FCC
MEASUREMENT AND TEST REPORT

For

ZTE Corporation

ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen,
Guangdong, China 518057

FCC ID: Q78-R8119F851719A
May 20, 2017

This Report Concerns: ☒ Original Report	Equipment Type: LTE Remote Radio Unit
Test Engineer:	Jennie.He
Report No.:	RP20170504027-4
Test Date:	Feb 20 – Mar 2, 2017
Reviewed By:	Xie Yuming
Prepared By:	ZRT EMC Shenzhen Laboratory
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2 GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The ZTE Corporation's product, model number: ZXSDR R8119 F851719A or the "EUT" as referred to in this report is a LTE Remote Radio Unit.

Technical specification:
Size: 230 mm (Diameter) * 43.5 mm (Depth)
Input voltage: -48V
Frequency range: UL:824MHz~849MHz; DL: 869MHz~894 MHz
Max RF output power: 20dBm
Appearance of EUT:

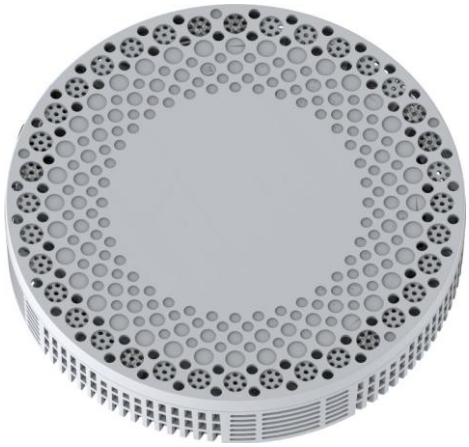


FIGURE 1 APPEARANCE OF ZXSDR R8119 F851719A

Objective

This type approval report is prepared on behalf of ZRT EMC Shenzhen Laboratory in accordance with Part 1、Part 2、part15、Part 24 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2 as well as the following parts:
Part 24 MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES
Applicable Standards: TIA EIA 137-A, TIA EIA 97-D, TIA/EIA 603-C, Land Mobile FM or PM Communications

Equipment Measurement and Performance Standards.
All radiated and conducted measurement was performed at ZTE Corporation Reliability Testing Center. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

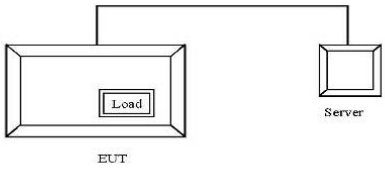
The Test site used by Shenzhen ZTE Technology Service Co., Ltd to collect test data is located in the ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China，Tel: +86-755-26770000，Fax: +86-755-26771999. Test site at ZRT EMC Shenzhen Laboratory has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.
The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 0007895832. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

3 SYSTEM TEST CONFIGURATION

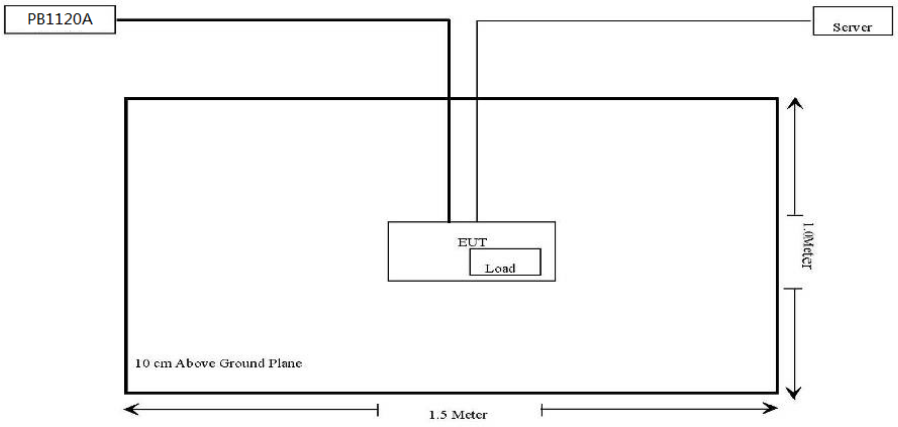
Description of Test Configuration

Justification
The EUT was configured for testing according to TIA/EIA-603C.
The final qualification test was performed with EUT operating at normal mode.
Equipment Modifications
ZTE Corporation has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



4 SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 2.1046 , §22.913	Transmitter output Power	Compliant
§ 2.1091 ,§1.1037	RF Exposure	Compliant
§ 2.1047	Modulation Characteristic	Compliant
§ 2.1053, §22.917	Spurious Radiated Emissions	Compliant

§ 2.1051, §22.917	Spurious Emissions AT Antenna Terminals	Compliant
§ 2.1049	Occupied Bandwidth	Compliant
§ 2.1051,§22.917	Band Edge	Compliant
§ 2.1055	Frequency stability	Compliant

5 TRANSMITTER OUTPUT POWER

Applicable Standard： FCC §2.1046, §22.913

According to FCC §2.1046 &22.913, the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

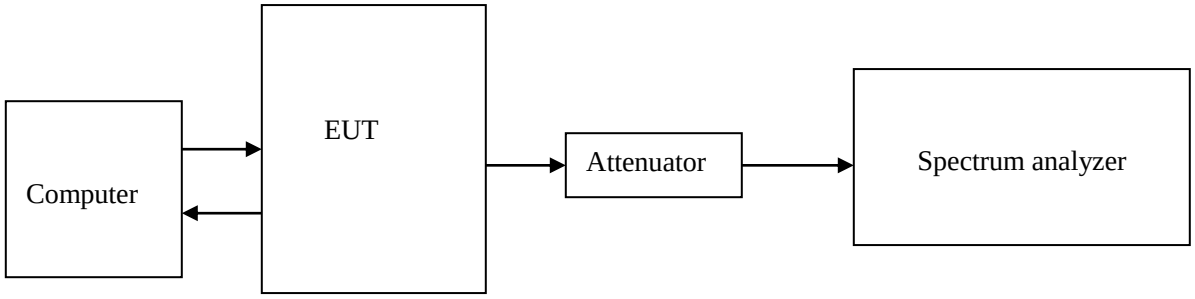
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.09.12	2017.09.12

DTS	DTS 20dB Attenuator	DTS50-30-3-1	09112005	2016.09.12	2017.09.12
Silverline	Silverline RF Cable	SLA18-NMN1T	100311-04-0001	N/A	N/A

*__statement of traceability:__ ZTE Corporation Reliability Testing Center attests that all calibration has been performed per the NVLAP requirements, traceable to NIST.

Test Procedure



The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. External attenuation Loss is 30dB, Cable Loss is about 1.5dB

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

Test Result: Pass

Test Mode: Transmitting LTE

Test Data:

RF Bandwidth :IBW 20M(LTE 20M)

Port	Center Freq. (MHz)	Max output Power in dBm	Total Power in W Of single antenna
0	879	19.8044	35.24
	881.5	19.7677	35.25
	884	19.8788	35.24
1	879	20.1994	35.25

	881.5	20.0609	35.24
	884	20.3166	35.24

RF Bandwidth :IBW 15M(LTE15M)

Port	Center Freq. (MHz)	Max output Power in dBm	Total Power in W Of single antenna
0	876.5	20.0919	35.24
	881.5	19.9989	35.25
	886.5	19.7812	35.24
1	876.5	19.9923	35.25
	881.5	19.8605	35.24
	886.5	19.9875	35.24

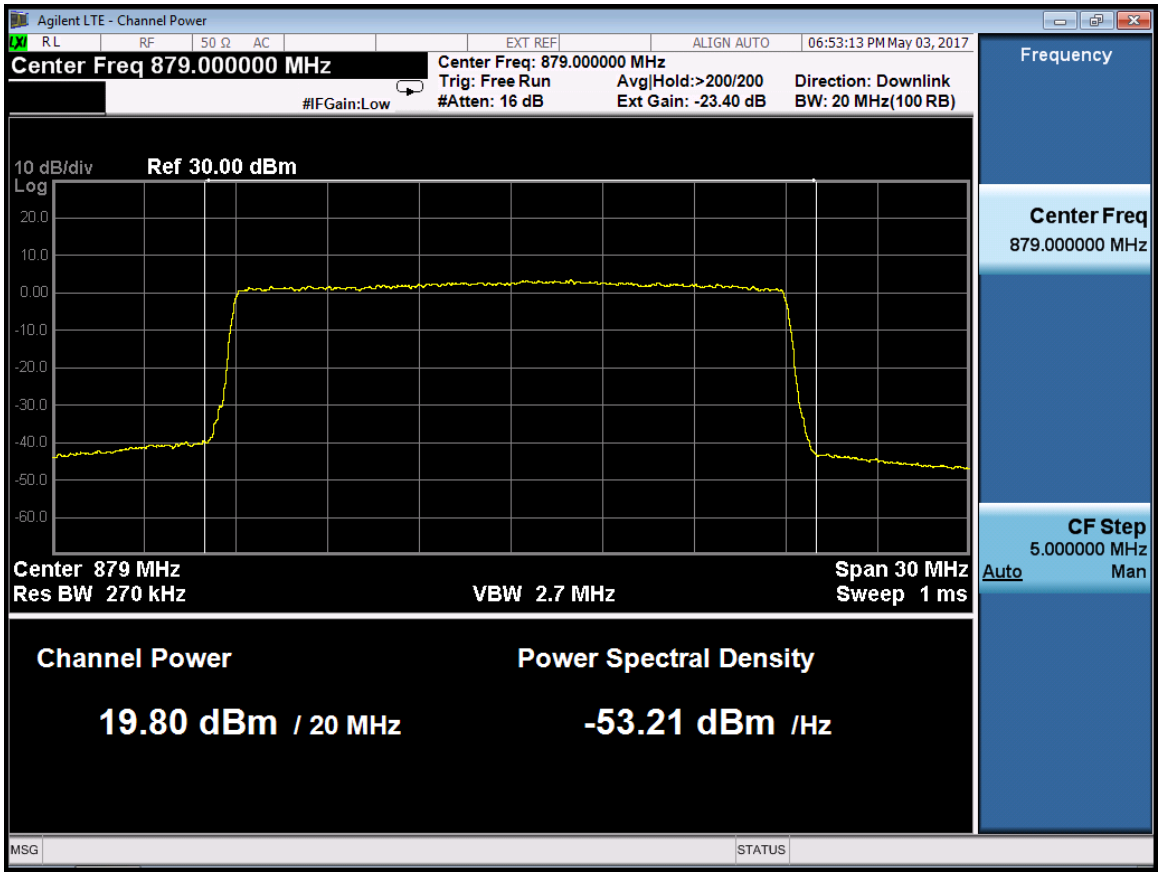
RF Bandwidth :IBW 10M(LTE10M)

Port	Center Freq. (MHz)	Max output Power in dBm	Total Power in W Of single antenna
0	874	19.7415	35.24
	881.5	19.5914	35.25
	889	20.0321	35.24
1	874	20.1512	35.25
	881.5	20.1598	35.24
	889	19.7385	35.24

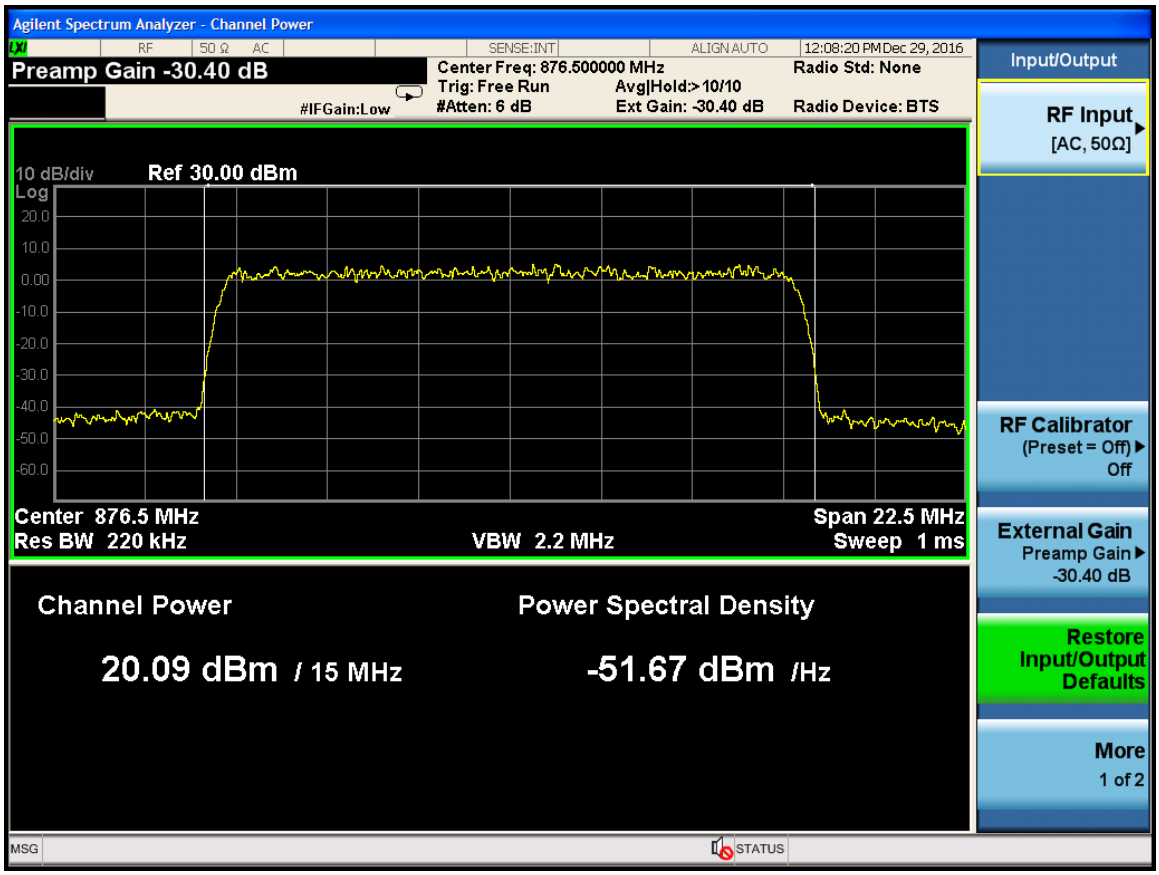
RF Bandwidth :IBW 5M(LTE5M)

Port	Center Freq. (MHz)	Max output Power in dBm	Total Power in W Of single antenna
0	871.5	20.7716	35.24
	881.5	19.8018	35.25
	891.5	20.1987	35.24
1	871.5	20.7684	35.25
	881.5	20.0641	35.24
	891.5	19.1982	35.24

