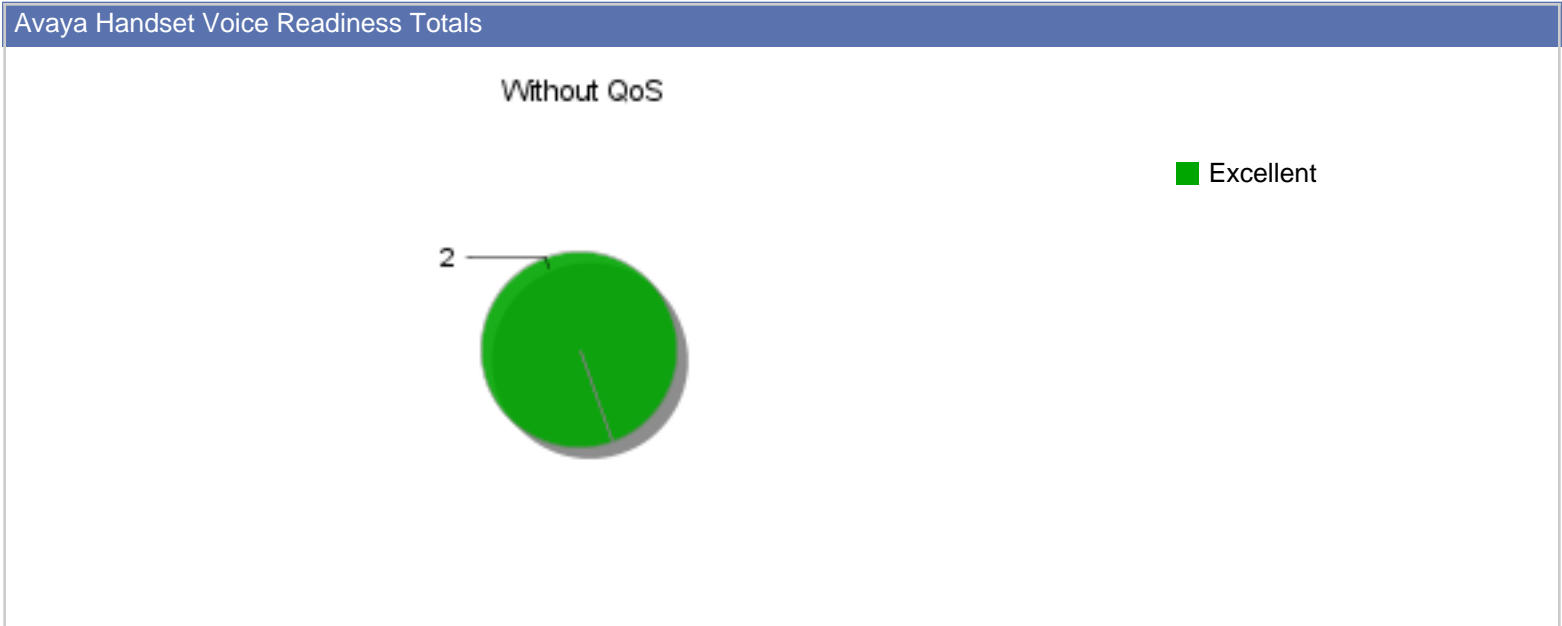


Avaya Handset Testing Results

The following summarizes details of the Avaya Handset testing parameters.

Codec: G.711 with a maximum MOS value of 4.4 at approximately 64 kbps
 QoS: Not Tested

The following chart shows the Voice readiness for the Avaya Handsets tested.



The following paths have been tested for voice readiness and quality. Click on the Path address to drill down to detailed test results.

