



# FCC RF TEST REPORT

Report Number : **RP20170313032\_04** Date of Issue: **12 Mar 2017**

FCC ID : **Q78-R8872AS1900**

Model / Serial No. : **ZXSDR R8872A S1900**

Product Type : **Macro Remote Radio Unit**

Applicant : **ZTE Corporation**

Address : **ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,  
Nanshan District, Shenzhen, Guangdong, P.R. China**

Production Facility : **ZTE Corporation**

Address : **ZTE Plaza, Keji Road South, Hi-Tech Industrial Park,  
Nanshan District, Shenzhen, Guangdong, P.R. China**

Test Result :  **Positive**     **Negative**

Total pages including Appendices : **167**

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## 1 General Information

### 1.1 Notes

It is the test results from all the tests which are performed in the RF Laboratory of Shenzhen Zoom Rel Testing Technology Co., Ltd. The RF Lab was certificated by CNAS and the registration number was L0611.

Test site 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 May 10, 2016.

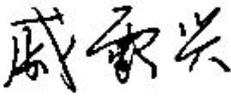
The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 373926. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

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**Prepared By**  
RF Test Engineer

2017-03-12  
**Date**

**Qi Luxing**  
**Name**

  
**Signature**

**Reviewed By**  
Laboratory Manager

2017-03-12  
**Date**

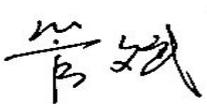
**Wu Shuzhong**  
**Name**

  
**Signature**

**Approved by**  
EMC/RF Project Manager

2017-03-12  
**Date**

**Guan Bin**  
**Name**

  
**Signature**



## 1.2 Testing Laboratory

**Shenzhen Zoom Rel Testing Technology Co., Ltd.**

**Address: 1/F, B2 Wing, ZTE plaza, Keji Road South, Hi-Tech industrial park, Shenzhen, Guangdong, 518057**

**Country: China**

**Phone: +86 755 26770349**

**FAX: +86 755 26770347**

## 1.3 Details of Manufacture

**Manufacture : ZTE Corporation**

**ADDRESS: ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R. China**

**PRODUCT DESCRIPTION: LTE Remote Radio Unit**

**MANUFACTURERS MODEL/SERIAL NUMBER: ZXSDR R8872A S1900(LTE)**

**FCC ID : Q78-R8872AS1900**

**SAMPLE NUMBER: SRP20170313032**

## 1.4 Application Details

**Date of receipt of order: 2017-01-04**

**Date of receipt of test item: 2017-01-04**

**Date of test: 2017-01-04~2017-03-05**

## 1.5 Test Item

**Refer to Chapter 2.**

## 1.6 Applied Standard

APPLIED PRODUCT STANDARD	TIA/EIA 603-C:2004
TEST METHODS	FCC 47 CFR Part1:2016 FCC 47 CFR Part2:2016 FCC 47 CFR Part24:2016



## 2 Summary of Results

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 , §24.232	Transmitter output Power	Compliant
§2.1091 ,§1.1037	RF Exposure	Compliant
§2.1047	Modulation Characteristic	Compliant
§2.1053, §24.238	Spurious Radiated Emissions	Compliant
§2.1051, §24.238	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049	Occupied Bandwidth	Compliant
§2.1051,§24.238	Band Edge	Compliant
§ 2.1055, ,§24.235	Frequency stability	Compliant

### 3 Equipment Specification

#### 3.1 Technical specification

Size: 415 mm x 352 mm x 137 mm (HxWxD)

Input voltage: -37V~-60V

Frequency range: UL:1850MHz~1910MHz; DL: 1930MHz~1990 MHz

Max RF output power: 49dBm

Gain of the antenna: 15dBi

Appearance of EUT:



fig 1. FIGURE 1 APPEARANCE OF ZXSDR R8872A S1900



#### **4 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.

## 5 Test configuration

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.

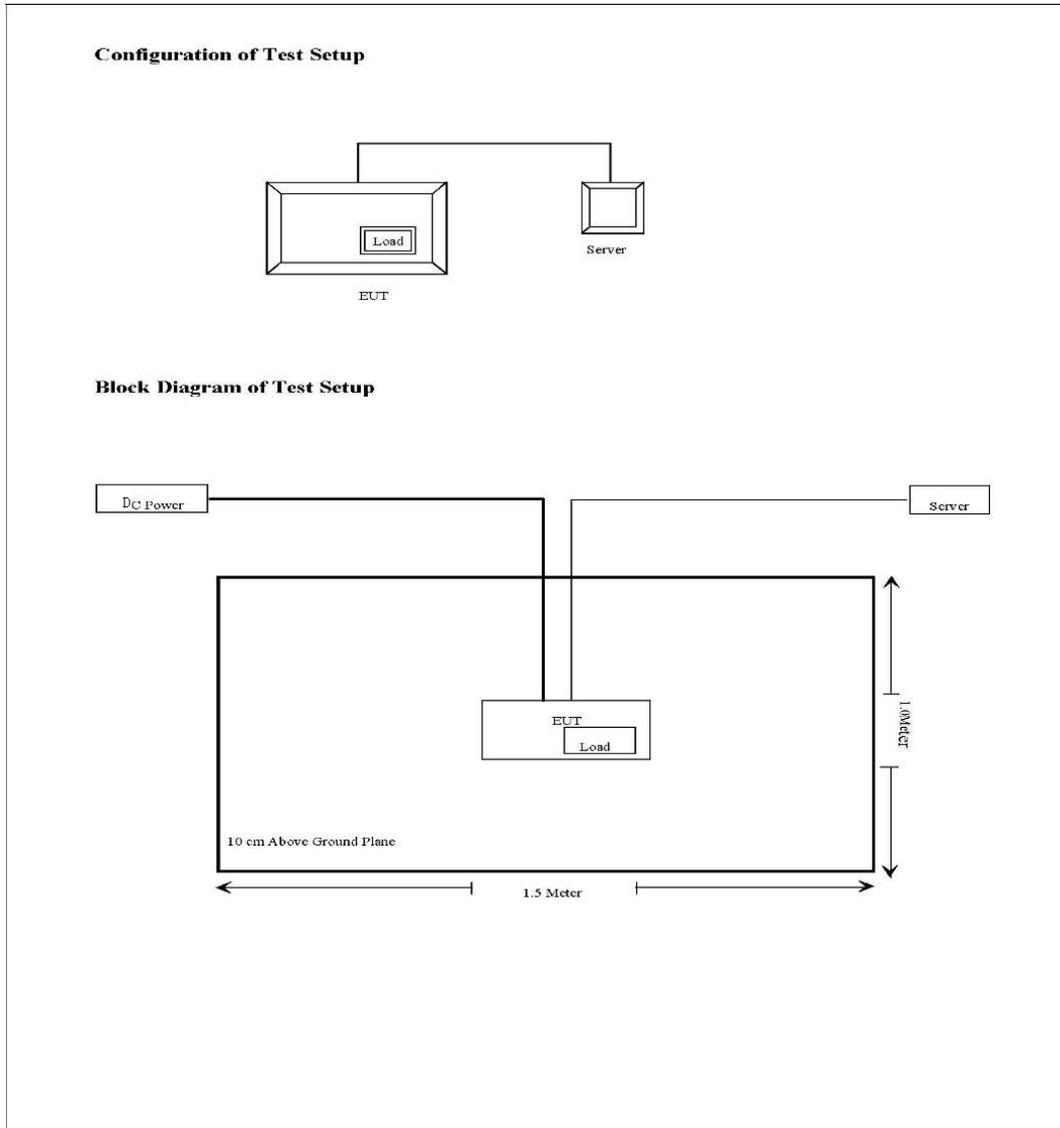


fig 2. Test configuration

**6 TRANSMITTER OUTPUT POWER**

**6.1 Applicable Standard: FCC §2.1046, §24.232**

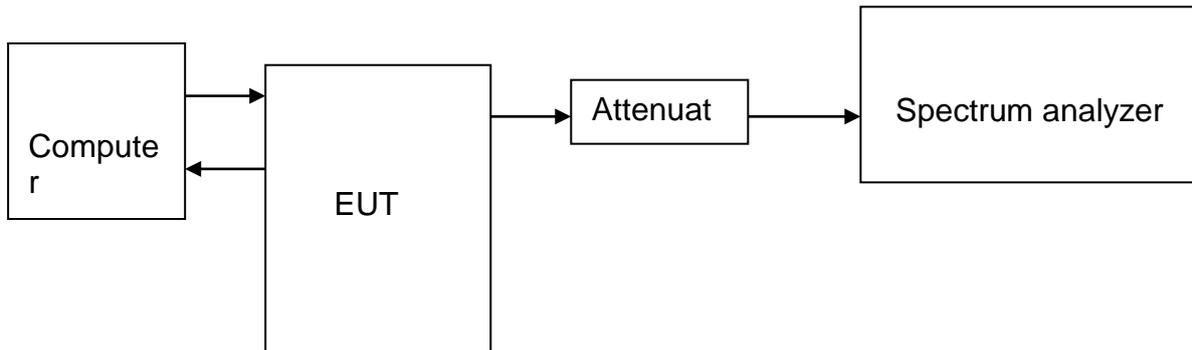
According to FCC §2.1046 & 24.232, the EIRP (equivalent isotropically radiated power) must not exceed 1640Watts.

**6.2 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 40dB Attenuator	DTS100-40-3-1	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.

**6.3 Test Procedure**



The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. External attenuation Loss is 40dB, Cable Loss is about 1.5dB

**6.4 Environmental Conditions**

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

**6.5 Test Result: Pass**

**6.6 Test Mode: Transmitting LTE**

**6.7 Test Data**

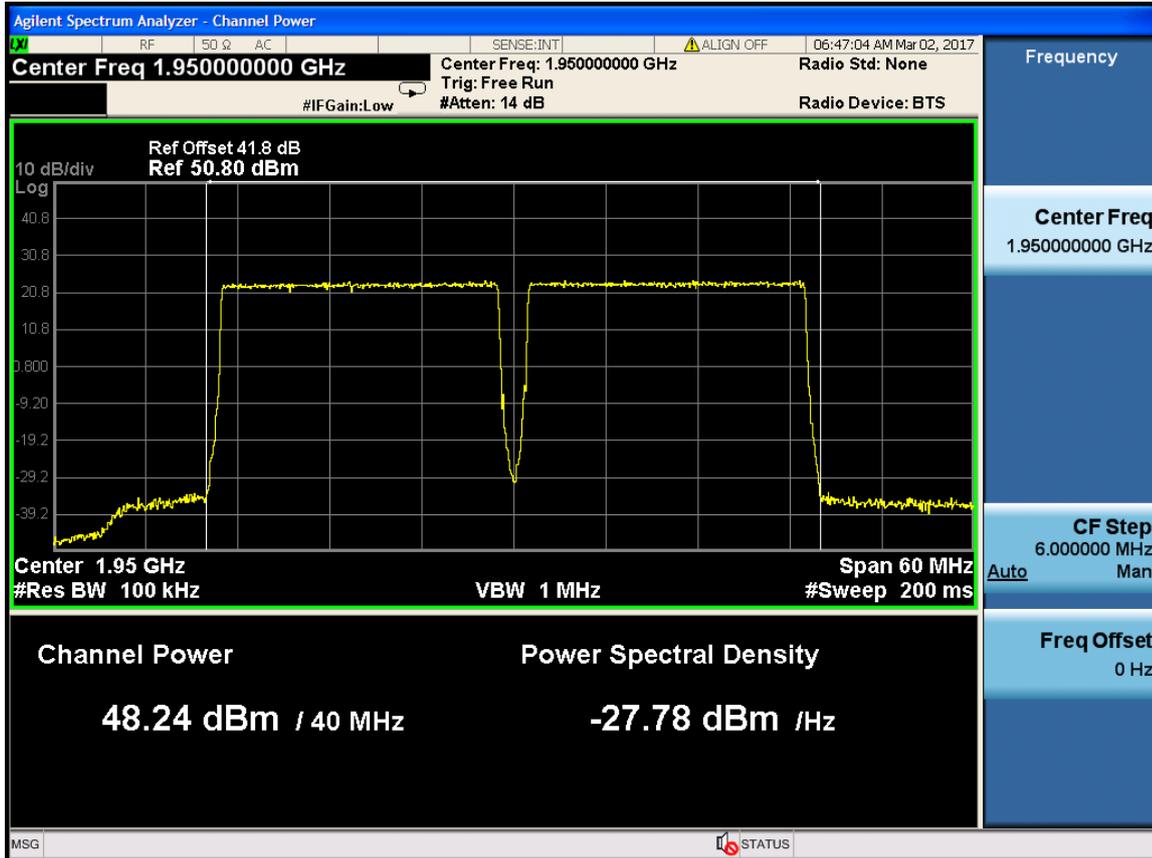
RF Bandwidth :IBW 40M(LTE 20M+LTE 20M)

Port	Center Freq. (MHz)	Max output Power in dBm	Antenna gain dBi	Cable Loss dB	equivalent isotropically radiated power dBm Of single antenna	Total Power in W Of single antenna

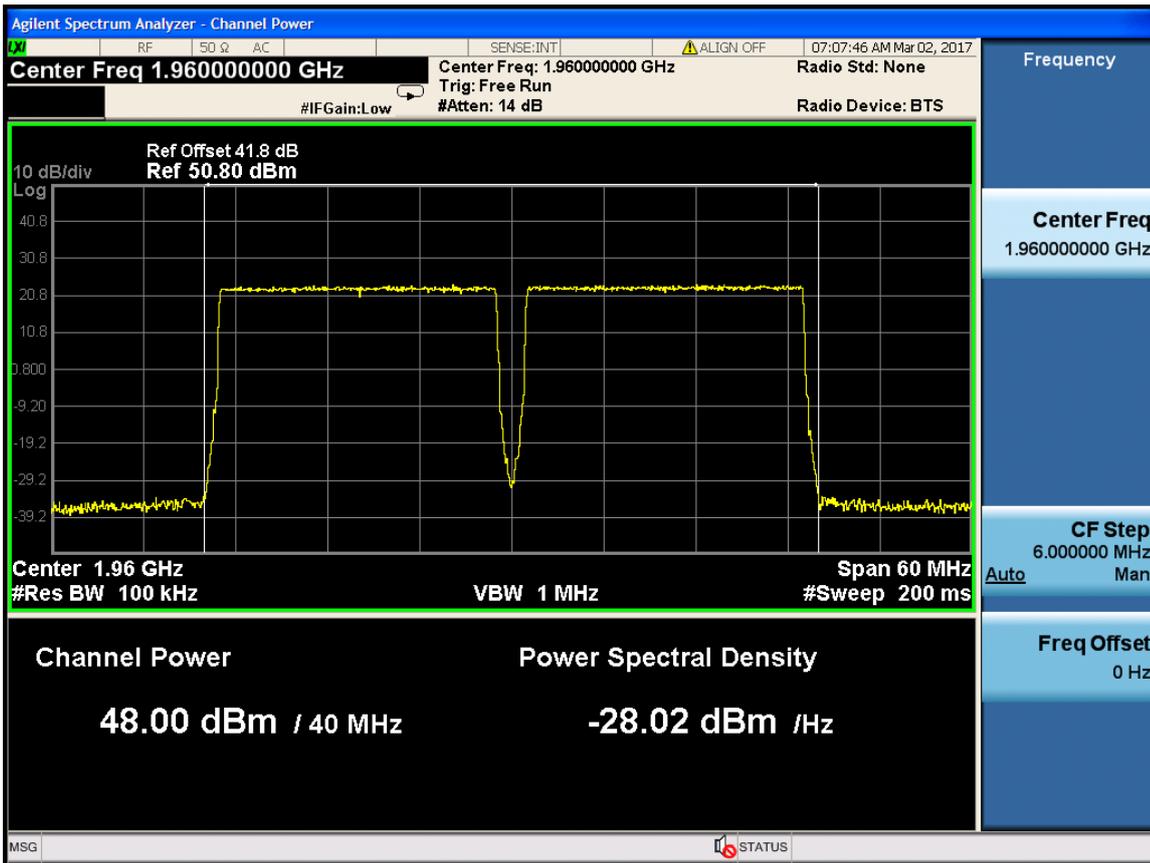


1	1950	48.24	15	4.5	58.74	748.170
	1960	48.00	15	4.5	58.50	707.946
	1970	48.18	15	4.5	58.68	737.904
4	1950	48.25	15	4.5	58.75	749.894
	1960	48.04	15	4.5	58.54	714.496
	1970	48.19	15	4.5	58.69	739.605

