GTI

Global TD-LTE Initiative **Beijing, China**

Ref: 2019-TERM-03

Ingbert Sigovich, SECRETARY
3GPP RAN5
E-mail: ingbert.sigovich@etsi.org

E-mail: admin@gtigroup.org
cc: songdan@chinamobile.com
bosco.choi@anritsu.com

Title: Reply to RAN5 LS "Study on 5G NR Application Layer Data Throughput Performance"

Response to: Study on 5G NR Application Layer Data Throughput Performance

GTI would like to thank 3GPP RAN5 for the LS R5-195422 about a study on 5G NR Application Layer Data Throughput Performance. We would like to inform RAN5 that GTI started developing a 5G Device Function and Performance Test Specification in June-2018. It is part of the overall 5G Device Certification programme in sub-6G bands for NSA and SA. It consists of a number of test chapters desgined to meet the specific test requirements by GTI operator members. They aim to complement the conformance tests desgined by RAN5 and certified by GCF. Chapter 10 of this test specification covers Data Throughput with a number of test cases included as listed in the appendix

Please note that 10.7 "Throughput with CA" list of test cases are not yet defined. The detail definition of the test cases can be found in latest version of the GTI 5G Device Function and Performance Test Specification v2.0 June-2019. A copy is attached. Below is the latest progress status of this test specification.

		Total		Phase 1 (Feb-2019)		Phase 2 (Jun-2019)		Phase 3 (Nov-2019)		
Chapter	Name	TC count	Progress	TC count	Progress	TC count	Progress	TC count	Progress	Comment
5	Basic Function	27	85%	15	100%	8	100%	4	0%	All P1&2 test cases completely defined
6	Mobility	21	100%	15	100%	6	100%			All P1&2 test cases completely defined
7	Service	4	100%			4	100%			All P2 test cases completely defined
8	Roaming	0						0		Test case list to be defined later
9	Power Consumption	40	90%	27	90%	13	90%			4 new P2 test cases added. All 40xP1&2 test cases defined, each at 90% completion.
10	Data Throughput	20	94%	9	93%	11	95%			7 P2 new test cases were added in phase 2
11	Latency	2	90%			2	90%			All P2 test cases defined at 90% completion.
12	High Speed Train	0						0		Test case list to be defined later
13	Beam Management	5	0%					5	0%	
	Total	119	88%	66	95%	44	95%	9	0%	

GTI is very interested to see RAN5's plan to cover the 5G NR Application Layer Data Throughput Performance. This indeed is a very important test area to ensure the quality of service is delivered under very challenging data throughtput demand in a 5G network. GTI would be very happy to support RAN5 in this work and provide further input in due course. In the meantime, GTI would welcome comments and feedback on the above Data Throughput tests.

GTI look forward to seeing the progress of this important study item and would kindly ask RAN5 to keep us informed.

Date of Next GTI Meetings:

GTI Workshop #26	Sep. 2019 (Date TBC)	Location (TBC)
GTI Workshop #27	Feb. 2019(Date TBC)	Barcelona, Spain

Reference

[1] GTI 5G Device Test and Certification Solution Progress Report, Feb-2019

[2] GTI 5G Device Function and Performance Test Specification v2.0.0

Appendix:

Chapter	Title	Introduction	UE Applicability
10	**Data Throughput**		
10.1	**Downlink TCP Throughput**	**To include ideal channel and fading channel**	
10.1.1	DL Throughput under static channel, DL 256QAM, DL4*4 MIMO	Conducted, Static Channel, SA Option2, 100 MHz BW, Full Resource Allocation,256QAM, DL 4*4 MIMO	SA SA+NSA
10.1.2	DL Throughput under fading channel, DL 256QAM, DL4*4 MIMO	Conducted, Static Channel, SA Option2, 100 MHz BW, Full Resource Allocation,256QAM, DL 4*4 MIMO	SA SA+NSA
10.2	**Uplink TCP Throughput**	**To include ideal channel and fading channel**	
10.2.1	UL Throughput under static channel, UL 64QAM, UL2*2 MIMO	Conducted, Static Channel, SA Option2, 100 MHz BW, Full Resource Allocation, UL 64QAM, UL 2*2 MIMO	SA SA+NSA
10.2.2	UL Throughput under static channel, UL 256QAM, Single TX, HPUE	Conducted, Static Channel, SA Option2, 100 MHz BW, Full Resource Allocation, UL 256QAM, Single TX, HPUE	SA SA+NSA
10.2.3	UL Throughput under static channel, UL 256QAM, UL2*2 MIMO	Conducted, Static Channel, SA Option2, 100 MHz BW, Full Resource Allocation, UL 256QAM, UL 2*2 MIMO	SA SA+NSA
10.3	**Bi-directional UDP Throughput**	**To include ideal channel and fading channel**	
10.3.1	Bi-direction Throughput under static channel,256QAM, DL 4*4 and UL 2*2 MIMO	Conducted, Static Channel, SA Option2, 100 MHz BW, Full Resource Allocation,256QAM, DL 4*4 MIMO,UL 2*2 MIMO, ideal channel	SA SA+NSA
10.3.2	Bi-direction Throughput under fading channel,256QAM, DL 4*4 and UL 2*2 MIMO	Conducted, fading Channel, SA Option2, 100 MHz BW, Full Resource Allocation,256QAM, DL 4*4 MIMO, UL 2*2 MIMO, fading channel	SA SA+NSA
10.4	**Downlink TCP Throughput, NSA**		
10.4.1	DL Throughput under static channel, DL 256QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, 256QAM, DL NR 4*4 MIMO + LTE 2*2 MIMO, data transmission on MCG and SCG simultaneously	NSA SA+NSA

10.4.2	DL Throughput under fading channel, NSA	Conducted, fading Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, dynamic scheduling based on channel condition, data transmission on MCG and SCG simultaneously	NSA SA+NSA
10.4.3	DL Throughput under static channel on SCG,DL 256QAM, NSA	Conducted, Static Channel, NSA Option3x, 100 MHz BW, Full Resource Allocation, 256QAM, DL NR 4*4 MIMO，data transmission on SCG	NSA SA+NSA
10.4.4	DL Throughput under fading channel on SCG,NSA	Conducted, fading Channel, NSA Option3x, 100 MHz BW, Full Resource Allocation, dynamic scheduling based on channel condition，data transmission on SCG	NSA SA+NSA
10.5	**Uplink TCP Throughput, NSA**		
10.5.1	UL Throughput under static channel, UL 64QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, UL NR 64QAM+LTE 64QAM,data transmission on MCG and SCG simultaneously	NSA SA+NSA
10.5.2	UL Throughput under static channel, UL 256QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, UL NR 256QAM+LTE 64QAM, data transmission on MCG and SCG simultaneously	NSA SA+NSA
10.5.3	UL Throughput under static channel on SCG, UL 64QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, UL NR 64QAM，data transmission on SCG	NSA SA+NSA
10.5.4	UL Throughput under static channel on SCG, UL 256QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, UL NR 256QAM，data transmission on SCG	NSA SA+NSA
10.6	**Bi-directional UDP Throughput, NSA**		
10.6.1	Bi-direction Throughput under static channel, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, 256QAM, DL NR 4*4 MIMO+ LTE2*2 MIMO, UL NR 256QAM+LTE 64QAM，data transmission on MCG and SCG simultaneously	NSA SA+NSA
10.6.2	Bi-direction Throughput under fading channel, NSA	Conducted, fading Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, dynamic scheduling based on channel condition, data transmission on MCG and SCG simultaneously	NSA SA+NSA
10.6.3	Bi-direction Throughput under static channel on SCG,UL 64QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, DL NR 256QAM+4*4 MIMO, UL NR 64QAM,data transmission on SCG	NSA SA+NSA

10.6.4	Bi-direction Throughput under static channel on SCG,UL 256QAM, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, DL NR 256QAM+4*4 MIMO, UL NR 256QAM,data transmission on SCG	NSA SA+NSA
10.6.5	Bi-direction Throughput under fading channel on SCG, NSA	Conducted, Static Channel, NSA Option3, 100 MHz BW, Full Resource Allocation, dynamic scheduling based on channel condition, data transmission on SCG	NSA SA+NSA
10.7	**Throughput with CA**		