INDOOR
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Electromagnetic Energy (EME) Report

Cnr Spencer Street and Regatta Road Five Dock NSW

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Document Control

Version Number	Comments	Issue Date
1	Original	20th July 2015

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1. Executive Summary

Two radiocommunication transmitters were found within a one kilometer radius from the proposed site. Maximum cumulative electromagnetic energy levels were within guideline levels for existing and proposed equipment at a 500m, 360^{o} radius and 1.5m above ground level of the radiocommunication transmitters. The proposed sites are approximately 554m and 555m away from the transmitters and it is unlikely that there is a human health risk.

2. Introduction

Indoor Environmental Solutions (IES) was commissioned by Mr Fady Elightany to undertake an electromagnetic report for the proposed site at the corner of Spencer Street and Regatta Road Five Dock NSW. The purpose of the assessment was for investigative reasons as part of a development application with the City of Canada Bay Council. IES is investigating the impact of electromagnetic radiation levels over the site emanating from radio communication transmitters.

2.1 City of Canada Bay Development Control Plan

City of Canada Bay states in their Development Control Plan (DCP) 2013, that 'Child Care Centres are not to be located within close proximity to mobile phone towers and base stations, transmission line easements or other sources of significant electromagnetic radiation.'

2.2 Limitations

This report and the associated services performed by Indoor Environmental Solutions (IES) are in accordance with the scope of services set out in the contract between IES and the Client. The scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

In preparing this report, IES has relied upon, and presumed accurate, certain information (or absence thereof) provided by government authorities, the Client and others identified herein. Except as otherwise stated in the report, IES has not attempted to verify the accuracy or completeness of any such information.

No warranty, undertaking, or guarantee, whether expressed or implied, is made with respect to the data reported or to the findings, observations, conclusions and recommendations expressed in this report. Furthermore, such data, findings, observations, conclusions and

recommendations are based solely upon existence at the time of the investigation. The passage of time, manifestation of latent conditions or impacts of future events (e.g. changes in legislation, scientific knowledge, land uses, etc) may require further investigation at the site with subsequent data analysis and re-evaluation of the findings, observations, conclusions and recommendations expressed in this report.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between IES and the Client. IES accepts no liability or responsibility whatsoever and expressly disclaims any responsibility for or in respect of any use of or reliance upon this report by any third party or parties. It is the responsibility of the Client to accept if the Client so chooses any recommendations contained within and implement them in an appropriate, suitable and timely manner.

3. Background Information

3.1 RF EME Definition

Electromagnetic energy (EME) is the energy stored in the electromagnetic field. It is part of our natural environment. There are also artificial sources of EME such as mobile phones and base stations. EME is non-ionising radiation, meaning it has insufficient energy to break chemical bonds or remove electrons (ionisation). Radiofrequency (RF) radiation, which is used mainly for communication purposes, is the transfer of energy by radio waves.[1]

3.2 RF EME Exposure

Exposure to sufficiently high levels of RF EME can heat biological tissue and potentially cause tissue damage. Damage results because the human body is unable to cope with excessive heat generated by very high RF exposure. Studies have shown that environmental levels of RF EME routinely encountered by the public, however, are far below the levels needed to produce significant heating and increased body temperature. [2]

[1] ARPNSA. Electromagnetic Energy and its effects. EME Series No.1 Fact Sheet. Australian Radiation Protection and Nuclear Safety Agency.
[2] ARPNSA. Electromagnetic Energy and its effects. EME Series No.1 Fact Sheet. Australian Radiation Protection and Nuclear Safety Agency.

4. Guidelines

4.1 Exposure Standard

Reference levels for general public exposure to electric and magnetic fields published by ARPANSA[3] have been referenced in Table 1. Table 1 shows the four exposure limits, which are equivalent values expressed in different units – volts per metre (V/m), watts per square metre (W/m^2), microwatts per square centimeter ($\mu W/cm^2$) and milliwatts per square metre (mW/m^2).

