Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Unwanted Emission Graphs**
Date Submitted	**2000-04-26**
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Re:	Unwanted Emissions Information for the IEEE 802.16.2 "Recommended Practice for Coexistence of BWA"
Abstract	This illustrates graphically the various Unwanted emission proposals to stimulate discussion of appropriate limits.
Purpose	IEEE 802.16.2 should review the graphical information at its Montreal interim meeting April 19/20th 2000, to develop appropriate limits for unwanted emissions.
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Unwanted Emission Graphs

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Introduction

At the IEEE 802.16.2 Interim meeting in Montreal on April 19/20th, figures 1-4 were presented to illuminate some differences between various unwanted emission masks. The figures show the application of unwanted emission masks to a specific measured system – other systems/bandwidths would trigger similar, though different graphs. They show the impact of the draft IEEE mask, the FCC mask and the ETSI mask. The solid lines show the limits at nominal transmit power (0 dBW per transmission with a specified output backoff) and use the left hand axis. The dashed lines show similar limits at high transmit power (+10 dBW/carrier) and use the red right-hand axis.

Analysis

The draft IEEE curve falls quickly but has a relatively high "floor" at $< 2*B_o$ offset from the authorized bandedge, due to an absolute –43 dBW/MHz limit, especially at low transmit power.

The FCC curve uses the same equation as the draft IEEE curve, but falls more gently as it depends on the authorized bandwidth rather than the occupied bandwidth. It typically has a lower floor than the draft IEEE curve. The FCC curve has a relatively high spurious emission level -43dBW/4kHz.

The ETSI curve falls between these two, but falls off significantly in the spurious emission region to very low levels.

The participants then requested similar curves assuming broadband signals and these are shown in figures 5-10.

Conclusion

The participants at the interim meeting decided on a compromise mask, based on:

- use the occupied bandwidth as key metric
- use the FCC equation in the out-of-band region ($<2*B_o$)
- use –43 dBW/MHz in the spurious region ($>2*B_o$)

The specific changes will be in a separate contribution.

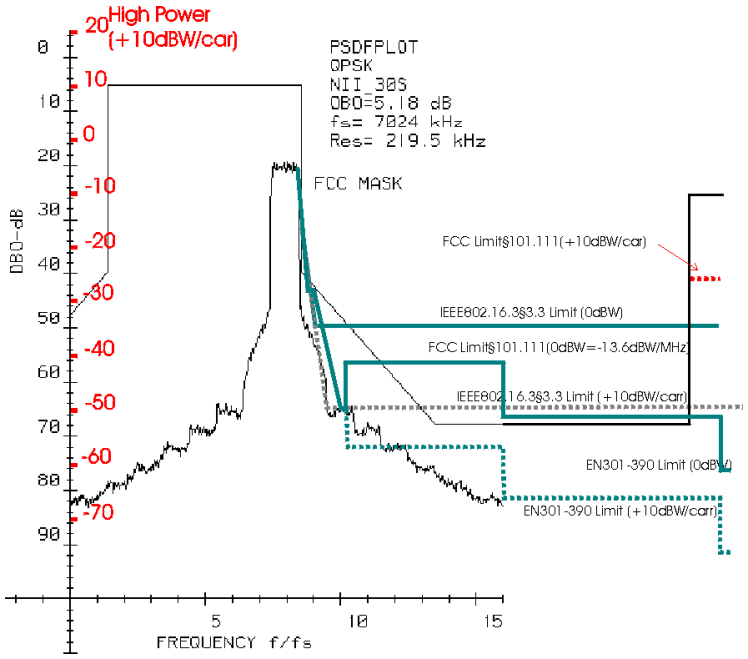

Figure 1

NOTE ETSI data assumed EN390-213-3 (V1.1.1) single carrier data (system type A) with assumed carrier center 3.5 MHz to left of edge of authorized bandwidth and assuming a channel spacing of 7 MHz.