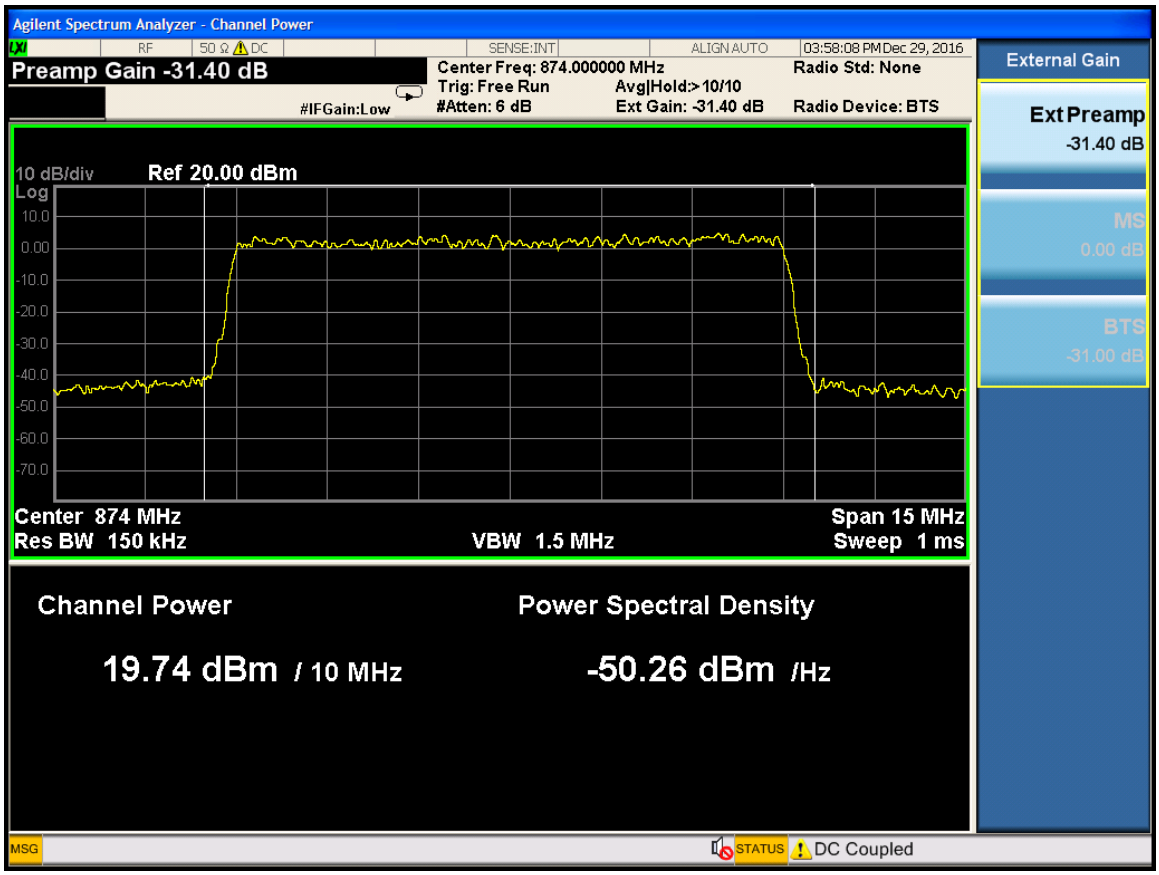
Port 0 - 879MHz



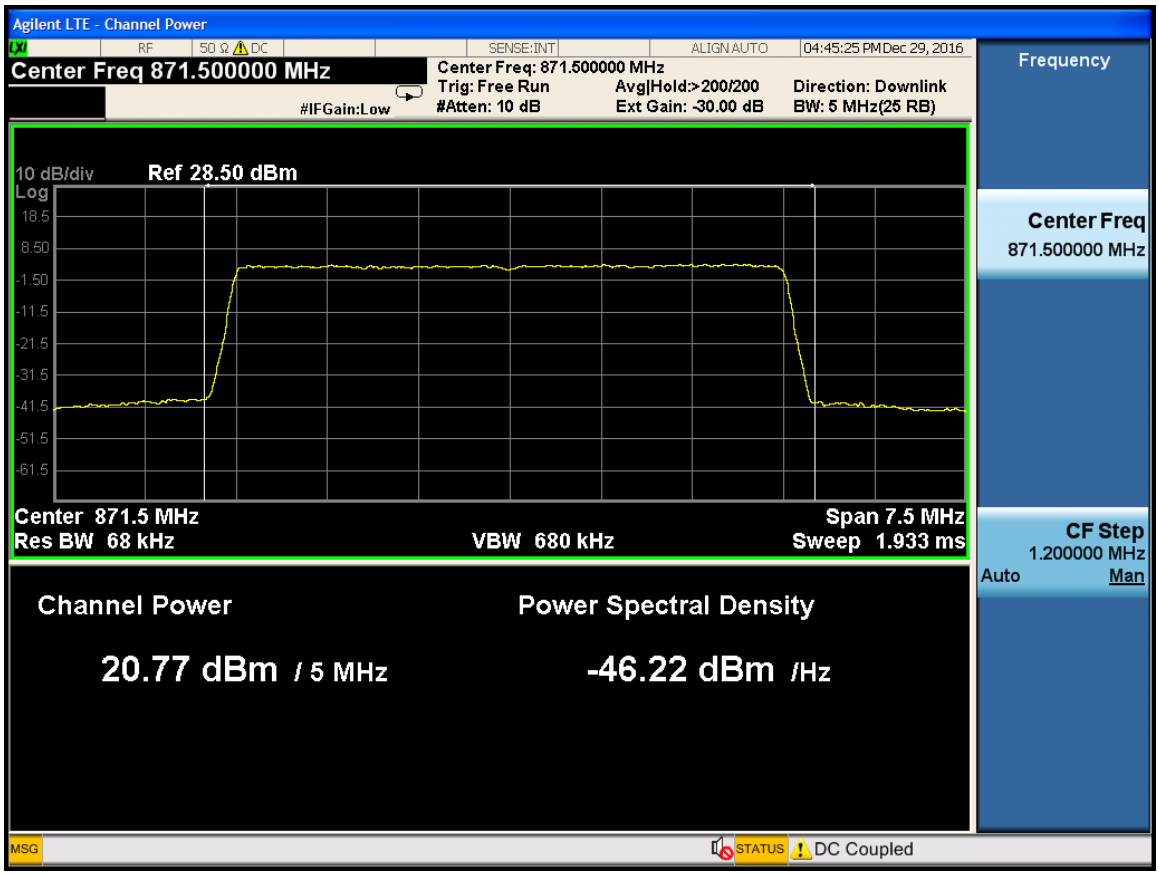
Port 0 - 876.5MHz



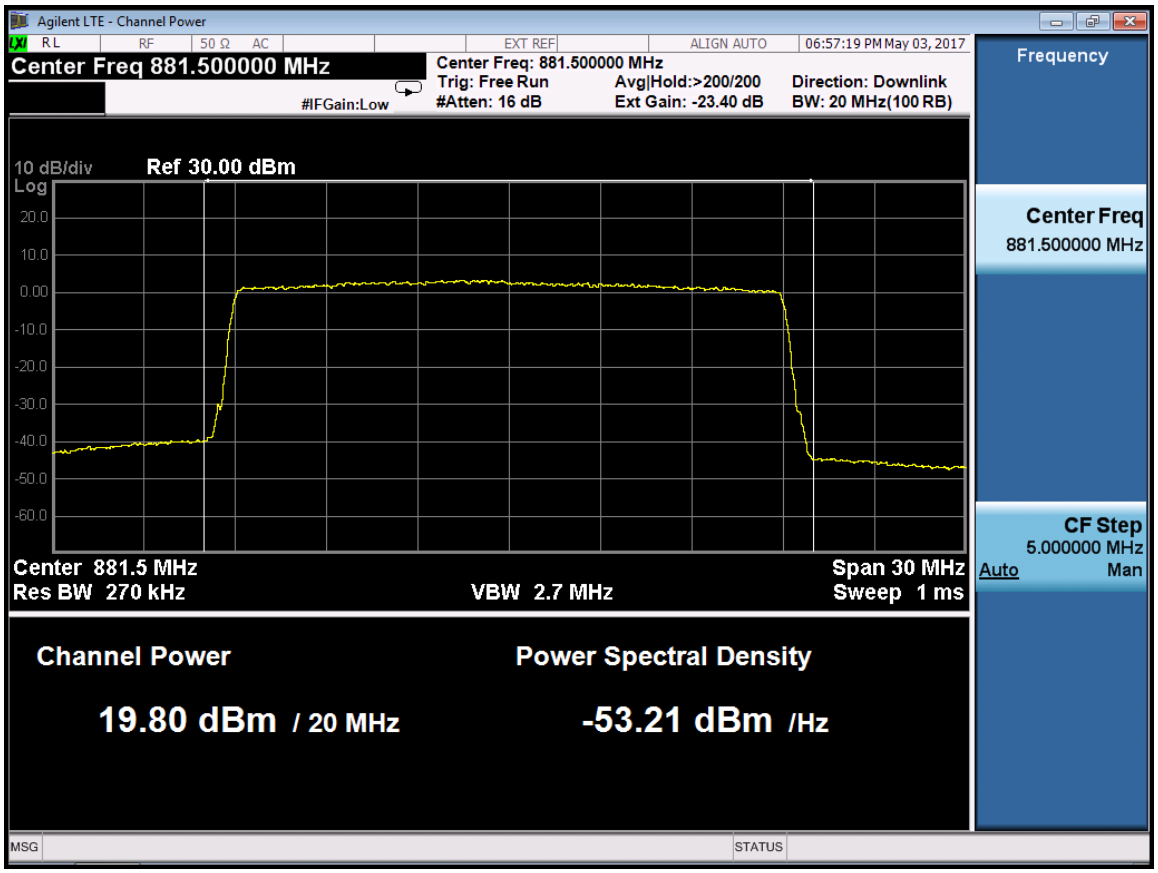
Port 0 - 874MHz



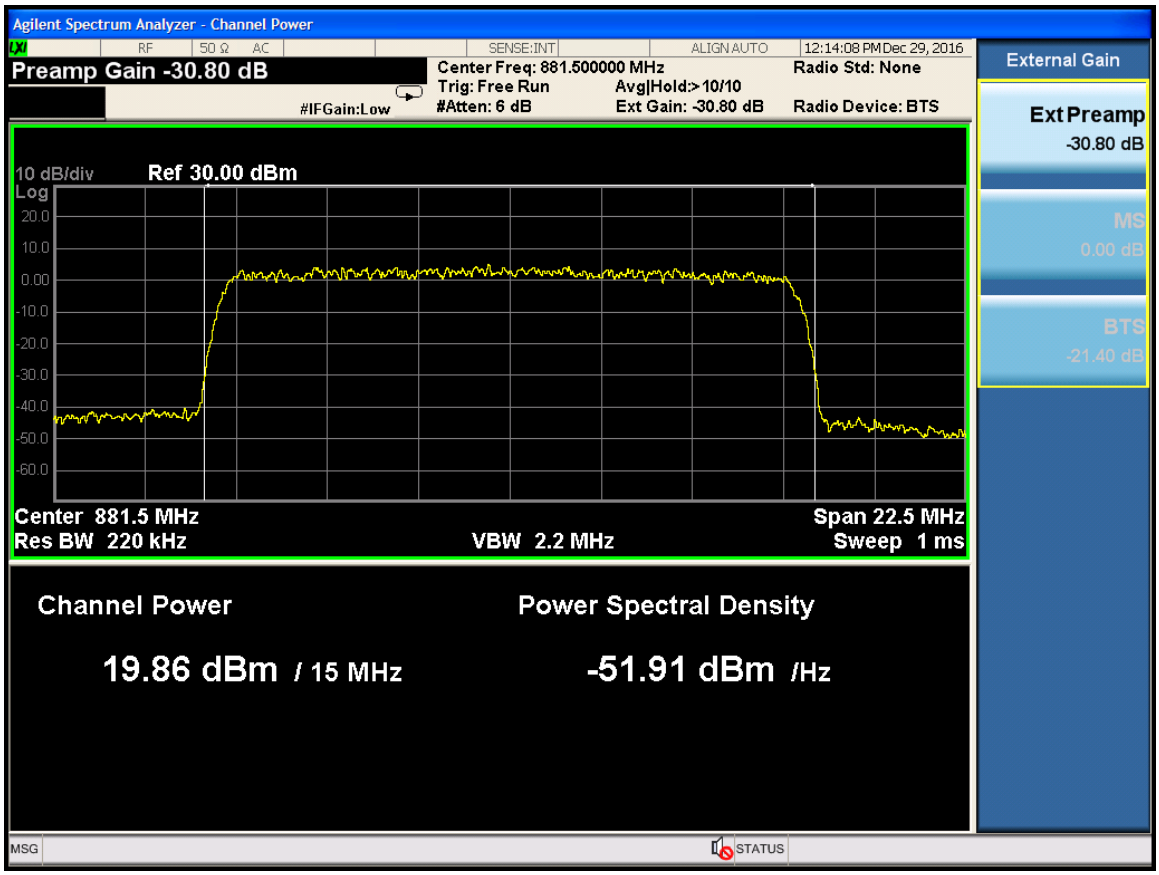
Port 0 - 871.5MHz



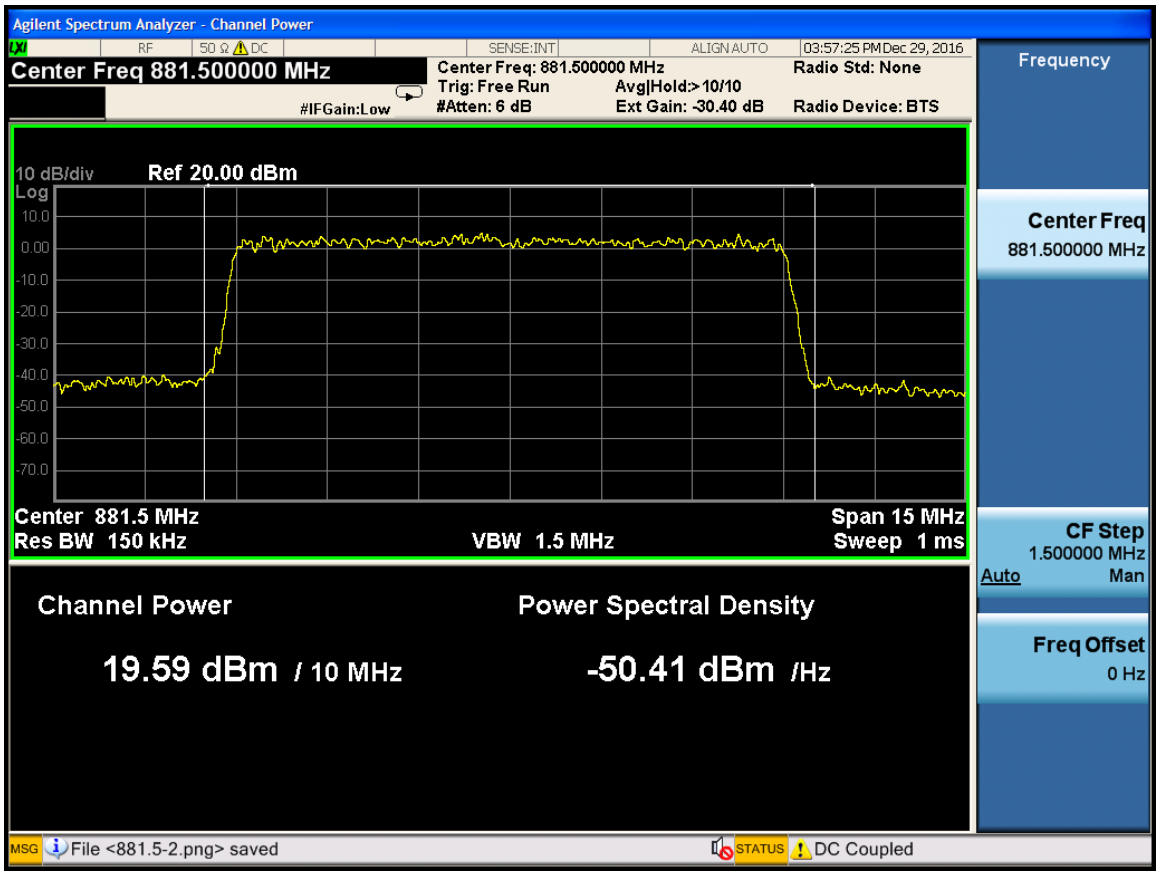
Port 0 - 881.5MHz



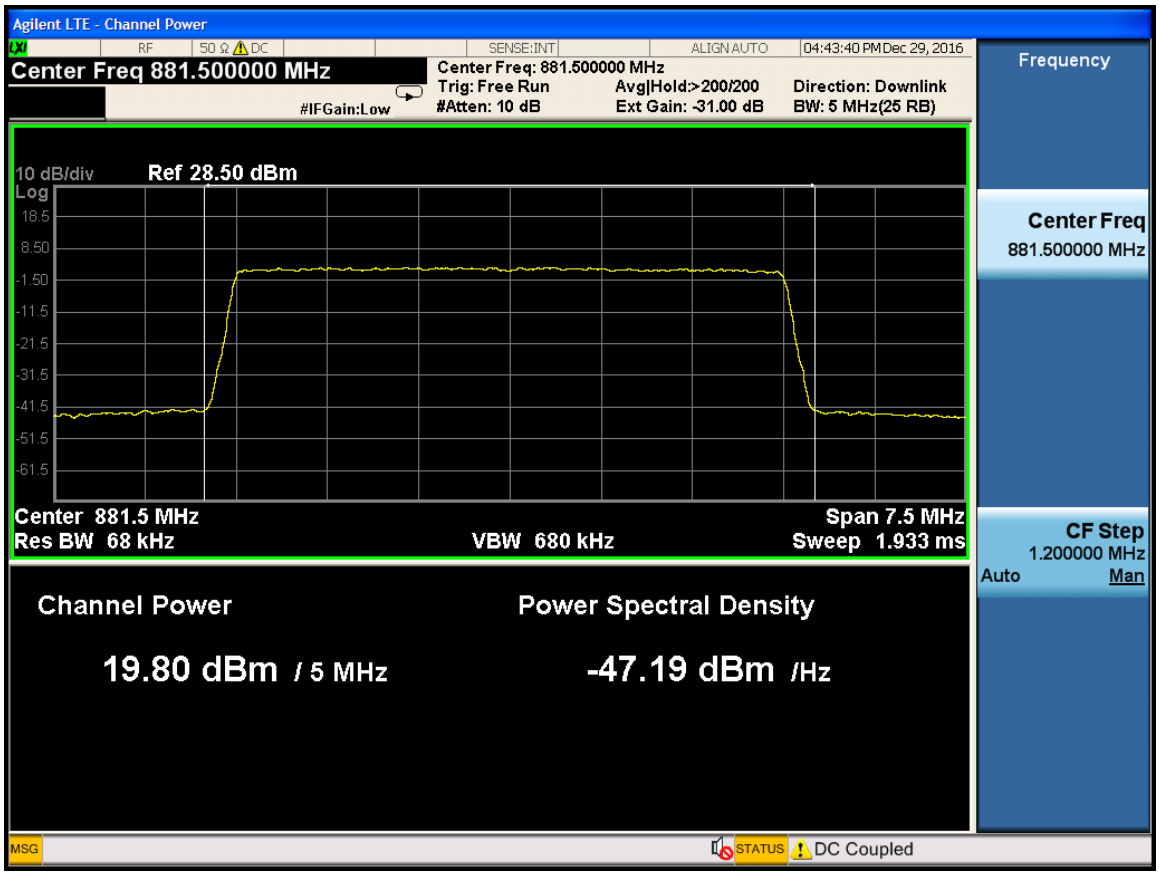
Port 0 - 881.5MHz



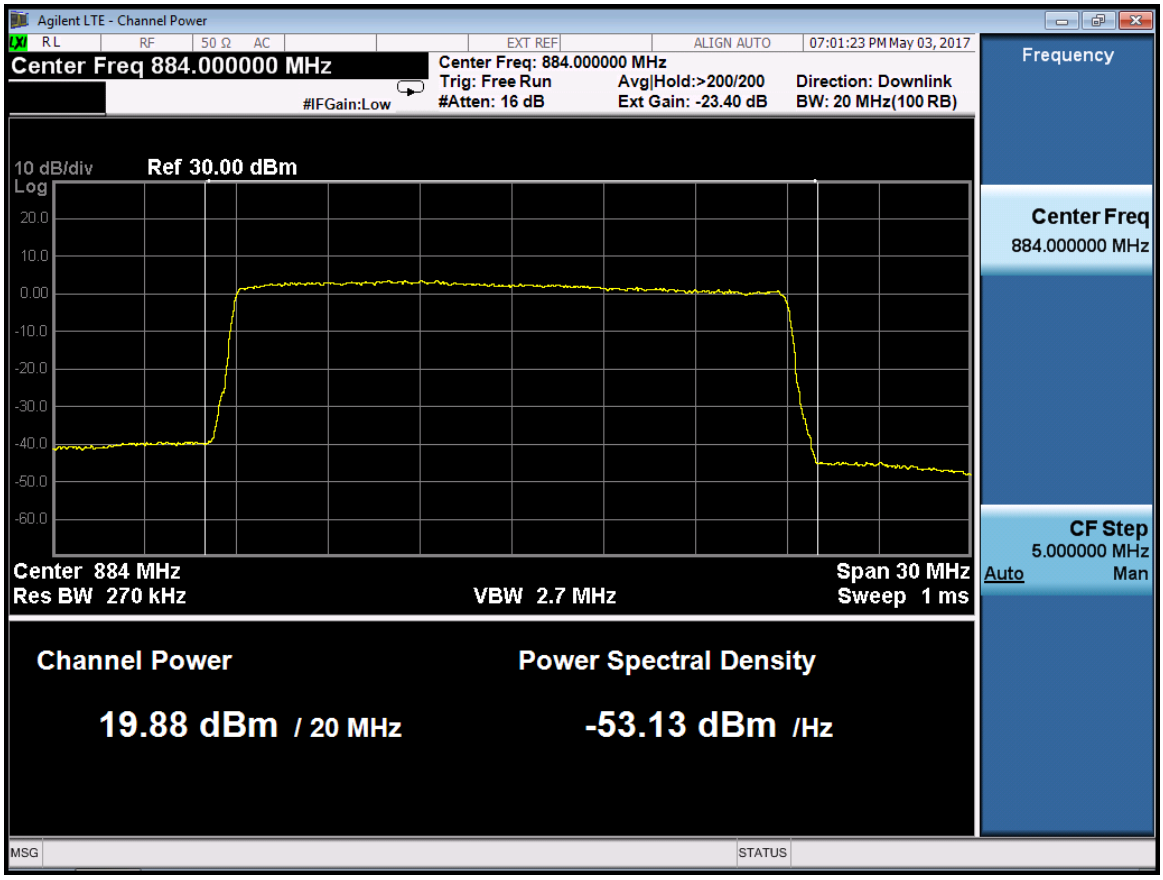
Port 0 - 881.5MHz



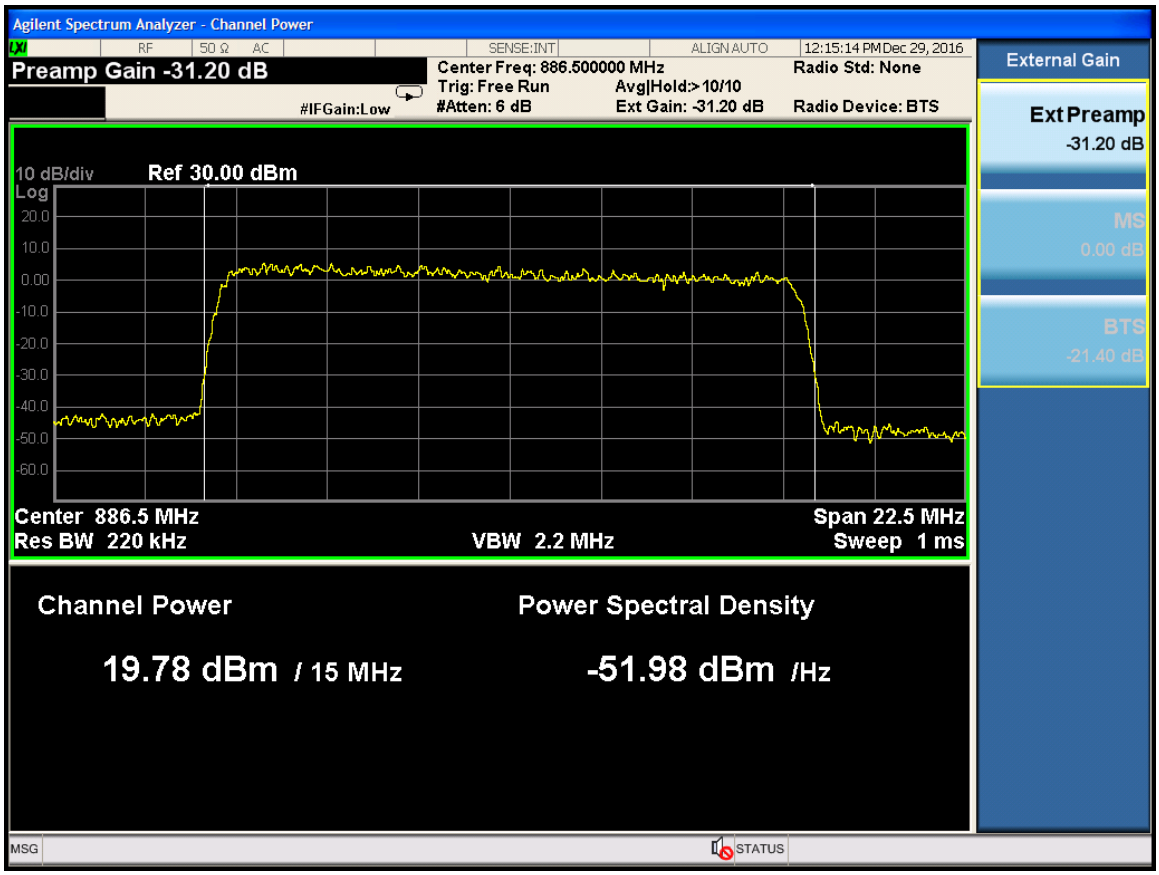
Port 0 - 881.5MHz



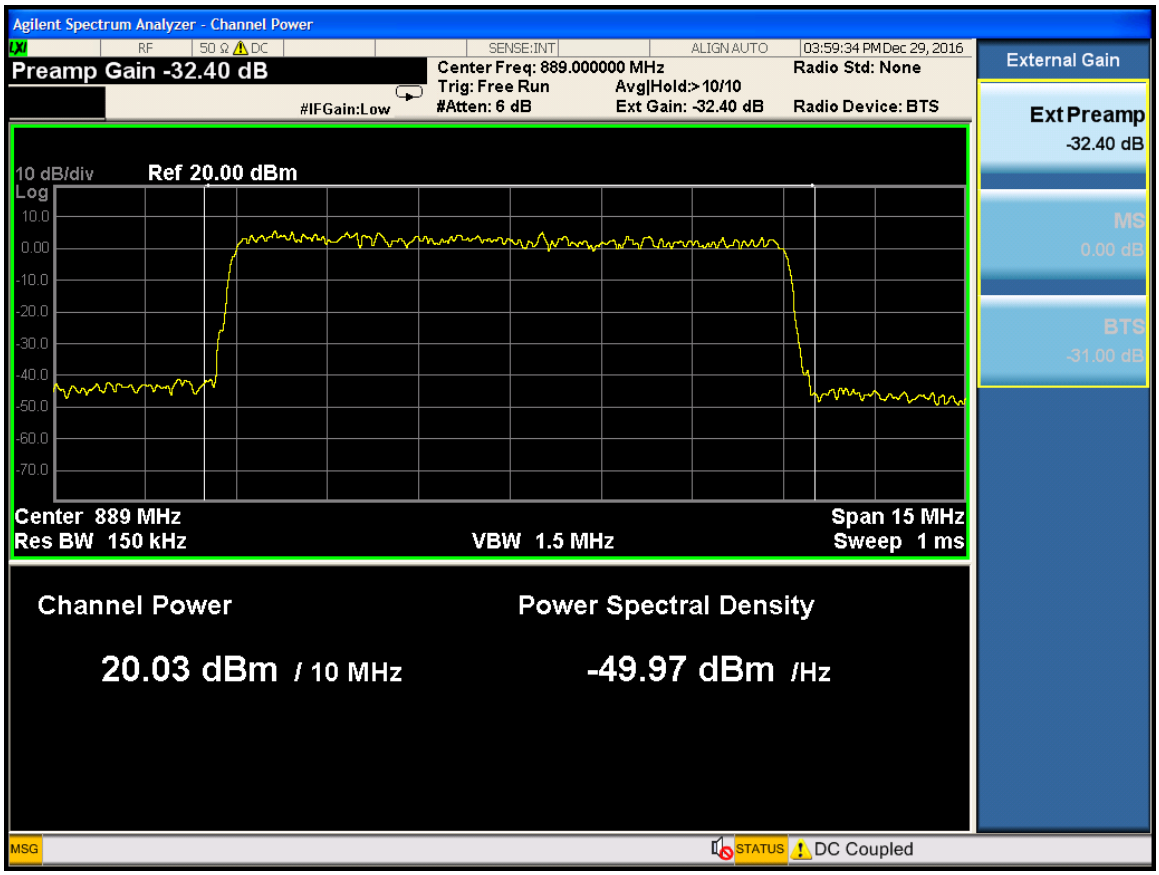
Port 0 - 884MHz



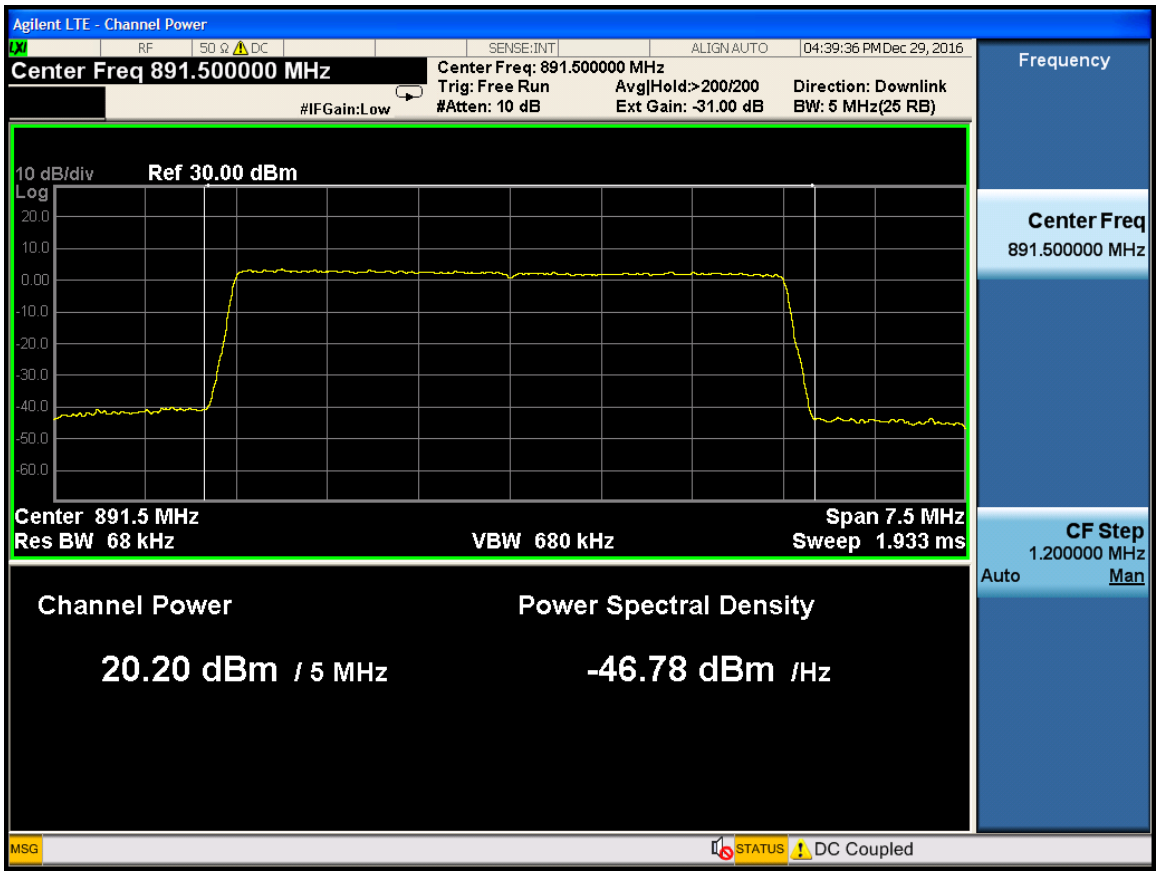
Port 0 - 886.5MHz



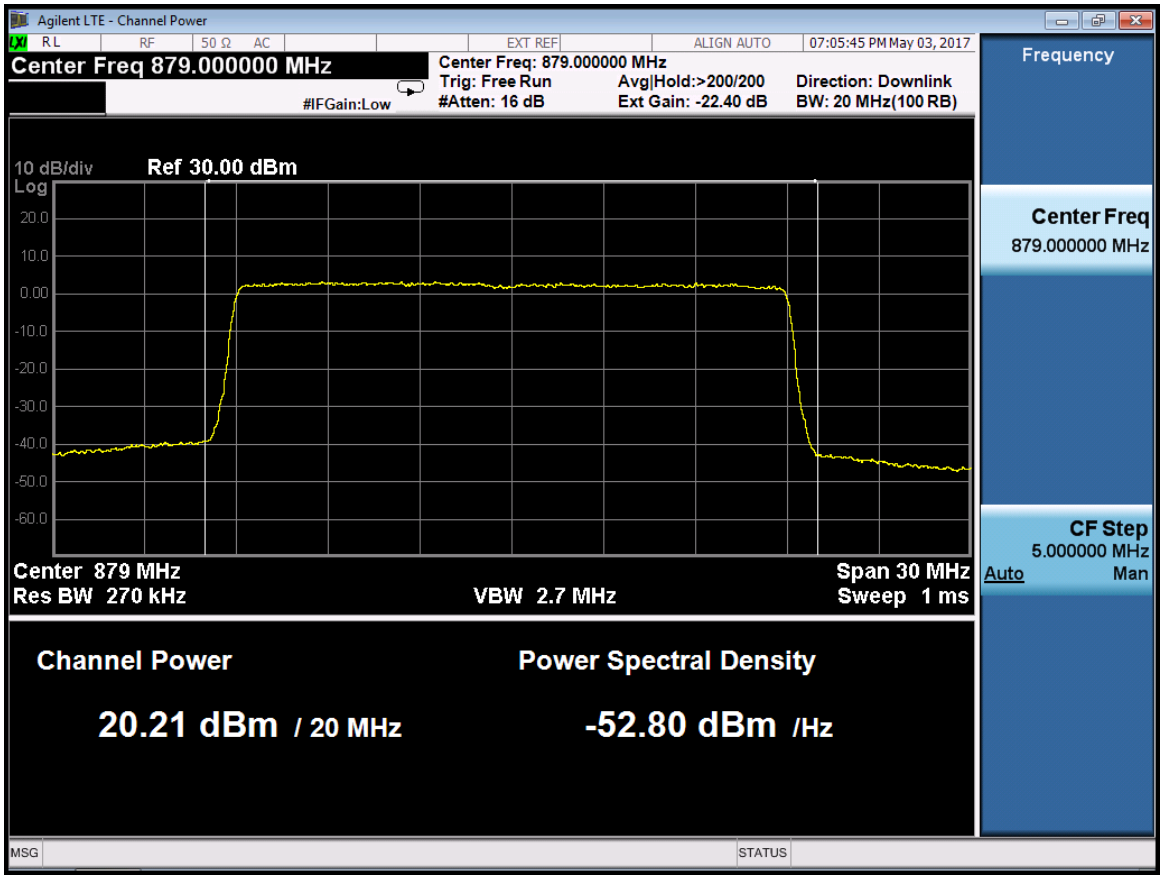
Port 0 - 889MHz



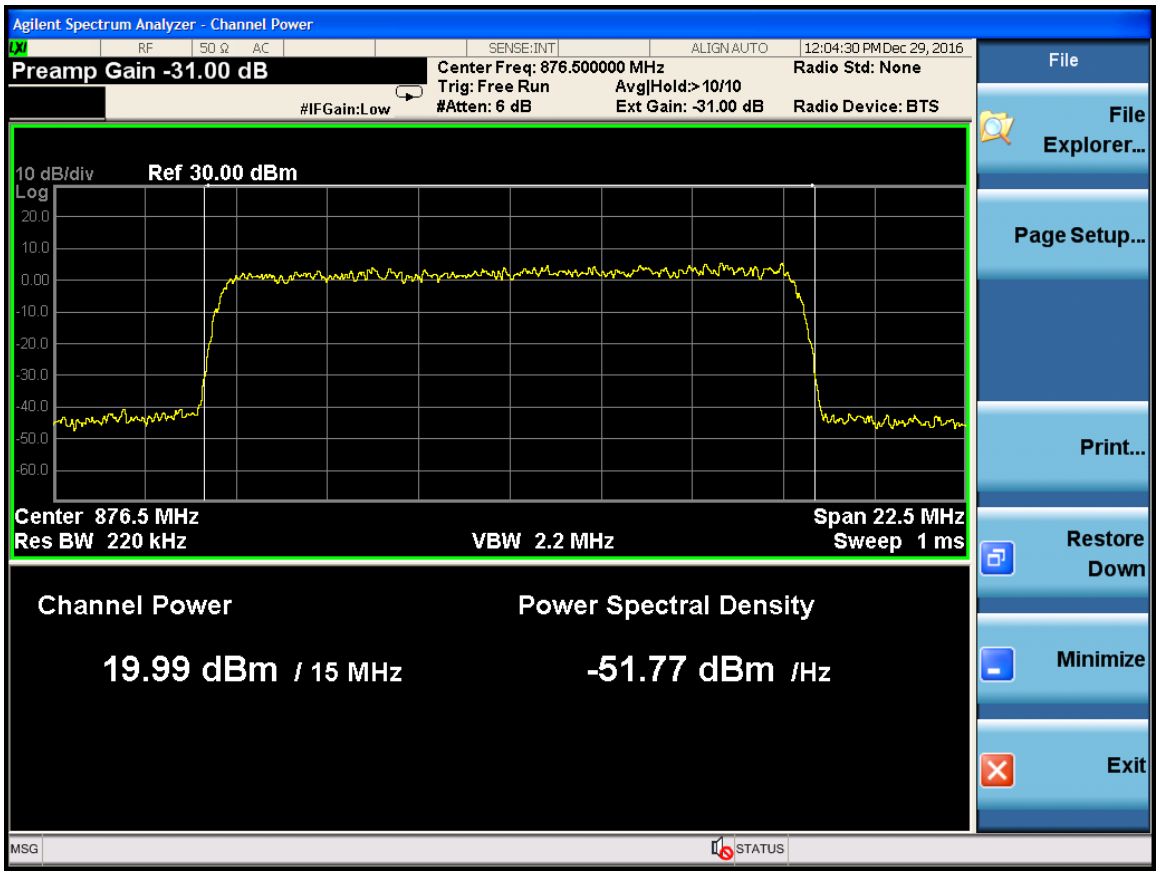
Port 0 - 891.5MHz



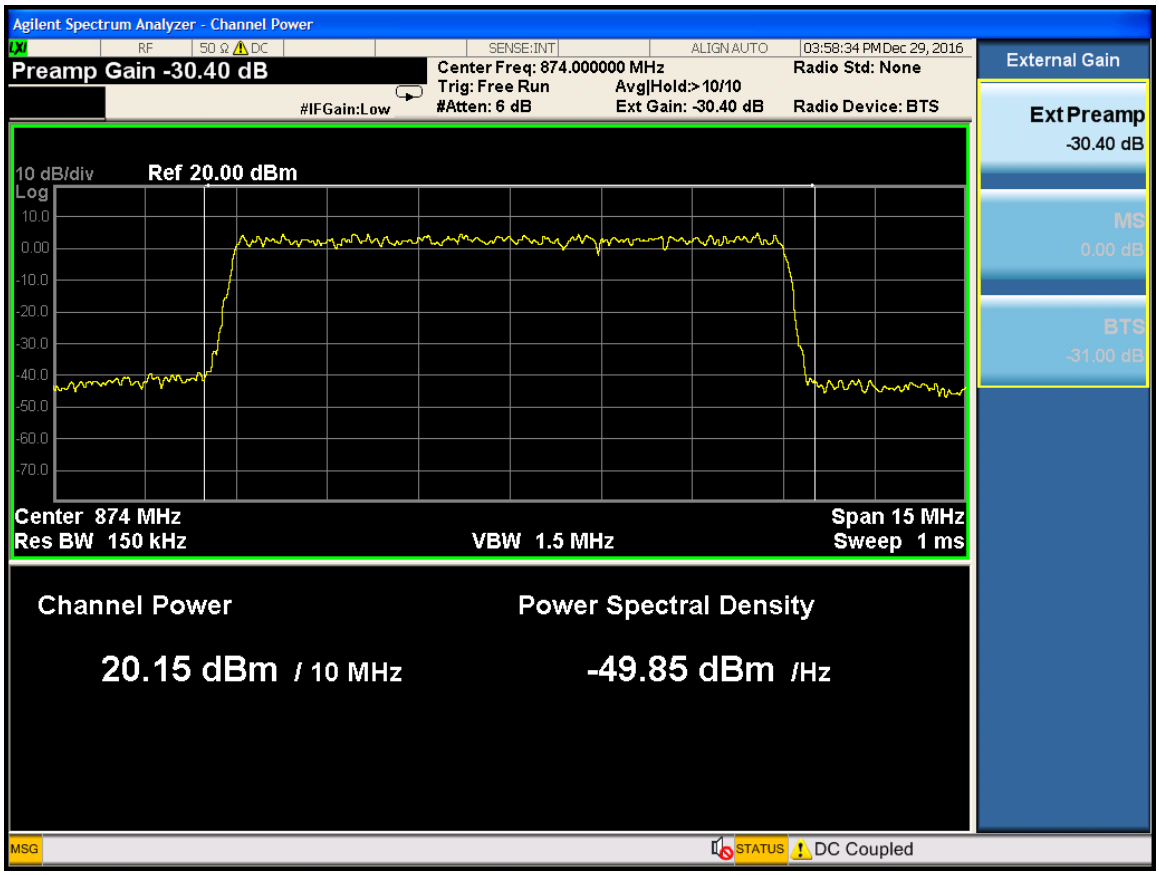
Port 1 - 879MHz



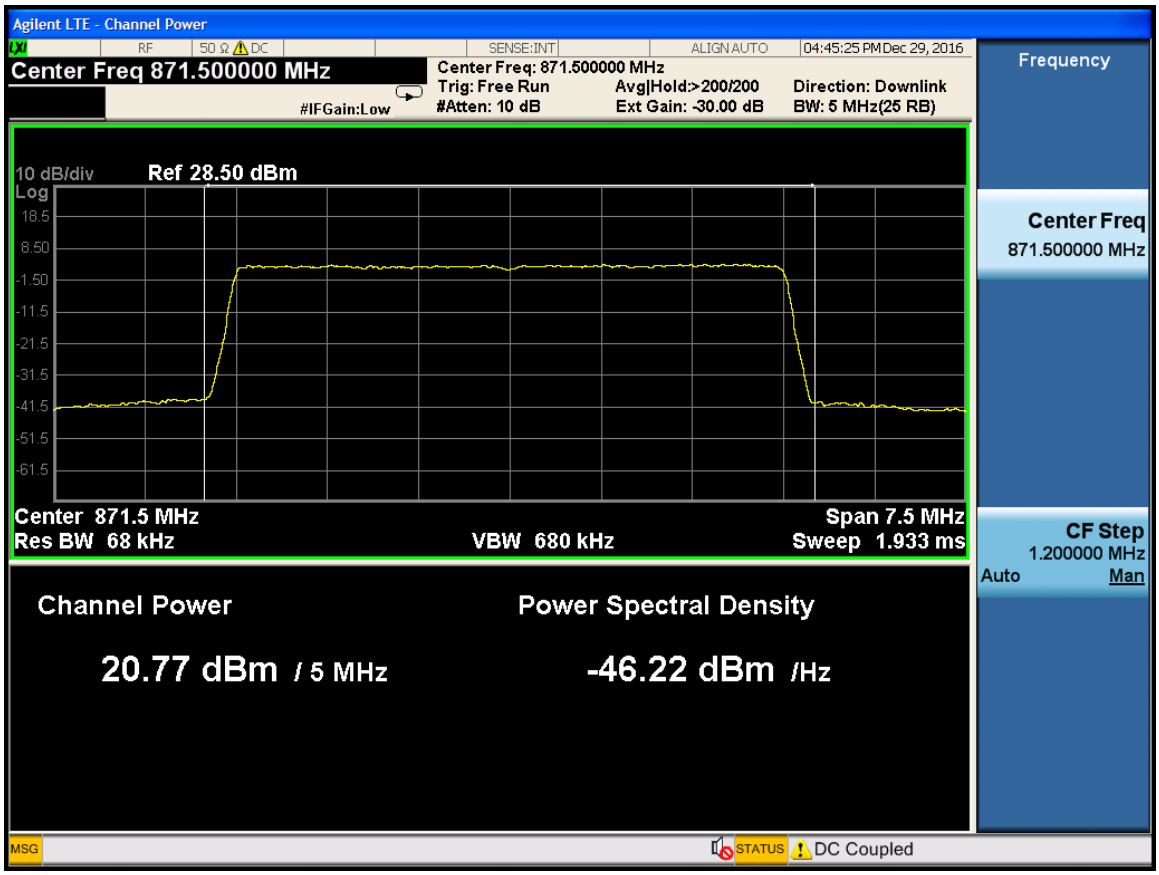
Port 1 - 876.5MHz



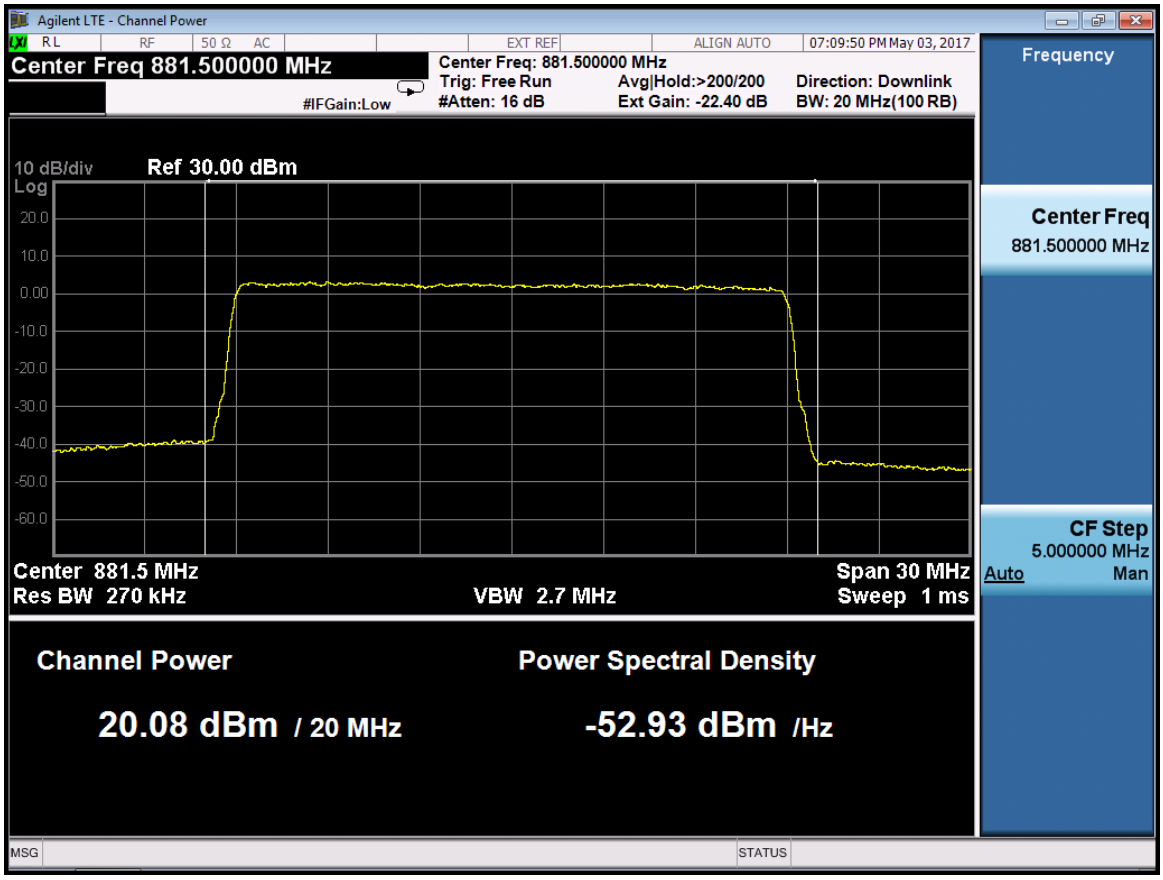
Port 1 - 874MHz



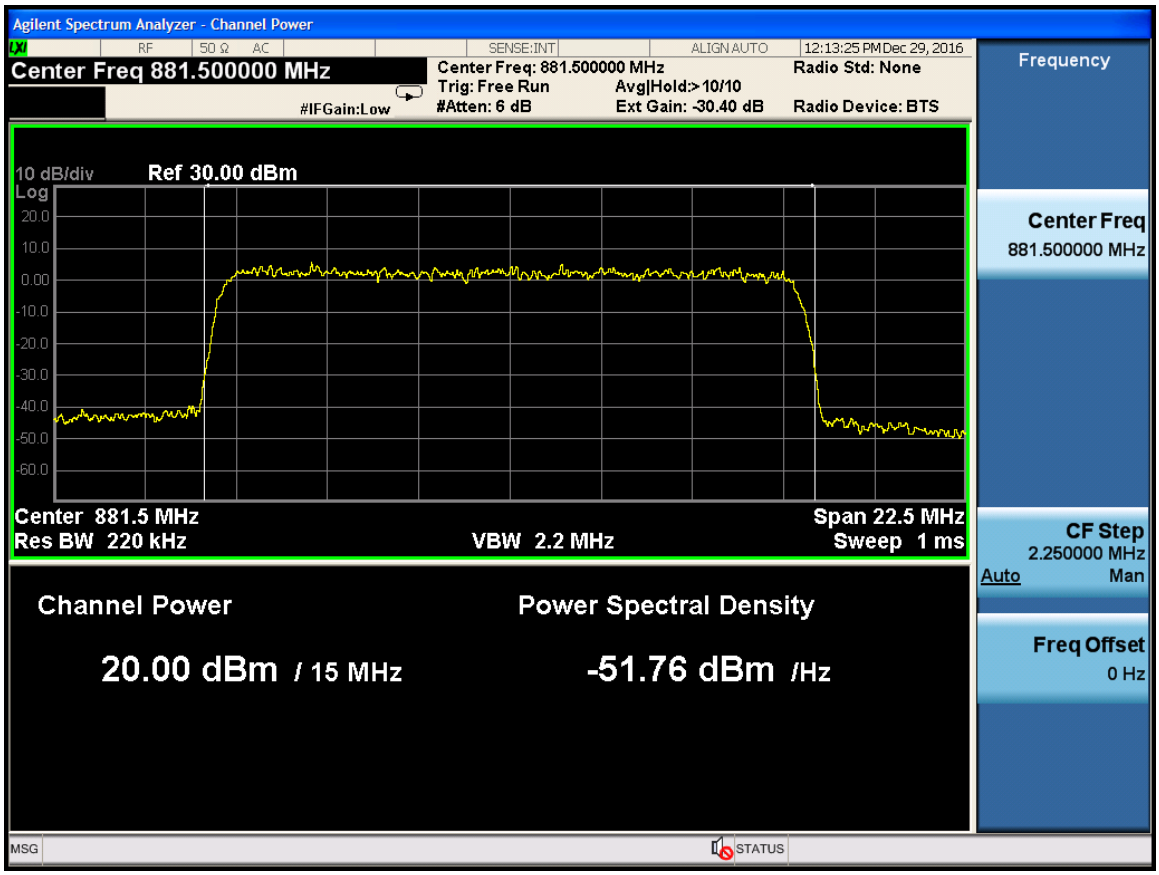
Port 1 - 871.5MHz



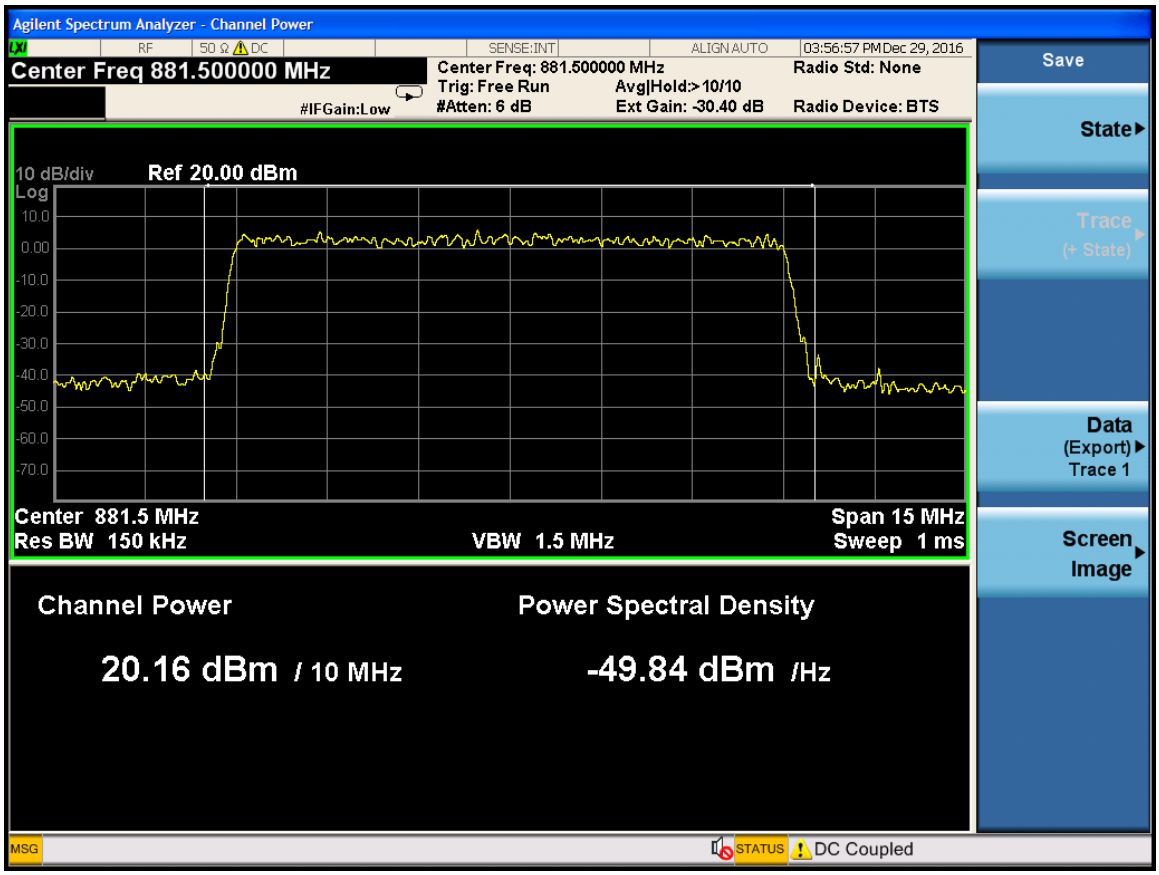
Port 1 - 881.5MHz



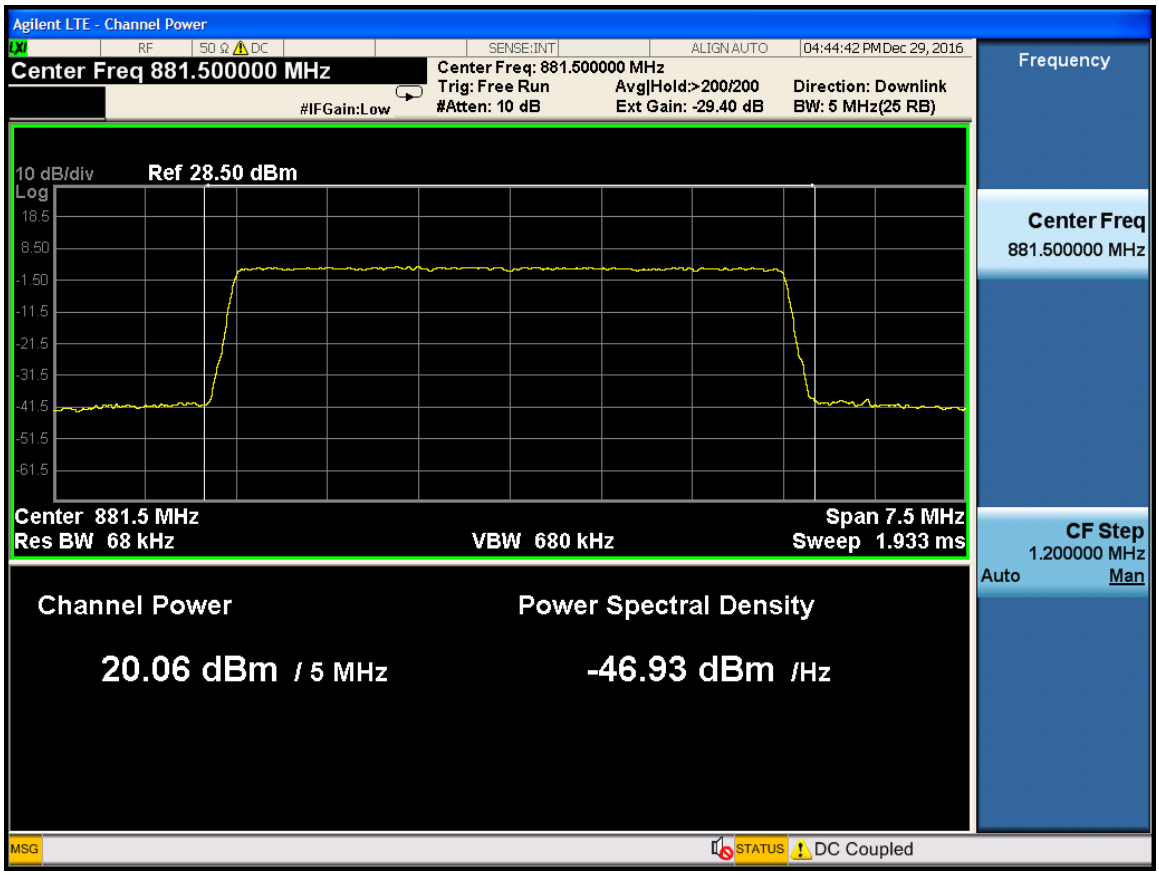
Port 1 - 881.5MHz



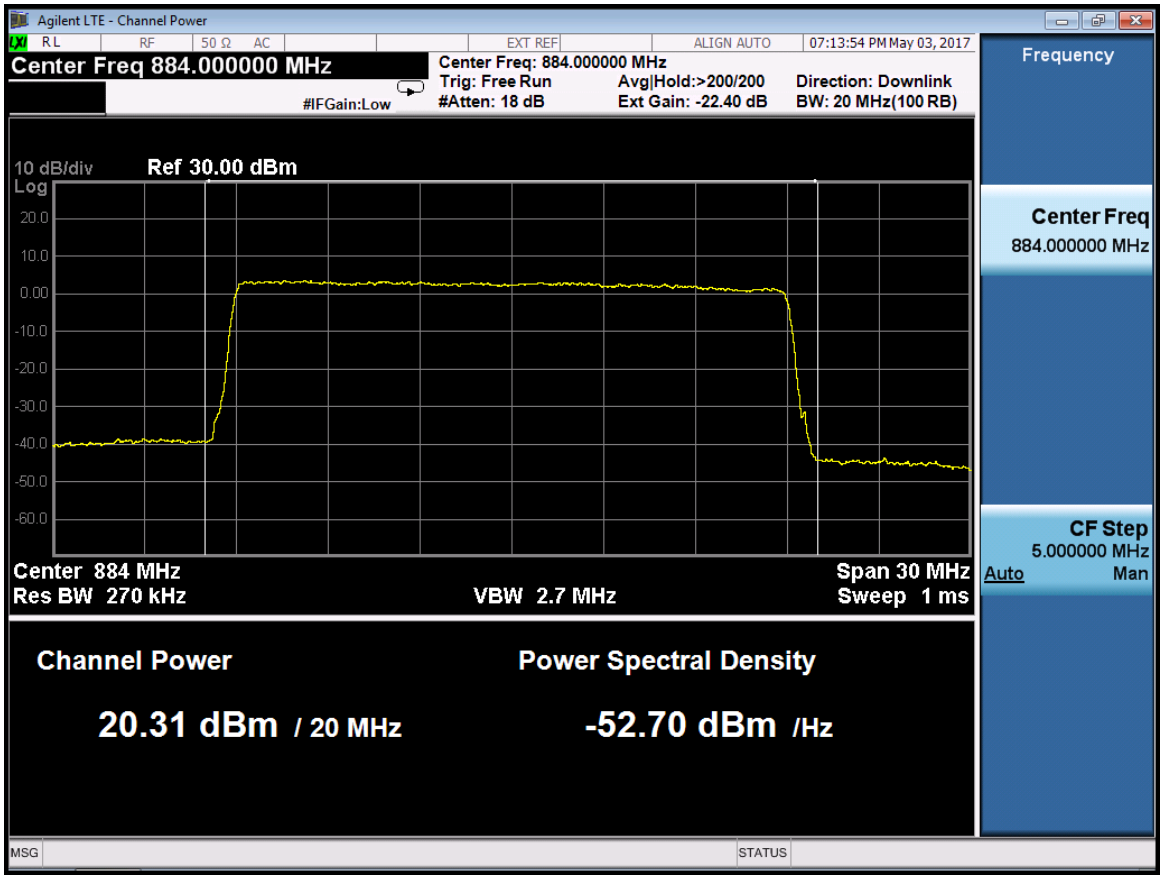
Port 1 - 881.5MHz



