

# 5G NR FR1 NCC PLMN CMX500 TEST DEMONSTRATION

Application Engineer  
Chuck Lo

**ROHDE & SCHWARZ**

Make ideas real



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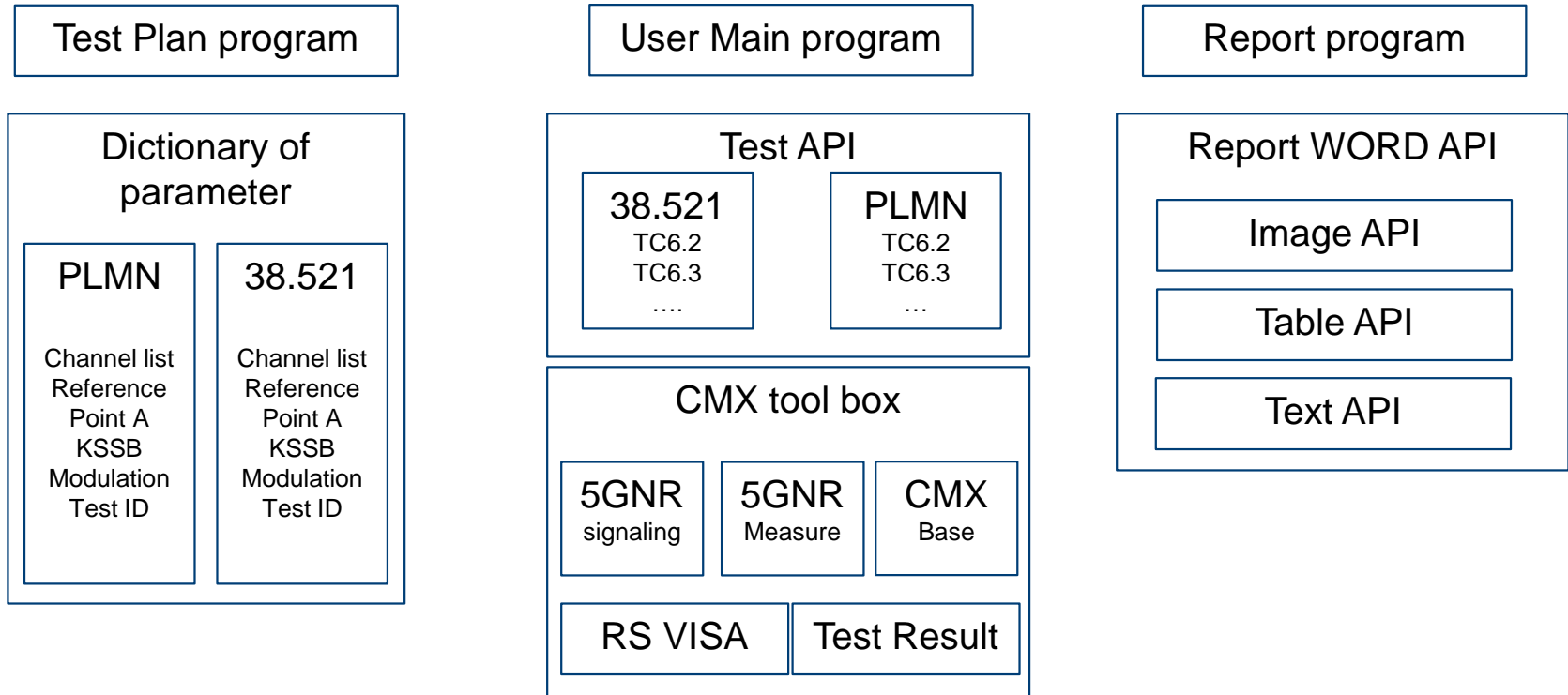
# OUTLINE

- ▶ Design Goals
- ▶ Structure of 5G NR ATE
- ▶ Test Plan Editor
- ▶ Test main Body and Result
- ▶ Test Report Generator
- ▶ Demo

