

Investigation of the Bragg Scattering of UWB Signal from the Window Blind : (2) Experimental Investigation

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Outline

- Background
- Measurement system and setup
- Specifications of the measurement
- Measurement results
- Comparison between experiment and simulation
- Conclusion

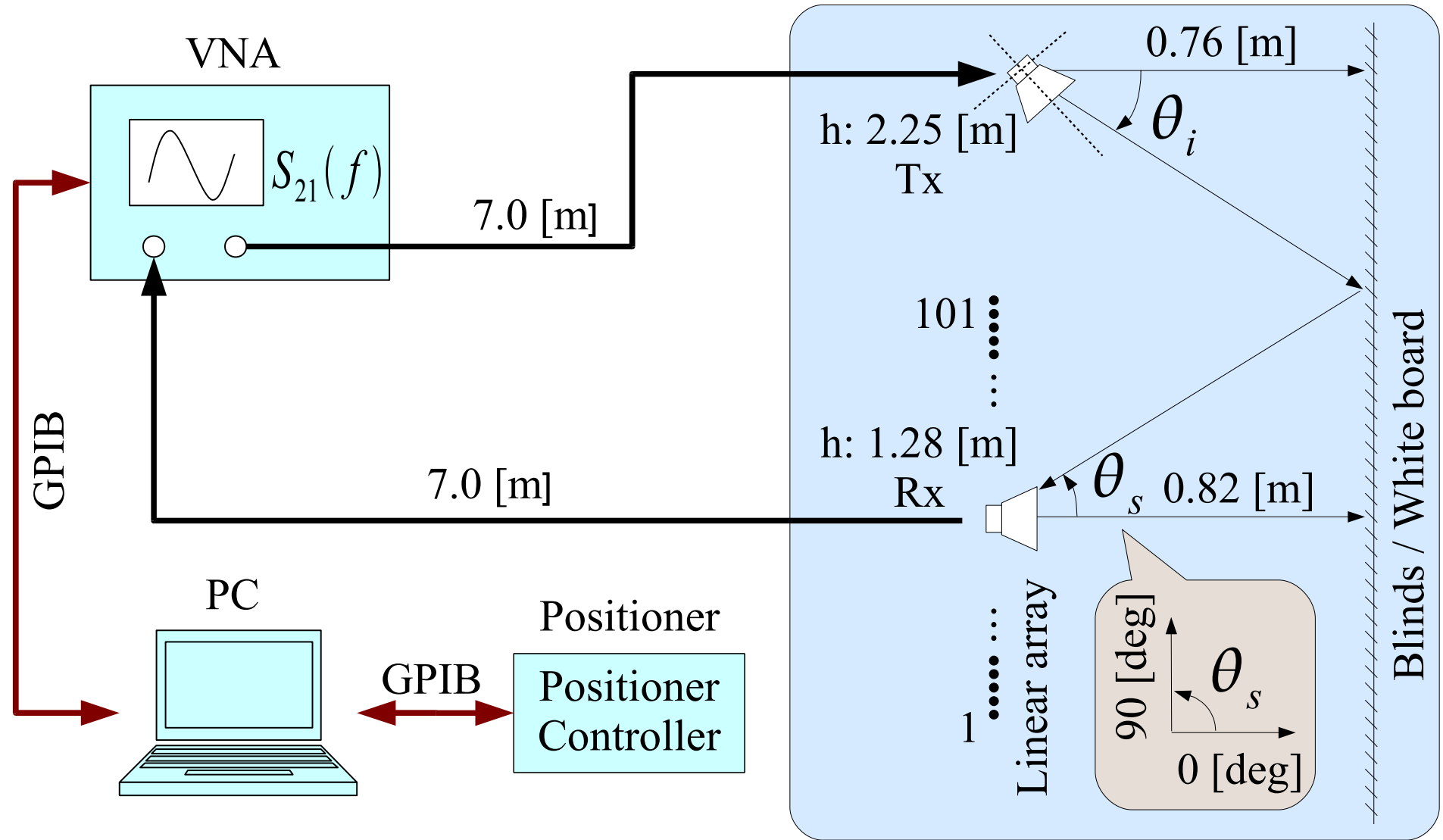


Background

- In indoor and outdoor propagation environments, the non-specular scattering at the walls are often not negligible.
- Bragg scattering may not be negligibly small for the periodic structures such as brick walls, metallic shutters and blinds.
- Its frequency dispersive property may influence the transmission property of the UWB system.