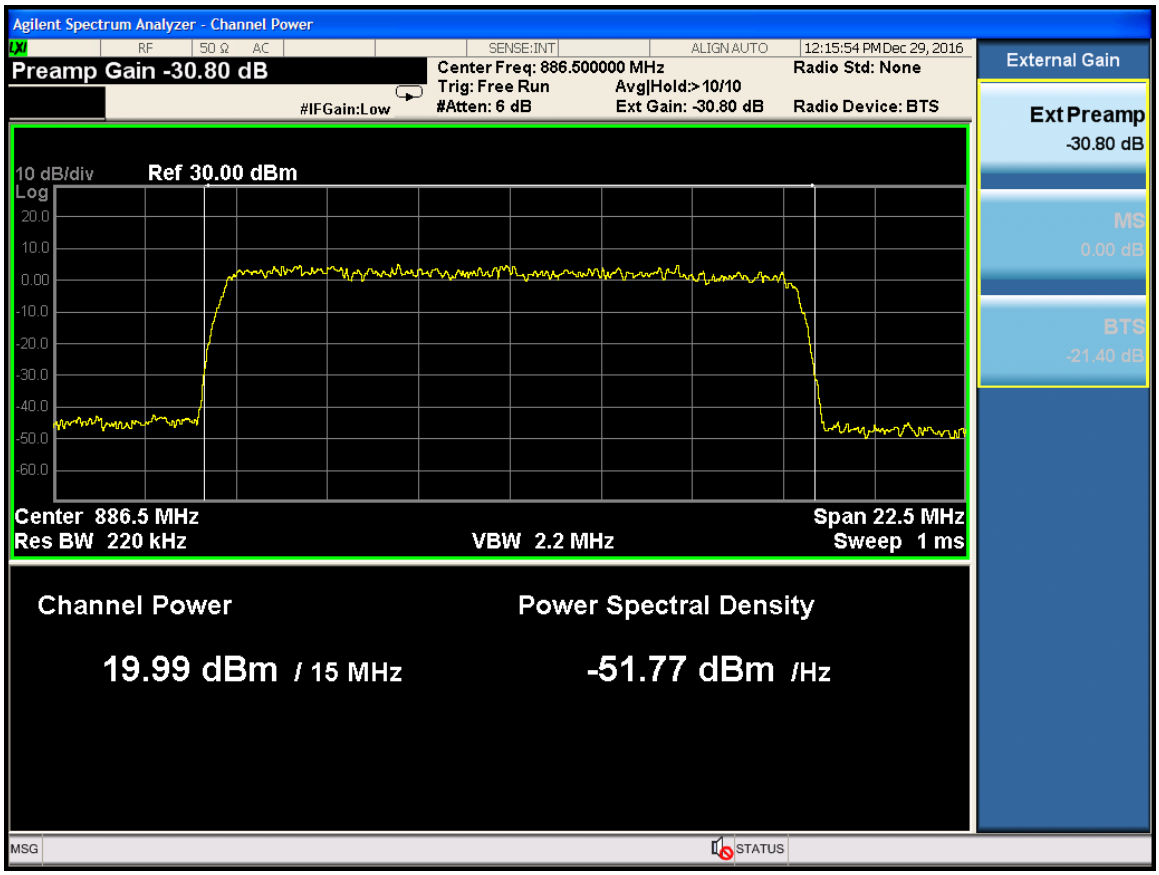
Port 1 - 881.5MHz



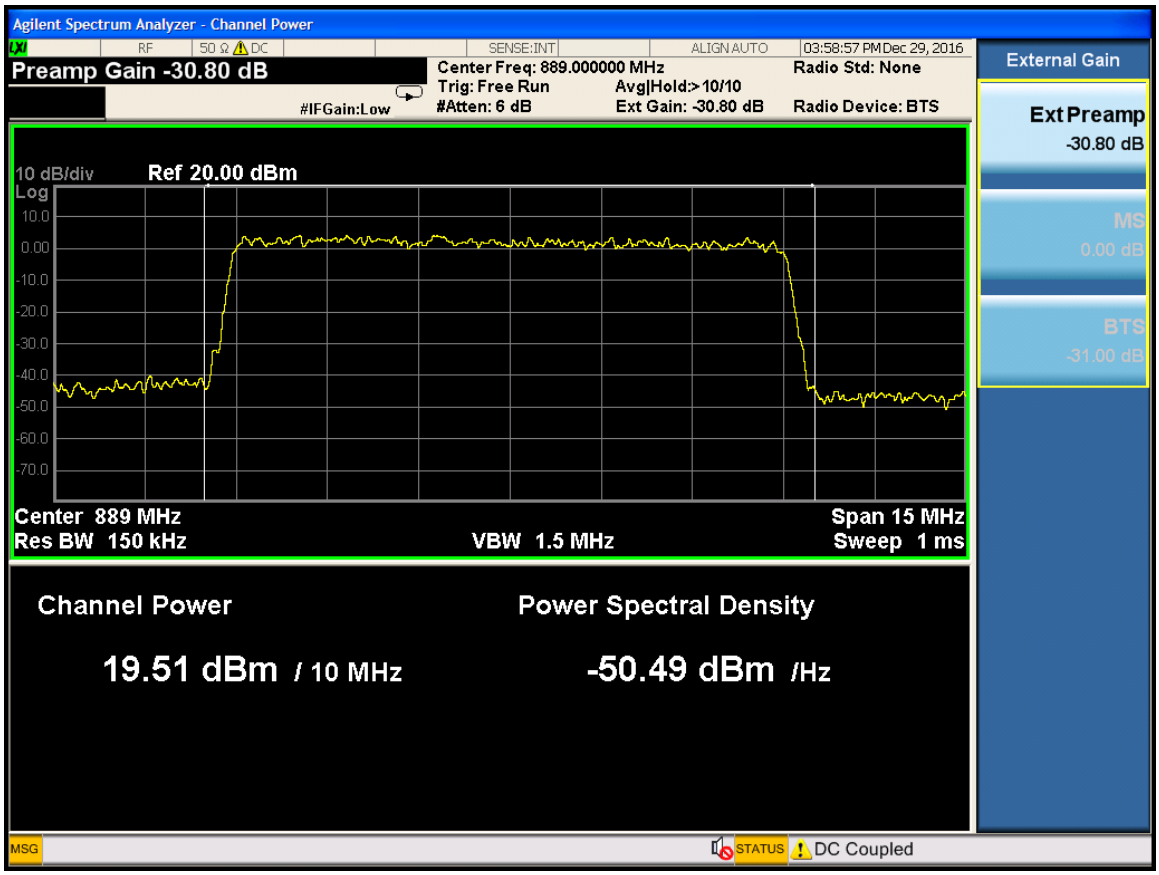
Port 1 - 884MHz



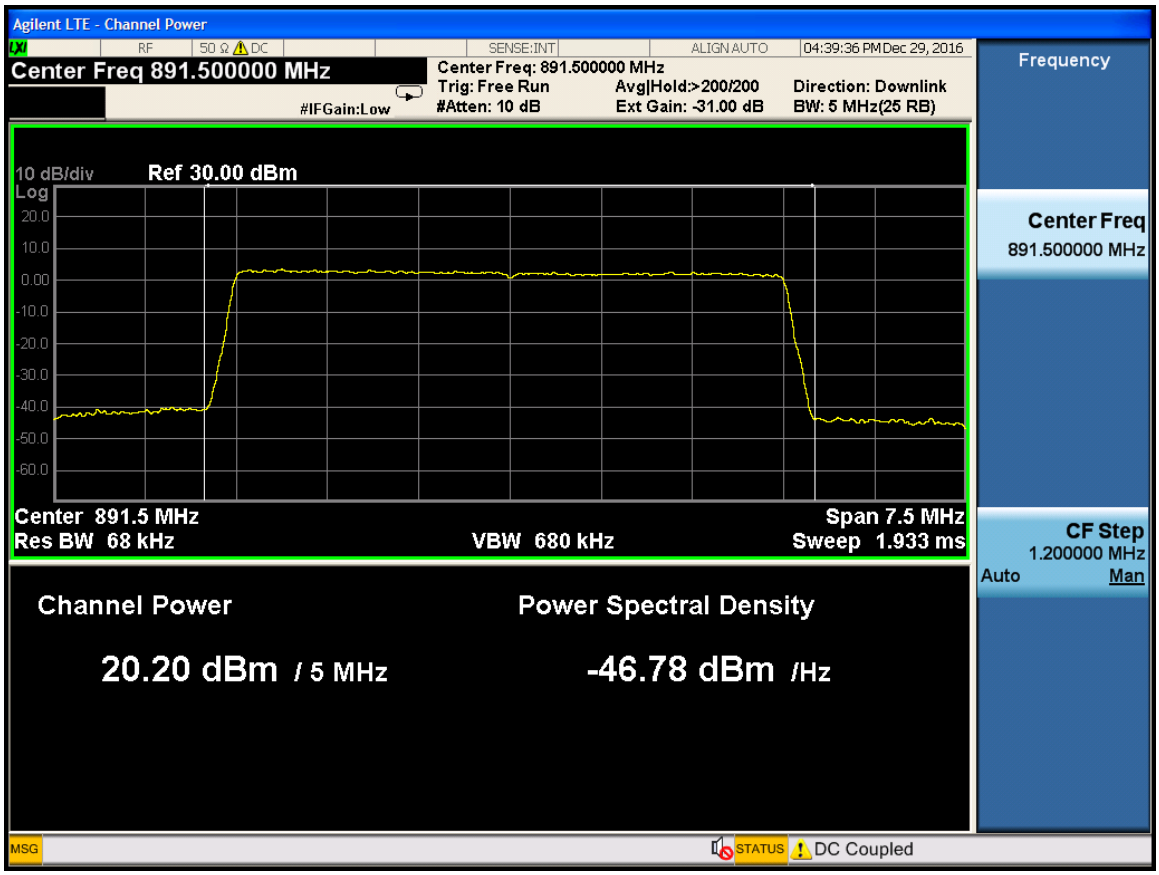
Port 1 - 886.5MHz



Port 1 - 889MHz



Port 1 - 891.5MHz



6 RF EXPOSURE

Applicable standard: FCC §2.1091 §1.1037

Limit

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
According to §1.1310 and §2.1091 RF exposure is calculated. Limits for Maximum Permissible Exposure (MPE)

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $|E|^2$, $|H|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Test Data

Predication of MPE limit at a given distance
Equation from page 18 of OET Bulletin 65, Edition 97-01
$S = EIRP/ 4\pi R^2$
Where: S = power density
R = distance to the center of radiation of the antenna= $[EIRP /4\pi S]^{1/2}$
According to §22.913, the equivalent isotropically radiated power (EIRP) of base transmitters and cellular repeaters must not exceed 1640 Watts.
Frequency 894MHz is between 300MHz and 1500MHz, and the Maximum S=0.596mW/cm2
⇨ R=4.68m.
This equipment should be installed and operated with minimum distance 4.68m between the radiator& your body.

