Consert

Commissioning Report

CHANGE RECORDS

ISSUE	DATE	EVOLUTION	AUTHOR
V1.0	01/04/04	Com. Orbiter Part 1	JP. Goutail
V1.1	30/04/04	Data analysis and operation procedures added Com Lander Part 1	A. Herique W.Kofman

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1. Orbiter Part 1 : 10 -11 March 2004

1.1 RMOC Report (Gary).

The initial CONSERT commissioning activities were run on the evening/morning of the 10th/11th March 2004.

At a high level the activities are considered successful, with the following points for action:

The CONSERT switch on OBCP is not reliable with respect to Time Synchronisation. During the activities it failed 50% of the time.
The procedures do not cover switching using the redundant configuration, either manually or by OBCP.
Clarification of timings of activities that occur directly after a switch on is needed. There is little leeway between the clock synchronisation and the 2 minute limit for Mission Table transmission, and recommended times should be given for any commanding required between these steps. This should wait until the OBCP time synchronisation anomaly is resolved.

The activities performed and noteworthy observations were:

2004.070.23.22.55 CN-FCP-000 CONSERT Switch On
This was the initial switch on of the instrument, performed by manual commanding.
An momentary OOL (LOW) was detected in the instrument current on switch on. This was an artifact of the control system, whereby the validity of the current was set to true before the first packet containing a current measurement following switch on.

2004.070.23.30.44 CN-FCP-010 CONSERT Switch Off
The instrument was successfully switched off according to the procedure.

2004.070.23.37.48 CN-FCP-001 CONSERT UFT orbiter - pre deployment. (Using CN-FCP-011/012 for switch on/off (by OBCP))
This was the first attempt to perform this test, and was abandoned (switched off early) on receiving unsynchronised packets from the instrument due to the failure of the OBCP switch on routine in CN-FCP-011 to perform time synchronisation.
The switch off OBCP executed correctly at 2004.070.23.43.52 according to procedure.

2004.070.23.50.07 CN-FCP-001 CONSERT UFT orbiter - pre deployment. (Using CN-FCP-000 for switch on / CN-FCP-012 for switch off).
The second attempt was executed using the manual procedure for switch on and OBCP for switch off. The procedures executed without problem or anomalous telemetry and were completed by 2004.071.00.11.23.

2004.071.00.14.10 Antenna deployment - part 1 (deployment using nominal pyros).
Completed 2004.071.00.20.57

2004.071.00.37.21 CN-FCP-001 CONSERT UFT orbiter - post deployment.
(Using OBCP procedures CN-FCP-011/012 for switch on/off).
The procedure executed without problem. Time synchronisation was successful.
Completed 2004.071.00.57.18

2004.071.00.58.53 Antenna deployment - part 2 (firing of redundant pyros)
Completed 2004.071.01.04.18

2004.071.01.15.37 CN-FCP-005 CONSERT TC Verification
(Using OBCP procedures CN-FCP-011/012 for switch on/off).
Initially verification of the CONSERT ON/OFF status and currents were not seen, although telemetry was being received from the instrument. This was a result of HK generation changes made for the antenna deployment activities and was corrected by execution of SY-FCP-048 during the execution of the procedure. Time synchronisation was successful.
Completed 2004.071.01.34.53.

2004.071.01.50.10 CN-FCP-006 CONSERT Patch & Dump
(Using OBCP procedures CN-FCP-011/012 for switch on/off).
The dump packets were not available until the execution of SY-FCP-061 to route the packets to ground.
The first dump packet had an unsynchronised time (the dump was performed +20s following the OBCP switch on).
The second packet was correctly timestamped (the dump was performed +40s following the OBCP switch on).
Time synchronisation was successful.
Completed 2004.071.02.20.22

2004.071.02.31.26 CN-FCP-007 CONSERT Interference Orbiter
(Using OBCP procedures CN-FCP-011/012 for switch on/off).
LOBT update failed - the procedure was terminated early at 2004.071.02.34.48

2004.071.02.49.06 CN-FCP-007 CONSERT Interference Orbiter
(Using OBCP procedures CN-FCP-011/012 for switch on/off).
Parameter PCNGA050 (in Mission table update) modified on request of science team to 200, with the subsequent expected increase in sounding duration.
The LOBT update succeeded.
Completed 2004.071.03.15.28

2004.071.03.27.08 CN-FCP-006 CONSERT Patch & Dump
(Using OBCP procedures CN-FCP-011/012 for switch on/off).
This was a repeat run of this procedure to narrow down the timing for the patch dump sequence and to attempt a switch on using the redundant units.
The command ZDMX0041 (Define Nom/Red branch for CONSERT) was run to correctly

route the TM/TC prior to the switch on by OBCP procedure (for which the sequence parameter was set to redundant). The time synchronisation failed, and the procedure was terminated by OBCP (CN-FCP-012) at 2004.071.03.30.35.

2004.071.03.32.42 CN-FCP-006 CONSERT Patch & Dump
A second attempt at performing the patch / dump on the redundant side using OBCP switchon. Once again the time synchronisation failed, and an early switch off by OBCP performed at 2004.071.03.35.35

2004.071.03.27.08 CN-FCP-006 CONSERT Patch & Dump
Using redundant units and manual switch on. The CN-FCP-000 procedure was used, changing the ZDMX0041 command parameter to redundant, and substituting ZPWMA368 (CONSERT PS 2, PL-LCL 52B ON-A) for the ZPWMA111 command. The procedure ran nominally in all respects and was normally terminated by OBCP (CN-FCP-012) at 2004.071.04.10.33

1.2 PI Report (Alain)

File: T20040311-124624.sfdu

OBT is calculated by regards to 01/01/2003 00:00:00 time origin for the spacecraft
That means 12 seconds shift by regards to the true S/C time origin.

SCET (execution)	OBT (12s shift)	TC	TM
23:22:55		**FCP-000**	**Slot 1 = Successful**
	23:24:52		Courant Nominal 0 mA
23:25:07	23:24:55	Consert PS1 on	
23:25:11			*EVT # 1 INIT EVT 1 (Reconstructed Time)*
	23:25:09		Courant Nominal 100 mA
23:25:57	23:25:45	Time Update	
	23:25:54		HK #1 Consert
23:26:17	23:26:05	Stop Time Update	
	23:30:39		HK #20 Consert
23:30:44		FCP-010	
23:30:55	23:30:43	Consert Off	
23:37:48		**FCP-001**	**Slot 2 = Time update missing**
	23:36:57		Courant Nominal 0
23:37:59	23:37:47	Start OBCP ON	
	23:38:13		Courant Nominal 100mA
23:38:20			*EVT # 1 INIT (Reconstructed Time)*
23:38:27			*EVT # 2 PING (Reconstructed Time)*
23:39:05	23:38:03	Mission Table	
23:39:06			*ACK (Reconstructed Time)*
23:39:23			*HK #1 including MT received (Reconstructed Time)*
23:44:04	23:43:02	Start OBCP OFF	
23:44:11			*HK #60 (Reconstructed Time)*
23:50:07		**FCP-001 (Manual)**	**Slot 3 = Successful**
	23:52:05		Courant Nominal 0
23:52:20	23:52:08	Consert PS1 on	
	23:52:20		Courant Nominal 100
23:52:25			*EVT # 1 INIT (Reconstructed Time)*
23:53:11	23:52:08	Time Update	
23:53:21	23:53:08		HK #1
23:53:31	23:53:18	Stop Time Update	
23:53:46	23:53:33	Mission Table	
23:53:46	23:53:33		ACK
23:58:55	23:58:42		EV #2 TUNING OK
23:59:54	23:59:41		EV #3 SOUNDING
23:59:56	23:59:43		SCIENCE #1
00:09:45	00:09:31		EV #4 SOUNDING END
00:09:45	00:09:31		SCIENCE #120
00:11:33	00:11:20		HK #215
00:11:34		Start OBCP OFF	
00:21:06		Pyro ON (Nom)	
00:37:32		**FCP 001**	**Slot 4 = Successful**
00:37:32	00:37:20	Start OBCP ON	
	00:37:28		Courant Nominal 0
	00:37:31		Courant Nominal 100
00:37:52			*EVT # 1 INIT (Reconstructed Time)*
00:38:00			*EVT # 2 PING (Reconstructed Time)*
00:38:35	00:38:22		ACK
00:38:36	00:38:23	Mission Table	
00:38:40	00:38:27		HK #1 (Including MT received)

