Tx and TM encoder in use configuration for HR
File: H_FCP_TTC_TUHR.xls
Author: E. Picallo

# Procedure Summary

## Objectives

This procedure describes the steps needed to change the TM bit rate to 1.5 Mbps when the downlink and the uplink are already established at 150 Kbps.

This procedure uses the logical addressing, thus can be executed under Ground control or not (the commands used can be inserted in the MTL).

## Summary of Constraints

XPND and the TM encoder are configured using TC(8,4,115,9), TC(8,4,115,18) and TC(8,4,115,20), thus the status of the ASW function "TTC Management" has to be "running".

Note that:
- the value of the TM modulation index is always 1.2;
- the value of the Output power level is always - 4dBm;
- the External reference and Internal bit pattern generator are always OFF.

It is highlighted that the Ranging is not possible with high rate.

If the ASW function "On board Scheduling" is stopped the TCs can not be added into the MTL.
If the function is running, up to four time-tagged TCs are released per second.

## Spacecraft Configuration

**Start of Procedure**

CDMU in default configuration;
Downlink active via TX and TWTA marked as "Nominal" and "Not Failed" in the "Unit in Use" table (nominally the branch 1);
TM bit rate equal to 150 Kbps;
XPND configuration: CM OFF or CM ON and RNG OFF or CM ON and RNG ON.

**End of Procedure**

CDMU in default configuration;
Downlink active via TX and TWTA marked as "Nominal" and "Not Failed" in the "Unit in Use" table (nominally the branch 1);
TM bit rate equal to 1.5 Mbps;
XPND configuration: CM OFF or CM ON and RNG OFF

## Reference File(s)

**Input Command Sequences**

**Output Command Sequences**

HFRTUHR

## Referenced Displays

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| ANDs | GRDs | SLDs |
|---|---|---|
| ZAZ7J999 | | |
| ZAZ7I999 | | |

## Configuration Control Information

| DATE | FOP ISSUE | VERSION | MODIFICATION DESCRIPTION | AUTHOR | SPR REF |
|---|---|---|---|---|---|
| 14/07/08 | 1 | 1 | Created | R. Miniscalco | |
| 28/08/08 | | 2 | TC DCT18170 Configure Xpnd mask update | E. Picallo | |
| 22/10/08 | 2 | 3 | TCs XPND Config & TM ENC Config blocked | E. Picallo | |
| 03/06/09 | 2.5 | 4 | XPND config. Coherent mode is unchanged | E. Picallo | |

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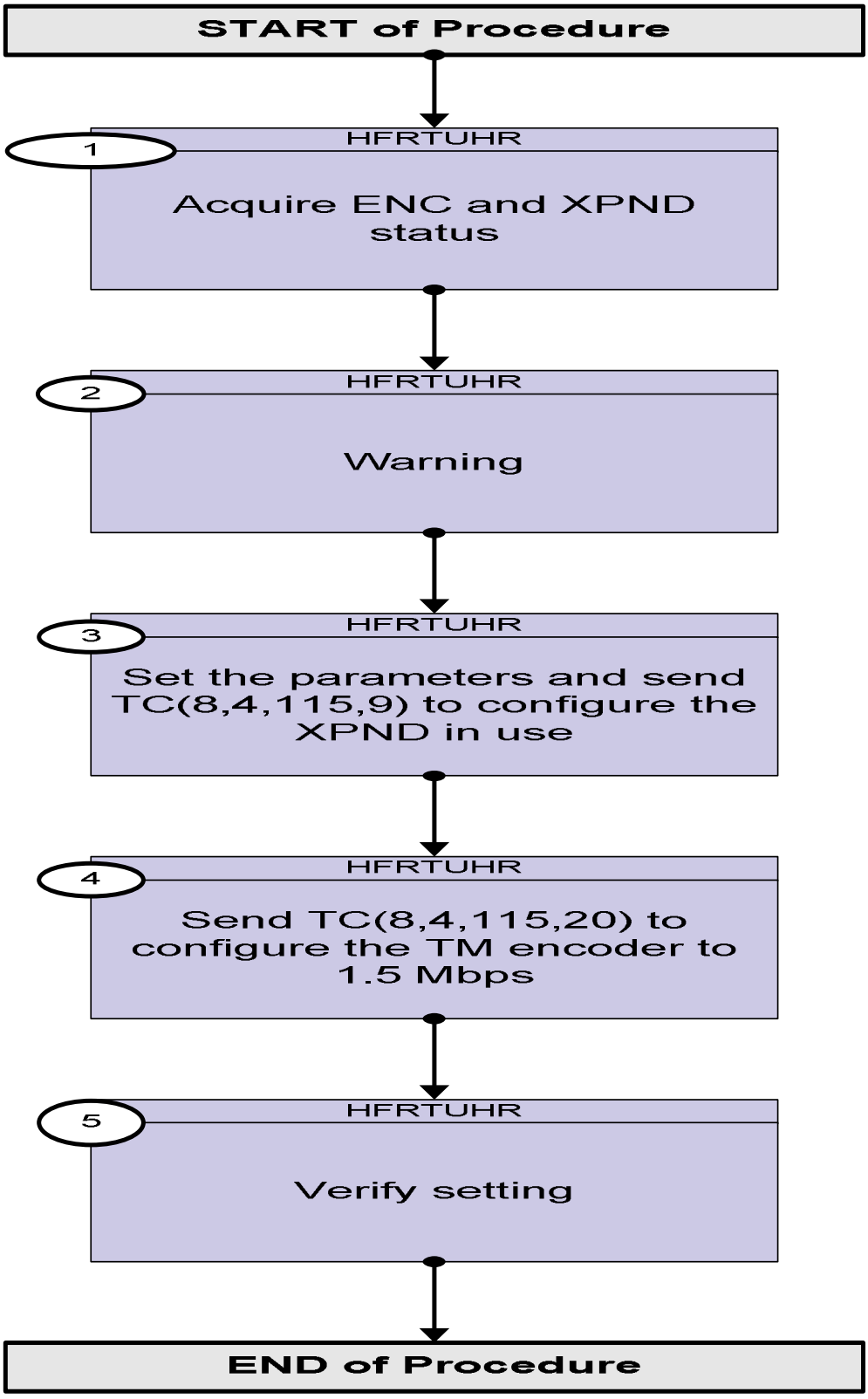
## Procedure Flowchart Overview



