



Agenda Item 4: Assessment of operational requirements to determine the implementation of improvements in communications, navigation and surveillance (CNS) capabilities for operations in route and terminal area

SURVEY ON CNS CAPACITY OF AIRCRAFT OPERATING IN THE AMERICAS AND NORTH ATLANTIC

(Presented by IATA)

SUMMARY	
This working paper presents the final version of the CNS Capacity survey of Aircraft flying in the Americas and the North Atlantic. This WP aims to discuss a strategy of how the survey could support the implementation of some CNS technologies in the SAM Region.	
References:	
<ul style="list-style-type: none"> • Global Air Navigation Plan (Doc. 9750) 	
ICAO Strategic Objectives	<i>A – Safety</i> <i>B – Air Navigation Capacity and Efficiency</i>

1. Introduction

1.1 The IATA’s preliminary version of the aircraft CNS survey was presented in the SAMIG21.

1.2 The objective of the survey is the need for the implementation of CNS technologies to take into consideration the present capacity of the aircraft fleet in the airspace in which it is intended to use it.

2. Discussion

2.1 Considering the importance of knowing the capacity of the fleet to support the cost-benefit analysis that must be carried out prior to the CNS implementations, IATA has completed the survey to verify this capacity.

2.2 To date, 27 airlines have provided information to the survey, totaling 3,375 aircraft in the database. The airlines are the following:

- a) AEROLITORAL
- b) AEROMEXICO
- c) AEROMEXICO CONNECT
- d) AIR CANADA

- e) AIR CANADA ROUGE
- f) AIR NEW ZEALAND
- g) AIR EUROPA
- h) AVIANCA BRAZIL
- i) AZUL
- j) CONDOR
- k) COPA AIRLINES
- l) DELTA
- m) ETIHAD
- n) FEDEX
- o) GOL
- p) IBERIA
- q) JETBLUE
- r) KLM
- s) LATAM
- t) LIAT
- u) QATAR AIRWAYS
- v) ROYAL JORDANIAN
- w) SAS
- x) SWISS
- y) SWISS GLOBAL
- z) UNITED AIRLINES
- aa) UPS

2.3 The investigated fleets were the following:

- a) A306
- b) A310
- c) A319
- d) A320
- e) A321
- f) A330
- g) A332
- h) A333
- i) A343
- j) A346
- k) A359
- l) A388
- m) ATR42
- n) ATR72
- o) B737
- p) B738
- q) B739
- r) B744
- s) B757
- t) B752
- u) B763
- v) B767
- w) B772
- x) B777
- y) B77F

- z) B77L
- aa) B77W
- bb) B787
- cc) B788
- dd) B789
- ee) DC10
- ff) E170
- gg) E190
- hh) MD11
- ii) MD88
- jj) MD90

2.4 The main CNS technologies considered in the survey were the following:

2.4.1 Communications

- a) AeroMAX / WiMAX - or any form of gate link communications
- b) 8.33kHz VHF Transceivers
- c) HF Transceivers
- d) High Frequency Data Link (HFDL)
- e) ACARS
- f) CPDLC based on ATN/VDL Mode 2
- g) CPDLC based on FANS 1/A or newer FANS standard
- h) Cockpit SatCom voice based on INMARSAT
- i) Cockpit SatCom data based on INMARSAT
- j) Cockpit SatCom voice based on IRIDIUM
- k) Cockpit SatCom data based on IRIDIUM
- l) Emergency Locator Transmitter(s) – ELTs

2.4.2 Navigation

- a) Multi-Mode Receivers - MMRs
- b) System (SBAS)/WAAS, EGNOS etc.
- c) GNSS Receivers:
 - TSO-C129a
 - TSO-C145c
 - TSO-C146c
 - TSO-C196
 - RAIM
 - AAIM
 - FDE
- d) RNAV 10 (RNP 10)
- e) RNAV 5 / B-RNAV
- f) RNAV 2
- g) RNAV 1
- h) RNP 4
- i) RNP 2
- j) RNP 1 / P-RNAV
- k) RNP 0.3
- l) RNP <0.3

- m) RNP APCH
- n) Advanced RNP
- o) APV Baro VNAV
- p) LPV SBAS
- q) INS / IRU
- r) FMS RTA
- s) FMS RF
- t) FMS FRT

2.4.3 Surveillance

- a) Mode S
- b) Mode S - ELS
- c) Mode S - EHS
- d) ADS-B OUT based on DO-260
- e) ADS-B OUT based on DO-260A
- f) ADS-B OUT based on DO-260B or later
- g) ADS-B IN displayed on a cockpit integrated EFB
- h) ADS-B IN displayed on cockpit Primary Flight Display(s)
- i) ADS-B IN displayed on a cockpit stand-alone device, e.g. iPad
- j) ADS-C
- k) FMS WPR

2.5 Updated information on Communications, Navigation and Surveillance capacity, by FIR, is attached, respectively, as **Appendix A, B and C** to this working paper. Such information should be considered taking into account that the database does not contain all the aircraft operating in the airspace, but only the aircraft of the airlines that have supplied data to date.

2.6 The survey could be complemented by information from the General, Executive and Military Aviation, if the States and / or SAM Regional Office requests that these aircraft operators also fill out the corresponding form. The interested States could coordinate with these users the completion of the survey through the following link:
https://docs.google.com/forms/d/e/1FAIpQLSdqIUDhD8rfufXrDpIv_5T8wt-ryGmW798HhCTIxTUZ-Y9AWA/viewform.

2.7 IATA could provide information for the SAM Regional Office and/or for each State interested in receiving the results of the survey for each FIR or for the SAM Region.

3. Suggested Actions

The meeting is invited to:

- a) Take note of the information provided in this working paper;
- b) Consider the updated information on CNS fleet capacity in the Regional and National CNS implementation projects
- c) Evaluate the feasibility of establishing a strategy for operators of general, executive and military aviation to provide data on the capacity of their fleet

Based on a survey of 3,375 airframes

Categorized by Flight Information Region (FIR)



IATA Americas Region

COMMUNICATIONS

Replacing assumptions with facts

This report is based on unedited airspace user submissions

Refer to statistical note on page 2

CONTRIBUTING AIRSPACE USERS

AEROMEXICO, AEROMEXICO CONNECT, AEROLITORAL, AIR CANADA, AIR CANADA ROUGE, AIR NEW ZEALAND, AIR EUROPA, AVIANCA BRAZIL, AZUL, CONDOR, COPA, DELTA, ETIHAD, FEDEX, GOL, IBERIA, JETBLUE, KLM, LATAM AIRLINES, LIAT, QATAR AIRWAYS, ROYAL JORDANIAN, SAS, SWISS, SWISS GLOBAL, UNITED, UPS.

AIRFRAME TYPES

A306, A310, A319, A320, A321, A330, A332, A333, A343, A346, A359, A388, ATR42, ATR72, B737, B738, B739, B744, B757, B752, B763, B767, B772, B777, B77F, B77L, B77W, B787, B788, B789, DC10, E170, E190, MD11, MD88, MD90.

DISCLAIMER: The information contained in this document is subject to constant review and update in light of continuing airspace user contributions via an on-line airframe equipage and capability survey and/or other sources. No reader should act on the basis of any such information without referring to applicable laws and regulations and/or without taking appropriate professional advice. Although every effort has been made to ensure accuracy, the International Air Transport Association shall not be held responsible for any loss or damage caused by errors, omissions, misprints or misinterpretation of the contents hereof. Furthermore, the International Air Transport Association expressly disclaims any and all liability to any person or entity in respect of anything done or omitted, and the consequences of anything done or omitted by any such person or entity, in reliance on the contents of this publication.



Data compilation date: 16th September 2018

Statistical Note

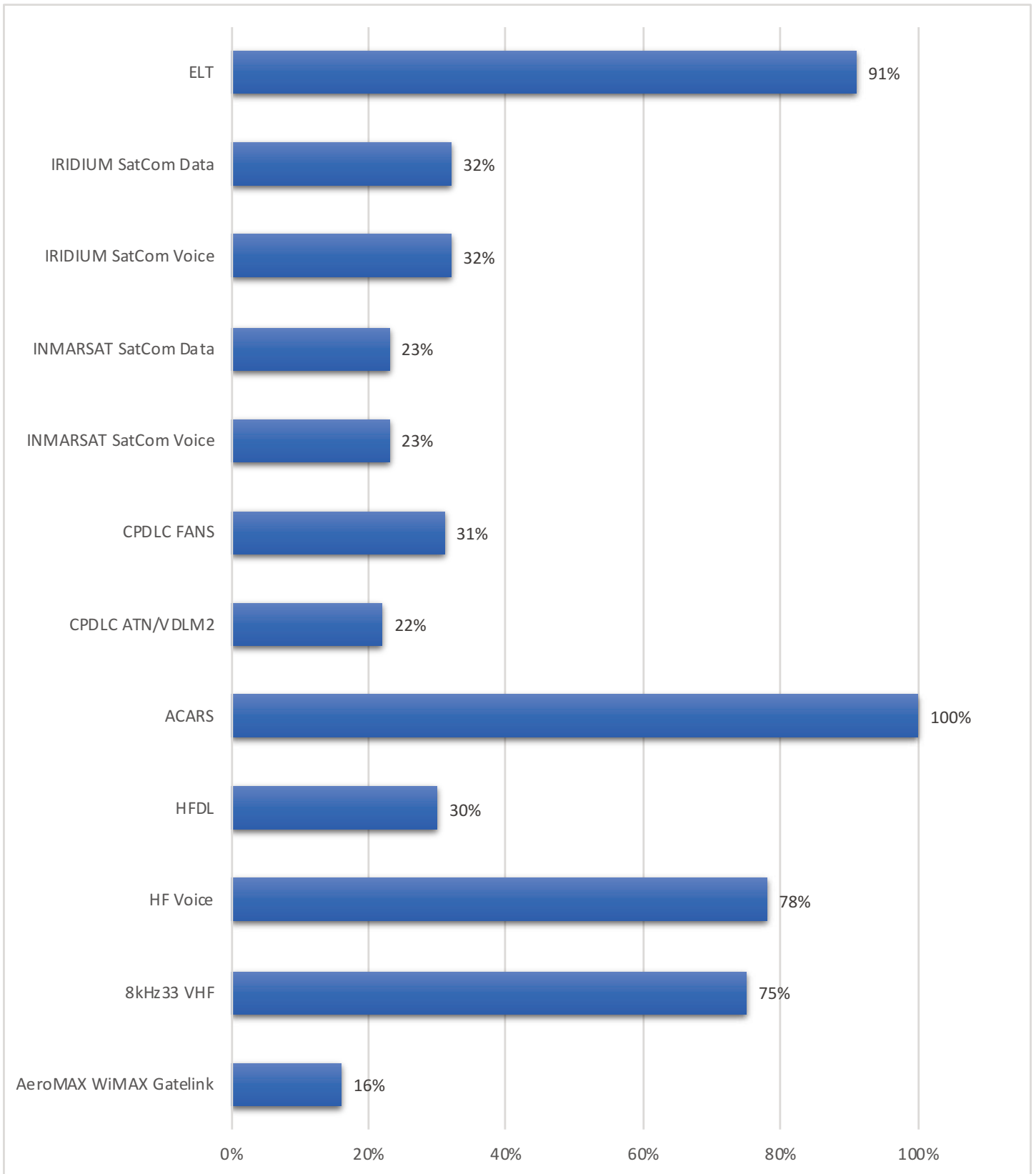
This document contains unedited airspace user data reflecting airframe COMMUNICATIONS equipage as reported by operators. The data is derived from a survey, not filed flight plans. It should be borne in mind that 70% of flight plans filed in the IATA Americas Region reflect actual airframe equipage. The remainder are generic or repetitive flight plans based on a standard fleet airframe. The results presented here are based solely on airspace user survey data.

Point of contact:

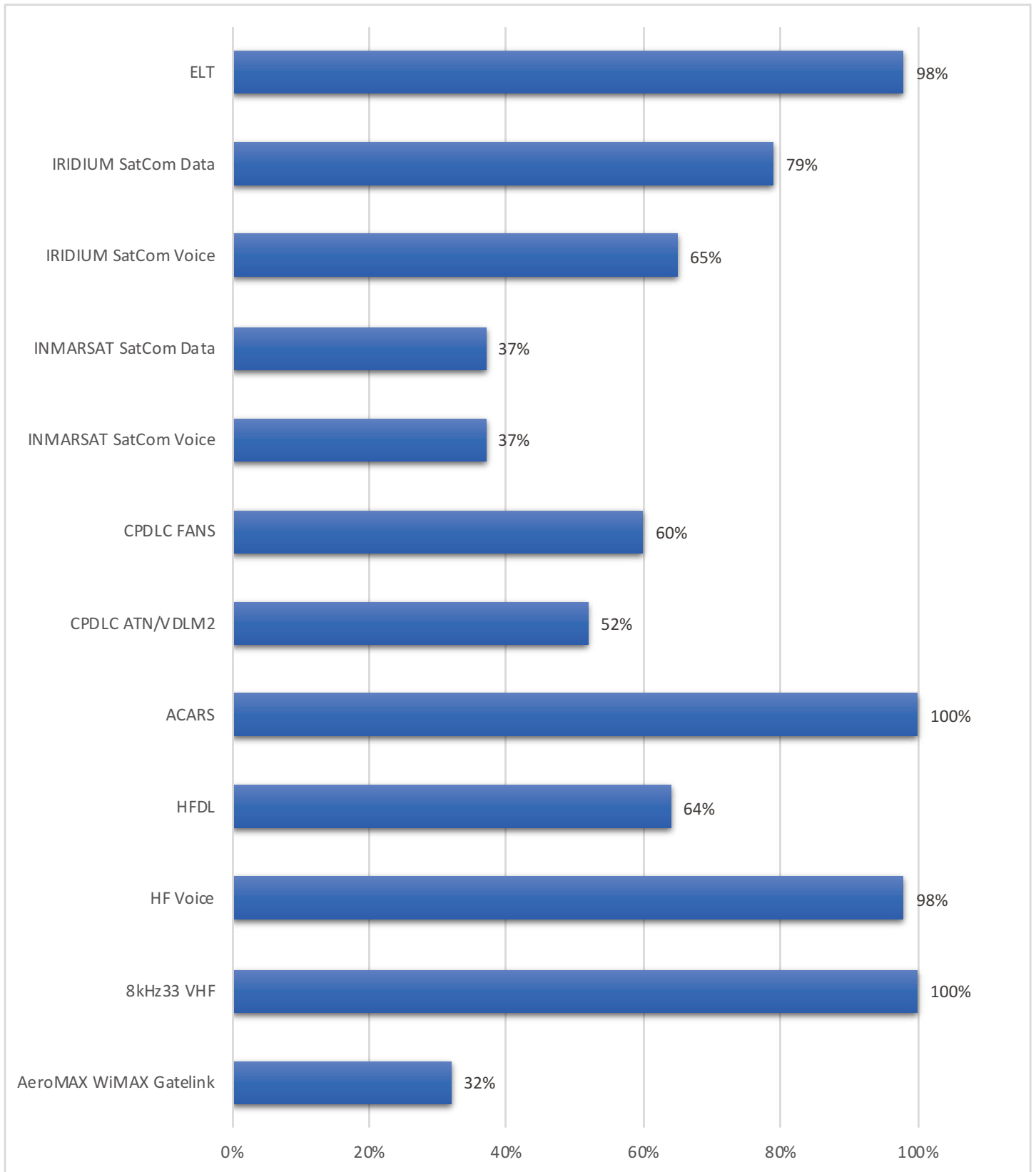
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ocarrollk@iata.org

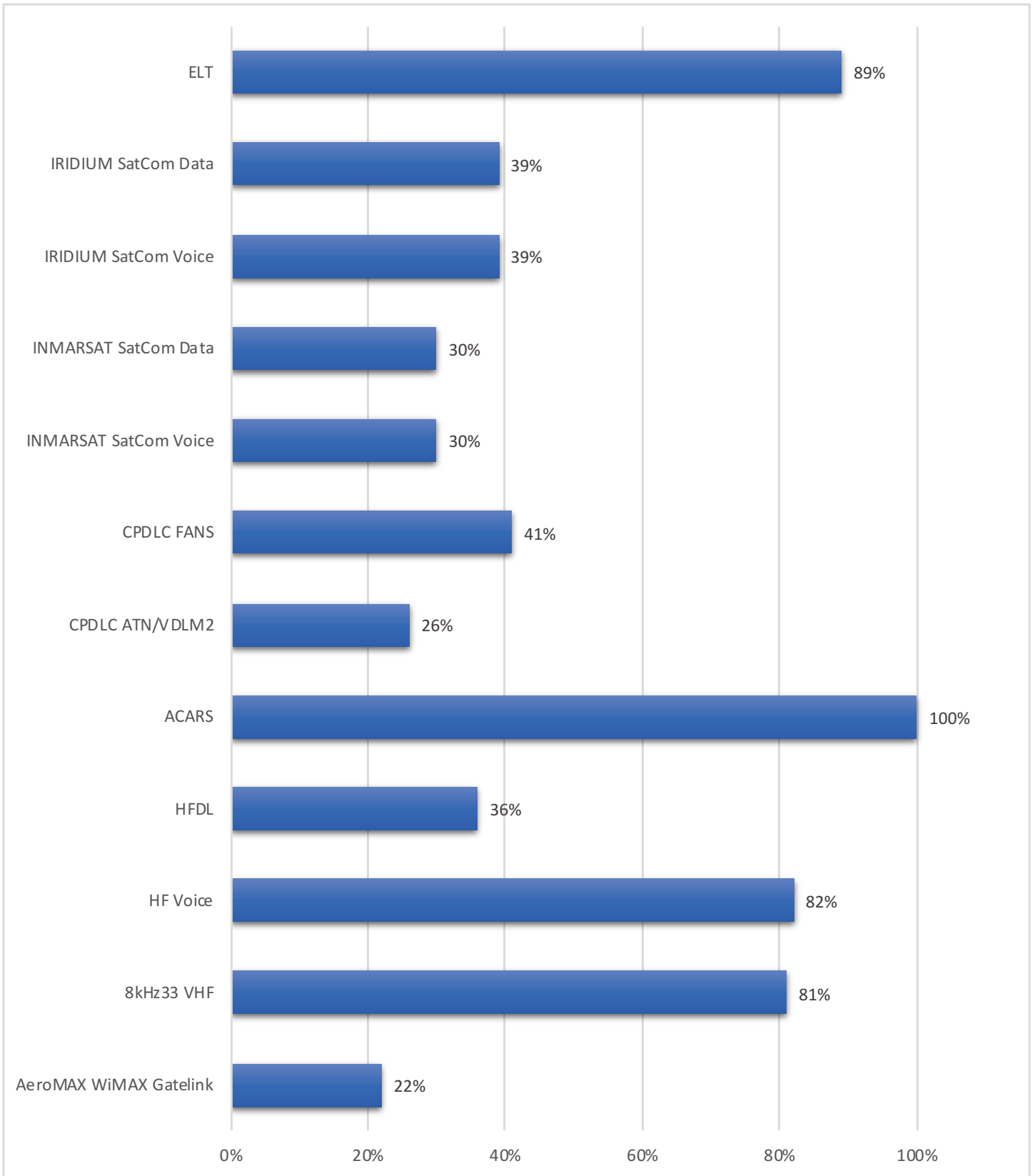
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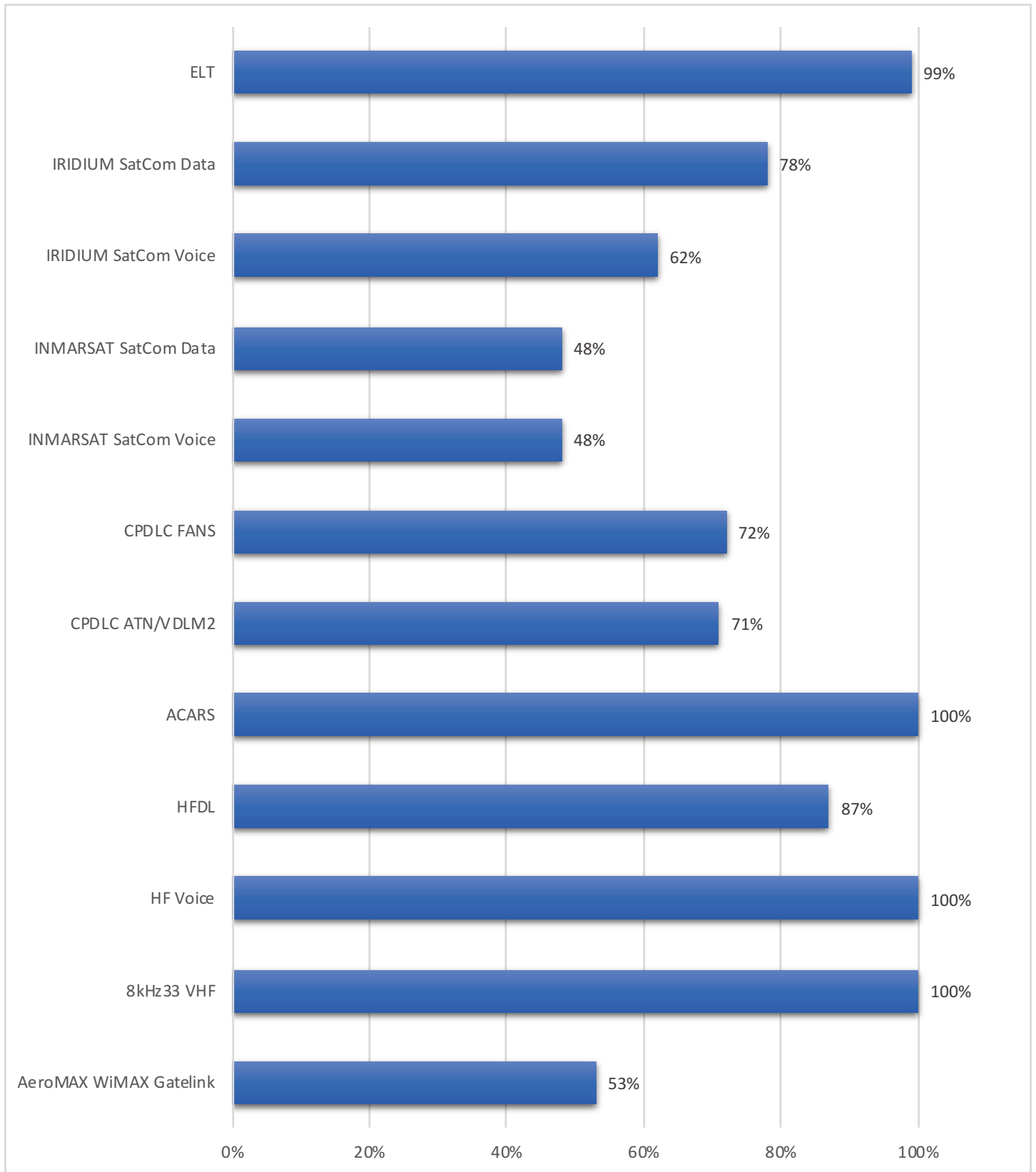
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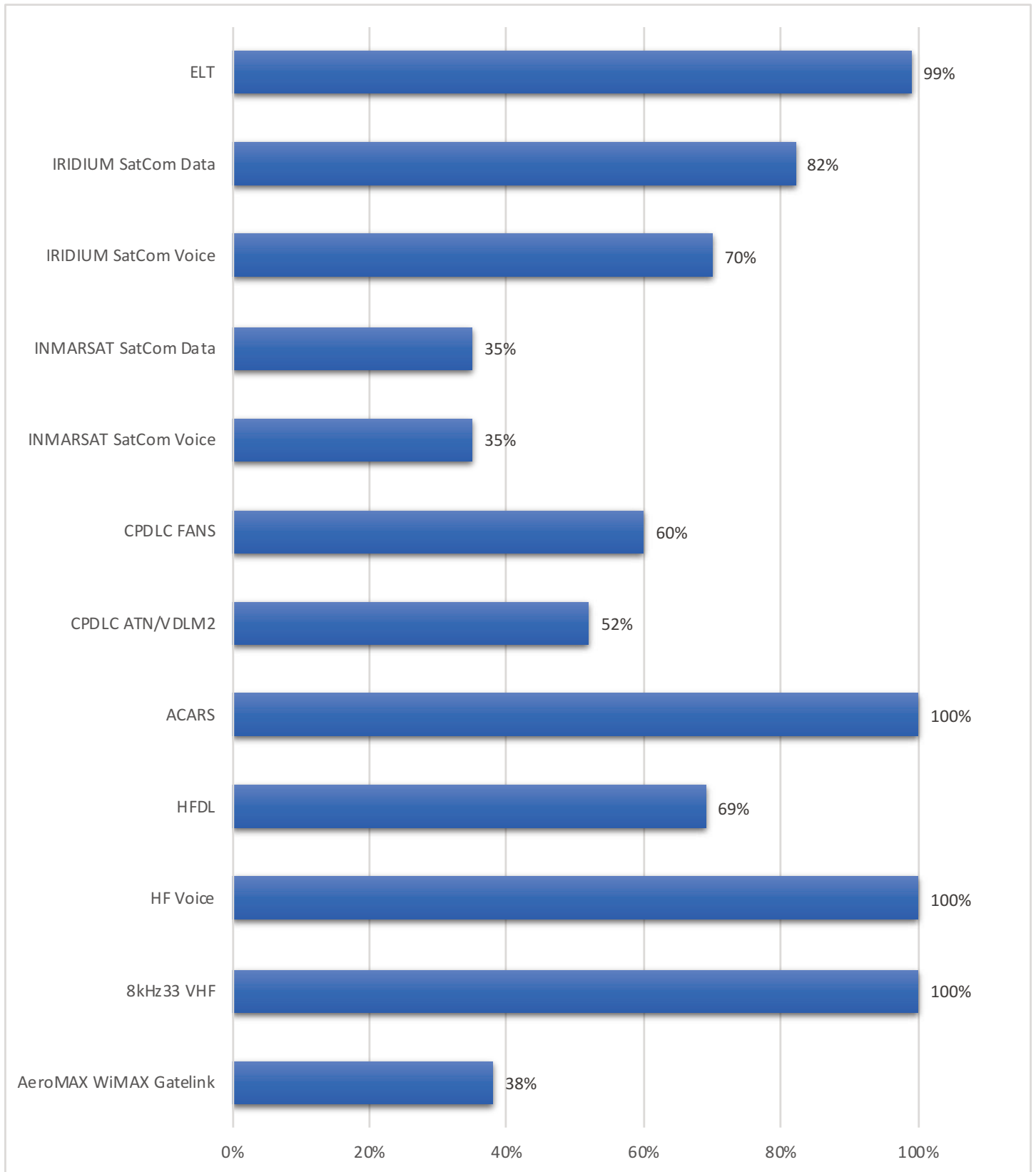
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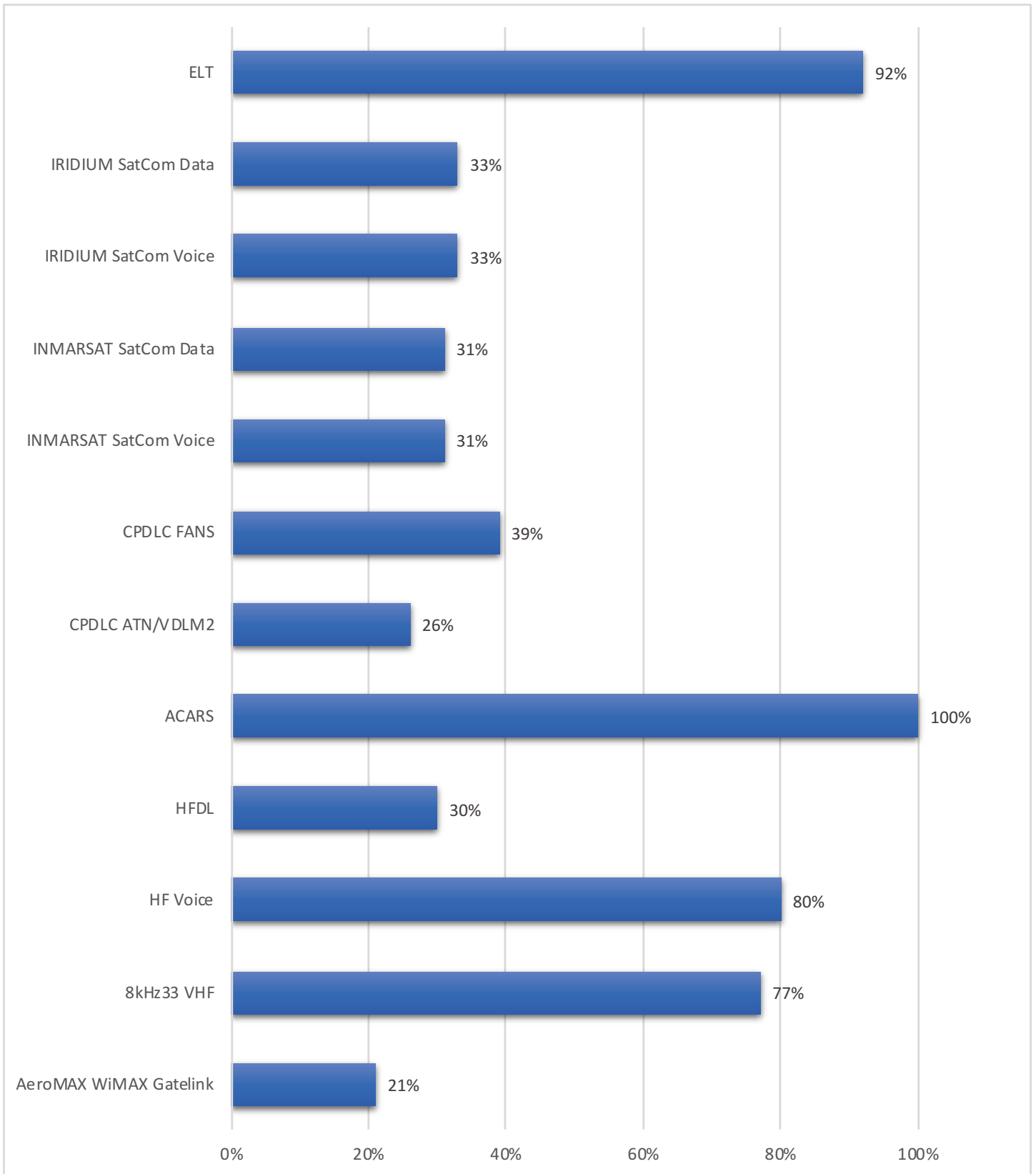
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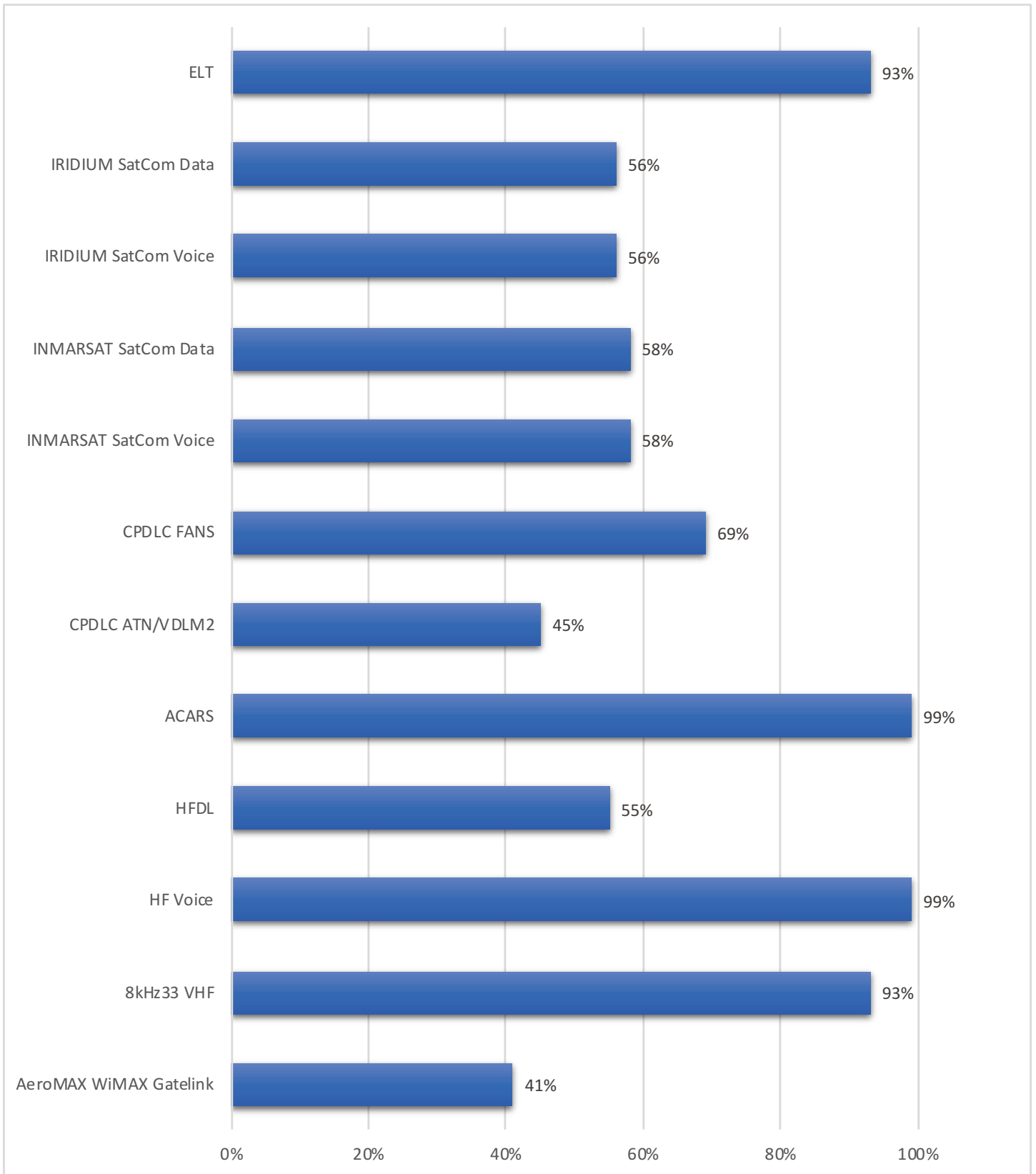
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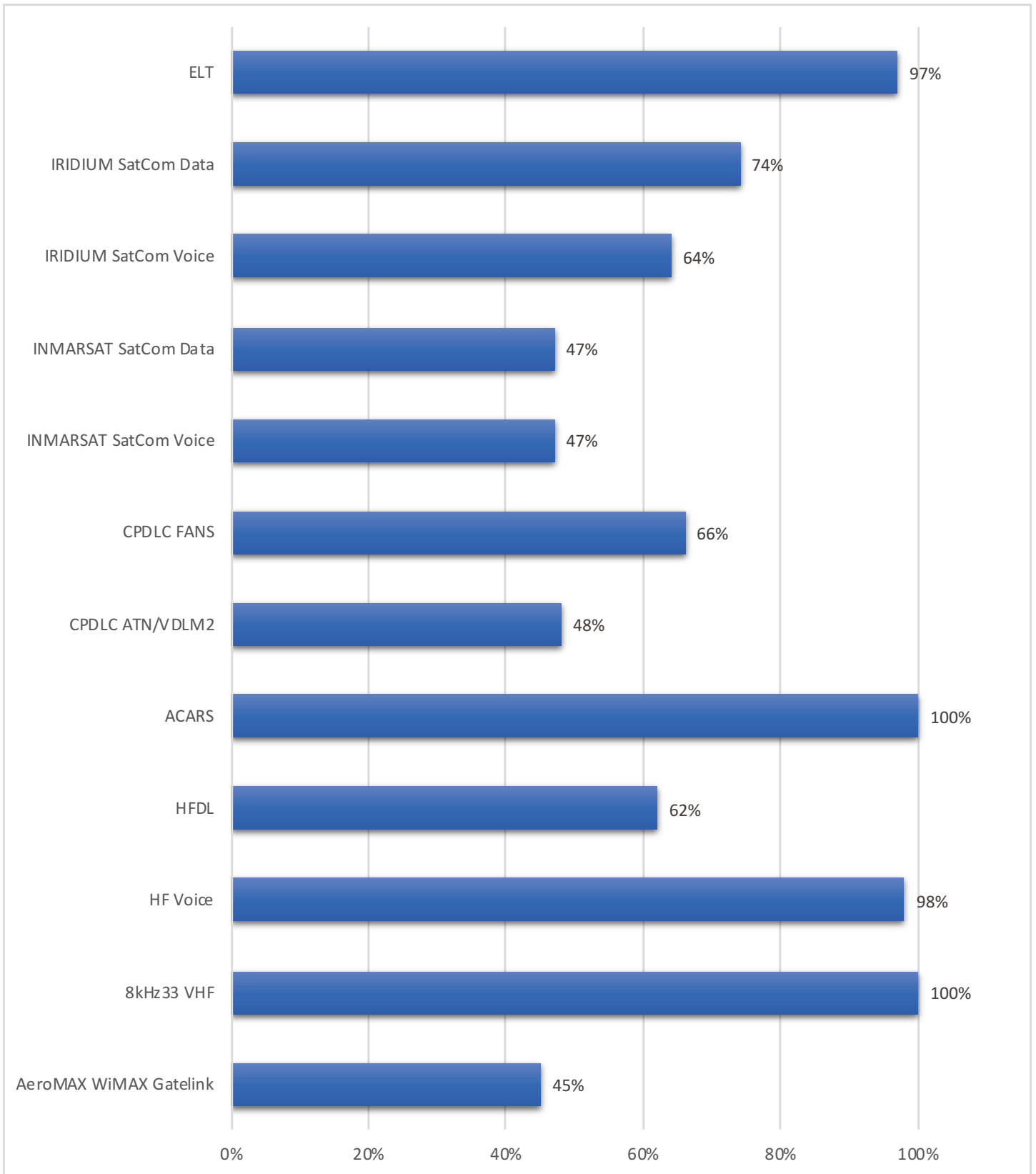
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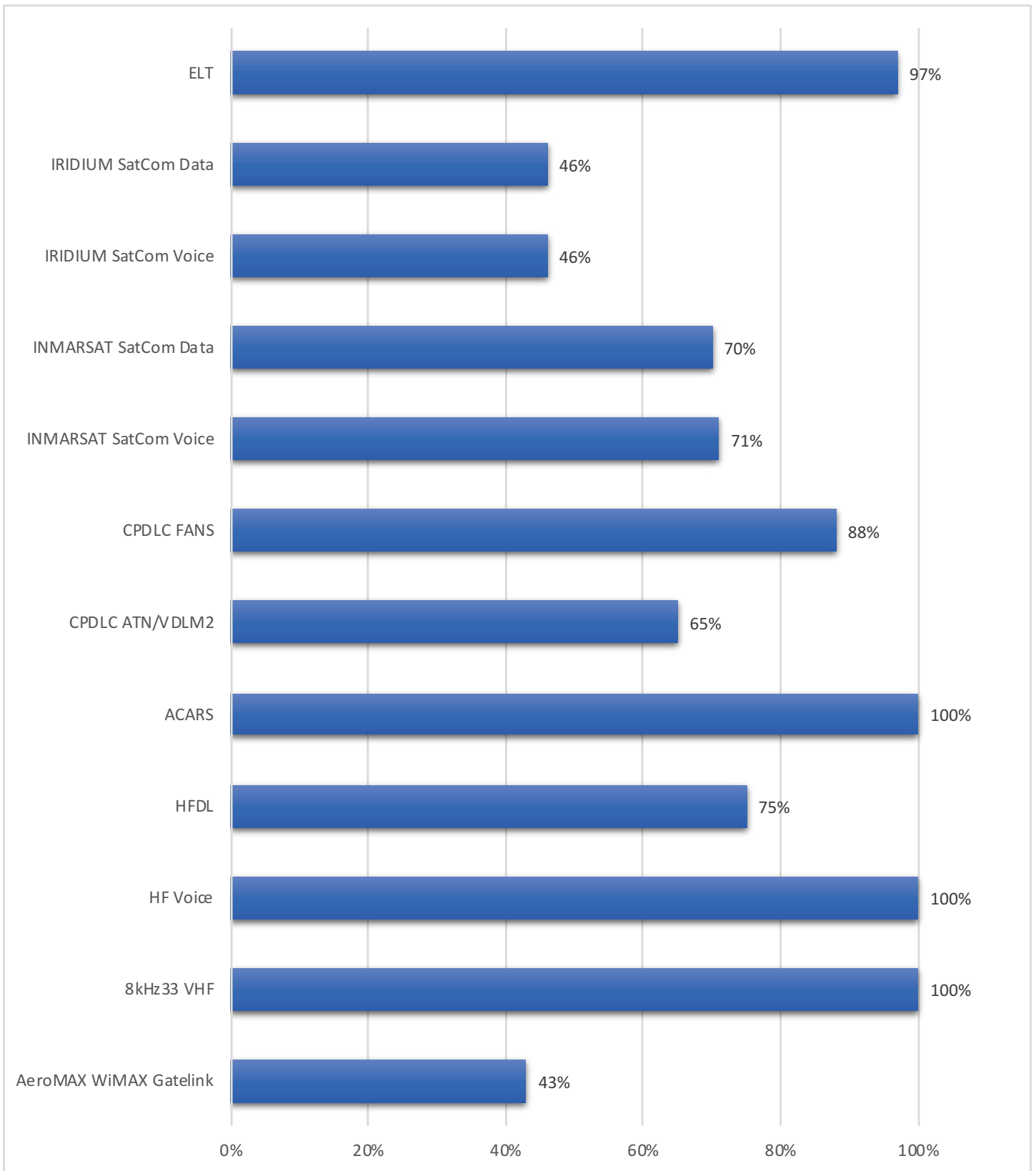
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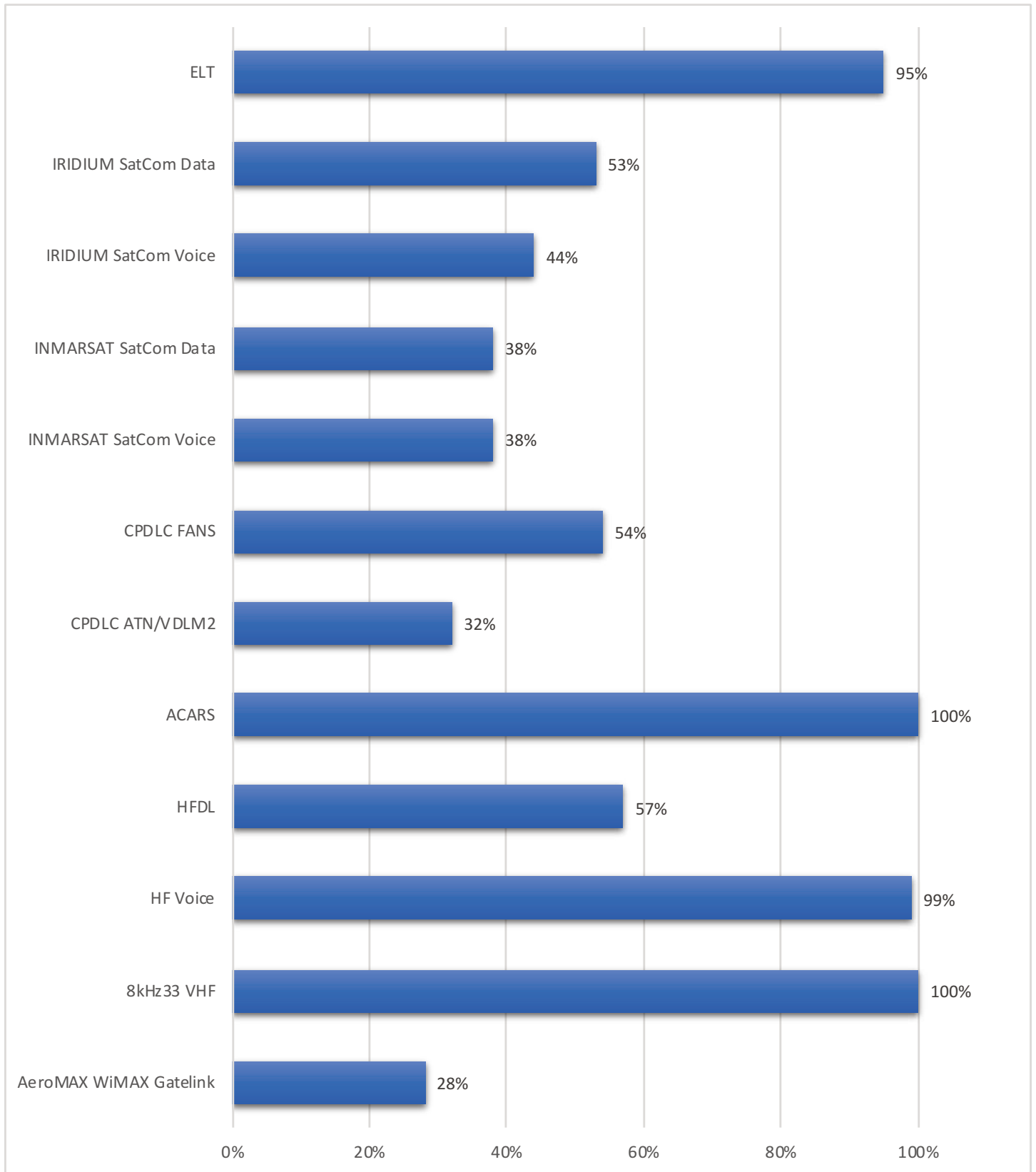
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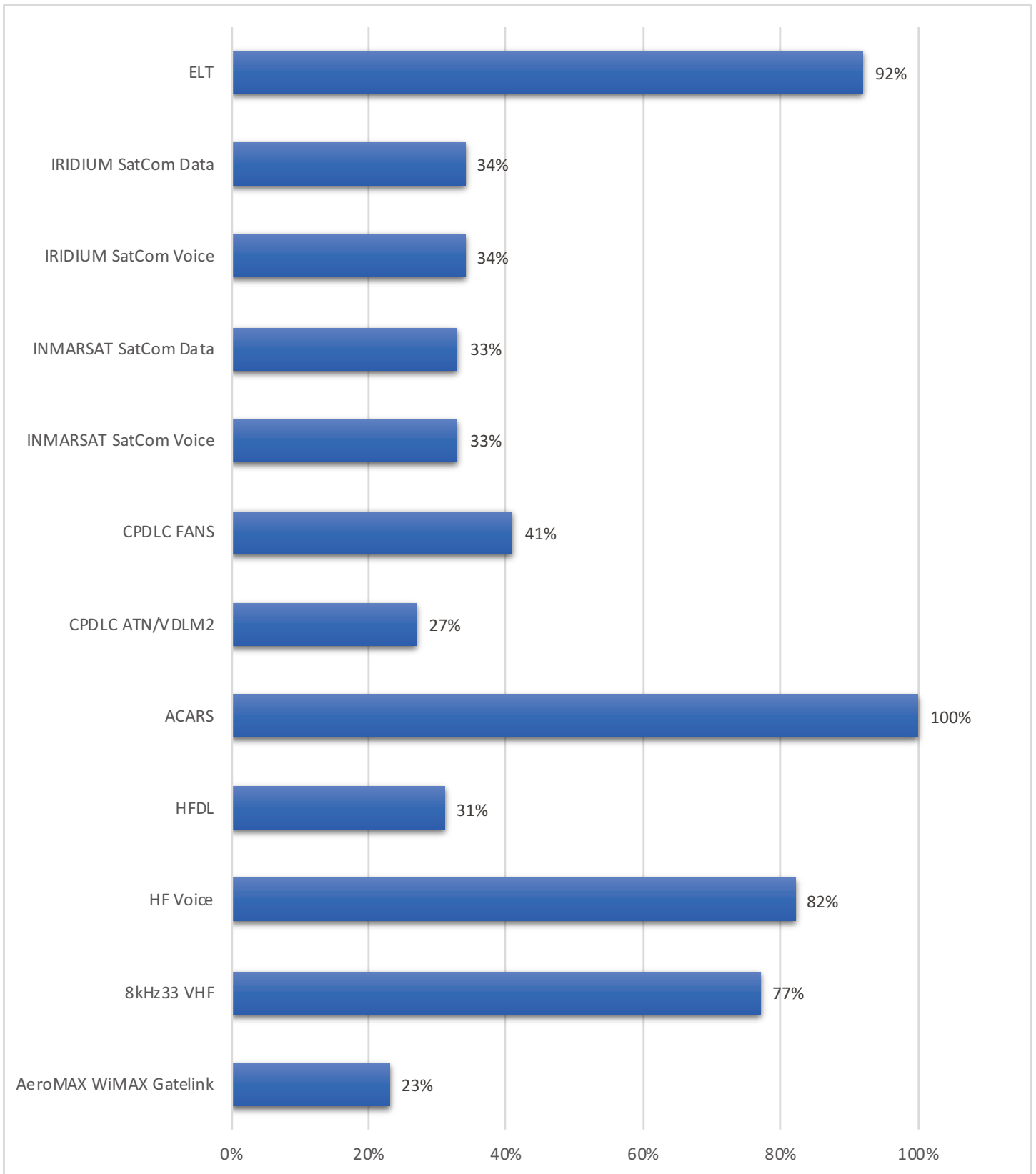
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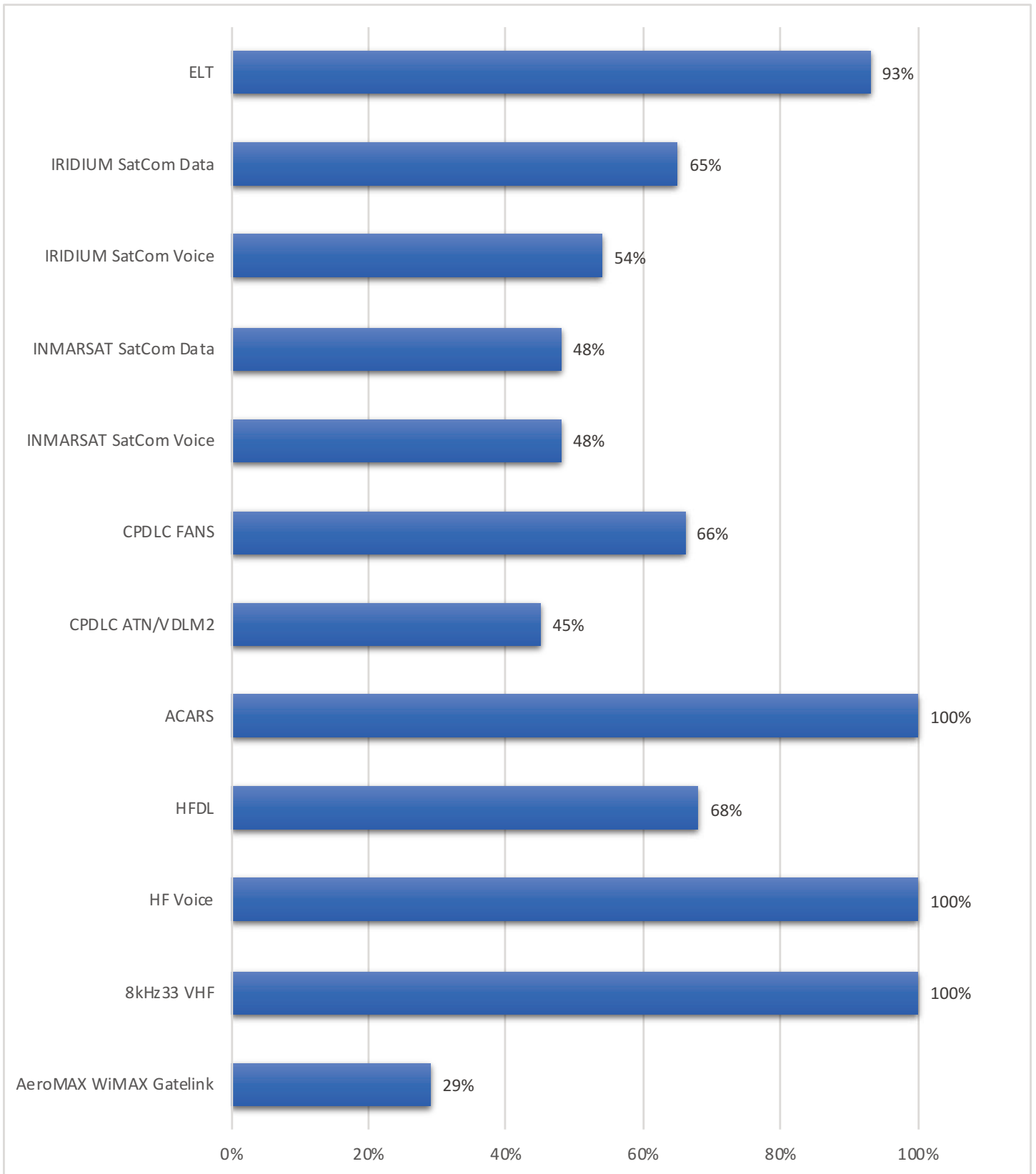


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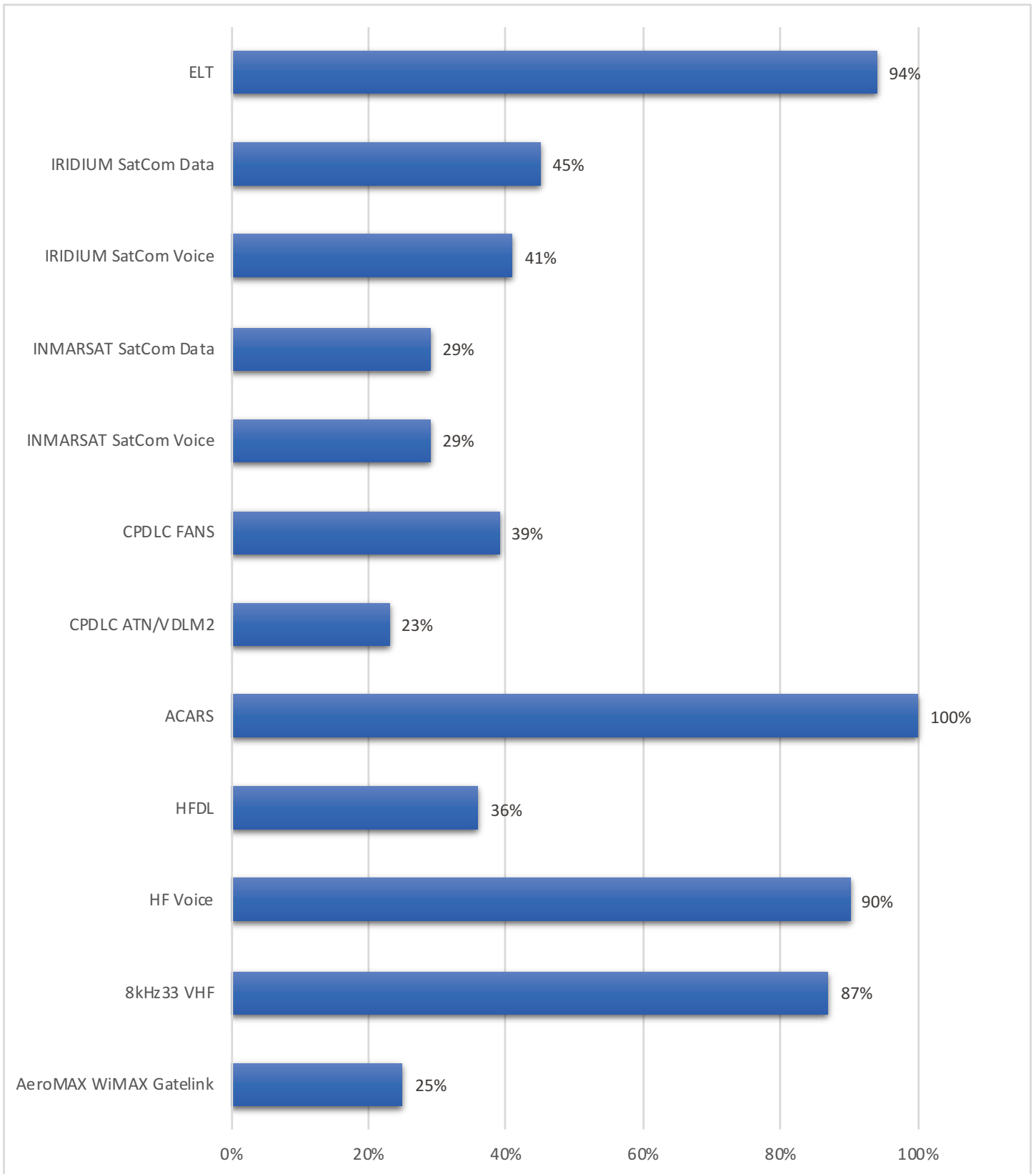


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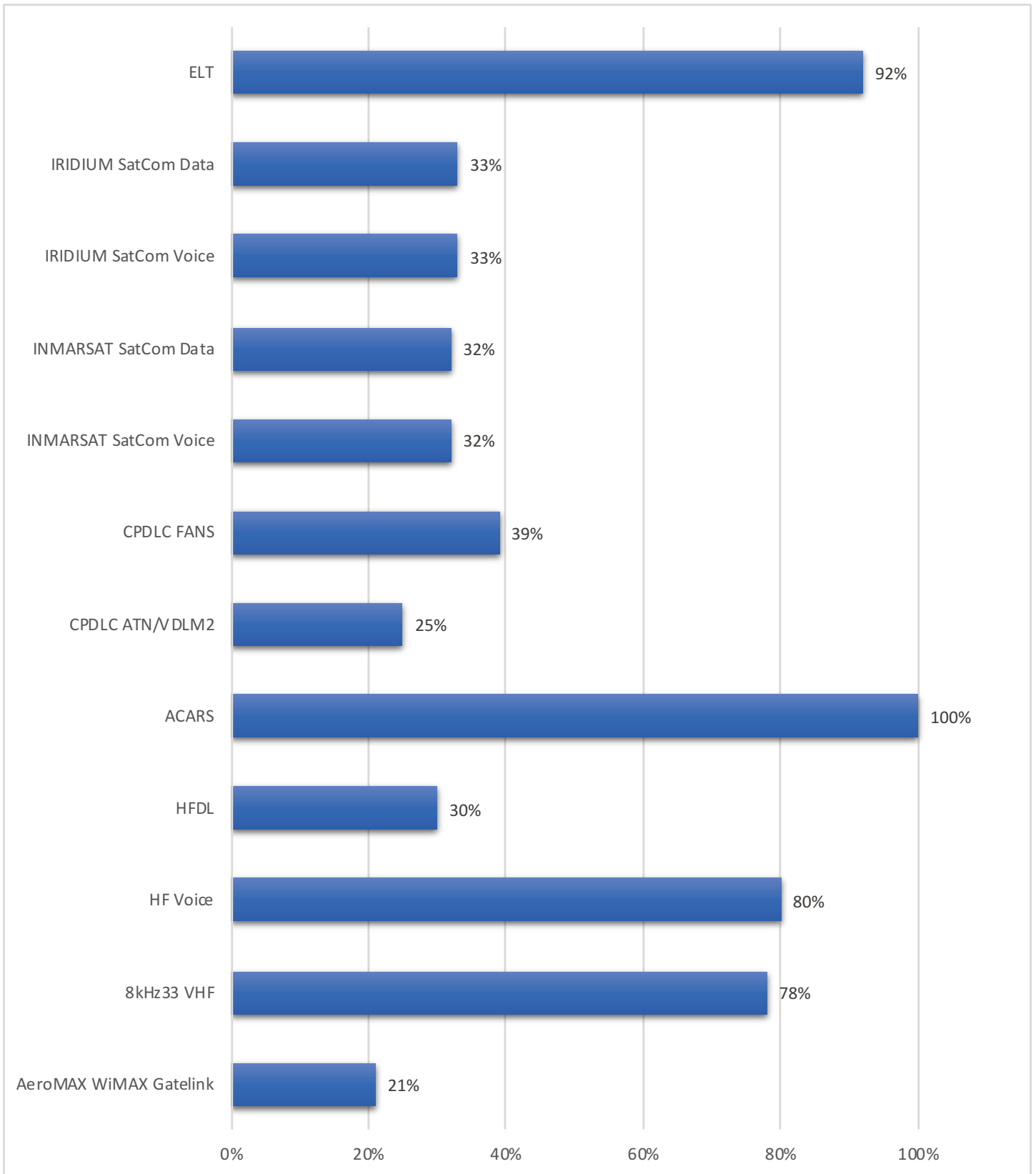




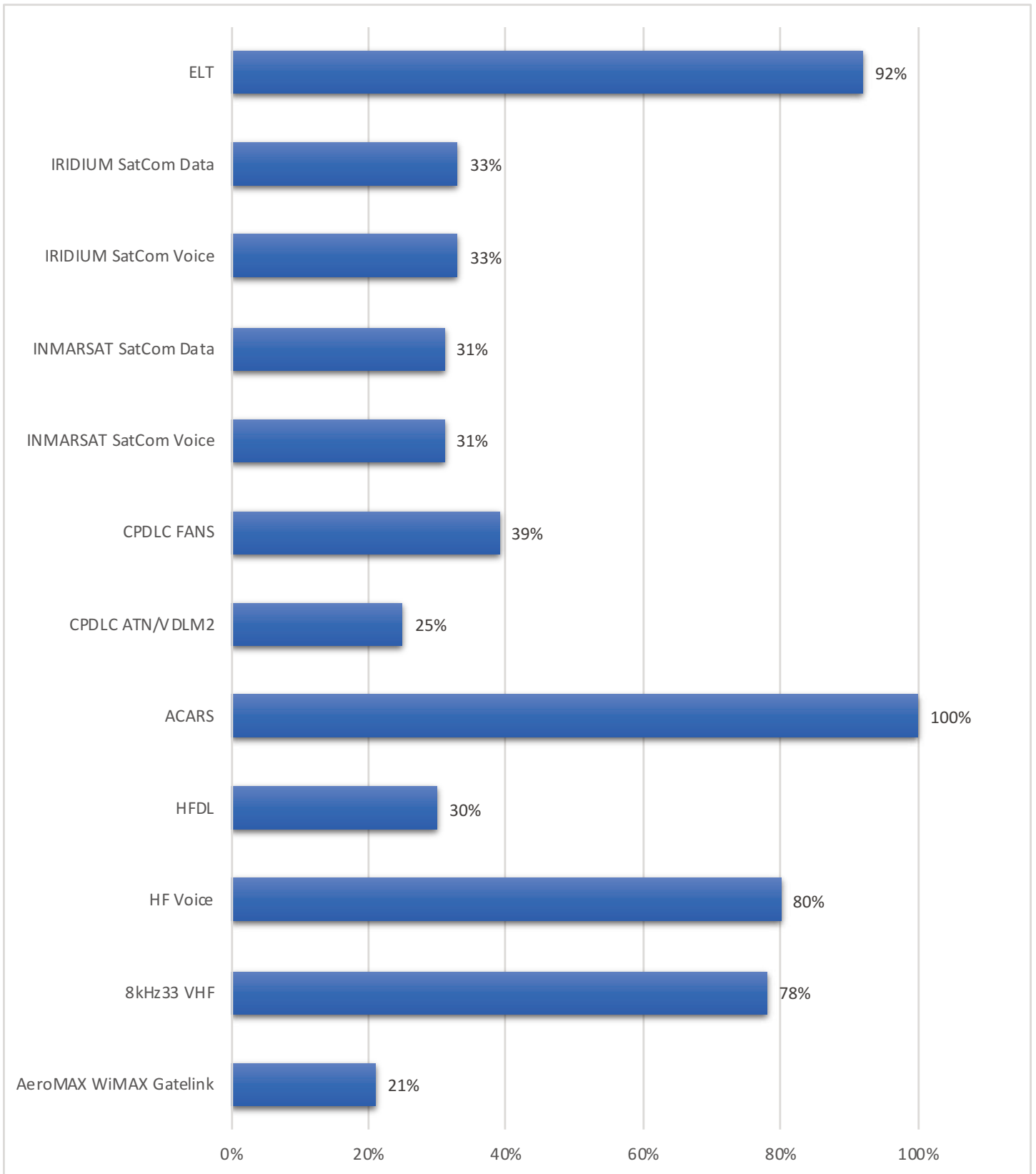
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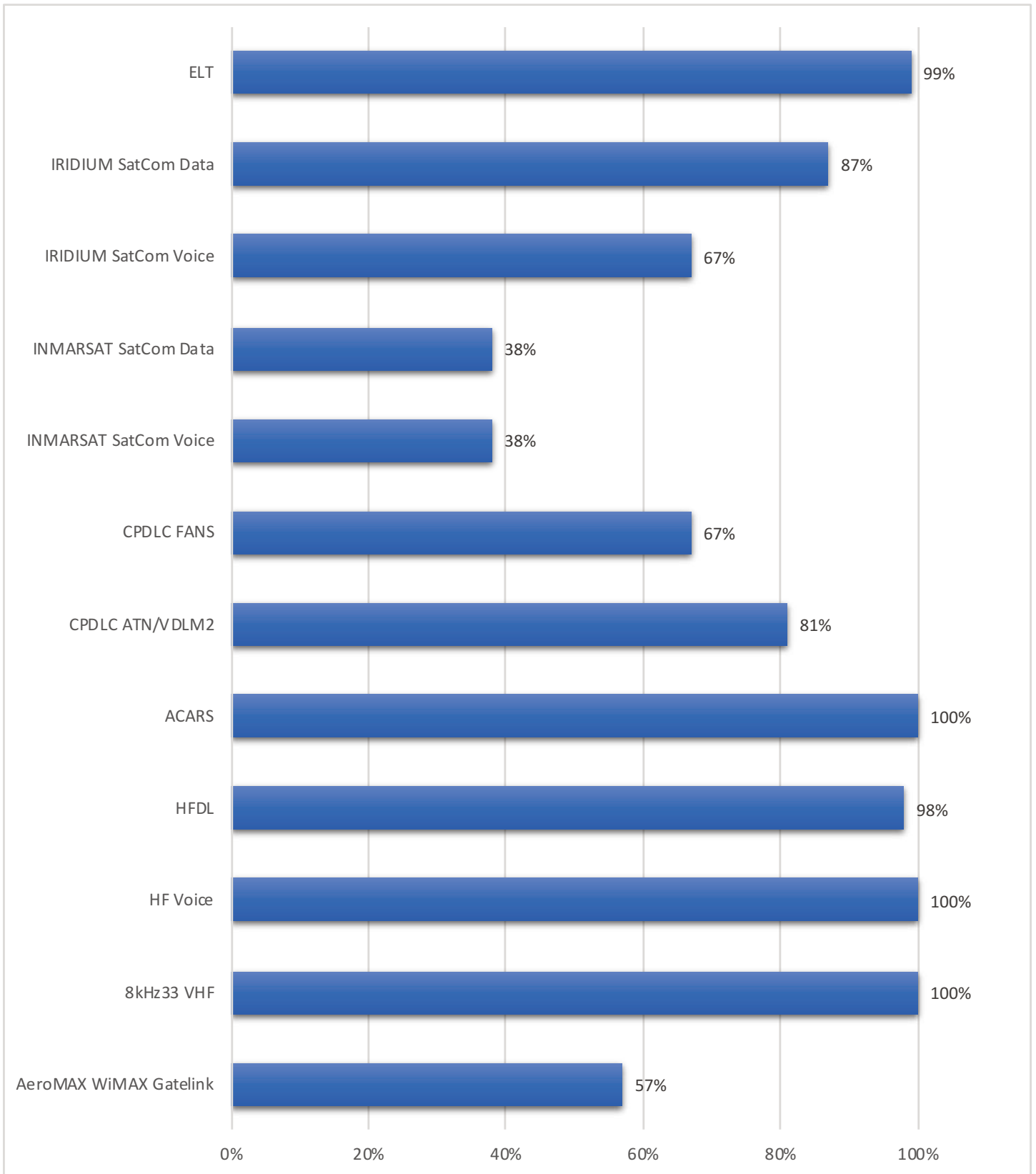
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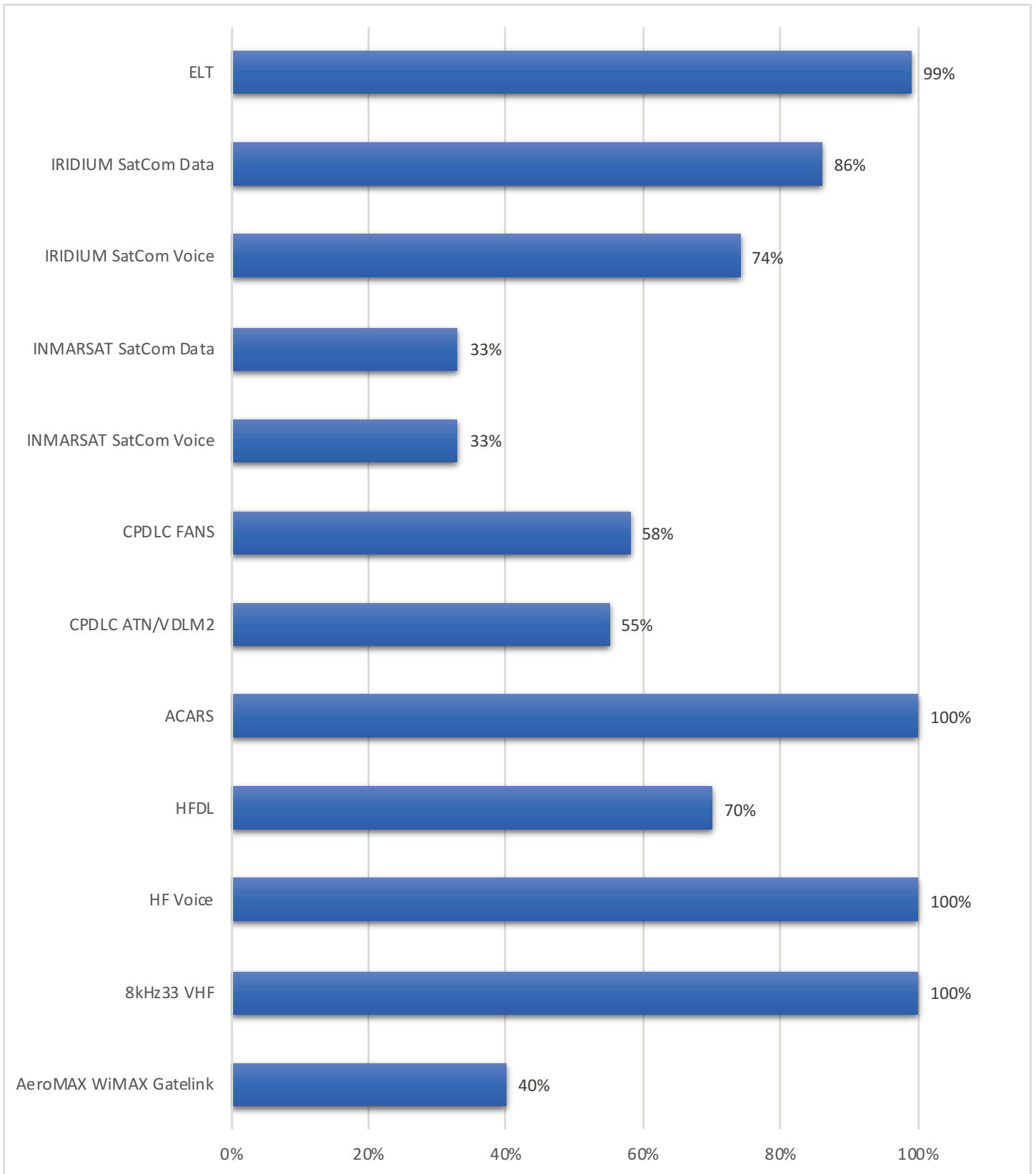


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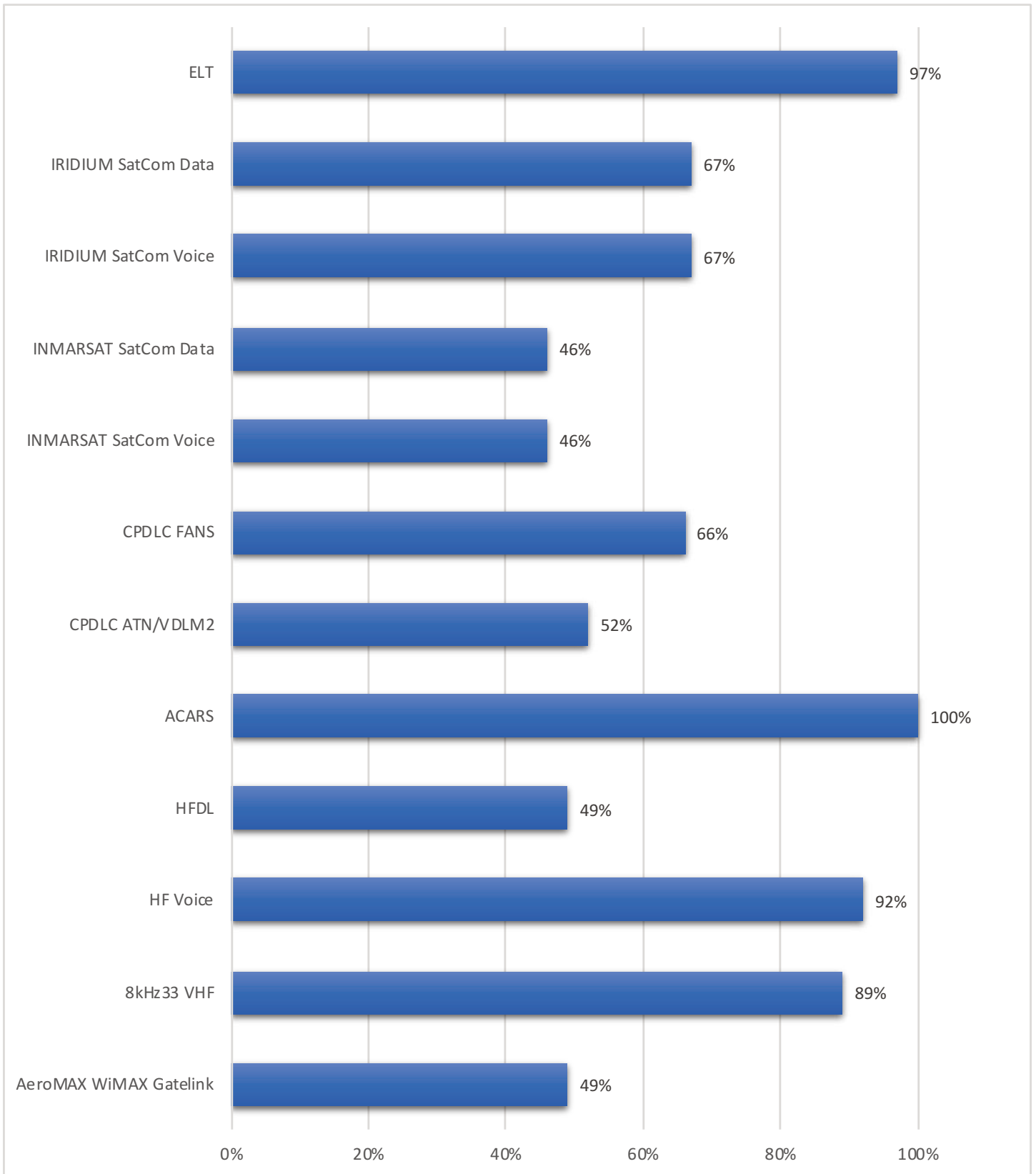


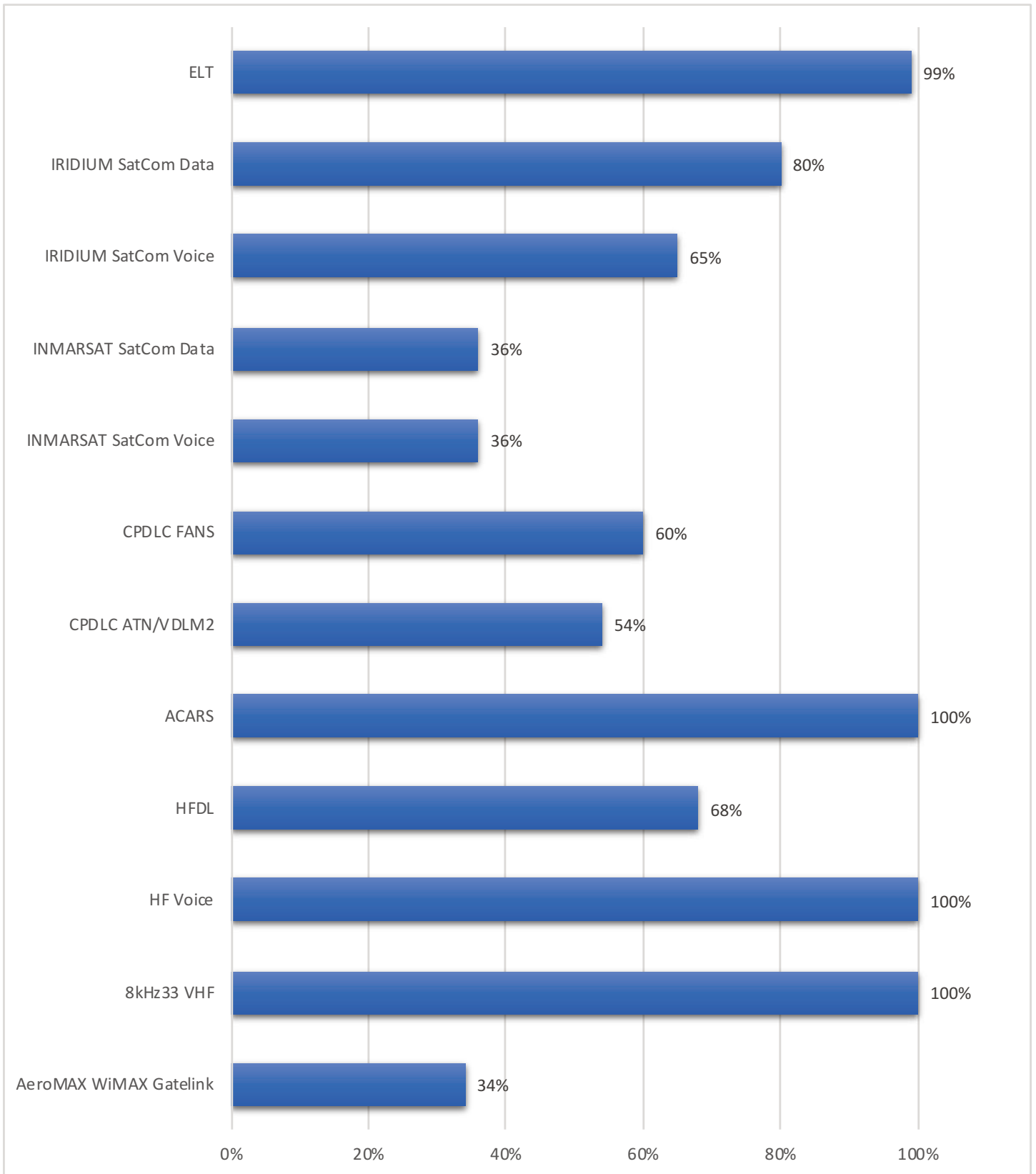
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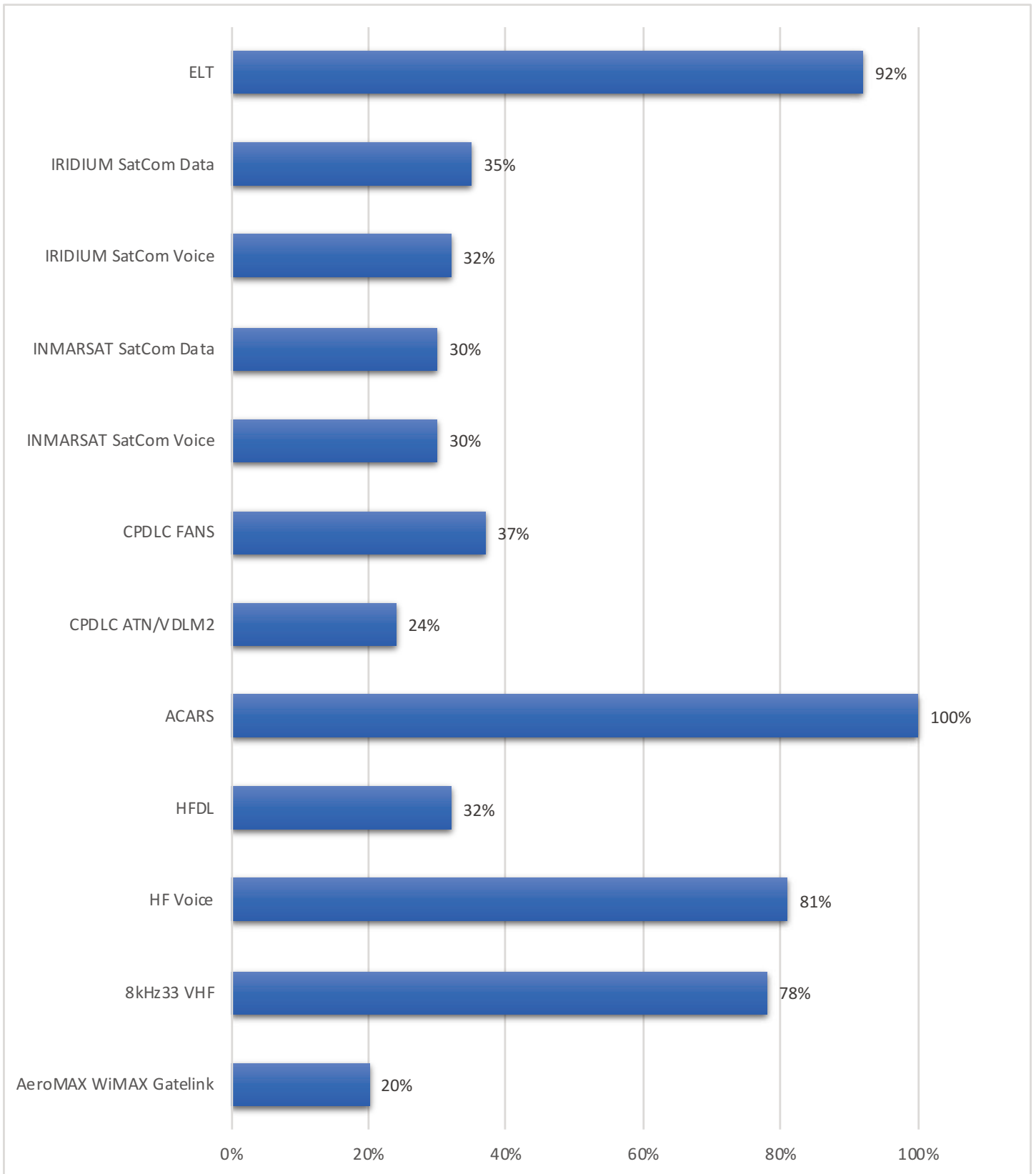


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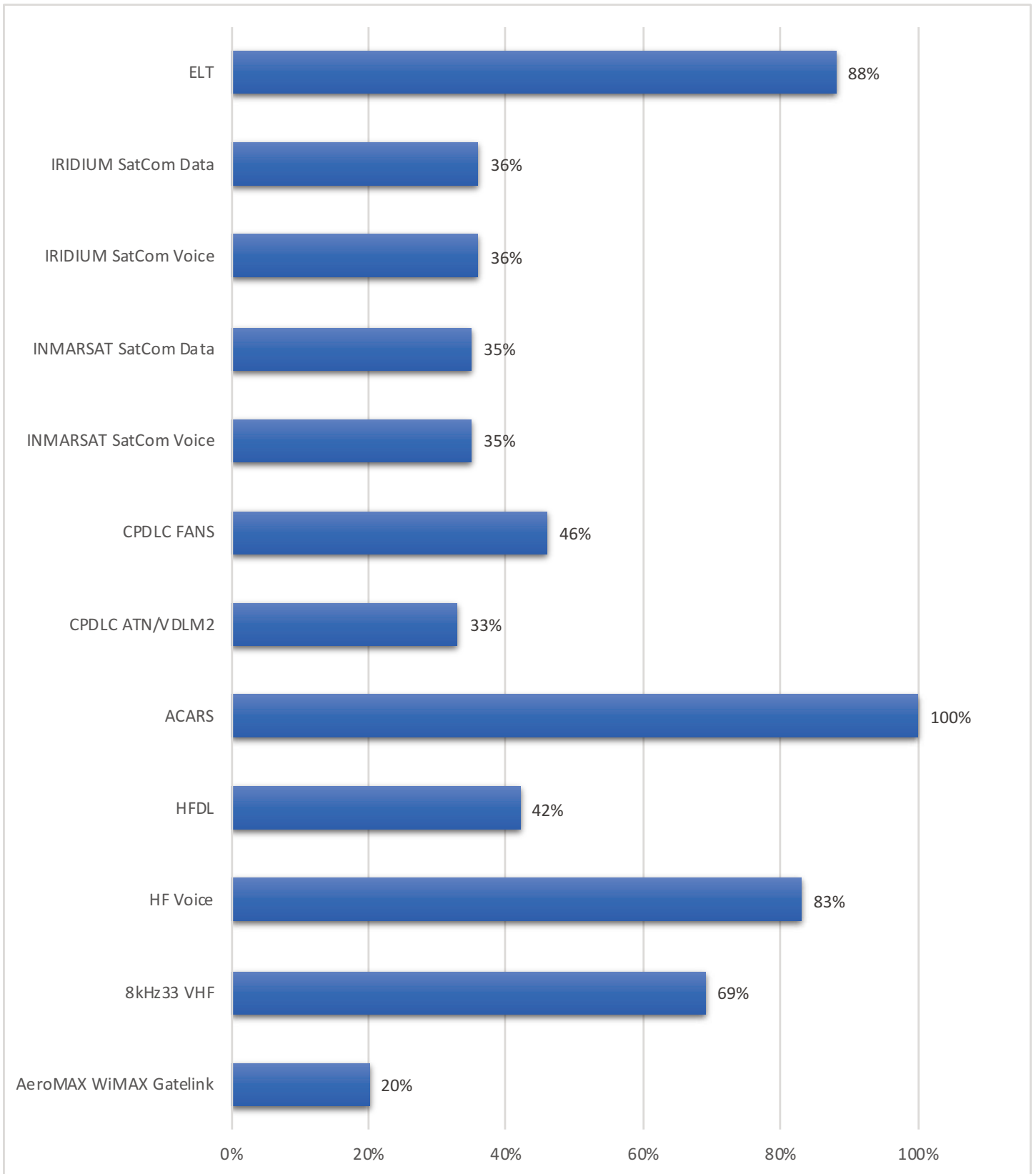


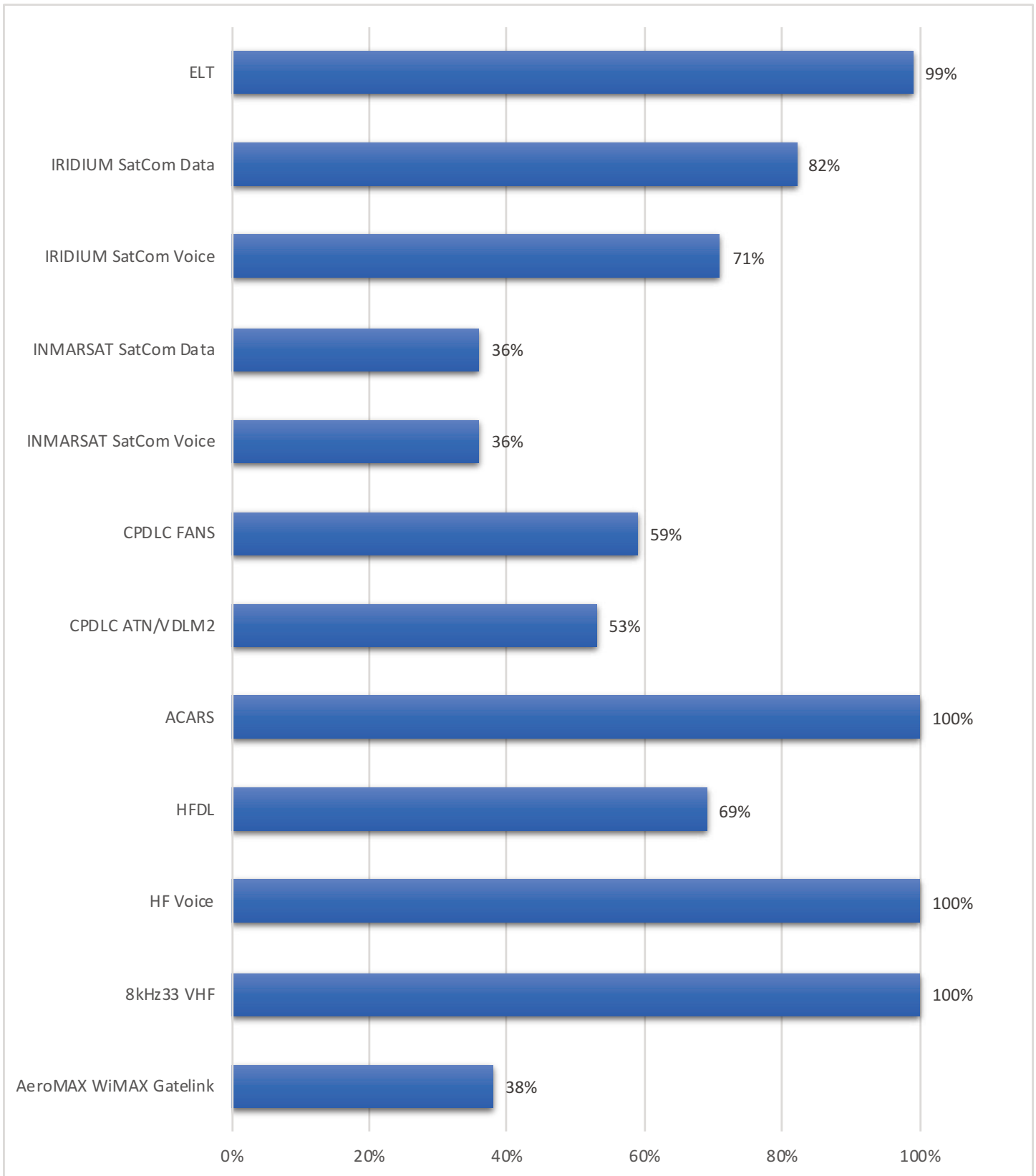


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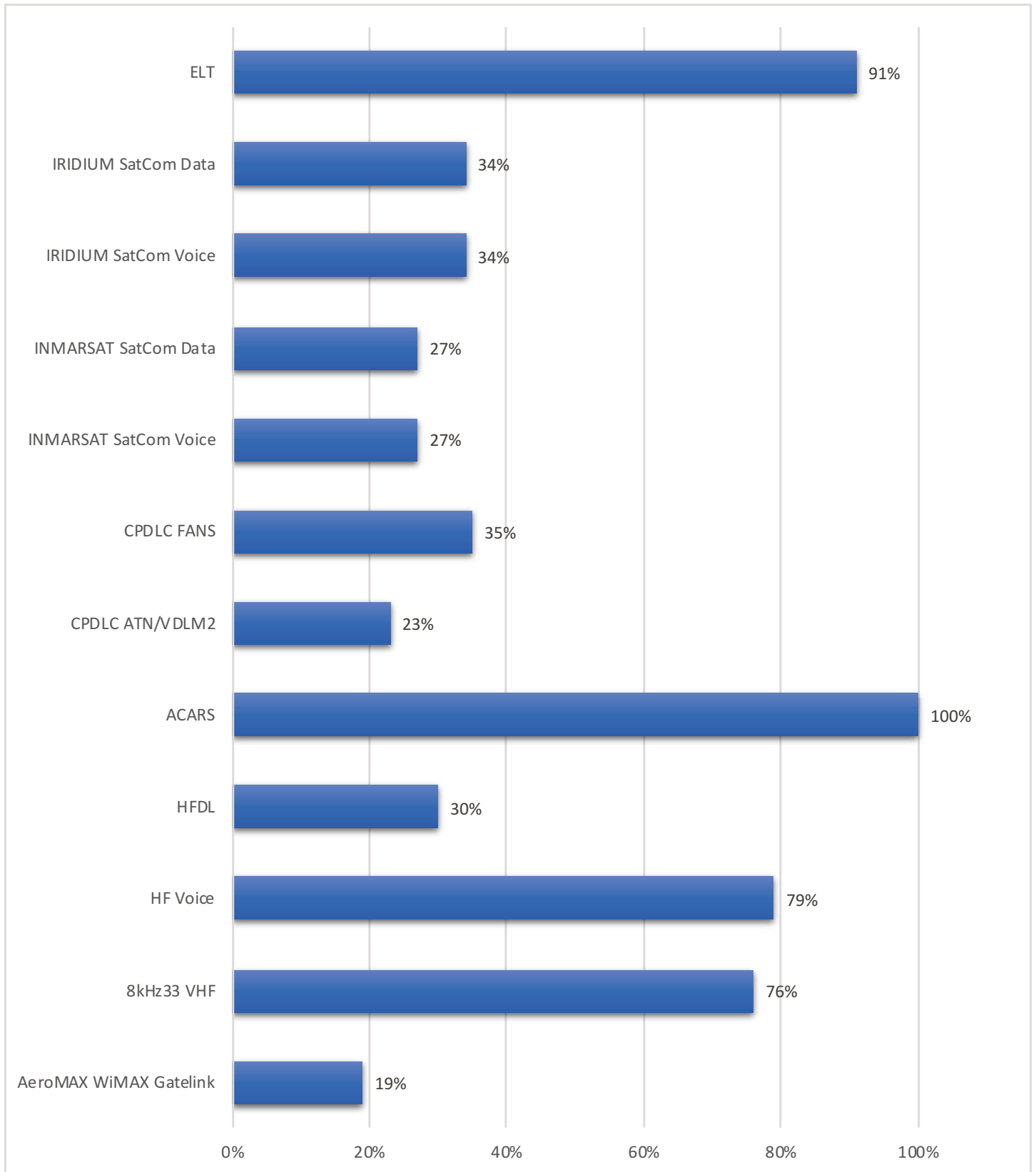


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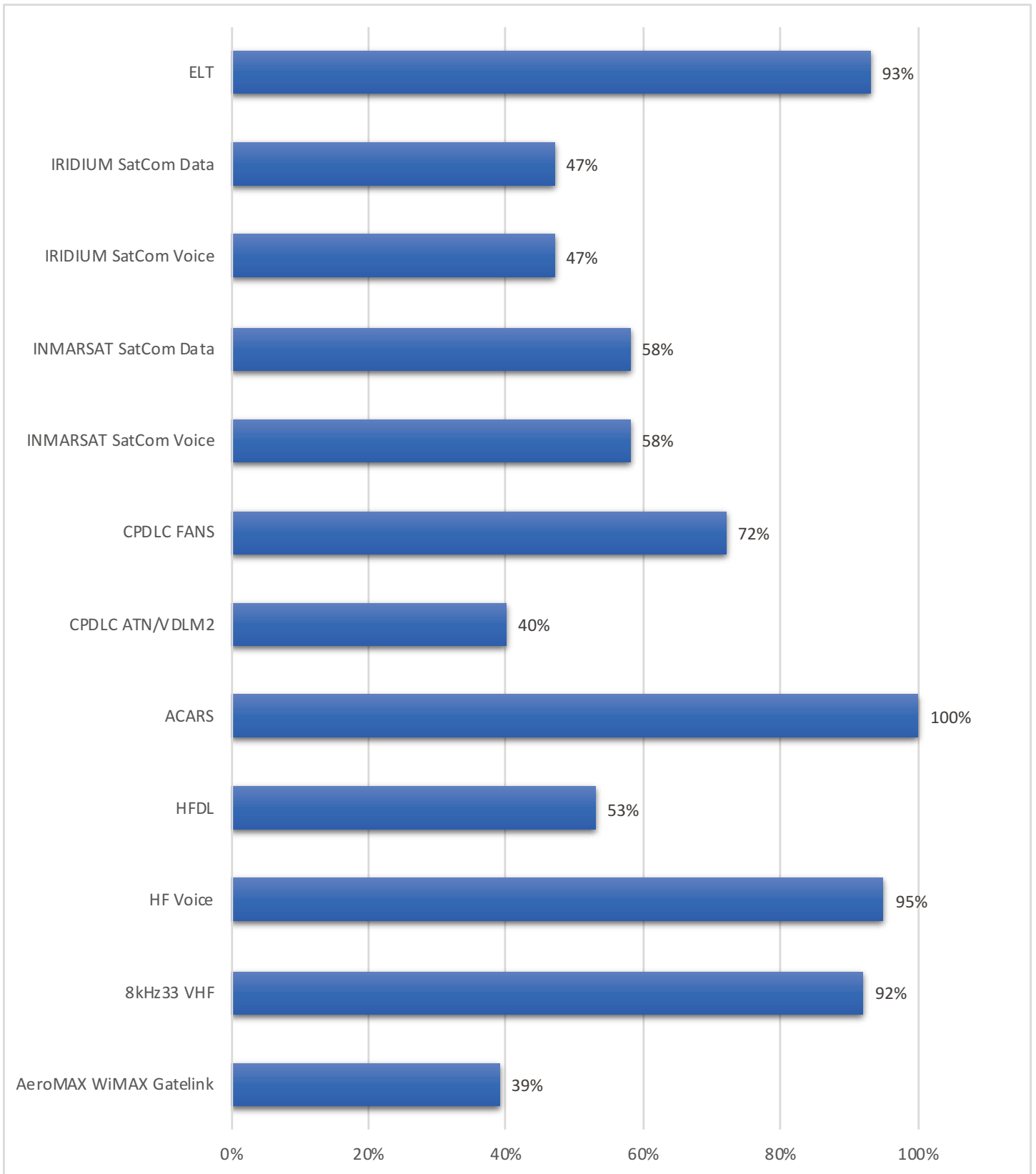




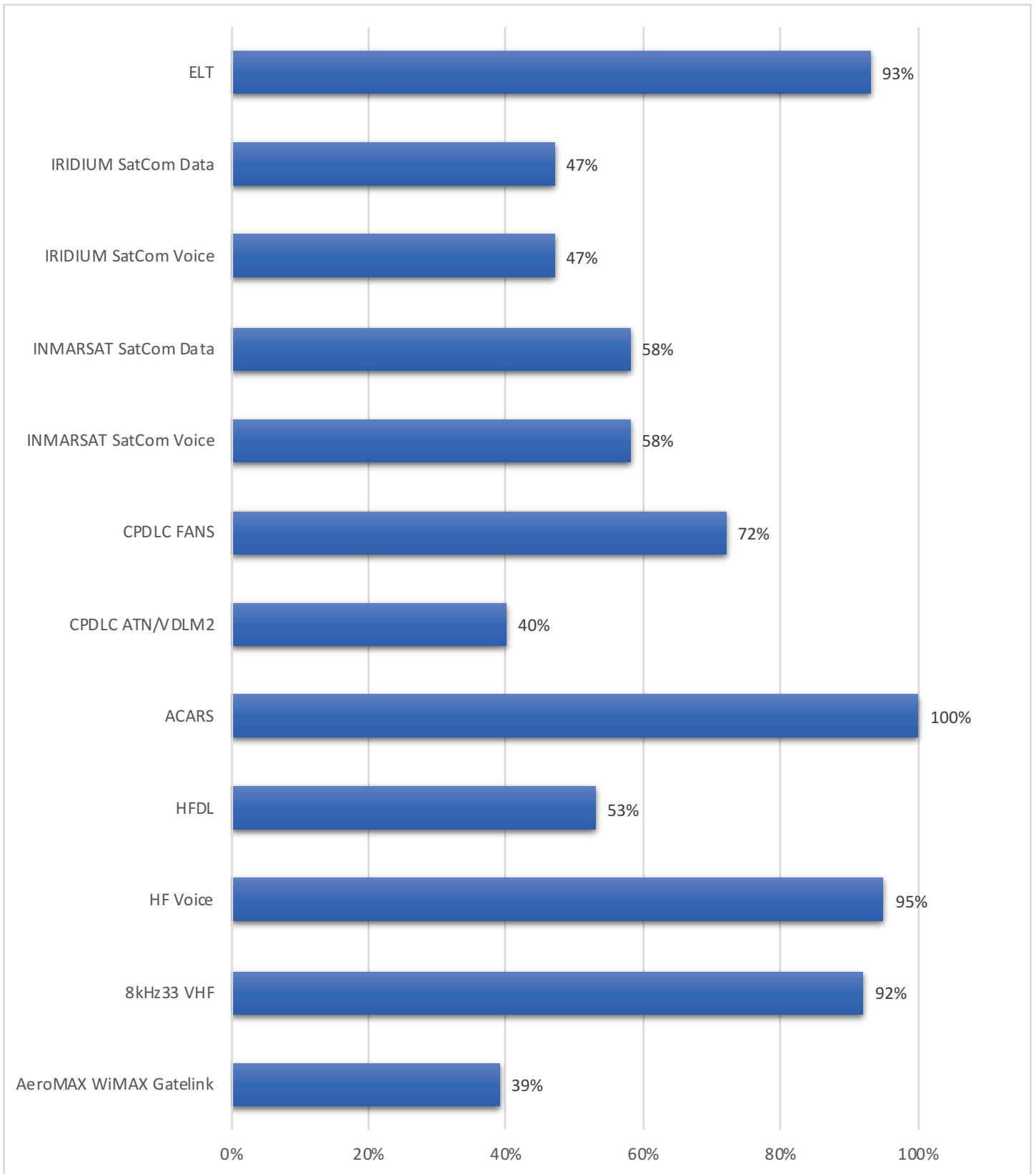
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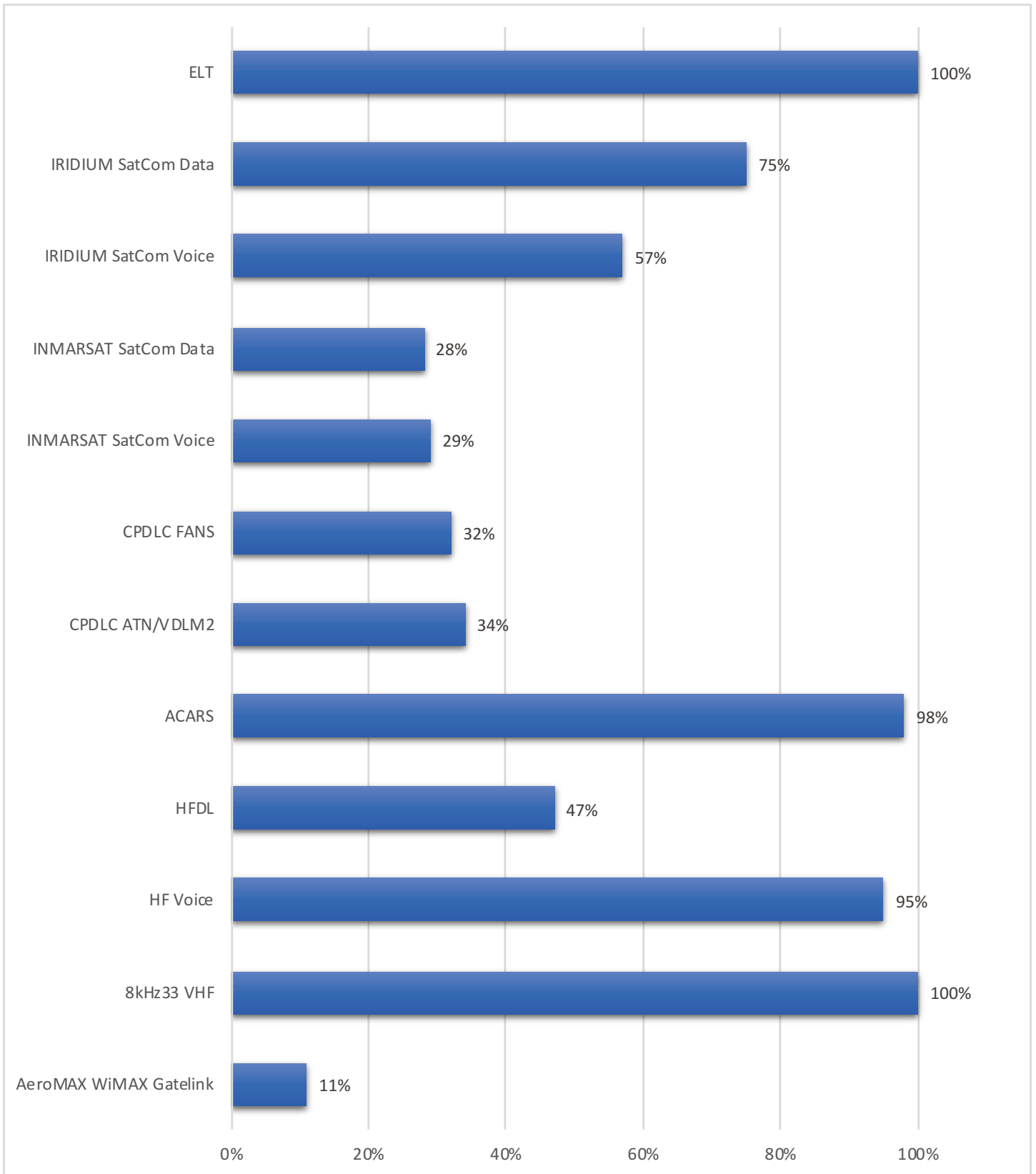
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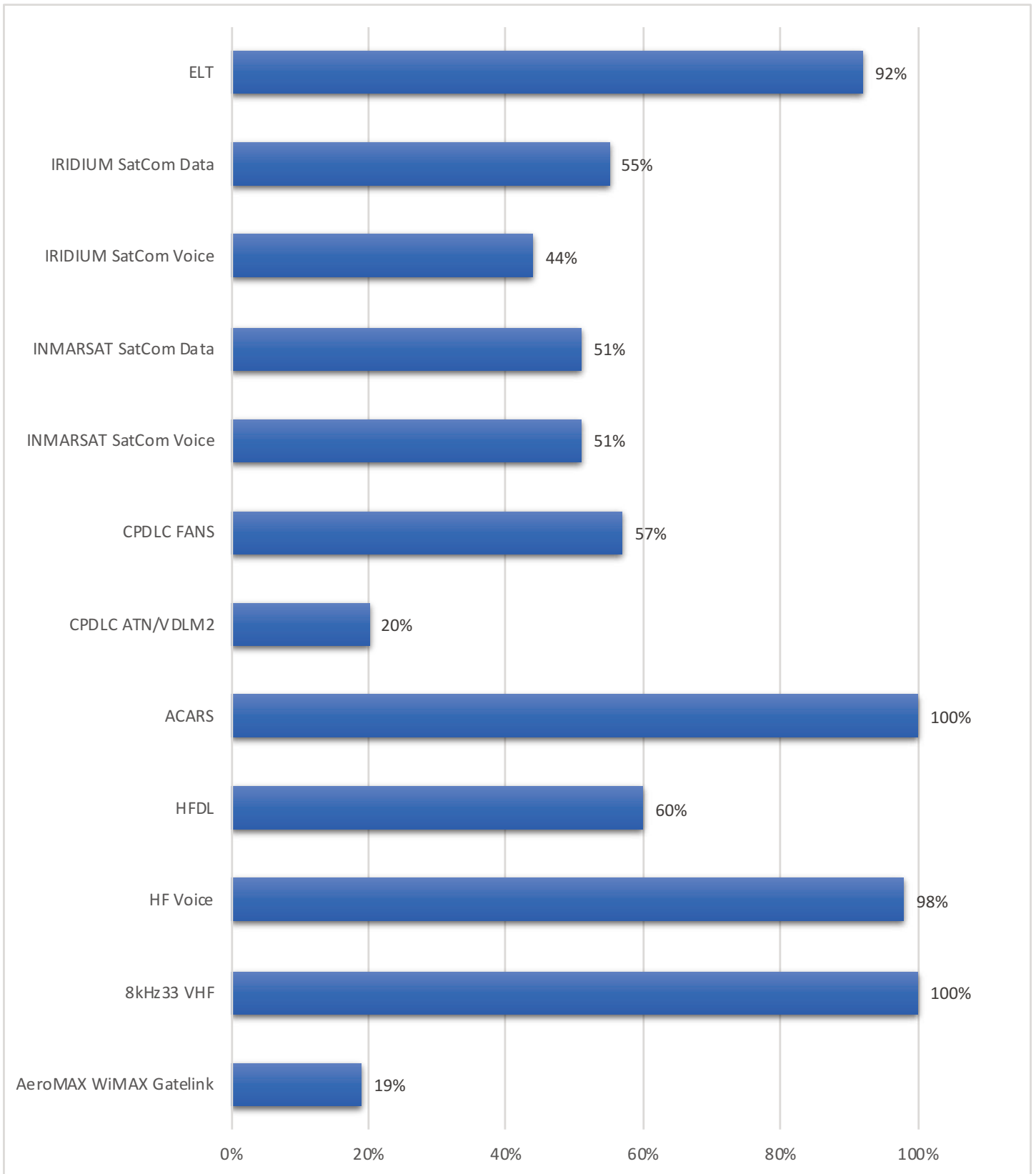