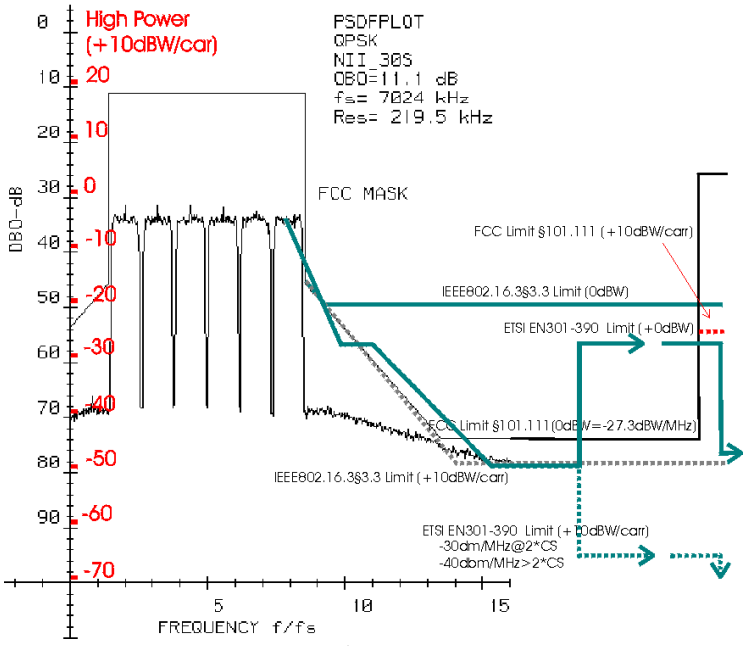

Figure 2

NOTE ETSI data assumed EN390-213-3 (V1.1.1) single carrier data (system type A) with assumed carrier center 28 MHz to left of edge of authorized bandwidth and assuming a channel spacing of 56 MHz.

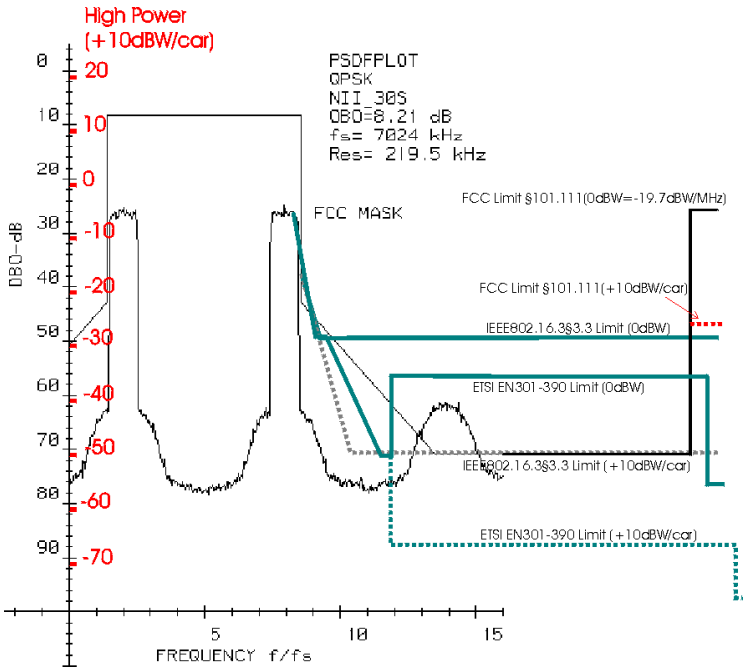

Figure 3

NOTE ETSI data assumed EN390-213-3 (V1.1.1) single carrier data (system type A) with assumed carrier center 7 MHz to left of edge of authorized bandwidth and assuming a channel spacing of 14 MHz.

