



July – Dec, 2021

PBCS Monitoring Report in Fukuoka FIR

Presented by: SAITO Masahiro



Japan Civil Aviation Bureau (JCAB)
Ministry of Land, Infrastructure, Transport and Tourism
Japan (MLIT)

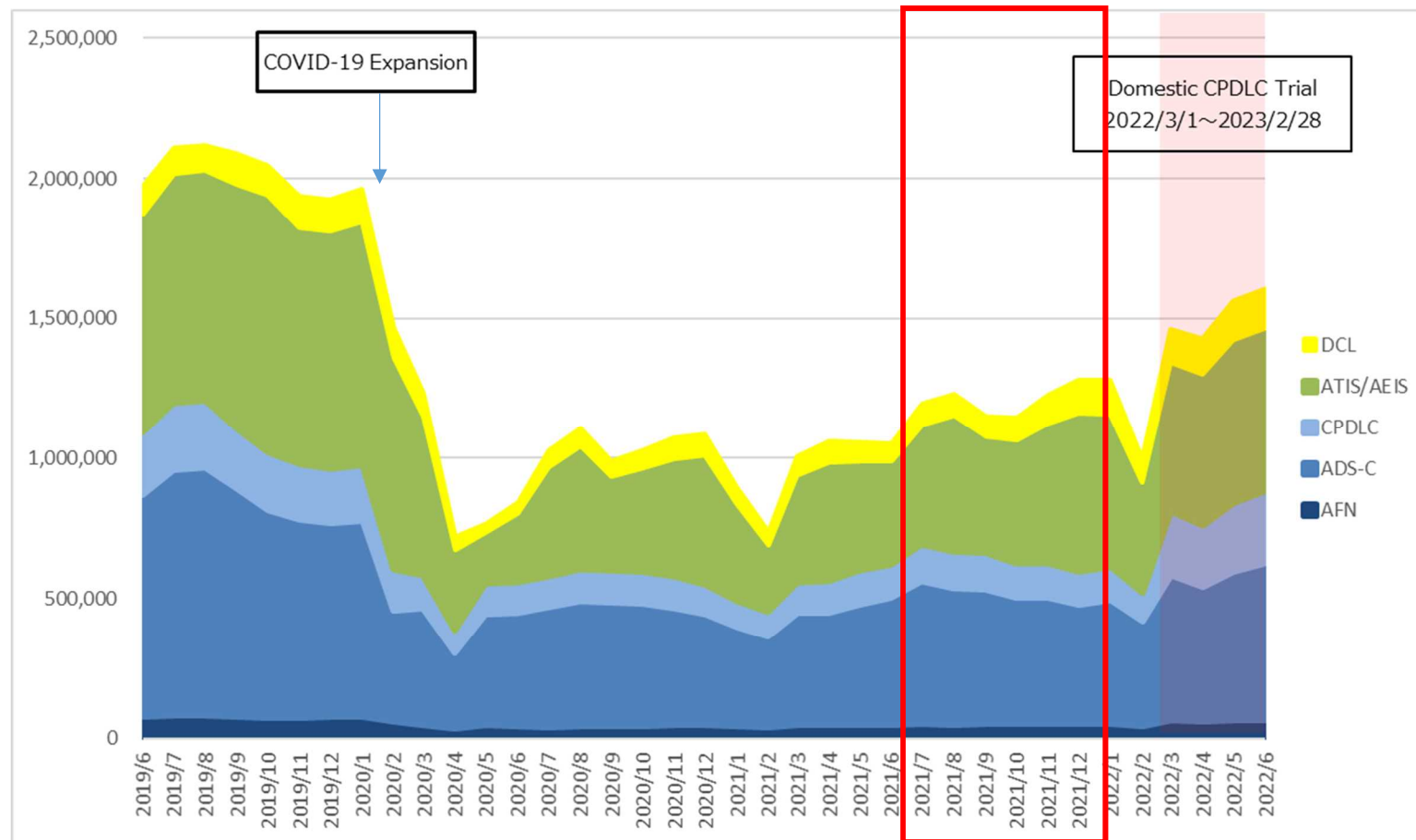
CRA JAPAN

Central Reporting Agency in Japan

FIT35
26 Sep, 2023

Datalink Message volume in Fukuoka FIR

- This graph shows total monthly number of messages in Fukuoka FIR.
- Datalink message volume has decreased significantly due to the decrease of air traffic by the impact of COVID-19 in early 2020.



Evaluation period

- 1) PBCS monitoring report in Fukuoka FIR for July 1 to December 31, 2021.
- 2) This report contains:
 - Availability and unplanned outage report
 - Continuity analysis result for each parameter
 - Performance by Media Type
 - Performance by Month
 - Performance by Station ID
 - Performance by Operator

Availability

Availability (January – December 2021)

CSP	Service	Location	Availability(%)	Number of Unplanned Outage	Number of Unplanned Outage > 10min	Accumulated Unplanned Outage Time(min)
SITA	Classic Aero/SBB	Global	100.00%	0	0	0
	Classic Aero	APK1(Paumalu)	99.98%	2	2	100
		APK2(Perth)	99.94%	3	3	296
	Iridium	IGW1(Phoenix)	99.99%	1	1	11
ARINC	Classic Aero/SBB	Global	99.96%	2	2	161
	Classic Aero	XXA(Paumalu)	99.97%	3	3	156
		XXP(Perth)	99.97%	2	2	150
		XXQ(Perth)	99.98%	1	1	88
	SBB	XXS(Paumalu)	99.97%	3	2	122
	Iridium	IG1(Phoenix)	99.89%	3	2	546
AVICOM	POA/AOA	Global	100.00%	0	0	0

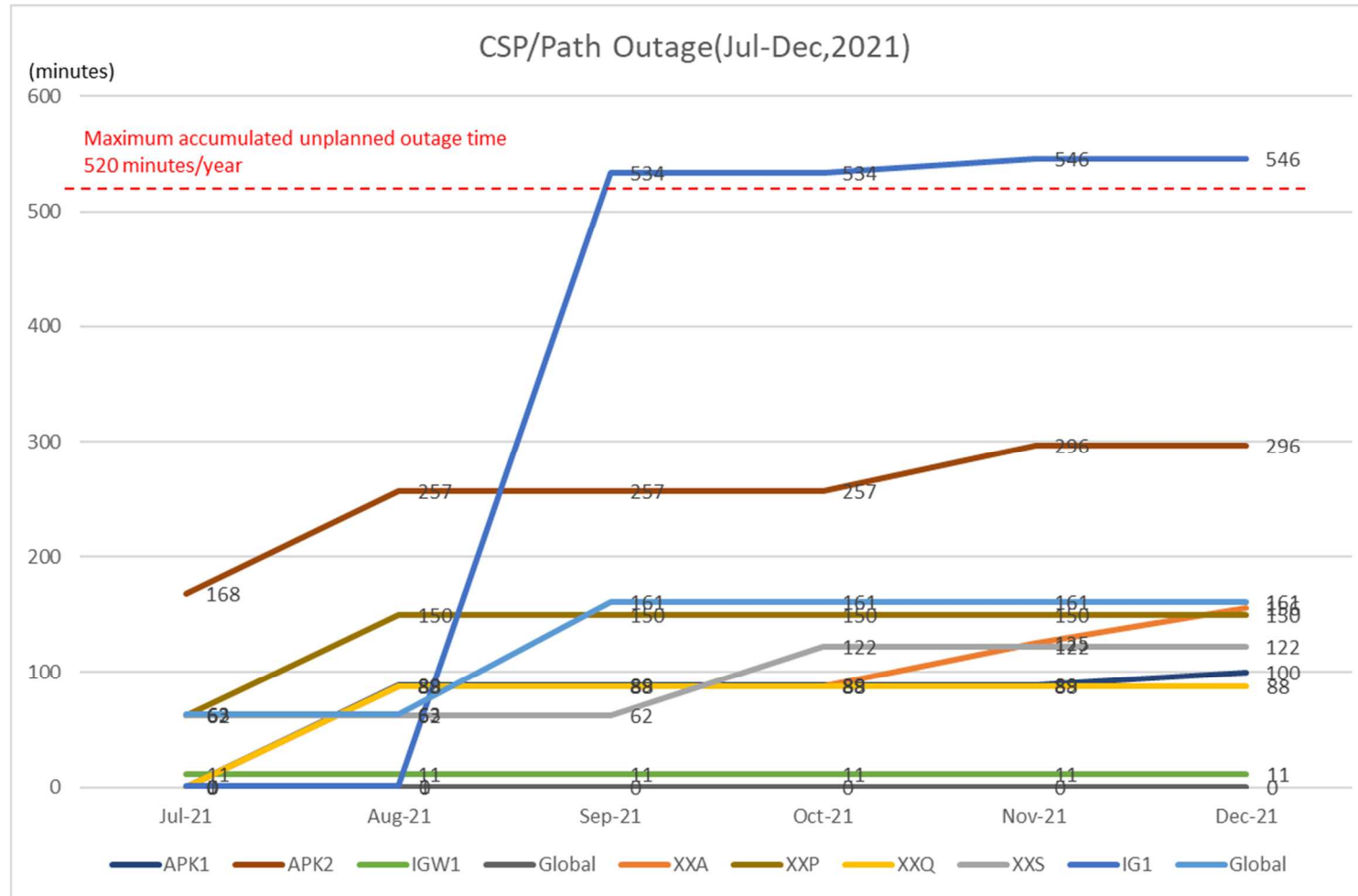
Legend:

	Meets Efficiency
	Under Efficiency but above Safety
	Under criteria

Unplanned Outages

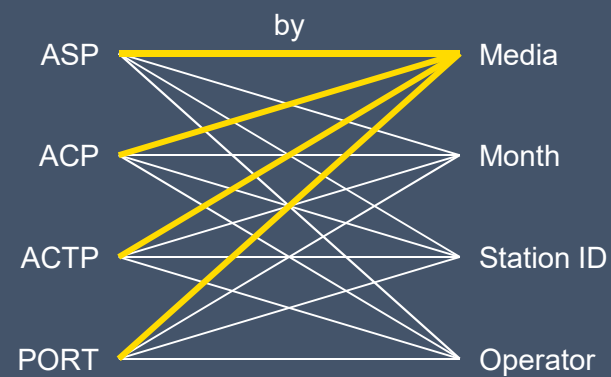
Start Date	Start Time	Duration (min)	CSP	Service Involved	Location Involved	Reason	Comment (Operational Impact)
2021/4/9	6:44	63	ARINC	ARINC	Global	ARINC system outage	No impact on flight HF voice 10 aircrafts (2 aircrafts of above requested altitude change)
2021/4/10	21:04	11	SITA	IRIDIUM	IGW1	Iridium datalink service degradation	No impact on flight
2021/4/10	21:04	1	ARINC	IRIDIUM	IG1		
2021/5/12	22:00	168	SITA	I3	APK2	Inmarsat service degradation by GES outage(Australia : Perth)	No impact on flight
2021/5/12	22:51	62	ARINC	I3	XXP		
2021/7/21	10:45	54	ARINC	I4 SBB	XXS	Inmarsat SBB service degradation	No impact on flight
2021/7/25	8:15	8	ARINC	I4 SBB	XXS	Inmarsat SBB service degradation	No impact on flight
2021/8/12	16:06	89	SITA	I4	APK1 APK2	Inmarsat outage	No impact on flight HF voice 50 aircrafts
2021/8/12	16:22	88	ARINC	I4	XXP XXA XXQ		
2021/9/9	14:52	533	ARINC	IRIDIUM	IG1	Iridium datalink service degradation	No impact on flight
2021/9/24	17:08	98	ARINC	ARINC	Global	ARINC line outage	No impact on flight HF voice 22 aircrafts (2 aircrafts of above requested altitude change)
2021/10/25	10:28	60	ARINC	I4 SBB	XXS	Inmarsat SBB service degradation	No impact on flight
2021/11/7	23:15	39	SITA	I3	APK2	Perth satation equipment outage	No impact on flight
2021/11/16	17:25	12	ARINC	IRIDIUM	IG1	Iridium datalink service degradation	No impact on flight
2021/11/28	22:06	37	ARINC	I4	XXA	Inmarsat datalink service degradation	No impact on flight
2021/12/15	8:12	31	ARINC	I4	XXA	Inmarsat datalink service degradation	No impact on flight HF voice 15 aircrafts
2021/12/15	8:34	11	SITA	I4	APK1		

Accumulated Unplanned Outage



Continuity

Performance by Media Type



Observed Performance by Media Type

- The case of communications using VHF for the uplink and SAT for the downlink doesn't meet ACTP 95% criteria.
- All meet the 95% criteria except above cases.

Media Type	RSP180			RCP240					
	Count of ADS-C	ASP		Count of CPDLC	ACP		ACTP		PORT
		95%	99.9%		95%	99.9%	95%	99.9%	95%
Total	1,772,717	98.53%	99.66%	36,896	99.73%	99.84%	99.73%	99.81%	99.46%
SAT	1,365,397	98.34%	99.62%	33,392	99.73%	99.85%	99.74%	99.81%	99.46%
VHF	407,320	99.17%	99.80%	3,235	99.90%	99.90%	99.90%	99.93%	99.65%
SAT/VHF *1	---	---	---	142	97.88%	98.59%	100.00%	100.00%	95.77%
VHF/SAT *2	---	---	---	127	96.06%	96.85%	91.33%	96.85%	97.63%

* 1 SAT/VHF : Communication using satellite for uplink and VHF for downlink

* 2 VHF/SAT : Communication using VHF for uplink and satellite for downlink

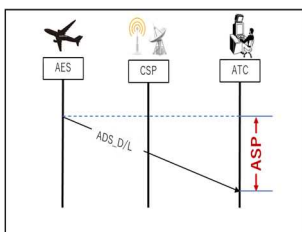
Legend:

	Meets criteria
	Under criteria but above 99.0%
	Under criteria

ASP by Media Type

- Both SAT and VHF meet the 95% criteria.

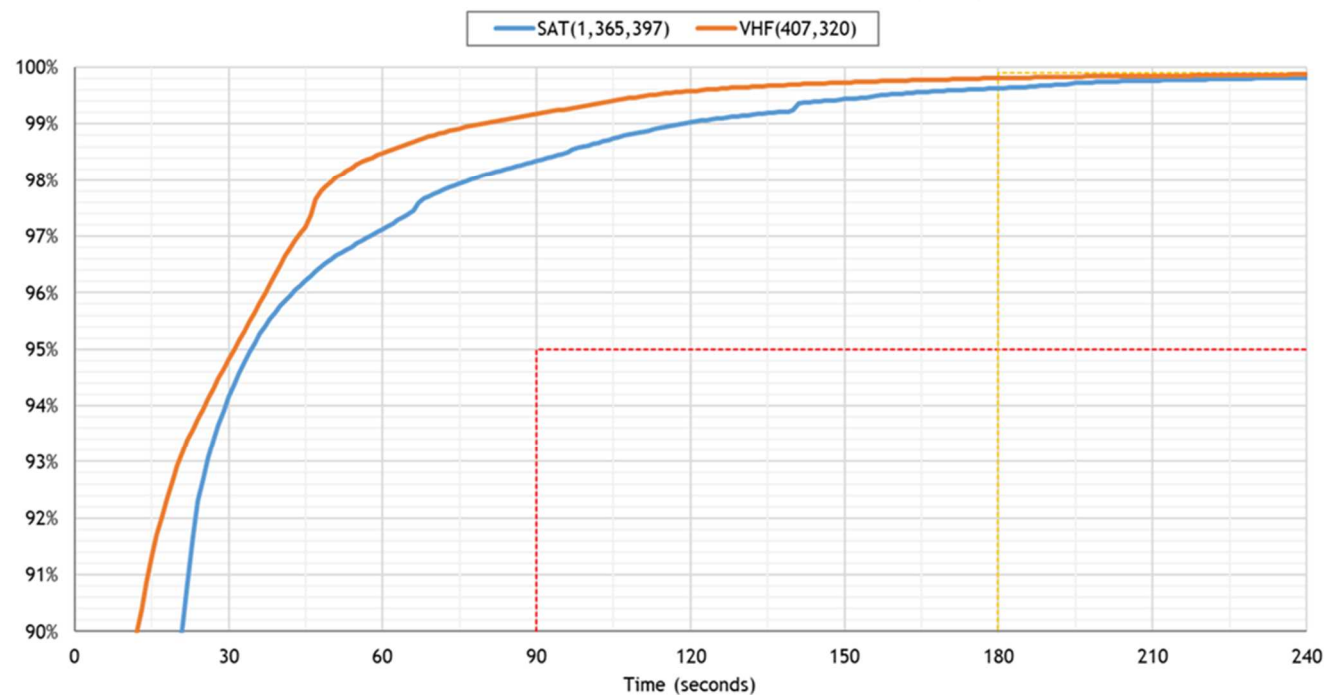
ASP measurement section



ASP:ADS Downlink transaction time

Fukuoka FIR - By Media Type - July to December 2021

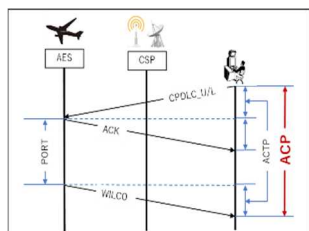
ADS-C Actual Surveillance Performance (ASP)



ACP by Media Type

- All cases of communication meet the 95% criteria.

