INTERNATIONAL CIVIL AVIATION ORGANIZATION ESAF AND WACAF OFFICE



TERMES OF REFERENCE AFI DATA LINK CENTRAL MONITORING AND REPORTING AGENCY

Version 1.0 – September 2016

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Terms of reference for AFI Data Link Monitoring and Reporting Agency (AFI DLMRA)

Introduction

The AFI Data Link Central Monitoring and Reporting Agency (AFI DL/CMRA) will report to APIRG with respect to data link implementation, trials and operations.

After an ATM operation predicated on the RCP/RSP specification becomes operational, AFI DL/CMRA should ensure that the communication and surveillance systems continue to operate successfully as a whole to ensure efficient and safe operations.

To determine continued operational compliance, AFI DL/CMRA should monitor communication and surveillance capabilities in the applicable airspace to detect and correct performance degradations due to potential instabilities or variations in overall system performance, or changes to any of the various subsystems.

It will receive and process routine and ad-hoc data and problem reports from end users and interested parties.

The main tasks of the AFI DLMRA are:

Part I. Problem analysis and resolution as per D.3 of the GOLD Manual, which includes:

- 1. A means for reporting e.g a web-based service
- 2. Diagnose problems and recommend resolutions
- 3. Co-ordinate problem reports and resolutions with other regional data link monitoring agencies.

Note 1: In the context of the ToR, provisions of D.3 and D.4 of the GOLD Manual are mandatory.

Note 2: The entity must enter into a confidential agreement with those stakeholders who require it to provide problem reports. Except as authorized by individual stakeholders, all problem reports and associated documentation shall be de-identified prior to distribution to members to protect the name and/or company originating the problem report. The entity must implement and maintain a program to protect confidential and sensitive information provided by AFI stakeholders. No identified data shall be kept longer than is essential to the successful resolution of the associated problem.

Part II. Problem analysis and resolution as per D.3 of the GOLD

D.3 Problem reporting and resolution

D.3.1 General

- D.3.1.1 The working principles in this guidance material result from the combined experience from CPDLC and ADS-C implementation, worldwide. Many regions have formed a regional monitoring agency to manage the problem reporting and resolution process.
- D.3.1.2 All stakeholders should be actively involved in the problem reporting and resolution process. It is essential that all aircraft operators in a region have the opportunity to become involved in the process and CMRA's should be pro-active in getting all aircraft operators and other stakeholders to register and participate in the process.
- D.3.1.3 The problem identification and resolution process, as it applies to an individual problem, consists of a data collection phase, followed by problem analysis and coordination with affected parties to secure a resolution, and recommendation of interim procedures to mitigate the problem in some instances. This is shown in the Figure D-20.

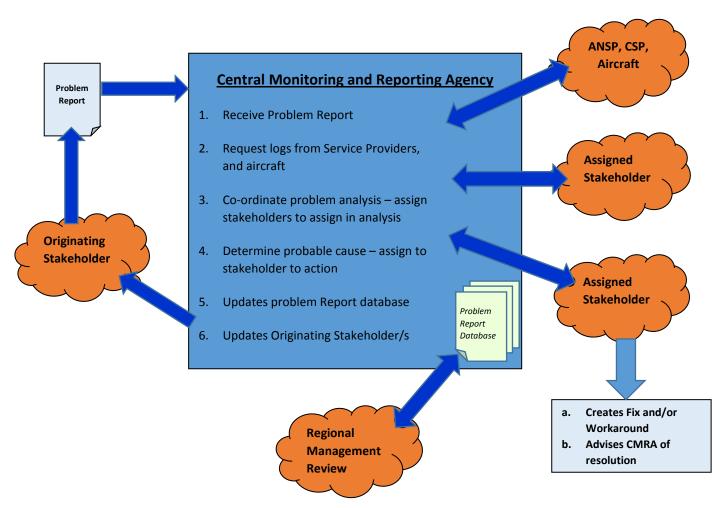


Figure D-13. Problem reporting and resolution process

D.3.2 Problem report form

- D.3.2.1 The problem identification task begins with receipt of a problem report from a stakeholder, usually an operator, ANSP or CSP but may include aircraft or avionics manufacturers. Standard reporting forms should be developed and regions should investigate the use of a website to receive and store problem reports.
- D.3.2.2 As an example, the AFI region has to use, a secured web-based problem reporting and tracking application, which should be managed by the AFI DL/CMRA. Problems should be reported, regardless whether it can be resolved locally or needs to be handled to promote knowledge sharing across the data link community of the AFI Region.
- D.3.2.3 Each ANSP should establish means to collect and maintain operational performance data in the standardized data formats defined as per Appendix D for CPDLC and ADS-C of the PBCS Manual 9869.
- D.3.2.4 Each ANSP within a region should identify the entity and focal point(s) for administering the AFI DL/CMRA programme to manage a regional problem reporting system and provide regional-level analysis and reporting of ANSP-monitored performance.
- D.3.2.5 ANSP should report to the AFI DL/CMRA any problems that may have a regional or global impact, or affect aircraft operators in its airspace, including any non-compliance with an RCP/RSP specification.
- D.3.2.6 AFI DL/CMRA should manage resources and any contracts, fund and recover costs and secure access to the services and information.
- D.3.2.7 AFI DL/CMRA should establish a process that authorizes users, such as ANSPs, aircraft operators, CSPs, aircraft manufacturers, equipment suppliers and other participants to submit or access information. This process may include issuing a user ID and password associated with a unique security profile to a user requesting an account. This would ensure that each user is authorized to submit or access information, such as:
 - a) submitting problem reports and other ANSP-monitored information (e.g. summary reports or PBCS CSV data files, as necessary);
 - b) submitting other data supporting the problem investigation and analysis;
 - c) accessing relational databases that provide information specific to an operator, aircraft type, ANSP, CSP, SSP or message type; and
 - d) accessing standardized reports, such as status reports for management, civil aviation authorities (CAAs) or regional groups on an as-needed basis.
- D.3.2.8 AFI DL/CMRA should validate submitted data before importing it into a secure centralized database and desensitize reports consistent with non-disclosure and security policies established for defining the security profile of authorized users.
- D.3.2.9 AFI DL/CMRA should maintain relational data, such as related to the ANSP, CSP/SSP, aircraft type and aircraft operator.

