Power Measurement KDB Update

Steven Jones
Technical Research Branch
Federal Communications Commission
Office of Engineering and Technology
Laboratory Division
Background

This presentation is intended to present information regarding recent measurement-related publications made through the FCC laboratory knowledge database (KDB).

All KDBs discussed herein can be accessed at:
https://fjallfoss.fcc.gov/oetcf/kdb/index.cfm
Power measurement procedure for transmitting devices operating within the Medical Device Radiocommunication (MedRadio) Service under Part 95 I

Presents a procedure for demonstrating compliance of a MedRadio device to the fundamental output power limit

Utilizes the integrated band power method for determining the average power level
KDB Publication 965270

- Offers guidance for performing fundamental output power measurement on Part 90Z wireless broadband devices operating in the 3650-3700 MHz band
- Specifies an integrated band power procedure to demonstrate compliance to the EIRP limit
- Presents a procedure to demonstrate compliance to the power spectral density (per MHz) limit
General guidance for measuring the fundamental output power of licensed broadband digital transmission systems

Presents guidance on measuring the signal bandwidth, average power over the fundamental bandwidth, power spectral density (PSD) and peak-to-average power ratio (PAPR)

Utilizes the occupied bandwidth (OBW) feature of contemporary spectrum/signal analyzers to determine signal bandwidth

Specifies the integrated band power function to determine the average power over a wide bandwidth

Utilizes the complimentary cumulative distribution function (CCDF) for determining the PAPR on a statistical basis

Specifies a method for determining the statistical peak power utilizing the measured average power and PAPR

Procedures currently being reviewed within C63 Working Group
Presents a methodology for determining the Effective Radiated Power (ERP) and the Equivalent (or Effective) Isotropically Radiated Power from measured output power data

Equations provided to determine ERP/EIRP from measured data expressed in either linear or logarithmic terms
Addresses inquiries regarding the use of a pre-calibrated field methodology as an adjunct to signal/antenna substitution methods prescribed in TIA-603-C

The pre-calibrated field methodology is not presently well understood by the FCC
- Only limited information has been provided to FCC in inquiries
- The methodology has not been recognized in any known industry standards

Therefore, at this time, FCC cannot accept data utilizing this method for demonstration of compliance to the limits
Addresses a recurring question of whether a log average detector can be used to perform measurements on intentional radiators operating above 1 GHz.

15.209 specifies the use of an average detector for measuring emissions above 1 GHz (and in the 9-90 kHz & 110-490 kHz bands).

The use of a linear average detector is required (i.e., no log averaging).

In particular, the power average (RMS) detector is recommended, particularly for measuring modern complex-modulated signals.
Addresses the question of what average detector should be used to measure radiated emissions from an unintentional radiator to demonstrate compliance with the limits specified in Section 15.109

A linear average detector should be used to demonstrate compliance to the limits.
Summary

The KDB publications presented herein are intended to clarify recurring questions submitted to the FCC regarding acceptable methods for performing power measurements to demonstrate compliance to the rules requirements.

Those identified as “Draft” publications are currently open for comment.

Encourage interested parties to review these draft publications and submit appropriate comments.
C63.26 Update

- Progress has been slowed somewhat due to the push to complete revision of C63.10
- STM1 is reviewing the KDB 971168 proposed standard procedure for measuring fundamental emission power
  - Discussions currently ongoing regarding alternative methods
- STM5 has released an early draft of a standard procedure for measuring the field strength of spurious emissions
- WG meeting scheduled for Oct. 25th-29th
Questions and Answers

Thanks!