Air Quality Sensing

***Bluetooth*® New Work Proposal**

- **Revision:** NWP
- **Revision Date:** 2017-Aug-08
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Abstract:

This New Work Proposal (NWP) proposes a new profile that has the low energy feature of Bluetooth to configure, operate, and read data from air quality monitors/sensors. A profile for air quality will enable many air quality sensing devices to work smoothly with many applications and other peripheral devices, such as air purifiers.

Revision History

Revision Number	Date	Comments
r00	2017-May-18	Initial Draft
r01	2017-May-31	Addressed changes and comments from Bluetooth SIG staff.
r02	2017-July-14	Review comments closed.
r03	2017-Aug-01	SIG staff review.
r04	2017-Aug-08	Removed additional names from proposed leadership per discussion during 8 Aug 2017 Board of Directors conference call.
NWP	2017-Aug-08	Approved by the Bluetooth SIG Board of Directors.

Contributors

Name	Company
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1 User scenarios

Air quality sensors measure the quantity of different gases and suspended particulate matter present in the air. These sensors can detect harmful gases, such as carbon oxides (CO_x), nitrogen oxides (NO_x), ozone (O_3), ammonia (NH_3), hydrocarbons, etc. This profile covers the basic uses of the data obtained from these sensing devices. The device must be able to collect the amount of hazardous gases present in air and send this data via the low energy feature of Bluetooth. Some possible user scenarios that can be implemented include the following:

- Turn air purifier on/off based on the air quality index of the room (see Section 1.1, user scenario A).
- Alert nearby people in case of gas leaks (see Section 1.2 , user scenario B).
- Help asthma patients to avoid exposure to asthma triggers such as ozone, smoke, sulphur dioxide (SO_2) (see Section 1.3, user scenario C).
- Monitor continuously the level of hazardous gases inside an industrial plant to ensure safety of workers (see Section 1.4, user scenario D).

1.1 User scenario A

Ron bought an air quality monitor for his home. He notices that it supports the low energy feature of Bluetooth and is compatible with his current air purifier. He is able to connect the air quality monitor with the air purifier and can now monitor the air quality using an app on his smartphone. Because there is a standard Bluetooth profile available for this, Ron does not need to worry about which air quality monitor will work with which application. Now Ron can view the air quality of his room in real time and set a threshold value for the air quality index below which the monitor will turn the purifier on and off when the desired level has been achieved. With this setup, the air purifier does not function unnecessarily and saves energy.

1.2 User scenario B

Carol owns a restaurant in a posh location. According to new government rules, she has to install air quality sensors in the kitchen of her restaurant. The sensors support the low energy feature of Bluetooth, allowing Carol to use an app to connect them to her smartphone. The sensors are highly sensitive at detecting hydrocarbons in the air and can easily detect a natural gas leak and send advertisements/alerts that have the low energy feature of Bluetooth to all of the devices around it, alerting people nearby about the leak.

1.3 User scenario C

Sharon lives in a smart city, and air quality sensors are installed all over the city. These sensors have the low energy feature of Bluetooth and advertise the level of harmful gases they detect around them. Since there is a standard Bluetooth profile available for air quality, the data advertised by these sensors can be easily read by a smartphone app and alert users to leave the area if the air is toxic.

Sharon has bronchial asthma. Her smartphone app alerts her when the quantity of ozone, smoke, and sulphur dioxide (components that trigger asthma) reach a level above the tolerable limit. Now Sharon will always be notified when to exit an area to avoid an asthma attack.

1.4 User scenario D

Jack is a production manager at a smelting plant. He has installed air quality sensors around the plant to monitor the level of oxygen, carbon dioxide, and other gases during the smelting process. The sensors, which have the low energy feature of Bluetooth, readily sense the levels of oxygen, carbon dioxide, lead oxide, sulfur dioxide, and other toxic gases in the air and communicate these readings to a smartphone app. Jack constantly monitors the level of these gasses via his smartphone. During the smelting process, he can stop the smelting activities if he finds that the oxygen level is insufficient for oxidizing or roasting or if there is a high presence of sulphur dioxide that would pose a threat to the health of the workers.

2 Industry support

2.1 Need for interoperability

Air quality sensors are generally manufactured as standalone sensors. These sensors must be integrated with the low energy feature of Bluetooth to constantly monitor the air quality and send reports to nearby devices. The profile will specify handshaking commands to be transmitted between air quality sensor/monitors and smart phones (supports the low energy feature of Bluetooth). The Air Sensing Profile seeks to provide consumers with an easy solution to collect data related to the presence and quantity of different gases in the air and pair these sensors with devices, allowing them to choose from a variety of air sensors and applications.

2.2 Supporting companies

The following companies are in support of this New Work Proposal:

Company	Membership Level	Name
Samsung Electronics Co., Ltd.	Associate	Sameer Gupta
Samsung Electronics Co., Ltd.	Associate	Nitin Nishchal
Robert Bosch GmbH	Associate	Raghavendra Kamma
Aricent	Adopter	Uttam Panda

3 Proposed Working Group, Subgroup, or Study Group

The development of the Functional Requirements Document (FRD) based on the use cases presented in this NWP is proposed to be assigned to the Smart Environment Study Group that will be open to Promoter, Associate, and Adopter members of the Bluetooth SIG. Any member who wishes to participate in the development of the FRD upon the board approval of the NWP should go to the Smart Environment Study Group page and subscribe to the study group.

If you are an Adopter member and wish to participate in the Functional Requirements Document (FRD) development, please contact the Group chair at smartenv-chair@bluetooth.org.

4 Proposed leadership

Name	Company Name
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