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Performance Evaluation of BTS Radiation for SP's in Khartoum, Sudan

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Abstract: ***The effect of electromagnetic radiation on human health is the subject of recent interest and study. ICNIRP (International Commission on Non-Ionizing Radiation Protection) study has concluded that the exposure levels due to cell phone base stations are generally around one-ten-thousand of the guideline levels. Moreover, the WHO has classified mobile phone radiation on the IARC (International Agency for Research on Cancer) scale into Group 2B – possibly carcinogenic to humans. That means that there could be some risk. On the other hand, telecom service providers are worried about QoS (quality of service) of mobile services after implementation of stricter norms regarding cell tower radiations. This paper presents the Comparative Analysis of Base Transceiver Station (BTS) Effects on the object Body in Khartoum, Sudan This was achieved using the measured and calculated values of power density.***

Keywords: Cell tower radiation, Compliance Distance, ICNIRP, QoS.

1. Introduction

Cell phone technology has grown exponentially in the last decade. Large number of BTSs/towers is to be deployed to meet the communication demand. Presence of large number of cell phone towers in populated area starts the debate on biological impact of cell tower radiation. Most of the countries has adopted the radiation norms as suggested by the ICNIRP.As per the ICNIRP, the value of power density at general public exposure zone should be less then f/200 watt/m^2 for 400-2000 MHz band. Here f is the frequency used by the mobile operator in Mhz. the next section handle methods, section three involved results and discussions and section 4 conclude the paper.

2. Method

Power density is considered to evaluate the performance of BTS for three different SP's(service providers) in Khartoum, Sudan through comparing calculated data and measured data using EMF Estimator and NADRA respectively the table which is shown below describe the difference also MATLAB programming language to show the result in graphical form

Table 1: Power density with respect to the distance from base station antenna for A service provider (W/m2)

Distance From Base Station Antenna (Metres)	P=33W G=5dB Power Density for A service provider (W/m^2)	
	Measured	Calculated
10	0.074	0.0831
20	0.018	0.0207
30	0.0078	0.0092
40	0.0041	0.0052
50	0.0028	0.0033

Table 2: Power density with respect to the distance from base station antenna for B service provider (W/m2)

Distance From Base Station Antenna (Metres)	P=66.7W G=5dB Power Density for B service provider (W/m^2)	
	Measured	**Measured**
10	0.18	0.18
20	0.035	0.035
30	0.017	0.017
40	0.009	0.009
50	0.0054	0.0054

Table 3: Power density with respect to the distance from base station antenna for C service provider (W/m2)

Distance From Base Station Antenna (Metres)	P=100W G=5dB Power Density for C service provider (W/m^2)	
	Measured	Measured
10	0.28	0.28
20	0.054	0.054
30	0.023	0.023
40	0.016	0.016
50	0.0091	0.0091

3. Result and Discussion

Measured and calculated value of power density for three service provider in Khartoum, Sudan is passed through MATLAB program to fetch the result and the result are shown in figure 1,2 and 3

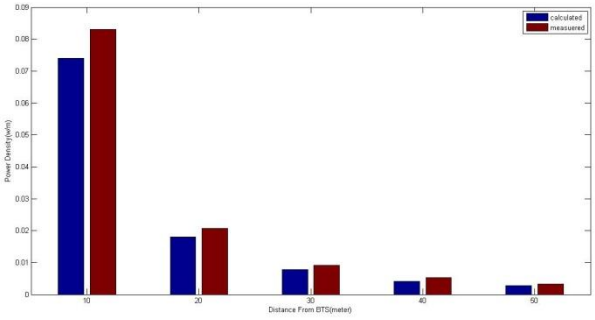

Figure 1: Power density for A Khartoum, Sudanese service provider

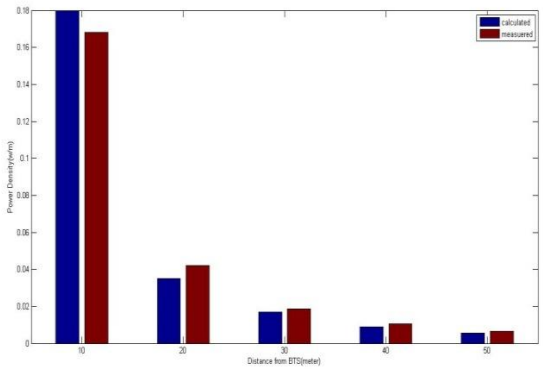

Figure 2: Power density for B Khartoum, Sudanese service provider

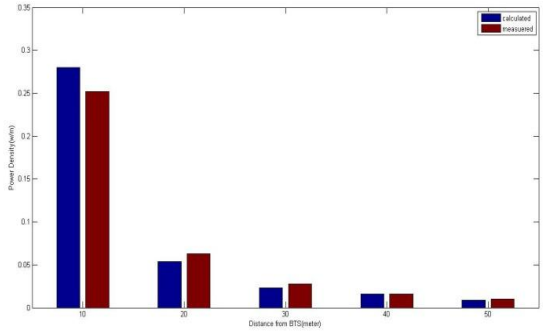

Figure 3: Power density for C Khartoum, Sudanese service provider

From the above figures we found that the amount of radiation in BTS is fewer than expected value and it make sense when the object's near from BTS the value of received radiation could be more than the radiation of the far one, result show that service provider C is the best one cause the measured value near to the calculated one.

4. Conclusion

The maximum radiating power of base station antennas in Khartoum, Sudan is in the region of 100Watts, and power density at the immediate vicinity of the antenna exceeds ICNIRP exposure guideline of **0.1w/m^2**. The performance Evaluation Of BTS Radiation For Service Provider In Khartoum, Sudan done through EMF estimator and NARDA instrument to calculate and measured the value of radiation from BTS respectively through power density at several distance from BTS for three service provider A,B and C and we found that C is the best one from accuracy point of view.

References

[1] Boteler D.H and Pirjola R.J; The Complex-Image Method For Calculating The Magnetic And Electric Fields Produced At The Surface of The Earth By The Auroral Electrojet,
[2] Geophys J.Int, 1998. J, February 2012.
[3] Sabah H, Saeid A; Theoretical Estimation of Power Density Levels around Mobile Telephone Base Stations, Journal of Science & Technology, 2008.
[4] Miodrag M, Anamarija J, and Miroslav P; Electric and Magnetic Fields in Vicinity of Overhead Multi- Line Power System, November 2008.
[5] Boniface O. A and Udochukwu B. A; Electromagnetic Wave Effect on Human Health: Challenges for Developing Countries, CEPA, 2012.