



ICAO

International Civil Aviation Organization

Tenth Meeting of the FANS Interoperability Team – Asia
(FIT-Asia/10)

Video Teleconference, 03 – 06 August 2020

Agenda Item 4: Review of ADS-C/CPDLC Operations and Performance

DATA LINK PERFORMANCE REPORT FOR KUALA LUMPUR FIR

(Presented by Malaysia)

SUMMARY

This paper presents data link performance data for January to December 2019 for Kuala Lumpur FIR.

1. INTRODUCTION

1.1 This paper presents the data link performance for Kuala Lumpur (WMFC) FIR from January to December 2019. Overall performance observed in 2019 against both RSP180 and RCP240 specifications is acceptable. Availability was affected by number of outages through the period.

2. DISCUSSION

ADS-C RSP 180

2.1 This section covers the Downlink Latency measurement for ADS-C messages sent within WMFC FIR for the whole year of 2019, categorized by data link media type and remote ground station (RGS) ground earth station (GES). The performance is measured against RSP180 performance criteria of 90 and 180 seconds for 95 and 99.9 percent criterion respectively. The Downlink Latency for messages sent via Satellite and VHF meet the 95 percent criterion but marginally fall below the 99.9 percent criterion. Only Downlink Latency for message sent via HF did not meet the 95 and 99.9 percent criterion.

2.2 **Table 1** summarizes RSP180 ADS-C Downlink Latency for messages sent within the WMFC FIR for the whole year of 2019. **Table 2** and **3** present ADS-C Downlink Latency by Remote Ground Station (RGS) Ground Earth Station (GES) with respect to VHF Data Link (VDL) and Satellite Communication (SATCOM).

2.3 In **Table 2**, only **BTJ** and **SIN7** Ground Earth Station (GES) did not have a complete record for the whole year 2019. For **BTJ** GES, it only had recorded for January, February and March 2019 and for **SIN7** GES, only November and December 2019 has a record.




























































































































FIR	WMFC					
Criteria	RSP180					
Period	January-June 2019			July-December 2019		
Colour Key						
 Meet Criteria	Message	95%	99.90%	Message	95%	99.90%
 99.0% - 99.9%	Counts	%<=90sec	%<=180sec	Counts	%<=90sec	%<=180sec
 Under Criteria						
By Media Type						
SATCOM	283,649	 96.96%	 99.16%	197,497	 96.75%	 99.15%
VHF	364,450	 99.30%	 99.78%	231,919	 98.95%	 99.15%
HF	67	 94.21%	 97.91%	47	 76.10%	 94.65%
ALL	648,166	 98.28%	 99.51%	429,463	 97.93%	 99.45%

Table 1: WMFC RSP180 by Media Type

By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	Type	(only RGS/GES with message counts >100 recorded)					
BTJ	VHF	4,370	 99.30%	 99.86%			
BTJ1	VHF	33,281	 96.32%	 98.49%	33,488	 96.33%	 98.72%
HDY	VHF	21,456	 99.69%	 99.94%	19,623	 99.42%	 99.80%
HDYV	VHF	3,124	 99.89%	 100.00%	3,441	 99.88%	 99.98%
HKT	VHF	115,088	 99.41%	 99.91%	56,328	 99.27%	 99.91%
HKTV	VHF	5,097	 99.63%	 99.94%	993	 99.42%	 99.82%
IXZ1	VHF	1,785	 99.75%	 99.90%	17,420	 99.40%	 99.93%
KBR1	VHF	2,442	 99.97%	 100.00%	2,608	 99.82%	 100.00%
KBV	VHF	5,513	 99.87%	 99.99%	2,115	 99.51%	 100.00%
KNO1	VHF	3,148	 98.63%	 99.63%	1,902	 98.53%	 99.60%
KUA	VHF	91	 97.52%	 98.98%	455	 97.23%	 98.36%
KUA1	VHF	764	 99.70%	 100.00%	586	 97.87%	 99.68%
KUL	VHF	11,117	 98.81%	 99.33%	4,250	 98.35%	 99.10%
KUL1	VHF	15,366	 99.89%	 99.97%	1,757	 99.01%	 99.93%
KUL2	VHF	11,188	 99.82%	 99.98%	2,779	 99.61%	 99.84%
KULA	VHF	16,425	 99.81%	 99.97%	6,867	 99.05%	 99.89%
LGK	VHF	263	 98.96%	 99.75%	177	 99.46%	 100.00%
NAW	VHF	355	 99.52%	 100.00%	715	 99.60%	 100.00%
PEN	VHF	180	 99.89%	 100.00%	415	 97.34%	 98.42%
PEN1	VHF	16,401	 99.95%	 99.98%	10,765	 99.89%	 99.94%
SIN	VHF	22,815	 99.57%	 99.92%	14,860	 99.67%	 99.94%
SIN1	VHF	3,036	 99.87%	 100.00%	7,443	 99.05%	 99.88%
SIN2	VHF	2,755	 99.93%	 100.00%	619	 99.52%	 99.93%
SIN7	VHF				898	 99.85%	 99.95%
SIN8	VHF	12,793	 99.88%	 99.97%	12,155	 99.97%	 100.00%
SIN9	VHF	18,593	 99.99%	 100.00%	5,526	 99.98%	 100.00%
SINA	VHF	353	 100.00%	 100.00%	73	 100.00%	 100.00%

