Health, Social Services and Housing Sub-Panel
Telephone Mast Review
Public Meeting

THURSDAY, 15th FEBRUARY 2007

Panel:
Deputy A. Breckon of St. Saviour (Chairman)
Deputy C.H. Egré of St. Peter
Senator B.E. Shenton
Connétable M.K. Jackson of St. Brelade

Witnesses:
Dr. J. Stather
Dr. J. Rubin

Deputy A. Breckon of St. Saviour (Chairman):

Good evening, ladies and gentlemen. Sorry we are a couple of minutes late. We have just been sorting out some of the technical backup. My name is Alan Breckon. I am the Chairman of the main Health, Social Security and Housing Panel and what we have is a sub-panel that was set up to look at and review telephone masts, proliferation of telephone masts, and the sub-panel members are Deputy Collin Egré, Senator Ben Shenton and the Constable of St. Brelade, Mike Jackson. We have 2 guest speakers tonight, Dr. John Stather and Dr. James Rubin. I will say a little bit about those in a moment or 2 and the format is they will speak and do their presentation. At the end of that we will take questions and we will take as many questions as possible from you. This is what it is about. It is about engaging with you, the public. Also we have our 2 Scrutiny Officers there, Carol Le Quesne and Malcolm Orbell. This is part of a process; it is not the end of a process. We have had 2 public meetings already. We have had 5 days of public hearings, the fifth day takes place tomorrow. That is full days or part of days. Our terms of reference, we do have some leaflets at the back. If anybody wants any further information, if you see any Scrutiny Officers, we can provide you with information we have and I would take this opportunity to thank everybody who has contributed. We have about 6 files of information, from 3-line emails to substantive submissions from all over the world in fact. The terms of reference of the Scrutiny Review on telephone masts are that the sub-panel will consider the concerns of the public relating to perceived health implications as a result of the increase in applications for mobile phone mast installations following the recent expansion of the mobile telephony market. In undertaking this review, the sub-panel will have regard to the advice provided by the Health Protection Department, international standards and best practice in respect of health precautions, health concerns raised by the public and reporting its findings and recommendations to the States. Just to say that this evening's proceedings are

being recorded and transcripts of this will be available when processed, probably within the next 7 to 10 days. As I said, this is part of a process not the end of it and we are still gathering information. For your information, there is a hearing taking place in the House of Commons next week. We will arrange to have transcripts of some of that, which I think is 22 February. There is an expert giving advice there. So we are still gathering information and, again, thanks to everybody that has contributed. The first speaker will be Dr. John Stather. Just to tell you a little bit about John, he has a very impressive CV (curriculum vitae), and this will be available after for anybody who wants that, but he is presently Deputy Director of the Radiation Protection Division of the Health Protection Agency, which was formerly the National Radiological Protection Board, and he is responsible for the work in the Physical Dosimetry Occupational Services and Operation Protection Departments. As I say, it is a very impressive CV, assisting others and advising and been involved with all sorts of organisations. Our other speaker is Dr. James Rubin. James has been a researcher of the Institute of Psychiatry since 1999 and was awarded his PhD in Psychology as Applied to Medicine in 2003 for his work in psychological factors affecting recovery from surgery. His research interests have since expanded to encompass the causes and treatment of various modern illnesses that afflict western societies such as electro-sensitivity and multiple chemical sensitivity, the scientific evaluation of complementary and alternative therapies and the psychological impact of terrorism. James is in charge of the day-to-day running of the Mobile Phones Research Unit at King's College London, and is also the co-ordinator for a programme of research into psychological repercussions of the 7th July London bombings. He has recently won the King's College London Young Researcher of the Year Award for his work in these areas and was a finalist for The Times Young Researcher of the Year Award. So we have not, I should say at the outset, planted any people upon you. We had a list of about 30 names and the officers have gone away and researched and what we hope this evening's proceedings will do is stimulate some interest, discussion and debate so that we can process our investigation. That is what it is. It is part of a process. It is not the end of it. We have not made any recommendations. We have not come to any conclusions. So, as it were, everything is still to play for. It is indeed a complex area and for lay people it is not the easiest area to understand, and I include myself in that analysis. So, without any further ado, I would ask John to begin proceedings. There will be an opportunity at the end for people to ask questions of the presentation or anything else that our witnesses may have a particular experience in relating to our inquiry. Thank you.

Dr. J. Stather:

Okay. Thank you. This is not a mobile phone. It looks about as tricky to use as a mobile phone. I will do my best and hope I do not go wrong. Anyway, I am pleased to be here to talk to you about some of the work that my organisation has done over the years in relation to mobile phones and base stations; although, in fact, exposures are more from phones than base stations, you know that I am sure. In practice, people are more concerned about the base stations that support the phones. Just a bit about the Health Protection Agency that I work for in the Radiation Protection Division. The Radiation Protection

Division has 3 key functions. They give advice and provide information. We have a website. There is lots of information on the website. We give advice to government, local authorities, anybody who asks us actually, like yourselves this evening. We undertake research to underpin the advice that we give and we provide services. So, for example, we go out and measure exposures of people to base stations or we go out and measure radon in homes. We provide dosimetry services. We provide a whole range of services and that provides a big source of income to the organisation. We provide a lot of publications at a whole range of different levels; obviously to scientific publications, peer review journals, formal advice to the government, and just informational leaflets, and a lot of those you can download off our website if you want to. We cover occupational, public and medical exposure, so the whole range of situations where people can be exposed to radiation of different kinds and different complexities. This is I want to structure the report. First of all, the main thing I am going to talk about is the *Stewart Report* and what has happened to the recommendations there. This is the document that some of you, if you are interested in mobile phones and health, may have come across. That was produced in 2000. I was one of the secretaries and this was an independent expert group set up by government. My organisation just serviced the committee. These were independent experts who came together to look at the subject. Some of them have expertise in exposures to electromagnetic fields, radio waves, power frequencies. Others were just good scientists. They did not know anything about it. So it was a good mix of people and there were also lay members. So, some of the background to why that report was set up, then something about the *Stewart Report* itself, the recommendations and what has happened to those recommendations over the succeeding few years, because the report itself came out in 2000. Bill Stewart, who chaired the Stewart Committee, was keen to look in a more formal way at what happened to the recommendations. So, my organisation produced this report, *Mobile Phones and Health 2004*, which came from the board of what was then National Radiological Protection Board with Bill Stewart chairing it, the same person who chaired the *Stewart Report*. I will have covered a lot of those responses to mobile phones and health in what I have said previously and then quite a bit about research reviews, I will skip that, then finally some conclusions. That is, overall, what I am going to be trying to cover. So, first of all, to remind you, we are looking at just a very small piece of the electromagnetic spectrum. There is a pointer here, if you go down to the very high frequency end … You have heard of gamma rays, you have heard of X-rays, X-rays in hospitals; very, very high frequencies, very short wavelength. We know these can do severe damage to tissues if you get radiated in significant amounts, by ionising radiation we call them. We know those radiations can damage the nuclear material themselves, the DNA (Deoxyribonucleic Acid). We know that can cause cancer many years later. Then we have ultraviolet radiation. Well, you know that can cause skin cancer and can cause cataracts. As you get to longer frequencies, but still quite short, visible light, infrared. Then we come to radio frequencies, microwaves, and GSM (Global System for Mobile Communications) mobile phones have frequencies in this band. If you keep on going down to even lower and lower frequencies, finally you get to the frequencies of electromagnetic fields from power lines and there the wavelength is about 3,000 miles. So it is a really big frequency wavelength. So a wide range of different radiations across the MF

(medium frequency) spectrum and how they affect the body depends very much on what the wavelength or frequency is. We say these from ultraviolet radiation knowledge are non-ionising radiation because they do not have the same amount of energy that deposits in tissues as X-rays and gamma rays. They do not have the same capacity to cause damage. So we know ionising radiation can cause cancer but that does not seem to be the case for non-ionising radiation because there does not seem to be enough energy there. We will come back to that. So, how do mobile phones work? I guess most of you know this but it seemed like a good idea to put an illustrative diagram up. The country, in this case Jersey, is divided up into cells, it is a cellular phone system, a cell like this with a base station essentially at the centre. They are not all tidy shapes, of course. They are very irregular shapes but, basically, the country is divided up into cells, so that by each company that provides the service, with a base station at the centre. If you have a phone, then your phone communicates with the base station. It sends out a radio signal that goes into the base station, goes into the network, you end up by talking to the person that you are in communication with who is in communication with another base station, the signal comes back to you. That is the sort of base station most people see and do not like, but of course in recent years we have seen more tinier base stations, simpler base stations, produced. Just a bit about base station characteristics. Now, this is essentially what a base station might look like. You know there is a beam coming out which communicates with a person down here with a phone. The beam is not as tidy as that, with side lobes, but generally the directional beam goes out to a 90 degree or to a segment and will pick up phones and signals from phones. But there is a bigger exposure to distance from the beam than there is near to the beam. Usually the beams would obviously be antennas on a mountain or on top of some structure, a roof or a structure as you can see here. The signals are only about 10 watts per signal and each antenna probably has 8 signals, each producing about 10 watts; so 80 watts maximum. So that is not a great power output of course, and the antennas direct power towards the horizon. As I have said, base stations these days have come simpler. Macrocells as we call them form the main structure of the network. Sometimes they are camouflaged. I understand in Jersey they now clad them in wood but this is one near where I live that has been camouflaged as not a very good pine tree, but anyway a pine tree and this is what you call a lamppost. I guess it is that sort of structure that is clad in wood in Jersey. But not only do we have macrocells which provide the main structure for the network, if there is an area where large numbers of people want to use their phones then the companies have to infill the network. If the company wants to infill the large cells that they have set up they infill with smaller microcells that will also work the same way but they tend to be smaller, less visible, they are mounted on buildings or whatever. Then in other places where you need still more signals then picocells get put up. There is a picocell in a building, it might be in a shopping centre, it could be a railway station, it could be an airport, and the picocells also provide the link for the phones so the phone works and passes a signal into the network. If you are moving, of course, then you are going to be communicating first with one macrocell and then with another macrocell. So what you see is a vehicle that communicates with that cell. As it goes on, it gets passed on to the next cell, the next cell and the next cell. So that is why people, the police for example, know where you are if you are using your mobile phone for nefarious

uses. From this cellular network they can see where the individual is using the phone and you can be tracked by the system. So it is quite a clever system really. Of course, the surrounding base stations will also pick you up to a degree as well, although you probably will not be using that one. So they can triangle it and see where you are. Anyway, that is roughly how the system works. So, if you go back to the late 1990s now, 1999, and these are more recent headlines but the same … You know, there were lots of concerns about what exposures from mobile phones can do to you and a whole spectrum of concerns were raised. They can cause either bad skin, they cause cancer, they are linked to Alzheimer's disease, lots of concerns around the UK in terms of where those masts would be placed, some concerns about what the planning situation is; lots of concerns about the location of mobile phones. That resulted in the government -- that is just an overview of what we are in terms of subscription to the phones. In the UK we now have something like 47,000 base stations. So there is pretty much 98 to 99 per cent coverage of the country; 65 million subscribers, that is how the numbers increased through 2005 and I guess in 2006 there is a few more than that; so around 65 million phones in use in the UK. And worldwide, well last year more than three-quarters of a billion phones were sold. That is a huge number of phones being sold. So the Stewart Group was set up by the then Public Health Minister, Tessa Jowell. Sir William Stewart, hence the *Stewart Report*, chaired it. It was set up to look at concerns about the possible health effects from the use of mobile phones, base stations, transmitters - obviously there were other things that transmit radio waves - to look at the information available, to give advice on the present safety knowledge and to make recommendations for further work. Now, a lot of reviews up to this point had really just reviewed the science and often said: "Well, you know, the science is here, we need to do more research." Bill Stewart was very keen that the group did much more than just review the science. I mean it was a public health issue, a public health concern. He had lay members on the committee that looked at how the media dealt with the issue and he held open meetings around the country, England, Ireland, Northern Ireland, Scotland and Wales, to look at what people's concerns were. So the final report, while it did review the science, and I will mention that briefly, also looked at and made many recommendations about how government, local authorities and the industry, could deal with the issue better. And I sat into the Scrutiny Committee meeting this afternoon and some of the issues that were raised in those open meetings were not too different from the issues you are talking about today at the Scrutiny Committee. Some of the recommendations and how they have been dealt with are issues that you might like to think about in terms of how you deal with the issue in Jersey. So this was the report and I do not need to belabour the point. First of all, it reviewed the scientific evidence as I have said, epidemiology, human health studies, experimental studies in animals, cellular studies, dosimetry, the science, basically. It called 30 experts to come and give evidence across a whole spectrum. There were scientists who were involved in the work, people who had concerns about it, a range of different opinions. If you look at the *Stewart Report* you will see summaries of the evidence that was provided by different people. As I said, they were open meetings and how the media dealt with the issue was also covered in a pretty comprehensive way. So, what are the long term effects of radiation? I showed you this electromagnetic spectrum and I said that ionising radiation, X-rays and

