



Electromagnet Fields

14th May 2009

Alan Horne

Director General

Telecommunications Regulatory Authority



Agenda

1. H.E. Mr. Alan Horne - General Director of the Telecommunications Regulatory Authority
2. Professor Michael Repacholi - Honorary President of the International Commission on Non-Ionizing Radiation Protection (Commission derived from the United Nations and its recommendations are approved by the World Health Organization)
3. Prof Waheeb Issa Al Nasser - Professor of Physics at the University of Bahrain, President of the Arabic Section of the World Association for Solar Energy (Germany), and the President of the World Energy Organization of the Middle East.
4. Dr. Mohab A. Mangoud, Associate Professor in Wireless Communications, Department of Electrical and Electronics Engineering, University of Bahrain. Presenting on Human exposure to Electromagnetic fields radiated by mobile telecommunication systems
5. Philip Harris - Manager of Licensing and Operations of the Telecommunications Regulatory Authority. Presenting the latest measurements conducted by TRA.
6. Conclusions



Introduction

- Ubiquitous High Speed Competitive Telecommunication services are fundamental to the economic development of Bahrain as recognised in the Economic Vision 2030
- Public concern has been expressed about radiation from Telecommunications Masts and their negative visual impact
- Municipal Councils have in some cases delayed issuing permits from masts until concerns can be settled
- Action has been taken by TRA and the Commission responsible for environmental matters to address these concerns
- Licensed operators have in some cases failed to meet their Licence obligation in coverage and QoS due to a lack of masts due to the hold up in receiving planning permissions
- Members of the public have complained about poor mobile coverage or dropped calls due to lack of capacity in the network



Action Taken (1)

- TRA has worked since 2005 with the Commission responsible for Environment with the result of a standard being issued in the form of a Ministerial Order which sets the maximum level for RF field strengths based on WHO/ICNIRP levels
- The radiation is from multiple sources including sound and TV Broadcasting, Telecommunications, Electricity substations and cables and Radar
- TRA has modified and re issued more than 300 frequency Licences with an additional clause making it mandatory for all holders of frequency licences to adhere to the international and national standards concerning RF field strengths
- TRA has prepared a Policy document for Licensees on masts – establishment of joint committee to agree procedures
- STC has paid US \$230 M for the third mobile licence and will require masts. TRA placed environmental aspects as a key criteria in the auction process



Actions Taken (2)

- TRA set up TTO to focus on infrastructure issues
- Measurements have been made over several years which have demonstrated that the levels of radiation are well below the safe limit set by the World Health Organisation and now enshrined in the Ministerial Order
- TRA has purchased measurement equipment in order to continuously monitor field strengths in key frequency bands
- Training in the use of the equipment has been undertaken for TRA and Commission Staff
- Results will be always available on our web site
- Organisations and individuals can request that their location is measured
- Reports have been written on the results
- Lectures have been given and questions answered at Majleses



Actions Planned

- Ongoing Public Awareness activities
- Ongoing measurements
- Dedicated team to work on implementation of Policy



