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S T A N D A R D S

Network Operations Subcommittee

SCTE OPERATIONAL PRACTICE

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**Field Strength Tutorial & Calculation of LTE User
Equipment Field Strength**

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1. Introduction

1.1. Executive Summary

Cable operators have been measuring the field strength of over-the-air radio frequency (RF) signals for decades. For instance, most operators are required to measure signal leakage field strength. As well, it can sometimes be helpful to calculate and/or measure the field strength of certain over-the-air signals such as potential interference sources.

In late 2010, a new wireless technology called 4G, or long term evolution (LTE), was introduced in the United States. LTE service operates in several frequency bands, including the 698 MHz to 806 MHz band, which overlaps the frequency spectrum used by many cable operators to deliver services to their customers. As LTE service providers continue to deploy LTE service, the RF signals emanating from LTE towers and user equipment (UE) represent sources of potential interference to services carried on cable systems.

More recently, 5G New Radio (NR) technology is being deployed by service providers. Here, too, some 5G technology operates on over-the-air frequencies that overlap the RF spectrum used in cable networks. One example is the 600 MHz band, with UE-to-tower transmissions in the 663 MHz to 698 MHz range, and tower-to-UE transmissions in the 617 MHz to 698 MHz range.

1.2. Scope

This Operational Practice provides a tutorial on RF field strength, and a method for calculating field strength, such as the field strength of an RF signal emanating from LTE UE. The same principles are applicable to cable network signal leakage field strength.

1.3. Benefits

Understanding the concept of field strength and how to calculate it can help cable operators as they maintain and troubleshoot their networks, and comply with government regulations applicable to signal leakage.

1.4. Intended Audience

The intended audience of this Operational Practice is technical personnel who are interested in understanding the basics of RF field strength, and its application to signal leakage and over-the-air signals that can potentially cause interference to cable networks.

1.5. Areas for Further Investigation or to be Added in Future Versions

No areas for further investigation were identified at the time this Operational Practice was written.

2. Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1. SCTE References

- No normative references are applicable.

2.2. Standards from Other Organizations

- No normative references are applicable.

2.3. Published Materials

- No normative references are applicable.

3. Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

3.1. SCTE References

- SCTE 209 2015: Technical Report - UHF Leakage, Ingress, Direct Pickup

3.2. Standards from Other Organizations

- No informative references are applicable.

3.3. Published Materials

- Hranac, R. (2012, July). The Antenna Factor. *Communications Technology*. Retrieved October 14, 2014, from <https://scte-cms-resource-storage.s3.amazonaws.com/12-07-01%20the%20antenna%20factor.pdf>
- Kraus, J. (1988). *Antennas, Second Edition*. New York: McGraw-Hill
- *The ARRL Antenna Book* (any recent edition); www.arrl.org
- *The ARRL Handbook for Radio Amateurs* (any recent edition); www.arrl.org