Test Result: pass

7 MODULATION CHARACTERISTIC

Applicable Standard: FCC §2.1047

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.09.12	2017.09.12
DTS	DTS 30dB Attenuator	DTS50-30-3-1	09112005	2016.09.12	2017.09.12

Silverline	Silverline RF Cable	SLA18-NMN1T	100311-04-0001	N/A	N/A

*__statement of traceability:__ ZTE Corporation Reliability Testing Center attest that all calibration have been performed per the NVLAP requirements , traceable to NIST.

Test Procedure

LTE digital mode is used by EUT.

Test Data Environmental Conditions

Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

Test Result: Pass

Test Mode: Transmitting LTE

Test Data:

RF Bandwidth :IBW 20M(LTE 20M)

Port	RF Center Freq. (MHz)	Test mode	EVM%
0	879	E-TM2	1.75373
		E-TM3.1	2.98391
		E-TM 3.2	3.95684
		E-TM 3.3	3.85873
	881.5	E-TM2	1.74049
		E-TM3.1	2.96863
		E-TM 3.2	3.90949
		E-TM 3.3	3.83132
	884	E-TM2	1.79668
		E-TM3.1	2.98251
		E-TM 3.2	3.93383
		E-TM 3.3	3.85261
1	879	E-TM2	1.7767
		E-TM3.1	2.956
		E-TM 3.2	3.92932
		E-TM 3.3	3.82803

	881.5	E-TM2	1.76907
		E-TM3.1	2.95548
		E-TM 3.2	3.90198
		E-TM 3.3	3.83041
	884	E-TM2	1.79977
		E-TM3.1	2.96913
		E-TM 3.2	3.93438
