

C221A Correlation Report

General information

- Session info: <http://www3.mpifr-bonn.mpg.de/div/vlbi/globalmm/>
- Station feedback: https://www3.mpifr-bonn.mpg.de/div/vlbi/globalmm/sessions/apr22/feedback_apr22.asc
- ALMA and LMT did not observe
- Mopra 86 GHz is linear polarized. Similarly, Yebes was inadvertently linear polarized for nearly the entire track.
- Release v1 is a release of all projects, without PolConvert of ML010A baselines to Mopra (nor to Yebes).
- Release v2 adds ML010A 3mm with Mopra polarization converted to circular not with PolSolve+PolConvert (failed) but rather with QWP_ROTATE.py and a fixed 45 deg rotation and a fixed Mopra "RCP-LCP" offset taken from one calibrator scan

Status

what	date
Started v1 correlation of 3mm	22 Nov 2022
Started v1 correlation of 7mm	24 Nov 2022
Packaging of v1 finished. Mopra in ML010A *not* polconverted for v1, neither was Yebes.	12 Dec 2022
Release v1 distributed to PIs	20 Dec 2022
Started trials for ML010A with PolSolve+PolConvert and QWP_ROTATE.py to convert Mopra	09 Jan 2022
Packaging of v2 ML0101A finished with Mopra converted to linear	06 Feb 2022

Fringes

Station	Code	Fringes	Plots	Comments
Ef		yes, 3mm No0128 50s SNR~200 Ef-On		
Nn		yes		
On		yes, 3mm No0128 50s SNR~200 Ef-On		
Mh		yes, 3mm No0048 100s SNR~15 Mh-On		
Ys		yes, 3mm No0209 30s SNR~90 On-Ys		most scans linear pol
Pv		no		
Gl		yes, 3mm No0136 Gl-Nn		freq setup shifted from C211

Station	Code	Fringes	Plots	Comments
Kt		yes, 3mm No0030 50s SNR~250 Kt-Ky, no Ku fringe		
Ky		yes, 3mm No0030 50s SNR~250 Kt-Ky		
Ku		yes, 3mm No0159 20s SNR~200 Ku-Ky		most of track no Ku fringes, only during No0155-No0181
VLBA		yes, intra VLBA and to Nn Ef		
VLBA_OV		yes		unexpected fringes despite observing log noting rx warm and several maintenance outages while working on the cryo
VLBA_NL		no		unexpected, no fringes yet no issues noted in observing log; in some sense the opposite of the case of OV
VLBA_PT		no		expected, observing log indicates Pt had major hardware failures
Mp		yes, 3mm No0235 Mp-Kt		linear pol at Mp - PolConvert!
ATCA		yes, 3mm No0235, At-Mp (circ x lin), At-Kt , No0229 Kp-Kt-Ky-At-Mp		No0235 ATCA refant W45
KVN-EU- VLBA-Aus		yes, arrays tied using Nn Kp Ky At		

