Approved Minutes (taken by Antonio)

TC95 Committee
Safety Levels with Respect to Human Exposure to Electric, Magnetic
and Electromagnetic Fields, 0 Hz to 300 GHz
1230 – 1600 h
Thursday, 8 August 2019
Flamingo Hotel
2777 Fourth Street, Santa Rosa, CA 95405

1. Call to Order
C-K. called the meeting to order promptly at 12:30 PM PDT

2. Introduction of those Present
See Attendance list in Attachment 1.

3. Approval of Agenda
Peter moves, Rob seconds, approved (Attachment 2)

4. Approval of August 15, 2018 TC95 minutes
Marv moved, Ric seconds, approved

5. Call for Patents
C-K. reminded members of the duty to disclose applicable patents.

6. ICES Chairman’s Report
See Jafar’s slides (Attachment 3)

7. TC95 Chairman’s Report
See C-K.’s slides (Attachment 4)

8. Secretary’s Report
See Antonio’s slides (Attachment 5)

9. Treasurer’s Report
See C-K.’s slides (Attachment 6)
C-K. is seeking for a person to serve as Treasurer. Candidate must be able to attend all meetings and resident of USA to handle bank issues.

10. Membership Chairman’s Report

Escobar

Roel reported that he sent confirmation emails to six new members, but is waiting for confirmation of the membership fees.

Promoting young/diverse membership: Roel seeks suggestions.

- Bob: most young candidates are not in the US, thus a reason to hold meetings abroad and consider lower fees for students.
- Frank: the EMC society symposium could be a good recruiting venue.
- Ric: past efforts to recruit outside of the US did not produce very good results.
- C-K.: frequently international members do not attend ICES activities, due to travel to USA. Need to open up web meeting.
- Antonio: try to relate participation with scientific production (publications, conferences).
- Josee: use social media, perhaps Linked In.
- Matt: did not have a good experience managing virtual groups. Postings could be useful.
- Roel: we must decide on the membership fee ASAP. Jafar will discuss with IEEE to determine what to do.

11. How to join an IEEE-SA Ballot

Roder

See Pat’s slides (Attachment 7)

12. Topic presentations

a) Communicating the Science and Risk of Emerging Technologies in a Sea of Intuitive Toxicology and Cognitive Bias (see Attachment 8) Bushberg

b) On the NTP Rats Bioassay Reverberating Chamber Dosimetry (see Attachment 9) Faraone

13. Subcommittee Reports

a) SC1 (Measurements and computations)

Colville/Douglas

Within an ad-hoc workshop discussion it was agreed that there should be a rethink on the structure of C95.3. Peter Zollman and Matt Butcher were tasked to progress this and report to the January 2020 SC1 meeting.

b) SC2 (Safety programs)

Tell

Several presentations filled the meeting:

- D. Haes presented A Brief History of C95.7 Recommended Practice.
- D. Maxson presented (in response to an Action Item) on terminology of
“normally accessible” vs “readily accessible”, specifically in regard to Category 2 exposure environments.

- (under new business) A. Faraone presented slides and led a discussion on developing guidance on RF safety programs for use of RF emitting devices.

c) SC3 (Safety levels – 0 Hz to 3 kHz)  
Since SC3 and SC4 met jointly, a report for both SC3 and SC4 is provided herein. SC4 held its meeting in Santa Rosa, CA on Wednesday, Aug 7, 2019 in conjunction with SC3 as usual. The agenda and minutes of the previous meeting was approved. There were no patent concerns. The C95.1-2019, as originally approved, was found to have many editorial errors and minor technical errors. This required the creation of a Corrigendum approved by a vote of SC3 and SC4 member and ultimately the IEEE SA. Upon incorporation of the corrections into the C95.1-2019 standard, it will need to be approved by the IEEE SA. Discussions were also begin on what changes should be made in future C95.1 standards. Four technical presentations were given:
  - Rob Kavet: Maximum Dose to Tissue: Factors to Consider
  - C-K. Chou: Highlights of BioEm2019
  - Peter Zollman: Elements of English Style in IEEE Standards
  - Ric Tell: Words to Live By.

The next meeting was decided to be in Plantation, FL on Jan 22, 2020.

d) SC4 (Safety levels – 3 kHz to 300 GHz)  
Ziskin/Thansandote

See report for SC3.

e) SC5 (Effects of EM fields on blasting operations)  
Harmon/Hay

The status of the C95.4-2002 Comment Resolution was addressed. A total of 140 comments were received, of which 20 need to be resolved. Of these 20 less than 10 need more data. The goal is to have the document ready by the end of 2019. The PAR expires 31 December 2020. The committee recirculation & IEEE-SA ballot is planned for the end of 2019. The review of comments will be done by two-weekly WebEx meeting until the end of the year. SC-members are invited to actively take part in the review process and the WebEx meetings.

New Business: Following the discussion on electromagnetic safety and explosive environments, a proposal was made to incorporate this in the current standard. This was not encouraged as IEEE will regard this as expanding the scope, which is not part of the current revision process.

f) SC6 (EMF dosimetry modeling)  
Hirata

Three working groups are active. Two working reports (WG4 and WG5) have summarized their activities (definition of incident power density and nerve activation modeling). In addition, technical issues (computational uncertainty, skin-to-skin contact etc) have been presented for the revision of low-frequency
guidelines. New WG for nonuniform exposure at LF and averaging schemes of in situ electric field may be formed in near future.

14. ICES Website Update  
Chou  
C-K. showed reports from both IEEE on the Get Program download statistics for the H1 of 2019, and from NEMA on the IEEE ICES website activities of 2019. (Attachments 11 and 12).

15. New Business  
Chou  
Bob Cleveland: FCC press release on non-adoption of new standards (Attachment 13  
FCC news release)  
Ric: consider selecting meeting places where there is an opportunity to hold educational sessions.  
Frank: memorialize Ron’s contributions.

16. Future Meetings  
Chou  
Plantation Jan 21-23, Oxford June 2020(?) C-K. will survey TC95 membership on the time and place of the Summer 2020 meeting.

