

# EXPERIMENTAL INVESTIGATION OF RADIO PERFORMANCE IN WIRELESS ACCESS NETWORK

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**Abstract:** This paper discusses the design and the implementation of the wireless access network in residential complex with minimum access points. It has been investigated the power of transmitted signal and signal noise ration of the designed network. The experimental results show that the designed network has very good quality performance.

**Keywords:** ETHERNET , LAN, NETWORK, WI-FI

## 1. Introduction

The project includes the building of a Wi-Fi network, ensuring wireless internet in a residential complex with minimum number of access points. Having in mind the specific features of the terrain and the complex as well, an optimal ways for installation of the antennas has been chosen [1]. The preliminary report has found that for the execution of the task four access points are enough for ensuring quality broadband range.

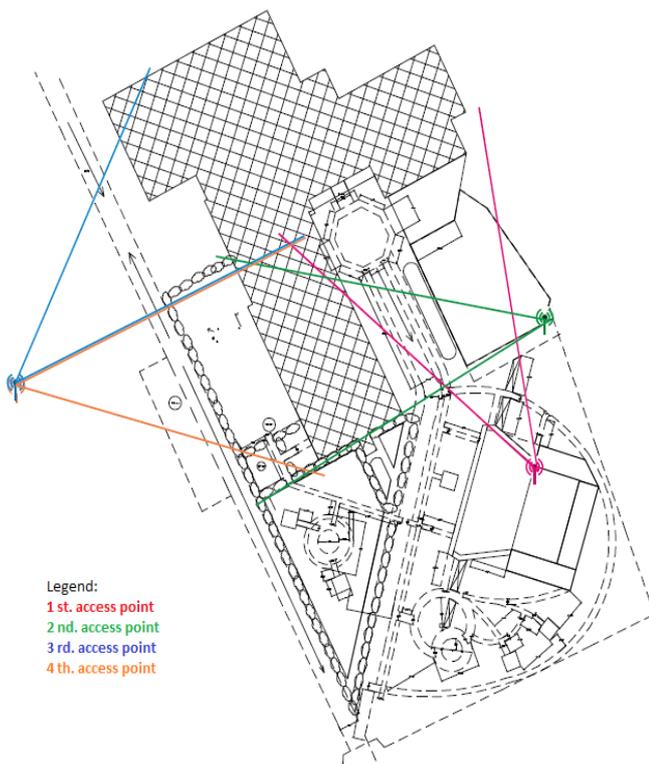


Fig. 1 Variant one

The antennas are situated according to two foreseen variants. Variant one (fig.1) and respectively - variant two (fig.2). For better coverage in the complex, circular (not pointed) antennas are used and the broadcasting angle is 360 degree. The foreseen small distances make possible the usage of less amplifying antennas.

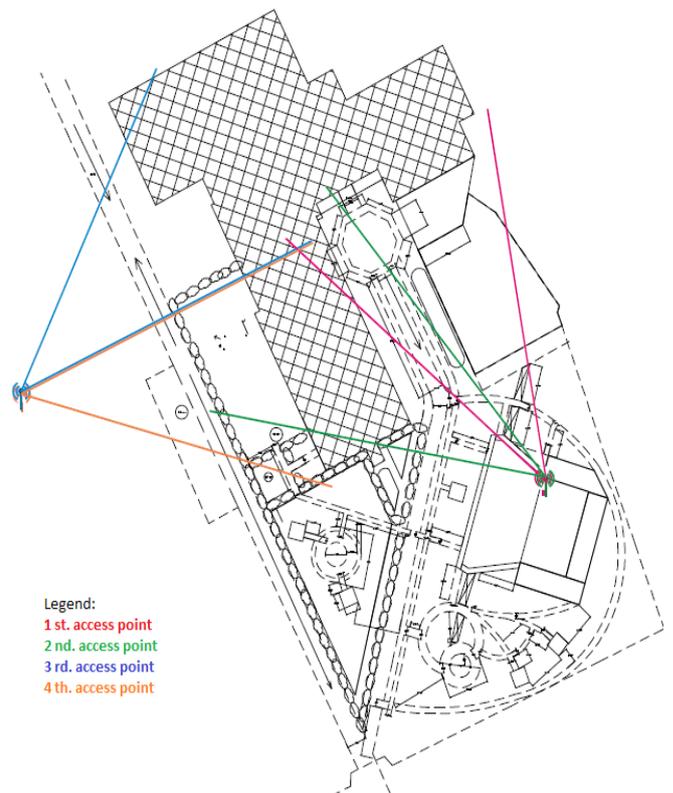


Fig. 2 Variant two

The distribution of the routers is at a height between 5 and 10 meters for ensuring full coverage [2].

## 2. Experiments

For ensuring full coverage, the foreseen four access zones are adjusted at four different frequency channels. For avoiding interference, the frequency channels are overlapping.

Point 1 - 4th fr channel

Point 2 - 1st fr channel

Point 3 - 7 th fr channel

Point 4 - 11 t h fr channel

Fig.3 and fig.4 show the frequency channels in the used working range.

