

STATES OF JERSEY



5G NETWORK: RESTRICTIONS ON USE

Lodged au Greffe on 2nd July 2019
by Senator S.C. Ferguson

STATES GREFFE

PROPOSITION

THE STATES are asked to decide whether they are of opinion –

to request the Minister for Treasury and Resources to –

- (a) take note of the current emergency restrictions being applied by the United States in the National Emergency Order signed by President Trump on 15th May 2019 and, as shareholder representative, to take steps to ensure that the operations of JT take these into account and that equipment and software used by JT in respect of 5G takes into account the restrictions signed into law or by U.S. Presidential order in the United States;
- (b) take steps, as shareholder representative, to ensure that access to the 5G network is limited to the Hospital and to the business area of central St. Helier and the Waterfront, with such access only provided if a requirement for 5G is requested in writing from the Hospital or a business in that area;
- (c) work with JT, as shareholder representative, to set up a plan to replace all software and equipment in the 4G network with equipment that takes into account the American restrictions; and
- (d) engage an expert technical consultant to advise the Minister, as shareholder representative, on telecommunications, and to conduct a review of the Island's preparedness against cyber-attacks.

SENATOR S.C. FERGUSON

REPORT

Jersey prides itself on its excellent regulatory process and its secure holding of assets. However, our clients rely on Jersey for the confidentiality about, and security, of their assets. If our finance industry and the Government of Jersey connects with the world through equipment which allows access to their records by other governments or companies, how secure will our clients feel?

I have no doubt that the contract offered by ZTE to JT was extremely tempting, with an excellent price and terms being offered. But is it good enough to sacrifice the reputation of our finance industry for a short-term gain? Should the Assembly be party to such short-termism? Surely it is better to be able to provide cyber-security to a higher level to support our finance industry and government?

The Treasury appears to have been less than thorough in their supervision of the companies, and have not taken expert advice where it would have been advantageous. Whilst the contracts entered into by JT might have been appropriate in the short term, it is not at all clear that they are advantageous for the long-term strategies of the States.

As outlined in **Appendix 1** to this report, pressure has been building for electronics companies, particularly telecommunications companies, to exhibit caution as to their equipment and components used in products and infrastructure and software. This has culminated in U.S. President Donald Trump signing an executive order on Wednesday 15th May 2019. The executive order did not name China or Chinese companies specifically. The order was issued under the 1977 International Emergency Economic Powers Act. Google has now announced it is not supporting Huawei phones for its Gmail and its applications, and others have now followed Google's lead (see attached article at **Appendix 2**).

The Commerce Department added Huawei and 70 affiliates to its "Entity List" after it concluded that the Chinese company was engaged in activities "contrary to U.S. national security or foreign policy interests". Inclusion in the list means that a U.S. Company, person or government agency purchasing equipment from a company on the Entity List now requires a specific licence "to export, re-export and/or transfer (in-country)".

It should also be recognised that what applies to Huawei also applies to ZTE.

Currently Jersey Finance are intending to develop business from the USA. In addition, JT have a contract for communications with a large American conglomerate. In the light of the executive order signed by President Trump on 15th May, the short-term approach being taken by JT may well jeopardise Island business efforts.

I have commented on 5G in Appendix 1. Expert opinion seems to be that much of what is proposed for 5G can be achieved using 4G. However, it is suggested that where there are substantial amounts of data to be processed, such as in the business sector or the Hospital, 5G offers significant advantages. It is not clear that it will be particularly advantageous for the domestic market at this point and consequently, no money should be spent on installing 5G at present.

One of the marketing advantages of Switzerland as a finance centre is the fact that it offers Tier 1 communications and advanced security. Jersey should be aiming at achieving this as near as possible in order to retain its position as a top offshore finance

centre. This proposition intends to put the Island firmly on the route to excellent security.

Ideally, our financial institutions should be subject to external high-level testing of their security systems at least once a year, and to report the results and reports in writing to the Jersey government. I am not aware that such testing or reporting is done.

