

NIST MRA Workshop 2009
Gaithersburg, MD U.S.A.



EMR - SAR Testing & Approval Requirements for Australia



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Topics Covered

- Human Exposure regulations- EMR Framework
- ARPANSA and ACMA EMR standards
- SAR Limits and Reference Levels
- EMR Compliance – Four measurement methods
- SAR Compliance – Two Measurement Methods
- When to test for SAR
- Labelling requirements, records, accredited testing
- Variants

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EMR Framework

- **The Radiocommunications (Electromagnetic Radiation (EMR) -Human Exposure) Standard 2003, Amdt1:2007**
 - “Standard” sets limits for human exposure to EMR from mobile/portable Radiocommunications Transmitters
 - Created by Australian Communications and Media Authority (ACMA)
 - Specifies ARPANSA (ICNIRP) Limits
 - 3 measurement methods (Field meter/2 SAR methods)

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EMR Framework

- **The Radiocommunications (Compliance Labelling-Electromagnetic Radiation) Notice 2003 (Labeling notice), Amdt 2007**
 - Register with ACMA to use compliance mark
 - record keeping, supporting documentation
 - Testing and report requirements
 - Laboratory accreditation
 - Compliance levels
 - Labelling requirements
 - Declaration of Conformity (DoC)





ARPANSA Radiation Protection Standard



Australian Government
Australian Radiation Protection
and Nuclear Safety Agency



- **“*Australian Radiation Protection And Nuclear Safety Agency (ARPANSA) - Maximum exposure levels to Radio Frequency fields, 3 kHz to 300 GHz*”**
- Adopted by ACMA
- Adopts ICNIRP recommendations
- Sets basic restrictions and reference levels
- Sets SAR limits and specifies criteria for SAR evaluation
- SAR measurement methods not given
- AS/NZS2772.2 specifies field measurement and calculation methods, not SAR



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Basic Restrictions

Specific Absorption Rate (SAR) limited to;

	Controlled / Occupational	Uncontrolled / General Public
Whole Body Averaged SAR	0.4 W/kg	0.08 W/kg
Spatial peak *1 -Head & Torso	10 W/kg	2 W/kg
Spatial peak *1 -Limbs	20 W/kg	4 W/kg

*1. SAR measured in a 10 gram cube of tissue
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ARPANSA Reference Levels For Time Averaged Exposure To RMS Electric And Magnetic Fields (Unperturbed Fields)

Exposure category	Frequency range	E-field strength (V/m rms)	H-field strength (A/m rms)	Equivalent plane wave power flux density S_{eq} (W/m ²)
Occupational	100 kHz – 1 MHz	614	$1.63 / f$	-
	1 MHz – 10 MHz	$614 / f$	$1.63 / f$	$1000 / f^2$ (see note 5)
	10 MHz – 400 MHz	61.4	0.163	10 (see note 5)
	400 MHz – 2 GHz	$3.07 \times f^{0.5}$	$0.00814 \times f^{0.5}$	$f / 40$
	2 GHz – 300 GHz	137	0.364	50
General public	100 kHz – 150 kHz	86.8	4.86	-
	150 kHz - 1 MHz	86.8	$0.729 / f$	-
	1 MHz - 10 MHz	$86.8 / f^{0.5}$	$0.729 / f$	-
	10 MHz – 400 MHz	27.4	0.0729	2 (see note 6)
	400 MHz – 2 GHz	$1.37 \times f^{0.5}$	$0.00364 \times f^{0.5}$	$f / 200$
	2 GHz – 300 GHz	61.4	0.163	10

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Comparison of SAR Limits Non-occupational/General Public

	Australia ARPANSA	USA	Europe (ICNIRP)	Japan	New Zealand
	ACMA	ANSI C95.1	EN50360	ARIB-T56	NZS2772.1
Whole Body	0.08 W/kg	0.08 W/kg	0.08 W/kg	0.08W/kg	0.08 W/kg
Spatial Peak	2 W/kg	1.6 W/kg	2 W/kg	2 W/kg	2 W/kg
Averaging Time	6 min	30 min	6 min	6 min	6 min
Averaging Time	10g	1g	10g	10g	10g
Shape	Cube	Cube	Cube	Cube	Cube

