



The 5G Messaging Service

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01 Preface

With the evolution of communication technologies, mobile communication network has evolved rapidly in 2G, 3G and 4G eras. In 2020, a year that 5G will be extensively commercialized, Chinese operators will actively carry out new 5G infrastructure construction and fully upgrade basic communication service leveraging advantages such as accessibility, security and interoperability, to address growing communication demands from subscribers, and contribute to digital transformation in all industries.

Short Message Service (SMS) could no longer fully address emerging demands for advanced features and better user experience from subscribers. Operators around the world have reached consensus that the operator messaging service in the 5G era needs to be upgraded from SMS to RCS messaging, i.e. 5G Messaging service. 5G Messaging service can support not only Person-to-Person (P2P) messaging, but also Application-to-Person (A2P) messaging. As per GSMA specification, RCS messaging is mandatory for 5G handsets. It can be foreseen that the popularity of 5G Messaging could bring new service experience to subscribers and valuable opportunity to operators, brands and their partners.

The joint release of 5G Messaging service white paper by China Telecom, China Mobile and China Unicom is aimed to call for collaboration with industry partners to help fully roll out of 5G Messaging service. In the meantime, Chinese operators are willing to share experience of exploration and practice with operators around the world, to build global 5G Messaging ecosystem and facilitate global prosperity of 5G Messaging service.

The 5G Messaging service requirements outlined in this white paper are common to China Telecom, China Mobile, and China Unicom, as a guideline for the industrial stakeholders to prepare solutions and products in a timely manner to jointly promote 5G Messaging service.

02 Visions

5G Messaging service, following GSMA RCS Universal Profile, brings advanced services such as multimedia messaging, group chat, and most notably, Messaging as a Platform (MaaP). With MaaP, the brands can provide online Chatbot to connect to their customers, and the customers could experience one-stop service including searching a brand, conversation with its Chatbot and payment etc. Thus, the 5G messaging will become a new entry for the online services. .

5G Messaging will be embedded in devices as delivered, eliminating the need for client downloading. 5G Messaging improves the user experience of messaging communication with richer contents including text, audio, video, image, geo-location and etc., and friendly user interface..

5G Messaging help governments and enterprises connect to the mobile users by providing online services with Chatbot. Users could search and select Chatbot via Chatbot Directory of 5G Messaging, as convenient as retrieving applications from application stores. A Chatbot represents a public service or business service. The users can access to the Chatbot at any time and have conversation with the Chatbot with rich media message and interactive Rich Cards. With 5G Messaging, the users conveniently obtain personalized service from service providers, and in another hand, the brands have a new and valuable channel for providing intelligent service and getting user feedback, and hence having closer connection with their customers.

5G Messaging service, as an upgrade of SMS, will be seamless intergraded with SMS in the handset, and inherits the carrier-grade service merits such as E.164 numbering, real-name, security, reliability, interoperability and interworking. Driven by artificial intelligence, cloud computing, big data and other emerging technologies, a wide variety of intelligent service will be powered by 5G Messaging to address users' demands of rich information communication and diversified service.

03 Service Description and Requirements

▶ 3.1 Overview

5G Messaging service supports multiple media formats, including text, picture, audio, video, etc. 5G Messaging service supports two types of message: the Person-to-Person (P2P) messaging service and the Application-to-Person (A2P) messaging service. The P2P messaging service includes 1-to-1 Messaging, 1-to-many Messaging and Group Chat . The combination of 5G Messaging service and voice call service can enrich the user experience.

▶ 3.2 P2P Messaging

3.2.1 General Requirements

P2P Messaging service support multiple types of media formats. The content of a message can be text, audio, video, picture, emoticons, vCard, geo-location, etc. It shall support Delivery Assurance, as well as message delivery status report and message history management for users.

