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Report On

RF Exposure Assessment of the
IP Access Ltd.
2G EDGE Picocell Base Station (1900MHz)

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DATED

05 May 2009

This report has been up-issued to Issue 2 to include the FCC Accreditation number and the calculation was updated to accommodate a 0dBi gain.



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CONTENTS

Section	Page No
1	REPORT SUMMARY 2
1.1	Introduction 3
1.2	Brief Summary of Results 4
1.3	Product Information 5
1.4	Summary 5
2	TEST DETAILS 6
2.1	Rationale for Assessment of the RF Exposure 7
2.2	Defined Limits 8
2.3	Establishing Wavelength and 1/4 Wavelength 8
2.4	Far Field Calculations 9
2.5	Field Regions 9
3	FIGURES 10
3.1	Field Representations: American – FCC Limits 11
4	DISCLAIMERS AND COPYRIGHT 13
4.1	Disclaimers and Copyright 14



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SECTION 1

REPORT SUMMARY

RF Exposure Assessment of the
IP Access Ltd.
2G EDGE Picocell Base Station (1900MHz)



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Exposure Assessment of the IP Access Ltd. 2G EDGE Picocell Base Station (1900MHz) to the requirements of the applied test specifications.

Objective	To perform RF Exposure Assessment to determine the Equipment Under Test's (EUT's) compliance of the applied rules.
Applicant	IP Access Ltd.
Manufacturing Description	2G EDGE Picocell Base Station (1900MHz)
Model Number(s)	nanoBTS 165H
Serial Number(s)	00075129
Hardware Version	A
Software Version	1

Test Specification/Issue/Date

1. OET Bulletin 65 Edition 97-01 August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
2. Radio communications (Electromagnetic Radiation – Human Exposure) Standard 2003

Related Document(s)

3. FCC Guidelines for Evaluating exposure to RF Emissions - 47 CFR § 1.1310; 47 CFR § 1.1307(b).
4. IEEE Std C95.1-2005: IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3KHz to 300GHz.



1.2 BRIEF SUMMARY OF RESULTS

1.2.1 General Public Exposure Levels

Antenna Gain (Numeric)	Peak Output Power (mW)	Field	Calculated RF Exposure at 0.200 m (20.0cm)	General Public Exposure Limit	Application
1	2000	S	0.3979 mW/cm ²	1.00 mW/cm ²	FCC 47 CFR § 1.1310
		E	38.730 V/m	N/A V/m	FCC 47 CFR § 1.1310
		H	0.1027 A/m	N/A A/m	FCC 47 CFR § 1.1310

The calculations have shown that they **meet** the General Public Exposure Levels described in the FCC 47 CFR § 1.1310 Guidelines limits at **20.0 cm**, the point of investigation.

1.2.2 Occupational Exposure Levels

Antenna Gain (Numeric)	Peak Output Power (mW)	Field	Calculated RF Exposure at 0.200 m (20.0cm)	Occupational Exposure Limit	Application
1.445	2000	S	0.3979 mW/cm ²	5.00 mW/cm ²	FCC 47 CFR § 1.1310
		E	38.730 V/m	N/A V/m	FCC 47 CFR § 1.1310
		H	0.1027 A/m	N/A A/m	FCC 47 CFR § 1.1310

The calculations have shown that they **meet** the Occupational Exposure Levels described in the FCC 47 CFR § 1.1310 Guidelines limits at **20.0 cm**, the point of investigation.



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1.3 PRODUCT INFORMATION

1.3.1 Attestation

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 MHz) - General public. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s)

1.3.2 Technical Description

The Equipment under test was a IP Access Ltd. 2G EDGE Picocell Base Station (1900MHz). A full technical description can be found in the manufacturer's documentation.

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields (10 MHz - 300 MHz) - General public. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s).

All reported calculations were carried out on the relevant information supplied or measured of a sample of 2G EDGE Picocell Base Station (1900MHz) to demonstrate compliance with the applied test specification(s) the sample assessed was found to comply with the requirements of the applied rules.

1.4 SUMMARY

The RF exposure assessment is based upon the following criteria:

The 2G EDGE Picocell Base Station (1900MHz) operates in the frequency range of

GSM1900: 1850 – 1910MHz / 1930 – 1990 MHz

WCDMA FDD1: 1920 – 1980 / 2110 – 2170 MHz

WCDMA FDD2: 1850 – 1910 / 1930 – 1990 MHz

The numeric gain of the 2G EDGE Picocell Base Station (1900MHz) is .