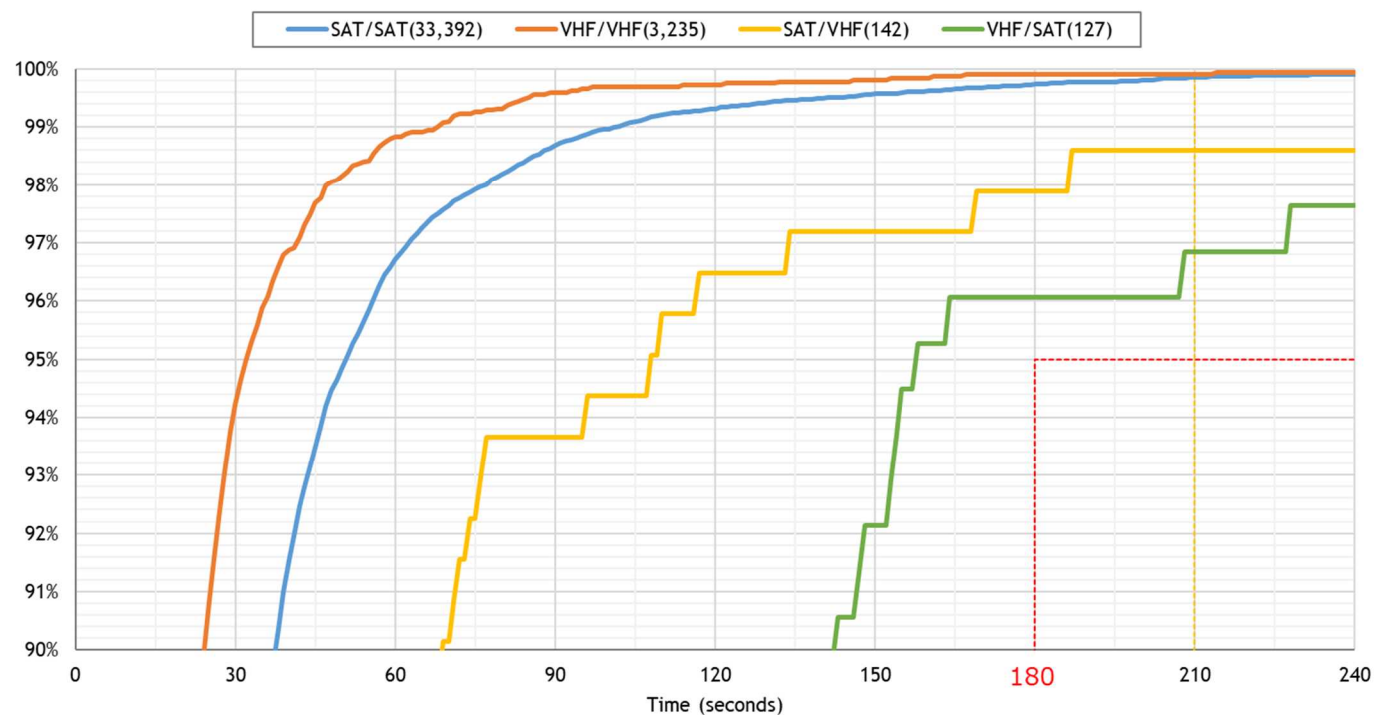
ACP measurement section



ACP : Total response time

Fukuoka FIR - By Media Type - July to December 2021

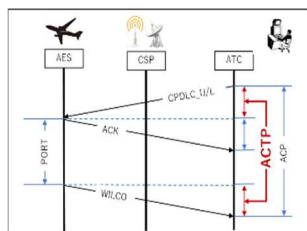
CPDLC Actual Communication Performance (ACP)



ACTP by Media Type

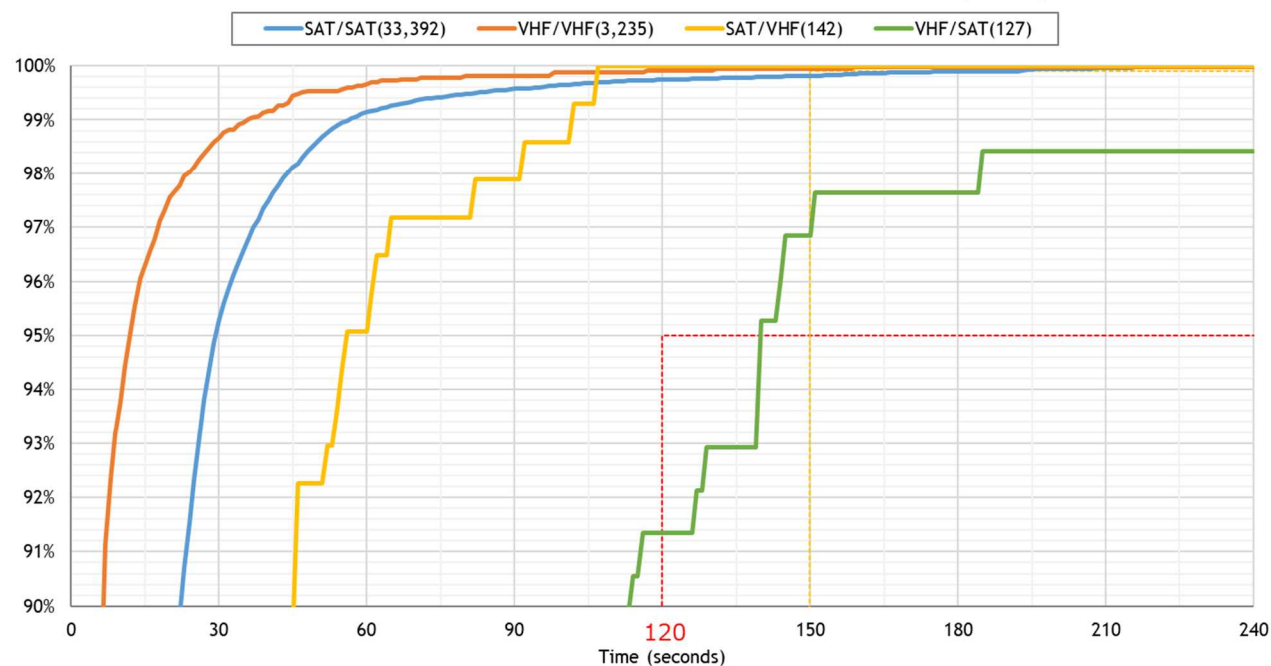
- The case of communications using VHF for the uplink and SAT for the downlink doesn't meet the 95% criteria. (Because the case changes the media to SAT after trying to resend several times by VHF.)
- ACTP meets the 95% criteria except above the case.

ACTP measurement section



ACTP : Ground to air transmission time

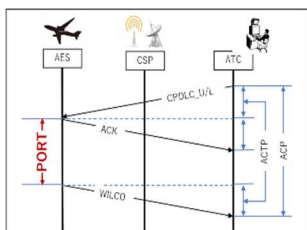
Fukuoka FIR - By Media Type - July to December 2021
CPDLC Actual Communication Technical Performance (ACTP)



PORT by Media Type

- All cases of communication meet the 95% criteria.