Notes

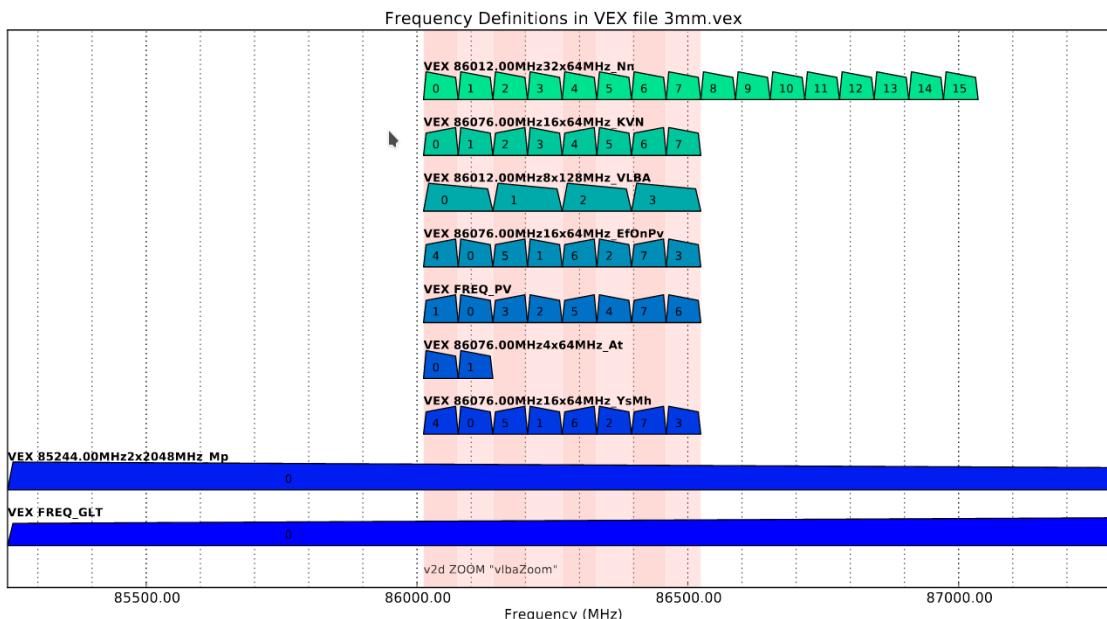
- PV joined late due to bad weather. The first scans were bad due to a setup problem. First good scan is 091-1415 No0265. Looks like the 3rd-last scan for PV, i.e. PV lost for most of this track.
- YS had technical problems in the beginning of c221a which were fixed after 091-0800 No0179. Missing quarter waves plates were inserted later. First good scan is 091-1415 No0265, the 3rd-last scan for YS.
- YS inadvertent linear-pol scans were not labeled as X,Y during correlation, but if PolConvert is indicated, could carry out relabeling on the existing visibility data prior to a PolConvert pass
- KU lacks fringes for the most of the track except for scans No0155-No0181
- Mopra is linear polarized (need PolConvert!) and had a different recording setup than scheduled, 2 x 2048 MHz at 85244.0 MHz USB.

- Mopra 20 scans of data lost at MPIfR due to VDIF conversion running while BeeGFS migration was ongoing, unfortunately no backup on transfer server
- Atca had a non-standard setup, 4 x 64 MHz USB at 86012.0 MHz and 86076.0 MHz
- Severe OpenMPI software issue, all of the 7 scans that have >=15 stations fail OpenMPI MPI_Init() with "num local peers failed". Fails also with a simple MPI Hello World program launched with the same mpi machinesfile. The MPI_Init() strangle succeeds when the machinesfile is first sorted alphabetically i.e. the exactly same nodes are used, merely started in different order. To correlate the 7 scans, had to reduce the nr of stations by dropping those stations that had bad data (Pv, Ys, Pt, La).
- GLT, Slack #c221, 01 Apr ~ 13 UT: "we observed M87 instead for scan 429, 435, 441, 446 as M87 has been low elevation", ~16 UT "GLT resumed the observations from scan 458. No snow, no problem so far."
- GLT, EHT 2022 obslog, scan 641 on 2013+370 and all later scans lost due to power outage

Frequency Setup

Mopra and GLT recorded wideband 2048 MHz, but did not have common scans in track A.

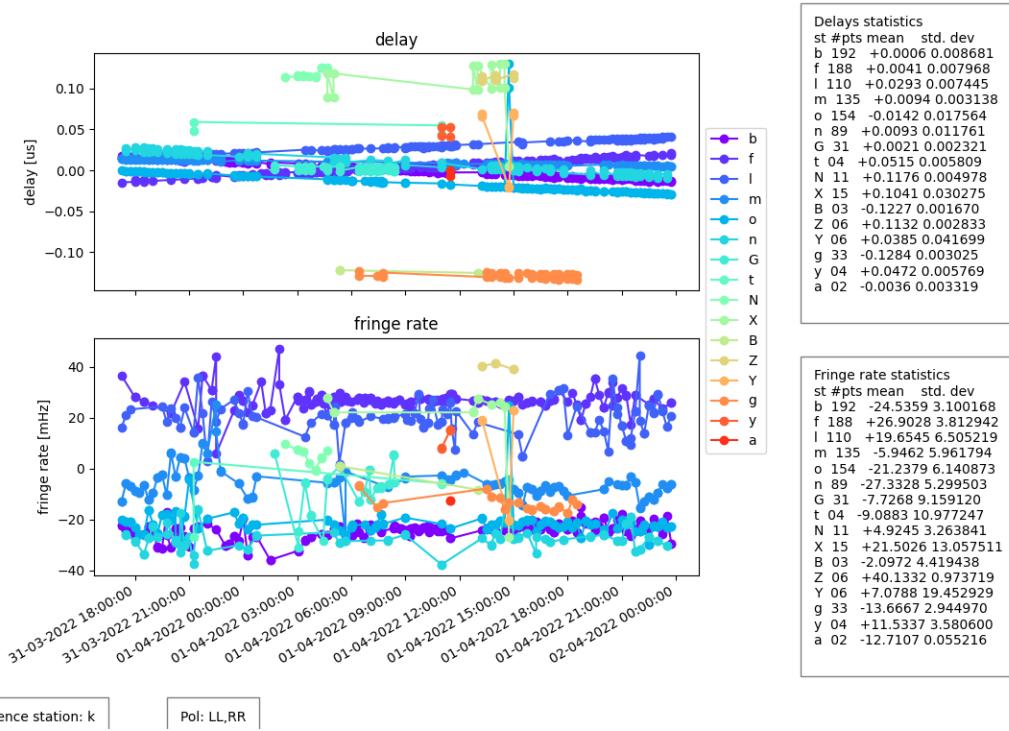
NOEMA recorded 1024 MHz of which 512 MHz are common with the majority of the GMVA array. Another 512 MHz are common only with GLT (38 scans Nn-Gl) and nominally with Mopra (but 0 scans Nn-Mp). These extra 512 MHz on Nn-Gl were *not* included in DiFX correlation.



