

REPRESENTATION

on

**ICASA Update of the National
Radio Frequency Plan 2021**

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About this document

This document sets out the written representation of Siklu Communication’s views on the [Draft Update of the National Radio Frequency Plan 2021](#). Specifically, it addresses the current ICASA regulations for the 60GHz band.

In this context, the Draft Frequency Plan references the [Radio Frequency Spectrum Regulations Amendments \(Government Gazette Number 40436, 22 November 2016\)](#), which together with the [Radio Frequency Spectrum Regulations 2015](#), **prohibits outdoor use** of multi-gigabit wireless systems (MGWS):

Column A Frequency	Column B Type of Device	Column C Maximum Radiated Power or Field Strength Limits & Channel spacing	Column D Relevant Standard	Column E Additional Requirements
57-66G	Multi-gigabit wireless systems (MGWS)	40 dBm e.i.r.p.	EN 302 567	The use of these systems is as described in ITU-R Report ITU-R M.2227 and Recommendation ITU-R M.2003. Fixed outdoor installations are not allowed.

In this document, we set out our view on why the outdoor restriction should be relaxed.

About Siklu

Siklu Communications is a leading global vendor for fixed terrestrial radios operating in 60/70/80GHz (V-band and E-band). Over 200,000 of our radios are installed globally, in virtually every country where these frequency bands are regulated. Siklu would like to thank ICASA for the opportunity to comment on the Draft Frequency Plan.



The case for outdoor use of MGWS operating at 60GHz

The 60GHz band is unique. It provides 9GHz of contiguous spectrum (up to 14GHz of continuous spectrum in many countries), which no other frequency band can offer. Propagation is limited (oxygen absorption, line of sight), and transmission is highly focused. Both these factors work together to effectively prevent interference.

Indeed, the 60GHz band is popular in those countries where it is regulated, and is used for many applications, in particular outdoor. Indeed, Siklu shipped many tens of thousands of such outdoor links all over the world. Conversely, very few applications (if any) exist in this band for indoor use.

Terragraph

The newest thing coming in 60GHz is [Terragraph](#). This is the brainchild of Facebook, who has been working tirelessly for several years, creating with a wide industry consortium, to provide inexpensive fibre-like connectivity in the licence-exempt 60GHz band.

Terragraph is a real game changer, in that it provides the basis for a true gigabit mesh network that can be rapidly deployed and easily expanded. The Terragraph PHY (physical layer) is based on the IEEE 802.11ay standard, which supports air-capacity of up to 4Gbps (to be expanded to 6Gbps by the end of the year).

Mass-produced, inexpensive 802.11ay-compliant ICs (integrated circuits) are available in the market, and deployment of Terragraph radios are ramping up very quickly.

In addition to the standardisation, wide-industry uptake, and low cost, Terragraph offers a unique advantage: beam-forming. This means that antenna alignment is accomplished electronically, and these systems can be deployed inexpensively by unqualified personnel.

Terragraph is designed *exclusively* for outdoor use (the radios require GPS synchronisation).

Applications for 60GHz

Siklu's customers are using 60GHz radios for many different applications, almost exclusively outdoor. Here are the main ones, which (we believe) would equally apply for South Africa:

Internet Access

60GHz is a cost-effective way to rapidly offer Gigabit internet connectivity to residential and commercial properties. In particular, with the economy of scale brought about by IEEE 802.11ad and 802.11ay, a Gigabit 60GHz connection is now affordable for even a single family home. Many Internet Service providers are already using 60GHz successfully to connect their customers. Here are some examples:

- [San Francisco, USA](#): residential internet connectivity.
- [Colorado, USA](#): Internet access recovery following a natural disaster.

Smart Cities

Smart cities are municipalities that deploy their own Gigabit data infrastructure for interconnecting city-wide assets and applications. These include: essential video security, public wi-fi services, IoT connectivity, education (school) networks, etc. Over 250 smart cities already use Siklu 60GHz radios for their wireless infrastructure. Many have upgraded their legacy and unreliable 5GHz networks to 60GHz. Here are some examples:

- [Cambridge, UK](#): CCTV backhaul in the heart of this historic city.
- [Baltimore, USA](#): public WiFi in this popular recreation area.



