

RTCA Special Committee 186, Working Group 5

ADS-B UAT MOPS

Meeting #4

Measurements of False Sync Rates

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SUMMARY

The paper presents results of bench tests of false sync detection rates using UAT prototype hardware. This paper is in support of UAT-WP-4-12 Section 3 and Open Issue #4 from UAT-WP-4-02.

Introduction:

Section 3.0 of Warren Wilson's paper UAT-WP-4-12 (Threshold Setting) describes the theoretical relationship between the false alarm rate for the UAT synchronization process vs. the sync detection threshold. The paper presents results from bench tests of the existing prototype UAT hardware (with 1.5 MHz IF filter bandwidth) to measure the false alarm rate.

Setup:

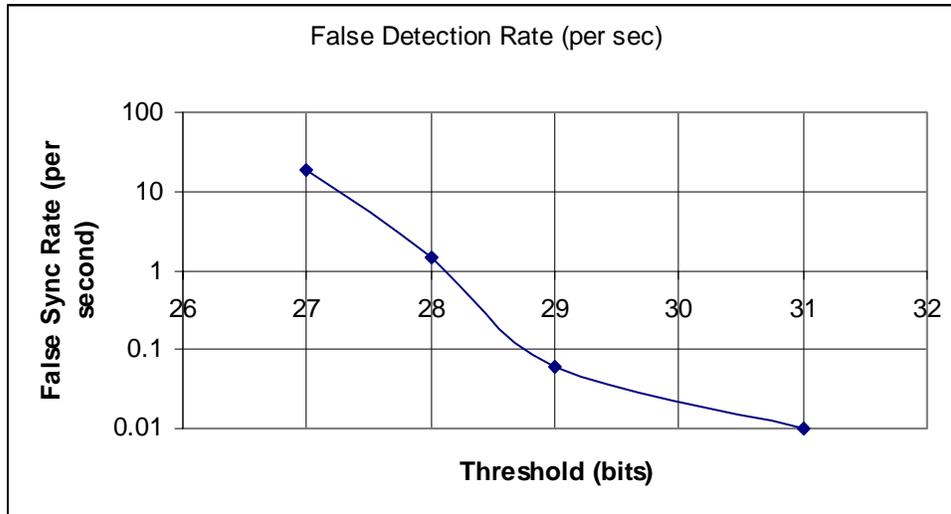
A 966 MHz UAT with the 1.5 MHz IF filter bandwidth was operated without a desired signal present. The test scenario was to simply allow the receiver process to operate and count the number of sync patterns detected in a length of time. The sync threshold was varied to determine the relationship between false sync detection and threshold setting.

Data:

The sync detection threshold is given in both bits and samples (3 correlator samples per bit).

| Threshold | Bits | Elapsed Time (sec) | Sync Detection Count | False Detection Rate (per sec) |
|-----------|-------|--------------------|----------------------|--------------------------------|
| 94 | 31.33 | 350 | 0 | 0.0 |
| 93 | 31 | 1265 | 11 | 0.01 |
| 87 | 29 | 431 | 25 | 0.06 |
| 84 | 28 | 301 | 427 | 1.42 |
| 81 | 27 | 5167 | 96,568 | 18.69 |

In Chart form: The value for Threshold = 94 was not plotted due to insufficient data collection.



Conclusion:

The data presented in the above table and figure represent false sync detection rates that are considerably lower than predicted by UAT-WP-4-12 Section3. The rates measured here are between 2 and 3 orders of magnitude lower than the predictions.

These results should be considered in discussion of the UAT performance characteristics.