



Radio Frequency 101 for Costa Mesa Planning Commissioners

Presenter:

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Dr. Jonathan L. Kramer, Esq.



- **Heads Telecom Law Firm, P.C.**
 - Admitted to practice law in California and New Mexico
 - Licensed by FCC since early 70s (holds six FCC licenses/certifications)
- 35+ years in telecom engineering/safety reviews (RF, broadband, fiber, outside plant safety, code compliance, RF safety)
- 33 years consulting on telecom matters > 1,000 governments/firms; 25 years of wireless siting and planning > 2,000 cases/matters
- Expert witness/trial advisor in 40+ wireless and wired telecom cases
- Co-author, Co-editor of FCC's "A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance"

Member: International Municipal Lawyers Association (Attorney Member)
Federal Communications Bar Association (Attorney Member)
NATOA (Twice Member of the Year), SCAN NATOA (Founding Member)
Society of Broadcast Engineers (Senior Member)
Society of Cable Telecommunications Engineers (Senior Member)

Education: Doctor of Law and Policy, Northeastern Univ., Boston (2016)
Master of Law *with honors*, Strathclyde University School of Law, Glasgow (2013)
Juris Doctor *cum laude*, Abraham Lincoln School of Law, Los Angeles (2001)

- **Teaching:** Instructor, Regulatory Law and Policy
Northeastern University (Doctoral and Masters programs)



How did we get here?

- < 1996 Local Governments free to set their own RF safety standards
- 1996 Congress passes Telecom Act, includes preemption of local standards, directs FCC to come up with uniform national RF safety rules
- 47 USC 332(c)(7): “[n]o State or *local government or instrumentality thereof* may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions *to the extent that such facilities comply with the [FCC’s] regulations concerning such emissions.*”





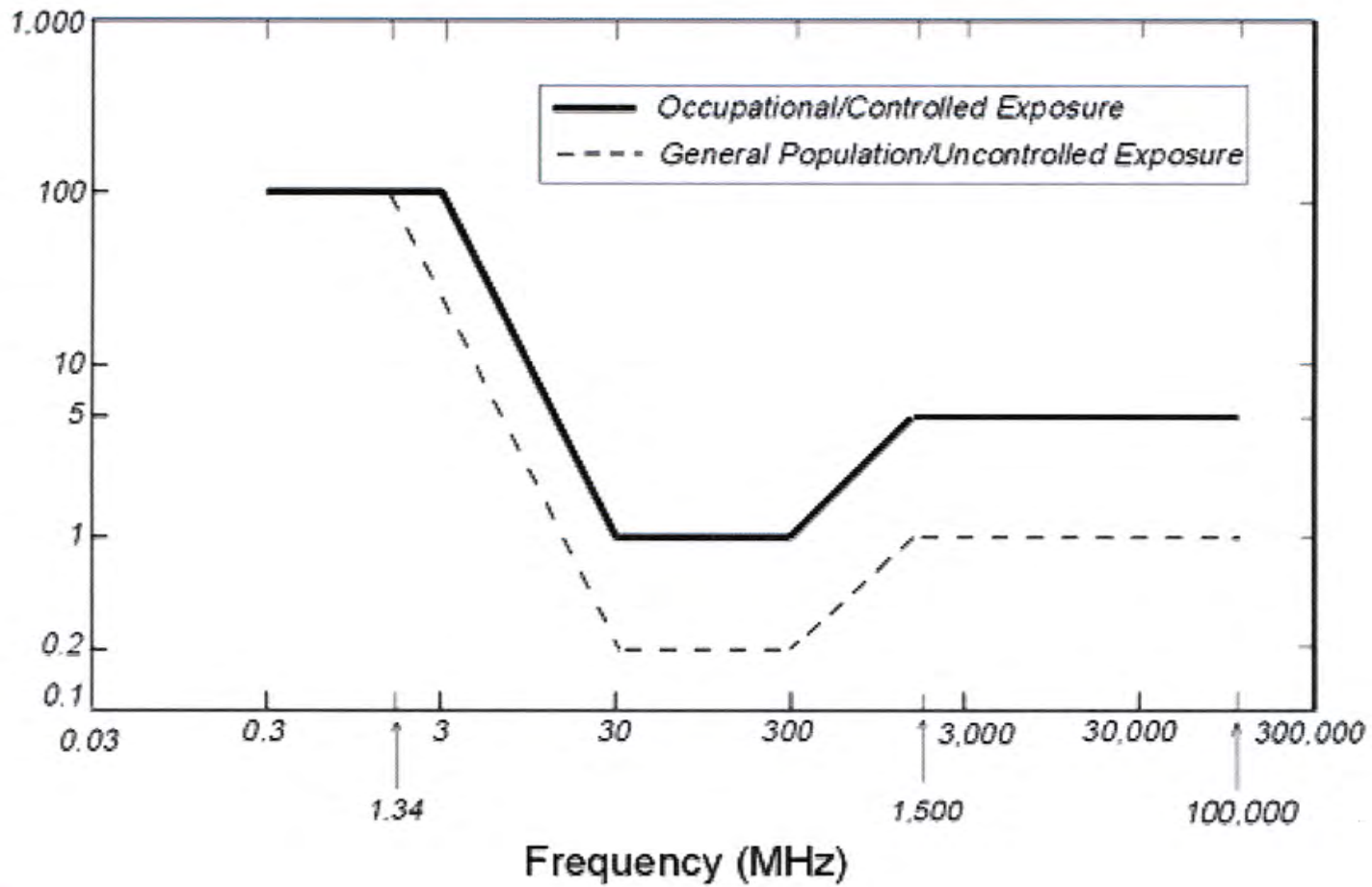
How did we get here?

