



	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x
Туре	FRR	FRR	FRR	FRR	FRR			
Commit ID	79188bf	gd19215c	Released					
Commit Date	2022-03-13	2022-08-07	2022-11-03					
PIM-SM-1.1	RFC 4601 s3	p7 PIM-SM Pr	otocol Overvie	w				
MUST	PIM protocol path to each hop neighbor	l is to provi	ide the next n subnet.The ny PIM Join/I	e primary rol hop router a MRIB is used Prune message	along a multi d to determin	cast-capable	·	
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-1.2	NEGATIVE R	FC 4601 s3 p7	PIM-SM Proto	ocol Overview				
MUST	PIM protocol path to each	l is to provi n destination	ide the next n subnet. The	e primary rol hop router a e MRIB is use Prune message	along a multi ed to determi	cast-capable	:	
	Ubuntu 18.04:	Ubuntu 18.04:	Ubuntu 18.04:					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-1.3	RFC 4601 s3.	1 p8 Phase Or	ne: RP Tree					
MAY	traffic dest	tined for a r	multicast gro	expresses its oup. Typical isms might al	ly it does t	his using		
	untested Ubuntu 18.04:	untested Ubuntu 18.04:	untested Ubuntu 18.04:					
	pass	pass	pass					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-1.4	RFC 4601 s3.	.1 p8 Phase Or	ne: RP Tree					
MUST	Join message the group	es are resent	periodical	ly so long as	the receive	er remains in	1	
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-1.5	+	RFC 4601 s3.1					77				
MUST		ives these en	·		decapsulate	es them,					
INIOST		s them onto	_	_							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.6	RFC 4601 s3.	RFC 4601 s3.2 p9 Phase Two: Register-Stop									
MUST	Although Register-encapsulation may continue indefinitely, for these reasons, the RP will normally choose to switch to native forwarding. To do this, when the RP receives a register-encapsulated data packet from source S on group G, it will normally initiate an (S,G) source-specific Join towards S.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.7	RFC 4601 s3.	.2 p9 Phase Tv	vo: Register-St	ор							
MUST	When packets from S also start to arrive natively at the RP, the RP will be receiving two copies of each of these packets. At this point, the RP starts to discard the encapsulated copy of these packets, and it sends a RegisterStop message back to S's DR to prevent the DR unnecessarily encapsulating the packets.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.8	RFC 4601 s3.	.3 p10 Phase T	hree: Shortest	-Path Tree							
MUST	the DR, may	ower latencie optionally i ific shortest towards S.	initiate a tr	ransfer from	the shared t	tree to a					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release	Release	Release	Release	Release	Release	Release	Release			
	8.2.2	8.3	8.4	X.X.X	X.X.X	X.X.X	X.X.X	X.X.X			
PIM-SM-1.9	RFC 4601 s3.	3 p10 Phase T	hree: Shortest	-Path Tree							
MUST	At this point the receiver (or a router upstream of the receiver) will be receiving two copies of the data - one from the SPT and one from the RPT. When the first traffic starts to arrive from the SPT, the DR or upstream router starts to drop the packets for G from S that arrive via the RP tree. Free BSD 10.3 Free BSD 10.3 Free BSD 10.3										
	untested	untested	untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.10	RFC 4601 s3.	3 p10 Phase T	hree: Shortest	-Path Tree							
MUST	At this point the receiver (or a router upstream of the receiver) will be receiving two copies of the data - one from the SPT and one from the RPT. When the first traffic starts to arrive from the SPT, the DR or upstream router starts to drop the packets for G from S that arrive via the RP tree. In addition, it sends an (S,G) Prune message towards the RP. This is known as an (S,G,rpt) Prune. (Note: Here DUT is considered as an upstream router. The verification is made that the Join/Prune msg send by DUT has RPT-bit set)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.11	RFC 4601 s3.	4 p10 Source-	Specific Joins								
MAY	IGMPv3 permits a receiver to join a group and specify that it only wants to receive traffic for a group if that traffic comes from a particular source.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.12	NEGATIVE R	FC 4601 s3.4 _l	p10 Source-Sp	ecific Joins							
MAY	wants to rec	ceive traffic source.	er to join a c for a group	o if that tra	affic comes f	_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-1.13	RFC 4601 s3.	4 p10 Source-	Specific Joins								
MAY	The range of multicast addresses from 232.0.0.0 to 232.255.255.255 is currently set aside for source-specific multicast in IPv4. For groups in this range, receivers should only issue source-specific IGMPv3 joins. If a PIM router receives a non-source-specific join for a group in this range, it should ignore it.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.14	NEGATIVE RFC 4601 s3.4 p10 Source-Specific Joins										
MAY	The range of multicast addresses from 232.0.0.0 to 232.255.255.255 is currently set aside for source-specific multicast in IPv4. For groups in this range, receivers should only issue source-specific IGMPv3 joins. If a PIM router receives a non-source-specific join for a group in this range, it should ignore it. (Note: Send IGMPv3 Membership Report with empty source list)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-1.15	RFC 4601 s3.	5 p10 Source-	Specific Prune	s							
MAY	RFC 4601 s3.5 p10 Source-Specific Prunes IGMPv3 also permits a receiver to join a group and specify that it only wants to receive traffic for a group if that traffic does not come from a specific source or sources. In this case, the DR will perform a (*,G) join as normal, Free BSD 10.3 Free BSD 10.3 Free BSD 10.3										
	untested Ubuntu 18.04:	untested Ubuntu 18.04:	untested Ubuntu 18.04:								
	inconclusive Free BSD 12.0	inconclusive Free BSD 12.0	inconclusive Free BSD 12.0								
	untested	untested	untested								
PIM-SM-1.16	RFC 4601 s3.	7 p12 RP Disc	overy								
MAY	for which the automatical through state	ney have (*,0	G) state. Thi pedded-RP), t ation.	ress of the F s address is through a boo	obtained ei	ther					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-1.17	RFC 4601 s3.	.7 p12 RP Disc	covery							
MAY	PIM-SM routers need to know the address of the RP for each group for which they have (*,G) state. This address is obtained either automatically (e.g., embedded-RP), through a bootstrap mechanism or through static configuration. (Note: through static configuration)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-1.18	ANVL Setup Verification									
MUST	Quick test to	to verify tha	at DUT sends	Assert messa	age with meta	ric value				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-1.19	ANVL Setup \	/erification								
MUST		to verify the	at DUT sends lly	Assert messa	age with meta	ric				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-1.20	ANVL Setup \	Verification								
MUST	1	_	at DUT sends it come from		sage with II	? Source set				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	
PIM-SM-3.1	RFC 4601 s4	.1.3 p17 (*,G) \$	State			•		•	
MUST	Join(*,G) me	m (*,G) Join, essages, and N interface.			_		1		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-3.2	RFC 4601 s4	.1.3 p17 (*,G) \$	State						
MUST	The last RPI changes then so, then we neighbor								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-3.3	RFC 4601 s4	.1.3 p17 (*,G) \$	State			•	•	•	
MUST	The last RPF neighbor towards the RP is stored because if the MRIB changes then the RPF neighbor towards the RP may change. If it does so, then we need to trigger a Prune(*,G) to the old upstream neighbor.								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-4.1	RFC 4601 s4	.1.4 p19 (S,G)	State						
MUST	Join(S,G) me	m (S,G) Join, essages, and N interface.			_		1		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						



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	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-4.2	RFC 4601 s4.	.1.4 p19 (S,G)	L State			<u> </u>		l			
MUST	The last RPF neighbor towards the S is stored because if the MRIB changes then the RPF neighbor towards the S may change. If it does so, then we need to trigger a new Join (S,G) to the new upstream neighbor										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-4.3	RFC 4601 s4.	1.4 p19 (S,G)	State								
MUST	changes then so, then we neighbor.	F neighbor to n the RPF ne need to trig	ighbor toward	ds the S may	change. If	it does	ı	ı			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: FAIL								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-4.4	RFC 4601 s4.	1.4 p19 (S,G)	State								
MUST	If the router detects through a changed GenID in a Hello message that the upstream neighbor towards S has rebooted, then it should re-instantiate state by sending a Join(S,G).										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-4.5	NEGATIVE R	FC 4601 s4.1.	4 p19 (S,G) Sta	ate							
MUST	(S,G) Shorte (S,G) state when the sou FALSE, only G. When SP	est Path Tree and still be arce-specific (*,G) forwan Fbit is TRUE	e (SPT) or or e forwarding tree is being state in both (*,G)	n the (*,G) to on (*,G) sta ing construct is used to fo and (S,G) fo	tree. A route during the during the during the december of the	ne interval PTbit is					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-4.6	NEGATIVE R	FC 4601 s4.1.4	4 p19 (S,G) Sta	ate							
MUST	The SPTbit is used to indicate whether forwarding is taking place on the (S,G) Shortest Path Tree (SPT) or on the (*,G) tree. A router can have (S,G) state and still be forwarding on (*,G) state during the interval when the source-specific tree is being constructed. When SPTbit is FALSE, only (*,G) forwarding state is used to forward packets from S to G. When SPTbit is TRUE, both (*,G) and (S,G) forwarding state are used. (Note: when SPTbit is FALSE, because JoinDesired(S,G) == FALSE for different group)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-4.7	RFC 4601 s4.	RFC 4601 s4.1.4 p19 (S,G) State									
MUST	The SPTbit is used to indicate whether forwarding is taking place on the (S,G) Shortest Path Tree (SPT) or on the (*,G) tree. A router can have (S,G) state and still be forwarding on (*,G) state during the interval when the source-specific tree is being constructed. When SPTbit is FALSE, only (*,G) forwarding state is used to forward packets from S to G. When SPTbit is TRUE, both (*,G) and (S,G) forwarding state are used. (Note: when SPTbit is TRUE)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-4.8	RFC 4601 s4.	1.4 p20 (S,G)	State								
MUST	rules" - whe	en the RP use	nis is necess es (S,G) joir traffic from	ns to stop er	capsulation,	and then					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								



PIM Results



Release Release Release Release Release Release Release Release 8.2.2 8.3 8.4 X.X.X X.X.X X.X.X X.X.X X.X.X PIM-SM-5.1 RFC 4601 s4.2 p27 Data Packet Forwarding Rules if(iif == RPF_interface(S) AND SPTbit(S,G) == TRUE) { MUST oiflist = inherited_olist(S,G) } else if(iif == RPF_interface(RP(G)) AND SPTbit(S,G) == FALSE) { oiflist = inherited_olist(S,G,rpt) CheckSwitchToSpt(S,G) else { # Note: RPF check failed # A transition in an Assert FSM, may cause an Assert(S,G) # or Assert(*,G) message to be sent out interface iif. # See section 4.6 for details. if ($SPTbit(S,G) == TRUE \ AND \ iif is in inherited_olist(S,G)$) { send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND iif is in inherited_olist(S,G,rpt) { send Assert(*,G) on iif oiflist = oiflist (-) iif forward packet on all interfaces in oiflist (Note: If the SPT-bit of an (S,G) entry is set, and if incoming interface is the same as a matching (S,G) ifaceIn, the packet is forwarded to the oif-list of (S,G)) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested untested Ubuntu 18.04: Ubuntu 18.04: Ubuntu 18.04: pass pass pass Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested untested untested





Release Release Release Release Release Release Release Release 8.2.2 8.3 8.4 X.X.X X.X.X X.X.X X.X.X X.X.X PIM-SM-5.2 NEGATIVE RFC 4601 s4.2 p27 Data Packet Forwarding Rules if(iif == RPF_interface(S) AND SPTbit(S,G) == TRUE) { MUST oiflist = inherited_olist(S,G) } else if(iif == RPF_interface(RP(G)) AND SPTbit(S,G) == FALSE) { oiflist = inherited_olist(S,G,rpt) CheckSwitchToSpt(S,G) else { # Note: RPF check failed # A transition in an Assert FSM, may cause an Assert(S,G) # or Assert(*,G) message to be sent out interface iif. # See section 4.6 for details. if ($SPTbit(S,G) == TRUE \ AND \ iif is in inherited_olist(S,G)$) { send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND iif is in inherited_olist(S,G,rpt) { send Assert(*,G) on iif oiflist = oiflist (-) iif forward packet on all interfaces in oiflist (Note: If the SPT-bit of an (S,G) entry is set, and if incoming interface is same as RPF_interface(s), the packet is forwarded to the oif-list of (S,G)) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested untested Ubuntu 18.04: Ubuntu 18.04: Ubuntu 18.04: pass pass pass Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested untested untested





