Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: Impact of wind on link performance in fixed wireless services
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Abstract: The aim of this contribution is to provide status of studies on link performance of fixed wireless services under windy conditions.

Purpose: Informing TAG THz on impact of heavy wind on performance of fixed wireless links .

Impact of wind on link performance in fixed wireless services

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Outline of this contribution

In fixed wireless systems with millimetre-wave or THz-wave, mechanical vibration would degrade link performance, where strong wind would have impact on wireless links dedicated for outdoor applications.

- APT (Asia Pacific Telecommunity) published a technical report on performance of fixed wireless systems under severe weather conditions.
- The reports includes study on impact of strong wind on E-band fixed wireless links.
- This results would be useful for THz systems as well.

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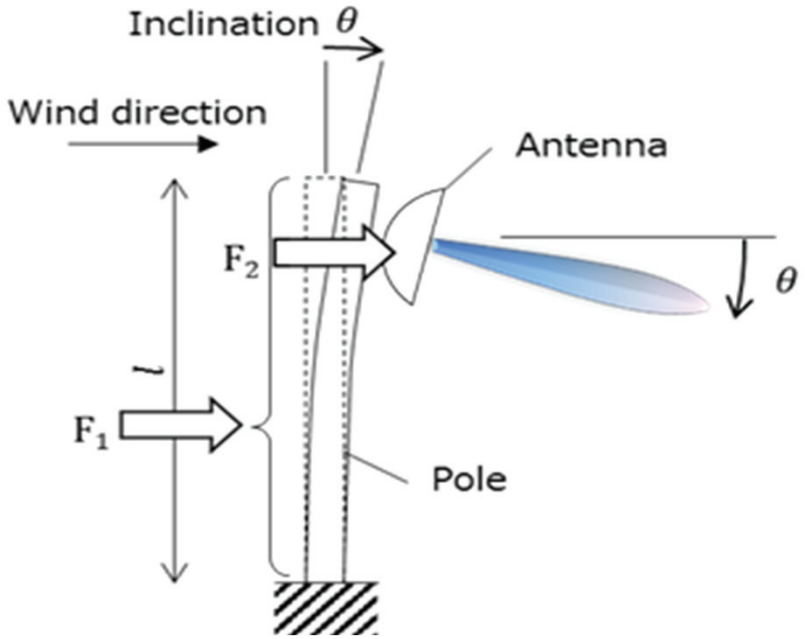
Model of mechanical vibration due to wind



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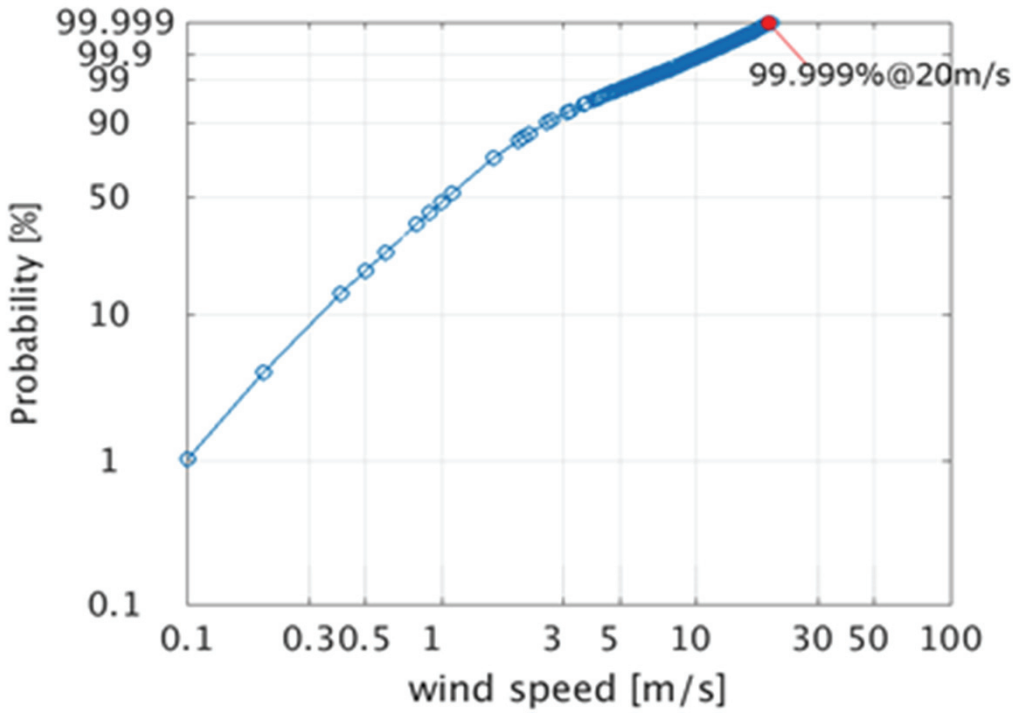
Wind speed distribution