The 2G EDGE Picocell Base Station (1900MHz) radio power is a maximum 2000 milliwatts.

The point of investigation is 20 cm (0.2m)

The antenna gain is 0.0 dBi.



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SECTION 2

TEST DETAILS



2.1 RATIONALE FOR ASSESSMENT OF THE RF EXPOSURE

The aim of the assessment report is to evaluate the compliance boundary for a set of given input power(s) according to the basic restrictions (directly or indirectly via compliance with reference levels) related to human exposure to radio frequency electromagnetic fields.

The chosen assessment method to establish the compliance boundary in the far-field region is the reference method as defined in BS EN50383:2002 Clause 5.2; E-field or H-field calculation. The method of calculation used is defined in BS EN50383:2002; Clause 8.2.2, 8.2.3 and 8.2.4. The calculated values have been compared with limits provided in the ICNIRP guidelines. Calculations can be made in three separate regions, based on distance from the antenna. These are called:

- far-field region,
- radiating near-field region,
- reactive near-field region.

The theory that defines these regions is given in EN50383:2002 Annex A.

Far-field region

As shown in EN50383 Annex A, the far-field calculations are accurate when the distance, r , from an antenna of length D to a point of investigation is greater than

$$r = \frac{2D^2}{\lambda}$$

Where, r is the distance from the antenna to the point of investigation.

Radiating near-field region

The radiating near-field region of an antenna of length D as shown in EN50383 Annex A, this region is defined by

$$\frac{\lambda}{4} < r < \frac{2D^2}{\lambda}$$

Reactive near-field region

The reactive near-field region of an antenna as shown in EN50383 Annex A, this region is defined by

$$r \leq \frac{\lambda}{4}$$

Where, r is the distance from the antenna to the point of investigation.

Recommend $\lambda/4$ as the boundary between the radiated near-field and reactive near-field for RF exposure compliance assessment.



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2.2 DEFINED LIMITS

Normative Reference

The defined limits are in accordance with 47 CFR § 1.1310 Radiofrequency radiation exposure limits.

Reference levels for general public exposure to time-varying electric and magnetic fields (unperturbed rms values)

At 1930.000 MHz

Power density (mWcm ²)	= 1.00	FCC 47 CFR § 1.1310
E-Field (Vm-1)	= N/A	FCC 47 CFR § 1.1310
H-Field (Am-1)	= N/A	FCC 47 CFR § 1.1310

Reference levels for occupational exposure to time-varying electric and magnetic fields (unperturbed rms values)

At 1930.000 MHz

Power density (mWcm ²)	= 5.00	FCC 47 CFR § 1.1310
E-Field (Vm-1)	= N/A	FCC 47 CFR § 1.1310
H-Field (Am-1)	= N/A	FCC 47 CFR § 1.1310

2.3 ESTABLISHING WAVELENGTH AND 1/4 WAVELENGTH

Frequency (MHz)	$\lambda = \frac{3 \times 10^8}{f}$		$\frac{\lambda}{4}$	
	m	cm	m	cm
1930.000	0.1554	15.54	0.0389	3.89
1960.000	0.1531	15.31	0.0383	3.83
1990.000	0.1508	15.08	0.0377	3.77



2.4 FAR FIELD CALCULATIONS

The following calculations are based on:

Worst case frequency 1930.000 MHz

P = 2 (Power (Watts)) or 2000 (Power milliwatts)

G = 1.0 (Numeric Gain) 0.0 dBi gain antenna

r = 20.0 (Distance (centimetres)) or 0.200 (Distance (meters))

The power flux:

$$S = \frac{PG(\theta, \phi)}{4\pi r^2} \quad S = 3.979 \text{ W/m}^2$$

$$S = 0.3979 \text{ mW/cm}^2$$

The electric field strength:

$$E = \frac{\sqrt{30PG(\theta, \phi)}}{r} \quad E = 38.730 \text{ V/m}$$

The magnetic field strength:

$$H = \frac{E}{\eta_0} \quad H = 0.1027 \text{ A/m}$$

The calculations meet the General Public Exposure Levels described in the FCC 47CFR§1.1310.

