

ANTENNA REQUIREMENT

Standard Applicable:

For intentional device, according to FCC 47 CFR Section 15.203, “an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device”. And according to FCC 47 CFR Section 15.247(b), “if transmitting antennas of directional gain greater than 5dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi”.

Antenna Connected Construction:

The additional or alternative antenna used in this radio modular is taoglas, ceramic patch antenna WPC25A with MMCX connector, a mini-coax cable for connectivity and a PCB carrier to mount the antenna. The maximum gain of the antenna is 5dBi.

(See the attached for details)



INTEGRATION ANTENNA REPORT FOR ALCONLABS DEVICE

Passive Testing



VERSION	DATE	PAGE	DESCRIPTION	CENTRE	APPROVED
A	07/03/2012	All	WPC25 Antenna Integration Report	San Diego	Eleazar Zuniga

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I. INTRODUCCION

Taoglas has been asked to integrate the WPC25A Wi-Fi patch antenna using a MMCX connector to work specifically for AlconLabs device in the enclosure specifically designed for the product and made of materials required by the application.

II. BASIC ANTENNA REQUIREMENTS

1. Frequency:

2400-2500 MHz ISM band

2. Return Losses:

-10 dB or less from 2400 to 2500 MHz

3. Efficiency:

Approximately 50 % from 2400 to 2500 MHz

The efficiency must be considered as an important issue for power consumption, long life time for the battery and functionality of the device itself. The efficiency of an antenna measures how much power is converted into electromagnetic waves, translating this in a better signal reception with higher signal-to-noise ratio. This reduces the number of dropped connections and improves the ability of the system to support fast data transfer rates and decreased power consumption.

4. The size and shape of the WPC25A Wi-Fi patch antenna must conform into the existing enclosure of the AlconLabs device.



III. FIRST ANALYSIS OF THE DEVICE

The AlconLabs device was sent to Taoglas to be tested in passive mode, using the WPC25A patch antenna with MMCX connector. The antenna is connected with a mini-coax cable with MMCX to U.FL transitions in order to connect the antenna to the module.

Figure 1 shows the antenna allocation and figure 2, shows the antenna with the min-coax cable.



