

## **Mobile Phone Base-Station Audit**

**Audit site: CEFN LLAN WATER TREATMENT WORKS  
ABERYSTWYTH  
SY23**

In 2000 the Government asked the Radiocommunications Agency to implement a national measurement programme to ensure that emissions from cellular base stations do not exceed the guidelines for public maximum exposure set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Ofcom took over the functions of the Radiocommunications Agency, along with those of the Independent Television Commission, Radio Authority, Ofjel and Broadcasting Standards Commission, on 29 December 2003.

Electric field strength measurements made in various bands are referenced to and presented alongside the relevant ICNIRP public maximum exposure levels. On the left hand side of the results page(s) is a graphical representation of the radio spectrum surveyed at each location on the site. The green line on each graph indicates the ICNIRP guideline exposure level for that frequency band. To the right hand side of each graph is a table showing the ten highest level emissions recorded within a band.

Further explanation of the results and their context within the ICNIRP guidelines can be provided by the Ofcom officers at the time of the audit or by contacting Ofcom on 0845 456 3000, or by email at [contact@Ofcom.org.uk](mailto:contact@Ofcom.org.uk). Results taken from all audit sites and further information on the audit programme can be found on the Ofcom website at [www.ofcom.org.uk](http://www.ofcom.org.uk).

## Report Summary

As the radio spectrum is continually changing, these measurements can only provide information on the radio frequency (RF) conditions for the specific locations at the time of the survey.

Ofcom performed this survey of the RF emission environment prevailing in the vicinity of CEFN LLAN WATER TREATMENT WORKS on 18 October 2004.

The following table, sorted in descending order of signal level, summarises the results obtained at each measurement location.

Summary of results:		
Location	Total Band Exposure	Relationship to ICNIRP Limit
SUB STATION ENTRANCE	1.94E-04	1/5167
SITE ENTRANCE	8.22E-05	1/12160
CEFNNLLAN ROAD SOUTH OF SITE ENTRANCE	5.70E-05	1/17545
SCIENCE PARK JUNCTION OPPOSITE UNIT 6	4.35E-05	1/23010
WESTERN END OF SCIENCE PARK	1.53E-05	1/65392
EASTERN END OF OFFICE BLOCK	8.62E-06	1/116043

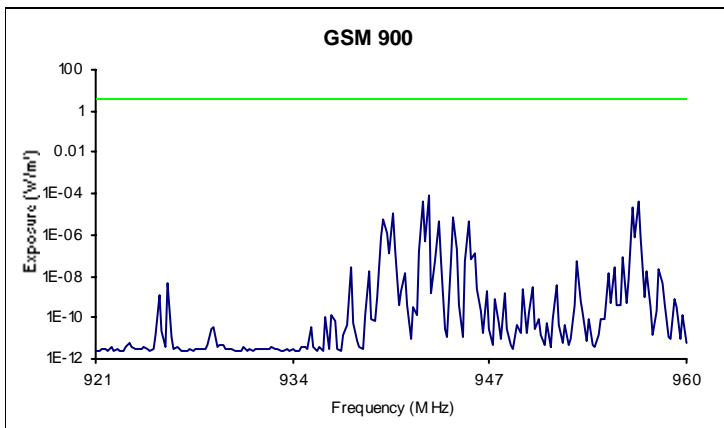
Issued on behalf of Ofcom.

Issued by:

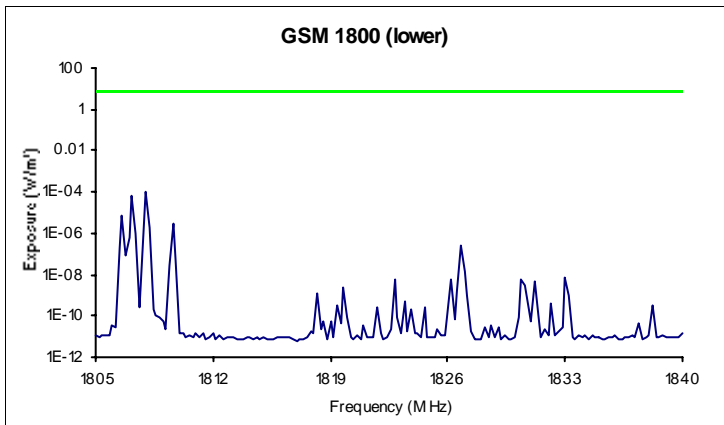
Received by:

