

SENDO8 NB IoT IAQ Sensor API Document

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The API document describes the format of downlink and uplink JSON data for the following IAQ sensor models:

- SEN10701-xxxx-000x
- SEN10701-xxxx-00Bx
- SEN10701-xxxx-00Wx (model compatible with Works with WELL)

SEN10701-xxxx-00Wx is compatible with **Works with WELL**. The reading and threshold of TVOC sensor of this model is presented in **ug/m³**, while other models are presented in ppb. It can be distinguished by:

- Model number: SEN10701-xxxx-00Wx
- JSON key on payload is TVOC_UGM3



Payload templates use unquoted placeholder names to describe field values. Replace each placeholder with a value of the type specified in the field table before sending JSON.

1. Uplink Data

1.1. Data Reporting

The IAQ sensor sends a data uplink data report in the following cases:

- Periodic data report
- Button press

- Air condition exceeds preset threshold

1.1.1. MQTT Topic Format

SENDO8/nbiot/data/<IMEI>

1.1.2. MQTT Message Payload Format for General Environment Mode (SEN10701-CXXX-000x and SEN10701-CXXX-00Bx)

```
{
  "ver":protocol_version,
  "msg":msg_seq_no,
  "time":epoch_time,
  "sn":sensor_imei,
  "temp":temperature,
  "RH":relative_humidity,
  "TVOC":[tvoc_value, tvoc_1hour, tvoc_24hours],
  "PM1.0":[pm1p0_value, pm1p0_1hour, pm1p0_24hours],
  "PM2.5":[pm2p5_value, pm2p5_1hour, pm2p5_24hours],
  "PM10":[pm10_value, pm10_1hour, pm10_24hours],
  "CO2":[co2_value, co2_1hour, co2_24hours],
  "HCHO": [hcho_value, hcho_1hour, hcho_24hours],
  "AQI": [aqi_value, aqi_1hour, aqi_24hours],
  "bat":battery_volt,
  "RAT":radio_type,
  "rssi":radio_rssi,
  "rsrp":radio_rsrp,
  "rsrq": radio_rsrq,
  "ci":radio_ci,
  "tac": radio_tac,
  "low_batt":low_batt_alert,
  "low_temp":low_temp_alert,
  "high_temp":high_temp_alert,
  "low_RH":low_rh_alert,
  "high_RH":high_rh_alert,
  "high_TVOC":high_tvoc_alert,
  "high_PM2.5":high_pm2p5_alert,
  "high_PM10":high_pm10_alert,
  "high_HCHO":high_hcho_alert,
  "high_CO2":high_co2_alert,
  "batt_pow":batt_pow,
  "event":event_type,
  "debug":debug_info
}
```

1.1.3. MQTT Message Payload Format for General Environment Mode, Compatible with Works with WELL (SEN10701-CXXX-00Wx)

```
{
  "ver":protocol_version,
  "msg":msg_seq_no,
  "time":epoch_time,
  "sn":sensor_imei,
  "temp":temperature,
  "RH":relative_humidity,
  "TVOC_UGM3":[tvoc_ugm3_value, tvoc_ugm3_1hour, tvoc_ugm3_24hours],
  "PM1.0":[pm1p0_value, pm1p0_1hour, pm1p0_24hours],
  "PM2.5":[pm2p5_value, pm2p5_1hour, pm2p5_24hours],
  "PM10":[pm10_value, pm10_1hour, pm10_24hours],
  "CO2":[co2_value, co2_1hour, co2_24hours],
  "HCHO": [hcho_value, hcho_1hour, hcho_24hours],
  "AQI": [aqi_value, aqi_1hour, aqi_24hours],
  "bat":battery_volt,
  "RAT":radio_type,
  "rssi":radio_rssi,
  "rsrp":radio_rsrp,
  "rsrq": radio_rsrq,
  "ci":radio_ci,
  "tac": radio_tac,
  "low_batt":low_batt_alert,
  "low_temp":low_temp_alert,
  "high_temp":high_temp_alert,
  "low_RH":low_rh_alert,
  "high_RH":high_rh_alert,
  "high_TVOC":high_tvoc_alert,
  "high_PM2.5":high_pm2p5_alert,
  "high_PM10":high_pm10_alert,
  "high_HCHO":high_hcho_alert,
  "high_CO2":high_co2_alert,
  "batt_pow":batt_pow,
  "event":event_type,
  "debug":debug_info
}
```