# DESIGN GOALS

- ▶ Simple
  - Clear and structured setup
  - Easy to read and understand
  
- ▶ Flexible
  - Quick to adapt and to extend
  - Customization development

# STRUCTURE OF 5G NR ATE



# TEST PLAN EDITOR

- ▶ Test standard
- ▶ Test case
- ▶ Test Item
- ▶ FDD/TDD
- ▶ NR Band
- ▶ LTE Band
- ▶ Channel
- ▶ SCS
- ▶ Bandwidth

Test Standard: 38.521
▼

1. Test Case: 6.2 ▼

Test Case Selected All

2. Test Item: ▼

3. FDD/TDD: TDD ▼

4. NR Band: 40 ▼

LTE Band: 4

NR Cell Power: -85

LTE Cell Power: -85

5. Channel: M ▼

User Define CH

6. SCS: 30 ▼

TDD only used SCS 30KHz

7. Bandwidth: 100 ▼

Get Image

+ Add to Test Plan

Number:

Delete Test Number

Modify Test Number

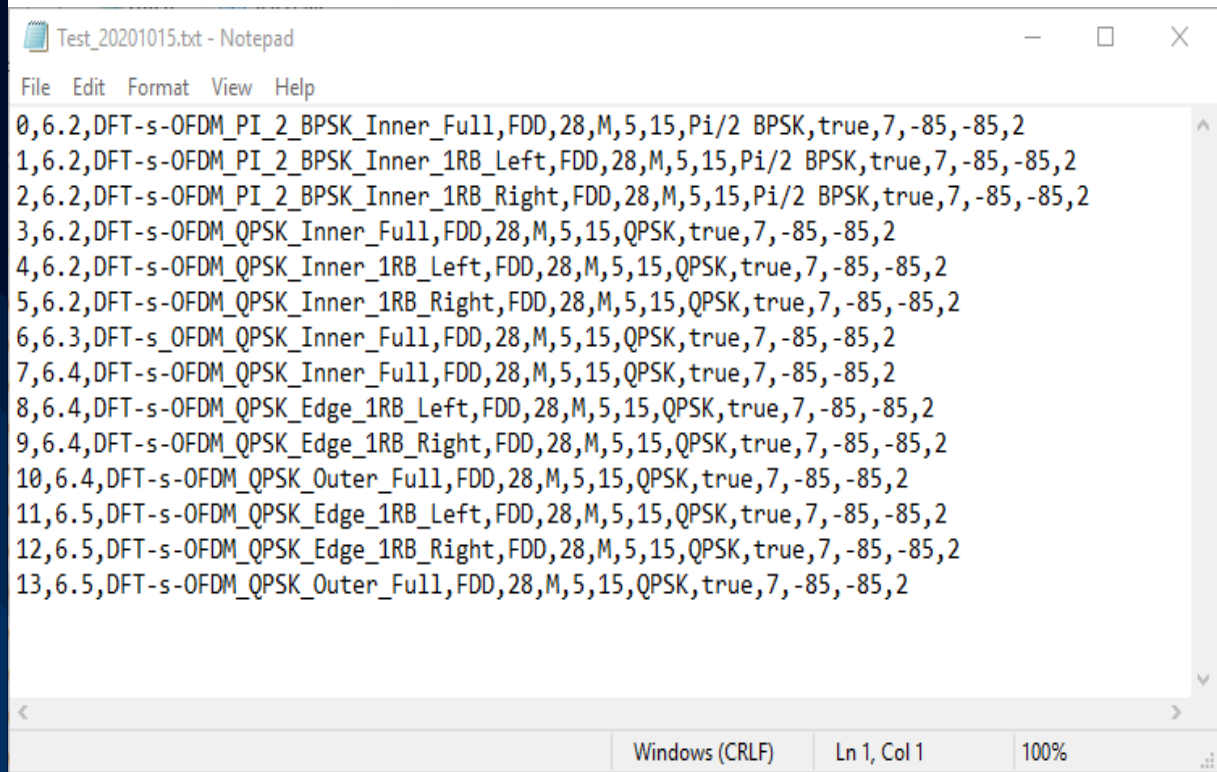
Save and Export Test Plan

Load Test Plan

Test Ti...	Test Case	Test Item	FDD/TDD	Band	Channel	Bandwidth	SCS	Modulation	Get Image	LTE Band	NR PWR	LTE PWR	CH Loss
0	6.2	DFT-s-OFDM_QPSK_Inner_Full	TDD	40	M	100	30	QPSK	false	4	-85	-85	2
1	6.3		TDD	40	M	100	30	QPSK	false	4	-85	-85	2
2	6.2	DFT-s-OFDM_PI_2_BPSK_Inner_Full	TDD	40	M	100	30	Pi/2 BPSK	false	4	-85	-85	2
3	6.2	DFT-s-OFDM_PI_2_BPSK_Inner_1RB_Left	TDD	40	M	100	30	Pi/2 BPSK	false	4	-85	-85	2
4	6.2	DFT-s-OFDM_PI_2_BPSK_Inner_1RB_Right	TDD	40	M	100	30	Pi/2 BPSK	false	4	-85	-85	2
5	6.2	DFT-s-OFDM_QPSK_Inner_Full	TDD	40	M	100	30	QPSK	false	4	-85	-85	2
6	6.2	DFT-s-OFDM_QPSK_Inner_1RB_Left	TDD	40	M	100	30	QPSK	false	4	-85	-85	2
7	6.2	DFT-s-OFDM_QPSK_Inner_1RB_Right	TDD	40	M	100	30	QPSK	false	4	-85	-85	2

# TEST PLAN FILE

- ▶ File type is txt
- ▶ Easy to modify
- ▶ Easy list what you want to measure
- ▶ Everything is on test plan