		E-TM 3.3	3.85288

RF Bandwidth :IBW 15M(LTE 15M)

Port	RF Center Freq. (MHz)	Test mode	EVM%
0	876.5	E-TM2	1.8679
		E-TM3.1	2.7137
		E-TM 3.2	3.7553
		E-TM 3.3	3.6939
	881.5	E-TM2	1.9233
		E-TM3.1	2.7062
		E-TM 3.2	3.7562
		E-TM 3.3	3.6886
	886.5	E-TM2	1.8856
		E-TM3.1	2.7950
		E-TM 3.2	3.8439
		E-TM 3.3	3.7491
1	876.5	E-TM2	2.0414
		E-TM3.1	2.7098
		E-TM 3.2	3.7225
		E-TM 3.3	3.6616
	881.5	E-TM2	2.2027
		E-TM3.1	2.6928
		E-TM 3.2	3.7181
		E-TM 3.3	3.6593
	886.5	E-TM2	1.9995
		E-TM3.1	2.7468
		E-TM 3.2	3.7615
		E-TM 3.3	3.7345

RF Bandwidth :IBW 10M(LTE 10M)

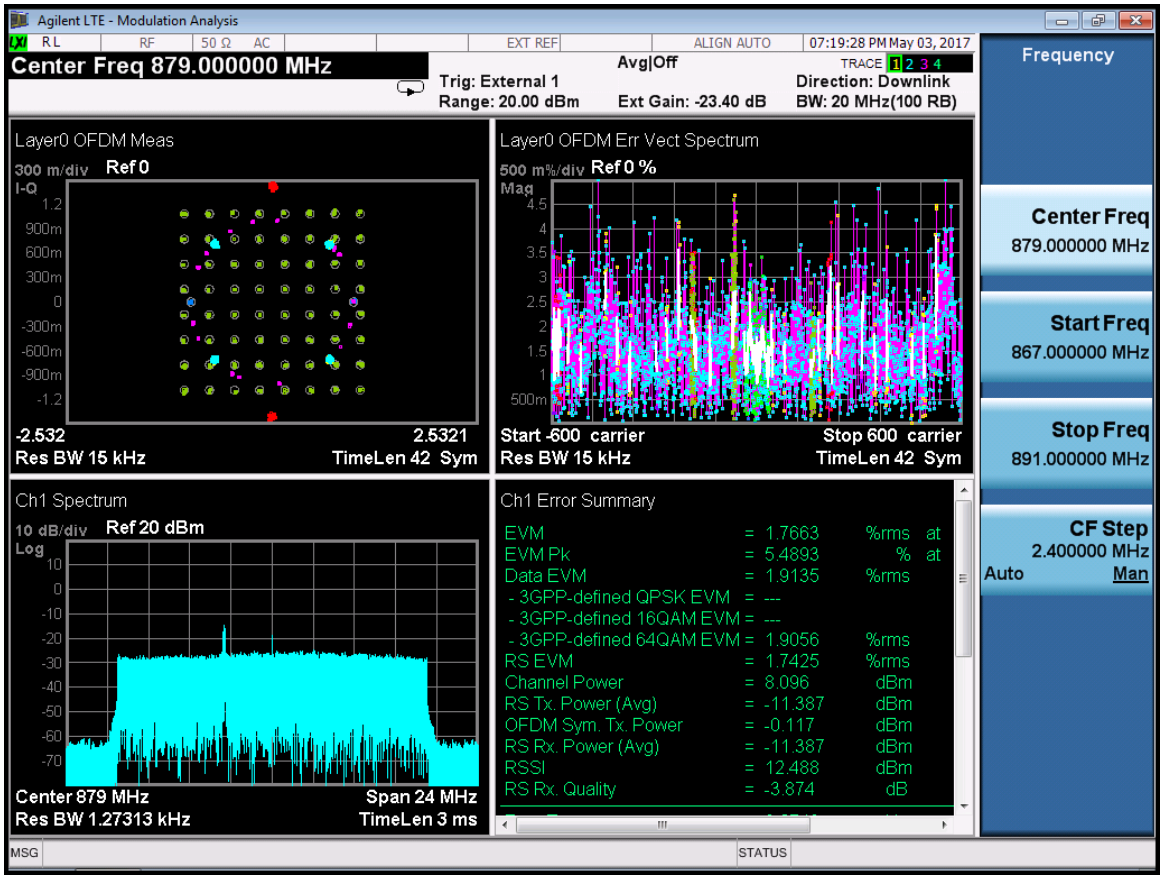
Port	RF Center Freq. (MHz)	Test mode	EVM%
0	874	E-TM2	1.3412
		E-TM3.1	2.5558
		E-TM 3.2	3.5010
		E-TM 3.3	3.2113
	881.5	E-TM2	1.2948
		E-TM3.1	2.2666
		E-TM 3.2	3.5000
		E-TM 3.3	3.2057
	889	E-TM2	1.5507

		E-TM3.1	2.3366
		E-TM 3.2	3.5441
		E-TM 3.3	3.2584
1	874	E-TM2	1.5556
		E-TM3.1	2.2863
		E-TM 3.2	3.5212
		E-TM 3.3	3.2220
	881.5	E-TM2	1.5297
		E-TM3.1	2.2703
		E-TM 3.2	3.4650
		E-TM 3.3	3.2029
	889	E-TM2	1.7233
		E-TM3.1	2.3210
		E-TM 3.2	3.5051
		E-TM 3.3	3.2441

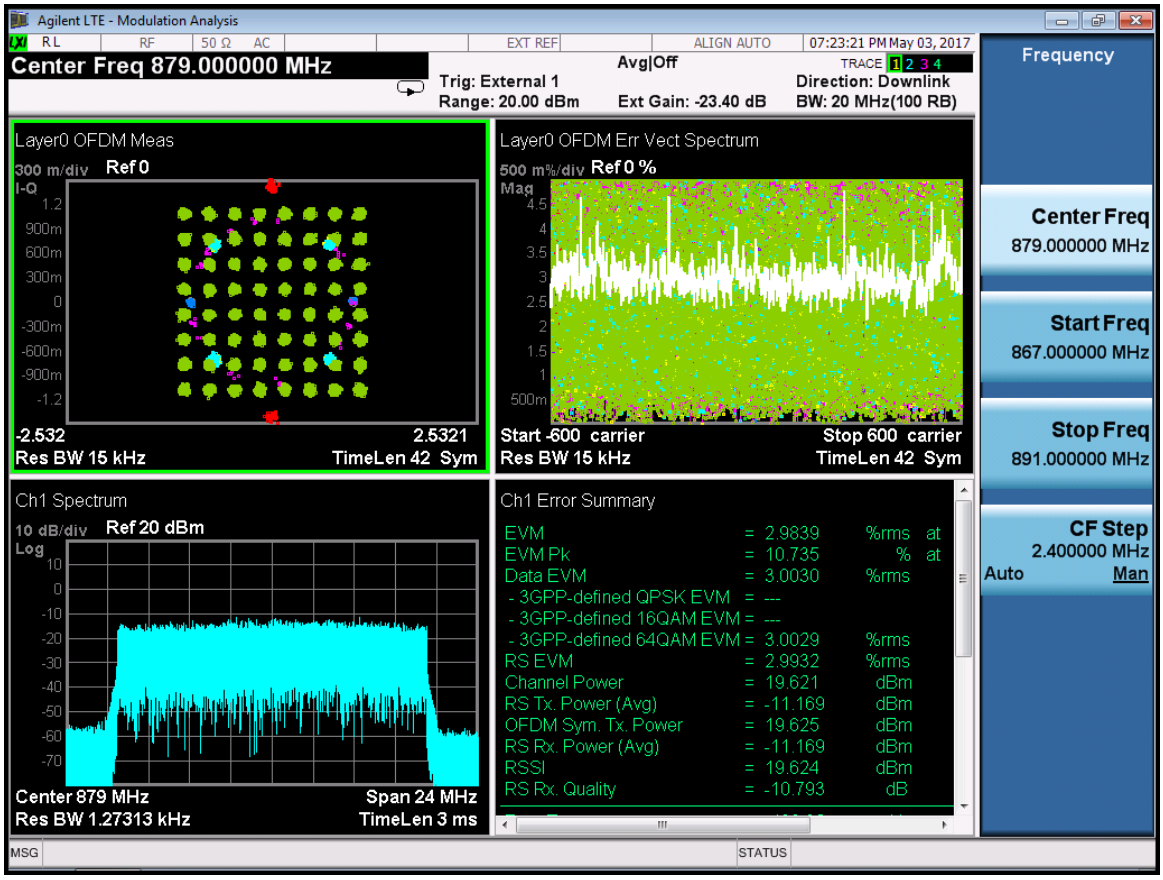
RF Bandwidth :IBW 5M(LTE 5M)

