



FCC RF TEST REPORT

Report Number : **RP20170313031_01** Date of Issue: **13 Mar 2017**

FCC ID : **Q78-R8872AS8500**

Model / Serial No. : **ZXSDR R8872A S8500**

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 : **103**

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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

2017-03-13
Date

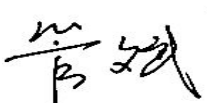
Wu Shuzhong
Name


Signature

Approved by
EMC/RF Project Manager

2017-03-13
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: Macro Remote Radio Unit

MANUFACTURERS MODEL/SERIAL NUMBER: ZXSDR R8872A S8500

FCC ID : Q78- R8872AS8500

SAMPLE NUMBER: S20170313031

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 FCC 47 CFR Part2:2016 FCC 47 CFR Part22:2016



2 Summary of Results

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046 §22.913	Transmitter output Power	Compliant
§2.1091 §1.1037	RF Exposure	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§2.1051, §22.917	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049 §22.917	Occupied Bandwidth	Compliant
§2.1051	Band Edge	Compliant
§ 2.1055	Frequency stability	Compliant

3 Equipment Specification

3.1 Technical specification

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

Input voltage: -60 ~ - 37Vdc

Frequency range: UL:824MHz~849MHz; DL: 869MHz~894MHz

(Bottom frequency is about 869.2MHz, Middle frequency is about 881.4MHz, Top frequency is about 893.8MHz).

Max RF output power: GMSK 49dBm, 8PSK 47dBm

Gain of the antenna: 15dBi

Modulation type of emission: GSM

Appearance of EUT:



fig 1. FIGURE 1 APPEARANCE OF ZXSDR R8872A S8500

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 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.

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.

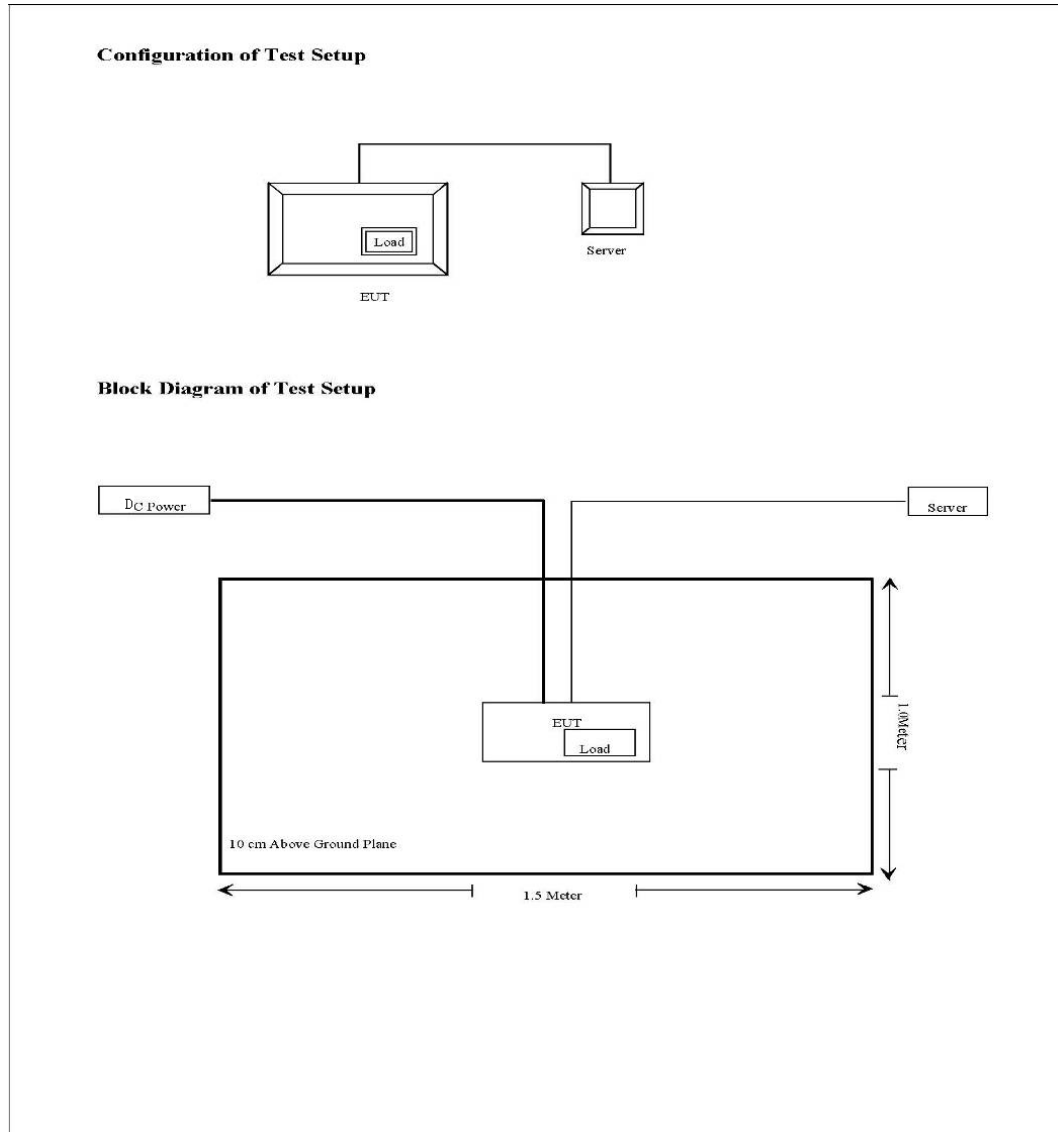


fig 2. Test configuration

6 TRANSMITTER OUTPUT POWER

6.1 Applicable Standard: FCC §2.1046 §22.913

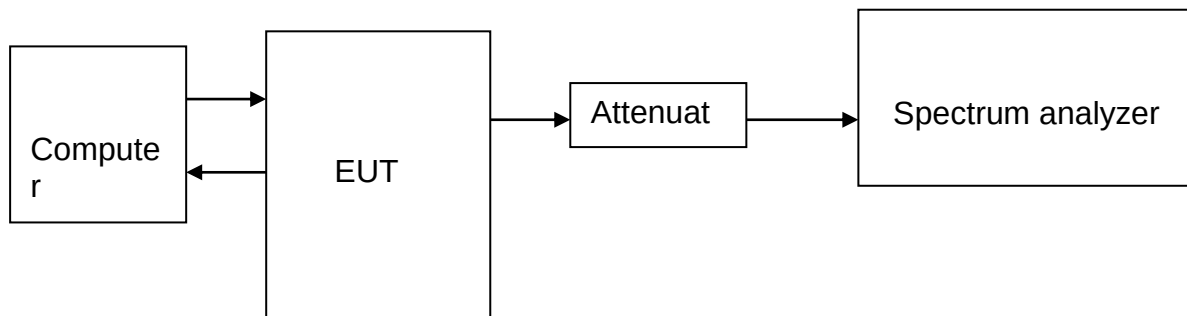
According to FCC §2.1046 & 22.913, the EIRP (equivalent isotropically radiated power) must not exceed 500 Watts.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020A	MY52090451	2016-3-15	2017-3-15
DTS	DTS100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	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.

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 3dB

6.4 Environmental Conditions

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

6.5 Test Result: Pass

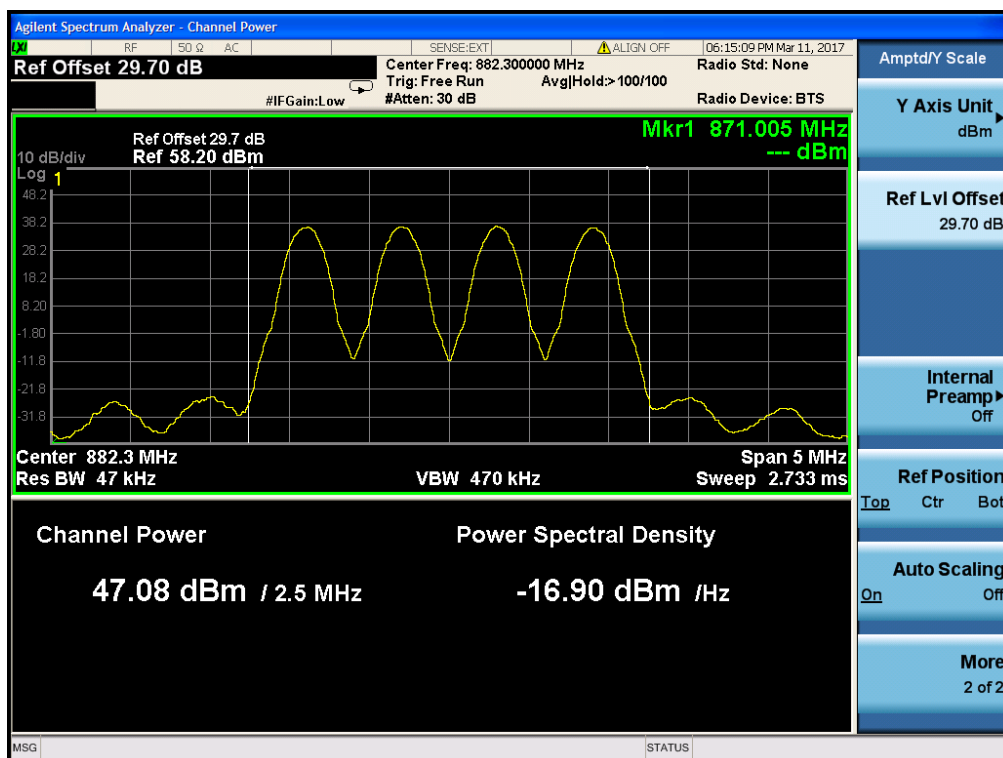
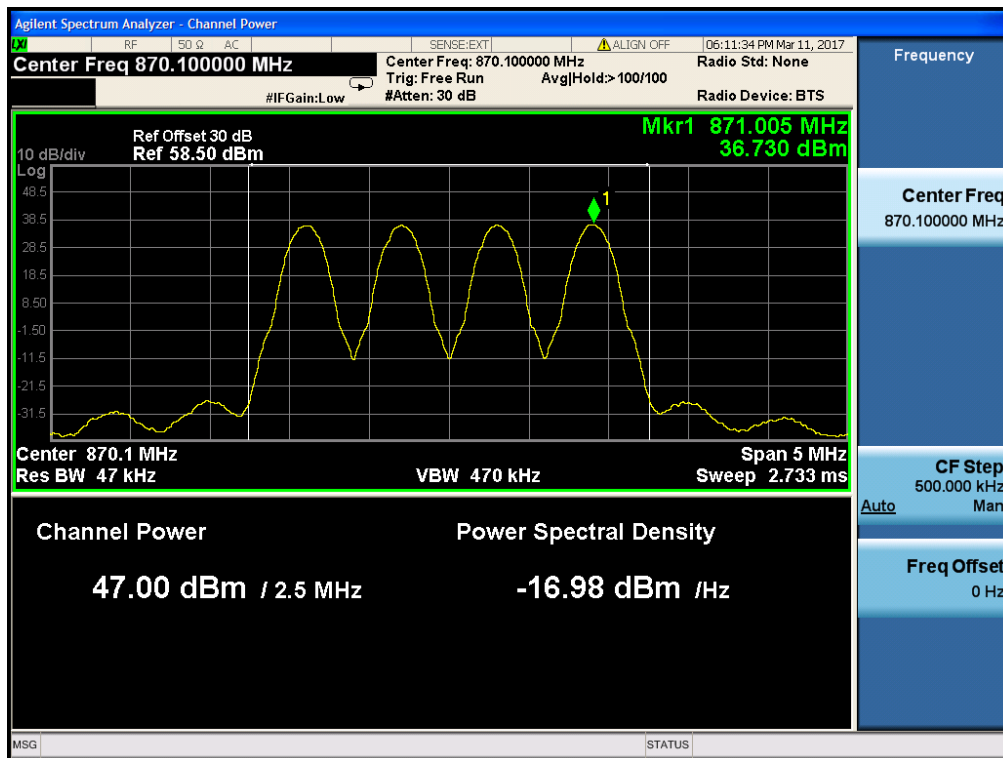
6.6 Test Mode: Transmitting GSM

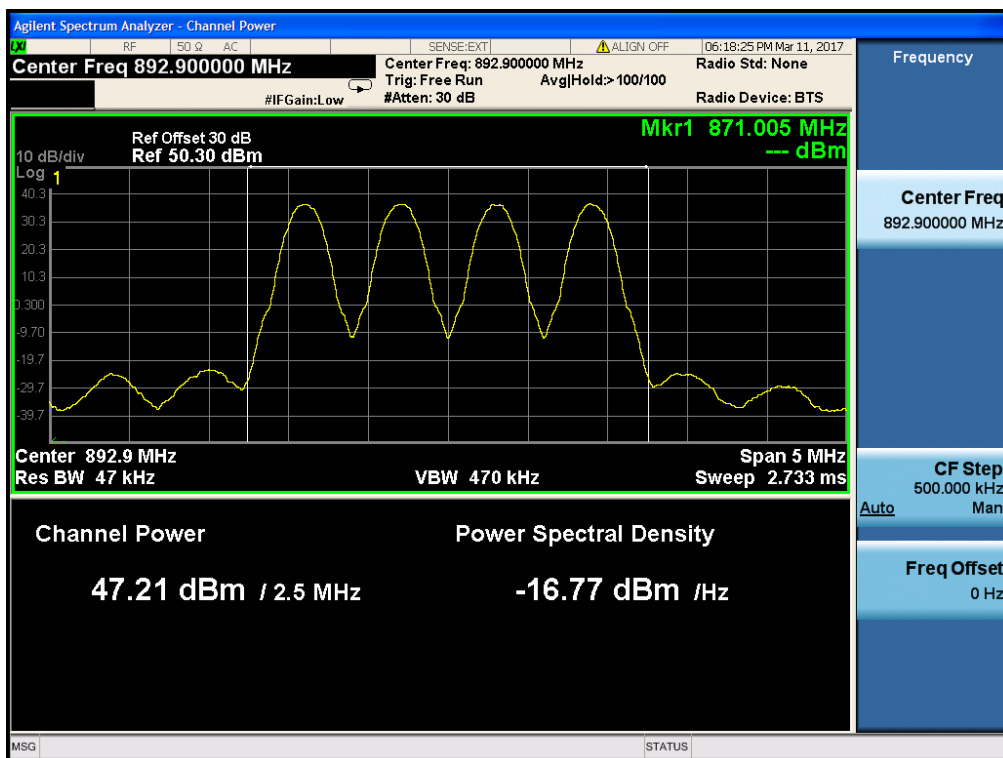
6.7 Test Data

Four carriers Port 1 8PSK

Port	modulation	Center Freq.	Frequency (MHz)	Max output Power
------	------------	--------------	-----------------	------------------

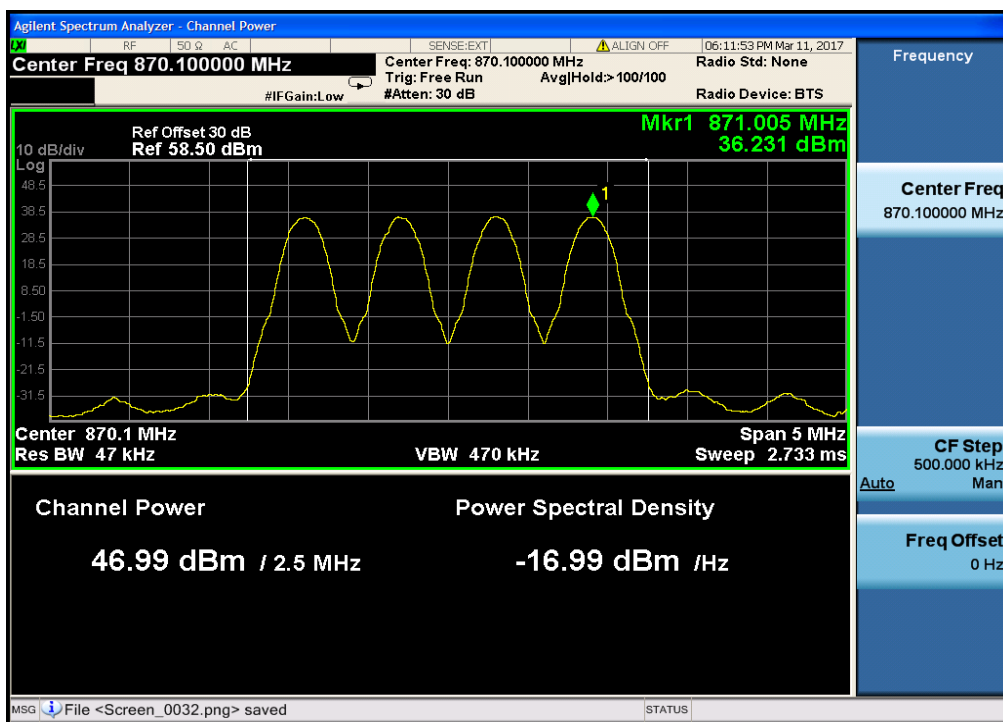
		(MHz)		in dBm
1	8PSK	870.1	869.2/869.8/ 870.4 /871	47
		882.3	881.4/882/882.6/883.2	47.08
		892.9	892/892.6/893.2/893.8	47.21

