



# Ambient Levels of Radio Frequency Emissions in the Kingdom of Bahrain

Results of measurements made between  
July and September 2011

A Report issued by the  
Telecommunications Regulatory Authority

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## **Purpose**

This report presents the results of RF field strength measurements taken in the Kingdom of Bahrain during the 3rd Quarter of 2011.

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## **1 Executive Summary**

- 1.1 This report is the 3rd report issued in 2011 by TRA as part of its ongoing campaign to measure the ambient level of Radio Frequency (RF) field strengths in the Kingdom of Bahrain.
- 1.2 Previous reports provided a detailed background to the issue as well as the results of measurements taken during the period covered by the report. This report provides the results of measurements made between July and September 2011 and can be considered to be an extension of the earlier reports.
- 1.3 The key findings concerning the measurements presented in this report are:
  - a. All RF field strengths measured are significantly below the ICNIRP guideline.
  - b. The highest total exposure level measured during the quarter was 0.12% of the ICNIRP level. This level was recorded at Arad (opposite MHQ Stadium).

## **2 Introduction**

- 2.1 This report is the 3rd report issued in 2011 by TRA as part of its ongoing campaign to measure the ambient level of Radio Frequency (RF) field strengths in the Kingdom of Bahrain.
- 2.2 Previous reports provided a detailed background to the issue as well as the results of measurements taken during the period covered by the report. This report provides the results of measurements made between July and September 2011 and can be considered to be an extension of the earlier reports.
- 2.3 During the period July to September 2011 measurements of RF field strengths were made at 12 locations throughout the Kingdom of Bahrain.
- 2.4 The results of these measurements are presented in section 4 of this report.

### 3 Scope

3.1 This report presents the results of measurements made between July and September 2011 at the following locations:

<b>Location</b>	<b>General Area</b>	<b>Specific location</b>
1	Arad	Rd 4432
2	Arad	Opposite Muharraq Stadium
3	Dumistan	Rd 2242
4	Janabeya	Rd 7912
5	Mugaba	Rd 569
6	Dumistan	Rd 1922
7	East Riffa	Rd 2726
8	Hamad Town	Rd 1650
9	Hamad Town	Rd 608
10	Riffa	Rd 1702
11	Sadad	Next to Batelco Tower
12	Um Al Hassam	Rd 3318

**Table 1: locations of measurement**

## 4 Results

- 4.1 Measurements were made either with the Insite Free or Insite Box systems. The Insite Box system enables automated measurements to be made continuously over a period of time (i.e. 24 hours a day and 7 days a week), but can only measure up to 3 GHz. The Insite Free equipment can measure up to 6GHz and therefore also measures the WiMAX band. Further, the Insite Free equipment enables a more detailed investigation of any frequency band within its range, but has to be operated manually. Thus the Insite Free system is used to measure signals in the WiMAX band and also for detailed follow-up investigations of measurements made using the Insite Box equipment.

### Insite Free

- 4.2 Measurements using the Insite Free equipment were made at the sites listed in Table 2 below. These sites were selected as they are close to recently erected base stations.
- 4.3 The following table shows the total exposure measured at each location as a percentage of the ICNIRP level:

Location / site name	Total % exposure limit
Arad Rd 4432	0.1
Arad-opposite MHQ Stadium	0.12
Um Al Hassam Rd 3318	0.04

**Table 2: Locations and results of measurement made with Insite Free**

### Insite Box

- 4.4 Figures 1 to 9 below present the results of measurements taken at each site showing the total exposure as a fraction of the ICNIRP level, as well as the minimum, maximum and average field strengths measured, per band, as a percentage of the ICNIRP level.
- 4.5 All measurements were taken in typical public or domestic locations (i.e. inside homes, offices or apartments).

