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PRESENTED BY
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ATSEP-CNS

5G UPDATE 2023

NCAA
Namibia Civil Aviation Authority



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WHAT IS 5G?

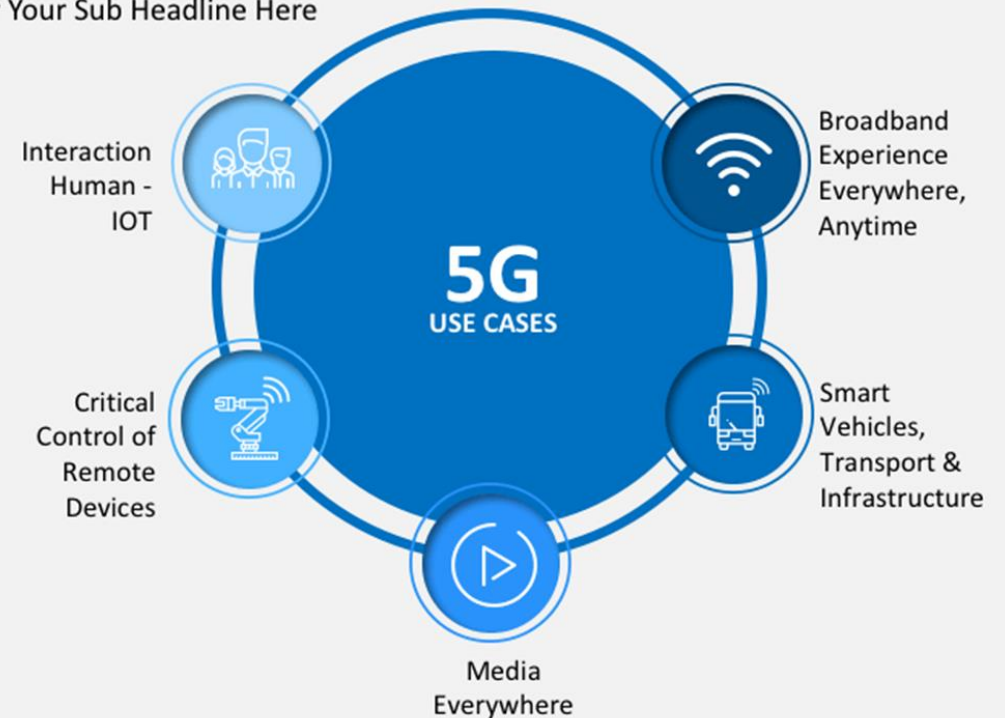
- 5G is a new global wireless standard after 1G, 2G, 3G, and 4G networks.
- It enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices.
- 1G, was about voice—the ability to use a phone in a car, or away from home.
- 2G introduced a short-messaging layer.
- 3G provided the core network speeds needed to launch the first smartphones.
- 4G LTE, with its high data-transfer rates, gave us access to mobile video with low buffering and gave rise to many of the connected devices and location services that we rely on and enjoy today.
- 5G offers speeds up to 10 times faster than median 4G—and that opens the door to a whole new world of game-changing possibilities.

POTENTIAL BENEFITS

- 5G can provide **high speeds**, **low latency** and massive **capacity**, offering the potential to change what you experience with your mobile device, and much more.
- 5G will help revolutionize industries and can provide immediate impact for customers.
- 5G could help make businesses more efficient and give consumers access to more information faster than ever before.

5G TECHNOLOGY

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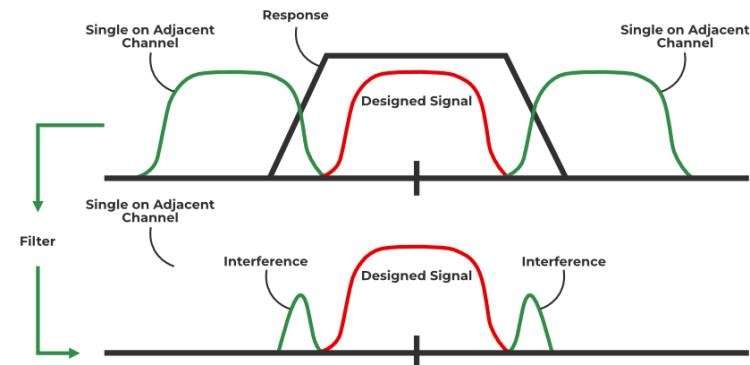


5G Frequency

- 5G in Namibia is in the **3.3-3.6 GHz** range (CRAN report)
- NCAA-ANS uses
 - Microwave – 5.975GHz – 6.226GHz, 6.004GHz – 6.256GHz (Used)
 - **VSAT – Rx-3.9GHz, Tx-4.2GHz (Used)**
 - **MLS - 5.043 to 5.09 GHz (Currently not used)**
- NCAA should note, deployment of 5G networks in this frequency band may introduce harmful radio frequency (RF) interference to the systems mentioned above.
- Radio frequency interference is the conduction or radiation of radio frequency energy that causes a system to produce noise that typically interferes with the function of an adjacent system.
- Radio frequency interference can disrupt and disturb the normal functioning of electronic and electrical systems, and thus it is important to limit it when possible.

