



ISPAC/27 FIT/20

Data Link Performance Analysis
Oakland, Anchorage and New York FIRs

Auckland, New Zealand
26-27 February 2013



FAA

Overview

- Summary of Reported Service Outages/Degradations
 - January 2012 to Present
- GOLD Performance Criteria
- How to Read GOLD Charts
- Aggregate Data Link Performance for Oakland, Anchorage and New York
- Performance for All Media Types Combined
 - Performance by Media Type
- ADS-C Performance by Station Identifier for Oakland, Anchorage and New York
- Aggregate Data Link Performance by Operator for Oakland, Anchorage and New York
- VHF Performance – Comparison of POA and AOA



START DATE	START TIME (UTC)	DURATION (HH:MM:SS)	SERVICE IMPACTED	SATELLITE REGION IMPACTED	NOTIFICATION SOURCE	NOTES
17-Jan-12	21:45	00:30:00	Iridium	Global	ARINC, Sita	Unexpected Service Interruption - SATELLITE AIRCOM-Iridium Datalink ACARS Service (Post-Incident Report) Short Burst Data Service may have been affected during the above timeframe. Voice service was not affected. Location: GLOBAL
18-Mar-12	12:15	00:40:00	Iridium	Global	ARINC, Sita	Iridium was experiencing delays with SBD DMT message delivery
2-Apr-12	5:45	00:58:00	Sita	AOE, AOW	Sita	Unexpected service interruption at Aussaguel GES
30-Apr-12	6:00	10:00:00	Iridium	Global	ARINC, Sita	Due to an internal network anomaly at the Tempe Gateway, SBD customers will have intermittent use of all SBD services during this period. SBD messages are queueing for delivery. Message delivery is delayed 30+ minutes.
1-May-12	10:15	04:52:00	Iridium	Global	ARINC, Sita	SBD DMO customers may experience delays in message delivery of up to 30 minutes. The back log of messages are being processed at this time. Engineering is working the issue.
9-May-12	23:48	05:07:00	Iridium	Global	ARINC, Sita	Due to severe thunderstorms in the vicinity of the Tempe Gateway
6-Jun-12	13:57	00:22:00	Sita	AOE, AOW, IOR, POR	Sita	Network Issue
13-Jul-12	00:30	02:57:00	Iridium	Global	Sita	All data services are currently degraded. Iridium Engineering is working on his issue.



START DATE	START TIME (UTC)	DURATION (HH:MM:SS)	SERVICE IMPACTED	SATELLITE REGION IMPACTED	NOTIFICATION SOURCE	NOTES
14-Jul-12	22:20	00:29:00	Iridium	Global	ARINC, Sita	Satellite voice and SBD data services degraded due to severe thunderstorms
29-Jul-12	23:00	05:00:00	Iridium	Global	ARINC, Sita	Due to severe thunderstorms in the vicinity of Tempe Gateway, customers may have experienced dropped calls and the inability to place or receive calls
30-Jul-12	19:49	00:14:00	Iridium	Global	ARINC, Sita	Due to an unscheduled service outage, SATELLITE AIRCOM-Iridium Voice and Datalink ACARS Services were unavailable
15-Aug-12	05:00	00:28:00	Iridium	Global	ARINC, Sita	Due to severe thunderstorms in the vicinity of the Tempe Gateway, customers may experience dropped calls and the inability to place or receive calls. Iridium Voice and all Data services may be affected until the weather anomaly has passed.
21-Aug-12	02:00	02:00:00	Iridium	Global	ARINC, Sita	Due to severe thunderstorms in the vicinity of Tempe Gateway, customers may have experienced dropped calls and the inability to place or receive calls.
22-Aug-12	04:24	04:36:00	Iridium	Global	ARINC, Sita	Due to severe thunderstorms in the vicinity of the Tempe Gateway, customers may have experienced dropped calls and the inability to place or receive calls.
24-Aug-12	12:59	04:00:00	Iridium	Global	ARINC, Sita	Satellite Voice and SBD Data Services via Iridium was operating in a degraded state due to severe thunderstorms in the vicinity of the Tempe Gateway. Customers may have perienced dropped calls and the inability to place or receive calls.
7-Sep-12	15:30	05:17:00	Iridium	Global	ARINC, Sita	Due to severe thunderstorms in the vicinity of the Tempe Gateway, customers may have experienced dropped calls and the inability to place or receive calls.



START DATE	START TIME (UTC)	DURATION (HH:MM:SS)	SERVICE IMPACTED	SATELLITE REGION IMPACTED	NOTIFICATION SOURCE	NOTES
14-Sep-12	04:49	05:45:00	Iridium	Global	ARINC,Sita	Iridium SBD services are currently experiencing an outage. Iridium engineers are currently working to resolve this issue.
6-Nov-12	06:45	01:25:00	Sita (Satellite Data Services)	EUA1 Fucino	Sita	Degraded due to antenna tracking problem
28-Nov-12	23:23	14:36:00	Iridium	Global	Sita	Iridium SBD service was interrupted following a change on the Iridium network reference Advisory 137
6-Dec-12	01:56	01:01:00	Iridium	Global	Sita, ARINC	
12-Dec-12	16:40	00:40:00	Iridium	Global	Sita, ARINC	IRIDIUM gateway experienced an anomaly with Short Burst Data (SBD) which led to a delay in message delivery for Email Mobile Originated (EMO), Direct IP Mobile Originated (DMO), Email Mobile Terminated (EMT) and Direct IP Mobile Terminated (DMT) messages
14-Dec-12	08:28	02:00:00	Iridium	Global	Sita, ARINC	Severe thunderstorms in the vicinity of the Tempe Gateway
30-Jan-13	21:11	09:56:00	ARINC Iridium	Global	ARINC	The Fiber cut was repaired
30-Jan-13	23:47	00:03:00	SITA Iridium	Global	Sita	During maintenance , there was an outage that affected SBD services for less than 2 minutes and caused delays in processing.
4-Feb-13	19:32	00:11:00	Iridium	Global	ARINC,Sita	Database issue
14-Feb-13	00:07	00:48:00	Sita	Global	Sita	Emergency system switchover to our Montreal processing center due to an issue at our Singapore center
14-Feb-13	23:30	03:56:00	Iridium Voice	Global	Sita, ARINC	Unscheduled service degradation of Iridium voice services
16-Feb-13	01:11	01:17:00	Iridium	Global	Sita, ARINC	Still investigating anomaly

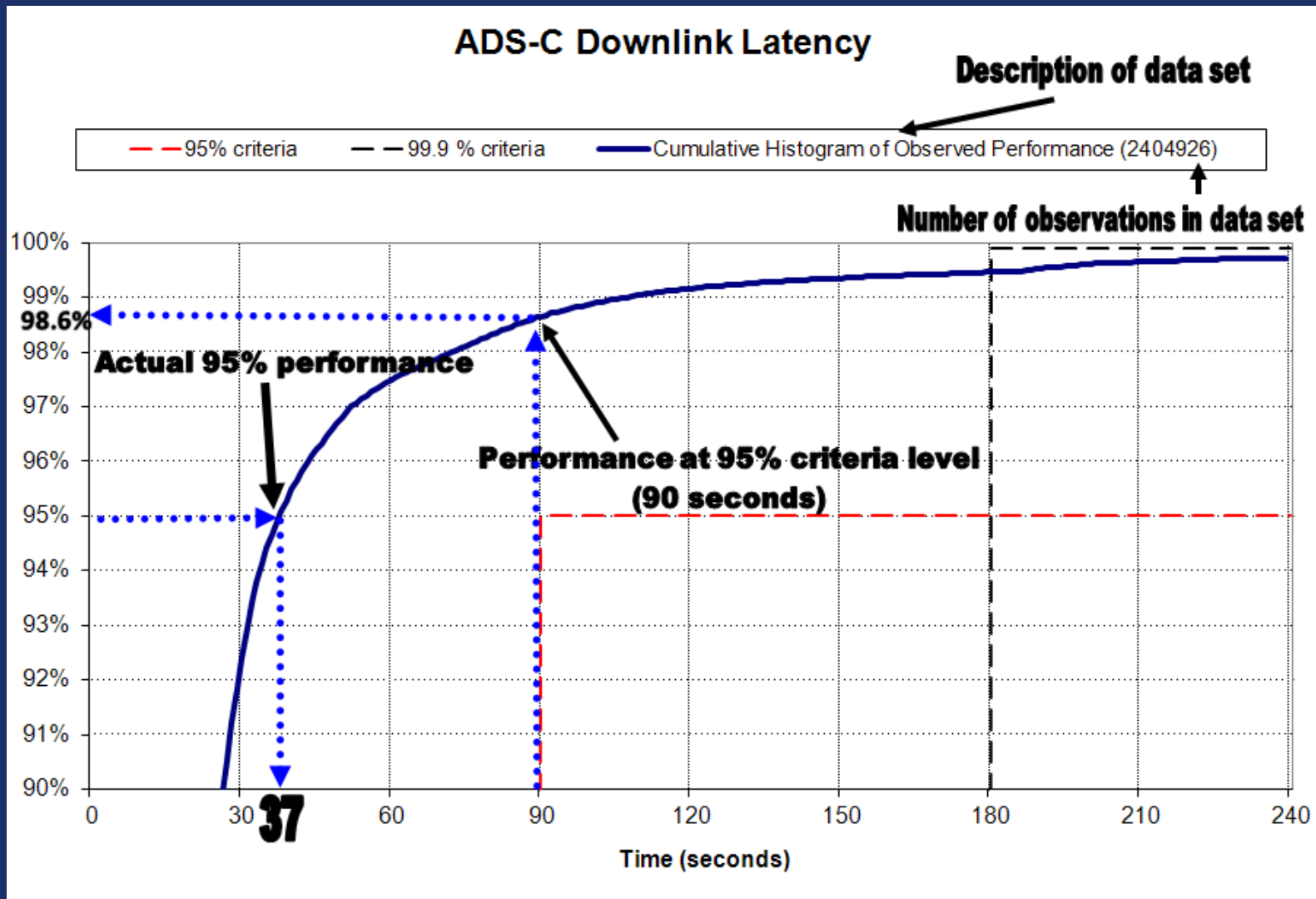


GOLD Performance Criteria

Performance Measure	Percent of Messages Required to Meet Criteria	ADS-C		CPDLC	
		RSP180 Criteria (sec)	RSP400 Criteria (sec)	RCP240 Criteria (sec)	RCP400 Criteria (sec)
ADS-C Latency	95%	90	300	--	--
	99.9%	180	400	--	--
ACTP	95%	--	--	120	260
	99.9%	--	--	150	310
ACP	95%	--	--	180	320
	99.9%	--	--	210	370
PORT	95%	--	--	60	60



How to Read GOLD Charts



Overview

- Analysis period: July to December 2012
 - Note for Anchorage data:
 - 26 days missing from July
 - 7 days missing from August
- All media types includes SAT, VHF, HF
 - RCP240 and RSP180 for SAT, VHF
 - RCP400 and RSP400 for HF

July to December 2012

SUMMARY OF PERFORMANCE BY MEDIA TYPE



Performance by Media Type

Oakland

59,578
flights

Media Type	ADS-C			CPDLC					
	Count of ADS-C Downlink Messages	ADS-C 95%	ADS-C 99.9%	Count of CPDLC Transactions	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
SAT	1,424,123	98.5%	99.5%	117,206	99.5%	99.7%	99.3%	99.6%	97.3%
VHF	197,608	99.2%	99.6%	2,127	100.0%	100.0%	99.7%	99.8%	97.3%
HF*	5,576	88.6%	91.3%	31	--	--	--	--	--
Aggregate	1,627,307	98.5%	99.5%	119,980	99.5%	99.6%	99.3%	99.5%	97.2%

* HF performance is assessed against RSP400/RCP400 criteria.

** 0.5% of RCP transactions occur over mixed media



Performance by Media Type

Anchorage

19,755 flights

Media Type	ADS-C			CPDLC					
	Count of ADS-C Downlink Messages	ADS-C 95%	ADS-C 99.9%	Count of CPDLC Transactions	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
SAT	301,812	97.5%	99.3%	9,967	99.2%	99.6%	99.1%	99.4%	96.2%
VHF	171,390	99.7%	99.8%	4,143	99.9%	100.0%	99.8%	99.9%	97.8%
HF*	3,126	85.6%	89.2%	9	66.7%	--	--	--	--
Aggregate	476,328	98.1%	99.4%	14,391	99.2%	99.5%	99.2%	99.4%	96.6%

* HF performance is assessed against RSP400/RCP400 criteria.

** 1.9% of RCP transactions occur over mixed media



Performance by Media Type

New York

**33,791
flights**

Media Type	ADS-C			CPDLC					
	Count of ADS-C Downlink Messages	ADS-C 95%	ADS-C 99.9%	Count of CPDLC Transactions	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
SAT	505,182	98.1%	99.4%	39,326	99.4%	99.6%	98.8%	99.2%	95.2%
VHF	134,146	99.0%	99.4%	3,711	100.0%	100.0%	99.5%	99.5%	95.7%
HF*	2,264	92.7%	95.1%	3	--	--	--	--	--
Aggregate	641,592	98.2%	99.3%	43,615	99.3%	99.5%	98.7%	99.1%	95.1%

* HF performance is assessed against RSP400/RCP400 criteria.

