

FCC MEASUREMENT AND TEST REPORT

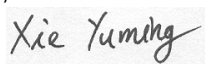
For

ZTE Corporation

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

FCC ID: Q78-R8862AS7000

May 30, 2016

This Report Concerns: ☒ Original Report	Equipment Type: Macro Radio Remote Unit
Test Engineer: Jennie HE 	
Report No.: RF20151509RP	
Test Date: May 20 – May 30, 2016	
Reviewed By: Xie Yuming 	
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Note: The test report is specially limited to the above company and this particular sample only. It may not be duplicated without prior written consent of ZTE Corporation. This report must not be used by the client to claim product certification 、 approval 、 or endorsement by any agency of the US Government.

1 TABLE OF CONTENTS

1	TABLE OF CONTENTS	2
2	GENERAL INFORMATION.....	4
	Product Description for Equipment Under Test (EUT).....	4
	Objective	5
	Related Submittal(s)/Grant(s).....	5
	Test Methodology	5
	Test Facility.....	5
3	SYSTEM TEST CONFIGURATION.....	6
	Description of Test Configuration	6
4	SUMMARY OF TEST RESULTS	7
5	TRANSMITTER OUTPUT POWER	8
	Applicable Standard: FCC §2.1046 ,§27.50	8
	Test Equipment List and Details.....	8
	Test Procedure.....	8
	Environmental Conditions	8
	Test Result: Pass.....	9
	Test Mode: Transmitting LTE	9
	Test Data:.....	9
6	RF EXPOSURE.....	27
	Applicable standard: FCC §2.1091 §1.1037	27
	Limit.....	27
	Test Data.....	28
	Test Result: pass.....	28
7	MODULATION CHARACTERISTIC.....	28
	Applicable Standard: FCC §2.1047	28
	Test Equipment List and Details.....	28
	Test Procedure.....	29
	Test Data Environmental Conditions	29
	Test Result: Pass.....	29
	Test Mode: Transmitting LTE	29
	Test Data:.....	29
8	SPURIOUS RADIATED EMISSIONS	101
	Applicable Standard: FCC CFR 47 §2.1053.....	101
	Test Equipment List and Details.....	101
	Test Procedure.....	102
	Test Results Summary: PASS	103
	Environmental Conditions	103
	Test data	103
9	SPURIOUS EMISSIONS AT ANTENNA TERMINALS.....	104
	Applicable Standard: FCC§2.1051, §27.53	104
	Test Equipment List and Details.....	104
	Test Procedure.....	105
	Test Data Environmental Conditions	105
	Test Result: Pass.....	105
	Test Mode: Transmitting LTE	105
	Test Data:.....	105
10	OCCUPIED BANDWIDTH.....	147
	Applicable Standard: FCC §2.1049	147

Test Equipment List and Details:.....	147
Test Procedure.....	148
Environmental Conditions	148
Test Result: Pass.....	148
Test Mode: Transmitting LTE	148
Test Data.....	148
11 BAND EDGES	166
Applicable Standard: FCC §2.1051 ,§27.53.....	166
Test Equipment List and Details.....	166
Test Procedure.....	167
Test Data Environmental Conditions	167
Test Result: Pass.....	167
Test Mode: Transmitting LTE	167
Test Data.....	167
12 FREQUENCY STABILITY	185
Applicable Standard: FCC § 2.1055,	185
Test Equipment List and Details.....	185
Test Procedure.....	186
Environmental Conditions	186
Test Result: Pass.....	187
Test Mode: Transmitting LTE	187
Test Data.....	187
Frequency Stability Versus Temperature.....	187
Frequency Stability Versus Voltage.....	209

2 GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The ZTE Corporation's product, model number: ZXSDR R8862A S7000 or the "EUT" as referred to in this report is a Macro Radio Remote Unit.

Technical specification:

Size: 425 mm x 220 mm x 165 mm (HxWxD)

Input voltage: -37V~-60V

Frequency range: 728MHz~746 MHz

(Bottom frequency is about 728.25MHz, Middle frequency is about 737MHz, Top frequency is about 745.75MHz).

Max RF output power: 46dBm

Gain of the antenna: 15dBi

Modulation type of emission: LTE

Appearance of EUT:



FIGURE 1 APPEARANCE OF ZXSDR R8862A S7000

Objective

This Type approval report is prepared on behalf of ZTE Corporation in accordance with Part 2, Part 15, Part 27 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 Wireless Communication 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 ZTE Industrial Plaza, LiuXian Avenue, XiLi, Shenzhen, Guangdong, 518055, P.R.China Tel: +86-755 26770341 Fax: +86-755-267703477. Test site at ZTE Corporation 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. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

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.

3 SYSTEM TEST CONFIGURATION

Description of Test Configuration

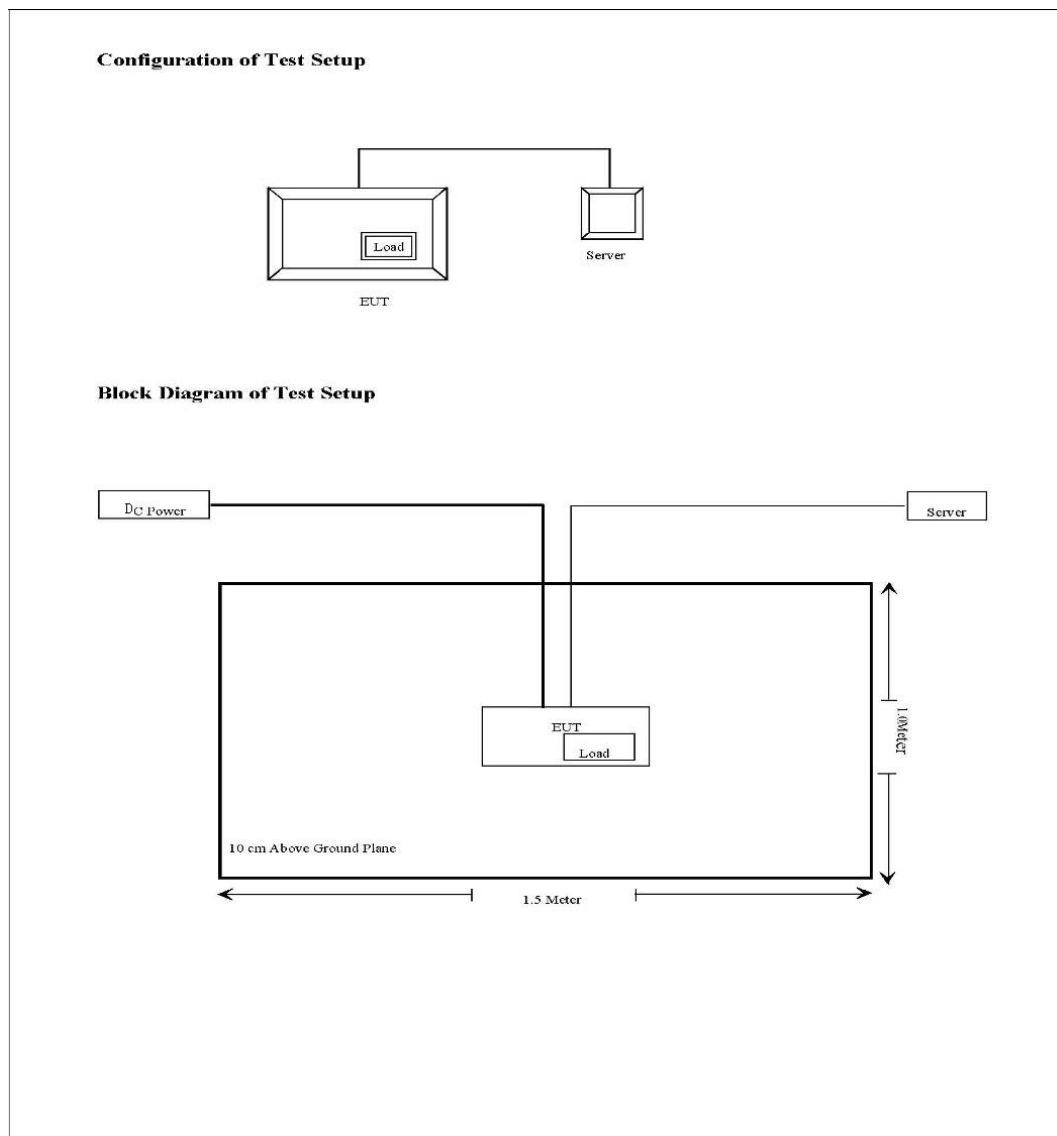
Justification

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.



4 SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 2.1046 , ,§27.50	Transmitter output Power	Compliant
§ 2.1091 ,§1.1037	RF Exposure	Compliant
§ 2.1047	Modulation Characteristic	Compliant
§ 2.1053, §27.53	Spurious Radiated Emissions	Compliant
§ 2.1051, §27.53	Spurious Emissions AT Antenna Terminals	Compliant
§ 2.1049,§27.53	Occupied Bandwidth	Compliant
§ 2.1051,§27.53	Band Edge	Compliant
§ 2.1055	Frequency stability	Compliant

5 TRANSMITTER OUTPUT POWER

Applicable Standard: FCC §2.1046 ,§27.50

According to FCC §2.1046 &27.50, the ERP(equivalent radiated power) must not exceed 1000 Watts.

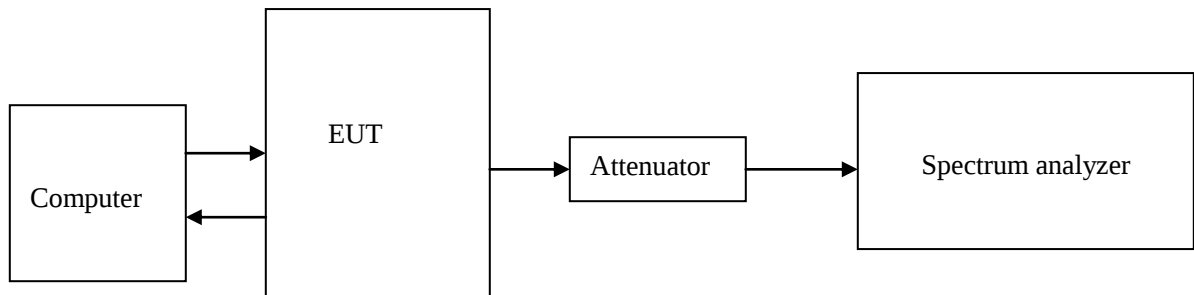
Note: ERP= Max output Power+ Antenna gain-Cable loss-2.15

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2015.09.26	2016.09.14
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2015.07.19	2016.07.19
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 40dB, Cable Loss is about 1.5dB

Environmental Conditions

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

Test Result: Pass

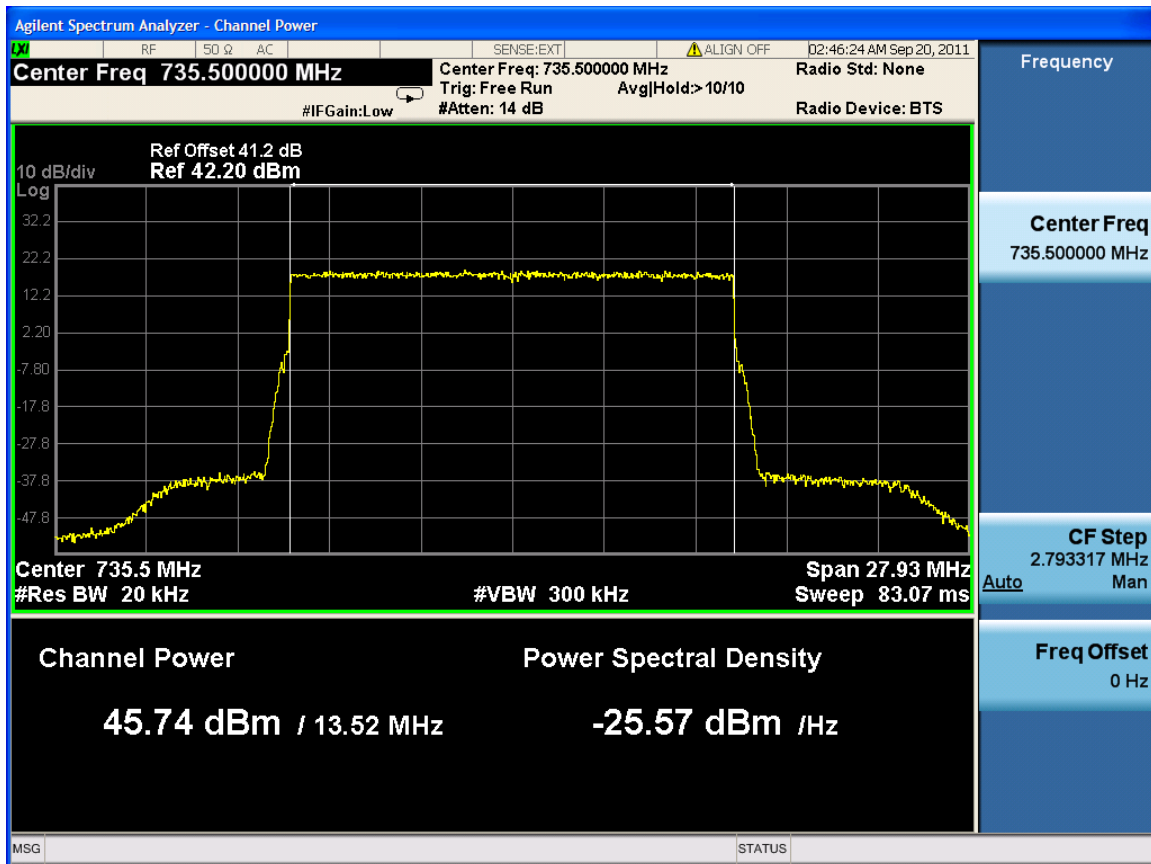
Test Mode: Transmitting LTE

Test Data:

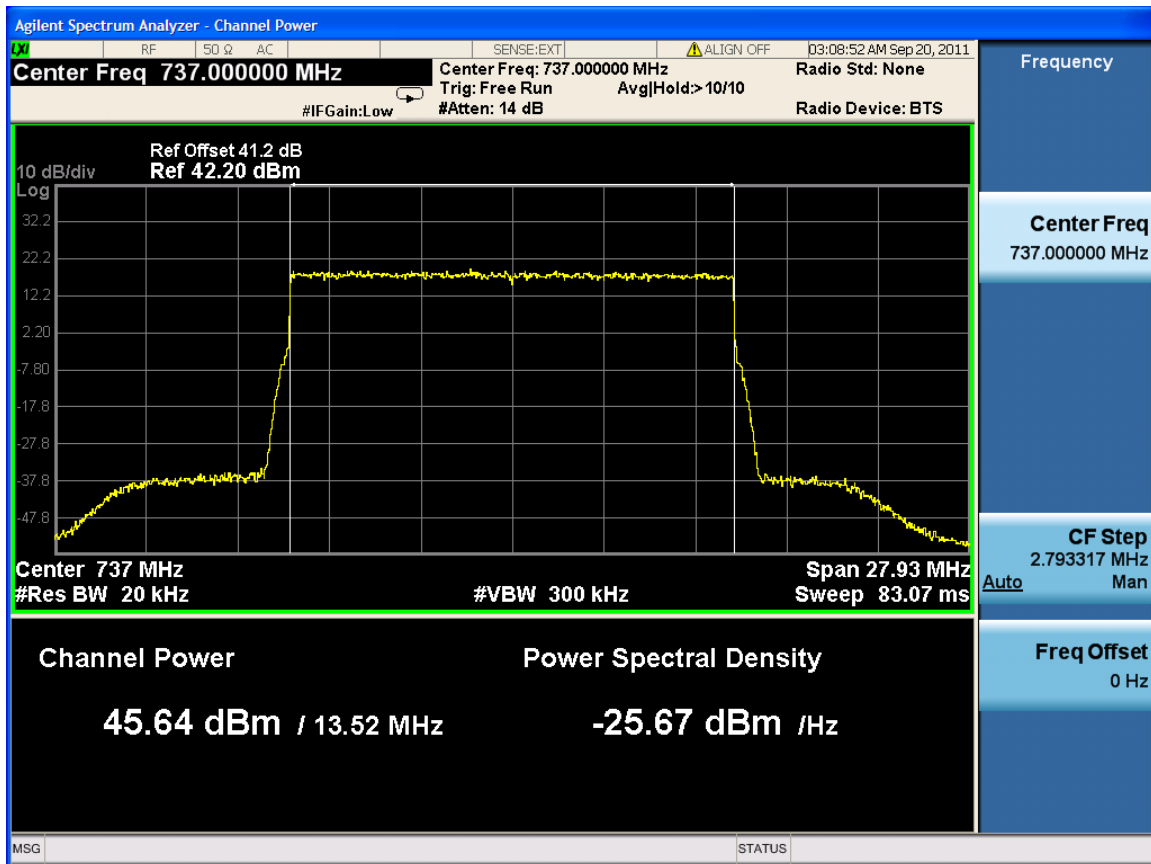
Channel Bandwidth :15M

Port	Center Freq. (MHz)	Max output Power in dBm	Antenna gain dBi	Cable Loss dB	Dipole Antenna	Equivalent radiated power dBm Of single antenna	Total Power in W Of single antenna	Total Power in W Of Two antenna
1	735.5	45.74	15	3	2.15	55.59	362.24	724.48
	737	45.64	15	3	2.15	55.49	354.00	708.00
	738.5	45.59	15	3	2.15	55.44	349.95	699.90
2	735.5	46.18	15	3	2.15	56.03	400.87	801.74
	737	46.19	15	3	2.15	56.04	401.79	803.58
	738.5	45.81	15	3	2.15	55.66	368.13	736.26

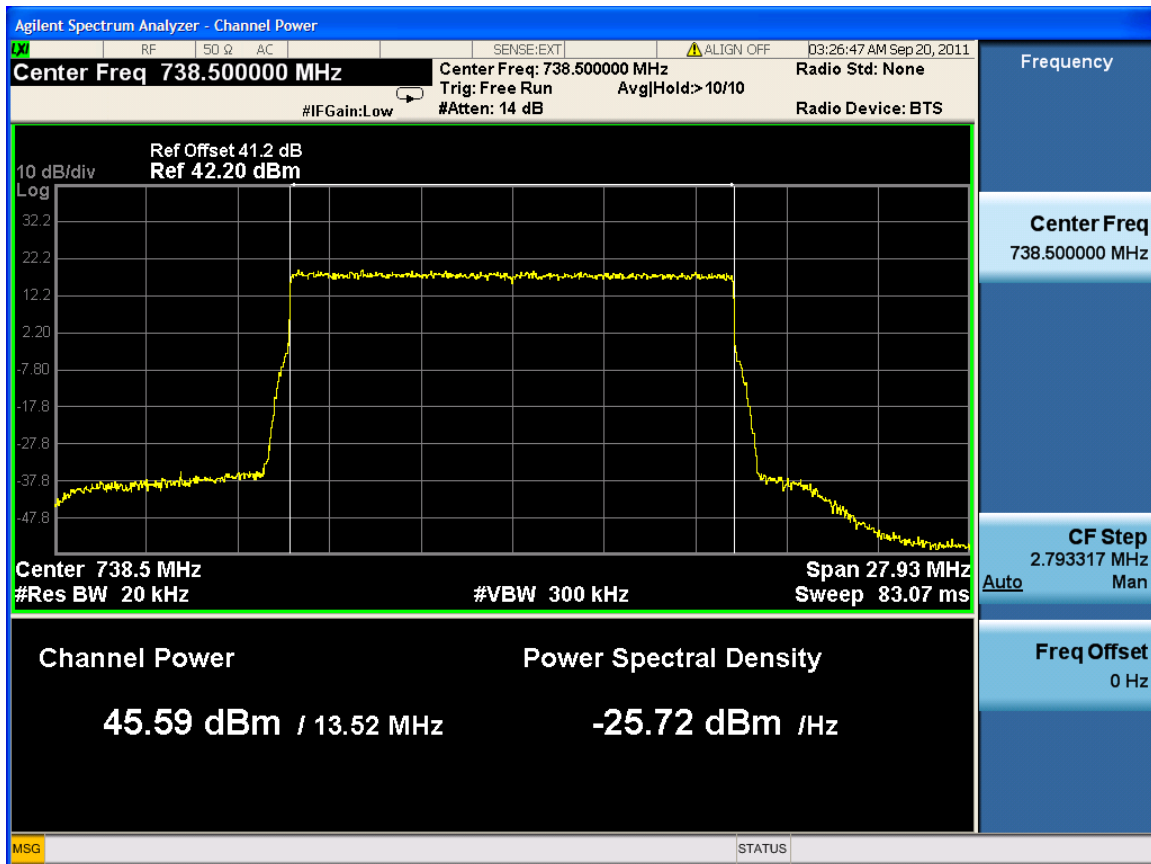
15M -Port 1 -735.5MHz



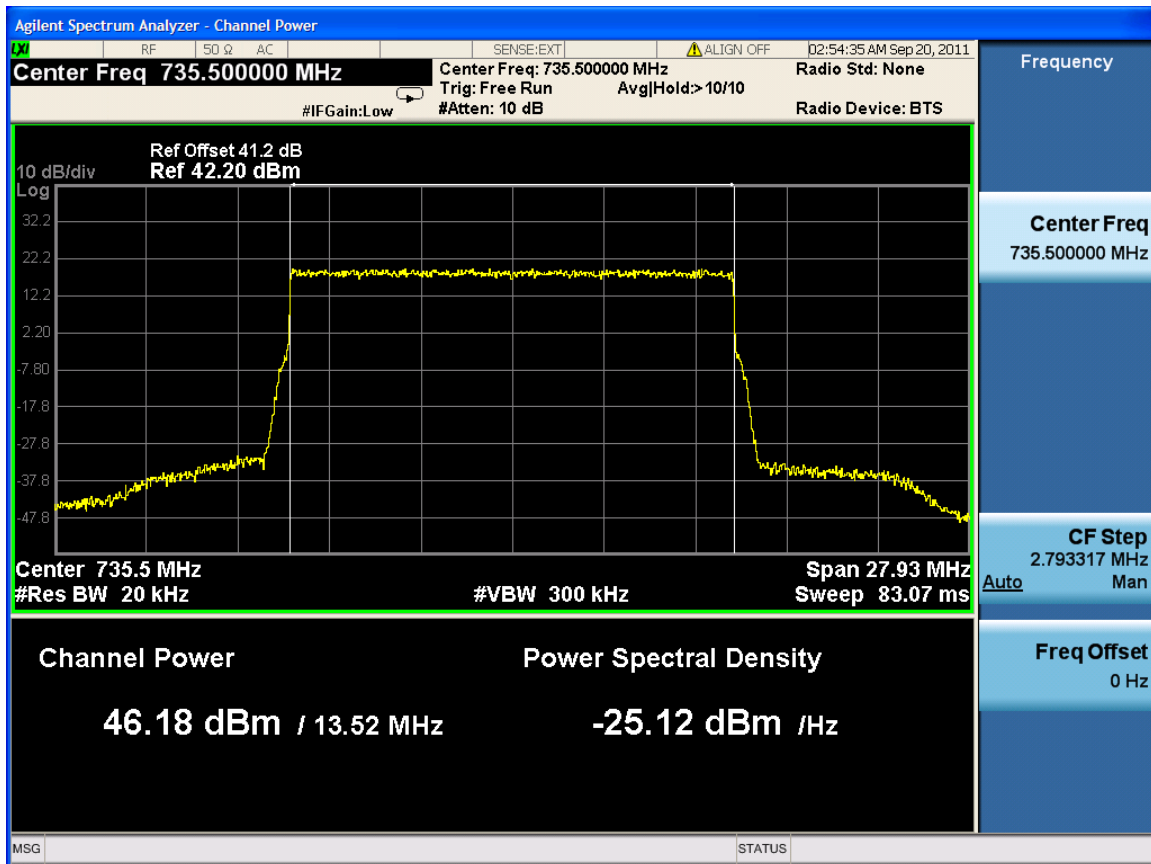
15M-Port 1 -737MHz



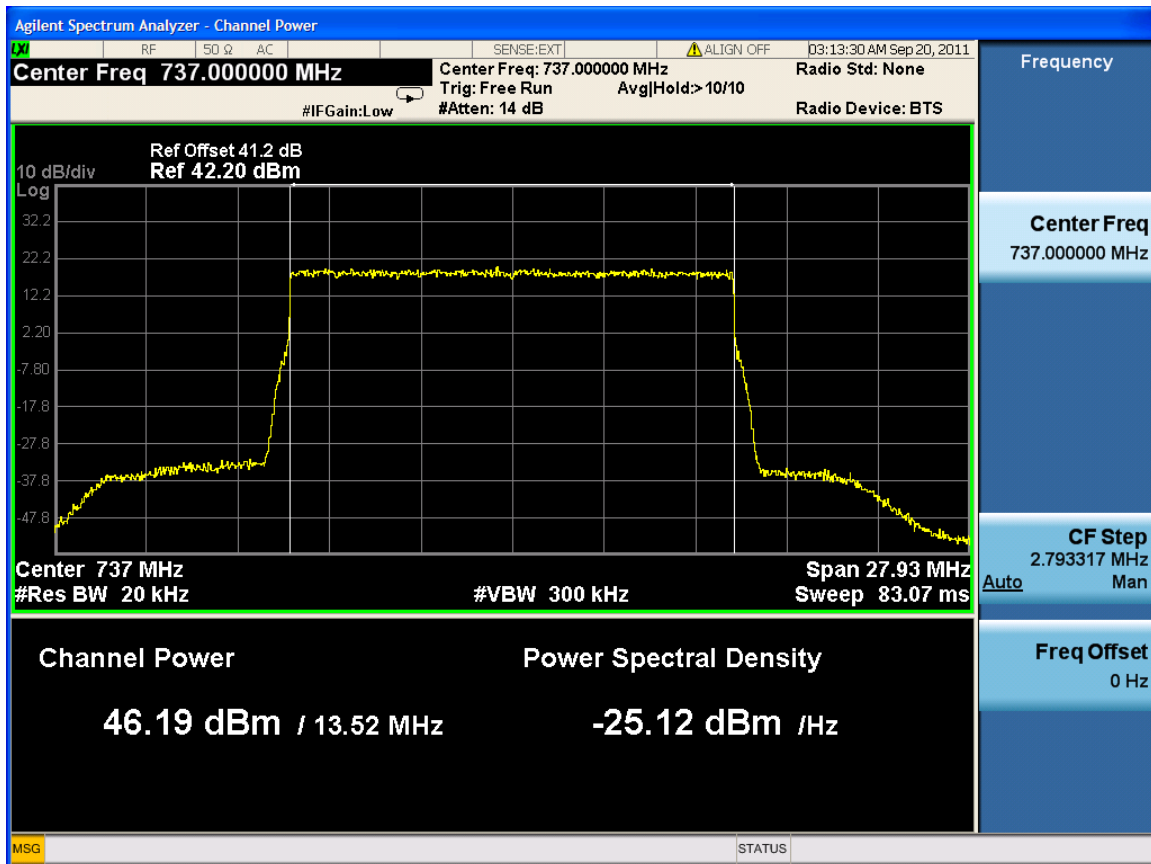
15M-Port 1 -738.5MHz



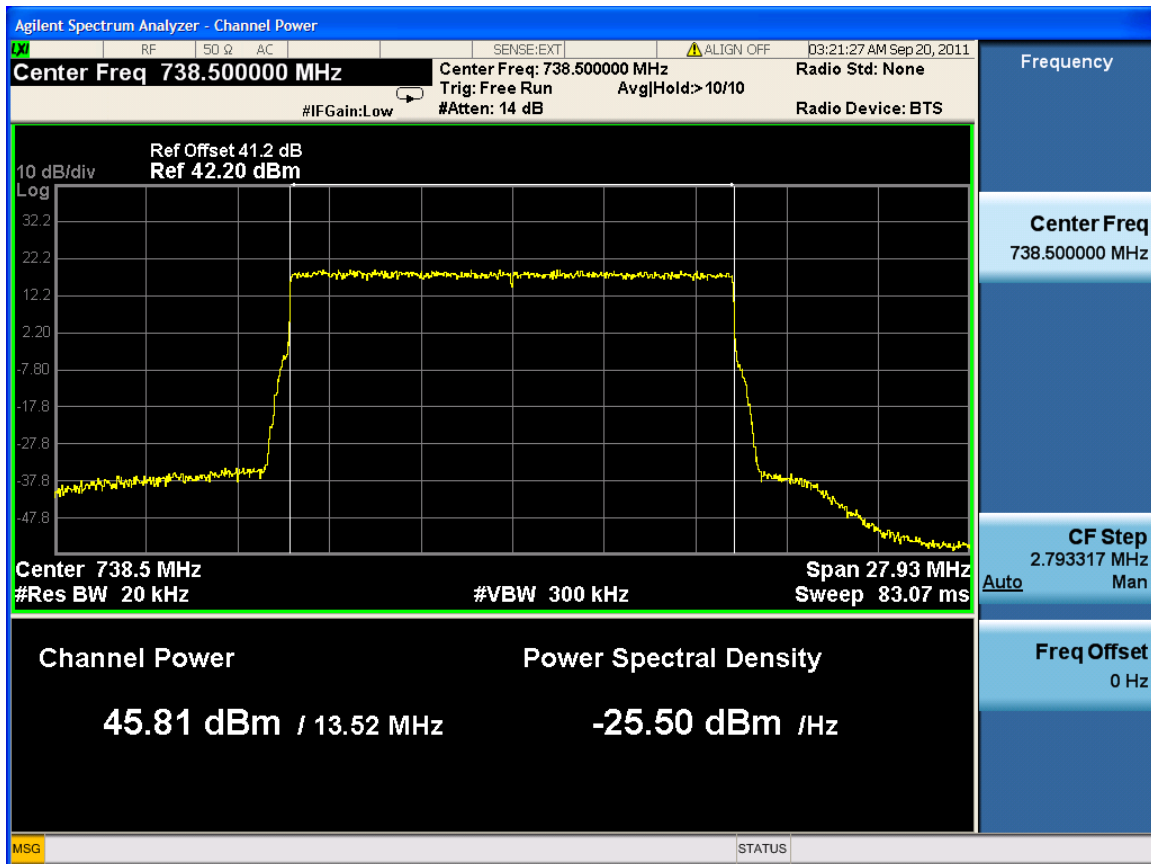
15M-Port 2-735.5MHz



15M-Port 2 -737MHz



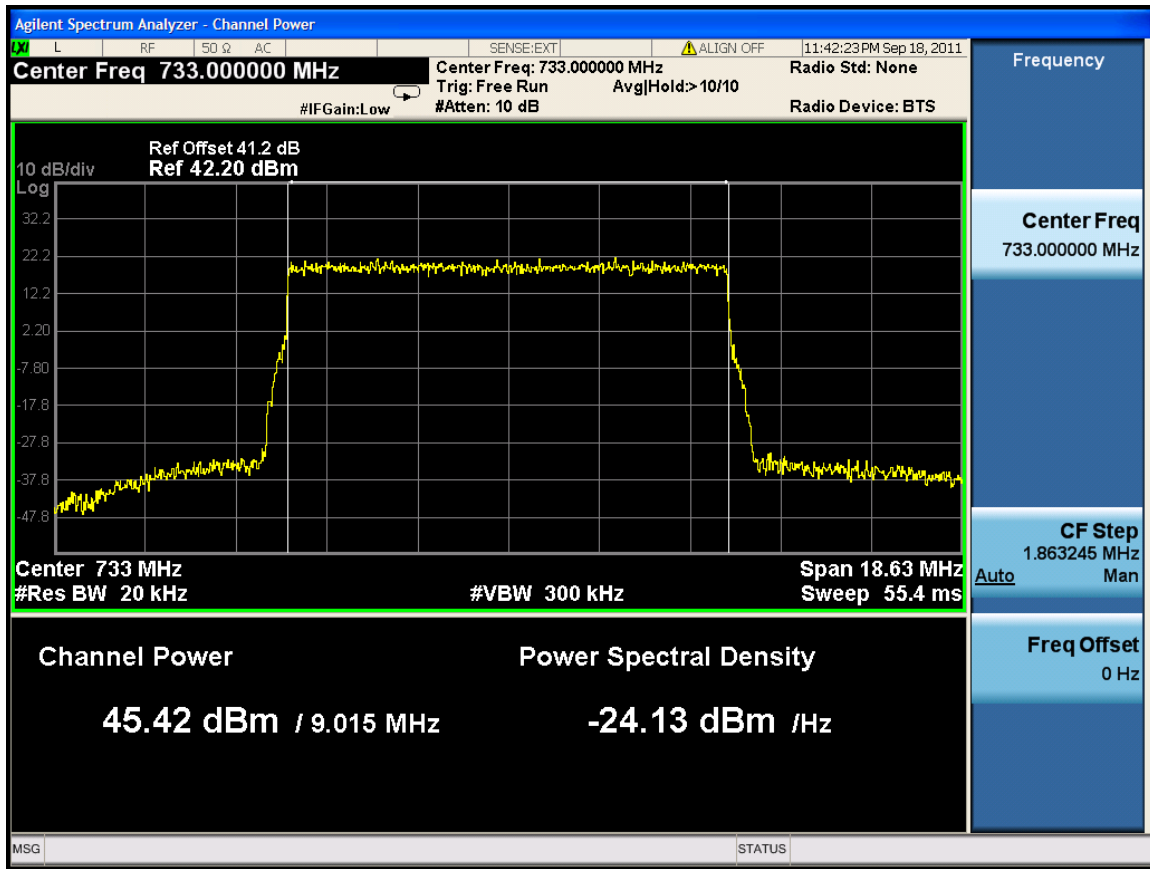
15M-Port 2 -738.5MHz



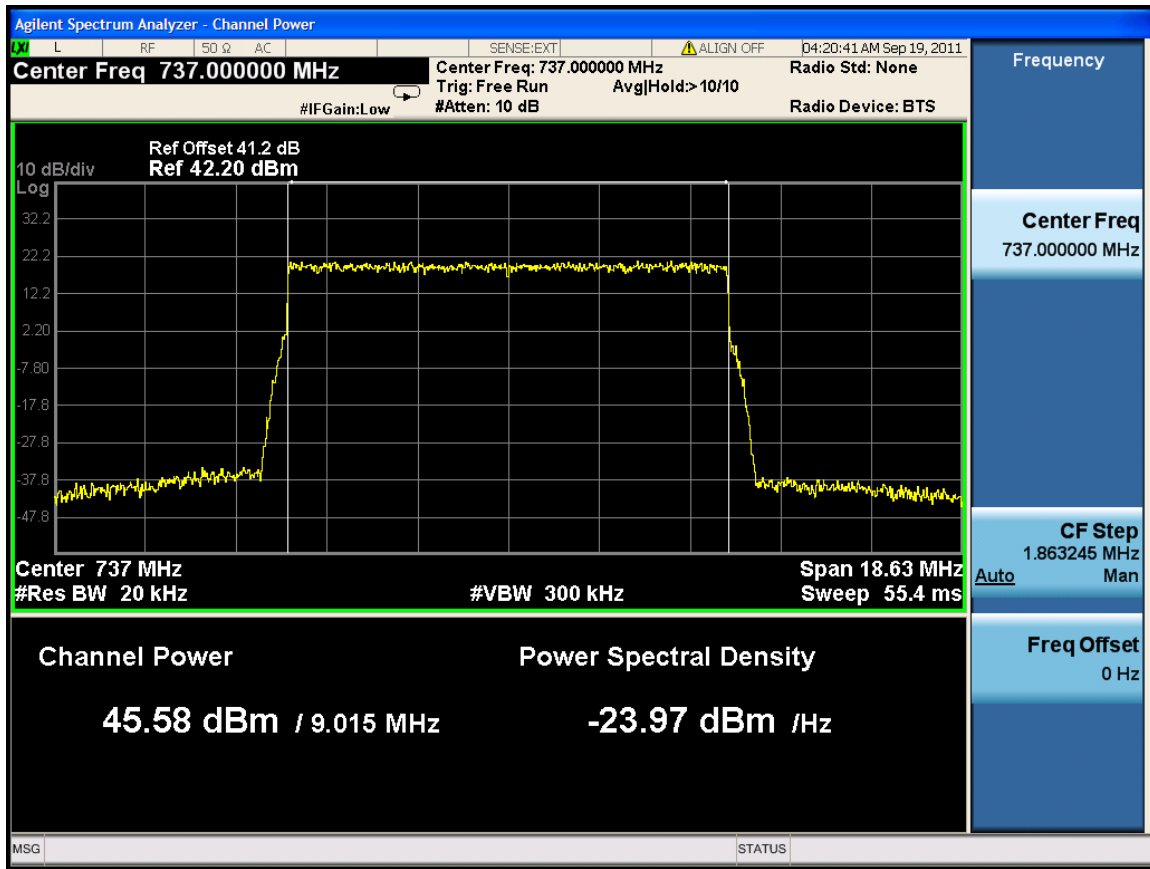
Channel Bandwidth :10M

Port	Center Freq. (MHz)	Max output Power in dBm	Antenn a gain dBi	Cable Loss dB	Dipole Antenn a	Equivalent radiated power dBm Of single antenna	Total Power in W Of single antenna	Total Power in W Of Two antenna
1	733	45.42	15	3	2.15	55.27	336.51	673.02
	737	45.58	15	3	2.15	55.43	349.14	698.24
	741	45.66	15	3	2.15	55.51	355.63	711.26
2	733	46.03	15	3	2.15	55.88	387.26	774.52
	737	46.11	15	3	2.15	55.96	394.46	788.92
	741	46.15	15	3	2.15	56.00	398.11	796.22

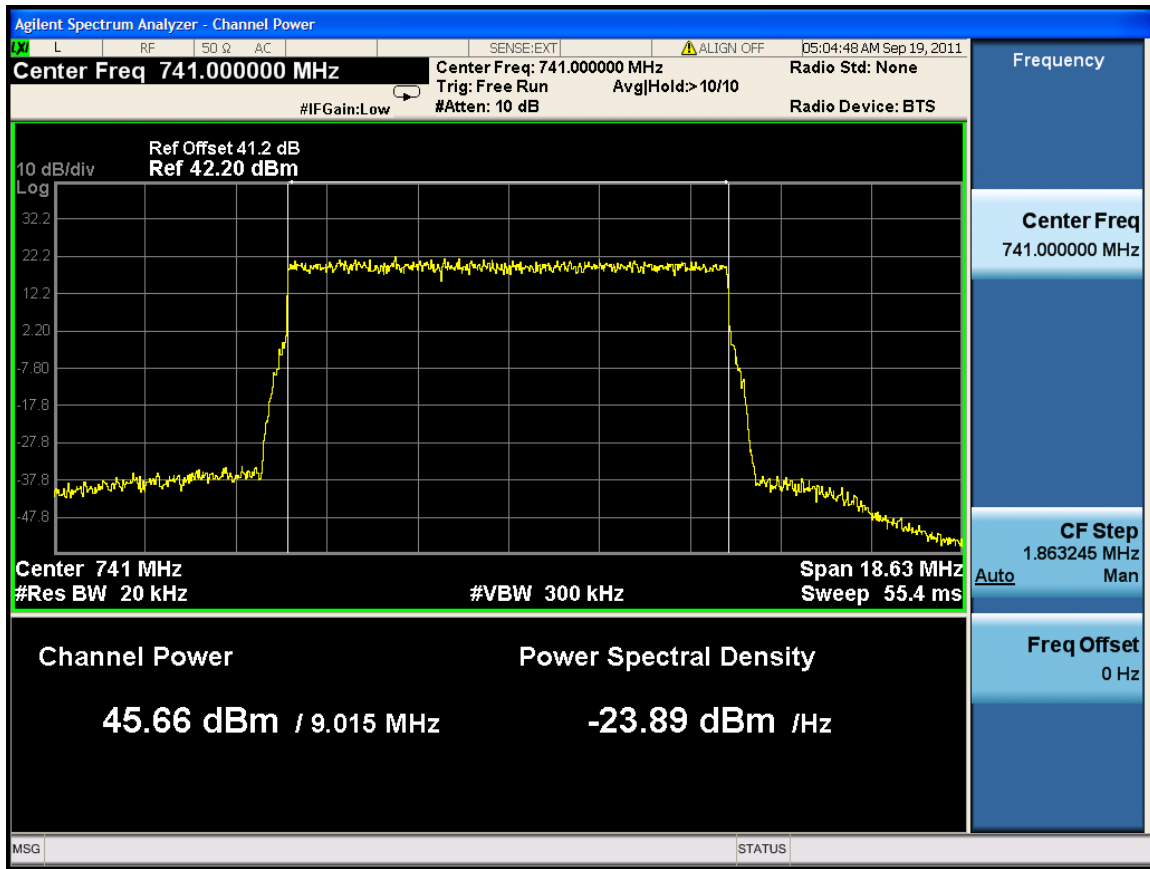
10M-Port 1 -733MHz



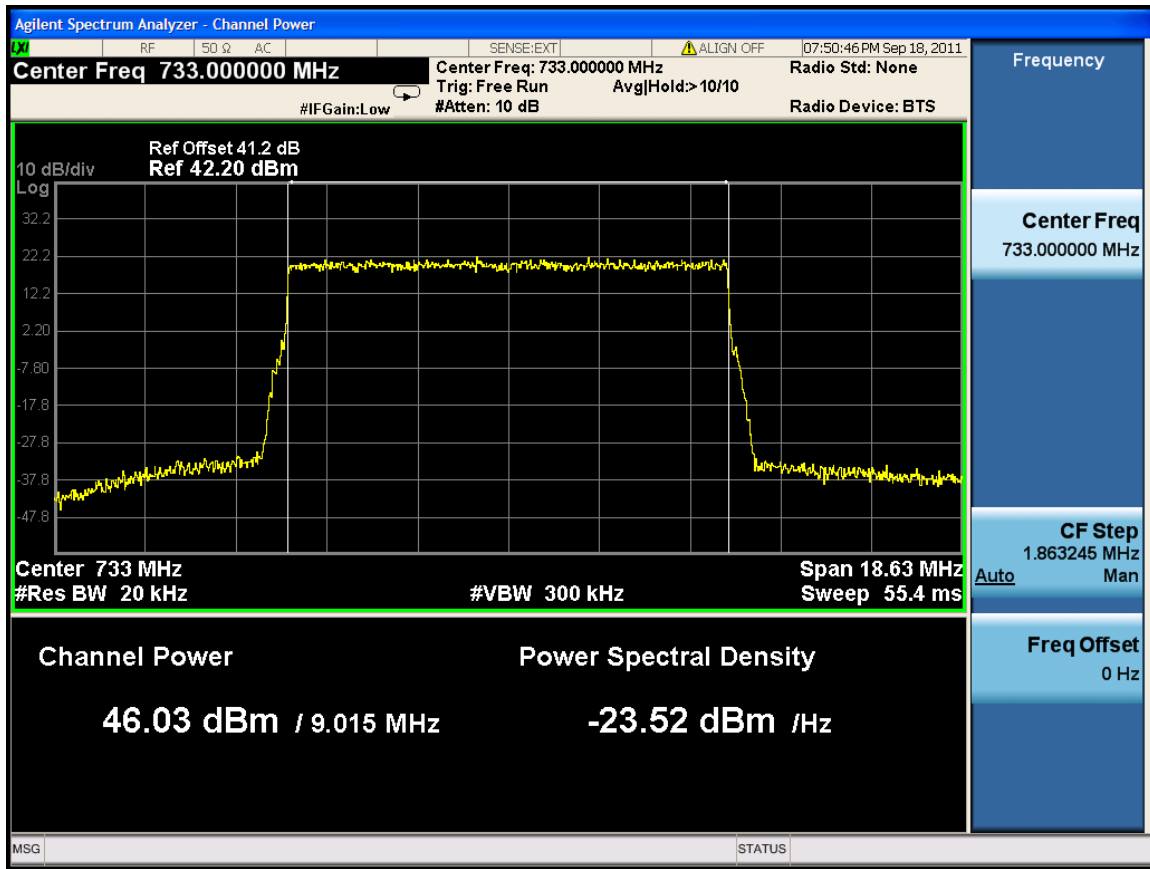
10M-Port 2 -737MHz



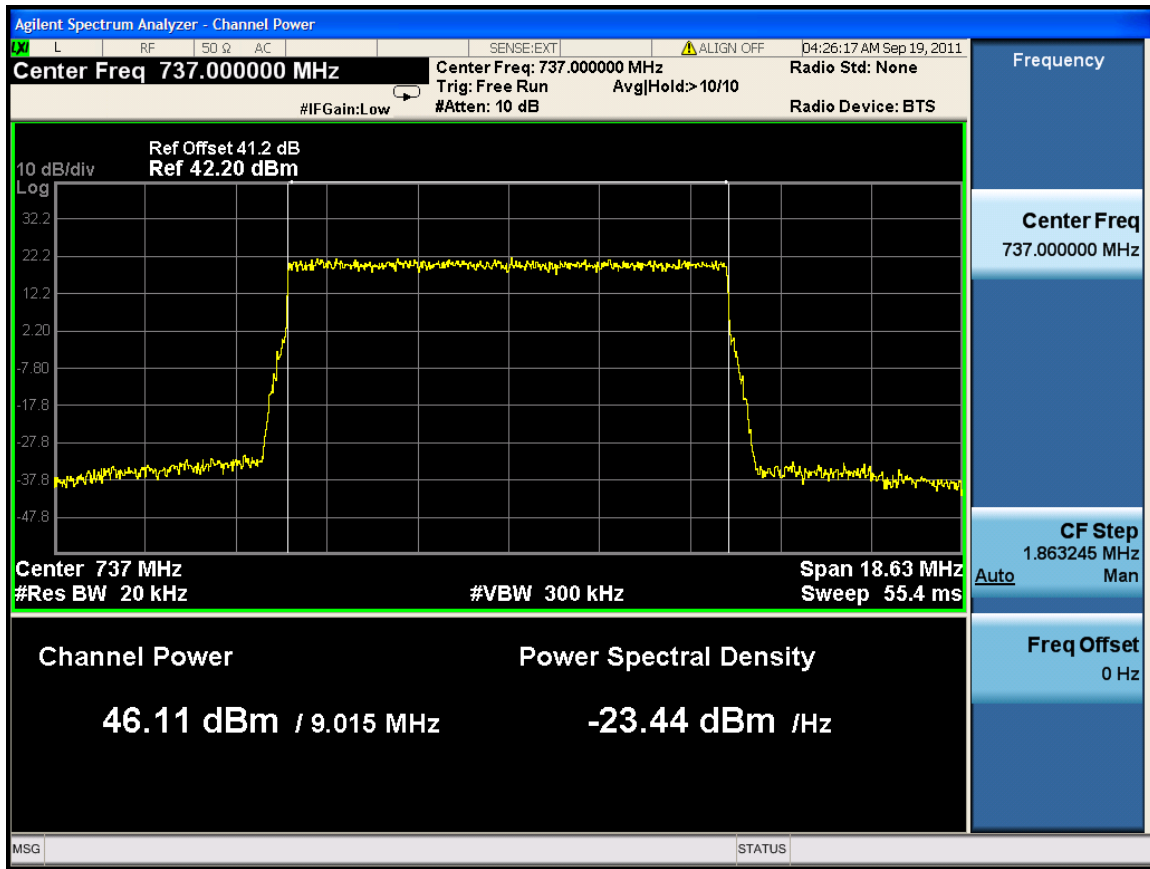
10M-Port 2 -741MHz



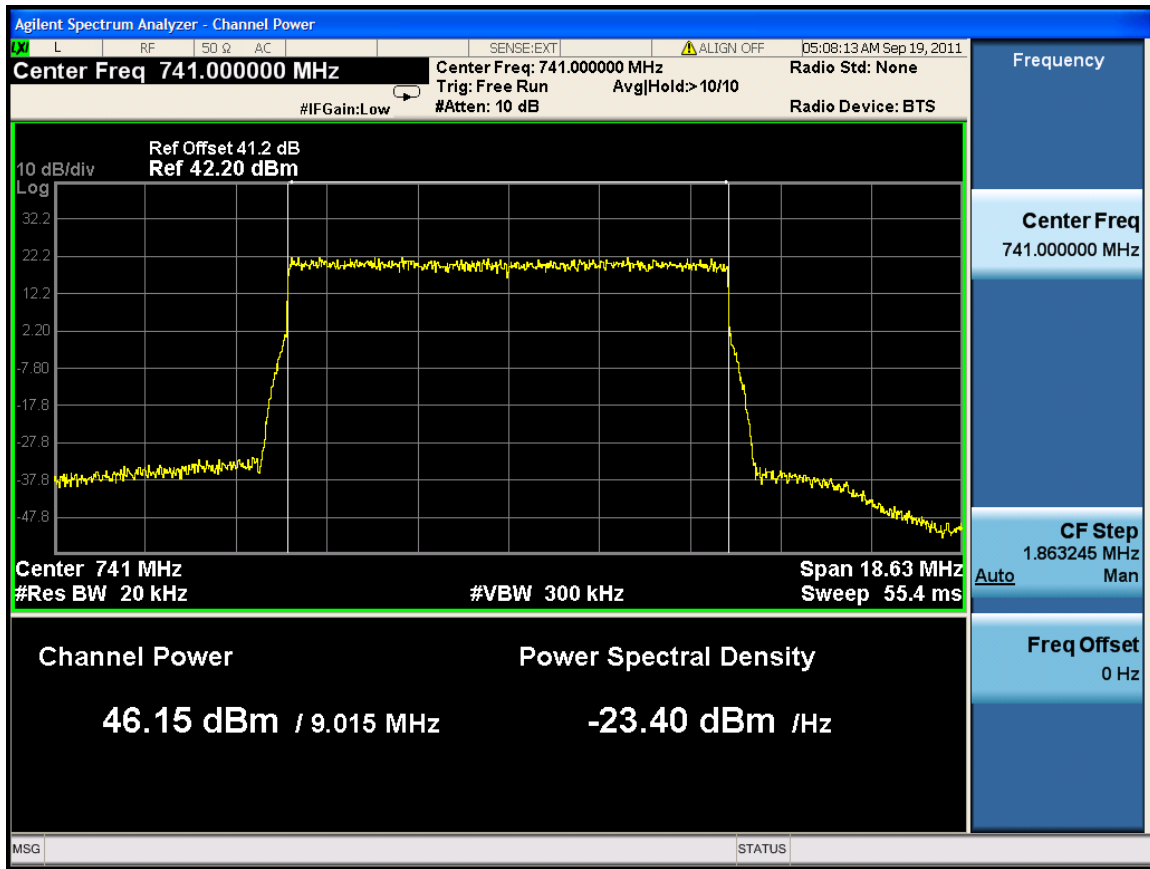
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10M-Port 2 -737MHz