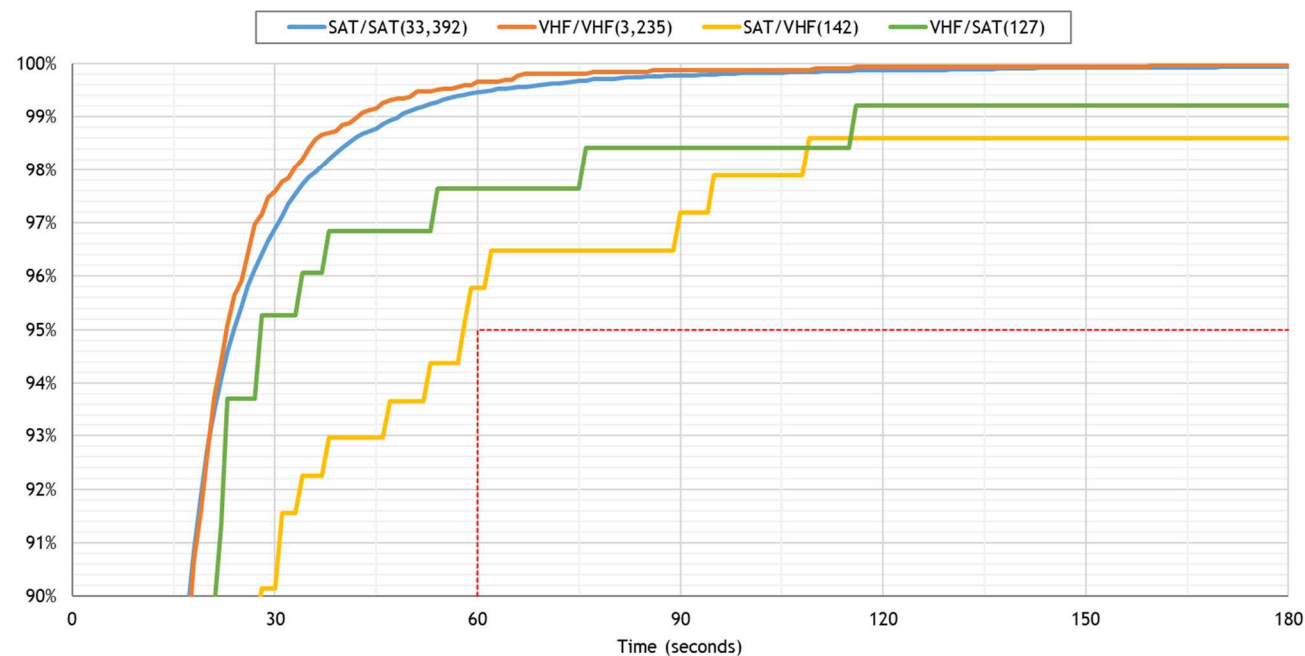
PORT measurement section



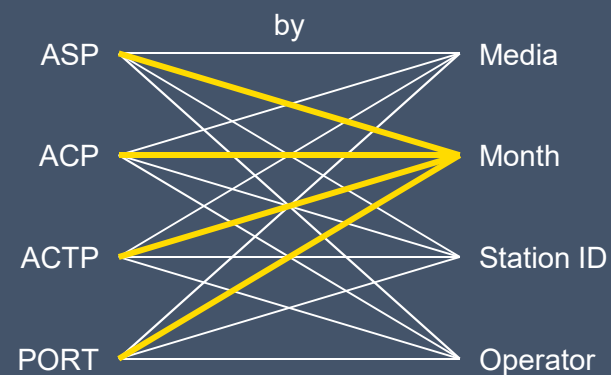
PORT: pilot operational response time

Fukuoka FIR - By Media Type - July to December 2021

CPDLC Pilot Operational Response Time (PORT)



Performance by Month



Observed Performance by Month

➤ All months meet the 95% criteria and there are no major fluctuations.

Month	RSP180			RCP240					
	Count of ADS-C	ASP		Count of CPDLC	ACP		ACTP		PORT
		95%	99.9%		95%	99.9%	95%	99.9%	95%
Jul	320,943	98.47%	99.61%	6,234	99.66%	99.82%	99.64%	99.77%	99.42%
Aug	305,780	98.61%	99.66%	6,960	99.79%	99.88%	99.75%	99.82%	99.42%
Sep	302,418	98.62%	99.69%	6,439	99.72%	99.82%	99.65%	99.76%	99.42%
Oct	285,946	98.58%	99.70%	6,011	99.66%	99.76%	99.71%	99.76%	99.51%
Nov	285,702	98.43%	99.69%	5,750	99.72%	99.87%	99.73%	99.84%	99.35%
Dec	271,928	98.48%	99.66%	5,502	99.83%	99.87%	99.89%	99.90%	99.65%

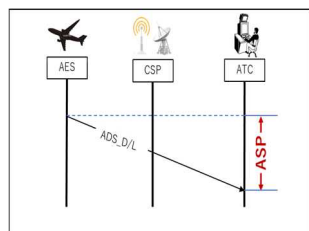
Legend:

	Meets criteria
	Under criteria but above 99.0%
	Under criteria

ASP by Month

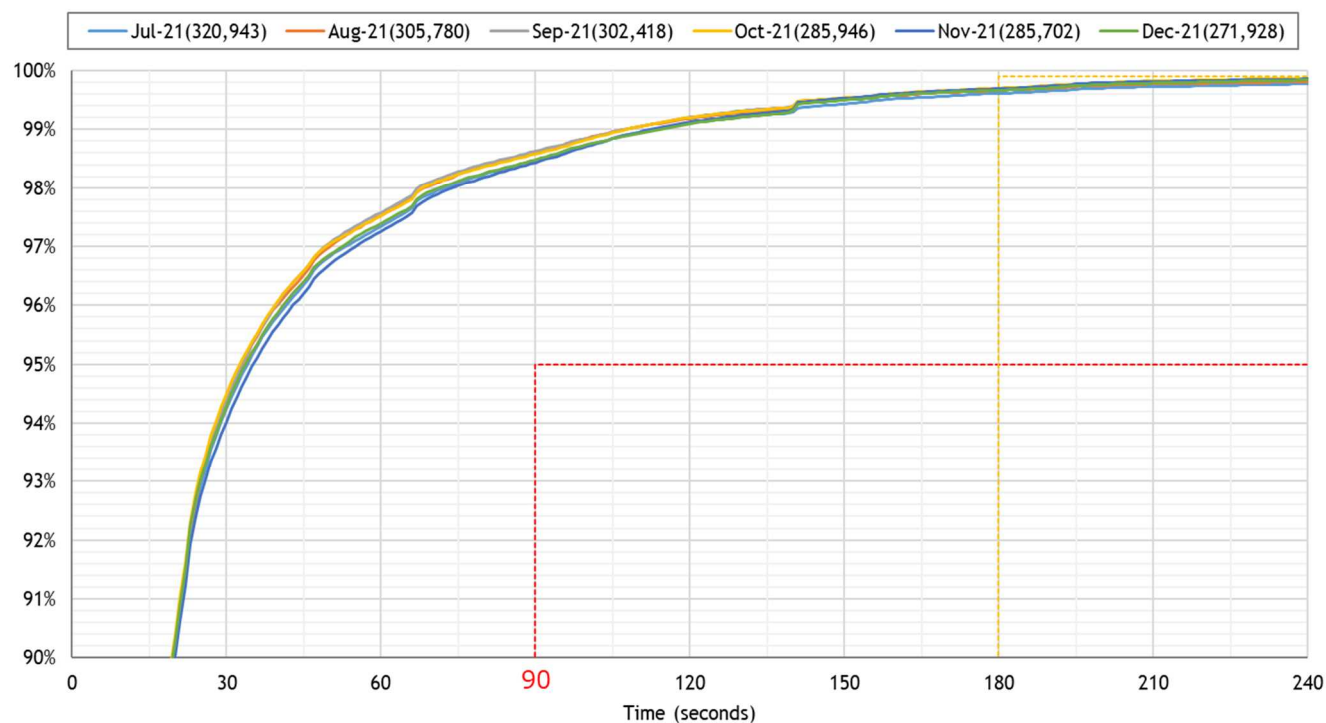
- All months meet the 95% criteria and there are no major fluctuations.

ASP measurement section



ASP:ADS Downlink transaction time

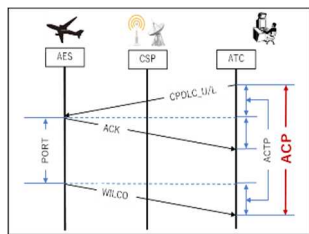
Fukuoka FIR - By Month - July to December 2021
ADS-C Actual Surveillance Performance (ASP)



ACP by Month

- All months meet the 95% criteria and there are no major fluctuations.

