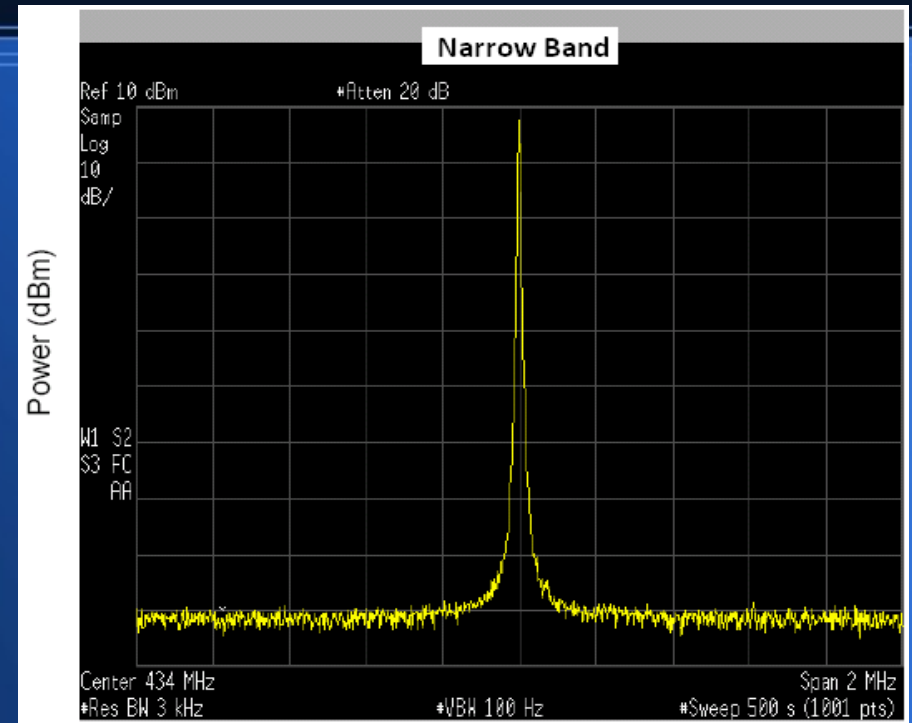
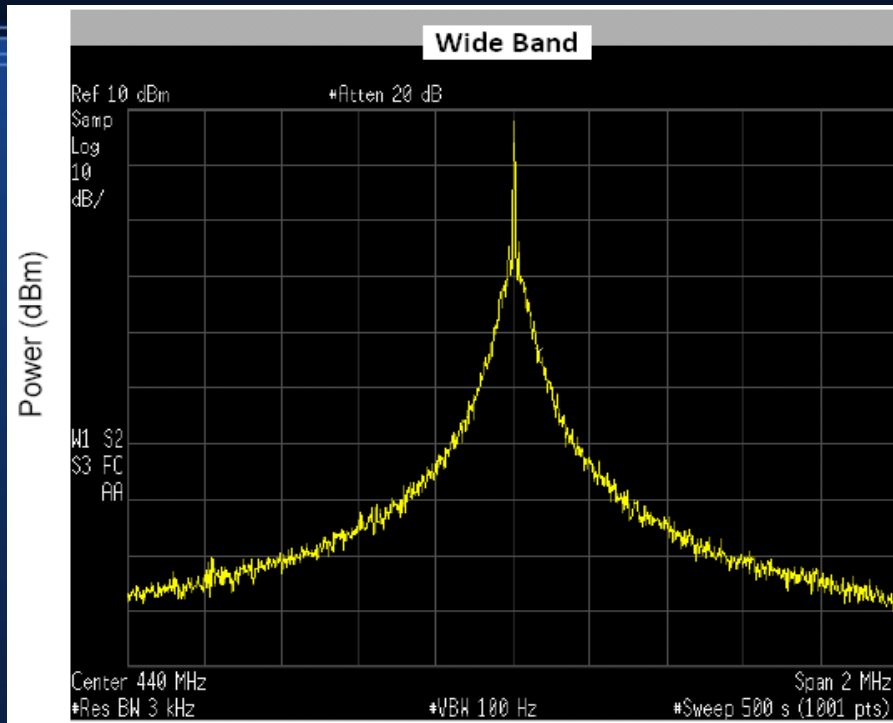


Getting Prepared For Narrowbanding



Presenter: Mark Cline, Vice President,
Middle Tennessee Two-Way Inc.
Communications Sales, Service,
and Consulting Since 1983



Established May 1, 1983

In Memory of Rod Altman 1946-2008



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Information

Narrow Banding Below 512 MHz

All stations must be at 12.5 kHz bandwidth (or equivalent) by Jan 1, 2013

After Jan 1, 2011, applications for new operations must provide one voice path per 12.5 kHz or 4800 bps per 6.25 kHz of bandwidth

Modification applications after Jan 1, 2011, must meet new application standard.

