

Mobile Phone Base-Station Audit

Audit site: Wray Castle
Ambleside
Cumbria
LA22 0JB

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, Ofcom 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. 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.

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 Wray Castle on 7 July 2005.

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
Overflow carpark, Wray Castle	3.56E-06	1/280592
Centre of lawn, Wray Castle	9.02E-07	1/1109079
Rutherford Room, Wray Castle	8.78E-08	1/11394432
1st Floor Balcony, Wray Castle	4.88E-08	1/20512414
Faraday Room, Wray Castle	3.72E-08	1/26883163
Dining Room, Wray Castle	5.69E-09	1/175901076

Issued on behalf of Ofcom.

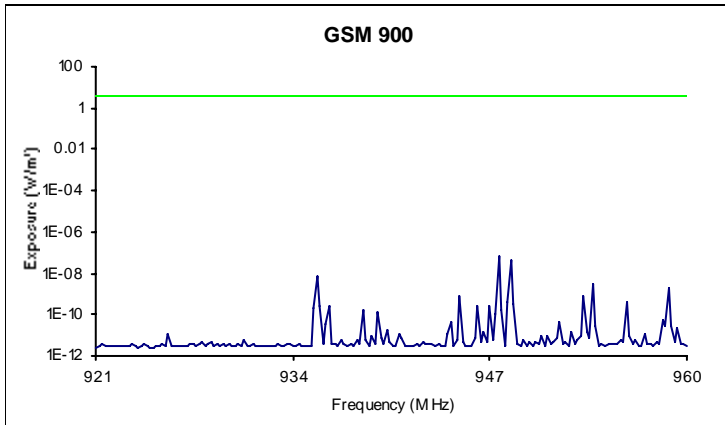
Issued by:

Received by:

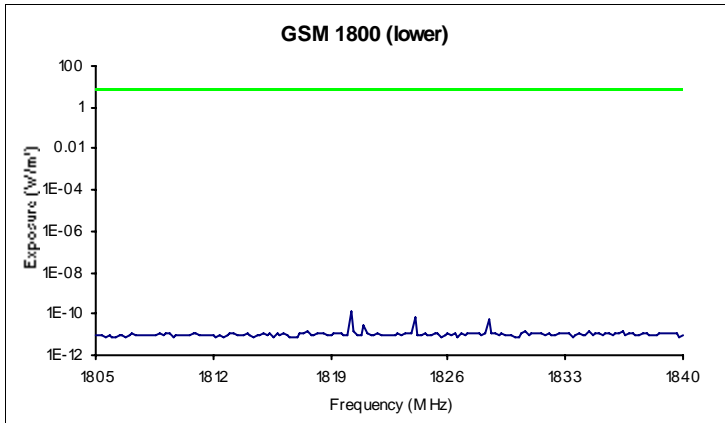
SP
Technical Investigation Officer

John Milton

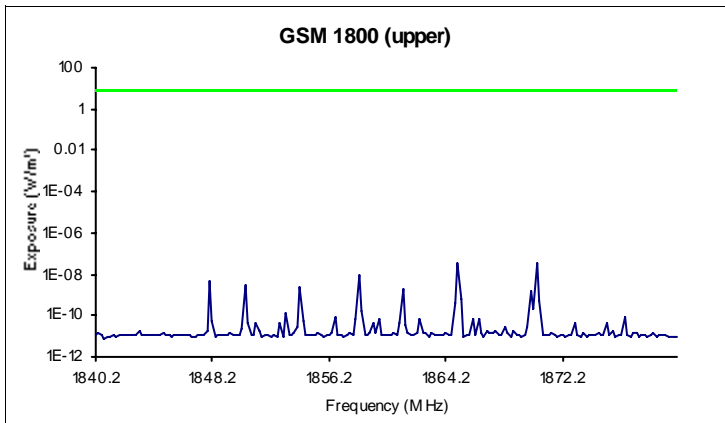
Site: Wray Castle	Receiver:
Location: Faraday Room, Wray Castle	Manufacturer: ROHDE&SCHWARZ
	Model: EB200
	Serial Number: 836.378/024
NGR: NY 3749 0103 Taken from GPS	Antenna:
Start Time: 07 July 2005 0:31:11	Manufacturer: Rohde & Schwarz
Officer: Stephen Parkinson	Model: HE200.4050.3609 02
	Serial Number: 100090