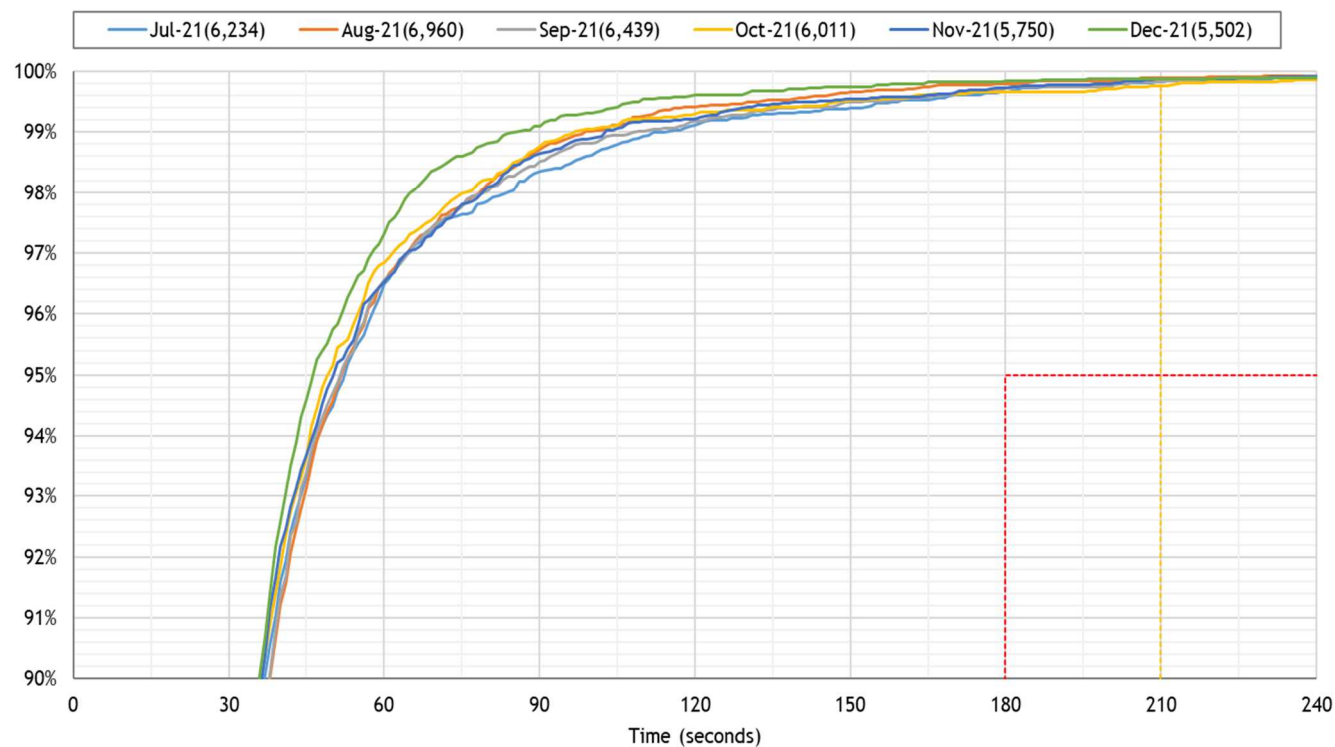
ACP measurement section



ACP : Total response time

Fukuoka FIR - By Month - July to December 2021

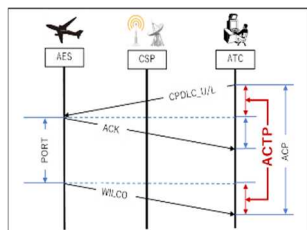
CPDLC Actual Communication Performance (ACP)



ACTP by Month

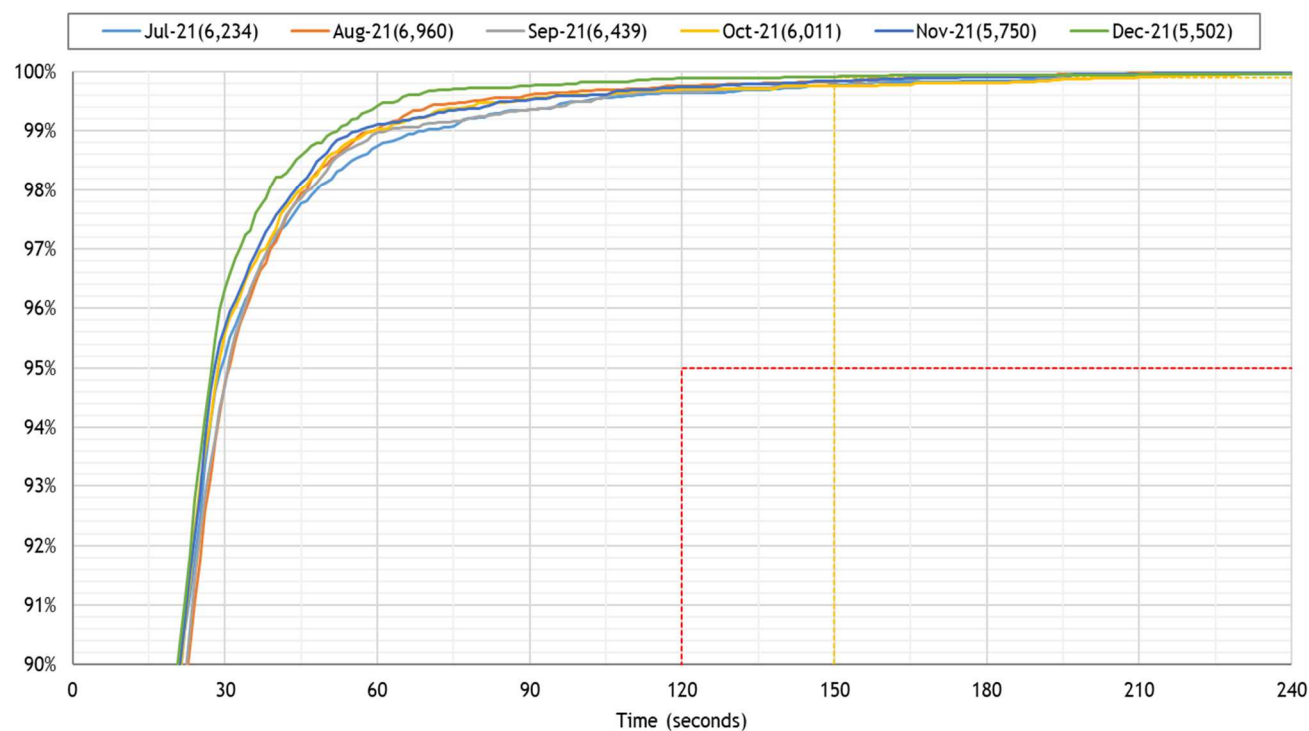
- All months meet the 95% criteria and there are no major fluctuations.

ACTP measurement section



ACTP : Ground to air transmission time

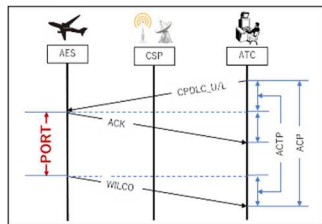
Fukuoka FIR - By Month - July to December 2021
CPDLC Actual Communication Technical Performance (ACTP)