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Frequency Band MHz	EN50361 (Head only)		EN62209-1 (Head only)		FCC OET 65C Head		ACMA Schedule 2 Body/Muscle	
	ϵ_r	σ	ϵ_r	σ	ϵ_r	σ	ϵ_r	σ
	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$	$\pm 5\%$
150			-	-	52.3	0.76	61.9	0.80
300	45.0	0.85	45.3	0.87	45.3	0.87	58.2	0.92
450	44.0	0.88	43.5	0.87	43.5	0.87	56.7	0.94
800	-	-	-	-	-	-	-	-
835			41.5	0.90	41.5	0.90	55.0	0.97
900	42.0	0.99	41.5	0.97	41.5	0.97	55.0	1.05
915			-	-	41.5	0.98	55.6	1.06
1430	41.0	1.3	-	-	40.5	1.20	54.0	1.30
1450			40.5	1.20				
1600			-	-				
1610			-	-	40.3	1.29	53.8	1.40
1800	40.0	1.38	40.0	1.40	40.0	1.40	53.3	1.52
1900			40.0	1.40				
1950			40.0	1.40				
2000			40.0	1.40	40.0	1.40	53.5	1.52
2450	39.0	1.84	39.2	1.80	39.2	1.80	52.7	1.95
2500			-	-				
3000	39.0	2.40	38.5	2.40	38.5	2.40	52.0	2.73
5800	??	??	??	??	35.3	5.27	48.2	6.00

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Comparison of Tissue Dielectric Values

20-26 °C
±2 °C

Harmonized??

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Case History (Arm-Held Position)



Test Date: XXXX
File Name: XXXXX Tablet with WLAN Type: XXXX 11n/g Module Serial: No XX
SPE: XXXXX Tablet with WLAN Type: XXXX 11n/g Module Serial: No XX

* Communication System: OFDM 5700 MHz, Frequency: 5745 MHz, Duty Cycle: 1:1
* Medium: Body 560 MHz, Medium parameters used (empirical): f = 5745 MHz, s = 8.25
* Material: A = 44.3, s = 1000 light
* Electronics: GAE3 S-HAZ Probe: E320V5-EMX009, Conn: (1.8, 1.8, 1.8)
* Phantom: Flat Phantoms 10.5 Serial: 0101, Phantom section: Flat 2.5 Section
Channel 148 Test 2/Area Scan (Flat1+1): Measurement grid: dx=20mm, dy=20mm
Reference Value = 0.87 mW/g
Power DUT = 0.2 dB
Maximum value of SAR = 7.44 mW/g

Channel 148 Test 2/Zoom Scan (Flat1+1)Cube B: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Power SAR (averaged) = 37.9 mW/g
SAR1 g1 = 5.16 mW/g, SAR10 g1 = 0.970 mW/g
Reference Value = 0.87 mW/g
Power DUT = 0.2 dB
Maximum value of SAR = 10.2 mW/g

SAR MEASUREMENT PLOT X

Ambient Temperature: 22.7 Degrees Celsius
Liquid Temperature: 28.1 Degrees Celsius
Humidity: 61 %

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- Example of 5.8GHz SAR Compliance of Tablet PC.
- Highest Evaluated SAR
 - 1g Cube = 5.16mW/g
 - 10g Cube = 0.970mW/g
- Compliance Margins
 - Exceeds FCC(USA) limit by over 3 times.
 - 50% of ACMA/EU limit



EMR Standard 2003 Compliance

Four Common Methods

1. Non-evaluation criteria (low power etc)
2. SAR Measurements
3. Reference Level Measurements
 - E-field
 - H - Field
 - Power Density
 - Limb/Contact Currents
4. Modelling/Predictions with manual or computer calculations

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ACMA EMR Standard 2003

Assessment Methods for Devices Exceeding Power Threshold

User Position	Applicable Frequency Range	ACA Evaluation Method
> 20 cm from Human Body	300 kHz to 100 GHz	Power density or Field Strength Reference Level measurements - EMR Meter AS2772.2
< 20 cm from Human Body	150 MHz – 5800 MHz	SAR measurements Push-to-Talk / Body Worn devices – -SAR per Schedule 2
Close Proximity to Human Ear	300 MHz – 3000 MHz	SAR Measurements at the ear Mobile/Portable Phones - -SAR per EN62209-1
< 2.5 cm from Human Body	300 kHz-100 GHz	If less than 20 mW, - complies without testing



