

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

Submission Title: [Observation of Narrowbeam Circular Polarization Measurement]

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Re: []

Abstract: [Update of activities in the channel modeling sub-group and call for participation]

Purpose: [Contribution to the 802.15 TG3c conference call on channel model]

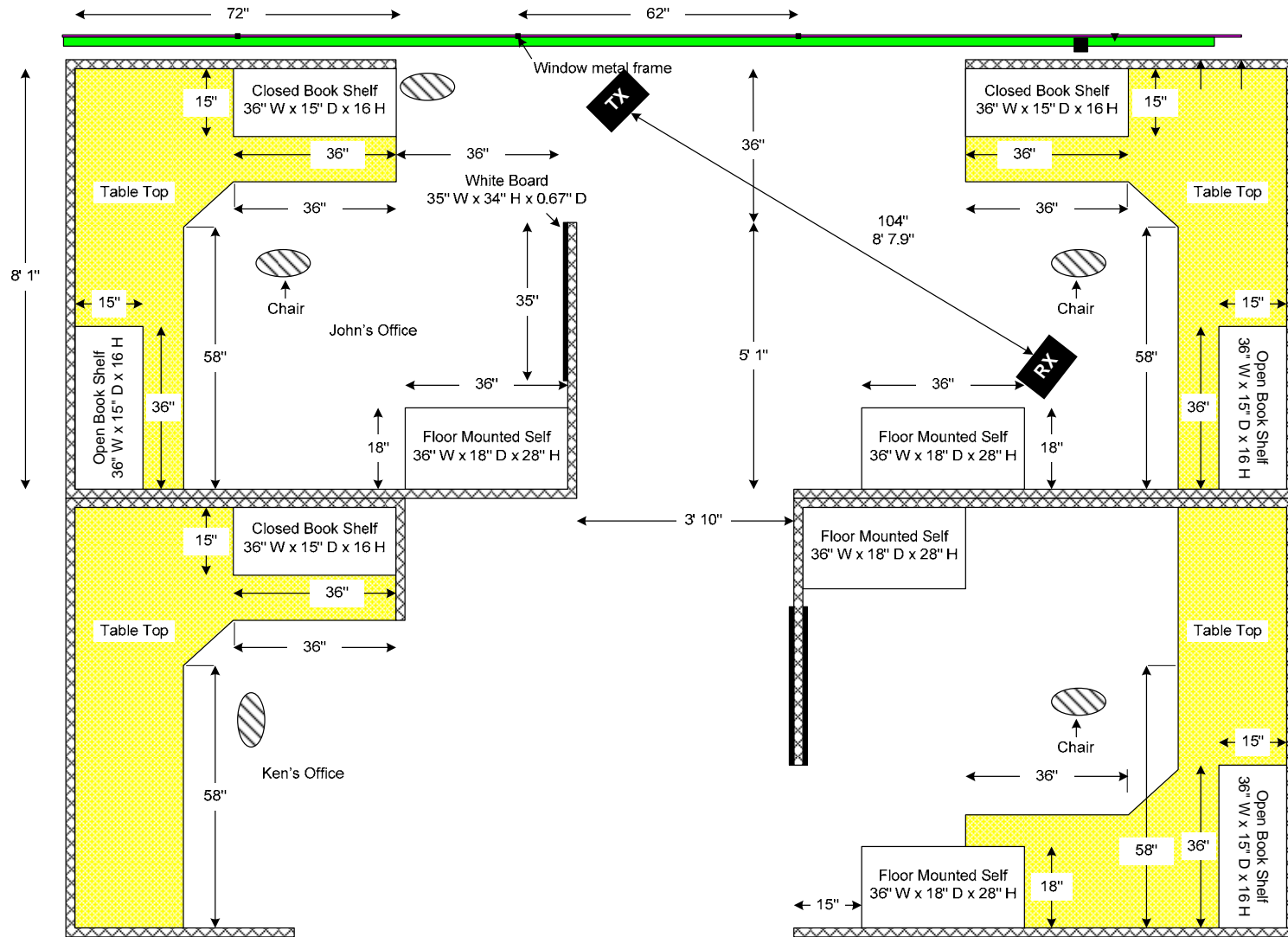
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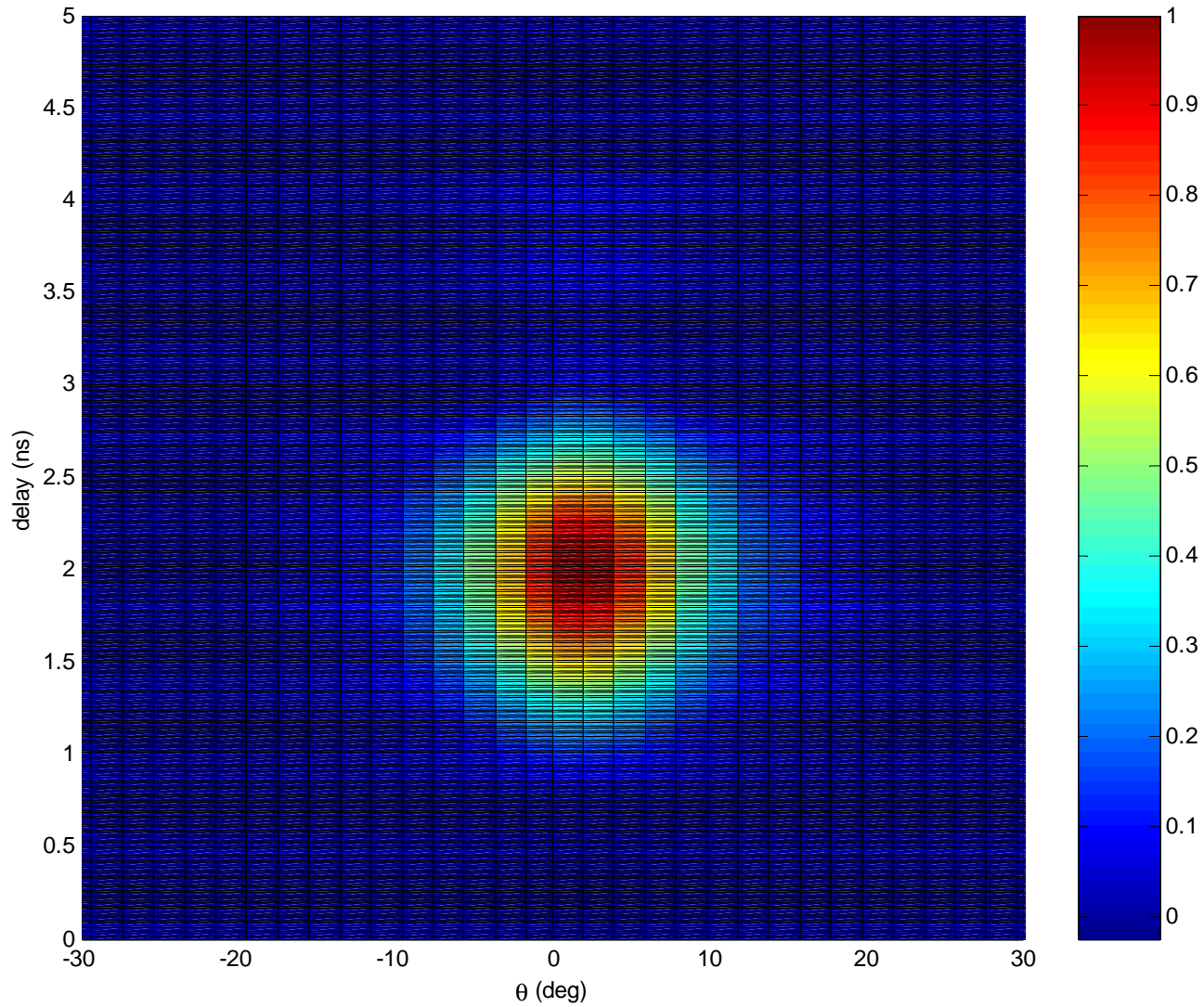
Measurement Information