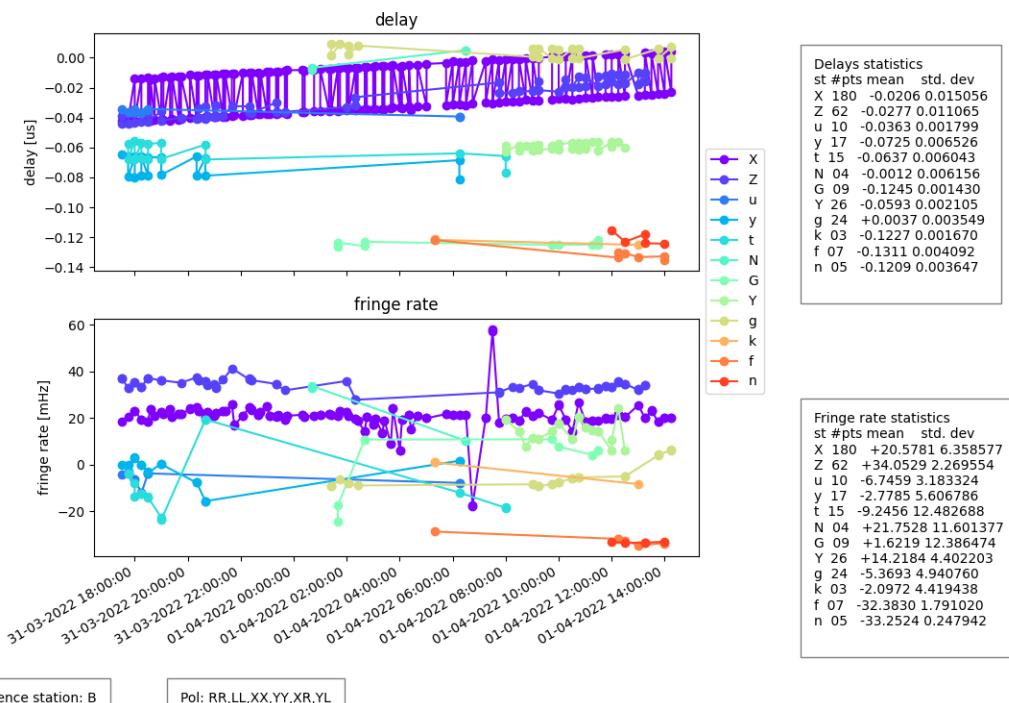
Post-Correlation checks

3mm Residuals

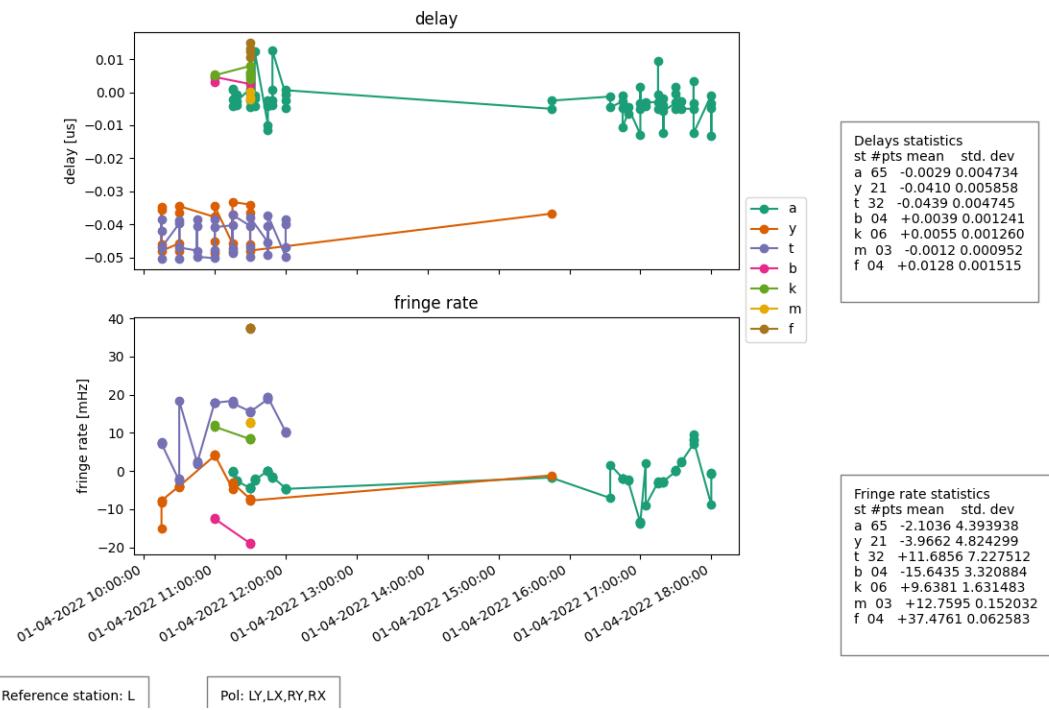
Residuals relative to Kitt Peak



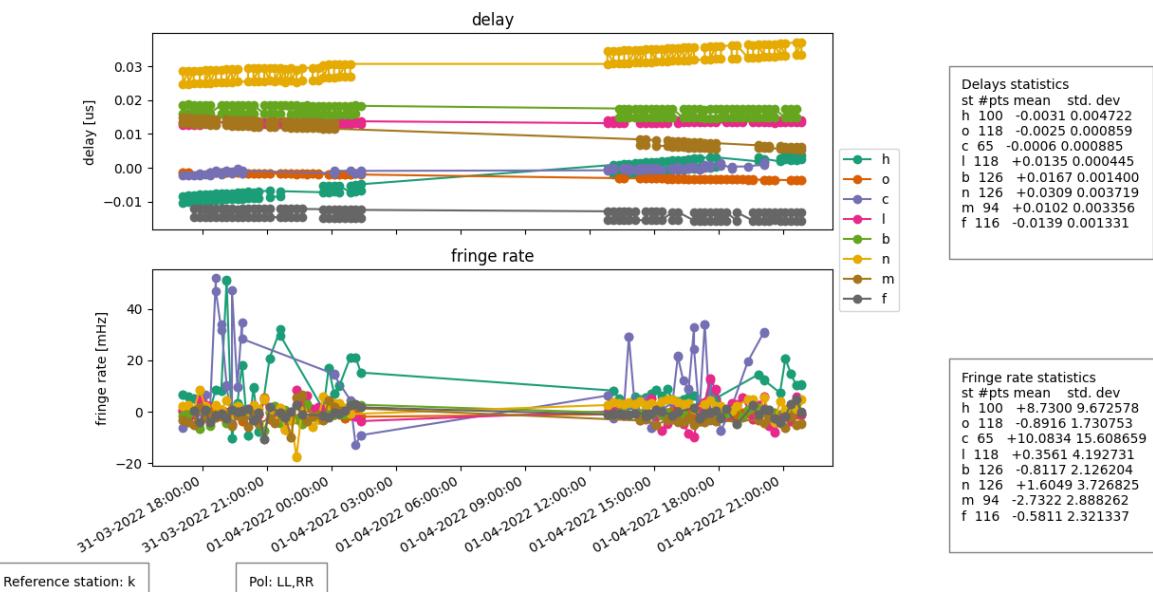
Residuals relative to Effelsberg



Residuals relative to Mopra



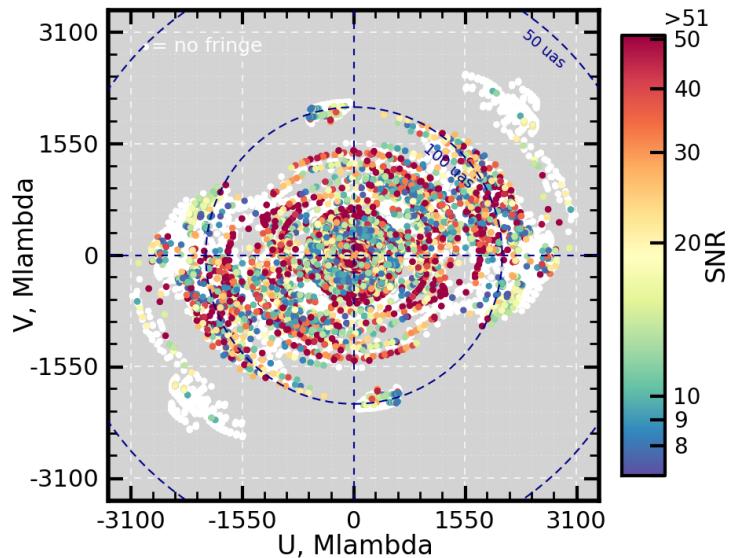
7mm Residuals



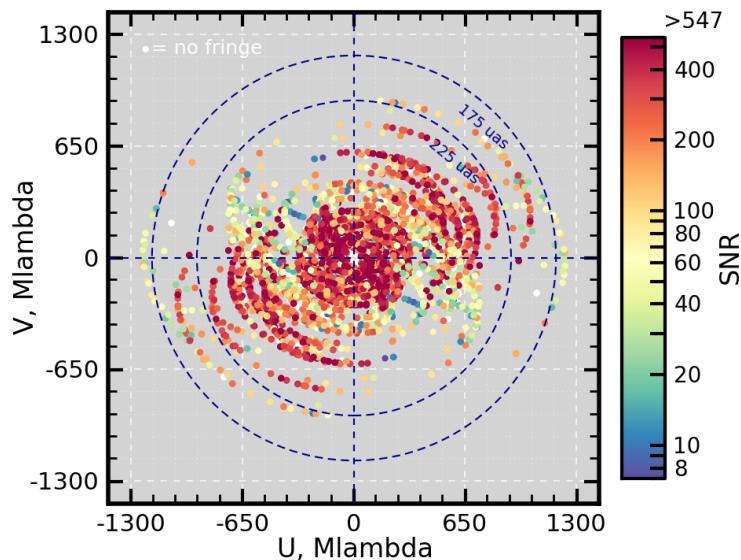
Detections

3mm

UV cov.: all sources, all antennas, all pols.

**7mm**

UV cov.: all sources, all antennas, all pols.



FITS completeness (pclist)

3mm

Note that this FITS-IDL-based list does not show ML010A scans since they contain mixed circular-linear baselines due to Mopra, and this is not supported by FITS-IDL.

	MH	KY	KU	KT	GL	GB	NL	FD	PT	LA	KP	OV	BR	MK	EF	ON	YS	PV	NN
c221a_1000	No0001				BLLAC	86ghz	o	o	o	o	o	o	o	o	.	.	.	.
c221a_1001	No0003	3C454.3			86ghz		o	o	o	o	o	o	o	o	.	.	.	.

.
c221a_1002	No0005	BLLAC	86ghz	o	o	o	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1004	No0008	3C454.3	86ghz	o	o	o	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1006	No0011	BLLAC	86ghz	o	o	o	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1008	No0014	3C454.3	86ghz	o	o	o	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1010	No0017	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1013	No0021	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1015	No0024	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1018	No0028	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1021	No0032	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1024	No0036	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1025	No0038	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1028	No0042	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1031	No0046	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1034	No0050	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1035	No0052	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.	o	o	o	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c221a_1038	No0056	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.	o	o	o	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
c221a_1041	No0060	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1044	No0064	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1045	No0066	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1048	No0070	3C454.3	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1051	No0074	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1054	No0078	3C454.3	86ghz	.	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1055	No0080	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1058	No0084	BLLAC	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.
.
c221a_1061	No0088	3C84	86ghz	o	o	x	o	o	o	o	o	o	o	.	.	.	.	.	.	.

