We'll go through an overview of the broadband project and then we can talk through some questions.

So I worked on the BT side, sort of around in the background of the project in 2008 and 2009, although for the first couple of years I wasn't actually directly involved in the project. So for the last couple years I was putting together announcements and writing the reports. Should we just go through your questions one at a time? Or?

Part 1
a) Setting up the project

1)

Ok, so the first question is how we recruit volunteers. When we started off the project right at the very beginning, we recruited volunteers by a research panel which was run by GFK. And for the first couple of rounds of the research, in conjunction with the hardware version series, which was supplied by Samknows, also panelists were asked questions to find out if people with different levels of performance had different attitudes towards their connections, etc. Actually, what we found was that the research side of things was quite expensive and the results that came out of it weren't very likely. So after the first couple of rounds of research we could see that, although we continued to use the existing panelists in our research.

This takes us to 2010, where we awarded a second contract to Samknows, the first one having finished. And when we did this we published a press release saying it had been awarded to them as our technical partner. And when we did that we asked if anybody was interested, and would like to, you know, help make it better, that they could go on to some of those websites and volunteer to take part in the services. From that, there's a bank of details for the volunteers, and if we needed to put the panels, they could go to that and ask, to see if they've got volunteers who fill our requirements.

We've gone a little bit now, with the launch of superfast services, the paycut isn't very high, so obviously the two possibilities are important to the development of the global market, and it's significantly important that they're included. So actually what we've done recently, where we're trying to get sufficient panelists, we've gone to the ISPs in question and asked them to email a random selection of their customers who are on that particular package, and explain to them that if they go to this particular website they can volunteer. We leave it to the ISPs how they word it, although we do make sure there's nothing in there to instructionally harangue. But again the line that they take is sort of "we want people to know how good our broadband service is, do you want to help us?"

So yes, in the lifetime of the project thus far, there've been three ways in which we've recruited people, and going forward we'll probably continue to use a mixture of the latter two. How do we ensure volunteers join the whole project without dropping out? We do get drop outs. In the early stages of the project, we used to have competitions among

the panelists, they'd say you can win an ipod or something like that. Now what they do is, every month if there're boxes which they've stopped reporting, they send an email to the panelists saying we've got a problem with your box, could you persuade them. Some of them go back online. There is natural dropout and wastage to the lifetime of the project either because the panelists lose interest or there may be an issue with the hardware. We expect to have to top up the panelists during the lifetime of the project. The ratio of dropout volunteers, we expect over two years, is about 20%. 15 - 20%. It's not ideal, but it could be higher. We can live with that, we've built it into our costs so we can expect it, and if it's lower that's even better.

2)

Is this actually the development of the White Box? Question 2? How much control did we have... did we define the problem?

What actually happened was, we had decided to have a look at actual broadband speeds and we were contacted by Samknows, and Samknows had just started up under Venture Capital funding. They had developed software to run on a box. I think it's called Open WILT, which is a Linux program which can be applied to certain phoneware which can be applied to certain routes. And they developed this and they came to speak to us and explained what they could do. So they were already working on it, they already had a version of the hardware, that's not to say that's the version that we use now, and we obviously have the software. When we actually contracted with them, we made certain stipulations about what the box can and can't do, a lot of these being for the safety and security of the panelists, so it won't record any data other than the results of the test. It won't interfere with any existing sort of firewall or antivirus software. It can be upgraded remotely so we weren't expecting the panelists to have to change any settings. And also, apart from that, we worked with downloads on the test's schedule. So we worked out which tests we were going to run, when we were going to run them, and that was quite important because running these tests uses data especially back then. So with the ISP packages we were looking at a very low data count. So we had to make sure that our panelists weren't being charged for excess data use as a result for the tests that we were running. So there's been a couple of changes to the hardware since we first started up the project, just as devices move on, and we've needed a higher hardware to record the speeds of connections which exceed 60mb/second.

3)

Well, some of it started off as a website which was run by a student in his spare time - Sam - and it's a hobby for him. Originally he was just monitoring availability of ADSL broadband. Sam is quite the computer enthusiast, he's quite an impressive guy. So he did a lot of it in his spare time, so the cost to develop the phoneware for the boxes probably wasn't actually that great. With regards to the hardware, under our contract with Samknows we basically paid for the vast majority of the hardware units and that's part of our contractual obligations to do that. So if you met with Samknows they would probably be able to give you a better indication of how much time and money was spent

developing these, but like I said I suspect that the vast majority of it was spent on the hardware itself which we funded.

4)

Did Ofcom consider about the hardware failure rate of White Box when planning the project? What is the hardware failure rate and how many back-ups are ready to replace the broken one? Again this goes back to what I was saying about panelist top-up, because that includes any hardware failure. If a panelist contacts Samknows and says there's an issue with the box, they will replace it and it's likely that we will fund that. But we tend to only do top-ups in stages, the basis for certain ISP packages which fall below levels which we think will enable us to produce the connections to move forward.

5)

We include significant tables to support the 95 and 99%. I understand it's usual to use the 99%. We found in using the 99% confidence level, there're very few differences between packages, especially between the ADSL packages, because the thing which is most important is dictating how well the connection performs, and the technology itself. So what we're actually doing if we look at it with the 95% because there, at the 95% confidence level, so there you can see what the difference is basically. We include the two in the report. We concentrate the analysis on the 95% but at the end we have it at the 99%.

With regard to the error values, the error values differ depending on how many panelists we have on a particular ISP package, depending on the variation of performance of those panelists is. So, it's a difficult question to answer. It depends on each ISP package and each variable at the moment.