SINV	VHF	5,871	99.51%	99.89%	5,311	99.77%	99.95%
SZB	VHF	642	99.36%	99.67%	2,519	97.92%	98.79%
SZB1	VHF	17,597	99.82%	99.93%	10,423	99.04%	99.84%
TGG1	VHF	377	100.00%	100.00%	603	99.84%	100.00%
USM	VHF	11,578	99.69%	99.90%	4,115	99.71%	99.91%
USMV	VHF	451	100.00%	100.00%	471	100.00%	100.00%
VTZ1	VHF	39	100.00%	100.00%	135	100.00%	100.00%

Table 2: WMFC RSP180 by VDL HF RGS

By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	Type	(only RGS/GES with message counts >100 recorded)					
AOR1	SAT	24,889	99.75%	99.90%	18,077	99.80%	99.93%
APK1	SAT	173,219	97.21%	99.26%	118,855	96.91%	99.28%
APK2	SAT	33,891	95.22%	98.25%	16,985	95.23%	97.99%
EUA1	SAT	234	99.10%	100.00%	178	96.79%	100.00%
IGW1	SAT	11,715	92.05%	98.10%	6,416	87.78%	97.09%
LGK1	SAT	631	99.91%	100.00%	1,075	99.94%	100.00%
XSP	SAT	2,649	99.76%	99.94%	1,830	99.56%	99.95%
XXA	SAT	30,381	96.50%	99.23%	28,910	96.57%	99.12%
XXP	SAT	6,040	98.43%	99.65%	5,131	97.76%	99.62%

Table 3: WMFC RSP180 by SATCOM RGS

CPDLC RCP240

2.4 This section covers the ACP measurement for CPDLC messages sent within WMFC FIR for the whole year of 2019, categorized by data link media type. The performance is measured against RCP240 performance criteria of 180 and 210 seconds for 95 and 99.9 percent criterion respectively. The ACP for messages sent via Satellite and VHF meet the 95 percent criterion but fall below the 99.9 percent criterion. However, ACP for message sent via HF did not meet the 95 and 99.9 percent criterion.

2.5 **Table 4** summarizes RCP240 for CPDLC messages sent within the WMFC FIR for the whole year of 2019. **Table 5** and **6** presents the ACP measurement by media type (Satellite, VHF, HF and the combined total of both) for whole month of December 2018.




FIR	WMFC					
Criteria	RCP240					
Period	January-June 2019			July-December 2019		
Colour Key						
 Meet Criteria	Message	95%	99.90%	Message	95%	99.90%
 99.0% - 99.9%	Counts	%<=120sec	%<=150sec	Counts	%<=120sec	%<=150sec
 Under Criteria						
By Media Type						
SATCOM	10,267	97.57%	98.59%	13,751	96.91%	98.05%
VHF	10,101	98.44%	98.90%	16,350	98.36%	98.81%
HF	73	92.69%	95.07%	145	92.84%	95.92%
ALL	20,441	97.97%	98.73%	30,246	97.67%	98.45%

Table 4: WMFC RCP240 by Media Type

By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	Type	(only RGS/GES with message counts >100 recorded)					
BTJ1	VHF	989	98.27%	98.78%	2,895	97.44%	98.43%
H06	HF	73	92.69%	95.07%	145	92.84%	95.92%
HDY	VHF	487	98.26%	98.75%	701	98.61%	99.01%
HKT	VHF	4,070	98.26%	98.75%	5,034	98.25%	98.59%
HKTV	VHF	177	100.00%	100.00%	283	98.59%	99.27%
IXZ1	VHF	8	100.00%	100.00%	822	99.81%	99.84%
KBV	VHF	164	98.72%	100.00%	239	99.35%	99.49%
KNO1	VHF	59	98.13%	98.65%	123	96.39%	96.85%
KUL	VHF	164	99.62%	99.70%	145	100.00%	100.00%
KUL2	VHF	138	98.05%	98.23%	215	100.00%	100.00%
KULA	VHF	296	98.63%	99.01%	446	98.99%	99.08%
PEN1	VHF	459	98.39%	99.35%	592	97.57%	98.30%
SIN	VHF	311	98.12%	98.33%	542	99.52%	99.60%
SIN1	VHF	244	99.64%	99.82%	468	99.77%	99.83%
SIN8	VHF	389	99.65%	99.85%	1,126	99.69%	99.87%
SIN9	VHF	816	99.82%	99.84%	675	100.00%	100.00%
SZB1	VHF	481	99.60%	99.66%	589	98.75%	99.46%
USM	VHF	357	98.36%	98.94%	725	98.07%	98.33%