** 1.3% of RCP transactions occur over mixed media



Summary of Data Link Performance by FIR

July to December 2012

Key Point

The 95% criteria for RCP240 ACP, ACTP and RSP180 ADS-C **is met** in Oakland, Anchorage and New York during the analysis period

.....→

Key Point

The 99.9% criteria for RCP240 ACTP **is met** for VHF transactions in Oakland, Anchorage and New York during the analysis period

Overview

- Analysis period: 2010, 2011, 2012
- All media types includes SAT, VHF, HF
 - RCP240 and RSP180

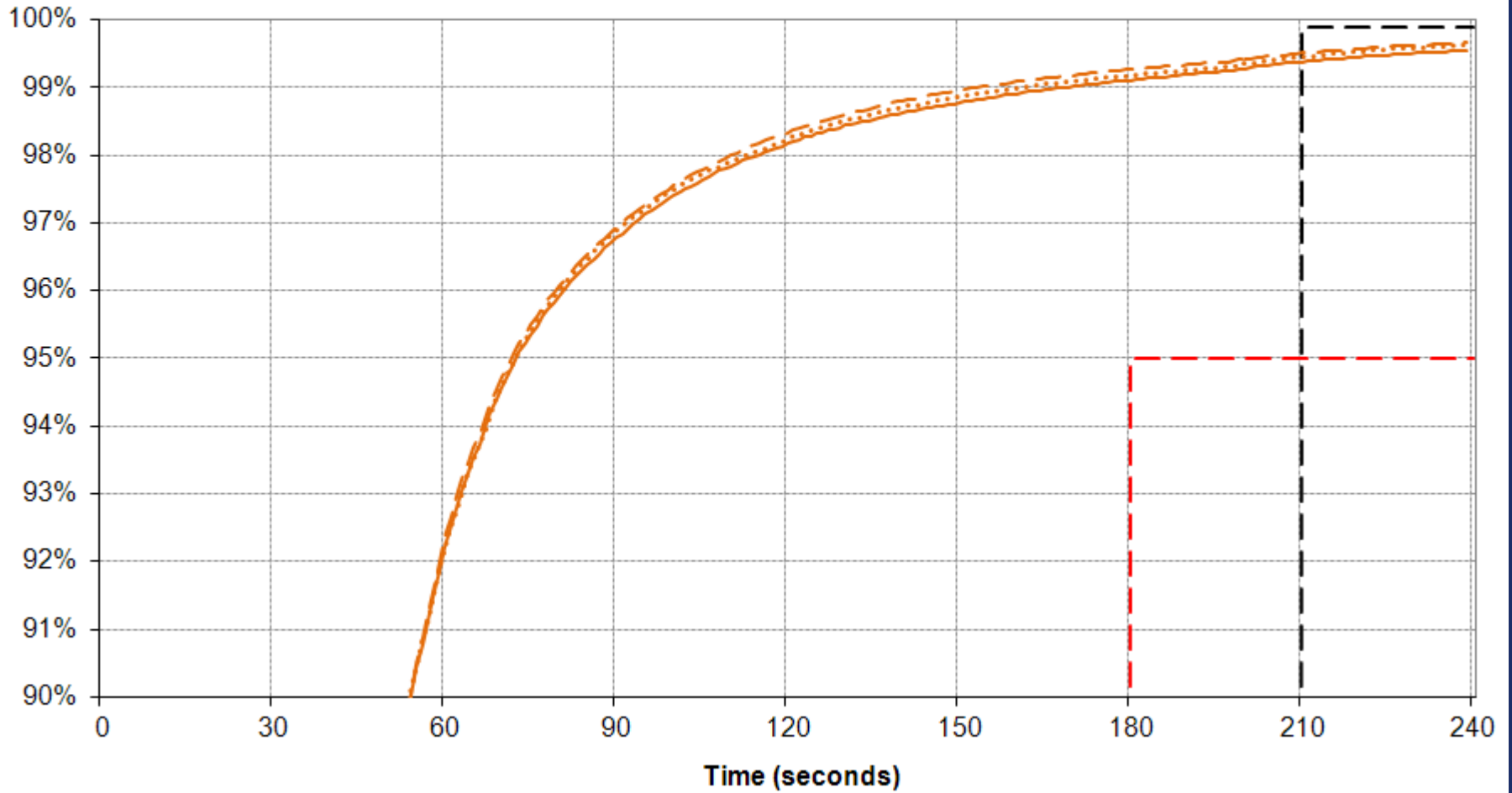
2010, 2011, 2012

SUMMARY OF ANNUAL PERFORMANCE

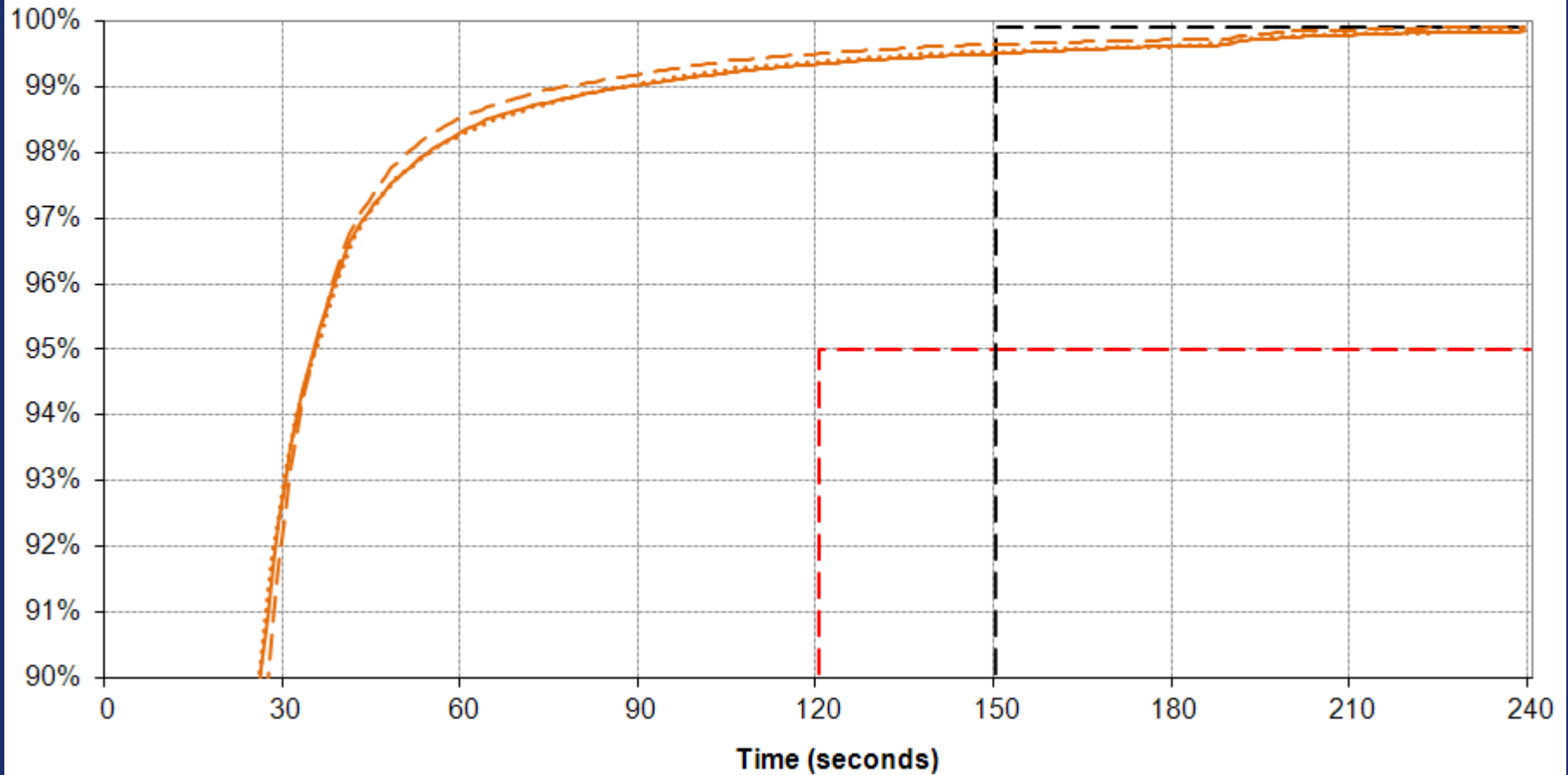
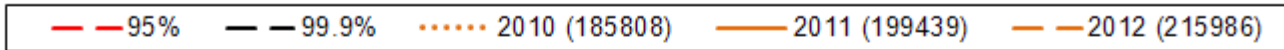


Datalink Performance - All Media - 2010, 2011, 2012 CPDLC Actual Communication Performance (ACP) (Reported DSP Outages Excluded)

--- 95%
 --- 99.9%
 2010 (185808)
 --- 2011 (199439)
 --- 2012 (215986)



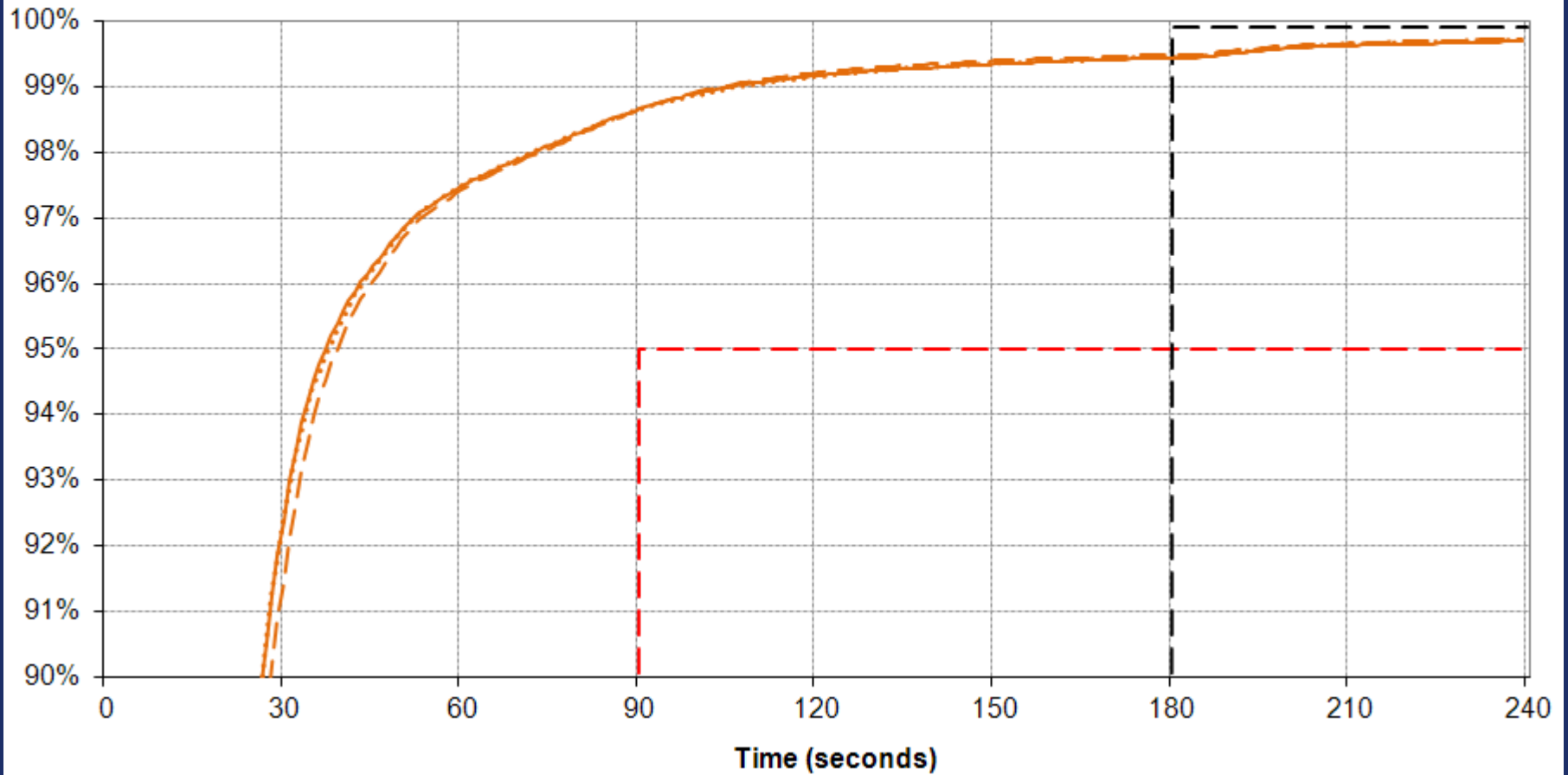
Datalink Performance - All Media - 2010, 2011, 2012 CPDLC Actual Communication Technical Performance (ACTP) (Reported DSP Outages Excluded)