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EMR- SAR Measurements

**Level 3 test
For SAR compliance**



SAR Measurement System



**Level 2 test
Field Strength Meter**





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EMR/SAR Measurement Methods

ACMA EMR Standard 2003+A1:2007

- **Ear position - SAR**
 - EN62209-1; mandatory as of March 2009
 - EN50361; expired March 2009
 - **FCC Reports not acceptable**
- **Body Worn Position – SAR**
 - ACMA EMR Std 2003, Schedule 2
 - Similar to FCC OET65C
 - Will be replaced by EN62209-2 when published
 - **FCC Reports not acceptable**
- **Devices >20cm from body**
 - EMR field strength meter, power density, reference levels

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2 ACA SAR Test Methods

- **ACMA EMR Std 2003, Schedule 2:**
*“Measurement method for devices 20cm or less from the human body
 Part 1: Information for documenting SAR compliance
 Part 2: Tissue Dielectric parameters
 Part 3: SAR Measurement Procedures”*
 - Specific reporting requirements
 - Head and Body Phantoms defined
 - Procedures, verification, uncertainty, EUT configuration

- For 150 MHz to 5.8 GHz devices
 - Body worn/PTT devices, WLAN Laptop, PDAs etc
 - Very similar to FCC *OET65C 01-01*

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What Needs SAR Testing?



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Table S1 ARPANSA

Threshold Levels for SAR Testing
 Device **< 2.5 cm** from body

Frequency MHz	Aware User RF Worker	Unaware User General Public
0.1 – 2500	100 mW	20 mW

SAR Evaluation Required if;

1. power exceeds threshold level, *or*
2. Operates between 2500 to 5800 MHz and within 20cm

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Table S2 ARPANSA

Threshold Levels for SAR Testing
 Device **< 20 cm and >2.5cm** from body

MPTE Operating Frequency <i>f</i> (MHz)	Aware User Clause S5.2 Mean Power Output - Watts	Non-Aware User Clause S5.3 Mean power output - Watts
0.1 - 450	7	1.4
450 - 2500	$3150/f$	$630/f$

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Labelling-Compliance Records

The Radiocommunications (Compliance Labelling-Electromagnetic Radiation) Notice 2003

- Labelling requirements same as for C-tick
 - Obtain Supplier ID
 - Prepare SAR test report (+other test reports)
 - Prepare Description of device
 - Prepare Compliance Folder
 - Declaration of Conformity
 - Apply A-tick **or** C-tick
 - No need to report actual SAR in user information.



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Which Compliance Mark?

- Radiocommunications/EMC devices may be labelled with
 - **C-Tick** 
- Devices to which the **EMR & Telecoms** labelling apply require
 - **A-Tick** 

<http://www.aca.gov.au/standards/marks.htm>

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Compliance Level 1

- **Applies to Category A devices**
 - Determined by *Table SI ARPANSA*
 - Low power and cannot exceed basic restrictions
 - E.g. analogue cordless phones, electronic garage door opener, (*some*) low power WLAN for PC
- **Requirements**
 - Deemed to comply without testing (but must still comply!)
 - Compliance labelling
 - Declaration of Conformity must be signed
 - Description of transmitter/device in compliance folder

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Compliance Level 2

- **Applies to Category B devices**
 - Devices which are not Category A
 - Normally used **>20cm** from body
 - Power sufficient to exceed basic restrictions
 - Apply *Table SI ARPANSA*
 - WLAN, Access Points, base station, mobile stations
- **Requirements**
 - Must comply with Reference Levels **E, H** or **Power Density**
 - Compliance mark required
 - Description of device
 - DoC

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Compliance Level 3 – SAR Test



- **Applies to Category B devices <20cm from Body**
 - Normally used <20cm from body
 - Power sufficient to possibly exceed basic restrictions
 - Apply *Table S1 ARPANSA*
 - Cell-phones, portable handheld/body-worn devices, PTT WLAN, Access Points, base station, mobile stations
- **Requirements**
 - **SAR Evaluation must be performed**
 - NATA MRA accredited test lab (Level 3 compliance)
 - 2 SAR test methods per ACA EMR Standard 2003
 - SAR limit of 2.0 W/kg
 - Records, Labelling, DoC