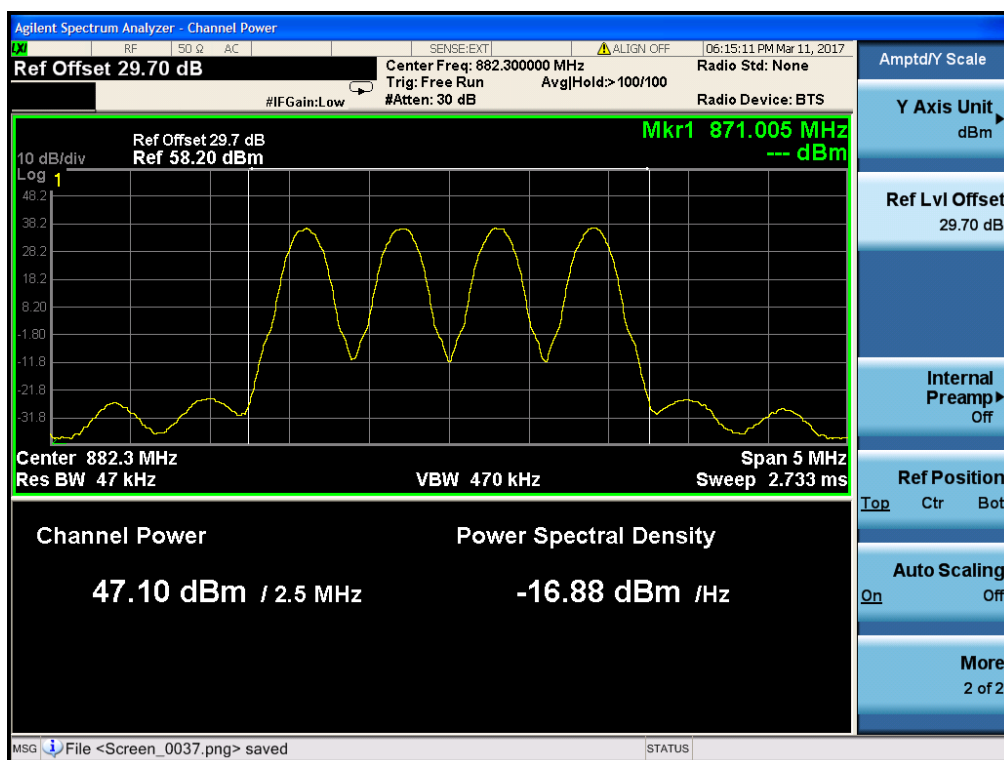




Four carriers Port 4 8PSK

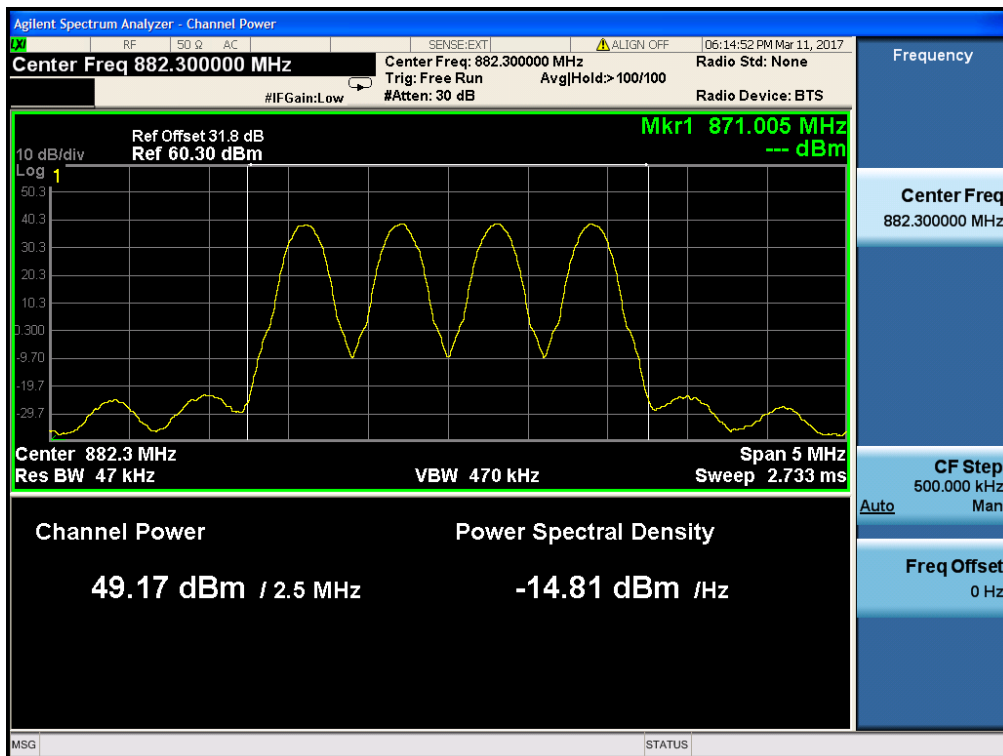
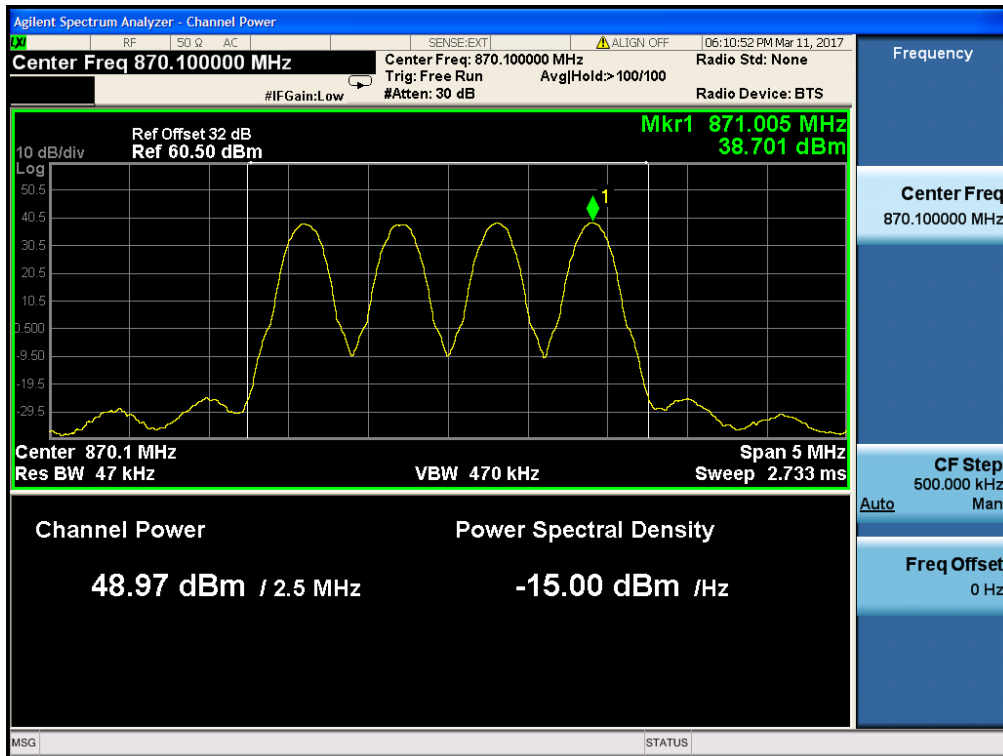
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	8PSK	870.1	869.2/869.8/ 870.4 /871	46.99
		882.3	881.4/882/882.6/883.2	47.1
		892.9	892/892.6/893.2/893.8	47.14

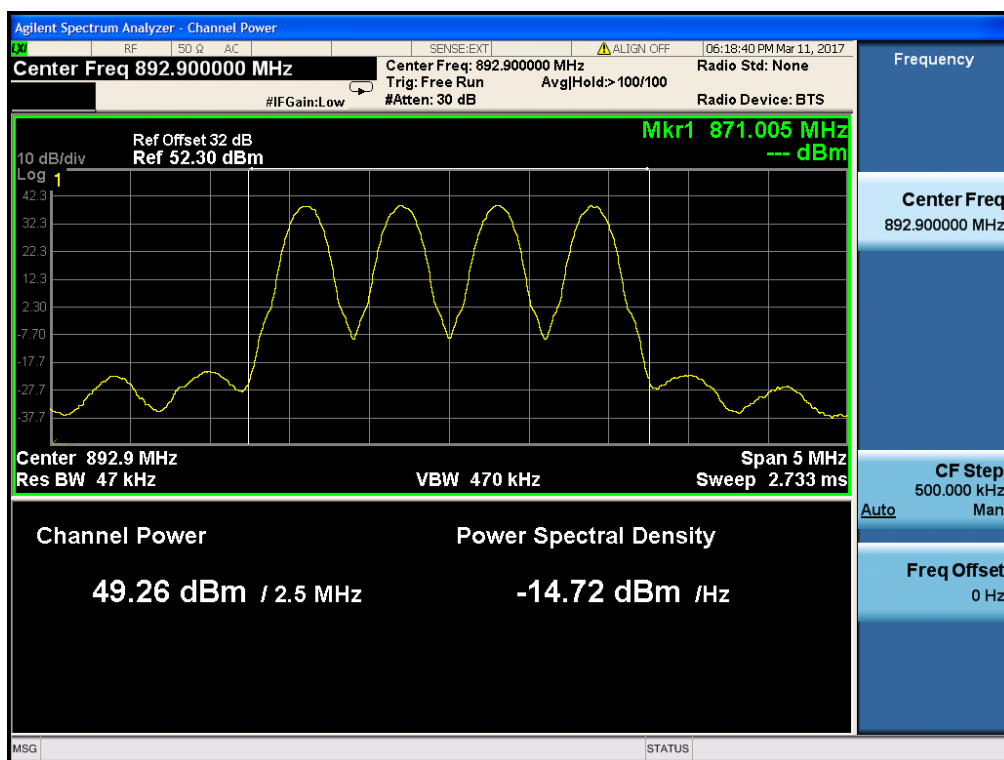




Four carriers Port 1 GMSK

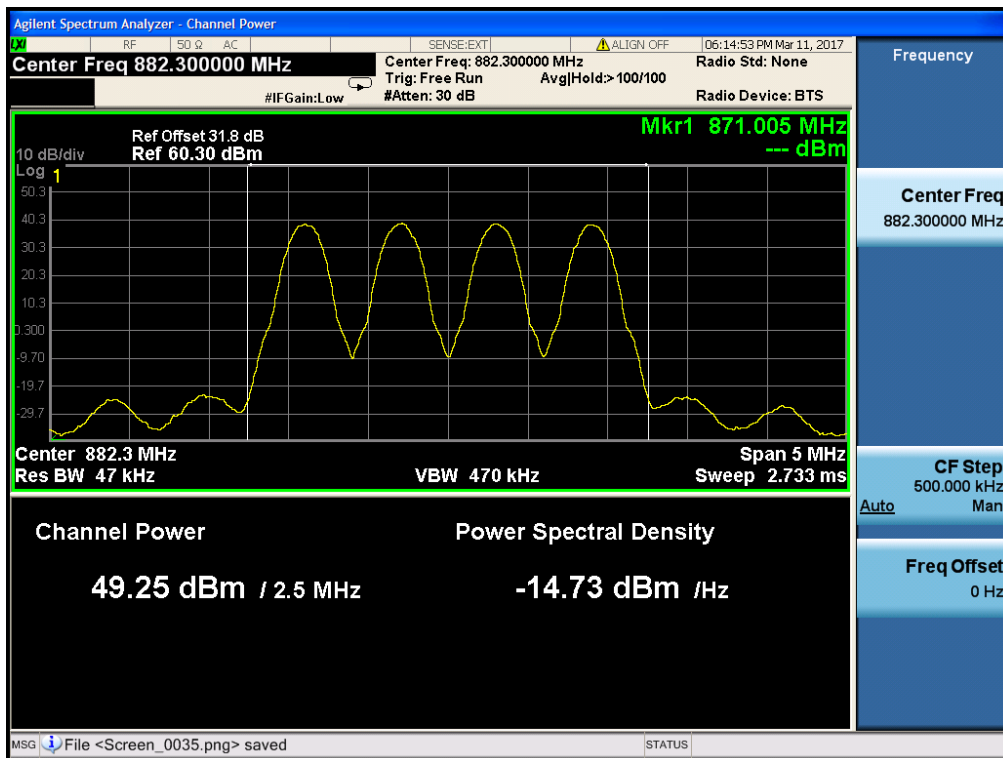
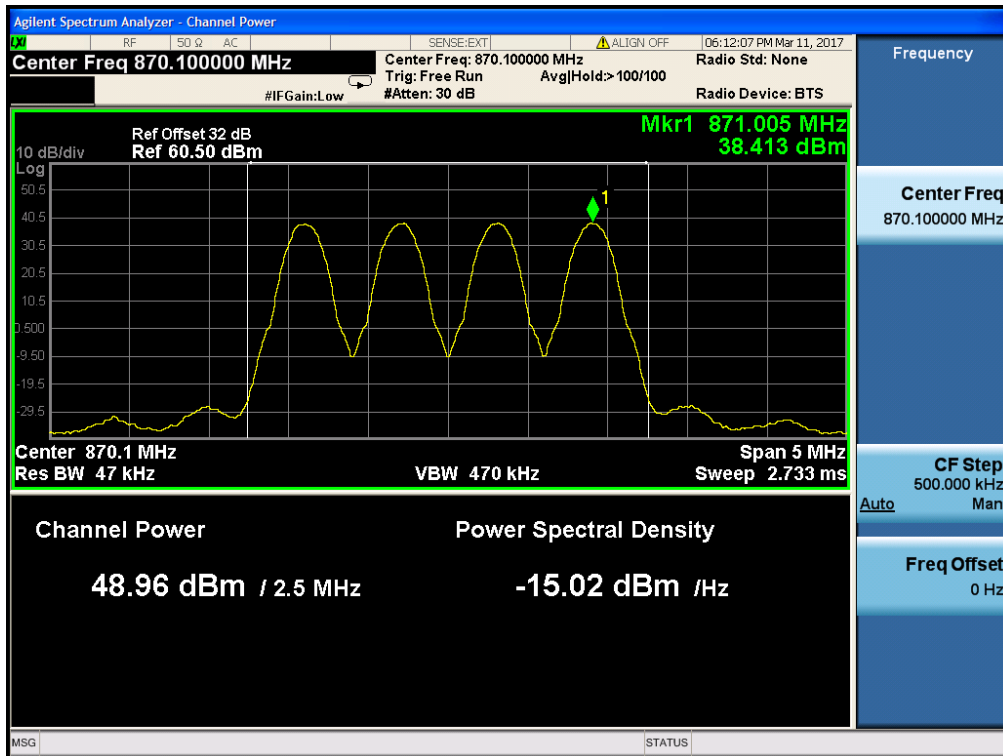
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1	GMSK	870.1	869.2/869.8/ 870.4 /871	48.97
		882.3	881.4/882/882.6/883.2	49.17
		892.9	892/892.6/893.2/893.8	49.26