- 1996-1997 FCC developed U.S. rules after:
- Review of the published RF safety standards in other countries (some higher, some lower)
- Consultation with other government agencies (health organizations, military)
- Consultation with independent radiological safety groups
- Non-ionizing radio frequency emissions



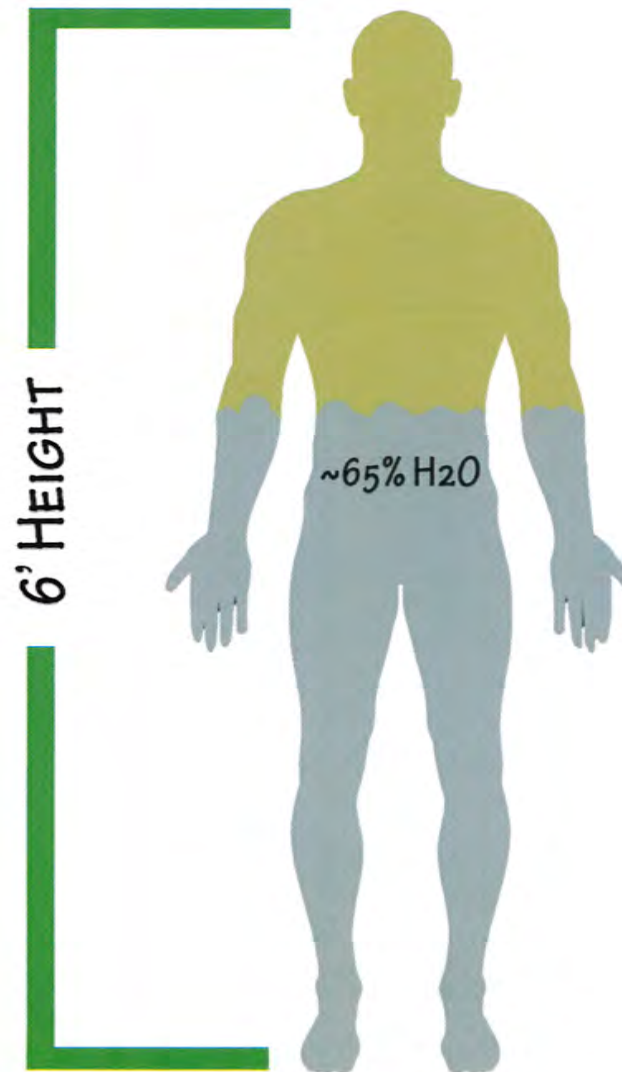


Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)
Plane-wave Equivalent Power Density



How did we get here?

