



**Suruhanjaya Komunikasi dan Multimedia Malaysia**

*Malaysian Communications and Multimedia Commission*

## **REPORT**

# **RADIOFREQUENCY AND MICROWAVE RADIATION MEASUREMENTS AROUND THE TELECOMMUNICATION STRUCTURE AT NO. 24-3A, JALAN PINGGIRAN 2/2, PINGGIRAN BATU CAVES, SELAYANG, SELANGOR**

**By**

**Malaysian Communications and Multimedia Commission**

**Central Region**

**Level, 17, Wisma SunwayMas**

**No. 1, Jalan Tengku Ampuan Zabedah C9/C**

**Section 9, 40100 Shah Alam**

**Selangor Darul Ehsan.**

**Tel: 03-5518 7701 Fax: 03-5518 7710**

**<http://www.skmm.gov.my>**

**Complaint Hotline: 1 800 888 030**

## **1. INTRODUCTION**

Suruhanjaya Komunikasi Dan Multimedia Malaysia (SKMM) has conducted a radiation measurement test at the telecommunication structure located at, **No. 24-3A, Jalan Pinggiran 2/2, Pinggiran Batu Caves, Selayang, Selangor**. The measurement was done with aim to know the level of the radiation emitted by the telecommunication structure.

SKMM carried out the measurement on 6<sup>th</sup> April 2009.

## **2. OBJECTIVE**

The main objectives of the measurement were to determine and access microwave radiation present in all accessible place around the structure and to make sure companies are following the guidelines and standard issued by SKMM and the International Committee on Non- Ionizing Radiation Protection (ICNIRP)

## **3. SCOPE OF THE MEASUREMENT**

The test was encompassed only on the assessment of the microwave radiation generated by the antenna. The measurements of radiations were assessment and evaluated against the exposure limit and the recommendation of the standard guidelines issued by the SKMM and the International Committee on Non –Ionising Radiation Protection (ICNIRP).

#### **4. STANDARD MEASUREMENT EQUIPMENT**

The Portable EMF Measurement System R&S® TS-EMF (Figure 1) measures electromagnetic fields in the environment (EMF). The measurements are a necessary basis for discussion about the effects of electromagnetic radiation.

Due to its wide frequency range from 30 MHz to 3 GHz, the R&S® TS-EMF complies with all common radio services:

- Mobile radio (GSM, CDMA)
- UMTS (frequency-selective)
- CPICH decoding for UMTS (option)
- DECT
- Bluetooth®
- WLAN (802.11b, g)
- TV broadcasting (analog, DVB)

The frequency-selective measurements not only determine total emission but also permit assignment to specific radio services. All common measurement methods and regulations are supported. Graphic and numeric result display with reference to a limit value simplifies evaluation.



Figure 1

Below is the table (Table 1) that been used for the reference level for general public exposure to time varying electric and magnetic field.

Frequency range	E-field strength (V m <sup>-1</sup> )	H-field strength (A m <sup>-1</sup> )	B-field (μT)	Equivalent plane wave power density S <sub>eq</sub> (W m <sup>-2</sup> )
up to 1 Hz	—	3.2 x 10 <sup>4</sup>	4 x 10 <sup>4</sup>	—
1–8 Hz	10,000	3.2 x 10 <sup>4</sup> /f <sup>2</sup>	4 x 10 <sup>4</sup> /f <sup>2</sup>	—
8–25 <sup>6</sup> Hz	10,000	4,000/f	5,000/f	—
0.025–0.8 kHz	250/f	4/f	5/f	—
0.8–3 kHz	250/f	5	6.25	—
3–150 kHz	87	5	6.25	—
0.15–1 MHz	87	0.73/f	0.92/f	—
1–10 MHz	87f <sup>1/2</sup>	0.73/f	0.92/f	—
10–400 MHz	28	0.073	0.092	2
400–2,000 MHz	1.375f <sup>1/2</sup>	0.0037f <sup>1/2</sup>	0.0046f <sup>1/2</sup>	f/200
2–300 GHz	61	0.16	0.20	10

Table 1 : reference levels for public exposure

## 5. SITE IMAGES

The telecommunication operator which is operating their service near the Water tank is U mobile. Below are the pictures of structures that belong to telecommunication operators.



Figure 2. Site overview



Figure 3. Street level view of structures.



