International Civil Aviation Organization

The Third Meeting of the Future Air Navigation Systems Interoperability Team-Asia (FIT-Asia/3)

Pattaya, Thailand, 26-27 May 2014

Agenda Item 2: Central Reporting Agency Reports

Problem Reports and CRA Arrangements

(Presented by the Secretariat)

SUMMARY

This paper presents follow up information arising from FIT-Asia/2 relating to apparent deficiencies in data-link problem and performance reporting by FIT-Asia States/Administrations, and the associated lack of arrangements with competent Central Reporting Agencies for the technical analysis of data-link systems' performance.

1. INTRODUCTION

1.1 The FIT-Asia Terms of Reference (TOR, **Attachment A**) require that it supports FIT-Asia participant States' compliance with ICAO Annex 11 – *Air Traffic Services* and Global Operational Data-Link Document (GOLD) requirements for data-link performance.

1.2 There is a considerable lack of data-link problem reporting among FIT-Asia States and airspace users, and few FIT-Asia States have arrangements in place for the analysis of problem reports by a competent Central Reporting Agency (CRA)[1].

2. DISCUSSION

2.1 The FIT-Asia TOR require, *inter-alia*, that it conducts the following activities to support FIT-Asia participant States' compliance with ICAO Annex 11 – *Air Traffic Services* and Global Operational Data-Link Document (GOLD) requirements for data-link performance:

- oversighting system configuration and the end-to-end monitoring process of datalink systems to ensure they are implemented and continue to meet performance, safety, and interoperability requirements within the Asian Region;
- establishing a problem reporting system;
- reviewing de-identified problem reports, identify trends and determining appropriate resolution;
- monitoring the progress of problem resolution;
- preparing summaries of problems encountered and their operational implications;

[1] The Asia/Pacific Regional Airspace Safety Monitoring Advisory Group (RASMAG) is responsible for updating and distributing the Regional list of competent airspace safety monitoring organizations for use by States requiring airspace safety monitoring services, including CRA.

- determining and validate system performance requirements;
- establishing a performance monitoring system; and
- assessing system performance based on information from the CRA;

2.2 Monitoring, reporting and analysis of data-link performance and problems is essential for the achievement and maintenance of system performance required for the application of RNP based separation standards.

2.3 In order to conduct these activities, arrangements for the reporting and analysis of data-link problems must be made between FIT-Asia States and a competent CRA. Annex 11 states:

> *2.27.5 Any significant safety-related change to the ATS system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the responsible authority shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.*

2.4 Clearly the implementation of ADS-C and CPDLC are significant safety related changes, given their use in ATS surveillance and Direct Controller – Pilot Communications (DCPC) communications and the PANS/ATM requirement for their use to support certain separation standards.

2.5 Implementation of improved separation using ADS-C and CPDLC is expected under the Asia Pacific Seamless ATM Plan, which was adopted by APANPIRG at its 24th meeting (APANPIRG/24, Bangkok, Thailand, 24 to 26 June 2013). The Seamless ATM Plan includes:

- Prioritization of Aviation System Block Upgrade (ASBU) module B0-TBO *En-route Data-link* as *Priority 1, critical upgrade;*
- Preferred Aerodrome/Airspace and Route Specifications (PARS) Phase 1 expectation of RNP 4, RNP 10 and RNP 2 and Preferred ATM Service Level (PASL) Phase 1 expectation of ADS-C and CPDLC enablement, implemented by November 2015 to support PBN-based separations, User Preferred Routes (UPR) and Dynamic Airborne Re-route Planning (DARP) in upper controlled airspace outside ground-based surveillance coverage.