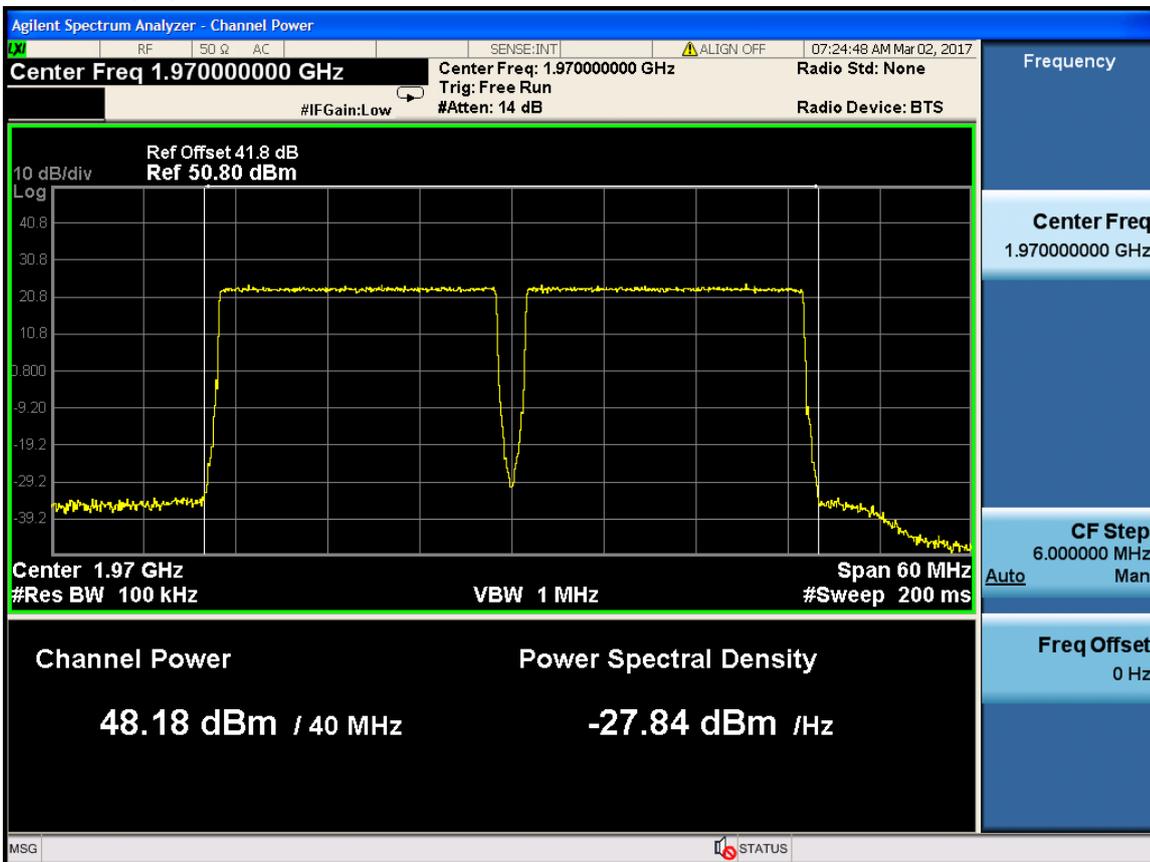
Port 1 -1950MHz



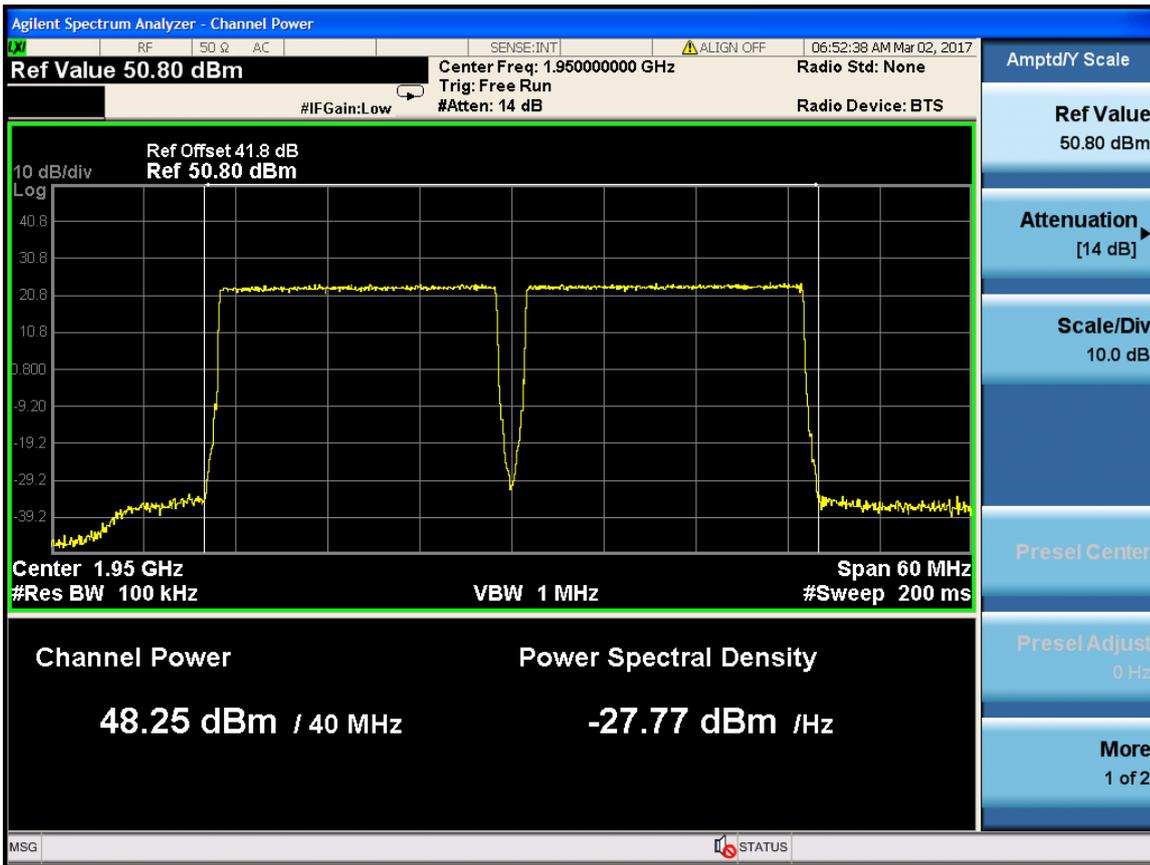
Port 1 -1960MHz



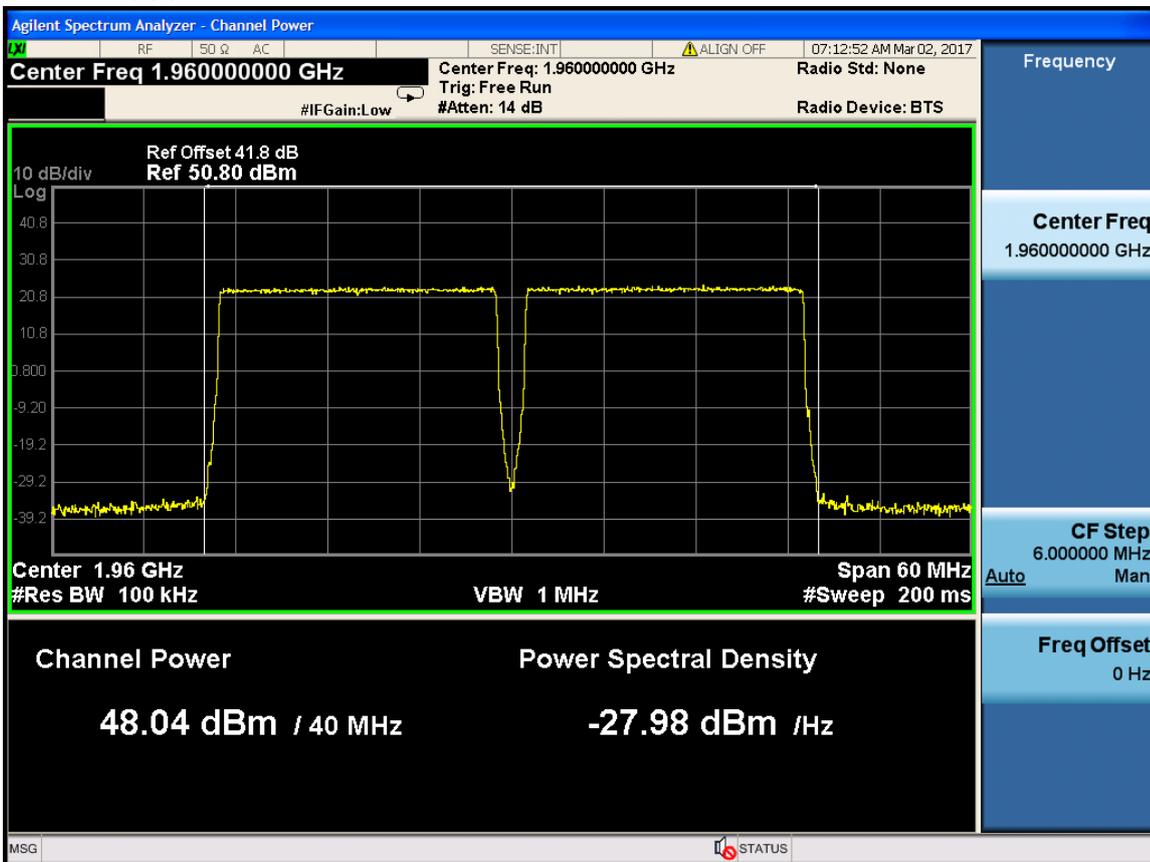
Port 1 -1970MHz



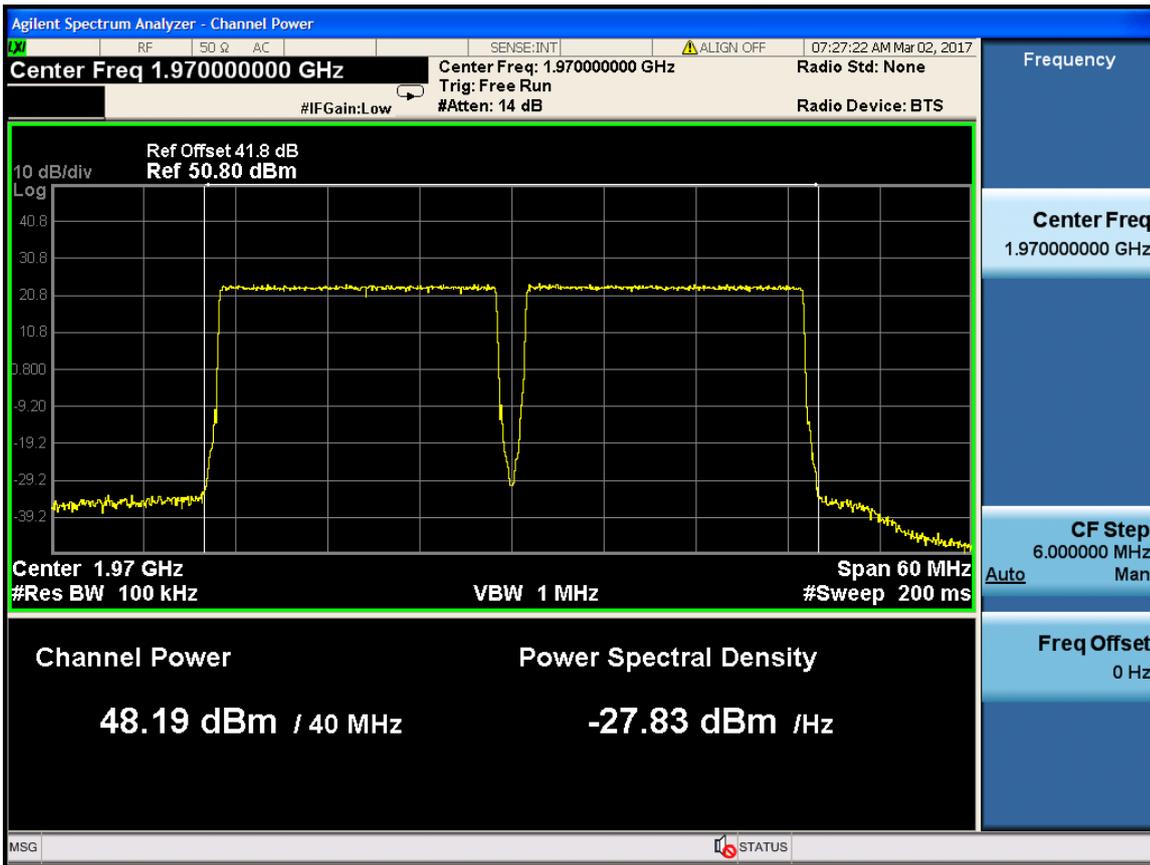
Port 4 -1950MHz



Port 4 -1960MHz



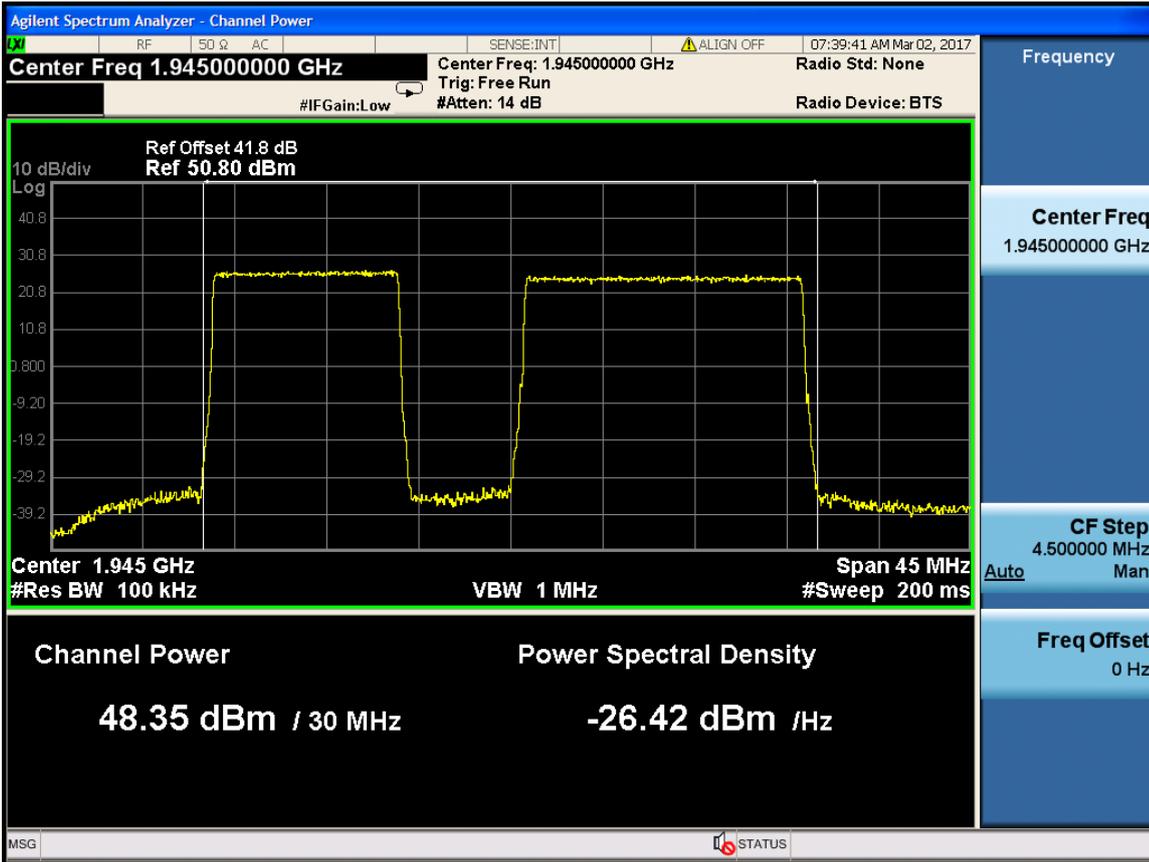
Port 4 -1970MHz



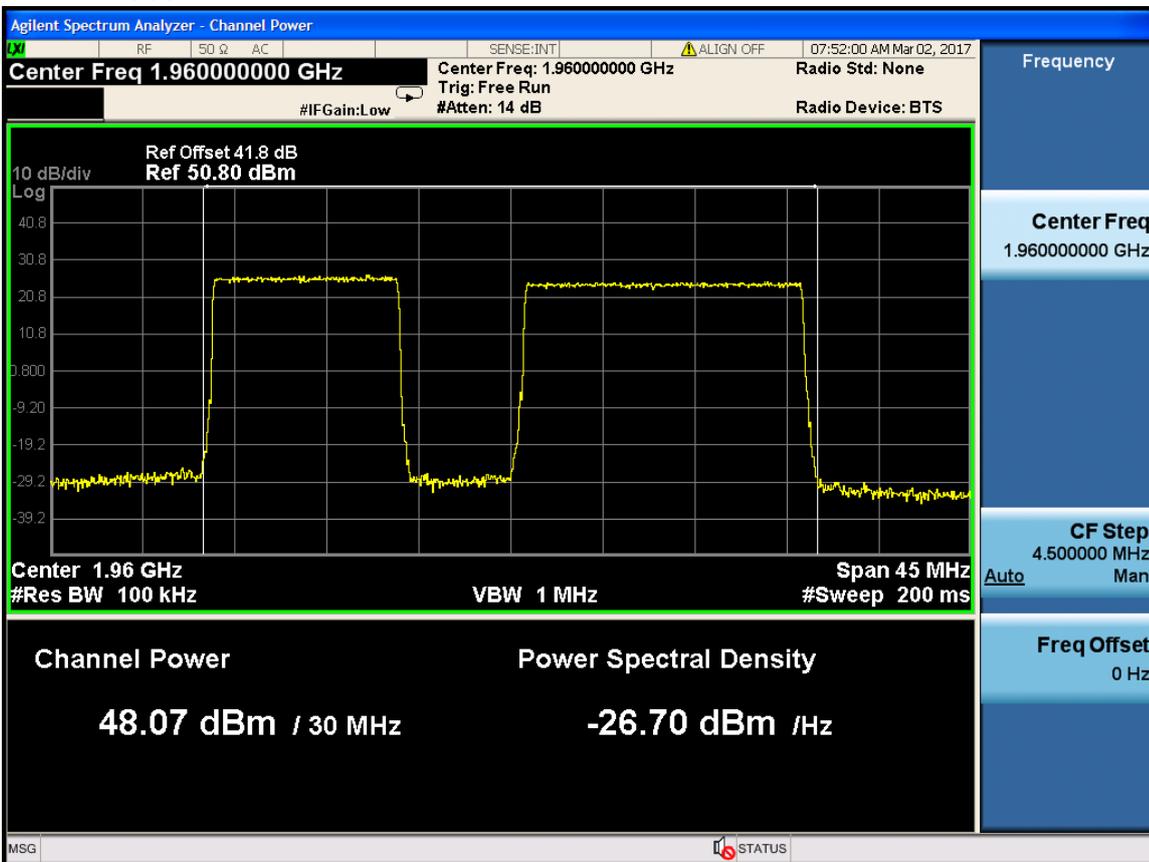
RF Bandwidth :IBW 30M(LTE 10M+LTE 15M)

Port	Center Freq. (MHz)	Max output Power in dBm	Antenna gain dBi	Cable Loss dB	equivalent isotropically radiated power dBm Of single antenna	Total Power in W Of single antenna
1	1945	48.35	15	4.5	58.85	767.361
	1960	48.07	15	4.5	58.57	719.449
	1975	48.15	15	4.5	58.65	732.825
4	1945	48.38	15	4.5	58.88	772.681
	1960	48.05	15	4.5	58.55	716.143
	1975	48.17	15	4.5	58.67	736.207

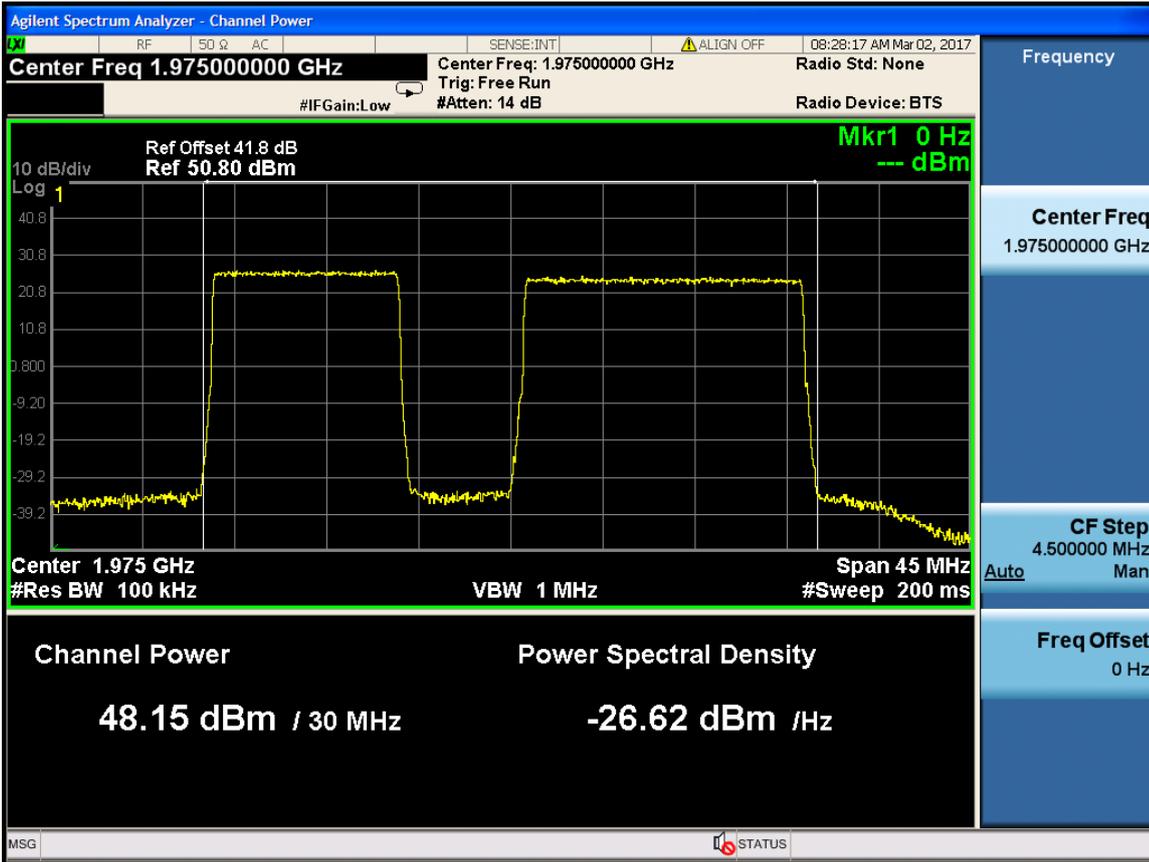
Port 1 -1945MHz



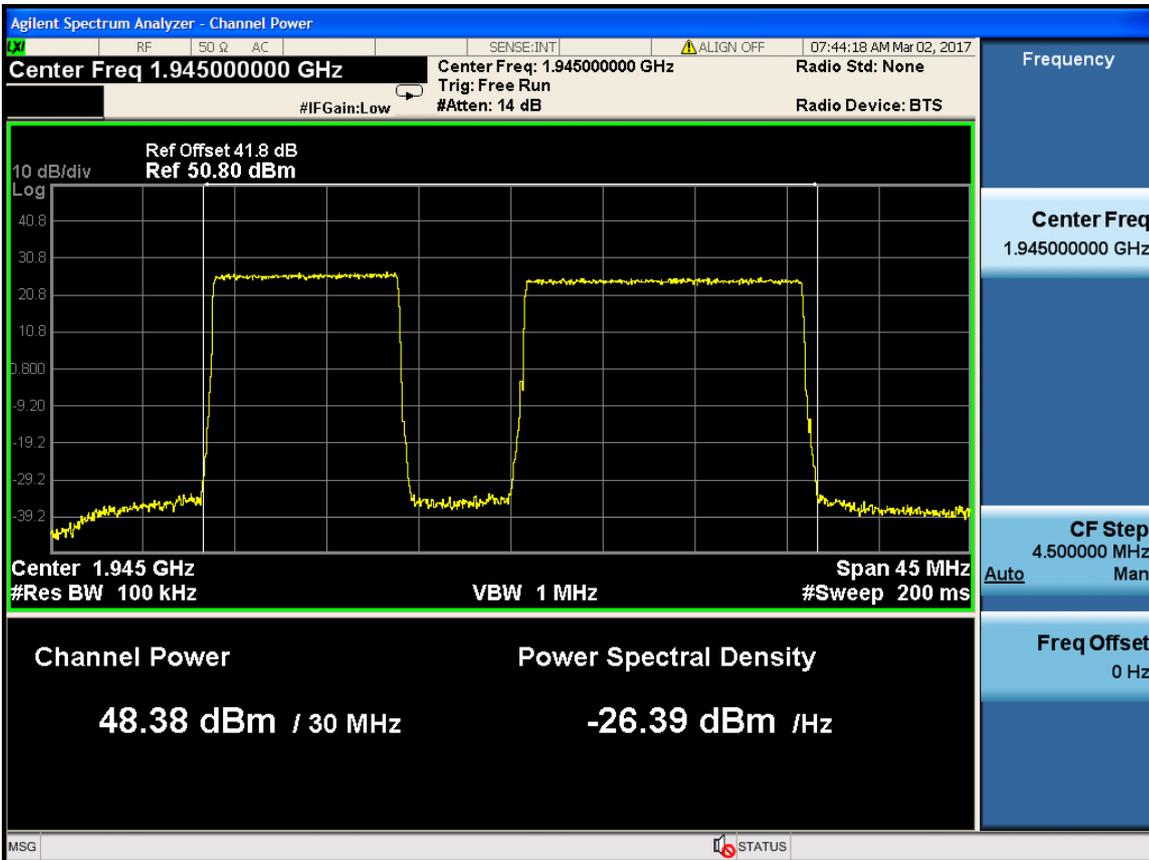
Port 1 -1960MHz



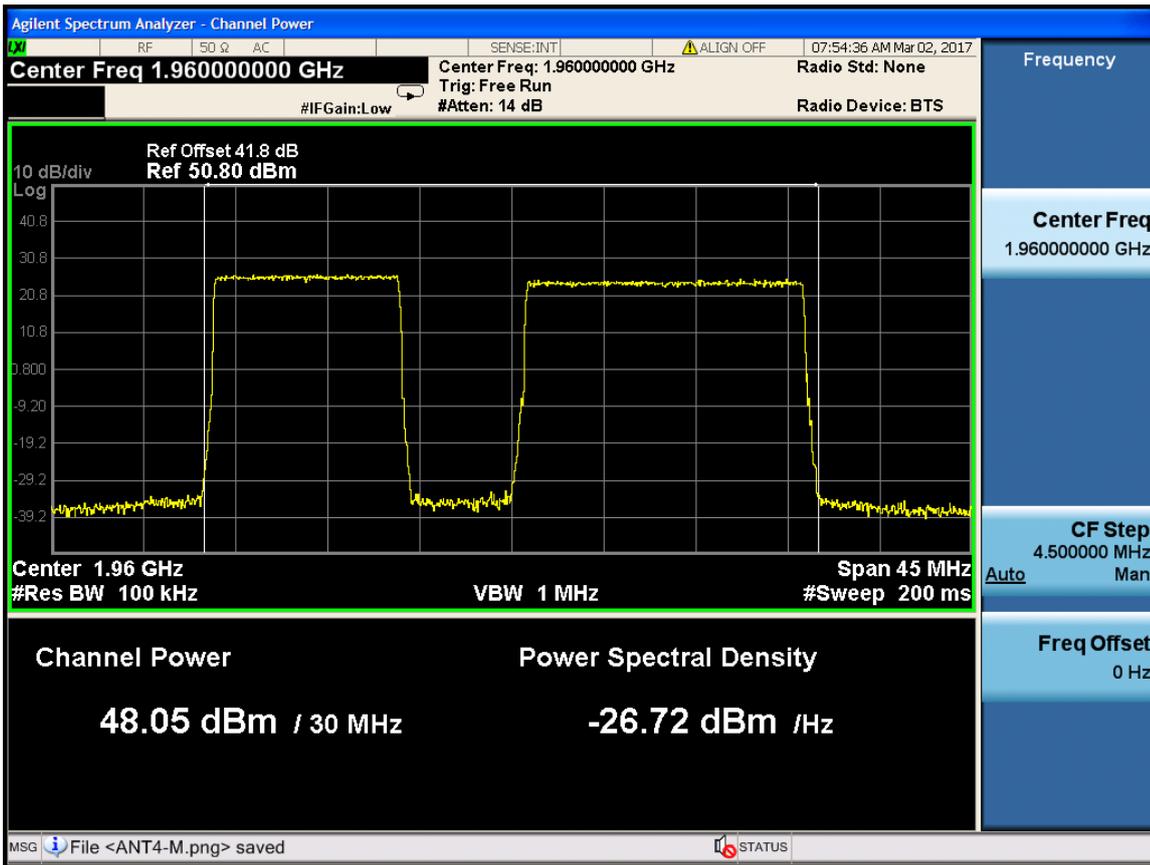
Port 1 -1975MHz



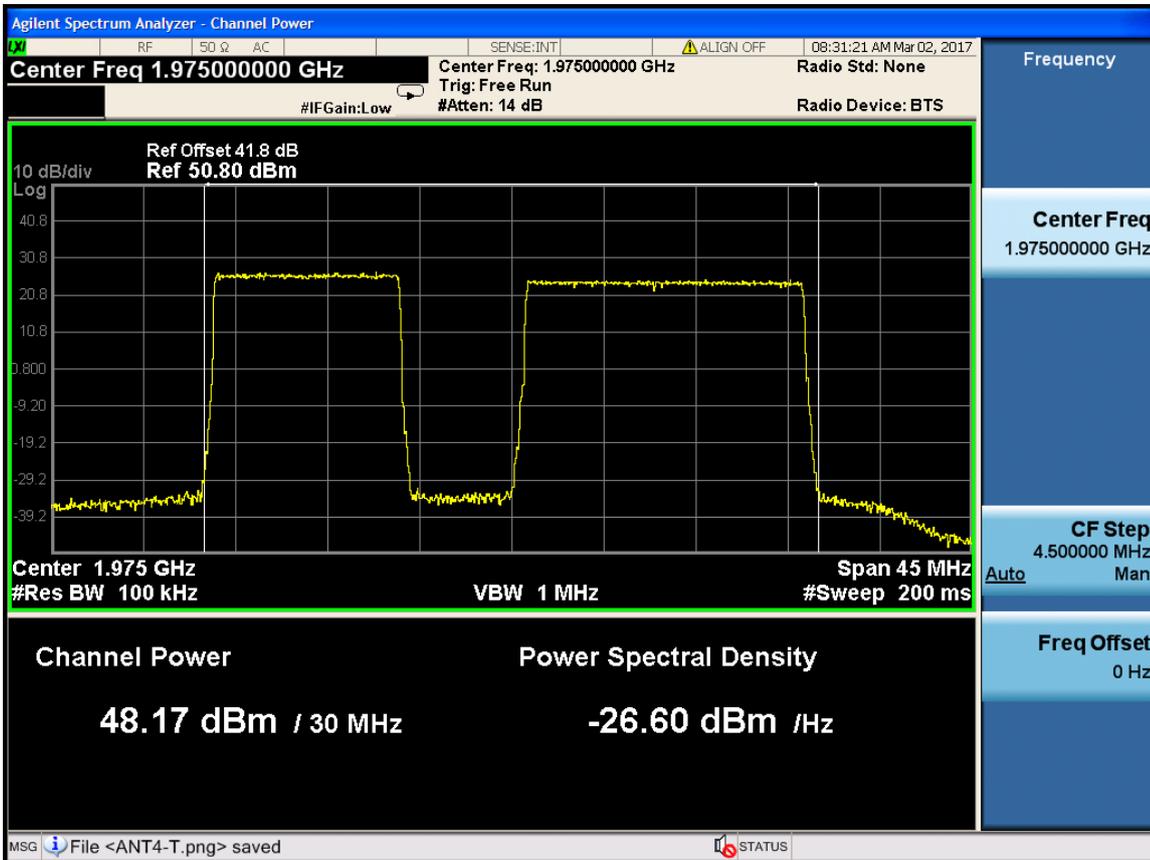
Port 4 -1945MHz



Port 4 -1960MHz



### Port 4 -1975MHz





## 7 RF EXPOSURE

### 7.1 Applicable standard: FCC §2.1091 §1.1037

### 7.2 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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

### 7.3 Test Data

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \text{EIRP} / 4\pi R^2$$

Where: S = power density

$$R = \text{distance to the center of radiation of the antenna} = [\text{EIRP} / 4\pi S]^{1/2}$$

According to §24.232, the equivalent isotropically radiated power (EIRP) of base transmitters and cellular repeaters must not exceed 1640 Watts.

Frequency 1990MHz is between 1500MHz and 100,000MHz, and the Maximum S=1mW/cm<sup>2</sup>

$$\Rightarrow R = 3.61\text{m.}$$

This equipment should be installed and operated with minimum distance 3.61m between the radiator& your body.

### 7.4 Test Result: pass

**8 MODULATION CHARACTERISTIC****8.1 Applicable Standard: FCC §2.1047****8.2 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 40dB Attenuator	DTS100-40-3-1	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.

**8.3 Test Procedure**

LTE digital mode is used by EUT.

**8.4 Test Data Environmental Conditions**

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

**8.5 Test Result: Pass****8.6 Test Mode: Transmitting LTE****8.7 Test Data**

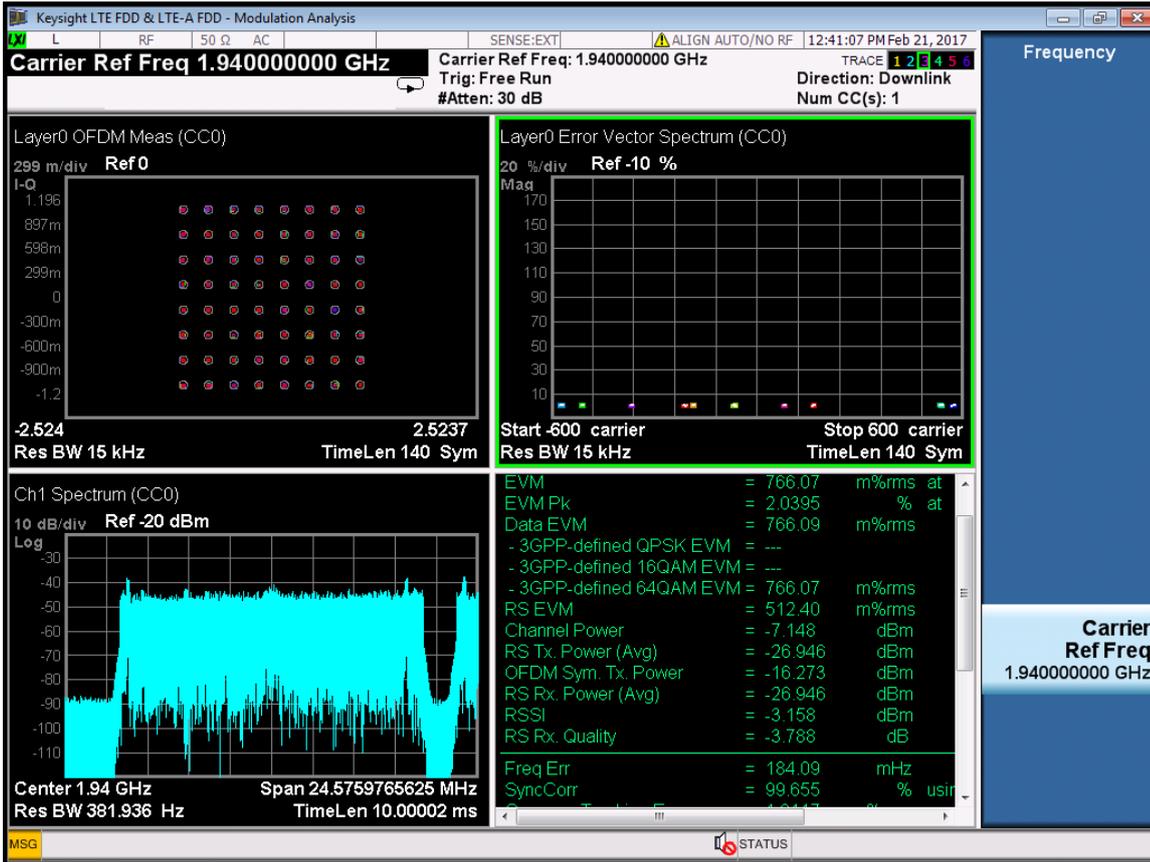
RF Bandwidth :IBW 40M(LTE 20M+LTE 20M)

Port	RF Center Freq. (MHz)	LTE Center Freq. (MHz)	Test mode	EVM%
1	1950	1940	E-TM2	0.76607
			E-TM3.1	4.6582
			E-TM 3.2	5.7484
			E-TM 3.3	7.6735
		1960	E-TM2	0.70432
			E-TM3.1	4.6422
			E-TM 3.2	5.7184
			E-TM 3.3	7.7371
	1960	1950	E-TM2	0.70206
			E-TM3.1	4.6738
			E-TM 3.2	5.7972
			E-TM 3.3	7.69058
		1970	E-TM2	0.68723
			E-TM3.1	4.6764
			E-TM 3.2	5.8207
			E-TM 3.3	7.7181

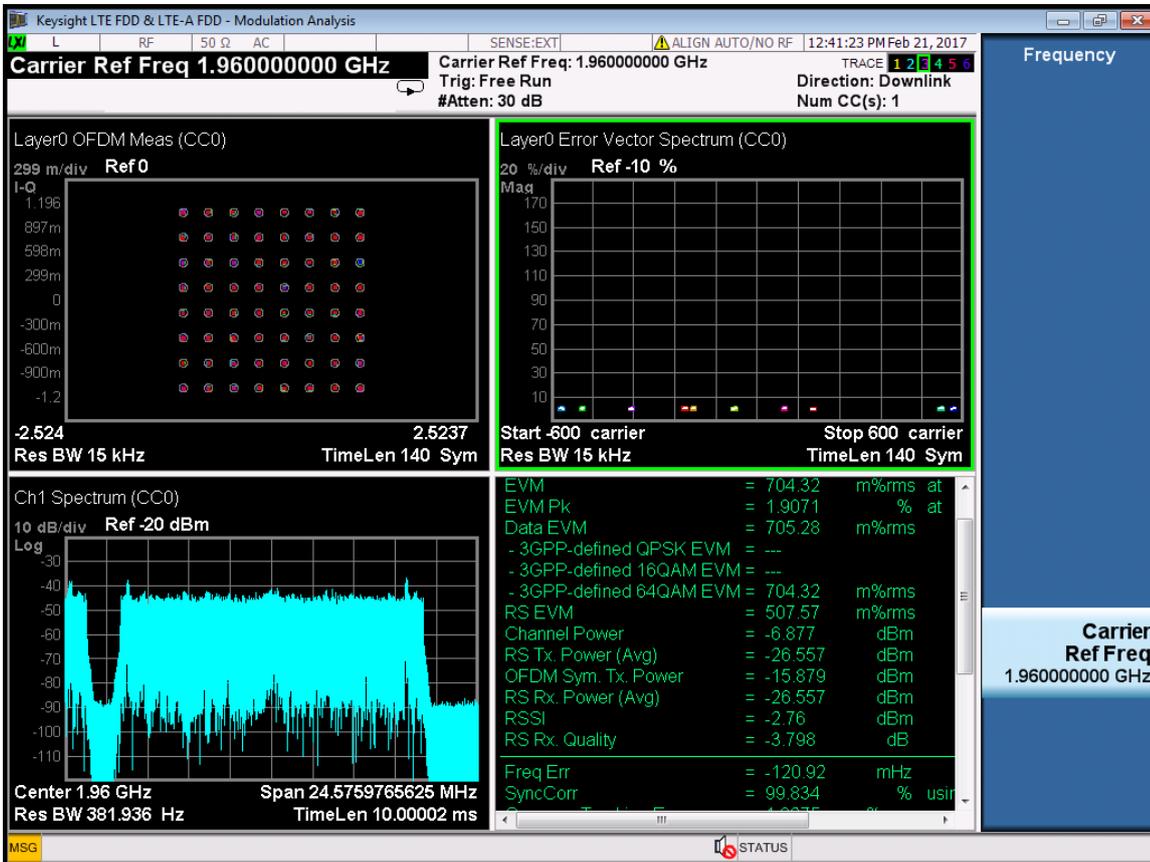


4	1970	1960	E-TM2	0.88864	
			E-TM3.1	4.6529	
			E-TM 3.2	5.7463	
			E-TM 3.3	7.6925	
		1980	E-TM2	0.78523	
			E-TM3.1	4.6813	
			E-TM 3.2	5.7475	
			E-TM 3.3	7.6971	
	1950	1940	1940	E-TM2	0.73151
				E-TM3.1	4.3692
				E-TM 3.2	5.4344
				E-TM 3.3	7.2785
			1960	E-TM2	0.67988
				E-TM3.1	4.3953
				E-TM 3.2	5.4347
				E-TM 3.3	7.2842
1960		1950	E-TM2	0.65533	
			E-TM3.1	4.4128	
			E-TM 3.2	5.6693	
			E-TM 3.3	7.2814	
		1970	E-TM2	0.738	
			E-TM3.1	4.4199	
			E-TM 3.2	5.5312	
			E-TM 3.3	7.4113	
1970	1960	E-TM2	0.92303		
		E-TM3.1	4.3985		
		E-TM 3.2	5.4373		
		E-TM 3.3	7.2331		
	1980	E-TM2	1.0540		
		E-TM3.1	4.3833		
		E-TM 3.2	5.4999		
		E-TM 3.3	7.2817		

