

## Radio Communications: Safety & Operation

**nbn** appreciates that some people in the community may have genuine concerns about the health and safety of radio communications, and **nbn** is dedicated to having an honest conversation with the community about radio communications, and relies on accepted, peer-reviewed science, and environmental data and when discussing these issues.

## Radio Communications in the Environment

Radiofrequency electromagnetic energy (EME) has been present in the environment for generations. Radio signals commonly found in urban areas include television, AM and FM radio broadcast signals, paging networks, mobile network signals, and many 2-way radio systems supporting emergency services, council services, hospitals, roadside assistance, taxi-services, sports clubs, transit authorities, utility providers, and large commercial operations such as shopping centres.

Putting the various radio signals into perspective, the World Health Organisation (WHO) states:

*Until mobile phones became widely used, members of the public were mainly exposed to radiofrequency emissions from radio and TV stations. Even today, the phone towers themselves add little to our total exposure, as signal strengths in places of public access are normally similar to or lower than those from distant radio and TV stations.<sup>1</sup>*

## Radio Communications Facilities Across Wollondilly

**nbn** has already completed planning for 12 **nbn**<sup>TM</sup> fixed wireless facilities in the Wollondilly Shire, of which five are already operational (Bargo, Buxton East, Couridjah, Douglas Park, Tahmoor East) and seven are pending construction completion (Bargo North, Belimbla Park South, Mount Hunter, Oakdale, Razorback North, Werombi, and Werombi East).

From an environmental perspective, **nbn**<sup>TM</sup> fixed wireless facilities do not introduce anything new to the local environment. All radio communications facilities emit electromagnetic energy (EME) as radio frequency signals or “radio waves”, and numerous radio facilities already exist across the Wollondilly Shire.

To put the **nbn** network facilities into perspective, the Australian Communications & Media Authority (ACMA) Register of Licensed Radio Communications facilities shows that there are more than 180 licensed radio facilities in the Wollondilly Shire. (\*See image on following page of radio sites in Wollondilly Shire.) Across mainland Australia there are approximately 60,000 licensed radio sites.<sup>2</sup>

Operators of these local sites include *Wollondilly Shire Council, Telstra Optus and Vodafone, the SES, Western Sydney Local Health District, Bureau of Meteorology, NSW Government Telecommunications Authority, and St Johns Ambulance*. The vast majority of these existing radio facilities are located within close proximity of surrounding properties, including residences and schools.

Locally, all of the hospitals surrounding Menangle have mobile phone network facilities located on their campuses: at Campbelltown Hospital, Camden Hospital, Liverpool Hospital and Bowral District Hospital. The Elizabeth Macarthur Agricultural Institute itself also has a licensed radio facility already operating on campus.<sup>3</sup>

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<sup>1</sup> WHO Fact Sheet: Typical Exposure Levels at Home and in the Environment

<sup>2</sup> [http://web.acma.gov.au/pls/radcom/register\\_search.main\\_page](http://web.acma.gov.au/pls/radcom/register_search.main_page)

<sup>3</sup> [http://web.acma.gov.au/pls/radcom/register\\_search.main\\_page](http://web.acma.gov.au/pls/radcom/register_search.main_page)

