



ALMA Band 5 Full Production

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European ALMA Support Centre



- ◆ Pre-production phase funded by the EC under FP6
 - Consortium of ESO, OSO/GARD, RAL/STFC, UoC/DAS
 - Official start in Jan. 2006
 - Completion of Band 5 Pre-production in Sep. 2012
 - 6 cartridges built, 5 of them installed in ALMA antennas
 - First light, single dish, on 6 Apr. 2012
 - First fringes on 23 Oct. 2012

- ◆ Full production phase funded through ALMA development
 - Band 5 Cold Cartridge production undertaken by a consortium by NOVA and OSO/GARD under contract by ESO
 - Band 5 Local Oscillator full production allocated to NA Executive (NRAO)
 - Integration and verification done at the OSF

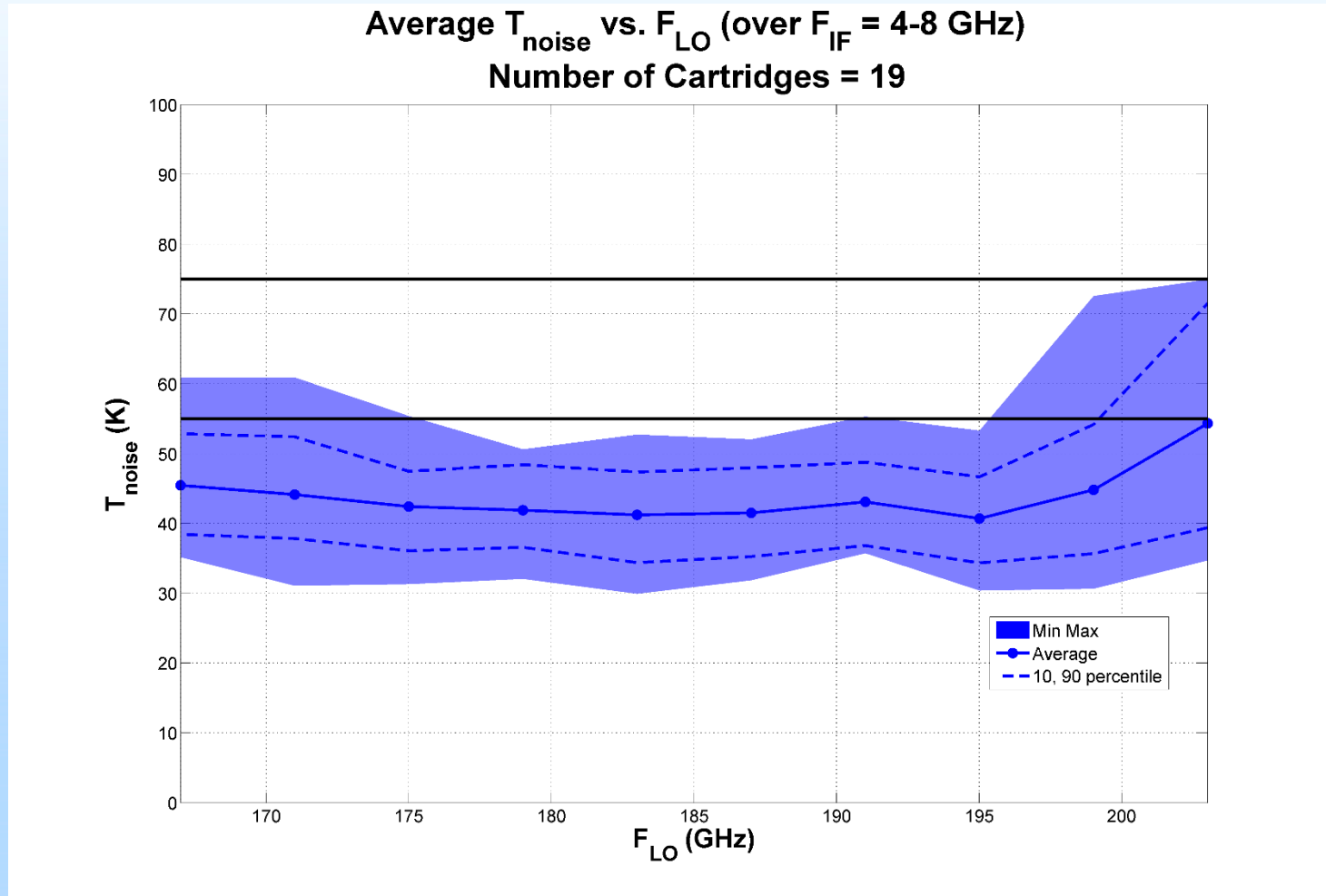
Band 5 Project status

- ◆ Kick-off meeting – 1 Feb. 2013
- ◆ Total 73 cartridges will be produced; pre-production cartridges replaced (few are/will be used on other telescopes)
