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Prepared by EUMETSAT
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ANALYSIS OF SUITABILITY OF 300/1200 BPS DATA COLLECTION PLATFORMS FOR METEOSAT SECOND GENERATION

This document presents the results of a study performed to assess the suitability of High Speed Data Collection Platforms for Meteosat Second Generation operations.

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1 INTRODUCTION

Specifications of new high speed data collection platforms were presented to CGMS XXVI by NOAA. CGMS Members were asked to study suitability of the DCP design for operations on their satellite systems. Various inputs were received at CGMS XXVII. It was concluded that there are some operators, who could use similar DCPs and others who would have problems accommodating the platforms. It was furthermore concluded that the use of High Rate Data Collection platforms (HRDCP) for the International Data Collection System (IDCS) was presently not feasible.

A study was performed to assess the suitability of the high speed DCPs for MSG operations. This document informs on the main results of the study.

2 STUDY INPUTS

The study was based on the specifications delivered by NOAA. Main characteristics were:

Bit rate : 300 /1200 bps
Modulation: Trellis Code
(2 bits – 3 code bits) + 8 PSK Modulation
Link quality: BER=1E-4

MSG - Antenna:

The MSG antenna is a “Electronically Switched and De-spun antenna” with two sets of 16 and 32 antennas symmetrically distributed around the satellite body. The antenna elements are switched in order to face the up-link and down-link beacons with maximum gain towards the Earth surface. The switching between the antenna elements introduces phase jumps on the signals. The impact of these phase jumps to the signal of the planned HRDCP were simulated and studied.

3 STUDY RESULTS

The fact that MSG is a spinning satellite in combination with the use of an electronically despun antenna creates phase jitters and phase jumps which result in a degradation of the link by up to 1 dB depending on the actual implementation of the decoder and DCP receiver loops. The results of the simulations indicated that for a receiver with a 16 state decoder and 2 Hz single sided DFL bandwidth, a token link quality of BER=2E-4 is achievable at a link C/No of 30 dBHz (for the 300 bps case) and 36 dBHz (for the 1200 bps case).

4 SUMMARY

The simulation results indicate that the parallel operation of HRDCP and nominal DCP would not be feasible. Advanced signal processing techniques could improve the situation. This would nevertheless have to be carefully studied.