1.1.4. MQTT Message Payload Format for Toilet Model (SEN10701-AHXX)

```
{
  "ver":protocol_version,
  "msg":msg_seq_no,
```

```

    "time":epoch_time,
    "sn":sensor_imei,
    "temp":temperature,
    "RH": relative_humidity,
    "NH3":[nh3_value, nh3_1hour, nh3_24hours],
    "H2S":[h2s_value, h2s_1hour, h2s_24hours],
    "AQI":[aqi_value, aqi_1hour, aqi_24hours],
    "bat":battery_volt,
    "RAT":radio_type,
    "rssi":radio_rssi,
    "rsrp":radio_rsrp,
    "rsrq": radio_rsrq,
    "ci":radio_ci,
    "tac": radio_tac,
    "low_batt":low_batt_alert,
    "low_temp":low_temp_alert,
    "high_temp":high_temp_alert,
    "low_RH":low_humi_alert,
    "high_RH":high_humi_alert,
    "high_NH3":high_nh3_alert,
    "high_H2S":high_h2s_alert,
    "batt_pow":batt_pow,
    "event":event_type,
    "debug":debug_info
  }

```

1.1.5. MQTT Message Payload Format for Carpark Model (SEN10701-MNXX)

```

{
  "ver":protocol_version,
  "msg":msg_seq_no,
  "time":epoch_time,
  "sn":sensor_imei,
  "temp":temperature,
  "RH": relative_humidity,
  "CO":[co_value, co_1hour, co_24hours],
  "NO2":[no2_value, no2_1hour, no2_24hours],
  "AQI":[aqi_value, aqi_1hour, aqi_24hours],
  "bat":battery_volt,
  "RAT":radio_type,
  "rssi":radio_rssi,
  "rsrp":radio_rsrp,
  "rsrq": radio_rsrq,
  "ci":radio_ci,

```

```

    "tac": radio_tac,
    "low_batt": low_batt_alert,
    "low_temp": low_temp_alert,
    "high_temp": high_temp_alert,
    "low_RH": low_humi_alert,
    "high_RH": high_humi_alert,
    "high_CO": high_co_alert,
    "high_NO2": high_no2_alert,
    "batt_pow": batt_pow,
    "event": event_type,
    "debug": debug_info
  }

```

<i>Field</i>	<i>Description</i>
protocol_version	Protocol version (int)
msg_seq_no	Message sequence number (uint32)
epoch_time	Unix epoch time in ms
sensor_imei	IMEI of the NB-IoT sensor (string)
temperature	Temperature reading (°C) (one decimal place)
relative_humidity	Relative humidity (%) (one decimal place)
co2_value	Latest carbon dioxide reading (ppm)
co2_1hour	Average Carbon dioxide reading in the past hour (ppm)
co2_24hours	Average Carbon dioxide reading in the past 24 hours (ppm)
tvoc_value	Latest total volatile organic compound (TVOC) reading (ppb)
tvoc_1hour	Average TVOC reading in the past hour (ppb)
tvoc_24hours	Average TVOC reading in the past 24 hours (ppb)
tvoc_ugm3_value	Latest total volatile organic compound (TVOC) reading (ug/m ³)
tvoc_ugm3_1hour	Average TVOC reading in the past hour (ug/m ³)
tvoc_ugm3_24hours	Average TVOC reading in the past 24 hours (ug/m ³)
pm1p0_value	Latest PM1.0 reading (ug/m ³)
pm1p0_1hour	Average PM1.0 reading in the past hour (ug/m ³)
pm1p0_24hours	Average PM1.0 reading in the past 24 hours (ug/m ³)
pm2p5_value	Latest PM2.5 reading (ug/m ³)
pm2p5_1hour	Average PM2.5 reading in the past hour (ug/m ³)
pm2p5_24hours	Average PM2.5 reading in the past 24 hours (ug/m ³)