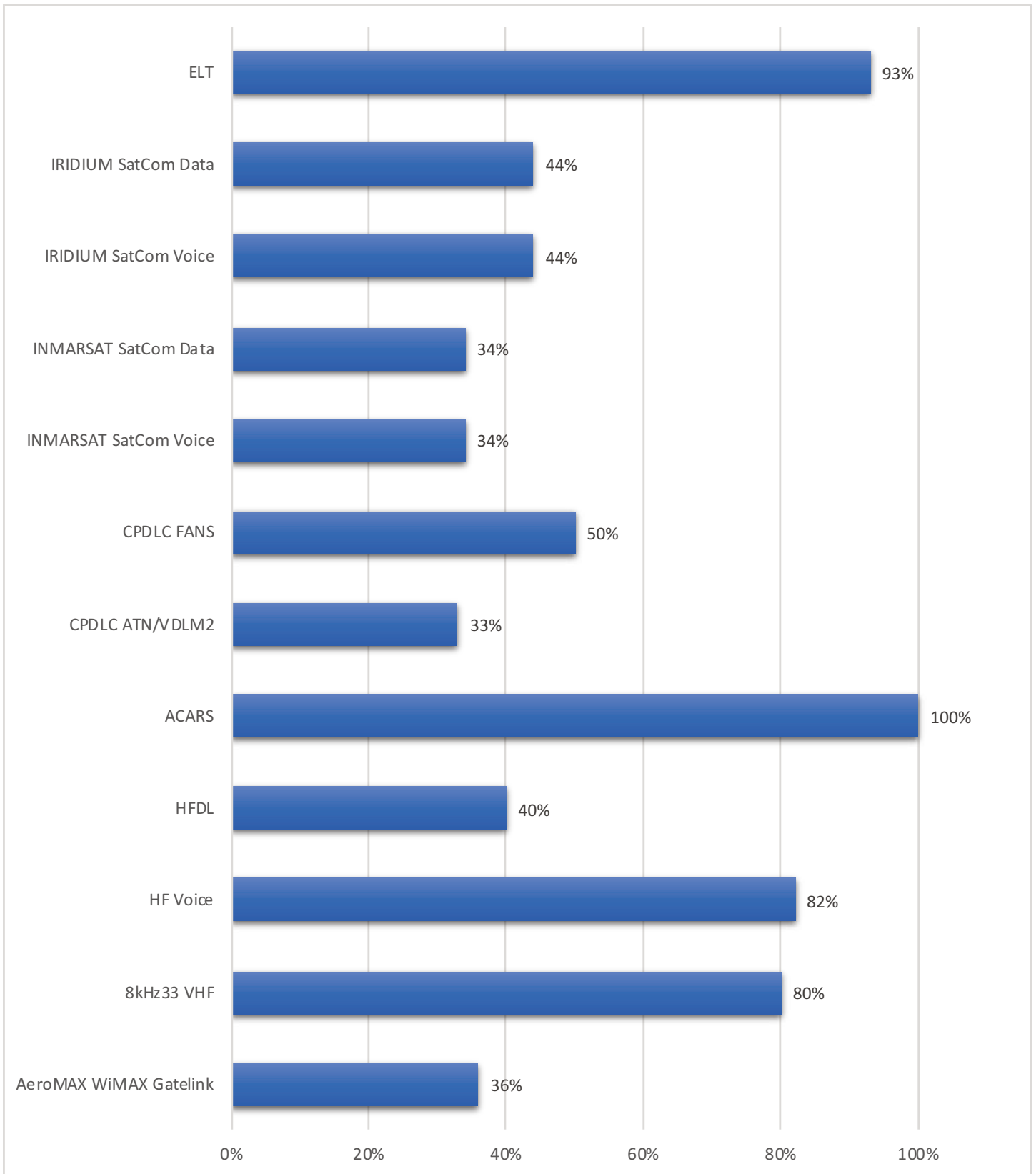
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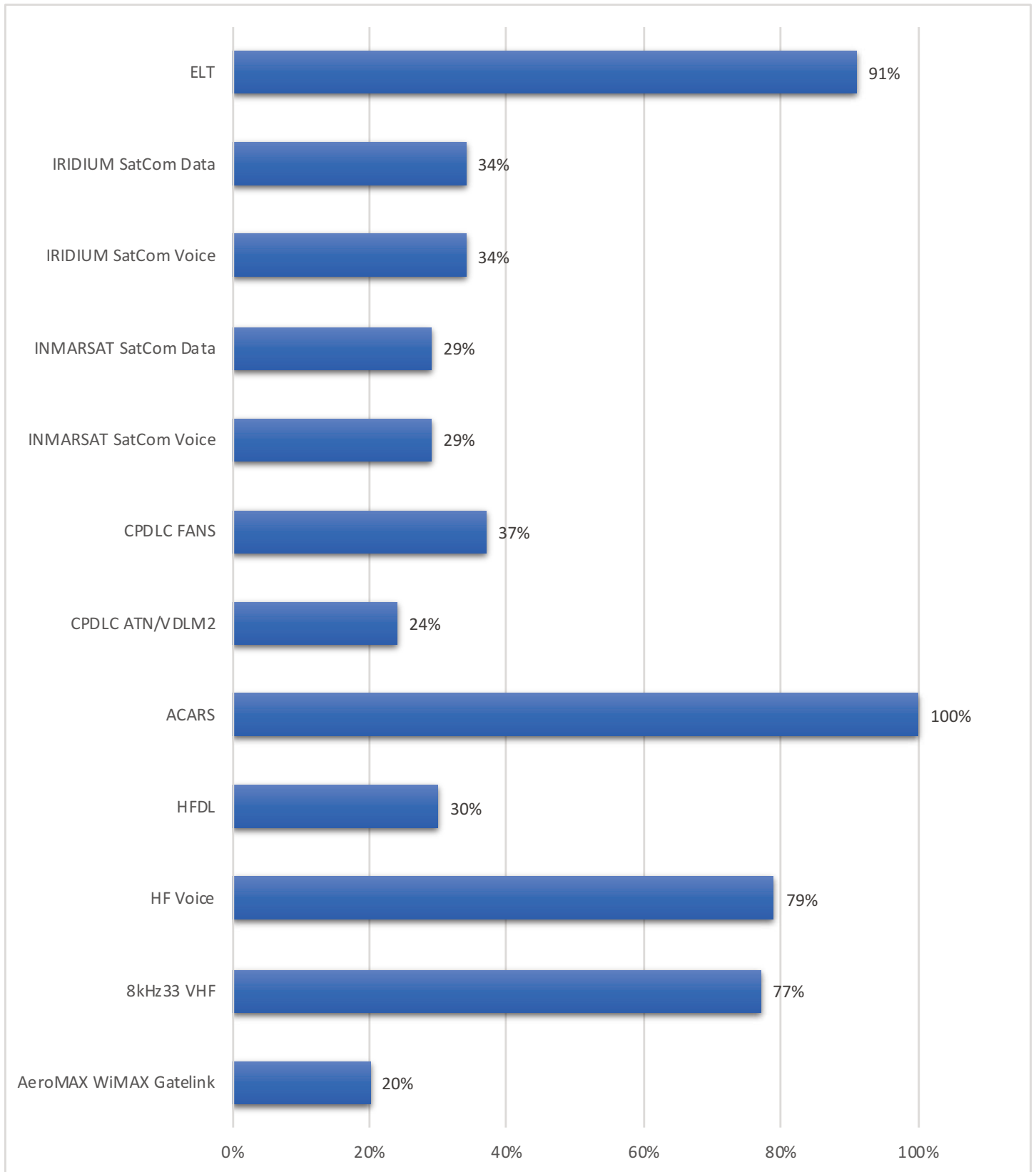
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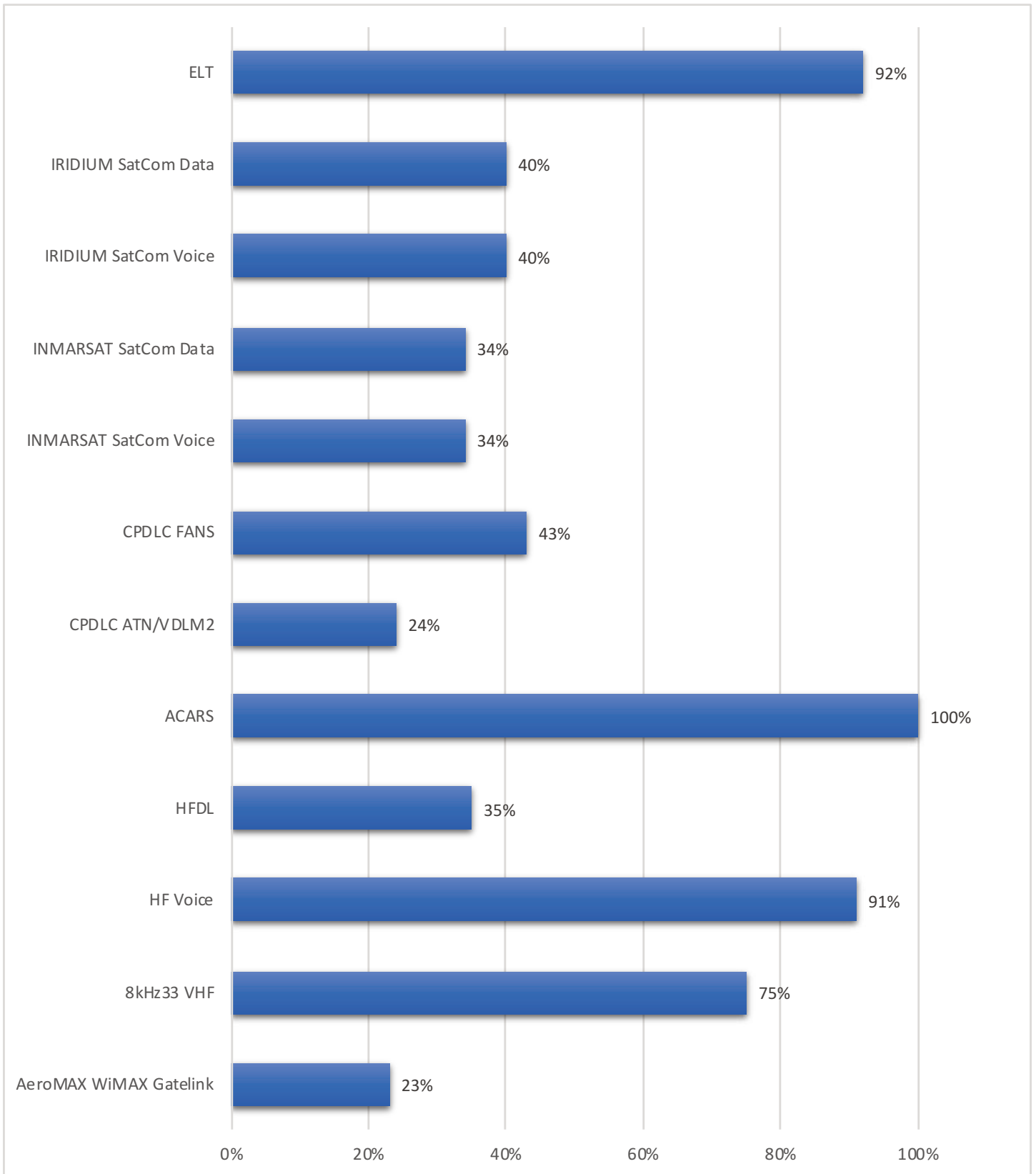




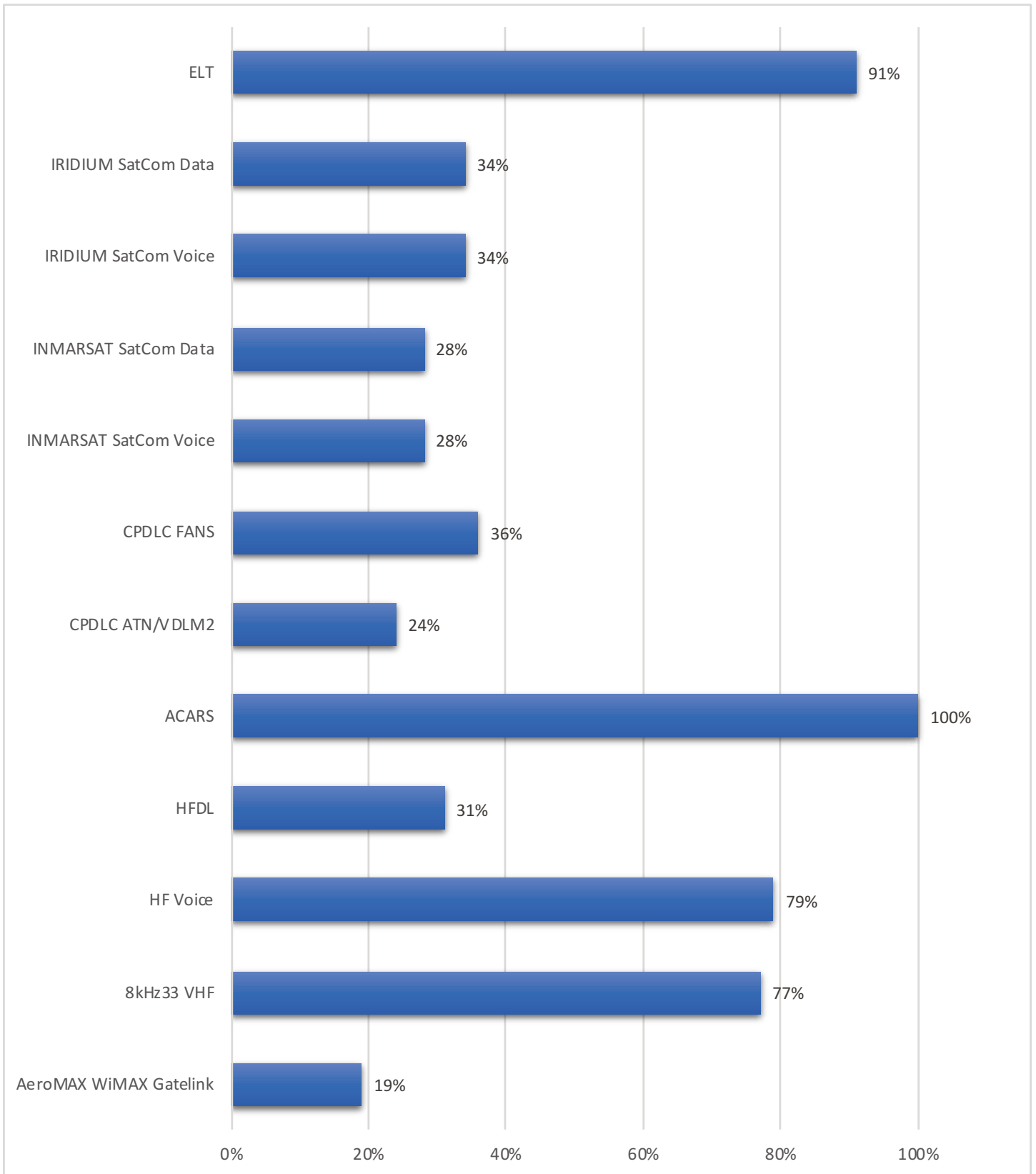
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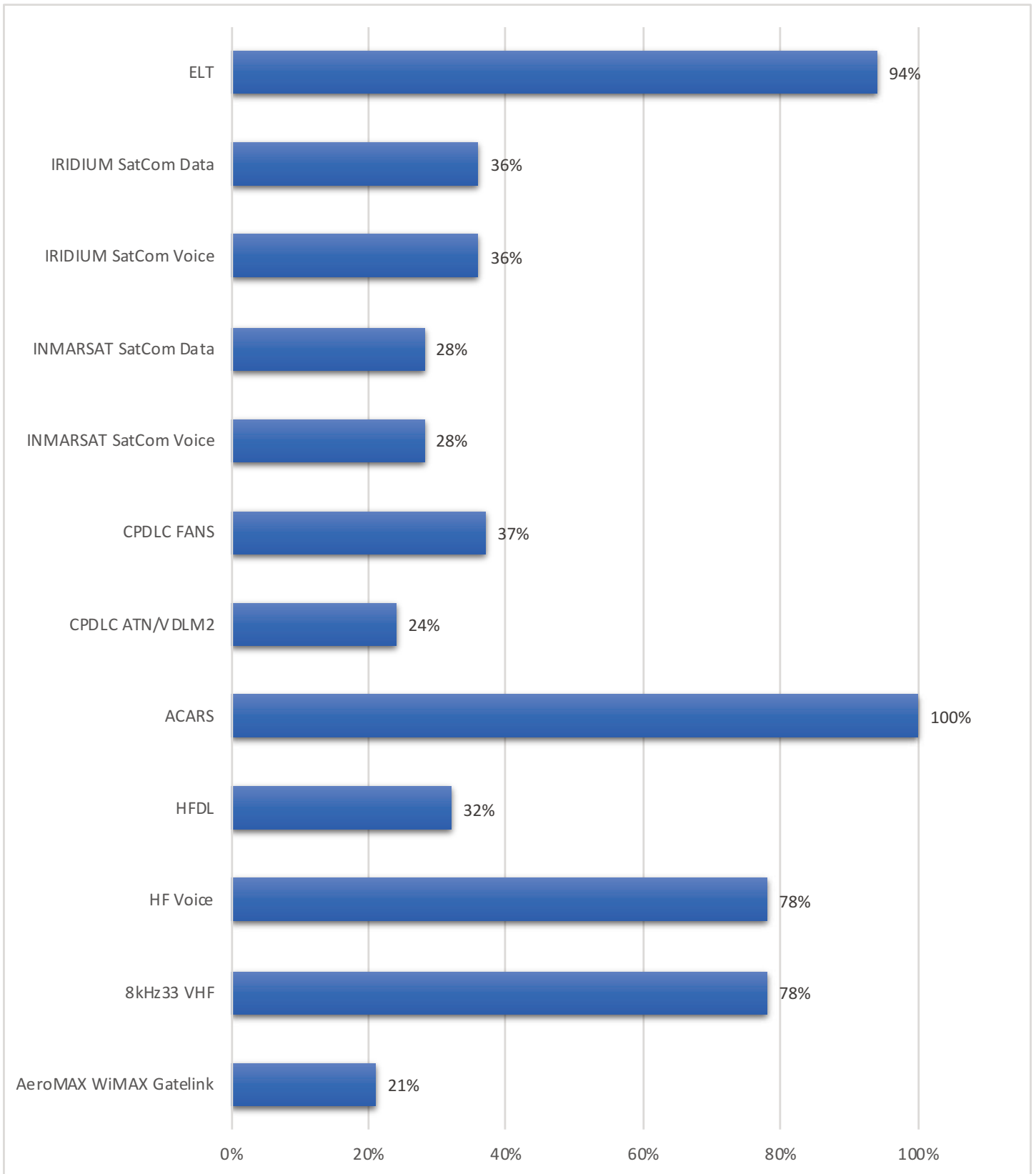
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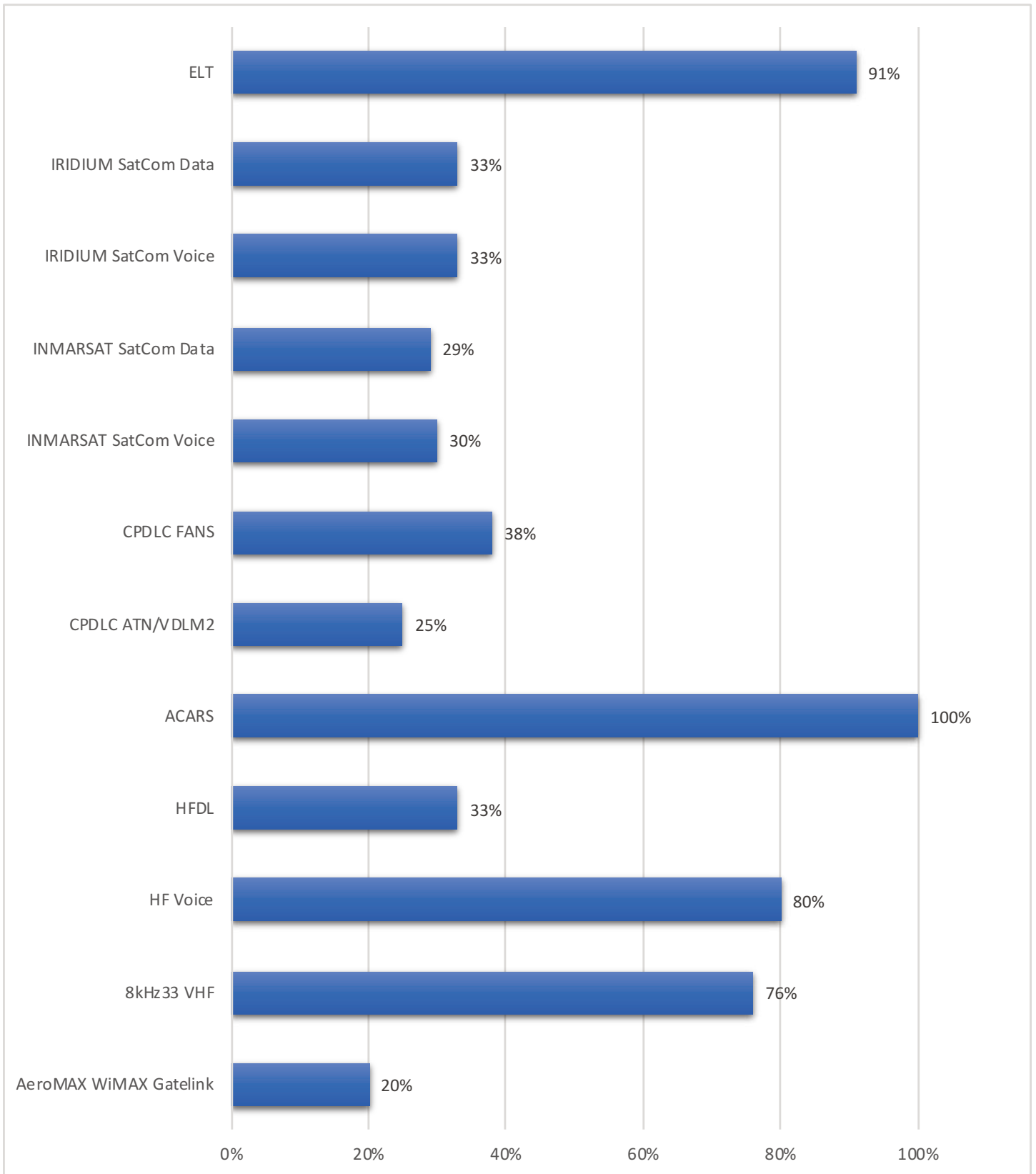
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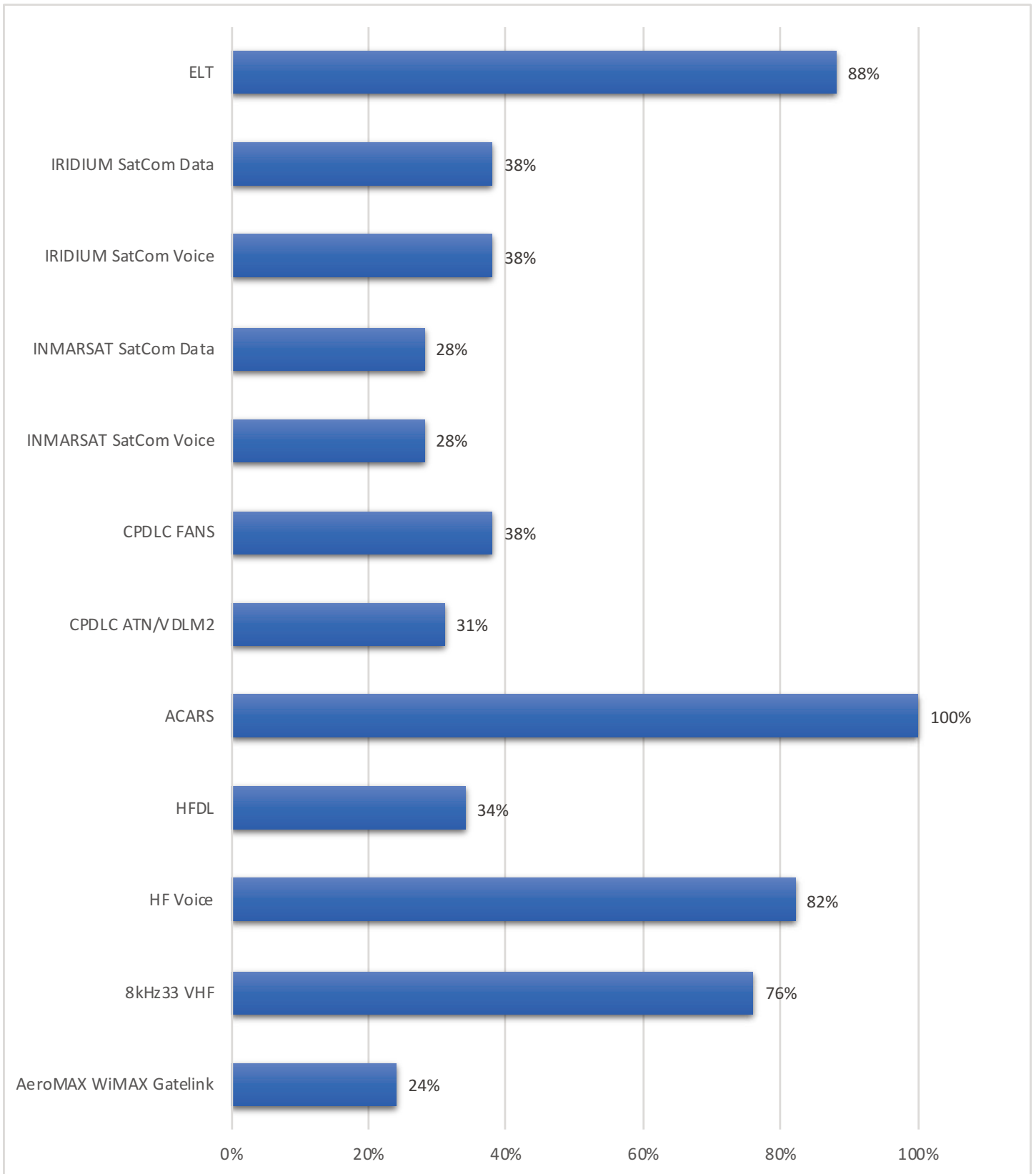


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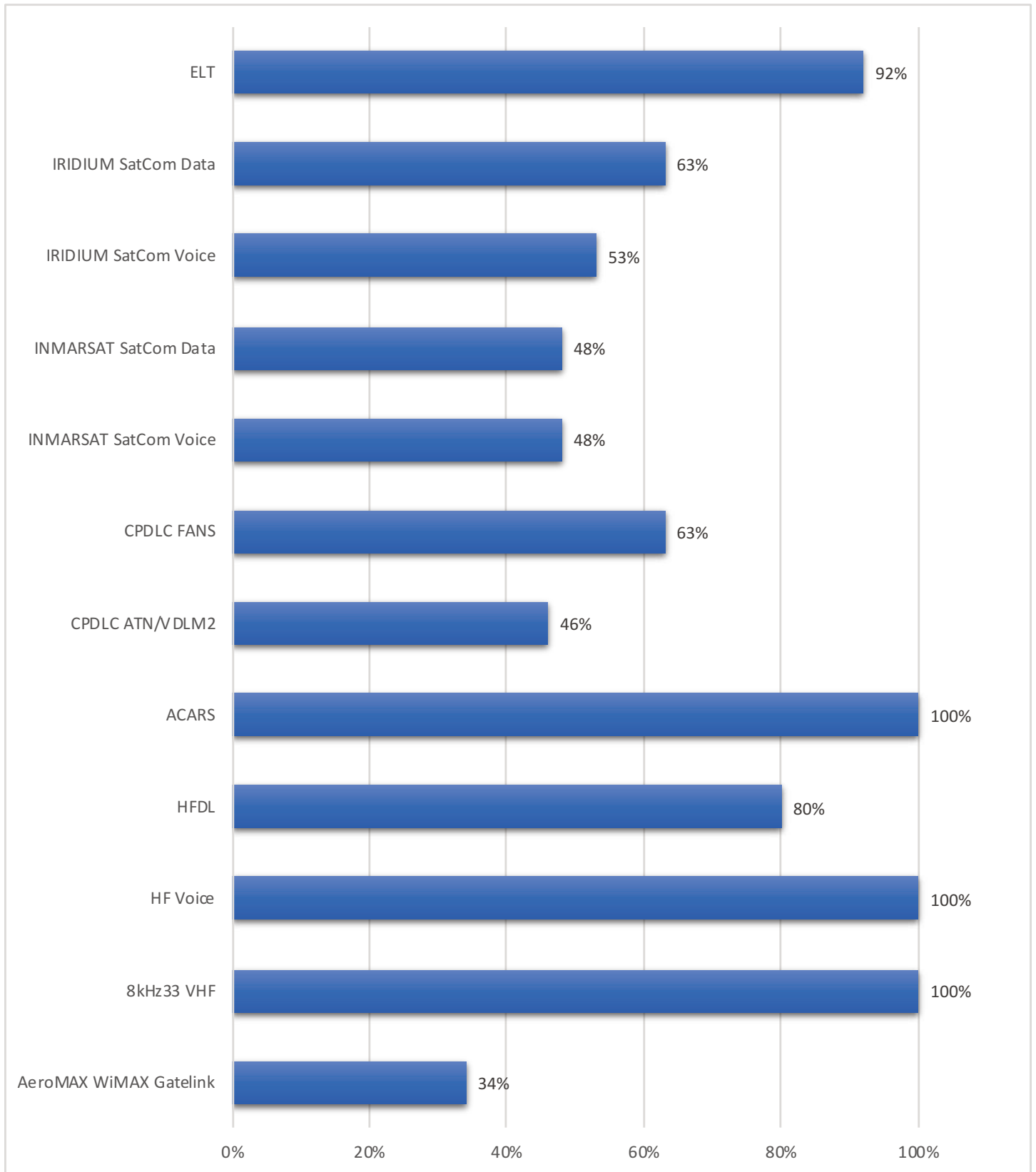


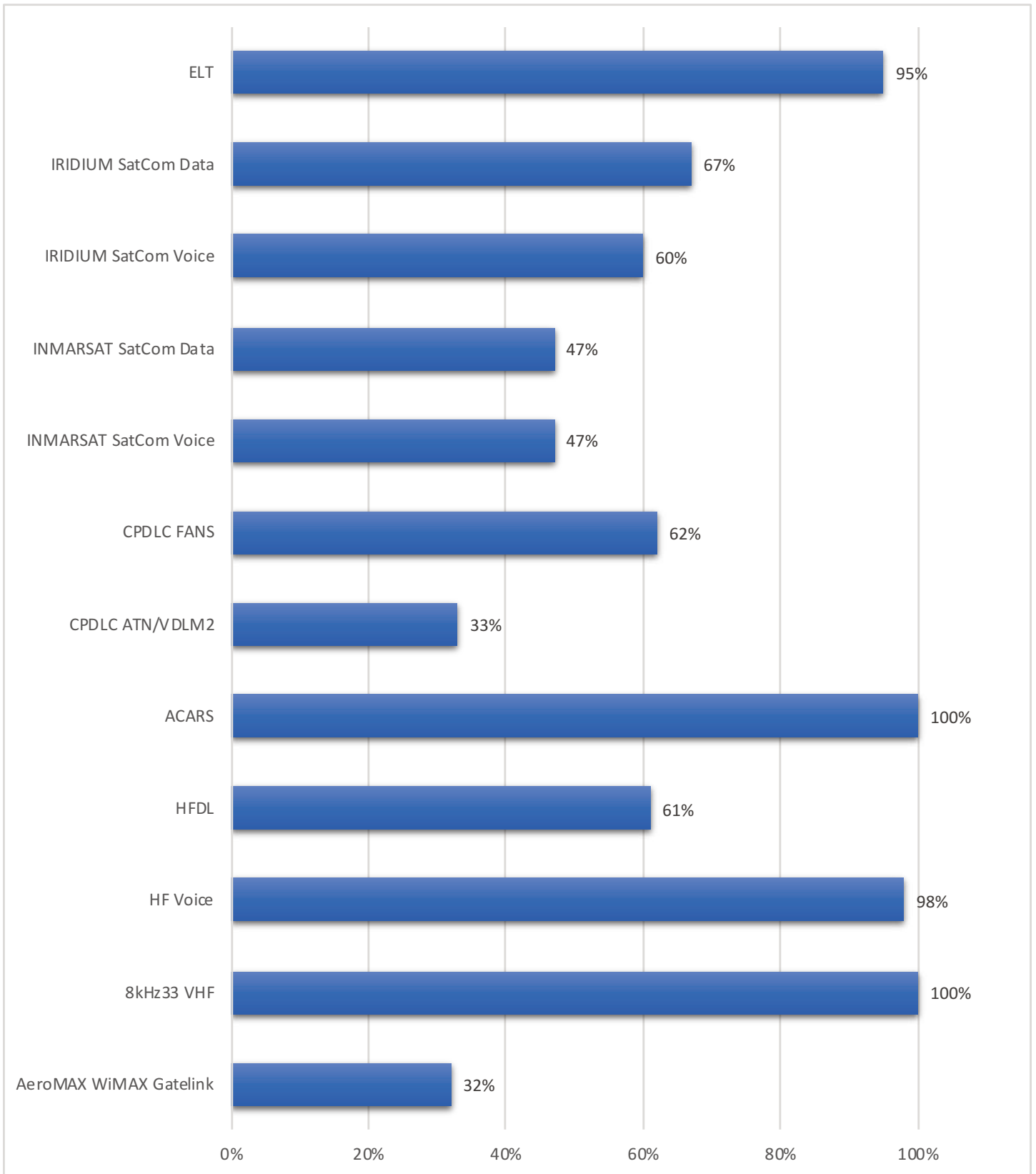
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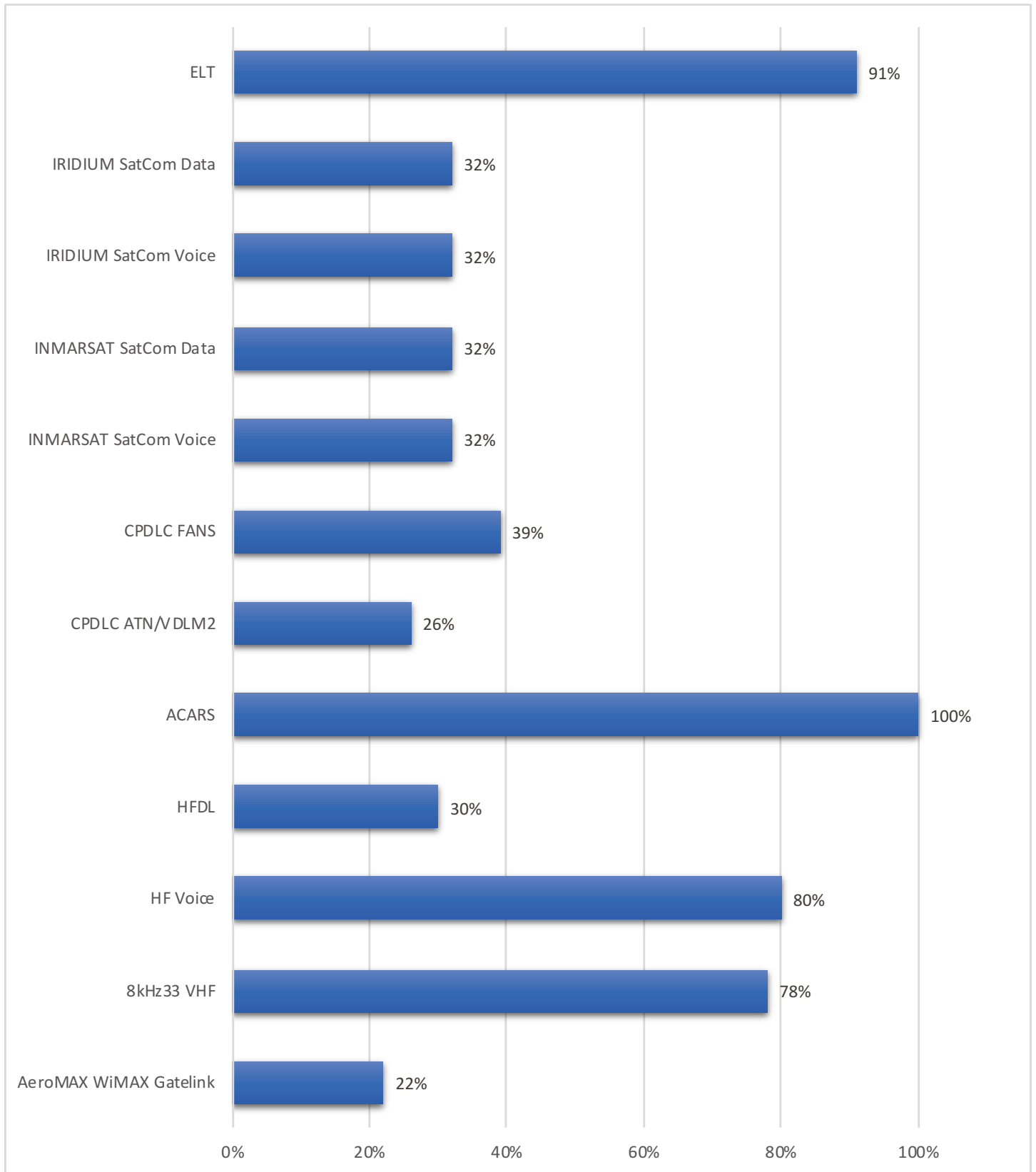


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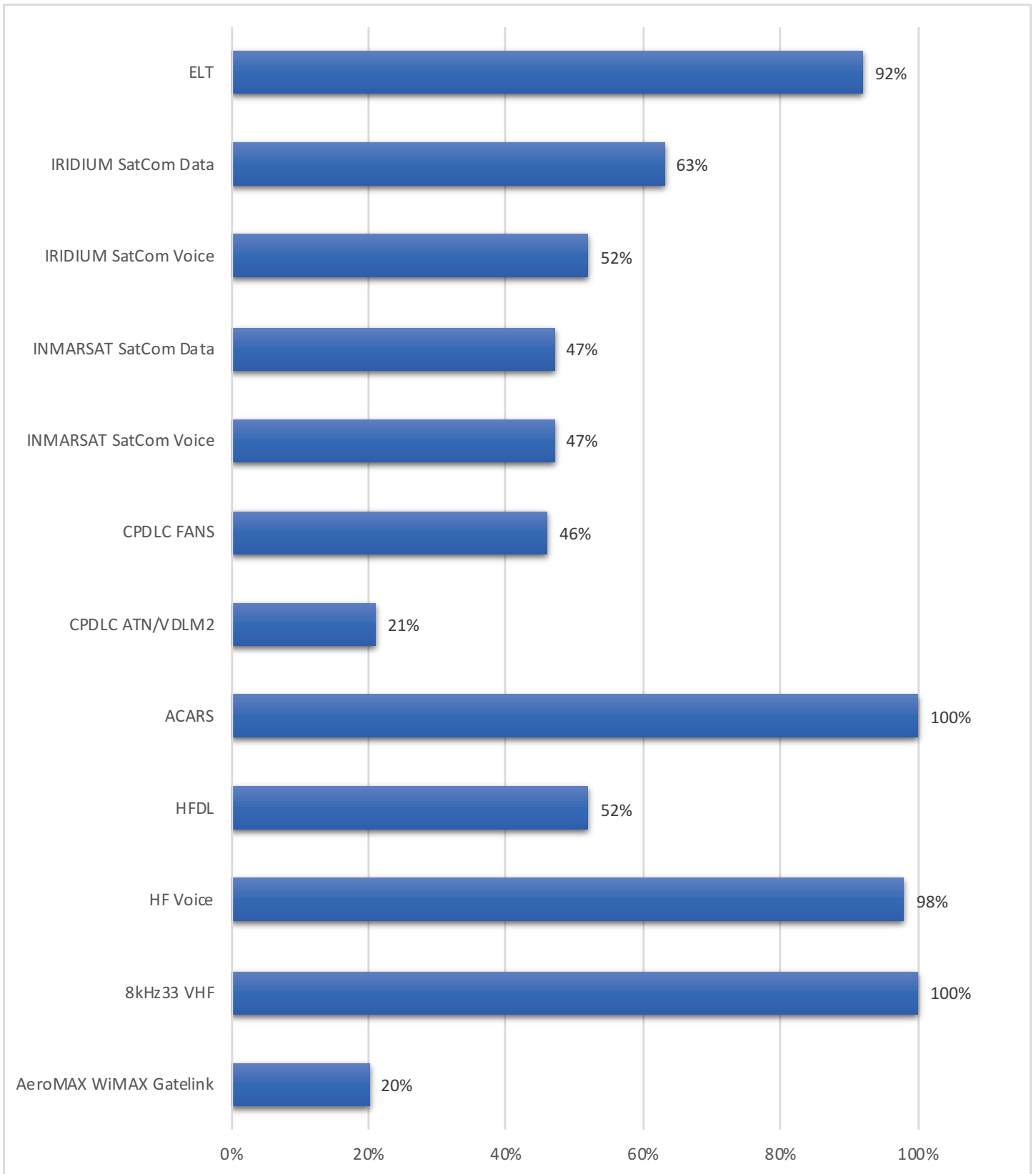




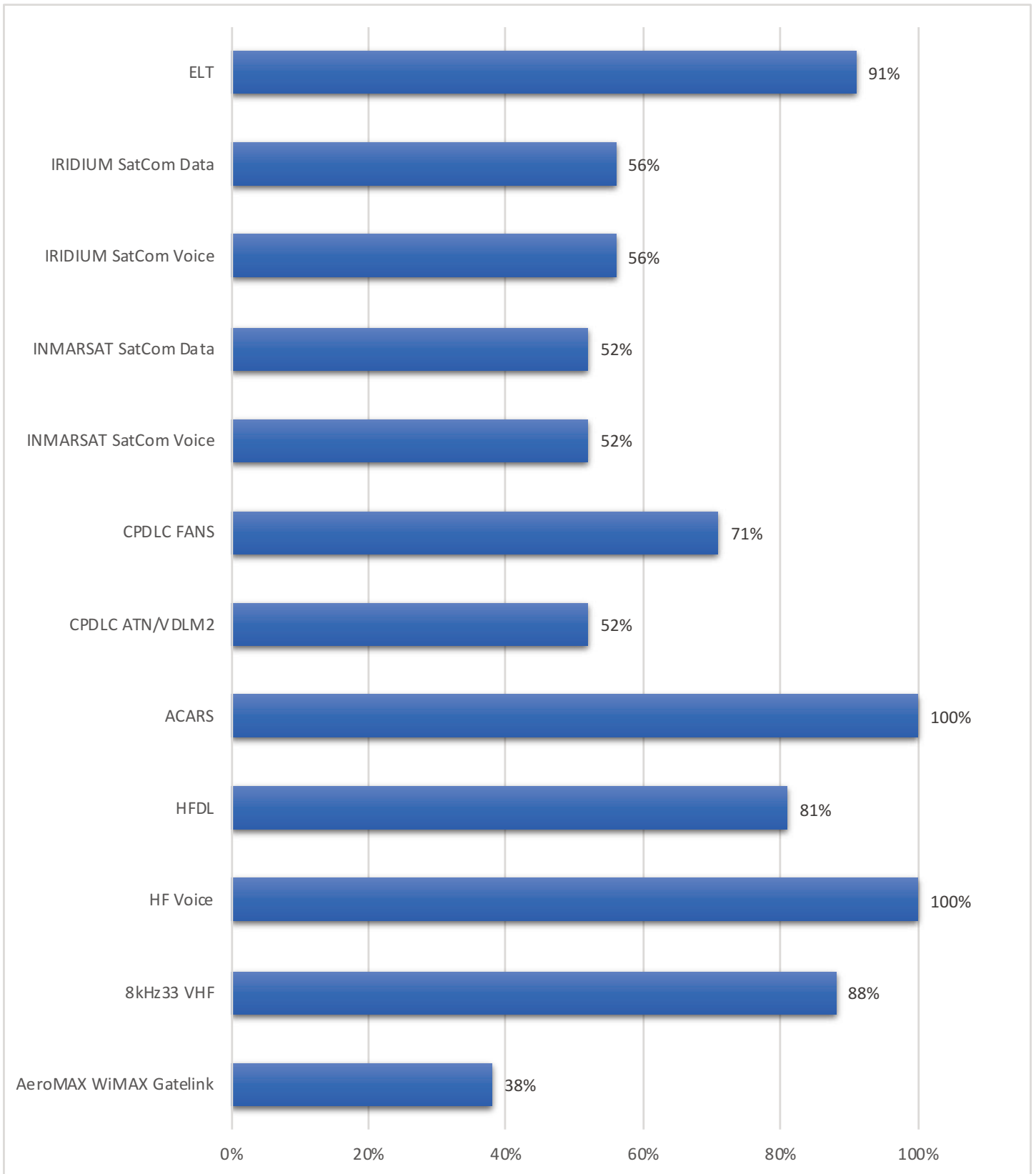
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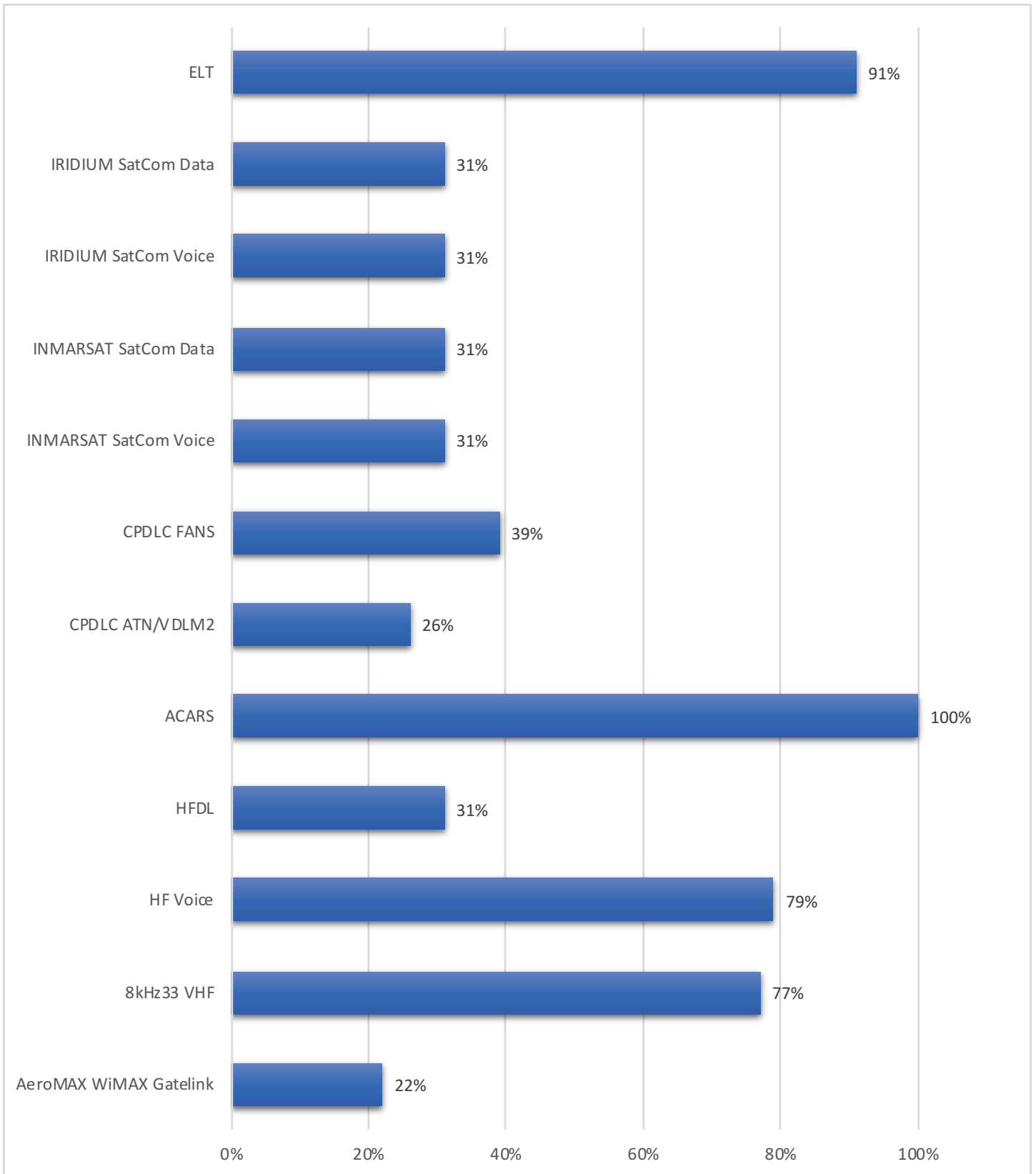
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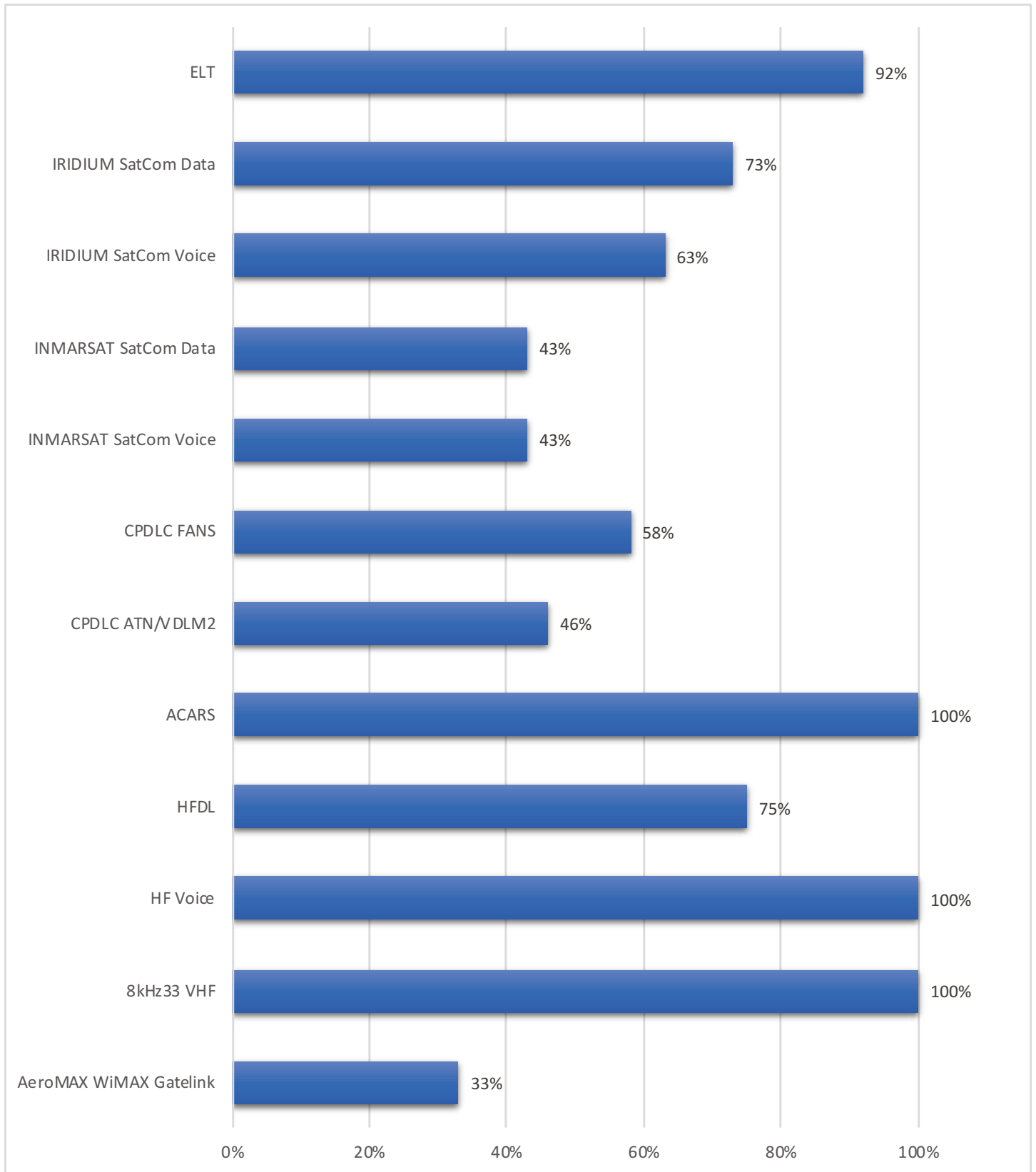
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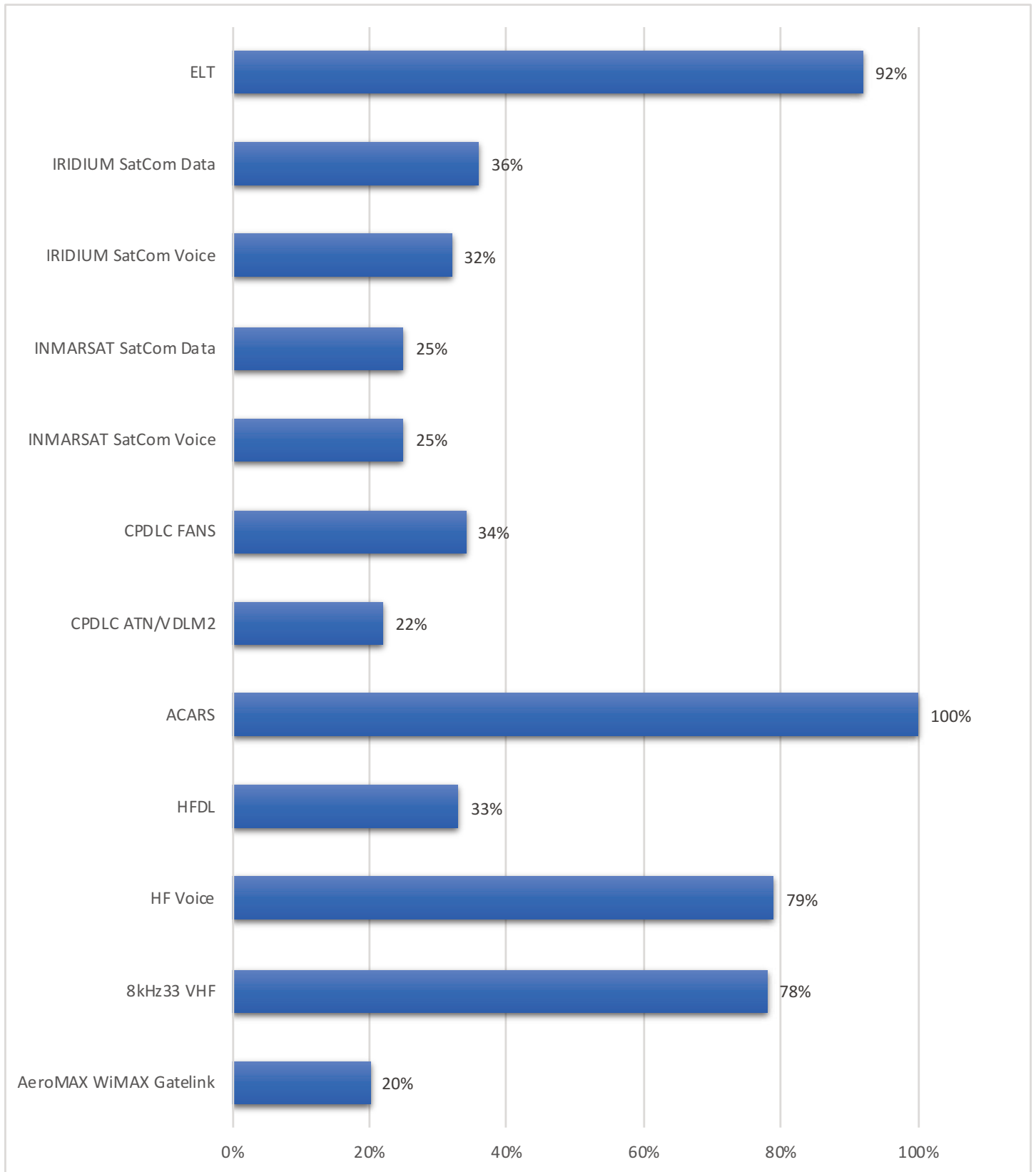
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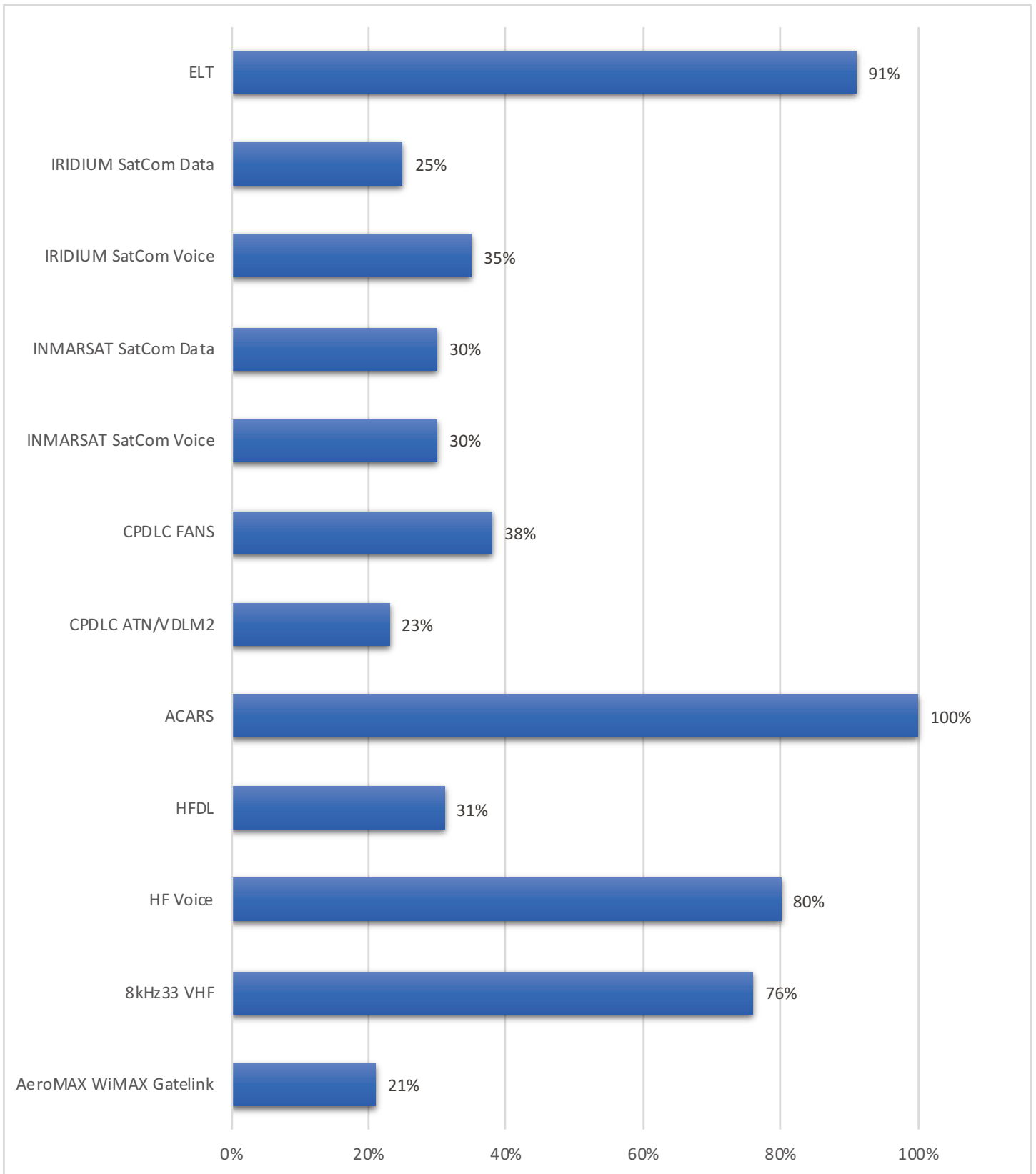
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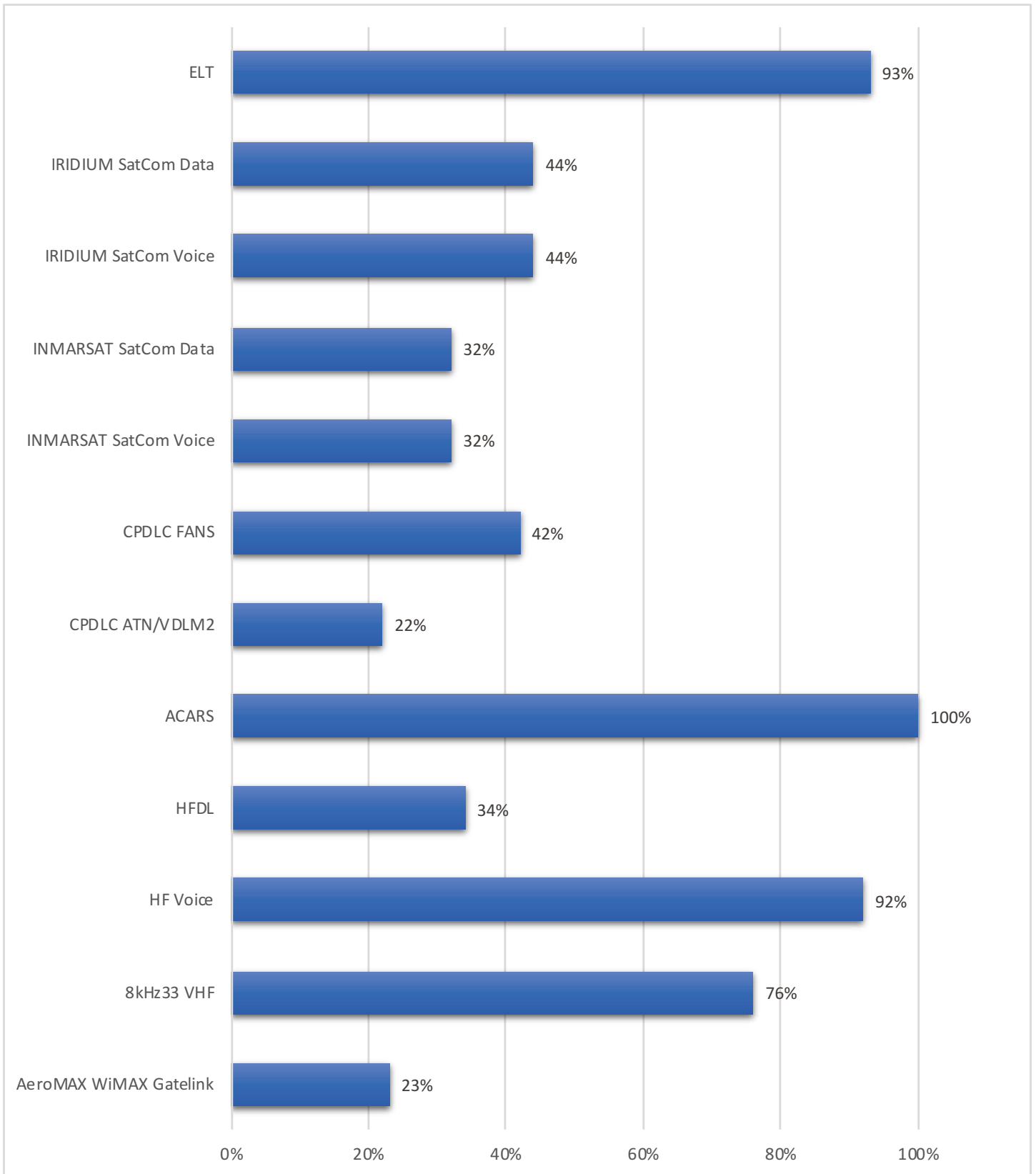
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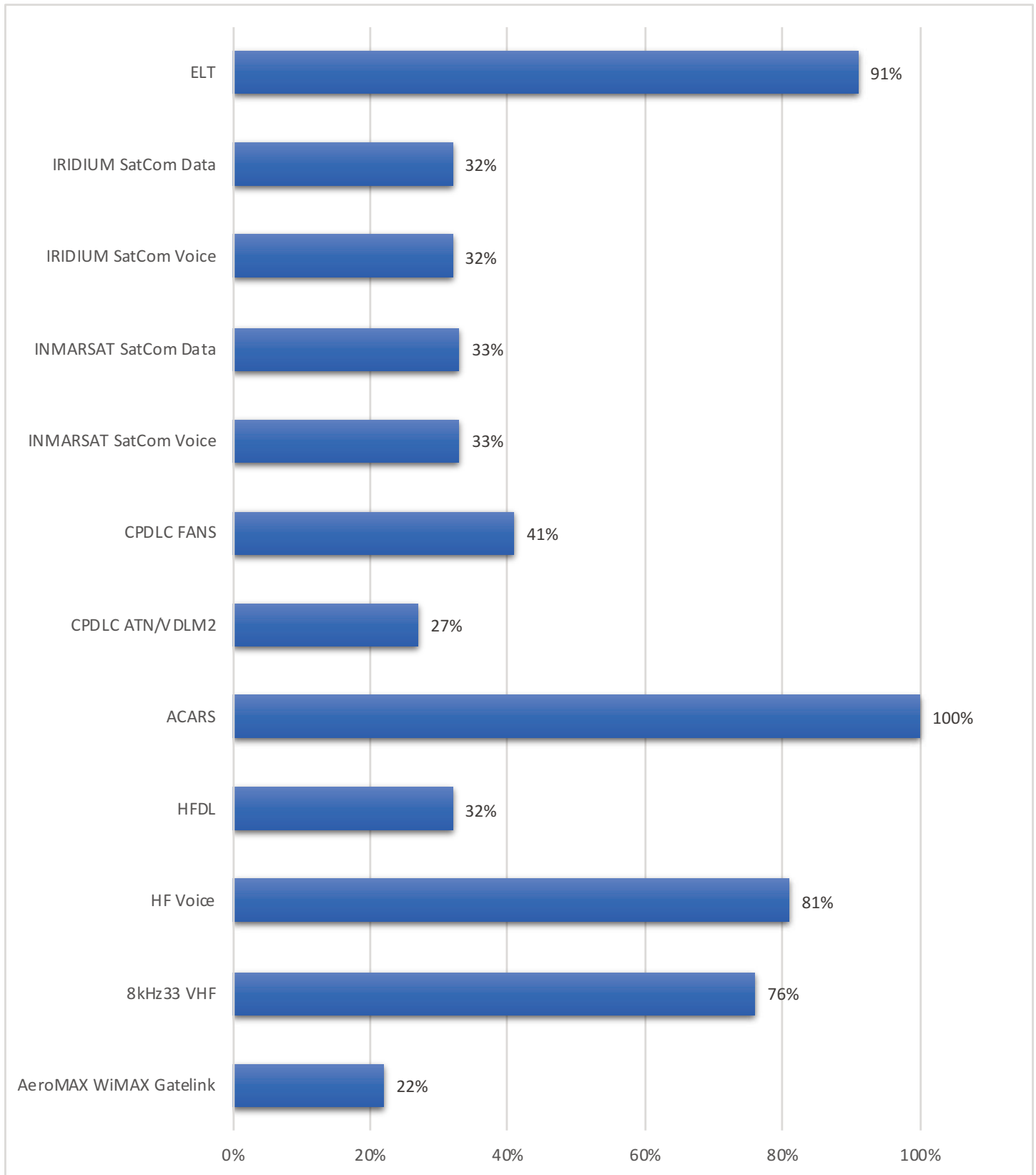
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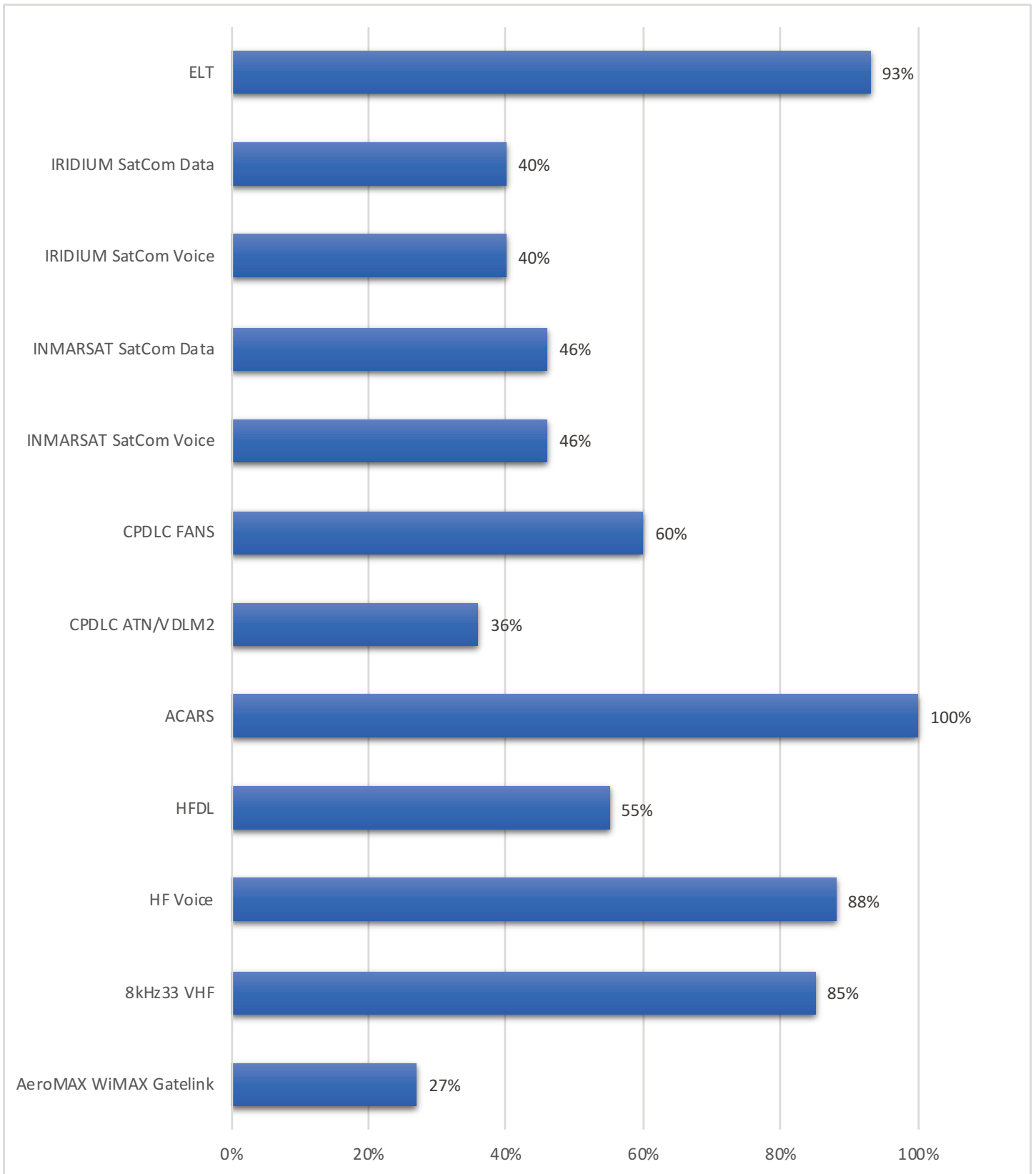


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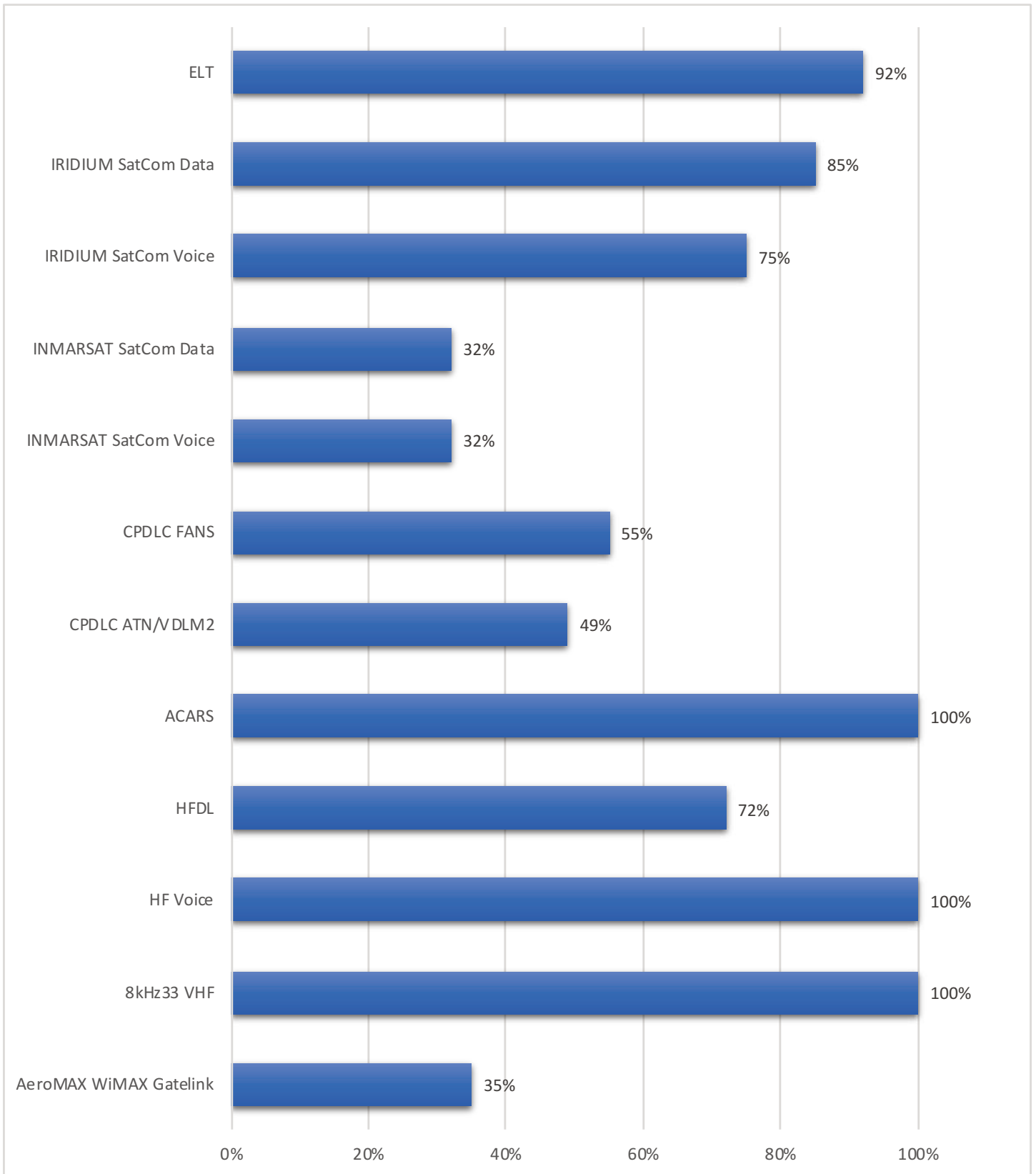


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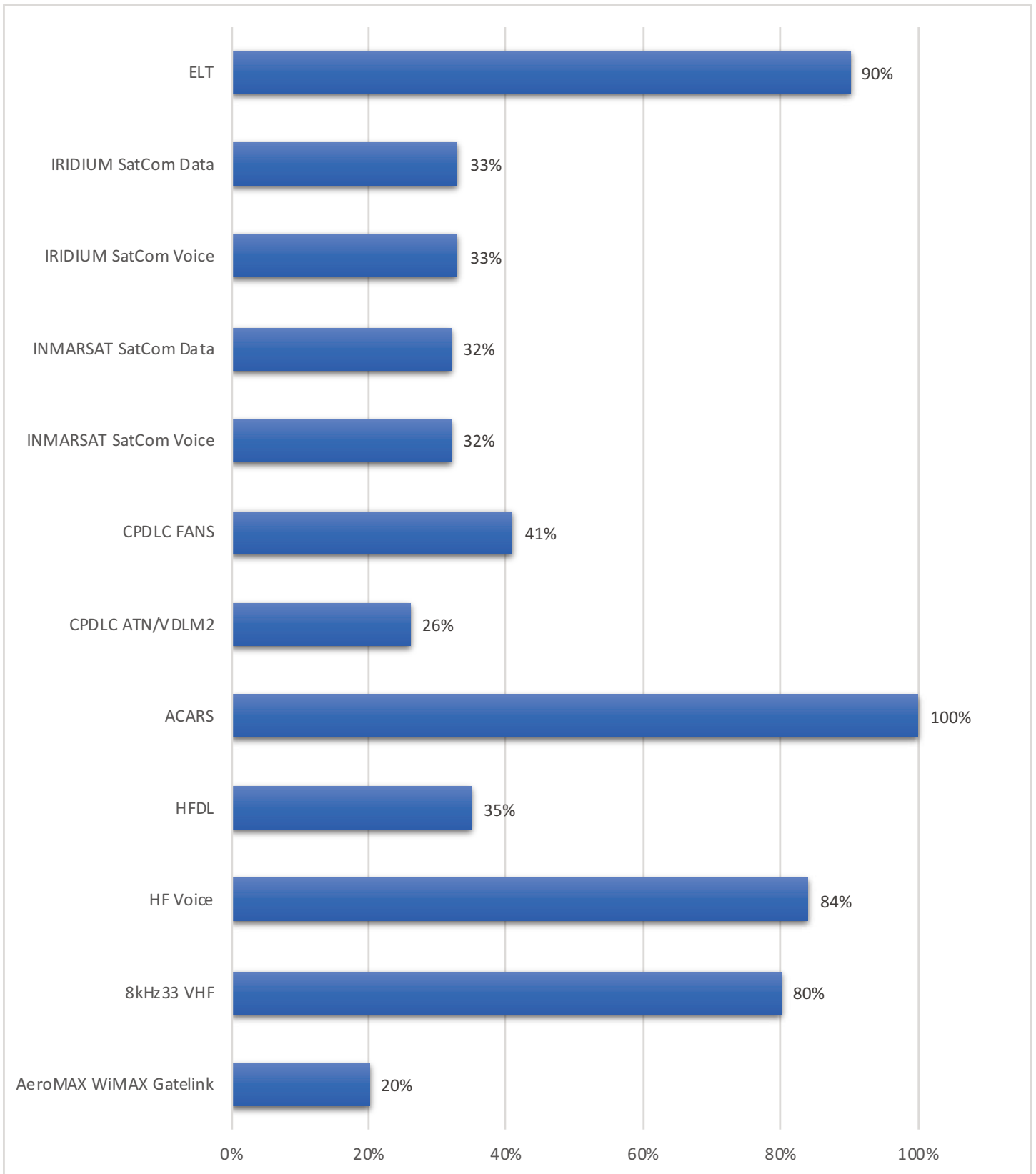


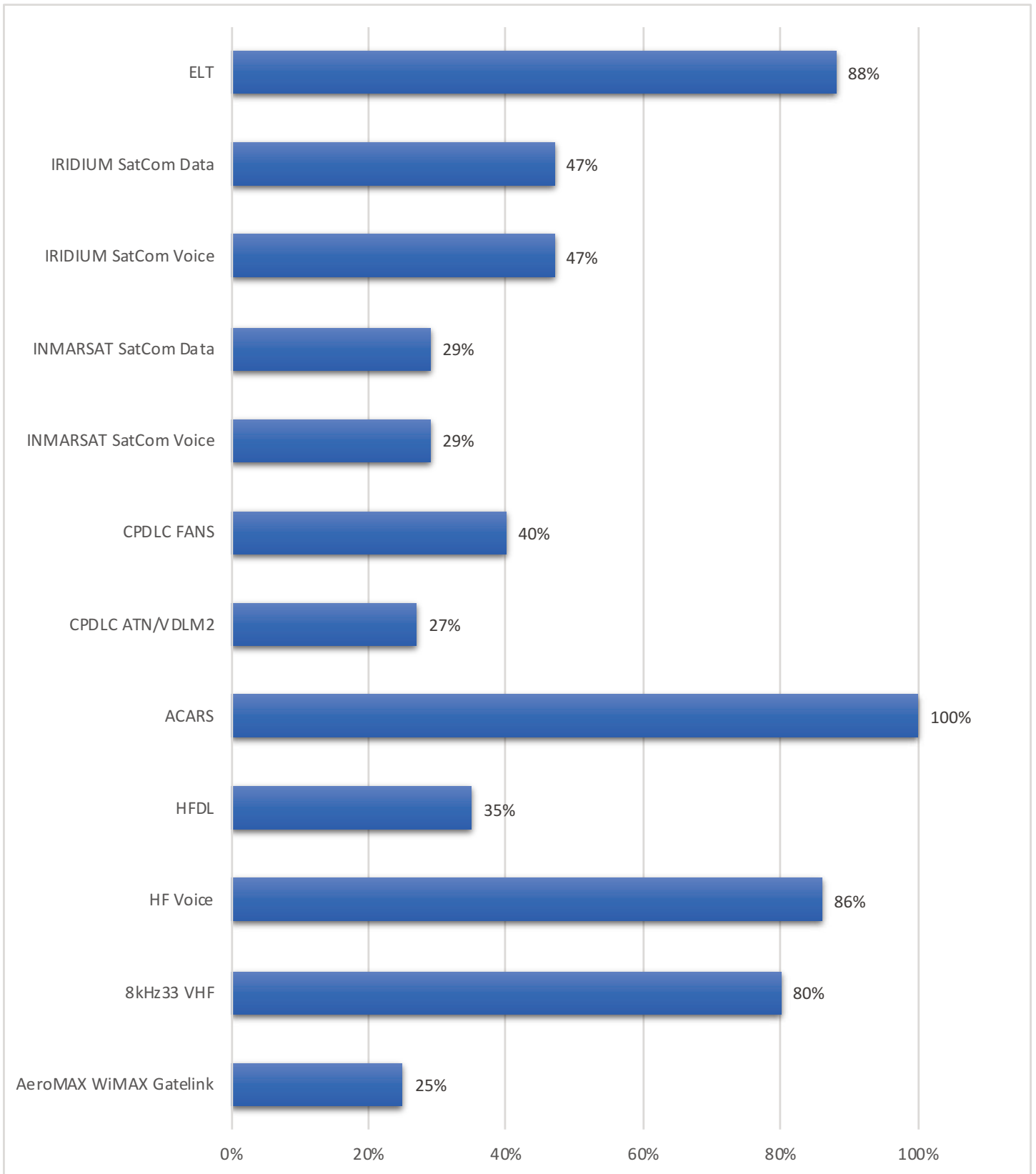


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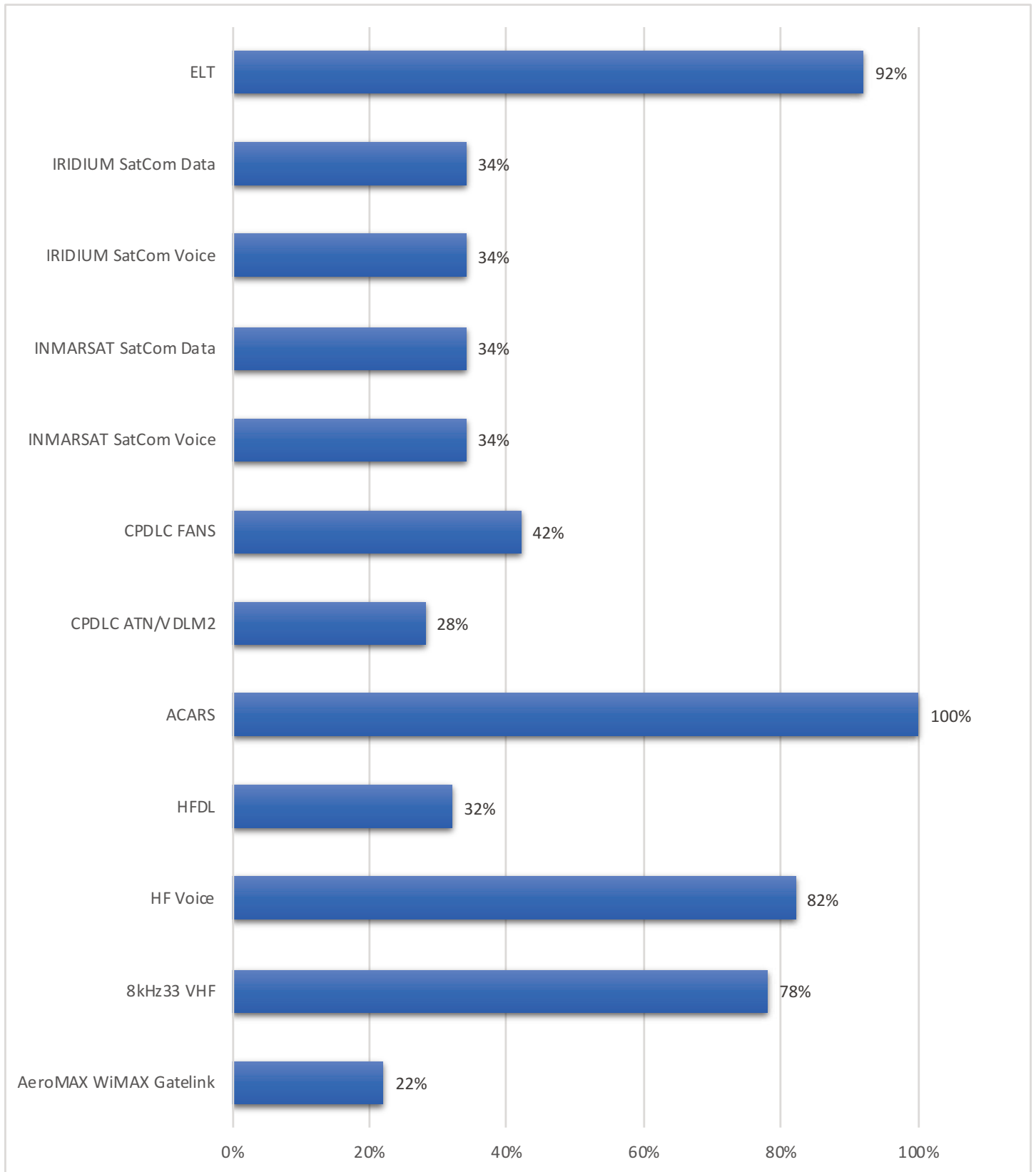


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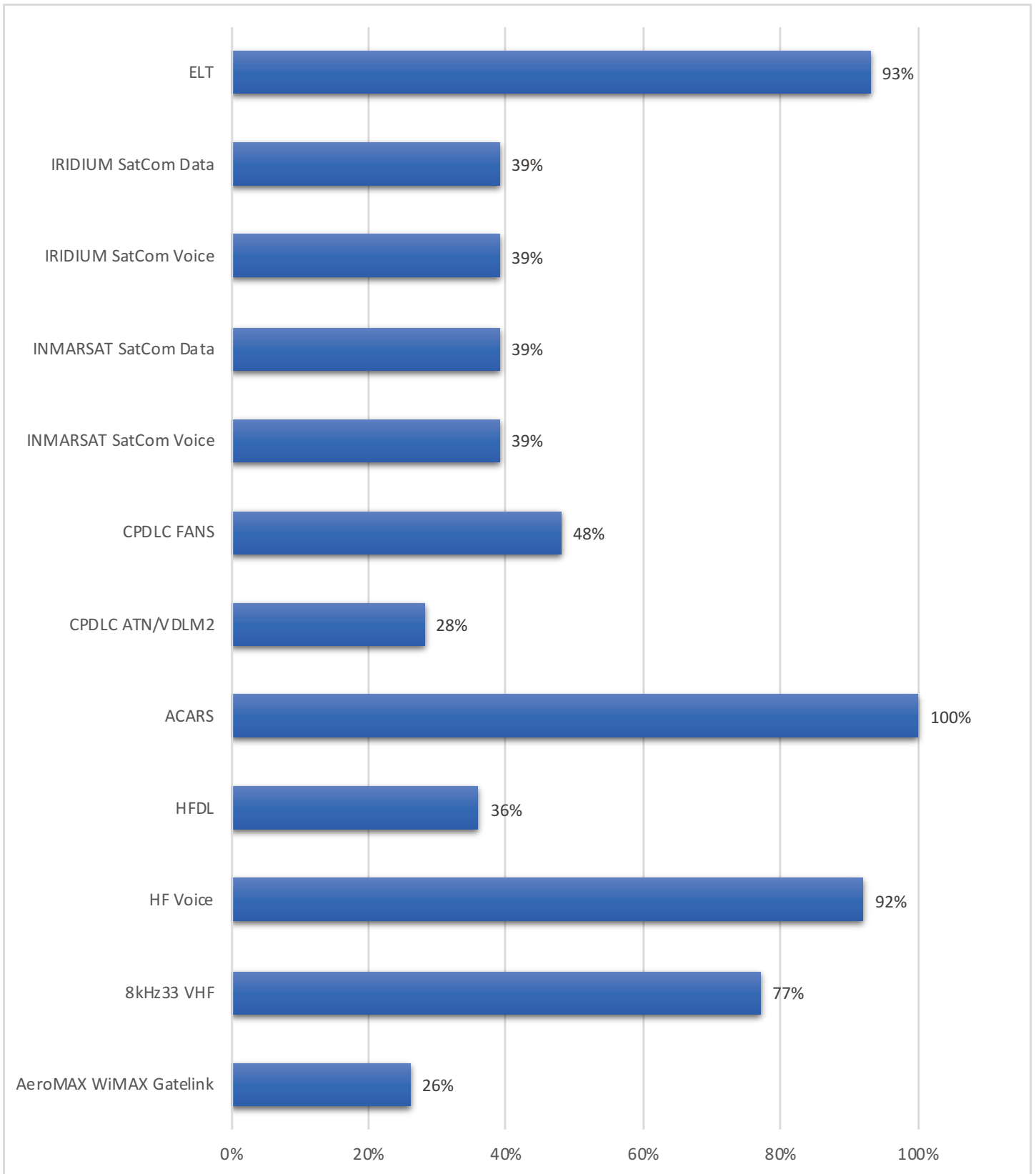




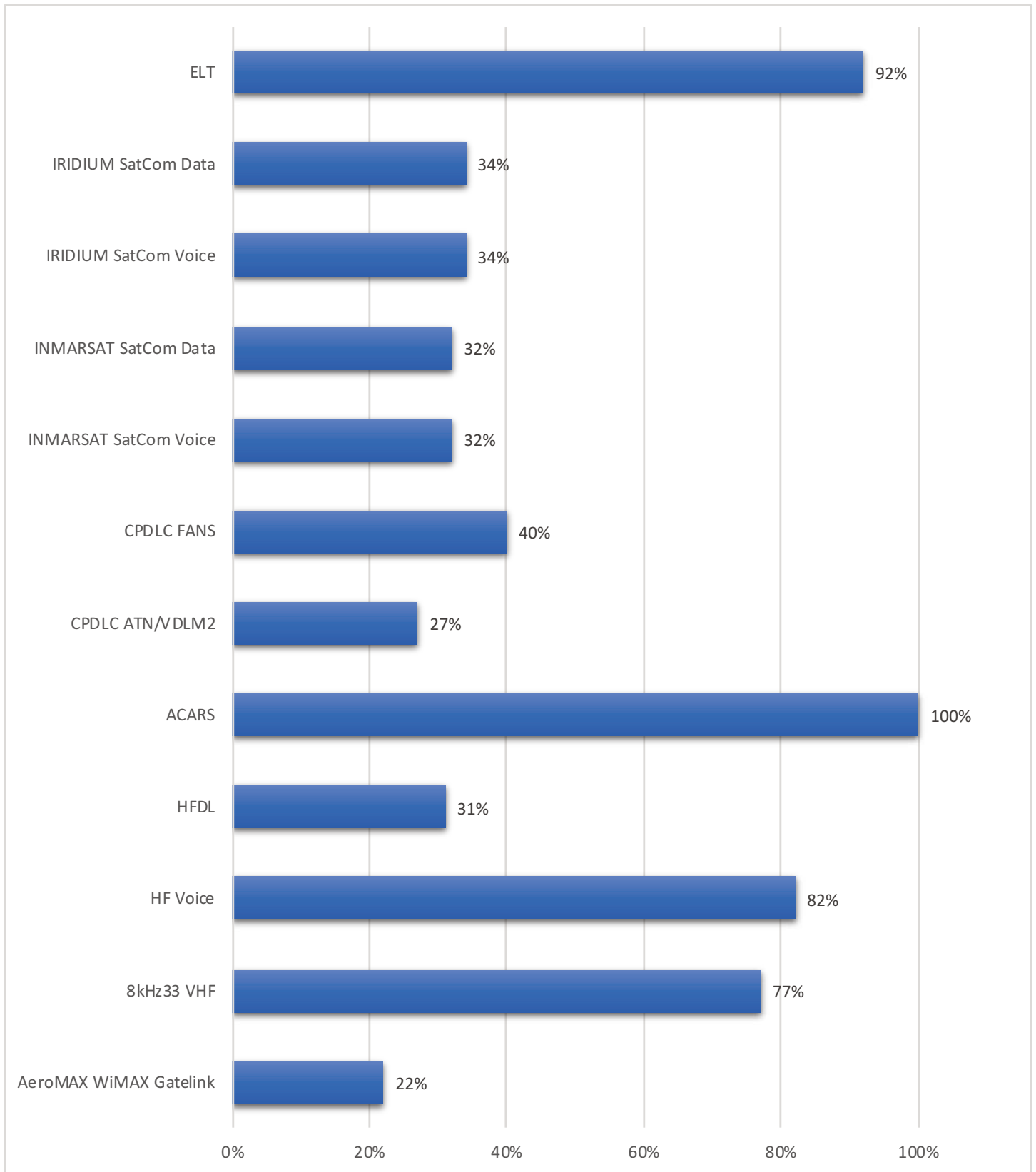
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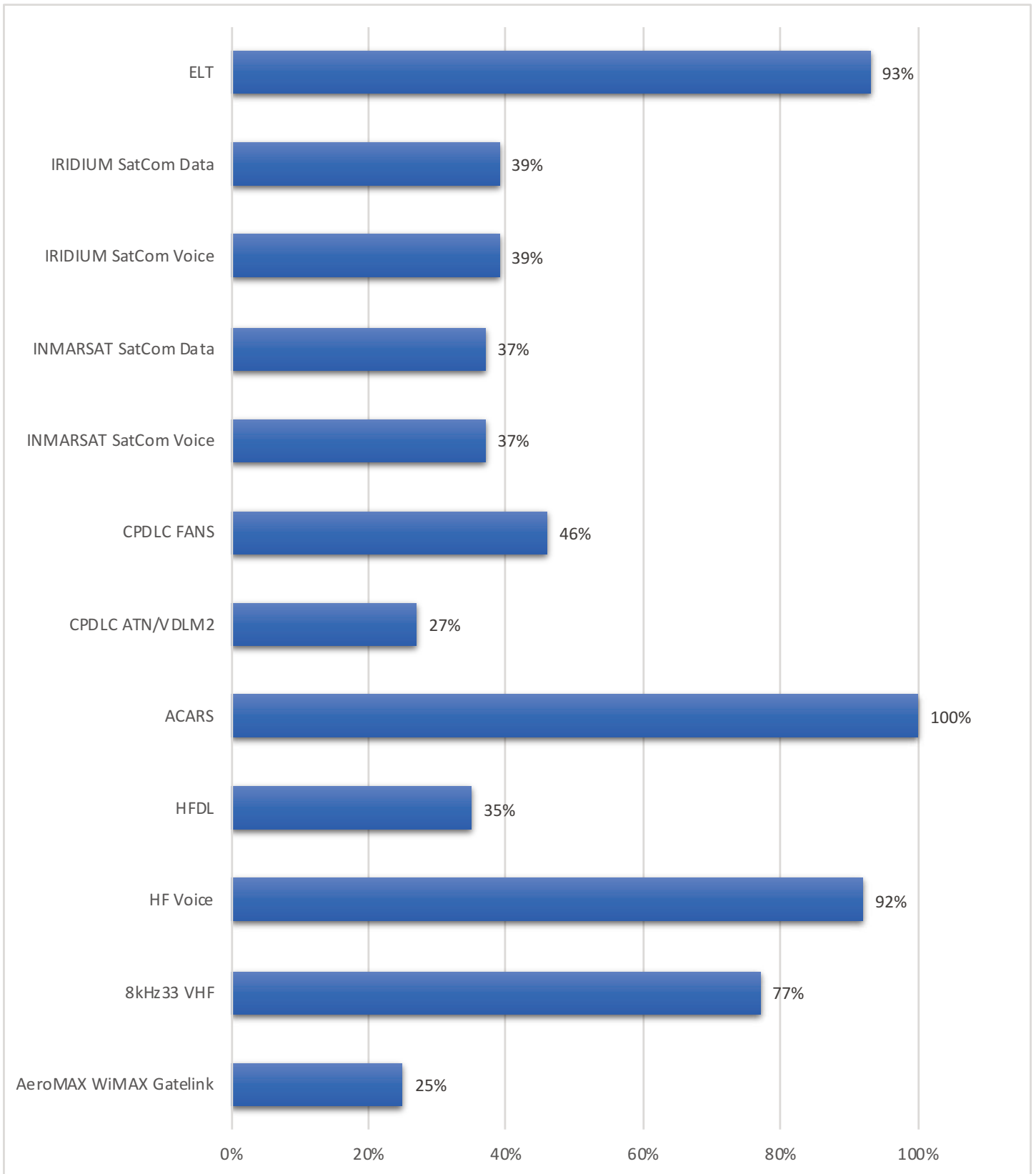
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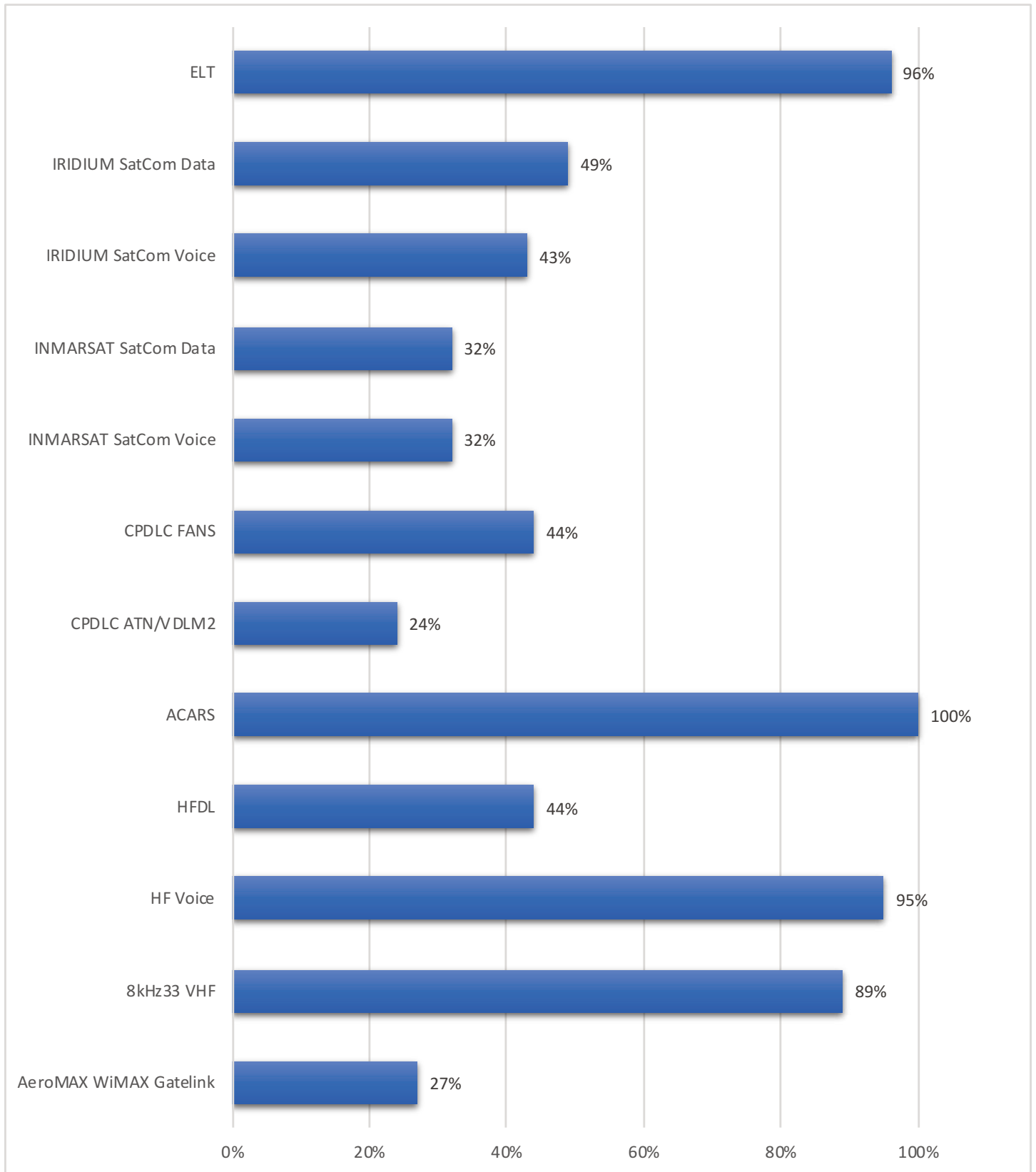
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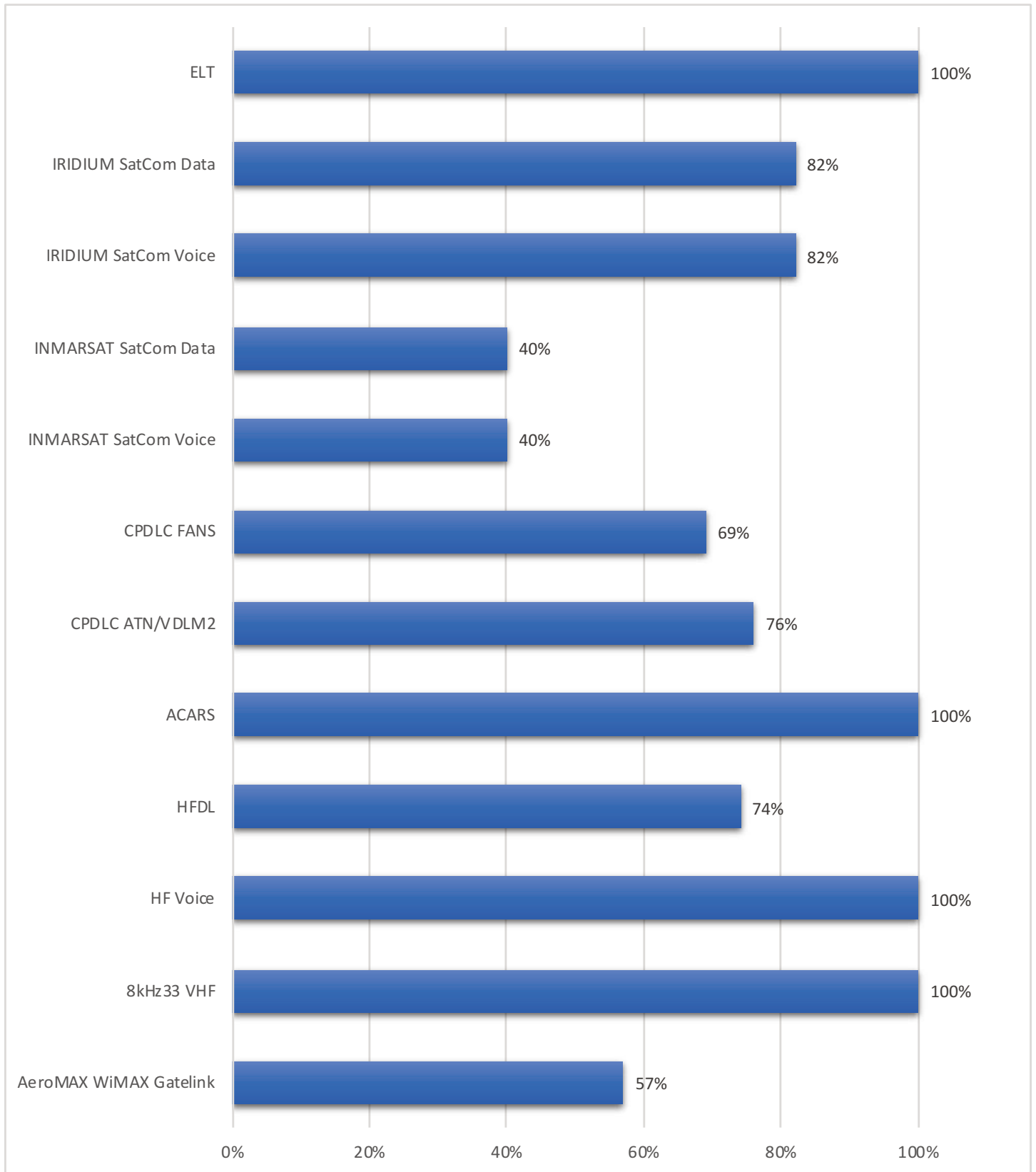
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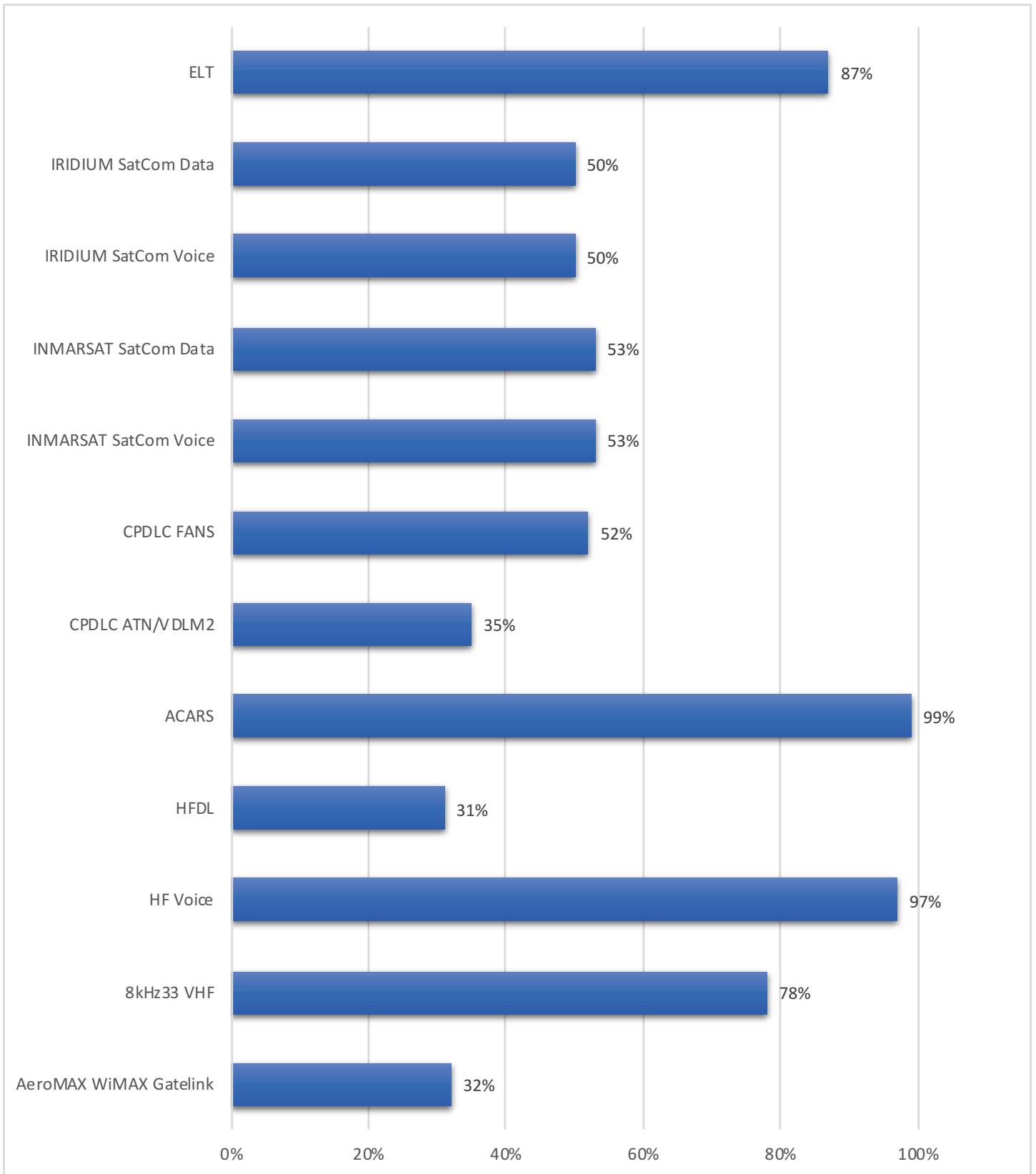


