Network Monitoring Report: **C-band 6cm** N22C3

Source: J1751+0939 and J2031+1219 **Length:** 180 min. **Observing mode:** 4096 Mbps, 32x32 MHz, 2 bits, dual pol.
Reference antenna: Effelsberg **Date of observations:** 20/10/22 **Reference date:** 293d 12h 00m
Experiment code: N22C3 **Date of report:** 30/06/25 **by:** Gabor Orosz

⊗ According to expectation, no special remarks ⬚ Station did not observe (not scheduled)
■ Problem occured - see enclosed footnote(s) ○ Entry not applicable/investigated

	Jb2	Wb	Ef	Mc	Nt	O8	T6	Ur	Tr	Ys	Hh	Ir	Km	Cm	Da	Kn	Pi	De
Station has observed	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	■	■	⊗	⊗	⊗	⊗	⊗
Station produced fringes (ftp)	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	⊗	⊗	⊗	⊗	⊗
Station produced fringes (disk)	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	⊗	⊗	⊗	⊗	⊗
Logs are available (within 72 h)	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	○	○	○	○	○
Antabs on vlbeer (within 7 days)	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	○	○	○	○	○
Feedback on www (within 7 days)	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	■	■	■	■	■
GPS clock estimate gives fringes	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	⊗	⊗	⊗	⊗	⊗
Clock rate in psec/sec	0.09	0.13	−0.01	0.03	0.13	−0.60	0.82	−0.53	0.06	1.36	0.06	–	–	−0.59	0.09	0.09	0.09	0.09
Recording okay	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	⊗	⊗	⊗	⊗	⊗
Polarization setup okay	⊗	■	⊗	⊗	■	⊗	⊗	⊗	■	⊗	⊗	⊗	⊗	■	■	⊗	⊗	■
Strong signal amplitude	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	⊗	⊗	■	⊗	⊗
Sampler statistics okay	⊗	⊗	⊗	⊗	■	⊗	⊗	⊗	⊗	⊗	⊗	⬚	⬚	■	⊗	■	■	⊗
Please check BBC number(s):					08/16				05							01/09		
Previous problem(s) corrected					■													
Problem(s) first reported																		
See enclosed footnote(s):	a	b		c	d				e			f	f	g/h	h	i	g	h

Enclosure: Footnotes C-band 6cm N22C3

Footnotes to the Network Monitoring Report: **C-band 6cm** N22C3

General:
1) eMERLIN stations recorded at 512 Mbps, while Westerbork and Urumqi recorded at 1 Gbps and 2 Gbps respectively due to system limitations. Other stations operated at the full 4 Gbps data rate.
2) Recording at 4 Gbps pushes most stations beyond their optimal local oscillator frequency ranges. This affects the lowest frequency channels (1-4 at 4632 MHz LSB/USB) most severely, with secondary effects on the highest channels (29-32 at 5080 MHz LSB/USB). This is expected behavior for stations operating at maximum data rates.
3) Both scheduled sources produced strong fringes, however J2031+1219 was 20-30% higher than J1751+0939, with better S/N on longer baselines.

a) Jb2, Jodrell Bank Mark 2: LCP has higher amplitude errors, exceeding 20% in some channels. There was also a Jm stream scheduled (Jb with the eMERLIN backend), which was not sent/correlated (it was not needed).
b) Wb, Westerbork: Due to a power outage at JIVE, some of the flexbuf disks used for Wb were down and it only started recording from scan 4 (12:30 UT). Strong polarization leakage across all sub-bands, resulting in elevated RL/LR values.
c) Mc, Medicina: Apart from the roll-off in the lowest channels, there are strong RFI spikes in the autocorrelations (see standard plots).
d) Nt, Noto: Polarization leakage in BBC 08/16 (5080 MHz LSB). This leakage is there in earlier and later NMEs, too (see N22C2, N23C1). Additionally, in N22C2 Nt failed to produce fringes due to an unlocked LO. Fixed in this NME.
e) Tr, Torun: Phase instability in time ($+/-180^\circ$ scatter): the interference bands are $\sim$1 min wide on average and appear every $\sim$4 minutes (this issue had been a problem from early 2022 and was eventually solved in the spring of 2023). Also swapped polarization inputs at the hardware level. The vex file was modified to account for the swap, but this correction can still lead to some amplitude and phase irregularities (see e.g., BBC05 (USB) RCP for reduced amplitudes in the middle, which might be related to this). The swapped polarizations are still happening regularly (see e.g., N24C3) with amplitude loss in the same channel.
f) Ir/Km, Irbene/Kunming: Could not participate due to technical maintenance.
g) Cm/Pi, Cambridge/Pickmere: Bad sampler distribution: outer quantization levels ($--$,$++$) severely compressed ($\sim$2-5%), inner levels inflated ($\sim$45–48%). $\sim$10-15% sensitivity loss.
h) Cm/Da/De, Cambridge/Darnhall/Defford: Polarization issues, with high RCP/LCP gain imbalance and cross-polarization leakage.
i) Kn, Knocking: Inverted sampler distribution with 75% in the highest quantization level ($++$) and only 5–6% in the middle ($-+$,$+-$) levels. As a result, sensitivity is degraded by more than 80%.