

MEMO

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PAON2-OptX21cm/19.02.13

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Subject: Summary of Electronic Test Bench analysis at LAL (18/02/13)

1 Introduction

In the continuity of reference PAON2-OptX21cm/15.02.13rev3 & 16.02.13 a series of systematical cross-checks have been performed on the same test bench focusing on Local Oscillator (OL) suspected to generate most of the powerful lines. As the tuning of the standard OL fails to suppress the powerful 1406MHz composite lines, the MEMO only focus on synthesized OL.

2 The setup

The setup is essentially the same used in PAON2-OptX21cm/16.02.1 where we have used a frequency synthesizer to generate the 1250MHz.

On Figure 1 it is shown the general spectra (dB) over the complete frequency band. The different colors correspond to chronological different OL setting and/or generation:

1. Black: Test 14-02 at 12h00 standard setting of the OL
2. Red: Test 18-02 at 14h40 OL synthesized with level reduced to -17dB and with a splitter to send the 1250MHz on both mixer channels.

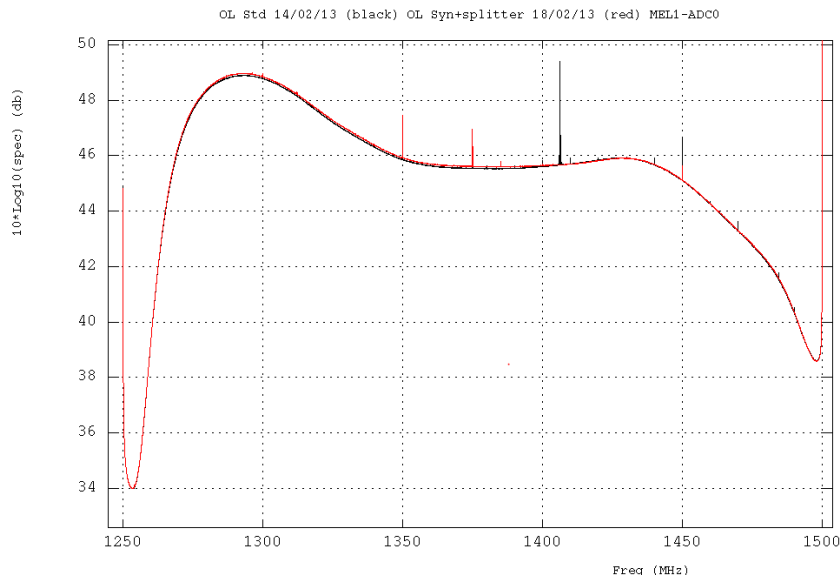


Figure 1

The new setting of the synthesized OL is quite the same as the standard OL with nice features as we see in next figures.

Next (Figure 2) we focus on the [1370, 1420]MHz. We see as already mentioned that the synthesized OL removes the powerful 1406MHz composite lines. But also other lines (black curves) are removed too (1380, 1390, 1410MHz and this is the case for all the spectrum), while a new 1385MHz line appears. The first use of a synthesized OL was not generating such line. Notice that the powerful 1375MHz line originates from the FPGA inside the ADC board (see PAON2-OptX21cm/11.02.13).

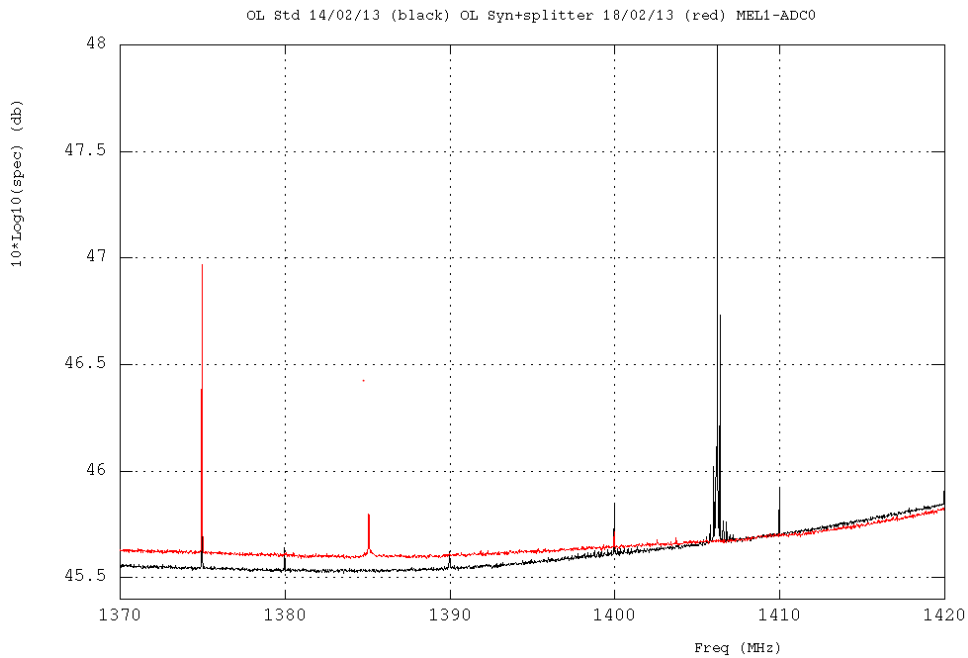


Figure 2

Focus now around the 1400MHz region (Figure 3) where the standard OL with standard setting (black curves) present a series of small lines. We see that the synthesized OL do not show the series of lines leaving the 1400MHz line.