PORT by Month

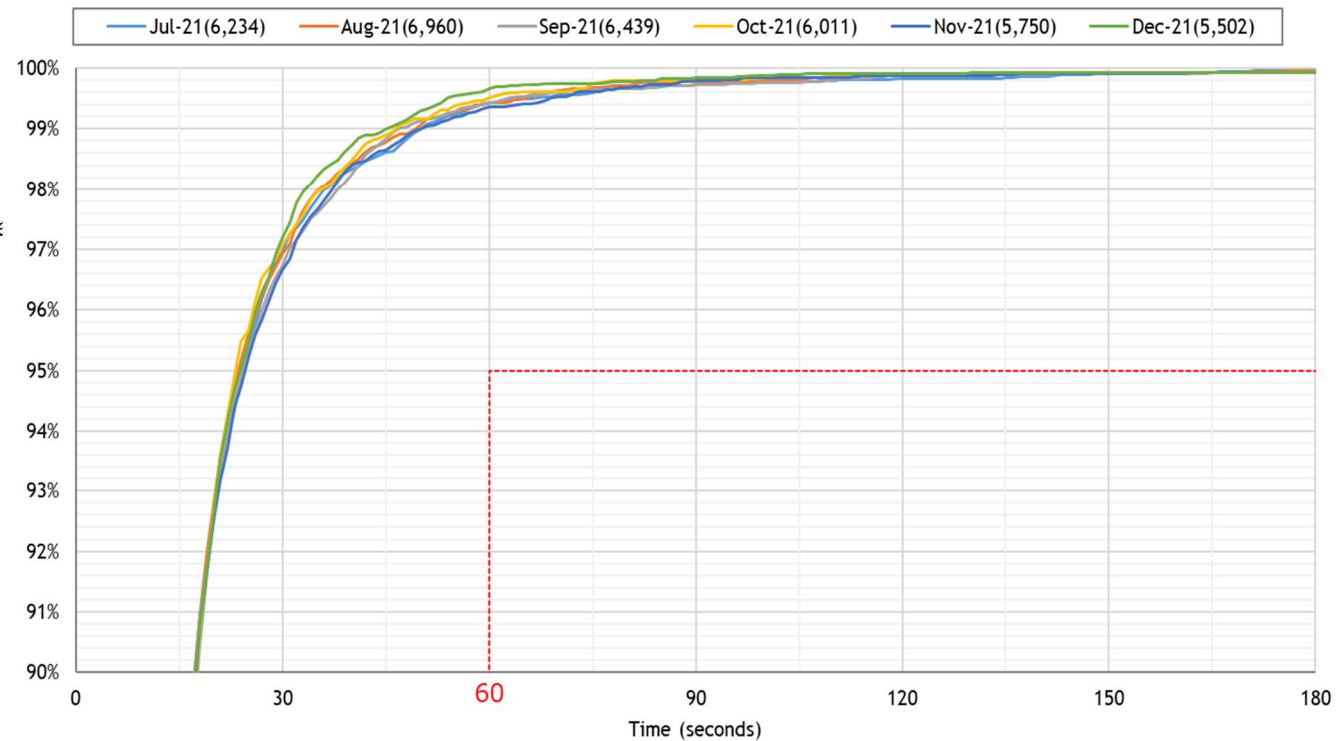
- All months meet the 95% criteria and there are no major fluctuations.

PORT measurement section

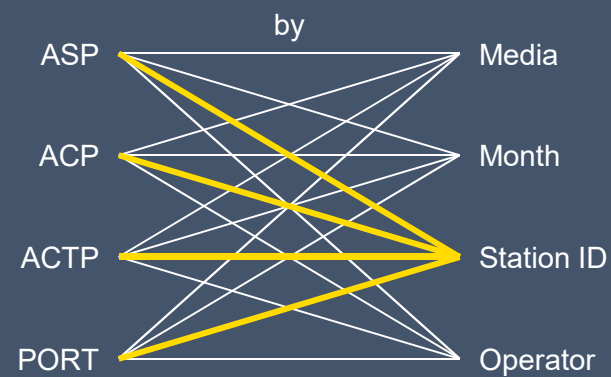


PORT: pilot operational response time

Fukuoka FIR - By Month - July to December 2021
CPDLC Pilot Operational Response Time (PORT)



Performance by Station ID



Observed Performance by Station ID

- All GES meet the 95% criteria.

CSP	Service	Station ID	RSP180			RCP240					
			Count of ADS-C	ASP		Count of CPDLC	ACP		ACTP		PORT
				95%	99.9%		95%	99.9%	95%	99.9%	
SITA	Classic Aero	APK1(Paumalu)	663,837	98.64%	99.73%	16,138	99.93%	99.95%	99.91%	99.94%	99.70%
		APK2(Perth)	33,655	97.20%	99.47%	860	99.65%	99.88%	99.76%	99.76%	99.30%
	SBB	APK9(Paumalu)	0	0.00%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%
	Iridium	IGW1(Phoenix)	19,176	96.09%	99.45%	373	100.00%	100.00%	100.00%	100.00%	98.48%
ARINC	Classic Aero	XXA(Paumalu)	432,110	98.58%	99.71%	10,559	99.76%	99.87%	99.75%	99.80%	98.40%
		XXP(Perth)	114,638	97.92%	99.15%	2,846	99.43%	99.68%	99.68%	99.71%	100.00%
		XXQ(Perth)	0	0.00%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%
	SBB	XXS(Paumalu)	0	0.00%	0.00%	0	0.00%	0.00%	0.00%	0.00%	0.00%
	Iridium	IG1(Phoenix)	101,974	96.69%	99.17%	2,758	98.73%	99.27%	98.73%	99.16%	99.58%

*No-colored where under 100 data points.

Legend:

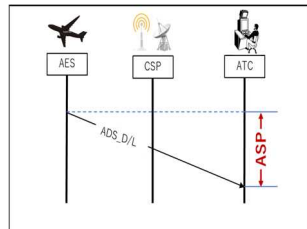
	Meets criteria
	Under criteria but above 99.0%
	Under criteria

ASP by Station ID

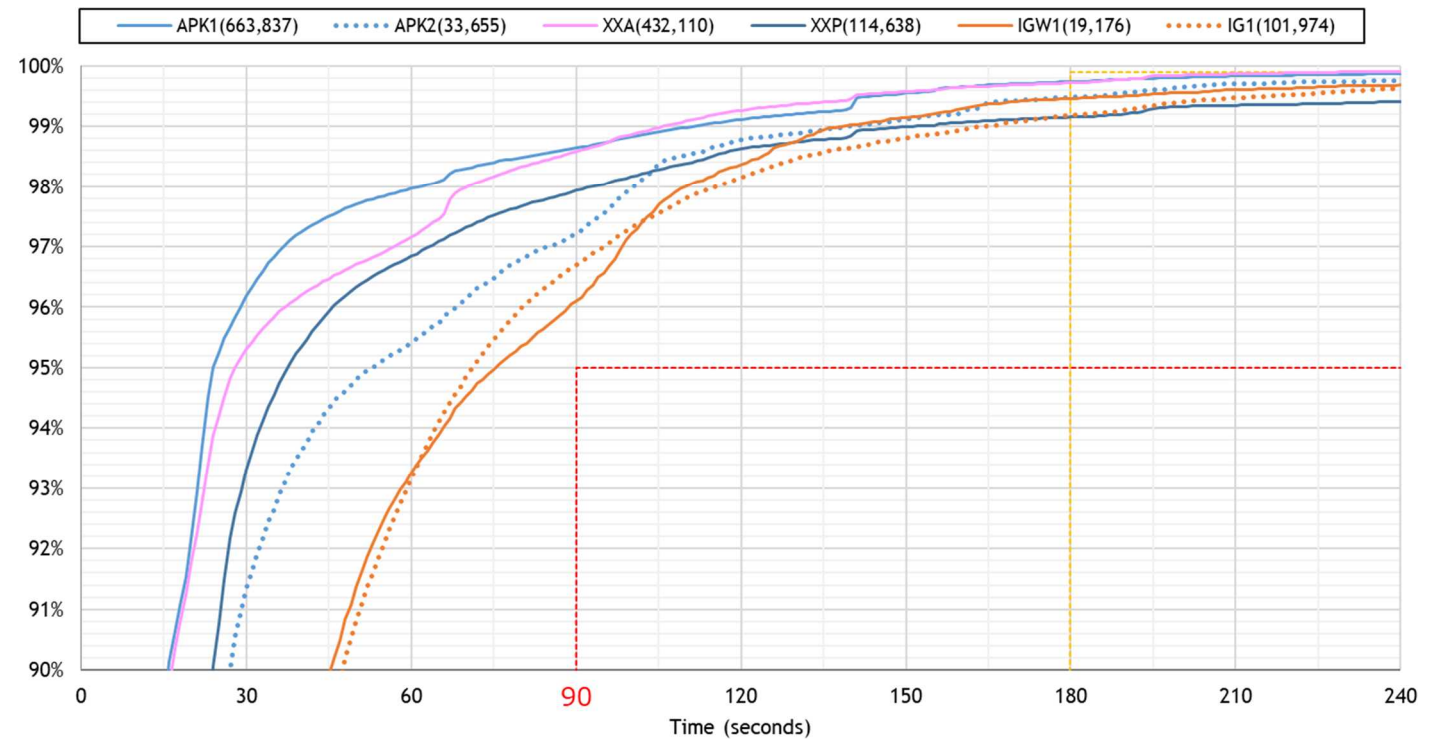
- All GES meet the 95% criteria.

