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FAO Mr Frank Stocks

LONDON BOROUGH OF HARROW ENVIRONMENTAL SERVICES		DES
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PLANNING SERVICES		FP
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Monday, 22 November 2004

Dear Mr Stocks

**Electromagnetic Survey – 102 High Street, Harrow on the Hill**

I am pleased to enclose my colleague's latest survey of the area. You will recall that this survey follows on from a survey done earlier in the year during which local residents were concerned that an Orange microcell located on the face of 102 High Street might not have been operational.

As before, the survey was done using equipment that measures the combined effect of all electromagnetic fields in the frequency range 100kHz to 3000MHz. This range encompasses the frequencies used by all the mobile phone networks as well as the frequencies used by a great many other radio systems.

Pages 7 and 8 attached show the change in levels recorded since the first survey. In all cases, the changes are small and are of the order that would be expected for surveys done at different times in a location where the overall electromagnetic radiation levels have remained fairly constant. The small differences measured may be accounted for by:

- Differing transmitter power levels from the base stations
- Minor differences in measurement locations
- Different contributions from other transmitters (mobile phones, taxi cab radios etc).

The key point to observe is that exposure levels in all cases are well within the international guideline levels.

One further observation is that although the levels vary from place to place and time to time, it would be wrong to assume that the varying levels of exposure relate in some way to varying risks. I am aware of no widely-accepted risks to health at the levels we have measured (i.e. levels below the relevant international guidelines).

I hope this is helpful.

Yours sincerely

Richard Newstead MIEE

## **ICNIRP Compliance Assessment of the mobile phone installations located at No.102 High Street, Harrow-on-the-Hill, London.**

### **Summary:**

The mobile phone Base Station emissions measured during this and the first survey easily comply with the International Commission for Non-Ionising Radiation Protection (ICNIRP) guidelines.

The highest level of the total electromagnetic power density measured in either this or the first survey at No.100 High Street was only 0.0006 Watts per square metre ( $\text{W/m}^2$ ). This level is more than 16,600 times below the ICNIRP maximum permitted public guideline value of  $10 \text{ W/m}^2$  set for the frequencies used by the operator 3 and 15,000 times below the  $9 \text{ W/m}^2$  set for the frequencies used by Orange.

The level of the total electromagnetic power density measured at a window within a flat more remote from the installation was only  $0.0017 \text{ W/m}^2$ . This value is more than 5,800 times below the ICNIRP maximum permitted public guideline value of  $10 \text{ W/m}^2$  set for the frequencies used by 3 and more than 5,200 times below  $9 \text{ W/m}^2$  set for the frequencies used by Orange.

The highest value of the total electromagnetic power density measured within the surrounding area at street level was  $0.0035 \text{ W/m}^2$ . This value is more than 2,800 times below the ICNIRP maximum permitted public guideline of value of  $10 \text{ W/m}^2$  set for frequencies used by 3 and more than 2,500 times below  $9 \text{ W/m}^2$  set for the frequencies used by Orange.

The ICNIRP guidelines are designed to provide for the full protection of everyone at the maximum permitted public values and these guidelines are endorsed by the National Radiological Protection Board and the World Health Organisation. Therefore it can be concluded, when considering the much lower measured values, then no harm should be expected to result to anyone living near these installations.

### **Compliance Assessment Survey**

The Measurement Survey was conducted by Garry Homer, Director, Electromagnetic Surveys Limited on 16 November 2004, between 1.40 pm and 4.40 pm.

## 1. Background

This survey was carried out to address the possibility that a small wall mounted antenna operated by Orange was not in service during the previous survey carried out in March this year. At that time attention was focussed on the installation operated by 3. This survey was commissioned to address these new concerns.

## 2. Instrumentation

The instrument used for this survey was the same as used before. That is, a Wandel & Goltermann EMR 300, serial number AP-0052, fitted with a probe that had a frequency response covering 100 kHz to 3000 MHz. Again, the instrument was within its calibration period and functioned normally throughout the tests.

## 3. Safety Standards

The position regarding guidelines has changed since the last report. In 2000 the Independent Expert Group on Mobile Phones chaired by Sir William Stewart recommended all mobile phone companies should use the guidelines issued by the International Commission for Non-Ionising Radiation Protection (ICNIRP) for areas where the public have access. The National Radiological Protection Board (NRPB) has now carried out a review of the research that has been completed since then and it now recommends the application of the ICNIRP guidelines for all frequencies, including the mobile phone frequencies.

The World Health Organisation also endorses the ICNIRP guidelines and promotes their use around the world. Also, the ICNIRP guidelines will be used in association with a European Directive on Electromagnetic Fields. The Health and Safety Executive expect this directive to be legally in force in the UK in 2008.