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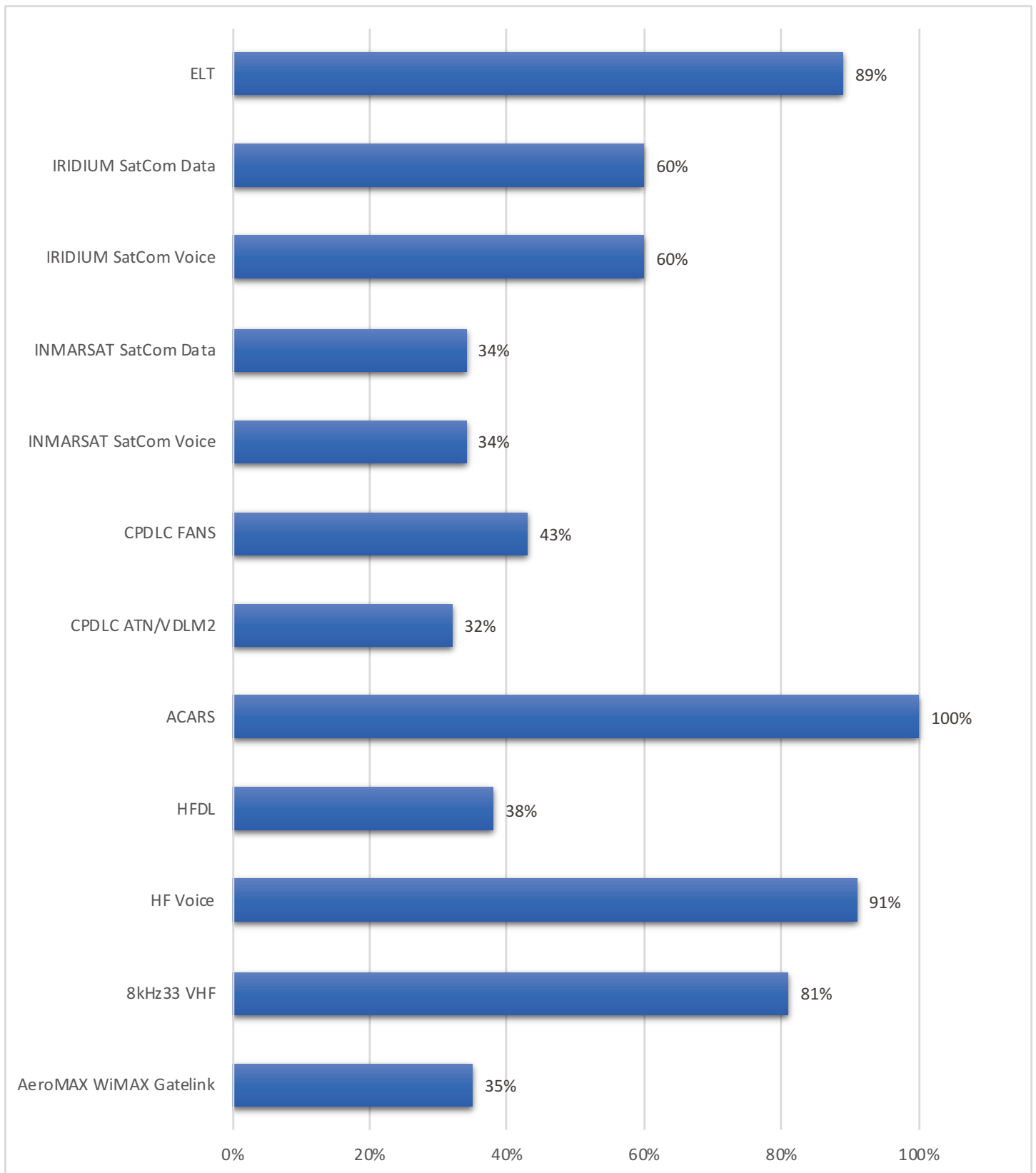


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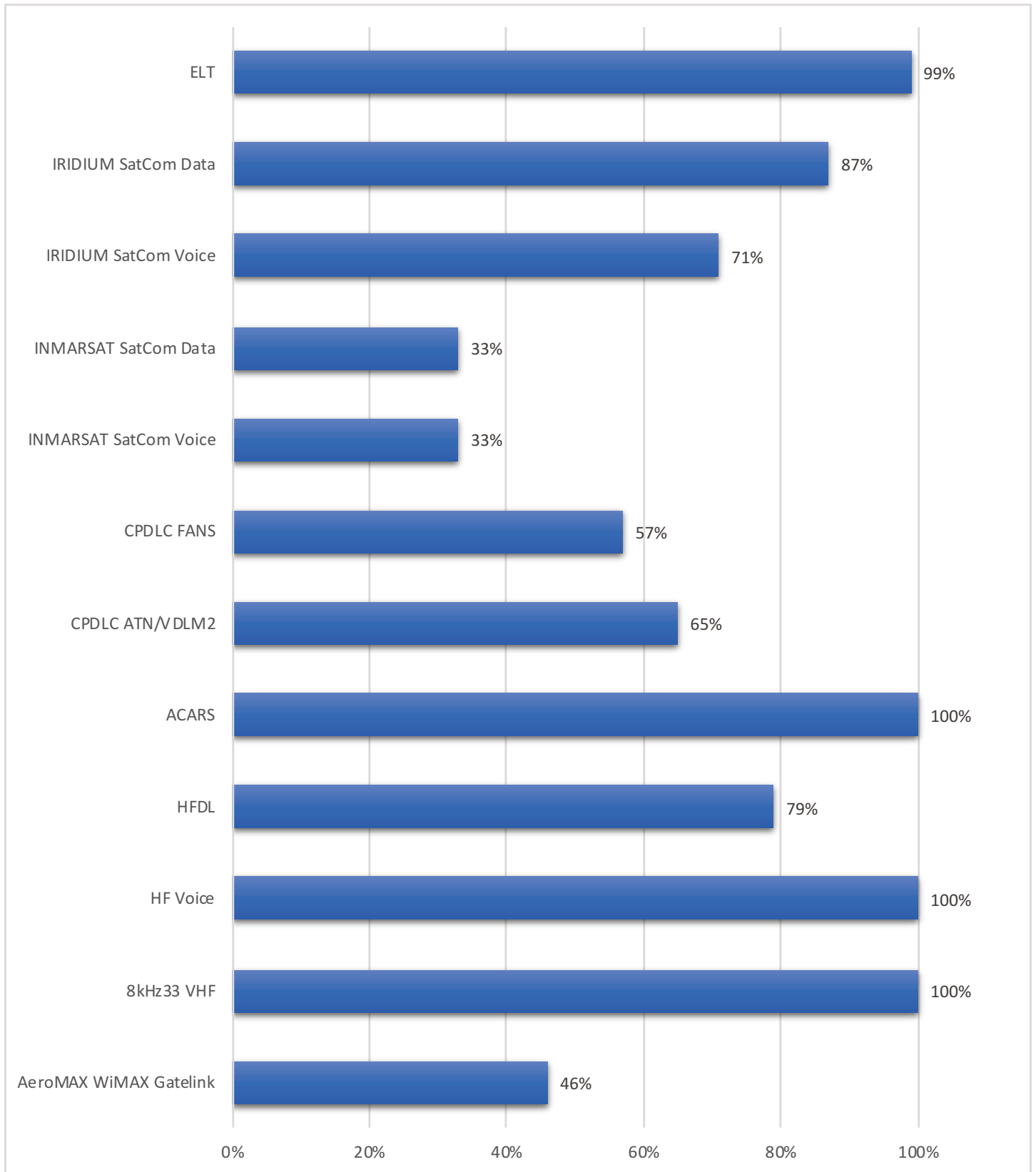




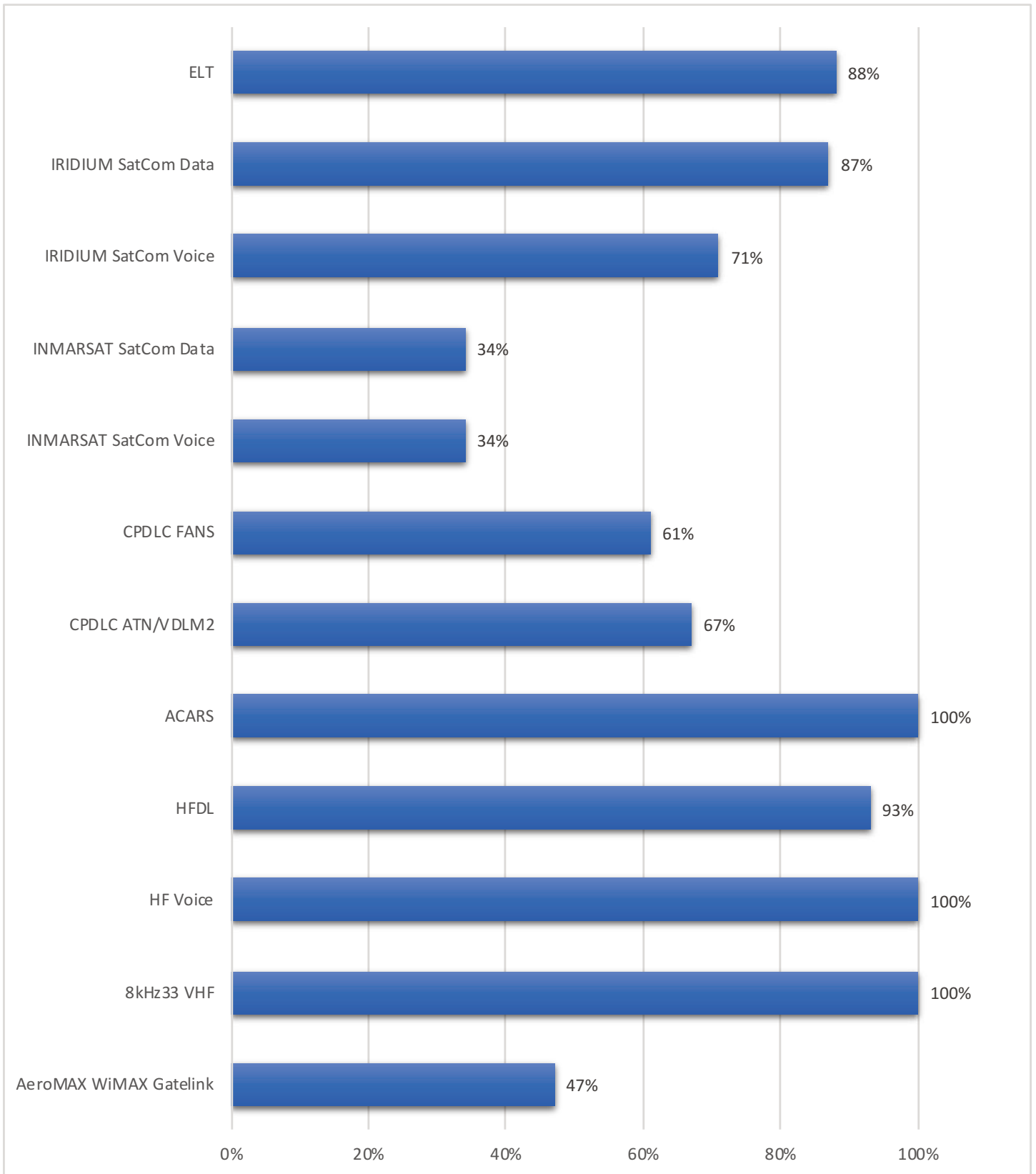
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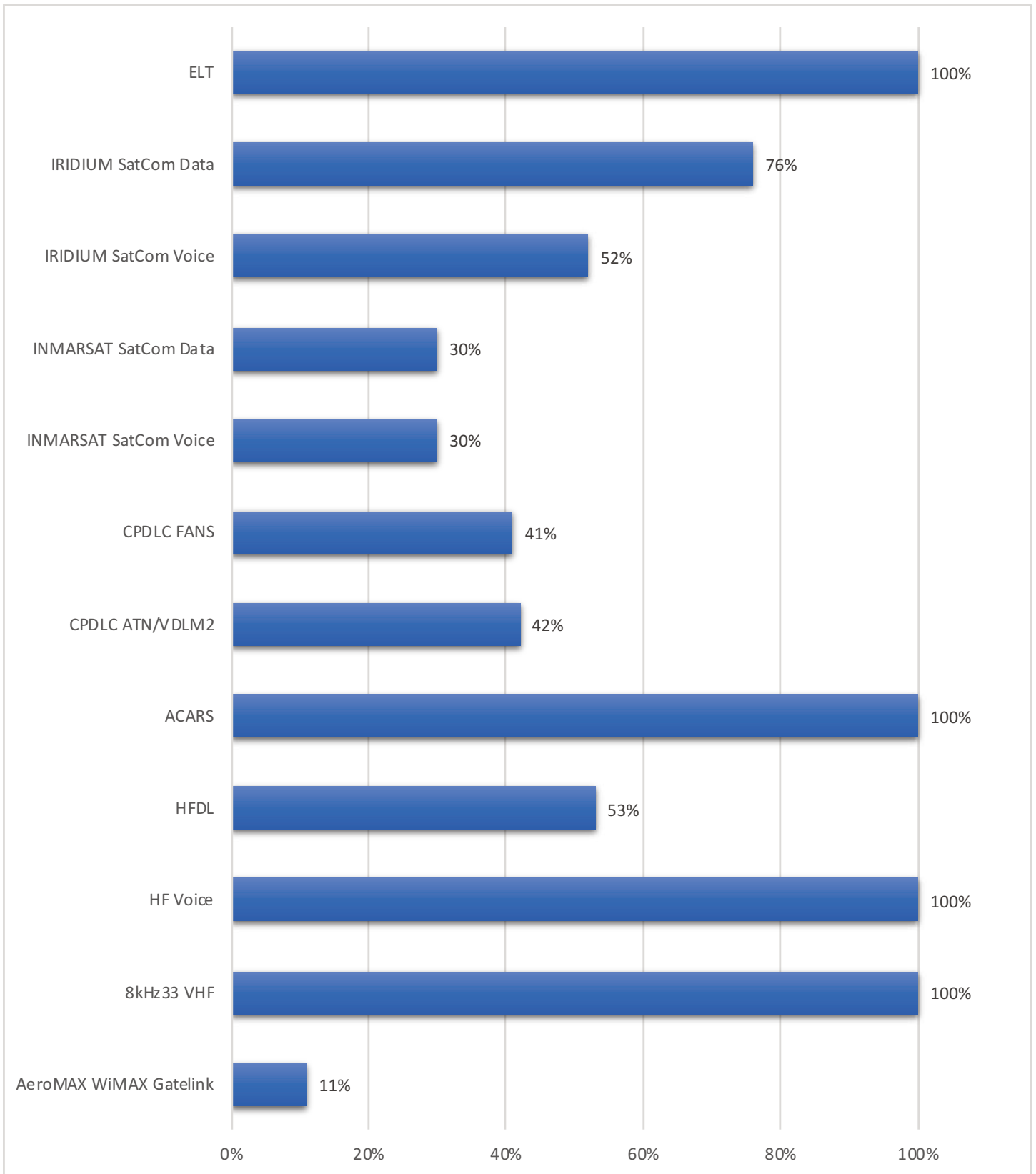


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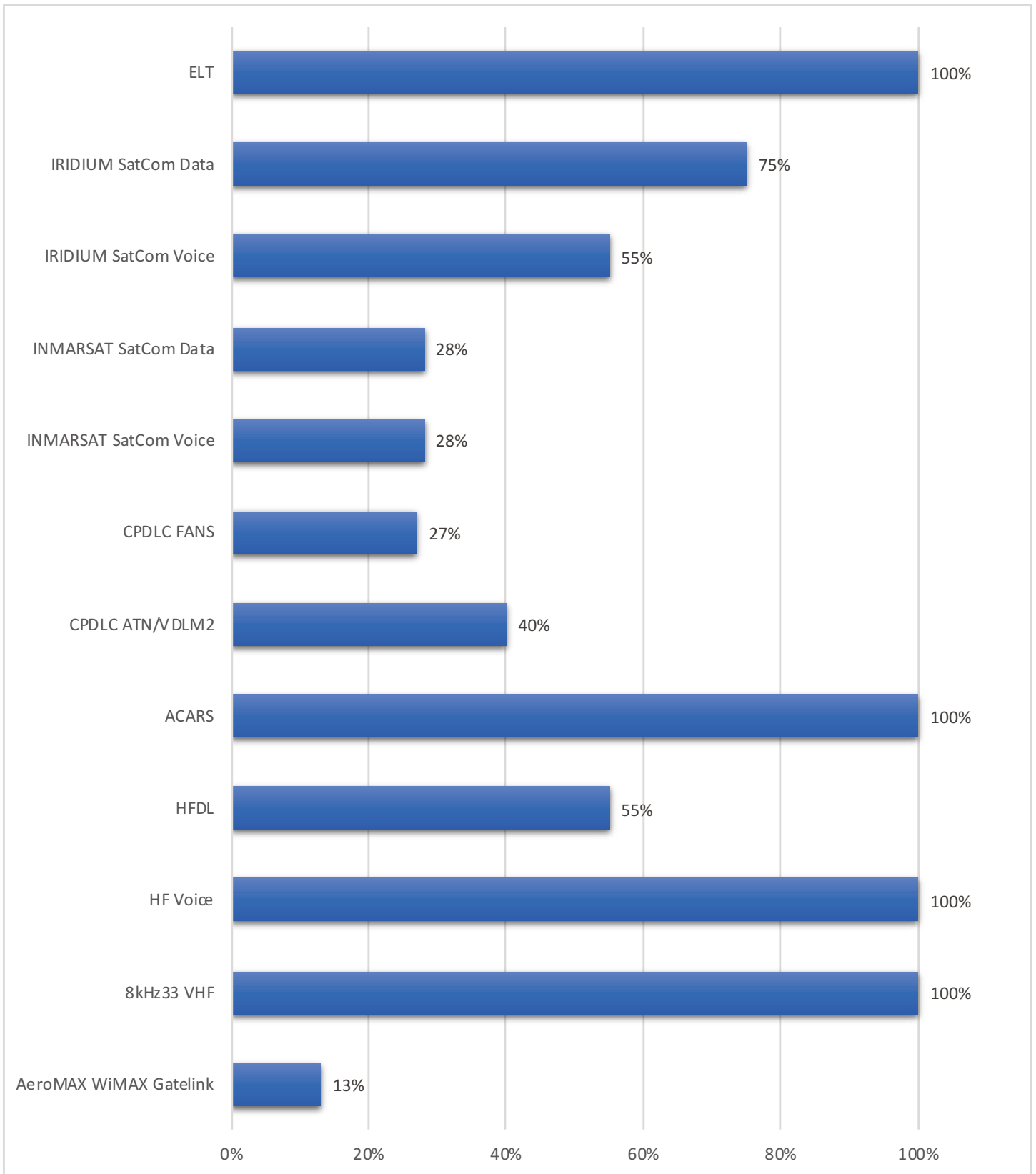


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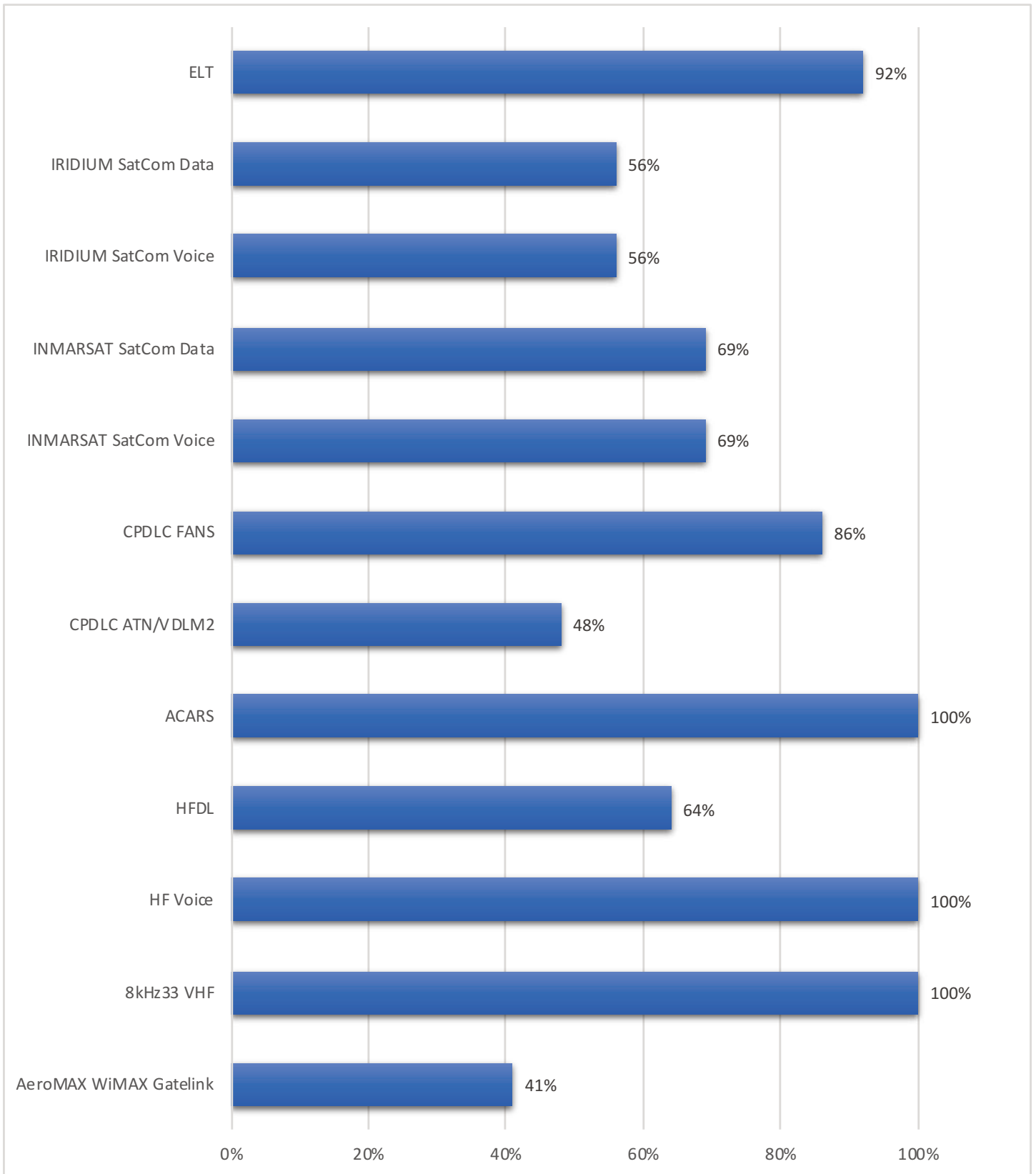


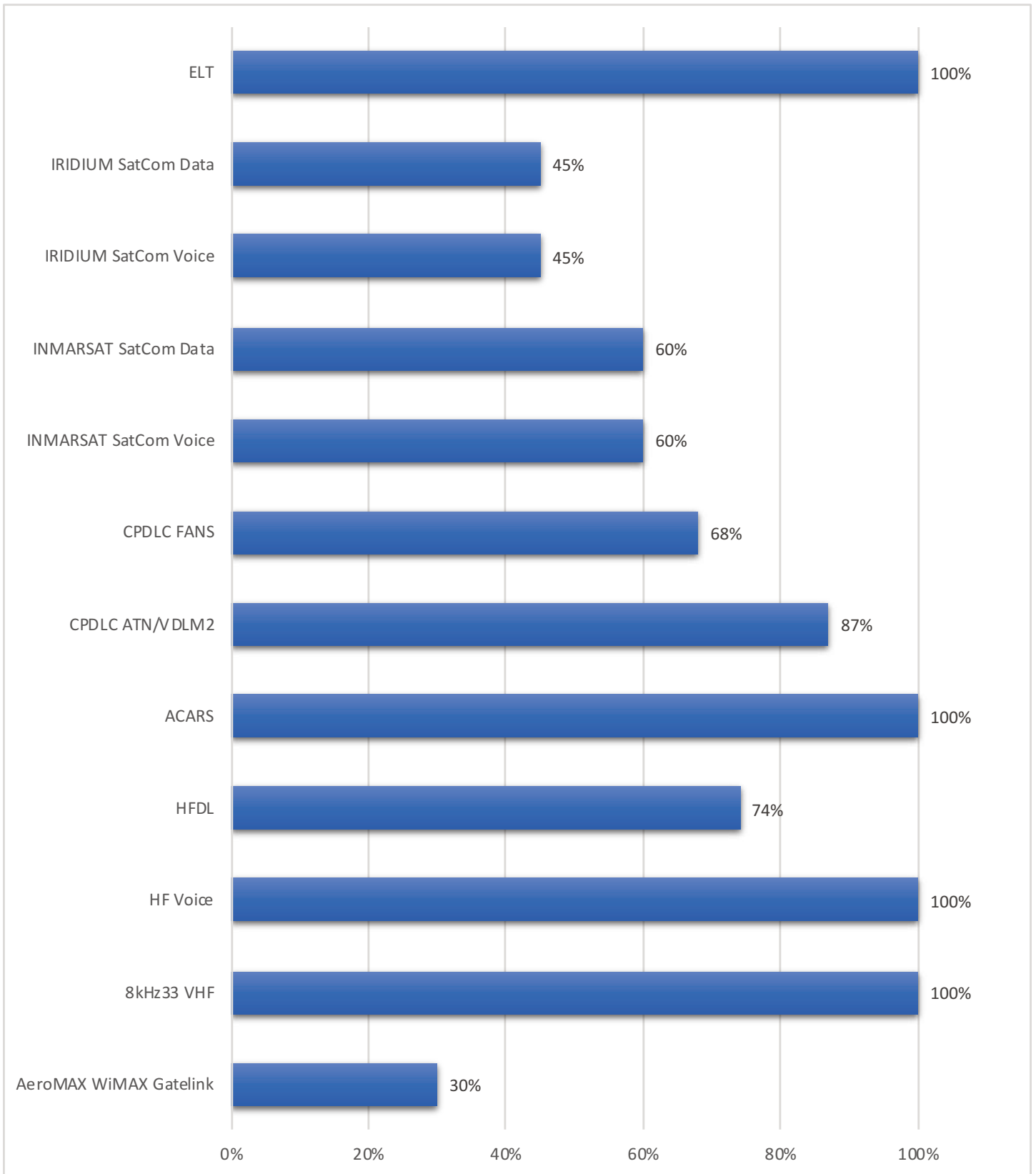


Resistencia

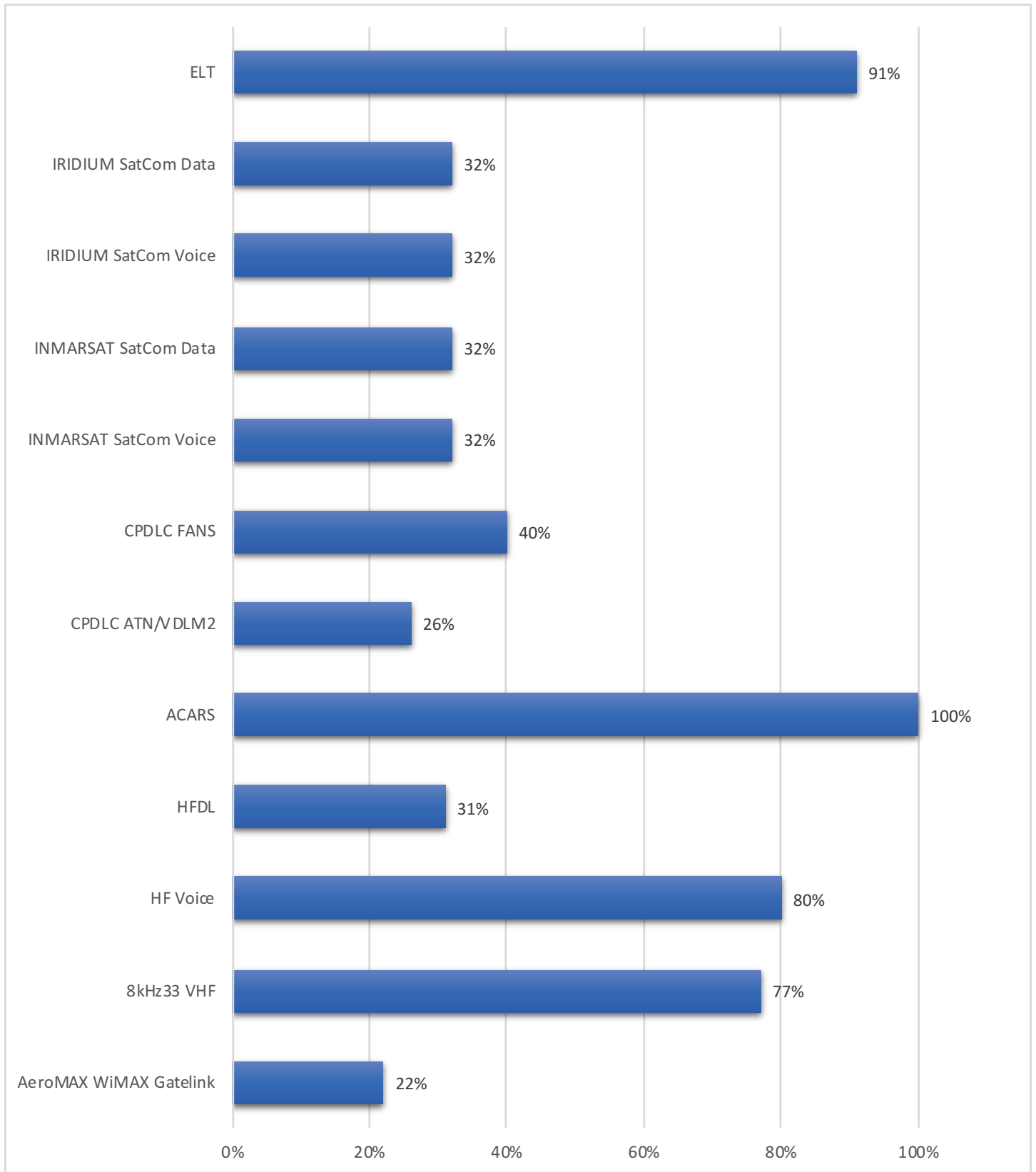


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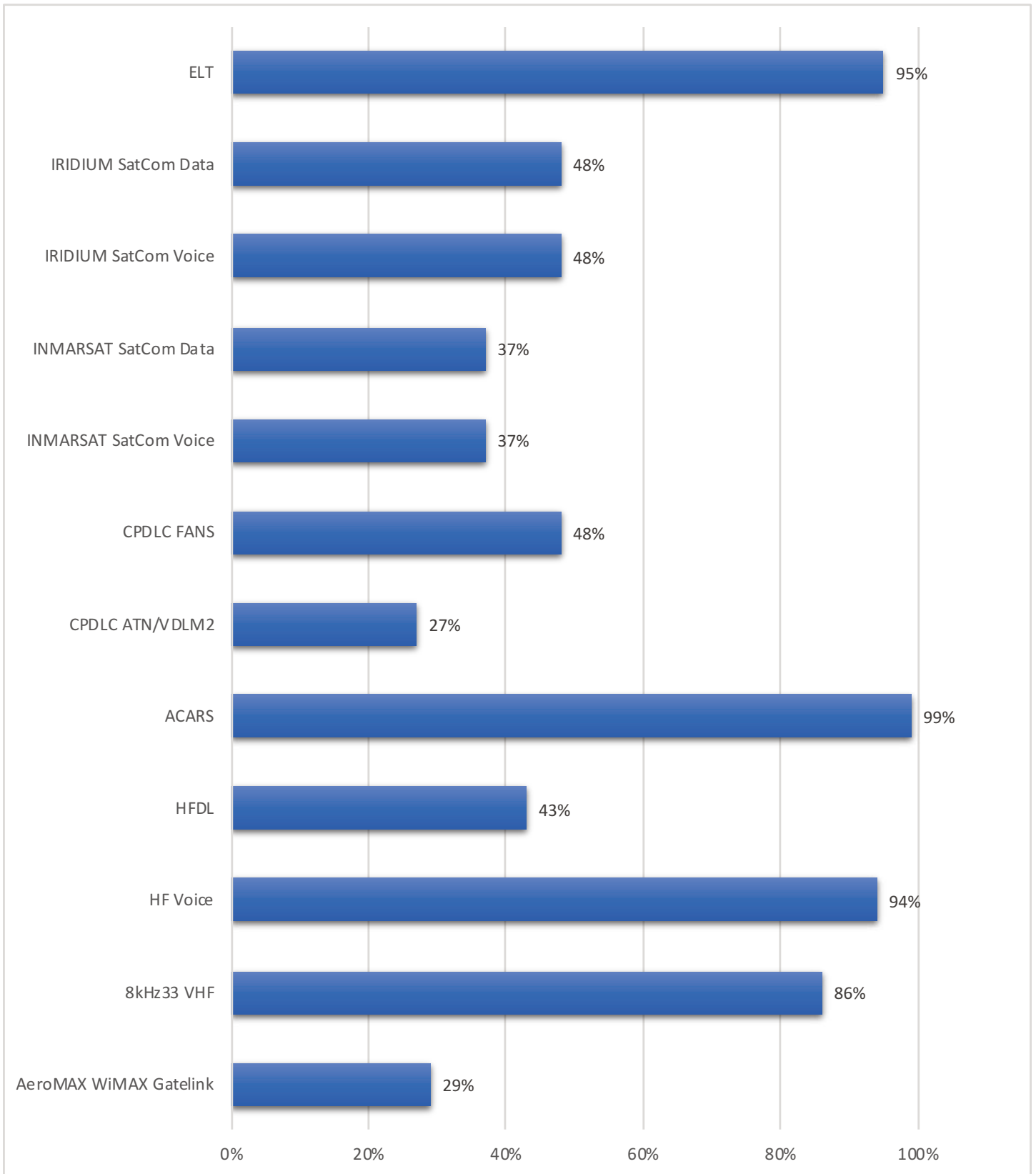




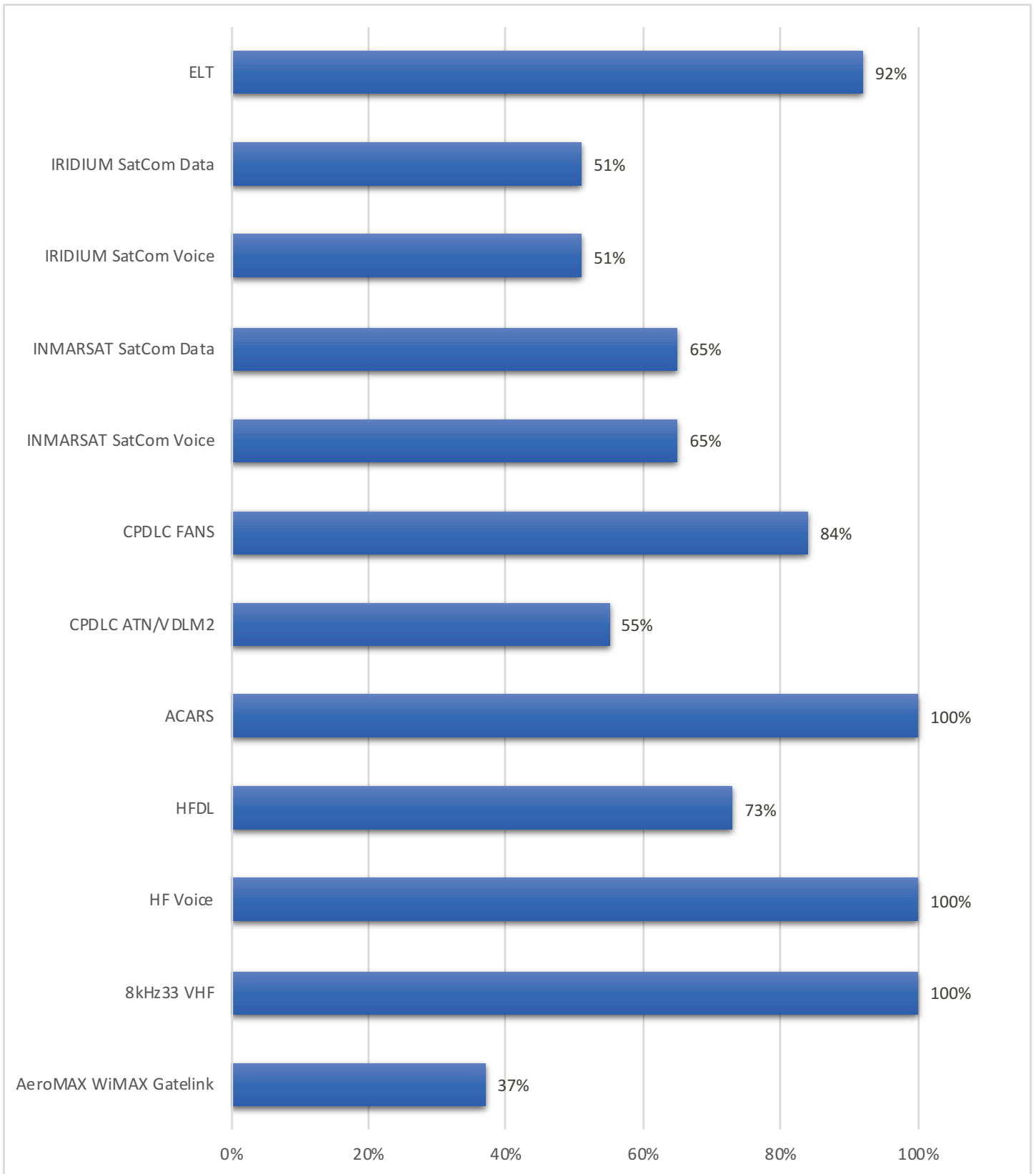
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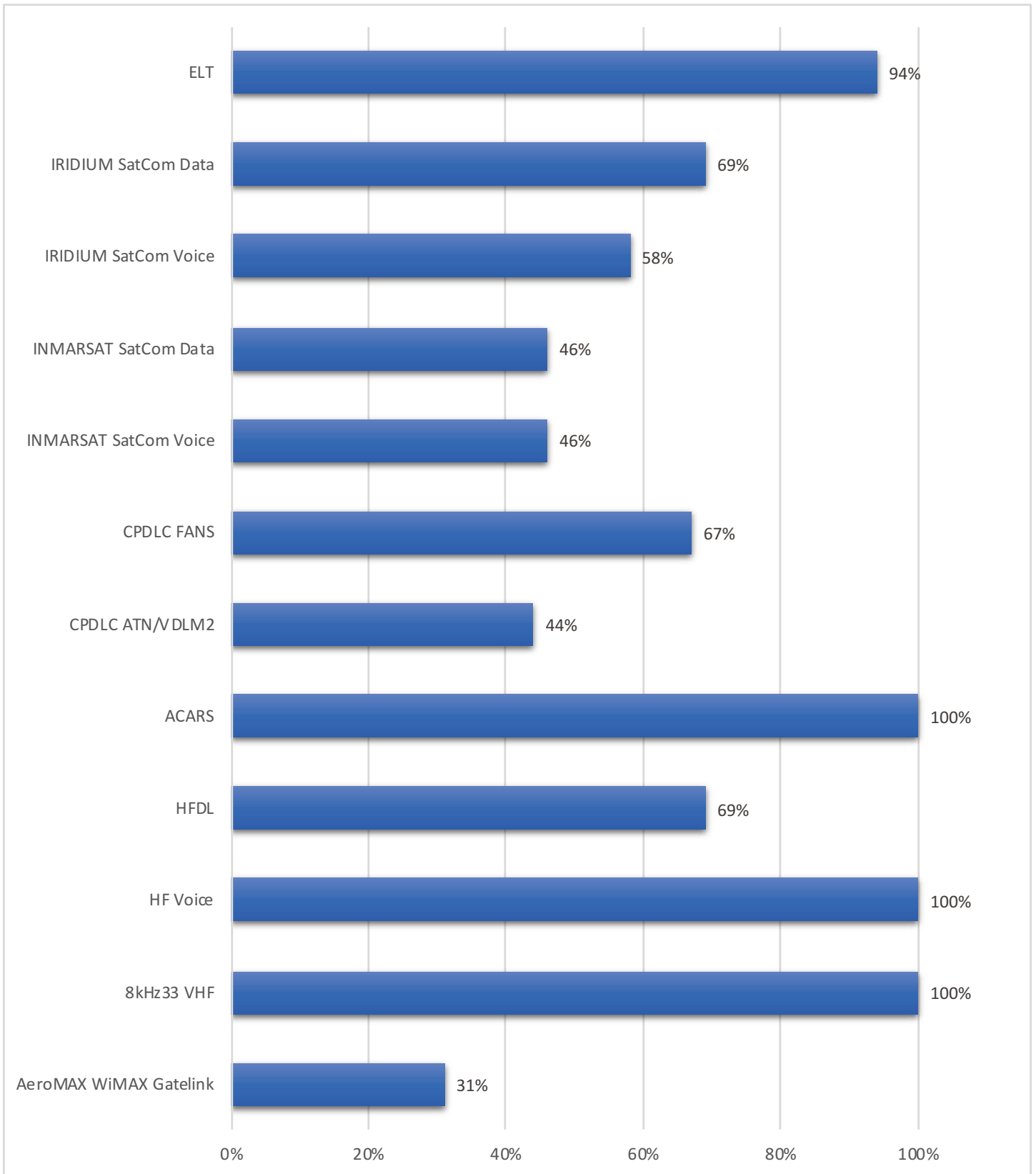


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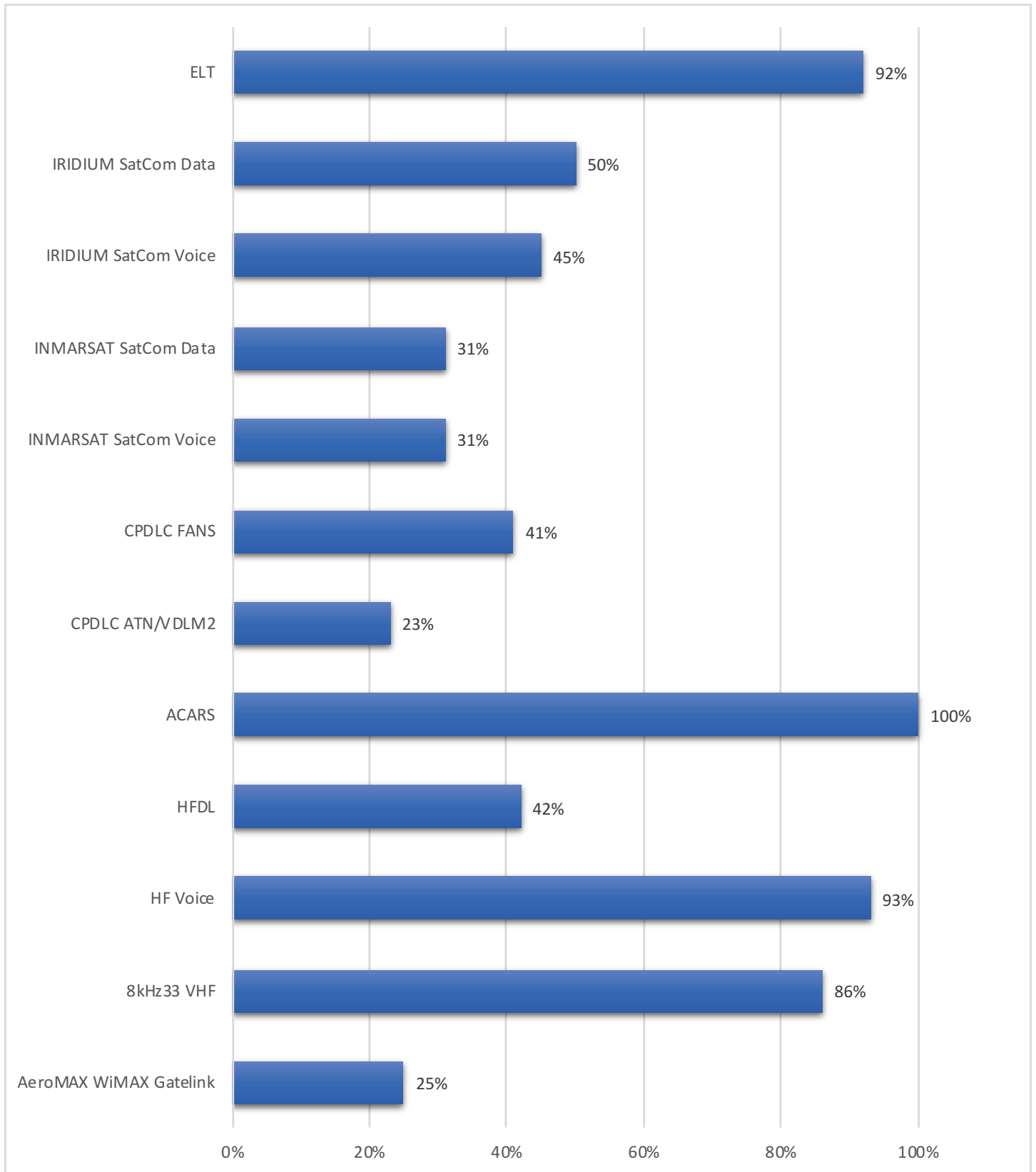


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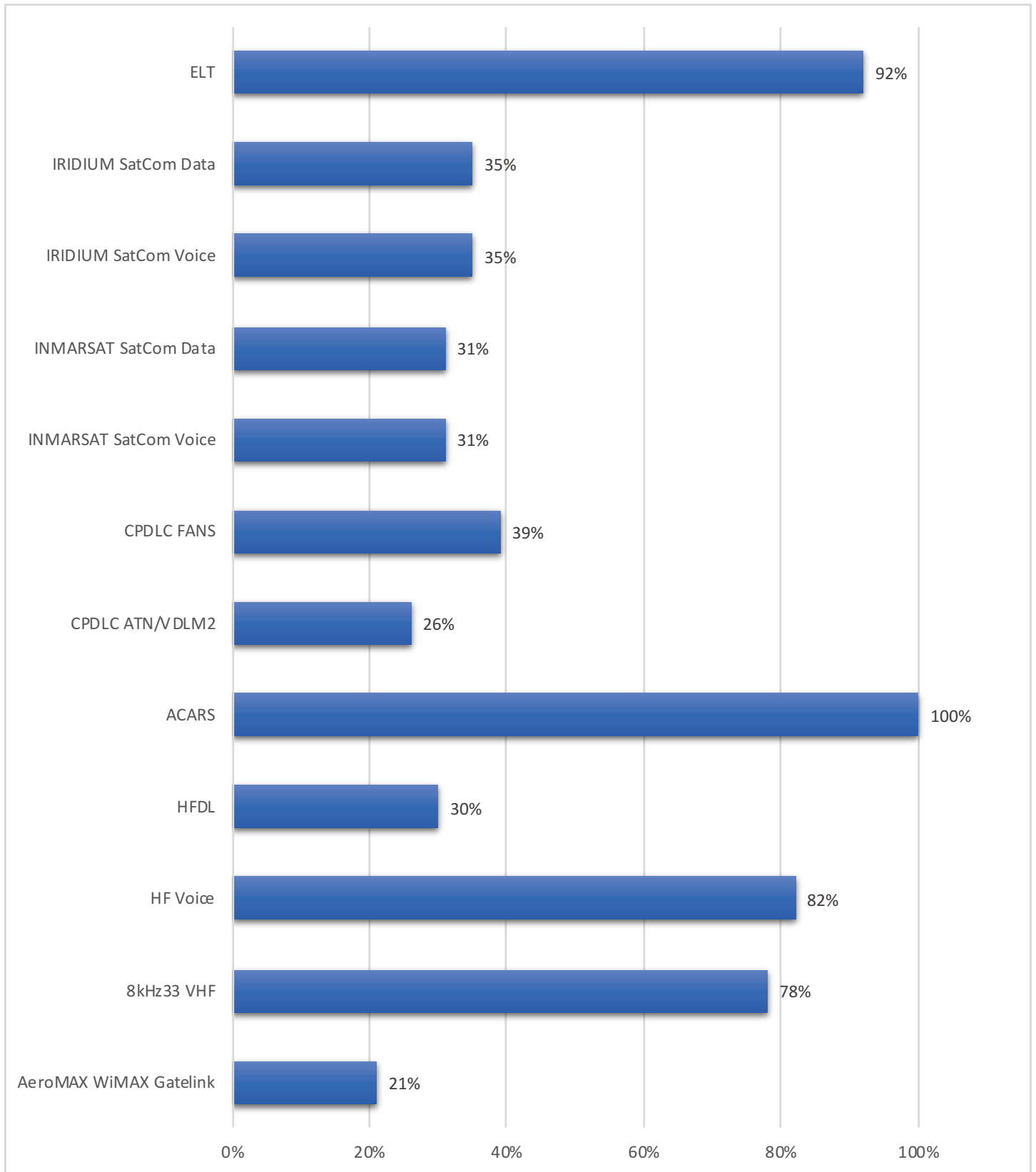




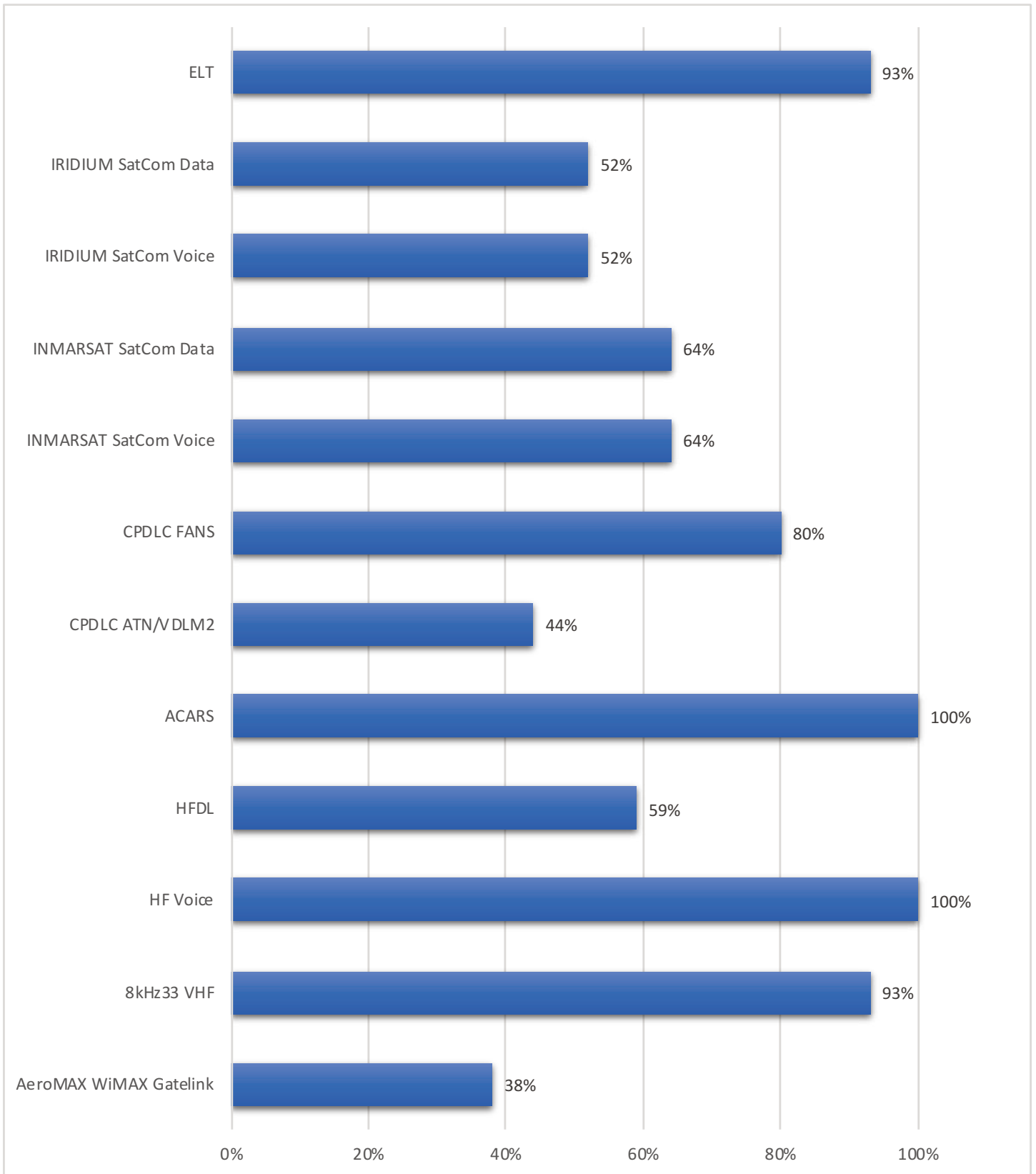
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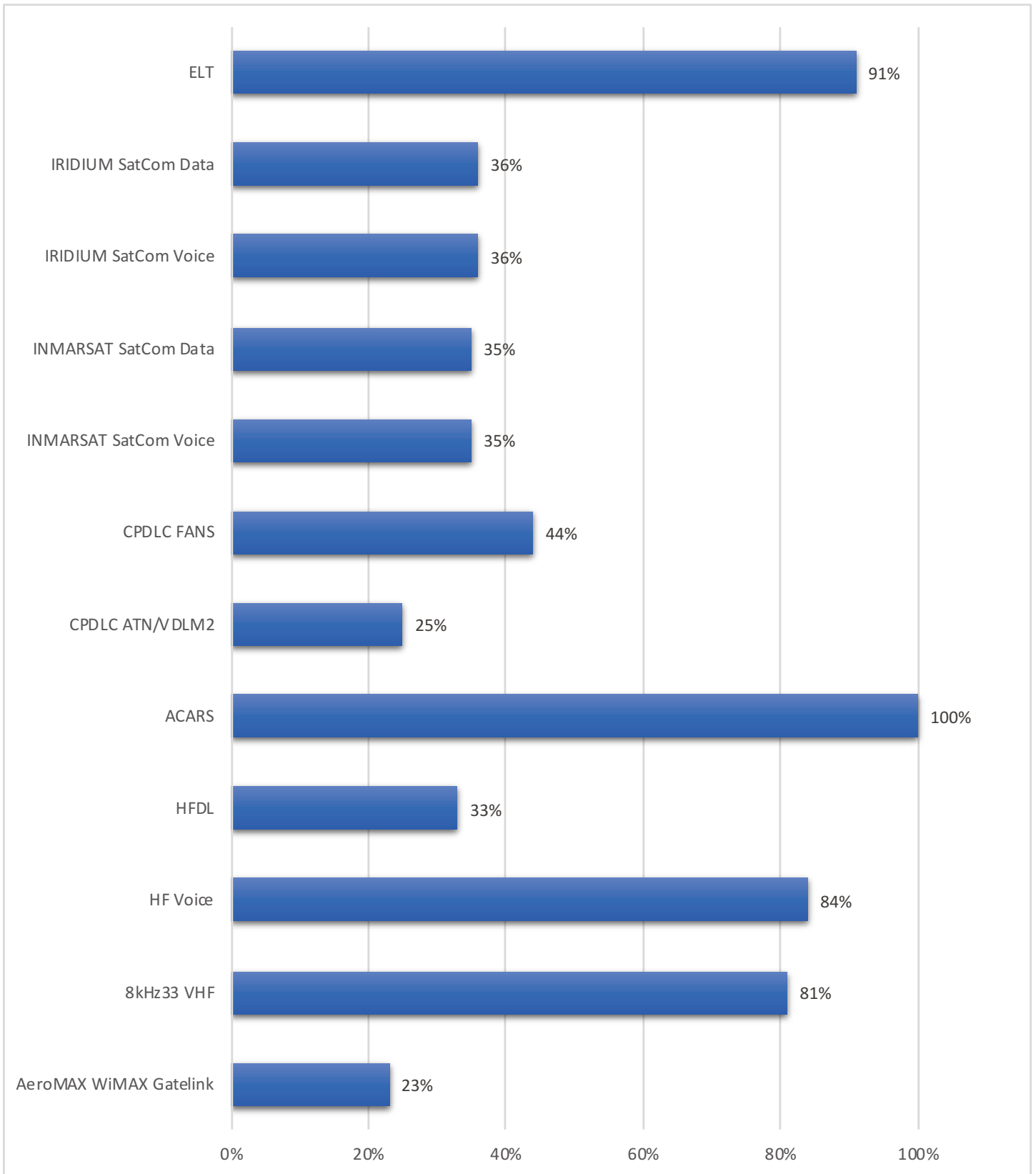


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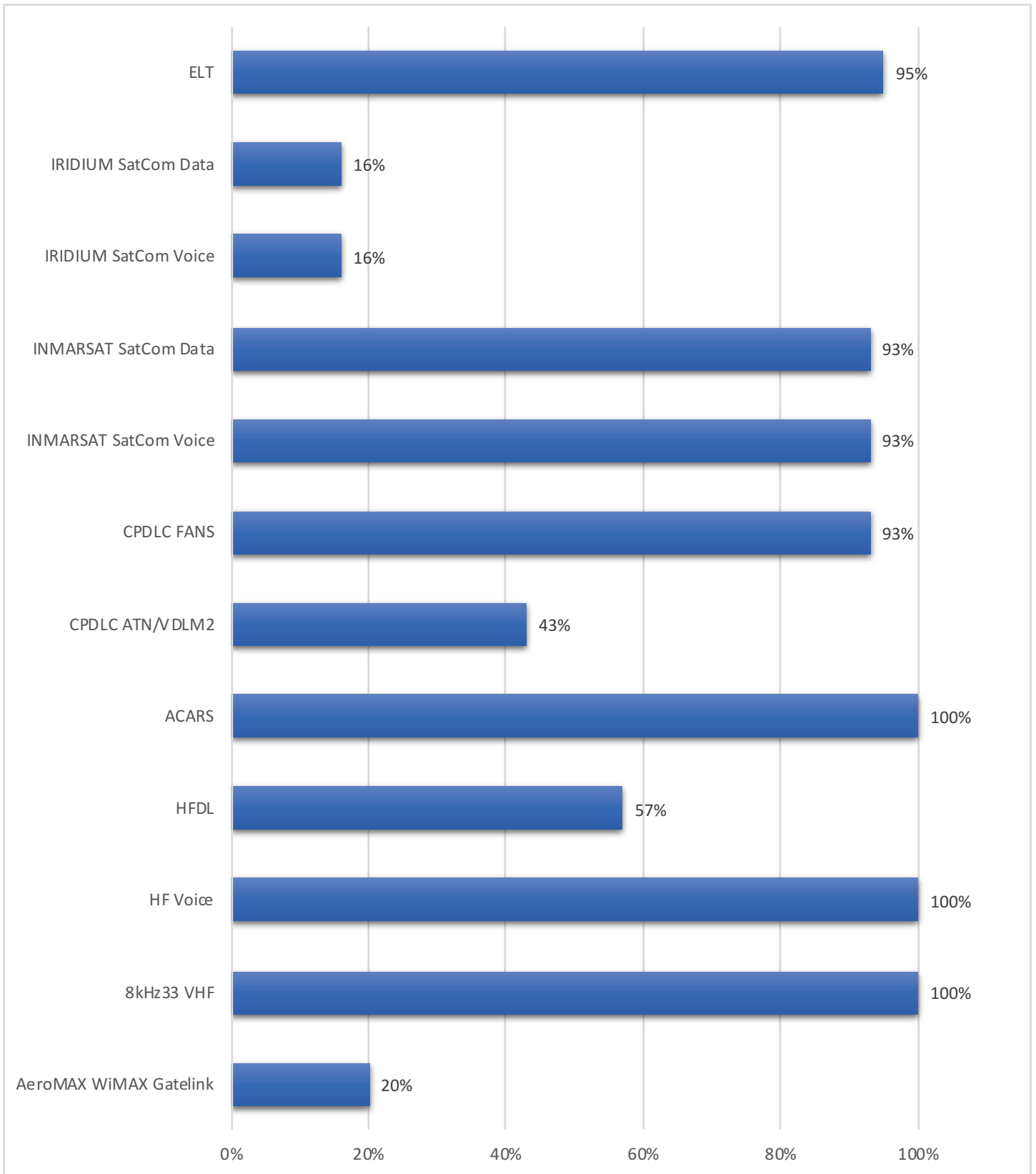


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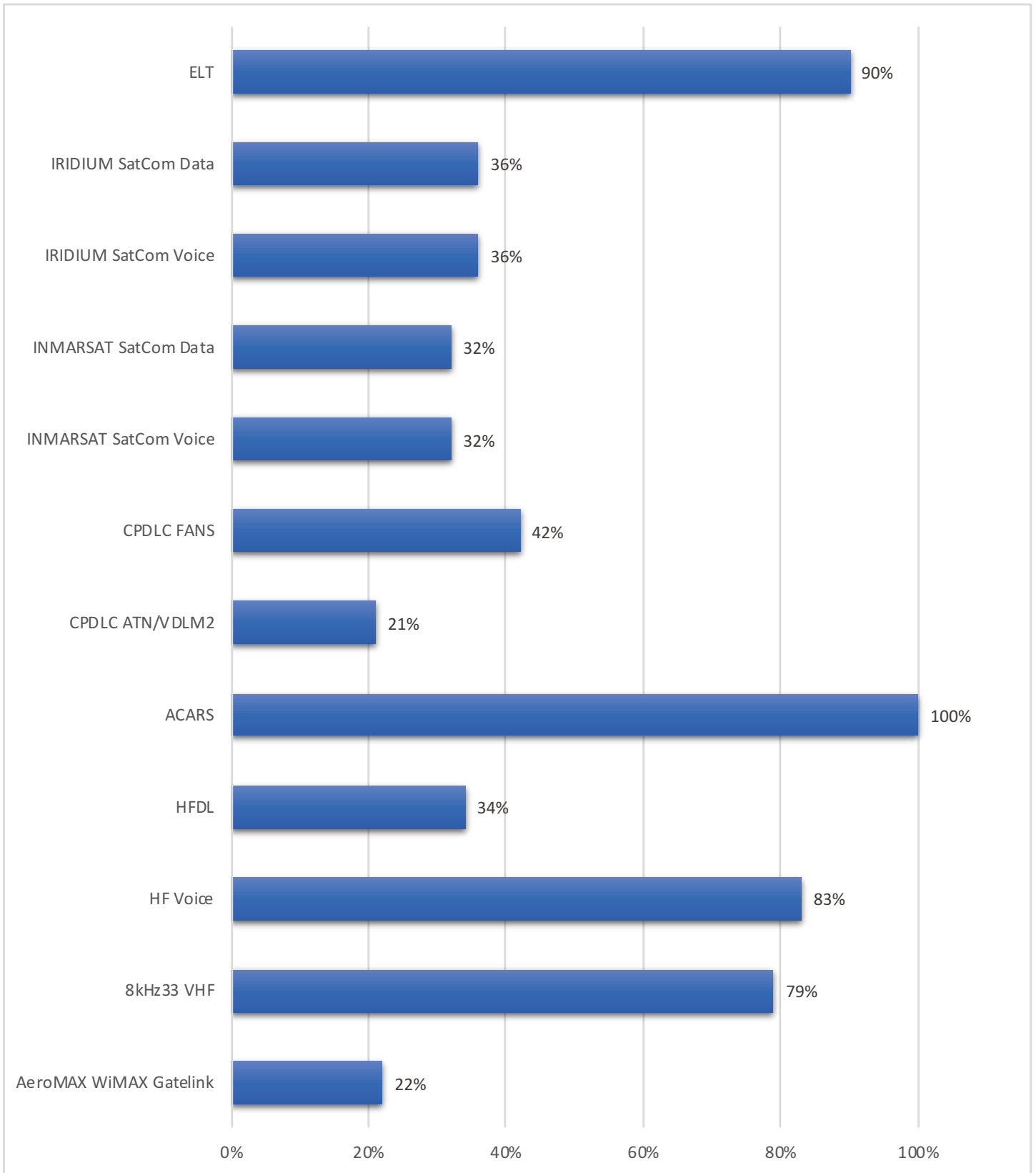




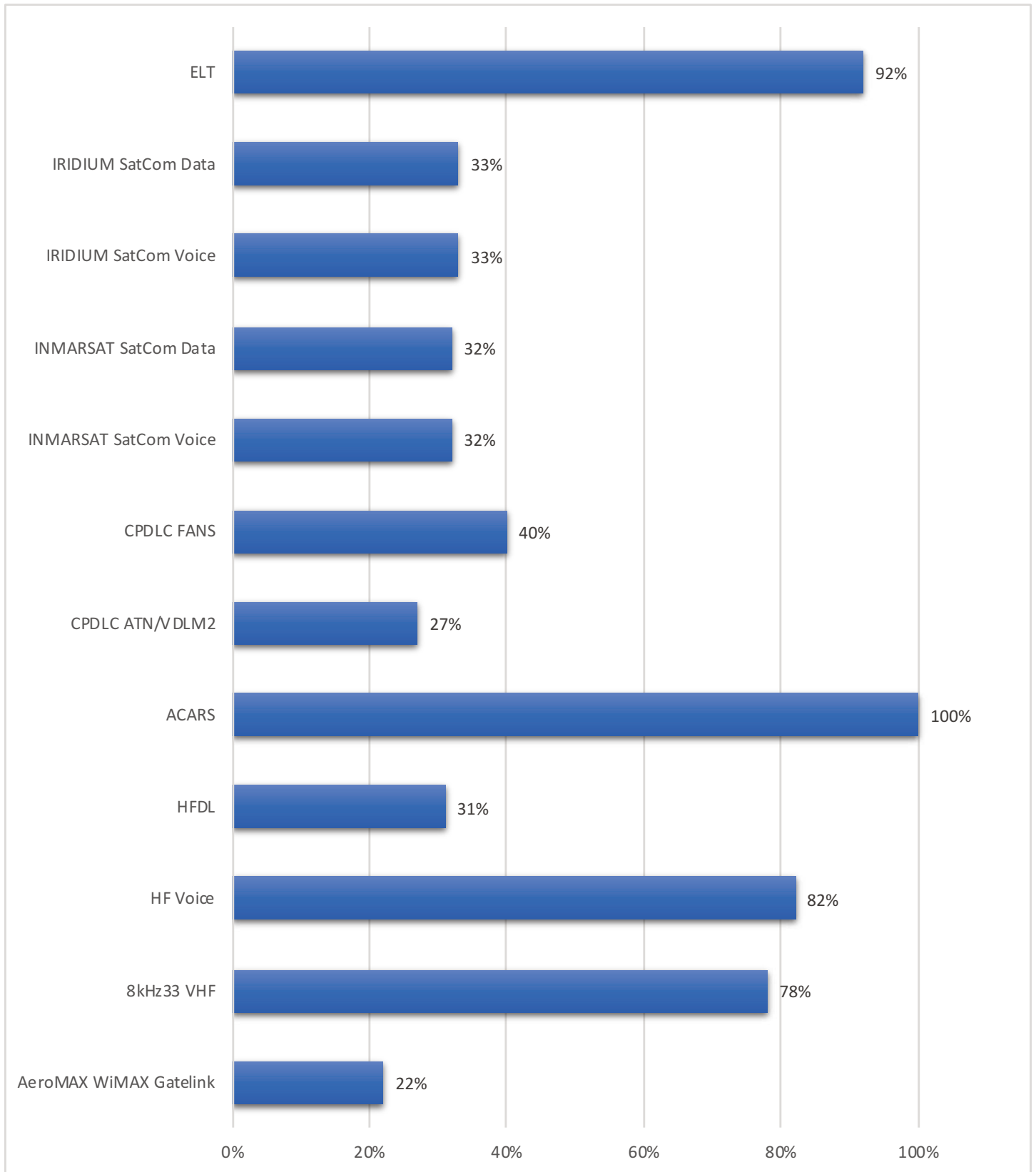
Trans-Polar (North and/or South)

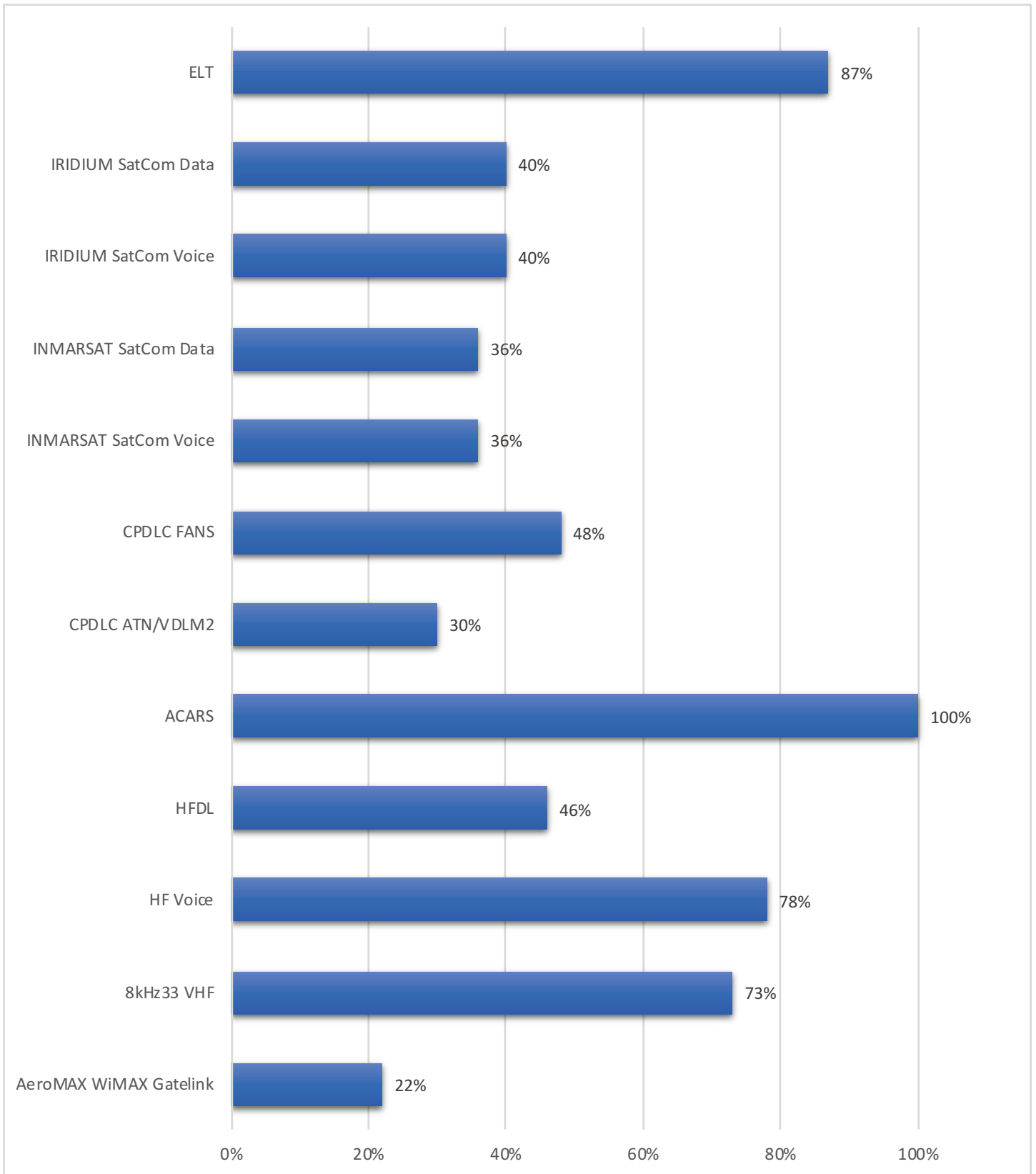


Vancouver



Washington





Work In Progress

All Americas Region airspace users including airlines, business, military and general aviation are welcome to contribute to this series of equipage and capability reports.

The associated survey is located here...

Aircraft Equipage and Capability Survey



Based on a survey of 3,375 airframes

Categorized by Flight Information Region (FIR)

IATA Americas Region

NAVIGATION

Replacing assumptions with facts

This report is based on unedited airspace user submissions

Refer to statistical note on page 2

CONTRIBUTING AIRSPACE USERS

AEROMEXICO, AEROMEXICO CONNECT, AEROLITORAL, AIR CANADA, AIR CANADA ROUGE, AIR NEW ZEALAND, AIR EUROPA, AVIANCA BRAZIL, AZUL, CONDOR, COPA, DELTA, ETIHAD, FEDEX, GOL, IBERIA, JETBLUE, KLM, LATAM AIRLINES, LIAT, QATAR AIRWAYS, ROYAL JORDANIAN, SAS, SWISS, SWISS GLOBAL, UNITED, UPS.

AIRFRAME TYPES

A306, A310, A319, A320, A321, A330, A332, A333, A343, A346, A359, A388, ATR42, ATR72, B737, B738, B739, B744, B757, B752, B763, B767, B772, B777, B77F, B77L, B77W, B787, B788, B789, DC10, E170, E190, MD11, MD88, MD90.

DISCLAIMER: The information contained in this document is subject to constant review and update in light of continuing airspace user contributions via an on-line airframe equipage and capability survey and/or other sources. No reader should act on the basis of any such information without referring to applicable laws and regulations and/or without taking appropriate professional advice. Although every effort has been made to ensure accuracy, the International Air Transport Association shall not be held responsible for any loss or damage caused by errors, omissions, misprints or misinterpretation of the contents hereof. Furthermore, the International Air Transport Association expressly disclaims any and all liability to any person or entity in respect of anything done or omitted, and the consequences of anything done or omitted by any such person or entity, in reliance on the contents of this publication.



Data compilation date: 1st September 2018

Statistical Note

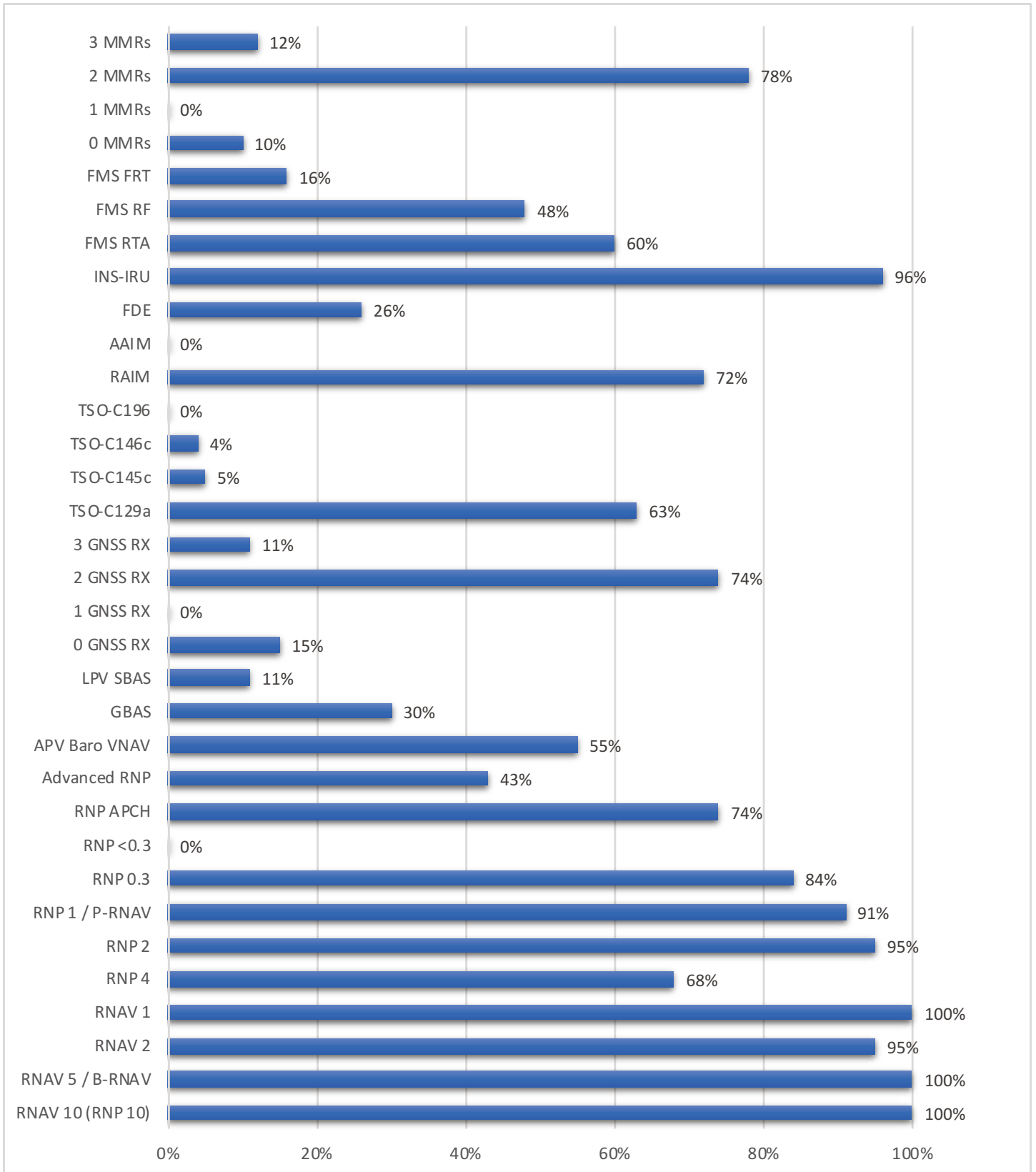
In a limited number of cases, airspace users reported capabilities such as SBAS without specifying the associated navigation source TSO. The capability to use SBAS was determined to be the overriding consideration and recorded as such. In other instances, multiple standards (TSOs) were listed for a navigation capability when referring to a single fleet. These facts were unaltered for the purposes of this report.

Point of contact:

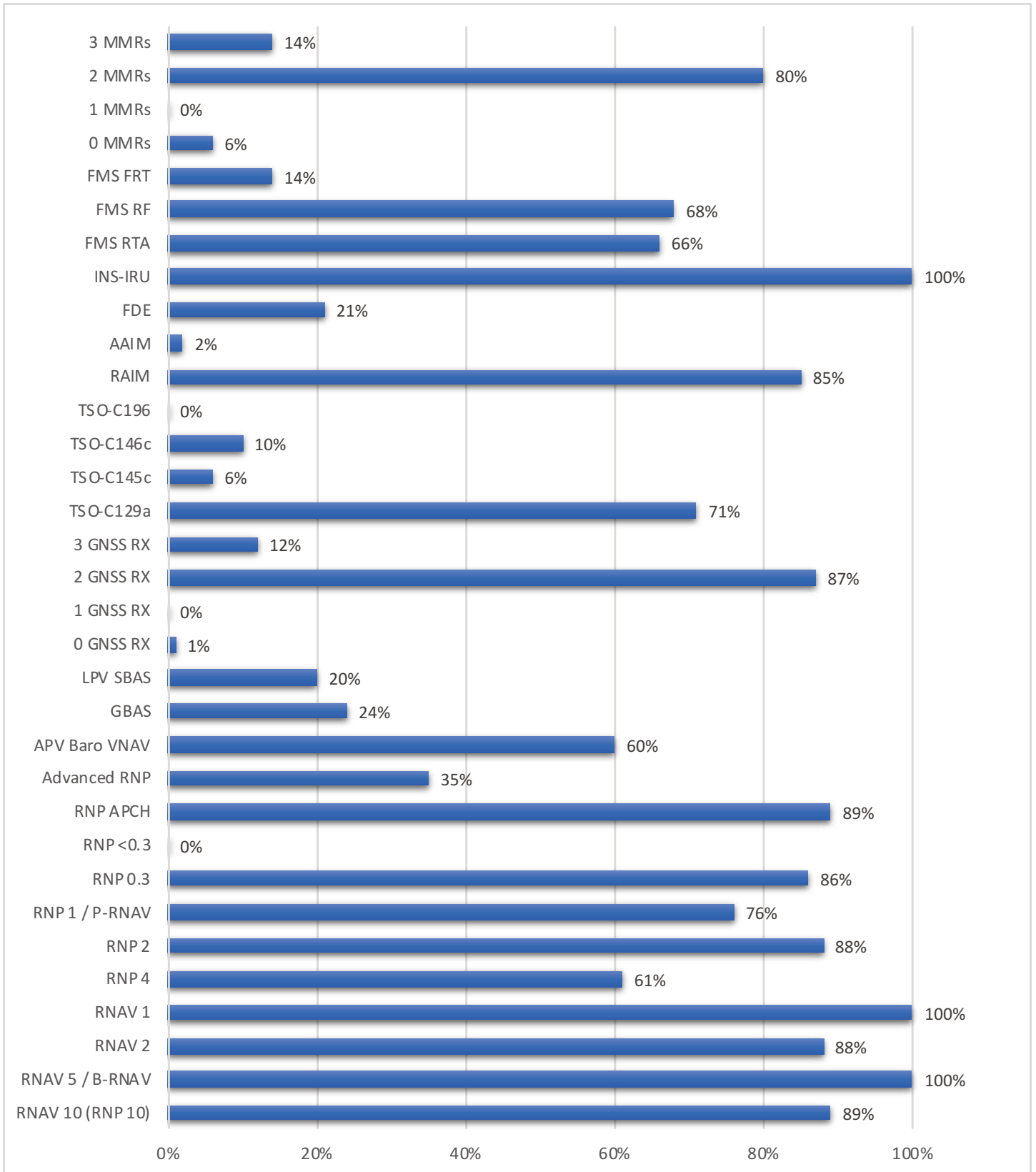
**Mr. Kieran O'Carroll
Safety and Flight Operations Department
IATA Americas Region
703 Waterford Way, Suite 600
Miami, Florida 33126
USA**

ocarrollk@iata.org

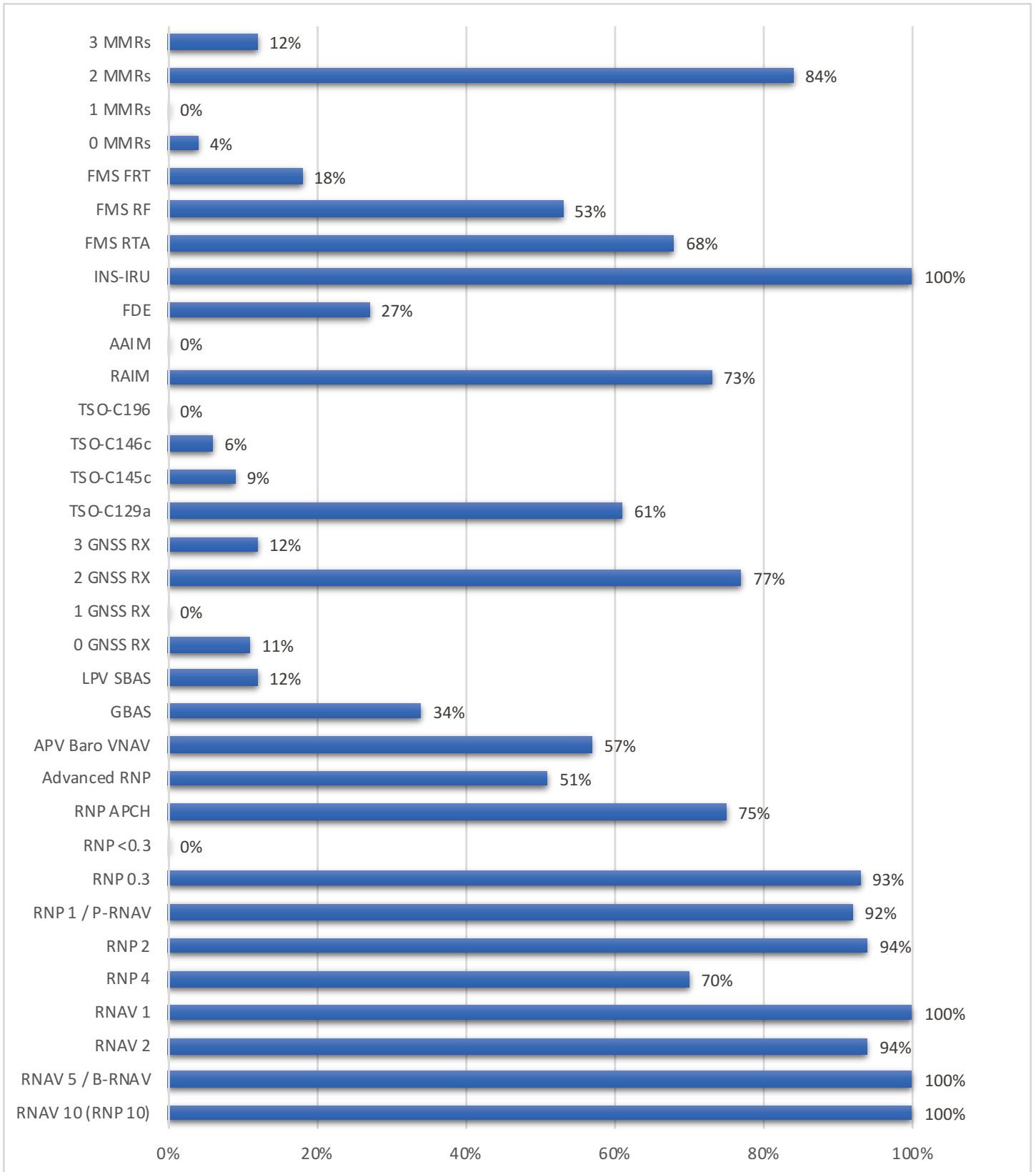
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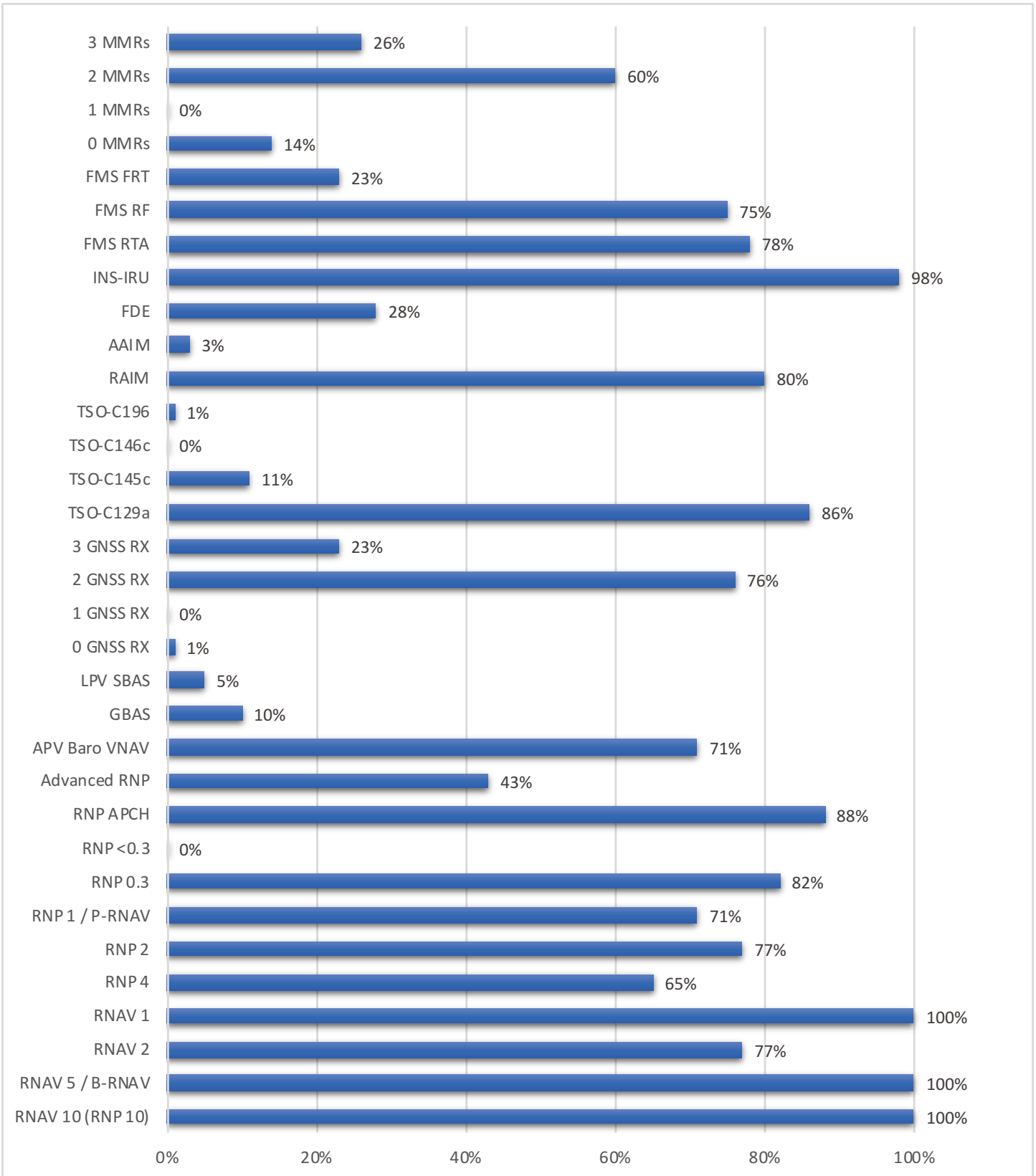
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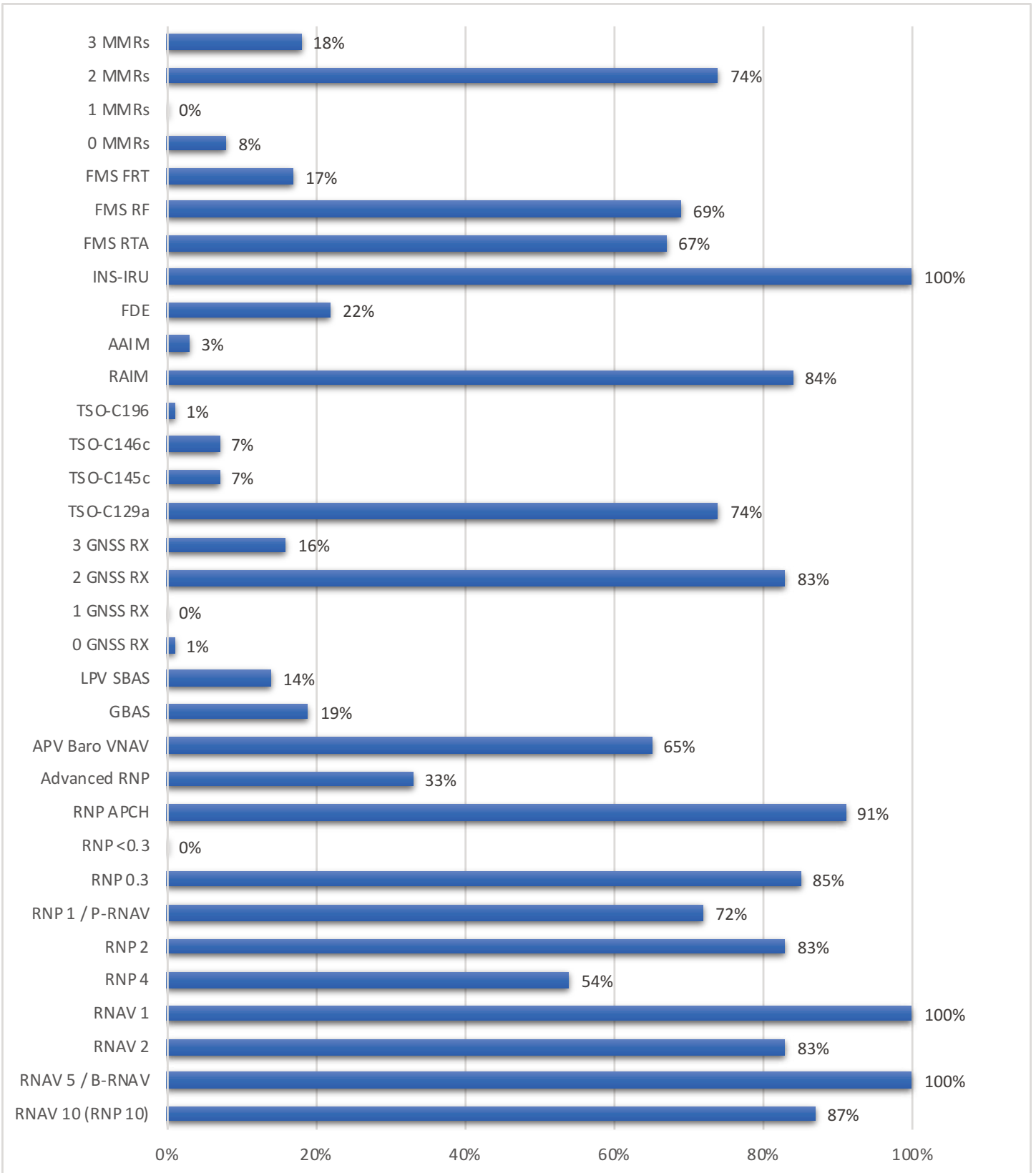
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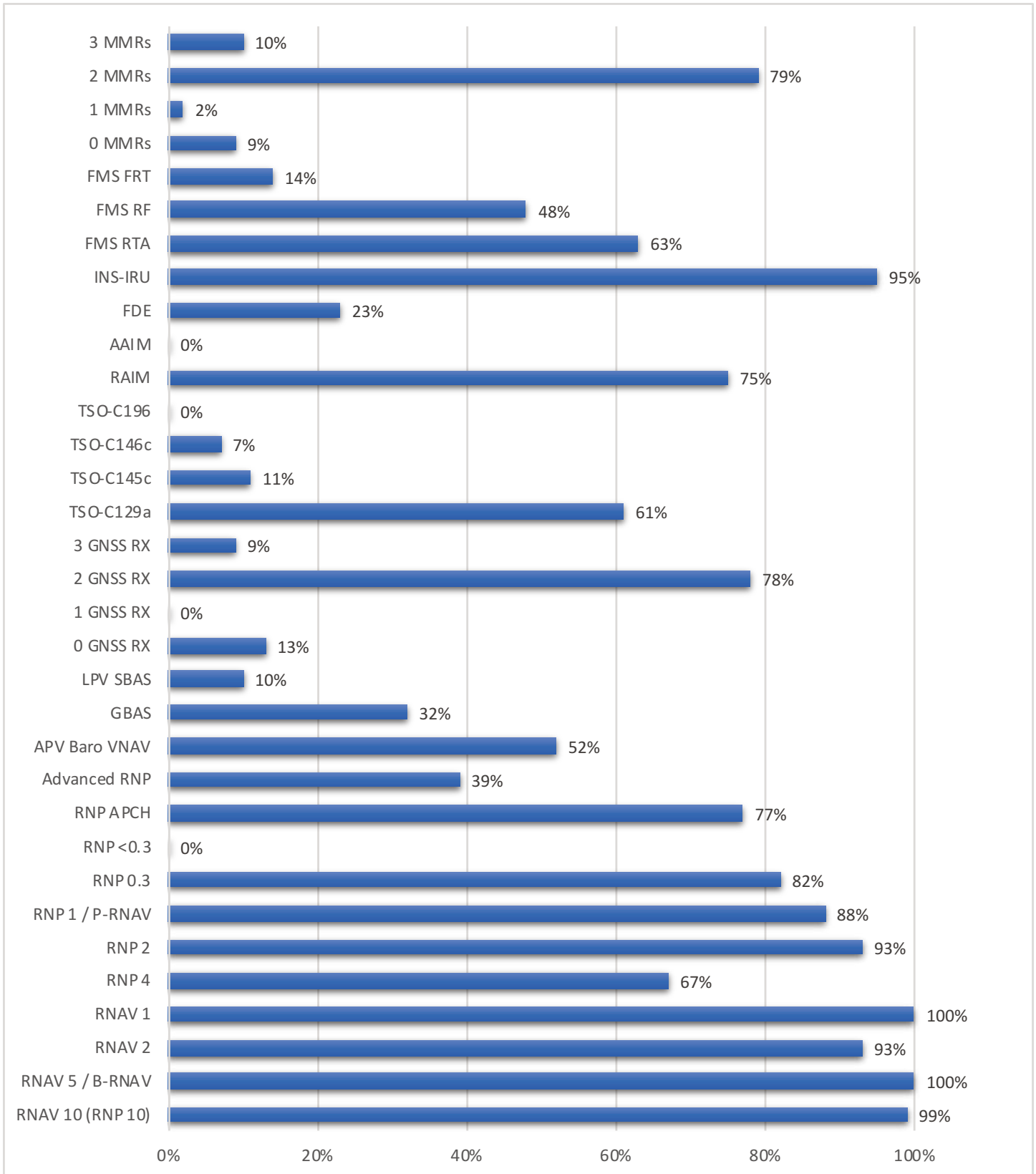


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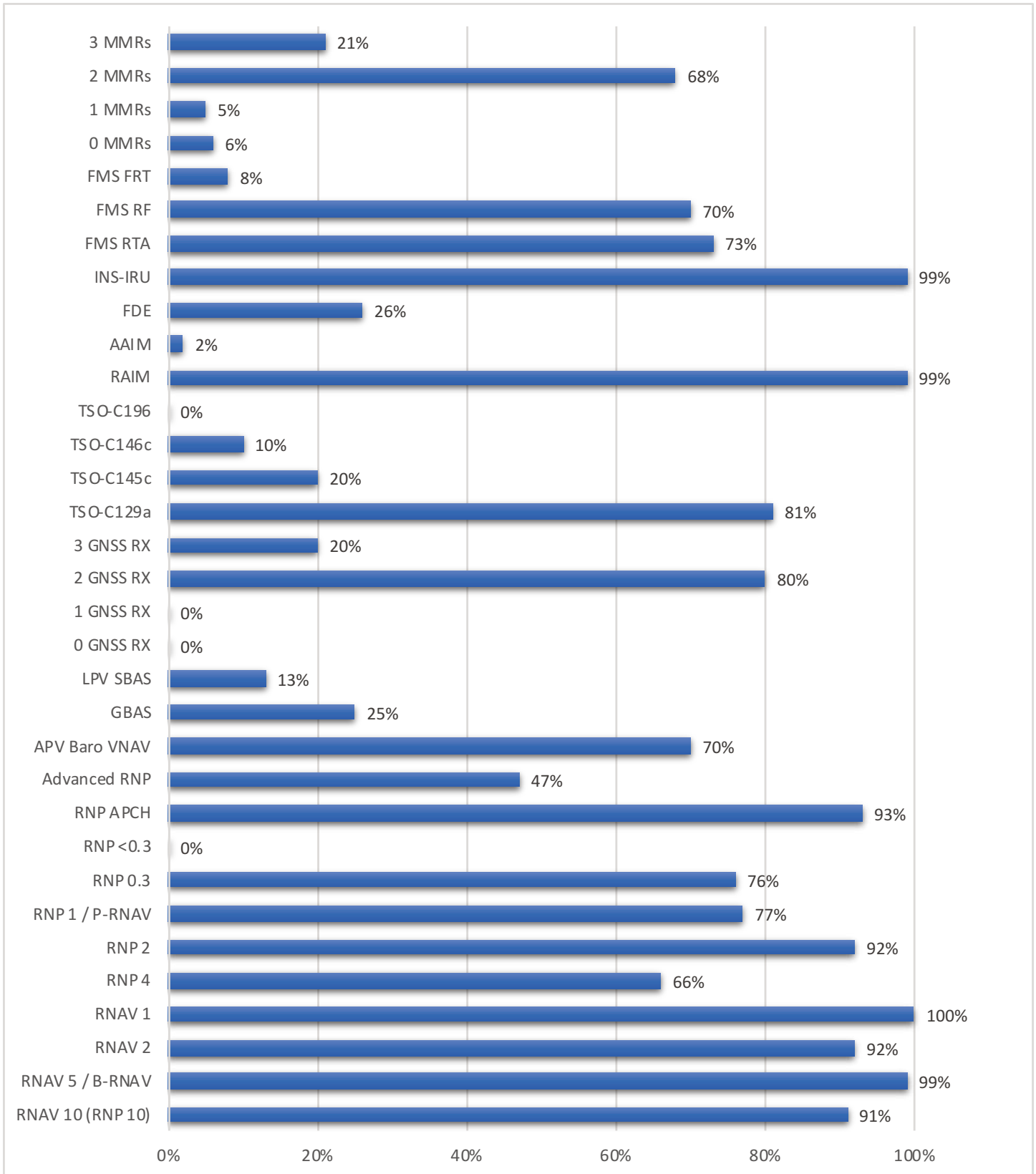