Datalink Performance - All Media - 2010, 2011, 2012

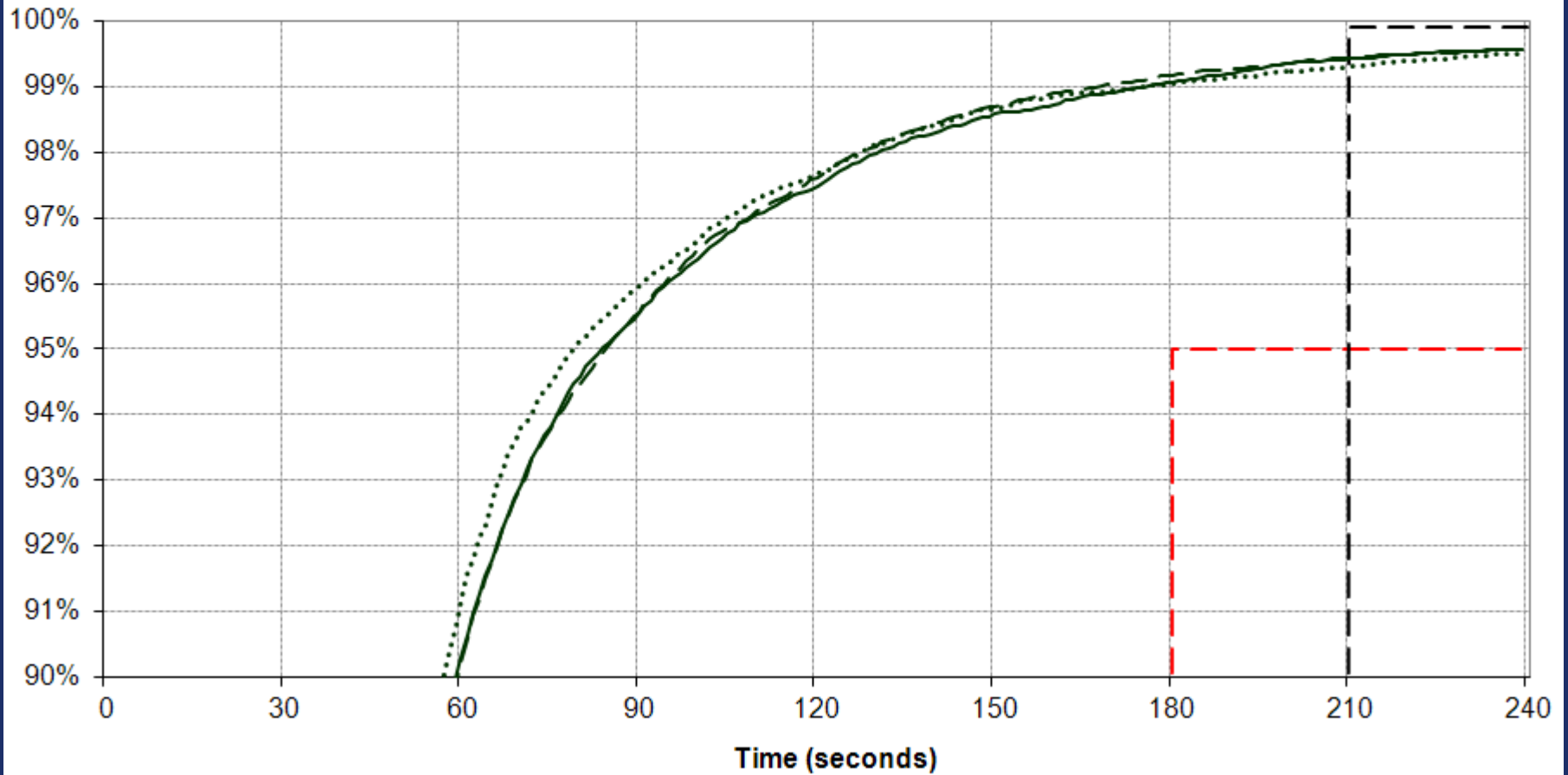
ADS-C Downlink Latency (Reported DSP Outages Excluded)

— 95% — 99.9% 2010 (2404926) — 2011 (2654762) — 2012 (3067084)



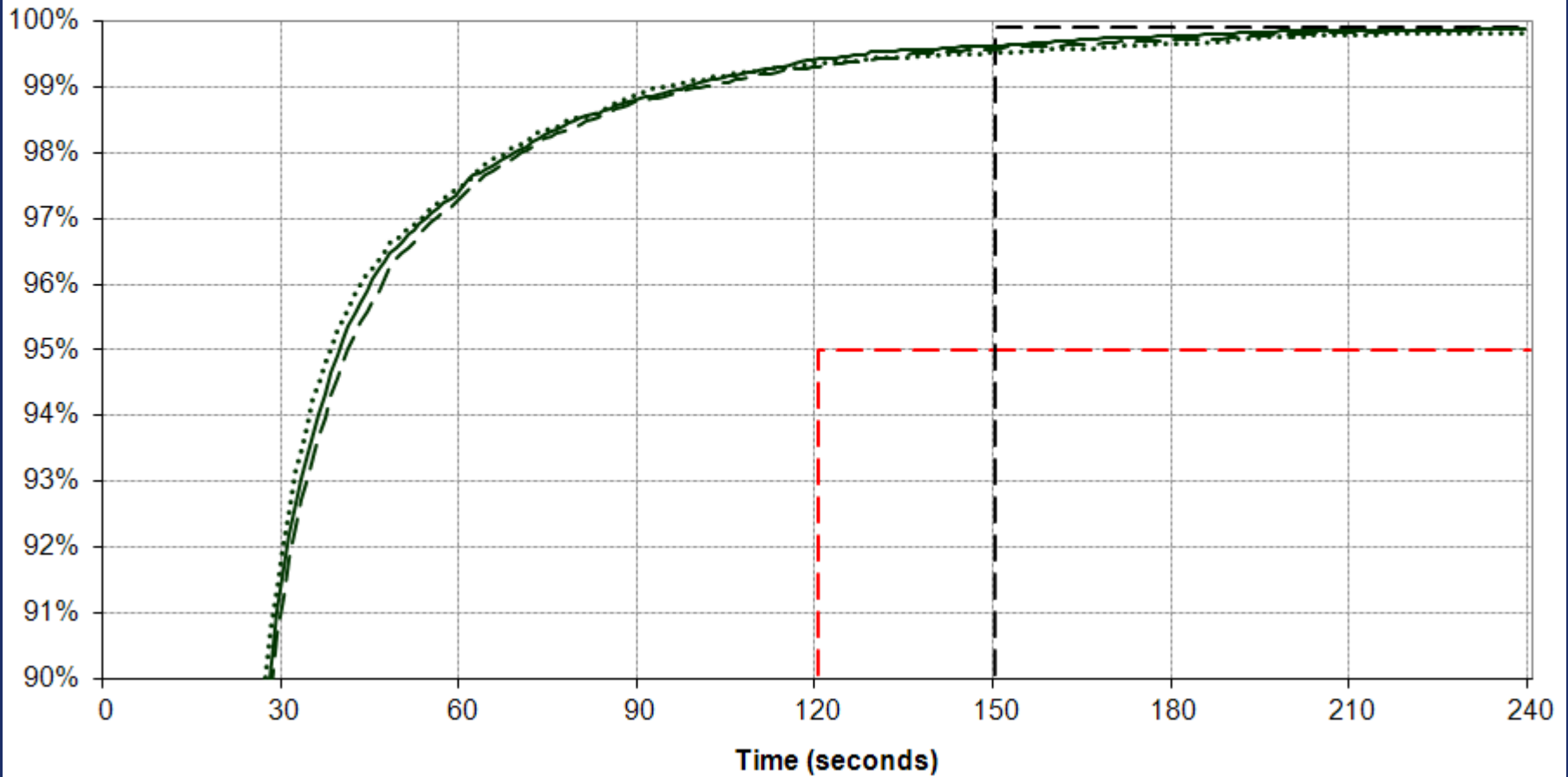
Datalink Performance - All Media - 2010, 2011, 2012 CPDLC Actual Communication Performance (ACP) (Reported DSP Outages Excluded)

- - - 95%
 - - - 99.9%
 2010 (16167)
 ——— 2011 (28673)
 - - - 2012 (30733)



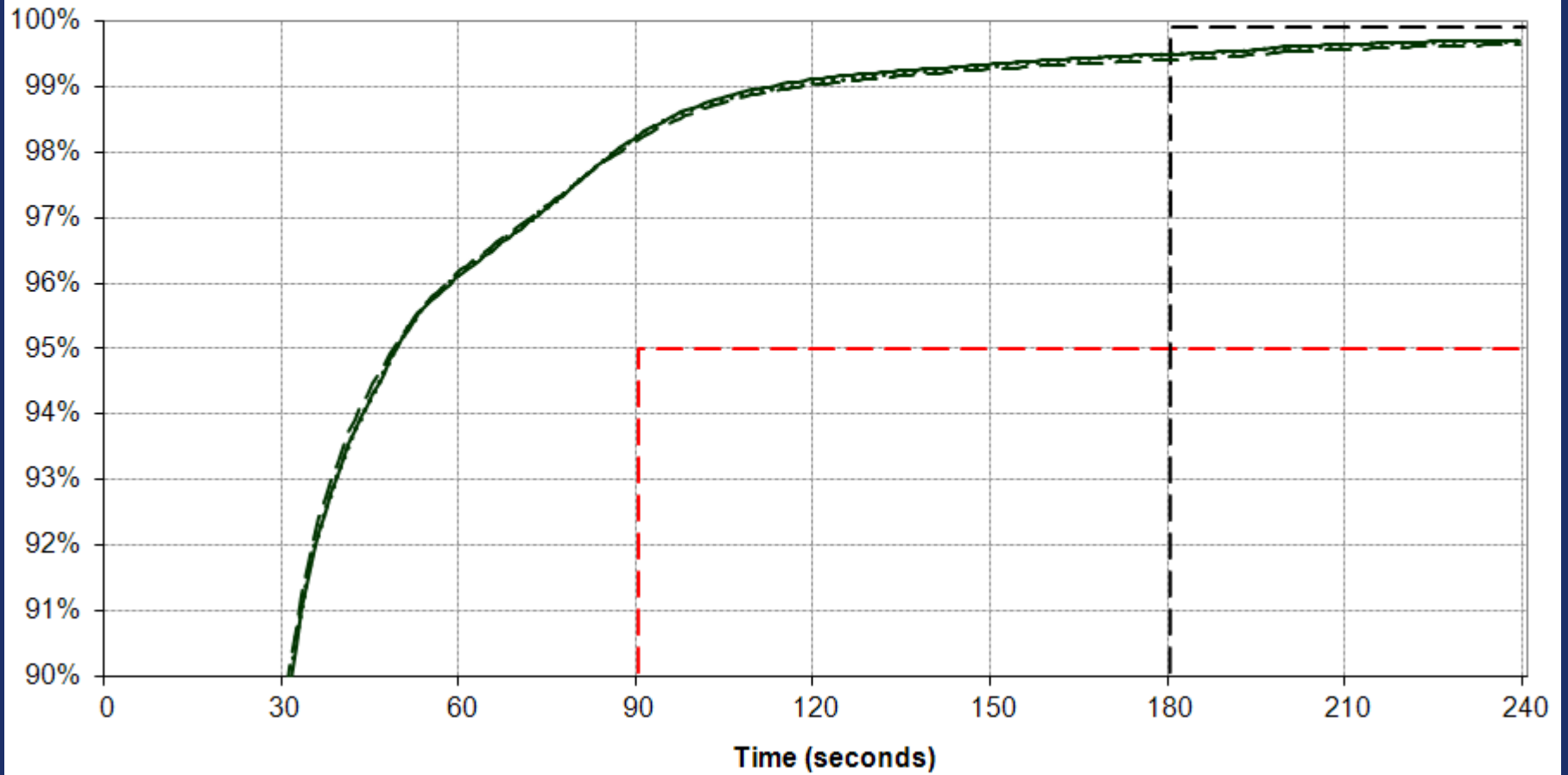
Datalink Performance - All Media - 2010, 2011, 2012 CPDLC Actual Communication Technical Performance (ACTP) (Reported DSP Outages Excluded)

- - - 95%
 - - - 99.9%
 2010 (16167)
 — 2011 (28673)
 - - - 2012 (30733)



Datalink Performance - All Media - 2010, 2011, 2012 ADS-C Downlink Latency (Reported DSP Outages Excluded)

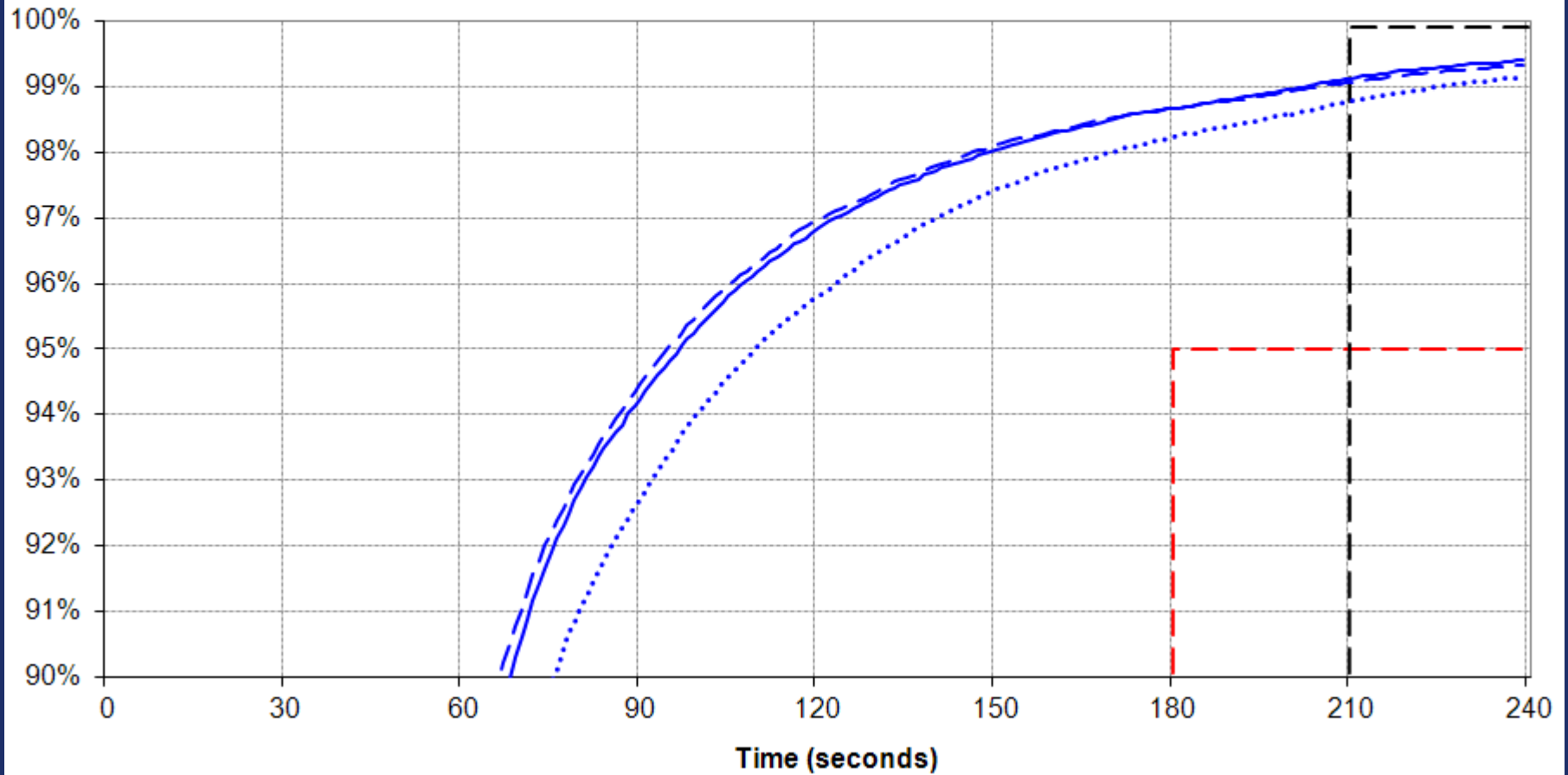
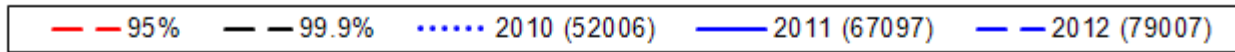
— 95%
 - - - 99.9%
 2010 (501983)
 — 2011 (853629)
 - - - 2012 (918349)