- ◆ 19 cold cartridges delivered to Observatory
- ◆ Integration started in May 2015; 18 receivers installed in ALMA antennas and available at the AOS
- ◆ End of production: Q3-Q4 2017
- ◆ Auxiliary parts
 - ◆ CPDS, bias modules: all delivered to JAO and accepted
 - ◆ Photomixers: all delivered to NRAO and accepted
 - ◆ Vacuum windows: machined plastic windows instead of quartz; production finished, ~70 assembled and accepted by JAO
 - ◆ ACA optics (warm mirrors for 7-m antennas) delivered and accepted





Band 5 Noise Performance



Band 5 production cartridge noise temperature performance meets tightened, version B, ALMA specifications* with margin

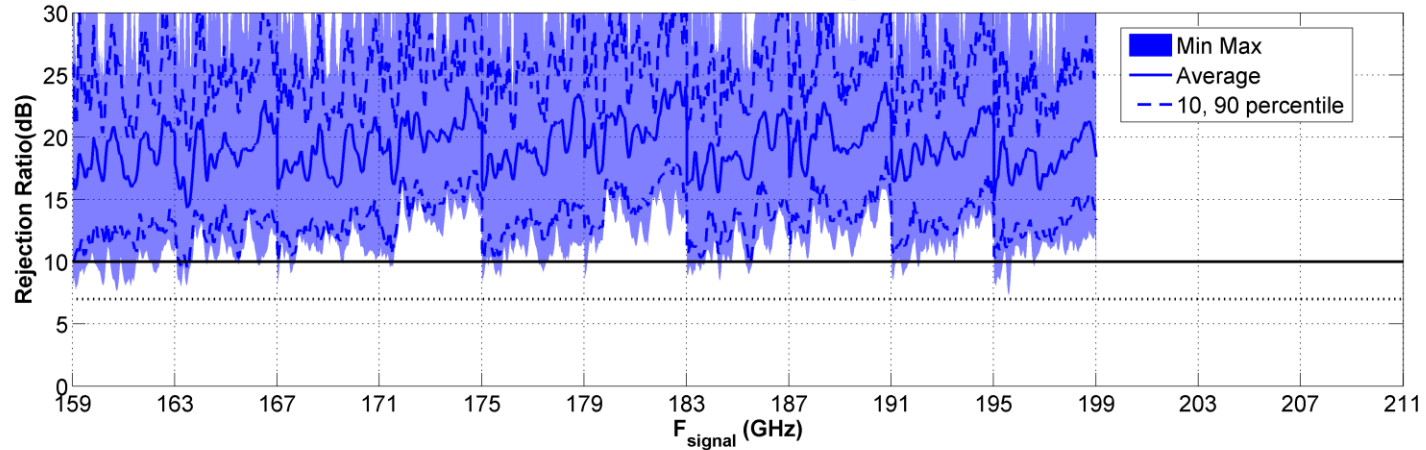
* < 55 K over 80% of the frequency range (version A / pre-production: 65 K)

< 75 K at any frequency (version A / pre-production: 108 K)