- D.3.2.10 An example of an online problem reporting form which will be on-line by the regional CMRA in the AFI region is shown in *Figure D-21*. The fields used in the form are as follows:
 - a) Originator's Reference Number: Originators problem report reference (e.g. ANZ_2009-23);
 - b) Title: A short title which conveys the main issue of the reported problem (e.g. CPDLC transfer failure);
 - c) Date UTC: Date in YYYYMMDD format (e.g. 20090705);
 - d) Time UTC: Time in HHMM (e.g. 2345);
 - e) Aircraft registration: ICAO flight plan aircraft registration (e.g. ZKADR);
 - f) Aircraft identification: ICAO flight plan call sign if applicable (e.g. NZA456);
 - g) Flight Sector: If applicable the departure and destination airfield of the flight (e.g. NZAA-RJBB);
 - h) Organization: Name of the originators organization (e.g. Airways NZ);
 - i) Active Center: Controlling Centre at time of occurrence if applicable (e.g. NZZO);
 - j) Next Center: Next controlling centre at time of occurrence if applicable (e.g. NFFF);
 - k) Position: Position of occurrence (e.g. 3022S16345E);
 - I) Problem Description: Detailed description of problem;
 - m) Attach File: Area of web page where originator and assigned stakeholders can attach data files or other detailed information such as geographic overlays; and
 - n) Additional Data: Area set aside for feedback from stakeholders assigned by the regional/State monitoring agency. This will includes the results of the investigation and the agreed action plan.

Note: A number of regional monitoring agencies are developing websites to manage the problem reporting process. Website addresses and the regional monitoring agency to which they are applicable are listed in Appendix E.

Form Details	
	Originators Reference Number
Title	
Date UTC	Time UTC
Registration	Flight Number
Flight Sector	
Originator	Aircraft Type
Organisation	
Active Center	Next Center
Position	
Problem Description	
(box will expand as you type)	
	Browse (click browse – do not type in this field)
	Browse (click browse – do not type in this field)
Attach File	Browse (click browse – do not type in this field)
	Browse (click browse – do not type in this field)
	Browse (click browse – do not type in this field)
Additional Data	
	Submit PR

Figure D-21. Example on-line problem reporting form

D.3.3 Problem assessment

D.3.3.1 Data collection

- D.3.3.1.1 The data collection phase consists of obtaining message logs from the appropriate parties (which will depend on which ANSPs and CSPs were being used and operator service contracts). Today, this usually means obtaining logs for the appropriate period of time from the CSPs involved. Usually, a log for a few hours before and after the event that was reported will suffice, but once the analysis has begun, it is sometimes necessary to request additional data, (perhaps for several days prior to the event if the problem appears to be an on-going one).
- D.3.3.1.2 Additionally, some aircraft-specific recordings may be available that may assist in the data analysis task. These are not always requested initially as doing so would be an unacceptable imposition on the operators, but may occur when the nature of the problem has been clarified enough to indicate the line of investigation that needs to be pursued. These additional records include:
 - a) Aircraft maintenance system logs.
 - b) Built-In Test Equipment data dumps for some aircraft systems.
 - c) SATCOM activity logs.
 - d) Logs and printouts from the flight crew and recordings/logs from the ANSPs involved in the problem may also be necessary. It is important that the organization collecting data for the analysis task requests all this data in a timely manner, as much of it is subject to limited retention.

D.3.3.2 Data analysis

- D.3.3.2.1 Once the data has been collected, the analysis can begin. For this, it is necessary to be able to decode all the messages involved, and a tool that can decode every ATS data link message type used in the region is essential. These messages include:
 - a) AFN (ARINC 622), ADS-C and CPDLC (RTCA DO-258/EUROCAE ED-100) in a region operating FANS-1/A.
 - b) Context Management, ADS-C and CPDLC applications (ICAO Doc 9705 and RTCA DO 280B/ED-110B).
 - c) ARINC 623 messages used in the region.
- D.3.3.2.2 The analysis of the decoded messages requires a thorough understanding of the complete message traffic, including:
 - a) Media management messages.
 - b) Relationship of ground-ground and air-ground traffic.
 - c) Message envelope schemes used by the particular data link technology (ACARS, ATN, etc).
- D.3.3.2.3 The analyst must also have a good understanding of how the aircraft systems operate and interact to provide the ATS data link functions, as many of the reported problems are aircraft system problems.

- D.3.3.2.3 This information will enable the analyst to determine a probable cause by working back from the area where the problem was noticed to where it began. In some cases, this may entail manual decoding of parts of messages based on the appropriate standard to identify particular encoding errors. It may also require lab testing using the airborne equipment (and sometimes the ground networks) to reliably assign the problem to a particular cause.
- D.3.3.2.4 Once the problem is identified, then the task of coordination with affected parties begins. The stakeholder who is assigned responsibility for fixing the problem must be contacted and a corrective action plan agreed. The stakeholder who initiated the problem report shall be provided with regular updates on the progress and resolution of the problem.
- D.3.3.2.5 This information (the problem description, the results of the analysis and the plan for corrective action) is then entered into a database covering data link problems, both in a complete form to allow continued analysis and monitoring of the corrective action and in a de-identified form for the information of other stakeholders. These de-identified summaries are reported at the appropriate regional management forum and made available to other regional central reporting/monitoring agencies on request.

D.3.4 Mitigating procedures – problem resolution

D.3.4.1 The DL/CMRA responsibility does not end with the problem's identification and resolution. As part of that activity, and because a considerable period of time may elapse while software updates are applied to all aircraft in a fleet, procedural methods to mitigate the problem may need to be developed while the solution is being coordinated. The regional monitoring agency should identify the need for such procedures and develop recommendations for implementation by the ANSPs, CSPs and operators involved.

D.4 Regional performance monitoring

D.4.1 General

- D.4.1.1 This section provides guidance on periodic reporting by individual ANSP of observed system performance in their airspace that will enable regional performance metrics to be developed for the availability, CPDLC transaction time and ADS-C surveillance data transit time requirements specified in Appendix B and Appendix C of the PBCS Manual.
- D.4.1.2 These regional performance metrics should be made available to all interested stakeholders. The use of regional websites to enhance the distribution of these metrics should be considered
- D.4.1.3 CPDLC analysis will be based on the measurement of actual communication performance (ACP) against required communication monitored performance (RCMP), actual communication technical performance (ACTP) against required communication technical performance (RCTP), and pilot operational response time (PORT) against RCP PORT.
- D.4.1.4 ADS-C analysis will be based on the measurement of actual surveillance performance (ASP), against the required surveillance performance (RSP).
- D.4.1.5 ANSP should save data in their database for the purpose of sharing CPDLC and ADS-C transaction data, and the data should be sent as a comma delimited text file. The format for each record will contain, at minimum 20 data points for CPDLC data collection and 12 data points for ADS-C data collection as per Doc 9869.

D.4.1.6 AFI DL/CMRA will set up monthly performance reporting to obtain system performance metrics. These reports will provide data on observed availability, CPDLC transaction time and ADS-C surveillance data transit time as described herein.

D.4.2 Reporting on availability

- D.4.2.1 ANSP should report on CSP notified system outages and on detected outages that have not been notified as described in paragraph D.2.3.2. This is used to calculate the actual availability of service provision.
- D.4.2.2 For each outage the following information should be reported:
 - a) Time of CSP outage notification: In YYYYMMDDHHMM format or "Not Notified" if no CSP notification received.
 - b) CSP Name: Name of CSP providing outage notification if applicable.
 - c) Type of outage: Report media affected SATCOM, VHF, HF, ALL.
 - d) Outage start time: In YYYYMMDDHHMM format
 - e) Outage end time: In YYYYMMDDHHMM format
 - f) Duration of Outage: In minutes.