3.2.2 1-to-1 Messaging

1-to-1 Messaging enables a user sending/receiving standalone messages to/from another user. It is required to send and receive RCS Message/SMS/MMS in a unified user interface, and interworking between RCS Message /SMS/MMS shall be supported. It shall support Network Fallback to SMS (NFS). If a message contains multimedia content, when the user falls back to SMS, a URL for retrieving the multimedia content will be carried in the SMS content, and the receiver can access the multimedia content by clicking the URL after receiving the SMS.

3.2.3 1-to-many Messaging

It shall support sending 1-to-many messages by selecting multiple recipients. A distribution list shall be created for a 1-to-many message on the sender party. Each receiver will receive a 1-to-1 message. It shall support Network Fall-back to SMS (NFS). If a message contains multimedia content when it falls back to SMS, a URL for extracting the multimedia content will be carried in the SMS content, and the receiver can access the multimedia content by clicking the URL after receiving the SMS.

3.2.4 Group Chat

It shall support creating a Group Chat conversation with a group of selected contacts whose devices are 5G Messaging capable. Group Chat allows users to exchange chat messages with a number of contacts at the same time. It shall support group management, including creating, leaving, deleting and dissolving a group, and adding, removing participants. The management of group meta-information shall also be supported.

3.3 A2P Messaging (MaaP)

3.3.1 General Requirements

A2P messaging enables the brands communicate with users through Chatbot. Users can send RCS messages to Chatbot including text, image, audio, video, emoticons, geo-location, vCard and file. Chatbots shall be able to message users via 1-to-1 or 1-to-many and send rich messages including text, image, audio, video, emoticons, geo-location, vCard and file. Chatbot shall be able to send Rich Cards that provide Suggested Chip List consisting of Suggested Replies and Actions.

3.3.2 Chatbots Discovery Service

Users shall be able to initiate conversations with Chatbots in multiple ways:

- Select the chosen Chatbot after searching in the message search box
- Click a Deep Link from a webpage displayed on a mobile browser
- Scan QR code
- Search based on Chatbot identifier (i.e. Service ID)

3.3.3 Chatbot Profile Information Viewing Service

Users may be able to view Chatbot Profile Information retrieved by terminals. The Chatbot Profile Information may consist of following elements:

- Service ID
- Service Name
- Service Icon
- Service Description, etc.

Users may be able to store or remove the Chatbot Profile Information on their devices.

The terminal will query the network to verify this Chatbot after receiving a message from a Chatbot for the first time. If the Chatbot is not found, the source of the message is considered to be unreliable and will not be displayed to the user, thereby ensuring the reliability of the source of the message.

3.3.4 Messaging Service Process

Users can communicate with Chatbots through Suggested Chip List (i.e. Suggested Replies and Actions). Suggested Replies or Suggested Actions shall be displayed as selectable buttons. When a Suggested Reply is tapped, the terminal shall send the suggested reply text to the conversation which can be seen by the user.

Suggested Actions when tapped shall be able to trigger one of the following actions:

- Open a web URL (which shall be used to open either a web or another APP on the device)
- Initiate a voice call to defined destination
- Initiate a video call to a defined destination
- Open the user's default mapping app to a position
- Send a geo-location push back to the Chatbot
- Open the user's default calendar app to the new event page
- Send a message to a defined destination
- Initiate the recording and sending of an audio or video message to a defined destination, etc.

Suggested Chip List (i.e. Suggested Replies and Actions) sent by Chatbots can be displayed as floating menus or buttons in Rich Cards or Persistent Menus at the bottom of conversation screens. Once a Suggested Chip List displayed as a floating menu is tapped, the whole Suggested Chip List disappears; whereas when a Suggested Chip in a Rich Card or a Persistent Menu is tapped, the Suggested Replies and Actions in the Rich Card or the Persistent Menu do not disappear.

04 Technical requirements

4.1 General Requirements

5G Messaging services is the update of basic telecommunication services of MNOs. It will be generally supported by all terminals and MNOs' network in the 5G era. 5G Messaging services is natively implemented. It is recommended that the 5G Messaging services is on by default in the terminals without manually switching it on. MNOs will upgrade the network to support 5G Messaging services and provide global interoperability.