Fukuoka FIR - By Station Identifier - July to December 2021 ADS-C Actual Surveillance Performance (ASP)

ASP measurement section



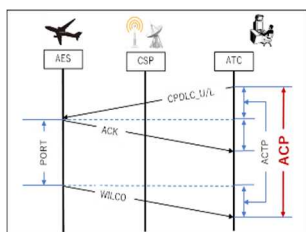
ASP:ADS Downlink transaction time



ACP by Station ID

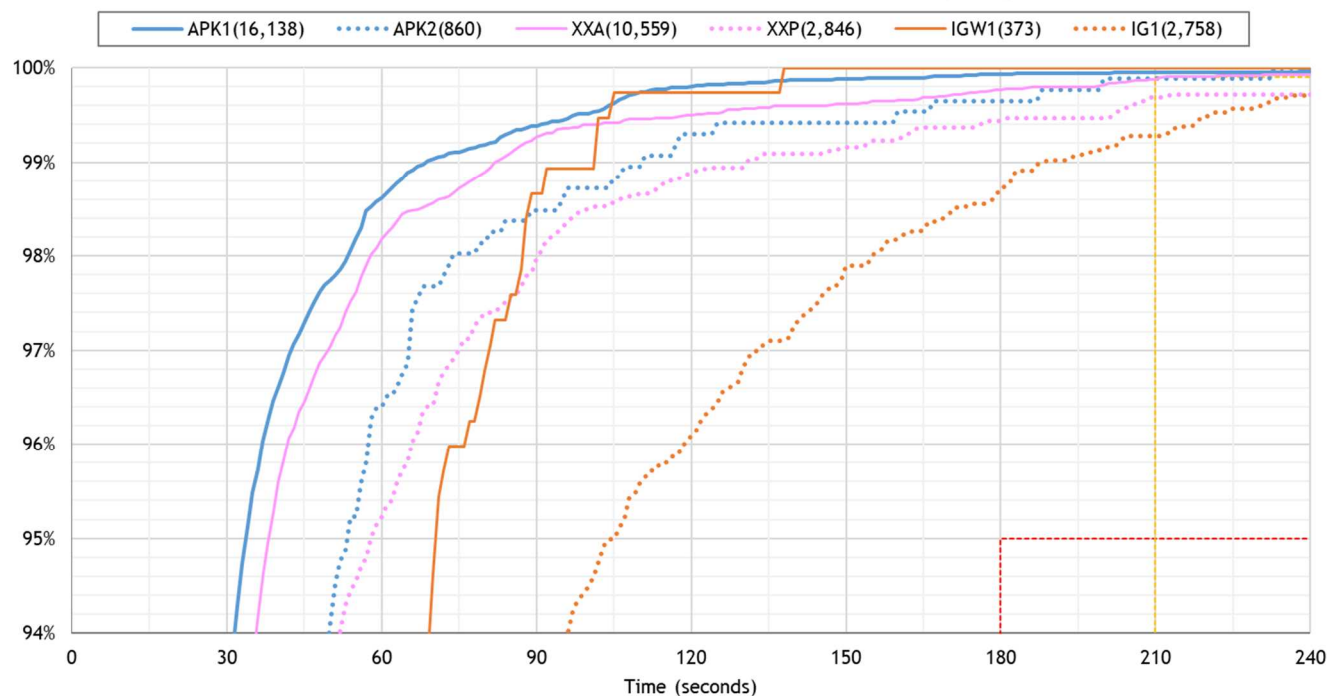
- All GES meet the 95% criteria.

ACP measurement section



ACP : Total response time

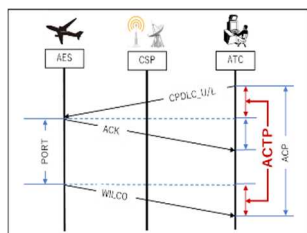
Fukuoka FIR - By Station Identifier - July to December 2021 CPDLC Actual Communication Performance (ACP)



ACTP by Station ID

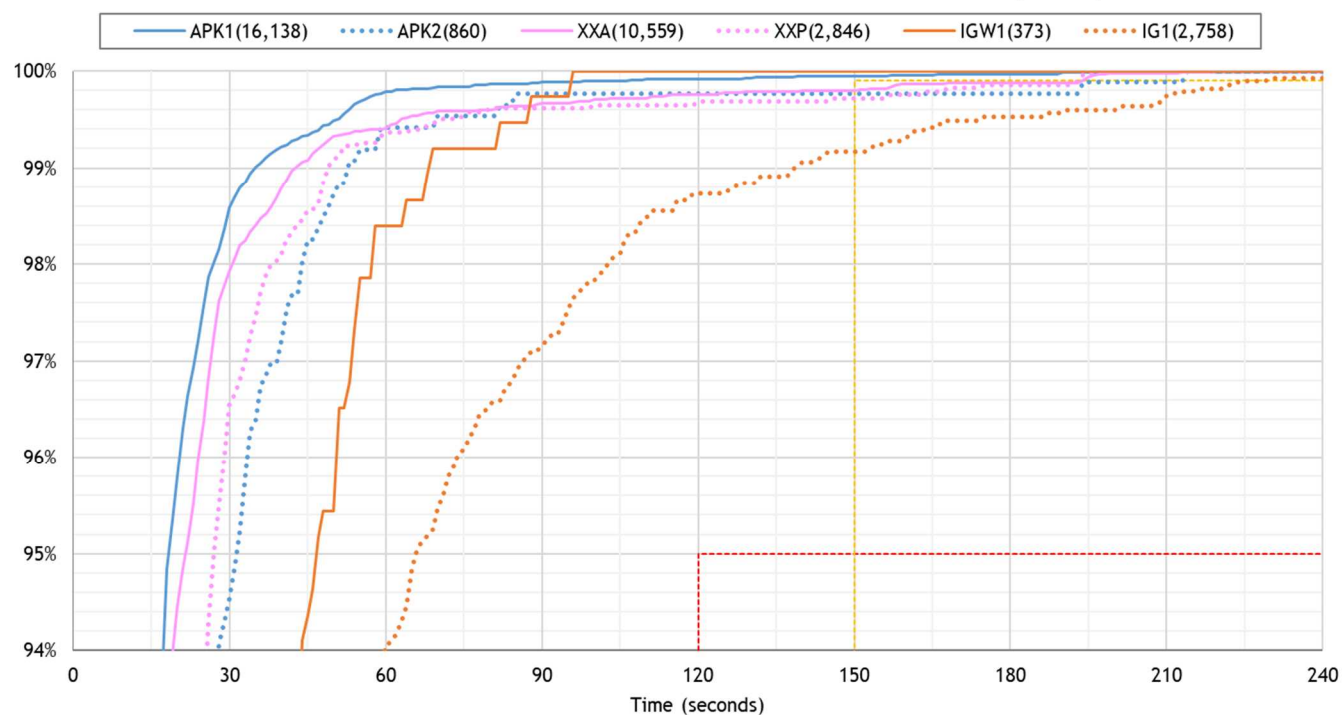
- All GES meet the 95% criteria.