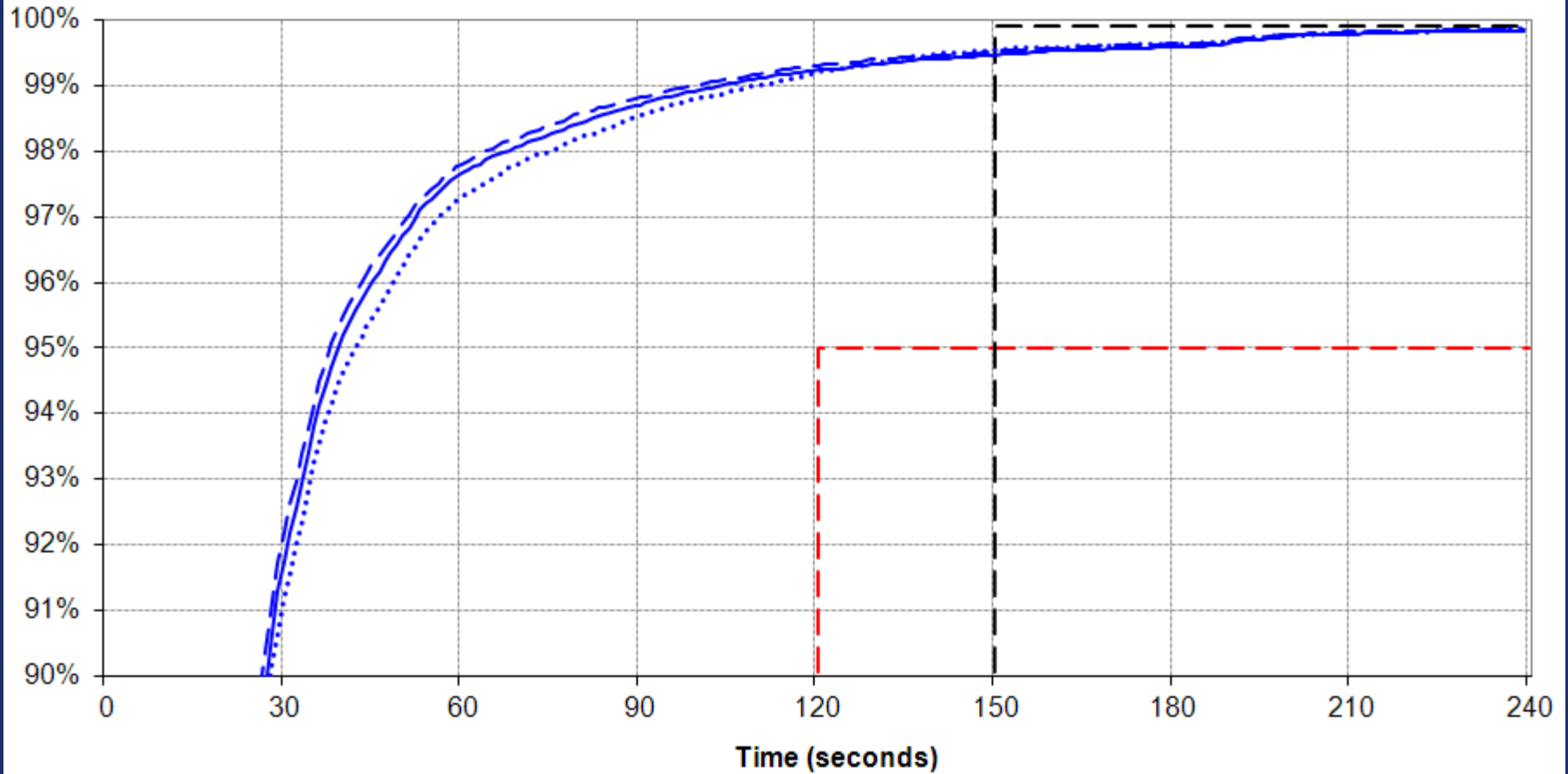
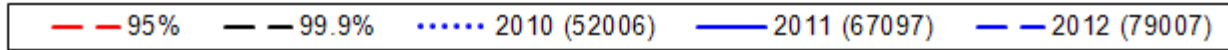
Datalink Performance - All Media - 2010, 2011, 2012

CPDLC Actual Communication Performance (ACP)

(Reported DSP Outages Excluded)



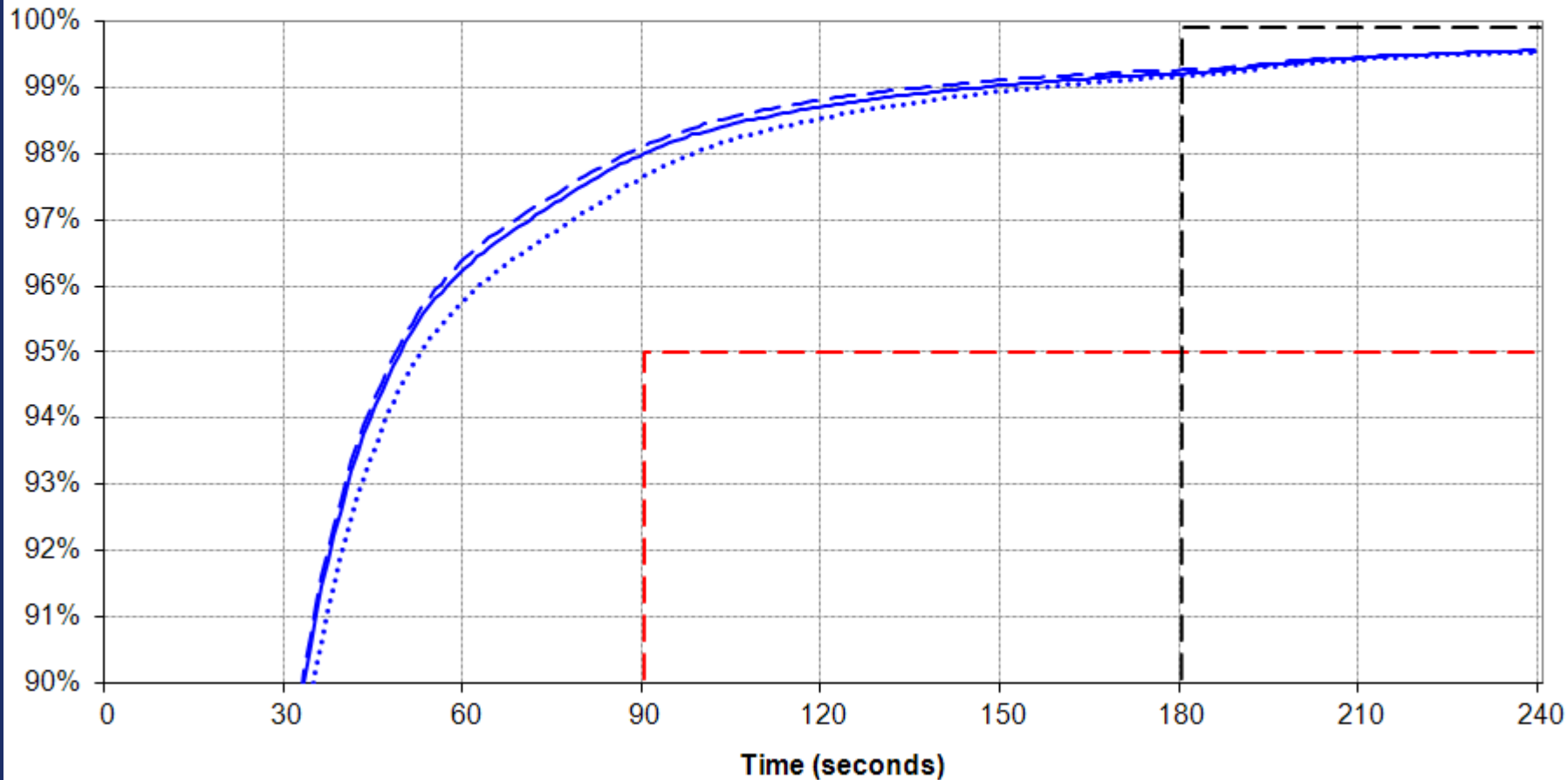
Datalink Performance - All Media - 2010, 2011, 2012 CPDLC Actual Communication Technical Performance (ACTP) (Reported DSP Outages Excluded)



Datalink Performance - All Media - 2010, 2011, 2012

ADS-C Downlink Latency (Reported DSP Outages Excluded)

- - - 95%
 - - - 99.9%
 2010 (961399)
 — 2011 (1061465)
 - - - 2012 (1254573)



Summary of Data Link Performance by FIR

2010, 2011, 2012

Key Points

- Notable improvement in ACTP and ACP in Oakland FIR between 2011 and 2012
- Significant improvement in New York FIR between 2010 and 2011, 2012
- Relatively stable performance in Anchorage FIR



Overview

- Analysis period: July to December 2012
- Analysis separate by FIR: Oakland, Anchorage, New York
 - Note for Anchorage data:
 - 26 days missing from July
 - 7 days missing from August
- RSP180 criteria
- Station identifiers designate “path” taken by data link messages between aircraft and ATC
- “Paths” vary between the four constellations of satellites as well as between the two data link service providers

July to December 2012

ADS-C PERFORMANCE BY STATION IDENTIFIER

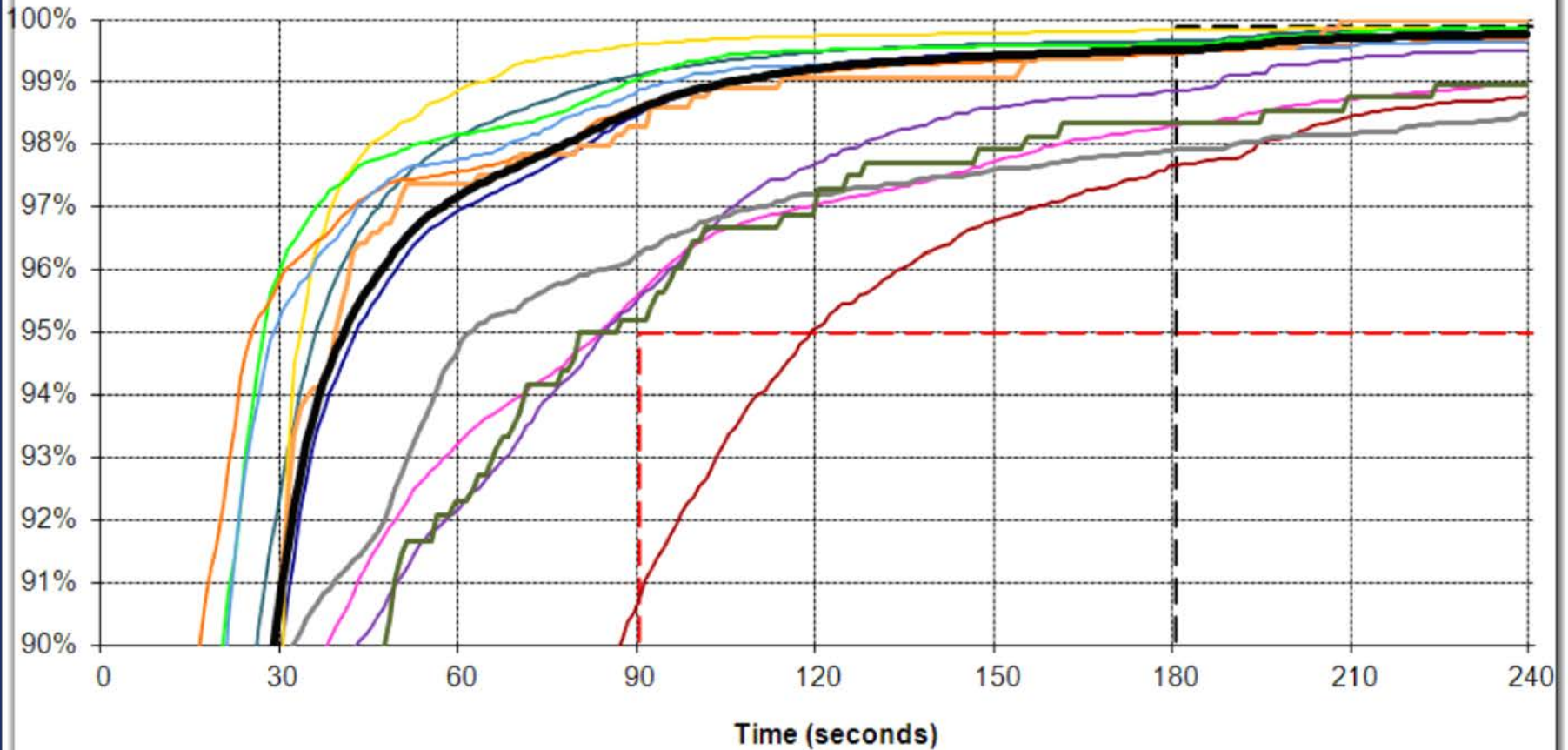
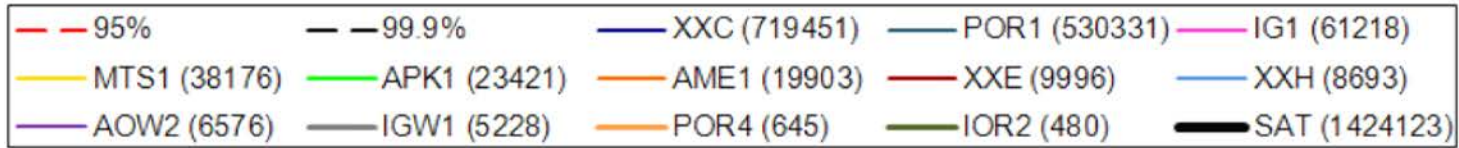


