RF Exposure Policies and Procedures - Status

TCB Workshop

April 2020

Laboratory Division
Office of Engineering and Technology
Federal Communications Commission

NOTE: Clarifications to Apr. 7, 2020 version are in GREEN font (2020-05-15)

Overview

- Final and Proposed Changes to RF Exposure Rules per FCC 19-126
- Continuing development for various other RF exposure policies and procedures

Final and Proposed Changes to RF Exposure Rules per the FCC 19-126 Rulemaking Item

FCC 19-126 Rulemaking

- The Second Report and Order (2RO) part of the rulemaking item FCC 19-126 appeared Apr. 1, 2020 in the Federal Register (FR)
  - The 2RO follows from proposals in the FNPRM part of the rulemaking item FCC 13-39 (docket no. 03-137)
  - The 2RO changes to the basic exposure rules 47 CFR Secs. 1.1307, 1.310, 2.1091, 2.1093 (originated under docket no. 93-62) are beyond those already made by the 1RO part of the FCC13-39 item

FCC 19-126; *Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*; docket no. 03-137 (Terminated); Adopted: November 27, 2019; Released: December 4, 2019

85 FR 18131-18151; (https://www.govinfo.gov/content/pkg/FR-2020-04-01/pdf/2020-02745.pdf)

34 FCC Rcd 11687-11855; (https://docs.fcc.gov/public/attachments/FCC-19-126A1_Rcd.pdf)

FCC 19-126 2RO Main Topics

- RF exposure routine evaluation requirement exemptions
  - Adopt formulas/framework from NPRM FCC 13-39
    - Applicable for fixed, mobile, portable RF sources under SAR and MPE limits
  - Associated revisions to KDB Pub. 447498 (mobile and portable devices), etc., and OET Bulletin 65 in preparation
- Environmental evaluation
  - Require computational software used for exposure evaluations to be fully validated; i.e., tested and shown to provide results equivalent to those derived from already accepted methods for the same canonical device(s)
  - Omit legacy 5 cm evaluation separation distance from 47 CFR Sec. 2.1093
  - Continue with use of KDB publications as means for providing RF exposure evaluation uniform policies and procedures for mobile and portable devices
- Mitigation measures
  - Primarily pertains to fixed-mount/fixed-site transmitters
  - OET Bulletin 65 associated updates in preparation
- Conforming edits
  - Misc. exposure requirement and exemption text changes in Secs. 1.4000, 2.1033, and Parts 15, 18, 22, 24, 25, 27, 73, 90, 95, 97, 101, for consistency with changes in Secs. 1.1307, 2.1091, 2.1093

FCC 19-126 Final Rules

- Effective date = June 1, 2020
  - Effective date per para. 55 of FCC 19-126, 85 FR 18141
  - Per 47 CFR Sec. 1.1307(b)(1) determination of exemption or exposure evaluation applies for all FCC-regulated RF sources, regardless of radio service or rule part
  - Exemption criteria formulas of 47 CFR Sec. 1.1307(b)(3) are applicable for all RF sources, including mobile and portable devices
  - Effective dates for 47 CFR Secs. 2.1091 and 2.1093 are to be announced later
- Transition period = 2 years
  - Transition period per para. 47 of FCC 19-126, 85 FR 18140
  - Allow manufacturers and licensees to determine whether devices are exempt from evaluation, and to complete evaluations and implement mitigation requirements where applicable
  - Allow for orderly transition of OET equipment authorization program to incorporate new exemption criteria into certification policies and procedures

FCC 19-126 New Sec. 1.1307(b)(3)

Comparison of example exemption threshold power P_{th} levels (mW) for portable devices at distances ≤ 50 mm calculated per KDB Pub. 447498 D01 v06 and per FCC 19-126 Sec. 1.1307(b)(3)(i)(B)