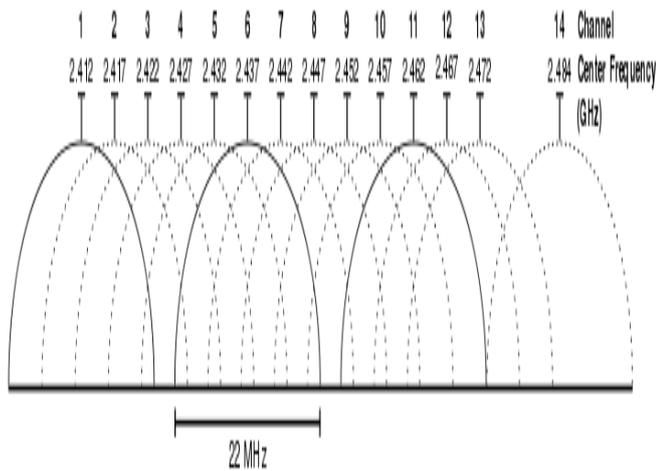


Fig. 3 Frequency channels used for access

In the experimental part, two measurements have been executed – for each of the controls for wi-fi internet [3].

Fig. 4 shows the resulting values for the level of the signal, the ratio signal/noise and the frequency channels of each router [4].

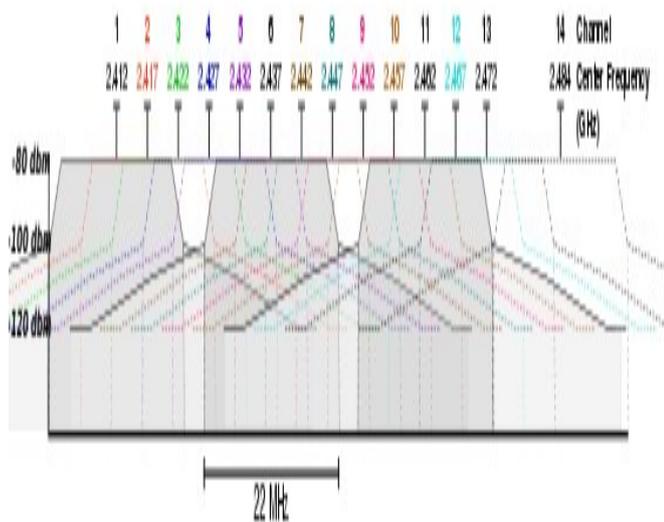


Fig. 4 Shows the resulting

The right situation and targeting of the antennas ensure the optimal level of the broadcasted signal and its spreading in the covering zones see Fig.5.



Fig. 5 Orientation of the antennas

### 3. Results

The measured value of the signal strength is -24 dBm for the Wi-fi network (fig.6). The results guarantee quality of the signal in the covered zones.

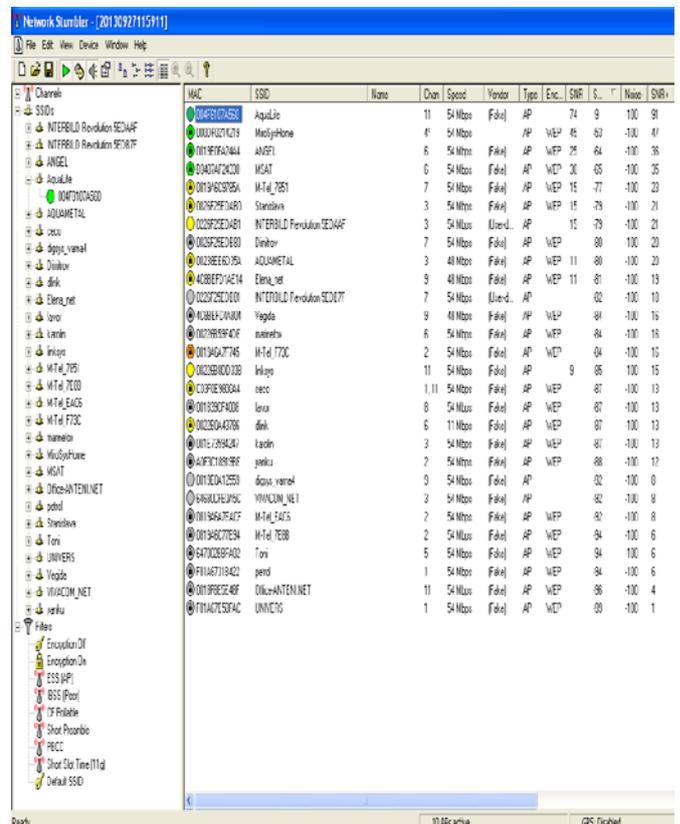


Fig. 6 Level of the transmitted signal

The executed tests prove the optimal choice and adjustments with regard to the ratio signal/noise see fig.7, 8, 9, 10.