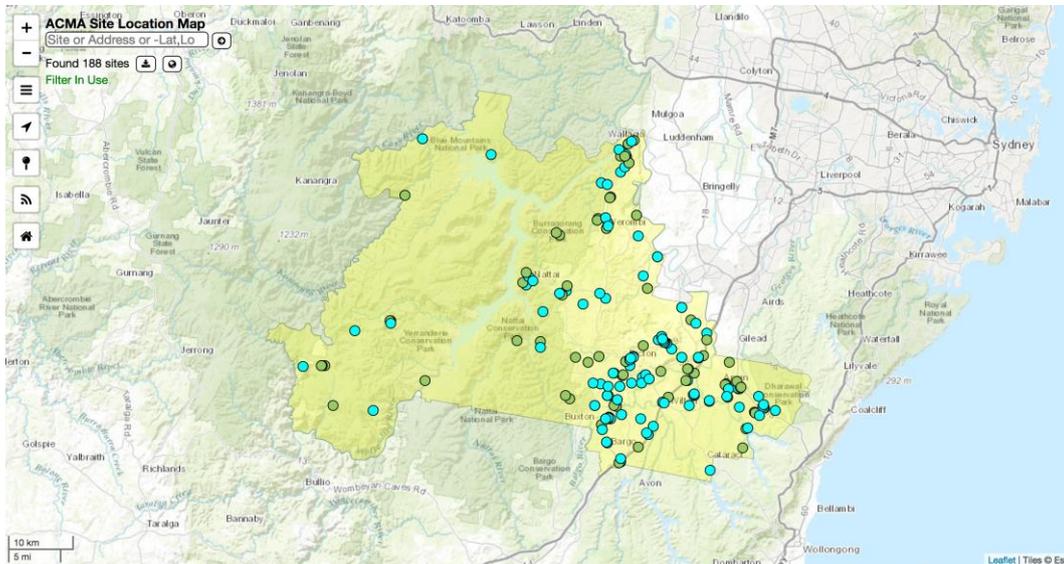


Figure 1: ACMA Register of Radio Communications Licenses - Wollondilly Shire

### Safety Standards - Scientific Knowledge and the Weight of Evidence

Licensed radio frequency transmitters, including the **nbn™** fixed wireless communications facilities and commercial radio and TV broadcast towers, are regulated to protect *all people* in all environments. The Australian safety standard (*Radiocommunications Electromagnetic Radiation — Human Exposure Standard 2014*) is designed to provide protection to all people, including vulnerable members of the community, 24-hours a day, 7-days a week.

The national safety regulations operate by placing a limit on the strength of the signal (or radio frequency EME) that our antennas can transmit. They do *not* impose any general public distance-based restrictions. For this reason, radio communications antennas are found in all environments. Australia has adopted the safety regulations recommended by the World Health Organisation (WHO). These regulations have a significant safety margin, or precautionary approach built into them.

The public health and safety standards recommended by the WHO are based on a very large body of peer-reviewed science. The weight of evidence shows that there are no substantiated or established health effects from radio frequencies (including 4G LTE) employed within safety limits. The rigorous, weight-of-evidence, approach undertaken by public health authorities includes the consideration of thousands of scientific papers published over many decades. The WHO states:

*In the area of biological effects and medical applications of non-ionising radiation approximately 25,000 articles have been published over the past 30 years. Despite the feeling of some people that more research needs to be done, scientific knowledge in is now more extensive than for most chemicals. Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields.<sup>4</sup>*

The current standard, recommended by the World Health Organisation (WHO), was introduced to Australia in 2002, and in June 2014, an independent, expert Review Panel reconfirmed the adequacy of the standard following a detailed assessment of recent scientific literature. The Australian Radiation Protection and Nuclear

<sup>4</sup> <http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html>

Safety Agency (ARPANSA) advises that its Review Panel considered more than 1300 separate pieces of scientific literature, as well as the results of 72 major panel reviews<sup>5</sup>. ARPANSA states:

*Based on the assessment of the scientific evidence from January 2000 till August 2012, the Expert Panel find that the underlying basis of the ARPANSA RF exposure Standard remains sound and that the exposure limits in the Standard continue to provide a high degree of protection against the known health effects of RF electromagnetic fields.<sup>6</sup>*

Importantly, ARPANSA also constantly evaluates emerging science, publishing a Literature Survey which is updated monthly, and is available on their website – [www.arpansa.gov.au](http://www.arpansa.gov.au).

