

CX(M)7 MP1.0 Pilot

Pilot Report

BTS SW CX(M)7 MP1.0

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About this document

The purpose of this document is to describe the pilot execution of the Base Transceiver Station (BTS) software version CX(M)7 MP1.0. The aim of a pilot is to verify the software readiness and find possible faults in a small scale live network prior to the official release.

Software CX(M)7 MP1.0 covers both MetroSite EDGE BTS and the UltraSite EDGE BTS software versions. Benchmarking of the Key Performance Indicators (KPI) was conducted for one week prior to software being loaded (week 40). The software level preceding the upgrade was CX(M)6 CD1.0. This document concentrates on the KPIs that were affected during the pilot. The BTS alarms were also compared and observed on a daily basis.

2 Pilot Summary

The piloting of BTS software in a customer's live network is a mandatory requirement before Nokia Siemens Networks can commercially release a new version of the software.

The sites chosen for the cluster were all under a BSC, which is located in the city centre. The sites chosen are also located in an area which has some major tourist attractions. Previously all of the sites were using BTS SW CX6 CD1.0. The BSC used SW S13 CD3 during the whole of the pilot.

The cluster of sites within the BSC was upgraded to CX(M)7 MP1.0 pre8 on October 6th. There was a further SW upgrade to the cluster on October 13th with CX(M)7 MP1.0 pre10.1. The official release package of CX(M)7 MP1.0 will contain the same files as CX(M)7 MP1.0 pre10.1.

In order to monitor the performance of the cluster, KPIs and alarm history were collected for one week prior to the scheduled software upgrade. This information would then be used as our baseline.

New KPIs and alarms were then collected during the pilot and comparisons were then made against the baseline SW (CX(M)6 CD1.0). The results show that there was no degradation of the performance in the test cluster and that no new alarms were observed during the pilot phase.

Based on the results of the pilot, Nokia Siemens Networks recommends full deployment to live customer networks as the tested software fully meets the P8 criteria.

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Customer pilot with CX(M)7 MP1.0 SW

Schedule

- Week 40 Baseline CX(M)6 CD1.0
- October 6th CX(M)7 MP1.0 pre8 activation in the pilot cluster
- October 13th CX(M)7 MP1.0 pre10.1 activation in the pilot cluster
- Week 43 CX(M)7 MP1.0 pre10.1 SW remains in the pilot cluster. Measurements taken up to October 21st

Main Features Active in the Cluster

- AMR FR & HR, EFR, GSM FR & HR
- GPRS
- Dual Band Usage

Deactivated Features

- EDGE

3.1 Used configurations

Network Software Level

Network Element	SW version during pilot
BSC SW level	BSS 13 CD3

Number of BTS per BSC

Sites	# Metro BTS	# of Ultra BTS
BSC 01	32 BTS	72 BTS

The frequency bands used by the BTS's are both GSM 900 and 1800. The UltraSite cluster consisted of 28 EDGE TRXs and 44 Non EDGE TRXs, while the MetroSite cluster consisted of 19 EDGE TRXs and 13 Non EDGE TRXs.

3.2 KPI

Measurement files were retrieved and post processed to obtain standard key performance indicators (KPI). In this case the following KPI were monitored.

cssr_3b/CSSR, voice	BAD FER - AMR HR 7.5
Immediate assignments	BAD FER - AMR HR 6.7
Paging msg sent	BAD FER - AMR HR 5.9
PS paging msg sent	BAD FER - AMR HR 5.15
CS paging msg sent	BAD FER - AMR HR 4.75
Delete paging command	BAD FER - AMR FR 12.2
Immediate assignments rejected	BAD FER - AMR FR 10.2
Packet immediate assignments	BAD FER - AMR FR 7.95
Packet immediate assignments rejected	BAD FER - AMR FR 7.4
SDCCH Requests	BAD FER - AMR FR 6.7
trf_11b/Average SDCCH traffic	BAD FER - AMR FR 5.9
sd_1b/SDCCH Requests other (fails, ghosts)	BAD FER - AMR FR 5.15
trf_54/SDCCH Seizures	BAD FER - AMR FR 4.75
sdr_1a/SDCCH Drop rate	BAD FER - ALL
sdr_4/SDCCH drop ratio without timer T3101 expiry	trf_197/TCH capacity usage by CS traffic (%)
csf_1/SDCCH access probability, before FCS	trf_198/TCH capacity usage by GPRS traffic (%)
SDCCH radio fail	