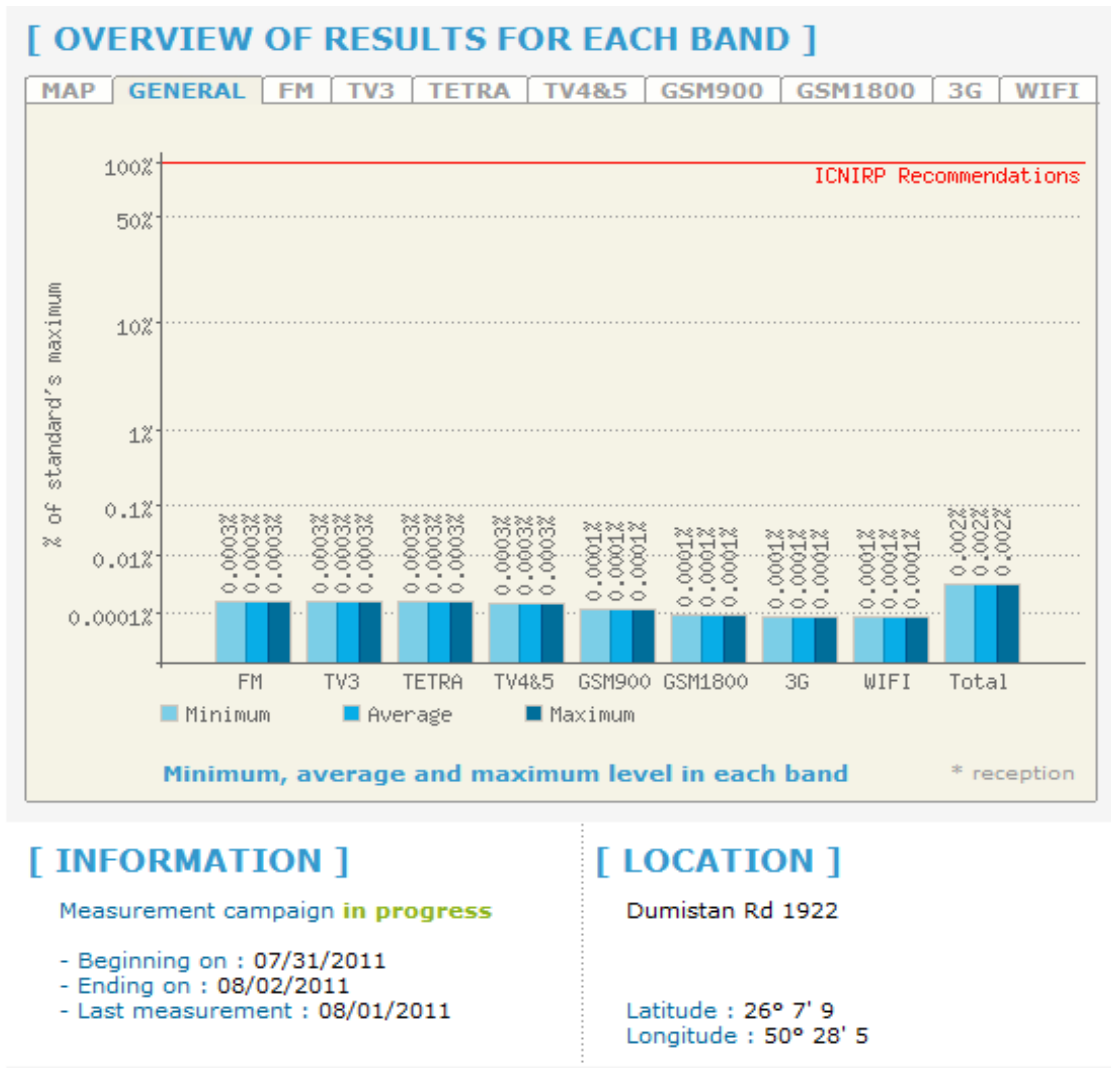


Figure 1: Result for Dumistan Rd 1922

