**IEEE P802.24**

**Vertical Applications Technical Advisory Group**

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| Project | IEEE P802.24 Vertical Applications Technical Advisory Group |
| Title | **Low Latency Communication White Paper** |
| Date Submitted | 15 January, 2019 |
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| Re: | N/A |
| Abstract | This contribution provides a first version of the Table of Contents of the Low Latency Communication White Paper. It will be updated (along with this Abstract) as the content materializes and is included. |
| Purpose | Assist in the development of the Low Latency Communication White Paper |
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# Background and Introduction

General information on low latency communication, background and the drive for it (e.g., linked to “5G”), possibilities that are created (in a general sense), challenges that are encountered, etc.

# Low Latency Communications Applications

Some detail about the possible applications for low latency communications. E.g., Haptic Communication expanding the human senses and interactions that can be conveyed over communication links, expanding machine “senses” and interactions that can be conveyed over communication links, the “Tactile Internet” and Industry 4.0, investment/trading(?), etc. It will be noted that many of the applications also link to high reliability, profoundly affecting the low latency solutions that might be used.

# Performance Requirements for Low Latency Communication

Derived from the discussion on applications in Section 2 and also using other sources such as the ITU definition of URLLC, will list the performance requirements of low latency communication such as:

* End-to-end data transfer latency
* Session establishment latency(?)
* Perhaps radio access latency (noting that in some fora, this distinction is made)
* Reliability, noting that many applications also have this requirement
* Data capacity
* Synchronization among flows (e.g., with audio/video for haptic+AV applications…?)
* Etc.

# Key Technologies/Solutions Supporting Low Latency Communication

Summarizing those technologies that have to be considered/utilized in order to achieve low latency, often in conjunction with high reliability. E.g.,

* Changes to framing to minimize wait time to receive a frame before processing the frame
* Softwarization to optimize communication path through invoking elements in software at better locations?
* Network sharing to optimize communication path; neutral hosting, etc., etc.
* Multi-connectivity (as a means to still achieve reliability while reducing latency—noting that many low latency applications also require a vast *increase* in reliability compared with what is currently achieved (at least wirelessly))
* New coding approaches to achieve latency and high reliability
* New protocols
* Others (e.g., security implications and solutions)?
* Etc., etc. (to be added to a refined)

# IEEE 802 Standards Supporting Low Latency Communications

List of IEEE 802 standards/amendments, etc., that can already assist or realize in low latency (some in tandem with high reliability) communication, and reasoning as to how. Also listing target standards for enhancements towards low latency communication, and reasoning as to why.

## 5.1 Current Standards

## 5.2 Target Standards for Enhancements

# Adaptions and Recommendations for IEEE 802 Standards to Enhance Low Latency Communications Support

Suggestions on which technologies (mentioned in Section 4 above) must be introduced, and very high-level suggestions on how it might be done. Both to enhance current standards supporting low latency, as well as the target ones.

## 6.1 Adaptations and Recommendations for Current Standards

## 6.2 Adaptations and Recommendations for Target Standards

# Conclusion and Future Work/Timeplan

Per usual content in this section. But could also try to project an overall vision/timeplan for implementation of such work—or such content might be extracted to its own Section? Of course, would require careful coordination with the relevant WGs.

# References