
IEEE P802.11
Wireless LANs

Title**Date:** January 10, 1999**Author:** Naftali Chayat and Tal Kaitz
BreezeCom
Atitim Technology Park, Bldg. 1, Tel-Aviv 61131, Israel
Phone: +972-3-645-6262
Fax: +972-3-645-6290
e-Mail : [naftalic talk]@breezecom.co.il

Abstract

In this document the effects of increasing the number of carriers from 48 to 52 carriers. This is

1. Systems under consideration

We shall compare two systems: a 48 subcarriers system and a 52 subcarriers section.

1.1. 48 subcarriers system

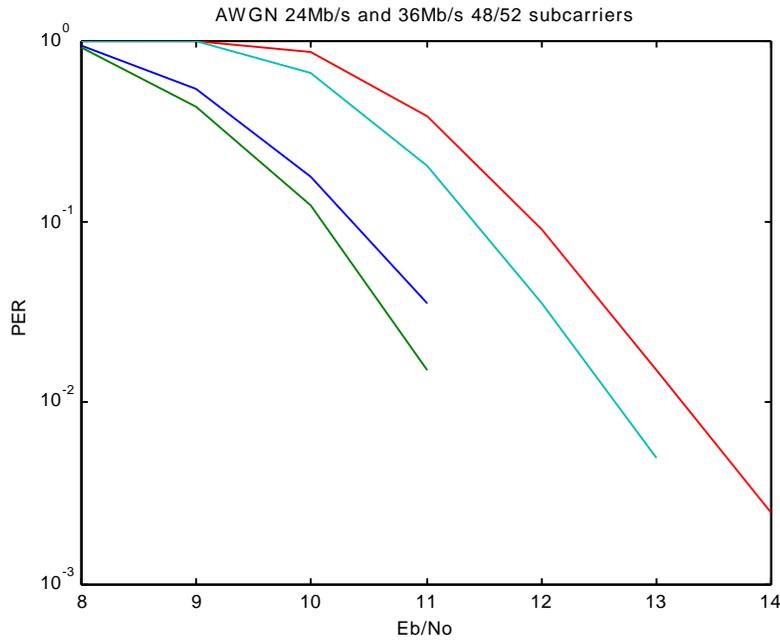
This systems utilises 48 subcarriers out of which three are used as pilot subcarriers. The pilot subcarriers inserted at location $-22, 2, 22$. The coded data bits that belong to these subcarriers are punctured.

1.2. 52 subcarriers system

This system utilises 52 subcarriers. 48 subcarriers are used for data and 4, located at $-24, 8, 8, 24$, are used for carrier tracking.

2. Performance issues:**2.1. Performance in AWGN**

We considered the performance of the two systems in flat AWGN in both 24Mb/s and 36Mb/s modes. Both systems included carrier tracking.



Blue 24Mb/s 48sc. Green: 24Mb/s 52sc. Red 36Mb/s 48sc. Torquise: 36Mb/s 52sc

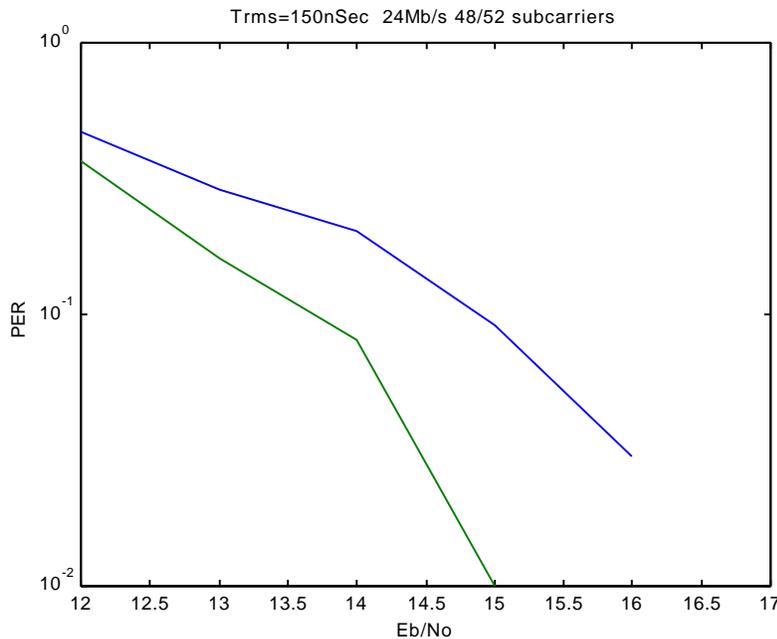
It can be observed that that in 24Mb/s the 52sc systems had an advantage of 0.4dB and in 36Mb/s the 52 sc had an advantage of 0.7 dB. The advantage is related to the increase in code rate and to the improved SNR of the carrier tracking.