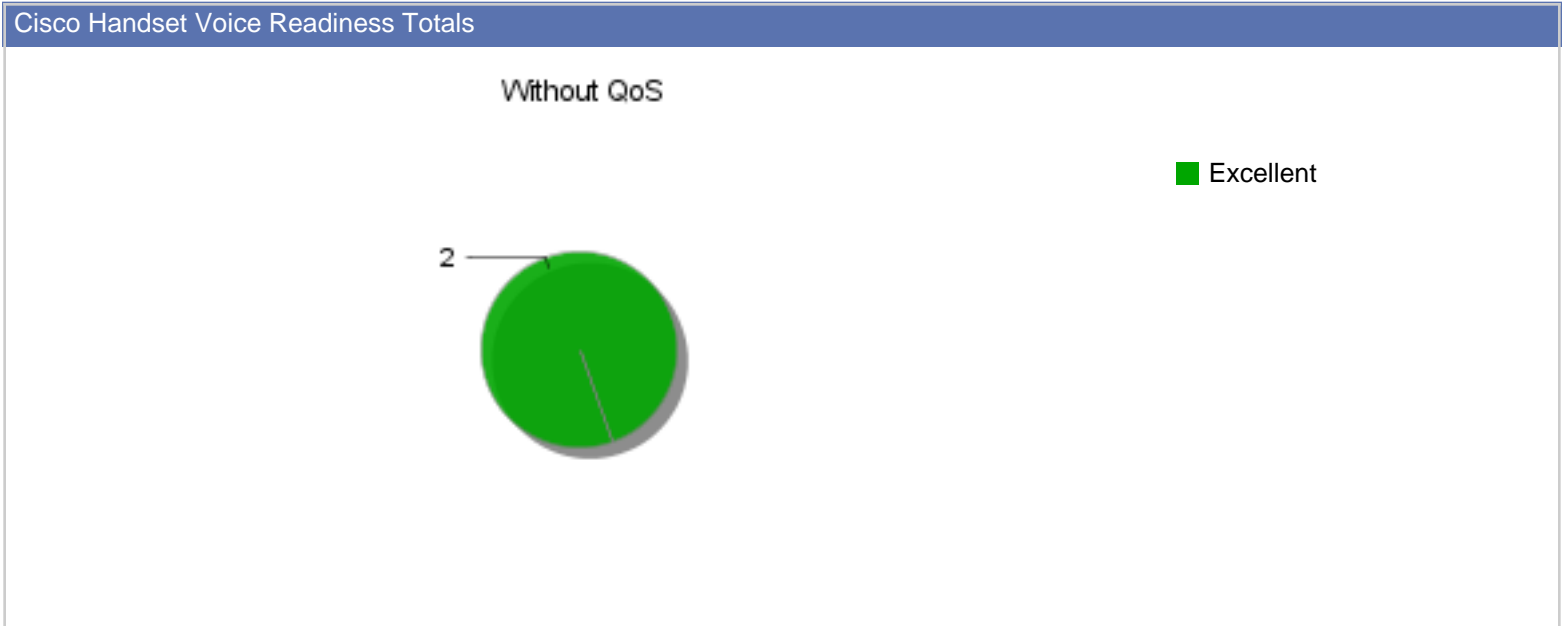
| Path | QoS | Readiness | MOS | | | Measurements | | | | |
|---------------------------------------------------|-----|-----------|------|----------|-------|--------------|--------|------------------|----------------------------|--------|
| | | | Best | Measured | Worst | BW Mb 2-way | Loss % | Prop. Delay (ms) | Jitter (Avg/Max, 1 way ms) | Util % |
| hs-5600-301 Avaya handset 5600 | Off | ↑ | 4.3 | 4.3 | 4.3 | 150 | 0 | 0.07 | 0.06 / 1.48 | 18.7 |
| hs-5600-302 Avaya Handset 5600 | Off | ↑ | 4.3 | 4.3 | 4.3 | 169 | 0 | 0.06 | 0.02 / 0.42 | 17.2 |

Cisco Handset Testing Results

The following summarizes details of the Cisco Handset testing parameters.

Codec: G.711 with a maximum MOS value of 4.4 at approximately 64 kbps
 QoS: Not Tested

The following chart shows the Voice readiness for the Cisco Handsets tested.



The following paths have been tested for voice readiness and quality. Click on the Path address to drill down to detailed test results.