Release Release Release Release Release Release Release Release 8.2.2 8.3 8.4 X.X.X X.X.X X.X.X X.X.X X.X.X PIM-SM-5.3 RFC 4601 s4.2 p27 Data Packet Forwarding Rules if(iif == RPF_interface(S) AND SPTbit(S,G) == TRUE) { MUST oiflist = inherited_olist(S,G) } else if(iif == RPF_interface(RP(G)) AND SPTbit(S,G) == FALSE) { oiflist = inherited_olist(S,G,rpt) CheckSwitchToSpt(S,G) } else { # Note: RPF check failed # A transition in an Assert FSM, may cause an Assert(S,G) # or Assert(*,G) message to be sent out interface iif. # See section 4.6 for details. if ($SPTbit(S,G) == TRUE \ AND \ iif is in inherited_olist(S,G)$) { send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND iif is in inherited_olist(S,G,rpt) { send Assert(*,G) on iif oiflist = oiflist (-) iif forward packet on all interfaces in oiflist (Note: On receiving multicast data packet if SPT-bit of an (S,G) entry is cleared, and ifaceIn differs than a matching (S,G) ifaceIn but matches with a (*,G) ifaceIn, packet is forwarded to the oif-list of (*,G)) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested untested Ubuntu 18.04: Ubuntu 18.04: Ubuntu 18.04: pass pass pass Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested untested untested





Release Release Release Release Release Release Release Release 8.2.2 8.3 8.4 X.X.X X.X.X X.X.X X.X.X X.X.X PIM-SM-5.4 RFC 4601 s4.2 p27 Data Packet Forwarding Rules if(iif == RPF_interface(S) AND SPTbit(S,G) == TRUE) { MUST oiflist = inherited_olist(S,G) } else if(iif == RPF_interface(RP(G)) AND SPTbit(S,G) == FALSE) { oiflist = inherited_olist(S,G,rpt) CheckSwitchToSpt(S,G) } else { # Note: RPF check failed # A transition in an Assert FSM, may cause an Assert(S,G) # or Assert(*,G) message to be sent out interface iif. # See section 4.6 for details. if ($SPTbit(S,G) == TRUE \ AND \ iif is in inherited_olist(S,G)$) { send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND iif is in inherited_olist(S,G,rpt) { send Assert(*,G) on iif oiflist = oiflist (-) iif forward packet on all interfaces in oiflist (Note: On receiving multicast data packet, if incoming interface does not match (S,G) ifaceIn or (*,G) ifaceIn, the packet is not forwarded) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested untested Ubuntu 18.04 Ubuntu 18.04: Ubuntu 18.04: pass pass pass Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested





Release Release Release Release Release Release Release Release 8.2.2 8.3 8.4 X.X.X X.X.X x.x.x X.X.X X.X.X PIM-SM-5.5 RFC 4601 s4.2 p27 Data Packet Forwarding Rules if(iif == RPF_interface(S) AND SPTbit(S,G) == TRUE) { MUST oiflist = inherited_olist(S,G) } else if(iif == RPF_interface(RP(G)) AND SPTbit(S,G) == FALSE) { oiflist = inherited_olist(S,G,rpt) CheckSwitchToSpt(S,G) else { # Note: RPF check failed # A transition in an Assert FSM, may cause an Assert(S,G) # or Assert(*,G) message to be sent out interface iif. # See section 4.6 for details. if (SPTbit(S,G) == TRUE AND iif is in inherited_olist(S,G)) { send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND iif is in inherited_olist(S,G,rpt) { send Assert(*,G) on iif oiflist = oiflist (-) iif forward packet on all interfaces in oiflist (Note: If the SPT-bit of an (S,G) entry is not set, and if incoming interface is the same as a matching $RPF_interface(RP(G))$, the packet is forwarded to the oif-list of (S,G,rpt)) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested untested Ubuntu 18.04: Ubuntu 18.04: Ubuntu 18.04: pass pass pass Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested untested untested PIM-SM-5.6 RFC 4601 s4.2 p27 Data Packet Forwarding Rules if (SPTbit(S,G) == TRUE AND iif is in inherited_olist(S,G)) { MUST send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND iif is in inherited_olist(S,G,rpt) { send Assert(*,G) on iif (Note: On receipt a data from S to G on interface iif, if SPT-bit is TRUE, it will send an Assert(S,G) on iif.) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested untested Ubuntu 18.04: Ubuntu 18.04: Ubuntu 18.04: inconclusive pass pass Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested untested untested





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-5.7	RFC 4601 s4.	2 p27 Data Pa	cket Forwardir	g Rules							
MUST	<pre>if (SPTbit(S,G) == TRUE AND iif is in inherited_olist(S,G)) { send Assert(S,G) on iif } else if (SPTbit(S,G) == FALSE AND</pre>										
	Free BSD 10.3 Free BSD 10.3 untested untested untested										
	Ubuntu 18.04: Ubuntu 18.04: FAIL FAIL FAIL										
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-6.1	RFC 4601 s4.	2.2 p29 Setting	g and Clearing	the (S,G) SPT	bit						
MUST	void Update_SPTb: if (iif : AND AND	Thus, when a packet arrives, the (S,G) SPTbit is updated as follows:									
		, the RPF int Here RP Tree				PF interface					
	Free BSD 10.3 untested										
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-6.2	RFC 4601 s4.	2.2 p29 Setting	g and Clearing	the (S,G) SPT	bit						
MUST	Thus, when a void Update_SPTb: if (iif = AND AND AND Set SPT } }	<pre>Thus, when a packet arrives, the (S,G) SPTbit is updated as follows: void Update_SPTbit(S,G,iif) { if (iif == RPF_interface(S) AND JoinDesired(S,G) == TRUE AND (DirectlyConnected(S) == TRUE OR RPF_interface(S) != RPF_interface(RP(G)) OR inherited_olist(S,G,rpt) == NULL OR ((RPF'(S,G) == RPF'(*,G)) AND</pre>									
	is set to TF Free BSD 10.3 untested Ubuntu 18.04:	Free BSD 10.3 untested Ubuntu 18.04:	Free BSD 10.3 untested								
	pass Free BSD 12.0 untested	pass Free BSD 12.0 untested	pass Free BSD 12.0 untested								
PIM-SM-6.5	RFC 4601 s4.2.2 p29 Setting and Clearing the (S,G) SPTbit										
MUST	<pre>Thus, when a packet arrives, the (S,G) SPTbit is updated as follows: void Update_SPTbit(S,G,iif) { if (iif == RPF_interface(S) AND JoinDesired(S,G) == TRUE AND (DirectlyConnected(S) == TRUE OR RPF_interface(S) != RPF_interface(RP(G)) OR inherited_olist(S,G,rpt) == NULL OR ((RPF'(S,G) == RPF'(*,G)) AND</pre>										
	Here no RP inherited_ol	Tree is built list(S,G,rpt)				R₽).					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-6.6	RFC 4601 s4.	2.2 p29 Setting	g and Clearing	the (S,G) SPT	bit						
MUST	Set SP: } Here the Jo: is set to Fi inherited_o:	<pre>Update_SPTbit(S,G,iif) { if (iif == RPF_interface(S) AND JoinDesired(S,G) == TRUE AND (DirectlyConnected(S) == TRUE OR RPF_interface(S) != RPF_interface(RP(G)) OR inherited_olist(S,G,rpt) == NULL OR (RPF'(S,G) == RPF'(*,G)) AND</pre>									
	Free BSD 10.3 untested Ubuntu 18.04: pass	Free BSD 10.3 untested Ubuntu 18.04: pass	Free BSD 10.3 untested	!= NULL							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-7.1	RFC 4601 s4.	3.1 p30 Sendi	ng Hello Messa	ages			•				
MUST	PIM Hello messages are sent periodically on each PIM-enabled interface. Hello messages must be sent every <hello-period> seconds.</hello-period>										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-7.2	RFC 4601 s4.	3.1 p30 Sendi	ng Hello Messa	ages							
MUST	point-to-po:	ges MUST be sint links, an 24.0.0.13' fo	nd are multic	cast to the `	ALL-PIM-ROUT						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								