gamma rays, are rather different in the way they interact with the body compared with non-ionising radiation. So we know ionising radiation, X-rays, gamma rays and alpha particles, which is from polonium ... You all heard about polonium during December, did you? I spent most of December working on polonium. Anyway, they can all damage DNA of cells directly and initiate cancer. They have a lot of energy, they cause ionisations, they damage the DNA, the nuclear material, and we know they can go on to cause cancer. We know that from animal studies, epidemiology, cellular studies and so on. From non-ionising radiation, either power frequencies or radio waves, radio frequencies if you like from phones, they do not have the same energy. They cannot damage DNA directly and so initiate cancer. There is the possibility that there could be interactions. You know, if a tumour has been formed from some other reason, a chemical, maybe the non-ionising radiation could promote the rate at which the cancer starts to develop in the site, and there could possibly be other effects. So these are things that, on the whole, people have been interested in for the last 10 years, I guess, really. But obviously a lot of research is still going on. So these were conclusions on the science in the *Stewart Report*. Exposure to radio frequency radiation below guidelines - I will come to guidelines shortly - but do not cause adverse health effects to the general population - some evidence which suggests there may be biological effects carrying beneath guidelines. Now, biological effects are not necessarily health effects. I do not know if my visual aid will work but, anyway, you can all see that light, can you? You can see that light because it is a biological effect. You realise that. But you would not call it a health effect, would you? If you had a meal before you came out, I mean the levels of hormones, nutrients, circulating in your blood would be quite different to what they would have been before the meal. That is a biological effect but it is not a health effect. So, while you might think radio waves could cause some biological effects and you can sometimes believe you detect those, they are not necessarily health effects. That is the third line. However, because some effects had been noted in cells in culture, some effects on brain function in volunteer studies, which suggested an improved performance rather than a reduced performance, some other effects, the group felt there was enough to justify a precautionary approach to the use of this new developing technology. This was in 2000. I think 2 years ago they would have said the same, until we got much more scientifically robust information available. What was obvious from the open meetings that they held, people were just worried about base stations. I mean, there were people who stood up at all the open meetings and said: "I have a base station. I know it is affecting me." They were clearly just worried about it and, whether there was a direct effect of the radiation or not, if people are worried about it, that is going to affect their well-being and can affect their health. So there are issues there that the Stewart Group felt they needed to deal with as well and it was quite clear that the one clear effect of mobile phones was that they would affect the way you drive. There was something like a 4-fold increase in the risk of running into the back of the car in front of you if you were on the phone while you were driving a car. So that was the one clear health effect and, of course, there has been legislation in the UK since the report came out to do things about driving and to discourage people from phoning and driving at the same time, and now you are going to get points off your licence as of the beginning of this year, I think, provided the police enforce it, of course. There has been a lot of concern

about whether radio waves, exposure to radio waves, can cause cancer at whatever level. I have said the evidence really does not suggest that and this really summarises what is said in the report. Experimental evidence, epidemiological evidence, does not really suggest RF (radio frequency) exposure causes cancer. They do not cause cells to mutate. They do not cause tumours to be promoted in any clear, obvious way. There were some questions this afternoon about work by Henry Lai. I looked it up in the half hour before I came over here. Henry Lai did some work in the States looking at damaged DNA and suggested there was an effect but when the Stewart Group looked at that, I mean, they said that the high levels that they found in the experimental cells were also found in the control cells. There were some problems with the experimental design and when those were repeated they were not able to reproduce the results obtained by Henry Lai. So there is some evidence, and I can point to other studies where people do suggest that they have found something. Often the studies have not been well designed but I think you have to look at the totality of the information that is available and that is what the expert group tried to do in putting the *Stewart Report* together, not just look at one or 2 studies that were suggested but look at the whole range of studies that had been carried out. Cannot exclude the possibility of association between mobile phones and the risk of cancer. You know, people have been using phones in large numbers for only a short period of time. There must remain the possibility, although the science does not support it, that there could be something there. So it is important to do long term follow up studies on people and that is being carried out in a number of different countries, a number of different studies. Continued research is necessary. Well, you might expect that from a review of research but that was not all that was done in the report. There has certainly been a lot of concern about exposure of children. It may have been in Jersey, I do not know, but certainly throughout England, Ireland, Northern Ireland, Scotland and Wales there has been. What they are saying in the report is: "If there are unrecognised health effects, children may be more vulnerable," for the reasons there. They have a developing nervous system, they have a longer life, possibly, not for sure but possibly, greater absorption in the tissue of the head, it is a smaller head. So there were a number of concerns like if there was a population at risk then maybe it would be children rather than adults. So the recommendations covered 5 areas; advice to the government, industry, something on research, need for better public information and the relevant NRPB (National Radiological Protection Board). They were quite hard hitting about NRPB and I guess … Up to 2000 we got a website but it was really geared to a, sort of, scientific and technical audience, much more than to the public. So one of the recommendations was to do much more about providing information to the public about a range of technologies and a range of radiations, not just mobile phone radiation, of course, but ionising radiation, power frequencies and so on. So if you look at our website now, it is under the HPA (Health Protection Agency) banner now of course, you will find a lot of information geared to the public as well as other information geared to government or to scientist level. So I am not going to say too much about the NRPB but a bit about the others. Exposure guidelines. I am interested in the exposure guidelines area. Well, the basis of guidelines is, first of all, you have to comprehensively review the science to look at what the clear effects of different sorts of radiation are. You must prevent any established health effects. The

guidelines that are recommended now by ICNIRP (International Commission on Non-Ionising Radiation Protection) are based on exposure of people. They are not about emissions from equipment. There are other standards for that. ICNIRP guidelines are about exposure of people and they are consistent with the scientific knowledge. So exposure guidelines for radio waves from mobile phones are based on heating affects, because we know if you heat tissue too much it will cause damage. You know, putting a phone to your head or being exposed to high levels of radio waves, it will heat the body and that can cause damage. So that is what the guidelines are based on, have the whole body area localised. The recommendation in the *Stewart Report* is that the ICNIRP guidelines should be adopted across the UK. Now, prior to that, there had been a single set of guidelines that applied both to workers and to the public and I think NRPB rather set those with a view that if you were protecting the workers you would also be protecting the public, but I think ICNIRP had looked at it rather differently. They said that among the public as a whole there may be groups of people who are more sensitive to radiation than people who work and have medical follow up. So the ICNIRP guidelines are lower by a factor of 5 than those for workers. So the government agree that, in line with the recommended precautionary approach, the ICNIRP guidelines for the public should be adopted in the UK and that is what is done in Jersey, of course, as well. Then in 2004, NRPB comprehensively looked at guidelines and the science underpinning them and there was certainly some evidence that members of the public could be, for some reasons, rather more sensitive to radiation than workers, so we went along with that and applied it to power frequencies as well. I think I have covered that factor of 5 reduction for the public compared with workers and that was part of the precautionary approach that was recommended in the *Stewart Report*. These are the SAR (specific absorption rate) values. I do not need to go into it in great detail but obviously if the whole body is being exposed to radio waves it can cope with the heating effect less well than if just a part of the body is being exposed. So, basically, for workers the values are higher than for the public, and for the whole body the exposure lower than head and trunk or limbs. So if you are concerned about using a phone, then these are the guidelines that you would use. If you are concerned about whole body exposure, as from a base station, then these are the guidelines that you would use. You can see these are much lower than these. I will, in due course, mention SAR from phones, which is a way of saying how much you are exposed to when you are using a phone. The yardstick for comparison is there are 2 watts per kilogram and if you look in a box now with a phone in it, look at the booklet, you will find out the SAR value of your phone, which really should be compared with this value of 2, and often it is 1 or 0.5 or 0.35, and if you are looking for a low SAR phone, so you have a low exposure, the lower that number the better. So what the Stewart Group did is looked at what information was available on exposures of people to phones and exposures of people to base stations, and all the evidence that was available in 2000 was that exposures of people to radio waves from base stations was really very small fractions of guidelines for phones, well, not quite as low, but certainly all the phones complied with the guidelines for the public, they were low by a factor of 2 or 3 or so. They looked at some measurements that my organisation had done. Not very many, 17 base stations as you can see, but the mean total exposure was only 18-millionths of the ICNIRP public exposure guidelines.

So you are not talking about 10 per cent or one per cent, you are talking about, really, a small fraction of the exposure guidelines. The maximum was 0.2 per cent effectively of the ICNIRP guidelines. So the conclusion on exposures from base stations was that the balance of evidence indicates there is no general risk to the health of people living near to base stations on the basis that exposures are expected to be small fractions of guidelines. But there was the concern that if people are worried about them, do not understand why they are being sited there, have not had an opportunity to be consulted, just worried about it, they do not know enough about it, then that could affect their well being and that, in itself, could affect their health, regardless of what the exposure level was from the radio waves emanating from the base station. So there were recommendations to government, changes to planning guides for base stations. One of the things that came across in all the open meetings, people would stand up and say: "I went to work one day and I came back in the evening and there was a base station 20 or 30 metres from the bottom of my garden." That really is not acceptable. I mean that clearly happened quite a lot of times. The companies in 1999 and 2000 felt they had a right to put up base stations because they had the licences and they did not really need to consult and they could just put up these base stations. Many times people in the audience said that had happened to them, maybe not overnight but within a couple of days. They found the hole, then they found the base station, and then once it was there it was really difficult to get it shifted. The other thing is, although the companies would always say the base station has complied with the guidelines, ICNIRP guidelines, it was felt it would be really valuable to have an independent random ongoing audit, you know, to just demonstrate and check that the base stations did comply with ICNIRP guidelines and that was a clear recommendation as well. Over the years the Government has changed planning guidance across the country. Scotland and Northern Ireland really have got to have almost full planning permission for base stations. England and Wales, it is not quite full planning but there is a longer consultation period and the companies are obliged to consult much more with local authorities about what they are going to do. It is also up to the local authorities to do something about it and consult with the public if they want to or feel they need to and I think that is patchy across the UK. Ofcom (Office of Communications), they have measured more than 450 base stations. So they have undertaken this, it has not been a completely random audit. They have tended to go to base stations near schools or hospitals and then some general ones as well. So it is an ongoing audit but it is not completely random. But they have been testing base stations to demonstrate that they comply with guidelines and they certainly do, and that information is published on the Ofcom website. In addition, they have put together Sitefinder. So if you go into Sitefinder on the website, if you just type in Sitefinder in Google you will find it, it shows you where all the base stations are around the country and their operating characteristics, if you click on them. So you can find out about base stations in your area if you want to do so. So the information is there and it is readily accessible. For industry, they thought, as the greater exposure was from phones rather than from base stations, what you needed was a way of allowing people to choose a low exposure phone if they wanted to, either for themselves or for their children. To do that properly and scientifically you need a standard method of testing and there was not, at the time, a standard method of testing. There now is. That has

been designed. So all the phones that have been coming on the market for a few years now are tested in a standard way, you get the SAR value for the phone under the standard testing conditions and if you want to, as a parent, you can choose to buy a low exposure phone for your child. I mean the child may want an MP3 player or a different colour, but if you want to choose a low exposure phone then you certainly can do. Sometimes the shops are very helpful, sometimes they are not, but you can get the information if you work at it. Information on the SAR should be readily available. Well, sometimes it is and sometimes it is not. What was the third one? Refrain from promoting the use of mobile phones by children. Well, I think that has happened. I do not think the industry has promoted the phones for the use by children. It has not stopped children getting phones in large numbers but they do tend to text rather than phone. I mean they certainly do phone but, I mean, they tend to text much more than they do phone. It is a question of finance and cost as much as anything else. But I do not think the industry does particular promote children, although in the end probably one in 2 children over 12 has got a phone, maybe a bigger proportion than that now. So we do have SAR for phones widely available. The industry also put together 10 commitments, which they published and they have tried to work to. I will not say it has happened uniformly across the country but the commitments are basically about improving consultation with local people, usually through local authorities, provision of information to local authorities and increased site sharing. I do not think increased site sharing has worked all that well but it has certainly happened to a degree. You have a similar problem in Jersey, I think. If you are going to share a site, which means share a mast, then the sets of antenna from different companies have to be so spaced, you know, 15 feet apart or something, which means it is a more obvious base station and many people do not like that. But, to a degree, in rural areas where it is not a problem they have gone into site sharing. Codes of practice on how to install base stations have been put together, both by the industry, that is this, and by government, code of best practice. It is just looking at how you should work with local authorities and local people in terms of looking for sites that suit most people most of the time. I mean, you will never get a site that suits everybody but if the industry comes up with a site that is very near a housing estate, for example, and they could just as easily have put one 100 metres away, it would be better to put it 100 metres away. You know, if people are worried about them put them somewhere different. So I think there is a lot in the advice from government about looking for sensitive sites, if you like, that people do not worry about so much. Whether or not there is a direct effect is one thing but certainly you can do things to more sensitively site where base stations go. This is being revised by government at present but I think it might take another year or so before that happens. Then research. Of course, a report that spends half its time reviewing research is inevitably going to come with further things that need doing. I was saying this afternoon that one of the problems with much of the research that was done prior to 2000, or even 2002/2003, around the world was often it was very good biology, good experimental system by biologists who understood what the system was, but the exposure system, the dosimetry, the physics if you like, was very badly done. Or there would be a very fancy dosimetry system, so you would know what the exposure was but there were not biologists working in tandem with it that could do a good experimental design, you know, the right strain of animal or cells or whatever.

