UPAS v2+ LOG FILE LEGEND (firmware version 149)

Section 1: Header data

CATEGORY	PARAMETER	FORMAT/UNITS	DESCRIPTION
Device information	UPASserial	(-)	UPAS serial number
	UPASpcbRev	(-)	Main PCB revision number
	UPASexpRev	(-)	Expansion PCB revision number
	MotionID	(HEX ID)	0x6B=LSM6DSRX 0x6C=LSM6DSOX
	PMserial	ID_FWver_HWrev_SHDLCver	Sensirion SPS30 particulate matter sensor serial number
	CO2serial	(HEX ID)	Sensrion SCD4x CO2 sensor serial numbrer
	Gasserial	(HEX ID)	Sensirion SGP41 VOC and Nox sensor serial number
	UPASfirmware	(-)	Current version of firmware running on the UPAS
	LifetimeSampleCount	(integer)	Number of samples started in the lifetime of the UPAS
	LifetimeSampleRuntime	(h)	Cumulative sample hours in the lifetime of the UPAS
	LifetimeBatteryRuntime	(h)	Cumulative hours that the battery has operated. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
	LifetimeSamplePumptime	(h)	Cumulative hours that the pumps have operated. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
	LifetimePMSensorFanStartCount	(#)	Cumulative counts that the SPS30 fan has started. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
	LifetimePMSensorFanHours	(h)	Cumulative hours that the SPS30 fan has operated. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
	LifetimePMSensorPMMC	(mg)	Estimated cumulative PM2.5 mass concentration that the SPS30 has sampled. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
	LifetimeCO2SensorHours	(h)	Cumulative hours that CO2 sensor has operated. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
	LifetimeVOCSensorHours	(h)	Cumulative hours that VOC sensor has operated. (Any hours of operation that occurred prior to Sept 16 2022 are not accounted for.)
Sample identification	LogFilename		Log filename as saved on the microSD card (automatically defined)
	SampleName		Sample name entered by the user into the mobile application
	CartridgeID		Cartridge identifier entered by the user into the mobile application
Setup summary	GPSUTCOffset	(h)	UTC offset for local time zone
	StartOnNextPowerUp	0 or 1	Was the UPAS programmed to start on next power-on? (0 = no, 1 = yes)
	ProgrammedStartTime	(s)	0 = "now" or "start on next power up"; otherwise equal to seconds since 1/1/1970
	ProgrammedRuntime	(s)	Programmed sample run time; 360000000 means "indefinite"
	SizeSelectiveInlet	(-)	PM size fraction collected by the size-selective inlet installed on the UPAS
	FlowRateSetpoint	(L min^{-1})	Programmed volumetric flow rate
	FlowOffset	(%)	The flow offset selected in the mobile application (% of the target)
	FlowDutyCycle	(%)	Duty cycle (possible values range from 13% to 100% in 3% or 4% increments)
	DutyCycleWindow	(s)	Period of duty cycle (30 s)
	GPSEnabled	0 or 1	GPS status during the sample; 0 = disabled, 1 = enabled