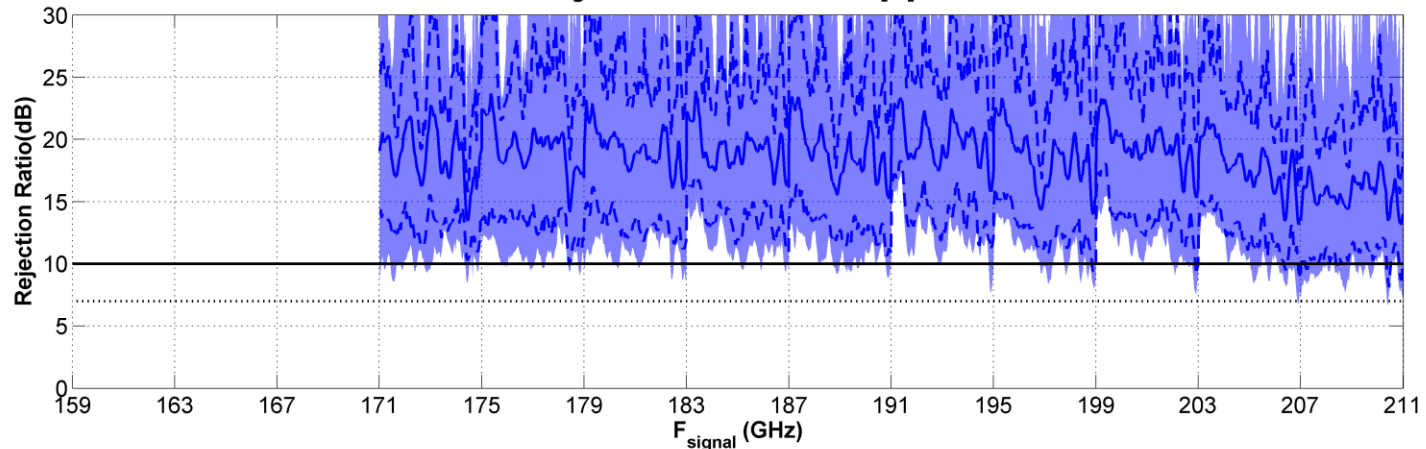


Band 5 sideband rejection

Sideband Rejection Ratio Lower Sideband Number of Cartridges = 19

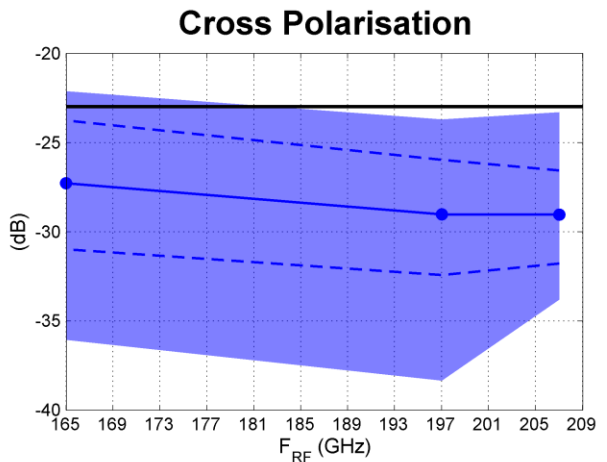
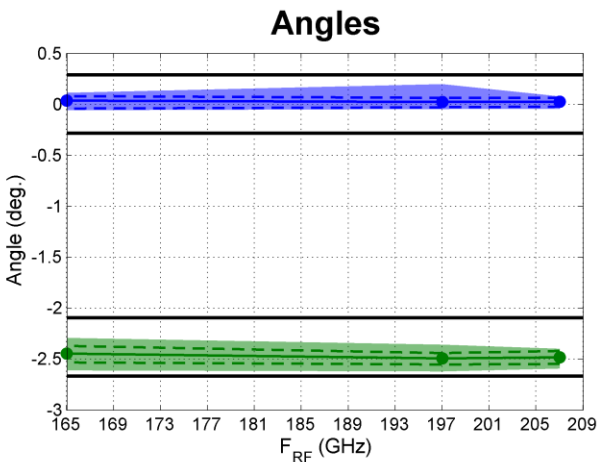
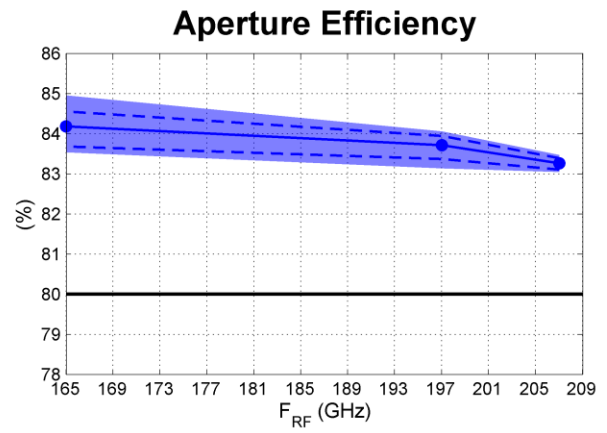
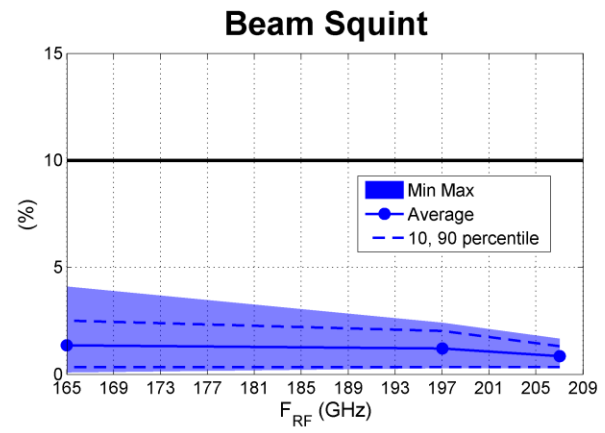


