

Can You Future Proof Your DAS System?

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Vision Technologies



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Who Writes the Rules

- ITU = International Telecommunications Union
 - Part of the United Nations, recommends policy world wide
- WRC = World Radio Communication Conference, negotiates and writes world wide policy with member participation
- FCC = Federal Communications Commission
 - Write and Ensure policy in the US



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Legacy Systems

- How old is your system?
- What will your passive infrastructure support?



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Modern Systems

- Traditional Coax Infrastructure
- Fiber to the Edge



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Emerging Cellular Technologies

- WiFi Phones
- VoIP
- VoLTE
- Internet of Things
- Qualcomm has a 1 GPS LTE-U Modem
- pCELL alternate to 5G?
- LTE-A and LTE-A Pro?



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Current Cellular Frequencies

- 700 MHz
- 700 MHz
- 850 MHz Cellular
- 1900 MHz PCS
- 2100 MHz AWS
- 2300 MHz WCS



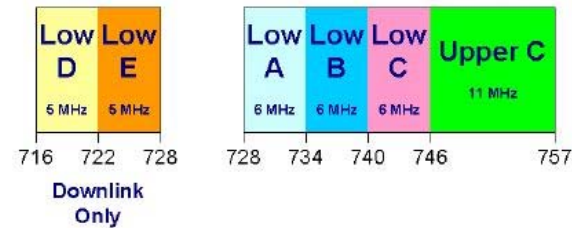
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Cellular Spectrum 700 MHz

700 MHz Commercial Uplink Band Plan



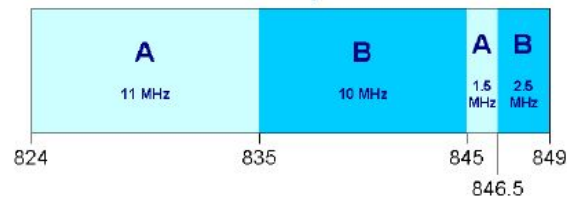
700 MHz Commercial Downlink Band Plan



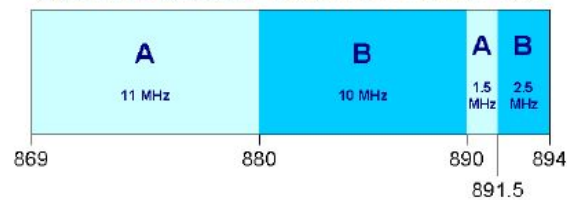
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Cellular Spectrum 850 Cell