```
Test_20201015.txt - Notepad
File Edit Format View Help
0,6.2,DFT-s-OFDM_PI_2_BPSK_Inner_Full,FDD,28,M,5,15,Pi/2 BPSK,true,7,-85,-85,2
1,6.2,DFT-s-OFDM_PI_2_BPSK_Inner_1RB_Left,FDD,28,M,5,15,Pi/2 BPSK,true,7,-85,-85,2
2,6.2,DFT-s-OFDM_PI_2_BPSK_Inner_1RB_Right,FDD,28,M,5,15,Pi/2 BPSK,true,7,-85,-85,2
3,6.2,DFT-s-OFDM_QPSK_Inner_Full,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
4,6.2,DFT-s-OFDM_QPSK_Inner_1RB_Left,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
5,6.2,DFT-s-OFDM_QPSK_Inner_1RB_Right,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
6,6.3,DFT-s-OFDM_QPSK_Inner_Full,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
7,6.4,DFT-s-OFDM_QPSK_Inner_Full,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
8,6.4,DFT-s-OFDM_QPSK_Edge_1RB_Left,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
9,6.4,DFT-s-OFDM_QPSK_Edge_1RB_Right,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
10,6.4,DFT-s-OFDM_QPSK_Outer_Full,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
11,6.5,DFT-s-OFDM_QPSK_Edge_1RB_Left,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
12,6.5,DFT-s-OFDM_QPSK_Edge_1RB_Right,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
13,6.5,DFT-s-OFDM_QPSK_Outer_Full,FDD,28,M,5,15,QPSK,true,7,-85,-85,2
Windows (CRLF) Ln 1, Col 1 100%
```

# TEST MAIN BODY

- ▶ Load Test Plan
- ▶ Test button
- ▶ Test information

RSTW ATE Tools Ver 0.1



## RSTW 5G NR ATE Tools

Load Test Plan

Load

Start Test

Test Time	Test Case	Result or message

# TEST RESULT

- ▶ Test Result Name is set from Date
- ▶ Test Information
- ▶ Test result for each test case

