Radio Frequency Fields Assessment

Kingsbury Drive, Melbourne VIC 3086
for
La Trobe University

EMC Technologies Report No. M151238

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Radio Frequency Fields Assessment
Kingsbury Drive, Melbourne VIC 3086

Report Number: M151238

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Assessment Date: 11th March 2016

Applicable Standards:
and Methods of Measurement and computation – 3kHz to 300GHz.

Predictions and testing Performed by:
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1.0 INTRODUCTION

EMC Technologies was requested by La Trobe University to undertake a radio frequency (RF) fields assessment at five locations near Kingsbury Drive, Melbourne VIC 3086.

This independent assessment was performed to address the possible interference concerns from a proposed nearby Telstra base station.

The report provides predicted levels of Electromagnetic Fields within each location and also the actual measured level at these locations before installation of the Telstra tower. Each mobile phone band was considered in isolation as each transmits at a different frequency.

The threshold levels used come from the Australian Standards used to determine product susceptibility to Electromagnetic fields (AS/NZS 61326-1). This standard (refer to section 4.1) has thresholds of 1, 3 and 10 V/m.

2.0 EXECUTIVE SUMMARY

RF Field levels predicted at the five locations were found to be below 1 Volt per metre (V/m).

Using the EN61326-1:2013 standard, levels less than 1 V/m fall below immunity threshold requirements for sensitive laboratory Equipment

Predicted field Levels also fall below immunity threshold requirements for other listed standards in section 4.1 of this report
3.0 SCOPE OF THE PREDICTIONS

E-Field Level predictions were performed in the following mobile phone bands.

<table>
<thead>
<tr>
<th>System</th>
<th>Frequency Range (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>850 Downlink</td>
<td>869 - 894</td>
</tr>
<tr>
<td>1800 Downlink</td>
<td>1805 - 1880</td>
</tr>
<tr>
<td>700 Downlink</td>
<td>758 - 768</td>
</tr>
</tbody>
</table>

The electric field (E-Field) in units of volts per metre (V/m) were predicted. All measurements were performed in the far field which enabled the units to be converted from Power Density in milliWatts per centimetre squared (mW/cm²) to E-Field in Volts per metre.

4.0 THE AUSTRALIAN STANDARDS, REGULATIONS & DEFINITIONS

4.1 Reference Standards and Regulations

RF Field Measurements and Evaluations- Methodology
The Australian Standard AS/NZS 2772.2:2011 Radio Frequency Fields, Part 2: Principles and Methods of Measurement and computation – 3kHz to 300GHz, specifies techniques and instrumentation for the measurement of potentially hazardous electromagnetic sources. The predictions were performed in accordance with this standard.

AS 2834 – 1995 Computer Accommodation
This standard details with the design and installation of a computer installation. In section 3.4.1 of the standard in the frequency range 0.15 kHz to 11GHz.
2V/m: for the range 0.15 to 470 MHz
5V/m: 470 to 11,000 MHz

AS/NZS 60335 –1: 2002 including amendment 1
Household and similar electrical appliances
This standard specifies the radiated and conducted immunity test to be performed on electrical appliances where safety could be a hazard. The level for radiated is 10V/m in the frequency range 80MHz to 2.5GHz. The level for conducted is 10Vrms in the frequency range 0.15MHz to 80MHz.

AS/NZS 61000 –6-1: Generic standards
Immunity for residential, commercial and light industrial environments
Consumer equipment that is CE marked can be presumed to have an immunity level of up to 3 V/m.

EN 61326-1:2013 - Electrical equipment for measurement, control and laboratory use - EMC requirements Part 1: General requirements
Covers laboratory equipment immunity levels of 1, 3, and 10V/m
1 V/m covers sensitive equipment.
5.0 METHODOLOGY

5.1 Calculations

Electric field strength for each zone was calculated considering each transmit band individually. Diagrams showing electric field strengths are included in this report. Predictions were performed at a scan height of 8 to 12 metre above ground level (fourth floor). These calculations were performed using worst case representative heights for the buildings of interest.