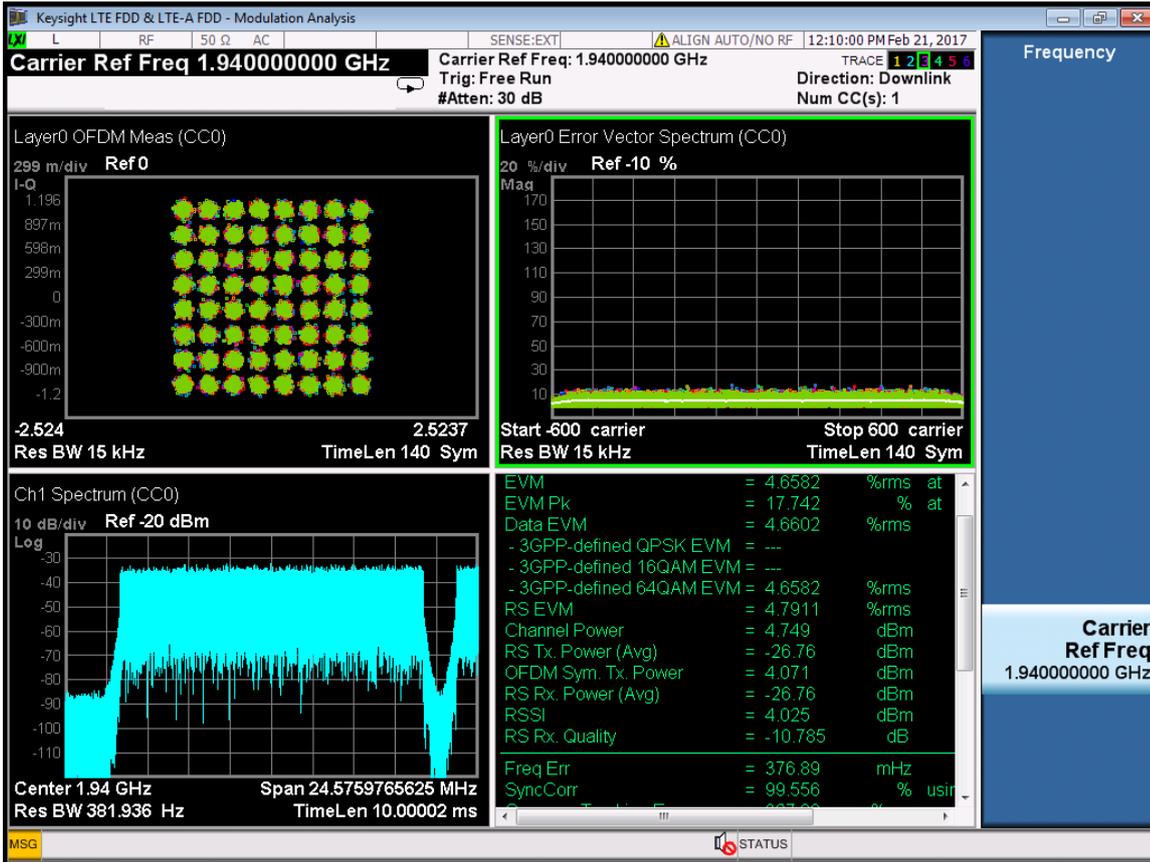
RF 1950M:  
LTE 20M-Port 1-1940MHz-E-TM2



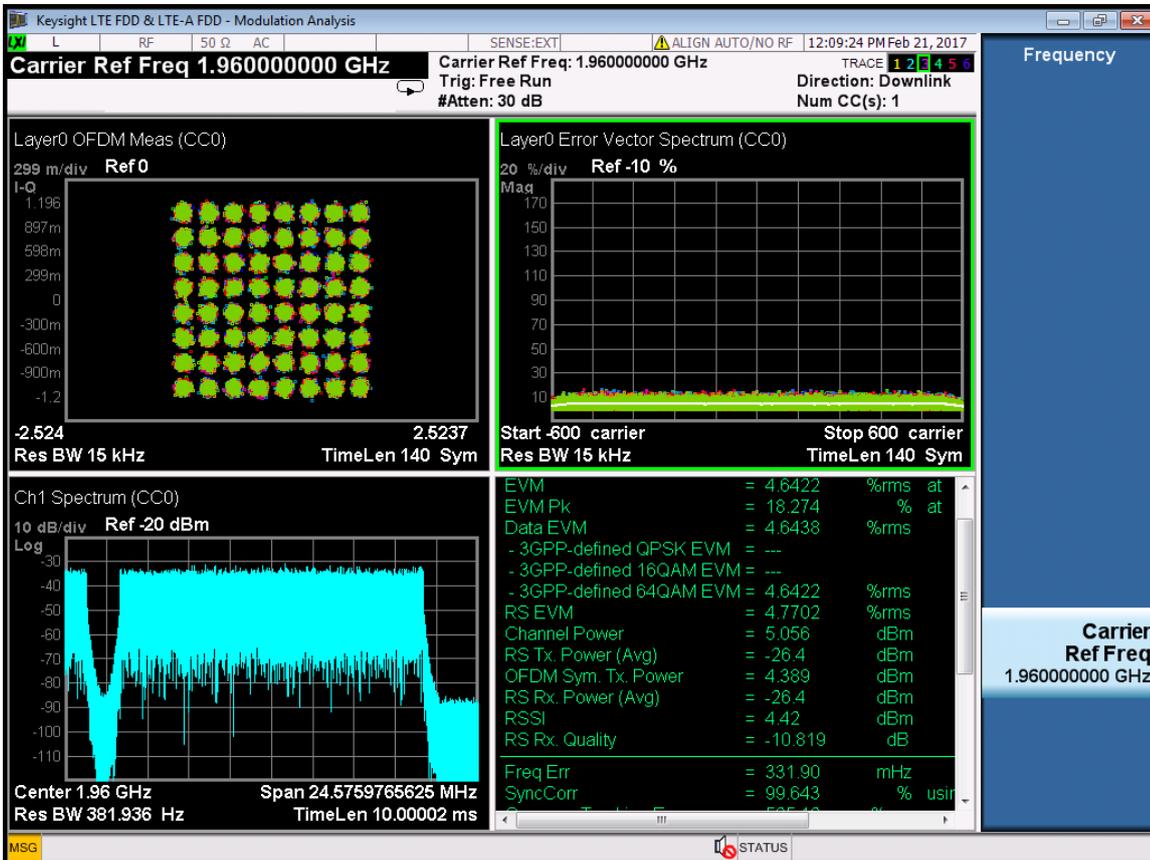
LTE 20M-20M-Port 1-1960MHz- E-TM2



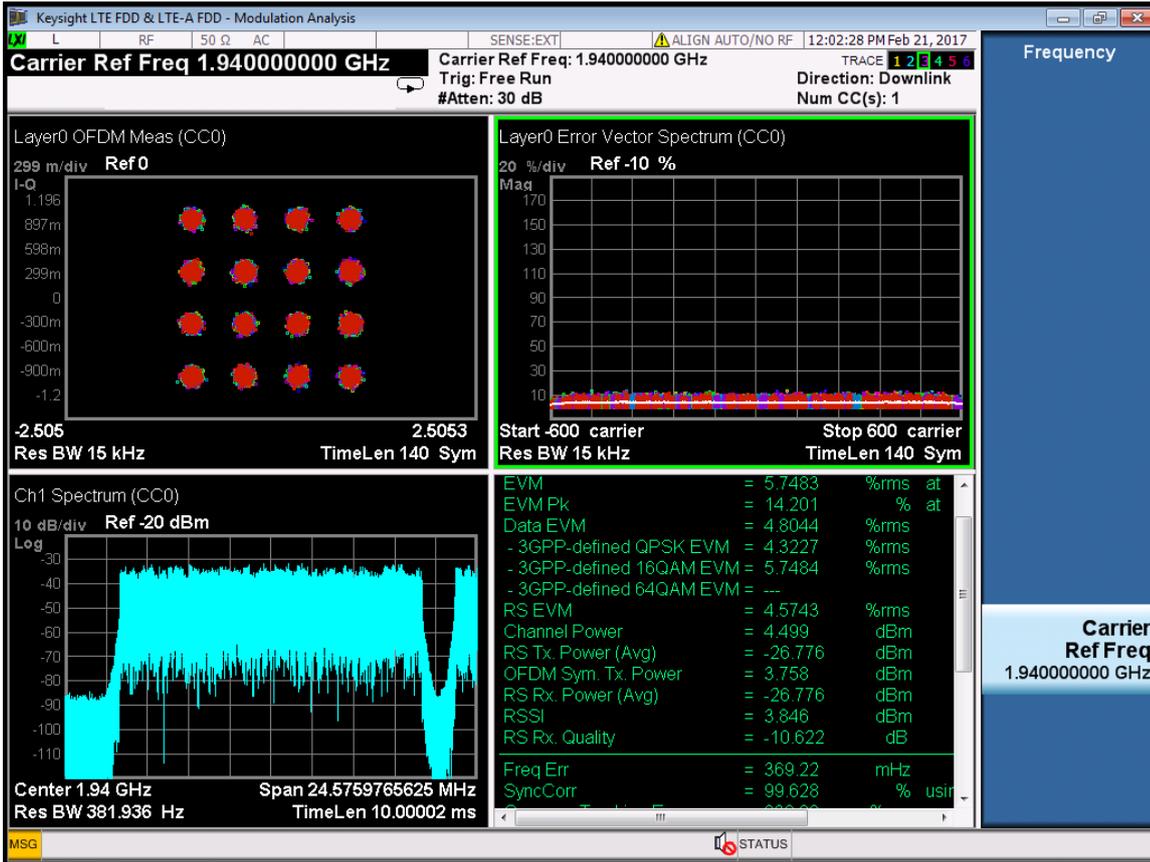
LTE 20M--Port 1-1940MHz-E-TM3.1



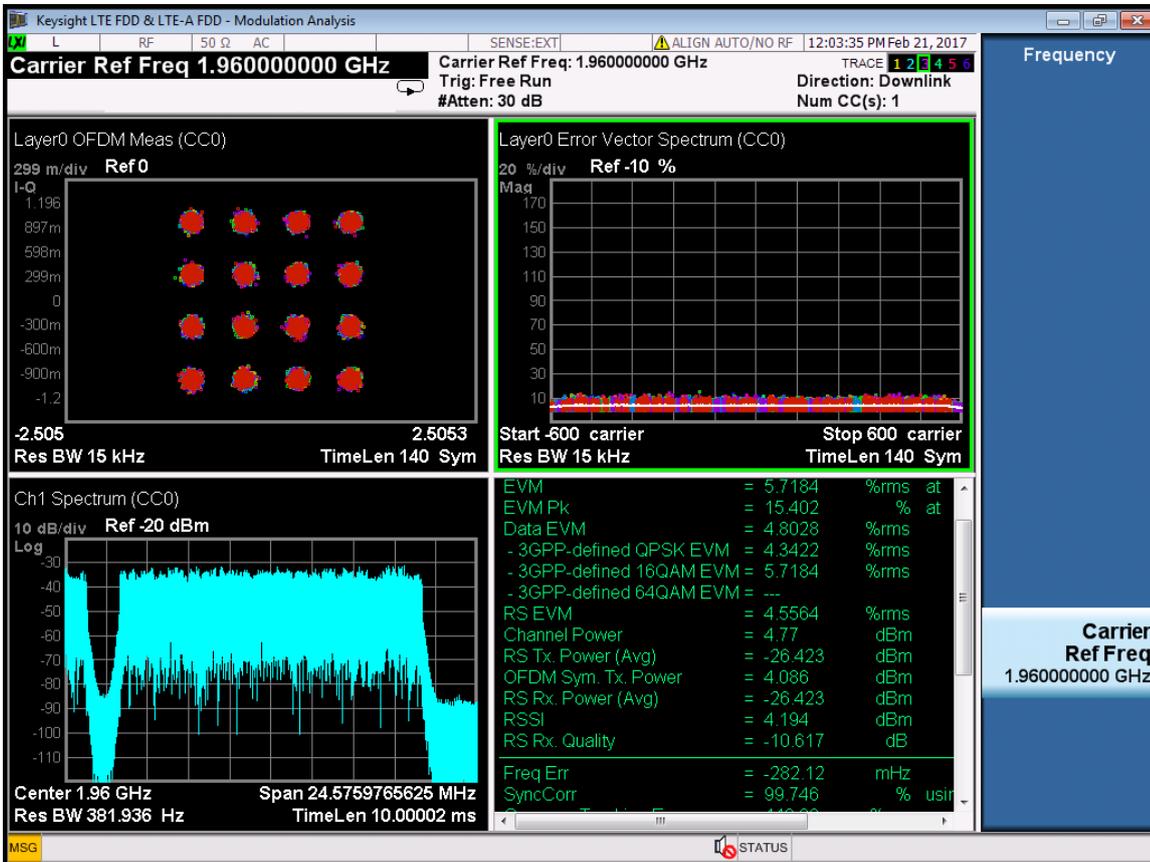
LTE 20M--Port 1-1960MHz-E-TM3.1



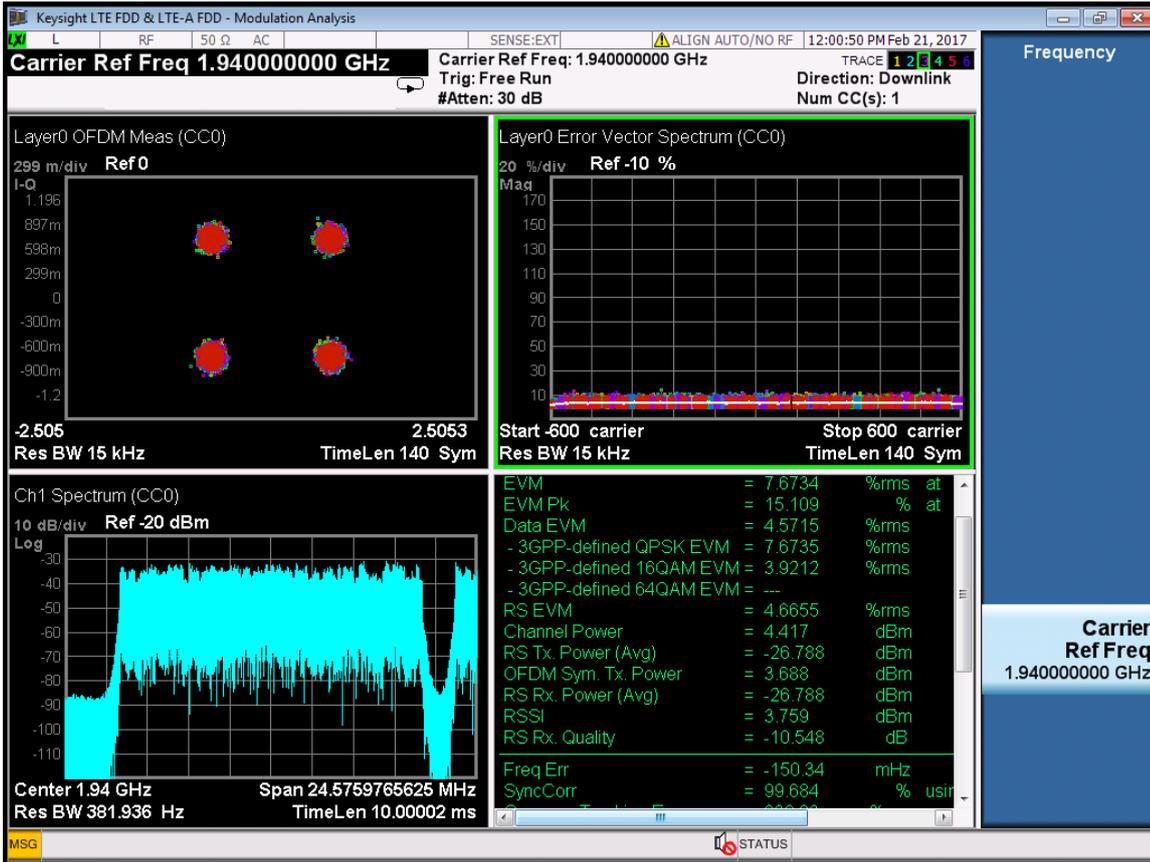
LTE 20M-Port 1-1940MHz-E-TM3.2



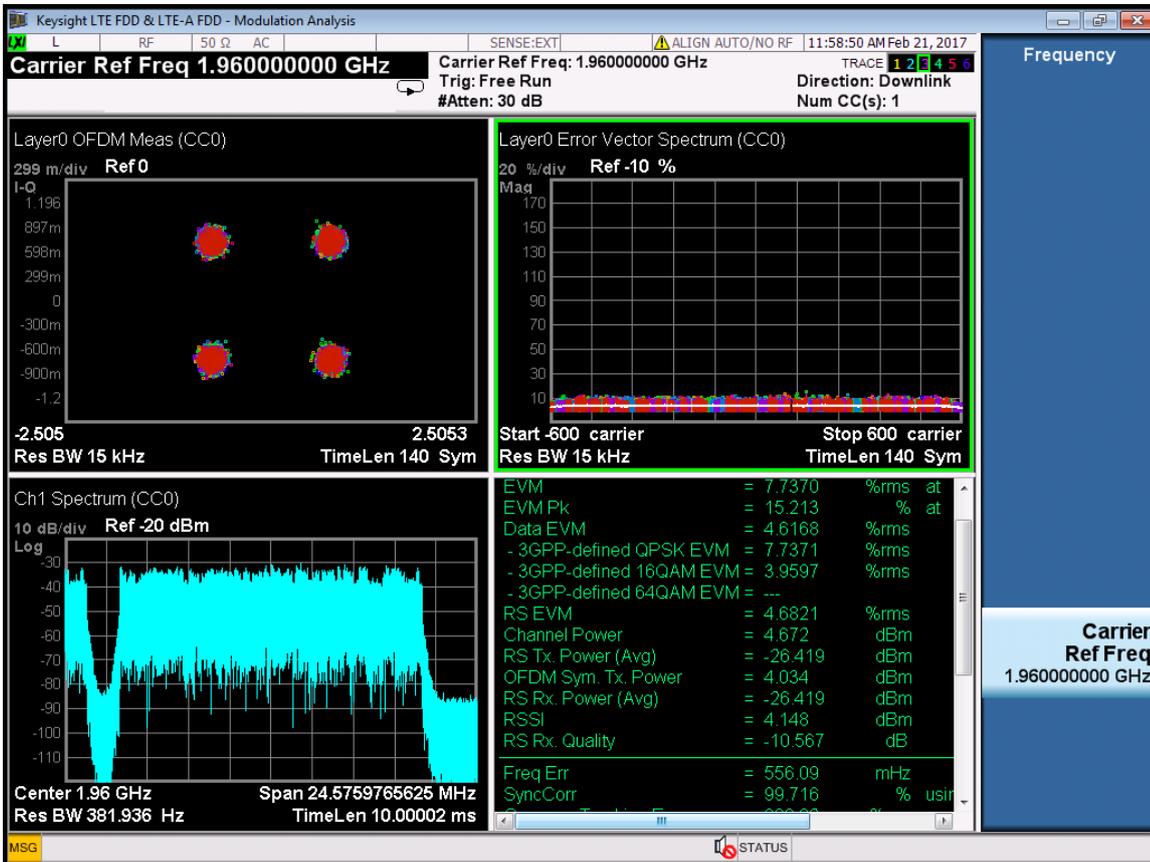
LTE 20M-Port 1-1960MHz- E-TM3.2



LTE 20M-Port 1-1940MHz-E-TM3.3

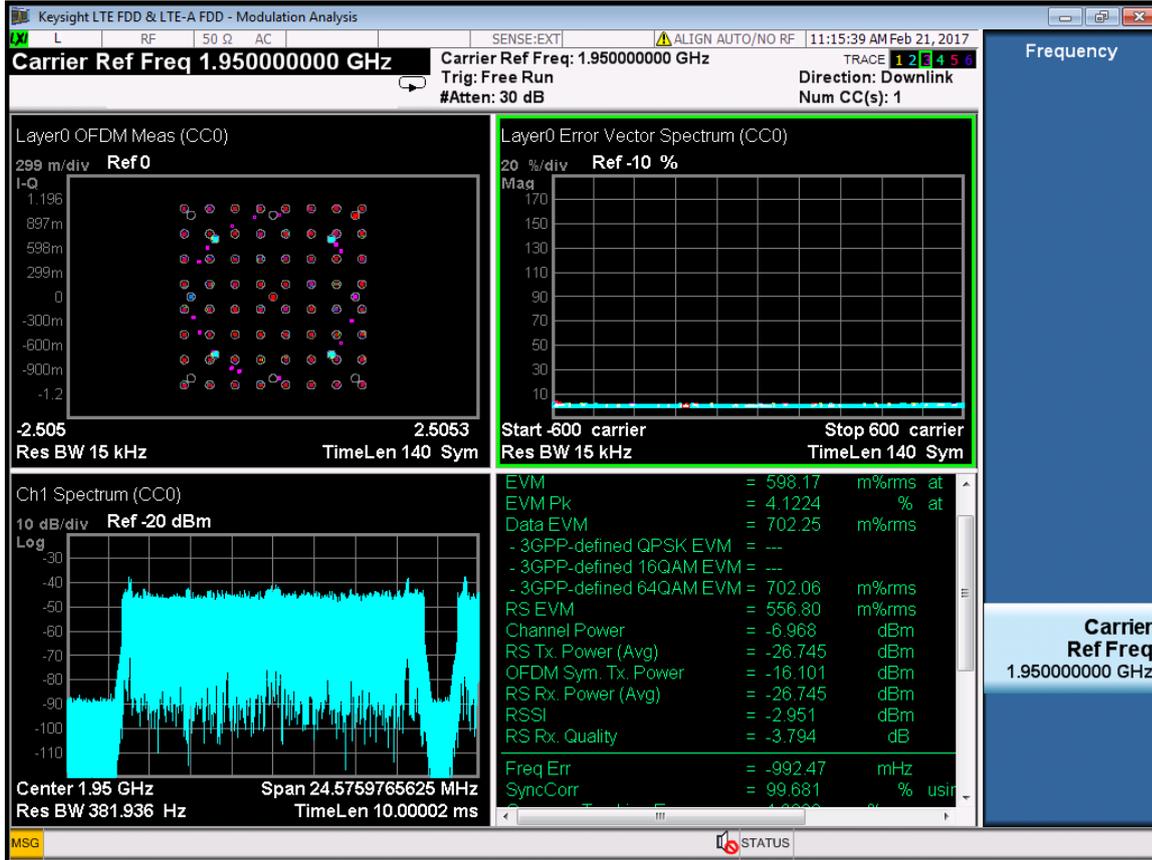


### LTE 20M-Port 1-1960MHz- E-TM3.3

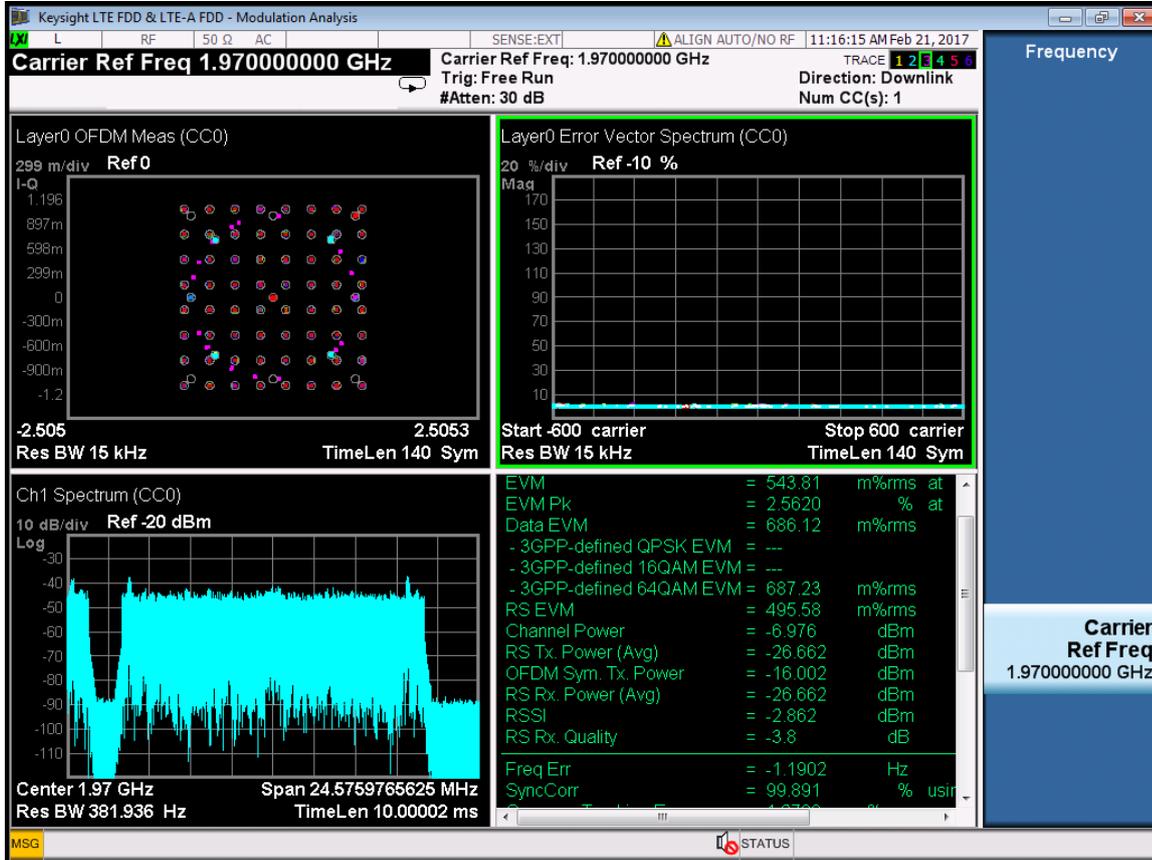


RF 1960M:

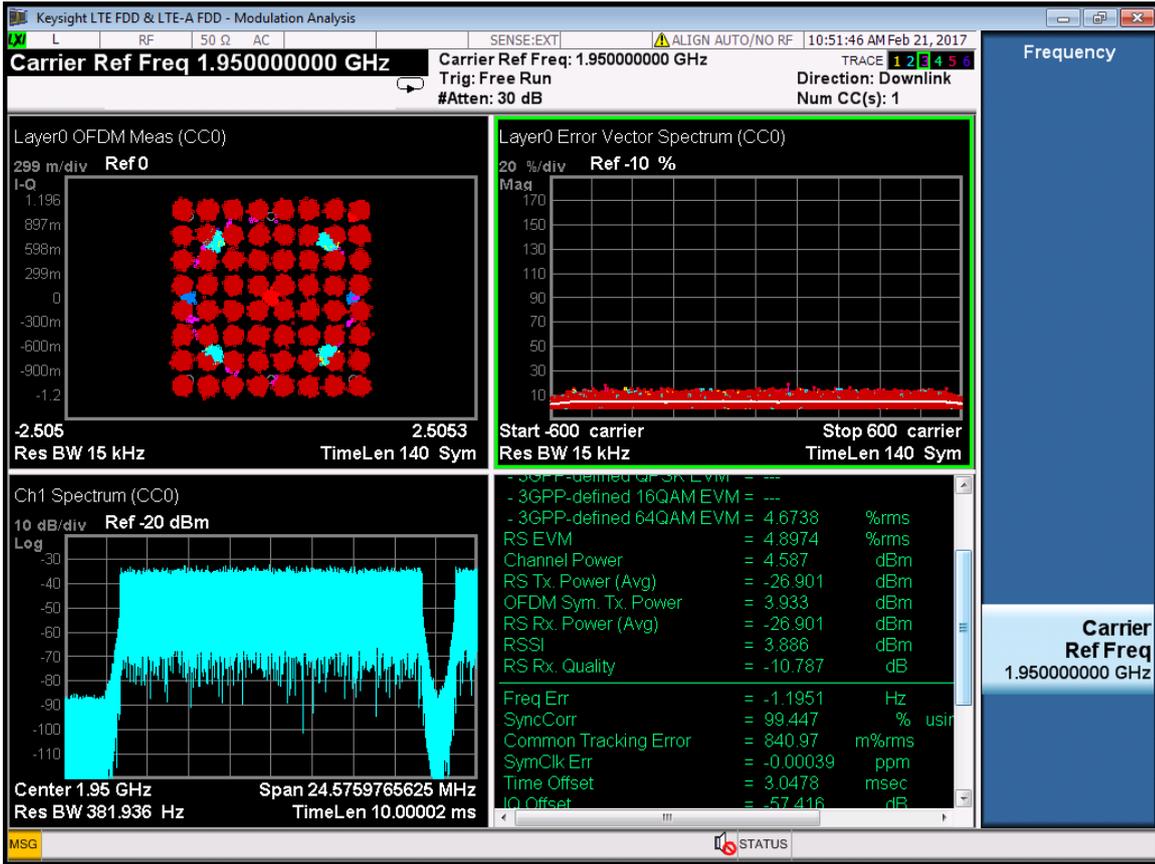
### LTE 20M-Port 1-1950MHz-E-TM2



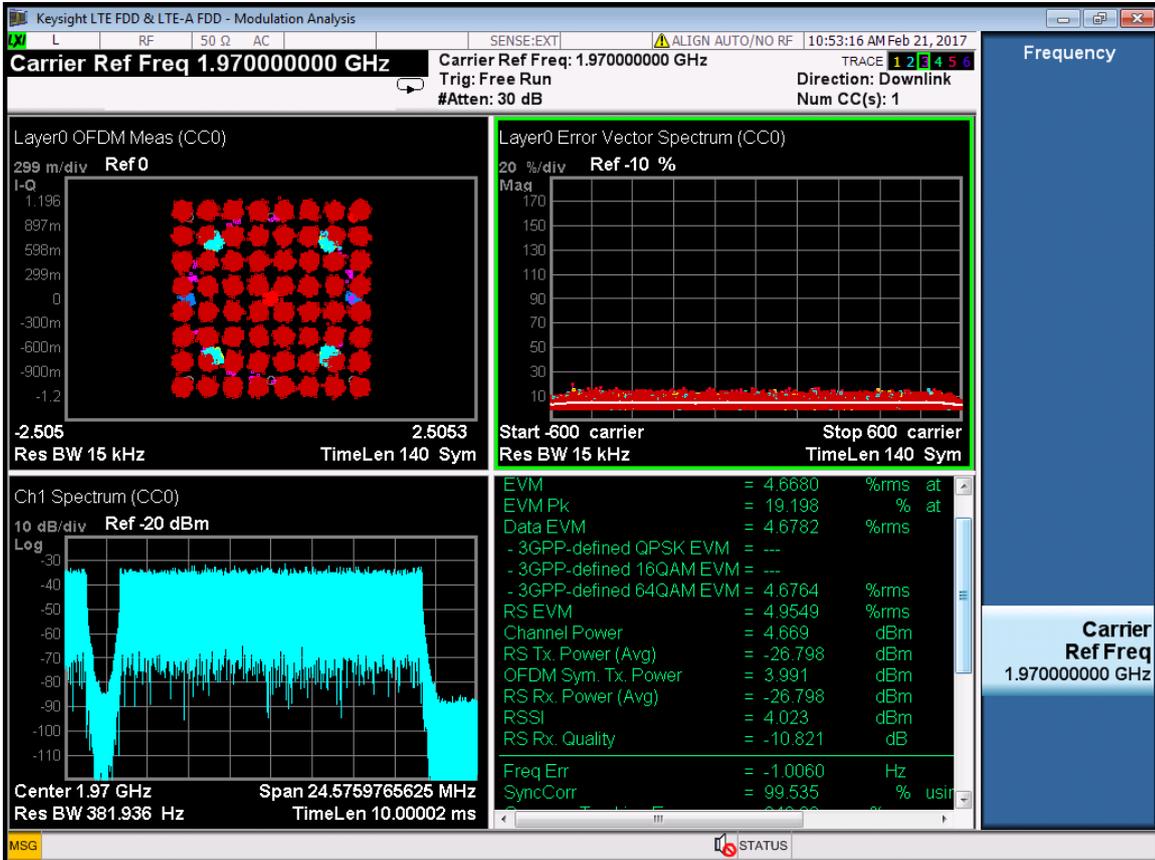
### LTE 20M-Port 1-1970MHz- E-TM2



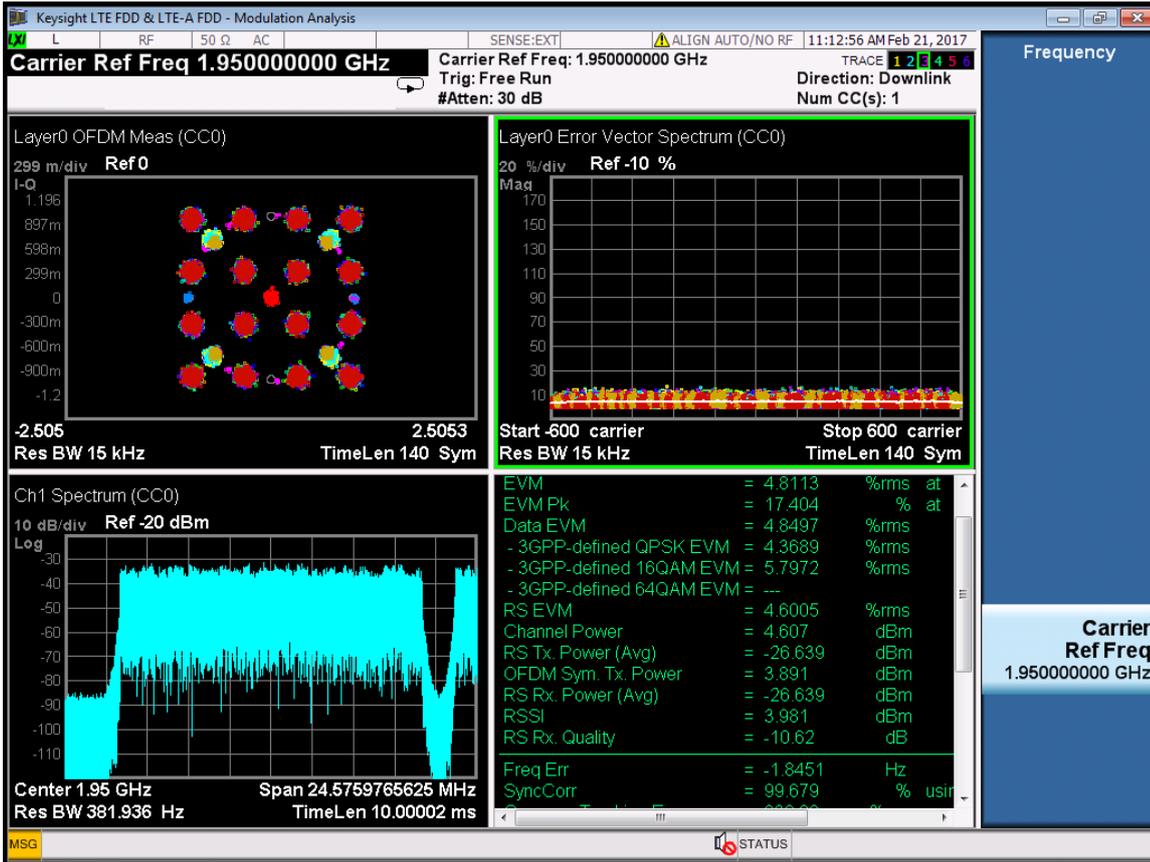
### LTE 20M-Port 1-1950MHz-E-TM3.1



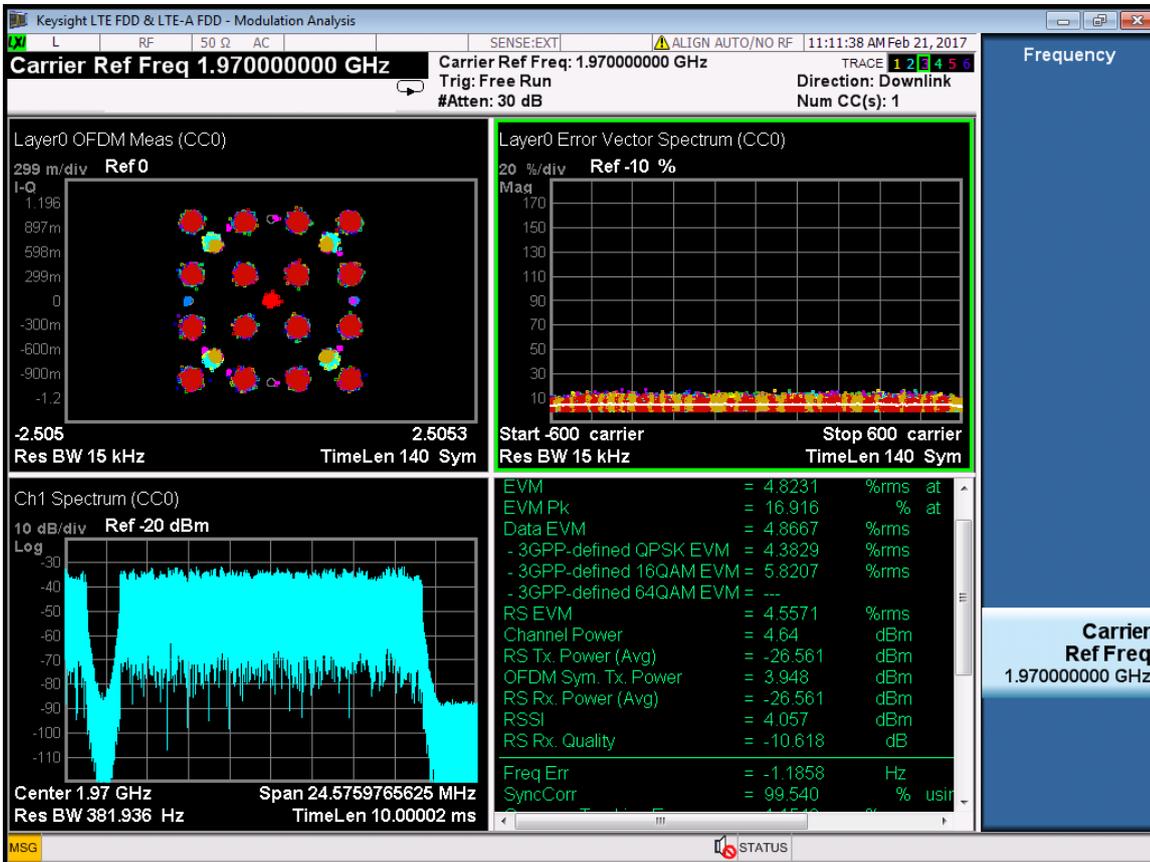
LTE 20M-Port 1-1970MHz- E-TM3.1



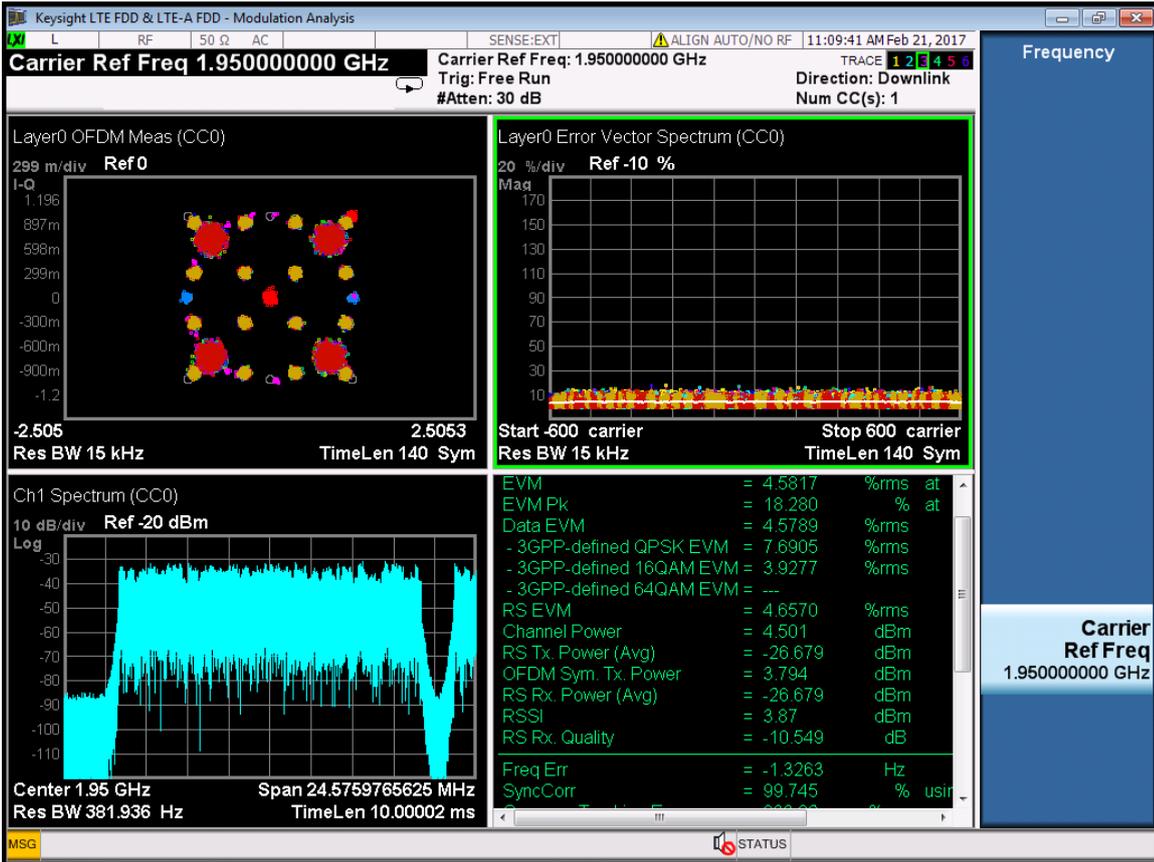
LTE 20M-Port 1-1950MHz-E-TM3.2



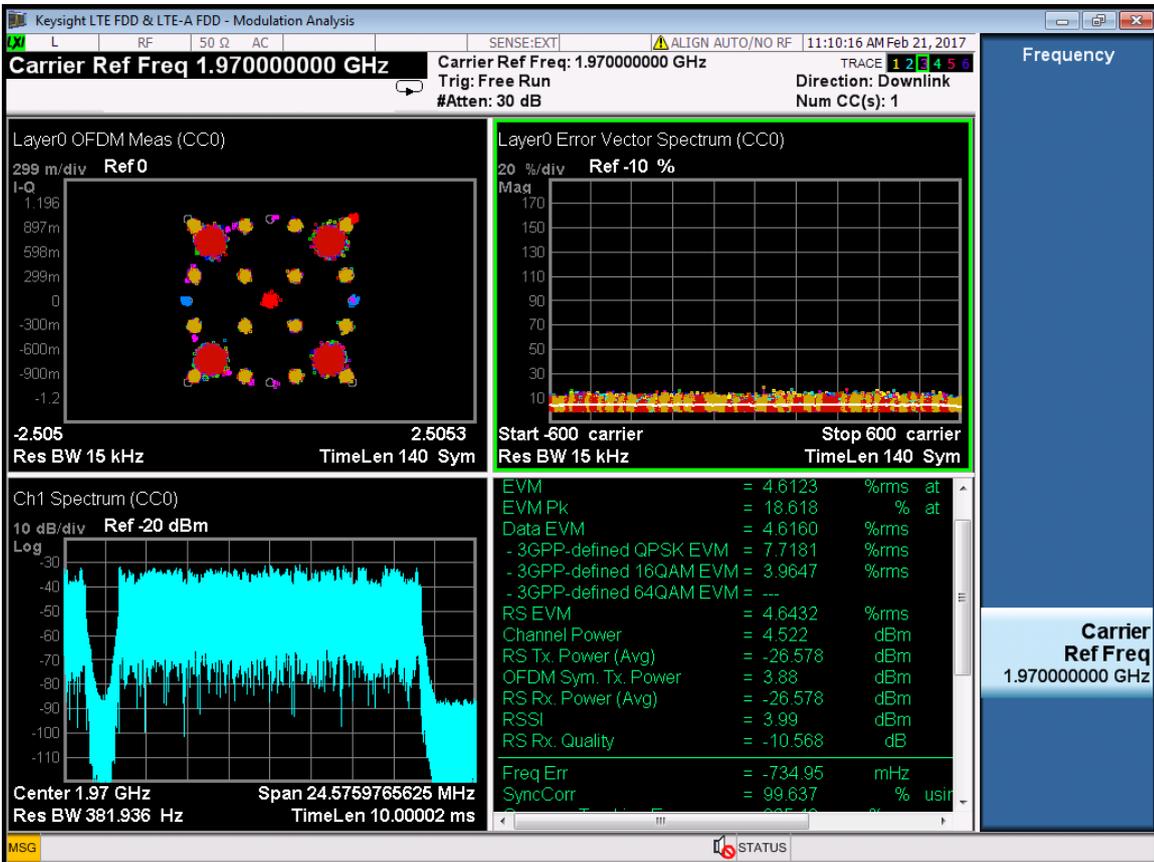
LTE 20M-Port 1-1970MHz- E-TM3.2



LTE 20M-Port 1-1950MHz-E-TM3.3

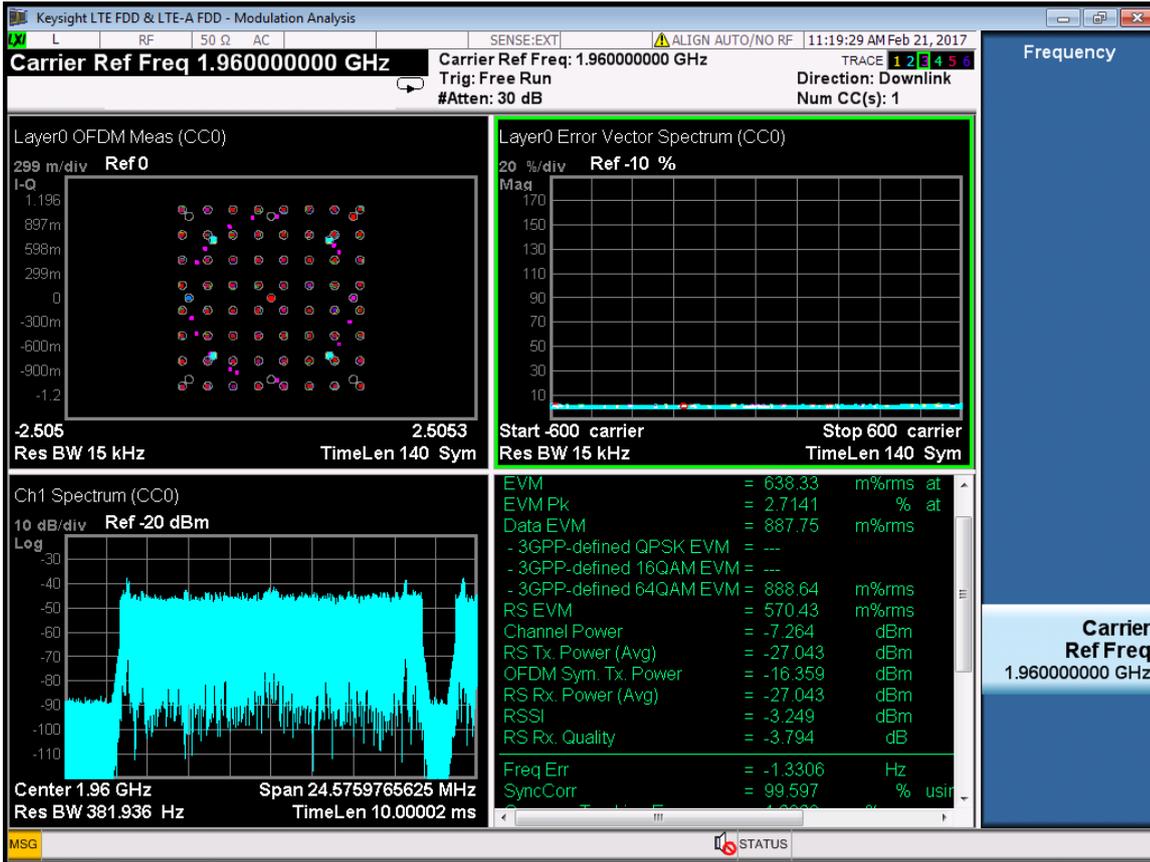


LTE 20M-Port 1-1970MHz- E-TM3.3

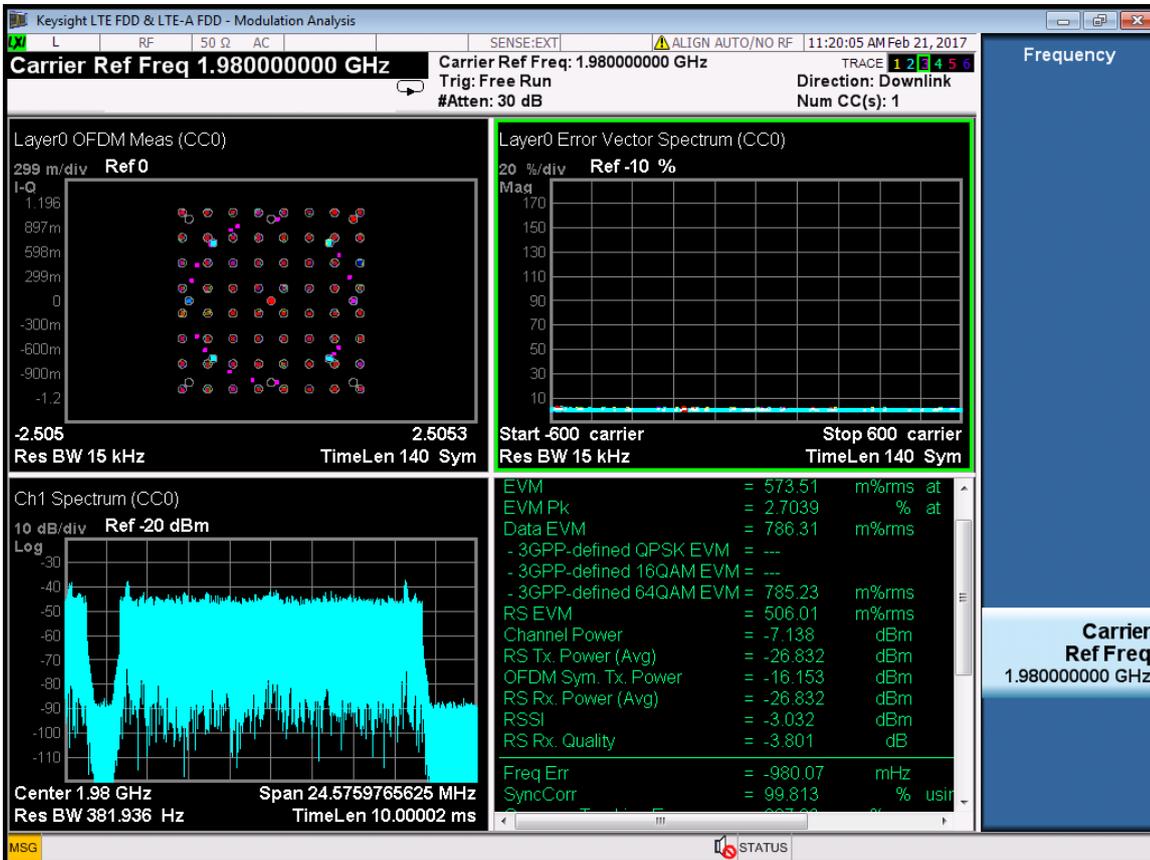


RF 1970M:

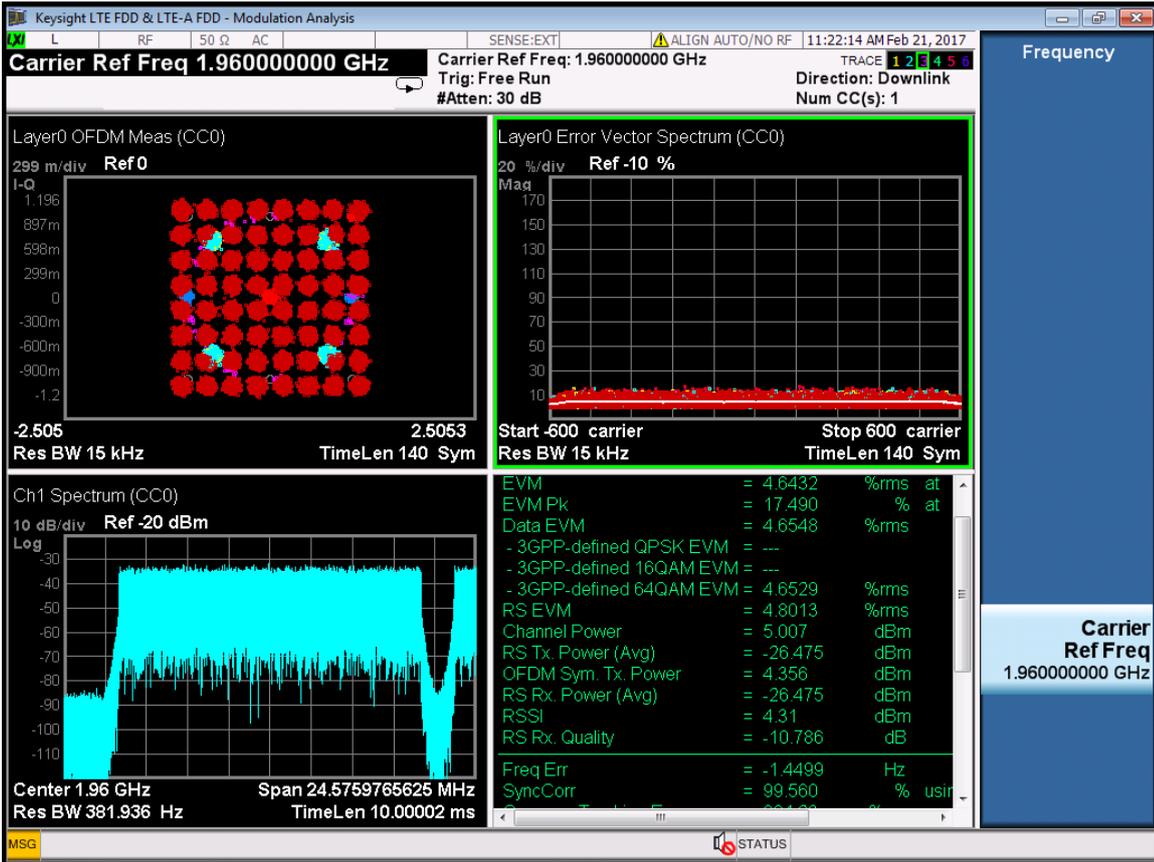
LTE 20M-Port 1-1960MHz-E-TM2



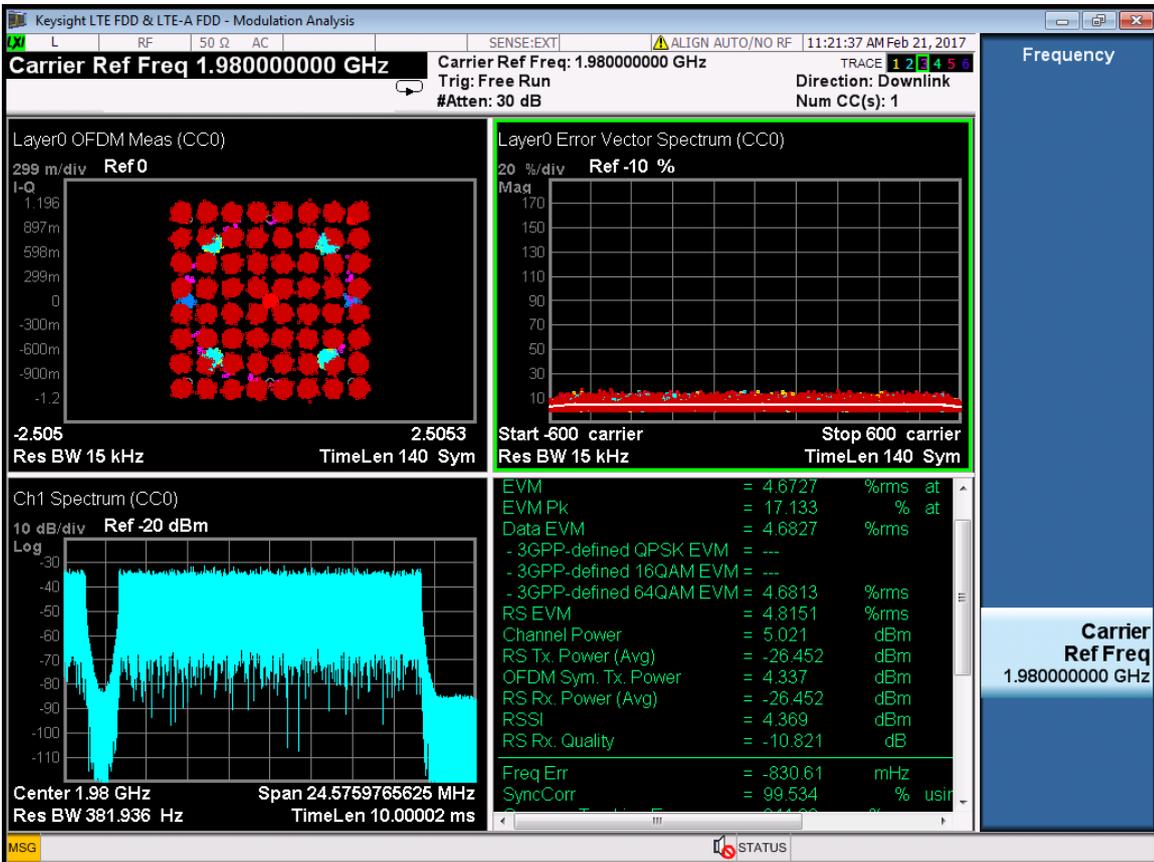
LTE 20M-Port 1-1980MHz- E-TM2



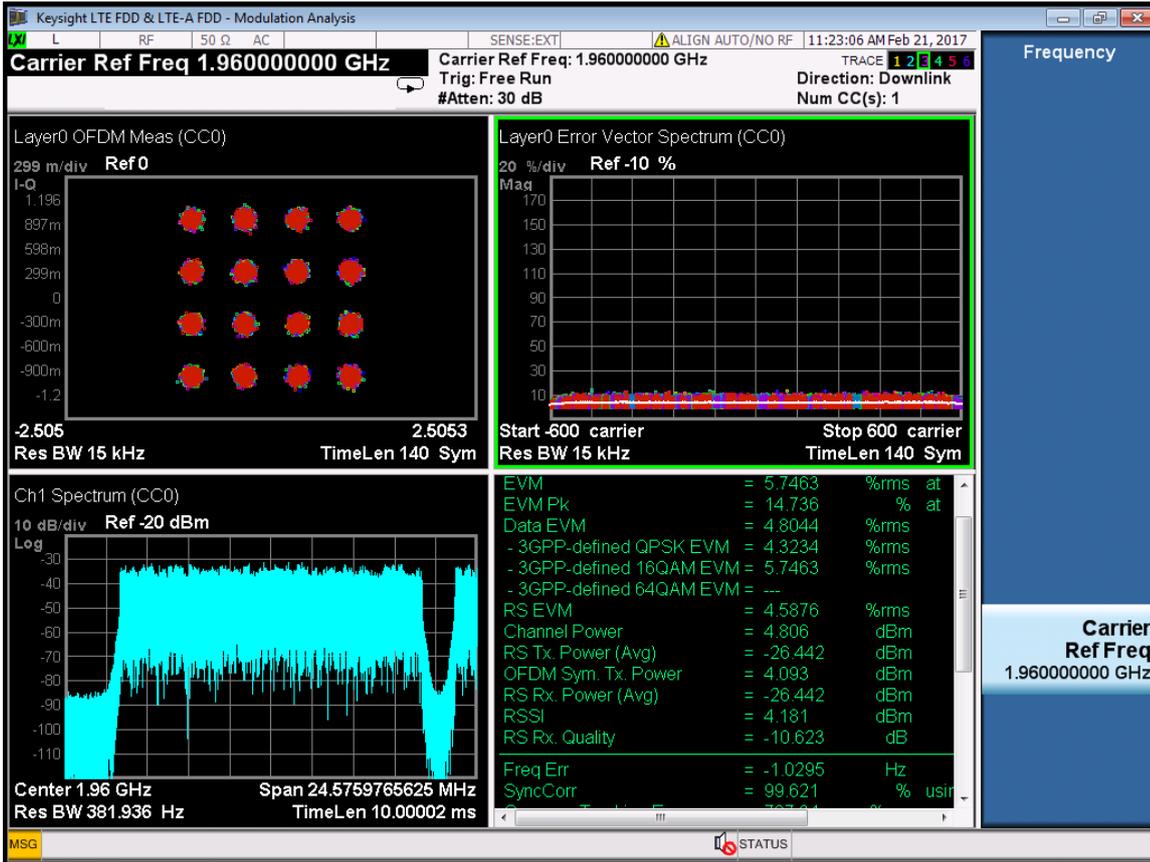
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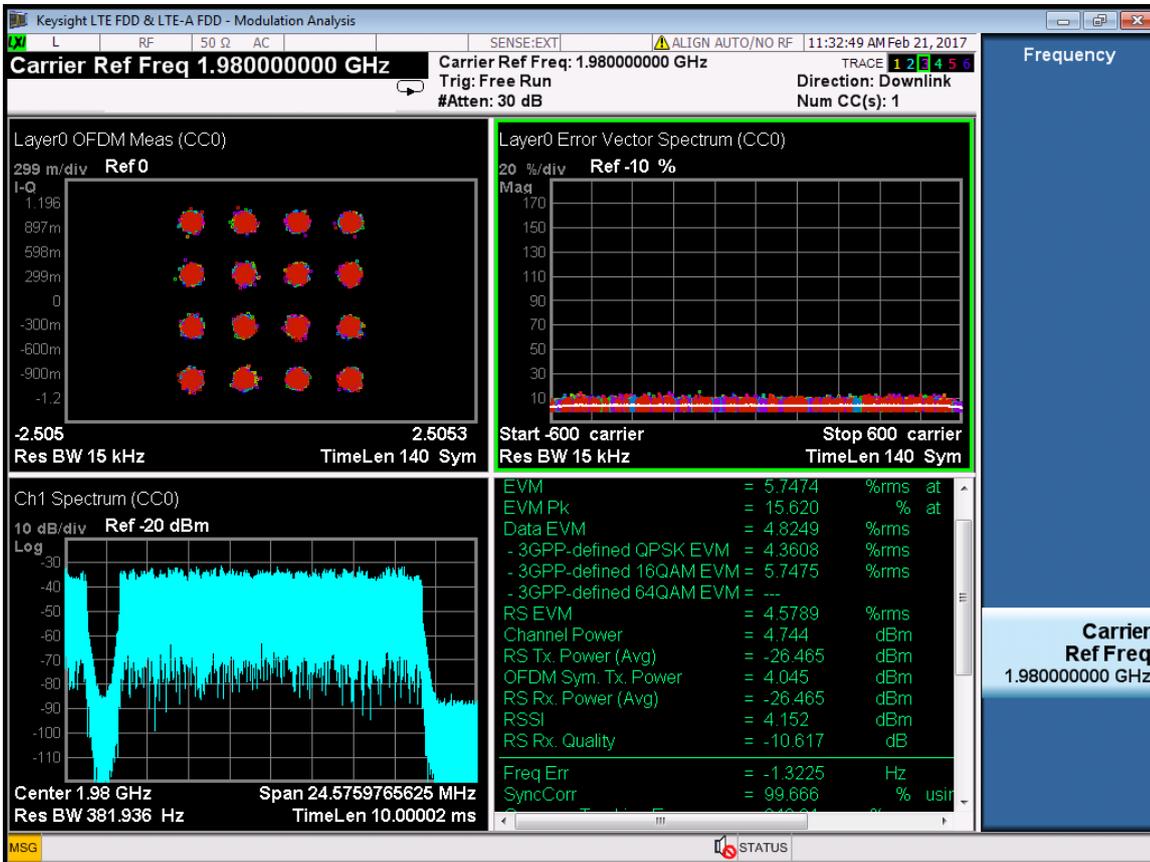
LTE 20M-Port 1-1980MHz- E-TM3.1



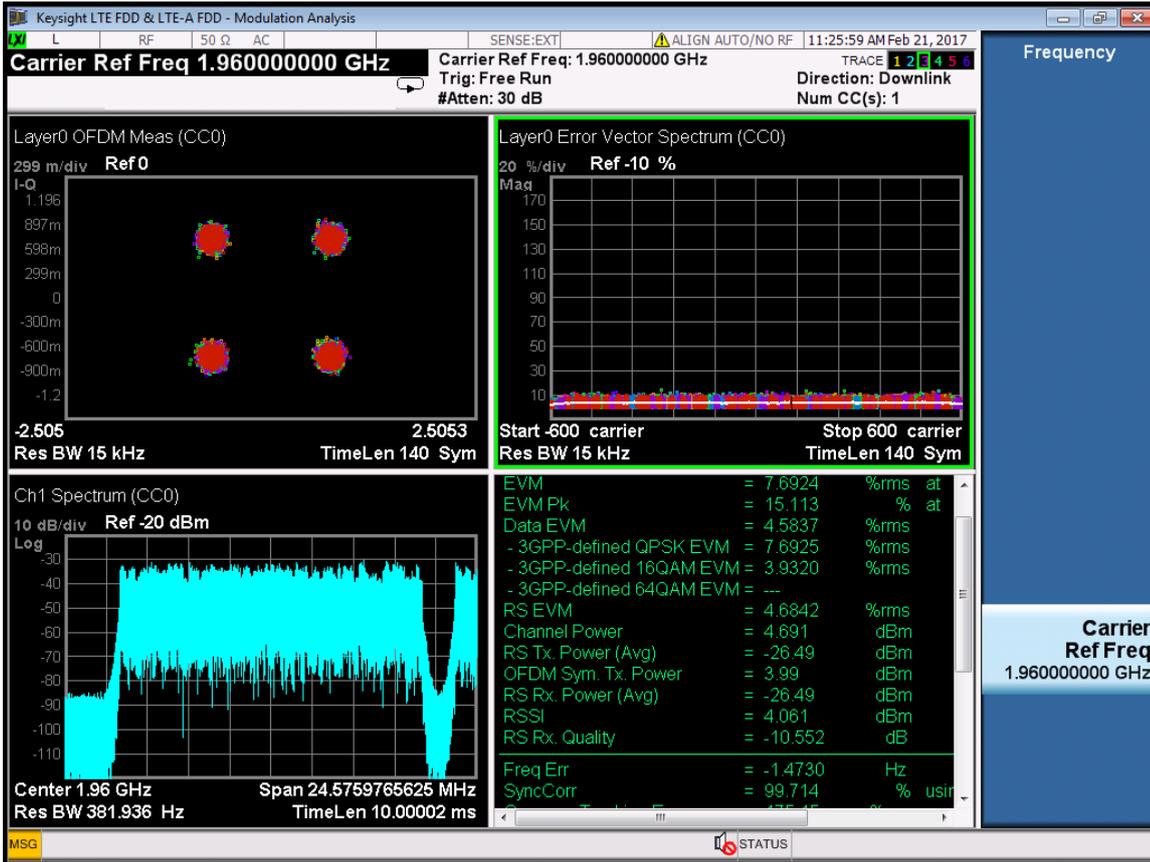
LTE 20M-Port 1-1960MHz-E-TM3.2



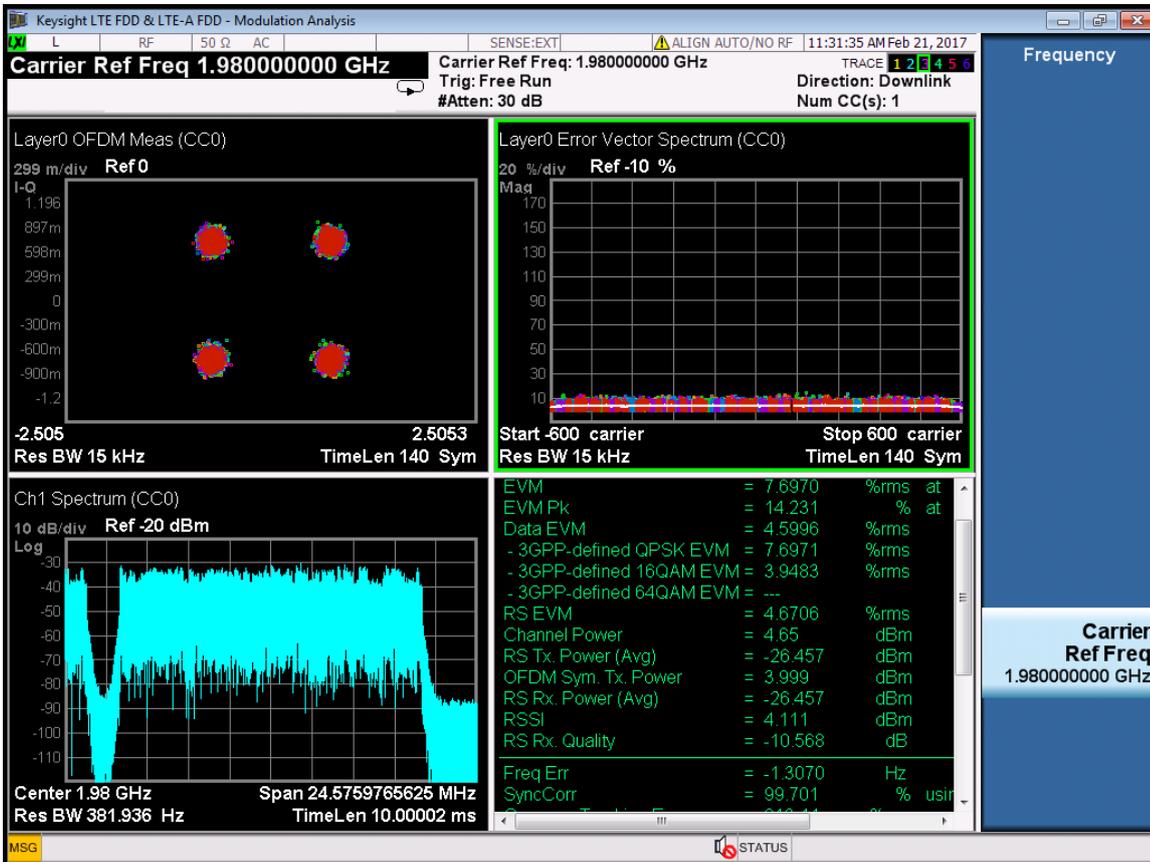
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### LTE 20M-Port 1-1960MHz-E-TM3.3

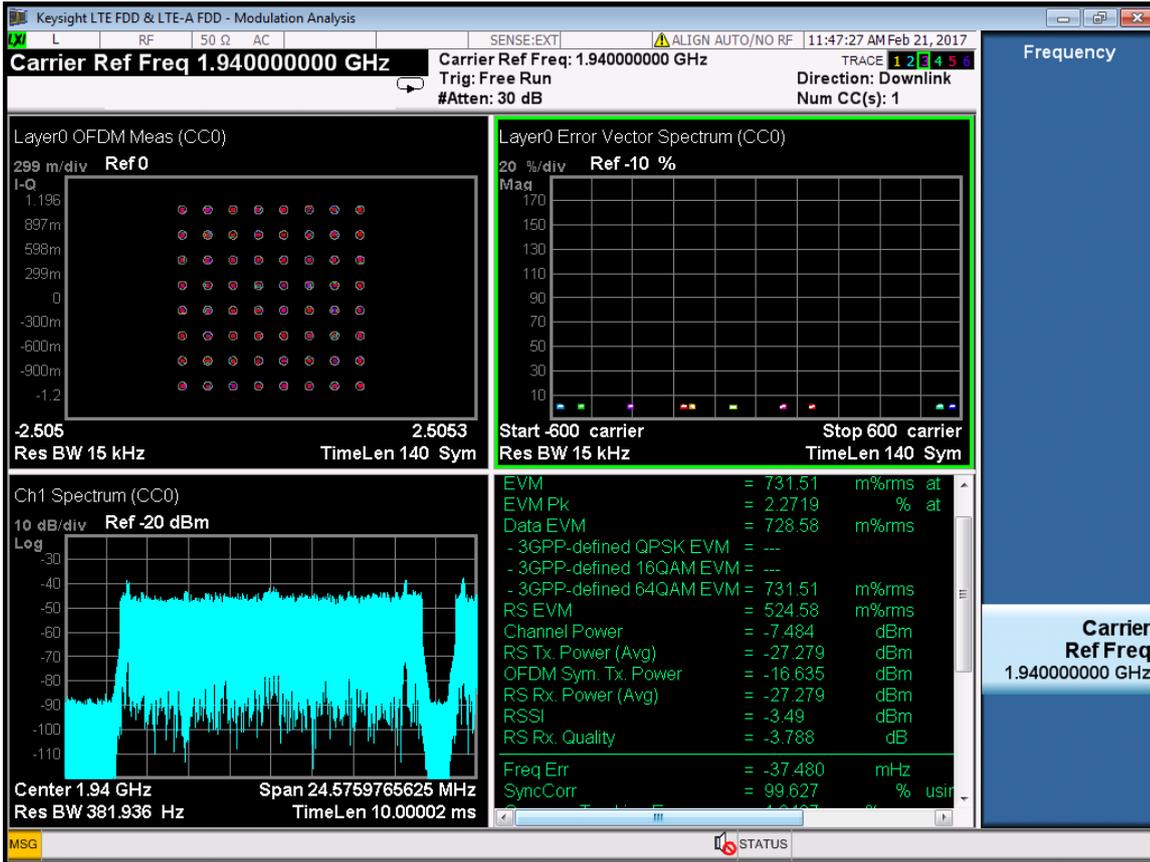


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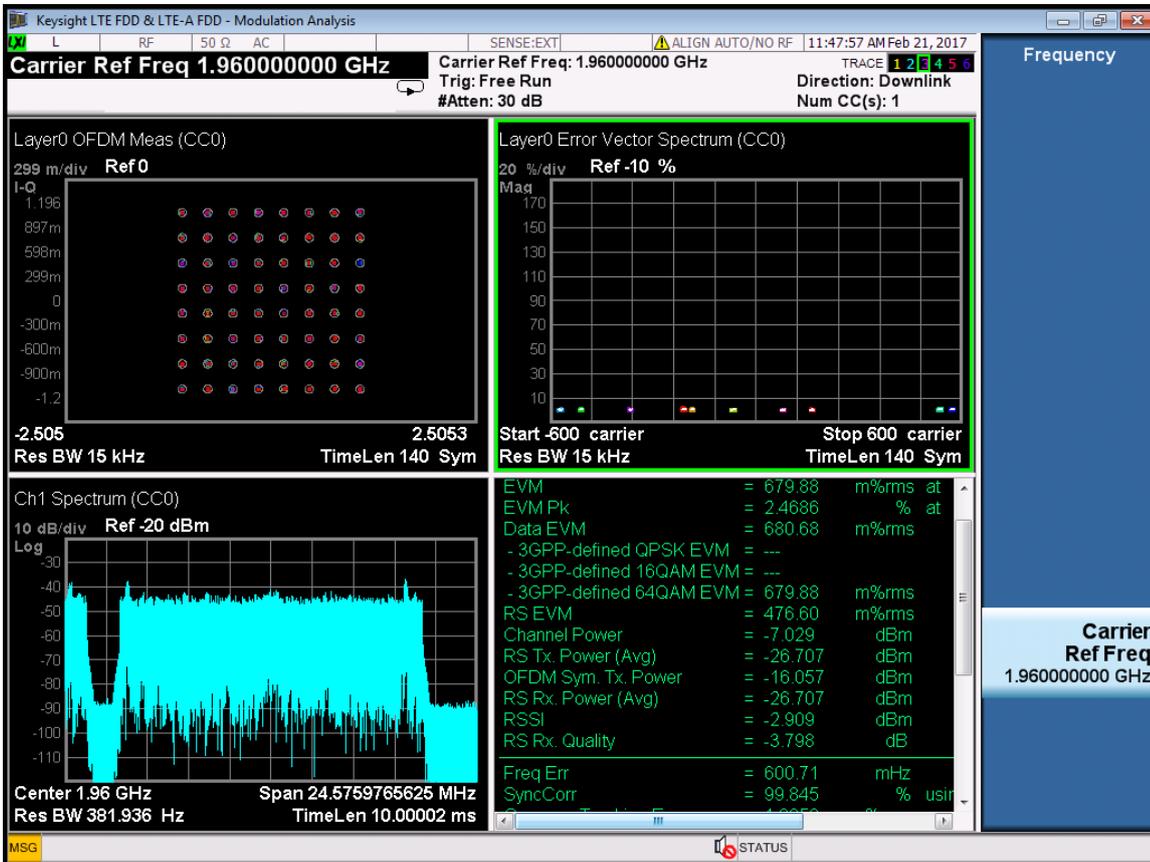


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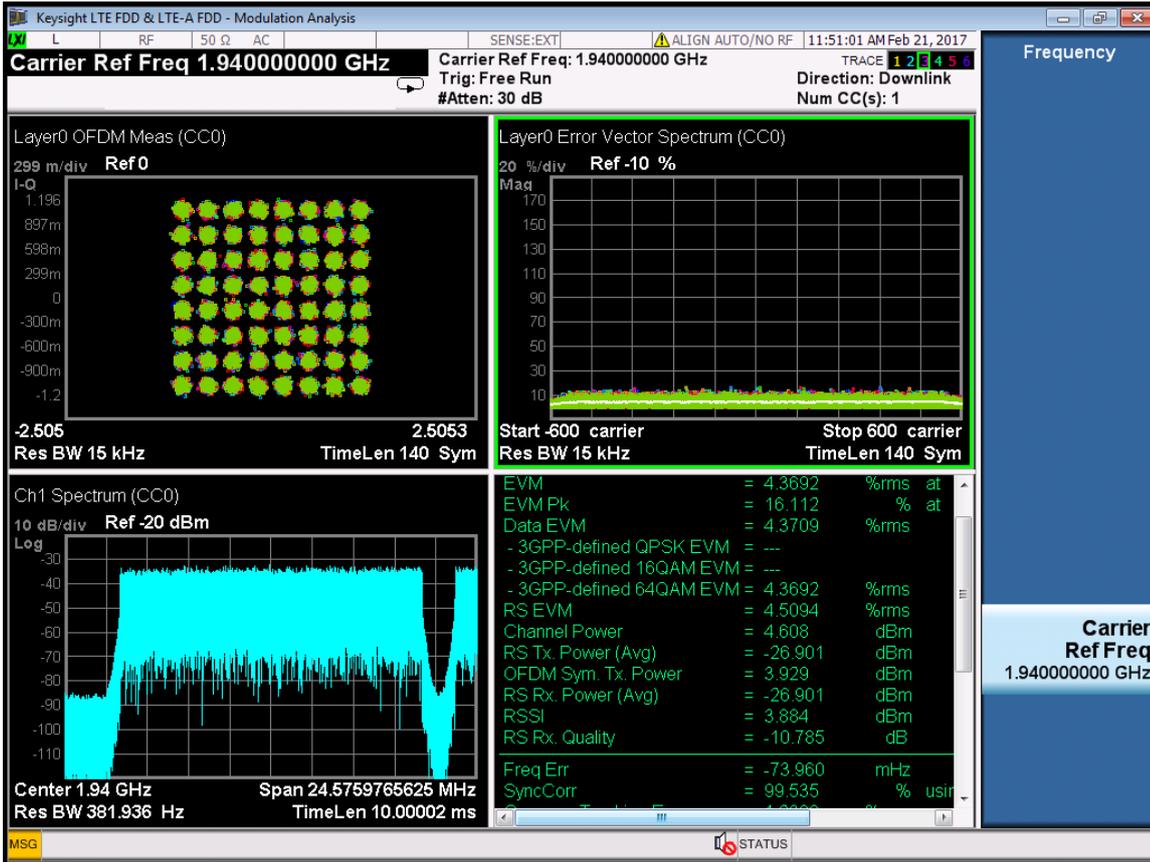
LTE 20M-Port 4-1940MHz-E-TM2