Field	Description
pm10_value	Latest PM10 reading (ug/m ³)
pm10_1hour	Average PM10 reading in the past hour (ug/m ³)
pm10_24hours	Average PM10 reading in the past 24 hours (ug/m ³)
hcho_value	Latest Formaldehyde reading (HCHO/CH ₂ O) (ppb)
hcho_1hour	Average HCHO/CH ₂ O reading in the past hour (ppb)
hcho_24hours	Average HCHO/CH ₂ O reading in the past 24 hours (ppb)
nh3_value	Latest Ammonia gas reading (NH ₃) (ppb)
nh3_1hour	Average NH ₃ gas reading in the past hour (ppb)
nh3_24hours	Average NH ₃ reading in the past 24 hours (ppb)
h2s_value	Latest Hydrogen sulfide gas reading (H ₂ S) (ppb)
h2s_1hour	Average H ₂ S reading in the past hour (ppb)
h2s_24hours	Average H ₂ S reading in the past 24 hours (ppb)
co_value	Latest Carbon Monoxide gas value (CO) (ppb)
co_1hour	Average CO reading in the past hour (ppb)
co_24hours	Average CO reading in the past 24 hours (ppb)
no2_value	Latest Nitrogen Dioxide gas value (CO) (ppb)
no2_1hour	Average NO ₂ reading in the past hour (ppb)
no2_24hours	Average NO ₂ reading in the past 24 hours (ppb)
aqi_value	Latest Air Quality Index (AQI) (1-500)
aqi_1hour	Average Air Quality Index (AQI) (1-500) in the past hour
aqi_24hours	Average Air Quality Index (AQI) (1-500) in the past 24 hours
battery_volt	Battery voltage (mV) (invalid when using AC adaptor)
batt_pow	SENSO8 power status 0 – Running on adaptor 1 – Running on battery
low_batt_alert	0 – battery normal; 1- battery low
radio_type	Radio Type, e.g. LTE, 3G, ...
radio_rssi	Radio RSSI (int)
radio_rsrp	Radio RSRP (int)

<i>Field</i>	<i>Description</i>
radio_rsrq	Radio RSRQ (int)
radio_ci	Radio cell information (8-digit hex string)
radio_tac	Radio tracking area code (4-digit hex string)
low_temp_alert	0 – normal; 1 – temperature below low temperature threshold
high_temp_alert	0 – normal; 1 – temperature above high temperature threshold
low_humi_alert	0 – normal; 1 – relative humidity below low humidity threshold
high_humi_alert	0 – normal; 1 – relative humidity above high humidity threshold
high_tvoc_alert	0 – normal; 1 – TVOC reading above threshold
high_hcho_alert	0 – normal; 1 – HCHO reading above threshold
high_co2_alert	0 – normal; 1 – CO2 reading above threshold
high_nh3_alert	0 – normal; 1 – NH3 reading above threshold
high_h2s_alert	0 – normal; 1 – H2S reading above threshold
high_co_alert	0 – normal; 1 – CO reading above threshold
high_no2_alert	0 – normal; 1 – NO2 reading above threshold
high_pm2p5_alert	0 – normal; 1 – PM2.5 reading above threshold
high_pm10_alert	0 – normal; 1 – PM10 reading above threshold
event_type	Data event type 0 – data update/trigger 1 – user-initiated (by button press) 2 – heartbeat
debug_info	Reserved

1.2. Device Configuration Reporting

The IAQ sensor uploads the device information (like IMEI, firmware version, etc) and settings (like data upload period, gas alert thresholds, etc) on start-up. By default, the sensor also reports these data every 24 hours by default. It is strongly suggested to keep a log of it for keep tracking of the sensor status.