Figure 1. Antenna allocation in the AlconLabs device

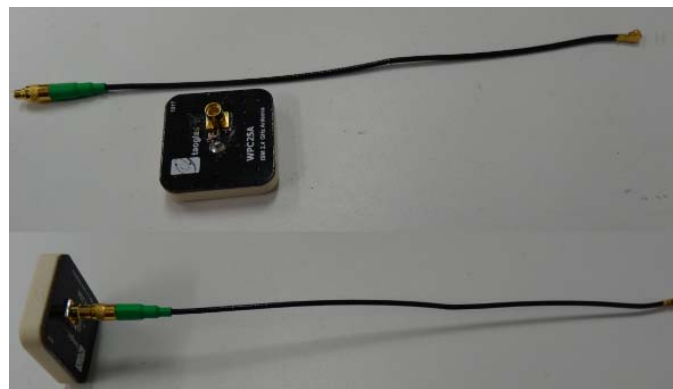


Figure 2. WPC25A with the mini-coax cable with MMCX to U.FL transition





IV. TEST SET UP

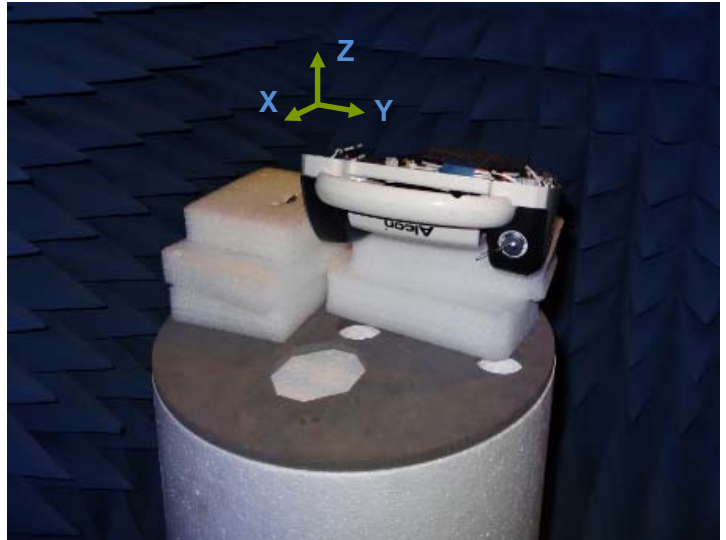
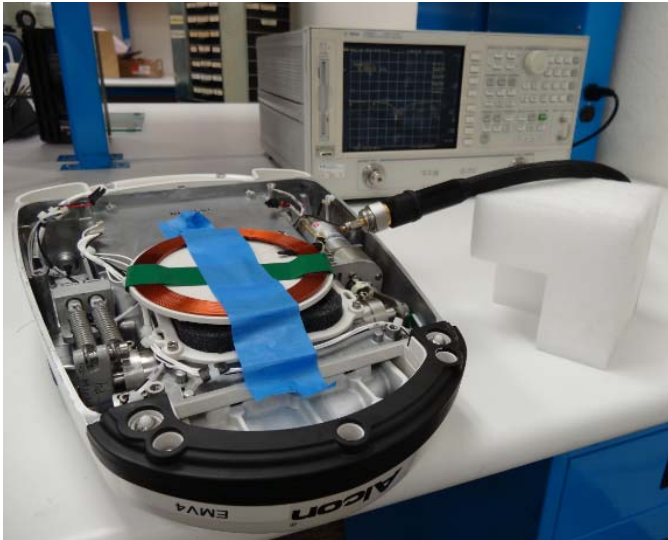


Figure 3. Impedance measurements (left), peak gain efficiency, radiation pattern (right)

V. ANTENNA PERFORMANCE

V.1. Return Loss

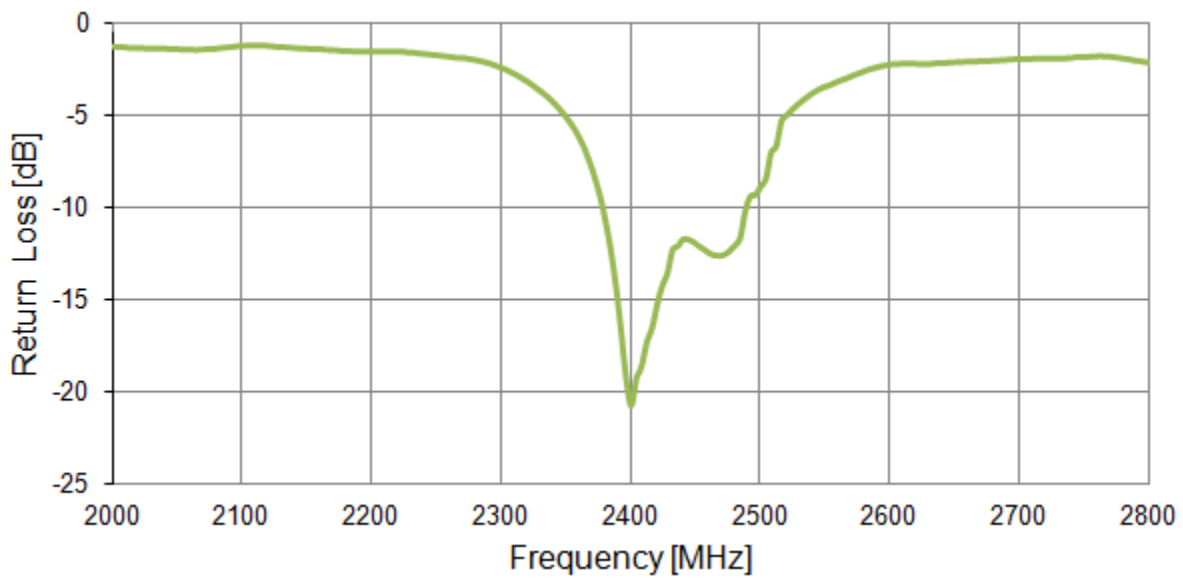


Figure 4. Return loss of the WPC25A Wi-Fi patch antenna.





