

MEMO

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PAON2-OptX21cm/16.02.13

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Subject: Summary of Electronic Test Bench analysis at LAL (14-15/02/13)

1 Introduction

In the continuity of reference PAON2-OptX21cm/15.02.13rev3 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.

2 The setup

The setup is essentially the one used in PAON2-OptX21cm/08.02.13 but we have restricted the study a single channel association OL-mixer MEL1 and ADC0 (first channel of first asdc chip), and we have put 50Ω loads on all unused channels both on OL-mixer and ADC boards. We have also used a frequency synthesizer to generate the 1250MHz.

On Figure 1 it is shown the 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. Blue: Test 14-02 at 17h40 OL synthesized first output level setting
3. Red: Test 15-02 at 17h55 OL synthesized second output level setting after discussion with Ph. Abbon
4. Green : Test 15-02 at 19h10 standard OL but -3dB setting
5. Cyan: Test 15-02 at 20h00 standard OL but -6dB setting
6. Orange: Test 15-02 at 22h53 standard OL with standard configuration

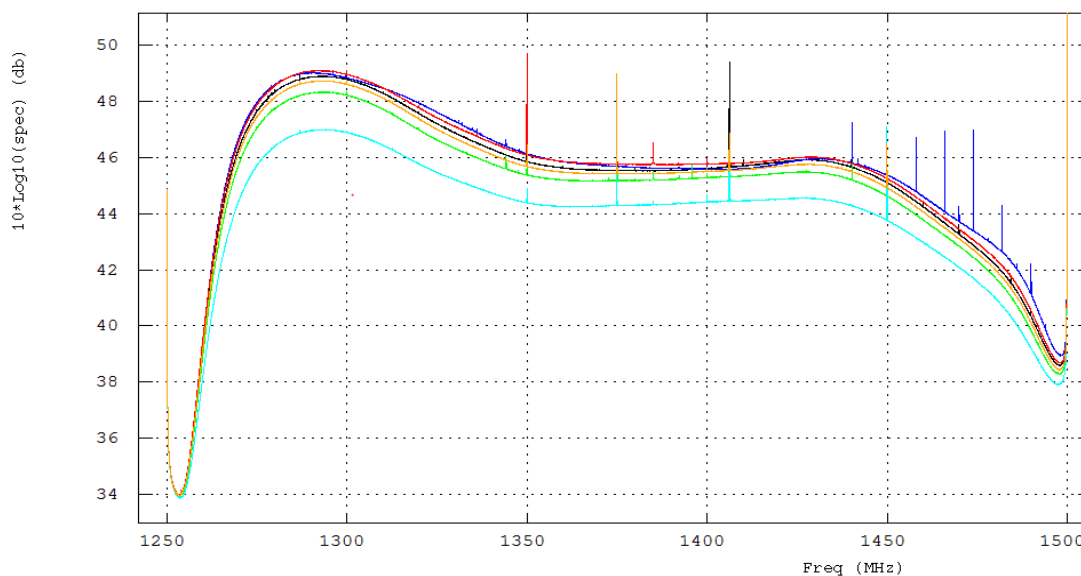


Figure 1

Next (Figure 2) we focus on the [1370, 1420]MHz band for all the above settings. It is remarkable that a new line at 1385MHz emerges when we switch to synthesized OL with new setting the 15th Feb and disappear when we came back to standard OL with standard setting. The first synthesized OL (blue curve) did not present this strong new line. We see also that most of the settings show 1406MHz composite lines.

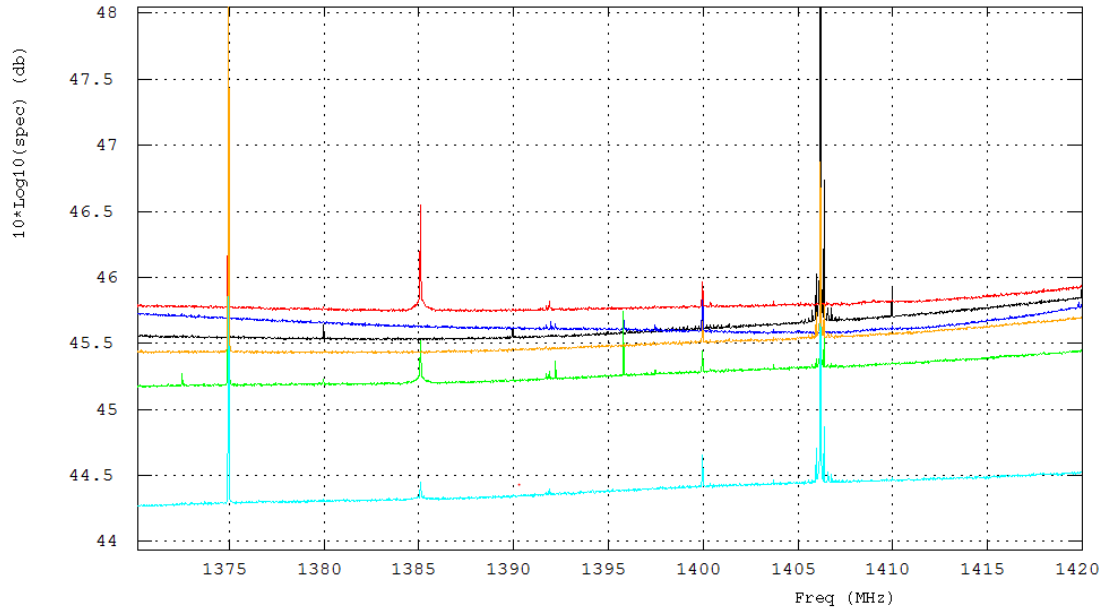


Figure 2

To clarify this region we zoom more (Figure 3), leaving the standard OL with -6dB setting which is not satisfactory. The 1406MHz composite lines disappear completely when we use only synthesized OL (blue & red curves), the different settings used to tune the standard OL fail.

