



Ambient Levels of Radio Frequency Emissions in the Kingdom of Bahrain

Results of measurements made between
January and March 2010

A Report issued by the
Telecommunications Regulatory Authority

Reference: LIC/0410/194
06 April 2010

Purpose

To present the results of RF field strength measurements taken in Bahrain during the 1st Quarter of 2010.

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1 Executive Summary

- 1.1 This report is the first 2010 report issued 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 of 2009 provided a detailed background to the issue as well as the results for measurements taken during that period. This report provides the results of measurements made between January and March 2010 and can be considered to be an extension of the earlier report issued in December 2009.
- 1.3 The key findings of 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 for a typical public/domestic site measured during the quarter was very small at 0.1% of the ICNIRP level as shown in Figure 8 Hamad Town, Road 1205.
 - c. The measurement using Insite Free equipment at Jidhafs (Granada Garden) is higher than at other locations but this is to be expected given that the measurement was taken at a distance of about 200m from the base station. Never the less, the measurement is still very small at just a 0.19% of the ICNIRP level.

2 Introduction

- 2.1 This report is the first of 2010 report issued 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 of 2009 provided a detailed background to the issue as well as the results for measurements taken during that period. This report provides the results of measurements made between January and March 2010 and can be considered to be an extension of the earlier report issued in December 2009.
- 2.3 During the period January to March 2010 measurements of RF field strengths were made at 14 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 January and March 2010 at the following locations:

Location	General Area	Specific location
1	Jufair	Road2442
2	Hamala	Children Academy
3	Awali	Road 4532
4	Hamad Town	Block 1203
5	West Riffa	Road 233
6	Seef District	new TRA office
7	Shahrakan	Road 4441
8	Sadad	Road 3758
9	Arad	Road 4432
10	Hamad Town	Road 1205
11	Boori	Road 5443
12	Muharraq	Road 214
13	Jidhafs	Granada Garden
14	Hamad Town	Road 1102

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 covers the WiMAX band. Further, it enables a more detailed investigation of any specific frequency band, but has to be operated manually. Thus the Insite Free system is used to follow-up on measurements made using the Insite Box equipment and also when specific instantaneous measurements are required – particularly involving the WiMAX band.

Insite Free

- 4.2 Measurements using the Insite Free equipment were made at Juffair, Hamala & Jidhafs in response to specific public concerns arising from the installation of new 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
Juffair, Road 2442	0.04%
Children Academy in Hamala	0.09%
Granada Garden-Jidhafs	0.19%

Table 2: Locations of measurement with Insite Free

Insite Box

- 4.4 Figures 1 to 12 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 fraction of the ICNIRP level.
- 4.5 All measurements were taken in typical public or domestic locations (i.e. inside homes, offices or apartments).