6)

Ok, the question here about sampling distribution. One of the things we are supposed to do when we introduce a new panel in is calculate the straight line distance from the local ADSL connections from the local exchange to their home. And then what we do is, in order to enable lifelike comparison with the different ISP packages, we then normalize those. Obviously we normalize them so they're most efficient so I'm afraid I can't tell you much more about it than that! But yes, it's important to do that because, one thing that we've found when we first started a couple of years ago was that there was one ISP in particular that was operating ADSL 1 broadband and ADSL 2+ broadband, and they would only sell the ADSL 2 product to customers who were close enough to the exchange to be able to benefit from ADSL 2+ over ADSL 1. What that actually meant was, the ADSL 2 product, the line distribution was a lot shorter with a lot more complexities. So we had some issues there. ADSL 1 is, generally, used in the UK, and was marketed as being up to 8 megabits per second. ADSL 2+, until the recent changes in the advertising guidelines, was generally advertising to be up to 20 or 24 megabits per second. Now I think it's advertised at 14 to 16 megabits per second. The

average speeds for ADSL 2 are higher than they are for ADSL 1. So yeah, in order to enable lifelike comparison, we have to do that. In the question here, it mentions users in different regions. I mean, in urban areas, you can expect the average line length to be shorter, which is one of the reasons why we normalize. And we don't actually look at the performance within regions, reason being that running these projects is quite costly, and that means that our sample sizes for the ISP packages aren't large enough to enable robust analysis of the results behind a region.

7)

Ok, so question 7 here. ADSL broadband in the UK is generally either provided, over BT's network, either by BT retail or by the ISPs buying wholesale products from BT, or by LLU, where the ISP replaces their own equipment and the BT are allowed to exchange and be connected to their home network. In our reports when we look at -- so LLU providers, they don't have UK wide coverage of their LLU network. So what they will do is where they can provide LLU, they'll provide an LLU-based service, generally, and in other areas provide a service using BT's wholesale products. Back in our report we only looked at the LLU customers for those ISPs which could offer the same up to 16 megabits per second service, using either their own LLU network or using BT's network. The reason being that, for the LLU customers, these ISPs have more control over more variables that can effect the speed of the service. Therefore, using BT wholesale products, the only thing they can really define is the amount of backup they use. We also think that it would be unfair if we were to include the performance of customers with a certain ISP when in fact that service is really being provided by BT.

Taiwanese man: But how many LLU users are there?

Now, I think there's about half of all ADSL users, it's over 7 million. about 7.5 million. So actually when you look at the proportion of customers whom we exclude from the analysis because they're using BT wholesale products, I think it's under 20%. Because although LLU makes up about half of ADSL, the majority of the rest of ADSL is provided by BT on a retail basis.

8)

Was the center server location of the project built on each ISP on net? Or off net? I'm not entirely sure what is meant by this question. Is it the server we use to run the tests and capture the results -- is there a separate one for each of the ISP networks? Is that the question?

Taiwanese woman: What they are trying to ask is, the server, would it actually affect the ISP? How could they affect the ISP? The location of the server.

Right. I don't think the location of the server should affect the ISP. That's for our technical partner -- on this side of things it's very much their domain. I'm not sure if

you've asked them about this. To be perfectly honest I'm not entirely sure where the server is.

They've got servers here in London, Manchester, but also got servers in North America, Asia Pacific. But all the information gathering is done through White Boxes, so all the information is gathered locally to where the server is, so all the intelligence is local.

9)

Right. So, were there any special restrictions about the center server associated bandwidth? I guess the real bandwidth is needed at the sum server which collects the results rather than the premises where the White Box is stored. And again, that's something that we leave to Samknows. Certainly in the early days of the project I know that they did have to upgrade independently.

10)

And how much did the project cost? I'm not entirely sure to be honest. It's been over a number of years. I mean there were the setup costs, which took quite a lot of investment of time by us to get it up and running. Then, once we had that annual process... it's a reasonably expensive project. The reason being that, the ongoing day to day running of it, we pay fees on those to collect the results for those. And then we publish our results every six months, and then we pay extra percentages for statistical analysis and for the provision of the data to us. But the vast majority of the costs is in us financing the boxes.

In the duration of the last contract which ran for two years, although we didn't pay for all of these because we had some already, I think it was around 2200 boxes. And the cost per box -- there are actually two different sorts of measurement units. The vast majority of the ones that we've used are the lower cost ones which cost 30 pounds per, but that's not in the public domain for me to share that with you. And the higher cost boxes, which we have far less of because we're only just starting to include these ISP packages is, they cost twice that so they're 60 pounds per box. But the other cost to us as a regular is time and effort and people involved. The project team is about -- because we only published the reports once every six months, I would say is probably equivalent of one (? about 28:00 ?) So we're talking 10 to 6 working, not in a steady day, but in a year is a much bigger effort to get it up and running. And it took quite a while for us to get it right. When we had our first set of results, I remember we spent a lot of time trying to understand the data that we had, particularly how to express the statistical data that was coming in ways that would be accessible to the public, but also maintain accuracy and precision. That took a lot of effort the first time.

Taiwanese woman: We are trying to form an effort to do this in Taiwan. So we were wondering why you chose to work with Samknows, I think they would be... (can't hear)

When we first started this project, in 2008, 2009, there were very few product or informational companies, and I think all of those used software based solutions. Samknows came to us with a hardware based solution. If you're using a software based solution which is on someone's PC, you can only run the tests when the PC is turned on, and also the PC won't be aware if there are other connections using the broadband line. So we just felt that a hardware based solution was the most robust one. Samknows was the only company we were aware of that did that, and so we chose them for it. Again, when we renewed the contract, we weren't nervous because we didn't feel that any of the other companies that bid it were viable either in their technical methodology or cost. And at that point we ran public tender. We started with Samknows because at the time, they had unique capabilities, but as we progressed we moved towards the model of putting out that contract for tender of their own, that we might go with somebody else in the future. We're back to tender again.

British man:We have similar rules that apply to our purchasing.