.
.

c221a_1064 No0092 0420-014 86ghz o o x o o o o o

.
.

c221a_1065 No0095 3C84 86ghz o o x o o o o o

.
.

c221a_1067 No0098 0420-014 86ghz o o x o o o o o

.
.

c221a_1070 No0102 3C84 86ghz o o x o o o o o

.
.

c221a_1073 No0107 0420-014 86ghz o o x o o o o o

.
.

c221a_1109 No0155 2013+370 86ghz o o o x o

o o o o . .

c221a_1112 No0158 2013+370 86ghz o o o o x o

o o o o . .

c221a_1113 No0159 BLLAC 86ghz o o o x o

o o o o . .

c221a_1113 No0159 BLLAC 86ghz o o o x o

o o o o . .

c221a_1116 No0163 2013+370 86ghz o o o x o

o

c221a_1119 No0166 BLLAC 86ghz o o o x o

o o o o . .

c221a_1119 No0166 BLLAC 86ghz o o o x o

o o o o . .

c221a_1122 No0170 2013+370 86ghz o o o x o

o

c221a_1123 No0171 2013+370 86ghz o o o x o

o

c221a_1126 No0174 BLLAC 86ghz o o o x o

o o o o . .

c221a_1126 No0174 BLLAC 86ghz o o o x o

o o o o . .

c221a_1129 No0178 2013+370 86ghz o o o . o

o

c221a_1132 No0181 BLLAC 86ghz o o o x o

o o o o o .

c221a_1132 No0181 BLLAC 86ghz o o o x o

o o o o o .

c221a_1133 No0182 BLLAC 86ghz o o o x o

o

c221a_1133 No0182 BLLAC 86ghz o o o x o

o

c221a_1136 No0186 2013+370 86ghz o o o x o

o

c221a_1139 No0190 BLLAC 86ghz o o o x o

o . . . o o

c221a_1139 No0190 BLLAC 86ghz o o o x o

o . . . o o

c221a_1142 No0194 2013+370 86ghz o o o x o

o	o o														
c221a_1143	No0195 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1146	No0198 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1149	No0202 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1152	No0205 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1155	No0209 BLLAC 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1155	No0209 BLLAC 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1158	No0213 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1161	No0216 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	x	o
o	o o														
c221a_1164	No0220 BLLAC 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o o														
c221a_1164	No0220 BLLAC 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o o														
c221a_1167	No0224 2013+370 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o o														
c221a_1170	No0227 2013+370 86ghz	o	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o o														
c221a_1173	No0231 BLLAC 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o o														
c221a_1173	No0231 BLLAC 86ghz	.	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o o														
c221a_1176	No0234 2013+370 86ghz	o	.	.	.	.	.	.	.	.	o	o	o	o	o
o	o .														
c221a_1179	No0237 2013+370 86ghz	o	o	.	.	.	.	.	.	.	o	o	o	o	o
o	o .														
c221a_1181	No0239 BLLAC 86ghz	o	o	.	.	.	.	.	.	.	o	o	o	o	o
o	o .														
c221a_1181	No0239 BLLAC 86ghz	o	o	.	.	.	.	.	.	.	o	o	o	o	o
o	o .														
c221a_1183	No0241 2013+370 86ghz	o	o	x	o	o	.	.	.	.	o	o	o	o	o
o	x .														
c221a_1186	No0245 2013+370 86ghz	o	o	x	o	o	.	.	.	.	o	o	o	o	o
o	x .														
c221a_1189	No0249 BLLAC 86ghz	o	o	.	.	o	o	o	.	.	o	o	o	.	o
o	o .														
c221a_1189	No0249 BLLAC 86ghz	o	o	.	.	o	o	o	.	.	o	o	o	.	o
o	o .														
c221a_1192	No0253 2013+370 86ghz	o	o	.	.	o	o	o	o	o	o	o	o	.	o
o	o .														
c221a_1195	No0257 2013+370 86ghz	o	o	.	.	o	o	o	o	o	o	o	.	o	.
o	o .														
c221a_1198	No0261 BLLAC 86ghz	o	o	.	.	o	o	o	o	o	o	o	.	o	.