Frequency (MHz)	Maximum Exposure (W/m ²)	ICNIRP Limit (W/m ²)	Frequency Exposure Quotient
947.600	6.48E-08	4.74	1.37E-08
948.400	4.39E-08	4.74	9.26E-09
935.600	6.91E-09	4.68	1.48E-09
953.800	2.68E-09	4.77	5.62E-10
958.800	1.83E-09	4.79	3.82E-10
953.200	8.65E-10	4.77	1.82E-10
945.000	7.93E-10	4.72	1.68E-10
956.000	4.17E-10	4.78	8.72E-11
948.200	3.91E-10	4.74	8.25E-11
948.600	3.41E-10	4.74	7.19E-11
Band Exposure Quotient:			2.66E-08



Frequency (MHz)	Maximum Exposure (W/m ²)	ICNIRP Limit (W/m ²)	Frequency Exposure Quotient
1,820.200	1.26E-10	9.10	1.38E-11
1,824.000	6.34E-11	9.12	6.95E-12
1,828.400	5.96E-11	9.14	6.52E-12
1,821.000	2.95E-11	9.11	3.24E-12
1,836.400	1.59E-11	9.18	1.73E-12
1,820.400	1.48E-11	9.10	1.62E-12
1,834.400	1.35E-11	9.17	1.47E-12
1,817.600	1.31E-11	9.09	1.44E-12
1,830.600	1.31E-11	9.15	1.43E-12
1,815.400	1.28E-11	9.08	1.40E-12
Band Exposure Quotient:			2.20E-10

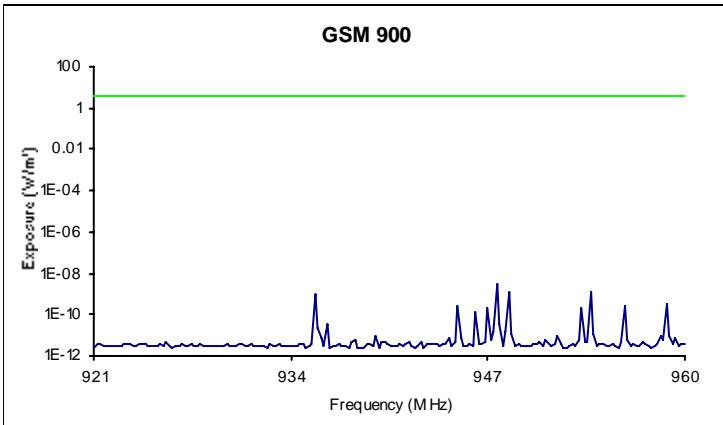


Frequency (MHz)	Maximum Exposure (W/m ²)	ICNIRP Limit (W/m ²)	Frequency Exposure Quotient
1,865.000	3.83E-08	9.32	4.10E-09
1,870.400	3.14E-08	9.35	3.36E-09
1,858.200	9.72E-09	9.29	1.05E-09
1,848.000	4.27E-09	9.24	4.62E-10
1,850.400	2.70E-09	9.25	2.92E-10
1,854.200	2.32E-09	9.27	2.50E-10
1,861.200	1.99E-09	9.31	2.14E-10
1,870.000	1.47E-09	9.35	1.57E-10
1,865.200	5.79E-10	9.33	6.21E-11
1,870.600	5.33E-10	9.35	5.70E-11
Band Exposure Quotient:			1.04E-08