Narrowbanding, Cont.

After Jan 1, 2011, all newly certified equipment must meet one voice path per 6.25 kHz or 4800 bps per 6.25 kHz

No date has been set for a mandatory switch to 6.25 kHz technologies, but FCC has said that they encourage an immediate step to 6.25 kHz, as 12.5 kHz is only a transitional step.

Narrowbanding, Cont.

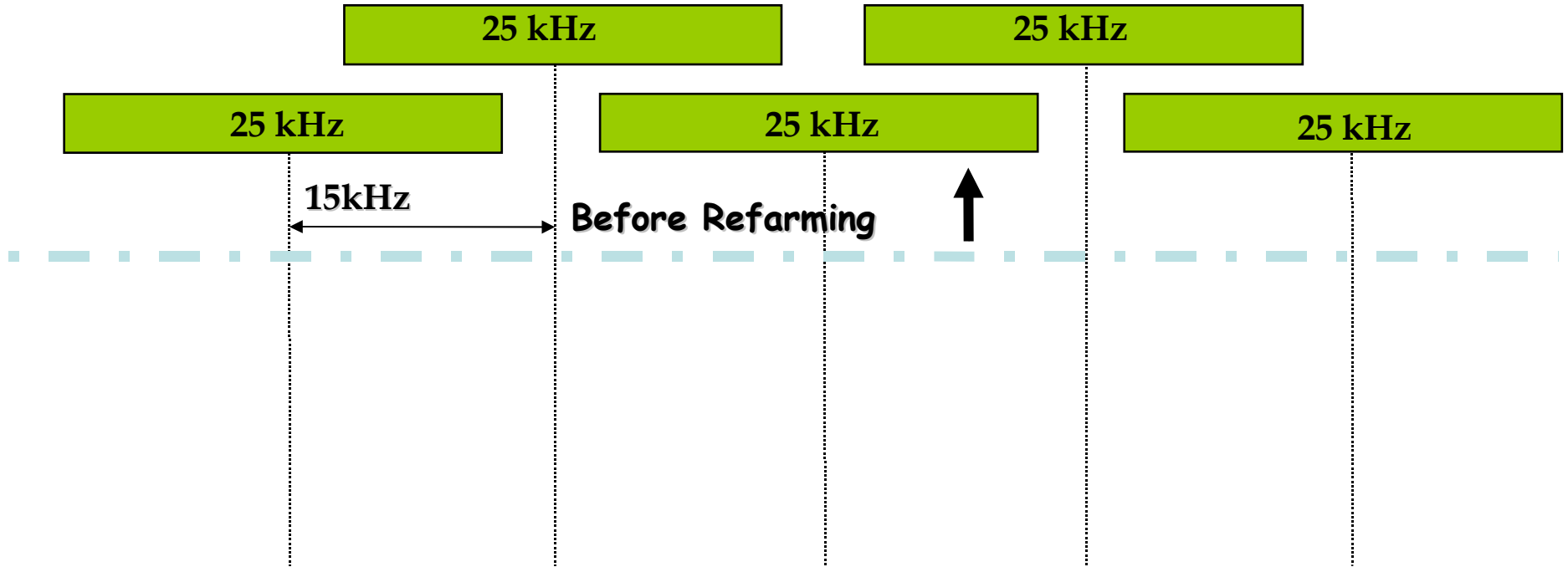
FCC Statements have caused uncertainty
12.5 kHz investments might be stranded
FCC then clarified that normal life should be
expected for 12.5 kHz equipment

