

## Assessing the progression of metal concentrations in plastic components and printed wiring boards of end-of-life mobile cell phones

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**Abstract.** This study assessed the progression of Pb, Cd and Cr concentrations in plastic components (PCs) and printed wiring boards (PWBs) of 59 end-of-life (EoL) mobile phones (MPs) produced between 2000 and 2015 by two leading original equipment manufacturers (OEMs) patronized by Nigerians. This was done to study the behavior of OEMs in complying with some widely acceptable regulations. Metals in PCs and PWBs of MPs were extracted following EPA 3050B method and extracts were analyzed using atomic absorption spectrophotometry technique. Furthermore, Toxicity Characteristic Leaching Procedure (TCLP) test was conducted on selected samples to assess metal leachability in landfill conditions. Summary of results (mg/kg) for PCs and PWBs for MPs produced by OEM 1 and OEM 2 in brackets ranged thus: PCs, Pb: 5.00 –195 (LOD-1750), Cr: LOD-6050 (LOD-2170) and Cd: LOD-1.00 (LOD-5.75) while PWBs, Pb: 129-9750 (5.00-12125), Cr: LOD-5488 (LOD- 4000) and Cd: LOD-1.00 (0.25-1.00). There were no regular trends for all metals for both OEMs. Results suggest that a greater percentage of MPs produced till 2015 contained Pb and Cr higher than RoHS and TTLC limits. Furthermore, 50% of TCLP extracts contain Pb higher than EPA limit of 5 mg/L. Therefore, EoL MPs arising in Nigeria should be handled as hazardous materials.

*Keywords:* mobile phone; toxic metals; plastic component; printed wiring board; progression.

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