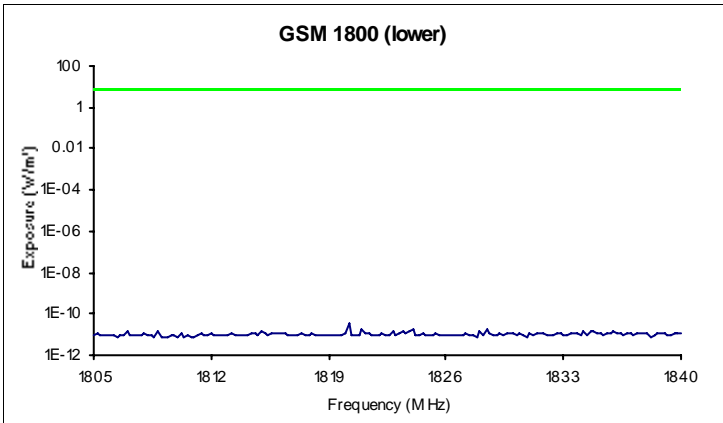
Total number of measurements: 572

Total Band Exposure Quotient: **3.72E-08**

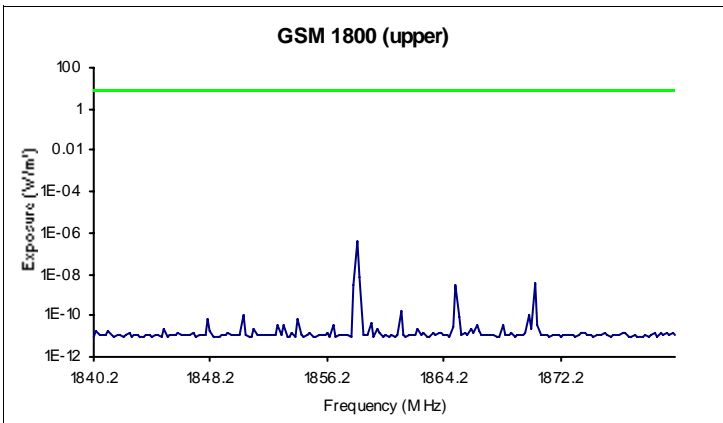
Site: Wray Castle	Receiver:
Location: 1st Floor Balcony, Wray Castle	Manufacturer: ROHDE&SCHWARZ
NGR: NY 3749 0103 Taken from GPS	Model: EB200
Start Time: 07 July 2005 0:43:44	Serial Number: 836.378/024
Officer: Stephen Parkinson	Antenna:
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609 02
	Serial Number: 100090



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
947.600	2.76E-09	4.74	5.83E-10
948.400	1.33E-09	4.74	2.80E-10
953.800	1.25E-09	4.77	2.63E-10
935.600	9.54E-10	4.68	2.04E-10
958.800	3.26E-10	4.79	6.79E-11
945.000	2.56E-10	4.72	5.43E-11
956.000	2.45E-10	4.78	5.14E-11
947.000	2.19E-10	4.74	4.63E-11
953.200	2.12E-10	4.77	4.46E-11
946.200	1.38E-10	4.73	2.92E-11
Band Exposure Quotient:			1.79E-09



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,820.200	3.30E-11	9.10	3.63E-12
1,821.000	1.82E-11	9.11	2.00E-12
1,828.400	1.72E-11	9.14	1.88E-12
1,824.000	1.71E-11	9.12	1.87E-12
1,808.800	1.59E-11	9.04	1.75E-12
1,834.600	1.51E-11	9.17	1.65E-12
1,834.800	1.45E-11	9.17	1.58E-12
1,834.200	1.41E-11	9.17	1.54E-12
1,828.000	1.40E-11	9.14	1.53E-12
1,807.000	1.35E-11	9.04	1.49E-12
Band Exposure Quotient:			2.01E-10

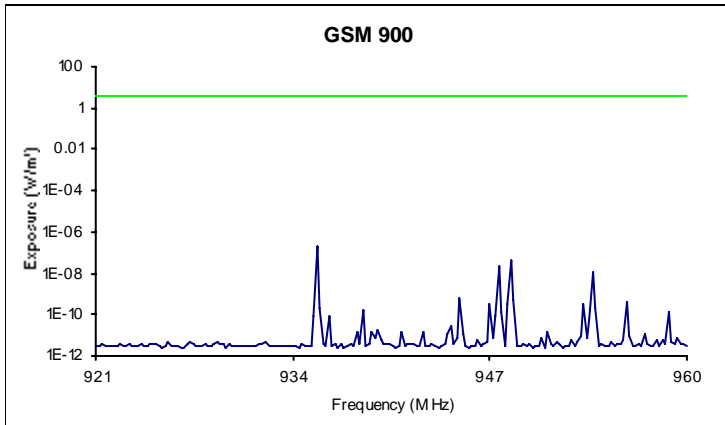


Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,858.200	4.15E-07	9.29	4.46E-08
1,858.400	7.21E-09	9.29	7.76E-10
1,870.400	3.69E-09	9.35	3.94E-10
1,865.000	2.97E-09	9.32	3.18E-10
1,858.000	2.93E-09	9.29	3.16E-10
1,861.200	1.70E-10	9.31	1.82E-11
1,870.000	1.14E-10	9.35	1.22E-11
1,850.400	1.05E-10	9.25	1.14E-11
1,865.200	8.57E-11	9.33	9.19E-12
1,854.200	7.49E-11	9.27	8.08E-12
Band Exposure Quotient:			4.68E-08