Measurement system



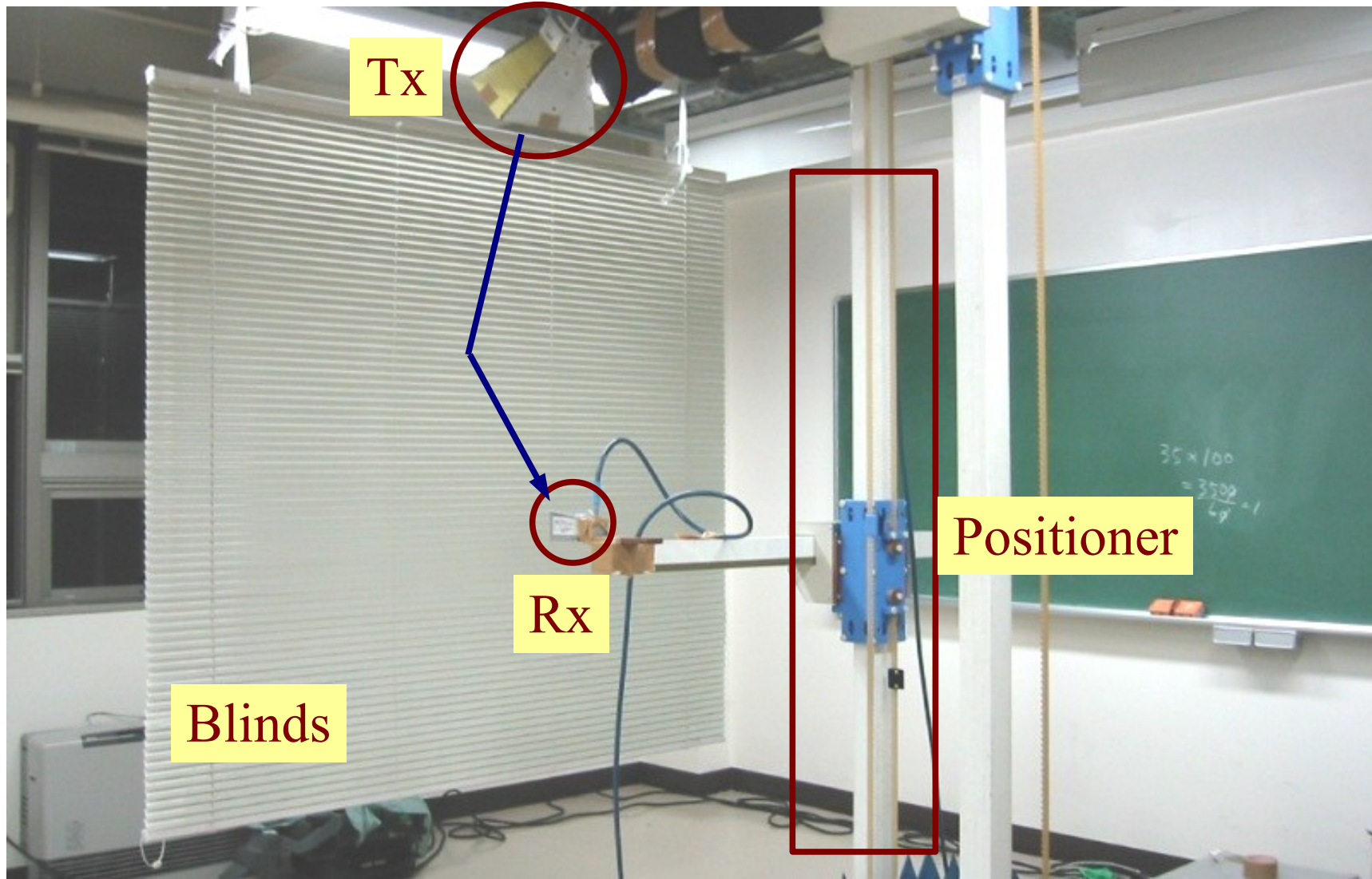
Specifications of the measurement

Bandwidth	3.1 to 10.6 [GHz]
Frequency sweeping points	751
Spatial sampling in the Rx position	101 points in vertical linear array whose element spacing is 1 [cm]
Power spectrum	DOA (θ_s) and frequency
Type of antennas	Double-ridged guide horn
Polarization	Vertical-Vertical
Calibration	Function of VNA
IF bandwidth of VNA	100 [Hz]
SNR at receiver	About 50 [dB]

- Beamforming was used.

