

IEEE P2520.1 Working Group #16

Meeting Minutes

25 July 2022

WG Chair: James Covington

WG Secretary: H. Troy Nagle

Meeting link:

<https://ieeesa.webex.com/ieeesa/j.php?MTID=m3c2538ee8e79fe92fcc9587a3d65c9d1>

1. Call to Order

Chair called meeting to order at 10:07 AM EDT. He announced that the meeting was being recorded for the purpose of preparing minutes.

2. Roll Call and Disclosure of Affiliation

Affiliation FAQs: <http://standards.ieee.org/faqs/affiliation.html>

The Chair asked the participants to sign-in at this link:

https://docs.google.com/spreadsheets/d/1x3Le7jd_5h3bgiNcYMZIfjIbzE2XdE0U8Daon00O8Ks/edit#gid=0.

The Chair asked the Secretary to check for a quorum. No new members were participating. The List of Participants is shown in **Attachment A**. A quorum was achieved (15 of the 18 voting members were present).

3. Approval of Agenda

The Chair asked for approval of the agenda. Troy Nagle made the motion; Susana Palma seconded. Without objection to unanimous consent, the motion was adopted.

4. Approval of Previous Meeting Minutes

The Chair asked for approval of the May 23 Meeting Minutes as circulated. Etienne Bultel made the motion; Susan Schiffman seconded. Without objection to unanimous consent, the motion was adopted.

5. IEEE-SA Patent & Copyright Policies

a. Call for Patents

<https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf>

Per standard IEEE SA WG meeting practice, the Chair reviewed the required policy regarding potentially essential patents. No one raised concerns for consideration.

b. Copyright Policy <https://standards.ieee.org/ipr/copyright-materials.html>

Per standard IEEE-SA WG meeting practice, the Chair reviewed the required policy regarding copyrights. There were no questions or concerns.

6. Technical Presentation:

There was no technical presentation. Instead, the major focus for this meeting was:

- Update of activities undertaken in July
- Updates to Level 3 pass/fail criteria
- Updates and discussion of chemicals list

7. Discussion of Current Draft

Level 3 Pass/Fail Criteria:

At this point in the meeting, the Chair gave a brief presentation on progress that has been made in determining options for the Level 3 Pass/Fail Criteria. The following points were made regarding progress:

- Level 3 is based on quantification of three selected from Appendix A.
- Similar to our other levels, this will include changes in concentration, temperature and humidity over time
- Our previous discussion was based on accuracy
- Now we are considering criteria based on “Error”
- Error is much easier to define
- This approach will have more acceptance

These options from our last meeting were discussed:

- Mean Square Error (MSE): measures the amount of error in statistical models. It assesses the average squared difference between the observed and predicted values
- **Root Mean Square Error (RMSE): more commonly applied measure of the differences between numbers**
- Root Mean Squared Logarithmic Error (RMSLE): takes the log of the predictions and actual values. Deals well with errors with large numbers
- **Mean Absolute Percent Error (MAPE): measures the size of the error in percentage terms**

The Chair reported a discussion with Santiago Marco regarding the use of R-squared. The recommendation is not to use it, but to instead continue to focus on MAPE as the first parameter for our testing trials to take place later this year and early next. We can also consider RMSE as an option if needed.

Appendix A: The Chemicals List:

The WG then focused on progress made in finding chemicals to list in Appendix A. The following characteristics are driving our deliberations. The chemicals should be:

- Relatively safe and stable
- Easily accessible/purchasable
- Applicable to most VOC analyzers

We want to provide:

- Five examples and let the other standards in the series define their own compositions
- Two examples with gas cylinders and three with liquid chemicals
- Gas cylinder options that are readily available in concentrations that can be diluted to meet the test specifications

The Chair then provided a draft table of chemicals for Appendix A. First were

two sets of three chemicals available in gas cylinders:

- Group 1: isobutylene, ethanol, and hexane
- Group 2: hydrogen sulfide, ammonia, and isopropanol

These were followed by three sets of three chemicals in liquid form:

- Group 3: n-butanol, propanoic acid, and dimethyl sulfide
- Group 4: ethyl acetate, acetone, and acetic acid
- Group 5: isoamyl acetate, isoamyl alcohol, and phenylethyl alcohol

Concern was expressed regarding the odor detection thresholds (OTDs) relative to the available concentrations in the commercial gas cylinders. Dilution to testing concentrations will be addressed in the P2520 Guide. Best would be to have testing done at the same number of dilutions for each of the three test chemicals in a Group.

Some WG members suggested that liquids will be commonly used. It was also suggested that, in general, the testing concentrations should be above the ODT levels. Since the odor recognition threshold is higher than the ODT, testing should be done at concentrations higher than the ODT. How much higher was discussed. A suggestion of two orders of magnitude was proposed.

Another specific point was mentioned. The ability of the EUT to distinguish between the different test chemicals will be important in many application areas.

WG members were assigned chemical groups to refine, and should be ready to continue this discussion at the next WG meeting. These assignments were: Group 1 (Ehsan Danesh), Group 2 (unassigned), Group 3 (Carlos Diaz), Group 4 (Etienne Bultel), and Group 5 (Krishna Persaud and Susan Schiffman)

Methods for testing will be considered during our WG meetings over the Fall period. WG members with enose devices will consider running some trial tests using their home facilities.

8. New Business/Activities for the Next Meeting

There was no New Business.

9. Future Meetings

The Chair announced the next meeting of the WG will take place on September 26 at 10:30 AM EDT.

10. Adjourn

The one-hour meeting time-period having expired and without objection to unanimous consent, the Chair adjourned the meeting at 11:00 AM.

Attachment A: Participants (17)

NAME	AFFILIATION
Carlos Diaz	Ambiente et Odora
Christopher Jensen	Self
Cyril Herrier	Aryballe
Duke Oeba	Egerton University, Kenya
Ehsan Danesh	Advanced Sensing Technologies Ltd.
Etienne Bultel	Aryballe
Fengchun Tian	Chongqing University
James Covington	University of Warwick
Katayoun Emadzadeh	Self
Krishna Persaud	University of Manchester
Louis-Ray Harris	University of West Indies, Mona
Paul Kagan	AWLDM Systems
Radislav Potyrailo	GE Research
Sandrine Isz	Alpha-MOS
Susan Schiffman	North Carolina State University
Susana Palma	NOVA University of Lisbon
Troy Nagle	North Carolina State University