FCC has not set date for 6.25 kHz

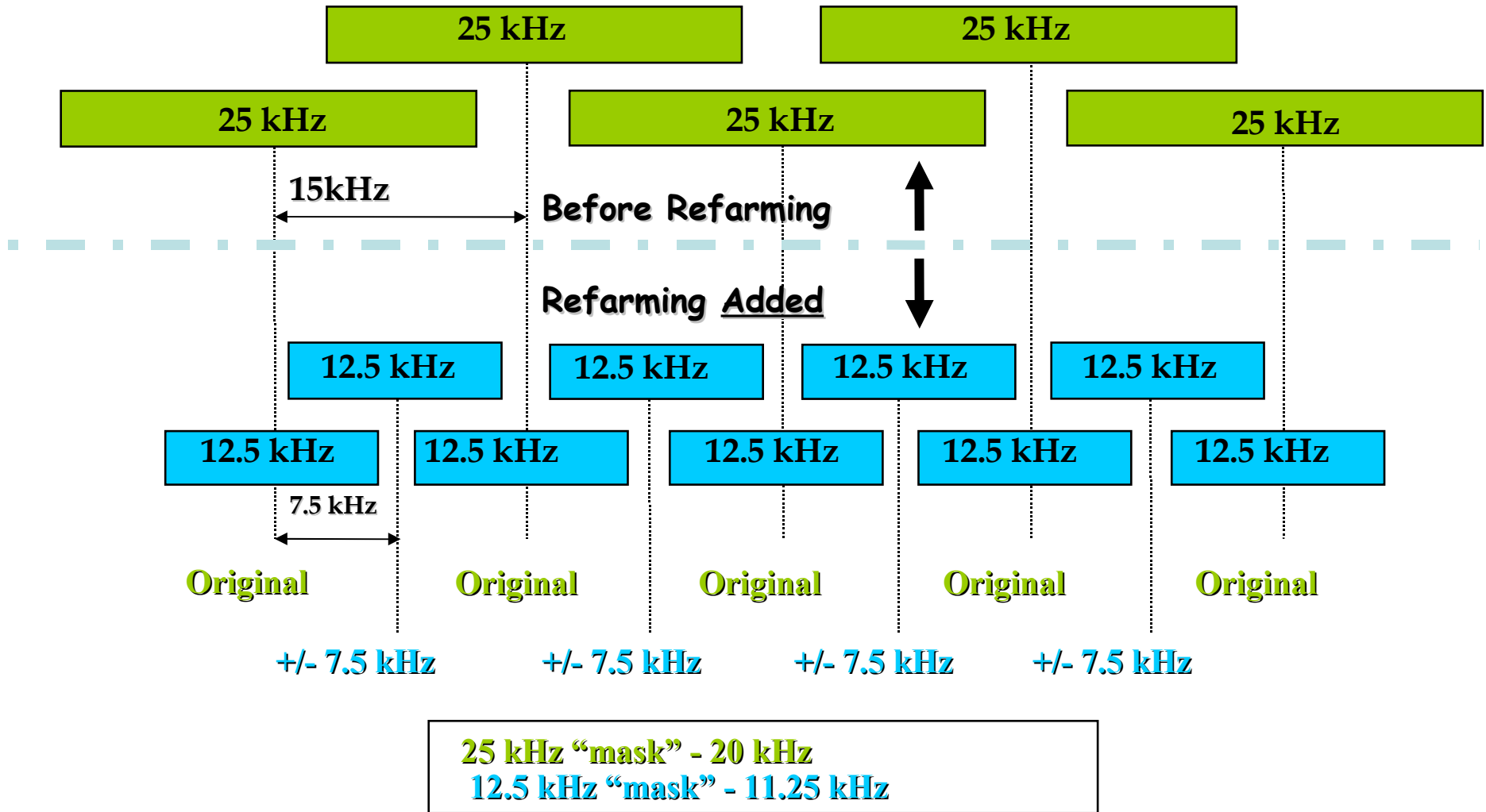
Products are emerging that meet the 6.25 kHz
efficiency standard