17. Adjourn  
C-K.’s closed the meeting promptly at 4PM US PDT.
## Attachment 1: Attendance List TC95 Meeting, 8 August 2019

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<td>34.</td>
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TC95 Committee
Safety Levels with Respect to Human Exposure to Electric, Magnetic
and Electromagnetic Fields, 0 Hz to 300 GHz
1300 – 1600 h
Thursday, 8 August 2019
Flamingo Hotel
2777 Fourth Street, Santa Rosa, CA 95405

1. Call to Order Chou
2. Introduction of those Present All
3. Approval of Agenda Chou
4. Approval of January 25, 2019 TC95 minutes Chou
5. Call for Patents* Chou
Participants have a duty to inform the IEEE of holders of essential patent claims if they or their affiliations hold such claims. Check the web link on the agenda for more details. If anyone in this meeting is personally aware of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please speak to the committee chair today.

6. ICES Chairman’s Report Keshvari
7. TC95 Chairman’s Report Chou
8. Secretary’s Report Faraone
9. Treasurer’s Report Chou
10. Membership Chairman’s Report Escobar
11. IEEE Staff Report Roder
   IEEE-SA ballot process
12. Topic presentations Bushberg
    a) Communicating science and risk Faraone
    b) TBD
12. Subcommittee Reports Colville/Douglas
    a) SC1 (Measurements and computations) Tell
    b) SC2 (Safety programs) Kavet/Graf
    c) SC3 (Safety levels – 0 Hz to 3 kHz) Ziskin/Thansandote
    d) SC4 (Safety levels – 3 kHz to 300 GHz) Harmon/Hay
    e) SC5 (Effects of EM fields on blasting operations) Hirata
    f) SC6 (EMF dosimetry modeling)
13. ICES Website Update Chou
14. Get Program statistics Chou
14. New Business Chou
15. Future Meetings Chou
16. Adjourn
IEEE/ICES
Chairman's Report
TC95
Jafar Keshvari
7th August 2019

WHO International Advisory Committee
(IAC) 2019 Meeting

• NIR Safety std
  • WHO core team will move on with the development of Non Ionizing Radiation safety standard.
  • There were some discussions about including the EMF safety limits.
  • From global harmonization perspective it would be more appropriate for WHO not introduce deviating limits.
WHO Environmental Health Criteria

- A **scientific literature review** to be published as a WHO technical document. The review will include conclusions for the clear-cut health outcomes, and will recommend systematic analysis for health outcomes for which the evidence does not provide consensus.
- The **RF EHC monograph** will elaborate on the health outcomes highlighted in the review process, using procedures for guideline development as recently required by WHO.
- Over 300 RF experts invited, 167 full responses.

WHO Environmental Health Criteria

**Structure:**
- Section 1 – Health Effects due to Temperature Increase
- Section 2 – Cancer
- Section 3 – Fertility and Birth Outcomes
- Section 4 – Symptoms Affecting Health
- Section 5 – Neurological Impairments/Disorders
- Section 6 – Neuroendocrine Effects
- Section 7 – Immunological Effects
- Section 8 – Haematology
WHO Environmental Health Criteria

Focus: 2. Prioritize health outcomes
- Developed and ran a survey—
- Commission systematic reviews
- Develop draft protocols for SRs
- Call for expressions of interest from SR teams

NTP research extension/Replication

1. The US team has already started the next phase of NTP study.
The goals of the second phase stated to be:
   - Further clarify and fill knowledge gaps in the NTP studies on RFR
   - Probe potential mechanisms for RFR-induced effects
   - Confirm RFR-induced DNA damage in the brain of rats and mice
   - Establish biomarkers of exposures to apply to studies of newer and emerging RFR-based communication technologies
NTP replication Research Program in Korea

- 5 years (2019-2023, $2.5 million/year
- Japan and Korea joint meeting for a cooperative study

• Draft Outline of the joint validation research plan of the NTP study:
  • (1) Exposure level: Whole body averaged SAR 4 W/kg
  • (confirmed)
  • (2) Frequency/waveform: 900 MHz/CDMA (confirmed)
  • (3) Exposure protocol: 10 min on/10 min off, 18hours/day,
  • initiated in utero on gestation day 5 for 2 years (104 weeks) after delivery (confirmed)

NTP replication Research Program in Korea

(4) Exposure apparatus: Custom-made reverberation chamber, common in both countries (Adopting RC proposed by ETRI, Korea: details to be discussed)
(5) Arrangement of cages, stirrers and antennae in the RC (details tbd)
(6) Measurement of core body temperature during exposure: Pilot study needed (details tbd)
(7) Material of cage: Polycarbonate (confirmed)
(8) Animal species: Harlan SD rat, male only imported from USA (confirmed)
NTP replication Research Program in Korea

(9) 3 Groups: Exposure, sham exposure, cage control
(confirmed)
(10) Number of animals per group in each country: 70 for 2-year + 5 for 14-week interim evaluation (genetic toxicology, by Comet assay and micronuclei assay) (confirmed)
(11) Measurement of food intake (feed for Harlan SD imported from USA) (confirmed)
(12) Target organs for pathological evaluation: Based on OECD Guidelines (confirmed)
(13) Selection of contracted research institute: Compliance to GLP necessary (confirmed)

NTP replication Research Program in Korea

Establishing International Advisory Committee:
- M. H. Repacholi (former coordinator, WHO Intl EMF Pj),
- M. Wyde (NIEHS),
- E.v. Deventer (leader, WHO Intl EMF Pj),
- E.v. Rongen (Chair, ICNIRP),
- J. Wiart (Telecom Paristech),
- Vijayalaxmi (Texas Univ Health Science Center)(tbd)
TC34 Collaboration with IEC TC106

- Reports from JWG including 5G standards development are shared with AdCom members in advance.
  - Progresses as planned, No delays. Reports from JWG’s available.
- IEC PT63184 proposes to establish JWG with IEEE/ICES TC34
  - AdCom Approved the proposal on 6th August 2019.