Port	RF Center Freq. (MHz)	Test mode	EVM%
0	871.5	E-TM2	1.1950
		E-TM3.1	2.0951
		E-TM 3.2	3.3184
		E-TM 3.3	3.2087
	881.5	E-TM2	1.2704
		E-TM3.1	2.1128
		E-TM 3.2	3.3363
		E-TM 3.3	3.2084
	891.5	E-TM2	1.4530
		E-TM3.1	2.2647
		E-TM 3.2	3.4267
		E-TM 3.3	4.8937
1	871.5	E-TM2	1.4419
		E-TM3.1	2.2113
		E-TM 3.2	3.4196
		E-TM 3.3	3.2856
	881.5	E-TM2	1.4696
		E-TM3.1	2.1875
		E-TM 3.2	3.4232
		E-TM 3.3	3.2798
	891.5	E-TM2	1.5884
		E-TM3.1	2.1752
		E-TM 3.2	3.4080
		E-TM 3.3	3.2722

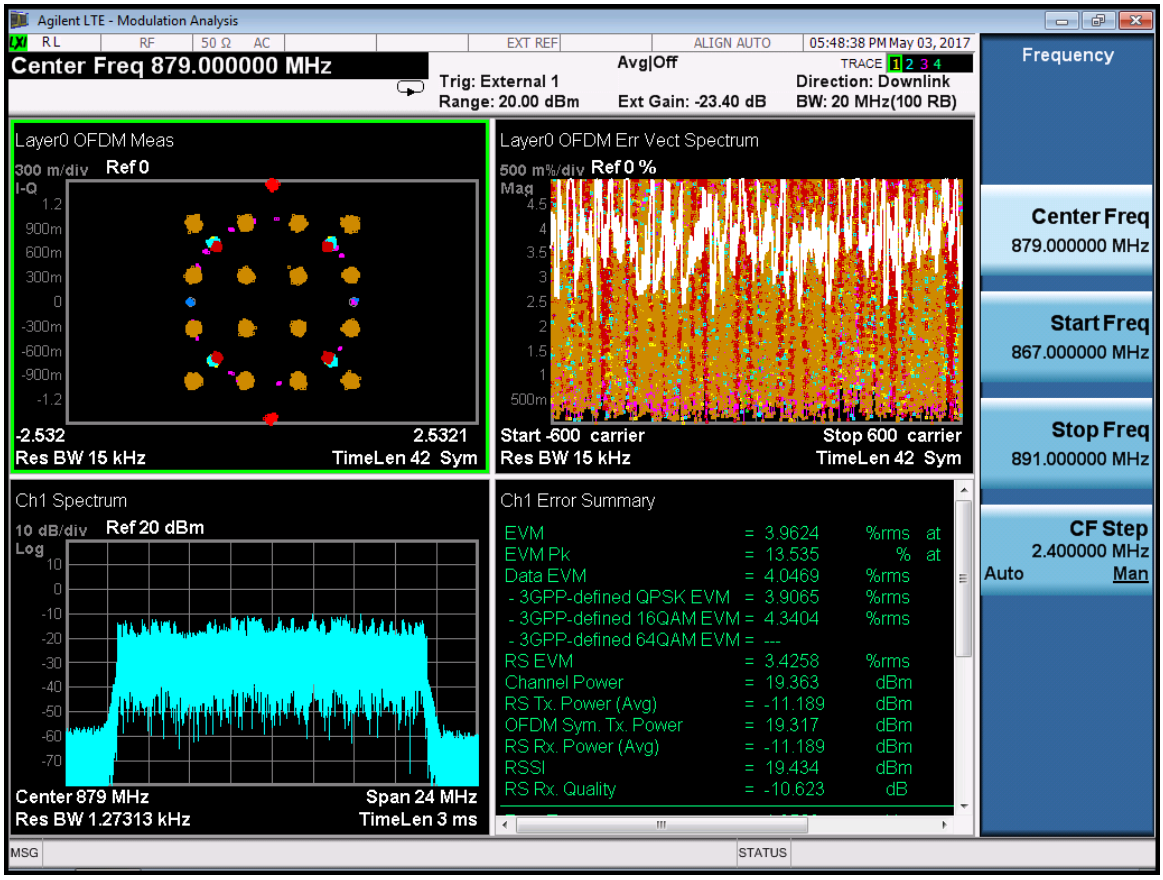
RF 879M:
LTE 20M-Port 0-879MHz-E-TM2



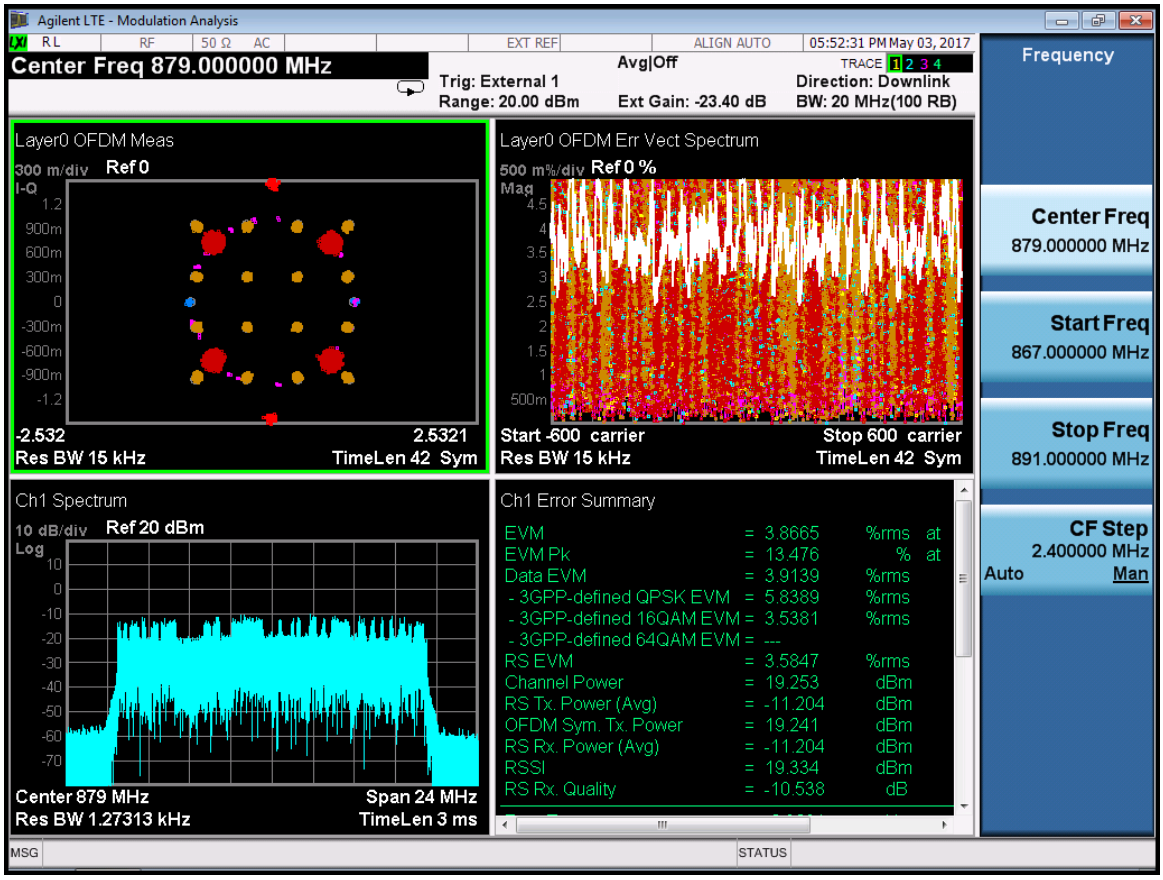
LTE 20M-Port 0-879MHz-E-TM3.1



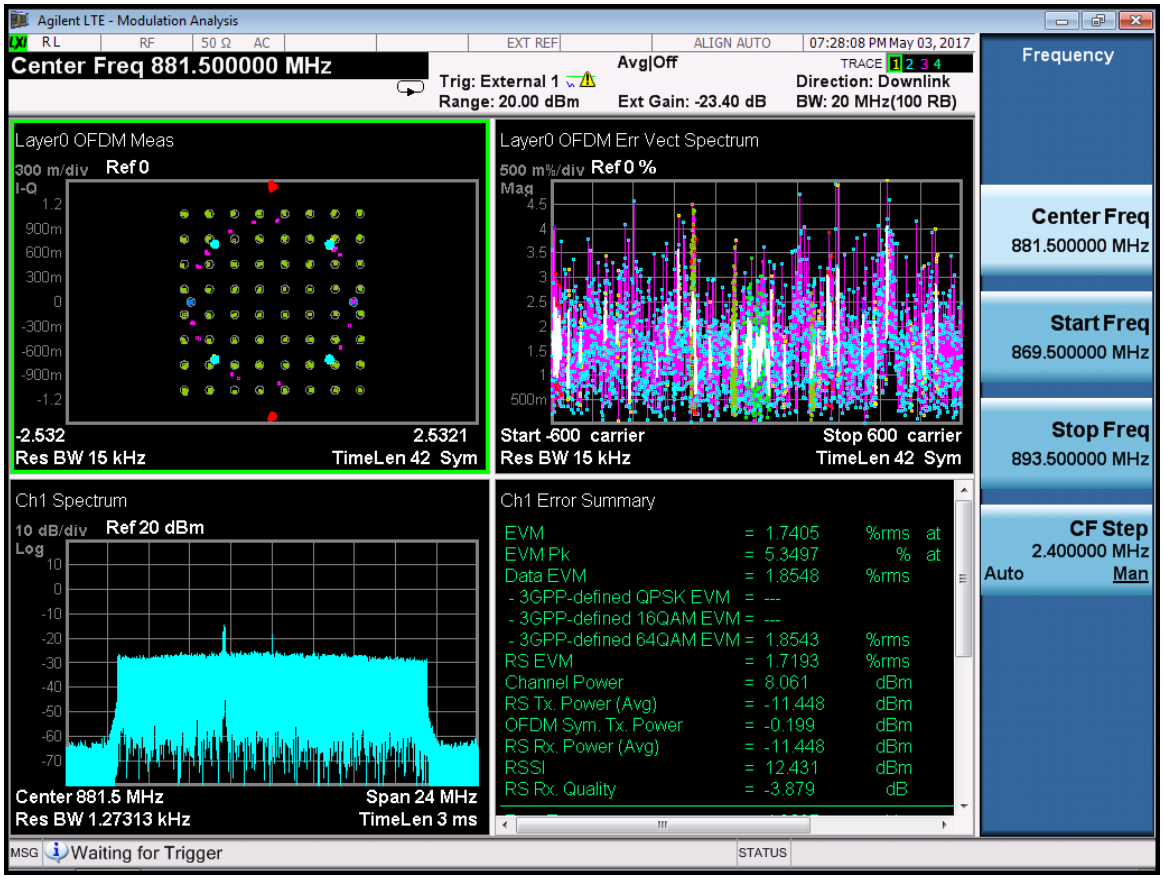
LTE 20M-Port 0-879MHz-E-TM3.2



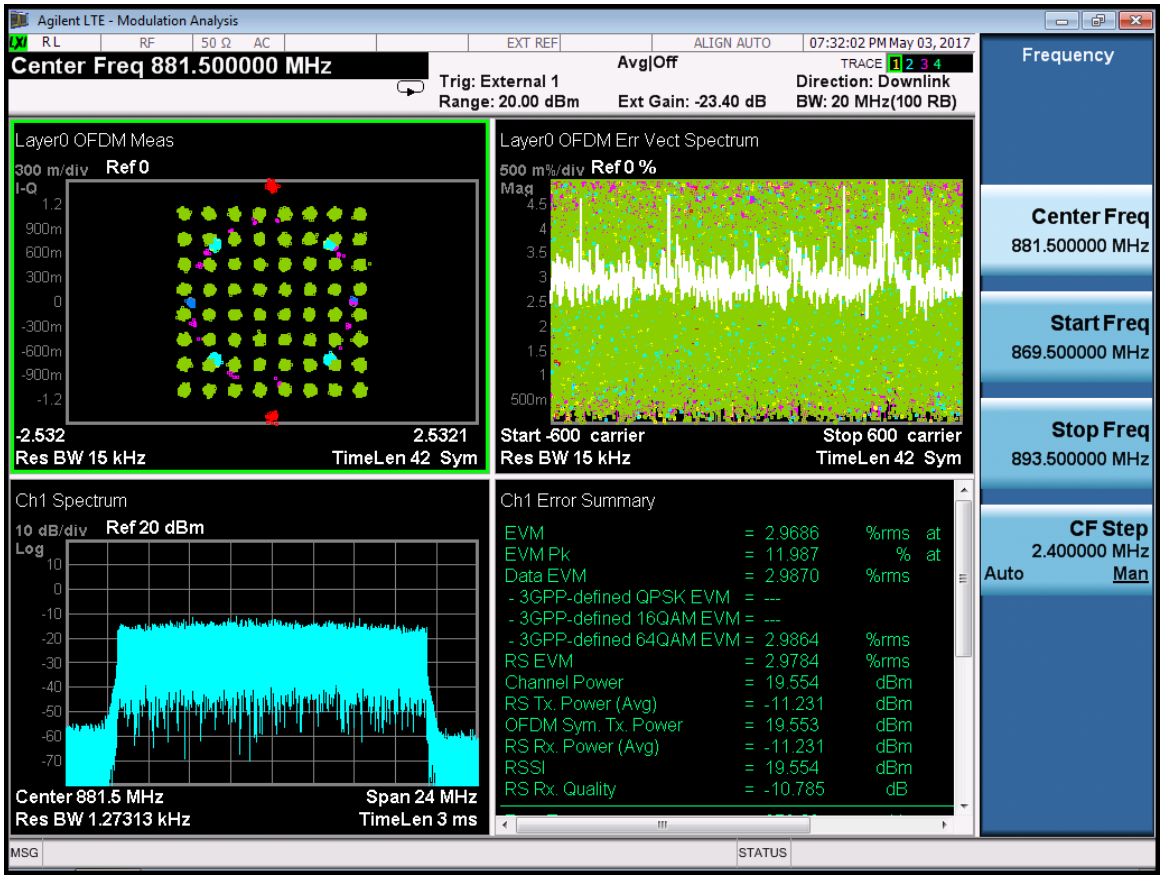
LTE 20M-Port 0-879MHz-E-TM3.3



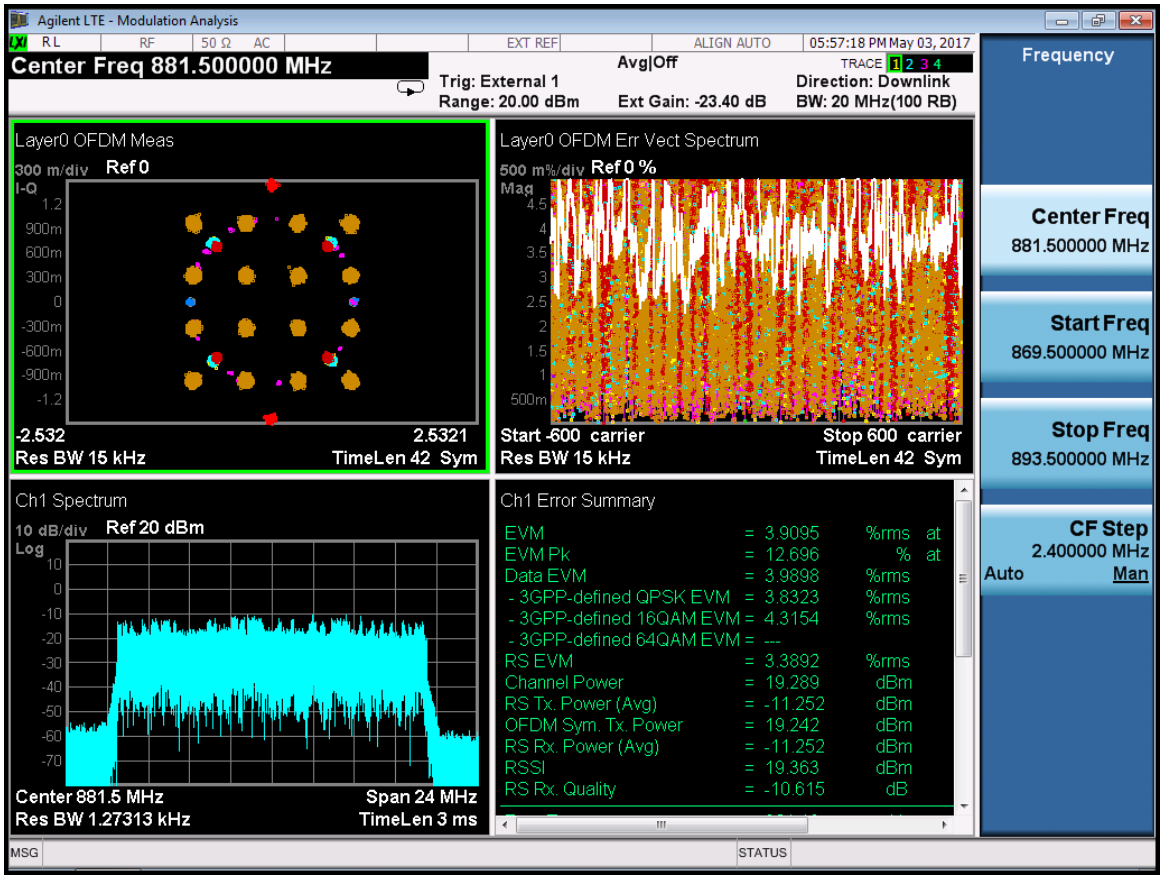
RF 881.5M:
LTE 20M-Port 0-881.5MHz-E-TM2