Keith Stanton  
Technical Investigation Officer

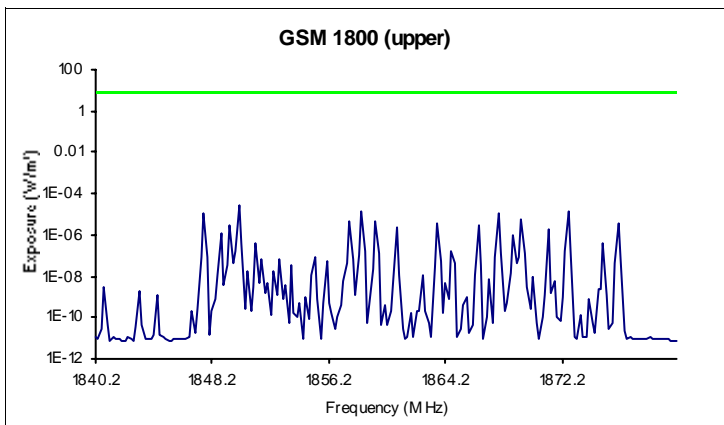
<b>Site:</b> CEFN LLAN WATER TREATMENT WORKS	<b>Receiver:</b>
<b>Location:</b> SITE ENTRANCE	Manufacturer: ROHDE&SCHWARZ
	Model: EB200
	Serial Number: 836.378/014
<b>NGR:</b> SN 5994 8149 <b>Taken from GPS</b>	<b>Antenna:</b>
<b>Start Time:</b> 18 October 2004 11:25:16	Manufacturer: Rohde & Schwarz
<b>Officer:</b> Keith Stanton	Model: HE200.4050.3609.02
	Serial Number: 836287/009



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
943.000	8.07E-05	4.71	1.71E-05
956.800	4.37E-05	4.78	9.14E-06
942.600	3.86E-05	4.71	8.19E-06
956.400	2.24E-05	4.78	4.69E-06
940.600	1.22E-05	4.70	2.58E-06
944.600	7.74E-06	4.72	1.64E-06
940.000	6.22E-06	4.70	1.32E-06
943.600	4.65E-06	4.72	9.86E-07
945.600	4.36E-06	4.73	9.22E-07
940.200	1.33E-06	4.70	2.83E-07
<b>Band Exposure Quotient:</b>			<b>4.78E-05</b>



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,808.000	1.15E-04	9.04	1.27E-05
1,807.200	7.07E-05	9.04	7.82E-06
1,806.600	6.44E-06	9.03	7.13E-07
1,809.600	2.96E-06	9.05	3.27E-07
1,808.200	1.91E-06	9.04	2.11E-07
1,807.800	1.10E-06	9.04	1.21E-07
1,807.400	1.02E-06	9.04	1.13E-07
1,807.000	6.60E-07	9.04	7.30E-08
1,826.800	2.59E-07	9.13	2.84E-08
1,806.400	2.23E-07	9.03	2.47E-08
<b>Band Exposure Quotient:</b>			<b>2.22E-05</b>

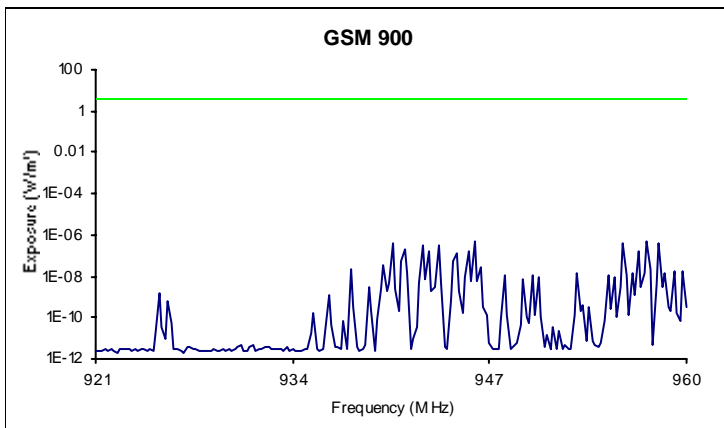


Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,850.000	2.58E-05	9.25	2.79E-06
1,872.600	1.41E-05	9.36	1.50E-06
1,858.400	1.25E-05	9.29	1.35E-06
1,867.800	1.24E-05	9.34	1.33E-06
1,847.600	1.07E-05	9.24	1.16E-06
1,869.400	5.20E-06	9.35	5.56E-07
1,857.600	4.98E-06	9.29	5.36E-07
1,859.400	4.88E-06	9.30	5.25E-07
1,876.000	3.99E-06	9.38	4.25E-07
1,863.600	3.73E-06	9.32	4.00E-07
<b>Band Exposure Quotient:</b>			<b>1.23E-05</b>