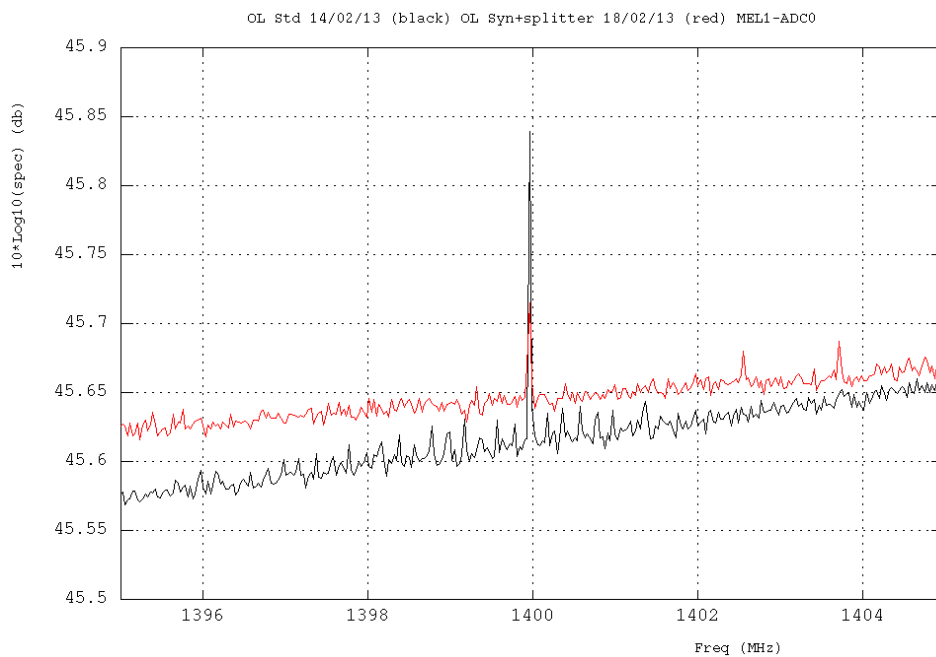


Figure 3

On the general spectrum one may wonder what happen at 1350MHz, here it is:

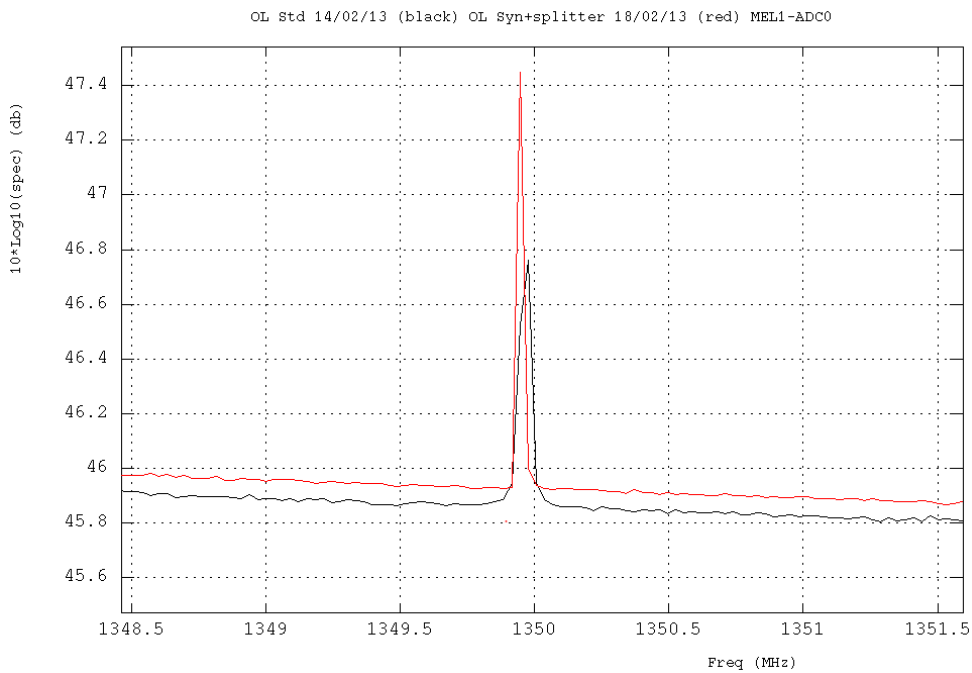


Figure 4

So both the standard and the synthesized OL present a line at ~ 1349.95MHz.

3 Summary & Outlook

In summary it seems that the tuning of the synthesized OL with a splitter presents the best features we have now. It would be worth to test 2 mixer channels and investigate the 1385MHz line even if it is a tiny line.