1.2.1. MQTT Topic Format

SENSO8/nbiot/sys/<IMEI>

1.2.2. MQTT Message Payload Format for General Environment Model (SEN10701-CXXX-000x and SEN10701-CXXX-00Bx)

```
{
  "ver": protocol_version,
  "sn": sensor_imei,
  "iccid": sim_iccid,
  "sampling": sampling_period,
  "upload": upload_period,
  "low_temp": [low_temp_threshold, 0, 1],
  "high_temp": [high_temp_threshold, 0, 1],
  "low_RH": [low_humi_threshold, 0, 5],
  "high_RH": [high_humi_threshold, 0, 5],
  "TVOC": [high_tvoc_threshold, 0, hysteresis],
  "CO2": [high_co2_threshold, 0, hysteresis],
  "HCHO": [high_hcho_threshold, 0, hysteresis],
  "PM2.5": [high_pm2p5_threshold, 0, hysteresis],
  "PM10": [high_pm10_threshold, 0, hysteresis],
  "pm_log": [900, 300],
  "cal_temp": cal_temp,
  "cal_RH": cal_RH,
  "led_sched": [on_time, off_time],
  "low_batt": low_batt_alert_lvl,
  "low_batt_delta": low_batt_alert_delta,
  "reg_timeout": nbiot_reg_timeout,
  "band": [band_1, band_2, ..., band_n],
  "repeat": repeat_config,
  "report": regular_report_interval,
  "local_port": local_tcp_port_option,
  "psm": psm_config,
  "en_shutdown": enable_shutdown,
  "verbosity": verbosity,
  "overwrite": overwrite,
  "pm_log": pm_log,
  "firmware": firmware_version,
  "client_prefix": client_prefix,
  "topic_prefix": topic_prefix,
  "stat": stat_info
}
```

1.2.3. MQTT Message Payload Format for General Environment Mode, Compatible with Works with WELL (SEN10701-CXXX-00Wx)

```
{
```

```

"ver": protocol_version,
"sn": sensor_imei,
"iccid": sim_iccid,
"sampling": sampling_period,
"upload": upload_period,
"low_temp": [low_temp_threshold, 0, 1],
"high_temp": [high_temp_threshold, 0, 1],
"low_RH": [low_humi_threshold, 0, 5],
"high_RH": [high_humi_threshold, 0, 5],
"TVOC_UGM3": [high_tvoc_ugm3_threshold, 0, hysteresis],
"CO2": [high_co2_threshold, 0, hysteresis],
"HCHO": [high_hcho_threshold, 0, hysteresis],
"PM2.5": [high_pm2p5_threshold, 0, hysteresis],
"PM10": [high_pm10_threshold, 0, hysteresis],
"pm_log": [900, 300],
"cal_temp": cal_temp,
"cal_RH": cal_RH,
"led_sched": [on_time, off_time],
"low_batt": low_batt_alert_lvl,
"low_batt_delta": low_batt_alert_delta,
"reg_timeout": nbiot_reg_timeout,
"band": [band_1, band_2, ..., band_n],
"repeat": repeat_config,
"report": regular_report_interval,
"local_port": local_tcp_port_option,
"psm": psm_config,
"en_shutdown": enable_shutdown,
"verbosity": verbosity,
"overwrite": overwrite,
"pm_log": pm_log,
"firmware": firmware_version,
"client_prefix": client_prefix,
"topic_prefix": topic_prefix,
"stat": stat_info
}

```

1.2.4. MQTT Message Payload Format for Toilet Model (SEN10701-AHXX)

```

{
  "ver": protocol_version,
  "sn": sensor_imei,
  "iccid": sim_iccid,
  "sampling": sampling_period,
  "upload": upload_period,