20201015112713TestReport.txt - Notepad

File	Edit	Format	View	Help									
96.875	TestCase: 6.2	Test Item: DFT-s-OFDM_PI_2_BPSK_Inner_Full	Band: 28	CH 156100	BW: 5	SCS: 15							
112.625	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
127.25	6.2 Max Power	20.5	25.0	24.703	dBm	PASS							
133.25	'@PRINT\Test\GetImage_0'												
135	TestCase: 6.2	Test Item: DFT-s-OFDM_PI_2_BPSK_Inner_1RB_Left	Band: 28	CH 156100	BW: 5	SCS: 15							
150.75	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
165	6.2 Max Power	20.5	25.0	24.756	dBm	PASS							
170.875	'@PRINT\Test\GetImage_1'												
172.75	TestCase: 6.2	Test Item: DFT-s-OFDM_PI_2_BPSK_Inner_1RB_Right	Band: 28	CH 156100	BW: 5	SCS: 15							
188.5	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
202.625	6.2 Max Power	20.5	25.0	24.702	dBm	PASS							
208.5	'@PRINT\Test\GetImage_2'												
210.375	TestCase: 6.2	Test Item: DFT-s-OFDM_QPSK_Inner_Full	Band: 28	CH 156100	BW: 5	SCS: 15							
226.125	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
240.375	6.2 Max Power	20.5	25.0	24.725	dBm	PASS							
246.25	'@PRINT\Test\GetImage_3'												
248	TestCase: 6.2	Test Item: DFT-s-OFDM_QPSK_Inner_1RB_Left	Band: 28	CH 156100	BW: 5	SCS: 15							
263.875	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
278	6.2 Max Power	20.5	25.0	24.715	dBm	PASS							
283.875	'@PRINT\Test\GetImage_4'												
285.75	TestCase: 6.2	Test Item: DFT-s-OFDM_QPSK_Inner_1RB_Right	Band: 28	CH 156100	BW: 5	SCS: 15							
301.5	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
315.625	6.2 Max Power	20.5	25.0	24.684	dBm	PASS							
321.625	'@PRINT\Test\GetImage_5'												
323.375	TestCase: 6.3	Test Item: DFT-s-OFDM_QPSK_Inner_Full	Band: 28	CH 156100	BW: 5	SCS: 15							
345.25	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
359.875	6.3 Freq Error	-78.05	78.05	0.554	Hz	PASS							
365.75	'@PRINT\Test\GetImage_6'												
367.625	TestCase: 6.4	Test Item: DFT-s-OFDM_QPSK_Inner_Full	Band: 28	CH 156100	BW: 5	SCS: 15							
389.375	Test Name :	Limit_Low	Limit_High	Test_Result	Unit	Pass/Fail							
404	6.4 ACLR NR Neg	29.2	999	46.777	dB	PASS							
404	6.4 ACLR NR pos	29.2	999	49.312	dB	PASS							
404	6.4 ACLR UTRA1 Neg	32.2	999	48.911	dB	PASS							
404.125	6.4 ACLR UTRA1 pos	32.2	999	51.280	dB	PASS							
404.125	6.4 ACLR UTRA2 Neg	35.2	999	62.250	dB	PASS							
404.125	6.4 ACLR UTRA2 pos	35.2	999	62.329	dB	PASS							
410	'@PRINT\Test\GetImage_7'												