See FCC Publication 07-39

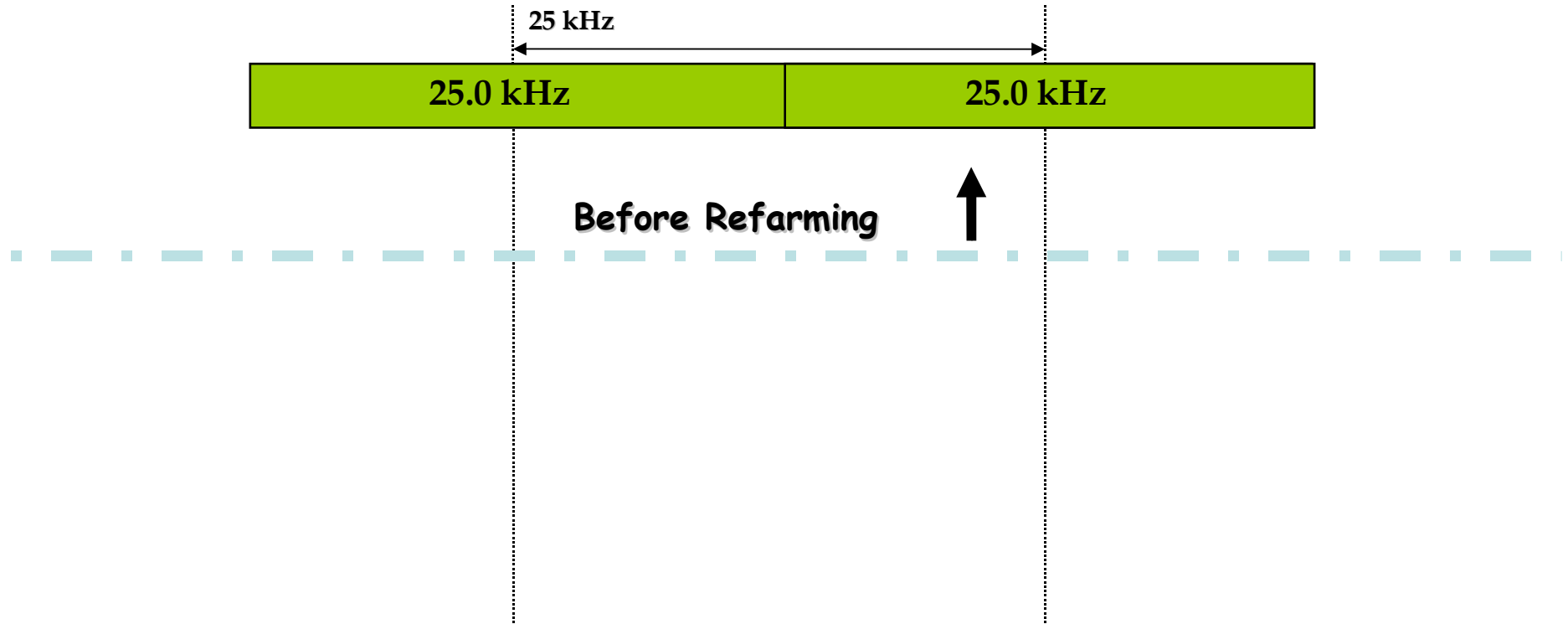
FCC VHF - 150 MHz to 174 MHz



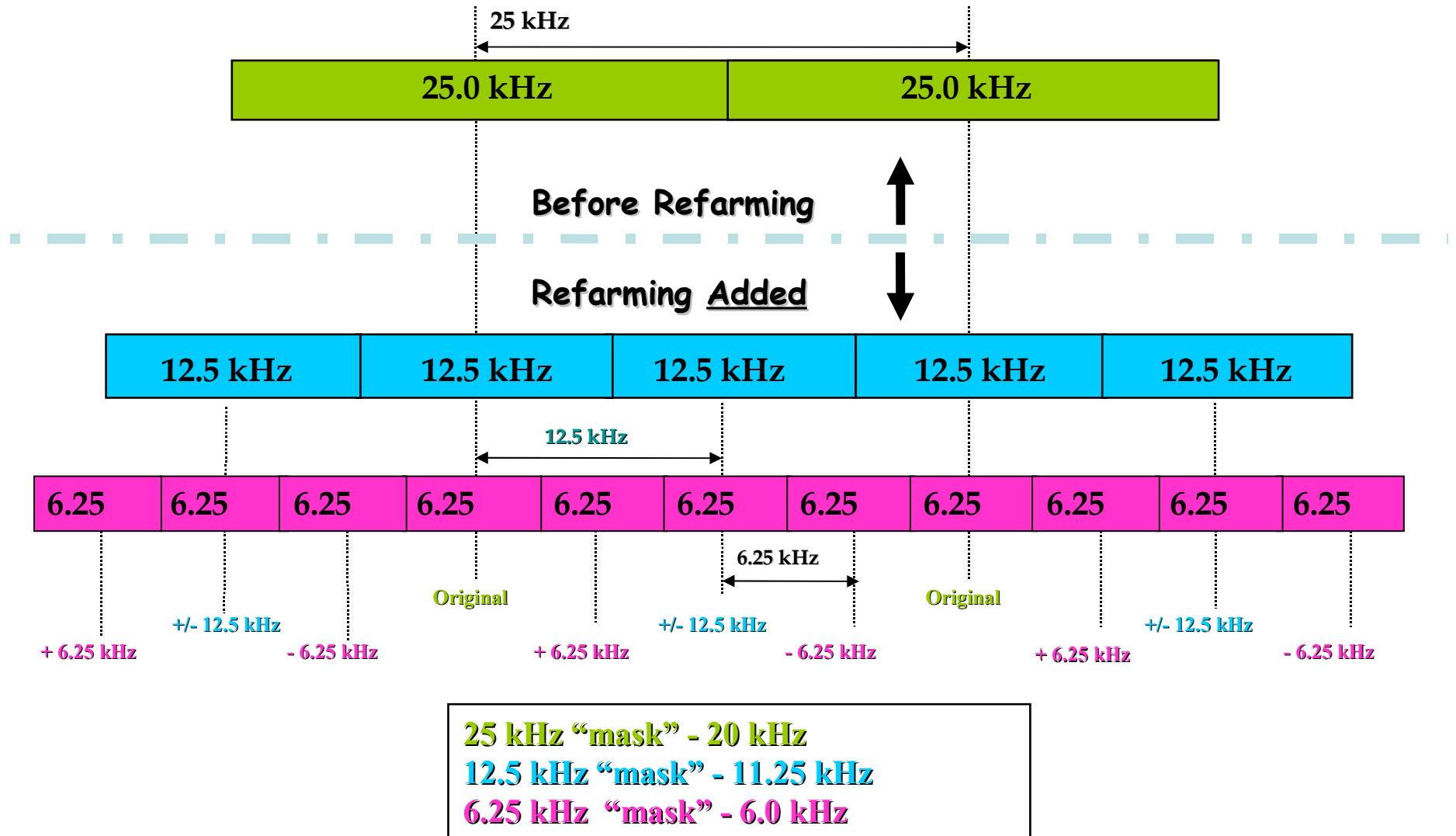
FCC VHF - 150 MHz to 174 MHz



FCC UHF - 450 MHz to 512 MHz



FCC UHF - 450 MHz to 512 MHz



Myths & Truths

Licensees must implement digital technology
False – No Digital Requirement

Licensees will end up with twice as many channels.
False – bandwidth is simply narrowed