V.2. VSWR

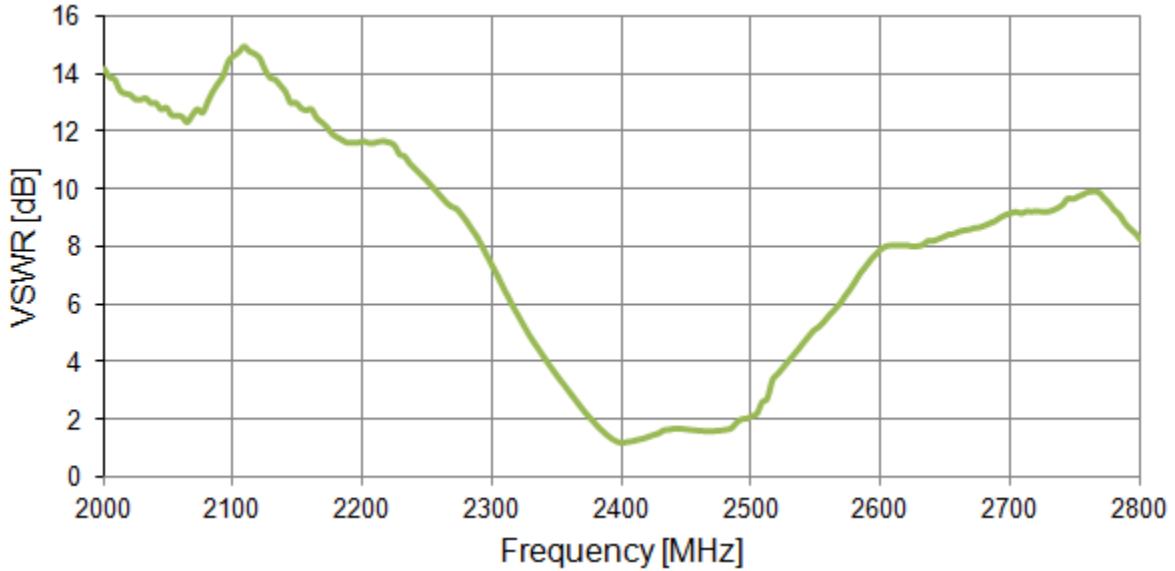


Figure 5. VSWR of the WPC25A Wi-Fi patch antenna.