850 MHz Cellular Uplink Band Plan

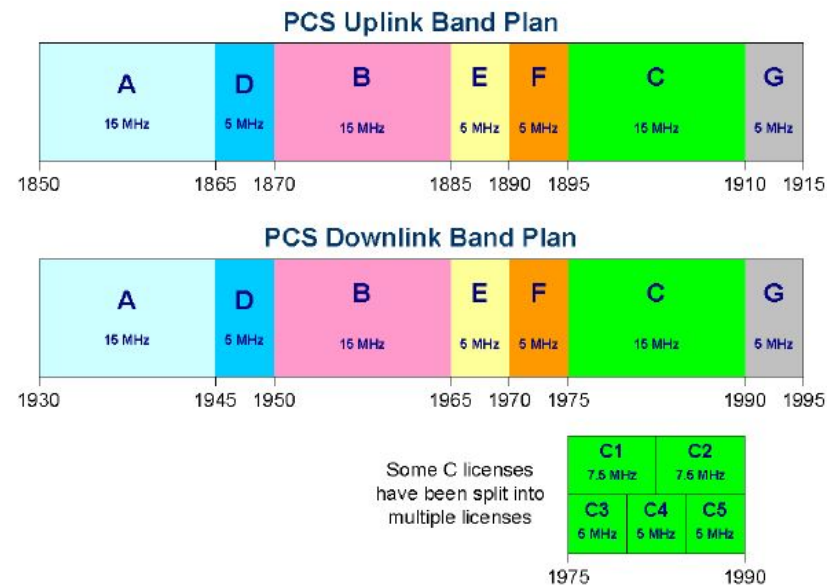


850 MHz Cellular Downlink Band Plan



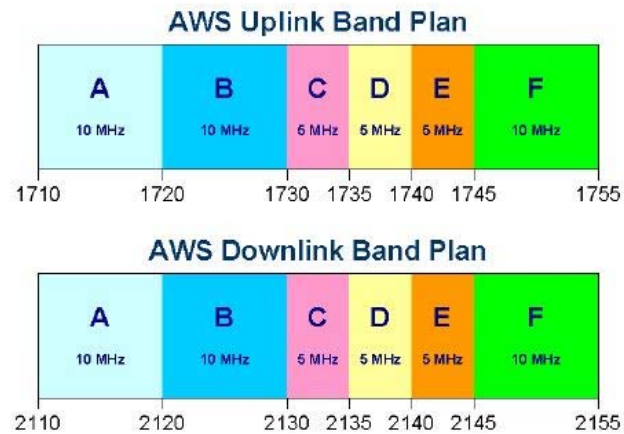
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Cellular Spectrum 1900 MHz



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Cellular Spectrum 2100 MHz



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Cellular Technologies

- GSM – Global System for Mobile Communications
- CDMA – Code Division Multiple Access
- HSPA – High Speed Packet Access
- LTE – Long Term Evolution
- AWS – Advanced Wireless Services
- VoLTE – Voice over LTE



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Carrier Modulation

Modulation	AT&T	Verizon	Sprint	T-Mobile	Metro PCS	Cricket
GSM	850, 1900			1900		
EDGE	850, 1900			1900		
UMTS	850, 1900			1700		
LTE	700, 2100	700, 2100			1700	1700
Wi-Max			2600			
iDEN			800, 900			
CDMA2000		850, 1900	1900		1900	1900
EV-DO		850, 1900	1900		1900	1900
Spectrum Owned	700, 850, 1900, 2100	700, 850, 1900, 2100	800, 900, 1900, 1700	1700, 1900	1700, 1900	1700, 1900



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Public Safety

- VHF
- 700 MHz
- 800 MHz
- Modulation Agnostic



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700 Public Safety Band

700 MHz PS Uplink Band Plan

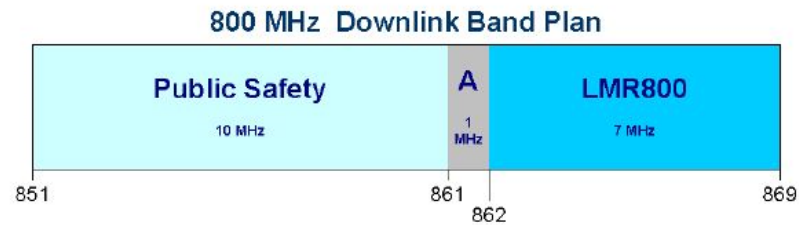
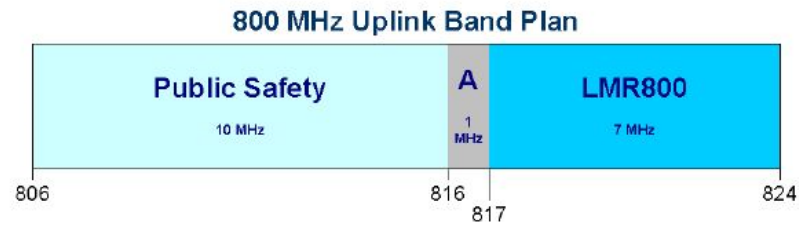


700 MHz PS Downlink Band Plan



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800 Public Safety Band



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PS Band 14

- LTE E-UTRA Band
- FDD Frequency Band
- Uplink 788-798 MHz
- Downlink 758-768 MHz



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5G!

- WRC + World Radio Communication Conference
- WRC15 500 MHz to 6G
- WRC 19 6G to 100 G
- Visible light starts at 100 G
- Backwards compatible with 2G, 3G and 4G



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Questions!



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