NEMA new representative at IEEE/ICES?

Zijun Tong
Program Manager
1300 North 17th Street | Suite 900
Rosslyn, VA 22209
Office Phone: 703.841.3253
Fax: 703.841.3353
Email: zijun.tong@nema.org
www.NEMA.org
General

• ICNIRP/ICES workshop during Glore meeting in November 2019. Kevin Graf, Jafar and C-K representing ICES at the meeting.

• International seminar on 5G and Health to address the key issues in relation to the deployment of the new generation of the mobile communications 5G, Ljubljana, Slovenia on 17.10.2019. http://www.5ghealth.si/. Jafar to represent ICES with a talk on the scientific basis of the revised exposure limits.

• EMF-Portal in Achen-Germany re-starts its activity.

• IoT Technologies WG and the Report.
  • No delay, report to be finalized by Dec 2019.

AdCom and TC95 meetings in 2020

• 21-23 Jan 2020, Plantation-US
• 18-20 June 2020, Oxford-UK

(In conjunction with BioEM 2020)
TC95 Chairman’s Report- C-K. Chou (August 8, 2019)

1. IEEE C95.1 standard: During February through July, Editorial Working Group (EWG) prepared Corrigenda for both TC95 and IEEE-SA level balloting. A final product was submitted to the RevCom on July 26. The standard board meets on September 6 to approve the Corrigenda. C95.1-2019 is expected to be in print about mid September.

2. Kanazawa Medical University: I was invited to attend the 2018 KMU Workshop on Ocular Changes: Induced by Electromagnetic Waves, held on March 4-5, 2019 in Kanazawa. My presentation was on "New IEEE C95.1-2019 Standard for Safe EMF Exposures".


4. Health Physics Society 64th Annual meeting, attended the Special Session: Non-Ionizing Radiation (NIR) Section organized by Dr. Jerry Bushberg, and presented “Overview of Safety Standards for Non-Ionizing Electromagnetic Fields (0 to 3000 GHz) on July 9, 2019.

5. Planed with Eric van Rongen and Jafar Keshvari to hold a session at the GLORE meeting in November at Lima to discuss further harmonization between ICNIRP and IEEE.
ICES
International Committee on Electromagnetic Safety

Secretary’s Report

August 8, 2019 Meeting
Santa Rosa, CA, USA

Antonio Faraone

ICES TC95 Structure

TC95 is comprised of six subcommittees:

1. Techniques, Procedures, Instrumentation and Computation (IEEE Std C95.3, C95.3.1)
2. Terminology, Units of Measurements and Hazard Communication (IEEE Std C95.2, C95.7)
3. Safety Levels with Respect to Human Exposure, 0 Hz–3 kHz (IEEE Std C95.6)
4. Safety Levels with Respect to Human Exposure, 3 kHz–300 GHz (IEEE Std C95.1, C95.1-2345)
5. Safety Levels with Respect to Electro-Explosive Devices (IEEE Std C95.4)
6. EMF Modeling
ICES TC95 Standards: Status

C95.1-2005: (Safety levels, 3 kHz – 300 GHz)
- Approved 2005; published 2006
- PAR for revision—approved June 2010, PAR extension request approved December 2014—expired 31 December 2018
- Revision incorporates C95.6 (Safety levels, 0 Hz to 3 kHz)
  - Stressing harmonization with ICNIRP guidelines
  - Completed Corrigenda August 5
  - IEEE SA approval expected in September
- Expected publication in mid-September!

C95.1a: (Safety levels, 3 kHz – 300 GHz)
- Published May 2010
- Amendment 1 (sets ceiling values for induced & contact current)
  8 August 2019

ICES TC95 Standards: Status

C95.1-2345-2014: (Safety levels, 0 Hz – 300 GHz)
- Approved 16 May 2014; published 30 May 2014
- NATO STANAG 2345 Ed.4, November 2015
- Expires in 2024 – 5 years for revision & NATO endorsement
- Will be revised based on IEEE C95.1-2019

C95.2-2018: (RF energy and current flow symbols)
- New standard!

8 August 2019
Slide 3
ICES TC95 Standards: Status

C95.3-2002: (RF measurements and computation: 100 kHz to 300 GHz)
- Reaffirmed 2008
- PAR for Revision – approved 6 February 2012;
  - PAR extended to 30 November 2019
- Revision incorporates C95.3.1 (measurements and computation: 0 Hz to 100 kHz)
  - Revision ongoing
  - New editorial team formed
- Frank Colville will step down within next year

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ICES TC95 Standards: Status

C95.4-2002: (Safe distances from antennas during blasting operations)
- Reaffirmed 2008
- PAR for Revision – approved 22 September 2016;
  - PAR expires 31 December 2020
  - Committee recirculation & IEEE-SA ballot by end of 2019

C95.6-2002: (Safety levels – 0 to 3 kHz)
- Reaffirmed 2007
- Incorporated into C95.1-2019 revision
- C95.6-2002 will become obsolete

8 August 2019
Slide 6
**ICES TC95 Standards: Status**

- **C95.7-2014:** (RF safety programs)
  - Revision of C95.7-2005
  - Approved 12 June 2014; published 8 August 2014
  - Working Group formed to improve guidance consistency with the rationale of the newly revised C95.1-2019 standard
  - Portable occupational devices to be addressed

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**Get C95™ Standards**

Access to the following standards at no cost has been sponsored by the US Navy, US Air Force, and US Army:*  

- IEEE Std C95.1™-2005 – to be replaced by 2019 revision!
- IEEE Std C95.1a™-2010
- IEEE Std C95.1-2345™-2014
- IEEE Std C95.2™-2018
- IEEE Std C95.3™-2002
- IEEE Std C95.3.1™-2010
- IEEE Std C95.6™-2002
- IEEE Std C95.7™-2014


*sponsorship of the Get IEEE C95 no-cost-to-public web access of the IEEE C95 standards does not imply that the Department of Defense nor its Component Services endorse or are obligated in any manner to adopt the covered standards current or future versions.*