	PMSensorInterval	integer between 0 and 18	0 = sensor disabled; 1 = continuous measurement; 2-15 = intermittent measurement interval in minutes (e.g., 5 = 30-s warm-up, followed by 30-s measurement, followed by 4-minute sleep period); 16 = 15-s warm-up, followed by 5-s measurement, followed by 10-s sleep period; 17 = 15-s warm-up, followed by 5-s measurement, followed by 40-s sleep period; 18 = 20-s warm-up, followed by 10-s measurement, followed by 30-s sleep period
	RTGasSampleState	0 or 1	Status of the Sensirion SGP41 VOC/NO_x sensor; 0 = off, 1 = on
	CO2SampleState	0 or 1	Status of the Sensirion SCD41 CO_2 sensor; 0 = off, 1 = on
	LogInterval	(s)	Interval at which data are written to the log file
	SamplerConfiguration	0 or 1	0=personal/mobile; 1=stationary This is only for metadata use to allow users to designate if a upas sample was worn by a subject or if the upas was setup to be a stationary monitor.
	ExternalPowerMode	0x0F or 0xF0	0x0F = Off meaning that the battery SOC check will continue to cycle if UPAS is powered up while plugged into an external power source; 1 = On meaning that the battery SOC check cycle will not halt start on next power on samples or keep users from connecting to the UPAS using the BLE smartphone application.
	PowerSaveMode	0 or 1	0 = off, 1 = on; in power-save mode, the GPS is turned off and PMSensorInterval = 15 between 9 PM and 4 AM local time.
	AppLock	0, 1, or -1	Status of mobile application lock; 0 = unlocked, 1 = locked, -1 = not set (this feature is currently unavailable)
	AppVersion	i = iOS, A = Android	The version of the mobile application that was used to program the UPAS
Sample summary	StartDateTimeUTC	(YYYY-MM-DDTHH:MM:SS) (UTC date time format)	Timestamp when sample started (coordinated universal time)
	StartDateTimeLocal	(YYYY-MM-DDTHH:MM:SS) (Local date time format)	Timestamp when sample started, displayed in the timezone on the mobile device used to program the UPAS
	EndDateTimeUTC	(YYYY-MM-DDTHH:MM:SS) (UTC date time format)	Timestamp when sample ended (coordinated universal time)
	EndDateTimeLocal	(YYYY-MM-DDTHH:MM:SS) (Local date time format)	Timestamp when sample ended, displayed in the timezone on the mobile device used to program the UPAS
	FlowCheckMeterReadingPreSample	(L min^{-1})	The external flow meter reading entered into the mobile application by the user during the manual pre-sample check (if applicable; a pre-sample flow check is not required)
	FlowCheckMeterReadingPostSample	(L min^{-1})	The external flow meter reading entered into the mobile application by the user during the manual post-sample check (this feature is currently unavailable)
	OverallDuration	(h)	Overall sample log duration
	PumpingDuration	(h)	Overall duration for which the pumps pulled air through the sample filter
	OverallFlowRateAverage	(L min^{-1})	Sample-averaged flow rate through the filter
	PumpingFlowRateAverage	(L min^{-1})	Sample-averaged flow rate through the filter when the pumps were on
	SampledVolume	(L)	Volume of air sampled through the filter
	PercentTimeWorn	(%)	Estimated percent of a sample that the UPAS was worn during a sample. This is calculated based on a rolling average using the AccelXVar, AccelYVar, and AccelZVar. If any of these three values are greater than 100 during a 10 minute period motion is considered detected during that period.
	StartBatteryCharge	(%)	Battery state of charge when the sample started
	EndBatteryCharge	(%)	Battery state of charge when the sample ended
	StartBatteryVoltage	(V)	Battery voltage when the sample started
	EndBatteryVoltage	(V)	Battery voltage when the sample ended

	ShutdownMode	(integer)	0 = unknown error shutdown; 1 = user pushbutton sample stop; 2 = depleted battery shutdown (< 2.6 V); 3 = successfully completed preset sample duration; 4 = thermal protection shutdown; 5 = max power at initialization error; 6 = max pump voltage during sample shutdown; 7 = blocked flow during sample shutdown; 8 = SD card removed during sample; 64+ = freeze; 80+ = real-time operating system (RTOS) crash
CO_2 sensor calibration	CO2CalDate	(YYYY-MM-DDTHH:MM:SS) (UTC date time format)	The timestamp when the CO_2 sensor was last calibrated
	CO2CalTarget	(ppm)	The target (i.e., reference) CO_2 concentration during calibration (e.g., 417 ppm for calibration in outdoor ambient air)
	CO2CalOffset	(ppm)	The offset applied to make the CO_2 sensor reading match CO2CalTarget
Mass flow sensor calibration	MFSCalDate	(YYYY-MM-DDTHH:MM:SS) (UTC date time format)	The timestamp when the internal UPAS mass flow sensor was last calibrated
	MFSCalPerson	(-)	Name of the person who completed and approved the mass flow sensor calibration
	MFSCalVoutBlocked	(V)	Mass flow sensor output voltage measured when flow was blocked during calibration (currently unused)
	MFSCalVoutMin	(V)	Mass flow sensor output voltage measured at minimum flow during calibration
	MFSCalVoutMax	(V)	Mass flow sensor output voltage measured at maximum flow during calibration
	MFSCalMFBlocked	(g min^{-1})	Mass flow rate measured when flow was blocked during calibration (currently unused)
	MFSCalMFMin	(g min^{-1})	Minimum mass flow rate measured during calibration when the flow was unblocked
	MFSCalMFMax	(g min^{-1})	Maximum mass flow rate measured during calibration
	MFSCalPumpVBoostMin	(V)	Minimum pump voltage measured during calibration (currently unused)
	MFSCalPumpVBoostMax	(V)	Maximum pump voltage measured during calibration (currently unused)
	MFSCalPDeadhead	(Pa)	The pressure inside the pump manifold when the inlet was blocked and pumps were run at maximum power during flow calibration (currently unused)
	MF4	(-)	Coefficient of 4th-degree term in polynomial describing the mass flow calibration curve
	MF3	(-)	Coefficient of 3rd-degree term in polynomial describing the mass flow calibration curve
	MF2	(-)	Coefficient of 2nd-degree term in polynomial describing the mass flow calibration curve
	MF1	(-)	Coefficient of 1st-degree term in polynomial describing the mass flow calibration curve
	MF0	(-)	Coefficient of 0th-degree term in polynomial describing the mass flow calibration curve

