

SAR Tests in Mouth and Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. It has been known for some time that there are SAR measurement difficulties in these regions of the SAM phantom. SAR probes are calibrated in tissue-equivalent liquids with sufficient separation between the probe sensors and nearby physical boundaries to ensure scattering does not affect probe calibration. When the probe tip is moved into tight regions with multiple boundaries surrounding its sensors, probe calibration and measurement accuracy can become questionable. In addition, these measurement locations often require a probe to be tilted at steep angles, where it may no longer comply with calibration requirements and measurement protocols, or satisfy the required measurement uncertainty. In some situations it is not feasible to tilt the probe or rotate the phantom, as suggested by measurement standards, to conduct these measurements.

In order to ensure there is sufficient conservativeness for ensuring compliance until practical solutions are available, additional measurement considerations are necessary to address these technical difficulties. When measurements are required near the mouth, nose, jaw or similar tight regions of the SAM phantom, area or zoom scans are often unable to fully enclose the peak SAR location as required by IEEE 1528 and Supplement C, due to probe orientation and positioning difficulties. Even when limited measurements are possible, the test results could be questionable due to probe calibration and measurement uncertainty issues. Under these circumstances, the following procedures apply:

The SAR required in these regions of SAM should be measured using a flat phantom.

- Rectangular shaped phones should be positioned with its bottom edge positioned from the flat phantom with the same distance provided by the cheek touching position using SAM. The ear reference point (ERP, as defined for SAM) of the phone should be positioned $\frac{1}{2}$ cm from the flat phantom shell.
- Clam-shell phones should be positioned with the hinge against a smooth edge of the flat phantom where the upper half of the phone is unfolded and extended beyond the phantom side wall. The lower half of the phone is secured in the test device holder at a fixed distance below the flat phantom determined by the minimum separation along the lower edge of the phone in the cheek touching position using SAM. If there is substantial variation in separation distance along the lower edge of a clam-shell phone when placed in the cheek touching position using SAM, the FCC

Laboratory may be contacted for additional guidance to position the phone for testing.

The flat phantom data should allow test results to be compared uniformly across measurement systems, until suitable solutions are available in measurement standards to address certain probe calibration and positioning issues, due to implementation differences between horizontal and up- right SAM configurations. These flat phantom procedures are only applicable to stand-alone SAR evaluation in tight regions of the SAM phantom, where measurement is not feasible or test results can be questionable due to probe calibration and accessibility issues. Details on device positioning and photos showing how separation distances are determined should be included in the SAR report. SAR for other regions of the head must be evaluated using SAM; therefore, a phone with antennas at different locations may require flat and SAM phantom evaluation for the different antennas. When simultaneous transmission SAR evaluation is necessary in these regions of SAM and until practical solutions are available, the FCC Laboratory should be contacted for interim guidance.

Test Result:

The following table lists the **Mouth/Jaw** SAR result with EUT positioned at the separation distance along the lower edge of the phone defined in the cheek touching position using SAM. SAR distribution plot is provided in Appendix A. Detailed setup photos with the separation distance are illustrated in Appendix B.

Test Channel:	PCS- channel 600
Test Position	SAR Result
Mouth	0.721 mW/g
Head - Right Touch	0.922 mW/g

Test Conclusion:

EUT complies with the RF radiation exposure limits of the FCC.