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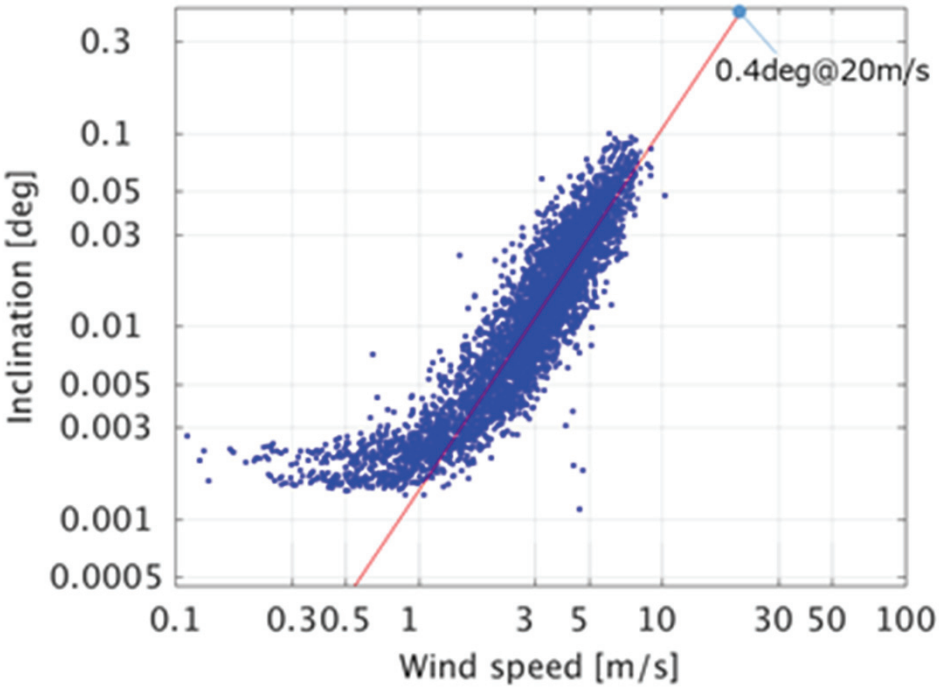
Inclination vs. wind speed



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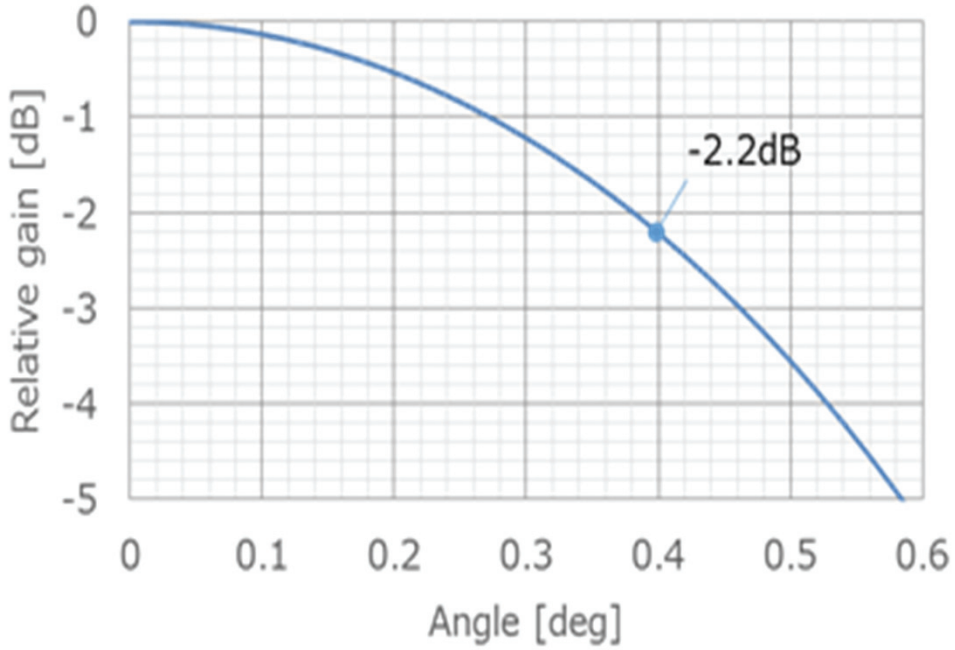
Antenna pattern