V.3. Efficiency

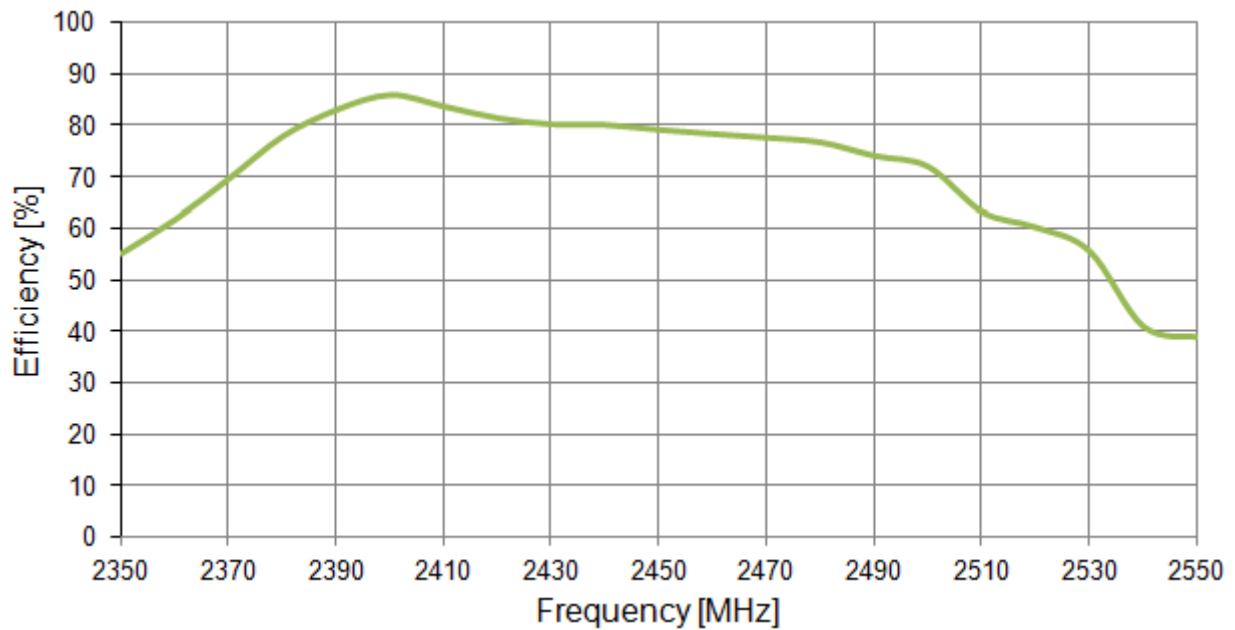


Figure 6. Efficiency of the WPC25A Wi-Fi patch antenna.





V.4. Peak Gain

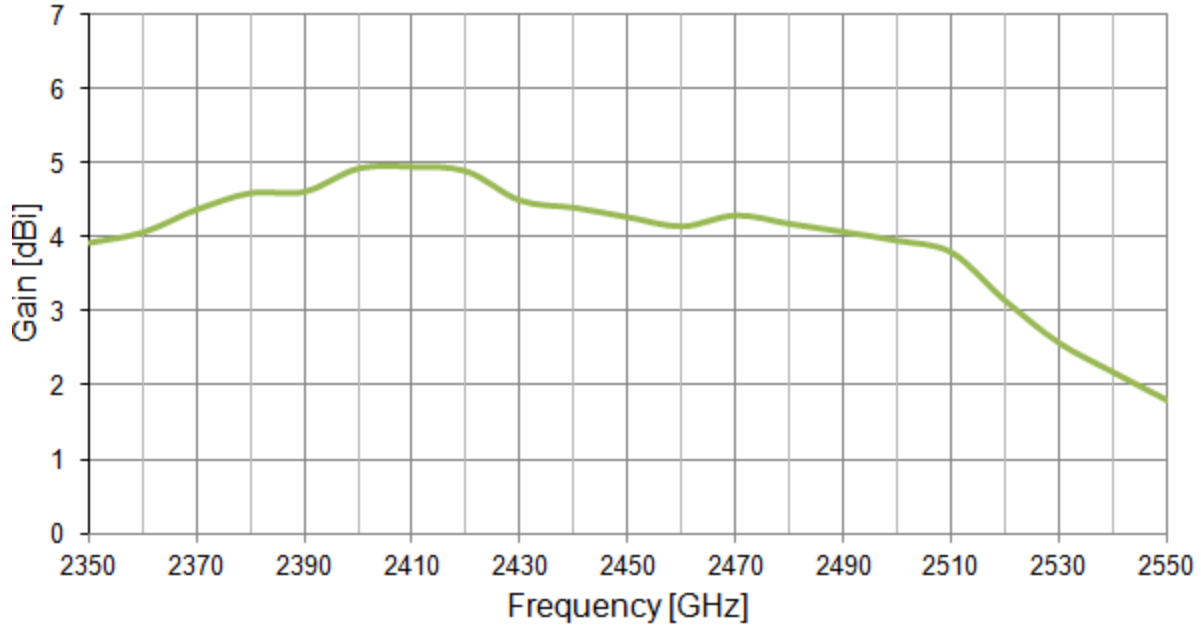


Figure 7. Peak Gain of the WPC25A Wi-Fi patch antenna.

