



Ambient Levels of Radio Frequency Emissions in the Kingdom of Bahrain

Results of measurements made between
July and September 2010

A Report issued by the
Telecommunications Regulatory Authority

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Purpose

To present the results of RF field strength measurements taken in Bahrain during the 3rd Quarter of 2010.

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1 Executive Summary

- 1.1 This report is the third 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.
- 1.2 Previous reports 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 July and September 2010 and can be considered to be an extension of the earlier reports issued in 2010.
- 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 measured during the quarter was very small at 0.11% of the ICNIRP level measured at Sar & Megsha..

2 Introduction

- 2.1 This report is the third 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 2010 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 July and September 2010 and can be considered to be an extension of the earlier reports issued in 2010.
- 2.3 During the period July to September 2010, measurements of RF field strengths were made at 15 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 2010 at the following locations:

Location	General Area	Specific location
1	Busaiteen	Block 228
2	Hamad Town	Block 1209
3	Riffa	Block 910
4	Um Al Hassam	Building 269
5	Hamad Town	Road 439
6	Hamad Town	Road 921
7	Hamad Town	Road 1139
8	Sar	Block 525, Road 2517
9	Al Hajar	Block 479
10	Budaiya Highway	Near Al Osra supermarket
11	Janabeya	Block 571, Road 35
12	Jasra	Block 1003, Road 307
13	Megsha	Road 2621, near Burgerland
14	Riffa	Road 977
15	Jid Ali	Block 721

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, 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 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
Hamad Town Rd 439	0.01
Hamad Town Rd 921	0.03
Hmad Town Rd 1139	0.01
Sar, block 525 Rd 2517	0.11
Budaiya Highway, near Al Osra supermarket	0.01
Janabeya, Block 571	0.01
Jasra Rd 307	0.01
Megsha Rd 2621	0.11

Table 2: Locations of measurement with Insite Free

Insite Box

- 4.4 Figures 1 to 7 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).

