# 2018 joint technical committee meeting Minutes of Power Qaulity Subcommittee – Harmonics WG (519)

## Meeting Location and Time

Jacksonville, Florida
Monday, 2018 January 8, 14:00 to 16:00
Hyatt Regency – Riverfront, Conference Center A

## MEEting Minutes

### Attendees

David Zech Kenn Sedziol

Nick Zagrodnik Ed Russo

Mark Halpin Dan Sabin

Francisc Zavoda Rich Bingham

Steven Johnston Addis Kifle

Kevin Kittredge Scott Peele

Joe Grappe Julio Barros

Li Yu Carl Miller

Nikunj Shah

The meeting was called to order by David Zech at 1403. Minutes were recorded by Nick Zagrodnik.

### Old Business

IEEE mandatory legal slides were reviewed by the Chair. No patents were identified by the attendees.

Minutes from 2017 GM approved.

### New Business

Update on work in 2 – 150kHz bandwidth. Group consensus is that frequencies above 9kHz should be considered noise, not harmonics. 9kHz and below should be considered harmonics and covered by 519 WG.

Discussed definitions contained in IEEE 519. Dave Zech and Kenn Sedziol to review definitions and make sure the definition appears in the current IEEE dictionary with reference to IEEE 519 and that the definitions match.

Discussed the topic of a new distortion term as defined by the equation,

$$New Distortion Term=\frac{\sqrt{F\_{rms}^{2}-F\_{1}^{2}}}{F\_{1}} $$

Frms is the measured rms value including all harmonic and interharmonic components limited by the sampling rate and processing techniques of the measurement device.

$$F\_{1} is the value of the fundamental (1st) harmonic subgroup$$

Need to decide what to call this new term? What should the acronym be? One suggestion was TD – total distortion. Another was CD – cumulative distortion. It is important for the RMS term to be measured correctly. It should only include frequency components to 3kHz in order to be consistent with applicable limits that stop at the 50th order.

There may be a need to adjust current and voltage distortion limits once the new distortion definition is used. Including interharmonics in the definition may significantly change the distortion value. Mark Halpin and Dan Sabin are still gathering monitoring data, and will show examples of how the THD will change comparing the existing formula and the proposed THD formula.

Measuring harmonics above 3kHz. CT and PT accuracy concerns above that frequency. Referenced Matt Norwalk PV Solar plant inverter switching distortion case that showed appreciable harmonics above the 50th. There was general agreement that limits should not be established above the 50th harmonic at this point. To be discussed further.

The idea of adjusting even order harmonic limits was discussed. C57.110 members were consulted about the effect of lower order even harmonics on transformer magnetization. Follow-up with Alex Emmanual on even order harmonics concerns for transformers. More research is needed on effects of lower order even harmonics.

Nikunj Shah gave presentation on a proposal to increase even order harmonic limits > 17th order. There was general agreement on increasing these limits. The question was asked how much to increase them. Should they be the same as the odd harmonics limits? Or half of the odd harmomic limits? More research is needed.

Julio Barros paper on analysis of 2nd order harmonic limits on power systems should be reviewed as well for additional insight.

Nick Zagrodnik showed example data from noisy service transformer case with grossly excessive level of 2nd order current harmonics from customer load.

Touched on Dave Mueller’s proposal of raising voltage distortion limits for transmission system voltages to match those in IEC 61000-3-6. Could not get into too much detail without Dave present to discuss his supporting findings/evidence. Are his example measurements keeping in mind cumulative probability 95? Is there a resonance that was occurring?

### Summary of Volunteers for Future Activities:

1. Kenn Sedziol and David Zech to review definitions in IEEE 519.
2. Mark Halpin and Dan Sabin to continue working on applying new THD definition to existing data to compare the existing THD formula and the proposed new formula.