00:44:14	00:44:01		EV #3 TUNING OK
00:45:13	00:45:00		EV #4 SOUNDING
00:45:15	00:45:02		SCIENCE #1
00:55:04	00:54:51		EV #5 SOUNDING END
00:55:04	00:54:51		SCIENCE #120
00:57:27	00:57:13		HK #226
00:57:29		Start OBCP OFF	
00:58:53		Pyro ON (red)	
01:08:20			*HK#1 (Reconstructed Time) = copy slot 2*
01:09:12			*HK#60 (Reconstructed Time)*
01:15:37		**FCP 005**	**Slot 5 = Successful**
01:15:48	01:15:36	Start OBCP ON	
01:16:00	01:15:48		Courant Nominal 0
01 :16 :08			*EVT # 1 INIT (Reconstructed Time)*
01 :16 :16			*EVT # 2 PING (Reconstructed Time)*
01:16:18	01:16:05		Courant Nominal 100
01:16:57	01:16:44		HK#1
01 :17 :00	01 :16 :47	Mission Table	
01 :17 :00	01 :16 :47		ACK
01:22:31	01:22:18		EVT#3 TUNING OK – OCXO = 223
01:23:16	01:23:03	Direct TC	
01:23:16	01:23:03		ACK
01:23:21	01:23:07		HK #74 – OCXO = 130
01:23:30	01:23:17		EVT#4 SOUNDING
01:23:32	01:23:19		SCIENCE #1
01:33:21	01:33:07		EVT#5 END SOUNDING
01:33:21	01:33:07		SCIENCE #120
01:35:04	01:34:51		HK #216
01:35:04		Start OBCP OFF	
01:50:10		**FCP 006**	**Slot 6 – First APID 953 delayed**
01:50:21	01:50:08	Start OBCP ON	
01:50:26	01:50:13		Courant Nominal 0
01:50:40			*EVT # 1 INIT (Reconstructed Time)*
01:50:42	01:50:28		Courant Nominal 130
01:50:42	01:50:29	Dump Memory	
01:50:44	*-3:-13:-57*		*ACK#1(Reconstructed Time)*
01:50:52	01:50:38	Load Memory	
01:50:54	01:50:40		ACK #2
01:50:54	01:50:40		EVT #2 PING
01:51:02	01:50:49		ACK #3
01:51:02	01:50:48		APID 953 – DUMP #2
01:51:03	01:50:49	Dump Memory	
01:51:22	01:51:09		ACK #4
01:51:23	01:51:10	Mission Table	
01:51:30	01:51:17		HK#1 Mission Table received
01:57:04	01:56:51		EVT#3 TUNING OK – OCXO = 222
01:58:03	01:57:50		EVT#4 SOUNDING
01:58:05	01:57:51		SCIENCE #1
02:07:54	02:07:40		EVT#5 END SOUNDING
02:07:54	02:07:40		SCIENCE #120
02:12:14	*-3:-13:-58*		*APID 953 – DUMP #1 VC0 (Reconstructed Time)*
02:20:26	02:20:17		HK #350
02:20:33		Start OBCP OFF	
02:31:26		**FCP 007**	**Slot 7 – Time Update missing – Twice HK TM**
02:31:37	02:31:24	Start OBCP ON	
02:31:46	02:31:33		Courant Nominal 0
02:31:56			*EVT # 1 INIT (Reconstructed Time)*
02:32:02	02:31:48		Courant Nominal 100

02:32:06			*EVT # 2 PING (Reconstructed Time)*
02:32:37	02:32:24	Mission Table	
02:32:40			*ACK#1(Reconstructed Time)*
02:32:49			*HK #1 including MT received (Reconstructed Time)*
02:33:00			*HK #1 including MT received (Reconstructed Time)*
02:34:58	02:34:45		Courant Nominal 100
02:35:00		Start OBCP OFF	
02:34:14	02:35:01		Courant Nominal 0
02:35:01			*HK #28 (Reconstructed Time)*
02:35:15			*HK #28(Reconstructed Time*
02:49:06		**FCP 007**	**Slot 8 – Successful**
02:49:17	02:48:04	Start OBCP ON	
02:49:22	02:49:06		Courant Nominal 0
02:49:36			*EVT # 1 INIT (Reconstructed Time)*
02:49:38	02:49:24		Courant Nominal 100
02:49:50	02:49:37		EVT # 2 PING
02:50:17	02:50:04	Mission Table	
02:50:17	02:50:04		ACK #1
02:50:26	02:50:13		HK #1 including Mission Table Received
02:56:00	02:55:47		EVT # 3 TUNING
02:56:59	02:56:46		EVT # 4 SOUNDING
02:57:01	02:56:47		SCIENCE #1
03:13:26	03:13:13		EVT # 5 SOUNDING END
03:13:26	03:13:12		SCIENCE #200
03:05:39	03:15:25		HK #304
03:15:39		Start OBCP OFF	
03:27:08		**FCP 006**	**Slot 9 – Time Update Missing – Stopped before sounding**
03:28:34		Start OBCP ON	
03:28:34	03:28:20		Courant Redondant 0
03:28:50	03:28:27		Courant Redondant 130 mA
03:28:53	*-3:-14:-7*		*EVT # 1 INIT (Reconstructed Time)*
03:29:03	*-3:-13:-51*		*EVT # 2 PING (Reconstructed Time)*
03:29:14		Dump	
03:29:16	*-3:-13:-37*		*ACK #1(Reconstructed Time)*
03:29:16	*-3:-13:-37*		*APID 953 #1(Reconstructed Time)*
03:29:25		Patch	
03:29:26	*-3:-13:-27*		*ACK #2(Reconstructed Time)*
03:29:35		Dump	
03:29:36	*-3:-13:-16*		*APID 953 #2(Reconstructed Time)*
03:29:40	*-3:-13:-16*		*ACK #3(Reconstructed Time)*
03:29:45	*-3:-13:-7*		*HK #1 (Reconstructed Time)*
03:29:47	*-3:-13:-7*		*HK #1 (Reconstructed Time)*
03:29:55		Mission Table	
03:29:57	*-3:-12:-56*		*ACK #4(Reconstructed Time)*
03:30:46		Start OBCP OFF	
03:30:47	*-3:-12:-8*		*HK #11 (Reconstructed Time)*
03:32:42		**FCP 006 (Red)**	**Slot 10 – idem slot 9**
03:33:30		Start OBCP ON	
03:33:38	03:33:24		Courant Redondant 0
03:33:48			*EVT # 1 INIT (Reconstructed Time)*
03:33:54	03:33:51		Courant Redondant 100 mA
03:33:56			*EVT # 2 PING (Reconstructed Time)*
03:34:10		Dump	
03:34:13			*ACK #1(Reconstructed Time)*
03:34:13			*APID 953 #1(Reconstructed Time)*
03:34:20		Patch	
03:34:22			*ACK #2(Reconstructed Time)*
03:29:30		Dump	

03:34:31			*APID 953 #2(Reconstructed Time)*
03:34:34			*ACK #3(Reconstructed Time)*
03:34:40			*HK #1 (Reconstructed Time) VC1*
03:34:47			*HK #1 (Reconstructed Time) VC0*
03:34:51		Mission Table	
03:34:54	*-3:-12:-56*		*ACK #4(Reconstructed Time)*
03:35:46		Start OBCP OFF	
03:35:47	*-3:-12:-8*		*HK #12 (Reconstructed Time) VC0*
03:49:34		**FCP 006 (Red)**	**Slot 11**
03:49:45		Start OBCP ON	
03:50:58	03:50:45		Courant Redondant 0
03:51:08			*EVT # 1 INIT (Reconstructed Time)*
03:51:14	03:51:1		Courant Redondant 130 mA
03:51:52	03:51:39	Send Time Update	
03:52:06	03:51:52		HK #1
03:52:13	03:52:00	Stop Time Update	
03:52:18		Dump	
03:52:18	03:52:05		ACK #1
03:52:18	03:52:05		APID 953 #1
03:52:28		Patch	
03:52:28	03:52:15		ACK #2
03:52:39		Dump	
03:52:38	03:52:25		ACK #3
03:52:38	03:52:25		APID 953 #2
03:52:59		Mission Table	
03:52:59	03:52:46		ACK #4
03:57:37	03:57:39		EVT #2 TUNING
03:58:36	03:58:23		EVT #3 SOUNDING
03:58:38	03:58:24		SCIENCE #1
04:08:27	04:08:14		EVT #4 SOUNDING END
04:08:27	04:08:13		SCIENCE #120
04:10:45	04:10:31		HK #217
03:10:44		Start OBCP OFF	

General Remarks from data analysis

1- The typical time accuracy between TM-SCET time (Ground Segment Correlated Time in TM header) and TC-Execution Time (in the Command History) is 1 second. That's means the TC execution time in the TC history could be posterior to its ACK TM date…

2- In case of Time Update failure, HK SCET reconstituted time depends in the TM channel (VC0/VC1): each HK is delivered twice by the DDS corresponding in two different SCET. Both HK TM set could be mixed (slot 7) or separated (example HK from slot 2 arriving from VC1 at 01:08)

3- The time update problem induces also an inversion of the order of the APID 953 Dump response. (#1 arriving after the #2 - slot 6)

4- OBCP introduce de delay of a few seconds between start OBCP and Consert ON

5- Dump Analysis (APID 953)

Slot	#	APID	Count	length	SCET	Type	3C01	Address	Length	Dump
6	1	0BB9	C001	0013	8000 000A 9000	4006 0600	3C01	0000 8000	0001	B1EC
6	2	0BB9	C002	0013	023D 9679 1F00	4006 0600	3C01	0000 8000	0001	AAAA
9	1	0BB9	C001	0013	8000 001E 9000	4006 0600	3C01	0000 8000	0001	AAAA
9	2	0BB9	C002	0013	8000 0033 8000	4006 0600	3C01	0000 8000	0001	AAAA
10	1	0BB9	C001	0013	8000 001E 9000	4006 0600	3C01	0000 8000	0001	AAAA
10	2	0BB9	C002	0013	8000 0033 8000	4006 0600	3C01	0000 8000	0001	AAAA
11	1	0BB9	C001	0013	023D B2E5 1F00	4006 0600	3C01	0000 8000	0001	AAAA
11	2	0BB9	C002	0013	023D B2F9 1F00	4006 0600	3C01	0000 8000	0001	AAAA

The first dump gives a value B1EC while all the other tests give AAAA: the Consert RAM memory is undefined after Consert INIT. In practice the memory state seems to be preserve during the 20-minutes Consert OFF from an operation slot to the following one.