Table 1: Reference Levels for General Public Exposure to Electric and Magnetic Fields

Radio Systems	Frequency Band	Assessment Frequency	ARPANSA Exposure Limit (100% of Standard)			
			V/m	W/m2	$\mu W/cm^2$	mW/m^2
WCDMA850	870-890MHz	900MHz	41.1	4.50	450	4500
GSM900, WCDMA900	935 – 960MHz	900MHz	41.1	4.50	450	4500
GSM1800, LTE1800	1805-1880MHz	1800MHz	58.1	9.00	900	9000
WCDMA2100, UMTS2100	2110 -2170MHz	2000MHz	61.4	10.00	1000	10000

[3] Australian Radiation Protection and Nuclear Safety Agency (ARPNSA) (2002) Radiation Protection Standard 'Maximum Exposure Levels to Radiofrequency Fields – 3kHz to 300Ghz'

5. Electromagnetic Energy Levels

The closest railway lines are approximately 1.5km from the proposed site (calculated using the distance tool in SIXX Maps); it is unlikely that there is a health risk from this source. A search of the records from the Radio Frequency National Site Archive (RFNSA) was undertaken to identify all radiocommunication transmitters, within a one kilometer radius from the corner of Spencer Street and Regatta Road Five Dock, both existing and proposed which could potentially impact on the development site (Table 2). Two radio communication transmitters were found on the National Frequency National Site Archive within a one kilometer radius (approx.) from the proposed site. One of the sites is located on the first floor at 75 Parramatta and Harris Roads Five Dock (site number 2046009), with an approximate distance of 555m from the proposed site. The other site is located 49 Queens Road Five Dock (site number 2046013), with an approximate distance of 554m from the proposed site. Existing and proposed Radio systems at RFNSA site number 2046009 and 2046013 can be seen in Tables 2, 3 and 4.

Table 2: Radio Systems at RFNSA site 2046009

Carrier	Radio Systems
Telstra	GSM900, LTE1800, WCDMA850
Optus	GSM900, WCDMA900, LTE1800

Additional proposed radio systems at RFNSA site number 2046009 can be seen in Table 3.

Table 3: Additional Proposed Radio Systems at RFNSA site 2046009

Carrier	Radio Systems
Telstra	GSM900, LTE1800, WCDMA850
Optus	LTE1800, GSM900, WCDMA900

Table 4: Radio Systems at RFNSA site 2046013

Carrier	Radio Systems
Optus Vodafone Joint Venture	WCDMA2100

EME levels at different distances from the base station (site 22046009) for existing and proposed equipment can be seen in Table 5. Maximum electromagnetic energy (EME) levels were calculated at the site in 360º circular bands at a distance of 500m from the base station, at an elevation of 1.5m above ground level.

EME levels at different distances from the base station (site 22046013) for existing equipment can be seen in Table 6. There is no proposed equipment to be installed at the site. Maximum electromagnetic energy (EME) levels were calculated at the site in 360º circular bands at a distance of 500m from the base station, at an elevation of 1.5m above ground level.

Table 5: Maximum Cumulative EME Levels (All Carriers) at RFNSA site 2046009

Distance from the antennas at 49-75 Buffalo Rd in 360º circular bands	Maximum Cumulative EME Level – All Carriers					
	Existing Equipment			Existing and Proposed Equipment		
	Electrical Field V/m	Power Density mW/m^2	%ARPANSA exposure limits	Electrical Field V/m	Power Density mW/m^2	%ARPANSA exposure limits
0- 50m	10.42	287.78	4.28%	10.76	307.0	4.71%
50m- 100m	11.69	362.5	5.42%	11.97	380.34	5.82%
100m-200m	7.57	151.85	2.3%	7.73	158.48	2.45%
200m-300m	3.68	35.95	0.54%	3.74	37.055	0.56%
300m-400m	2.48	16.35	0.25%	2.51	16.76	0.25%
400m-500m	1.86	9.14	0.14%	1.88	9.36	0.14%
Maximum EME Level	11.69	362.5	5.42	11.97	380.34	5.82
	57.25m from the antennas AT 1ST Floor, 75 Parramatta/Harris Rds			57.25m from the antennas AT 1ST Floor, 75 Parramatta/Harris Rds		

Table 6: Maximum Cumulative EME Levels (All Carriers) at RFNSA site 2046013

Distance from the antennas at 49-75 Buffalo Rd in 360º circular bands	Maximum Cumulative EME Level – All Carriers
	Existing Equipment
	%ARPANSA exposure limits
0- 50m	0.08%
50m- 100m	0.15%
100m-200m	0.47%
200m-300m	0.35%
300m-400m	0.16%
400m-500m	0.089%
Maximum EME Level	0.47%
	160.44m from the antennas at 49 Queens Road