Asuncion

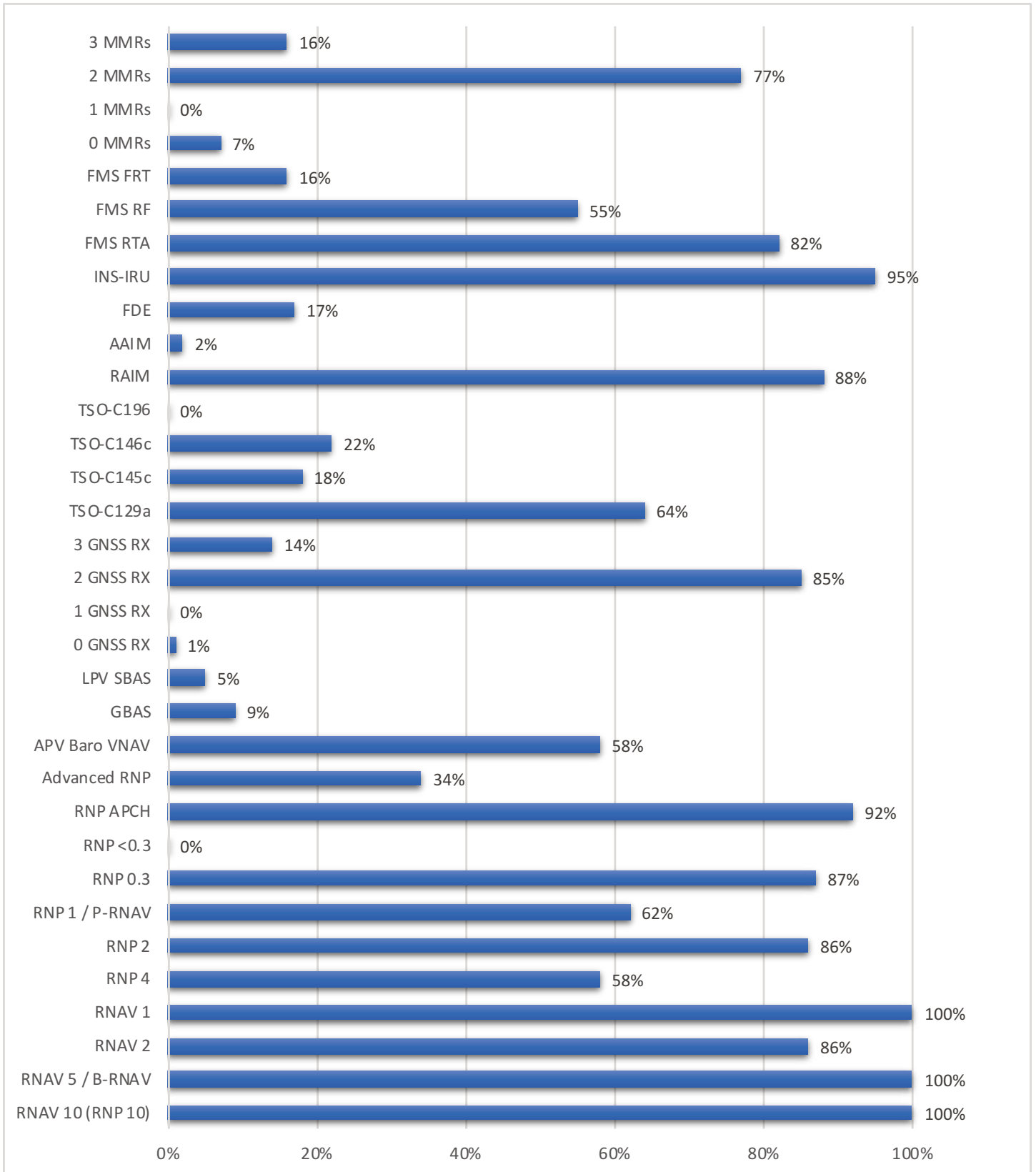




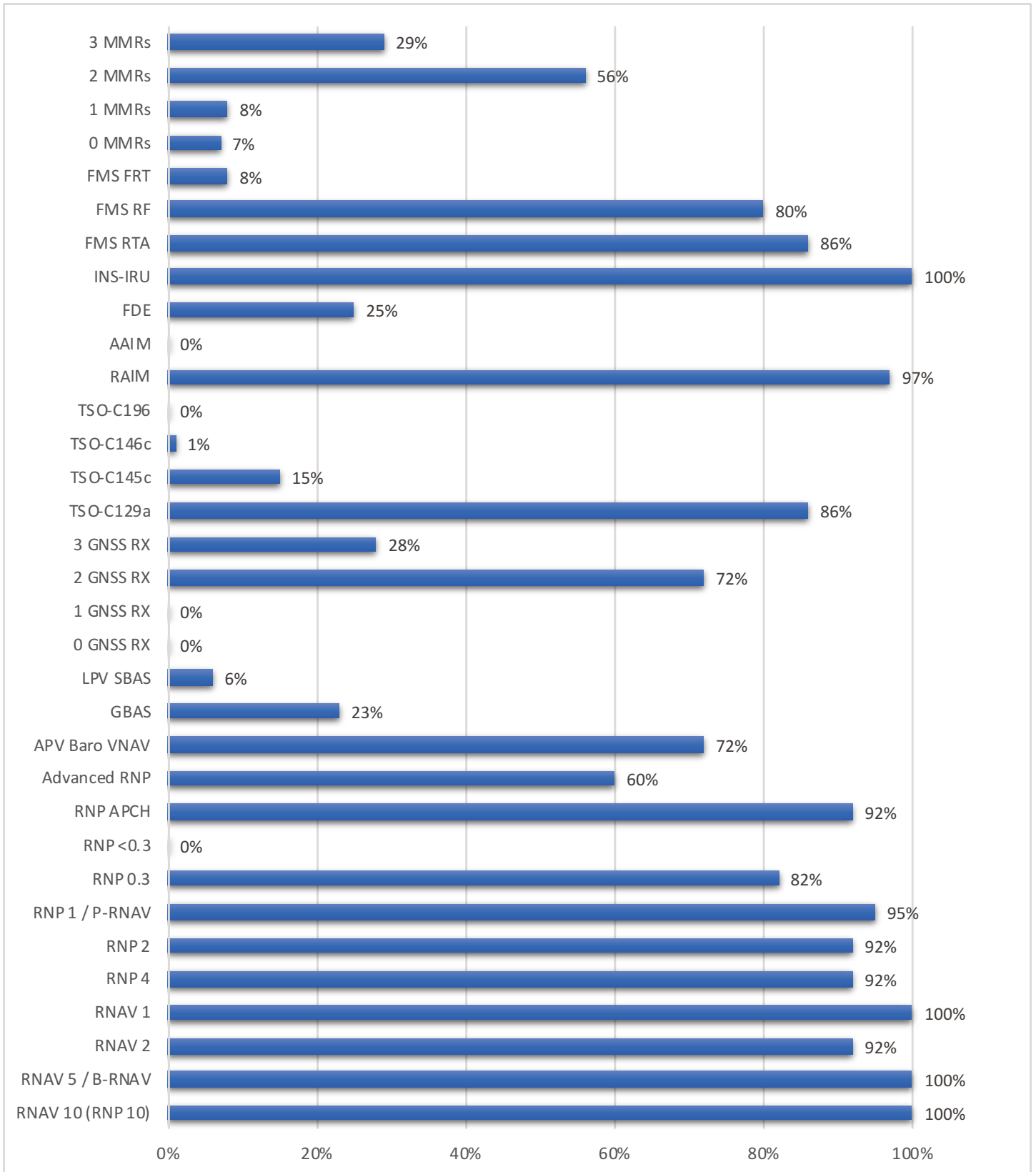
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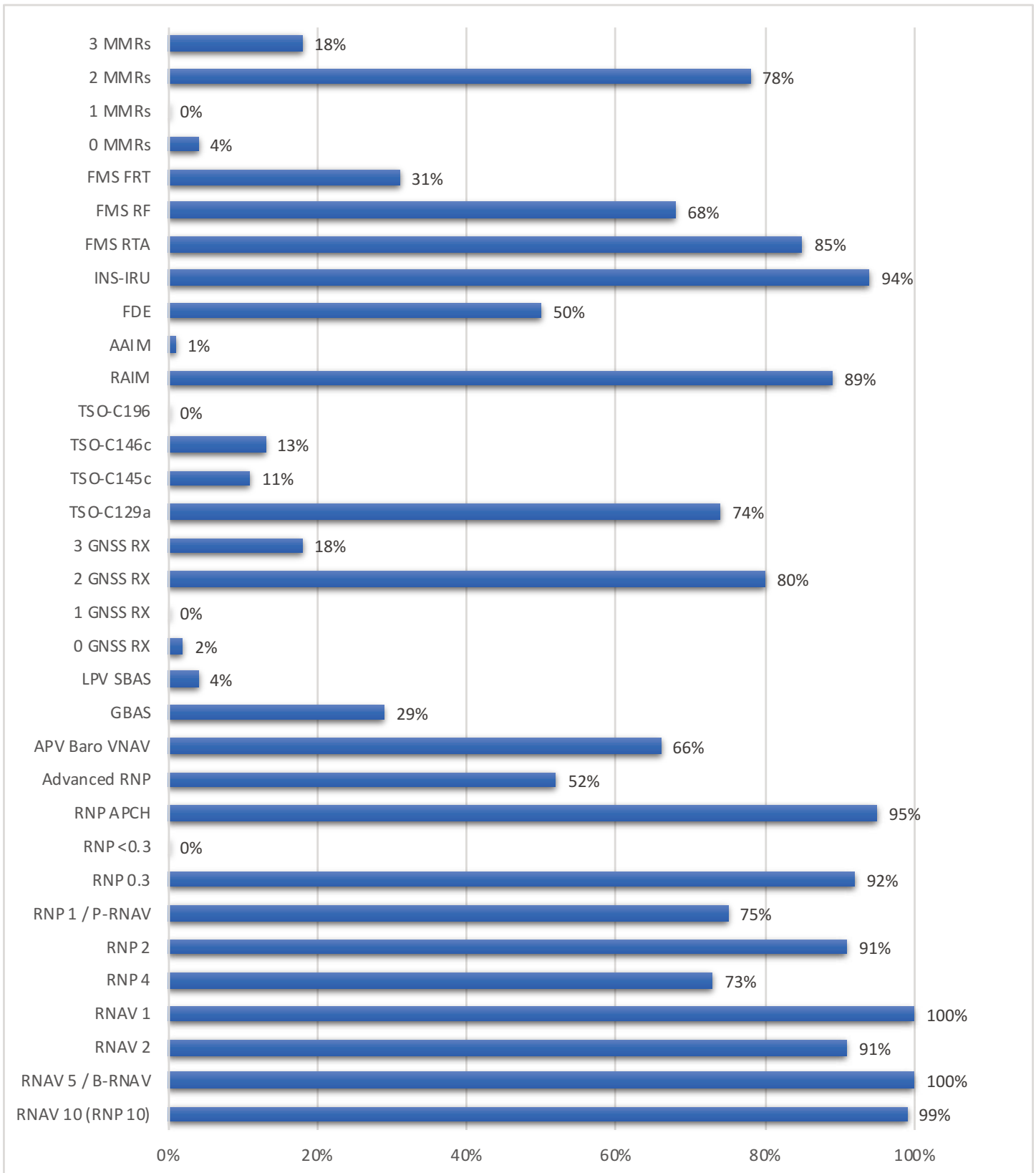
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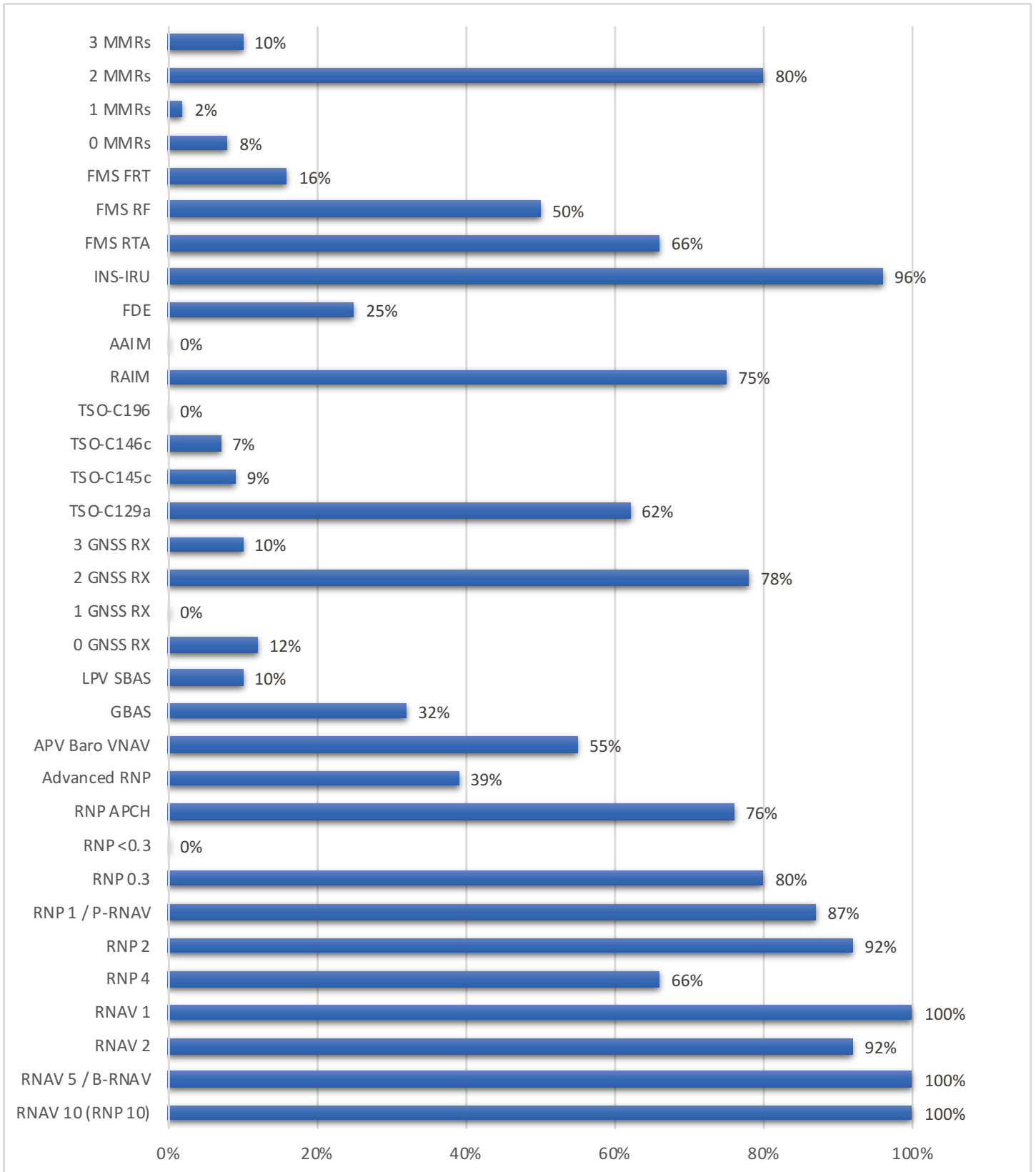
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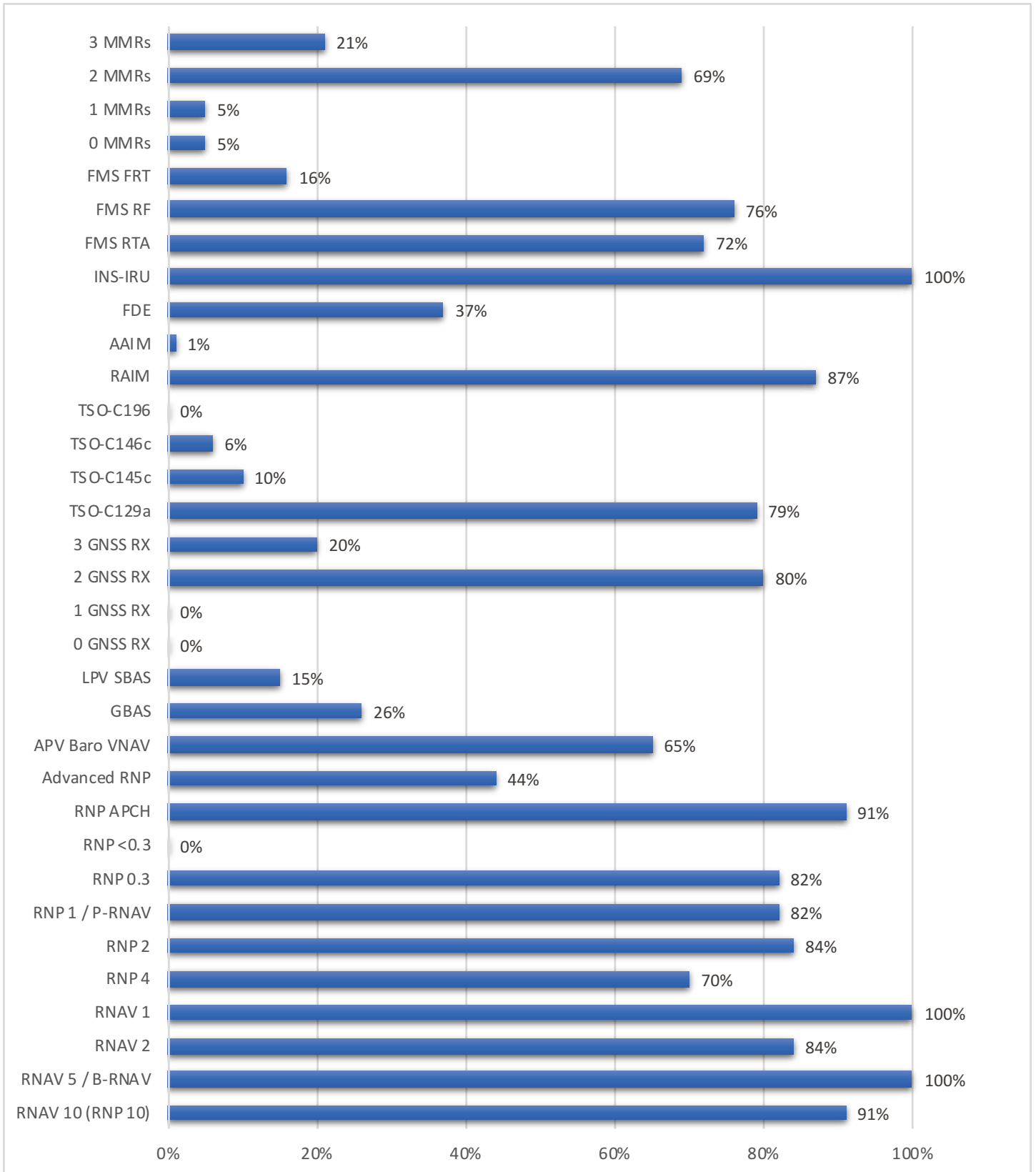


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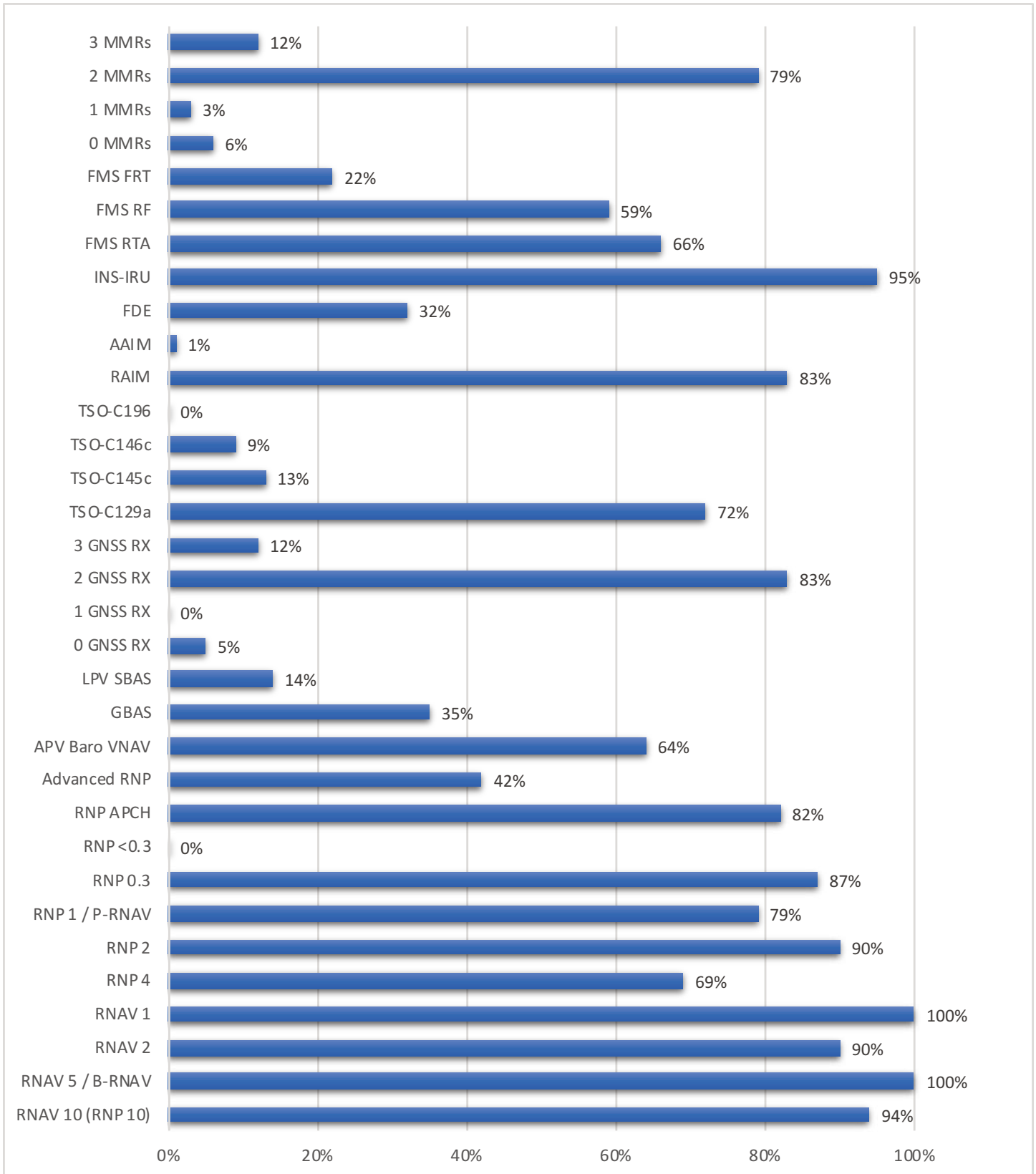


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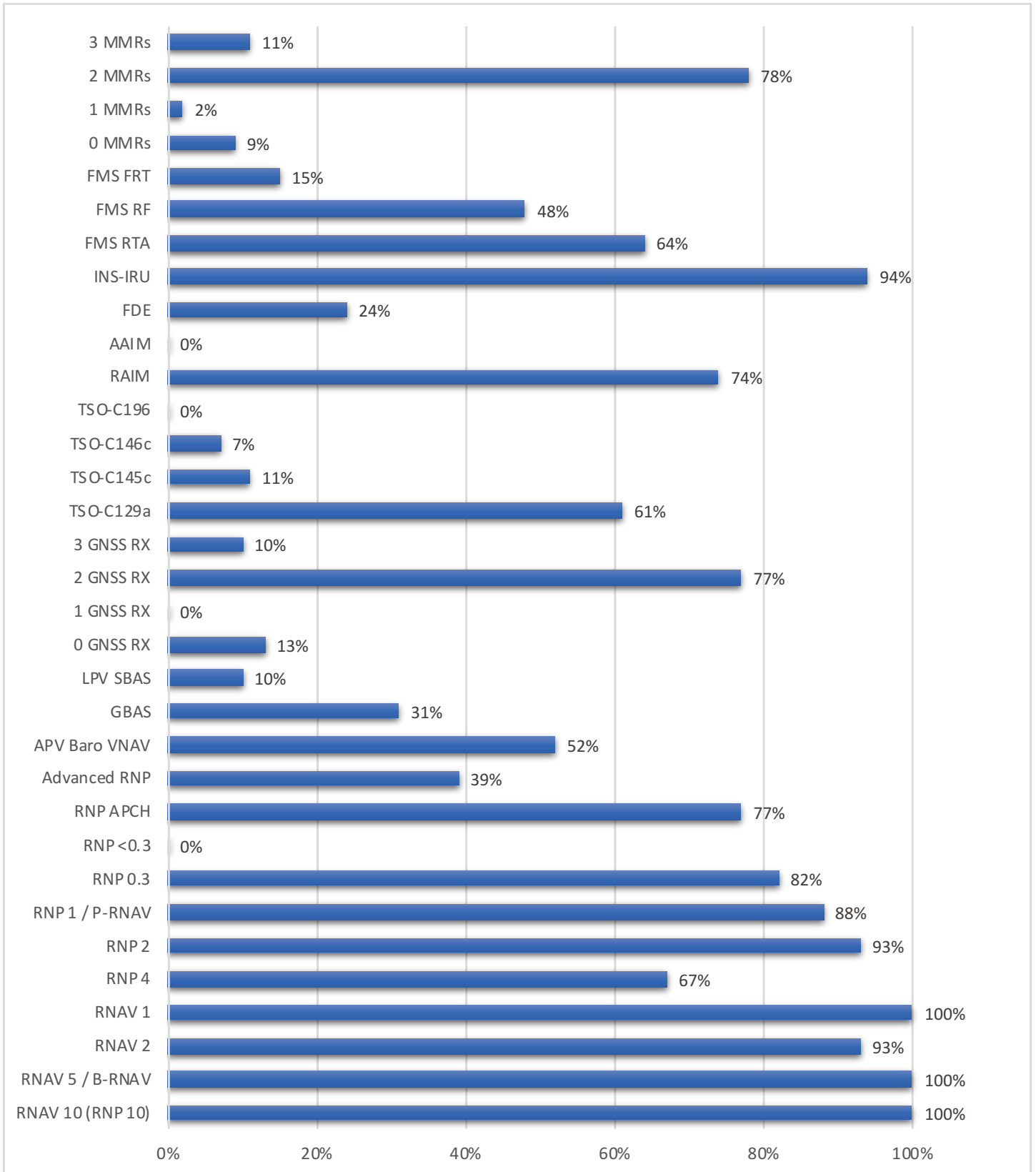




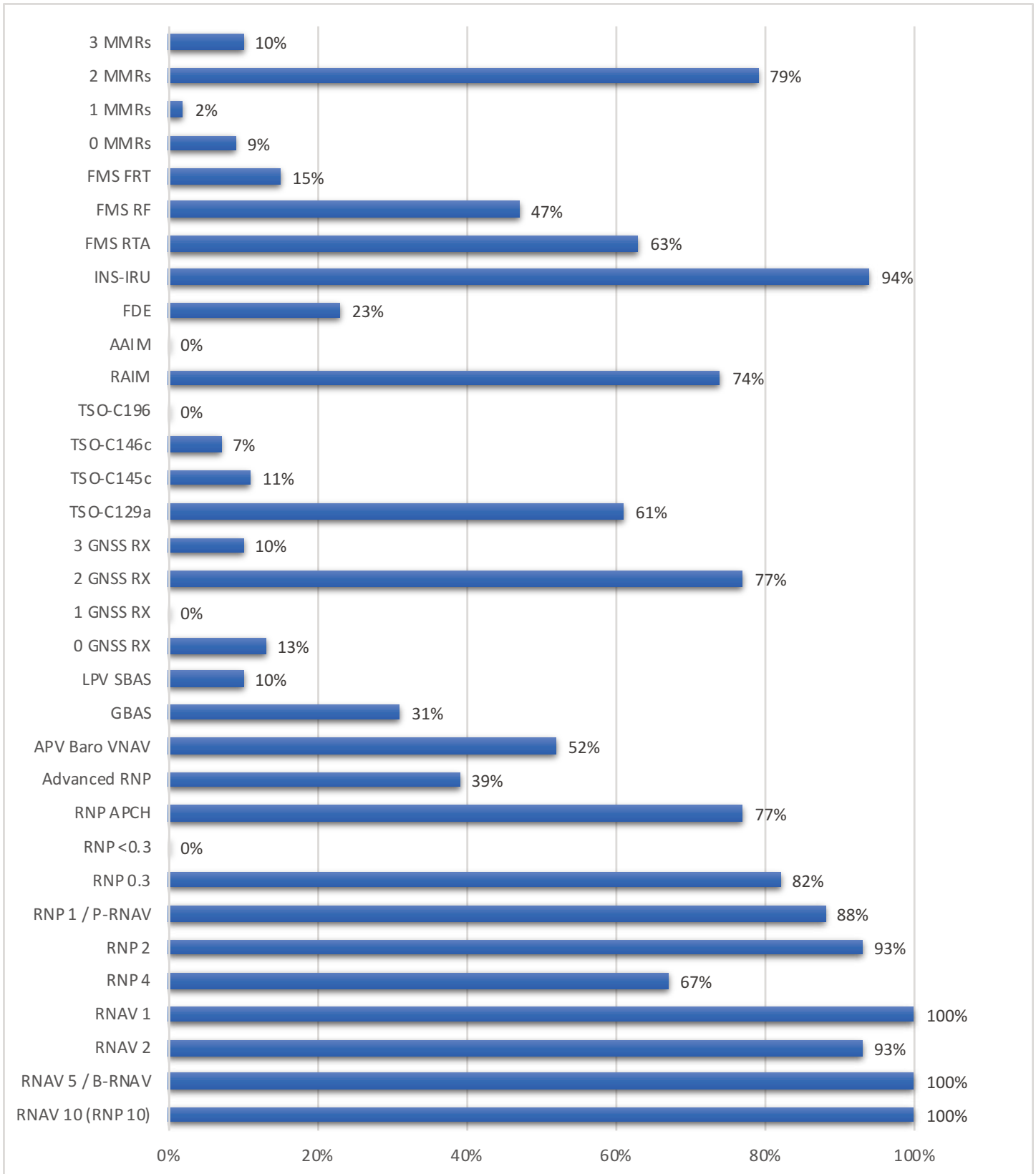
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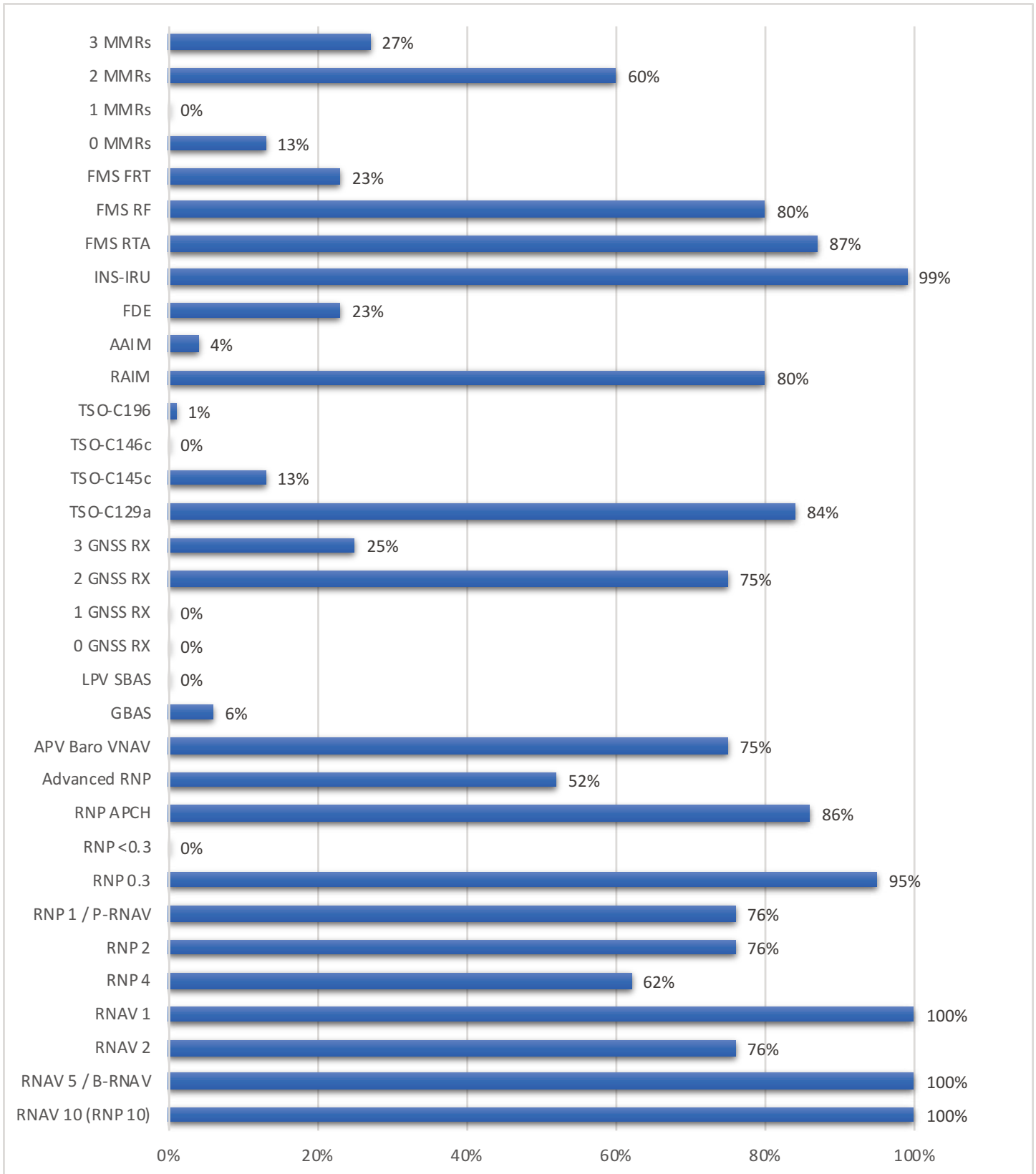
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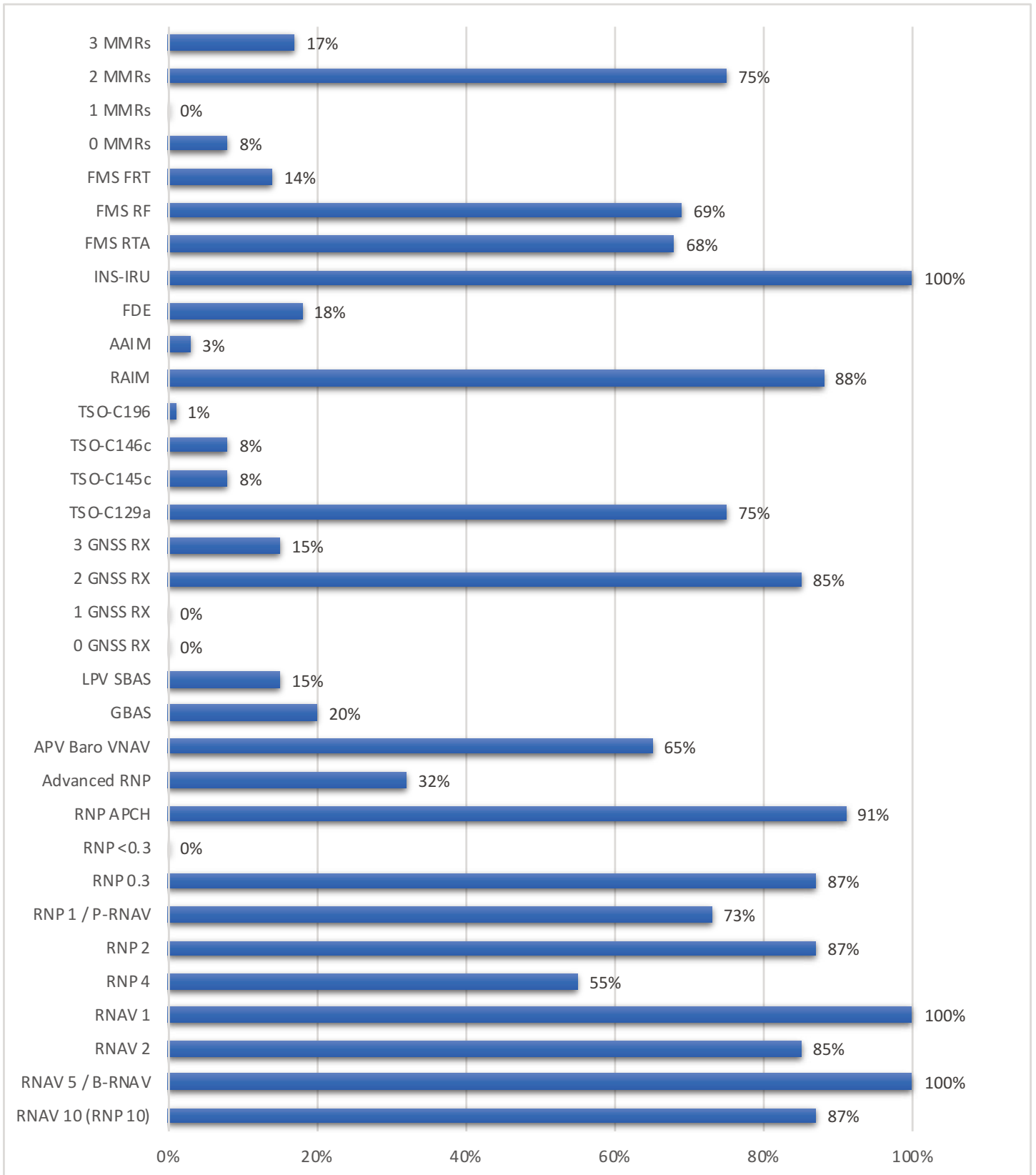


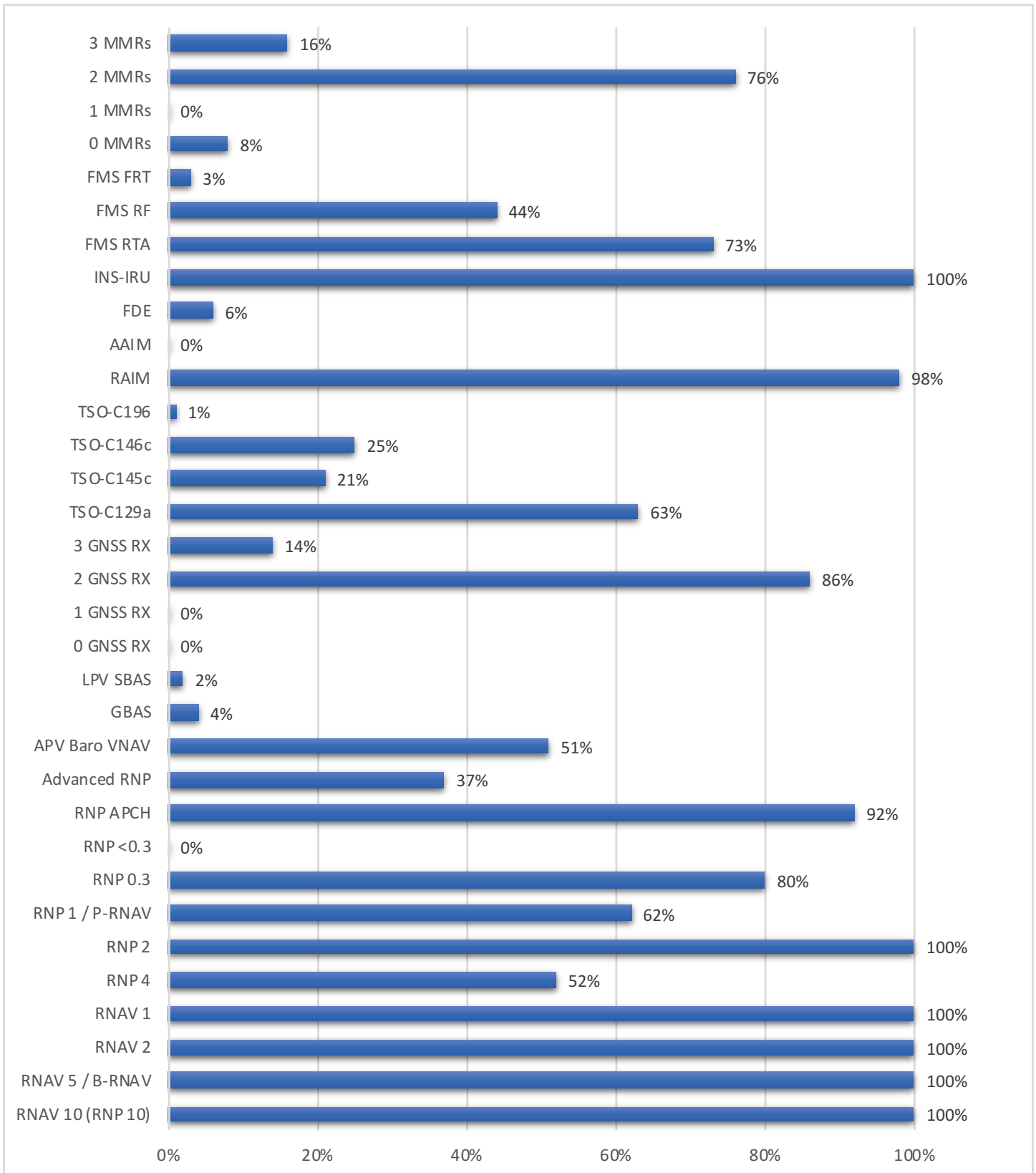
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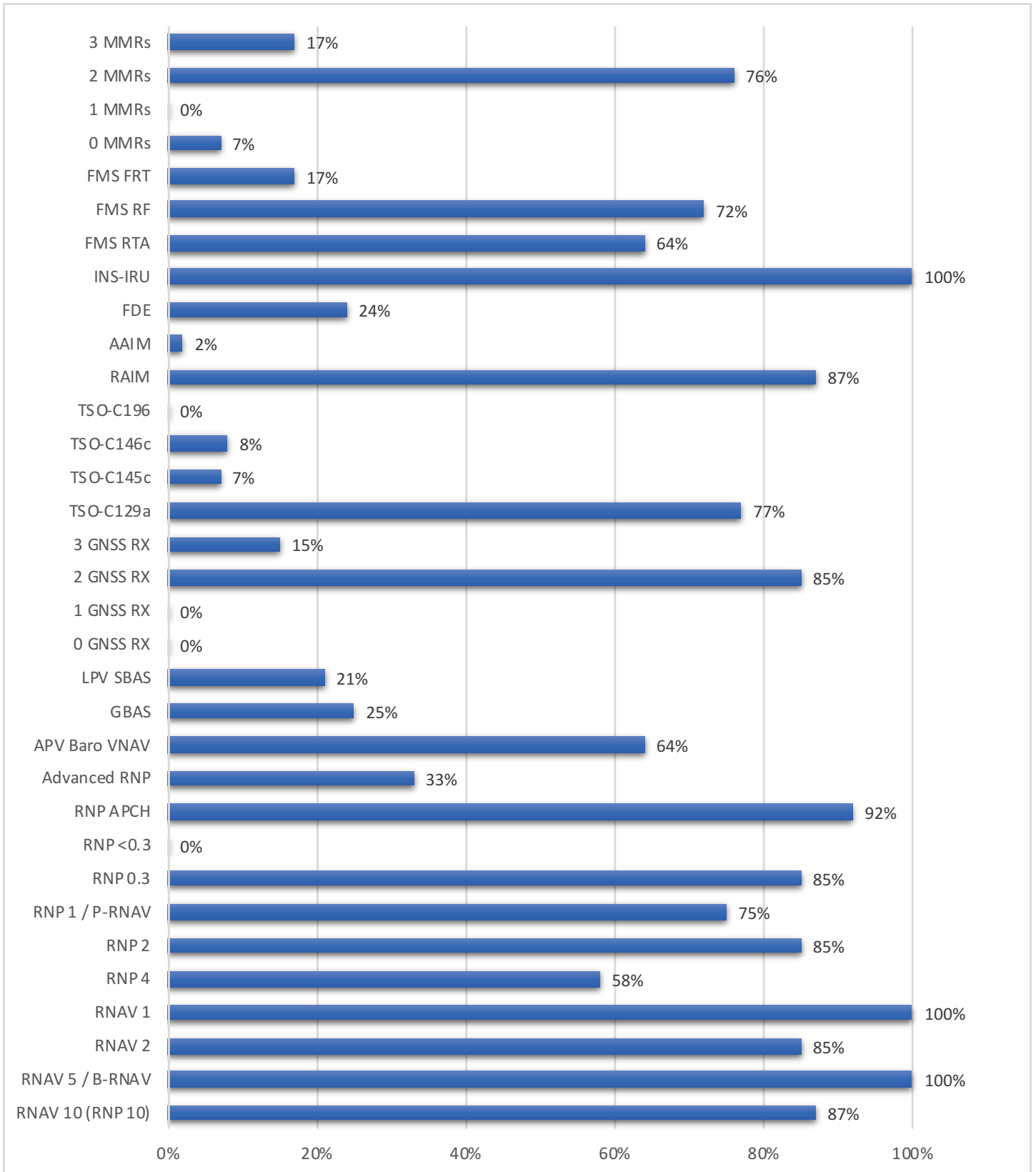


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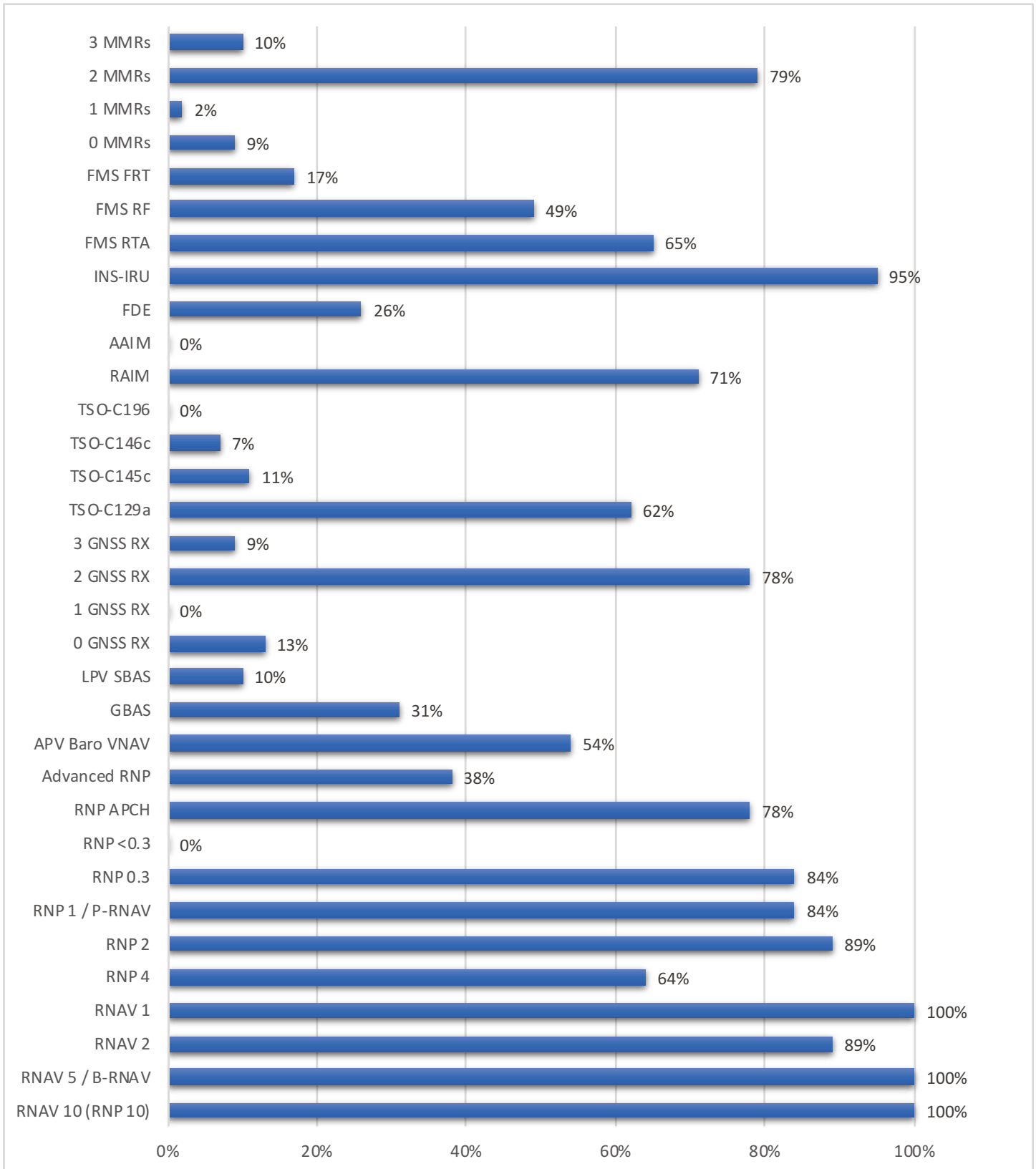


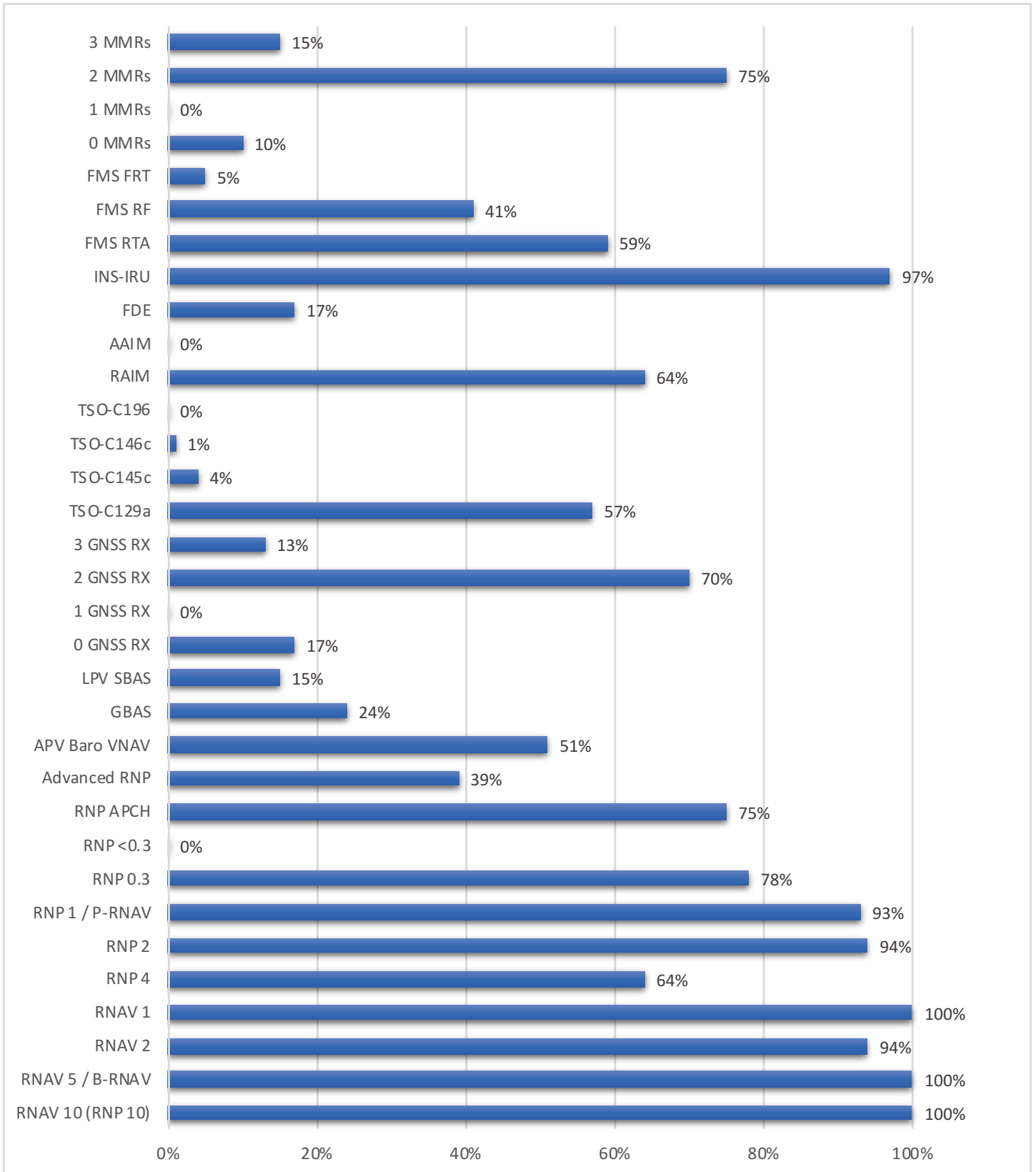


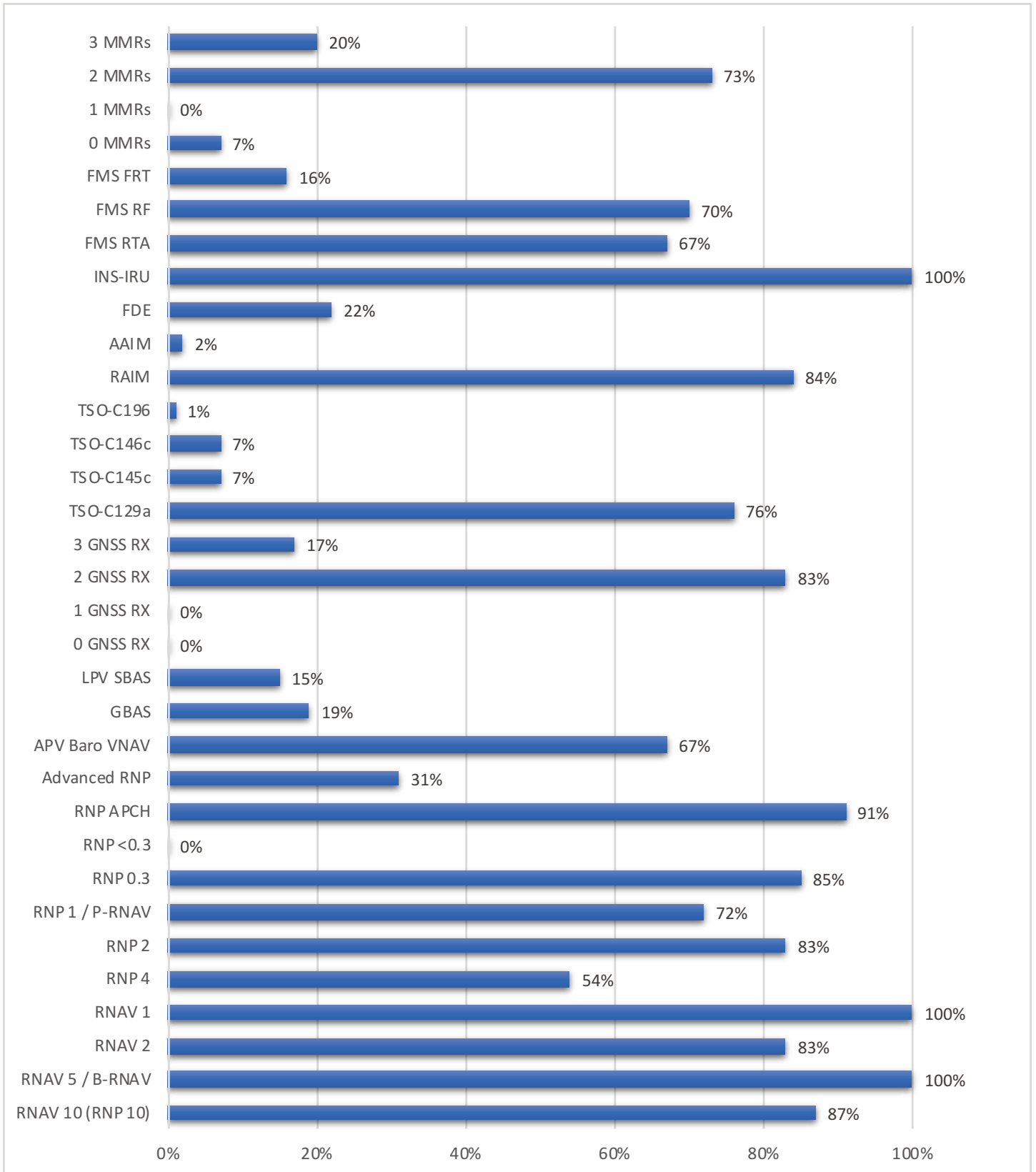




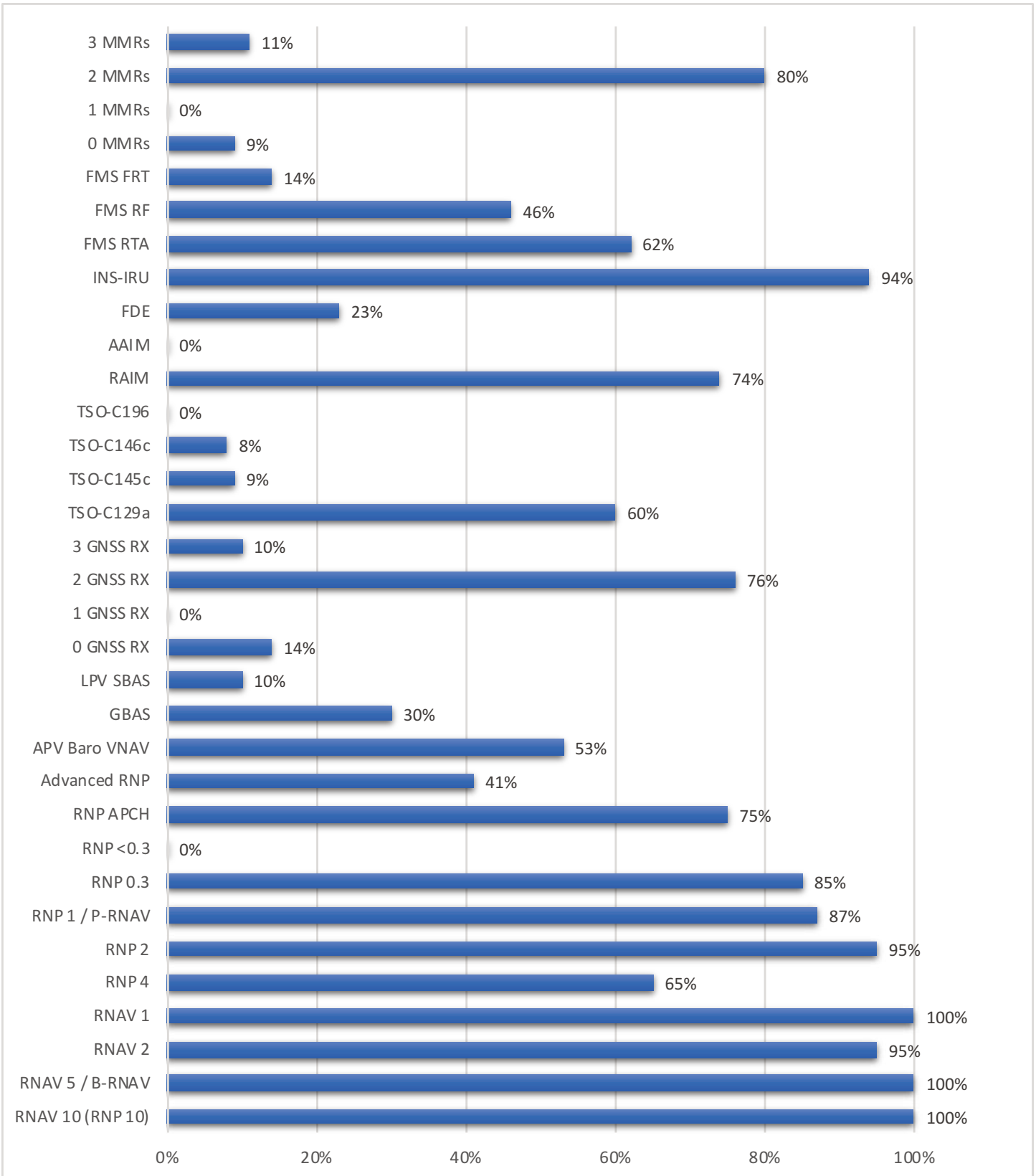
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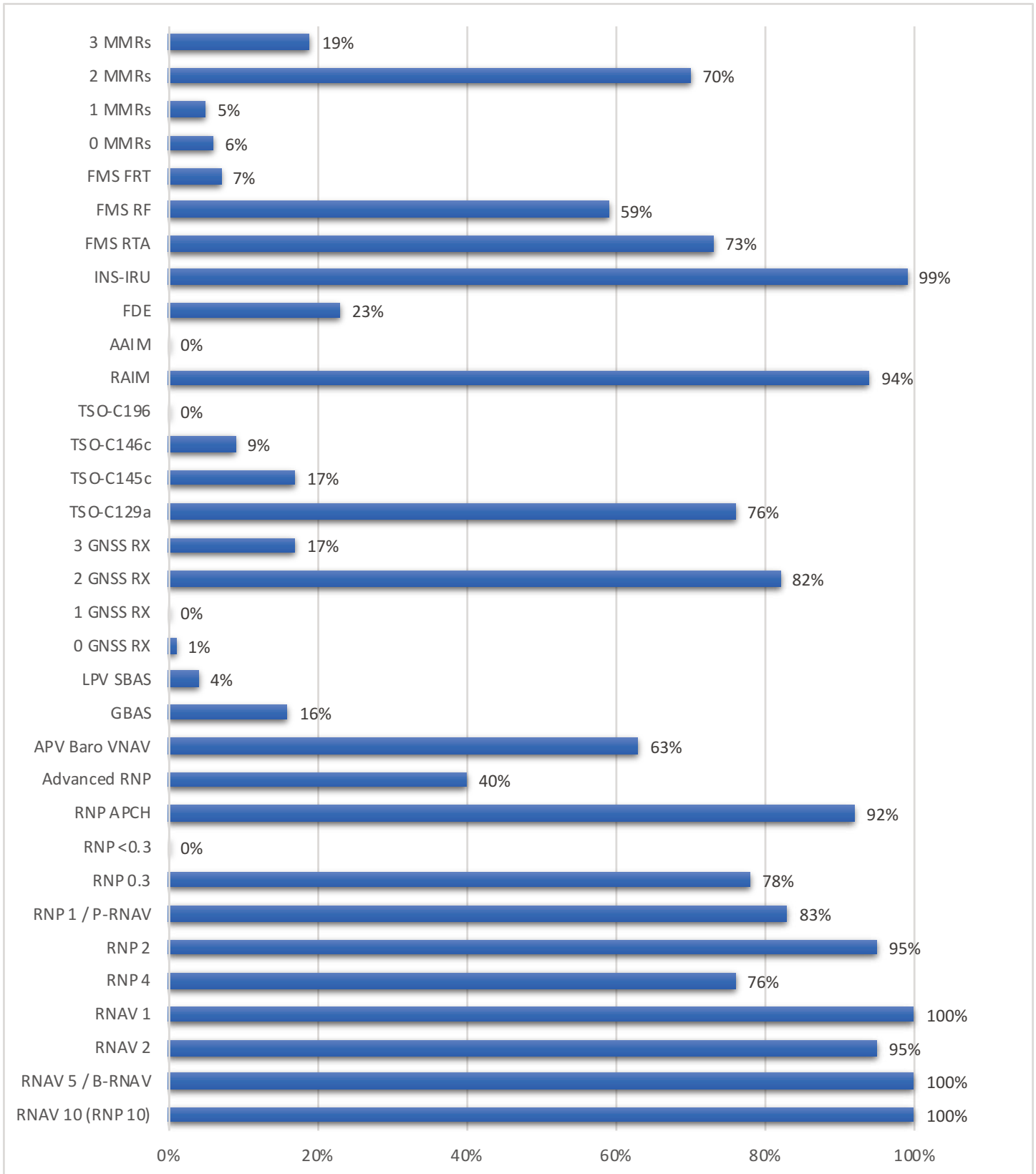




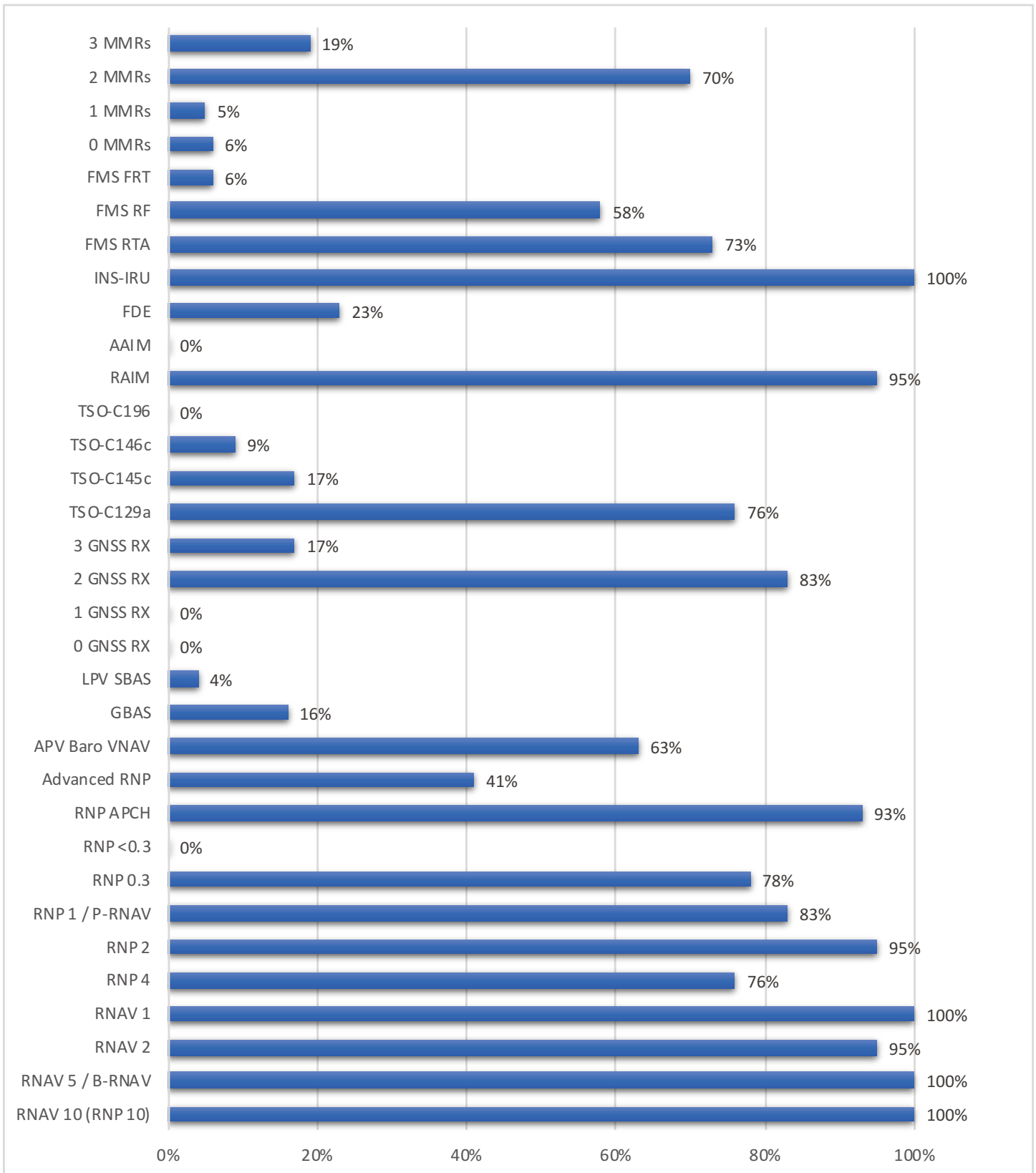
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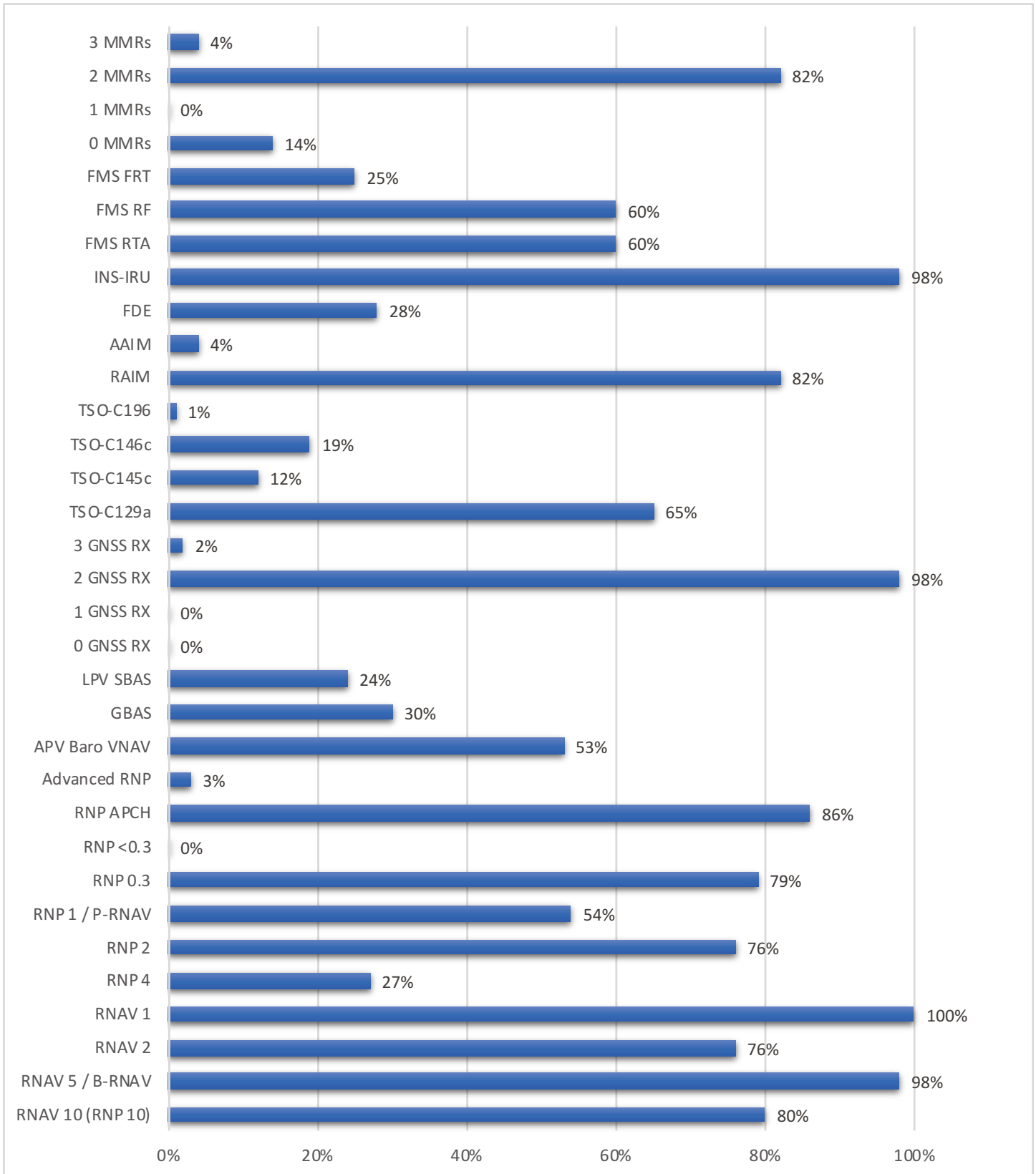
Gander Domestic

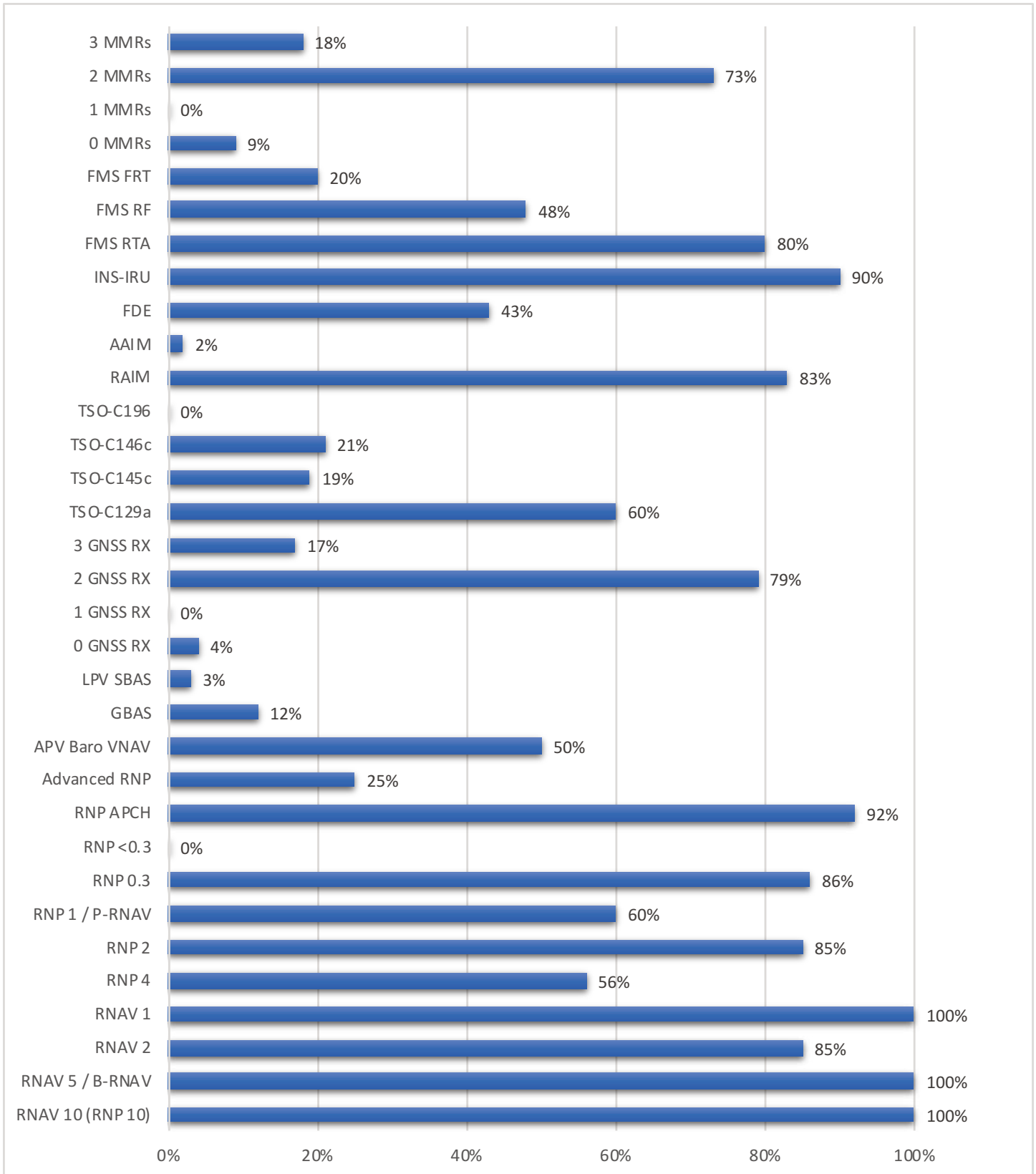


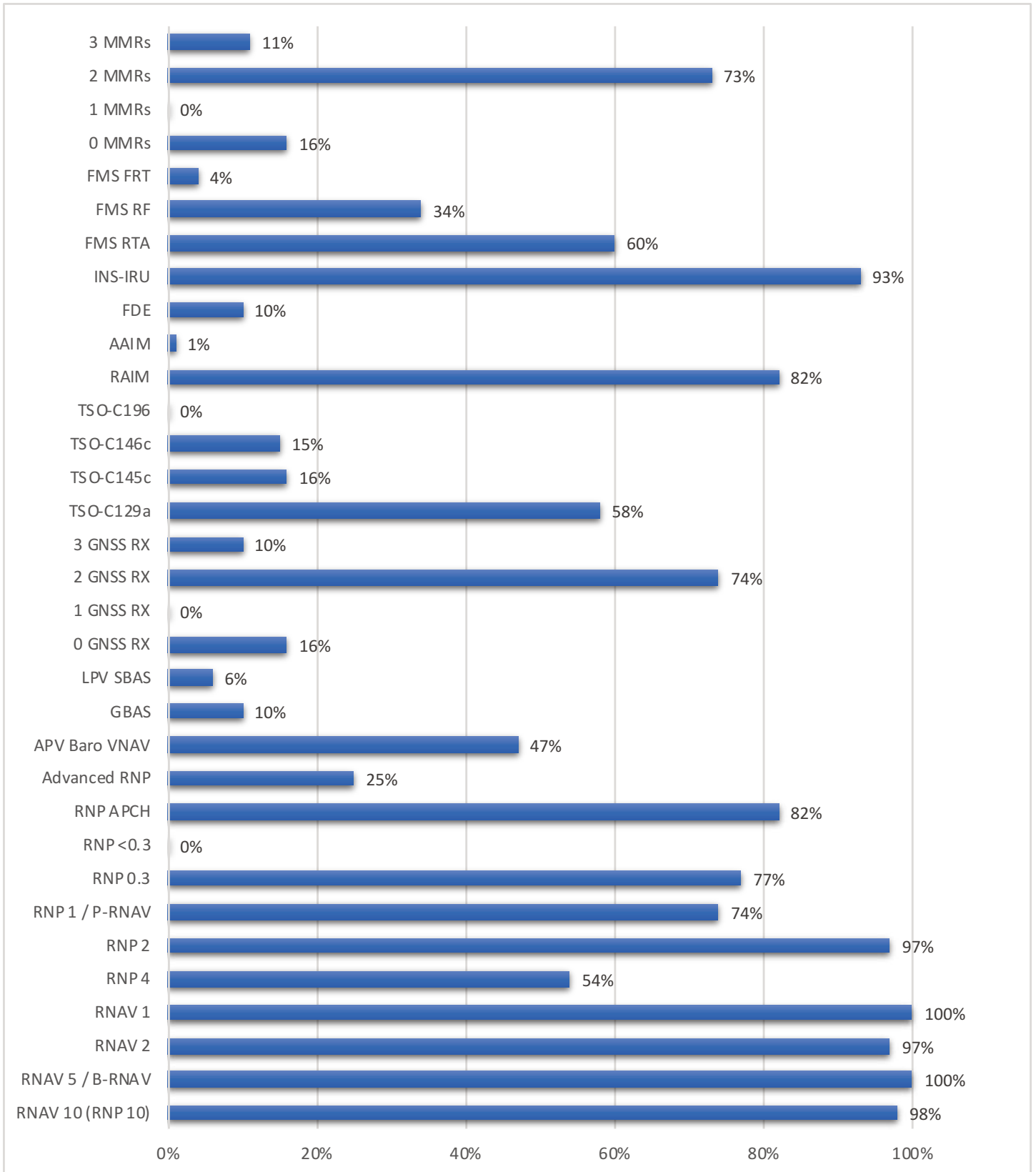
Gander Oceanic



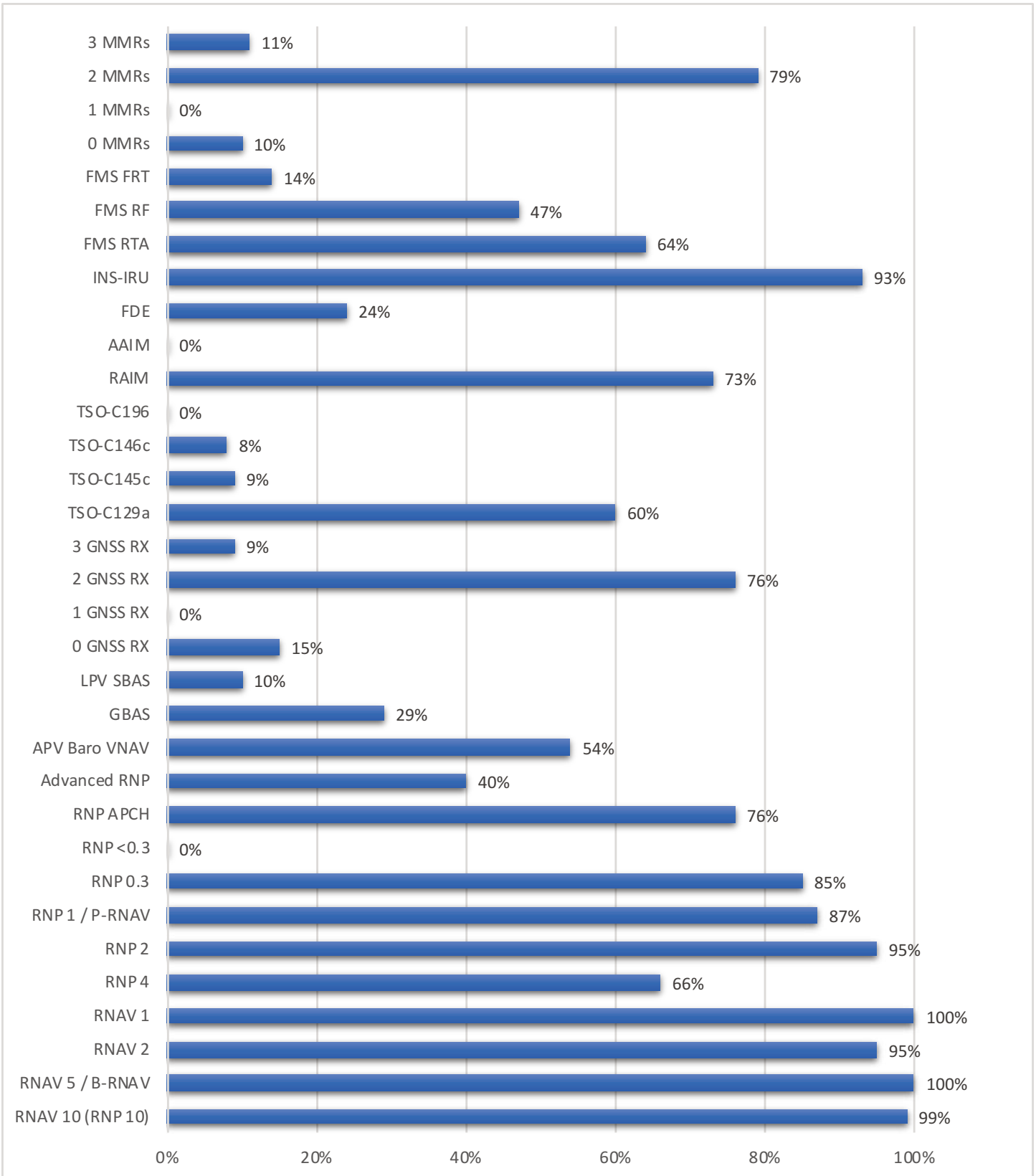
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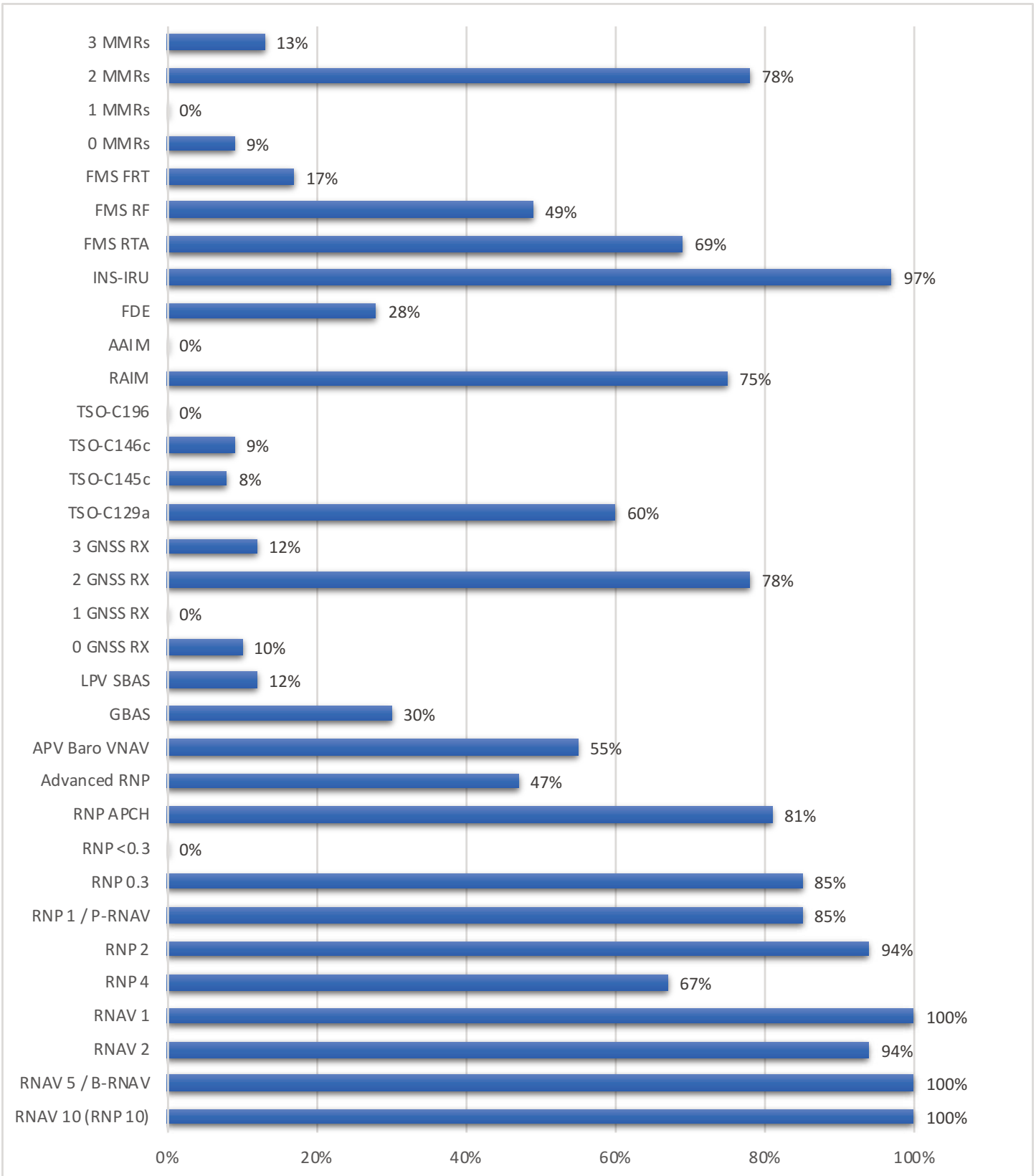




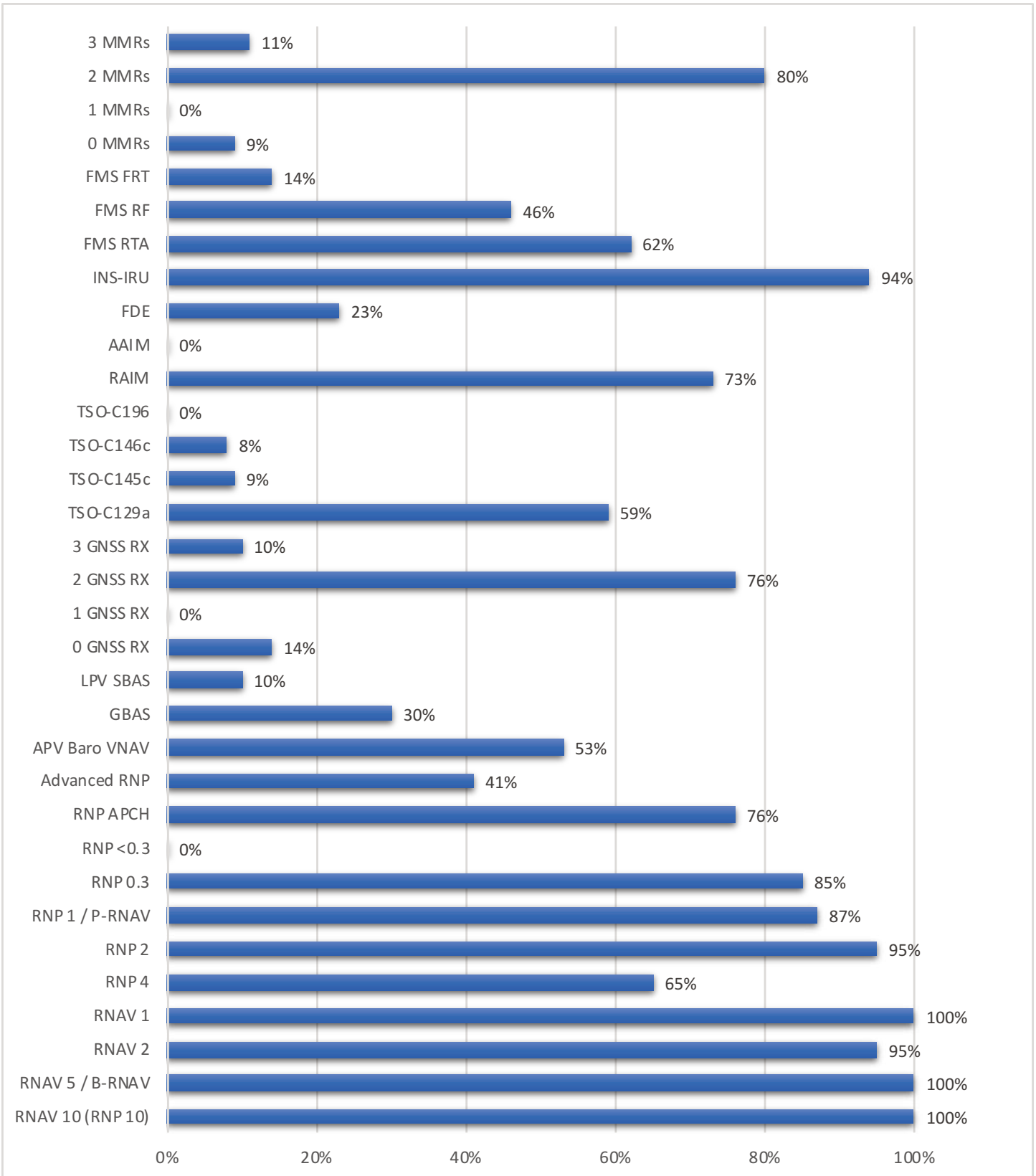
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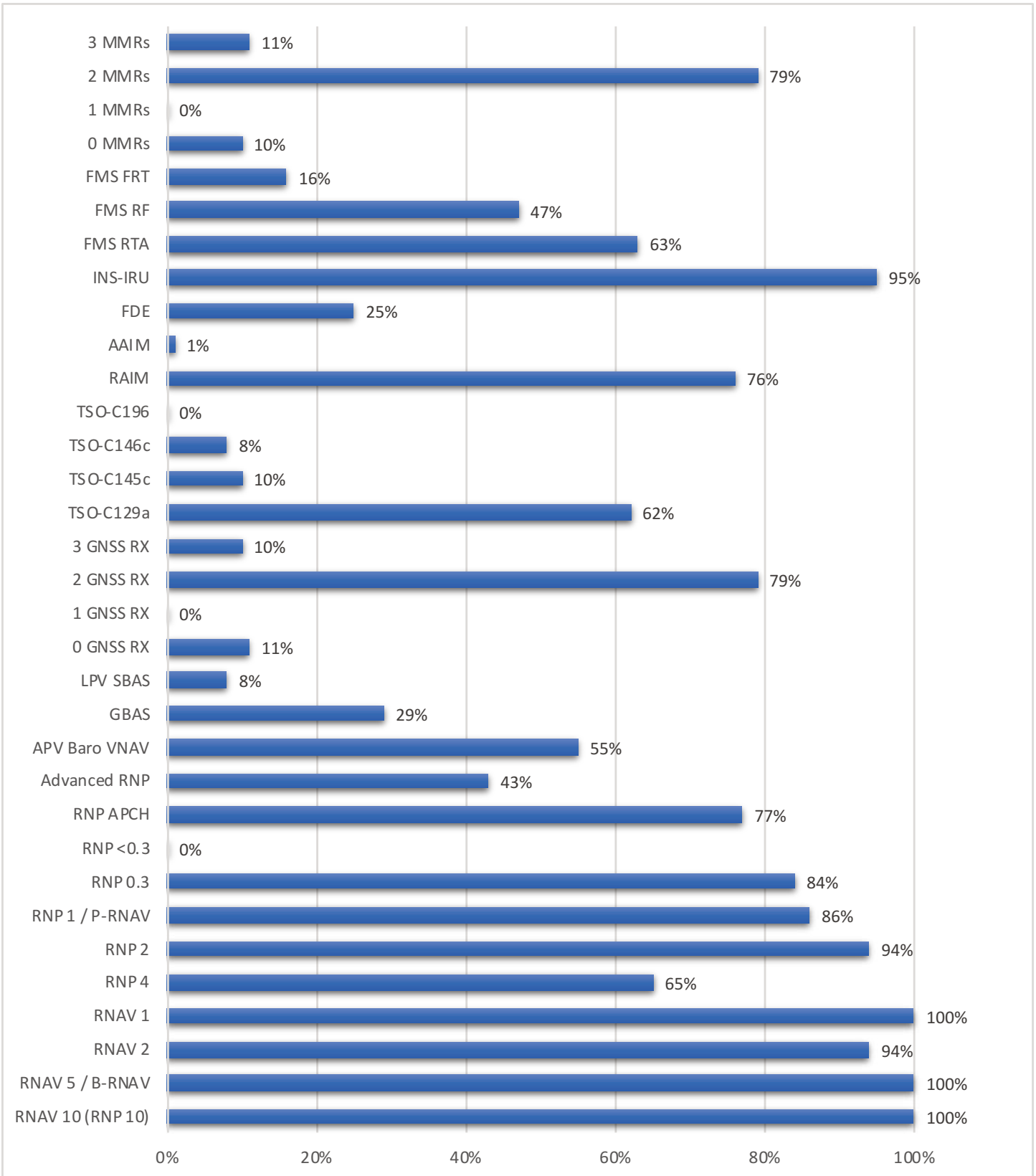
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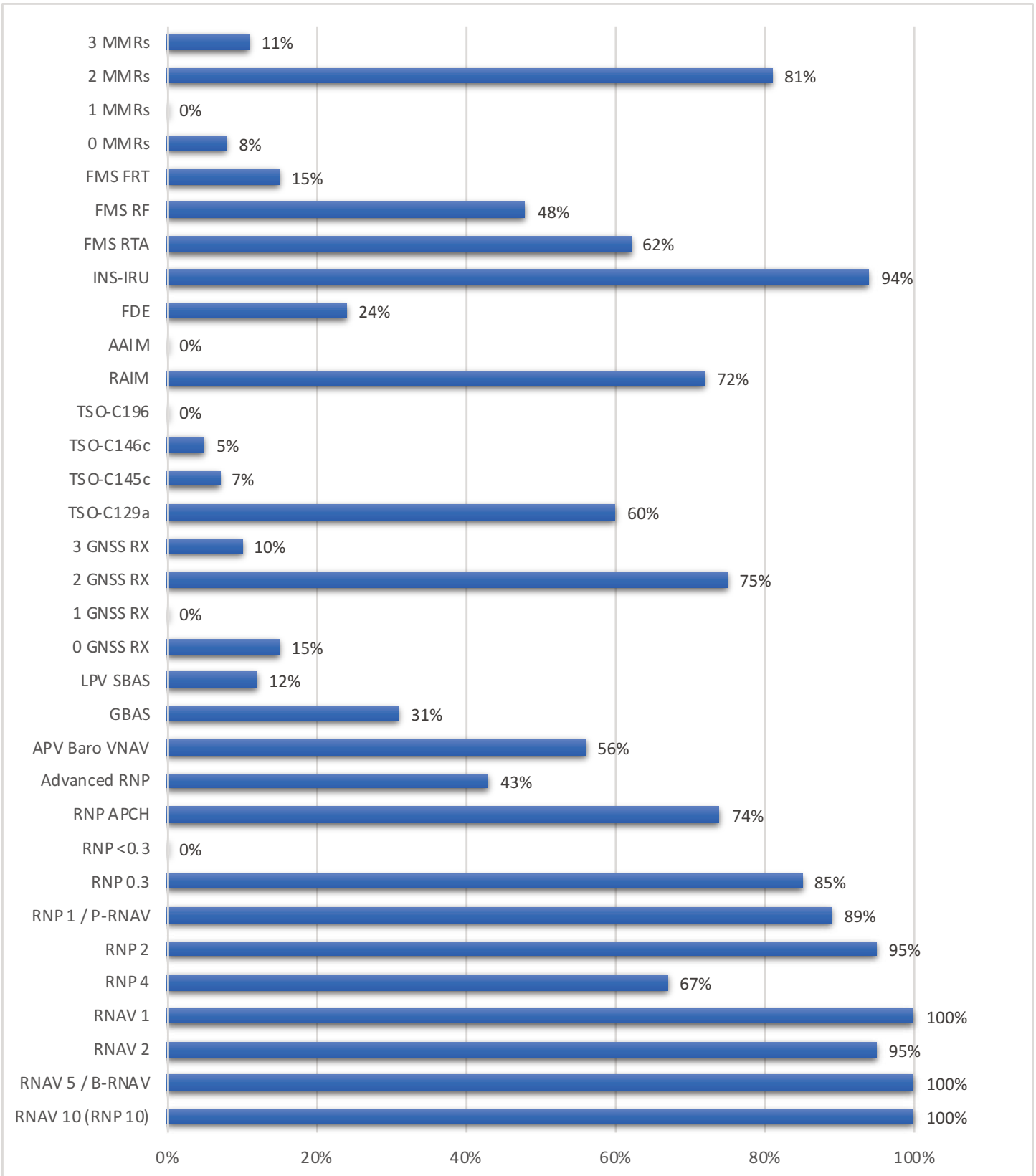
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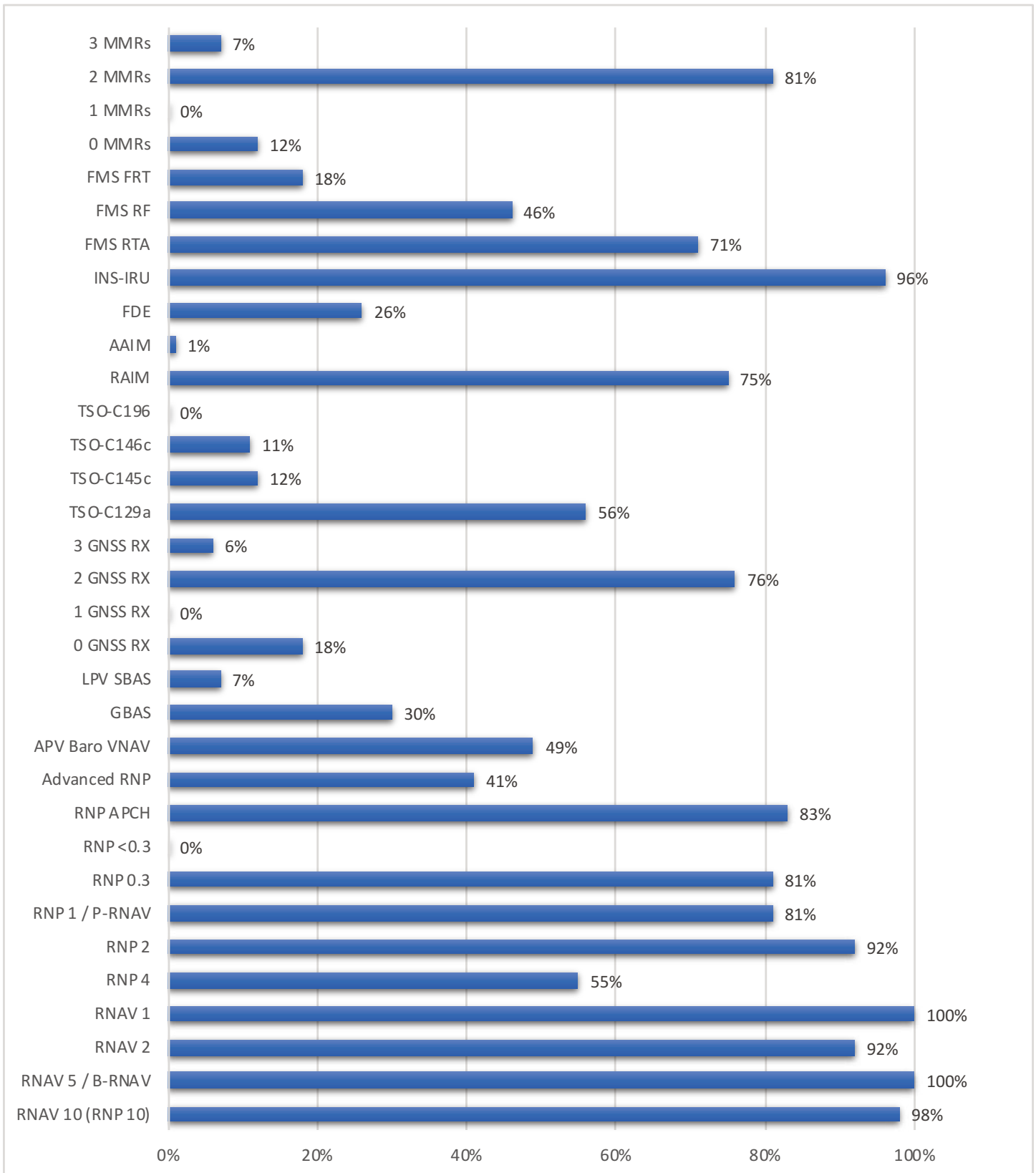


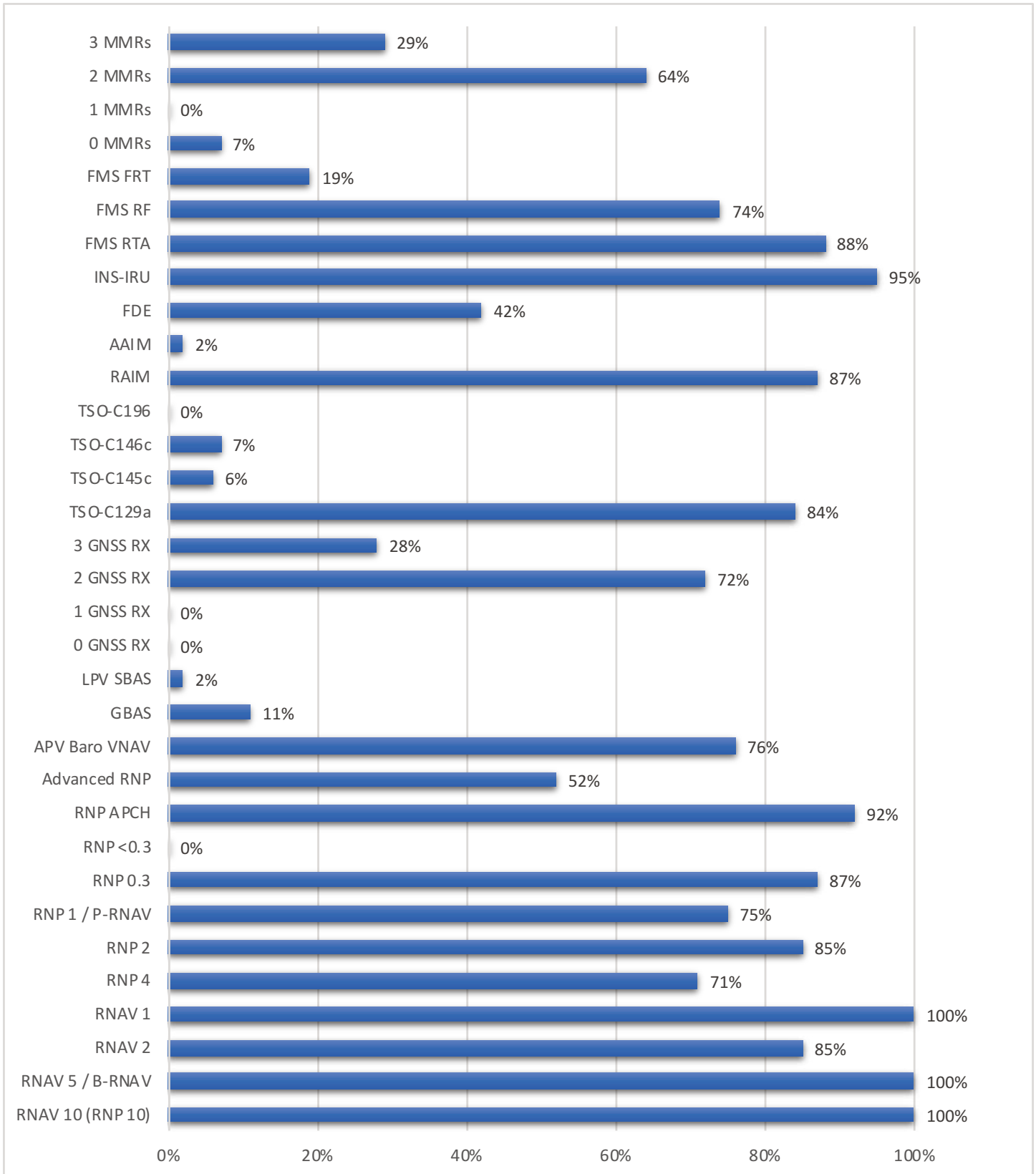
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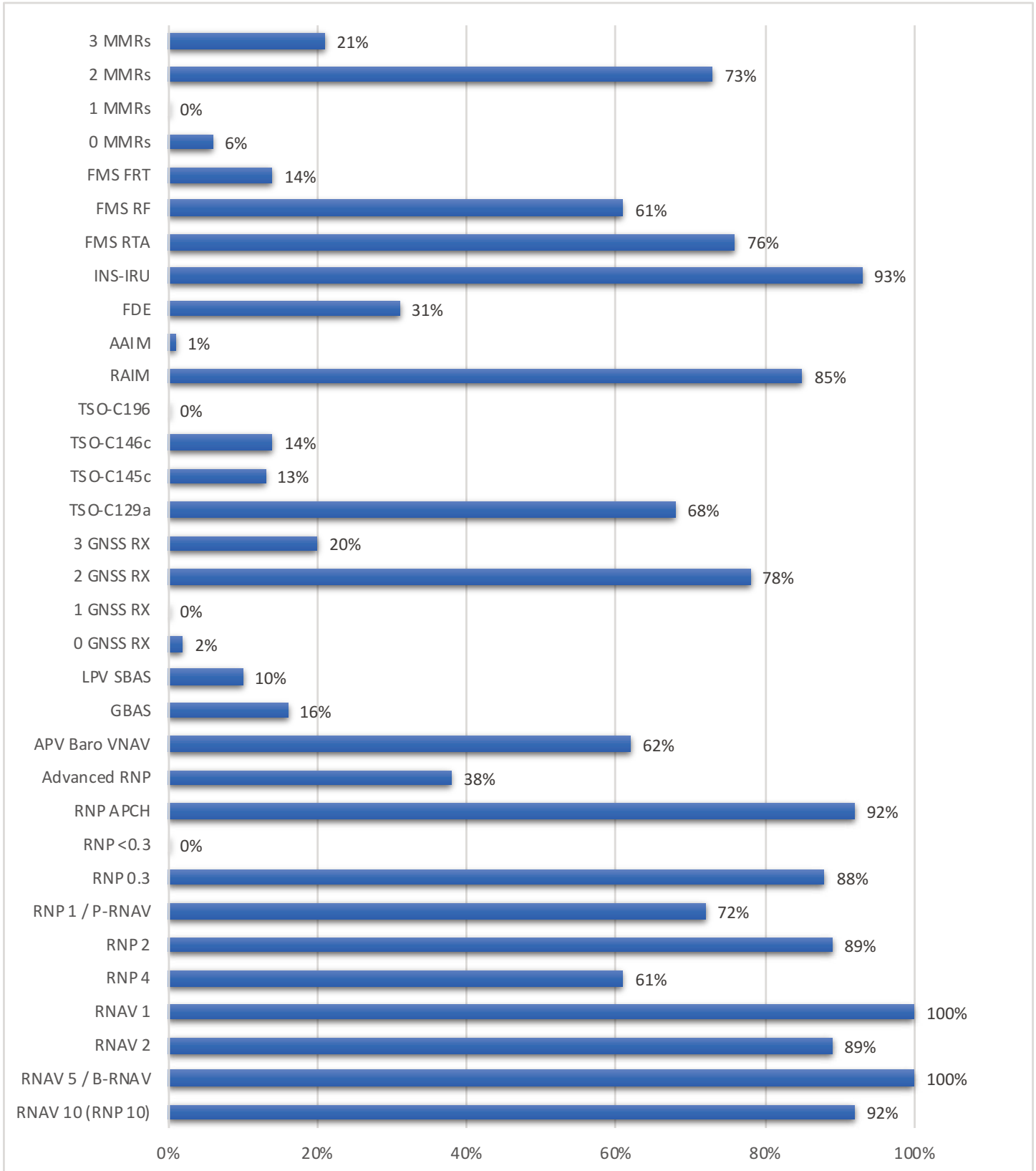


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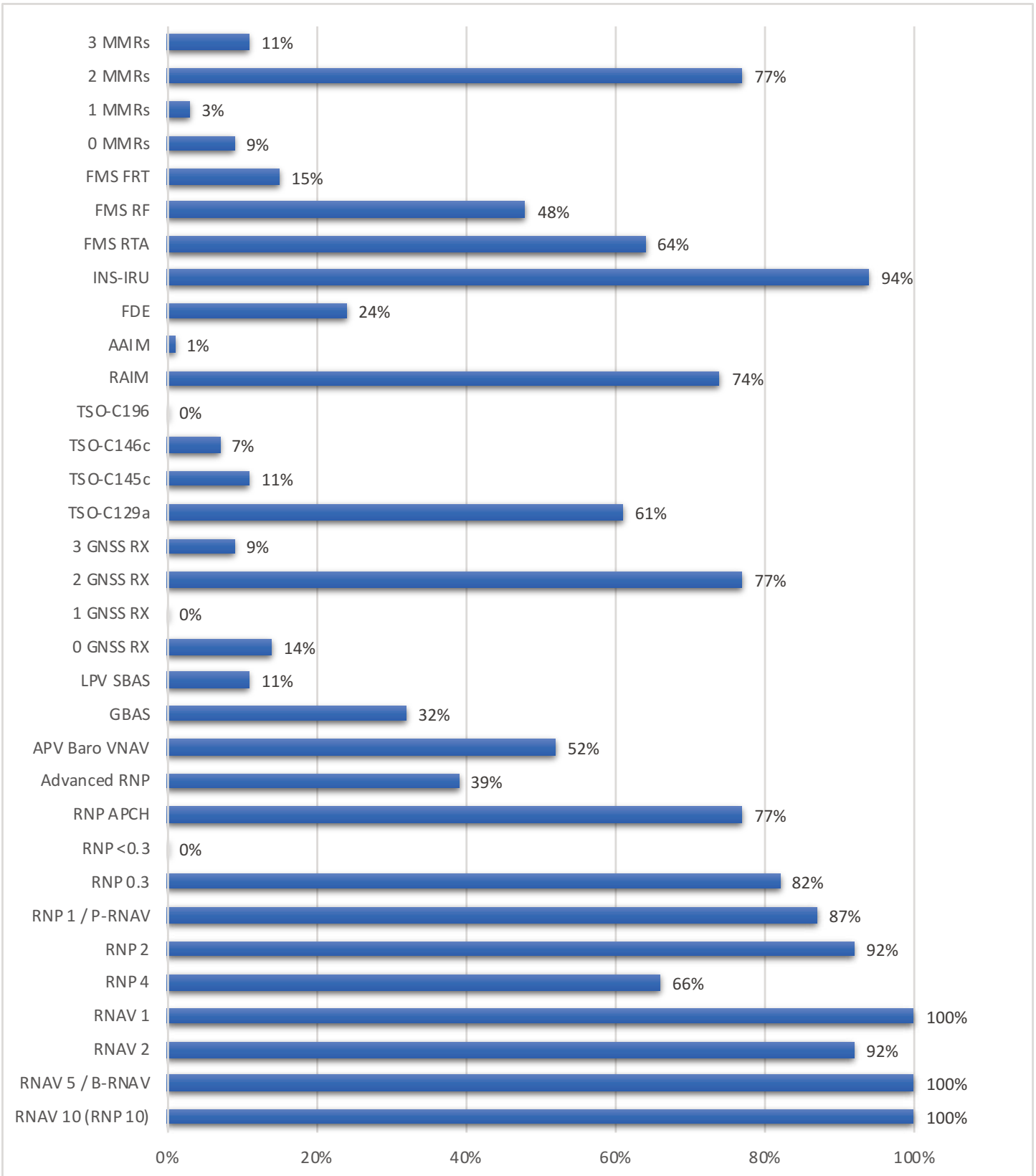