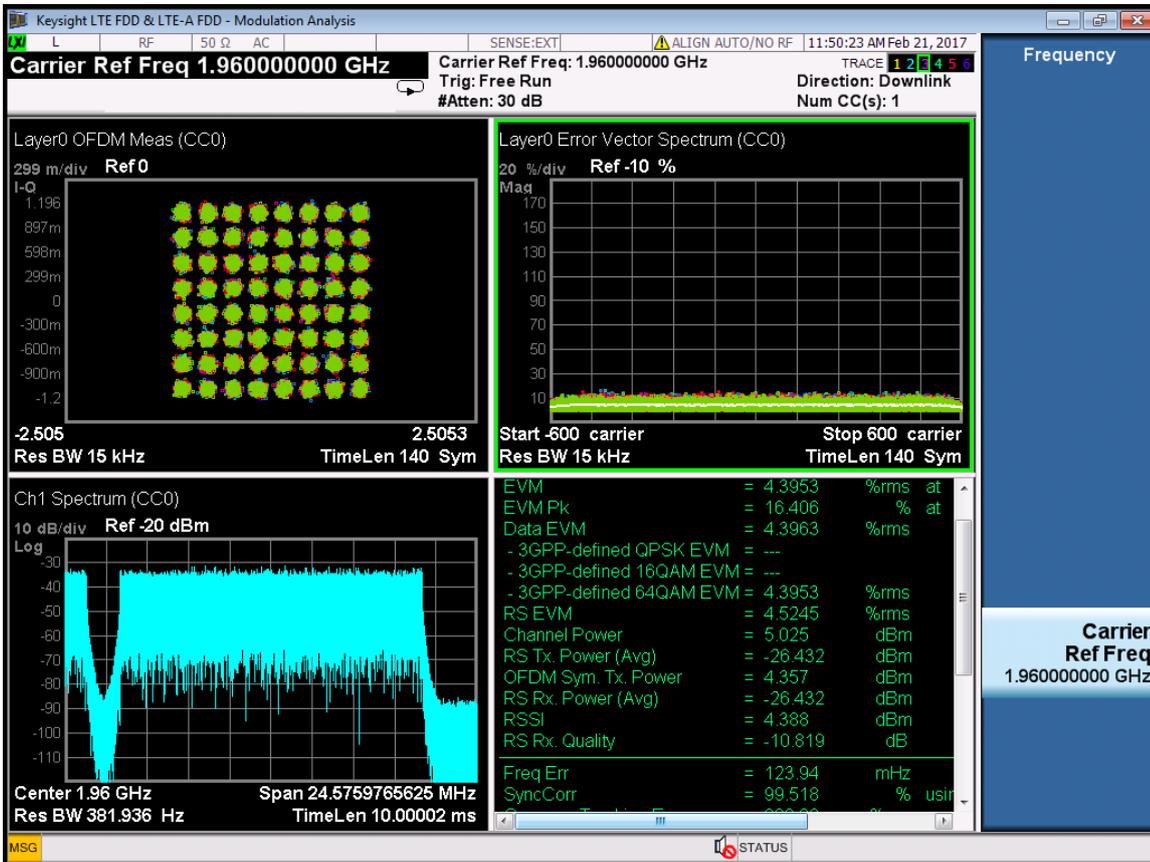
LTE 20M-Port 4-1960MHz- E-TM2



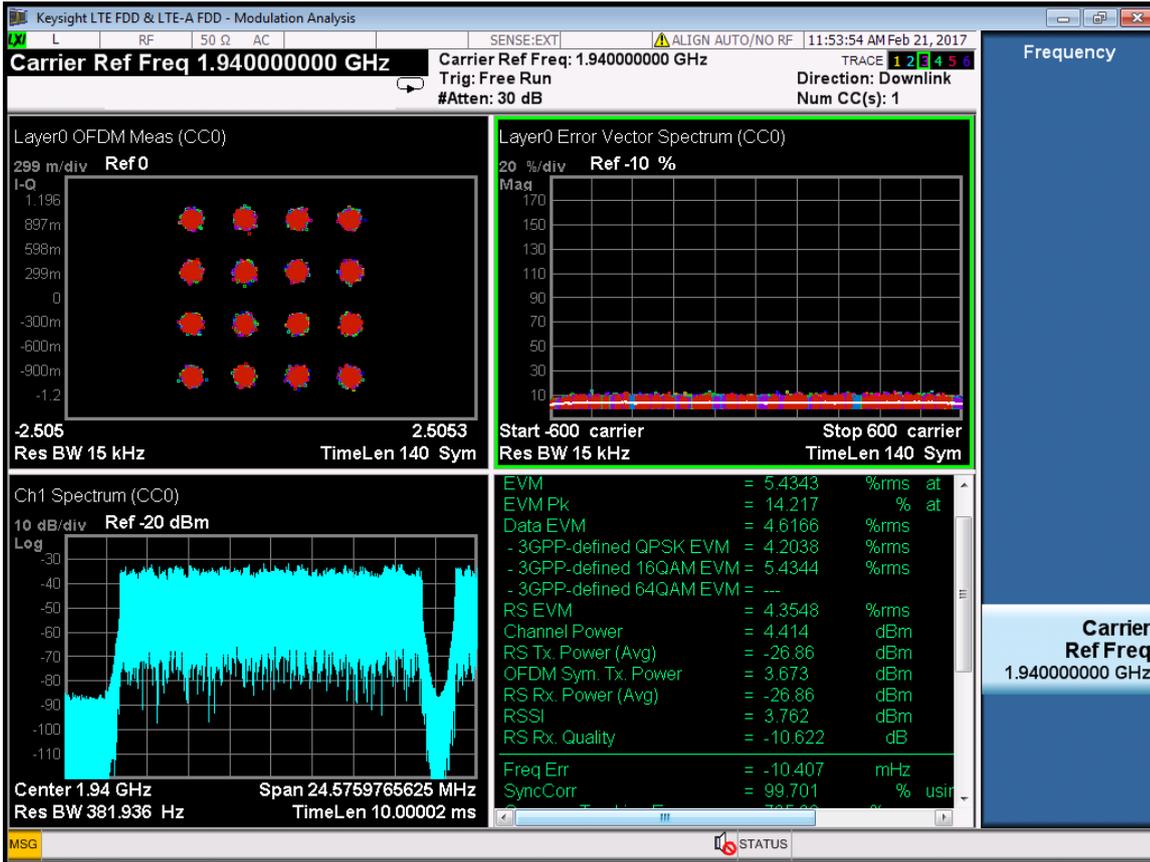
LTE 20M-Port 4-1940MHz-E-TM3.1



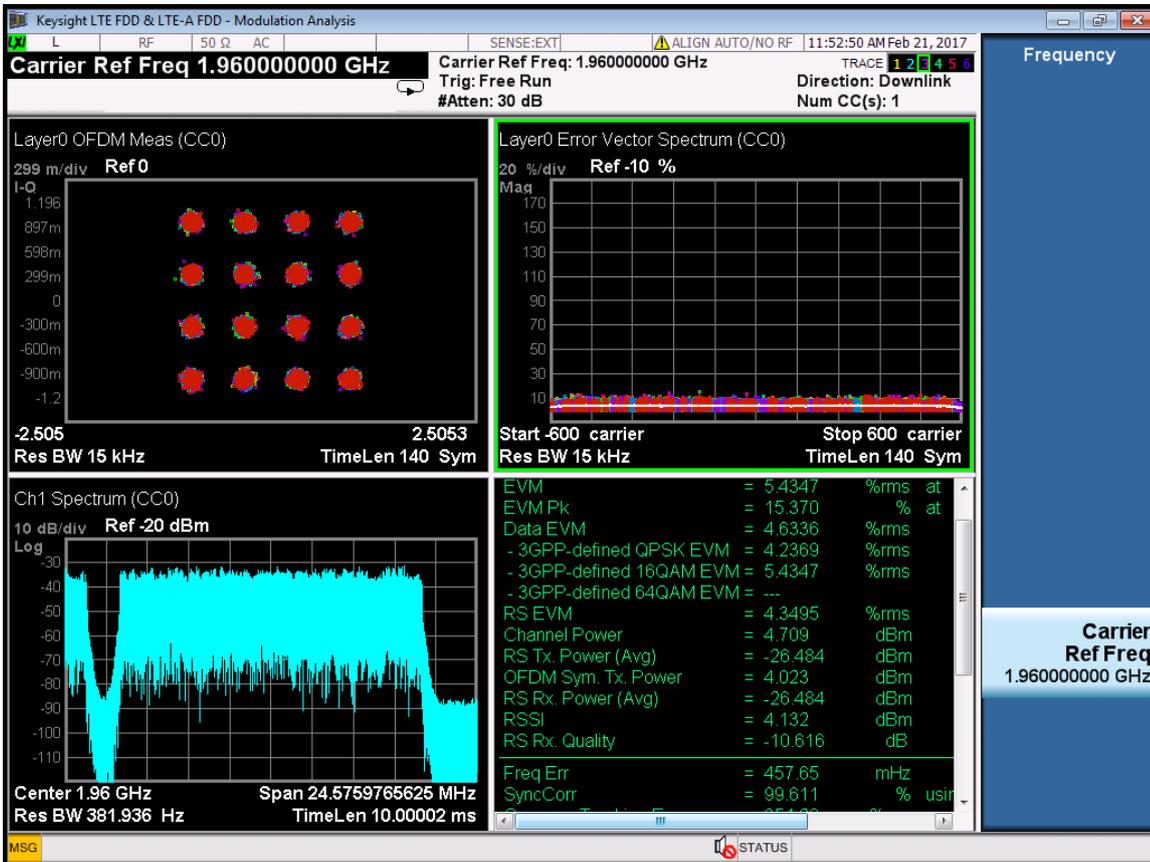
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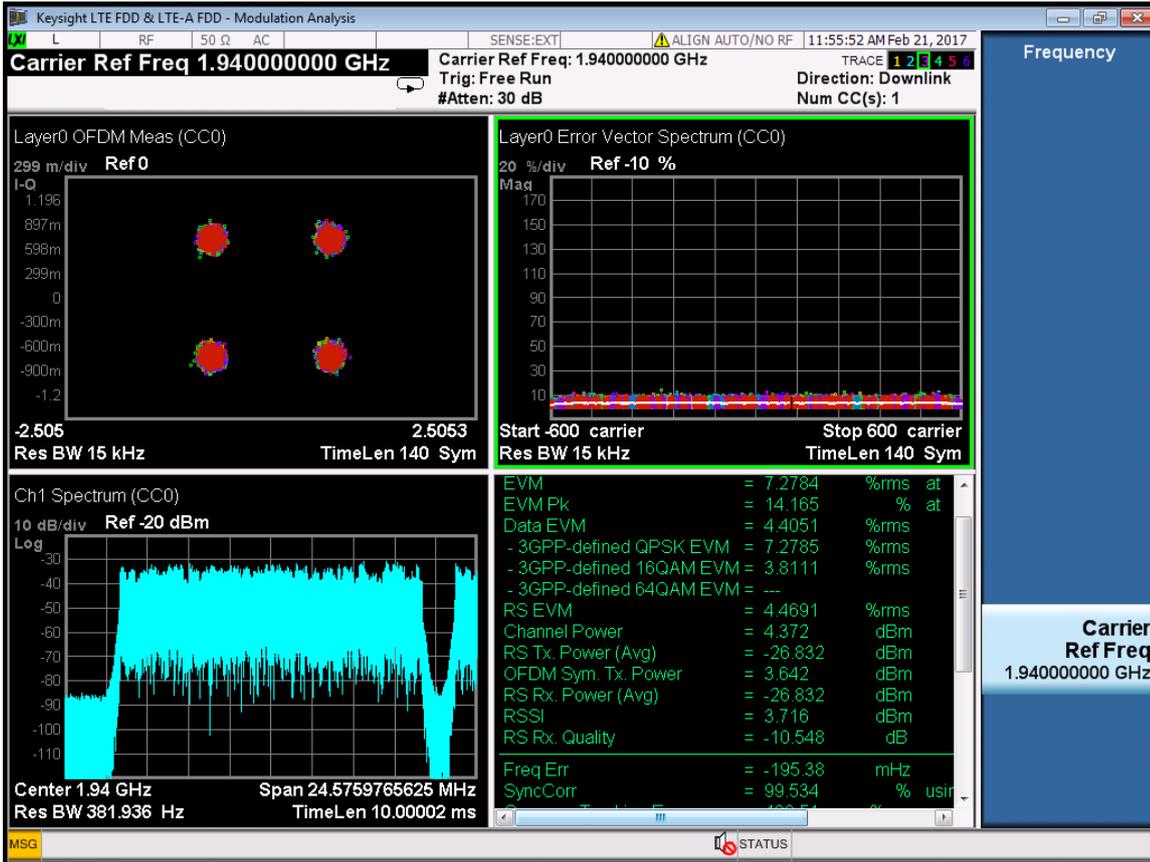
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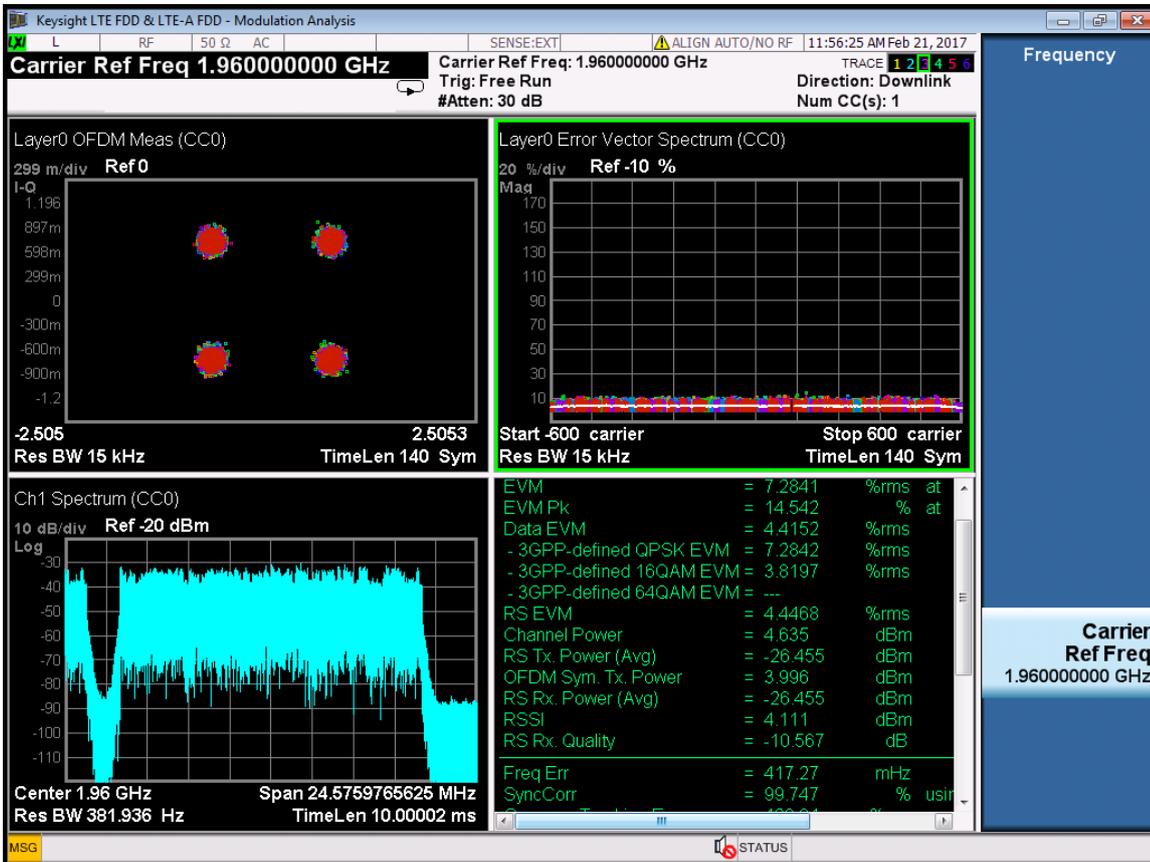
### LTE 20M-Port 4-1960MHz- E-TM3.2



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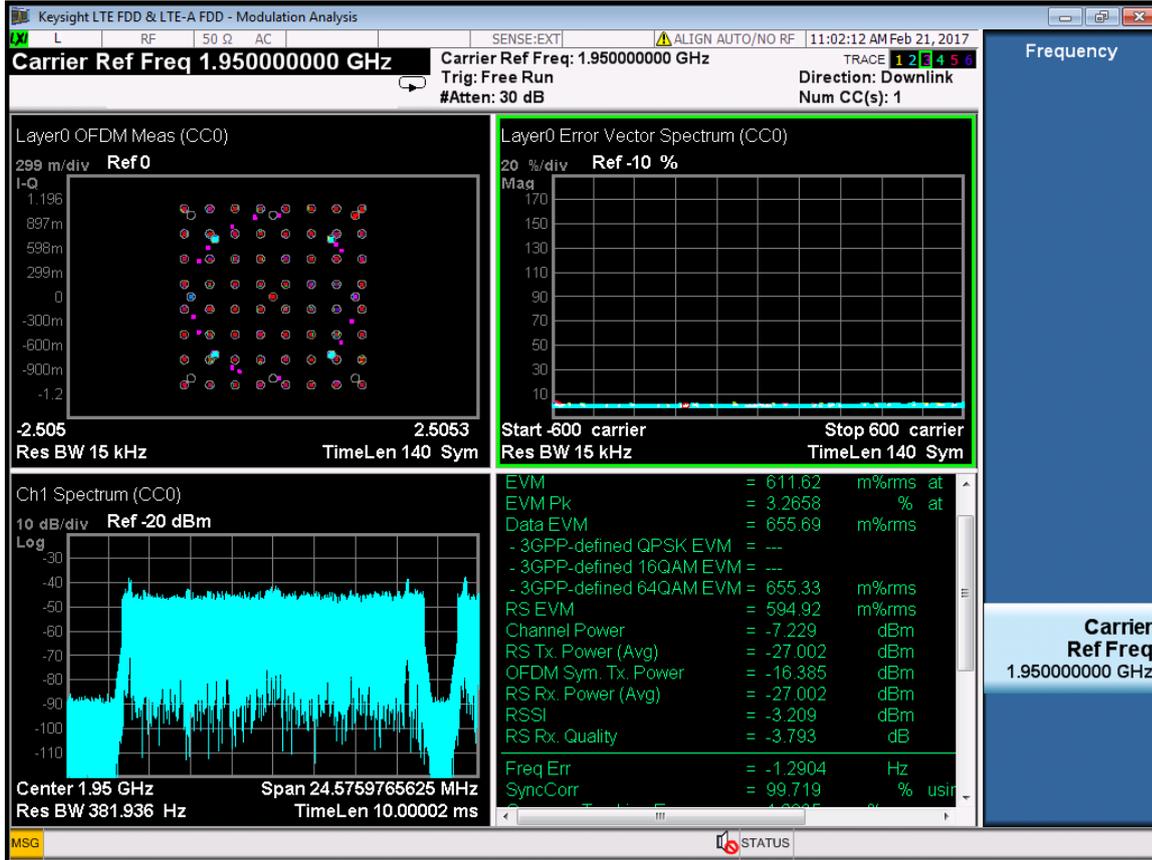
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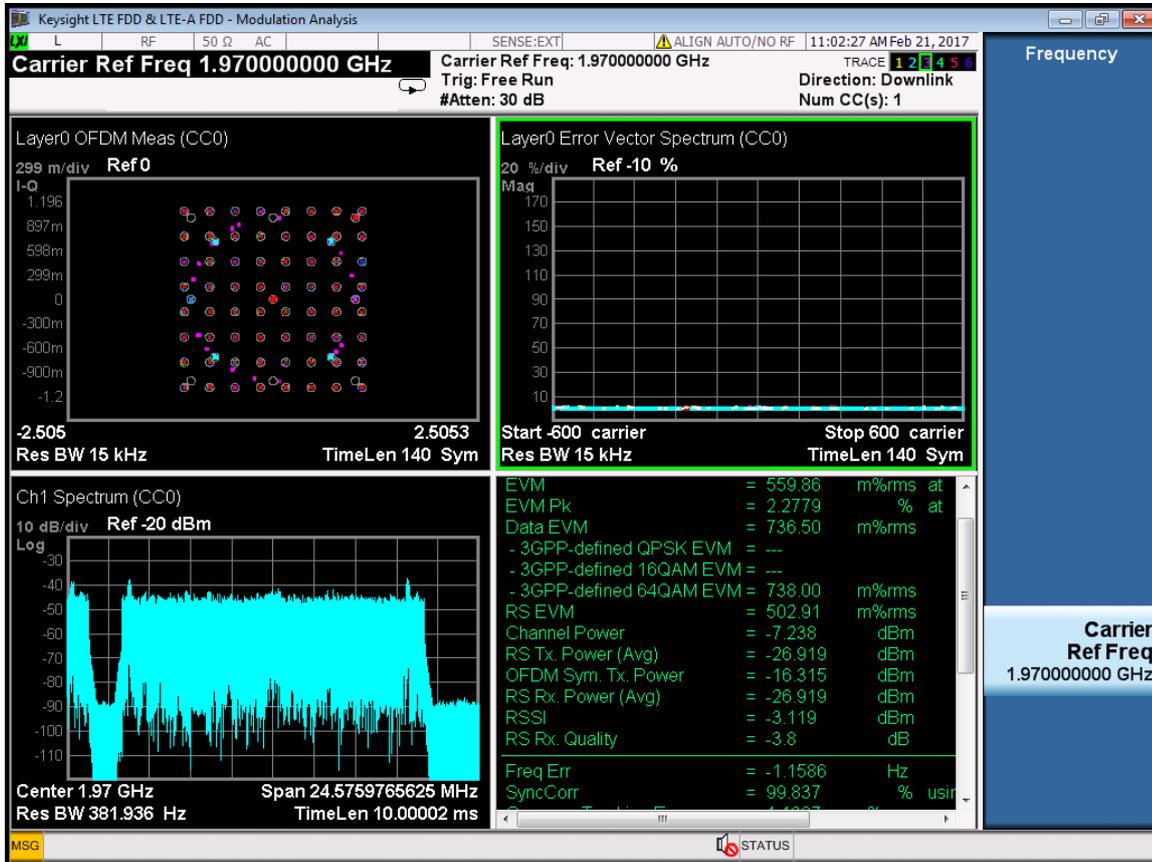
RF 1960M:



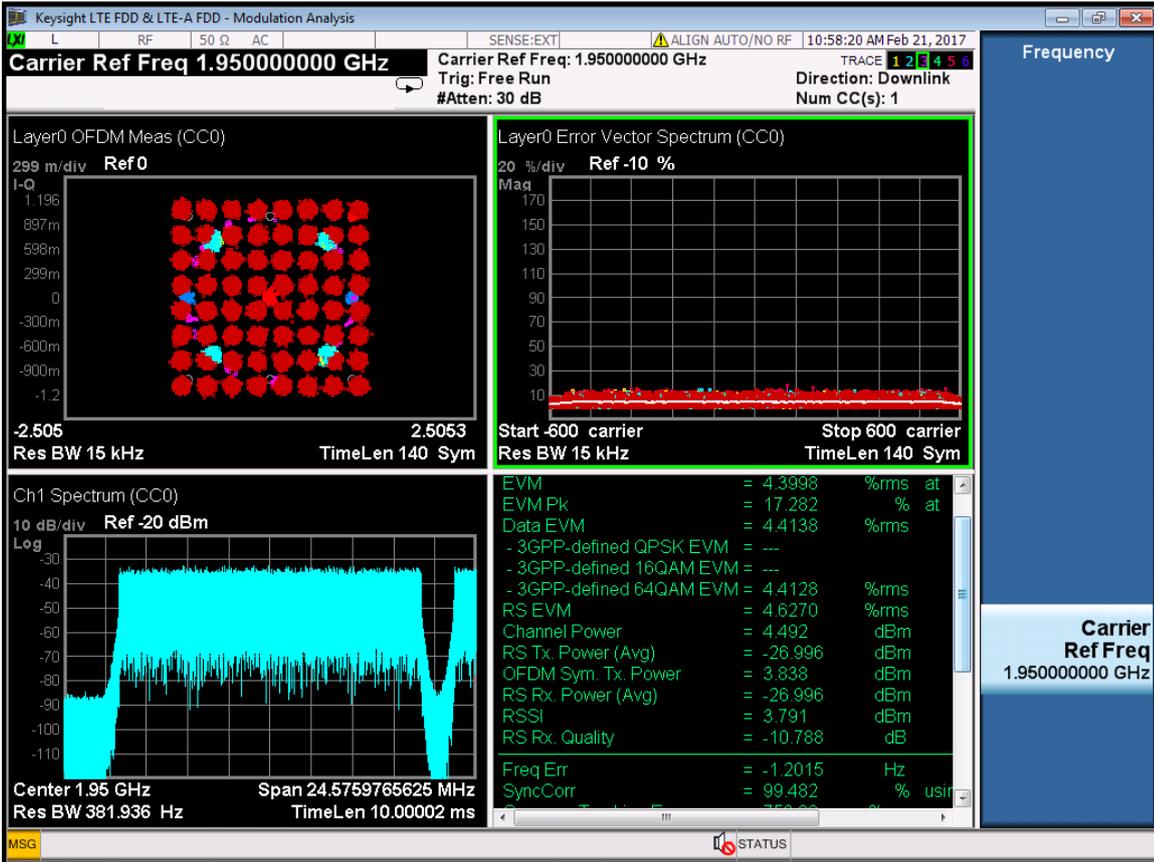
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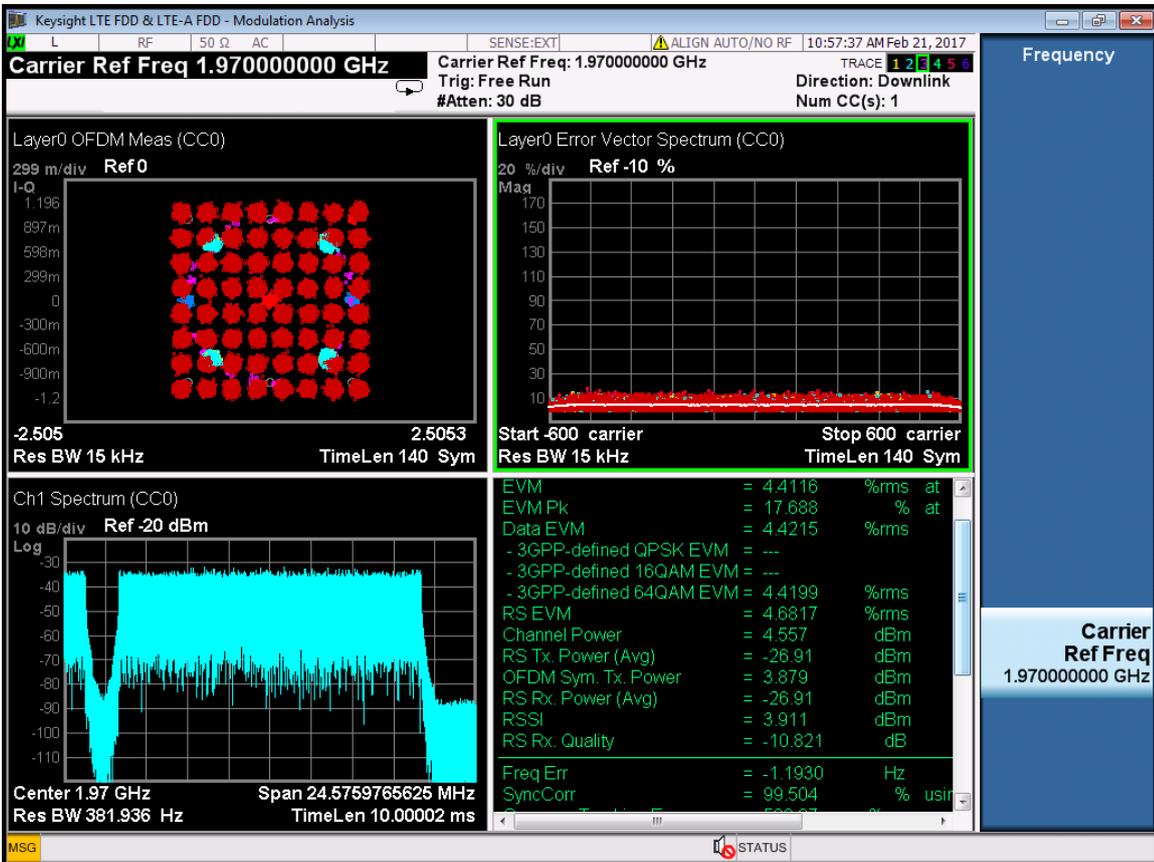
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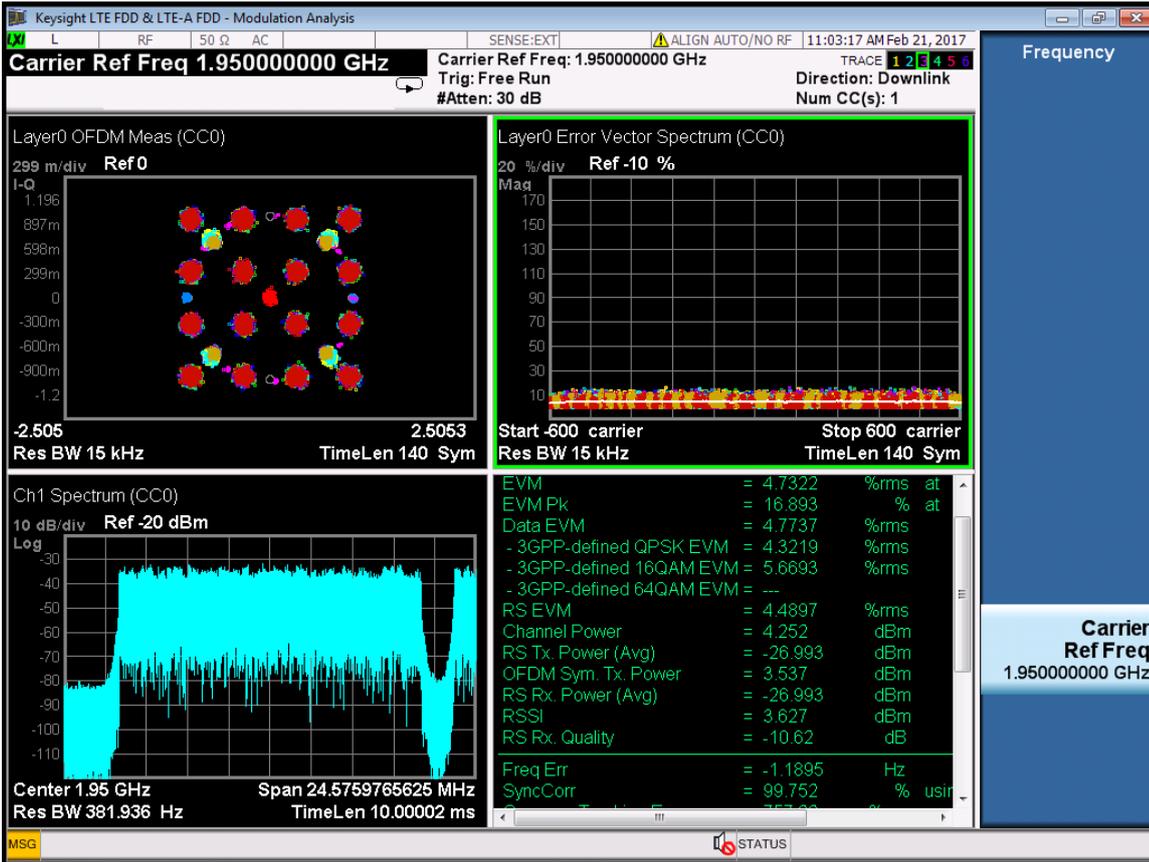
### LTE 20M-Port 4-1950MHz-E-TM3.1