Station/Gateway Identifiers

SATELLITE	GES LOCATION(S)	SITA	ARINC
Inmarsat I-3	Aussaguel, France:	AOW2 AOE2	--
	Eik, Norway:	AOW3 AOE3 IOR5	XXE
	Perth, Australia:	POR1 IOR2	--
	Santa Paula, California, US:	POR4	XXC
Inmarsat I-4	Fucino, Italy	EUA1	XXF
	Paumalu, HI, US	APK1 AME1	XXA XXH
MTSAT	Kobe and Hitachiota, Japan	MTS1	--
Iridium	Phoenix, Arizona, US	IGW1	IG1



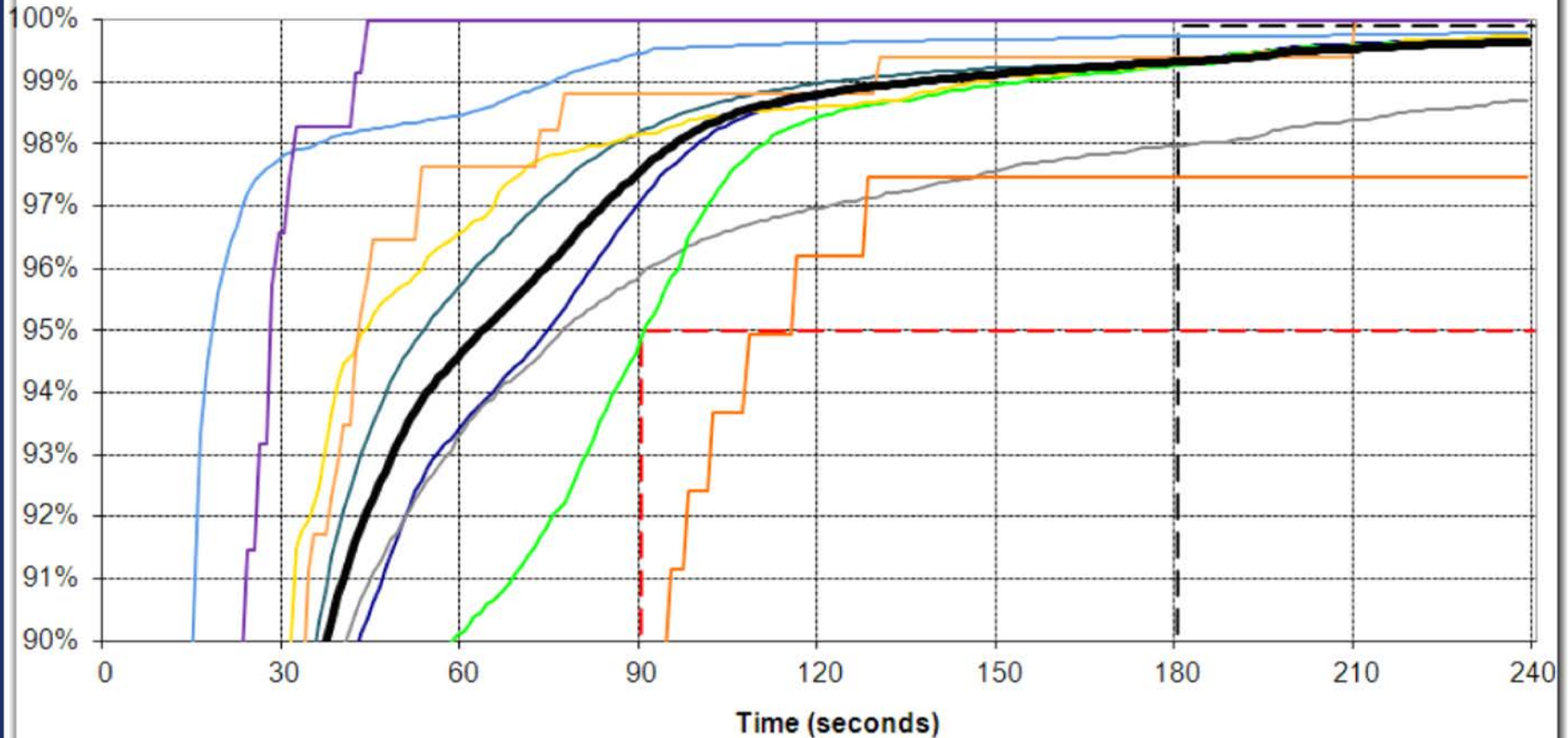
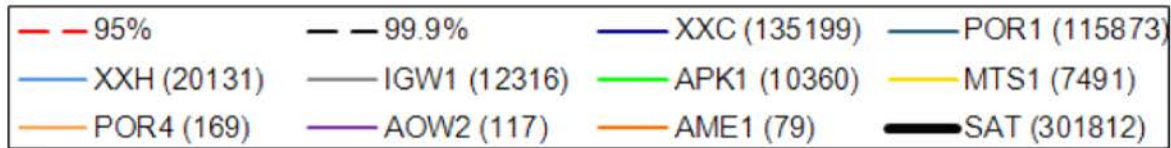
Oakland FIR - Performance By Station Identifier - July to December 2012
ADS-C Downlink Latency
 (Duplicate Messages and Messages During Reported DSP Outages Excluded)



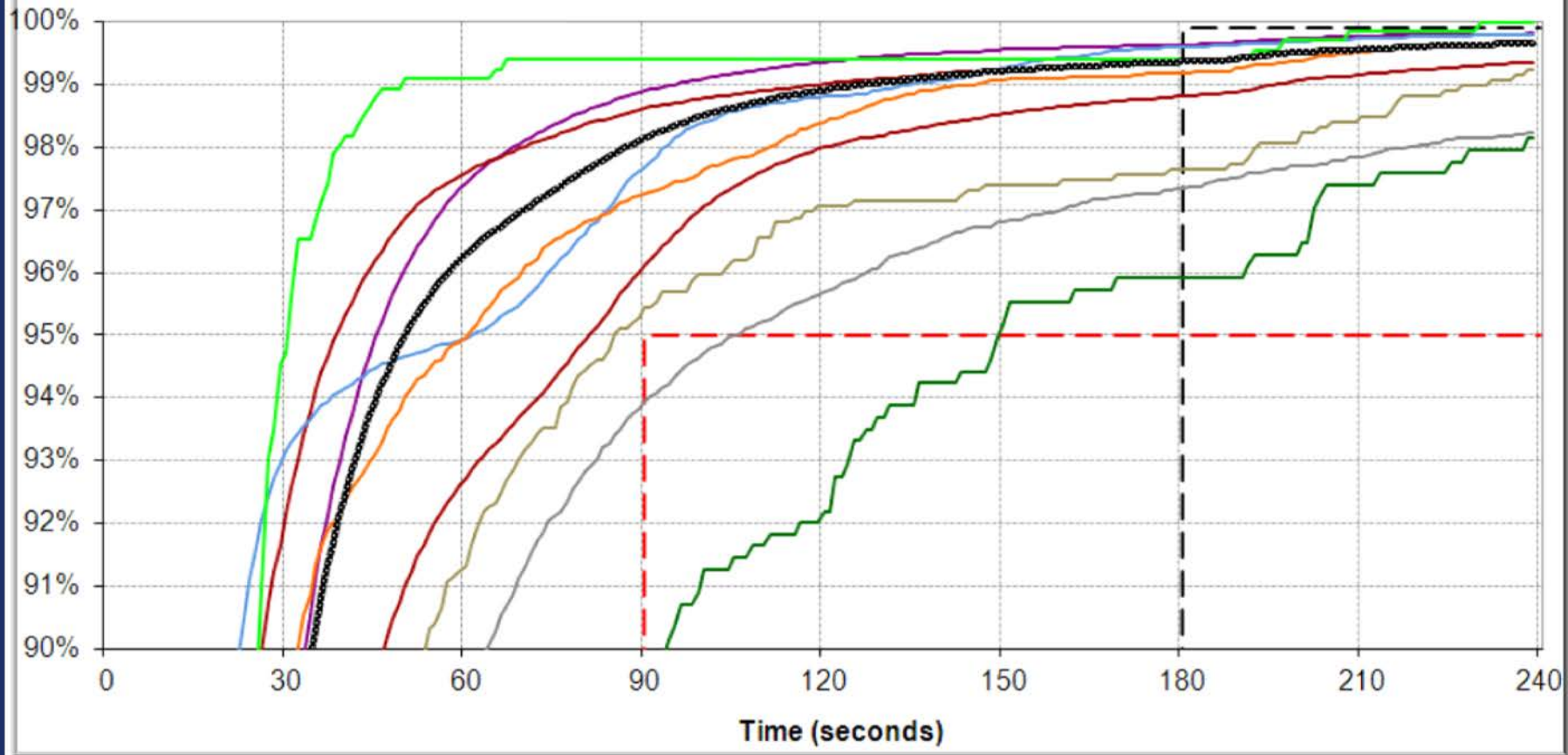
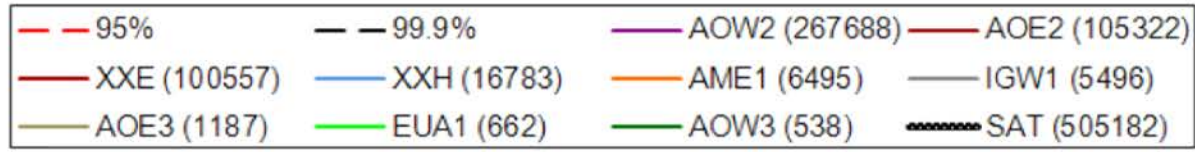
Anchorage FIR - Performance By Station Identifier - July to December 2012

ADS-C Downlink Latency

(Duplicate Messages and Messages During Reported DSP Outages Excluded)



New York FIR - Performance By Station Identifier - July to December 2012
ADS-C Downlink Latency
 (Duplicate Messages and Messages During Reported DSP Outages Excluded)



Summary of Observed ADS-C Performance

By Station Identifier

OAKLAND

RSP180 95% criteria is met in Oakland for all “paths” except:

- POR Inmarsat-3 series of satellites via the ground station located in Eik, Norway with data link service provided by ARINC (XXE)

ANCHORAGE

RSP180 95% criteria is met in Anchorage for all “paths” except:




- Inmarsat-4 series of satellites via the ground station located in Paumalu, Hawaii with data link service provided by SITA (AME1) (Note: less than 100 data points)

NEW YORK

RSP180 95% criteria is met in New York for all “paths” except:

- Iridium satellites with data link service provided by SITA (IGW1)
- AOR Inmarsat-3 series of satellites via the ground station located in Aussaguel with data link service provided by SITA (AOW3) ?

Overview

- Analysis period: July to December 2012
- Analysis by FIR: Oakland, Anchorage, New York
 - Note for Anchorage data: 27 days missing from July, 7 days missing from August
- All media types combined
- RCP240 and RSPI80 criteria
- Operators contributing top 90% of ADS-C downlink messages
- Operators ordered in summary tables by descending count of ADS-C downlink messages
- Green highlights where criteria is met 
- Red highlights where criteria is not met 
- Yellow highlights where performance at 99.9% goal is at least 99.5% 

July to December 2012

DATA LINK PERFORMANCE BY OPERATOR

Observed Performance by Operator **Oakland FIR**

July - December 2012

Oper Code	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
A	254,124	15.6%	98.2%	99.4%	16,273	13.6%	99.4%	99.5%	99.0%	99.3%	95.4%
NNN	162,078	10.0%	97.4%	99.1%	8,244	6.9%	99.3%	99.6%	98.6%	99.0%	96.0%
D	127,866	7.9%	98.4%	99.5%	7,430	6.2%	99.3%	99.6%	99.2%	99.6%	97.3%
L	111,330	6.8%	98.6%	99.6%	9,324	7.8%	99.4%	99.6%	98.8%	99.2%	95.5%
B	100,431	6.2%	99.0%	99.6%	7,719	6.4%	99.4%	99.6%	99.3%	99.6%	98.2%
G	85,836	5.3%	99.7%	99.9%	12,237	10.2%	99.8%	99.9%	99.8%	99.9%	99.2%
Q	79,104	4.9%	98.1%	99.6%	6,057	5.0%	98.8%	99.5%	99.7%	99.8%	96.8%
E	59,698	3.7%	99.4%	99.7%	4,753	4.0%	99.7%	99.8%	99.6%	99.6%	98.3%
J	50,949	3.1%	99.7%	99.9%	6,055	5.0%	99.8%	99.8%	99.7%	99.8%	99.2%
O	47,145	2.9%	98.8%	99.5%	3,010	2.5%	99.5%	99.7%	99.6%	99.7%	98.9%
R	47,087	2.9%	98.6%	99.6%	2,524	2.1%	99.4%	99.5%	99.5%	99.9%	98.3%



Observed Performance by Operator **Oakland FIR**

July - December 2012 (Continued)