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Laboratory Accreditation Requirements



- **Compliance Level 1 and 2**
 - accreditation not mandatory but preferred.
- **Compliance Level 3**
 - Must be accredited to conduct tests to ACMA EMR Standard 2003 by **NATA**
 - or by*
 - International body having Mutual Recognition Agreement (MRA) with **NATA**
e.g UKAS, NVLAP, A2LA,, DAR, etc
 - **Must be accredited to EN62209-1+ACMA Schedule 2**



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Variants of Device

SAR must be re-assessed when variant likely to increase SAR:

eg:

- Changes to geometry of phone
- Changes to types of material used in construction of phone, keyboard, displays etc
- The use of alternate batteries
- Any changes to the antenna including the fitting of so called radiation reduction devices or performance enhancement devices

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Thank You

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Wireless Telecommunications Approval Requirements for Australia



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Wireless Telecommunications Approval Requirements for Australia



Australian Government
**Australian Communications
and Media Authority**

GSM – WCDMA – UMTS- Cordless

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GSM Handset - Applicable Standards

- Certification, testing & report to the following:
 - **AS/ACIF S042.1:2006** - Requirements for connection to an air interface of a Telecommunications Network – General
 - Emergency dialling: “000”& “112”
 - Voice shall not activate “106” emergency text (non-speech) emergency number.
 - Acoustic shock (max Sound Pressure Level) limit 120dBA
 - Network Integrity/Interoperability per EN 301 511
 - IMEI Security- ETSI TS 151 010-4
 - **AS/ACIF S042.3:2005 (replaced ACA TS018-1997)**– GSM Telecommunications Equipment (including Australian requirements).
 - **AS/NZS60950-1:2003** – Safety of Information Technology Equipment. Applies to handset.
 - **EMR Standard 2003 +Amdt 1:2007** - Human Exposure to RF.
 - SAR to EN62209-1(devices used at the ear)
 - SAR to ACMA EMR Standard Schedule 2 (body worn devices)



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Australian Communications
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GSM- Documentation Requirements

- Full copy of a test report to the applicable versions of
 - GCF-CC (Global Certification Forum)
 - or* ETSI EN300 607-1 (GSM phase 2+ 900/1800)
 - or* ETSI EN301 511 (GPRS, GSM 900/1800)
 - or* an approval to connect from an Australian carrier
- Copy of User manual
- Details of Manufacturer
- IMEI integrity attestation
- Details of Software version of telephone being supplied
- Details of manufacturer’s model number
- Details of market model number



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GSM – Approval Requirements AS/ACIF S042.3

- Labelling Notice Schedule 1, Category A24 has three testing and reporting requirements
- Interoperability and integrity testing to ACMA AS/ACIR S042.3 is compliance Level 3.
- **IMEI integrity is Compliance Level 1**
- Safety to AS/NZS 60950.1: 2003 will also apply e.g. Modem modules mounted in equipment and for desk top units.



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GSM – Approval Requirements AS/ACIF S042.1

Schedule 1, Category A24 – other requirements.

- Compliance Level 2 applies to the differences to GSM standards for :
 - **Emergency dialling “000 & 112”**
 - **Ignition of flammable atmospheres (Notice to users)**
 - **Acoustic Shock: SPL rms must not exceed 20dBA**
 - Compliance Level 1 applies to IMEI integrity
- Reports must exist for all Category A24 requirements.



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GSM – Approval Requirements Certification Body

- AS/ACIF S042.3 interoperability and integrity testing are exempt if EU Type Approval is available.
- If a Recognised Testing Authority (RTA) test report or EU Type Approval certificate is not available, certification by a ACMA “Certification Body” is required
- This is the most common approach to approvals of GSM handsets.



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What is a Certification Body?

- A body which has been granted the authority by the Approving Body (ACMA) to issue Statements of Compliance against the Telecommunications Act 1997 section 376 Technical Standards.
- A Certification Body may only issue a Statement of Compliance:
 - in accordance with the Telecommunications Labelling Notice (TLN) and the ACMA guidelines; and
 - against standards or parts thereof, covered by the scope of determination by the approving body.