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8 August 2019
Slide 7

8 August 2019
Slide 8
ICES Annual Report, and Policies and Procedures

**Annual Report:**
The 2017-2018 ICES Annual Report was accepted at the December 2018 Standards Board Meeting

**Policies and Procedures (P&Ps):**
- **Sponsor P&Ps:** Accepted at the June 2017 Standards Board Meeting*
- **Working Group P&Ps:** Deemed without issue at the December 2017 Standards Board Meeting
  - New TC34 P&P to be submitted in mid-September

*https://development.standards.ieee.org/pub/view-sponsor-pnps

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Secretary’s report

Questions?
# Interim Treasurer’s Report

**August 8, 2019 Meeting**

Flamingo Hotel  
Santa Rosa, California  
C-K. Chou

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25 January 2019  
Slide 2
How to Join an IEEE-SA Ballot

Pat Roder
Senior Program Manager
IEEE Standards Association
August 2019

The Ballot Invitation Process

- The formation of the Ballot Group begins when a specific IEEE standards project nears the SA Ballot stage.
- The Ballot Invitation email is sent out to everyone who expressed interest in the Activity Area that was chosen by the Working Group Chair.
  - Information about IEEE Standards Sponsor ballot invitations shall also be made available in myproject to allow additional interested parties the opportunity to participate.
  - If a party is interested in participating in the Sponsor Ballot, the person logs into myProject and enrolls in the ballot group.
  - Those who enroll comprise the Ballot Group.
  - Must be members of the IEEE-SA or pay a per-ballot fee.
The Ballot Group

- Those who respond affirmatively to the invitation during the period in which the ballot invitation is open and who otherwise fulfill the criteria in both subclause 5.2.2.3 of the IEEE-SA Standards Board Bylaws and 5.4.1 of the IEEE-SA Standards Board Operations Manual shall become members of the balloting group for that proposed standard
  - The set of persons who ultimately vote on the proposed standard

- Once the ballot has begun, the balloting group is closed to additional participants
  - Even if IEEE-SA membership status changes during the balloting period or recirculation period, there shall be no change to the voting status of the baloter with respect to that ballot.

- Balloters are required to classify their relationship to the balloting group relative to the scope of standards activity (for example, producer, user, and general interest).

---

The Ballot Group

- No balloter shall have more than one vote.
- Balloting group members have an obligation to respond during the balloting period
- Balloting groups of individuals should have at least 10 members to ensure adequate balance.

**Reference Material for Ballot Invitations & Ballot Groups**
- IEEE-SA ByLaws (Clause 5.4.1, "Balloting Group")
  http://standards.ieee.org/develop/policies/opman/sect5.html#5.4.1
- IEEE-SASB Operations Manual (Clause 5.4.2, "Ballot Invitations")
Advantages of the Ballot Invitation Process

- Helps ensure an open process
- Ensures that only those who have actively expressed an interest in participating in the IEEE Standards Sponsor Ballot are actually involved
- Reduces probability of recirculations or failed ballots resulting from unreturned ballots by “disinterested” parties
- Ensures a balanced Ballot Group by collecting the proper classifications (producer, user, etc.)
  - No one interest group can comprise more than one third of the balloters

How to Join an IEEE-SA Ballot

- Must either
  - Pay the IEEE-SA per-ballot fee or
  - Be an IEEE-SA member
- Working Group members do not automatically become Ballot Group Members
How to Join an IEEE-SA Ballot

Option 1: Pay the IEEE-SA per-ballot fee
The single ballot fee is $306.00.
- This is the most expensive option. Single ballot fees are higher than annual membership in the IEEE-SA, and entitle you to join just one ballot group and any recirculations of that ballot.
- To take advantage of this service which is unavailable online, send in your check or call with your credit card information at least 5 working days prior to invitation closing to allow time for processing.

Option 2: Pay the IEEE-SA membership fee
- Please contact the Membership Administrator, Chris Krysa
  - c.krysa@ieee.org
  - 732-562-2681
How to Join an IEEE-SA Ballot

Option 2: Become an IEEE-SA Member

- If you are already an IEEE member, but not an IEEE-SA member, you can join the IEEE-SA for an additional cost of $56.00.
- This entitles you to
  - Ballot on unlimited number of Individual Projects
  - Initiate new Individual Projects
  - Assume leadership positions on working groups
  - Participate in IEEE-SA Board of Governors & Elections
  - Monthly IEEE-SA Newswire
  - Discount on the purchase of IEEE standards

Option 2: Become an IEEE-SA Member

- If you are not an IEEE Member or IEEE-SA Member, there are two options:

  Option 1: Because you are not an IEEE member and not an IEEE-SA member, consider joining the IEEE for an annual cost that varies by region. Once you are an IEEE member, add IEEE-SA membership for $56.00.
  To join IEEE as a member please visit: standards.ieee.org/about/membership/

- Option 2: If you do not wish to become an IEEE member, consider joining the IEEE-SA only for $252.00.
- For more details on the above membership alternatives, and/or to join the IEEE-SA online, go to: standards.ieee.org/about/membership/
How to Join an IEEE-SA Ballot

- Various companies have IEEE corporate memberships. A benefit of corporate membership is a tiered number of complimentary IEEE-SA Individual Memberships. Please check the following webpage to see if your company has corporate membership:
  - [https://standards.ieee.org/develop/corpchan/mbrs1.html](https://standards.ieee.org/develop/corpchan/mbrs1.html)
  - If your company is listed here, please check with Chris Krysa to determine whether a complimentary IEEE-SA individual membership is available.