2.2. Performance under fading conditions

We considered the performance of the two systems under Rayleigh fading.

24Mb/s mode:

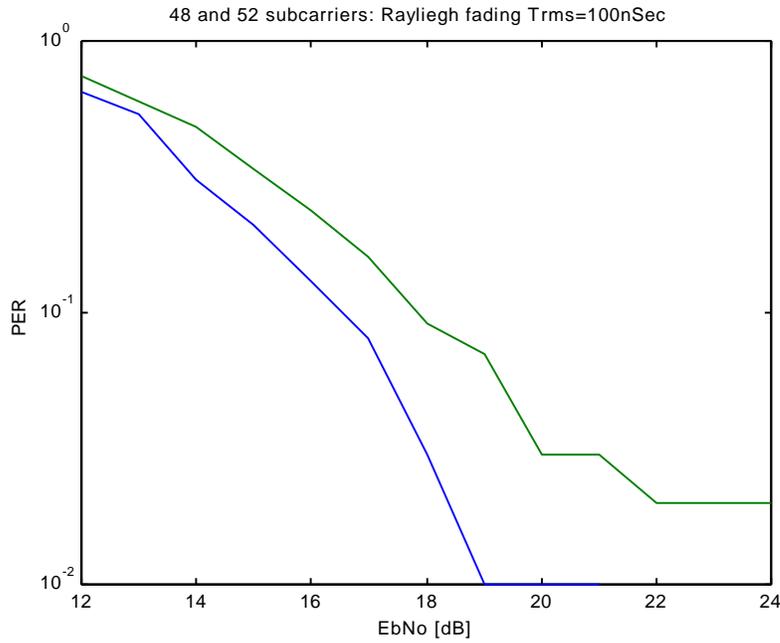
Trms=150nS.



Green : 52 sc. Blue 48 sc.

An advantage of 1.25 dB is apparent.

36 Mb/s mode

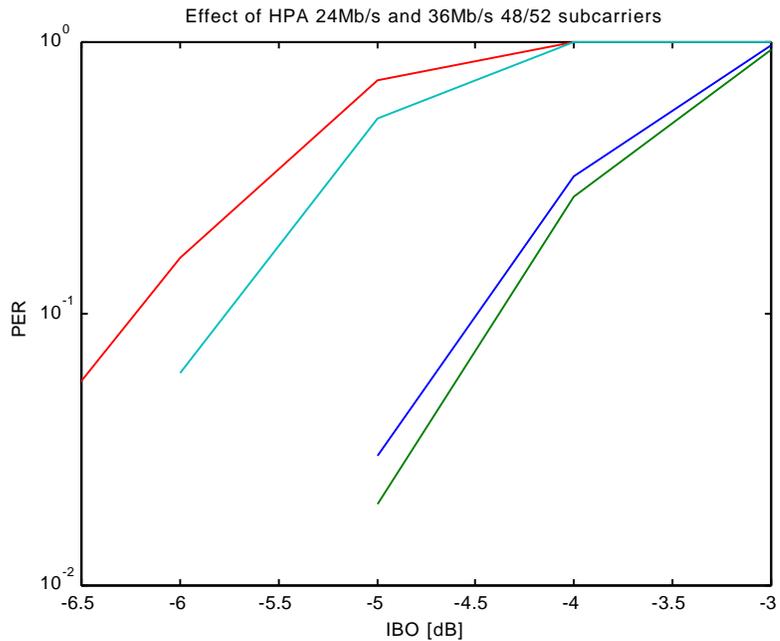


Green : 48 sc. Blue 52 sc.

In 24Mb/s an advantage of 1.25 dB is apparent while in 36 Mb/s the advantage is about 1.6dB. The advantage is related to the increased in coding rate and to the improved channel tracking.

