Test results

Abstract

Within the last two years there have been efforts in order to improve the user experience of Plan Ceibal's connectivity making the most of the existing infrastructure, improving user distribution through equal SSID definitions, keeping it transparent to the user.

Previous trials deployed by the R&D team of Plan Ceibal have found that WPA_supplicant is responsible for connecting and reconnecting to the access points and that naming all the access points of a WLAN the same makes roaming transparent for the user.

However, a new issue arose while testing single SSID configurations: unnecessary jumps between APs when the laptops where measuring more than one access point with good signal levels. A WPA_supplicant patch was created by Dan Williams in order to avoid this jumps. The trials described by this report consisted on testing the compatibility of the thresholds defined in the patch by comparing them with the variability of the signal received by four types of laptops .

Once analyzed, results showed that, although the thresholds where compatible with the computers, their behavior could be optimized by widening the values as described further in this document.

Introduction

Four different power levels where defined as a result of the requirements analysis stage. Those levels being -60, -67, -72 and -80 dBm. The idea behind the trial was the comparison between the variability of the power levels measured with different models of computers and the thresholds defined in the WPA_supplicant patch.

Objectives

The major objective of the trials described by the present report was to validate the thresholds defined by Dan Williams for WPA_supplicant's roaming algorithm.

Proceeding

The trial consisted on capturing the result of iwlist scan command every five seconds during an hour, measuring one of the defined power levels with two OLPC XO models (1.0 and 1.75, Libertas firmware) along with two models of generic Intel netbooks (Realtek and Intel).

A bash script was created for this purpose. The decision of measuring power with iwlist scan was based on previous tests which compared the result of the aforementioned command with the value of current_bss->level from WPA_supplicant's code. Due to the fact that the differences between the values were insignificant and because of the complexity of customizing WPA_supplicant's code in order to be able to capture current_bss->level values every five seconds, it was decided that iwlist scan values where good enough for the purpose of the trial.

Results

The graphs below represents a comparison between the maximum and average values of the standard deviation of the received signal and the values of the thresholds defined by Dan Williams for each power level value.

Numbers 1, 2, 3 and 4 of the x axis represent four different machine models (1 and 2: XO 1.0 and 1.75 respectively. 3 and 4: generic Intel netbooks).
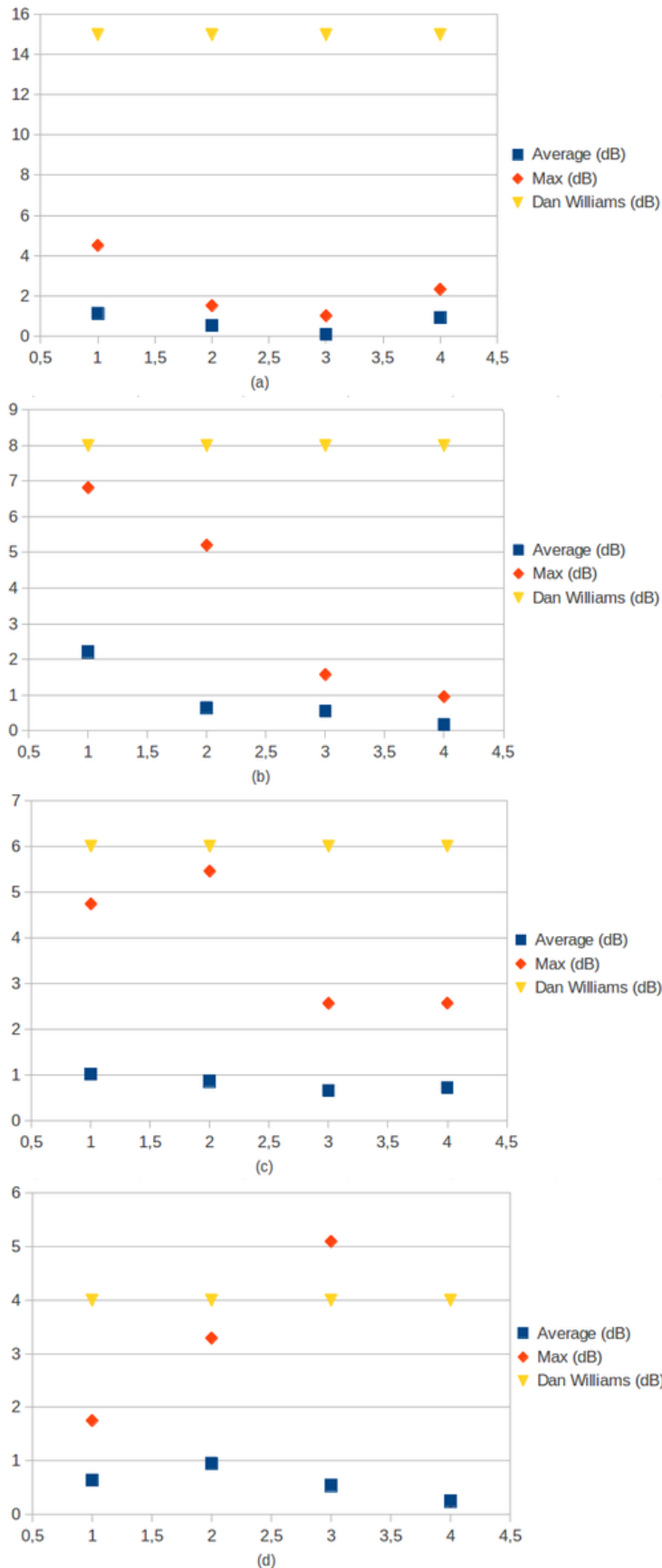
**Picture 1: Comparison between standard deviation max and average and thresholds defined by Dan Williams for
(a) -60 dBm, (b) -67 dBm, (c) -72 dBm, (d) -80 dBm**

It can be noted at first glance that there is only one case in which the maximum deviation is higher than the defined threshold, it corresponds to one of the generic Intel netbooks at -80 dBm.

Conclusions and Recomendations

Based on the results of the trial, the main conclusion is that the values defined by Dan Williams are compatible with the tested machines. However, it can also be concluded from the collected data that those values could be

adjusted. Therefore we suggest to widen the thresholds as follows:

- Power level < -65 dBm: +1 dB
- Powel level < -70 dBm: +1 dB
- Power level < -75 dBm: +2 dB