blk_5a/SDCCH real blocking	trf_78c/UL GPRS traffic (erl)
TCH Requests – All	
pwr_1/MS Average power (dbm)	trf_208c/DL GPRS traffic (erl)
dis_1/MS-BS Average Distance (M)	
trf_2d/Average call length (sec)	blk_13/Rejected CS immediate assignments (%)
trf_13f/Handover/Calls ratio	blk_21b/Rejected PS immediate assignments (%)
TCH drop - due to radio fail	ava_16a/Average PS territory
TCH drop - abis fail	GPRS territory upgrade requests
TCH drop - tr fail	blk_22/GPRS territory upgrade rejected (%)
dcr_3i/TCH drop call ratio, before re-establishment	GPRS territory downgrade requests
dcr_5a/TCH dropped conversation	tb_41/Number of GPRS TBFs established in UL
dcr_5b/TCH dropped conversation, re-est. considered	
dcr_8h/TCH drop call ratio, after TCH assignment, with RE	tb_42/Number of GPRS TBFs established in DL
dcr_10e/Drops per erlang (before re-est)	
blk_8i/TCH call blocking	tb_5c/Average duration of normally released TBF UL (sec)
blk_8g/TCH call blocking, DR compensated, EFR excluded	tb_6c/Average duration of normally released TBF DL (sec)
blk_29/TCH denied for call request ratio	tb_66/(E)GPRS TBF establishment failure ratio
TCH Seizures - FR V1	tb_67/TBF success ratio, releases due flush, suspend or dtm removed
TCH Seizures - FR V2 (EFR)	tb_52/(E)GPRS UL TBF establishment failure ratio
TCH Seizures - FR V3 (AMR)	tb_49/(E)GPRS DL TBF establishment failure ratio
TCH Seizures - HR V1	tb_34b/Overall TBF success rate, UL and DL together (%)
TCH Seizures - HR V3 (AMR)	tb_45a/DL TBF success rate (%)
TCH Failures - FR V1	tb_46a/UL TBF success rate (%)
TCH Failures - FR V2 (EFR)	tb_27c/TBF Drops (MS lost) per 10 kbyte UL, GPRS+EGPRS
TCH Failures - FR V3 (AMR)	tb_28c/TBF Drops (MS lost) per 10 kbyte DL, GPRS+EGPRS
TCH Failures - HR V1	tb_37d/Average number of UL TBFs per timeslot
TCH Failures - HR V3 (AMR)	tb_38d/Average number of DL TBFs per timeslot
FR TCH Time Share	rlc_10e/Retransmission ratio of UL GPRS CS1 blocks, ack mode
HR TCH Time Share	rlc_11f/Retransmission ratio of UL GPRS CS2 blocks, ack mode
trf_120a/TCH traffic share of non-AMR calls	
trf_121/TCH traffic share of FR AMR calls	rlc_12a/Retransmission ratio of DL GPRS CS1 blocks, ack mode
trf_122a/TCH traffic share of HR AMR calls	rlc_13/Retransmission ratio of DL GPRS CS2 blocks, ack mode
hfr_68c/Handover Drop Rate	
hfr_2b/Total HO failure ratio, area level	rlc_27/Retransmission ratio of UL GPRS CS3 blocks, ack mode
hsr_9a/Intra-cell TCH-TCH HO success ratio	rlc_29/Retransmission ratio of UL GPRS CS4 blocks, ack mode
ho_11/Outgoing inter-cell HO attempts	rlc_28/Retransmission ratio of DL GPRS CS3 blocks, ack mode
ho_13h/HO attempts, outgoing and intracell	rlc_30/Retransmission ratio of DL GPRS CS4 blocks, ack mode
hsr_6a/BSC controlled outgoing TCH-TCH HO success ratio	trf_238/Average number of busy UL GPRS channels
dcr_4/TCH drop in intra-cell HO	trf_239/Average number of busy DL GPRS channels
ho_24/Intra-cell HO attempts	trf_74c/Total GPRS RLC data
ho_68/HO due to UL quality	trf_235b/DL GPRS RLC throughput
ho_69/HO due to UL level	trf_233c/UL GPRS RLC throughput
ho_70/HO due to DL quality	trf_212c/Uplink GPRS RLC payload
ho_71/HO due to DL level	trf_213c/Downlink GPRS RLC payload
HO due to UL interference	