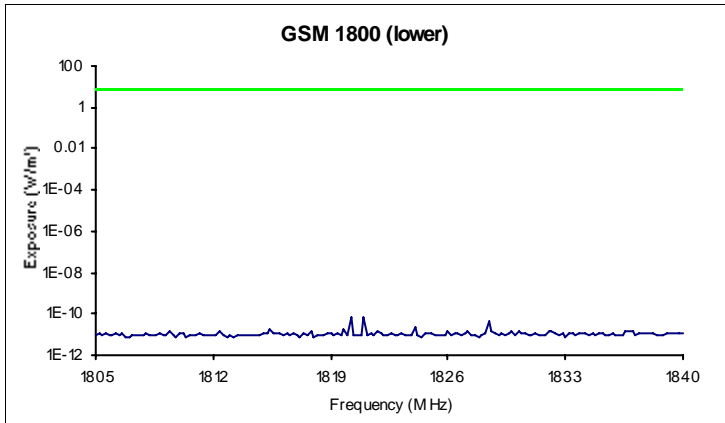
Total number of measurements: 572

Total Band Exposure Quotient: **4.88E-08**

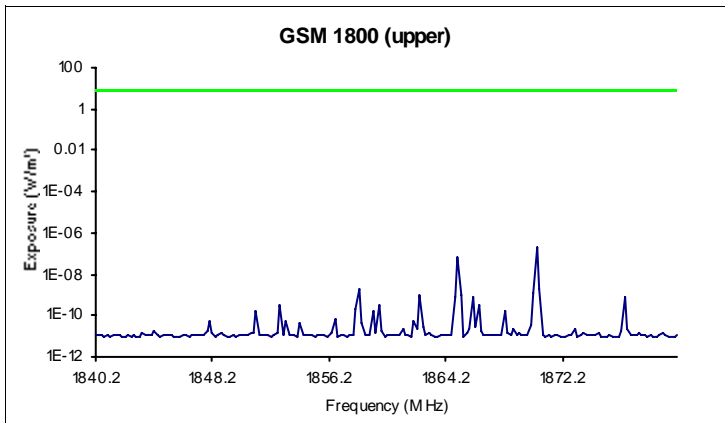
Site: Wray Castle	Receiver:
Location: Rutherford Room, Wray Castle	Manufacturer: ROHDE&SCHWARZ
NGR: NY 3749 0103 Taken from GPS	Model: EB200
Start Time: 07 July 2005 0:54:55	Serial Number: 836.378/024
Officer: Stephen Parkinson	Antenna:
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609 02
	Serial Number: 100090



Frequency (MHz)	Maximum Exposure (W/m ²)	ICNIRP Limit (W/m ²)	Frequency Exposure Quotient
935.600	1.95E-07	4.68	4.16E-08
948.400	4.39E-08	4.74	9.26E-09
947.600	2.10E-08	4.74	4.43E-09
953.800	1.17E-08	4.77	2.45E-09
945.000	6.75E-10	4.72	1.43E-10
948.600	4.71E-10	4.74	9.92E-11
956.000	4.17E-10	4.78	8.72E-11
947.000	3.32E-10	4.74	7.01E-11
948.200	3.25E-10	4.74	6.86E-11
953.200	2.93E-10	4.77	6.15E-11
Band Exposure Quotient:			5.87E-08



Frequency (MHz)	Maximum Exposure (W/m ²)	ICNIRP Limit (W/m ²)	Frequency Exposure Quotient
1,820.200	7.57E-11	9.10	8.32E-12
1,821.000	7.24E-11	9.11	7.95E-12
1,828.400	4.63E-11	9.14	5.06E-12
1,824.000	2.25E-11	9.12	2.47E-12
1,819.800	1.94E-11	9.10	2.14E-12
1,815.400	1.84E-11	9.08	2.03E-12
1,828.600	1.50E-11	9.14	1.64E-12
1,827.200	1.49E-11	9.14	1.64E-12
1,809.400	1.45E-11	9.05	1.60E-12
1,832.200	1.44E-11	9.16	1.57E-12
Band Exposure Quotient:			2.19E-10