4.2 Terminal Requirements

5G Messaging services shall be natively implemented in the terminals as per specified in GSMA RCS Universal Profile v2.4. It is recommended that the terminals support upgrade mechanism to synchronize with the latest specification.

The technical requirements for terminals are listed below:

1)The terminals shall support the procedures for client configuration. The network configuration data and client configuration parameters relevant to RCS services are provided by the serving MNO.

2)The terminals shall support AKA and GBA based user authentication using the 3GPP Authentication Centre and the USIM.

3)Sending 1-to-1/1-to-many messaging via RCS Standalone Messaging and receiving 1-to-1 messaging via RCS Standalone Messaging are required to be supported.

4)Communication between terminals and Chatbots via RCS Standalone Messaging shall be supported.

5)RCS Group Chat is needed to be supported.

6)Various media types, e.g. picture, audio, video and vCard, can be sent in all kinds of messaging services by using HTTP based file transfer mechanism.

7)It is required to support regular RCS messages, Rich Cards and both message types combined with a Suggested Chip List (including Suggested Replies and Actions) in the Chatbot Service.

8)The terminals shall support the Chatbot discovery mechanism by retrieving a list of available Chatbots from MNO configured Chatbot Directory.

9)The terminals shall support the retrieval of Chatbot Profile Information by accessing MNO configured Chatbot Information Function.

10)It is required for the terminals to invoke a Chatbot conversation with specific contents from a deep link. The deep links can be embedded in a webpage, a mobile application, or a QR code.

11)Spam Report and Inappropriate Chatbot Behavior shall be supported.

12)Network based Chatbot Blacklist and client local Chatbot Blacklist should be supported

4.3 Network Requirements

5G Messaging services shall be supported by the MNOs' network according to GSMA RCS Universal Profile v2.4. The network shall authorize the terminals to use 5G Messaging services and communicate with the terminals via RCS Standalone Messaging. The additional technical requirements for MNOs' network are listed below:

1) Provide unified User-Network Interface among all three Chinese MNOs. The terminals can use 5G Messaging services in every MNO's network without modification.

2) Provide unified Chatbot API Interface among all three Chinese MNO. The Brands can use Chatbot Service via different MNO's network without additional development.

3) The MNOs' network must support compatibility with multiple software versions of the terminals, due to the manually upgrade rate of terminals.

4) The global interoperability of 1-to-1 messaging and RCS Group Chat are necessary to be provided.

5) The verification and authentication of Chatbot shall be provided by the network.

6) The network shall support management of Chatbot list and Chatbot Profile Information. The retrieval procedures of Chatbot list and Chatbot Profile Information are necessary to be supported.

7) Standalone Message Delivery Assurance should be supported by using Network Interworking with Legacy Messaging services and Standalone Message Revocation specified in GSMA PRD RCC.07 v11.0.

8) MNOs' network should be updated with the new version of RCS Universal Profile. Three MNOs are recommended to provide similar services based on similar technical implementation.

9) Spam Report and Inappropriate Chatbot Behavior shall be supported.

4.4 Brands Access Requirements

Brands can apply Chatbot Service via MNOs' Chatbot API. Brands can communicate with all the three MNOs' subscriber by using Chatbot Standalone Message specified in GSMA PRD RCC.07 v11.0. The technical requirements for Chatbots are listed below:

1)It is necessary for the Chatbots to call Chatbot APIs to send unicast or multicast message to terminals via MNOs' network.

2)It is necessary for the Chatbots to call Chatbot APIs to exchange regular RCS messages and regular RCS messages combined with a Suggested Chip List (including suggested replies and actions) with terminals via MNOs' network.