So there is a need to do good quality, experimental work. So things that were included were, you know, more work on brain function. I mentioned earlier on that there were some studies that suggested there could be affects on brain function so that needed to be reproduced. You know, radio waves could interfere with brain function and change it but the studies had suggested an improved performance rather than a reduction. But the group was concerned that if there can be some effect and if it could go one way, it could go another, something about exposure to pulse signals. There was lots of debate about whether pulsing of signals could have some different effect. Looking at dosimetry. Cellular, working with cells in culture, look at what damage might be, psychological and sociological studies. Well, you will hear something about that later. Also, to continue with some improved epidemiology studies, looking at human health basically, so research priority. The Government in 2000 set up the Mobile Telecommunications and Health Research Programme, funded it with about £7.4 million. Subsequently a bit more money came into the system, funded partly by government, about 50 per cent by government and 50 per cent by industry but the main point ... I mean people, maybe you, could say: "If it is funded by industry, it cannot be good research." Well, it can be good research. Industry should fund research but it is important that the control of the research does not have anything to do with the industry. There is a programme management committee set up which sort of provided the barrier, if you like, between the research scientists on one hand and the funding on the other to stop government or industry being involved or tampering, if you like, with the research. I think the programme management committee had a key role to play in bringing together the researchers and making sure good quality research was done of the kind I talked about; good science involving good biology, good epidemiology and good dosimetry as well. The programme started in 2001 and there were 28 studies. A few more have been done since. It is now coming to an end and what I hope we will see in the next 5 months or so is an overview of the research programme, what has been found. There should be another programme carrying on from it but we expect to see the programme to end around now, except for the epidemiology. Epidemiology always takes a long time. Government wanted a leaflet to go around to every home in the country summarising results of the report, if you like. I think the Government chose not to do that, that was going to be quite a lot of leaflets, but in the end they produced about 9 million leaflets. We have them here; one about base stations, one about phones and really covering the essence of the conclusions about those, 2 halves of the issue, and we expect a revision in 2007, once this review of the mobile phones research programme comes out. They also asked for a further review of the scientific evidence in 3 years. Government asked my organisation as it was then, NRPB, to carry out the research and we asked our independent advisory group to do that, and that was completed at the end of 2003. So the overall conclusions in the *Stewart Report*, if you want one take home message, the balance of evidence to date suggests that exposures to RF radiation below, let us say ICNIRP guidelines, does not cause adverse health effects to the general population. There was no really clear evidence at all that beneath guidelines there was any clear effect on health but a need to do more research, as you have seen. I just thought you might be interested to see this. I put this together a couple of days ago. The *Stewart Report* is on the website, if you want to look at it that is the address. Up to January this year it

had just over 3 million hits. The really interesting thing for me is that the hit rate has not changed that much over all these years. That large number of hits, about 60,000 was the day the report came out, and you might have expected, as with any information that goes on a website, the numbers would fall away very quickly. It just did not really happen. It is tailing away slightly but not that fast. So, it is still about just under 20,000 hits a month. That is a lot of hits. I think it demonstrates the fact that people see this as really being a report that treated the issue very differently. The recommendations were important because they talked to the public, they talked to experts, they talked to a whole range of people and they had not just reviewed the science, and they had broadly made recommendations that looked at how government, if you like, and others should address the issue for the future, and that is really what has been done in recent years. My organisation looked at what science had been published in the following 3 years. Well, really, things had not changed very much. Some more research had been carried out. Really still no evidence of health effects beneath exposure guidelines, still the research has limitations because of the short period of use and continued research needed. I mean, it was a fairly substantial report, it covered a lot of papers, but in the end that is really what the conclusions boiled down to. There is no point in me spending a lot of time going through science when the essence of the conclusions were not really that different to the *Stewart Report*. We produced a video explaining the technology, summarising some of the key results and members of the *Stewart Report* were interviewed, and they are on camera, and we distributed that to local authorities around the UK. If you want one, I can send you one. There were also lots of reviews in other countries. I mean the World Health Organisation is an international organisation. ICNIRP looked at it, it is not there. UK, Canada, US, France, Sweden, but really all the conclusions in all these reviews by all the different organisations and different people came to essentially the same conclusions; the sort of precautionary approach recommended for children was not really taken up by all these. I mean in Holland, I think the feeling in their report from the Health Council was that maybe it was a bit over the top. There was no evidence that would suggest there may be concerns and there may be affects on children. Well, I think the *Stewart Report* said essentially the same but also said, if there was a sensitive group in the population it was more likely to be children than anybody else. So, hence the advice they gave. Then 2 years ago, *Mobile Phones and Health 2004*. Bill Stewart was very keen to look at what had happened to the recommendations in the *Stewart Report*. So that report really looks at the things I have talked about; what the recommendations were and how government, industry and others had dealt with all those different recommendations and there were, in total, about 36 recommendations. I think most of them had been dealt with in one way or another. There were a few - you can ask me later if you like - that had not been dealt with but most of the key ones certainly had been looked at. But this was the reason for looking at the review. Rapidly developing technology, still some studies suggesting RF fields can cause biological systems. Not possible, even today, to have got results from long term epidemiology. That will have to continue. There was a study in Holland that suggested there may be affects of GSM signals on brain function; that is being looked at by the MTHR (Mobile Telecommunications and Health Research) programme but Holland does not really think there is much substance in the conclusions of

that study. So they have looked at what has been done in their country. Sir William has been very concerned about whether, within any population, there could be some individuals who are particularly sensitive to radio wave exposure. You will be hearing about that later. The issue of children and concerns about well-being, I have already covered that. I should say that report was produced by Bill Stewart who was, at that point, chairman of our board, the board of NRPB, and it was produced by him and his board, basically, looking at how things have been dealt with. So, development of use of mobile phones has not been associated with clearly established health effects. Lack of hard information; the lack of hard information sentence has been pretty widely quoted, showing that mobile phone systems are damaging to health. Nevertheless, widespread use of mobile phones is recent and technology continues to develop so ... But exposures from base stations, because now we have information not just on a few tens of base stations but hundreds of base stations, and all the evidence really demonstrates that exposures of people, where they are, are small fractions of guidelines. If somebody gets on a roof and gets very near a base station then it can approach or exceed guidelines but where people are or children are in playgrounds, all the measurements demonstrate very small fractions of exposure guidelines, like 100-thousandth of exposure guidelines; very small fractions. Still, some studies which suggest RF fields can interfere with biological systems but not health effects as such, and we need to extend the epidemiology studies looking at long term health effects. I think the conclusions we have really covered. These are some recommendations. Further improvements in the information to public still needed. So although information was getting out better to the public, there was still more that could be done. For example, SARs for phones from the industry, if you wanted to choose a low exposure phone, in 2004 it was still difficult to go into a shop and get comparative information on SAR. You could drill down and open the box and find out about a phone but to get comparative data was difficult. It has become better and some companies are more effective than others. The chairman still felt, you know, the advice to children should be to limit their use. Well, comparisons of SARs I have talked about. Clear planning advice needed. Well, I think planning has improved and it has continued to improve. One of the difficulties in England and Wales is that planning authorities just have an awful lot to do and they do not have as much time as maybe they should to look at the proposals to where base stations might go. In some parts of the country it works very well, in other parts less well. I have covered driving, I will not cover it again, and they felt if there was going to be any further research then it clearly needed to be prioritised. I am coming to an end. If children are going to reduce their exposure there are many things that you can do, not just choose a phone with low SAR; essential calls only, limit call length, use text messaging, which they tend to do anyway as we have said, use a fixed line phone. So there are many things you can do to reduce exposure, if you want to, and that is really the parent's choice. You know, government is not going to do anything about that; it cannot do anything about it. It is really up to the parents to decide, you know, about how children use their phones. I do not need to read these out, do I? I think I have essentially covered them as I have been going through it. No evidence of health effects based on totality of the evidence, only limited information though to assess long term health effects. Precautionary approach until more information is available. Good quality

information for the public, and that is the website where you can find a lot of information that we put on relative to providing public information. For the future; well there have been quite a number of small epidemiology studies published looking at mobile phone use and effects on health. As an organisation we have not really commented on those because each one on its own is pretty small in terms of the power to detect whether there is an effect or not. But there is ... From the International Agency for Research in Cancer (IARC) they are going to pool about 13 different studies and we expect that result to be published this year. That should have a lot more power to see whether there is or is not an effect and I am sure, when that comes out, we will comment on it. The research by the Mobile Telecoms Health Research Programme, there should be a summary of that research published, you know, early this summer this year and then we might hear there will be an extension with a prioritised list of research projects for the future. I think that is probably it.

Deputy A. Breckon:
Thank you, Doctor. What we do propose is for James to do his presentation and then we will ask questions at the end. Okay, thank you for that.

Dr. J. Rubin:
Right, thank you. My name is James Rubin. I am a lecturer at King's College London. I am a psychologist by training and my area of expertise in this field is looking at the short term health effects of mobile phones, and I will come onto why a psychologist is studying this later. What I thought I would like to do first, the idea behind my presentation is really to give you a flavour of the kind of research that has been done in this area, talk about some of the observational studies and the experimental work and try and give you an idea of where the current science stands with regards to what the short term health effects might be. Before I do, I just wanted to read out a couple of press cutting that will give you an idea of the kind of symptoms that we are talking about. These were all taken from the *National Press* in the UK and I have anonymised them by taking out the names of the people involved. The first one is from *News of the World*, 30 May 2004: "Farmer X puts a silver-plated mesh on his head when he strides off to work and in the middle of the night he gets up and drives away from home to sleep in his 4 by 4 vehicle. He claims a mobile phone mast on his land in Tipperary, is giving him headaches, nosebleeds, dizzy spells and burning sensations. Mr. X says: 'As soon as the mast went up I started to feel the effects. After putting serious pressure on Vodafone it was switched off for 3 weeks and everything was fine but the minute it was switched back on, my symptoms returned.'" Next one, from *The Express*: "A woman claims she lost her hair, developed palpitations, burning skin and headaches from mobile mast emissions. Mrs. X from Totnes, Devon, says her symptoms started 4 years ago when the family moved into a flat in the town, 800 metres from a mast. She said: 'I got a burning pain on my head, then my clothes and my hair became static.' She had no other explanation for the symptoms but locals dismissed her worries. Her condition worsened and she had heart palpitations, burning skin and hair loss. She said: 'My heart beat so much I thought I was having a heart attack.' She

refused to go back into the flat and the family, including a daughter, 6, a son, 4, and her husband, camped in a field for 3 months until they found somewhere else to live. Since then Mrs. X's symptoms have improved." So, clearly these are serious conditions. These have genuine health effects and there are 2 points I want to make about these 2 case studies because they illustrate the kind of symptoms that I am talking about. The first point to make is that the symptoms are what we call non-specific. By that I mean that they occur following on from lots of different conditions. To give you a counter example, if you go to your doctor complaining of a tightness in your chest and shooting pains down your arm, that is a fairly specific set of symptoms and it indicates that you are having a heart attack. If you go to your doctor complaining of a headache and fatigue, there are lots of different conditions that might result in that, hence the term "non-specific". The other point I want to make about these kinds of symptoms is they are quite common in society. I would hope that most of you will be able to go through the next year without experiencing chest pains and shooting pains down your arms. If a lot of you manage to make it through the next year without experiencing a headache or without experiencing fatigue I would be surprised and you are probably far healthier than the majority of the population. Now, those 2 facts make it difficult for us to conduct studies to look at whether mobile phone mast emissions are genuinely causing these kinds of symptoms and there are 2 basic study designs to tell if they are. The first is observational studies and the other is experimental studies. Observational studies, as they sound, involve the researchers simply observing what is going on in the world without trying to intervene in it. So he may come into your house and try and take measurements of the strength of mobile phone mast emissions in your bedroom, give you a questionnaire to fill out about how you are feeling, do that on a large sample of people and see if there is any kind of association. Experimental studies on the other hand; researchers might invite you into their laboratory, they might expose you deliberately to the mobile phone signal or to nothing at all, and look at whether the 2 things cause different effects. I would like to give you an idea of both of those kinds of studies. Starting off with the observational ones that have been done, looking at mobile phone masts and symptoms. When I was putting this talk together I was trying to find a list of the various mobile phone mast observational studies that have been done, that have looked specifically at these short term symptoms, and I found various websites, normally kind of activist websites, campaigning websites, that gave me a list that might help. This was the list I came out with. Whoever put this list of studies together was very helpful and highlighted in red the studies that show a correlation between mobile phone masts and symptoms and in green the studies that do not show an effect. But when I saw this list I was quite surprised because there are some of those studied I had never come across before. So I went scurrying off to the library, I dug out the papers, and I had a look at them and I can tell you straight away that 3 of those studies from the list do not concern us. Two of them do not measure health effects from mobile phone masts at all. In fact, what they measure are whether people think that mobile phone masts are risky. Obviously that is a separate matter. To give you an idea, one of these studies looked at whether people think that air travel is risky and obviously most of the people who ticked "Yes," they think air travel is risky, probably have not been involved in a mid-air collision. The other study, the third one that I do not think we need to