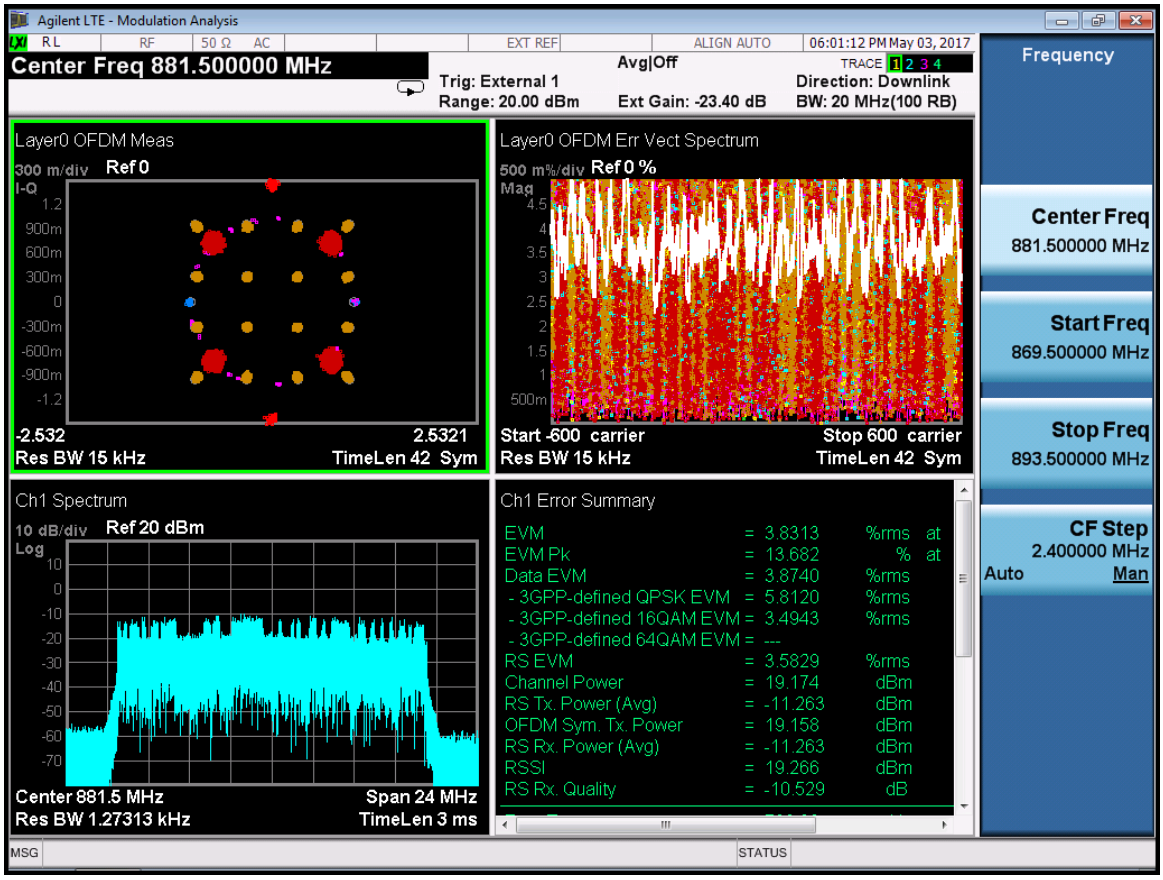
LTE 20M-Port 0-881.5MHz-E-TM3.1



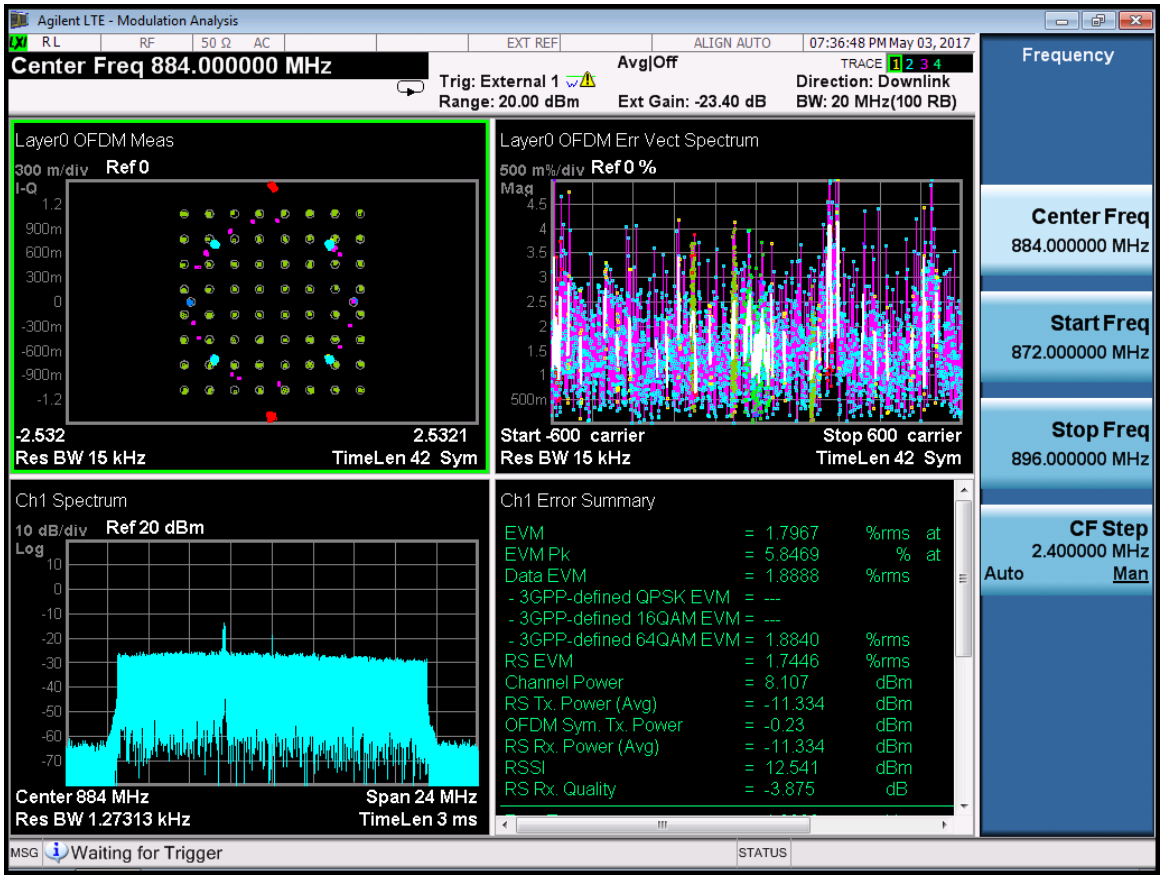
LTE 20M-Port 0-881.5MHz-E-TM3.2



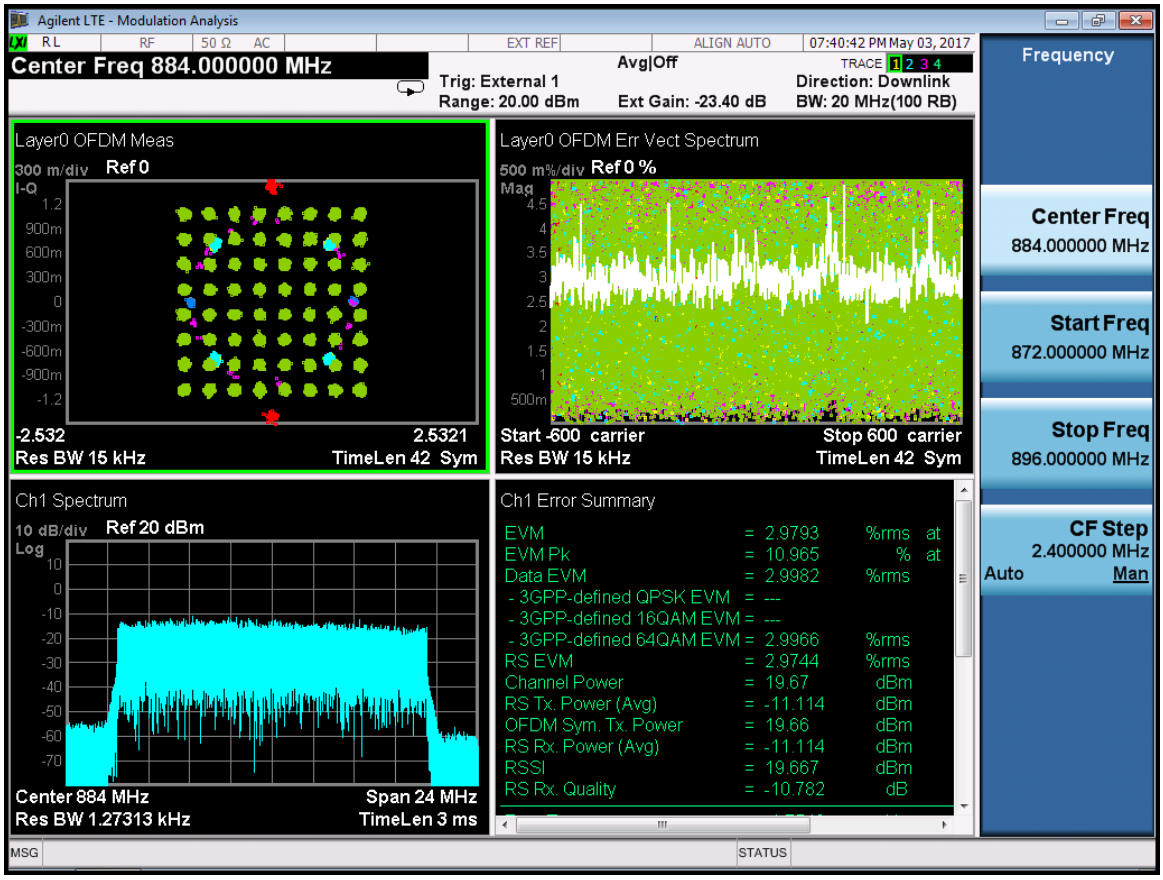
LTE 20M-Port 0-881.5MHz-E-TM3.3



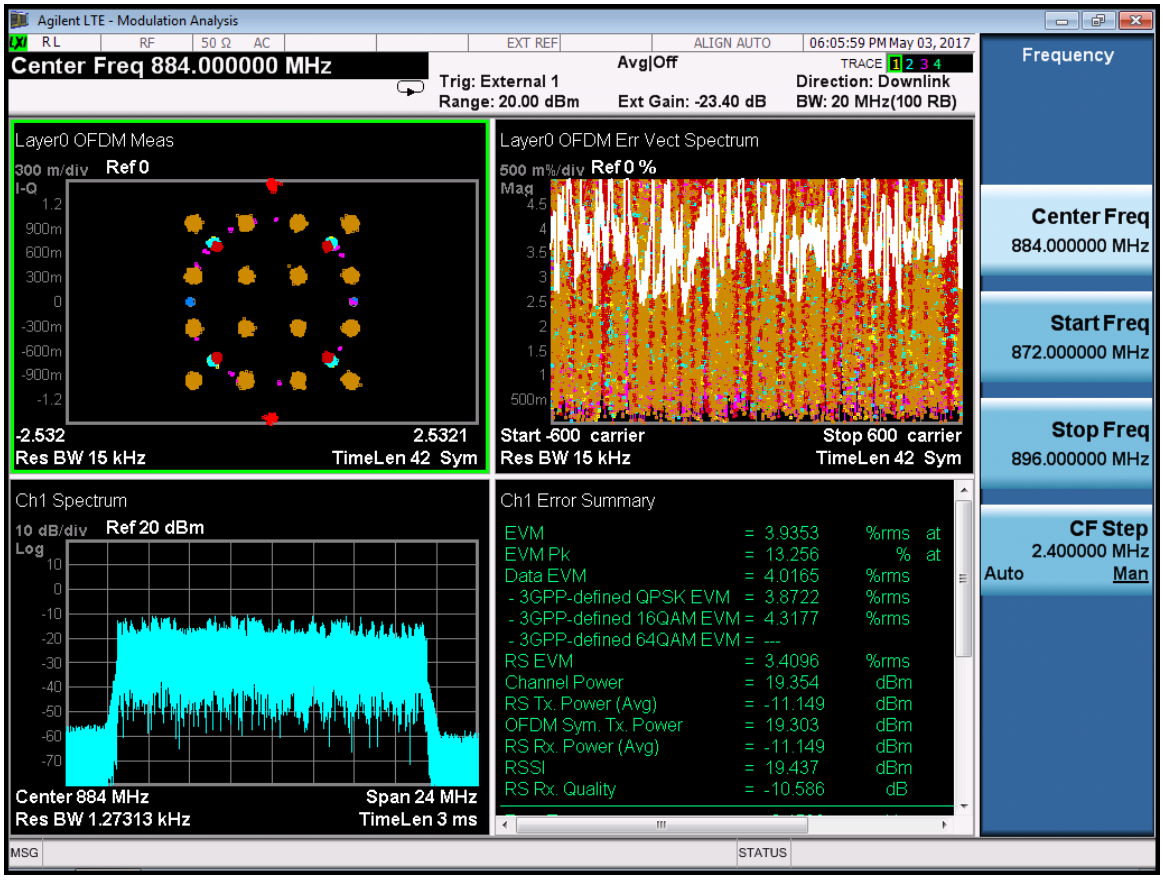
RF 884M:
LTE 20M-Port 0-884MHz-E-TM2



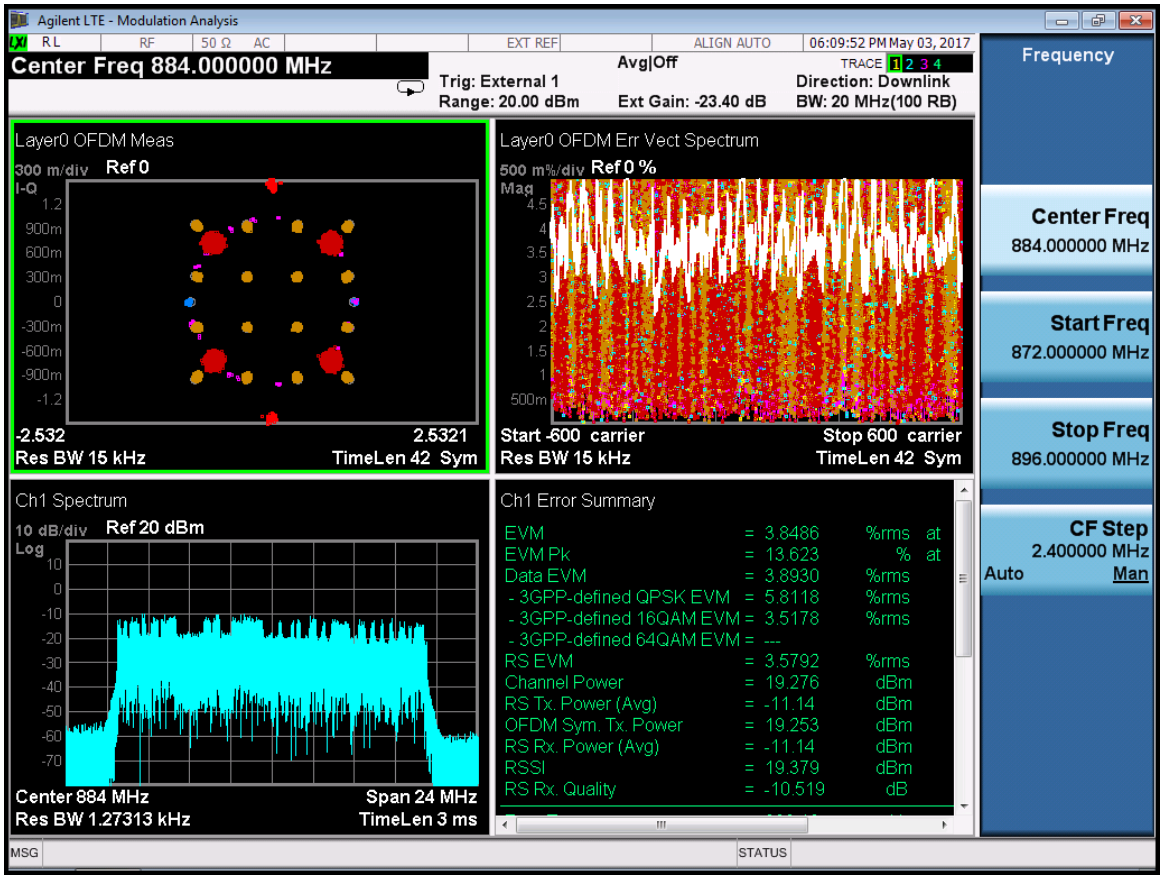
LTE 20M-Port 0-884MHz-E-TM3.1



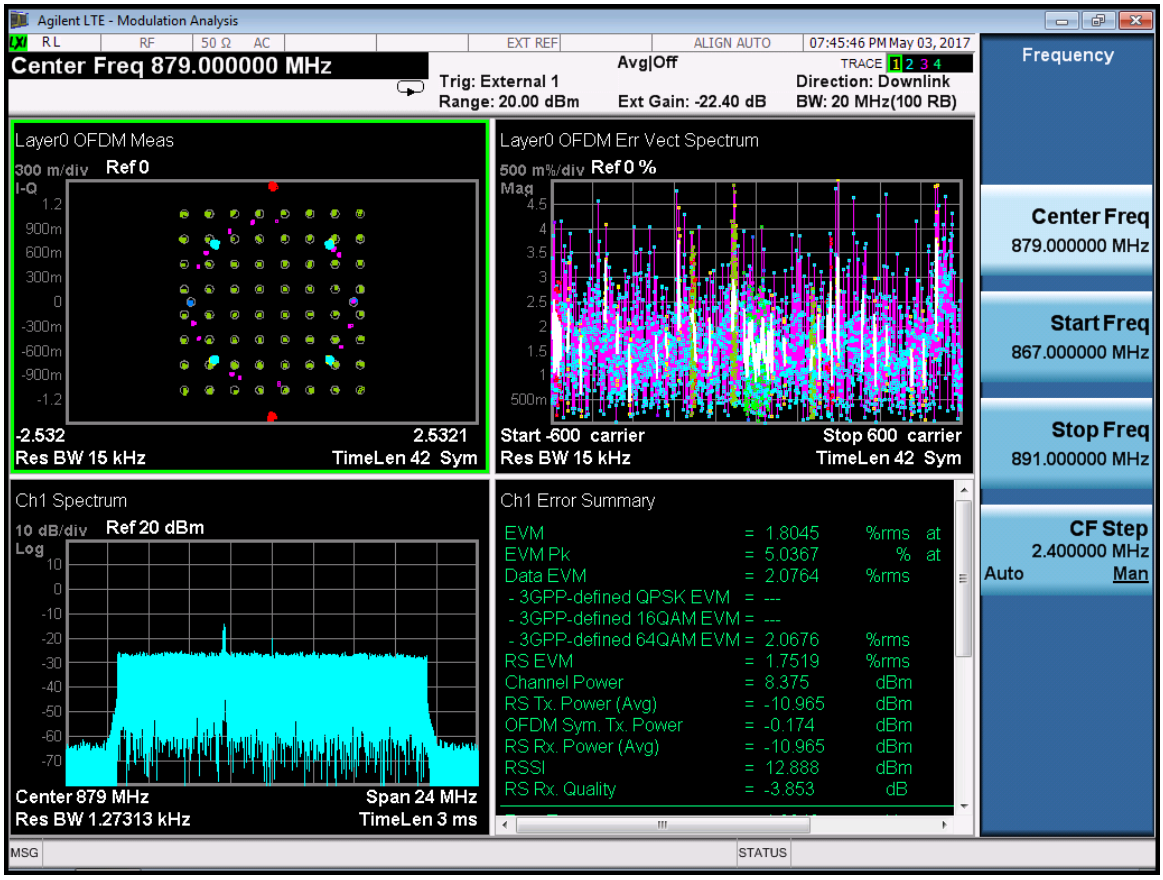
LTE 20M-Port 0-884MHz-E-TM3.2



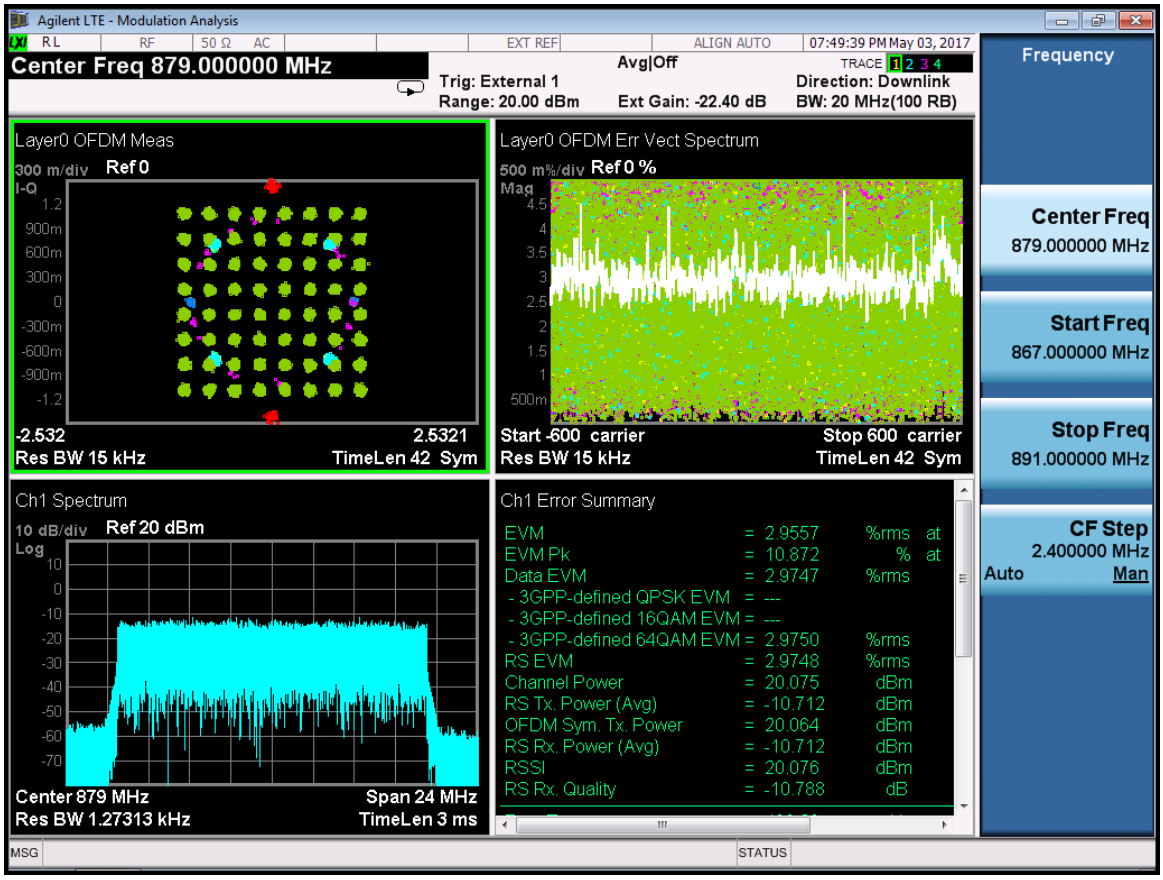