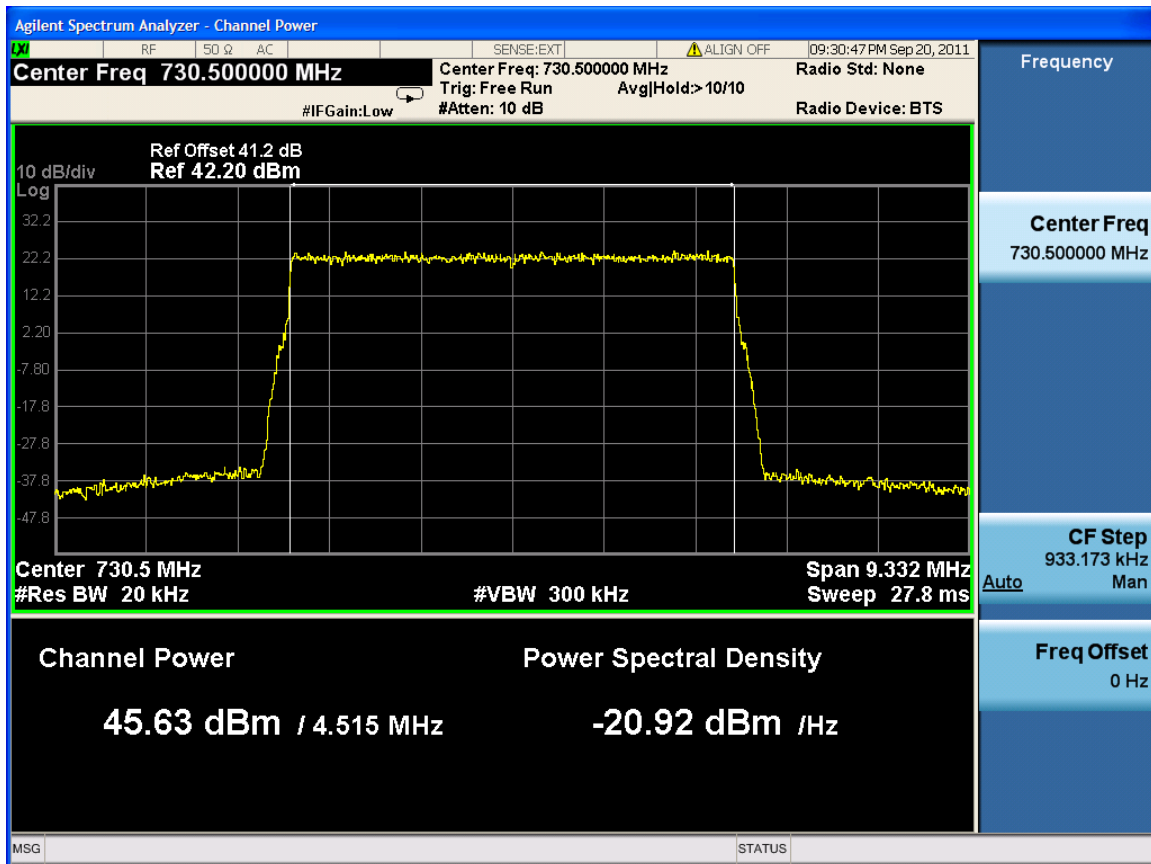
10M-Port 2 -741MHz



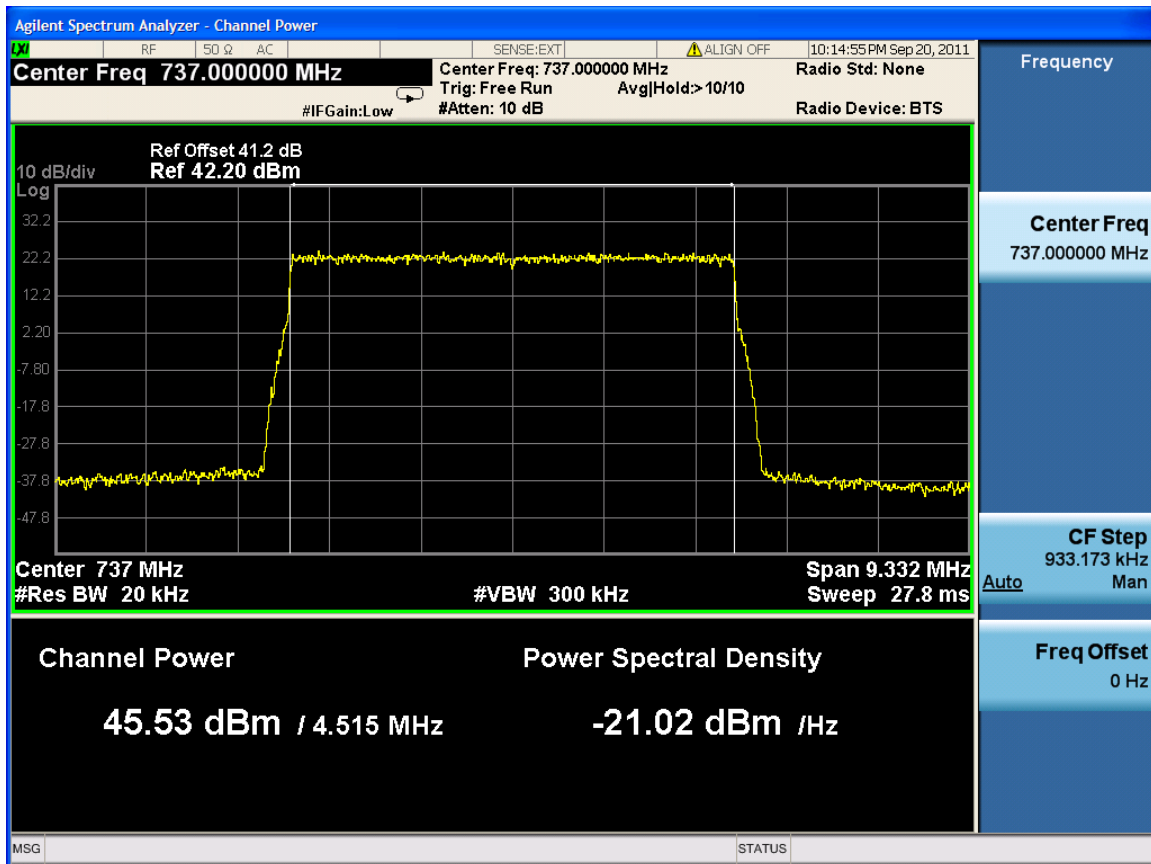
Channel Bandwidth :5M

Port	Center Freq. (MHz)	Max output Power in dBm	Antenn a gain dBi	Cable Loss dB	Dipole Antenn a	Equivalent radiated power dBm Of single antenna	Total Power in W Of single antenna	Total Power in W Of Two antenna
1	730.5	45.63	15	3	2.15	55.48	353.18	706.36
	737	45.53	15	3	2.15	55.38	345.14	690.28
	743.5	45.48	15	3	2.15	55.43	349.14	698.24
2	730.5	46.07	15	3	2.15	55.92	390.84	781.68
	737	46.00	15	3	2.15	55.85	384.59	769.18
	743.5	45.94	15	3	2.15	55.79	379.32	758.64

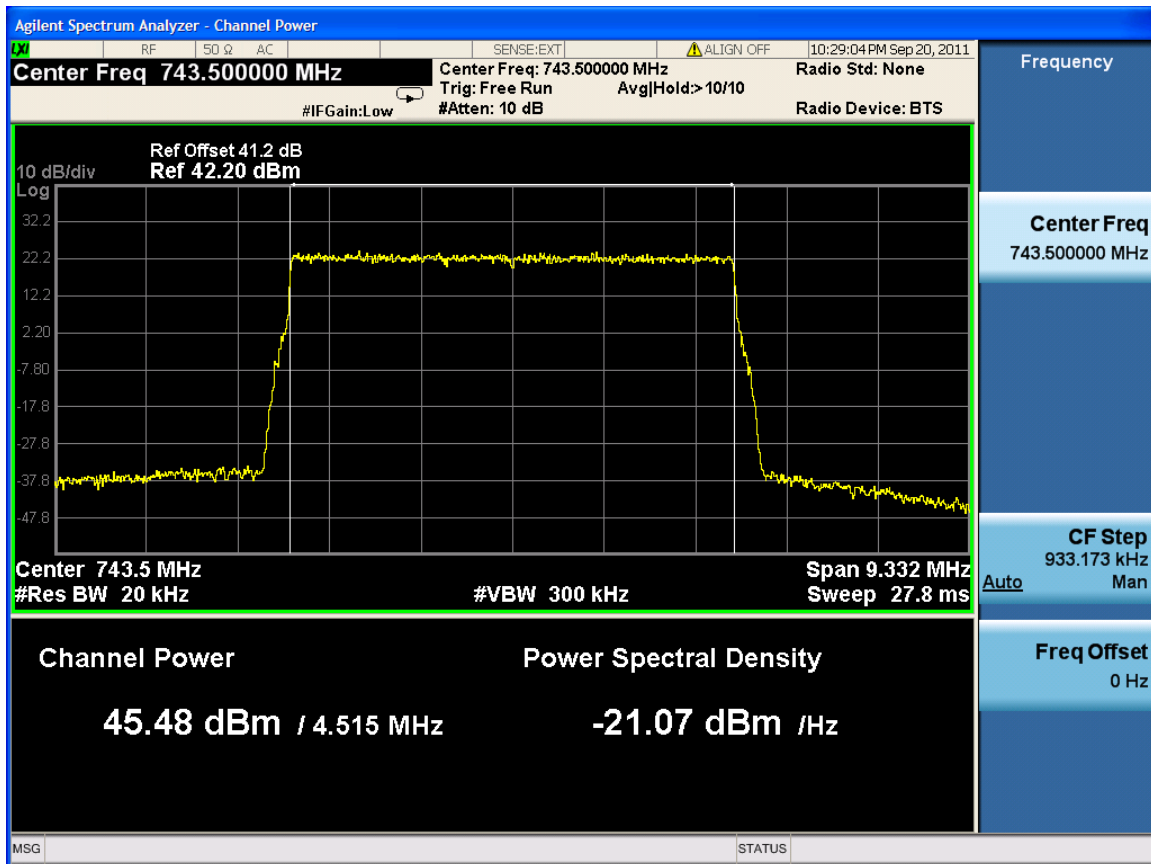
5M-Port 1 -730.5MHz



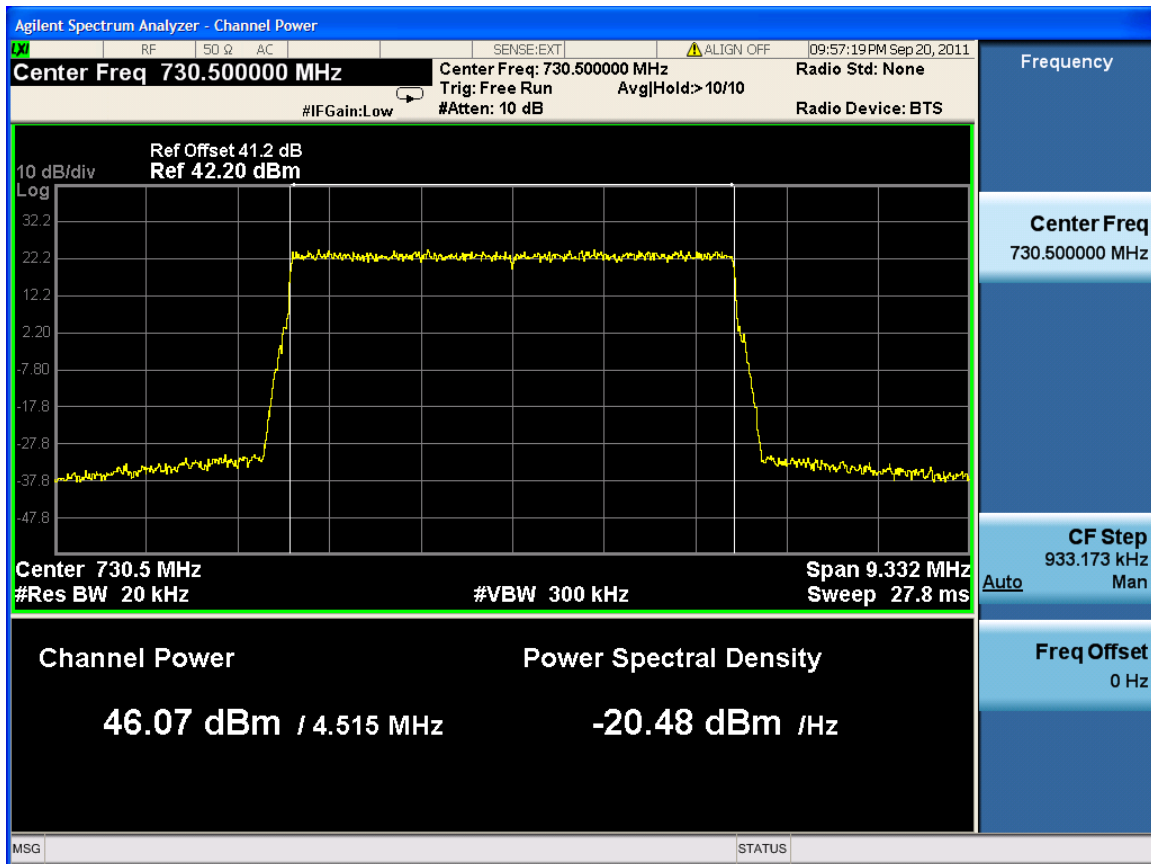
5M-Port 1 -737MHz



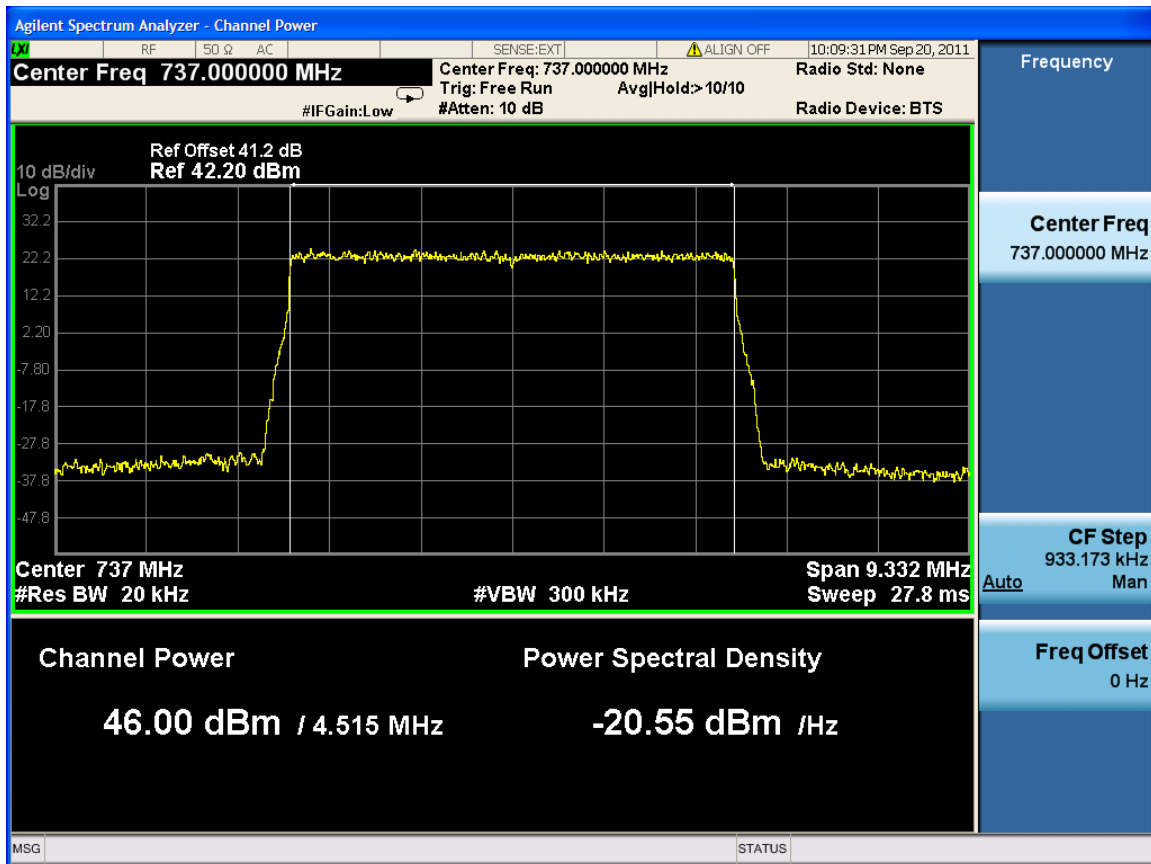
5M-Port 1 -743.5MHz



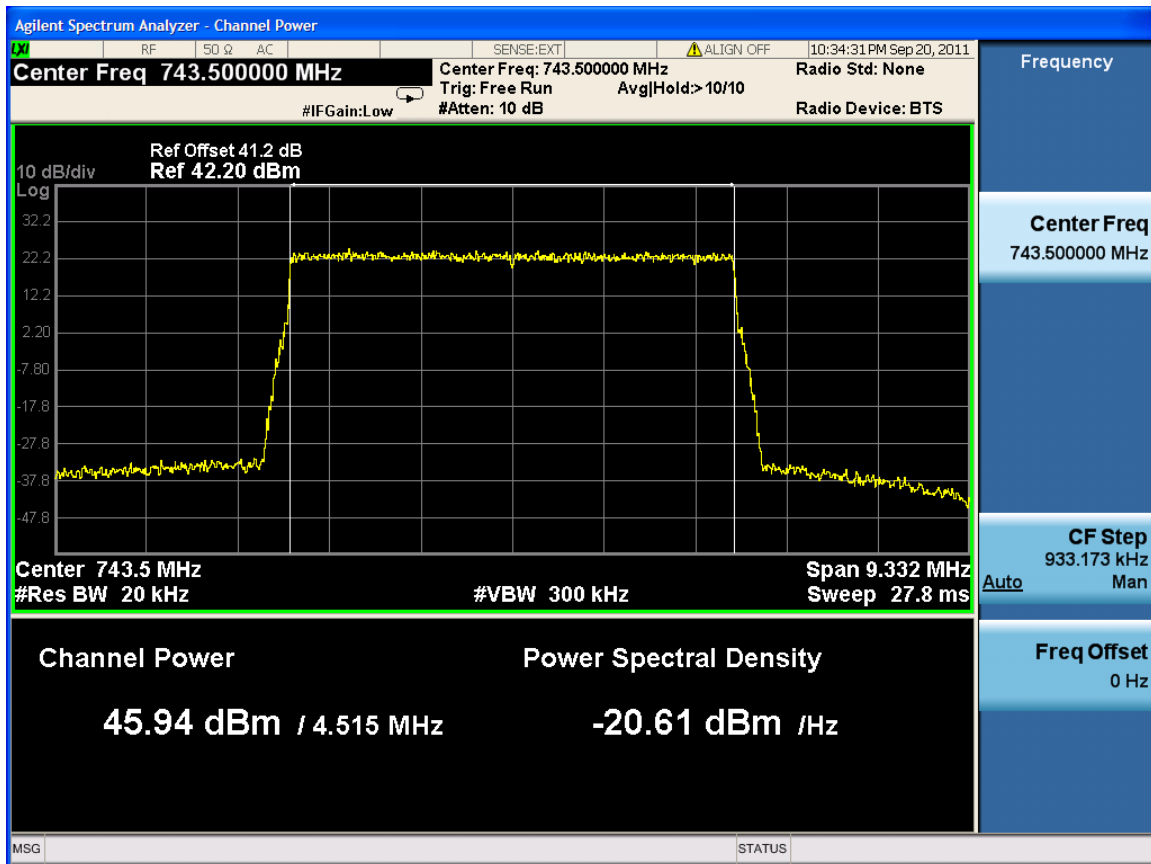
5M-Port 2 -730.5MHz



5M-Port 2 -737MHz



5M-Port 2 -743.5MHz



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

$$S = PG / 4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 46.2 (dBm) Maximum peak output power at antenna input terminals: 41.687 (W), the cable loss is 3dB

Prediction distance: 400 (cm)

Predication frequency: 728 (MHz)

Antenna Gain (typical): 15 (dBi)

Power density at predication frequency at 400 cm: 0.328(mW/cm²)

MPE limit for uncontrolled exposure at prediction frequency: 0.485 (mW/cm²)

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	N9030A	MY49431143	2015.09.26	2016.09.14

	Analyzer				
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2015.07.19	2016.07.19
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

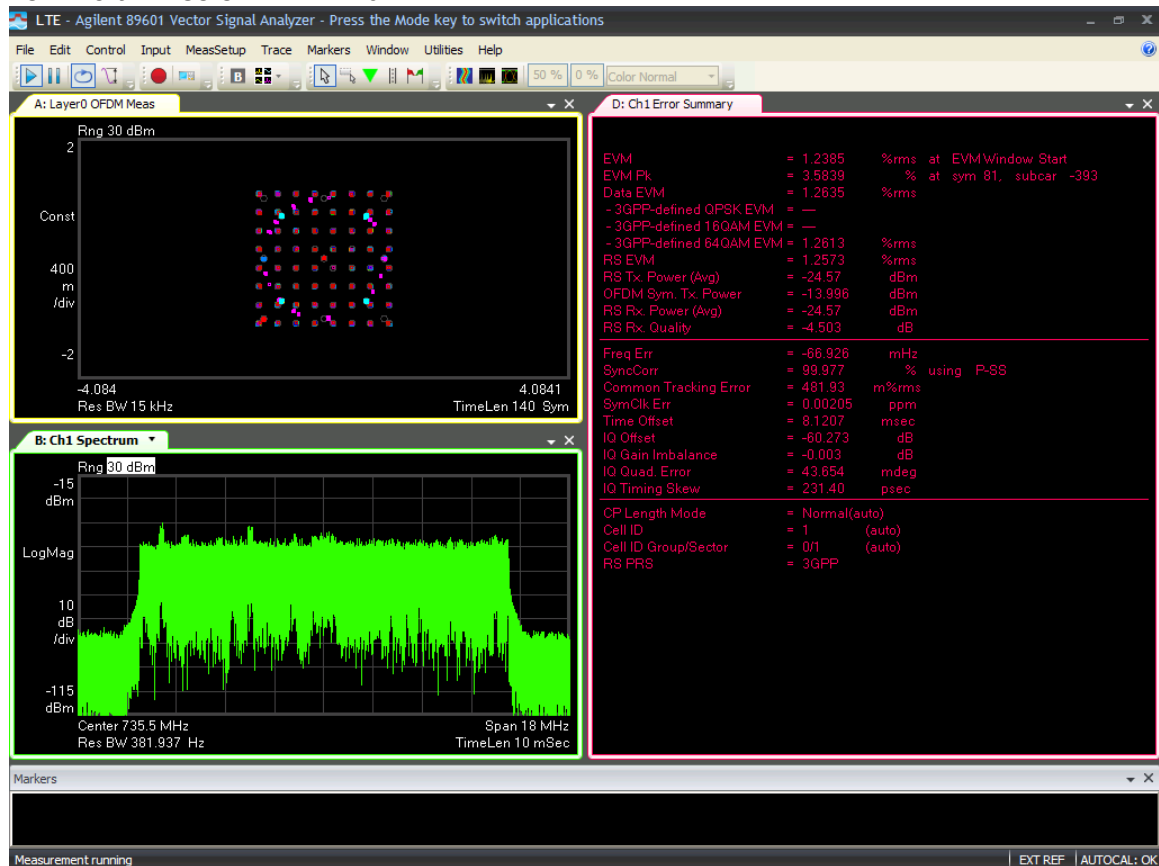
Test Mode: Transmitting LTE

Test Data:

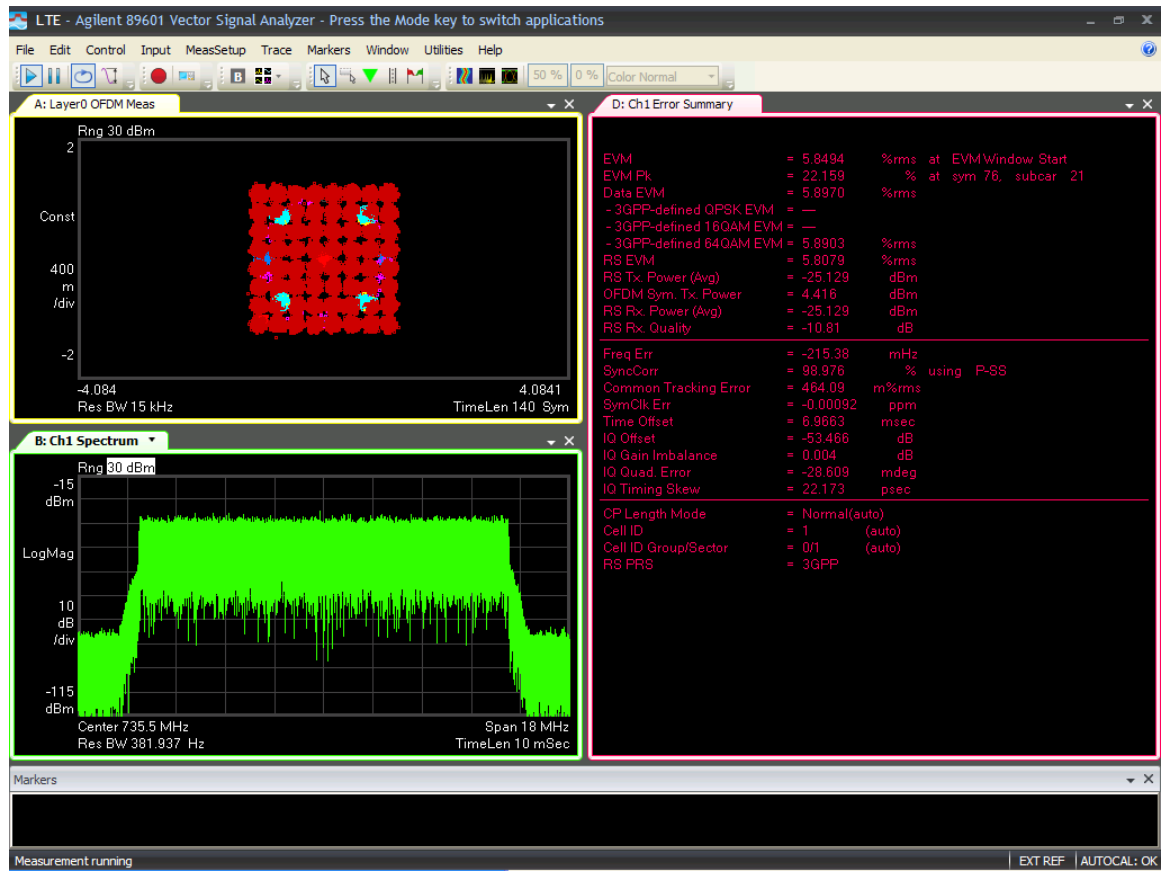
Channel Bandwidth :15M			
Port	Frequency (MHz)	Test mode	EVM
1	735.5	TM2.0	1.26
		TM3.1	5.89
		TM3.2	8.52
		TM3.3	12.00
	737	TM2.0	1.31
		TM3.1	5.90
		TM3.2	8.53
		TM3.3	12.03
	738.5	TM2.0	1.26
		TM3.1	5.92

2	735.5	TM3.2	8.54
		TM3.3	12.04
		TM2.0	1.27
	737	TM3.1	5.94
		TM3.2	8.57
		TM3.3	12.09
	738.5	TM2.0	1.29
		TM3.1	5.95
		TM3.2	8.58
	739.5	TM3.3	12.06
		TM2.0	1.25
		TM3.1	5.93