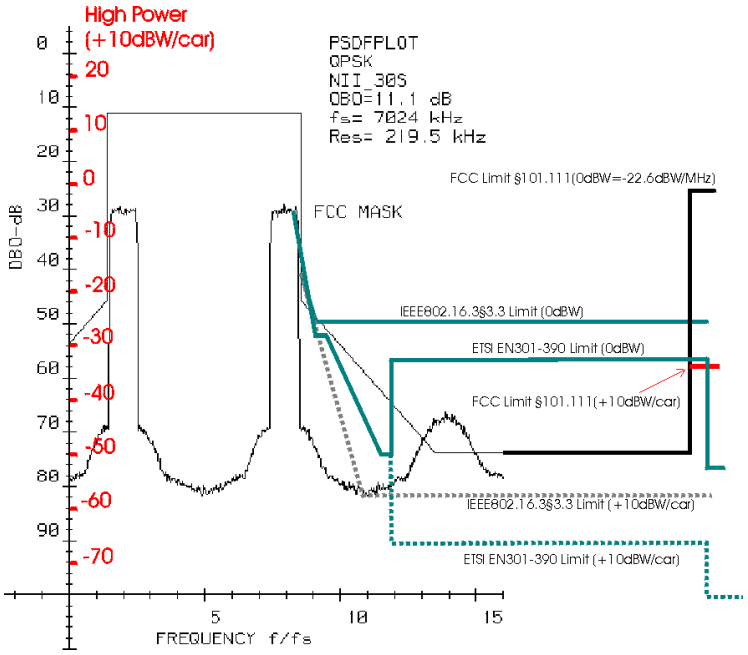

Figure 4

NOTE ETSI data assumed EN390-213-3 (V1.1.1) single carrier data (system type A) with assumed carrier center 7 MHz to left of edge of authorized bandwidth and assuming a channel spacing of 14 MHz.