V.5. Radiation Pattern

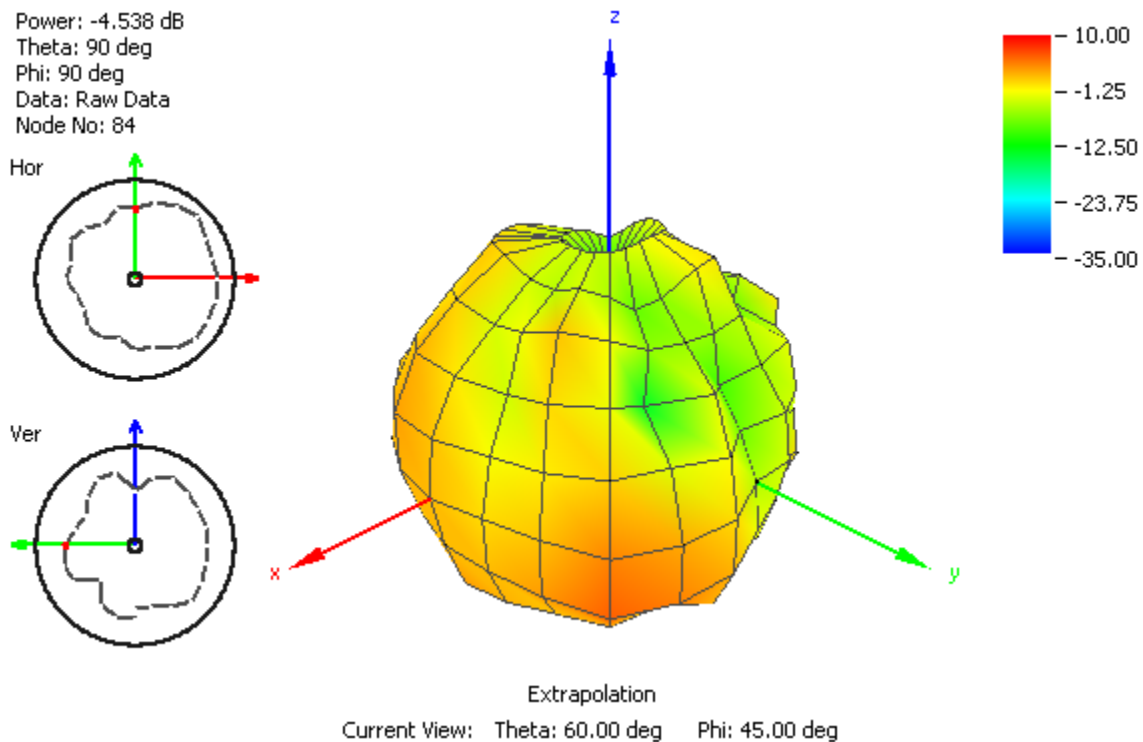


Figure 8. Radiation Pattern at 2400MHz of the WPC25A Wi-Fi patch antenna.

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VI. CONCLUSIONS

Taoglas has been designed a PC board with MMCX connector to integrate the WLP25, the board was designed especially for the AlconLabs device.

Base on the Return Loss, VSWR and efficiency the antenna is working with excellent performance.

Due the WLP25 is a patch antenna can work attached to a metal.

In order to tune the antenna with the new board and connector an inductor of 3nH in parallel needs to be added to the PCB board.