FRROUTING RFC Compliance Test Report PIM Results



	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-7.3	RFC 4601 s4.	3.1 p31 Sendi	ng Hello Messa	ages		•	•	•			
MUST		at interface	an interface is set to a								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-7.5	NEGATIVE R	FC 4601 s4.3.	1 p31 Sending	Hello Message	es						
MAY	a router uni	Note that neighbors will not accept Join/Prune or Assert messages from a router unless they have first heard a Hello message from that router. (Note: This test is for (*,G) join state)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-7.6	NEGATIVE R	FC 4601 s4.3.	1 p31 Sending	Hello Message	es						
MAY	Note that neighbors will not accept Join/Prune or Assert messages from a router unless they have first heard a Hello message from that router. (Note: This test is for (S,G) join state)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-7.7	RFC 4601 s4.	3.1 p31 Sendi	ng Hello Messa	ages RFC 460°	1 s4.6 p83 PIM	1 Assert Messa	ges				
MUST	a router und AND If a router and it has n	receives an		rd a Hello me age from a pa sage from tha	essage from a articular IP at source add	source addredress, then t					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-7.8	RFC 4601 s4.	.3.1 p31 Sendi	ng Hello Messa	ages						
SHOULD	The DR_Priority Option SHOULD be included in every Hello message, even if no DR Priority is explicitly configured on that interface.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-7.9	RFC 4601 s4.	.3.1 p31 Sendii	ng Hello Messa	ages						
SHOULD	included in configured of DR election that they as priority is	on that inter is only enak re capable of 1.	message, ever face. This oled when all f using the I	is necessary neighbors o	v because pri on an interfa	iority-based ace advertise				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-7.10	RFC 4601 s4.	.3.1 p31 Sendii	ng Hello Messa	ages						
SHOULD	The Generat: Hello messag		er (GenID) Op	otion SHOULD	be included	in all				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-7.11	RFC 4601 s4.	.3.1 p31 Sendii	ng Hello Messa	ages						
MUST	is regenerat	ted each time	ns a randomly e PIM forward ding when the	ling is start	ed or restar	rted				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-7.12	RFC 4601 s4	.3.1 p31 Sendi	ng Hello Messa	ages		•	•	•		
SHOULD		ne Delay Opt: ti-access LAN		e included ir	n all Hello r	nessages				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-8.1	RFC 4601 s4.	.3.2 p33 DR El	ection			l	<u> </u>	l		
MUST	Bool dr_is_l if(there is fa: return } else return } }	n (a.dr_prio (a.dr_prio a.primary	or n on I for ip_address &g ority > b ority == b.dr y_ip_address	which n.dr_gt; b.primary.dr_priority Aleggt; b.prima	priority_previp_address) OR ID ary_ip_addres	esent ss)				
	Note: If no DR-priority option is specified in a Hello message, the neighbor with the highest IP address is elected as the DR.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-8.2	RFC 4601 s4.	.3.2 p33 DR El	ection			l	<u> </u>	<u> </u>		
MUST	Bool dr_is_) if(there is fa: return } else return } }	n (a.dr_prio (a.dr_prio a.primary	or n on I for ip_address &g ority > b ority == b.dn y_ip_address	which n.dr_gt; b.primary_dr_priority Al > b.prima	priority_prev_ ip_address) OR ID ary_ip_addres	esent ss)				
	Note: If DR-priority option is specified in a Hello message. The DR Priority is a 32-bit unsigned number and the numerically larger priority is always preferred. (When DUT is elected as DR)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-8.3	RFC 4601 s4.	3.2 p33 DR El	ection								
MUST	Bool dr_is_t if(there is fal return } else return } Note: If DR- DR Priority larger prior	The function used for comparing DR "metrics" on interface I is: Bool dr_is_better(a,b,I) { if(there is a neighbor n on I for which n.dr_priority_present is false) { return a.primary_ip_address > b.primary_ip_address } else { return (a.dr_priority > b.dr_priority) OR									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-8.4	RFC 4601 s4.	3.2 p33 DR El	ection								
MUST											
	Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested										
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-8.5	RFC 4601 s4.	3.2 p33 DR EI	ection							
MUST	Bool dr_is_l if(there is fa: return } else return } Note: If DR with the DR address is 6	petter(a,b,I is a neighbolse) { n a.primary_: { n (a.dr_prid a.primarypriority opt	or n on I for ip_address &g prity > b prity == b.dr y_ip_address tion is specified equal to the ne DR.	which n.dr_gt; b.primary dr_priority priority AN > b.prima	_priority_prev_ ip_address) OR ID ary_ip_addrese	esent ss) the neighbo	r			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-8.6	RFC 4601 s4.	3.2 p33 DR El	ection			•				
MUST	The Neighbor Liveness Timer (NLT(N,I)) is reset to Hello_Holdtime (from the Hello Holdtime option) whenever a Hello message is received containing a Holdtime option, or to Default_Hello_Holdtime if the Hello message does not contain the Holdtime option.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-8.7	RFC 4601 s4.	3.2 p33 DR El	ection							
MUST	The Neighbor Liveness Timer (NLT(N,I)) is reset to Hello_Holdtime (from the Hello Holdtime option) whenever a Hello message is received containing a Holdtime option, or to Default_Hello_Holdtime if the Hello message does not contain the Holdtime option. (Note: ANVL sends Hello message that contains Holdtime option, from <mcast-router-b>, NLT is set to Hello_Holdtime)</mcast-router-b>									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-8.8	RFC 4601 s4.	3.2 p34 DR El	ection							
MAY	a PIM Hello a router's o		received, who	n an interfac en a neighbor	_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-8.9	RFC 4601 s4.	3.2 p34 DR El	ection							
MUST	a PIM Hello a router's o	message is n own DR Priori	received, whe	n an interfac en a neighbor nges)						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-8.10	RFC 4601 s4.3.2 p34 DR Election									
MAY	A router's idea of the current DR on an interface can change when a PIM Hello message is received, when a neighbor times out, or when a router's own DR priority changes. If the router becomes the DR or ceases to be the DR, this will normally cause the DR Register state-machine to change state. (Here selection of the new DR to be one with the highest IP address)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-9.1	RFC 4601 s4.	3.3 p34 Reduc	cing Prune Prop	pagation Delay	on LANs					
MUST	the LAN Pruma link adventors (Note: when & Effective	ne Delay opti rtise the opt lan_delay_er	ion is not us tion. nabled is FAI terval(I) ret	ne informations and unless all assertions. SE, both Efficurn Propagat	l neighbors	on agation_Delay	γ(I),			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release	Release	Release	Release	Release	Release	Release	Release			
	8.2.2	8.3	8.4	X.X.X	X.X.X	X.X.X	X.X.X	x.x.x			
PIM-SM-9.3	RFC 4601 s4.	3.3 p35 Reduc	cing Prune Pro	pagation Delay	on LANs						
MUST	When all routers on a link are in a position to negotiate a Propagation Delay different from the default, the largest value from those advertised by each neighbor is chosen. (Note: for Effective_Propagation_Delay(I) & (*,G) state)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-9.5	RFC 4601 s4.3.3 p36 Reducing Prune Propagation Delay on LANs										
MUST	Interval dis	Then all routers on a link are in a position to negotiate an Override interval different from the default, the largest value from those advertised by each neighbor is chosen. Note: for Effective_Override_Interval(I) & (*,G) state)									
	untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-10.1	RFC 4601 s4.	4 p38 PIM Reg	gister Message	s							
MUST	encapsulates the relevant	s multicast p	packets from ss it recentl	or point-to- local source ly received a n the RP.	s to the RP						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-10.2	NEGATIVE R	FC 4601 s4.4 ¡	o38 PIM Regis	ter Messages							
MUST	The Designated Router (DR) on a LAN or point-to-point link encapsulates multicast packets from local sources to the RP for the relevant group unless it recently received a Register Stop message for that (S,G) or (*,G) from the RP.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release	Release	Release	Release	Release	Release	Release	Release	
	8.2.2	8.3	8.4	X.X.X	X.X.X	x.x.x	X.X.X	X.X.X	
PIM-SM-10.3	RFC 4601 s4.	4 p38 PIM Re	gister Message	s					
MUST	The Designated Router (DR) on a LAN or point-to-point link encapsulates multicast packets from local sources to the RP for the relevant group unless it recently received a Register-Stop message for that (S,G) or (*,G) from the RP. Free BSD 10.3 Free BSD 10.3 Free BSD 10.3								
	untested	untested	untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-10.4	RFC 4601 s4.	4 p38 PIM Reg	gister Message	s					
MUST	a Register S Stop timer of allow the RI	Stop timer to expires, the P to refresh	Register Stop maintain th DR sends a N the Register	nis state. Ju Jull-Register	st before the Message to	ne Register the RP to			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-11.1	RFC 4601 s4.	4.1 p39 Sendii	ng Register Me	essages from th	ne DR				
MUST	In Join(J) state if DR receives RegisterStop Message, then it will go to Prune(P) state by removing register tunnel and set Register-Stop Timer.								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-11.2	RFC 4601 s4.	4.1 p39 Sendiı	ng Register Me	essages from th	ne DR	•		•	
MUST	go to NoInfo	o(NI) State 8	ldRegister(S, remove reg -> FALSE))->FALSE	tunnel		will			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-11.3	RFC 4601 s4.	4.1 p39 Sendi	ng Register Me	essages from th	ne DR						
MUST	In Join(J) state if RP(G) changes, then the DR updates Register tunnel										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-11.4	RFC 4601 s4.	RFC 4601 s4.4.1 p39 Sending Register Messages from the DR									
MUST		_	te if RegStor ing the regis	_	res then the	DR will go					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-11.5	RFC 4601 s4.	4.1 p39 Sendi	ng Register Me	essages from th	ne DR						
MUST	1	_	te if RP char ister tunnel								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-11.6	RFC 4601 s4.	4.1 p39 Sendi	ng Register Me	essages from th	ne DR						
MUST	In Join Pending(JP) state if CouldRegister(S,G) becomes false then it will go to NoInfo(NI) State Here CouldRegister(S,G) -> FALSE is achieved by making I_am_DR(RPF_interface(S))->FALSE										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								



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	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x
PIM-SM-11.7	RFC 4601 s4	.4.1 p39 Sendi	ng Register Me	essages from th	ne DR			
MUST		<u> </u>	te if RegStop RegStop timer			-		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-11.8	RFC 4601 s4	.4.1 p39 Sendi	ng Register Me	essages from th	ne DR			
MUST	In Prune(P) Null-Regist	-	gister-Stop t	cimer expires	then the DF	R will send		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-11.9	RFC 4601 s4	.4.1 p39 Sendi	ng Register Me	essages from th	ne DR			
MUST	go to NoInfo Here CouldRo	o(NI) State	ıldRegister(§ -> FALSE))->FALSE			t will		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-11.10	RFC 4601 s4	.4.1 p39 Sendi	ng Register Me	essages from th	ne DR			
MUST			(G) changes, l; cancel Reg			ı(J) state	_	
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-11.11	RFC 4601 s4.	4.1 p39 Sendii	ng Register Me	essages from th	ne DR		•				
MUST	go to Join(d Here CouldRe	J) State, add	ling register -> TRUE i	becomes true tunnel s achieved k		.11					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-11.12	RFC 4601 s4.	RFC 4601 s4.4.1 p42 Sending Register Messages from the DR									
MUST		Stop(*,G) sho ter state mad		ed as a Regi	ster-Stop(S,	G) for all					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-12.1	RFC 4601 s4.	4.2 p43 Recei	/ing Register M	lessages at the	e RP						
MUST	decided accepacket_arriv	ording to the ves_on_rp_tur it(S,G) OR cchToSptDesin nerited_olist Register-Stop vitch on firs Desired(S,G) c the source ced_olist(S,G)	e following panel(pkt) { red(S,G) AND red(S,G) == NUI red(S,G) to on retur; return true and group. returl A	[LL)))) {	implemented e packet has SptDesired(S	by making s been S,G) == TRUE))				
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-12.2	NEGATIVE R	FC 4601 s4.4.2	2 p43 Receivin	g Register Mes	ssages at the F	RP				
MUST	decided accordance	receives a Representation of the ves_on_rp_ture RP(G) AND out	e following p nnel(pkt) {	seudocode:	se of action	n is				
	if(} }	<pre>if(!SPTbit(S,G) AND !pkt.NullRegisterBit) { decapsulate and forward the inner packet to inherited_olist(S,G,rpt) # Note (+) } </pre>								
	with Null-Re	Note: If (S,G) entry with SPT bit set to TRUE, and received Register ith Null-Register-Bit set to FALSE then RP don't decapsulate and ass the inner packet to the normal forwarding path.)								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-12.3	NEGATIVE R	FC 4601 s4.4.2	2 p43 Receivin	g Register Mes	ssages at the F	RP				
MUST	decided accordance	receives a Representation of the ves_on_rp_ture RP(G) AND out	e following p nnel(pkt) {	seudocode:	se of action	n is				
	if(}	_	and forward	ullRegisterBi d the inner p	acket to					
	with Null-Re	S,G) entry wi egister-Bit s ner packet to	set to TRUE t	hen RP don't	decapsulate					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-12.4	RFC 4601 s4.	4.2 p43 Recei	ving Register M	lessages at the	e RP						
MUST	decided accordance	receives a Re ording to the ves_on_rp_tur RP(G) AND out	e following p nnel(pkt) {		se of action	n is					
	if(} }	<pre>if(!SPTbit(S,G) AND !pkt.NullRegisterBit) { decapsulate and forward the inner packet to inherited_olist(S,G,rpt) # Note (+) } }</pre>									
	and received	there is no (S,G) entry, i.e. SPTbit set to FALSE d received Register has Null-Register-Bit set to FALSE then decapsulate and pass the inner packet to the normal rwarding path for forwarding on the (*,G) tree.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-12.5	RFC 4601 s4.	4.2 p43 Recei	ving Register M	lessages at the	e RP						
MUST	decided accorpacket_arriv	ording to the ves_on_rp_tur n_RP(G) &&	e following p nnel(pkt) { outer.dst ==	= RP(G)) {	se of action	ı is					
	Message	tested if (I_	_amRP(G) -	-> FALSE)	RP sent a Re	egister-Stop					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-12.6	RFC 4601 s4.	FC 4601 s4.4.2 p43 Receiving Register Messages at the RP								
MUST	When an RP receives a Register message, the course of action is decided according to the following pseudocode: packet_arrives_on_rp_tunnel(pkt) {									
		if(I_am_RP(G) && outer.dst == RP(G)) {								
	send # No }	<pre> } else { send Register-Stop(S,G) to outer.src # Note (*) } Gere it is tested if (I_am_RP(G) -> FALSE) RP does not forward the data </pre>								
	Free BSD 10.3	Free BSD 10.3	Free BSD 10.3							
	untested	untested	untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-12.7	RFC 4601 s4.	4.2 p43 Recei	ving Register M	lessages at the	e RP					
MUST	<pre>When an RP receives a Register message, the course of action is decided according to the following pseudocode: packet_arrives_on_rp_tunnel(pkt) {</pre>									
	Free BSD 10.3	.dst == RP(G) Free BSD 10.3	Free BSD 10.3							
	untested	untested	untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-12.8	RFC 4601 s4.	.4.2 p43 Recei	ving Register N	lessages at the	e RP					
MUST	When an RP receives a Register message, the course of action is decided according to the following pseudocode: packet_arrives_on_rp_tunnel(pkt) { if(I_am_RP(G) AND outer.dst == RP(G)) {									
	<pre>if(!SPTbit(S,G) AND !pkt.NullRegisterBit) { decapsulate and forward the inner packet to inherited_olist(S,G,rpt) # Note (+) } }</pre>									
	If there is no (S,G) entry, i.e. SPTbit set to FALSE and received Register has Null-Register-Bit set to TRUE then RP doesn't decapsulate and pass the inner packet to the normal forwarding path for forwarding on the (*,G) tree.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-12.9	RFC 4601 s4.	.4.2 p44 Recei	ving Register N	lessages at the	e RP					
MUST	When forwarding a packet from the Register Tunnel, the TTL of the original data packet is decremented after it is decapsulated.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-12.10	NEGATIVE R	FC 4601 s4.4.2	2 p44 Receivin	g Register Me	ssages at the F	RP				
MUST	When forwarding a packet from the Register Tunnel, the TTL of the original data packet is decremented after it is decapsulated.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-12.11	RFC 4601 s4.	.4.2 p44 Recei	ving Register N	lessages at the	e RP					
MUST	packet to th	oits should b ne decapsulat		om the IP hea	ader of the F	Register				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-14.1	RFC 4601 s4.5.2 p49 Receiving (*,G) Join/Prune Messages									
MAY	If the RP in the message does not match RP(G) the Join(*,G) should be silently dropped.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.2	RFC 4601 s4.	5.2 p49 Recei	ving (*,G) Join/	Prune Messag	es					
MAY	BSR message		nformation (e y choose to a		_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.3	RFC 4601 s4.	5.2 p49 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	Received $Prune(*,G)$ messages are processed even if the RP in the message does not match $RP(G)$.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.4	RFC 4601 s4.5.2 p49 Receiving (*,G) Join/Prune Messages									
MAY	BSR message		nformation (e 7 choose to a		_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-14.5	RFC 4601 s4	.5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	In NoInfo(NI) state by receiving Prune(*,G) message the (*,G) downstream state machine on interface I remains in the NoInfo state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.6	RFC 4601 s4	.5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST		_	receiving Joi e on interfac							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.7	NEGATIVE R	FC 4601 s4.5.2	2 p50 Receivin	g (*,G) Join/Pr	une Messages					
MUST	In NoInfo(NI) state by receiving Join(*,G) message the (*,G) downstream state machine on interface I transitions to the Join state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.8	RFC 4601 s4	.5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es	•	•	•		
MUST	In NoInfo(NI) state by receiving Prune(*,G) message the (*,G) downstream state machine on interface I remains in the NoInfo(NI) state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-14.9	RFC 4601 s4	.5.2 p50 Recei	ıving (*,G) Join/	L Prune Messag	es			<u> </u>		
MUST	In Join(J) state by receiving Join(*,G) message the (*,G) downstream state machine on interface I remains in Join state, and the Expiry Timer (ET) is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune mesage. (Note: When current value is smaller than HoldTime from the triggering Join/Prune message)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.10	RFC 4601 s4	.5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	downstream : the Expiry 'value and the	state by recestate machine Fimer (ET) is the HoldTime to current valu message) Free BSD 10.3	e on interfaces restarted, from the trice	ce I remains set to maxim	in Join stat num of its cu Prune messag	irrent ge.				
	untested	untested	untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.11 MUST	RFC 4601 s4.5.2 p50 Receiving (*,G) Join/Prune Messages In Join(J) state by receiving Join(*,G) message the (*,G) downstream state machine on interface I remains in Join state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.12	RFC 4601 s4	.5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	In Join(J) state by receiving Prune(*,G) message The (*,G) downstream state machine on interface I transitions to the Prune-Pending state. The Prune-Pending Timer is started; it is set to the J/P_Override_Interval(I) if the router has more than one neighbor on that interface; otherwise it is set to zero causing it to expire immediately. (Note: Prune-Pending Timer expires immediately)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-14.13	RFC 4601 s4.	5.2 p50 Recei	/ing (*,G) Join/	Prune Messag	es		•			
MUST	In Join(J) state by receiving Prune(*,G) message the (*,G) downstream state machine on interface I transitions to the Prune-Pending state. The Prune-Pending timer is started; it is set to the J/P_Override_Interval(I) if the router has more than one neighbor on that interface;									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.14	RFC 4601 s4.	5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es	•	•	•		
MUST	state machin	state if the ne on interfa interface I t	ace I expires	s. The (*,G)	downstream s					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.15	RFC 4601 s4.	5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	In Prune-Pending(PP) state by receiving Prune(*,G) message the (*,G) downstream state machine on interface I remains into the Prune-Pending state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.16	RFC 4601 s4.	5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	(*,G) downst	nding(PP) sta cream state r ate. The Prur an expiry eve	nachine on ir ne-Pending ti	nterface I tr	ansitions to)				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	x.x.x	x.x.x		
PIM-SM-14.17	NEGATIVE R	FC 4601 s4.5.	2 p50 Receivin	g (*,G) Join/Pr	une Messages	i				
MUST	In Prune-Pending(PP) state by receiving Join(*,G) message the (*,G) downstream state machine on interface I transitions to the Join state. The Prune-Pending timer is canceled (without triggering an expiry event).									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.18	RFC 4601 s4.	5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	In Prune-Pending(PP) state by receiving Join(*,G) message the (*,G) downstream state machine on interface I transitions to the Join state. The Expiry Timer is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (Note: When current value is greater than HoldTime from the triggering Join/Prune message)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.19	RFC 4601 s4.	5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	In Prune-Pending(PP) state if the Expiry Timer for the (*,G) downstream state machine on interface I expires. The (*,G) downstream state machine on interface I transitions to the NoInfo state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-14.20	RFC 4601 s4.	5.2 p50 Recei	ving (*,G) Join/	Prune Messag	es					
MUST	downstream a	state machine state machine uneEcho(*,G)	ate if the Present on interface on interface is sent onto	ce I expires. ce I transiti	The (*,G) ons to the N	VoInfo				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	
PIM-SM-14.21	RFC 4601 s4.	5.2 p52 Recei	ving (*,G) Join/	Prune Messag	es				
MUST	In Prune-Pending(PP) state by receiving Join(*,G) message the (*,G) downstream state machine on interface I transitions to the Join state. The Expiry Timer is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (Note: When current value is smaller than HoldTime from the triggering Join/Prune message) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3								
	Ubuntu 18.04: pass Free BSD 12.0 untested	Ubuntu 18.04: pass Free BSD 12.0 untested	Ubuntu 18.04: pass Free BSD 12.0 untested						
PIM-SM-15.1	RFC 4601 s4.	5.3 p54 Recei	/ing (S,G) Join	/Prune Messaç	jes				
MUST	· ·	· -	_	une(S,G) mess ce I remains	-				
	Ubuntu 18.04: pass Free BSD 12.0 untested	Ubuntu 18.04: pass Free BSD 12.0 untested	Ubuntu 18.04: pass Free BSD 12.0 untested						
DIM OM 45 0									
PIM-SM-15.2 MUST	RFC 4601 s4.5.3 p54 Receiving (S,G) Join/Prune Messages In NoInfo(NI) state by receiving Join(S,G) message the (S,G) downstream state machine on interface I transitions to the Join state.								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-15.3	NEGATIVE R	FC 4601 s4.5.	3 p54 Receivin	g (S,G) Join/Pi	rune Messages	S			
MUST		· -	_	in(S,G) messa ce I transiti	-				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						