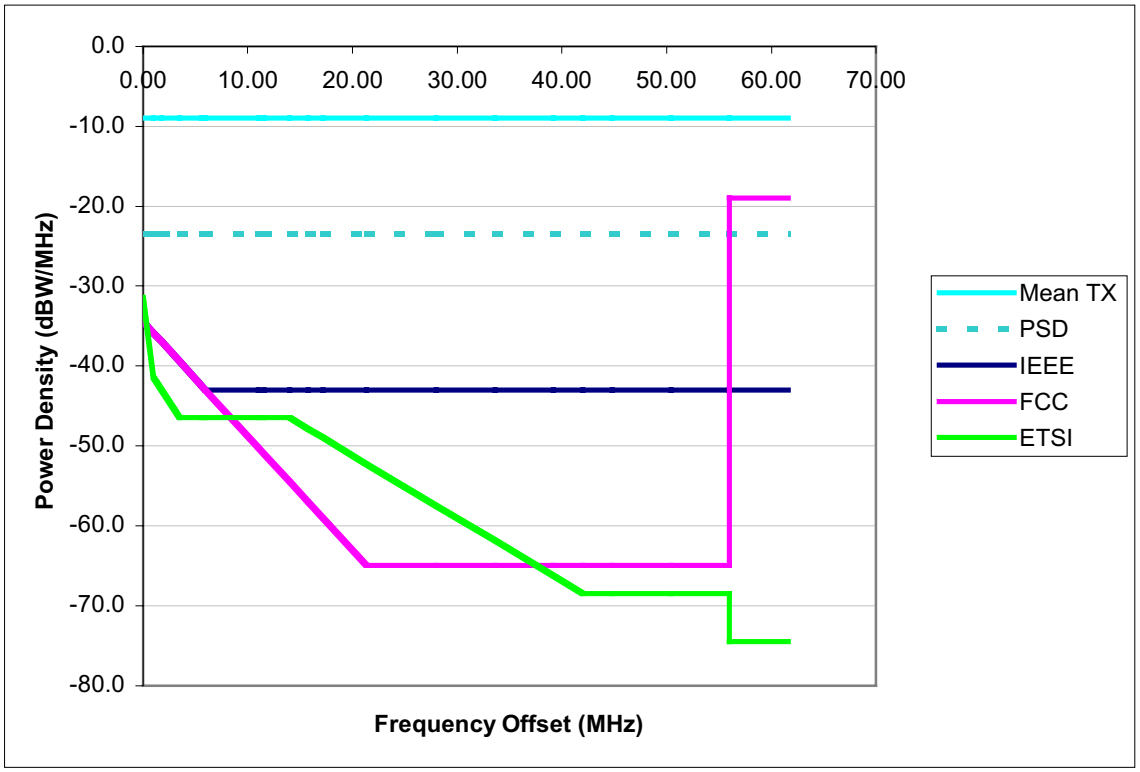

Figure 5 28MHz transmission @ 21 dBm

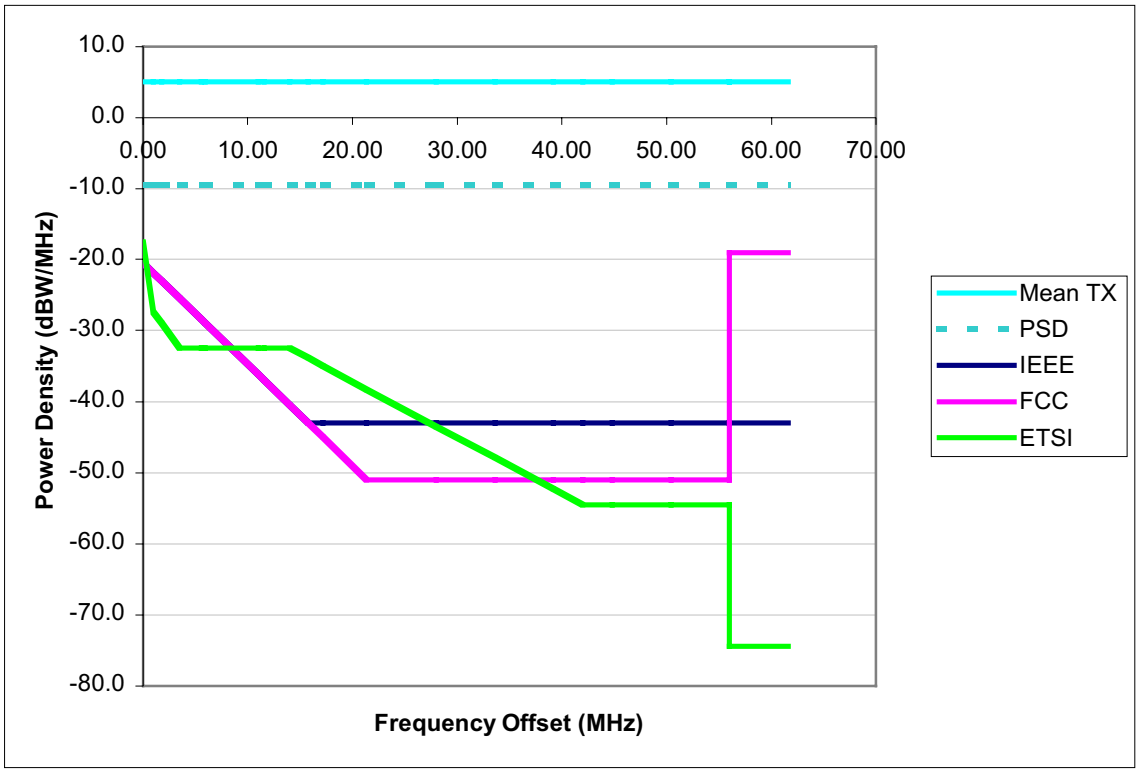