Section 2: Sample Log

The log data are organized into nine categories:

DateTime	Timestamps
FilterSample	Data on the flow through the sample filter
Battery	The battery state of charge
Atmo	Data on environmental conditions: temperature, pressure, relative humidity, air density, and altitude
GPS	Global Positioning System data
Motion	Data from the accelerometer
Light	Data from the light sensor
PMSensor	Data from the Sensirion SPS30 particulate matter sensor

EngData	"Engineering data": Detailed data on the operational state of the UPAS that can be helpful for troubleshooting
GasExperi	Data from the Sensirion SCD41 CO_2 sensor and the Sensirion SGP41 VOC/NO_x sensor

CATEGORY	VARIABLE	FORMAT/UNITS	DESCRIPTION
DateTime	SampleTime	(HH:MM:SS)	Elapsed time since the UPAS flow rate reached a value within 4% of the setpoint
	UnixTime	(s)	Primary timestamp: Number of seconds that have elapsed since the Unix epoch (00:00:00 UTC on 1 January 1970, excluding leap seconds)
	UnixTimeMCU	(s)	Secondary timestamp: Number of seconds that have elapsed since the Unix epoch (we recommend using UnixTime instead of this timestamp)
	DateTimeUTC	(YYYY-MM-DDTHH:MM:SS) (UTC date time format)	Primary timestamp in Coordinated Universal Time
	DateTimeLocal	(YYYY-MM-DDTHH:MM:SS) (Local date time format)	Primary timestamp displayed in the timezone on the mobile device used to program the UPAS
FilterSample	PumpingFlowRate	(L min^{-1})	The volumetric flow rate through the sample filter. If the log interval = 30 s, this is the time-average of the volumetric flow rate measured when the pumps were active. If the log interval = 1 s, this is the instantaneous volumetric flow rate (when the pumps were active) or zero (when the pumps were inactive).
	OverallFlowRate	(L min^{-1})	Duty cycle-adjusted flow rate through the sample filter; calculated as PumpingFlowRate multiplied by the duty cycle.
	SampledVolume	(L)	Cumulative volume of air pulled through the sample filter
	FilterDP	(Pa)	Differential pressure across the inlet and sample filter when pumps were active
Battery	BatteryCharge	(%)	Battery state of charge calculated as a percentage. Fully charge the UPAS battery before first-time use to ensure this value is accurate.
Atmo	AtmoT	(C)	Temperature measured by an RTD sensor in the air flow path. Representative of the atmospheric sampling conditions.
	AtmoP	(hPa)	Atmospheric pressure as measured on the surface of the UPAS PCB.
	AtmoRH	(%)	Relative humidity measured by a sensor in the air flow path (a value between 0 and 100).
	AtmoDensity	(g L^{-1})	Air density calculated from AtmoT, AtmoP, and AtmoRH
	AtmoAlt	(m)	Elevation in meters above sea level
GPS	GPSQual	(-)	NMEA GPS signal quality: 0 = no fix, 1 = autonomous GNSS fix, 2 = differential GNSS fix, 4 = RTK fixed, 5 = RTK float, 6 = estimated/dead reckoning fix (measured once per log interval)
	GPSlat	(decimalDegree)	Latitude; logged to six decimal places and accurate to a distance of approximately 0.15 m (measured once per log interval)
	GPSlon	(decimalDegree)	Longitude; logged to six decimal places and accurate to a distance of approximately 0.15 m (measured once per log interval)
	GPSalt	(m)	Altitude above sea level (measured once per log interval)
	GPSsat	(integer)	Number of GPS satellite signals being received (measured once per log interval)
	GPSspeed	(m s^{-1})	Speed at which the GPS is moving (measured once per log interval)
	GPShDOP	(-)	Horizontal Dilution of Precision: represents the positional precision of the GPS relative to the accessible satellites (measured once per log interval)