```

```

"low_temp": [low_temp_threshold, 0, 1],
"high_temp": [high_temp_threshold, 0, 1],
"low_RH": [low_humi_threshold, 0, 5],
"high_RH": [high_humi_threshold, 0, 5],
"NH3": [high_nh3_threshold, 0, hysteresis],
"H2S": [high_h2s_threshold, 0, hysteresis],
"cal_temp": cal_temp,
"cal_RH": cal_RH,
"led_sched": [led_on_min, led_off_min],
"low_batt": low_batt_alert_lvl,
"low_batt_delta": low_batt_alert_delta,
"reg_timeout": nbiot_reg_timeout,
"band": [band_1, band_2, ..., band_n],
"repeat": repeat_config,
"report": regular_report_interval,
"local_port": local_tcp_port_option,
"psm": psm_config,
"en_shutdown": enable_shutdown,
"verbosity": verbosity,
"overwrite": overwrite,
"pm_log": pm_log,
"firmware": firmware_version,
"client_prefix": client_prefix,
"topic_prefix": topic_prefix,
"stat": stat_info
}

```

1.2.5. MQTT Message Payload Format for Carpark Model (SEN10701-MNXX)

```

{
  "ver": protocol_version,
  "sn": sensor_imei,
  "iccid": sim_iccid,
  "sampling": sampling_period,
  "upload": upload_period,
  "low_temp": [low_temp_threshold, 0, 1],
  "high_temp": [high_temp_threshold, 0, 1],
  "low_RH": [low_humi_threshold, 0, 5],
  "high_RH": [high_humi_threshold, 0, 5],
  "CO": [high_co_threshold, 0, hysteresis],
  "NO2": [high_no2_threshold, 0, hysteresis],
  "cal_temp": cal_temp,
  "cal_RH": cal_RH,
  "led_sched": [led_on_min, led_off_min],

```

```

"low_batt": low_batt_alert_lvl,
"low_batt_delta": low_batt_alert_delta,
"reg_timeout": nbiot_reg_timeout,
"band": [band_1, band_2, ..., band_n],
"repeat": repeat_config,
"report": regular_report_interval,
"local_port": local_tcp_port_option,
"psm": psm_config,
"en_shutdown": enable_shutdown,
"verbosity": verbosity,
"overwrite": overwrite,
"pm_log": pm_log,
"firmware": firmware_version,
"client_prefix": client_prefix,
"topic_prefix": topic_prefix,
"stat": stat_info
}

```

Field	Description
protocol_version	Protocol version (int)
sensor_imei	IMEI of the sensor (string)
sim_iccid	ICCID of the SIM card (string)
sampling_period	Data sampling period (sec) (except PM)
upload_preiod	Data upload period (sec)
low_temp_threshold	Low temperature alert threshold (°C)
high_temp_threshold	High temperature alert threshold (°C)
low_humi_threshold	Low relative humidity alert threshold (%)
high_humi_threshold	High relative humidity alert threshold (%)
high_tvoc_threshold	High TVOC alert threshold (ppb)
high_tvoc_ugm3_threshold	High TVOC alert threshold (ug/m ³)
high_co2_threshold	High CO2 alert threshold (ppm)
high_hcho_threshold	High HCHO alert threshold (ppb)
high_pm2p5_threshold	High PM2.5 alert threshold (ug/m ³)
high_pm10_threshold	High PM10 alert threshold (ug/m ³)
high_nh3_threshold	High NH3 alert threshold (ppb)
high_h2s_threshold	High H2S alert threshold (ppb)

Field	Description
high_co_threshold	High CO alert threshold (ppb)
high_no2_threshold	High NO2 alert threshold (ppb)
hysteresis	1/10 of the corresponding threshold
cal_temp	Temperature offset for calibration (0.1 °C)
cal_RH	Relative humidity offset for calibration (0.1 %)
led_on_min	AQI LED indication on time (0-1440 min) ¹
led_off_min	AQI LED indication off time (0-1440 min) ¹
low_batt_alert_lvl	Battery low alert threshold (mV)
low_batt_alert_delta	Reserved
nbiot_reg_timeout	Mobile network registration timeout (sec)
band_x	NB-IoT frequency band supported (int) 0 – Auto 1 – B1 3 – B3 5 – B5 8 – B8 20 – B20
repeat_config	Reserved
regular_report_interval	Regular device configuration (sys) report interval in hour (int)
local_tcp_port_option	Local TCP port number option 0 – Local TCP port number generated from NB-IoT module 1 – Local TCP port number generated from firmware
nbiot_reg_timeout	Mobile network registration timeout (sec)
psm_config	Reserved
enable_shutdown	Reserved
verbosity	Reserved
overwrite	Reserved
pm_log	Reserved