Hundreds of new channels will be available in 2013.
False – Narrowbanding will ease congestion but new coordinations will still be a process, and not a surety.

Myths & Truths

Failure to narrowband will result in secondary status.
False - Failure to narrowband will be illegal and stations will have to go off the air.

Interference may occur to existing systems
True – Wideband operations may experience interference from new narrow band stations.

Sound quality may be negatively impacted
True – Until all equipment is narrowbanded distortion and/or volume discrepancies may/will occur

Myths & Truths

Paging channels need not narrowband
True for 2 channels only – 152.0075 MHz and
157.450 can remain 25 kHz bandwidth

The FCC will allow continued operation at 25 kHz
after Jan 1, 2013 by waiver
Maybe – but don't count on it. The FCC has taken a hard
line policy on narrowbanding

800 MHz must be narrowbanded
False – Refarming does not apply above 512 MHz

Prior to Narrowbanding

Realize that most equipment since 1997 has a narrowband mode. Narrowbanding may be no more than reprogramming.

Assess whether 150 & 450 MHz channels meet long term needs – consider channel capacity and coverage issues going forward.

Any new VHF/UHF systems should be narrowband only

Update FCC licenses as necessary

Actions to Narrowband

Inventory equipment subject to narrowbanding

Determine if additional sites will be needed to compensate for reduced coverage due to the narrower bandwidth.

Determine if signaling equipment will require replacement

Establish a schedule to meet the 2013 date, and
Get funding approved

Actions, cont.

Modify existing licenses for narrowband (including new sites, if needed) – work closely with frequency coordinator

Notify FCC of conversion through license modification to remove wideband emission designator(s)

Conduct coverage tests with new system, once installed – make additional modifications if needed

Range Problems With Narrowband

Licensee can expect some loss of coverage due to lowered recoverable audio.

Every system is unique, and should be carefully evaluated to determine the result.

Voters can help with talk back coverage

Additional sites or increased ERP may be necessary to improve talk out coverage

Digital Advantages

Forward Error Correction in digital systems can help mitigate or buy back some lost coverage

DAQ – Delivered Audio Quality

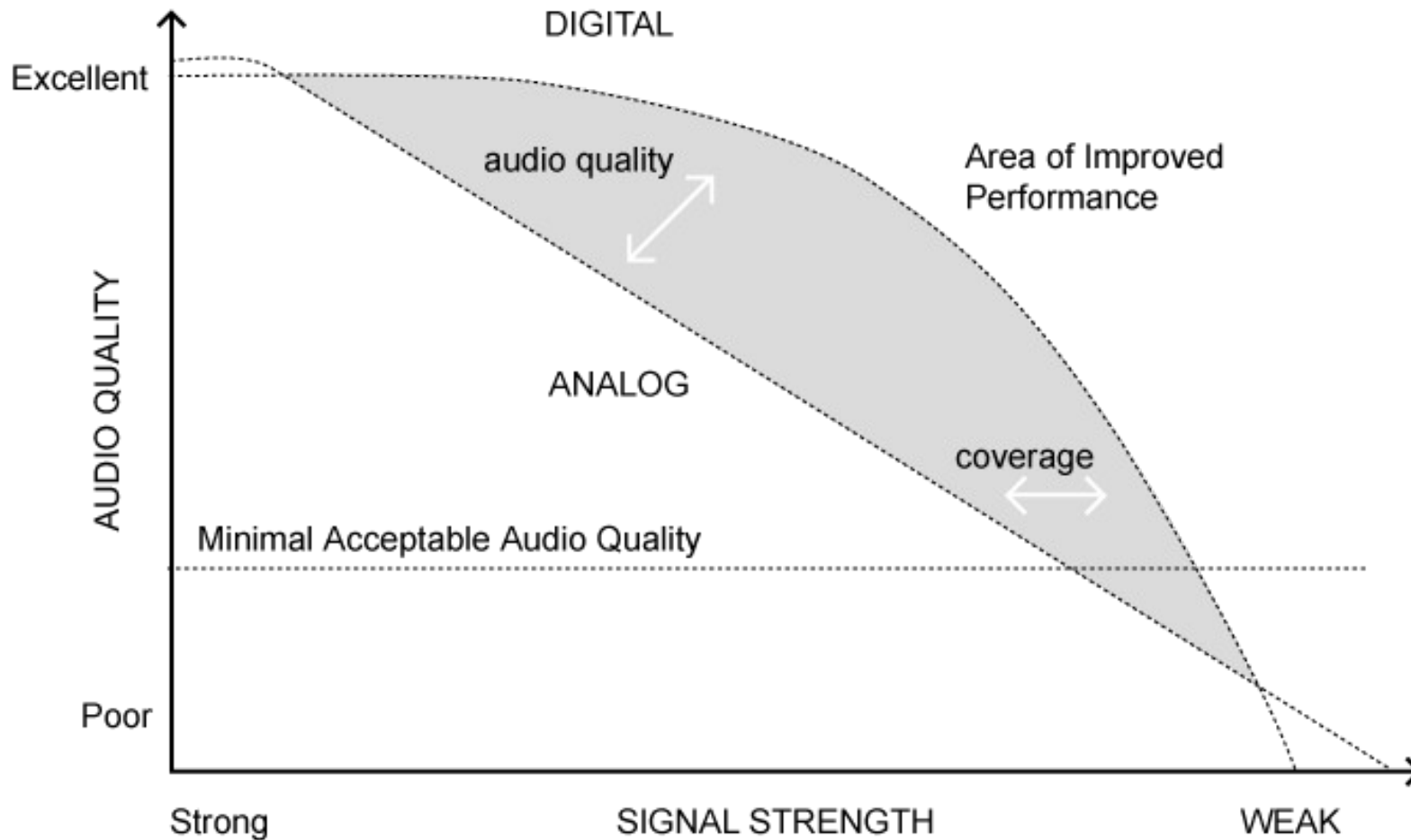
Digital signals can carry more than just voice