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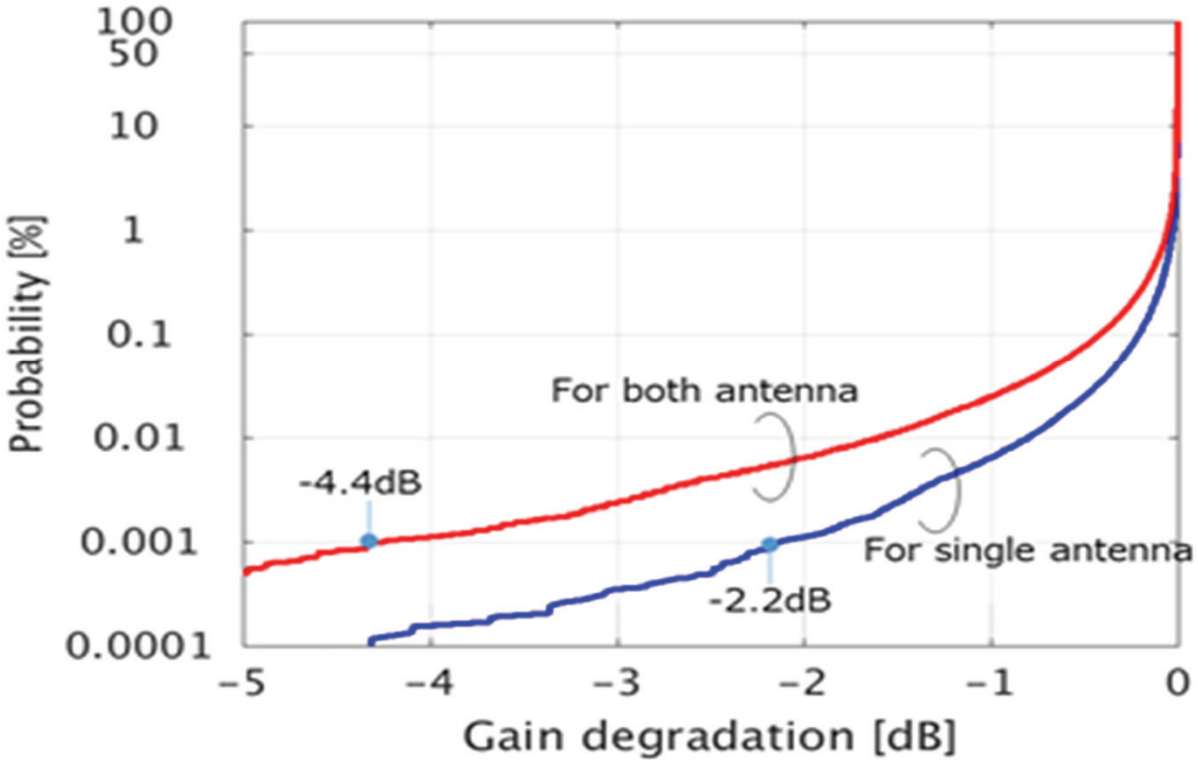
Expected link degradation due to wind



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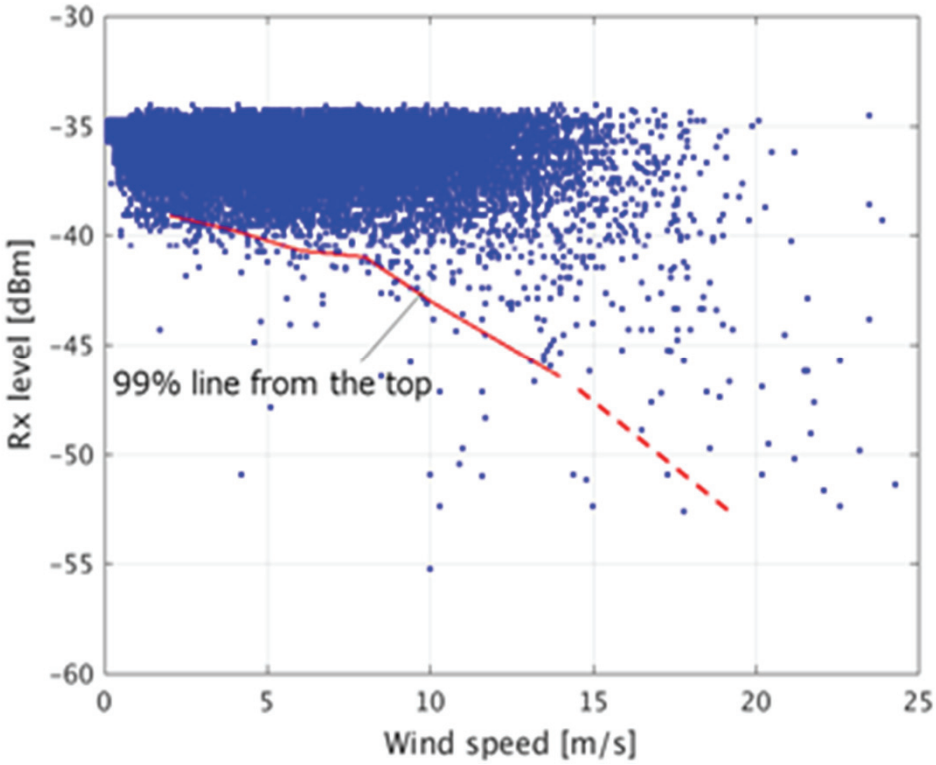
Measured Rx level under windy condition



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Summary and Discussion

- APT Wireless Group (AWG) studies FS link performance under severe weather conditions.
- Wind would have impact on performance of links using high-frequency bands such as millimeter-wave, THz, etc.
- Link degradation due to wind should be taken into account for design of THz fixed wireless systems for outdoor applications.
- Mechanical vibration would be an issue for indoor application as well.
- Narrow angle beamforming would be useful for mitigation of link degradation by strong wind.