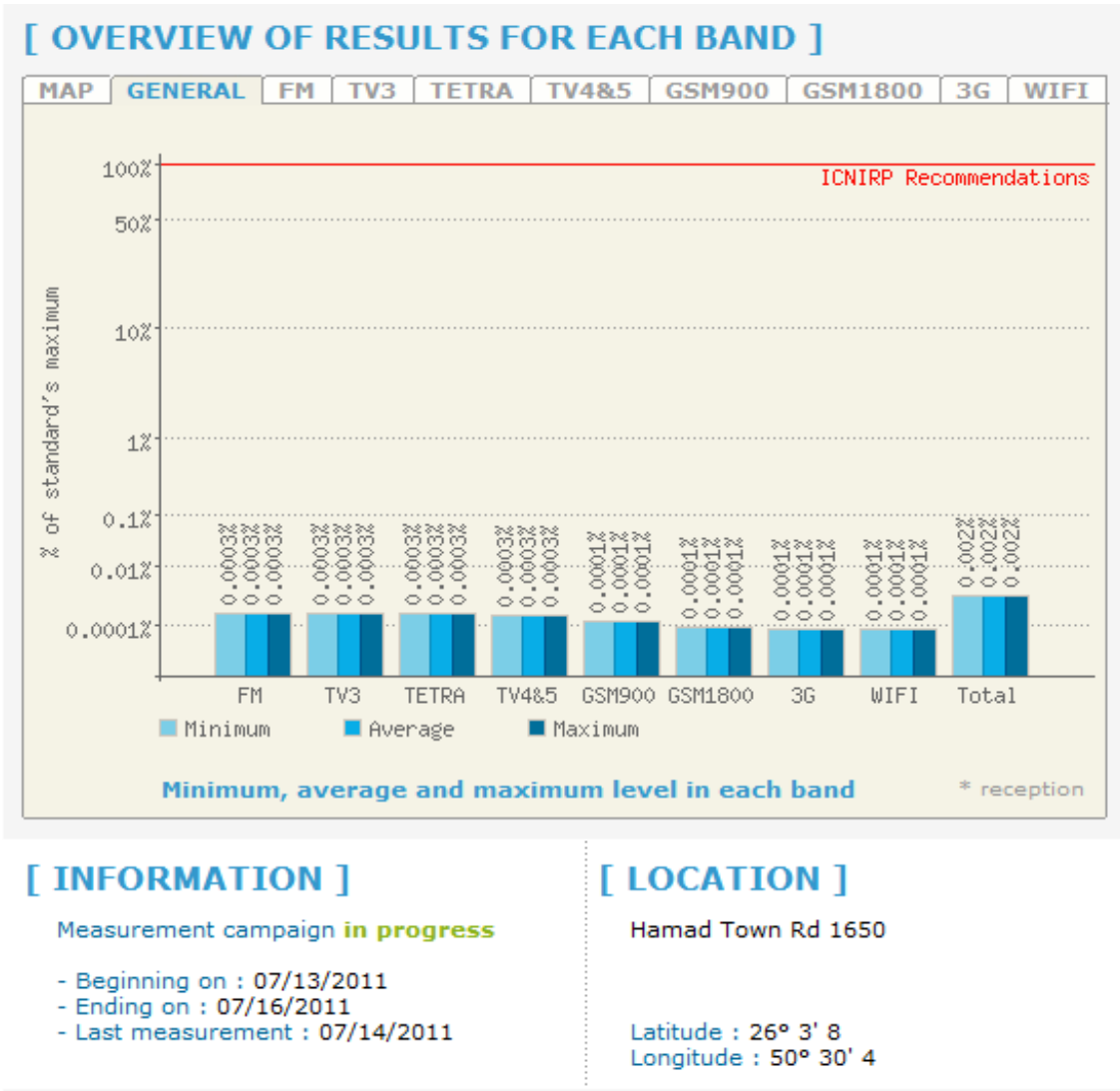
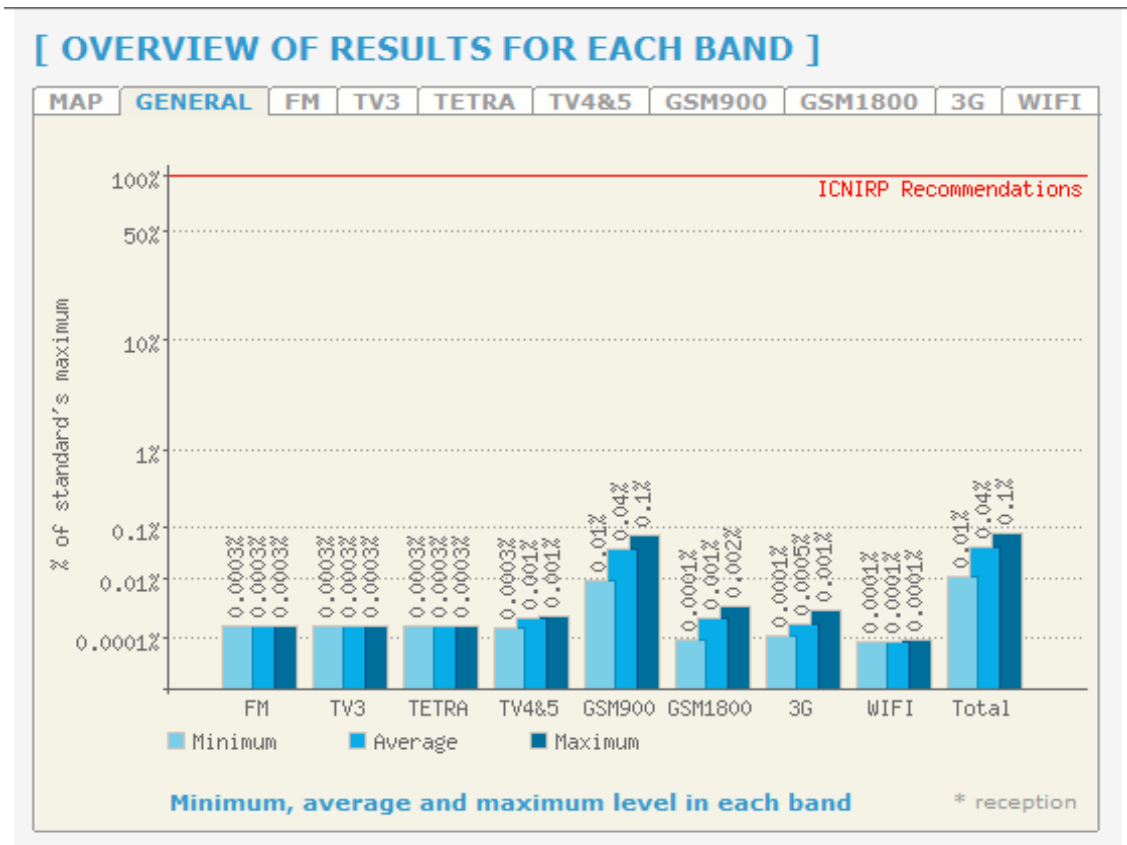