	Release	Release	Release	Release	Release	Release	Release	Release			
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	x.x.x	x.x.x			
PIM-SM-15.4	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	ges						
MUST	1	_	eiving Join(S e on interfac			ce.					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 Free BSD 12.0 Free BSD 12.0 untested untested										
PIM-SM-15.5	RFC 4601 s4.5.3 p54 Receiving (S,G) Join/Prune Messages										
MUST	In Join(J) state by receiving Join(S,G) message the (S,G) downstream state machine on interface I remains in Join state, and the Expiry Timer (ET) is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (When current value is greater than HoldTime from the triggering Join/Prune message) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3 untested untested										
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-15.6	RFC 4601 s4.	RFC 4601 s4.5.3 p54 Receiving (S,G) Join/Prune Messages									
MUST	In Join(J) state by receiving Join(S,G) message the (S,G) downstream state machine on interface I remains in Join state, and the Expiry Timer (ET) is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (When current value is smaller than HoldTime from the triggering Join/Prune message)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-15.7	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	jes						
MUST	downstream s Prune-Pendir started; it router has r it is set to	state machine ng state. The is set to the more than one o zero causin	eiving Prune(e on interface e Prune-Pendi ne J/P_Overri e neighbor or ng it to expi ner expires i	ce I transiti ng Timer is de_Interval(n that interf re immediate	ons to the I) if the ace; otherwi	se					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-15.8	RFC 4601 s4.	.5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	jes	l				
MUST	In Join(J) state by receiving Prune(S,G) message the (S,G) downstream state machine on interface I transitions to the Prune-Pending state. The Prune-Pending timer is started; it is set to the J/P_Override_Interval(I) if the router has more than one neighbor on that interface;									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-15.9	RFC 4601 s4.	.5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	jes					
MUST	RFC 4601 s4.5.3 p54 Receiving (S,G) Join/Prune Messages In Join(J) state by receiving Prune(S,G) message the (S,G) downstream state machine on interface I transitions to the Prune-Pending state. Tree BSD 12.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 free BSD 10.3 free BSD 10.3 untested Ubuntu 18.04: Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 10.3 free BSD 10.3 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 10.0 free BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 pree BSD 10.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 10.0 pree BSD 12.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 12.0 pree BSD 12.0 untested Ubuntu 18.04: Ubuntu 18.04: pass pass Free BSD 12.0 pree BSD 12.0 pree BSD 12.0 untested Ubuntu 18.04: Ubuntu 18.04: untested Ubuntu 18.04: untested									
PIM-SM-15.10	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	jes					
MUST	(S,G) downstream state machine on interface I remains into									
PIM-SM-15.11	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	jes					
MUST	(S,G) downst	tream state rate. The Prur	nachine on ir ne-Pending ti	nterface I tr	ansitions to					
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-15.12	NEGATIVE R	FC 4601 s4.5.	3 p54 Receivin	g (S,G) Join/P	rune Messages	5					
MUST	In Prune-Pending(PP) state by receiving $Join(S,G)$ message the (S,G) downstream state machine on interface I transitions to the Join state. The Prune-Pending timer is canceled (without triggering an expiry event).										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-15.13	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messag	ges						
MUST	In Prune-Pending(PP) state by receiving Join(S,G) message the (S,G) downstream state machine on interface I transitions to the Join state The Expiry Timer is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (Note: When current value is greater than HoldTime from the triggering Join/Prune message)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-15.14	RFC 4601 s4.	.5.3 p54 Recei	ving (S,G) Join	/Prune Messa	ges						
MUST	In Prune-Pending(PP) state by receiving Join(S,G) message the (S,G) downstream state machine on interface I transitions to the Join state The Expiry Timer is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (Note: When current value is smaller than HoldTime from the triggering Join/Prune message)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-15.15	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messa	ges						
MUST	downstream s	state machine state machine	ate if the Execution on interface	ce I expires.	The (S,G)						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release	Release	Release	Release	Release	Release	Release	Release			
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	x.x.x	x.x.x			
PIM-SM-15.16	RFC 4601 s4.	5.3 p54 Recei	ving (S,G) Join	/Prune Messaç	ges						
MUST	downstream a	state machine state machine uneEcho(S,G)	e on interface e on interface	rune-Pending ce I expires. ce I transiti o the subnet	The (S,G) ons to the N	IoInfo					
	untested	untested	untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-16.1	RFC 4601 s4.5.4 p58 Receiving (S,G,rpt) Join/Prune Messages In NoInfo(NI) state by receiving Join(S,G,rpt) message the (S,G,rpt)										
MUST		_		in(S,G,rpt) m ce I remains		_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-16.2	RFC 4601 s4.5.4 p58 Receiving (S,G,rpt) Join/Prune Messages										
MUST	In NoInfo(NI) state by receiving Prune(S,G,rpt) message the (S,G,rpt) downstream state machine on interface I transitions to Prune-Pending(PP) state The Prune-Pending timer is started; it is set to the J/P_Override_Interval(I) if the router has more than one neighbor on that interface; otherwise it is set to causing it to expire immediately (Note: Here DUT has only one downstream neighbor)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-16.3	RFC 4601 s4.	5.4 p58 Recei	ving (S,G,rpt) J	loin/Prune Mes	sages						
MUST	downstream state. The large state interface that interface	state machine Prune-Pending e_Interval(I) ace	e on interfact g timer is st g if the rout	nne(S,G,rpt) ce I transiti tarted; it is ter has more	ons to Prune s set to the than one nei	e-Pending(PP)					
	Free BSD 10.3	Free BSD 10.3 untested	Free BSD 10.3 untested		,						
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-16.4	RFC 4601 s4.	5.4 p58 Recei	ving (S,G,rpt) J	loin/Prune Mes	sages						
MUST	In Prune-Pending (PP) state by receiving Prune(S,G,rpt) message the (S,G,rpt) downstream state machine on interface I remains in the Prune-Pending(PP) state.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-16.5	RFC 4601 s4.	5.4 p58 Recei	ving (S,G,rpt) J	loin/Prune Mes	sages						
MUST	(S,G,rpt) do the Prune-Pe contain (S,G	ownstream sta ending-Tmp(PF G,rpt) Join/F	tate by receinate machine of P') state. If Prune informations to NoInformation	on interface the (*,G) mation the dow	I transition message does	ns to not					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-16.6	RFC 4601 s4.5.4 p58 Receiving (S,G,rpt) Join/Prune Messages										
MUST	In Prune-Pending (PP) state by receiving Join(S,G,rpt) message the (S,G,rpt) downstream state machine on interface I transitions to NoInfo state. ET and PPT are canceled.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: FAIL	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-16.7	RFC 4601 s4.	5.4 p58 Recei	ving (S,G,rpt) J	loin/Prune Mes	sages						
MUST	downstream s	state machine	tate if the Be on interface on interface	ce I expires.	The (S,G,r	ot))				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	
PIM-SM-16.8						AIAIA	AiAiA		
MUST	RFC 4601 s4.5.4 p58 Receiving (S,G,rpt) Join/Prune Messages In Pruned(P) state by receiving Join(*,G) message the (S,G,rpt) downstream state machine on interface I transitions to PruneTmp state. The end of the compound Join/Prune message is reached. The (S,G,rpt) downstream state machine on interface I transitions to the NoInfo state. ET is canceled. (Note: Here DUT has only one downstream neighbor)								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-16.9	RFC 4601 s4	.5.4 p58 Recei	ving (S,G,rpt)	Join/Prune Mes	sages				
MUST) state by restate machine		_		_			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-16.10	RFC 4601 s4	.5.4 p58 Recei	ving (S,G,rpt)	loin/Prune Mes	sages				
MUST) state by restate machine		_		_			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-16.11	RFC 4601 s4	.5.4 p58 Recei	ving (S,G,rpt)	loin/Prune Mes	sages				
MUST	downstream s Expiry Times and the Hold (Note: When triggering) state by restate machine r (ET) is restitution the drime from the current valuation of the Join/Prune me	e on interface started, set ne triggering ne is larger essage)	ce I remains to maximum o g Join/Prune	in Pruned st of its current message.	ate. The			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						