The ICNIRP guideline maximum permitted levels depend upon the frequency that is in use, as shown below.

Operator	Base Station Transmit Frequency  (Megahertz) MHz	ICNIRP public level  W/m <sup>2</sup>
Orange	1800	9
3	above 2000	10

## 4. Methodology

This survey was carried out by visiting each measurement location that was used during the first survey. Again, as the ICNIRP guidelines specify averaged values; the measuring instrument was also set to indicate averaged values to ensure any transient events were included correctly.

## 5. Discussion of the survey findings

At the time of the first survey, attention and concerns were focussed upon the 3G transmissions from the tall slim mast mounted above 102 High Street. The new concerns about the wall mounted Orange antenna, were associated with the possibility that at the time of the first survey, this antenna was not in service, and therefore emission levels could now be higher.

The Tables of Results – 11/16/04 show the measured values for this survey. As the Orange antenna is now also the focus of attention, these tabulated results include a column to show compliance at the guideline level set for Orange's 1800 MHz transmissions. The same method as used for the 3G system has been used to calculate compliance for Orange. That is, all the measured value has been used to assess compliance, regardless of all the other sources of transmissions that are included in this value. Therefore, this compliance is a very pessimistic assessment for Orange due to the proximity of the larger 3G installation.

Overall, the measured values do not show any significant increase in levels. The differences in levels are shown in the Tables of Results – Change since first survey. Some levels were found to be lower this time. Two locations revealed slightly larger increases in the recorded values, however, these values are still very small compared to the guideline levels.

The main difference between the recorded values of these two surveys is some mobile phone transmissions are constantly varying depending on the number of calls that are being handled. Also, it was not possible to position the instrument probe in exactly the same position that was used in the first survey.

The increase that was found outside the 'Connoisseur' restaurant is interesting, as values were found to increase towards the restaurant windows and reduce towards the kerb edge of the footpath. This effect can not easily be attributed to the mobile phone Base Station transmissions, as the distance to these antennas remained almost constant as positions changed across the footpath. The effect is more likely to be due to the proximity of equipment or mobile/cordless phones that may have been in use in the restaurant. The value at the kerb edge was  $0.0011 \text{ W/m}^2$  and a value of  $0.0018 \text{ W/m}^2$  was found near to the restaurant window. The tabulated value of  $0.0016 \text{ W/m}^2$  represented a position at the middle of the footpath.

As the new measured levels are approximately the same as the older values, it is highly likely the Orange installation was operational during the first survey. Therefore, it is reasonable to use the highest values recorded during either survey to characterise a slightly pessimistic normal situation. This is shown in the Tables of Results – Compliance using the highest values from this and the first survey.

While little has changed between this survey and the first, it is important to record one extra reading that shows how well ordinary building materials reduce the radio frequency levels. There was concern expressed about levels measured at a bedroom window at No.80 High Street. The recorded level during this survey was  $0.0017 \text{ W/m}^2$ . Measurements made at locations within the same bedroom revealed a level of only  $0.0001 \text{ W/m}^2$  at the centre of the room. Similar very low values were seen to continue to exist until within about 1m of the window, where the values started to rise. These lower values are due to these areas not having 'line-of-sight' of the antennas. In these areas, the levels can only be composed of much weaker indirect signals.

## 6. Conclusions

- 1 The mobile phone Base Station emissions measured during this and the first survey easily comply with the International Commission for Non-Ionising Radiation Protection (ICNIRP) guidelines.
- 2 The highest level of the total electromagnetic power density measured in either this or the first survey at No. 100 High Street was only 0.0006 Watts per square metre ( $\text{W/m}^2$ ). This level is more than 16,600 times below the ICNIRP maximum permitted public guideline value of  $10 \text{ W/m}^2$  set for the frequencies used by the operator 3 and 15,000 times below the  $9 \text{ W/m}^2$  set for the frequencies used by Orange.
- 3 The level of the total electromagnetic power density measured at a window within a flat more remote from the installation was only  $0.0017 \text{ W/m}^2$ . This value is more than 5,800 times below the ICNIRP maximum permitted public guideline value of  $10 \text{ W/m}^2$  set for the frequencies used by 3 and more than 5,200 times below  $9 \text{ W/m}^2$  set for the frequencies used by Orange.
- 4 The highest value of the total electromagnetic power density measured within the surrounding area at street level was  $0.0035 \text{ W/m}^2$ . This value is more than 2,800 times below the ICNIRP maximum permitted public guideline of value of  $10 \text{ W/m}^2$  set for frequencies used by 3 and more than 2,500 times below  $9 \text{ W/m}^2$  set for the frequencies used by Orange.
- 5 The ICNIRP guidelines are designed to provide for the full protection of everyone at the maximum permitted public values and these guidelines are endorsed by the National Radiological Protection Board and the World Health Organisation. Therefore, when considering the much lower measured values, then no harm should be expected to result to anyone living in these buildings or nearby.