- Environment: office (corridor and cubicle), conference room, residential
 - The corridor measurements were made in a passage way with office cubicles on either side.
 - The measurement in the office cubicle was made with metal shelves, white board, and office window. Owing to the small size of these cubicles, one measurement could be made per cubicle.
 - The residential measurement was made in US homes. The environment consists of windows, doors, picture frames, wooden furniture, and fire place.
 - The small conference room has metal shelves, white board and office window.
 - The large conference room a large white board and office window.
- Center frequency: ~60 GHz
- Bandwidth: 1 ns pulse
- Contains angular information: Receiver rotated in steps of 1.98°
- TX antenna type: Directional, HPBW of 14°
- RX antenna type: Directional, HPBW of 14°
- Polarization: Circular, right hand

Office Cubicle Layout Measurement #2

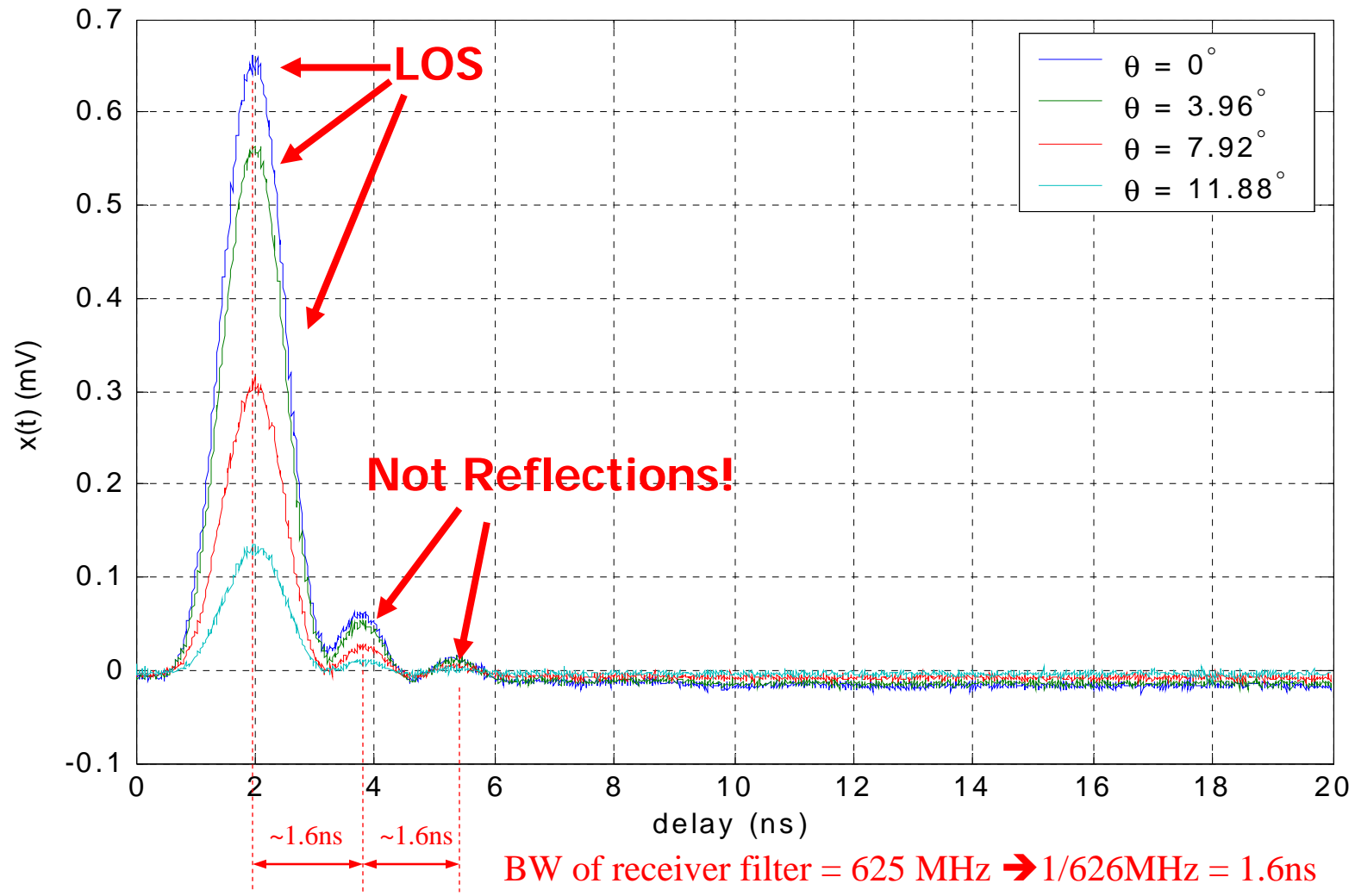


Reflection Plot Measurement #2



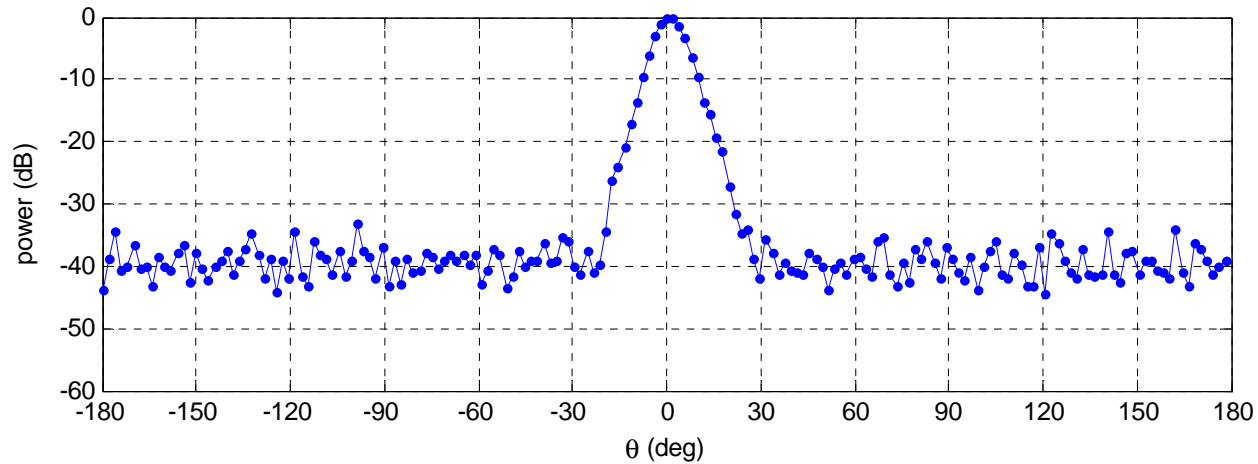
Impulse Responses at Different Angles

Measurement #2

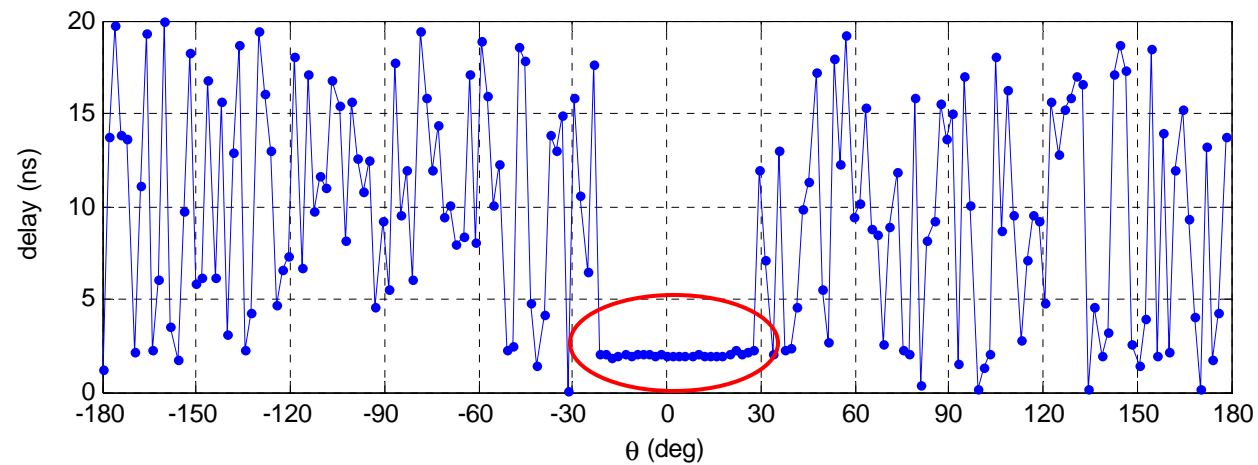


Reflection Plot over 360° Measurement #2

Maximum strength (normalized) of the received signal at each angle:



Corresponding delays:



Conference Room Layout Measurement #5

Measurement A

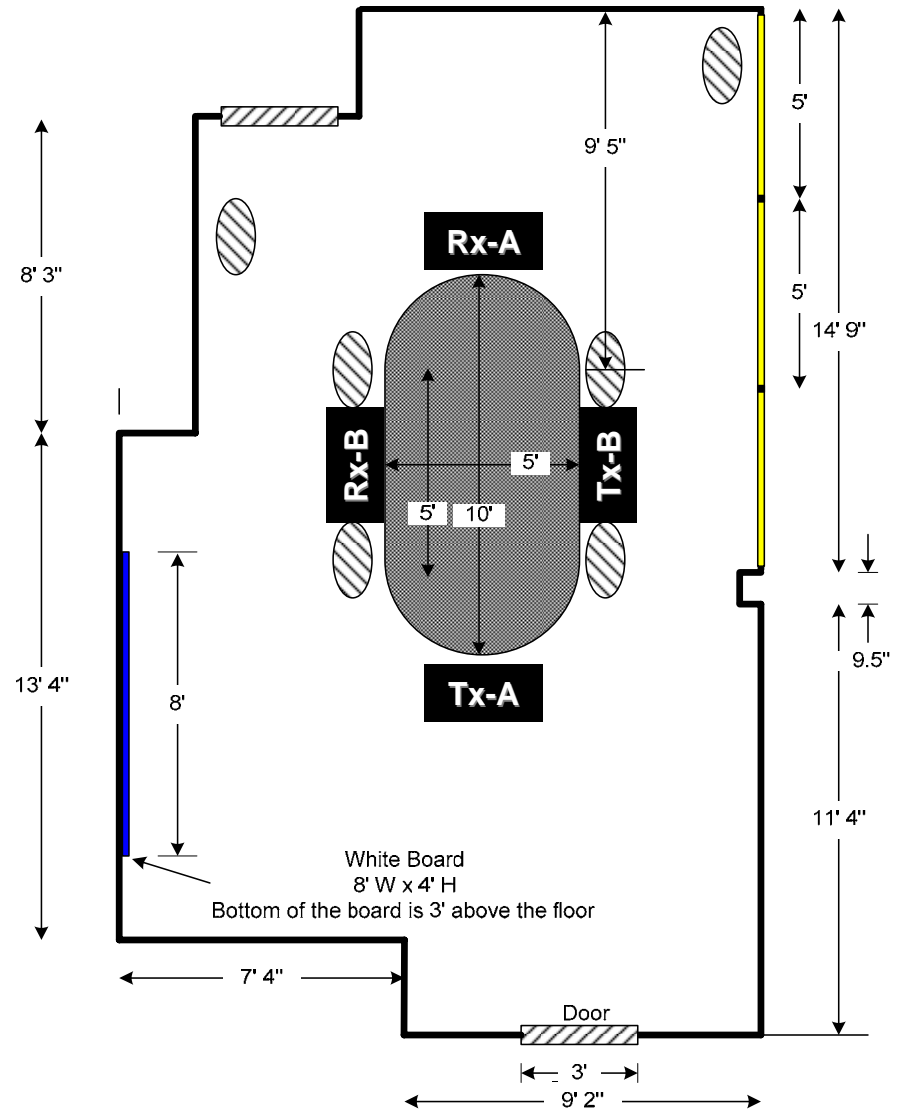
- 141''