How to Join an IEEE-SA Ballot

- The IEEE-SA Standards process is managed through myProject™

- myProject is:
  - A web-based tool that facilitates the IEEE standards process
  - A database that holds information related to the standards process
  - A tool used by IEEE members, staff, and other individuals who want to participate in the standards process

- In order to use my project, you must have:
  - Access to the internet
  - A web browser (e.g. Internet Explorer, Firefox, etc.)
  - A PDF viewer (e.g. Adobe Reader)
  - A spreadsheet editor *only for download/upload comment functions* (e.g. Excel)
  - An IEEE web account
How to Join an IEEE-SA Ballot

- To participate in a ballot, follow the instructions provided in the email you received from IEEE-SA sa-ballot@ieee.org
- Or
- Go to https://development.standards.ieee.org/my-site
  - Enter your IEEE Account username/email and password and click “LOGIN”.
  - If you do not have an IEEE web account, you can create one by clicking on the “Need an IEEE Account?” link. (IEEE Web Accounts are free and do not require IEEE membership.)
myProject Home Screen – Express Interest in a Project

1. On the myProject™ Home Screen, select “Manage Activity Profile”.
2. On the “Manage Activity Profile” Page, scroll down to the Society or SCC you are interested in and expand the tree by clicking the "+" sign to view Sponsors, Working Groups, and Projects. (Choose IEEE-SASB Coordinating Committees)
3. Check the box next to the activity you are interested in. (Choose SCC39) Click the “+” sign to view the specific WGs
4. Check the box next to the activity you are interested in. Click the “+” sign to view the specific projects.
5. Check the box next to the activity your are interested in.

6. Click “CONTINUE”
7. Confirm your interest area and enter your affiliation information.
   - Select from the list or type in your company/organization.
Joining a Ballot Group

On this screen you will initially see open ballot invitations that are tied to your selection(s) under "Manage Activity Profile". Check the box next to "Show all open ballot invitations" to see all ballot invitations.
Joining a Ballot Group

Specify your affiliation and your voter classification for the ballot.

myBallot™ Home (Voter) >> Show/Join Open Ballot Invitations >> Join Open Ballot
PI 1873-18412 Standard for Health Information - Personal health device communication - Respiratory rate monitor

Please specify your Affiliation for this ballot's Project Committee, verify your Employer and select your voter classification for this ballot, then click Ok to confirm enrollment. For more information about this process, use the help link in the upper right corner.

Note that you can change your classification category as often as you like prior to the invitation's close date/time by clicking the "Update" link in the Actions column on the previous page.

Classification | Definition
---|---
Academic | An educational institution or a person or entity affiliated with such institution, providing academic review of the standard being developed.
General Interest | A participant in standards activities who may benefit directly or indirectly, and may be affected by the standard being developed without being primarily a member of any of the other interest categories.
Government/Military | A governmental entity or a person affiliated with such entity with direct interest in the standard being developed.
Producer | A person or entity that directly creates or that will create a conforming product, component, or service, for sale or distribution.
User | A person or entity that uses or will rely on the standard to define compliance of the product or service, or will have a common understanding of the operation of the product or service.

OK | CANCEL

myBallot Control Panel

Upon joining the ballot you will receive an email notification from the myProject system when the ballot is opened. To vote and comment, click "Manage myBallot Activity."

myBallot™ Home (Voter)

Balloting Process | Memberships | General
---|---|---
Show/Join Open Ballot Invitations | Update Web Account Info | Send Sponsor Message
Manage myBallot Activity | | Send Designee Message
View All IEEE Ballot Invitations | | Send Balloting Center Message
 Invocation History | myBallot Home (Management)
If you have questions, please contact:
Pat Roder
732-465-6475
p.roder@ieee.org
Attachment 8: “Communicating the Science and Risk of Emerging Technologies in a Sea of Intuitive Toxicology and Cognitive Bias” slide deck (by J. Bushberg)

Human Decision-Making: BIASES

<table>
<thead>
<tr>
<th>Social</th>
<th>Self-Deception</th>
<th>Simplification</th>
</tr>
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<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

- Framing
- Representativeness
- Gambler’s fallacy
- Anchoring
- False Cause Fallacy
- Familiarity and more impressionist effects
- False Analogy
- Halo effect

Let’s focus on five key biases and then we can address them.

Human Decision-Making

- Standard models of human decision-making (such as utility theory) have typically minimized or ignored the influence of emotions and other primal influences on people’s decision-making behavior, idealizing the decision-maker as a perfectly rational cognitive machine (‘economic man’) who usually pursues their goals in an optimal fashion.

- “Home Economics”

- Over the years this assumption has been challenged by behavioral psychologists, who have identified emotional factors and cognitive biases that influence our decision-making.

- SO WHO ARE WE?

Statement of Multiple Systems Hypothesis (MSH)

- The brain makes decisions (e.g., constructs value) by integrating signals from multiple systems.

- These multiple systems process information in qualitatively different ways.

- System 1: Intuition & instinct
- System 2: Rational thinking

- 95%
- 5%
Distinctions between classification Schemes

System 1 (Limbic System) (Effective system)
- Fast
- Sub-conscious
- Nourishment driven
- Reflexive
- Myopic
- Effortless
- Virtually inexhaustible
- Amygdala (Fight/Flight), Medulla Oblongata (Stress), Hypothalamus (Hunger/Hygiene)
- Hippocampus (L.T. Memory & Emotional Response)

95%

System 2 (Cerebral Cortex) (Analytic system)
- Higher Level Cognition
- Slow
- Conscious
- Reflective
- Forward-looking
- Analyze
- Self-regulatory
- Effortful and exhaustible

5%

System 1 Can Be Helpful

What is 6 divided by 3?

System 1
Integration
System 2

2

Contrasting Human & Technological Evolutions

200,000 years ago the hominid evolution is Today

System 2 Can Be Helpful

Would you like a piece of chocolate?

System 1
Behavior
System 2

No, thank you!

Multiple systems model

System 1
Integration
System 2

Behavior

System 1 Can Be Harmful

Would you like a piece of chocolate?

System 1
Behavior
System 2

stress
Human Decision-Making BIASES:

Social  Self-Deception  Simplification

Herd instinct
Conservatively evitar the possibility and follow the behavior of the majority to reduce stress and avoid conflict.

A SIMPLE PROBLEM:
A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost?

