



RF Exposure Procedures

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Note: The views expressed in this presentation are those of the author and may not necessarily represent the views of the Federal Communications Commission



Overview

- Capacitive Proximity Sensors and Corners/Vertex SAR
- Fast SAR/Vector Measurement Based Systems (VMBS)



Capacitive Proximity Sensors and Corner/Vertex SAR (1)

- Capacitive proximity sensors have been used for several years in a variety of form factors (Handsets, Phablets, Laptops, Tablets, etc.) as part of power reduction mechanisms
- Methods for verifying sensor triggering distance and tilt angle have been established in FCC KDB Pub. 616217 for several years
- Similarly, the procedures for testing SAR for devices with antennas in the corner(s) of the device have been in place for several years



Capacitive Proximity Sensors and Corner/Vertex SAR (2)

- No major issues/problems/complaints have been identified with the existing procedures
- **New Guidance:** As such, devices that utilize capacitive proximity sensors and/or have antennas in the corner, that follow the guidance in established KDB Publications, will no longer require a pre-testing KDB Inquiry or a PAG
- Devices that utilize other sensors to reduce power (Infrared, Ultrasound, G-sensors) will still require a PAG, unless an exception is provided by other guidance



Capacitive Proximity Sensors and Corner/Vertex SAR (3)

- TXSENS item in the PAG list has been modified
- Footnote 7 removed
- Old TXSENS item:
 - When proximity, device tilt, movement detection or other sensing features are used to reduce the transmit power; additional guidance shall be followed for specific implementations⁶ and for testing (KDB Publication 616217)⁷.



Capacitive Proximity Sensors and Corner/Vertex SAR (4)

- New TXSENS item:
 - When proximity, device tilt, movement detection or other sensing features are used to reduce the transmit power, with the exception of devices that implement capacitive proximity sensors for power reduction and apply the guidance found in KDB Publication 616217 for sensor verification and testing.
 - For devices that use Hall effect or gravity sensors the following guidance must be applied to determine lid angle where power reduction occurs, by taking power measurements at each step:
 - i. From the lid in closed mode (0 degrees), open the screen in 10 degree steps until laptop mode is obtained
 - ii. Lower the screen by 5 degrees increments to verify that the “closed mode” is triggered
 - iii. From the position of the previous step, open the screen in 1 degree increments until laptop mode is triggered again
 - iv. Continue opening the screen in 1 degree increments until at least 5 degrees past where laptop mode was obtained, then continue opening the screen in 10 degree steps until the device switches to tablet mode
 - v. Reverse the previous procedure to go from tablet mode back down to closed mode



Capacitive Proximity Sensors and Corner/Vertex SAR (5)

- TXSENS item in PAG Reuse List has been modified
- Footnote 14 deleted
- Old PAG Reuse TXSENS item:
 - TXSENS Reuse is permitted only for Power reduction for convertible laptops utilizing Hall effect or G-sensors, under PAG item TXSENS.¹⁴



Capacitive Proximity Sensors and Corner/Vertex SAR (6)

- New PAG Reuse TXSENS item:
 - TXSENS Reuse is permitted only for Power reduction for convertible laptops utilizing Hall effect or G-sensors, under PAG item TXSENS.
 - Reuse is only applicable for convertible laptops whose screen rotates around one axis, from 0 degrees to 360 degrees, in a clamshell style, i.e., from closed mode, to open mode, to “tent” mode, and finally to tablet mode. As compared to the original PAG, the new device must use the same sensor hardware, while the actual screen lid angles where power reduction triggering occurs, and the amount of power reduction, may differ.



Fast SAR/Vector Measurement Based Systems (VMBS) (1)

- Continued work ongoing in IEC/IEEE standards committees and working groups
- Preliminary testing plans for comparative SAR/Vector testing between various measurement systems have been discussed
 - Laboratory testing has been limited due to ongoing Covid-19 restrictions



Fast SAR/Vector Measurement Based Systems (VMBS) (2)

- Communication with other regulatory agencies has been ongoing to enable acceptance of VMBS for full compliance testing
- Guidance from previous FCC presentations at TCB Workshop is still applicable
 - Allowed for pre-scan test reduction measurements for 2G/3G technology
 - Final tests to demonstrate compliance should be done on a traditional SAR measurement system



Questions?

Thank You!