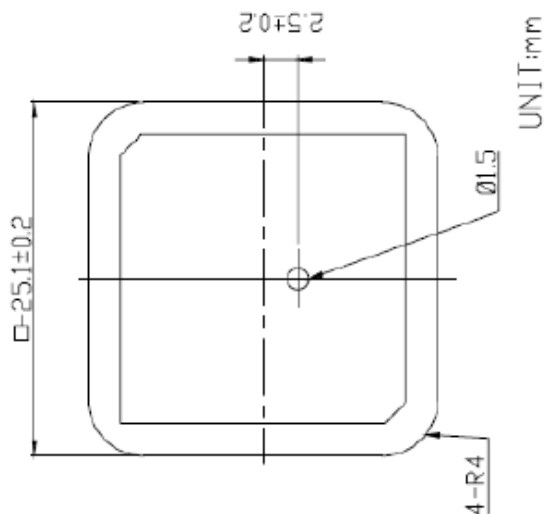


Figure 8. WLP25 patch antenna





Bottom View

Top View

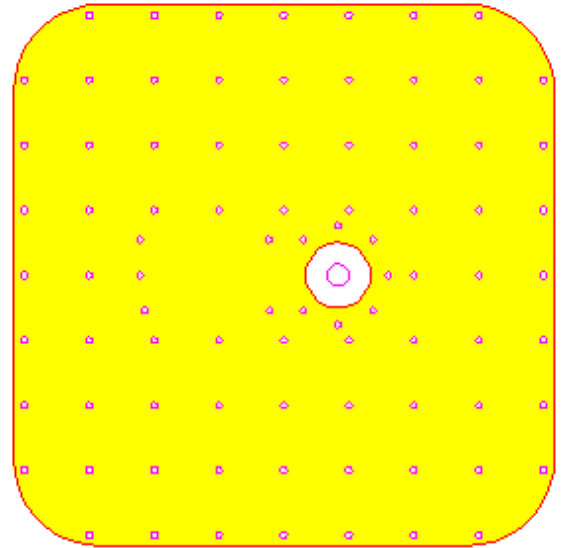
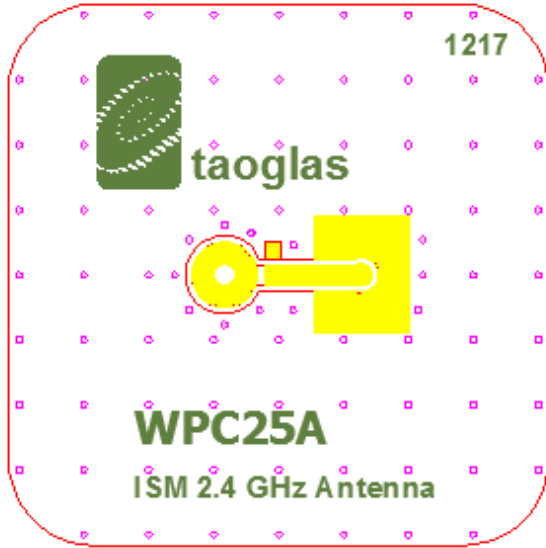


Figure 9. PCB board

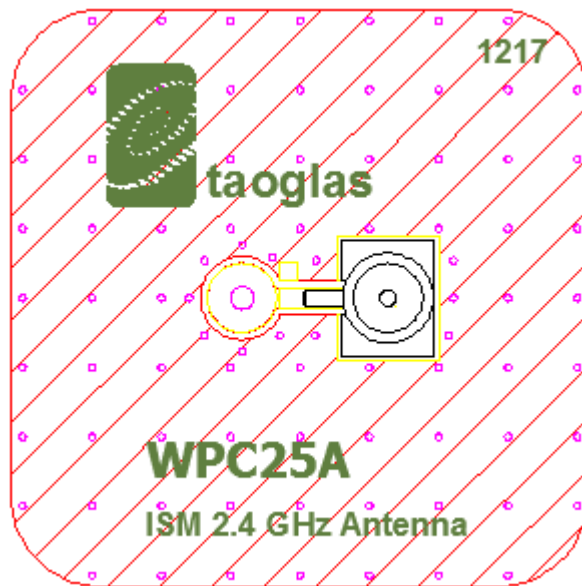


Figure 10. MMCX connector