Garry Homer B.Sc. MIEEE  
Director

19 November 2004

Tables of Results – 16/11/04

Measurement Locations:	Measured Power Density 16/11/04  W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 10 W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 9 W/m <sup>2</sup>	Electric Field  V/m
No.100 High Street, side bedroom window overlooking the base of the flagpole style antenna	0.0004	25,000	22,500	0.39
No.100 High Street, centre of the above bedroom	0.0001	100,000	90,000	0.19
No.100 High Street, attic bedroom, near the wall nearest the mast	0.0001	100,000	90,000	0.19
No.100 High Street, attic bedroom, by the window	0.0001	100,000	90,000	0.19
No.100 High Street, study, by the desk near the window	0.0001	100,000	90,000	0.19
No.80 High Street, Lilly's bedroom, by the window overlooking High Street	0.0017	5,882	5,294	0.80
No.80 High Street, main bedroom, by the window	0.0003	33,333	30,000	0.34
No.80 High Street, living room, by the window	0.0001	100,000	90,000	0.19
High Street, by the gateway to 'The Park'	0.0001	100,000	90,000	0.19
High Street, outside No.74	0.0001	100,000	90,000	0.19
High Street, outside the 'Connoisseur'	0.0016	6,250	5,625	0.78
High Street, outside No.45	0.0006	16,667	15,000	0.48
High Street, outside No.49	0.0004	25,000	22,500	0.39
High Street, outside No.53	0.0006	16,667	15,000	0.48
High Street, outside No.57	0.0010	10,000	9,000	0.61
High Street, opposite No.100	0.0025	4,000	3,600	0.97
High Street, outside No.100	0.0020	5,000	4,500	0.87
London Road, outside No.9	0.0030	3,333	3,000	1.06
London Road, outside No.17	0.0034	2,941	2,647	1.13
London Road, outside 'Tithegate'	0.0024	4,167	3,750	0.95

Tables of Results – 16/11/04

Measurement Locations:	Measured Power Density 16/11/04  W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 10 W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 9 W/m <sup>2</sup>	Electric Field  V/m
London Road, outside No.29	0.0015	6,667	6,000	0.75
London Road, outside 'Herga House'	0.0015	6,667	6,000	0.75
London Road, outside 'Tall Gate Cottage'	0.0006	16,667	15,000	0.48
London Road, outside 'Highlands'	0.0003	33,333	30,000	0.34
London Road, outside 'Littlecourt'	0.0002	50,000	45,000	0.27
Harrow Park, opposite the driveway to 'Cairnryan Cottage'	0.0001	100,000	90,000	0.19
Harrow Park, opposite 'Syon'	0.0002	50,000	45,000	0.27
Harrow Park, opposite 'High Brow'	0.0005	20,000	18,000	0.43
Harrow Park, rear of 45 High Street	0.0013	7,692	6,923	0.70
Byron Hill Road, opposite No.5	0.0001	100,000	90,000	0.19
Byron Hill Road, opposite No.8	0.0001	100,000	90,000	0.19
Byron Hill Road, opposite No.14	0.0001	100,000	90,000	0.19
West Hill, by the roadway leading to 'West Hill Motors'	0.0002	50,000	45,000	0.27
West Hill, near to lamppost 'K980'	0.0002	50,000	45,000	0.27
West Hill, near to lamppost 'K1058'	0.0001	100,000	90,000	0.19
Roxeth Hill, outside 'Mount Pleasant Flat'	0.0002	50,000	45,000	0.27



## Tables of Results – Change since the first survey

Measurement Locations	Change in Power Density from 04/03/04 W/m <sup>2</sup>	Change in Electric Field from 04/03/04 V/m
No.100 High Street, side bedroom window overlooking the base of the flagpole style antenna	-0.0002	-0.09
No.100 High Street, centre of the above bedroom	-0.0002	-0.15
No.100 High Street, attic bedroom, near the wall nearest the mast	-0.0001	-0.08
No.100 High Street, attic bedroom, by the window	-0.0002	-0.15
No.100 High Street, study, by the desk near the window	-0.0001	-0.08
No.80 High Street, Lilly's bedroom, by the window overlooking High Street	0.0001	0.02
No.80 High Street, main bedroom, by the window	-0.0001	-0.05
No.80 High Street, living room, by the window	No change	No change
High Street, by the gateway to 'The Park'	-0.0001	-0.08
High Street, outside No.74	-0.0002	-0.15
High Street, outside the 'Connoisseur'	0.0010	0.30
High Street, outside No.45	0.0001	0.05
High Street, outside No.49	No change	No change
High Street, outside No.53	0.0001	0.05
High Street, outside No.57	0.0003	0.10
High Street, opposite No.100	0.0004	0.08
High Street, outside No.100	-0.0002	-0.04
London Road, outside No.9	0.0010	0.19
London Road, outside No.17	-0.0001	-0.02
London Road, outside 'Tithegate'	-0.0005	-0.10