Taiwanese woman: Commissioner would like to know, because when they go back they will have, like you, public tender, and they'd like you to share with us, when you did that before, how do you define the budget of the project? So you let the companies who are interested and they can just come.

British man: I don't think we do that. They certainly weren't in 2010 when we realized the true potential of the project. One or two, we have to disregard them straight away because they were far beyond the cost budget.

Let's move on to the next question. In the measurement results of the consumer experience, why did Ofcom only announce the average data for all operators, but didn't release the measured data by individual operators? That's about mobile? Maybe we'll leave that one til the end. Do you want to move on to the next? Do all the mobile ones at the end.

b) Publishing data and following up

2)
We'll go onto this one: Did Ofcom educate consumers how to choose the most suitable way to get on the internet when declaring the measurement results? We haven't done this currently because although we've published some of the mobile data, we probably keep a lot on the long term project, and eventually we expect to align the two pieces of work. So hopefully sometime in the future we'll be able to give direct comparisons between the two. Thus far we haven't done that because our research has concentrated on the fixed broadband side of things. But I believe our consumer quality team have published consumer guides regarding it.

I mean, it's a matter of general quality. We don't seek to do more than provide information to consumers, and as your question correctly identifies, fixed internet and

mobile internet services have very different characteristics. And many consumers choose to have both, some consumers choose one or the other. And so we see our role as being to provide consumers with information to allow them to choose, and we try and resist presenting them in a way which guides their choice, other than to give them information.

But beyond the limited of information we provide directly to consumers, there's also advertising roles, which we'll come to, and the information that providers give to consumers. And so what Ofcom did which goes hand in hand with the speeds, is to put together a code of practice, or encouraged the ISPs to put together a code of practice which determines the information they get to consumers about the speeds, about the practice which might effect the speeds before they sign a contract. So it's another way that Ofcom looks at consumer education, consumer information. We try to improve the information that ISPs provide directly to consumers.

3)

Question three here, if the measured broadband speed rate is too low, will Ofcom ask the carrier to improve it? No. But if you're talking about the measured speed through our broadband speed research, no we don't ask them to improve it, but all of the ISPs are very conscious of our research. Which is widely, in advertising via ISPs, so if there is an issue with the results I'm sure that a change has be implemented that we're probably not aware of in order to make sure that there are improvements on that front. Secondly, separate to that, Ben has just mentioned that broadband speed of practice, which was revised last year, and under that revised code of conduct, anyone signing up to a fixed broadband package, at the point of sale, should be given an estimated speed range for the product. And if the actual speeds that they get are below that, and the ISP isn't able to improve them, then they are able to cancel their contract without penalty.

Taiwanese man: Are there any expectations from the consumer organizations?

We ask about consumer satisfaction so we have a big market research team that asks consumers are you satisfied with fixed connectivity, are you satisfied with mobile connected coverage, are you satisfied with fixed broadband, are you satisfied with mobile broadband. So that gives us some idea through the market research of how consumers are feeling towards the services. And when we publish our fixed broadband speeds reports they get widespread coverage. So obviously it's one of the benefits to allow consumers to compare different ISP packages to help them make an informed purchasing decision. And also I think there's a move towards data from the reports being used on a practical comparisons stance, so consumers using broadband are comparing different services online, now can gauge the relative performance of them before making a purchase.

Taiwanese man: So that data you published, the ISPs can use the data to adjust their behavior.

I think the way that we see it is, we publish the data as it is, and then we know that because consumers put great value on the place the ISP comes in, the rankings, for example; ISPs are looking at the way we measure the data and trying to improve their performance. Now, we hope that the work we're doing is to give consumers better performance rather than finding ways of cheating the system. But I think all the ISPs, all the larger ISPs, are very conscious of this as both a tool for marketing so they can improve performance, and also as a source of harm to their brand if they aren't giving a very high performance. I think one of the interesting things that has happened since we started publishing this research is that the cable company, Virgin Media, has been the clear winner in terms of fixed line internet performance, via much much faster speeds available over cable connections than over any copper connections whether it's from BT directly or from one of Open Reach's customers. And as a result of that, awareness of the cable network as a premium network has grown amongst consumers and led to further investment firstly by the cable company, to capitalize on what they've now researched. It's one of the things that has helped cement the awareness of super-fast broadband in the eyes of consumers. And conversely, as the cable company has invested in its network, there's now been investment by BT to add fiber to its network, so you get competitive pressure. The starting point is always that consumers have to be aware of the differences between internet services for them to be able to factor that in as they choose.

It's a good question. I think it's true to say that when we began, we thought about it mainly in terms of establishing whether or not the claims being made by ISPs were true. There was consumer anxiety about advertising claims that said UP TO a particular speed, when in fact the delivered speed was a lot lower in many cases. And we knew, intuitively, that that was the case but we didn't have hard evidence that that was the case. That was one of the things driving us to do that. We had ambition, but we had got to get it right to compete in the competitiveness in the market. But I think that succeeded more than we had necessarily expected. Our starting point - I think that's right, isn't it? That our starting point was consumer anxiety about advertising, that ended up serving both our consumer protection goal, and advancing the addition of cable.

c) Advertising

1) Ok, so, on the advertising. CAP/BCAP consulted on advertising of broadband. Ofcom's suggestion was that a typical speed range should be used and although we didn't say what we thought the speed range could be, we indicated that maybe it would be the speeds that the middle 50% get, so above the 25% and below 75%. And also we suggested that if an up-to speed was used, the typical speed range should be given equal prominence. What CAP/BCAP actually did was, they decided

that, and what was recommended to the ASA, was that where broadband services were advertised, that advertised speeds should be attainable by at least 10% of that particular ISP package's customer base. Those guidelines came in a couple months ago, and others previously. Now what's happened with ADSP 2+ services which we previously advertised as being up to 20 or 24 megabits per second, these are now advertised from I think 14, 16, maybe 18 megabits. So yeah, CAP/BCAP didn't follow our recommendations, but at the same time the speeds we now see being advertised for our services are more realistic.