Figure 6 28MHz Transmission @ 35 dBm

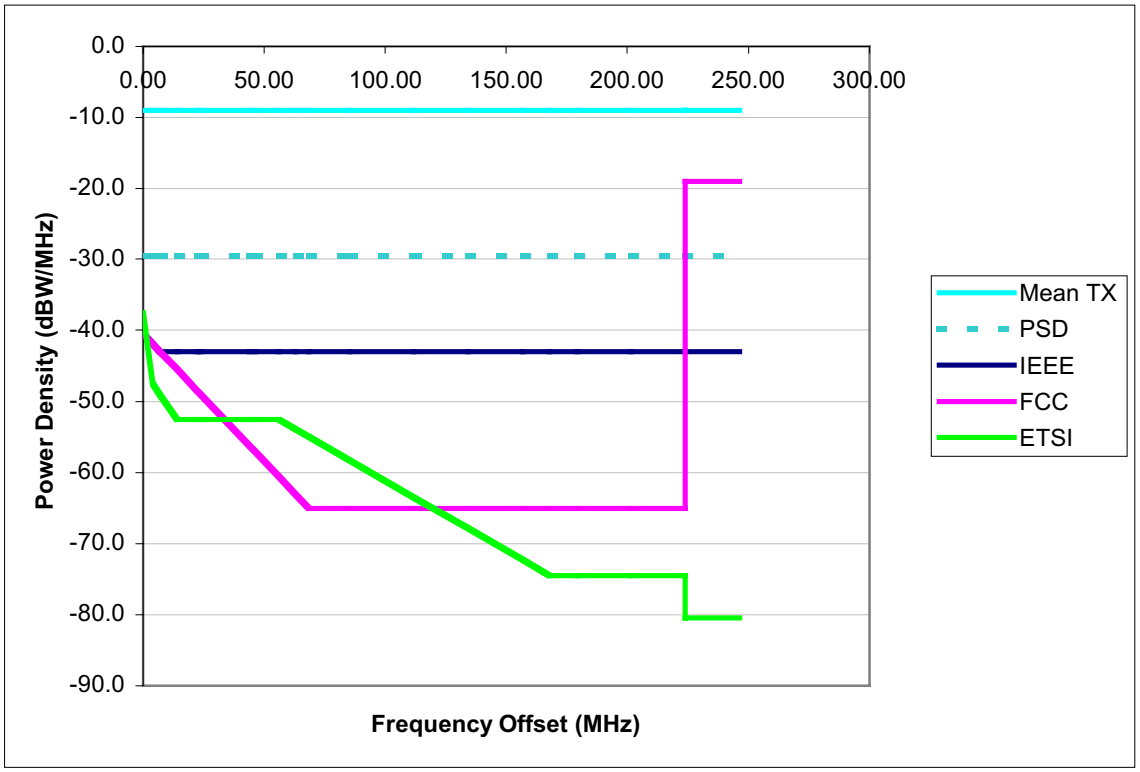

Figure 7 112 MHz Transmission @ 21 dBm