Motion	AccelX	(mg)	Linear acceleration in the X-direction, relative to the accelerometer position on the UPAS; used to estimate the orientation of the UPAS (if log interval = 30 s and duty cycle = 100%, this is an average of values measured at 1 Hz over the full 30-s; if log interval = 30 s and duty cycle < 100%, this is an average of values measured at 1 Hz while the pumps were off; if log interval = 1 s and duty cycle = 100%, this is an intantaneous measurement; if log interval = 1 s and duty cycle < 100%, this is an instantaneous value measured only when the pumps were off.)
	AccelXVar	(mg)	The variance in AccelX over the log interval (will be 0 or blank if log interval = 1 s)
	AccelXMin	(mg)	Minimum acceleration in the X-direction during the log interval
	AccelXMax	(mg)	Maximum acceleration in the X-direction during the log interval
	AccelY	(mg)	Linear acceleration in the Y-direction, relative to the accelerometer position on the UPAS (see the description of AccelX for additional details)
	AccelYVar	(mg)	The variance in AccelY over the log interval (will be 0 or blank if log interval = 1 s)
	AccelYMin	(mg)	Minimum acceleration in the Y-direction during the log interval
	AccelYMax	(mg)	Maximum acceleration in the Y-direction during the log interval
	AccelZ	(mg)	Linear acceleration in the Z-direction, relative to the accelerometer position on the UPAS (see the description of AccelX for additional details)
	AccelZVar	(mg)	The variance in AccelZ over the log interval (will be 0 or blank if log interval = 1 s)
	AccelZMin	(mg)	Minimum acceleration in the Z-direction during the log interval
	AccelZMax	(mg)	Maximum acceleration in the Z-direction during the log interval
	RotX	(mdeg s^{-1})	Estimate of rotational acceleration in the X-direction, relative to the accelerometer position on the UPAS; used to estimate movement of the UPAS (see the description of AccelX for additional details)
	RotXVar	(mdeg s^{-1})	The variance in RotX over the log interval (will be 0 or blank if log interval = 1 s)
	RotXMin	(mdeg s^{-1})	Minimum rotational acceleration in the X-direction during the log interval
	RotXMax	(mdeg s^{-1})	Maximum rotational acceleration in the X-direction during the log interval
	RotY	(mdeg s^{-1})	Estimate of rotational acceleration in the Y-direction, relative to the accelerometer position on the UPAS (see the description of AccelX for additional details)
	RotYVar	(mdeg s^{-1})	The variance in RotY over the log interval (will be 0 or blank if log interval = 1 s)
	RotYMin	(mdeg s^{-1})	Minimum rotational acceleration in the Y-direction during the log interval
	RotYMax	(mdeg s^{-1})	Maximum rotational acceleration in the Y-direction during the log interval
	RotZ	(mdeg s^{-1})	Estimate of rotational acceleration in the Z-direction, relative to the accelerometer position on the UPAS (see the description of AccelX for additional details)
	RotZVar	(mdeg s^{-1})	The variance in RotY over the log interval (will be 0 or blank if log interval = 1 s)
	RotZMin	(mdeg s^{-1})	Minimum rotational acceleration in the Z-direction during the log interval
	RotZMax	(mdeg s^{-1})	Maximum rotational acceleration in the Z-direction during the log interval
	AccelComplianceCnt	(#)	Number of 30s sample periods in the 10 min rolling average that detected the UPAS was in motion. Min value of 0, Max value of 20. Moyion is detected if the AccelXVar, AccelYVar, or AccelZVar are greater than 100.

