Q1 – What future changes, if any, should ISED examine with regard to the existing licensing regime to better plan for innovative new technologies and applications and allow for benefits that new technology can offer, such as improved spectrum efficiency?

[TELRAD Networks]

Telrad suggests ISED investigates dynamic spectrum sharing such as CBRS in the US. It is imperative that the traditional method of hording spectrum to block competition be avoided. The Fixed Wireless Access (FWA) use case must be represented in all spectrum policy. This means enabling operators of all size equally to drive competition and innovation, this in turn will translate to a renewed focus on spectral efficiency. FWA is also a major use case for 5G as the industry starts to transition away from proprietary technologies. Taking a standard based approach would ensure timing synchronization between mobile and FWA. Also, spectrum sharing will ensure the remote and rural communities continue to benefit from Job creation. The key to innovation is affordable access to spectrum for smaller operators. Efficient use of the spectrum depends on the use of standards-based technology which will allow for coexistence

Q2 –Do you agree with the above assessment on demand for commercial mobile services in the next few years? Is there additional information on demand, which is not covered above, that should be considered? If so, please explain in detail.

[TELRAD Networks]

Although in general Telrad agrees with the assessment, it is important to note FWA as a 5G use case. Furthermore, 4G technologies are expected to be a major part of any FWA deployment throughout 2022 and beyond. If ISED is considering FWA as a component of mobile due to Fixed mobile convergence (FMC) then Telrad would agree with the assessment. Otherwise the need to bring high speed broadband access to rural, residential and business throughout the country should be considered

Q3 – What new technology developments and/or usage trends are expected to address traffic pressures and spectrum demand for commercial mobile services? When are these technologies expected to become available?

[TELRAD Networks]

The Evolution of the 3GPP LTE standard has enabled for better scalability and use of spectrum. As the 4G standard evolves, techniques such as Mu-MIMO increase spectrum efficiency while techniques such as Carrier aggregation allow for higher peak rates to end users. This continues to evolve with the definition of 5G NR which is expected to begin surfacing commercially in 2020.

Q4 – Recognizing the trend of increasing commercial mobile traffic, what operational measures (e.g. densification, small cells or advanced traffic management) are being taken to respond to, and support, increasing traffic? To what extent are these measures effective?

No comment

Q5 – Do you agree with the above assessment of demand for licence-exempt spectrum in the next few years? Is there additional information regarding demand, which is not covered above, that should be considered? If so, please explain in detail.

[TELRAD Networks]

Telrad agrees with the assessment of demand for license exempt spectrum. It is also important to enforce that standards-based technology be considered to ensure synchronization and better coexistence within the bands

Q6 – What new technologies and/or sharing techniques are expected to aid in relieving traffic pressures and addressing spectrum demand for licence-exempt applications? When are these technologies expected to become available?

[TELRAD Networks]

ISED should consider following the lead of the US with the CBRS band. The implementation of tiered access based on a combination of affordable priority access licensing and General Authorized Access. Doing so will enable for not only better coordination of "lightly licensed" but also prevent the use of spectrum hoarding to block innovation and competition. This is turn will result is a more competitive landscape with a better customer experience.

Otherwise LTE License Assisted Access employs the use of Listen Before Talk as does LTE WAN Aggregation which allows for the use of LTE and WIFI together

Q7 – What existing licence-exempt frequency bands will see the most evolution in the next five years? Are there any IoT applications that will have a large impact on the existing licence-exempt bands? If so, what bands will see the most impact from these applications?

[TELRAD Networks]

5GHz in general is expected in residential applications as is 3.65GHz due to IoT. The US CBRS band 48 will enable an ecosystem of industrial IoT devices. Purpose built devices are expected in farming, Utility and mining applications. This will increase the need for spectrum and place pressure on the broadband access industry

Q8 – Will the trend for offering carrier-grade or managed Wi-Fi services continue to increase over the next five years? If so, will this impact congestion in Wi-Fi bands and which bands would be most affected?