? $1.05

Global Warming Petition Project

Over 31,000 scientists signed the Anti-Global Warming Petition Project. The petition features over 31,000 scientists signing the petition stating “there is no convincing scientific evidence that human release of carbon dioxide, methane or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth’s atmosphere and disruption of the Earth’s climate.”

National Medal of Science
Henry Kissinger
Albert Einstein Award

A SIMPLE PROBLEM:
If the ball cost 10 cents and the bat costs $1.00 more than the ball, then the bat would cost $1.10 for a grand total of $1.20. The correct answer to this problem is that the ball costs 5 cents and the bat costs — at a dollar more — $1.05 for a grand total of $1.10.

Petition: 30,000 Scientists Oppose 5G Roll Out

Facts about 5G:

- 5G is a high-speed mobile data network that offers faster download speeds than previous generations of wireless technology.
- 5G networks use a range of frequencies, including millimeter waves, which are higher than those used for 4G and 3G.
- 5G supports a wide range of devices, from mobile phones to connected cars and industrial applications.
- 5G is expected to enable new applications and services, such as autonomous vehicles, remote surgery, and connected factories.

Advantages of 5G:

- Increased speed and reduced latency.
- Improved reliability and connectivity for internet of things (IoT) devices.
- Support for a wider range of applications and services.
- Enhanced security and privacy.

Disadvantages of 5G:

- High initial investment cost for deployment.
- Potential health concerns related to exposure to high-frequency radiation.
- Concerns about data security and privacy in the age of big data.
- Potential impact on wildlife and ecosystems due to the use of higher frequencies.

Impact on society:

- 5G is expected to have a significant impact on society by enabling new applications and services that can improve efficiency, safety, and quality of life.
- However, the potential health concerns and privacy issues need to be addressed to ensure that the benefits of 5G technology are realized without compromising public safety and privacy.

Compatibility with existing networks:

- 5G can coexist with existing networks, but it requires a significant investment in new infrastructure and technology.
- The transition to 5G will need to be gradual and well-planned to ensure a smooth transition for consumers and businesses.

Challenges and risks:

- The rapid pace of technological change makes it difficult to predict the long-term impacts of 5G on society.
- The role of government regulations and standardization in ensuring the safety and security of 5G networks is critical.
- The potential for increased cybersecurity threats as more devices become connected to the internet.

Future implications:

- The widespread adoption of 5G technology is expected to have far-reaching implications for industries ranging from healthcare to transportation.
- The development of 6G technology is already underway, and it is expected to offer even greater speeds and capabilities than 5G.
- The future of 5G is likely to be shaped by ongoing developments in technology, policy, and social norms.
Confirmation Bias

The tendency notice and to look for what confirms one’s beliefs, and

Government Conspiracy

Petition: 26,000 Scientists Oppose 5G Roll Out

Human Decision-Making BIASES:
Dunning-Kruger Effect (Illusion of Knowledge)

Confirmation Bias

To ignore or undervalue the relevance of what contradicts one’s beliefs

Confirmation Bias

If the card has a vowel on one side, then it must have an even number on the other side.

A) A, 4  C) Q, 4
B) A, 7  D) Q, 7
Confirmation Bias

- Most people choose A and 4 because these are the cards capable of confirming the statement, but confirming evidence doesn't prove anything.
- The 4 card has no ability to invalidate the hypothesis.

**A 4**

False Cause Fallacy

- "Post hoc ergo propter hoc" Latin for, "after this, because of this."
- Assumess that because X precedes Y, therefore X caused Y.
- Often expressed in Epidemiology as: "Correlation is not necessarily imply Causation."

False Cause Fallacy

- Infants are not proportionately scaled down adults.
- Comparisons: adults and children.  "Are adults twice as likely to die in a car crash as children do?"
- The answer is: No, not necessarily.
- In fact, the number of annual Canadian child deaths from motor vehicle accidents is lower than that of adults.

Framing Fallacy

- Explosive Growth in iPhone Sales?
- Tim Cook took over for Steve Jobs, CEO Apple, 2011-Present.
What’s Wrong With This Conclusion?

- “While short of statistical significance after Bonferroni correction (p=0.13), the results underscore a clinically important effect size (relative odds of survival at 5 years=1.2) that challenges the current therapeutic paradigm.”

False Analogy: Misleading Comparisons

What’s the Problem with this Analogy?

Dr. Deborah says

... Why worry.

No Need for Flu Vaccination

Framing Fallacy

Dr. Deborah MD

Increase in Rate of Influenza in the Unvaccinated

Vaccine Match: only 3 more people out of 101 or 6%

Vaccine mismatch: only 1 more person out of 101 or 1%

Public Misconceptions

- Artificial sources are more dangerous than natural sources.
- All radiation causes cancer.
- No level of exposure to radiation or any carcinogen is safe.
- Radiation exposures associated with diagnostic examinations may be more dangerous than any illness.
- Radiation exposure of the parents carries a high risk of genetic effects in the children.

Vaccine Mis-Match (2Xs)

Risk

- Definition: A situation involving exposure to danger (hazard).
- Synonyms: possibility, chance, probability, likelihood, danger, peril, threat, menace, fear, prospect, possibility, chance, probability, likelihood, danger, peril, threat, menace, fear, prospect, imperil, jeopardize.
- Antonyms: impossibility.

The burden of flu disease 2017 – 2018

98 million

-2 million

158000

get vaccinated, everyone
**RISK = P x S x W**
Where...

- P = Probability of the Hazard Occurring
- S = Severity of the Hazard
- W = Weighting Factor

---

**Perceived Risk = Hazard + Outrage**
- Is the risk voluntary?
- Is the risk from natural or artificial source?
- Is the risk familiar or exotic?
- Is there a risk of cancer or genetic effects?
- Is there a risk to children or the fetus?
- Is there a lot known about the risk?
- Is there trust in the source of the information?
- Is the company responsive to my questions?

