



Ambient Levels of Radio Frequency Emissions in the Kingdom of Bahrain

Results of measurements made between
January and March 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 1st Quarter of 2011.

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1 Executive Summary

- 1.1 This report is the 1st 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 for measurements taken during the period covered by the report. This report provides the results of measurements made between January and March 2011 and can be considered to be an extension of the earlier reports.
- 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 new typical public sites measured during the quarter was 0.01% of the ICNIRP level. This level was recorded at the BDF HQ & Bu Quwah block 455 as shown in figures 1 and 3 respectively.
 - c. The measurement using Insite Free equipment at Aali Rd 4603 is higher than at other locations but this is to be expected given that the measurement was taken, in open air, at a distance of about 200m from the base station. Never the less, the measurement is still very small at just 0.08% of the ICNIRP level.

2 Introduction

- 2.1 This report is the 1st 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 for measurements taken during the period covered by the report. This report provides the results of measurements made between January and March 2011 and can be considered to be an extension of the earlier reports.
- 2.3 During the period January to March 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 January and March 2011 at the following locations:

Location	General Area	Specific location
1	Abu Saiba	Rd 7153
2	Aali	Rd 3240
3	Budaiya	Rd 5229
4	Hamad Town	Rd 1061
5	Riffa	Jaari Alshaikh
6	Riffa BDF	BDF HQ
7	Sar	Rd3387
8	Malkeya	Rd3431
9	Hamad town	Rd 1144
10	Bu Quwah	Block 455
11	Boori	Block 754
12	Aali	RD 4603

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 measure signals in the WiMAX band and also to investigate the detail 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
Aali – Rd 4603	0.08
Abu Saiba Rd 7153	0.05
Hamad Town -Rd 1061	0.04
Budaiya - Rd 5229	0.03
Riffa-Jar Alshaikh	0.02
Aali Rd 3240	0.04

Table 2: Locations of measurement made with Insite Free

Insite Box

- 4.4 Figures 1 to 6 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).

