



ICES

International Committee on Electromagnetic Safety

**IEEE/ICES TC95 Subcommittee 3
Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 0 - 3 kHz
and**

**IEEE/ICES TC95 Subcommittee 4
Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields,
3 kHz to 300 GHz**

**Motorola Solutions, Inc.
Plantation, FL, 33322**

January 15th, 2014: 0900 – 1700 h*

1. Call to Order

Co-chairman Ziskin called the meeting to order at 0910 h.

2. Introduction of those Present

Each of the attendees introduced him/herself. TC95 Chairman Chou reminded those in attendance to submit a short biosketch for posting on the ICES website. See Attachment 1 for the list of attendees.

3. Approval of Agenda

Following a motion by Haes and a second by Klauenberg, the agenda was approved with the following change: Add item 8b – Letter to ICNIRP regarding SAR volume average (Keshvari); Update on ICES activities (Chou). (See Attachment 2 for agenda.)

4. Approval of the Minutes (7 June 2013 Meeting)

Following a motion by Hatfield and a second by Bushberg, the minutes of the June 2013 SC3/SC4 meeting were approved as presented.

5. Secretary's Report

Petersen noted that a complete report of the secretary will be presented at the TC95 meeting the following day.

6. Chairmen's Reports

Ziskin reviewed the status of the SC3/SC4 projects (see Attachment 3). He reviewed the progress of PC95.1-2345 (NATO standard) discussing the different approaches (low versus high frequency), which had a major impact on the early drafts, especially the rationale for the induced and contact current limits. The issues were resolved, the draft balloted and is on the March SASB RevCom agenda. Once approved as an IEEE standard, the next step will be ratification by the NATO member countries.

Ziskin reported that ICES provided comments in response to the *Further Notice of Proposed Rule Making* (FNPRM) and *Notice of Inquiry* (NOI) issued by the Federal Communications Commission (FCC). He summarized the response (Attachment 3) and briefly described the required IEEE approval process for submitting the response. Chou expanded on Item 4 of the attachment (low power device exclusions) explaining that while IEC 62209-2 is the recommended standard for compliance testing, the 20 mW value found in IEC 62479 for low power device exclusions should be followed by FCC, rather than the 1 mW value. The comments also include a detailed annex by J.P. Reilly that reviews the rationale for the IEEE low-frequency limits building the case for FCC adoption of the IEEE limits, rather than those of ICNIRP. Chou pointed out that it is not yet clear if the FCC will adopt limits for frequencies between 3 kHz and 100 kHz. Chou noted that ICES also filed a separate response supporting a joint submittal by Momentum Dynamics (MD) Corporation and Oak Ridge National Laboratory (ORNL). The MD and ORNL comments recommend that if the FCC chooses to adopt limits for frequencies between 3 kHz and 100 kHz, the appropriate limits would be those found in IEEE C95.1-2005 and IEEE C95.6-2002. Both filings went through the ICES balloting process and were approved by IEEE legal. (See Attachments 4 and 5 for ICES replies.)

Ziskin also reviewed the ICES response to questions from the Government Accountability Office (GAO) regarding certification of mobile telephone handsets. He pointed out that the response to the questions was prepared by an ad hoc group and were submitted as a response from individuals named in the document—not as an ICES response. The response was reviewed by IEEE legal who provided a process for making it completely clear that such responses are from individuals. Meltz noted that COMAR also has a process for responding in such cases, possibly without going through legal review. (See Attachments 6a and 6b for response to GAO.)

Ziskin reviewed the statistics for the 1st quarter of 2013 regarding the number of C95 standards downloaded at no cost through the IEEE Get Program. The total for the quarter was 1093. Petersen said that he will provide more recent statistics as part of the Secretary's Report at the TC95 meeting.

Ziskin noted the low turnout at the June ICES meetings held in conjunction with BioEM2013 in Thessaloniki, Greece. The next meeting of BioEM will be held in Cape Town South Africa, where ICES turnout may be even lower. He noted that the AdCom decided that it is not necessary to hold yearly meetings in conjunction with BEMS/BioEM meetings. An upcoming schedule of ICES meetings will be discussed at the TC95 meeting.

7. Issues on Merging of C95.1 and C95.6

a) Literature surveillance and review/evaluation

Elder provided an update on the literature surveillance/update process (see attachment 7). He pointed out that the contract for the program has been established through 2014; credit for obtaining pdf files for the papers goes to Ziskin. Although there are 5387 citations in the database, the actual number is less due to deletion of duplicate citations and other errors. He reviewed the yearly statistics pointing out that the number of papers has been decreasing since 2010, which is probably related to decreasing research funding/support, but may increase based on new research programs. The highest numbers of papers are associated with mobile telephone research programs.