Financial considerations

The present Jersey structure where JT, which is 100% Government-owned, pays for all the Jersey telecommunications infrastructure improvements, means that only the Government of Jersey, not the operators, is paying for infrastructure upfront, as the other operators do not presently contribute. An example is that fibre is not, for the most part, used or paid for by the other operators except JT, as the cost to the other operators is too high to be profitable. The fibre is used and paid for only if absolutely necessary by other operators.

The regulator is presently asking for comments on 5G frequency allocation.

Financial and manpower implications

The short-term direct financial and manpower implications could result in reduced dividends from JT unless the vertical separation and change in structure is agreed. However, the benefit to the finance industry if Jersey is perceived to have an excellent security system is significant.

APPENDIX 1

Over the past few months there has been a significant increase in international condemnation of the unprincipled steps allegedly being taken by Chinese industry to steal technological and other information from western countries. As a result, and as documented in the attached press cuttings, governments are forbidding their telecommunications companies to enter into contracts with Chinese companies. Leading countries such as the United States, Australia and New Zealand are already taking such steps. Japan has avoided the problem by using Nokia equipment. BT is removing Huawei equipment from its 3G and 4G networks and will not be using Huawei in the core of its fixed-line network¹. It is also removing Huawei equipment from the core of the mobile networks it acquired when it bought EE, and will not use Huawei equipment in central parts of the 5G network.

The concerns about the Chinese approach to intellectual property have arisen from work being done by the U.S. Authorities. Mr. Bill Evanina is director of the National Counter-intelligence and Security Centre, a division of the Office of the Director of National Intelligence. He serves as the U.S. Government's top counter-intelligence official.

He says: *“When it comes to espionage, China poses the greatest threat. Its trade secrets, proprietary data, intelligence, emerging technology, nanotechnology, hybrid, anything that they can see that is the future. Supercomputing, encryption, those are the issues that they look at. And they have a prioritized schedule that they look at and they send people forward to go collect that data.”*

What is more, if you are going to China to discuss business, Evanina recommends that you do not take a phone which has any personal or corporate data on it. Visitors should remember that when they turn on their phone or their laptop, they are connecting to the Government of China.

Mr. John Demers, of the Justice Department's National Security Division, says that since 2011, more than **90 percent** of the economic espionage cases they have charged have involved China, which has stolen secrets about everything from genetically modified rice seeds to wind-turbine technology. He adds that they are “very persistent, very sophisticated. Very well-resourced, very patient and very broad in scope”.

Demers says Chinese operatives have intensified their efforts on industries critical to Chinese President Xi Jinping's “Made in China 2025” program, a 10-year plan to jump ahead of the United States in aerospace, automation, artificial intelligence, quantum computing, and other cutting-edge industries.

Given this experience, it is not surprising that the United States is clamping down on the installation of Chinese equipment or components. Nor is it surprising that countries such as Australia and New Zealand are following suit. The EU is taking notice, and senior management of companies are now questioning the sense of allowing Chinese companies to take over advanced technological firms.

¹ Reuters, 5th December 2018

When interviewed by the Financial Times² the CEO of Siemens expressed concern about the Chinese takeovers. The technological departments are hived off into a separate company, which is then transferred to China, together with all the intellectual property, patents, etc.

Whilst this may appear to be fanciful, the serious press, as well as the technical press, is concerned about the campaign to obtain these intellectual properties from the West, whether by theft or by purchase.