2.6 As discussed at the FIT-Asia/2 meeting (Bangkok, Thailand, 28 – 29 March 2013), a considerable number of FIT-Asia States do not have arrangements with a competent CRA. As a result of that discussion the following Conclusion was subsequently agreed by APANPIRG/24:

Conclusion 24/24: ADS/C and CPDLC Problem Reporting and Analysis

That, FIT-Asia States are requested to:

- *register on the FIT-Asia website (http://www.ispacg-cra.com), and report their registration to the ICAO Asia/Pacific Regional Office by 31 December 2013;*
- *report problems relating to Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data-Link Communications (CPDLC) services to the Central Reporting Agency (CRA) for analysis, utilizing the FIT-Asia website; and*
- *ensure the CRA analysis is reported to FIT-Asia.*

2.7 As at 16 May 2014 only 2 FIT-Asia States/Administrations were registered on the FIT-Asia CRA.

2.8 **Table 1** provides a list of FIT-Asia administrations, their known ADS-C/CPDLC implementation status, the expectations for ADS-C/CPDLC placed upon them under the Seamless ATM Plan, and their FIT-Asia CRA registration status.

Administration	Data-Link Service Status	Seamless ATM Expectation (Nov 2015)	FIT-Asia CRA Registration
Afghanistan		YES *	
Bangladesh		YES *	
Bhutan			
Brunei Darussalam			
Cambodia		YES *	
China	Implemented	YES *	YES
Hong Kong China		YES	
Macao, China			
India	Implemented	YES	YES
Indonesia	Implemented	YES	
DPR Korea		YES *	
Rep. of Korea		YES *	
Lao PDR		YES *	
Malaysia		YES	
Mongolia		YES	
Myanmar	Implemented	YES	
Maldives	Implemented	YES *	
Nepal		YES *	
Pakistan		YES *	
Sri Lanka	Implemented	YES	
Thailand		YES *	
** Dependent on whether the administration provides upper level ATC services outside ground-based surveillance and communications coverage*			

Table 1: FIT-Asia ADS-C/CPDLC Implementation and CRA Registration Status.

2.9 In the event that Administrations implement or have implemented data-link services without a competent CRA service and a robust program of post-implementation performance monitoring, the service does not comply with ICAO SARPS as defined in Annex 11. In these cases the service may be recorded as an APANPIRG Deficiency.

2.10 Factors contributing to low participation in the FIT-Asia CRA, which may be related to individual ANSP capability and/or resources to extract data-link performance records from ATM and communications systems.

2.11 Appendix D of the Global Operational Data-Link Guidance Document (GOLD, available through the ICAO Secure Portal, and on the ICAO Asia/Pacific Regional Office website at http://www.icao.int/APAC/Documents/edocs/GOLD_2Edition.pdf) details performance data and data formats for post-implementation monitoring. It also provides guidance on how to obtain the required data points from FANS 1/A, ACARS and ATN B1 messages, and on the calculation of actual communication performance (ACP), actual communication technical performance (ACTP, pilot operational response time (PORT), actual surveillance performance (ASP). Examples of the type of analysis that can be carried out at an ANSP level are also included.

2.12 As reported to FIT-Asia/2 (IP/08) the GOLD Performance Analysis Tool (G-PAT), which can be used for the analysis of data collected in accordance with GOLD guidelines, is available

on the ICAO GOLD secure website, or can be obtained through direct enquiry by any State or ANSP to the Informal South Pacific ATS Coordinating Group (ISPACG, http://www.ispacg-cra.com)

2.13 The meeting is also reminded that a template for ADS-C/CPDLC performance reporting was developed by FIT-Asia/2 (**Attachment B**), and is available on the ICAO Asia/Pacific Regional Office web-page at:

http://www.icao.int/_layouts/download.aspx?SourceUrl=/APAC/Documents/edocs/Data Link Performance Data Reporting Template.doc.

2.14 Further information on the establishment and operation of an implementation/interoperability team and CRA including roles, terms of reference, functions and resource requirements can be found in the *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia Pacific Region (Version 4.0 – February 2011)*, available on the ICAO Asia/Pacific Regional Office website at:

http://www.icao.int/APAC/Documents/edocs/GuidanceMaterial_EndToEnd_ver4.pdf.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and discuss

i) the reasons the FIT-Asia registration may not have occurred;

ii) state capability to extract data-link performance data from ATM and communications systems;

iii) suggested strategies to improve data extraction capability and performance reporting; and

iv) any other relevant matters as appropriate.