o	o .			
c221a_1198	No0261	BLLAC	86ghz	o o . . o o o o o o o o o o . o
o	o .			
c221a_1201	No0265	2013+370	86ghz	o o . . o o o o o o o o o o o o
o	o .			
c221a_1204	No0269	2013+370	86ghz	o o . . o o o o o o o o o o o o
o	o .			
c221a_1207	No0273	2013+370	86ghz	x x . . x x 04 x x x x x . .
x	x .			
c221a_1210	No0277	BLLAC	86ghz	o o . . o o o o o o o o o o o o
o	o .			
c221a_1210	No0277	BLLAC	86ghz	o o . . o o o o o o o o o o o o
o	o .			
c221a_1213	No0281	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1216	No0285	3C454.3	86ghz	o o o o o o o o o o
.	o .			
c221a_1216	No0285	3C454.3	86ghz	o o o o o o o o o o
.	o .			
c221a_1219	No0289	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1222	No0293	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1225	No0297	BLLAC	86ghz	o o o o o o o o o o
.	o .			
c221a_1225	No0297	BLLAC	86ghz	o o o o o o o o o o
.	o .			
c221a_1228	No0301	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1230	No0305	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1233	No0309	3C454.3	86ghz	o o o o o o o o o o
.	o .			
c221a_1233	No0309	3C454.3	86ghz	o o o o o o o o o o
.	o .			
c221a_1236	No0313	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1239	No0317	2013+370	86ghz	o o o o o o o o o o
.	o .			
c221a_1242	No0321	BLLAC	86ghz	o o o o o o o o o o
.	o .			
c221a_1242	No0321	BLLAC	86ghz	o o o o o o o o o o
.	o .			
c221a_1245	No0325	2013+370	86ghz	o o o o o o o o o o 90
.	o .			
c221a_1248	No0329	2013+370	86ghz	o o o o o o o o o o x
.	o .			
c221a_1251	No0333	3C454.3	86ghz	o o o o o o o o o o x
.	o .			
c221a_1251	No0333	3C454.3	86ghz	o o o o o o o o o o x

.	.	.	.	.	o	.									
c221a_1252	No0335	2013+370	86ghz	o	o	o	o	o	o	x	.	.	.	.	.
.	.	.	.	x	.										
c221a_1253	No0337	2013+370	86ghz	o	o	o	o	o	o	x	.	.	.	.	.
.	.	.	.	x	.										
c221a_1254	No0339	BLLAC	86ghz	o	o	o	o	o	o	x	.	.	.	.	.
.	.	.	.	x	.										
c221a_1254	No0339	BLLAC	86ghz	o	o	o	o	o	o	x	.	.	.	.	.
.	.	.	.	x	.										
c221a_1255	No0341	2013+370	86ghz	o	o	o	o	o	o	x	.	.	.	.	.
.	.	.	.	x	.										
c221a_1256	No0343	2013+370	86ghz	o	o	o	o	o	o	x	.	.	.	.	.
.	.	.	.	x	.										
c221a_1257	No0345	3C454.3	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1257	No0345	3C454.3	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1258	No0347	2013+370	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1259	No0349	2013+370	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1260	No0351	BLLAC	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1260	No0351	BLLAC	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1261	No0353	3C454.3	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1261	No0353	3C454.3	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1262	No0355	BLLAC	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1263	No0357	BLLAC	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1264	No0359	BLLAC	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.	.	.	.	x	.										
c221a_1265	No0361	0420-014	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1266	No0362	3C84	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1267	No0363	0420-014	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1268	No0364	3C84	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1269	No0365	0420-014	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1270	No0366	3C84	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1271	No0367	0420-014	86ghz	o	o	o	o	o	o	o	.	.	.	.	.
.										
c221a_1272	No0368	3C84	86ghz	o	o	o	o	o	o	o	.	.	.	.	.