Sideband Rejection Ratio Upper Sideband



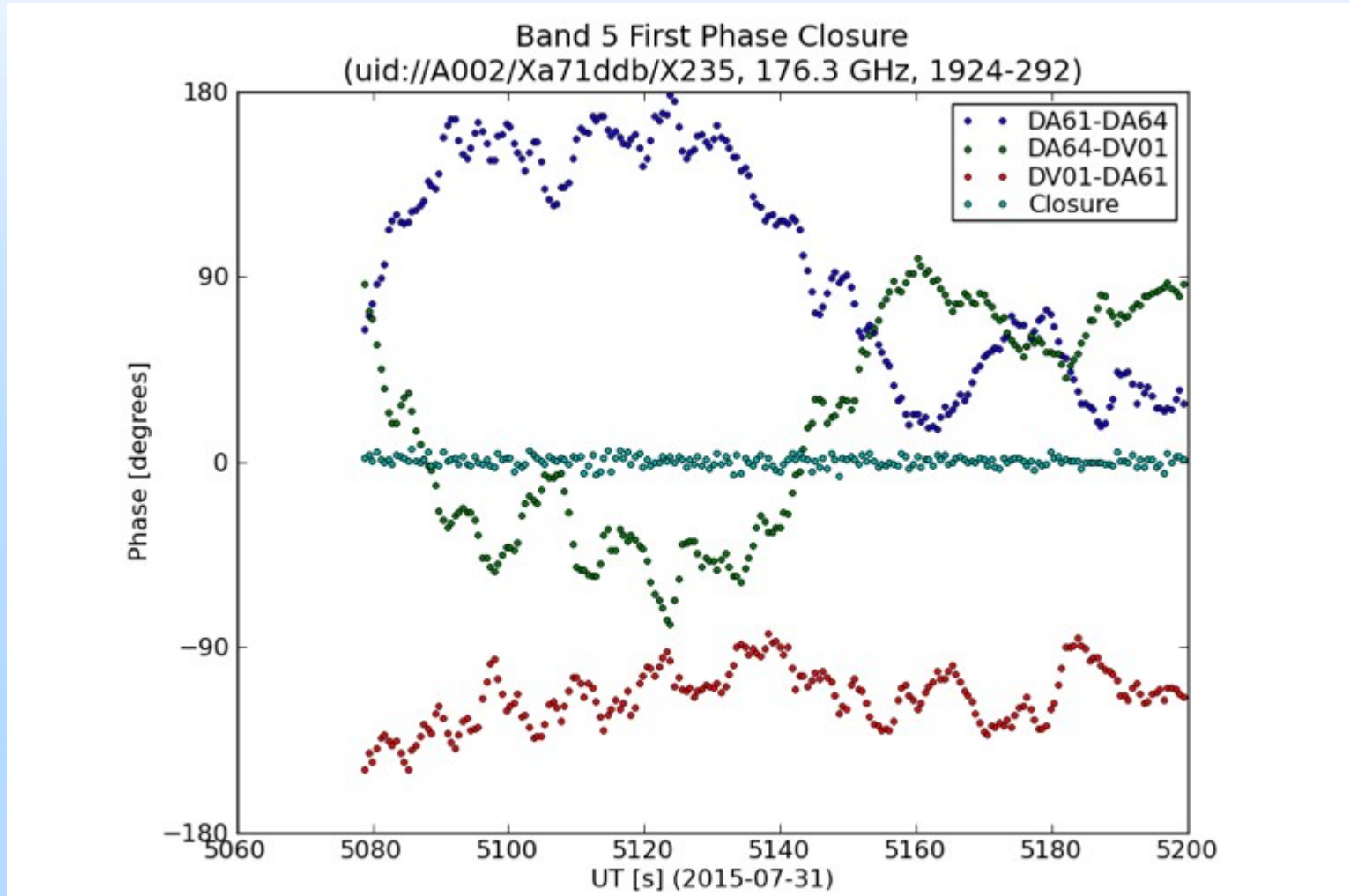
Band 5 Optical Performances

Beampattern Overview ; Number of Cartridges = 19



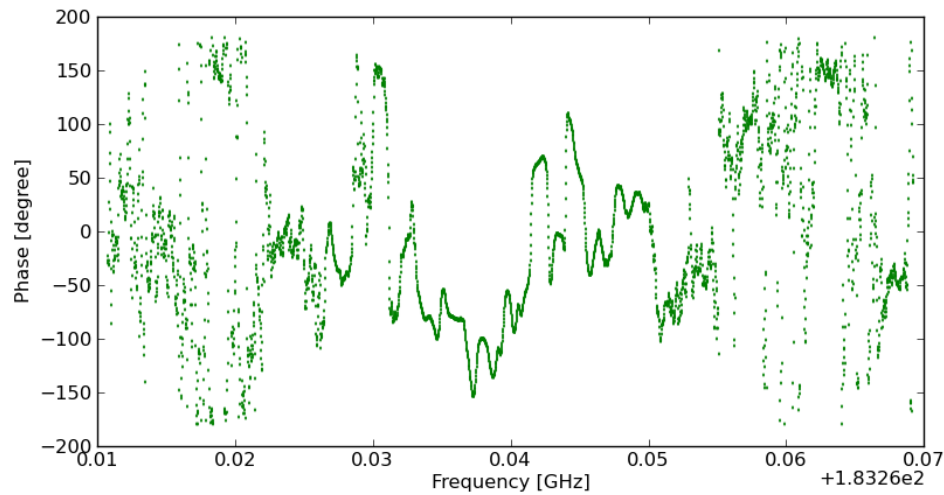
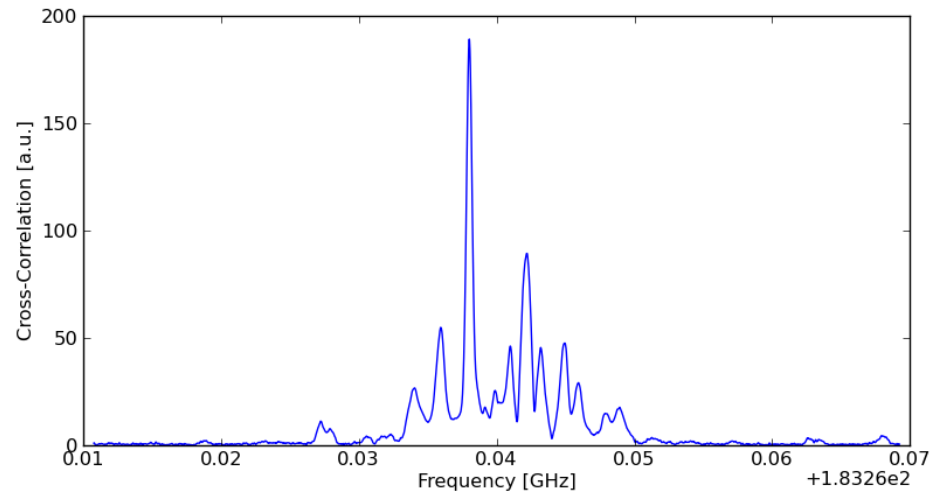
Band 5 production cartridges have very good optical performance, in particular the polarization efficiency is well above the 99.5% requirement

Phase closure, 8th July 2015



First light

Band 5 1st Fringe (DA64-DV01) at AOS, baseline ~ 1km, OMC1 H₂O Maser 183.3 GHz



Band 5 Integration/Verification

- ◆ Band 5 cold cartridge and axillary components are produced by EU
- ◆ LO is contributed by NA
- ◆ Final integration and verification of Band 5 is done at OSF
 - ◆ Coordinated with maintenance activities, limited impact on operations
- ◆ Band 5 Integration / Verification plan approved and being successfully implemented
- ◆ Band 5 Integration / Verification costs are shared by EU (70%) and NA (30%) Executives
- ◆ NAOJ provides in-kind contribution
 - ◆ Manpower to support integration/verification at OSF