Security of Critical Infrastructure

Reliable and secure connectivity is key for maintaining the security of critical infrastructure: power plants, airports, seaports, etc. 60GHz is a favourite choice for these applications, due to the narrow transmission beam-widths which naturally resist detection and interception; as well as due to the licence-exempt spectrum management, which means the details of installed links are not publically known. Examples include:

- [Columbus USA International Airport](#): airport security based on 60GHz.
- [Port of Long Beach, California](#): seaport security based on 60GHz.

Temporary Events

Organisers of temporary events (mega sport events, festivals, etc.) often require robust gigabit broadband connectivity to facilitate media access for tens of thousands of participants, as well as for maintaining security. Some examples:

- [Leeds, UK](#): Tour de France grand départ
- [Houston Texas](#): Super Bowl: the annual NFL championship

5G Connectivity

While 5G is a new technology, 60GHz is already playing a role in both mobile and fixed 5G connectivity. In 5G mobile, operators are using 60GHz to connect their 5G base stations (both backhaul and fronthaul). Early adopters Siklu is aware of include: Optus and Vodafone (Australia), Rogers and Freedom (Canada). In Israel, although 60GHz has only just opened, Pelephone (the first mobile operator) is already [planning migration to 60GHz](#). In 5G Fixed, Deutsche Telecom, The Orange Group, Telefonica, Vodafone and others are key players in TIP (the [Telecom Infra Project](#)), which has at its centre Facebook's [Terragraph](#) initiative, for connectivity at 60GHz.

Connectivity in South Africa

Global research reports indicate that broadband connectivity in South Africa is both slow and expensive, compared to the global average.

For example, [Cable Research](#) compares the average cost of broadband across the globe, and rates South Africa in the 132nd place at an average of \$60.0 per month, where the 1st place is the least expensive at 10% of this, and the 211st place most expensive.

The well known [SpeedTest website](#) provides a global index for internet connection speeds. Data for June 2021 show South Africa to be well below the global average. In terms of fixed broadband speeds, South Africa is in 85th place, at an average 47.3Mbps, less than half than the global average at 106.6Mbps. In terms of mobile data, South Africa is doing better in the 56th place, at an average 44.6Mbps, but still well below the global average at 55.3Mbps.

These are just a couple of examples, that make it clear the well being and prosperity of South African will be greatly improved by the availability of inexpensive gigabit connectivity.



Regulation in other countries

The 60GHz band is open for outdoor use in many countries, primarily developed countries. Here are some notable examples (this list is by no means exhaustive).

USA

The 60GHz band is open for outdoor use of MGWS in the USA in the range 57-71GHz. The technical parameters are generally quite relaxed, as set out in [47CFR15.255](#).

Several countries reference the same regulations, notably: **Australia, Taiwan**, where this band is open for outdoor use.

EU

In the European Union, the 60GHz band is open for outdoor use of MGWS in the range 57-71GHz. The technical requirements are similar to those of ICASA for indoor use. Please refer to [EC Decision \(EU\) 2019/1345 of 2 August 2019](#), band 75a.

The **United Kingdom** follows the EU regulations in 60GHz.

Canada

Canada permits outdoor use of MGWS in the range 57-64GHz, as per [RSS-210](#), section J.2.2.

Mexico

Mexico also permits outdoor use of MGWS in the range 57-64, as shown [here](#), with technical parameters as shown in paragraph 2.18.

Other countries in the region follow suit, including: **Argentina, Brazil, Chile, Columbia**, and others.

Japan

In Japan, the 60GHz band is open for outdoor use of MGWS in the range 57-66GHz.

Interference mitigation

The key reason 60GHz is permitted for outdoor use in so many key countries, is that 60GHz is uniquely interference free. Here are the main reasons for this lack of interference:

- Limited propagation distance, due to:
 - Natural obstructions to line-of-sight (buildings, vegetation, etc.)
 - Very high oxygen absorption, especially in the range 57-65GHz (up to 15dB/Km)
 - Regulatory limits on EIRP and/or minimum antenna directivity
- Effective spectrum-sharing techniques
- Very strong spatial filtering (narrow transmission beam-width)

Indeed, in practice, Siklu's customers do not ever report interference, despite the fact that spectrum access is licence-exempt in almost all countries, and 60GHz use is very dense in some urban centres.

Combine this lack of interference with the ability to facilitate Gigabit connectivity quickly and inexpensively, it becomes clear why 60GHz has been so successful in those countries that already permit it. Siklu is confident South Africa would enjoy the same benefits to its digital infrastructure, if it permitted outdoor the use of this band.