D.4.2.3 As per Appendix B of Doc 9869 only outages greater than 10 minutes are reported. An example form is shown in *Figure D-24*.

D.4.2.4 D.4.2.5 ANSP can use graphical analysis to track availability as illustrated in *Figure D-22* and *Figure D-23*.



Figure D-22. Example System availability graph

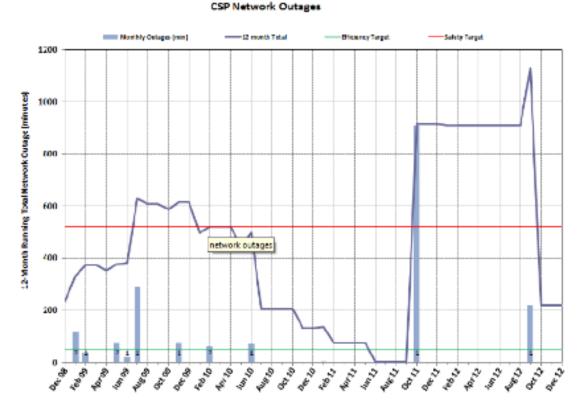


Figure D-23. Example network outage graph

D.4.3 Reporting on CPDLC actual communications performance

D.4.3.1 ANSP should report observed ACP and ACTP for RCP240 and RCP400 for different media paths using all transactions involving a WILCO response as described in paragraph D.2.1.3 of PBCS Manual. The media paths to report are:

- a) From all aircraft via all remote ground station (RGS) types.
- b) From all aircraft where both uplink and downlink are via SATCOM RGS
- c) From all aircraft where both uplink and downlink are via VHF RGS
- d) From all aircraft where both uplink and downlink are via HF RGS
- e) From all aircraft where either uplink and downlink are via HF or SATCOM RGS
- D.4.3.2 A tabular reporting format can be used to capture the observed performance at the 95% and 99.9% RCP240/400 times.
- D.4.3.3 As PORT is independent of media path, this need only be reported for all RGS types. An example form is shown in *Figure D-24*.

D.4.4 Reporting on RSP data transit time

D.4.4.1 ANSP should report observed RSP data transit time for RSP 180 and RSP 400 and DO290/ED120 based performance specifications for different media paths as described in paragraph D.2.4. The media paths to report are:

- a) From all aircraft via all Remote Ground Station (RGS) types.
- b) From all aircraft where both uplink and downlink are via SATCOM RGS
- c) From all aircraft where both uplink and downlink are via VDL RGS
- d) From all aircraft where both uplink and downlink are via HFDL RGS
- e) From all aircraft where either uplink and downlink are via HFDL or SATCOM RGS

D.4.4.2 A tabular reporting format can be used to capture the observed performance at the 95% and 99.9% RSP 180 and RSP 400 times. An example form is shown in *Figure D-24*.

		Section	1: Availability						
SP Notification	CSP Name	Outage Type	Start	Duration (mins)					
No Notified	N/A	SATCOM	200907212233	200907212255	22				
200907281515	SITA	SATCOM	200907281510	200907281525	15				
200307201313	31171	371100111	200307201310	200307201323	13				
		Section	on 2: CPDLC						
	ALL RGS		SATCOM						
	120 sec	98.20%		120 sec					
ACTP RCP 240	150 sec	100%	ACTP RCP 240	150 sec					
	180 sec	98%		180 sec					
ACP RCP 240	210 sec	97.70%	ACP RCP 240	210 sec					
PORT	60 sec	98%							
	260 sec			260 sec					
ACTP RCP 400	310 sec		ACTP RCP 400	310 sec					
4 CD DCD 400	320 sec		A CD DCD 400	320 sec					
ACP RCP 400	370 sec		ACP RCP 400	370 sec					
	VDL			HFDL					
	120 sec			120 sec					
ACTP RCP 240	150 sec		ACTP RCP 240	150 sec					
	180 sec			180 sec					
ACP RCP 240	210 sec		ACP RCP 240	210 sec					
	260 sec			260 sec					
ACTP RCP 400	310 sec		ACTP RCP 400	310 sec					
	320 sec			320 sec					
ACP RCP 400	370 sec		ACP RCP 400	370 sec					
S	ATCOM + HFDL								
	120 sec								
ACTP RCP 240	150 sec								
	180 sec								
ACP RCP 240	210 sec								
	260 sec								
ACTP RCP 400	310 sec								
	320 sec								
ACP RCP 400	370 sec								
		Section	on 3: ADS-C						
	ALL RGS			SATCOM					
400 000 100	90 sec	98.20%	400.000.000	90 sec					
ASP RSP 180	180 sec	100%	ASP RSP 180	180 sec					
400 500 444	300 sec	98%	400	300 sec					
ASP RSP 400	400 sec	97.70%	ASP RSP 400	400 sec					
	VDL		HFDL						
400 500 444	90 sec		400	90 sec					
ASP RSP 180	180 sec		ASP RSP 180	180 sec					
	300 sec			300 sec					
ASP RSP 400	400 sec		ASP RSP 400	400 sec					
S	ATCOM + HFDL								
	90 sec								
ASP RSP 180	180 sec								
	300 sec								
ASP RSP 400	400 sec								

Figure D-24. Example ANSP monthly report

D.4.5 Reporting data to enable graphical reports

D.4.5.1 In addition to the tabular performance reporting described above regions should consider presenting performance data using graphical means. Performance graphs illustrating regional communications and surveillance performance for the different media paths can be readily obtained by aggregating spreadsheet data from individual ANSP as illustrated in *Figure D-25*. This figure illustrates part of an ANSP report of actual performance for ACTP, ACP, and PORT against the RCP240 requirements for a particular media type where the number of messages received within a time is recorded at one second intervals. This type of data can be included in an ANSP monthly report to enable regional aggregation of agreed performance information to allow it to be presented in graphical form. Regions could present all or some of the data reported in tabular form per paragraphs D.4.3 and D.4.4 above in graphical form if desired. This method of reporting would also assist global aggregation.