Digital voice is more secure (can't be heard on a scanner) and is easily encrypted for even higher security

Digital Radio Technology

Digital Audio Coverage

Enhanced Audio Performance



Digital Radio Technology

Digital Audio Coverage (Cont.)

- What end user will experience with Digital Audio:
 - Consistent performance throughout coverage area with no gradual fade at the fringes.
 - Digital sounds different.
 - Background noise reduction.
- What end user will NOT experience with Digital Audio:
 - Digital radio 'CD quality'.
 - Digital cannot solve historic problems.

Digital Radio Technology

System Coverage Planning

Coverage Considerations

Before coverage (usable audio range) can be defined.

Identify the minimum acceptable audio quality.



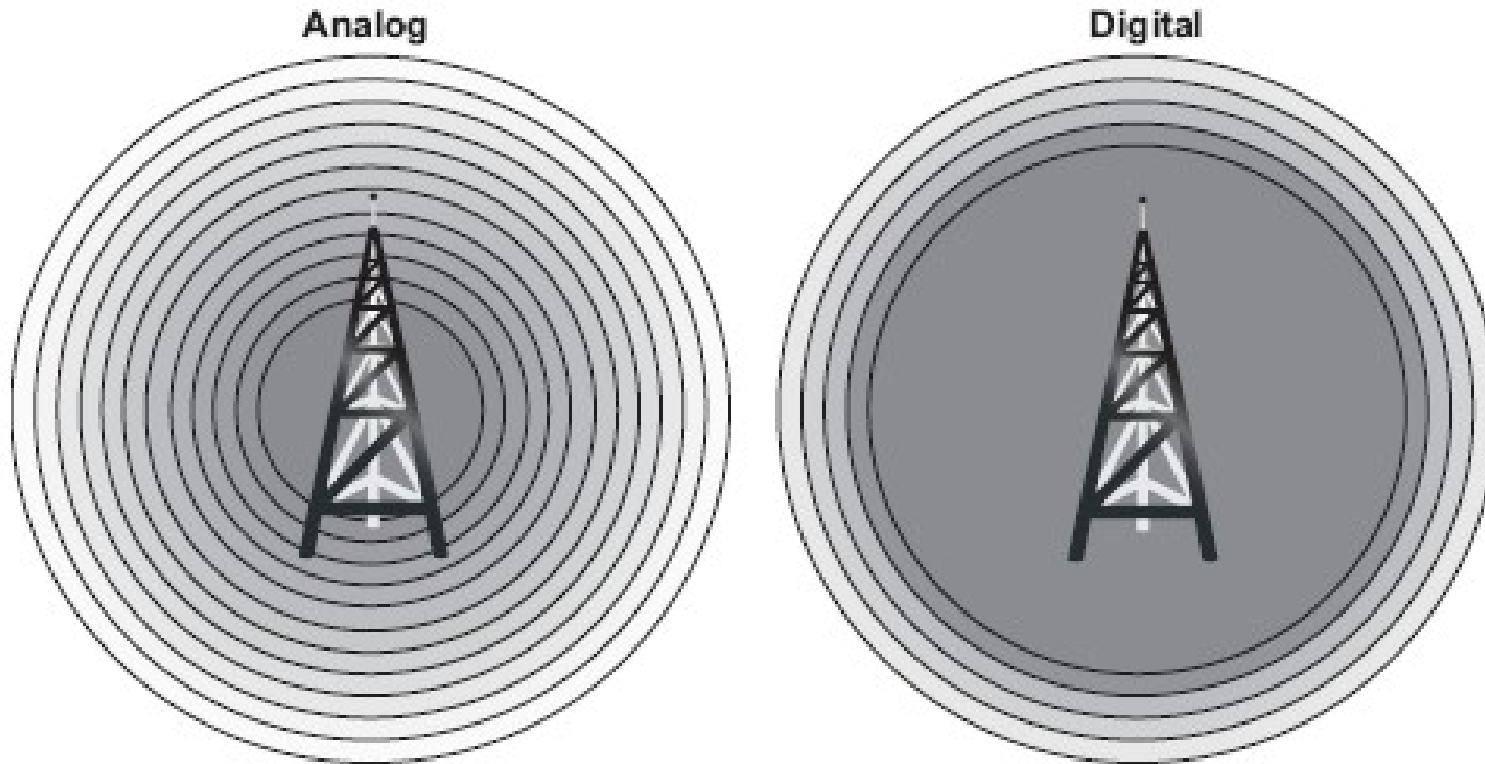
One accepted method is known as Delivered Audio Quality (DAQ).