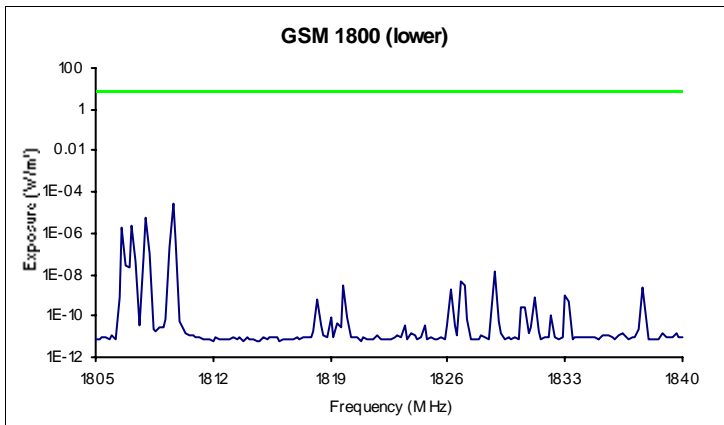
Total number of measurements: 572

**Total Band Exposure Quotient:** **8.22E-05**

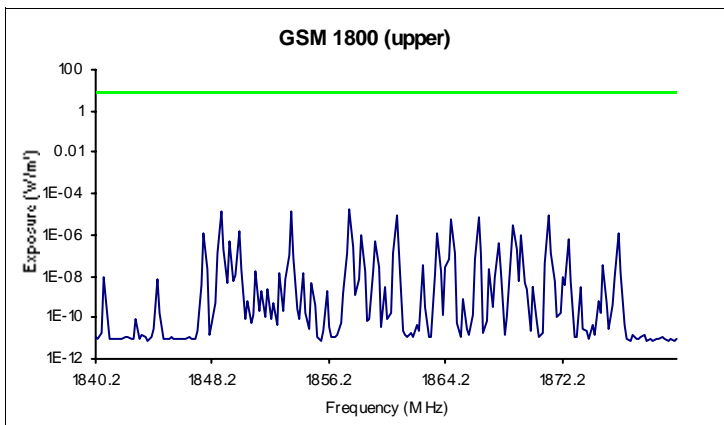
<b>Site:</b> CEFN LLAN WATER TREATMENT WORKS	<b>Receiver:</b>
<b>Location:</b> WESTERN END OF SCIENCE PARK	Manufacturer: ROHDE&SCHWARZ
	Model: EB200
	Serial Number: 836.378/014
<b>NGR:</b> SN 5981 8141 <b>Taken from GPS</b>	<b>Antenna:</b>
<b>Start Time:</b> 18 October 2004 12:24:08	Manufacturer: Rohde & Schwarz
<b>Officer:</b> Keith Stanton	Model: HE200.4050.3609.02
	Serial Number: 836287/009



Frequency (MHz)	Maximum Exposure (W/m <sup>2</sup> )	ICNIRP Limit (W/m <sup>2</sup> )	Frequency Exposure Quotient
957.400	5.39E-07	4.79	1.13E-07
946.000	5.13E-07	4.73	1.08E-07
958.200	4.39E-07	4.79	9.16E-08
940.600	4.12E-07	4.70	8.75E-08
955.800	3.89E-07	4.78	8.14E-08
943.600	3.53E-07	4.72	7.48E-08
942.600	2.86E-07	4.71	6.07E-08
941.400	1.89E-07	4.71	4.01E-08
943.000	1.69E-07	4.71	3.58E-08
945.600	1.58E-07	4.73	3.35E-08
<b>Band Exposure Quotient:</b>			<b>8.84E-07</b>



Frequency (MHz)	Maximum Exposure (W/m <sup>2</sup> )	ICNIRP Limit (W/m <sup>2</sup> )	Frequency Exposure Quotient
1,809.600	2.89E-05	9.05	3.20E-06
1,808.000	6.03E-06	9.04	6.67E-07
1,807.200	2.34E-06	9.04	2.59E-07
1,806.600	1.82E-06	9.03	2.01E-07
1,809.800	4.69E-07	9.05	5.19E-08
1,809.400	2.19E-07	9.05	2.42E-08
1,808.200	1.07E-07	9.04	1.19E-08
1,807.800	6.02E-08	9.04	6.66E-09
1,807.400	3.89E-08	9.04	4.30E-09
1,806.800	3.08E-08	9.03	3.41E-09
<b>Band Exposure Quotient:</b>			<b>4.43E-06</b>

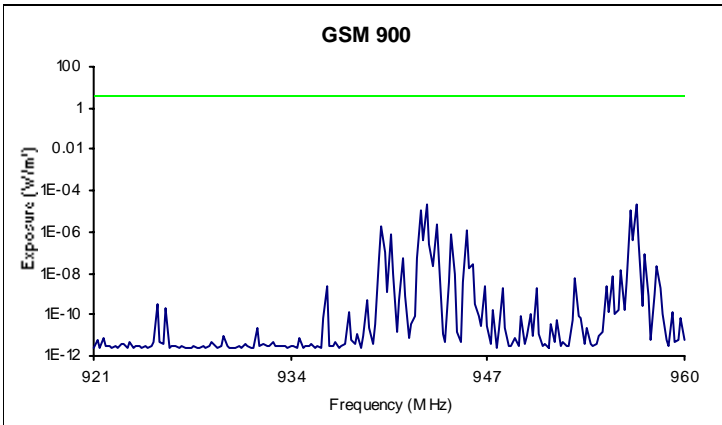


Frequency (MHz)	Maximum Exposure (W/m <sup>2</sup> )	ICNIRP Limit (W/m <sup>2</sup> )	Frequency Exposure Quotient
1,857.600	1.77E-05	9.29	1.90E-06
1,848.800	1.45E-05	9.24	1.57E-06
1,853.600	1.43E-05	9.27	1.54E-06
1,860.800	9.99E-06	9.30	1.07E-06
1,871.200	8.66E-06	9.36	9.25E-07
1,866.400	7.83E-06	9.33	8.39E-07
1,864.600	5.66E-06	9.32	6.07E-07
1,868.800	2.92E-06	9.34	3.13E-07
1,850.000	1.45E-06	9.25	1.57E-07
1,863.600	1.21E-06	9.32	1.30E-07
<b>Band Exposure Quotient:</b>			<b>9.98E-06</b>

