



DENEL OVERBERG TEST RANGE

COMMENTS ON ICASA'S NOTICE 494 OF 2018 DRAFT  
RADIO FREQUENCY MIGRATION PLAN 2018

Denel SOC Ltd, t/a Denel Overberg Test Range

**ICASA NOTICE 494 OF 2018 REGARDING  
THE DRAFT RADIO MIGRATION PLAN 2018  
FOR CONSULTATION AND COMMENTS**

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*Original Signed*

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## 1. Introduction

Denel SOC Ltd, trading as DENEL OVERBERG TEST RANGE (Test Range), is located in the Overberg Region of the Western Cape, South Africa. Denel SOC Ltd operates primarily in the military and landwards defence environment. The South African government is its sole Shareholder, and as a state owned company, it reports to the Minister of Public Enterprises.

The Test Range operates as a multi-purpose missile and aircraft test range that provides in-flight systems performance measurement and weapon system evaluation services to local and international clients. The Test Range prides itself on being able to provide a turnkey service to its clients throughout the year. In this way it not only plays a significant role in enabling the responsible testing of defence equipment, but also contributes to South Africa's foreign exchange earnings.

The Range is located in the **proclaimed flight area, FAR147**, controlled by the South African Air Force. The Airforce Base (AFB) Overberg with its 3000m main and 2000m secondary runways is located adjacent to the Test Range.

The Test Range utilises Optical and RF instruments for tracking purposes. The first and most affected instruments by RF interference are the RF instruments. Although the Optical instruments are not affected by RF interference the supporting services are. This means that every System on the Range is affected by said plan. The following RF instruments are used on the Range:

### Instrumentation Radars

The three coherent instrumentation radar systems provide the Test Ranges primary real-time tracking capability. Located at strategic positions effective coverage of the entire test arena is ensured. The monopulse systems operating in C-band were designed for a variety of applications. These applications encompass general test range work, including missile and ammunition evaluation, and aircraft performance tests.

### Weibel Radar

The Weibel Ranging Radar System is continuous wave mobile tracking radar. The system is a Multi Frequency Continues Wave Doppler Radar system and is based on state of the art radar technologies. The rugged mechanical system design combined with the unique electronic design ensures high reliability and resistance to blast and vibrations. It can be positioned to best suit the test requirements and little preparation of the deployment site is required.

### Telemetry Systems

The Test Range has two primary telemetry facilities installed at fixed locations available to provide real-time reception, recording and relay of telemetry data. These systems are ideally located to support operations at sea as well as air. In addition, two mobile secondary telemetry facilities are available for integration purposes or telemetry reception at remote sites. Stations are equipped with two-axis auto tracking S-Band antennas. Follows IRIG 106 standard. Quick-look and post trials processing available.

If required two streams of telemetry signals received through the land-based antennas are transmitted from the lateral station in the Eastern Sector to the main station in real-time via

microwave link. A Best Select unit provides a single data source, selecting automatically the best data quality stream out of the two streams from L1 and the two streams from MS2. This feature is specifically for flight tests of systems at very low altitudes where single station telemetry reception might be problematic due to multipath, RF obstructions etc.

#### **Upper Air Meteorological Profiles**

Meteorological balloons equipped with radio sondes are used to monitor upper air conditions with 50m interval resolution up to 30km - temperature, humidity and density are measured as a function of altitude. Derivatives from the standard parameters measured are the dew point, density and refraction index.

#### **Flight Termination System**

The flight termination system ground equipment consists of a mobile, dual redundant system with remote control facilities connected to the control room. The system functions together with the airborne receiver/decoder. The airborne receiver/decoder unit is considered client furnished equipment (CFE). The flight termination system conforms to a sub set of the specifications set out in the American Range Commanders Council document (RCC 319-92).

#### **Overview of Communication System**

A combination of PCM and Ethernet based communication systems together with an extensive optical and microwave network, link the operational control centre to the rest of the range infrastructure. Mobile microwave links enable the deployment of range instrumentation at remote/unprepared sites.

The network supports the transmission of:

- Real-time data to and from the Central Computer
- Video images from tracking systems
- Intercom, public address and telephones
- IRIG-B time base data
- Ethernet based data communication

#### **Radio and Intercom**

The Test Range and surrounding area is well covered with a two-way radio network and access via the intercom system from the control room. Mobile phone (GSM) coverage is also available. Maritime and ground-to-air radios provide communication to participating ships and aircraft.

The Test Range has been established by the South African government in the 1980's as a strategic service provider to test in-flight systems by the Department of Defence (DoD). The DoD has ever since contracted the Test Range to provide government services on an on-going basis. The DoD has this year issued a five-year contract to the company for such services.

Radar tracking and Telemetry data from devices being tested is used primarily by the Test Range for safety purposes where the position and status of objects are monitored. Safety footprints are defined and analysed and it is paramount for tests to be contained in these areas especially with population growth in the area and increased activities in the vicinity of the Test Range. Any



interference with these safety parameters could possibly lead to the destruction of a normal projectile or cause the erroneous impact of such with negative repercussions. Refer to the National Integrated ICT policy white paper of 2016, paragraph 9, for ideologies regarding the management of this strategic resource.