2) I think question two here's been covered, the new guideline thing.

d) Mobile Broadband

1)

Should I just say about the Mobile Broadband project, we undertook this once in 2010 as a one-up project. I wasn't actually here at the time, I came in just afterwards. But what we're doing now is, we're about to start a three year project and to collect mobile broadband measurements every six months. So what we did last time, just to fill you in on that, we pended for a tactical partner to go in and collect the data for us. We used a company called Etitiro. They collected data using three memes. They had different devices collecting data 24 hours a day, 7 days a week, doing download tests from both the mobile network and the internet. We had some dry testing, so we had the Etitiro team went around and collected data from different parts of the UK from devices in their cars. And we also had a consumer application as well so consumers on panel had an automated application that was collecting data as well. So that was a great success. We found mobile broadband speeds from the consumers were averaging 1.5 megabits. It was a bit fast, this was in shopping centers. Although arguably it's a slightly artificial environment when you put a device in a shopping center because the experience will always be faster there. I think it was 2.1 megabits in the shopping centers. So this project went well, we've begun the process for the new three year project, and we've just collected Samknows for the mobile project. We're keeping the projects separate because there's not too many issues in common with measuring it, because the actual test devices are quite different, we didn't feel there was much in common in running the two projects together. So Samknows are going to measure in five types of location. They're going to measure in homes, they're going to measure in businesses, they're going to measure in public hot spots (so shopping centers, railway stations, airports, places like that), they're going to do drive tests and they're going to have a consumer application as well. We hope this project will kick off round about September of this year. It will last for three years, and we're basically coming in every six months and will publish a report every six months as a benchmark. There's been a bit of disruption now because of the Olympics - we wanted to start in August, but it's a bit difficult. Networks conditions are very different. So we're currently going through a pilot phase. Samknows is going to do this - we're talking through the technical details, but it's probable that Samknows will use one or two of the following methodologies: 1) A smartphone application on smartphones that they will take 'round to different locations, and also the

consumers mediums. And 2) What they call a White Box, which is at it's root, quite similar to the fixed White Box, but what it does is it has six dongles in it. So the White Box has a CPU in it, just providing the intelligence. And that CPU makes the dongles make data for the internet. So we have sort of six dongles in the White Box, one for each mobile network operator in the UK, and then we have one spare dongle, and that's going to provide a comparison between one of the other five dongles. It's kind of a benchmark. What we're hoping to do is take advantage - because they UK has quite limited, compared with some countries, limited download caps, so for example if as a company you go to O2, you can only have an absolute maximum of 2 gigabits of data in a month, and that's quite small compared to some countries. This could cause some issues for the testing. So what we're trying to do is use unlitered traffic to connect to the internet. But we just want to make sure that our unlitered traffic isn't causing any adverse effects for being unlitered. So we have these fake phone calls just to provide the check that nothing's going wrong with that unlitered traffic. These White Boxes will be deployed in homes and the hot spots. We're just discussing with Samknows at the moment about the White Box to be used in smart phones and in the drive testing. So we're going to run a pilot phase, and once we've proven that the pilot works in getting the data we want, we're going to move on to the first set of data collection later this year, and then every six months. And Samknows will produce reports for us on the data every six months. So that's a responsibility we pass to them to produce for us. And they'll provide some of the statistical analysis as well so we don't have to do that.

Woman: We had a meeting with Samknows and they say, for the moment, they only apply to Android. How do you measure the consumers who use Apple? The iphone?

So for the consumer application, it is only Android. So only panelists will have an Android smartphone that we'll be able to measure. But we would be surprised if a user with an iphone would get a very different experience. We think it would be quite similar.

As long as the network has one Android handset, we can run a test on the network. And the experience of connecting that network to different handsets would I think be roughly the same. So if one network is better than another network for an Android device, it's likely that it will be better for a non-Android device as well. That's an assumption, not a conclusion.

And we're keen to understand the performance of the mobile network, the goal is not to understand the performance of the handset. If Apple is faster than a handset, well that's interesting but not really an objective of the project.

Taiwanese man: Would you please talk more about the moving tests?

Yes, the drive tests? Yes. That's still in the early days so we haven't started measuring yet. But what we intend to do is, because Ofcom recognizes 12 regions in the UK - that's 9 in England plus Scotland, Wales, and Northern Ireland - we're going to send Samknows out to all 12 regions to do driving in each of those regions. So they'll get measurements in Scotland, they'll get measurements in Wales. We're absolutely going

to make sure that they go to Northern Ireland because it's expensive to get there, you have to go by sea or by air. And then we send them 'round to all 9 English regions as well. We make sure that we have enough testing to be statistically significant across every region. In terms of the actual volume, we may have to weight it slightly according to where users are. We have a debate involving the mobile network operators because we've found their involvement with these projects is important because at the end of the day, they'll probably use these results and they're also the stakeholders, so it's important to work with the mobile network operators. And in doing so they've come out with several points; one of which is, if most of your mobile customers are in London, why are you testing in Northern Ireland? And others might say we have a lot of customers in Birmingham and Manchester, don't do so much in London. So we have to balance these different arguments and make sure we have the right trade off that gives the results provided by Ofcom and presents a representative sample.

Woman: In Taiwan, they would like to do the moving probe testing. Since in the UK you also have some difficulty in this area, is there any way you will conquer this in the future? What's your plan?

Yeah, so we have -- forgive me, some of these things are not public information, we just share because -- yeah. So Samknows has promised to give a certain number of hours of time that they'll spend driving. What we're going to do -- in lieu of the times, we're not quite there yet -- is to discuss with them where we would like them to drive. So some of the questions are, we need to cover all 12 regions.

