## **Duke Spectrometer References (to DSS)**

## Indirect reference ratio (IUPAC):

1H	(DSS)	1.000000000	a	1,	2
2H	(DSS)	0.153506088	a	2,	5
13C-1H	(DSS)	0.251449530	a	1,	2
15N-1H	(DSS)	0.101329118	b	1,	2
31P-1H	(DSS)	0.404808636	h	2,	6

## Duke600 (By Su Wang, November 18, 2013)

		<pre>cryoprobe @ frequency fo</pre>		599.7140205	MHz
13C	absolute	rence for 130 frequency fo frequency fo	or Oppm:	150.7978086 60.7684927	MHz MHz
		cryoprobe @ frequency fo		599.7140523	MHz
Indi	rect refe	rence for 130	and 15N		
13C 15N	absolute absolute	frequency for frequency for	or Oppm: or Oppm:	150.7978166 60.7684960	MHz MHz
Duke	600 with	cryoprobe @	30C		
1H	absolute	frequency fo	or Oppm:	599.7140830	MHz
Indi	rect refe	rence for 130	and 15N		
				150.7978243	
15N	absolute	frequency fo	or Oppm:	60.7684991	MHz
Duke	600 with	cryoprobe @	35C		
1H	absolute	frequency fo	or Oppm:	599.7141133	MHz
		cence for 130			
				150.7978319	
15N	absolute	frequency fo	or Oppm:	60.7685022	MHz
Duke	600 with	cryoprobe @	37C		
				599.7141249	MHz
Indi	rect refe	rence for 130	and 15N		
13C	absolute	frequency fo	or Oppm:	150.7978348	MHz
15N	absolute	frequency fo	or Oppm:	60.7685033	MHz
	600 with	cryoprobe @	40C		
1H		frequency fo		599.7141422	MHz
India	rect refe	rence for 130	'and 15N		
				150.7978392	MHz
				60.7685051	
 Duke	600 with	cryoprobe @	45C		
1H				599.7141715	MHz
		cence for 130			
				150.7978466	
				60.7685081	
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Duke 700 (By Qinglin Wu, June 02, 2013)	
Duke 700 with cryoprobe @ 15C  1H absolute frequency for Oppm:	700.019871 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.0196676 MHz 70.93239611 MHz
Duke 700 with cryoprobe @ 20C 1H absolute frequency for Oppm:	700.019909 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.0196771 MHz 70.93239996 MHz
Duke 700 with cryoprobe @ 25C  1H absolute frequency for Oppm:	700.019946 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.0196864 MHz 70.93240371 MHz
Duke 700 with cryoprobe @ 30C  1H absolute frequency for Oppm:	700.019982 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.0196955 MHz 70.93240736 MHz
Duke 700 with cryoprobe @ 35C  1H absolute frequency for Oppm:	700.020018 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.0197045 MHz 70.93241101 MHz
Duke 700 with cryoprobe @ 37C  1H absolute frequency for 0ppm:	700.020032 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.019708 MHz 70.93241242 MHz
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Indirect reference for 13C and 15N 13C absolute frequency for Oppm: 15N absolute frequency for Oppm:	
Duke 700 with cryoprobe @ 40C  1H absolute frequency for 0ppm:	700.020053 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	
Duke 700 with cryoprobe @ 45C  1H absolute frequency for 0ppm:	700.020087 MHz
Indirect reference for 13C and 15N 13C absolute frequency for 0ppm: 15N absolute frequency for 0ppm:	176.0197219 MHz 70.932418 MHz

## Duke 800 (By Qinglin Wu, Su Wang and Jessica Wojtaszek, November 20, 2013)

	h cryoprobe @ 20C e frequency for Oppm:	799.9057661 MHz
13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	201.1359289 MHz
Duke 800 wit	h cryoprobe @ 25C e frequency for Oppm:	799.905803 MHz
Indirect ref 13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	
	h cryoprobe @ 30C e frequency for Oppm:	799.9058458 MHz
13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	
	h cryoprobe @ 35C e frequency for Oppm:	799.9058888 MHz
13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	201.1359598 MHz
	h cryoprobe @ 37C e frequency for Oppm:	799.9059039 MHz
13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	201.1359636 MHz 81.05375973 MHz
	h cryoprobe @ 40C e frequency for Oppm:	799.9059287 MHz
13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	201.1359698 MHz 81.05376223 MHz
	h cryoprobe @ 45C e frequency for Oppm:	799.9059689 MHz
13C absolut	erence for 13C and 15N e frequency for Oppm: e frequency for Oppm:	201.1359799 MHz
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