LTE 20M-Port 0-884MHz-E-TM3.3



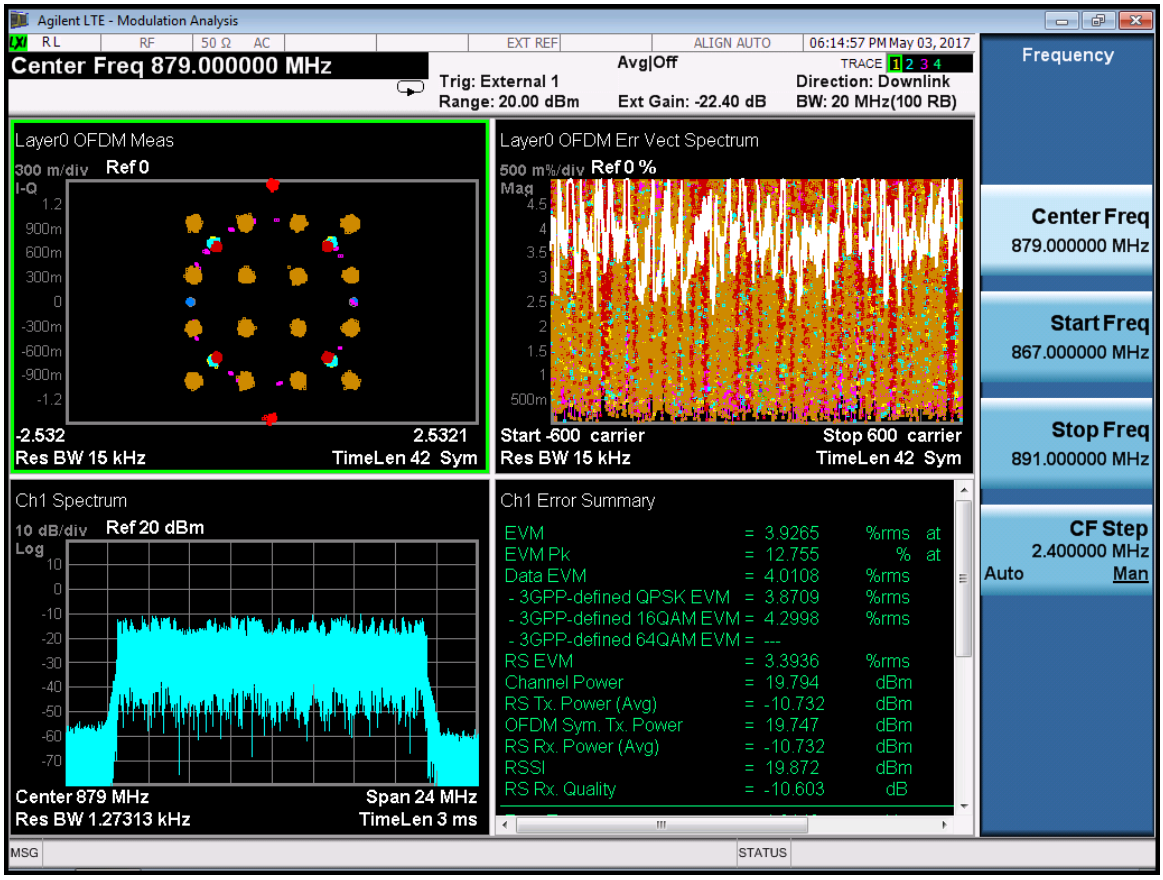
RF 879M:
LTE 20M-Port 1-879MHz-E-TM2



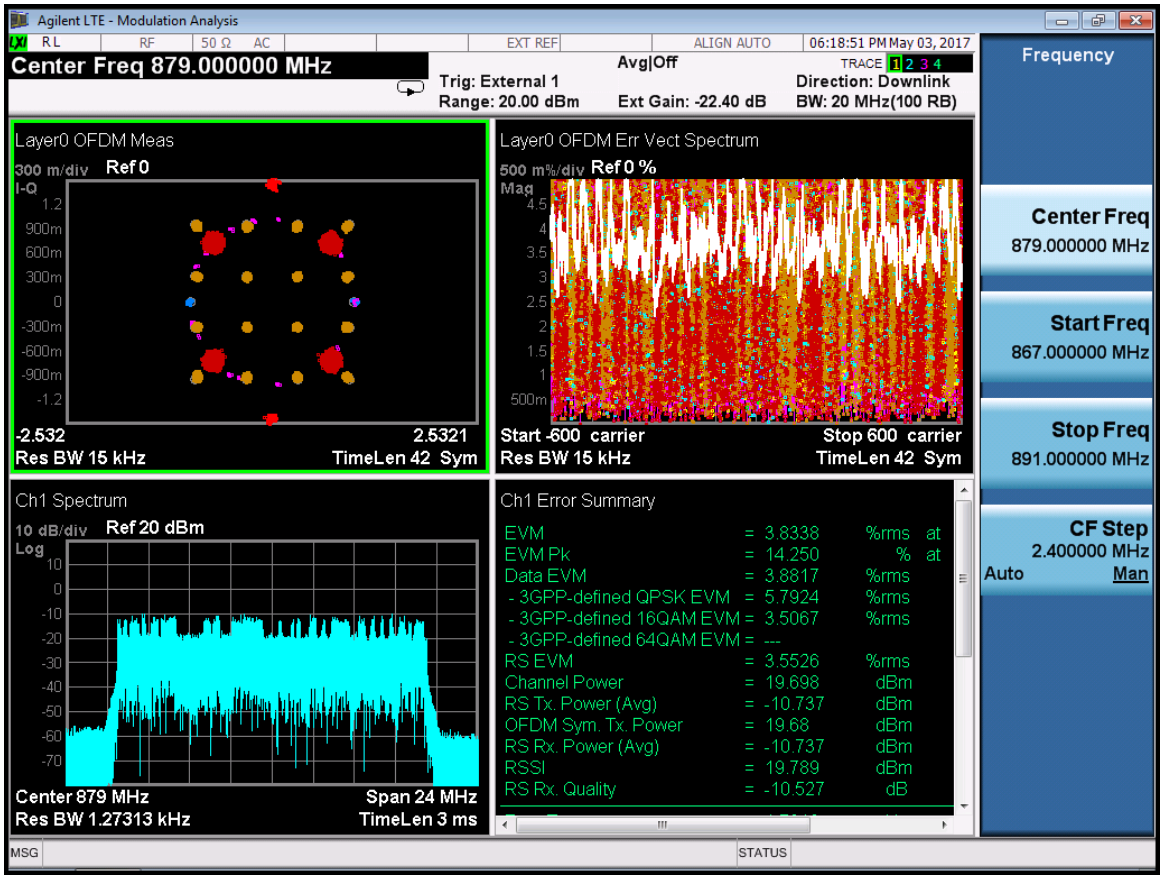
LTE 20M-Port 1-879MHz-E-TM3.1



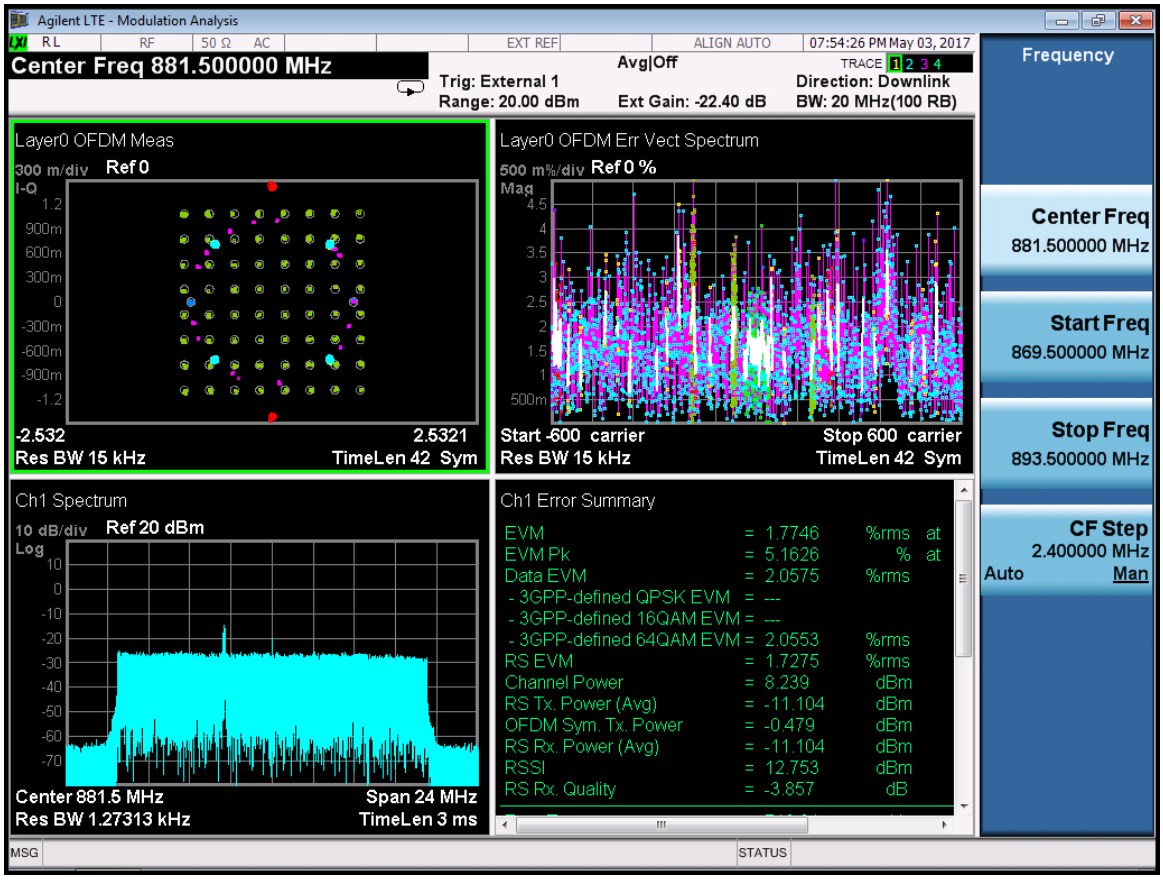
LTE 20M-Port 1-879MHz-E-TM3.2



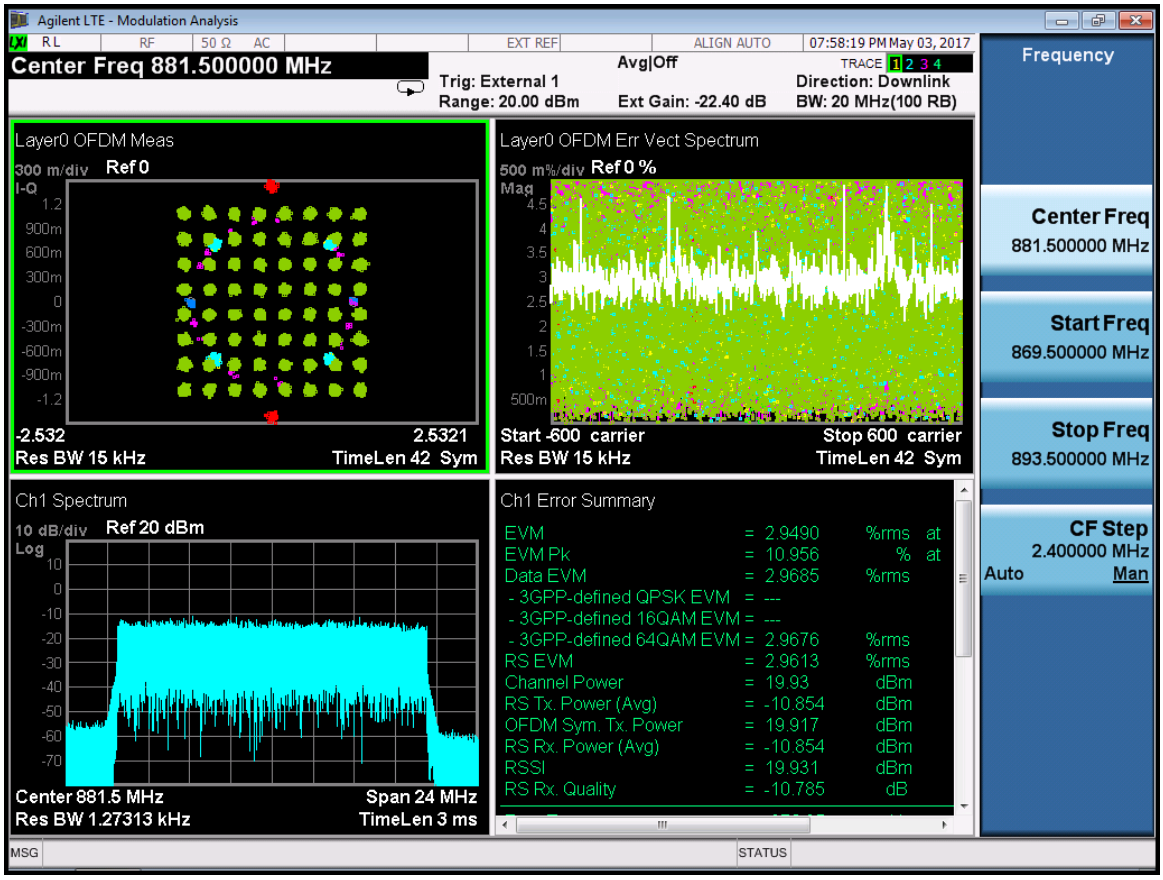
LTE 20M-Port 1-879MHz-E-TM3.3



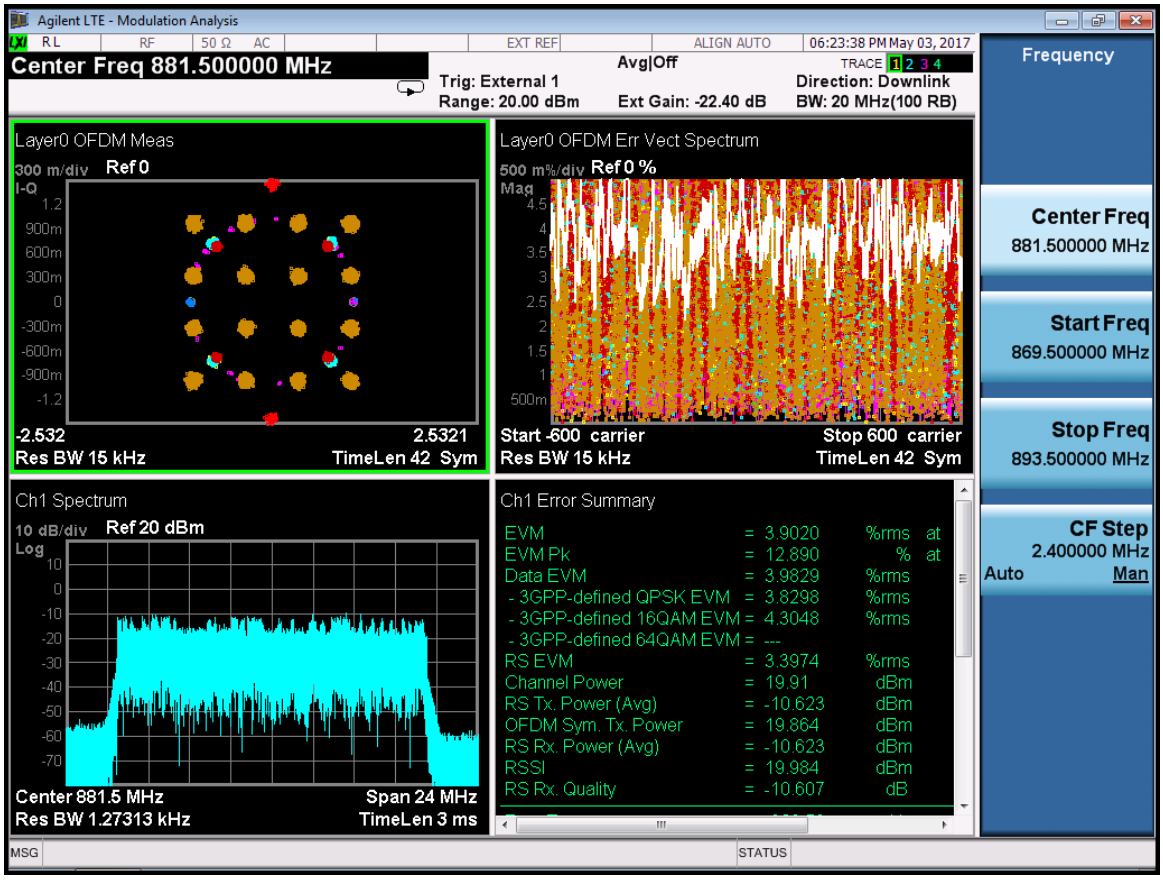
RF 881.5M:
LTE 20M-Port 1-881.5MHz-E-TM2



LTE 20M-Port 1-881.5MHz-E-TM3.1



LTE 20M-Port 1-881.5MHz-E-TM3.2



LTE 20M-Port 1-881.5MHz-E-TM3.3