Requirements and Reports

Mast Sharing
Policy
TRA
April
2009

Ministerial
Order
April
2009

Report on
measurement
Rohde & Schwartz
2005

Report on
measurement
Bahrain University
2007

Wireless Telecommunications
Network Facility Sharing
Regulation
TRA
April 2009

Report on
Coordination
Committee
Concerning Radiation
Oct 2008

Report on
Unjustified Delays
In mast Permits
TRA
Oct 2008

Report on RF
measurements
TRA
Q1
2009

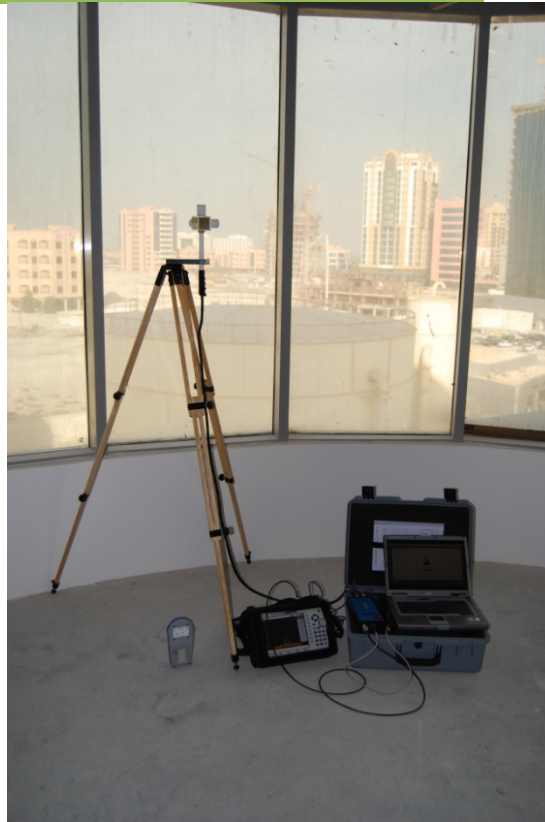


Phil Harris

- TRA measurement capability
- Communication of results via the TRA web site
- Overview of measurements so far



Measurement equipment purchased by TRA



Measurement sites so far

No.	General Area	Specific Location	Device
1	Central Informatics Organisation, Isa	Cisco Training room on second floor	Insite Box
2	City Centre Mall, Seef	Customer service point on ground floor	Insite Box
3	Crowne Plaza Hotel, Diplomatic area	Conference centre	Insite Box
4	French School, Muharraq	Playground	Insite Box
5	International Exhibition Centre	Multiple locations	EME Spy
6	Malkya	Villa 2201, Block 1034	Insite Box
7	Saar	Villa 2782, Block 507, Saraya 1	Insite Box
8	St. Christopher's School, Isa	Playground	Insite Box
9	Taib Tower, Diplomatic area	TRA office on 7 th floor	Insite Box
10	Tubli	Al Mahmood Villa	Insite Box
11	Seef District	5 th Floor, Rabiya A-4 Building	Insite Free
12	Hajiyat, Riffa	Building No. 2338 Road 3947	Insite Free
13	Hamela, Montessori Pre-School	Outside facing mast	Insite Box and Free