Band 5 science verification status



ESO
European Organisation
for Astronomical
Research in the
Southern Hemisphere

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Band 5 Science Verification Status

CCA SN	FE	Ant	ADP No.	Parent Ticket	ENG Parent Ticket	Pointing JIRA	5	Focus JIRA	5	Spectral JIRA	L5	S5	BeamSquint JIRA	5	Notes, Issues
09	38	DA61	ADP-28	DSOANT-61	AIV-18223	DSOANT-64	✓	DSOANT-65	✓	DSOANT-66	✓	✓	DSOANT-67	✓	
07*	43	DA64	ADP-12	DSOANT-27	AIV-18123	DSOANT-27	✓	DSOANT-26	✓	DSOANT-30	✓	✓	DSOANT-31	✓	FE swap Mar-2016 from DA64 to PM03
11	40	DA49	ADP-70	DSOANT-82	AIV-18252	DSOANT-86	✓	DSOANT-85	✓	DSOANT-87	✓	✓	DSOANT-88	✓	
08	61	DV01	ADP-51	DSOANT-2	AIV-18152	DSOANT-6	✓	DSOANT-5	✓	DSOANT-20	✓	✓	DSOANT-24	✓	
12	48	DA45	ADP-126	DSOANT-98	AIV-18275	DSOANT-102	✓	DSOANT-101	✓	DSOANT-103	✓	✓	DSOANT-104	✓	
14	69	DV12	ADP-171	DSOANT-146	AIV-18387	DSOANT-150	✓	DSOANT-149	✓	DSOANT-151	✓	✓	DSOANT-152	✓	
13	47	DV17	ADP-148	DSOANT-139	AIV-18348	DSOANT-142	✓	DSOANT-143	✓	DSOANT-144	✓	✓	DSOANT-145	✓	
10	28	DV19	ADP-101	DSOANT-91	AIV-18267	DSOANT-95	✓	DSOANT-94	✓	DSOANT-96	✓	✓	DSOANT-97	✓	
29	03	DV23	ADP-195	DSOANT-163	AIV-18360	DSOANT-165	✓	DSOANT-164	✓	DSOANT-166	✓	✓	DSOANT-167	✓	
31	53	DA48	ADP-222	DSOANT-168	AIV-18206	DSOANT-170	✓	DSOANT-169	✓	DSOANT-171	✓	✓	DSOANT-172	✓	
20	36	CM09	ADP-266	DSOANT-202	AIV-18853	DSOANT-204	✓	DSOANT-203	✓	DSOANT-205	✓	✓	DSOANT-206	✓	
21	15	DA58	ADP-293	DSOANT-173	AIV-18452	DSOANT-175	✓	DSOANT-174	✓	DSOANT-176	✓	✓	DSOANT-177	✓	
24	49	CM08	ADP-349	DSOANT-181	AIV-18581	DSOANT-183	✓	DSOANT-182	✓	DSOANT-184	✓	✓	DSOANT-185	✓	
22	37	DV05	ADP-369	DSOANT-195	AIV-18679	DSOANT-197	✓	DSOANT-196	✓	DSOANT-198	✓	✓	DSOANT-199	✓	Pol 1 deep only in cycle 3 on SW
27	52	DV25	ADP-398	DSOANT-207	AIV-18874	DSOANT-209	✓	DSOANT-208	✓	DSOANT-210	✓	⚠	DSOANT-211	✓	A lot of strong Birdies PRTSIR-9579
07*	43	PM03	ADP-12	DSOANT-27	AIV-18123 AIV-18971	DSOANT-27	✓	DSOANT-26	✓	DSOANT-30	✓	✓	DSOANT-31	✓	FE swap Mar-2016 FE-43 from D64
26	46	CM06	ADP-417	DSOANT-222	AIV-18997	DSOANT-224	✓	DSOANT-223	✓	DSOANT-225	✓	✓	DSOANT-226	✓	
25	25	DA42	ADP-440	DSOANT-227	AIV-19053	DSOANT-229	✓	DSOANT-228	✓	DSOANT-230	✓	✓	DSOANT-231	✓	

Edit