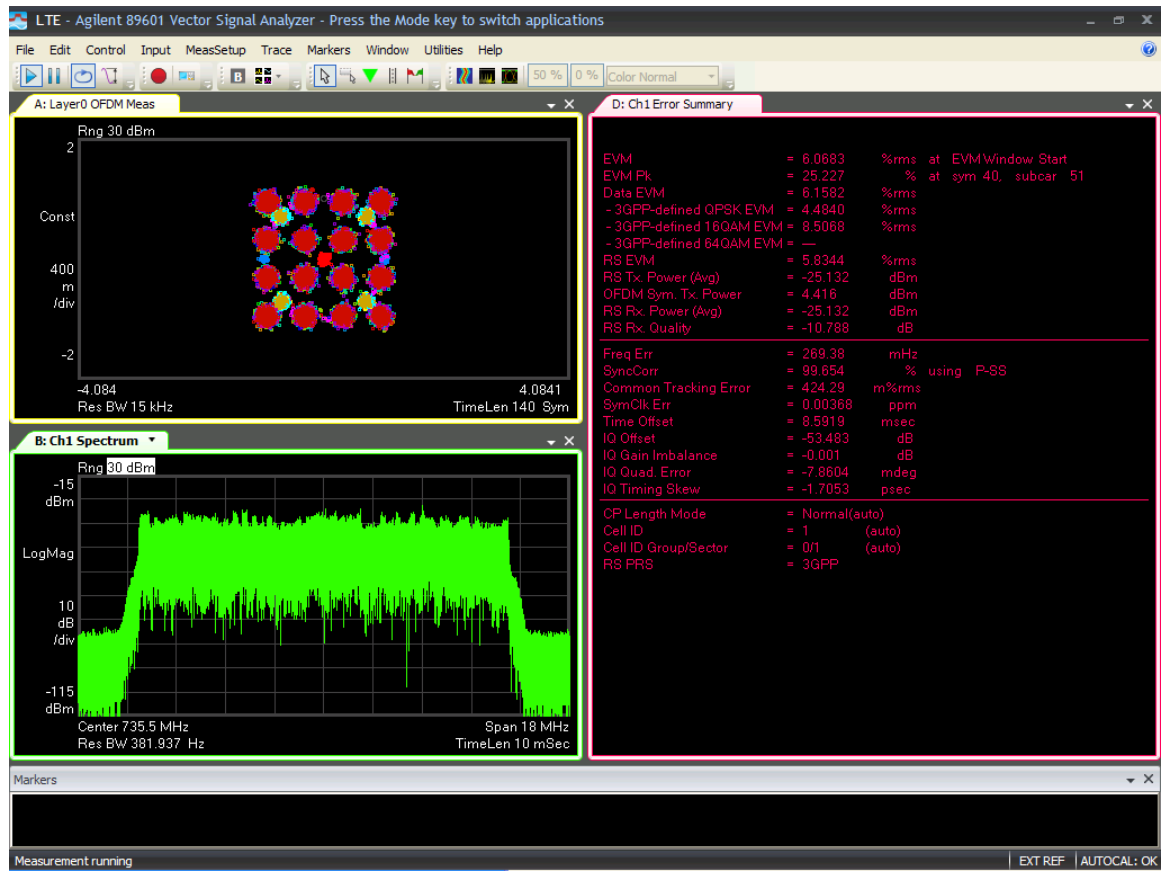
15M-Port 1 -735.5MHz-TM2.0



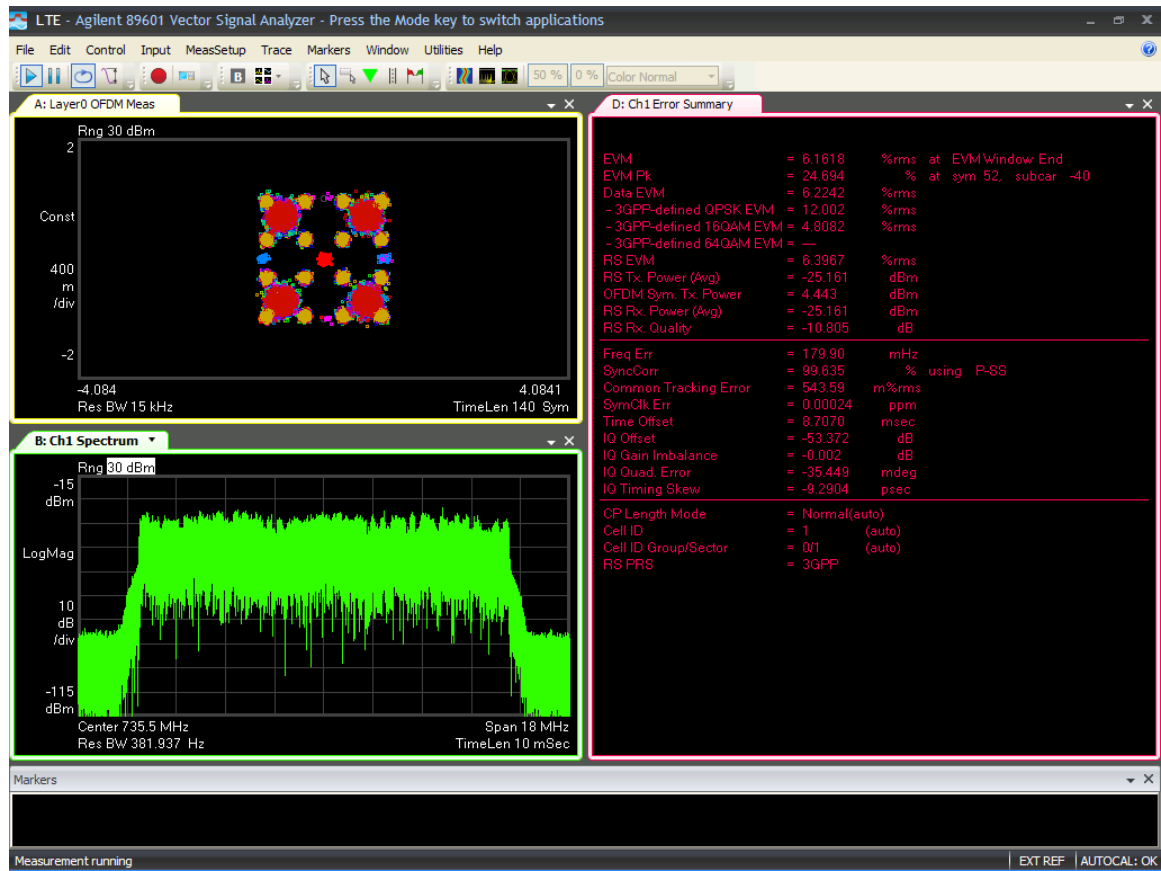
15M-Port 1 -735.5MHz-TM3.1



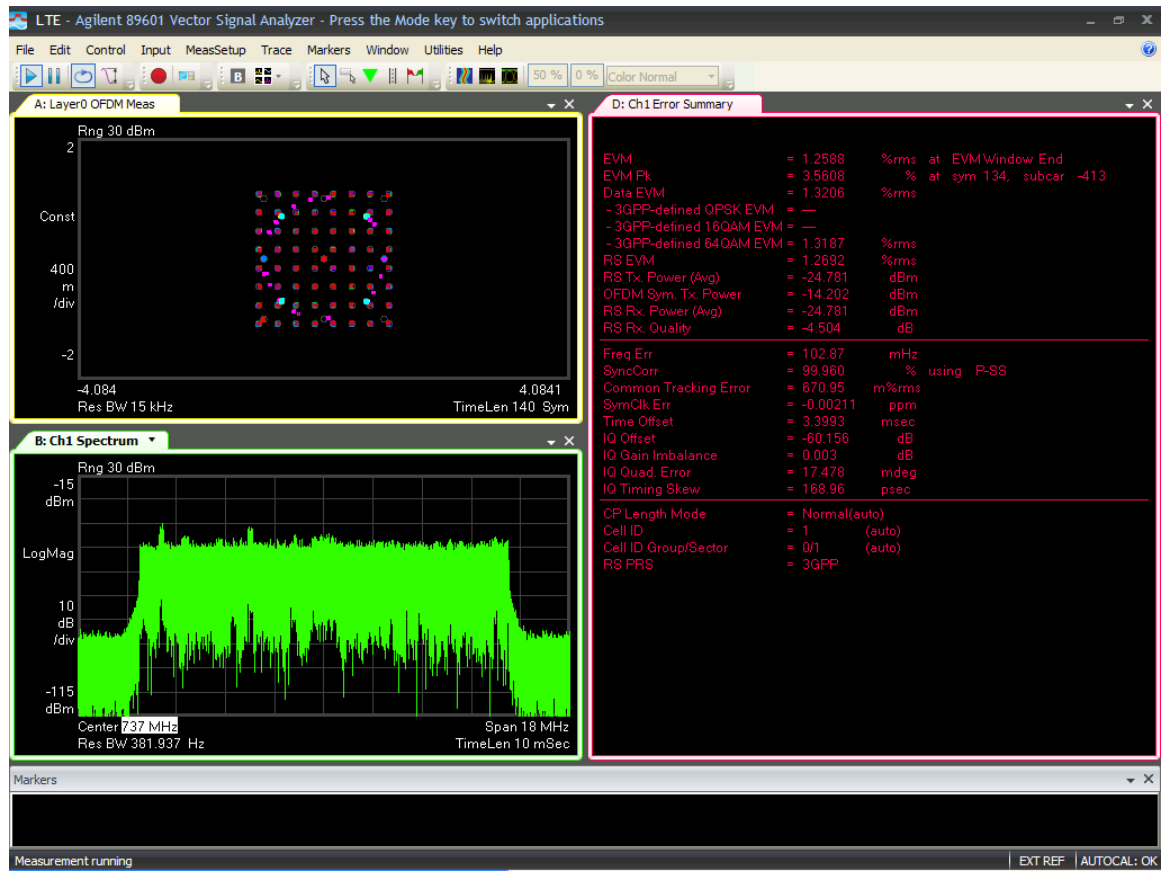
15M-Port 1 -735.5MHz-TM3.2



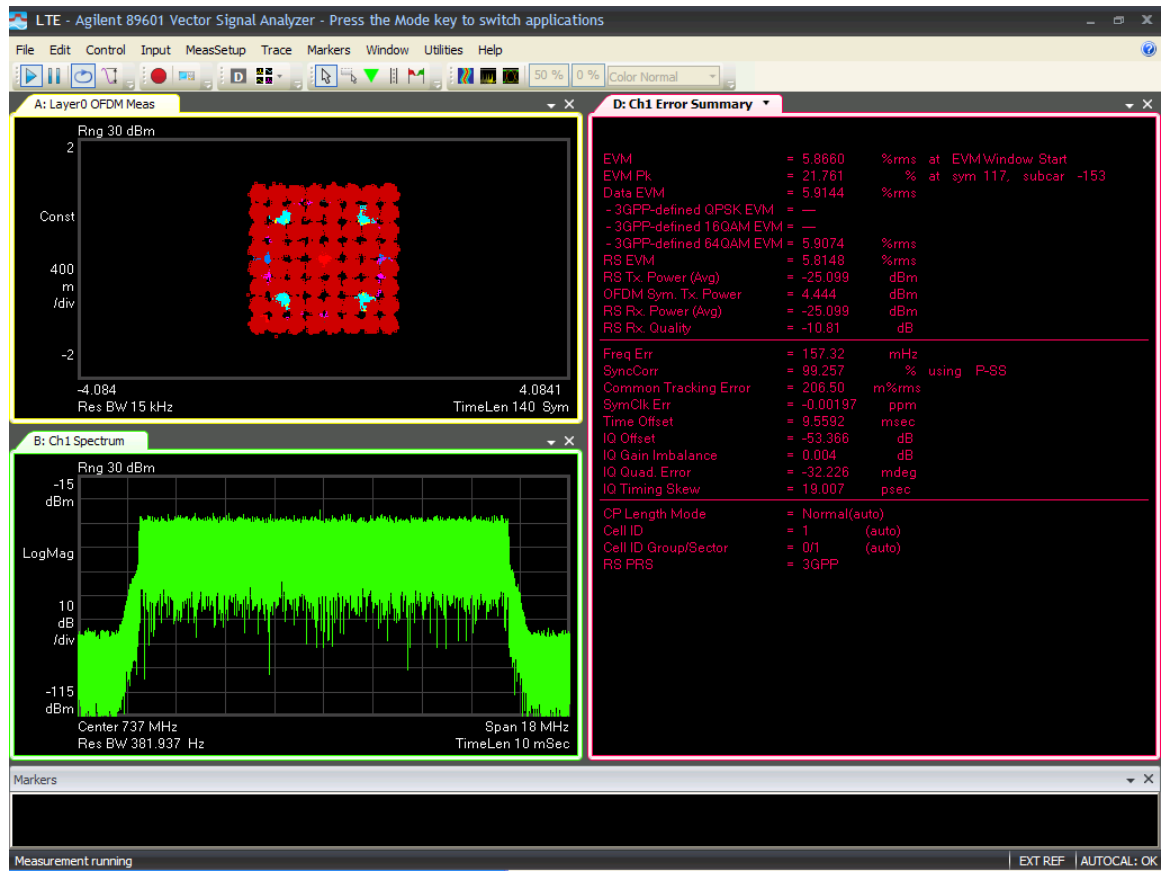
15M-Port 1 -735.5MHz-TM3.3



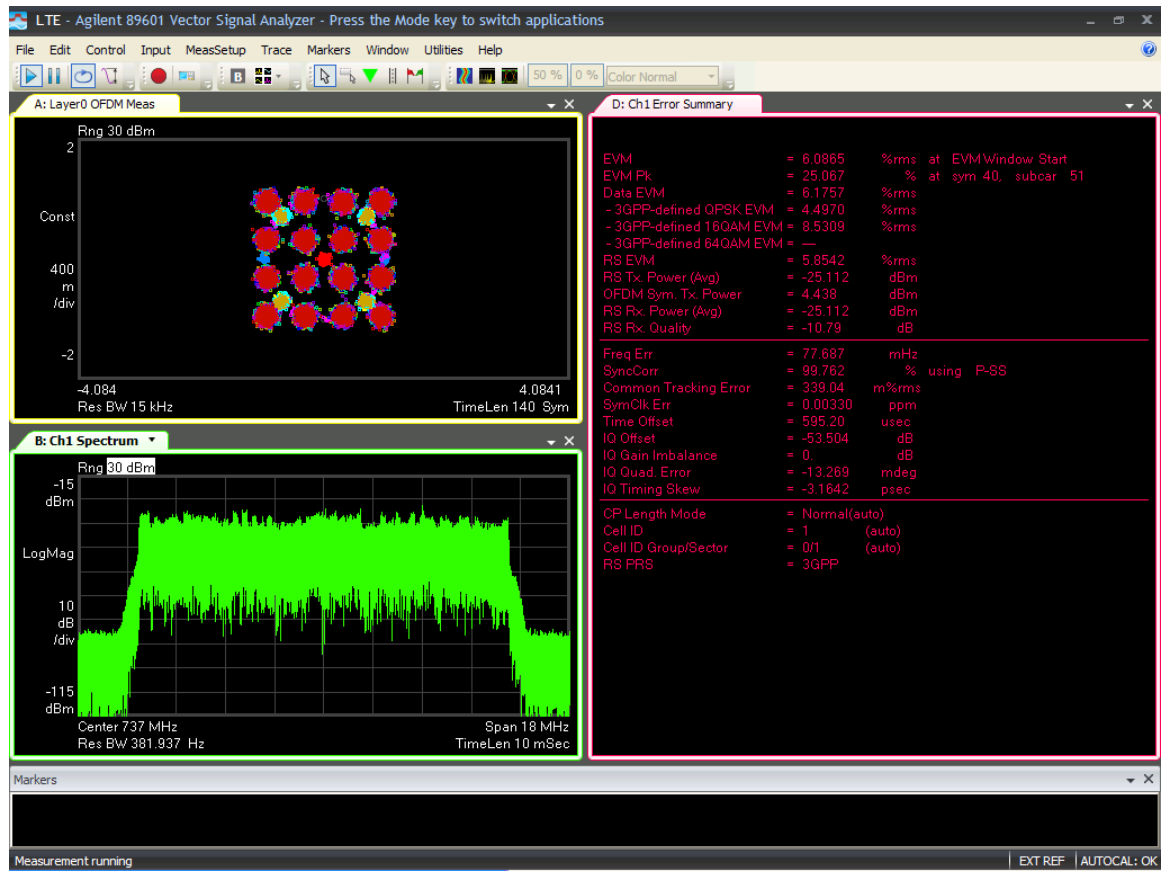
15M-Port 1 -737MHz-TM2.0



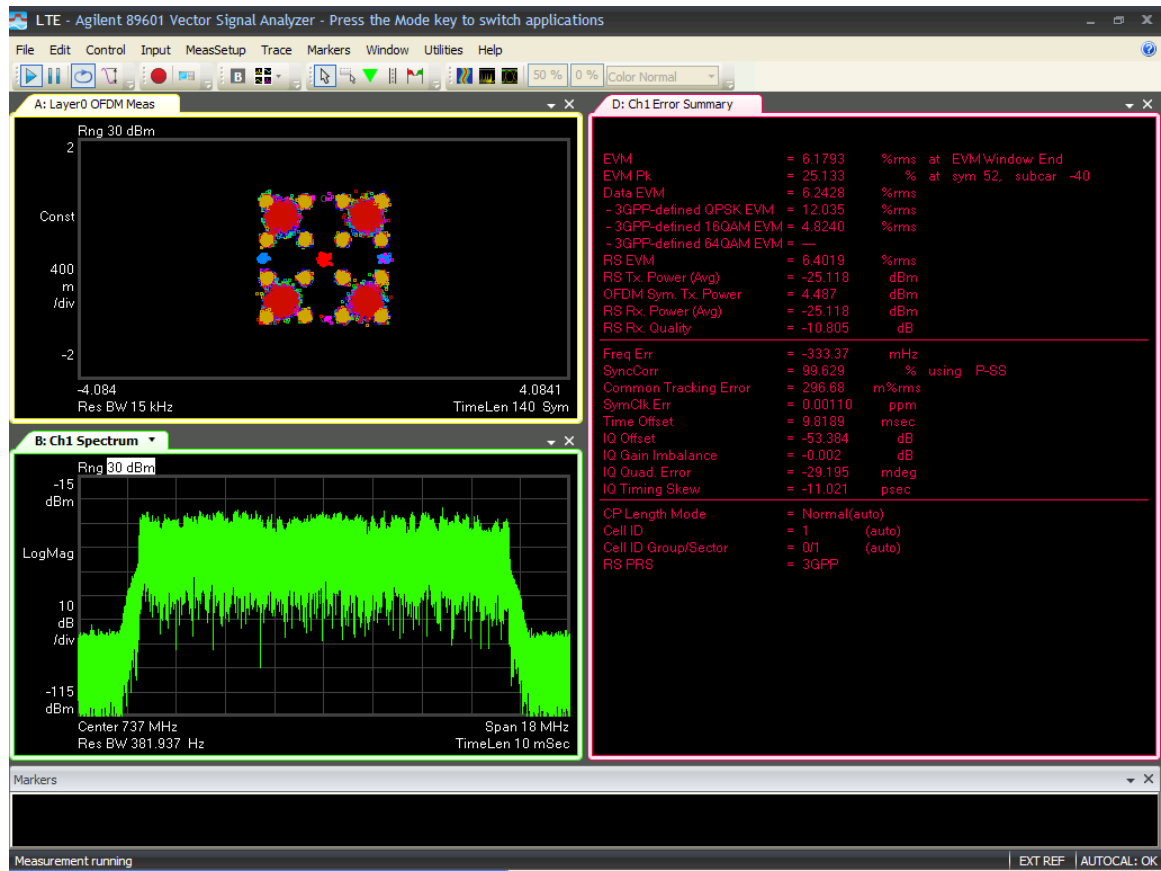
15M-Port 1 -737MHz-TM3.1



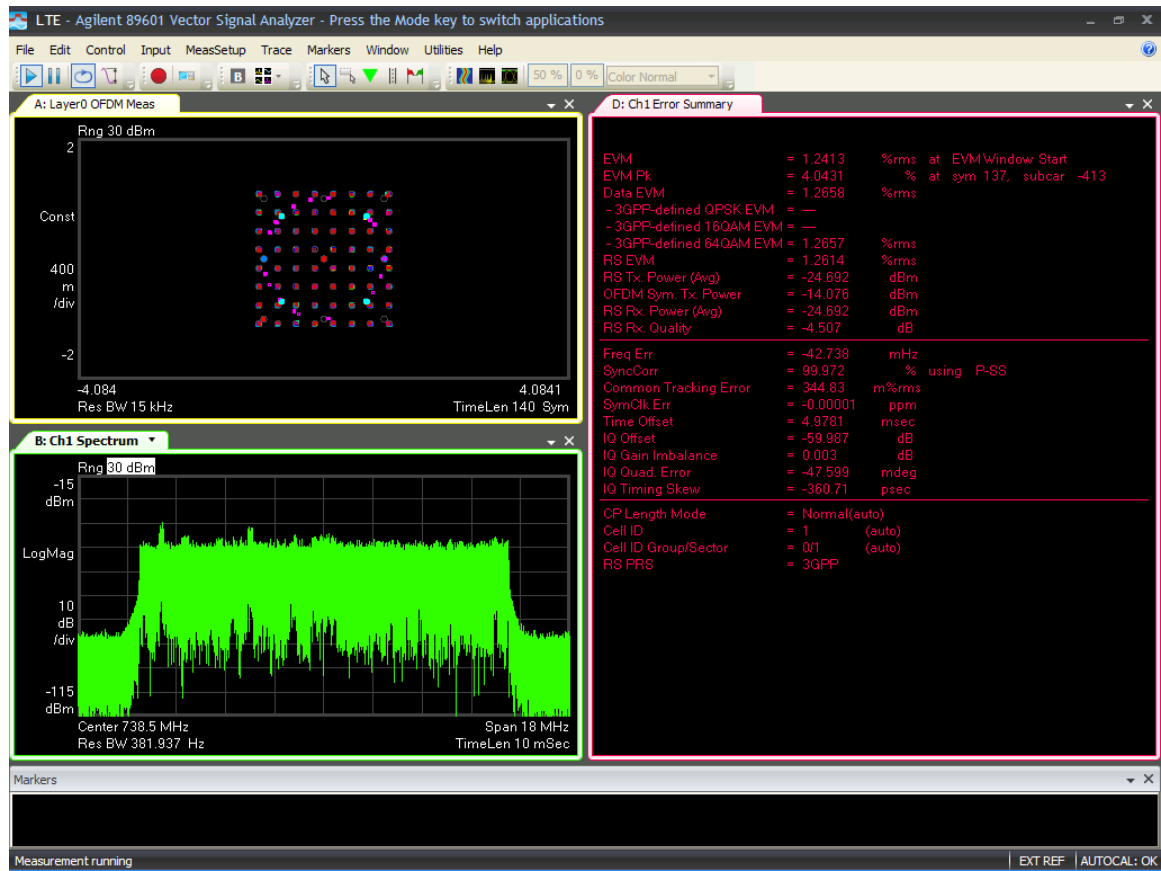
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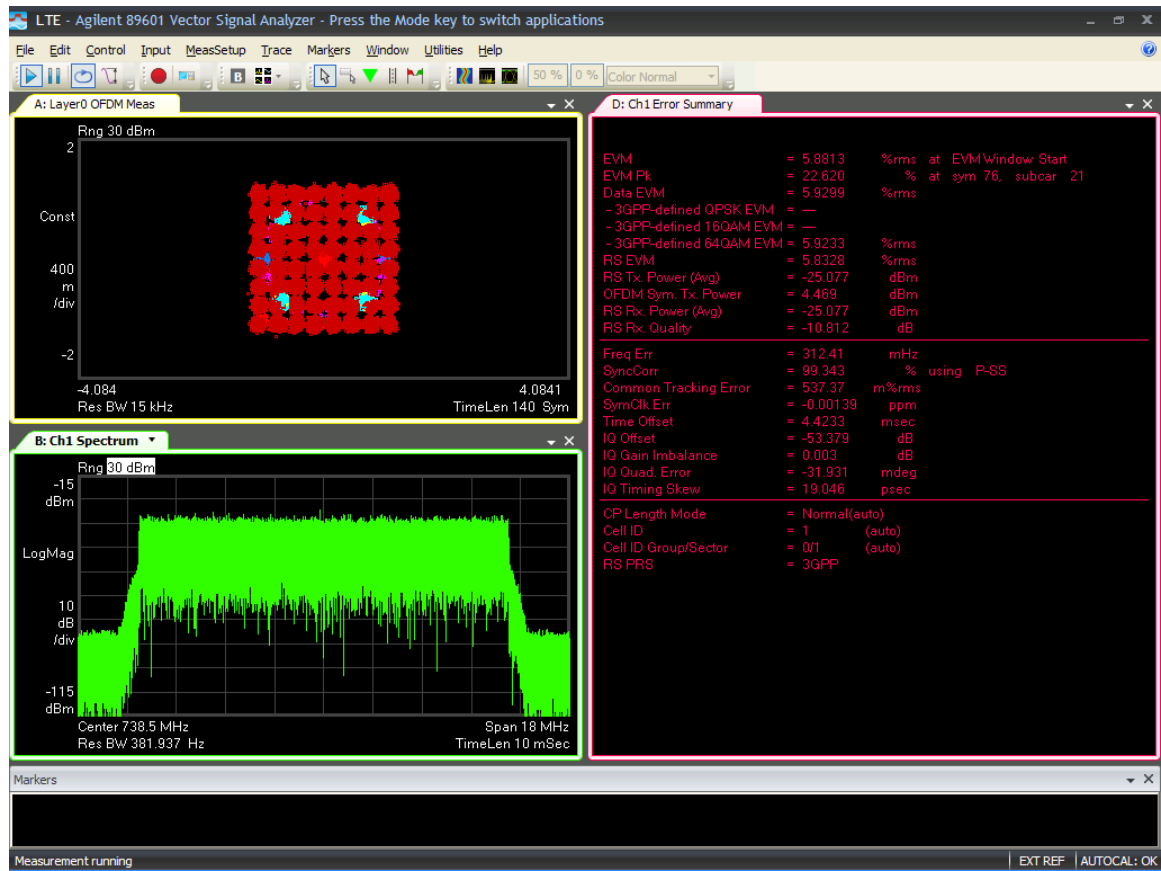
15M-Port 1 -737MHz-TM3.3