Assuming this explanation, only the first patch and dump test (slot 6) could be analyzed and is successful if the TM has been well resynchronized during our analysis.
A complete PATCH and DUMP test has to include 2 patches with two different values and 3 dumps in order to control this effect.

Conclusion

1- Consert H/W test successful:

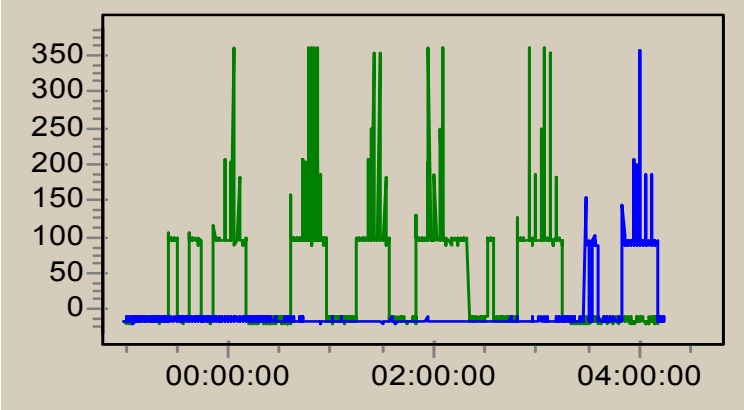

Figure 1: The measured currents are nominal on both nominal and redundant channels. (mA)

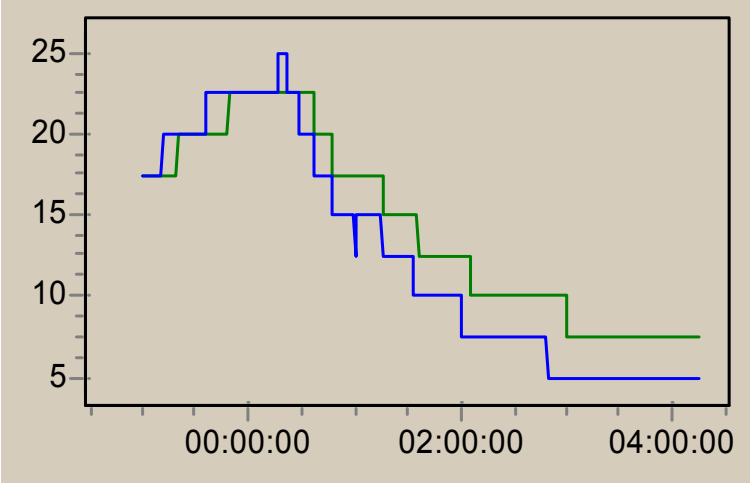

Figure 2: The decrease of the Antenna Temperature (°c) is compliant with the deployment success

2- Consert S/W and Telemetry

The TC test is successful

The TM check is successful excepted problem related to the update failure

The Patch and Dump seems successful. Complementary test asked if possible.

3- Consert Operation

The time update with OBCP is unsuccessful and generates HK data duplication

1.4 Data analysis

The following figures show the spectrum of the received signals for the different slots.

The main observation is the increase of the noise level after the antenna deployment. This increase is equal to 1 dB and could correspond in the increase of the galactic noise level in the receiver after the deployment due to the change of the antenna gain..

The noise spectrum shape is quiet similar before and after deployment with some "sinusoidal" variation as a function of the frequency. This figure could be due to the electronics gain variation or on the internal noise level variation: in a system dominated by the internal noise with an external noise a few dB lower; an increase of the external noise could increase the total noise and, in the same time, the general shape of this noise remaining the same.
The decrease of spectral lines after the deployment could be explain by a lower coupling with the S/C structure but could also be due to some clocks drift…. The spectral lines appering at the third slot are actually connected to the change in the consert ocxo frequency

The Comparison with ground measurement gives noise level a few dB lower than during the EMC test in ESTEC: (-24/-25 dB by regards to -21/-24 dB). In the other hand, the noise level is significantly lower than during the calibration and acceptance test in Orsay, due to a drastic decrease of the +/-3.3 MHz internal lines.
This variation could be due to a better grounding in the S/C configuration.

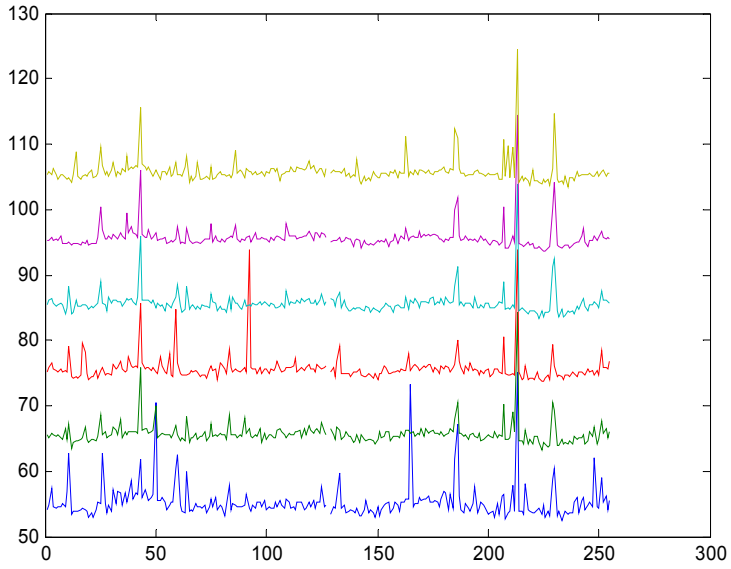

Figure 3: Mean spectrum (RMS) for each slot in dB from 85 to 95 MHz
10 dB Shift between each graph: the blue one corresponds to the slot1 before deployment

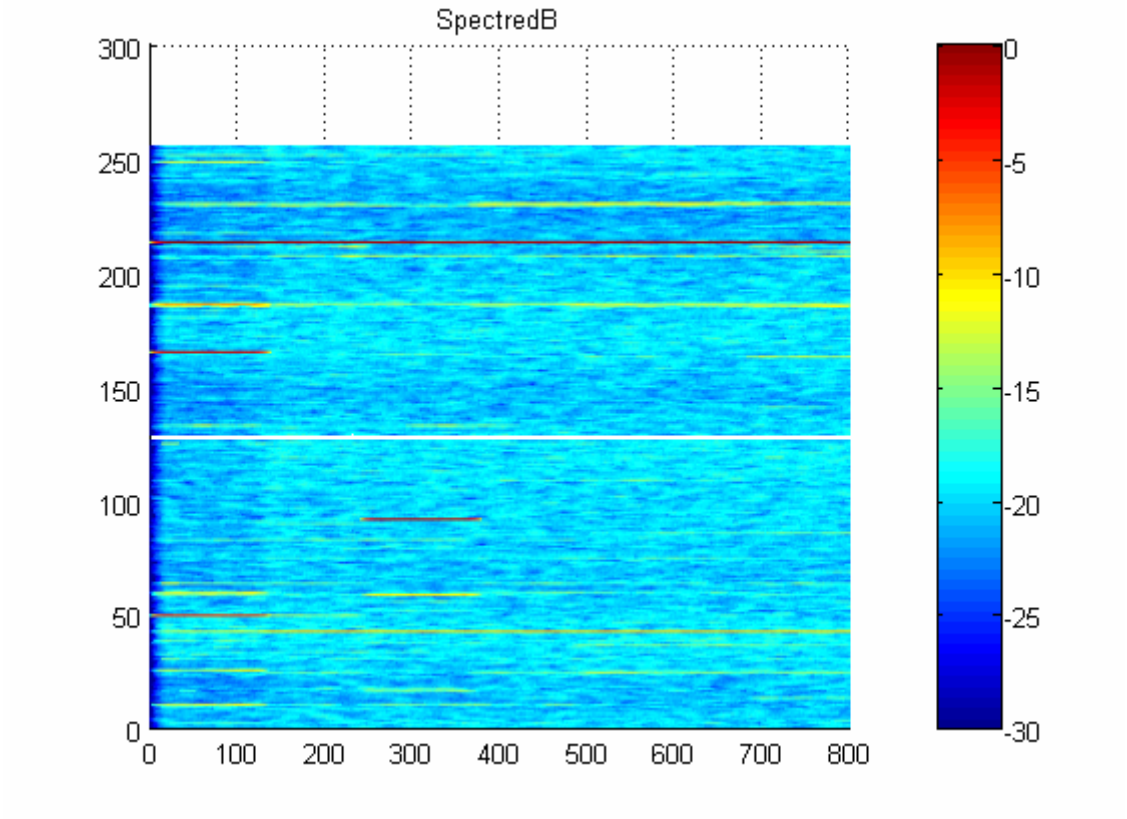

Figure 4: Spectrum from 85 to 95 MHz (vertical axis)
as a function of the sounding number (horizontal axis) in dB (colour scale)
Average of 20 soundings to reduce the standard variation of the noise level estimate
The power increase of the first tens points corresponds to the averaging filter transient