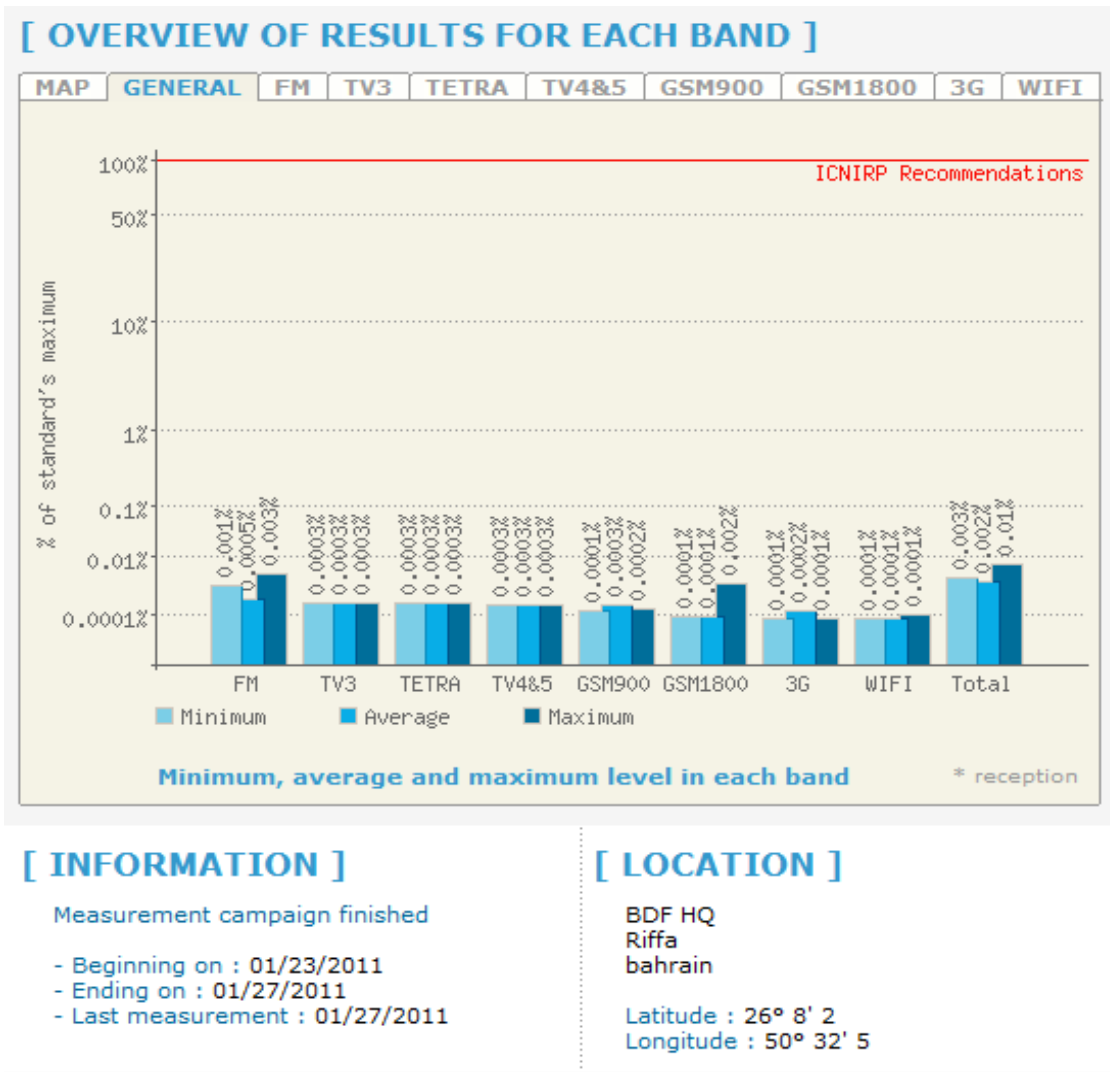
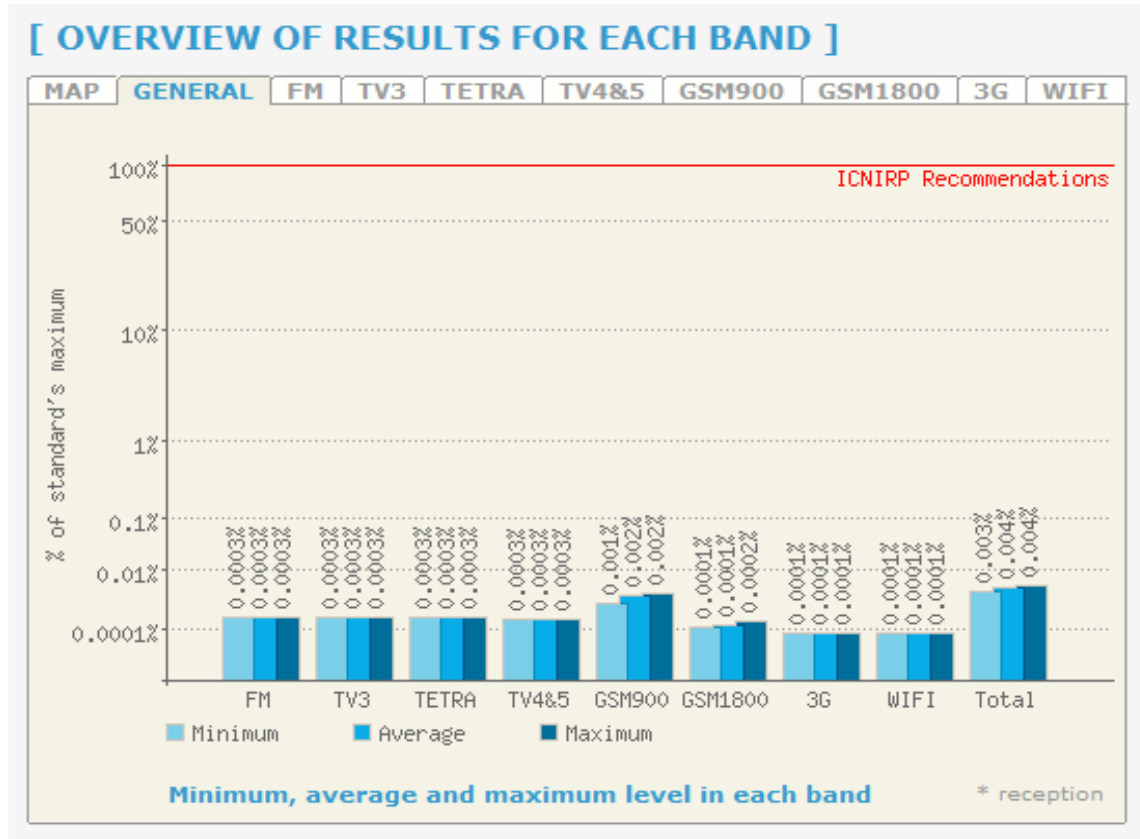