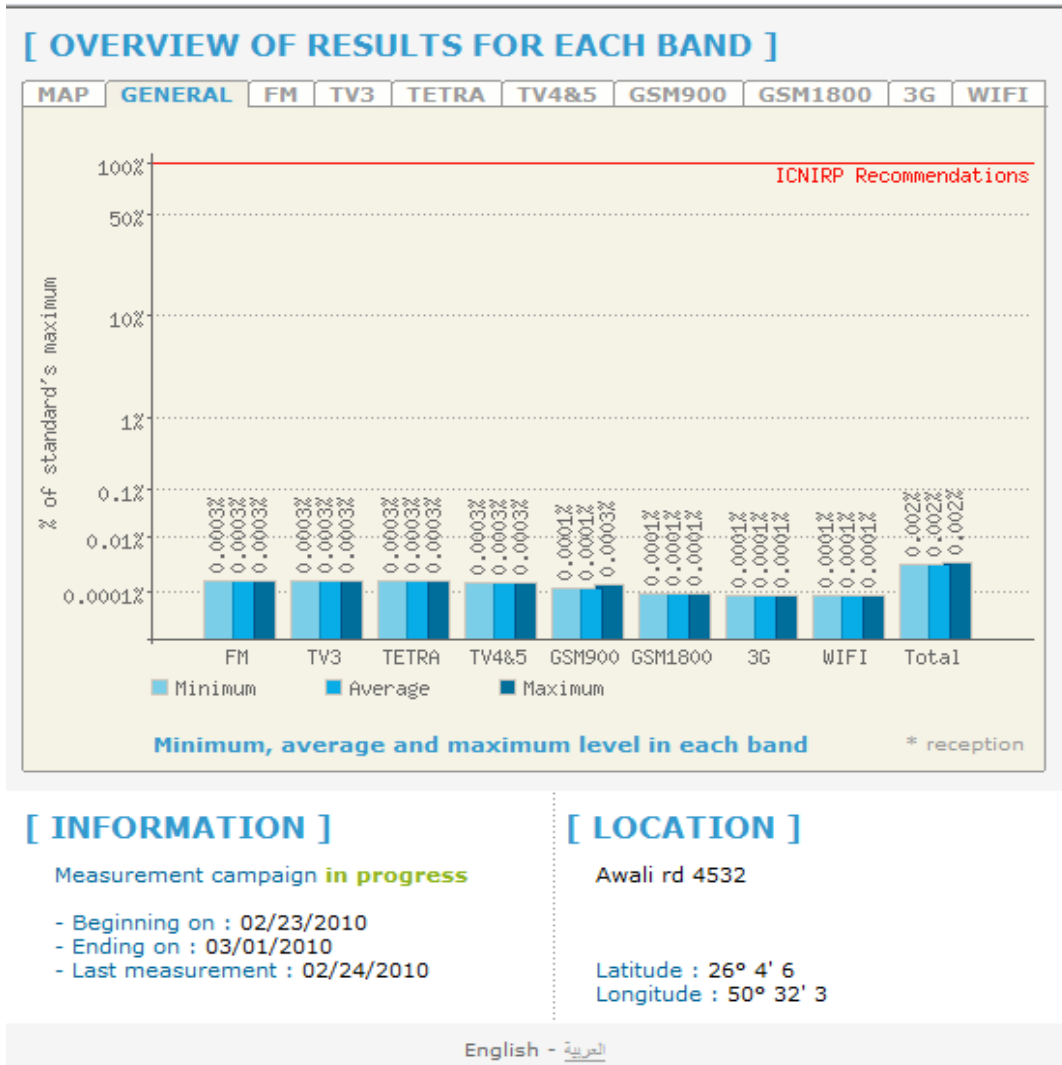


Figure 1: Result for Awali Rd 4532

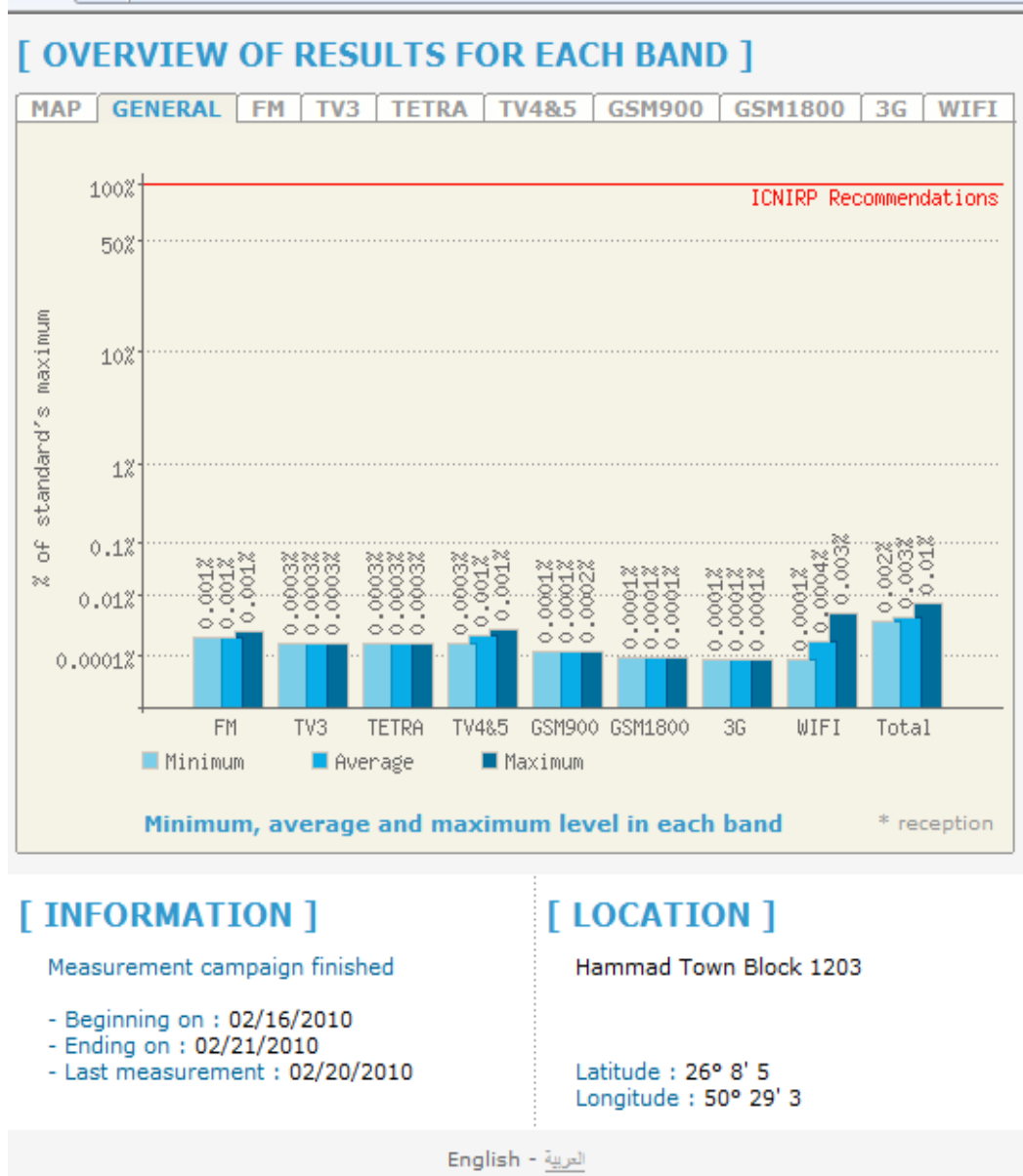


Figure 2: Result for Hamad Town block 1203

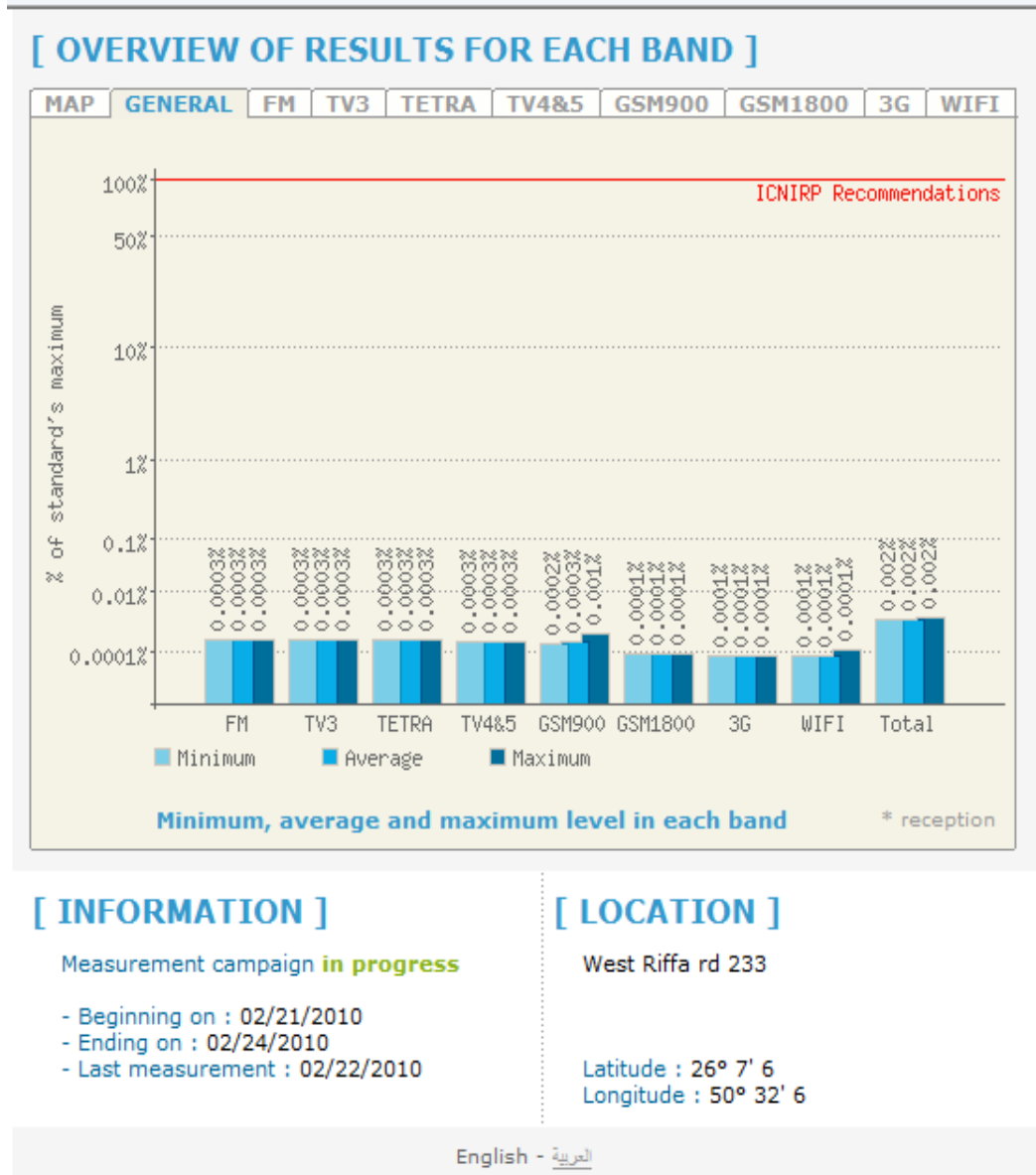


Figure 3: Result for West Riffa Rd 233

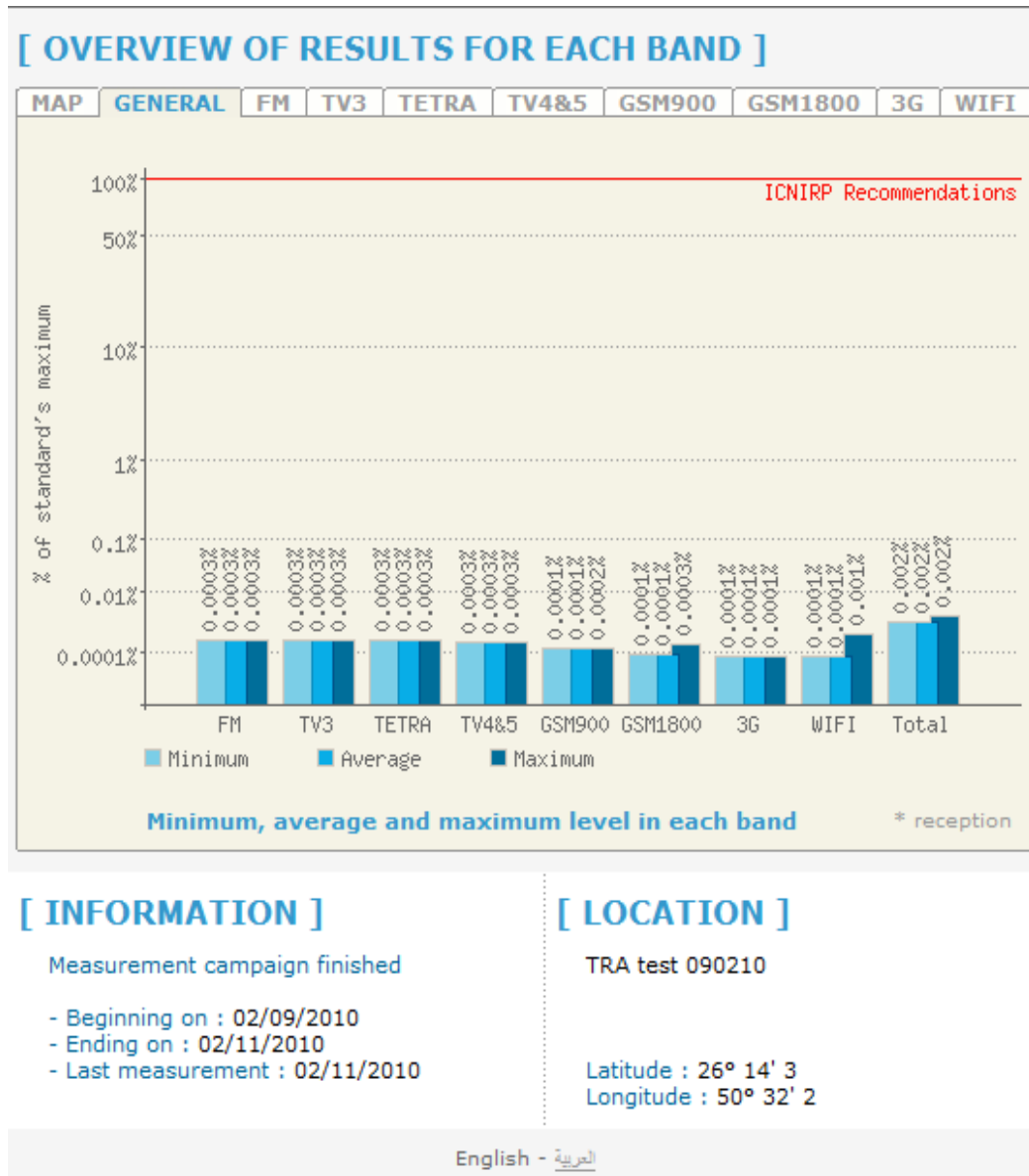