Table 5: WMFC RCP240 by VDL HF RGS

By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	Type	(only RGS/GES with message counts >100 recorded)					
AOR1	SAT	779	99.01%	99.41%	16,478	99.14%	99.46%
APK1	SAT	6,256	97.27%	98.39%	8,206	96.31%	97.67%
APK2	SAT	1,222	96.85%	98.54%	1,002	96.06%	97.50%
IGW1	SAT	394	95.69%	97.38%	498	89.76%	93.71%
LGK1	SAT	18	100.00%	100.00%	147	98.94%	100.00%
XXA	SAT	1,363	99.47%	99.75%	1,943	99.57%	99.74%
XXP	SAT	195	98.94%	99.18%	272	98.53%	98.83%

Table 6: WMFC RCP240 by SATCOM RGS

2.6 **Table 7** presents ACP measurement by Aircraft Operator and Type of Aircraft as below. Only Aircraft Operator/Type KNE/A388, QTR/A346 and THY/B789 did not have record for the whole year 2019. For THY/B789, it's a new fleet introduced by Turkish Airline by June 2019. For other Aircraft Operator/Type, no Terminated Flight Plan (TFL) record on stated period.

FIR	WMFC					
Criteria	RCP240					
PERIOD	January-June 2019			July-December 2019		
Colour Key	Message Counts	95% %<=120sec	99.90% %<=150sec	Message Counts	95% %<=120sec	99.90% %<=150sec
■ Meet Criteria						
■ 99.0% - 99.9%						
■ Under Criteria						
By Aircraft Operator / Type (only message counts >100 recorded)						
AFR/B77W	225	98.11%	99.60%	482	98.26%	99.04%
BAW/A388	364	98.08%	98.61%	448	98.17%	98.62%
BAW/B77W	309	96.28%	96.75%	453	98.01%	98.79%
BAW/B789	311	98.07%	99.41%	343	99.11%	99.25%
BOX/B77L	62	98.70%	99.01%	101	99.77%	99.96%
DLH/A359	159	99.73%	99.97%	224	99.02%	99.46%
DLH/A388	199	99.62%	99.84%	191	98.19%	98.41%
ETD/A332	293	97.82%	98.42%	412	95.69%	97.12%
ETD/B77W	366	99.73%	100.00%	572	97.92%	98.91%
ETD/B789	420	97.54%	98.81%	627	97.23%	98.72%
FDX/B77L	68	99.42%	100.00%	107	87.85%	91.09%
FIN/A359	298	94.81%	95.41%	224	97.83%	98.33%
KLM/B772	163	99.22%	99.59%	170	97.50%	98.82%
KLM/B77W	469	97.27%	98.40%	597	98.76%	99.57%
KNE/A388				157	99.41%	100.00%
LOT/B788	83	98.80%	99.29%	190	98.47%	98.79%
MAS/A333	375	98.06%	98.76%	455	98.66%	99.43%
MAS/A359	550	98.55%	99.50%	915	98.13%	98.88%
MAS/A388	73	98.59%	99.91%	400	100.00%	100.00%
MAS/B738	753	97.14%	98.13%	1,257	93.08%	95.78%
OMA/A332	135	99.37%	100.00%	209	97.09%	98.30%
OMA/A333	376	98.76%	99.17%	540	99.25%	99.54%
QFA/A388	340	98.28%	99.45%	381	100.00%	100.00%
QTR/A332	121	99.21%	99.80%	207	93.56%	96.07%
QTR/A333	152	99.53%	99.68%	7	100.00%	100.00%
QTR/A346	113	97.18%	98.61%			
QTR/A359	433	97.27%	98.61%	1,032	97.58%	98.52%
QTR/A35K	340	97.16%	98.18%	912	97.70%	98.81%
QTR/B77L	28	100.00%	100.00%	151	92.12%	93.47%
QTR/B77W	1,006	95.56%	97.12%	1,762	95.79%	97.79%
QTR/B788	899	98.58%	99.26%	888	98.05%	99.00%

