

## **Mobile Telephone Base-station Radio Emission Audit**

Audit Site: **The Loop**  
**British Lines Road**  
Gibraltar

The Gibraltar Regulatory Authority (GRA) is responsible for the management of the civil radio spectrum in Gibraltar. The Government has asked the GRA to implement a national measurement programme to ensure that emissions from cellular base stations do not exceed recommended guidelines.

GRA engineers measure the power density of transmissions in the various radio bands to be surveyed. The results, derived from electric field voltage measurements, are referenced to and presented alongside the relevant International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommended 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. At the top of each graph a dotted green line indicates the ICNIRP recommended exposure level for that frequency band. To the right hand side of each graph is a table showing the ten highest peak level emissions recorded within a band. In addition to this report, results taken from each audit site will be posted on the GRA website at [www.gra.gi](http://www.gra.gi) where further information on the audit can be found.

Further explanation of the results and their context within ICNIRP guidelines can be provided by the GRA engineers at the time of the audit or by contacting the GRA on 74636 or by e-mail at [info@gra.gi](mailto:info@gra.gi)

## Report Summary

The Gibraltar Regulatory Authority performed this survey of the RF emission environment prevailing in the Frontier Area on 6<sup>th</sup> June 2003.

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

The following table, summarises the results obtained at the measurement location.

Summary of results:

Location	Total Band Exposure Quotient	Relationship to ICNIRP Public Exposure Level
<b>The Loop, British Lines Road</b>	4.25915725635486E-06	~ 1 / 234788

Issued on behalf of the Gibraltar Regulatory Authority

Issued by:

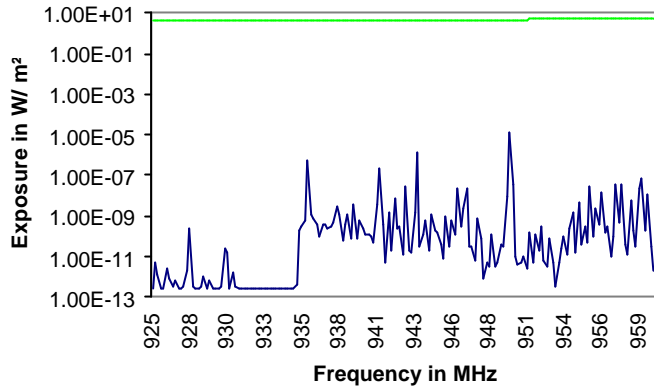
Received by:

Peter Hyde / Joseph Torres

**Site:** The Loop  
**Location:** British Lines Road  
**Date:** 6<sup>th</sup> June 2003 11:50:00  
**Engineer:** Peter Hyde / Joseph Torres

**Receiver:**  
 Manufacturer: ROHDE & SCHWARZ  
 Model: EB200  
 Serial Number: 100715  
**Antenna:**  
 Manufacturer: ROHDE & SCHWARZ  
 Model: 40522.9156.02  
 Serial Number: N/A

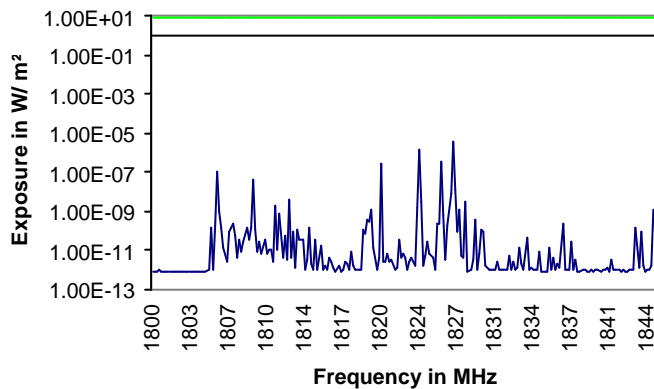
**GSM 900 (925- 960 MHz)**



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
935.800	5.012E-07	4.68	1.071E-07
940.800	2.399E-07	4.70	5.100E-08
942.600	3.090E-08	4.71	6.557E-09
943.400	1.230E-06	4.72	2.608E-07
949.600	9.120E-09	4.75	1.921E-09
949.800	1.318E-05	4.75	2.776E-06
950.000	3.311E-08	4.75	6.971E-09
955.400	3.162E-08	4.78	6.620E-09
958.800	2.239E-08	4.79	4.670E-09
959.000	6.457E-08	4.80	1.347E-08