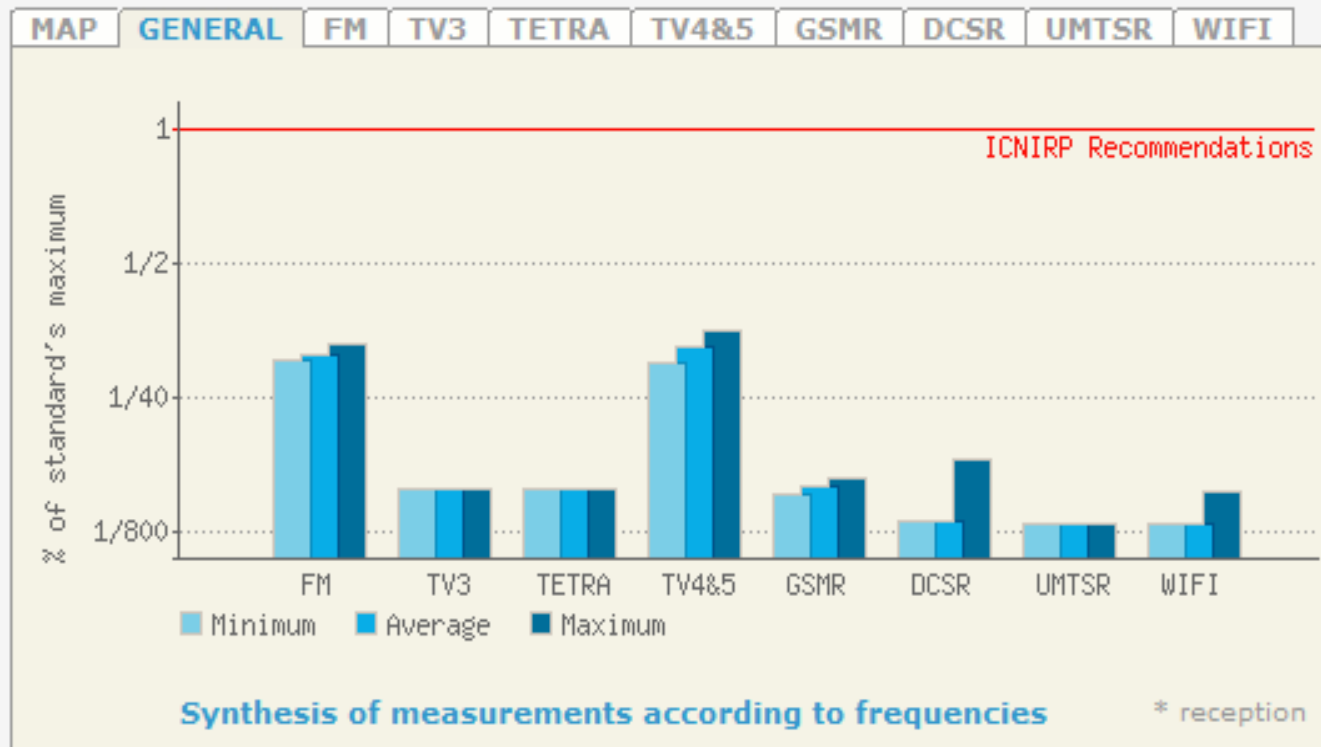


Measurements to cover the whole of Bahrain



Example CIO Building – Measurement results

[DIAGRAM]



[INFORMATION]

Measurement campaign passed

- Beginning on : 03/08/2009
- End on : 03/23/2009
- Last measure : 03/20/2009

[LOCALIZATION]

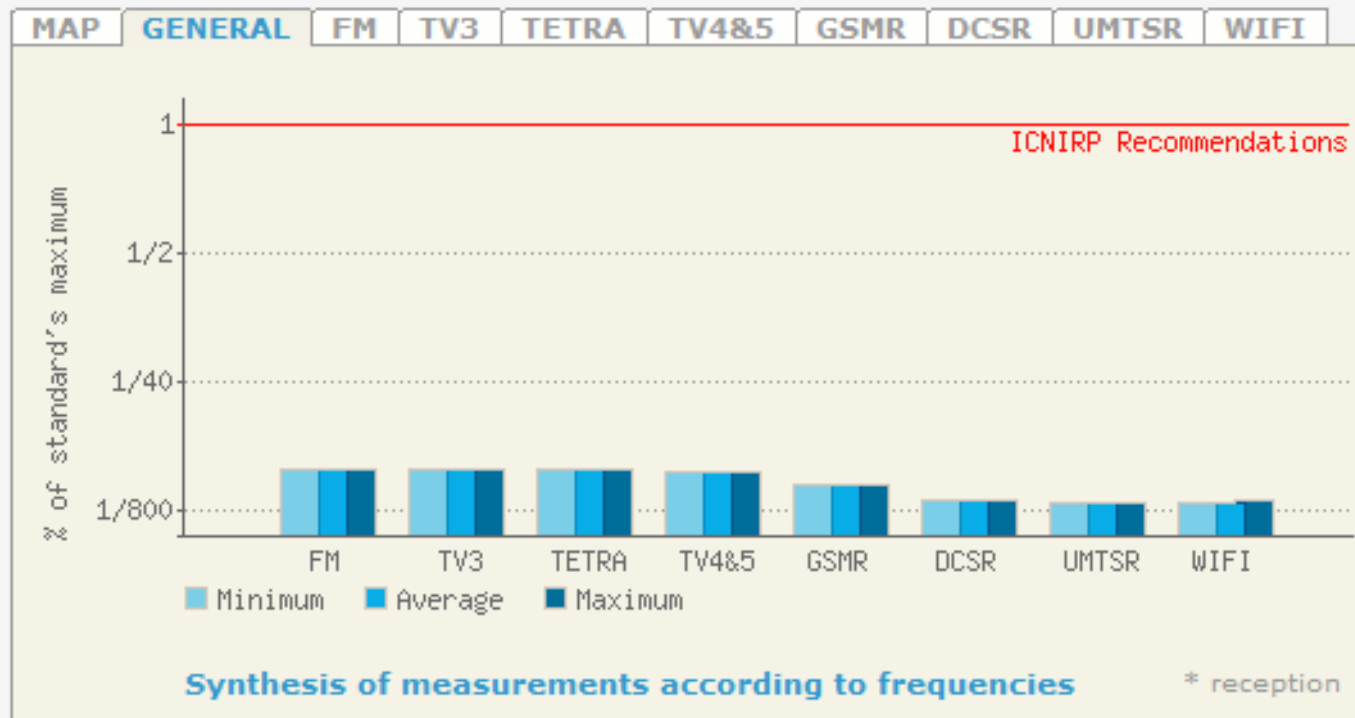
Central Informatics Organisation
Isa Town
Kingdom of Bahrain