ACTP measurement section



ACTP : Ground to air transmission time

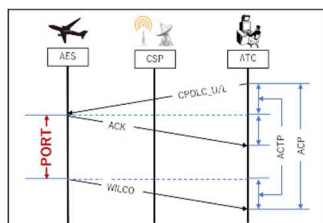
Fukuoka FIR - By Station Identifier - July to December 2021
CPDLC Actual Communication Technical Performance (ACTP)



PORT by Station ID

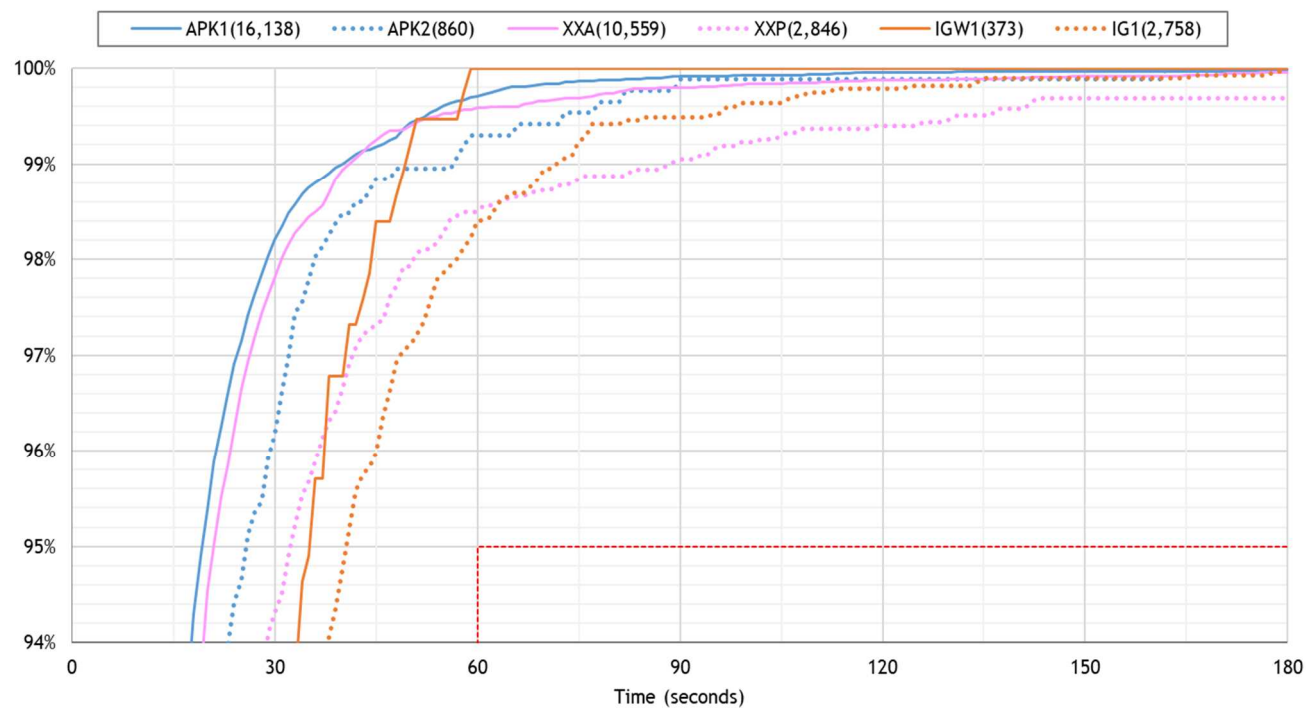
- All GES meet the 95% criteria.

PORT measurement section



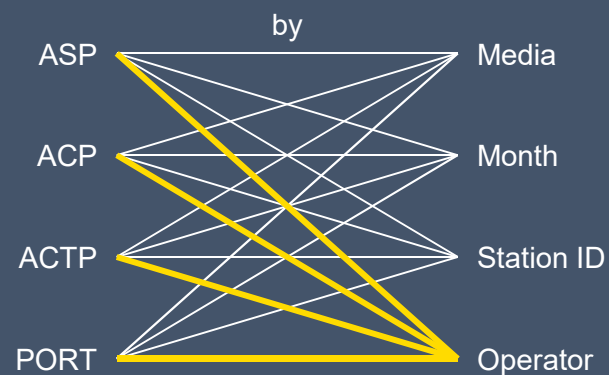
PORT: pilot operational response time

Fukuoka FIR - By Station Identifier - July to December 2021
CPDLC Pilot Operational Response Time (PORT)



Performance by Operator

Table only, Percentile graph not contained



Summary of Performance by Operator

- ◆ 56 operators with at least 100 ADS-C messages
 - 1 operator don't meet ASP95% criteria *1.
 - 4 operators were below 99.0% at ASP99.9% criteria.
- ◆ 31 operators had more than 100 RCP transactions
 - All operator meet ACP95% criteria*2.
 - 5 operators were below 99.0% at ACP99.9% criteria.

	RSP180		RCP240				
	ASP		ACP		ACTP		PORT
	95%	99.9%	95%	99.9%	95%	99.9%	95%
Meets Criteria	55	16	31	20	31	16	31
Under criteria but above 99.0%		36		10		14	
Under criteria	1	4	0	1	0	1	0

*1 ASP95% criteria: The ASP value of 95% of the entire ADS-C downlink must be within 90 seconds.

*2 ACP95% criteria: The ACP value of 95% of the entire CPDLC communication with response request must be within 180 seconds.

Summary of Performance by Operator/AC-Type

- ◆ 157 operators / AC-type pairs with at least 100 ADS-C messages
 - 4 pairs not meet ASP95% criteria *1.
 - 13 pairs were below 99.0% at ASP99.9% criteria.
- ◆ 68 operators / AC-type pairs with at least 100 RCP transactions.
 - All operator meets ACP95% criteria *2.
 - 2 pairs were below 99.0% at ACP99.9% criteria.

	RSP180		RCP240				
	ASP		ACP		ACTP		PORT
	95%	99.9%	95%	99.9%	95%	99.9%	95%
Meets Criteria	153	65	68	46	68	42	68
Under criteria but above 99.0%		79		20		24	
Under criteria	4	13	0	2	0	2	0

*1 ASP95% criteria: The ASP value of 95% of the entire ADS-C downlink must be within 90 seconds.

*2 ACP95% criteria: The ACP value of 95% of the entire CPDLC communication with response request must be within 180 seconds.

Operator/AC-Type Not Meeting RSP180/RCP240

- In this term, 4 pairs (B789/ETH, B737/KAL, B77W/GIA, GL7T/VJT) don't meet the 95% ASP criteria. For These pairs, many media transitions occur when flying near the edge of VHF coverage such as South A590 route, which occur performance degradation.

Aircraft Type	OP Code	RSP180				RCP240						
		Count of ADS-C	% of Total ADS-C	ASP		Count of CPDLC	% of Total CPDLC	ACTP		ACP		PORT
				95%	99.9%			95%	99.9%	95%	99.9%	
A321	PAL	1,457	0.08%	97.32%	98.63%	22	0.06%	95.45%	95.45%	95.45%	95.45%	100.00%
A333	GIA	154	0.01%	95.45%	97.40%	2	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%
A333	KAL	13,369	0.75%	97.76%	99.52%	197	0.53%	98.48%	98.98%	98.98%	99.49%	98.98%
B789	ETH	243	0.01%	94.65%	100.00%	3	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%
B737	KAL	140	0.01%	92.14%	96.43%	1	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%
B744	CKS	20,896	1.18%	96.49%	99.03%	327	0.89%	95.72%	98.17%	96.94%	98.47%	96.33%
B752	FDX	108	0.01%	97.22%	98.15%	3	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%
B752	SAM	214	0.01%	96.73%	97.20%	3	0.01%	100.00%	100.00%	100.00%	100.00%	100.00%
B763	ANA	14,119	0.80%	96.17%	98.57%	222	0.60%	98.65%	99.10%	99.10%	99.55%	97.75%
B772	OAE	1,794	0.10%	97.27%	98.77%	46	0.12%	100.00%	100.00%	100.00%	100.00%	100.00%
B77L	CKS	7,362	0.42%	96.64%	98.72%	129	0.35%	99.22%	99.22%	100.00%	100.00%	100.00%
B77W	GIA	838	0.05%	94.03%	96.42%	17	0.05%	100.00%	100.00%	100.00%	100.00%	100.00%
C17	RCH	7,000	0.39%	99.40%	99.71%	158	0.43%	99.37%	99.37%	98.73%	98.73%	97.47%
D328	RCH	106	0.01%	96.23%	98.11%	1	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%
GL7T	VJT	243	0.01%	94.65%	97.53%	0	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GLF6	KAL	141	0.01%	98.58%	98.58%	1	0.00%	100.00%	100.00%	100.00%	100.00%	100.00%
MD11	WGN	4,958	0.28%	97.50%	98.73%	104	0.28%	99.04%	99.04%	99.04%	99.04%	99.04%

*No-colored where under 100 data points.

Legend:

	Meets criteria
	Under criteria but above 99.0%
	Under criteria

Summary

Summary of the report

- 1) For availability, a long-term outage exceeded availability criteria occurred at ARINC-Iridium IG1.
- 2) For continuity, in cases different media (SAT/VHF) used for uplink and downlink, some items don't meet the criteria.

In particular, many media transitions occur when flying near the edge of VHF coverage such as South A590 route, which is a factor in performance degradation.

Any Questions?

Thank you!



Technical Management
Center



Network Performance
Assessment Center



Air Traffic Management
Center