5G Networks

There has been a great deal of hype about the implementation of 5G networks. I have included an article from the New Scientist,³ questioning whether the alleged advantages of 5G justify a rush to installation. According to Mr. William Webb, a former director of OFCOM, a significantly faster connection may be pointless. If your phone is slow when browsing the web or streaming a movie, it is more likely to be due to limited hardware than network issues. He says *“All of the applications we use are no longer limited by the connection speed, they are limited by the processor on the device or the far end server.”*

The current target market is the commercial user rather than the consumer. Trials are in progress to establish whether a private 5G network will handle data better than Wi-Fi or a 4G equivalent, but the tests have yet to be completed. It is suggested that an important area to be considered is healthcare. The main advantage being considered is that a hospital will no longer require complicated wiring. There are suggestions that 5G will make it possible to provide better home care for the elderly. However, Mr. Webb states that it would be simpler to connect the in-home devices with traditional broadband Internet and Wi-Fi. If they haven't got it, then give it to them. That is going to be cheaper.

The conclusion is that many of the advantages hyped for 5G are in fact available with 4G.

² Financial Times, 21st December 2018

³ New Scientist, 9th March 2019

INSIGHT 5G NETWORKS

Phoning in the future

Will 5G, the speedy upgrade to our phone networks, live up to the hype? **Chris Baraniuk** reports

"I want 5G... in the United States as soon as possible," Donald Trump tweeted recently. The US president isn't the only one buying into the hype around the fifth generation of wireless technology. At last week's mobile technology event MWC Barcelona, we were promised blisteringly quick download speeds and a mini industrial

"It is being positioned as all things to everybody, the Swiss army knife of the mobile world"

revolution powered by zipper data. Naturally, you will have to buy a new phone.

Perhaps Trump is worried about being left behind: the world's first commercial 5G network is being switched on this month in South Korea, while US providers aren't expected to launch services until later this year. The technology has also become part of the US's trade war with China. The Trump administration is extending a ban on 5G kit made by Chinese firm Huawei, citing national security concerns. Huawei, in turn, is expected to sue the US government this week to overturn the ban.

But hang on. What even is 5G, and what is it going to mean for you? If you have heard about it before, you have probably got some sense that 5G is meant to be faster than 4G, the current mobile internet service that lets us stream video on the go or Instagram our every move.

"It is being positioned as all things to everybody, the Swiss army knife of the mobile world," says Simon Forrest at market research firm Futuresource.

In reality, 5G is a collection of

different technologies developing at their own pace, some of which won't be much faster than existing networks.

In basic terms, there are three main types of 5G operating at low, medium and high frequencies. The latter is just what it sounds like: an electromagnetic signal broadcast at very high frequencies of over 24 gigahertz. That means data transfer of at least 1000 megabits per second (Mbps), or 50 times as fast as the average 4G speed in the UK.

That ultra-fast signal could be useful if you wanted to, say, connect tens of thousands of fans in a sports stadium so they could watch high-definition replays on their phones or tablets.

But that high frequency means the signal doesn't spread

out easily over a wide area, because the tightly packed electromagnetic wave is narrower and less free to bend or diffract.

That means lots of mobile masts would have to be dotted around the stadium to connect everyone up – perhaps 200 to allow 50,000 people to stream HD video at once. This would be too expensive to do across wider spaces such as cities.

The medium frequency variant of 5G, operating at 3 to 6 gigahertz, would offer speeds of around 100 Mbps or more. This is still faster than 4G and the signal would cover a wider area than high frequency 5G.

In Europe, low frequency 5G will broadcast at around 700 megahertz, but may vary elsewhere, and exactly how it

will be used is still a matter of debate. Some see it as enabling far-reaching coverage for a 5G network, although data speeds at those lower frequencies might not beat 4G.

Marketing buzzword

So 5G is really a marketing buzzword that masks a complex mix of technologies that could leave people confused when they buy a new phone. Worse still, countries are free to choose from a range of frequencies for their 5G services, so a smartphone that gives you 5G at home might not do so on holiday. Addressing this problem is crucial, according to industry trade body GSMA, but progress has been slow.

There is an even bigger elephant in the 5G room, though: who actually needs it? William Webb, a former director at UK telecoms regulator Ofcom and author of *The 5G Myth*, says he has yet to hear a convincing answer. For smartphone users, a significantly faster connection speed may be pointless. If your phone is slow when browsing the web or streaming a movie, it is more likely to be down to limited hardware than network issues.