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What is a Recognised Testing Authority (RTA)

- Telecommunications equipment classified as **compliance level 3** in the Australian Communications and Media Authority's (ACMA) Labelling Notice 2001 as amended December 2008 must be tested for compliance against the relevant standards by a **Recognised Testing Authority**.
- To be an RTA, a laboratory must have one or more of the AS/ACIF standards or former ACA Technical Standards identified in its scope of accreditation.
- Current RTA list: www.nata.asn.au
- Check RTA scope and check exclusions



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WCDMA- Applicable Standards

- **AS/ACIF S042.1:2005** – Requirements for connection to an air interface of a telecommunications network – Part 1 General.
 - Testing will be required for proof of compliance to AS/ACIF S042.1
- **AS/NZS 60950.1** – Safety of Information Technology Equipment
- **AS/ACIF S003** – PABX connected to PSTN if a Plain Ordinary Telephone Service (POTS) port is provided



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WCDMA - Documentation Requirements



- Copy of *3GPP* or *ETSI* interoperability test reports or an approval to connect from the Australian carrier
- Copy of User manual
- Details of Software version of compliant telephone being supplied
- Details of manufacturer's model number
- Details of market model number



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PSTN Cordless Handset



- Traditional Cordless Telephones (Low Frequency) & Spread Spectrum Cordless Telephones.
- Required to meet the requirements of Schedule 1, Category A1 – **AS/NZS 60950.1, AS/ACIF S002, AS/ACIF S004**
- RF Requirements to AS/NZS 4821.
- EMC & EMR (SAR) requirements apply.



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Other Requirements

- **EMC**
 - Charger , Accessories, Car Kits
- **Human Exposure to RF**
 - EMR, SAR
 - Body Worn SAR applicable for Hands Free Kit
- **Safety**
 - Power adapters/Chargers, Handset



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Electromagnetic Compatibility

- **AS/NZS CISPR22 (EN55022)**
Interference Characteristics of Information Technology Equipment (may apply depending on the product)
- Conducted EMI on Telecoms Ports mandatory 
- Radiated EMI >1 GHz will apply when mandatory in Europe
- C-tick mark not to be used for Telecoms devices 
- Charger and accessories may be C-ticked



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Human Exposure to RF



- **The Radiocommunications (Electromagnetic Radiation (EMR) -Human Exposure) Standard 2003 + Amdt:2007 (EMR Standard 2003)**
 - “Standard” sets limits for human exposure to EMR from specified mobile/portable Radiocommunications Transmitters
 - Created by Australian Communications Authority
 - Specifies ARPANSA (ICNIRP) Limits
 - Defines 2 SAR test methods



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Human Exposure to RF



- **The Radiocommunications (Compliance Labelling-Electromagnetic Radiation) Notice 2003 (EMR Labeling Notice)**
 - Register with ACA to use compliance mark
 - record keeping, supporting documentation
 - Testing and report requirements
 - Laboratory accreditation
 - Compliance levels
 - Labeling requirements
 - Declaration of Conformity (DoC)







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Specific Absorption Rate (SAR) Limits

Based on ICNIRP

	Controlled / Occupational	Uncontrolled / General Public
Whole Body Averaged SAR	0.4 W/kg	0.08 W/kg
Spatial peak -Head & Torso	10 W/kg	2 W/kg
Spatial peak -Limbs	20 W/kg	4 W/kg



SAR measured in a 10 gram cube of tissue

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ACA EMR Standard 2003

Assessment method for devices exceeding power threshold

User Position	Applicable Frequency Range	ACA Evaluation Method
> 20 cm from Human Body	300 kHz to 100 GHz	Power density or Field Strength Reference Level measurements - EMR Meter AS2772.2
< 20 cm from Human Body	150 MHz – 5800 MHz	SAR measurements Push-to-Talk / Body Worn devices – -SAR per Schedule 2
Close Proximity to Human Ear	300 MHz – 3000 MHz	SAR Measurements at the ear Mobile/Portable Phones - -SAR per Schedule 2 or EN50361
< 2.5 cm from Human Body	300 kHz-100 GHz	SAR test, or if less than 20 mW, - complies without testing