Woman: So you have a schedule, right?

Yeah, they'll probably drive for six hours a day. I think by the time you got to the start and got back to the end, it's a working day. So they've got six hours, they will drive a driven route. And the measurements can either be picked up either at specific times or specific places as well. So it's possible to set up a GPS trigger so when they get to a point, a specific point, the devices will just take the test. Or the device can take the test every 30 minutes, whichever works best.

And one of the debates we're also having is whether we can get measurements not only in a car, but whether we can get measurements on foot as well, because people on foot can get to places where people in cars can't, and these places you can get to on foot are often places where people really do use a phone.

2)

So mobile is quite unlike fixed in terms of how it is advertised. So, as Nick was saying, fixed tends to be advertised in terms of speed, so BT might advertise up to 7, 6 megabits as top range. In mobile this really doesn't happen. It used to happen a while ago and maybe my colleagues might recall through their work at the time. Mobile

broadband when it first became a reality in 2006, 2007 in the UK, there was a lot of emphasis on what speed you could get and this was kind of one of the main ways it was sold. That's dropped down, mobile really isn't sold according to speed now. So if you buy a mobile broadband product, be it a dongle or MyFi, or smartphone, then there's no expectation on consumers as to what speed they're going to get. So we haven't established that as we have on the fixed side. What there is on the mobile side is a voluntary code which has been drawn up by the mobile network operators. So they have some "best packages guidelines" as they call it. So it's not mandatory if its drawn up by the industry, but they've drawn up some guidelines as to how they were going to sell mobile broadband. One of the printables which they had has not made undue claims; they still don't advertise speed at the moment. One of the interesting things will be, when we do these tests and we find that mobile broadband speed has increased by X% over months or a year, this could change the situation and speed might become more important to the mobile network operators. And also with 4G coming along and 4G will happen probably in 2013 or 2014, possibly with 4G it could be the operators because they have much faster services than trying to start with 3G. So that's all speculation but speeds may become more important.

Woman: That's a bit different than what we do in Taiwan. I think we have to market the speeds when we sell the mobile product, the package. What we do is a bit different compared to the UK. When we sell the mobile product, the handset, they have to mark the speed. That's what the consumer cares about.

Do you give a maximum speed?

Taiwanese man: No, average.

How do you find your average speed for mobile? How do you work it out?

Woman: 300 Kbits.

But how do you know this? How do you know it's 300K?

Taiwanese man: It's not a measurement, we just ask the operator, according to the ideal standard.

I think the typical speed range is kind of difficult for mobile. Whereas on fixed, you have a line and you can see, well, everyone has one line. But in mobile, your speed depends not on a line, but where you are and how many other people are making a call. It's complicated.

3)

So, in terms of reports, we hope to be measuring from about September this year. This will be the pilot, and following the pilot will be the formal data collection. And then it will be every six months, so expect that the report will likely be a few months away.

Is there anything else you want to talk about the mobile test?

Taiwanese man: the publishing data and following up...

(section b, no. 1)

That's where we haven't really stated by individual operator. And it's usually because it's not statistically significant. Whereas if you have the data for the whole project, as soon as you do it by individual operator, you're dividing everything, all the sample sizes, by 5. So you only have a fifth of the sample, so it's less statistically significant every time you cut the data. So, if that makes it too small, we don't report it by operator.

Taiwanese man: So, you mean, if the data or the sample is large enough, the significance is reversed, then you will announce the data.

Yes. We haven't really committed to exactly what we're going to report for the mobile data, and on the fixed you report by operator. Last time around it was really a sampling issue that stopped us doing it.

Taiwanese man: So can we expect that, if the recovery of the data is ok, then the data published?

We see it as our duty to publish as much as we can, but we also only publish what we see as meaningful to consumers. And so, sometimes you look at data and realize it shows variations that are insignificant, or there are other reasons why, so it doesn't help consumers to publish it. Under those circumstances we'll generally try and go back and do more research and come up with something better in terms of quality of the data for consumers.

And its public knowledge for the mobile broadband project that we set the price range and you can see this from the public tender. And you can see the price range for the project was between 150 000 to 250 000 pounds. That was the guide that we were giving to potential tenders. We measure, we'll be collecting data -- because mobile is inherently different to fixed. With fixed connection you get lots of bandwith and you can use it for a long time and it still stays within the limit. With mobile you can't. So we're only going to be testing for about two weeks every six months, but that's ok. You can do quite a lot of testing in two weeks. So every six months for a period of two weeks we'll do the tests, gather, analyze reports, and publish. There's quite a lot of other mobile projects out there as well. There's quite an interesting case in Brazil where they're doing -- they've got a fixed and mobile project -- and they're combining it all into one. They're doing this one massive super project for most of Brazil, fixed speeds and mobile speeds testing.

Part 2 - Functional separation, Openreach and competition in UK telecoms market

Broadband speed testing was a challenging project. Functional speed separation is very challenging. We've got your questions, but I thought it might be beneficial to do a brief introduction to the history of functional separation. Ofcom was formed in 2003 and one of the first things that the new management team for Ofcom did was a large review of the telecommunications market across the UK. So like your Commission, our duties include broadcasting advertisements so telecommunications are a very important part of that. And we are also part of the European framework for electronic communications. So we had to work out how to reconcile our duties in relation to the European framework and to also think about competition, and to try and look in a fresh way at the way in which those markets had been working. BT had been a monopoly supplier for a very long time. It had been liberalized in the '80s, privatized, and there were quite a large population of competitors, many of which had core networks of their own but depended on BT's access. And what we found was that when we conducted that review, our conclusion was that previous rules, rules that required BT to open network access under non-discrimination, that is, not to discriminate, had been inadequate to address the problems that we saw in the market. And so we developed a solution which involved two elements. One was the idea of equality of access. So rather than simply having two forms of access which were sufficiently similar so as to be not discrimination, we actually said there needed to be one form of access supplied to BT users and to others competing with BT. And to deliver the one form of access, BT was to set up its own access division and split between the access division and the rest of BT with functional separation. So that's the sort of context within which functional separation has arisen. Now that ideal is very simple to state; the practicality of that has in fact been very complex. Because for a number of services it's actually quite hard to identify one single impulse that can be considered to all the players. So that probably is a useful starting point for your first question, which is about the competitiveness of broadband markets.