- DAQ measures the intelligibility and quality of voice conveyed through a communications system.
- Audio quality is measured on a 5-point scale, with the DAQ rating of 3 as the minimum acceptable audio quality level for public safety applications.
- The definition of DAQ 3 is: ‘Speech understandable with slight effort. Occasional repetition required due to Noise/Distortion’.

Digital Radio Technology

System Coverage Planning (Cont.)

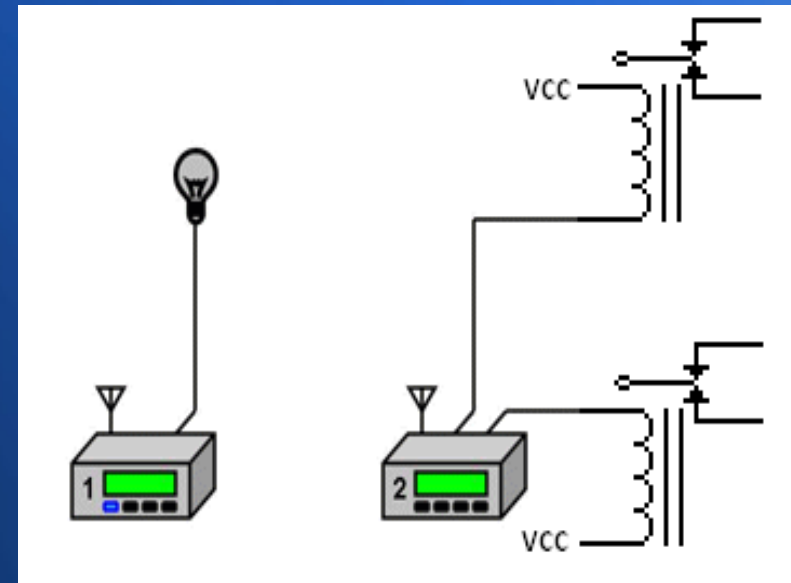
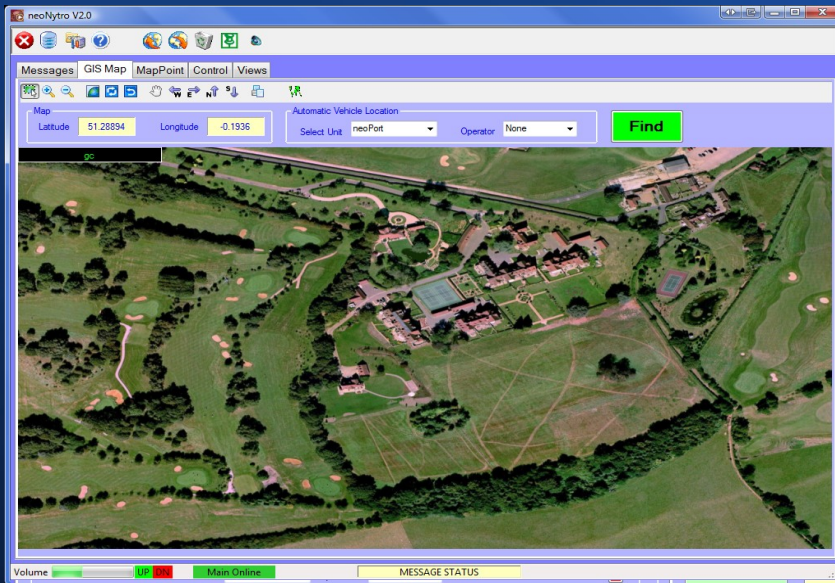
Coverage Considerations –