In response to a question from Maurer regarding foreign language papers, Elder explained that only papers published in English are accepted for review. In response to a question from Meltz regarding papers published on the Internet, Elder explained that only peer-reviewed papers are considered. Elder concluded his presentation by pointing out that abstracts are available for the papers in the database but the complete papers are available only to those on the literature evaluation working groups.

b) Report from Editorial Working Group – status of the merging work

Chou provided an update on the Editorial Working Group (EWG) activities regarding the revision of IEEE C95.1-2005 and the merging of C95.6-2002 with the revision. Most of the recent EWG efforts have been focused on C95.1-2345, but now that balloting has been completed the EWG will focus on the revision/merger of C95.1 and C95.6. Chou pointed out issues that have to be addressed. For example, most of the papers evaluated for C95.1-2005 were published before 2003. Also, the rationale sections of the two standards have to be updated, some of which was accomplished during development of C95.1-2345. In response to a question from Joyner regarding the status of C95.1-2345 as a NATO standard, Klauenberg explained that the standard will first have to be approved by the IEEE SASB, following which it will be considered more of a “military” standard. Additional work, including ratification by NATO member countries, remains.

c) Update on NATO standard

Klauenberg reviewed the Air Force’s interest and involvement moving forward with the NATO standard project. (See Attachment 8.) In order to update the original STANAG 2345, a group met in the UK in 1993 and within a few days the document was revised. He then reviewed the latest activities, military needs, and the unique aspects of C95.1-2345, e.g., exposure zones that include zones where exposures to levels higher than what would be considered occupational exposure are permitted. In response to a question regarding zones 1, 2 and 3 being similar to FCC category 1, 2 and 3, it was pointed out that the C95.1-2345 zone limits are based on exposure—the FCC categories are based on emission. In response to a question regarding research programs addressing the effects of exposure at levels in the “Danger” zone, Klauenberg noted that some limited research has been carried out, e.g., research associated with active denial systems. Limited programs examining relationships between frequency, power, penetration-depth are ongoing mainly to determine spectrum of risk. Chou pointed out that local versus whole-body exposure should be considered regarding humans.

8. Technical Presentations

a) RF contact currents: Sensory responses and dosimetry

Kavet reviewed the question of discrepancies in existing data raised by Tell at the January 2013 SC3/SC4 meeting and the progress made since then. (See Attachment 9.) He noted that the Kavet, Tell and Olsen paper shown in slide 6 of the attachment is now available. He then reviewed key papers, e.g., Rodgers, Dalziel, Chatterjee, pointing out that the perception thresholds vary somewhat from paper to paper, which led to considerable discussion at several of the EWG meetings during development of C95.1-2345. Kavet reviewed the difference in reported thresholds for perception, discomfort, and pain reported by the various authors and their accompanying models. In a response to a question regarding sensitivity of the back of the hand, Tell explained that the thresholds are highly dependent on the geometry of the contact, which further compounds the problem. While limits in contemporary standards and guidelines are expressed in terms of measured current, current density is key. Reilly noted that he has found that sensitivity thresholds are lower for surfaces of the body closer to the brain. Ziskin explained that the effect may have more to do with sensitivity of the tissue, which is complex and suggests that there may be more variables than considered at this point.

b) Letter to ICNIRP regarding SAR volume average

Keshvari’s presentation addressed the question of the definition of SAR averaging volume in compliance standard assessment standards, i.e., the shape of a cube (IEEE, FCC), or any 10 g of contiguous tissue (ICNIRP). (See Attachment 10.) The goal is to encourage a single definition,

i.e., harmonized international standards. He pointed out potential issues relating to unrestricted shape of the averaging volume, e.g., inadequate representation of the thermal distribution when the ratio of the surface area to volume is allowed to become increasingly large. Keshvari pointed out that this was discussed at the January 2013 SC3/SC4 meeting where it was suggested that a letter to ICNIRP from SCC39 and IEC Maintenance Team 1 would be appropriate. A letter from IEC MT1 was sent to ICNIRP pointing out the issue to which a response has not yet been received.

c) Research update

Chou provided a summary of hi-lights associated with bioeffects research based on his presentation to the Mobile Manufacturers Forum (see Attachment 11). The focus was on the quality of the science that is/can be used in standard-setting. Summaries of reports from a number of expert groups that recently revised the relevant scientific literature were included.

d) Update on IEEE ICES activities

Chou provided an update on ICES activities (see Attachment 12). In response to a question regarding whether or not ICNIRP has ever been invited to ICES meetings, Chou explained that whereas ICES meetings are open, and members of ICNIRP have attended, ICNIRP meetings are closed. Over the years a few ICES members have been invited to attend portions of the ICNIRP meetings.

9. Other New Business

Meltz briefly pointed out that the membership and leadership of ICES is getting on in years and we should be thinking about developing a program to encourage young scientists and engineers to become involved. There was agreement and considerable discussion followed but no specific action was established. This will be a topic at the next meeting.

10. Date and Place of Next Meeting

Following a discussion of meeting venues, the results of a straw poll showed support for holding the next TC95 meetings at one of the one of the hotels in Pismo Beach, California in September or October 2014. The attendees agreed that is should be a three-day meeting beginning on a Tuesday (to accommodate travel). If the above meeting venue is agreed to at tomorrow's TC95 meeting, Meltz agreed to follow-up with the local hotels to seek suitable arrangements.

11. Adjourn

There being no further business, the meeting was adjourned at 1505 h.

List of Attachments

1. List of attendees
2. Approved agenda
3. Chairman's report-SC3/SC4 – Ziskin
4. FCC NOI-NPRM (RF) – ICES response
5. FCC NOI-NPRM (low frequencies) – ICES response
6. ICES response to questions from the Government Accountability Office
7. Literature Surveillance WG update – Elder
8. NATO (PC95.1-2345) update – Klauenberg
9. RF Contact currents: Sensory responses and dosimetry – Kavet
10. The question ICNIRP's averaging volume – Keshvari
11. Research update – Chou
12. ICES activities update – Chou