MHz \ mm	5	10	15	20	25	50
300	27 / 39	55 / 65	82 / 88	110 / 110	137 / 129	274 / 217
450	22 / 22	45 / 44	67 / 67	89 / 89	112 / 112	224 / 226
835	16 / 9	33 / 25	49 / 44	66 / 66	82 / 90	164 / 240
900	16 / 8	32 / 23	47 / 42	63 / 63	79 / 88	158 / 242
1500	12 / 4	24 / 14	37 / 29	49 / 49	61 / 73	122 / 254
1900	11 / 3	22 / 12	33 / 26	44 / 44	54 / 66	109 / 236
2450	10 / 3	19 / 10	29 / 22	38 / 38	48 / 59	96 / 219
3600	8 / 2	16 / 8	24 / 18	32 / 32	40 / 49	79 / 195
5200	7 / 2	13 / 6	20 / 15	26 / 26	33 / 42	66 / 175
5400	6 / 1	13 / 6	19 / 14	26 / 26	32 / 41	65 / 173
5800	6 / 1	12 / 6	19 / 14	25 / 25	31 / 40	62 / 169

FCC 19-126 Proposed Rules

- The Notice of Proposed Rulemaking (NPRM) part of the rulemaking item FCC 19-126 appeared Apr. 6, 2020 in the Federal Register (due-dates extended as of May 15, 2020)
  - NPRM key topics include:
    - Extending exposure limits below 100 kHz and above 100 GHz, and associated matters on limit quantities and parameters
    - Device-based time-averaging for exposure compliance
    - Spectrum and rule part basic matters and RF exposure considerations for wireless power transfer (WPT) devices
  - Interested parties can submit comments by ~~May 6~~ June 17, 2020, and reply comments by ~~June ##~~ July 20, 2020, under docket no. 19-226

FCC 19-126; *Targeted Changes to the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields*; docket no. 19-226; Adopted: November 27, 2019; Released: December 4, 2019

85 FR 19117-19126; (https://www.federalregister.gov/documents/2020/04/06/2020-06966/human-exposure-to-radiofrequency-electromagnetic-fields), ~~REPLY COMMENT DATE CORRECTION PENDING~~ (https://www.govinfo.gov/content/pkg/FR-2020-04-06/pdf/2020-06966.pdf)

DA 20-521; Public Notice; Released: May 15, 2020; OET EXTENDS COMMENT AND REPLY COMMENT DEADLINES FOR HUMAN EXPOSURE TO RADIOFREQUENCY ELECTROMAGNETIC FIELDS PROCEEDING; ET Docket No. 19-226; Revised Comment Date: June 17, 2020; Revised Reply Comment Date: July 20, 2020

34 FCC Rcd 11687-11855; (https://docs.fcc.gov/public/attachments/FCC-19-126A1_Rcd.pdf)

FCC 19-126 Other Actions

- The FCC 19-126 item includes two other FCC actions:
  - Resolution of Notice of Inquiry; docket no. 13-84
    - Continues existing:
      - SAR and MPE limits, including as pertaining to children
      - SAR evaluation basic procedures, including test separation distance requirements
      - RF exposure information dissemination processes
  - Memorandum Opinion and Order; docket no. 03-137
    - Dismiss petition-for-reconsideration (DOC-322492; Public Notice Report No. 2988; 78 FR 52893; Aug. 27, 2013) thus affirm prior decision that pinnae (outer ears) are subject to extremity SAR limits
  - Both actions are included in the Apr. 1, 2020 Federal Register summary of FCC 19-126

Continuing Development for Various Other RF Exposure Policies and Procedures

Developing and Interim Policies

- Development and preparation is continuing for several mobile and portable device RF exposure evaluation and review and approval uniform policies and procedures
  - Several policies and procedures overlap with and may be impacted by topics and activities in the exposure rulemaking release, measurement standards projects and working groups, and evolving device technologies in KDB inquiries and PAG reviews
  - Highlights in following pages
- Along with information of this session, existing evaluation and review and approval policies and procedures guidance generally continue to apply

Development Topics (1)