- Why did the FCC set RF safety emissions limits based on power versus frequency versus time versus height?



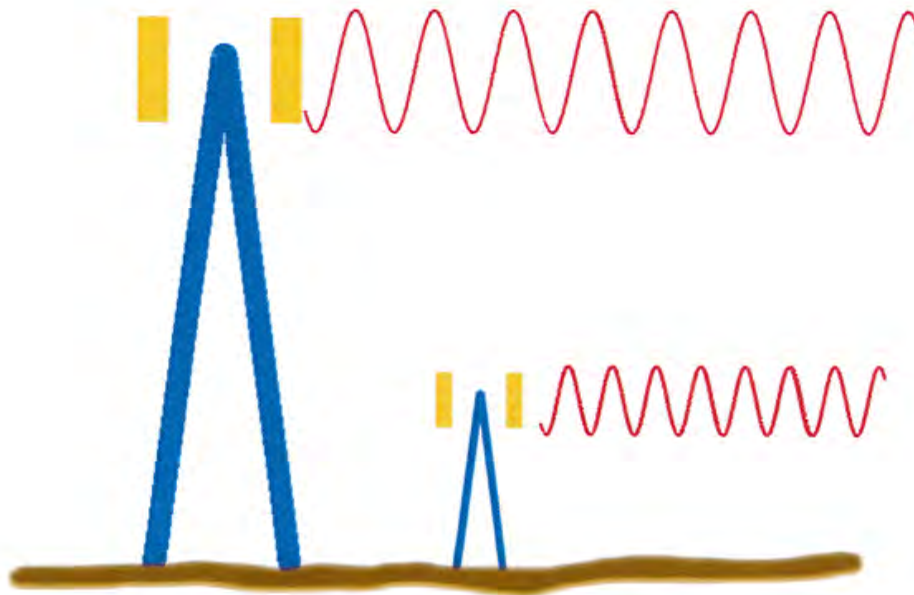
Where is here?

- ‘Here’ is really two places:
 - RF safety emissions rules for cell sites
 - RF safety emissions rules for hand-held phones (“SAR Rules”)
- Congress, the FCC, and the State of California all allow local governments to determine whether a cell site will comply with the FCC’s rules for cell sites (not for SAR)



What's around here?

- What kinds of cell sites are we focused on?



