DATAONE LIMITED
RESPONSE TO CONSULTATION PAPER ON DATACASTING

1 BACKGROUND ON DATAONE

In establishing the world's first digital (DVB-T), terrestrial television broadcast facility, Advent Television Ltd gained valuable experience in the capability of broadcasting data utilising the same technology. It has conducted extensive tests of digital DataCasting in Singapore. Building on that experience DataOne now aims to be a global seller of Digital DataCasting systems.

DataOne can provide corporate, governments and suppliers of broadband data services with the most effective means of provisioning volume capacity. Having tested some key parameters, we are now ready to deliver datacasting services such as one quoted for a client in Asia:-

- Upto 4 serial digital video feeds each with stereo audio channels
- DataOne Data Injection system to allow data to be delivered in either a Push technology style of service and/or as an asymmetric network. It will supply one or multiple TCP/UDP or FILE delivery services.
- The DVB-T transmission system will provide a multiple service delivery platform that can cover a range of 20km or more.

2 NOTE ON UNCERTAINTY IN DATACASTING

There is a general view in the market that there is a lot of uncertainty in the DataCasting industry. In our opinion, this uncertainty has little to do with the technology, rather the uncertainty lies in how current regulations will be adapted to accommodate datacasting and the largely untested consumer preferences that will shape the services to be offered. The issues are stated below:

2.1 Datacasting technology

Analog DataCasting has been around for years in various applications. Digital DataCasting is an extension of this proven technical and business model. Companies like NDS, Thomson and Siemens have conducted extensive testing on every aspect of Digital DataCasting. Their corporate statements indicate little uncertainty in their minds.

In Singapore field tests alone, DataOne has proven:-

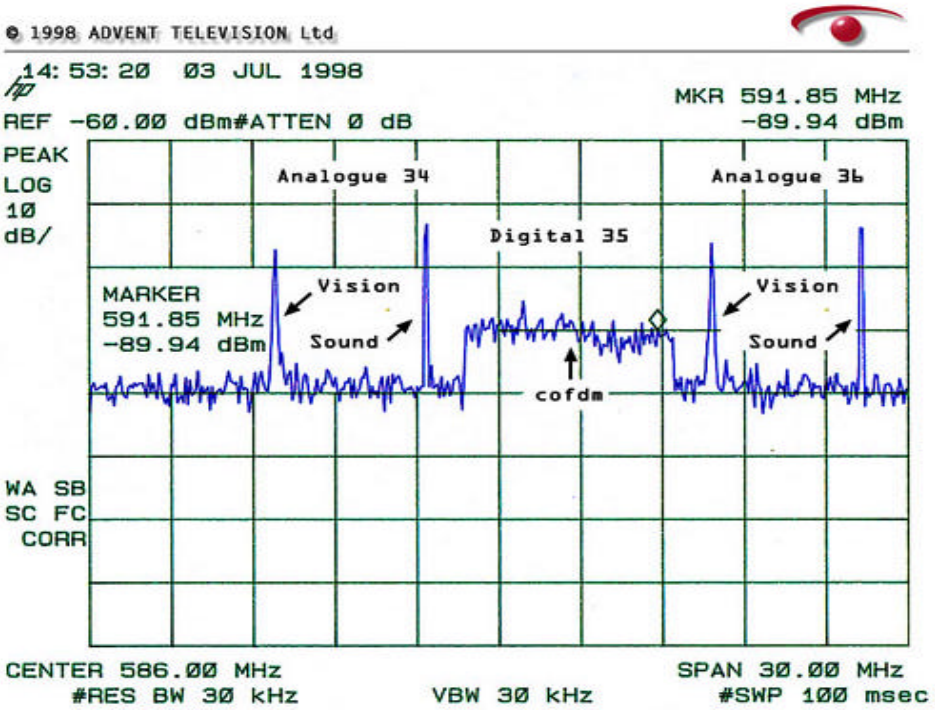
- **Data Speeds**
  Using a DVB-T transmitter with a range of more than 20km radius data speeds of 32 Mbps were achieved. This is in line with tests in Europe.

- **Robustness of Mobile Data**
  Following tests in Germany where DVB-T signals were received successfully at 275 km/h, DataOne has tested data reception in moving vehicles all over Singapore. The robustness of the signal provides an opportunity for high speed data on the move.

- **Rain attenuation**
  Tests show that terrestrial digital DataCasting in the UHF spectrum would not have any problem with rain attenuation.

- **Digital channels can occupy interleaving channels**
  The field result example shows that the digital television signal's spectra is well contained within the allocated channel, with negligible interference to its adjacent channels. As shown in the spectrum chart, Advent's broadcasts

using digital channel 35, which is between two current analogue broadcasting channels 34 and 36.



- **Single Frequency network**
  Spectral and Power efficiency is also obtained due to Single Frequency Networks. This is because as reception can be omni-directional. The wanted signal comprises of components from different transmitters, and since variations of field strength are weakly correlated, another transmitter can fill in the field strength. By doing so, there are smaller variations of the total field strength. This means lower powered transmitters can be used to achieve desired coverage over one RF channel.

Having proven the technology we are now in the next stage and are ready to offer DataCasting products, business services and consulting.

2.2 Regulatory Bodies

The radio frequency spectrum is a natural resource that is used by being occupied. The efficiency of its use depends on coordination among users and the technology being used. Accordingly most countries have set up regulatory bodies to adjudicate over frequency distribution.

The regulatory bodies have to play a fine balancing act between Government, Business and Consumer needs. Given the importance of the decisions it is understandable that regulatory bodies require a very high standard of certainty before they make statutory changes.

2.3 Equipment Manufacturers and Businesses

Regulatory uncertainty and delays lead to business uncertainty as nobody knows what will *not* be allowed, what will be allowed and when it will be allowed. Equipment manufacturers need to take considerable risks and make huge investments to research and develop products. They are not prepared to do this unless there is widespread support for the

technology. However, businesses cannot support the manufacturers because they do not know what is going to be allowed in their market. Hence, this creates an impediment in the development of Digital DataCasting applications that would otherwise benefit the general populace.

2.4 Consumer Preferences

The absolute determination of consumer preferences cannot be developed from the best marketing research alone. Consumer consumption is the ultimate decider.

However, the experience in Singapore and elsewhere, is that there is an increasing demand for cost-effective delivery of high speed bandwidth for all consumers in the digital environment – Now!

3 REGULATORY DECISIONS

3.1 DURATION AND TIMING OF TRIAL

Our opinion is that the trial period serves little purpose and will only prove things that are widely accepted in our market. More importantly, it will further delay the introduction of a technology that is desirable and beneficial to the government and peoples of Singapore, and beyond.

DataOne conducted its trial of data broadcasting in an identifiable stages:

1. Advent TV was one of the first to put together the digital DVB-T broadcasting equipment and know-how in December 1997
2. Tested, and corrected for, the inter-operability of all the equipment
3. Developed the software to co-ordinate, monitor & control the equipment and transmission
4. Developed and tested the transmission including non-interference with adjacent channels and the Single Frequency Network.
5. Tested the reception on digital and conventional televisions with a set-top box
6. Developed and tested data transmission and reception on PCs
7. Content is now being developed with various partners from a commercial and technical perspective and to test the user interface.

In the coming stages we expect to apply for a license for commercial datacasts and offer our products and services globally.

3.2 AMOUNT OF SPECTRUM IN TOTAL

If the goal of the government is to be a global leader in this promising field, it is important that all qualified companies have open access to broadcasting spectrum and licenses. This is the only way to ensure that companies will make the investment to develop innovative content and services.

As mentioned, spectrum is a scarce resource. One of the key benefits of digital technology is its potential to ***free up the spectrum*** or at least increase the usage efficiency by allowing more people to use it. Hence, we believe that the maximum possible spectrum be made available.

3.3 AMOUNT OF SPECTRUM PER LICENSEE

DataOne considers that only full 8MHz channels are commercially suitable for terrestrial DataCasting in the UHFand VHF ranges in Singapore. This is because set top boxes (STBs) for digital free-to-air television in Singapore will most likely be designed to receive

8MHz channels. Then consumers can use the same STB for viewing digital television and for access to datacasting services.

3.4 NUMBER OF LICENSEES

This follows from 3.4 above and our view is that free and open competition alongwith access to spectrum is critical in developing this industry. We believe that a market based solution is required if there are too many applicants.

4 DATACASTING

4.1 APPLICATIONS

Datacasting applications will be based on the benefits the technology provides.

Alternate to congested Internet infrastructure:
As witnessed in Singapore, the Internet lines became extremely congested since the introduction of free-internet access by Starhub. Digital DataCasting provides an alternate to congested land-lines, by using airwaves that are underutilised. Here is an opportunity to be carriers for ISPs like Starhub.

Low cost access to a wide audience
There is huge opportunity to use digital DataCasting and its inherent encryption to target only specific users and audiences. Hence, people who have been largely ignored by mass media can be targeted. One can envisage a service that sends news and information related to the interest of a widely spread out but heterogenous groups in Singapore. DataOne would like to set up a service that sends marketing information into various shops, information kiosks and billboards. Without DataCasting the cost of providing these services could be prohibitive.

Special Interest groups
While television is good for entertainment, the content is largely shaped by advertisers, governments and the broadcasters. The content is designed to suit everyone and often ends up satisfying no one in particular. The Internet, on the other hand, can be tailored to an individual's choice but requires active interaction and some degree of learning and constantly keeping up.

If developed well, DataCasting has the potential to merge the 'passive' audience of television with the active audience of the Internet. Hence, applications that DataOne feels most likely to succeed are delivery of highly specialised or directed content that could not justify significant time on existing channels. The audiences would have a limited scope for interactivity and seek additional information.

Develop Related Industries
DataCasting can add momentum to and improve the viability of taking up digital television and radio. These services may not find a consumer acceptance on their own. Further Datacasting will also increase innovation in content and services provided by broadcasters and on the internet.

4.2 INTERCONNECTION ISSUES

DataOne is committed to providing interconnectivity for all services up to the performance limits of our own system. Fundamentally the DataOne DataCasting system is based on IP encapsulation. Therefore any interconnectivity will depend on the other operator being able to deliver data either already encapsulated or ready for encapsulation.

4.3 TECHNICAL PROBLEMS

The nature and technical performance of the DataOne DataCasting system does not suffer from attenuation due to rain and smoke except in extraordinary circumstances. DataOne's tests here show that terrestrial digital DataCasting in the UHF spectrum would not have any problem with rain attenuation.

5 CONCLUSION

The questions asked in Singapore are much the same as are being asked by governments worldwide.

There is a general view in Australia and globally that spectrum is a valuable public resource and should be allocated competitively for the benefit of the local public. An open and free market would ensure competitiveness required for the efficient use of the available spectrum.

Accordingly anyone with a valuable user proposition should be allowed the opportunity to datacast and given access to spectrum irrespective of the technology or business model they wish to promote. DataOne not only supports full and free competition, it believes that this environment is necessary for its global ambitions.

The fast pace of technology is evident in everything from medicine, agriculture, and manufacturing. Datacasting is not any different and should not be treated as an unknown. The basic technology is well proven and hence, DataOne's focus is now moving to market studies and consumer acceptance of various services. We believe that with the right regulatory and financial support DataOne has the opportunity to capture a global market in this field.