



**FEDERAL COMMUNICATIONS COMMISSION**  
**Laboratory Division**  
**7435 Oakland Mills Road**  
**Columbia, MD 21046**

## OET 65 Supplement C EAB Part 22/24 SAR Review Reminder Sheet 01/2002

|                                                          |                                                                                                                             |
|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Date                                                     | Engr. Init.                                                                                                                 |
| EA #                                                     | FCC ID                                                                                                                      |
| Battery options (standard, extended, other):             | Quantity and type supplied with device: belt clip/holster options - any metal?; body-worn spacing; headset/earphone options |
| Transmits with flip cover closed (Y/N)?                  | Antenna type, location, fixed/retractable:                                                                                  |
| Max ERP 800 (SAR report & EMC report)                    | Max EIRP 1900 (SAR report & EMC report)                                                                                     |
| Max ERP/EIRP CDMA-800 or OTHER (SAR report & EMC report) | Max P conducted (SAR report & EMC report)                                                                                   |

| OK |  | REVIEW ITEM                                                                                                                                                                                                                                                                                                                                                                                                                                               | COMMENTS |
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|    |                                                                                   | 1) <i>Output power</i><br><br>a) Powers in SAR report must agree with EMC report and tune-up procedure<br>b) Conducted power in SAR report should be greater than or equal to what's in EMC report, but not exceeding tune-up/tolerance<br>c) Scaling up or down 5% is allowed<br>d) Maximum output power (conducted) or SAR drift measured at same position in liquid before and after each SAR test?                                                    |          |
|    |                                                                                   | 2) <i>Users Manual</i><br><br>a) Check for accessories and battery options – should test any accessories containing metal, and with all possible combinations; need justification if limited or “worst-case” combinations only tested<br>b) To comply with RF safety requirements use the specific belt clip. All other belt clips should be avoided and may not comply with RF safety requirements (for fair-trade do not exclude 3rd party accessories) |          |



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| OK |  | REVIEW ITEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | COMMENTS |
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|    |                                                                                   | c) Check for RF Safety statements. Users must be clearly informed of the compliance requirements for device use, especially regarding body-worn configurations.<br>d) Check that FCC ID and SAR numbers in manual are correct<br>e) Do not allow any unsupported compliance claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |          |
|    |                                                                                   | 3) <i>GENERAL REPORT INFORMATION</i><br><br>a) FCC ID listed (see 47 CFR §2.909)?<br>b) statement of compliance with FCC RF exposure included (§2.1093)?<br>c) mobile or portable transmitter device category identified?<br>d) testing for Occupational/Controlled OR General Population/Uncontrolled limits?<br>e) test device is production unit or identical prototype (47 CFR §2.908)?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |
|    |                                                                                   | 4) <i>DEVICE OPERATING CONFIGURATIONS AND TEST CONDITIONS</i><br><br>a) brief description of the test device operating configurations included? For example:<br><br>i) operating modes and operating frequency range(s)<br>ii) maximum device rating for each operating mode and frequency range, both test sample and production units<br>iii) antenna type and operating positions<br>iv) applicable body-worn configurations<br>v) battery options that could affect the SAR results<br>vi) test positions for other accessories, e.g., earphones<br><br>b) procedures to establish the test signals described (put phone on a call, e.g., base-station simulator vs internal test codes)? This may include a test equipment list or test codes<br>c) Multiple modes – CDMA, TDMA, GPRS, GSM, Bluetooth, etc?<br>d) applicable source-based time-averaging duty factor and tested duty factor listed? |          |
|    |                                                                                   | 5) <i>SAR Measurement system and site description</i><br><br>a) Brief description of the SAR scanning measurement system included?<br>b) Brief description of the test setup included: handset holders, phantom orientation, surroundings, absorber, noise floor, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |          |



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| OK |  | REVIEW ITEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | COMMENTS |
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|    |                                                                                   | <p>6) <i>Electric field probe calibration</i></p> <ul style="list-style-type: none"> <li>a) description of the probe – including tip diameter, internal sensor offset from tip, etc</li> <li>b) description of the probe measurement errors included?</li> <li>c) Description of probe calibration errors/uncertainties?</li> <li>d) most recent calibration date and calibration certificate showing all factors used in report?</li> <li>e) Check for consistency of probe factor and correspondent tissue parameters thru report</li> <li>f) crest factor (peak-to-average voltage) parameters shown or needed, and/or addressed in calibration?</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |
|    |                                                                                   | <p>7) <i>SAR system verification with flat phantom and reference source</i></p> <ul style="list-style-type: none"> <li>a) brief description of the reference source (e.g., 900, 1800 MHz dipoles) used to verify the SAR system performance – prefer center frequency within the operating frequency range of the handset, dipole/source return loss, etc.</li> <li>b) verification frequency(s) must be within <math>\pm 100</math> MHz of device center frequency(s)</li> <li>c) manufacturer/calibration reference dipole data</li> <li>d) list of measured tissue dielectric parameters, ambient and tissue temperatures – check for consistency with values used in system manufacturer's reference test ( <math>\epsilon</math>, <math>\sigma</math> within 5% of those used in reference data)</li> <li>e) forward power input to the reference source/dipole</li> <li>f) target and measured peak and 1-g SAR (target usually given by SAR system supplier, or IEEE Std 1528) – agree within 10%</li> <li>g) at least one dipole test for each device frequency band</li> <li>h) dipole test results for each date of device testing</li> <li>i) dipole SAR plots included – check for reasonable symmetry</li> <li>j) system validation with head liquid OK for device testing in muscle</li> </ul> |          |
|    |                                                                                   | <p>8) <i>Phantom description</i></p> <ul style="list-style-type: none"> <li>a) include description of head (SAM) and body phantoms used in the tests, including shell thickness and other tolerances</li> <li>b) thickness <math>2 \pm 0.2</math> mm for head and body phantoms</li> <li>c) photos or z-axis scans to show 15 cm LIQUID DEPTH included?</li> <li>d) Phantom supporting structures and stands – phantom support structures should be spaced at least one device width away and non-metallic in transverse directions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |



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| OK | <input checked="" type="checkbox"/> | REVIEW ITEM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | COMMENTS |
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|    |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          |
|    |                                     | <p>9) <i>Tissue liquid dielectric properties</i></p> <ul style="list-style-type: none"> <li>a) Composition, ingredients, and amounts for tissue liquid listed</li> <li>b) liquid dielectric parameters and temperature measured at device mid-band frequencies</li> <li>c) liquid temperatures during SAR testing stay within <math>\pm 2^{\circ}</math> C</li> <li>d) check for consistency in liquid parameters in calibration, system verification, and device testing</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |
|    |                                     | <p>10) <i>Device positioning</i></p> <ul style="list-style-type: none"> <li>a) includes description of the handset holder or similar fixtures used to position the test device in the specified test configurations</li> <li>b) holder must not surround, enclose, cover, or obstruct antenna</li> <li>c) describes the positioning procedures used to evaluate the highest exposure expected under normal operating configurations</li> <li>e) diagrams or photos showing device positions with respect to the phantom; including separation distances and angles as needed, if regular touch and tilt positions not achievable; diagrams should clearly show reference points/lines/planes on EUT and phantom</li> <li>f) description of the antenna operating positions, extended, retracted or stowed etc. and the configurations tested in the SAR evaluation</li> <li>g) Body – prefer 1.5 cm, may allow 2.5 cm (Suppl C) spacing from flat phantom</li> </ul> |          |
|    |                                     | <p>11) <i>Coarse-scan to find SAR peaks</i></p> <ul style="list-style-type: none"> <li>a) descriptions of coarse area scan procedures, including grid size, area shape and size</li> <li>b) descriptions of interpolation procedures used to locate peak SARs at a finer spatial resolution</li> <li>c) specify which peak SAR location(s) were used to evaluate max 1-g SAR(s)</li> <li>d) report probe tip distance to phantom inner surface</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |
|    |                                     | <p>12) <i>One-gram averaged SAR</i></p> <ul style="list-style-type: none"> <li>a) descriptions of high-resolution cube volume or “zoom” scan procedures used for local scan; list measurement and interpolation resolutions</li> <li>b) descriptions of extrapolation procedures used to estimate SAR values adjacent to phantom surface (unreachable due to probe case and boundary effects)</li> <li>e) descriptions of within-cube interpolation procedures to get 1 mm or 2 mm SAR grid</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |



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|    |  | f) description of averaging (integration) procedures to get 1-g SAR from final interpolated grid<br>g) entire "hot spot" captured?<br>h) Check for "peak outside scan area" conditions – no clipped peaks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |
|    |  | <i>13) Total measurement uncertainty (MUST BE REPORTED – BUT "NOMINAL" REVIEW ONLY UNTIL IEEE Std 1528 IS COMPLETED)</i><br><br>a) a tabulated list of the error components and uncertainty values contributing to the total measurement uncertainty (Suppl C App. D)<br>b) reporting the combined standard uncertainty and expanded uncertainty (for $k=2$ ) of each test – 30% or less expected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |
|    |  | <i>14) Test results required for determining SAR compliance</i><br><br>a) Prefer that all SAR plots are included<br>b) if the channels tested for each configuration (left, right, cheek, tilt/ear, extended, retracted etc.) have similar SAR distributions, a plot of the highest SAR for each test configuration should be sufficient; otherwise additional plots should be included to document the different SAR distributions – purpose is to identify peak locations relative to device and phantom<br>c) all measured SAR values should be reported in a tabular format for all test configurations, i.e., low/mid/high frequencies, antenna in/out, flip cover open/closed; repeat of these for all battery and belt-clip/holster types; repeat of these for all modes (AMPS, CDMA-800, PCS)<br>d) hand SAR typically not needed<br>e) check crest factor (examples TDMA=3, GSM=8, CDMA=1, iDEN/data=1.44, iDEN/2-way=6, iDEN/TDMA=3, AMPS=1, GPRS=4, etc.); use whatever inverse-duty-factor ratio is appropriate for EUT maximum "on-time"<br>f) repeat for all batteries, belt-clips, other metallic accessories etc<br>g) accessories with metal must be tested; test not required for accessories that have no metal and provide larger spacing to body |          |
|    |  | <i>15) Plots – quantity and content</i><br><br>a) Crest factor correct?<br>b) date of test on all plots<br>c) Liquid parameters listed (typically $\rho = 1$ )<br>d) Device description and position (touch/tilt, body)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |



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|    |                                                                                   | <ul style="list-style-type: none"><li>e) Ambient and liquid temperatures</li><li>f) Antenna position</li><li>g) Frequency channel</li><li>h) Numeric values used to get avg SAR (optional)</li><li>i) Peak and average SAR values and locations indicated</li><li>j) Phantom used (optional)</li><li>k) z-axis scan at max SAR location</li><li>l) show relative location of hot spot on device, or outline of device on plot</li><li>m) PLOTS MUST SHOW PROBE FACTORS (e.g., ConvF)</li></ul> |          |