1)
Under the European market we have to review, and conduct reviews every three years. And when we do that, we look at different functional layers in the market, or to put it another way, different parts of the supply chain of broadband. Our conclusion has been that at the very basic level, the access network, BT's network is not economic to replicate. So there is only one national copper network, and no one else is going to build a network that competes with that network. And so it's not competitive at the level of basic infrastructure for the UK nationally; that was our first finding. And as we've conducted further market reviews, we've looked at the way in which the market evolved over time so that different areas in the UK came to have different regulatory approaches. And our conclusion today is that it remains the case that BTs network is the only copper network available, but our services provided over that copper network, wholesale broadband access services, there is one part of the country where it is competitive for people to offer wholesale broadband access services, so that certain

area is where there is an overlap between the cable network and two or more providers using unmodeled local loops. So in those areas you have BT, the cable company, and at least two competitors to BT delivering DSL using unmodeled local loops. And so in that zone, where you have four more providers, we have deregulated. But then we have two further zones, the most extreme of which BT is the only wholesale supplier, and there we have effectively an obligation to provide services available for retail, and then there's a zone which is a middle between those two, where we're trying to test whether or not market efficiencies will drive the competitive zone out further. So we have regulation of what's termed "wholesale local access" applies nationally everywhere, so BT unbound of the local loop, everywhere, then we have zones of regulation where wholesale broadband services are not competitive. On top of that, the retail market is deregulated on the basis of the regulation of the wholesale market. So our view of the competitiveness of the market is split by the different layers of activity. And we will continue to review the market and have to reestablish whether or not regulation is necessary every three years.

Taiwanese man: So wholesale is regulated?

Yes.

Taiwanese man: And retail is deregulated.

Deregulated, yes. And that has been the trend not just in broadband services but in other services as well. So for example, when Ofcom began, BT, which was then the dominant retail supplier, had a retail price control imposed upon it, and so it's prices were regulated. In 2006 that charge control lapsed, and we didn't reestablish a new one. And so from that point, BT has been deregulated in the retail market, not just in terms of the levels of its prices but also in terms of the structure of its prices as well. And BT's competitors have never been regulated at the retail level. And what we've seen in the retail market since is that, deregulation has been a lower innovation, so for example most customers buy a bundle of services consisting of fixed telecoms, broadband, and also quite often paid television. And that happened because regulation has been taken away and allowed that kind of combining different service to go on. And as long as the inputs are available to all players equally, then the retail markets can be effectively competitive.

2)

So your next question was, as you rightly point out, each country is different, but if you're looking at following functional separation, how you might go about doing that. I think our starting point is that there's no single method for thinking about these issues. And that the starting point really has to be the market as you find it, and the market structure as you find it. And it depends on your relationship with the incumbent operator and also the legal powers that you have. In Britain, we went through a process which began with a dialogue between the incumbent and the regulator, and actually ended with a voluntary agreement to the functional separation. I think it would have been

harder to reach an agreement if BT hadn't been aware that we potentially had the power to refer the market to the competition commission, and one of the consequences of that could have been compulsory structural separation of BT. We couldn't guarantee that that would be the outcome, but it would be a risk that BT would have to take. So I think they probably looked more favorably upon an agreement that they might not have done otherwise if that hadn't been a factor. And so a question for the Commission is how you have that discussion, and what do both parties know about their alternatives to reaching an agreement.

Taiwanese man: So, excuse me, you mean, the dialogue between the regulator and BT; "dialogue" means something like "bargain".

Yes.

Taiwanese man: So, I think there must be some resistance from BT. How did you solve such a problem?

There was a lot of resistance from BT. I think realistically, there were a number of things that we did that made a big difference. So, one was that we took time to have a process of public consultation which allowed all of the organizations involved, BT and its competitors, to get used to the idea that we might do something in this area. Because we didn't just have a public consultation on the idea of functional separation. Our first consultation was about the characteristics of a well functioning market. And so this was the first telecom strategic review consultation. And its first question was what are the features of a well functioning telecommunications market? And we looked at things like prices, quality of services, how the market was working for investors, all these different aspects of market performance. And we didn't ask a question directly about BT's structure, other than to say people have raised BT's structure as an issue, do you think it is a relevant question or not? The first consultation didn't do more than raise questions. And that created a dialogue, and not just a dialogue between Ofcom and BT, but also between BT and its competitors. I should say at the time, I worked for one of BT's competitors, so I was involved on that side of the process, and the competitors saw the opportunity to come to Ofcom and explain the need for a new model. BT saw that competitors were doing that and saw that it had to engage in the dialogue, it couldn't just stand back and say I'm not participating. That would have been very high risk for them. And that process gradually brought the sides closer together, and then that set the stage for the final phase, which was a very direct negotiation between Ofcom and BT. But we couldn't have gone straight to that final stage. It took a long time.

Taiwanese man: How long?