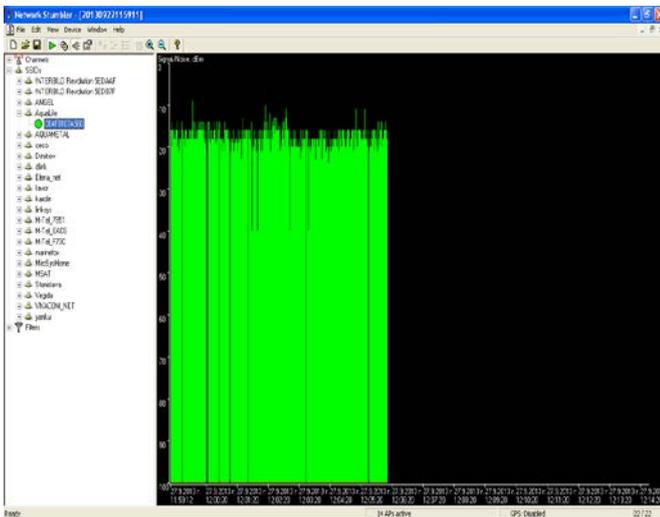


Fig. 7 Signal / noise in point 1

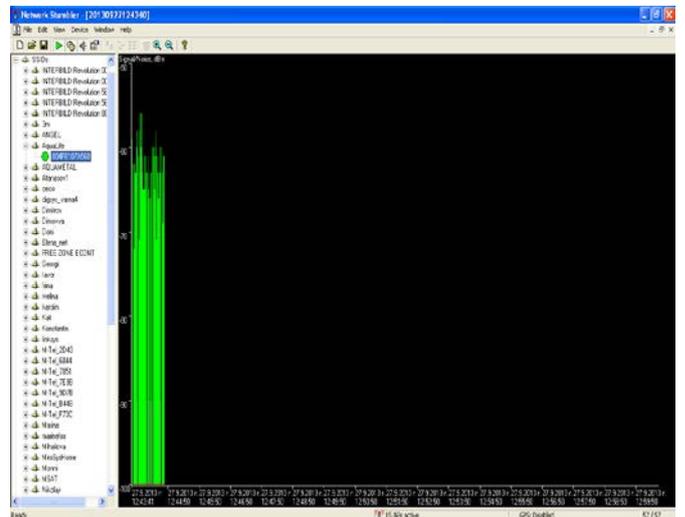


Fig. 10 Signal / noise in point 4

The graphical results have been obtained when the routers work respectively in first, fourth, seventh and eleventh frequency channels.

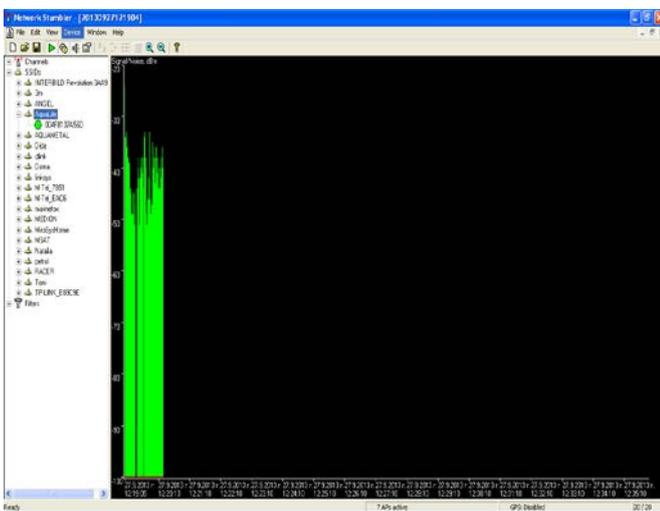


Fig. 8 Signal / noise in point 2

#### 4. Conclusion

The executed tests and measurements show, that the designed wireless network covers the requirements for reliability and quality of the signal.

For the choice of the hardware has been taken into account the possibility for power supply trough Ethernet (PoE).

The test results of Vo802.11 network make obvious its ability to compete with PSTN using uncompressed voice and the appropriate protocols. The possibility for using compressed format of the data makes the system flexible and preferred from the network designers.

#### References

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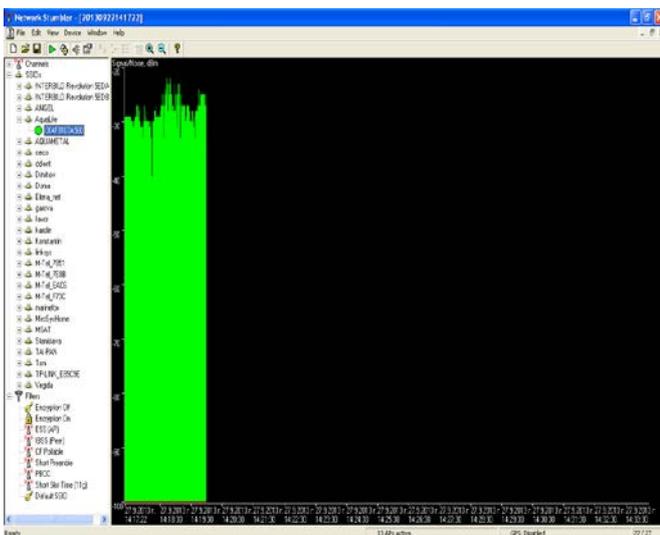


Fig. 9 Signal / noise in point 3