

**ENGINEERING STATEMENT PREPARED IN SUPPORT OF
REPLY TO OPPOSITIONS TO PETITIONS FOR RECONSIDERATION**

In the Matter of:

Unlicensed Operation in the
TV Broadcast Bands ET Docket No. 04-186

Additional Spectrum for Unlicensed Devices
Below 900 MHz and in the 3 GHz Band
ET Docket No. 02-380

The following engineering statement has been prepared on behalf of Cellular South, Inc. (“CS”) concerning ET Docket No. 04-186, “Unlicensed Operation in the TV Broadcast Bands” and ET Docket No. 02-380, “Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band.” The purpose of this statement is to address the need to prohibit TVBD operation on CH 51 throughout the United States with regard to the cumulative impact from multiple signals.

The Commission has recognized that multiple interfering signals on the same frequency add in a predictable way which must be taken into account if interference is to be avoided. FCC Rule Section 73.182(k) describes this process:

“Objectionable nighttime interference from a broadcast station occurs when, at a specified field strength contour with respect to the desired station, the field strength of an undesired station (co-channel or first adjacent channel, after application of proper protection ratio) exceeds for 10% or more of the time the values set forth in these standards. *The value derived from the root-sum-square of all interference contributions represents the extent of a station's interference-free coverage.*”

The cumulative level of interference from other stations is calculated using the root-sum-square (RSS) values of interfering field strengths which is accomplished by considering the signals in order of decreasing magnitude, adding the squares of the values and extracting the square root of the sum, excluding those signals which are less than 50% of the RSS values of the higher signals already included. This procedure has been a part of the rules for decades.

For digital services in the 21st century, the calculation of interference to a digital facility can be described as follows:

Calculation of the resulting sum field strength of interferers¹

To calculate the resulting interfering sum field strength level from several signal sources E_{sum} the power sum method shall be applied. This is the logarithmic value of the sum of the individual field strength levels expressed as arithmetic powers:

$$E_{sum,n} [\text{dB}\mu\text{Vm}^{-1}] = 10 \cdot \log\left(\sum_{i=1}^n 10^{\frac{E_i}{10}}\right)$$

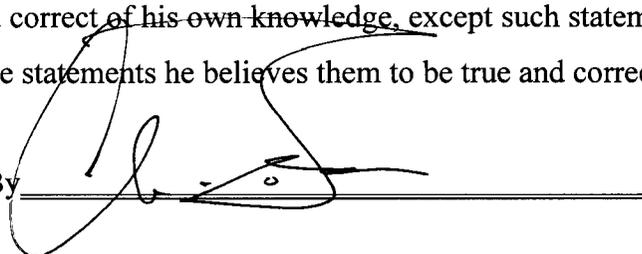
where E_i represents the individual field strengths level [dB($\mu\text{V}/\text{m}$)].

FCC OET Bulletin No. 69 sets the 41 dBu F(50,90) contour as the limit of protected service and the D/U ratio at 15 dB. Under this standard, interference could be considered to exist when the 26 dBu F(50,10) interfering contour overlaps the 41 dBu F(50,90) service contour. However, if at a point immediately outside the 41 dBu contour four signals exist which each have a field strength of 25 dBu, the total interference by the formula above, which is mathematically equivalent to the Part 73 RSS method, will be 31 dBu. This represents a significant increase in the noise floor and a cause of interference to Lower Block A wireless licensee base station facilities not countenanced in the Second Memorandum Opinion and Order. CS is not suggesting that the Commission should modify the protection rules established in this proceeding but rather use this as an example of why CH 51 operation in the entire United States should be precluded if Lower Block A wireless licensee facilities are to be protected.

1 FROM DRM Planning Factors Document *V 2.0a - 10/09/2010*

The foregoing was prepared on behalf of **Cellular South, Inc.** by Clarence M. Beverage of *Communications Technologies, Inc.*, Marlton, New Jersey, whose qualifications are a matter of record with the Federal Communications Commission. The undersigned certifies, under penalty of perjury, that the statements herein are true and correct of his own knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.

By



Clarence M. Beverage
for Communications Technologies, Inc.
Marlton, New Jersey

March 3, 2011