The overall TSR happened over two years. From the very beginning to the very end. 2003 was when Ofcom commenced operation; 2005 was when the undertakings took effect. So, not many many years, but enough time for people to, for example the board of BT, enough time for them to be able to have internal discussions. And I think the other success factor was in fact that the leadership of BT, their chief executive and

some of their senior executives really decided that it was in BT's interest to try this, try something different. I think if we had had a much more resistant attitude from the incumbent, it could have been a lot harder than it was. And so for example, my native Australia, at the same time that this was going on, had a very aggressive dialogue between the incumbent and the government and the regulator. It's hard because the chief executive of Telstra in Australia took a very different view of strategic importance of holding onto the network. So I think a lot depends on the relationship you have with the leadership of the incumbent. Because if you can get a common vision of what a healthy market looks like, and a common understanding that is legitimate for there to be multiple players, and in return for its cooperation effectively in enhancing competition, that it will be able to compete itself, and it will have freedom to invest in recovery investments; this is all in the dialogue, but you can't really force that on the incumbent very easily. I think if that dialogue isn't there, you have to go the long way 'round which is more formal processes, more formal rule setting. And we can operate in that mode, but it's a lot less efficient.

Taiwanese man: Now we are facing the same problem but we went too fast. We want to make an amendment to the telecommunication law. So the incumbent is very angry. This is the problem we are facing now, so we should take a long time to...

It can happen quickly if you can reach a common understanding. I mean, in my previous career before Ofcom, I worked with new entries and with incumbents. In my experience, I think incumbents tend to be concerned with cherry-picking of customers and the balance of how much universal service for example is driving their cost, and the time that they need to become capable of competing more effectively, and their fear that they will be regulated and other people will not. And there's also often the pressure to invest, and it's not clear whether they will be able to recover their investment. The conversations are regulated so they can see that their concerns are being taken account of, so we can start a discussion where both sides get enough of what they want to be able to support that. But it is very challenging. I think the other challenge is deciding where the boundary for the separation falls. In the case of the UK for example, we originally thought that Openreach would just deliver unbundled copper loops. What happened was, that was fine for unbundled copper loops, but as we moved to an environment where fiber became the way in which we expected some, but not all of the access networks to be constructed, we had to confront the reality that the previous model of Openreach just offering effectively physical access to exchanges, and literally the ability to attach the copper wire; so no electronics, no complexity, it was just offering facilities access; this doesn't work in a fiber world because the services that Openreach has to offer are effectively bitstream services. And so this forced us to think profoundly about whether or not this model, whether the boundary was in the right place for us and also for BT, because once they're locked into that separation, it's very challenging for them to be able to coordinate their different activities. So you're in a constant dialogue, even afterwards.

Optic fiber is now being deployed by Openreach into the access network, and Openreach has an exemption from the -- originally the undertaking is that Openreach

can’t offer active services, they can only offer in passive services -- and there’s a specific exemption to allow it to offer fiber to its own sister company BT, and to others.

3)

Question three I think is really about investment incentives. So you’re asking about whether BT might choose not to invest in building a fiber network, because there’s access to the copper network. So it’s been a complicated picture because BT is under a lot of pressure from government, not from Ofcom but from the government, to invest in fiber. It’s probably the national objectives. So it hasn’t just been a question of competition or investment to them, it’s also been a question of how they manage that pressure. And I think the risk BT has is that if they don’t deploy fiber, we will offer access to their ducts and poles to other companies who will, and so they’ve had to respond. I’ve mentioned before, competition from the cable network is factored in their thinking, and also the need to respond to the risk that others might come along and buy their own access to ducts and poles, and provide their own fiber networks.

4)

Your fourth question asking about the costs of functional separation; the cost of functional separation is borne by BT essentially. Although the cost of BT’s access division ultimately form part of the charges that it’s customers pay. So it recovers the cost, including the transitional costs, and those are permitted to be recovered under our charging mechanism. So ultimately those costs are shared amongst all the customers through the wholesale market. But in the short term there wasn’t any direct compensation to BT for having to do functional separation. They had to internalize the costs.

5)

And question five is; so you’ve asked whether the broadband network policy is safeguarding competition or encouraging investment or both. The answer is, our primary duty is to provide competition, but we have to have regard to the desirability of investment as well. So there is an element of both, but our starting point is that competition is the driving force for the market. And our observation is that investments are often made under the threat of competition, and so I think we don’t see a tension between competition and investment; we see people investing because they need to make sure that their customers are kept happy. There is an exception of course for national monopoly assets, and there we’re concerned about efficiency of investment because there is no competition to be concerned about. The question about is there an obligation to provide a fiber network and should the government provide a profit guarantee, the answer is there is no profit guarantee to BT. We calculate their cost to capital, their average cost to capital, when we’re regulating their national monopoly elements. One of the challenging aspects of that is the risk premium for different parts of BTs investments. But we have tended to try and find mechanisms that allow BT to internalize the risk and reward calculation. So for example when BT first deployed fiber,

we did not price regulate the voice service, what we call the virtual unbundled line access service -- sorry not the voice service, the virtual unbundled line access service, which was a bitstream service which BT offered over the fiber -- we regulated the underlying conducting pole access, but we didn't conduct price regulated fiber service. We had to offer access to it to everyone, so everyone had access to it, but you could charge whatever you wanted to charge within the context of the market review for a period of three years. Because that would allow BT to acclimate. They could decide whether or not to invest in fiber, and they did. Now there's a judgement to be made in when that sort of period should end and when you should return to a more conventional sort of pricing mechanism. At the time, fiber deployment was very low, and the need to deploy fiber was seen as very strong. I think our approach has changed over time as the picture has changed. But in a way we try and make sure we're being consistent in order to preserve investment incentives. But it is a key area of judgement and a real challenge for us.

6)

Would functional separation possibly cause new monopolies? I think the essence of functional separation is the recognition of a national monopoly and an attempt to quarantine or separate that monopoly from every other part of the telecommunications supply chain. So I'm not sure that it causes new monopolies, but it certainly brings into sharp relief and creates a sharp focus on the monopolies that are there, because they're not combined with other activities, they're kept separate. And so that means that at that point where there is no competition, regulation has to step in to address the market conduct.