O	ACTP#	ACTP%	ACP#	ACP%	CREW#	CREW%	t"	16	6660	99.65%	16540	98.94%	16655	99.62%	200
0 0.00% 0 0.00% 210 1.26% 2 16662 99.67% 16549 99.99% 16655 99.63% 203 0 0.00% 0 0.00% 1673 4.03% 4 16662 99.67% 165549 99.09% 16657 99.64% 205 1 0.00% 0 0.00% 1444 8.64% 5 16662 99.67% 16553 99.00% 16657 99.64% 205 1 0.00% 0 0.00% 1444 8.64% 5 16662 99.67% 16553 99.00% 16657 99.64% 205 1 0.00% 19.00% 19.00% 19.00% 19.00% 19.00% 16657 99.64% 205 1 0.00% 19.00% 19.00% 19.00% 19.00% 16.657 99.64% 205 1 0.00% 19.00% 19.00% 19.00% 19.00% 19.00% 19.00% 19.00% 16.657 99.64% 205 1 0.00% 19.00%	0	0.00%	0	0.00%	149	0.89%	0	16	6660	99.65%	16543	98.95%	16656	99.63%	201
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29 0.17% 0 0.00% 3133 18.74% 7 16662 99.67% 16561 99.66% 16657 99.65% 208 988 5.91% 0 0.00% 3731 28.30% 9 16664 99.68% 16563 99.07% 16593 99.65% 209 200			0		1444		5	16	6662	99.67%	16553	99.01%	16657	99.64%	206
29	1	0.01%	0	0.00%	2330	13.94%	6	16	6662	99.67%	16556	99.03%	16657	99.64%	207
3939 23.56% 0 0.00% 4731 28.30% 9 16664 99.68% 16564 99.68% 16662 99.67% 210 16664 99.68% 16565 99.68% 16662 99.67% 211 16664 99.68% 16565 99.68% 16662 99.67% 211 16664 99.68% 16565 99.68% 16662 99.67% 211 16664 99.68% 16565 99.68% 16662 99.67% 211 16664 99.68% 16565 99.68% 16662 99.67% 211 16665 99.68% 16565 99.68% 16662 99.67% 211 16665 99.68% 16565 99.68% 16662 99.67% 211 16665 99.68% 16565 99.68% 16662 99.67% 211 16665 99.68% 16565 99.68% 16662 99.67% 211 16665 99.68% 16565 99.68% 16662 99.67% 211 16667 99.68% 16565 99.68% 216 21401 74.18% 136 0.81% 10964 65.58% 16 16667 99.69% 16573 99.13% 16665 99.68% 216 216 27.753% 232 1.39% 11483 68.69% 17 16667 99.69% 16573 99.13% 16665 99.68% 217 16667 99.69% 16573 99.13% 16666 99.69% 218 16669 99.69% 219 16669 99.69% 219 16669 99.69% 219 16669 99.69% 219 16669 99.69% 219 16669 99.69% 220 16669 99.69% 221 16673 99.73% 16669 99.69% 222 16673 99.73% 16669 99.69% 223 16673 99.73% 16669 99.69% 224 16673 99.73% 16669 99.69% 224 16673 99.73% 16669 99.69% 225 16673 99.73% 16668 99.69% 225 16673 99.73% 16689 99.69% 225 16673 99.73% 16689 99.73% 16669 99.69% 225 16673 99.73% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75% 16674 99.75% 16668 99.70% 228 16673 99.75% 16674 99.75%	29	0.17%	0	0.00%	3133	18.74%	7	16	6662	99.67%	16561	99.06%	16657	99.64%	208
6726 40.23% 0 0.00% 5667 33.90% 10 10 8519 50.96% 0 0.00% 6763 40.45% 11 1956 57.22% 3 0.02% 7811 46.72% 12 16664 99.68% 16565 99.09% 16662 99.67% 212 10585 63.31% 13 0.06% 8794 52.60% 13 16667 99.69% 16571 99.12% 16663 99.67% 214 11356 67.93% 33 0.20% 5994 57.39% 14 16667 99.69% 16571 99.12% 16663 99.67% 214 11356 67.93% 33 0.20% 5994 57.39% 14 16667 99.69% 16571 99.12% 16663 99.63% 215 12401 74.18% 136 0.81% 10964 65.58% 16 16667 99.69% 16575 99.13% 16665 99.68% 216 12401 74.18% 136 0.81% 10964 65.58% 16 16667 99.69% 16575 99.14% 16665 99.68% 217 12952 77.53% 232 1.39% 11483 68.69% 17 13550 60.93% 60.93% 60.94% 12267 73.38% 19 16667 99.69% 16575 99.13% 16666 99.69% 218 13938 83.37% 1499 11.66% 12267 73.38% 19 16669 99.71% 16570 99.15% 16666 99.69% 218 14247 85.22% 2280 19.62% 12567 69.96% 21 14415 86.22% 4226 23.69% 13146 70.60% 22 14724 88.07% 6508 37.73% 13387 80.03% 23 1499 89.76% 7656 46.45% 13764 82.33% 23 16667 99.74% 16580 99.21% 16666 99.69% 224 14938 89.76% 7656 46.45% 13764 82.33% 25 16675 99.74% 16580 99.23% 16666 99.69% 224 14938 89.26% 10763 64.88% 14998 89.35% 1318 10373 62.05% 14425 86.29% 29 15660 99.69% 225 133% 10373 62.05% 14425 86.29% 29 15660 99.69% 234 16667 99.75% 16660 99.70% 230 15440 99.88% 1235 73.18% 14938 89.35% 33 15540 29.13% 16677 99.75% 16694 99.23% 16668 99.70% 234 15599 93.81% 12235 73.18% 13528 91.27% 36 16677 99.75% 16604 99.32% 16668 99.70% 234 15599 93.81% 11720 70.10% 15049 90.02% 34 16677 99.75% 16604 99.32% 16668 99.70% 234 15599 93.81% 11720 70.10% 15449	988	5.91%	0	0.00%	3946	23.60%	8	16	6664	99.68%	16563	99.07%	16659	99.65%	209
S519 50.96% 0 0.00% 6763 40.45% 11 1566 59.69% 16566 99.69% 16662 99.67% 212 15666 57.22% 3 0.02% 7811 46.72% 12 16666 99.69% 16567 99.10% 16663 99.67% 213 11356 67.93% 33 0.20% 5594 57.39% 14 11356 67.93% 33 0.20% 5594 57.39% 14 16667 99.69% 16572 99.13% 16665 99.69% 215 11910 71.24% 67 0.40% 10355 61.94% 15 16667 99.69% 16572 99.13% 16665 99.68% 215 12401 74.18% 136 0.81% 10964 65.58% 16 16667 99.69% 16574 99.14% 16665 99.68% 216 12507 77.53% 232 1.35% 11483 88.65% 17 16667 99.69% 16576 99.15% 16666 99.69% 218 13538 83.37% 1949 11.66% 12267 73.38% 19 14247 55.22% 2320 19.62% 12595 75.24% 20 14415 86.22% 4326 25.88% 12867 76.96% 21 14666 87.25% 4326 25.88% 12867 76.96% 21 14666 87.25% 4326 25.88% 13867 76.96% 21 14669 97.71% 16581 99.15% 16666 99.69% 220 14628 87.25% 4326 25.88% 13867 80.03% 23 14628 87.25% 4326 25.88% 13867 80.03% 23 16667 99.74% 16580 99.15% 16666 99.69% 220 14628 87.25% 4326 25.88% 13867 76.96% 23 16667 99.75% 16581 99.15% 16666 99.69% 222 1399 89.76% 70.57% 13920 30.32% 26 16672 99.73% 16581 99.15% 16666 99.69% 223 15232 91.64% 94.94 56.79% 14249 55.23% 26 16675 99.74% 16586 99.23% 16667 99.69% 225 15223 91.64% 94.94 56.79% 14249 55.23% 26 16677 99.75% 16594 99.26% 16666 99.70% 228 15209 99.70% 14249 55.23% 26 16677 99.75% 16597 99.25% 16668 99.70% 228 15232 91.64% 94.94 56.79% 14249 56.28% 29 16667 99.75% 16669 99.70% 228 15232 91.64% 94.94 56.79% 14249 56.28% 29 16667 99.75% 16668 99.70% 228 15232 91.64% 94.94 56.79% 14249 56.28% 29 16667 99.75% 16668 99.70% 228 15232 91.64% 94	3939	23.56%	0	0.00%	4731	28.30%	9	16	6664	99.68%	16564	99.08%	16662	99.67%	210