Improving Audio Quality



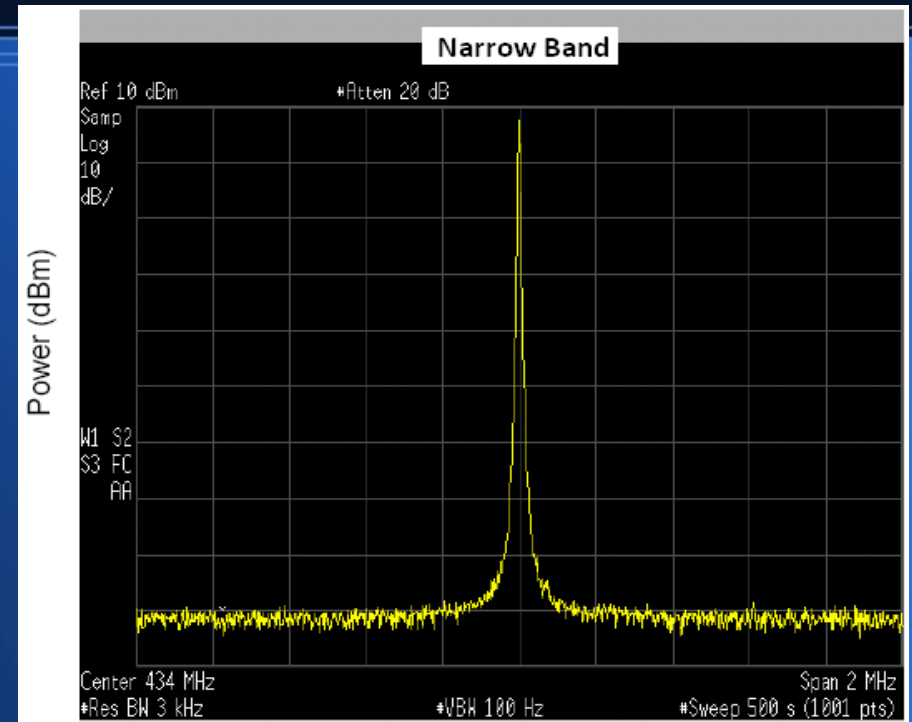
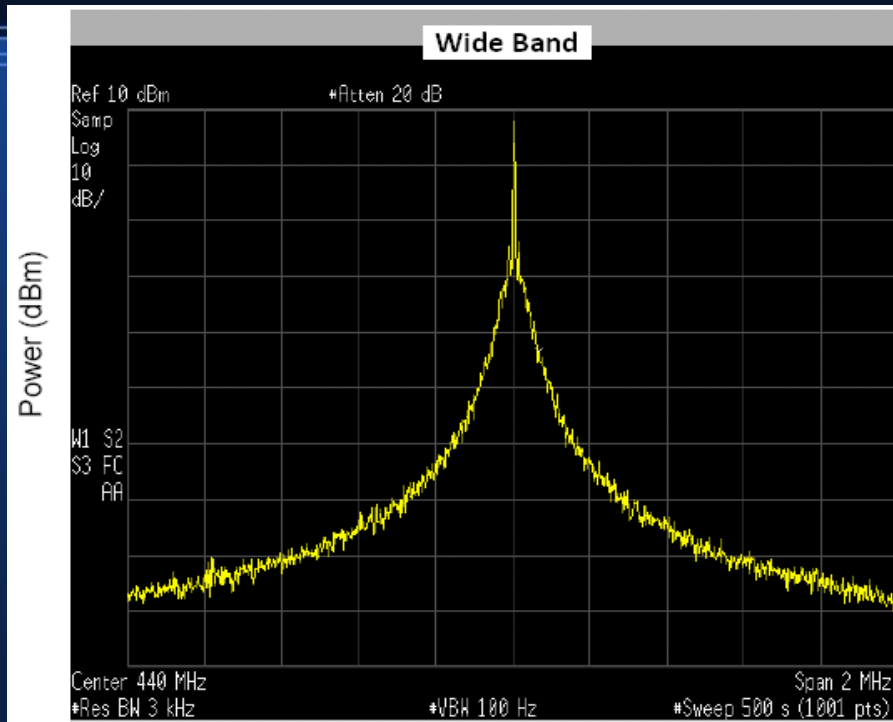
AVL & Telemetry



Functions can be performed with little or no conflict with voice communications

Questions?

Getting Prepared For Narrowbanding



Thank You!

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615-890-6685 - markcline700@gmail.com