7)

I think we touched on question seven. So Openreach has achieved much in LLU and Openreach is deploying fiber in the access network which we would think of as next generation access. But there's also a question about next generation core networks. And there, that's outside of Openreach. That's BT wholesale, technically, who run BT's core network. And there I think we've seen increasing convergence between the characteristics of core networks for companies like BT, and core networks for mobile networks for example. And we are seeing, for example, separate from this topic, we are seeing increased network sharing in the mobile area, and that involves the same kind of division, effectively, the same kind of split where the companies maintain independent core networks that create features that customers experience, but share effectively the cost of the access network.

8)

So, question eight about people being asked to contact Openreach; there is an issue about making sure the consumers understand what's going on when there's multiple providers. And we have had issues, particularly early on with not just the delivery of broadband services, but particularly with questions of how to switch from one provider

to another. Because when operators are using unbundled local loops, if they switch, if a customer switches from one provider to another, there's often a physical adjustment that needs to be made in the local exchange. Unlike retail competition where customers can switch relatively easily, there can be a lot of interruption associated with that. So we have had to work very hard with Openreach and providers to try and make those processes better, and we've put a lot of pressure on Openreach to make their processes better, and to make them more consumer friendly.

Taiwanese man: One question. Maybe this is not a problem. Even separated, so Openreach, what is the true attitude of Openreach toward BT? When a customer wants to change, to move to some other provider, there will be many obstacles set by them.

So Openreach has been required to built processes which deliver equality of input. And so their migration processes have to be designed to treat all the providers equally. The problems that arose were not so much -- well, there were two problems that arose. One was that Openreach didn't do its job very well on some issues. And so, it was a very big task to come up with these systems, and of course not everything went very well. So Sometimes there were changes within the Openreach system where people were moving from one customer of Openreach to another customer of Openreach, and the service levels just weren't very good. So that was addressed by us talking to Openreach. But there's a whole different set of issues about the fact that we had the cable network and other platforms, and migration to and from those platforms is a different sort of technical challenge, and we still haven't sorted out those issues. We have looked at them in a variety of different ways, but we are currently conducting a new review of consumer issues. And that review is dealing with two issues. One is this question of switching between platforms and within platforms, and whether that creates a differential impact on competition. The other is that, in the retail market, about 60 to 70% of consumers now buy a bundle. And so, switching processes are all about switching one element of the bundle; switching the voice provider, switching your broadband provider. And they hadn't been previously a "switching your bundle" kind of arrangement. So what that means is, if you switch your bundle provider, maybe one element will go over quickly and smoothly and another will be a problem, and it just creates a lot of difficulty for consumers. Of course it's the one proceeding where no single company involved wants to do the work. They all want to make switching as hard as possible. For many different proceedings we have many different companies kind of for an against. On this one they all seem to be saying, "No no no! You don't need to be doing this!" But we've got consumers complaining that we do need to be doing this. But the part of the question of process design is what led us to develop the office of a telecom adjudicator. So that is a special agency which sits below Ofcom, which is separate and independent of Ofcom, which is designed to work with Openreach and its customers to drive service performance to avoid Ofcom getting drawn into the detail. If you haven't already, it might be worth having a look at the way the office of the telecom adjudicator has taken some of the burden away from the regulator, and that system works well I think, because there is a cultural imperative for people to try and agree that once you get the process up and running, if you get the people in the room and say we need to improve these metrics, and you get operational network people in on this,

focused on solving problems; get it away from the commercial and regulatory and legal people and say, we just want to make this best for consumers. Often the network people are quite responsive to that and quite interested in doing that. And if you can get them with their counterparts in saying that, look -- here's the network guide from that company, work out a way of shifting your customers one to the other -- they will often have a very constructive dialogue. And with the regulator there you can ensure that its operating for consumers. So that's a tool that we have used to get all the parties to the table, and effectively to push them to come up with solutions. And that's worked quite well in particular cases.

Taiwanese man: I just have one last question. Sometimes in Taiwan there is the argument that, if you implement functional separation, then you will raise the cost of communication services nation-wide. Is this right?

I think in theory, it's certainly true that if there is a difference in efficiency between fully integrated supply, and functionally separate supply, those costs are often borne by consumers. That must be right. I think it's a question of static effect vs dynamic effect, and what you gain in terms of enhanced competition downstream, and enhanced innovation. In 2005, the calculation of Ofcom was that the inefficiencies that might be associated with setting up Openreach were far outweighed by the benefits of innovation and the investment in downstream supply. And in particular what we saw was very aggressive entry into the broadband market by people using unbundled local loops, that have created the broadband market that we see today. And Ofcom's diagnosis is that that really wouldn't have happened if we didn't have functional separation in the way that we agreed it with BT. But what happens in terms of if entry isn't very effective, if the technology is such that there isn't really very much going on that you're trying to enhance, then I guess you could have a possible issue. I think the question is, how do you get beyond the theoretical side, that yes there might be some inefficiency, to thinking about how much inefficiency really is there, and if it works.

Taiwanese man: So if the efficiency of competition is good, then it will compensate the costs.

So in the case of BT's functional separation, it was by agreement. So we didn't have to undertake a formal cost-benefit. So when I say "our calculations", what I mean is, we accepted their undertaking on the logical premise that we believed that those downstream benefits would be very large, and that because BT was offering functional separation, we took it that BT's assessment was that the inefficiencies were not huge. We saw some estimates from BT about how much it said functional separation would cost. Eventually BT got to some more realistic figures, and of course we ultimately know how much it costs because it's in the regulated account. What we don't know is how much BT thinks it lost commercially as a result of no longer controlling everything. But of course the point of the exercise is to take those benefits and deliver them via competition to consumers. Thank you very much.