Figure 1: Result for BDF HQ



[INFORMATION]

Measurement campaign **in progress**

- Beginning on : 01/17/2011
- Ending on : 01/19/2011
- Last measurement : 01/18/2011

[LOCATION]

Boori Block 754

Latitude : 26° 8' 0
Longitude : 50° 30' 0

Figure 2: Result for Boori Block754

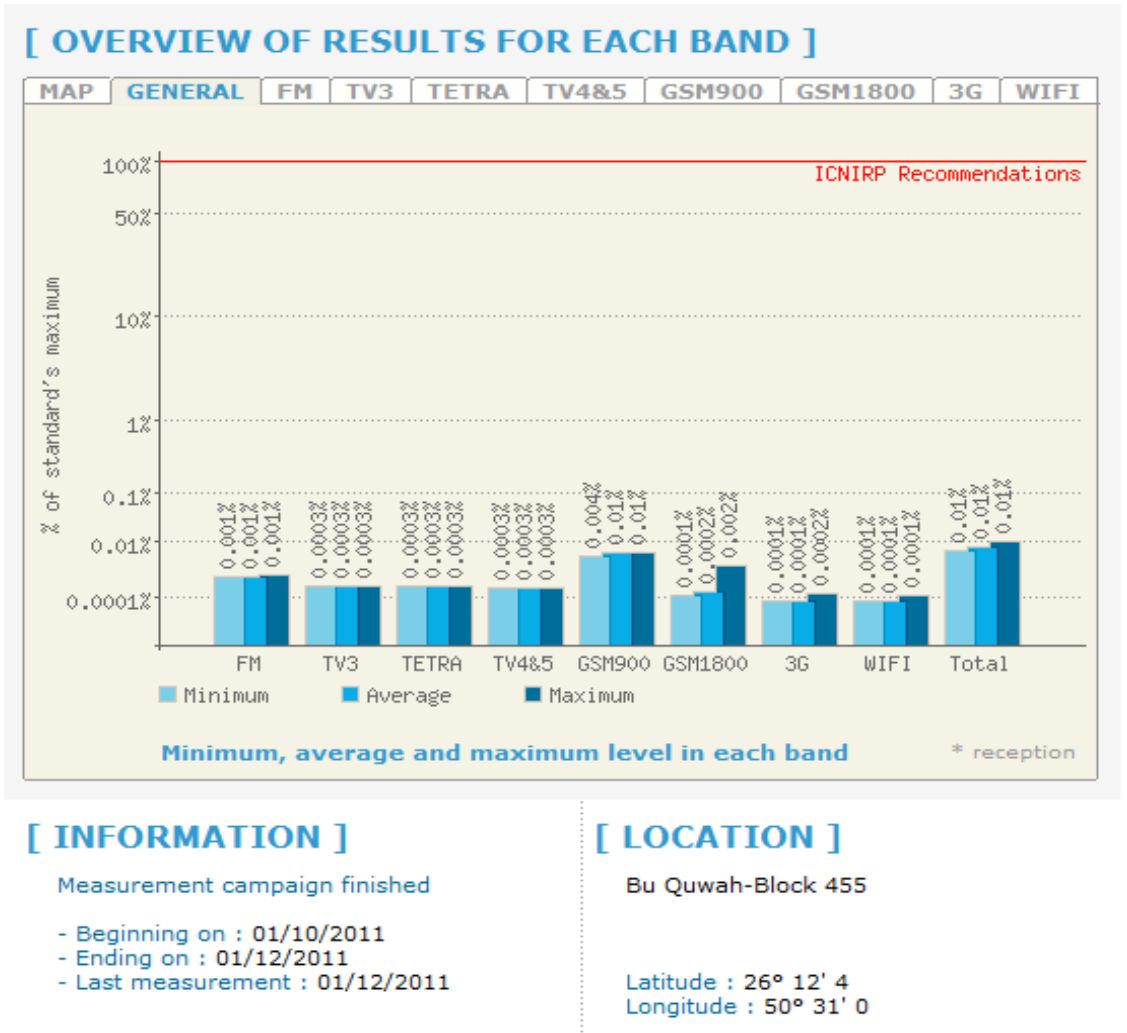
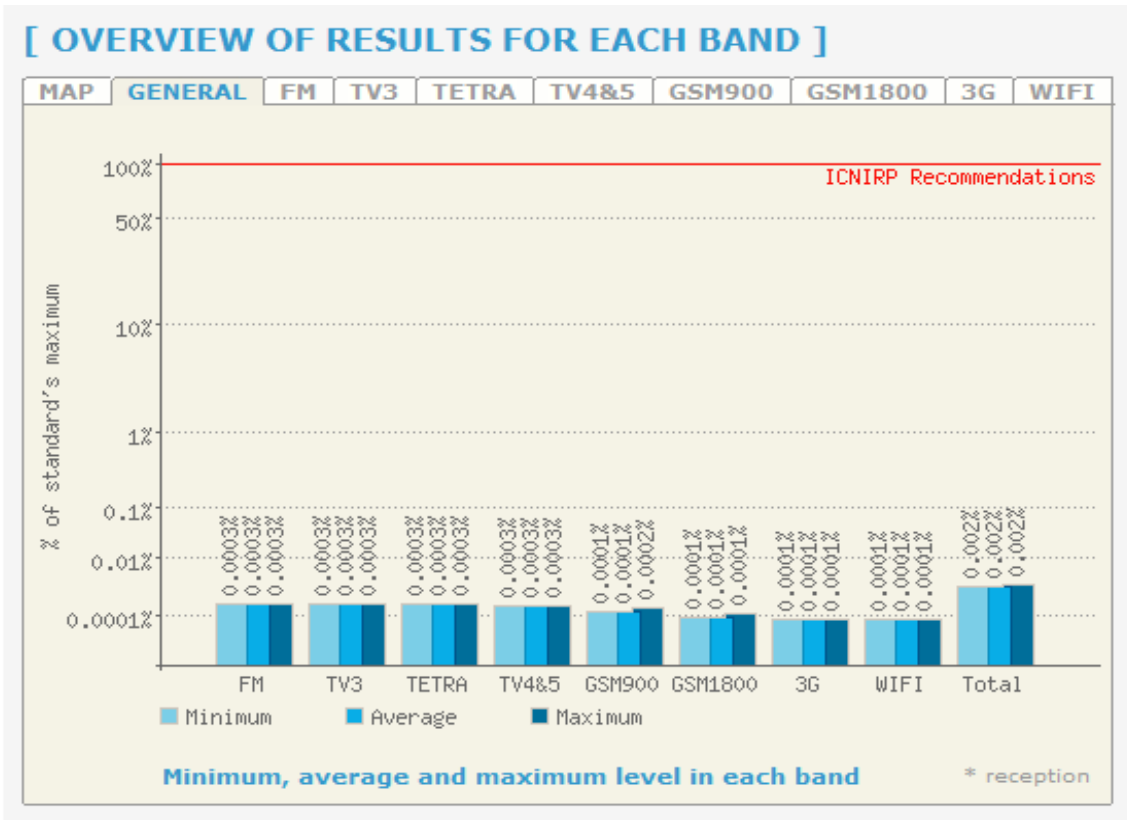