### What does the World Health Organisation (WHO) say?

The WHO provides very clear advice regarding the science and safety of radio communications networks:

*From all evidence accumulated so far, no adverse short- or long-term health effects have been shown to occur from the RF signals produced by base stations. Since wireless networks produce generally lower RF signals than base stations, no adverse health effects are expected from exposure to them.... Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.<sup>7</sup>*

Nevertheless, you may be aware that the WHO has classified radiofrequency energy as a “Class 2B Possible Carcinogen”. Many substances, such as coffee, are classified as 2B, and it is important to understand what this listing really means. It does not mean that the substance is considered proven, or even probable, as a carcinogen. By contrast, both alcohol and processed meats (such as bacon) have been listed by the WHO as Class 1A (known) carcinogens<sup>4</sup>, and red meat has been classed as a 2A (probable) carcinogen<sup>5</sup>.

Radiofrequency has been listed as a Class 2B Possible Carcinogen based on the potential risks associated with hand-held mobile phone use immediately next to the user’s head. The World Health Organisation (WHO) / International Agency for Research on Cancer (IARC) joint statement regarding the Class 2B listing, issued on 31 May 2011, states this explicitly in its opening paragraph:

*“The WHO/International Agency for Research on Cancer (IARC) has classified radiofrequency electromagnetic fields as possibly carcinogenic to humans (Group 2B), based on an increased risk for glioma, a malignant type of brain cancer, associated with wireless phone use.”<sup>8</sup>*

The IARC statement goes on to clarify that three distinct types of exposure were considered: occupational (exposures to radar and to microwaves); environmental (exposures associated with transmission of signals for radio, television and wireless telecommunications); and personal exposures (associated with the use of wireless telephones). The IARC specified that they found “*limited*” evidence that suggested wireless phone use may result in gliomas and acoustic neuromas, but “*inadequate evidence*” that occupational or environmental exposures resulted in any risk to health.

The WHO consequently issued specific precautionary advice regarding the use of hand-held mobile devices next to the head, but did not advise the need for any additional precaution for environmental exposures. The WHO explicitly states:

*“Studies to date provide no indication that environmental exposure to RF fields, such as from base stations, increases the risk of cancer or any other disease.”<sup>9</sup>*

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<sup>5</sup> Review of the Radiofrequency Health Effects Research – Scientific Literature 2000 – 2012, Technical Report Series No. 164

<sup>6</sup> Review of the Radiofrequency Health Effects Research – Scientific Literature 2000 – 2012, Technical Report Series No. 164

<sup>7</sup> WHO Fact Sheet: Electromagnetic Fields and Public Health – Base Stations and Wireless Technologies

<sup>8</sup> [www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208\\_E.pdf](http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf)

<sup>9</sup> [www.who.int/features/qa/30/en/](http://www.who.int/features/qa/30/en/)

**nbn** advises that the design and operation of the fixed wireless network adheres to and is strictly consistent with WHO guidelines for public safety.

### [nbn Compliance with Safety Standards - Menangle](#)

Typically **nbn** fixed wireless communications facilities operate at radio signal strengths that are thousands of times below the safety limit. To put the signal strength into perspective, the general public exposure to radio signals from our fixed wireless network facilities is about one-tenth the power of a taxi's two-way radio, or the equivalent of the signals produced by a wireless router in the home.

At Menangle, the maximum or worst case signal strength at ground level from the proposed **nbn** antennas at the Elizabeth Macarthur Rd, at any distance and in any direction, would be 0.076% of the safety standard - or more than 1,300 times below the safety limit. (Specifically the strongest signal density would be at a distance of 284m, within the Agricultural Institute.)

The maximum signal strength at specific points of interest in the community (which are measured up to 5m above ground, assuming two-storey buildings) are as follows:

- Gilbulla – 0.00091%, or more than 109,000 times weaker than the signal strength deemed to be safe 24-hours a day, 7-days a week
- Broughton Anglican College – 0.00018%, or more than 550,000 times weaker than the signal strength deemed to be safe 24-hours a day, 7-days a week
- Durham Green – 0.0019%, or more than 52,600 times weaker than the signal strength deemed to be safe 24-hours a day, 7-days a week
- The Store – 0.0026%, or more than 38,400 times weaker than the signal strength deemed to be safe 24-hours a day, 7-days a week

**nbn** does not just get its toe over the line when it comes to meeting health and safety obligations – but operates its fixed wireless radio network safely and responsibly at signals strengths significantly below national and World Health Organisation (WHO) standards. By operating the fixed wireless network at signal strengths significantly below that safety standard, **nbn** has additionally applied a precautionary approach to the operation of its network.