Figure 4 Structures

## 6. RESULT AND CONCLUSION

Below is the result that we get from the activity:

I) Location 1 (inside complainant's house)

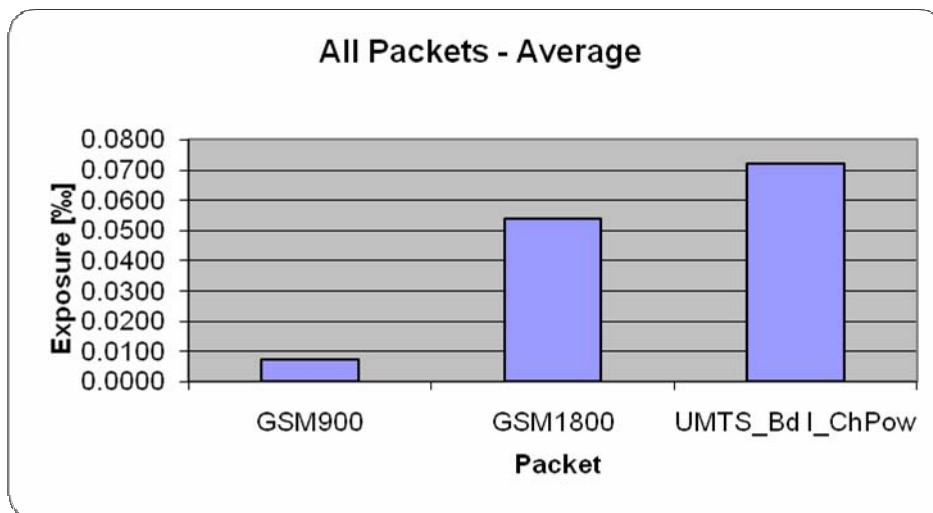
**Printout for Measurement**  
**pinggiran batu cave(indoor)**  
**on 4/6/2009**

(Averaging over a range of minutes)

All Packets - Average

Packet	Total Field (RMS) [V/m]	Total ER * 1000 [‰]
GSM900	0.1140	0.0073
GSM1800	0.4336	0.0538
UMTS_Bd I_ChPow	0.5169	0.0718
Sum	0.6842	0.1329

Limit Line: ICNIRP  
Antenna: Tri-axis probe - R&S SerNo 101365 RSEMF30-22-08-100231



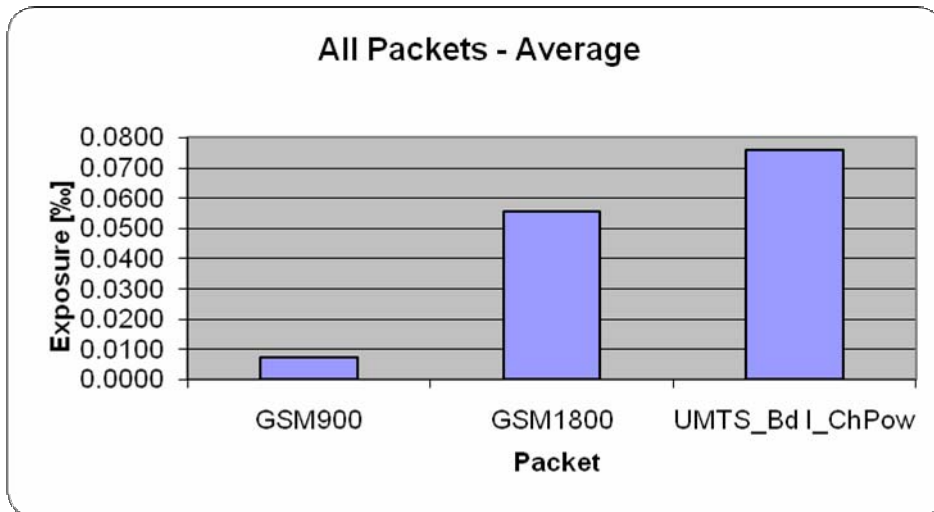
II) Location 2

**Printout for Measurement**  
**pinggiran batu cave(outdoor)**  
**on 4/6/2009**  
(Averaging over a range of minutes)

All Packets - Average

Packet	Total Field (RMS) [V/m]	Total ER * 1000 [‰]
GSM900	0.1129	0.0071
GSM1800	0.4406	0.0556
UMTS_Bd I_ChPow	0.5304	0.0756
Sum	0.6987	0.1383

Limit Line: ICNIRP  
Antenna: Tri-axis probe - R&S SerNo 101365 RSEMF30-22-08-100231



III) Location 3

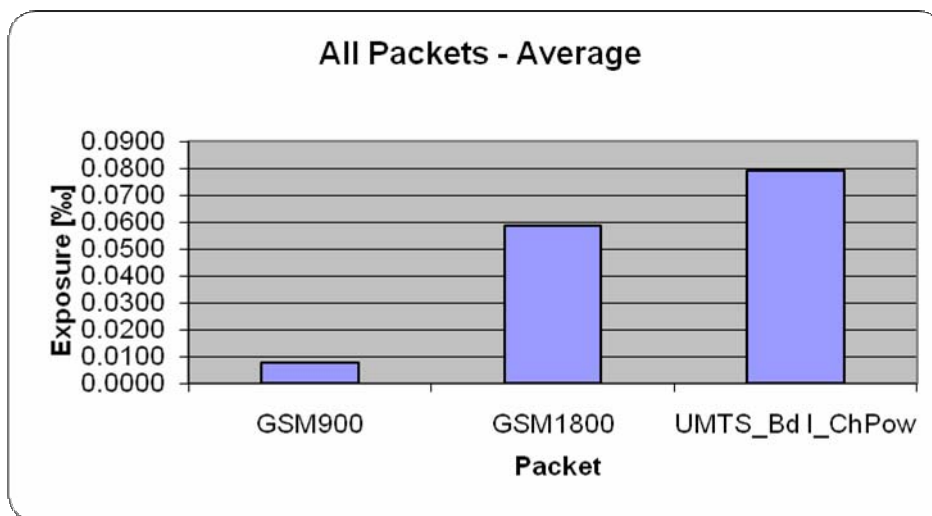
**Printout for Measurement**  
**pinggiran batu cave(outdoor2)**  
**on 4/6/2009**