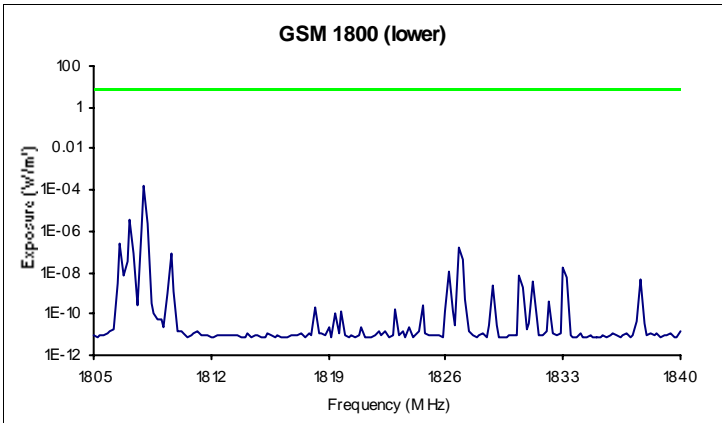
Total number of measurements: 572

**Total Band Exposure Quotient:** **1.53E-05**

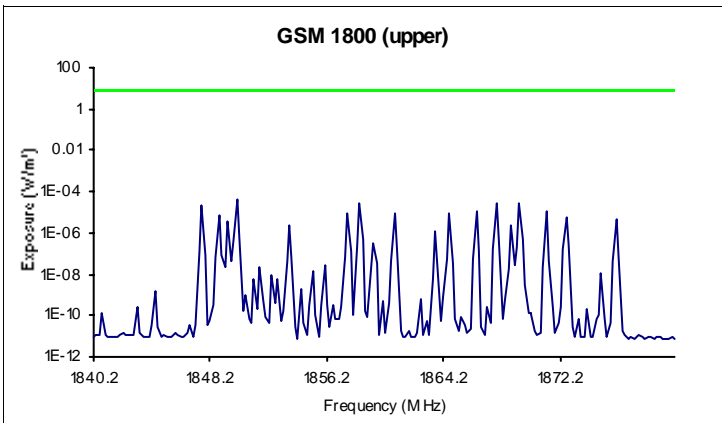
<b>Site:</b> CEFN LLAN WATER TREATMENT WORKS	<b>Receiver:</b>
<b>Location:</b> CEFNLLAN ROAD SOUTH OF SITE ENTRANCE	Manufacturer: ROHDE&SCHWARZ
<b>NGR:</b> SN 5994 8141 <b>Taken from GPS</b>	Model: EB200
<b>Start Time:</b> 18 October 2004 12:44:00	Serial Number: 836.378/014
<b>Officer:</b> Keith Stanton	<b>Antenna:</b>
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609.02
	Serial Number: 836287/009



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
956.800	2.30E-05	4.78	4.80E-06
943.000	2.07E-05	4.71	4.40E-06
942.600	1.17E-05	4.71	2.47E-06
956.400	1.05E-05	4.78	2.19E-06
943.600	2.39E-06	4.72	5.06E-07
940.000	2.11E-06	4.70	4.49E-07
945.600	1.32E-06	4.73	2.79E-07
944.600	8.29E-07	4.72	1.76E-07
940.600	7.49E-07	4.70	1.59E-07
942.800	4.43E-07	4.71	9.41E-08
<b>Band Exposure Quotient:</b>			<b>1.58E-05</b>



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,808.000	1.45E-04	9.04	1.60E-05
1,807.200	3.98E-06	9.04	4.40E-07
1,808.200	2.29E-06	9.04	2.53E-07
1,807.800	1.26E-06	9.04	1.39E-07
1,806.600	2.34E-07	9.03	2.59E-08
1,826.800	1.60E-07	9.13	1.75E-08
1,809.600	8.53E-08	9.05	9.43E-09
1,807.400	7.94E-08	9.04	8.78E-09
1,827.000	4.21E-08	9.13	4.61E-09
1,807.000	3.38E-08	9.04	3.74E-09
<b>Band Exposure Quotient:</b>			<b>1.69E-05</b>