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Applicable SAR Tests

- Body worn SAR tests applicable for Hands Free Kits
- Applicable for devices not used at the ear
- Test house must be accredited to **ACMA EMR Standard Schedule 2** and **EN62209-1**



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Safety Requirements

- Power Adapter and Plug Packs generally fall outside of the ACMA (federal) safety requirements.
- These devices are considered “Prescribed Items” and must obtain Electrical Authority Approval (state government)
- AS/NZS 60950.1 (IEC 60950 with Australian deviations)
 - Switch Mode Charger
- AS/NZS 61558
 - Transformer Power Adapters
- **MEPS (Minimum Energy Performance Standard)**
 - AS/NZS 4665.1 – Testing
 - AS/NZS 4665.2 – Application/Registration



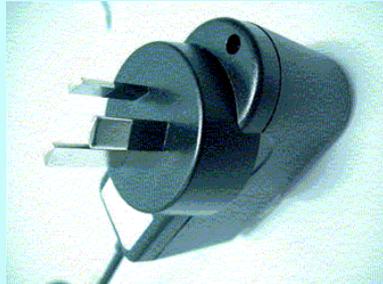
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Insulated Single Phase Mains Pins

It is mandatory for Insulated Pins to be fitted to all single phase mains powered devices supplied in Australia from April 2005



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Contact Details



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Approval of Short Range Devices













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Approval of Short Range Devices

- ❑ **802.11a,b,g,n** must comply with *"ACMA Radiocommunications (Short Range Devices) Standard 2004"*
- ❑ Short range devices operate under **class licence** conditions listed in *"Radiocommunications (Low Interference Potential Devices) Class Licence 2000, as amended 2008"*
 - prescribes standards, and may specify other technical and operational parameters.
 - No applications, registrations or fees
 - Voluntary C-tick labelling
- ❑ Must not cause interference and is not afforded protection from interference
- ❑ *Radiocommunications (Electromagnetic Radiation- Human Exposure) Standard 2003 + A1:2007* (applies in most cases)

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Approval of Short Range Devices

**To operate under the class licence
the device must meet either :**

- AS/NZS4268** (Australian version of **ETS 300 328** but with a few variations)
- or**
- meet the requirements of **ETS 300 328**.
- or**
- meet the provisions of section **15.247** of the FCC Rules except for certain frequency bands and the provisions of **15.247 (b)** which relate to transmitter power and antenna gain,

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Radiocommunications (Low Interference Potential Devices) Class Licence 2000+Amdt 2008

Item	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
17	All transmitters	433.05-434.79	25 mW	
18	All transmitters	915-928	3 mW	
19	All transmitters	2400-2483.5	10 mW	
19A	All transmitters	5725-5875	25 mW	

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Radiocommunications (Low Interference Potential Devices) Class Licence 2000 + Amdt:2008

Item	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
26	Telecommand or telemetry transmitters	1. 2400-2450 2. 5725-5795 3. 5815-5875	1 W	
27	Telecommand or telemetry transmitters	5795-5815	2 W	

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Radiocommunications (Low Interference Potential Devices) Class Licence 2000 + Amdt:2008

Item	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
52	Frequency hopping transmitters	915-928	1 W	A minimum of 20 hopping frequencies must be used
53	Frequency hopping transmitters	2400-2483.5	500 mW	A minimum of 15 hopping frequencies must be used
54	Frequency hopping transmitters	5725-5850	4 W	A minimum of 75 hopping frequencies must be used

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Radiocommunications (Low Interference Potential Devices) Class Licence 2000 + Amdt:2008

Item	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
44	Radio Local Area Network transmitters used indoors (RLAN)	5150-5250	200 mW (averaged over the entire transmission burst)	<ol style="list-style-type: none"> 1. If the emission bandwidth is 1 MHz or greater, the radiated power spectral density in any 1 MHz is limited to 10 mW per MHz 2. If the emission bandwidth is less than 1 MHz, the radiated power spectral density in any 4 kHz is limited to 40 µW per 4 kHz

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Radiocommunications (Low Interference Potential Devices) Class Licence 2000 + Amdt:2008