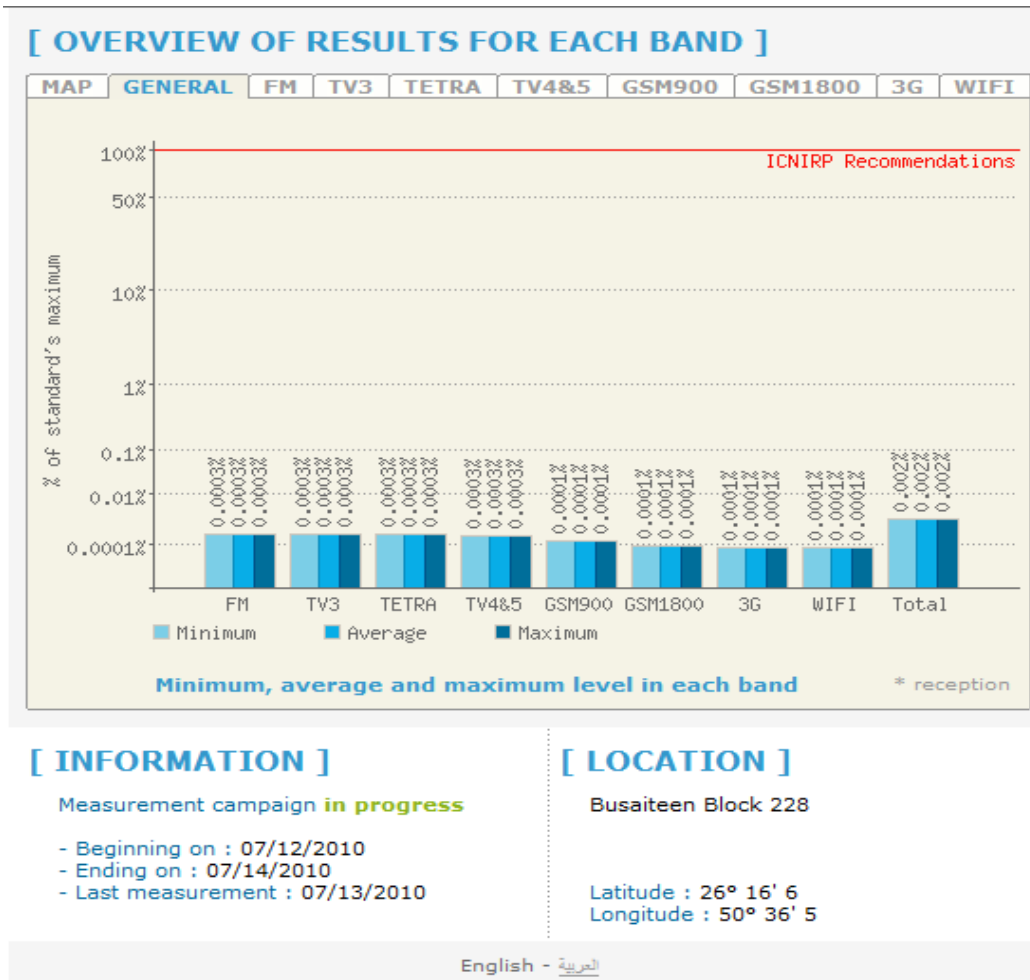


Figure 1: Result for Busaiteen, block 228

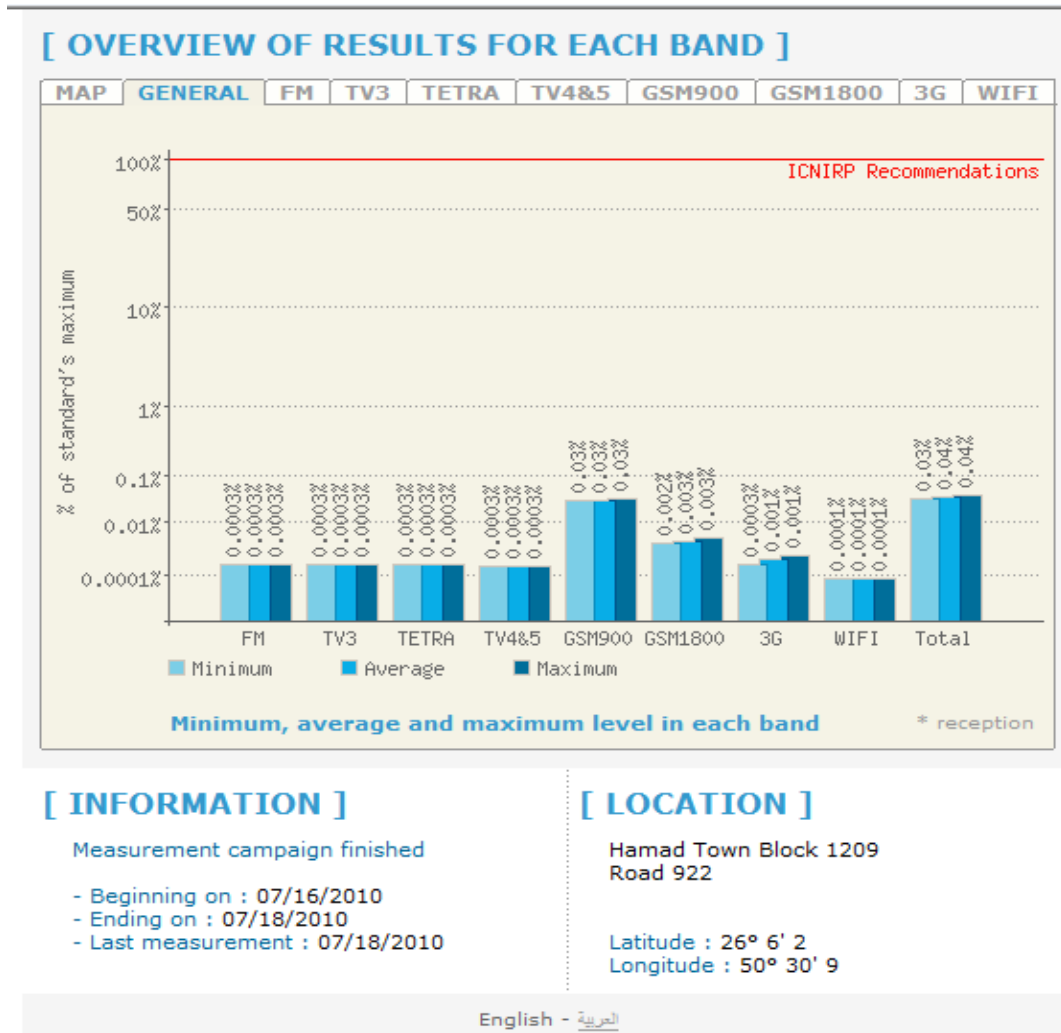


Figure 2: Result for Hamad Town block 1209