Band Exposure Quotient: 3.277E-06

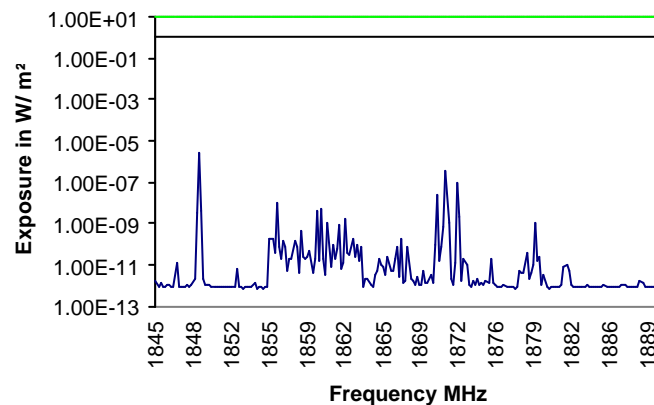
**GSM 1800 Lower (1800-1845 MHz)**



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,805.800	1.096E-07	9.03	1.214E-08
1,809.000	4.266E-08	9.05	4.716E-09
1,811.000	2.042E-09	9.06	2.255E-10
1,812.200	4.169E-09	9.06	4.601E-10
1,819.600	1.202E-09	9.10	1.321E-10
1,820.400	2.399E-07	9.10	2.636E-08
1,823.800	1.445E-06	9.12	1.585E-07
1,826.800	3.802E-06	9.13	4.162E-07
1,828.000	3.236E-09	9.14	3.540E-10
1,844.800	1.122E-09	9.224	1.216E-10

Band Exposure Quotient: 6.567E-07

**GSM 1800 Upper (1845-1890 MHz)**



Frequency (MHz)	Maximum Exposure (W/m²)	ICNIRP Limit (W/m²)	Frequency Exposure Quotient
1,848.600	3.162E-09	9.24	3.421E-10
1,848.800	2.512E-06	9.24	2.717E-07
1,849.000	4.266E-09	9.25	4.614E-10
1,855.800	1.096E-08	9.28	1.182E-09
1,859.800	5.248E-09	9.30	5.644E-10
1,860.400	1.175E-09	9.30	1.263E-10
1,870.200	2.630E-08	9.35	2.813E-09
1,871.000	3.388E-07	9.36	3.622E-08
1,872.000	9.772E-08	9.36	1.044E-08
1,872.200	2.089E-09	9.36	2.232E-10

Band Exposure Quotient: 3.255E-07

**Total Band Exposure Quotient: 4.259E-06**

# Glossary

**Location:**

The point at which the readings are taken. Each location is identified by its address and its timestamp. A description of the location should be sufficient to allow the position to be identified at a later date.

**Date:**

The date and time at which the receiver started taking its measurements at a location.

**Antenna:**

The antenna device connected to the receiver. This is known by its serial number, type and manufacturer, and has an associated calibration (see definition).

**Sweep Band:**

The measurements are taken at regular frequency intervals within a band of frequencies. A sweep band is defined by the band title (which appears on each graph), start frequency, end frequency, frequency step, bandwidth and dwell time.

**Exposure:**

This is the name given to the measured results. The maximum electric field strength values in decibel microvolts per metre (dB(mV/m)) are converted to power density in watts per square metre (W/m<sup>2</sup>).

**Table Data:**

The 'Maximum Exposure' column consists of the ten highest exposure values in a band. Accompanying them are the frequency at which they occurred, the ICNIRP limit at that frequency (see definition), and the frequency exposure quotient (see definition).

**ICNIRP:**

International Commission for Non-Ionizing Radiation Protection

**ICNIRP Limit:**

This is a guideline for the maximum permitted power density of non-ionizing radiation for public exposure. The guideline is frequency dependent and is currently defined as:

*Frequency ICNIRP Limit*

Less than 400MHz 2W/m<sup>2</sup>

400MHz to 2GHz (f / 200)W/m<sup>2</sup>, where f is frequency in MHz

2GHz to 300GHz 10 W/m<sup>2</sup>

**Frequency Exposure Quotient:**

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

**Band Exposure Quotient:**

The sum of all the frequency exposure quotients in a band at a single location.

**Total Band Exposure Quotient:**

The sum of all the frequency exposure quotients in all bands at a single location.

**Power Density:**

The energy flowing from an antenna through a unit area normal to the direction of propagation in a unit time. This is measured in watts per square metre (W/m<sup>2</sup>).

**GSM:** Global System for Mobile communication

**TETRA:** Terrestrial Trunked Radio

**1.000E-06** Exponential (or scientific) number format. Equal to one millionth

**1.000E-09** Equal to one thousand millionth

**1.000E-12** Equal to one million millionth.