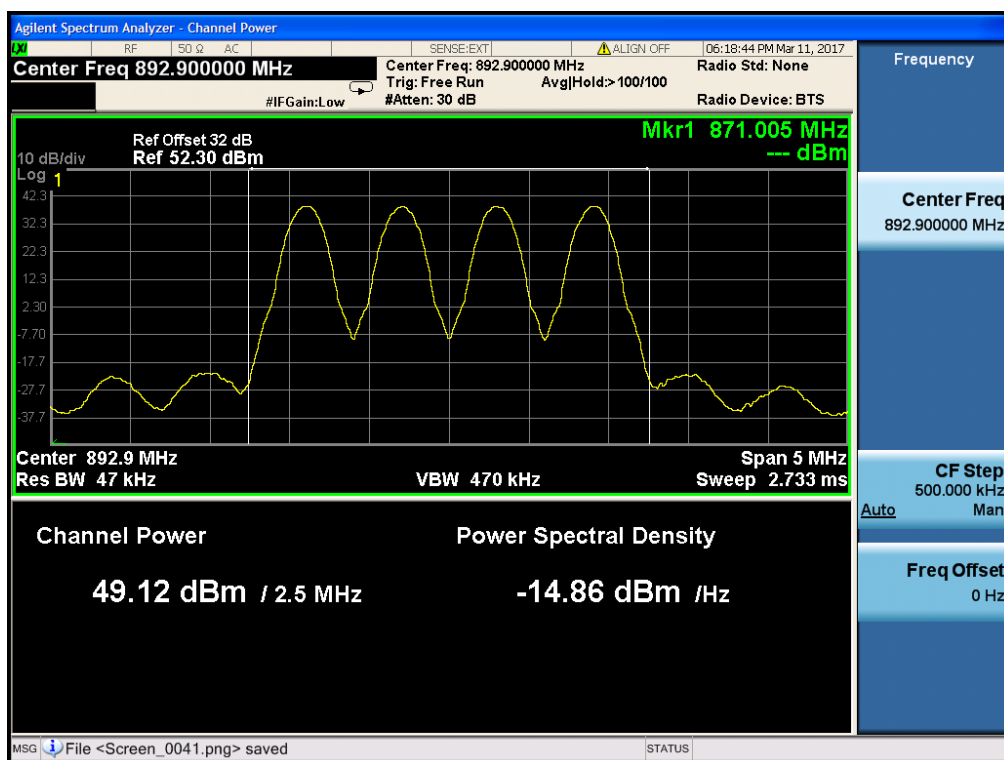




Four carriers Port 4 GMSK

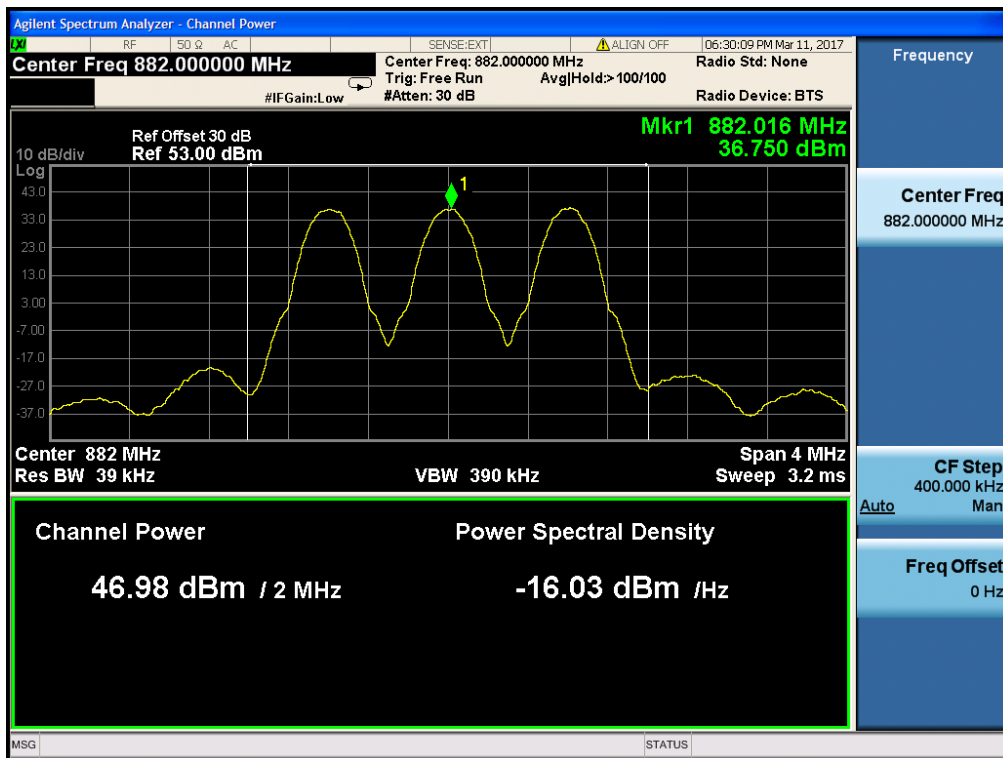
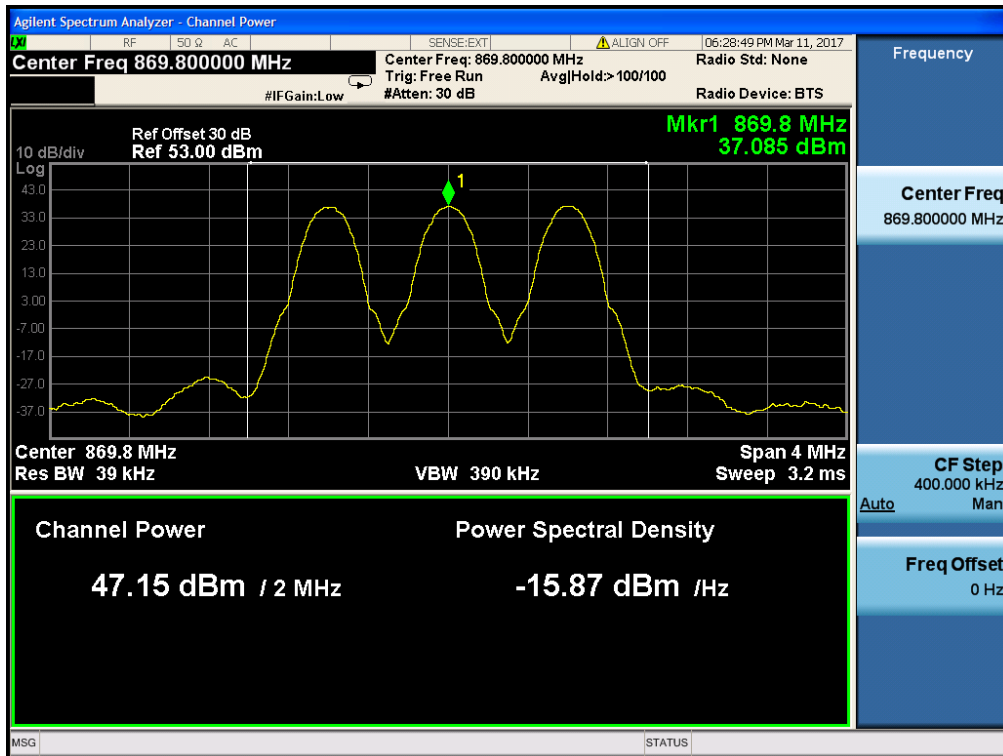
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	GMSK	870.1	869.2/869.8/ 870.4 /871	48.96
		882.3	881.4/882/882.6/883.2	49.25
		892.9	892/892.6/893.2/893.8	49.12

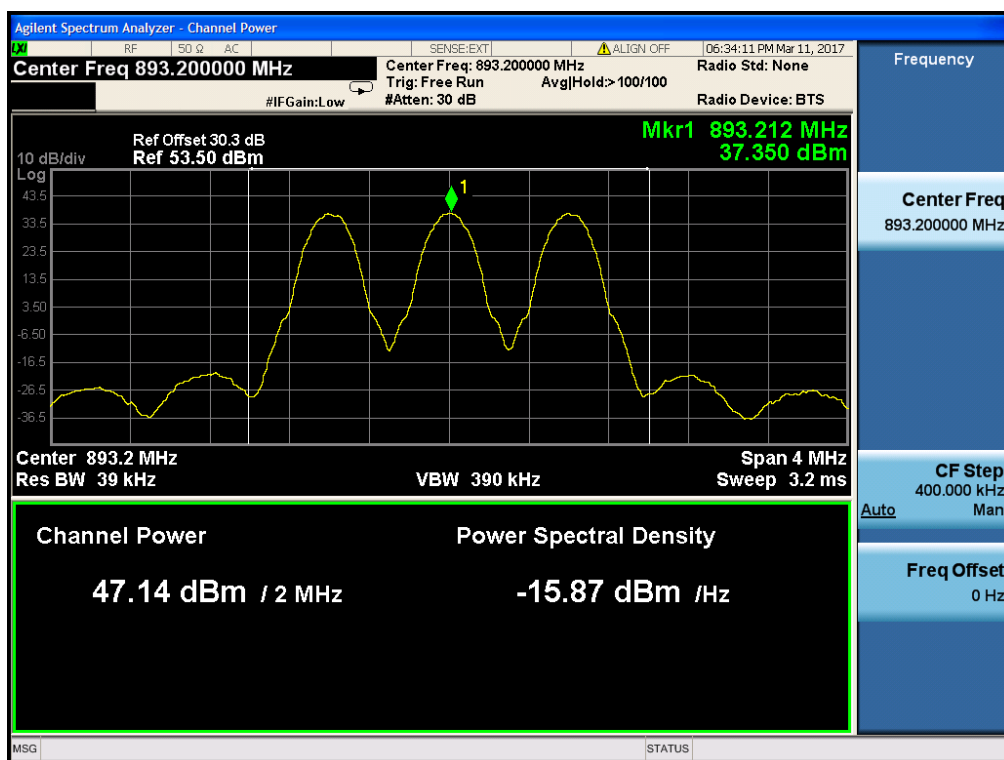




Three carriers Port 1 8PSK

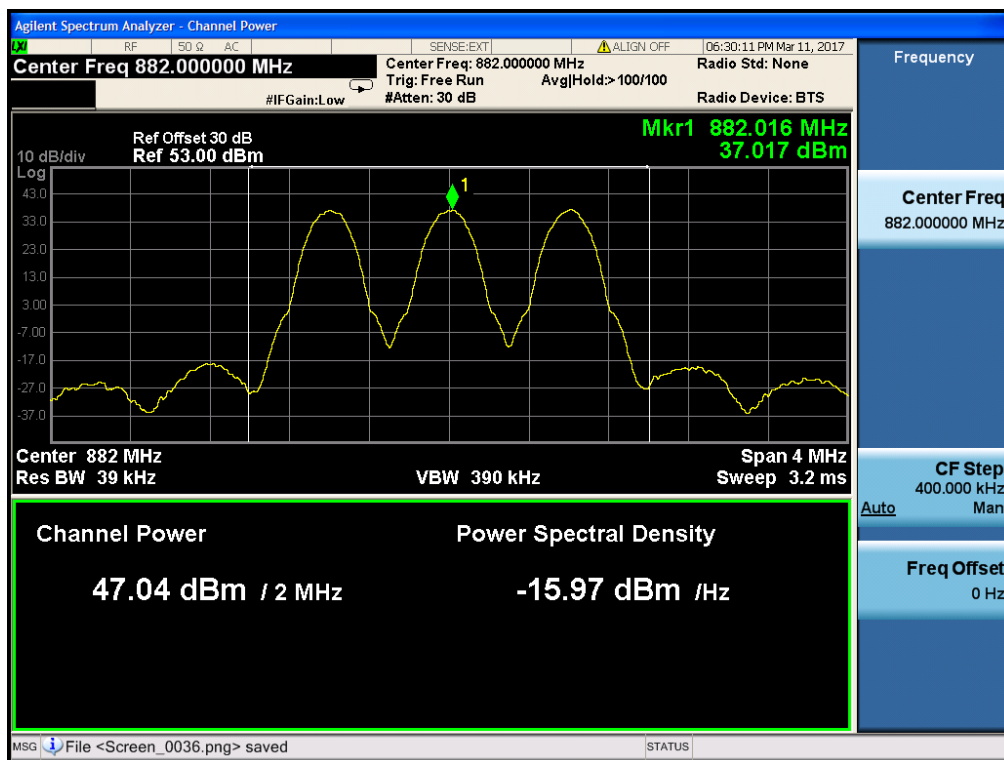
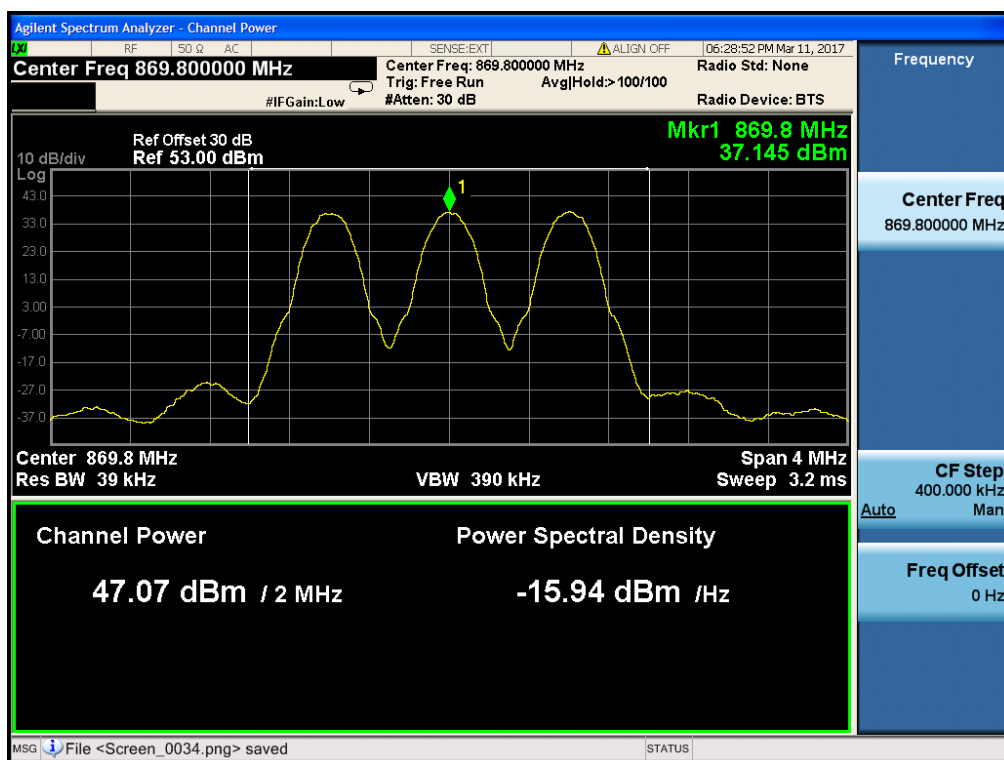
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1	8PSK	869.8	869.2/869.8/ 870.4	47.15
		882	881.4/882/882.6	46.98
		893.2	892.6/893.2/893.8	47.14