SAA/A343	105	100.00%	100.00%	82	100.00%	100.00%
SIA/A333	480	99.62%	99.69%	746	99.52%	99.76%
SIA/A359	1,246	96.55%	97.59%	2,250	96.37%	97.02%
SIA/A388	1,083	96.63%	97.60%	1,238	95.87%	96.74%
SIA/B744	151	98.23%	99.34%	166	94.75%	95.98%
SIA/B772	365	99.79%	99.95%	224	99.49%	99.77%
SIA/B773	150	99.78%	100.00%	135	100.00%	100.00%
SIA/B77W	1,280	99.01%	99.40%	1,323	98.99%	99.24%
SLK/A320	142	100.00%	100.00%	156	99.79%	100.00%
SLK/B738	519	99.51%	100.00%	759	98.45%	99.06%
SVA/B744	14	100.00%	100.00%	115	98.47%	98.95%
SVA/B789	334	98.68%	99.42%	334	95.31%	96.41%
SWR/B77W	297	99.41%	99.71%	406	99.51%	99.96%
TGW/B788	156	98.58%	99.43%	427	99.35%	99.50%
TGW/B789	74	100.00%	100.00%	175	98.64%	99.46%
THY/A333	337	95.31%	96.83%	339	96.25%	96.63%
THY/B77W	363	97.25%	98.40%	562	97.36%	97.95%
THY/B789				251	98.54%	99.26%
UAE/A388	817	99.28%	99.43%	1,483	99.54%	99.73%
UAE/B77L	37	97.18%	97.90%	118	100.00%	100.00%
UAE/B77W	1,563	99.47%	99.63%	2,518	99.66%	99.80%
XAX/A333	72	100.00%	100.00%	101	99.59%	100.00%

Table 7: WMFC RCP240 by Aircraft Operator and Type of Aircraft

2.7 **Attachment A, B, C and D** to this IP contains WMFC 2018 performance reports. These reports include:-

Attachment A – ADS-C analysis by Media Type and RGS.

Attachment B – ADS-C analysis by Aircraft Operator and Type.

Attachment C – CPDLC analysis by Media Type and RGS.

Attachment D – CPDLC analysis by Aircraft Operator and Type.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) Note the information contained in this paper; and
- b) Discuss any relevant matters as appropriate.




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ADS-C
MEDIA TYPE/RGS/GES

FIR		WMFC					
Criteria		RSP180					
Period		January-June 2019			July-December 2019		
Colour Key		Message Counts	95%	99.90%	Message Counts	95%	99.90%
 Meet Criteria	%<=90sec		%<=180sec	%<=90sec		%<=180sec	
 99.0% - 99.9%							
 Under Criteria							
By Media Type							
SATCOM	283,649	96.96%	99.16%	197,497	96.75%	99.15%	
VHF	364,450	99.30%	99.78%	231,919	98.95%	99.15%	
HF	67	94.21%	97.91%	47	76.10%	94.65%	
ALL	648,166	98.28%	99.51%	429,463	97.93%	99.45%	
By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	Type	(only RGS/GES with message counts >100 recorded)					
AOR1	SAT	24,889	99.75%	99.90%	18,077	99.80%	99.93%
APK1	SAT	173,219	97.21%	99.26%	118,855	96.91%	99.28%
APK2	SAT	33,891	95.22%	98.25%	16,985	95.23%	97.99%
BTJ	VHF	4,370	99.30%	99.86%			
BTJ1	VHF	33,281	96.32%	98.49%	33,488	96.33%	98.72%
EUA1	SAT	234	99.10%	100.00%	178	96.79%	100.00%
HDY	VHF	21,456	99.69%	99.94%	19,623	99.42%	99.80%
HDYV	VHF	3,124	99.89%	100.00%	3,441	99.88%	99.98%
HKT	VHF	115,088	99.41%	99.91%	56,328	99.27%	99.91%
HKTV	VHF	5,097	99.63%	99.94%	993	99.42%	99.82%
IGW1	SAT	11,715	92.05%	98.10%	6,416	87.78%	97.09%
IXZ1	VHF	1,785	99.75%	99.90%	17,420	99.40%	99.93%
KBR1	VHF	2,442	99.97%	100.00%	2,608	99.82%	100.00%
KBV	VHF	5,513	99.87%	99.99%	2,115	99.51%	100.00%
KNO1	VHF	3,148	98.63%	99.63%	1,902	98.53%	99.60%
KUA	VHF	91	97.52%	98.98%	455	97.23%	98.36%
KUA1	VHF	764	99.70%	100.00%	586	97.87%	99.68%
KUL	VHF	11,117	98.81%	99.33%	4,250	98.35%	99.10%
KUL1	VHF	15,366	99.89%	99.97%	1,757	99.01%	99.93%
KUL2	VHF	11,188	99.82%	99.98%	2,779	99.61%	99.84%
KULA	VHF	16,425	99.81%	99.97%	6,867	99.05%	99.89%
LGK	VHF	263	98.96%	99.75%	177	99.46%	100.00%
LGK1	SAT	631	99.91%	100.00%	1,075	99.94%	100.00%
NAW	VHF	355	99.52%	100.00%	715	99.60%	100.00%
PEN	VHF	180	99.89%	100.00%	415	97.34%	98.42%
PEN1	VHF	16,401	99.95%	99.98%	10,765	99.89%	99.94%
SIN	VHF	22,815	99.57%	99.92%	14,860	99.67%	99.94%