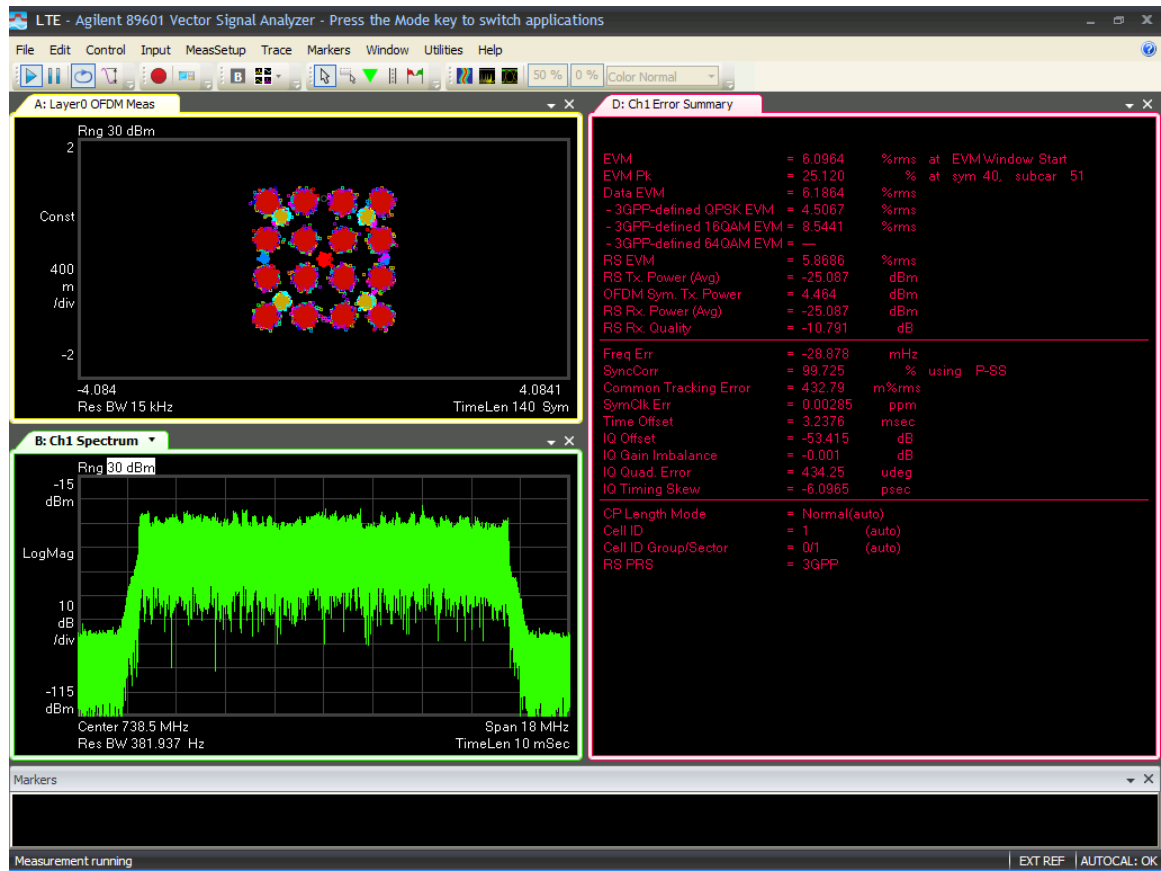
15M-Port 1 -738.5MHz-TM2.0



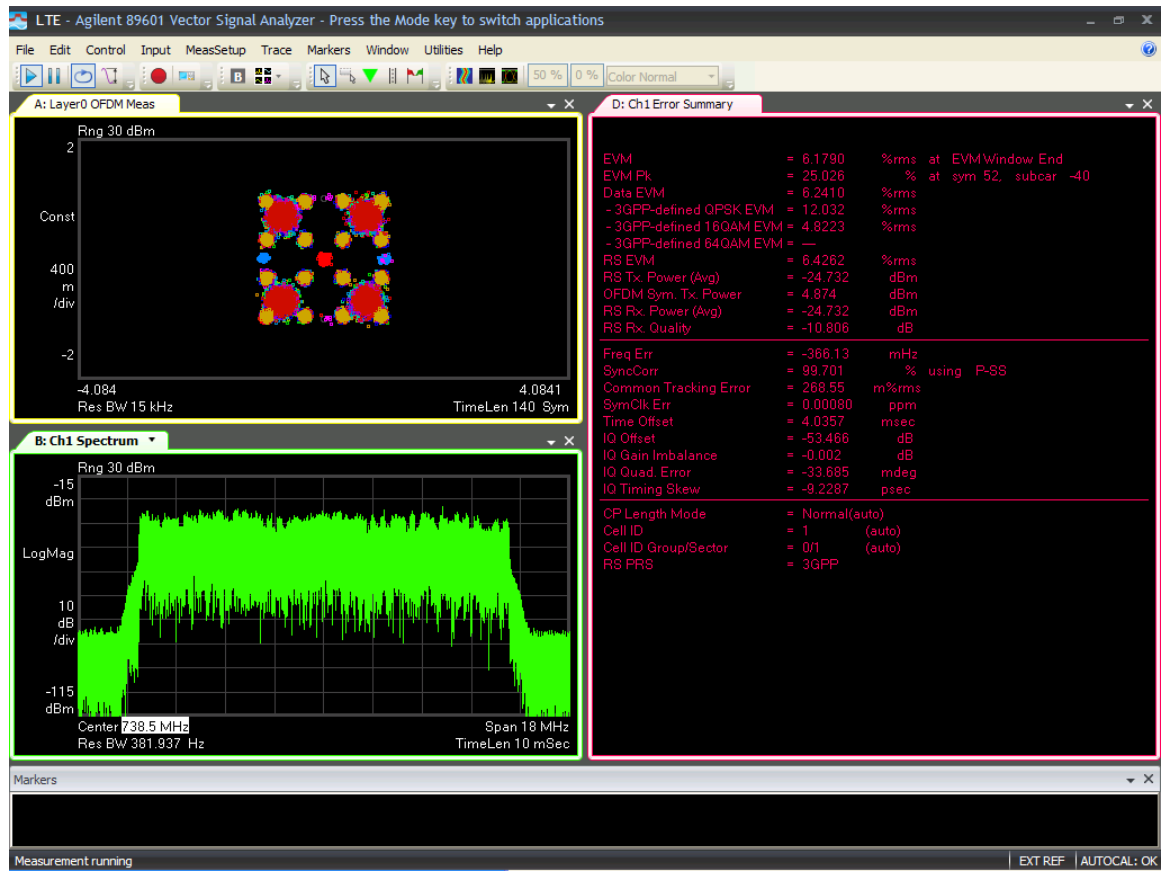
15M-Port 1 -738.5MHz-TM3.1



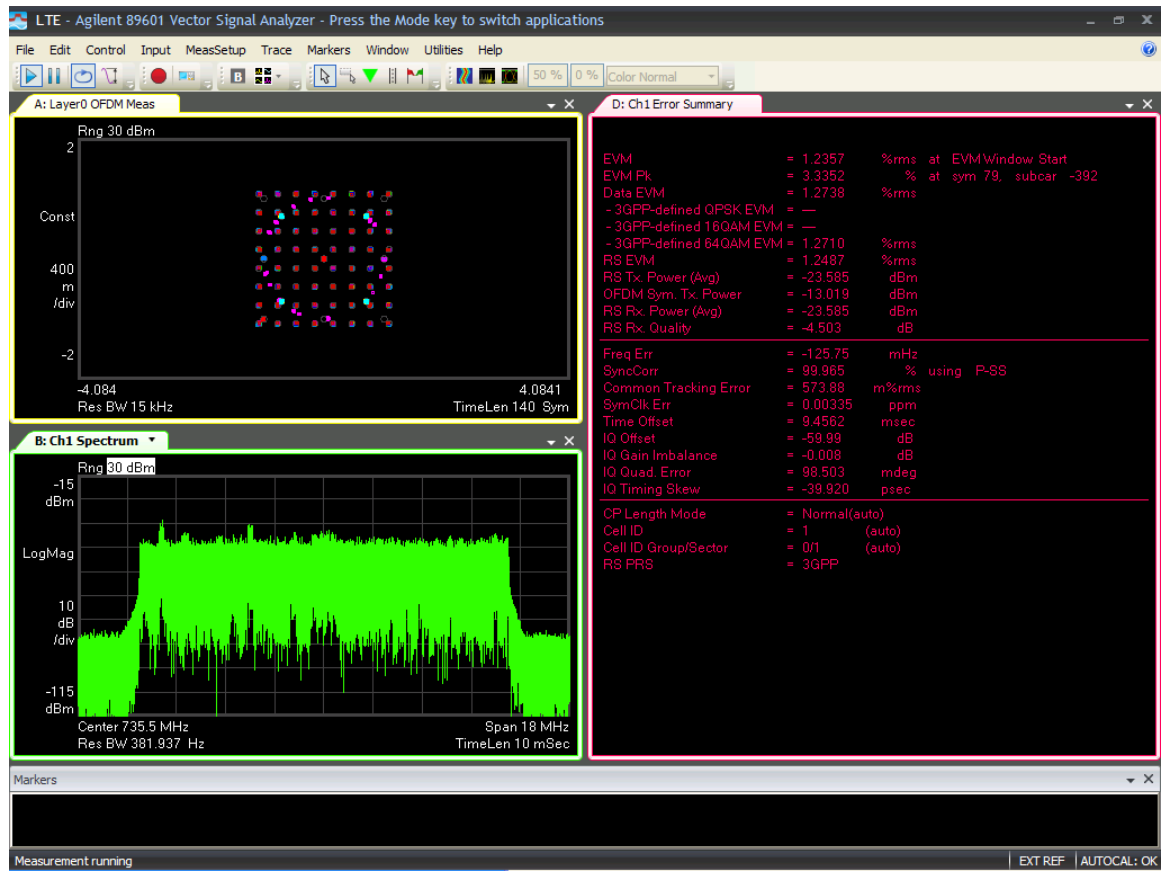
15M-Port 1 -738.5MHz-TM3.2



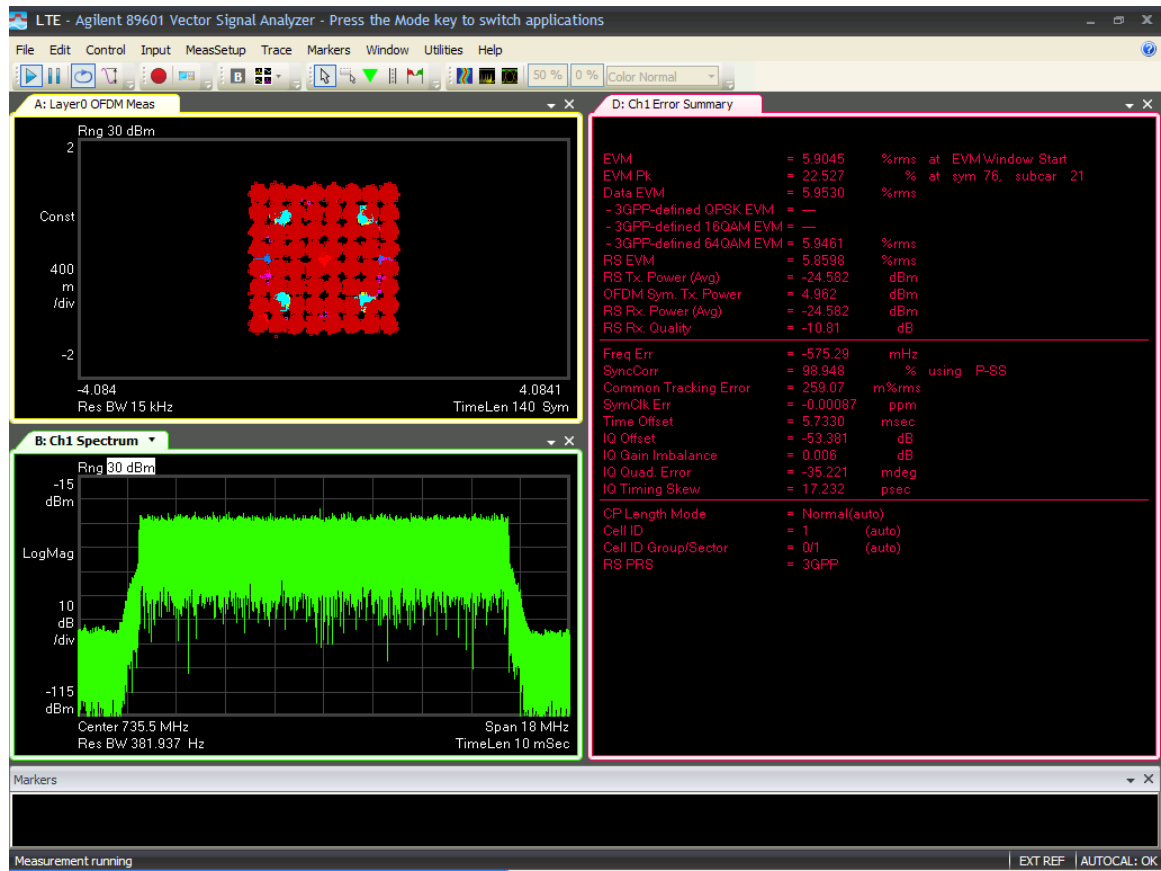
15M-Port 1 -738.5MHz-TM3.3



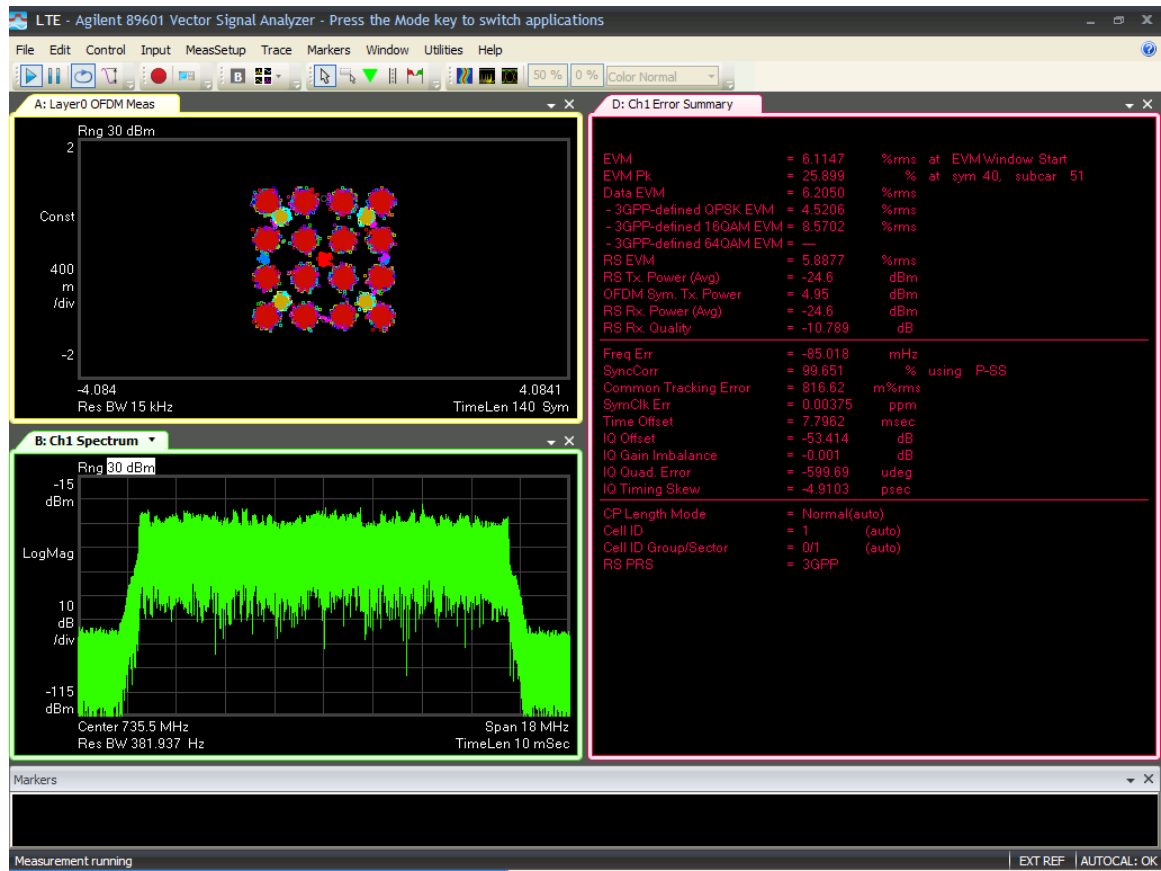
15M-Port 2 -735.5MHz-TM2.0



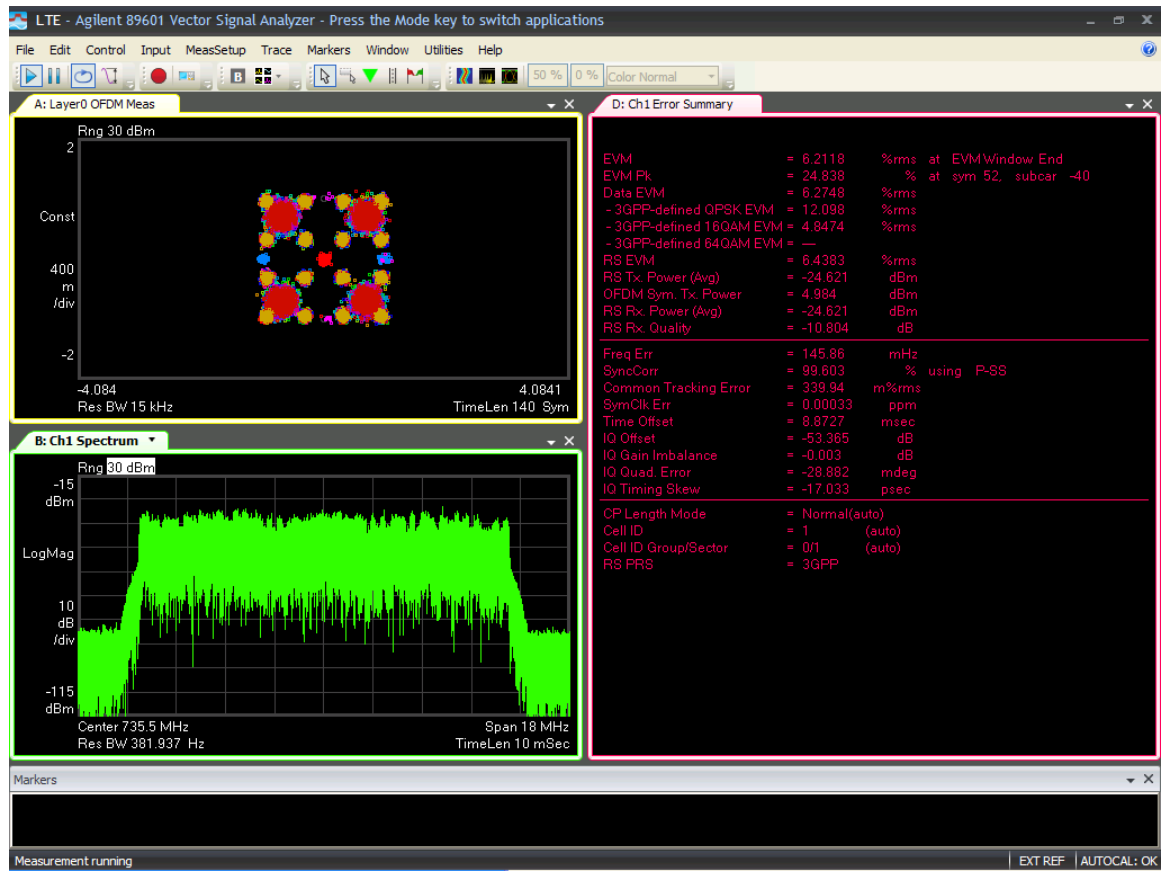
15M-Port2 -735.5MHz-TM3.1



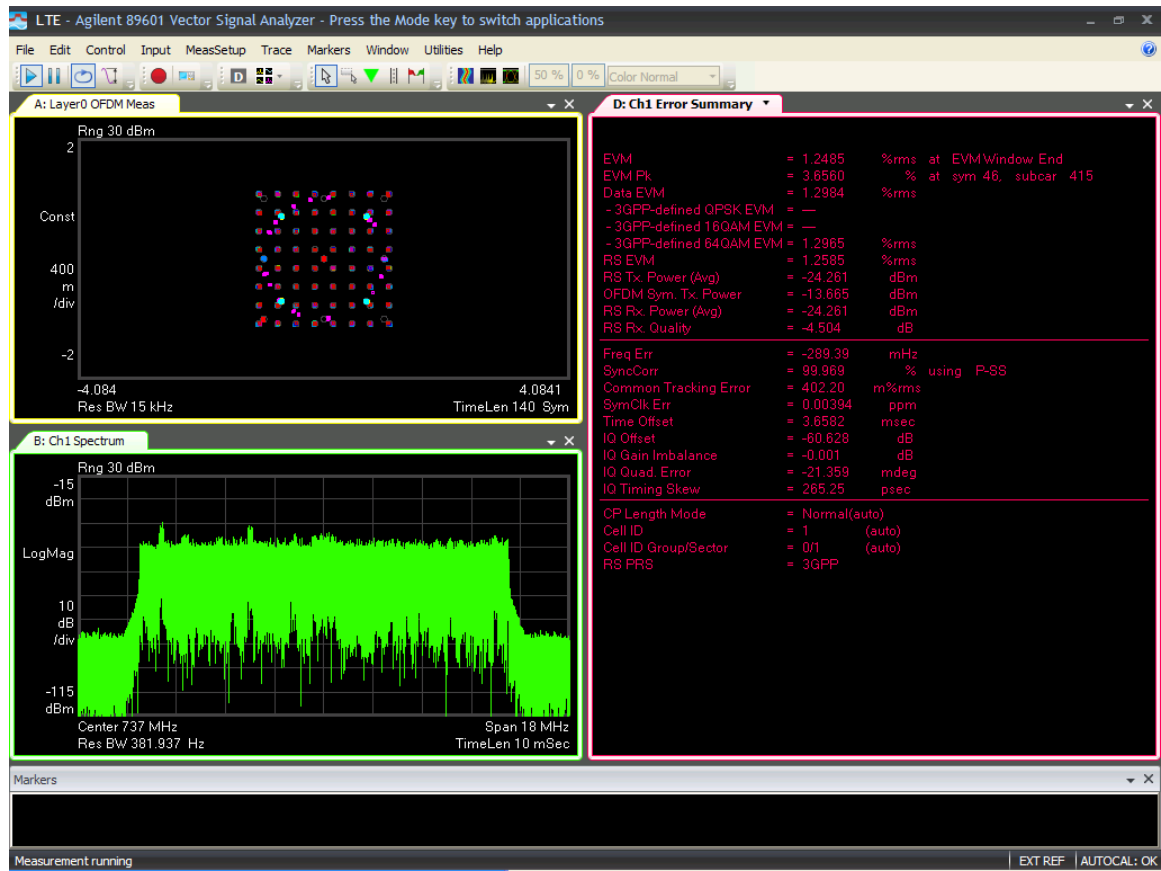
15M-Port 2 -735.5MHz-TM3.2



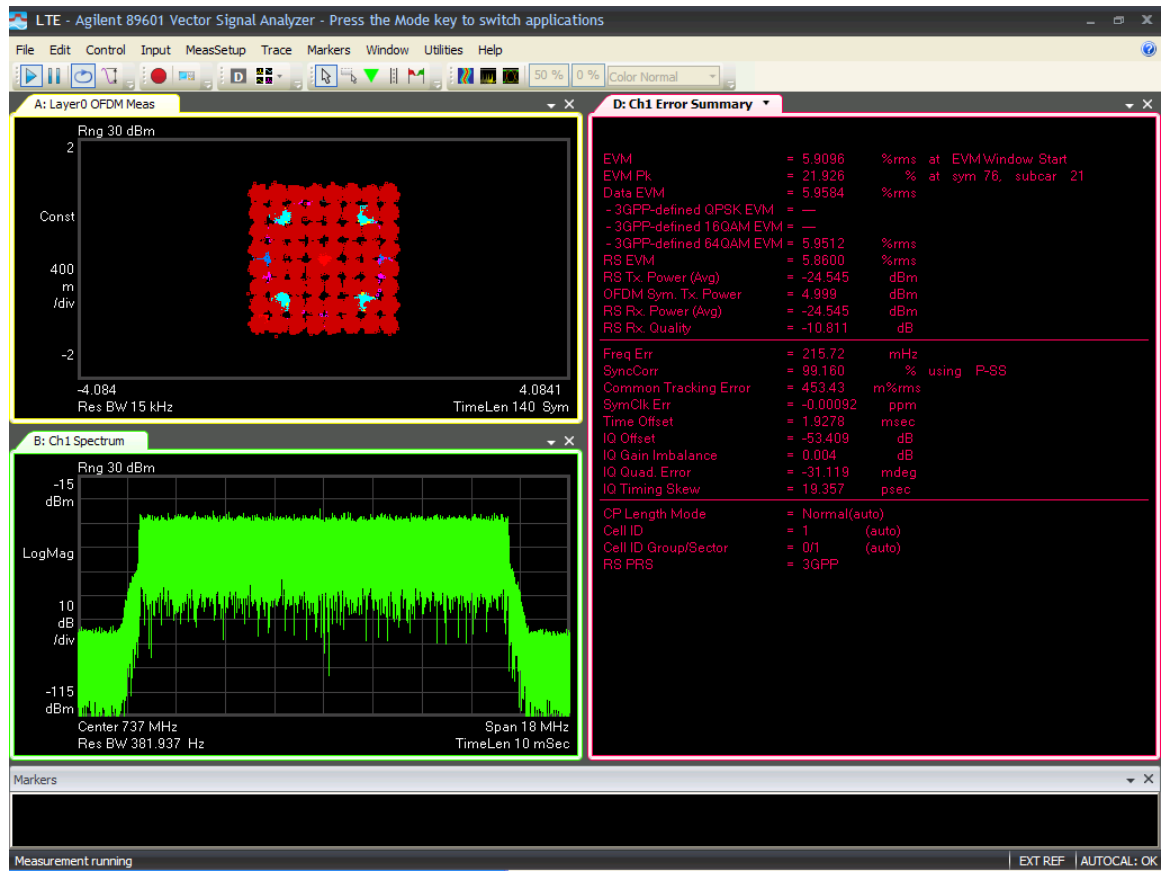
15M-Port 2 -735.5MHz-TM3.3



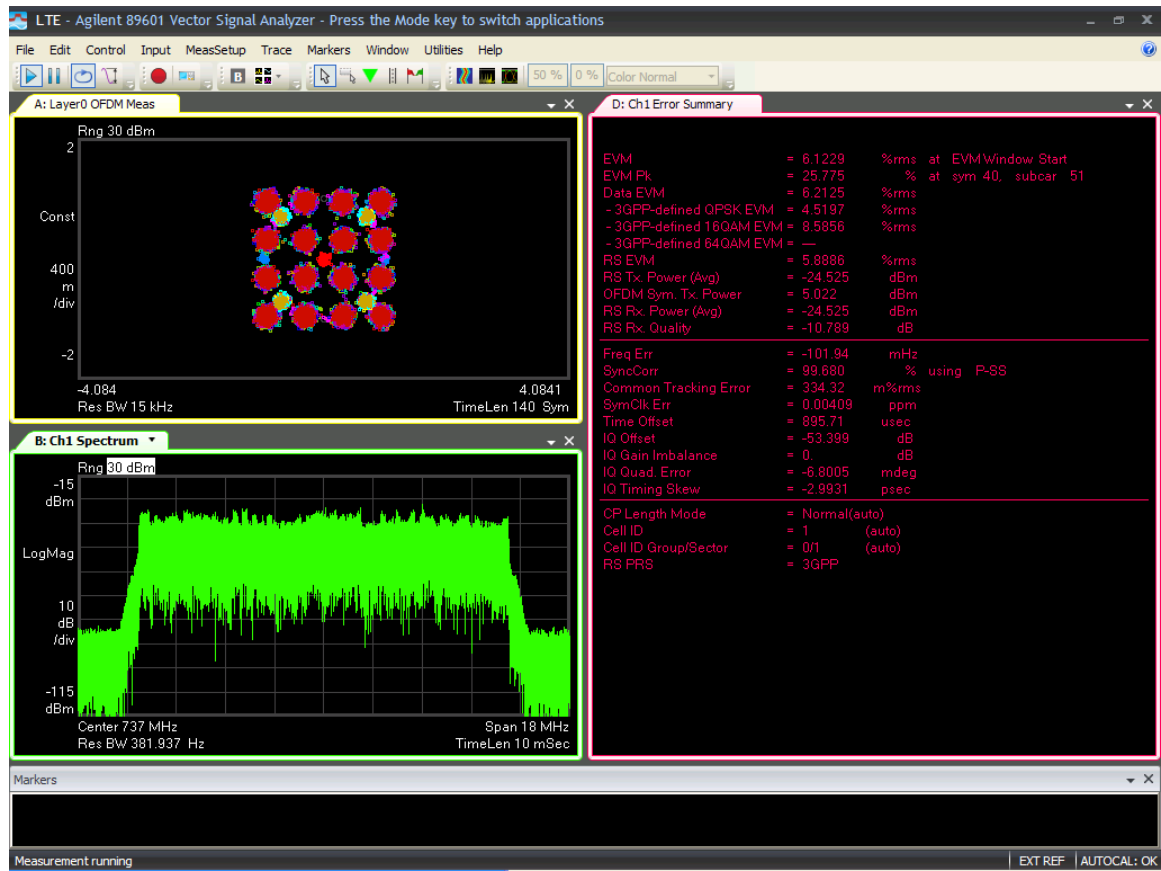
15M-Port 2 -737MHz-TM2.0



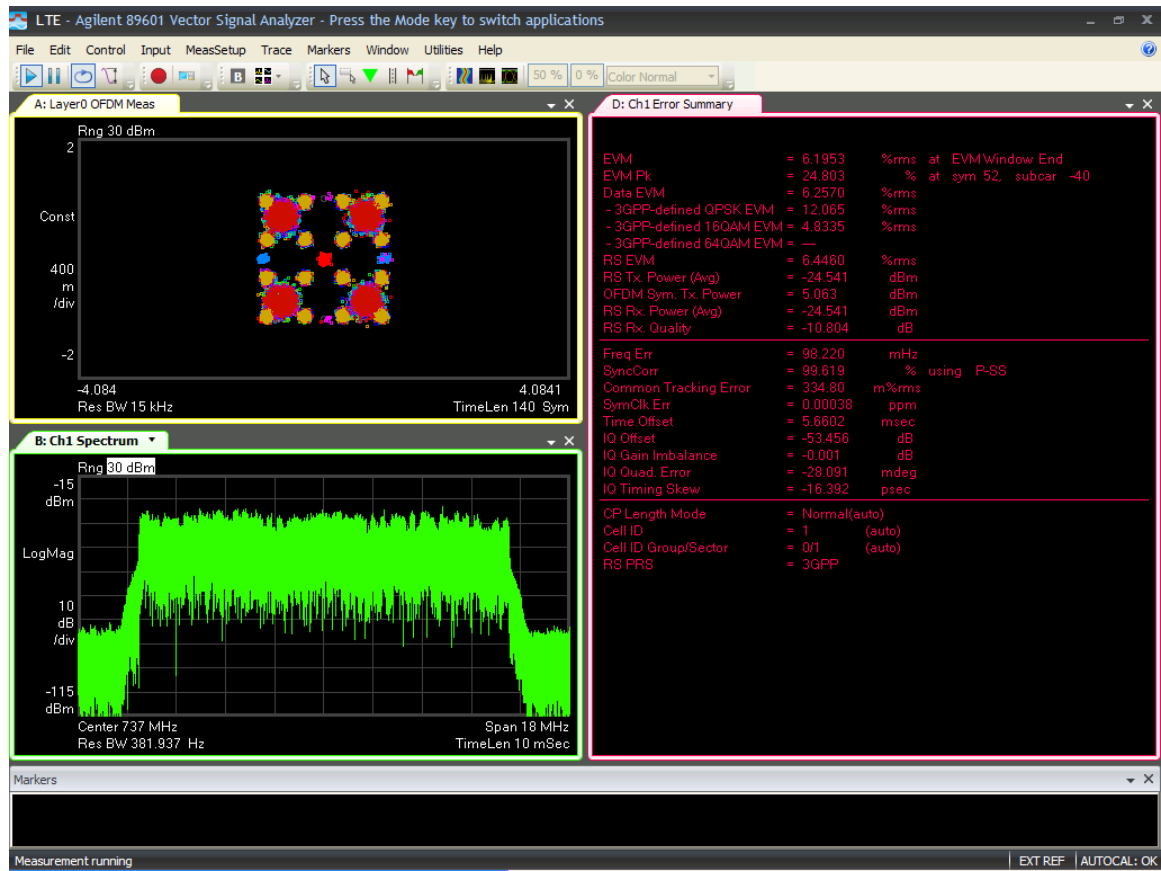
15M-Port 2 -737MHz-TM3.1



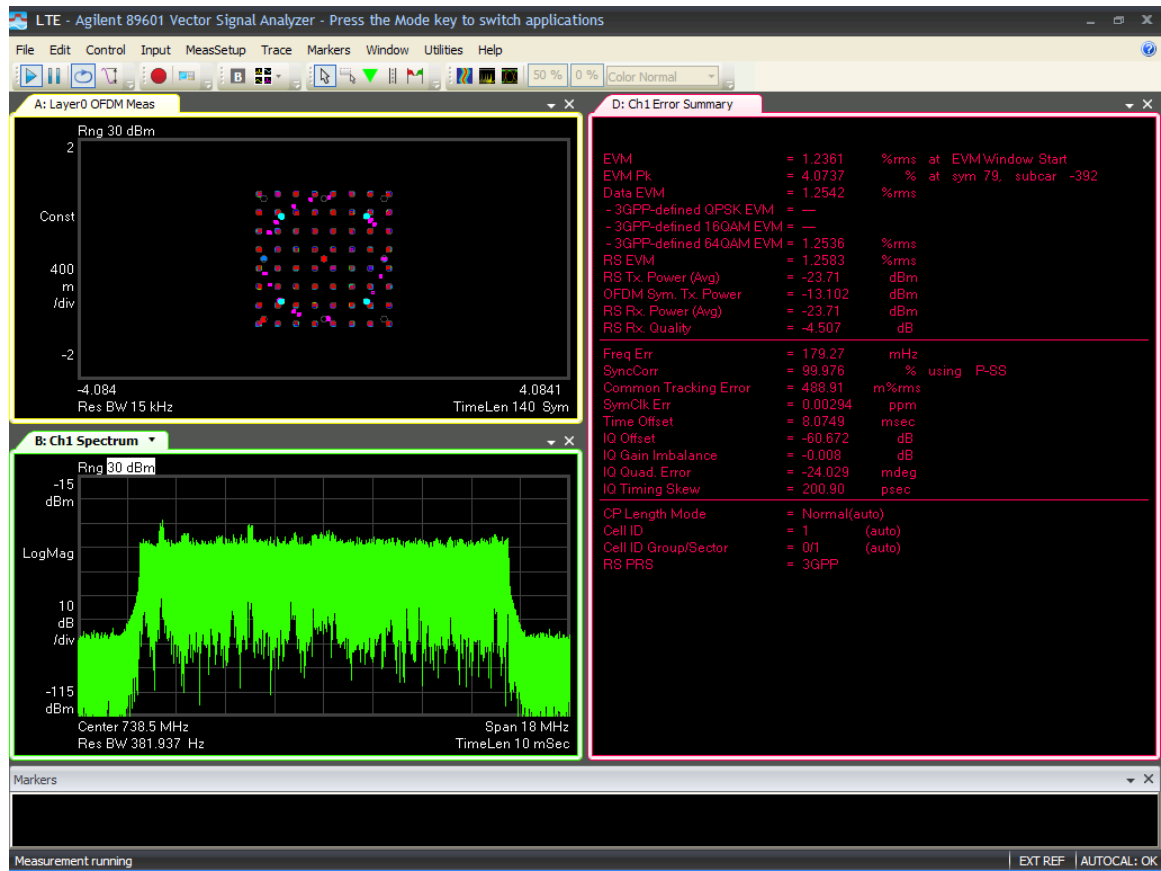
15M-Port 2 -737MHz-TM3.2



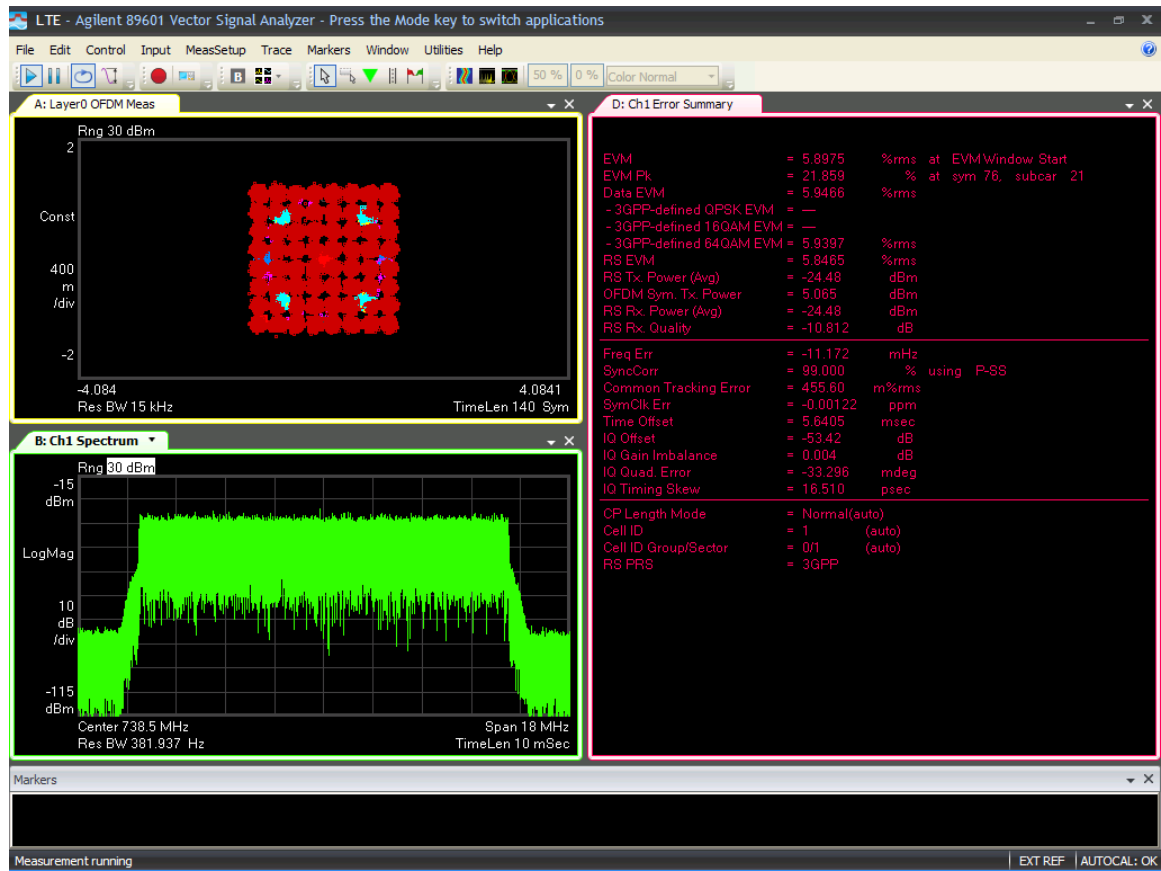
15M-Port 2-737MHz-TM3.3



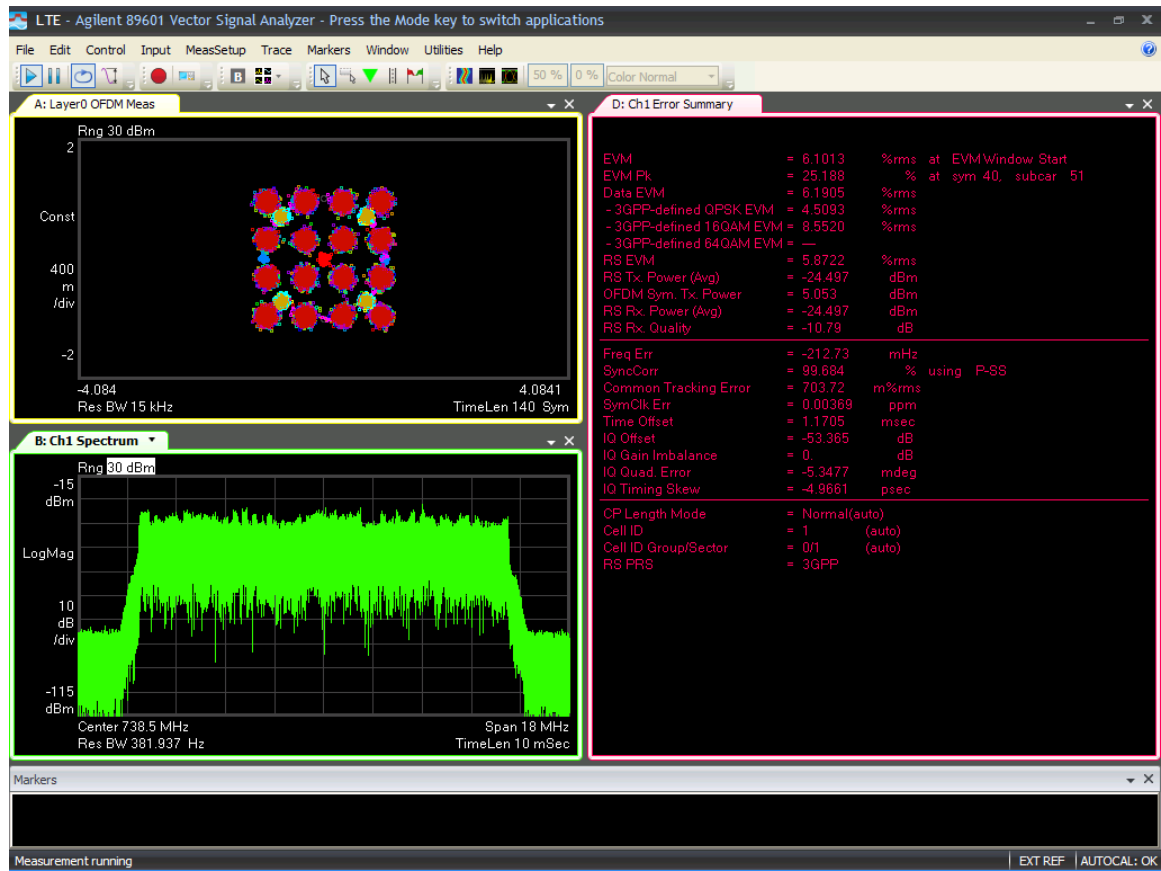
15M-Port 2 -738.5MHz-TM2.0



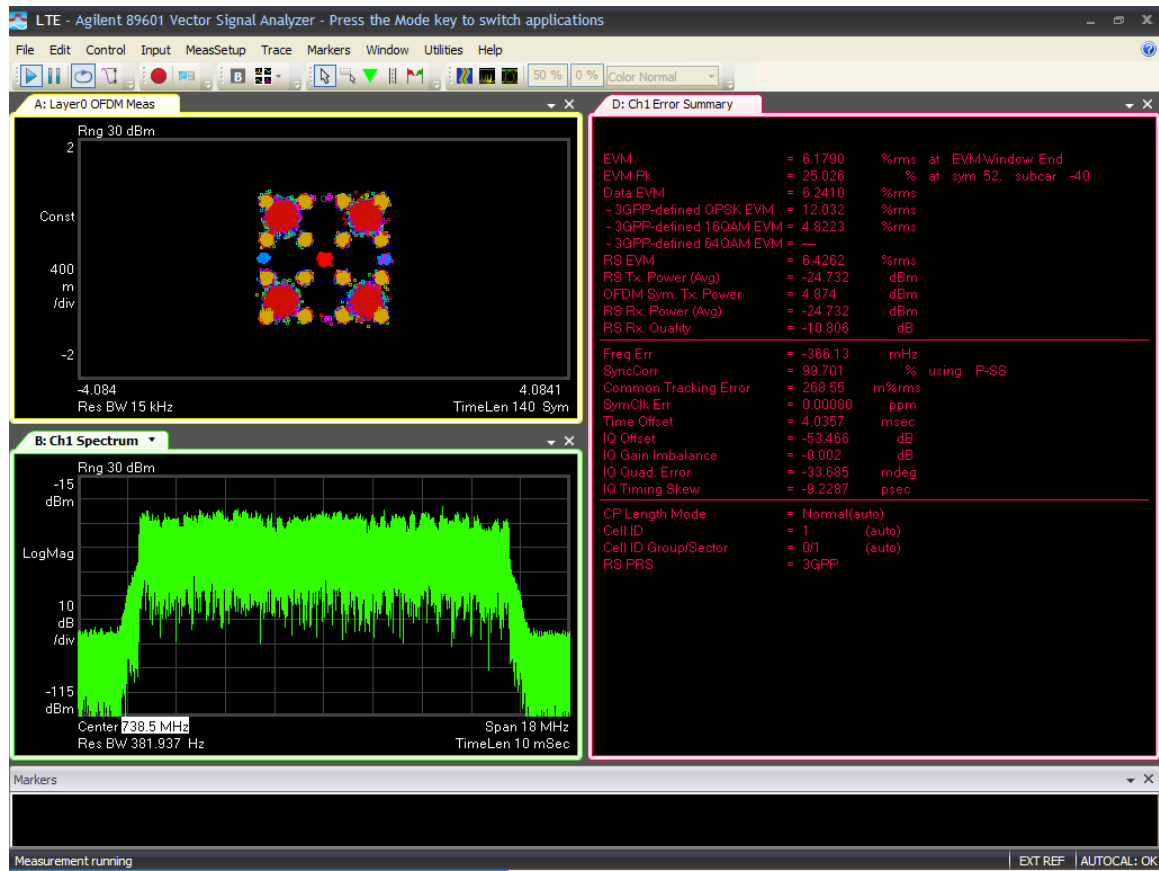
15M-Port 2 -738.5MHz-TM3.1



15M-Port 2 -738.5MHz-TM3.2



15M-Port 2 -738.5MHz-TM3.3

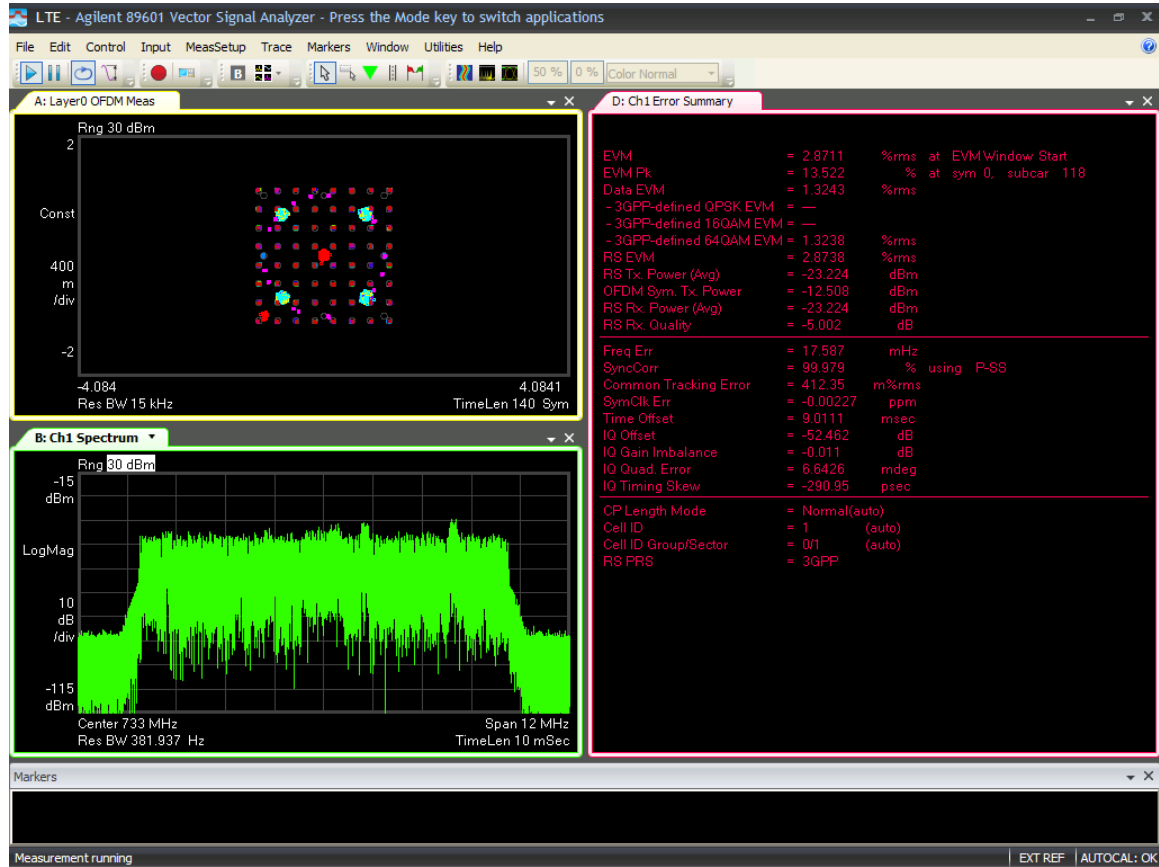


Channel Bandwidth :10M

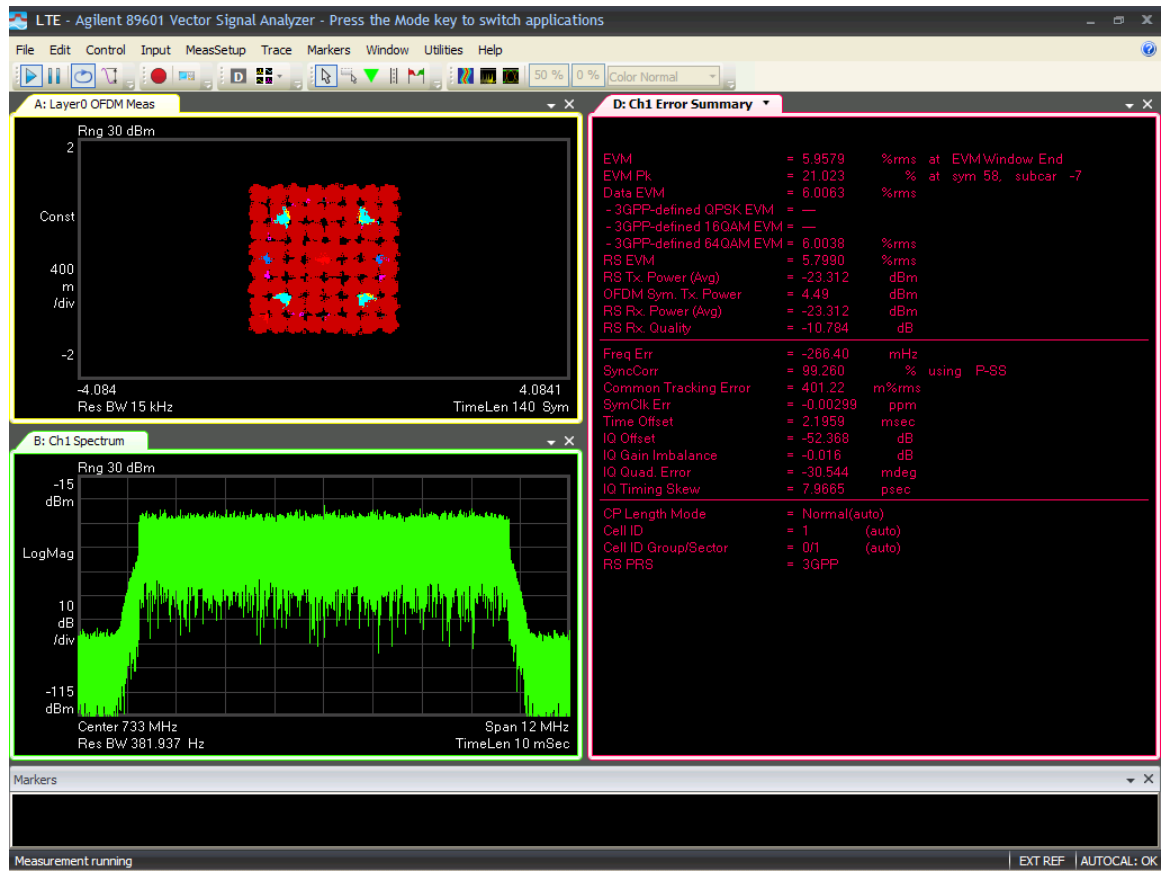
Port	Frequency (MHz)	Test mode	EVM
1	733	TM2.0	1.32
		TM3.1	6.00
		TM3.2	8.34
		TM3.3	11.89
	737	TM2.0	0.74
		TM3.1	6.01
		TM3.2	8.35
		TM3.3	11.92
	741	TM2.0	0.784
		TM3.1	5.99
		TM3.2	8.34
		TM3.3	11.90
2	733	TM2.0	1.32
		TM3.1	6.01
		TM3.2	8.40
		TM3.3	12.00
	737	TM2.0	0.75
		TM3.1	6.02
		TM3.2	8.36
		TM3.3	11.91
	741	TM2.0	0.692
		TM3.1	5.99
		TM3.2	8.34
		TM3.3	11.90