9566 57.22% 3 0.02% 7811 46.72% 12 10585 63.31% 13 0.08% 8794 52.60% 13 11356 67.93% 33 0.20% 9594 57.39% 14 11356 67.93% 33 0.20% 9594 57.39% 14 11366 67.93% 33 0.20% 9594 57.39% 14 11910 71.24% 67 0.40% 10355 61.94% 15 12401 74.18% 126 0.81% 10964 65.58% 16 12401 74.18% 126 0.81% 10964 65.58% 16 12380 80.93% 60.9 3.64% 11899 71.17% 18 13530 80.93% 60.9 3.64% 11899 71.17% 18 13938 83.37% 1949 11.66% 12267 73.38% 19 14247 85.22% 2320 19.62% 11895 75.24% 20 14415 86.22% 4326 25.88% 12867 76.96% 21 14415 86.22% 4326 25.88% 12867 76.96% 21 14424 88.07% 6308 37.73% 13387 80.08% 23 14598 87.25% 5362 23.07% 13145 78.63% 22 14596 87.25% 5362 32.07% 13145 78.63% 22 14596 87.25% 98.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 0308 50.17% 13930 03.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15128 90.49% 8977 53.70% 14098 84.33% 27 15128 90.49% 8977 53.70% 14098 84.33% 27 15202 91.04% 9494 56.79% 14249 85.23% 28 15402 92.13% 10373 62.03% 14562 87.10% 30 15448 92.40% 10763 64.38% 14568 87.91% 31 15543 92.77% 11102 66.41% 14826 88.88% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 34 15570 94.03% 12237 73.18% 15258 91.27% 36 15680 99.77% 16609 99.35% 16668 99.70% 233 15770 94.45% 11995 71.69% 15160 90.68% 35 1570 94.45% 11995 71.69% 15160 90.68% 35 1570 94.45% 11990 77.21% 15476 92.57% 38 15813 94.59% 13111 78.42% 15533 92.91% 40	6726	40.23%	0	0.00%	5667	33.90%	10	16	6664	99.68%	16565	99.08%	16662	99.67%	211
10585 63.31% 13 0.08% 8794 52.60% 13 1356 67.93% 33 0.20% 5954 57.33% 14 16667 99.69% 16572 99.13% 16665 99.68% 215 1910 71.24% 67 0.40% 10355 61.94% 15 16667 99.69% 16574 99.14% 16665 99.68% 216 12401 74.18% 136 0.81% 10964 65.58% 16 16667 99.69% 16575 99.13% 16665 99.68% 217 12962 77.53% 232 1.39% 11483 68.69% 17 13580 80.93% 60.9 3.64% 11899 71.17% 18 13938 83.37% 1949 11.66% 12267 73.38% 19 16669 99.71% 16577 99.15% 16666 99.69% 219 14415 86.22% 4326 25.88% 12867 76.96% 21 14458 86.22% 4326 25.88% 12867 76.96% 21 14596 87.25% 5362 32.07% 13145 78.69% 22 14693 88.76% 7057 42.21% 13588 81.28% 24 14938 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 88.77% 7057 42.21% 13588 81.28% 24 15220 81.04% 94.94 56.79% 14249 85.23% 28 15220 91.04% 94.94 56.79% 14249 85.23% 28 15220 91.04% 94.94 56.79% 14249 85.23% 28 15220 91.04% 94.94 56.79% 14249 85.23% 28 15220 91.04% 94.94 56.79% 14249 85.23% 28 15250 91.04% 94.94 56.79% 14249 85.23% 28 15250 91.04% 94.94 56.79% 14249 85.23% 28 15676 99.75% 15689 99.23% 16667 99.69% 225 15448 22.00% 10763 64.88% 14696 87.91% 31 15577 99.75% 16599 99.23% 16666 99.70% 230 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 33 15577 94.03% 12235 73.18% 15258 91.27% 36 16677 99.75% 16600 99.32% 16668 99.70% 233 15579 94.45% 12368 77.21% 15465 92.15% 38 16677 99.75% 16600 99.32% 16668 99.70% 233 15579 94.45% 12368 77.18% 15468 92.75% 36 16677 99.75% 16600 99.32% 16668 99.70% 234 16679 99.75% 16668 99.70% 235 1	8519	50.96%	0	0.00%	6763	40.45%	11	16	6664	99.68%	16566	99.09%	16662	99.67%	212
11356 67.93% 33	9566	57.22%	3	0.02%	7811	46.72%	12	16	6666	99.69%	16567	99.10%	16663	99.67%	213
11910 71.24% 67	10585	63.31%	13	0.08%	8794	52.60%	13	16	6667	99.69%	16571	99.12%	16663	99.67%	214
12401 74.184 136	11356	67.93%	33	0.20%	9594	57.39%	14	16	6667	99.69%	16572	99.13%	16665	99.68%	215
12962 77.53% 232 1.39% 11483 68.69% 17 13830 80.93% 609 3.64% 11899 71.17% 18 13938 83.37% 1949 11.66% 1267 73.38% 19 14247 85.22% 2380 19.62% 11295 75.24% 20 14415 86.22% 4326 25.88% 12867 76.99% 21 14506 67.25% 5362 32.07% 13145 78.69% 22 14724 88.07% 6308 37.73% 13387 80.08% 23 14939 80.76% 70.57 42.21% 13580 81.280% 24 14939 80.76% 70.57 42.21% 13580 81.280% 24 14939 80.76% 70.57 42.21% 13580 81.280% 24 15029 80.90% 8388 7766 46.45% 13764 82.333% 25 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.97% 1433 68.39% 14938 89.35% 33 15543 92.97% 1433 68.39% 14938 89.35% 33 155640 93.55% 11985 71.69% 15160 90.68% 35 15683 93.81% 12235 73.18% 15258 91.27% 36 15770 94.03% 12477 74.63% 15338 91.75% 37 15777 94.19% 12703 75.98% 15405 92.15% 38 15790 94.45% 12908 77.21% 15476 92.55% 38 15790 94.45% 12908 77.21% 15476 92.55% 38 15790 94.45% 12908 77.21% 15476 92.55% 38 15813 94.59% 13111 78.42% 15533 92.91% 40	11910	71.24%	67	0.40%	10355	61.94%	15	16	6667	99.69%	16574	99.14%	16665	99.68%	216
18530 80.93% 609 3.64% 11899 71.17% 18 18393 83.37% 1949 11.66% 12267 73.38% 19 16669 99.71% 16577 99.16% 16666 99.69% 220 14247 85.22% 2380 19.62% 12595 75.34% 20 16669 99.71% 16580 99.17% 16666 99.69% 221 14415 86.22% 4326 25.88% 12867 76.96% 21 14586 67.25% 5362 32.07% 13145 78.639% 22 14724 88.07% 6308 37.73% 13387 80.08% 23 14699 80.76% 7057 42.21% 13598 81.28% 24 16672 99.72% 16581 99.18% 16666 99.69% 222 14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8388 50.17% 13930 83.32% 26 15029 89.90% 89.77 \$5.70% 14098 84.33% 27 15128 90.49% 8977 53.70% 14098 84.33% 27 15200 91.04% 9494 56.79% 14249 85.23% 28 16676 99.75% 16593 99.25% 16668 99.70% 228 15402 92.13% 10373 62.05% 14562 87.10% 30 15402 92.13% 10373 62.05% 14562 87.10% 30 15402 92.13% 10373 62.05% 14562 87.10% 30 15501 92.72% 11102 66.41% 14826 88.68% 32 15501 92.72% 11102 66.41% 14826 88.68% 32 15667 99.75% 16598 99.28% 16668 99.70% 233 15660 93.55% 11985 71.69% 15160 90.68% 35 15600 93.55% 11985 71.69% 15160 90.68% 35 15700 94.45% 12908 77.21% 15476 92.57% 39 15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40	12401	74.18%	136	0.81%	10964	65.58%	16	16	6667	99.69%	16575	99.14%	16665	99.68%	217
13938 83.37% 1949 11.66% 12267 73.38% 19 14247 85.22% 3280 19.62% 12595 75.34% 20 14415 86.22% 4326 25.88% 12867 76.96% 21 14586 87.25% 5362 32.07% 13145 76.96% 22 14586 87.25% 5362 32.07% 13145 78.63% 22 14724 88.07% 6308 37.73% 13387 80.08% 23 14724 88.07% 6308 37.73% 13387 80.08% 23 14939 88.76% 7057 42.21% 13588 81.28% 24 14939 88.76% 7057 42.21% 13588 81.28% 24 14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8368 50.17% 19930 83.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15128 90.49% 8977 53.70% 14098 84.33% 27 15128 90.49% 9968 59.62% 14249 85.23% 28 15220 91.04% 9494 55.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15323 91.66% 9968 59.62% 14455 86.28% 29 15402 92.13% 10373 62.05% 14562 87.10% 30 15448 92.40% 10763 64.38% 14696 87.91% 31 15501 92.72% 11102 66.41% 14826 88.68% 32 15599 93.31% 11720 70.10% 13049 90.02% 34 15599 93.31% 11720 70.10% 15049 90.02% 34 15679 99.75% 16604 99.32% 16668 99.70% 233 15679 99.75% 16604 99.32% 16668 99.70% 234 16679 99.77% 16606 99.33% 16668 99.70% 235 16679 99.77% 16606 99.35% 16668 99.70% 236 16679 99.77% 16600 99.35% 16668 99.70% 237 15720 94.03% 12477 74.63% 15338 91.75% 37 15720 94.03% 12477 74.63% 15338 91.75% 37 15740 94.45% 12908 77.21% 15406 92.57% 38 15790 94.45% 12908 77.21% 15476 92.57% 38 15813 94.59% 13111 78.42% 15533 92.91% 40	12962	77.53%	232	1.39%	11483	68.69%	17	16	6667	99.69%	16576	99.15%	16666	99.69%	218