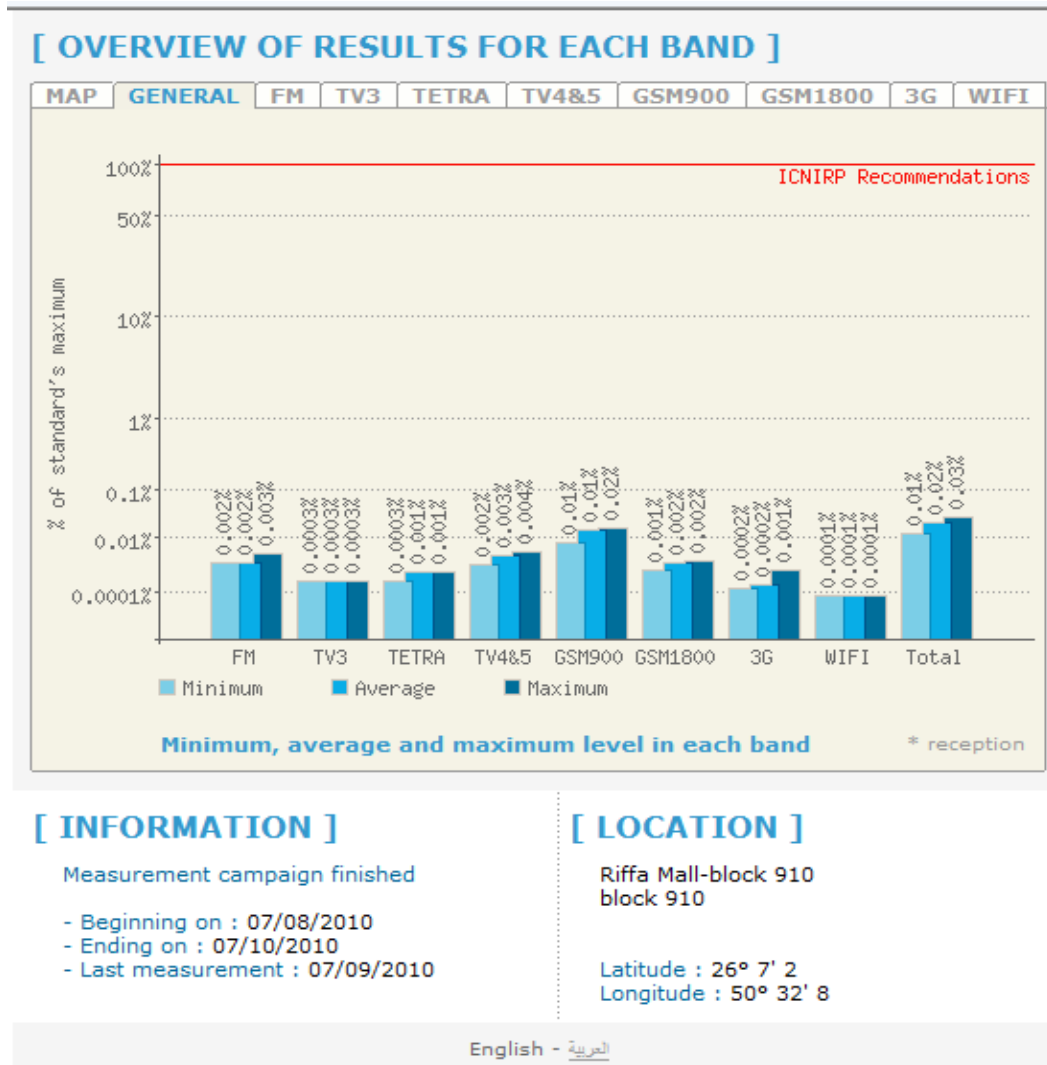


Figure 3: Result for West Riffa block 910

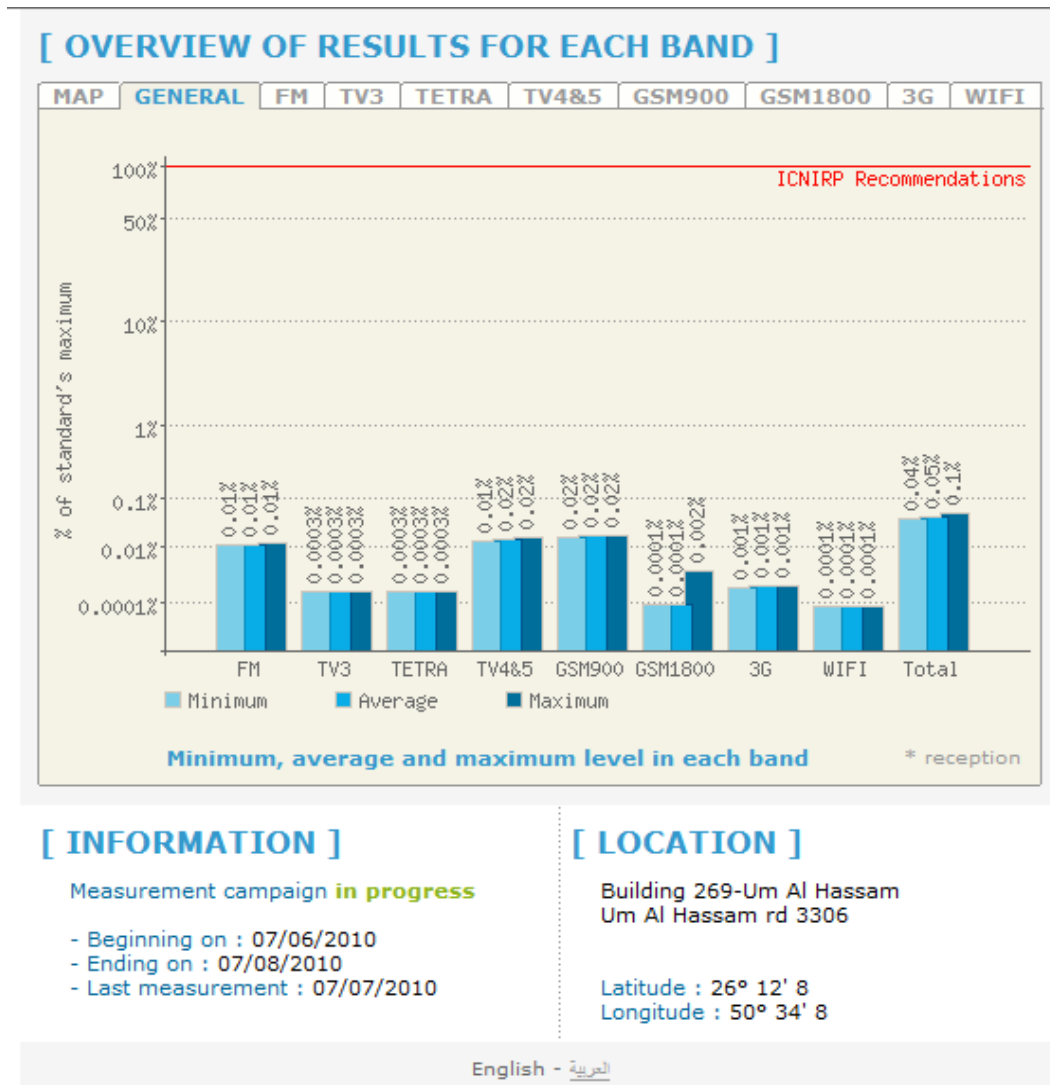


Figure 4: Result for Building 269 @ Um Al Hassam

