
Exposure to EME from Wireless Devices in Australian Homes

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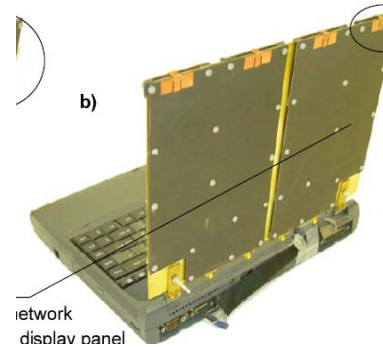
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Introduction



- Public concern regarding the RF levels from devices such as mobile phones and base stations, personal wireless devices, WiFi and wireless LAN
- Concern that such exposures may **ADD** to reach levels that might exceed compliance levels
- Little data available on typical sources or levels of exposure in Australian homes

Aim & Hypothesis

> Aim

- Determine what RF devices (number and type) are ‘typical’ in Australian homes
- Conduct a series of measurements in homes around the Melbourne area for a number of pre-defined exposure scenarios
- Compare measurements to compliance levels

> Hypothesis

- Each of the RF sources detected within the ‘typical’ home will be within compliance levels
- Summation of exposure from these RF devices will not exceed compliance levels

Protocol – Recruitment

- > Recruited 20 homes throughout greater Melbourne metropolitan area (associates, response to advertising)
- > Questionnaire requesting details of all RF and ELF emitting devices
 - Protocol required that there were at least 3 RF devices in use in the home (not including microwave oven)
 - RF devices such as cordless and mobile phones, Wi-Fi, wireless LAN, Bluetooth, wireless remote controls and baby monitors
- > Visited homes April-August 2008

Protocol - Survey

- > Audit number and type of devices in home
- > Measure cumulative exposure at fixed locations in the home
 - Inside (lounge or living room)
 - Outside (front or rear yard)
 - Desk or study area
- > Measure personal exposure to individual devices
 - Height of 1.5 m (head height for sitting adult)
 - 20 cm from device (nearby but not hand held)

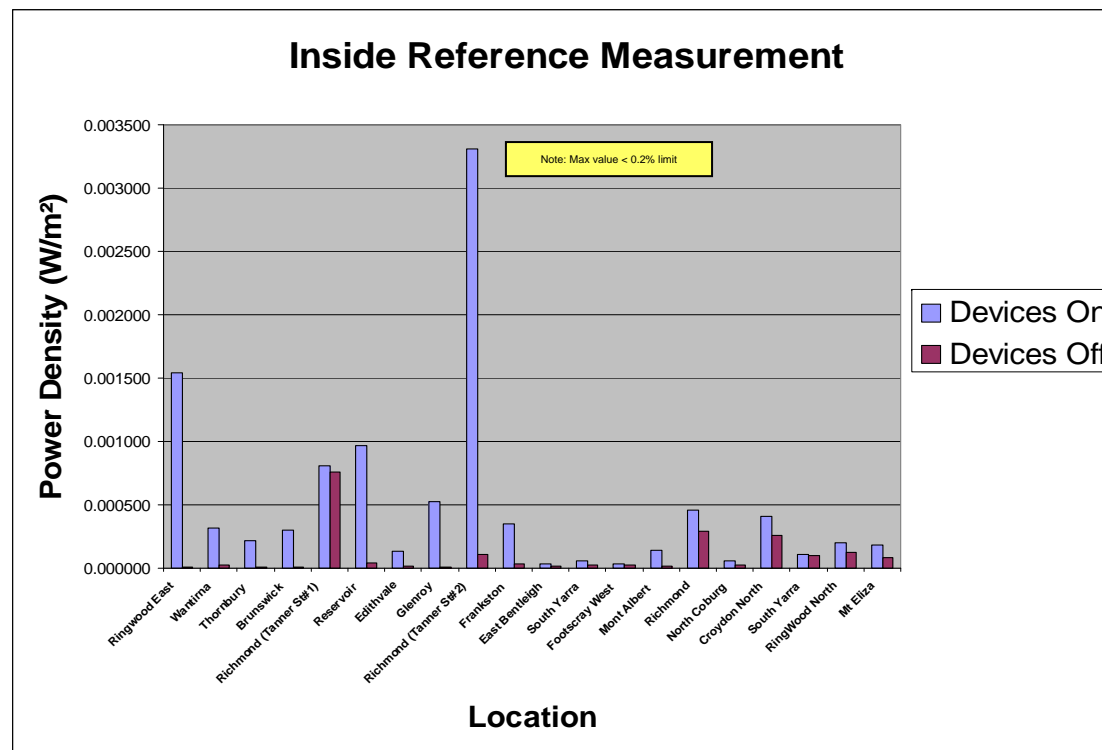
Measurement Equipment

- > Narda SRM 3000 (75 MHz-3 GHz)
- > For freq < 75 MHz, uni-axial loop
- > For freq > 3 GHz, Anritsu spectrum analyser