HO due to DL interference	
ho_77/HO due to power budget	
ho_78/HO due to OMC	
sms_5/SDCCH SMS Attempts	
sms_3/SDCCH SMS failure ratio	msl_15b/UL multislot allocation ratio
sms_6/TCH SMS Attempts	msl_16b/DL multislot allocation ratio
sms_2/TCH SMS failure ratio	llc_3a/Volume Weighted LLC Throughput
trf_202/Average CS Traffic (Erl)	blck_30/Territory upgrade rejection due to CSW
ulq_3/UL quality ratio, FER based, Bad UL FER Rate (>4,2%)	tbf_16b/DL multislot allocation blocking S13
UL RX-LEVEL distribution	GPRS territory upgrade rejection due to lack of PCU capacity
DL RX-LEVEL distribution	UL TBF Release due to no response from MS
dlq_2a/Bad DL cumulative quality ratio % in classes 5,6,7	Counter 001139 TCH call drop, radio failure
ulq_2a/Bad UL cumulative quality % in class 5,6,7	Counter 001084 TCH call drop, Abis failure
UL RX-Quality (Q6&7 SHARE)	Counter 001029 TCH call drop, transmission failure
DL RX-Quality (Q6&7 SHARE)	Call Setup Failure Rate
UL Interference (Band 1)	
UL Interference (Band 2)	
UL Interference (Band 3)	
UL Interference (Band 4)	
UL Interference (Band 5)	AMR HR MODE 1 ON DL
BAD FER – HR	AMR HR MODE 2 ON DL
BAD FER – FR	AMR HR MODE 3 ON DL
BAD FER – EFR	AMR HR MODE 4 ON DL
BAD FER - AMR HR 7.95	

3.3 KPI analysis

All of the KPIs listed in the tables in section 3.2 were collected, analysed, and closely monitored for any changes associated with the introduction of the CX(M)7 MP1.0 pre-release package. Only very minor changes were observed in a handful of KPIs throughout the pilot.

In analysing the KPI, please be guided by the dates listed below: The KPI report will only highlight activities that were related to software upgrades.

- October 6 – CX(M)7 MP1.0 pre8 software upgrade
- October 13 – CX(M)7 MP1.0 pre10.1 software upgrade

Other network specific dates to highlight in reviewing the KPI

- 2nd October - KPI Baseline data is missing from 1600 Friday 2nd October to 0100 Saturday 3rd October (around 9 hours).

5th October - Many people took this day as a holiday therefore the traffic in the network was a lot lower then it would be normally for a Monday.