"All of the applications that we use are no longer limited by the connection speed," he says. "They're limited by the processor on the device or the far-end server."

While you could, hypothetically, use 5G to download vast amounts of data remotely – an entire TV series, perhaps – it is unclear that anyone would want to.

That is why some 5G proponents are pinning their

THE 5G CONSPIRACY

New 5G networks are barely on the streets, but that hasn't stopped the rise of baseless conspiracy theories. "These towers are weaponry," a YouTuber incorrectly insists in a video with nearly 1 million views, as he attempts to "expose" mobile networks



and 5G as a government-designed "kill grid" poised to harm people en masse.

In some cities, people have scrawled anti-5G graffiti on phone boxes or mobile masts. While research continues to be carried out on any possible effects of electromagnetic radiation on human health in certain scenarios, there is no conclusive evidence that exposure to everyday phone signals causes harm.

The anti-5G conspiracy theorists are themselves a symptom of the hype and uncertainty surrounding the technology, says psychologist Oliver Mason at the University of Surrey, UK, who has studied technophobia.

Paranoia is bound to creep in when change is promised, especially when the details or potential consequences of that change are unclear, he says. "Technology is a lovely breeding ground as we've got pretty much no idea what is possible."



hopes on commercial, rather than consumer, applications. Brendan O'Reilly, chief technology officer at Telefónica UK, says 5G will fundamentally change the way businesses use data.

Telefónica UK, which operates the O2 mobile network, will be rolling out 5G trials in four UK cities by the end of the year. These won't be networks for smartphone users, but small-scale tests for businesses.

O2 is already involved with a 5G trial being run at Worcester Bosch. The UK firm has installed a private 5G network in its factory, which churns out more than a quarter of a million boilers every year and has nearly 100 industrial machines at work.

Chief executive Carl Arntzen says the network allows the firm to connect sensors to its machines and monitor them in real time. This allows any slips in quality to be caught before they create

problems down the assembly line. Arntzen says the 5G network is intended to handle these huge data streams better than a Wi-Fi or 4G equivalent, but it isn't clear if that is actually the case – it is “early days” for the trial, he says.

Arntzen isn't alone in pondering the benefits of high-speed wireless coverage in offices and factories. A recent survey by consultancy

“You could use 5G to download vast amounts of data, but it's not clear that anyone would want to”

firm McKinsey found that a majority of companies outside North America felt identifying a business case for 5G was the main challenge facing the technology. Although respondents expected applications to emerge in the next few years, these clearly haven't arrived yet.

Another area supposedly ripe

to benefit from 5G is healthcare. The Rush University Medical Center in Chicago is trialling the technology in an effort to get rid of wires in its departments. It thinks doing so will save money in the long-run and allow it to connect up older equipment.

Meanwhile, a trial in Liverpool, UK, is testing communications devices in people's homes that allow health visits to be carried out remotely. Instead of speaking in the flesh with a health professional, the individual talks into a speaker-shaped smart device equipped with a high-resolution 4K camera.

“If somebody's got a rash on their skin, they can show it to the pharmacist on the video,” says Rosemary Kay, director at E-Health Cluster, which is running the trial.

In this case, the devices themselves lack 5G chips, but instead use Wi-Fi to connect to

5G is the umbrella term for a mixture of new technologies

routers on nearby street lights. Those, in turn, broadcast a 5G signal operated by AIMES, a cloud service spun out of the University of Liverpool. The idea is to provide trial participants, who are often older people with no mobile or internet network connection, a smooth way of transferring lots of data, which is crucial for 4K video.

But Webb says it would probably be simpler to connect those in-home devices with traditional broadband internet and Wi-Fi instead. “If they haven't got it, frankly, give it to them,” he says. “That is going to be cheaper.”

Don't, then, believe all the hype. If a mobile internet revolution is afoot, it is certainly looking suspiciously slow. Many would argue we actually already had such a revolution – it was called 4G.