SIN1	VHF	3,036	99.87%	100.00%	7,443	99.05%	99.88%
SIN2	VHF	2,755	99.93%	100.00%	619	99.52%	99.93%
SIN7	VHF				898	99.85%	99.95%
SIN8	VHF	12,793	99.88%	99.97%	12,155	99.97%	100.00%
SIN9	VHF	18,593	99.99%	100.00%	5,526	99.98%	100.00%
SINA	VHF	353	100.00%	100.00%	73	100.00%	100.00%
SINV	VHF	5,871	99.51%	99.89%	5,311	99.77%	99.95%
SZB	VHF	642	99.36%	99.67%	2,519	97.92%	98.79%
SZB1	VHF	17,597	99.82%	99.93%	10,423	99.04%	99.84%
TGG1	VHF	377	100.00%	100.00%	603	99.84%	100.00%
USM	VHF	11,578	99.69%	99.90%	4,115	99.71%	99.91%
USMV	VHF	451	100.00%	100.00%	471	100.00%	100.00%
VTZ1	VHF	39	100.00%	100.00%	135	100.00%	100.00%
XSP	SAT	2,649	99.76%	99.94%	1,830	99.56%	99.95%
XXA	SAT	30,381	96.50%	99.23%	28,910	96.57%	99.12%
XXP	SAT	6,040	98.43%	99.65%	5,131	97.76%	99.62%

ADS-C
AIRCRAFT OPERATOR/TYPE

FIR	WMFC					
Criteria	RSP180					
PERIOD	January-June 2019			July-December 2019		
Colour Key	Message Counts	95% %<=90sec	99.90% %<=180sec	Message Counts	95% %<=90sec	99.90% %<=180sec
 Meet Criteria						
 99.0% - 99.9%						
 Under Criteria						
By Aircraft Operator / Type (only message counts >100 recorded)						
9MT/GLF6	105	97.33%	100.00%			
A7H/A342				100	100.00%	100.00%
ABW/B744				216	98.25%	99.16%
ABW/B748	87	98.48%	99.87%	247	99.48%	100.00%
AFL/A333	112	100.00%	100.00%	6	100.00%	100.00%
AFL/B77W	360	98.70%	99.38%			
AFR/B77W	7,643	97.81%	99.66%	6,043	98.10%	99.76%
AIC/A20N				970	93.09%	96.93%
AIC/A320	1,729	93.62%	96.51%	784	90.02%	94.43%
AIC/B788	2,562	98.84%	99.77%	1,947	98.84%	99.99%
AZA/B772	102	100.00%	100.00%			
AZG/B744	785	89.43%	95.73%	1,026	90.45%	97.44%
AZG/B748	634	98.42%	99.66%	176	100.00%	100.00%
BAW/A388	8,645	99.39%	99.79%	5,086	99.40%	99.95%
BAW/B77W	10,539	97.46%	99.57%	6,250	96.78%	99.45%
BAW/B789	9,364	99.46%	99.86%	5,555	99.07%	99.77%
BOX/B77L	2,443	99.97%	100.00%	2,570	99.79%	99.84%
CAL/B77W	120	98.53%	100.00%			
CFG/B763	1,556	98.91%	99.91%	706	98.58%	100.00%
CLX/B744	517	92.84%	98.03%	870	95.17%	99.80%
CLX/B748	2,327	97.72%	99.00%	1,139	99.21%	99.98%
CPA/A333	388	99.73%	100.00%	311	100.00%	100.00%
CPA/A35K	136	100.00%	100.00%	271	99.96%	100.00%
CPA/A359	906	99.82%	100.00%	292	100.00%	100.00%
CPA/B744				172	98.35%	100.00%
CPA/B77W	1,206	97.84%	99.61%	781	98.46%	99.39%
DLH/A359	5,668	98.31%	99.86%	4,493	98.43%	99.93%
DLH/A388	10,223	98.31%	99.95%	6,587	98.30%	100.00%
EDW/A343	527	99.86%	100.00%	13	100.00%	100.00%
ETD/A332	9,208	95.87%	98.36%	5,419	98.15%	99.55%
ETD/A388	145	100.00%	100.00%	439	99.86%	100.00%
ETD/B77L	114	100.00%	100.00%	294	98.06%	99.91%