14247 \$5,22\(1280 \) 19,62\(1285 \) 75,24\(1285 \) 75,24\(1285 \) 76,64\(1285 \) 76	13530	80.93%	609	3.64%	11899	71.1796	18	16	6669	99.71%	16577	99.16%	16666	99.69%	219
14415 86.22% 4326 25.88% 12867 76.96% 21 14596 87.25% 5362 32.07% 13145 78.63% 22 14724 88.07% 6308 37.73% 13387 80.08% 23 14939 88.76% 7057 42.21% 13588 81.28% 24 14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8388 50.17% 19390 83.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.97% 11102 66.41% 14826 88.68% 32 15640 93.55% 11985 71.69% 15160 90.28% 16667 99.79% 236 <tr< td=""><td>13938</td><td>83.37%</td><td>1949</td><td>11.66%</td><td>12267</td><td>73.38%</td><td>19</td><td>16</td><td>6669</td><td>99.71%</td><td>16579</td><td>99.17%</td><td>16666</td><td>99.69%</td><td>220</td></tr<>	13938	83.37%	1949	11.66%	12267	73.38%	19	16	6669	99.71%	16579	99.17%	16666	99.69%	220
14566 87.25% 5362 32.07% 13145 78.63% 22 14724 88.07% 6308 37.73% 13387 80.08% 23 14839 88.76% 7057 42.21% 13588 81.28% 24 14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8877 53.70% 14098 84.33% 27 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.97% 11433 68.39% 14938 89.35% 33 15543 92.97% 11433 68.39% 14938 89.35% 33 15640 93.55% 1198	14247	85.22%	3280	19.62%	12595	75.34%	20	16	6669	99.71%	16580	99.17%	16666	99.69%	221
14724 88.07% 6308 37.73% 13387 80.08% 23 14839 88.76% 7057 42.21% 13588 81.28% 24 14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8388 50.17% 13930 83.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.97% 11102 66.41% 14826 88.68% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15540 93.81% 11720 70.10% 15049 90.02% 34 15543 92.97% 11433 68.39% 14938 89.35% 33 15540 93.31% <td>14415</td> <td>86.22%</td> <td>4326</td> <td>25.88%</td> <td>12867</td> <td>76.96%</td> <td>21</td> <td>16</td> <td>6672</td> <td>99.72%</td> <td>16581</td> <td>99.18%</td> <td>16666</td> <td>99.69%</td> <td>222</td>	14415	86.22%	4326	25.88%	12867	76.96%	21	16	6672	99.72%	16581	99.18%	16666	99.69%	222
14839 88.76% 7057 42.21% 13588 81.28% 24 14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8388 50.17% 13930 83.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15402 92.13% 10373 62.05% 14562 87.10% 30 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.97% 11102 66.41% 14826 88.68% 32 15540 92.97% 11102 66.41% 14826 88.68% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15540 93.55% 11	14586	87.25%	5362	32.07%	13145	78.63%	22	16	6673	99.73%	16583	99.19%	16666	99.69%	223
14943 89.38% 7766 46.45% 13764 82.33% 25 15029 89.90% 8388 50.17% 13930 83.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15402 92.13% 10373 62.05% 14562 87.10% 30 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.97% 11102 66.41% 14826 88.68% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15599 93.81% 11720 70.10% 15049 90.02% 34 15640 93.55% 11985 71.69% 15160 90.68% 35 15640 93.81% 1	14724	88.07%	6308	37.73%	13387	80.08%	23	16	6674	99.74%	16586	99.21%	16666	99.69%	224
15029 89.90% 8388 50.17% 19930 83.32% 26 15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15402 92.13% 10373 62.05% 14562 87.10% 30 15448 92.40% 10763 64.38% 14696 87.91% 31 15543 92.77% 11102 66.41% 14826 88.68% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15599 93.31% 11720 70.10% 15049 90.02% 34 15604 93.55% 11985 71.69% 15160 90.68% 35 15633 93.81% 12235 73.18% 15258 91.27% 36 15639 93.81%	14839	88.76%	7057	42.21%	13588	81.28%	24	16	6675	99.74%	16586	99.21%	16667	99.69%	225
15128 90.49% 8977 53.70% 14098 84.33% 27 15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 15402 92.13% 10373 62.05% 14562 87.10% 30 15448 92.40% 10763 64.38% 14696 87.91% 31 15548 92.72% 11102 66.41% 14826 88.68% 32 15551 92.72% 11102 66.41% 14826 88.68% 32 15599 93.31% 11720 70.10% 15049 90.02% 34 15660 93.55% 11985 71.69% 15160 90.68% 35 15633 93.81% 12235 73.18% 15258 91.27% 36 15720 94.03% 12477 74.63% 15338 91.75% 37 15720 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40 16676 99.75% 16593 99.25% 16668 99.70% 228 16677 99.75% 16596 99.27% 16668 99.70% 230 16677 99.75% 16597 99.28% 16668 99.70% 232 16677 99.75% 16601 99.30% 16668 99.70% 233 16678 99.76% 16604 99.32% 16668 99.70% 235 16679 99.77% 16600 99.32% 16668 99.70% 235 16679 99.77% 16600 99.33% 16668 99.70% 235 16679 99.77% 16600 99.33% 16668 99.70% 235 16679 99.77% 16600 99.35% 16668 99.70% 236 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238 16679 99.77% 16600 99.35% 16668 99.70% 238	14943	89.38%	7766	46.45%	13764	82.33%	25	16	6675	99.74%	16589	99.23%	16667	99.69%	226
15220 91.04% 9494 56.79% 14249 85.23% 28 15323 91.66% 9968 59.62% 14425 86.28% 29 16677 99.75% 16596 99.27% 16668 99.70% 230 15402 92.13% 10373 62.05% 14562 87.10% 30 16677 99.75% 16597 99.28% 16668 99.70% 231 1548 92.40% 10763 64.38% 14696 87.91% 31 16677 99.75% 16597 99.28% 16668 99.70% 231 15501 92.72% 11102 66.41% 14826 88.68% 32 16677 99.75% 16598 99.28% 16668 99.70% 232 16679 93.31% 11720 70.10% 15049 90.02% 34 16678 99.75% 16604 99.32% 16668 99.70% 233 16678 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16604 99.32% 16668 99.70% 235 16678 99.76% 16605 99.32% 16668 99.70% 236 16679 99.77% 16600 99.33% 16668 99.70% 237 16779 94.45% 12205 73.18% 15405 92.15% 38 15747 94.19% 12703 75.98% 15405 92.15% 38 15813 94.59% 13111 78.42% 15533 92.91% 40 37 0.22% 109 0.65% 50 0.30% >240	15029	89.90%	8388	50.17%	13930	83.32%	26	16	6675	99.74%	16589	99.23%	16667	99.69%	227