	Release	Release	Release	Release	Release	Release	Release	Release			
	8.2.2	8.3	8.4	X.X.X	X.X.X	X.X.X	X.X.X	X.X.X			
PIM-SM-16.12	RFC 4601 s4.	.5.4 p58 Recei	ving (S,G,rpt) J	oin/Prune Mes	sages		l				
MUST	In Pruned(P) state by receiving Prune(S,G,rpt) message the (S,G,rpt) downstream state machine on interface I remains in Pruned state. The Expiry Timer (ET) is restarted, set to maximum of its current value and the HoldTime from the triggering Join/Prune message. (Note: When current value is smaller than HoldTime from the triggering Join/Prune message)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04:										
	pass Free BSD 12.0	pass Free BSD 12.0	pass Free BSD 12.0								
	untested	untested	untested								
PIM-SM-16.13	RFC 4601 s4.5.4 p58 Receiving (S,G,rpt) Join/Prune Messages										
MUST	state machin) state if the state on interface I to	ace I expires	s. The (S,G,r	pt) downstre						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-18.1	RFC 4601 s4.	5.6 p66 Sendi	ng (*,G) Join/P	rune Message:	S	•	•				
MUST	RFC 4601 s4.5.6 p66 Sending (*,G) Join/Prune Messages If a (*,G) Assert occurs on the upstream interface, and this changes this router's idea of the upstream neighbor, it should be prepared to ensure that the Assert winner is aware of downstream routers by sending a Join(*,G) almost immediately.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-18.2	RFC 4601 s4.	5.6 p67 Sendi	ng (*,G) Join/P	rune Message:	5						
MUST	The downstreinterface is True. The up Join(*,G) to	(*,G) becomes eam state for s in immediat pstream (*,G o the appropr List verified	c (*,G) has c te_olist(*,G) state machi ciate upstrea	, making Joi ne transitio	nDesired(*,0	G) become d state. Send	1				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	X.X.X	x.x.x	x.x.x	x.x.x		
PIM-SM-18.3	RFC 4601 s4.	.5.6 p67 Sendii	ng (*,G) Join/P	rune Message:	3					
MUST	JoinDesired(*,G) becomes True The downstream state for (*,G) has changed so that at least one interface is in immediate_olist(*,G), making JoinDesired(*,G) become True. The upstream (*,G) state machine transitions to Joined state. Send Join(*,G) to the appropriate upstream neighbor, which is RPF'(*,G). (Note: Here WC and RPT Bit are checked)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-18.4	RFC 4601 s4.	.5.6 p67 Sendii	ng (*,G) Join/P	rune Messages	3					
MUST	The downstre immediate_o. (*,G) state the appropri (Note: Here	machine tran iate upstrean Prune List v	r (*,G) has on the control of the co	sired(*,G) be NotJoined sta	ecome False. ite. Send Pri	The upstream	n			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-18.5	RFC 4601 s4.	.5.6 p67 Sendii	ng (*,G) Join/P	rune Message:	6					
MUST	The downstre immediate_oi (*,G) state the appropri	(*,G) becomes eam state for list(*,G), ma machine tran iate upstream WC and RPT F Free BSD 10.3 untested	r (*,G) has o aking JoinDes nsitions to N n neighbor, w	sired(*,G) be NotJoined sta which is RPF'	ecome False. ite. Send Pri	The upstream	ı			
	Ubuntu 18.04:	Ubuntu 18.04:	Ubuntu 18.04:							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-18.6	RFC 4601 s4.	ı .5.6 p67 Sendiı	ng (*,G) Join/P	rune Message:	3	l				
PIM-SM-18.6 MUST	When the ups Join Timer Join(*,G) to	stream (*,G) (JT) expires o the appropi	state-machir, indicating	ne is in Joir time to send am neighbor,	ned state, if l a Join(*,G) which is					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04:	Ubuntu 18.04:	Ubuntu 18.04:							
	P 4.0 C		The second secon							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-18.7		<u> </u>	ng (*,G) Join/P				1				
MUST	When the up: Join Timer Join(*,G) to RPF'(*,G). I t_periodic: (Note: See to to t_joinsup	stream (*,G) (JT) expires of the appropriate the disseconds. Join(*,G) to	state-machir, indicating riate upstrea Join Timer (C	ne is in Joir time to send am neighbor, UT) to expire	ned state, is a Join(*,G which is after						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-18.8	RFC 4601 s4.	.5.6 p67 Sendi	ng (*,G) Join/P	rune Message:	3						
MUST	Join Timer Join(*,G) to RPF'(*,G). I t_periodic s	(JT) expires of the appropriate the appropriat	state-machir, indicating riate upstrea Join Timer (C	time to send am neighbor, JT) to expire	l a Join(*,G which is e after						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-18.9	RFC 4601 s4.5.6 p67 Sending (*,G) Join/Prune Messages										
MUST	When the upstream (*,G) state-machine is in Joined state, if the RPF'(*,G) GenID changes then the upstream (*,G) state machine remains in Joined state.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-19.1	RFC 4601 s4.	.5.7 p71 Sendi	ng (S,G) Join/F	Prune Message	s						
MUST	changes this	s router's id to ensure th	s on the upst dea of the up nat the Asser ending a Joir	ostream neigh et winner is	nbor, it show aware of	ıld					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
							•				
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	x.x.x	X.X.X	X.X.X	x.x.x		
PIM-SM-19.2	RFC 4601 s4	.5.7 p72 Sendii	ng (S,G) Join/F	Prune Message	s					
MUST	When the upstream (S,G) state machine is in NotJoined state, JoinDesired(S,G) becomes True, The downstream state for (S,G) has changed so that at least one interface is in inherited_olist(S,G). (Note: Verify (S,G) Join List contains the Source Address in Join List)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-19.3	RFC 4601 s4	.5.7 p72 Sendii	ng (S,G) Join/F	Prune Message	s RFC 4601 s	4.9.5.1 p124 G	roup Set Sour	ce List Rules		
MUST	address of the full len	e list entrie the source S ngth of the I ded-Source-Ac WC and RPT I	the Source- IP address, a ddress cleare	-Address Mask and both the ed.	Len set to		Т	Г		
	untested	untested	untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-19.4	RFC 4601 s4	.5.7 p72 Sendii	ng (S,G) Join/F	Prune Message	es .					
MUST	JoinDesired(S,G) becomes False The downstream state for (S,G) has changed so no interface is in inherited_olist(S,G), making JoinDesired(S,G) become False. The upstream (S,G) state machine transitions to NotJoined state. Send Prune(S,G) to the appropriate upstream neighbor, which is RPF'(S,G) (Here Prune List verified)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-19.5	RFC 4601 s4.5.7 p72 Sending (S,G) Join/Prune Messages									
MUST	The downstre inherited_of upstream (S Prune(S,G)	(S,G) becomes eam state for list(S,G), ma ,G) state mad to the approp WC and RPT F	c (S,G) has o aking JoinDes chine transit oriate upstre	sired(S,G) be tions to Noto eam neighbor,	ecome False. Toined state	The . Send				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-19.6	RFC 4601 s4.	5.7 p72 Sendi	ng (S,G) Join/F	rune Message	es						
MUST	When the upstream (S,G) state-machine is in Joined state, if the Join Timer (JT) expires, indicating time to send a Join(S,G). Send Join(S,G) to the appropriate upstream neighbor, which is RPF'(S,G). Restart the Join Timer (JT) to expire after t_periodic seconds.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-19.7	RFC 4601 s4.	5.7 p72 Sendi	ng (S,G) Join/F	Prune Message	es						
MUST	Join Timer Join(S,G) to RPF'(S,G). I t_periodic s	(JT) expires of the appropriate the appropriat	state-machir, indicating riate upstrea Join Timer (C	time to send am neighbor, JT) to expire	d a Join(S,G) which is e after						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-19.8	RFC 4601 s4.	5.7 p72 Sendi	ng (S,G) Join/F	Prune Message	es						
MUST	When the upstream (S,G) state-machine is in Joined state, if the Join Timer (JT) expires, indicating time to send a Join(S,G). Send Join(S,G) to the appropriate upstream neighbor, which is RPF'(S,G). Restart the Join Timer (JT) to expire after t_periodic seconds. (Note: See Prune(S,G) to RPF'(S,G), Decrease Join Timer to t_override)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-19.9	RFC 4601 s4.	5.7 p75 Sendi	ng (S,G) Join/F	Prune Message	es						
MUST	sees Prune(*,G) to RPF' n t_override	state-machir (S,G), If the seconds, res	e Join Timer	is set to ex	kpire					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	x.x.x	x.x.x		
PIM-SM-19.10	RFC 4601 s4.	5.7 p76 Sendii	ng (S,G) Join/F	Prune Message	s					
MUST	When the upstream (S,G) state-machine is in Joined state, if the RPF'(S,G) GenID changes then the upstream (S,G) state machine remains in Joined state.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-20.1	RFC 4601 s4.	5.9 p78 State	Machine for (S	,G,rpt) Triggere	ed Messages					
MUST		ed" State, if a Prune(S,G,1		ed(S,G,rpt)-8 (S,G,rpt)	gt;TRUE the	action	,			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-20.2	RFC 4601 s4.	5.9 p78 State	Machine for (S	,G,rpt) Triggere	ed Messages					
MUST	If the router is in the Pruned(S,G,rpt) state, and PruneDesired(S,G,rpt) changes to FALSE, this could be because the router no longer has RPTJoinDesired(G) true, or it now wishes to receive traffic from S again. If it is not the former the action is to send a Join(S,G,rpt) to RPF'(S,G,rpt)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-20.3	RFC 4601 s4.	5.9 p78 State	Machine for (S	,G,rpt) Triggere	ed Messages					
MUST	a Join(S,G,		(S,G,rpt) to	ride Timer ex override the	_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release	Release	Release	Release	Release	Release	Release	Release	
	8.2.2	8.3	8.4	X.X.X	X.X.X	X.X.X	X.X.X	X.X.X	
PIM-SM-20.5	RFC 4601 s4	.5.10 p82 Back	ground: (*,*,RF	P) and (S,G,rpt) Interaction				
MUST	cancel (S,G	te that recept, rpt) prune sty itself does (*,G) Join) Free BSD 10.3	state on that	interface,	whereas rece	eiving a		I	
	untested	untested	untested						
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-21.1	RFC 4601 s4	.6.1 p84 (S,G)	Assert Messag	e State Machir	ne				
MUST		has lost an G onto inter		on interfac	ce I. It must	not forward	l		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: FAIL	Ubuntu 18.04: inconclusive						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-21.2	NEGATIVE: F	RFC 4601 s4.6	.1 p84 (S,G) As	ssert Message	State Machine)			
MUST		This router has lost an (S,G) assert on interface I. It must not forward packets for G onto interface I.							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						
PIM-SM-21.3	RFC 4601 s4	.6.1 p84 (S,G)	Assert Messag	e State Machir	ne				
MUST	RFC 4601 s4.6.1 p84 (S,G) Assert Message State Machine In NoInfo state, if an Inferior Assert is received with RPT bit set CouldAssert(S,G,I) is TRUE, then Send Assert(S,G) Set Assert Timer to (Assert_Time - Assert_Override_Interval) Store self as AssertWinner(S,G,I) Store spt_assert_metric(S,I) as AssertWinnerMetric(S,G,I) (Note: The winning router sends an Assert message containing its own metric to that outgoing interface(State machine))								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested						
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive						
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested						





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x				
PIM-SM-21.4	RFC 4601 s4.	6.1 p84 (S,G)	Assert Messag	je State Machir	ne							
MUST	When in NoInfo state, if an inferior assert is received for (S,G) with the RPT bit cleared and CouldAssert(S,G,I) == TRUE, We transition to the "I am Assert Winner" state											
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									
PIM-SM-21.5	RFC 4601 s4.	RFC 4601 s4.6.1 p84 (S,G) Assert Message State Machine										
MUST	bit set(it's	When in NoInfo state, if an assert is received for (S,G) with the RPT bit set(it's a (*,G) assert) and CouldAssert(S,G,I) == TRUE, We Send Assert(S,G).										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									
PIM-SM-21.6	RFC 4601 s4.	6.1 p84 (S,G)	Assert Messag	je State Machir	ne							
MUST	When in NoInfo state, if an (S,G) data packet comes on Interface I and CouldAssert(S,G,I) == TRUE, We transition to the "I am Assert Winner" state											
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									
PIM-SM-21.7	RFC 4601 s4.	6.1 p84 (S,G)	Assert Messag	je State Machir	ne							
MUST	CouldAssert	(S,G,I) == TH	RUE, we Send	ata packet co Assert(S,G)	omes on Inter	rface I and						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									