		TM3.2	8.35
		TM3.3	11.91

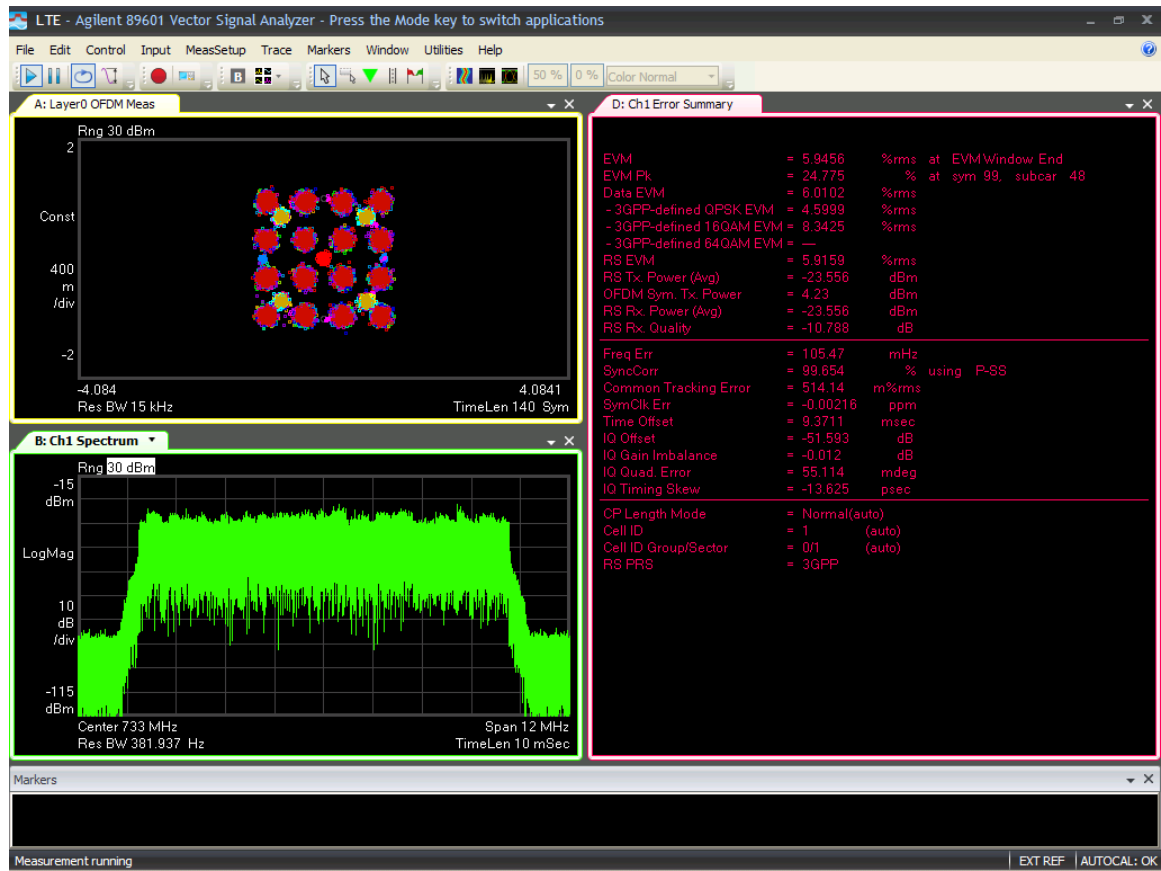
10M-Port 1 -733MHz-TM2.0



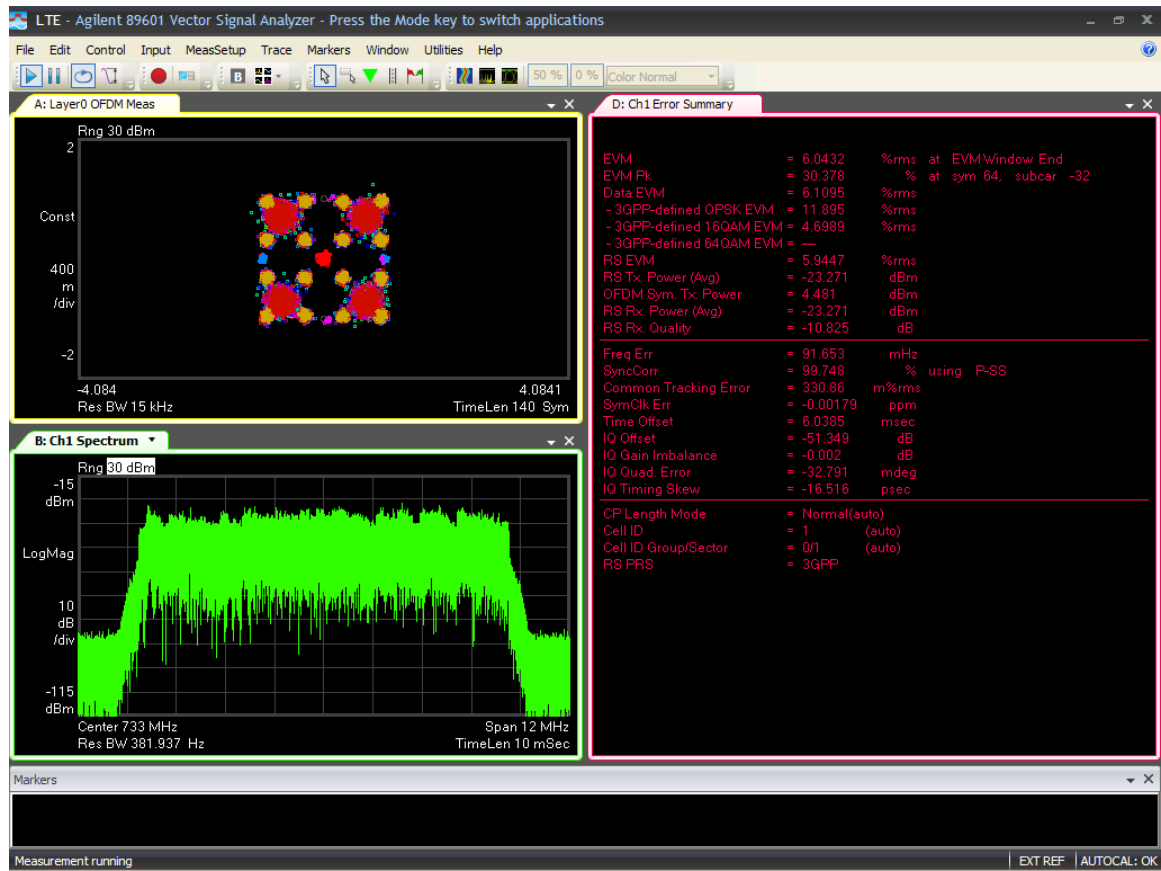
10M-Port 1 -733MHz-TM3.1



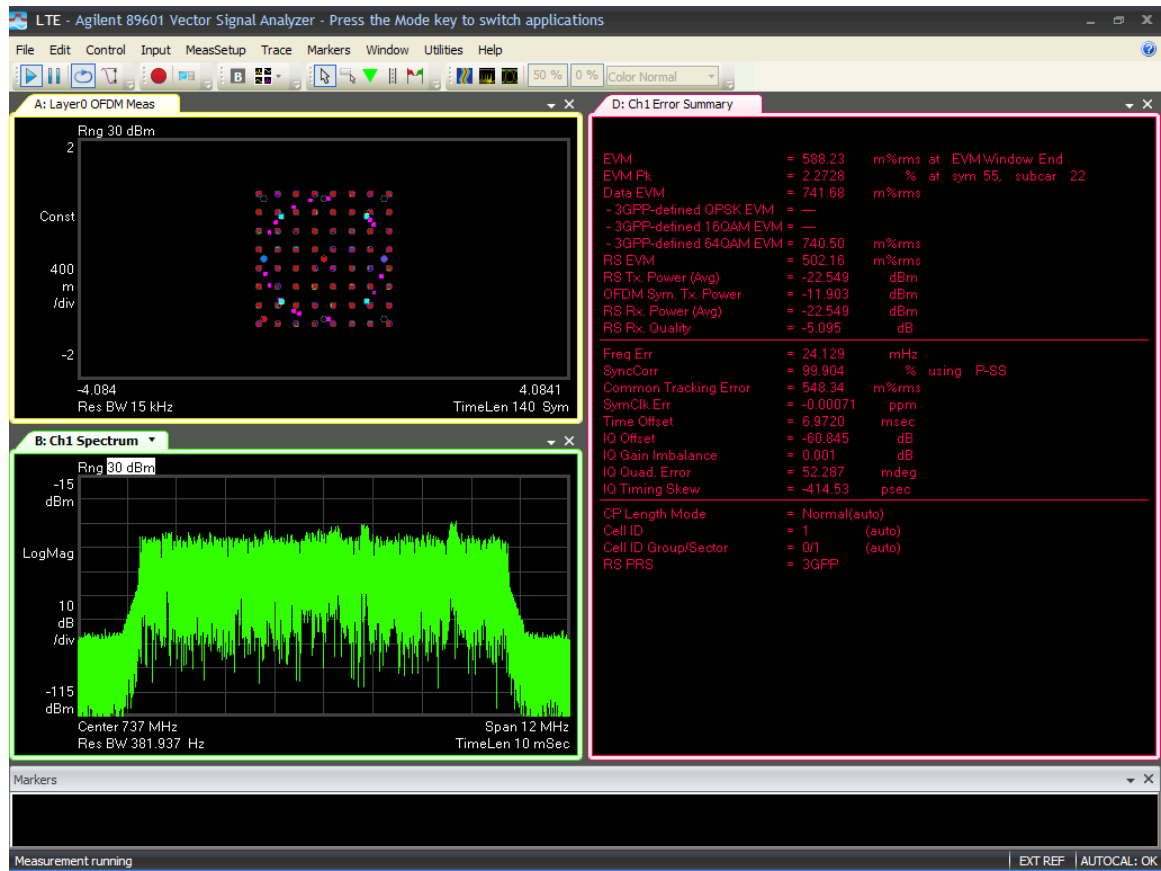
10M-Port 1 -733MHz-TM3.2



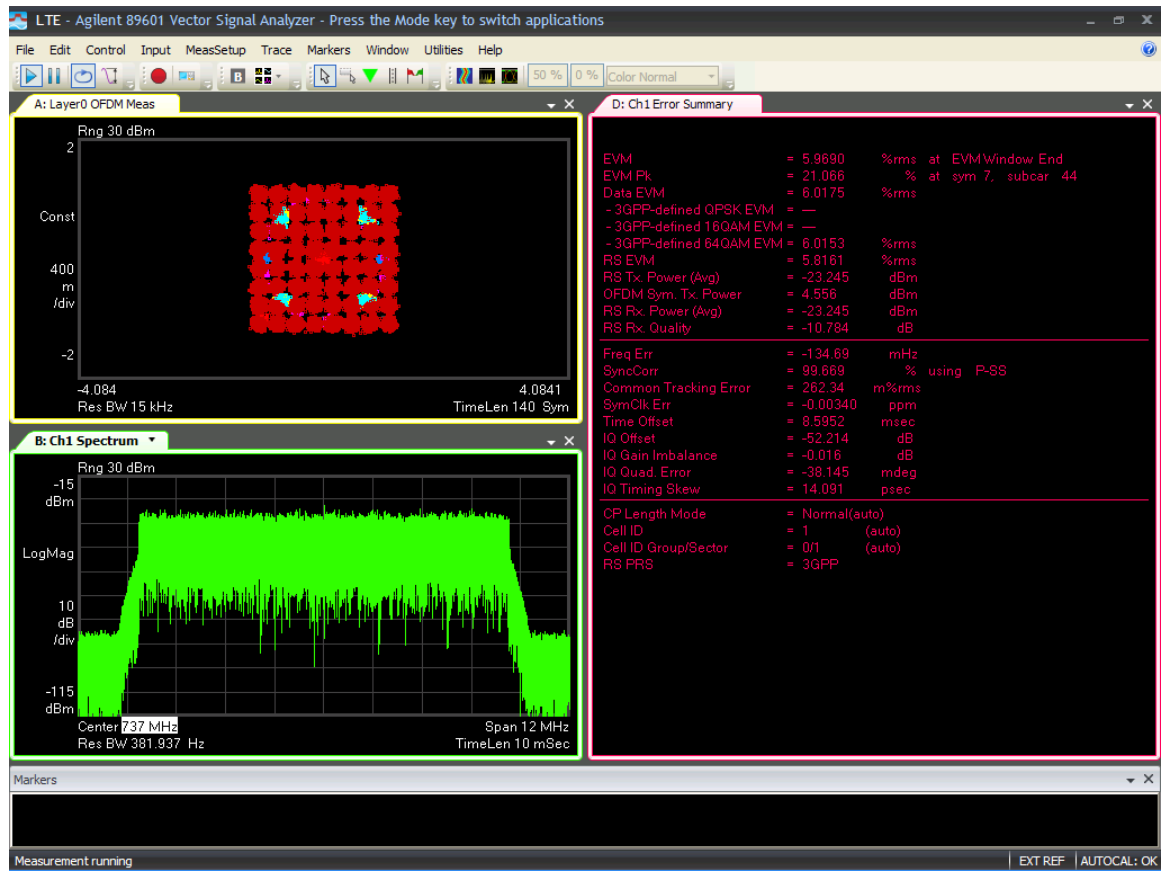
10M-Port 1 -733MHz-TM3.3



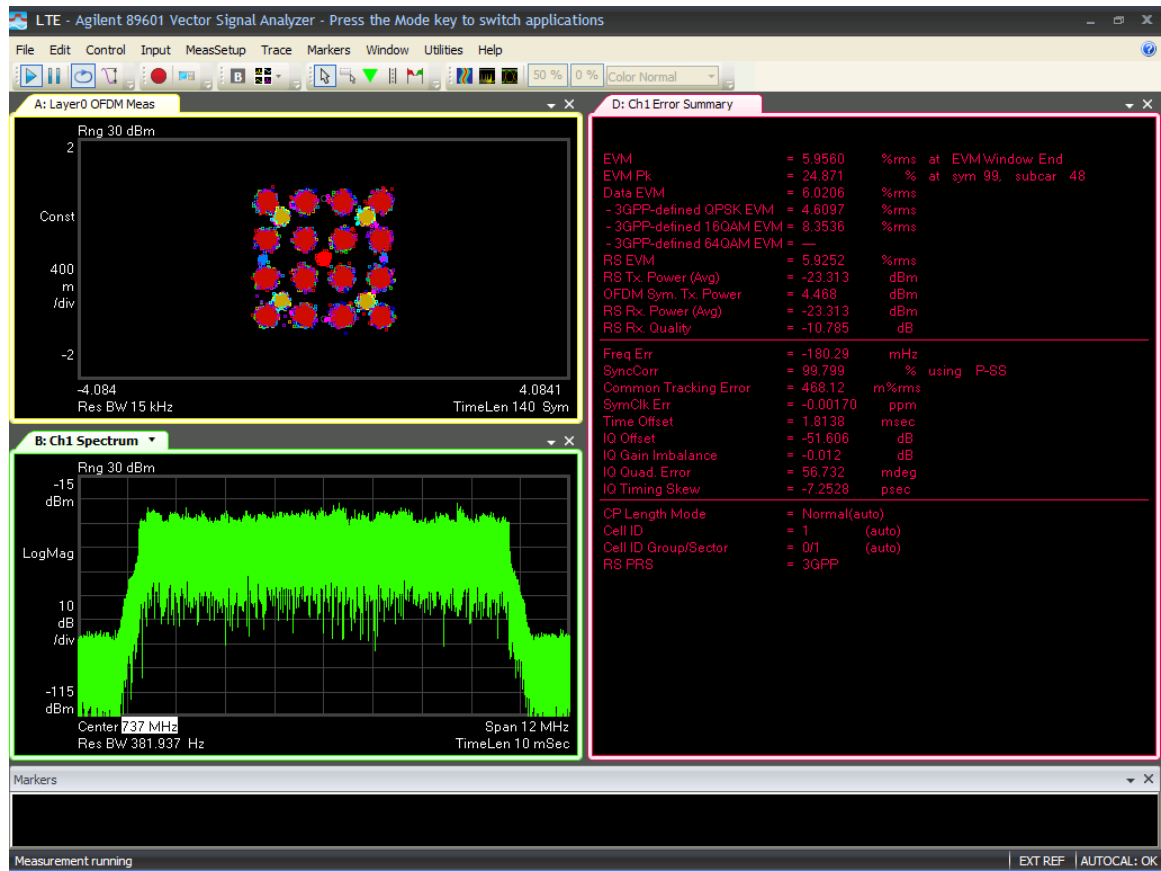
10M-Port 1 -737MHz-TM2.0



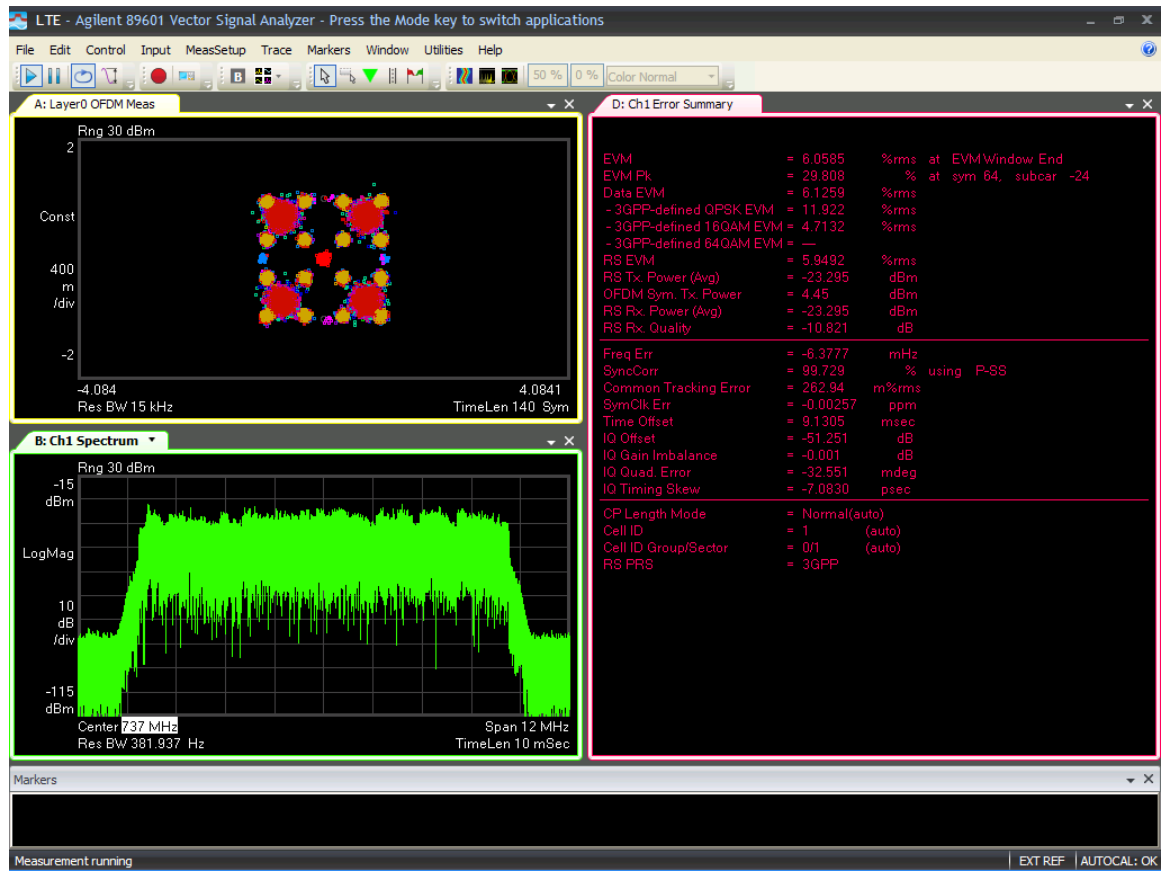
10M-Port 1 -737MHz-TM3.1



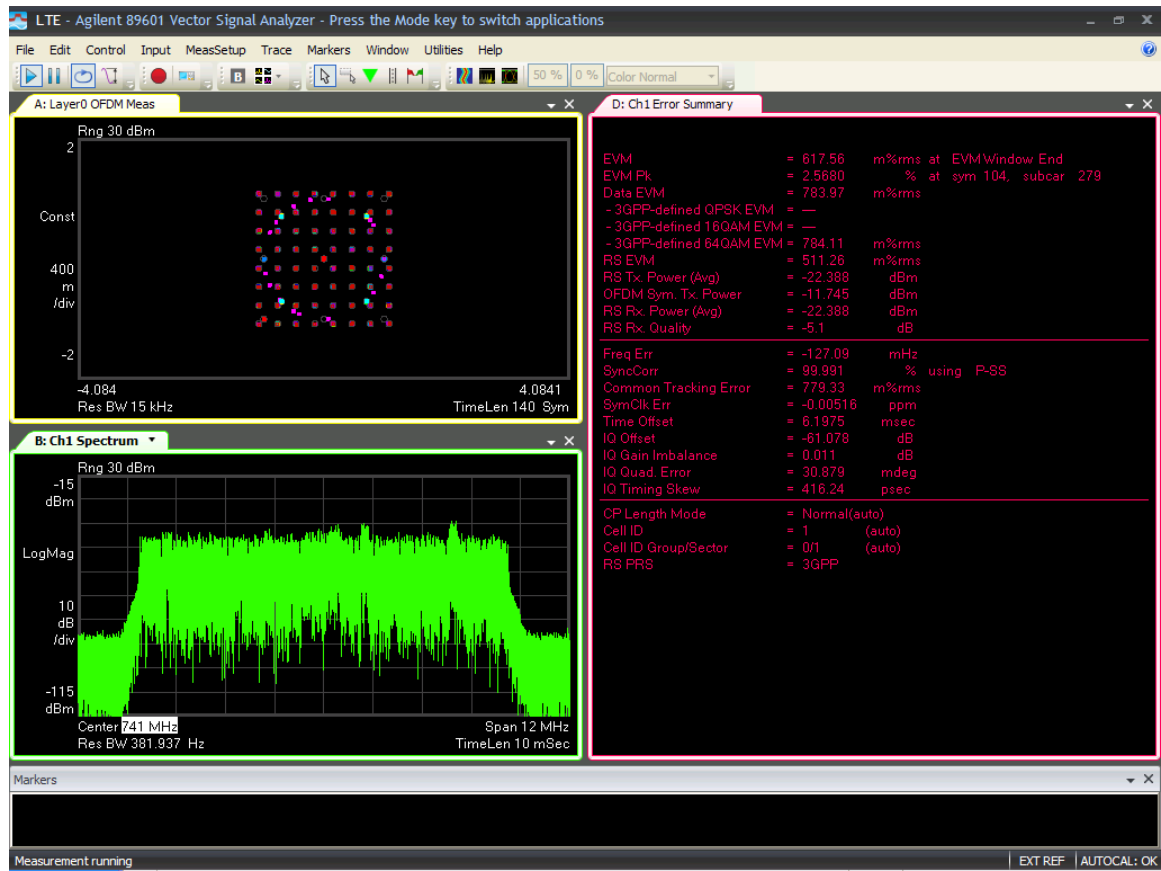
10M-Port 1 -737MHz-TM3.2



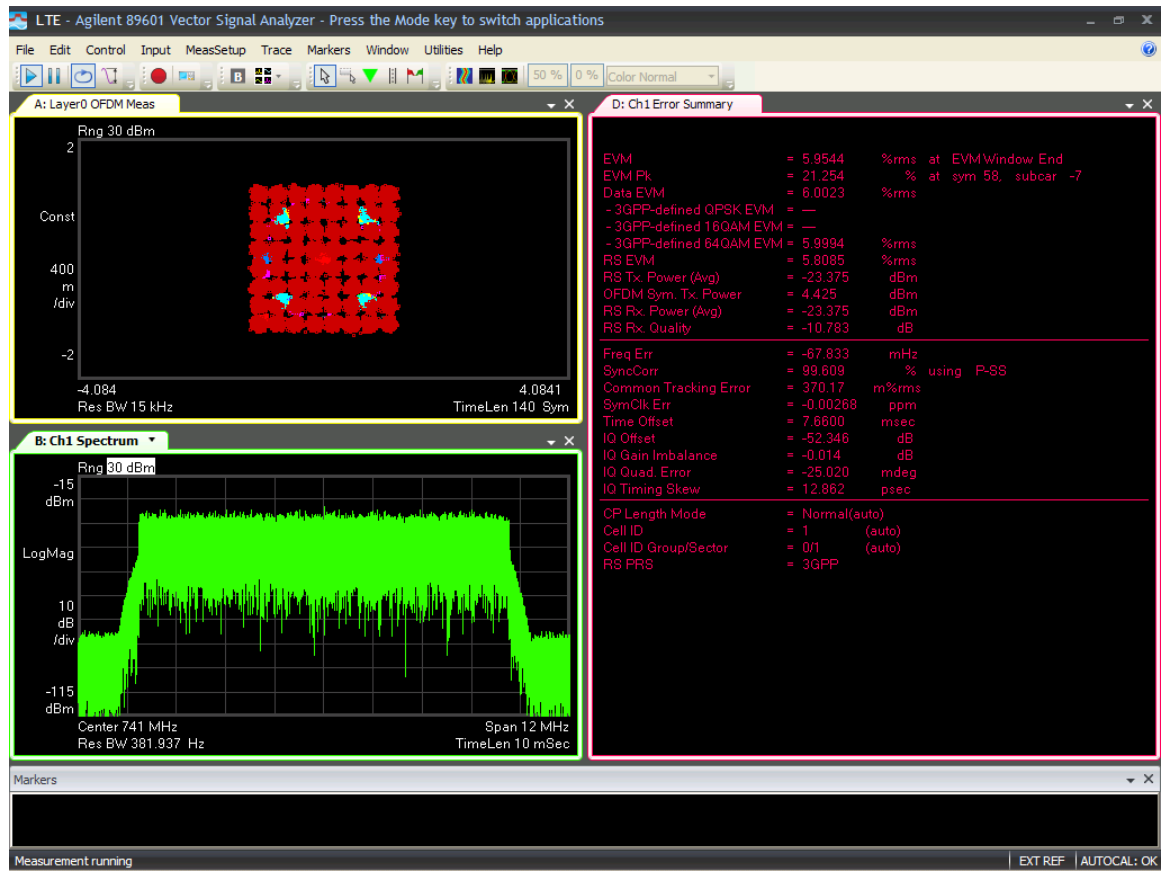
10M-Port 1 -737MHz-TM3.3



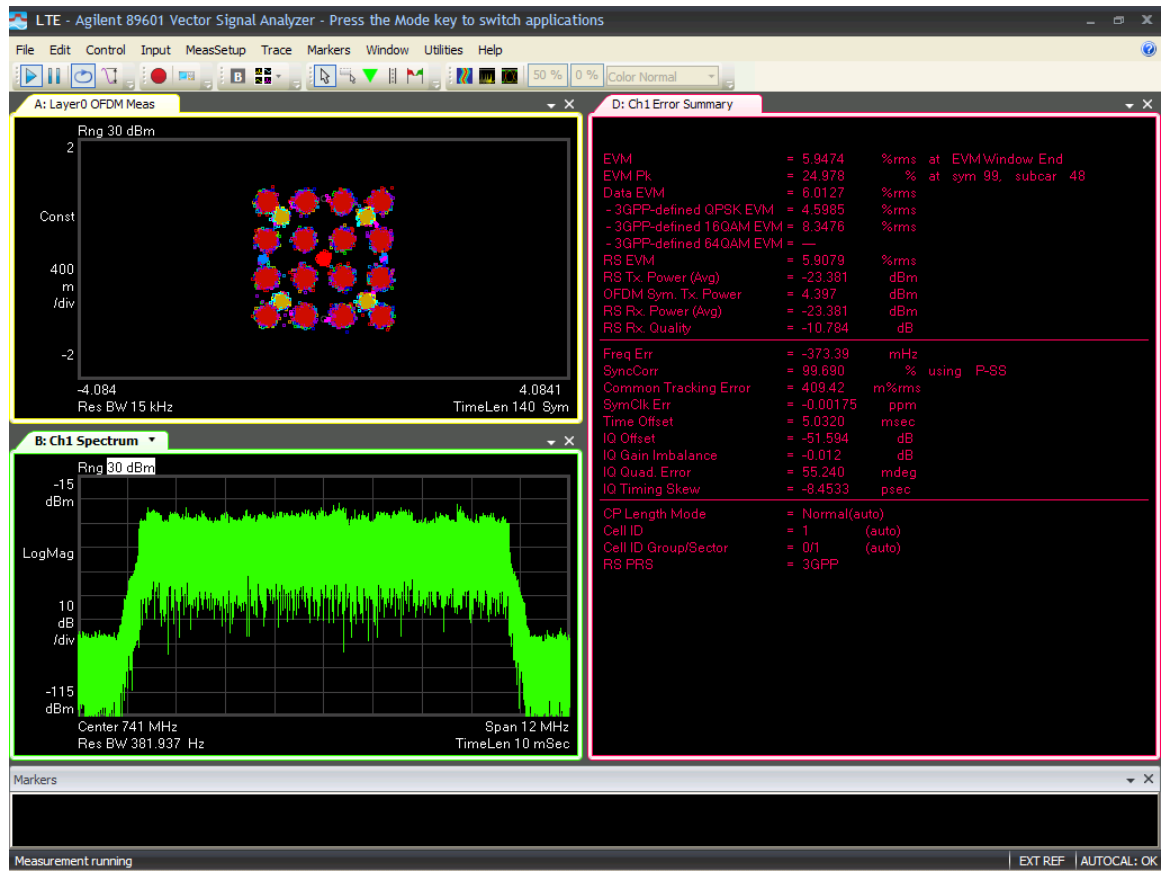
10M-Port 1 -741MHz-TM2.0



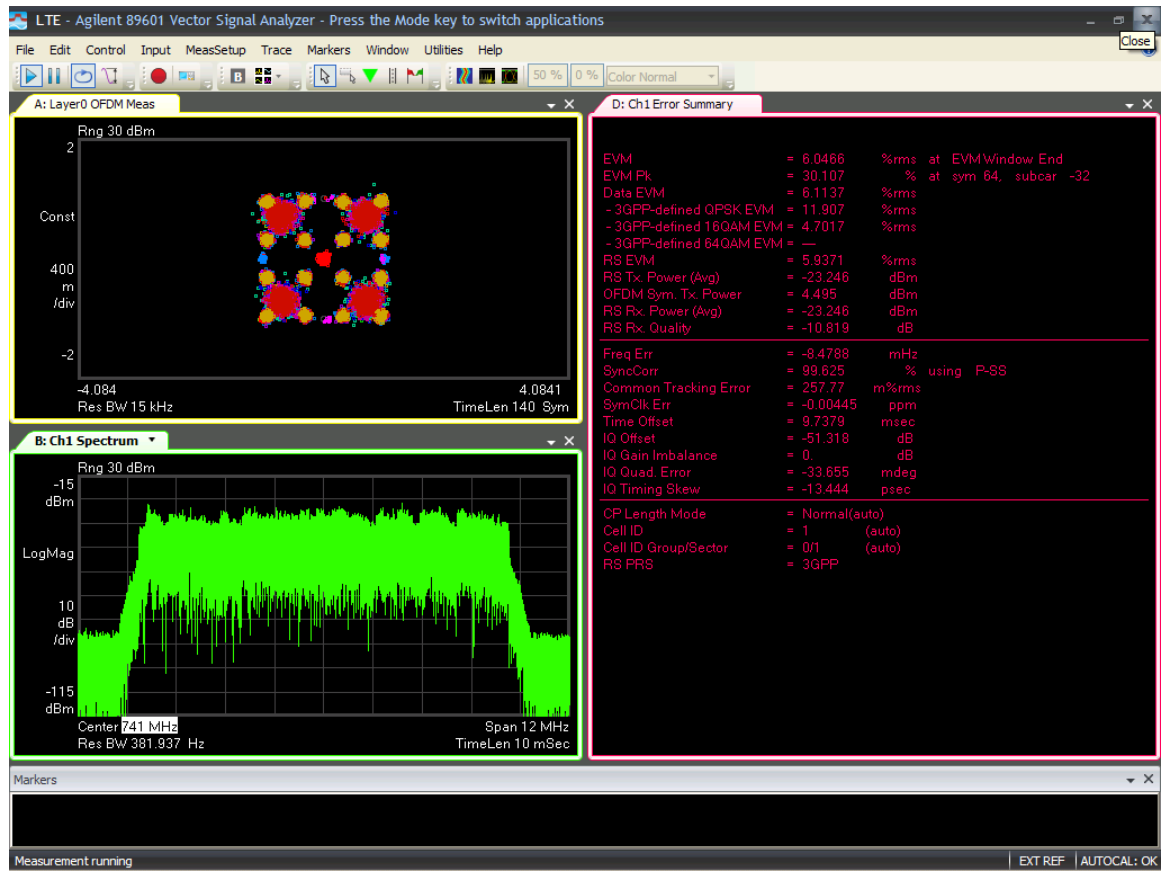
10M-Port 1 -741MHz-TM3.1



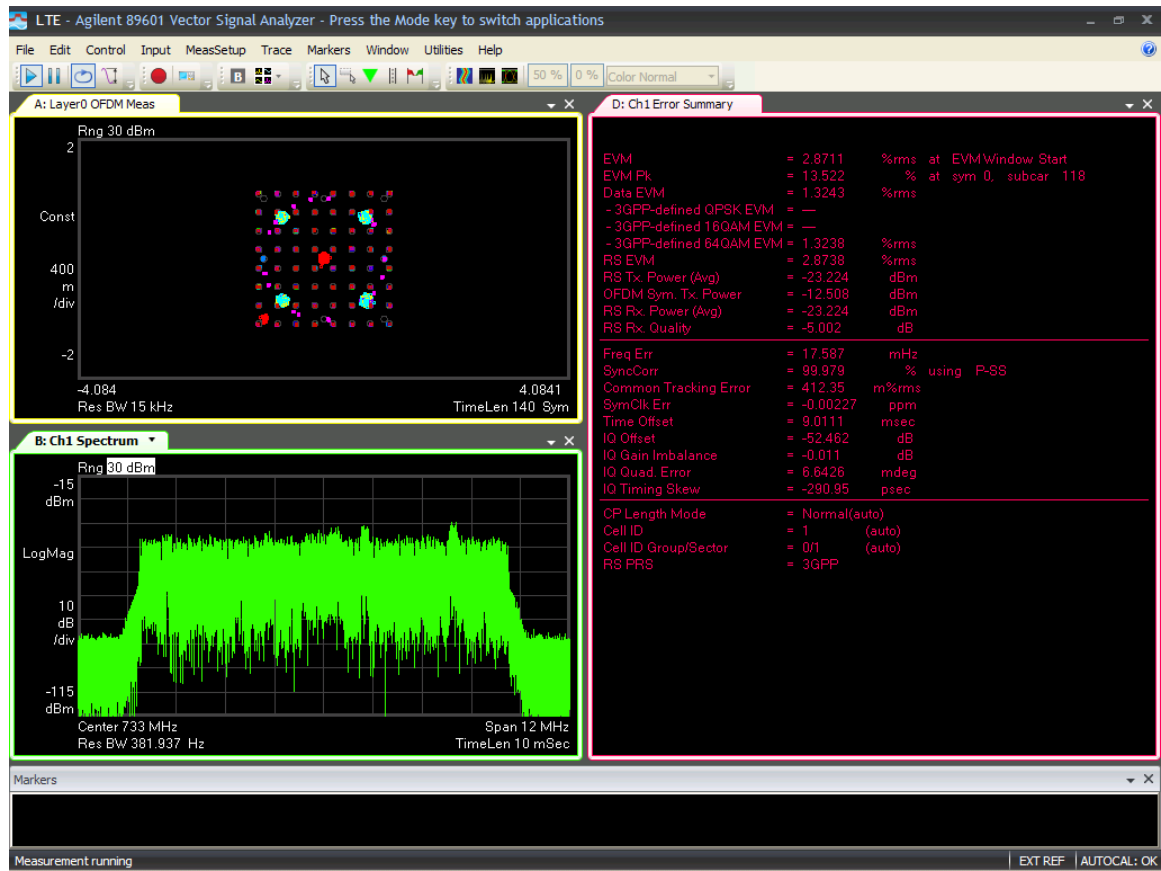
10M-Port 1 -741MHz-TM3.2



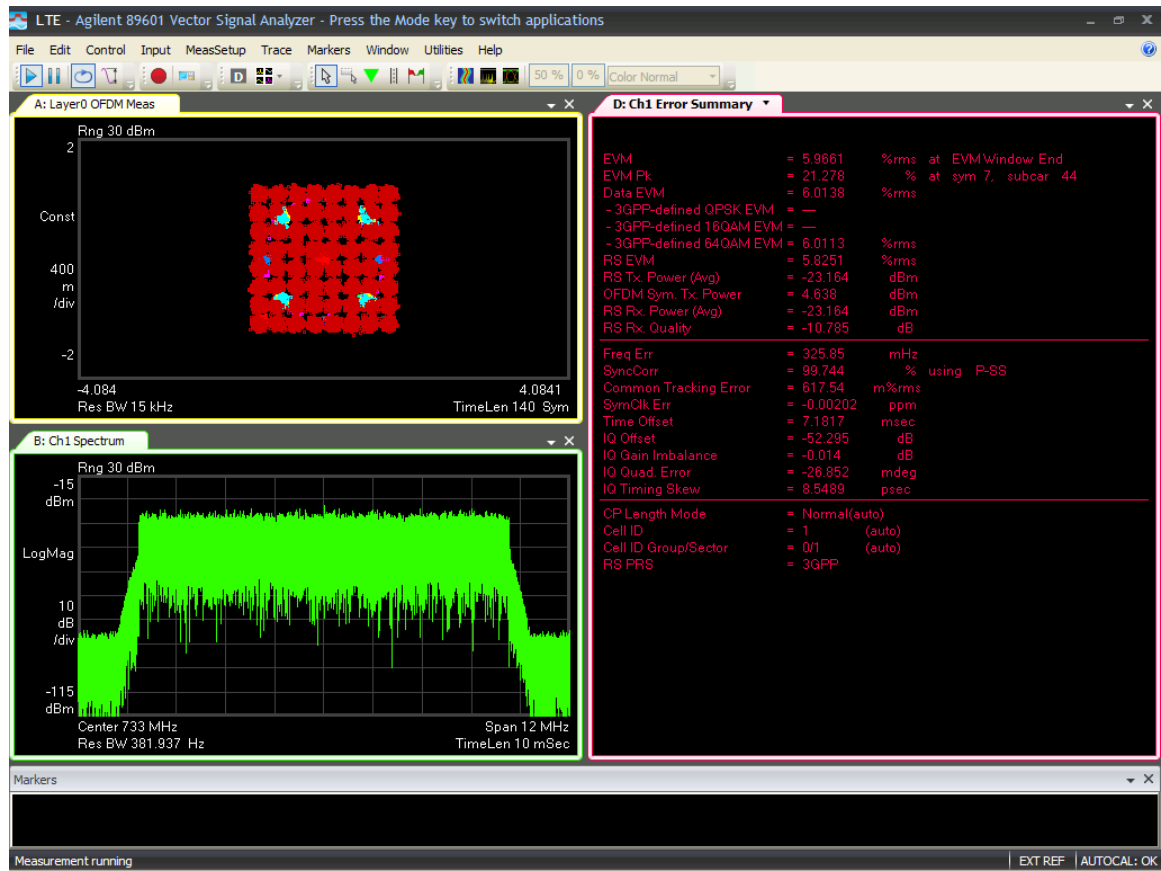
10M-Port 1 -741MHz-TM3.3



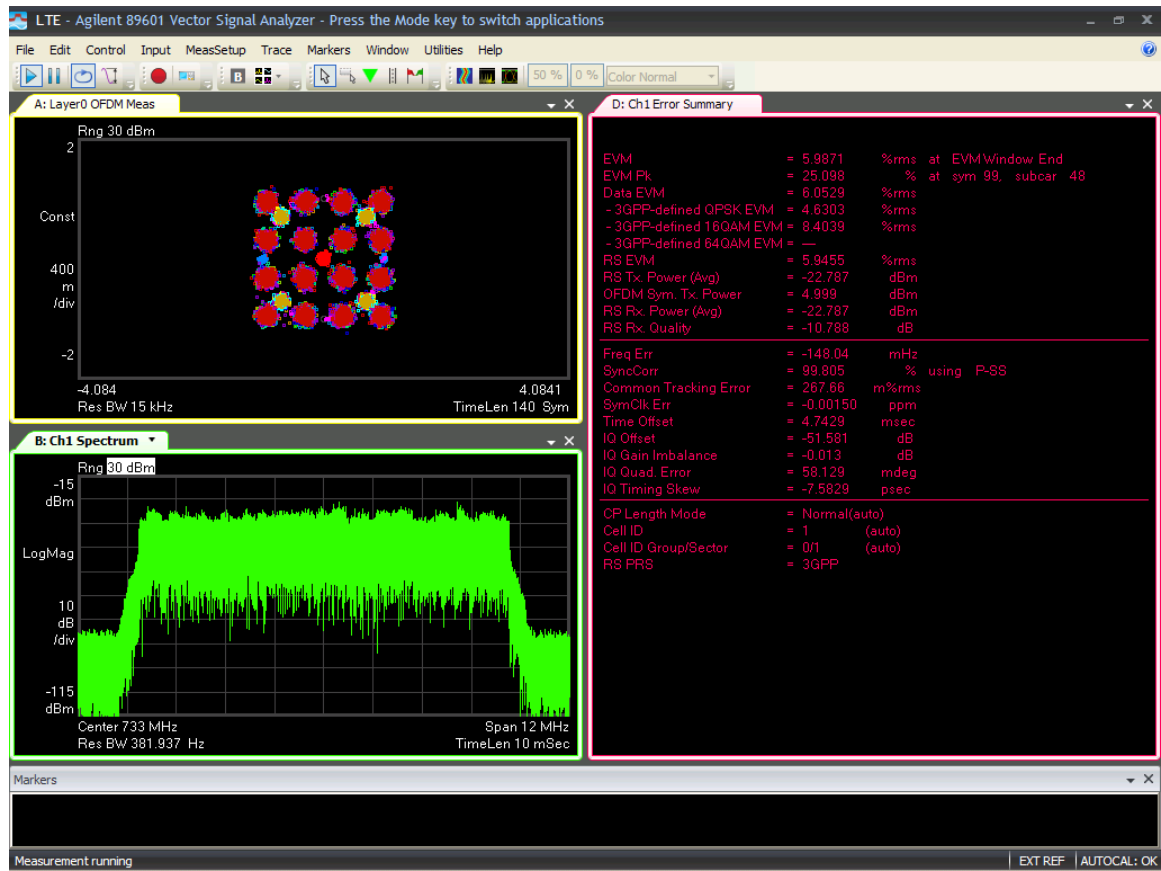
10M-Port 2 -733MHz-TM2.0



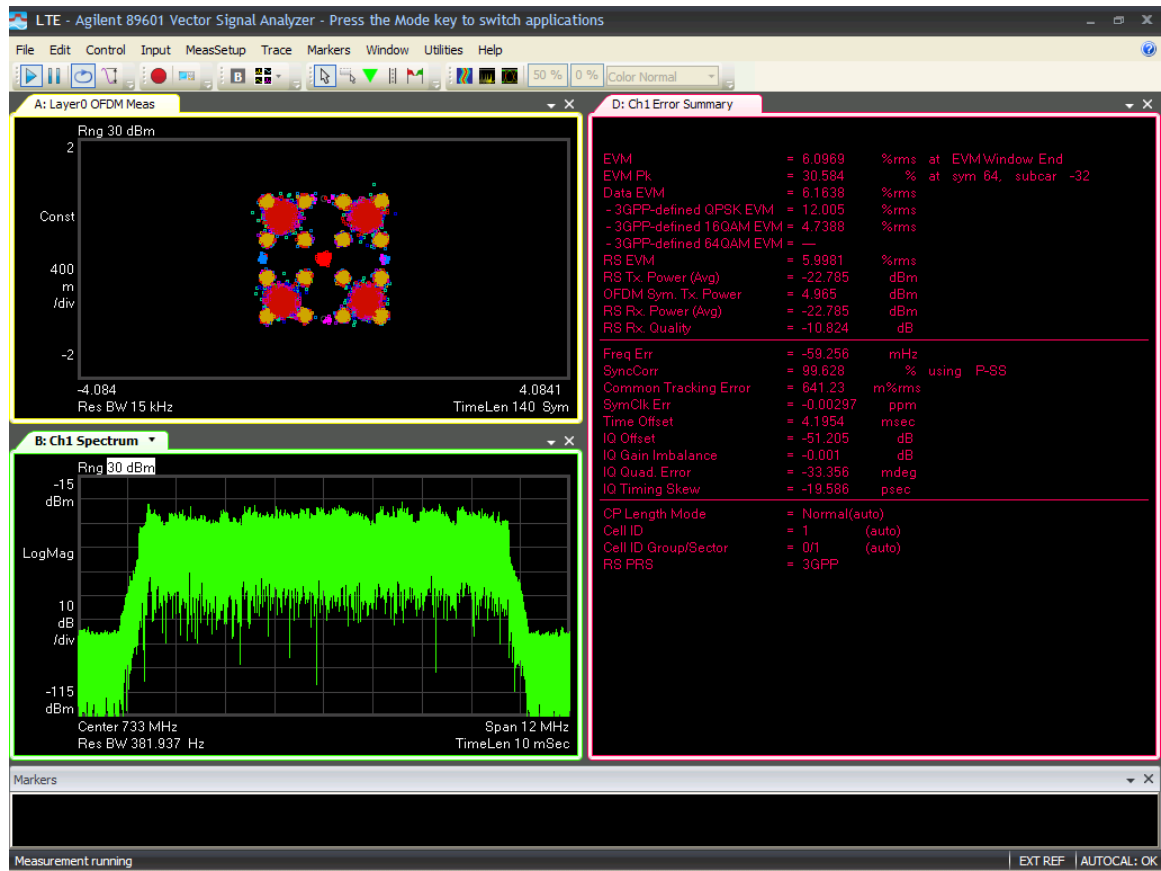
10M-Port 2 -733MHz-TM3.1



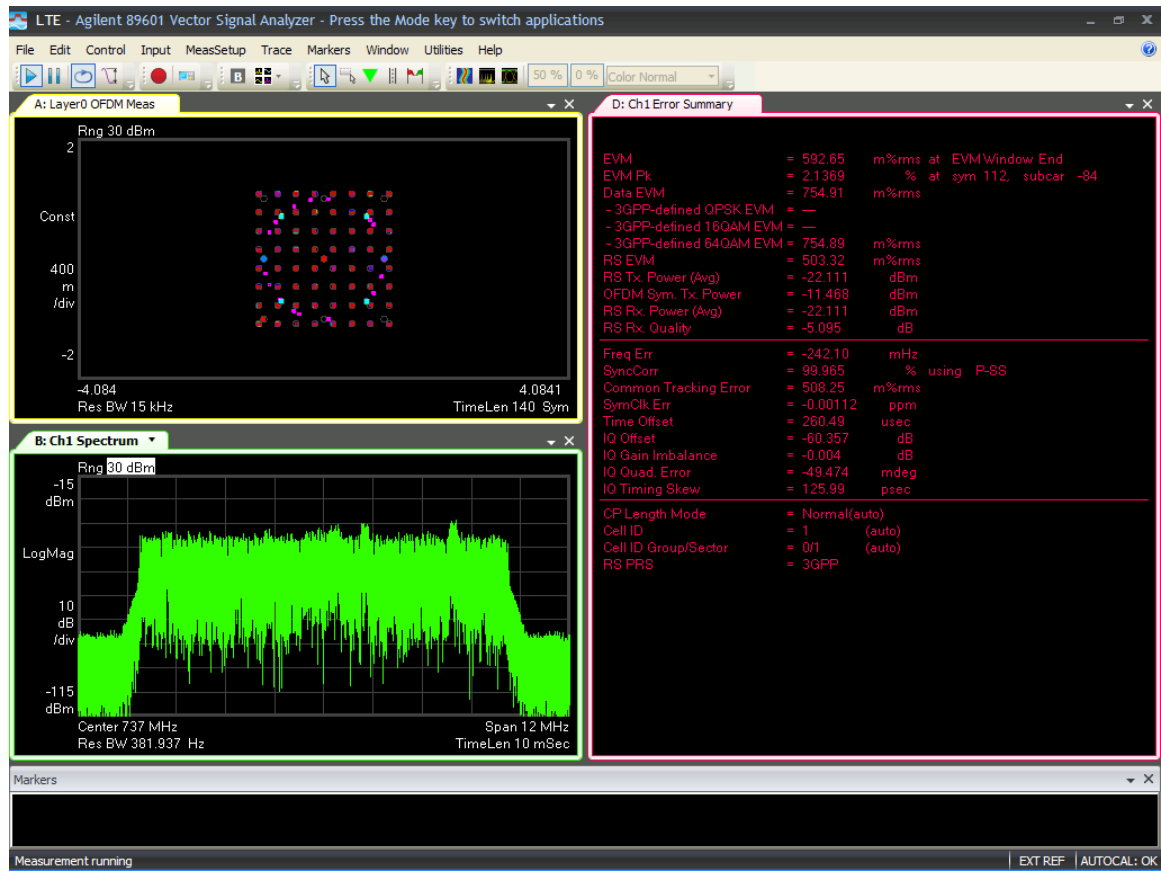
10M-Port 2 -733MHz-TM3.2



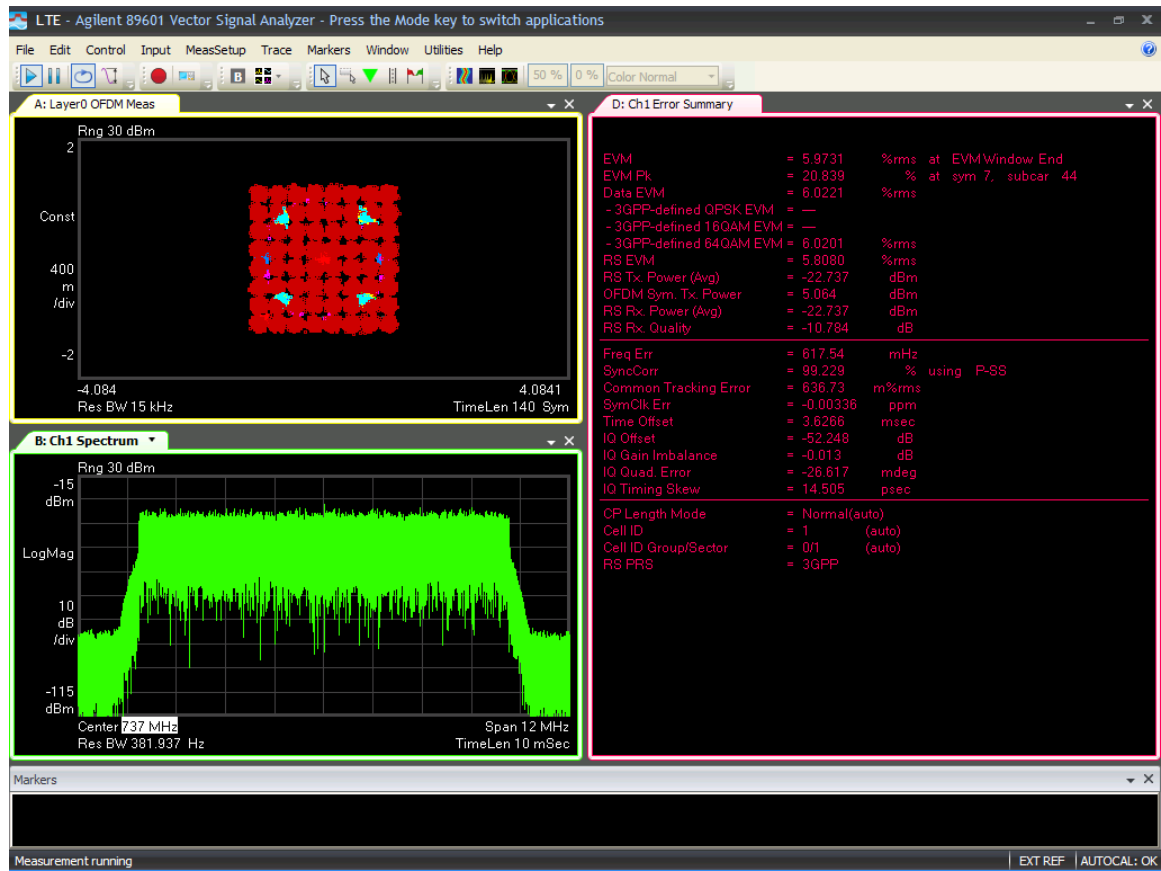
10M-Port 2 -733MHz-TM3.3



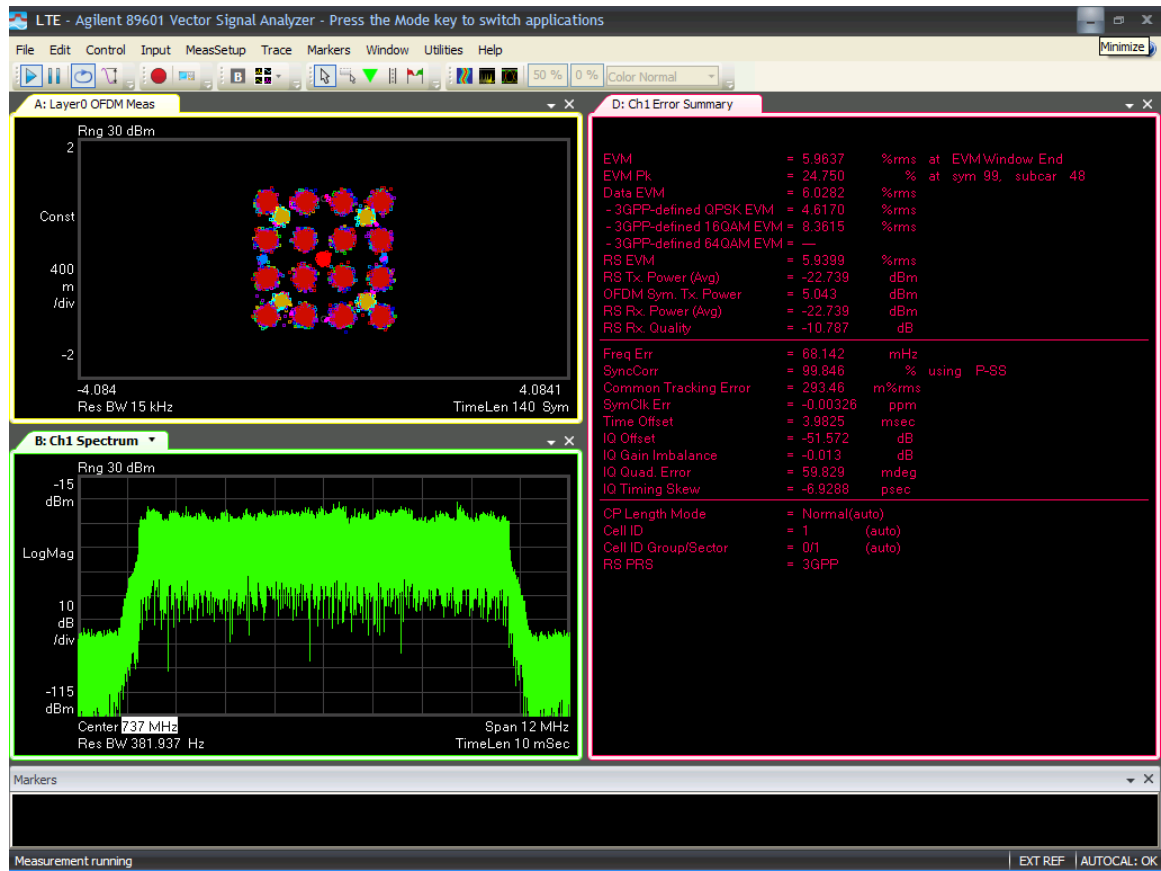
10M-Port 2 -737MHz-TM2.0



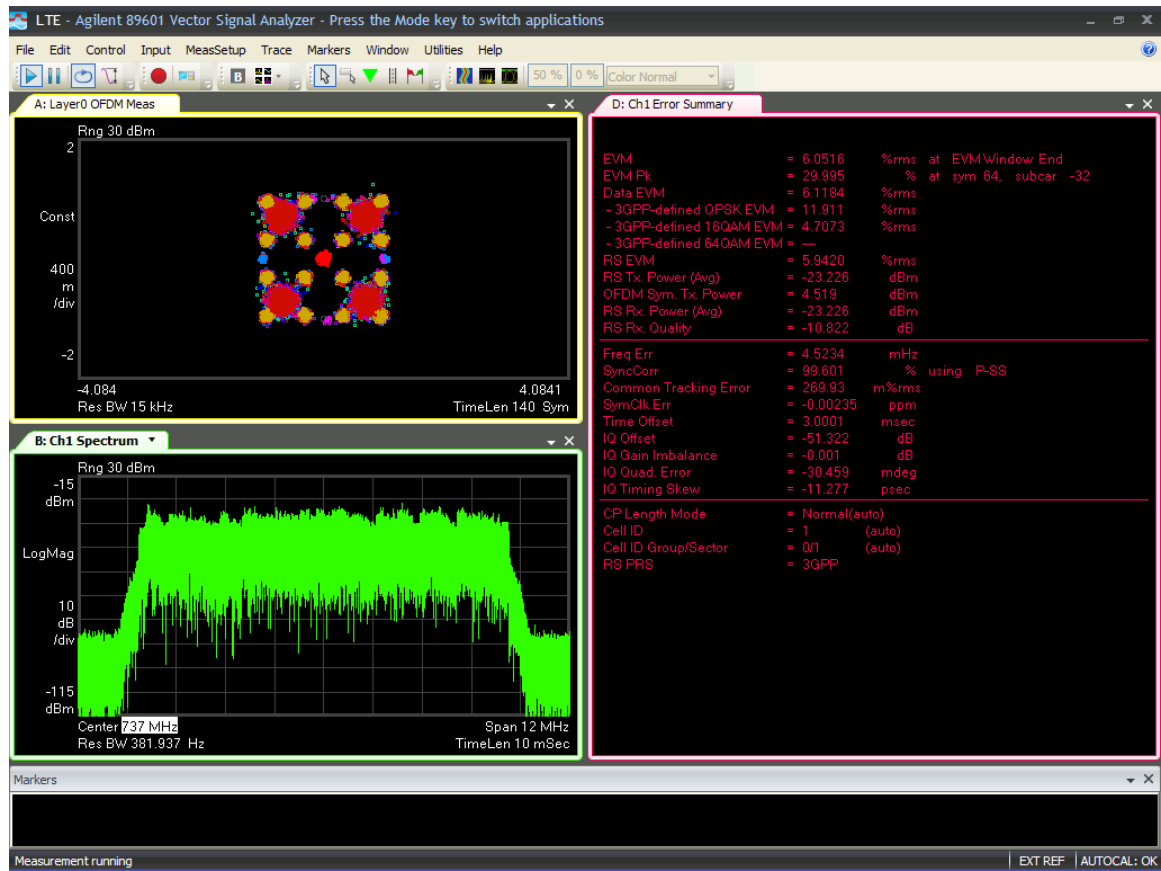
10M-Port 2 -737MHz-TM3.1



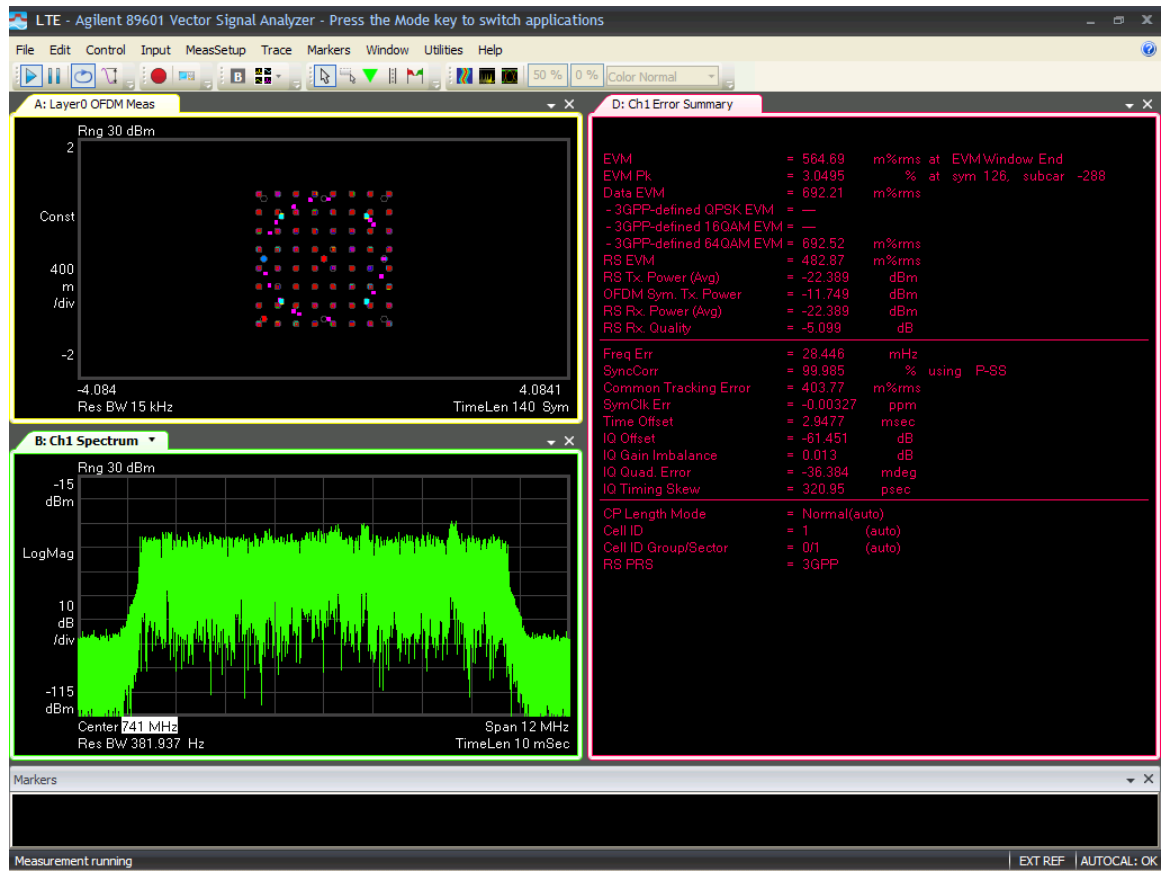
10M-Port 2 -737MHz-TM3.2



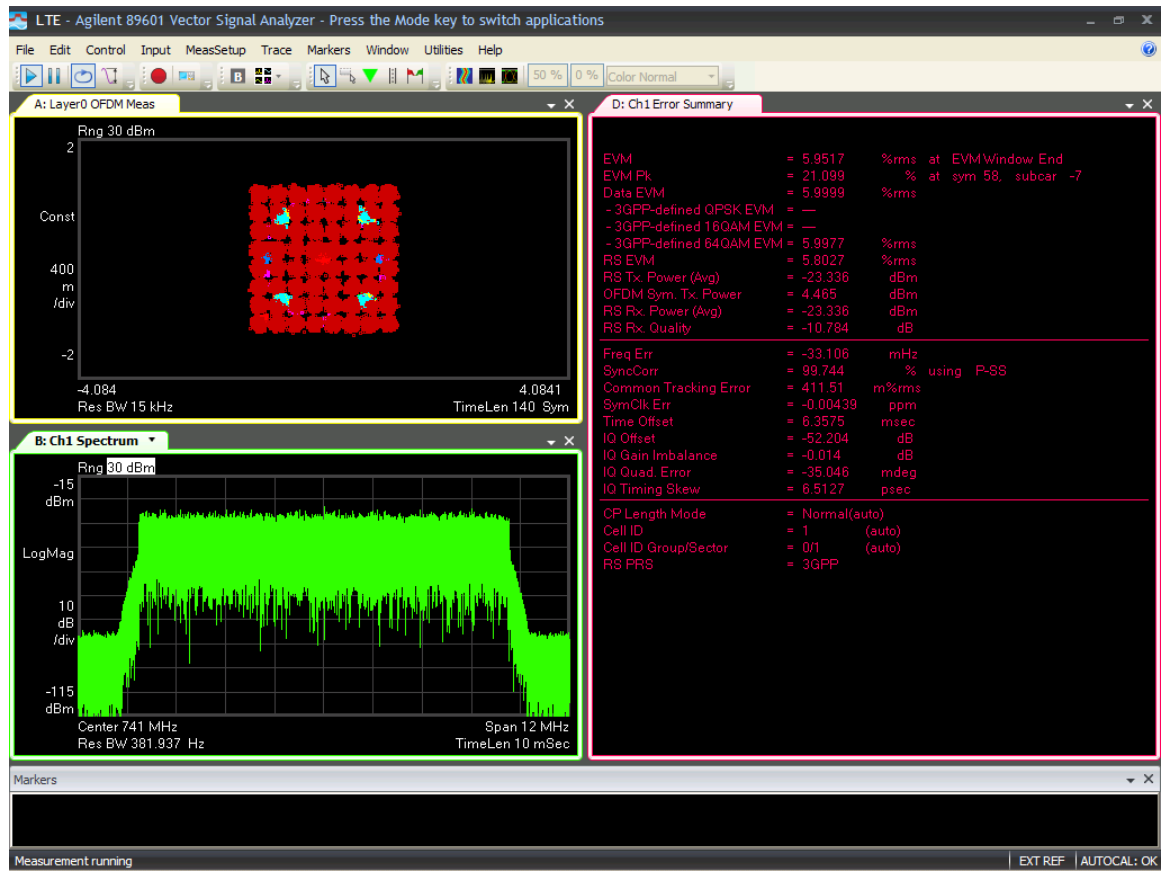
10M-Port 2 -737MHz-TM3.3



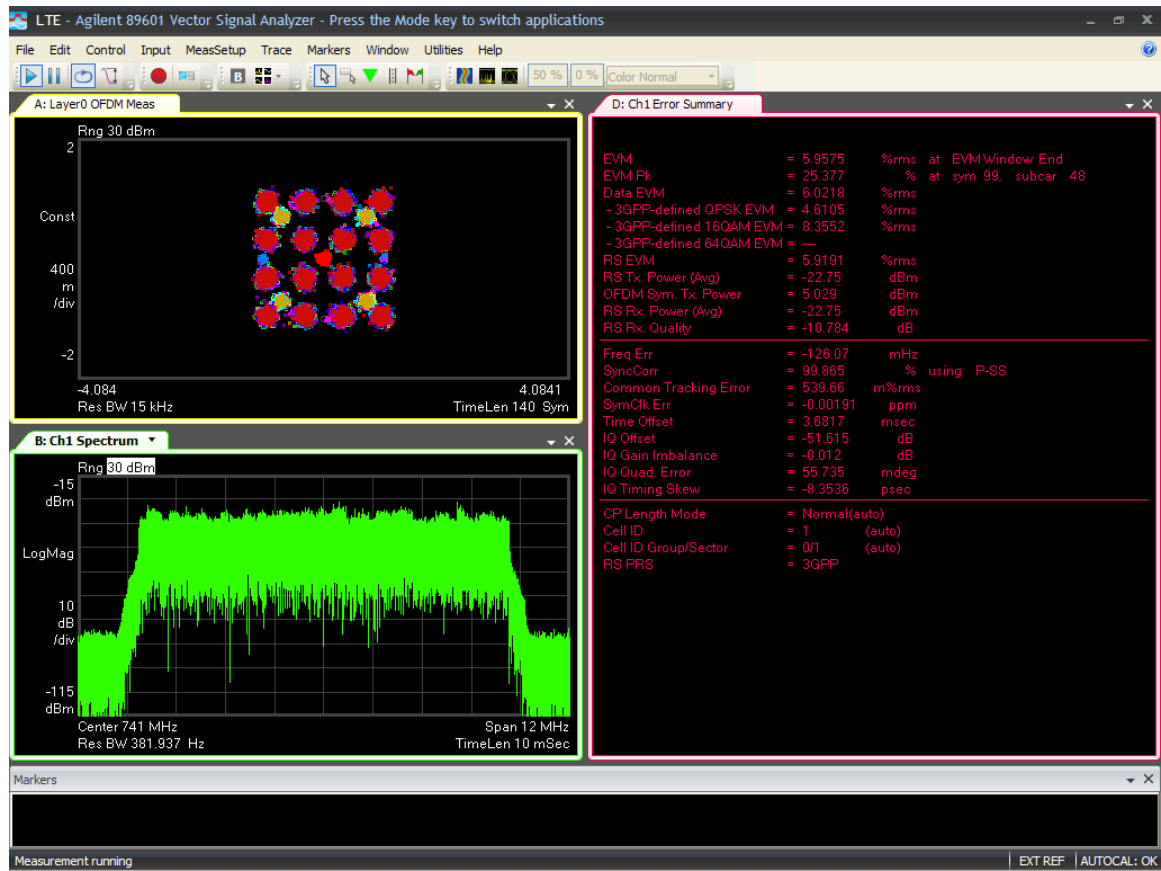
10M-Port 2 -741MHz-TM2.0