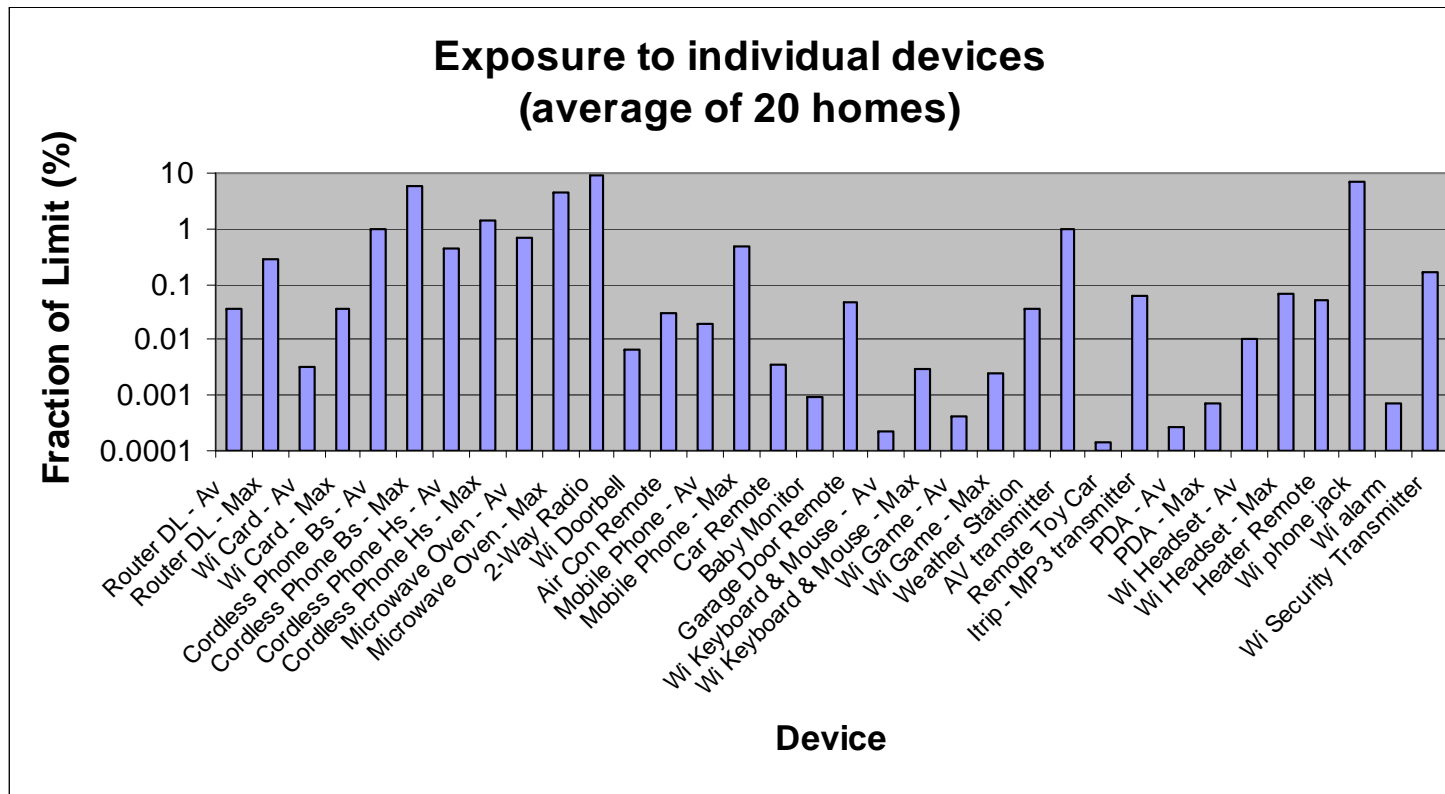
Results – Cumulative exposure

- > All exposures less than compliance limits
- > Devices On = 5 x Devices Off (Av. over 20 homes) but highly variable