Item	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
44A	RALN transmitters used indoors	5250-5350	200 mW (averaged over the entire transmission burst)	<ol style="list-style-type: none"> 1. If the emission bandwidth is 1 MHz or greater, the spectral density in any 1 MHz is limited to 10 mW EIRP per MHz 2. If the emission bandwidth is less than 1 MHz, the spectral density in any 4 kHz is limited to 40µW EIRP per 4 kHz 3. From 1 January 2006 devices operated for the first time must use Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC). If TPC is not used then the maximum EIRP is limited to 100mW

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Radiocommunications (Low Interference Potential Devices) Class Licence 2000 + Amdt:2008

Item	Class of transmitter	Permitted operating frequency band (MHz)	Maximum EIRP	Limitations
45	Digital modulation transmitters	915-928 note 1.	1 W	<ol style="list-style-type: none"> 1. The radiated peak power spectral density in any 3 kHz is limited to 25 mW per 3 kHz 2. The minimum 6 dB bandwidth must be at least 500 kHz

Note 1. 902-915 MHz range not allowed in Australia

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More Information

- EMC Technologies Ltd
 - Melbourne
 - Sydney
 - Brisbane
 - **Auckland (NZ) - Andrew Cutler, Manager**
Accredited Radio Testing Laboratory
 - www.emctech.com.au

- AMCA Area Office
 - www.acma.gov.au



Australian Government
Australian Communications and Media Authority

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NIST MRA Workshop 2009
Gaithersburg, MD U.S.A.



Overview of Safety Requirements for Electrical and Electronic Products in Australia



Chris Zombolas
Technical Director
EMC technologies
Melbourne, Australia



Australian Regulators

- Federal Government regulates communications but has no jurisdiction over power supply
- Electrical Safety in Australia is regulated by the 6 State and 2 territory governments
- Safety approval in any one state is accepted by all other states
- Australia New Zealand have MRA on safety regulator approvals

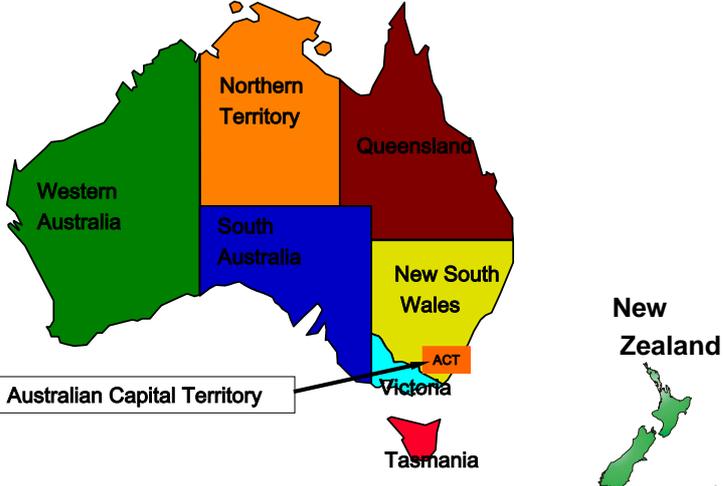
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8 Australian Safety Regulators

6 State and 2 Territory regulators responsible for electrical safety



Australian Capital Territory

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Definitions

- **“Prescribed Items”** also known as **“Declared Articles”** - equipment defined and listed by the electrical regulators as requiring a “Certificate Of Approval” (appendix D of AS/NZS 4417 for RCM)
- **Non-Prescribed Items** - all other items of electrical equipment (still required to meet minimum safety standards)
- **Responsibilities** - manufacturer or importer is responsible for ensuring the supply of safe products and for proper labelling.