Figure 4: Result for TRA new office, Seef District

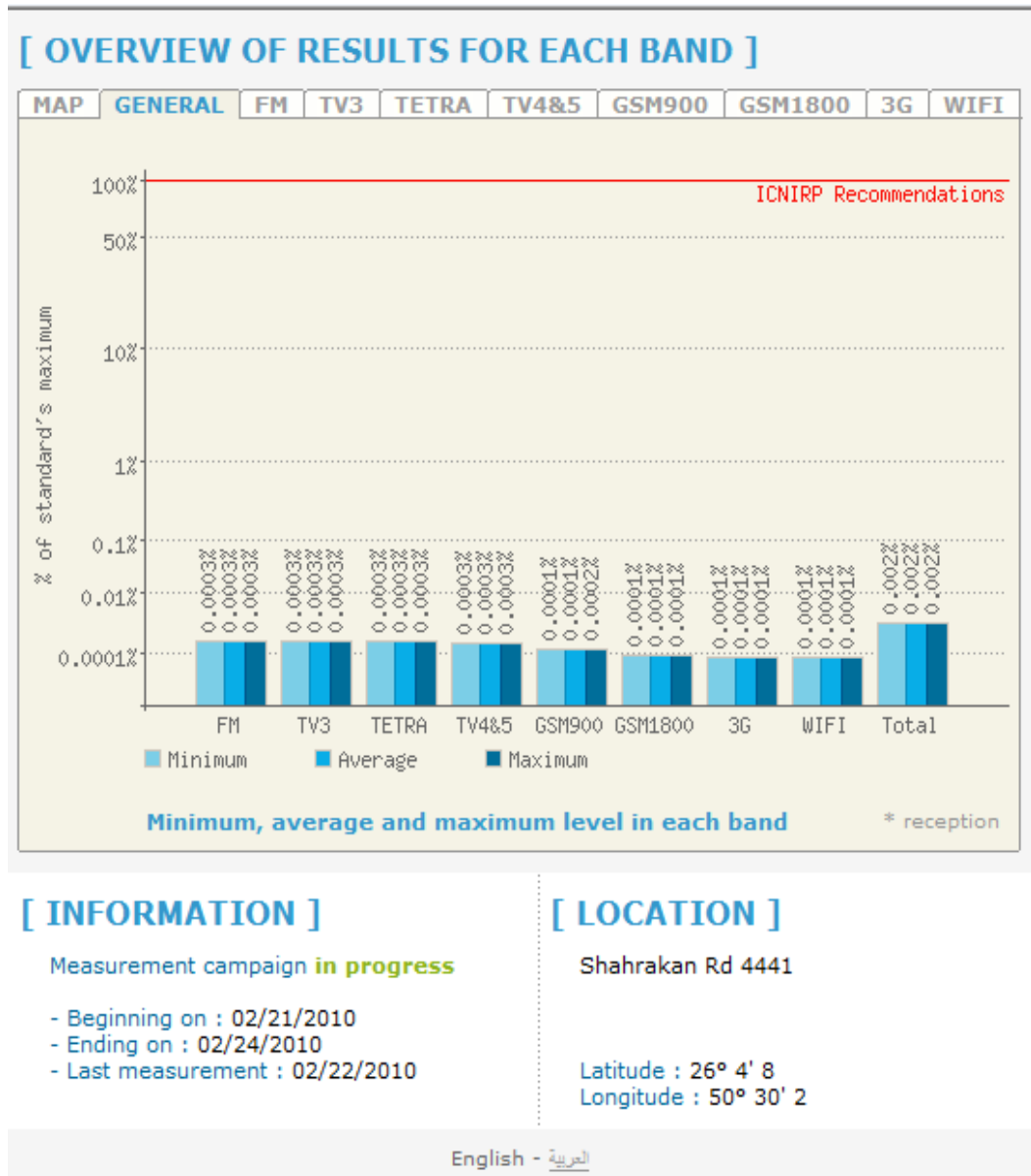


Figure 5: Result for Shahrakan Rd 4441

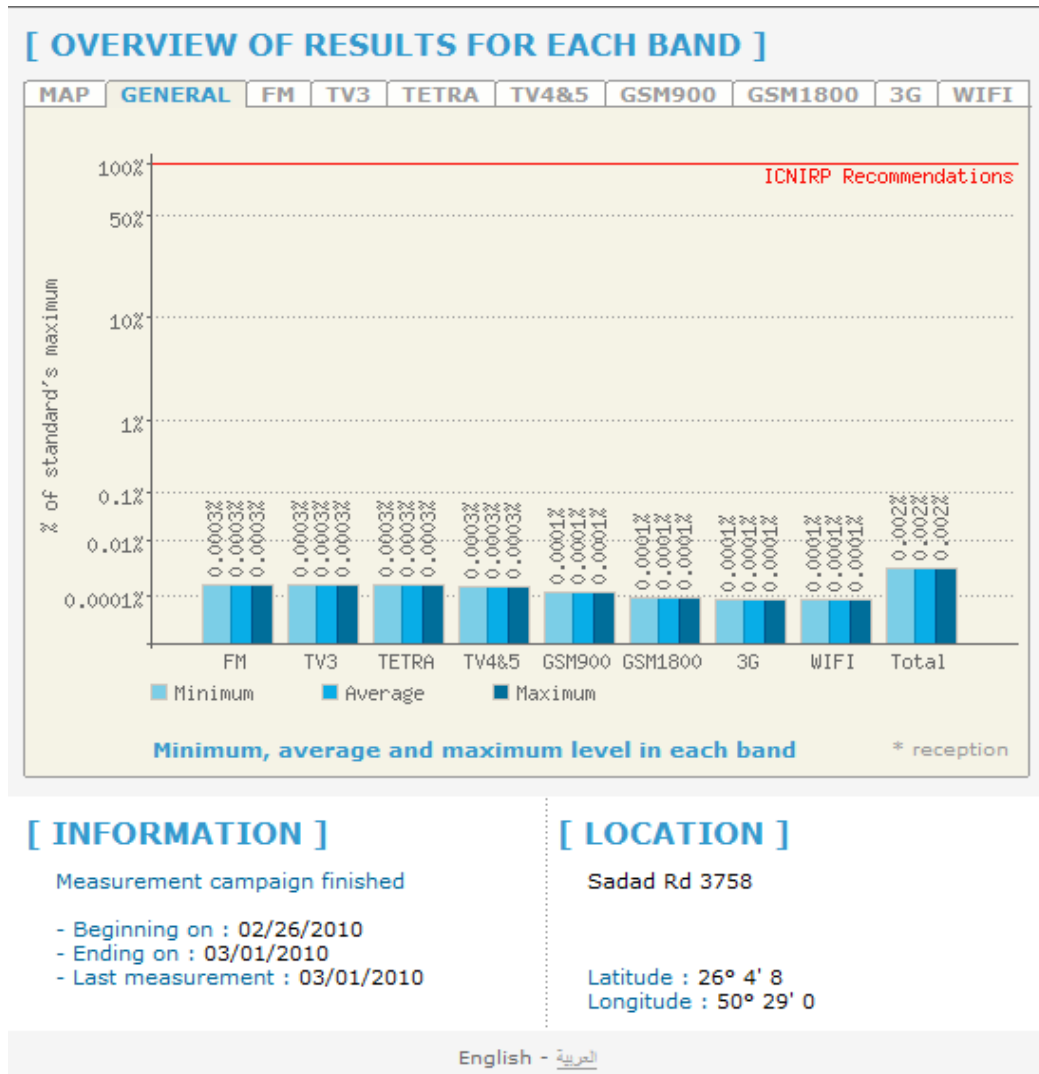


Figure 6: Result for Sadad Rd 3758

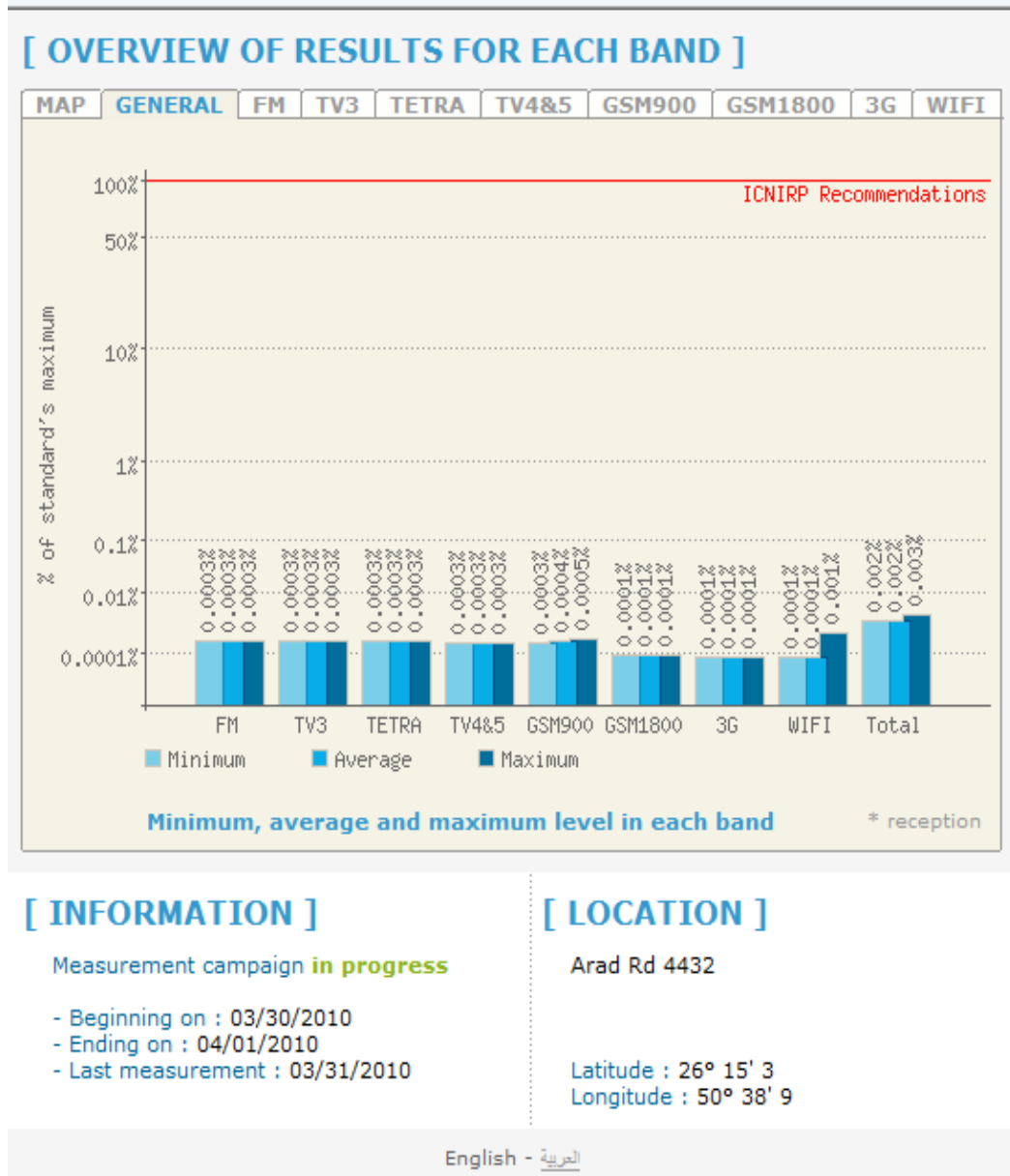


