

Evaluation of a Near Field Scanner for TRP and Radiation Pattern Measurements of GSM Mobile Phones

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Abstract:

The rapid growth of the mobile phone industry has resulted in a demand, of not only highly efficient, but also multifunctional mobile phones in bulk quantity. Due to this demand, rapid testing of the radio performance of every mobile phone has become a challenge to the manufacturers.

The radio performance of the mobile phone depends on its antenna and it needs to be tested both during the design and the production phases. Currently, devices like anechoic chambers [1], the Wheeler cap [2], reverberation chambers [3], etc. are available to test the radio performance of small antennas. Even though these methods are accurate and repeatable, using them for testing the radio performance of integrated, miniaturized and MIMO antennas during the design and production phases of a mobile terminal may become difficult and time consuming.

According to the standard bodies CTIA and 3GPP [4, 5], the figures of merit Total Radiated Power (TRP) and Total Receiver Sensitivity (TRS) should be used to evaluate the radio performance of terminal antennas. Hence, the radio performance of the mobile phone should be expressed in TRP or TRS irrespective of the device used for testing.

In order to quickly find an accurate estimate of TRP “Lab Express_Near Field Scanner”, [6] has been developed by EMSCAN. This device claims to be capable of accurately measuring the transmit radio performance of a mobile phone antenna in less than 5 seconds for a single GSM channel. The Lab Express is a solid state near field scanner with dimensions 22x30x7 cm. It has an array of probes to capture the electric- (E), and magnetic-field (H) vectors from the device under test (DUT).

In this paper, a near field scanner from EMSCAN is used to measure the radio performance of 10 commercial mobile phones in terms of TRP and radiation patterns. The obtained results for the mobile phones are compared with the measured results of the same phones using a CTIA approved Satimo SG24 [7] anechoic chamber. An attempt is also made to test the dependency of the measured radiated power on the positioning of the mobile phone on the near field scanner.

References:

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