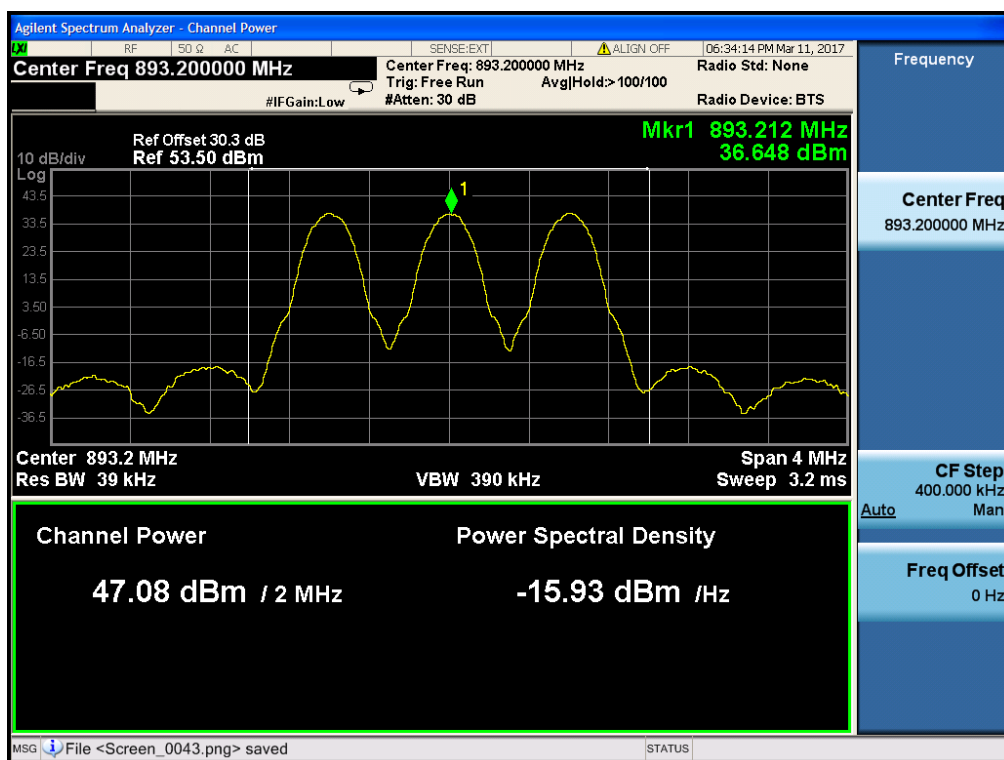




Three carriers Port 4 8PSK

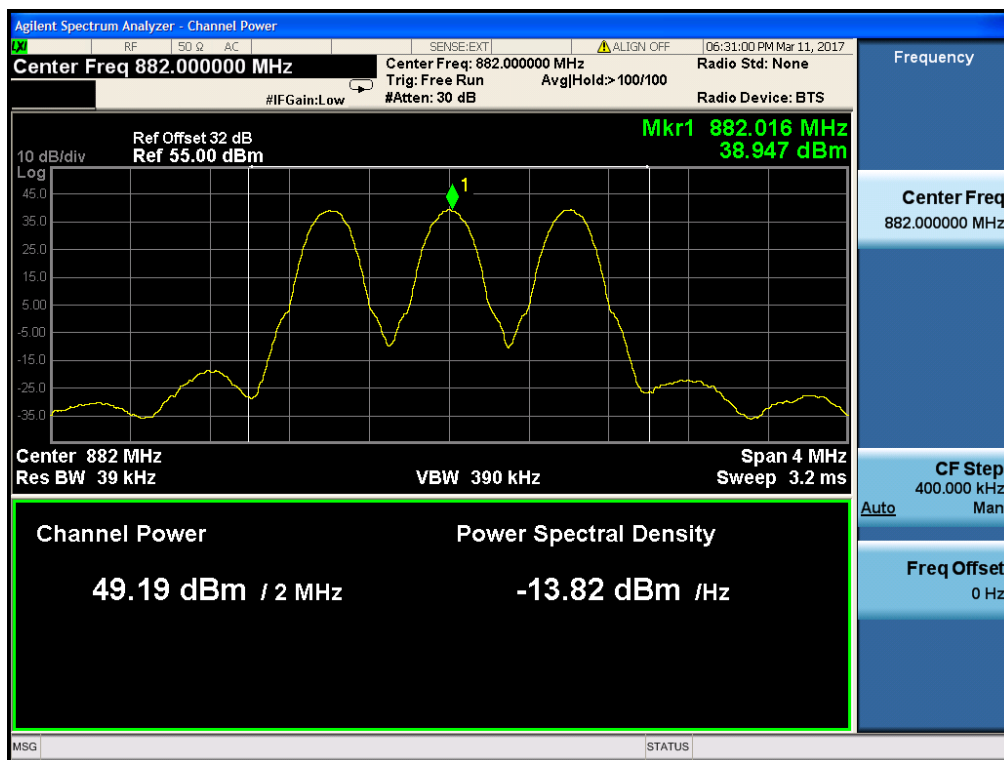
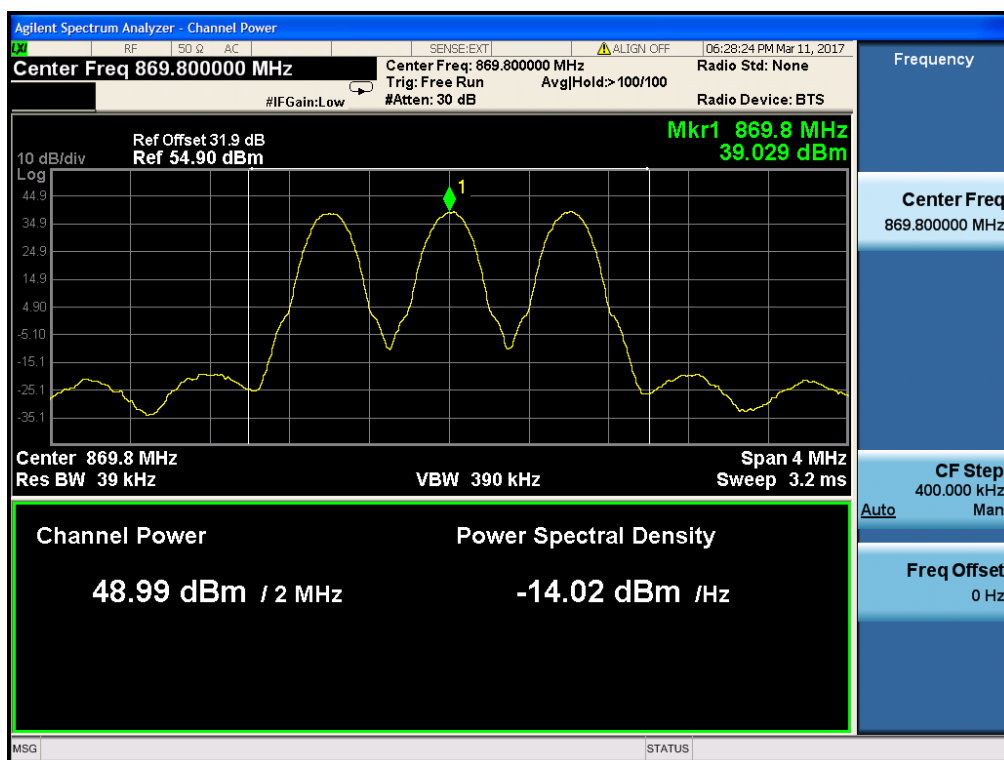
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	8PSK	869.8	869.2/869.8/ 870.4	47.07
		882	881.4/882/882.6	47.04
		893.2	892.6/893.2/893.8	47.08

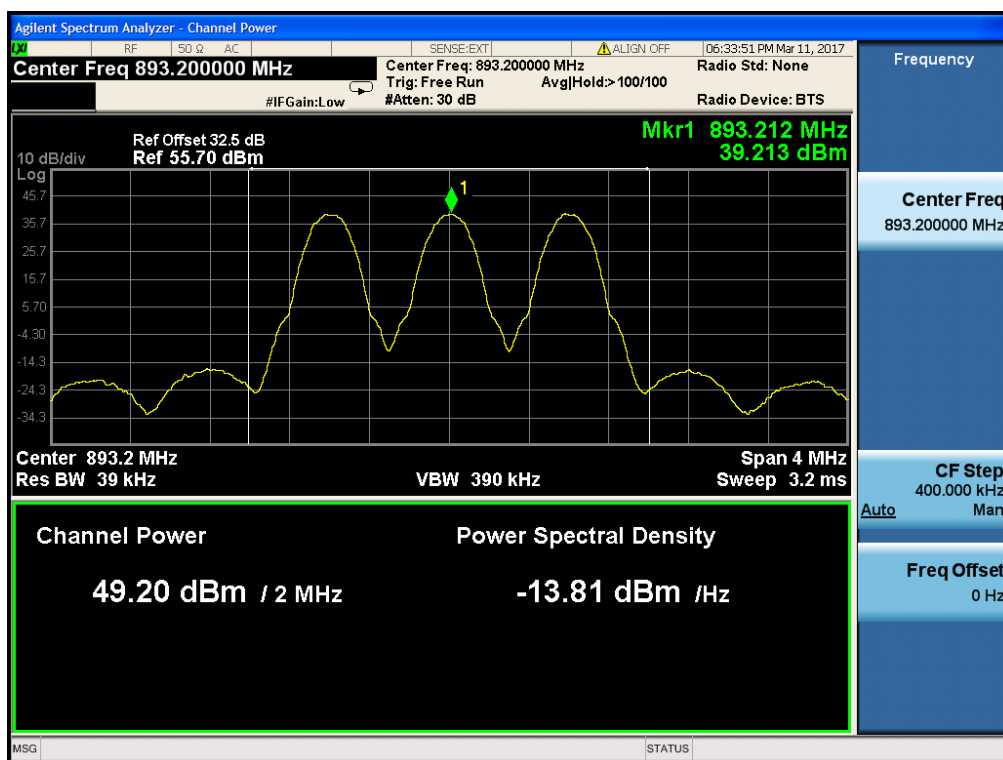




Three carriers Port 1 GMSK

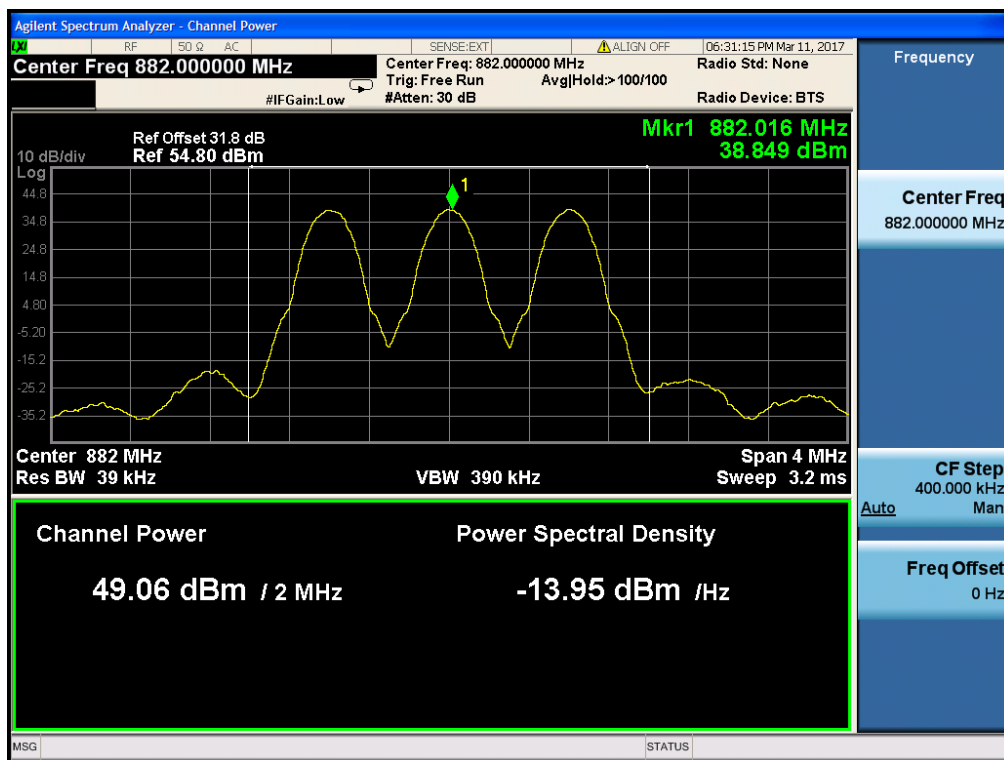
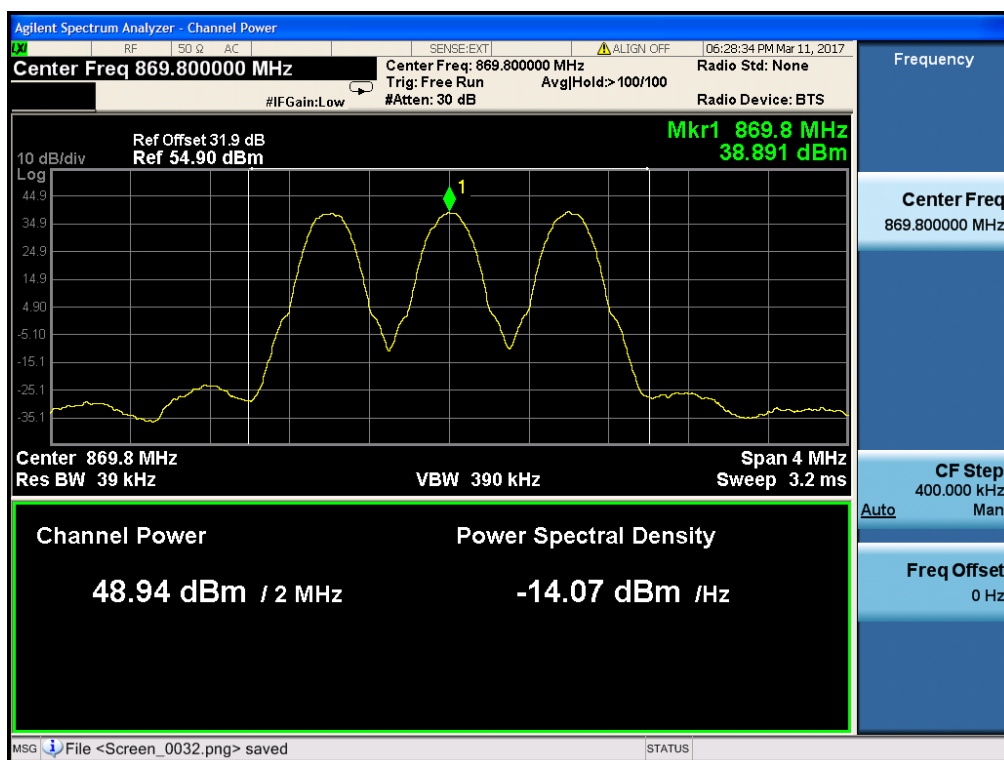
Port1	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
	GMSK	869.8	869.2/869.8/ 870.4	48.99
		882	881.4/882/882.6	49.19
		893.2	892.6/893.2/893.8	49.2