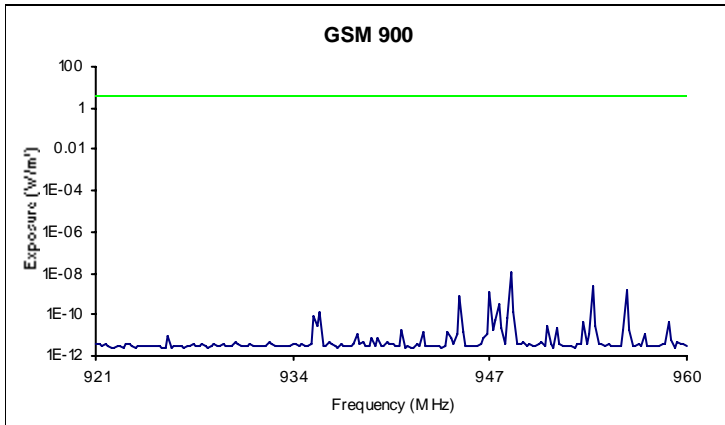


Frequency (MHz)	Maximum Exposure (W/m ²)	ICNIRP Limit (W/m ²)	Frequency Exposure Quotient
1,870.400	1.89E-07	9.35	2.02E-08
1,865.000	6.65E-08	9.32	7.13E-09
1,870.600	1.98E-09	9.35	2.12E-10
1,858.200	1.81E-09	9.29	1.95E-10
1,870.200	1.34E-09	9.35	1.43E-10
1,862.400	1.10E-09	9.31	1.18E-10
1,865.200	1.05E-09	9.33	1.13E-10
1,866.000	8.19E-10	9.33	8.78E-11
1,876.400	8.15E-10	9.38	8.69E-11
1,864.800	7.46E-10	9.32	8.00E-11
Band Exposure Quotient:			2.88E-08

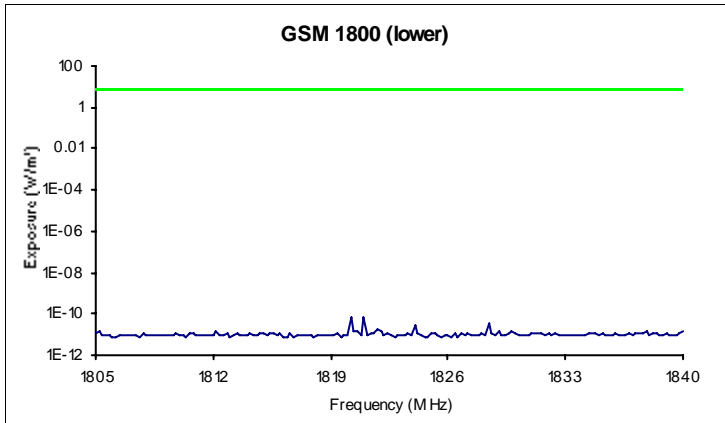
Total number of measurements: 572

Total Band Exposure Quotient: **8.78E-08**

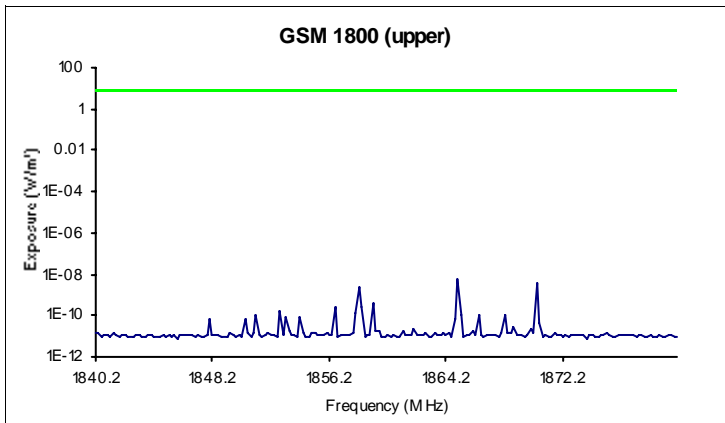
Site: Wray Castle	Receiver:
Location: Dining Room, Wray Castle	Manufacturer: ROHDE&SCHWARZ
NGR: NY 3749 0103 Taken from GPS	Model: EB200
Start Time: 07 July 2005 1:08:01	Serial Number: 836.378/024
Officer: Stephen Parkinson	Antenna:
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609 02
	Serial Number: 100090