1.5 Procedures list

CN-FCP-000
CN-FCP-001
CN-FCP-005
CN-FCP-006
CN-FCP-007
CN-FCP-010
CN-FCP-011
CN-FCP-012

See directory in annex

1.6 Command History (DDS)

Command history printout from time: 2004.070.23.00.00.000 to time: 2004.071.05.59.59.999
Current printout time: 2004.077.10.54.50.172 Print view mode: BRIEF Sort order: EXECUTION Filter: INACTIVE

Name	Description	Sequence	Release Time	Execution Time	Sub	ST	SST	PID	11	13	C	S	D	0	1	G	B	IL	ST	FC	SSC	R	GTO	AC0	AC1
ZSKA6521	START "START PASS TM MODE CONF." OBCP	ASYF051A	04.070.23.00.02	04.070.23.00.14.245	1	7	1	1			A	E	E	E	E			MS	4B	34A	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF080A	04.070.23.03.51	04.070.23.04.02.247	1	11	4	1			A	E	E	E	E			MS	4C	34B	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF083A	04.070.23.03.51	04.070.23.04.02.247	1	11	4	1			A	E	E	E	E			MS	4D	34C	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081B	04.070.23.03.51	04.070.23.04.03.247	1	11	4	1			A	E	E	E	E			MS	4E	34D	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF080B	04.070.23.03.52	04.070.23.04.04.247	1	11	4	1			A	E	E	E	E			MS	4F	34E	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.03.53	04.070.23.04.04.247	1	11	4	1			A	E	E	E	E			MS	50	34F	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.03.53	04.070.23.04.04.247	1	11	4	1			A	E	E	E	E			MS	51	350	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	ASYF051A	04.070.23.03.54	04.070.23.04.06.247	1	11	4	1			A	E	E	E	E			MS	52	351	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	ADMF160B	04.070.23.03.55	04.070.23.04.07.247	1	11	4	1			A	E	E	E	E			MS	53	352	S	SSS	SS	SS
ZDM02216	Disable back up MTL	ADMF306C	04.070.23.13.01	04.070.23.13.13.254	1	137	2	1			A	E	E	E	E			MS	54	353	S	SSS	SS	SS
ZDM02213	Delete whole back up MTL	ADMF306A	04.070.23.13.37	04.070.23.13.49.254	1	11	21	1			A	E	E	E	E			MS	55	354	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.15	04.070.23.15.26.255	1	11	20	1			A	E	E	E	E			MS	56	355	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.15	04.070.23.15.26.255	1	11	20	1			A	E	E	E	E			MS	57	356	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.16	04.070.23.15.27.255	1	11	20	1			A	E	E	E	E			MS	58	357	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.17	04.070.23.15.28.255	1	11	20	1			A	E	E	E	E			MS	59	358	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.17	04.070.23.15.28.255	1	11	20	1			A	E	E	E	E			MS	5A	359	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.18	04.070.23.15.29.255	1	11	20	1			A	E	E	E	E			MS	5B	35A	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.18	04.070.23.15.29.255	1	11	20	1			A	E	E	E	E			MS	5C	35B	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.19	04.070.23.15.30.255	1	11	20	1			A	E	E	E	E			MS	5D	35C	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.19	04.070.23.15.30.255	1	11	20	1			A	E	E	E	E			MS	5E	35D	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.20	04.070.23.15.31.255	1	11	20	1			A	E	E	E	E			MS	5F	35E	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.20	04.070.23.15.31.255	1	11	20	1			A	E	E	E	E			MS	60	35F	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.21	04.070.23.15.32.255	1	11	20	1			A	E	E	E	E			MS	61	360	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.21	04.070.23.15.32.255	1	11	20	1			A	E	E	E	E			MS	62	361	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.22	04.070.23.15.33.255	1	11	20	1			A	E	E	E	E			MS	63	362	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.22	04.070.23.15.33.255	1	11	20	1			A	E	E	E	E			MS	64	363	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.23	04.070.23.15.34.255	1	11	20	1			A	E	E	E	E			MS	65	364	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.23	04.070.23.15.34.255	1	11	20	1			A	E	E	E	E			MS	66	365	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.070.23.15.24	04.070.23.15.35.255	1	11	20	1			A	E	E	E	E			MS	67	366	S	SSS	SS	SS
ZDM02215	Enable back up MTL	ADMF306D	04.070.23.16.51	04.070.23.17.02.256	1	137	1	1			A	E	E	E	E			MS	68	367	S	SSS	SS	SS
ZDMX0041	Define Nom/Red branch for CONSERT	ACNF000A	04.070.23.22.55	04.070.23.23.06.260	12	16	1	1			A	E	E	E	E			MS	69	368	S	SSS	SS	SS
ZDMX0063	Enable/Disable TC sending to CONSERT	ACNF000A	04.070.23.23.19	04.070.23.23.30.260	12	16	3	1			A	E	E	E	E			MS	6A	369	S	SSS	SS	SS
ZDMX0052	Enable/Disable TM polling from CONSERT	ACNF000A	04.070.23.23.23	04.070.23.23.34.260	12	16	2	1			A	E	E	E	E			MS	6B	36A	S	SSS	SS	SS
ZPWMA111	CONSERT PS 1, PL-LCL 52A ON-A	ACNF000A	04.070.23.24.55	04.070.23.25.07.261	1	2	2	1			A	E	E	E	E			MS	6C	36B	S	SSS	SS	SS
ZDMX0215	Send Time to CONSERT 59	ACNF000A	04.070.23.25.45	04.070.23.25.57.262	1	9	2	1			A	E	E	E	E			MS	6D	36C	S	SSS	SS	SS
ZDMX0226	Stop Time Update to CONSERT 59	ACNF000A	04.070.23.26.06	04.070.23.26.17.262	1	9	3	1			A	E	E	E	E			MS	6E	36D	S	SSS	SS	SS
ZPWMA112	CONSERT PS 1, PL-LCL 52A OFF-A	ACNF010A	04.070.23.30.44	04.070.23.30.55.265	1	2	2	1			A	E	E	E	E			MS	6F	36E	S	SSS	SS	SS
ZDMX0052	Enable/Disable TM polling from CONSERT	ACNF010A	04.070.23.31.49	04.070.23.32.00.266	12	16	2	1			A	E	E	E	E			MS	70	36F	S	SSS	SS	SS
ZDMX0063	Enable/Disable TC sending to CONSERT	ACNF010A	04.070.23.31.54	04.070.23.32.05.266	12	16	3	1			A	E	E	E	E			MS	71	370	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.070.23.37.48	04.070.23.37.59.270	12	7	1	1			A	E	E	E	E			MS	72	371	S	SSS	SS	SS
ZCN19201	Mission Table Update	ACNF001A	04.070.23.38.53	04.070.23.39.05.271	12	192	1	59			A	E	E	E	E			MS	73	00D	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.070.23.43.52	04.070.23.44.04.274	12	7	1	1			A	E	E	E	E			MS	74	372	S	SSS	SS	SS
ZDMX0041	Define Nom/Red branch for CONSERT	ACNF000A	04.070.23.50.07	04.070.23.50.19.278	12	16	1	1			A	E	E	E	E			MS	75	373	S	SSS	SS	SS