Figure 2: Result for Hamad Town Rd 1650





**[ INFORMATION ]**

Measurement campaign finished

- Beginning on : 07/25/2011
- Ending on : 07/27/2011
- Last measurement : 07/26/2011

**[ LOCATION ]**

EAST RIFFA 2726

Latitude : 26° 7' 6  
Longitude : 50° 34' 9

**Figure 3: Result for East Riffa Rd 2726**

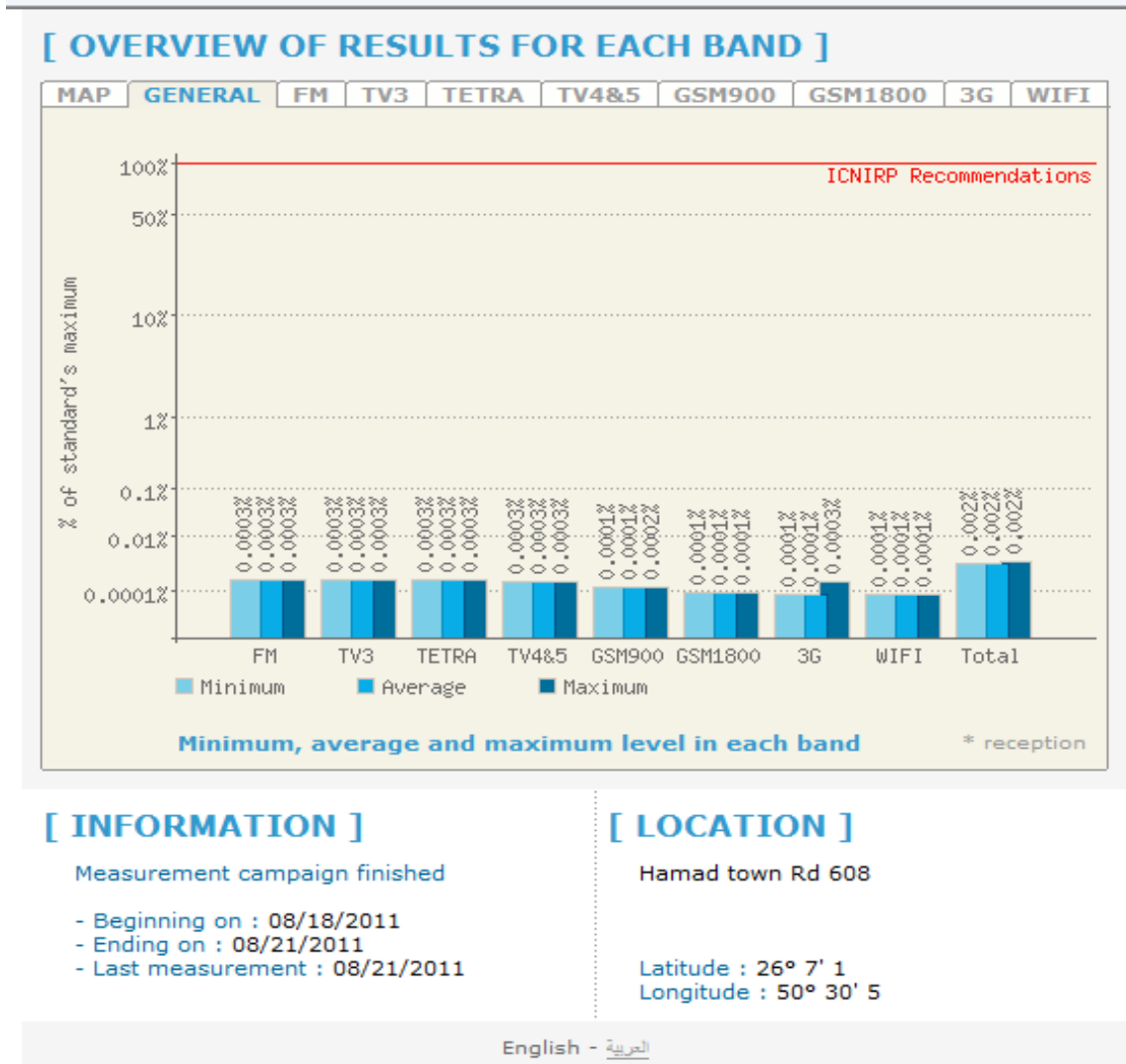


Figure 4: Result for Hamad Town Rd 608

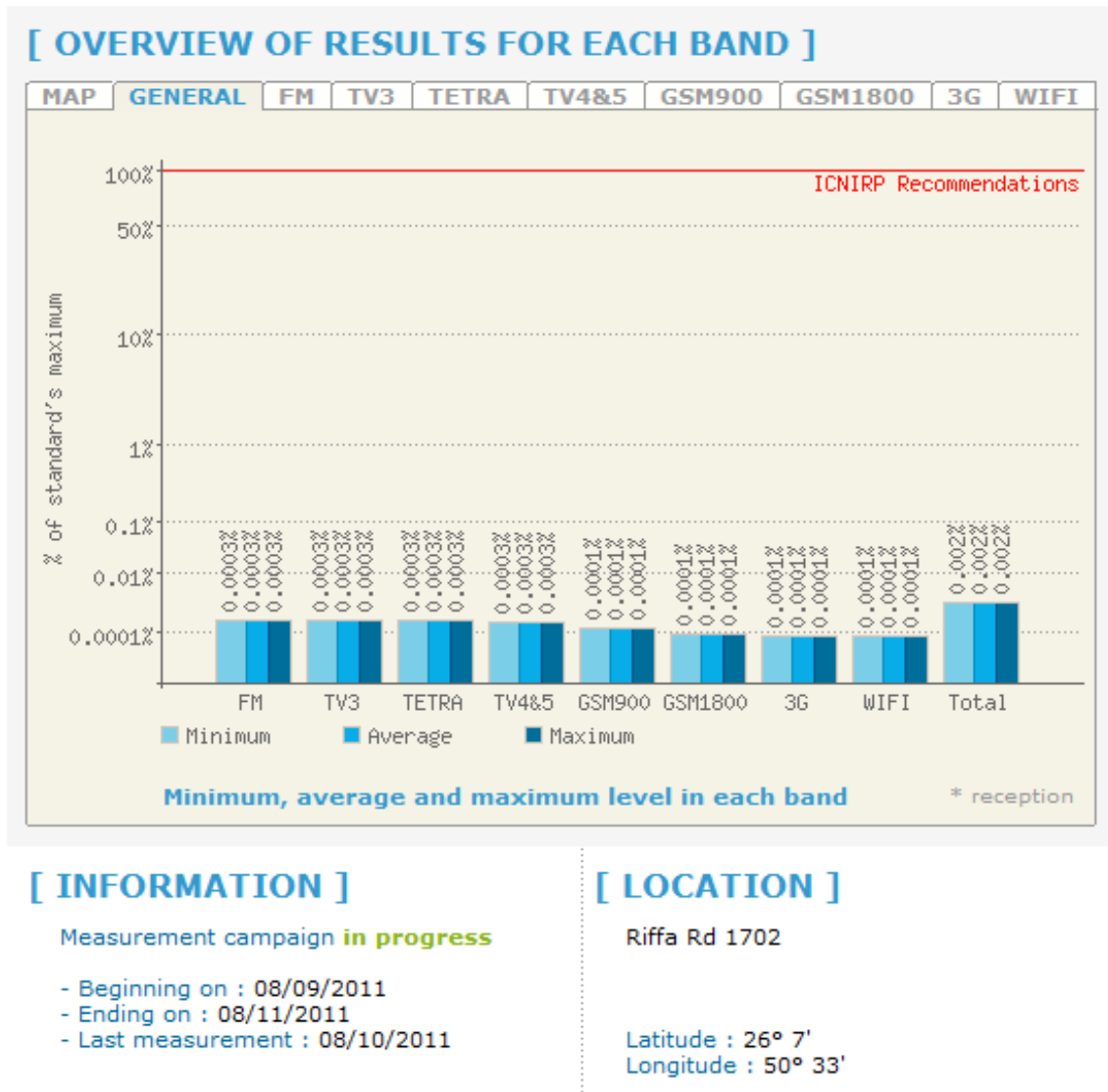


Figure 5: Result for Riffa Rd 1702

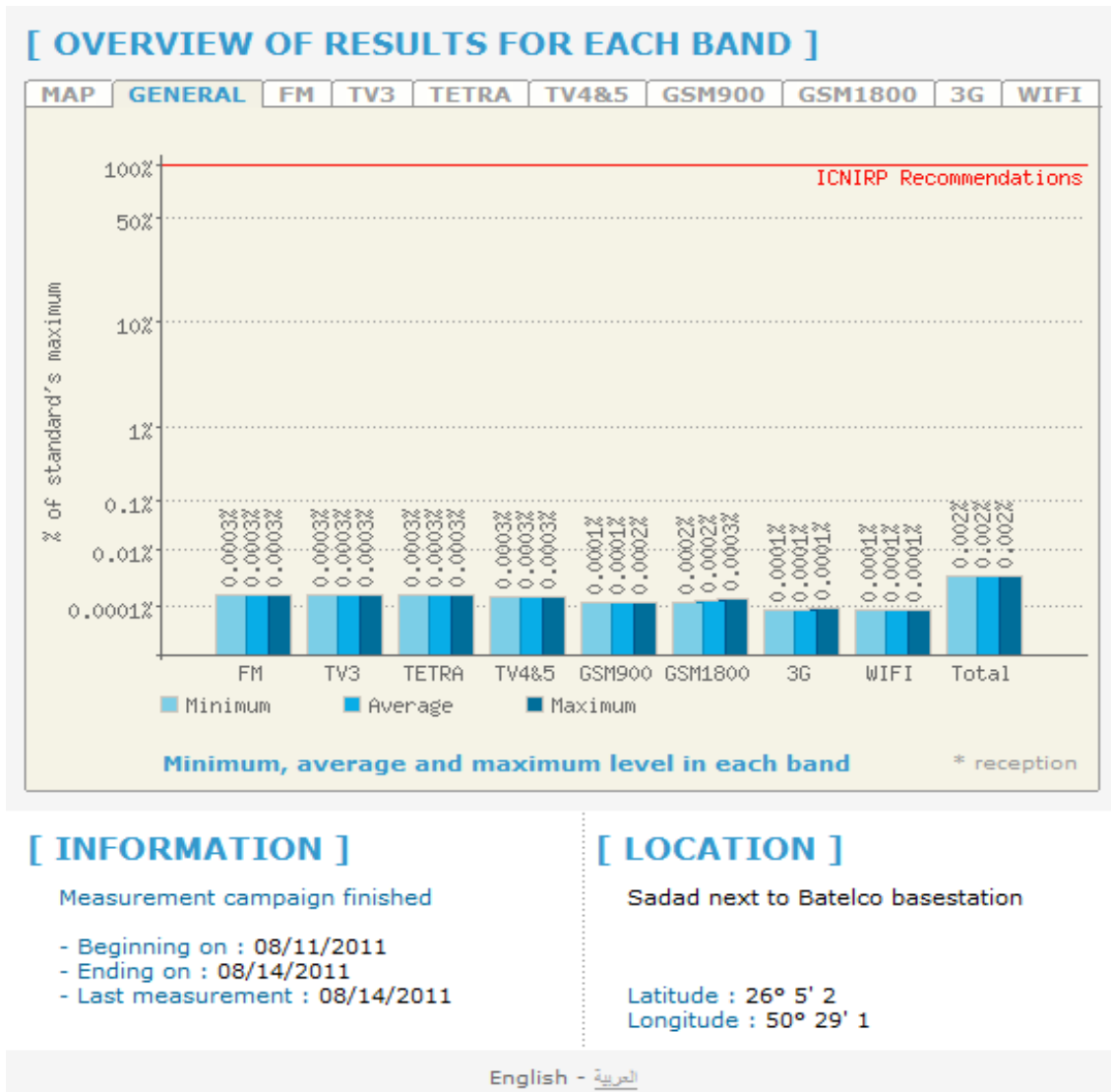