(Averaging over a range of minutes)

All Packets - Average

Packet	Total Field (RMS) [V/m]	Total ER * 1000 [%]
GSM900	0.1182	0.0078
GSM1800	0.4523	0.0586
UMTS_Bd I_ChPow	0.5415	0.0788
Sum	0.7154	0.1452

Limit Line: ICNIRP  
Antenna: Tri-axis probe - R&S SerNo 101365 RSEMF30-22-08-100231



## 7. RF RADIATION LEVEL MEASUREMENT RESULTS

**Location :** No. 24-3A, Jalan Pinggiran 2/2, Pinggiran Batu Caves, Selayang, Selangor

**Latitude/ Longitude :** 101° 41' 39.63"  
3° 15' 19.49".

**Date of Measurement :** 6<sup>th</sup> April 2009

### Location 1

Frequency in MHz	Signal detected in V/m	SKMM & ICNIRP exposure limit in V/m	Result Comparison
938.2 to 956.2	0.1140	41.25	Far below limit
1850.2 to 1874.0	0.4336	58.34	Far below limit
2110 to 2170	0.5169	61	Far below limit

1. Table above shows the measurement results taken at location.
2. For 938.2 MHz to 956.2 MHz, the result shows the highest radiation level detected is **0.1140V/m**, which is far below the recommended exposure limit of **41.25 V/m (0.28% only)**.

3. For 1850.2 MHz to 1874.0 MHz, the result shows the highest radiation level detected is **0.4336V/m**, which is far below the recommended exposure limit of **58.34 V/m (0.74% only)**.
4. For 2110 MHz to 2170.0 MHz, the result shows the highest radiation level detected is **0.5169V/m**, which is far below the recommended exposure limit of **61 V/m (0.85% only)**.

## Location 2

Frequency in MHz	Signal detected in V/m	SKMM & ICNIRP exposure limit in V/m	Result Comparison
938.2 to 956.2	0.1129	41.25	Far below limit
1850.2 to 1874.0	0.4406	58.34	Far below limit
2110 to 2170	0.5304	61	Far below limit

1. Table above shows the measurement results taken at location.
2. For 938.2 MHz to 956.2 MHz, the result shows the highest radiation level detected is **0.1129V/m**, which is far below the recommended exposure limit of **41.25 V/m (0.27% only)**.
3. For 1850.2 MHz to 1874.0 MHz, the result shows the highest radiation level detected is **0.4406V/m**, which is far below the recommended exposure limit of **58.34 V/m (0.76% only)**.
4. For 2110 MHz to 2170.0 MHz, the result shows the highest radiation level detected is **0.5304V/m**, which is far below the recommended exposure limit of **61 V/m (0.87% only)**.

### Location 3

Frequency in MHz	Signal detected in V/m	SKMM & ICNIRP exposure limit in V/m	Result Comparison
938.2 to 956.2	0.1182	41.25	Far below limit
1850.2 to 1874.0	0.4523	58.34	Far below limit
2110 to 2170	0.5415	61	Far below limit

1. Table above shows the measurement results taken at location.
2. For 938.2 MHz to 956.2 MHz, the result shows the highest radiation level detected is **0.1182V/m**, which is far below the recommended exposure limit of **41.25 V/m (0.29% only)**.
3. For 1850.2 MHz to 1874.0 MHz, the result shows the highest radiation level detected is **0.4523V/m**, which is far below the recommended exposure limit of **58.34 V/m (0.78% only)**.
4. For 2110 MHz to 2170.0 MHz, the result shows the highest radiation level detected is **0.5415V/m**, which is far below the recommended exposure limit of **61 V/m (0.89% only)**.

## 8. CONCLUSION

The radiofrequency and microwave radiation present at the tower area were measurable but of low levels. The electrical field strength was well below the exposure limits stipulated by SKMM and ICNIRP guidelines for workers and members of the public.

Based on the findings of this measurement, SKMM strongly believe that the presence of the radiofrequency and microwave radiation emitted by the telecommunication structure with the present loads would not lead to any significant radiation exposure received by residence or workers in area around the telecommunication structure.

Note: SKMM- **S**uruhanjaya **K**omunikasi dan **M**ultimedia **M**alaysia  
ICNIRP-**I**nternational **C**ommission on **N**on-**I**onizing **R**adiation  
**P**rotection (ICNIRP, 1996)

## 9. REFERENCES

- I) Guidance To Safety And Health Aspects Of Base Stations And Mobile Phone; Ministry of Health Malaysia; 2007
- II) R& S TS-EMF Measurement Guide; Rohde & Schwarz; 2008