Figure 7: Result for Arad Rd 4432

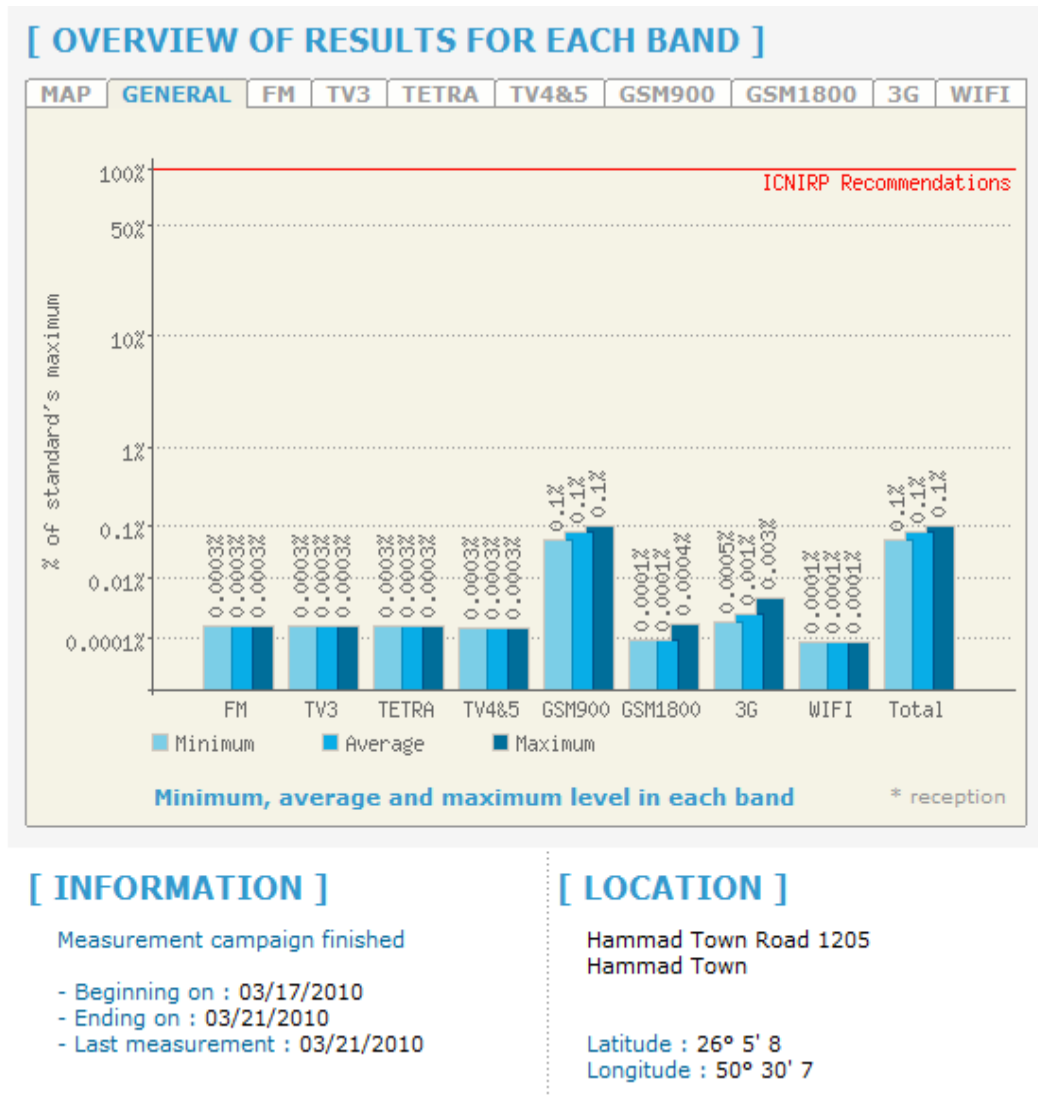


Figure 8: Result for Hamad Town Rd 1205

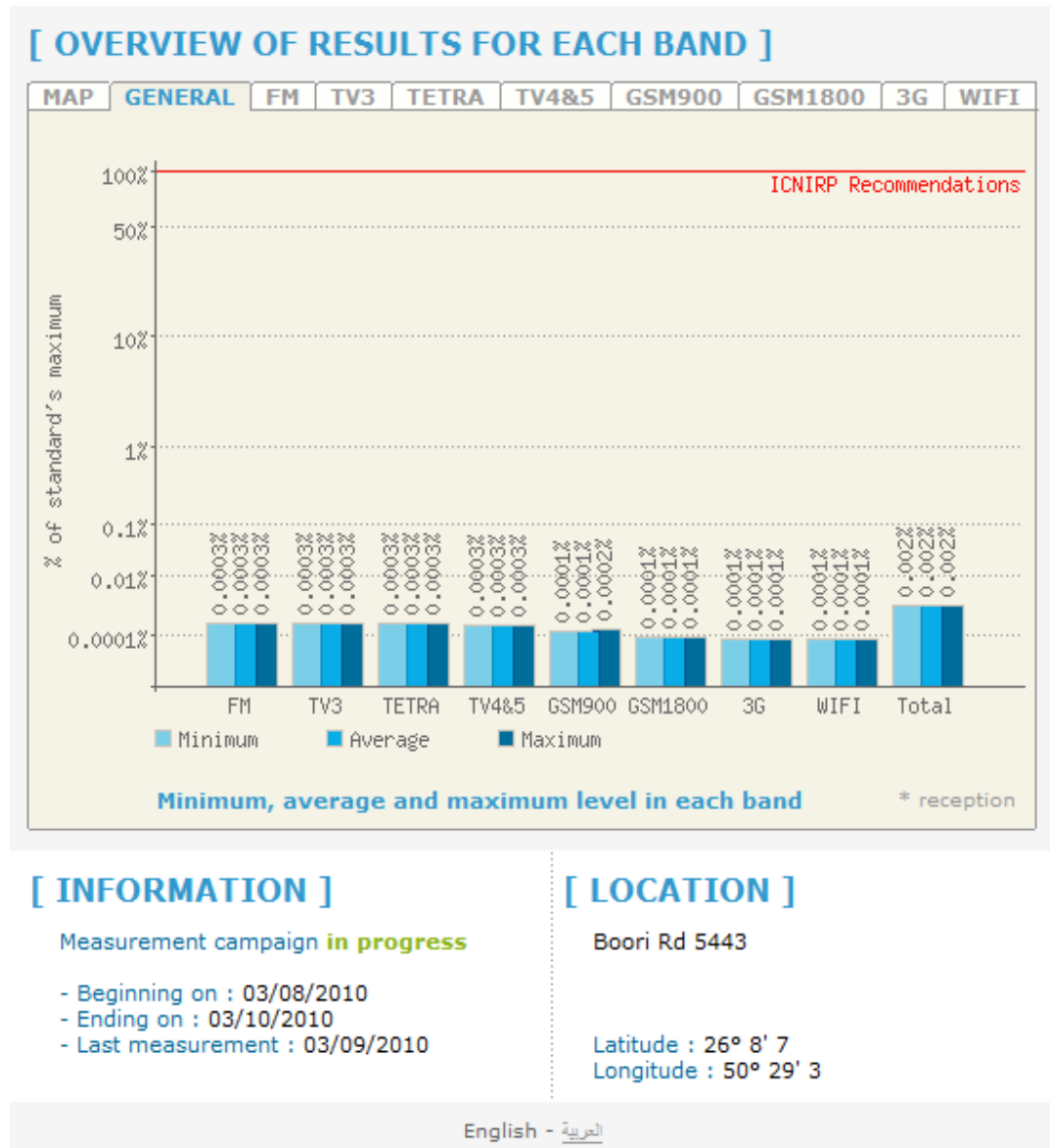


Figure 9: Result for Boori Rd 5443

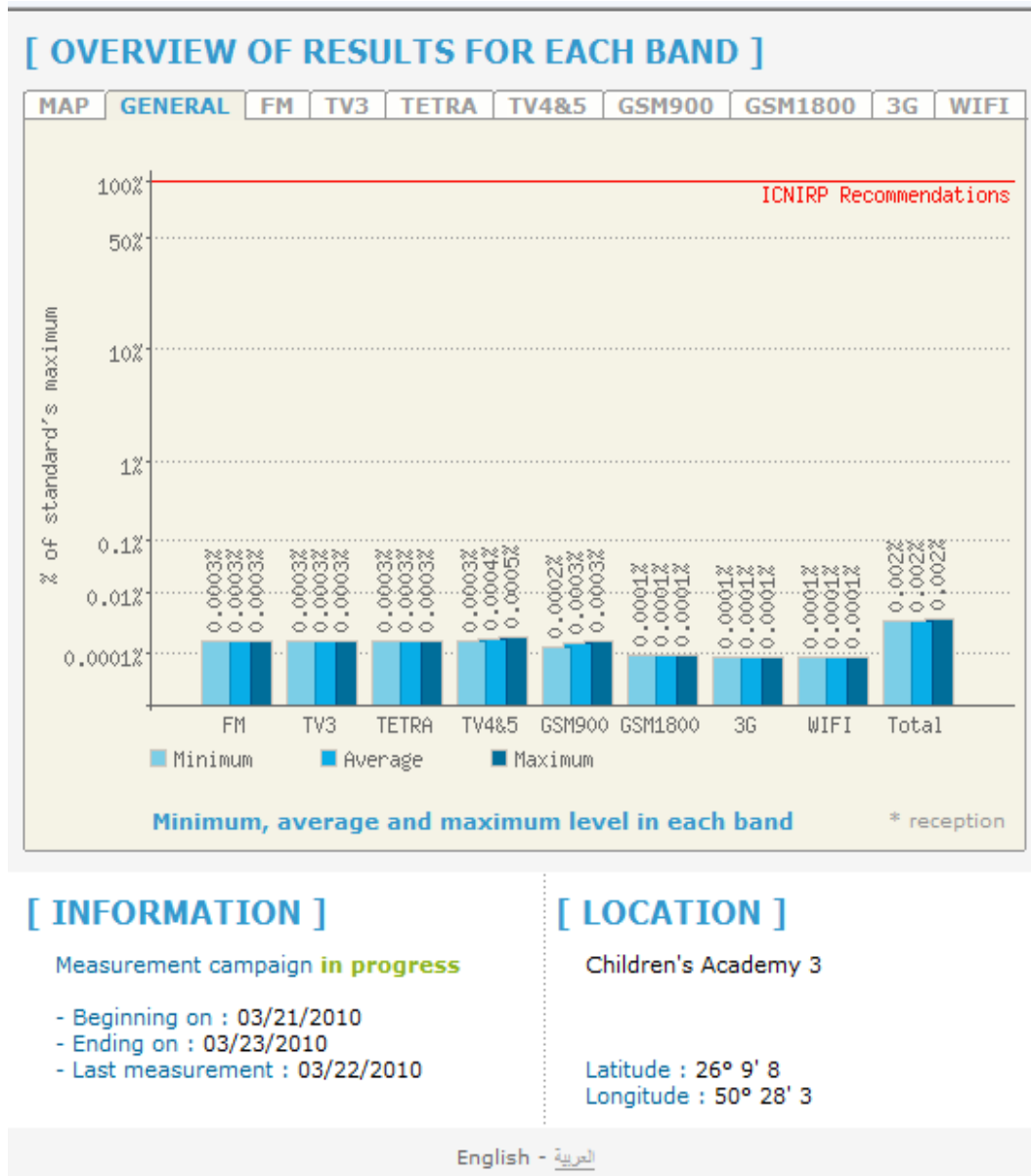


Figure 10: Result for Children’s Academy, Hamala

