

RESPONSE OF KYMETA CORPORATION

Strategic Review of Satellite and Space Science Use of Spectrum Call for Input

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Introduction

Kymeta Corporation (“Kymeta”), by its U.S. regulatory counsel, hereby responds to Ofcom’s Call for Input regarding the Strategic Review of Satellite and Space Science Use of Spectrum.

Kymeta applauds Ofcom for reaching out to industry as part of its examination of the use of satellite spectrum. Kymeta has not previously participated in Ofcom proceedings, but appreciates the opportunity to do so in this important proceeding.

Kymeta is developing the next generation of antennas for satellite communications that will reduce the cost of broadband deployment and enable entirely new uses of satellite technology.¹ Kymeta’s flat panel antennas use software and metamaterials technology to electronically and dynamically steer the antenna beam to track the target satellite without any mechanical moving parts – as demonstrated in this animation: <http://www.kymetacorp.com/technology/>. The Kymeta technology will enable thinner, lighter, more efficient, and less expensive antennas compared to traditional satellite antenna technologies. Kymeta’s flat panel antennas will be manufactured using mass-produced, affordable LCD manufacturing infrastructure.

The reduced cost and form factor offer the potential to substantially broaden not only the scope of uses, but also the addressable market for satellite technologies. Kymeta’s technology is ideal for greatly enhancing mobile satellite applications for various existing markets, including ships, aircraft and trains, and the technology also enables new markets where broadband satellite communications have not been feasible to date, including automobiles and smaller vessels with hundreds of millions potential satellite terminals as the potential market opportunity.

¹ In 2012, Kymeta was spun out of Intellectual Ventures, the technology and patent company based in the Seattle area. Bill Gates, Jr. is member of Kymeta’s Board of Directors, and a leading investor along with Lux Capital, Liberty Global, Osage University Partners, and The Kresge Foundation.

Kymeta has focused its initial development efforts on Ku-band and Ka-band antennas. To this end, Kymeta has tested (or plans to test) its antenna technology with many of the leading Ku-band and Ka-band satellite operators, including Intelsat, Inmarsat, O3b and Hughes/EchoStar. Kymeta has also entered into terminal development agreements with world leading integrators including Honeywell Aerospace and Intellian.

Kymeta now responds to the consultation questions set forth below.

Question 2: Do you have any comments on our broad overview of the satellite sector set out in this section. In particular, do you have any comments on the completeness of the list of applications, their definitions and their use of the relevant ITU radiocommunications service(s)?

Response: Kymeta submits that the list of end-user applications is incomplete. Ofcom includes in its list “Commercial Mobility”, and states that “[t]ypical applications include maritime communications ... and land mobile applications (e.g. satellite phones).

On a forward-looking basis, Kymeta believes that automobiles (the “connected car”) may be one of the largest, if not the largest, markets for satellite services. Thus, any strategic review of satellite spectrum must account for the huge potential of tens, if not hundreds of millions of vehicles connected via satellite services. A typical use case for automobiles may be software and firmware upgrades to the many microprocessor controlled systems in a car, where multicast/broadcast of software on a global basis is a unique value proposition to today’s alternatives -- manual labor in-shop upgrades performed by a technician or in some cases 4G/LTE software upgrades utilizing unicast connection to vehicles in urban areas (which cover less than 10% of the land mass today).

Kymeta’s low-power, low profile flat panel antenna will enable auto manufacturers to integrate it into the roof of the car and Kymeta already has had well advanced integration discussions with one of the largest automobile manufactures in the world (to be disclosed in early 2016). Gartner has predicted that “by 2020, there will be a quarter billion connected vehicles will be on the road, enabling new in-vehicle services and automated driving capabilities.”² This is a massive new market ideally suited to satellite services.

² Source: <http://www.gartner.com/newsroom/id/2970017>

In the near term, connected vehicles will enable auto manufacturers to provide, and obtain, huge amounts of data into and out of vehicles, globally, without interruption, and at very low cost. Connected vehicles will enable remote software updates, remote monitoring, and real-time updates for mapping, road and weather conditions, and emergencies and public safety. For the lifetime of the car, the cost savings from remote software upgrade could be in the USD 400 – 500 range.³ With millions of cars being recalled every year with software as a leading cause, the cost savings in the United States alone will be counted in billions of dollars per year compared to the cost of traditional software updates done via individual dealer visits.⁴

Auto manufacturers will be able to work with a single integrated vendor, rather than having to work across the 100+ cellular operators around the world. And coverage will be ubiquitous – 24/7 even in the most remote areas.

Further into the future, the connected car will be the foundation for autonomous driving, which will require ubiquitous two-way connectivity to ensure safe operation, and will demand always-on high-speed Internet access for passenger use. Kymeta believes that broadband satellite service will be an integral part of autonomous driving.

Question 8: From your perspective, what high level trends will affect the satellite sector in the coming years?

Response: Kymeta submits that the satellite sector will be affected by (1) the continued deployment of high-throughput satellites capable of delivering high-speed broadband Internet access; (2) the deployment of non-geostationary satellite orbit (NGSO) satellite systems, with hundreds if not thousands of satellites; and (3) the commercial deployment of low-cost, low-power, low-profile, beam-forming flat panel antennas.

These high level trends will greatly expand the addressable market for satellite services. As noted in response to Question 2, Kymeta believes that there will be a huge market for satellite service to connected vehicles.

³ Source: <http://blog.ihs.com/remote-software-update%3A-future-growth-business>

⁴ Source: <http://blog.ihs.com/remote-software-update%3A-future-growth-business>

In addition, the commercial deployment of inexpensive, beam-forming flat panel antennas will facilitate and improve, and thereby substantially increase, the deployment of satellite broadband services to maritime vessels, aircraft, and trains.

Maritime: Kymeta is working with Intelsat, Airbus Defence and Space and Intellian to make available high-throughput services to the maritime industry (see press releases [here](#)). Kymeta's low-cost flat panel satellite tracking antennas will serve not only existing maritime satellite users, including large ships and off-shore platforms, but will expand the market to smaller vessels where traditional satellite antennas are not currently practical, feasible or sufficiently cost-effective.

Aircraft: Kymeta is working with Inmarsat and Honeywell Aerospace to create smaller and thinner satellite antennas that can be installed on a wider variety of aircraft, including smaller business aviation aircraft. The flat panel design is lighter and reduces weight and drag on the aircraft, in turn reducing fuel and maintenance costs.

Trains: Kymeta's flat panel antenna is an ideal solution for providing uninterrupted broadband access on high-speed trains. The flat panel antenna can be successfully deployed on trains that pass through tunnels with only a few inches of clearance.