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FANS INTEROPERABILITY TEAM - ASIA (FIT-ASIA)

TERMS OF REFERENCE

FIT-Asia Objective and Scope

The FANS Interoperability Team - Asia (FIT-Asia) shall be responsible for overseeing system configuration and the end-to-end monitoring process of datalink systems to ensure they are implemented and continue to meet performance, safety, and interoperability requirements within the Asian Region.

The FIT-Asia shall:

Implementation

a) support the implementation and operational benefits of AIDC, CPDLC and ADS;

Reporting and problem resolution processes

b) establish a problem reporting system;
c) review de-identified problem reports, identify trends and determine appropriate resolution;
d) develop interim operational procedures to mitigate the effects of problems until resolution;
e) monitor the progress of problem resolution;
f) prepare summaries of problems encountered and their operational implications;

System performance and monitoring processes

g) determine and validate system performance requirements;
h) establish a performance monitoring system;
i) assess system performance based on information from the CRA;
j) coordinate system testing and trials;
k) identify accountability for each element of the end-to-end system;
l) develop, document and implement a quality assurance plan that will provide a stable system;
m) identify end-to-end system configurations that provide acceptable data link performance;
n) ensure that such configurations are maintained by all stakeholders;

New procedures

o) coordinate testing in support of implementation of enhanced operational procedures

Reporting

p) report safety-related issues to the appropriate State or regulatory authorities for action;
q) provide reports to relevant ATM coordinating groups; and
r) report to RASMAG.

Relevant Central Reporting Agencies (CRA) and States will report, as required, to the FIT-Asia. ICAO Secretariat will submit reports to appropriate sub-groups of APANPIRG.

Composition of FIT-Asia

The FIT-Asia will consist of representatives from States (ANS Providers) communication service providers (CSP), CRAs, IATA, CANSO, IFALPA and IFATCA. Aircraft and ancillary equipment manufacturers may also be requested to participate.

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Approved by APANPIRG/22, September 2011

FIT-Asia/X−IP/XX
dd – dd/mm/YYYY

International Civil Aviation Organization

The XX$^{nd/rd/th}$ Meeting of the Future Air Navigation Systems Interoperability Team-Asia (FIT-Asia/XX)

[e.g. Bangkok, Thailand, dd – dd Mmmmm YYYY]

Agenda Item 3: Review of ADS/CPDLC Operations

DATA LINK PERFORMANCE REPORT FOR (STATE/ORGANIZATION)

(Presented by NAME OF STATE/ORGANIZATION)

SUMMARY

This paper presents data link performance data for YYYY for the following FIR/s:

- FIR 1
- FIR 2
- etc……

1. INTRODUCTION

1.1 TEXT

2. DISCUSSION

XXXX FIR CPDLC Actual Communications Performance (ACP)

2.1 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

2.2 **Table 1** summarizes overall CPDLC Actual Communications Performance (ACP) for messages sent within the XXXX FIR. **Figure 1** presents the ACP measurement by media type (Satellite, VHF and the combined total of both) for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP				
Messages		**% > 180 sec (Target 95%)**	**%> 210 sec (Target 99.9%)**	**Remarks**
Satellite	XX	XX	XX	
VHF	XX	XX	XX	-
Total	XX	XX	XX	

Table 1: XX FIR CPDLC ACP per Media Type

INSERT ACP GRAPH
Figure 1: xx FIR ACP by Data Link Media Type

XXXX FIR ADS-C Downlink Latency

2.3 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

2.4 **Table 2** summarizes ADS-C Downlink Latency for messages sent within the XXXX FIR. **Figure 2** presents the ADS-C Downlink Latency per media type (Satellite, VHF, and the combined total of both) for the period XXX 20XX to XXX 20XX..