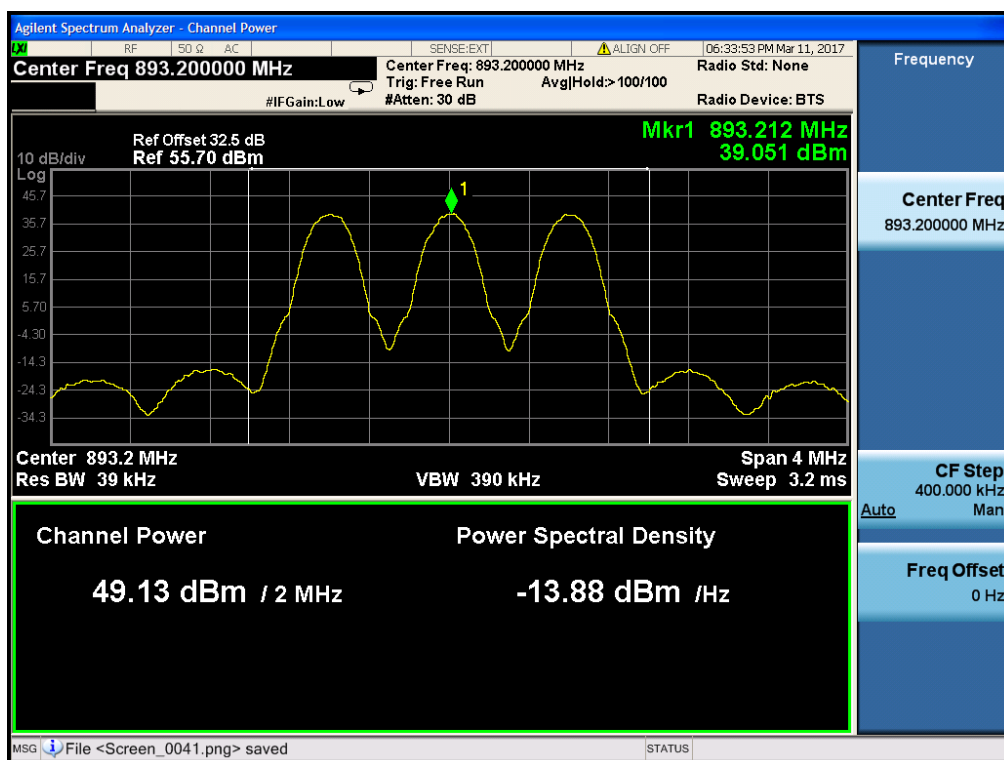




Three carriers Port 4 GMSK

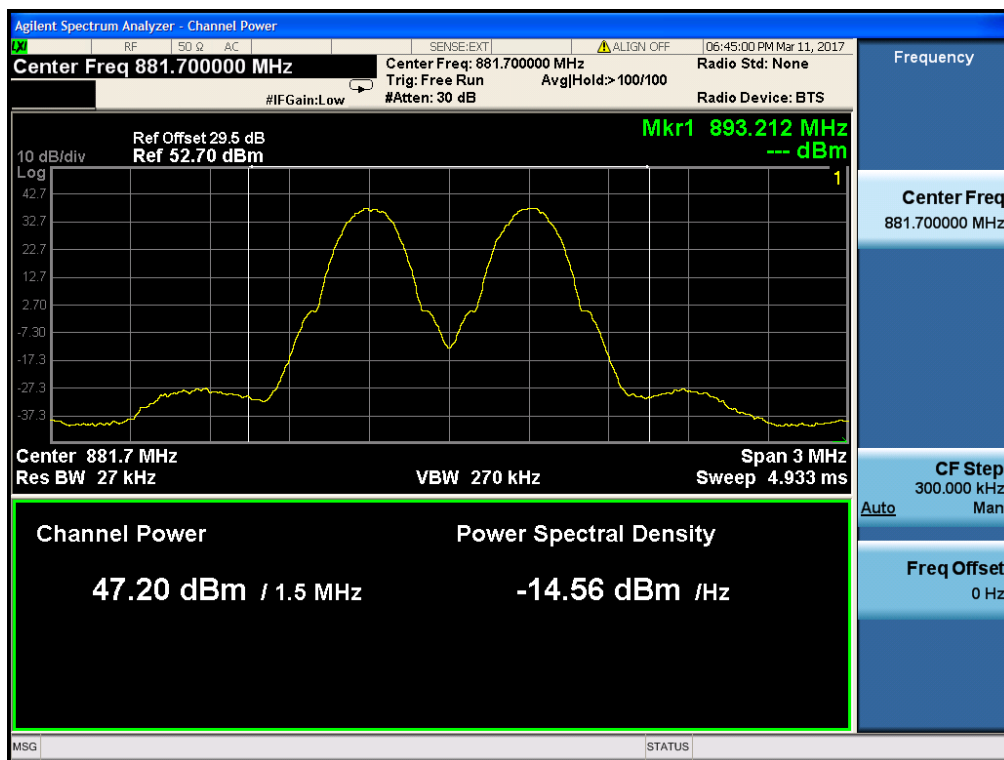
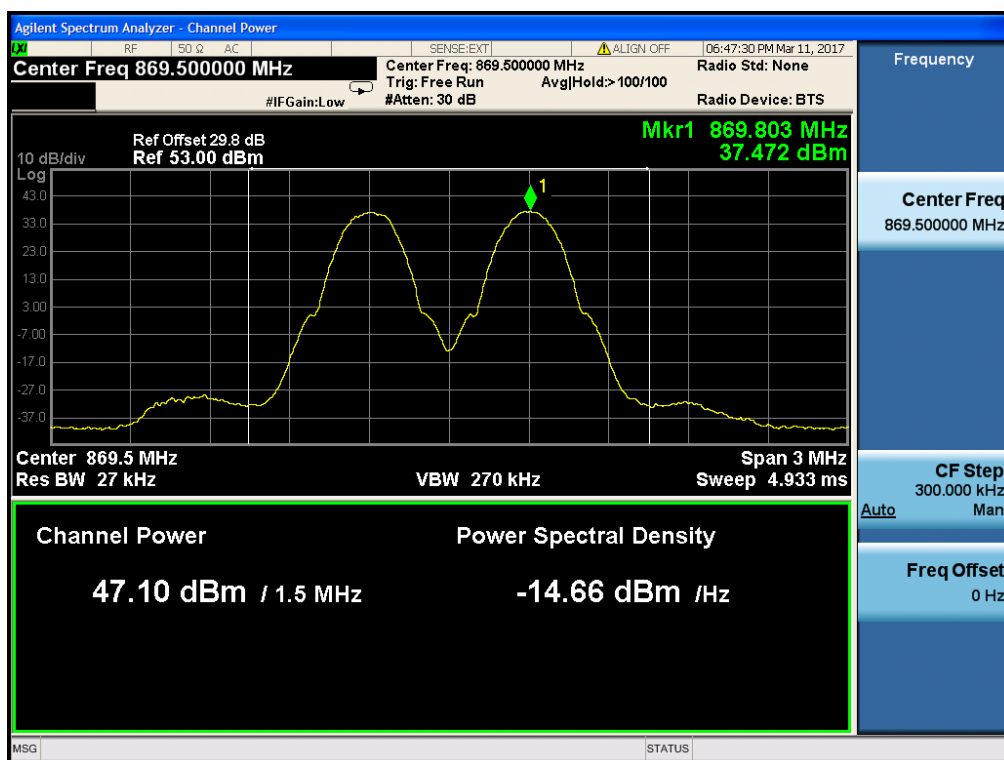
Port4	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
	GMSK	869.8	869.2/869.8/ 870.4	48.94
		882	881.4/882/882.6	49.06
		893.2	892.6/893.2/893.8	49.13

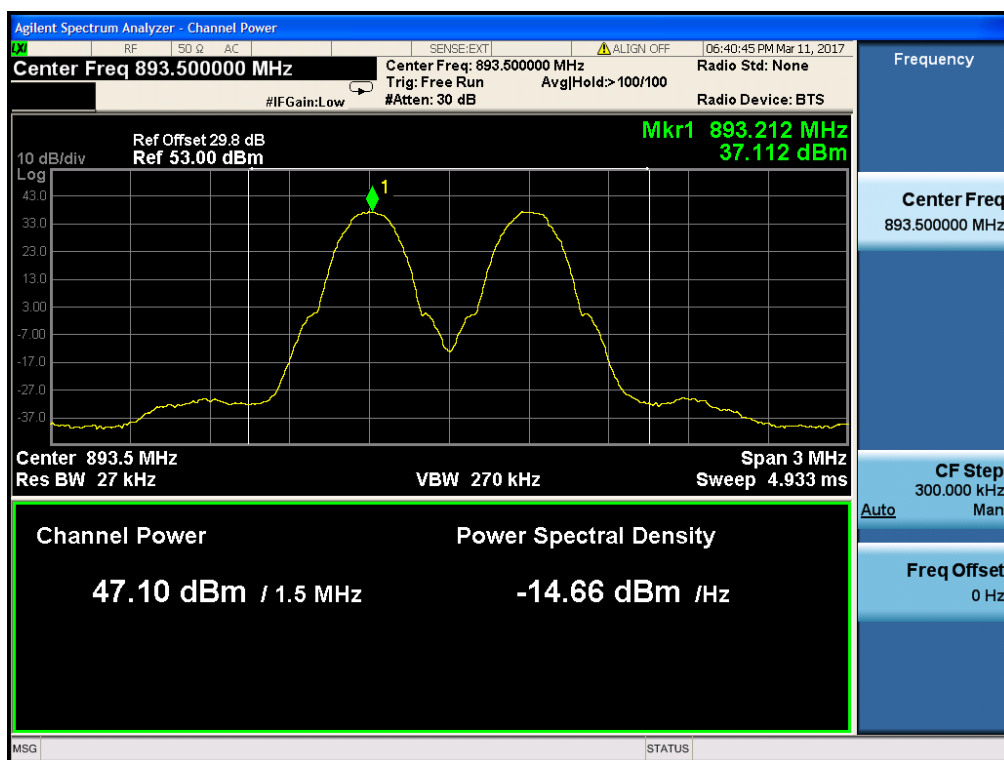




Two carriers Port 1 8PSK

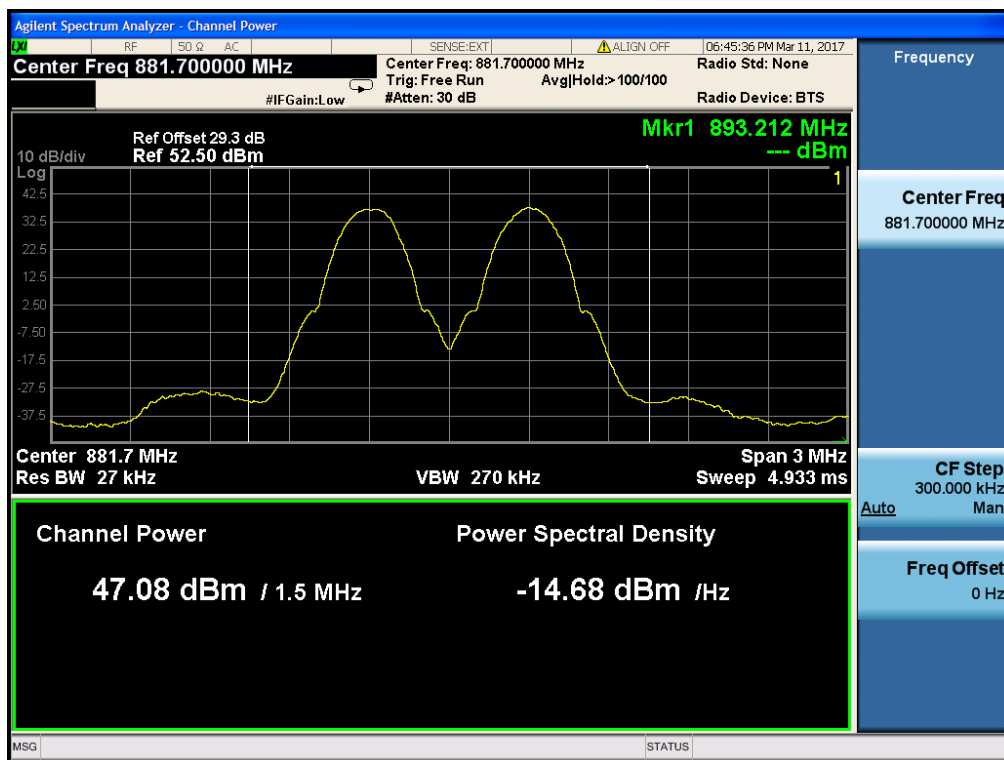
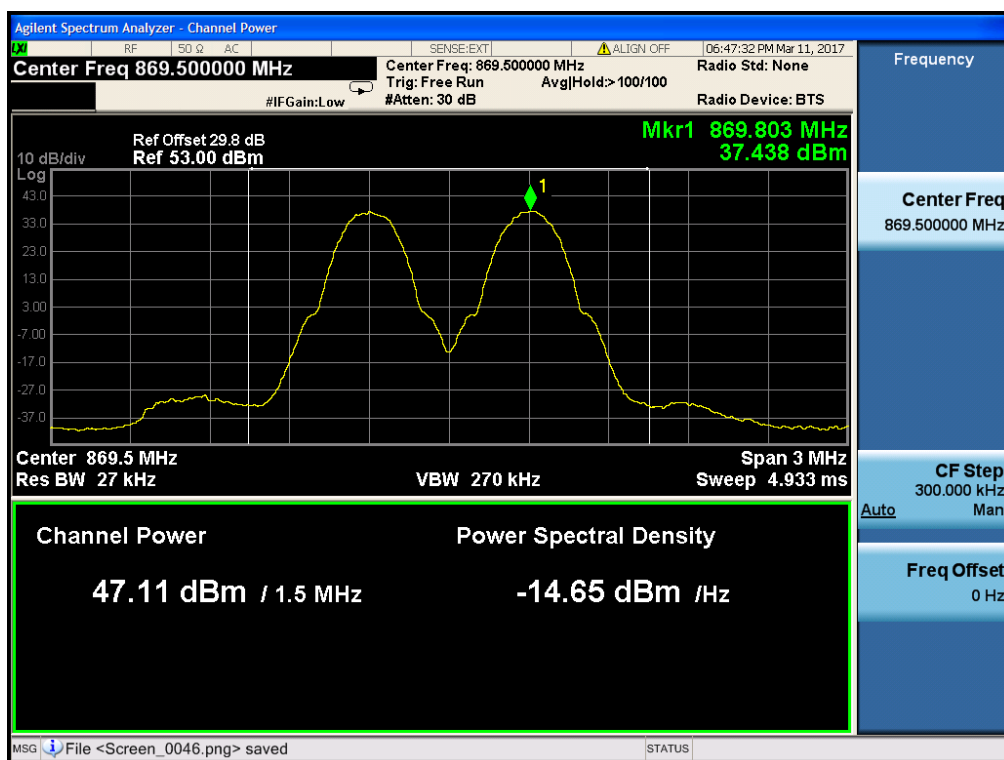
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1	8PSK	869.5	869.2/869.8	47.1
		881.7	881.4/882	47.2
		893.5	893.2/893.8	47.1