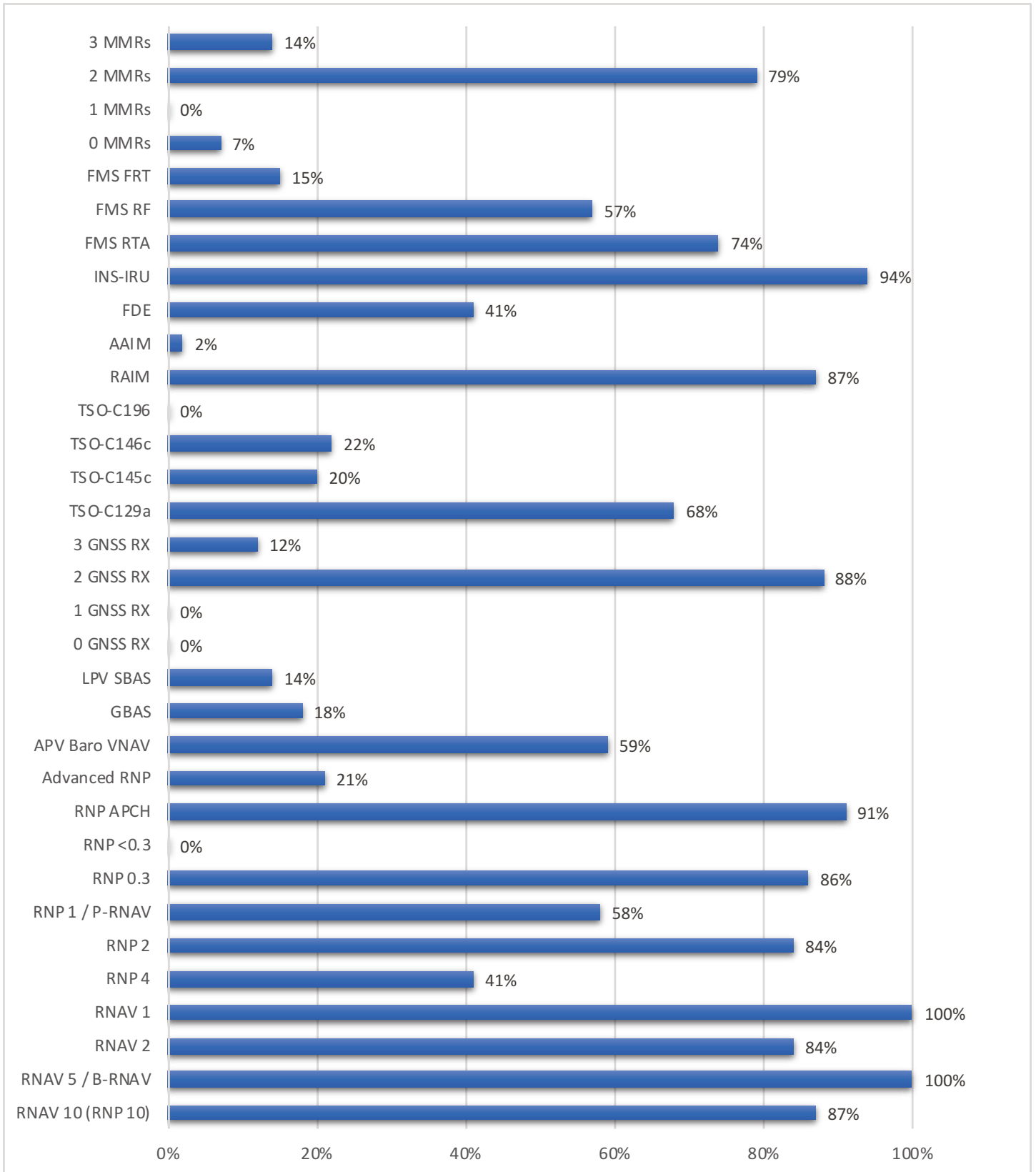




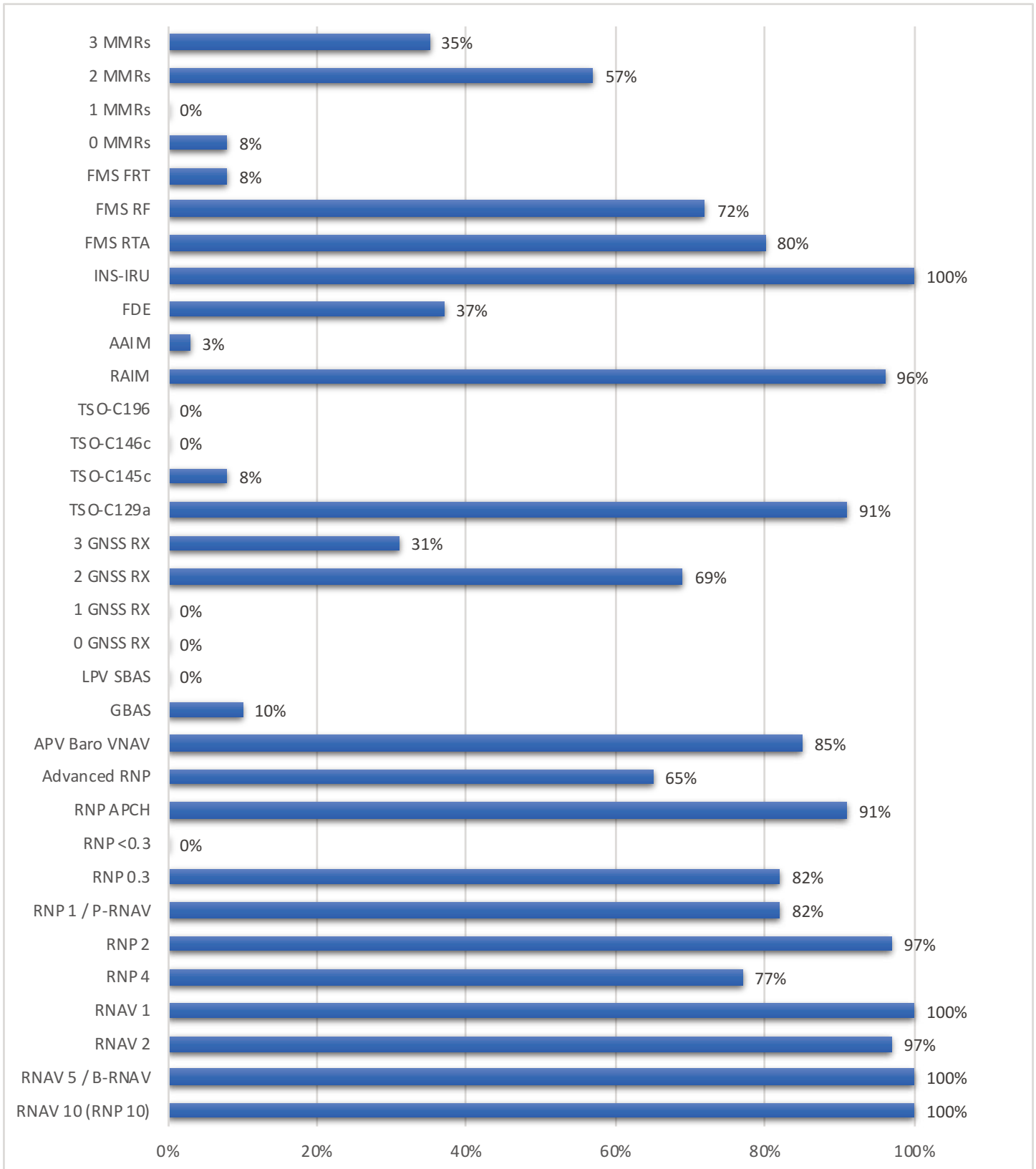
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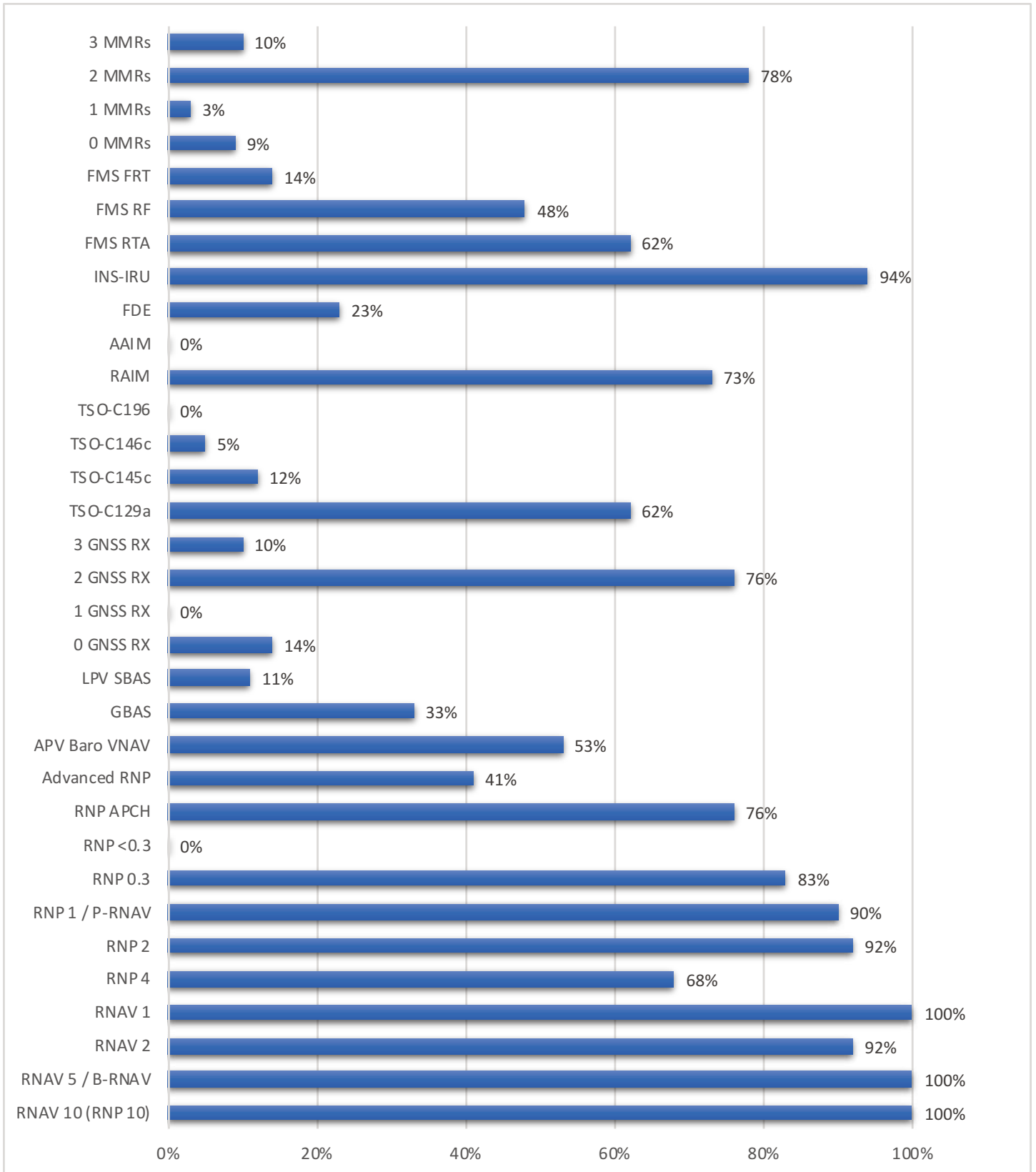
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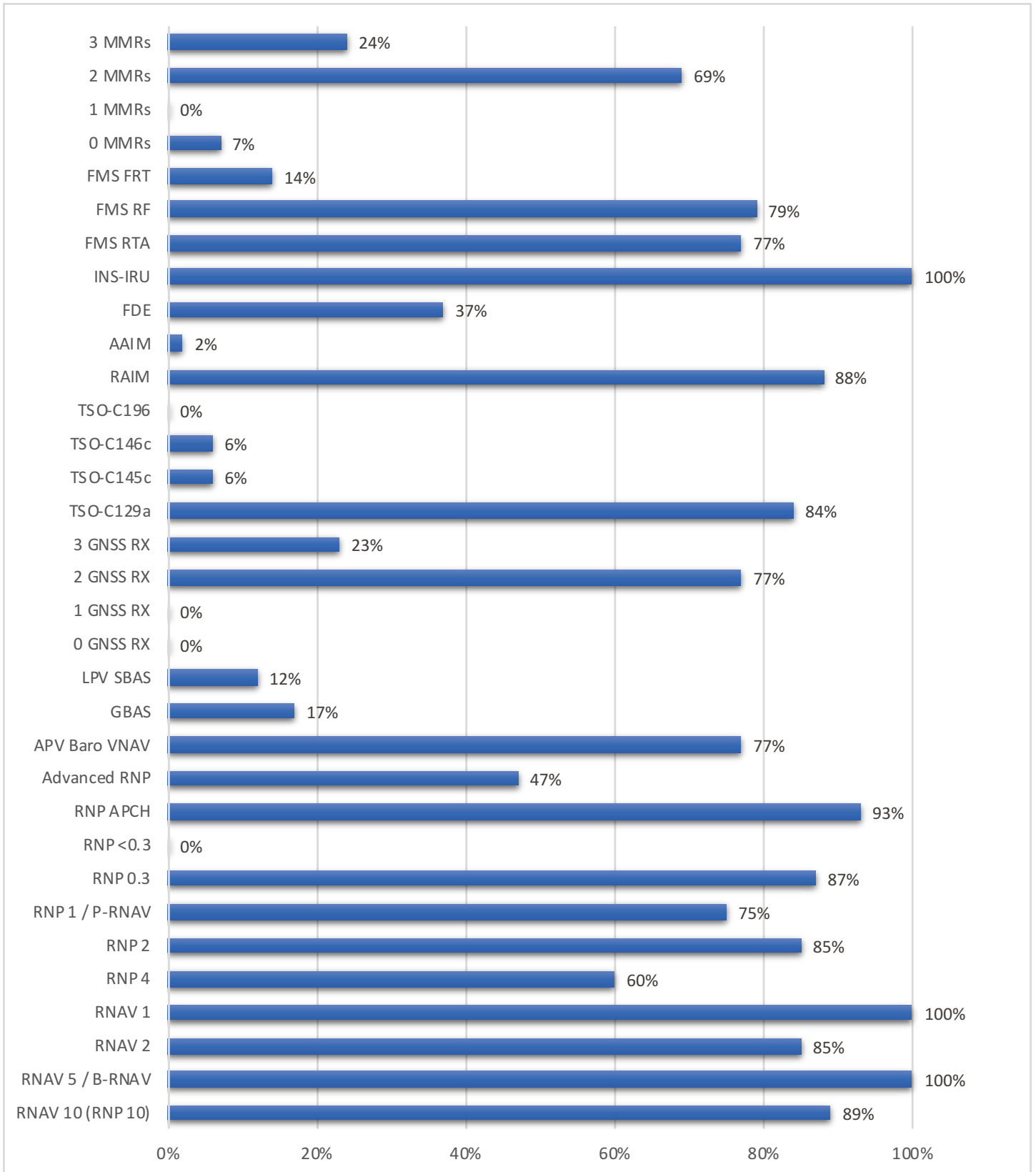
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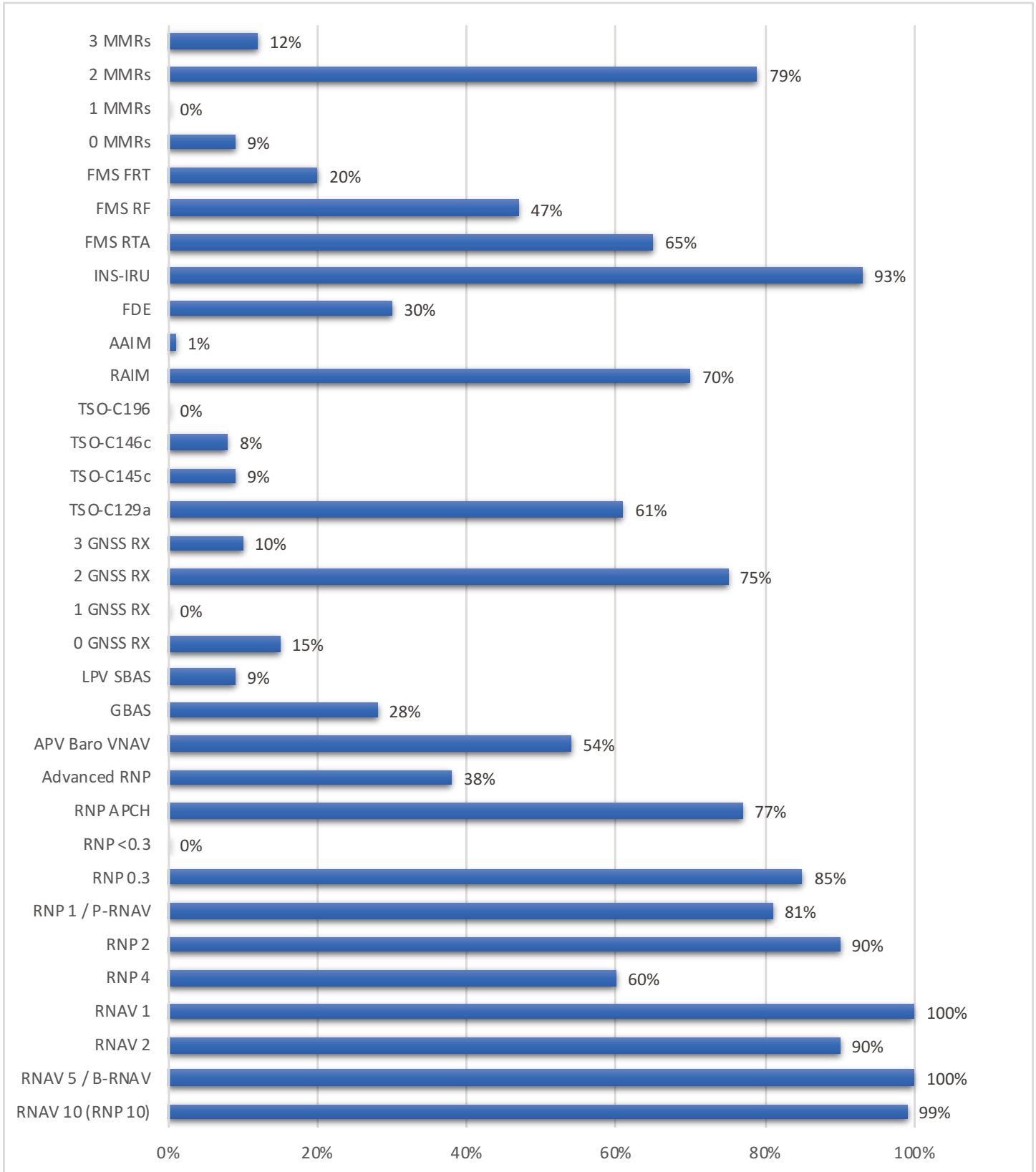
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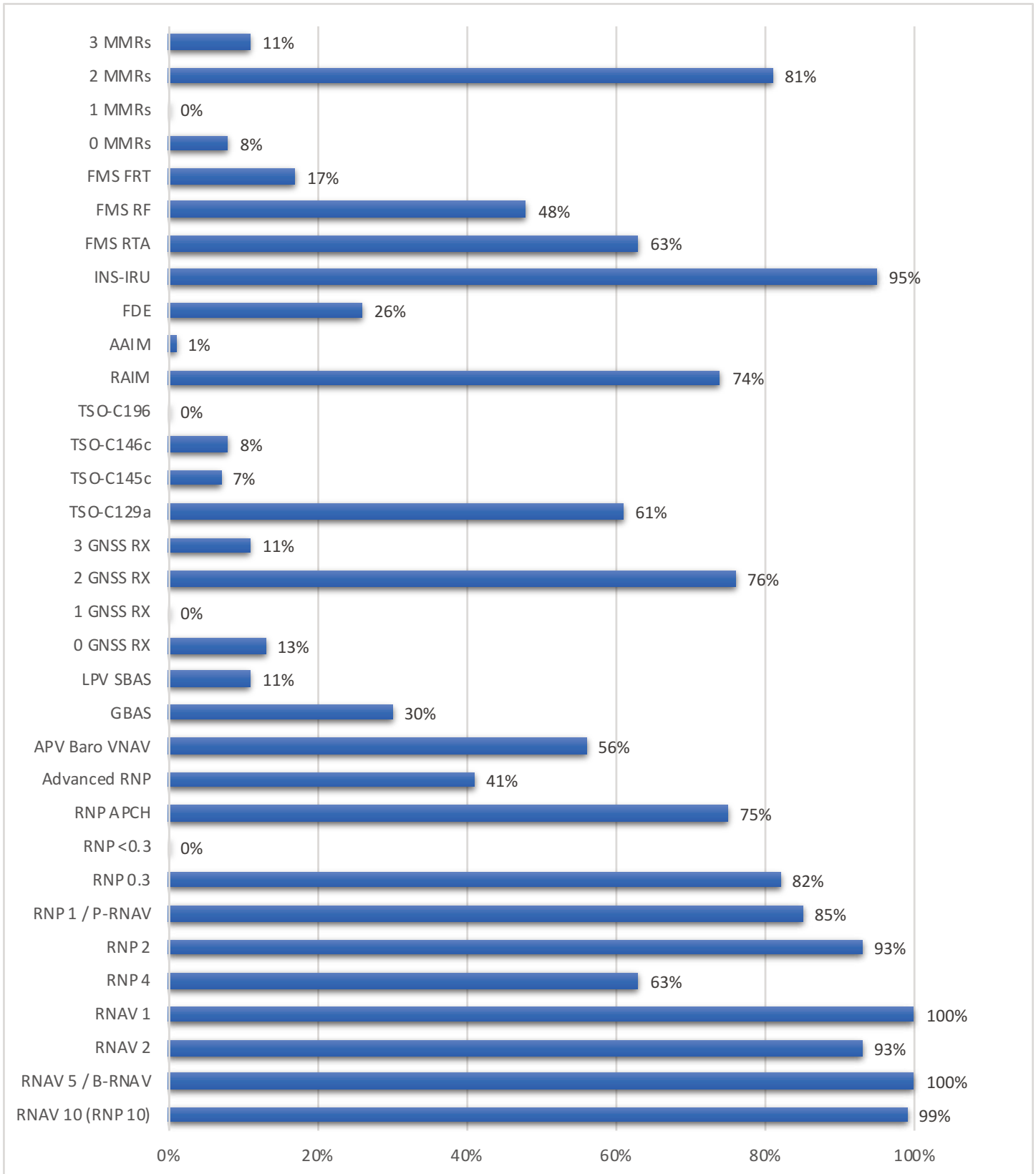
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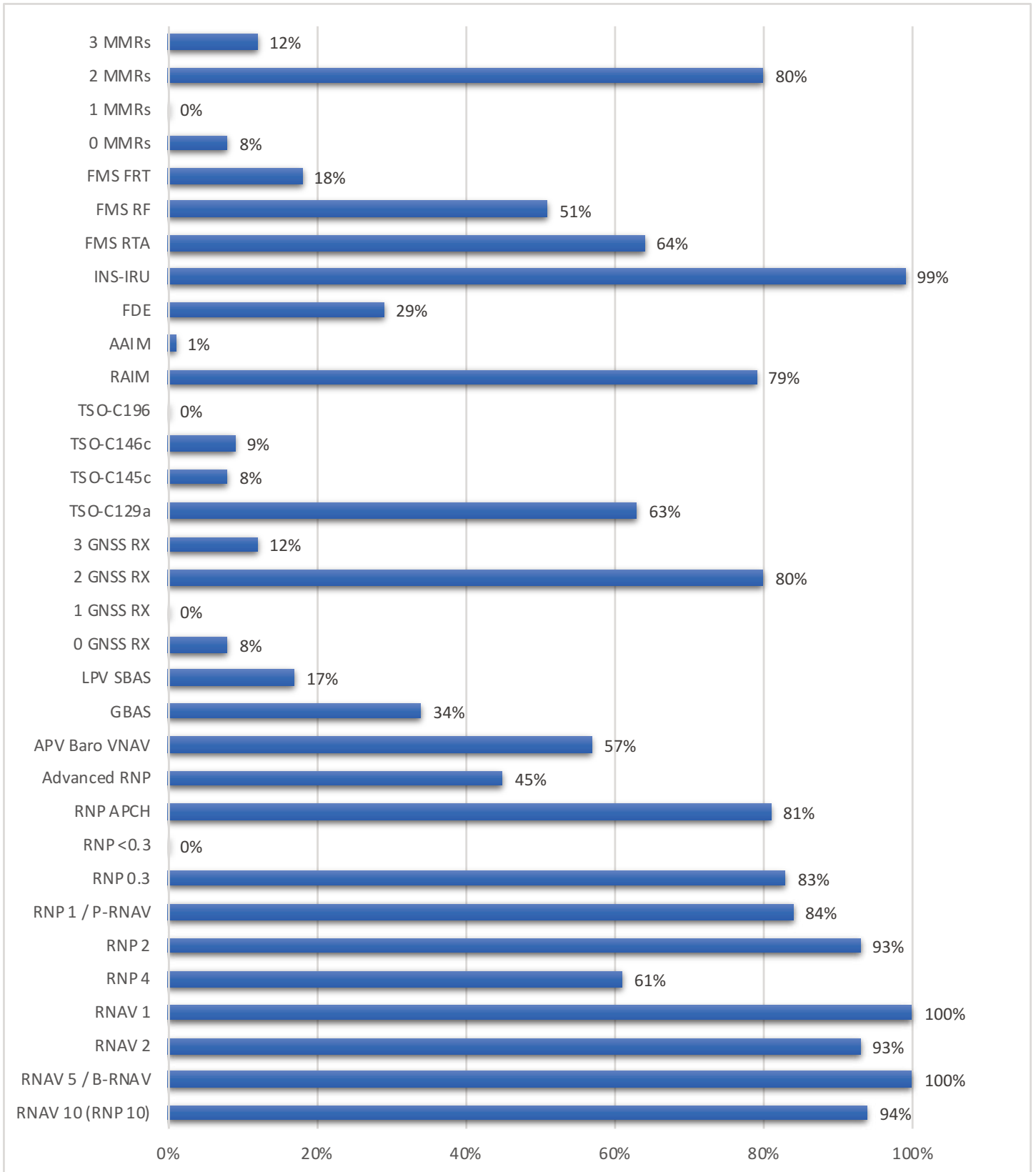
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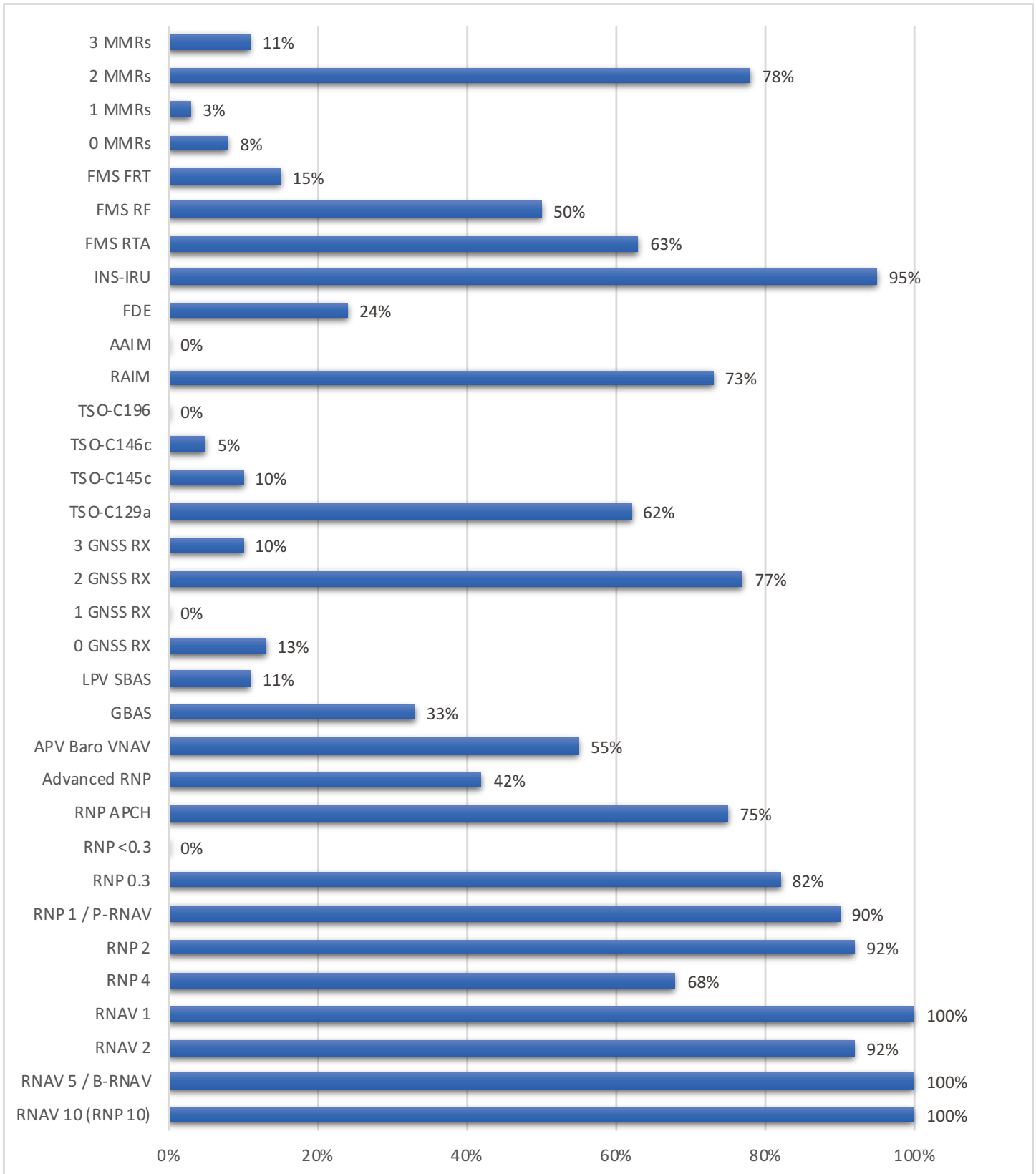
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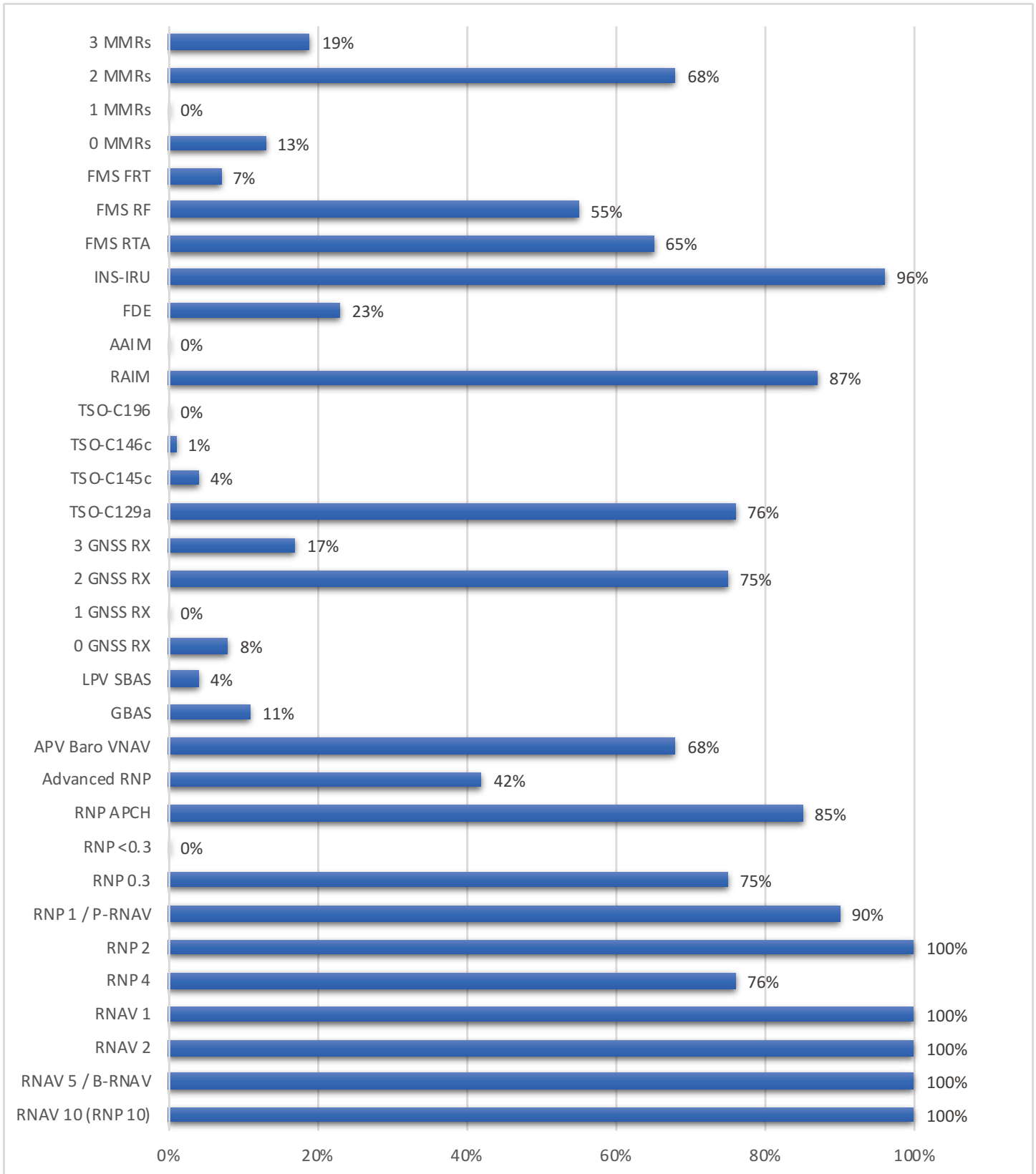


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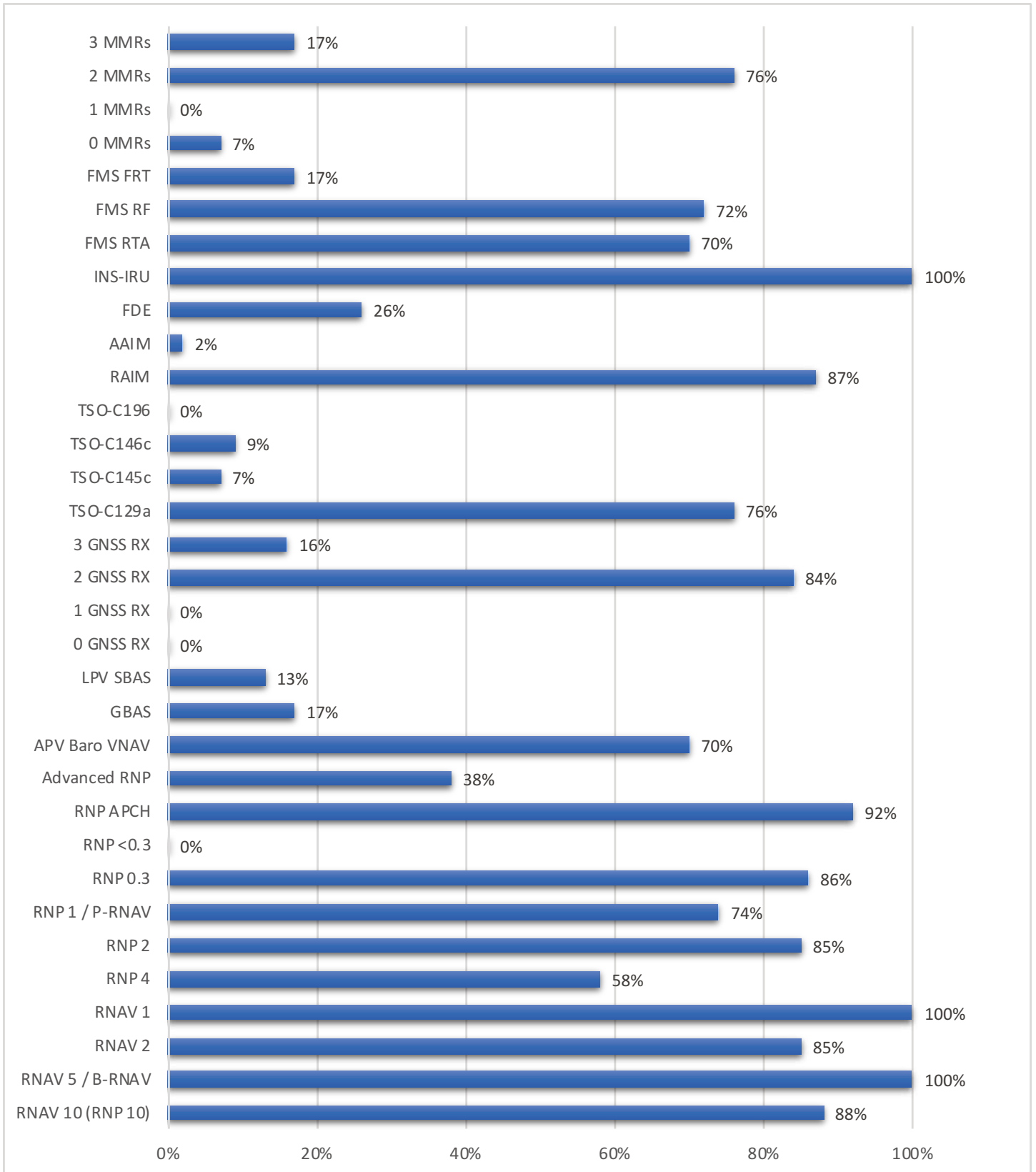


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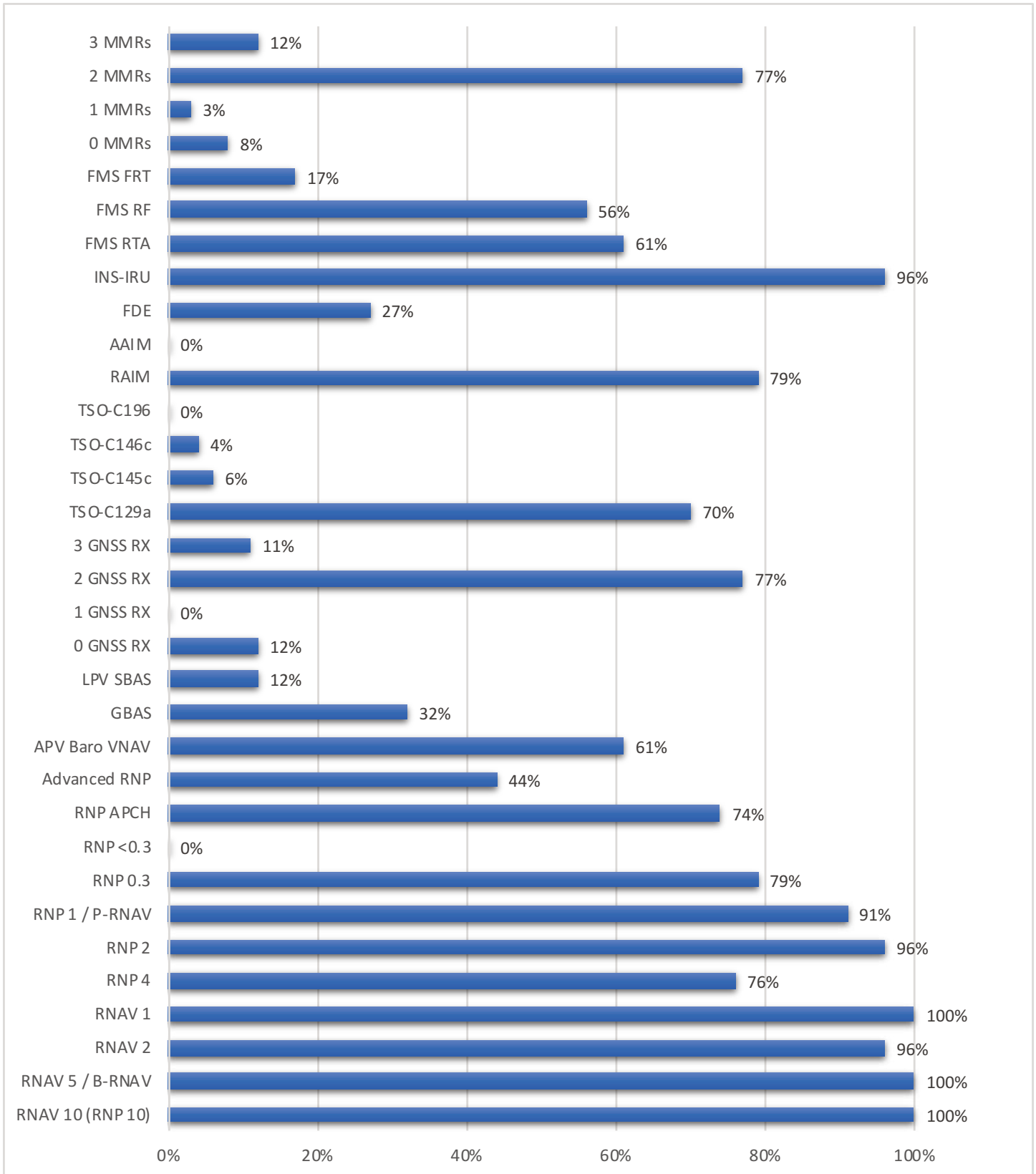


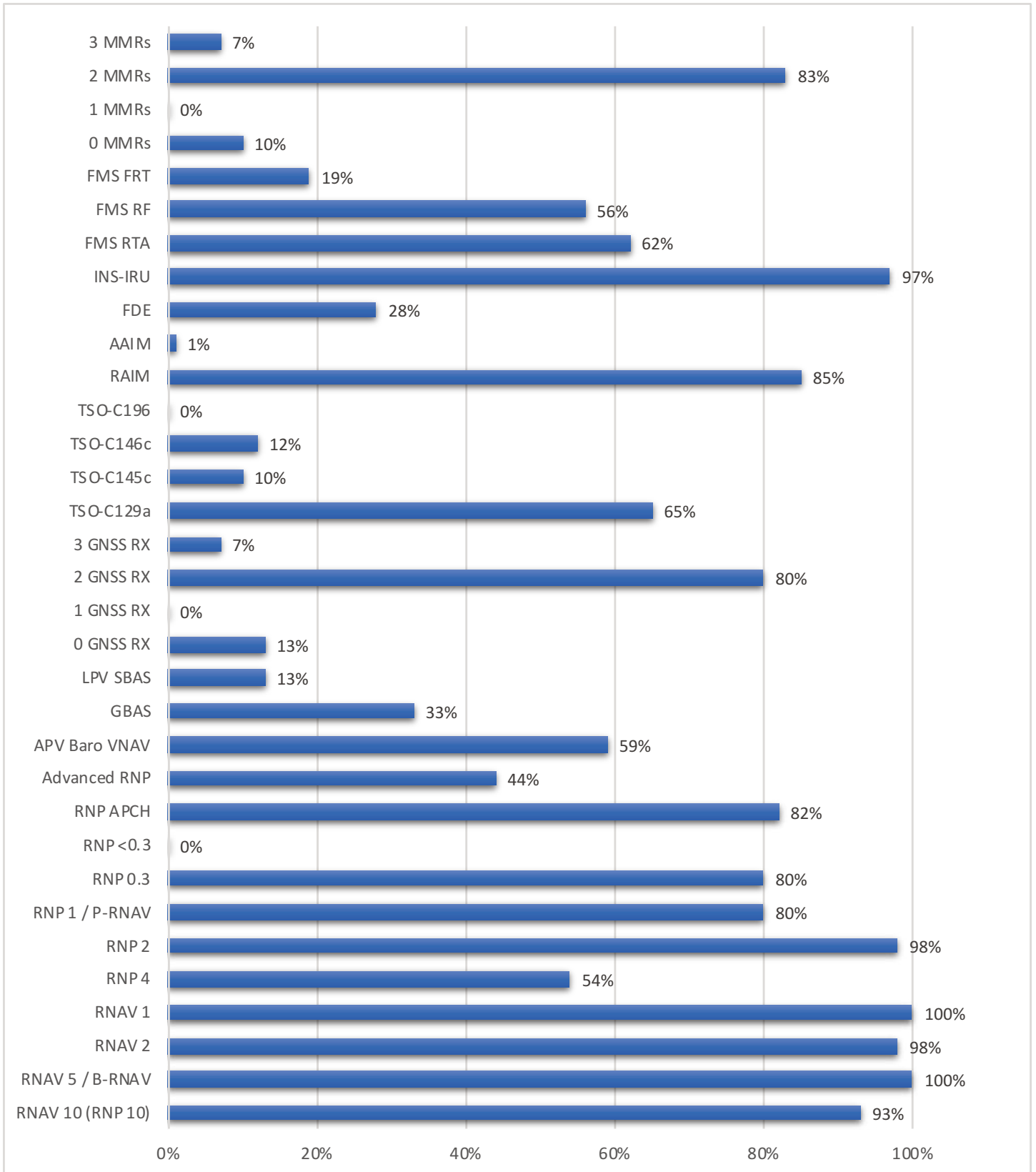


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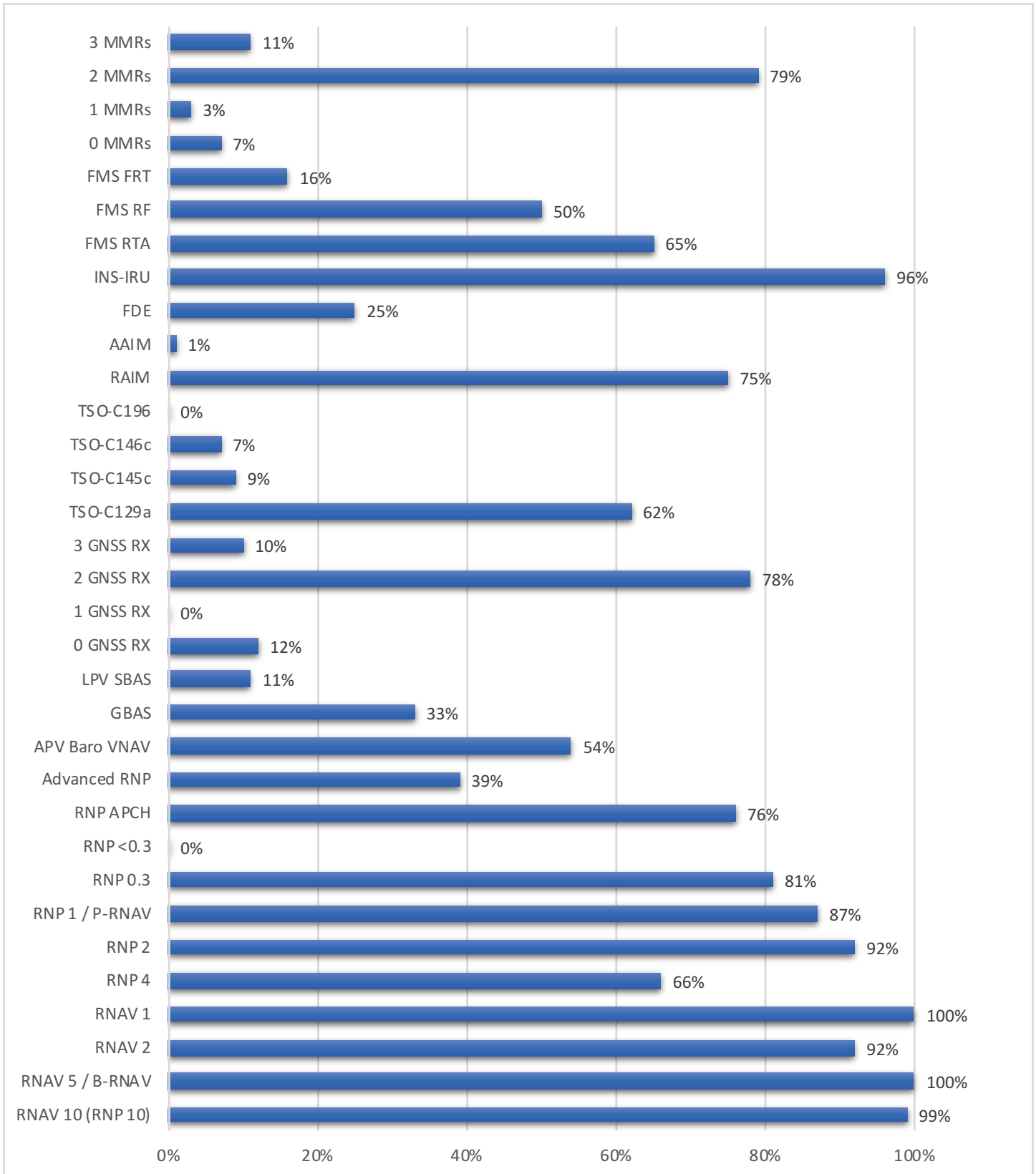


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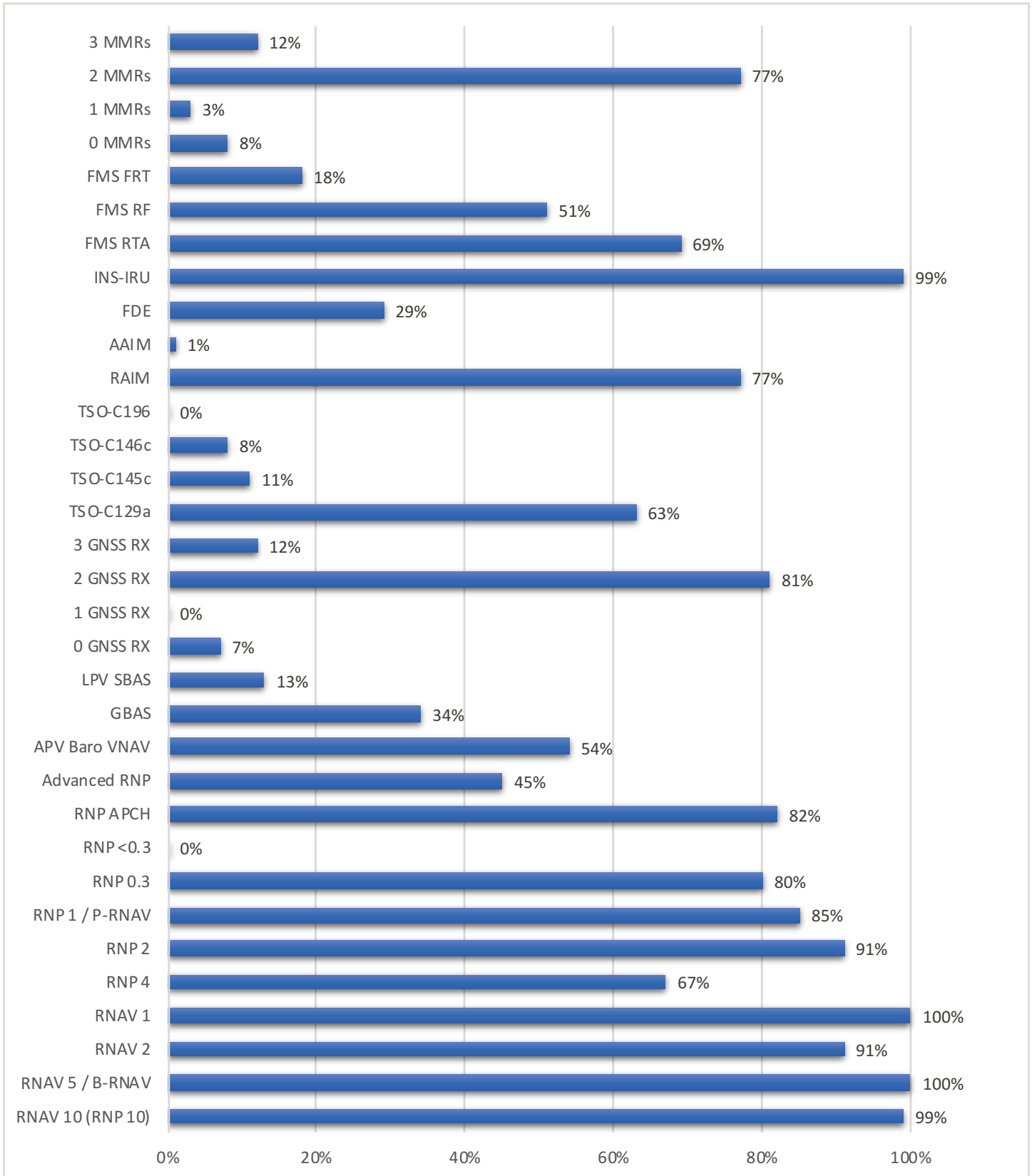




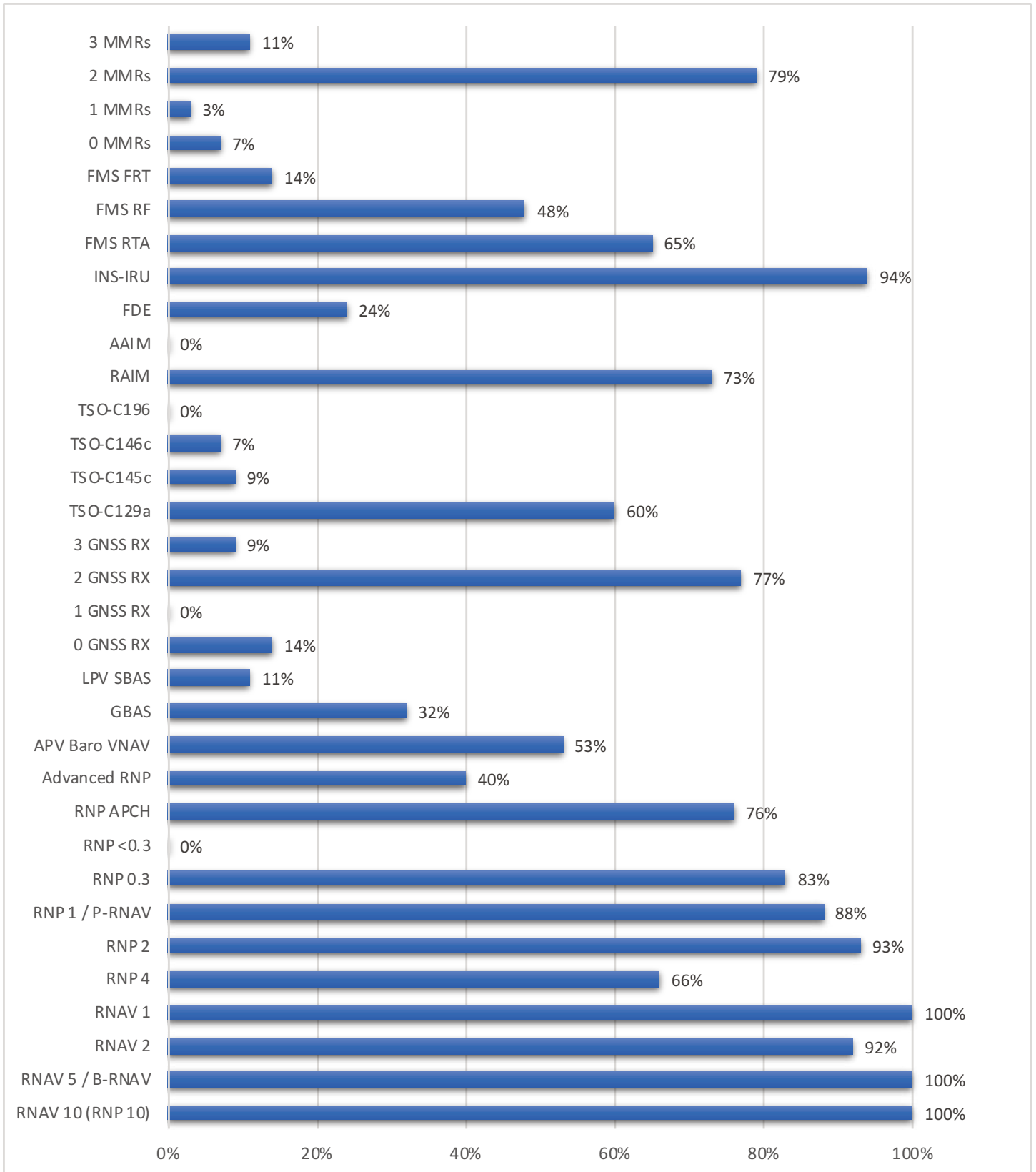
New York Domestic



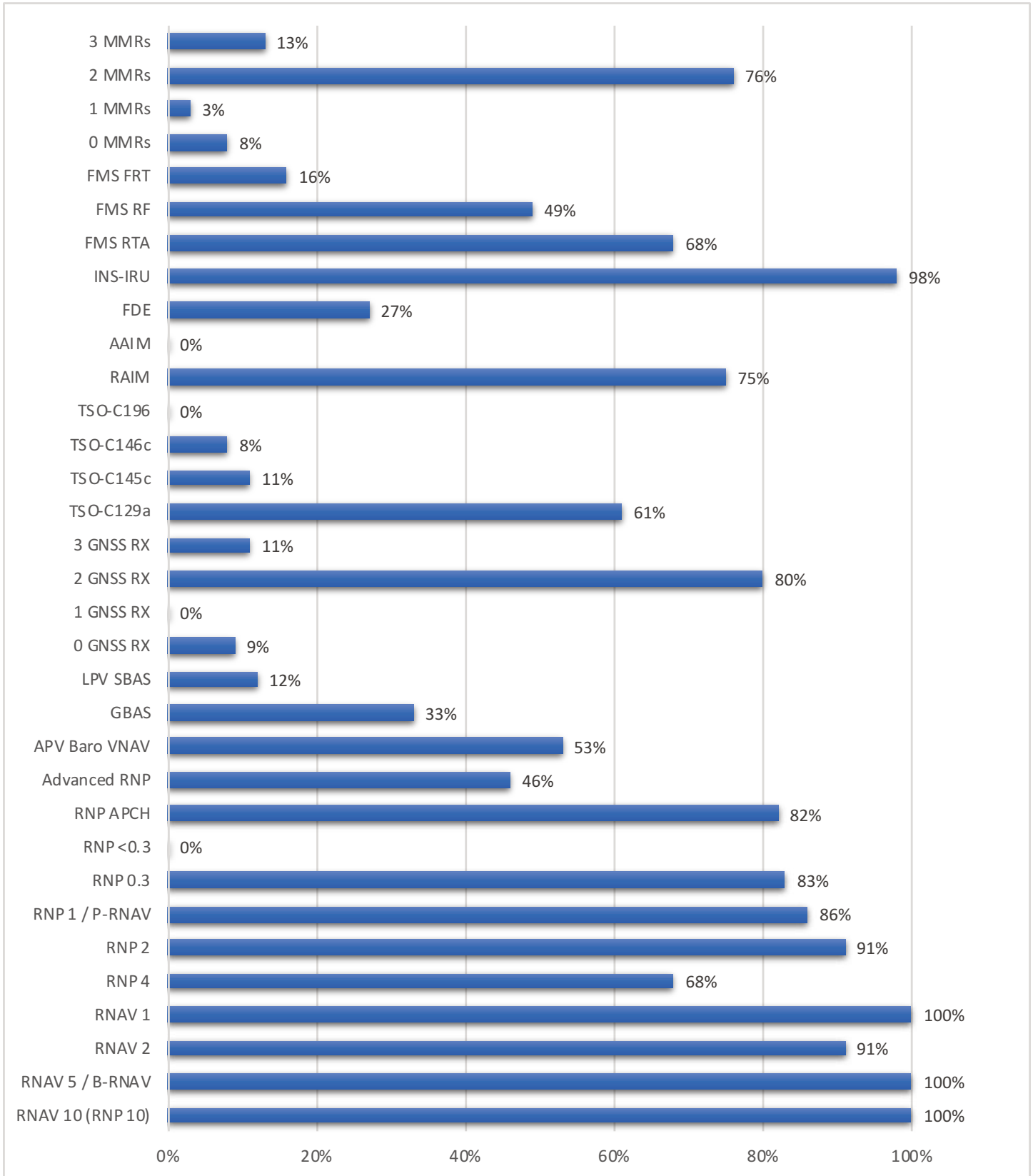
New York Oceanic



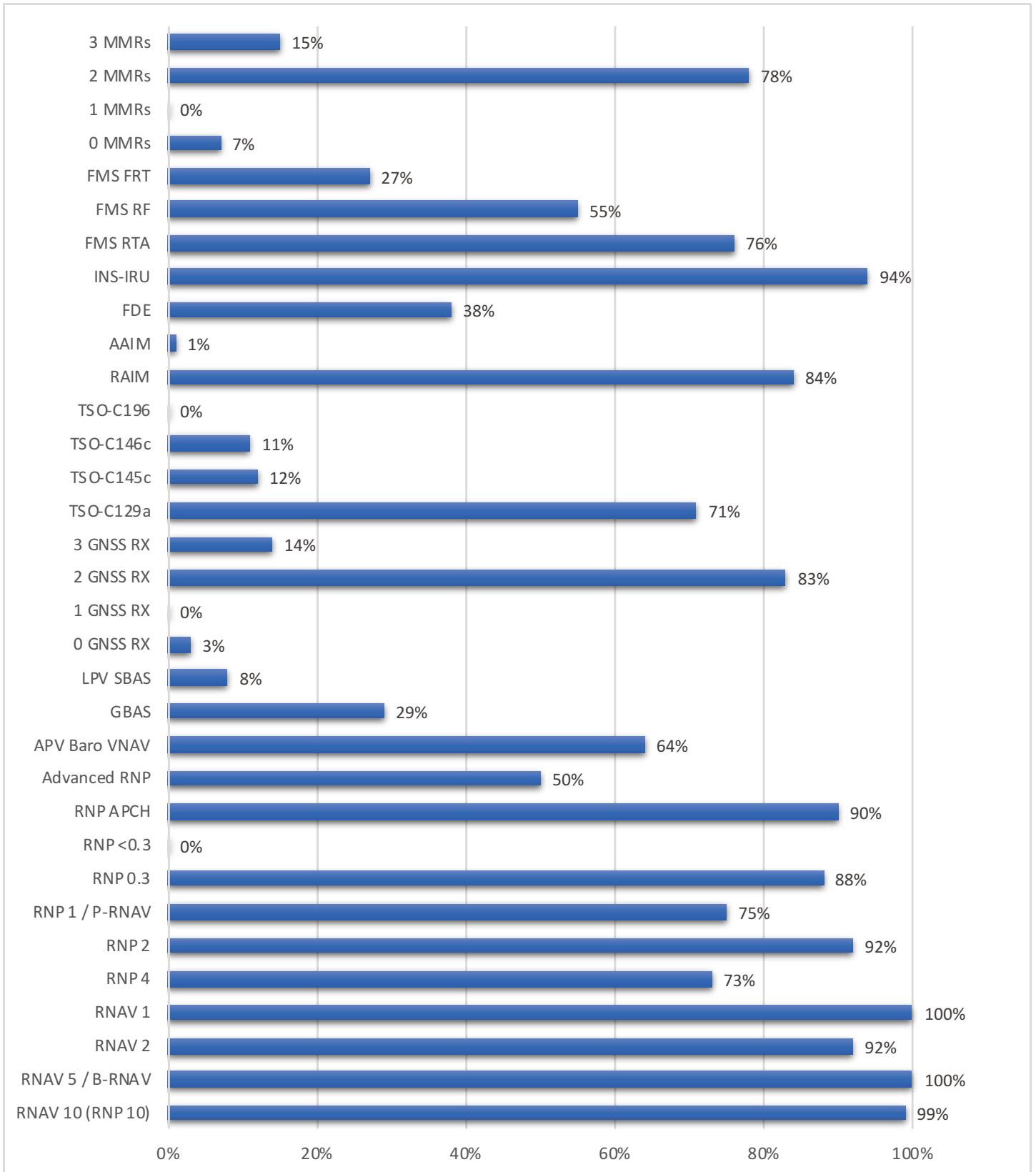
Oakland Domestic



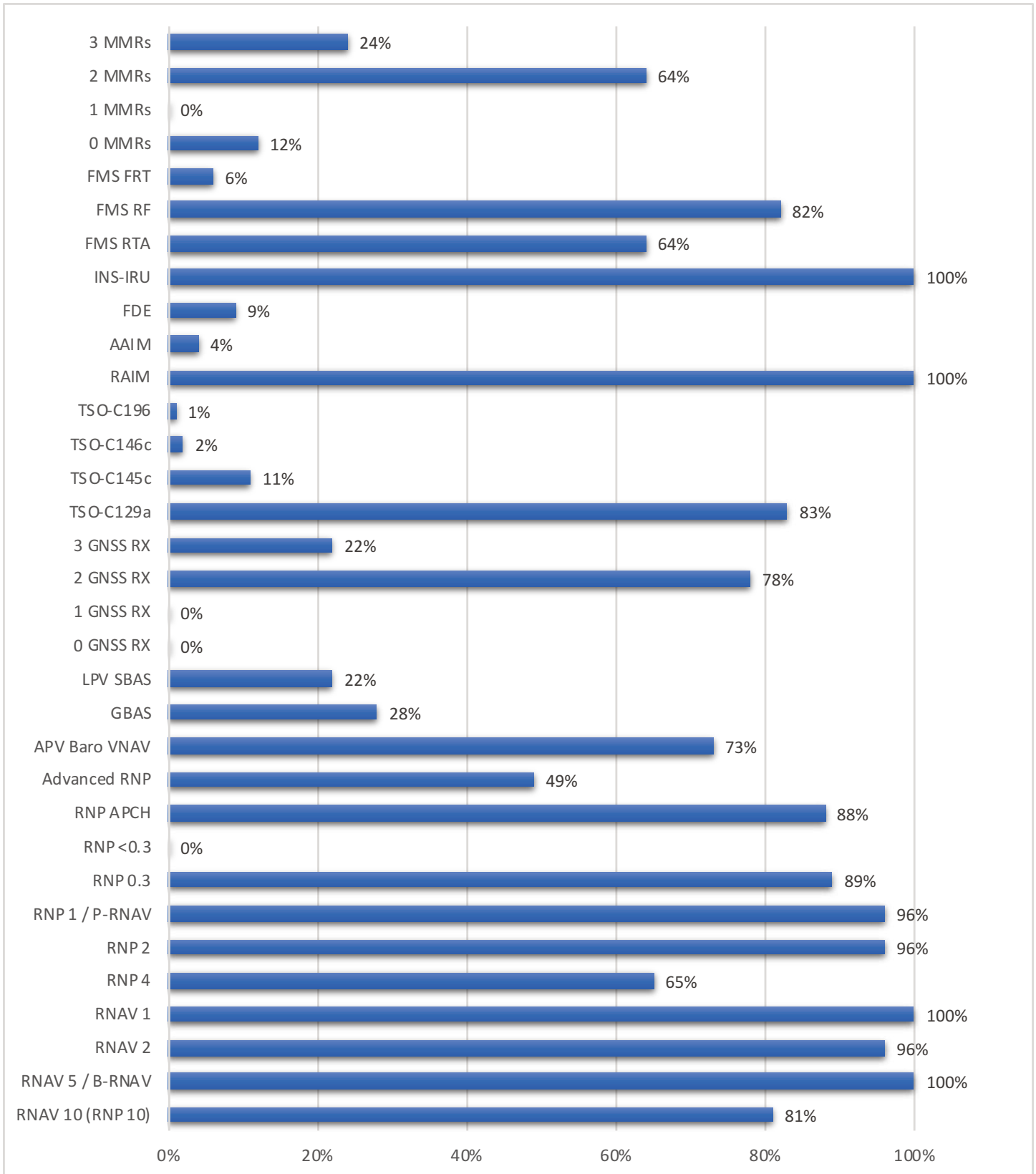
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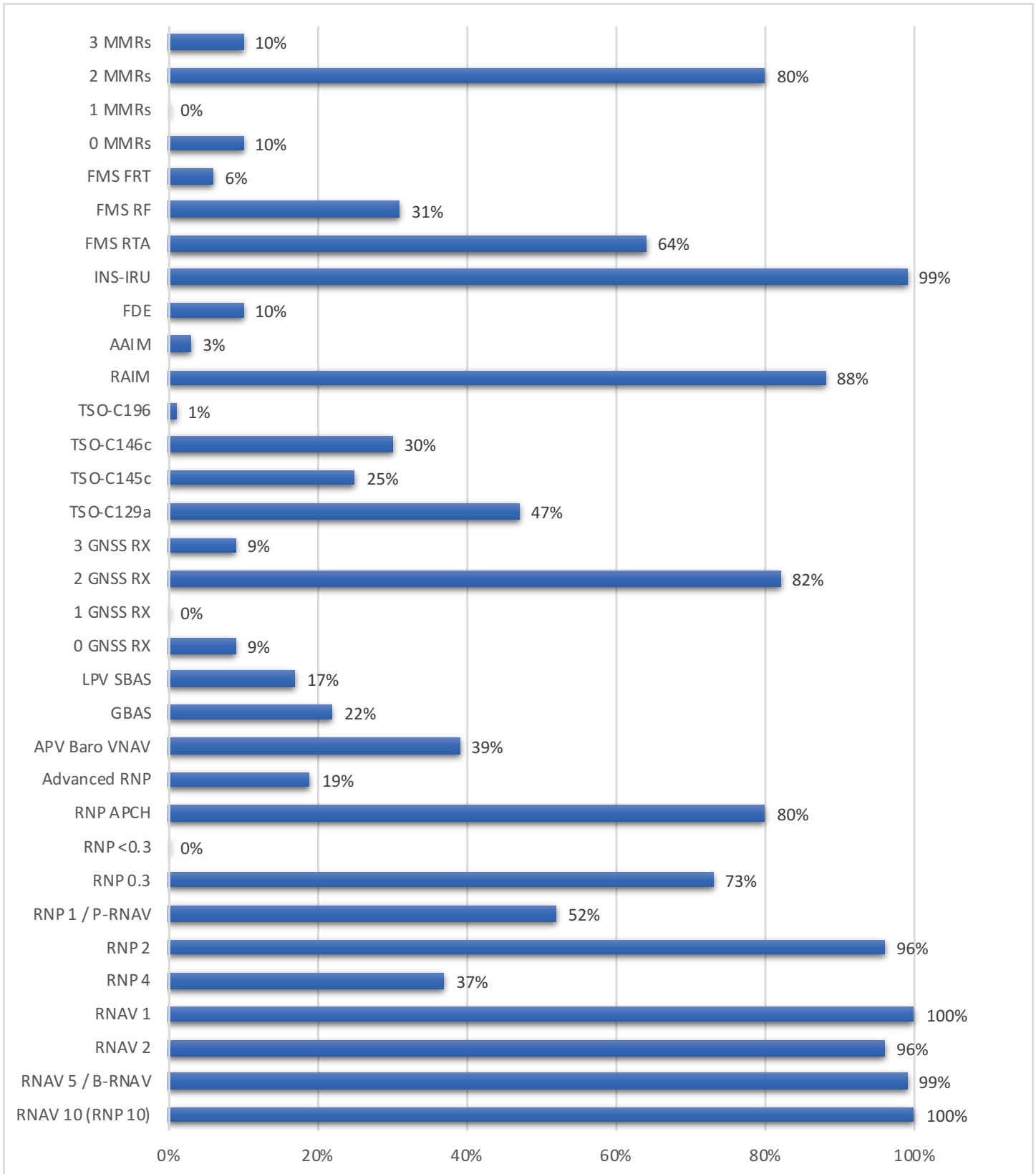


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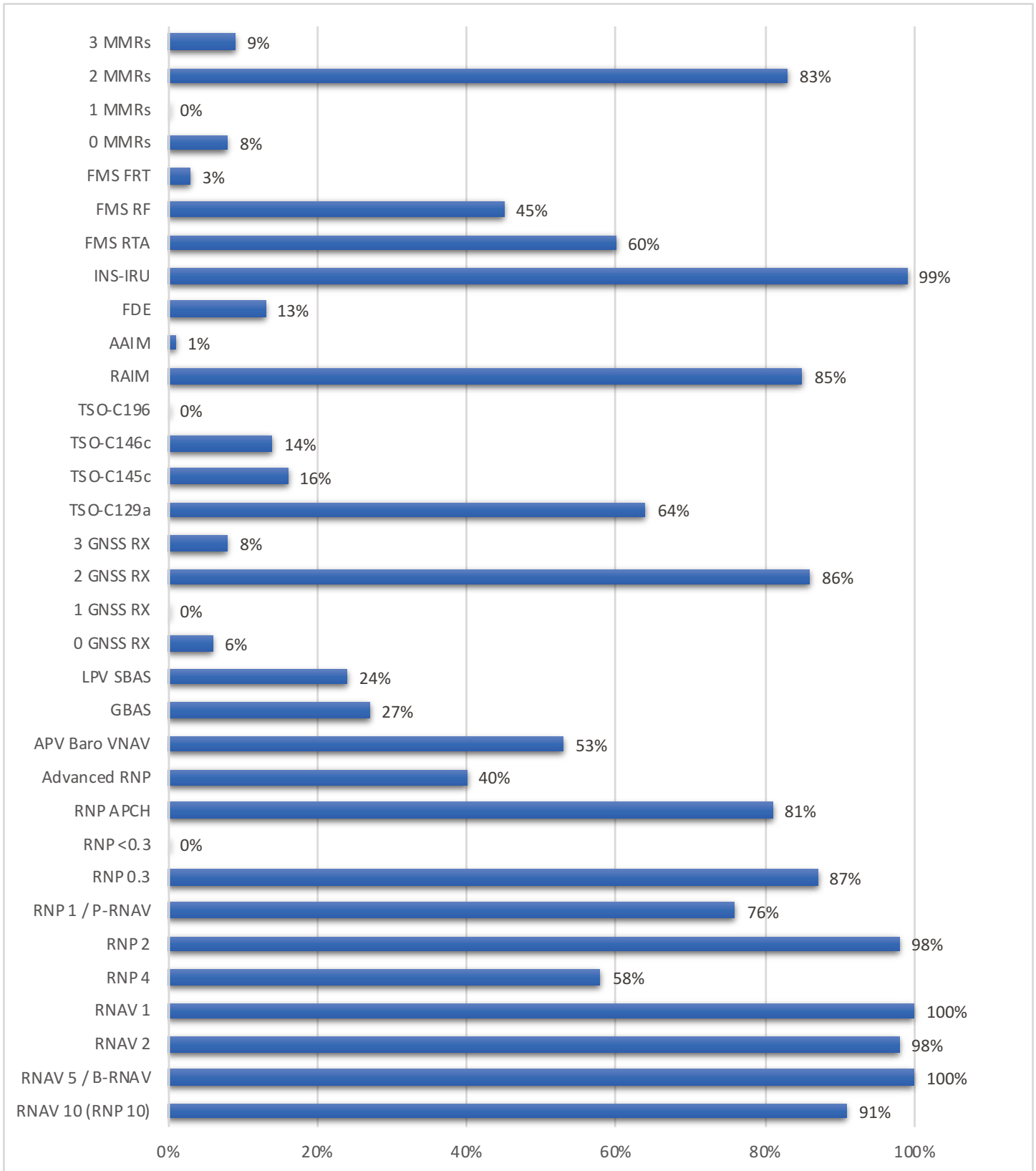


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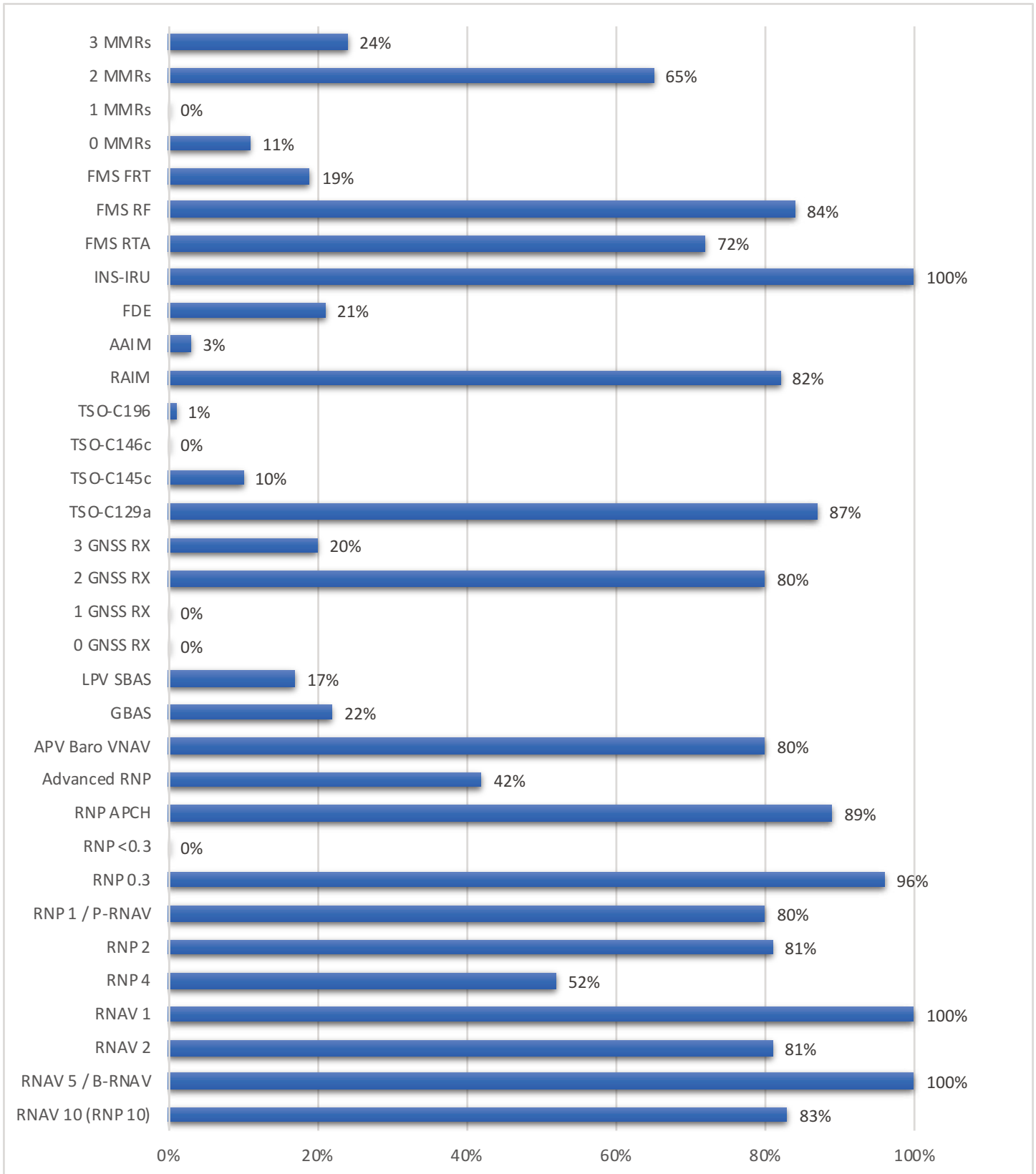




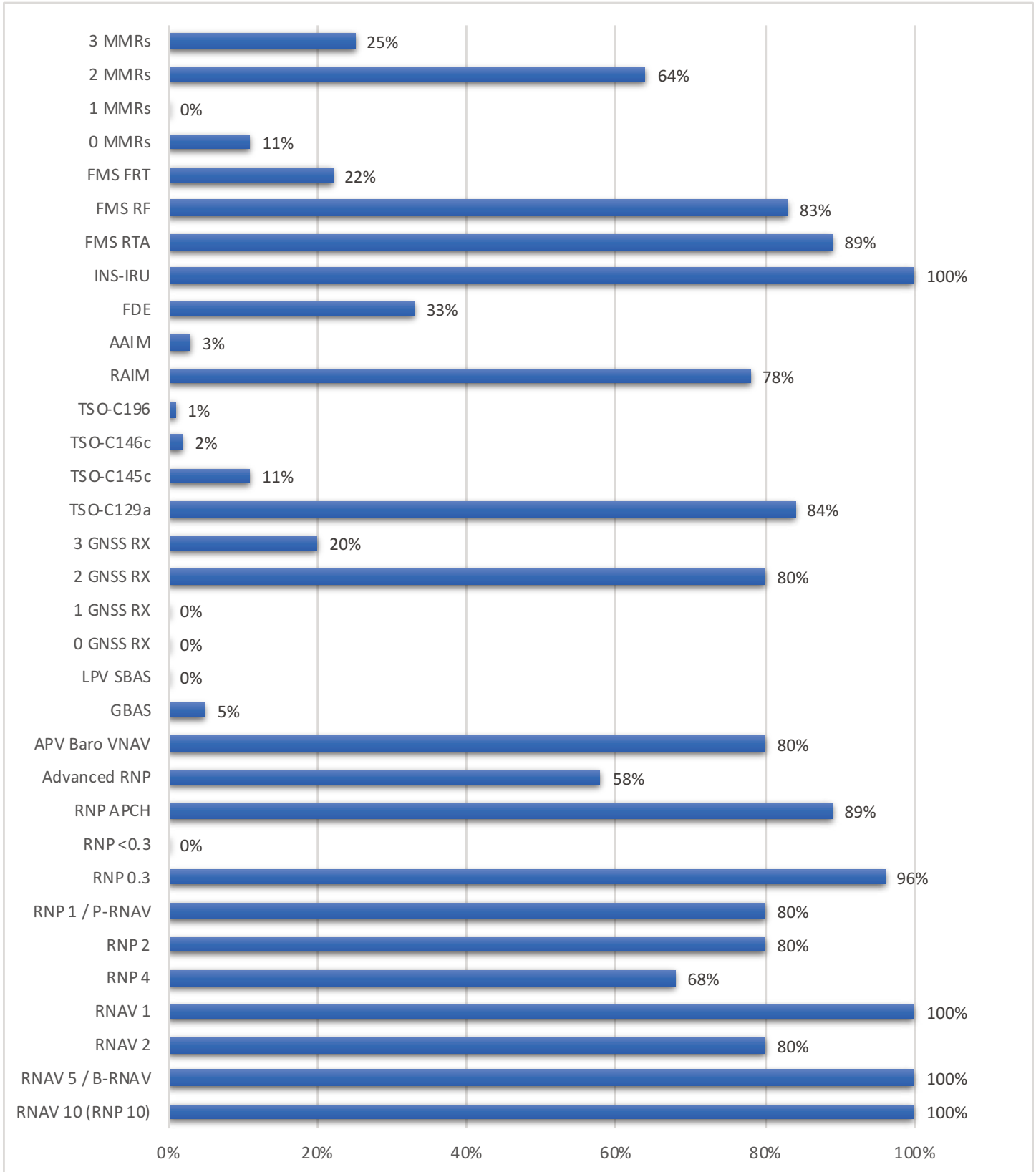
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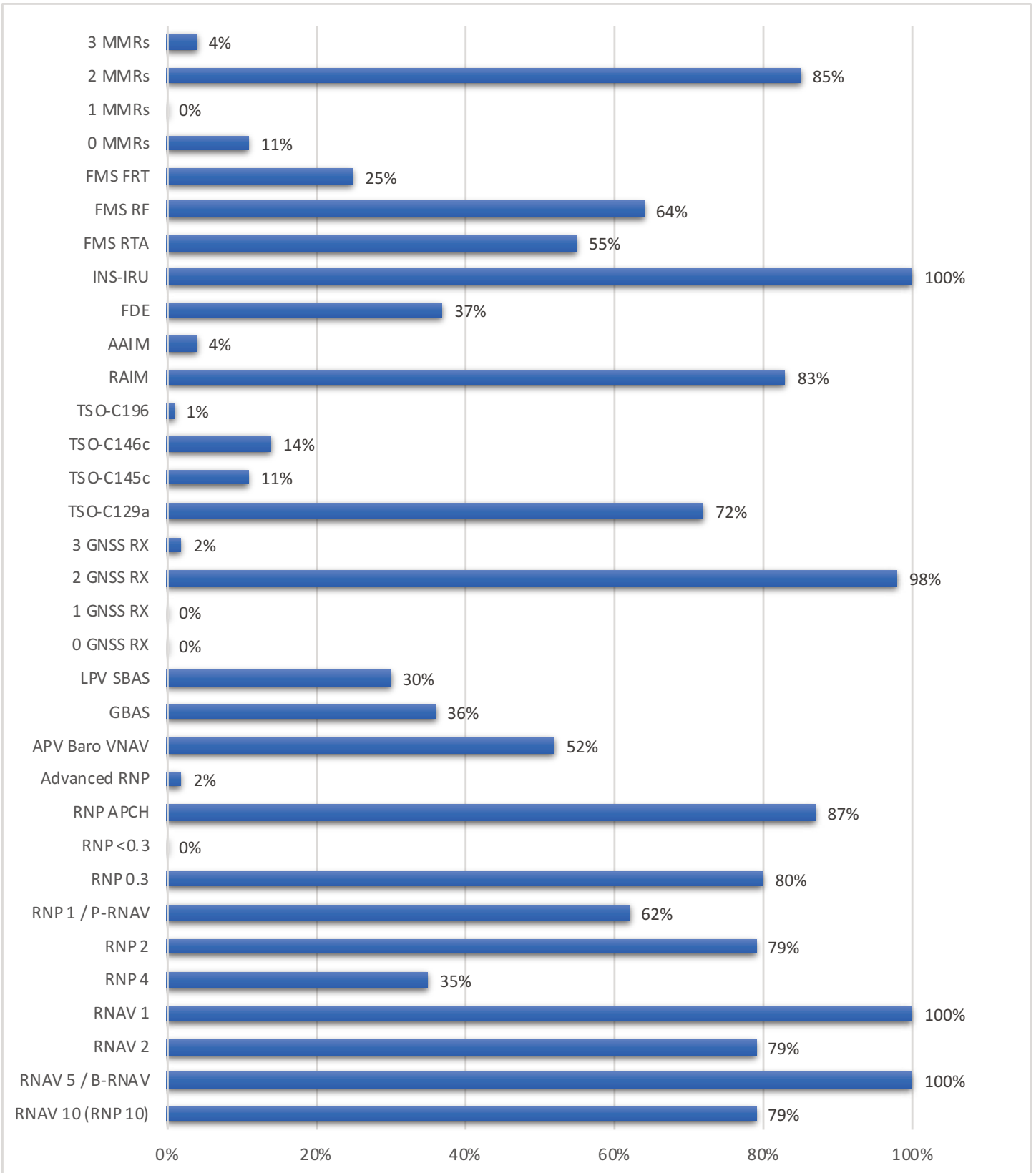


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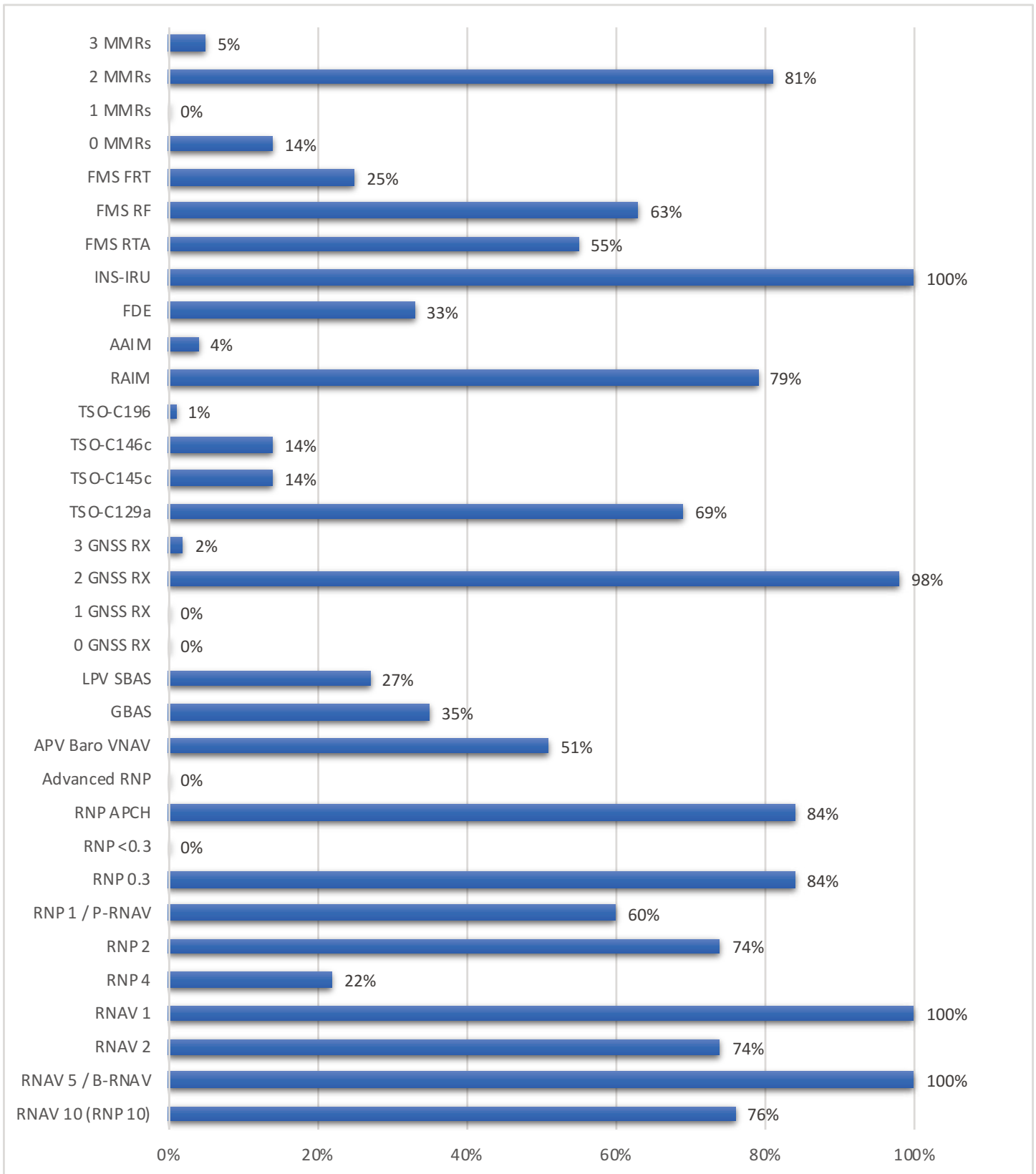


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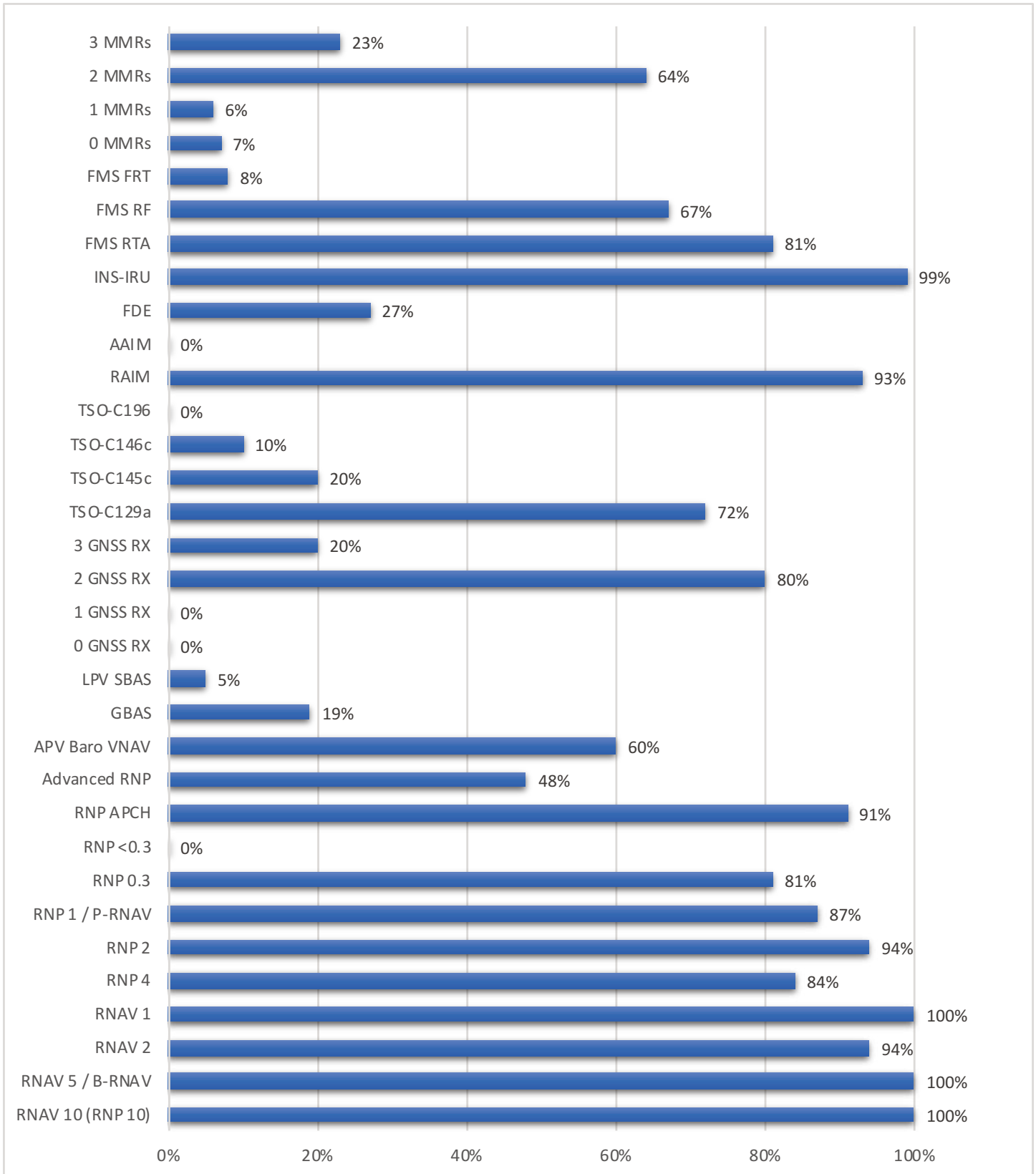