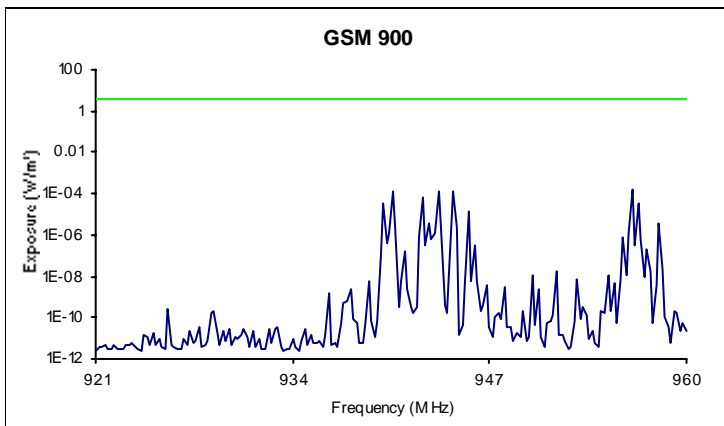


Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,850.000	4.48E-05	9.25	4.85E-06
1,858.400	2.94E-05	9.29	3.16E-06
1,869.400	2.73E-05	9.35	2.92E-06
1,867.800	2.54E-05	9.34	2.72E-06
1,847.600	1.95E-05	9.24	2.11E-06
1,866.400	1.11E-05	9.33	1.19E-06
1,871.200	1.04E-05	9.36	1.11E-06
1,860.800	8.50E-06	9.30	9.14E-07
1,857.600	8.46E-06	9.29	9.10E-07
1,864.600	8.17E-06	9.32	8.77E-07
<b>Band Exposure Quotient:</b>			<b>2.43E-05</b>

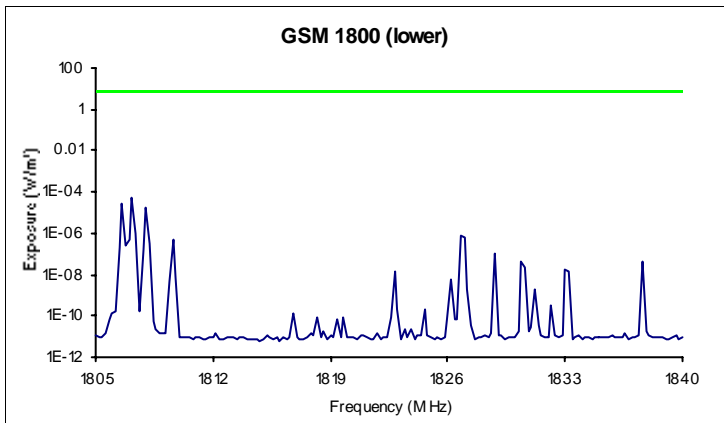
Total number of measurements: 572

**Total Band Exposure Quotient:** **5.70E-05**

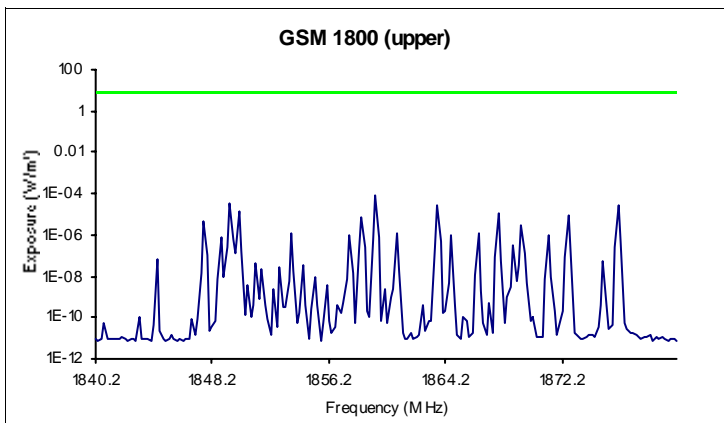
<b>Site:</b> CEFN LLAN WATER TREATMENT WORKS	<b>Receiver:</b>
<b>Location:</b> SUB STATION ENTRANCE	Manufacturer: ROHDE&SCHWARZ
<b>NGR:</b> SN 5994 8154 <b>Taken from GPS</b>	Model: EB200
<b>Start Time:</b> 18 October 2004 13:16:17	Serial Number: 836.378/014
<b>Officer:</b> Keith Stanton	<b>Antenna:</b>
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609.02
	Serial Number: 836287/009



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
940.600	1.43E-04	4.70	3.04E-05
956.400	1.45E-04	4.78	3.03E-05
944.600	1.41E-04	4.72	2.98E-05
943.600	1.34E-04	4.72	2.84E-05
942.600	7.36E-05	4.71	1.56E-05
956.800	3.55E-05	4.78	7.43E-06
940.000	3.12E-05	4.70	6.64E-06
945.600	1.38E-05	4.73	2.92E-06
958.200	4.00E-06	4.79	8.35E-07
943.000	3.69E-06	4.71	7.83E-07
<b>Band Exposure Quotient:</b>			<b>1.56E-04</b>



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,807.200	5.75E-05	9.04	6.36E-06
1,806.600	2.75E-05	9.03	3.04E-06
1,808.000	1.74E-05	9.04	1.92E-06
1,807.400	8.70E-07	9.04	9.63E-08
1,826.800	7.84E-07	9.13	8.58E-08
1,827.000	5.68E-07	9.13	6.22E-08
1,807.000	5.00E-07	9.04	5.54E-08
1,809.600	4.91E-07	9.05	5.43E-08
1,808.200	2.95E-07	9.04	3.27E-08
1,806.800	2.62E-07	9.03	2.91E-08
<b>Band Exposure Quotient:</b>			<b>1.18E-05</b>

