Recommendation WG3.18.001
(Replaces WG3.86.002)

Bucking Coordination

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Subject: Coordination

Title: Bucking Coordination

Background:

Frequency bucking may be unavoidable due to frequency congestion or network design constraints unrelated to frequency coordination. As noted in NSMA WG03-10-001, "Mixed High-Low Frequency Plans (Bucks) and Reflection Interference", the interference potential of a bucking situation is unpredictable using analytical methods. Links should be designed to avoid bucking where possible.

For direct interference cases, there is a clear-cut technical standard (e.g. TIA TSB10-F) in use to guide frequency coordinators in determining when an interference case is acceptable or when it can be used to reject the coordination. However, there is currently no recommendation to identify bucking cases that are acceptable from severe bucking cases that require caution, if they are to be attempted at all.

Therefore, the purpose of this NSMA recommendation is to describe a method for resolving the bucking cases that were identified based on guidance from NSMA WG03-10-001. This recommendation should improve the efficiency of bucking case handling, result in faster frequency coordination, and eliminate frivolous objections that are based solely on benign bucking cases.

Recommendation:

In all situations where bucking has been identified per NSMA WG03-10-001 guidelines, the details of the bucking paths should be examined to ensure proper handling of potential interference. Site coordinates should be verified for accuracy. If an incumbent provides coordinates that differ from the license data, these updated coordinates should be used for all distance and azimuth calculations. The actual Far Field Distance of the largest antenna should be calculated or taken from Table 1 below. If coordinates are unable to be verified, a single coordinate inaccuracy allowance of 39 meters (see NSMA WG-3-10-001) can be added to the Far Field Distance in Table 1. In addition, the frequency spacing between the bucking paths should be considered.

1. **Co-Channel Bucking**

   Co-channel bucking occurs when both of the following conditions apply:
   - The proposed transmit channel bandwidth infringes on any part of the channel bandwidth of the incumbent receiver.
   - The distance between sites is less than the Far Field Distance of the largest antenna.

   RECOMMENDED ACTIONS:
   - NSMA does not recommend coordination with Co-channel bucking.
   - Co-channel Bucking should be avoided.
   - Mitigating circumstances such as significant blockage, a back-to-back antenna configuration that minimizes interference coupling, or lack of a reflective or scattering environment may be presented to gain agreement from the incumbent party.
   - If no agreement can be reached and the coordinating party (proponent) is willing to incur the risks of proceeding, the incumbent may request field testing. Testing must be completed within 30 days of build completion of both paths, unless a longer period is mutually agreeable.
   - If no response is made by the coordinating party to the incumbent's request for testing, the coordinating party/applicant should be willing to assume the risk of potential objections to its FCC filing.

2. Adjacent Channel Bucking

Adjacent channel bucking occurs when both of the following conditions apply:

- The proposed transmit channel bandwidth infringes on any part of the adjacent channel bandwidth of the existing receiver
- The distance between sites is less than the Far Field Distance of the largest antenna

RECOMMENDED ACTIONS:

- Cases should be reported by incumbents and responded to by the coordinating party.
- Mitigating circumstances such as significant blockage, a back-to-back antenna configuration that minimizes interference coupling (see section below), or lack of a reflective or scattering environment may be presented to the incumbent party.
- If no agreement can be reached on adjacent channel concerns, an exchange of contact information and coordinate verification of both sites may be requested by either party and should be accommodated.
- Pre-service monitoring may be requested by the incumbent and should be accommodated; this request should be made at least two weeks prior to the planned operation of the proponent's system.

3. Minor Bucking

This is comprised of all remaining bucking cases, where one of the following conditions apply:

- The proposed transmit channel bandwidth does not infringe into the adjacent channel or co-channel bandwidth of the existing receiver
- The distance between sites is greater than the Far Field Distance of the largest antenna

RECOMMENDED ACTIONS:

- Reported minor bucking cases without any co-channel or adjacent channel overlap do not require a response from the proponent.
- For minor bucking cases in the Far Field of the largest antenna that have spectral overlap between the proposed channel bandwidth and the incumbent channel bandwidth(s) or adjacent frequency channel bandwidth(s), the incumbent may request coordinate verification of the bucking site, which should be provided by the coordinating party.
- If the incumbent provides specifics about potential concerns, then a request by the incumbent to the coordinating party for notification of the planned turn-up date may be made and accommodated at least two weeks prior to installation and operation of the coordinated path. The specific details recommended to justify requests for turn-on notice include a detailed 3-D map and other relevant information.
- Coordination should be allowed to proceed on schedule as long as there are no coordinate discrepancies that would change the category of the potential bucking case.

Calculate Far Field Distance of Antenna

The Far Field Distance (near-field/far-field boundary) pertaining to the specific bucking case should be calculated using the formula in NSMA WG03-10-001 for the antenna with the largest diameter and the actual transmit frequency of the case. The table below provides sample calculation results for several frequency and antenna combinations in each band.

Table1: Transmit Antenna Far Field Distances Calculated for Specific Frequencies and Antenna Sizes

Transmit Frequency, MHz	1-foot Antenna Far Field Distance, meters	2-foot Antenna Far Field Distance, meters	3-foot Antenna Far Field Distance, meters	4-foot Antenna Far Field Distance, meters	6-foot Antenna Far Field Distance, meters	8-foot Antenna Far Field Distance, meters	10-foot Antenna Far Field Distance, meters	12-foot Antenna Far Field Distance, meters
6175			34.5	61.2	137.7	244.7	382.5	550.8
6700			37.4	66.4	149.4	265.5	415.0	597.7
11200		27.8	62.6	111.0	249.8	443.8	693.7	
18700	11.6	46.4	104.4	185.3	417.0	741.0		
22400	13.9	55.6	125.0	221.9	499.6			

- If coordinates are unable to be verified, a single coordinate inaccuracy allowance of 39 meters can be added to the Far Field Distance.

Approved by WG3: 2/20/2018
Approved by NSMA Board: 3/22/2018
To Membership for comment: 3/27/2018
Effective date: 4/26/2018