talk about, is this middle one, the 20:01:03 (inaudible) 2004 paper and that is because I suspect it is a review paper. I say "suspect" because it is actually written in Polish so is a little difficult to tell, but the title says it is a review paper when it is translated into English, the title, and so I do not think we need to consider that one. That still leaves us with a list of 4 that I have drawn from these activist websites that I would like to look at. You will notice that all 4 are in red. If we look at the first one, this is a study by Santini, 2003, and this is typical of the kind of observational study that has been done on this area. What Santini did was send out some questionnaires to a batch of people and the questionnaires asked 2 things. They asked, first of all: "How far away do you live from a mobile phone mast?" Secondly: "Have you been experiencing any [out of a list of I think it was about 20 symptoms] recently?" When the results came back and they plugged them into the computer, they found there was an association. The closer people said they lived to a mobile phone mast, the more symptoms they said they were experiencing, which seems fairly cut and dried until you consider this question. Do people know how far away they live from a mobile phone mast? Now, if I ask you, I would imagine the answer is probably yes and the answer is probably yes because you are concerned about it, that is why you are in this room. But does Joe Bloggs on the street know how far he lives from a mast? This is an issue that was looked at in another paper recently by some colleagues of ours at the University of Essex. They did fundamentally the same thing. They sent out these questionnaires, they asked whether people had been experiencing symptoms recently. They asked how far they thought they lived from a mobile phone mast and they asked what their postcode was. By plugging the postcode into the Sitefinder website we have heard about earlier, first of all they found, as with Santini, that people who experienced symptoms thought they lived nearer to a mobile phone mast than people without symptoms. But by looking at their postcodes, it turns out that was not the case. People with symptoms lived just as far from mobile phone masts as people without symptoms. The difference occurs because people without symptoms under-estimate how far they are from a mast. They are not concerned about it so they do not pay attention to where the local mast is. Navarro, the next paper on the 4 that we saw that were in red, did a similar kind of thing. Again, you look at how far away someone lives from a mast and you ask them: "How many symptoms they have been experiencing?" Here they divide them into 2 groups; people who live more than 250 metres away or people who live closer than 150 metres. Again, they found a similar kind of thing, that people who lived closer reported more symptoms. This had a slight difference in the design. They went into the bedrooms of these people, took some measurements and thought they found that they were slightly higher readings in the people who said they lived nearer than in the people who said they lived further away. But there is a problem here. Are there no other differences between people who live near to a mast and people who live further away from a mast that might explain why one group suffers worse health than the other? Where I live in London, mobile phone masts are normally erected on tall buildings, typically on top of council blocks. So people who live closer to a mast tend to be council flat residents. People who live further away have a greater tendency to own their own property. So, you see a difference between these groups in terms of simple wealth. One group tends to be richer than the other. We know there is copious evidence that people who are richer tend to have better health; they

have better diet, they tend to smoke less, they have better access to health care systems. So you have to question whether, in these kinds of studies, there might be any other differences between the 2 groups that might explain the health effects and I think there is a genuine possibility that that might be what this group is observing. The next study on the list, the third study, took a slightly different approach. This time they looked at people who lived directly underneath a mobile phone mast and compared them to people who lived over 2 kilometres away and the mast in question was the first ever mobile phone mast to be erected in this district in Egypt. What they saw, again, is people who lived directly under the mast tend to report more symptoms than people who live further away. Again, though, you have to question is this because of the emissions from the mast or is there something else going on? Consider that this is the first mast to ever be erected in this part of Egypt. The researchers themselves noted that people were quite anxious about it. We know from copious studies that anxiety goes hand-in-hand with genuine physical symptoms. You know yourselves that when you are under stress you tend to be more tired, you tend to experience more headaches, you become shaky. Are the access symptoms that these researchers are noticing because of that anxiety, because after all these people are underneath the first ever mobile phone mast to be erected in that area, or are they because of the emissions? Both are plausible. I would say that the anxiety explanation is more plausible. The final study on this list of 4 is the most recent one, this study by Hutter. Hutter talked his way into the bedrooms of 300 people, which is quite a feat in itself, and he took field measurements within their bedrooms. He then asked them to fill out questionnaires; again: "Are you experiencing any of this list of symptoms?" He correlated the 2 together and what he noticed was that, for most of the symptoms, there were no associations whatsoever to be seen. But for some very specific ones, headaches, cold hands or feet and difficulty concentrating, the higher the mobile phone mast readings were in their bedroom, the more of these symptoms people seemed to experience. But there is an important problem with this. The problem relates to the statistics that were involved. If you consider the kind of statistical tests that people are doing here it is equivalent to rolling a dice, essentially. You roll a dice and your lucky number is 6 and it comes up 6, you roll it again and it comes up 6 again, you might be quite impressed. If you roll 100 dice and 2 of them come up 6, you are less impressed. What Hutter has done is he has done lots of different significance tests, statistical tests, and some of them have come up positive but what he needs to do is take into account the fact that he is looking at lots of different things and only a couple have shown up a significant effect. As they themselves admit: "We did not correct for the fact that we did lots of different tests." When other people go back and look at his data again and they do correct for the fact that he has done so many tests, they say that there are no effects to be found whatsoever in this data. So where are we with these observational studies? Well, we knocked out 3 straight away as not being relevant to us. For 3 more, I think there are serious problems with the way these studies have been designed. It is quite tricky to do this kind of research properly and I am not sure these have been done properly. For the final one, when you reanalyse it using proper statistics, more appropriate statistics, it turns from a red study into a green study. They did not find any effects. Of course, there was the extra study I mentioned that was not on the list originally, looking at people's postcodes; again, a green study that has not found an effect. So,

although the list originally that I drew from this website looked quite alarming, when you go through it in detail it is not as alarming as it first seems. The other thing you can do, the way to get around all these problems that observational studies have got, is to do experiments. I did an experiment with some colleagues from King's College London looking at whether mobile phone signals can cause headaches and this was research that was funded under the MTHR programme that you heard about earlier. What we did is we took a group of 60 people, all of whom reported that mobile phones -- when they used a mobile phone they got a headache and they reported that that headache came on very quickly. It tended to happen within, on average, 7 minutes of starting a mobile phone call, and all of them were certain that it was the mobile phone signal that was causing their headaches. So what we did is we got their permission to test them. We got them into our lab on 3 separate occasions. On one occasion we exposed them to a genuine mobile phone signal, on one occasion to a signal that was like a mobile phone signal but did not have the same kind of pulsing characteristic and on one occasion to a condition, so no mobile phone signal was present. The order in which those 3 conditions occurred for each of our volunteers was determined randomly - some people got them shammed, then pulsing, then non-pulsing and some people got them in the opposite order. We juggled it about. Importantly, the study is also double blind so we did not tell the volunteers which session which was and, in fact, the researchers themselves did not know which session was which. Here is a picture of my research assistant wearing our mobile phone setup. What we saw when we unblinded the results was, first of all, that our volunteers were very confident that they could tell the difference between the 3 sessions we were using. They thought that they were able to detect quite confidently which session was emitting a signal and which was not. We also saw that volunteers were experiencing quite severe symptoms during the study. In fact, some of them were so severe that we had to halt the experiment early for them. However, when you unblind it those symptoms were just as likely to occur in the sham setting as in the genuine setting. Also, although people thought they could tell the difference, they were just as likely to think that the sham setting was emitting something as the genuine settings. So although these effects were real, they were genuine physical symptoms and they caused real distress to people and real discomfort, they did not seem to have been caused by the mobile phone signals. Instead, what we suspect was going on was something akin to the placebo response where people became anxious about the kind of effects they might experience and they expected to experience some effects and those 2 things became a, kind of, self fulfilling prophecy. Now, it is important that you do not just take my word for this. Ours is not the only study to have done this. In fact, there are all these studies as well. In total, some of them have looked at handsets, some have looked at masts and all of them exposing people to either a genuine field or a sham field. In total, they show a similar kind of thing; people do react in these experiments and they do experience genuine symptoms but those are just as likely to occur in the sham setting as in the real setting. It is not just mobile phone signals that have been looked at in this way; people report being sensitive to all sorts of different devices. Some people report that when they use a computer they get these kind of symptoms or when they are near an overhead power line or a hair dryer or a microwave oven or a television set. These studies have replicated what we have done -

obviously they came first so we have replicated them - looking to see whether those kind of electrical fields trigger off those symptoms. The overall result is that they do not seem to. We produced a review paper on this in 2005 evaluating all the evidence contained within these experiments and the basic conclusion was that out of those 36 experiments that have been done, we could not find any robust evidence that the electromagnetic fields were what were responsible for triggering off these symptoms. This is our overall conclusion. The systematic review could find no robust evidence to support the existence of a biophysical sensitivity to electromagnetic fields. Again, it is not just our review that has come to that conclusion; other people have reviewed this literature as well - this is the World Health Organisation's results. The majority of studies indicate that people who think they are sensitive to electromagnetic fields cannot detect electromagnetic fields any more accurately than people who do not think they are sensitive to them. Well controlled and conducted double blind studies have shown that symptoms are not correlated with exposure to electromagnetic fields. There is no scientific basis to link these symptoms to EMF (electromagnetic field) exposure. The European Commission as well; this is the preliminary conclusion from one of their reports: "The scientific studies so far have failed to provide support for a relationship between RF exposure [that is Radio Frequency] and symptoms. Present knowledge suggests that symptoms are not correlated with RF field exposure." So to conclude my bit of this, I think the message I would like to take home is that these symptoms are genuine. They are real physical symptoms and as the case study showed they present real problems for people like the lady who had to camp in a field with her family to try and get away from the emissions or the farmer who has to wear a silver plated mesh on his head. Obviously these symptoms are causing real disability and real distress, but when you test them in a laboratory they do not seem to be caused by electromagnetic fields. Obviously, that leaves the question open, well, what is causing these symptoms if it is not the electromagnetic fields? One possibility is that there is some kind of psychology mechanism going on. As I have said, we well know that anxiety can cause genuine physical symptoms. Another possibility is that it may be something else that is causing the problem. Various studies that have looked at these people in detail have found that somewhere between about 13 per cent and 40 per cent of them are experiencing some other chronic medical illness that might be the cause of their symptoms and that if we treat that illness hopefully the people may get better. For some, the honest answer is that we simply do not know what is causing their symptoms. All we can say is that the evidence to date suggests it is probably not electromagnetic fields. Thank you.

Deputy A. Breckon:

Thank you to our 2 speakers, Dr. James Stather and Dr. James Rubin. I would say if anybody requires a copy of the slides for their own information, please give your names to the Scrutiny Officer and we can arrange that and also any of the papers that were mentioned. If anybody wants any further information, again if you give your name to the officers we will ensure that you get those because part of the process is for you to share the information that we have got. The floor is open to questions if anybody wishes to ask a question to either or both of our distinguished guests. Hopefully we will take as many questions as

possible. Please can you give your name for the benefit of the tape and we have a roving microphone as well if you wait until the microphone comes to you.

Ms. C. Garnier:

My name is Christine Garnier. You were talking about short term effect. I live in a council house - thank you very much - but that aside we live in a very small place and I have cordless telephones and I have had them for 18 months without a problem. Then I started to get a lot of pressure headaches, and a bit earlier than me my son had started having really bad sleeping problems and he did not like coming home in the afternoons. He used to say that coming home made him feel ill for no specific reason or anything. He could not eat his breakfast in the morning. I could find no cause. I had been to the doctors, I had said to my boss I had been for blood tests but there was absolutely nothing I could find. I went to a meeting about masts. I knew nothing about it and had no concerns. I went on the website and started having a look and I found out that cordless phones were similar to having a mobile mast quite close to where you live so I pulled the phones out. Immediately we felt better. Now you could say that my symptoms were psychosomatic, but my son is 6 years old and he cannot possibly be. Could you explain that to me please?

Dr. J. Rubin:

I am delighted that your symptoms are better and I would not suggest for a moment that they are not real and obviously as you have said, they have caused a major problem for you and for your son. All I would add is that the experiments that we have done cannot find any evidence that it is those phones, as you were saying, or the mobile phone mast that would be responsible for those symptoms. What is, I genuinely do not know. I can hazard a guess that for some people I suspect it is psychological and may have a factor to play in it; for other people there may be some other problem that is going on. In your personal case, I do not know. I am sorry.

Ms. C. Garnier:

See, this is what I mean. I mean it is just -- you are saying you do not know, so you are not saying to me that it could possibly have been the deck phones. To be quite honest with you, I was hoping that they were going to have no effect whatsoever because if you think I have wanted to waste the last few months campaigning about these phone masts, I really have not, but it has become a passion of mine because the change was so fast, and in my child so specific, and the difference is just great, you know. So that is what I would like to say.

Dr. J. Stather:

I do not think I can say any more than James has. I mean, I am pleased the symptoms have gone. I mean, we do have some information on exposures from deck phones and really they are extremely small. I mean, there is no distance at all between the phone and the base station. I mean, it does work in

a similar sort of way although the frequency is different. You know, I do not have an explanation for why you developed symptoms which subsequently went, but I find it hard to think that it was radio frequency or the radiation from the deck phone.

Mr. G. Langley-Smith:

My name is Granville Langley-Smith. I feel your experiments here conclude very little in fact, any more than the experiments the pharmaceuticals companies carry out with regard to placebos. They give placebos and they give genuine tablets to patients and the ones who take the placebos get well just as quickly as the ones that have taken the pharmaceutical drug. What we should be interested in here, and I believe our focus should be, is people who develop symptoms and not being in the knowledge that there has been any phone mast or any increase in EMFs in their area and there are countless examples of this. Now, people are not stupid. They develop symptoms, they go to their doctor, and their doctor does not really know what is going on. He says: "Okay, you may be working too hard; you are getting tired; you are getting nose bleeds." It is all, as you say, very non-specific. It is only later on when they eventually track it down to what is happening, whether the environment they are working in or the environment they are sleeping in, that 2 and 2 are put together. So I do not think these experiments show anything any more than if I put you in a room with a scorpion and one was a false scorpion and then I brought in a real live scorpion but it was asleep and you were absolutely terrified of scorpions, which most of us would be because we know they can kill us, so our heart rate would go up, our stress levels would go up, and it just proves that we are under stress. We know that electromagnetic emissions long term cause electromagnetic stress to the body and the body cannot perceive these emissions, cannot feel them, cannot smell them, but the reaction in the body is just the same and this is my point. Long term, and this is what tends to be case, if we are stressed for long enough our systems break down.

Mr. J. Rubin:

I think there are possibly 2 separate issues to what you are saying. I think in terms of the long term consequences of it, experiments such as the ones that I have discussed are probably not the most appropriate way to test for those kind of long term reactions because obviously if you have somebody in a laboratory you can only measure them for the period of time that they are in the laboratory, and I do not want to keep someone in my lab for 10 years because we do not have space for people. With regards to the short term reactions, we can use those experiments quite well to look at whether those short term reactions are due to radio frequency field exposure and we have not been able to find that evidence that they are. The long term studies, you would need more epidemiological work such as the observation studies I was talking about earlier.

Mr. J. Stather:

I think you said EMFs do stress the body. I think that is an assertion, at least not a fact or not a scientific fact. I mean, it is possible but I do not really think there is the evidence in the way that you suggest it.

You say, you know, somebody suddenly finds there is a base station near where they live and then they develop symptoms. Well, we have made lots of measurements, as has Ofcom, but we have done it in more detail, and whilst if you measure, you know, the exposure of somebody it will often be the case that the exposure from that base station which is the more visible and maybe the more recent one, is quite a lot less than one that is some distance away, maybe 100 or 200 metres away, and has been there for quite some time. It can certainly be that a television transmitter or a radio transmitter can have an even higher signal. So what the person perceives and thinks is the problem in terms of a higher level of exposure may have nothing to do with it all. It could just be something else, but they see a new base station and they attribute their symptoms to that even though the total exposure from that particular base station might be trivial. The total exposure from all the sources will still be much less than the guidelines though that I talked about.

Mr. G. Langley-Smith:
Can I just say that experiments have been done in the past with rats. They are not capable of looking at where the emission is coming from so they are unlikely to have a psychological process.

Mr. J. Stather:
No, of course.

Mr. G. Langley-Smith:
The studies that I have read which have been fairly conclusive, especially Professor Becker, twice nominated for the Nobel Prize, who concluded that from the work done on rats that the body is severely stressed because they all develop tumours in the adrenal glands, the pituitary and the thyroid which is the triad of the stress system in the body, and this was just over a year of being exposed to emissions very much lower than from mobile phones and telephone base stations. This was a long study. So I really do not think rats are going to have a psychological stand point with this and 4 times the number of rats developed tumours of these endocrine organs as did the control group.

Mr. J. Stather:
I do not honestly know of any really well conducted animal study that demonstrates that at such low levels of exposure tumours are induced. I mean, you are obviously going to show me the paper and I am happy to look at it and I will get back to you, but I mean I think, you know, if you look at the totality of the evidence I --

Mr. G. Langley-Smith:
I suggest you have a browse through this book as it has a lot of very good information in it and he is an extremely good author. It is called *Cross Currents*.

Mr. J. Stather:
I am happy to do that.

Ms. M. Melvin:
My name is Marilyn Melvin. I would like to ask the panel if they have heard of the German physicist Fritz-Albert Popp because he has done, along with Robert Becker and Jack Burness - they are all physicist scientists - I am just going to read a few lines from this report and this report is from *Living the Field:* "And they have all experimentally demonstrated that all living things, humans, animal and plants, generate EMFs and that EM signalling is the primary means of communication between cells. A new science of bioelectron magnetics has clearly established that we are fundamentally electromagnetic beings. In this view of the human body the fundamental nature of our being is frequency and exposure to external frequencies from the entire transmission infrastructure of, say, mobile phone technology can cause us to pulse to the wrong beat." I would suggest that is perhaps why that lady's young son and other people do -- are real.

Mr. J. Rubin:
I do not know the specific paper that you are talking about or the specific quotes but we have -- I mean in our study and other studies we looked at the difference between the pulsing signal and a non-pulsing signal; looking to see if the pulsing characteristic had any importance in contributing to those kind of effects, and in our study and others we have not been able to see that effect, to be honest.

Ms. M. Melvin:
It is a scientific fact that -- I have been to the seminars and I have been to Fritz-Albert Popp presentations and he has proved that we are all emitting signals ourselves and anything that is coming into our own frequency can disturb our own frequencies which keep us well. That would suggest to me why people are real. I mean, as soon as I used a mobile phone I could feel the pressure in my ear straight away. I mean, I have no expectation at all and I would suggest that that is the reason why.

Mr. J. Rubin:
Those kind of symptoms that you describe, the pressure in your ear and the other things I was mentioning about the headaches, we were looking for that in the experiment and we did expose people to mobile phone signals and to, as I said, the sham condition. We could not see any difference there in those double blind conditions, so we have not been able to replicate that in the laboratory. I am not saying it does not happen; you obviously do experience that. I am just saying that we have not been able to find the evidence that it is due to the mobile phone signal.

Mr. J. Stather:
I mean, the nervous system does work because of changes in charge. That is why, I think, there has

been a view that there is the potential for radio waves in some way to influence how the nervous system functions. If you go back a few years there were some studies that suggested that, and that maybe the case, but when they were repeated those earlier results were not reproduced. I know in the last 2 or 3 years the MTHR animal studies that have been done have really been very carefully controlled and they just have not been able to demonstrate the effect in mice in really well done studies. So the potential was there and, you know, for -- your starting point, you know, charge can affect the nervous system but it has not been possible to demonstrate a real effect, and I think James is saying something similar, in human studies.

Ms. M. Melvin:
I mean, I have seen he has a biomagnetic field machine which when people are ill their pulses that they are emitting are not straight lined, they are fragmented and he can measure what they are emitting and he can reverse what they are emitting and pulse them with signals to, you know, put right whatever the signals are that they are emitting. So, you know, it is feasible to measure these things if you are studying the right field.

Ms. J. Simpson:
My name is Jane Simpson. I am going to be a bit greedy because I have a few questions. First and foremost, who has funded both of your research?

Mr. J. Rubin:
I am funded under the Mobile Telecommunications and Health Research Programme which John was talking about earlier. The MTHR is itself funded 50 per cent by industry, 50 per cent by government, but I would emphasis that there is a programme management committee. It is an independent committee of experts that acts as a firewall between myself and industry and, in fact, I have had no contact with industry whatsoever during my research. I personally think it is a good way to do it. I think industry should be made to pay for this kind of research. I do not think they should be let out of paying for it. What is needed is a mechanism to ensure independence of researchers. I think the MTHR provides an excellent way to do that.

Ms. J. Simpson:
Well I have read that where research is funded partly or wholly by the mobile phone companies it is up to 6 times more likely to find in favour of the phones not being detrimental to health.

Mr. J. Rubin:
I have read that review and what they say is that the studies that are part-funded by industry and part-funded by someone else, be it government or charity, are the highest quality studies.

Mr. J. Stather:

I mean, that essentially picks up what I said. I mean, certainly within the MTHR from its inception the aim was to make sure that there were top quality studies bringing together good physics and good biology. Sometimes they are reproducing studies that have been done earlier where, you know, one element of the study was just not very good. So if a top quality study just is not able to demonstrate the fact, well, that is the way it is I am afraid. I am not funded by anybody because, you know, I am not fortunate to be doing the research now but I was just talking through what, you know, our organisation has reviewed and other people have reviewed and the importance of it. But I do think the MTHR way of doing it has been the right way of doing it. I think industry should support some research but even industry -- well, if any benefit from research that is found to be flawed or influenced in some, it is only going to be any good if it is top quality research that seemed to be independent and they have worked really hard to demonstrate that is the case through this programme management committee.

Ms. J. Simpson:

Well, you say you take these people out of their home environment, you stick them in a laboratory, right? So they are isolated. It is not a true replication of what they are experiencing at home because at home you have not just got the mast, you have got other influences. For instance, we have got granite, we have got electromagnetic fields within the building and we have got geopathic stress. We have got all kinds of other influences as well as that mast, plus we have got -- well, in my case, I have got one 30 metres, and it is because I have paced it out, from my house. I then go to work and I have Wi-Fi all around me because I work in technology and I have got 2 masts that have just been erected on the roof of the building which is probably about 20 to 30 feet above my head. I had an interesting conversation; just by accident I bumped into an English company over here that were erecting the actual masts themselves and he said he has got a whole backlog of steel because we have put blocks on it and I said: "Oh, what are your safety precautions when you are working?" and he said: "Well, we cannot work 2 metres in front of it or 1 metre behind it when we are working."

Mr. J. Stather:

I think that is right. I mean, he would be exceeding the guidelines if he was that near to it.

Ms. J. Simpson:

So I had quite an interesting conversation with him.

Mr. J. Stather:

The field falls off quite dramatically with distance. You know, 10 metres away he would have been well beneath the guidelines.

Ms. J. Simpson:

My question to you is, have you taken into consideration with all your experiments, that all human cells are not the same? For instance, let me explain, I have a thyroid problem and I have adrenal problems and hypothalamus problems which I am being treated for. Parts of those symptoms are that I get really dry skin from it and I am being treated and it is slowly responding. This is the interesting thing - I had a mobile phone which I did not have too many problems about sensing things in my hand from it. If I picked it up I did not have much sensors from it, however if I held it to my head then I did get this pressure band so I had a minute timer on it. Now, I bought a new PDA (Personal Digital Assistant) which is like a mini computer which has got a whole load of computer stuff on it as well as being a phone. Now, at the time when I brought it my skin was in a phase where it had gone extremely dry with the thyroid and I picked this phone up and I connected all the Wi-Fi and the mobile phone side of it, and my hand was burning with it and itching. This was just the hand I was holding it in and not the one I was using the little stylus with. Now, over a few weeks the thyroid treatment was kicking in and my skin got better and I am more able now to cope with holding the phone when it is connected. Fortunately, I can disconnect all its transmissions and receiving abilities so I can use it just as a computer. However, you see, that is just my experience of it but there are going to be people out there who have cancer, they have compromised immune systems, they are young, they might have leukaemia. With all your research, are you having a good cross-section of standards of health amongst these people in the experiments?

Mr. J. Rubin:
I think there are a few issues you have raised.

Mr. J. Stather:
The epidemiology studies will have a good cross-section. I mean, there is something like 13 studies going on across Europe looking at the use of phones so it will be based on the population. It will inevitably have a mix of people in those populations that are being studied. I mean, they are not looking for people with particular characteristics; they are just looking at use of phone and, you know, comparing high use and low use, so there must inevitably be a mix of people.

Ms. J. Simpson:
Have you done any research where there is a huge density of mobile masts such as we are going to experience in this Island?

Mr. J. Stather:
Well, I do not think it is going be any different to anywhere else, but I think the main study that is going on at present is phone use rather than epidemiology in relation to exposure to masts. There is a desire to try and do some epidemiology in relation to exposure to masts, but it is quite difficult to do. My organisation has been putting a lot of effort into how to measure exposure of individuals to radio

frequencies from masts and different sources.

Ms. J. Simpson:
So you are saying the research really is about the handsets that are being done, it is not about the masts?

Mr. J. Stather:
Most of the MTHR programme is about phones rather than masts, but of course in both cases it relates to exposure to radio waves so it does relate to the masts even though it is geared more to phones than it is to masts.

Ms. J. Simpson:
That is what I wanted to hear.

Mr. J. Rubin:
There are experiments going on into masts. There is the University of Essex study at the moment which is looking at symptoms that might be caused by mobile phone mast emissions so there is some research going on into that.

Mr. S. Hinault:
I am Stuart Hinault. How does the strength of electromagnetic fields from televisions and computers and radios in the house compare to mobile phones or ground stations? What would be the comparison in strength?

Mr. J. Stather:
I do not think I have got a good answer across the whole spectrum. I mean, certainly base stations are trivial compared with most other sources. I mean, phones, as I said, tend to be quite a bit higher and it is local exposure to the head, you know, and it is short term.

Mr. S. Hinault:
But compared to a television in your house?

Mr. J. Stather:
Televisions, well, of course, it is power frequencies rather than radio frequencies, but the television is obviously getting, you know -- it is working because it is getting an RF signal from a local transmitter.

Mr. S. Hinault:
But it is not sending out signals in the house which --

Mr. J. Stather:
No, no, but it is receiving a signal in the same way as that, you know, you are concerned about the signal you are getting from a base station. You are also getting the signal that the television is getting. It is not directed at the television; it is coming out in all directions. When we have made measurements sometimes the exposure can be higher from the local television transmitter and sometimes it can be higher from a base station; not necessary the nearest base station, but one that is some distance away.

Mr. S. Hinault:
I am not worried about the signals from a base station anyway. Thank you.

Pierre:
My name is Pierre. You said a few things about thermal effects or radiation. I am surprised you said nothing regarding non thermal effects especially as regards to DNA structure alteration. The reason why I am mentioning DNA is because as you know any DNA alteration is the beginning of cancer development. Now, I do not know if you know this, but Jersey has the unfortunate record of having the highest mortality of death by cancer in the whole world which is 350 deaths per year per 100,000 inhabitants. Now, I believe that we have already enough sources of electromagnetic pollution here - we have the radio transmissions, we have the television, we have the airport, we have the sea or the harbours, we have the police, we have the ambulance, the fire brigade, we also have on top of this Bellozanne emitting a lot of their steam, we also have the nuclear power station 40 miles away and I would have thought -- how many masts are being erected on the Island? Is it 200 that are proposed?

Mr. J. Stather:
150.

Pierre:
Yes. I think this is just not good enough. Well on 56 square miles I do not get it, sorry. I would have thought one or 2 masts would be sufficient. Do we need any more sources of electromagnetic pollution? We already have, as I said, this very sad record of the highest mortality of cancer here in the whole world. Can you please reply to this? Thank you.

Deputy A. Breckon:
Something that will not be known to our visitors is --

Mr. J. Stather:
My guess is a lot of people have retired to Jersey.

Pierre:

No, no, that is not good enough.

Mr. J. Stather:
Okay, but that could be one reason why the mortality from cancer is higher.

Pierre:
There are 350 deaths per year here in Jersey. This is the highest mortality rate in the whole world. We are on a par with Guernsey and Hungary. Now, we already have here a lot of electromagnetic pollution and other sources of pollution, do we want 300 masts? The answer is no.

Mr. J. Stather:
I think it would be quite unreasonable to try and attribute those deaths to EMFs.

Pierre:
And you have said nothing about DNA alteration and breaking in your presentation which is the most important aspect of this issue.

Deputy A. Breckon:
You have mentioned deaths. Of those 350 deaths many would be related to smoking. Now, our visitors would not have knowledge of that, but 350 deaths related to cancer are not related to mobile phone use. They are not related and that is a fact. That is a fact. I am sorry, that is a fact; 350 deaths you mentioned in cancer in Jersey per 100,000 are not related to mobile phone use. You are using a figure and associating it with something that it is not directly associated to. The biggest cause of cancer is smoking and smoking related. It is a fact if you check the Medical Officer of Health's report. It is independent.

Pierre:
The reason why I mentioned 350 deaths is because it is the environment in which we are already living in here. I did not say anything else.

Deputy A. Breckon:
But you linked it with something that it was not necessarily associated with. Regarding the DNA, would you like to comment on that? If you listen while other people are talking you will hear the answers. Would anyone like to comment on the DNA?

Mr. J. Stather:
I cannot comment on the DNA.

Ms. N. Langley-Smith:
Dr. Stather, Nicola Langley-Smith. You mentioned in your talk about the fact that children should not really use mobile phones too much.

Mr. J. Stather:
That was the advice of the group.

Ms. N. Langley-Smith:
And it was precautionary. We ought to be, you know, looking after our children. At what age do you think that the immune system of children is fully developed and at what age do you think it is safe for children to use mobile phones?

Mr. J. Stather:
There is no answer to that is there? I know Bill Stewart, the chairman, has been asked that a number of times and, you know, I --

Ms. N. Langley-Smith:
So when do you think the immune system is fully developed?

Mr. J. Stather:
It is progressive, is it not?

Ms. N. Langley-Smith:
It is progressive. So it is not fully developed with any specific age?

Mr. J. Stather:
No.

Ms. N. Langley-Smith:
Could you tell me why Mr. Repacholi said categorically in his submission that after the age of 2 children's immune systems are fully developed and, therefore, it is completely safe for children to use mobile phones whenever they want? Please remember he was brought over by Jersey Airtel.

Mr. J. Stather:
Well, I would not say that. It seems to me not unreasonable to say that if any group of the population is more sensitive than others or more susceptible than others for whatever reason, then it is more likely to be children.

Ms. N. Langley-Smith:
So, you are disagreeing with him. Thank you.

Mr. J. Stather:
I know Mike Repacholi quite well, you know. Obviously he was involved in the World Health Organisation programme and led that very well for a long time.

Ms. J. Banks:
My name is Jo Banks. First of all, I have a question for Mr. John Stather please. In your presentation you mentioned that ionising radiation can cause cancer but your words were; "It does not seem to be the case with non-ionising radiation." I thought the word "seem" was a little bit vague and did not sound very definite. Later on, you mentioned that tumours could start from lots of various other causes which obviously could be something else other than electromagnetic fields, but after that I did not quite catch what you said and I just was not sure. My question would be, if you already had cancer can you honestly say that exposure to electromagnetic fields or electromagnetic radiation would not in any way accelerate its growth? This, I think, is quite relevant because, as a gentleman on the other side of the Parish Hall has said, Jersey does have very, very high levels of cancer and even if you are saying you do not think it can cause cancer, can you honestly say that for someone who has got cancer that exposure to this sort of radiation or these fields would not possibly accelerate it in any way?

Mr. J. Stather:
It is very difficult to get a scientist to say things are black and white and he does not like that. I mean there are epidemiology studies -- first of all, I said although there does not seem to be any evidence that radio waves can initiate or cause cancer there is the potential for maybe promoting cancer that is already there. I guess that is what the epidemiology studies that are being carried out around Europe and other countries are doing by looking at whether there is some relationship between radio waves and cancer, in the brain particularly. Those studies are hopefully going to come to fruition this year with this pooling by the International Agency for Research on Cancer in this interphone study which will be, you know, a big study which is quite powerful. There will still be the limitation though that it will not be a long term follow up of people because large numbers of people have not been using phones for a long time yet. I mean my guess is even when interphone is published, whatever it suggests the epidemiologists will want to extend it for a few years to have more confidence in their result. If there was a significant risk we would have seen it so far, and that is not the case.

Ms. J. Banks:
Can I just go on from that and, sort of, tell you and maybe all the learned gentlemen who are sitting at the table, that to me there seems to be a definite element of doubt. You are, sort of, referring to this significant risk but there is a risk and is it really --

Mr. J. Stather:
No, I am not saying there is a risk. I am saying we need to do the long term epidemiology to be sure of the position.

Ms. J. Banks:
You cannot say that -- yes, okay, but it is not 100 per cent proven that there is no risk?

Mr. J. Stather:
No.

Ms. J. Banks:
No. So, my thought or question is, is it right that you should decide by -- okay, you did not decide to increase the competition, but is it right that these base stations should be, sort of, positioned throughout the Island in respect that they can be very close to some people's homes, and obviously people live here 7 days a week, 365 days a year, when it is not 100 per cent sure that they are safe? Is it right that you are, sort of, almost using us all as, sort of -- we are all huge experiments and you kept referring to more tests that are being done and there will be more evidence later on in 2007 and there will be more -- you keep saying, more research, more research, more research, but I do not want to be a statistic. I do not want my children to be statistics. We do not want to be the guinea pigs which may or may not show that these risks were greater than you thought at the moment because at the moment enough research has not been done. Is that morally right that you should expose us to these potential risks? Please do not reply by saying there are risks in everything that we do, because we have heard that a lot and basically most of the risks that we expose ourselves to we have a choice over. You know, I have heard people say: "Oh, every time you get into a car you take a risk." Of course you do but you decide whether you are going drive cautiously or if you are going to be a bit erratic. People who smoke take a risk, but they decide whether they do that. We have heard that the risks associated with the use of a mobile phone are far greater than exposure to a base station. That may be the case but I personally do not think that is proven because as you yourselves have admitted the research that is being done is not long term. You, yourself, have said it is very difficult to do research when everything is so new, but should we not be giving the research a chance to show whether it is safe before we put these stations right next to people's houses or next to schools rather than assuming it is all safe until we find evidence that it is not safe?

Mr. J. Stather:
Well, the research I have talked about, as you know, relates to phone use rather than base stations.

Ms. J. Banks:
I thought this review was about base stations though, is it not?

Mr. J. Stather:
This meeting is about base stations but, you know, the exposures from base stations are trivial compared to exposures from phones, so the emphasis of the epidemiology is really on the use of phones and, as I said, there is no significant evidence of any real risks but this pooling study should throw more light on that. As far as base stations are concerned, exposures are just many yields of magnitude lower than exposures from phones, so it is hard to envisage there could be -- and I think the conclusions of all the reviews is that there is really no risk that people, you know, will ever see an exposure to base stations and it is hard to imagine how that could possibly be in terms of levels of exposure that are there.

Ms. J. Banks:
Could I also just ask Dr. James Rubin a question please? It is following on from the lady's comments about your laboratory testing. Can I ask you, when you exposed the people to the tests to establish whether you thought they were responding to the emissions from the phones, I assume that the rooms they were exposed to these electromagnetic fields had been cleared of all other sorts?

Mr. J. Rubin:
No.

Ms. J. Banks:
Would that not have been a sensible thing to do because if there are other electromagnetic fields in the room, could that not have had an effect on your results? I would have thought if you were trying to just test the effect of the phone you should have made sure that perhaps there was nothing else that could have interfered with that?

Mr. J. Rubin:
There are 2 schools of thought on this. There is the school of thought that says, as you suggest, you should ideally do it in a kind of totally screened environment where the only electromagnetic field that is being presented is what is coming from the experimental equipment. The other school of thought is that you should do it in the natural environment because there may be some kind of interaction that is going on. It is possible that the phones only have an effect, for example, if people are exposed in a natural environment and the electromagnetic fields from the phone are interacting with what is already in the environment. In practice studies have done it both ways. Some have done it in that screened environment you are talking about and others, such as ours, have done it in a natural environment where there are natural background electromagnetic fields, and in practice those 2 different kinds of study do not see any difference. The studies that have done it in screened rooms still do not see any effects, but it is not clear which is the better way to do it so studies do it both ways.

Deputy A. Breckon:

You mentioned about the safety masts and the number of them but this has come about by people wanting competition. That is a view that has been expressed and I do not think that the safety of masts was an issue when the competition issue was first raised. That was not really seen as an issue. It was a case of you need to have an infrastructure to have competition because sharing is not working in full at the moment, and it was the States that decided that and they set up the JCRA (Jersey Competition Regulatory Authority) who has a function under the telecoms law to do that. What some of you will not know is we had a conversation with the Economic Development Minister this afternoon and under the competition law and the telecoms law he could, in fact, request the JCRA to get the operators to give the public information about where every mast is, what it is and some technical detail about it and also what he could do, and the telecoms operators would pay for it but it would be done independently, the systems would be monitored and the results would be made public. Now at the moment that does not exist, but we have been exploring that today because it is right what you say, when some of the issues were raised other issues were not taken into consideration. So you know that is something that we are looking at. Now that well may give some people some comfort, but if there is safety levels, where is that drawn? Jersey is no different to many other places in the world in that we do have international standards in other areas that could be adopted for that. But we do have a small community and it is something that we are looking at.

Ms. J. Simpson:

If these changes can be made then why can the States not have their own infrastructure and rent it out to the competition? Just one set of masts.

Deputy A. Breckon:

That was discussed this afternoon the possibility of sharing more equipment than we have got at the moment.

Ms. J. Simpson:

Why can they not share the lot?

Deputy A. Breckon:

Because at the moment we have Jersey Telecom who are the operator and some of their system is not able to be shared by the others because of the technology.

Ms. J. Simpson:

Why not update one system and the States own the system, not Telecom, because Telecom have been sold off anyway, have they not?

Deputy C.H. Egré of St. Peter:

My name is Collin Egré. If I could add to the discussion that you are having just to relate it to what a gentleman said before. My father died of cancer and I am attending a funeral tomorrow for someone who has died of cancer and my brother had thyroid cancer. So I am fully aware that cancer is very permeate in Jersey. Having said that, I take an objective view of what the cause may be and I am looking at an objective view with regard to mobile phones. Talking about the number of masts that are required, I believe technically that we have to - well, we do not have to - but because mobile phones are being used we require the aerials to service that use. In other words, those people who have mobile phones, and some of you may not, but those people who have mobile phones wish to make that call. Now the actual radio emissions that come from the aerials, be they one or 2, will be the same number of transmissions that are required to operate the system. So as much as what you are saying, it would be nice to feel that if you only have, let us just use a figure, 100 masts operated by one company the actual emissions that are required to operate that mast will be exactly the same as if you had 2 operating on, you know, one corner and one on the other. Regretfully, that is the way the system operates. I hope that gives you some idea of how it is not quite that simple as to just go for, you know, a limited number of masts because the transmissions will still be there.

Ms. J. Simpson:

But it would reduce the amount considerably.

The Deputy of St. Peter:

Regretfully, it will not and that is the point I am trying to make, because when you make a telephone call -- if you have 1,000 telephones and you are making 1,000 calls you require that number of transmissions going in and out of an area and, you know, if you have 1,000 calls, 500 might belong to one company and 500 might belong to another company and they have 2 aerials, you are still going to have the same electromagnetic emissions to operate the system that you have been having.

Ms. J. Simpson:

As I have said before, those masts are blasting out frequencies whether they are being used by a phone or not because I have tested them. The one by me does. In the middle of the night it will still pump out as much as during the day.

The Deputy of St. Peter:

Again, we have heard comments on both sides. One group saying that it does not push out as much transmission during the night and another group that is saying there is no difference. We will be looking at the tests to get a fact as to whether that is the case rather than a comment. I am not suggesting that you are wrong, but we have got to double check objectively to see whether that is the case.

Male Speaker:
I think I can safely say that I am the only person here who has had cancer and after being in hospital for 10 months I got through it. You can understand my concerns on the issue. By the way, I have never smoked a cigarette in my life or touched a spirit or drink, so I do not think that has anything to do with it. If what you are saying is there is not much to worry about on the issues of what we bring up tonight, then why does no insurance company want to cover any mobile phone company with any adverse effects? And on this note who is going to take responsibility for any future health issues?

Deputy A. Breckon:
We had 3 days of hearings and in that we asked the operators what their public liability insurance was and, I cannot remember, but they have got insurance up to about £60 million and there are no exclusions that they could tell us in there, so the installation and the operation of mobile telephone equipment is in their public liability insurance and it is up to £60 million. There is an issue if somebody sites a mast on their land as to who is responsible. Is it the operator? Is it the landowner? And we understand that as part of the lease some of the landowners were taking public liability insurance of up to £100 million, but it is something we are still investigating and we have got some evidence on it, but we will certainly ask some more questions. They do have public liability insurance, this was just for this installation. So that was evidence that we have been given, but we have not asked all of the landowners what their liability is, but the operators have said they have £60 million. That was the figure we were quoted.

Male Speaker:
On that issue, insurance companies will not take liability of the emissions that they are going to -- if any effects of ill health do come out, the insurance companies will make that void. I have spoken to insurance companies and they will not cover even though they have got liability insurance, but it is not connected to if there are any future effects from these aerials that we do not know about. What probably most people here tonight want to know is who is going to put it in writing and take any future responsibility? I mean, if no one is going to take responsibility -- you know, you should not be in business without adequate insurance cover anyway and as far as I have spoken to insurance companies they are not willing to cover people in future.

Deputy A. Breckon:
Well, we asked that question of the operators and what they said was that they had public liability insurance up to £60 million and there were no exclusions for the operation of mobile masts. The other thing, of course, to test is that we have not been able to find anybody that has taken an operator to court and got compensation on health grounds for the operation of a mobile mast, so there is no case history. There is a case that failed somewhere - I cannot remember where but I think in the UK - but we have not got any history to look back on of individuals taking legal action against a telephone operator. There is no case history.

Ms. J. Simpson:
At the last meeting I attended which was in St. Brelade, Steve Harwood raised the fact that Cable & Wireless had settled out of court on one case. That was considerable; that was £2 million, was it not?

Deputy A. Breckon:
That was said. We could not find anything.

Ms. J. Simpson:
You did not manage to find the evidence on that one.

Deputy J.B. Fox of St. Helier:
I was waiting until last as it was only fair that the general public should -- in fact, I am asking the question tonight on behalf of a constituent who has got a migraine tonight but that is incidental. She is a representative of an area that is near the power station at the JEC (Jersey Electricity Commission) at Mont a L'Abbe. The question I think has probably been covered quite a lot tonight about the concern in the area by the residents of one mast transmitting but it now appears that there is more starting to be erected in the area and it there might not just be mobile phones, it could be TETRA (Terrestrial Trunked Radio) and other ones for all we know, but the question is does the amount of transmissions that will be going in and out increase and does that increase the risk that -- and, of course, as the Minister has already said, if information changes all these masts have got a limited 12 month life, I think it is, and they can change things if information suggests that this should be done. But I think by listening tonight and looking -- but you said it was trivia, John, compared with the actual phones. I think the problem is for residents, and especially for one that has got a school that is not that far away and a primary school on the other side of the road a bit further away, is that there is uncertainty about it. There is a lot of speculation that it is short term at the moment so we have not got long term evidence to show for it. Like most or all experts, they all have different opinions on levels and everything else, but for the person that is worried and is getting stressed out about it, it seems that the only thing that might tell us what is happening is if someone has a way of reading what is emulating out of a particular area. Is that something that is done or could be done?

Mr. J. Stather:
That is something that is done. I mean, not across thousands of base stations, but Ofcom is doing an audit of base stations, about 100 a year, and they have got equipment that will measure total exposure from radio waves across a fairly broad band and the conclusions are that exposures are very small fractures of guidelines. My organisation has measured something like 80 base stations now around the country. I mean, sometimes, you know, you can go to a meeting like this and the local concern, you know, will go away because you explain things; sometimes it will not and there are still people who

remain very concerned. If we then go and make some measurements and demonstrate that for that particular base station exposures are very low compared with, you know, guidelines then often the issue does go away. But what we see is that usually there are exposures in any particular place from a number of sources of radio waves, as I have explained once or twice already; not just one base station, but maybe 2 or 3 and a radio transmitter and, you know, a television transmitter, but the total exposure will still be small compared to the guidelines.

Deputy J.B. Fox:

Well then, can I ask the Chairman whether such facilities are in existence in Jersey at this time and if they are not, can they be brought to Jersey so that random checks or where people are concerned it could be investigated to see if that would shed some more certainty and exactly what is currently happening or not?

Deputy A. Breckon:

What happens at the moment is if an application is made to Planning then with the planning application needs to be a technical specification that says what this equipment is and what the outputs will be. Part of the granting of the application is conditional upon a monitoring exercise when it is installed. We have done that but what we do not have at the moment is an ongoing thing. So what could happen is that could happen 3 months after installation and at the moment there are no further checks after that because that then complies with the planning permit. So part of the recommendations could be, for example, that the location of all masts is identified and there is an ongoing monitoring process that is paid for by the operators. Now, there is equipment in the Island at the moment, the most modern of which belongs to Jersey Telecom and it is on loan to a States' department who are testing with Jersey Telecom's equipment but it is calibrated independently. To buy this kit is about £15,000 and for the operators to fund that and for someone else to independently use it or to somebody like Ofcom who independently -- in Guernsey we stand by the regulator, and it has been done twice already and it could easily be done here, but at the moment the equipment is there. It does not belong to the Health Department, it does not belong to the States, it belongs to a telecom operator and there is always the suspicious that if the telecom operators monitor themselves then they would say that, would they not? So it does need to be independent, so this can happen.

Deputy J.B. Fox:

I would agree it has got to be independent, Chairman. I would also agree that with the increasing multiples of these phone masts and the antenna that is on them that we should go back, not just on a one-off 3 months and the other thing -- the question I was asking is that we have TETRA in the Island which is a whole different ball game and in different places, and does this equipment identify the radiation that comes out of it or whatever?

Mr. J. Stather:
Ofcom have measured some TETRA base stations as well in, you know, England.

Deputy J.B. Fox:
I think that in this case for the lady that is representing the area they are seeking some certainty as opposed to "it is trivia compared to others". They want to know.

Mr. J. Stather:
It was an important recommendation in the *Stewart Report*.

Deputy J.B. Fox:
I do not argue that at all. What I am seeking though is if the Chairman and the committee could take it on board with the suggestion that we look at having individual sites independently checked out especially where there are areas of concern. Yes, it is going to cost the States some money but I think an Island of this size and for the amount of use it would be a justifiable expense.

Deputy A. Breckon:
The other thing that must happen, Ben, is it must not be in technical terms; it must be in terms that people understand. You know, if it is a technical trade value on something then people say: "Yes, that is all right, but what does it mean?" so it must relate to something, and then if you have got industry standards then it must be benchmarked against that. For people's safety and comfort they must be able to demonstrate that we are well within agreed limits. Now that has been demonstrated elsewhere and in some of the monitoring that is done in Jersey the planning specifications is saying that they are adopting industry standards and best practice from elsewhere, but again because people are not aware of what is going on there is a communication problem.

Deputy J.B. Fox:
All that I agree with.

Mr. J. Stather:
I think the gentleman is right. It has got to be properly done. The science, if you like, and the physics has got to be right, but it has got to be understandable by the people you want to communicate it with.

Deputy J.B. Fox:
Well, I am not expecting that the sub-panel will make a promise without having further considered it, but what I would hope to read at the end of the day is that their recommendations to the States is this should happen and I would be quite happy to second it or put a proposition if required.

Deputy A. Breckon:
I think that we can safely say then that the TETRA stations, of which there are about 5 in the Island, are regularly tested by the Department of Electronics' staff who are very competent to do so, and I think we can safely say that discussions with the Minister this afternoon indicated that he was in favour of independent testing as well and was ready to suggest to the JCRA that that be done, so I do not think there is any doubt at all that that will take place.

Deputy J.B. Fox:
Good. If residents, especially those that represent other residents, make such a request, do you see a way forward that this could be accommodated?

Deputy A. Breckon:
This is already on board. We are already looking at this.

Deputy J.B. Fox:
Wonderful. Thank you very much.

Deputy A. Breckon:
There is a gentleman at the back there.

Pierre:
Yes. My next question is you said a few minutes ago that more masts will be needed to accommodate the number of calls being made on the Island. Is that right?

The Deputy of St. Peter:
The point I was making there was that you require a mast for a telephone, and if you have 1,000 telephones operating on the Island, you will need an aerial that can meet the task that is being demanded of it by that telephone.

Pierre:
Right. How do you explain then that the present mobile system is functioning well with -- what is it, probably 76 masts already erected, maybe more, and we are talking about 350. How do you warrant that?

The Deputy of St. Peter:
I am not too sure where this figure of 350 came from.

Pierre:

It is 200 plus. Now, if the system is working now, I do not see why we have a need for another 150, 200.

The Deputy of St. Peter:
There is an increase in the number of telephones that are being sold in Jersey. Now, this --

Pierre:
Hang on a minute. According to the report published by the States of Jersey, there are 90,000 handsets in circulation in Jersey. That is approximately the entire population of the Island. I do not see how more masts can be required when we have already reached saturation point and the system is currently working very well, is it not? So, why do we need an extra 150, 200 masts?

The Deputy of St. Peter:
As I understand it --

Pierre:
I am sorry, I want an answer to this. This is a very simple question. Why do you want more masts? I also understand that the average rental to individuals per mast is roughly £3,000 per year. Now, this is scandalous, because this is really enticing people to have more masts in their garden and creating obviously more health hazards. So, can you please answer those 2 questions?

Dr. J. Stather:
Can I chip in?

The Deputy of St. Peter:
Yes, certainly.

Dr. J. Stather:
Phones have what is called adaptive power control. You accept the fact you have more exposure from the phone than from a base station. The phone is near your head; the base station is maybe 2 or 3 miles away. Phones have adaptive power control, so they only put out enough signal to reach the nearest base station. So, the nearer the base station is, the less the output from the phone. So, in practice - you will not like to hear this, I know - but the more base stations there are, the less the exposure in total will be from the use of a phone by any one person. I am not sure that is something that influences the companies, but the physics is such that that is the way it is.

Connétable M.K. Jackson of St. Brelade:
Can I just comment on the number of masts that we have in the Island, which is a point that you were

making? Effectively, we have a situation which is consumer driven. You will realise now that there are 3 operators in the Island, each with its own system and each system needs a network of masts. The planning authority, the Planning Department, has decided to go for a larger number of smaller masts than a smaller number of larger masts, and this is what is driving the number of masts which you see.

Pierre:
They should have known the implications of what they were doing in the first place, before they granted these additional companies to operate here. They must have foreseen this, surely?

The Connétable of St. Brelade:
Sorry, I did not hear that.

Pierre:
The States of Jersey must have foreseen what was going to happen by giving 2 additional licences.

The Connétable of St. Brelade:
I fully understand what you are saying and that is a sentiment which is shared by many. But the difficulty is, it is consumer driven and the Economic Minister suggested this afternoon that he was faced with satisfying the demands of the community to a healthy standard. He has taken advice from the highest authority and made his decisions based on that.

Pierre:
Yes, but again, Jersey only has a service area of 56 square miles. We are literally a pebble in the sea here. This is a minute little island. Why do you want 350 masts for? It just cannot be warranted.

Deputy A. Breckon:
Well, this comes from the fact that the States of Jersey set up a Competition Regulatory Authority and they have licensed the operators.

Pierre:
But that is ridiculous.