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Attachment B

ETD/B77W	10,731	98.02%	99.66%	7,446	97.35%	99.62%
ETD/B787				113	100.00%	100.00%
ETD/B789	11,630	99.51%	99.86%	8,757	98.80%	99.74%
ETD/B78X				306	100.00%	100.00%
ETH/B788	397	98.49%	99.47%	727	97.46%	99.98%
FDX/B763	249	95.93%	98.94%	206	93.69%	97.11%
FDX/B77L	3,114	95.79%	98.01%	1,909	94.11%	97.82%
FIN/A359	6,829	99.07%	99.74%	3,219	99.63%	99.99%
GGG/GLF6	114	97.63%	100.00%	62	97.52%	100.00%
GIA/A332				656	100.00%	100.00%
GIA/B744				1,276	98.67%	99.54%
GIA/B77W	2,896	98.61%	99.79%	1,409	98.07%	99.77%
GZP/F900	107	97.11%	99.40%			
HBJ/FA7X	183	100.00%	100.00%	40	100.00%	100.00%
HBJ/GLF5	245	98.80%	100.00%	100	98.61%	100.00%
HDA/A333	331	100.00%	100.00%	770	99.77%	99.94%
IJM/GLF6	108	99.08%	99.78%			
JAI/A332	904	98.87%	99.44%			
JAI/A333	798	98.31%	99.31%			
JST/B788	630	99.47%	100.00%	898	99.81%	100.00%
KAL/B748	156	98.96%	99.56%	71	94.48%	98.81%
KAL/B77L	144	96.94%	100.00%	51	100.00%	100.00%
KLM/B772	4,926	97.38%	99.45%	3,467	98.01%	99.57%
KLM/B77W	13,890	98.11%	99.64%	12,262	98.71%	99.77%
KNE/A388				1,702	99.14%	99.74%
LOT/B788	2,531	96.88%	99.46%	3,198	97.12%	99.85%
LOT/B789	398	99.12%	100.00%	422	98.35%	99.88%
MAS/A332	1,374	96.56%	97.53%	1,172	99.21%	99.78%
MAS/A333	12,852	98.02%	99.32%	5,520	98.88%	99.65%
MAS/A359	15,662	98.39%	99.49%	9,127	99.10%	99.70%
MAS/A388	3,058	98.81%	99.58%	5,531	99.37%	99.75%
MAS/B738	30,311	95.81%	98.95%	15,159	93.63%	98.46%
MAU/A332	162	100.00%	100.00%	56	100.00%	100.00%
MDG/A343	184	99.62%	100.00%	101	100.00%	100.00%
MMD/FA7X	154	100.00%	100.00%	78	100.00%	100.00%
MOU/FA7X	131	99.24%	100.00%			
N11/GLF6				114	85.83%	90.47%
NAX/B788	341	96.48%	99.53%			
NRS/B789	133	100.00%	100.00%			
OMA/A332	4,736	99.73%	99.94%	3,080	99.70%	99.92%
OMA/A333	14,234	99.16%	99.66%	7,846	99.25%	99.71%
OMA/B788	544	97.54%	99.89%	154	100.00%	100.00%
OMA/B789	2,126	99.03%	99.87%	1,065	99.28%	99.94%




ORF/A320	129	100.00%	100.00%			
QFA/A332	92	100.00%	100.00%	126	100.00%	100.00%
QFA/A333	486	99.65%	99.78%	983	99.77%	99.98%
QFA/A388	7,280	99.67%	99.97%	4,600	99.43%	99.58%
QFA/B789				205	99.13%	100.00%
QTR/A332	2,374	96.72%	98.26%	3,028	98.77%	99.71%
QTR/A333	6,339	99.70%	99.91%	108	100.00%	100.00%
QTR/A346	6,970	98.91%	99.56%			
QTR/A359	14,062	98.56%	99.50%	13,355	98.37%	99.49%
QTR/A35K	8,201	97.99%	99.28%	12,388	98.89%	99.69%
QTR/A388	271	100.00%	100.00%	372	100.00%	100.00%
QTR/B77L	522	94.75%	97.84%	2,661	87.30%	96.40%
QTR/B77W	23,606	93.71%	98.06%	22,609	92.83%	98.14%
QTR/B787				145	98.74%	99.18%
QTR/B788	34,315	99.19%	99.78%	11,549	98.68%	99.65%
RBA/A332				255	100.00%	100.00%
RBA/A339				141	100.00%	100.00%
RBA/B788	1,572	98.71%	99.75%	74	97.52%	100.00%
REU/A332				117	100.00%	100.00%
REU/B788	331	99.81%	100.00%	17	100.00%	100.00%
RJA/B788	90	96.31%	100.00%	121	98.93%	100.00%
ROJ/B737	176	93.04%	99.45%	56	100.00%	100.00%
SAA/A343	3,501	99.45%	99.63%	869	99.42%	99.62%
SDM/B77W	190	97.61%	99.89%	1,755	99.74%	100.00%
SHE/FA7X	99	100.00%	100.00%	55	98.44%	100.00%
SHE/FA8X				123	100.00%	100.00%
SIA/A333	15,533	99.78%	99.84%	8,153	99.77%	99.86%
SIA/A359	35,414	99.46%	99.93%	24,417	99.74%	99.95%
SIA/A388	32,227	99.88%	99.98%	13,267	99.80%	99.93%
SIA/B744	4,878	86.61%	94.63%	2,156	84.14%	92.04%
SIA/B772	10,850	99.38%	99.77%	2,045	98.73%	99.90%
SIA/B773	1,705	98.68%	99.77%	1,340	97.99%	99.58%
SIA/B77W	40,078	98.98%	99.81%	13,956	97.71%	99.53%
SIA/B78X	335	98.45%	100.00%	525	98.68%	100.00%
SLK/A320	4,070	98.80%	99.63%	2,115	98.72%	99.27%
SLK/B38M	2,485	96.54%	99.21%			
SLK/B738	11,096	98.03%	99.50%	8,848	97.71%	99.42%
SVA/A1				246	99.32%	100.00%
SVA/A332				213	100.00%	100.00%
SVA/B744	635	95.96%	99.45%	1,948	90.66%	97.82%
SVA/B77W	989	96.31%	99.55%	1,147	98.95%	99.95%
SVA/B789	13,432	99.34%	99.84%	7,096	98.96%	99.75%
SVA/B78X				524	100.00%	100.00%
SWR/B77W	10,843	96.69%	98.67%	6,641	95.41%	97.64%