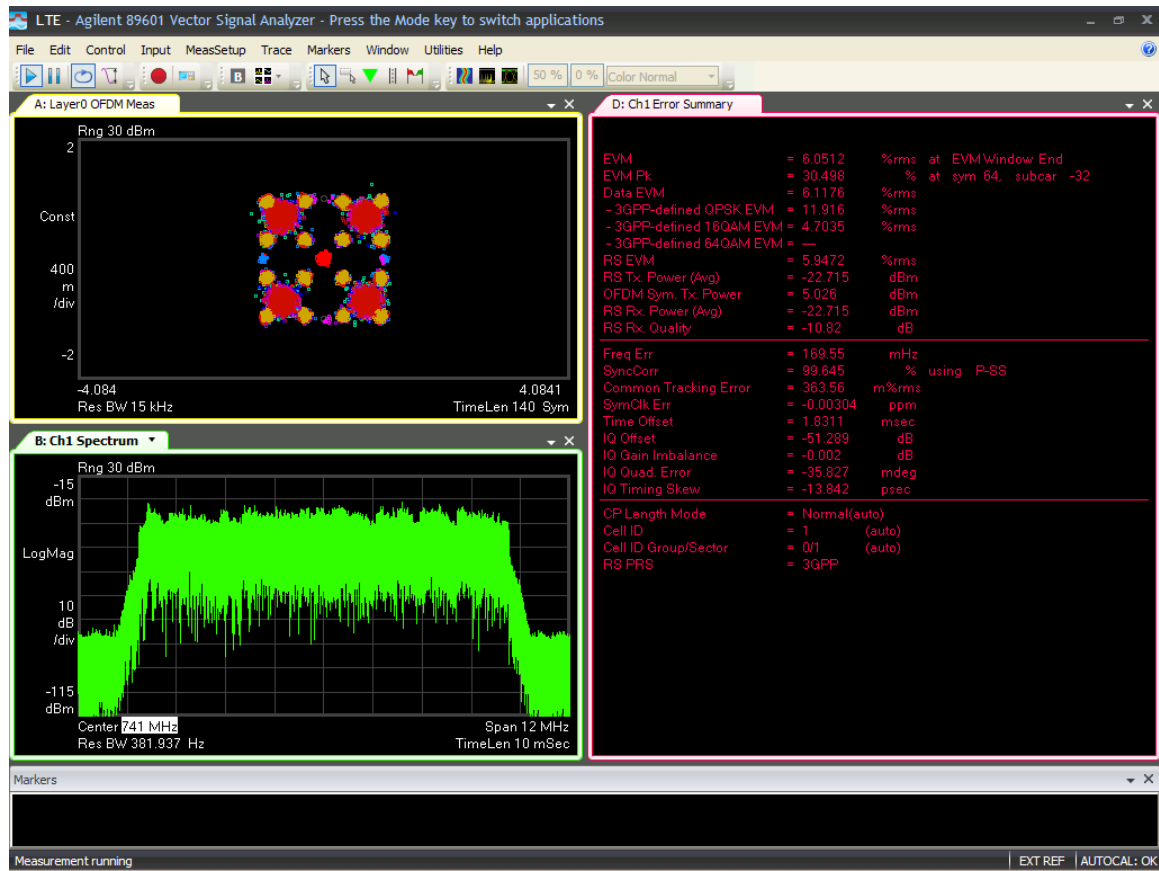
10M-Port 2 -741MHz-TM3.1



10M-Port 2 -741MHz-TM3.2



10M-Port 2 -741MHz-TM3.3

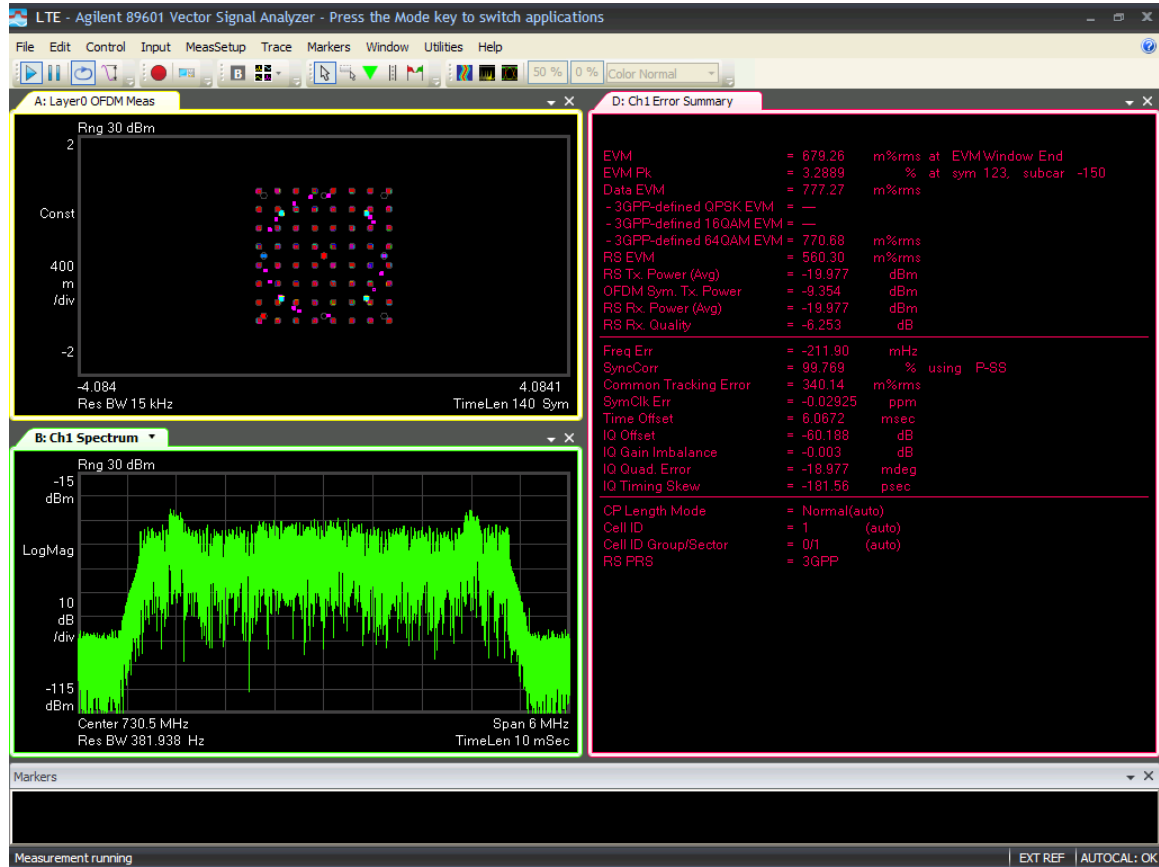


Channel Bandwidth :5M

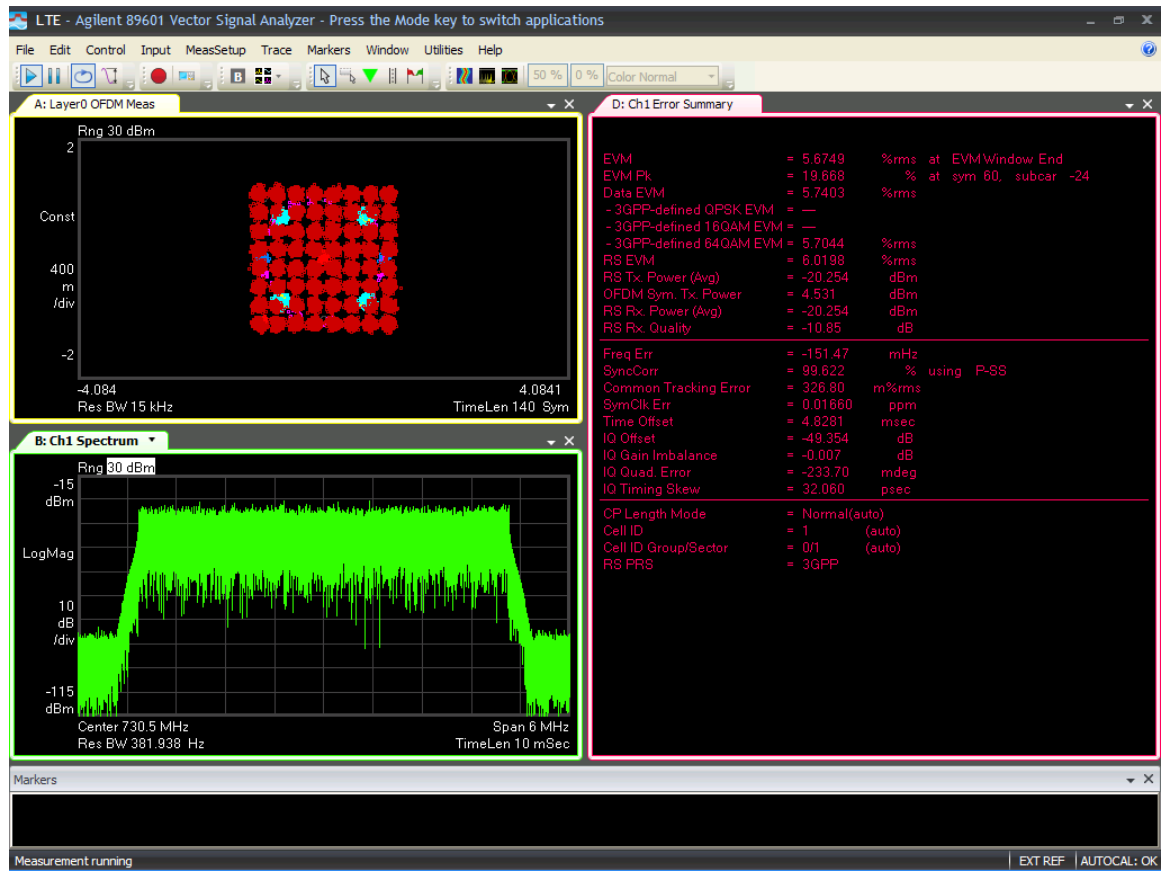
Port	Frequency (MHz)	Test mode	EVM
1	730.5	TM2.0	0.77
		TM3.1	5.70
		TM3.2	8.08
		TM3.3	9.97
	737	TM2.0	0.71
		TM3.1	5.68
		TM3.2	8.05
		TM3.3	9.95
	743.5	TM2.0	0.78
		TM3.1	5.70
		TM3.2	8.06
		TM3.3	9.95
2	730.5	TM2.0	0.73
		TM3.1	5.75
		TM3.2	8.12
		TM3.3	10.00
	737	TM2.0	0.68
		TM3.1	5.70
		TM3.2	8.07
		TM3.3	9.99
	743.5	TM2.0	0.74
		TM3.1	5.71
		TM3.2	8.07
		TM3.3	9.99

		TM3.2	8.07
		TM3.3	9.99

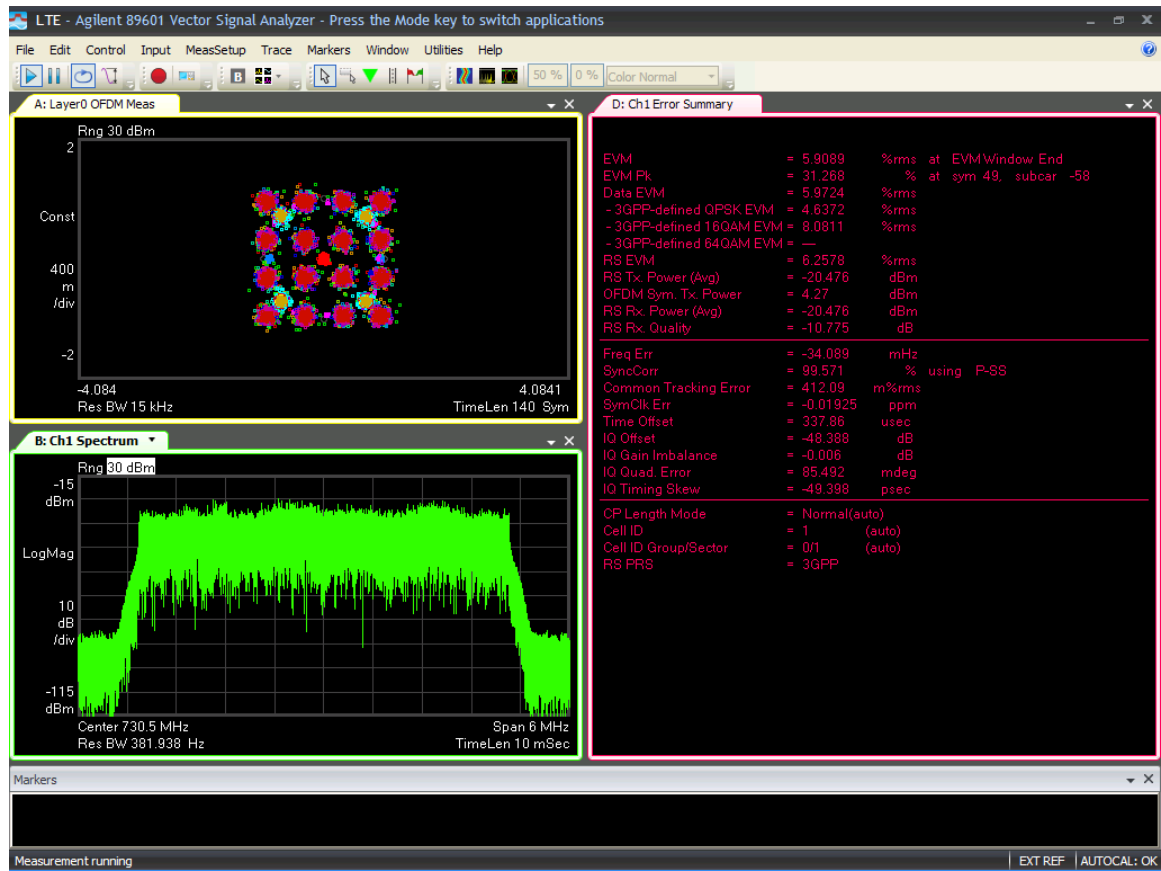
5M-Port 1 -730.5MHz-TM2.0



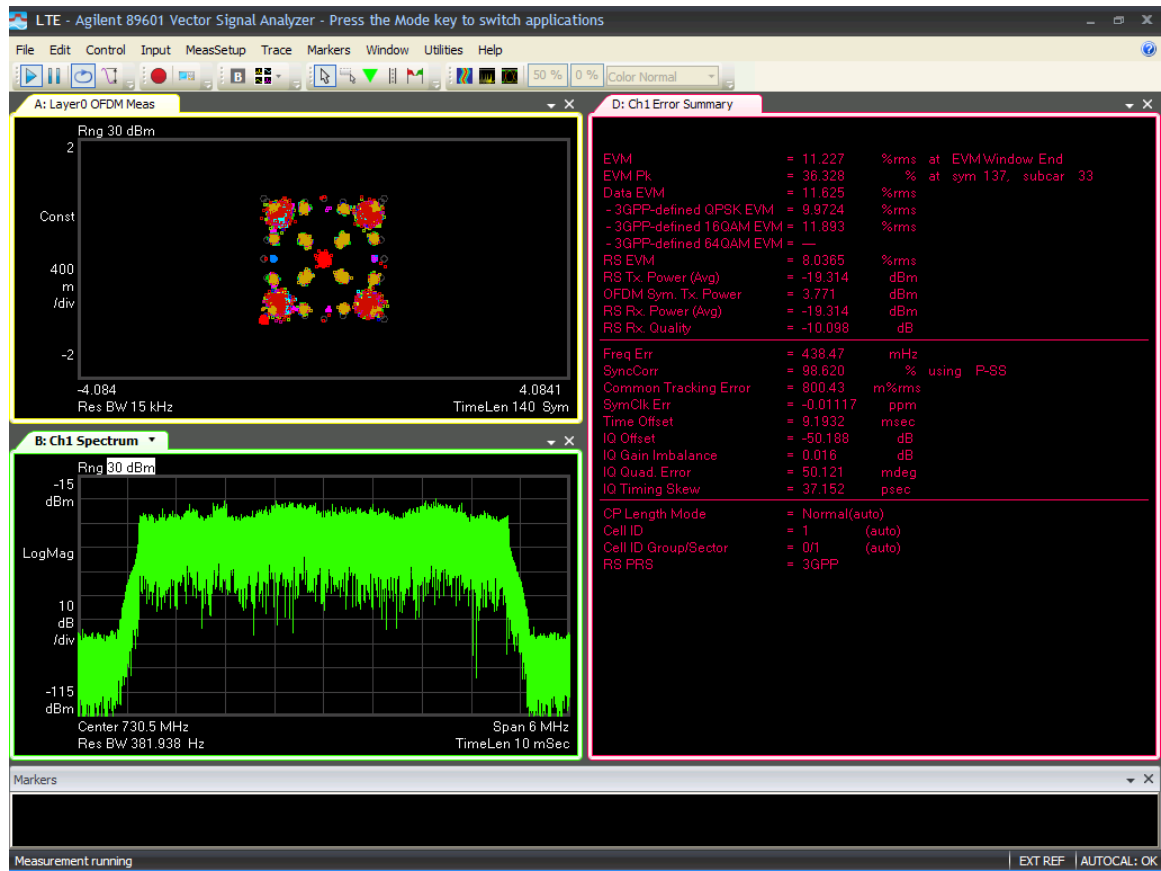
5M-Port 1 -730.5MHz-TM3.1



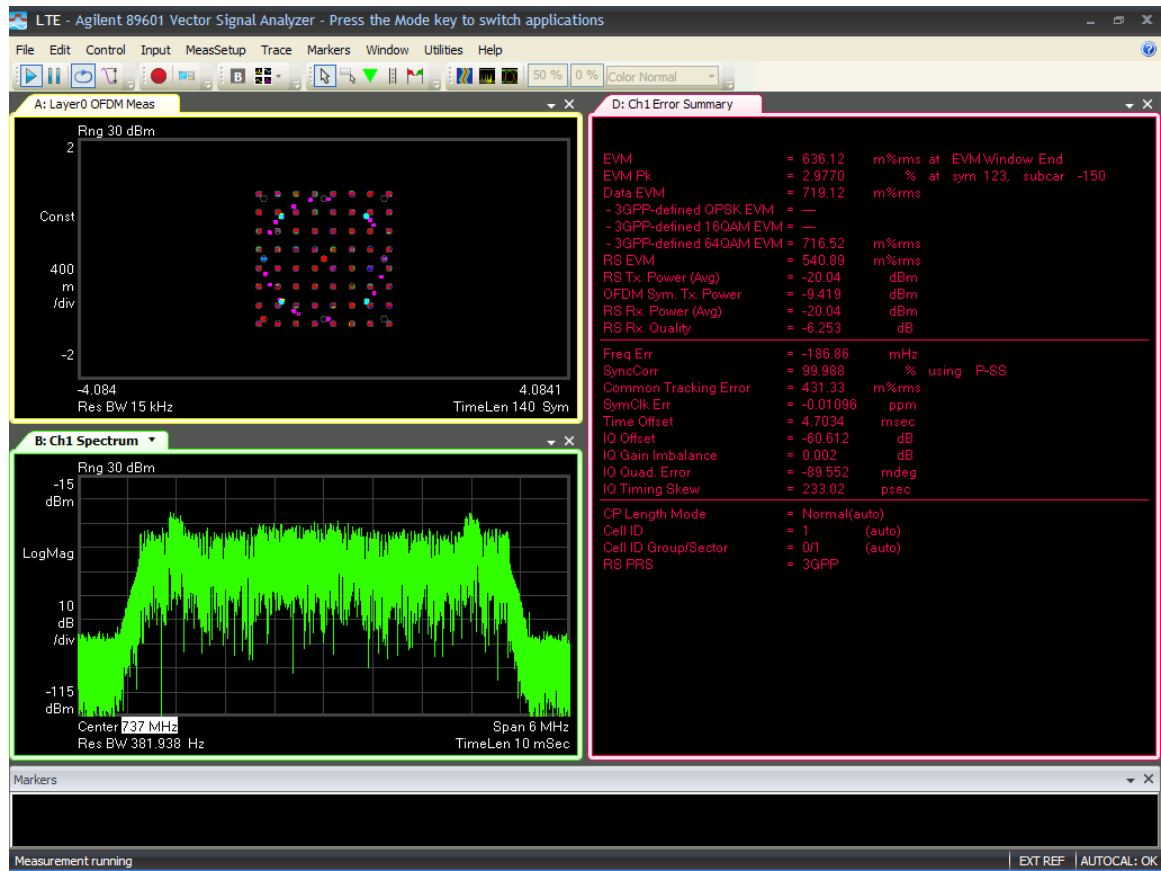
5M-Port 1 -730.5MHz-TM3.2



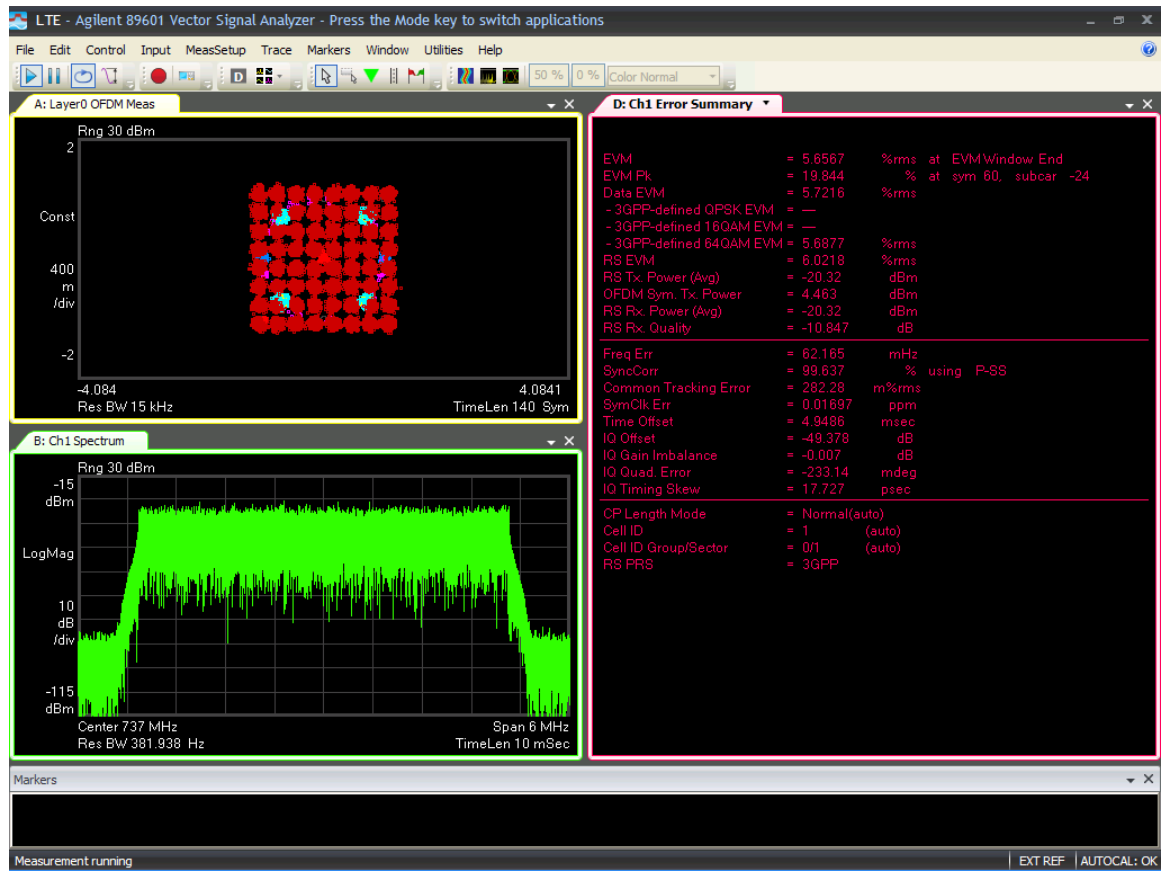
5M-Port 1 -730.5MHz-TM3.3



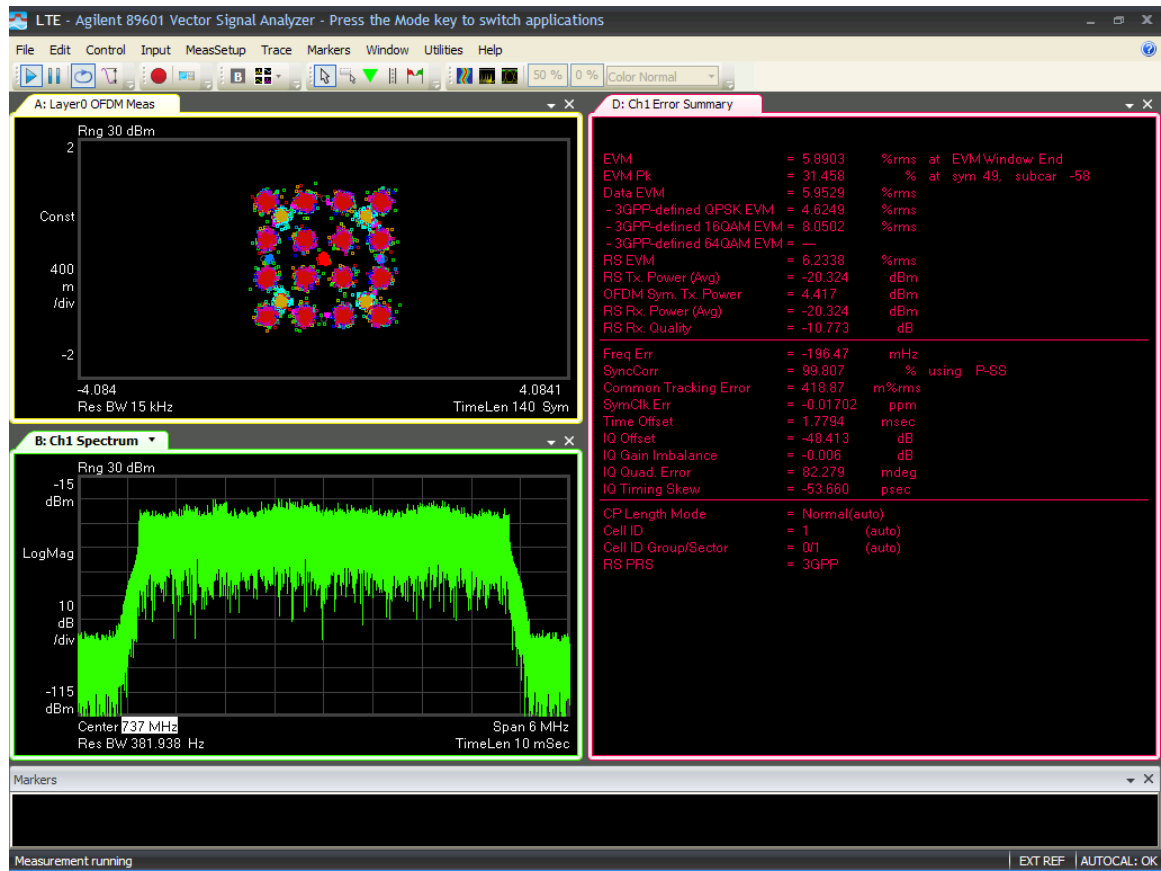
5M-Port 1 -737MHz-TM2.0



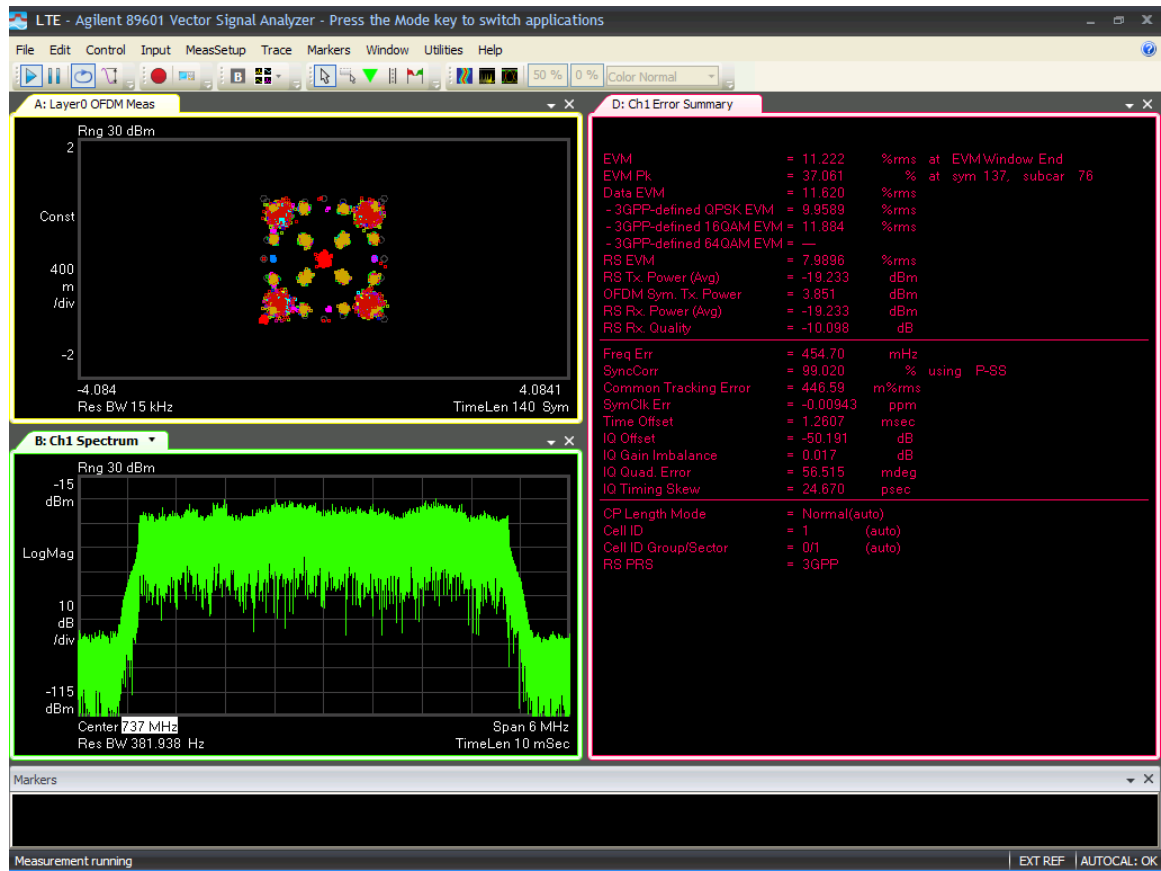
5M-Port 1 -737MHz-TM3.1



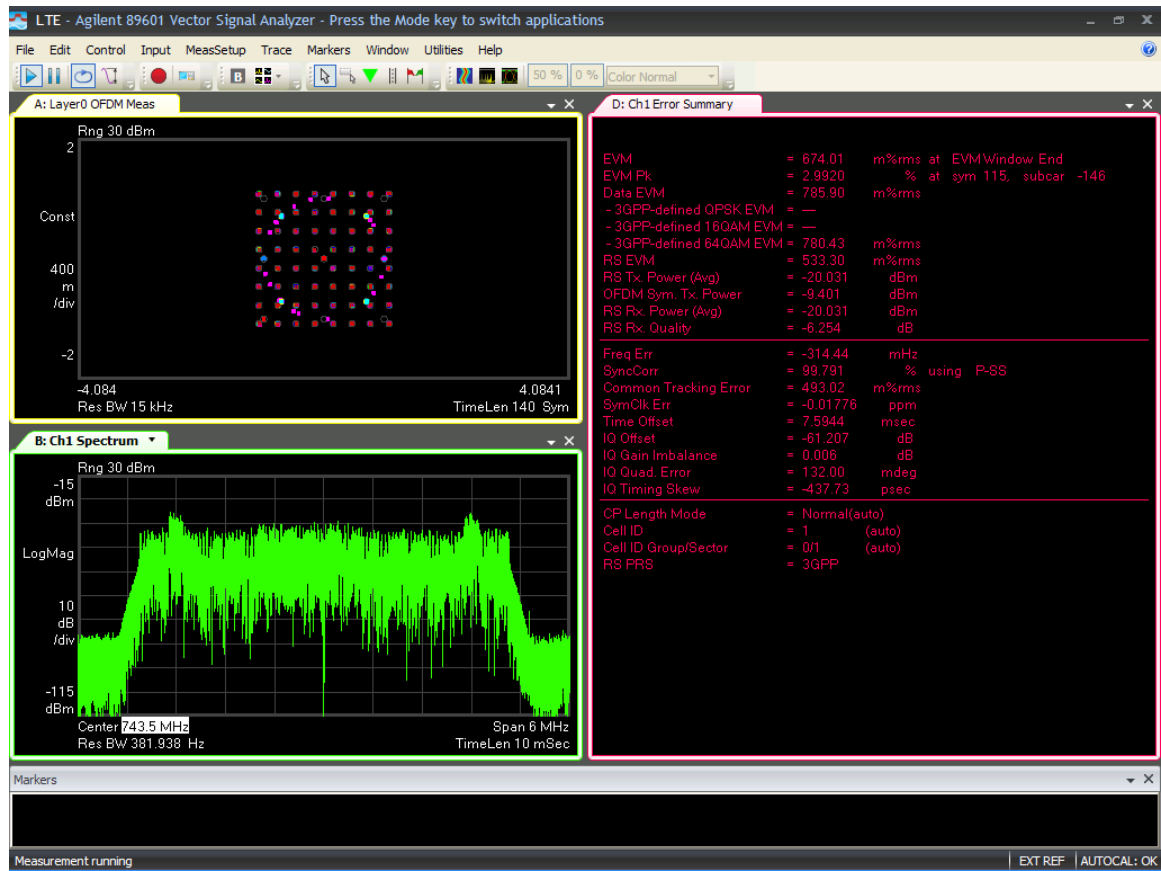
5M-Port 1 -737MHz-TM3.2



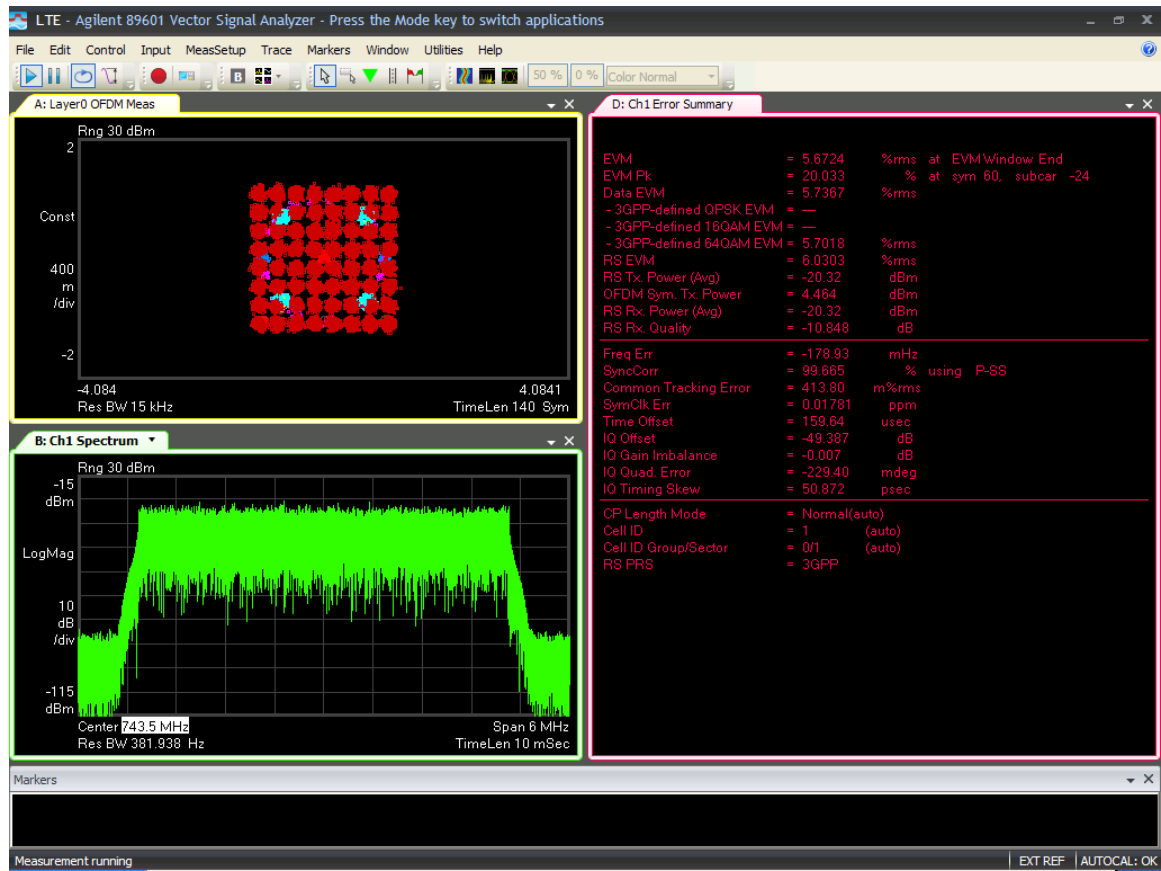
5M-Port 1 -737MHz-TM3.3



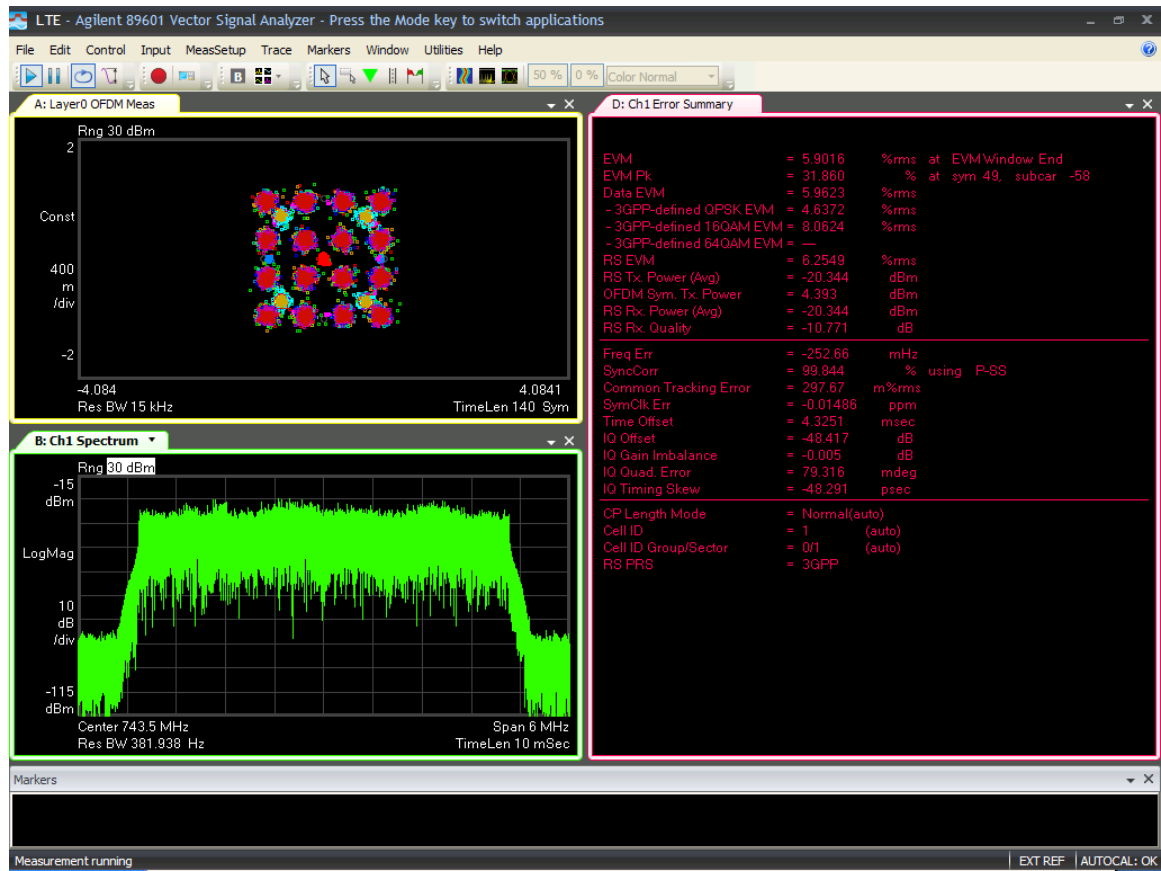
5M-Port 1 -743.5MHz-TM2.0



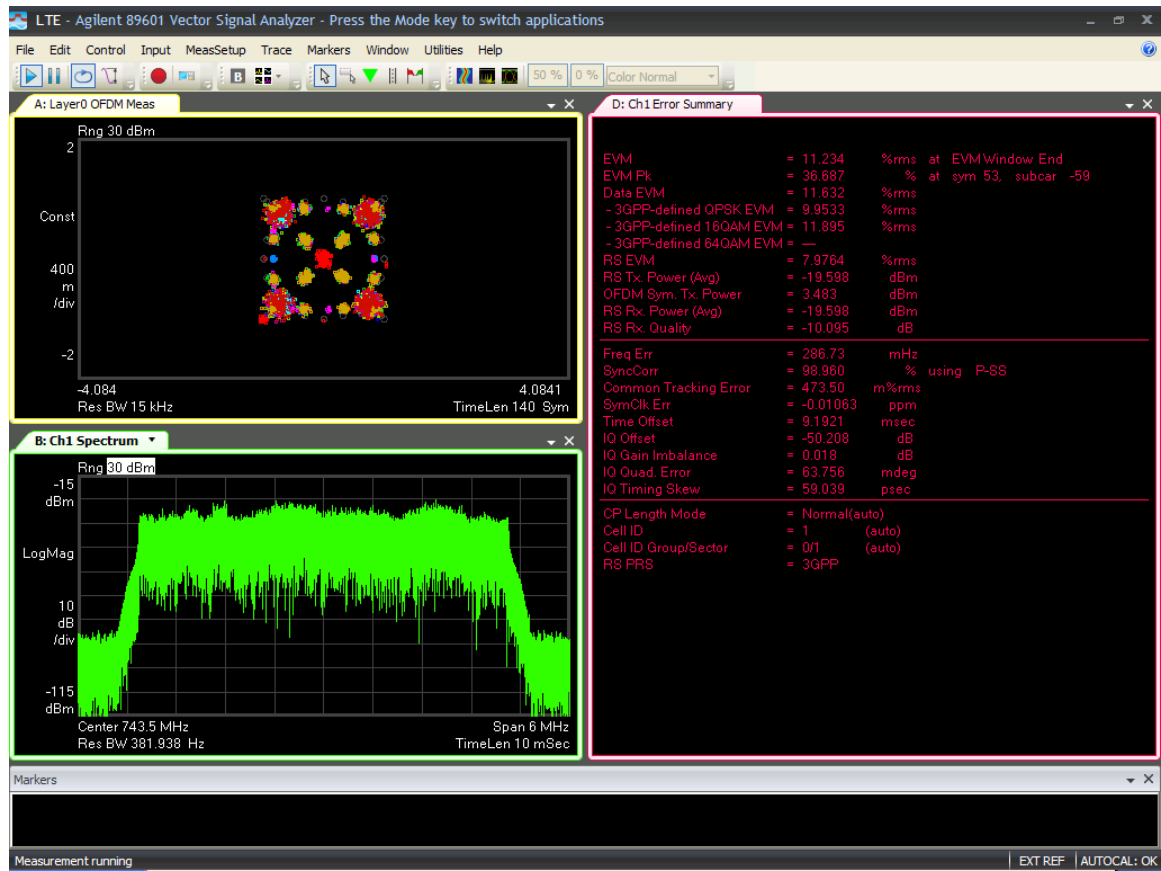
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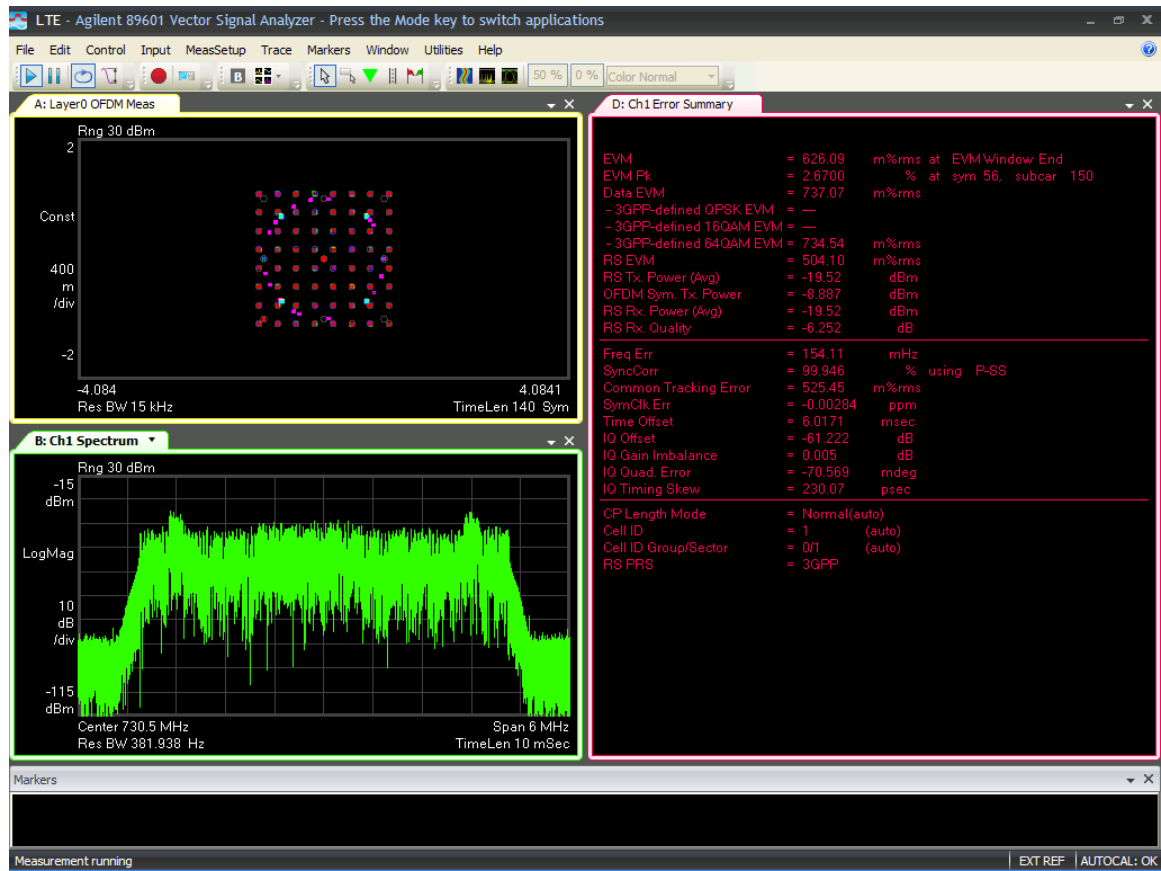
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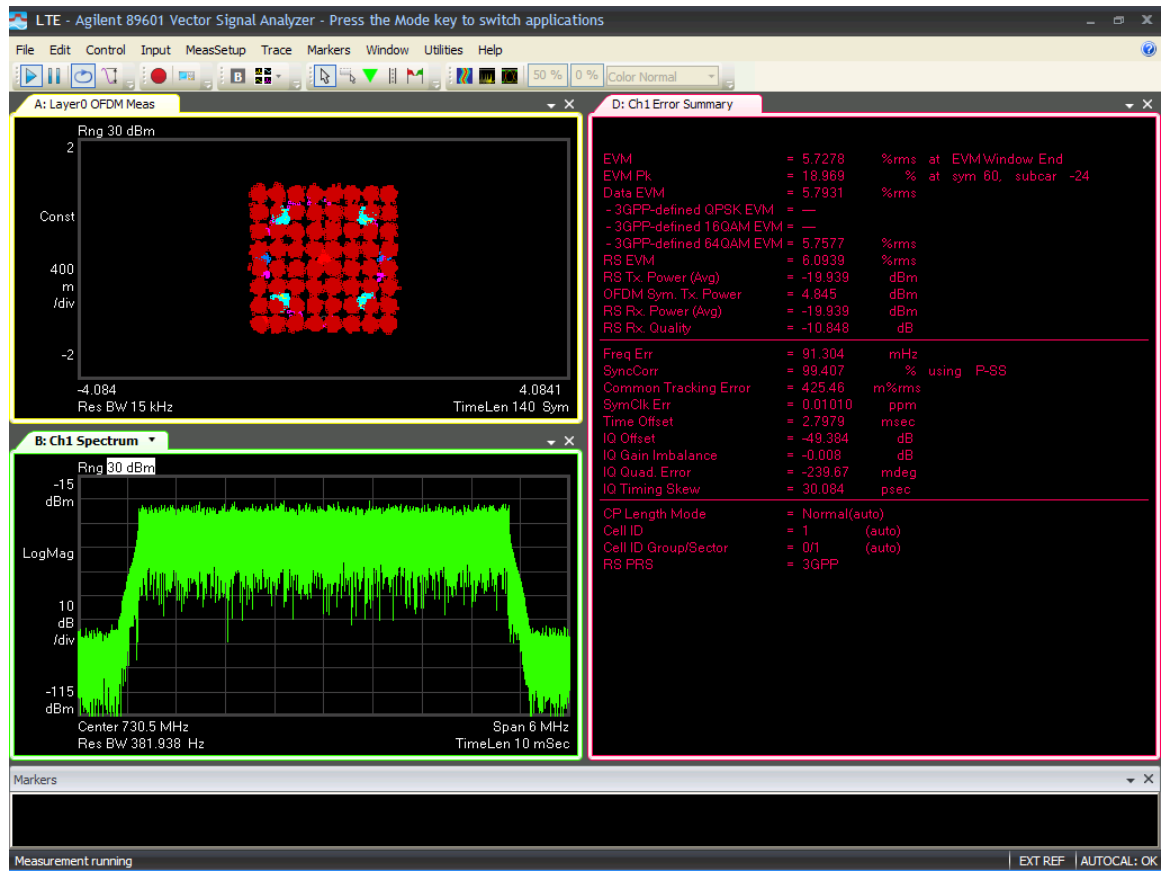
5M-Port 1 -743.5MHz-TM3.3