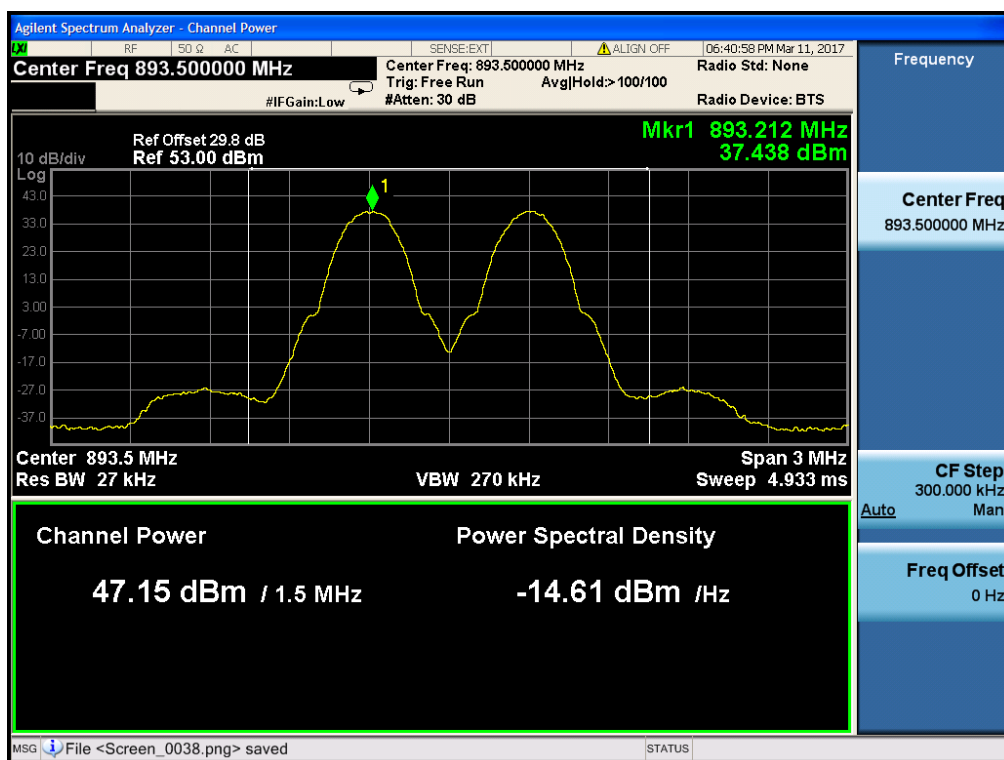




Two carriers Port 4 8PSK

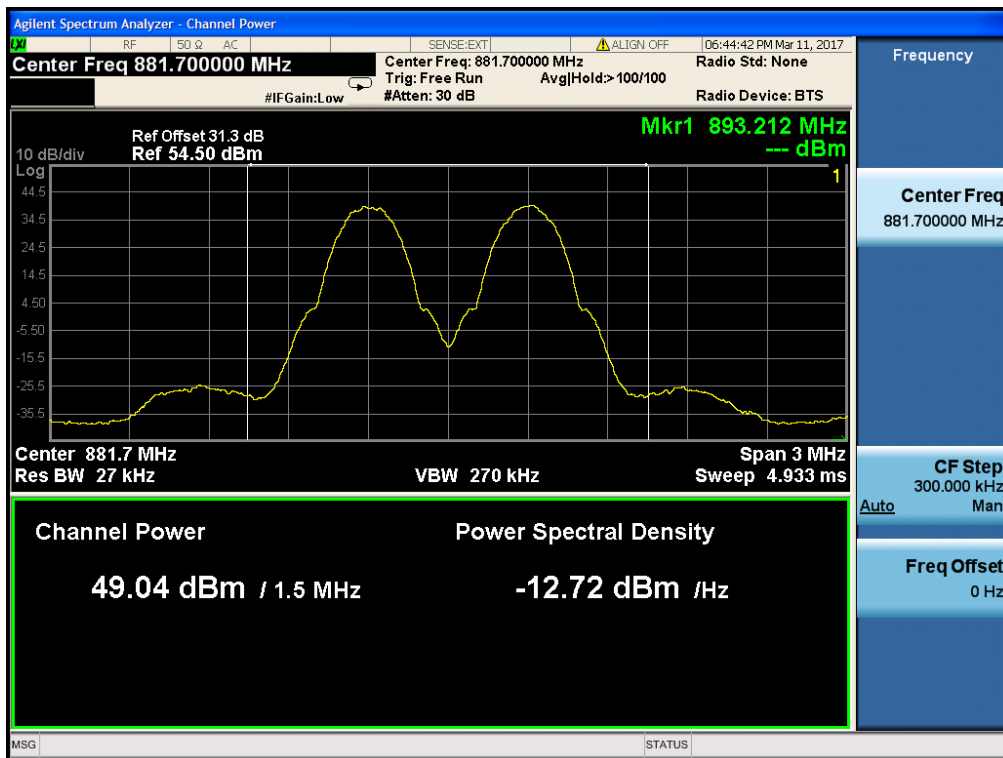
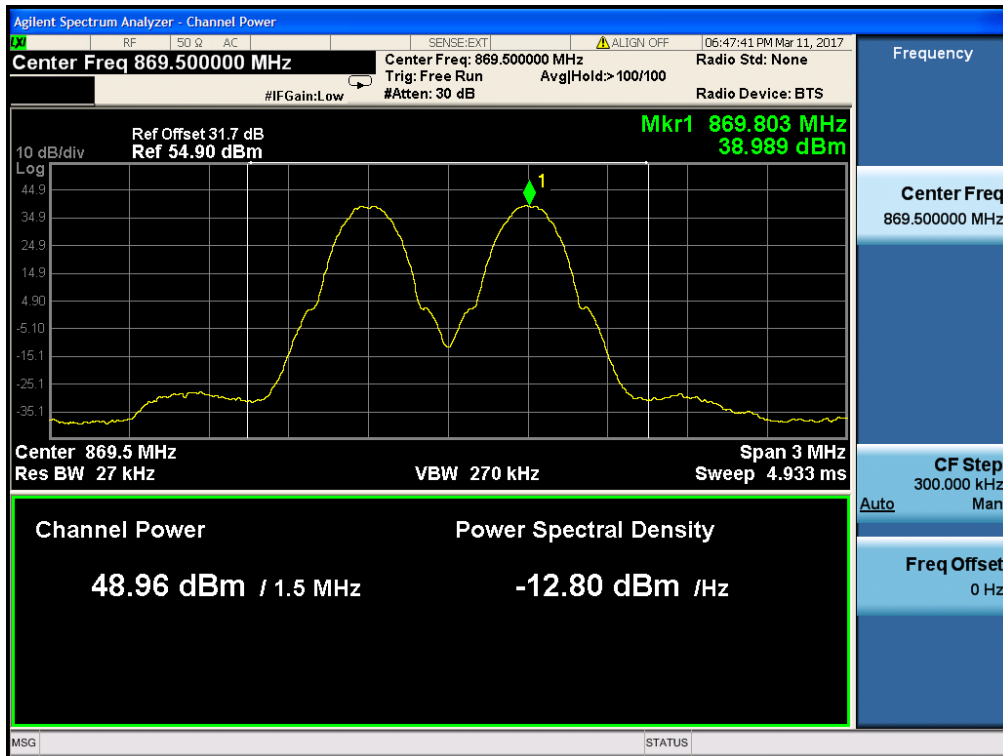
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	8PSK	869.5	869.2/869.8	47.11
		881.7	881.4/882	47.08
		893.5	893.2/893.8	47.15

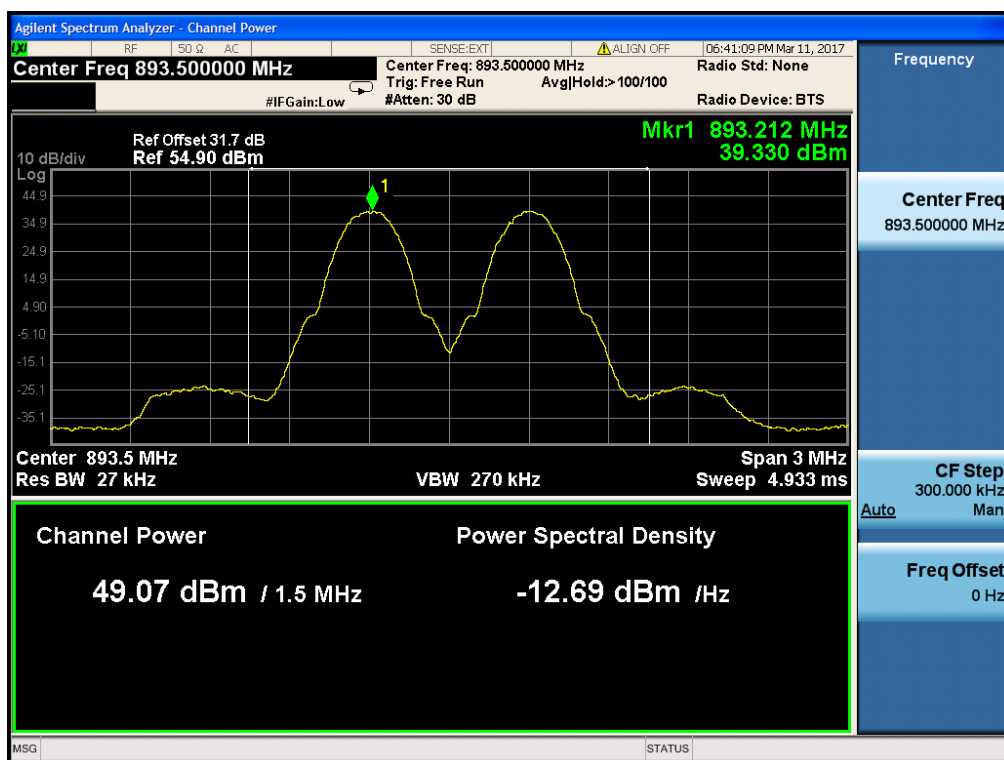




Two carriers Port 1 GMSK

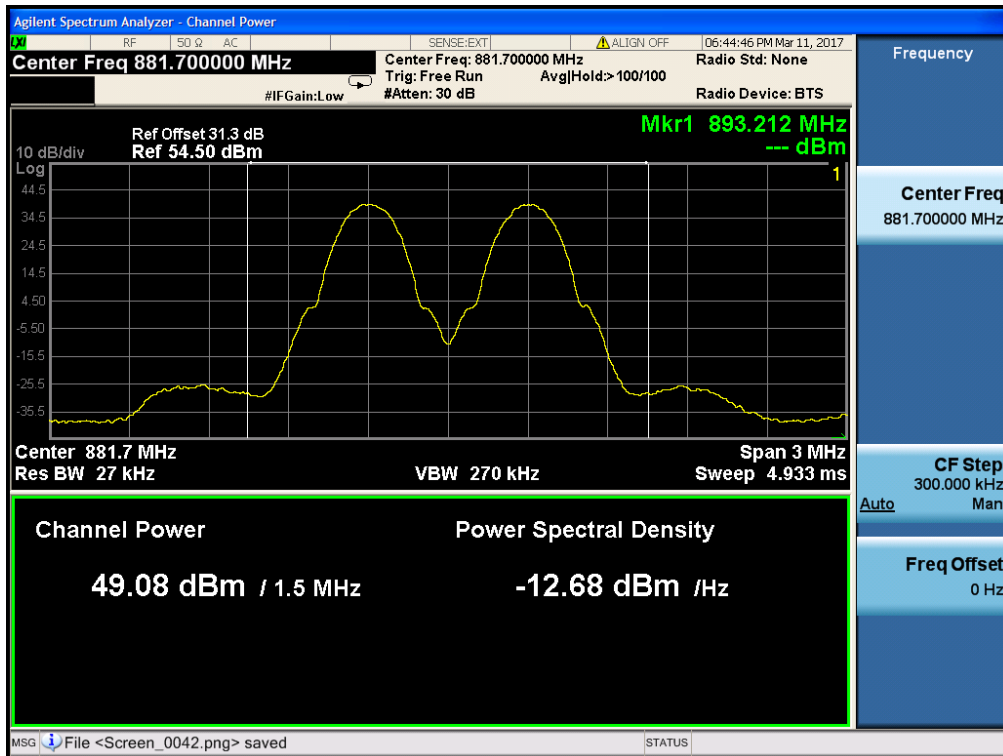
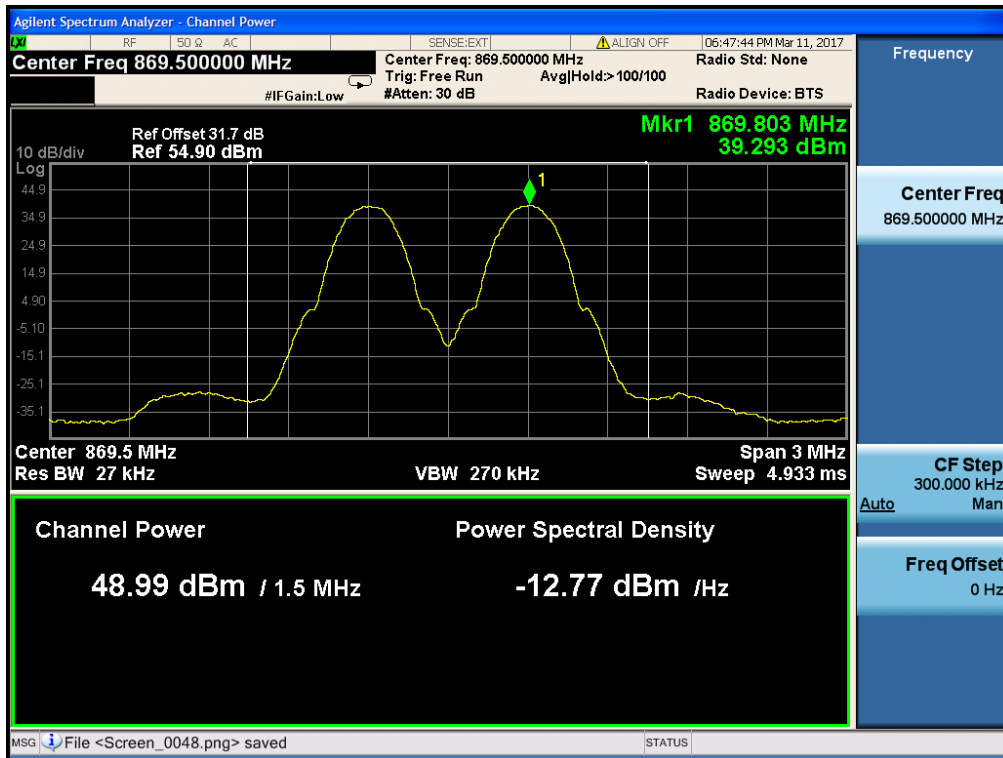
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1	GMSK	869.5	869.2/869.8	48.96
		881.7	881.4/882	49.04
		893.5	893.2/893.8	49.07