# CMX500 IP DATA THROUGHPUT TESTING APP

Application Engineer  
Chuck Lo

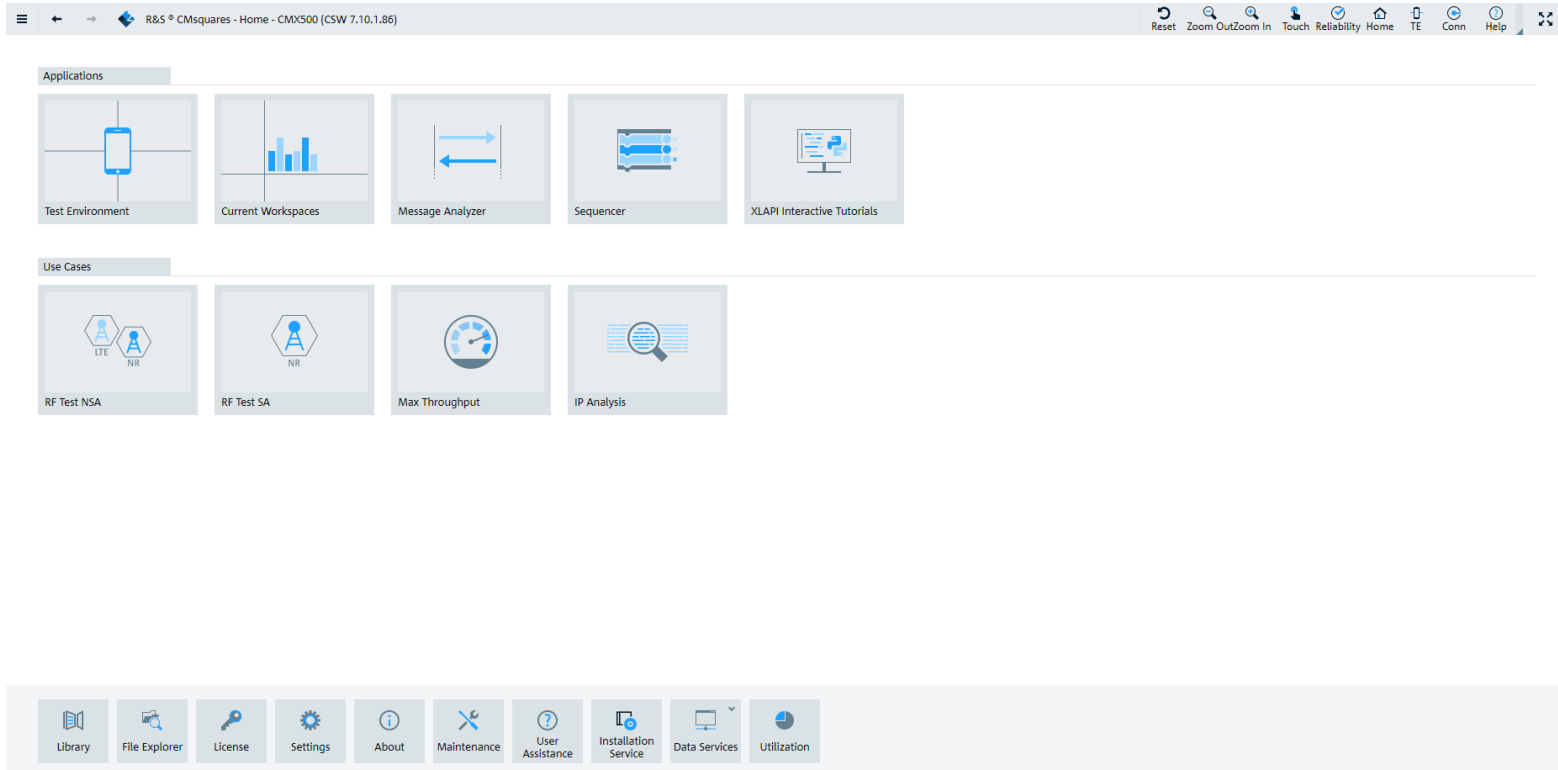
**ROHDE & SCHWARZ**

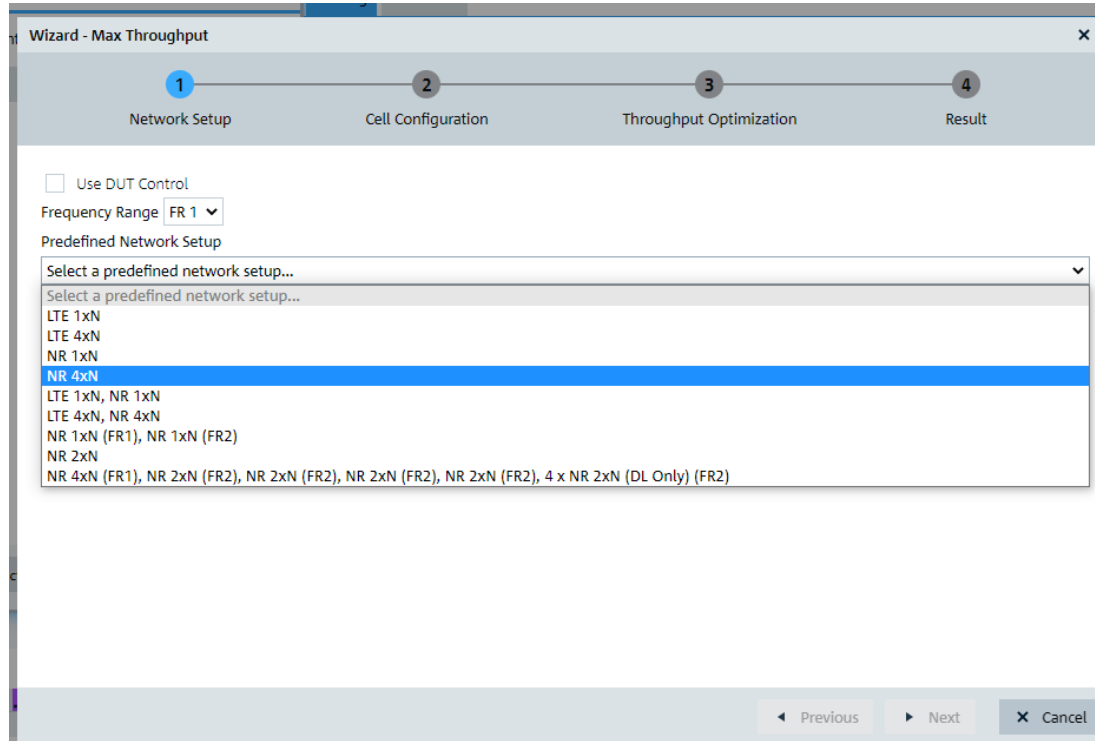
Make ideas real