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	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-21.8	RFC 4601 s4	.6.1 p84 (S,G)	L Assert Messac	I ie State Machii	l ne					
MUST	When in "I am Assert Winner" State, if we receive an (S,G) assert or (*,G) assert mentioning S that has a worse metric than our own. Whoever sent the assert is in error, and so we remains in "I am Assert Winner" State (Note: for (S,G) assert)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.9	RFC 4601 s4.	.6.1 p84 (S,G)	Assert Messag	je State Machi	ne					
MUST	or (*,G) ass Whoever sent and restart	am Assert Winsert mention: t the assert the Assert (S,G) assert Free BSD 10.3	ing S that ha is in error Timer (Action	as a worse me , and so we i	etric than ou	ar own.				
	untested Ubuntu 18.04:	untested Ubuntu 18.04:	untested Ubuntu 18.04:							
	inconclusive	inconclusive	pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.10	RFC 4601 s4.	.6.1 p84 (S,G)	Assert Messag	je State Machi	ne					
MUST	RFC 4601 s4.6.1 p84 (S,G) Assert Message State Machine When in "I am Assert Winner" State, if we receive an (S,G) assert or (*,G) assert mentioning S that has a worse metric than our own. Whoever sent the assert is in error, and so we re-send an (S,G) Assert, and restart the Assert Timer (Action A3 below). Set Assert Timer to (Assert_Time - Assert_Override_Interval) (Note: for (S,G) assert)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.11	RFC 4601 s4.	.6.1 p84 (S,G)	Assert Messag	je State Machi	ne					
MUST	or (*,G) ass Whoever sent "I am Assert	am Assert Winsert mention: t the assert t Winner" Sta (*,G) assert	ing S that ha is in error ate	as a worse me	etric than ou					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-21.12			Assert Messan							
				if we receiv		aggert				
MUST	or (*,G) ass Whoever sent and restart	sert mention	ing S that hat is in error, Fimer (Action	as a worse me , and so we r	etric than ou	ır own.				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.13	RFC 4601 s4.	6.1 p84 (S,G)	Assert Messag	je State Machir	ne					
MUST	or (*,G) ass Whoever sent and restart (Assert_Time	sert mentions t the assert	ing S that hat is in error, Gimer (Action verride_Inter	if we receive as a worse me, and so we red A3 below).	etric than ou re-send an (S	ır own. S,G) Assert,				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.14	RFC 4601 s4.	6.1 p84 (S,G)	Assert Messag	je State Machir	ne					
MUST	When in "I am Assert Winner" State, if We receive an (S,G) assert that has a better metric than our own. We transition to "I am Assert Loser" state									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: FAIL							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.15	RFC 4601 s4.	6.1 p88 (S,G)	Assert Messag	e State Machir	ne					
MUST	FALSE, we can so we transi includes ser Send Assert(an no longer ition to NoIr nding a "cano Cancel(S,G) I	perform the nfo state and celing assert Delete assert	if CouldAsse actions of t d perform act " with an ir info (Asser return their	the assert with ions A4 (belong the metrical strains and the metrical strains are the metrical strains and the metrical strains are the metrical s	inner, and low). This ic ,I) and				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





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	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-21.16	RFC 4601 s4.	.6.1 p88 (S,G)	Assert Messag	je State Machi	ne	•				
MUST	When in "I am Assert Loser" State, we receive an assert that is better than that of the current assert winner. We stay in Loser state, and perform actions A2 below Store new assert winner as AssertWinner(S,G,I) and assert winner metric as AssertWinnerMetric(S,G,I). Set Assert Timer to Assert_Time									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.17	RFC 4601 s4.	6.1 p88 (S,G)	Assert Messag	ge State Machi	ne					
MUST	current asse (although the We stay in I assert winne	ert winner th ne metric may Loser state, er as AssertW	nat is better y be worse the and perform Winner(S,G,I	we receive and than our own and the winner actions A2 k and assert trimer to A	n metric for er's previous pelow St winner metri	this (S,G) metric).				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.18	RFC 4601 s4.	6.1 p89 (S,G)	Assert Messag	ge State Machi	ne					
MUST	expires. We assert info	e transition rmation (acti	to NoInfo st	The (S,G) Ass tate, deletir). ime according	ng the (S,G)					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-21.19	RFC 4601 s4.	6.1 p89 (S,G)	Assert Messag	ge State Machi	ne					
MUST	RFC 4601 s4.6.1 p89 (S,G) Assert Message State Machine When in "I am Assert Loser" State, if we receive an assert from the current assert winner that is worse than our own metric for this group (typically the winner's metric became worse or because it is an assert cancel). We transition to NoInfo state, deleting the (S,G) assert information and allowing the normal PIM Join/Prune mechanisms to operate.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





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	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x				
PIM-SM-21.20	RFC 4601 s4.	.6.1 p89 (S,G)	Assert Messag	je State Machii	ne							
MUST	We transition (action A5)	am Assert Los on to NoInfo below) I rMetric(S,G,I	state, delet Delete assert	ing the (S,C info (Asser	3) assert inf ctWinner(S,G,	formation ,I) and						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									
PIM-SM-21.21	RFC 4601 s4.	.6.1 p89 (S,G)	Assert Messag	je State Machi	ne							
MUST	from the cur previously or or router has assume it no state, delet	as gone down o longer know ting this (S	reporting a nis indicates (and may hav ws it was the G) assert ir	different Ge s that the cu we come back e winner. We	enID from the arrent winner up), and so transition t	e one it r's interface we must to the NoInfo						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									
PIM-SM-21.22	RFC 4601 s4.	.6.1 p89 (S,G)	Assert Messag	e State Machi	ne							
MUST	When in "I am Assert Loser" State, my_assert_metric(S,G,I) has changed so that now my assert metric for (S,G) is better than the metric we have stored for current assert winner. This might happen the underlying routing metric changes, or when CouldAssert(S,G,I) becomes true; for example, when SPTbit(S,G) becomes true. We transition to NoInfo state, delete this (S,G) assert state (action A5 below), and allow the normal PIM Join/Prune mechanisms to operate. (Note: underlying routing metric changed)											
	Free BSD 10.3	Free BSD 10.3	Free BSD 10.3									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									
PIM-SM-21.23	RFC 4601 s4.	.6.1 p89 (S,G)	Assert Messag	je State Machi	ne							
MUST	When in "I a interface for deleting the info (Assert	am Assert Los or S, and nov is (S,G) asset tWinner(S,G,I	ser" State, in it is not. Pert state (ac	interface I we transition	used to be the point of the NoInfo	state, ete assert						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested									
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive									
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested									