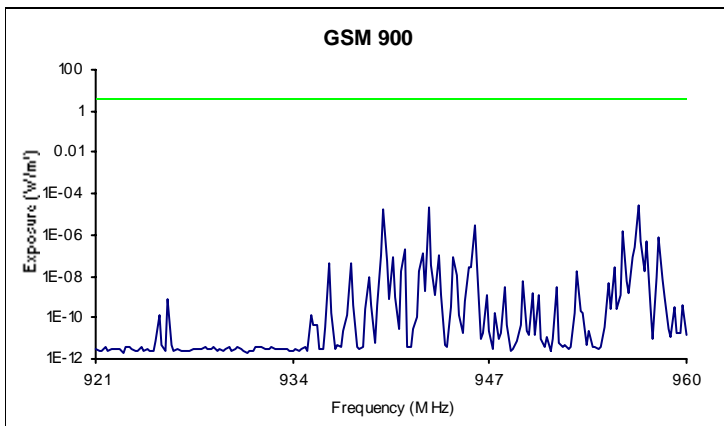


Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,859.400	8.10E-05	9.30	8.71E-06
1,849.400	3.72E-05	9.25	4.03E-06
1,876.000	2.82E-05	9.38	3.01E-06
1,863.600	2.77E-05	9.32	2.97E-06
1,850.000	1.42E-05	9.25	1.53E-06
1,867.800	1.01E-05	9.34	1.08E-06
1,872.600	8.88E-06	9.36	9.48E-07
1,858.400	6.73E-06	9.29	7.24E-07
1,847.600	4.46E-06	9.24	4.83E-07
1,869.400	2.86E-06	9.35	3.06E-07
<b>Band Exposure Quotient:</b>			<b>2.52E-05</b>

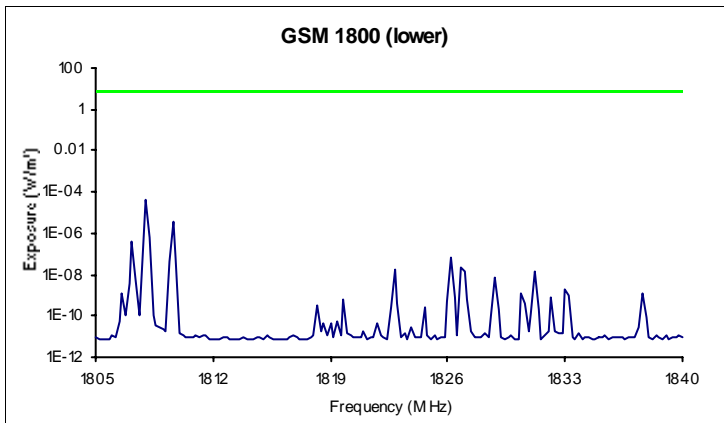
Total number of measurements: 572

**Total Band Exposure Quotient:** **1.94E-04**

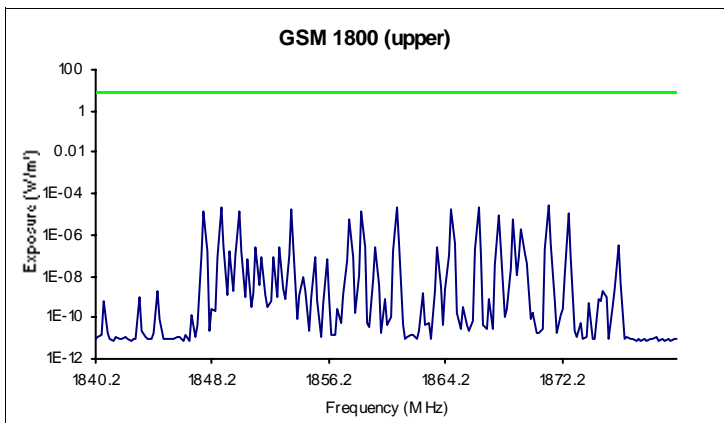
<b>Site:</b> CEFN LLAN WATER TREATMENT WORKS	<b>Receiver:</b>
<b>Location:</b> SCIENCE PARK JUNCTION OPPOSITE UNIT 6	Manufacturer: ROHDE&SCHWARZ
<b>NGR:</b> SN 5986 8131 <b>Taken from GPS</b>	Model: EB200
<b>Start Time:</b> 18 October 2004 13:46:16	Serial Number: 836.378/014
<b>Officer:</b> Keith Stanton	<b>Antenna:</b>
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609.02
	Serial Number: 836287/009



Frequency (MHz)	Maximum Exposure (W/m <sup>2</sup> )	ICNIRP Limit (W/m <sup>2</sup> )	Frequency Exposure Quotient
956.800	2.82E-05	4.78	5.90E-06
943.000	2.03E-05	4.71	4.30E-06
940.000	1.88E-05	4.70	4.00E-06
946.000	2.75E-06	4.73	5.82E-07
955.800	1.55E-06	4.78	3.24E-07
958.200	7.80E-07	4.79	1.63E-07
957.400	4.80E-07	4.79	1.00E-07
957.000	4.48E-07	4.79	9.36E-08
956.600	2.35E-07	4.78	4.91E-08
941.400	1.97E-07	4.71	4.19E-08
<b>Band Exposure Quotient:</b>			<b>1.58E-05</b>