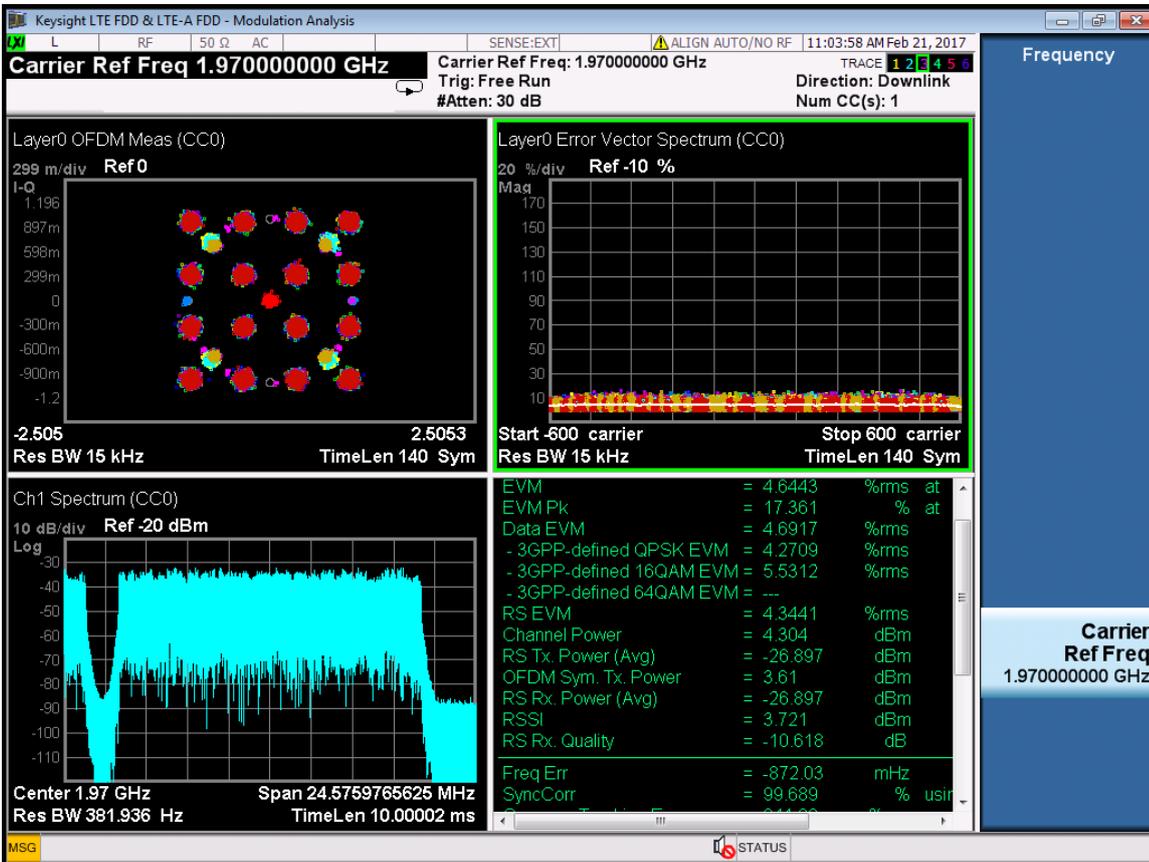
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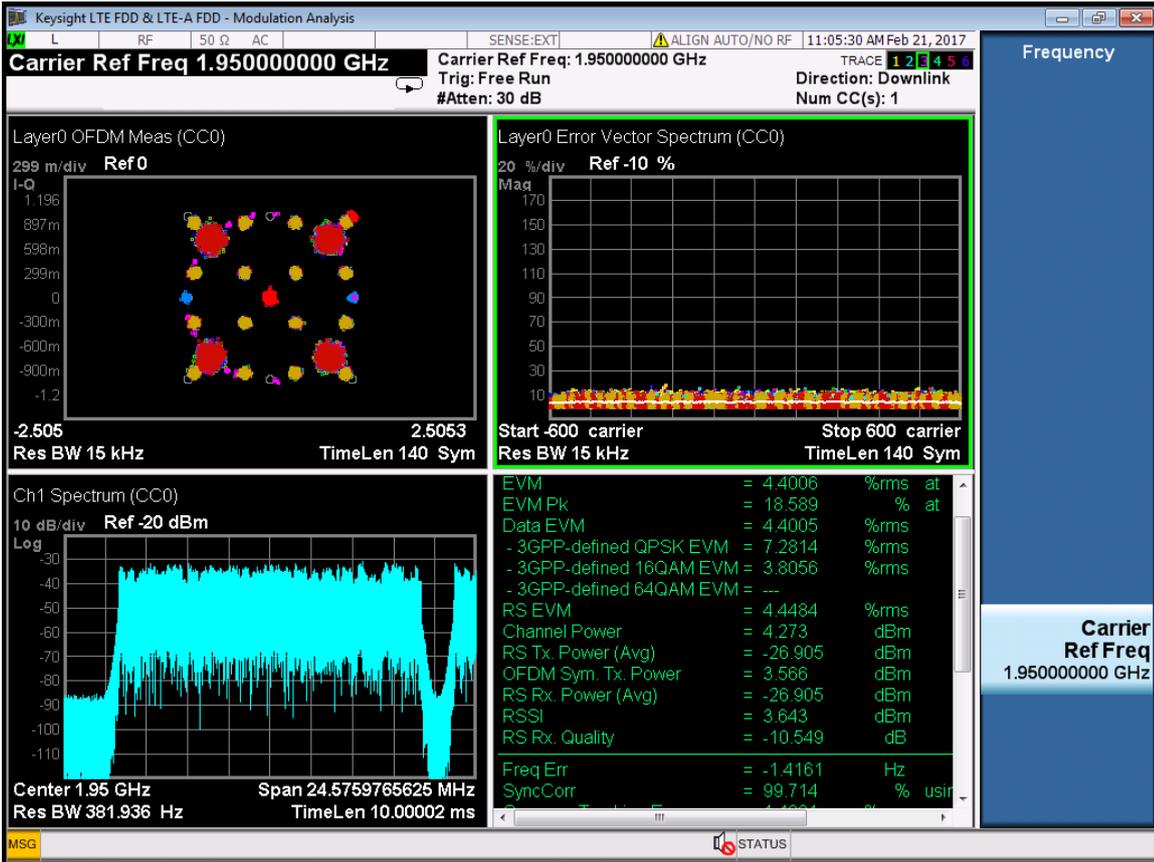
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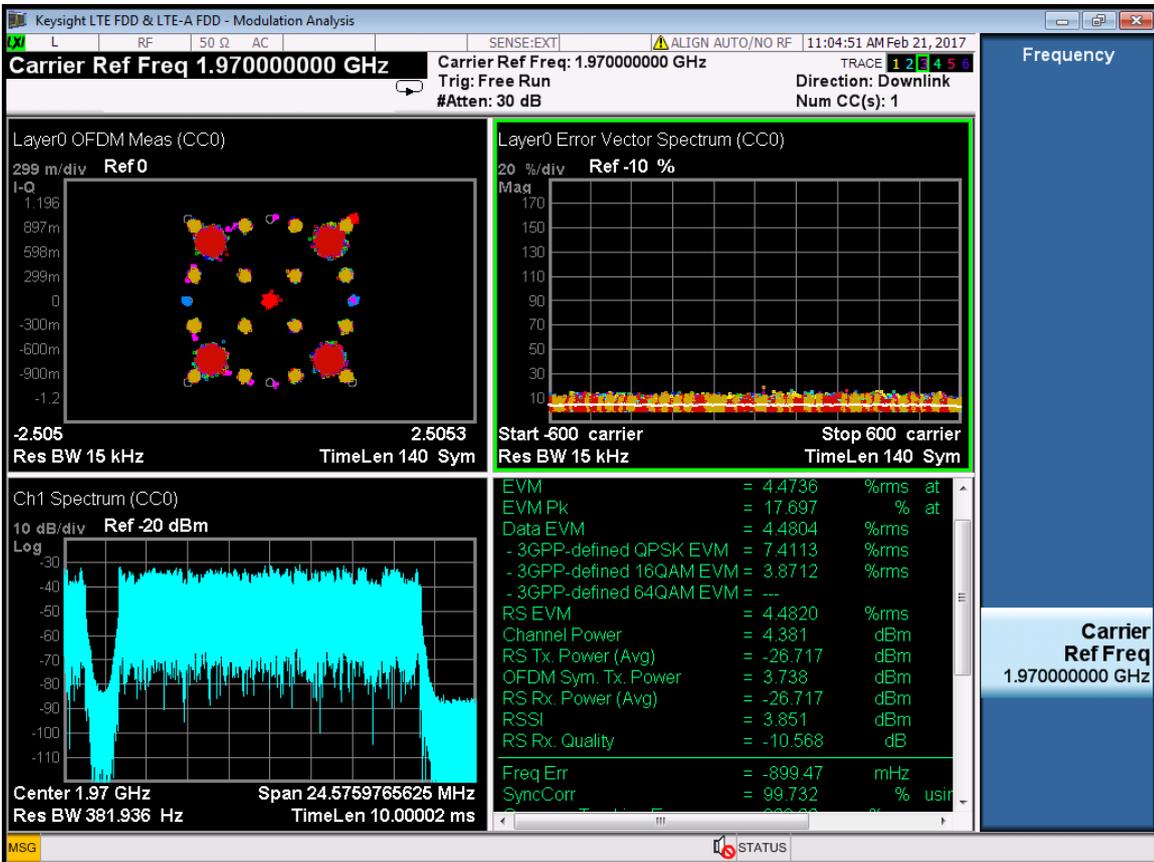
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LTE 20M-Port 4-1950MHz-E-TM3.3

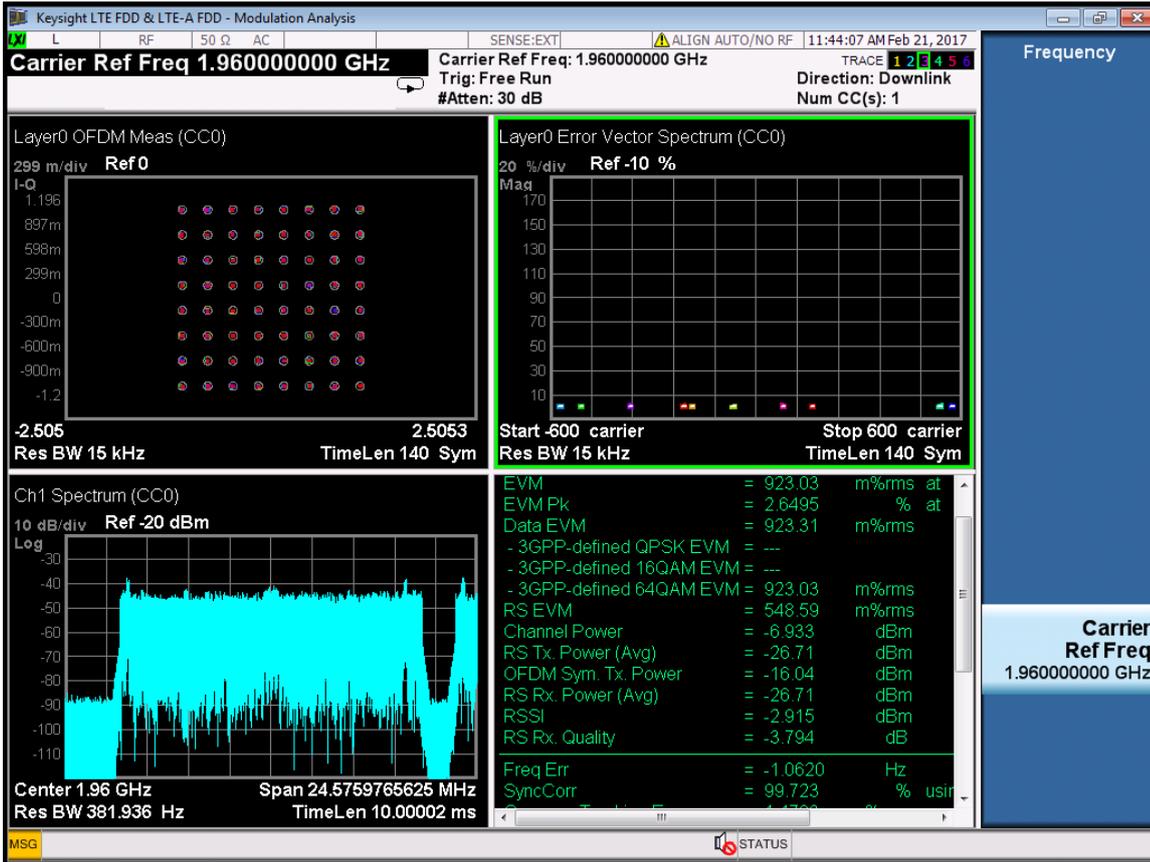


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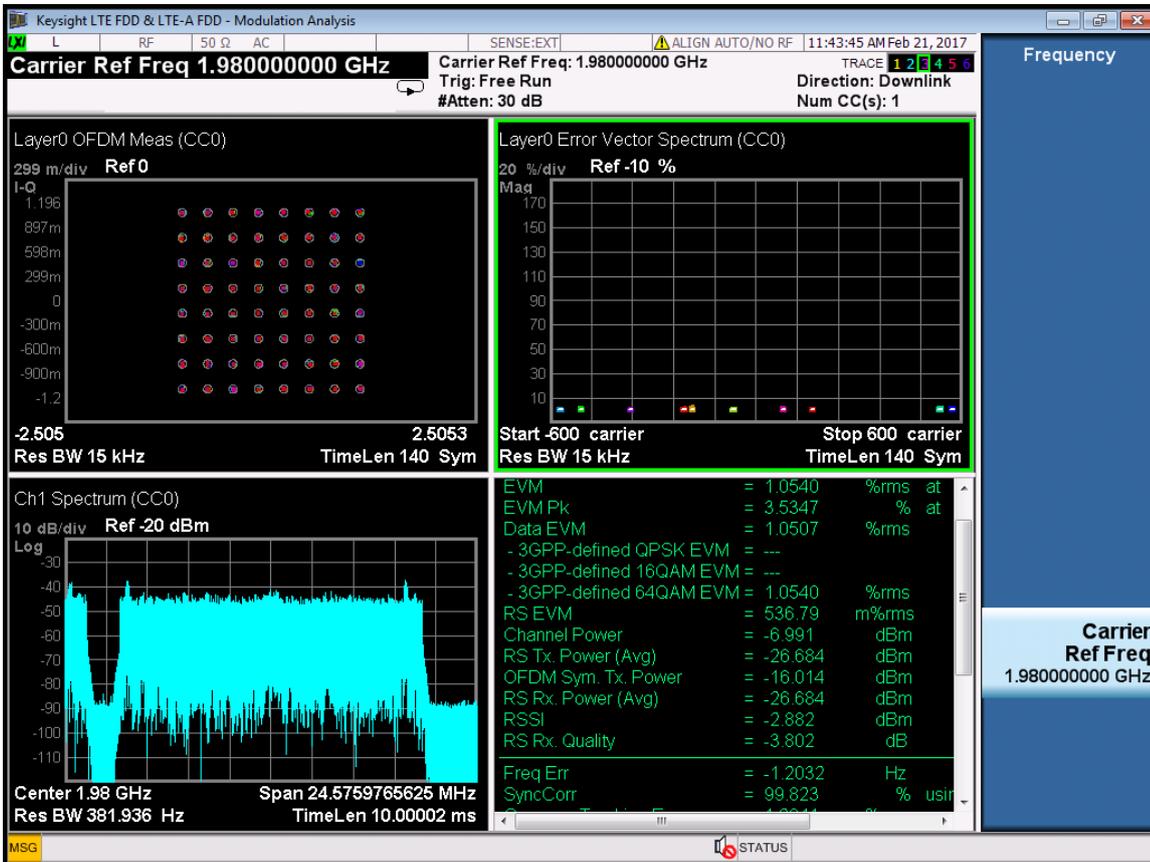


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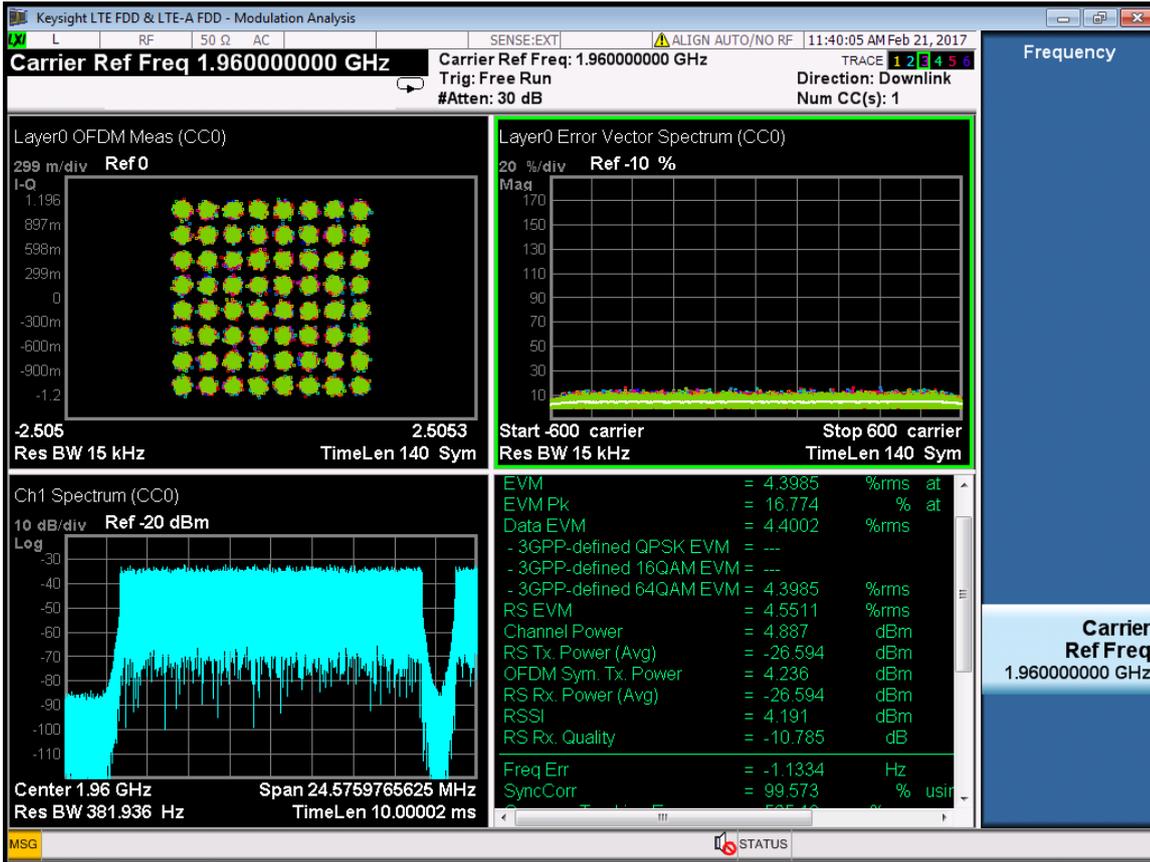
LTE 20M-Port 4-1960MHz-E-TM2



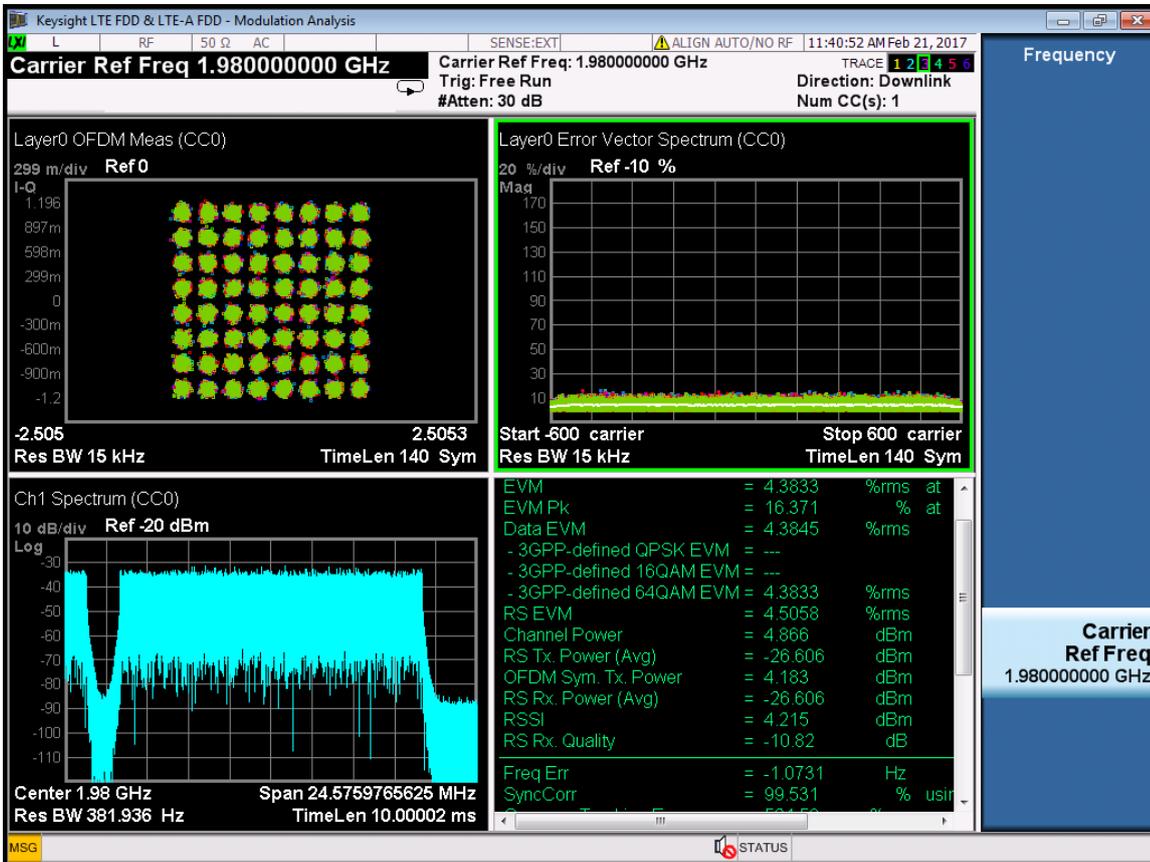
### LTE 20M-Port 4-1980MHz- E-TM2



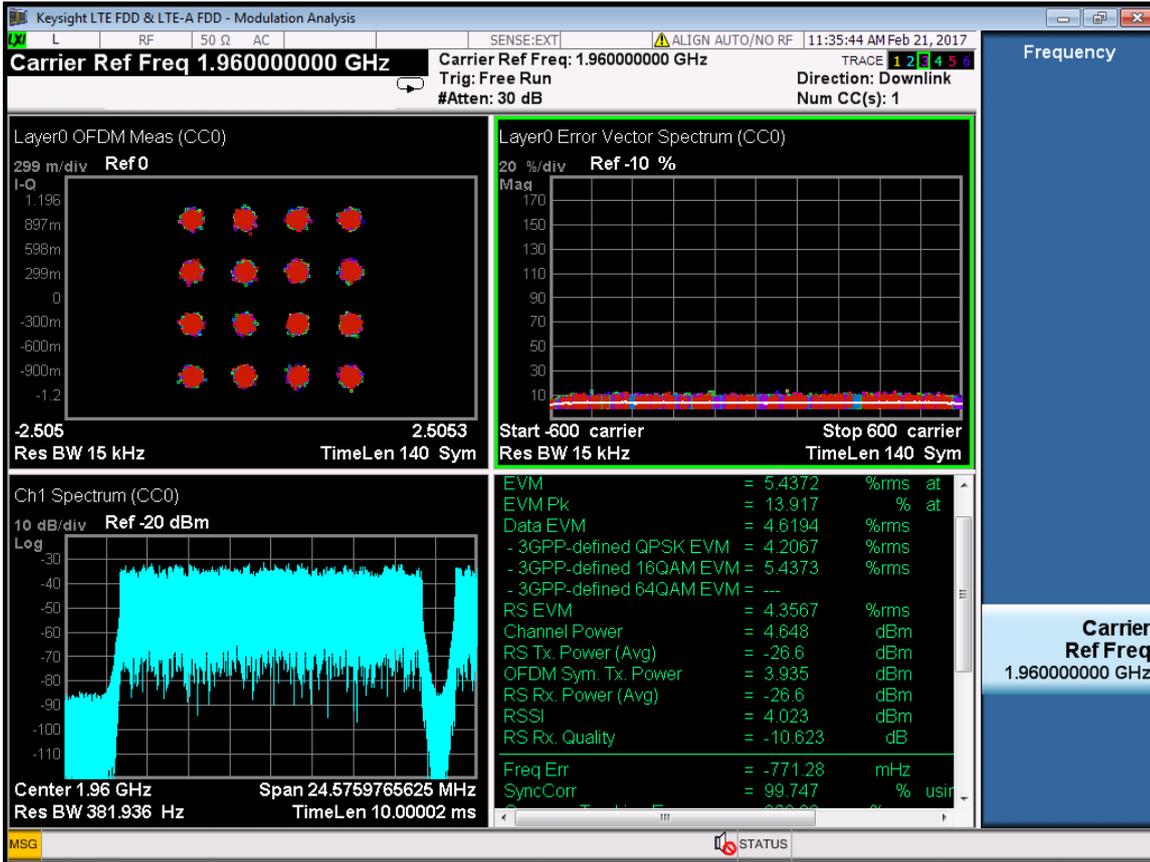
### LTE 20M-Port 4-1960MHz-E-TM3.1



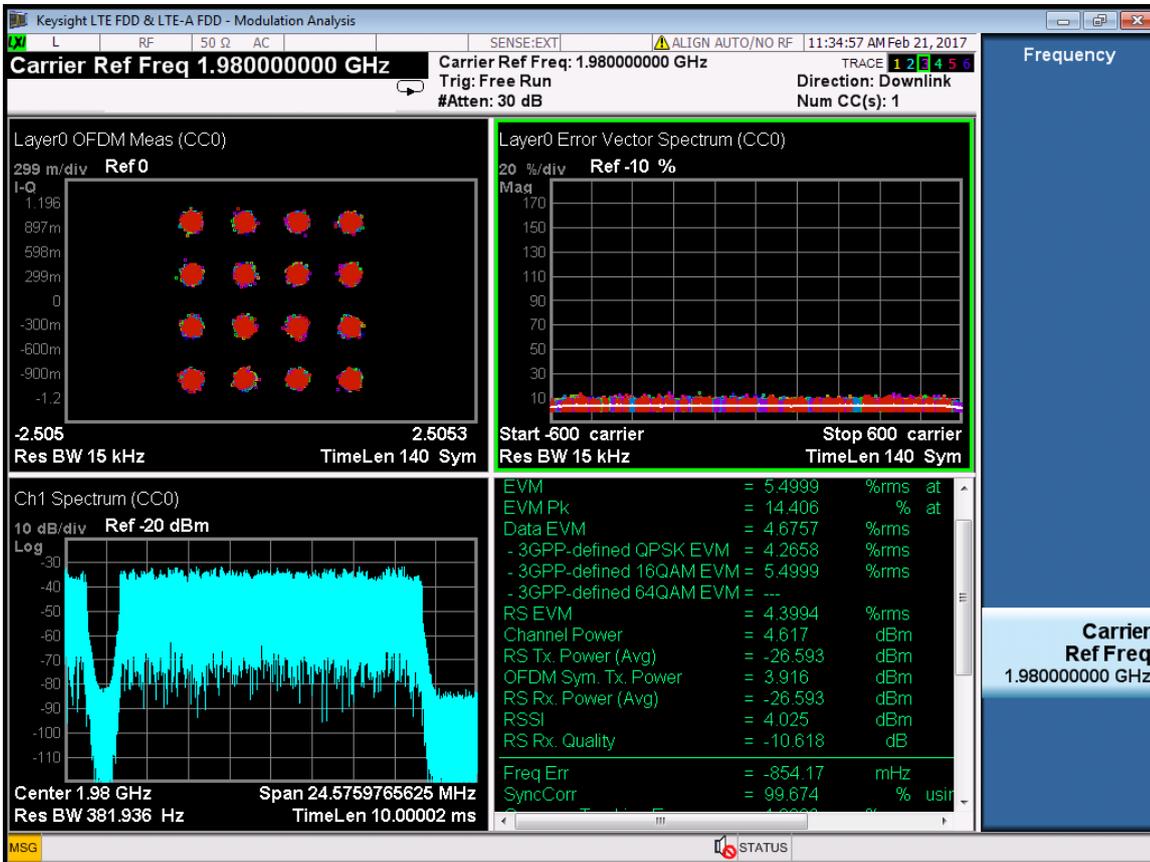
LTE 20M-Port 4-1980MHz- E-TM3.1



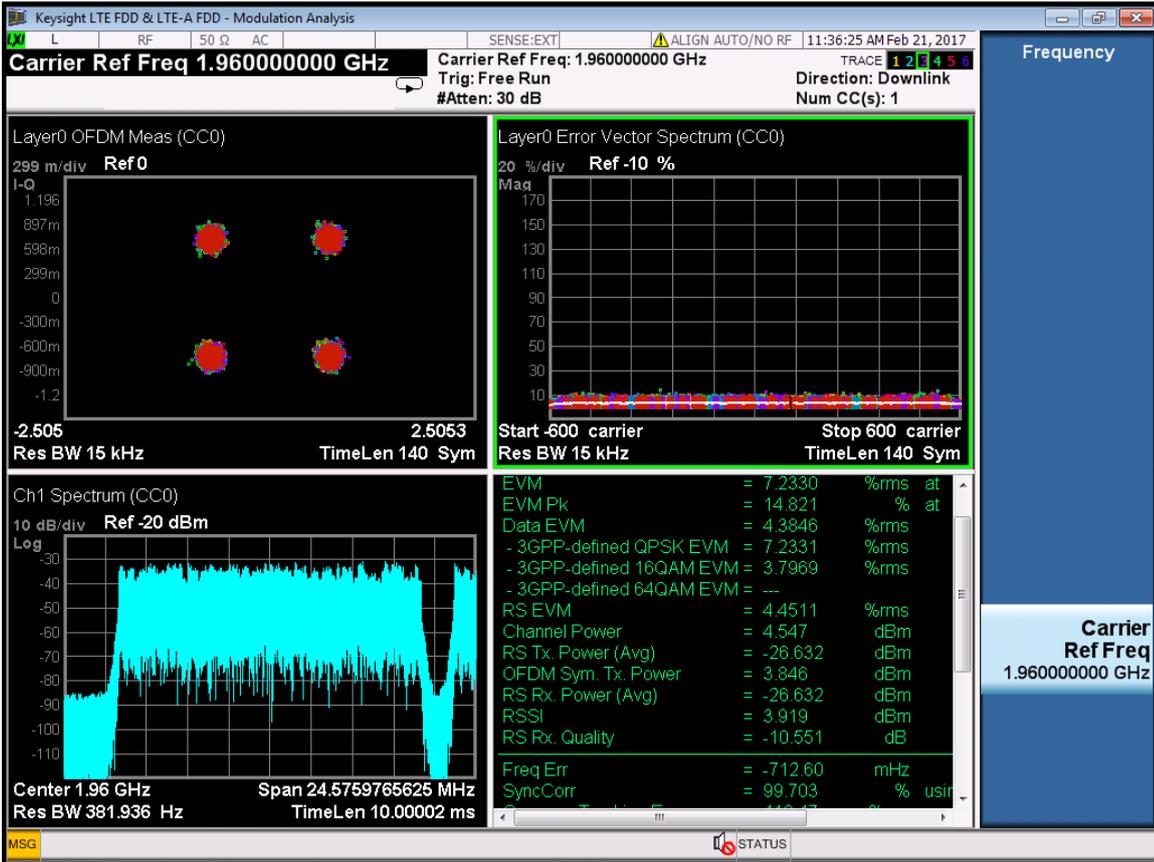
LTE 20M -Port 4-1960MHz-E-TM3.2



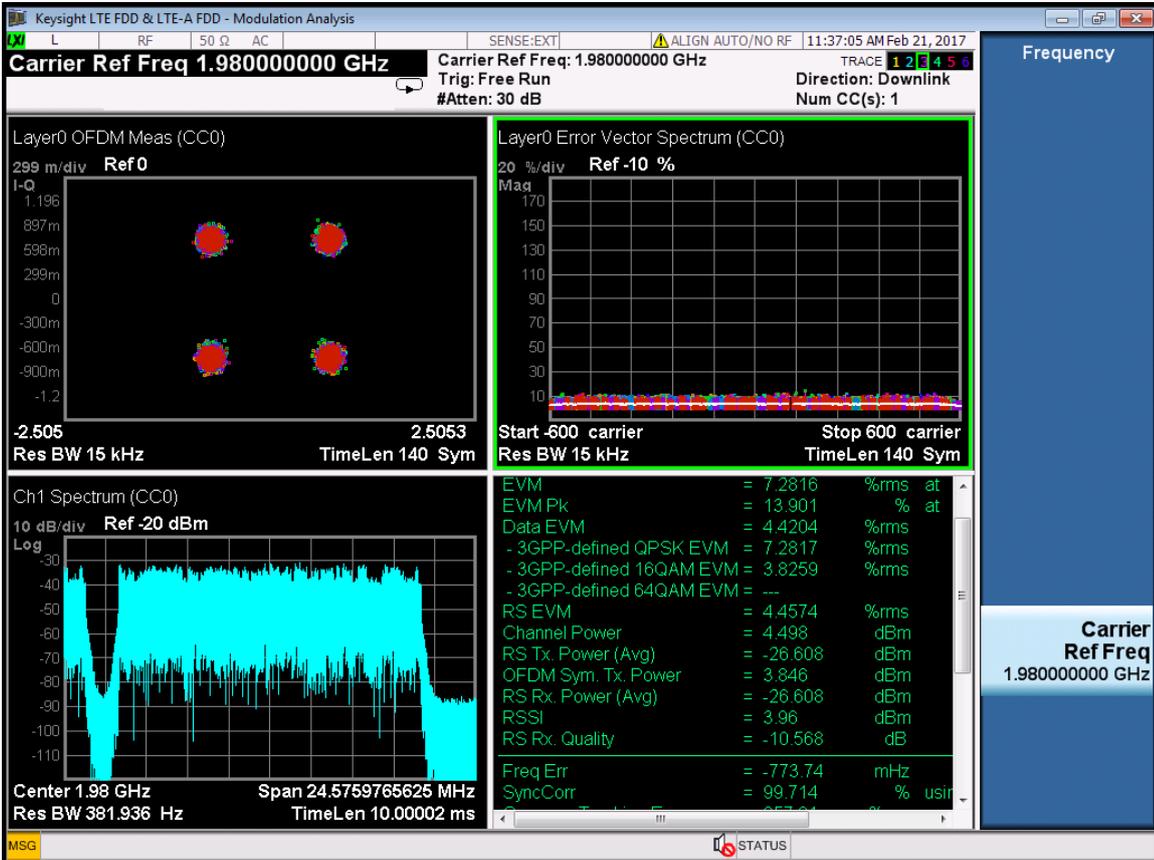
### LTE 20M-Port 4-1980MHz- E-TM3.2



### LTE 20M-Port 4-1960MHz-E-TM3.3



LTE 20M-Port 4-1980MHz- E-TM3.3



RF Bandwidth :IBW 30M(LTE 10M+LTE 15M)