[TELRAD Networks]

Telrad agrees that the trend will continue to increase. WIFI congestion will absolutely increase as well. We expect to see unlicensed WIFI bands such as 5GHz to be utilized with technologies such as LAA which is LTE based on LWA with is a combination of WIFI and LTE

Q9 – ISED is seeking comments on the above demand assessment for MSS and earth observation applications for the period 2018-2022. Is there additional information on demand, which is not covered above, that should be considered?

[TELRAD Networks]

No comment

Q10 – ISED is seeking comments on the above demand assessment for FSS/BSS for the period 2018-2022. Is there additional information on demand, which is not covered above, that should be considered with regards to the below bands?
a) C-band
b) Ku-band
c) Ka-band
[TELRAD Networks]

No comment

Q11 – What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for satellite services? When are these technologies expected to become available?
[TELRAD Networks]
No comment

Q12 – What satellite applications (e.g. broadband Internet, video broadcasting, backhaul, etc.) do you consider a priority for the period 2018-2022?

[TELRAD Networks]

No comment

Q13 – Do you agree with the above assessment on demand for backhaul in the next five years? Is there additional information on demand, which is not covered above, that should be considered? If so, please explain in detail.

Q14 – Backhaul service in Canada is delivered using a variety of solutions, including fibre optics, microwave radio and satellites. What changes, if any, are anticipated to the mix of backhaul solutions employed?
[TELRAD Networks]
No comment

Q15 – What and how will technology developments and/or usage trends aid in relieving traffic pressures and addressing spectrum demand for backhaul services? When are these technologies expected to become available?
[TELRAD Networks]

Q16 – Will the demand for commercial mobile, licence-exempt, satellite, or fixed wireless services/applications impact the demand for backhaul spectrum? If so, how and which of these services/applications will create the most impact?
[TELRAD Networks]
Yes, as access equipment capacity increase so will the need for backhaul

Q17 – Is there a range or ranges of frequencies that will be in higher demand over the next five years? Why is higher demand anticipated for these frequency ranges?

[TELRAD Networks]
To accommodate the rural broadband requirements, sub 6GHz spectrum must be made available via a spectrum sharing or lightly licensed approach. The US is evaluating 3.7-4.2 GHz which should too be considered in Canada. Taking advantage of international trends and following economies of scale such as the US ensures that there is an ecosystem available

Q18 –Will allowing flexible fixed and mobile services within the same frequency band change how backhaul is planned and used?

[TELRAD Networks]

Yes, there are major differences between fixed and mobile. As in mobile capacity is burst oriented however in fixed sustained rates are consistently high. Considering the needs of the fixed wireless use case backhauls must be able to support the ever-increasing demand. The coexistence of fixed and mobile is necessary to scale and make best use of spectrum. However, this also enforces a need for the use of standards based technology to ensure synchronization

Q19 – Provide, with rationale, your view of the above assessments on the bands being considered internationally for commercial mobile, fixed, satellite, or licence-exempt.
[TELRAD Networks]
No comment

Q20 – ISED is seeking comments on the potential frequency bands for release in table 7:
a) the proposed services and/or applications for each frequency band
b) the potential timing of releasing for each frequency band
c) the priority of the release of the frequency bands

Provide supporting rationale for your responses.
[TELRAD Networks]

No comment

Q21 – Are there any other bands that should be considered for release in the next five years for commercial mobile, fixed, satellite, or licence-exempt that are not discussed above? Provide rationale for your response.
[TELRAD Networks]

Telrad encourages the enablement of sub 6GHz spectrum due to the propagation characteristics needed to service rural broadband. Following major markets such as the USA ensures the availability of an ecosystem

Example
3100-3450MHz

3700-4200MHz
5925-6425MHz

Q22 – Are there specific frequency ranges/spectrum bands that should be made available for specific applications?
[TELRAD Networks]

Q23 – Are there any factors that would impact the potential release of these frequency bands between 2018 and 2022?

[TELRAD Networks]

Thanks You,

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