15323 91.66% 9968 59.62% 14425 86.28% 29 16677 99.75% 16596 99.27% 16668 99.70% 230 15402 92.13% 10373 62.05% 14562 87.10% 30 16677 99.75% 16597 99.28% 16668 99.70% 231 15448 92.40% 10763 64.38% 14696 87.91% 31 16677 99.75% 16598 99.28% 16668 99.70% 232 15501 92.72% 11102 66.41% 14826 88.68% 32 16677 99.75% 16601 99.30% 16668 99.70% 233 15543 92.97% 11433 68.39% 14938 89.35% 33 16677 99.75% 16604 99.32% 16668 99.70% 234 16640 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16604 99.32% 16668 99.70% 235 15600 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16604 99.32% 16668 99.70% 235 15720 94.03% 12235 73.18% 15258 91.27% 36 16679 99.77% 16606 99.33% 16668 99.70% 237 15720 94.03% 12477 74.63% 15338 91.75% 37 16679 99.77% 16600 99.33% 16668 99.70% 237 16679 94.19% 12703 75.98% 15405 92.15% 38 16680 99.77% 16609 99.35% 16668 99.70% 239 15790 94.45% 12908 77.21% 15476 92.57% 39 16681 99.78% 16609 99.35% 16668 99.70% 239 15813 94.59% 13111 78.42% 15533 92.91% 40	15128	90.49%	8977	53.70%	14098	84.33%	27	16	6676	99.75%	16593	99.25%	16668	99.70%	228
15402 92.13% 10373 62.05% 14562 87.10% 30 15448 92.40% 10763 64.38% 14696 87.91% 31 16677 99.75% 16598 99.28% 16668 99.70% 232 15501 92.72% 11102 66.41% 14826 88.68% 32 16677 99.75% 16598 99.28% 16668 99.70% 232 15543 92.97% 11433 68.39% 14938 89.35% 33 16677 99.75% 16604 99.32% 16668 99.70% 234 15549 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16604 99.32% 16668 99.70% 235 15640 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16604 99.32% 16668 99.70% 235 15720 94.03% 12235 73.18% 15258 91.27%	15220	91.04%	9494	56.79%	14249	85.23%	28	16	6677	99.75%	16594	99.26%	16668	99.70%	229
15448 92.40% 10763 64.38% 14696 87.91% 31 15501 92.72% 11102 66.41% 14826 88.68% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15599 93.31% 11720 70.10% 15049 90.02% 34 15640 93.55% 11985 71.69% 15160 90.68% 35 15683 93.81% 12235 73.18% 15258 91.27% 36 15720 94.03% 12477 74.63% 15338 91.75% 37 15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40	15323	91.66%	9968	59.62%	14425	86.28%	29	16	6677	99.75%	16596	99.27%	16668	99.70%	230
15501 92.72% 11102 66.41% 14826 88.68% 32 15543 92.97% 11433 68.39% 14938 89.35% 33 15599 93.31% 11720 70.10% 15049 90.02% 34 15640 93.55% 11985 71.69% 15160 90.68% 35 15683 93.81% 12235 73.18% 15258 91.27% 36 15720 94.03% 12477 74.63% 15338 91.75% 37 15747 94.19% 12703 75.98% 15405 92.57% 38 15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40	15402	92.13%	10373	62.05%	14562	87.10%	30	16	5677	99.75%	16597	99.28%	16668	99.70%	231
15543 92.97% 11433 68.39% 14938 89.35% 33 16677 99.75% 16604 99.32% 16668 99.70% 234 15599 93.31% 11720 70.10% 15049 90.02% 34 16678 99.76% 16604 99.32% 16668 99.70% 235 15640 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16605 99.32% 16668 99.70% 236 15683 93.81% 12235 73.18% 15258 91.27% 36 16678 99.76% 16605 99.32% 16668 99.70% 236 15720 94.03% 12477 74.63% 15338 91.75% 37 16679 99.77% 16607 99.33% 16668 99.70% 238 15747 94.45% 12908 77.21% 15476 92.57% 39 16680 99.77% 16609 99.35% 16668 99.70% 239	15448	92.40%	10763	64.38%	14696	87.91%	31	16	6677	99.75%	16598	99.28%	16668	99.70%	232
15599 93.51% 11720 70.10% 15049 90.02% 34 16678 99.76% 16604 99.32% 16668 99.70% 235 15640 93.55% 11985 71.69% 15160 90.68% 35 16678 99.76% 16605 99.32% 16668 99.70% 236 15683 93.81% 12235 73.18% 15258 91.27% 36 16679 99.77% 16606 99.33% 16668 99.70% 237 15720 94.03% 12477 74.63% 15338 91.75% 37 16679 99.77% 16607 99.34% 16668 99.70% 238 15747 94.19% 12703 75.98% 15405 92.55% 38 16680 99.77% 16609 99.35% 16668 99.70% 239 15790 94.45% 12908 77.21% 15476 92.57% 39 16681 99.78% 16609 99.35% 16668 99.70% 240	15501	92.72%	11102	66.41%	14826	88.58%	32	16	5677	99.75%	16601	99.30%	16668	99.70%	233
15640 93.55% 11985 71.69% 15160 90.68% 35 15683 93.81% 12235 73.18% 15258 91.27% 36 15720 94.03% 12477 74.63% 15338 91.75% 37 15747 94.19% 12703 75.98% 15405 92.15% 38 15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40	15543	92.97%	11433	68.39%	14938	89.35%	33	16	6677	99.75%	16604	99.32%	16668	99.70%	234
15633 93.81% 12235 73.18% 15258 91.27% 36 16679 99.77% 16606 99.33% 16668 99.70% 237 15720 94.03% 12477 74.63% 15338 91.75% 37 16679 99.77% 16607 99.34% 16668 99.70% 238 15747 94.19% 12703 75.98% 15405 92.15% 38 16680 99.77% 16609 99.35% 16668 99.70% 239 15790 94.45% 12908 77.21% 15476 92.57% 39 16681 99.78% 16609 99.35% 16668 99.70% 240 15813 94.59% 13111 78.42% 15533 92.91% 40 37 0.22% 109 0.65% 50 0.30% >240	15599	93.31%	11720	70.10%	15049	90.02%	34	16	5678	99.76%	16604	99.32%	16668	99.70%	235
15720 94.03% 12477 74.63% 15338 91.75% 37 15747 94.19% 12703 75.98% 15405 92.15% 38 15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40	15640	93.55%	11985	71.69%	15160	90.68%	35	16	6678	99.76%	16605	99.32%	16668	99.70%	236
15747 94.19% 12703 75.98% 15405 92.15% 38 15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40 37 0.22% 109 0.65% 50 0.30% >240	15683	93.81%	12235	73.18%	15258	91.27%	36	16	5679	99.77%	16606	99.33%	16668	99.70%	237
15790 94.45% 12908 77.21% 15476 92.57% 39 15813 94.59% 13111 78.42% 15533 92.91% 40 16681 99.78% 16609 99.35% 16668 99.70% 240 37 0.22% 109 0.65% 50 0.30% >240	15720	94.03%	12477	74.63%	15338	91.75%	37	16	6679	99.77%	16607	99.34%	16668	99.70%	238
15813 94.59% 13111 78.42% 15533 92.91% 40 37 0.22% 109 0.65% 50 0.30% >240	15747	94.19%	12703	75.98%	15405	92.15%	38	16	5680	99.77%	16609	99.35%	16668	99.70%	239
	15790	94.45%	12908	77.21%	15476	92.57%	39	16	6681	99.78%	16609	99.35%	16668	99.70%	240
15851 94.81% 13289 79.49% 15603 93.33% 41 16718 100.00% 16718 100.00% 16718 100.00% Total	15813	94.59%	13111	78.42%	15533	92.91%	40		37	0.22%	109	0.65%	50	0.30%	>240
	15851	94.81%	13289	79.49%	15603	93.33%	41	16	6718	100.00%	16718	100.00%	16718	100.00%	Total