<i>Field</i>	<i>Description</i>
firmware_version	Firmware version
client_prefix	Prefix string at MQTT client (string)
topic_prefix	Prefix string at MQTT topic (string)
stat_info	Reserved

2. Downlink Data

The downlink data is used for updating the IAQ sensor settings online. It is published to the IAQ sensor via the MQTT broker. The format of the downlink commands is described in [Downlink Data Format](#). **After issuing a downlink configuration command, the device will publish a Device Configuration Report (SYS message) acknowledging the command and showing the latest device configuration.**

2.1. MQTT Settings

The IAQ sensor is using MQTT persistent connection to receive downlink commands.

In order to support downlink command, the **MQTT broker** needs to support **MQTT 3.1.1**. And, the following setting is required for MQTT client posting downlink data to SENSO8 sensor.

- Publish QoS = 1
- Retain Flag = False

2.2. Downlink Data Format

2.2.1. Data Upload Period Configuration

2.2.1.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.1.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "upload": upload_period
}
```

2.2.2. High Temperature Threshold Configuration

2.2.2.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.2.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "high_temp": [high_temp_threshold, 0, 1]
}
```

2.2.3. Low Temperature Threshold Configuration

2.2.3.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.3.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "low_temp": [low_temp_threshold, 0, 1]
}
```

2.2.4. High Relative Humidity Threshold Configuration

2.2.4.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.4.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "high_RH": [high_humi_threshold, 0, 5]
}
```

2.2.5. Low Relative Humidity Threshold Configuration

2.2.5.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.5.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "low_RH": [low_humi_threshold, 0, 5]
}
```

2.2.6. High TVOC Threshold Configuration

2.2.6.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.6.2. MQTT Message Payload Format (SEN10701-CXXX-000x and SEN10701-CXXX-00Bx)

```
{
  "sn": sensor_imei,
  "TVOC": high_tvoc_threshold
}
```

2.2.6.3. MQTT Message Payload Format (Models Compatible with Works with WELL, SEN10701-CXXX-00Wx)

```
{
  "sn": sensor_imei,
  "TVOC_UGM3": high_tvoc_ugm3_threshold
}
```

2.2.7. High CO2 Threshold Configuration

2.2.7.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.7.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
```

```
{
  "CO2": high_co2_threshold
}
```

2.2.8. High HCHO Threshold Configuration

2.2.8.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.8.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "HCHO": high_hcho_threshold
}
```

2.2.9. High PM2.5 Threshold Configuration

2.2.9.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.9.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "PM2.5": high_pm2p5_threshold
}
```

2.2.10. High PM10 Threshold Configuration

2.2.10.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.10.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "PM10": high_pm10_threshold
}
```

2.2.11. High NH3 Threshold Configuration

2.2.11.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.11.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "NH3": high_nh3_threshold
}
```

2.2.12. High H2S Threshold Configuration

2.2.12.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.12.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "H2S": high_h2s_threshold
}
```

2.2.13. High CO Threshold Configuration

2.2.13.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.13.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "CO": high_co_threshold
}
```

2.2.14. High NO2 Threshold Configuration

2.2.14.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.14.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "NO2": high_no2_threshold
}
```

2.2.15. NB-IoT Frequency Band Configuration

2.2.15.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.15.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "band": [band_1, band_2, ..., band_n]
}
```

2.2.16. Device Configuration Report Interval Configuration

2.2.16.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.16.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "report": regular_report_interval
}
```

2.2.17. Local TCP Port Number Configuration

2.2.17.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.17.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "local_port": local_tcp_port_option
}
```