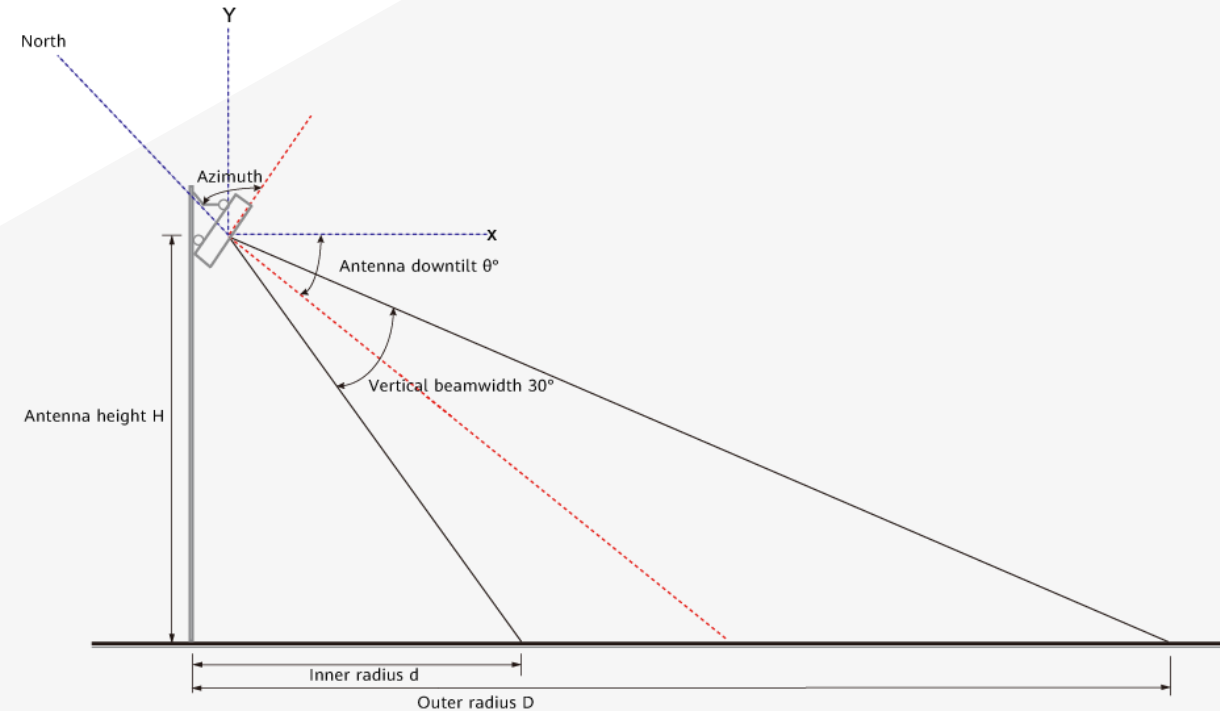
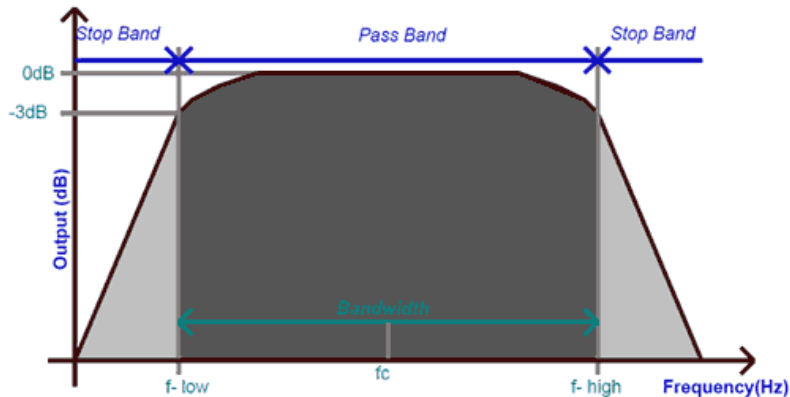
5G Potential Interference to Aviation Equipment

- **Out-of-band interference** originates from a wireless system that transmits energy in a frequency band outside that of its intended use. An example is when transmitter radiates **harmonics** that fall into a higher frequency band.
- **Adjacent Channel Interference**- It is the interference caused to the signal which is adjacent in frequency to the desired signal. If adjacent channel signal strength becomes strong, it will be difficult for Base Station to differentiate the actual mobile signal from the strong mobile signal.