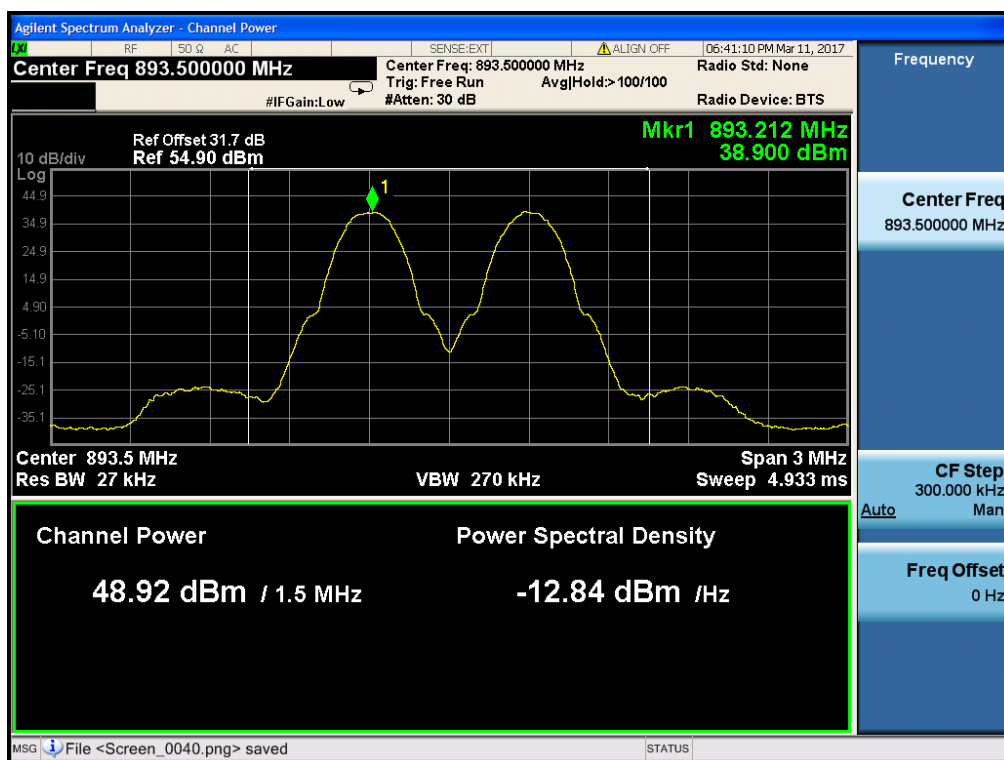




Two carriers Port 4 GMSK

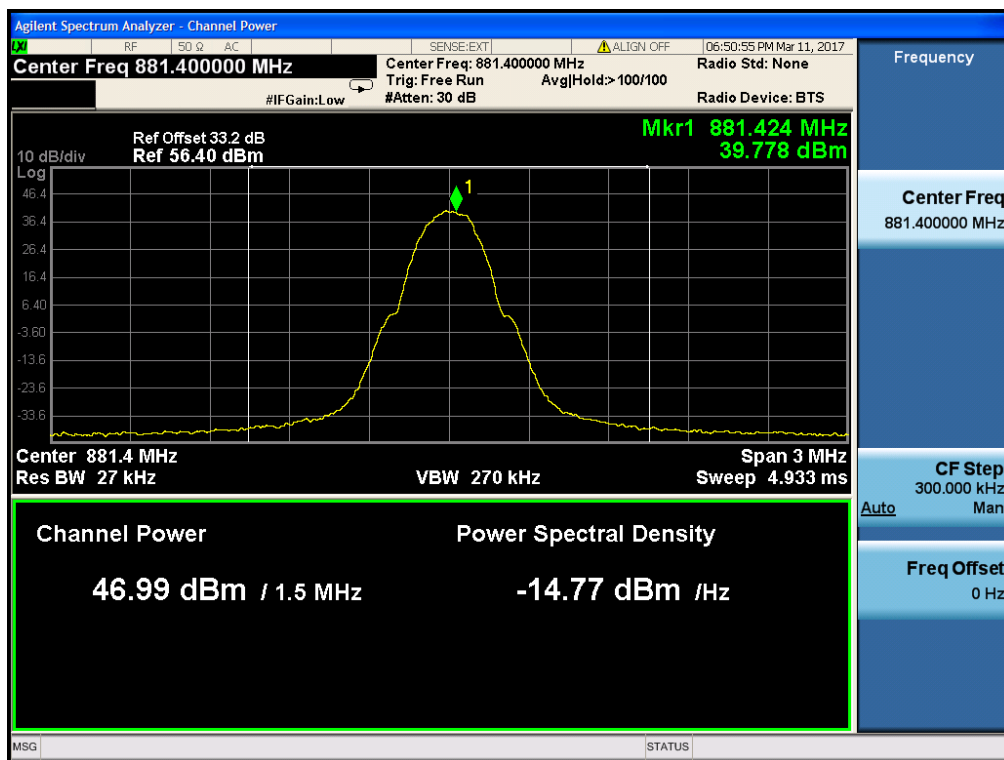
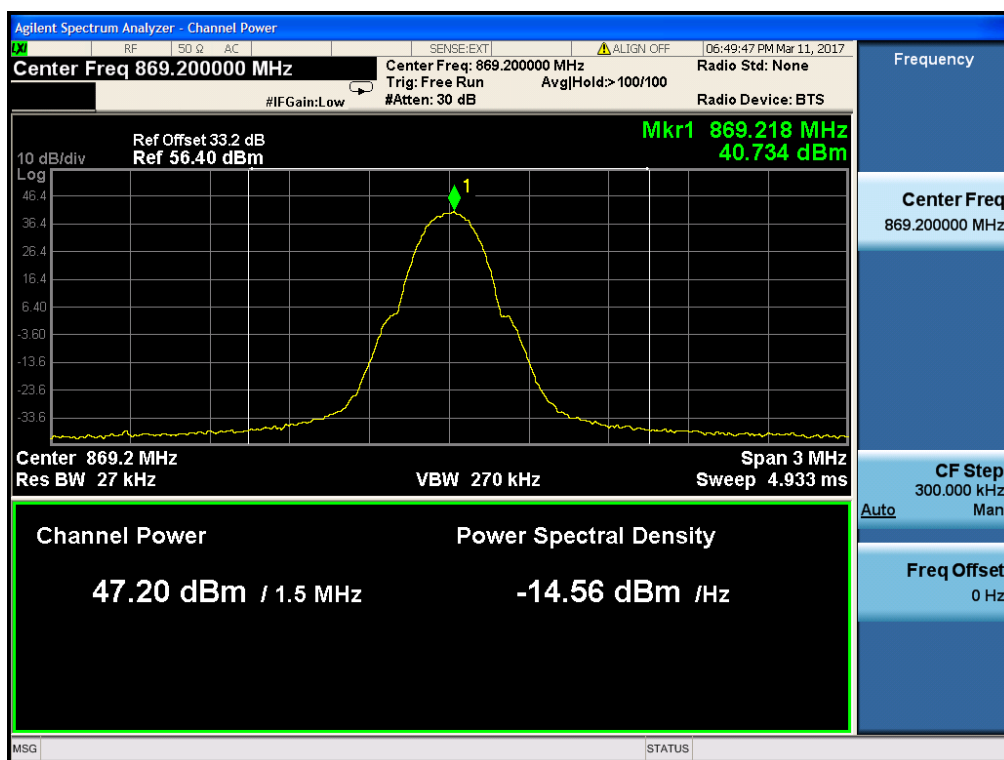
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	GMSK	869.5	869.2/869.8	48.99
		881.7	881.4/882	49.08
		893.5	893.2/893.8	48.92

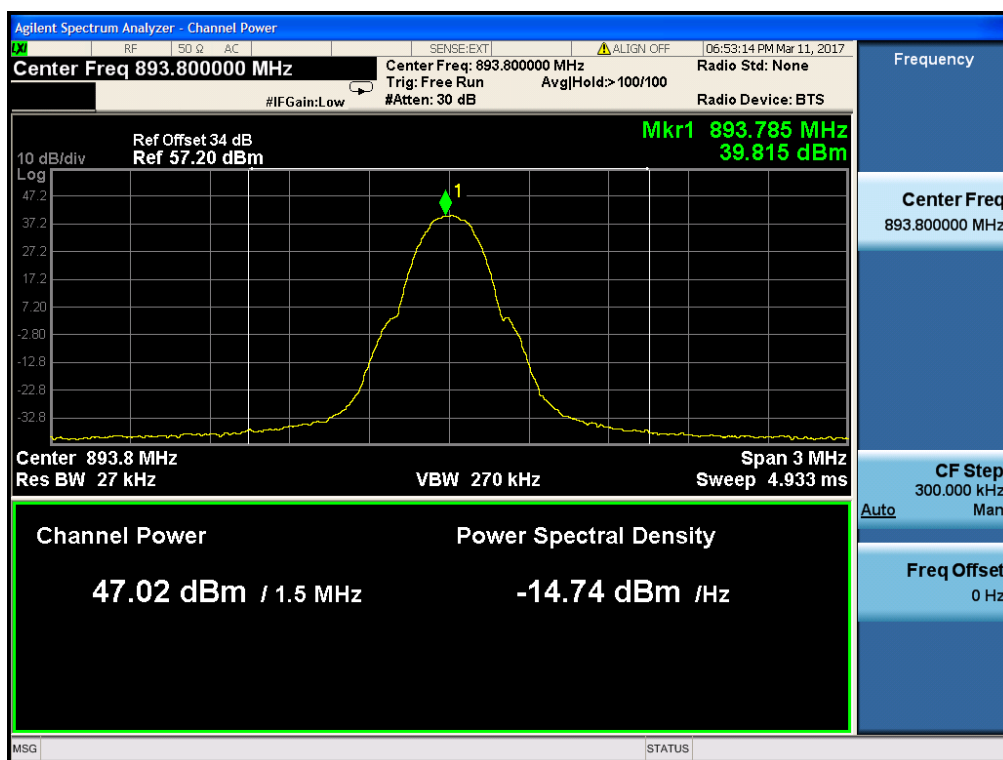




One carrier Port 1 8PSK

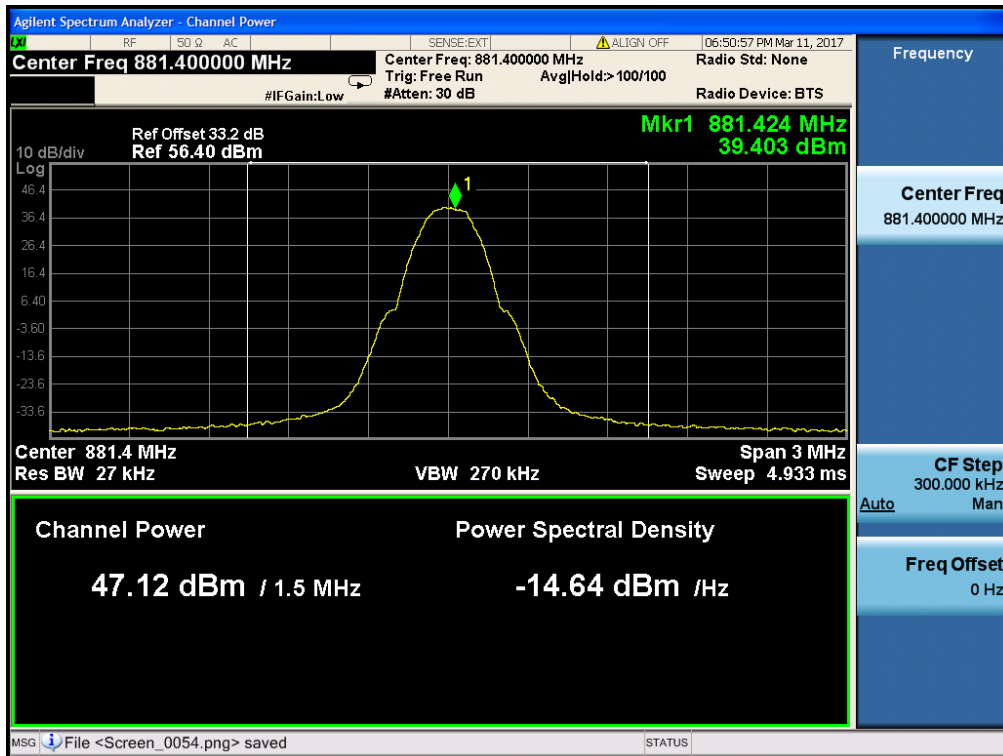
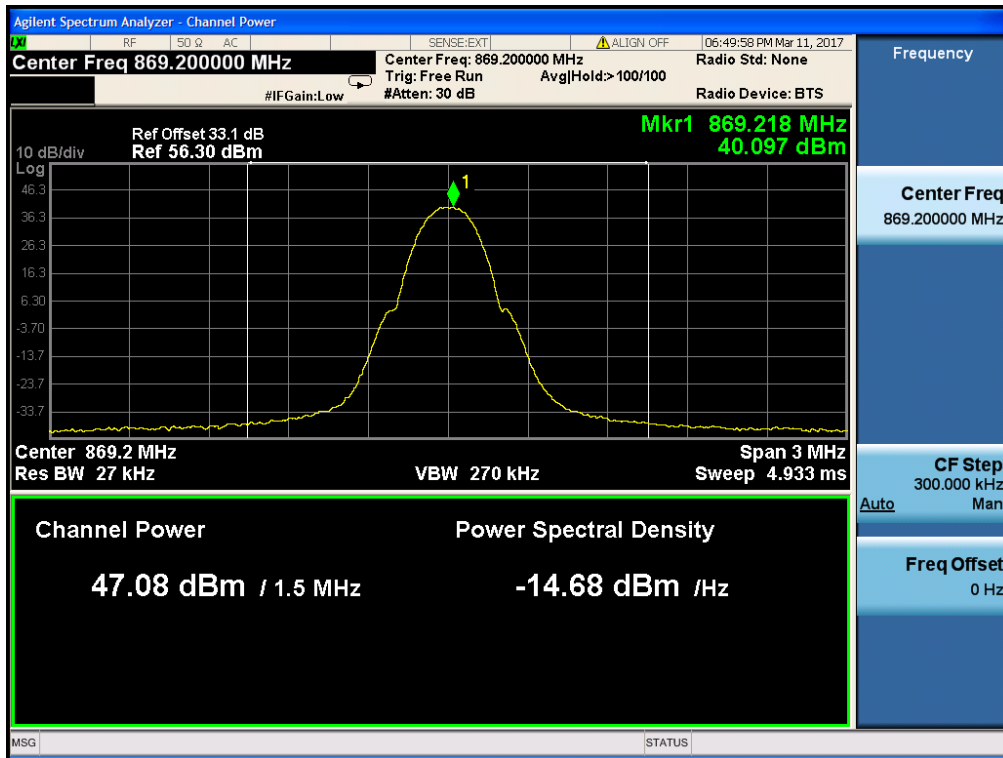
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1	8PSK	869.2	869.2	47.2
		881.4	881.4	46.99
		893.8	893.8	47.02