Oper Code	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
N	44,027	2.7%	99.2%	99.5%	2,470	2.1%	99.5%	99.6%	99.4%	99.8%	98.0%
H	40,429	2.5%	99.4%	99.8%	4,468	3.7%	99.7%	99.8%	99.7%	99.8%	99.0%
S	40,361	2.5%	98.2%	99.3%	1,925	1.6%	99.5%	99.6%	99.4%	99.6%	97.8%
F	40,343	2.5%	99.2%	99.8%	4,723	3.9%	99.8%	99.8%	99.6%	99.7%	98.8%
T	39,128	2.4%	99.0%	99.6%	3,580	3.0%	99.5%	99.7%	99.4%	99.6%	97.9%
Y	34,775	2.1%	97.4%	98.6%	937	0.8%	98.0%	98.3%	97.1%	97.9%	97.2%
ZZZZ	27,824	1.7%	98.5%	99.1%	1,568	1.3%	99.6%	99.7%	97.6%	98.0%	89.7%
V	21,481	1.3%	99.8%	99.8%	1,630	1.4%	99.9%	99.9%	99.8%	99.9%	99.1%
K	20,968	1.3%	98.9%	99.4%	1,903	1.6%	99.2%	99.4%	99.5%	99.8%	98.2%
P	18,995	1.2%	98.8%	99.6%	1,841	1.5%	99.5%	99.8%	99.6%	99.7%	97.9%
NNNN	18,640	1.1%	98.6%	99.5%	850	0.7%	99.8%	99.9%	98.6%	99.1%	96.9%
MMMM	8,460	0.5%	98.2%	99.0%	249	0.2%	100.0%	100.0%	96.0%	96.8%	85.5%
LLLL	4,913	0.3%	98.7%	99.6%	190	0.2%	100.0%	100.0%	99.5%	99.5%	96.8%



Observed Performance by Operator **Oakland FIR**

Summary

- There are 22 operators contributing 90% of the ADS-C downlink messages
- 2 additional operators of interest are shown
- All operators shown meet the 95% criteria for RSP180 ADS-C and RCP240 ACTP and ACP
- 22 operators meet the 95% criteria for PORT within 60 seconds
- 3 operators meet the 99.9% criteria for RSP180 ADS-C
- 4 operators meet the 99.9% criteria for RCP240 ACTP
- 3 operators meet the 99.9% criteria for RCP240 ACP

Observed Performance by Operator Anchorage FIR

July - December 2012

Oper Code	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
D	57,314	12.0%	98.1%	99.5%	1,105	7.7%	98.4%	99.1%	98.3%	98.8%	95.7%
A	51,883	10.9%	98.0%	99.6%	1,350	9.4%	99.6%	99.8%	99.5%	99.9%	95.1%
Q	51,202	10.7%	98.0%	99.4%	1,361	9.5%	98.6%	99.2%	99.3%	99.6%	96.0%
S	40,639	8.5%	97.7%	99.5%	1,168	8.1%	99.0%	99.1%	99.2%	99.4%	98.1%
Y	40,035	8.4%	95.6%	97.7%	541	3.8%	97.0%	97.8%	95.9%	96.9%	94.3%
L	31,729	6.7%	98.4%	99.5%	905	6.3%	99.0%	99.6%	99.0%	99.5%	95.7%
H	27,179	5.7%	98.9%	99.6%	1,432	10.0%	99.7%	99.8%	99.3%	99.4%	96.9%
R	27,112	5.7%	98.1%	99.7%	563	3.9%	99.3%	99.8%	99.6%	100.0%	97.3%
F	24,195	5.1%	99.0%	99.8%	1,233	8.6%	99.7%	99.8%	99.3%	99.8%	97.6%



Observed Performance by Operator Anchorage FIR

July - December 2012 (Continued)

Oper Code	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
G	19,751	4.1%	97.7%	99.3%	1,057	7.3%	99.7%	100.0%	99.9%	99.9%	97.7%
J	19,166	4.0%	99.7%	99.8%	978	6.8%	99.9%	99.9%	99.8%	99.8%	98.6%
T	10,876	2.3%	98.9%	99.7%	460	3.2%	99.1%	99.8%	99.4%	99.6%	95.4%
NNNN	9,999	2.1%	98.4%	99.5%	184	1.3%	97.8%	98.4%	98.9%	98.9%	96.7%
QQQ	9,225	1.9%	98.5%	98.9%	415	2.9%	99.8%	99.8%	99.8%	99.8%	99.3%
P	9,215	1.9%	98.3%	99.6%	387	2.7%	98.7%	99.0%	98.7%	99.0%	97.7%

ZZZZ	2,914	0.6%	98.5%	98.9%	--	--	--	--	--	--	--
MMMM	2,510	0.5%	98.3%	98.8%	--	--	--	--	--	--	--
LLLL	308	0.1%	98.7%	100.0%	--	--	--	--	--	--	--



Observed Performance by Operator Anchorage FIR

Summary

- There are 15 operators contributing 90% of the ADS-C downlink messages
- 3 additional operators of interest are shown
- All operators shown meet the 95% criteria for RSP180 ADS-C and for RCP240 ACTP and ACP
- 14 operators meet the 95% criteria for PORT within 60 seconds
- 1 operator meets the 99.9% criteria for RSP180 ADS-C
- 2 operators meet the 99.9% criteria for RCP240 ACTP
- 3 operators meet the 99.9% criteria for RCP240 ACP

Observed Performance by Operator New York FIR

July - December 2012

Oper Code	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
AA	66,283	10.3%	99.1%	99.8%	7,150	16.4%	99.7%	99.8%	99.5%	99.6%	96.8%
L	60,615	9.4%	97.5%	99.4%	4,207	9.6%	99.1%	99.5%	97.6%	98.2%	93.3%
BB	59,358	9.3%	99.2%	99.5%	3,485	8.0%	99.3%	99.4%	99.1%	99.5%	96.5%
FF	45,827	7.1%	97.6%	99.3%	3,629	8.3%	99.0%	99.2%	99.0%	99.6%	97.4%
DD	39,220	6.1%	96.9%	99.3%	3,415	7.8%	99.0%	99.5%	97.7%	98.3%	88.7%
A	32,278	5.0%	96.1%	98.6%	1,455	3.3%	98.1%	98.6%	98.1%	98.7%	96.0%
GG	30,353	4.7%	99.2%	99.8%	2,166	5.0%	99.6%	99.7%	99.1%	99.3%	95.3%
EE	29,077	4.5%	97.5%	98.1%	2,223	5.1%	99.2%	99.3%	98.5%	99.2%	94.9%
R	24,308	3.8%	97.2%	99.6%	1,093	2.5%	99.3%	99.5%	98.7%	99.3%	97.3%
HH	23,469	3.7%	98.9%	99.2%	1,249	2.9%	99.9%	99.9%	99.4%	99.5%	96.2%
JJ	22,478	3.5%	99.6%	100%	773	1.8%	100%	100%	99.7%	99.7%	96.6%
KKKK	19,873	3.1%	99.9%	99.9%	2,061	4.7%	99.9%	99.9%	99.5%	99.7%	96.6%



Observed Performance by Operator New York FIR

July - December 2012 (Continued)

Oper Code	ADS-C				CPDLC						
	Count of ADS-C	% of Total ADS-C	ADS-C 95%	ADS-C 99.9%	Count of CPDLC	% of Total CPDLC	ACTP 95%	ACTP 99.9%	ACP 95%	ACP 99.9%	PORT 95%
CC	18,124	2.8%	97.9%	99.1%	1,262	2.9%	99.7%	99.7%	99.1%	99.4%	96.6%
II	15,105	2.4%	99.5%	99.9%	1,123	2.6%	99.6%	99.7%	99.3%	99.5%	96.6%
ZZ	13,959	2.2%	99.3%	99.7%	834	1.9%	99.9%	99.9%	98.8%	99.0%	93.7%
MM	13,014	2.0%	99.3%	99.8%	647	1.5%	99.7%	99.9%	98.9%	99.2%	93.8%
SS	12,647	2.0%	97.9%	99.6%	452	1.0%	99.1%	99.6%	97.8%	98.5%	89.4%
LL	12,530	2.0%	98.7%	99.2%	1,174	2.7%	99.7%	99.7%	99.2%	99.5%	96.9%
PP	12,236	1.9%	99.0%	100%	753	1.7%	99.5%	99.6%	99.1%	99.6%	95.2%
ZZZZ	10,281	1.6%	94.4%	96.1%	435	1.0%	96.6%	96.8%	94.5%	94.9%	89.7%
WW	7,866	1.2%	97.9%	99.3%	302	0.7%	99.7%	99.7%	97.7%	98.0%	91.1%
DDDD	7,247	1.1%	99.1%	99.3%	458	1.1%	100.0%	100.0%	99.3%	99.6%	97.6%

MMMM	5,953	0.9%	95.9%	98.0%	150	0.3%	98.7%	100.0%	96.7%	98.0%	88.0%
LLLL	251	0.0%	99.2%	99.2%	11	--	--	--	--	--	--



Observed Performance by Operator **New York FIR**

Summary

- There are 22 operators contributing 90% of the ADS-C downlink messages
- 2 additional operators of interest are shown
- 23 operators meet the 95% criteria for RSP180 ADS-C
- All operators meet the 95% criteria for RCP240 ACTP
- 22 operators meet the 95% criteria for RCP240 ACP
- 15 operators meet the 95% criteria for PORT within 60 seconds
- 6 of the operators meet the 99.9% criteria for RSP180 ADS-C
- 7 of the operators meet the 99.9% criteria for RCP240 ACTP
- 1 of the operators meets the 99.9% criteria for RCP240 ACP

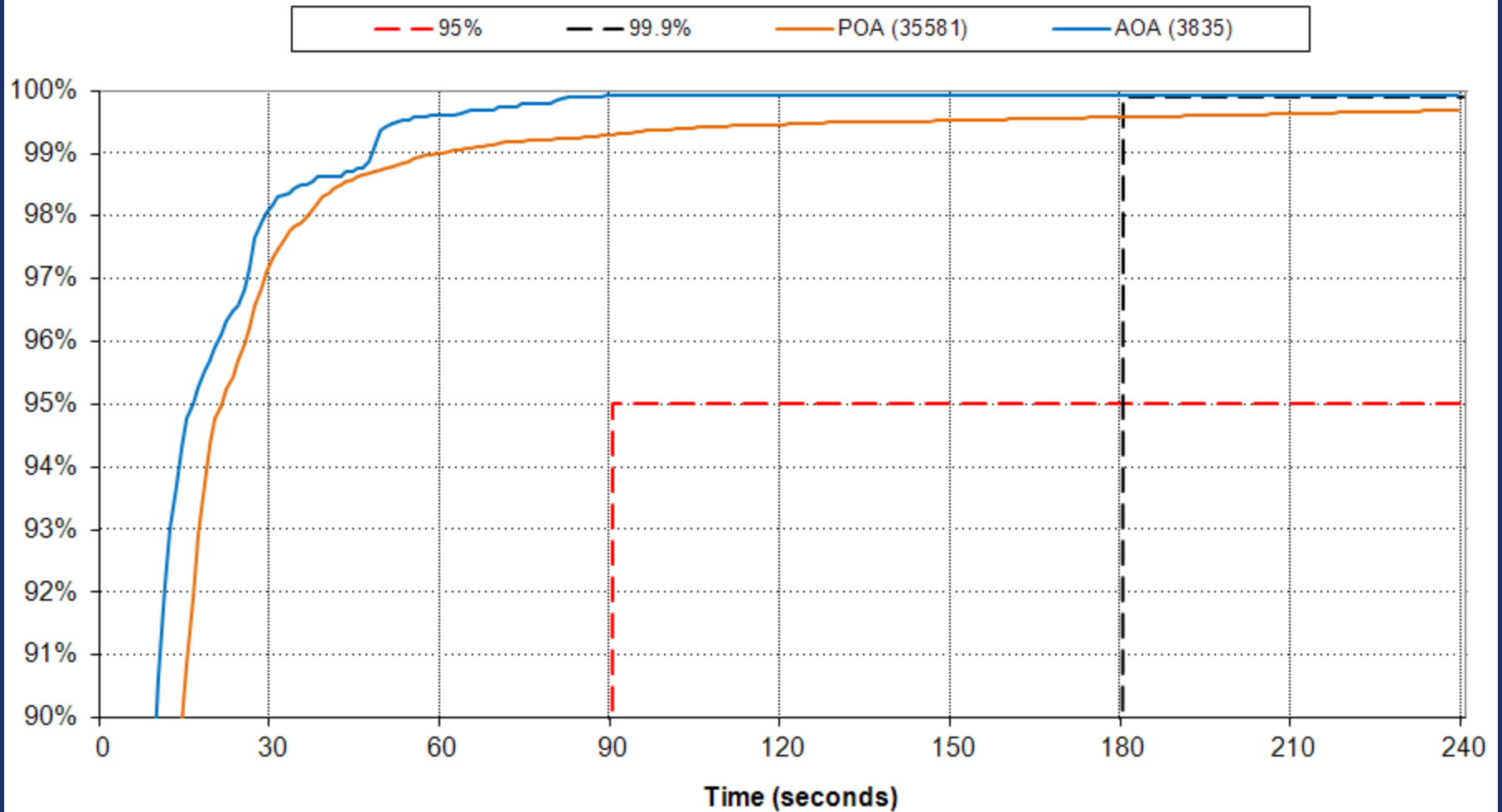
Overview

- Analysis period: July to December 2012
- Analysis separate by FIR: Oakland, Anchorage, New York
 - Note for Anchorage data:
 - 26 days missing from July
 - 7 days missing from August
- RSP180 criteria
- Data set comprised of ADS-C messages via Sita only
- 4th alphanumeric character is used to discriminate between POA and VDL Mode 2
- No known way to discriminate POA vs. AOA for ARINC messages