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-21.24	RFC 4601 s4.	.6.1 p89 (S,G)	Assert Messag	e State Machir	ne					
MUST	When in "I am Assert Loser" State, we receive a Join(S,G) that has the Upstream Neighbor Address field set to my primary IP address on interface I. The action is to transition to NoInfo state, and delete this (S,G) assert state (action A5 below), and allow the normal PIM Join/Prune mechanisms to operate.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.1	RFC 4601 s4.	.6.2 p91 (*,G) A	Assert Messag	e State Machin	e					
MUST		has lost an G onto inter		on interfac	e I. It must	not forward	l			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.2	NEGATIVE: F	RFC 4601 s4.6.	2 p91 (*,G) As	sert Message	State Machine					
MUST		has lost an G onto inter		on interfac	e I. It must	not forward	l			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.3	RFC 4601 s4.	.6.2 p92 (*,G) A	Assert Messag	e State Machin	е	•	•			
MUST	_	router send e - Assert_Ov		Set Assert Trval)	imer to					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x
PIM-SM-22.4	RFC 4601 s4.	.6.2 p94 (*,G) A	Assert Message	e State Machin	е			
MUST	I, AND Could state, and p to (Assert_S Store rpt_as	dAssert(*,G,I perform Actio Time – Assert	D)==TRUE Ons Al (below C_Override_Ir (G,I) as Asse	we transition) Send nterval) StorertWinnerMetr	on to the "I Assert(*,G) re self as As	es on interfa am Assert Wi Set Assert T ssertWinner(*	nner" 'imer	
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL	Ubuntu 18.04: FAIL					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-22.5	RFC 4601 s4.	6.2 p94 (*,G) A	Assert Message	e State Machin	е			
MUST	I, AND Could state, and pto (Assert_'Store rpt_as (Note: sends untested Ubuntu 18.04: inconclusive	dAssert(*,G,; perform Actio Fime - Assert ssert_metric s Assert (*,C Free BSD 10.3 untested Ubuntu 18.04: inconclusive	Discrete True Discrete Al (below E_Override_Ir G,I) as Asses B)) Free BSD 10.3 untested Ubuntu 18.04: inconclusive	we transition) Send	on to the "I Assert(*,G) re self as As	es on interfa am Assert Wi Set Assert T ssertWinner(*	nner" 'imer	
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-22.6	RFC 4601 s4.	.6.2 p95 (*,G) <i>F</i>	Assert Message	e State Machin	e			
MUST	As we're in state that : thrashing o: we resend the (Actions A3)	the Winner s is actively h f the forward ne (*,G) Asso below). Assert Timer	state, then we being kept alder and periodert and resta	The (*,G) As we must still live. To pre- odic flooding art the Asser Time - Assert	have (*,G) event unneces g of duplicat t Timer	forwarding ssary se packets,		
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-22.7	RFC 4601 s4.	.6.2 p95 (*,G) A	Assert Messag	ıe State Machin	e			1		
MUST	When in "I am Assert Winner" State, The (*,G) Assert Timer expires. The (*,G) Assert Timer expires. As we're in the Winner state, then we must still have (*,G) forwarding state that is actively being kept alive. To prevent unnecessary thrashing of the forwarder and periodic flooding of duplicate packets, we re-send the (*,G) Assert, and restart the Assert Timer (Action A3 below). (Note: we must still have (*,G) forwarding state)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.8	RFC 4601 s4.	.6.2 p95 (*,G) A	Assert Messag	e State Machin	е					
MUST	has a worse so we re-ser A3 below). (Assert_Time (Note: Here	am Assert Wir metric than nd a (*,G) As Send Asse e - Assert_Ov check that F	our own. Whesert, and rect(*,G) Setwerride_Interestriates	noever sent t estart the As Assert Timer cval)	the assert has ssert Timer (to	as lost, and Action	er)			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.9	RFC 4601 s4.	.6.2 p95 (*,G) A	Assert Messag	e State Machin	е					
MUST	When in "I am Assert Winner" State, we receive a (*,G) assert that has a better metric than our own. We transition to "I am Assert Loser" state and perform actions A2 (below).									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.10	RFC 4601 s4.	.6.2 p95 (*,G) A	Assert Messag	e State Machin	е					
MUST	RFC 4601 s4.6.2 p95 (*,G) Assert Message State Machine When in "I am Assert Winner" State,if our (*,G) forwarding state or RPF interface changed so as to make CouldAssert(*,G,I) become false. We can no longer perform the actions of the assert winner, and so we transition to NoInfo state and perform actions A4 (below) Send AssertCancel(*,G) Delete assert info (AssertWinner(*,G,I) and AssertWinnerMetric(*,G,I) will then return their default values). (Note: send AssertCancel(*,G))									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
Ī	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	X.X.X	x.x.x		
PIM-SM-22.11	RFC 4601 s4.	6.2 p95 (*,G) A	Assert Messag	e State Machin	е					
MUST	is better th		the current a	We receive a assert winner						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.12	RFC 4601 s4.	6.2 p95 (*,G) A	Assert Messag	e State Machin	е					
MUST	current asset	ert winner th ne metric may	nat is better be worse th	We receive a than our own the winne actions A2 k	n metric for er's previous	this group				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.13	RFC 4601 s4.	6.2 p96 (*,G) A	Assert Messag	e State Machin	е					
MUST	current asse (typically b cancel). We	ert winner th because the v transition t	nat is worse vinner's meta to NoInfo sta	We receive and than our own or our own or our own or our our our our our our our our our	n metric for orse or is no chis (*,G) as	this group ow an assert ssert state				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.14	RFC 4601 s4.	6.2 p96 (*,G) A	Assert Messag	e State Machin	е					
MUST	We transition (action A5). AssertWinner	RFC 4601 s4.6.2 p96 (*,G) Assert Message State Machine When in "I am Assert Loser" State, The (*,G) Assert Timer expires. We transition to NoInfo state and delete this (*,G) assert info (action A5) Delete assert info (AssertWinner(*,G,I) and AssertWinnerMetric(*,G,I) will then return their default values). (Note: transition to NoInfo state)								
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-22.15	RFC 4601 s4.	.6.2 p96 (*,G) A	Assert Messag	e State Machin	е					
MUST	When in "I am Assert Loser" State, we receive a Hello message from the current winner reporting a different GenID from the one it previously reported. This indicates that the current winner's interface or router has gone down (and may have come back up), and so we must assume it no longer knows it was the winner. We transition to the NoInfo state, deleting the (*,G) assert information (action A5).									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.16	RFC 4601 s4.	.6.2 p96 (*,G) A	Assert Messag	e State Machin	е					
MUST	rpt_assert_r for (*,G) is winner. We state (action to operate.	am Assert Los metric(G,I), s better than transition ton A5), and a	has changed n the metric to NoInfo sta allow the non	so that now we have storate, and dele	my assert me ed for curre ete this (*,0	ent assert 3) assert				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.17	RFC 4601 s4.	.6.2 p97 (*,G) A	Assert Messag	e State Machin	е					
MUST	interface fo	am Assert Los or RP(G), and this (*,G) as	d now it is r	not. We trans						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-22.18	RFC 4601 s4.	.6.2 p97 (*,G) A	Assert Messag	e State Machin	е					
MUST	RFC 4601 s4.6.2 p97 (*,G) Assert Message State Machine When in "I am Assert Loser" State, We receive a Join(*,G) or a Join(*,*,RP(G)) that has the Upstream Neighbor Address field set to my primary IP address on interface I. The action is to transition to NoInfo state, and delete this (*,G) assert state (action A5), and allow the normal PIM Join/Prune mechanisms to operate. (Note: transition to NoInfo state for Join(*,G))									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	x.x.x	x.x.x		
PIM-SM-23.1	RFC 4601 s4	.6.3 p98 Assert	Metrics							
MUST	If all fields are equal, the primary IP address of the router that sourced the Assert message is used as a tie-breaker, with the highest IP address winning. (Note: This is for (*,G) Assert)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-23.2	RFC 4601 s4	.6.3 p98 Assert	Metrics			•				
MUST	that sourced	ds are equal d the Assert address winn is for (S,G Free BSD 10.3	message is i							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-24.2	RFC 4601 s4	.7.1 p105 Grou	p-to-RP Mappi	ing						
MAY	Note that if the set of possible group-range-to-RP mappings changes, each router will need to check whether any existing groups are affected. This may, for example, cause a DR or acting DR to re-join a group, or cause it to re-start register encapsulation to the new RP. (Note: This is done for (*,G) Join)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-25.1	RFC 4601 s4	.8 p106 Source	-Specific Multi	cast		•				
MUST	and FF3x::// semantics is data packets	multicast add 32 for IPv6, s determined s and PIM mes Message with	is reserved by the multi ssages.	for SSM, and Least group a	d the choice address in bo	of				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-25.2	RFC 4601 s4.	.8 p106 Source	-Specific Multi	cast							
MUST	A range of multicast addresses, currently 232.0.0.0/8 in IPv4 and FF3x::/32 for IPv6, is reserved for SSM, and the choice of semantics is determined by the multicast group address in both data packets and PIM messages. ((S,G) Join Message with group address is in SSM range)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-26.1	RFC 4601 s4.8.1 p106 Protocol Modifications for SSM Destination Addresses										
MUST		ST NOT send a an SSM addre		essage for ar	ny packet tha	at is					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-26.2	RFC 4601 s4.	8.1 p106 Proto	ocol Modificatio	ons for SSM De	stination Addr	esses					
MUST	1	ting as an RI has an SSM o		_	egister-encap	psulated					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-26.3	RFC 4601 s4.	8.1 p107 Proto	ocol Modification	ons for SSM De	stination Addr	esses	•	•			
SHOULD	an SSM addre	Y be configuress. If so, ster message	it SHOULD re	espond with a	Register-St	op message					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-27.1	RFC 4601 s4.	8.2 p108 PIM-	SSM-Only Rou	ıters						
MUST	Additionally, the Packet forwarding rules of Section 4.2 can be simplified in a PIM-SSM-only router: If (iif == RPF_interface(S) AND UpstreamJPState(S,G) == Joined) { oiflist = inherited_olist(S,G) } else if(iif is in inherited_olist(S,G)) { send Assert(S,G) on iif									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-27.2	RFC 4601 s4.	8.2 p108 PIM-	SSM-Only Rou	ıters						
MUST	Additionally, the Packet forwarding rules of Section 4.2 can be simplified in a PIM-SSM-only router: if (iif == RPF_interface(S) AND UpstreamJPState(S,G) == Joined) { oiflist = inherited_olist(S,G) } else if(iif is in inherited_olist(S,G)) { send Assert(S,G) on iif } oiflist = oiflist (-) iif forward packet on all interfaces in oiflist									
	Free BSD 10.3	Free BSD 10.3	Free BSD 10.3	OTTTIBLE						
	untested	untested	untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-28.1	RFC 4601 s4.	9 p108 PIM Pa	acket Formats							
MUST	All PIM cont	rol messages	have IP pro	otocol number	103.	1	1	ı		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-28.2	RFC 4601 s4.	9 p109 PIM Pa	acket Formats							
MUST	Set to zero	on transmiss		ed upon recei	ipt.	T	T	Т		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Dalagas	Dologoo	Dologoo	Dologo	Dologoo	Delegee	Deleges	Dalagas		
	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-28.3	RFC 4601 s4.	9 p109 PIM Pa	acket Formats							
MUST	The checksum is a standard IP checksum, i.e. the 16-bit one's Complement of the one's complement sum of the entire PIM message, excluding the "Multicast data packet" section of the Register message.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-28.4	RFC 4601 s4.	9 p110 PIM Pa	acket Formats							
MUST	or a message it MUST be of administrate	e's destinat: discarded and or in a rate	d with an unrion does not dan error me lan error me limited manr , DUT discard	correspond tessage SHOULI	to the table	above,				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-29.1	RFC 4601 s4.	9.1 p111 Enco	ded Source ar	d Group Addre	ess Formats					
MUST	If the message is sent for a single group then the Mask length must equal the address length in bits for the given Address Family and Encoding Type. (e.g. 32 for IPv4 native encoding, 128 for IPv6 native encoding).									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-29.2	RFC 4601 s4.	9.1 p111 Enco	ded Source ar	nd Group Addre	ess Formats					
MUST	1	ne group rang	ge should use nis specifica							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release	Release	Release	Release	Release	Release	Release	Release		
	8.2.2	8.3	8.4	x.x.x	x.x.x	x.x.x	x.x.x	x.x.x		
PIM-SM-29.3	RFC 4601 s4.	.9.1 p111 Encc	ded Source ar	nd Group Addre	ess Formats					
MUST	Admin Scope [Z]one indicates the group range is an admin scope zone. This is used in the Bootstrap Router Mechanism [11] only. For all other purposes, this bit is set to zero and ignored on receipt. (Here we are considering Non-BSR message)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-29.4	NEGATIVE R	FC 4601 s4.9.	1 p111 Encode	ed Source and	Group Address	s Formats				
MUST	This is used other purpose (Here we are	[Z]one indiced in the Bookses, this bite considering	strap Router is set to 2 Non-BSR mes	Mechanism [zero and igno	11] only. F	or all				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-29.5	RFC 4601 s4.	.9.1 p112 Enco	ded Source ar	nd Group Addre	ess Formats					
MUST		oit is a 1 b		to 1 for PI	M-SM.	,	T	T		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-29.6	RFC 4601 s4.	.9.1 p112 Enco	ded Source ar	nd Group Addre	ess Formats					
MUST	The WC(or WildCard) bit is a 1 bit value for use with PIM Join/Prune messages. (S,G) source list entries have the Source-Address set to the address of the source S, the Source-Address Mask-Len set to the full length of the IP address and have both the WC and RPT bits of the Encoded-Source-Address cleared. (Note: check the WC bit & RPT bit)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Dalassa	Dalassa	Dalagas	Dalagas	Dalages	Delegee	Delegee	Dalassa		
	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-29.7	RFC 4601 s4.	.9.1 p112 Enco	ded Source ar	d Group Addre	ess Formats					
MUST	with PIM Jo:	Rendezvous I in/Prune mess PT bit MUST k	sages (see Se							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-29.8	NEGATIVER	-C 4601 s4.9.1	p112 Encoded	d Source and 0	Group Address	Formats				
MUST	with PIM Jo:	Rendezvous I in/Prune mess PT bit MUST 1	sages (see Se							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-30.1	RFC 4601 s4.9.2 p114 Hello Message Format									
SHOULD	a router on (see Section the receiving information	ges with a Ho an interface 1 4.3.1). The ng routers sh for the sencesting is dor neighbor)	e about to go ese are effect nould immedia der.	o down or cha ctively goodk ately time ou	inging IP add oye messages at the neighb	dress and				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-30.2	RFC 4601 s4.	.9.2 p114 Hello	Message Forr	nat						
MUST	RFC 4601 s4.9.2 p114 Hello Message Format Hello messages with a Holdtime value set to `0' are also sent by a router on an interface about to go down or changing IP address (see Section 4.3.1). These are effectively goodbye messages and the receiving routers should immediately time out the neighbor information for the sender. (Note: change of IP address)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





							l			
	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-30.3	RFC 4601 s4	.9.2 p114 Hello	Message Forr	mat						
MUST	Hello messages with a Holdtime value set to `0' are also sent by a router on an interface about to go down or changing IP address (see Section 4.3.1). These are effectively goodbye messages and the receiving routers should immediately time out the neighbor information for the sender. (Note: interface goes down)									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-31.1	RFC 4601 s4	.9.3 p117 Regi	ster Message F	ormat						
MUST	for Registe:	rs is done on he PIM headen	educe encapsually on the fi	irst 8 bytes	of the pack	et,				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-31.2	RFC 4601 s4	.9.3 p117 Regi	ster Message F	ormat		•	•			
MUST	RFC 4601 s4.9.3 p117 Register Message Format If the router is a DR for a source that it is directly connected to, it sets the B bit to 0									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-32.1	RFC 4601 s4	.9.4 p119 Regi	ster-Stop Mess	sage Format						
MUST	length * 8	- '	Mask Len fie IPv4 native oup							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-33.1	-				λ.λ.λ	Α.Α.Α	Α.Α.Α	\ \.\.\\		
MUST	Within one D	ce addresses	ne message, a	e Format all the Multi Source addres	_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-34.1	RFC 4601 s4.	.9.5.1 p122 Gro	oup Set Source	e List Rules						
MUST	- the begins field and the mask length for IPv4 or (This test	ning of the me prefix lend field of the ff00::/8 for IPv4)	multicast addingth of the me Multicast (ed by the ent dress range i multicast add Group Address	n the group dress range	address in the				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-34.2	RFC 4601 s4.	9.5.1 p123 Gro	oup Set Source	e List Rules						
MUST	(*,G) source list entries have the Source-Address set to the address of the RP for group G, the Source-Address Mask-Len set to the full length of the IP address and have both the WC and RPT bits of the Encoded-Source-Address set.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-34.3	RFC 4601 s4.	9.5.1 p124 Gro	oup Set Source	e List Rules						
MUST	address of the	the source S	, the Source- s and have bo	Source-Addres -Address Mask oth the WC ar	-Len set to	the full				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-35.1	RFC 4601 s4.	.9.6 p127 Asse	rt Message Fo	rmat						
MUST	<pre>RPT-bit is a 1 bit value. The RPT-bit is set to 1 for Assert(*,G) messages and 0 for Assert(S,G) messages. (Note: for (*,G) Asserts)</pre>									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-35.2	RFC 4601 s4.	.9.6 p128 Asse	rt Message Fo	rmat						
MUST	a specific s	source on the (are sent by shortest-pa Group-Address d set to sour	ath tree(SPT s field set t	bit is TRUE					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-35.3	RFC 4601 s4.	.9.6 p128 Asse	rt Message Fo	rmat						
MUST	messages and		e. The RPT-bi rt(S,G) messa)		1 for Assert	(*,G)				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-35.4	RFC 4601 s4.	.9.6 p128 Asse	rt Message Fo	rmat						
MUST	the group an	nd source(s)	are sent by r under conter Group-Address	ntion on the	shared tree.	•				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x
PIM-SM-35.5	RFC 4601 s4.	9.6 p128 Asse	rt Message Fo	rmat			•	•
MAY	the IP source		the data pa	ce-Address fi acket that tr				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-35.6	RFC 4601 s4.	9.6 p128 Asse	rt Message Fo	rmat				
MUST	IP source ad set to zero is set to MI (Note: for S	ddress of the otherwise. RIB.pref(RP(C Source-Addres	e data packet The RPT-bit G)) and the Ness field & Me	ce-Address fi that trigge is set to 1, Metric is set etric-Prefere	ered the Asse the Metric- to MRIB.met	ert and is Preference		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-35.7	RFC 4601 s4.	9.6 p128 Asse	rt Message Fo	rmat				
MUST	For data-triggered Asserts the Source-Address field MAY be set to the IP source address of the data packet that triggered the Assert and is set to zero otherwise. The RPT-bit is set to 1, the Metric-Preference is set to MRIB.pref(RP(G)) and the Metric is set to MRIB.metric(RP(G)). (Note: for Source-Address field & Metric)							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					
PIM-SM-35.8	RFC 4601 s4.	9.6 p128 Asse	rt Message Fo	rmat			•	•
MUST	IP source ac set to zero is set to MI	ddress of the otherwise.	e data packet The RPT-bit G)) and the M	ce-Address fi that trigge is set to 1, Metric is set -bit)	red the Asse the Metric-	ert and is Preference		
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested					
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive					
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested					