Figure D-25 Example ANSP monthly report that will enable graphical analysis

- D.4.5.2 AFI DL/CMRA shall takes into account other monitoring programme in the Region particularly those established such as for monitoring RVSM, performance-based horizontal separation minima, and safety of ATM operations such as ARMA, SATMA.
- D.4.5.3 AFI DL/CMRA should provide a forum for users to develop and share tools to facilitate the conduct of specific analysis on selected data or to automatically query a database and send non-compliance and corrective action notices to appropriate parties.
- D.4.5.4 AFI DL/CMRA programme should provide staff support to assist ANSPs and other participants to investigate problems and conduct local and regional analyses.
- D.4.5.5 AFI DL/CMRA should support participating ANSPs in the analysis and reporting of operational data, including ACP, ASP and availability data, at the regional level, including:
 - a) coordinate, as requested by the participating ANSPs, the analysis of degraded performance and availability issues that are common within the region or globally; and
 - b) produce regional PBCS monitoring reports in accordance with established procedures for receiving ANSP-monitored information and report formats provided by the participating ANSPs;
- D.4.5.6 AFI DL/CMRA should notify appropriate parties when the operational system does not meet the RCP/RSP specification, including:
 - a) the relevant ANSP when the non-compliance concerns a subsystem of the infrastructure, including the CSP/SSP, under its control; and
 - b) the relevant operator and the State of the Operator or State of Registry when the non-compliance concerns the operator, or any aircraft type or individual aircraft within its fleet.
- Note.— Typically, means to notify the State of the Operator or State of Registry will be conducted via the regional PBCS monitoring programme to which the relevant State is assigned. If the relevant State is not assigned to a regional PBCS monitoring programme, then the regional PBCS monitoring programme that originated the non-compliance action would contact the State directly.
- D.4.5.7 AFI DL/CMRA should coordinate the global exchange of monitoring information in accordance with the guidelines provided in section 5.5.4 of the PBCS Manual.
- D.4.5.8 AFI DL/CMRA should exchange the following information with Data Link monitoring programmes in other regions:
 - a) lessons learned from PBCS implementation and operations;
 - b) analytical tools that can be shared for conducting analysis of ACP and ASP;
 - c) a list of aircraft operators that are filing RCP/RSP designators in their flight plan; and
 - d) a list of known problems, including those with particular networks, components of a network, aircraft types/systems, or aircraft operators, and associated resolutions.