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
948.400	1.05E-08	4.74	2.22E-09
953.800	2.33E-09	4.77	4.89E-10
956.000	1.51E-09	4.78	3.17E-10
947.000	1.29E-09	4.74	2.73E-10
945.000	8.49E-10	4.72	1.80E-10
947.600	3.10E-10	4.74	6.55E-11
948.600	1.39E-10	4.74	2.93E-11
935.800	1.26E-10	4.68	2.69E-11
935.400	9.32E-11	4.68	1.99E-11
948.200	7.12E-11	4.74	1.50E-11
Band Exposure Quotient:			3.85E-09



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,821.000	6.45E-11	9.11	7.09E-12
1,820.200	6.15E-11	9.10	6.76E-12
1,828.400	3.85E-11	9.14	4.21E-12
1,824.000	2.96E-11	9.12	3.25E-12
1,821.800	1.70E-11	9.11	1.87E-12
1,812.200	1.60E-11	9.06	1.76E-12
1,820.600	1.55E-11	9.10	1.70E-12
1,822.000	1.45E-11	9.11	1.59E-12
1,829.800	1.43E-11	9.15	1.57E-12
1,805.200	1.41E-11	9.03	1.56E-12
Band Exposure Quotient:			2.10E-10

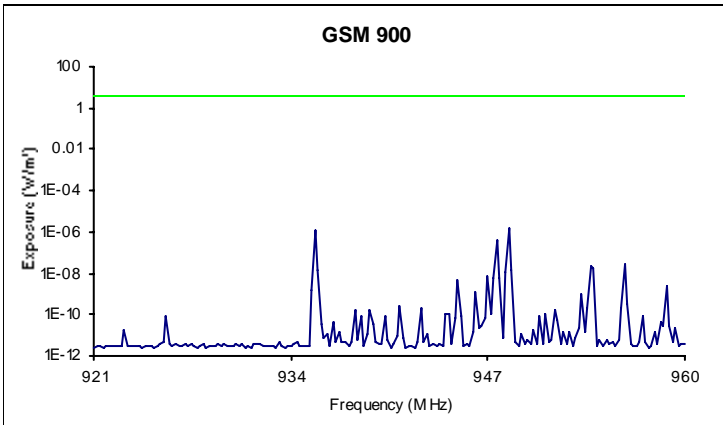


Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,865.000	5.28E-09	9.32	5.66E-10
1,870.400	3.44E-09	9.35	3.68E-10
1,858.200	2.23E-09	9.29	2.40E-10
1,859.200	4.25E-10	9.30	4.57E-11
1,856.600	2.49E-10	9.28	2.68E-11
1,858.400	2.44E-10	9.29	2.63E-11
1,852.800	1.67E-10	9.26	1.81E-11
1,858.000	1.37E-10	9.29	1.48E-11
1,851.200	1.13E-10	9.26	1.22E-11
1,866.400	1.08E-10	9.33	1.16E-11
Band Exposure Quotient:			1.63E-09