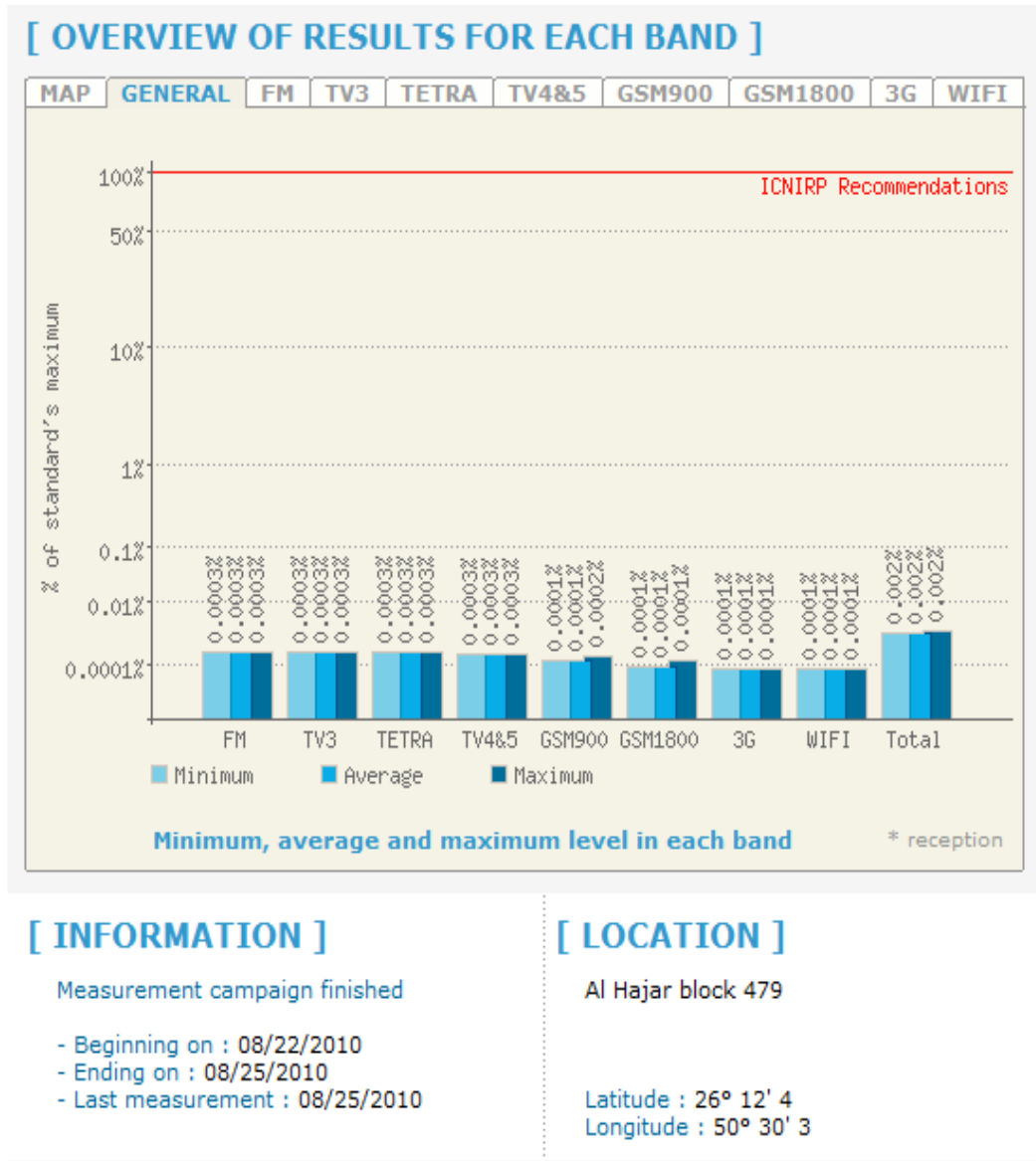


Figure 5: Result for Al Hajar, block 479

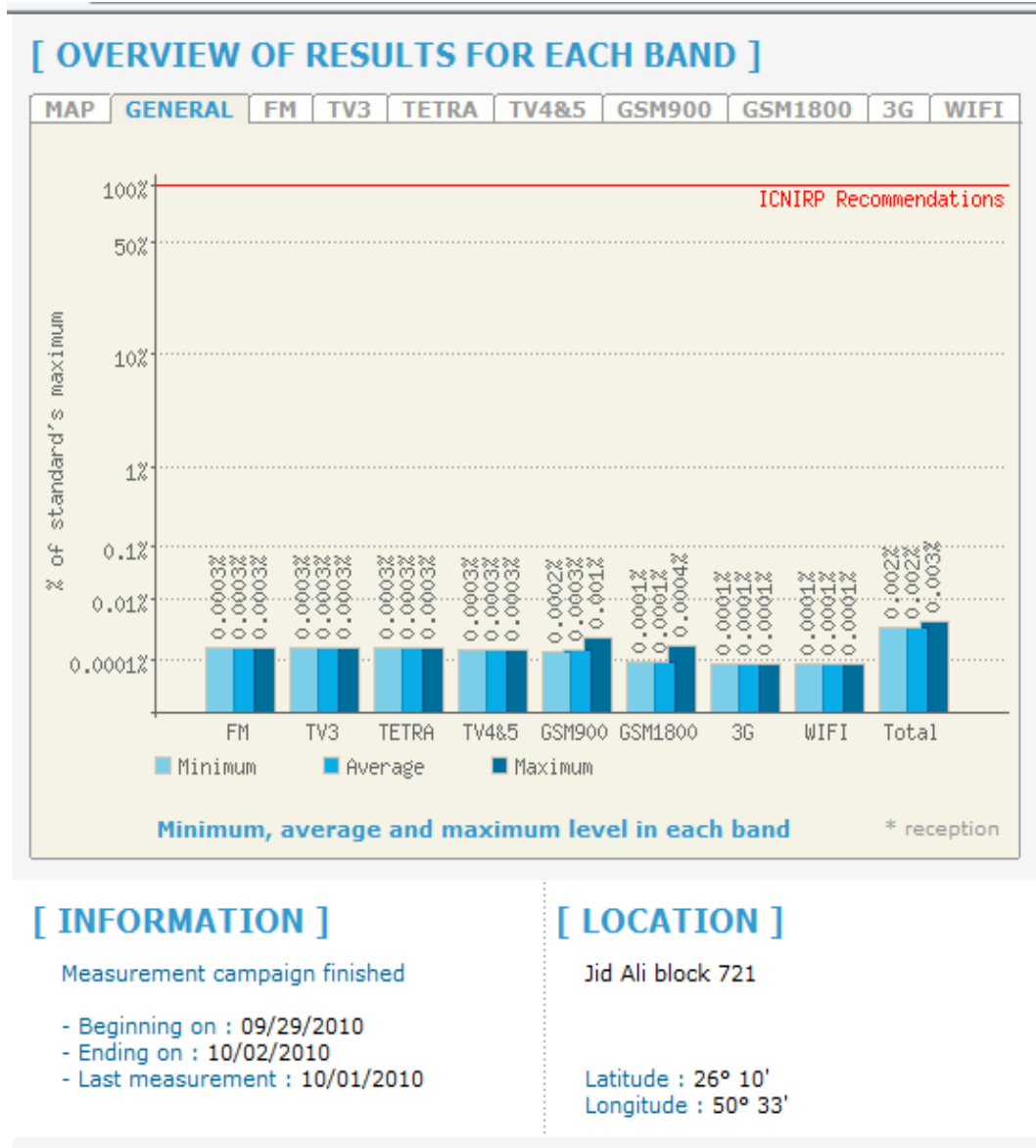


Figure 6: Result for Jid Ali, Block 721