---

**The “R” Word**
- Nuclear Power Accidents
- Nuclear Weapons

---

**Perceived Risk = Hazard + Outrage**
- Outrage is as important as hazard
- Outrage is real
- Outrage is powerful
- Outrage reduces objectivity
- Outrage motivates action
- Outrage is manageable
- Outrage management is step one
- Outrage must be reduced before they will listen to the science

---

**Radiation Monsters and the Tabloids**
- Hulk
- Spider-Man
- Superman
- Tabloid Headlines
TV News Headlines and Teasers
- "Scars May Be Cancer Predictors"
- "Are Doctors Wrong About High Fiber Diets Cutting the Risk Colon Cancer"
- "No Link Found Between Fat and Breast Cancer"
- "Two Drinks a Day Keeps Strokes Away"
- "Mobile Phones and Cancer"
- "Cellular Phones...Are We Taking Ourselves To Death?"

Media is a Business
The Commodity is Your Attention
Selective pressures being what they are for human attention, the media has a distinct advantage when the selective pressure they use is fear or sensationalism.
Unfortunately, simple but dramatic misinformation or deliberately misleading "disinformation", too often uncheked from reality, morality or responsibility will always have more shock value than a more balanced and often necessarily complex and nuanced presentation on the same topic.

In Many Cases.....
The Public May Choose to believe a Simple Lie in Preference to a Complicated Truth
SYSTEM 1 THINKING

Your Perception of an Unacceptable Risk May Differ from Others
"There is no point in getting into a panic about the risks of life until you have compared the risk that worry you with those that don't but probably should"
Lord Rothschild

At the End of the Day It's about Balancing Risk & Benefit and Establishing Trust
On the NTP rats bioassay reverberating chamber dosimetry

Antonio Faraone & Giangi RB-Babik
Motorola Solutions Inc.
IEEE ICES Meetings, Santa Rosa, CA
August 8, 2019

Background

- NTP issued preliminary reports on the lifetime rats bioassay in 2016, reporting “some evidence” (NTP scale) of RF cardiogenic activity.
- In 2017 NTP issued complete reports on mice and rats bioassays, restating “some evidence” for rats brain glioma, heart schwannoma.
- NTP convened peer-review panels in 2018, which elevated the heart schwannoma findings to “clear evidence” (highest in the NTP scale) and the robbin's bioassays final reports were updated accordingly.
- Several aspects of the NTP study design and execution received articulated criticism within the scientific and regulatory communities.
- IEEE and ICNIRP did not consider the reported NTP findings to warrant changes in RF exposure metrics and associated limits.

Background (cont’d)

- Reverberating chambers designed by US NIST were selected to expose concurrently a large number of rats (90+) at four wBSAR target levels.
- Reverberating chambers are shielded rooms energized by one or more antennas where a Rayleigh time-varying EM field distribution may be realized through mechanically operated “mode stirrers”.
- Thermal and RF dosimetry analyses were conducted to verify core temperature rise < 1 °C and determine wBSAR variance.
- NTP will be conducting follow-up studies on rats using newly designed reverberating chambers (older ones were scrapped).
- Researchers in Korea and Japan plan to conduct replication studies using specially designed reverberating chambers.
Rayleigh scattering environment

Outline

- NTP assessment of the \textit{wbSAR} uncertainty
- NTP assessment of the heart-averaged SAR
- Additional potential sources of variation
  - Shielded water lines
  - Concurrent exposure of rats in the cages
  - Asymmetries in rats weight, location, orientation
  - Non-ideality of actual reverberating chambers
- Concluding remarks

NTP assessment of the \textit{wbSAR} uncertainty

NTP DOSIMETRY
(FDTD @ 900 MHz)

Reverberation Chamber Exposure Environment
- Anechoic chambers
  - Uniform field
  - Uniform time-harmonic field
  - Rayleigh distributed temporal variations

exposure environment representations
- Pulsed plane wave method
- 12 dipole wave method
Random Planewaves

- each input plane wave at the source excitation point (with a Planewave Summation) - center presentation

- The 2D HAT will be incident on the same source plane if it is located within a 10 meter radius of the array center.

- each exposure condition involves > 200 corrosion parameters.

Maximum SAR Uncertainty Over Whole Lifetime

<table>
<thead>
<tr>
<th>Contributions</th>
<th>Standard Uncertainty %</th>
<th>Standard Deviation</th>
<th>Standard Deviation</th>
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<tbody>
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<td>Antenna Gain</td>
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<td>Combined Uncertainty Inter</td>
<td>2%</td>
<td>2.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Impact of weight (isolated rat)

Animal Weights

Impact on heart-averaged SAR

Dose-effect relation

NTP assessment of the heart-averaged SAR
Organ specific SAR

- Brain and heart SAR
  - Performed and brain: higher SAR that affects the whole body at once
  - Tissue-specific SAR differences are not usually used to SAR averaging
  - Results may differ by less than 1% within the same voxel

- SAR in fat
  - Fat SAR can be found in the subcutaneous layer
  - Fat SAR can be used for SAR averaging

Additional potential sources of variation
- Shielded water lines
- Concurrent exposure of rats in the cages
- Asymmetries in rats, weight, location, orientation
- Non-ideality of actual reverberating chambers

Impact of posture (mice)

- Posture
  - Posture affects the interaction between the body and the electromagnetic field
  - Posture changes can lead to variations in the SAR distribution

Impact of the metallic water lines?

Impact of asymmetries, scattering and coupling
Concluding remarks

- The published rats dosimetry analysis presented to the NTP peer review panels did not include several, potentially dominant, sources of exposure variation.
- As a consequence, artifacts or potentially extreme exposures may have been overlooked by the NTP scientists and peer reviewers.
- Quality of dosimetry analysis of current and future bioassays employing reverberating chamber would benefit from including all major sources of variation.

Concluding remarks (cont’d)

- In the absence of a complete simulation of a loaded reverberating chamber, which is onerous, there is no evidence that using the simplified “12-wave method” leads to accurate estimates of concurrent exposures.
- In fact, applicable literature suggests that the “12-wave method” is insufficient even for a single rat.
- The validation of the “12-wave method” in published NTP dosimetry may be questionable, since it relies on an unspecified “mapping” of any arbitrary impinging plane wave onto plane waves from cardinal directions.