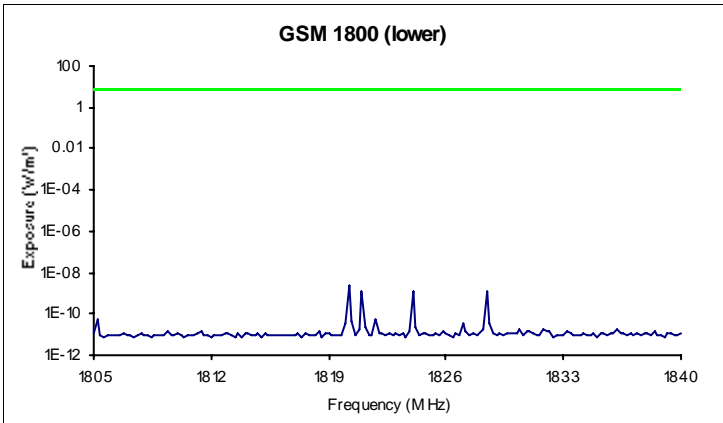
Total number of measurements: 572

Total Band Exposure Quotient: **5.69E-09**

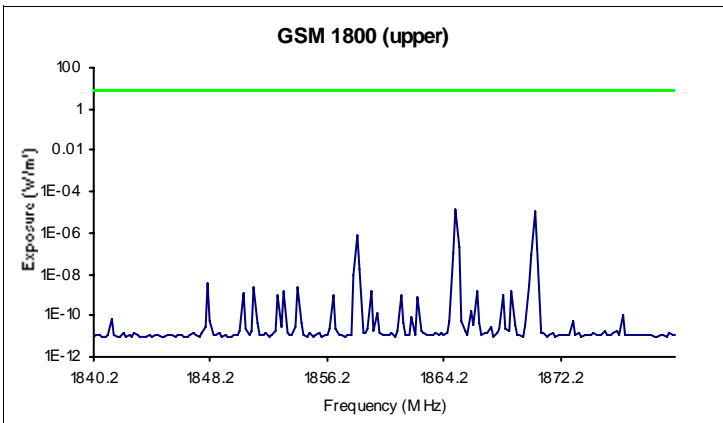
Site: Wray Castle	Receiver:
Location: Overflow carpark, Wray Castle	Manufacturer: ROHDE&SCHWARZ
NGR: NY 3743 0107 Taken from GPS	Model: EB200
Start Time: 07 July 2005 1:25:00	Serial Number: 836.378/024
Officer: Stephen Parkinson	Antenna:
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609 02
	Serial Number: 100090



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
948.400	1.63E-06	4.74	3.44E-07
935.600	1.23E-06	4.68	2.63E-07
947.600	3.73E-07	4.74	7.87E-08
956.000	2.75E-08	4.78	5.76E-09
953.800	2.39E-08	4.77	5.00E-09
954.000	1.65E-08	4.77	3.46E-09
935.800	1.55E-08	4.68	3.31E-09
948.600	1.49E-08	4.74	3.14E-09
948.200	1.21E-08	4.74	2.55E-09
947.000	6.78E-09	4.74	1.43E-09
Band Exposure Quotient:			7.16E-07



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,820.200	2.34E-09	9.10	2.57E-10
1,828.400	1.22E-09	9.14	1.33E-10
1,821.000	1.20E-09	9.11	1.32E-10
1,824.000	1.10E-09	9.12	1.21E-10
1,805.200	5.60E-11	9.03	6.20E-12
1,821.800	5.02E-11	9.11	5.51E-12
1,820.400	4.07E-11	9.10	4.47E-12
1,820.000	3.79E-11	9.10	4.17E-12
1,828.600	3.59E-11	9.14	3.93E-12
1,827.000	3.58E-11	9.13	3.92E-12
Band Exposure Quotient:			8.63E-10

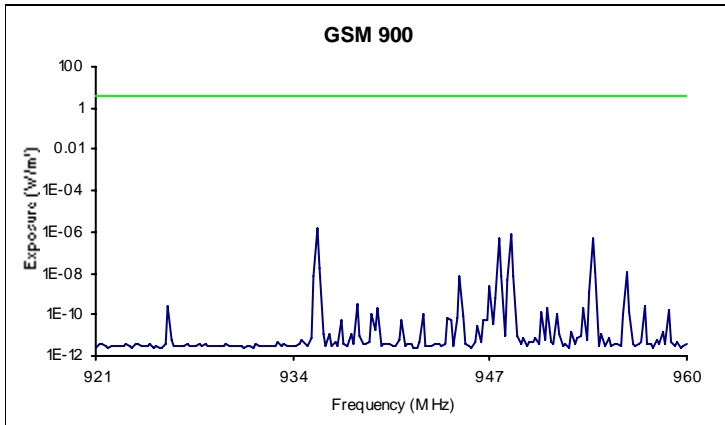


Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,865.000	1.30E-05	9.32	1.39E-06
1,870.400	1.22E-05	9.35	1.31E-06
1,858.200	7.90E-07	9.29	8.50E-08
1,865.200	2.20E-07	9.33	2.36E-08
1,870.600	1.50E-07	9.35	1.61E-08
1,864.800	1.05E-07	9.32	1.13E-08
1,870.200	8.84E-08	9.35	9.46E-09
1,858.400	1.73E-08	9.29	1.86E-09
1,858.000	9.72E-09	9.29	1.05E-09
1,848.000	3.98E-09	9.24	4.31E-10
Band Exposure Quotient:			2.85E-06