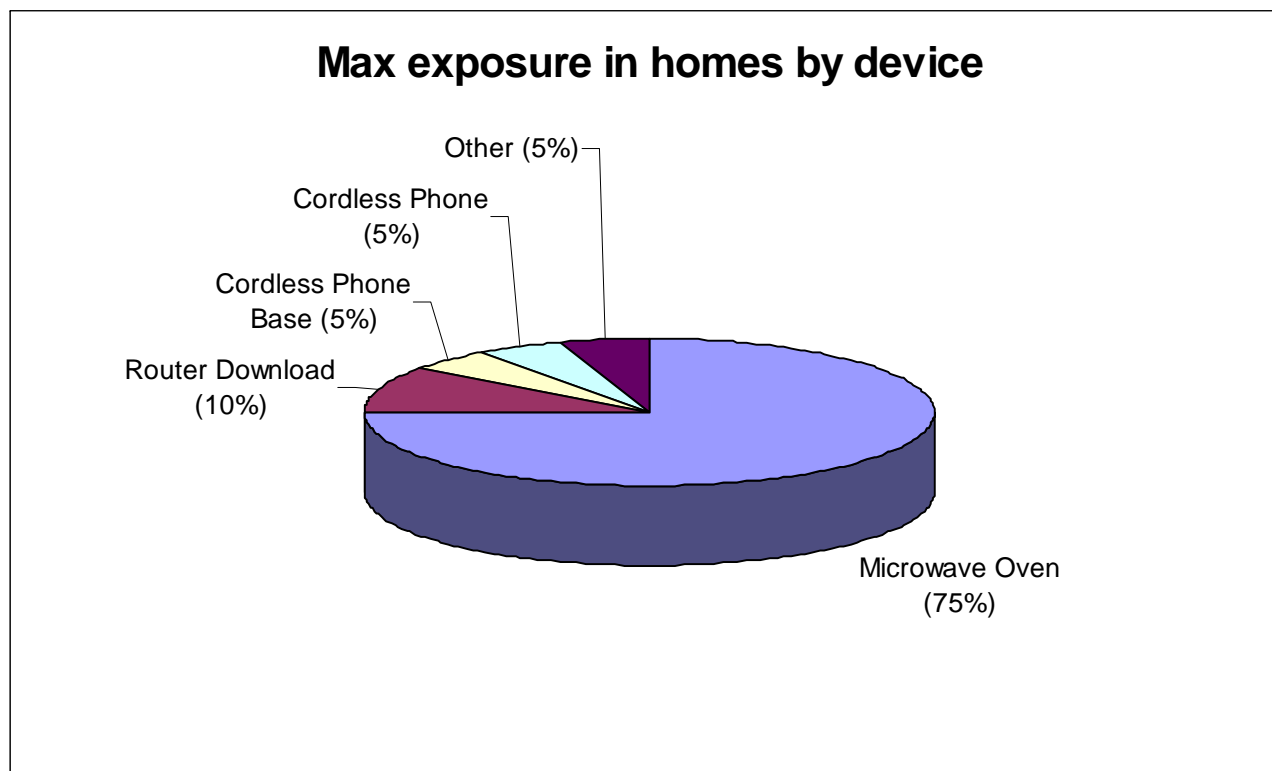
Results – Exposure to individual devices

- > Highest exposure from microwaves, routers and cordless phones



Results – Exposure to individual devices

- > Microwave oven most frequently the source of highest exposure



Results – Desktop scenario

- > Field levels at desktop ~ 5 x levels at inside reference point
- > % Exposure Limit ~ same due to type of devices in use (different frequency of operation → different limits)

Exposure Location		Average (W/m ²)	Max (W/m ²)	Min (W/m ²)
Home	Inside	0.000507	0.003305	0.000029
	Outside	0.000215	0.000839	0.000017
Desk		0.002487	0.016720	0.000018

Summary & Conclusion

- > All exposures less than compliance limit
- > Cumulative exposure at reference point or desk hundreds or thousands of times below compliance limit
- > Individual exposure dominated by microwave oven, cordless phone, wireless router
- > Large variation in exposure across homes and across devices

Acknowledgments

- > The ACRBR wishes to acknowledge the grant provided by the Australian Mobile Telecommunications Association, and RadHaz Consulting who undertook the measurement work