Acknowledgement

Dr. John Osepchuk provided an initial, detailed, and valid analysis, soon after the 2016 publication of the preliminary NTP report on rats, highlighting several potential issues related to employing reverberating chambers featuring shielded, meandering water lines.
Attachment 10:
### By Standard

<table>
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<th>Standard #</th>
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<th>Jun</th>
<th>Jul</th>
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**Chart:**

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- C95.6-2002, 0.065690191
- C95.4-2002, 0.020417221
- C95.3-2002, 0.062583222
- C95.2-2018, 0.033288948
- C95.3.1-2010, 0.070128717
- 1460-1996, 0.0168664
- C95.1-2005, 0.39502885
- C95.1A-2010, 0.154016866
- C95.1-2345-2014, 0.094540613

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**Note:**

- Total downloads as of December 2019: 2,253
- Percentages are rounded to two decimal places.
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* Other (Please explain) Breakout

Other (Please explain)-Engineering Librarian | 6   | 6   |
Other (Please explain)-Utility              | 6   | 6   |
Other (Please explain)-Amateur radio operator | 5   | 5   |
Other (Please explain)-Private              | 4   | 4   |
Other (Please explain)-Engineer             | 1   | 2   |
Other (Please explain)-Nonprofit            | 2   | 2   |
Other (Please explain)-Wireless Communication Manager | 2   | 2   |
Other (Please explain)-Quality Engineer      | 2   | 2   |
Other (Please explain)-Member               | 2   | 2   |
Other (Please explain)-Compliance Engineer   | 2   | 2   |
Other (Please explain)-get knowledge        | 1   | 1   |
Other (Please explain)-Safety Engineer       | 1   | 1   |
Other (Please explain)-Wireless Consultant   | 1   | 1   |
Other (Please explain)-Consultant - Wireless Telecommunications | 1   | 1   |
Other (Please explain)-Government Contractor | 1   | 1   |
Other (Please explain)-Researcher           | 1   | 1   |

8 10 2 11 7 3 - - - - - - 17
NEMA Website Analysis Form

Completed by NEMA\Sr. Digital Media Manager and provided to website liaison for their review and feedback.

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<th>Jan-Aug</th>
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<td>Reviewed By:</td>
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Contents
2. Website Analytics Summary & Comparison ................................ Error! Bookmark not defined.
5. Top Search Terms (Jan. 1, 2019 – Aug. 5, 2019) .......................... 53
1. **Website Analytics Charts (Jan 1 – Aug. 5, 2019)**

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<th>Pageviews¹</th>
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<td>/home/</td>
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<tr>
<td>/expert-reviews/</td>
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<td>/committees/tc95-subcommittees/</td>
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<td>/publications/standards/</td>
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<td>/home/meetings/</td>
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¹ *Pageviews*: The total number of pages viewed. Repeated views of a single page are counted.
2. Website Analytics Summary & Comparison

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3. Traffic Sources (Jan 1 – Aug. 5, 2019)

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4. Top Referral Sites (Jan 1 – Aug. 5, 2019)

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<td>emfandhealth.com</td>
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² Sessions: The period time (not greater than 30 minutes) a user is actively engaged with your website.
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5. **Top Search Terms (Jan 1 – Aug. 5, 2019)**
CHAIRMAN PAI PROPOSES TO MAINTAIN CURRENT RADIOFREQUENCY EXPOSURE SAFETY STANDARDS

FCC’s RF Exposure Limits for Handheld Devices are Among the Most Stringent in the World

WASHINGTON, August 8, 2019—Federal Communications Commission Chairman Ajit Pai shared with his colleagues today a proposal that would continue to ensure the health and safety of workers and consumers of wireless technology. Following more than six years of public input and review, the proposal would maintain the Commission’s existing radiofrequency (RF) exposure limits. The United States’ RF exposure limits for handheld devices are among the most stringent in the world.

The proposal would also establish a uniform set of guidelines for ensuring compliance with the limits regardless of the service or technology, replacing the Commission’s current inconsistent patchwork of service-specific rules. In addition, Chairman Pai is proposing that the Commission seek comment on establishing rules formalizing its existing methods of determining compliance with the RF exposure standard for high-frequency devices.
“The FCC sets radiofrequency limits in close consultation with the FDA and other health agencies. After a thorough review of the record and consultation with these agencies, we find it appropriate to maintain the existing radiofrequency limits, which are among the most stringent in the world for cell phones,” said Julius Knapp, chief of the FCC’s Office of Engineering and Technology.

As Jeffrey Shuren, Director of the Food and Drug Administration’s Center for Devices and Radiological Health, wrote to the FCC, “[t]he available scientific evidence to date does not support adverse health effects in humans due to exposures at or under the current limits...” and “[n]o changes to the current standards are warranted at this time.”

The draft item includes these main components:

- **Maintaining the current standard:** The item would maintain the existing RF exposure limits and thus resolve the Commission’s 2013 Notice of Inquiry that sought public input on whether to strengthen or relax its existing RF exposure limits.
- **Establishing uniform rules for determining compliance with RF standards:** The item would establish a uniform set of guidelines, agnostic to the service or technology, using science-based metrics around frequency, distance, and power, to determine how entities assess whether they are in compliance with RF standards.
- **Formalizing the application of the existing standard to certain frequencies:** The item would seek comment on establishing a rule to formalize the Commission’s existing methods of determining compliance with the RF exposure standard for devices operating at high frequencies.

For more information on RF exposure limits, visit: [https://www.fcc.gov/rfsafety](https://www.fcc.gov/rfsafety).

###

Media Relations: (202) 418-0500 / ASL: (844) 432-2275 / TTY: (888) 835-5322 / Twitter: @FCC / www.fcc.gov

*This is an unofficial announcement of Commission action. Release of the full text of a Commission order constitutes official action. See MCI v. FCC, 515 F.2d 385 (D.C. Cir. 1974).*
Attachment 14: