Main Q&A (2020 Analyst Meeting concerning 5G)

Questioner No. 1	
Q1	You appealing with the copy "Lightning Speed 5G," but tell us the difference in speed from 4G, and how it is different from dynamic spectrum sharing. What is the difference in capability in the actual speed and devices?
A1	Enabling high speed has two factors – one is the bandwidth in the used frequency, and the other is the radio technology used therein. As to the bandwidth, there is a major difference between the bandwidth secured with 4G-allocated frequency and newly allocated frequency for 5G.
	The bandwidth of newly allocated 5G is wide, and that fact alone enables faster speed. The second factor, the radio technology has also advanced since 4G, but the major factor is the bandwidth. "Lightning Speed 5G" refers to a network that uses a new frequency bandwidth to speed up throughput.
	Using the existing frequencies used by 4G and predecessor technologies in 5G, while the network system is 5G-enabled, one cannot expect dramatically higher-speed throughput because the bandwidth used in 4G is narrower compared with the new frequency band in 5G.
	The current 5G is non-stand alone system that houses 4G system as well, but by making it stand-alone or 5G core, a functionality called slicing may be enabled, accommodating various network qualities and service levels. For this reason, making pre-existing frequencies 5G enabled may provide a part of 5G quality, but providing a higher transmission speed is probably difficult.
Q2	In DOCOMO's case, how fast is the transmission speed when you apply frequencies that have been used prior to 4G generation to 5G?
A2	It is not that different from the throughput when used in 4G. Current 4G provides bandwidth of 10MHz to 40MHz per band, while 5G and millimeter wave is one digit broader at 100MHz and 400MHz respectively.
Q3	DOCOMO is saying the CAPEX for 5G is 1 trillion yen over the next 3 years, but other carriers are saying 2 trillion yen in 10 years. What does your CAPEX include, and what is the difference from others?
A3	Capital expenditures for 5G base stations, upper core nodes, and peripheral equipments, as well as R&D expenses for 5G are included. 1 trillion yen means 1 trillion yen in 5 years starting from last fiscal year. We are aware other carriers are saying 2 trillion yen in 10 years, and we intend to have a solid investment beyond 5 years.
Q4	Does the plan include conversion of 4G to 5G?
A4	At the moment we don't take into account.
Questioner No. 2	
Q1	We understand you are using a different technology when you switch from NSA to SA technology in 5G, but will there be any changes for user experience point of view?
A1	When SA system is used the network configuration as a pure 5G facility, we can expect further increase in speed. Also, when the time of SA comes, the use of MEC, where we locate the server and cloud functions close to the customers, will be widely used in order to minimize latency. For this reason, there will be advantages to the customers in terms of transmission.
	However, we will have to figure out using our wisdom and creativity, what kind of services or solutions we can provide on the network to make customers to feel the advantage.
	Some of the services or solutions we described today may require low latency, but with slicing the time will come when one network may hold various devices. For instance, device that requires high speed and large capacity, and IoT device that does not require large capacity but a large number of devices are connected, may be processed in one go and held in a single network, thereby providing an opportunity for customer to feel the convenience. SA technology is currently going through

	standardization, so we want to closely watch the timing of completion of standardization process when creating services.
Questioner No. 3	
Q1	Regarding the coverage of 5G expansion, among the various frequencies, what are the differences compared to other carriers? In 4G coverage there were little differences, but is there any with 5G?
A1	We are not aware of coverage expansion strategy of other carriers, but the major difference between 5G and 4G is that, because the frequency is very high, technical expertise required for creating coverage is much higher, and that one must create 5G coverage while avoiding the area where the existing system is using the same frequencies. Because of these two reasons, we think it likely to see differences among carriers when compared with 4G coverage expansion.
Questioner No. 4	
Q1	Does this mean coverage expansion for network with system converted from 4G frequency is easier?
A1	Correct. Earlier explanation was for high-speed, large-capacity areas using Sub6. If exactly the same 4G frequency is used for 5G, of course a wide wireless area has already been established with 4G base stations, so it can be quickly created.
Q2	I understand that DOCOMO haven't decided not to do conversion of 4G frequencies to 5G, but what would be your response if the competition aggressively starts 4G frequency conversion?
A2	We are aware other carriers have already submitted application for 5G coverage using 4G frequencies, so we expect them to implement the actual coverage in the near future. DOCOMO believes we would like our customers to firmly feel the value of high speed and large capacity feature in the 5G area, so we want to realize those advantages using the new frequencies, preventing them from being misled to believe the advantage of 4G frequencies-converted 5G services. Also, except for the new frequencies, the display may indicate 4G, DOCOMO 4G speed is almost equal to, in some cases even faster than others' 5G using 4G frequencies. We will provide clear explanations at our contact points – DOCOMO Shops and call centers, so that these points are clearly understood by customers, and they would use our services comfortably.
Questioner No. 5	
Q1	Please tell us the current situation on the interference issues with 3.7GHz band, and if DOCOMO has a clear advantage in being the only carrier that has acquired 4.5 GHz. Carrier aggregation can only be realized when there are two frequency bands, so could we understand that you are expanding your coverage with both frequency bands?
A1	We have two frequencies, 3.7GHz and 4.5GHz in sub6, and we utilize both while avoiding interference with the existing system. In some areas we are unable to use 3.7GHz, or even if we could we cannot propagate radio wave with high power. So from the standpoint of expanding sub6 coverage we are using the two frequencies in combination. You are correct in saying carrier aggregation can be realized when two frequencies are simultaneously propagated, so in the area where interference can be avoided, we are actively using both bands, creating an area where max. speed is 4.2 Gbps. Technically, in addition to not using specific frequency at all, interference can also be avoided by lowering the power. For example, propagate high power signal in 4.5GHz while propagating low-powered 3.7GHz sporadically, and with that combination carrier aggregation can be realized. With that kind of method, we are actively expanding carrier aggregation coverage.
Questioner No. 6	
Q1	KDDI and Softbank are saying they are going to share 5G base stations. What does DOCOMO think of infrastructure sharing?
A1	Regarding sharing the infrastructure, regardless of technology such as 4G or 5G, our position remains unchanged, in that we would utilize it when it provides cost advantage when compared with DOCOMO building it alone. We are aware that KDDI and Softbank are creating 5G Japan and pursuing infrastructure sharing, but at the moment DOCOMO will simply continue to actively study its use where infrastructure sharing can provide good cost efficiency, without deciding whom we would partner with.

Q2	What is the ratio of those you can share the infrastructure out of 32,000 stations? In the remote region, obviously it would be more efficient to share the infrastructure, but is there a reason why you are not involved in infrastructure sharing with KDDI or Softbank? If three companies can do it together we would think that would be most efficient, but because NTT has a stake in J Tower, is there a pressure where DOCOMO has no choice but to use them for example?
A2	We would refrain from disclosing specific figures, but it is almost slated a portion of 32,000 stations will be infrastructure sharing. But we cannot make the decision to execute infrastructure sharing alone. If it were the optimal way, we would use infrastructure sharing in efficiently rolling out the facilities. By the way, there is no pressure from NTT to use J Tower. In addition, they are not an operator, but a means to be used when sharing the infrastructure, so you cannot compare them in the same category as KDDI or Softbank.
Q3	You have announced the plan to roll out 32,000 base stations up to 3 years from now, but China and others have announced plans to roll out millions of base stations, which is extraordinary. What is the projected number of base stations to have a nationwide coverage with sub6? Please tell us the number of base stations needed in mid- to long-term view.
A3	Candidly speaking, we haven't decided on the optimal number of base stations we are rolling out eventually. We have approximately 200,000 4G stations, but they are for all frequencies. There are fewer types of frequencies when we limit to sub6/millimeter wave, but before that, we haven't even reached a conclusion whether building out 5G coverage with sub6 to almost 100% of the population is really optimal.
Q4	Softbank has 230,000 base stations, but DOCOMO has only 80,000. Softbank is insisting they have the advantage when it comes to speed of rolling out - we want to hear you views. Softbank is assuming expanding the coverage with the use of 4G frequency, but isn't there a concern that you are falling behind in terms of rollout speed?
A4	DOCOMO has stated in the roll-out plan of base stations, 80,000 4G infrastructure sites will be efficiently used, and it is a fact that there is/are operator(s) with more base stations. However, doubling the number of base stations that can be rolled out does not simply doubling the population coverage or the area where you can actually use the network. DOCOMO's 80,000 sites is a result of our pursuit to efficiently manage allocated 4G frequencies in each station as much as possible, and coverage area per site is quite optimized. Adding sub6 or millimeter wave, we believe, will definitely assure the area where you can actually use the network, as well as the quality.
Questioner No. 7	
Q1	We understand that proceeding with merging of fixed and mobile telecommunications is one of the targets of NTT's TOB of DOCOMO, but what kind of synergy can be created?
A1	We will have stronger linkage/coordination with NTT Group such as NTT Communications or NTT Comware. When we look at the competitive landscape, other companies are already pursuing mobile and fixed telecommunications. In that sense NTT Group is behind, and the competition will be tough. Going forward we will respond to that. In customers' view also, mobile and fixed telecommunications will become seamless, so we have reached this decision.
Questioner No. 8	
Q1	Regarding the millimeter wave, you were saying all the prefectures will be covered by December. Can you give us the concrete idea of coverage expansion?
A1	Millimeter wave has a wider bandwidth of frequency that can produce considerable throughput, but higher frequency prevents building large coverage areas. For this reason, we take advantage of its characteristics and create comparatively small coverage areas where a lot of people gather in, such as event venues, large commercial establishments, or train stations compound.
Q2	We hear that Verizon's pursuit of millimeter wave is not working out so well. How shall we think of this?
A2	We believe the use of millimeter wave by Verizon is for certain spots or for residence in the last-one-mile type of usage. Meanwhile T-Mobile is appealing having achieved quick coverage expansion by the use of low range frequencies on the marketing side as well. We don't necessarily view Verizon's strategy as not working – in fact we hear that they are successful in locking in the high

	data usage customers. So, our understanding is that each carrier is executing strategies that make the best use of its strengths. At least, the jury is still out on their success at this moment.
Q3	Regarding the international situation on ORAN, it maybe just a view held by those who are not pursuing ORAN but some media are saying it is still too early. We believe NTT Group is promoting ORAN through investment in NEC and other factors, so tell us the situation with collaboration between NEC and Fujitsu as well.
A3	There are various views internationally on ORAN, but DOCOMO believes we are in a position to lead ORAN positively in the world, and currently its adoption is spreading and ongoing. The best advantage of ORAN is that it can make equipment support multi-carrier function, and that leads to better quality and cost advantage as well as contributes to various technical competition. We want to first recognize the advantages of ORAN, and by making a strong appeal to vendors spread the technical specification of ORAN. Next on collaboration with NEC and Fujitsu – NEC and Fujitsu are developing and supplying 5G base station equipment, and we have built a good relationship with them. NTT is also making an investment in NEC, and we need to build a stronger relationship, including efforts to spread ORAN specifications going forward. Of course we need to reinforce our collaboration in introduction and development of equipment with not only NEC but also with various global vendors.
Q4	There are variousviews on V-RAN (virtualization) and ORAN. NEC is supplying V-RAN to Rakuten, and Fujitsu is supplying V-RAN to new carrier(s) in the U.S. Please tell us about the situation on virtualization.
A4	We are currently proceeding with putting V-RAN in the network equipment. 100% virtualization if technically challenging, so some parts may need to be handled by dedicated equipment. On the other hand, we recognize V-RAN offers advantages like enhanced flexibility of equipment configuration and cost reduction. So we are proceeding where we can in both base station and network equipment.
Q5	In other words, V-RAN is not in competition with O-RAN - you are pursuing V-RAN as well. Some see them as separate groups, but are they both look toward the same direction?
A5	We believe virtualization is a valid means, and we believe that is a common view held globally.
Q6	In your presentation you focused on solutions in education and agriculture, but we hear in various quarters that 5G has quite an affinity with machine control in factories. Your presentation material this time does not cover that aspect. Why?
A6	Presentation this time uses the material for New Product Announcement, so it introduces the latest topics rather than looking at 5G strategy standpoint. As it has been covered with press releases and various briefing opportunities so far, we naturally pursue manufacturing and medical fields as well. We launched our pre-services from the last autumn, and we carried out verifications on over 500 solutions. When you look at their content, you can see that our policy of looking at a sweeping suite of fields remains unchanged – education, agriculture, medical treatment, manufacturing, construction and transportation. Affinity of 5G with manufacturing has been mentioned many times in the past. We are carrying out verification with some global manufacturers or manufacturing equipment vendors. In some cases they use 5G we offer as a telecom carrier, and in others they want to use local 5G, as they want to completely close the telecom environment within a plant. We have indicated that we provide services to cover both patterns, and we want to make a solid appeal going forward.
Questioner No. 9	
Q1	About monetizing 5G solutions. There is the telecom charges pattern, and the revenue from coordinating service as a whole and from consultation. As we have an impression that the former will continue to decline, the latter seems to be more profitable. What is your view?
A1	As you stated, in the past we have pursued enterprise sales focusing on selling telecommunications services, but with 5G the main focus is to provide the solutions our customers desire and making it a platform. If we factorize your question into two, first would be pricing the large number of equipment, cloud and application as a package solution, presenting the price to the customer and tuning it up. The other would be, in addition to physical services, there is a consulting point of view. Regarding wireless network for example, we have many wireless engineers, and work of designing

	wireless network itself has a potential to be monetized, and we are studying a new type of service such as consulting with our knowledge of DX.
Questioner No.10	
Q1	We have heard from Hokkaido University that the agriculture IoT project carried out in Iwamizawa is a solution that combines mobile and fixed telecommunications. Are you going to proceed with this kind of service development?
A1	There is a strong possibility that services that combine mobile and fixed telecommunications would be developed further. In Iwamizawa's case, it required stable communication in natural environment, so because of the fact that fixed telecommunication has a feature of stable communication and that it was in verification stage, it was carried out as a hybrid of 5G mobile and fixed telecommunications. In the service development going forward, we might shift to mobile when customer's demand for the quality of telecom is not that critical, and in some cases where severing connection is not acceptable, ratio of fixed telecommunication will be increased. Hybrid type of service attracts strong interest in various fields such as manufacturing and agriculture, so we are proceeding with its studies.
Q2	As a 5G application autonomous driving or remote surgery is attracting attention. The impression is that DOCOMO is not actively pursuing application in those fields where risk of life cannot be taken, but has there been any change?
A2	As discussed earlier, by the use of technologies such as slicing, highly accurate guarantee on bandwidth would be possible. Study of critical mission such as autonomous driving or remote surgery would probably be included in the portfolio in the context of development of technology, and of creating multi-bearer environment including fixed telecom. Though we do not advertise it, we believe there is a potential in those fields, so not only due to the change in business environment at this time, but also in looking toward advancement of 5G technology, we do not deny that direction.
Questioner No.11	
Q1	My Network Concept was announced earlier, but could you update the current situation.
A1	My Network Concept was announced about a year and a half ago. Since the 3G era, smartphone has become the mainstream device, and now the majority of customer experiences are by smartphones. We feel this form of usage will continue, but because smartphone is limited as a means of input and in its display size, we want to broaden the customers' body-sensory experiene of services by removing barriers through the use of peripheral devices. The goal of My Network Concept is to enhance the value of 5G services, and to expand the ecosystem, involving the peripheral device vendors in it. We have been steadily proceeding with our endeavors, but in the announcement this time, a peripheral device rental service Kikito is an important initiative for broadening the base. Initially through the use of Kikito, not only the accessible and affordable devices, but also Kikito can make the not-so-accessible devices such as VR goggles, high-def or 360-degrees camera will be available. We want to pursue My Network concept with this initiative. In addition, we perceive the effort to build the services with partners provided on devices, and enhancing service experience of customers on 5G network to be an important task.