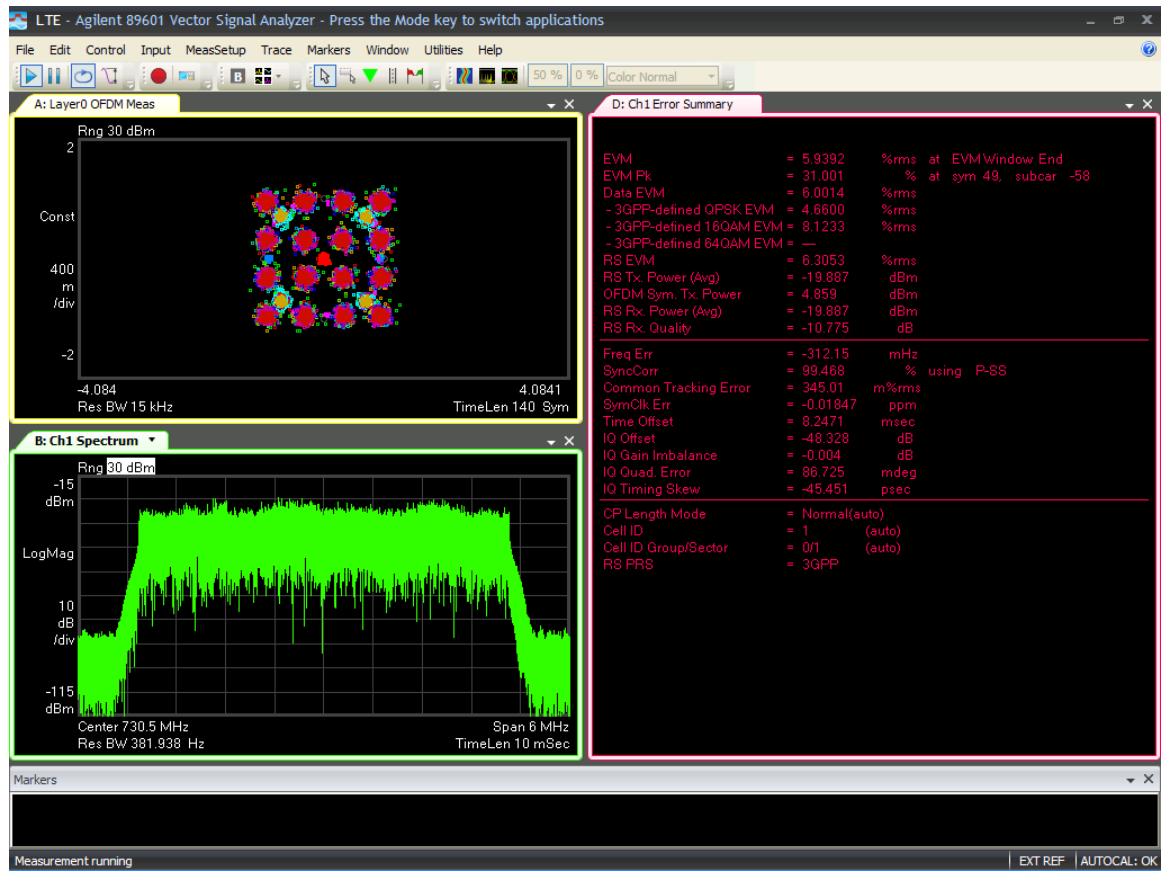
5M-Port 2 -730.5MHz-TM2.0



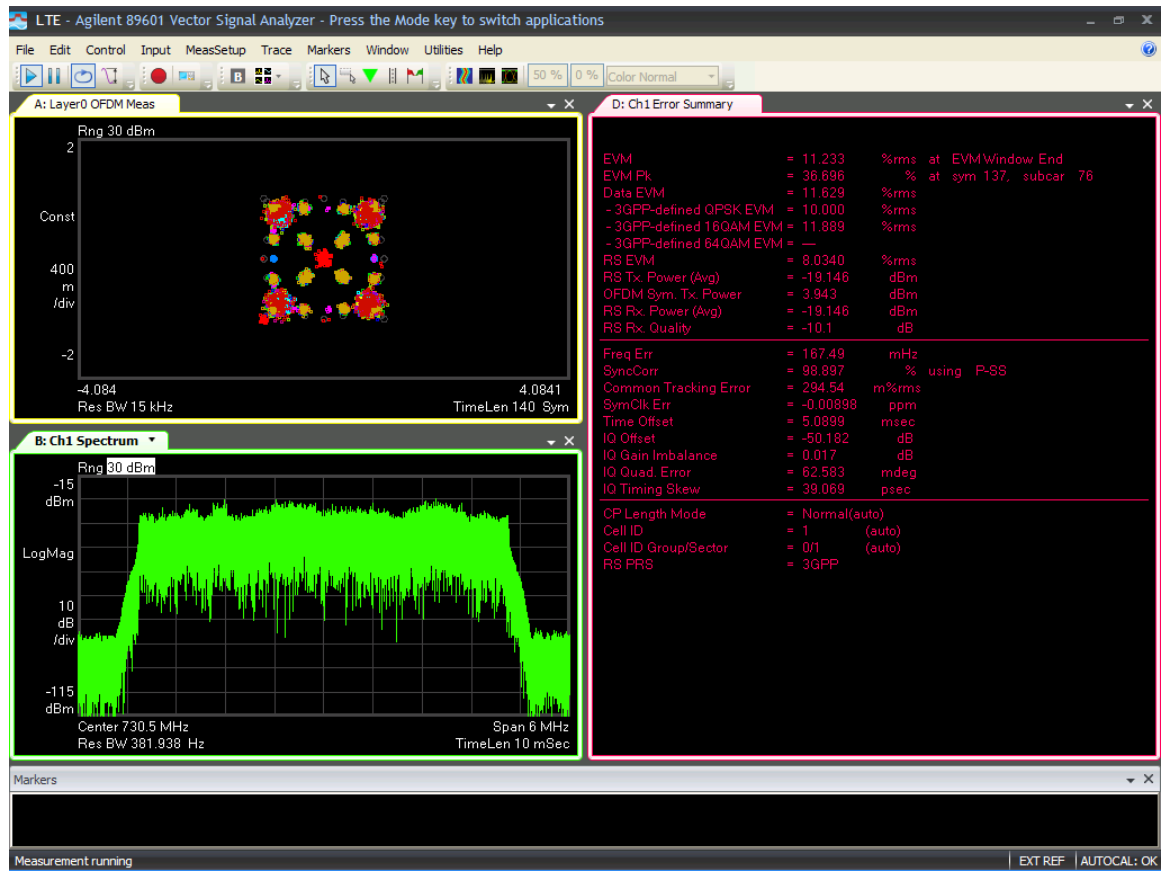
5M-Port 2 -730.5MHz-TM3.1



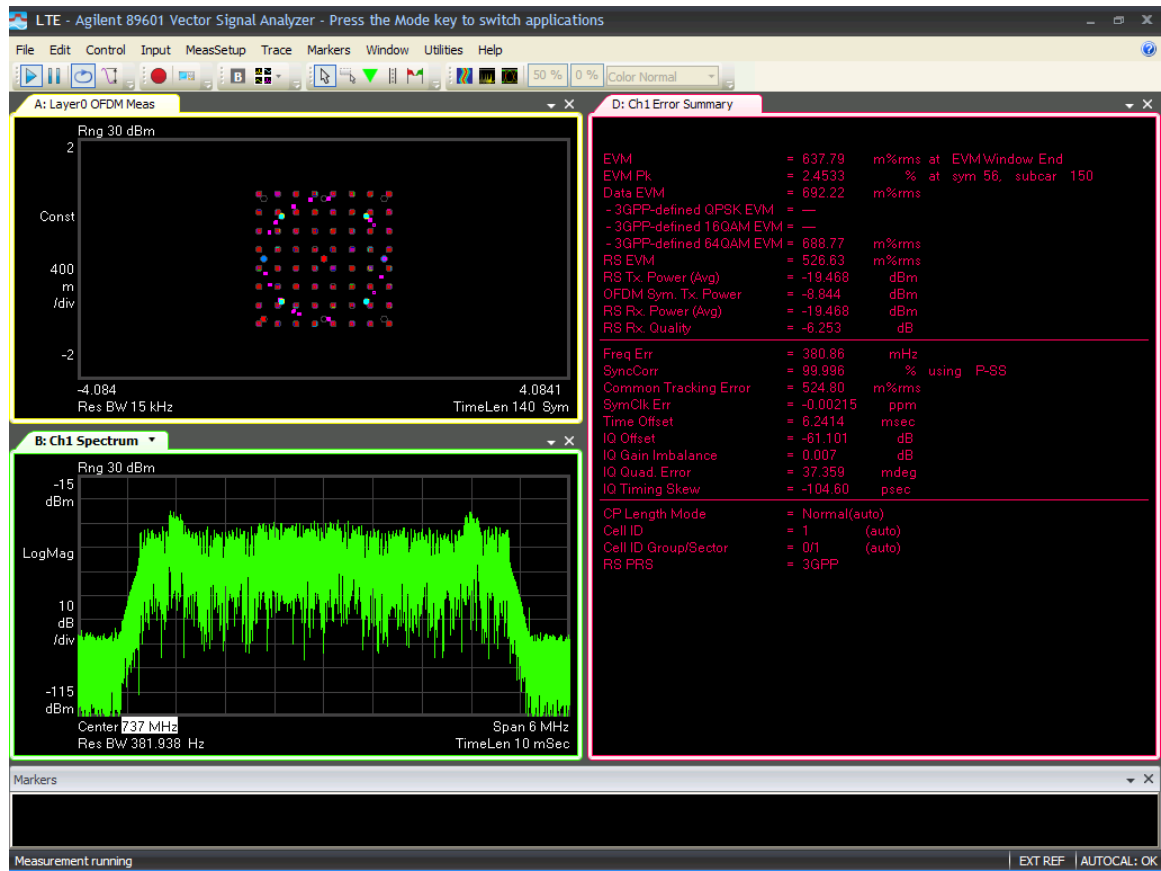
5M-Port 2 -730.5MHz-TM3.2



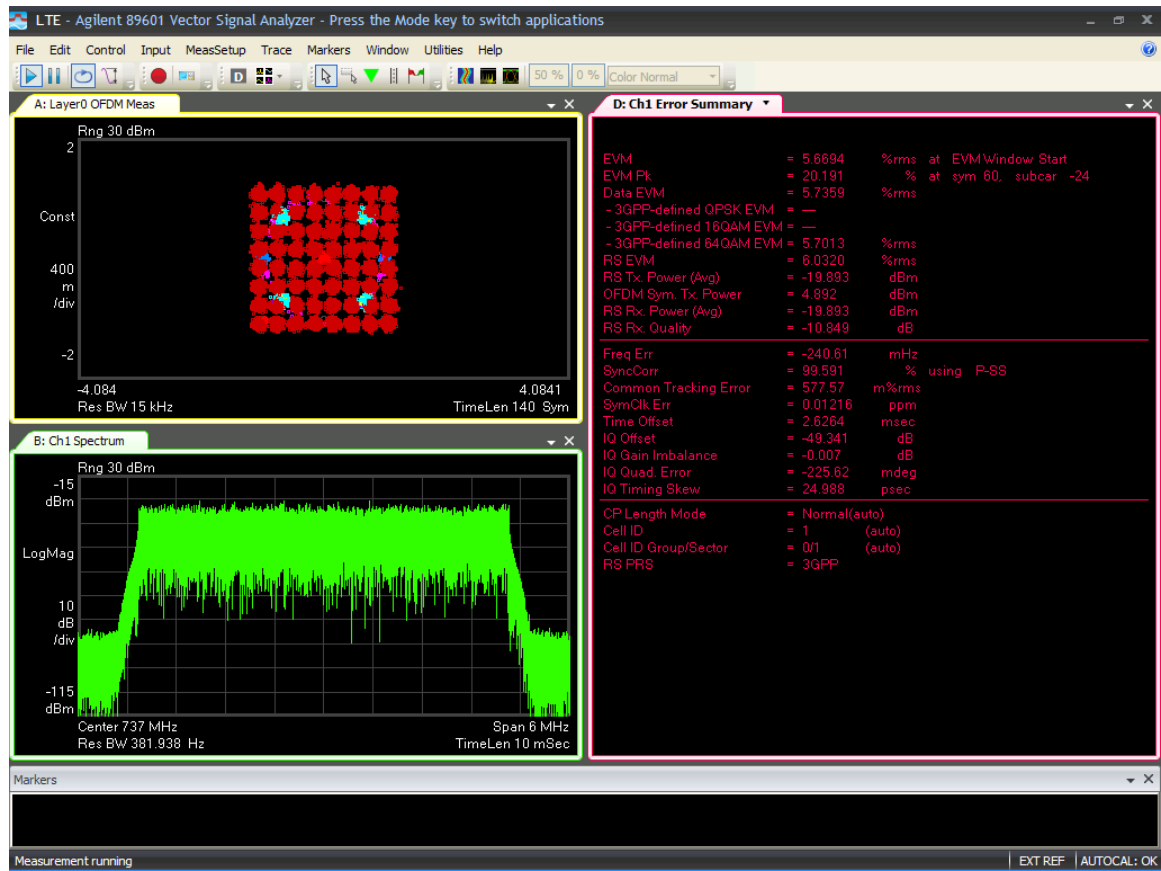
5M-Port 2 -730.5MHz-TM3.3



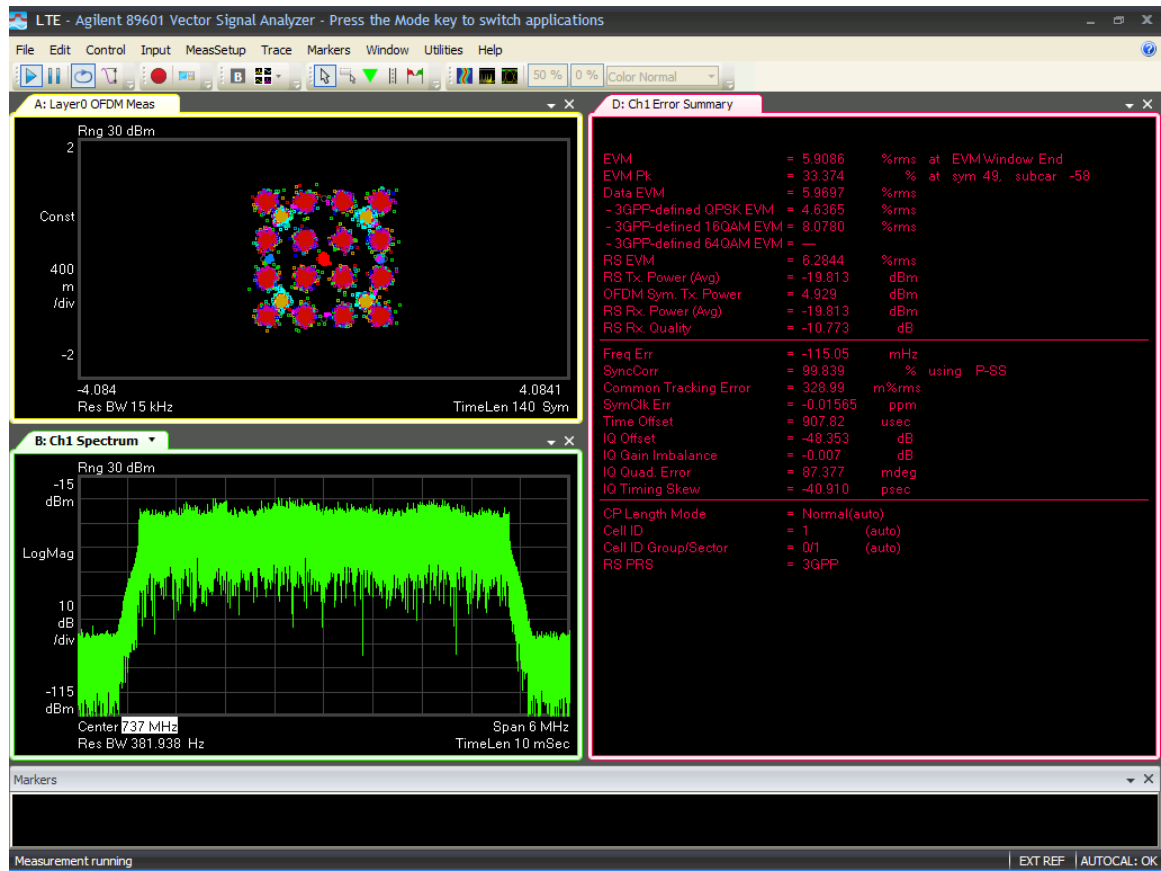
5M-Port 2 -737MHz-TM2.0



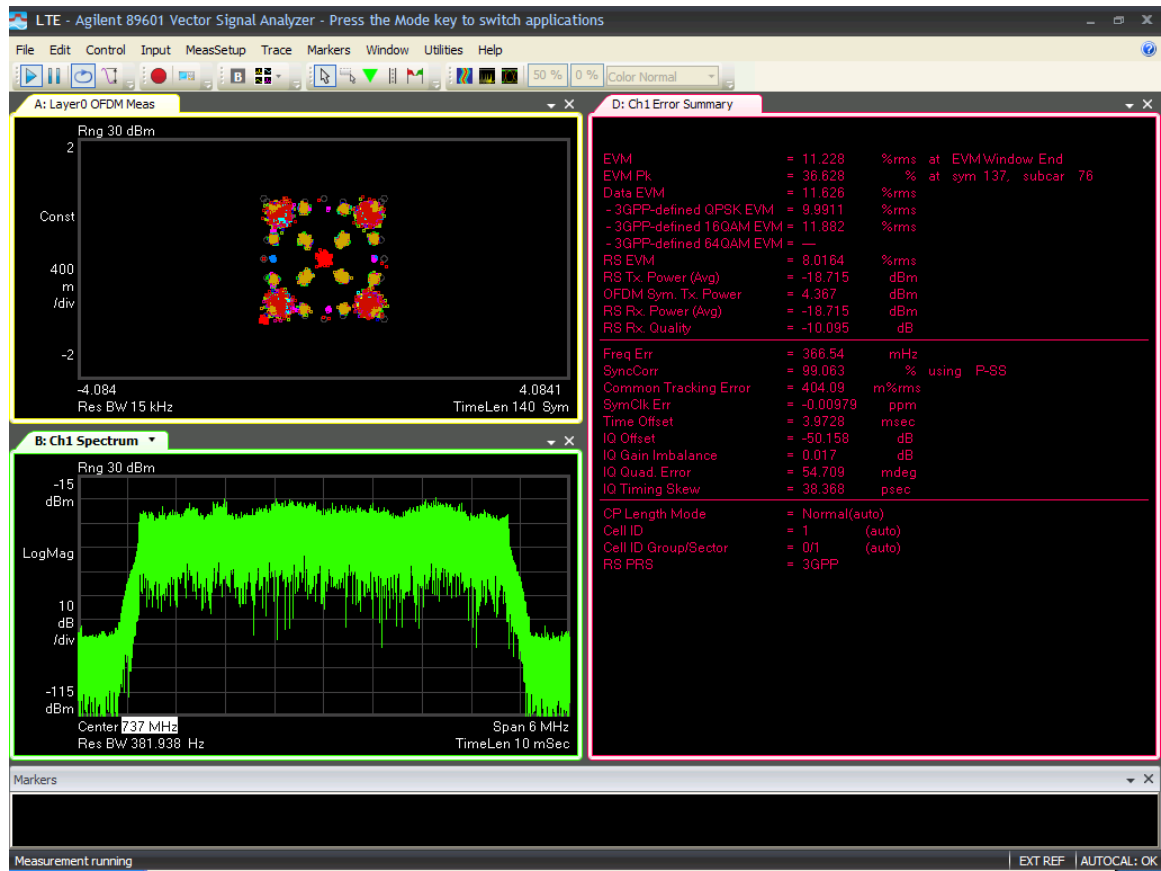
5M-Port 2 -737MHz-TM3.1



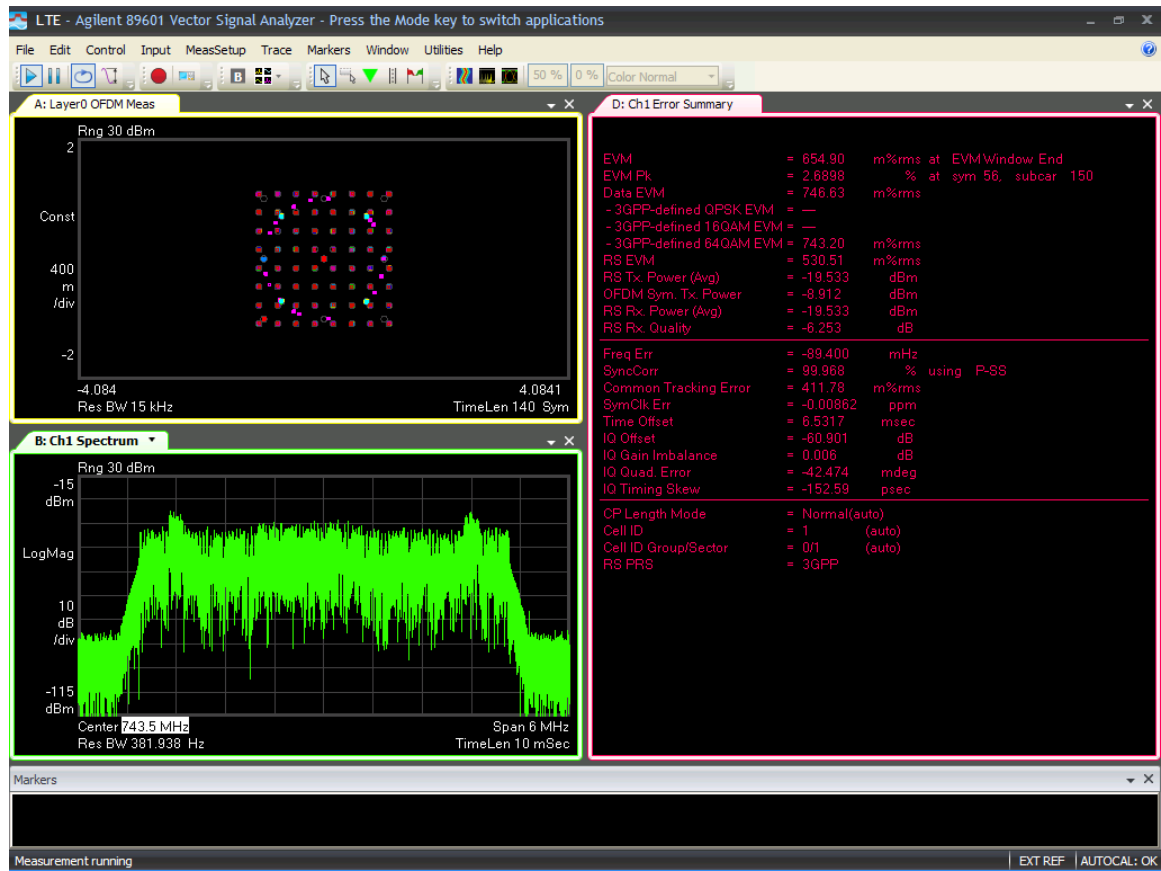
5M-Port 2 -737MHz-TM3.2



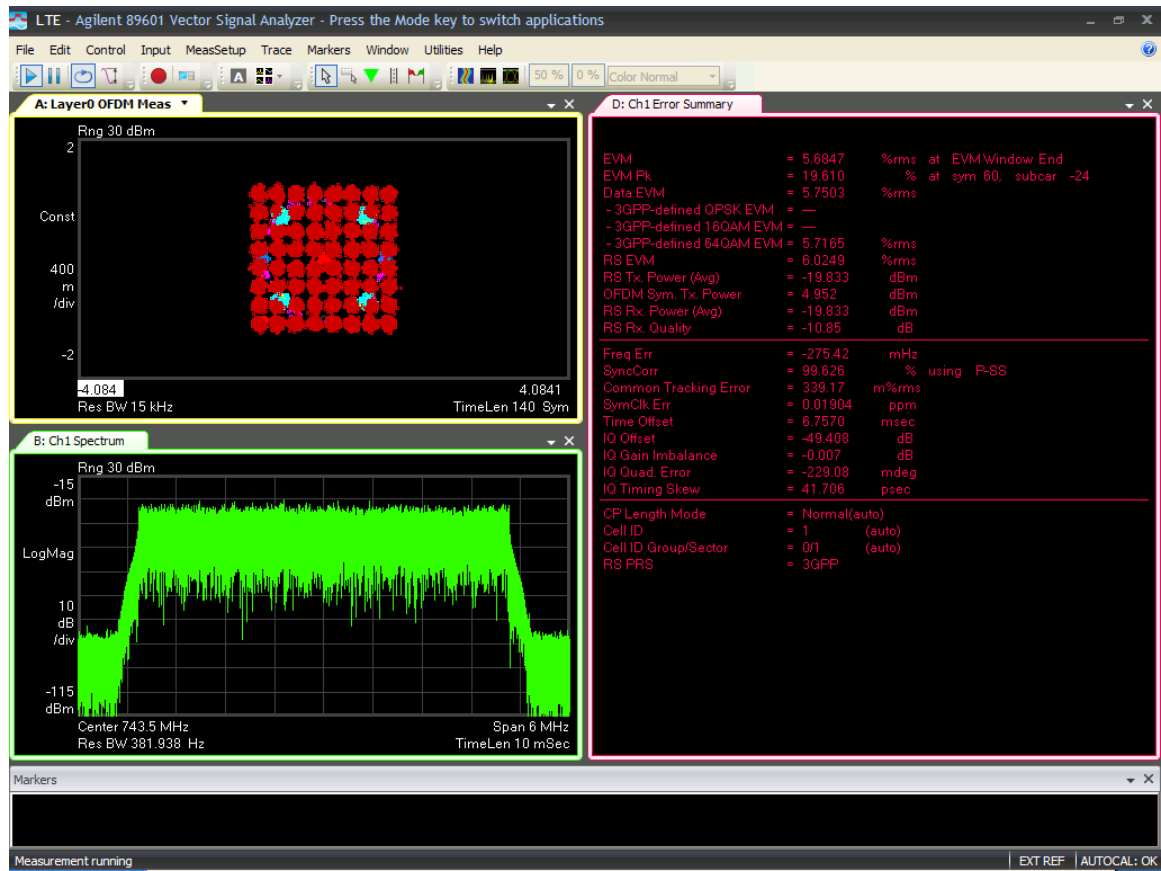
5M-Port 2 -737MHz-TM3.3



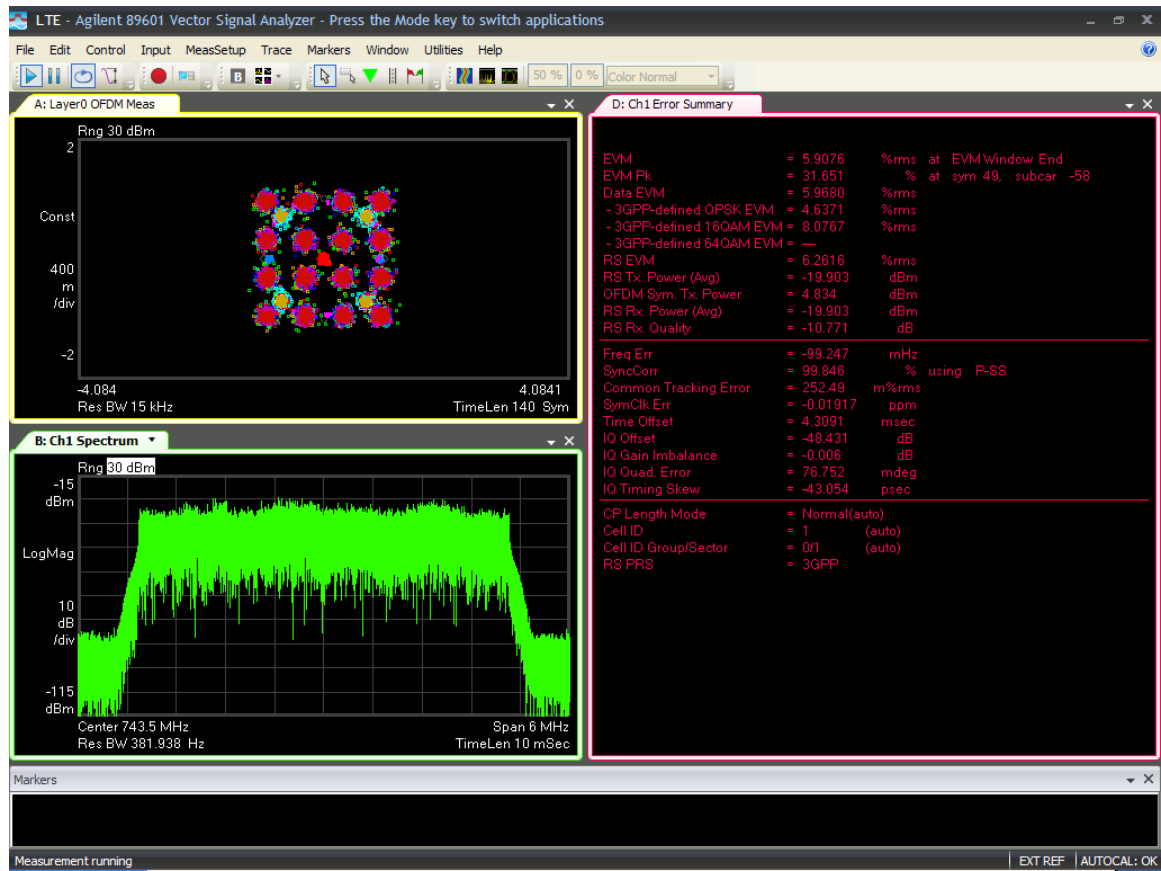
5M-Port 2 -743.5MHz-TM2.0



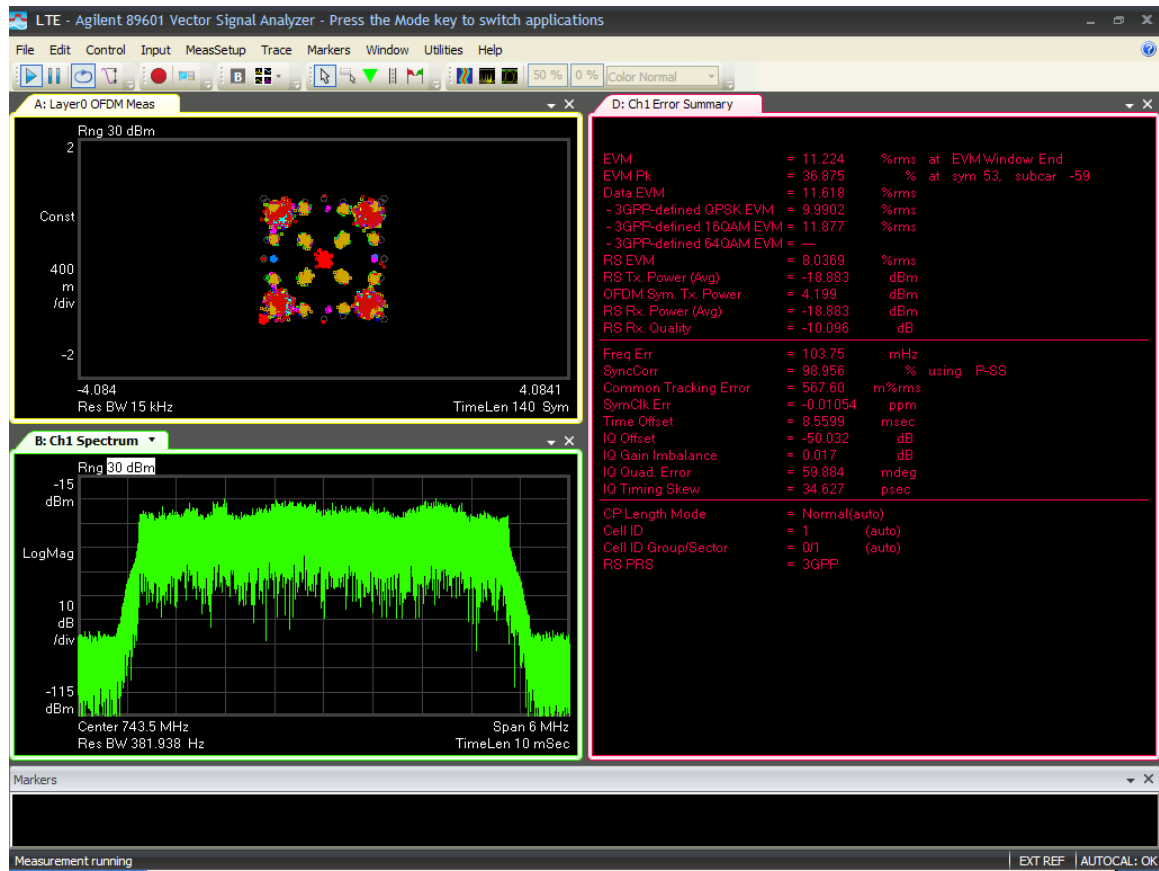
5M-Port 2 -743.5MHz-TM3.1



5M-Port 2 -743.5MHz-TM3.2



5M-Port 2 -743.5MHz-TM3.3



8 SPURIOUS RADIATED EMISSIONS

Applicable Standard: FCC CFR 47 §2.1053

Test Equipment List and Details

Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
R&S	SIGNAL GENERATOR	SMR20	A00017351	2010-10-29	1 year
Albatross	Anechoic Chamber	3m Site	A00017354	2010-6-30	1 year
R&S	EMI Test Receiver	ESIB26	100058	2010-10-29	1 year
R&S	Ultra Breitband Antennas	HL562	100022	2010-8-5	1 year
R&S	Double-Ridged	HF906	100032	2010-8-5	1 year

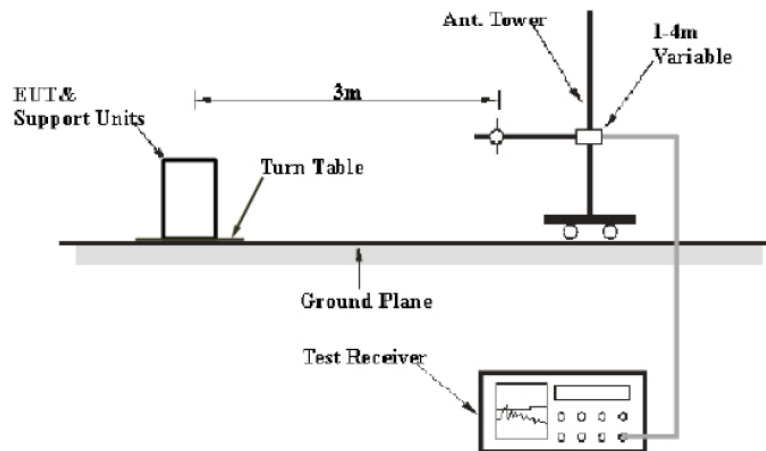
	Waveguide Horn Antenna				
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100446	2010-8-5	1 year
SCHWARZ-BECK	Biconical Antenna	VUBA9117	9117-122	2010-8-5	1 year

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiated emissions measurement at the EMC lab. is 3.6dB.

EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the FCC part 2.1053. The specification used was the FCC 2.1053 limits.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TX pwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB = 43 + 10 Lg P (power out in Watts)

The resolution bandwidth of the spectrum analyzer was set at 1 percent as specified for

Test Results Summary: PASS

Environmental Conditions

Temperature:	26°C
Relative Humidity:	60 %
ATM Pressure:	1009 mbar

Test data

[illegible]

Report #FCC-2011-031

[illegible]

9 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified.

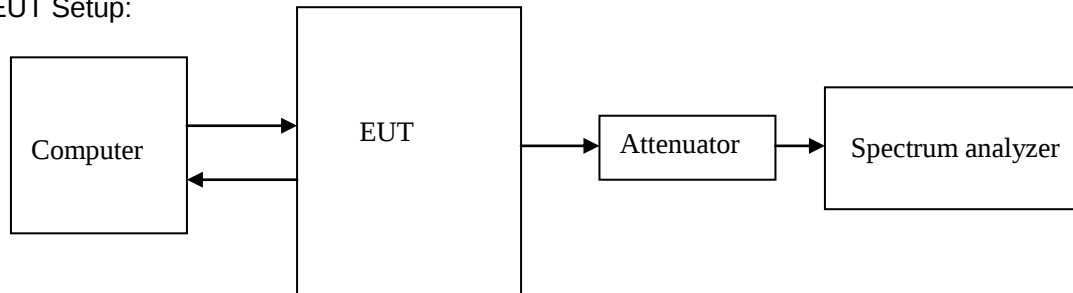
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2015.09.26	2016.09.14
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2015.07.19	2016.07.19

Report #FCC-2011-031

Test Procedure

EUT Setup:



REMARKS: Attenuator loss (dB)=40dB, Cable Loss (dB)=1.5dB.

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.