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-36.1	RFC 4601 s4.	.11 p130 Time	· Values								
MUST	Hello Timer	(HT(I)). Per	riodic interv	al for Hello	messages.						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-36.2	RFC 4601 s4.	.11 p132 Time	· Values								
MUST	I		, AT(S,G,I)). e assert stat			_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-36.3	RFC 4601 s4.	RFC 4601 s4.11 p133 Timer Values									
MUST	Upstream Join Timer (JT(*,*,RP), JT(*,G), JT(S,G)). This timer is used for period between Join/Prune messages. Default: 60 seconds										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-36.4	RFC 4601 s4.	.11 p133 Time	· Values		_						
MUST	period when do so. Value	someone else	(*,*,RP), JT(e sends a J/E * t_periodic, is true, 0 ot	message so	we don't nee						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-36.6	RFC 4601 s4.	.11 p133 Timer	· Values							
MUST	Upstream Join Timer $(JT(*,*,RP), JT(*,G), JT(S,G))$. This timer is used for period between Join/Prune messages $(Here\ JT(S,G))$ is tested									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-36.7	RFC 4601 s4.	.11 p134 Timer	· Values							
MUST	(S,G) data p	Keepalive Timer (KAT(S,G)). This timer is the Period after last (S,G) data packet during which (S,G) Join state will be maintained even in the absence of (S,G) Join messages. Default: 210 seconds. Free BSD 10.3 Free BSD 10.3 Free BSD 10.3								
	untested	untested	untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-41.1	draft-ietf-pim-	sm-bsr-12.txt s	1.2 p7 Protoco	l Overview						
MUST	BSMs are or: failure rest	iginated peri	iodically to	ensure consi	stency after	·	,			
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-41.2	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine)			
MUST	If Bootstrap Timer expires, and current state is `P-BSR', the router goes to E-BSR state and after receiving a non-preferred BSM, it remains in the E-BSR state and originates a BSM that contains the BSR priority value of the included BSR & the address of the bootstrap router for the domain.									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-41.3	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine					
MUST	In E-BSR state and after receiving a preferred BSM, it goes to the C-BSR state & forward BSM; store RP-Set; set Bootstrap timer to BS_Timeout.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.4	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine					
MUST		& forward BS	r receiving a SM; store RP-	_	_						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.5	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine					
MUST	In P-BSR state and after receiving a non-preferred BSM, it remains in the P-BSR state & forward BSM										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.6	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine					
MUST		R state & for	receiving a	-							
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-41.7	draft-ietf-pim-	draft-ietf-pim-sm-bsr-12.txt s3.1.1 p11 Per-Scope-Zone Candidate-BSR State Machine									
MUST	In C-BSR state and after receiving a preferred BSM, it remains in the C-BSR state & forward BSM; store RP-Set; set bootstrap timer to BS_Timeout (Note: A Bootstrap message is also preferred if it is from the current BSR with a lower weight than the previous BSM it sent, provided that if the router is a Candidate BSR the current BSR still has a weight higher or equal than the router itself.)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.8	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine					
MUST	to the P-BSI <bs_rand (Note:A Book but the BSR</bs_rand 	R state & for _Override>. tstrap messag Priority fie the current	r receiving a rward BSM; se ; ge is receive eld in the re ly elected BS	et bootstrap	timer to elected BSR, age has chang	ged,					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.9	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine					
MUST	In C-BSR state when bootstrap timer expires, it goes to the P-BSR state & set bootstrap timer to BS_Rand_Override										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.10	draft-ietf-pim-	sm-bsr-12.txt s	3.1.1 p11 Per-	Scope-Zone C	andidate-BSR	State Machine		•			
MUST		ate if the BS BS Timer to	S Timer expir BS_Period	res the BSR o	originates						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-41.11	draft-ietf-pim-	sm-bsr-12.txt s	3.1.2 p13 Per-	Scope-Zone S	tate Machine fo	or Non-Candida	ate-BSR Route	ers			
MUST	If the included BSR is not preferred over, and not equal to, the currently active BSR If the Bootstrap Timer has expired and the receiving router is not a C-BSR, the Bootstrap message is then forwarded (Note: Per-Scope-Zone State-machine for Non-Candidate-BSR Routers) Free BSD 10.3 Free BSD 10.3 Free BSD 10.3										
	untested	untested	untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.12	draft-ietf-pim-	sm-bsr-12.txt s	3.1.2 p13 Per-	Scope-Zone S	tate Machine fo	or Non-Candida	ate-BSR Route	ers			
MUST	RP-Set prov	The router knows the identity of the current BSR, and is using the RP-Set provided by that BSR. Only bootsrap messages from that BSR or from a C-BSR with higher weight than the current BSR will be accepted									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.13	NEGATIVE di	raft-ietf-pim-sm	-bsr-12.txt s3.	1.2 p13 Per-Sc	ope-Zone Stat	e Machine for N	Non-Candidate	-BSR Routers			
MUST	RP-Set prov	knows the ide ided by that R with higher	BSR. Only bo	ootsrap messa	ges from tha	at BSR or					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.14	draft-ietf-pim-	sm-bsr-12.txt s	3.2 p19 Sendir	ng Candidate-F	RP-Advertisem	ent Messages					
MUST		periodically the unicast			the BSR						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-41.15	draft-ietf-pim-	sm-bsr-12.txt s	3.2 p19 Sendir	ng Candidate-F	RP-Advertisem	nt Message		•			
MUST	Every C-RP periodically unicasts a C-RP-Adv to the BSR (Note: Here the periodic test is performed)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.16	draft-ietf-pim-	sm-bsr-12.txt s	3.2 p19 Sendir	ng Candidate-F	RP-Advertisem	ent Messages					
SHOULD	C-RPs should	d by default	send C-RP-Ad	lv messages v	iththe Prior	rity field se	t to 192.				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.17	draft-ietf-pim-	sm-bsr-12.txt s	3.2 p19 Sendir	ng Candidate-F	RP-Advertisem	ent Messages					
MUST	Zone bit MUS zone; otherw	ST be set in wise this bit	an admin so the C-RP-Adv MUST NOT be bit is unset	messages it		_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.18	draft-ietf-pim-sm-bsr-12.txt s3.3 p21 Creating the RP-Set at the BSR										
MUST	from the C-I than BS_Per:	RP-Set, subjection and SHOUI	e "RP-Holdtimect to the co LD be larger ages getting	onstraint tha than 2.5 tim	at it MUST be	e larger					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release	Release	Release	Release	Release	Release	Release	Release			
	8.2.2	8.3	8.4	X.X.X	X.X.X	X.X.X	X.X.X	X.X.X			
PIM-SM-41.19	draft-ietf-pim-	draft-ietf-pim-sm-bsr-12.txt s3.3 p21 Creating the RP-Set at the BSR									
SHOULD	For each RP-address, the "RP-Holdtime" field is set to the Holdtime from the C-RP-Set, subject to the constraint that it MUST be larger than BS_Period and SHOULD be larger than 2.5 times BS_Period to allow for some Bootstrap messages getting lost. (Note: Here we test the SHOULD part										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.20	draft-ietf-pim-	sm-bsr-12.txt s	3.3 p21 Creatii	ng the RP-Set	at the BSR						
MUST	There MUST h		minimum of E	S_Min_Interv	al between e	each					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.21	draft-ietf-pim-	sm-bsr-12.txt s	3.4 p23 Forwa	rding Bootstrap	Messages						
MUST	One is that bit is set,	_	message is r	not forwarded	l if its No-F	orward					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.22	draft-ietf-pim-	sm-bsr-12.txt s	3.4 p23 Forwa	rding Bootstrap	Messages						
MUST	multicast-ca	apable interf	e is forwarde Tace which ha age was recei	as PIM neighb		_					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x		
PIM-SM-41.23	draft-ietf-pim-	sm-bsr-12.txt s	3.5 p24 Bootst	rap Messages	to New and R	ebooting Route	ers	•		
MAY	each admin s SHOULD be se compatibilit Unicast Boot (Note: Here Multicast of	on the LAN se scope zone to ent as a No-I ty, this mess tstrap messag ANVL checks r Unicast des e No-Forward	o the new or Forward Boots sage MAY instage, that whether stination. If	rebooting rostrap message tead or in ac the Bootstr the destina	outerThis e For bac ddition be se	message ckwards ent as a by DUT has				
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-41.24	s4.9, p110 PII	raft-ietf-pim-sm M Packet Form w or rebootin	ats				ooting Routers	RFC4601		
	Hello message is received from a new neighbor, or a Hello message with a new GenID is received from an existing neighbor, one router on the LAN sends a stored copy of the Bootstrap message for each admin scope zone to the new or rebooting router. NOTE: <case-l> Sending PIM Hello MSG with Unrecognized Version field <case-2> Sending PIM Hello MSG with incorrect checksum</case-2></case-l>									
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-41.26	draft-ietf-pim-	sm-bsr-12.txt s	4 p25 Messag	e Formats		'	•	•		
MUST	ALL-PIM-ROU	otstrap messa TERS group, DUT originat						l		
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							
PIM-SM-41.27	draft-ietf-pim-	sm-bsr-12.txt s	4 p25 Messag	e Formats				•		
MUST	ALL-PIM-ROU	otstrap messa TERS group, DUT forwards			TTL 1 to the					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested							
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass							
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested							





	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-41.28	draft-ietf-pim-	draft-ietf-pim-sm-bsr-12.txt s4 p25 Message Formats									
MUST	Usually, Bootstrap messages are multicast with TTL 1 to the ALL-PIM-ROUTERS group, (Note: here we check IP TTL value)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.29	draft-ietf-pim-	sm-bsr-12.txt s	4 p25 Messag	e Formats							
MUST	ALL-PIM-ROUT in section : PIM neighbor	TERS group, k 3.5.2) Bootst r.	ages are multout in some carap messages TTL value for Free BSD 10.3	circumstances s are unicast	described to a specif	fic					
	untested	untested	untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.30	draft-ietf-pim-	sm-bsr-12.txt s	4.1 p28 Bootst	rap Message F	ormat	•	•				
MAY	The length (in bits) of the mask to use in the hash function. For IPv4 we recommend a value of 30.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-41.31	draft-ietf-pim-	sm-bsr-12.txt s	4.2 p32 Candi	date-RP-Adver	tisement Mess	age Format					
MUST	C-RPs MUST 1	NOT send C-RI	P-Adv message	es with a Pre	fix Count of	`0'.					
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive	Ubuntu 18.04: inconclusive								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								





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	Release 8.2.2	Release 8.3	Release 8.4	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x	Release x.x.x			
PIM-SM-42.1	draft-ietf-pim-	sm-bsr-12.txt s	3.6 p25 Receiv	ving and Using	the RP-Set						
MUST	If a mapping is not already part of the RP-Set, it is added to the RP-Set and the associated Group-to-RP mapping Expiry Timer (GET) is initialized to the holdtime from the Bootstrap message. Its priority is set to the Priority from the Bootstrap message.										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-42.2	draft-ietf-pim-	sm-bsr-12.txt s	3.6 p25 Receiv	ving and Using	the RP-Set						
MUST	Priority fro	g is already om the Bootst dtime from th	rap message	and its asso	_						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-42.3	draft-ietf-pim-	sm-bsr-12.txt s	3.6 p25 Receiv	ing and Using	the RP-Set						
MUST	If a mapping is not already part of the RP-Set, it is added to the RP-Set and the associated Group-to-RP mapping Expiry Timer (GET) is initialized to the holdtime from the Bootstrap message. Its priority is set to the Priority from the Bootstrap message. (Note: This test is for rp-priority)										
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								
PIM-SM-42.4	draft-ietf-pim-	sm-bsr-12.txt s	3.6 p25 Receiv	ving and Using	the RP-Set						
MUST	Priority fro	g is already om the Bootst dtime from th test is for	trap message ne Bootstrap	and its asso	_						
	Free BSD 10.3 untested	Free BSD 10.3 untested	Free BSD 10.3 untested								
	Ubuntu 18.04: pass	Ubuntu 18.04: pass	Ubuntu 18.04: pass								
	Free BSD 12.0 untested	Free BSD 12.0 untested	Free BSD 12.0 untested								