ZDMX0063	Enable/Disable TC sending to CONSERT	ACNF000A	04.070.23.50.38	04.070.23.50.49.278	12	16	3	1	A E E E E		MS	76	374	S	SSS	SS	SS
ZDMX0052	Enable/Disable TM polling from CONSERT	ACNF000A	04.070.23.50.42	04.070.23.50.53.278	12	16	2	1	A E E E E		MS	77	375	S	SSS	SS	SS
ZPWMA111	CONSERT PS 1, PL-LCL 52A ON-A	ACNF000A	04.070.23.52.09	04.070.23.52.20.279	1	2	2	1	A E E E E		MS	78	376	S	SSS	SS	SS
ZDMX0215	Send Time to CONSERT 59	ACNF000A	04.070.23.53.00	04.070.23.53.11.280	1	9	2	1	A E E E E		MS	79	377	S	SSS	SS	SS
ZDMX0226	Stop Time Update to CONSERT 59	ACNF000A	04.070.23.53.20	04.070.23.53.31.280	1	9	3	1	A E E E E		MS	7A	378	S	SSS	SS	SS
ZCN19201	Mission Table Update	ACNF001A	04.070.23.53.35	04.070.23.53.46.280	12	192	1	59	A E E E E		MS	7B	00E	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.00.11.23	04.071.00.11.34.292	12	7	1	1	A E E E E		MS	7C	379	S	SSS	SS	SS
ZSKA6523	START System TM Mode Configuration OBCP	ASYF056A	04.071.00.14.10	04.071.00.14.21.294	1	7	1	1	A E E E E		MS	7D	37A	S	SSS	SS	SS
ZPWMA007	RESET PL-PDU-A PYRO BUFFERS, RTU-IO-A	APWF316A	04.071.00.18.17	04.071.00.18.28.297	1	2	2	1	A E E E E		MS	7E	37B	S	SSS	S	S
ZPWMA219	CONSERT ANT REL, PL-PARM3 PYRO7A ON-A	APWF316A	04.071.00.19.54	04.071.00.20.06.298	1	2	2	1	A E E E E		MS	7F	37C	S	SSS	SS	SE
ZPWMA251	ARM PL-PDU PYRO GROUP 3A, RTU-IO-A	APWF316A	04.071.00.19.56	04.071.00.20.07.298	1	2	2	1	A E E E E		MS	80	37D	S	SSS	SS	SE
ZPWMA259	PL-PDU A PYRO POWER: BAT1 ON, RTU-IO-A	APWF316A	04.071.00.19.57	04.071.00.20.08.298	1	2	2	1	A E E E E		MS	81	37E	S	SSS	SS	SE
ZPWMA265	FIRE PL-PDU A PYRO, RTU-IO-A	APWF316A	04.071.00.20.55	04.071.00.21.06.299	1	2	2	1	A E E E E	B	MS	82	37F	S	SSS	S	S
ZPWMA262	PL-PDU A PYRO POWER: BAT1 OFF, RTU-IO-A	APWF316A	04.071.00.20.55	04.071.00.21.06.299	1	2	2	1	A E E E E	E	MS	82	380	S	SSS	SS	SS
ZPWMA226	CONSERT ANT REL, PL-PARM3 PYRO7A OFF-A	APWF316A	04.071.00.20.56	04.071.00.21.07.299	1	2	2	1	A E E E E		MS	83	381	S	SSS	SS	SS
ZPWMA256	DISARM PL-PDU PYRO GROUP 3A, RTU-IO-A	APWF316A	04.071.00.20.57	04.071.00.21.08.299	1	2	2	1	A E E E E		MS	84	382	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.00.37.21	04.071.00.37.32.310	12	7	1	1	A E E E E		MS	85	383	S	SSS	SS	SS
ZCN19201	Mission Table Update	ACNF001A	04.071.00.38.25	04.071.00.38.36.310	12	192	1	59	A E E E E		MS	86	00F	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.00.57.18	04.071.00.57.29.323	12	7	1	1	A E E E E		MS	87	384	S	SSS	SS	SS
ZPWMA476	CONSERT ANT REL, PL-PARM3 PYRO7B ON-A	APWF316A	04.071.00.58.53	04.071.00.59.04.324	1	2	2	1	A E E E E		MS	88	385	S	SSS	SS	SE
ZPWMA508	ARM PL-PDU PYRO GROUP 3B, RTU-IO-A	APWF316A	04.071.00.58.54	04.071.00.59.05.324	1	2	2	1	A E E E E		MS	89	386	S	SSS	SS	SE
ZPWMA516	PL-PDU B PYRO POWER: BAT2 ON, RTU-IO-A	APWF316A	04.071.00.58.55	04.071.00.59.06.324	1	2	2	1	A E E E E		MS	8A	387	S	SSS	SS	SE
ZPWMA522	FIRE PL-PDU B PYRO, RTU-IO-A	APWF316A	04.071.00.59.52	04.071.01.00.03.325	1	2	2	1	A E E E E	B	MS	8B	388	S	SSS	S	S
ZPWMA519	PL-PDU B PYRO POWER: BAT2 OFF, RTU-IO-A	APWF316A	04.071.00.59.52	04.071.01.00.03.325	1	2	2	1	A E E E E	E	MS	8B	389	S	SSS	SS	SS
ZPWMA483	CONSERT ANT REL, PL-PARM3 PYRO7B OFF-A	APWF316A	04.071.00.59.53	04.071.01.00.04.325	1	2	2	1	A E E E E		MS	8C	38A	S	SSS	SS	SS
ZPWMA513	DISARM PL-PDU PYRO GROUP 3B, RTU-IO-A	APWF316A	04.071.00.59.54	04.071.01.00.05.325	1	2	2	1	A E E E E		MS	8D	38B	S	SSS	SS	SS
ZDM01703	PDU P/L Pyro Mode	APWF316A	04.071.01.00.55	04.071.01.01.06.326	1	130	8	1	A E E E E		MS	8E	38C	S	SSS	SS	SS
ZPWMA007	RESET PL-PDU-A PYRO BUFFERS, RTU-IO-A	APWF316A	04.071.01.04.18	04.071.01.04.29.328	1	2	2	1	A E E E E		MS	8F	38D	S	SSS	S	S
INSERTTT	INSERT TIME TAG	AACF210A	04.071.01.08.06	04.071.01.08.17.331	1	11	4	1	A E E E E		MS	90	38E	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.06	04.071.01.08.18.331	1	11	4	1	A E E E E		MS	91	38F	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF210A	04.071.01.08.07	04.071.01.08.18.331	1	11	4	1	A E E E E		MS	92	390	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.08	04.071.01.08.20.331	1	11	4	1	A E E E E		MS	93	391	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.08	04.071.01.08.21.331	1	11	4	1	A E E E E		MS	94	392	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081A	04.071.01.08.09	04.071.01.08.21.331	1	11	4	1	A E E E E		MS	95	393	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.10	04.071.01.08.23.331	1	11	4	1	A E E E E		MS	96	394	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081A	04.071.01.08.11	04.071.01.08.24.331	1	11	4	1	A E E E E		MS	97	395	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081A	04.071.01.08.12	04.071.01.08.24.331	1	11	4	1	A E E E E		MS	98	396	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF083A	04.071.01.08.13	04.071.01.08.25.331	1	11	4	1	A E E E E		MS	99	397	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF211A	04.071.01.08.14	04.071.01.08.25.331	1	11	4	1	A E E E E		MS	9A	398	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.15	04.071.01.08.26.331	1	11	4	1	A E E E E		MS	9B	399	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.15	04.071.01.08.26.331	1	11	4	1	A E E E E		MS	9C	39A	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.16	04.071.01.08.27.331	1	11	4	1	A E E E E		MS	9D	39B	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.16	04.071.01.08.27.331	1	11	4	1	A E E E E		MS	9E	39C	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF212A	04.071.01.08.17	04.071.01.08.28.331	1	11	4	1	A E E E E		MS	9F	39D	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.17	04.071.01.08.29.331	1	11	4	1	A E E E E		MS	A0	39E	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF212A	04.071.01.08.18	04.071.01.08.29.331	1	11	4	1	A E E E E		MS	A1	39F	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.19	04.071.01.08.31.331	1	11	4	1	A E E E E		MS	A2	3A0	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF105A	04.071.01.08.19	04.071.01.08.32.331	1	11	4	1	A E E E E		MS	A3	3A1	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081A	04.071.01.08.20	04.071.01.08.32.331	1	11	4	1	A E E E E		MS	A4	3A2	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081A	04.071.01.08.21	04.071.01.08.33.331	1	11	4	1	A E E E E		MS	A5	3A3	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF081A	04.071.01.08.23	04.071.01.08.34.331	1	11	4	1	A E E E E		MS	A6	3A4	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF083A	04.071.01.08.23	04.071.01.08.34.331	1	11	4	1	A E E E E		MS	A7	3A5	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	AACF209A	04.071.01.08.23	04.071.01.08.34.331	1	11	4	1	A E E E E		MS	A8	3A6	S	SSS	SS	SS