Port	RF Center Freq.	LTE Center	Test mode	EVM%
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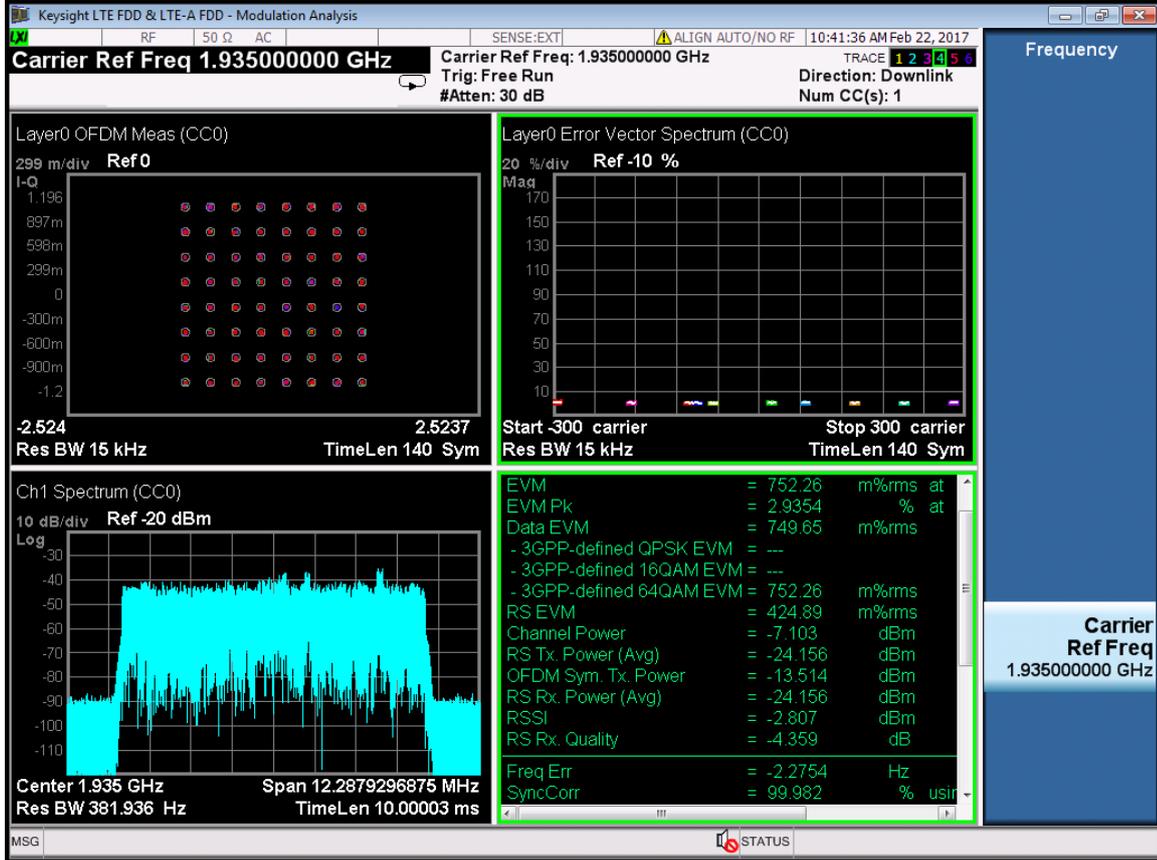


	(MHz) (MHz)	Freq. (MHz) (MHz)		
1	1945	1935	E-TM2	0.75226
			E-TM3.1	5.1140
			E-TM 3.2	6.9552
			E-TM 3.3	10.018
		1952.5	E-TM2	0.61512
			E-TM3.1	5.1502
			E-TM 3.2	7.0571
			E-TM 3.3	10.162
	1960	1950	E-TM2	0.72334
			E-TM3.1	5.1172
			E-TM 3.2	7.0156
			E-TM 3.3	10.065
		1967.5	E-TM2	0.76612
			E-TM3.1	5.1746
			E-TM 3.2	7.0786
			E-TM 3.3	10.206
	1975	1965	E-TM2	0.78989
			E-TM3.1	5.0862
			E-TM 3.2	7.2025
			E-TM 3.3	10.062
1982.5		E-TM2	0.76436	
		E-TM3.1	5.1518	
		E-TM 3.2	7.0771	
		E-TM 3.3	10.209	
4	1950	1935	E-TM2	0.78743
			E-TM3.1	5.0885
			E-TM 3.2	6.9932
			E-TM 3.3	10.040
		1952.5	E-TM2	0.65872
			E-TM3.1	5.1409
			E-TM 3.2	7.0812
			E-TM 3.3	10.149
	1960	1950	E-TM2	0.85540
			E-TM3.1	5.1431
			E-TM 3.2	7.0539
			E-TM 3.3	10.141
		1967.5	E-TM2	0.81726
			E-TM3.1	5.1837
			E-TM 3.2	7.1113
			E-TM 3.3	10.268
	1970	1965	E-TM2	0.88365
			E-TM3.1	5.0865
			E-TM 3.2	6.9830
			E-TM 3.3	10.041
1982.5		E-TM2	0.67454	

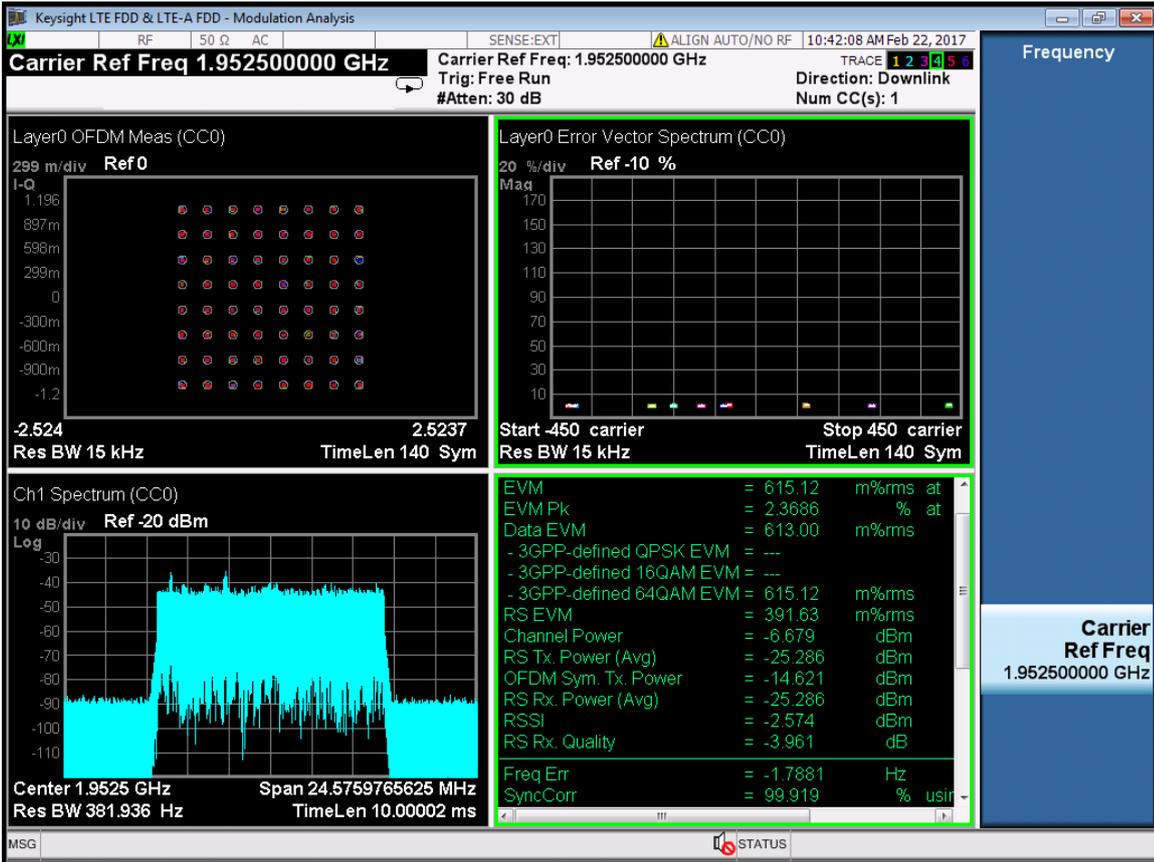


			E-TM3.1	5.1586
			E-TM 3.2	7.0610
			E-TM 3.3	10.200

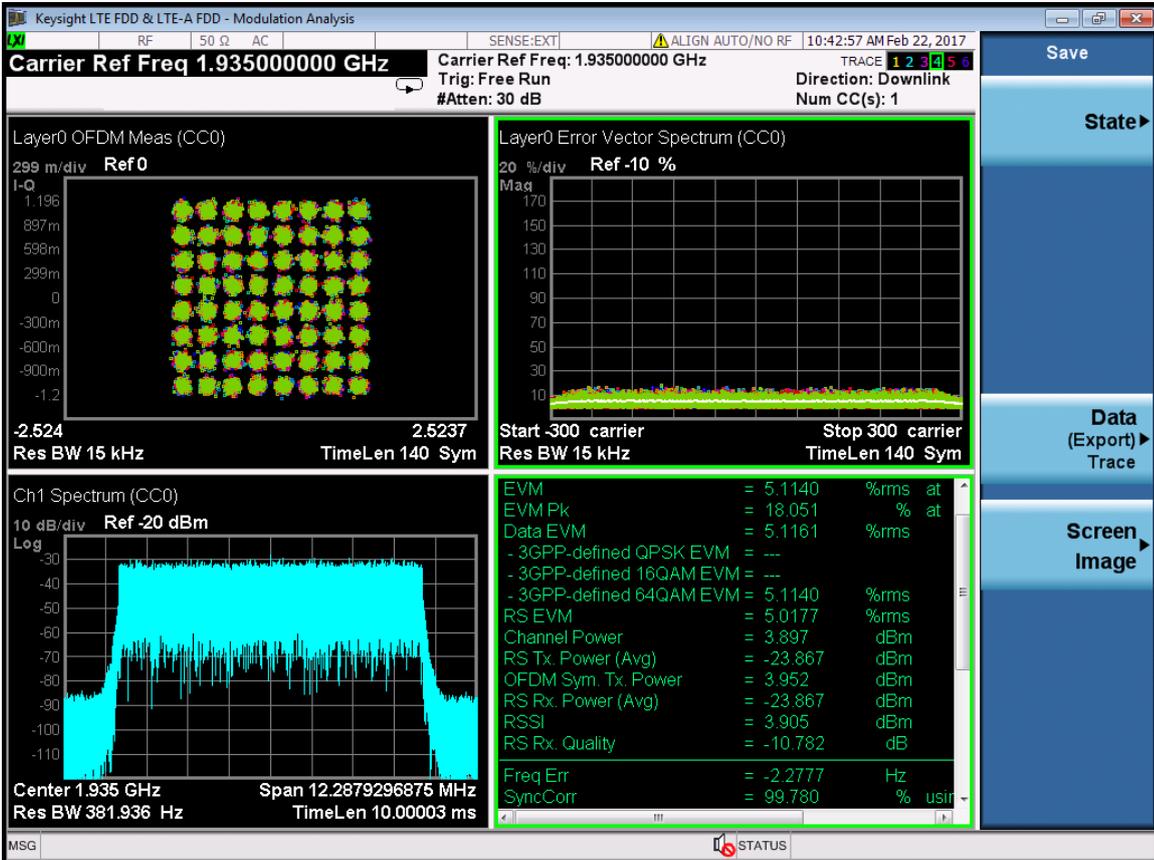
RF 1945M:  
 LTE 10M -Port 1-1935MHz-E-TM2



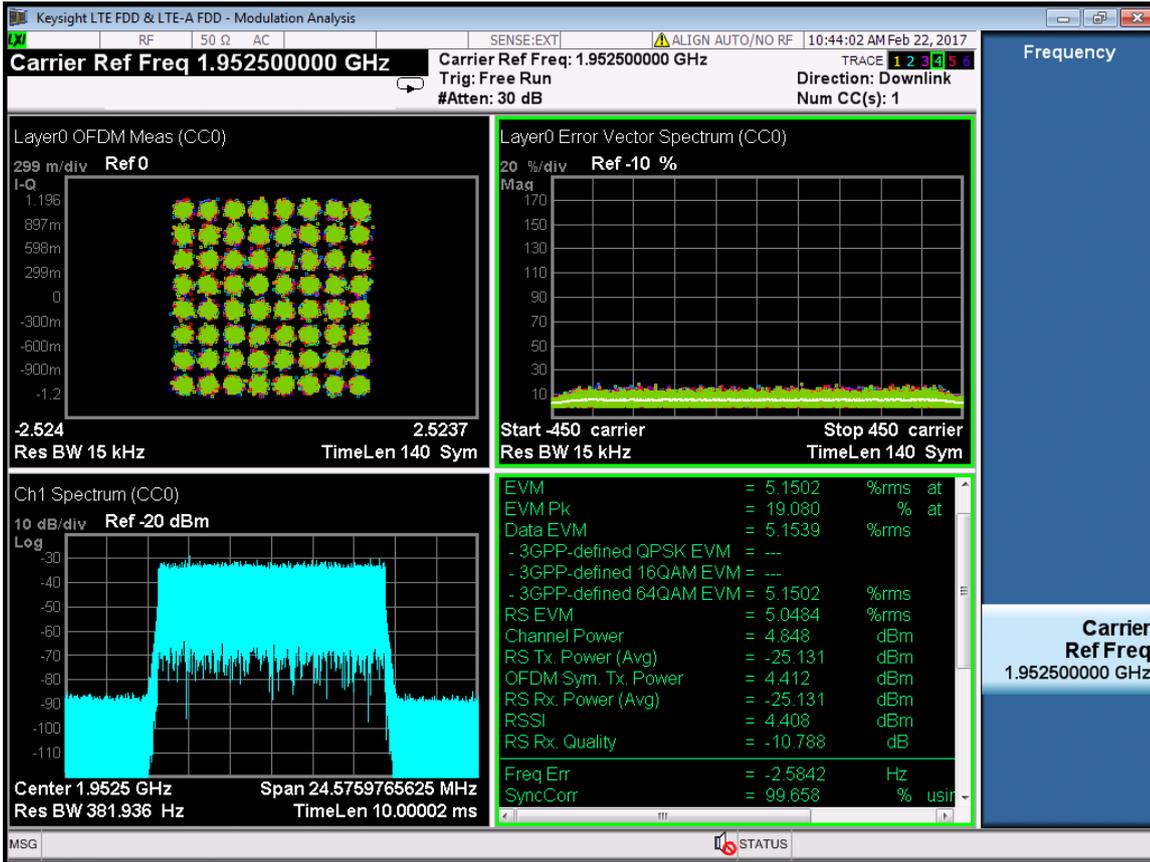
LTE 15M -Port 1-1952.5MHz- E-TM2



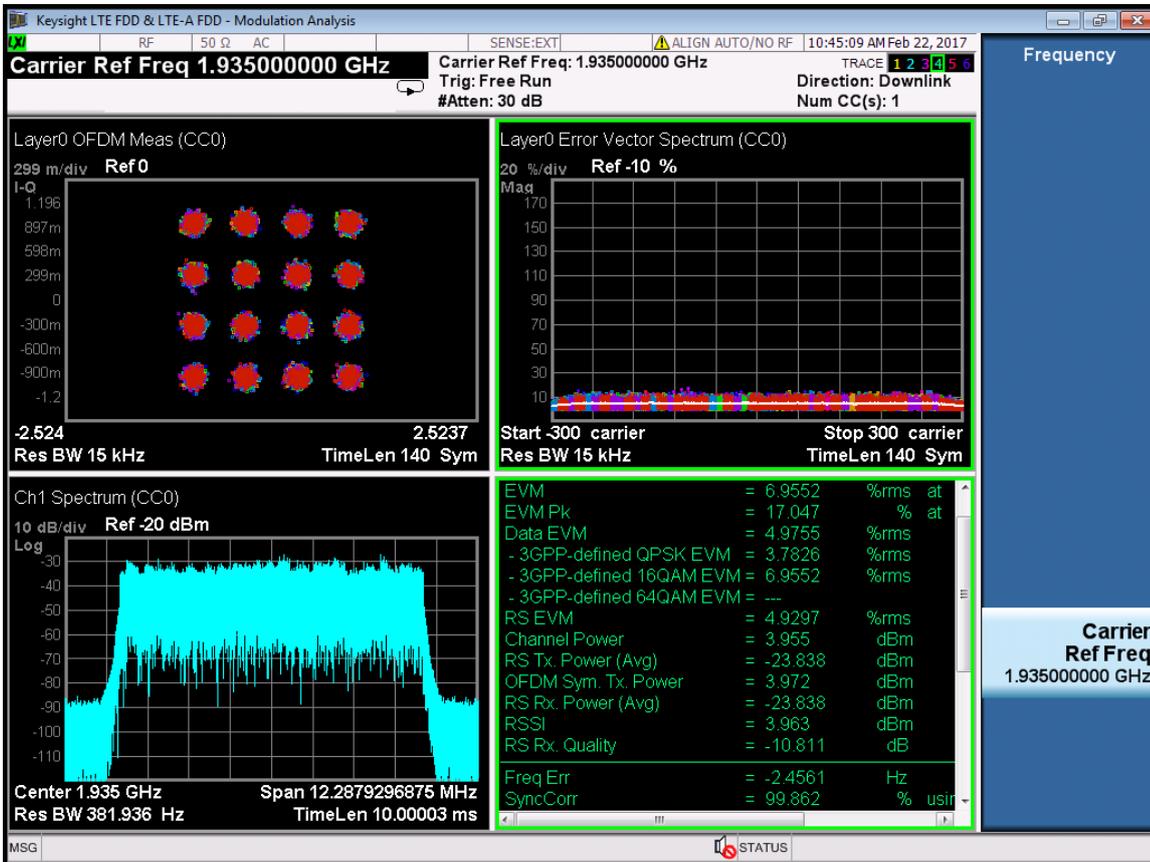
LTE 10M-Port 1-1935MHz-E-TM3.1



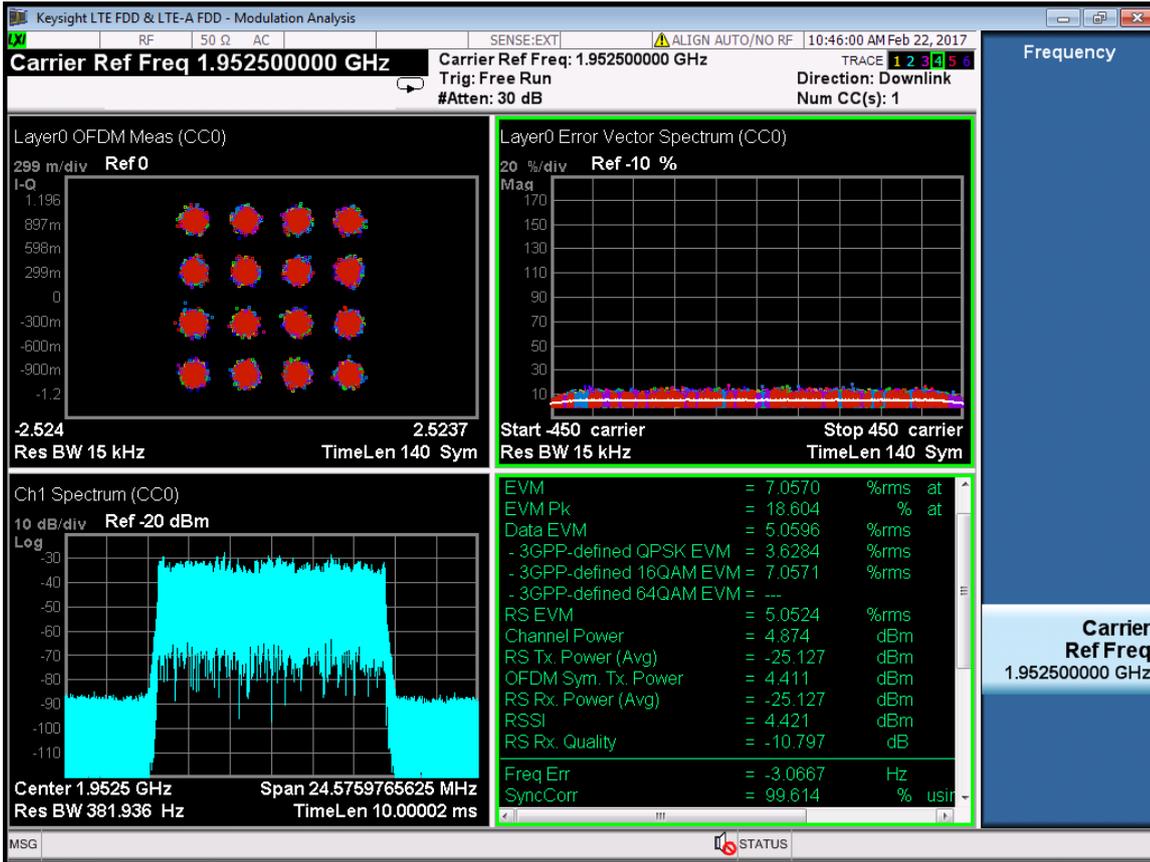
LTE 15M-Port 1-1952.5MHz- E-TM3.1



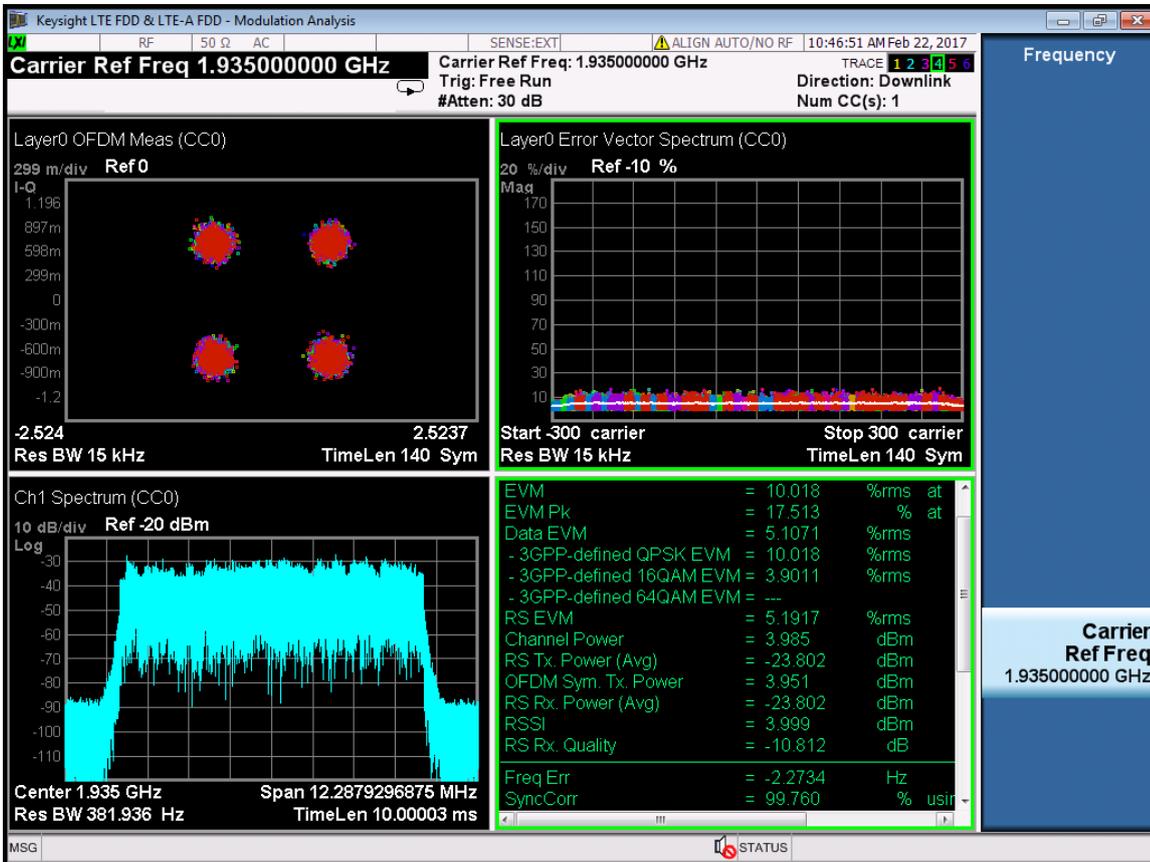
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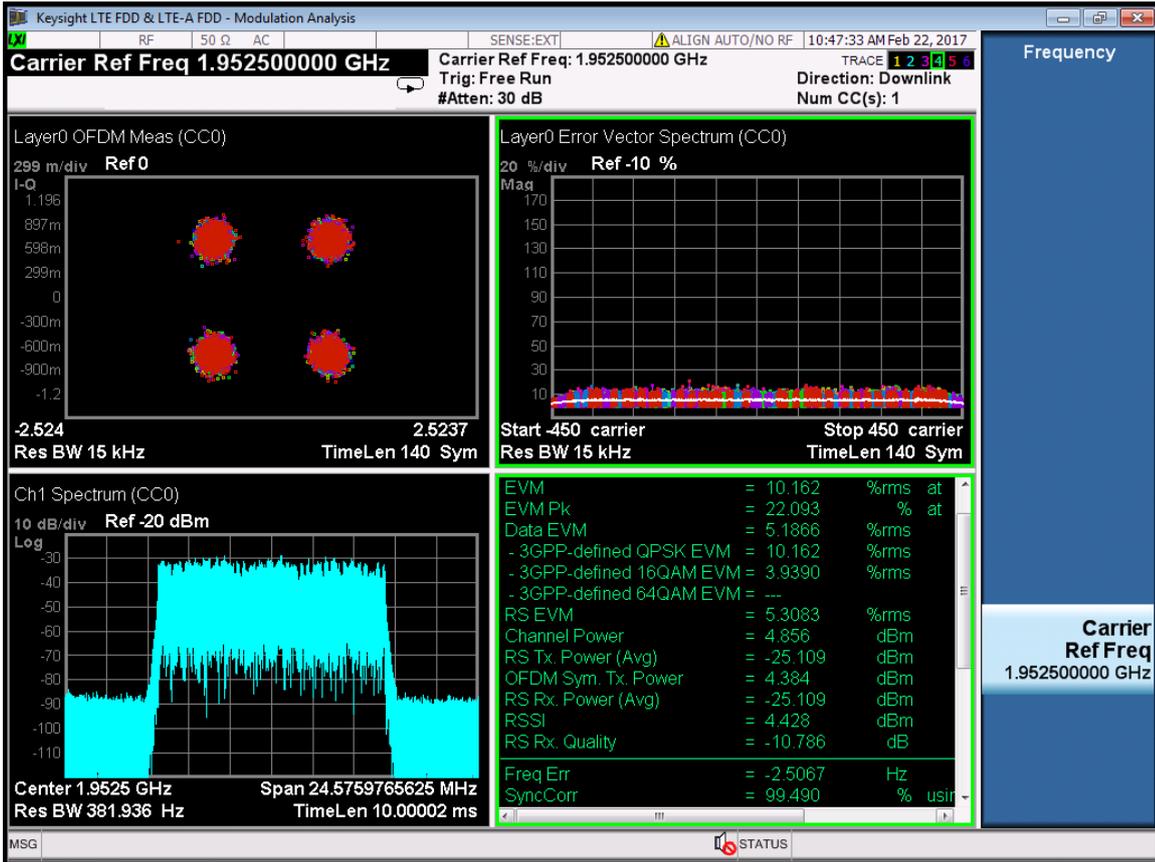
LTE 15M-Port 1-1952.5MHz- E-TM3.2



### LTE 10M-Port 1-1935MHz-E-TM3.3



### LTE 15M-Port 1-1952.5MHz- E-TM3.3



RF 1960M:  
LTE 10M-Port 1-1950MHz-E-TM2