Figure 6: Result for Sadad- next to Batelco Tower

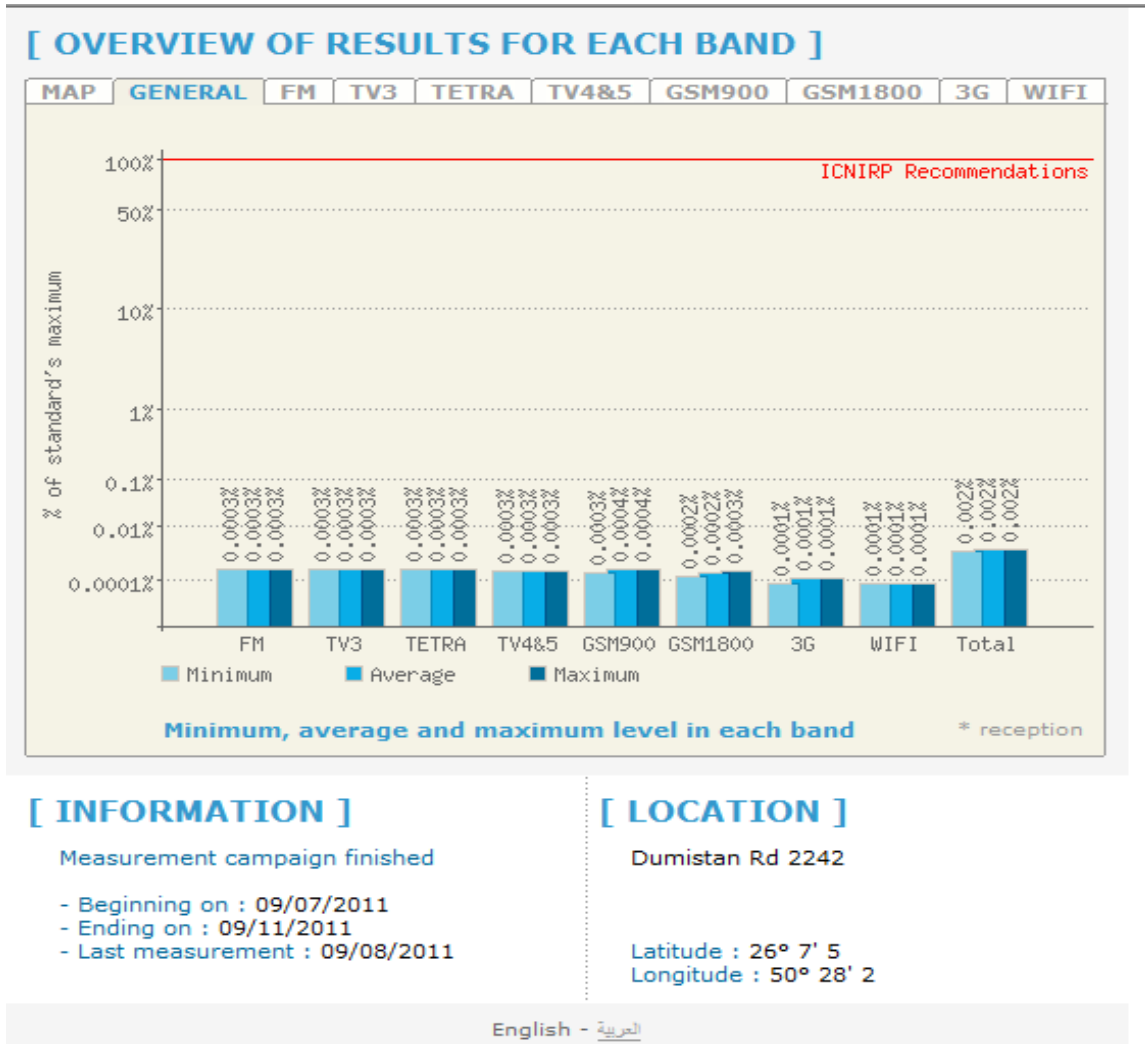


Figure 7: Result for Dumistan Rd 2242

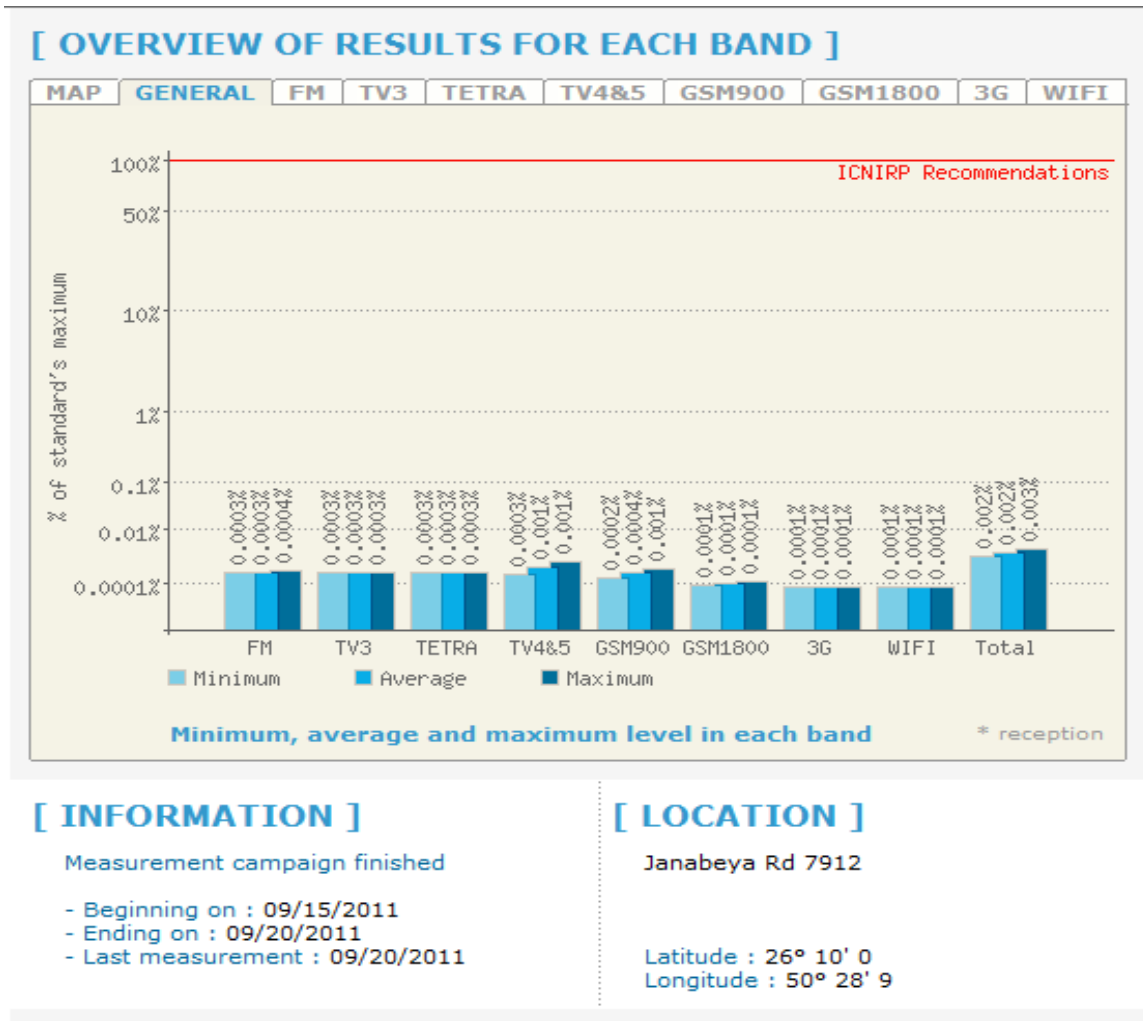


Figure 8: Result for Janabeya Rd 7912

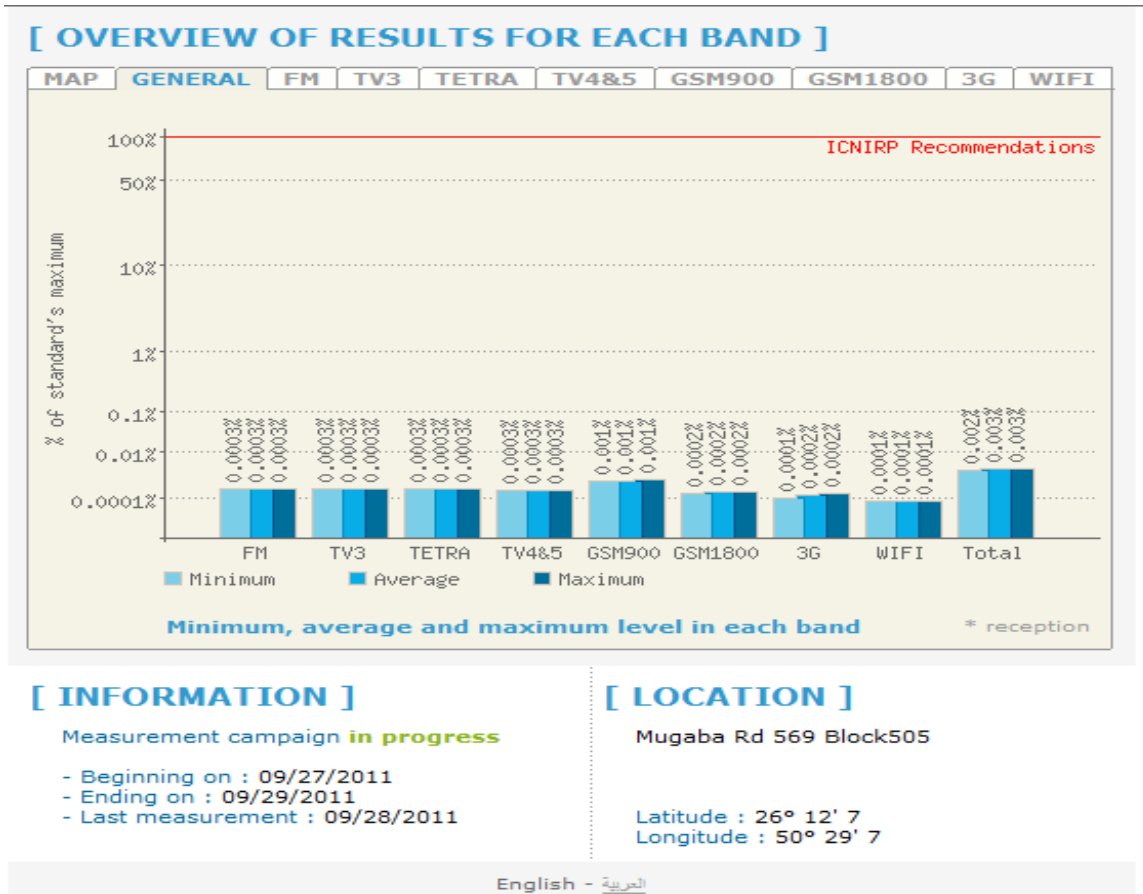


Figure 9: Result for Mugaba Rd 569

## **5 Conclusions**

- 5.1 The levels of all RF signals measured during the period were very small compared to the ICNIRP guidelines and at, or very close to, the lowest signal level measurable by the test equipment.
- 5.2 The highest total exposure level measured during the quarter was 0.12% of the ICNIRP level. This level was recorded at Arad (opposite MHQ Stadium).

## **6 Next Steps**

- 6.1 TRA will continue with the measurement campaign in 2011 to map RF signal levels throughout the Kingdom of Bahrain