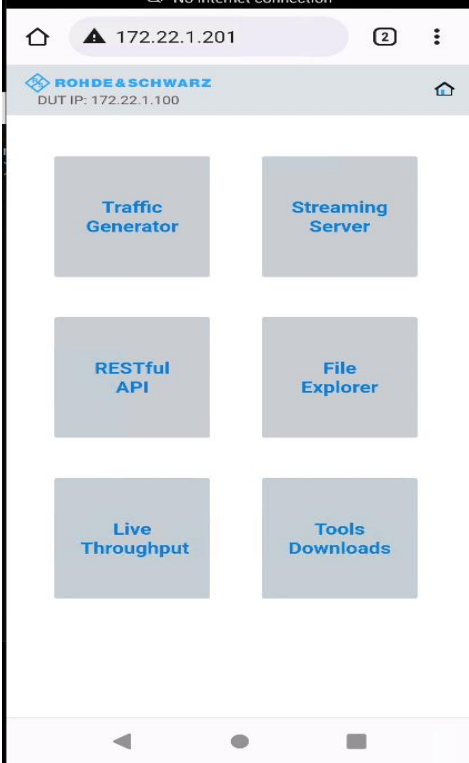
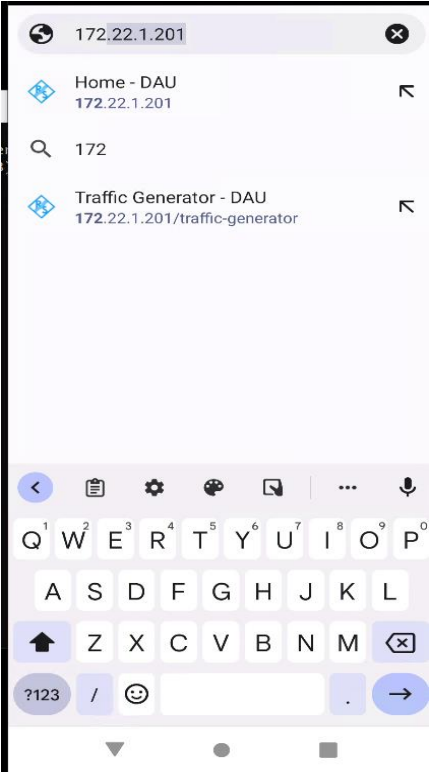
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# CMX500 GUI





# THROUGHPUT APP



# IP DATA THROUGHPUT TESTING