INSERTTT	INSERT TIME TAG		04.071.01.08.24	04.071.01.08.36.331	1	11	4	1	A E E E E	MS	A9	3A7	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.25	04.071.01.08.36.331	1	11	4	1	A E E E E	MS	AA	3A8	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.25	04.071.01.08.37.331	1	11	4	1	A E E E E	MS	AB	3A9	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG		04.071.01.08.27	04.071.01.08.39.331	1	11	4	1	A E E E E	MS	AC	3AA	S	SSS	SS	SS
ZSKA6523	START System TM Mode Configuration OBCP	ASYF050A	04.071.01.10.18	04.071.01.10.29.332	1	7	1	1	A E E E E	MS	AD	3AB	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.01.15.37	04.071.01.15.48.336	12	7	1	1	A E E E E	MS	AE	3AC	S	SSS	SS	SS
ZCN19201	Mission Table Update	ACNF005A	04.071.01.16.49	04.071.01.17.00.337	12	192	1	59	A E E E E	MS	AF	010	S	SSS	U	S
ZDM01251	Modify HK Report Pckt Generation Freq.	ASYF048A	04.071.01.21.09	04.071.01.21.20.340	1	3	27	1	A E E E E	MS	B0	3AD	S	SSS	SS	SS
ZDM01200	Enable HK Report Packet Generation	ASYF048A	04.071.01.21.14	04.071.01.21.26.340	1	3	5	1	A E E E E	MS	B1	3AE	S	SSS	SS	SS
ZCN19202	Direct TC	ACNF005A	04.071.01.23.05	04.071.01.23.16.341	12	192	2	59	A E E E E	MS	B2	011	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.01.34.53	04.071.01.35.04.349	12	7	1	1	A E E E E	MS	B3	3AF	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.01.50.10	04.071.01.50.21.360	12	7	1	1	A E E E E	MS	B4	3B0	S	SSS	SS	SS
ZCN00605	Dump Memory		04.071.01.50.30	04.071.01.50.42.360	12	6	5	59	A E E E E	MS	B5	012	S	SSS	U	S
ZCN00602	Load Memory		04.071.01.50.41	04.071.01.50.52.360	12	6	2	59	A E E E E	MS	B6	013	S	SSS	U	S
ZCN00605	Dump Memory		04.071.01.50.51	04.071.01.51.03.360	12	6	5	59	A E E E E	MS	B7	014	S	SSS	U	S
ZCN19201	Mission Table Update	ACNF006A	04.071.01.51.12	04.071.01.51.23.360	12	192	1	59	A E E E E	MS	B8	015	S	SSS	U	S
ZDM10121	SSMM-Read Pckt Store Cont for Pckt Range	ASYF061A	04.071.02.12.02	04.071.02.12.13.375	1	15	7	25	A E E E E	MS	B9	306	S	SSS	SS	SS
INSERTTT	INSERT TIME TAG	ASYF061B	04.071.02.13.06	04.071.02.13.17.376	1	11	4	1	A E E E E	MS	BA	3B1	S	SSS	SS	SS
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.02.20.22	04.071.02.20.33.381	12	7	1	1	A E E E E	MS	BB	3B2	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.02.31.26	04.071.02.31.37.388	12	7	1	1	A E E E E	MS	BC	3B3	S	SSS	SS	SS
ZCN19201	Mission Table Update	ACNF007A	04.071.02.32.26	04.071.02.32.37.389	12	192	1	59	A E E E E	MS	BD	016	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.02.34.48	04.071.02.35.00.391	12	7	1	1	A E E E E	MS	BE	3B4	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.02.49.06	04.071.02.49.17.401	12	7	1	1	A E E E E	MS	BF	3B5	S	SSS	SS	SS
ZCN19201	Mission Table Update	ACNF007A	04.071.02.50.06	04.071.02.50.17.402	12	192	1	59	A E E E E	MS	C0	017	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.03.15.28	04.071.03.15.39.420	12	7	1	1	A E E E E	MS	C1	3B6	S	SSS	SS	SS
ZDMX0041	Define Nom/Red branch for CONSERT		04.071.03.27.08	04.071.03.27.20.428	12	16	1	1	A E E E E	MS	C2	3B7	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.03.28.23	04.071.03.28.34.429	12	7	1	1	A E E E E	MS	C3	3B8	S	SSS	SS	SS
ZCN00605	Dump Memory		04.071.03.29.03	04.071.03.29.14.430	12	6	5	59	A E E E E	MS	C4	018	S	SSS	U	S
ZCN00602	Load Memory		04.071.03.29.13	04.071.03.29.25.430	12	6	2	59	A E E E E	MS	C5	019	S	SSS	U	S
ZCN00605	Dump Memory		04.071.03.29.24	04.071.03.29.35.430	12	6	5	59	A E E E E	MS	C6	01A	S	SSS	U	S
ZCN19201	Mission Table Update	ACNF006A	04.071.03.29.44	04.071.03.29.55.430	12	192	1	59	A E E E E	MS	C7	01B	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.03.30.35	04.071.03.30.46.431	12	7	1	1	A E E E E	MS	C8	3B9	S	SSS	SS	SS
ZDMX0041	Define Nom/Red branch for CONSERT		04.071.03.32.42	04.071.03.32.53.432	12	16	1	1	A E E E E	MS	C9	3BA	S	SSS	SS	SS
ZSKA8021	START CONSERT ON OBCP	ACNF011A	04.071.03.33.18	04.071.03.33.30.433	12	7	1	1	A E E E E	MS	CA	3BB	S	SSS	SS	SS
ZCN00605	Dump Memory		04.071.03.33.59	04.071.03.34.10.433	12	6	5	59	A E E E E	MS	CB	01C	S	SSS	U	S
ZCN00602	Load Memory		04.071.03.34.09	04.071.03.34.20.433	12	6	2	59	A E E E E	MS	CC	01D	S	SSS	U	S
ZCN00605	Dump Memory		04.071.03.34.19	04.071.03.34.30.434	12	6	5	59	A E E E E	MS	CD	01E	S	SSS	U	S
ZCN19201	Mission Table Update	ACNF006A	04.071.03.34.39	04.071.03.34.51.434	12	192	1	59	A E E E E	MS	CE	01F	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.03.35.35	04.071.03.35.46.434	12	7	1	1	A E E E E	MS	CF	3BC	S	SSS	SS	SS
ZDMX0041	Define Nom/Red branch for CONSERT	ACNF000A	04.071.03.49.34	04.071.03.49.45.445	12	16	1	1	A E E E E	MS	D0	3BD	S	SSS	SS	SS
ZDMX0063	Enable/Disable TC sending to CONSERT	ACNF000A	04.071.03.49.36	04.071.03.49.48.445	12	16	3	1	A E E E E	MS	D1	3BE	S	SSS	SS	SS
ZDMX0052	Enable/Disable TM polling from CONSERT	ACNF000A	04.071.03.49.38	04.071.03.49.50.445	12	16	2	1	A E E E E	MS	D2	3BF	S	SSS	SS	SS
ZPWMA368	CONSERT PS 2, PL-LCL 52B ON-A		04.071.03.50.51	04.071.03.51.02.446	1	2	2	1	A E E E E	MS	D3	3C0	S	SSS	SS	SS
ZDMX0215	Send Time to CONSERT 59	ACNF000A	04.071.03.51.41	04.071.03.51.52.446	1	9	2	1	A E E E E	MS	D4	3C1	S	SSS	SS	SS
ZDMX0226	Stop Time Update to CONSERT 59	ACNF000A	04.071.03.52.02	04.071.03.52.13.447	1	9	3	1	A E E E E	MS	D5	3C2	S	SSS	SS	SS
ZCN00605	Dump Memory		04.071.03.52.07	04.071.03.52.18.447	12	6	5	59	A E E E E	MS	D6	020	S	SSS	U	S
ZCN00602	Load Memory		04.071.03.52.17	04.071.03.52.28.447	12	6	2	59	A E E E E	MS	D7	021	S	SSS	U	S
ZCN00605	Dump Memory		04.071.03.52.27	04.071.03.52.39.447	12	6	5	59	A E E E E	MS	D8	022	S	SSS	U	S
ZCN19201	Mission Table Update	ACNF006A	04.071.03.52.48	04.071.03.52.59.447	12	192	1	59	A E E E E	MS	D9	023	S	SSS	U	S
ZSKA8022	START CONSERT OFF OBCP	ACNF012A	04.071.04.10.33	04.071.04.10.44.460	12	7	1	1	A E E E E	MS	DA	3C3	S	SSS	SS	SS
ZDMX0041	Define Nom/Red branch for CONSERT		04.071.04.12.30	04.071.04.12.42.462	12	16	1	1	A E E E E	MS	DB	3C4	S	SSS	SS	SS

2 Lander Part 1 : 11-12 April 04

2.1 Operation logbook

Time references:

- The one way propagation from Earth to S/C equal 45 seconds
- The OBT is calculated by regards to 01/01/2003 00:00:00 time origin for the spacecraft in our data analysis

SCET Time	OBT time	TC and CDMS command	1804 # / pos.	LCN packet	Souding Number	Type	LCN Time	Oc xo
00:00:43	**Slot 1**	**ACVF238A**						
00:00:47	00:00:33	AMDT Change 455						
00:01:01	00:00:47		1 / u	1	0	1	00:14	128
	00:02:33	TC Exec 462						
	00:02:33		9 / 1,2	9	0	2	02:00	131
	00:02:52		9 / 4	11	0	1	02:19	131
	00:07:33		24 / 1	68	1	1	01:00	131
	00:08:47		24 / 4	71	4	1	01:14	131
	00:16:41		124 / 4	167	100	3	10:53	131
	00:18:39		134 / 4	191	0	1	11:08	131
00:18:59	00:18:45	AMDT Change 463						
00:33:46	**Slot 2**	**ACVF257A**						
00:33:51	00:33:37	AMDT Change 473						
	00:33:51		135 / u	1	0	1	00:14	128
	00:35:36	TC Exec 480						
	00:35:38		143 / 1,2	9	0	2	02:00	131
	00:35:56		143 / 4	11	0	1	02:19	131
	00:41:36		158 / 1	68	1	1	01:00	131
	00:41:50		158 / 4	71	4	1	01:14	131
	00:42:06	Exec Report 481						
	00:42:06		163 / 3,4	75	8	2	01:31	85
	00:42:21	Exec Report 482						
	00:42:22		169 / 1,2	79	11	2	01:46	131
	00:42:30		169 / 4	81	12	1	01:54	131
	00:49:45		259 /4	169	100	3	09:10	131
	00:51:43		269 / 4	193	0	1	11:08	131
00:52:03	00:51:49	AMDT Change 483						
01:06:38	**Slot 3**	**ACVF258A**						
01:06:43	01:06:29	AMDT Change 493						
	01:06:43		270 / u	1	0	1	00:14	128
	01:07:00	Exec Report 497						
	01:07:01		272 / u	3	0	2	00:32	128
	01:07:09	Exec Report 498						
	01:07:09		273 / u	4	0	2	00:40	128
	01:08:29	Exec Report 502						
	01:08:29		280/ 1,2	11	0	2	02:01	131
	01:08:47		280 / 4	13	0	1	02:19	131
	01:14:28		295 / 1	70	1	1	01:00	131
	01:14:42		295 / 4	73	4	1	01:14	131
	01:22:36		395 / 4	169	100	3	09:10	131
	01:24:34		405 / 4	193	0	1	11:08	131
01:24:56	01:24:41	AMDT Change 503						

The previous table summarize the Consert Telemetry from Consert TM and the Lander commands from the CDMS Telemetry and S/C command report.