Deputy A. Breckon:
There are 4 operators that have a spectrum licence. There is another one that does not operate and they have an option as well, but they need a licence to operate in Jersey, but they have a spectrum licence. The licence for the airwaves comes from outside the Island. We do not licence that ourselves, that is an Ofcom thing. COLT (City of London Telecommunications) also have one, but they are not proposing to set up at the moment, that we know of. So, there is another possibility. But having said that, the market

will decide and there is probably not, bearing in mind that you said, I think, there is over 100,000 mobile phones. So, it is a bit like cars or vehicles. There are more vehicles than people licensed and mobile phones are the same because people might have their own or they might have 2; they have one for business and whatever else. But the fact is, if somebody else sets up, there will probably be no more phones. It would just be split between the operators, and in the end the market will decide whether they can make money, and if they cannot then they will not. Somebody mentioned Jersey Telecom is supposedly up for sale. If that happens, one of the other operators could well buy it or somebody else does. So, in other areas what has happened is, there has been competition with 3 or 4 and that has usually come down to 2, sometimes 3. So, this will find a level.

Ms. J. Simpson:
So, what happens to all the masts that we have?

Deputy A. Breckon:
Well, they will not be working because there will be no signal to them.

Ms. J. Simpson:
Sorry. Why do it that way around? Why? It seems --

Deputy A. Breckon:
It is the market. If the companies want to come --

Ms. J. Simpson:
Well, you keep saying it is market driven, but this is a mistake by the States.

Deputy A. Breckon:
All right. That is your opinion. You are quite entitled to that.

Ms. J. Simpson:
Well, it is my opinion and the opinion of many people that this is a major cock-up, because it was not foreseen.

Deputy A. Breckon:
As I said before, one of the things about the competition is, when people were asked would they like competition in the mobile phone market perhaps the consequences were not thought out by everybody or explained by anybody.

Christy:

My name is Christy. I would like to know what you have thought about the dangers when these masts will overlap another one and how much more radiation will be coming from these masts?

Deputy A. Breckon:
Do you have anything to say about overlap?

Dr. J. Stather:
I think we have already covered it.

Deputy A. Breckon:
I think what happens with the cells is they need to sort of overlap with each other to work, so that if you are using a mobile phone you can receive a signal, and obviously if you have 3 operators then you have some duplication there. But again, it is a functional thing required really by the system.

Dr. J. Stather:
I think, as I have explained, where we have made measurements in any particular place, in a school playground, a housing estate, you do see signals from a number of different sources, different base stations.

Christy:
Being we are in such a small little island, there is going to be so many overlaps and how much more dangerous will it be when you are living just underneath where those overlaps are taking place and if there are so many companies involved, will it be more triple times? It could be a lot more.

Dr. J. Stather:
The evidence from England, where we have made lots of measurements - and Scotland as well, and Wales - is that even though there is some overlap, the total exposure is still a very, very small fraction of the guidelines for the public.

Deputy A. Breckon:
Is there anybody who has not asked a question who would like to ask a question? Anybody who has not asked a question?

Mr. R. Thompson:
Yes, Rob Thompson. I am a radio communications engineer. The gentleman on the end, he says about the power of the mobile phone, it adjusts itself about 6 different levels, but the base station stays constant all the time and that is quite a problem if you have overlapping cells, because they are all overlapping and the power is additive.

Dr. J. Stather:
I guess it is not constant because there are signals going backwards and forwards between the base station and the phone.

Mr. R. Thompson:
Yes, but the transmitters are constantly beaming out. They do not alter their power.

Dr. J. Stather:
But the base station is on all the time whereas the phone is not, I agree.

Mr. R. Thompson:
Yes. It is at full power and you are saying 10 watts on your screen there. I do not believe that. I believe it is more like 100.

Dr. J. Stather:
No, no. Per channel and there are 8 channels in each direction, so it is getting up to 100, about 80 in total.

Mr. R. Thompson:
Yes. Well, it is additive.

Dr. J. Stather:
I mean, you are right.

Mr. R. Thompson:
Plus the gain of the aerial is additive as well.

Dr. J. Stather:
Sorry?

Mr. R. Thompson:
The gain of the antennae is additive to it as well, so you are probably ending up with a kilowatt out the base station in the end.

Dr. J. Stather:
Yes. But the peak guidelines I am talking about are about exposure of people, not about emissions from equipment. But the total wattage output is not very much.

Mr. R. Thompson:
But we can easily expose ourselves to those levels. If you drive up to the top Minden Place car park, you are right in line with the new antennae that is there. Pier Road car park is the same.

Dr. J. Stather:
Sure. Where members of the public should be --

Mr. R. Thompson:
Yes, but they are beaming out base stations on top of car parks which --

Mr. J. Stather
Exposure to small fractions of -- if you want to go and stand in front of the transmitter, now, that is not a very sensible thing to do.

Mr. R. Thompson:
No, but there is no --

The Deputy of St. Peter:
If I could just go in the middle of this one, if I may, just for a second? If I could just clarify a point for my own benefit: we are talking about base stations and there are 3 types.

Mr. R. Thompson:
I am talking about the main base station, not the pico cells or the micro cells. These are the --

The Deputy of St. Peter:
This is the point of clarification I want to make, so we know exactly what we are talking about. A pico will be pushing out a lot less power than a macro station.

Mr. R. Thompson:
Yes, possibly 500 milliwatts.

The Deputy of St. Peter:
Yes. So, the one you are talking about in Minden Place, as an example, how close can you get to it?

Mr. R. Thompson:
I would say you can get to within about 30 feet of it.

The Deputy of St. Peter:
30 feet. So, you are looking --

Mr. R. Thompson:
It is on top of the lift house. If you go down to Clos de L'Eglise at Grouville, you can get to within 50 feet of an antennae there which is banging out one hell of a signal.

The Deputy of St. Peter:
That is underneath it?

Mr. R. Thompson:
That is nearby it. That is right on top of Telecom's east exchange. It is a new 3G one which has just gone up.

Deputy A. Breckon:
Well, if there is any issues with these, if the recommendation was, for example, that this stuff was monitored, and that if there is any danger to the public with levels and things, that would be picked up, but we have no knowledge of that at the moment.

Mr. R. Thompson:
Yes. The other thing is, nearly all the yellow phone boxes are emitting quite a strong signal also. They have cells in the roofs.

Deputy A. Breckon:
We asked for a list of that, so that --

Mr. R. Thompson:
Not every phone box has one, but I can --

Deputy A. Breckon:
No, we asked for a list.

Mr. R. Thompson:
But I can give you a demonstration if you require it. I have the equipment to do it.

Deputy A. Breckon:
We have asked for that list from Jersey Telecom, because that was discussed earlier as well.

Mr. R. Thompson:
Thank you.

Deputy A. Breckon:
Anybody else who has not asked a question who would like to? The lady here?

Ms. M. Evans:
Thank you. Mary Evans. What I would just like to know is if you are living in a house and you spend most of your time in that house working in the day, sleeping at night, and you have a mast, say, 100 metres from you, is there an accumulative effect or does it not matter that you are constantly exposed to it?

Dr. J. Stather:
There is no evidence that it matters. I mean, it is a very small fraction of guidelines and whether it is for an hour or 24 hours a day it is not really going to make a difference. That is what you would get from the --

Ms. M. Evans:
But surely it must make a difference?

Dr. J. Stather:
Ionising radiation, x-rays, gamma rays, cumulative exposure matters. The bigger the exposure the more risk of cancer. I mean, that is quite clear from human epidemiology, animal studies and what we know about damage to cells, et cetera, radio waves do not have the same interaction with tissues. The standards are based on heating, and essentially you are making sure that any exposure is well beneath that threshold for any effect at all. For base stations, it is very much beneath that effect. People are looking for whether there could be any other effects. You know, we have talked about that. There is not any strong evidence at all. But, you know, you should, in all honesty, want to make sure that you can carry on epidemiology for long enough to be absolutely clear that there is no risk. But there cannot be anything much, because we would have seen it by now. We are talking about large numbers of people using phones over a reasonable period of time and the epidemiology is certainly not throwing up anything of any consequence.

Ms. M. Evans:
But I do not --

Dr. J. Stather:
But I would not want to put too much emphasis on any one of these rather small studies. I would rather

look to the pooling of these small studies in a big exercise during the course of this year.

Ms. M. Evans:
I just feel that nobody really knows. It is not conclusive, is it?

Dr. J. Stather:
I mean, we do know quite a lot about how different radiations interact with tissues and I tried to touch on that at the beginning of my talk. So, there is not the evidence there from the way radio waves interact to suggest they could cause cancer. The promotionals, there is no evidence from animal studies, for example, there are other possible effects. When people have tried to repeat studies where other people have shown something, the repeats have really not demonstrated the fact.

Ms. M. Evans:
Which of course is what we all want to hear and yet you keep hearing other things, do you not?

Dr. J. Stather:
But I am a scientist. I will never say never, and there is certainly cause to carry on doing research, for the time being anyway.

Ms. M. Evans:
Yes, but I just feel that maybe we have rushed in too quickly.

Dr. J. Stather:
Well, the graph I showed you, it is a technology that has taken off very fast. Maybe to sort of wrap up on that, in England and Wales and Scotland and Northern Ireland, I have given similar sorts of talks over the last 2 or 3 years, and the concerns you have are no different to the concerns I have heard in other talks I have given. Even in Libya, last year I gave a talk, and it was the same questions in Libya. But I do think that the recommendations in the *Stewart Report* which are being implemented in Scotland, Northern Ireland, Wales, England, about how to provide better communications, independent audit of base stations, that sort of communication has made a big difference. If I go back 3 years, I used to receive lots of correspondence about exposures from mass. I do not get so much anymore. I will not say I get none. I do get lots of letters about electro-sensitivity, which our public health physician tends to answer. That is still a live issue and, if you like, has grown, I think, over the last couple of years. But just concerns about base stations exposure, that has tended to decrease somewhat and certainly TETRA definitely has. You know, 3 years ago when the system was being rolled out, I received lots of letters about TETRA. We produced a report. We demonstrated there is not much difference between TETRA base stations and ordinary base stations and gradually the concern seems to have died away. People are getting used to them I guess is the answer. It is when there is a new phase of more base stations going

up and more people are seeing them, then they start to become anxious. But, if necessary, you can measure them. The independent audit helps. Providing more information helps. There are lots of things you can do as well as the research bit.

Deputy A. Breckon:
Last question. Mr. Langley-Smith, you had a question?

Dr. G. Langley-Smith:
Thank you. Everyone refers to the *Stewart Report*. I would just like to bring to everybody's attention that at the same time as the *Stewart Report* was brought out there was the ECOLOG Report, which remained submerged for 6 years, due to translation difficulties. This was commissioned by the T-Mobile company and there are 220 international scientist peer-reviewed research papers on the effects of masts and they have come out conclusively to say that telephone masts do have an effect on the DNA breakage and the inability for it to join up and it is a precursor to cancer. It is conclusive.

Dr. J. Stather:
It is not.

Dr. G. Langley-Smith:
I have it here.

Dr. J. Stather:
You may have it --

Dr. G. Langley-Smith:
Would you like me to read it?

Dr. J. Stather:
But it is not conclusive and it is not what most other international bodies and national bodies concluded.

Dr. G. Langley-Smith:
Would you like me to read it, their conclusion?

Dr. J. Stather:
I am sure you can find a line you can quote, but I can quote many others which would be the reverse of that.

Deputy A. Breckon:

Anyway, I think we do have that report. I do not think --

Dr. G. Langley-Smith:
You have this one?

Dr. J. Stather:
I know the report.

Deputy A. Breckon:
Yes. I think we have that one.

Dr. G. Langley-Smith:
"Given the results of present epidemiological studies, it can be concluded that electromagnetic fields with frequencies in the mobile telecommunications range do play a role in the development of cancer" and it goes on, blah, blah, blah.

Deputy A. Breckon:
We do have that, so that is part of the evidence that we have.

Dr. G. Langley-Smith:
Good.

Deputy A. Breckon:
Anyway, thank you for that. I think anybody who has wanted to ask a question will have had the opportunity. I think you have had about 5 questions, my friend, so we do have to close sometime. Thanks to our distinguished speakers, Dr. John Stather and James Rubin and thank you to you. As I said, this is part of a process, not the end of it. We have a public hearing tomorrow at 10.30 a.m. We will have the Health Minister tomorrow; we will have the Economic Development and the Planning Minister. The information is available. If anybody wants any further information, any contact, please speak to the Scrutiny Officers. Leave your details: we can email, we can post it, we can photocopy whatever you want. This is part of a public process. It is not my inquiry, it is yours as well. I did mention earlier there is an inquiry in the House of Commons next week and we are arranging to have the transcripts of that on a similar subject, and we are still looking in other areas, and we are hoping to report in the next 6 or 7 weeks. It sounds a long way, but it is fairly tight. We have about 6 significant bundles of information from some of you as well, and as I say, the information has come from all over the world. Again, I will just close by thanking you for coming tonight. Your views and opinions are appreciated. They will make a difference; I will give you that assurance. We have the difficult task of making rhyme and reason of all of this, and hopefully, making a report to the States that will make a

difference, not just now, but in the future. If there are concerns, perhaps if you can share that information with the people who have it at the moment, then that would help in this process. As I say, this is part of it, it is not the end of it. So, thank you. Good night and have a safe journey home.