The following frequency bands are utilised by the Test Range (as defined in NRFP-18):

2 000 kHz – 30.005 MHz	:	HF Radios
117.975 – 137 MHz	:	Air-To-Ground Radios
154 – 156.8125 MHz	:	Marine Radios
400.05 – 406 MHz	:	Radio Sondes
420 – 430 MHz	:	Flight Termination System
450 – 455 MHz	:	Flight Termination System & Range Radios
456 – 459 MHz	:	Range Radios
459 – 460 MHz	:	
460 – 470 MHz	:	
2 025 – 2 110 MHz	:	Telemetry
2 200 – 2 290 MHz	:	Telemetry
2 483.5 – 2 500 MHz	:	Telemetry
2 500 – 2 520 MHz	:	Telemetry
2 700 – 2 900 MHz	:	Air Search Radar
5 350 – 5 460 MHz	:	Tracking Radars
5 460 – 5 470 MHz	:	Tracking Radars
5 470 – 5 570 MHz	:	Tracking Radars
5 570 – 5 650 MHz	:	Tracking Radars
5 650 – 5 725 MHz	:	Tracking Radars
5 725 – 5 830 MHz	:	Tracking Radars
5 830 – 5 850 MHz	:	Tracking Radars
5 850 – 5 925 MHz	:	Tracking Radars
9 300 – 9 500 MHz	:	Meteorological Radar & Marine Search Radars
10 – 10.4 GHz	:	Weibel Radar
10.4 – 10.45 GHz	:	Weibel Radar
10.45 – 10.5 GHz	:	Weibel Radar
10.55 – 10.6 GHz	:	Weibel Radar

## 2. Comments on ICASA's Notice

We as Denel Overberg Test Range are **opposed** to the draft radio frequency spectrum assignment plan, **specifically** in the FAR147 region as any sharing in this geographical area causing interference will null and void the strategic operations of the DoD at the Test Range and Airforce Base Overberg (AFB OVB).

The only area of concern to us is that which has been **proclaimed flight area, FAR147**. The area includes Bredasdorp, Napier, Riversonderend, Swellendam, Stil Bay, Witsand, Struis Bay and Cape Agulhas. All these towns are in the Overberg region of the Western-Cape.



The telemetry and radar systems utilised have extremely sensitive receiver front-ends and the limiting of radiated power would not be a viable mitigating factor to prevent external interference.

The only solution in the FAR147 region would be “**geographical isolation**” as receivers are not band limited to channels inside the designated frequency spectrum.

**Frequency bands where isolation is critical:**

**2 025 – 2 110 MHz & 2 200 – 2 290 MHz**

These bands are not currently “unused” or under-utilized as stated in the Notice as it is part of the spectrum utilized in the geographical area, FAR 147. The main reason for the allocation of this frequency bands to the DoD is their requirement to test its systems relating to government services in this proclaimed flight area. **It is of utmost importance that the Test Range has the entire band from 2200MHz to 2400MHz available exclusively.** The very wide bandwidth occupied by the modern weapon systems dictates that. The proposed assignment of this band to fixed mobile systems will cause severe interference in the area to the extent that general public safety might be compromised. It will also interfere with telemetry equipment at the Test Range and thus the contractual obligation to the DoD.

Any use of these bands in the area **FAR147** should be **prohibited**. Proposed Broadband Fixed Wireless Access has the same implications as addressed under Notice 494 and thus should be regulated by the Authority under the same principles.

Refer to ITU R SA.1154 for a description of certain aeronautical mobile telemetry systems operating in the 2200-2290 MHz band.

The DoD has informed us that it is also the legal title holder of the frequency band between 2200 MHz to 2400 MHz under license number 253-629-9.

**5095 – 5199 MHz**

Discussions are currently underway by the World Communications Conference (WRC) to allocate additional spectrum, called C-Band in the frequency band 5095MHz to 5199MHz for Telemetry due to continual spectrum encroachment in the S-Band (2200MHz to 2400MHz). The Test Range intends to explore this option as its clients are developing new weaponry systems with new technologies which operate in this band.

**5400 – 5900 MHz**

The encroachment of WAS / RLAN and fixed link installations is a serious threat to the tracking capability of the Tracking Radars on the Test Range. These Radars are the main tracking instruments of the Test Range and again these sources cause severe interference in the area to the extent that general public safety might be compromised. This interference with the Radar equipment can also affect the Test Range’s ability to comply to the contractual obligation to the DoD.



**10.0 – 10.60 GHz**

There are no interference sources in this band affecting the Weibel Radar at the moment. This band should however be protected in this area to ensure the sustainability of the Test Range.

**Interference mitigation**

Although the band is signified to be used only for P2P links, the nature of operations between South African Airforce (SAAF) at AFB OVB and the Test Range where low flying objects are common, the risk of interference still exists to a great degree and should be taken into account.

**3. Conclusion**

Denel Overberg Test Range is available to make a presentation to the committee and invite committee representatives to visit the Test Range in order to ascertain the facts for themselves.

We thank you for the opportunity to make written comments on Notice 494 of 2018.

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