3)It is necessary for the Chatbots to call Chatbot APIs to exchange Rich Cards and Rich Cards combined with a Suggested Chip List with terminals. Title, description, multimedia (e.g. image, video and voice) and Suggested Chip List elements can be included in Rich Cards.

4)Receiving and handling messages sent from terminals are necessary to be supported by the Chatbots.

5)Receiving and handling Client Response to Suggestion messages and Data shared messages shall be supported by the Chatbots.

05 Building a 5G Messaging Ecosystem

The 5G Messaging ecosystem built by global operators and industry partners will be a standard, open and win-win ecosystem. Jointly launched first by the three operators in China, 5G Messaging service could deliver cross-carrier-service to all domestic users as well as interconnect with other MNOs globally. With unified technical standards, 5G Messaging could eliminate the implementation differences of terminals, achieve the interoperability between the

terminal and the network, and offer common experiences to all end-users. As The 5G Messaging ecosystem built by global operators and industry partners will be a standard, open and win-win ecosystem. Jointly launched first by the three operators in China, 5G Messaging service could deliver cross-carrier-service to all domestic users as well as interconnect with other MNOs globally. With unified technical standards, 5G Messaging could eliminate the implementation differences of terminals, achieve the interoperability between the terminal and the network, and offer common experiences to all end-users. As more operators around the world join 5G Messaging ecosystem, further expanding of user coverage could be expected. As a platform, 5G messaging service has the nature of openness and absolute neutrality to all brands to ensure fair access. All parties in this ecosystem, including operators, brands, terminal manufacturers, individual users, as well as AI and software vendors, could expect for a much more profitable and promising future.

5G Messaging serves as a friendly and convenient bridge between brands and their customers. Brands are enabled to offer richer and more vivid information to customers. Meanwhile, users could have an easier way of service consulting and feedback, and could even complete services instantly within the messaging window. Instead of adapting to each platform and handset repeatedly, brands now simply connect to operator's platform via one single standard interface, which remarkably lowers development and operation cost.

5G Messaging will derive new profit space for handset vendors. 5G Messaging service is embedded in the handset and does not require APP downloading. The 5G Messaging services will be shipped in the new delivered devices as well as in the upgraded devices that are already in the market, providing better user experience of messaging and information service. More and more benefits and profits will be driven by the messaging service, with which the handset vendors could explore new possibilities.

Brands are important parties involved in 5G messaging ecosystem, and operators are committed to provide unified interface for the brands, lowering the barriers of external services' access adaption and industry innovation, to gather industry customers, incubate and create diversified applications, and accelerate development and maturity of ecosystem.

5G Messaging service essentially relies on native support of handset, which makes terminal industry a critical factor for ecosystem building. The three leading operators in China will cooperate closely in all around including technical standardization, device testing and etc., for promoting maturity and global prosperity of terminal industry for 5G Messaging.

5G Messaging service as an upgrade of SMS service is a basic telecommunication service. With global support by operators, its business advantage will be maximized, serving mobile users in the world with a more convenient and qualified information service.

5G Messaging has brought rare opportunities to global industry. Involved parties' collaboration, innovation and development will necessarily bring prosperity to ecosystem and have profound effect on our society.

06 Conclusion

Operators have the responsibility of providing customers high-quality pervasive communication services, and are committed to improving service capacity and user experience. 5G Messaging service is an upgrade of SMS, and will be a core and actively developed communication service by operators in 5G era.

China Telecom, China Mobile and China Unicom look forward to full collaboration with operators and industry partners around the world, to make 5G service a universally available telecommunication service enabled on every handset and used by every subscriber.

07 Terms

Term	Description
MaaP	A remote service that the user is able to communicate with from the Messaging Application on the device, e.g. a Chatbot.
Chatbot	An automated service provided to users whose output is presented in a conversational form. Often a piece of software interfacing with one or more users aiming to simulate intelligent human conversation.
Standalone Message	A single text message that was conveyed from one user to another using the RCS Standalone Messaging service.