Figure 3: Result for Bu Quwah, Block 455



[INFORMATION]

Measurement campaign finished

- Beginning on : 03/20/2011
- Ending on : 03/22/2011
- Last measurement : 03/22/2011

[LOCATION]

Hamad town Rd 1144

Latitude : 26° 5' 9
Longitude : 50° 30' 6

Figure 4: Result for Hamad Town Rd 1144

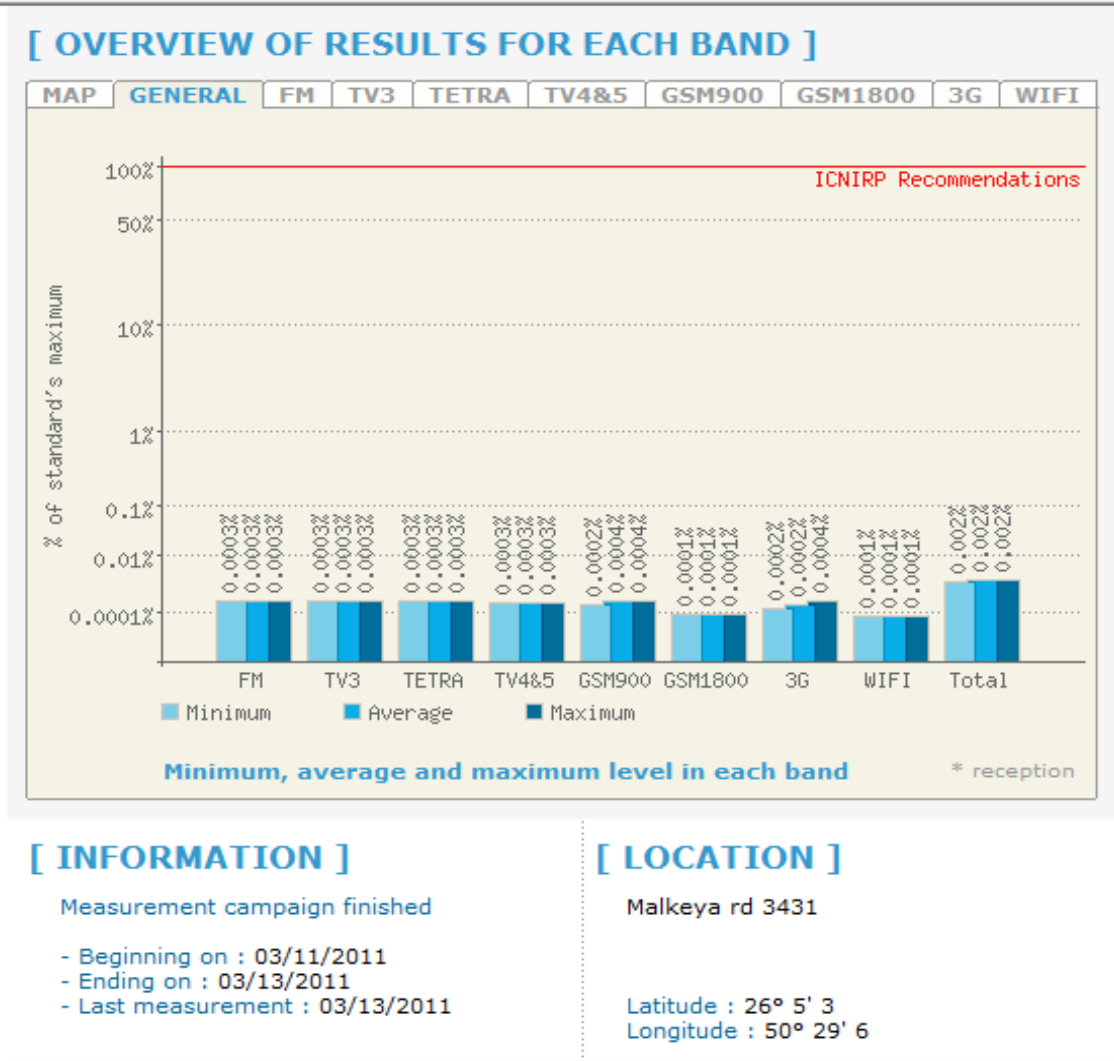
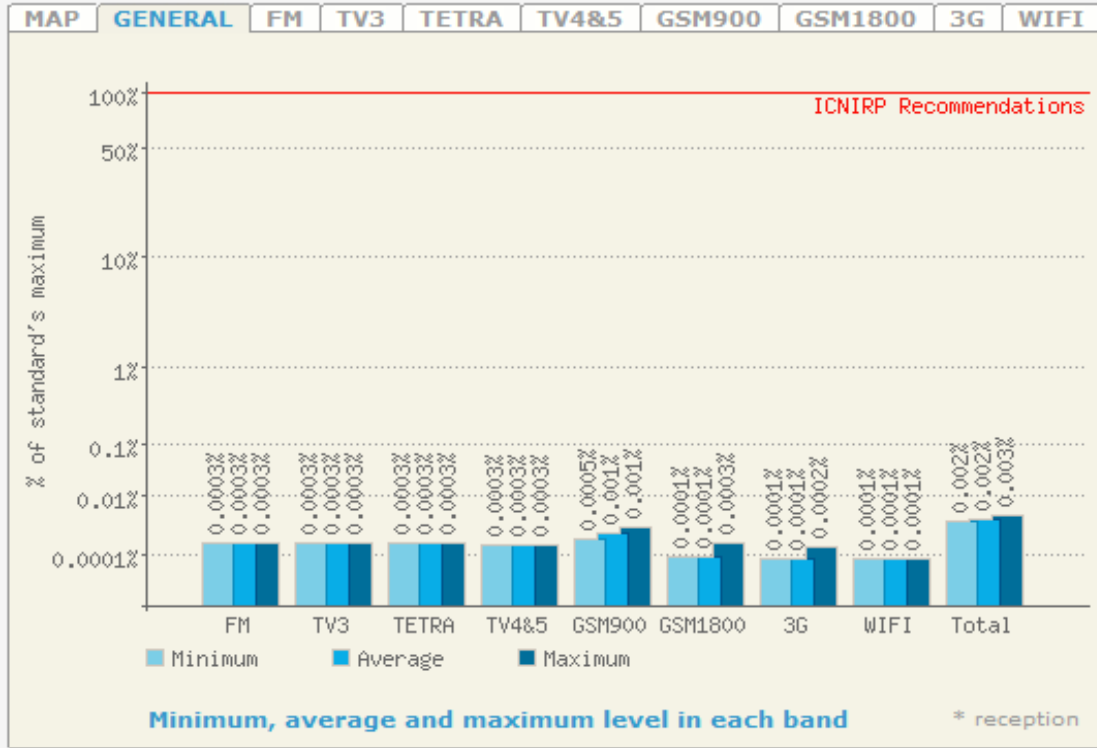


Figure 5: Result for Malkeya RD 3431

[OVERVIEW OF RESULTS FOR EACH BAND]



[INFORMATION]

Measurement campaign finished

- Beginning on : 03/02/2011
- Ending on : 03/06/2011
- Last measurement : 03/06/2011

[LOCATION]

SAR Rd 3387

Latitude : 26° 11' 8
Longitude : 50° 28' 3

Figure 6: Result for SAR Rd 3387

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 for typical public sites measured during the quarter was 0.01% of the ICNIRP level as shown in figures 1 and 3.
- 5.3 The measurement using Insite Free equipment at Aali Rd 4603 is higher than at other locations but this is to be expected given that the measurement was taken, in open air, at a distance of about 200m from the base station. Never the less, the measurement is still very small at just 0.08% of the ICNIRP level.

6 Next Steps

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