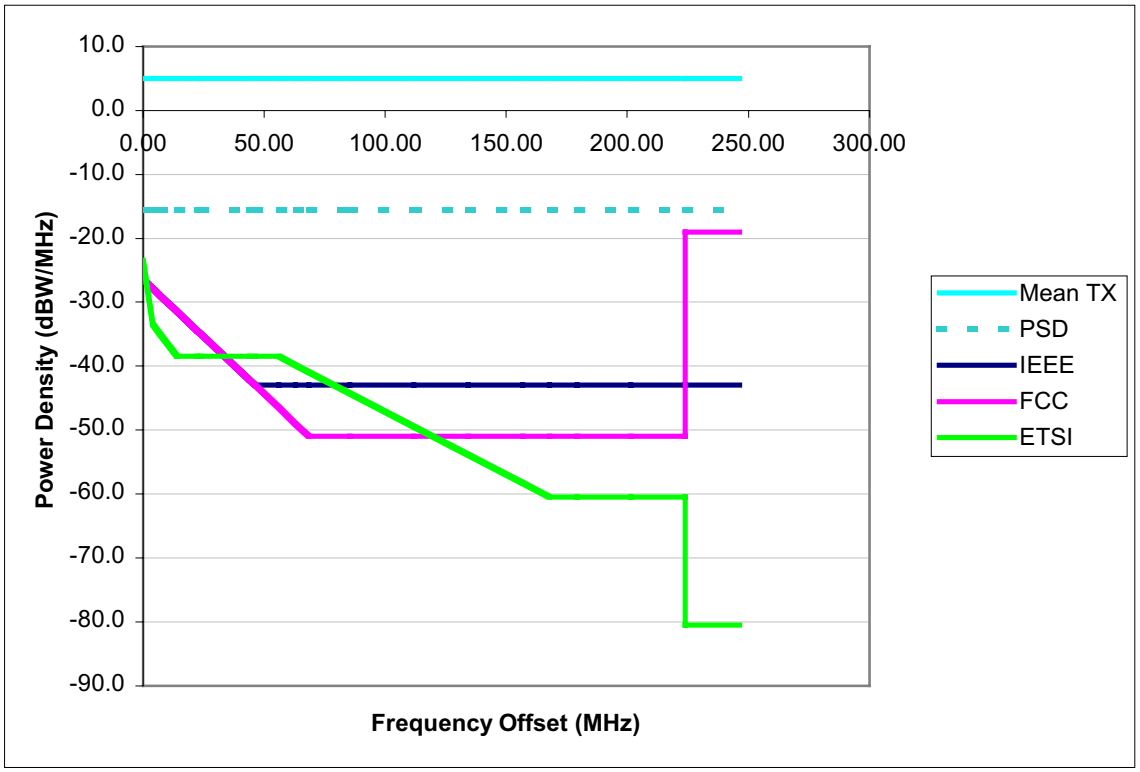

Figure 8 112 MHz Transmission @ 35 dBm

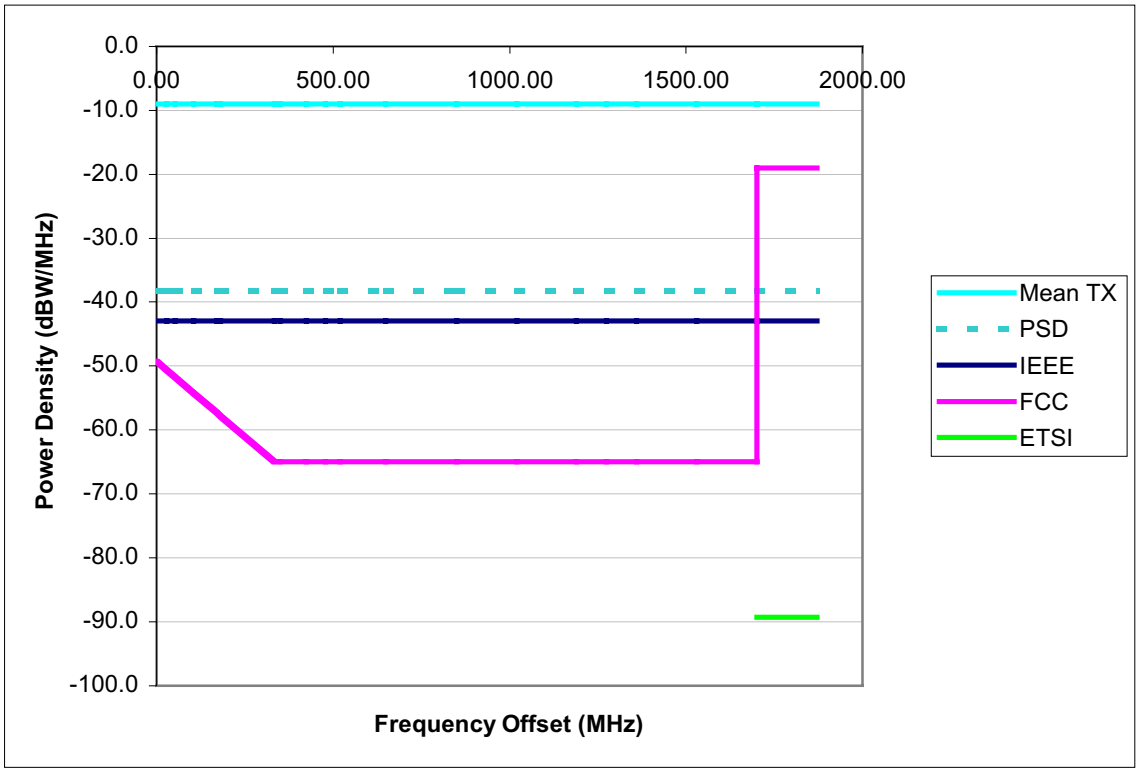