XXXX FIR ADS-C Downlink Latency				
Messages		**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
Satellite	XX	XX	XX	
VHF	XX	XX	XX	-
Total	XX	XX	XX	

Table 2: XX FIR CPDLC ACTP (VHF) per Month

INSERT ADS-C Downlink Latency GRAPH
Figure 2: xx FIR ADS-C Downlink Latency

XXXX FIR CPDLC Actual Communications Performance (ACP) per Operator (de-identified)

2.5 **Table 3** summarizes CPDLC Actual Communications Performance per Operator for messages sent within the XXXX FIR. **Figure 3** presents the CPDLC Actual Communications Performance per Operator for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP per Operator				
Operator (de-identified)	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table 3: XX FIR CPDLC ACP per Operator

INSERT CPDLC ACP per Operator GRAPH
Figure 3: xx FIR CPLC ACP per Operator

2.6 TEXT

3. ACTION BY THE MEETING

3.1 The meeting is invited to: AMEND AS APPROPRIATE

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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POSSIBLE APPENDIX MATERIAL

XXXX FIR CPDLC Actual Communications Performance (ACP) per Month - Satellite

1.1 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.2 **Table X** summarizes CPDLC ACP (Satellite) per month for messages sent within the XXXX FIR. **Figure X** presents the ACP (Satellite) XXX measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP per Month - Satellite				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACP per Month - Satellite

INSERT XXXX GRAPH
Figure X: xx FIR ACP per Month - Satellite

XXXX FIR CPDLC Actual Communications Performance (ACP) per Month - VHF

1.3 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.4 **Table X** summarizes CPDLC ACP (VHF) per month for messages sent within the XXXX FIR. **Figure X** presents the ACP (VHF) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP per Month - VHF				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACP per Month - VHF

INSERT XXXX GRAPH
Figure X: xx FIR ACP per Month - VHF

XXXX FIR CPDLC Actual Communications Technical Performance (ACTP)

1.5 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.6 **Table X** summarizes overall CPDLC Actual Communications Technical Performance (ACTP) for messages sent within the XXXX FIR. **Figure X** presents the ACTP measurement by media type (Satellite, VHF and the combined total of both) for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACTP				
Messages		**% > XXX sec (Target XX%)**	**%> 150 sec (Target 99.9%)**	**Remarks**
Satellite	XX	XX	XX	
VHF	XX	XX	XX	-
Total	XX	XX	XX	

Table X: XX FIR CPDLC ACTP

INSERT ACTP GRAPH
Figure X: xx FIR ACTP by Data Link Media Type

XXXX FIR CPDLC Actual Communications Technical Performance (ACTP) per Month – Satellite

1.7 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.8 **Table X** summarizes CPDLC ACTP (Satellite) per month for messages sent within the XXXX FIR. **Figure X** presents the ACTP (Satellite) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACTP - Satellite				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACTP per Month - Satellite

INSERT ACTP per Month GRAPH
Figure X: xx FIR ACTP per Month - Satellite

XXXX FIR CPDLC Actual Communications Technical Performance (ACTP) per Month - VHF

1.9 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.10 **Table X** summarizes CPDLC ACTP (VHF) per month for messages sent within the XXXX FIR. **Figure X** presents the ACTP (VHF) measurement per month for the period XXX 20XX to XXX 20XX..

XXXX FIR CPDLC ACTP (VHF)				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACTP (VHF) per Month

INSERT ACTP (VHF) per Month GRAPH
Figure X: xx FIR CPDLC ACTP (VHF) per Month

XXXX FIR ADS-C Downlink Latency per Month - Satellite

1.11 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.12 **Table X** summarizes ADS-C Downlink Latency (satellite) measurements per month for messages sent within the XXXX FIR. **Figure X** presents the ADS-C Downlink Latency (satellite) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR ADS-C Downlink Latency - Satellite				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR ADS-C Downlink Latency per Month - Satellite

INSERT ADS-C Downlink Latency per Month – Satellite GRAPH
Figure X: xx FIR ADS-C Downlink Latency per Month - Satellite