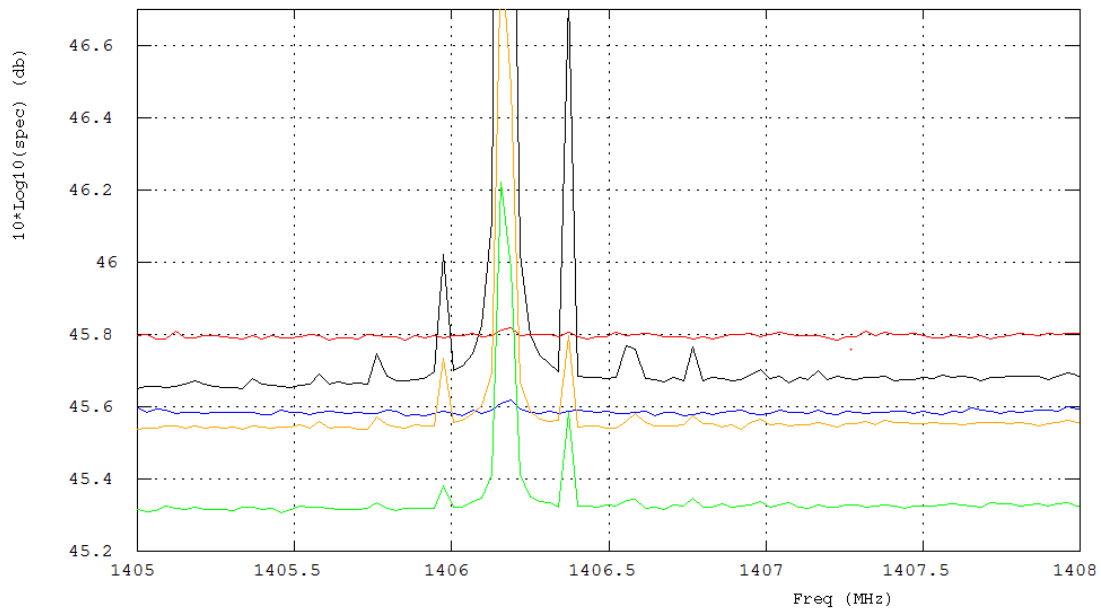


Figure 3

Focus now around the 1400MHz region (Figure 4) where the standard OL with standard setting (black curves) present a series of small lines. It is natural that reducing the dB on the standard OL reduce the lines strength, but we see also that the synthesized OL do not show the series of lines too.

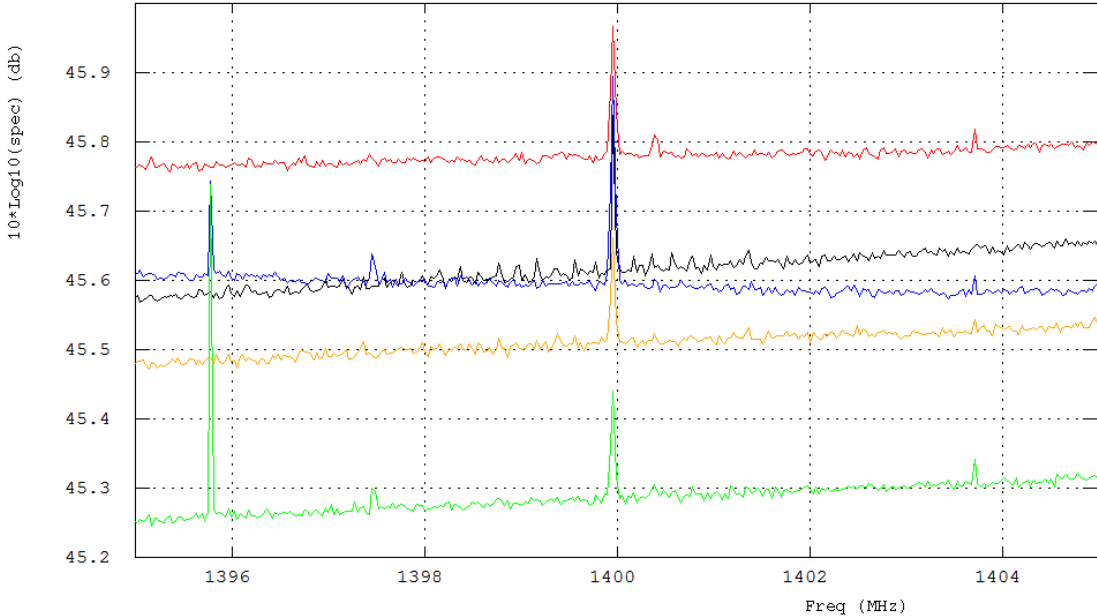


Figure 4

3 Summary & Outlook

In summary it seems that the tuning of the standard OL fails to remove the powerful 1406MHz composite lines. The synthesized OL is better in general, but we must repeat the exercise to confirm or not the presence of a powerful 1385MHz line seen in Test 15-02 at 17h55.