Consert Operation:

- Consert Functional Test successful : apparent noise level 1 or 2 dB higher than on the orbiter.
- TC verification are successful : ocxo changes observed
- Patch and Dump: One patch and one dump planed in the FCP and observed on the data. The verification at the TM level is successful (patch TC = 0206 8000 AAAA 1234 5678 0000, Dump block = AAAA 1234 5678 0000 0000 0000)

The Consert test is successful.
The redundant test is missing and has to be done in a following part.
The dump and patch procedure has to be updated with 3 dumps and 2 patch TC's in order to take into account the memory remanence.

CDMS

- The Consert TM numbering (APID 1804) is continuous for a given set of operations. The TM numbering is reseted by the CDMS turn OFF/ON
- The TM dating (OBT) is done by the CDMS and no time update is done at LCN level. Nevertheless we can note that the time is not right-flagged by the CDMS before the "time update ok" as shown by some CDMS HK TM.
- Analysis of CDMS HK and EV by regards to the Consert operation is ok

The CDMS groups the Consert packet per 4 to generate APID 1804 telemetry. At the end of each FCP, the remaining TM's which are not included in a group of 4 TM's seem to be lost and the memory seems to be reset. For example in the slot 3, the packet 194 at 01:24:39 is missing. (This behaviour has been observed for the Quiet mode)

Lander PSS

- The low monitoring rate of the lander payload currents preclude a complete monitoring of the Consert working cycle as it is done for the orbiter. (see figure hereafter). An increase of the rate will be required in case of malfunction.
- The current larger of 100 mA is explained by a measured tension of 26 Volts, on the lower side of accepted voltage (what will happen for lower ambient temperature?).

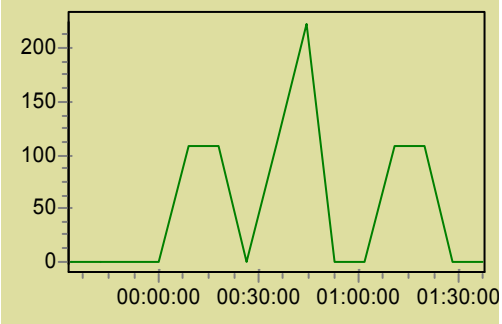

Figure 5: The measured currents (mA)

Data delivery and Operation Monitoring at SONC

- Data delivery at Sonc level works without problems. Data propagation from Consert E-box to Consert-Egse is 4 ~ 6 minutes
- Data integrity problems on the Davis viewer (on the wall). Some times, the Consert current equal to zeros while Consert is working (too large refreshing period?); some times, the Consert antenna temperature appears as "unstable" with of correct and wrong values (nominal/redundant channel?).
- Request a direct access to Davies displays and possibility to select pages.(like SCOS2000 viewer in Pisa room,Esoc)
- Request possibility to speak directly on the voice loop.
- No possibility to access WebSonc in the same time as the Data are displayed. One of the other displays should be also available for punctual checks.

List of Apid's analysed by consert egse (to be provided by SONC during future operations)

- Lander 1540 sid 2, 1588, 1780, 1748, 1751 evt id 50002 id 50000
- Orbiter 84 sid 102, 116 sid 151, 244 sid 101, 20 sid 4
- Consert 945,948,951,953,956, 1793 and 1804

2.2 CDMS TM

CDMS HK

Nb	Heure	LCN	Lander state Vector	AMST	AMDT
1807	23:33:00		0000001000000100	107	107
1808	23:37:21		0000001000000100	107	107
1809	23:41:37		0000000000000100	0	0
1810	23:45:53		0000000000000100	0	0
1811	23:49:08		0000000000000100	0	0
1812	23:50:15		0000000000000100	0	0
1813	23:54:32		0000000000000100	0	0
1814	23:58:47		0000000000000100	0	0
1815	00:01:06	X	0010000000000100	103	103
1816	00:03:05	X	0010000000000100	103	103
1817	00:07:21	X	0010000000000100	103	103
1818	00:11:37	X	0010000000000100	103	103
1819	00:15:55	X	0010000000000100	103	103
1820	00:20:08		0000000000000100	0	0
1821	00:23:12		0000000000000100	0	0
1822	00:24:28		0000000000000100	0	0
1823	00:28:44		0000000000000100	0	0
1824	00:32:59		0000000000000100	0	0
1825	00:34:09	X	0010000000000100	203	203
1826	00:37:18	X	0010000000000100	203	203
1827	00:41:34	X	0010000000000100	203	203
1828	00:45:50	X	0010000000000100	203	203
1829	00:50:06	X	0010000000000100	203	203
1830	00:54:21		0000000000000100	0	0
1831	00:56:44		0000000000000100	0	0
1832	00:58:40		0000000000000100	0	0
1833	01:02:56		0000000000000100	0	0
1834	01:07:01	X	0010000000000100	303	303
1835	01:07:13	X	0010000000000100	303	303
1836	01:11:29	X	0010000000000100	303	303
1837	01:15:45	X	0010000000000100	303	303
1838	01:20:01	X	0010000000000100	303	303
1839	01:24:18	X	0010000000000100	303	303
1840	01:28:33		0000000000000100	0	0
1841	01:32:50		0000000000000100	0	0
1842	01:34:54		0000000000000100	0	0
1843	01:37:08		0000000000000100	0	0
1844	01:41:24		0000000000000100	0	0

CDMS EVT 50002 (AMDTChangeReport)

Nb	Heure	LCN	Lander state Vector	AMST	AMDT
445	23:40:24		0000000000000100	0	0
455	00:00:33	X	0010000000000100	103	103
463	00:18:45		0000000000000100	0	0
473	00:33:37	X	0010000000000100	203	203
483	00:51:49		0000000000000100	0	0
493	01:06:29	X	0010000000000100	303	303
503	01:24:41		0000000000000100	0	0

CDMS EVT 50000 (Vis-TC-ExecutionReport)

Nb	Heure	TC APID
444	23:37:26	1868
462	00:02:33	1804
480	00:35:36	1804
481	00:42:06	1804
482	00:42:21	1804
497	01:07:00	1804
498	01:07:09	1804
502	01:08:29	1804

2.3 Data Analysis

The data analysis is done with 100 sounding point and a FIOV ratio equal to 5 that mean 20 complete signals per operation slot.

The following signal show a signal shape with oscillation larger than the orbiter ones (10 dB versus 2 dB).

The measured noise level is a few dB larger on the Lander than on the orbiter. The raison of this larger level: a higher Rx amplifier gain or a higher noise level, has to be analysis in a further study.

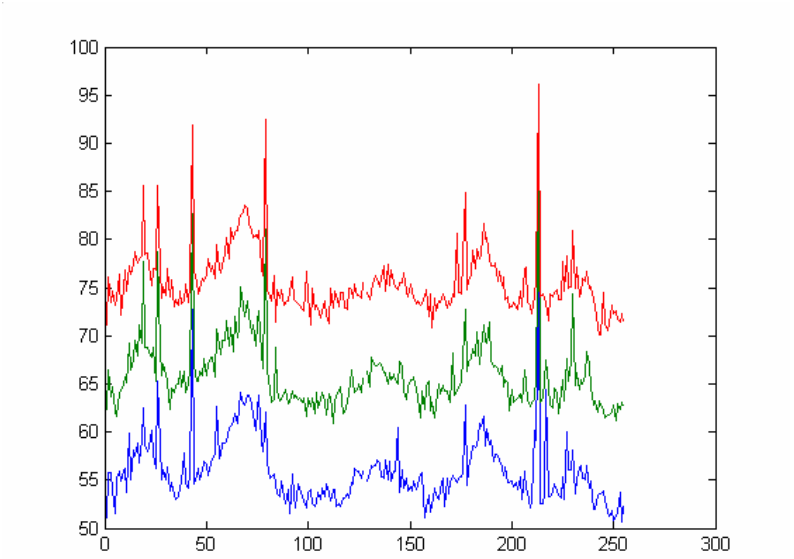

Figure 6: Mean spectrum (RMS) for each slot in dB from 85 to 95 MHz
10 dB Shift between each graph: the blue one corresponds to the slot1

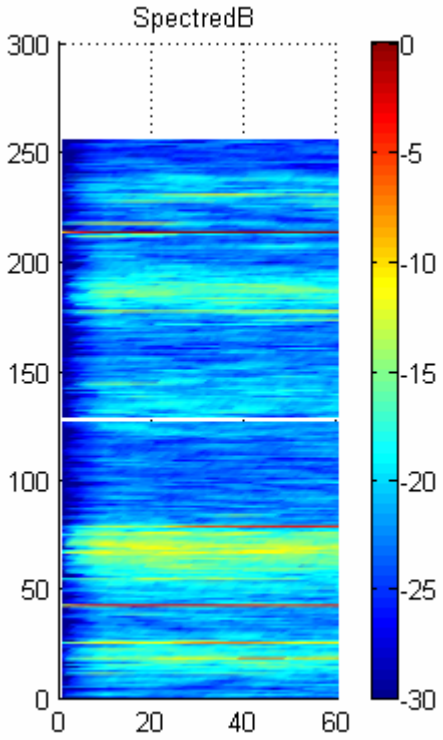

Figure 7: Spectrum from 85 to 95 MHz as a function of the sounding number in dB
Average of 10 soundings to reduce the standard variation of the noise level estimate
The power increase of the first tens points corresponds to the averaging filter transient