The ACMA has additionally conducted an extensive audit of the fixed wireless network, and concludes that:

*“NBN has a high level of compliance with the EME licence conditions, has a clear understanding about EME compliance obligations and associated record-keeping requirements, has processes in place to ensure that compliance assessments accurately reflect current environmental and site conditions, is appropriately addressing the underlying risk of EME exposure from its base stations, is highly cooperative and willing to work with the ACMA in relation to all aspects of its EME compliance.”<sup>10</sup>*

### [Precautionary Approach](#)

The WHO-recommended standard that Australia has adopted has a significant safety margin, or precautionary approach built into it. The Australian Radiation Protection and Nuclear Safety Authority (ARPANSA) reiterates that the safety standard has a precautionary level already built into the standard:

*“Significant safety factors are incorporated into the exposure limits – that is, the limits are set well below the level at which adverse health effects are known to occur.”<sup>11</sup>*

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<sup>10</sup> [www.acma.gov.au/Industry/Suppliers/Product-supply-and-compliance/Priority-compliance-areas/eme-and-the-national-broadband-network](http://www.acma.gov.au/Industry/Suppliers/Product-supply-and-compliance/Priority-compliance-areas/eme-and-the-national-broadband-network)

<sup>11</sup> [http://www.arpansa.gov.au/pubs/rps/rps3\\_qa.pdf](http://www.arpansa.gov.au/pubs/rps/rps3_qa.pdf)



By operating the fixed wireless network at maximum signal strengths that are significantly below that safety standard, **nbn** has additionally applied a precautionary approach to the operation of its network, in keeping with the expectations of the Standard, which defines a valid precautionary approach as follows:

*“Minimising, as appropriate, RF exposure which is unnecessary or incidental to achievement of service objectives or process requirements, provided this can be readily achieved at reasonable expense. Any such precautionary measures should follow good engineering practice and relevant codes of practice. The incorporation of arbitrary additional safety factors beyond the exposure limits of this Standard is not supported.”<sup>12</sup>*

The proposed facility reflects this requirement. ARPANSA states:

*“Similarly, the ACIF Code does not specify arbitrary distances at which infrastructure must be sited from community sensitive locations, because arbitrary distances do not necessarily reflect a precautionary approach. In fact, infrastructure sited further from a community sensitive area may need to operate at a higher power and may result in higher EME exposures in that sensitive area. Furthermore, it must be remembered that evidence gathered by ARPANSA confirms that exposure levels in public areas are typically hundreds or thousands of times less than the exposure limit set by the ACMA”.<sup>13</sup>*

Further, the WHO also cautions against arbitrary, non-scientific approaches as follows:

*“If regulatory authorities have adopted health-based guidelines but, because of public concerns, would like to introduce additional precautionary measures to reduce exposure to RF fields, they should not undermine the science base of the guidelines by incorporating arbitrary additional safety factors into the exposure limits.”<sup>14</sup>*

**nbn** has a legal, environmental and ethical obligation to deliver a network that operates safely and responsibly, without posing risk to any members of the general public. At all times and in any location, **nbn** operates its fixed wireless network safely and responsibly at signals strengths significantly below WHO and Australian standards.

### Further Information

For further information regarding the safety and operation of the **nbn**™ fixed wireless network, please contact Ericsson Community Relations Advisor, Jacqueline Crompton on 0425 203 832 or via [nbnwirelessnsw@visionstream.com](mailto:nbnwirelessnsw@visionstream.com).

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<sup>12</sup> Australian Radiation Protection Standard, Maximum Exposure Levels to Radiofrequency Fields 3kHz to 300GHz

<sup>13</sup> ARPANSA Fact Sheet No. 6

<sup>14</sup> [www.who.int/mediacentre/factsheets/fs193/en/](http://www.who.int/mediacentre/factsheets/fs193/en/)