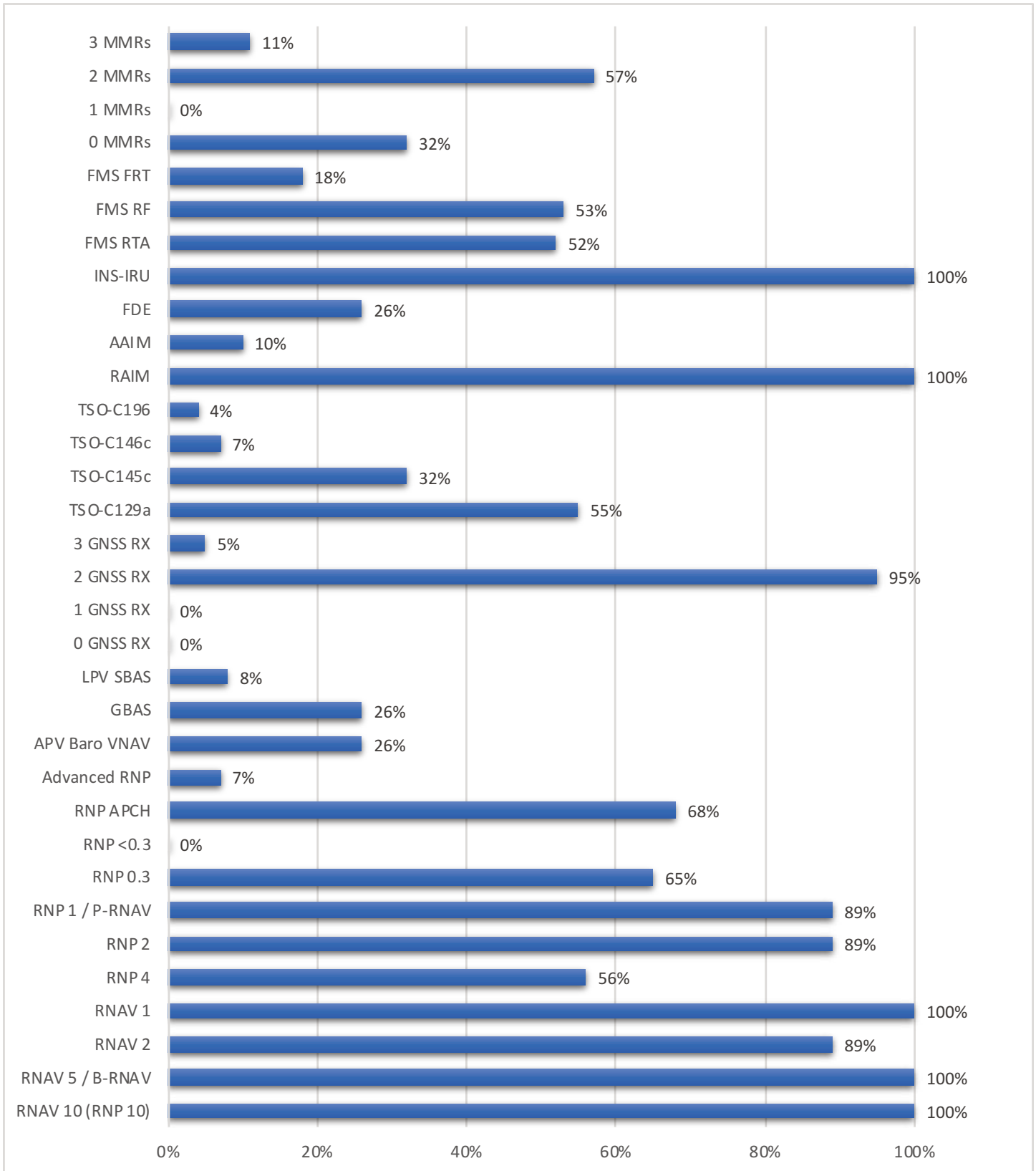


Resistencia

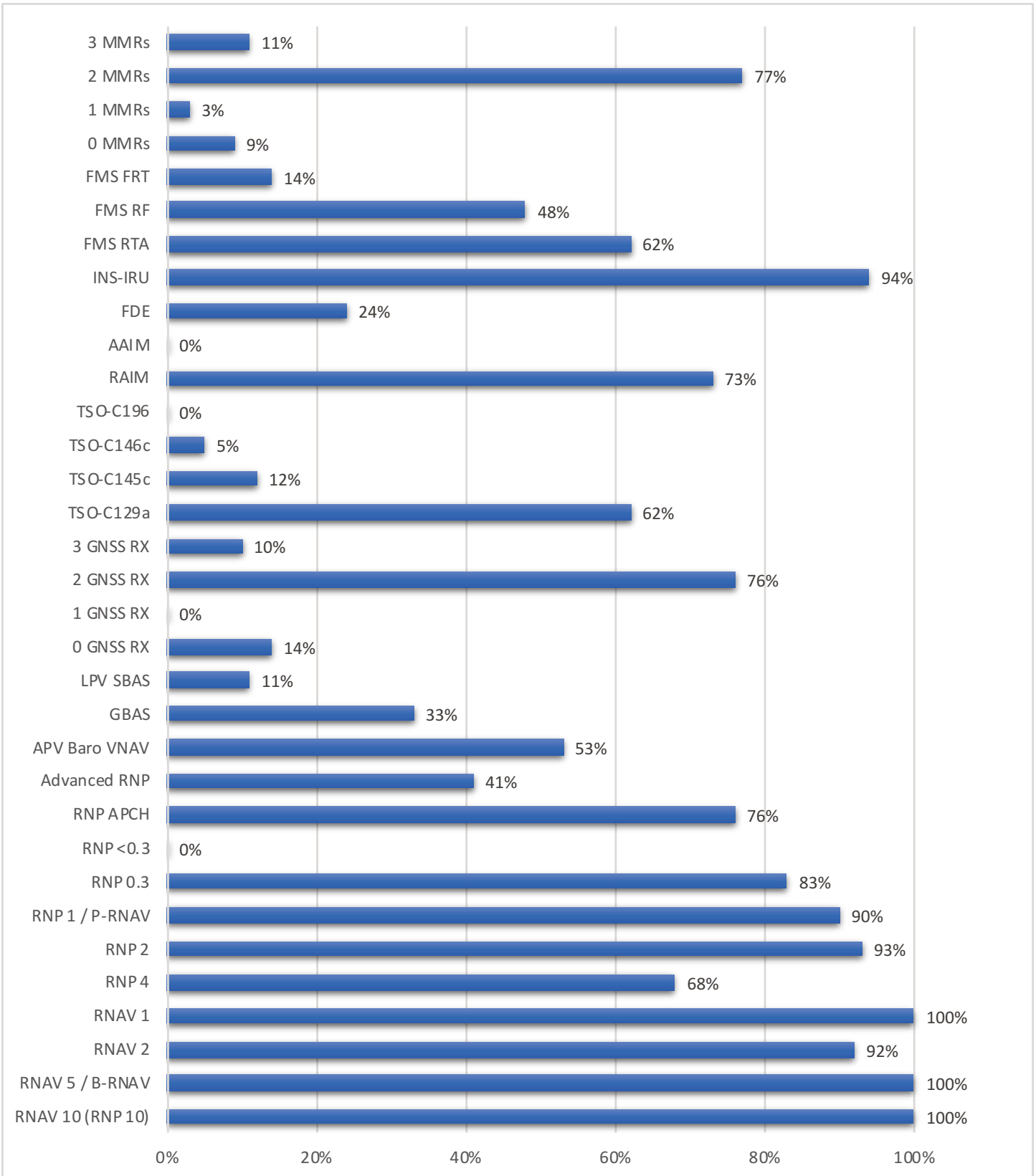


Reykjavik Oceanic

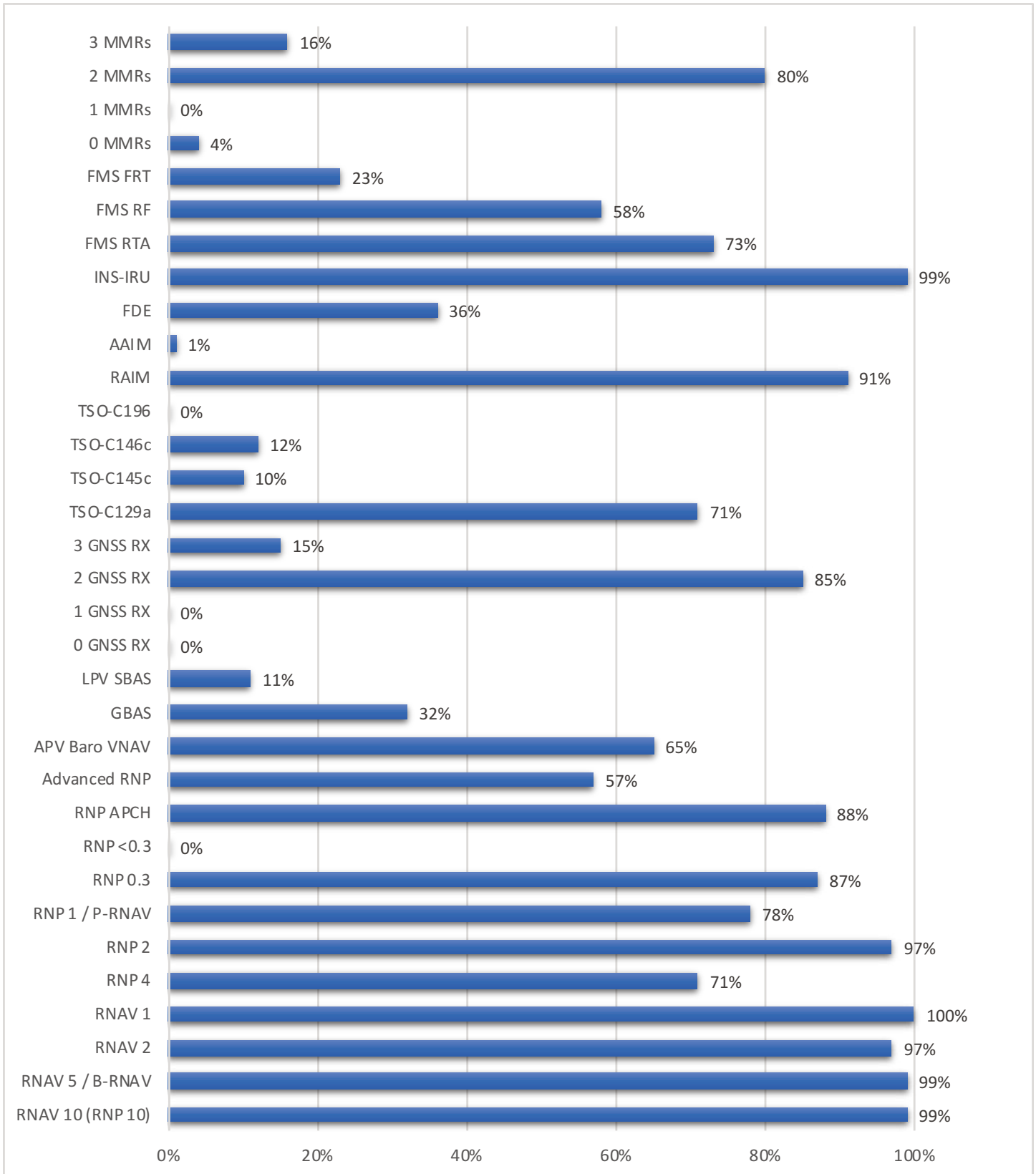




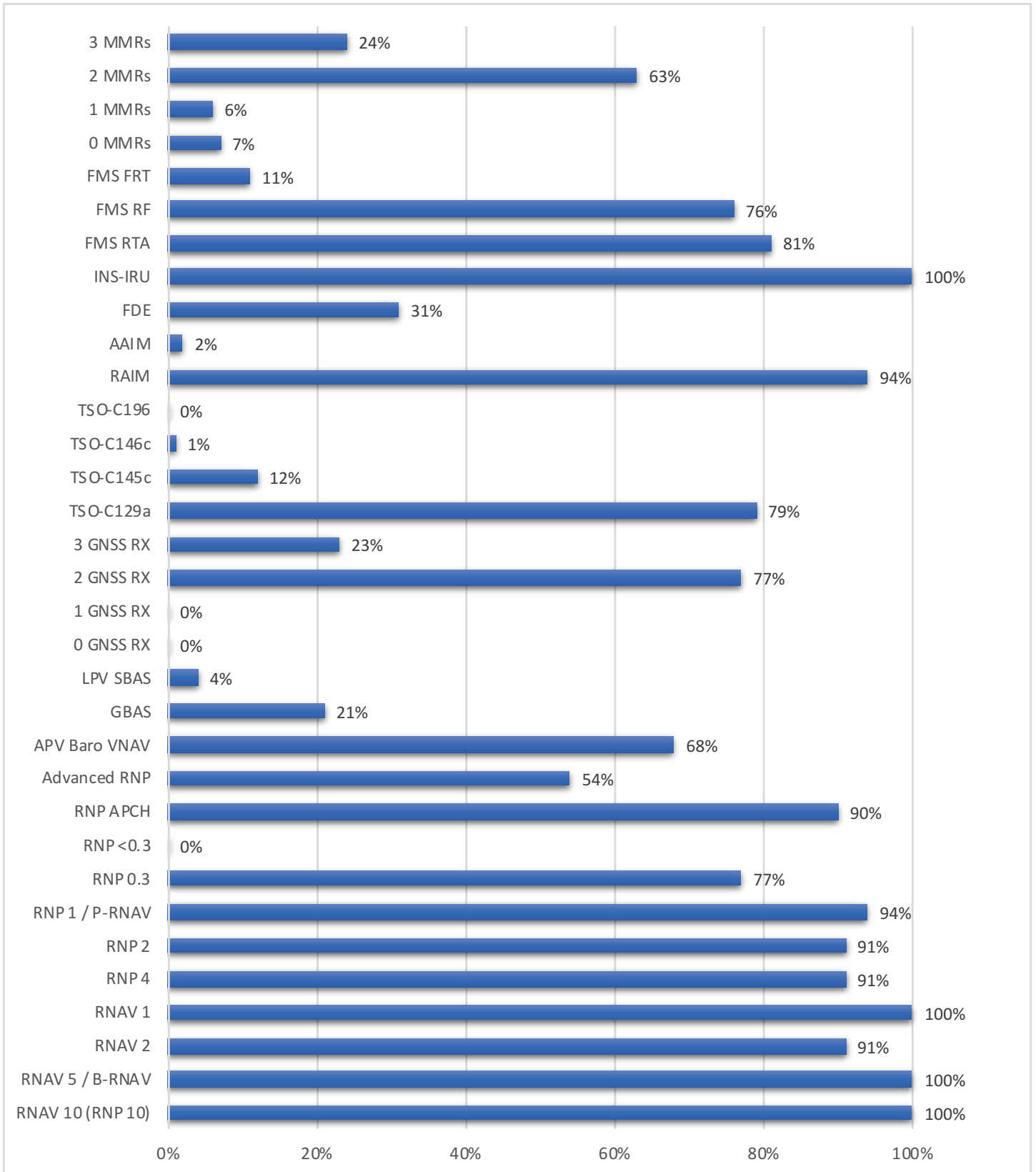
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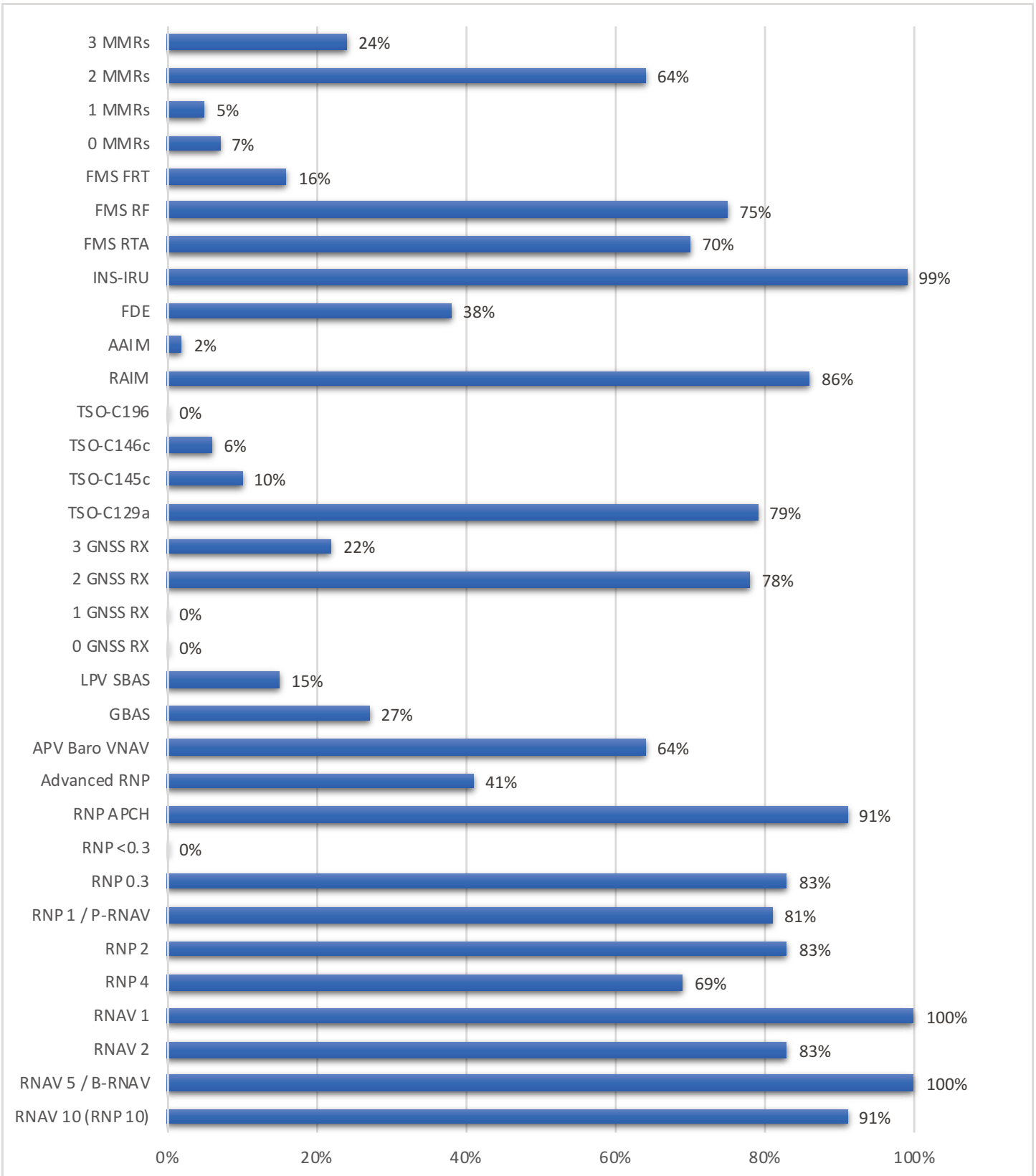
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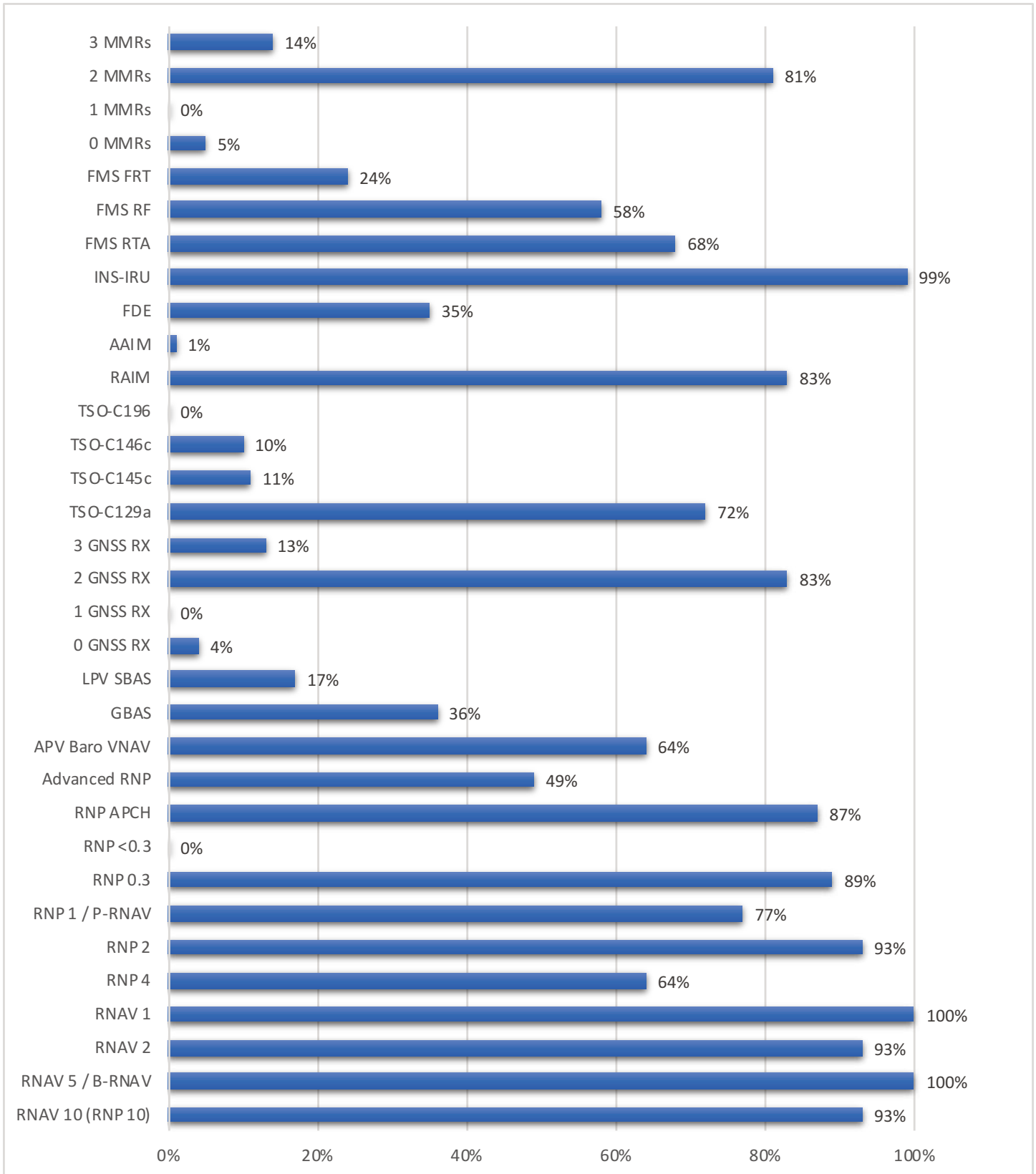
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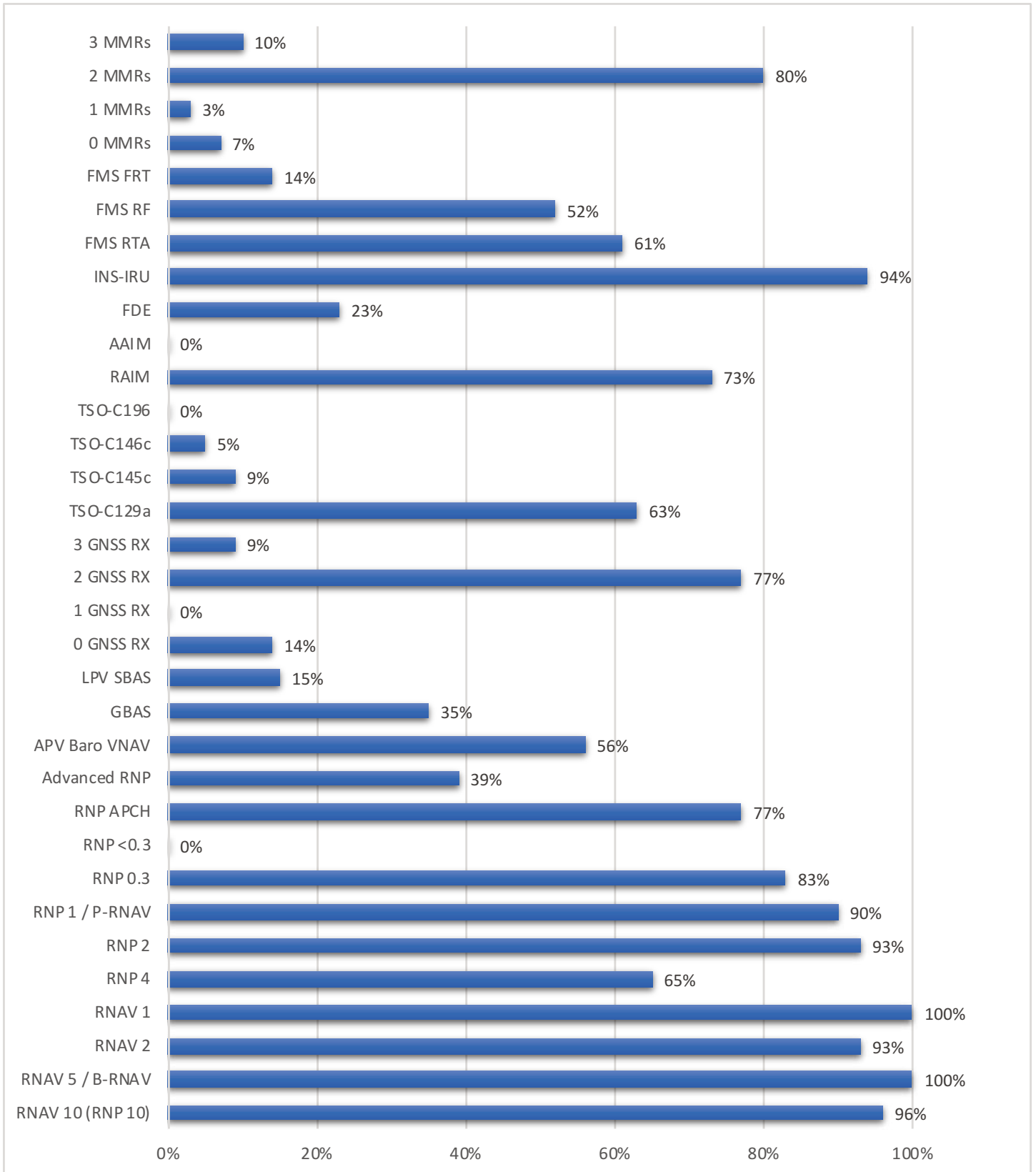


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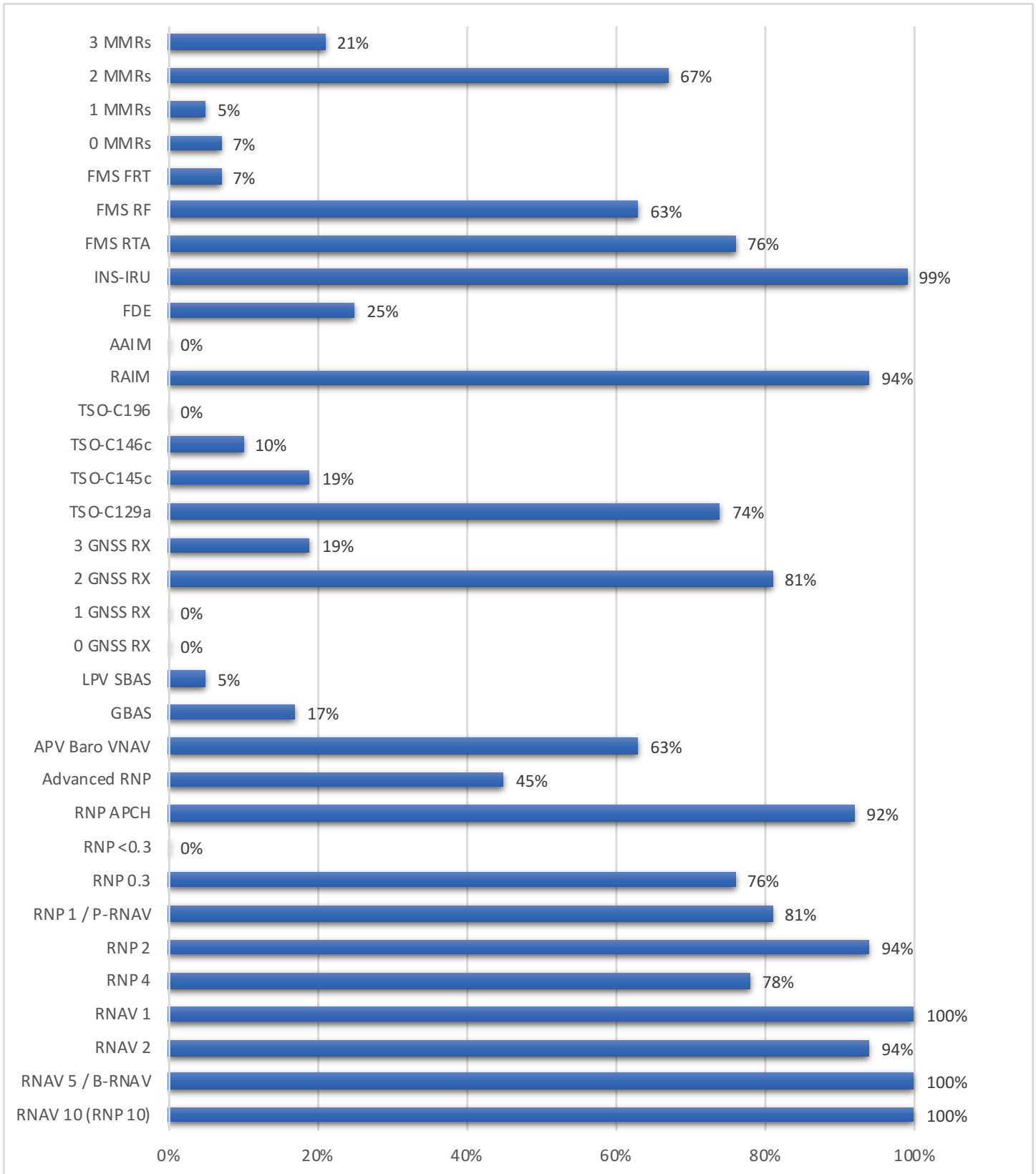


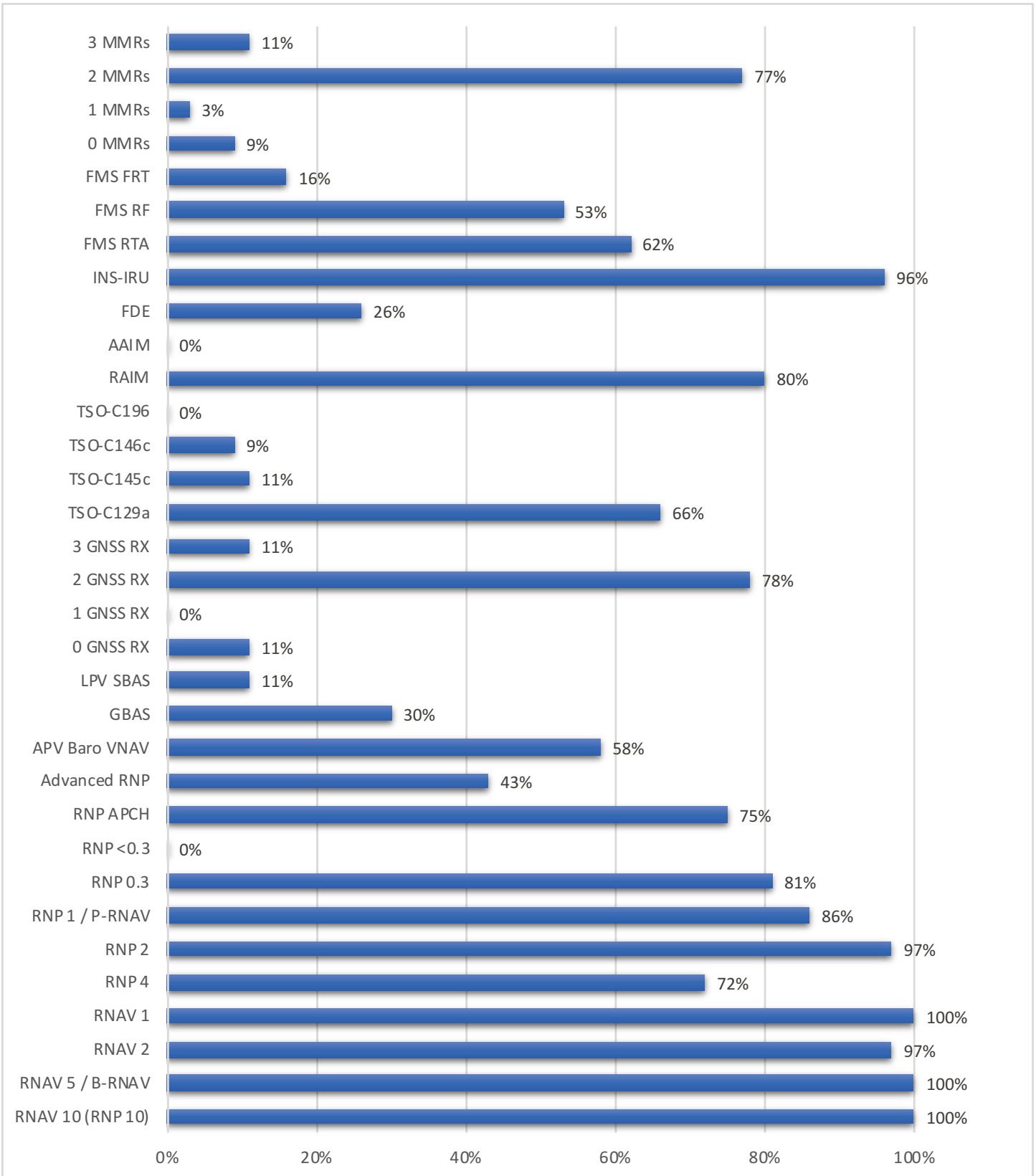
Santo Domingo



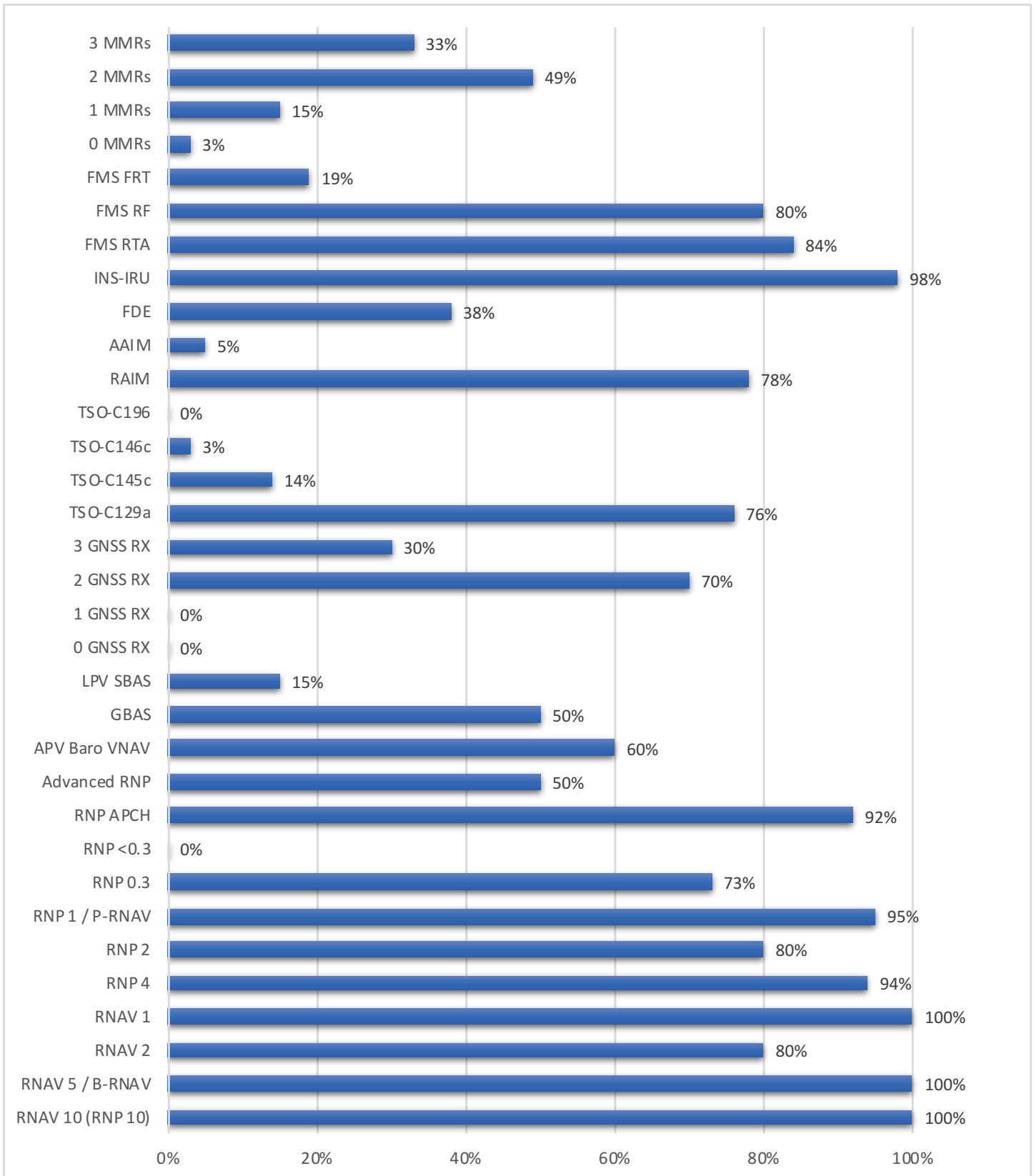


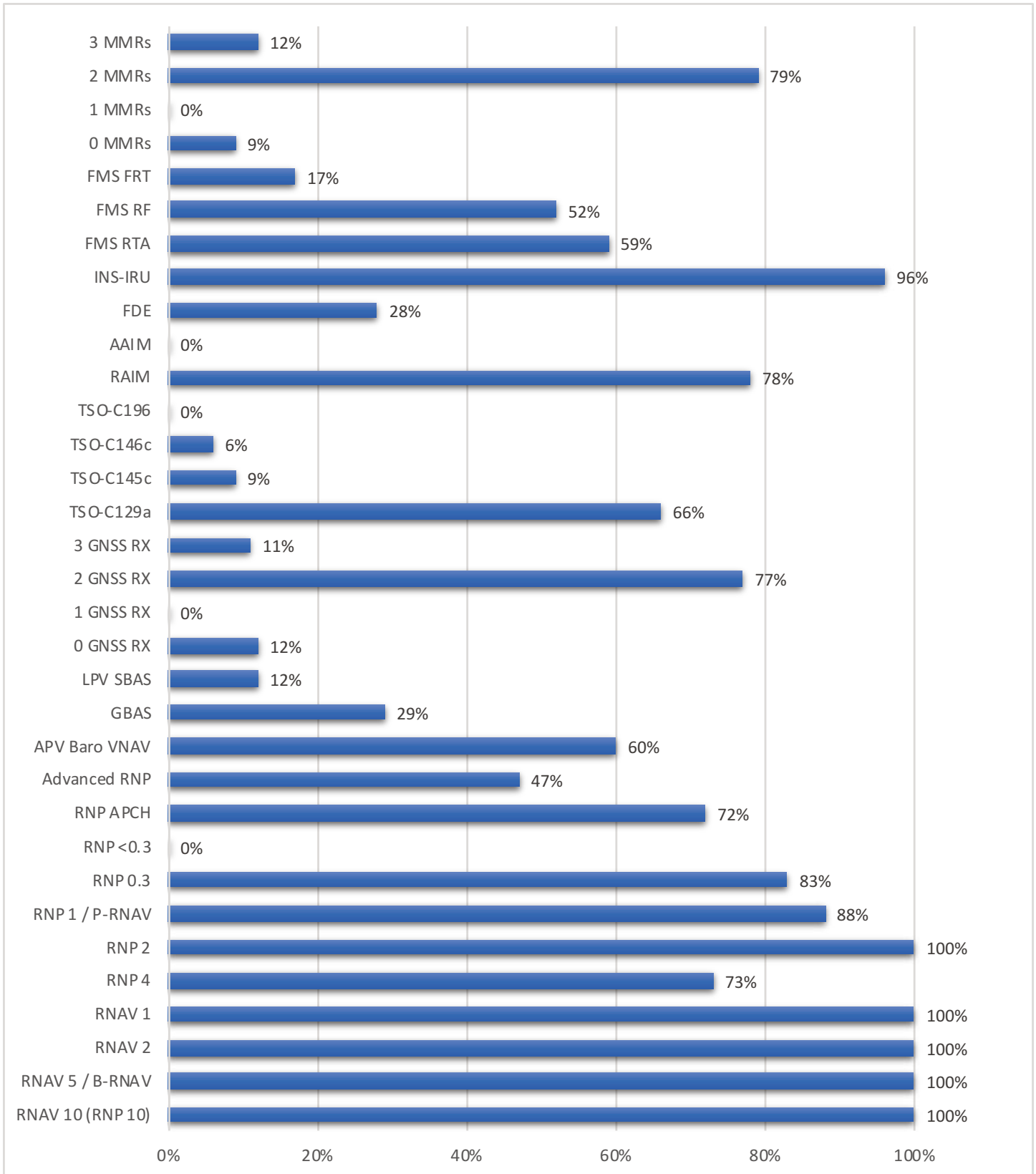
Shanwick Oceanic



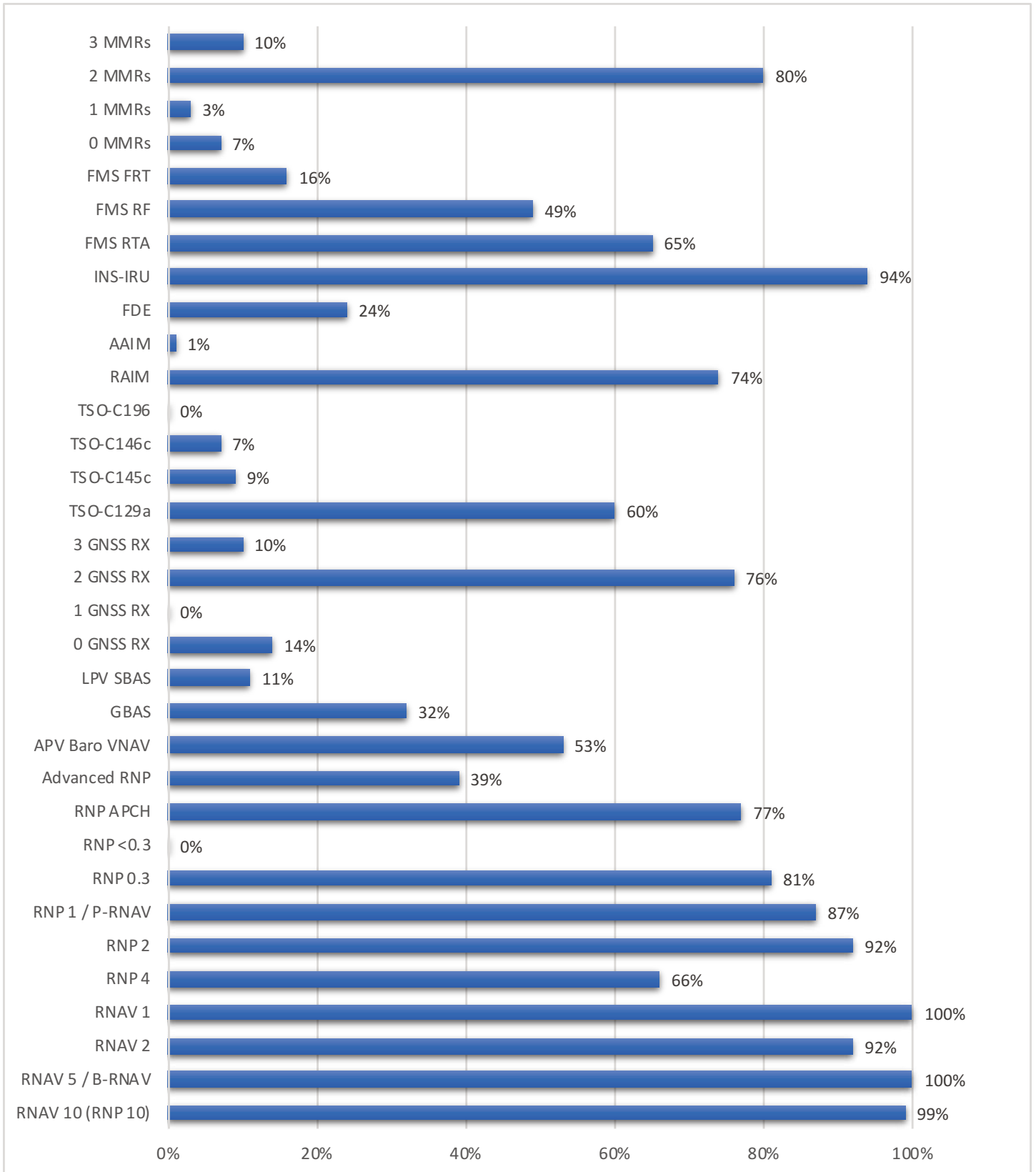


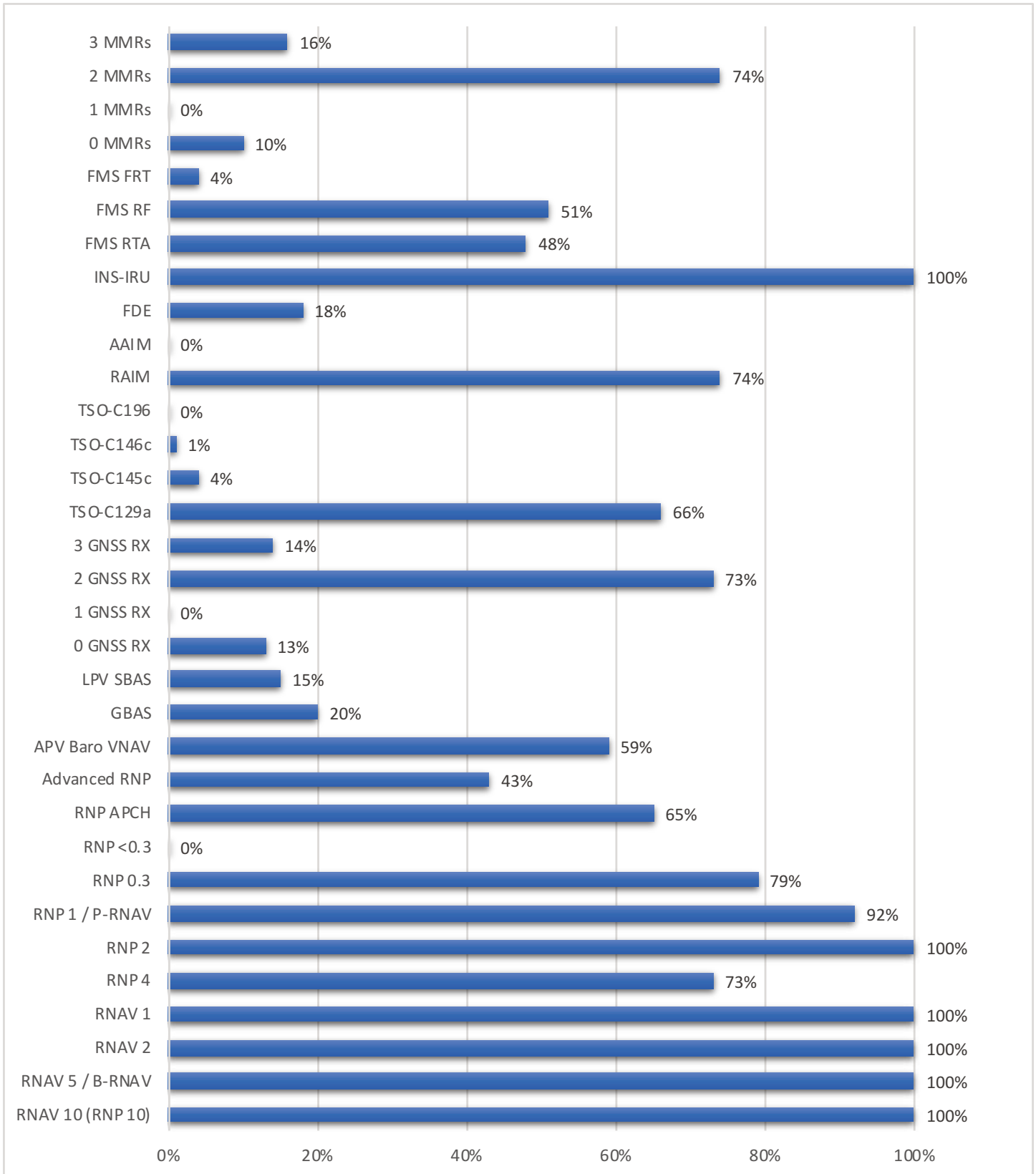
Trans-Polar (North and/or South)





Washington





Work In Progress

All Americas Region airspace users including airlines, business, military and general aviation are welcome to contribute to this series of equipage and capability reports.

The associated survey is located here...

Aircraft Equipage and Capability Survey



Based on a survey of 3,375 airframes

Categorized by Flight Information Region (FIR)

IATA Americas Region

SURVEILLANCE

Replacing assumptions with facts

This report is based on unedited airspace user submissions

Refer to statistical note on page 2

CONTRIBUTING AIRSPACE USERS

AEROMEXICO, AEROMEXICO CONNECT, AEROLITORAL, AIR CANADA, AIR CANADA ROUGE, AIR NEW ZEALAND, AIR EUROPA, AVIANCA BRAZIL, AZUL, CONDOR, COPA, DELTA, ETIHAD, FEDEX, GOL, IBERIA, JETBLUE, KLM, LATAM AIRLINES, LIAT, QATAR AIRWAYS, ROYAL JORDANIAN, SAS, SWISS, SWISS GLOBAL, UNITED, UPS.

AIRFRAME TYPES

A306, A310, A319, A320, A321, A330, A332, A333, A343, A346, A359, A388, ATR42, ATR72, B737, B738, B739, B744, B757, B752, B763, B767, B772, B777, B77F, B77L, B77W, B787, B788, B789, DC10, E170, E190, MD11, MD88, MD90.

DISCLAIMER: The information contained in this document is subject to constant review and update in light of continuing airspace user contributions via an on-line airframe equipage and capability survey and/or other sources. No reader should act on the basis of any such information without referring to applicable laws and regulations and/or without taking appropriate professional advice. Although every effort has been made to ensure accuracy, the International Air Transport Association shall not be held responsible for any loss or damage caused by errors, omissions, misprints or misinterpretation of the contents hereof. Furthermore, the International Air Transport Association expressly disclaims any and all liability to any person or entity in respect of anything done or omitted, and the consequences of anything done or omitted by any such person or entity, in reliance on the contents of this publication.



Data compilation date: 1st October 2018

Statistical Note

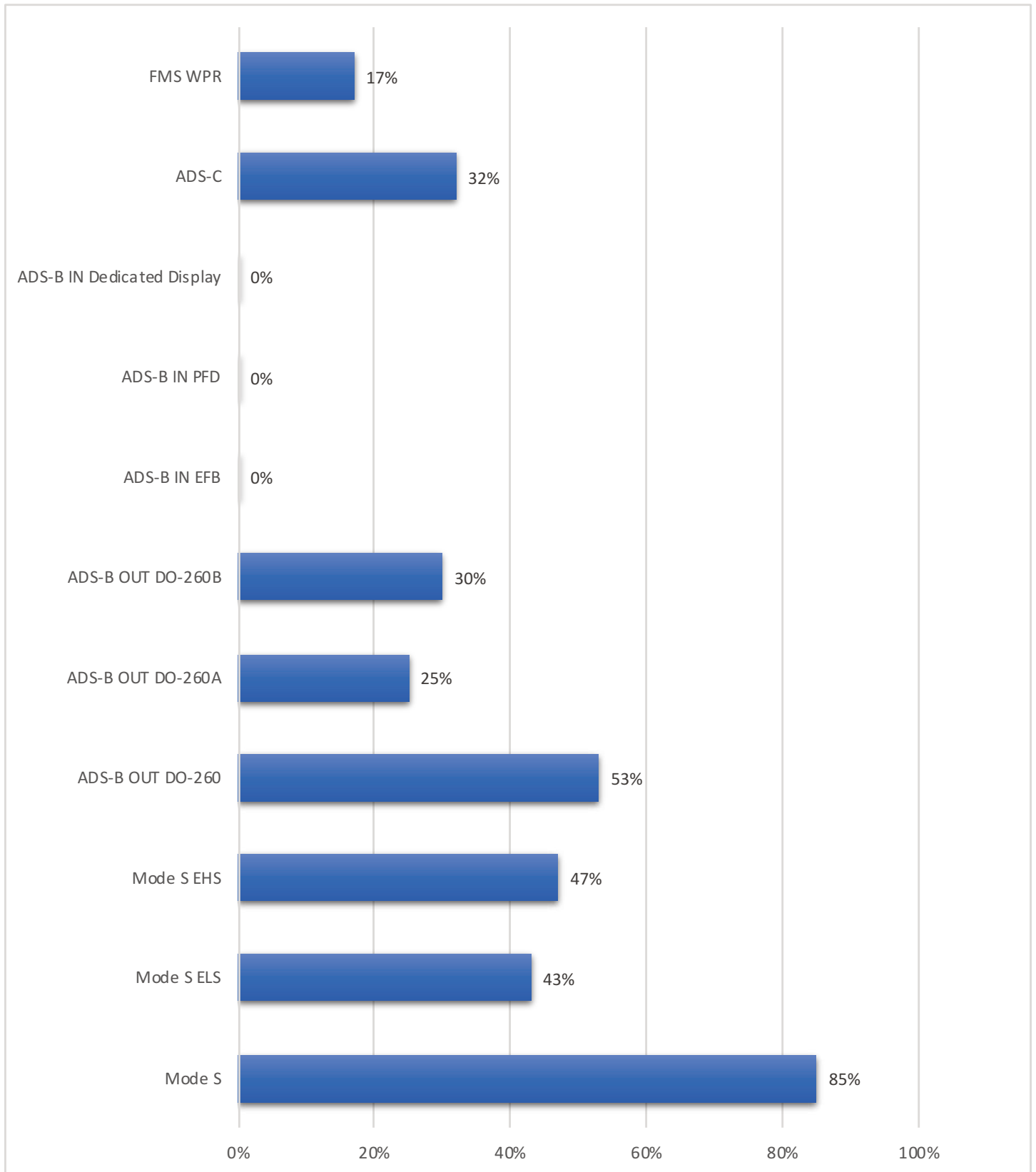
For certain parameters, e.g. ADS-B OUT, some airspace users selected the best capability of the fleet in question (DO-260B) but also selected lesser capabilities for the same fleet (DO-260A and DO-260). This leads to the same fleet being counted in each DO-260 category. Since DO-260B compliance betters the other selections, the ADS-B OUT operational capability of the subject fleet(s) was unedited for this report. A similar reporting phenomenon was observed with respect to Mode S transponders, sub-categories ELS, EHS. Further, in the case of capabilities that totaled as a fraction per FIR, e.g. "ADS-B IN displayed on PFD", these are reported as 1%.

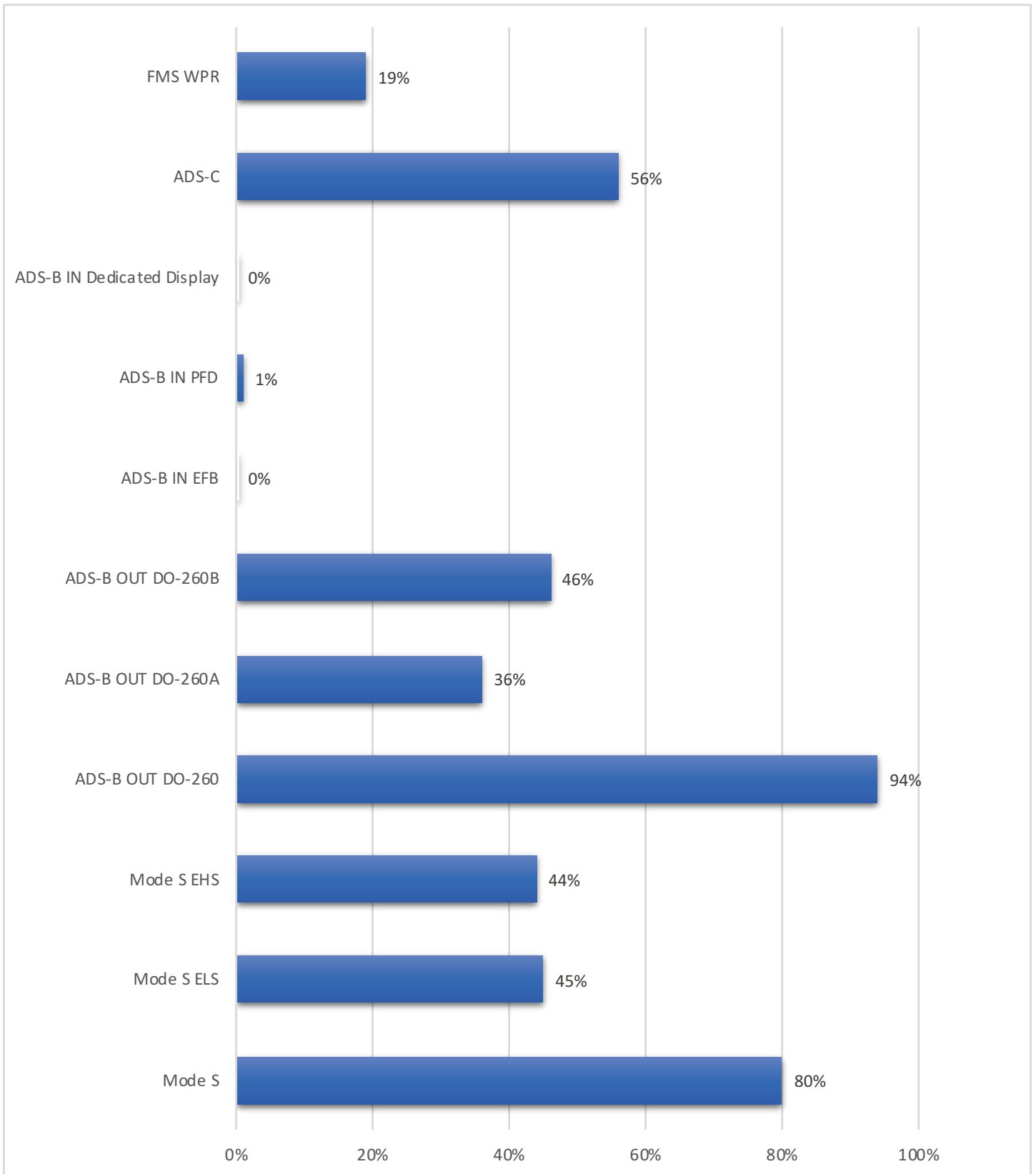
Point of contact:

Mr. Kieran O'Carroll
Safety and Flight Operations Department
IATA Americas Region
703 Waterford Way, Suite 600
Miami, Florida 33126
USA

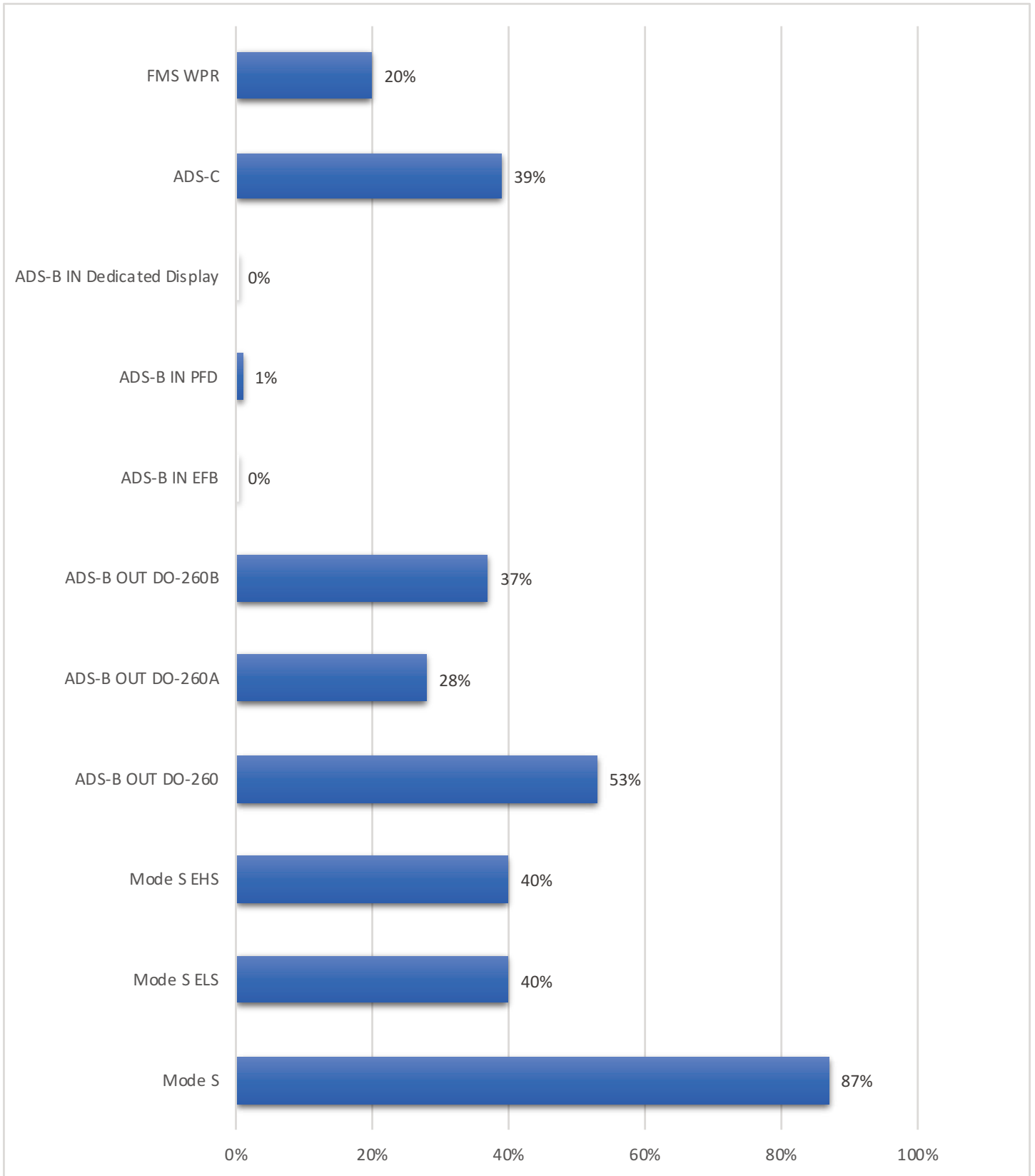
ocarrollk@iata.org

Albuquerque

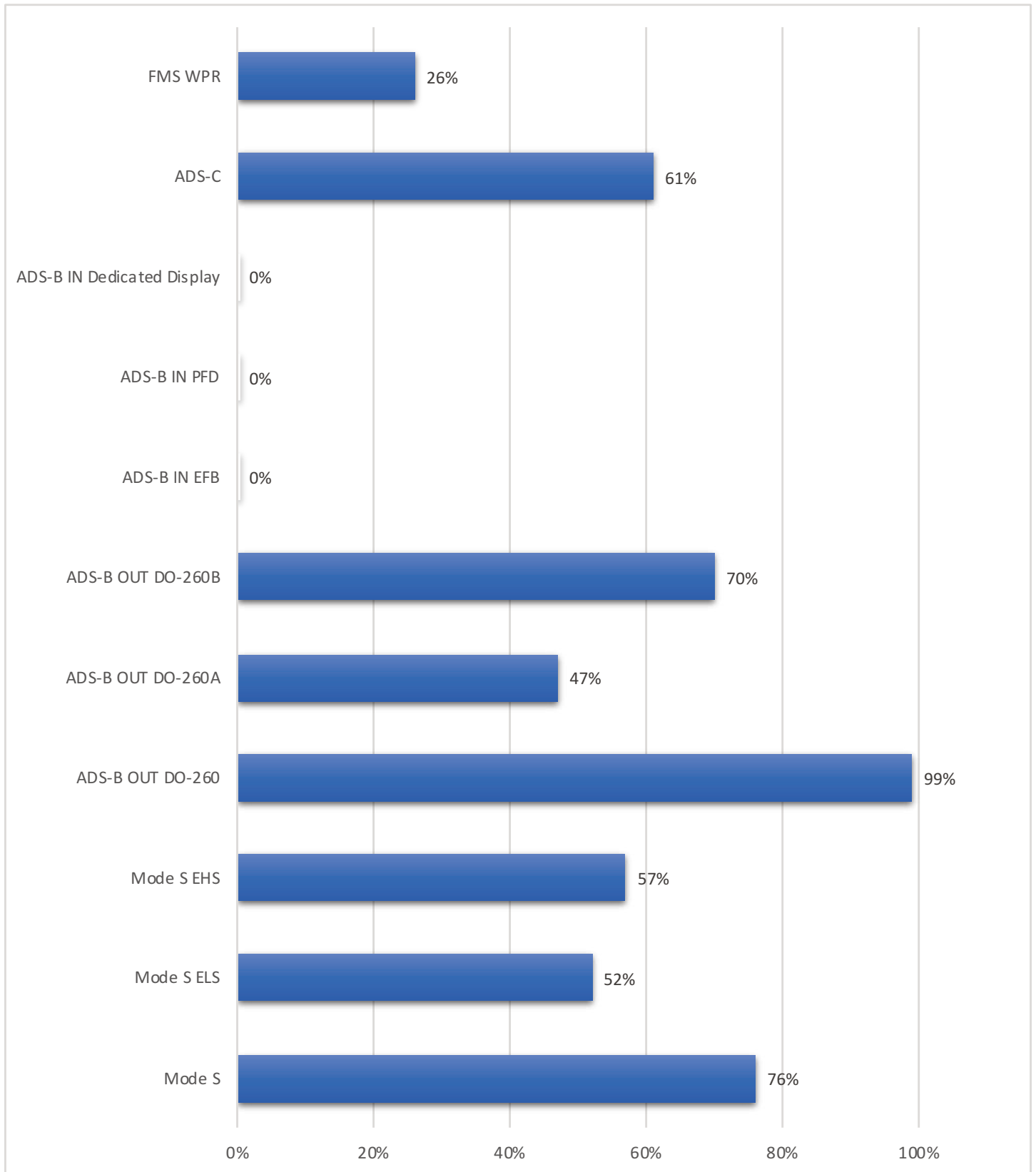




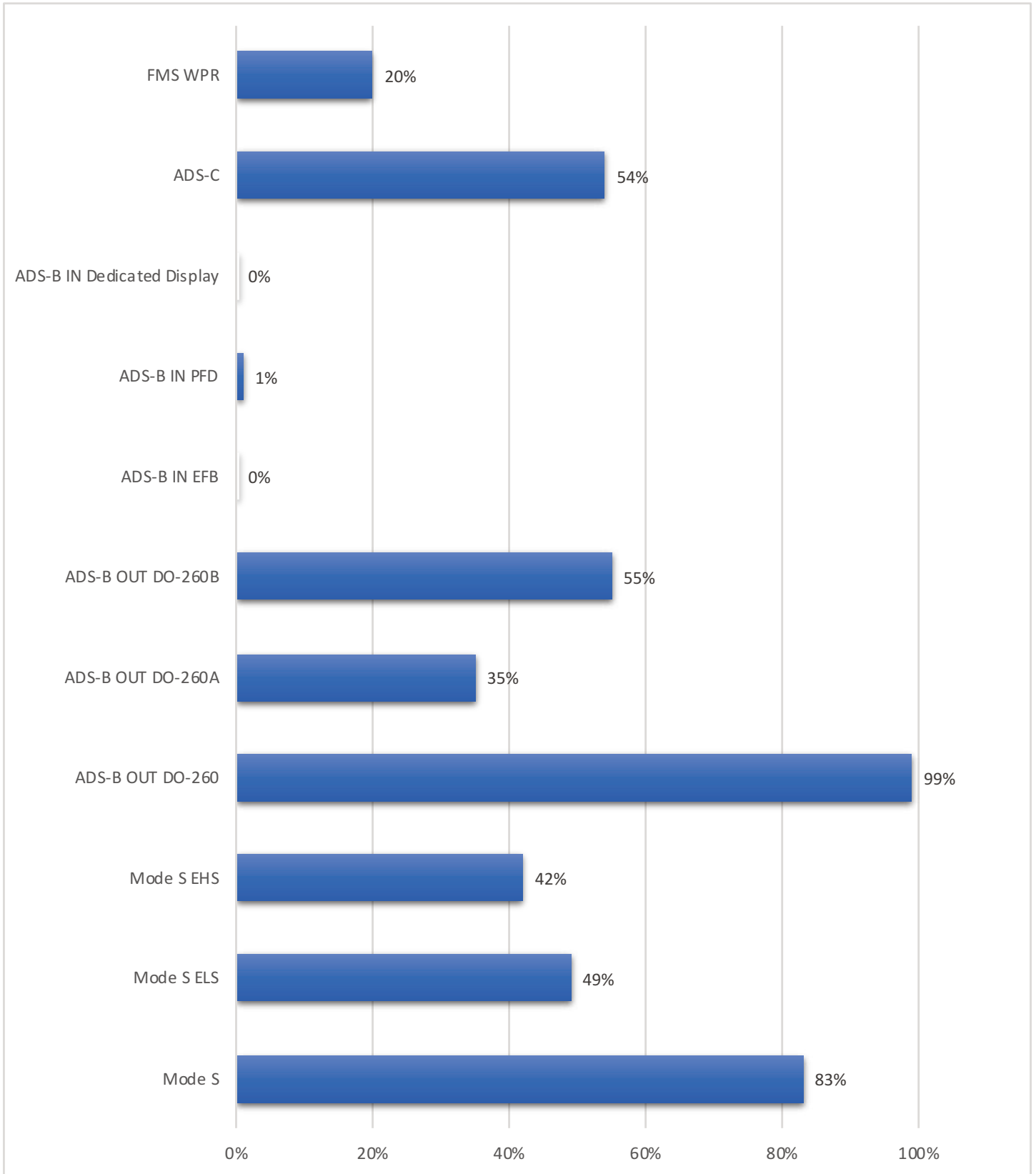
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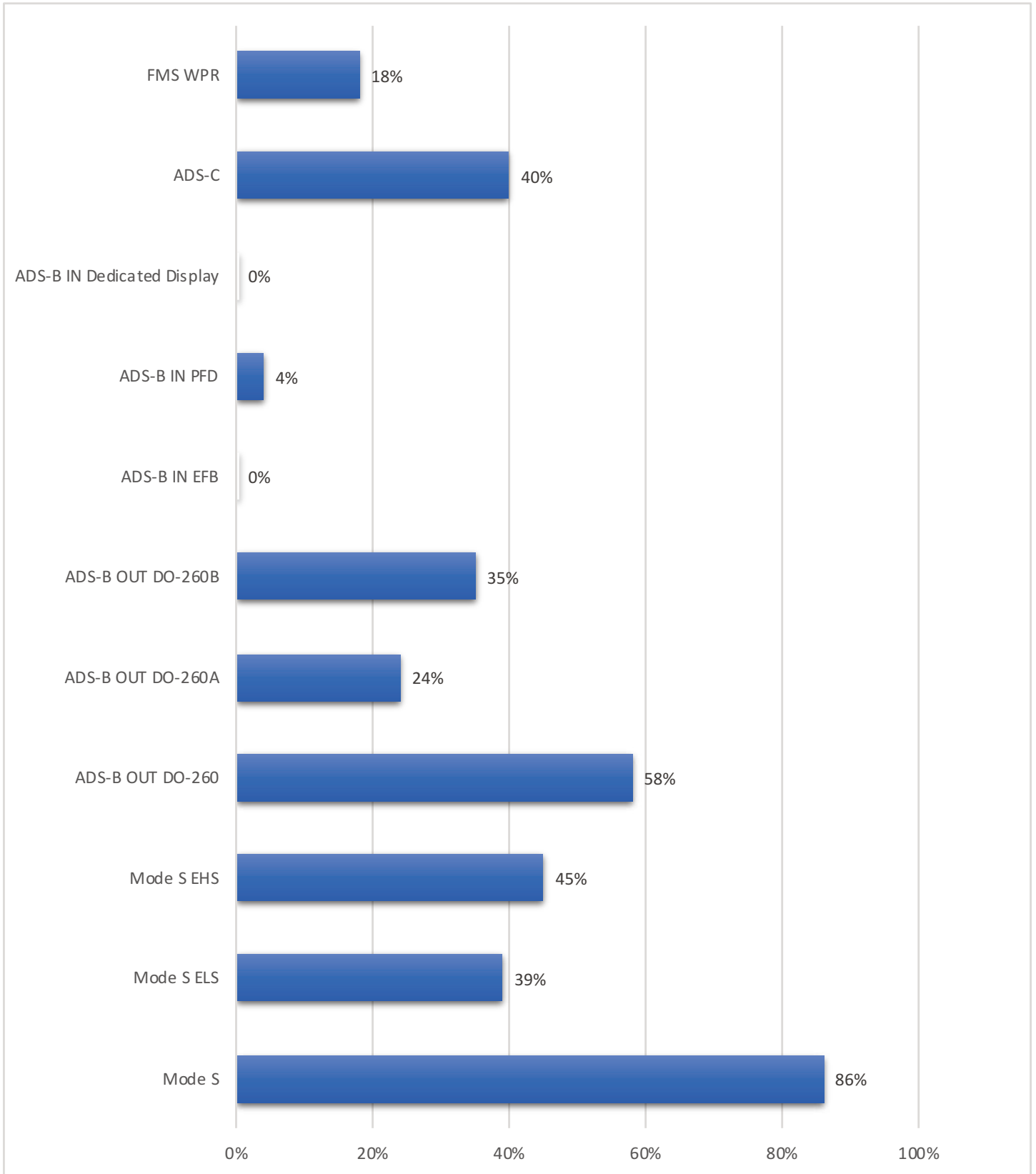
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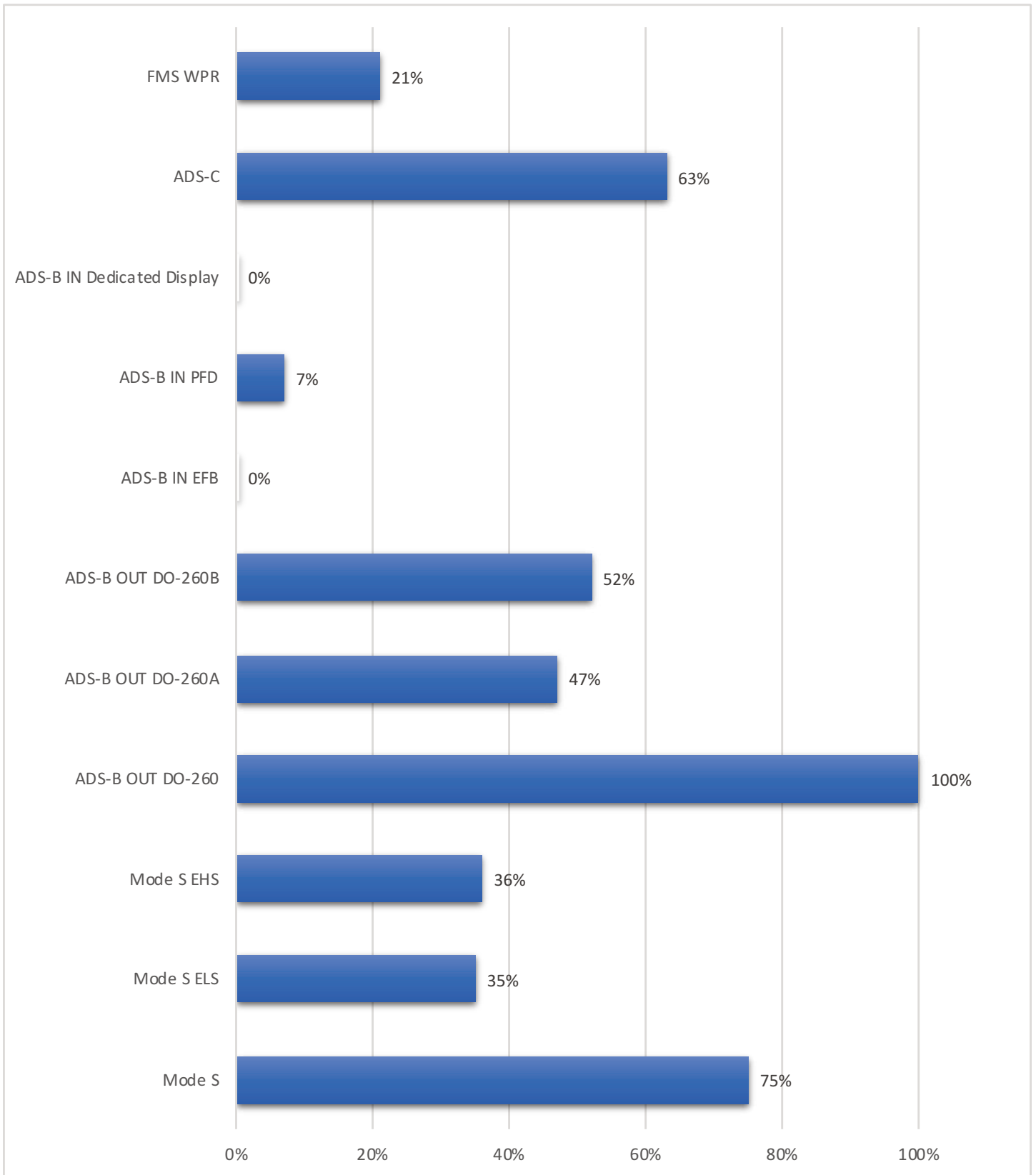
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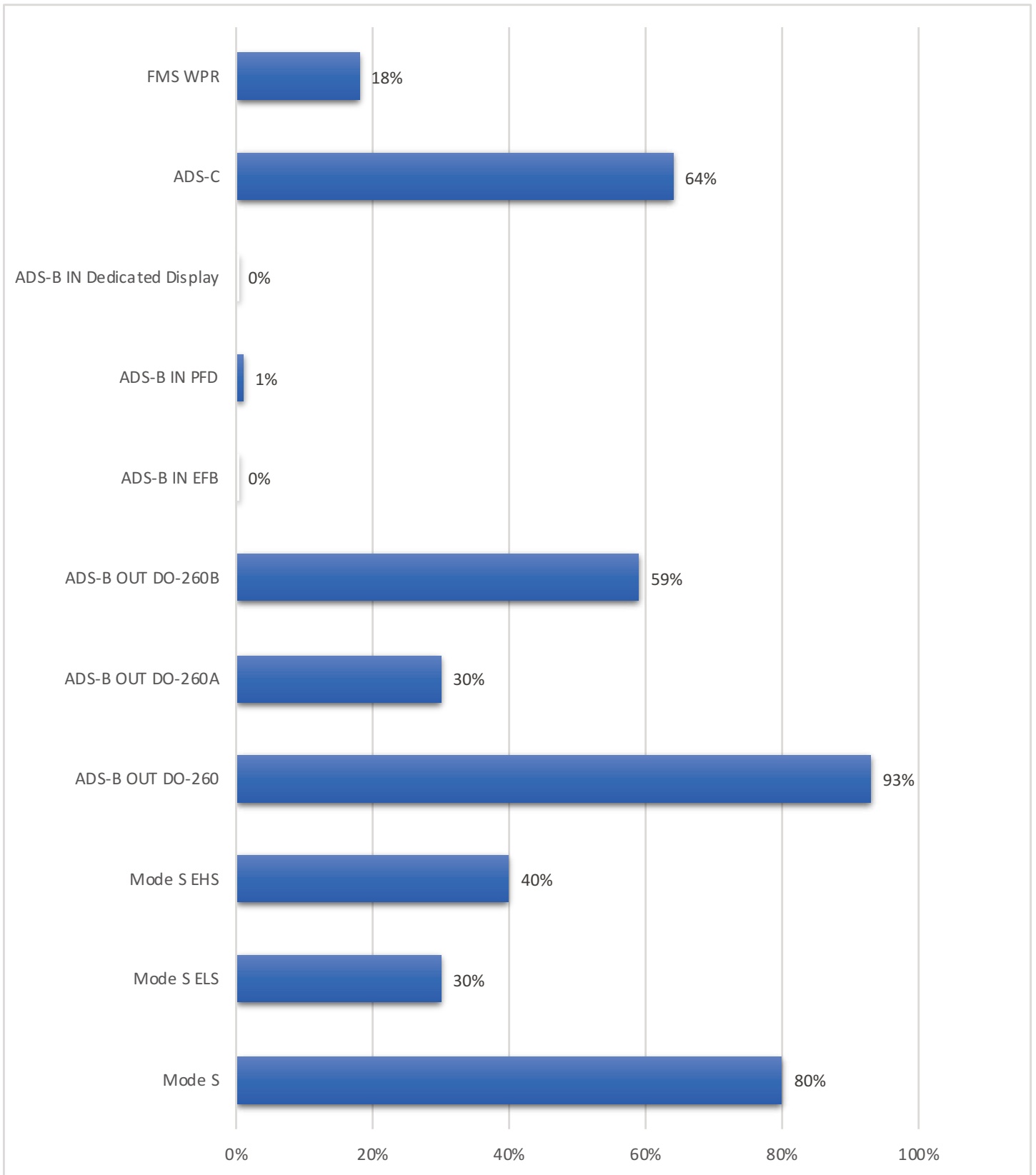
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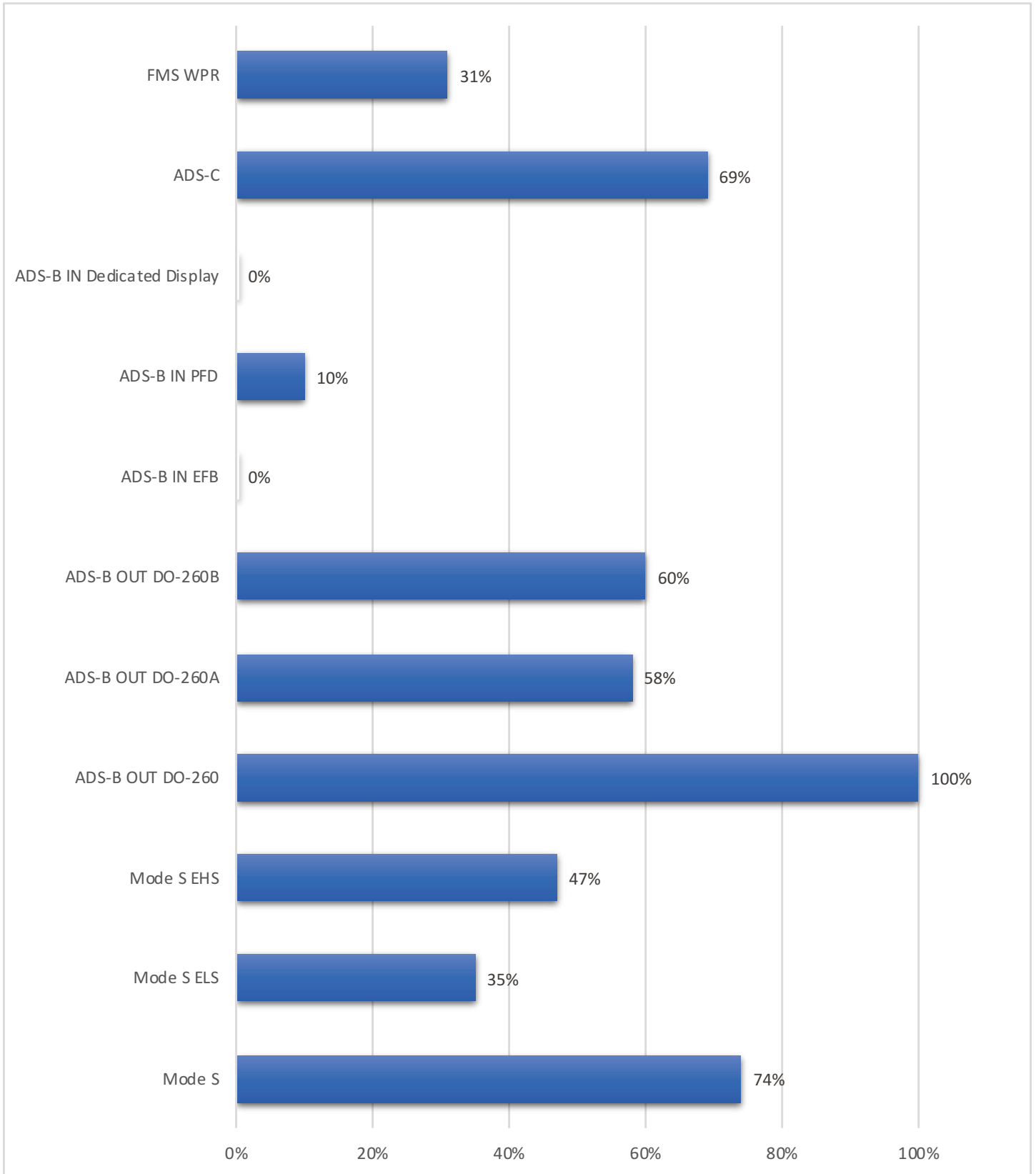


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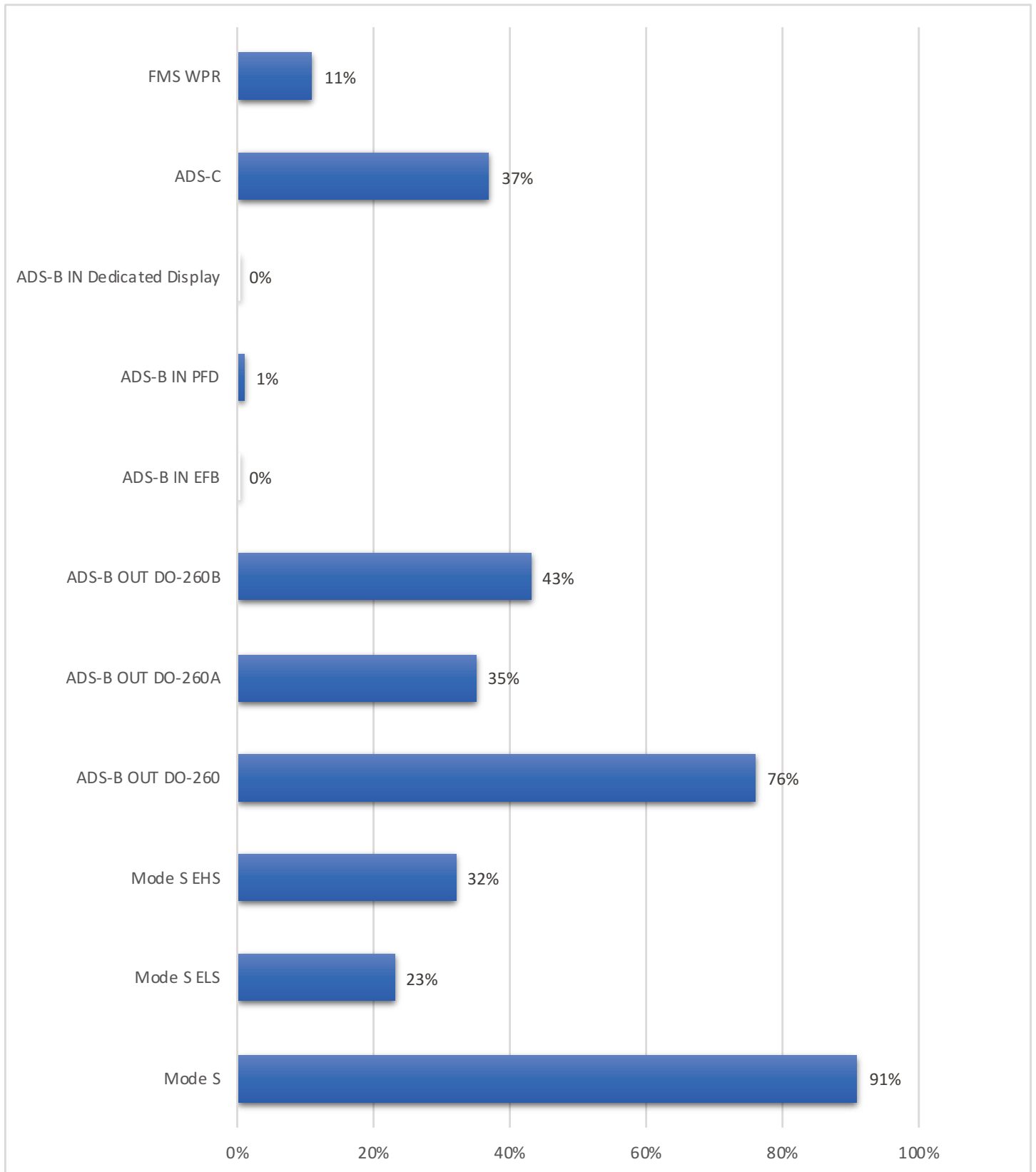


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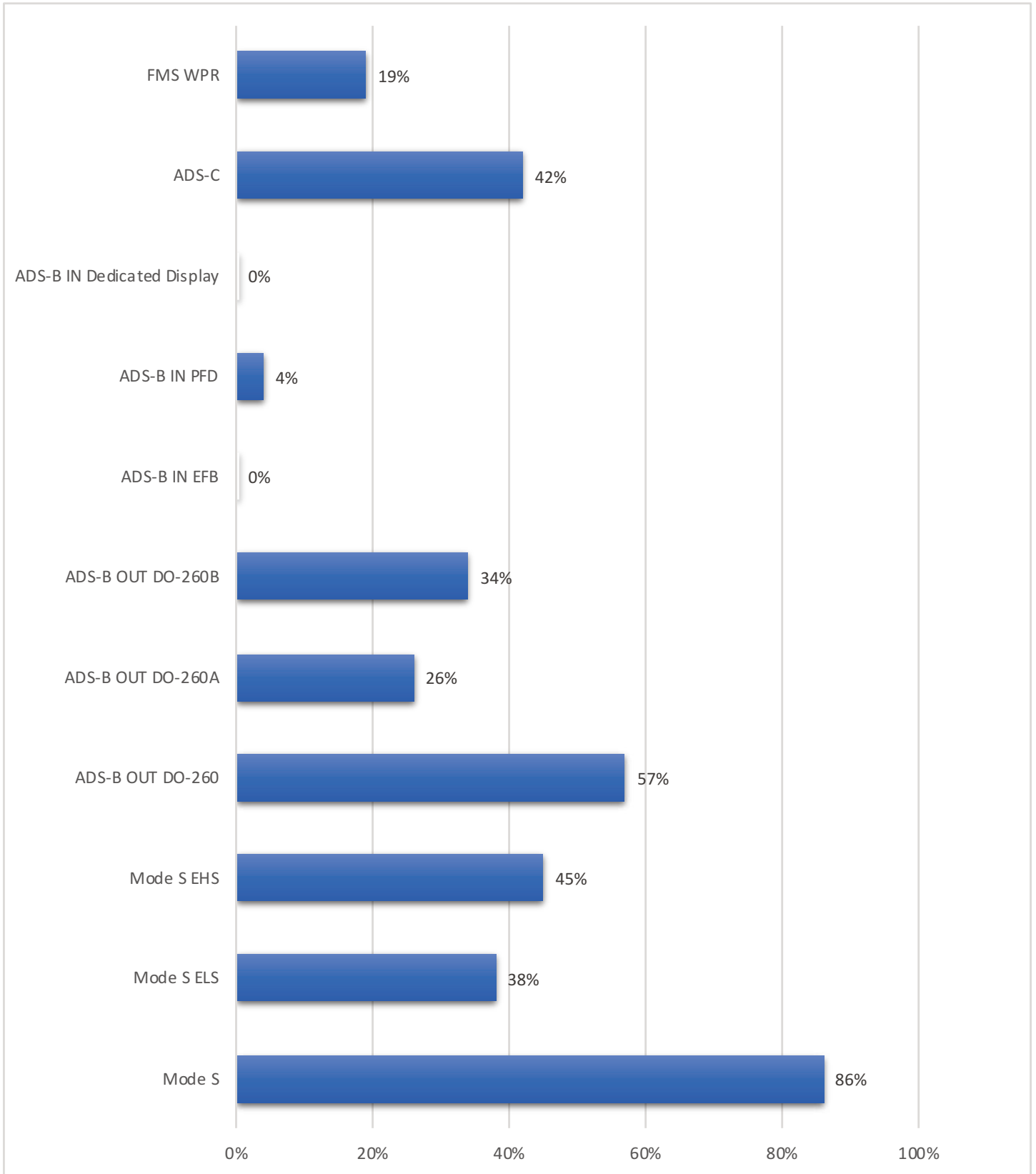


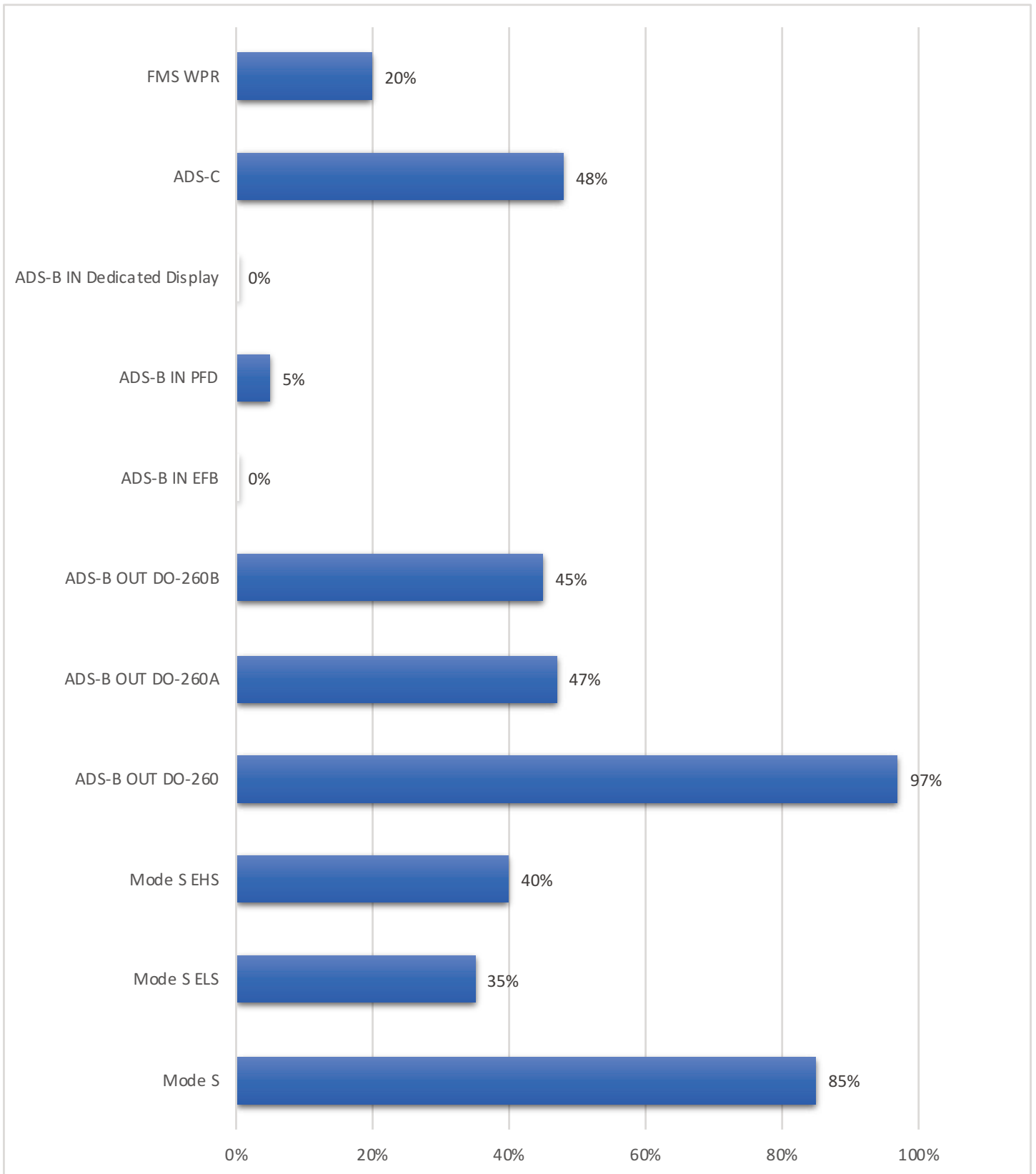


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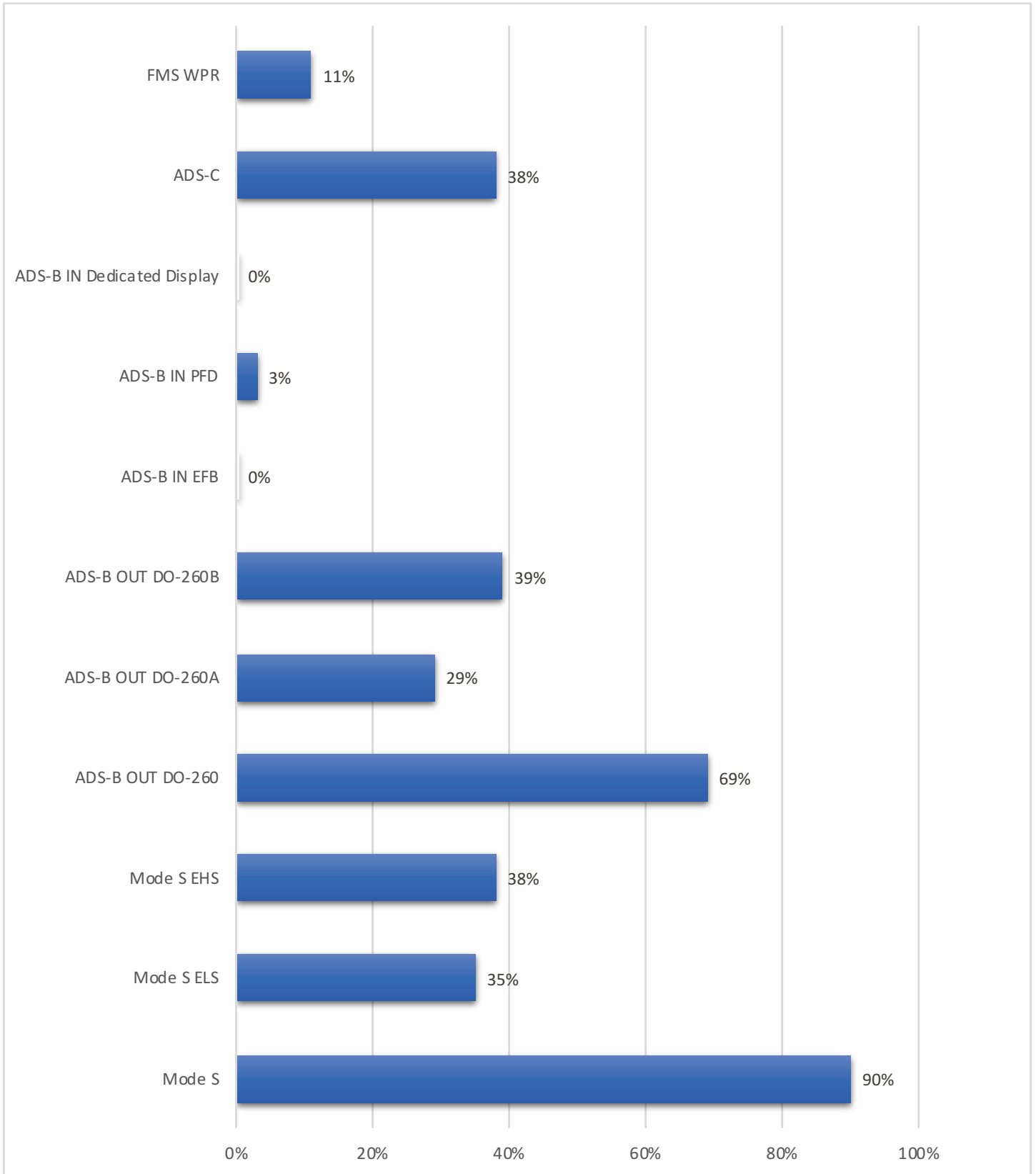


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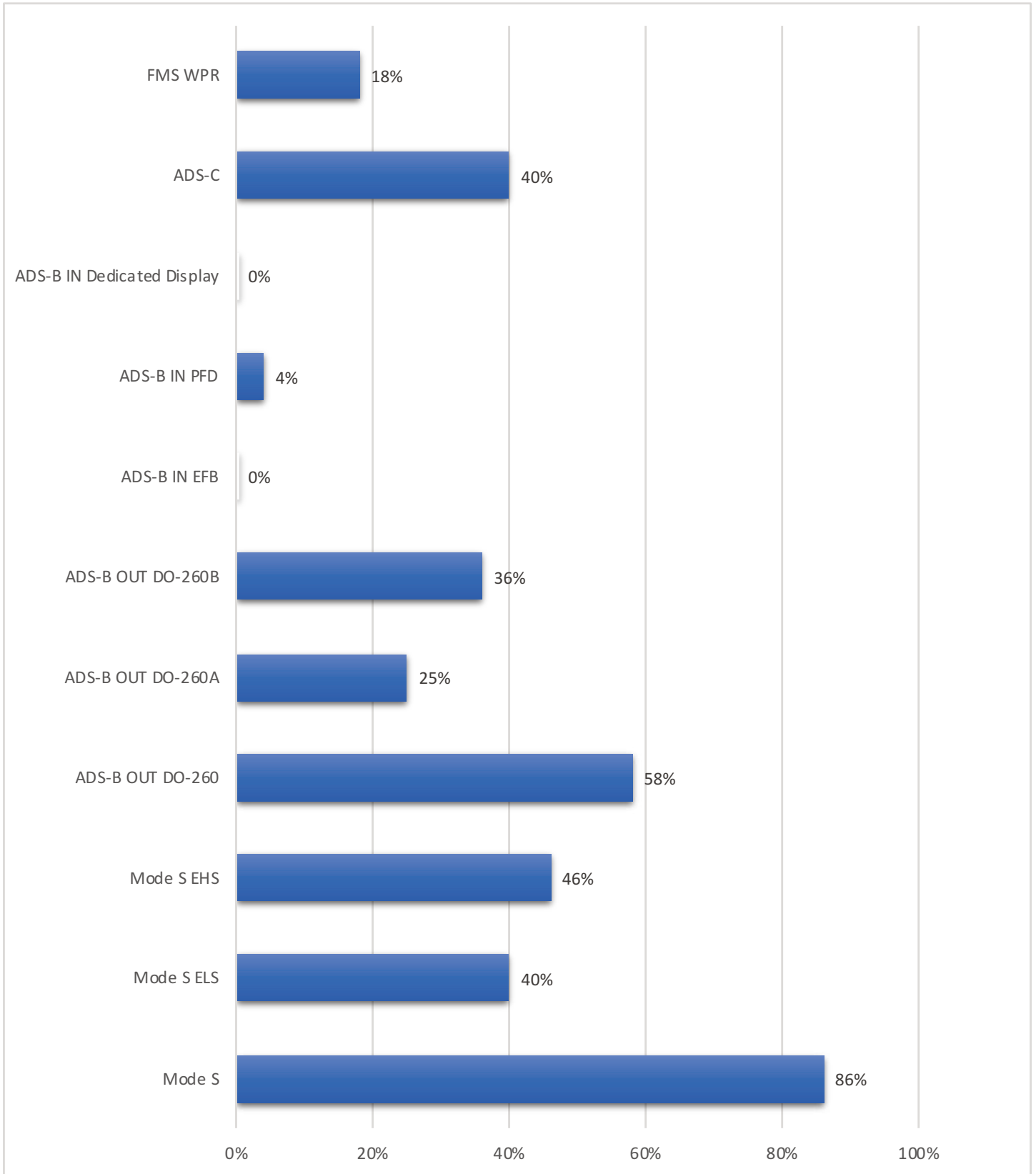




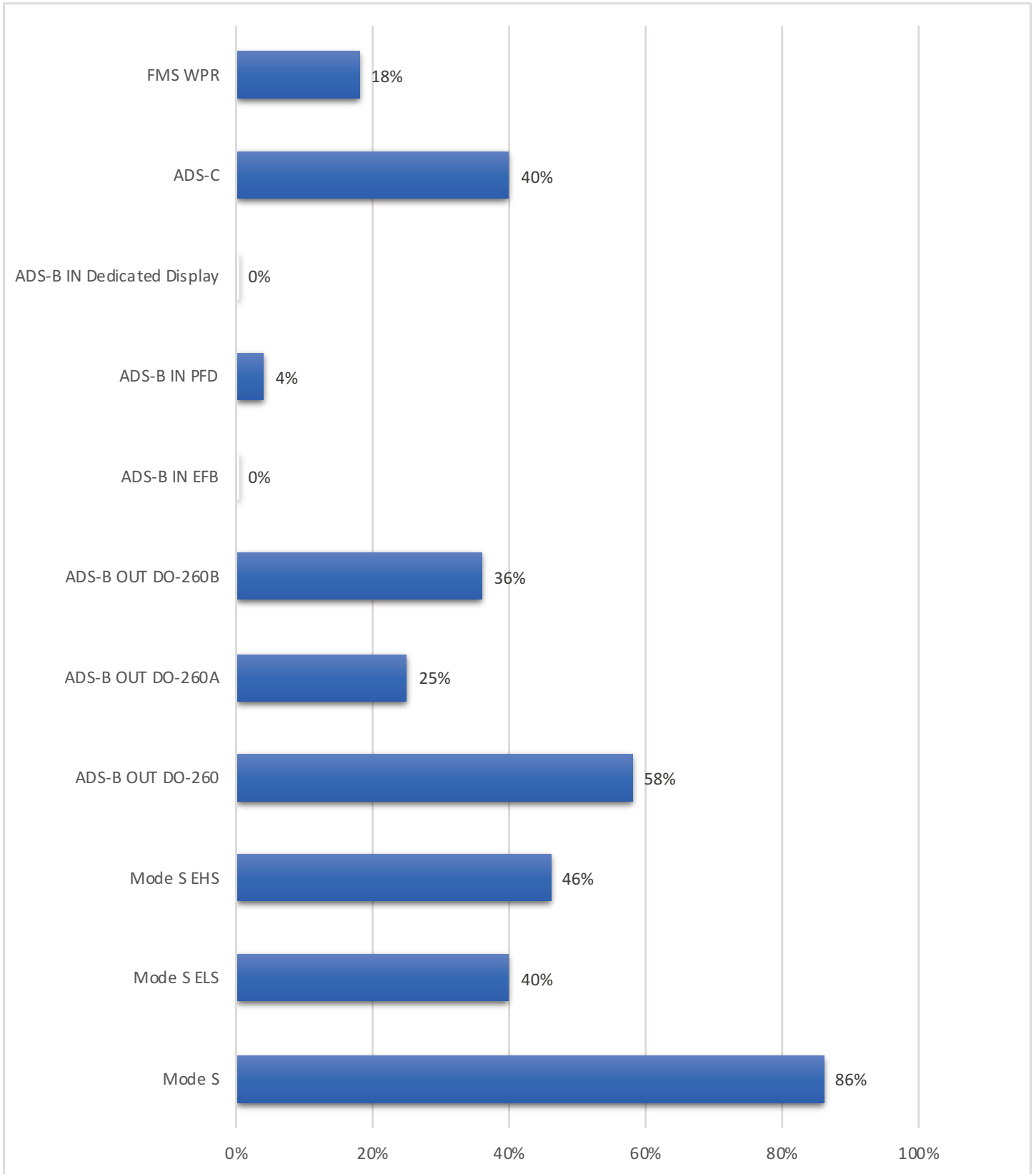
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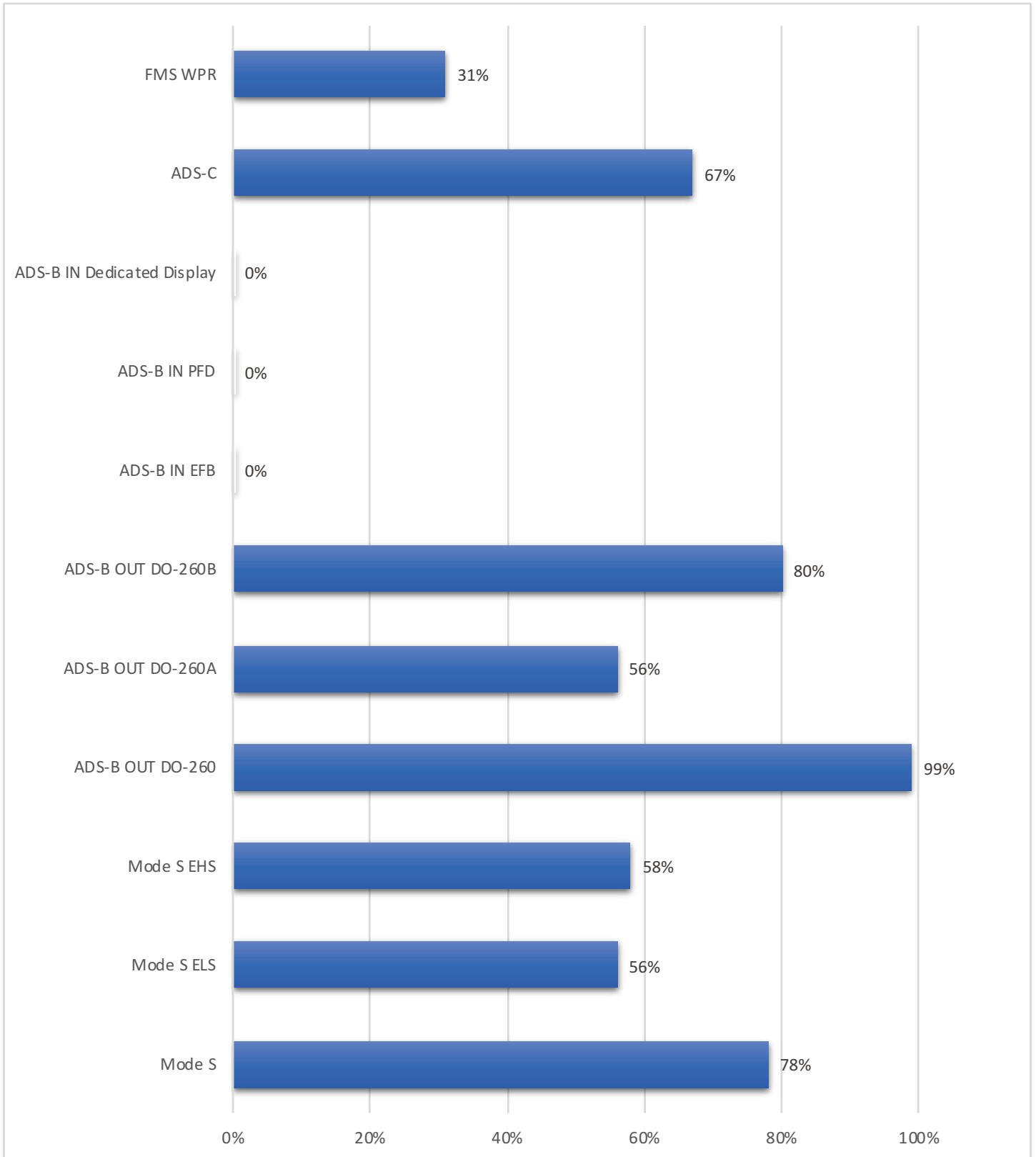
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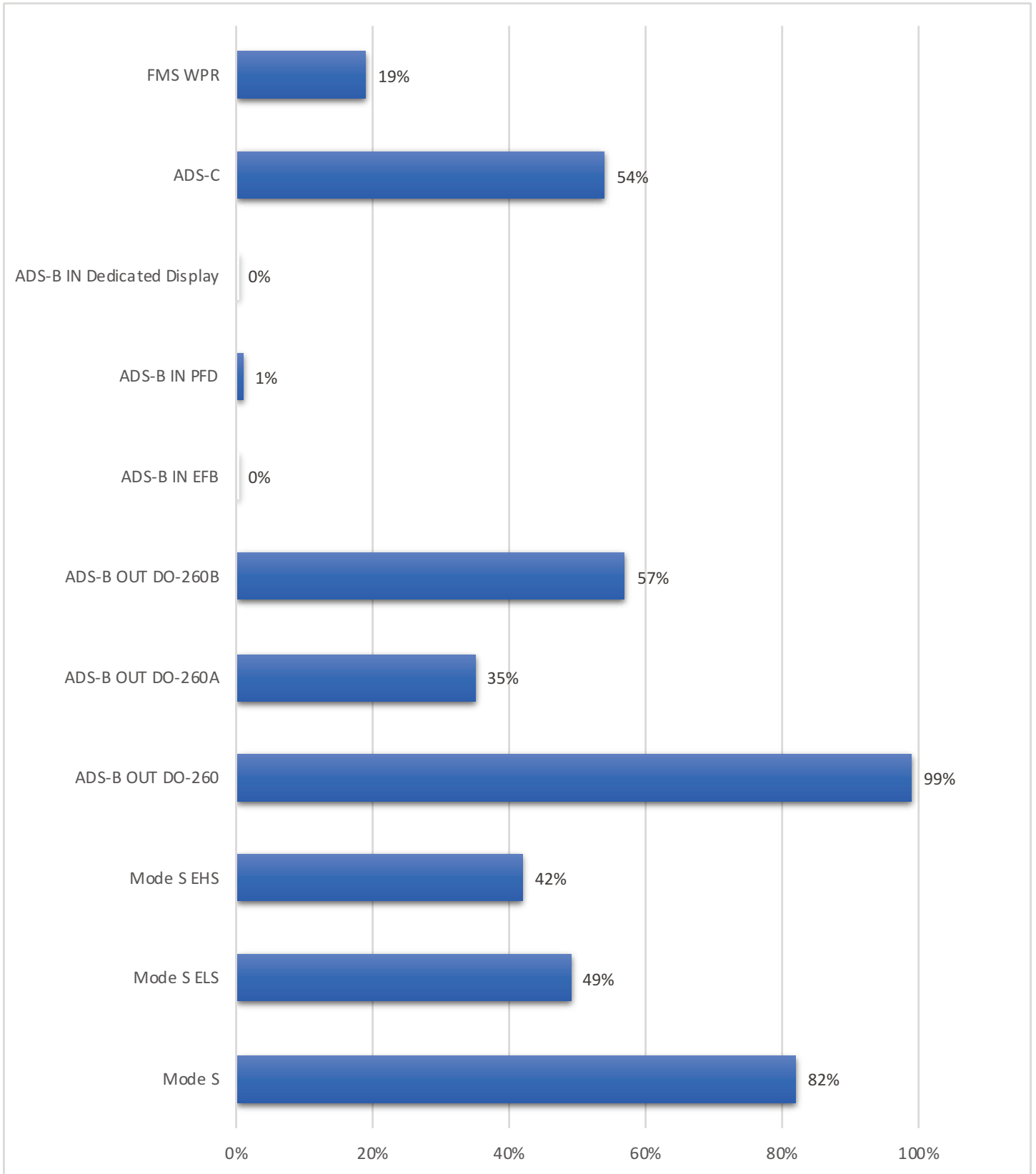