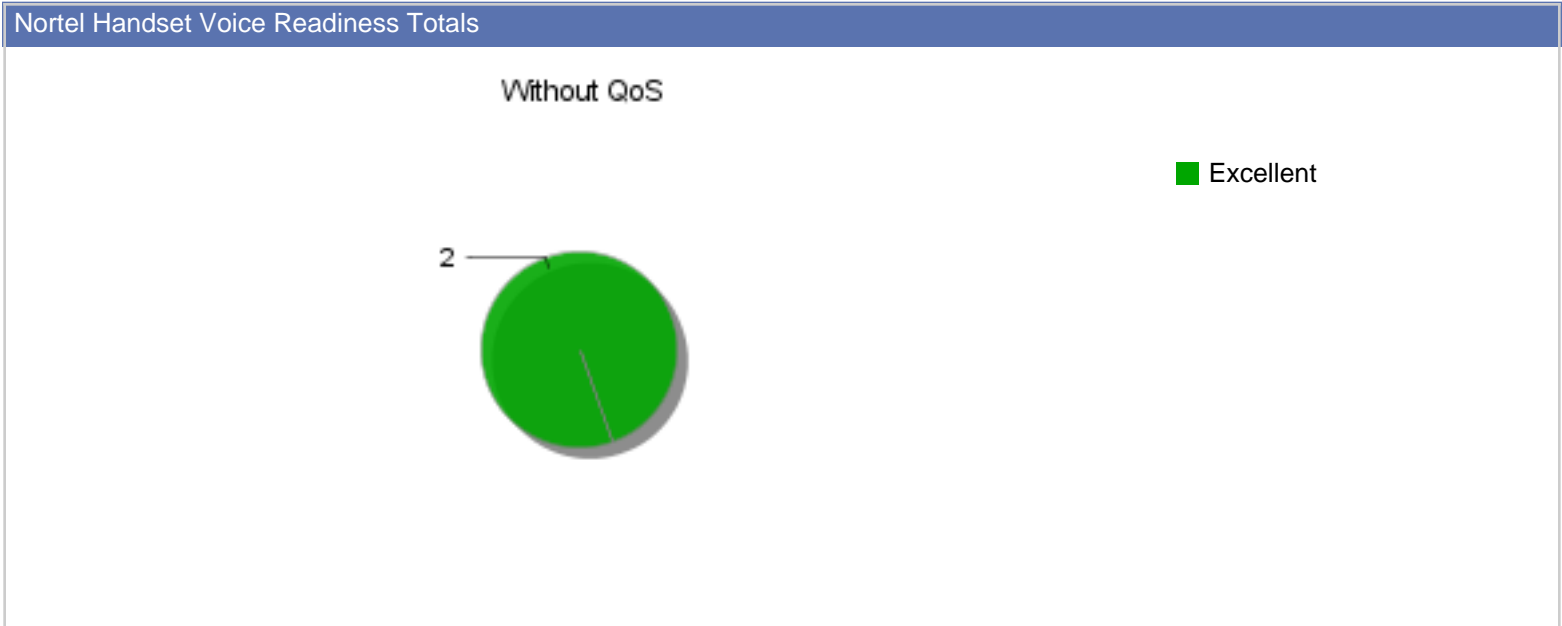
| Path | QoS | Readiness | MOS | | | Measurements | | | | |
|---------------------------------------------------|-----|-----------|------|----------|-------|--------------|--------|------------------|----------------------------|--------|
| | | | Best | Measured | Worst | BW Mb 2-way | Loss % | Prop. Delay (ms) | Jitter (Avg/Max, 1 way ms) | Util % |
| hs-7960-101 Cisco Handset 7960 | Off | ↑ | 4.3 | 4.3 | 4.3 | 12.1 | 0 | 7.72 | 1.50 / 5.64 | 48.5 |
| hs-7960-102 Cisco Handset 7960 | Off | ↑ | 4.3 | 4.3 | 4.3 | 12.7 | 0 | 7.82 | 1.43 / 5.47 | 49.9 |

Nortel Handset Testing Results

The following summarizes details of the Nortel Handset testing parameters.

Codec: G.711 with a maximum MOS value of 4.4 at approximately 64 kbps
 QoS: Not Tested

The following chart shows the Voice readiness for the Nortel Handsets tested.



The following paths have been tested for voice readiness and quality. Click on the Path address to drill down to detailed test results.

| Path | QoS | Readiness | MOS | | | Measurements | | | | |
|--------------------------------------------|-----|-----------|------|----------|-------|--------------|--------|------------------|----------------------------|--------|
| | | | Best | Measured | Worst | BW Mb 2-way | Loss % | Prop. Delay (ms) | Jitter (Avg/Max, 1 way ms) | Util % |
| hs-1140-201 Nortel 1140 | Off | ↑ | 4.3 | 4.3 | 4.3 | 28.4 | 0 | 16.8 | 0.41 / 13.6 | 30.8 |
| hs-1140-202 Nortel 1140 | Off | ↑ | 4.3 | 4.3 | 4.3 | 26.4 | 0 | 16.8 | 0.50 / 13.4 | 11.7 |