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List of Prescribed Items

- Consumer devices
- Domestic appliances
- TV Receivers
- Battery Chargers
- Transformers/Power packs
- Electronic ballasts
- etc
- etc
- For a current list, go to:



http://www.fairtrading.nsw.gov.au/Businesses/Product_safety/Electrical_products/Declared_articles.html



Prescribed Items (Declared Articles)

- Show compliance with an appropriate Australian or equivalent international safety standard.
- Testing must be performed by a **NATA** or MRA Partner accredited test laboratory.
A2LA, NVLAP, UKAS, DAR, etc
- A ***“Certificate of Approval”*** must be obtained from the electrical regulator.
- Appropriate test reports and application forms must be supplied.
 - a representative sample may be requested.
 - application fees are charged

Non-Prescribed Items (Non-Declared Articles)



- Do not need a “*Certificate Of Approval*” before being supplied.
- Must still meet the minimum requirements of the appropriate electrical standard.
 - Obtain a voluntary “Certificate of Suitability”
 - Meet the requirements to apply the Regulatory Compliance Mark
 - Obtained by providing the electrical regulator with **NATA** or equivalent endorsed test reports and the appropriate application forms and fees.
- Australian “difference testing” is common.



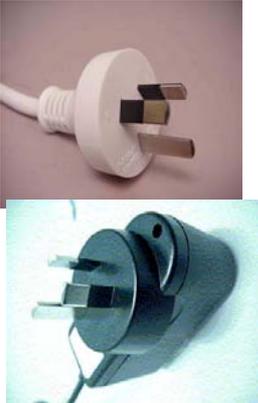
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All Electrical Equipment to have Insulated Pins



- Insulated pins must be fitted to all single phase products (electrical devices, appliances, consumer electrical products, power cords, etc)



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How to Obtain Approval Certificates

1. Lodge form with State or Territory electrical regulator
2. Pay the application fee, and provide
 - A fully compliant test report (reports from NATA or MRA laboratories) and
 - Supporting documentation including installation and operating instructions, circuit diagrams, materials and component lists, and
 - A complete, compliant production sample of the equipment (**not always requested**)
3. A “Certificate Of Approval” or “Certificate of Suitability” is issued and is valid for 5 years

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Compliance Labelling Requirements

- **Prescribed Items:** 
 - ACMA Suppliers Number and “Certificate Of Approval” number.
- **Non-prescribed Item:** 
 - ACMA Suppliers Number and optional “Certificate Of Suitability” number.
 - In English, legible, durable; not easily removed; and
 - Placed on an external surface (or one readily accessible to the user). If this is not available, contact the appropriate regulator for an alternative option.

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Enforcement

The maximum penalty for selling, importing, hiring or exchanging unmarked or unapproved electrical goods:

- **Individual** - \$82,500 and/or two years jail
- **Corporation** - \$825,000



Acceptable Approval Marks

Overseas *Certificates of Approval* and approval marks are **not** acceptable in Australia

Type of Approval Mark	Example
NSW Approval Number	NSW12345
QLD Approval Number	Q011234
Victoria Approval Number	V023425
Regulatory Compliance (RCM)	

Contact Details



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Overview of MEPS Requirements for External Power Supplies Australia & New Zealand



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MEPS in Australia-NZ

- Minimum Energy Performance Standards (MEPS) is regulated by State Governments
- MEPS Labelling in one state is accepted by all other states
- Australia New Zealand have MRA on labelling and approvals
- Mandatory MEPS compliance
 - in Australia 1 December 2008
 - in New Zealand 1 April 2009

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Standard & Requirements

- AS/NZS 4665.1: 2005 mandatory for Australia and New Zealand.
- Testing must be performed at 230V 50Hz but if name plated with 240V then 240V 50Hz must be used.
 - 115V 60Hz is not accepted
- AS/NZS 4655.2 – Application/Registration. PSU labelling.

more info: <http://www.energyrating.gov.au/man1.html>

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PSU Labelling for 230V or 240 V

- There are 3 compliance levels.
 - Ⓜ Mark III Compliance (Least efficient)
 - Ⓜ Mark IV Compliance
 - Ⓜ Mark V Compliance (Most efficient)
- AS/NZS 4665.1 defines compliance levels. Refer to tables within.

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PSU That Must Comply

- External Power supplies which connect to a third party device
- PSU with a fixed output voltage
- PSUchargers where the batteries do not directly plug into it but via a third party charger.

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MEPS Registration

- MEPS registrations are accepted by New South Wales, South Australia, Victoria, Queensland and New Zealand.
- AS/NZS 4655.2 – Application/Registration must include
 - test reports or data to standard
 - a sample label (where applicable)
 - a representative sample (where applicable)
 - application fees are charged

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Contact Details



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