The calculations meet the Occupational Exposure Levels described in the FCC 47CFR§1.1310

2.5 FIELD REGIONS

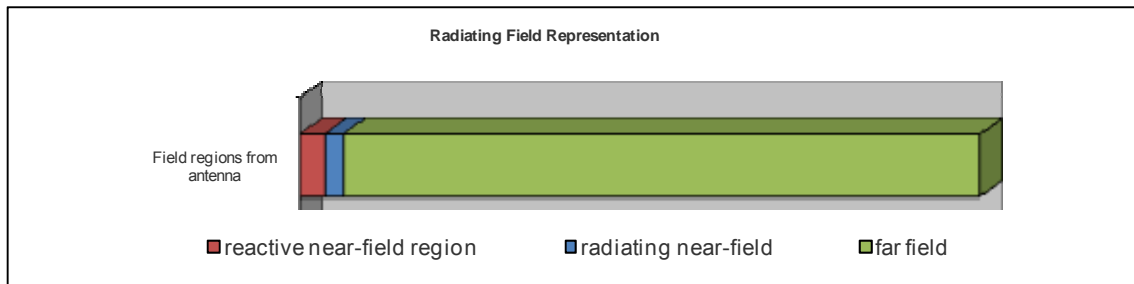


Figure 1 – Radiating field representation, not to scale.

The Reactive near-field region (from antenna) is less than : 0.039 m (3.886 cm)

The Radiating near-field region is greater than : 0.039 m (3.886 cm)

The Radiating near-field region is less than : 0.030 m (2.96 cm)

The Far-field region is greater than : 0.030 m (2.96cm)



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SECTION 3

FIGURES



3.1 FIELD REPRESENTATIONS: AMERICAN – FCC LIMITS

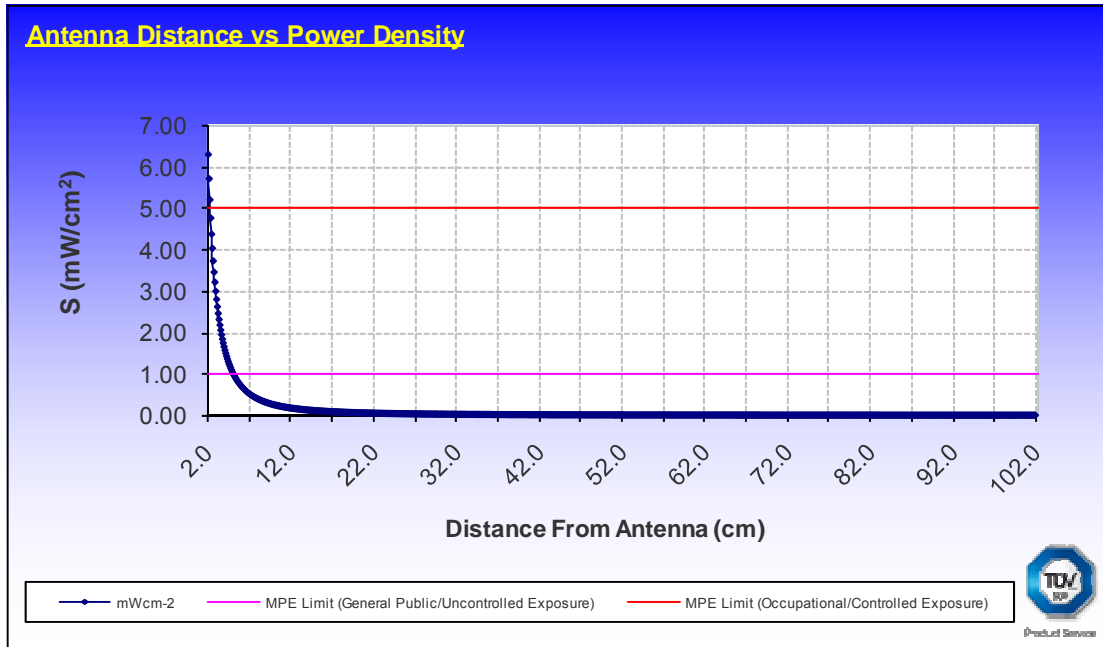


Figure 5 – This graph shows the S field (mW/cm²) strength value with regards to distance from the Antenna (cm).