2.3. Effects of HPA

The two systems were simulated under the conditions of a non-linear HPA. We used Rapp model with $p=2$. The packet error rate was measured as a function of input backoff. The systems were simulated at an SNR of 3dB above threshold.



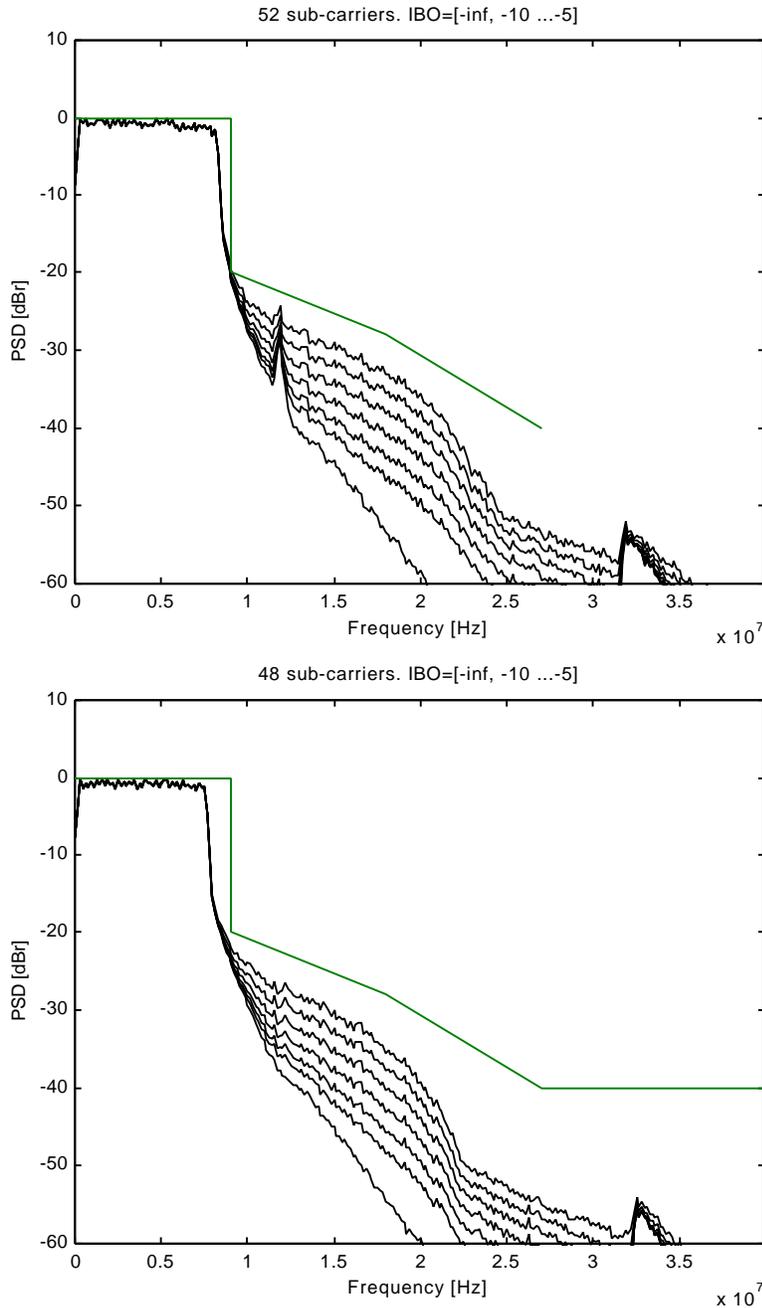
Green: 24Mb/s 52sc. Blue 24Mb/s 48sc. Red 36Mb/s 48sc. Torquise: 36Mb/s 52sc

36Mb/s EbNo=15dB. 24Mb/s EbNo=13dB

The 52 sc system could sustain an IBO higher than that of the 48 sc system.

3. Spectral issues

The power spectral density is shown for the systems under Rapp model p=2 HPA. The simulation included the effect of the D/A and the transmit anti-aliasing filter which was implemented as a factor of two interpolator and an analogue 3rd order filter.



It can be observed that for a -40 dbr level, the difference in allowed IBO is about 1dB.

4. Conclusion

A comparison between 48 and 52 subcarriers was performed. It was verified that the 52 system outperformed the 48 subcarriers system. The 52 sc system requires an additional IBO of 1dB but the difference is compensated for in the higher immunity of the 52 sc system to HPA effects.