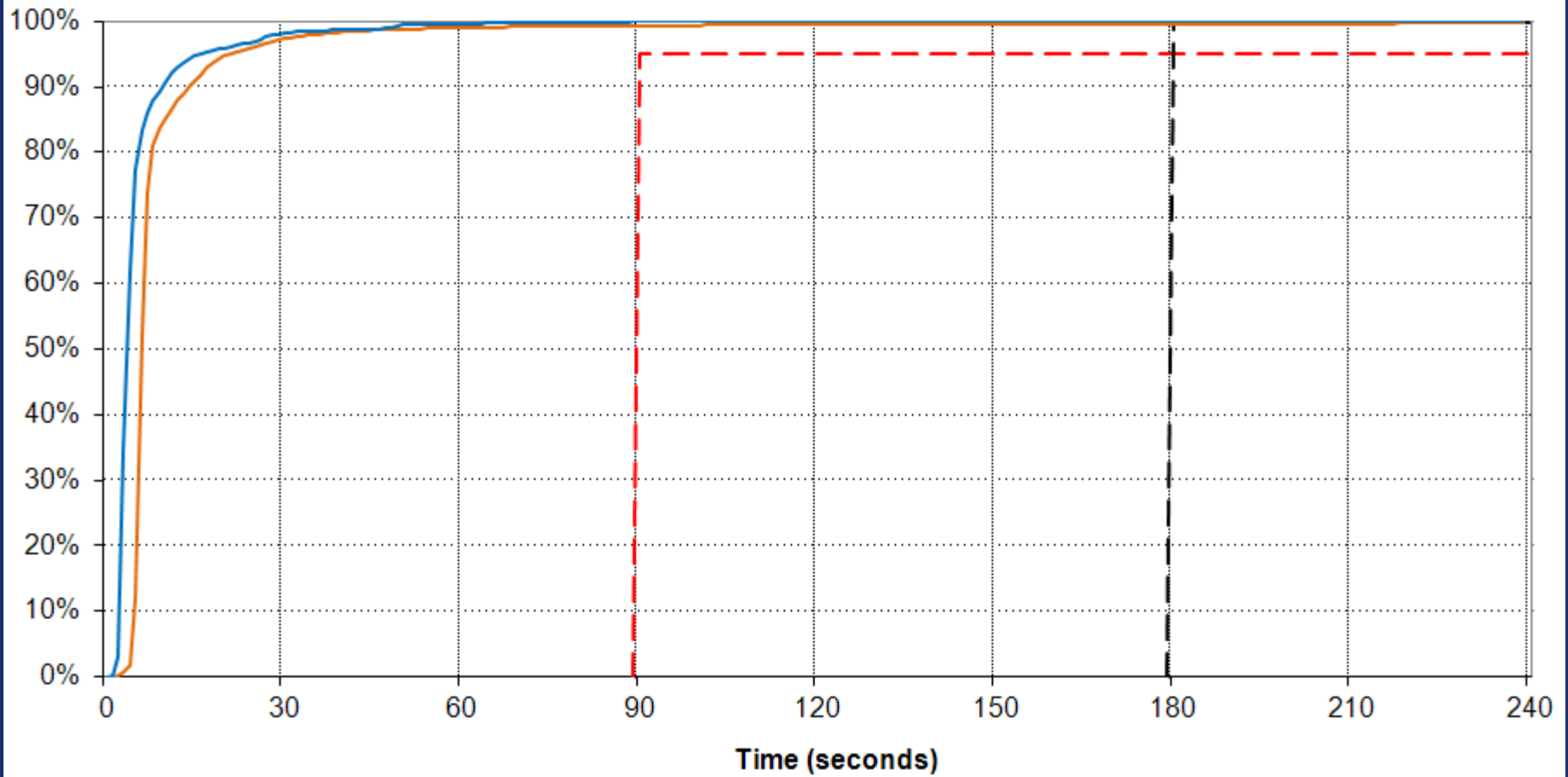
July to December 2012

VHF PERFORMANCE – POA VS. AOA

Oakland FIR - VHF - July to December 2012 ADS-C Downlink Latency (Duplicate Messages and Messages During Reported DSP Outages Excluded)

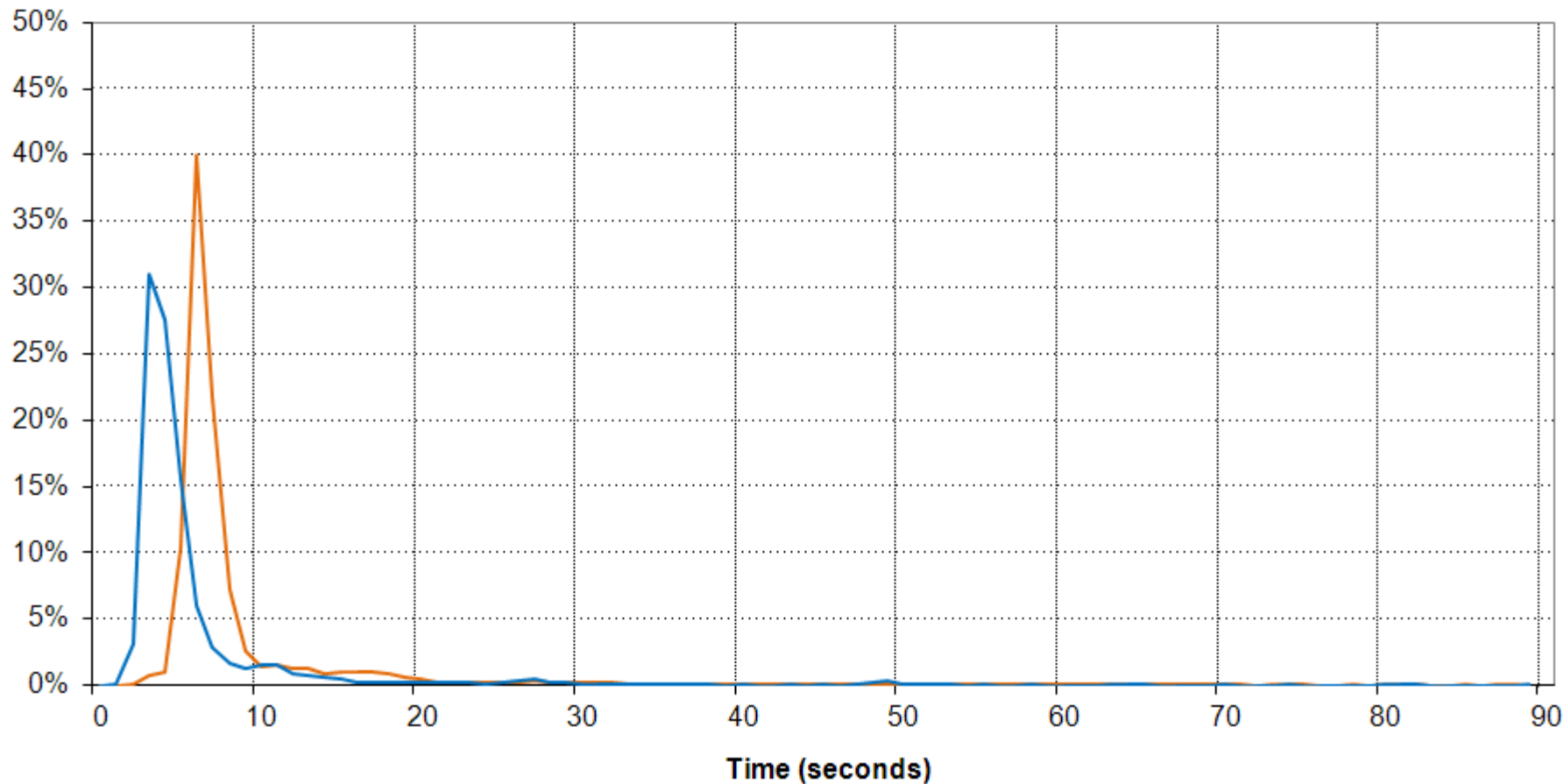


Oakland FIR - VHF - July to December 2012 ADS-C Downlink Latency (Duplicate Messages and Messages During Reported DSP Outages Excluded)

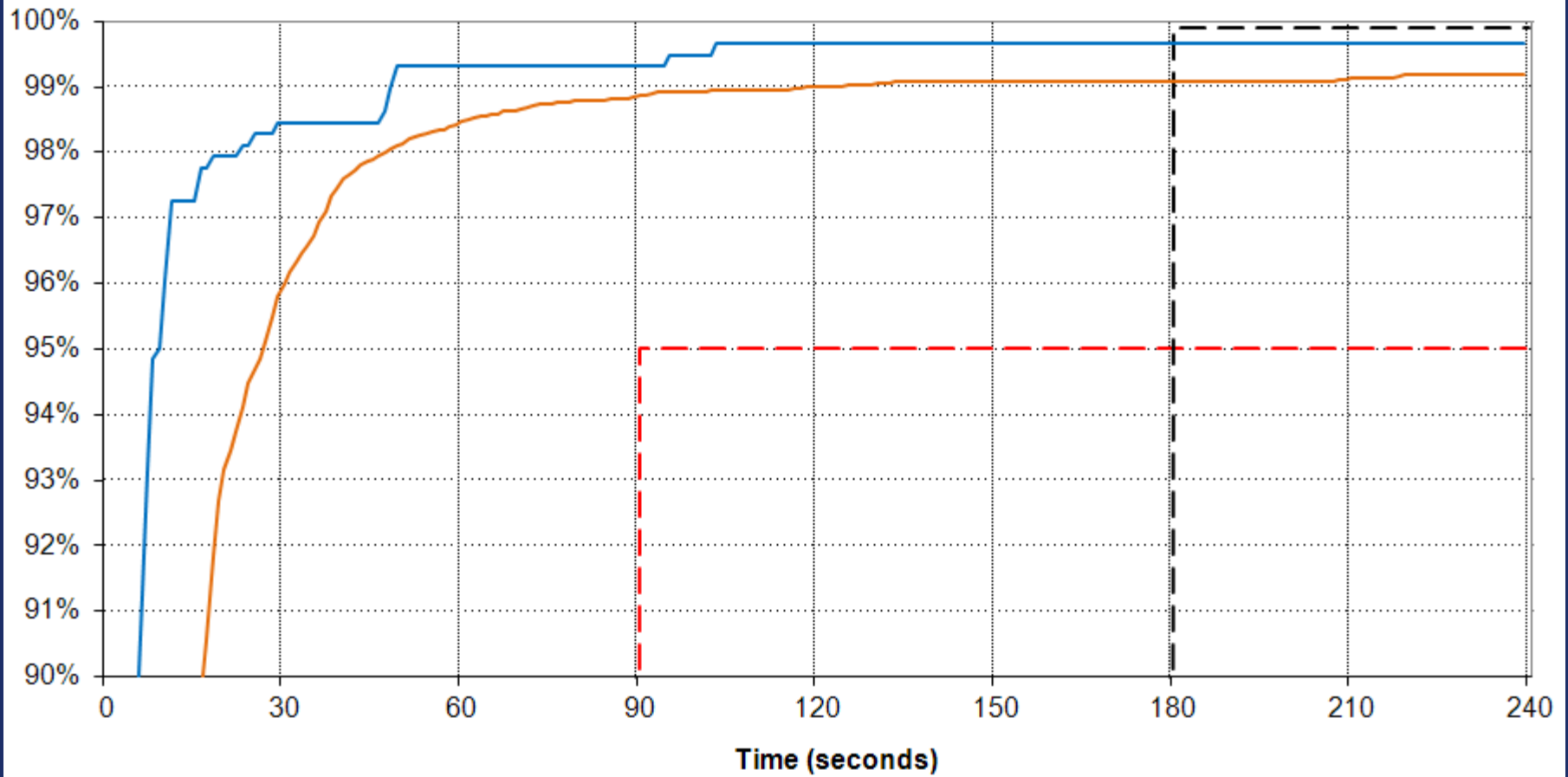


Oakland FIR - VHF - July to December 2012 ADS-C Downlink Latency - Relative Frequency Distribution (Reported DSP Outages Excluded)

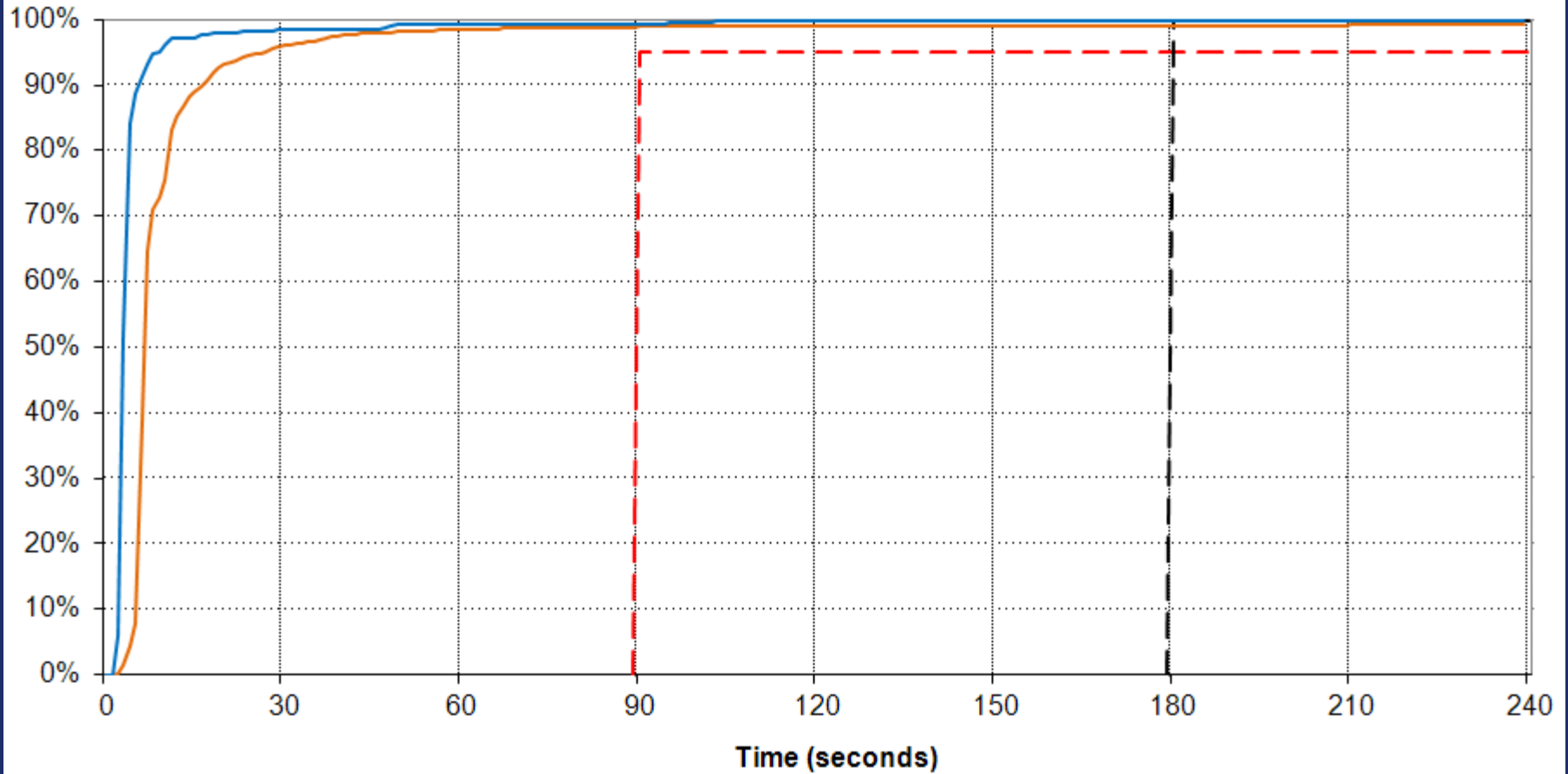
POA (35581) AOA (3835)