6. Discussion

The public limit exposure expressed as a percentage of the ARPANSA Standard public exposure limit is 100%. The maximum EME levels at base station 2046009 was 5.42% on existing systems and 5.82% with proposed alterations to the site. This was at a distance of 50m-100m from the base station. These levels were within the ARPANSA Standard exposure limit. Furthermore, distance loss is evident at 100m intervals from 100m to 500m from the base station, with levels dropping to 0.14% of the ARPANSA exposure limit at 400-500m from the base station (existing and proposed alterations). It is expected that exposure from base station 2046009 to the proposed site will be <0.14% of the exposure limit.

The maximum EME levels at base station 2046013 was 0.47% on existing systems. This was at a distance of 100-200m from the base station. These levels were within the ARPANSA Standard exposure limit. Furthermore, distance loss is evident at 100m intervals from 200m to 500m from the base station, with levels dropping to 0.089% of the ARPANSA exposure limit at 400-500m from the base station. It is expected that exposure from base station 2046013 to the proposed site will be <0.089% of the exposure limit.

Based on the above information, cumulative exposure from the two base stations is expected to be < 0.229% of the ARPANSA exposure limit, well within the 100% public exposure limit. It must be noted that the data contained within this report for base station 2046013 is based on a worst case scenario, with estimated levels calculated on the maximum mobile phone call and data capacity anticipated for the site. The estimation does not account for radio signal attenuation due to buildings and the general environment. The actual EME levels at base station 2046013 will most likely be significantly less than predicted due to path losses.

APPENDIX A: SITE COMPLIANCE CERTIFICATES

SITE COMPLIANCE CERTIFICATE

NSA SITE NO: 2046009 FIVE DOCK SAM'S AUTO

RF Human Exposure Limits

The Australian Radiation Protection And Nuclear Safety Agency (ARPANSA) has produced a standard for exposure to RF transmissions – ARPANSA Radiation Protection Standard 2002 Maximum Exposure Levels to Radio Frequency Fields – 3 kHz to 300 GHz (RPS3)

The Australian Communications and Media Authority (ACMA) has a Licence Condition Determination (LCD) that requires that the general public is not exposed to RF transmission levels exceeding the general public limits specified in the ARPANSA Standard (RPS3)

State and Commonwealth Occupational Health & Safety Acts require compliance with the limits and requirements of the ARPANSA standard (RPS3)

Compliance Statement

This site has been assessed and found to comply with the RF Human Exposure Limits as specified by the ACMA Licence Condition Determination (LCD) and requirements of the ARPANSA Standard (RPS3)

Access Control, RF warning signs (if required) and Safe Working Procedures are in place as detailed in the accompanying Radio Communications Site Management Book (RCSMB).

NATA Accreditation Number: 15500
This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17020

Issued under the Authority of:

Name: Bryon Dunkley-Smith

Signature:

Company: RADHAZ Consulting Pty Ltd
Designation: Training and Quality Manager

Date: 18/06/2013

Site Assessment Report No: 24436-02 Issue Date: 18/06/2013

RCSMB Issue No: 02 Issue Date: 18/06/2013

SITE COMPLIANCE CERTIFICATE

NSA SITE NO: 2046013 CANADA BAY -V

RF Human Exposure Limits

The Australian Radiation Protection And Nuclear Safety Agency (ARPANSA) has produced a standard for exposure to RF transmissions – ARPANSA Radiation Protection Standard 2002 Maximum Exposure Levels to Radio Frequency Fields – 3 kHz to 300 GHz (RPS3)

The Australian Communications and Media Authority (ACMA) has a Licence Condition Determination (LCD) that requires that the general public is not exposed to RF transmission levels exceeding the general public limits specified in the ARPANSA Standard (RPS3)

State and Commonwealth Occupational Health & Safety Acts require compliance with the limits and requirements of the ARPANSA standard (RPS3)

Compliance Statement

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Accredited for compliance with ISO/IEC 17020

Qualified NATA EME Signatory:

Name: Bryon Dunkley-Smith

Signature:

Company: RADHAZ Consulting Pty Ltd

Designation: Operations Manager

Date: 20/02/2013

Site Assessment Report No: 20041-02 Issue Date: 20/02/2013

RCSMB Issue No: 02 Issue Date: 20/02/2013