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VARIAN

Dear NMR Spectroscopist,

Factory test data included with this letter :

- Proton S/N on Ethylbenzene
- Proton S/N on 2mM Sucrose in 90% H_2O
- Water suppression on 2mM Sucrose in 90% H_2O
- Proton non-spin lineshape
- ^{1}H nutation curve
- ^{13}C nutation curve
- ^{15}N nutation curve
- ^{2}H nutation curve
- Gradient strength / recovery

System requirements :

- VNMR 6.1C with patch level 203 or higher
- Pre-conditioning VT unit (such as FTS)
- Waveform generator on channel 2

Guidelines for safe and optimized operation of your cold probe :

- The standard VT range of the cold probe is 0 to 50 degrees Celsius. Safe operation of the probe requires that these limits are not exceeded. Use the 'temp' pop-up window to control the sample temperature. The pre-conditioning unit should have a minimum temperature setting of -20 degrees Celsius.

- The ^{1}H pw90 should calibrated to be > 6μs (for non-salty samples) ; ^{13}C pw90 > 14μs ; ^{15}N pw90 > 35μs & ^{2}H pw90 > 125μs. To avoid causing damage to the probe it is especially important that you do not use 90° pulse widths less than these values. Varian cold probes are more power efficient than our comparable conventional probes, hence lower power settings are needed to achieve comparable pw90 values (with the exception of ^{2}H). When calibrating pulses, start at a lower power (approx. 4 dB below what would be used on a standard HCN probe for example) and increase the power in small steps. When pulsing carbon and nitrogen nuclei simultaneously, reduce the power on both channels by a minimum of 3 dB each. BioPack experiments account for this automatically. For salty samples use the same power that has been calibrated for a non-salty sample and calibrate a longer pulse width to achieve a 90-degree tip angle.

- Power handling :

	RF strength	Maximum length	Duty cycle
^{13}C decoupling	3 kHz	120 ms	< 8 %
^{13}C decoupling	2.5 kHz	250 ms	< 8%
^{13}C spinlock	9 kHz	25 ms	
^{15}N decoupling	1.5 kHz	120 ms	< 8 %
^{15}N decoupling	1 kHz	250 ms	< 8 %
^{2}H decoupling	1 kHz	60ms	< 8 %
^{1}H spinlock (TOCSY)	8 kHz	100ms	< 8 %
^{1}H spinlock (ROESY)	2.5 kHz	500ms	< 8 %

- Decouple ^{13}C using an adiabatic decoupling scheme. Use the makeCshp macro to generate a WURST-40 shape file from standard hard pulse calibrations.

- For experiments involving simultaneous ^{13}C and/or ^{15}N decoupling and/or ^{13}C spin lock pulses, take extra care to monitor cooling power usage (by looking at the ITC heating) and that a sufficient number of steady state scans are used to reach thermal equilibrium before acquisition begins. Ensure that the reduction in available cooling power for any experiment does not exceed 1 Watt. Cooling power (ITC heating) is displayed on the screen of the CryoBay in the box labeled "Heater".

- Use solvent susceptibility matched Shigemi tubes to improve solvent suppression, RF homogeneity and overall experimental performance. The recommended sample height is 18-20 mm in this type of tube.

Please don't hesitate to contact us about any questions that might arise.

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