Figure 9 850 MHz Transmission @ 21 dBm

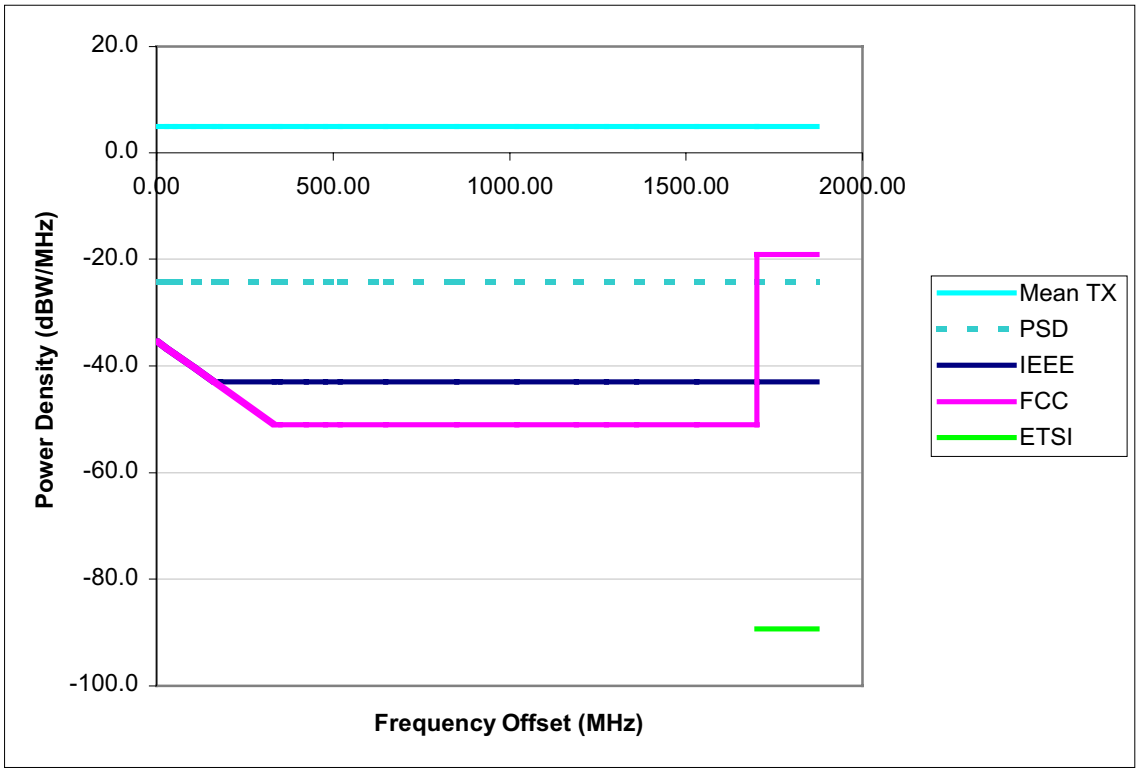

Figure 10 850 MHz Transmission @ 35 dBm