## Tables of Results

Measurement Locations:	Change in Power Density from 04/03/04  W/m <sup>2</sup>	Change in Electric Field from 04/03/04  V/m
London Road, outside No.29	-0.0002	-0.05
London Road, outside 'Herga House'	0.0005	0.14
London Road, outside 'Tall Gate Cottage'	-0.0004	-0.13
London Road, outside 'Highlands'	No change	No change
London Road, outside 'Littlecourt'	0.0001	0.08
Harrow Park, opposite the driveway to 'Cairnryan Cottage'	No change	No change
Harrow Park, opposite 'Syon'	0.0001	0.08
Harrow Park, opposite 'High Brow'	0.0001	0.04
Harrow Park, rear of 45 High Street	-0.0005	-0.12
Byron Hill Road, opposite No.5	-0.0001	-0.08
Byron Hill Road, opposite No.8	No change	No change
Byron Hill Road, opposite No.14	No change	No change
West Hill, by the roadway leading to 'West Hill Motors'	No change	No change
West Hill, near to lamppost 'K980'	0.0001	0.08
West Hill, near to lamppost 'K1058'	No change	No change
Roxeth Hill, outside 'Mount Pleasant Flat'	No change	No change

**Tables of Results – Compliance using the highest values from this and the first survey**

Measurement Locations:	Measured Power Density  W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 10 W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 9 W/m <sup>2</sup>	Electric Field  V/m
No.100 High Street, side bedroom window overlooking the base of the flagpole style antenna	0.0006	16,667	15,000	0.48
No.100 High Street, centre of the above bedroom	0.0003	33,333	30,000	0.34
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No.80 High Street, main bedroom, by the window	0.0004	25,000	22,500	0.39
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High Street, by the gateway to 'The Park'	0.0002	50,000	45,000	0.27
High Street, outside No.74	0.0003	33,333	30,000	0.34
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High Street, outside No.53	0.0006	16,667	15,000	0.48
High Street, outside No.57	0.0010	10,000	9,000	0.61
High Street, opposite No.100	0.0025	4,000	3,600	0.97
High Street, outside No.100	0.0022	4,545	4,091	0.91
London Road, outside No.9	0.0030	3,333	3,000	1.06
London Road, outside No.17	0.0035	2,857	2,571	1.15
London Road, outside 'Tithegate'	0.0029	3,448	3,103	1.05

**Tables of Results – Compliance using the highest values from this and the first survey**

Measurement Locations:	Measured Power Density  W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 10 W/m <sup>2</sup>	Times below the ICNIRP Public guideline of 9 W/m <sup>2</sup>	Electric Field  V/m
London Road, outside No.29	0.0017	5,882	5,294	0.80
London Road, outside 'Herga House'	0.0015	6,667	6,000	0.75
London Road, outside 'Tall Gate Cottage'	0.0010	10,000	9,000	0.61
London Road, outside 'Highlands'	0.0003	33,333	30,000	0.34
London Road, outside 'Littlecourt'	0.0002	50,000	45,000	0.27
Harrow Park, opposite the driveway to 'Cairnryan Cottage'	0.0001	100,000	90,000	0.19
Harrow Park, opposite 'Syon'	0.0002	50,000	45,000	0.27
Harrow Park, opposite 'High Brow'	0.0005	20,000	18,000	0.43
Harrow Park, rear of 45 High Street	0.0018	5,556	5,000	0.82
Byron Hill Road, opposite No.5	0.0002	50,000	45,000	0.27
Byron Hill Road, opposite No.8	0.0001	100,000	90,000	0.19
Byron Hill Road, opposite No.14	0.0001	100,000	90,000	0.19
West Hill, by the roadway leading to 'West Hill Motors'	0.0002	50,000	45,000	0.27
West Hill, near to lamppost 'K980'	0.0002	50,000	45,000	0.27
West Hill, near to lamppost 'K1058'	0.0001	100,000	90,000	0.19
Roxeth Hill, outside 'Mount Pleasant Flat'	0.0002	50,000	45,000	0.27