Channel models for long range deployment

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IEEE 802.16.3c-01/76) and URL <http://ieee802.org/16/tg3/docs/802163c-01_76.pdf>.]
Purpose:
Suggest extrapolation of the channel models to 30km cells

Extension of Channel Models to 30km Range Cells

- Purpose: adjust the existing models for 30km range cells
- Based on formulation and numbers of IEEE 802.16.3c-01/29r2
- Changed: τ_{rms}, K-factor
- Not modified: Path loss models, Doppler, Gain Reduction Factors

Expressions for Delay Spread and K-factor

$$\tau_{rms} = T_1 d^{\varepsilon} \gamma \Rightarrow \tau_{rms}(30km) = \tau_{rms}(7km)\left(\frac{30}{7}\right)^{\varepsilon}$$

$$K = F_s F_h F_b K_o d^{\gamma} \Rightarrow K(30km) = K(7km)\left(\frac{30}{7}\right)^{\gamma}$$

u

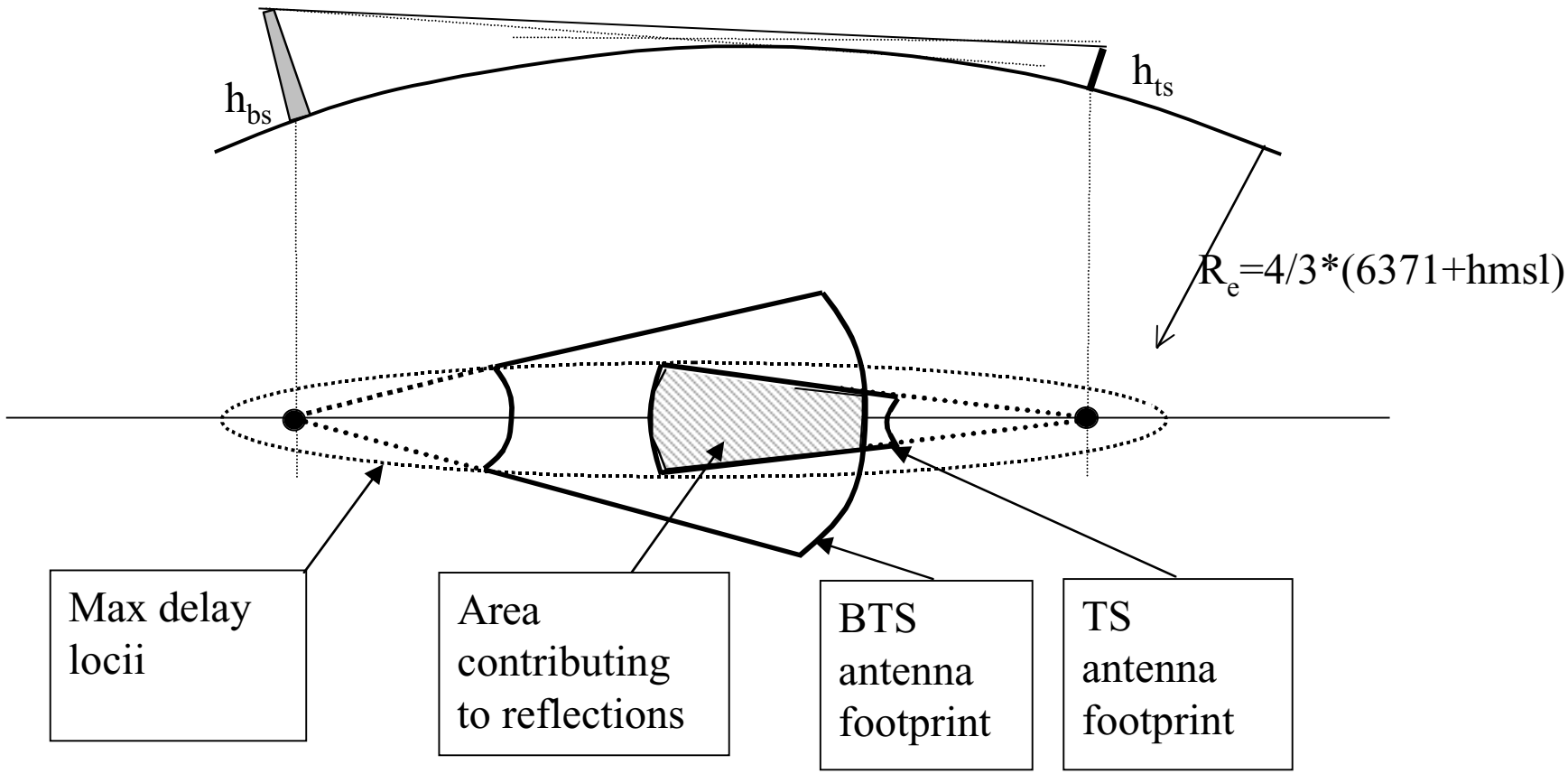
$\varepsilon = 0.5 - 1$ (0.75 taken)

γ = -0.5

Values for Delay Spread and K-Factors

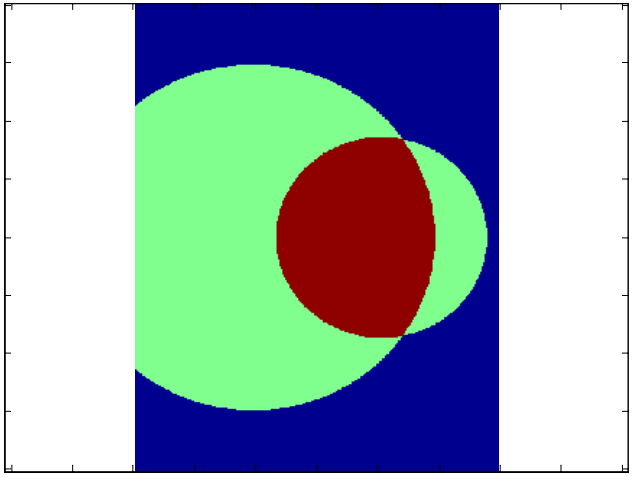
Extrapolated model	τ_{rms} (μs)	K		
		90%	75%	50%
SUI-1, Omni antenna	0.307	1.6	5.02	°
30° antenna	0.122	6.8	21.4	
SUI-2, Omni antenna	0.596	0.77	2.46	°
30° antenna	0.226	3.33	10.5	
SUI-3, Omni antenna	0.908	0.24	0.77	°
30° antenna	0.444	1.06	3.38	
SUI-4, Omni antenna	4.006	0.1	0.29	°
30° antenna	2.017	0.48	1.55	
SUI-5, Omni antenna	9.094	0.05	0.14	0.46
30° antenna	4.447	0.19	0.63	2.0
SUI-6, Omni antenna	15.608	0.05	0.14	0.46
30° antenna	7.059	0.19	0.63	2.0

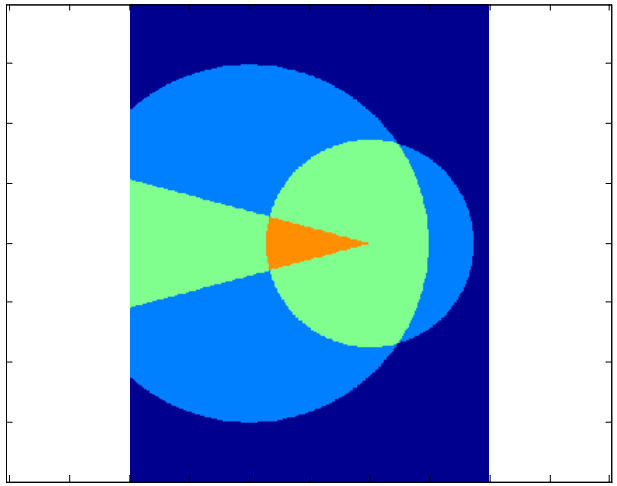
Effects of the Horizon



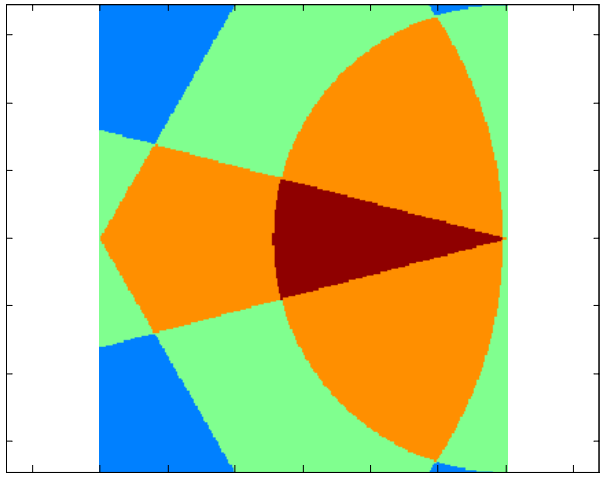
Geometries

BS Omni





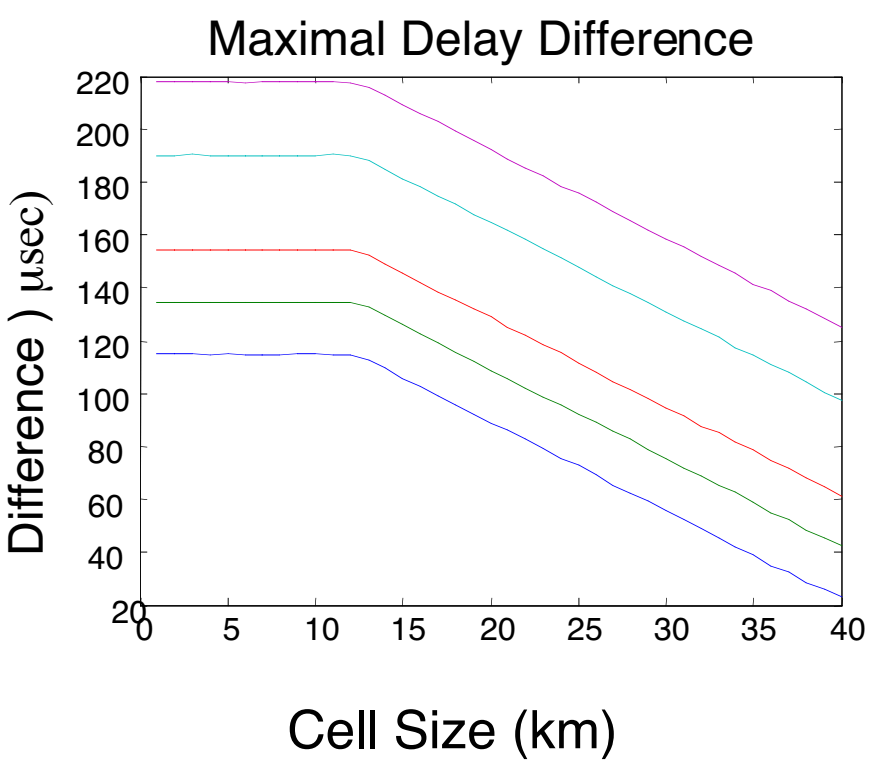
BS Directional

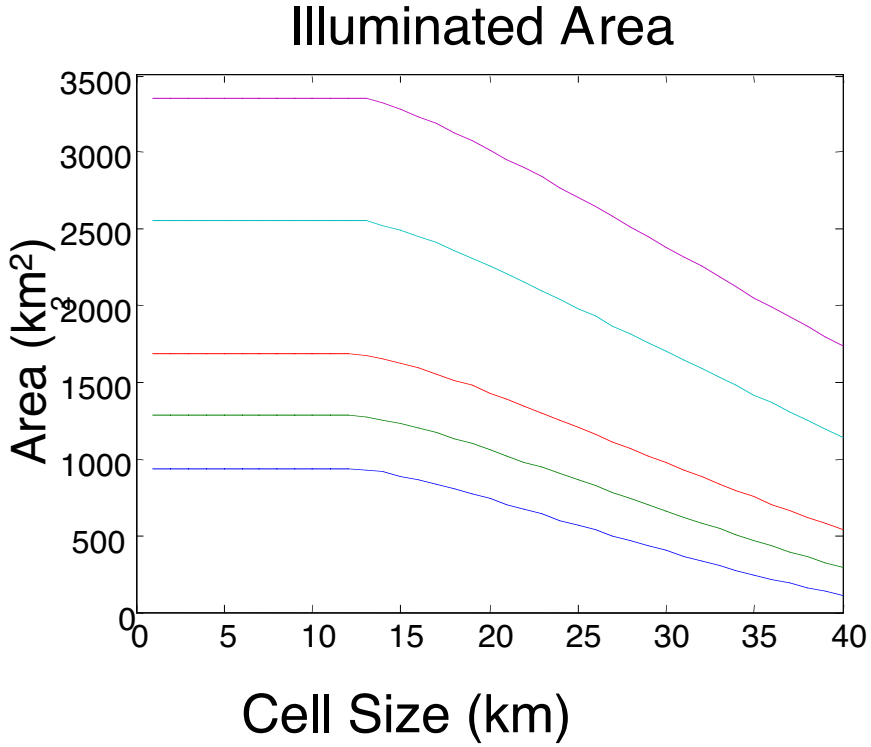


TS Omni

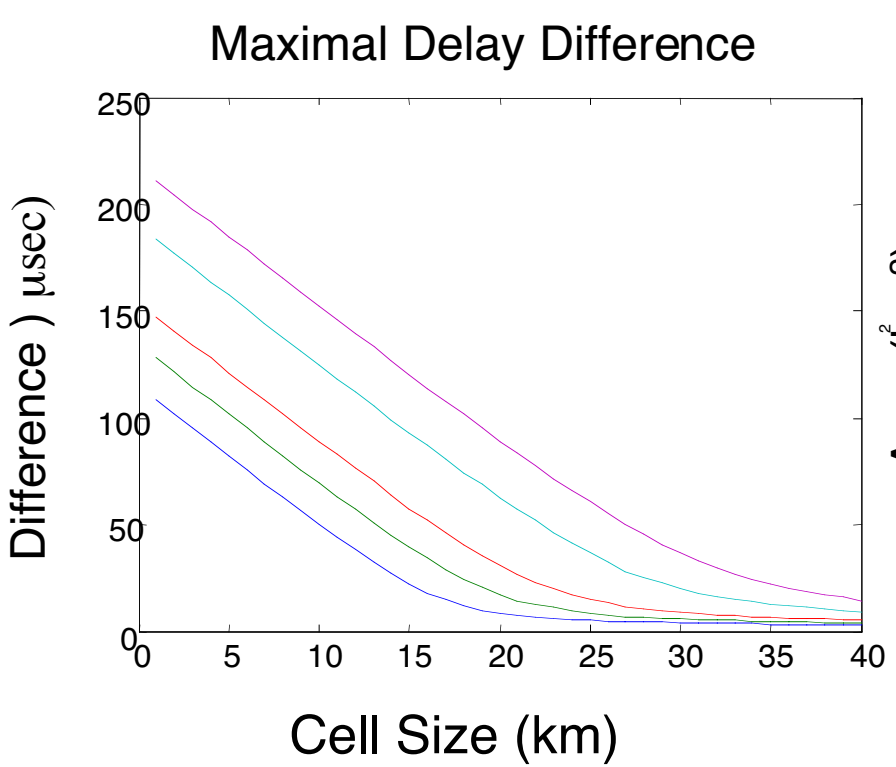
TS Directional

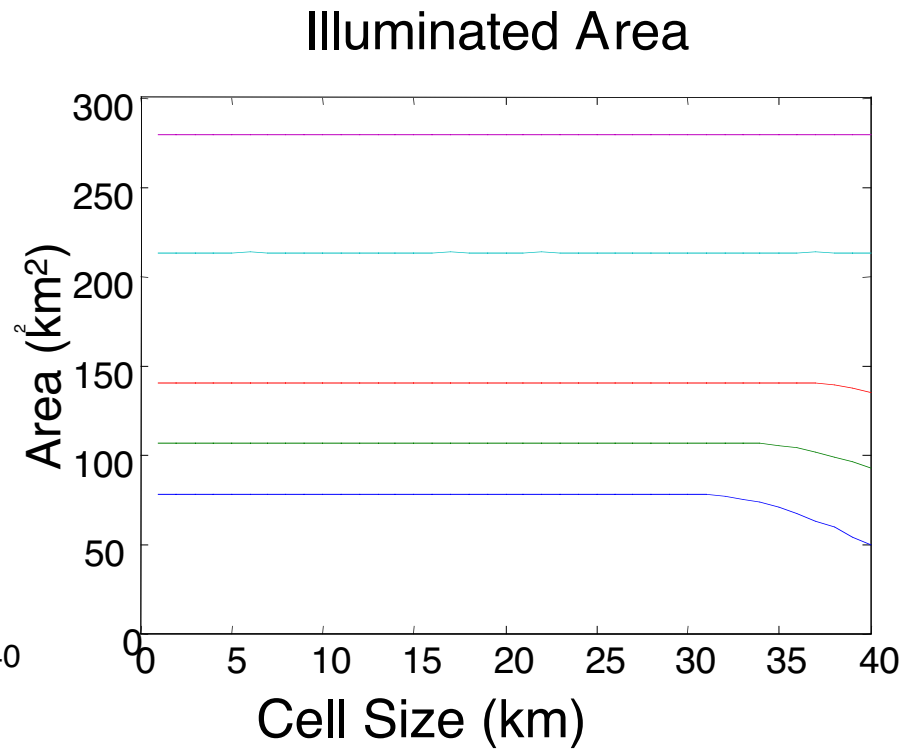
Omni- Omni


Maximal Delay Difference
Difference) µsec)
220
200
180
160
140
120
100
80
60
40
20
0
5
10
15
20
25
30
35
40
Cell Size (km)

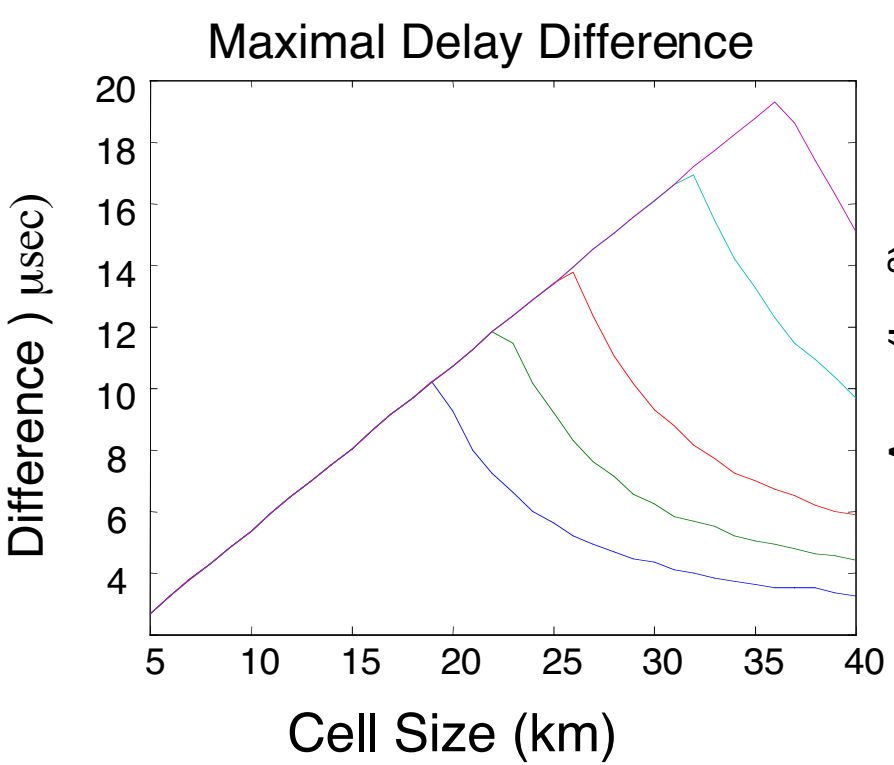

Illuminated Area
Area (km2)
3500
3000
2500
2000
1500
1000
500
0
0
5
10
15
20
25
30
35
40
Cell Size (km)

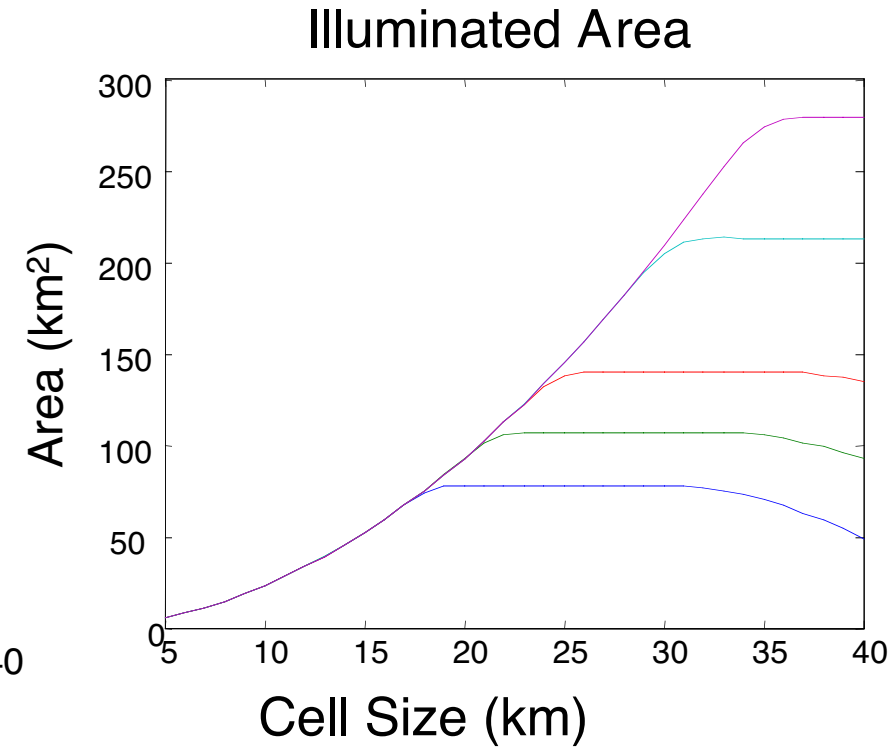
Omni - Directional





Directional - Directional





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