Frequency (MHz)	Maximum Exposure (W/m <sup>2</sup> )	ICNIRP Limit (W/m <sup>2</sup> )	Frequency Exposure Quotient
1,808.000	4.27E-05	9.04	4.72E-06
1,809.600	3.99E-06	9.05	4.41E-07
1,808.200	6.92E-07	9.04	7.65E-08
1,807.800	5.13E-07	9.04	5.67E-08
1,807.200	4.26E-07	9.04	4.71E-08
1,826.200	6.22E-08	9.13	6.81E-09
1,809.800	6.04E-08	9.05	6.68E-09
1,809.400	4.08E-08	9.05	4.51E-09
1,826.800	2.42E-08	9.13	2.65E-09
1,822.800	1.87E-08	9.11	2.05E-09
<b>Band Exposure Quotient:</b>			<b>5.37E-06</b>



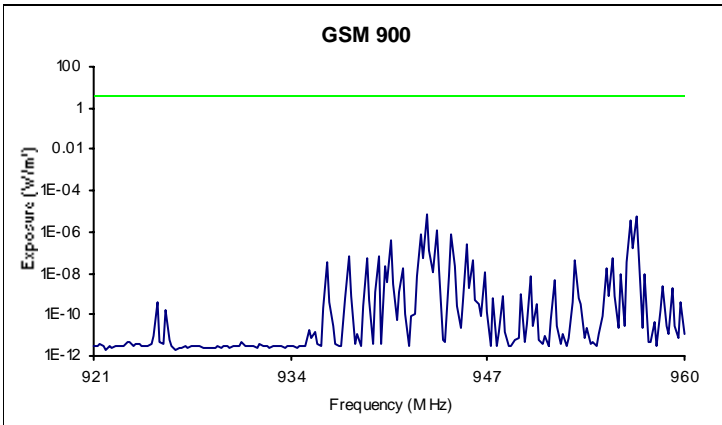
Frequency (MHz)	Maximum Exposure (W/m <sup>2</sup> )	ICNIRP Limit (W/m <sup>2</sup> )	Frequency Exposure Quotient
1,871.200	2.56E-05	9.36	2.73E-06
1,860.800	2.29E-05	9.30	2.46E-06
1,848.800	2.24E-05	9.24	2.43E-06
1,866.400	2.11E-05	9.33	2.26E-06
1,853.600	1.88E-05	9.27	2.03E-06
1,864.600	1.75E-05	9.32	1.87E-06
1,858.400	1.34E-05	9.29	1.44E-06
1,850.000	1.32E-05	9.25	1.43E-06
1,847.600	1.32E-05	9.24	1.43E-06
1,872.600	1.14E-05	9.36	1.22E-06
<b>Band Exposure Quotient:</b>			<b>2.23E-05</b>

Total number of measurements: 572

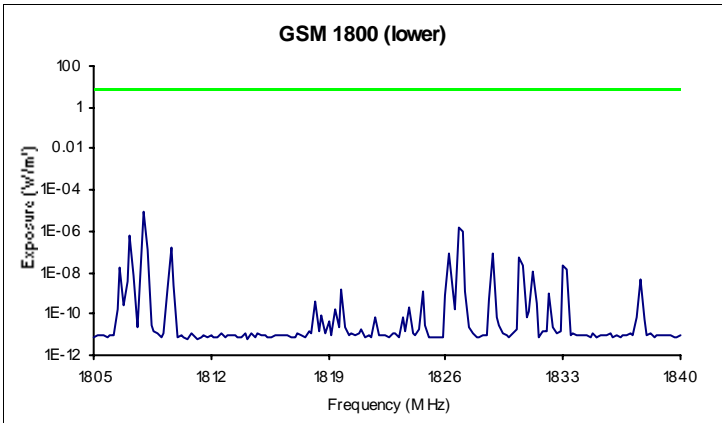
**Total Band Exposure Quotient:** **4.35E-05**



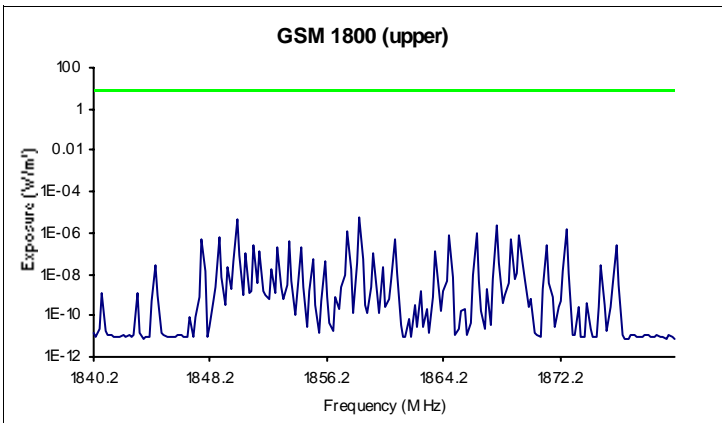
<b>Site:</b> CEFN LLAN WATER TREATMENT WORKS	<b>Receiver:</b>
<b>Location:</b> EASTERN END OF OFFICE BLOCK	Manufacturer: ROHDE&SCHWARZ
	Model: EB200
	Serial Number: 836.378/014
<b>NGR:</b> SN 5993 8137 <b>Taken from GPS</b>	<b>Antenna:</b>
<b>Start Time:</b> 18 October 2004 14:18:30	Manufacturer: Rohde & Schwarz
<b>Officer:</b> Keith Stanton	Model: HE200.4050.3609.02
	Serial Number: 836287/009