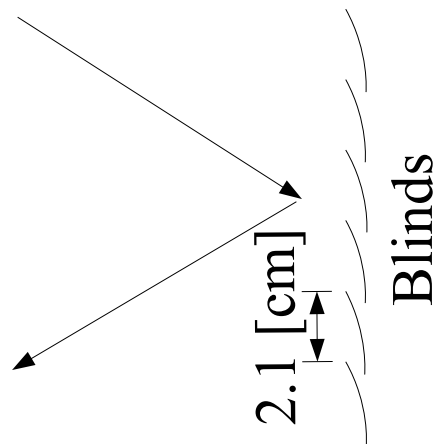


Measurement setup

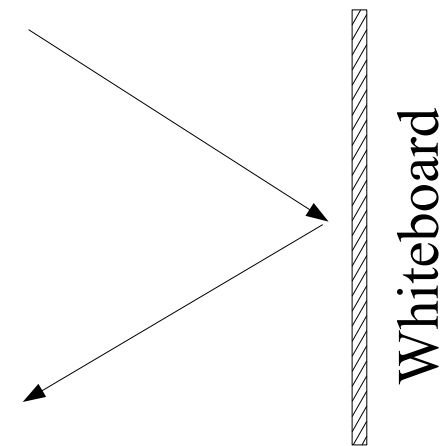


Reflection objects

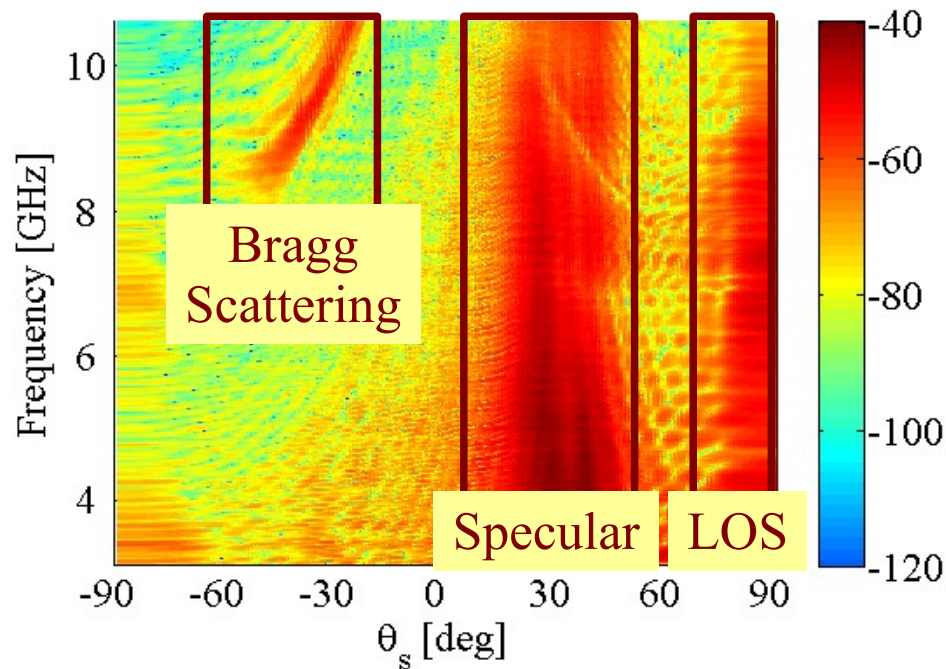
Case A



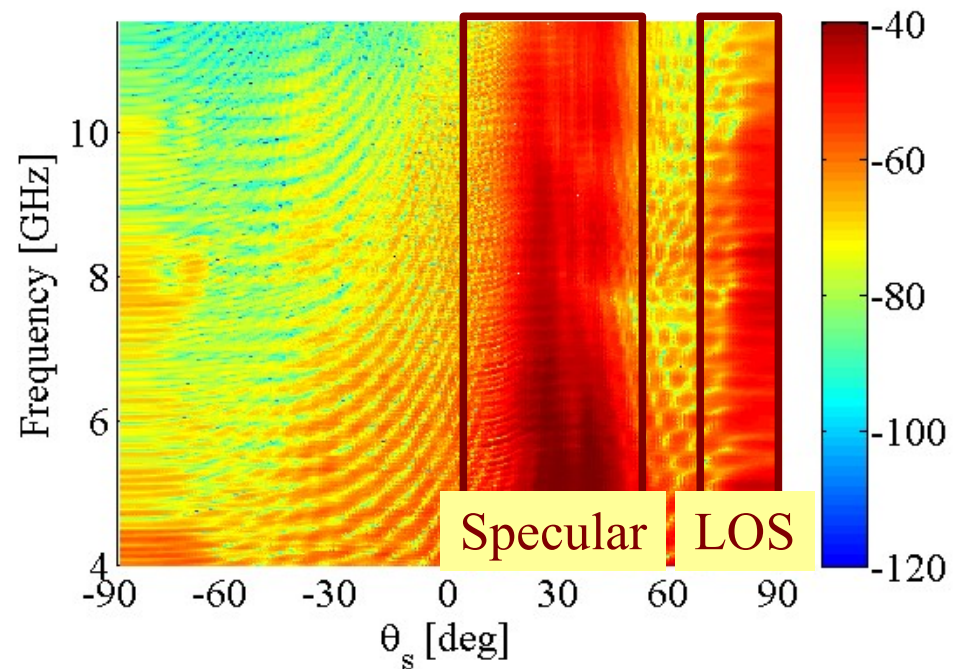
Case B



Power spectrum of the measurement



Case A : Blinds

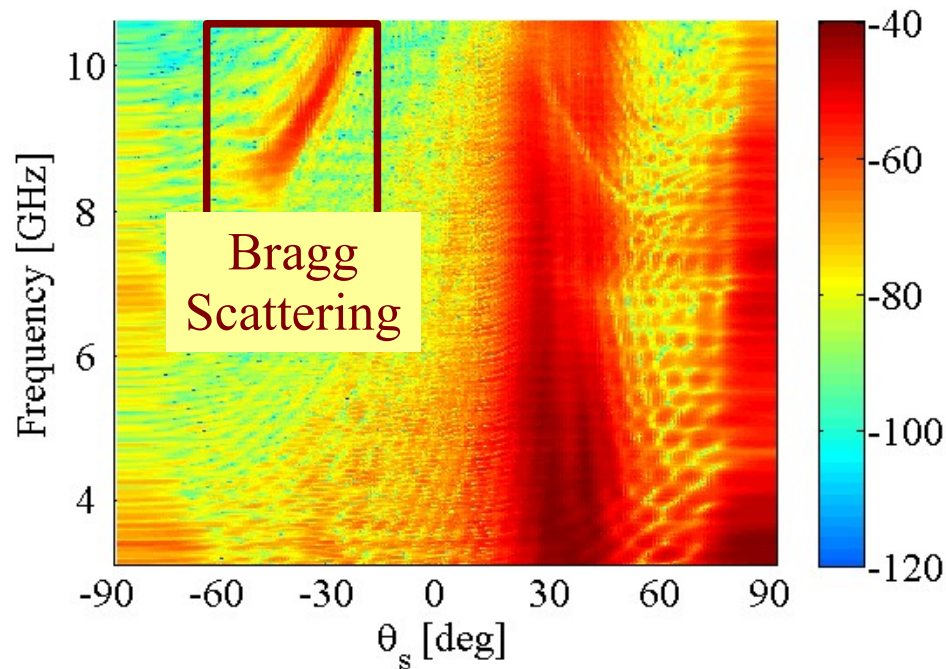


Case B : Whiteboard

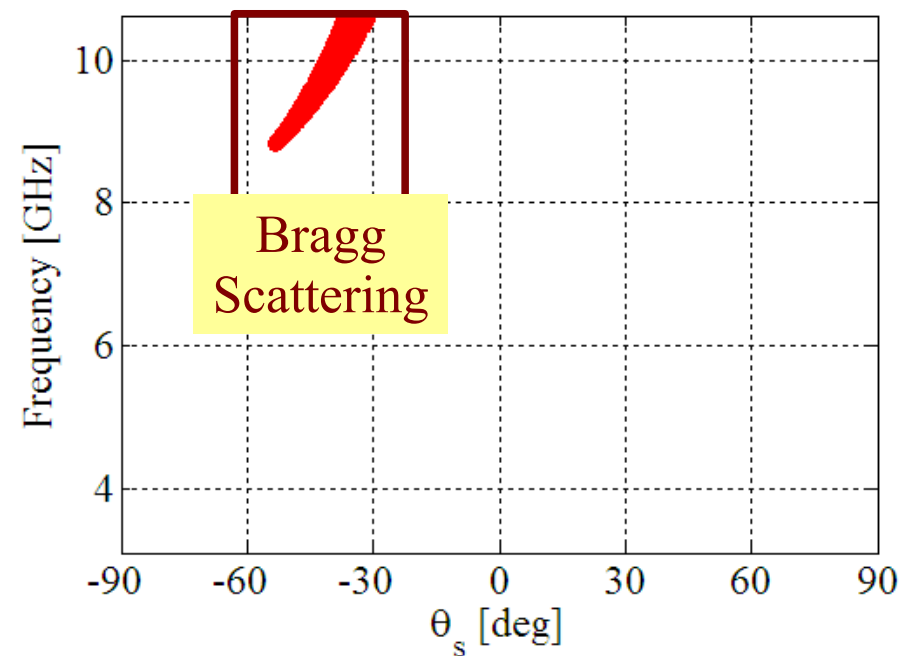
- Bragg scattering in Case A appeared for frequencies greater than 8 [GHz].
- No Bragg scattering appeared in Case B



Comparison between experiment and simulation



Case A : Blinds



Simulation

- The experiment results corresponded with the theoretical value of the simulation.



Conclusion

- UWB indoor measurements were done by using ordinary window blinds acting as periodic rough surfaces.
- Bragg scattering appeared, and its results corresponded with the theoretical value of the simulation.

Future work

Apply Bragg scattering to ray path model of UWB



Thank you for your attention!