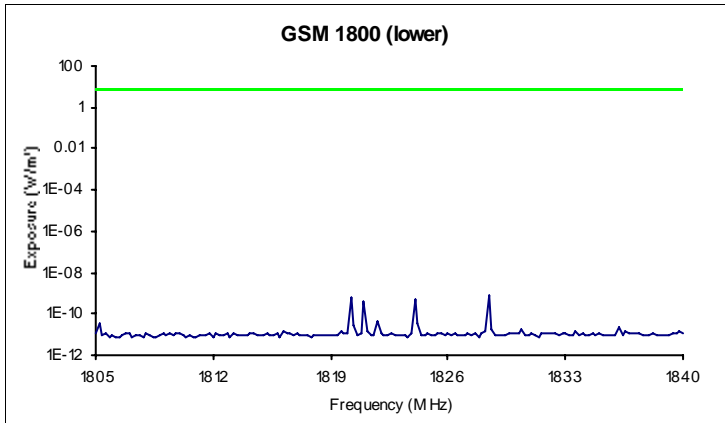
Total number of measurements: 572

Total Band Exposure Quotient: **3.56E-06**

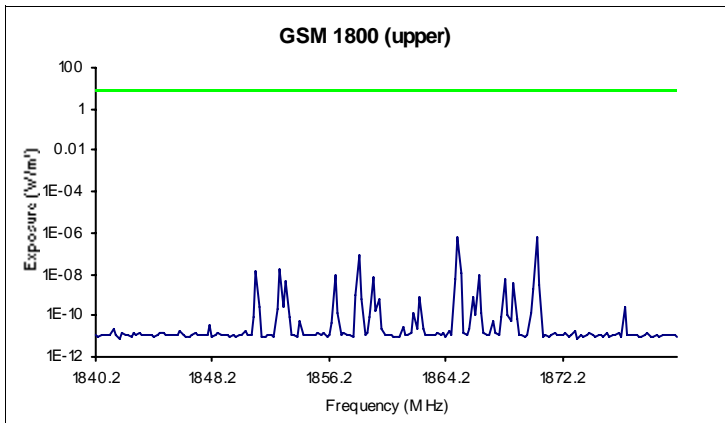
Site: Wray Castle	Receiver:
Location: Centre of lawn, Wray Castle	Manufacturer: ROHDE&SCHWARZ
NGR: NY 3746 0087 Taken from GPS	Model: EB200
Start Time: 07 July 2005 1:39:39	Serial Number: 836.378/024
Officer: Stephen Parkinson	Antenna:
	Manufacturer: Rohde & Schwarz
	Model: HE200.4050.3609 02
	Serial Number: 100090



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
935.600	1.62E-06	4.68	3.46E-07
948.400	8.17E-07	4.74	1.72E-07
947.600	5.03E-07	4.74	1.06E-07
953.800	4.65E-07	4.77	9.76E-08
935.800	1.90E-08	4.68	4.07E-09
954.000	1.22E-08	4.77	2.57E-09
956.000	1.10E-08	4.78	2.29E-09
945.000	8.11E-09	4.72	1.72E-09
947.800	7.98E-09	4.74	1.68E-09
948.600	7.63E-09	4.74	1.61E-09
Band Exposure Quotient:			7.41E-07



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,828.400	7.17E-10	9.14	7.84E-11
1,820.200	6.44E-10	9.10	7.08E-11
1,824.000	4.70E-10	9.12	5.15E-11
1,821.000	4.26E-10	9.11	4.68E-11
1,821.800	4.68E-11	9.11	5.14E-12
1,805.200	3.37E-11	9.03	3.74E-12
1,824.200	3.33E-11	9.12	3.65E-12
1,820.400	2.81E-11	9.10	3.09E-12
1,836.200	2.41E-11	9.18	2.62E-12
1,828.600	1.80E-11	9.14	1.97E-12
Band Exposure Quotient:			4.50E-10



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,870.400	6.56E-07	9.35	7.01E-08
1,865.000	6.50E-07	9.32	6.97E-08
1,858.200	9.07E-08	9.29	9.76E-09
1,852.800	1.92E-08	9.26	2.07E-09
1,851.200	1.36E-08	9.26	1.47E-09
1,865.200	1.21E-08	9.33	1.30E-09
1,866.400	1.01E-08	9.33	1.08E-09
1,856.600	8.25E-09	9.28	8.89E-10
1,859.200	7.05E-09	9.30	7.59E-10
1,868.200	5.96E-09	9.34	6.38E-10
Band Exposure Quotient:			1.61E-07

Total number of measurements: 572

Total Band Exposure Quotient: **9.02E-07**

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(μ V/m)) converted to an equivalent power density (W/m²)
- 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/m²)
- ICNIRP Limit:** The reference level given by the International Commission for Non-Ionizing Radiation Protection (ICNIRP) for general public exposure to electromagnetic fields

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

(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