Test Data Environmental Conditions

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

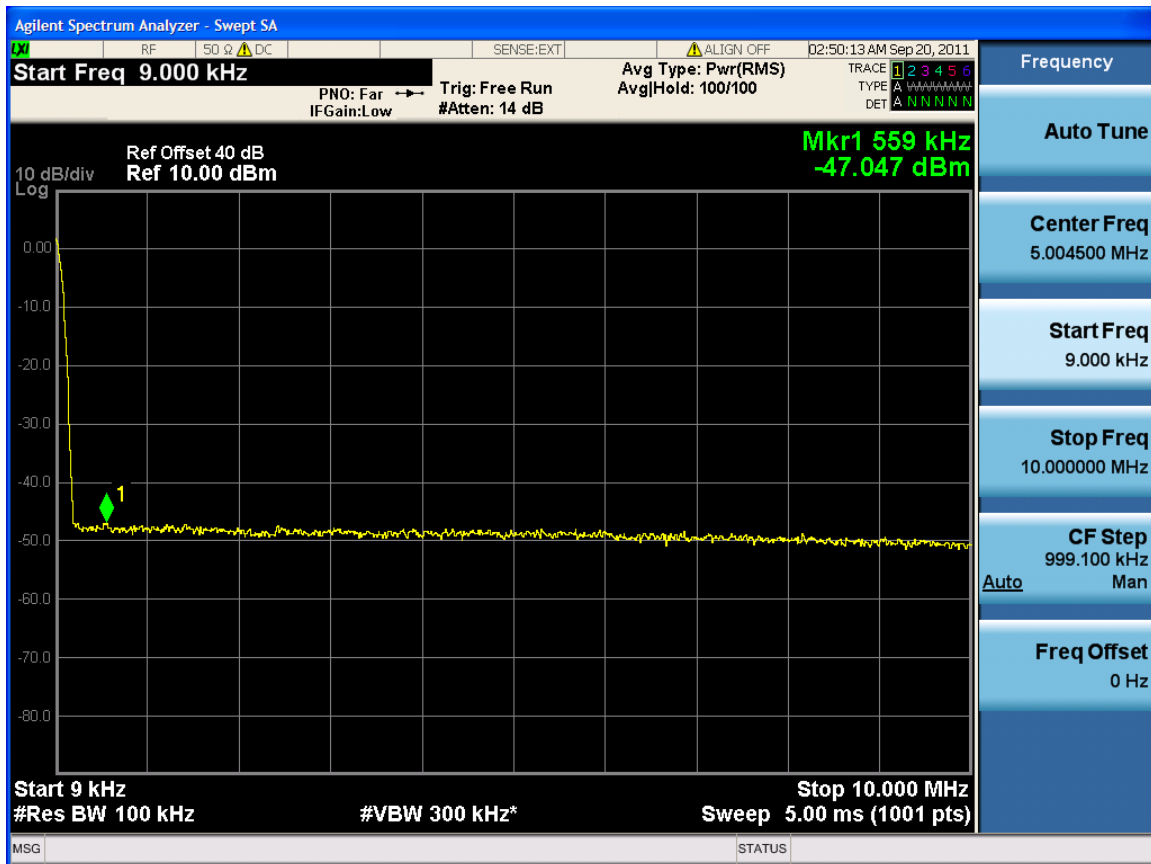
Test Result: Pass

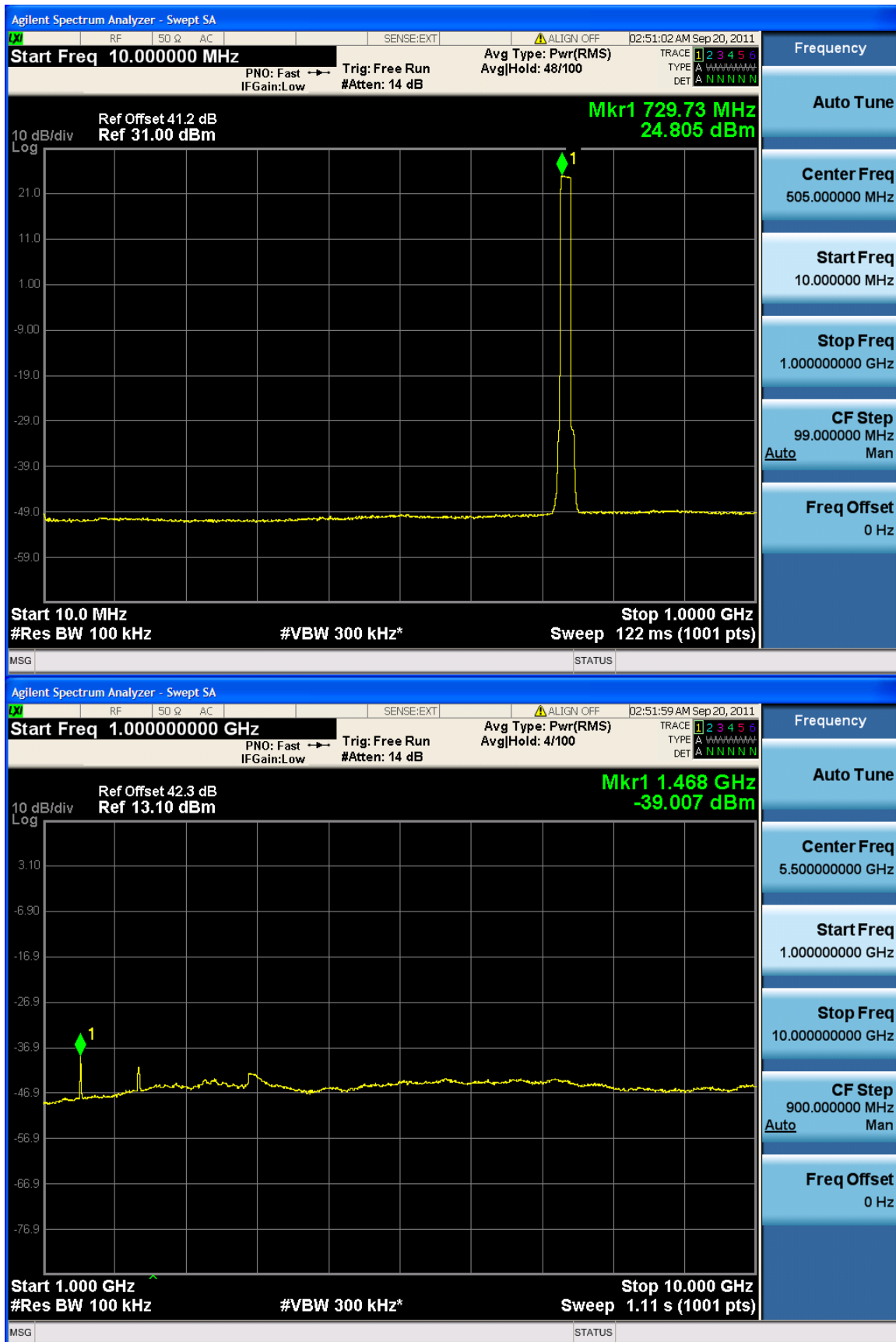
Test Mode: Transmitting LTE

Test Data:

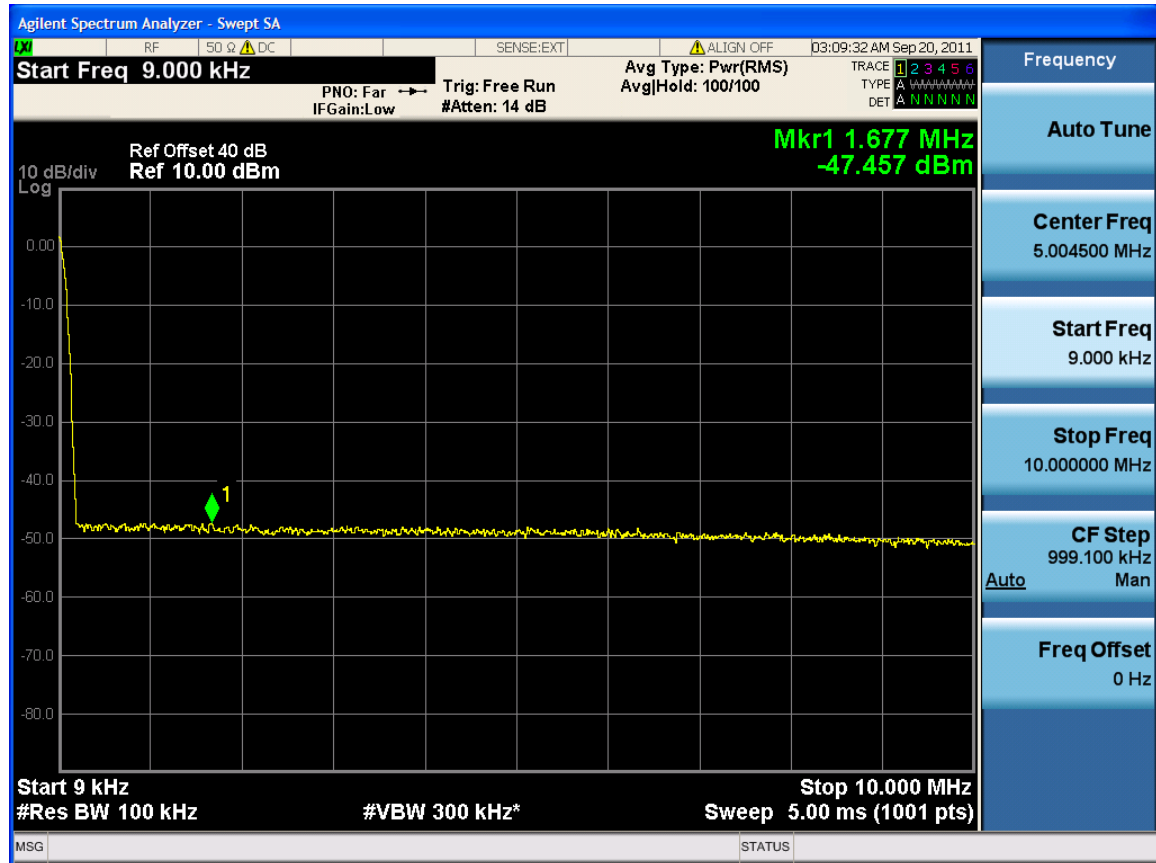
15M-Port 1 -735.5MHz

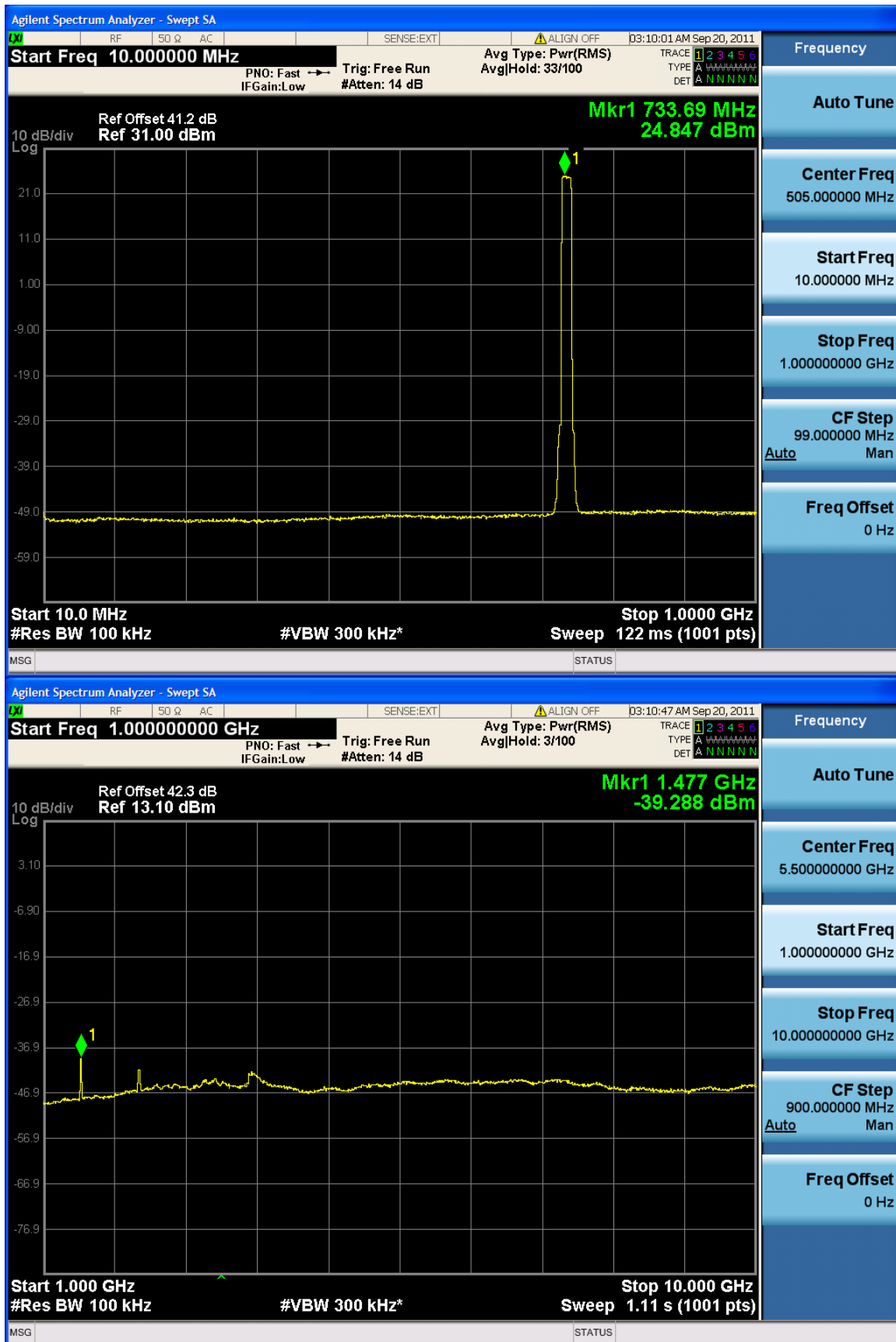
Channel Bandwidth :15M



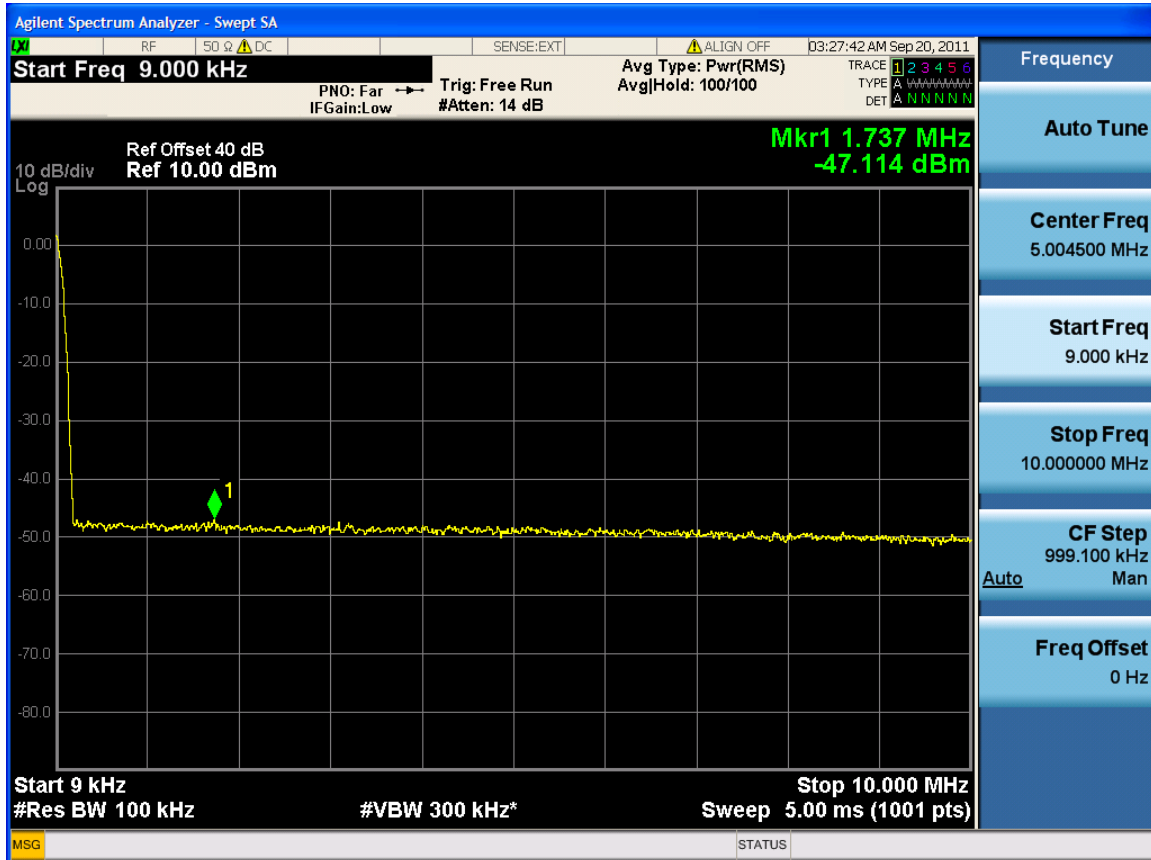


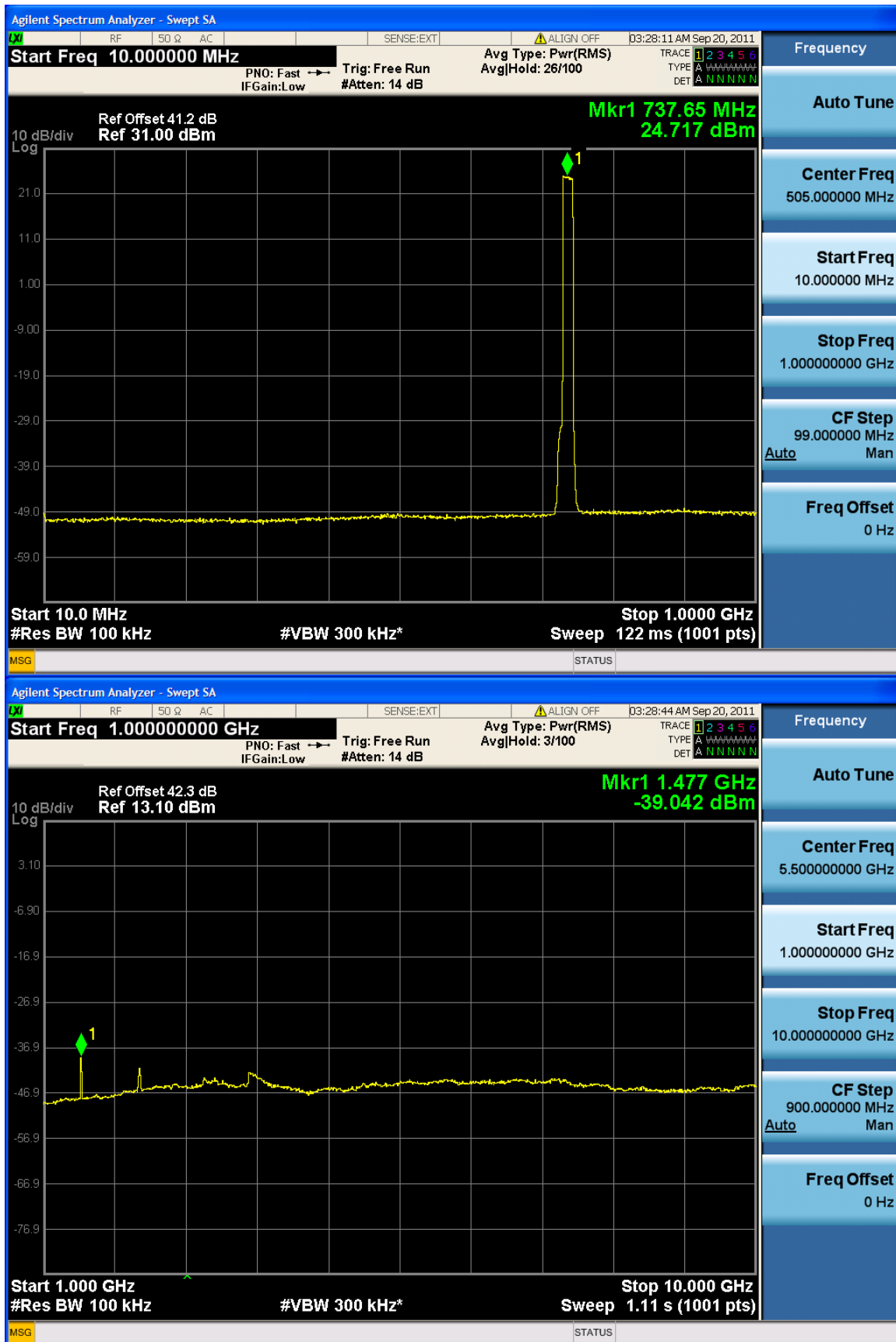
15M-Port 1 -737MHz



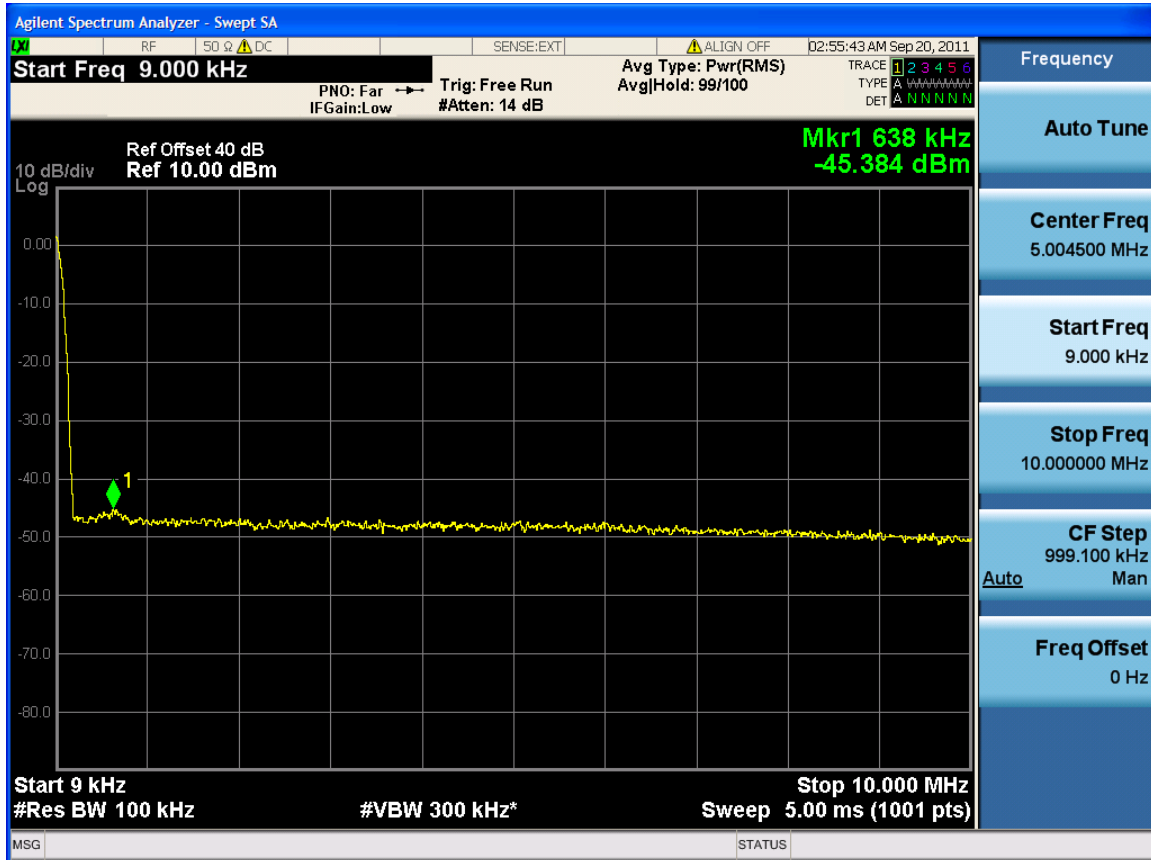


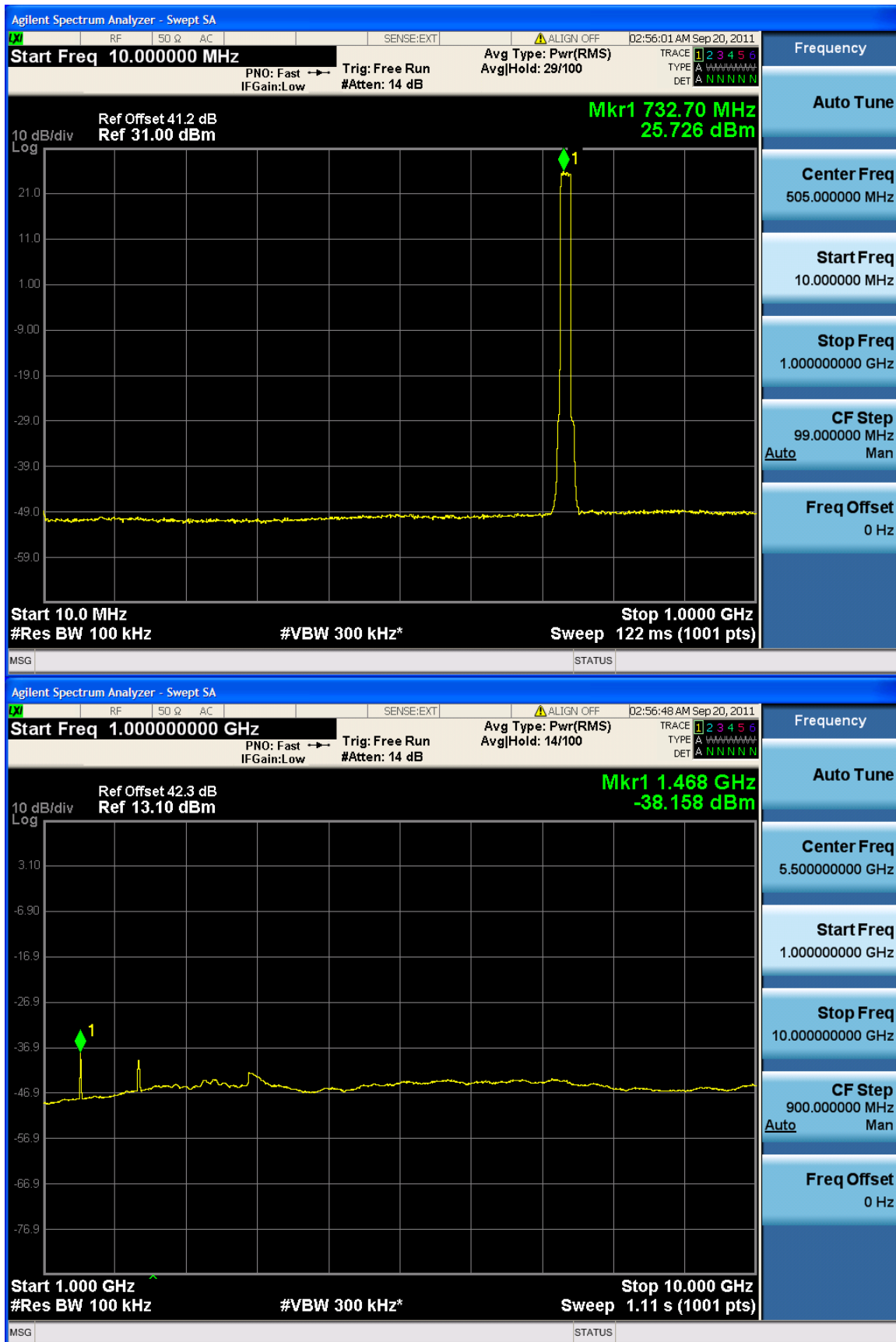
15M-Port 1 -738.5MHz



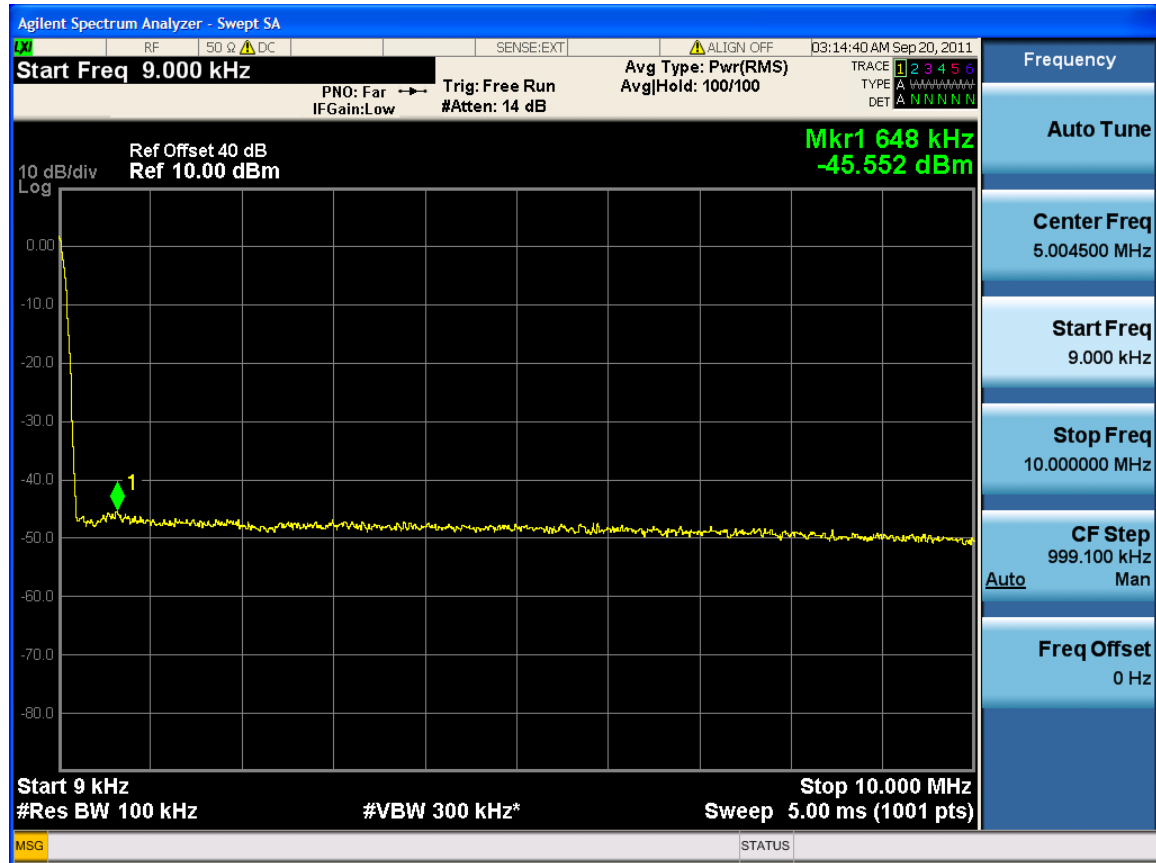


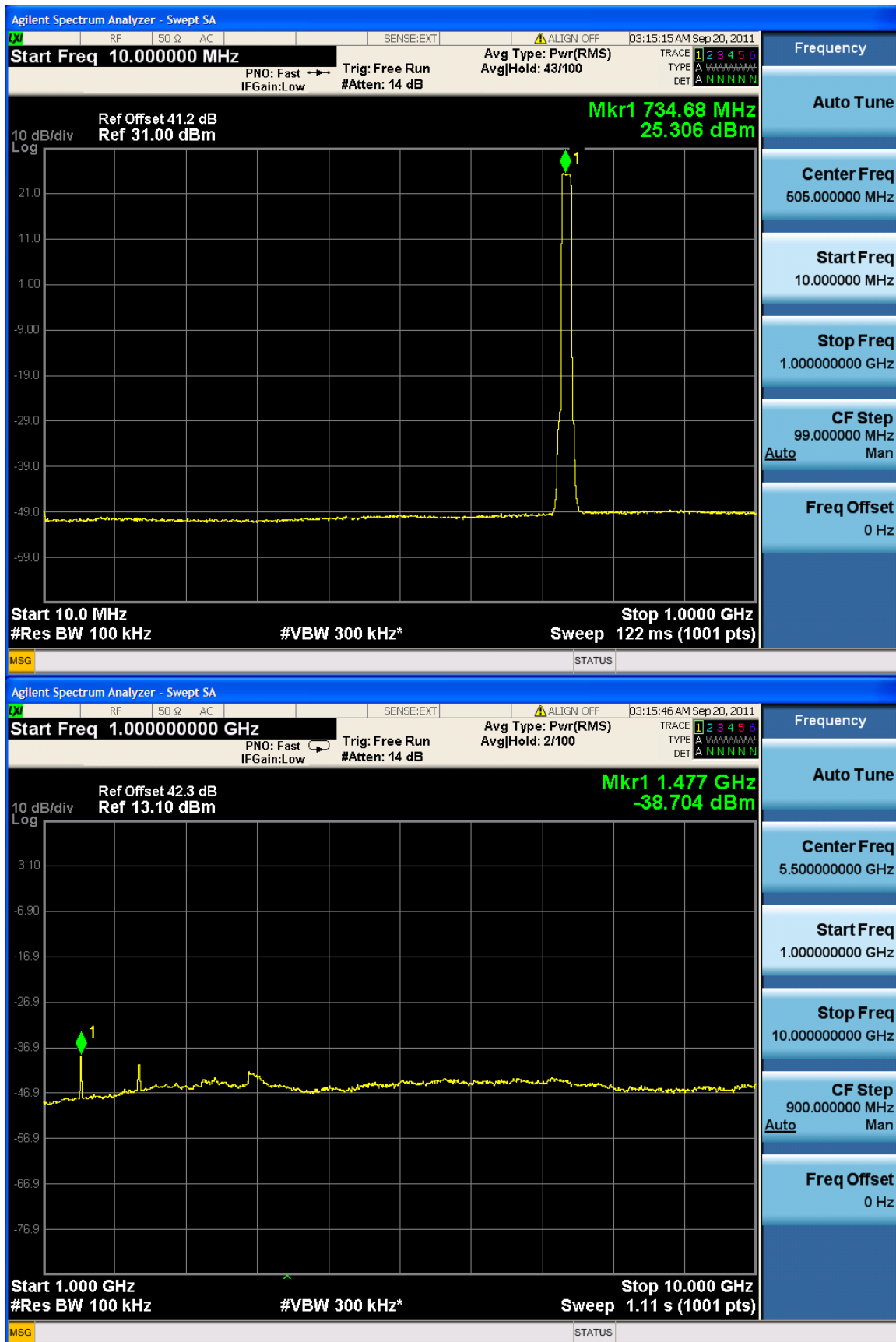
15M-Port 2-735.5MHz



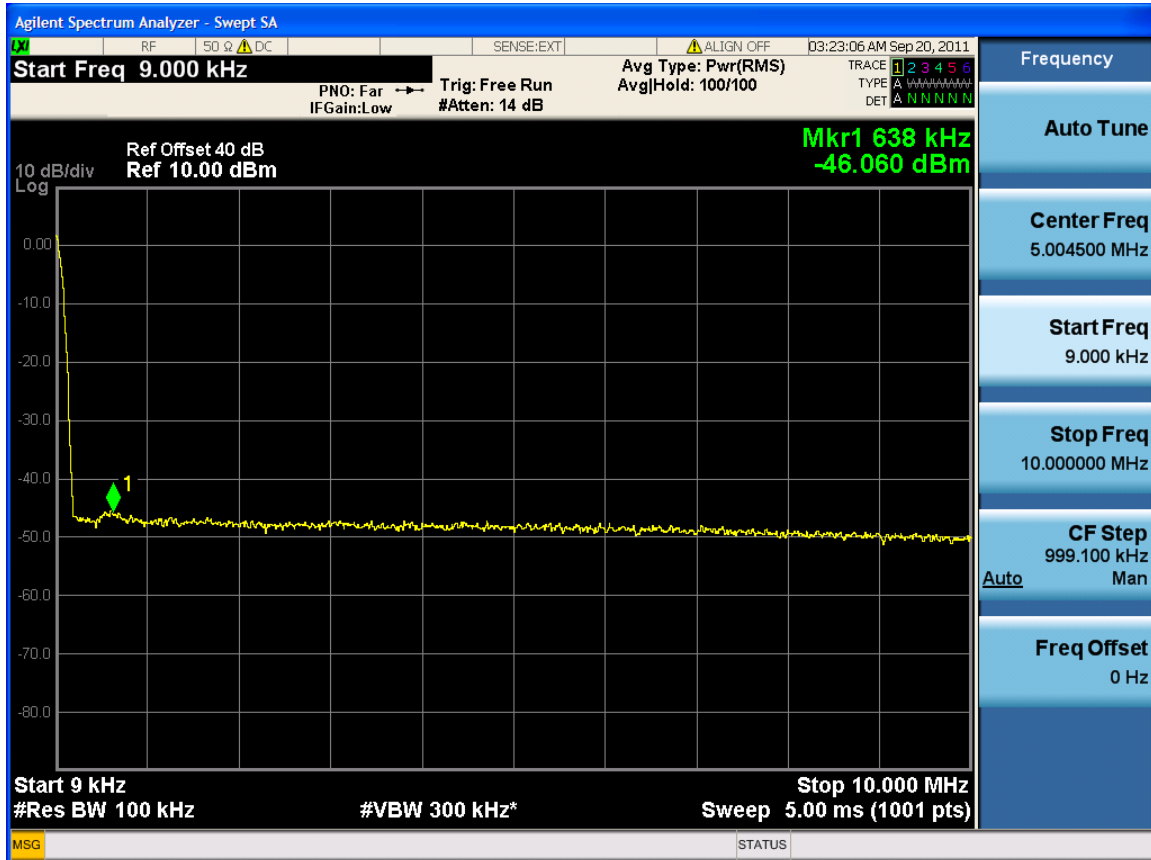


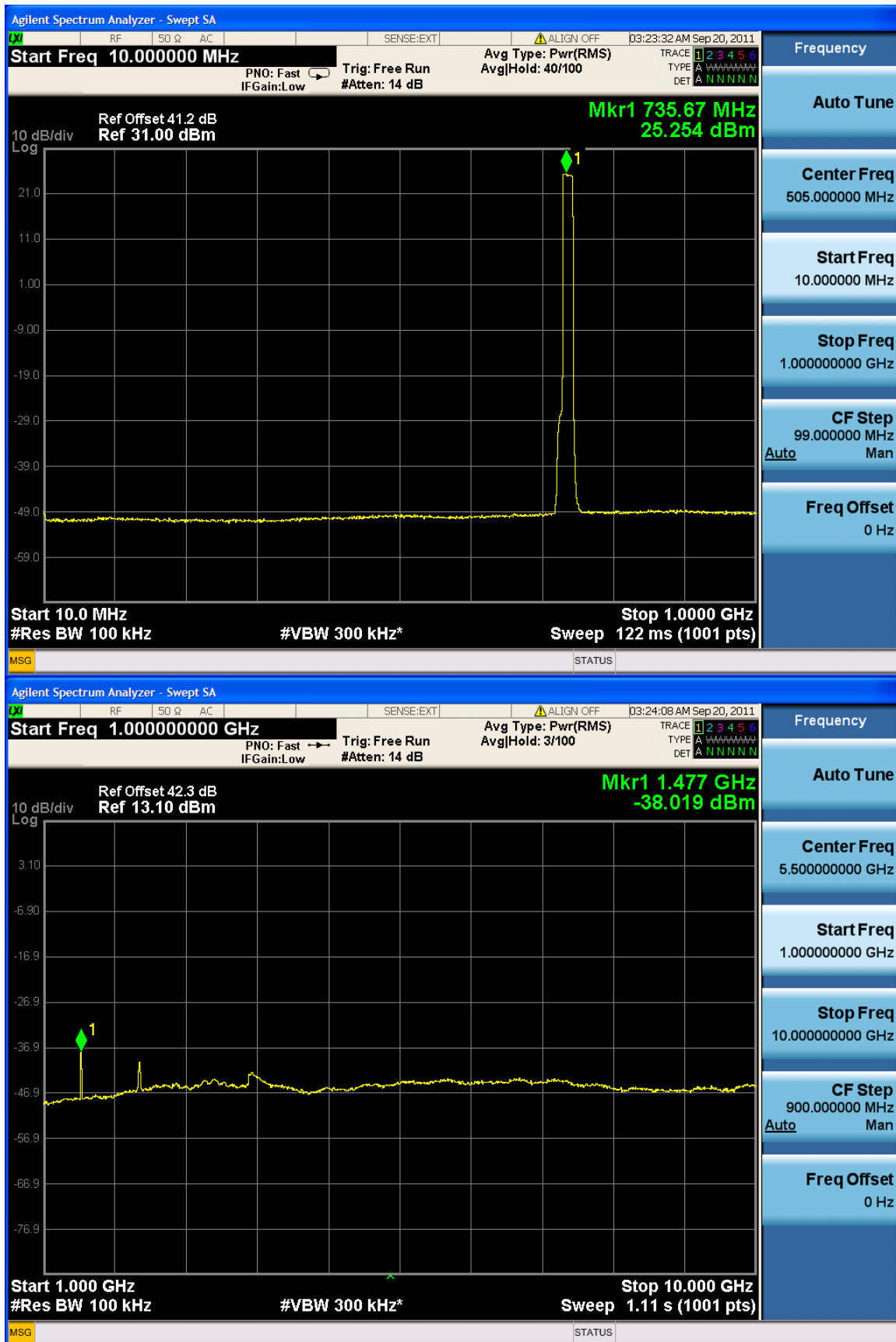
15M-Port 2 -737MHz





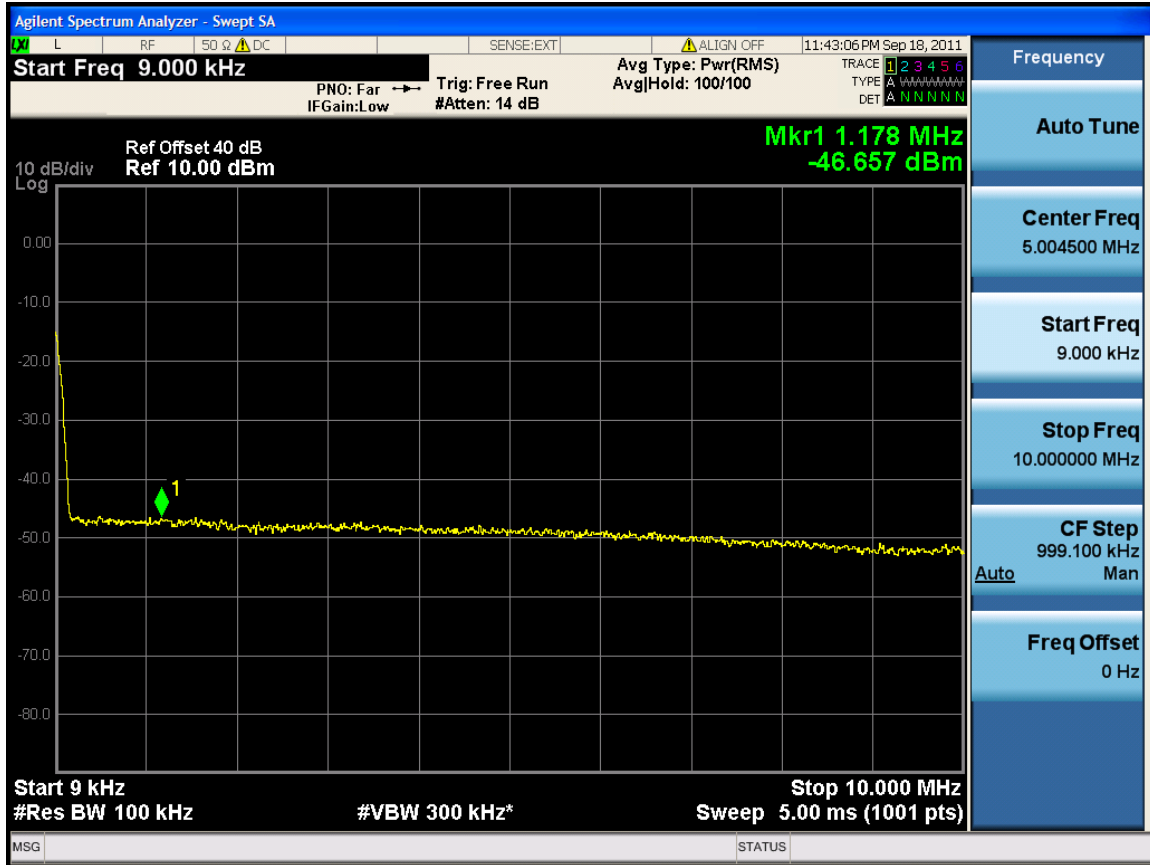
15M-Port 2 -738.5MHz

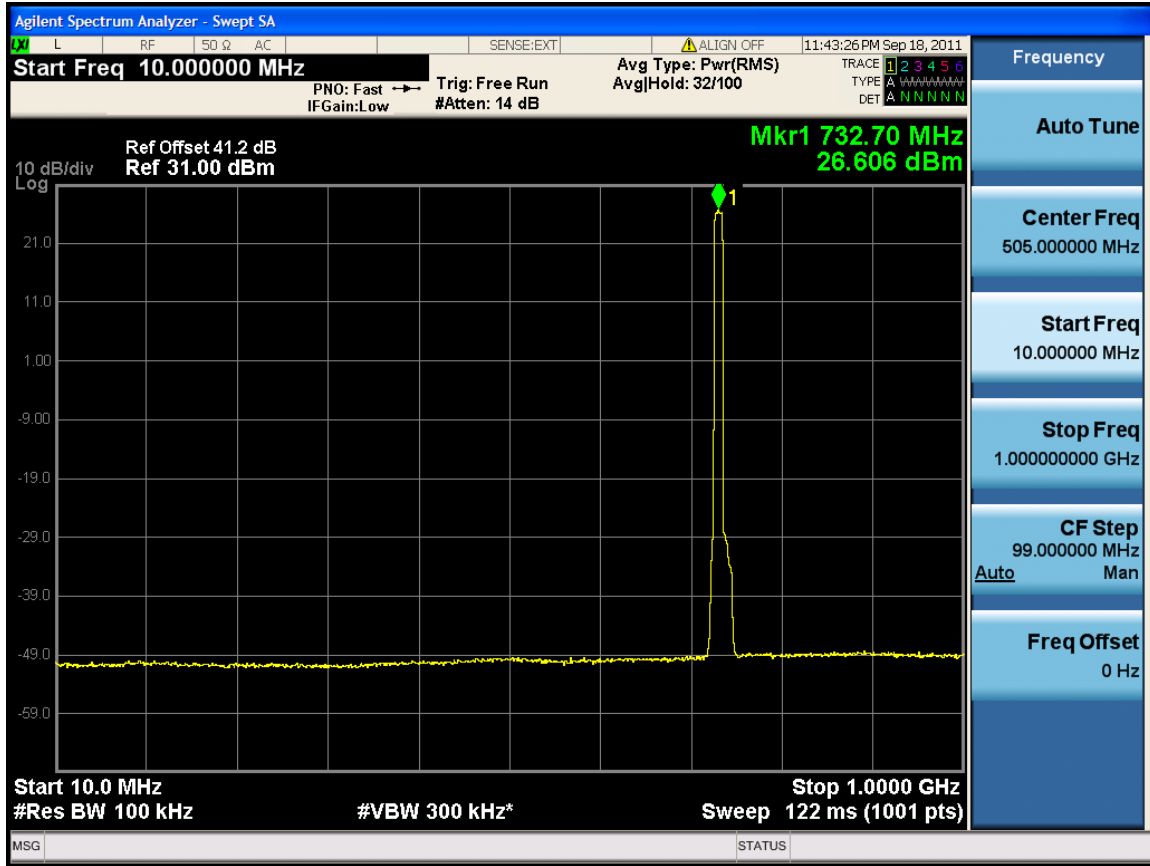


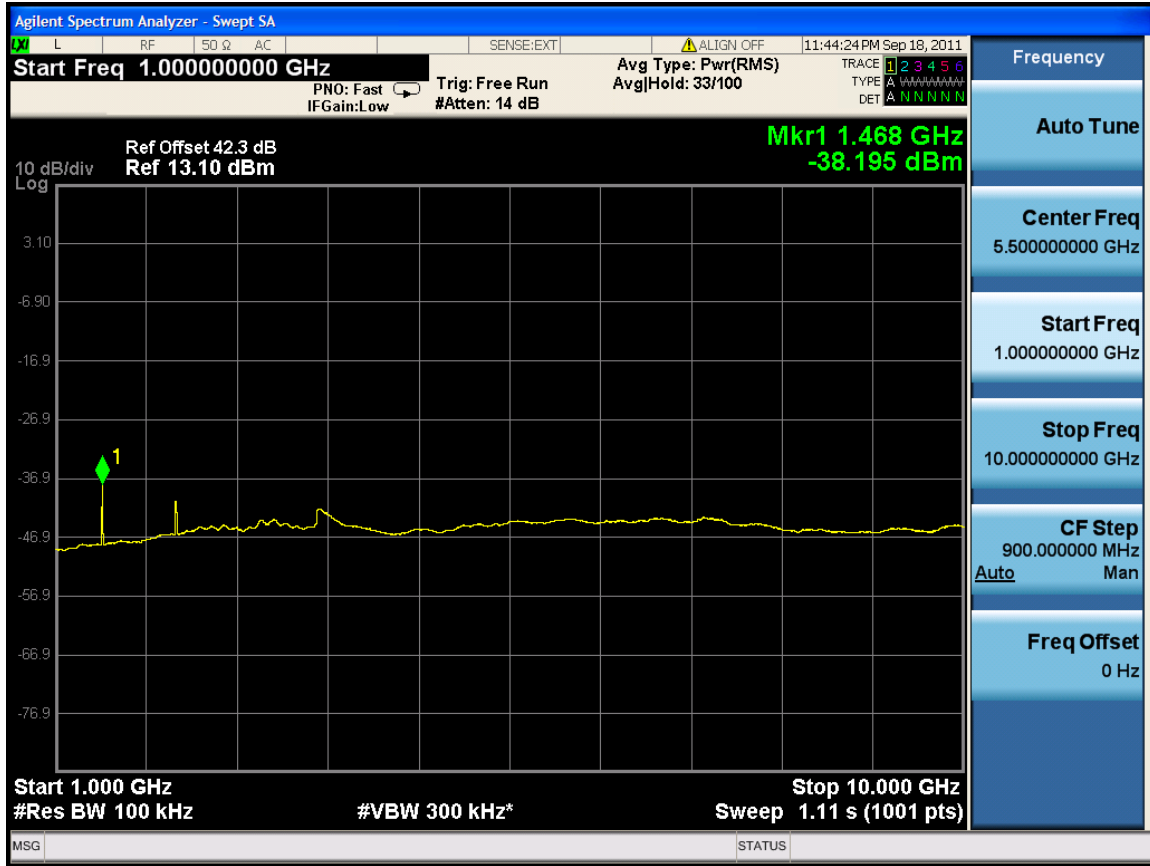


Channel Bandwidth :10M

10M-Port 1 -733MHz







10M-Port 1 -737MHz