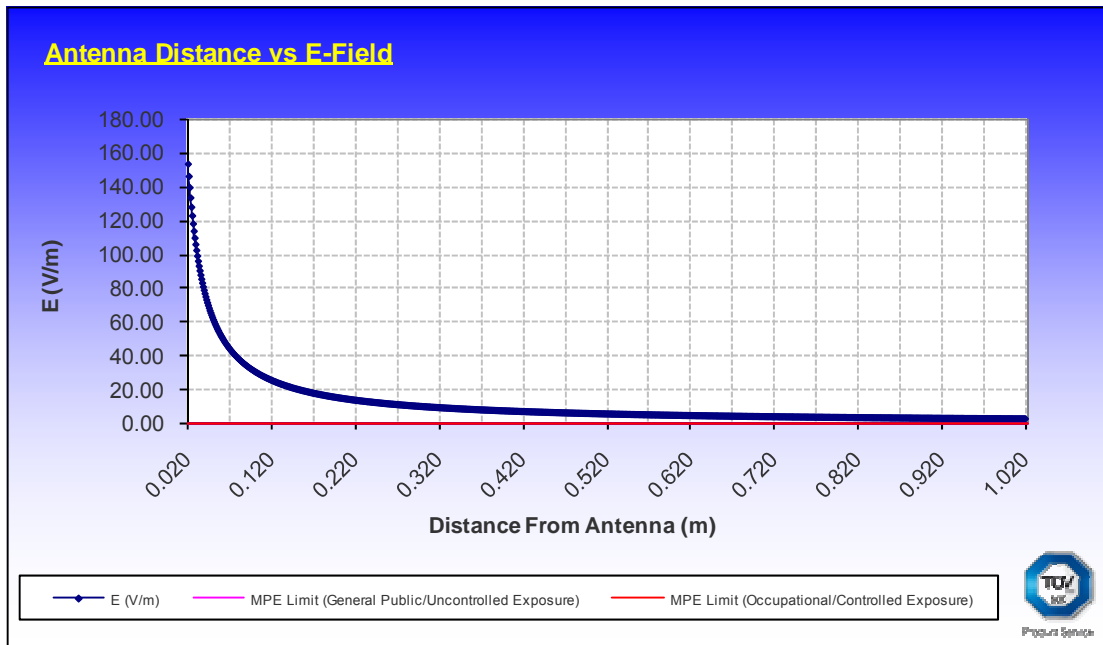


Figure 6 – This graph shows the E field (V/m) strength value with regards to distance from the Antenna (cm).

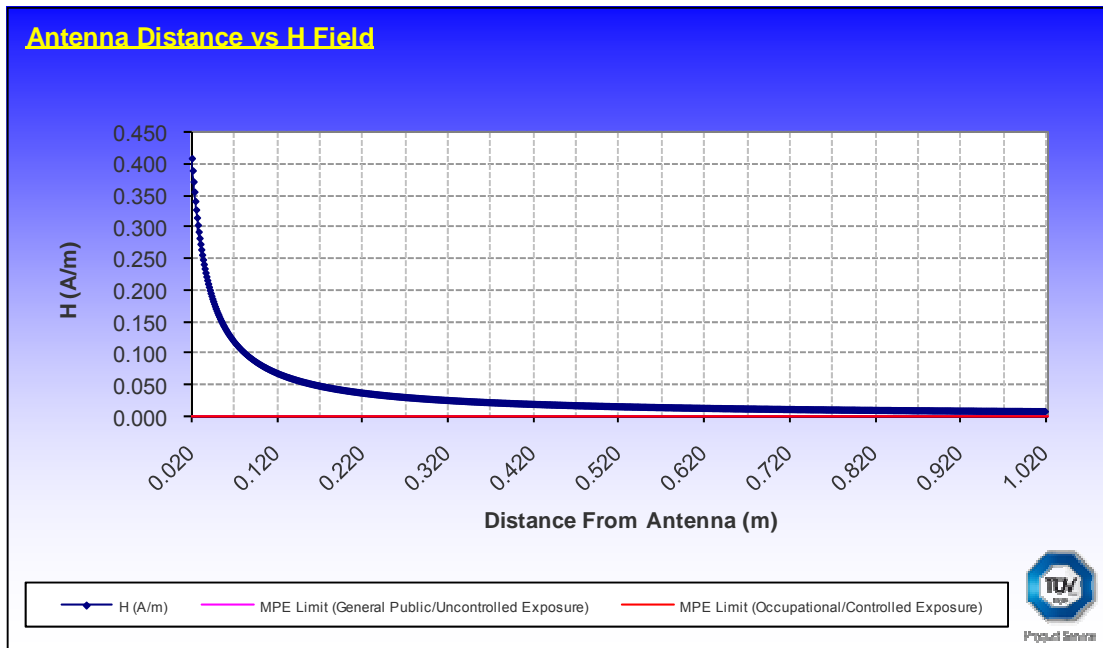


Figure 7 – This graph shows the H field (A/m) strength value with regards to distance from the Antenna (cm).



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SECTION 4

DISCLAIMERS AND COPYRIGHT



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4.1 DISCLAIMERS AND COPYRIGHT

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