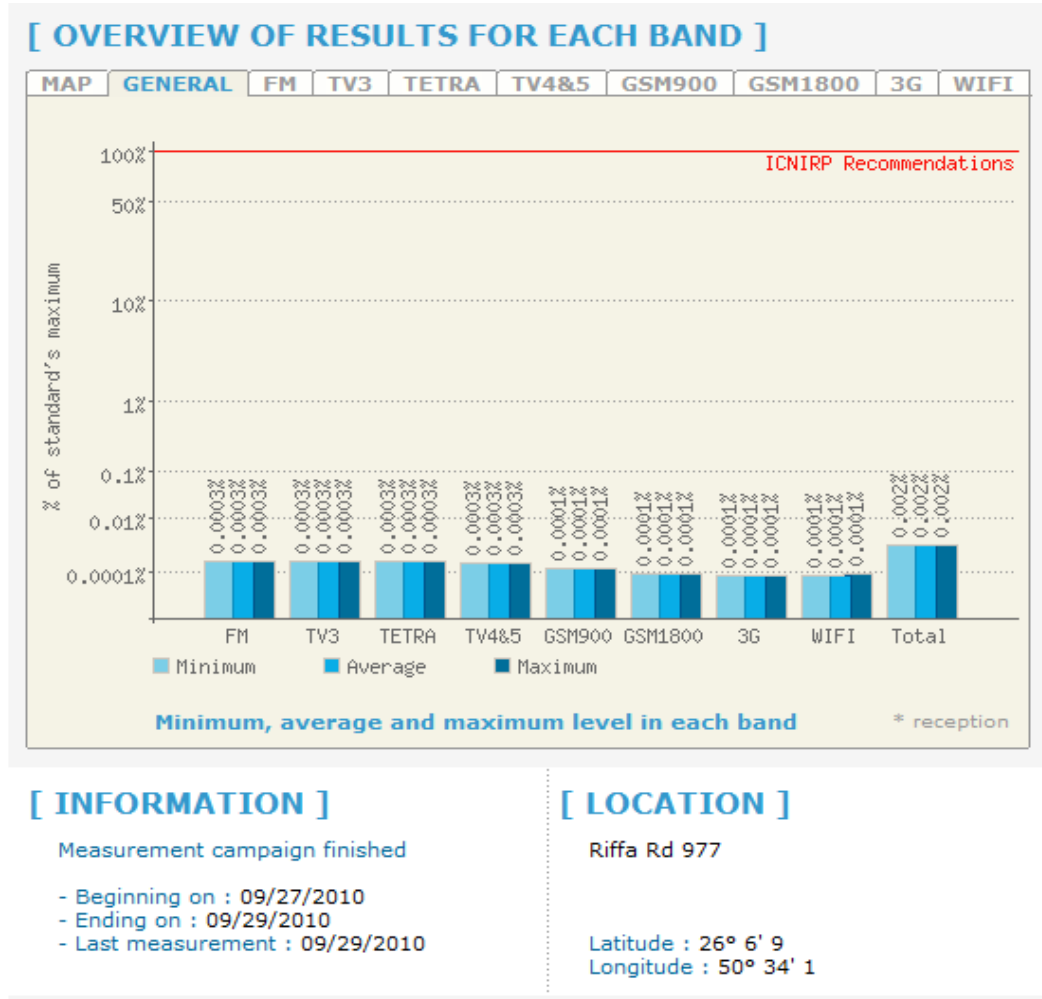


Figure 7: Result for Riffa Rd 977

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.
- 5.3 The measurement using Insite Free equipment at Sar & Megsha is very slightly higher than at other locations but this are to be expected given that the measurement was taken outside and at a distance of about 200m from the base station. Never the less, the measurement is still very small at just a 0.11% 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.