Anchorage FIR - VHF - July to December 2012 ADS-C Downlink Latency (Duplicate Messages and Messages During Reported DSP Outages Excluded)

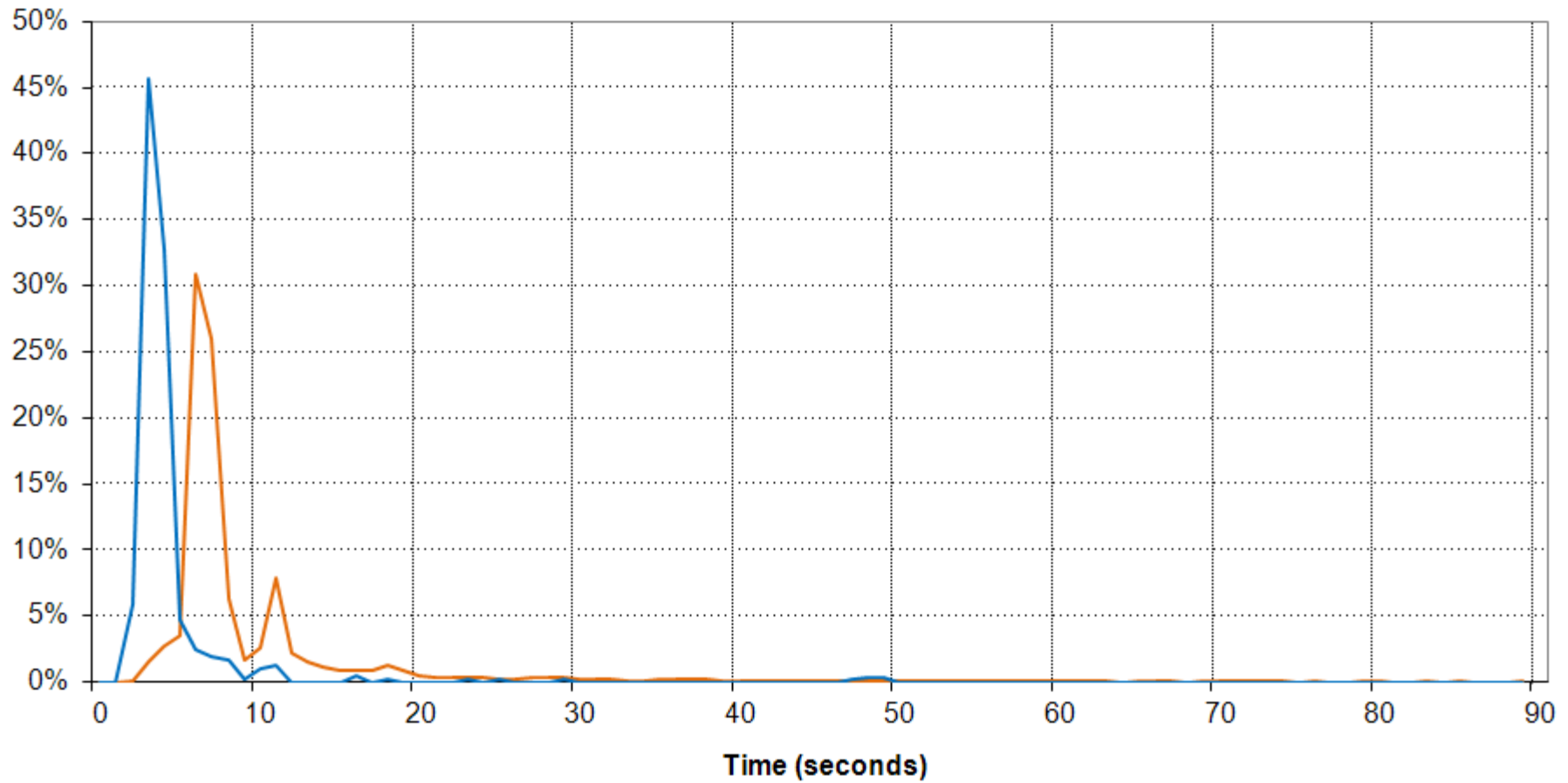


Anchorage FIR - VHF - July to December 2012 ADS-C Downlink Latency (Duplicate Messages and Messages During Reported DSP Outages Excluded)

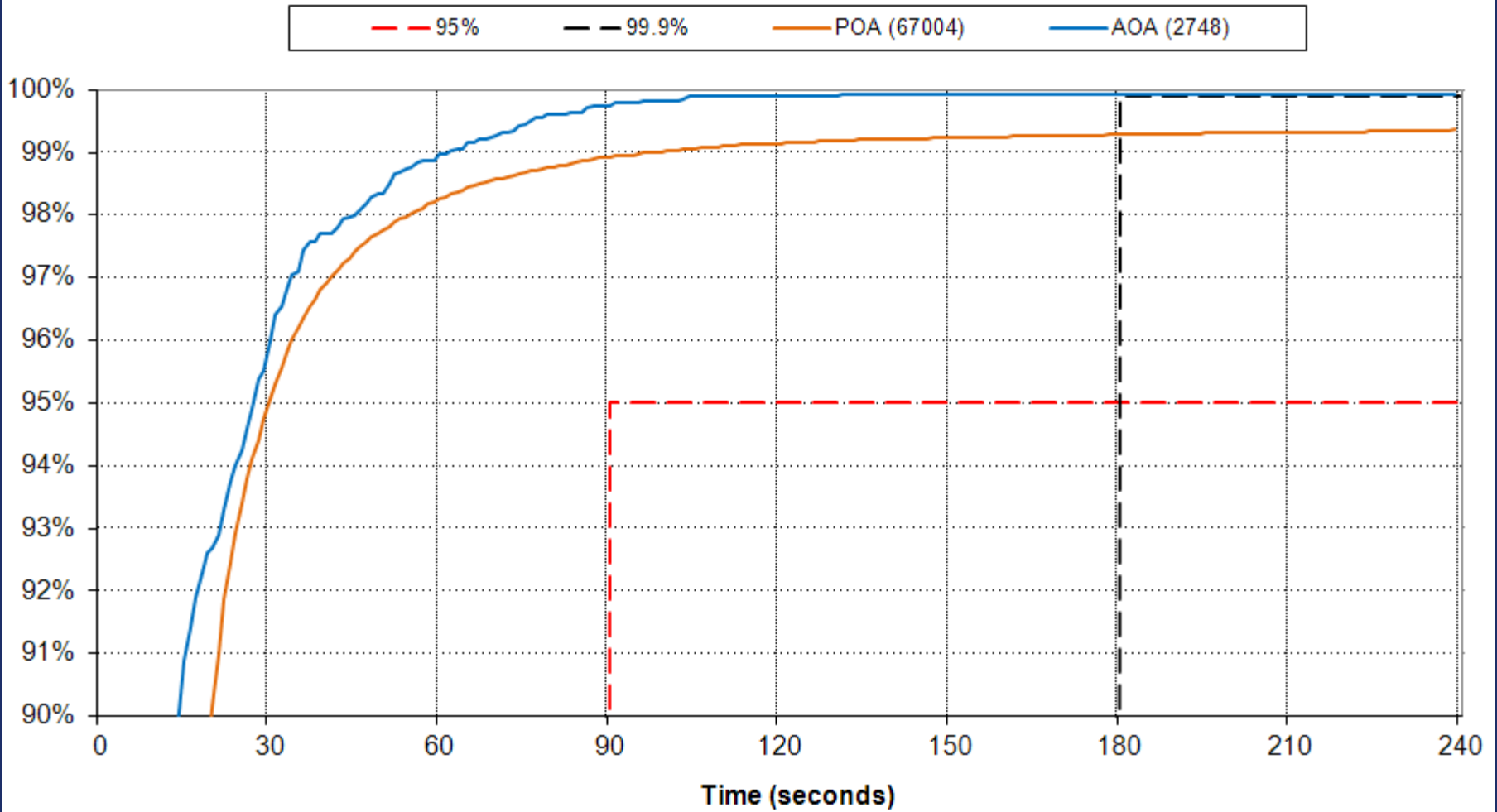


Anchorage FIR - VHF - July to December 2012 ADS-C Downlink Latency - Relative Frequency Distribution (Reported DSP Outages Excluded)

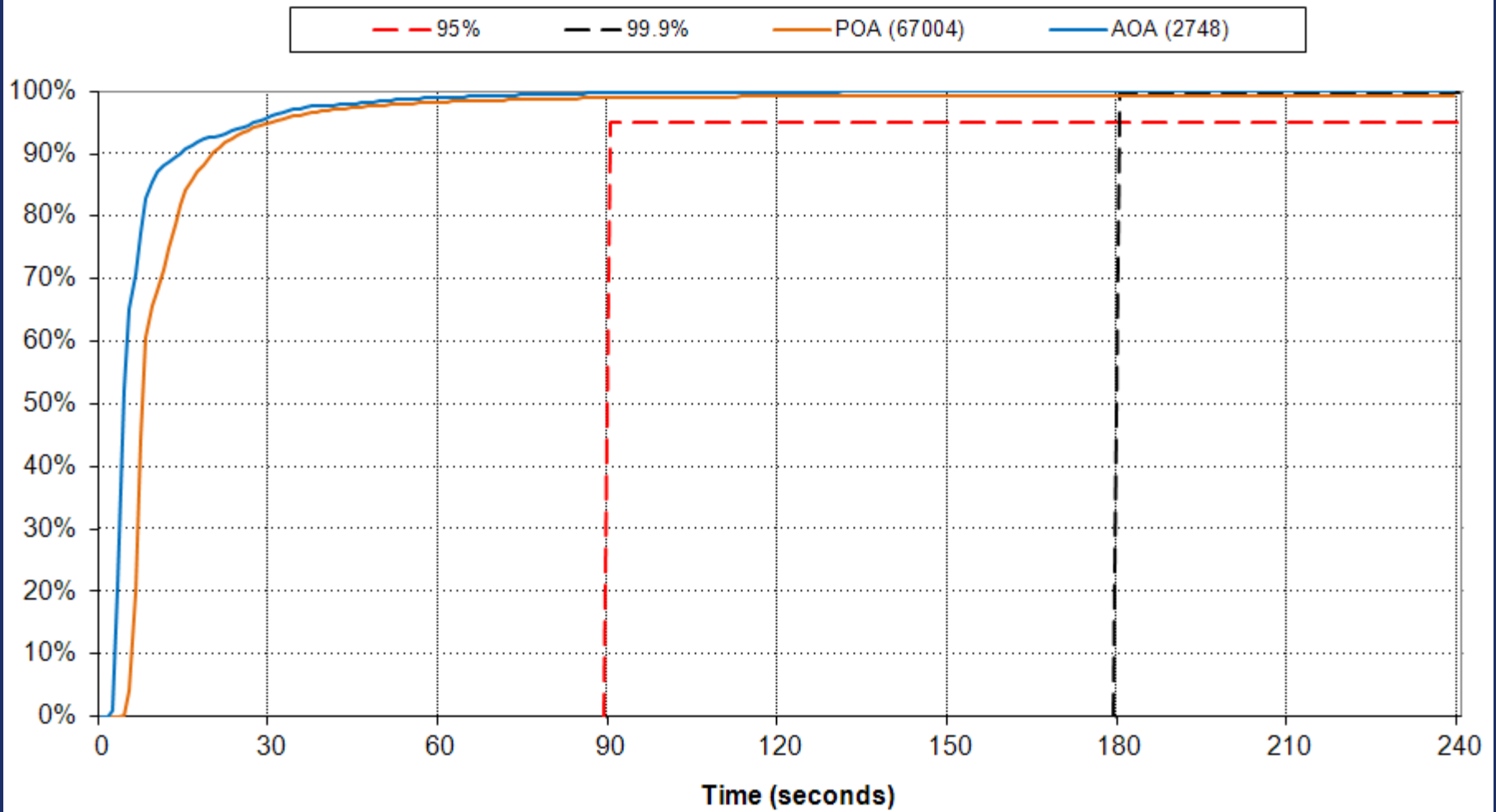
POA (8251) AOA (581)



New York FIR - VHF - July to December 2012 ADS-C Downlink Latency (Duplicate Messages and Messages During Reported DSP Outages Excluded)



New York FIR - VHF - July to December 2012 ADS-C Downlink Latency (Duplicate Messages and Messages During Reported DSP Outages Excluded)



New York FIR - VHF - July to December 2012 ADS-C Downlink Latency - Relative Frequency Distribution (Reported DSP Outages Excluded)

POA (67004) AOA (2748)