Latitude : 26° 9' 9"
Longitude : 50° 33' 4"



Example French School Muharraq - results

[DIAGRAM]



[INFORMATION]

Measurement campaign passed

- Beginning on : 01/26/2009
- End on : 02/26/2009
- Last measure : 01/31/2009

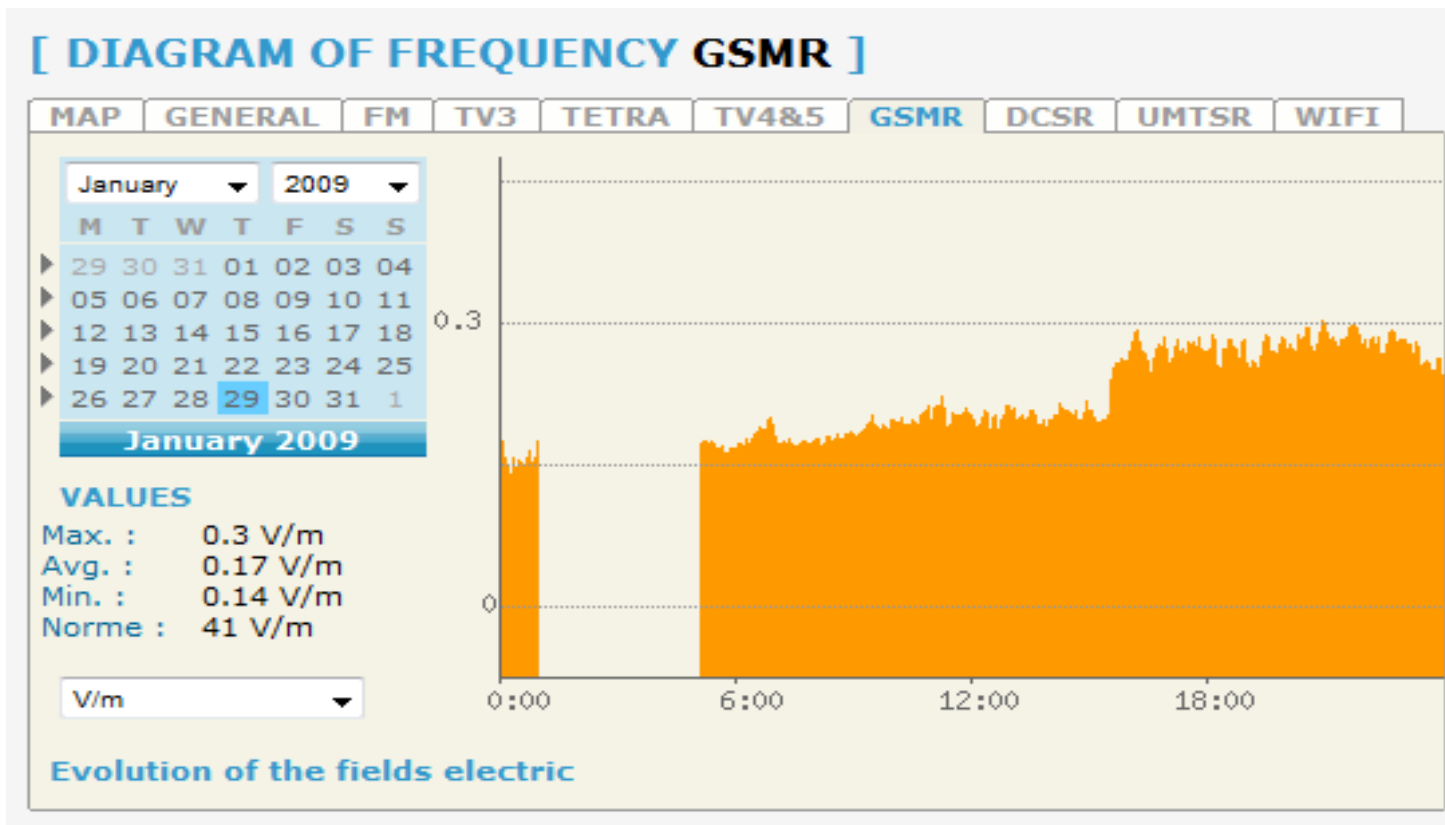
[LOCALIZATION]