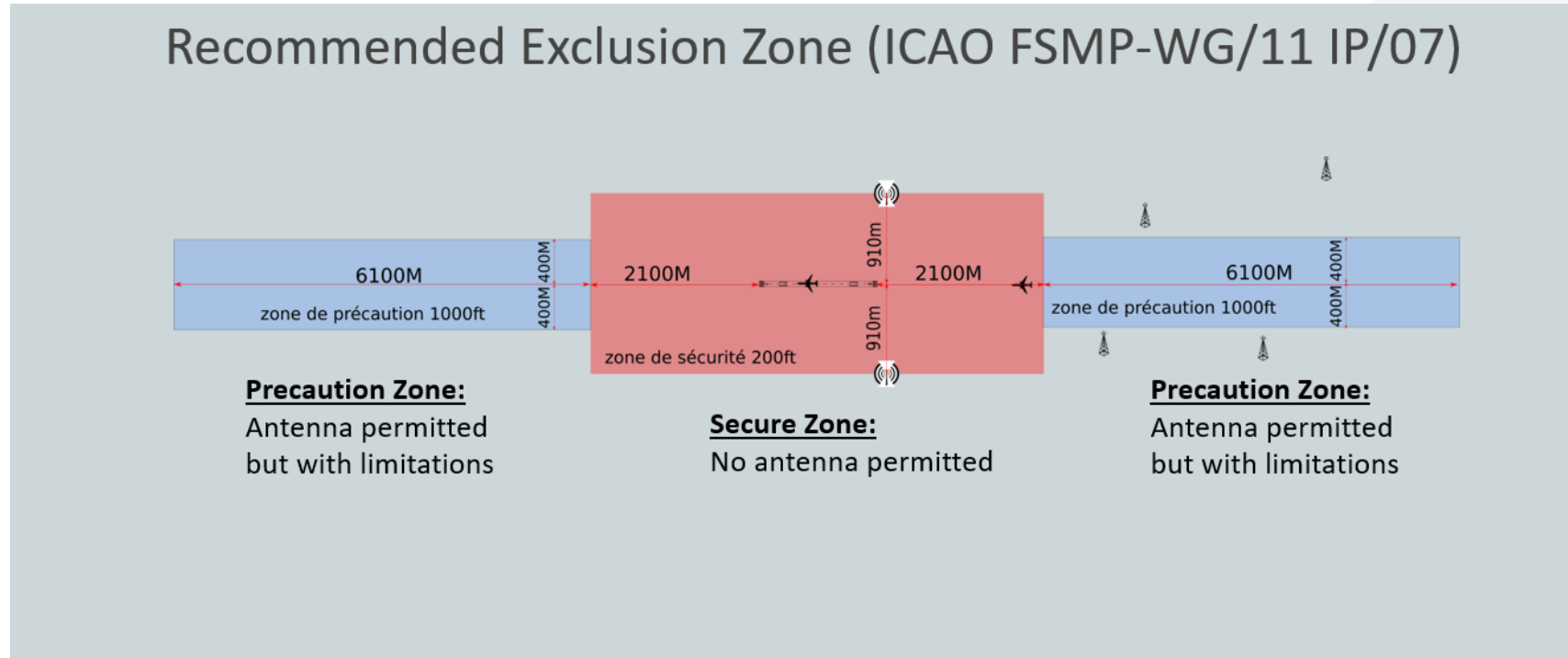
5G Interference mitigation

- Band Pass Filters incorporation in designs
 - New System designs
- Antenna down-tilt
- Antenna proximity/distance limitation.



5G Interference mitigation

- Buffer areas/exclusion/protected areas



This is the planned mitigation in Namibia to prevent any safety risk to low visibility operations

NCAA/CRAN update

- CRAN (*STRATEGY IN RESPECT OF IMPLEMENTATION OF IMT-2020 (5G) IN THE REPUBLIC OF NAMIBIA 2022-2027*)
 - Made provision to restrict spectrum utilization for fixed satellite services to above 3600 MHz;
 - confirmed they will benchmark with the buffer zones to avoid interference to radio altimeters which affect low visibility operations;

Final Thought

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- While the aviation industry has recognized that changes to the RF environment in which radar altimeters operate are inevitable and performance standards must be updated accordingly,
- Work to develop and implement such changes for safety-critical systems like radar altimeters and VSAT systems.
- Given the planned timeline for deployment of 5G systems by CRAN in the 3.3-3.6 GHz , these radar altimeters will be exposed to such risks and operational impacts if proper mitigations are not put in place.
- NCAA and CRAN are in the process of implementing these mitigations and roll out will be after careful risk analysis and implementation of industry best practices for safeguarding our skies

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THANK YOU !!