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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **Beginning of Procedure** | | |
| | | *TC Seq. Name :HFRTUHR* (Tx use for HR)<br>Tx and TM encoder in use configuration for HR<br><br>*TimeTag Type: B*<br>*Sub Schedule ID:* | | |
| 1 | | *Acquire ENC and XPND status* | | Next Step: 2 |
| | | Verify Telemetry<br>**TME_BITRATE DEMRF160** | **= 150 Kbps** | AND=ZAZ7J999 |
| | | | | |
| 1.1 | | *Verifications if XPND1 in use* | | |
| | | Verify AGC/Uplink Level Telemetry<br>**X1 AGC TMUplnk RMB20442** | **>= -141.0 dbmW**<br>**<= -45.0 dbmW** | AND=ZAZ7I999 |
| | | Verify RX1 Lock status Telemetry<br>**X1 Rx Lock - RL RMB24442** | **= Locked** | AND=ZAZ7I999 |
| | | Verify Low Rate-1 status Telemetry<br>**X1 LowRate-1 MD RMB30442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify Low Rate-2 status Telemetry<br>**X1 LowRate-2 MD RMB31442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify Medium Rate Modulator status Telemetry<br>**X1 MedRate-MRM RMB29442** | **= ON** | AND=ZAZ7I999 |
| | | Verify High Rate status Telemetry<br>**X1 HIRateMD-HRM RMB28442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify Coherent Mode status Telemetry<br>**X1 Coher MOD-CM RMB26442** | | AND=ZAZ7I999 |
| | | Verify Ranging Modulator status Telemetry<br>**X1 Rang MOD-RM RMB27442** | **= OFF** | AND=ZAZ7I999 |
| | | | | |
| 1.2 | | *Verifications if XPND2 in use* | | |
| | | Verify RX2 AGC Level Telemetry<br>**X2 AGC TMUplnk RMB41442** | **>= -141.0 dbmW**<br>**<= -45.0 dbmW** | AND=ZAZ7I999 |
| | | Verify RX2 Lock statusTelemetry<br>**X2 Rx Lock - RL RMB45442** | **= Locked** | AND=ZAZ7I999 |
| | | Verify Low Rate-1 status Telemetry<br>**X2 LowRate-1 MD RMB51442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify Low Rate-2 status Telemetry<br>**X2 LowRate-2 MD RMB52442** | **= OFF** | AND=ZAZ7I999 |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Medium Rate Modulator status Telemetry<br>**X2 MedRate-MRM RMB50442** | **= ON** | AND=ZAZ7I999 |
| | | Verify High Rate Modulator status Telemetry<br>**X2 HIRateMD-HRM RMB49442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify Coherent Mode status Telemetry<br>**X2 Coher MOD-CM RMB47442** | | AND=ZAZ7I999 |
| | | Verify Ranging Modulator status Telemetry<br>**X2 Rang MD - RM RMB48442** | **= OFF** | AND=ZAZ7I999 |
| | | | | |
| 2 | | *Warning* | | Next Step: 3 |
| | | **The current TM bit rate is not HR. Therefore a TM bit rate switch will be performed.**<br><br>**A specific feature of this switching, is that it shall be done by several TC. Specifically, separate TC will be necessary to set-up the TM encoder, and the XPND.**<br><br>**In the time interval between those TC, the TM flux will be some TM disruption, and no CLCW will be available to acknowledge the TC.**<br><br>**Therefore send those TCs blocked. The blocked commands will be encoded in a single CLTU.** | | |
| | | | | |
| 3 | | *Set the parameters and send TC(8,4,115,9) to configure the XPND in use* | | Next Step: 4 |
| | ET=+00.00.00<br>UT=+ | Execute Telecommand<br>**XpndConfigure_Templ**<br><br>*Command Parameter(s) :*<br>**XpndId DH018170**<br>**XpndConfMask1Unus DH220170**<br>**XpndConfMask1_ER DH221170**<br>**XpndConfMask1_CM DH222170**<br>**XpndConfMask1_RM DH223170**<br>**XpndConfMask1_HRM DH224170**<br>**XpndConfMask1_MRM DH225170**<br>**XpndConfMask1LRM1 DH226170**<br>**XpndConfMask1LRM2 DH227170**<br>**XpndConfMask1_RMI DH228170**<br>**XpndConfMask1_TMI DH229170** | **DCT18170**<br><br>**XpndInUseLogic**<br>**11 <bin>**<br>**ON**<br>**OFF** (Def)<br>**ON**<br>**ON**<br>**ON**<br>**ON**<br>**ON**<br>**111 <bin>**<br>**1111 <bin>** | |

| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | **XpndConfMask2_PG DH230170**<br>**XpndConfMask2Unus DH231170**<br>**XpndConfMask2OPLS DH232170**<br>**XpndConfDW1Unus DH020170**<br>**XpndConfDW1_ER DH021170**<br>**XpndConfDW1_CM DH022170**<br>**XpndConfDW1_RM DH023170**<br>**XpndConfDW1_HRM DH024170**<br>**XpndConfDW1_MRM DH025170**<br>**XpndConfDW1LRM1 DH026170**<br>**XpndConfDW1LRM2 DH027170**<br>**XpndConfDW1_RMI DH028170**<br>**XpndConfDW1_TMI DH029170**<br>**XpndConfDW2_PG DH030170**<br>**XpndConfDW2Unus DH031170** | **ON**<br>**11111111111 <bin>**<br>**1111 <bin>**<br>**0 <dec>** (Def)<br>**OFF** (Def)<br>**ON**<br>**OFF** (Def)<br>**ON**<br>**OFF** (Def)<br>**OFF** (Def)<br>**OFF** (Def)<br>**0** (Def)<br>**1.2**<br>**OFF** (Def)<br>**0 <dec>** (Def) | |
| | | **XpndConfDW2OPLS DH032170**<br><br>*TC Control Flags :*<br>**GBM IL DSE**<br>**-SY -- ---**<br>*Subsch. ID : 10*<br>Det. descr. : TEMPLATE Configure Xpnd TC(8,4,115,9) | **-4** | |
| | | **Notice that in the configuration of the XPND the coherent mode is unchanged. Although if the receiver losses lock for more than 0.2 s, then the transponder reverts back to noncoherent mode. When receiver locks again, the transponder automatically returns to the memorised mode.** | | |
| | | | | |
| 4 | | *Send TC(8,4,115,20) to configure the TM encoder to 1.5 Mbps* | | Next Step:<br>5 |
| | ET=+00.00.05<br>UT= | Execute Telecommand<br>**TtcConfigTmEncInUseHigh**<br><br>*TC Control Flags :*<br>**GBM IL DSE**<br>**-E- -- ---**<br>*Subsch. ID : 10*<br>Det. descr. : TTC: Config TM Enc In Use Mode High 1.5Mbps, TC(8,4,115,20) | **DC27F170** | |
| | | | | |
| 5 | | *Verify setting* | | Next Step:<br>END |
| | | Verify Telemetry<br>**TME_BITRATE DEMRF160** | **= 1.5 Mbps** | AND=ZAZ7J999 |
| | | | | |
| 5.1 | | *Verifications if XPND1 in use* | | |
| | | Verify High Rate status Telemetry<br>**X1 HIRateMD-HRM RMB28442** | **= ON** | AND=ZAZ7I999 |

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| Step No. | Time | Activity/Remarks | TC/TLM | Display/ Branch |
|---|---|---|---|---|
| | | Verify Coherent Mode status Telemetry<br>**X1 Coher MOD-CM RMB26442** | | AND=ZAZ7I999 |
| | | Verify Ranging Modulator status Telemetry<br>**X1 Rang MOD-RM RMB27442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify RNG Modulation Index Telemetry<br>**X1 RNGMD ID-RMI RMB32442** | **= 0 rad** | AND=ZAZ7I999 |
| | | | | |
| 5.2 | | *Verifications if XPND2 in use* | | |
| | | Verify High Rate Modulator status Telemetry<br>**X2 HIRateMD-HRM RMB49442** | **= ON** | AND=ZAZ7I999 |
| | | Verify Coherent Mode status Telemetry<br>**X2 Coher MOD-CM RMB47442** | | AND=ZAZ7I999 |
| | | Verify Ranging Modulator status Telemetry<br>**X2 Rang MD - RM RMB48442** | **= OFF** | AND=ZAZ7I999 |
| | | Verify RNG Modulation Index Telemetry<br>**X2 RNGMD ID-RMI RMB53442** | **= 0 rad** | AND=ZAZ7I999 |
| | | | | |

**End of Procedure**