French School
Muharraq
Kingdom of Bahrain

Latitude : 26° 16' N
Longitude : 50° 36' E



Example: Detail of Measurement



[INFORMATION]

Measurement campaign passed

- beginning on : 01/25/2009
- End on : 02/01/2009
- Last measure : 02/01/2009

[LOCALIZATION]

City Centre Mall
Manama
Bahrain

- Latitude : 26° 14 N
- Longitude : 50° 50 E



Highest field strengths measured per band

Band		Highest value measured in Bahrain (% of ICNIRP level)		Site
		Highest	Average for site	
FM Radio	88 – 108MHz	4.5%	3.6%	Central informatics Organisation
TV (Band 3)	174 – 223MHz	Below measurement limit		
TETRA	380 – 400MHz	0.8%	0.05%	City Centre Mall
TV (Band 4/5)	470 – 830MHz	6.3%	4.7%	Central informatics Organisation
GSM 900	925 – 960MHz	0.7%	0.4%	City Centre Mall
GSM 1800	1805 – 1880MHz	1.2%	0.7%	City Centre Mall
UMTS	2110 – 21170MHz	0.4%	0.3%	City Centre Mall
WLAN	2400 – 2500MHz	0.02%	0.01%	City Centre Mall



Conclusions – Visuals aspects

- Environmental concerns about the unsightliness of masts is of concern
- TRA has issued a mast sharing regulation and Policy
- TRA will work with the Municipalities and Commission to ensure new masts are only erected when absolutely necessary to provide the required telecom services - TTO
- Progressively masts will be modified to better blend into their environment
- Discussions on one Company to manage and deploy masts for all operators



Conclusion – Power levels

- WHO and ICNIRP have set a maximum exposure levels for non ionising electromagnetic radiation at values well below levels at which there is no evidence of harm to people
- The experience in Bahrain follows international experience with radiation levels from Telecommunications being typically in the order of 1% or less of the maximum level set by ICNIRP
- Authorities and the general public should not have health concerns in respect to emissions from Telecommunications Masts
- The current outstanding requests from Batelco, Zain and MENA should be completed
- TRA in cooperation with the Commission will continue monitoring power levels and publish results both on the web site and in quarterly reports
- We will measure at any place of concern to the public
- TRA will respond to any public concerns over power levels and have an ongoing Public Awareness activities



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