7mm

			NL	FD	PT	LA	KP	OV	BR	MK	HN	SC
c221a_1000	No0002	BLLAC	43ghz	o	o	o	o	o	o	o	o	o
c221a_1001	No0004	3C454.3	43ghz	o	o	o	o	o	o	o	o	o
c221a_1002	No0006	BLLAC	43ghz	o	o	o	o	o	o	o	o	o
c221a_1003	No0009	3C454.3	43ghz	o	o	o	o	o	o	o	o	o
c221a_1004	No0012	BLLAC	43ghz	o	o	o	o	o	o	o	o	o
c221a_1005	No0015	3C454.3	43ghz	o	o	o	o	o	o	o	o	o
c221a_1006	No0018	BLLAC	43ghz	o	o	x	o	o	o	o	o	11
c221a_1007	No0022	3C454.3	43ghz	o	o	x	o	o	o	o	o	o
c221a_1008	No0025	BLLAC	43ghz	o	o	x	o	o	o	o	o	o
c221a_1009	No0029	3C454.3	43ghz	o	o	x	o	o	o	o	o	o
c221a_1010	No0033	BLLAC	43ghz	o	o	x	o	o	o	o	o	o
c221a_1011	No0037	3C454.3	43ghz	o	o	x	o	o	o	o	o	o
c221a_1012	No0039	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1013	No0043	3C454.3	43ghz	o	o	x	o	o	o	o	o	.
c221a_1014	No0047	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1015	No0051	3C454.3	43ghz	o	o	x	o	o	o	o	o	.
c221a_1016	No0053	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1017	No0057	3C454.3	43ghz	o	o	x	o	o	o	o	o	.
c221a_1018	No0061	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1019	No0065	3C454.3	43ghz	o	o	x	o	o	o	o	o	.
c221a_1020	No0067	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1021	No0071	3C454.3	43ghz	o	o	x	o	o	o	o	o	.
c221a_1022	No0075	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1023	No0079	3C454.3	43ghz	o	o	x	o	o	o	o	o	.
c221a_1024	No0081	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1025	No0085	BLLAC	43ghz	o	o	x	o	o	o	o	o	.
c221a_1026	No0089	3C84	43ghz	o	o	x	o	o	o	o	o	o
c221a_1027	No0093	0420-014	43ghz	o	o	x	o	o	o	o	o	o
c221a_1028	No0096	3C84	43ghz	o	o	x	o	o	o	o	o	o
c221a_1029	No0099	0420-014	43ghz	o	o	x	o	o	o	o	o	o
c221a_1030	No0103	3C84	43ghz	o	o	x	o	o	o	o	o	o
c221a_1031	No0108	0420-014	43ghz	o	o	x	o	o	o	o	o	o
c221a_1032	No0110	1156+295	43ghz	.	o	x	o	o	o	o	.	o
c221a_1033	No0114	1156+295	43ghz	.	o	x	o	o	o	o	.	o
c221a_1034	No0242	2013+370	43ghz	o	o	x	o	o	.	.	.	x
c221a_1035	No0246	2013+370	43ghz	o	o	x	o	o	.	.	.	o
c221a_1036	No0250	BLLAC	43ghz	o	o	x	o	o	o	o	.	o
c221a_1037	No0254	2013+370	43ghz	o	o	x	o	o	o	o	o	o
c221a_1038	No0258	2013+370	43ghz	o	o	o	o	o	o	o	o	o
c221a_1039	No0262	BLLAC	43ghz	o	o	o	o	o	o	o	o	o
c221a_1040	No0266	2013+370	43ghz	o	o	o	o	o	o	o	o	o
c221a_1041	No0270	2013+370	43ghz	o	o	o	o	o	o	o	o	o

c221a_1042	No0274	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1043		BLLAC	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1044	No0282	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1045	No0286	3C454.3	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1046	No0290	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1047	No0294	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1048	No0298	BLLAC	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1049	No0302	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1050	No0306	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1051	No0310	3C454.3	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1052	No0314	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1053	No0318	2013+370	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1054	No0322	BLLAC	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1055	No0326	2013+370	43ghz	o	o	o	o	o	o	x	x	o	
c221a_1056	No0330	2013+370	43ghz	o	o	o	o	o	o	x	x	o	
c221a_1057	No0334	3C454.3	43ghz	o	o	o	o	o	o	x	x	o	
c221a_1058	No0336	2013+370	43ghz	o	o	o	o	o	o	x	x	.	
c221a_1059	No0338	2013+370	43ghz	o	o	o	o	o	o	x	x	.	
c221a_1060	No0340	BLLAC	43ghz	o	o	o	o	o	o	x	x	o	
c221a_1061	No0342	2013+370	43ghz	o	o	o	o	o	o	x	x	.	
c221a_1062	No0344	2013+370	43ghz	o	o	o	o	o	o	o	o	.	
c221a_1063	No0346	3C454.3	43ghz	o	o	o	o	o	o	o	o	o	o
c221a_1064	No0348	2013+370	43ghz	o	o	o	o	o	o	o	o	.	.
c221a_1065	No0350	2013+370	43ghz	o	o	o	o	o	o	o	o	.	.
c221a_1066	No0352	BLLAC	43ghz	o	o	o	o	o	o	o	o	o	.
c221a_1067	No0354	3C454.3	43ghz	o	o	o	o	o	o	o	o	o	.
c221a_1068	No0356	BLLAC	43ghz	o	o	o	o	o	o	o	o	o	.
c221a_1069	No0358	BLLAC	43ghz	o	o	o	o	o	o	o	o	o	.
c221a_1070	No0360	BLLAC	43ghz	o	o	o	o	o	o	o	o	o	.