	AceelComplianceHrs	(hrs)	Cumulative time that the comliance algorithm detected the UPAS in motion. This value increments by 30s if AccelComplianceCnt is greater than 0.
	Xup	(%)	Percent of time the UPAS was in the Xup orientation during the log interval (see attached diagram)
	XDown	(%)	Percent of time the UPAS was in the Xdown orientation during the log interval
	Yup	(%)	Percent of time the UPAS was in the Yup orientation during the log interval
	Ydown	(%)	Percent of time the UPAS was in the Ydown orientation during the log interval
	Zup	(%)	Percent of time the UPAS was in the Zup orientation during the log interval
	Zdown	(%)	Percent of time the UPAS was in the Zdown orientation during the log interval
	StepCount	(#)	Estimated step count during for the current log interval
Light	LUX	(lux)	Measurement of illuminance from the Silicon Labs Si1133 light sensor. In the UPAS v2+, this sensor has a limited field of view and is installed behind a window; thus, we recommend interpreting all metrics reported by the light sensor as relative, and not exact, measurements.
	UVindex	(-)	Light sensor estimation of intensity of ultraviolet radiation from the sun (0 to 11+). Higher numbers represent higher exposures.
	HighVisRaw	(-)	Light sensor raw output for high-wavelength visible light. This metric (along with the LowVisRaw, IRRaw, and UVRaw metrics listed below) is included in the log file for experimental purposes only.
	LowVisRaw	(-)	Light sensor raw output for low-wavelength visible light
	IRRaw	(-)	Light sensor raw output for infrared (IR) light
	UVRaw	(-)	Light sensor raw output for ultraviolet (UV) light
PMSensor	PMMeasCnt	(#)	Number of PM measurements taken during this log interval; PM1MC, PM2_5MC, PM4MC, PM10MC, PM0_5NC, PM1NC, PM2_5NC, PM4NC, PM10NC, and PMtypicalParticleSize are averages of this many readings
	PM1MC	($\mu g\ m^{-3}$)	$PM_{1.0}$ mass concentration reported by the SPS30. We expect this value to be correlated with the "true" mass concentration, but do not recommend interpreting it as an exact concentration; scaling these sensor-reported values to a filter-derived $PM_{1.0}$ concentration might improve accuracy, but no $PM_{1.0}$ UPAS inlet is currently available.
	PM1MCVar	($\mu g\ m^{-3}$)	The variance in PM1MC over log the interval
	PM2_5MC	($\mu g\ m^{-3}$)	$PM_{2.5}$ mass concentration reported by the SPS30. We expect this value to be correlated with the "true" mass concentration, but do not recommend interpreting this value as an exact concentration; scaling these sensor-reported values to a filter-derived $PM_{2.5}$ concentration might improve accuracy. For additional information, see: https://dx.doi.org/10.1016/j.jaerosci.2020.105654
	PM2_5MCVar	($\mu g\ m^{-3}$)	The variance in PM2_5MC over the log interval
	PM4MC	($\mu g\ m^{-3}$)	$PM_{4.0}$ mass concentration reported by the SPS30 sensor. Published data suggest that the SPS30 does not efficiently detect 4.0 µm particles; this value might not be correlated with the "true" $PM_{4.0}$ mass concentration. For additional information, see: https://dx.doi.org/10.5194/amt-13-2413-2020
	PM4MCVar	($\mu g\ m^{-3}$)	The variance in PM4MC over the log interval