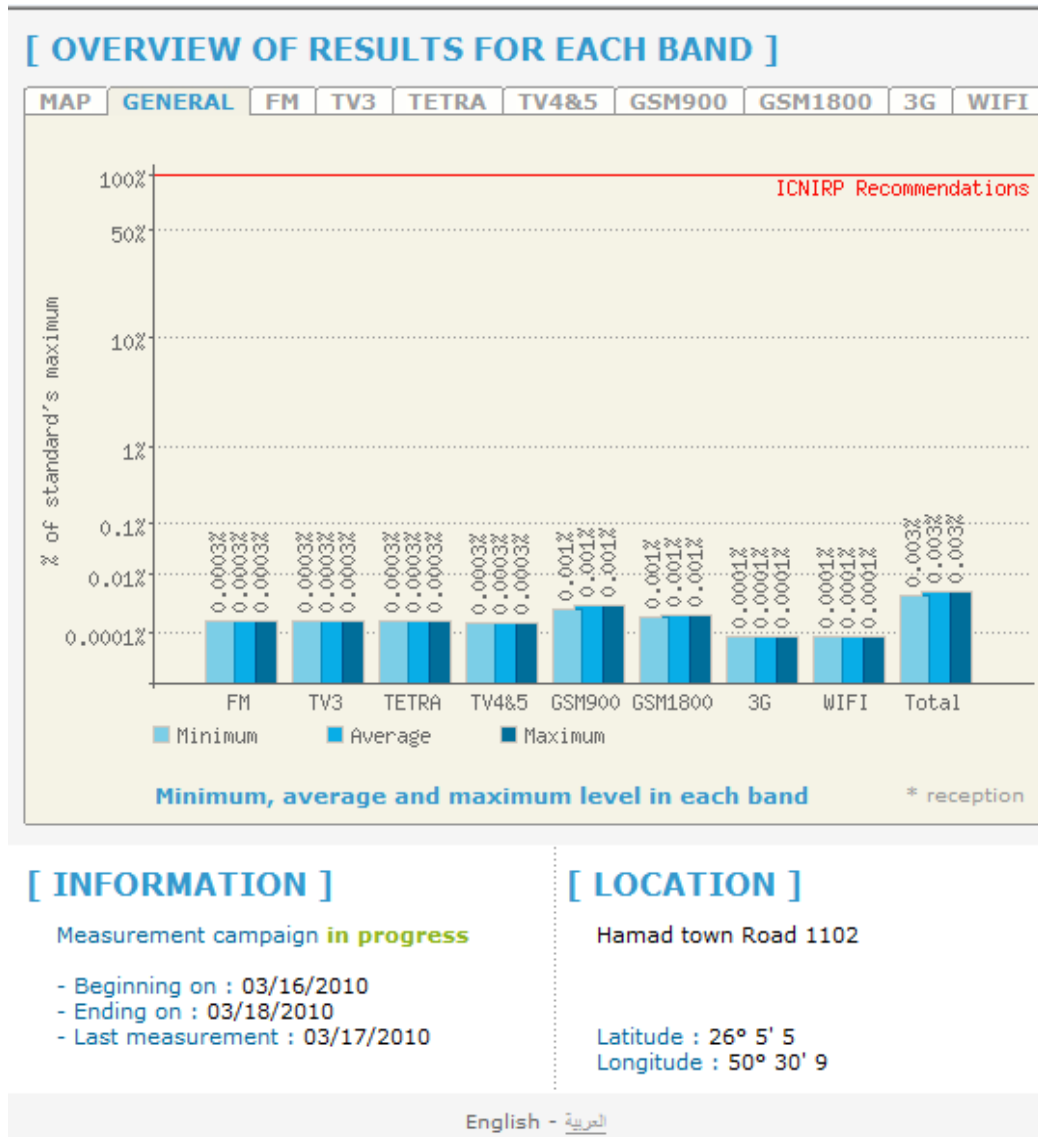
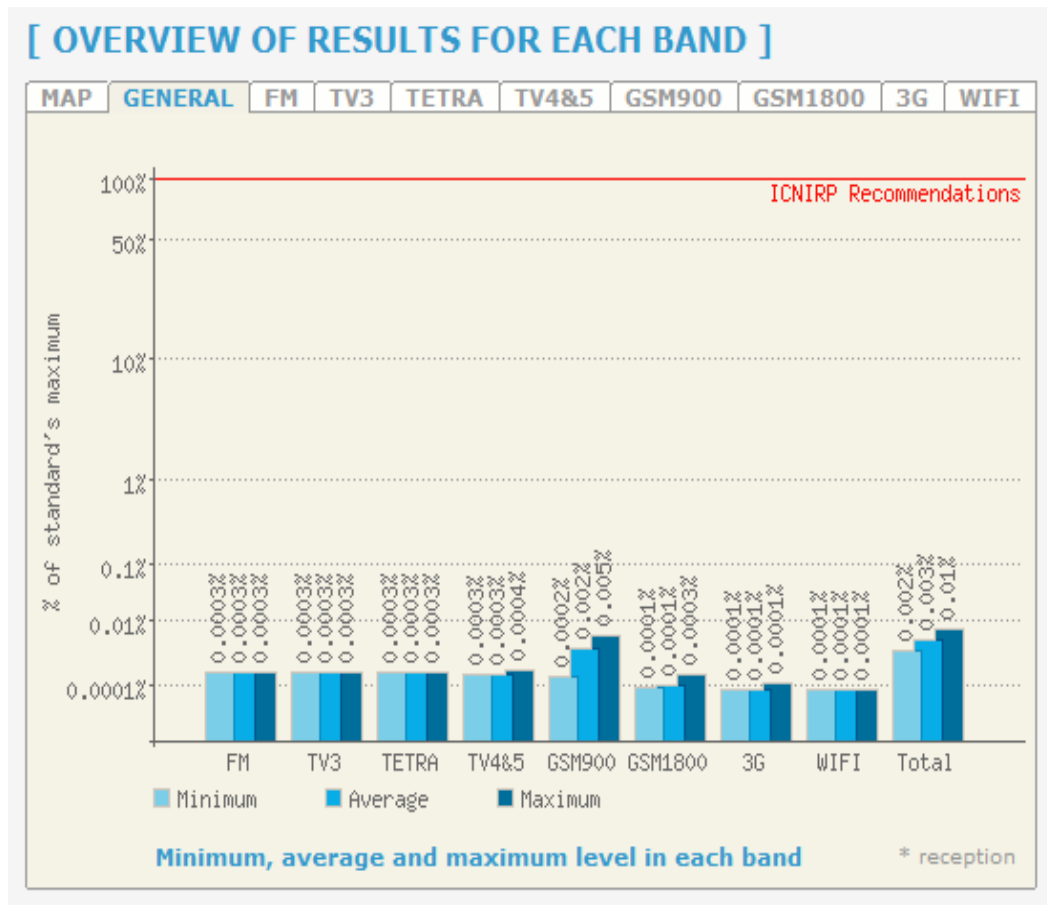


Figure 11: Result for Hamad Town Rd 1102



[INFORMATION]

Measurement campaign finished

- Beginning on : 03/18/2010
- Ending on : 03/21/2010
- Last measurement : 03/21/2010

[LOCATION]

Muharraq Road 214
Muharraq

Latitude : 26° 15' 7
Longitude : 50° 37' 4

Figure 12: Result for Muharraq Rd 214

5 Conclusions

- 5.1 All measurements were small compared to the ICNIRP guidelines.
- 5.2 The highest total exposure level for a typical public/domestic site measured during the quarter was very small at 0.1% of the ICNIRP level as shown in Figure 8 for Hamad Town, Road 1205.
- 5.3 The measurement using Insite Free equipment at Jidhafs (Granada Garden) is higher than at other locations but this is to be expected given that the measurement was taken at a distance of about 200m from the base station. Never the less, the measurement is still very small at just a 0.19% of the ICNIRP level.

6 Next steps

- 6.1 TRA will continue with the measurement campaign in 2010 to map RF signal levels throughout the Kingdom of Bahrain.