An additional 10dB was included in all predictions to account for wall attenuation.

EMC Technologies EMRMap program was used to carry out predictions in this report.

5.1 Measurements

Onsite measurements were performed to measure the fields in the buildings of interest before the installation of the Telstra tower.

5.2 PREDICTION UNCERTAINTY

EMC Technologies has evaluated the equipment and the methods used to perform radiated electromagnetic field measurements. The estimated predicted uncertainties for the test shown within this report are as follows:

The uncertainty in the predicted and measured levels is (+/-3dB).

The above expanded uncertainties are based on standard uncertainties multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.
6.0  LOCATIONS OF INTEREST

Predictions were performed in four different locations away from the proposed building and one location inside the proposed building.

Point of interest locations were selected by La Trobe University.

The measurements were performed in the fourth floor except in LIMS2 building, it was performed in the sixth floor.

Map showing prediction Locations
7.0 RESULTS OF RF FIELDS PREDICTIONS

7.1 Plan at fourth floor (8m to 12m) 850 MHz

Levels Predicted at all locations are predicted at less than 1 V/m after adding wall attenuation
7.2 Plan at fourth floor (8m to 12m)  1800 MHz

Levels Predicted at all locations are predicted at less than 1 V/m after adding wall attenuation
7.3 Plan at fourth floor (8m to 12m) 700 MHz

Levels Predicted at all locations are predicted at less than 1 V/m after adding wall attenuation
7.4 Plan View 8m (All Technologies added)

Levels Predicted at all locations are predicted at less than 1 V/m after adding wall attenuation
7.5 Prediction Summary

<table>
<thead>
<tr>
<th></th>
<th>Expected E-field at 850 MHz Band V/m</th>
<th>Expected E-field at 1800 MHz Band V/m</th>
<th>Expected E-field at 700 MHz Band V/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS1</td>
<td>0.14 to 0.25</td>
<td>0.25 to 0.67</td>
<td>0.25 to 0.67</td>
</tr>
<tr>
<td>LIMS2</td>
<td>0.03 to 0.14</td>
<td>0.03 to 0.14</td>
<td>0.03 to 0.14</td>
</tr>
<tr>
<td>LIMS1</td>
<td>0.14 to 0.25</td>
<td>0.25 to 0.67</td>
<td>0.25 to 0.67</td>
</tr>
<tr>
<td>BS1</td>
<td>0.14 to 0.25</td>
<td>0.14 to 0.25</td>
<td>0.25 to 0.67</td>
</tr>
<tr>
<td>Agora</td>
<td>0.25 to 0.67</td>
<td>0.25 to 0.67</td>
<td>0.25 to 0.67</td>
</tr>
</tbody>
</table>

Note: 10 dB attenuation added to the result to account for the building attenuation.

7.6 Measurements

All measured levels, pre-installation of the tower, were less than 0.03 V/m (90 dBμV) refer to appendix B.
8.0 CONCLUSION

EMC Technologies was requested by La Trobe University to undertake a radio frequency (RF) fields assessment at five locations near Kingsbury Drive, Melbourne VIC 3086.

RF Field levels predicted at the five locations were found to be below 1 Volt per metre (V/m).

Using the EN61326-1:2013 standard for scientific equipment, levels less than 1 V/m fall below immunity threshold requirements for sensitive laboratory Equipment.

Predicted field Levels also fall below immunity threshold requirements for other listed standards in section 4.1 of this report.
9.0 Appendix A

Photo1 : PS1 Building - fourth floor (Room 425)

Photo2 : LIMS2 Building - fourth floor (Room 408)

Photo3 : LIMS1 Building - sixth floor (Room 606)

Photo4 : BS1 Building - fourth floor (Room 440)

Photo5 : Agora
10.0 Appendix B