T7A/GLF5	146	98.84%	99.93%	18	100.00%	100.00%
T7T/GL5T	52	100.00%	100.00%	164	100.00%	100.00%
TBJ/GLEX	108	86.73%	96.52%	28	100.00%	100.00%
TGW/A320	216	100.00%	100.00%			
TGW/B788	2,776	98.85%	99.53%	6,047	98.64%	99.47%
TGW/B789	1,883	99.36%	99.83%	1,892	99.64%	99.92%
THY/A333	9,285	96.56%	98.77%	6,009	98.49%	99.50%
THY/B77L				105	95.71%	98.80%
THY/B77W	12,016	98.14%	99.75%	8,472	97.10%	99.52%
THY/B789				4,657	98.72%	99.96%
UAE/A388	38,320	99.37%	99.95%	35,695	99.34%	99.96%
UAE/B77L	1,041	99.31%	99.94%	1,495	99.30%	100.00%
UAE/B77W	52,676	98.61%	99.62%	35,786	98.14%	99.41%
UPS/B763	70	100.00%	100.00%	362	97.79%	99.38%
UZB/B763	495	99.60%	99.67%	54	100.00%	100.00%
VJT/GLEX	102	100.00%	100.00%	86	99.92%	100.00%
VKG/A332	591	96.73%	99.86%	1	100.00%	100.00%
VPB/GLF6	248	97.18%	100.00%	152	99.91%	100.00%
VPC/GLEX	9	100.00%	100.00%	176	97.60%	98.67%
VQB/FA7X	123	98.75%	100.00%	35	100.00%	100.00%
XAX/A333	2,163	97.35%	99.00%	619	99.93%	100.00%

CPDLC
MEDIA TYPE/RGS/GES

FIR		WMFC					
Criteria		RCP240					
Period		January-June 2019			July-December 2019		
Colour Key		Message Counts	95%	99.90%	Message Counts	95%	99.90%
	Meet Criteria		%<=90sec	%<=180sec		%<=90sec	%<=180sec
	99.0% - 99.9%						
	Under Criteria						
By Media Type							
SATCOM		10,267	97.57%	98.59%	13,751	96.91%	98.05%
VHF		10,101	98.44%	98.90%	16,350	98.36%	98.81%
HF		73	92.69%	95.07%	145	92.84%	95.92%
ALL		20,441	97.97%	98.73%	30,246	97.67%	98.45%
By Remote Ground Station (RGS) Ground Earth Station (GES)							
Designator	Type	(only RGS/GES with message counts >100 recorded)					
AOR1	SAT	779	99.01%	99.41%	16,478	99.14%	99.46%
APK1	SAT	6,256	97.27%	98.39%	8,206	96.31%	97.67%
APK2	SAT	1,222	96.85%	98.54%	1,002	96.06%	97.50%
BTJ1	VHF	989	98.27%	98.78%	2,895	97.44%	98.43%
H06	HF	73	92.69%	95.07%	145	92.84%	95.92%
HDY	VHF	487	98.26%	98.75%	701	98.61%	99.01%
HKT	VHF	4,070	98.26%	98.75%	5,034	98.25%	98.59%
HKTV	VHF	177	100.00%	100.00%	283	98.59%	99.27%
IGW1	SAT	394	95.69%	97.38%	498	89.76%	93.71%
IXZ1	VHF	8	100.00%	100.00%	822	99.81%	99.84%
KBV	VHF	164	98.72%	100.00%	239	99.35%	99.49%
KNO1	VHF	59	98.13%	98.65%	123	96.39%	96.85%
KUL	VHF	164	99.62%	99.70%	145	100.00%	100.00%
KUL2	VHF	138	98.05%	98.23%	215	100.00%	100.00%
KULA	VHF	296	98.63%	99.01%	446	98.99%	99.08%
LGK1	SAT	18	100.00%	100.00%	147	98.94%	100.00%
PEN1	VHF	459	98.39%	99.35%	592	97.57%	98.30%
SIN	VHF	311	98.12%	98.33%	542	99.52%	99.60%
SIN1	VHF	244	99.64%	99.82%	468	99.77%	99.83%
SIN8	VHF	389	99.65%	99.85%	1,126	99.69%	99.87%
SIN9	VHF	816	99.82%	99.84%	675	100.00%	100.00%
SZB1	VHF	481	99.60%	99.66%	589	98.75%	99.46%
USM	VHF	357	98.36%	98.94%	725	98.07%	98.33%
XXA	SAT	1,363	99.47%	99.75%	1,943	99.57%	99.74%
XXP	SAT	195	98.94%	99.18%	272	98.53%	98.83%