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
943.000	7.71E-06	4.71	1.64E-06
956.800	6.04E-06	4.78	1.26E-06
956.400	3.72E-06	4.78	7.78E-07
943.600	1.12E-06	4.72	2.37E-07
944.600	7.56E-07	4.72	1.60E-07
942.600	7.53E-07	4.71	1.60E-07
940.600	4.02E-07	4.70	8.56E-08
945.600	2.29E-07	4.73	4.84E-08
956.600	1.82E-07	4.78	3.81E-08
943.200	1.44E-07	4.72	3.05E-08
<b>Band Exposure Quotient:</b>			<b>4.59E-06</b>



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,808.000	9.55E-06	9.04	1.06E-06
1,826.800	1.68E-06	9.13	1.83E-07
1,827.000	9.21E-07	9.13	1.01E-07
1,807.200	5.75E-07	9.04	6.36E-08
1,809.600	1.48E-07	9.05	1.64E-08
1,808.200	1.45E-07	9.04	1.60E-08
1,807.800	1.00E-07	9.04	1.11E-08
1,826.200	9.20E-08	9.13	1.01E-08
1,828.800	8.43E-08	9.14	9.21E-09
1,830.400	5.09E-08	9.15	5.56E-09
<b>Band Exposure Quotient:</b>			<b>1.49E-06</b>



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,858.400	6.13E-06	9.29	6.60E-07
1,850.000	4.91E-06	9.25	5.31E-07
1,867.800	2.32E-06	9.34	2.48E-07
1,872.600	1.58E-06	9.36	1.69E-07
1,857.600	1.22E-06	9.29	1.32E-07
1,866.400	8.79E-07	9.33	9.42E-08
1,869.400	8.43E-07	9.35	9.02E-08
1,864.600	8.36E-07	9.32	8.97E-08
1,848.800	5.76E-07	9.24	6.23E-08
1,860.800	5.37E-07	9.30	5.77E-08
<b>Band Exposure Quotient:</b>			<b>2.54E-06</b>

Total number of measurements: 572

**Total Band Exposure Quotient:** **8.62E-06**



## Glossary

- Site:** The building or area around which sets of measurements are taken
- Location:** The position within a site at which a single set of measurements is taken. A set of measurements consists of multiple scans of many frequencies within a number of bands
- Band:** A portion of the electromagnetic spectrum reserved for specific radio services
- NGR:** The Ordnance Survey national grid reference coordinates of the location. In this survey NGRs are specified to 8-digit (10-metre) resolution. E.g. SJ 9755 9888
- GPS:** The Global Positioning System
- Start Time:** The date and time at which the receiver started taking its measurements at a location
- Officer:** The name of the RA representative who carried out the audit
- Receiver:** The receiver used to perform the measurements
- Antenna:** The antenna used to perform the measurements
- Exposure:** The maximum measured electric field strength (dB( $\mu$ V/m)) converted to an equivalent power density (W/m<sup>2</sup>)
- Power Density:** The electromagnetic energy flowing through a unit area normal to the direction of propagation in a unit time. Measured in Watts per square metre (W/m<sup>2</sup>)
- ICNIRP Limit:** The reference level given by the International Commission for Non-Ionizing Radiation Protection (ICNIRP) for general public exposure to electromagnetic fields

<b>Frequency</b>	<b>ICNIRP limit</b>
10MHz to 400 MHz	2 W/m <sup>2</sup>
400MHz to 2GHz	f / 200 W/m <sup>2</sup>
2GHz to 300GHz	10 W/m <sup>2</sup>

(where f is frequency in MHz)

**Frequency Exposure Quotient:**

The ratio of the measured maximum power density to the ICNIRP limit at a given frequency. A value close to 1 signifies that exposure levels could be near to the ICNIRP limit for that frequency

**Band Exposure Quotient:**

The sum of the frequency exposure quotients for a single band at a location

**Total Band Exposure Quotient:**

The sum of the frequency exposure quotients for all of the measured bands at a location

- GSM:** Global System for Mobile communication
- ETACS:** Extended Total Access Communications
- TETRA:** Terrestrial Trunked Radio
- 3G:** Third Generation mobile-phone services

- 1.00E-03:** Exponential (or 'scientific') number format. Equal to one thousandth
- 1.00E-06:** Equal to one millionth
- 1.00E-09:** Equal to one thousand-millionth
- 1.00E-12:** Equal to one million-millionth