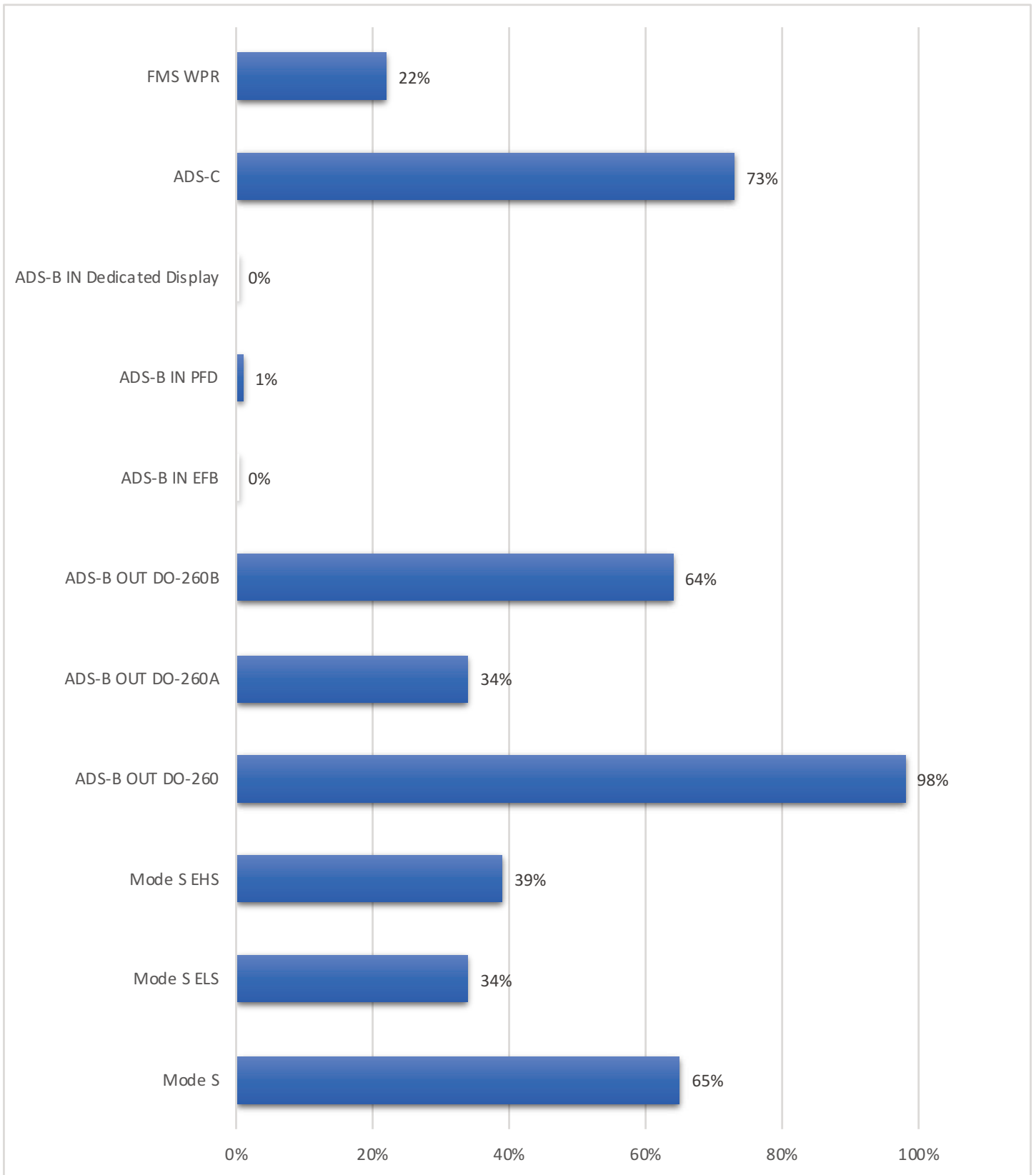
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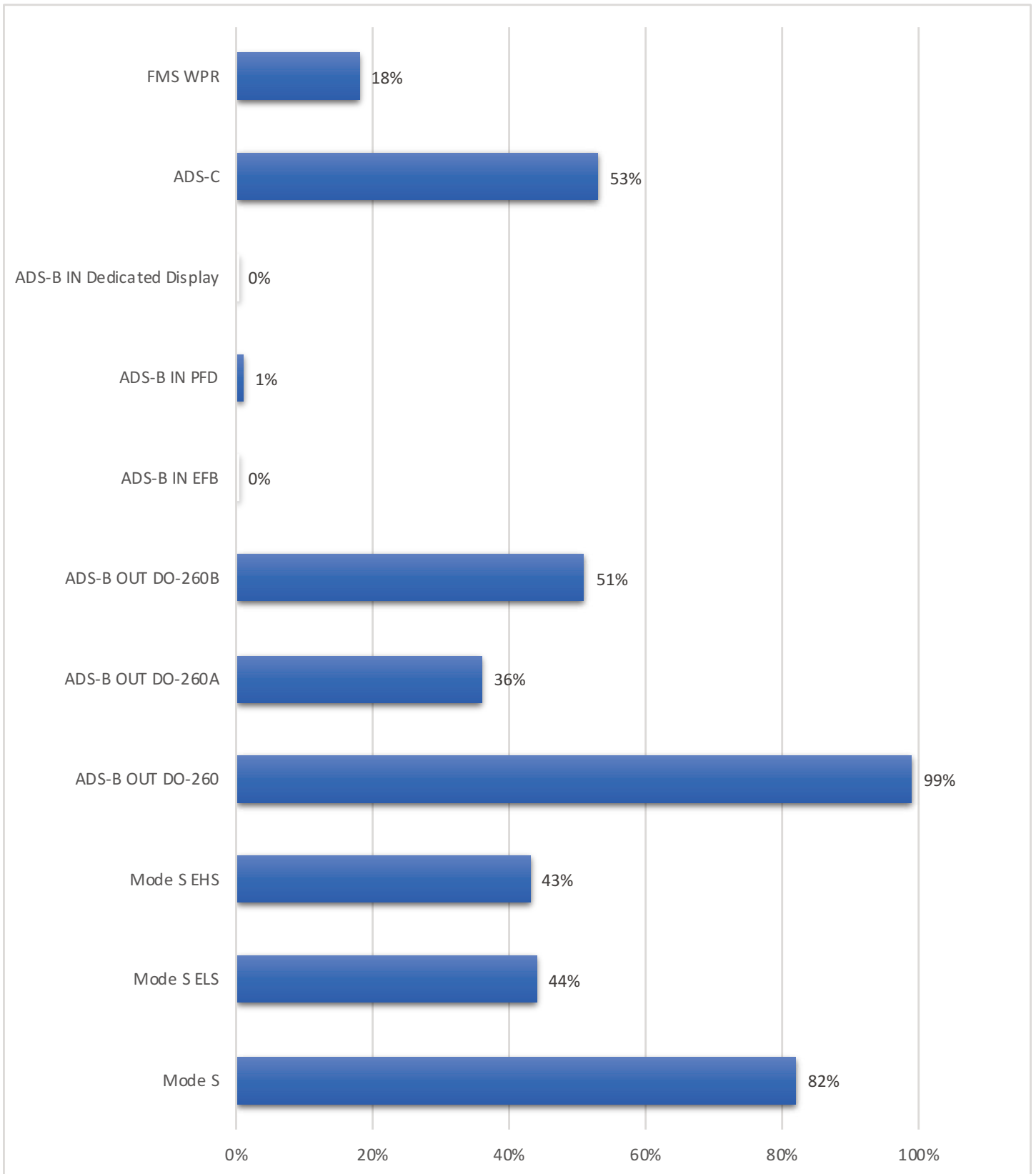


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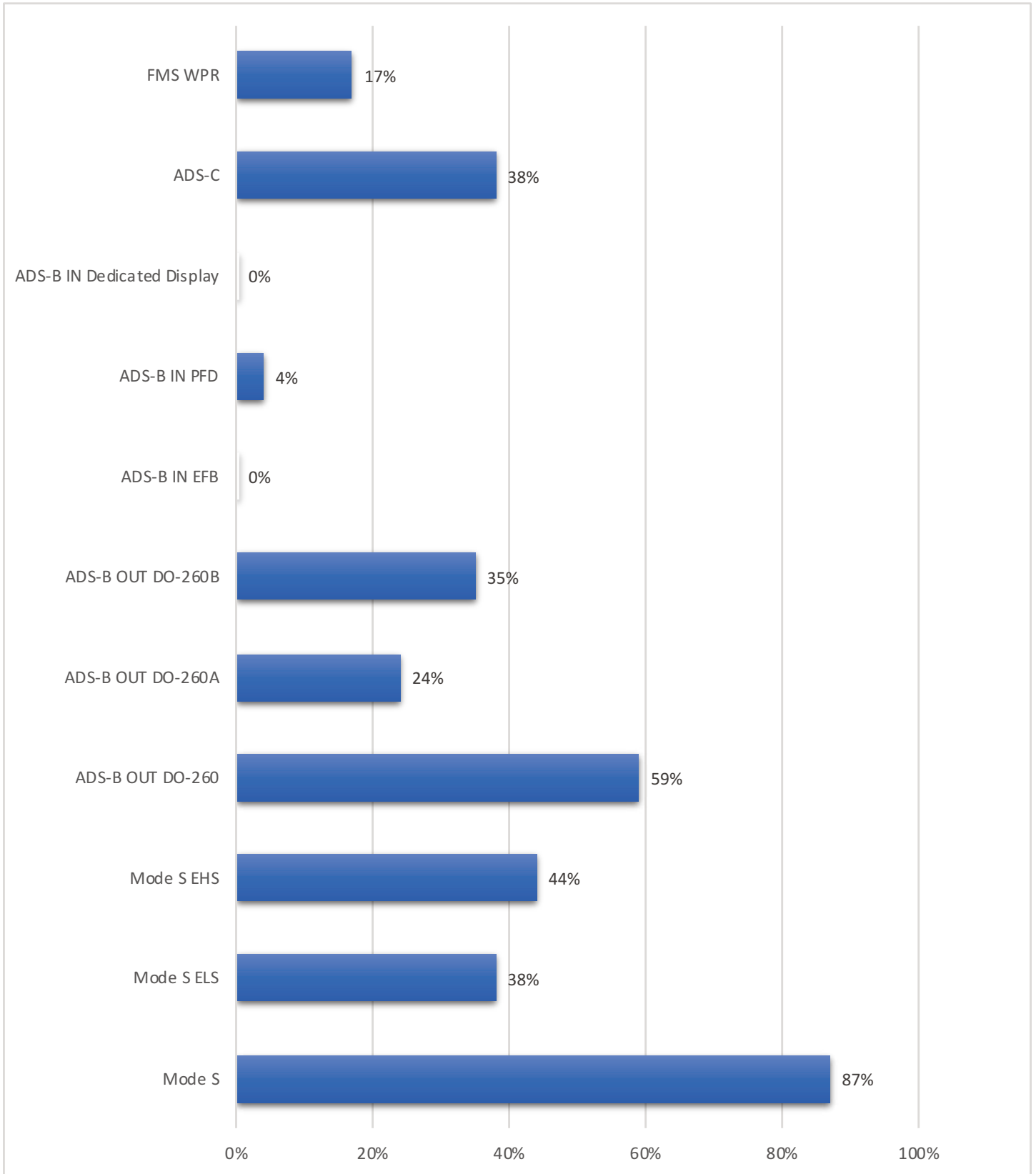




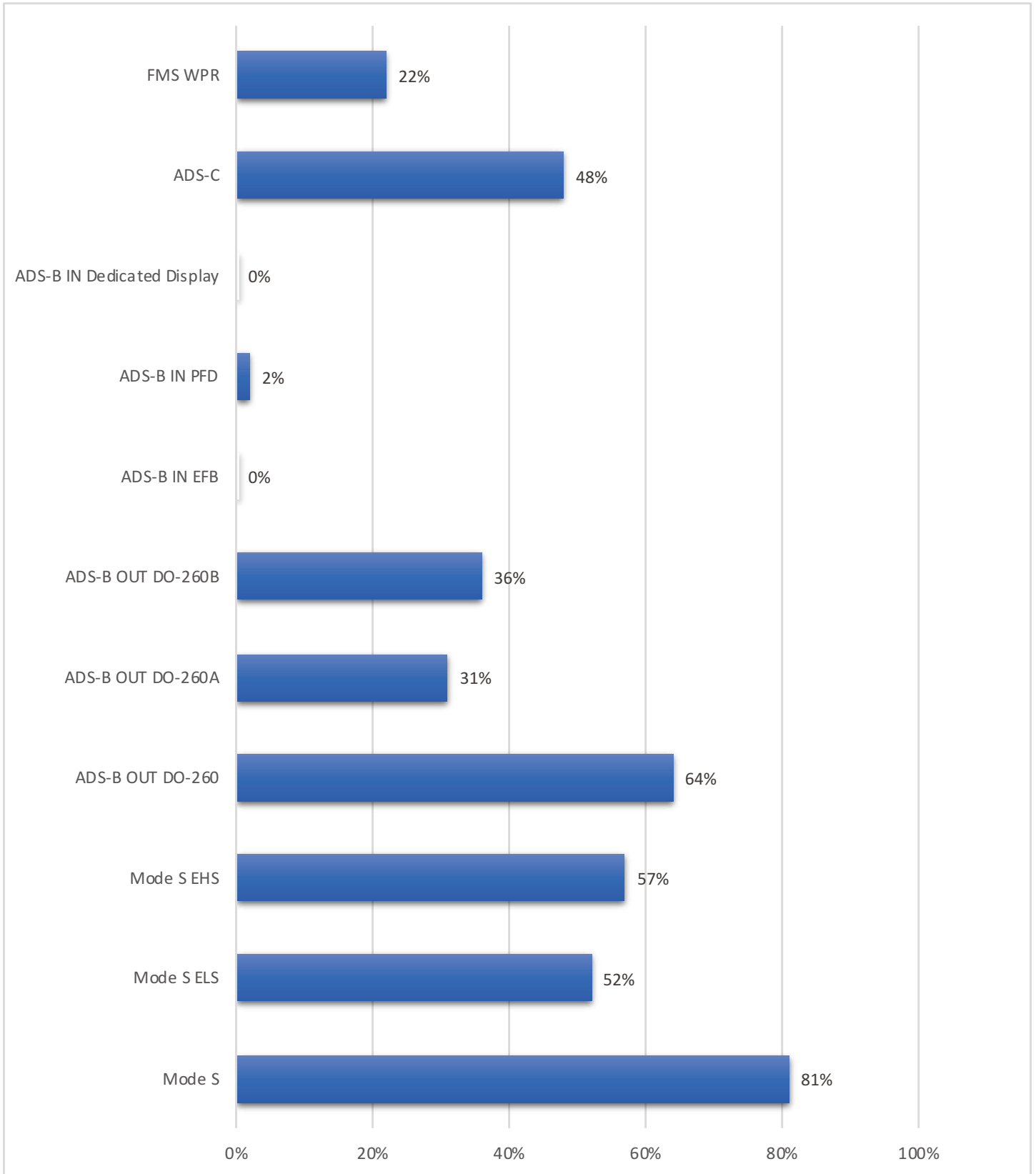


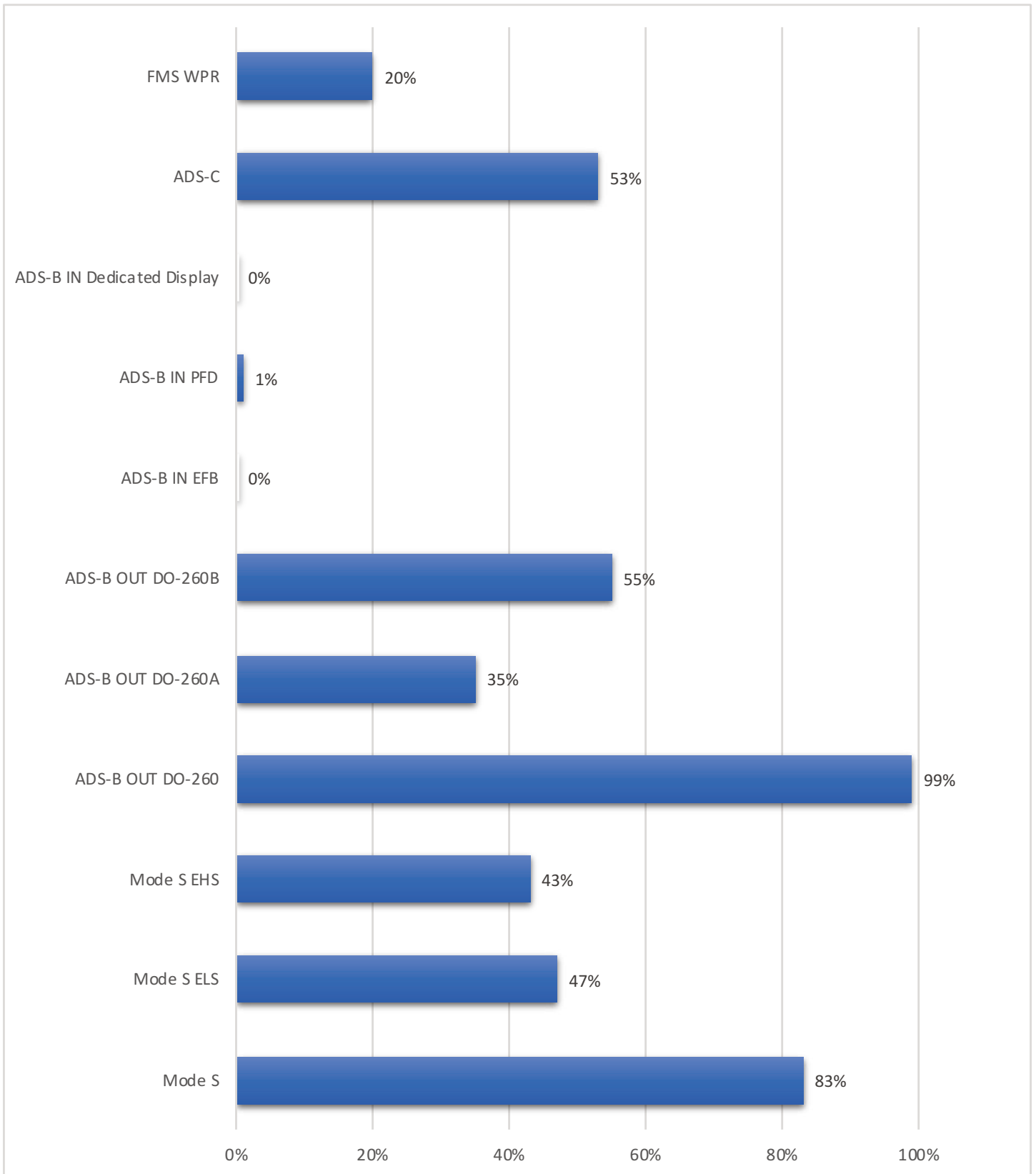


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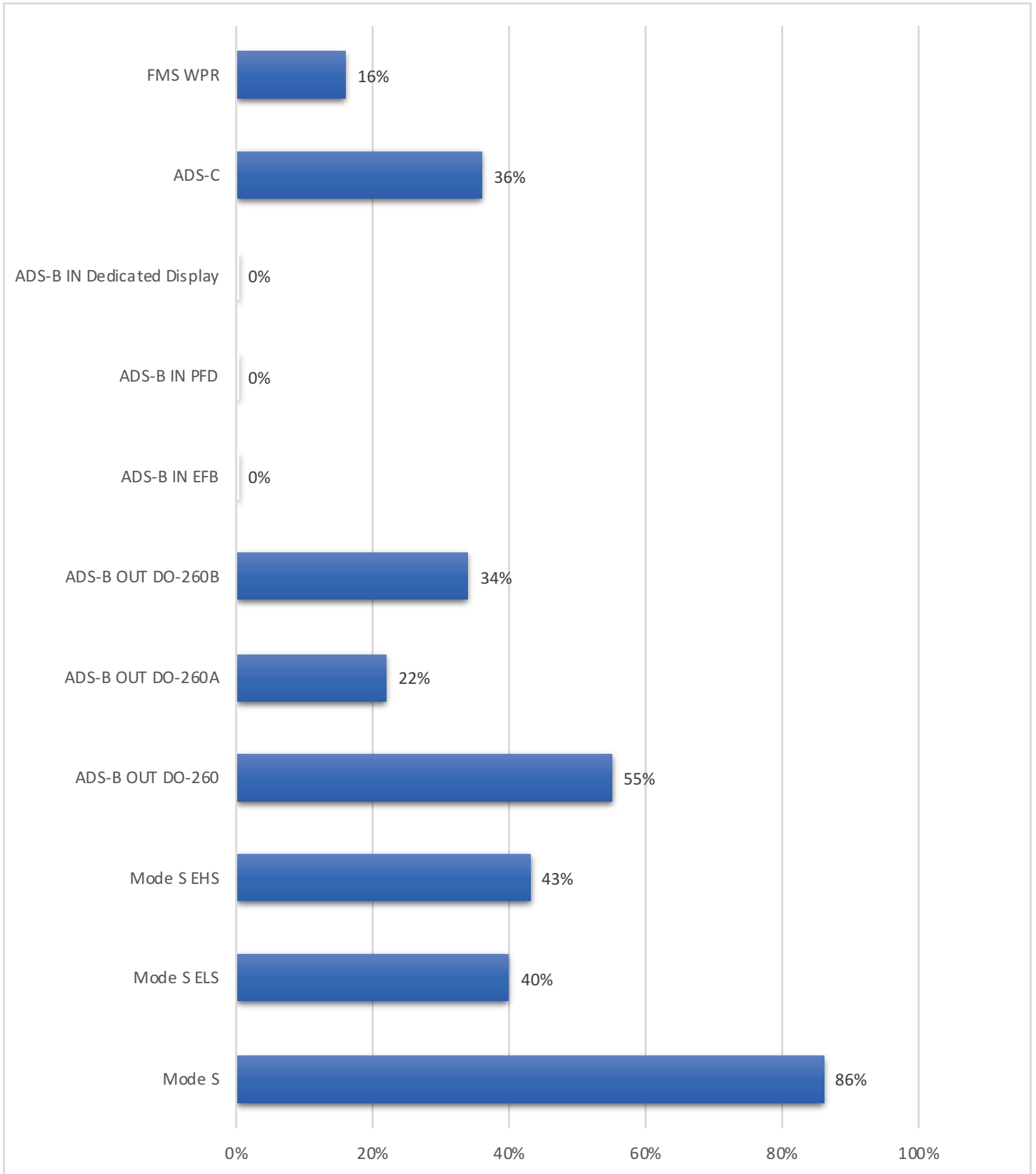


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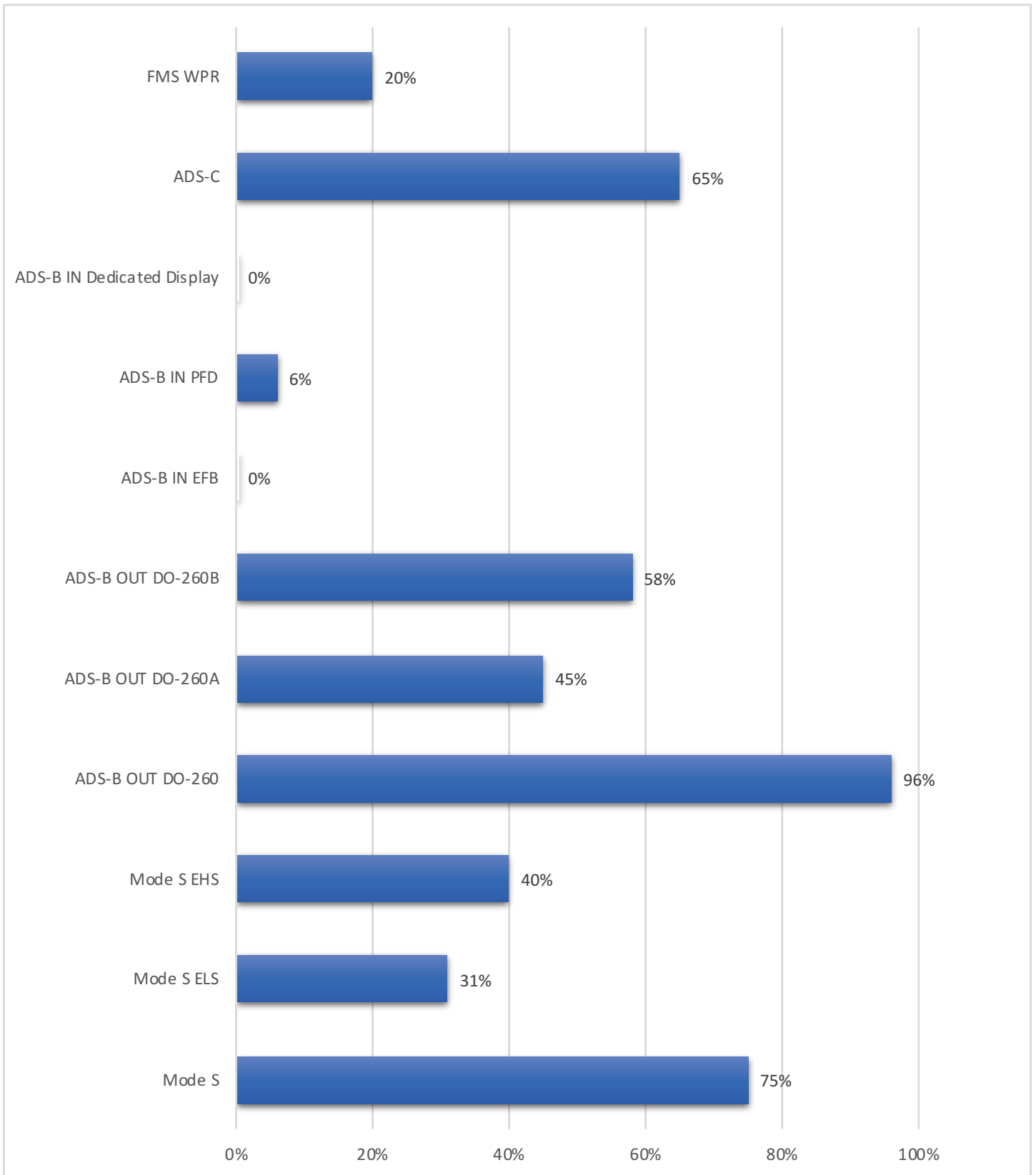




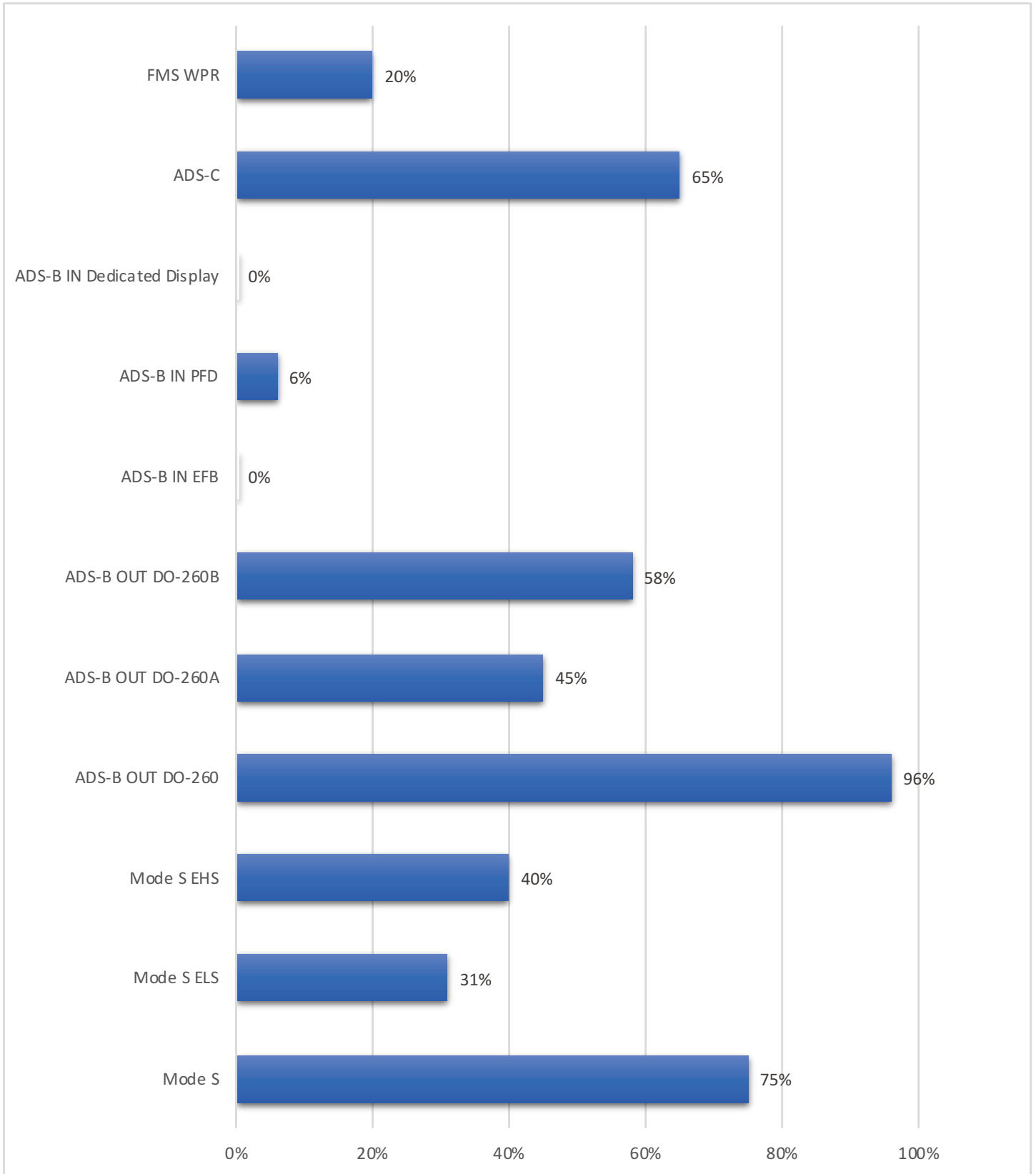
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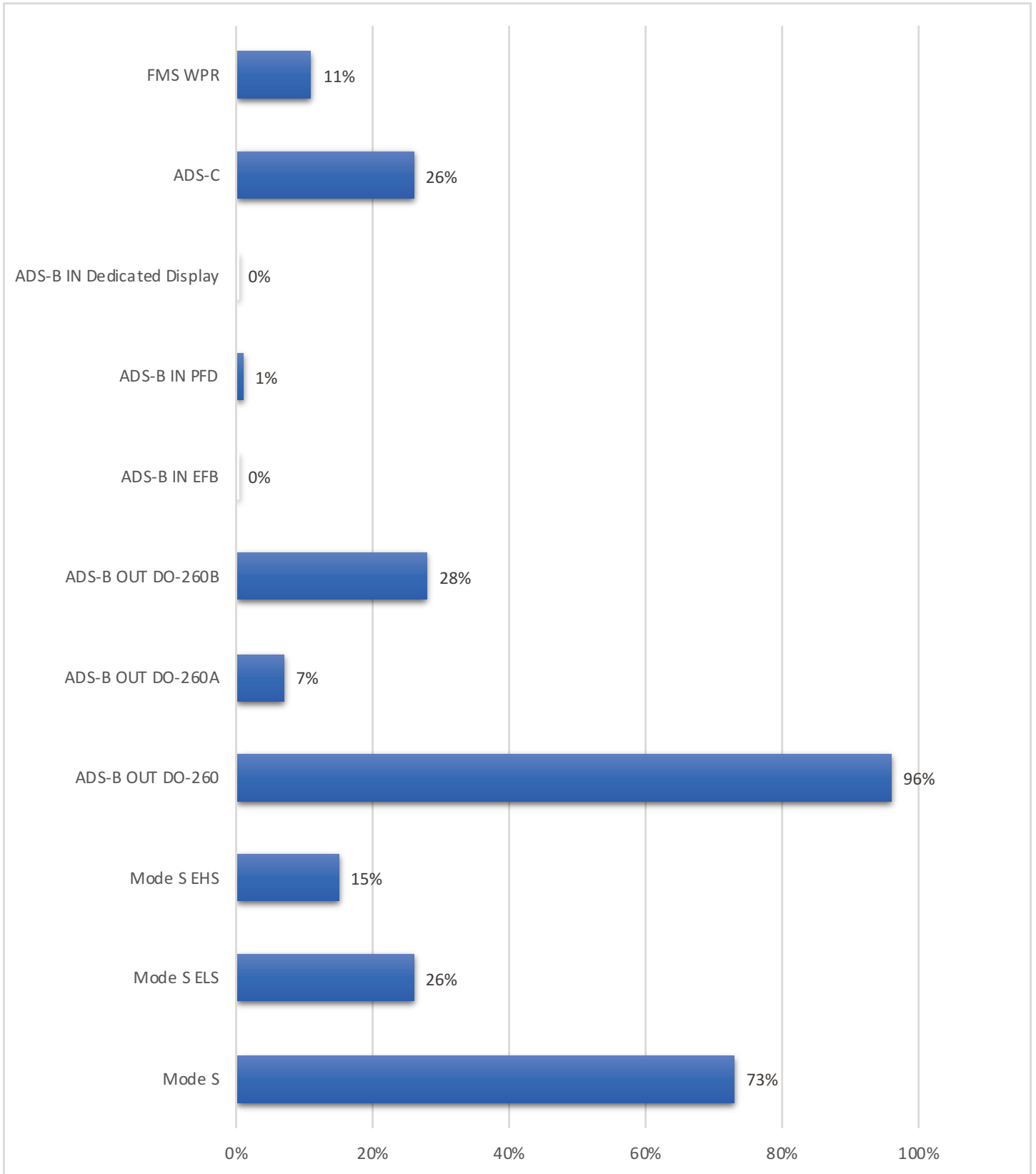
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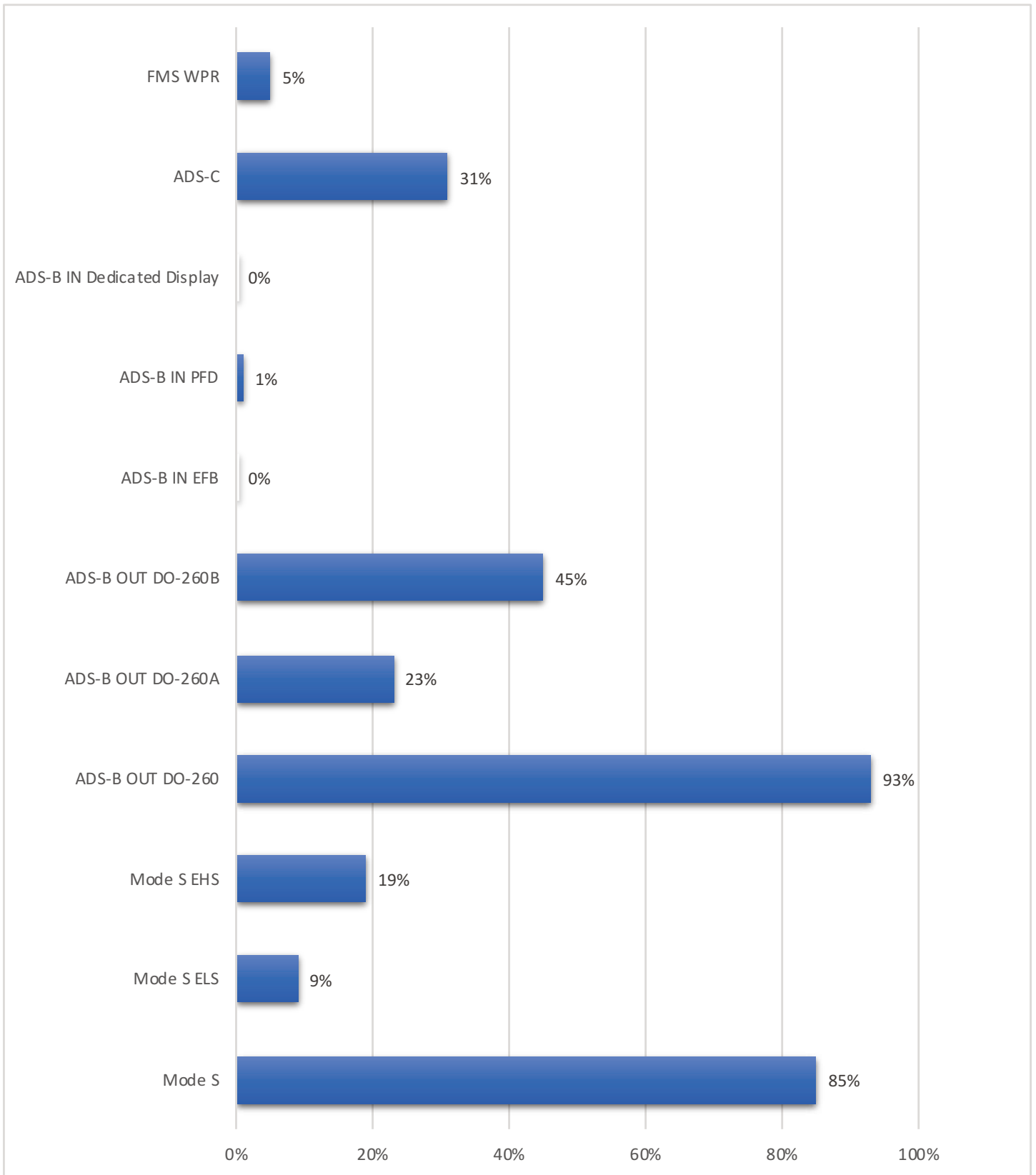
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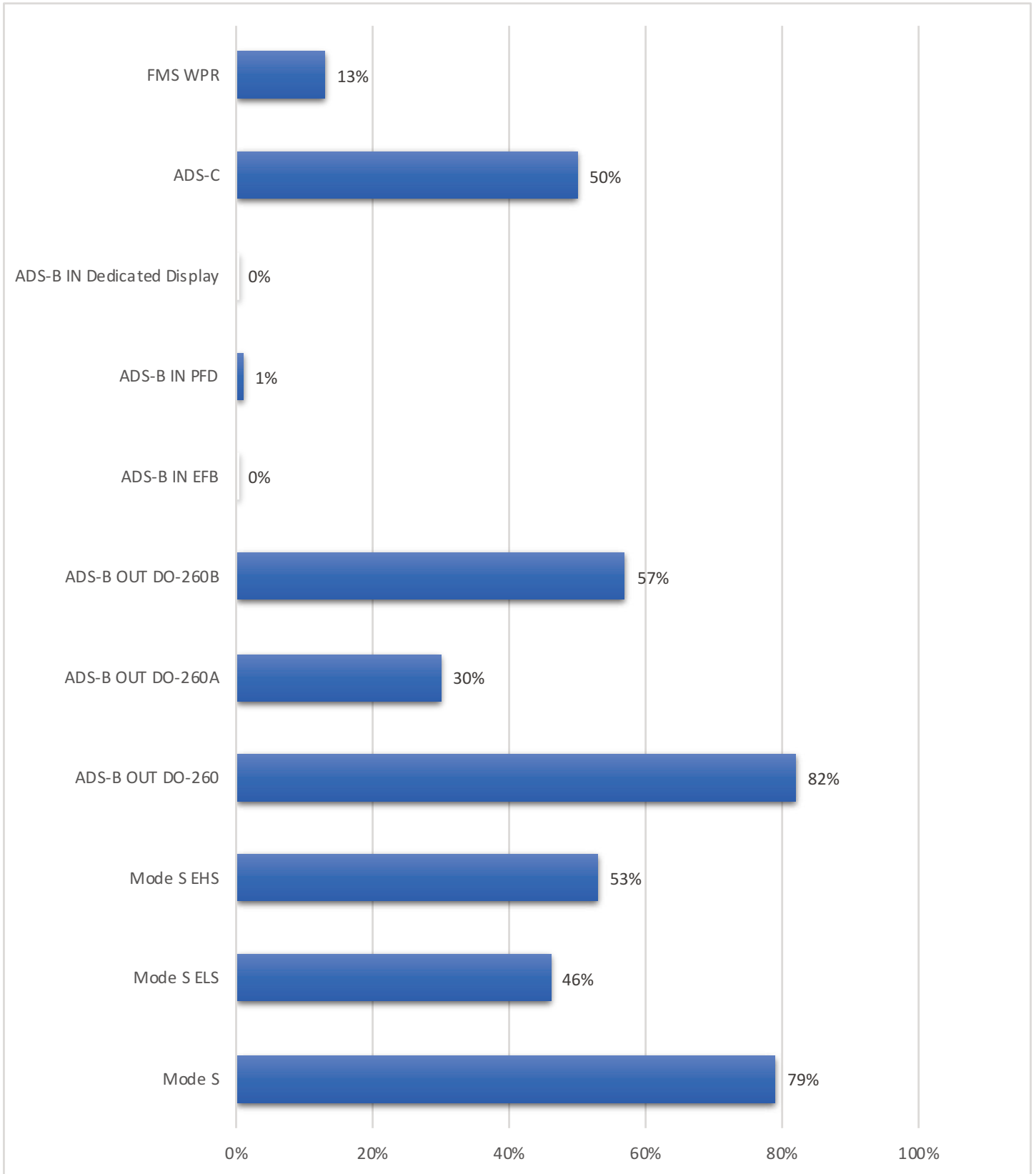


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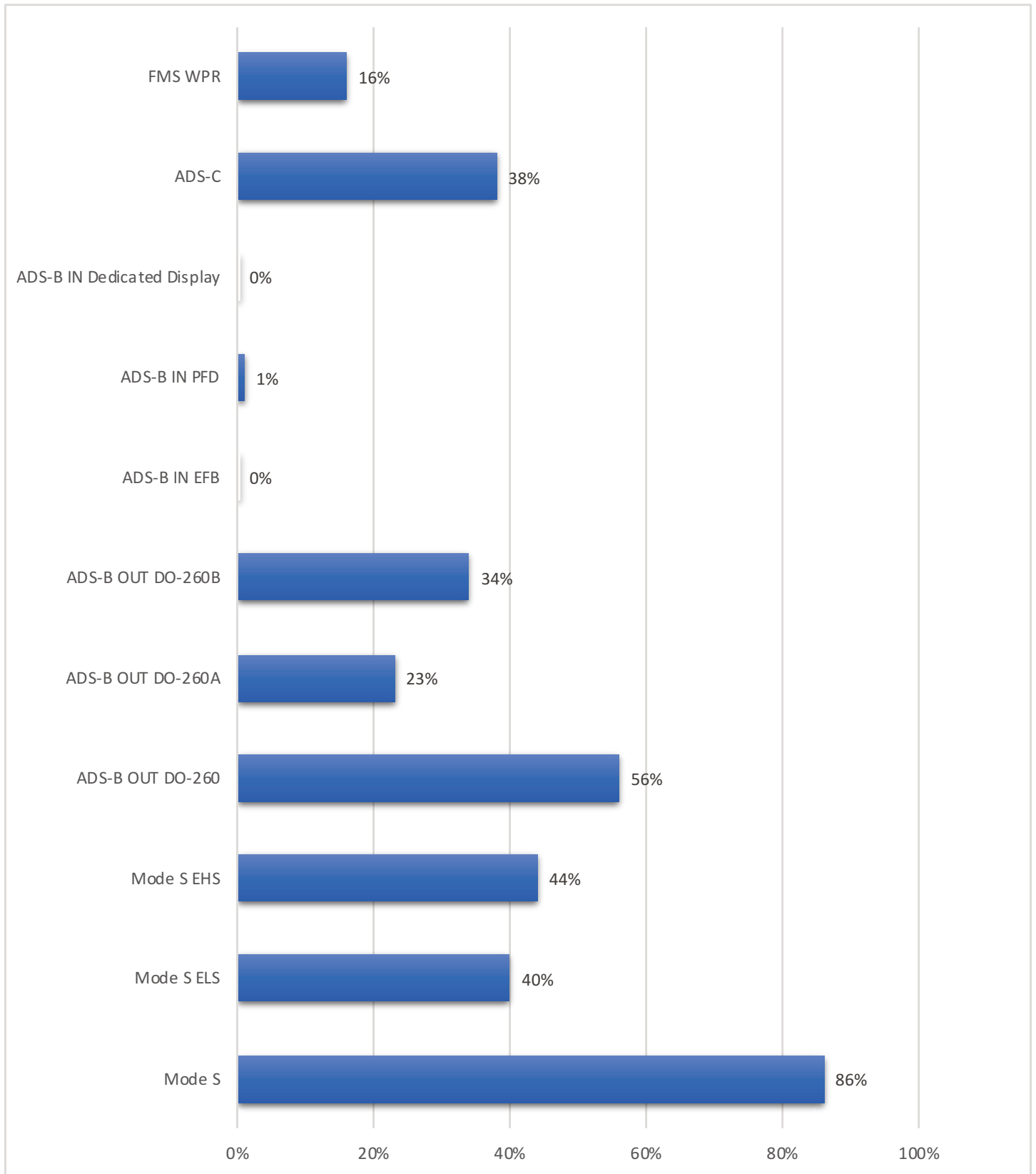


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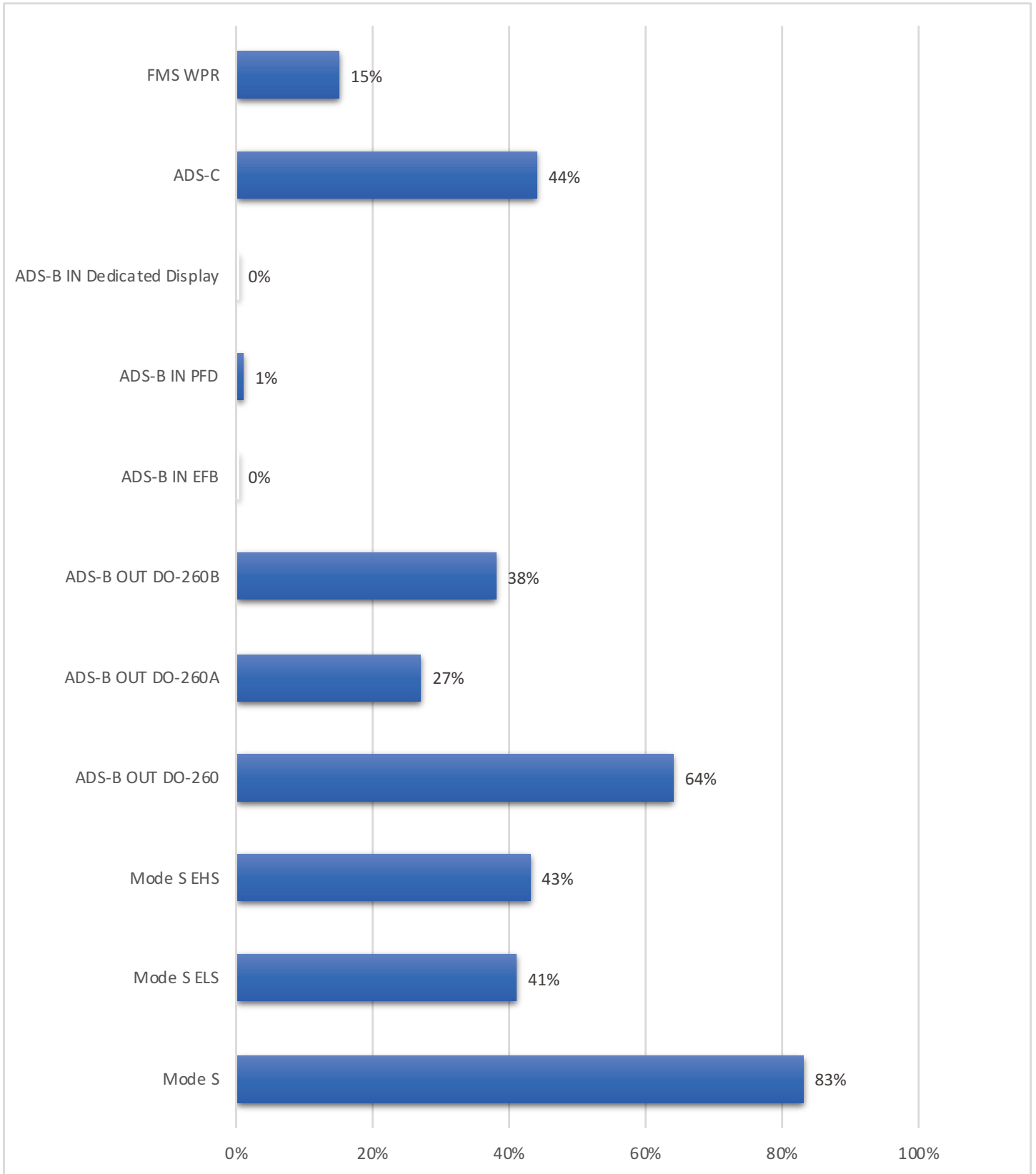


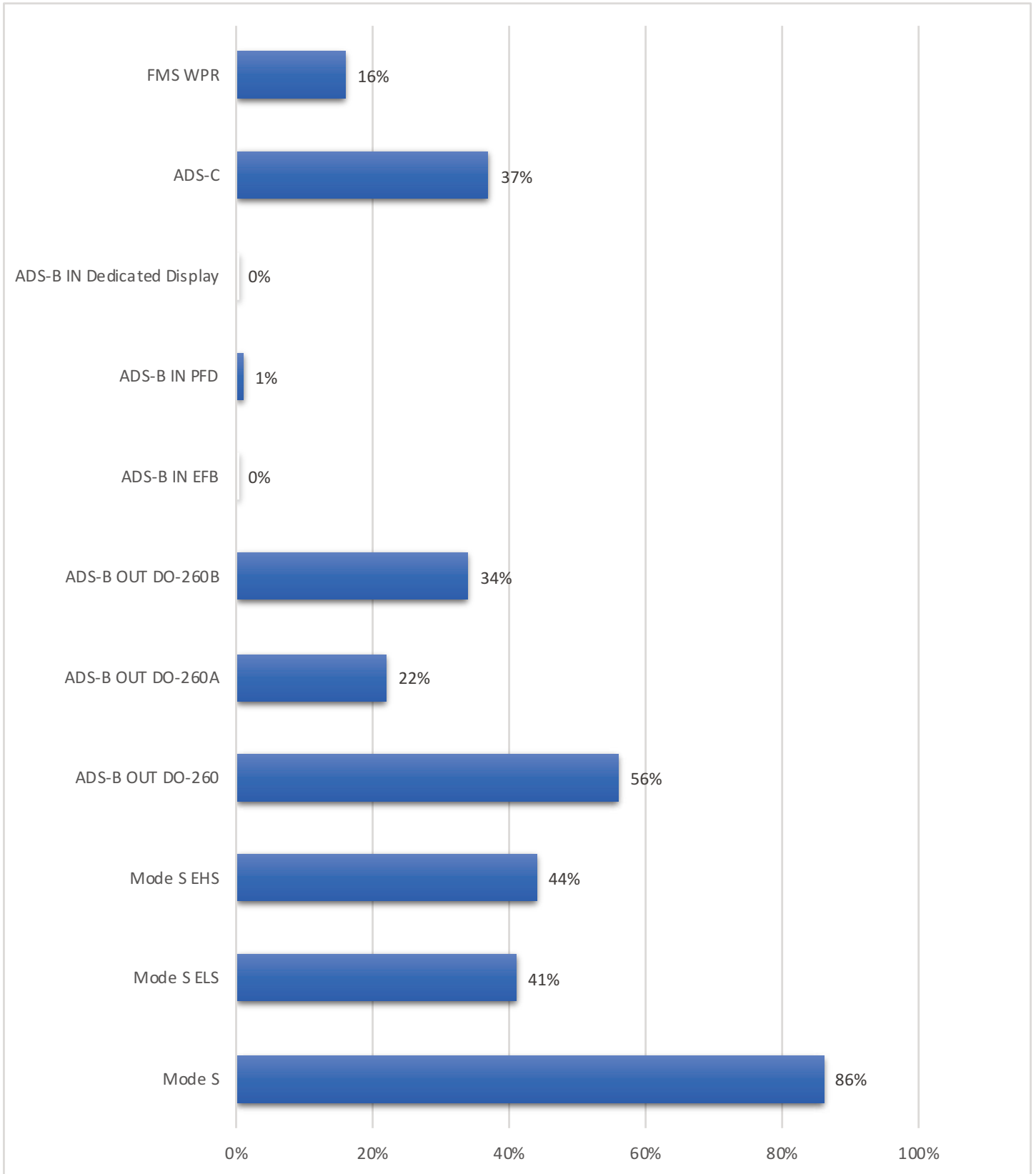


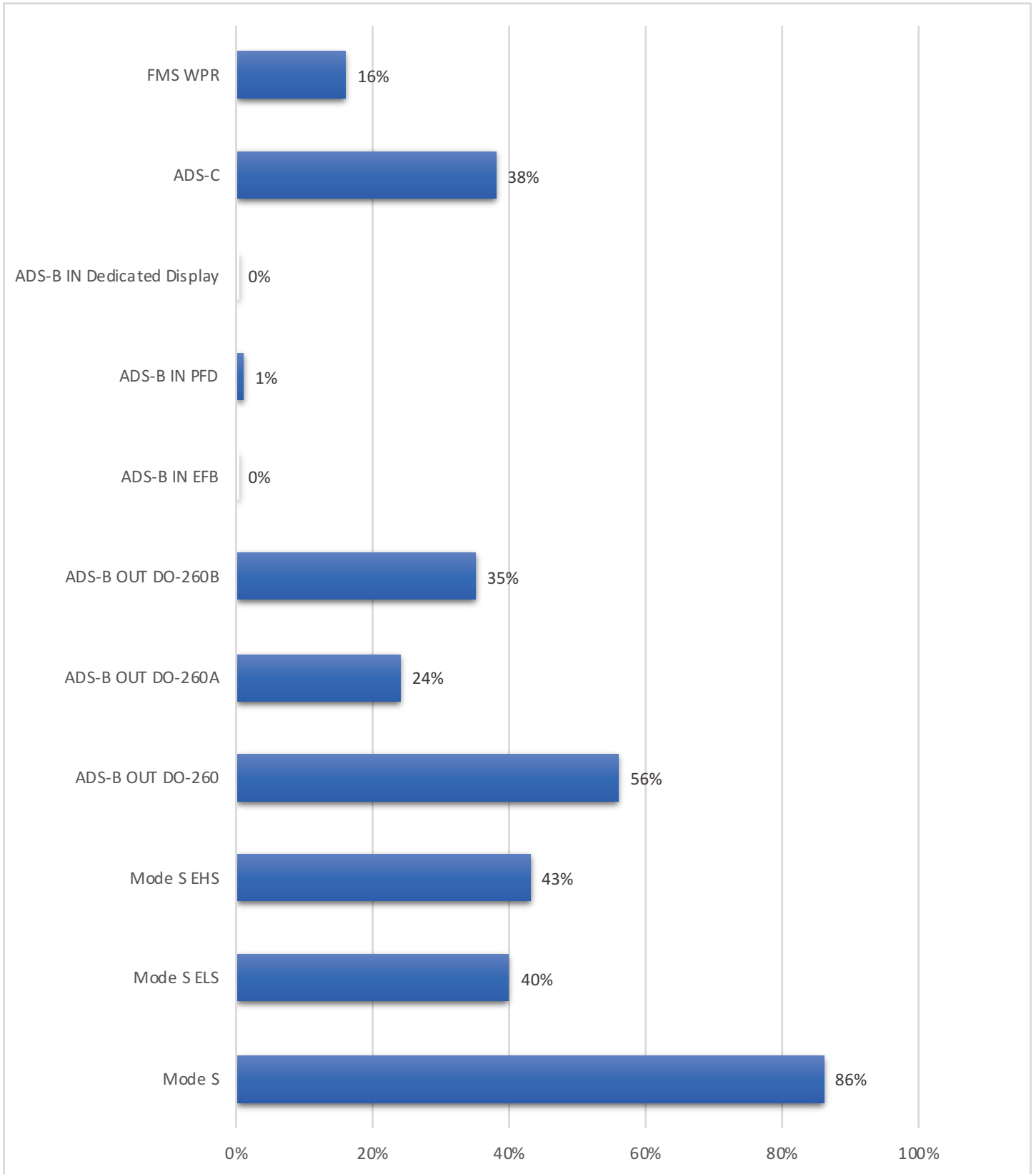
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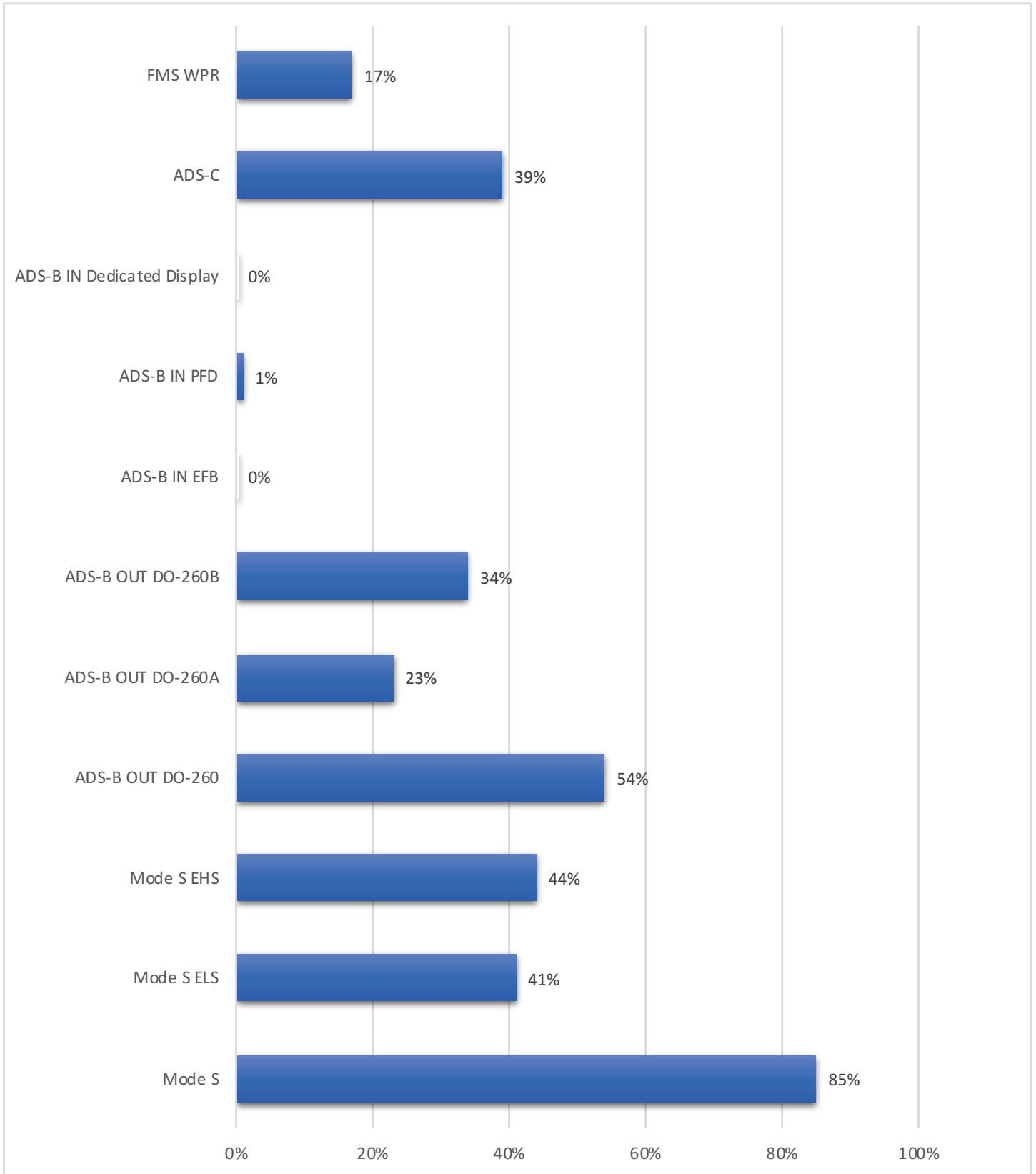
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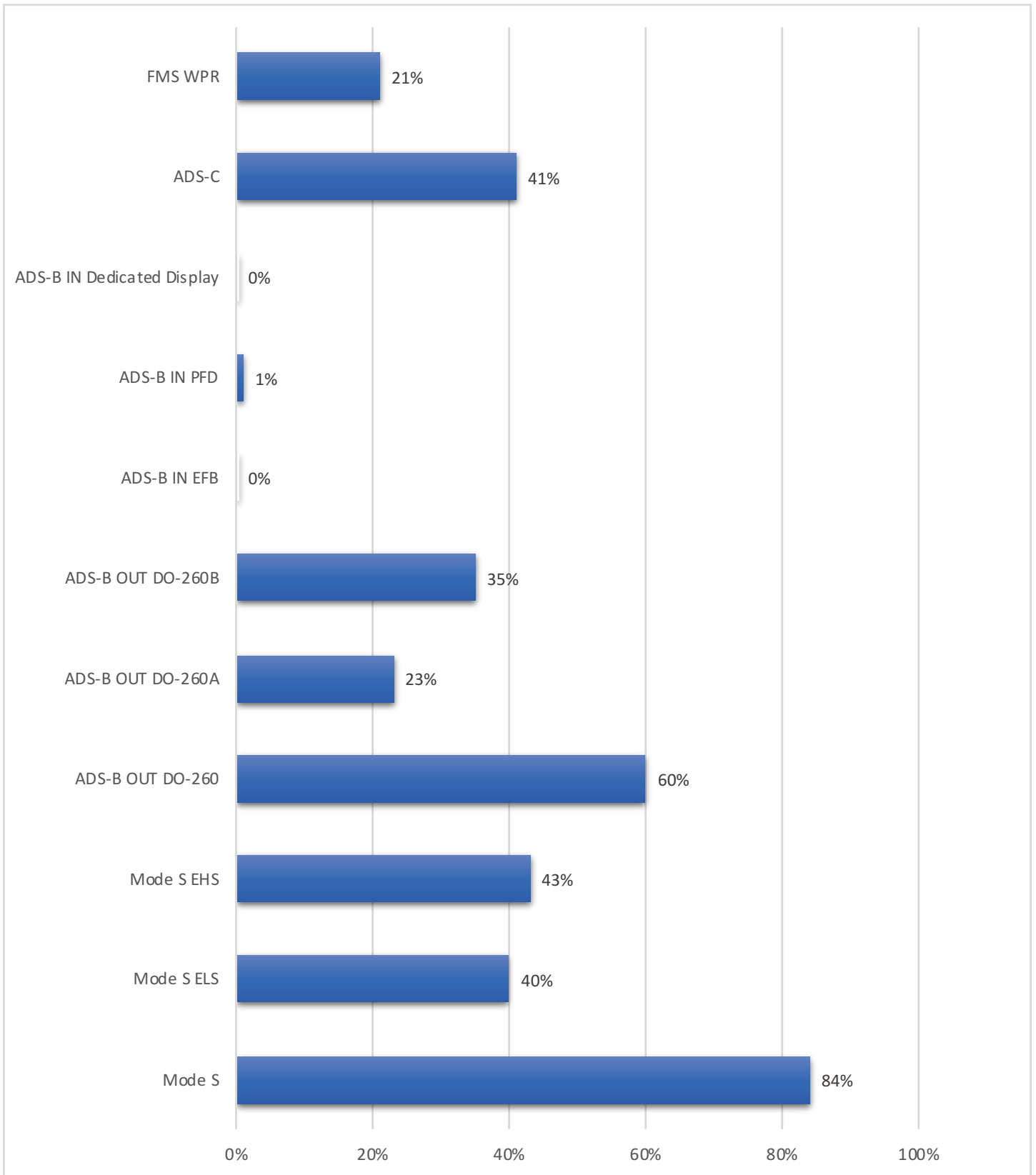




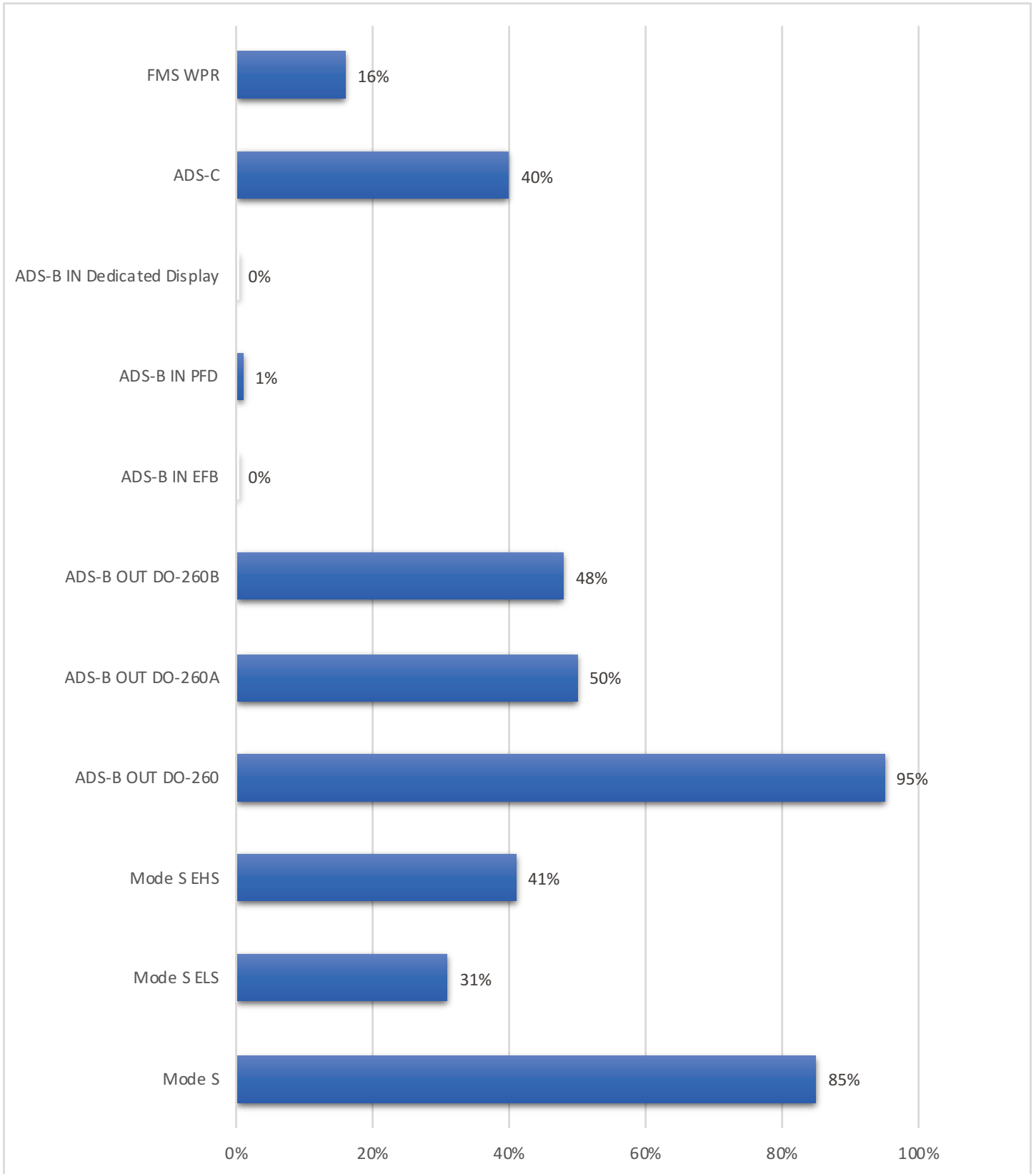


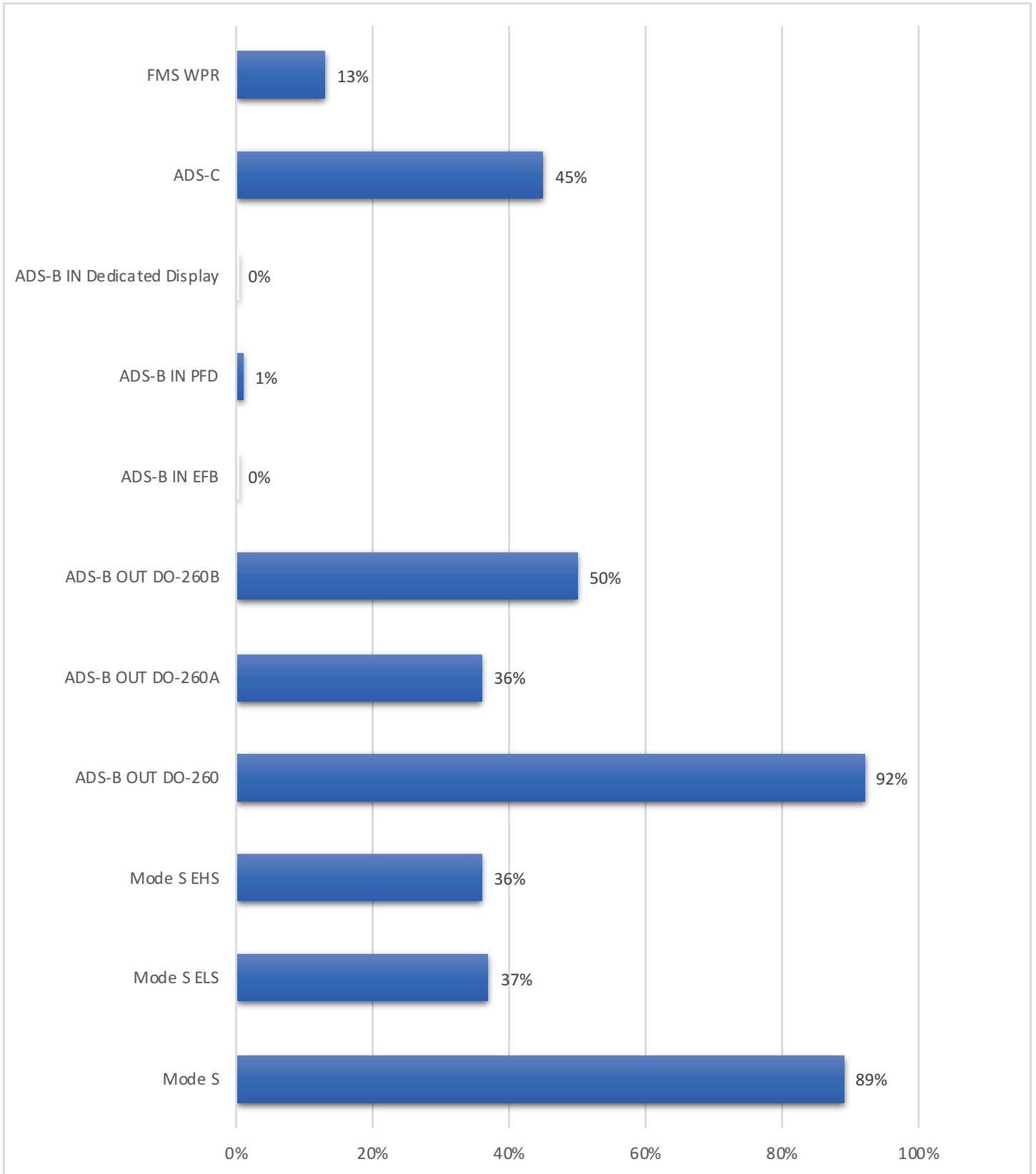
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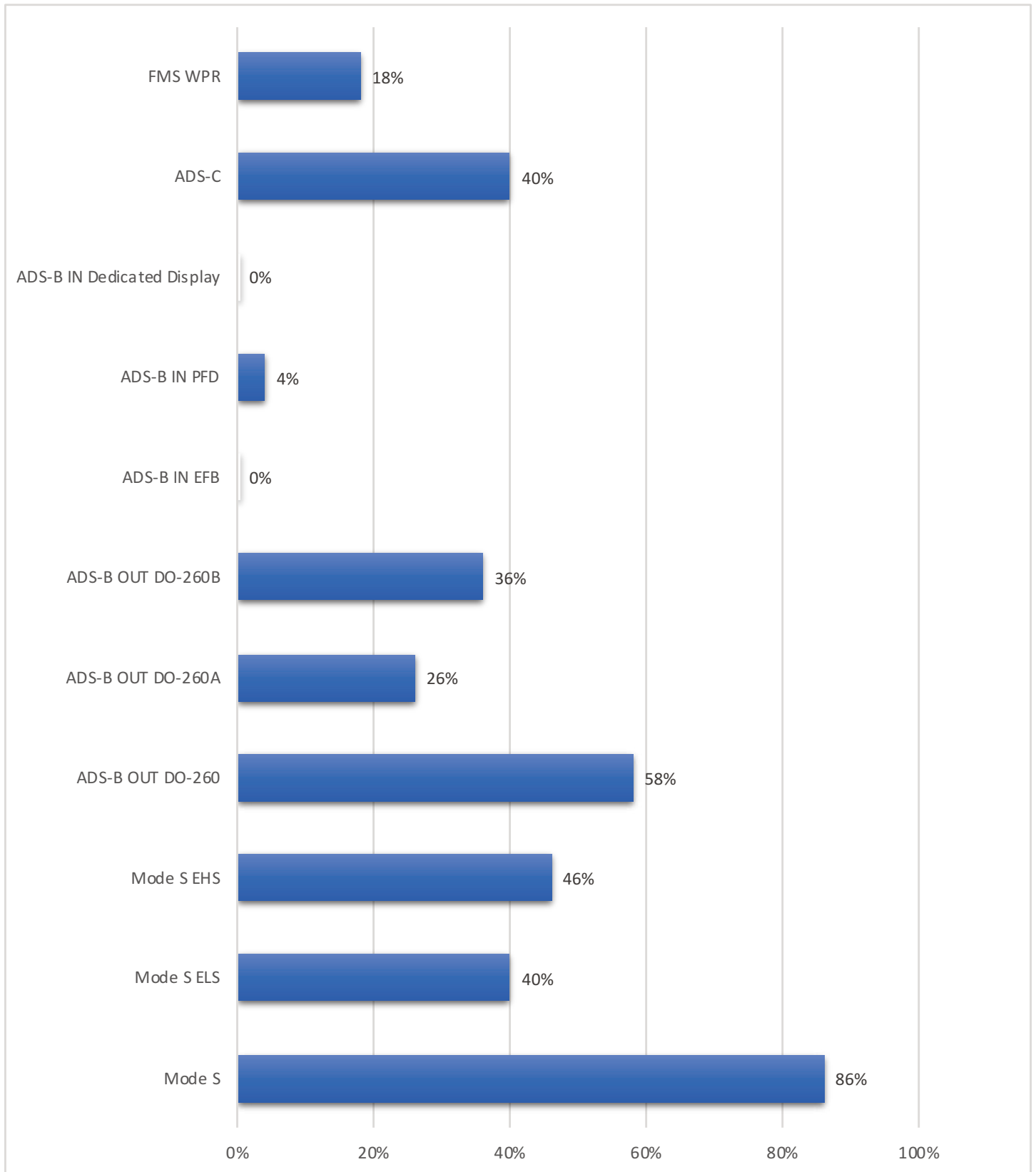


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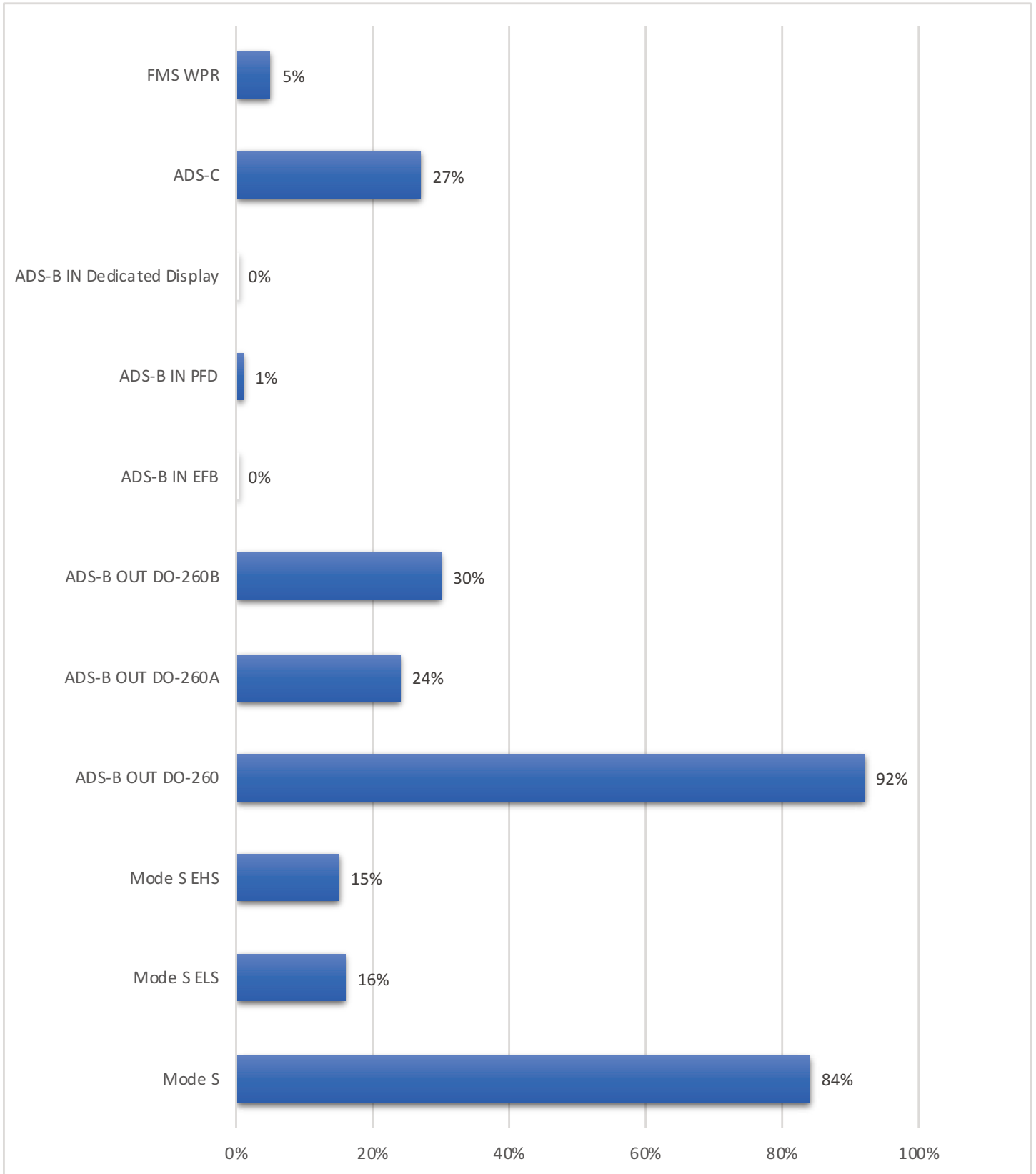




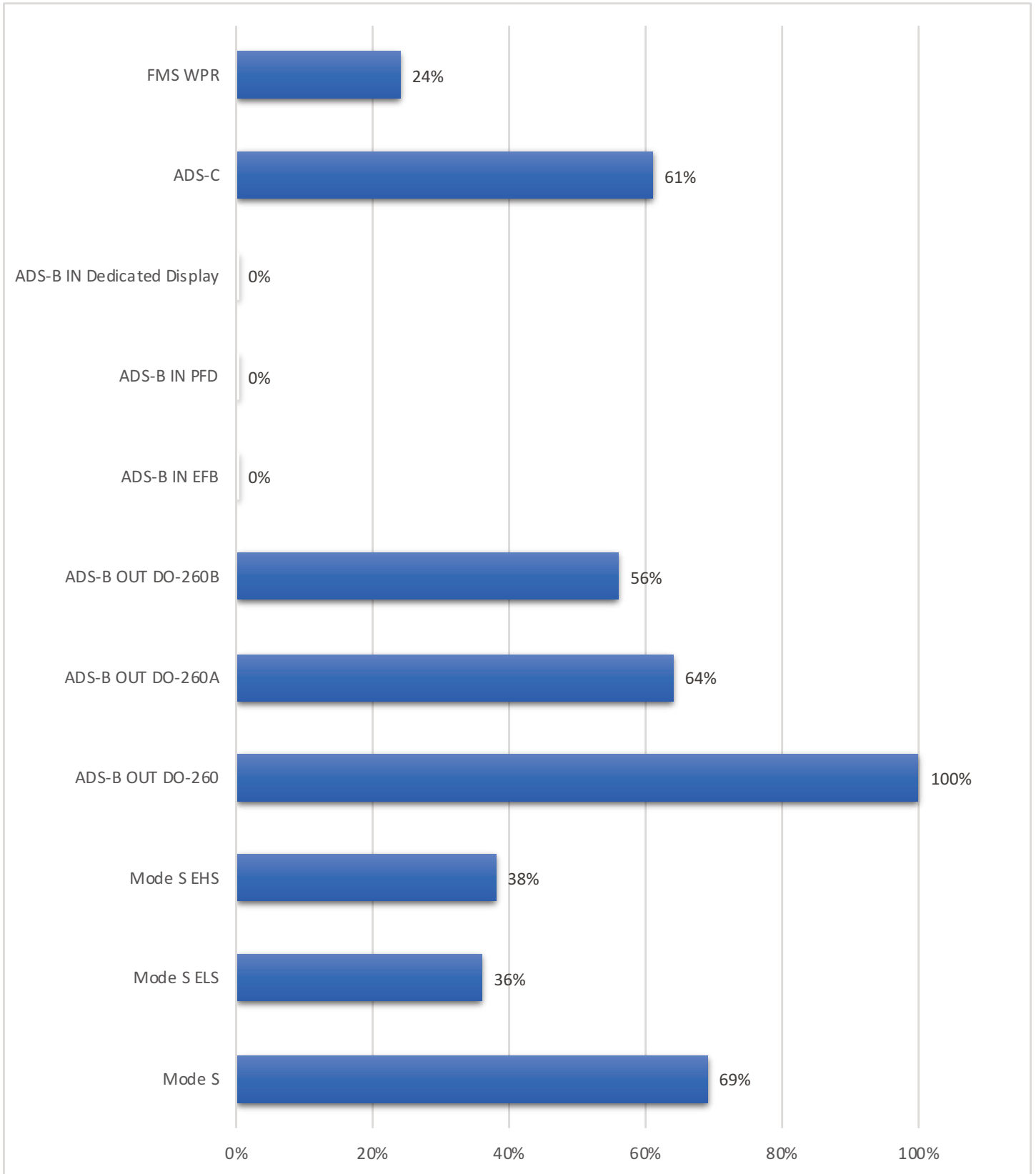
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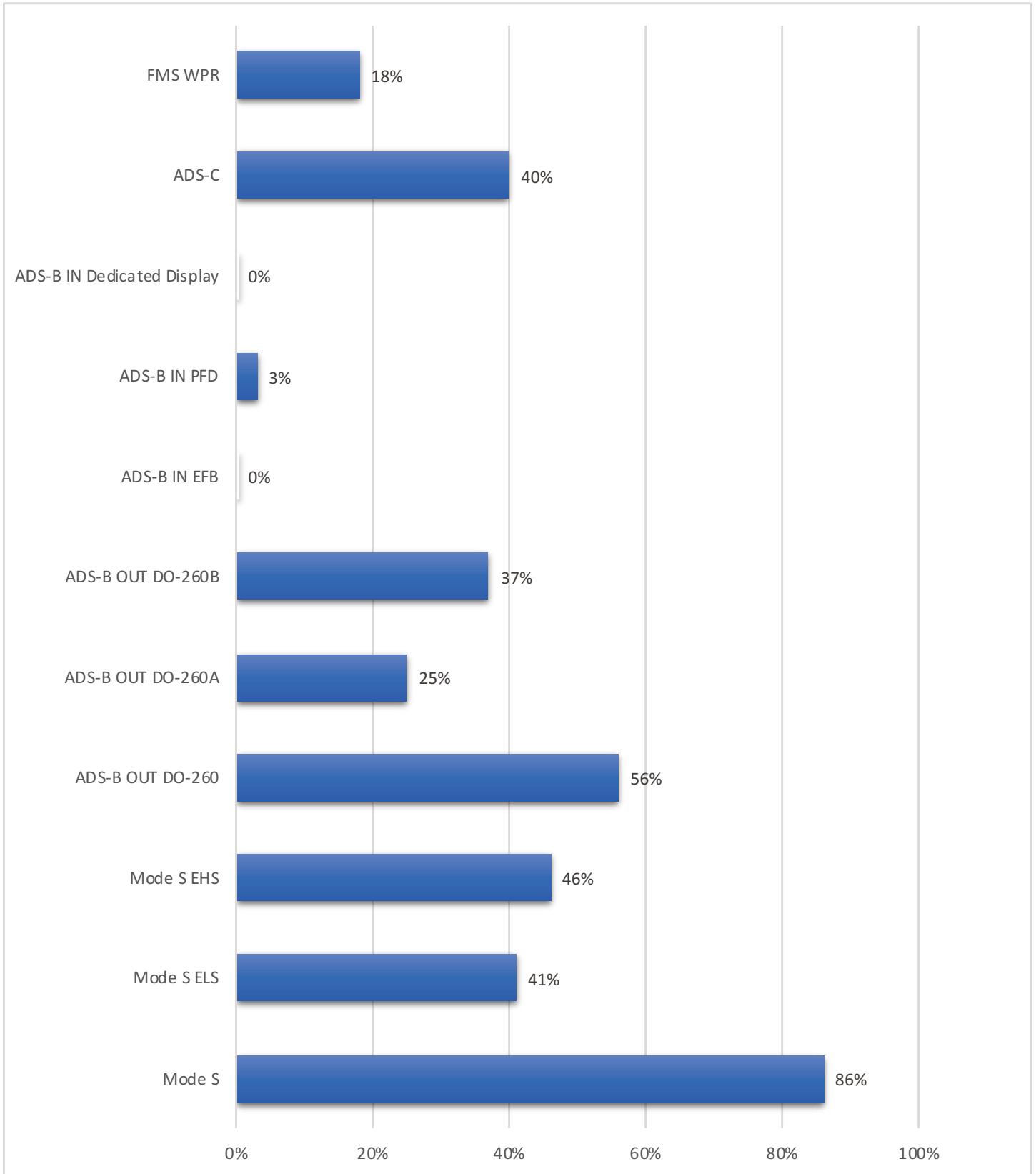
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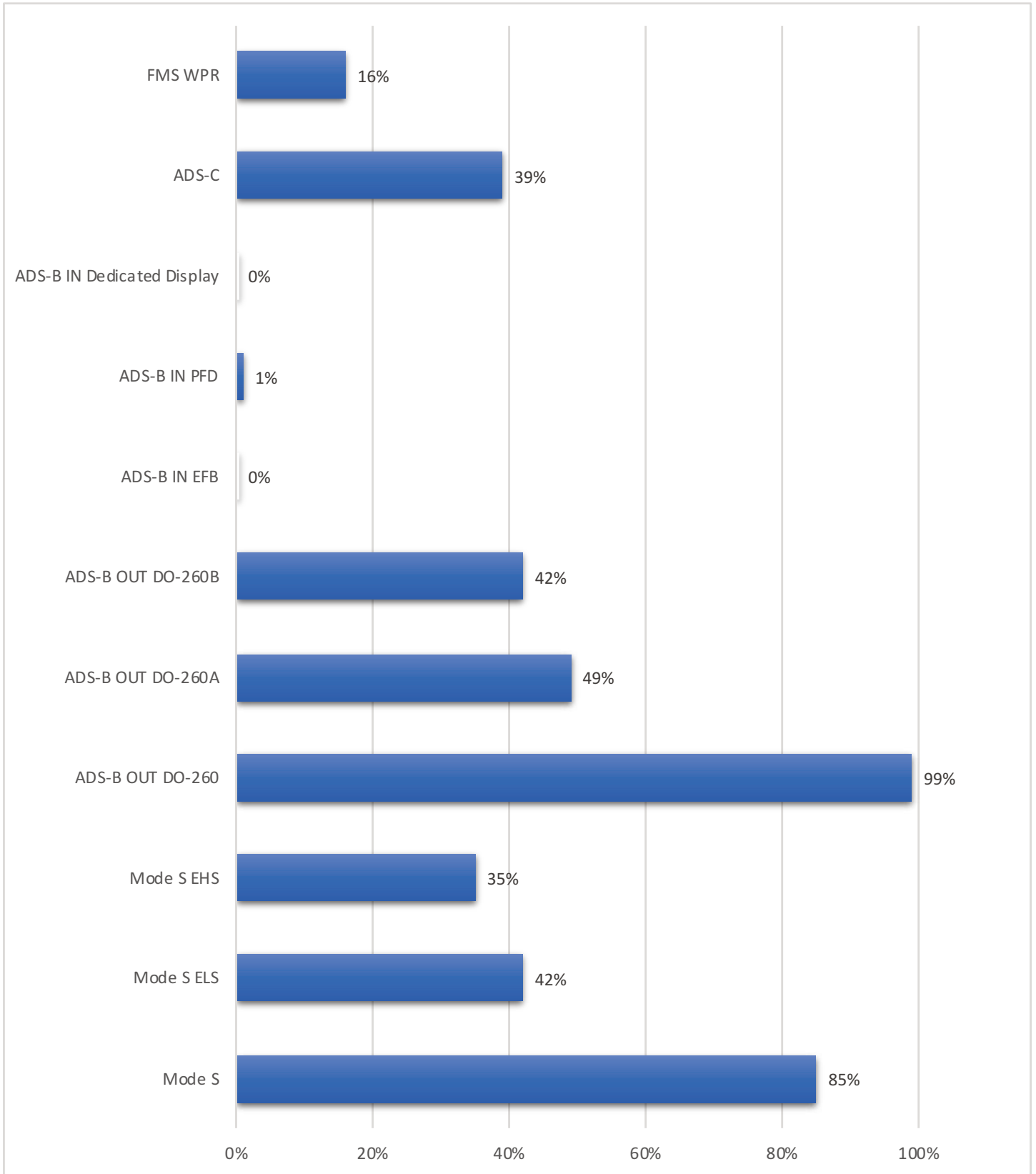
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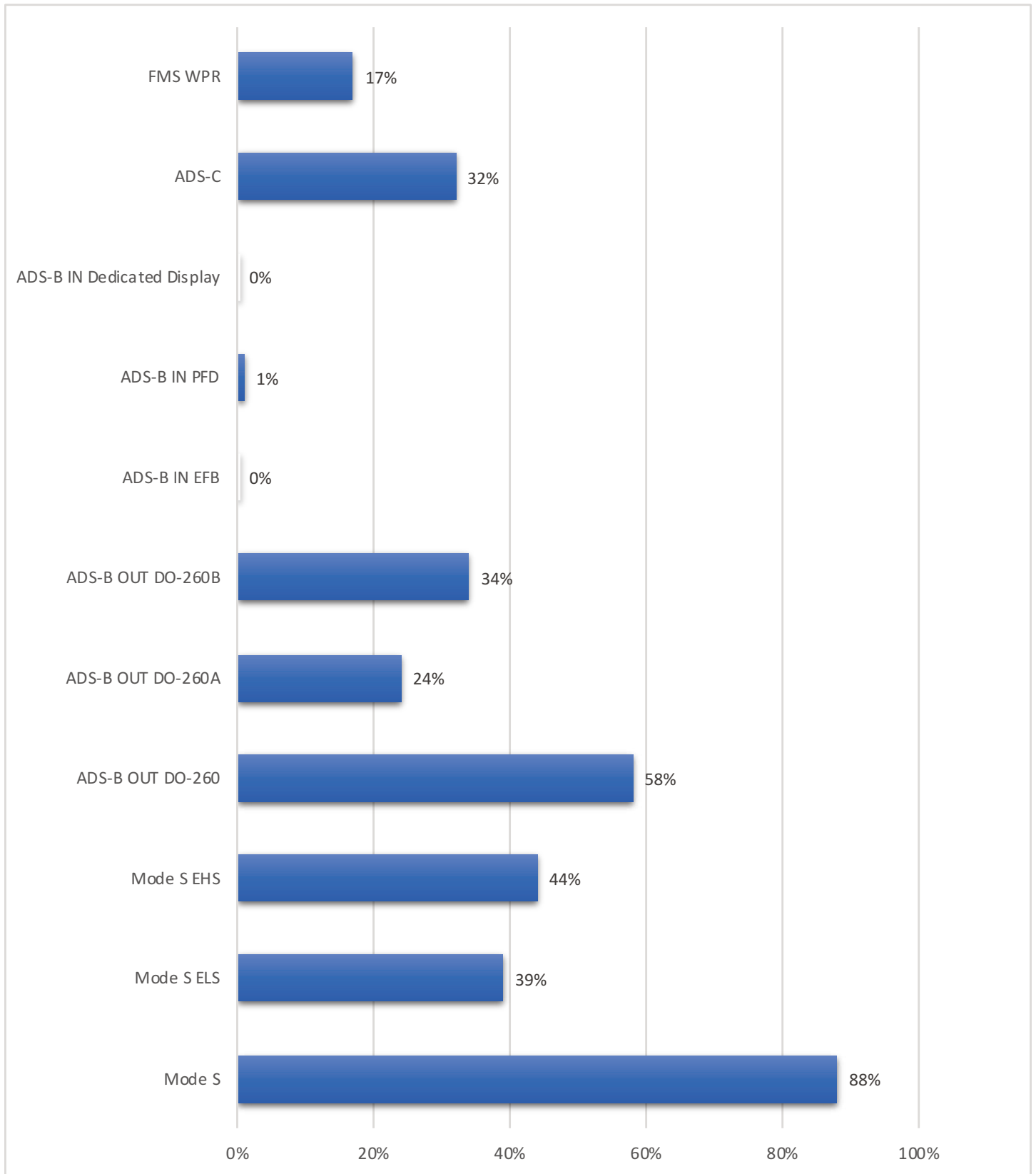
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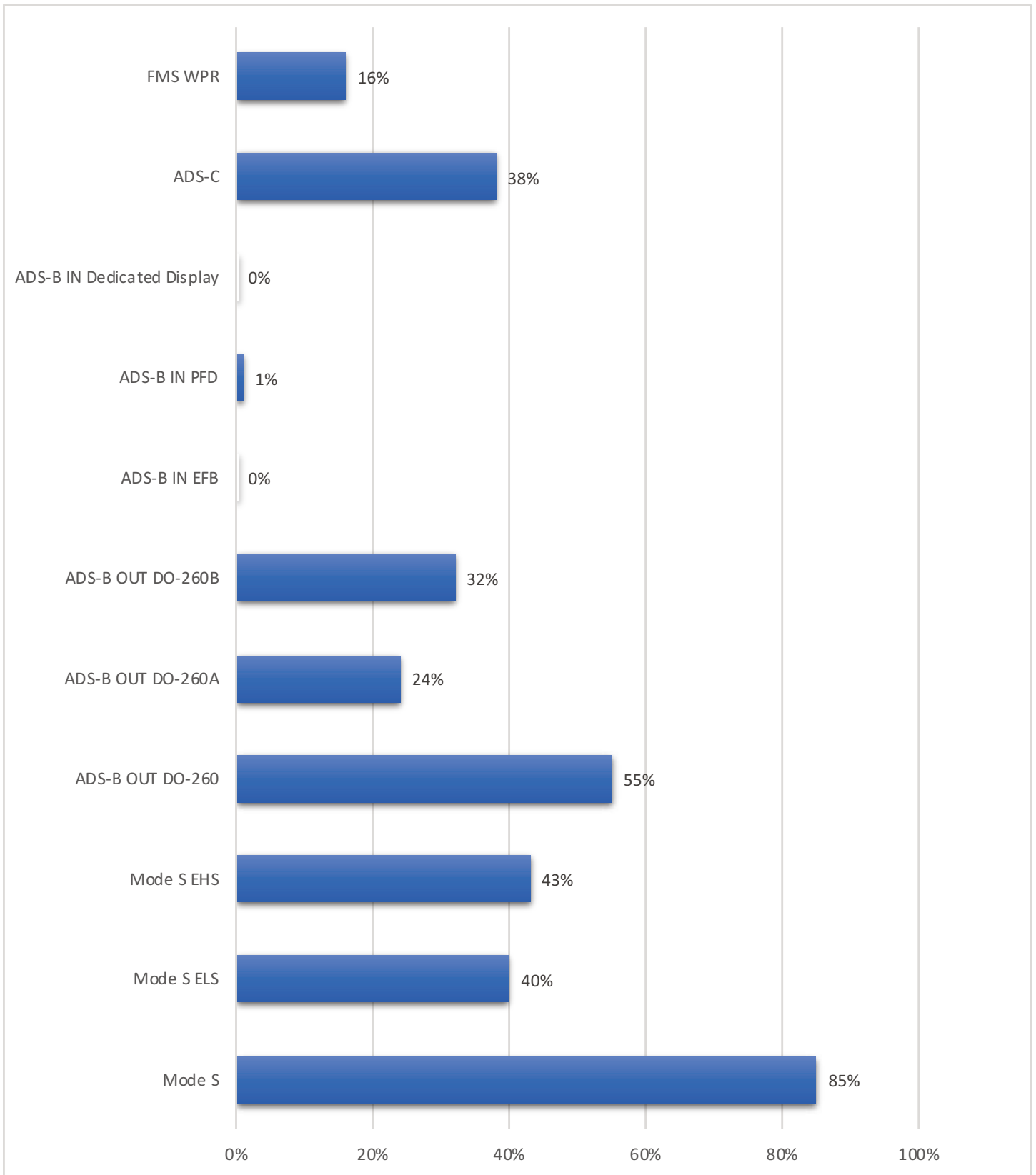
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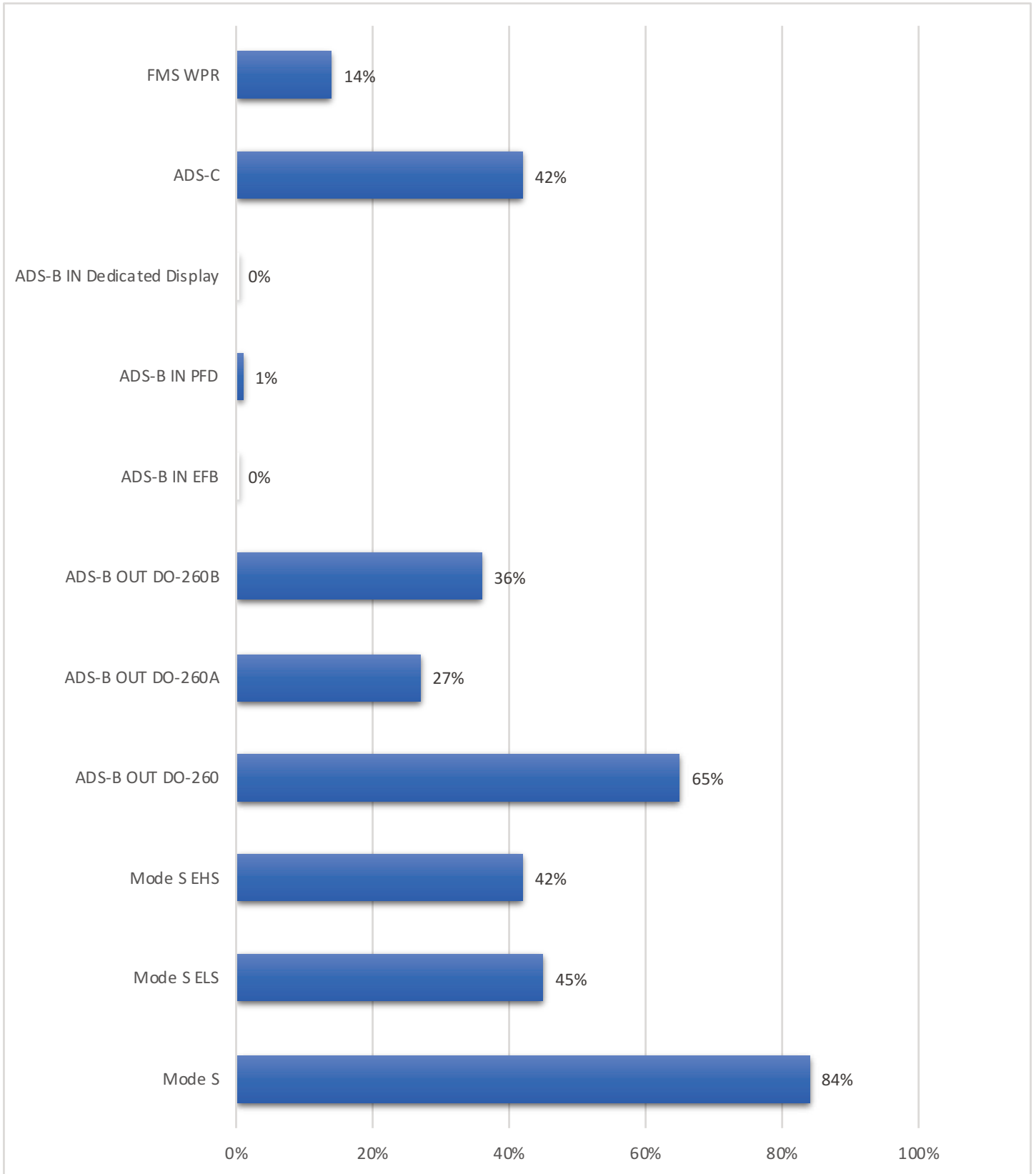
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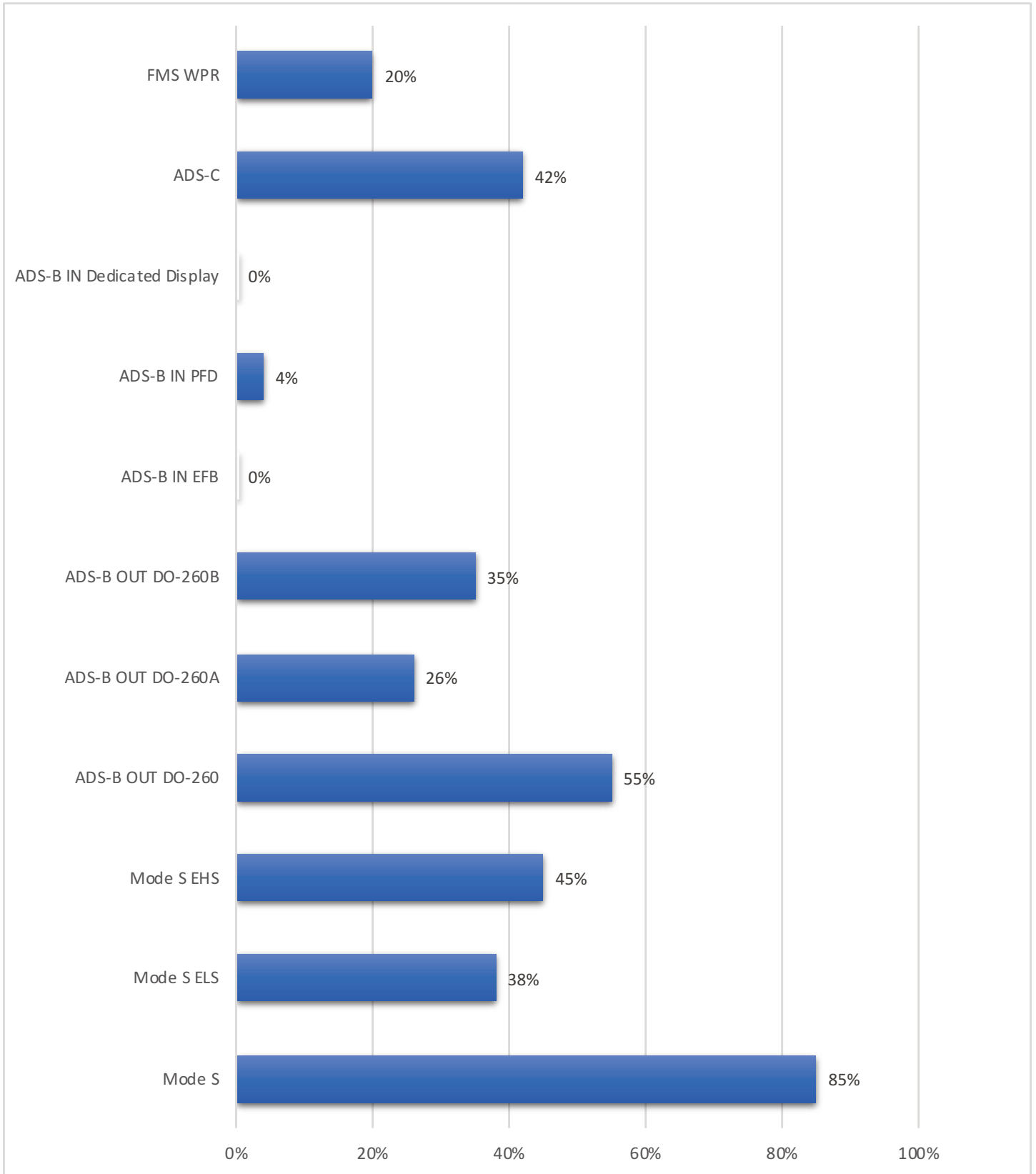
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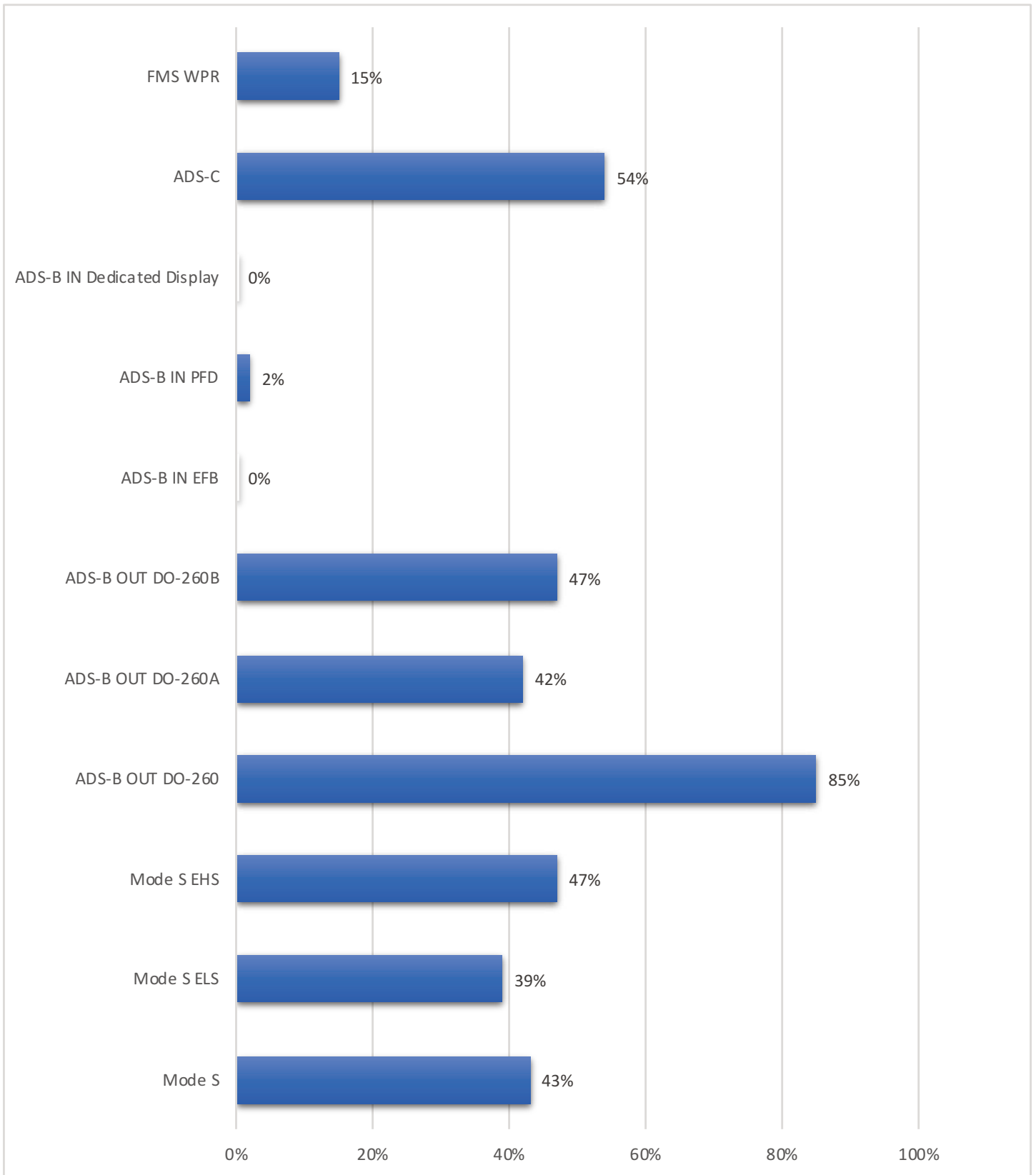


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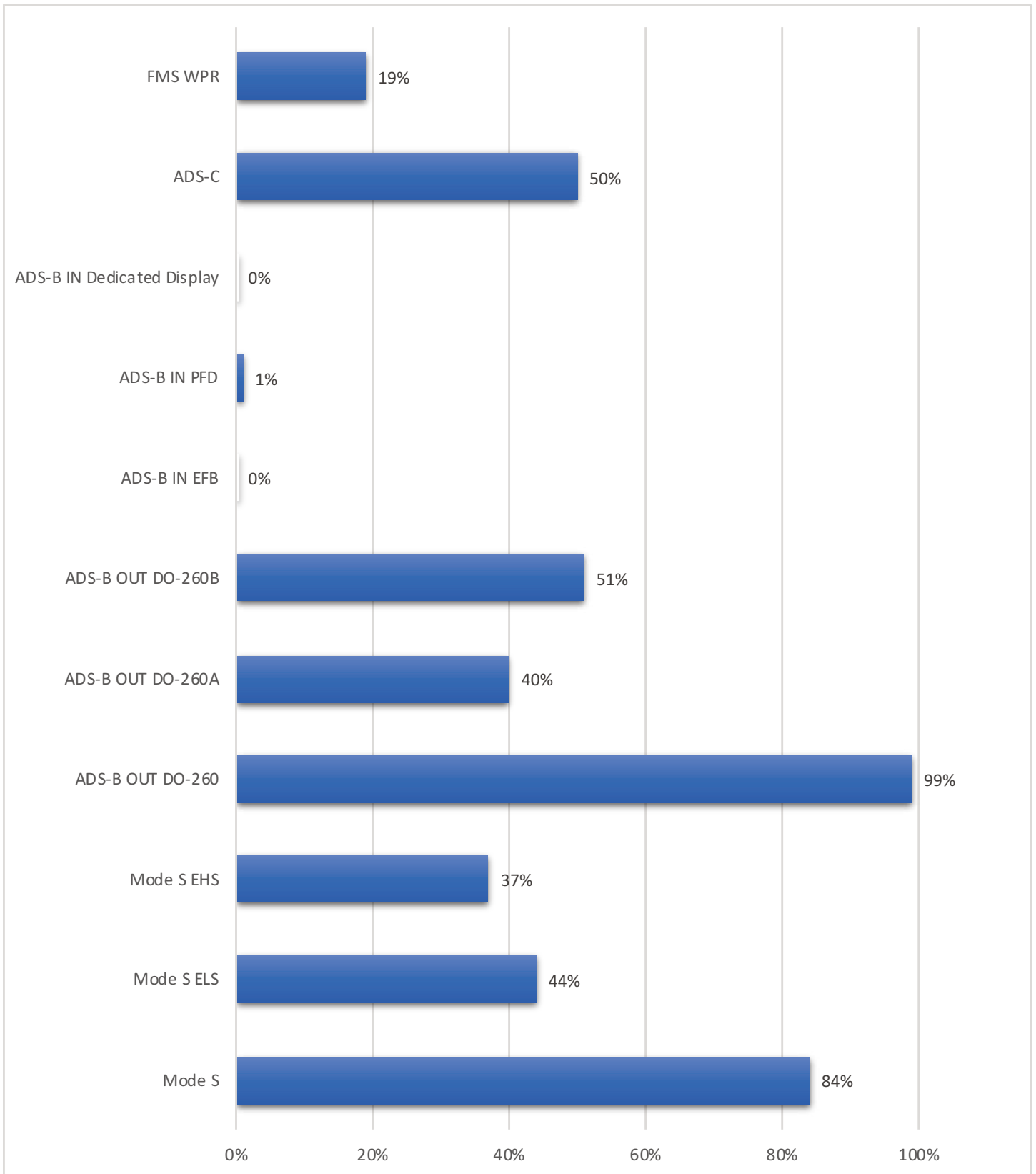