CPDLC
AIRCRAFT OPERATOR/TYPE

FIR	WMFC					
Criteria	RCP240					
PERIOD	January-June 2019			July-December 2019		
Colour Key	Message Counts	95% %<=90sec	99.90% %<=180sec	Message Counts	95% %<=90sec	99.90% %<=180sec
 Meet Criteria						
 99.0% - 99.9%						
 Under Criteria						
By Aircraft Operator / Type (only message counts >100 recorded)						
AFR/B77W	225	98.11%	99.60%	482	98.26%	99.04%
BAW/A388	364	98.08%	98.61%	448	98.17%	98.62%
BAW/B77W	309	96.28%	96.75%	453	98.01%	98.79%
BAW/B789	311	98.07%	99.41%	343	99.11%	99.25%
BOX/B77L	62	98.70%	99.01%	101	99.77%	99.96%
DLH/A359	159	99.73%	99.97%	224	99.02%	99.46%
DLH/A388	199	99.62%	99.84%	191	98.19%	98.41%
ETD/A332	293	97.82%	98.42%	412	95.69%	97.12%
ETD/B77W	366	99.73%	100.00%	572	97.92%	98.91%
ETD/B789	420	97.54%	98.81%	627	97.23%	98.72%
FDX/B77L	68	99.42%	100.00%	107	87.85%	91.09%
FIN/A359	298	94.81%	95.41%	224	97.83%	98.33%
KLM/B772	163	99.22%	99.59%	170	97.50%	98.82%
KLM/B77W	469	97.27%	98.40%	597	98.76%	99.57%
KNE/A388				157	99.41%	100.00%
LOT/B788	83	98.80%	99.29%	190	98.47%	98.79%
MAS/A333	375	98.06%	98.76%	455	98.66%	99.43%
MAS/A359	550	98.55%	99.50%	915	98.13%	98.88%
MAS/A388	73	98.59%	99.91%	400	100.00%	100.00%
MAS/B738	753	97.14%	98.13%	1,257	93.08%	95.78%
OMA/A332	135	99.37%	100.00%	209	97.09%	98.30%
OMA/A333	376	98.76%	99.17%	540	99.25%	99.54%
QFA/A388	340	98.28%	99.45%	381	100.00%	100.00%
QTR/A332	121	99.21%	99.80%	207	93.56%	96.07%
QTR/A333	152	99.53%	99.68%	7	100.00%	100.00%
QTR/A346	113	97.18%	98.61%			
QTR/A359	433	97.27%	98.61%	1,032	97.58%	98.52%
QTR/A35K	340	97.16%	98.18%	912	97.70%	98.81%
QTR/B77L	28	100.00%	100.00%	151	92.12%	93.47%
QTR/B77W	1,006	95.56%	97.12%	1,762	95.79%	97.79%
QTR/B788	899	98.58%	99.26%	888	98.05%	99.00%
SAA/A343	105	100.00%	100.00%	82	100.00%	100.00%

FIT-Asia/10 – WP/08
Attachment D

SIA/A333	480	99.62%	99.69%	746	99.52%	99.76%
SIA/A359	1,246	96.55%	97.59%	2,250	96.37%	97.02%
SIA/A388	1,083	96.63%	97.60%	1,238	95.87%	96.74%
SIA/B744	151	98.23%	99.34%	166	94.75%	95.98%
SIA/B772	365	99.79%	99.95%	224	99.49%	99.77%
SIA/B773	150	99.78%	100.00%	135	100.00%	100.00%
SIA/B77W	1,280	99.01%	99.40%	1,323	98.99%	99.24%
SLK/A320	142	100.00%	100.00%	156	99.79%	100.00%
SLK/B738	519	99.51%	100.00%	759	98.45%	99.06%
SVA/B744	14	100.00%	100.00%	115	98.47%	98.95%
SVA/B789	334	98.68%	99.42%	334	95.31%	96.41%
SWR/B77W	297	99.41%	99.71%	406	99.51%	99.96%
TGW/B788	156	98.58%	99.43%	427	99.35%	99.50%
TGW/B789	74	100.00%	100.00%	175	98.64%	99.46%
THY/A333	337	95.31%	96.83%	339	96.25%	96.63%
THY/B77W	363	97.25%	98.40%	562	97.36%	97.95%
THY/B789				251	98.54%	99.26%
UAE/A388	817	99.28%	99.43%	1,483	99.54%	99.73%
UAE/B77L	37	97.18%	97.90%	118	100.00%	100.00%
UAE/B77W	1,563	99.47%	99.63%	2,518	99.66%	99.80%
XAX/A333	72	100.00%	100.00%	101	99.59%	100.00%