- Preparing KDB publication changes per Apr. 2020 Fed. Register release rulemaking FCC 19-126
  - SAR and MPE measurement exemption threshold power levels in KDB 447498
  - Associated evaluation and reporting conditions in exposure KDB publications
  - Transition period guidance document may be considered
- Preparing cohesive guidance for mmw-band device measurements and associated computational simulations
  - Considering test modes and signaling, system check procedures, etc., in existing and continuing PAG reviews
  - Considering latest draft IEEE/IEC draft standards (63195)
  - Power density limits apply for frequencies above 6 GHz not SAR limits

Development Topics (2)

- Chipset and modem-based dynamic power control for exposure time averaging in portable devices
  - Pre-TCB-PAG test plan KDB inquiry[1] is not required for devices implementing latest Qualcomm-based WWAN methods
    - PAG remains required for TCB application processing[2]
    - Simultaneous-transmission power density and SAR evaluation
    - Additional test reduction and data reuse uniform guidance is under consideration
  - Pre-TCB test plan KDB inquiry and TCB PAG generally remain required for other or different and any new WWAN and WLAN dynamic power control exposure time-averaging methods
  - Considering information presently under discussion in IEC TC 106 project for time-averaging draft technical report (candidate amendment to IEC/IEEE 62209-1528(:2020))

[1] KDB Pub. 388624 **D01** v11r03 II) B) 1) to 3) describes pre-TCB KDB for devices subject to PAG

[2] KDB Pub. 388624 **D02** v16r06 II) A) 6); KDB Pub. 388624 **D01** v11r03 III) (TCB PAG KDB)

Development Topics (3)

- Preparing cohesive guidance for 4G-LTE SAR intra-band and inter-band uplink carrier-aggregation evaluations
  - Draft KDB pub. evolved from Nov 2018 and Oct 2017 TCB slides
- Preparing cohesive guidance for 5G-NR sub-6 GHz SAR evaluations
  - Developing device-setup and test-exemption considerations
  - Considering information from application-specific evaluations in existing FCC IDs
    - Dynamic power sharing in EN DC (E-UTRAN & New Radio dual connectivity)
    - Call-box and signaling test setup; device test modes supporting info
    - Conducted power measurements for establishing test reductions across CP-OFDM, DFT-s-OFDM pi/2-BPSK etc.
    - Non-standalone and standalone modes (NSA, SA)
    - Resource block allocations per 3GPP TS 38.521-1, etc.
    - Associated measurement and test system issues as relevant (signal bandwidths, liquid parameters, etc.)
  - Considering information presently under discussion in IEC TC 106 project for 5G NR SAR draft technical report (candidate amendment to IEC/IEEE 62209-1528(:2020))

Development Topics (4)

- Measurements and simulations for wireless power transfer (WPT) exposure evaluations
  - Finalize criteria and KDB 680106 changes to streamline filings for Qi-based and similar portable devices
  - Application-specific exposure evaluation KDB inquiry submissions, and TCB PAG for certification application filings, remain applicable for:
    - Radiative WPT RF sources (aka e.g. WPT-at-a distance)
      - 1 m maximum charging distance for Part 18
    - Full-vehicle wireless chargers
      - Typically f-below-300 kHz, power greater than 1 kW

Development Topics (5)

- Preparing KDB publication modifications for various SAR measurements and measurement systems topics
  - Vector-measurement-based probe-array systems (VMBPAS)
    - Continue development of draft KDB publication considering IEC 62209-3:2019, also Fast SAR Procedure A of IEC 62209-1528(:2020)
  - Streamline procedures for simultaneous-transmit test exemptions (KDB 447498 and 616217 SPSLR for close-by antennas, etc.)
  - Considerations in KDB 865664 for special phantoms (e.g., face-down, limb)
- Continuing OET staff participation in IEC and IEEE standards working groups
  - Active projects include: IEC/IEEE 62209-1528, 63195-1, 63195-2, 63184, 62074-4; IEC 62232 (OET EMC Div. staff)
  - As has been customary, when standards documents are finalized some aspects may be adapted in KDB publications as applicable

Thank you for your attention