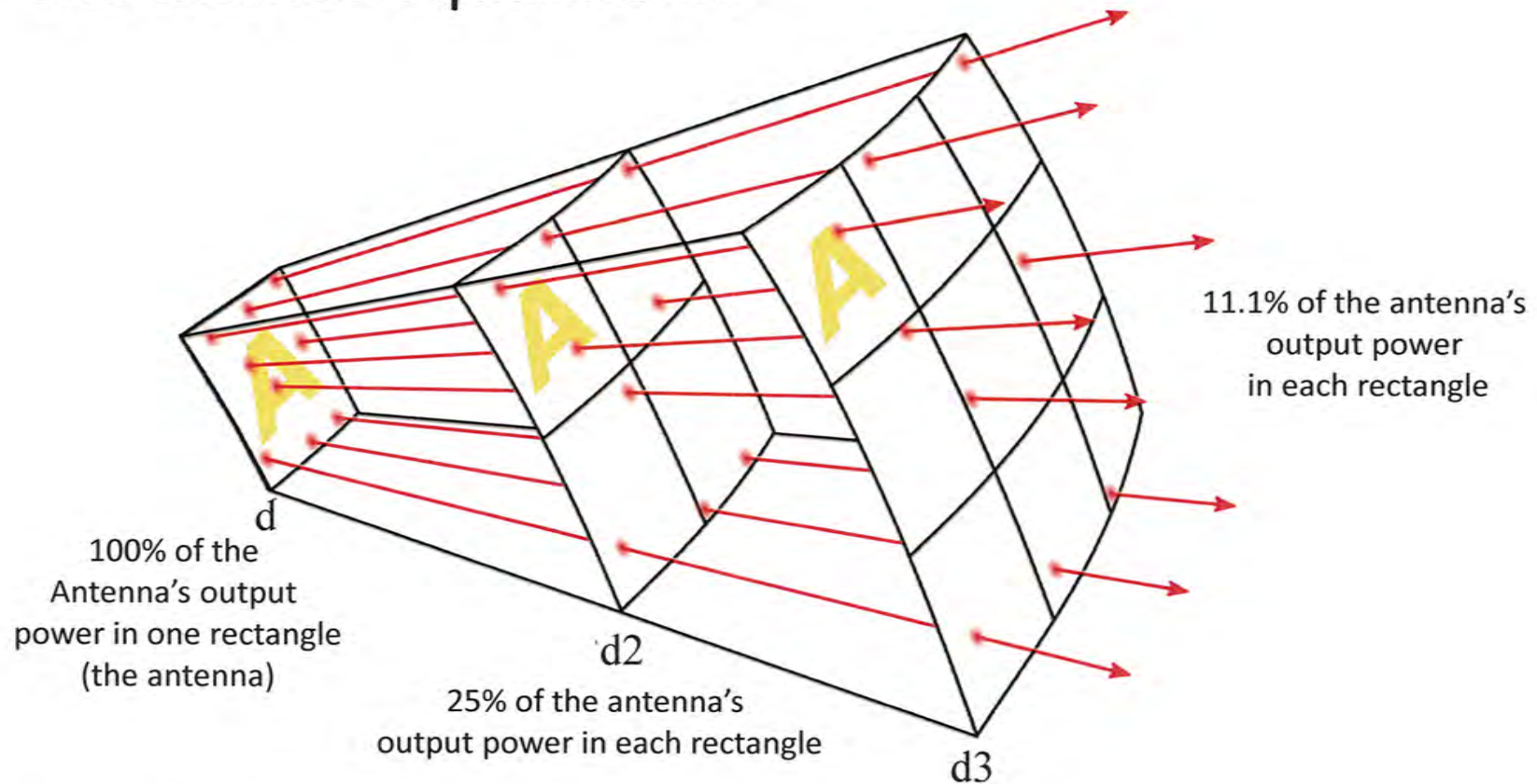
The signal is aimed horizontally to the horizon, not down to the ground

- So... Shorter sites over taller sites



What's around here?

- The Inverse Square Law



- So... We focus on closer sites over farther sites







What May You Ask?

You may ask:

“Does the project site demonstrate planned compliance today with the FCC’s safety regulations concerning radio frequency emissions?”

Okay, that’s not a very satisfying question.

What really helps is to understand the FCC radio frequency environmental rules in relation to effects and margins...



**FCC RF
Safety Standards
with No Math**

**Measurable
increase in
temperature**

**Where does the FCC
set its standard?**

**FCC's 100% General
Population Limit**

**Typical for
Small Cells:
Emissions of a
fraction of 2%**

**50x
2%
Margin
of effect**





What May You Ask?

If the answer to:

“Does the project site demonstrate planned compliance today with the FCC’s regulations concerning radio frequency emissions?”

...is ‘yes’ then...

**That’s the end of a jurisdiction’s
RF consideration for
the project.**



What May You Ask?

If the answer to:

“Does the project site demonstrate planned compliance today with the FCC’s regulations concerning radio frequency emissions?”

...is ‘no’ then...

Are there conditions of approval that will allow a demonstration of compliance (i.e., warning barriers; locked doors; FCC-approved signage; roof markings; etc.)?

...if yes, then the conditions should be included in the project approval.

...if no, then the project needs to go back to the applicant for revisions.



What May You Ask?

But what about the future?

You may consider RF compliance with the FCC's rules for today's project before you, but you may not consider what the site might morph into sometime in the future.



What About Tomorrow?

What if a building is constructed adjacent to a cell site in the future? Who has to 'give?'

Good Answer: A FCC licensee is required to protect the public even in the event of changed conditions around the cell site.

Really Good Answer: New building next to the site? The licensee, at its sole cost, must do whatever it takes to make sure the public is protected from excessive RF emissions.



Pulling All of this Together.

- FCC's RF emissions rules are **conservative**
- The City cannot deny a cell site application on RF grounds **if** the site demonstrates planned FCC compliance
- The burden is **on the applicant** to demonstrate planned compliance
- The burden is **on the site operator** to ensure future actual compliance, even with changed conditions.