XXXX FIR ADS-C Downlink Latency per Month - VHF

1.13 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.14 **Table X** summarizes ADS-C Downlink Latency (VHF) measurements per month for messages sent within the XXXX FIR. **Figure X** presents the ADS-C Downlink Latency (VHF) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR ADS-C Downlink Latency - VHF				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR ADS-C Downlink Latency per Month - VHF

INSERT ADS-C Downlink Latency (VHF) per Month GRAPH
Figure X: xx FIR ADS-C Downlink Latency per Month - VHF

XXXX FIR CPDLC Actual Communications Performance (ACP) per Month - HF

1.15 INCLUDE AN EXECUTIVE SUMMARY FOR EACH PERFORMANCE COMPONENT REPORTED

1.16 **Table X** summarizes CPDLC ACP (HF) measurements per month for messages sent within the XXXX FIR. **Figure X** presents the CPDLC ACP (HF) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP per Month - HF				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACP per Month - HF

INSERT CPDLC ACP per Month - HF GRAPH
Figure X: xx FIR CPDLC ACP per Month – HF

XXXX FIR CPDLC Actual Communications Technical Performance (ACTP) per Month - HF

1.17 **Table X** summarizes CPDLC ACTP (HF) measurements per month for messages sent within the XXXX FIR. **Figure X** presents the CPDLC ACTP (HF) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP per Month - HF				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACTP per Month - HF

INSERT CPDLC ACP per Month - HF GRAPH
Figure X: xx FIR CPDLC ACTP per Month - HF

XXXX FIR ADS-C Downlink Latency per Month - HF

1.18 **Table X** summarizes ADS-C Downlink Latency (HF) measurements per month for messages sent within the XXXX FIR. **Figure X** presents the ADS-C Downlink Latency (HF) measurement per month for the period XXX 20XX to XXX 20XX.

XXXX FIR ADS-C Downlink Latency per Month - HF				
Month	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR ADS-C Downlink Latency per Month - HF

INSERT CPDLC ACP per Month - HF GRAPH
Figure X: xx FIR ADS-C Downlink Latency per Month - HF

XXXX FIR CPDLC Actual Communications Performance (ACP) per Operator (de-identified)

1.19 **Table X** summarizes CPDLC Actual Communications Performance per Operator for messages sent within the XXXX FIR. **Figure X** presents the CPDLC Actual Communications Performance per Operator for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACP per Operator				
Operator (de-identified)	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACP per Operator

INSERT CPDLC ACP per Operator GRAPH
Figure X: xx FIR CPLC ACP per Operator

XXXX FIR CPDLC Actual Communications Technical Performance (ACP) per Operator (de-identified)

1.20 **Table X** summarizes CPDLC Actual Communications Technical Performance per Operator for messages sent within the XXXX FIR. **Figure X** presents the CPDLC Actual Communications Performance per Operator for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC ACTP per Operator				
Operator (de-identified)	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table X: XX FIR CPDLC ACTP per Operator

INSERT CPDLC ACTP per Operator GRAPH
Figure X: xx FIR CPLC ACP per Operator

XXXX FIR CPDLC Pilot Operational Response Time (PORT) per Operator (de-identified)

1.21 **Table 15** summarizes CPDLC Pilot Operational Response Time per Operator for messages sent within the XXXX FIR. **Figure 15** presents the CPDLC Pilot Operational Response Time per Operator for the period XXX 20XX to XXX 20XX.

XXXX FIR CPDLC PORT per Operator				
Operator (de-identified)	**Messages**	**% > XXX sec (Target XX%)**	**%> XXX sec (Target XX%)**	**Remarks**
XXX	XX	XX	XX	
XXX	XX	XX	XX	-
XXX	XX	XX	XX	

Table 15: XX FIR CPDLC PORT per Operator

INSERT CPDLC PORT per Operator GRAPH
Figure 15: xx FIR CPLC PORT per Operator

…….