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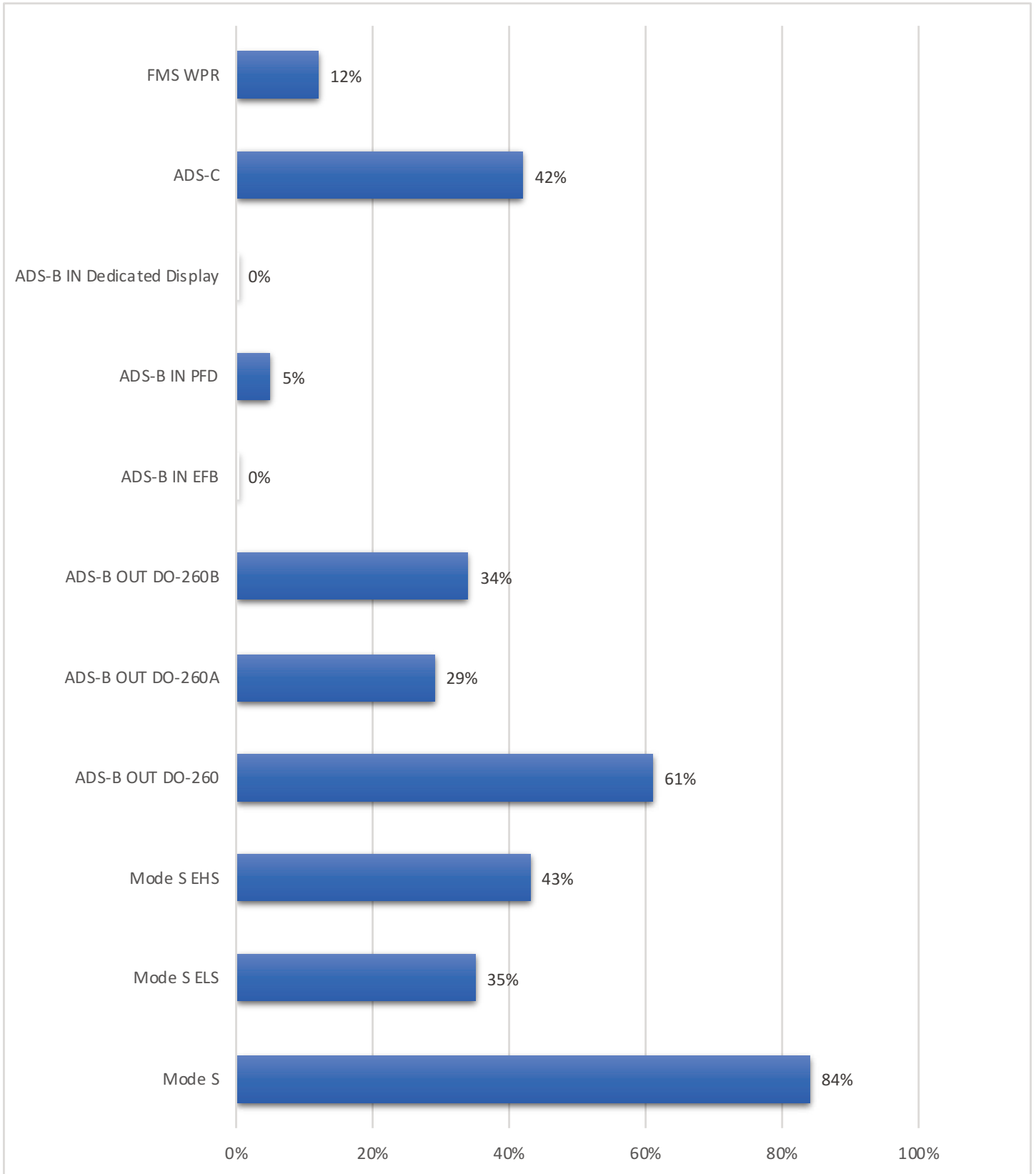


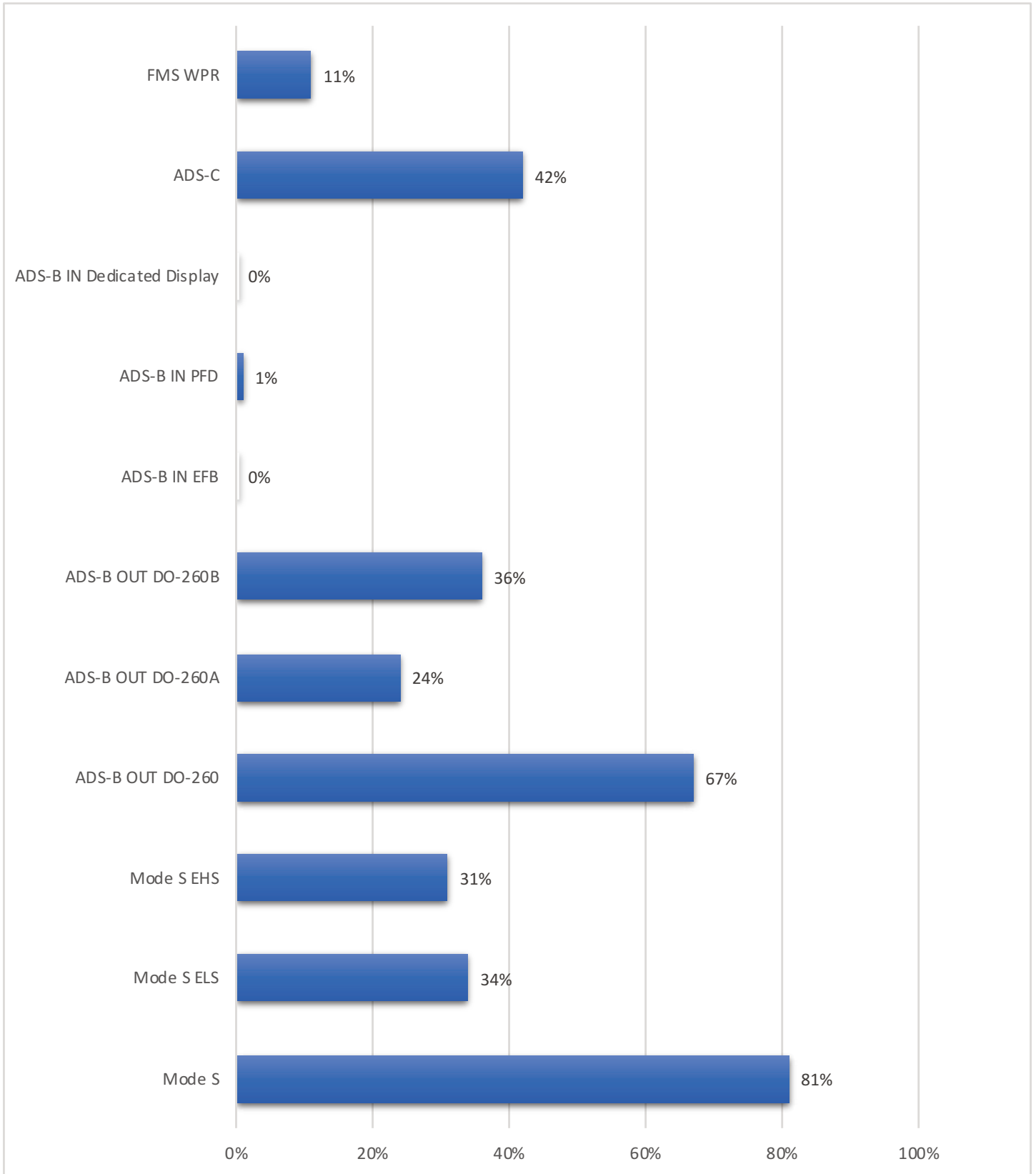


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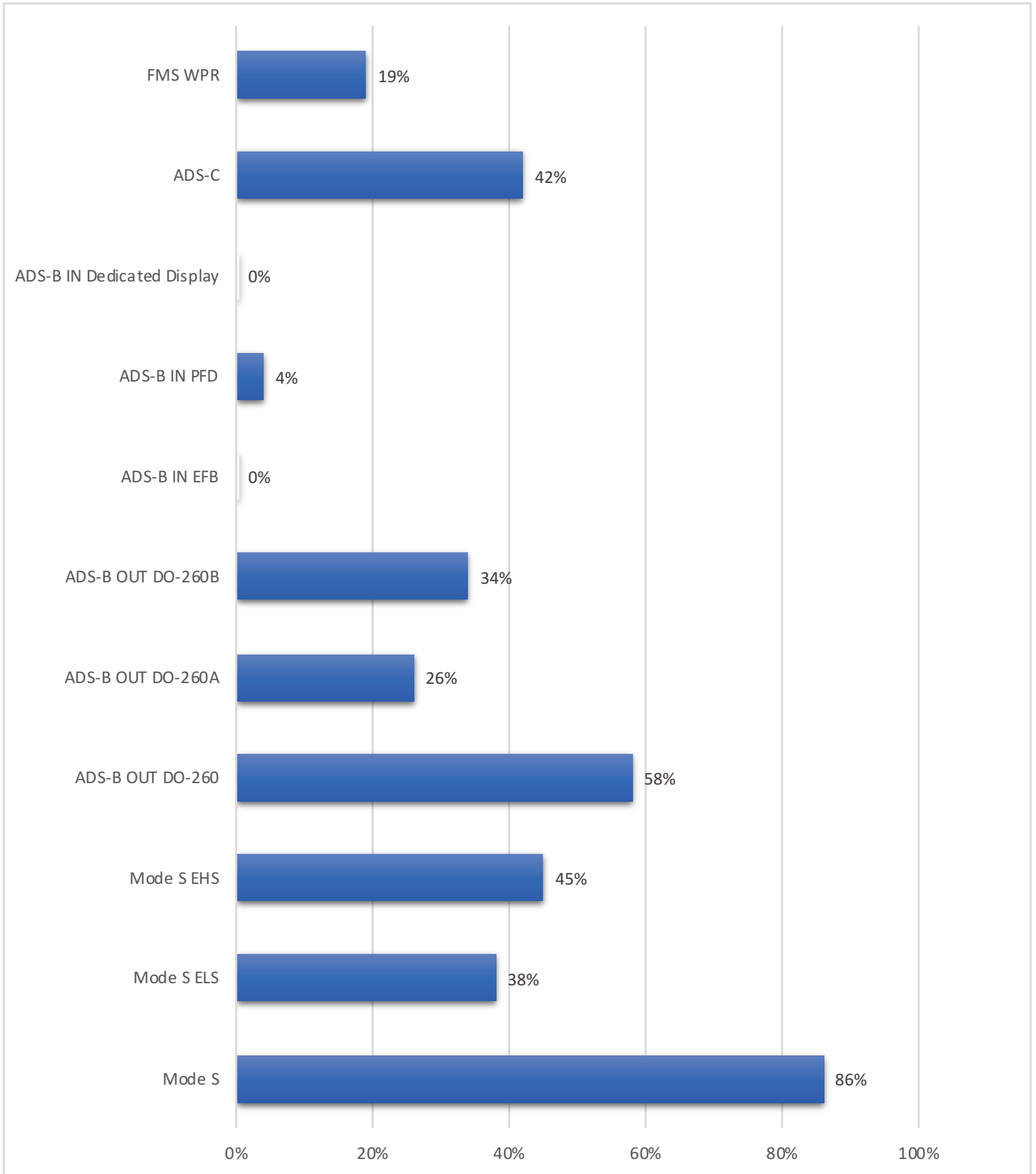


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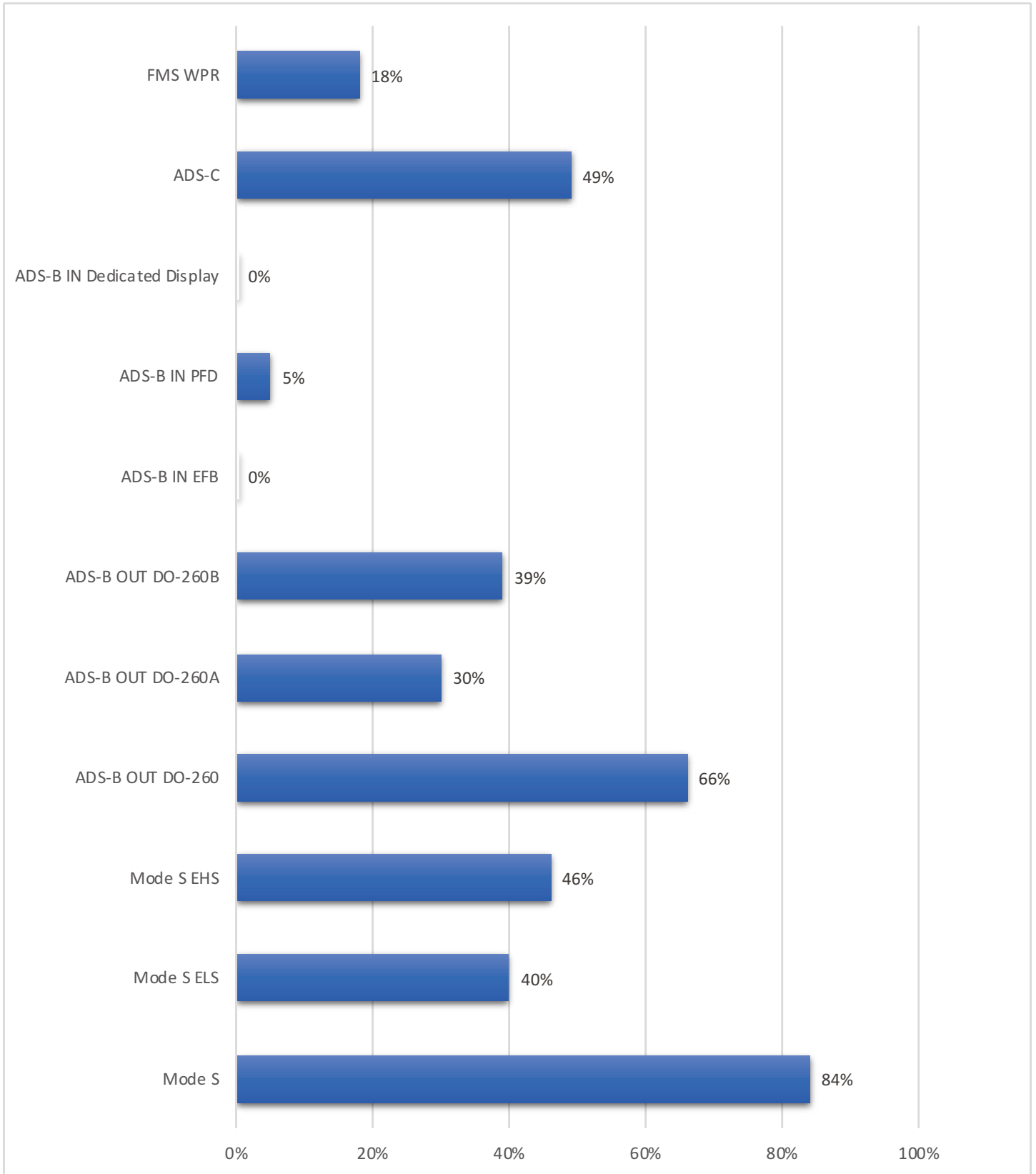




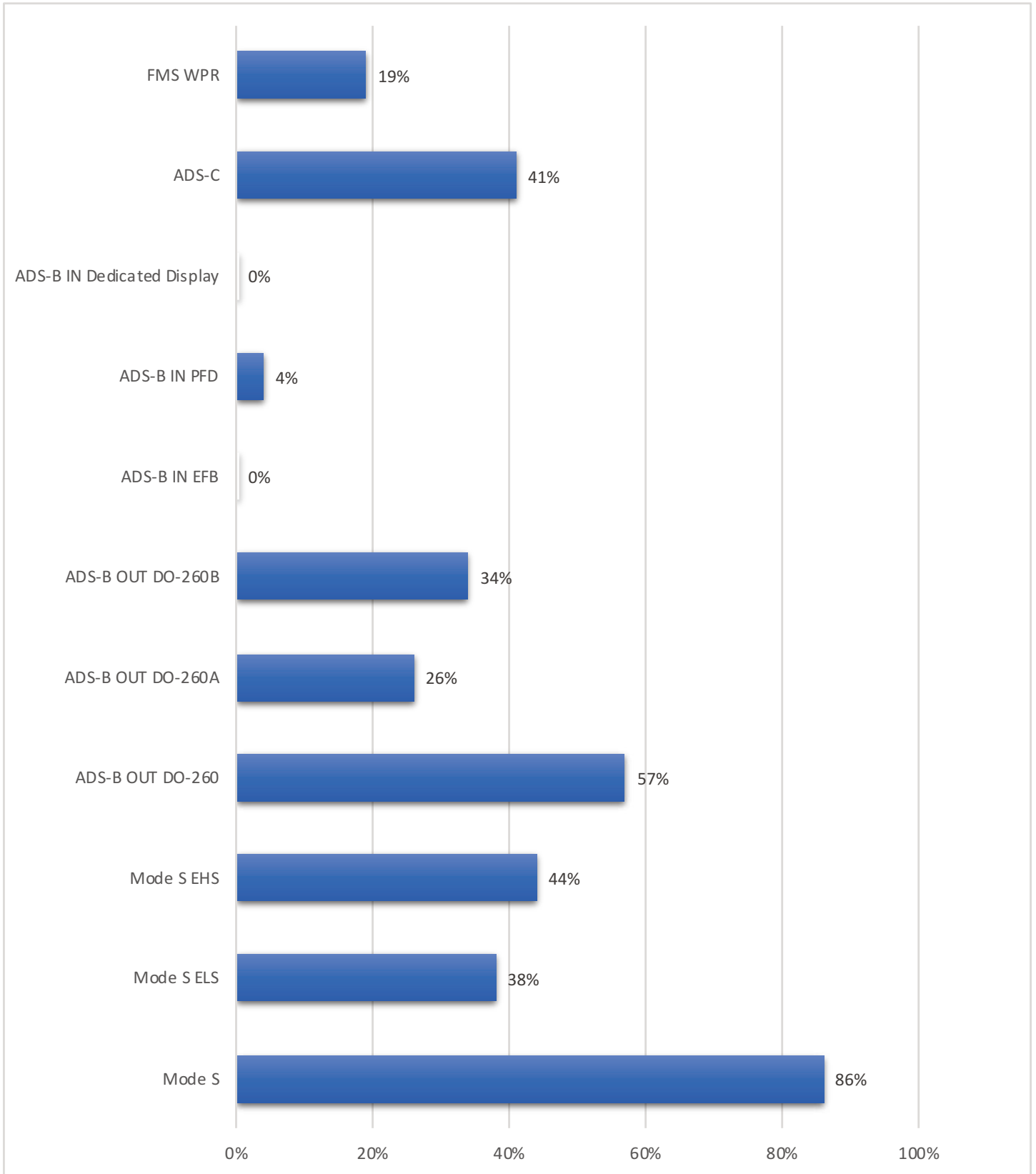
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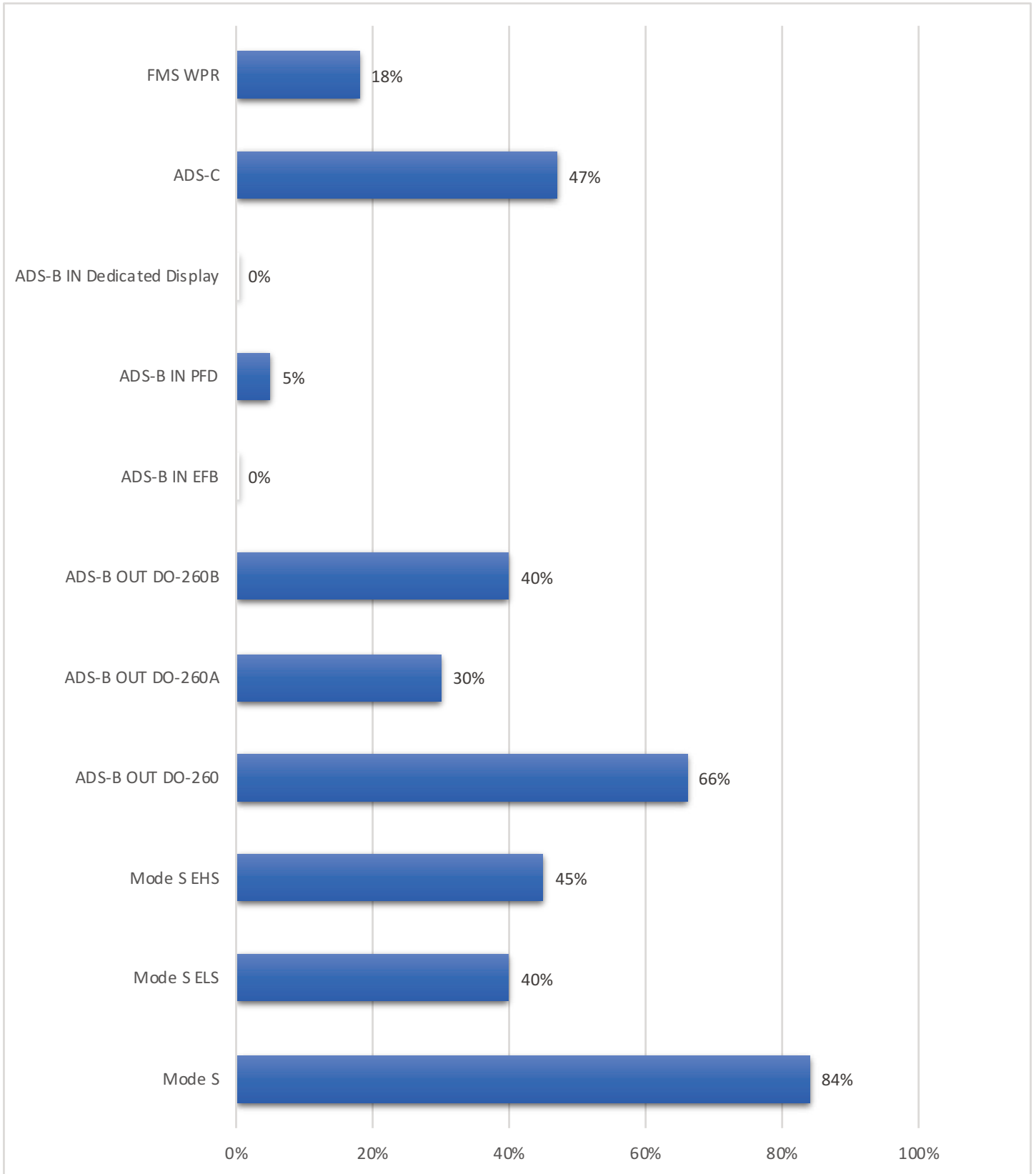
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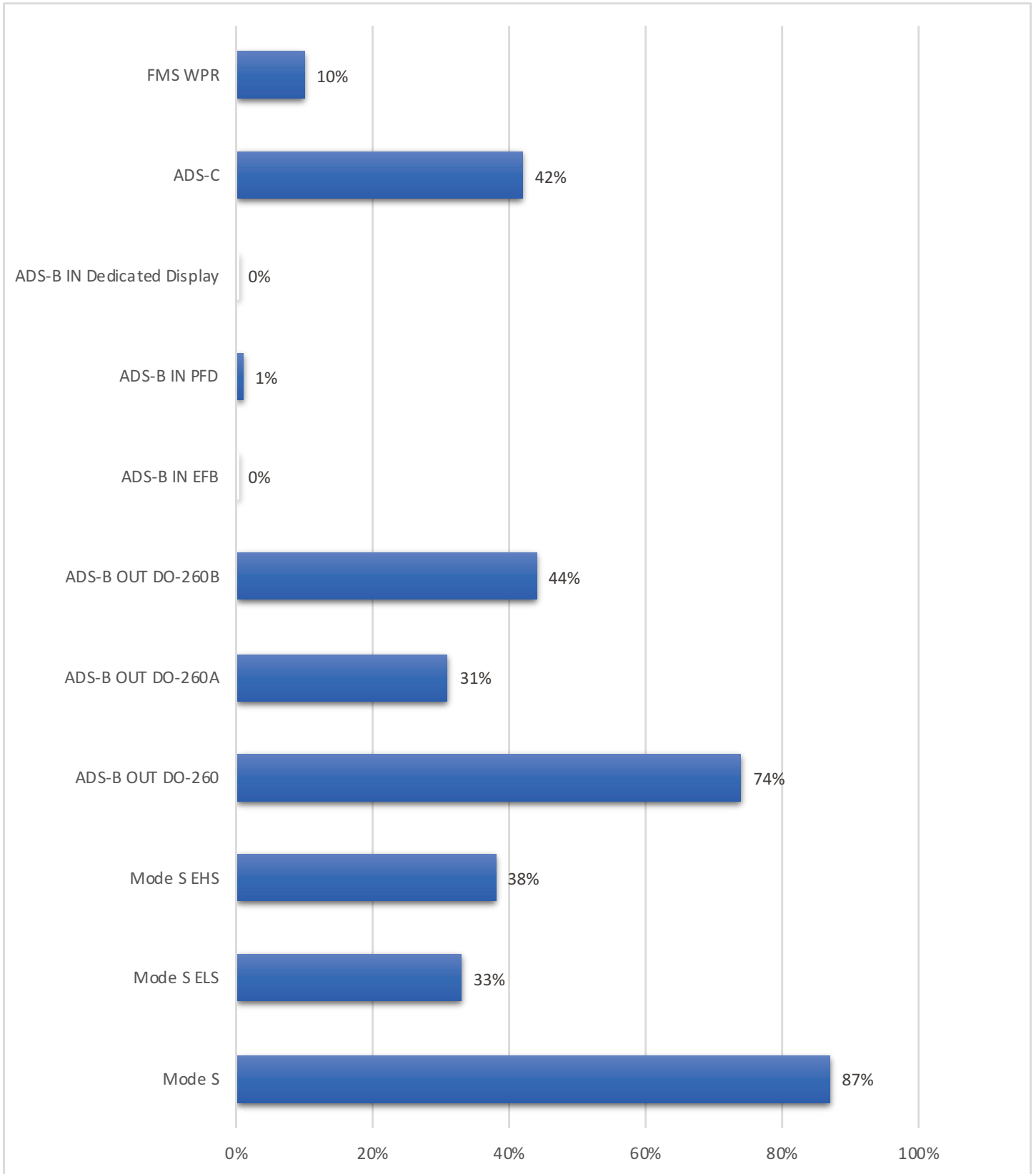
Oakland Domestic



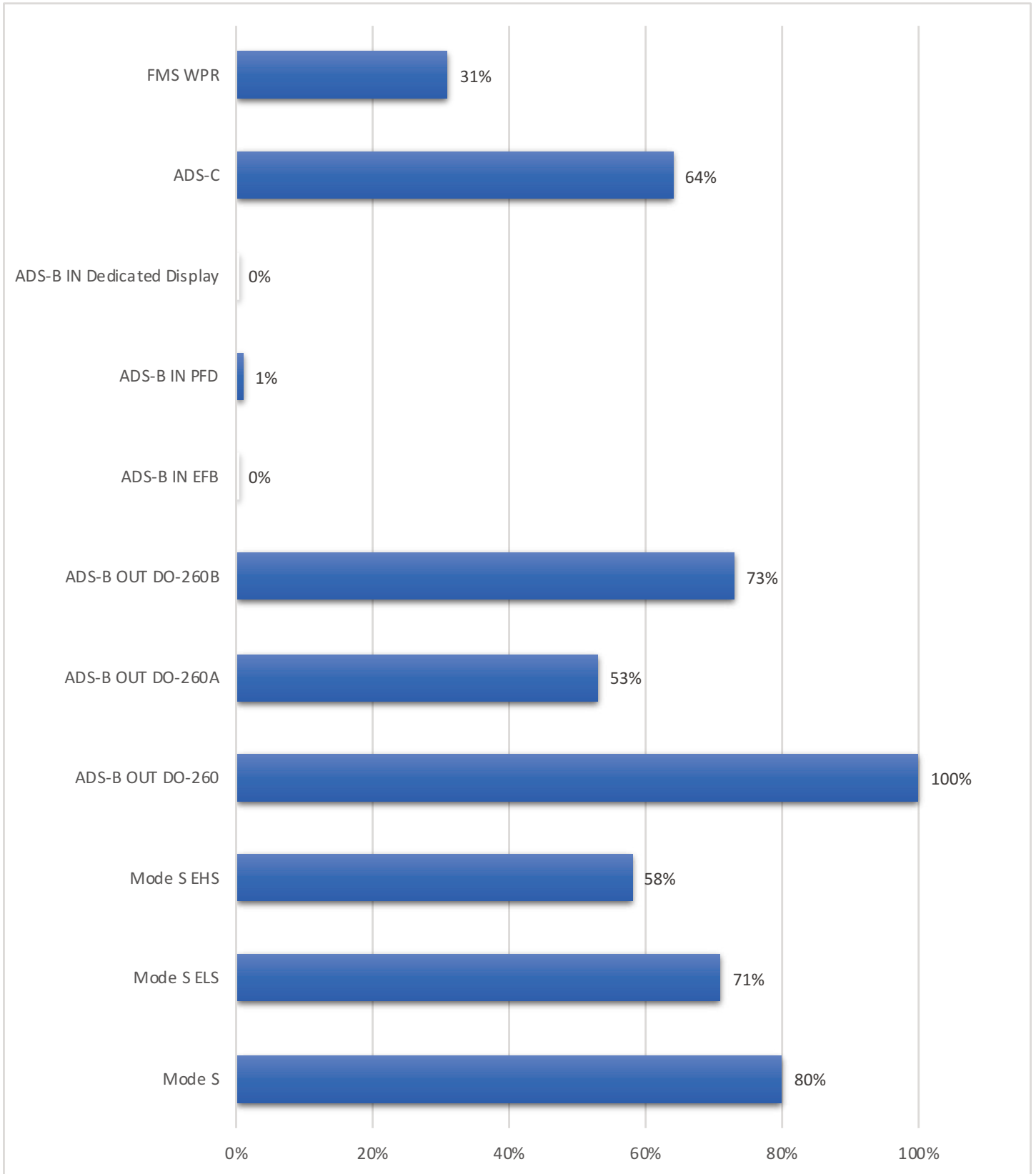
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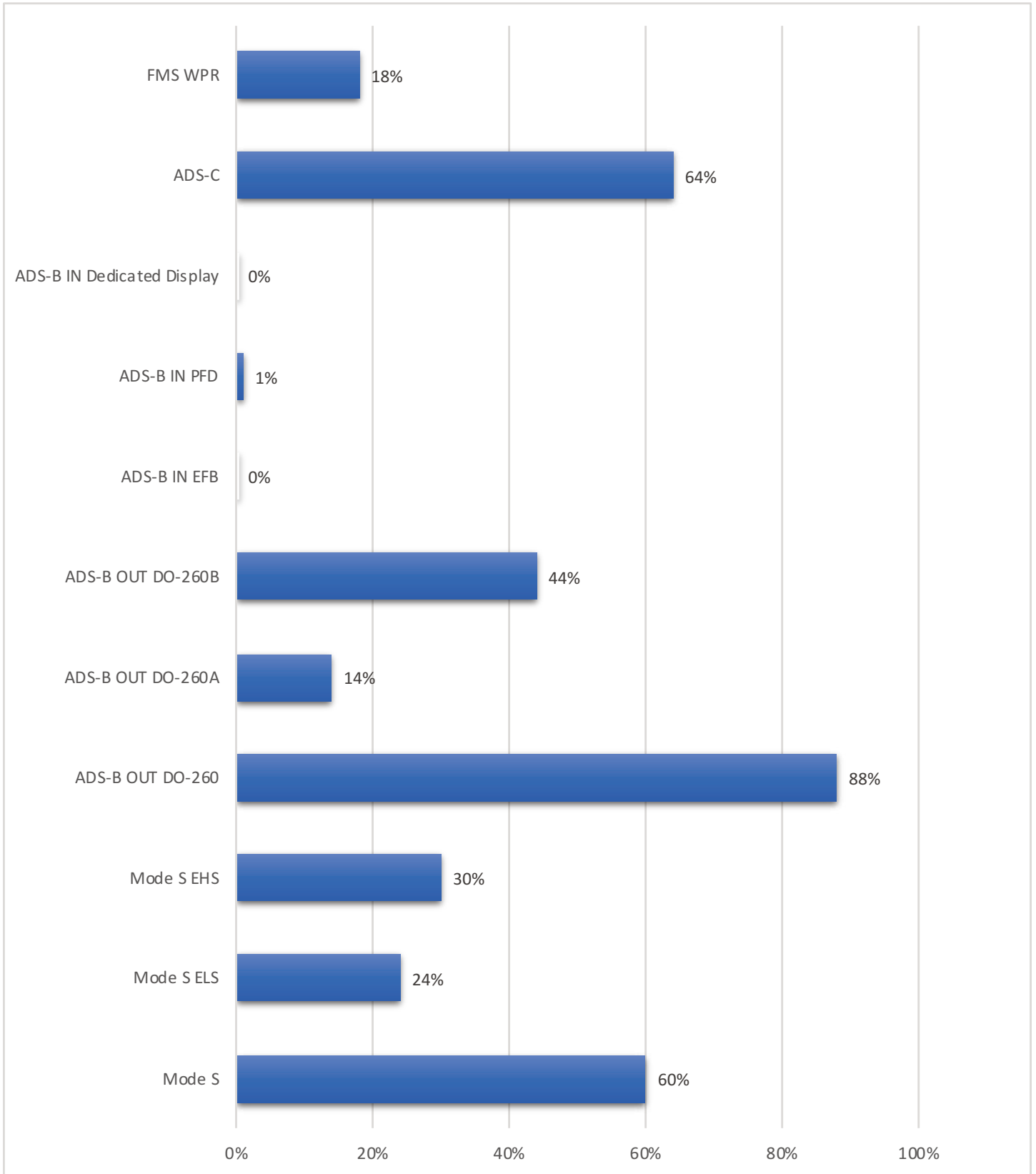


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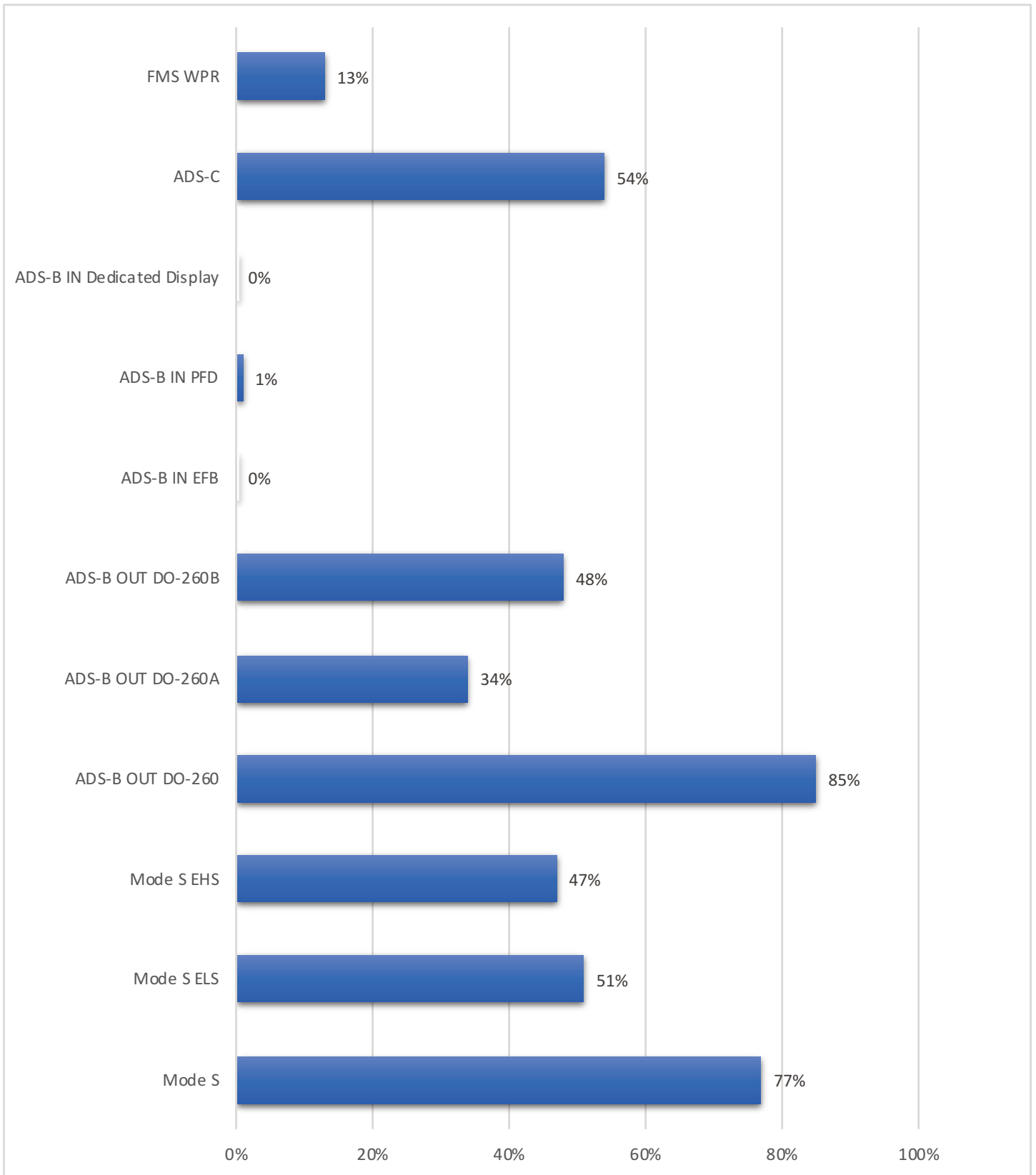


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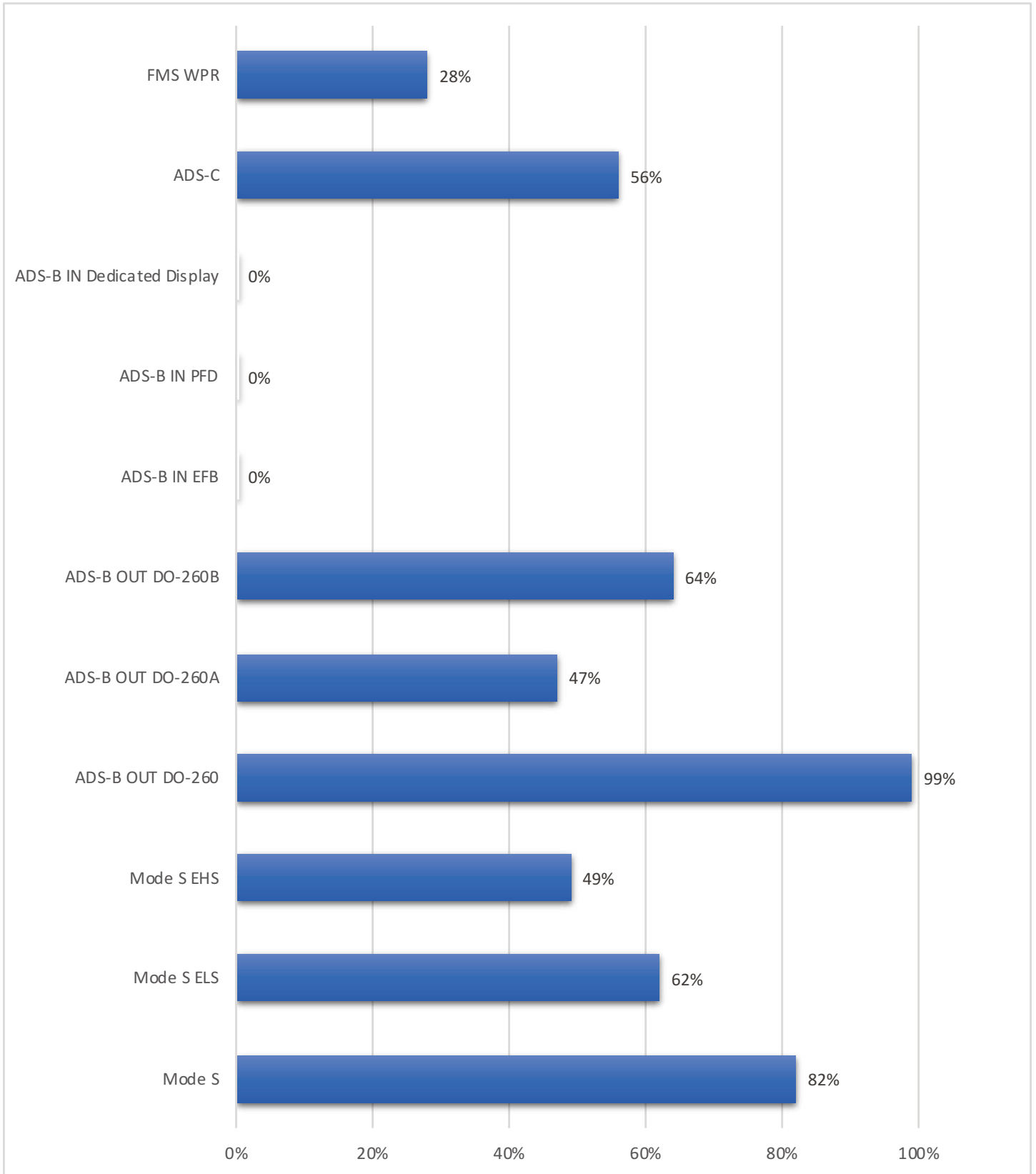




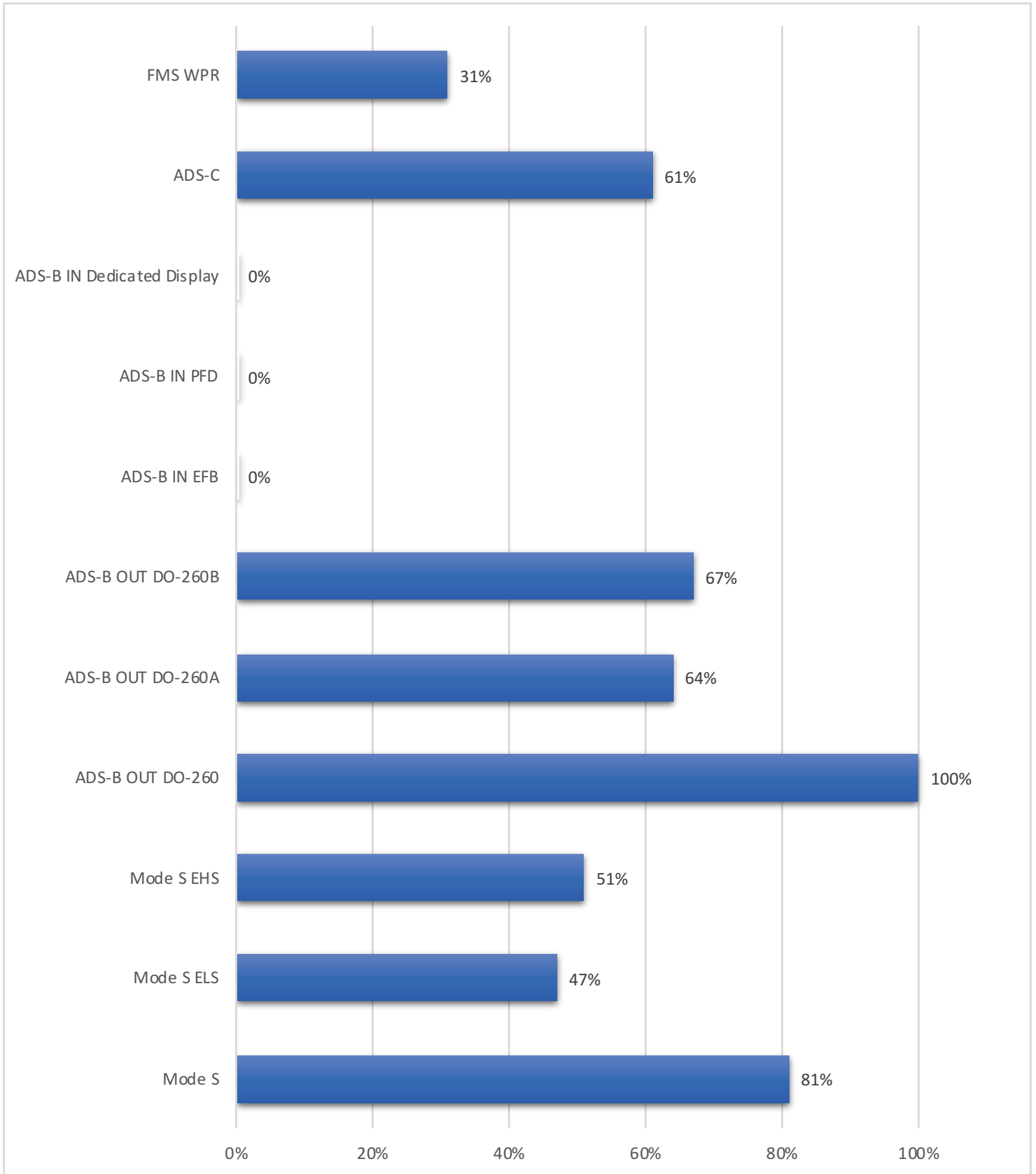
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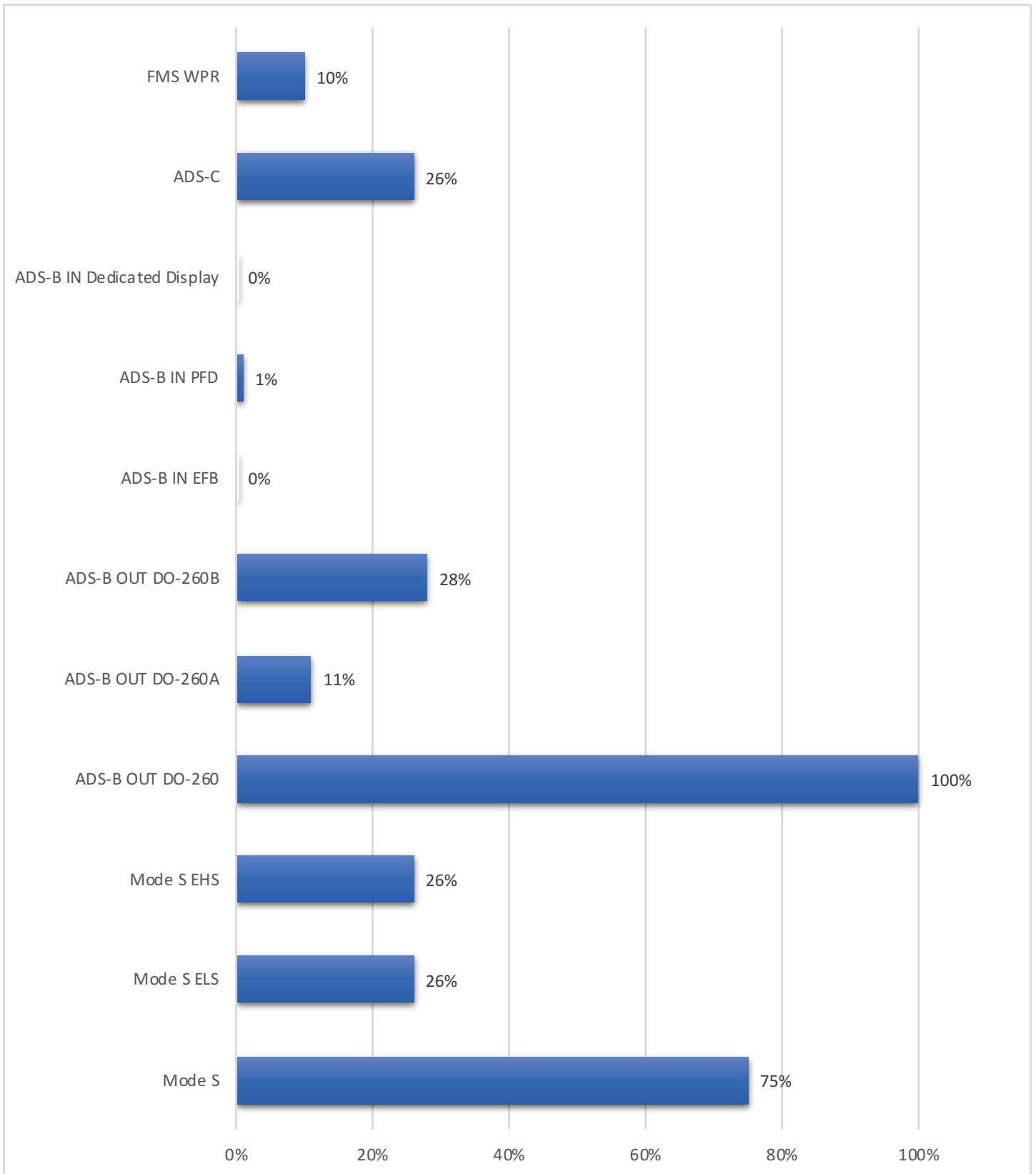


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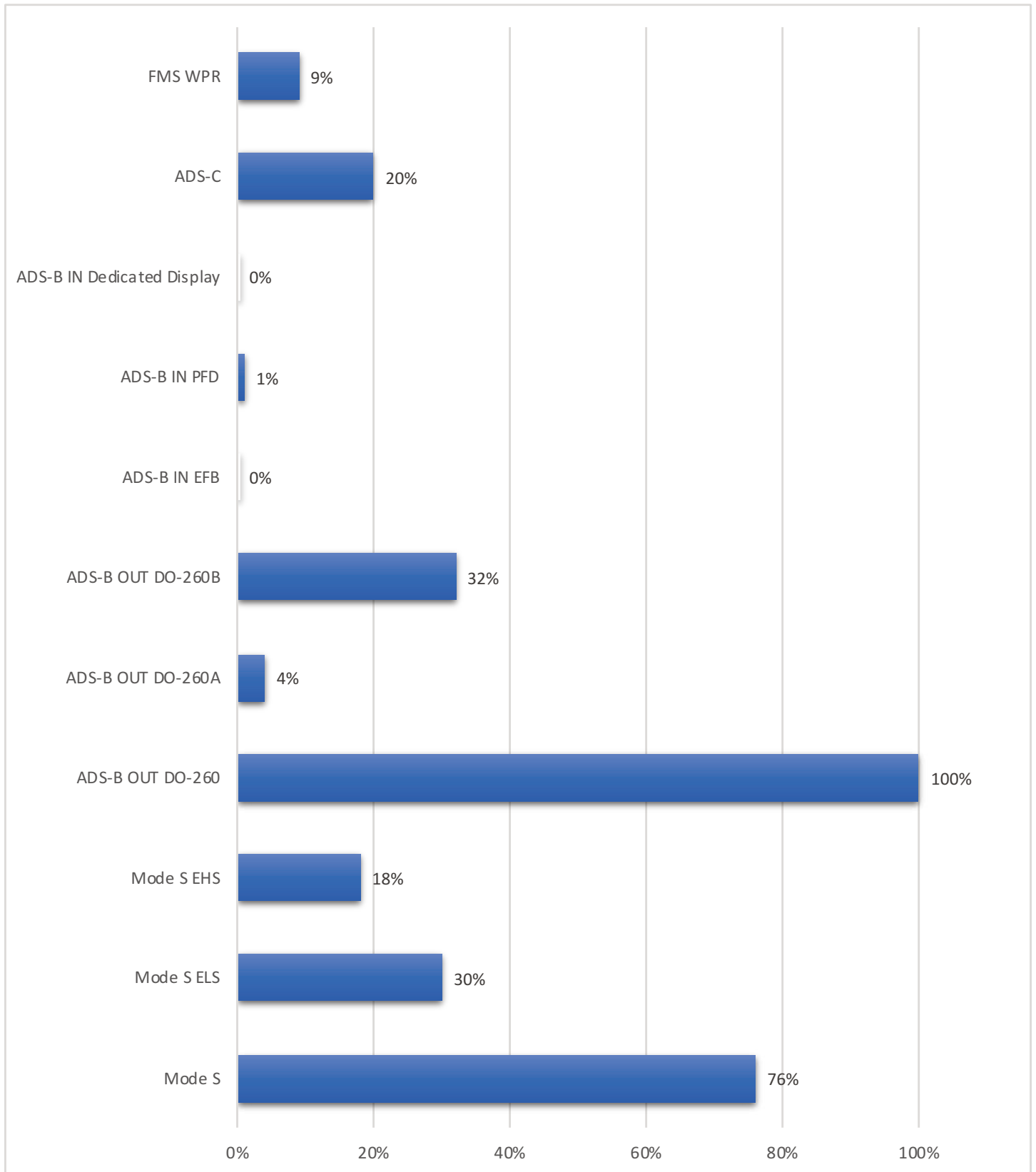


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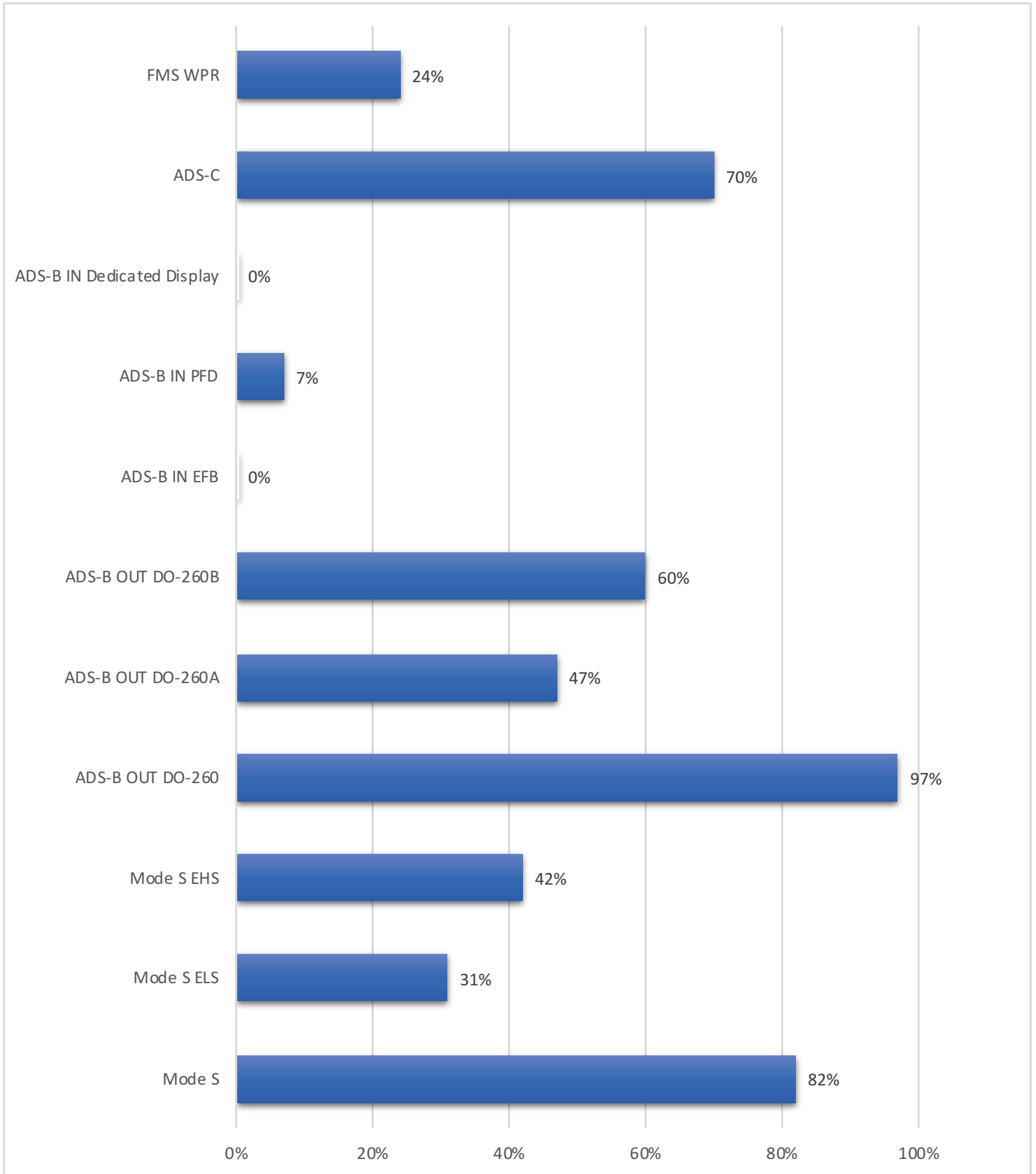


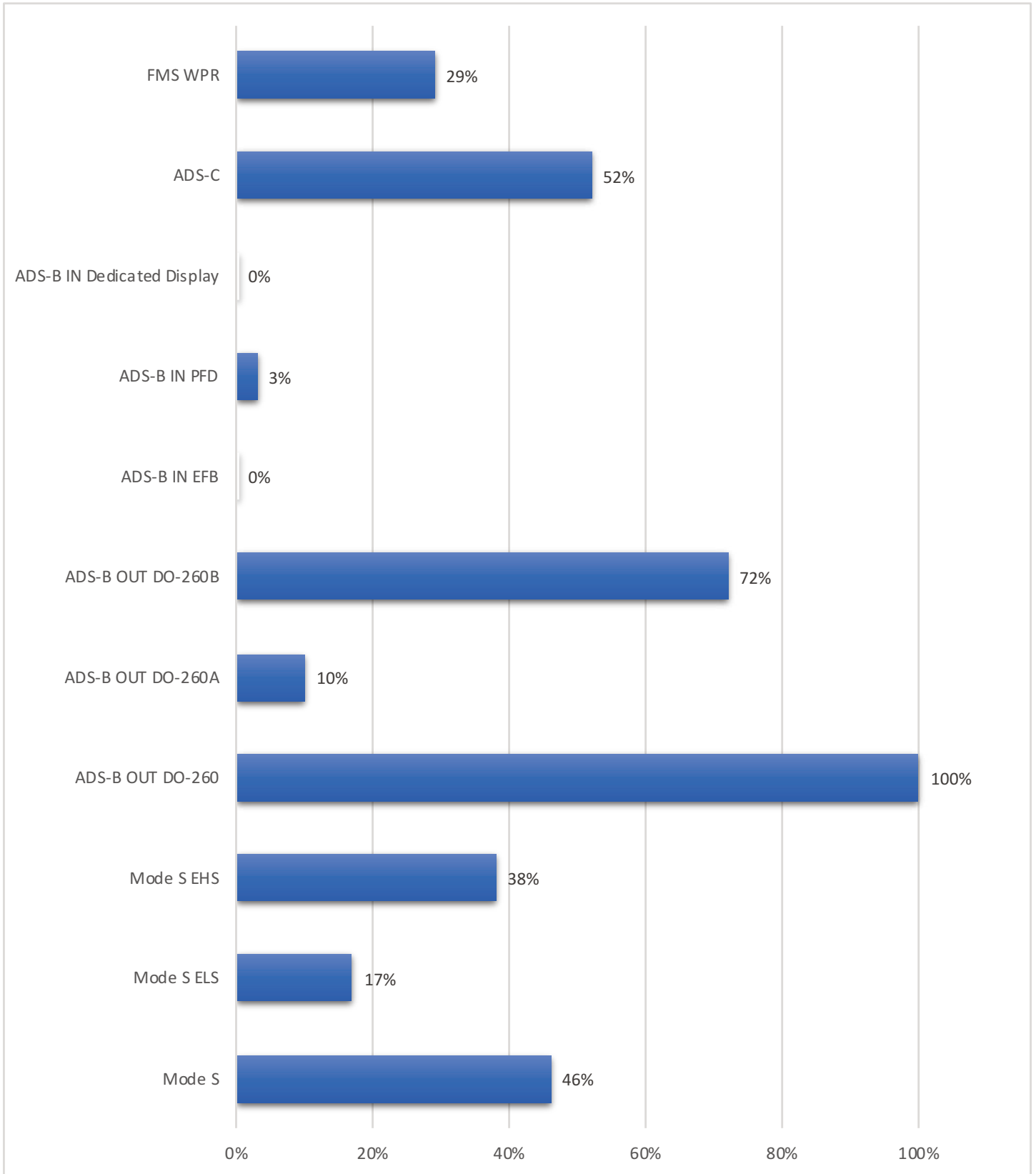


Resistencia

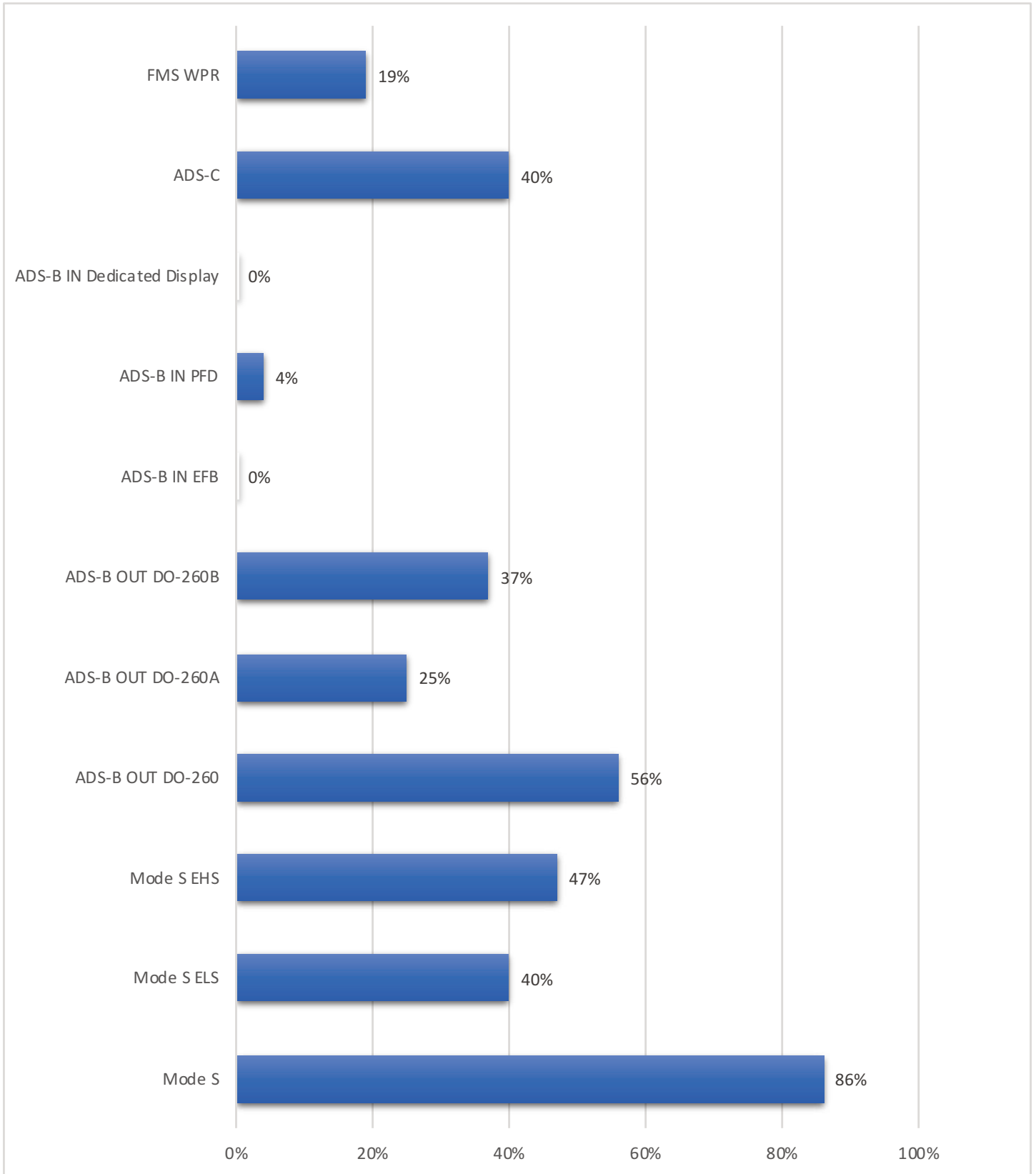


Reykjavik Oceanic

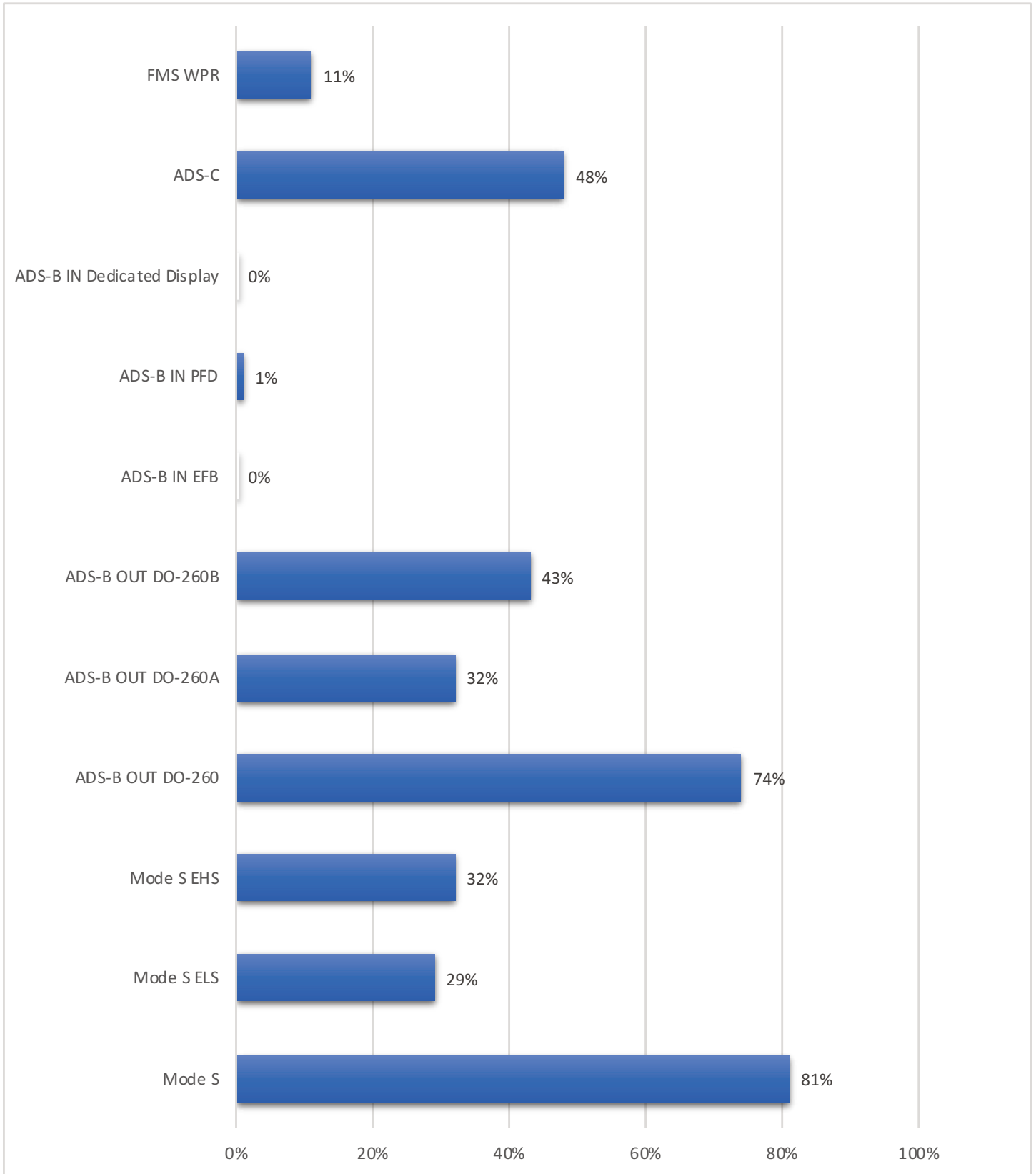




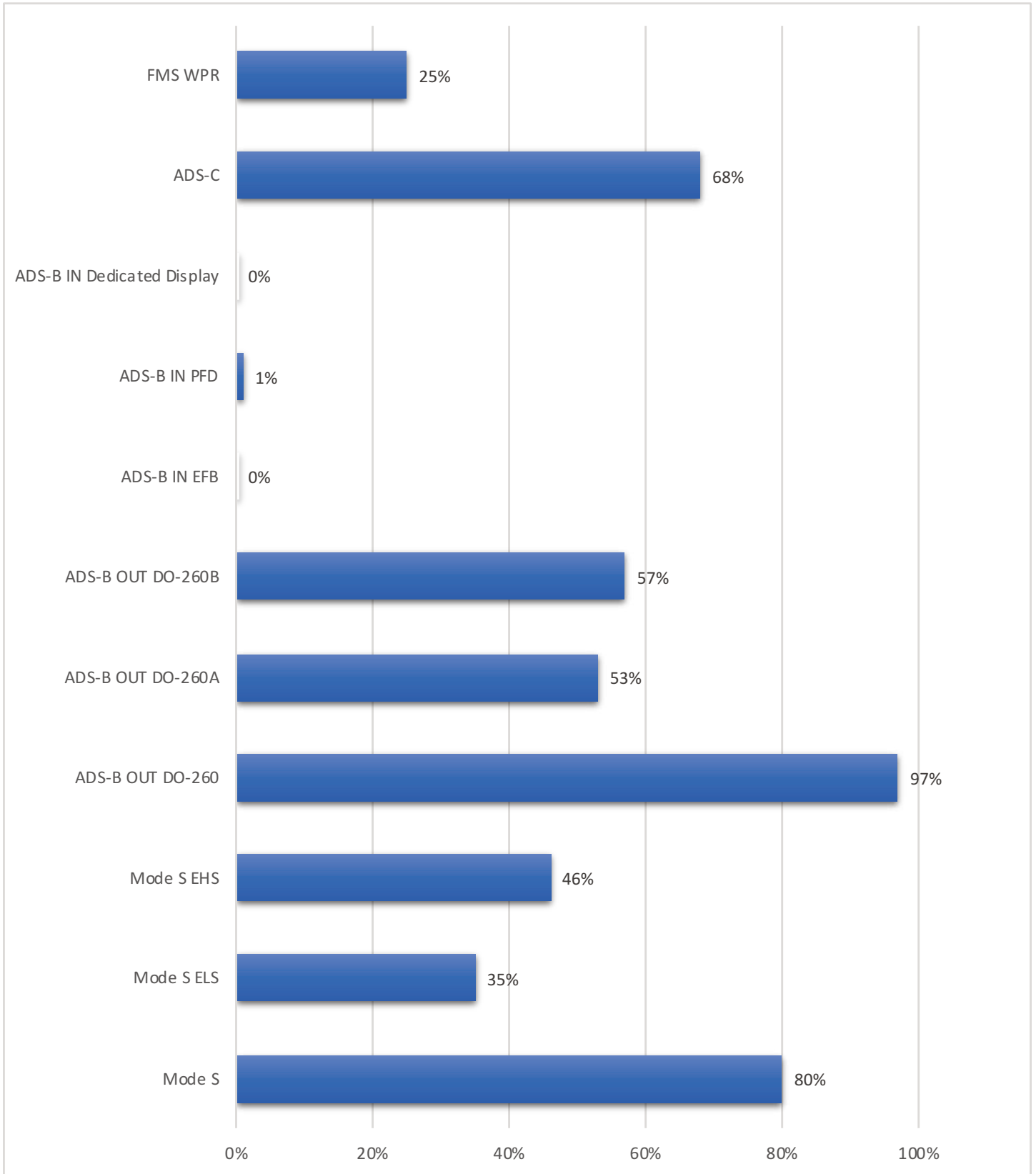
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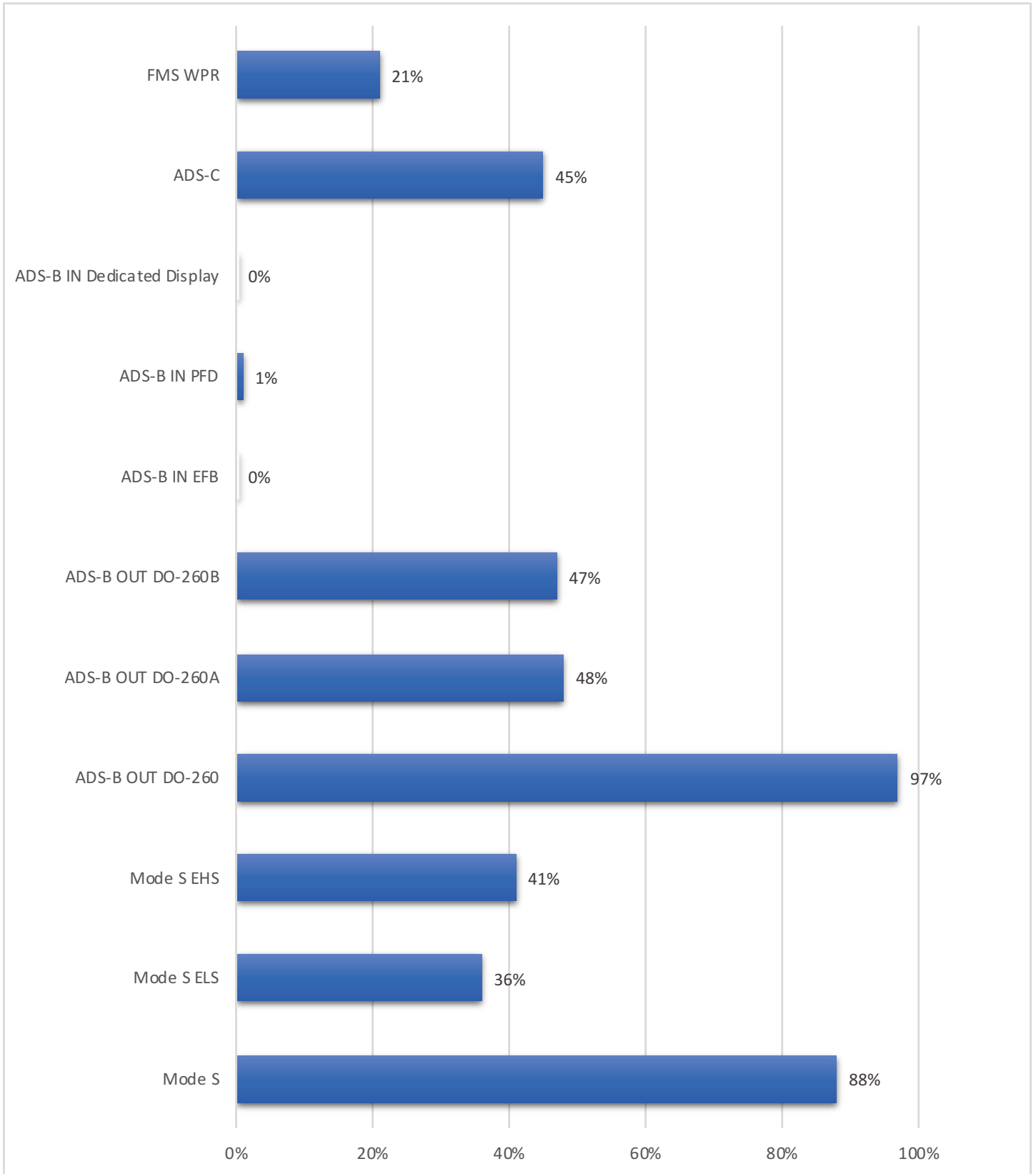


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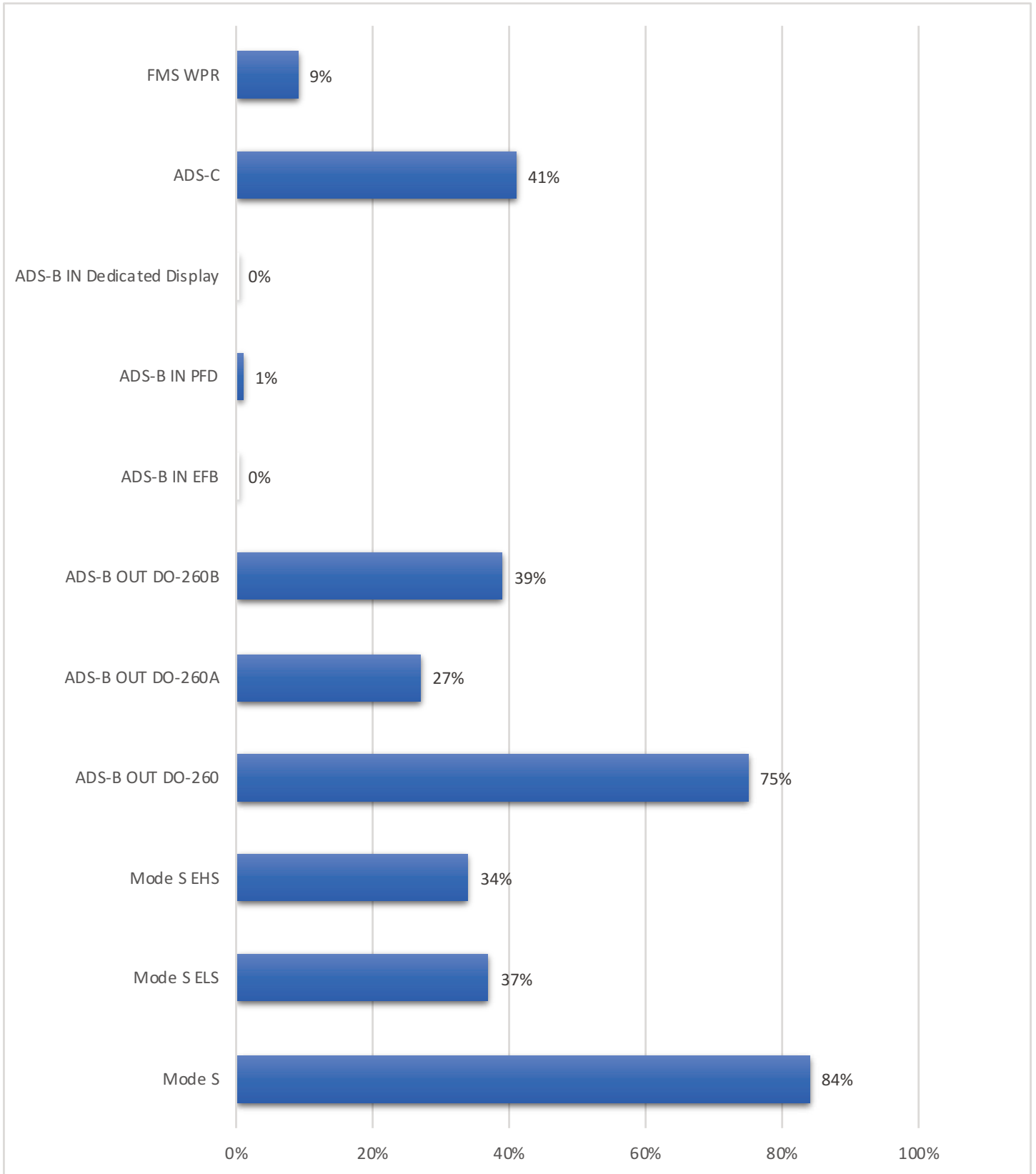


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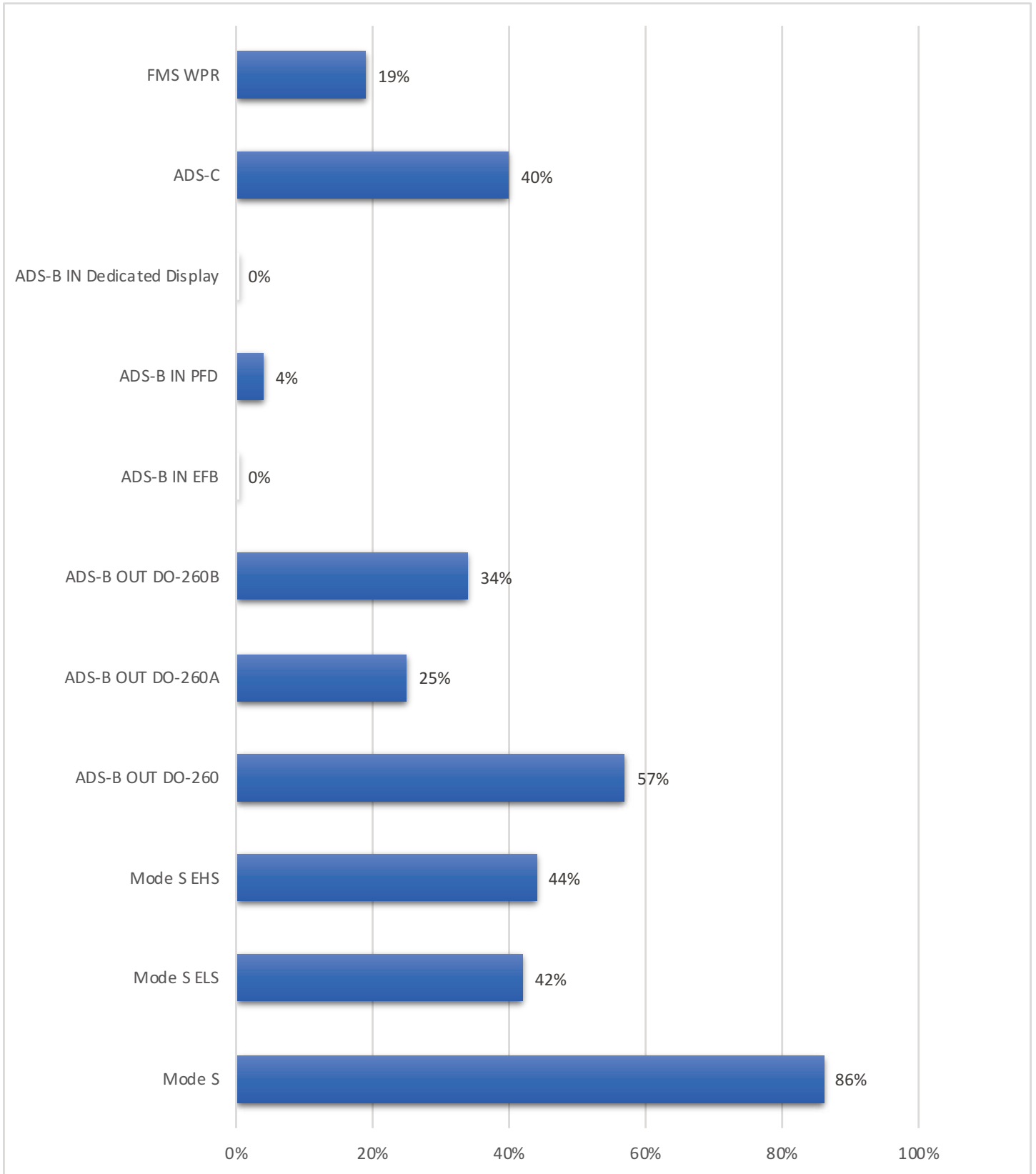




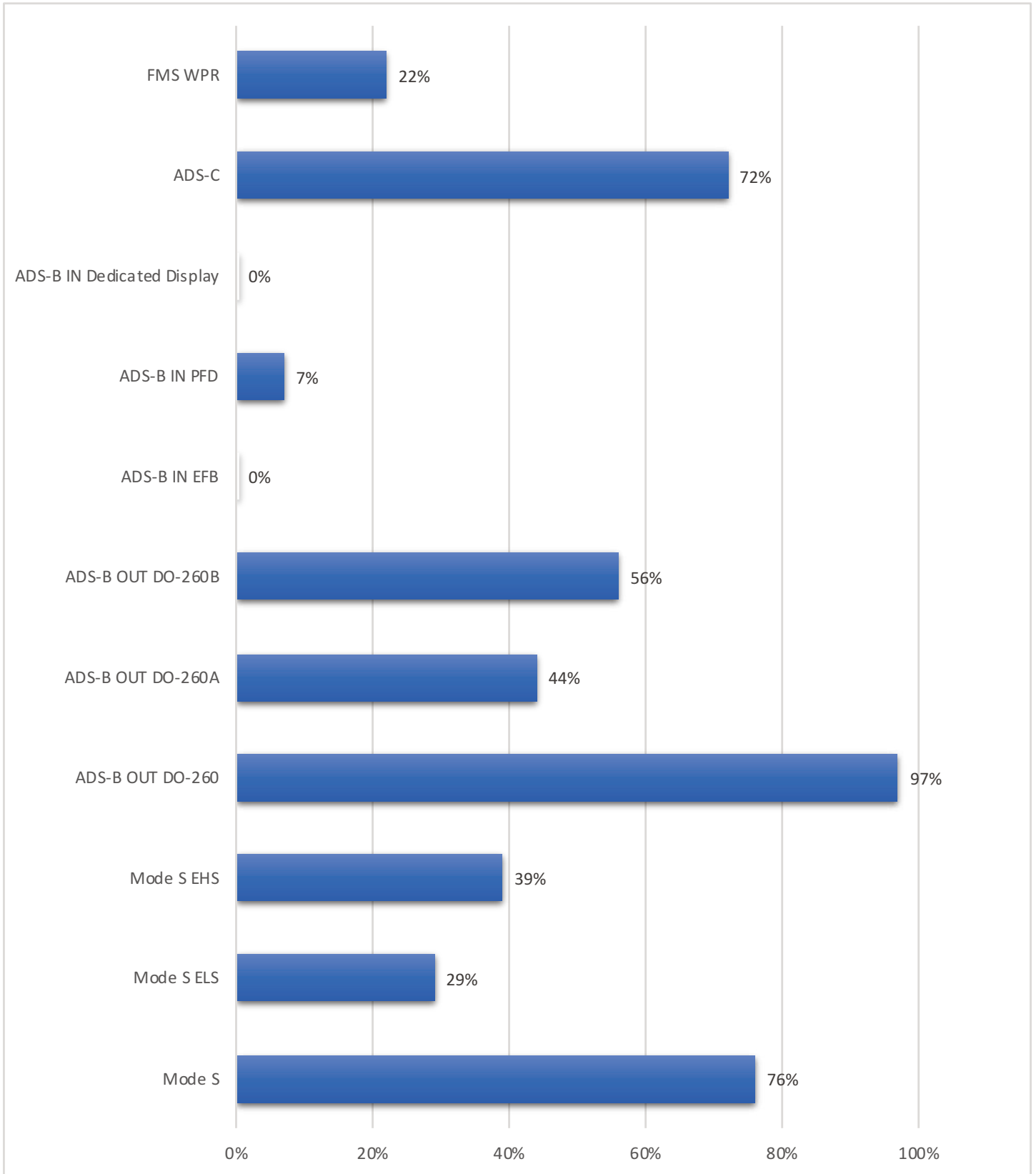
Santo Domingo

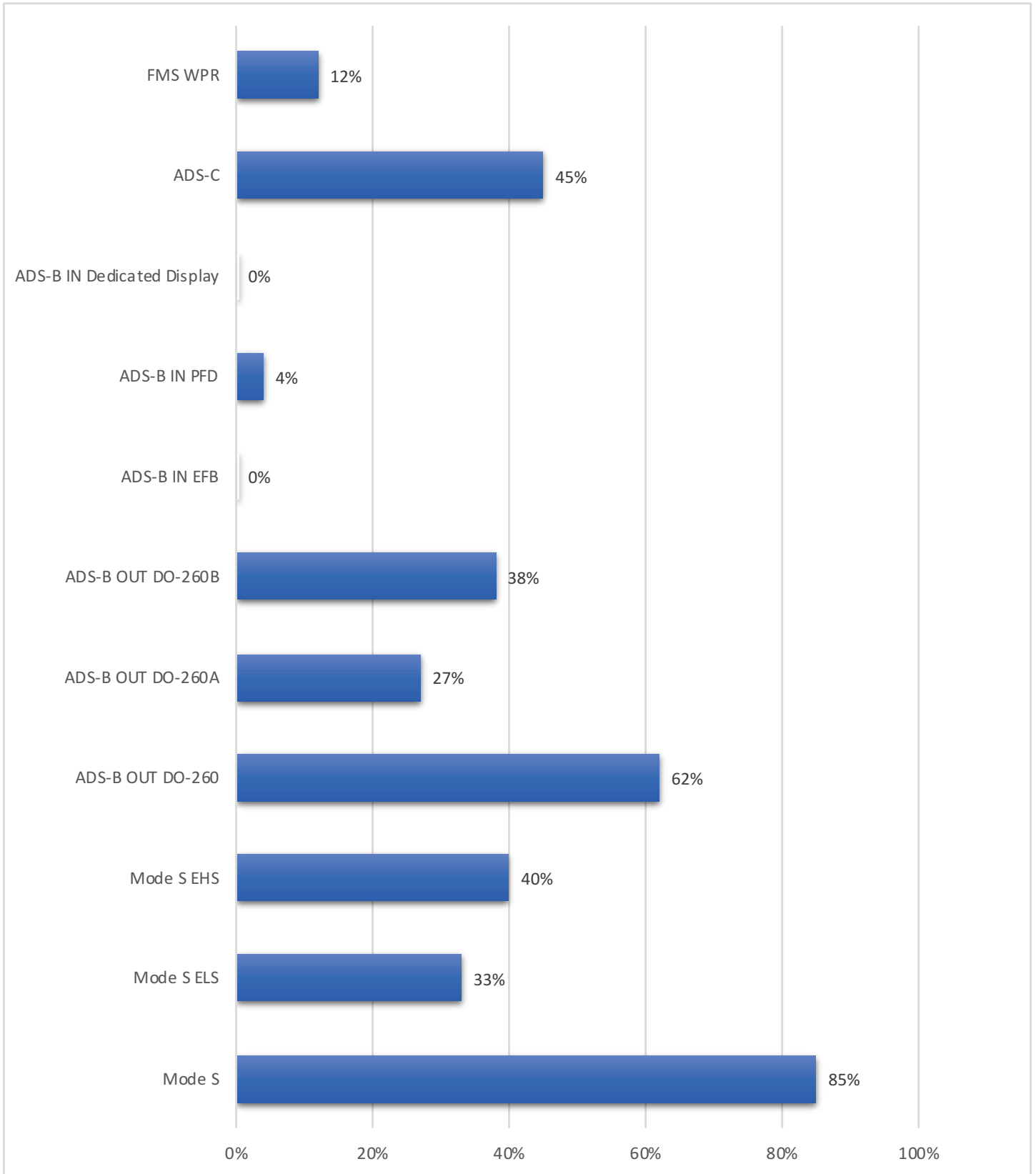


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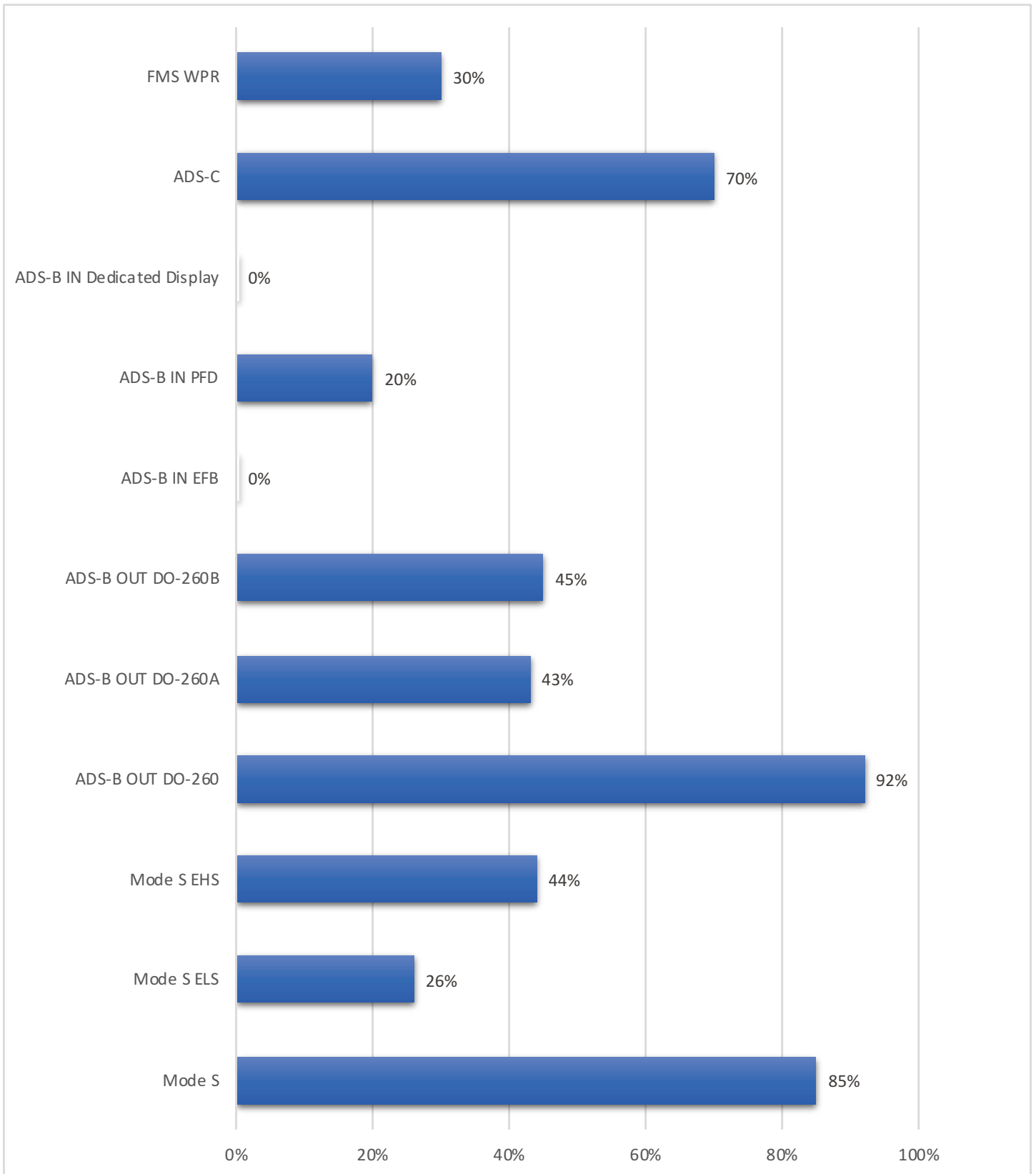


Shanwick Oceanic

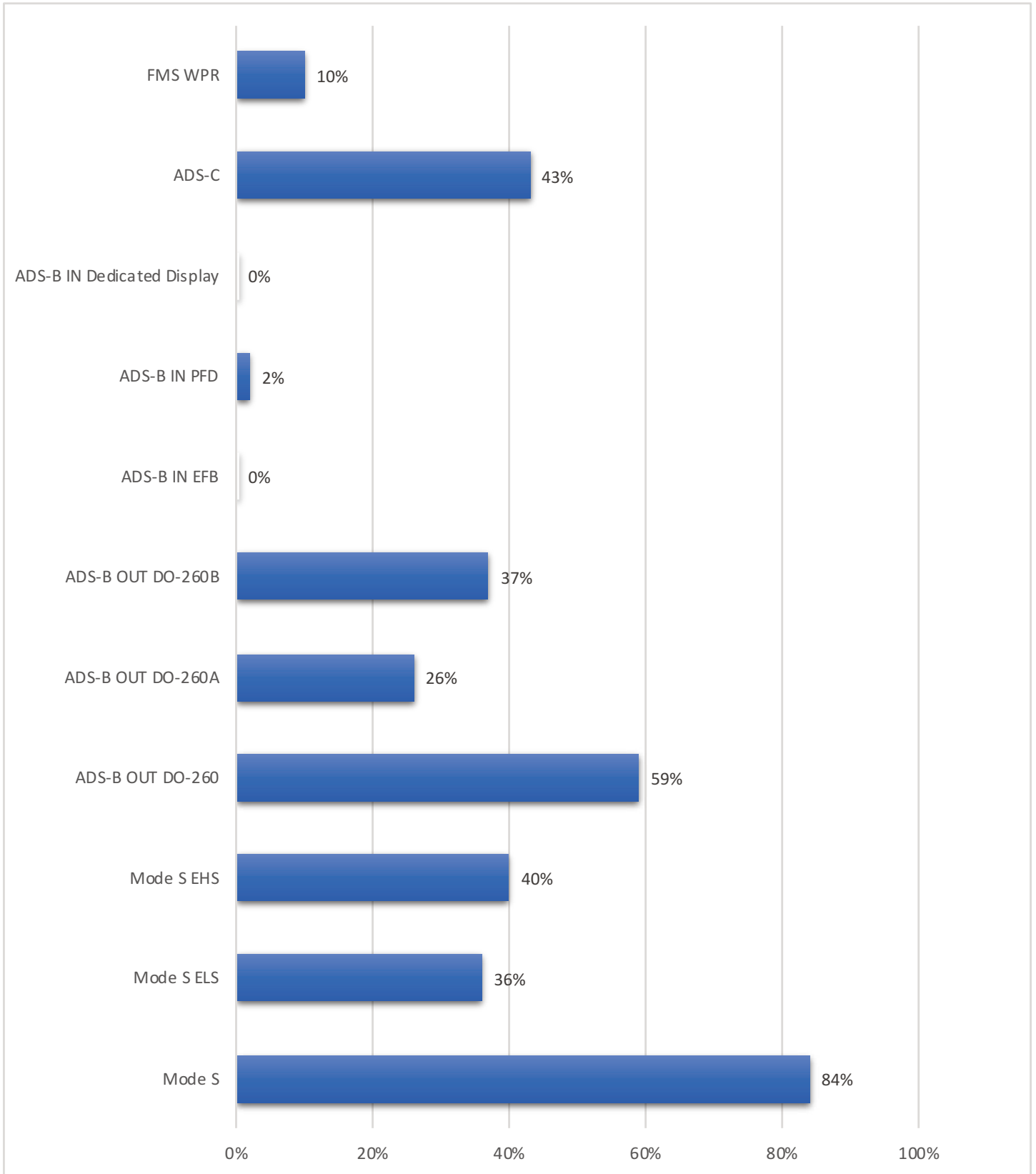




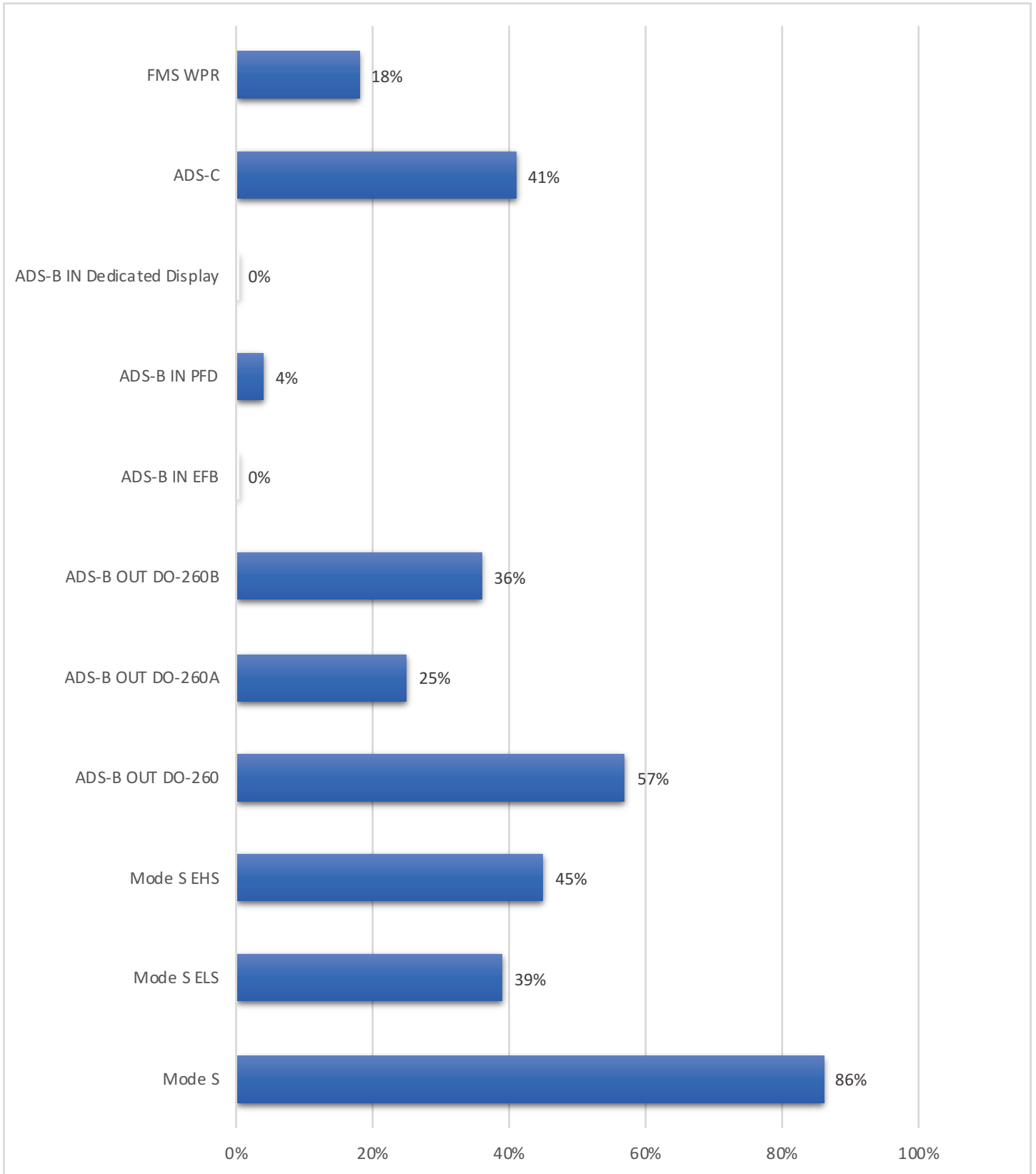
Trans-Polar (North and/or South)

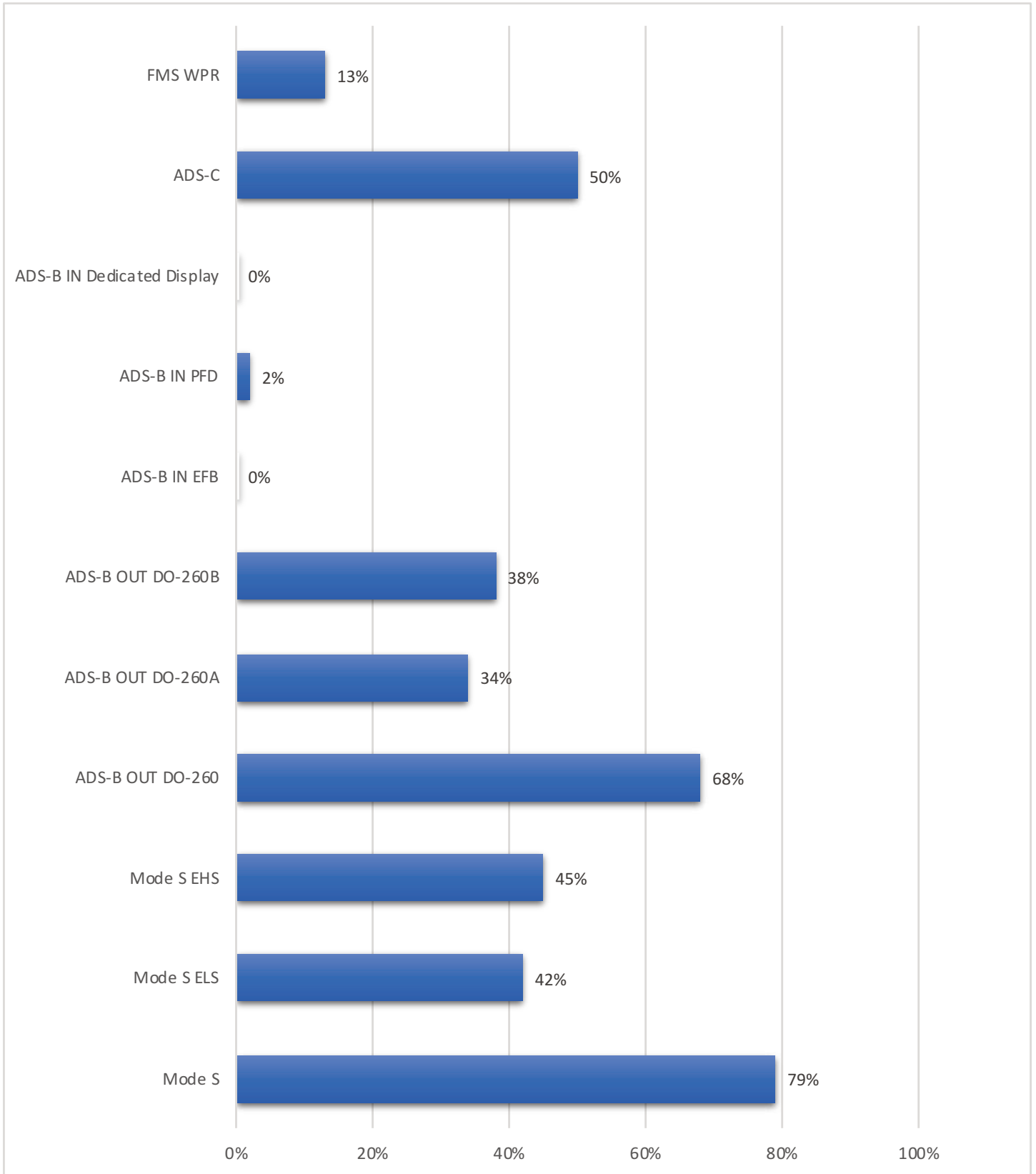


Vancouver



Washington





Work In Progress

All Americas Region airspace users including airlines, business, military and general aviation are welcome to contribute to this series of equipage and capability reports.

The associated survey is located here...

Aircraft Equipage and Capability Survey