	PM10MC	(µg m^{-3})	PM_{10} mass concentration reported by the SPS30 sensor. Published data suggest that the SPS30 does not efficiently detect 10 µm particles; this value might not be correlated with the "true" PM_{10} mass concentration. For additional information, see: https://dx.doi.org/10.5194/amt-13-2413-2020
	PM10MCVar	(µg m^{-3})	The variance in PM10MC over the log interval
	PM0_5NC	(# cm^{-3})	Concentration of particles between 0.3 and 0.5 µm as reported by the SPS30
	PM0_5NCVar	(# cm^{-3})	The variance in PM0_5NC over the log interval
	PM1NC	(# cm^{-3})	Concentration of particles between 0.3 and 1.0 µm as reported by the SPS30
	PM1NCVar	(# cm^{-3})	The variance in PM1NC over the log interval
	PM2_5NC	(# cm^{-3})	Concentration of particles between 0.3 and 2.5 µm as reported by the SPS30
	PM2_5NCVar	(# cm^{-3})	The variance in PM2_5NC over the log interval
	PM4NC	(# cm^{-3})	Concentration of particles between 0.3 and 4.0 µm as reported by the SPS30
	PM4NCVar	(# cm^{-3})	The variance in PM4NC over the log interval
	PM10NC	(# cm^{-3})	Concentration of particles between 0.3 and 10.0 µm as reported by the SPS30
	PM10NCVar	(# cm^{-3})	The variance in PM10NC over the log interval
	PMtypicalParticleSize	(µm)	An indication of the average particle size as calculated and reported by the SPS30
	PMtypicalParticleSizeVar	(µm)	The variance in PMtypicalParticleSizeVar over the log interval
	PMReadingErrorCnt	(#)	Number of reading errors during a logging period reported by the SPS30.
	PMFanErrorCnt	(#)	Number of fan errors during a logging period reported by the SPS30.
	PMLaserErrorCnt	(#)	Number of laser errors during a logging period reported by the SPS30.
	PMFanSpeedWarn	(#)	Number of fan speed errors during a logging period reported by the SPS30.
	PM2_5SampledMass	(µg)	Cumulative mass of $PM_{2.5}$ sampled onto the filter as estimated from PM2_5MC
EngData	PCB1T	(°C)	Temperature measured on the main UPAS PCB (1 of 2 locations)
	PCB2T	(°C)	Temperature measured on the main UPAS PCB (2 of 2 locations)
	FdpT	(°C)	Temperature measured at the differential pressure sensor downstream of the filter
	AccelT	(°C)	Temperature measured at the accelerometer
	PT100R	(Ω)	Resistance of the RTD (used to calculate AtmoT)
	PCB2P	(hPa)	Pressure measured on the UPAS PCB (2 of 2 locations)
	PumpPow1	(integer)	Main pump power level
	PumpPow2	(integer)	Secondary pump power level
	PumpV	(V)	Voltage input into the pumps
	MassFlow	(g min^{-1})	Mass flow rate through the sample inlet and filter cartridge
	MFSVout	(V)	Voltage output by the internal mass flow sensor
	BFGenergy	(integer)	Battery fuel gauge output
	BattVolt	(V)	Battery voltage output
	v3_3	(V)	Main UPAS PCB 3.3V rail voltage
	v5	(V)	Main UPAS PCB 5V rail voltage
	PumpsON	(bool)	Pump operational state (0 = off, 1 = on)
	Dead	(bool)	Currently not used.
	BCS1	(bool)	Battery charging indicator; 1 = complete (blue light on UPAS while sampling)
	BCS2	(bool)	Battery charging indicator; 1 = in progress (magenta light on UPAS while sampling)

	BC_NPG	(bool)	External power indicator; 0 = external power connected and 1 = no external power
	FLOWCTL	(s)	Time to read all sensors and write each line of data to the log file
	GPSRT	(s)	Time to read the GPS data
	SD_DATAW	(s)	Time to write each line of log data in the log on the SD card
	SD_HEADW	(s)	Time to update the header data in the log file on the SD card
	TPumpsOFF	(s)	Amount of time the pumps were OFF during the log interval (for a 30-s log interval and a 50% duty cycle, this value should = 15 s)
	TPumpsON	(s)	Amount of time the pumps were ON during the log interval
GasExperi	CO2	(ppm)	CO_2 concentration measured by the Sensirion SCD41 CO_2 sensor
	SCDT	(°C)	Temperature measured by the Sensirion SCD41 CO_2 sensor
	SCDRH	(%)	Relative humidity measured by the Sensirion SCD41 CO_2 sensor
	VOCRaw	(-)	Raw VOC output signal from the Sensirion SGP41. This value should decrease as the VOC concentration increases; see Sensirion's datasheet for details. Access Sensor Technologies has not independently verified that this value is correlated with or accurately reflects the total VOC concentration.
	NOXRaw	(-)	Raw NO_x output signal from the Sensirion SGP41. This value should increase as the NO_x concentration increases; see Sensirion's datasheet for details. Access Sensor Technologies has not independently verified that this value is correlated with or accurately reflects the NO_x concentration.