2.4 Procedure list

CV-FCP-238	AMST 103
CV-FCP-257	AMST 203
CV-FCP-258	AMST 303

See directory in annex

2.5 Command History (DDS)

Command history printout from time: 2004.100.13.07.59.000 to time: 2106.036.06.28.14.000
Current printout time: 2004.105.07.49.06.940 Print view mode: BRIEF Sort order: EXECUTION Filter: INACTIVE

Name	Description	Sequence	Release Time	Execution Time	Sub	ST	SST	PID	11	13	C	S	D	0	1	G	B	IL	ST	FC	SSC	R	GTO	AC0	AC1
INSERTTT	INSERT TIME TAG	ASYF101A	04.102.21.20.08	04.102.21.20.59.744	1	11	20	1			A	E	E	E	E			MS	37	08C	S	SSS	SS	SS
ZDM02215	Enable back up MTL	ADMF306D	04.102.21.23.00	04.102.21.23.50.746	1	137	1	1			A	E	E	E	E			MS	38	08D	S	SSS	SS	SS
ZLC80010	CDMS HW Config. Reset	ALZF200A	04.102.21.33.42	04.102.21.34.33.757	21	192	50	109			A	E	E	E	E			MS	39	1E2	S	SSS	U	S
ZLC80011	PSS Configuration Reset	ALZF200A	04.102.21.35.42	04.102.21.36.34.759	21	192	59	109			A	E	E	E	E			MS	3A	1E3	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ALZF200A	04.102.21.36.13	04.102.21.37.03.759	21	192	49	109			A	E	E	E	E			MS	3B	1E4	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ALZF200A	04.102.21.36.43	04.102.21.37.34.760	21	192	49	109			A	E	E	E	E			MS	3C	1E5	S	SSS	U	S
ZLC90000	Lander to Normal Mode	ALZF900A	04.102.21.45.09	04.102.21.45.59.768	21	192	65	109			A	E	E	E	E			MS	3D	1E6	S	SSS	U	S
ZLC80007	Fast CDMS/PSS HK	ALZF900A	04.102.21.46.09	04.102.21.46.59.769	21	192	49	109			A	E	E	E	E			MS	3E	1E7	S	SSS	U	S
ZLC80036	Select TCU1 as default	ALZF200B	04.102.21.54.37	04.102.21.55.28.777	21	192	59	109			A	E	E	E	E			MS	3F	1E8	S	SSS	U	S
ZLC80014	Set HPC only	ALZF200B	04.102.21.56.38	04.102.21.57.28.779	21	192	59	109			A	E	E	E	E			MS	40	1E9	S	SSS	U	S
ZLC80022	Select CIU2 I/F (Main)	ALZF200B	04.102.21.57.08	04.102.21.57.59.779	21	192	50	109			A	E	E	E	E			MS	41	1EA	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ALZF200B	04.102.21.59.08	04.102.21.59.59.781	21	192	49	109			A	E	E	E	E			MS	42	1EB	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ALZF200B	04.102.21.59.39	04.102.22.00.29.782	21	192	49	109			A	E	E	E	E			MS	43	1EC	S	SSS	U	S
ZLC90000	Lander to Normal Mode	ALZF900A	04.102.22.05.28	04.102.22.06.18.787	21	192	65	109			A	E	E	E	E			MS	44	1ED	S	SSS	U	S
ZLC80007	Fast CDMS/PSS HK	ALZF900A	04.102.22.06.28	04.102.22.07.18.788	21	192	49	109			A	E	E	E	E			MS	45	1EE	S	SSS	U	S
ZLC90107	Start MUPUS CV Sequence	ACVF242A	04.102.22.15.25	04.102.22.16.16.797	21	192	65	109			A	E	E	E	E			MS	46	1EF	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF242A	04.102.22.15.56	04.102.22.16.46.797	21	192	49	109			A	E	E	E	E			MS	47	1F0	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF242A	04.102.22.16.26	04.102.22.17.17.798	21	192	49	109			A	E	E	E	E			MS	48	1F1	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF242A	04.102.23.48.24	04.102.23.49.14.888	21	192	49	109			A	E	E	E	E			MS	49	1F2	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF242A	04.102.23.48.54	04.102.23.49.44.888	21	192	49	109			A	E	E	E	E			MS	4A	1F3	S	SSS	U	S
ZLC90103	Start CONSERT CV Sequence	ACVF238A	04.102.23.59.52	04.103.00.00.43.899	21	192	65	109			A	E	E	E	E			MS	4B	1F4	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF238A	04.103.00.00.22	04.103.00.01.12.900	21	192	49	109			A	E	E	E	E			MS	4C	1F5	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF238A	04.103.00.00.52	04.103.00.01.42.900	21	192	49	109			A	E	E	E	E			MS	4D	1F6	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF238A	04.103.00.22.28	04.103.00.23.18.922	21	192	49	109			A	E	E	E	E			MS	4E	1F7	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF238A	04.103.00.22.58	04.103.00.23.49.922	21	192	49	109			A	E	E	E	E			MS	4F	1F8	S	SSS	U	S
ZLC90203	Start CONSERT TC Verification	ACVF257A	04.103.00.32.56	04.103.00.33.46.932	21	192	65	109			A	E	E	E	E			MS	50	1F9	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF257A	04.103.00.33.26	04.103.00.34.16.933	21	192	49	109			A	E	E	E	E			MS	51	1FA	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF257A	04.103.00.33.56	04.103.00.34.47.933	21	192	49	109			A	E	E	E	E			MS	52	1FB	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF257A	04.103.00.56.00	04.103.00.56.50.956	21	192	49	109			A	E	E	E	E			MS	53	1FC	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF257A	04.103.00.56.30	04.103.00.57.20.956	21	192	49	109			A	E	E	E	E			MS	54	1FD	S	SSS	U	S
ZLC90303	Start CONSERT Patch & Dump	ACVF258A	04.103.01.05.48	04.103.01.06.38.965	21	192	65	109			A	E	E	E	E			MS	55	1FE	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF258A	04.103.01.06.18	04.103.01.07.08.966	21	192	49	109			A	E	E	E	E			MS	56	1FF	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF258A	04.103.01.06.49	04.103.01.07.39.966	21	192	49	109			A	E	E	E	E			MS	57	200	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ACVF258A	04.103.01.34.10	04.103.01.35.01.994	21	192	49	109			A	E	E	E	E			MS	58	201	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ACVF258A	04.103.01.34.41	04.103.01.35.31.995	21	192	49	109			A	E	E	E	E			MS	59	202	S	SSS	U	S
ZLC19265	Executing an AMST	ALCS100H	04.103.01.49.15	04.103.01.50.07.010	21	192	65	109			A	E	E	E	E			MS	5A	203	S	SSS	U	S
ZLC19248	CDMS Memory Load and Dump	ALCS100J	04.103.02.04.18	04.103.02.05.09.025	21	192	48	109			A	E	E	E	E			MS	5B	204	S	SSS	U	S
ZLC19248	CDMS Memory Load and Dump	ALCS100J	04.103.02.09.43	04.103.02.10.34.031	21	192	48	109			A	E	E	E	E			MS	5C	205	S	SSS	U	S
ZLC19253	Uplink Set-points Tab for Thermal SS	ALZF300A	04.103.02.20.36	04.103.02.21.27.042	21	192	53	109			A	E	E	E	E			MS	5D	206	S	SSS	U	S
ZLC90011	Switch ON Both TCUs	ALZF300A	04.103.02.21.07	04.103.02.21.58.043	21	192	65	109			A	E	E	E	E			MS	5E	207	S	SSS	U	S
ZLC80001	Dump 1 CDMS HK SID=1	ALZF300A	04.103.02.23.07	04.103.02.23.59.045	21	192	49	109			A	E	E	E	E			MS	5F	208	S	SSS	U	S
ZLC80005	Dump 2 PSS HK SID=4/5	ALZF300A	04.103.02.23.38	04.103.02.24.29.046	21	192	49	109			A	E	E	E	E			MS	60	209	S	SSS	U	S
INSERTTT	INSERT TIME TAG	ADMF160B	04.103.02.30.51	04.103.02.31.42.053	1	11	4	1			A	E	E	E	E			MS	61	08E	S	SSS	SS	SS
ZDM01240	Request Connection Test Response		04.103.02.32.22	04.103.02.33.13.055	1	17	1	1			A	E	E	E	E			MS	62	08F	S	SSS	SS	SS
ZSKA6525	START OBCP 'Stop SSMM Dump'	ADMF160B	04.103.02.30.51	04.103.02.35.01.000	1	7	1	1	Y		A	E	E	E	E			MS	61	259	S	SSS	SS	SS

Annex A : Data Files

File	Model	Phase	
T20040311-124624.sfdu	FMO + S/C	Part1 : 10-11 / 3 / 4	
T20040414-181829.sfdu	FSL + S/C	Part2 : 11-12 / 4 / 4	
B2_P300112.rolbin	FSL	Part2 : 11-12 / 4 / 4	