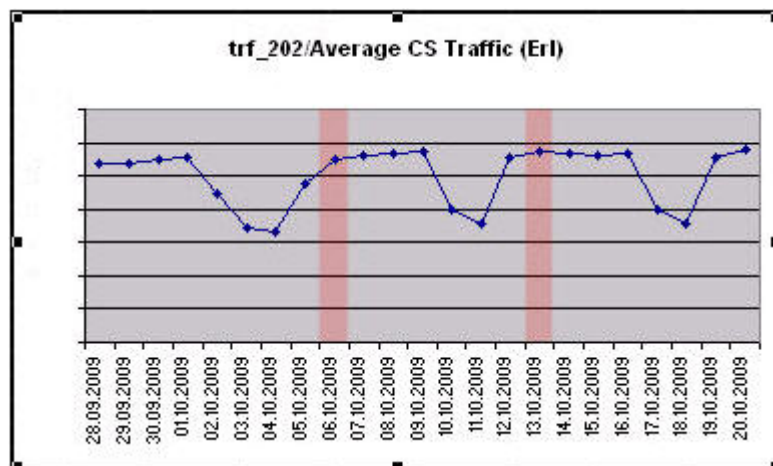


Figure 1 Ave CS Traffic (Erl) –

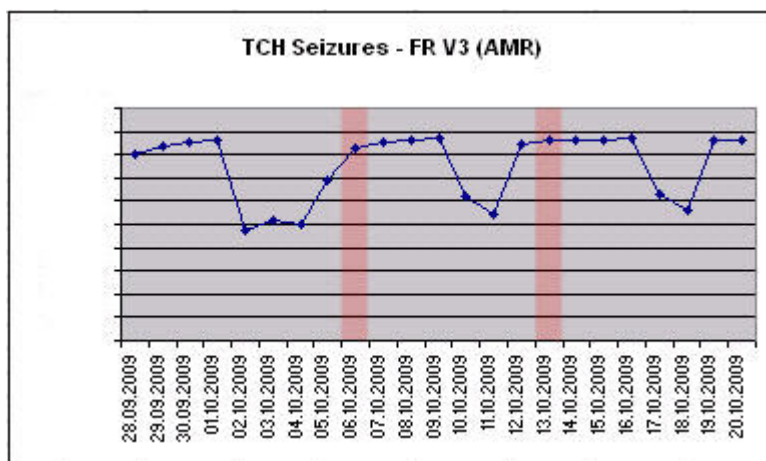


Figure 2 TCH Seizures FR AMR. - In trend

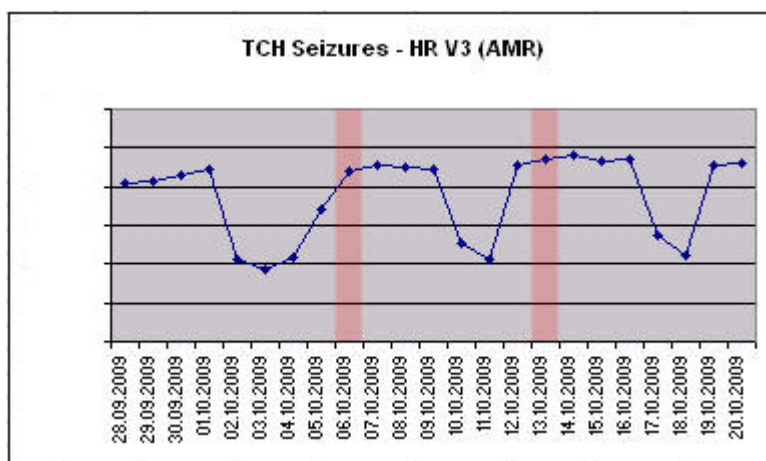


Figure 3 TCH Seizures HR AMR. - In trend

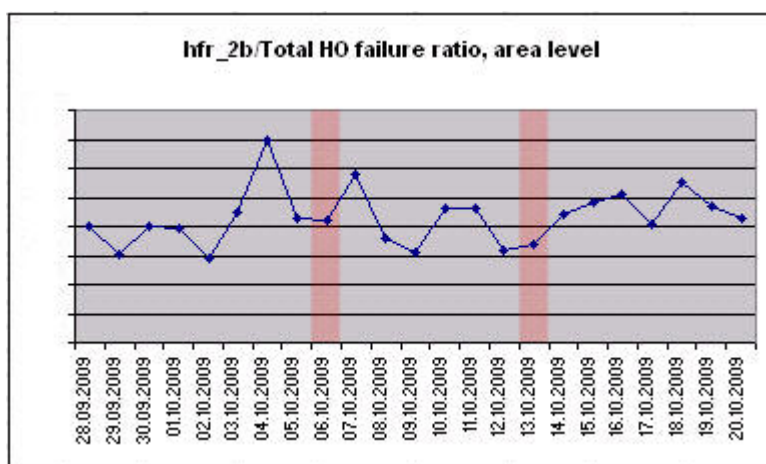


Figure 4 Total Handover Failure Ratio – In trend

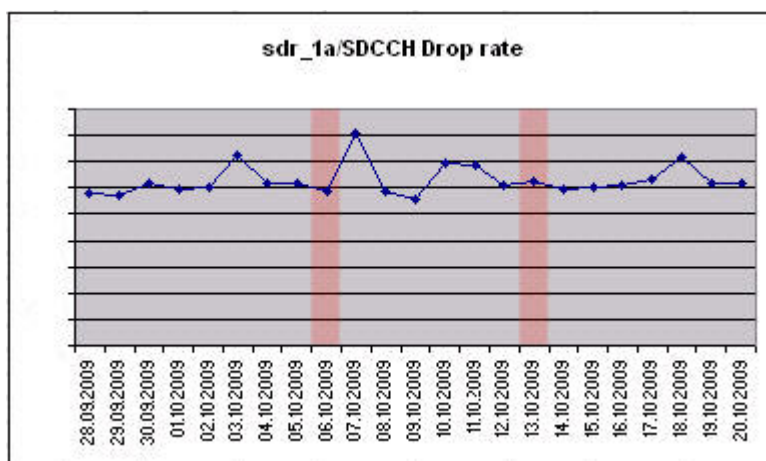


Figure 5 SDCCH Drop rate.

3.3.1 MetroSite KPI charts

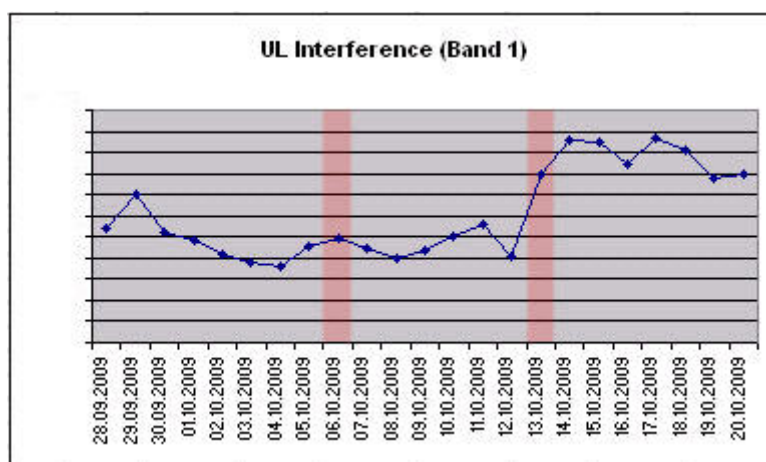


Figure 6: UL interference (Band 1) – The decrease in interference on 14th October is due to an improvement in one BTS only.

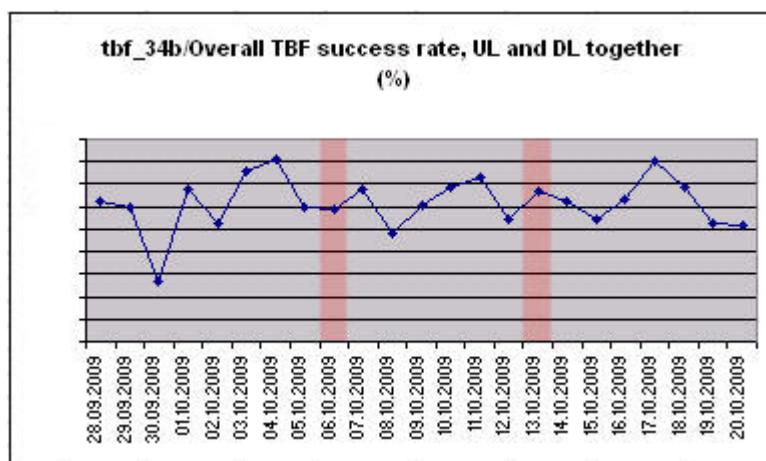


Figure 2 Overall TBF success rate, UL and DL together. - In trend

4 Alarms

Active alarms and alarm histories were collected in the pilot cluster on a daily basis. All BTS generated alarms were checked to see whether they are genuine and if they were as a result of the piloted feature.

There were no alarms seen as a result of the activation of the new BTS SW. All BTS within the pilot cluster operated as expected throughout the pilot.

4.1 Problem reports raised during the pilot

There were no problems raised against CX(M)7 MP1.0 SW during the course of the pilot.

5 References

- 1 UltraSite EDGE BTS List of Generic Faults [LGF-2GBTSu-2009-44](#)
- 2 MetroSite EDGE BTS List of Generic Faults [LGF-2GBTSm-2009-44](#)