Measurement B

- 84''

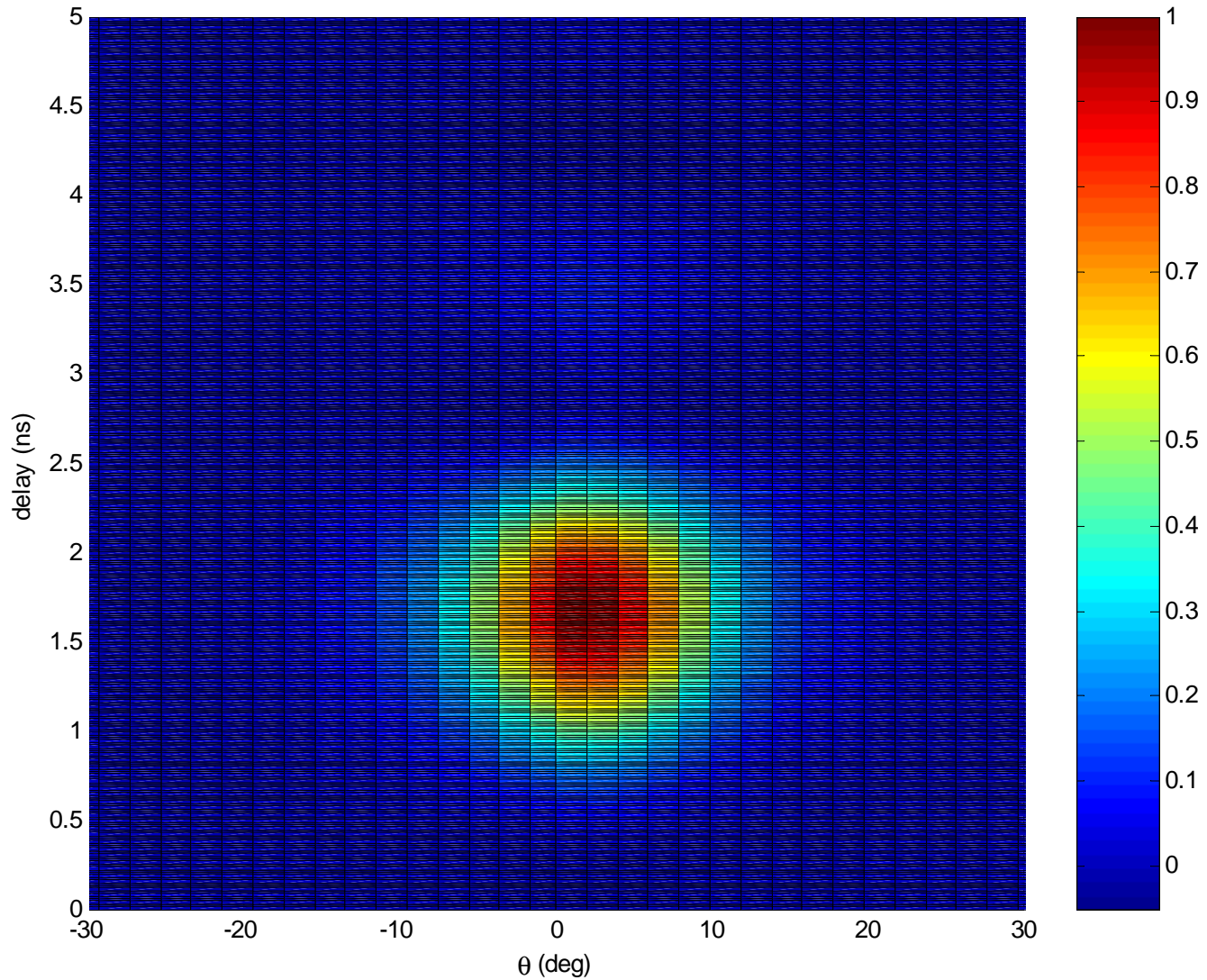
Measurement C

- Rx and Tx in
Measurement B reversed
- 83''



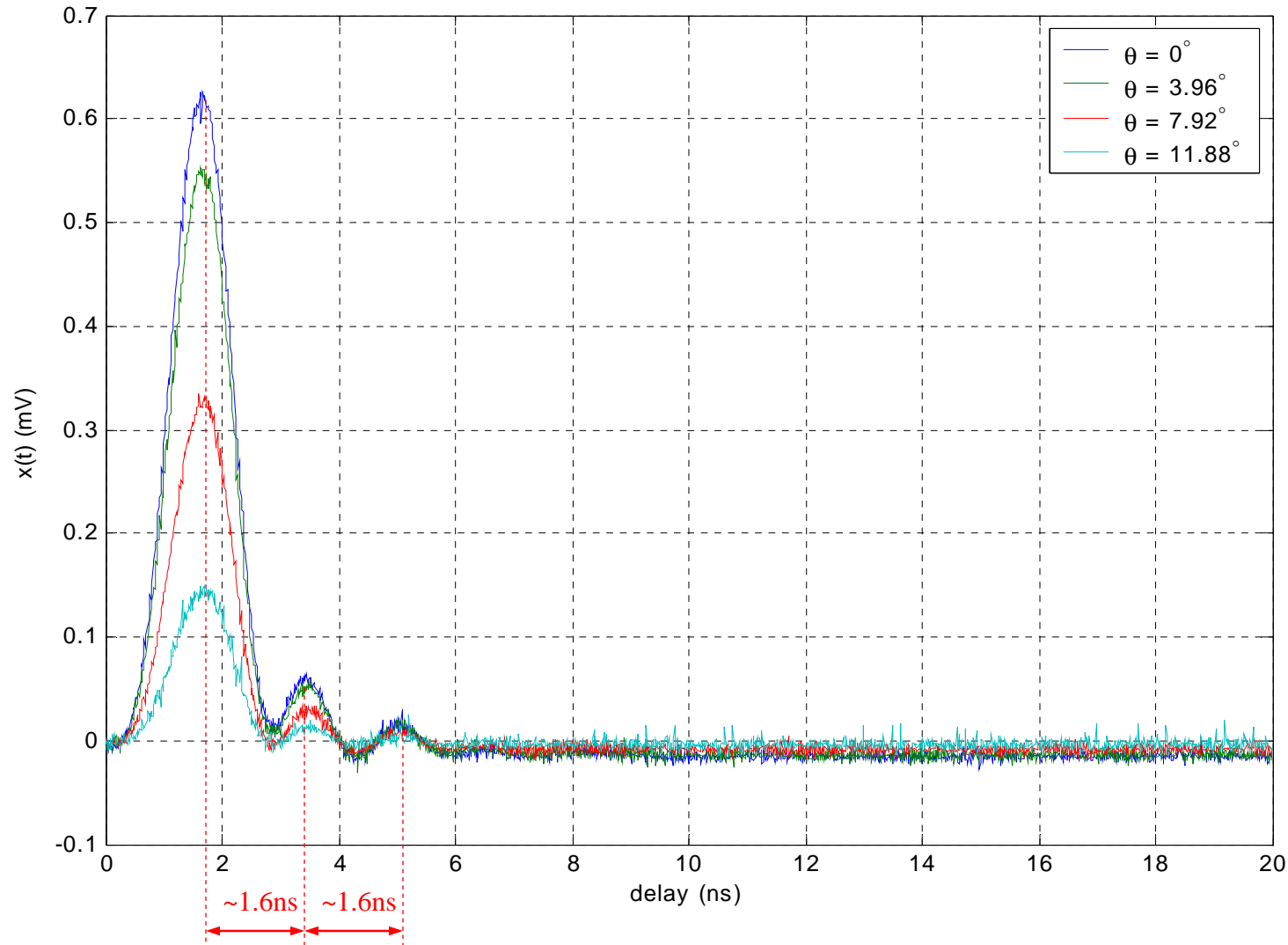
Reflection Plot

Measurement #5a



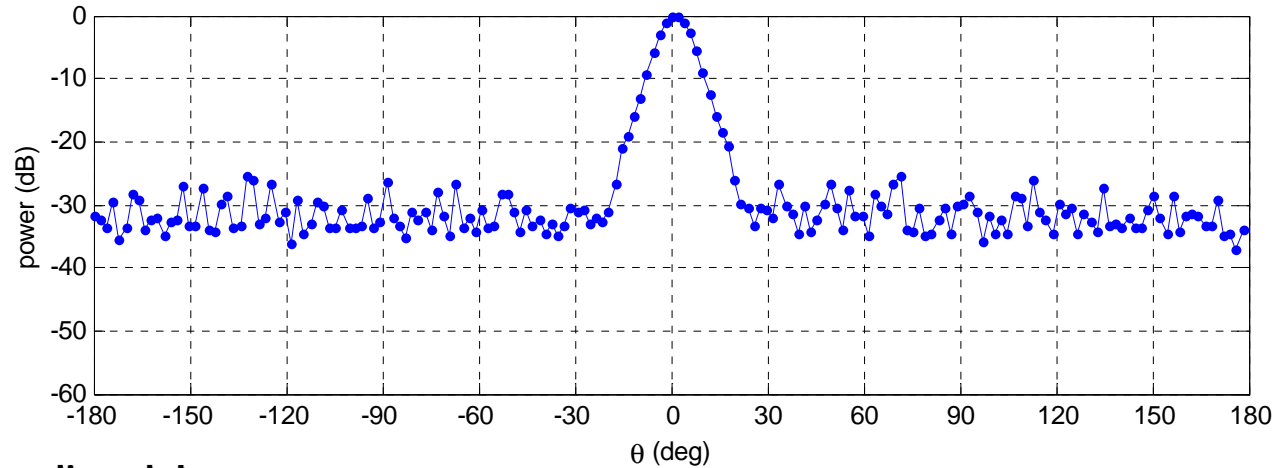
Impulse Responses at Different Angles

Measurement #5a

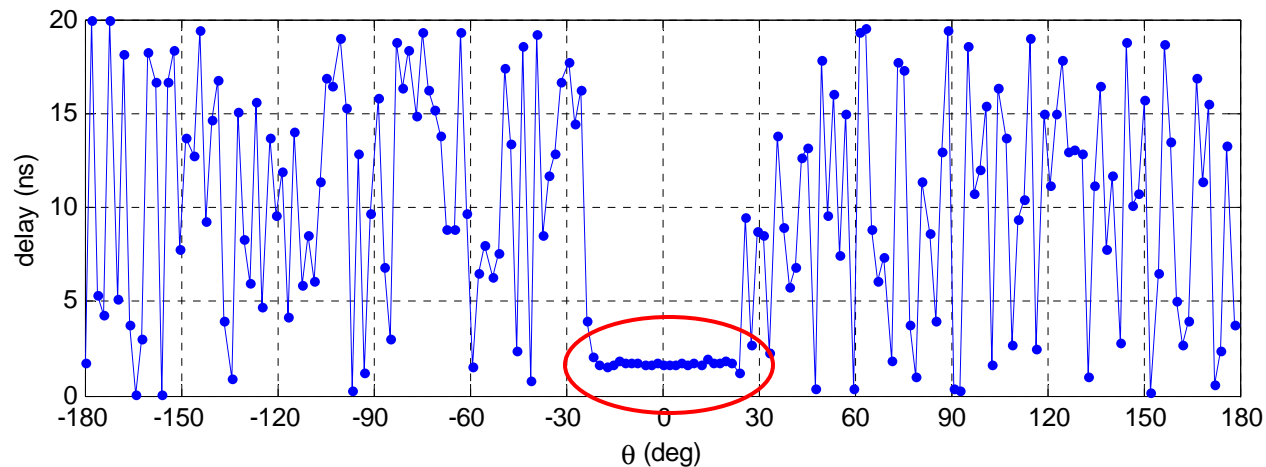


Reflection Plot over 360° Measurement #5a

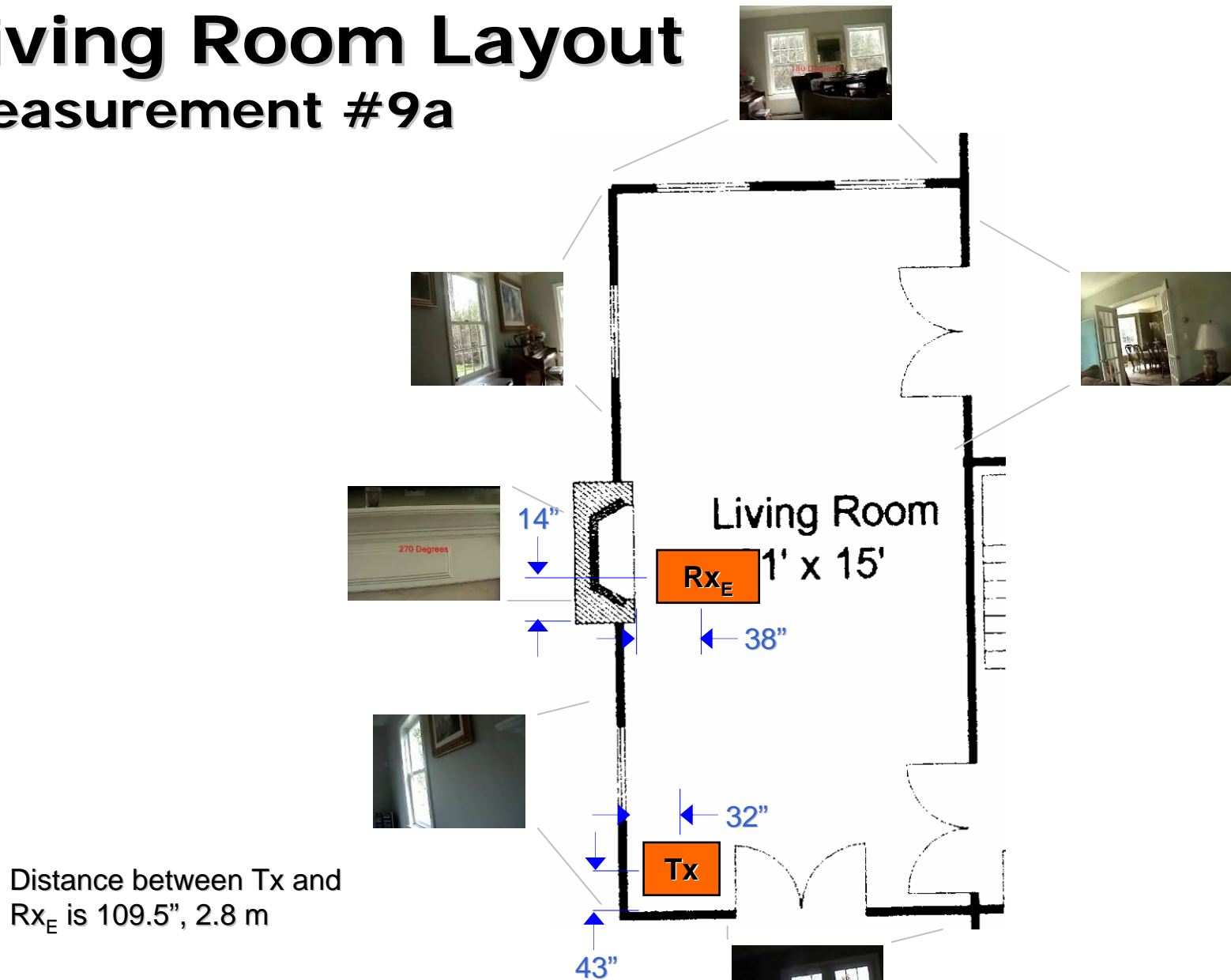
Maximum strength (normalized) of the received signal at each angle:



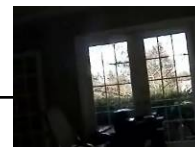
Corresponding delays:



Living Room Layout Measurement #9a

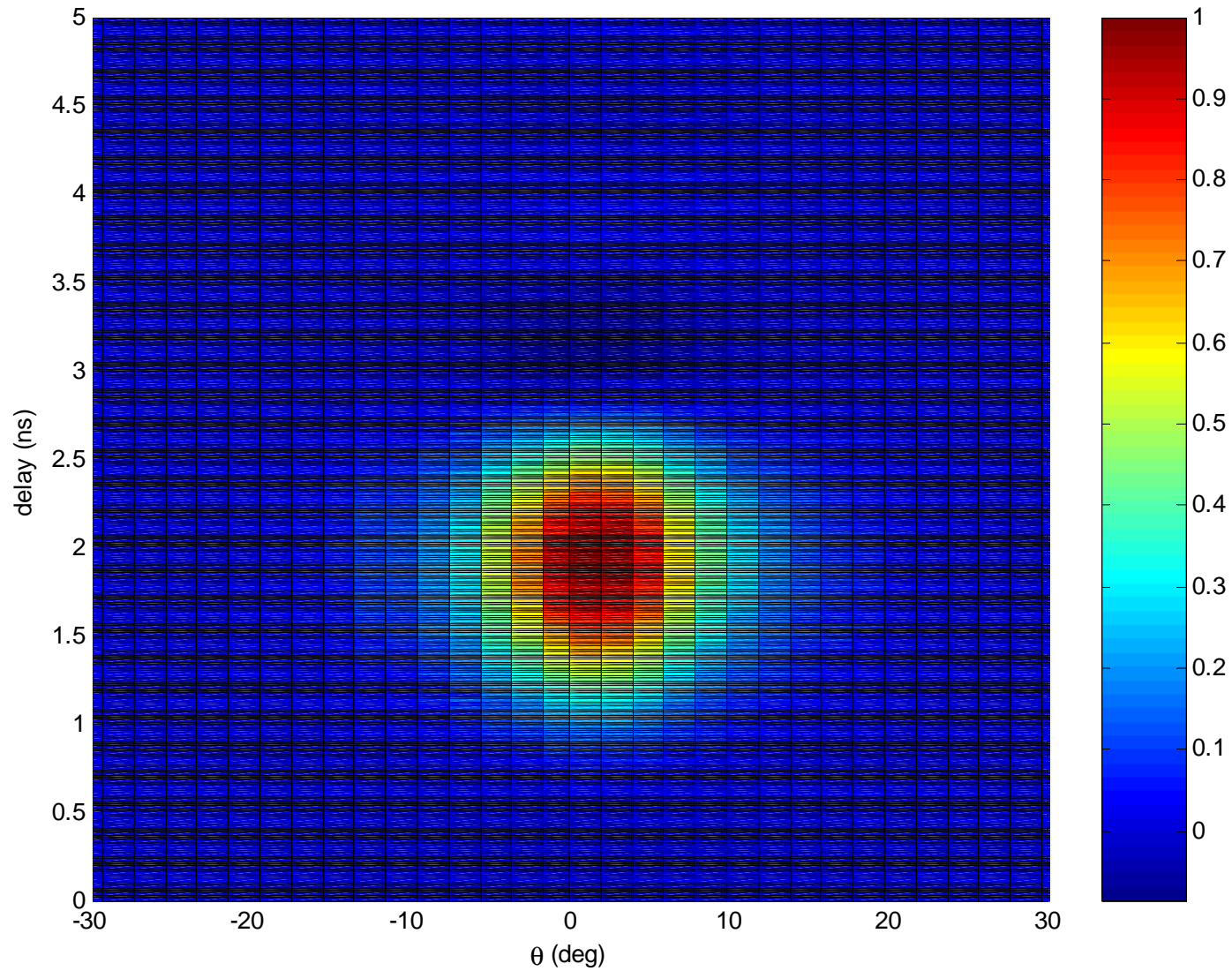


Distance between Tx and Rx_E is 109.5", 2.8 m



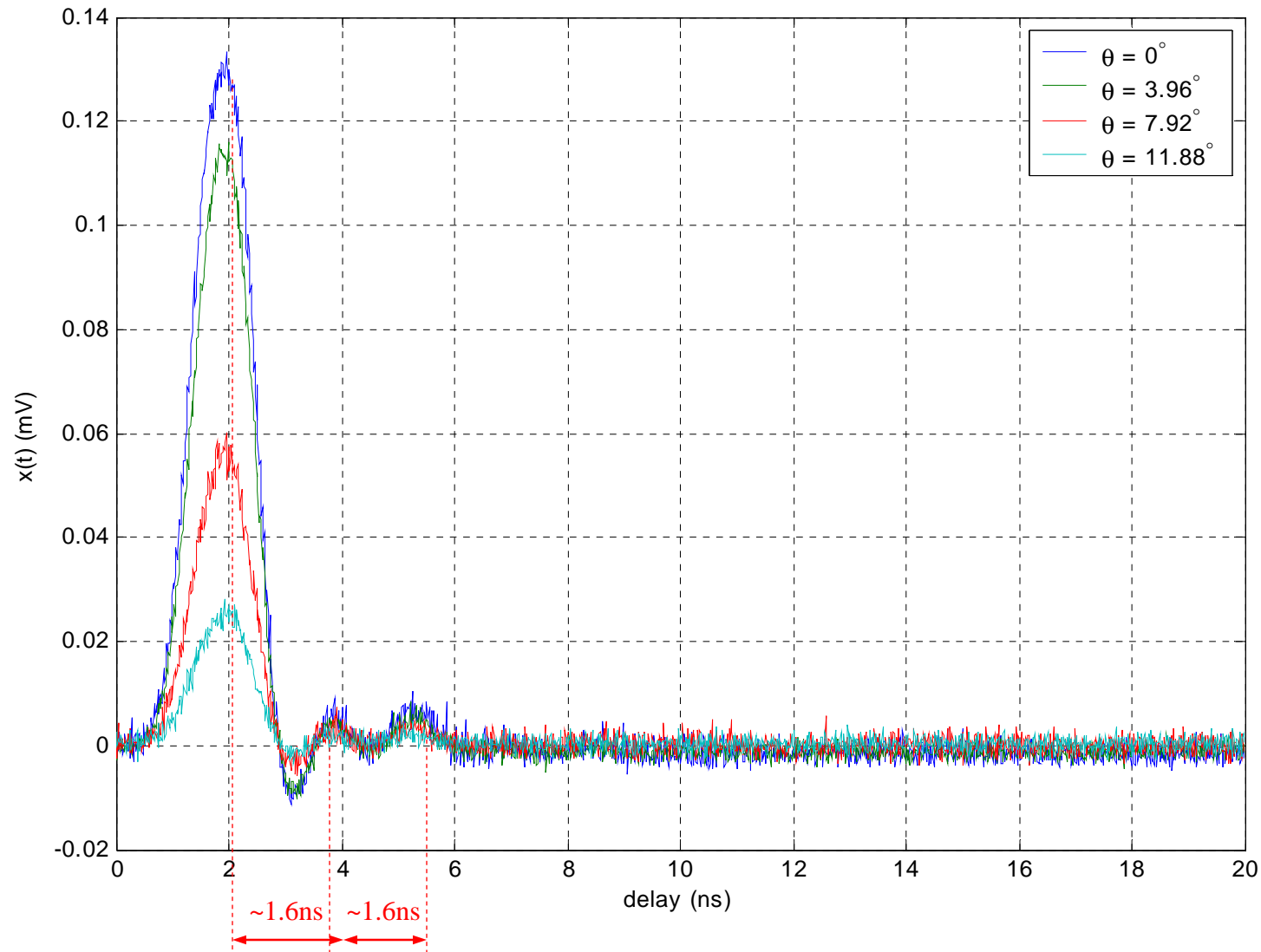
Reflection Plot

Measurement #9a



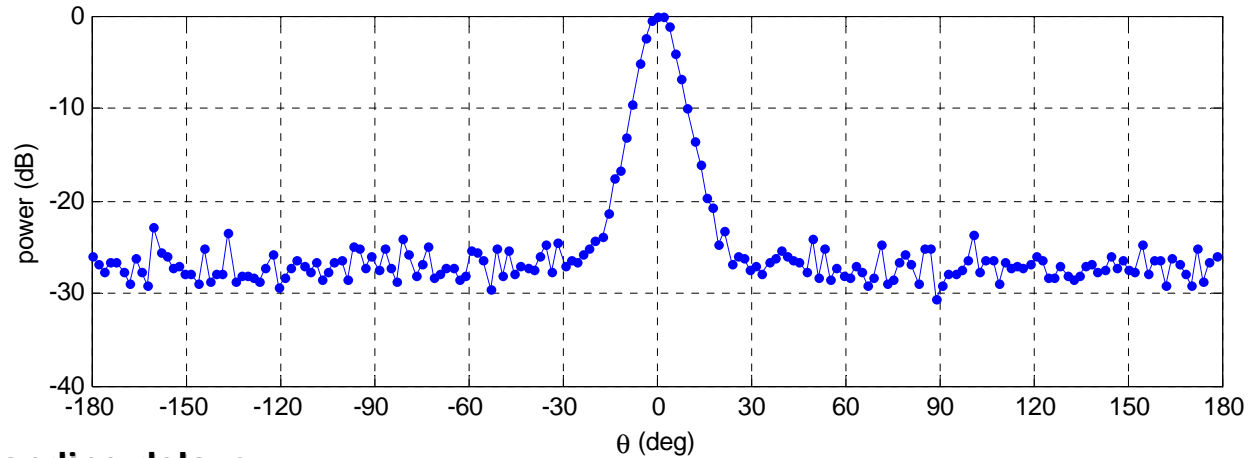
Impulse Responses at Different Angles

Measurement #9a

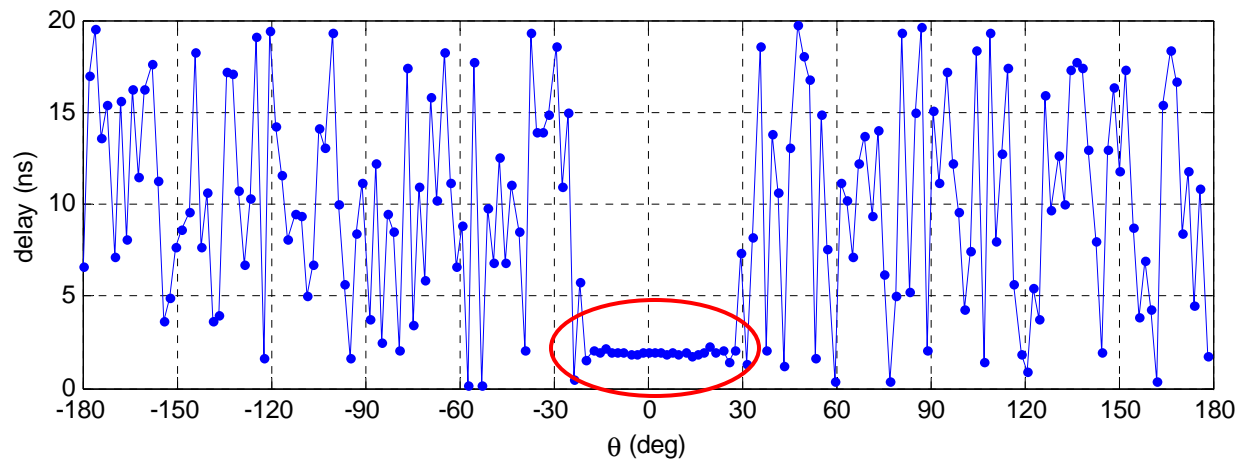


Reflection Plot over 360° Measurement #9a

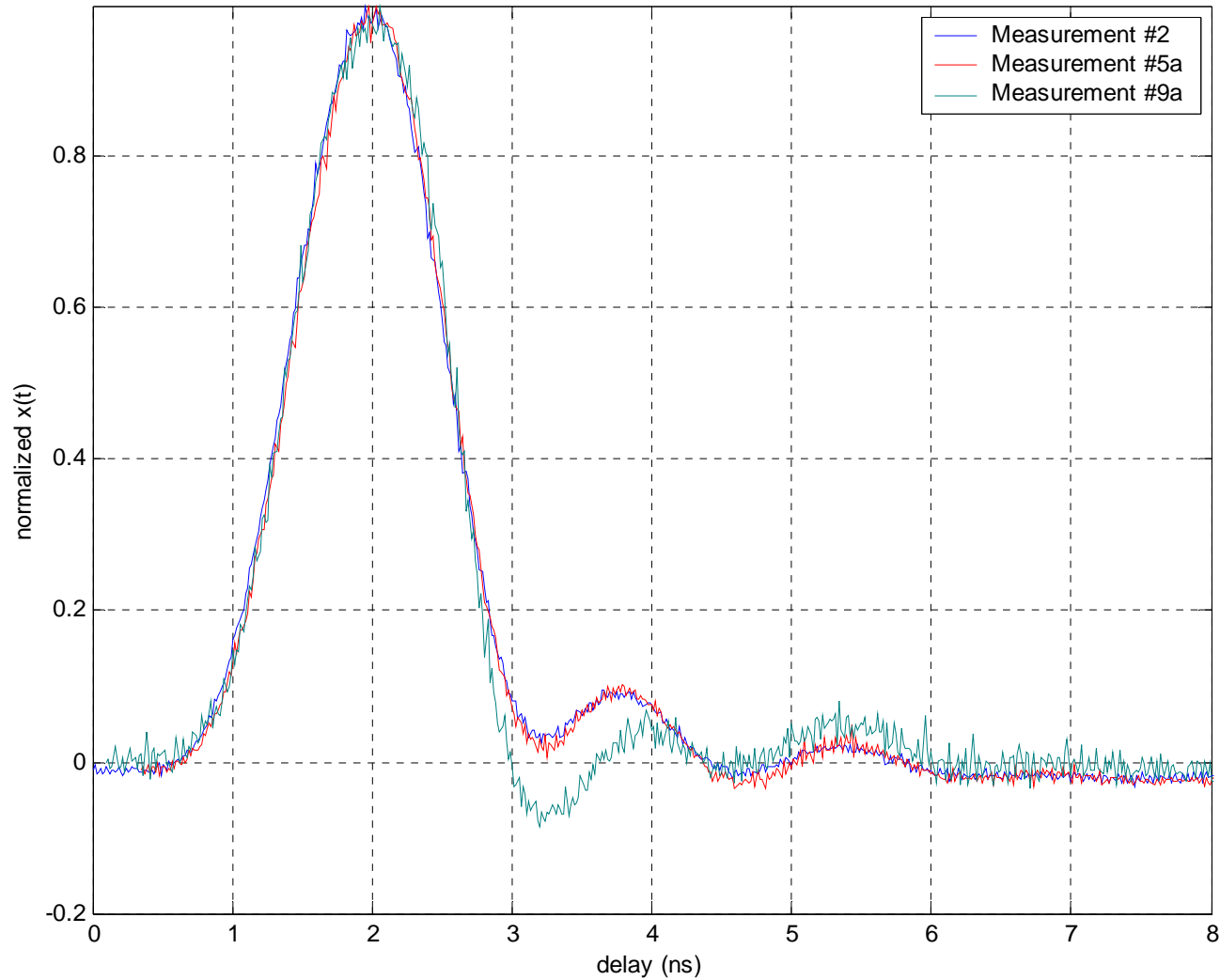
Maximum strength (normalized) of the received signal at each angle:



Corresponding delays:



Consolidated Impulse Plot At 0°



Summary

- Measurement data using directional antennas (both Tx and Rx) and circular polarization in office cubicle, conference room, and residential room are presented.
- In all three different environments, only the line of sight signal is observed, i.e., there is no multipath detected.

Questions

- As narrow beam with circular polarization suppresses multipath, can we approximate to an AWGN environment with some correction factor?
- Shall we include the antenna effects in the channel model?