2.2.18. AQI LED Indication On/Off

2.2.18.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.18.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "led_sched": [led_on_time, led_off_time]
}
```

2.2.19. Data Sampling Period Configuration

2.2.19.1. MQTT Topic Format

SENSO8/nbiot/ctrl/<IMEI>

2.2.19.2. MQTT Message Payload Format

```
{
  "sn": sensor_imei,
  "sampling": sampling_period
}
```

<i>Field</i>	<i>Description</i>	<i>Type</i>	<i>Default</i>
upload_period	Data upload period (sec) (min: 180, max: 43200) ¹	number	3600 (battery) 900 (adaptor)

Field	Description	Type	Default
sampling_period	Data sampling period (sec) (min: 60, max: 43200) ¹	number	900 (battery) 300 (adatpor)
low_temp_threshold	Low temperature alert threshold (°C) (int)	number	18
high_temp_threshold	High temperature alert threshold (°C) (int)	number	30
low_humi_threshold	Low relative humidity alert threshold (%) (int)	number	40
high_humi_threshold	High relative humidity alert threshold (%) (int)	number	80
high_tvoc_threshold	High TVOC alert threshold (ppb) (int)	number	435
high_tvoc_ugm3_threshold	High TVOC alert threshold for models compatible with Works with WELL (ug/m ³) (int)	number	1899
high_co2_threshold	High CO2 alert threshold (ppm) (int)	number	1500
high_hcho_threshold	High HCHO alert threshold (ppb) (int)	number	200
high_pm2p5_threshold	High PM2.5 alert threshold (ug/m ³) (int)	number	56
high_pm10_threshold	High PM10 alert threshold (ug/m ³) (int)	number	254
high_nh3_threshold	High NH3 alert threshold (ppb) (int)	number	2000
high_h2s_threshold	High H2S alert threshold (ppb) (int)	number	2000
high_co_threshold	High CO alert threshold (ppb) (int)	number	12400
high_no2_threshold	High NO2 alert threshold (ppb) (int)	number	360
band_x	NB-IoT frequency band supported (int) ² 0 – Auto 1 – B1 3 – B3 5 – B5 8 – B8 20 – B20	number	0

<i>Field</i>	<i>Description</i>	<i>Type</i>	<i>Default</i>
regular_report_interval	Regular device configuration (sys) report interval in hours (int) ³	number	24
local_tcp_port_option	Local TCP port number option 0 – Local TCP port number generated from NBIoT module 1 - Local TCP port number generated from firmware	number	0
led_on_time	AQI LED indicator on time in minute in a day (int) ⁴ e.g. 0 is 00:00, 60 is 01:00 ... 1380 is 23:00	number	420
led_off_time	AQI LED indicator off time in minute in a day (int) ⁴ e.g. 0 is 00:00, 60 is 01:00 ... 1380 is 23:00	number	1380

Note:

1. Data upload period must be longer than data sampling period. The sensor can store up to 20 samples between each data upload period.
2. For automatic frequency selection, set “band”: [0] on the command. Otherwise, put the desired frequency bands in the JSON array. For example, to support B3 and B8, set “band”: [3 , 8] on the command.
3. The SENSO8 IAQ sensor uploads device configuration data on sys topic at a regular interval. It is suggested to keep a log of data from this topic to keep track of the IAQ sensor settings.
4. When LED on time and off time are both 0, the AQI LED indication will always ON. When LED on time and off time are both negative values, there will not be any AQI LED indication. This feature is useful in battery saving.

3. Revision History

<i>Revision</i>	<i>Date</i>	<i>Description</i>
1.0	Nov 2020	Initial Release.
1.01	Dec 2020	Fixed a typo on the TVOC data payload.
1.02	Apr 2022	Added payload format on Carpark model.
1.03	Apr 2022	Updating format for data upload and sampling period.

<i>Revision</i>	<i>Date</i>	<i>Description</i>
1.10	Jul 2023	Added supported models, description and payload for Works with WELL models.
2.0	Oct 2026	First release on docs.senso8.com