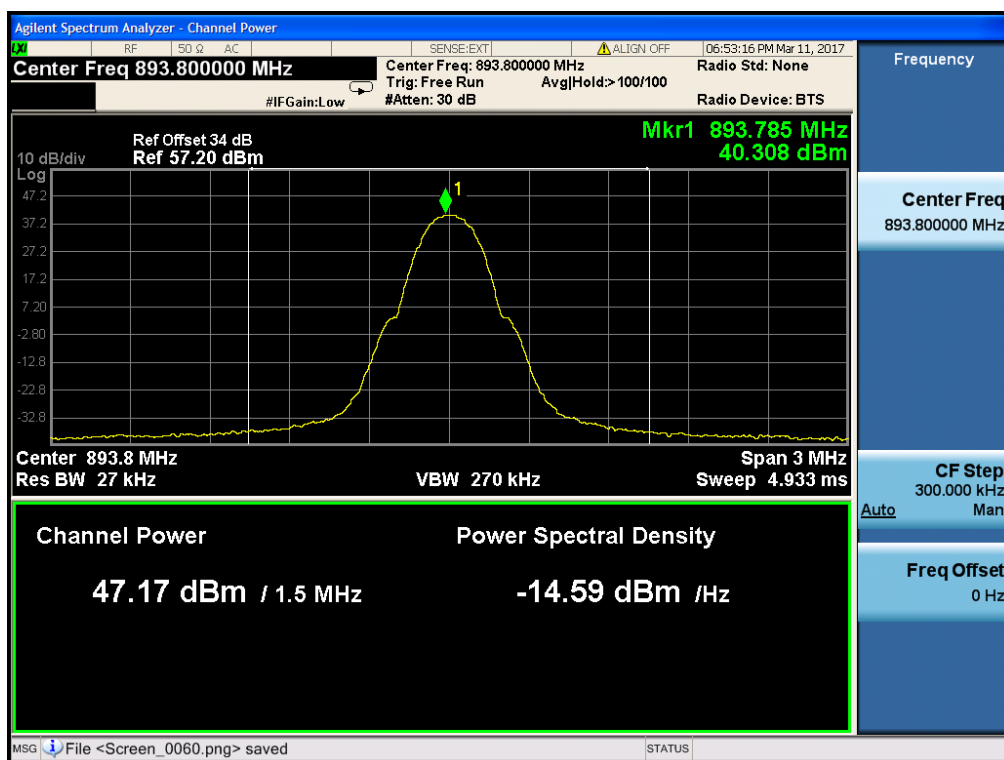




One carrier Port 4 8PSK

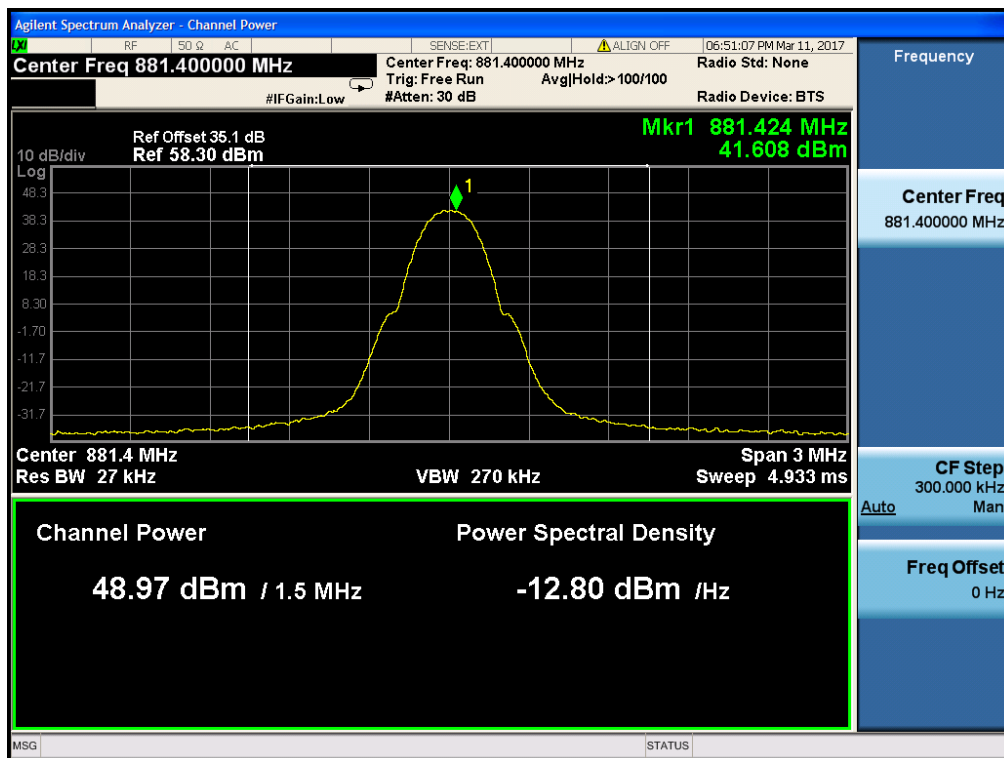
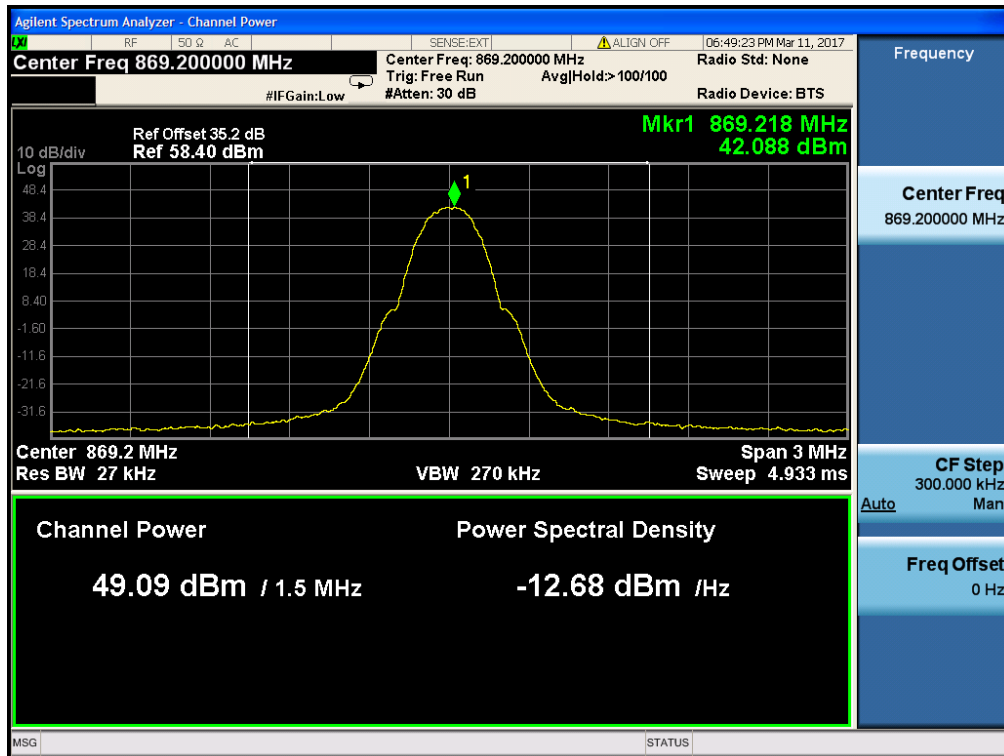
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	8PSK	869.2	869.2	47.08
		881.4	881.4	47.12
		893.8	893.8	47.17

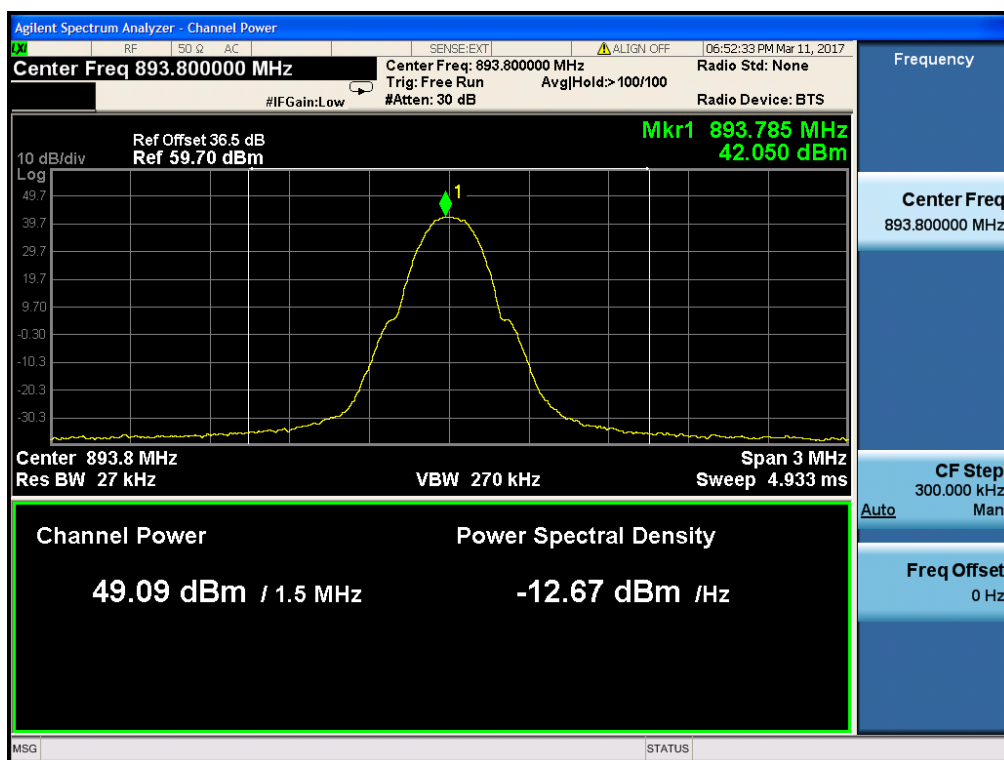




One carrier Port 1 GMSK

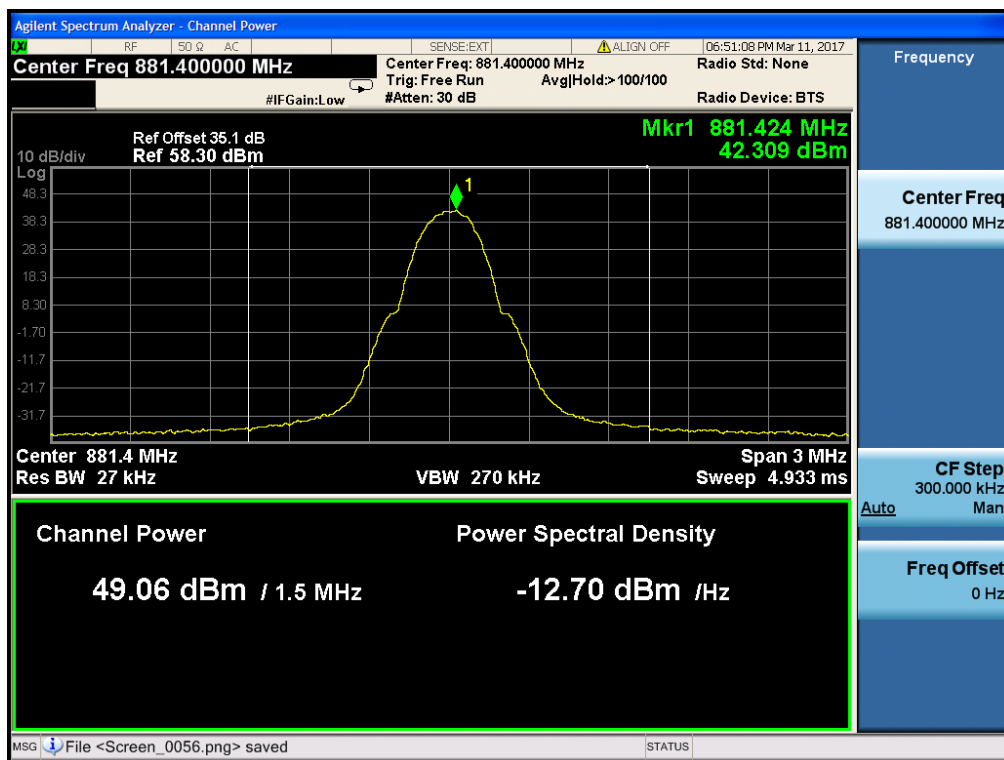
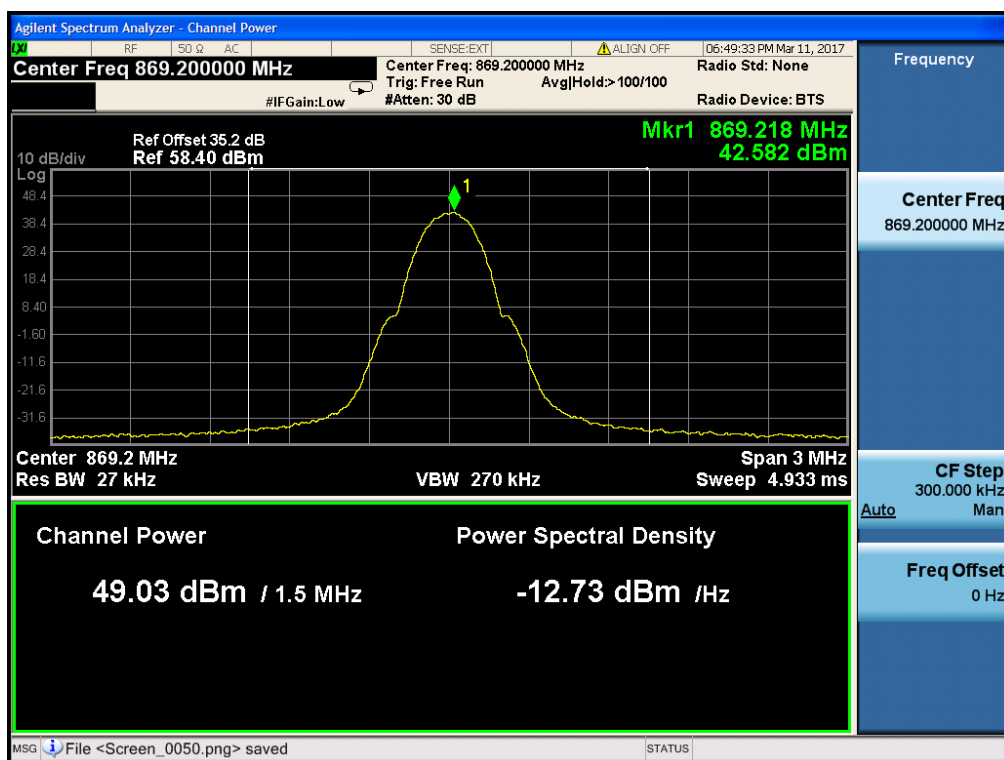
Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
1	GMSK	869.2	869.2	49.09
		881.4	881.4	48.97
		893.8	893.8	49.09

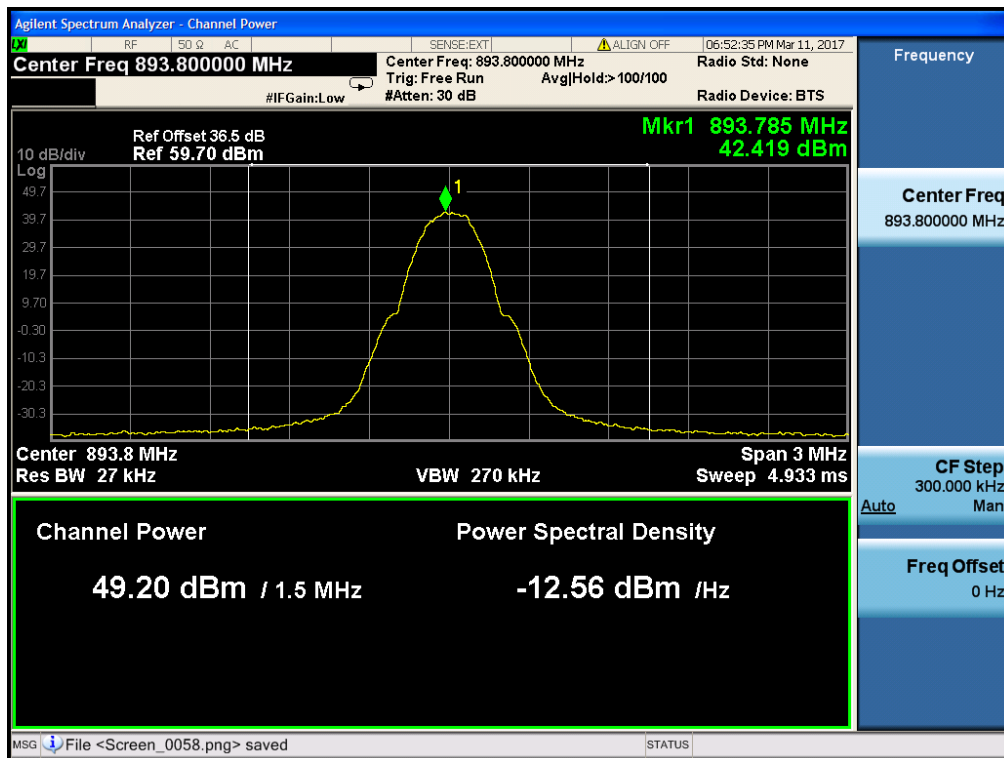




One carrier Port 4 GMSK

Port	modulation	Center Freq. (MHz)	Frequency (MHz)	Max output Power in dBm
4	GMSK	869.2	869.2	49.03
		881.4	881.4	49.06
		893.8	893.8	49.2







7 RF EXPLOSURE

7.1 Applicable standard: FCC §2.1091 and §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 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

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 §22.913, the the effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 1000 Watts.

Frequency 869MHz is between 300MHz and 1500MHz, and the Maximum $S=f/1500(\text{mW}/\text{cm}^2)$

$$\Rightarrow R=4.75\text{m}.$$

This equipment should be installed and operated with minimum distance 4.75m 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	N9020A	MY52090451	2016-3-15	2017-3-15
DTS	DTS100 40dB Attenuator	DTS100-40dB-N	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	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

GSM digital mode is used by EUT.

8.4 Test Data Environmental Conditions

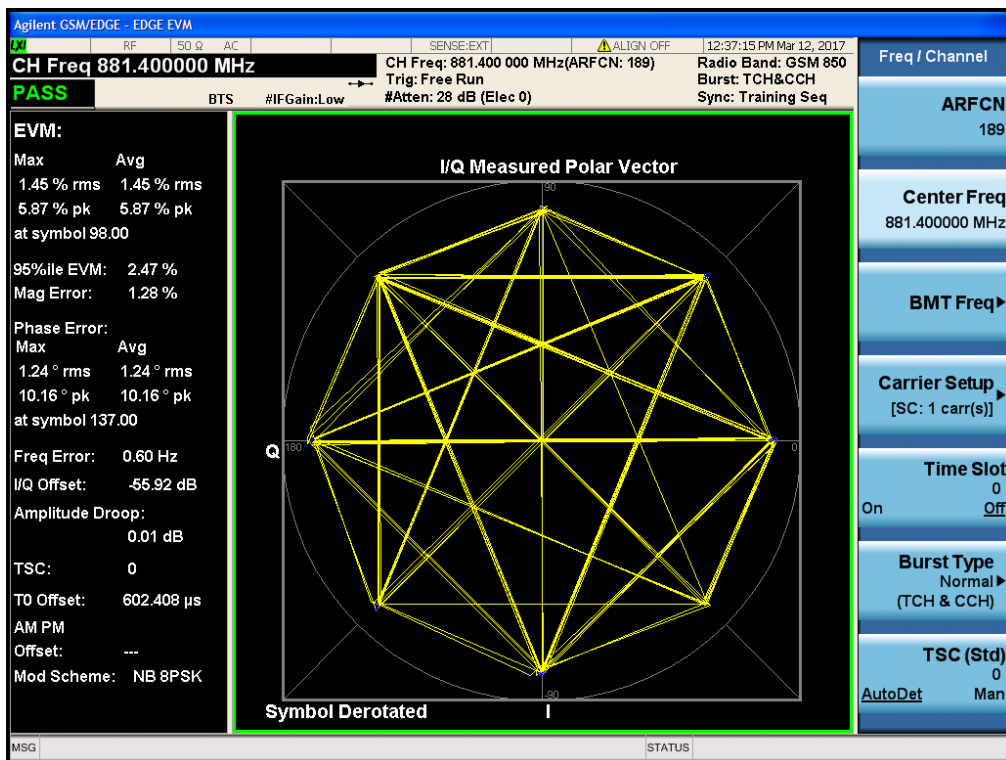
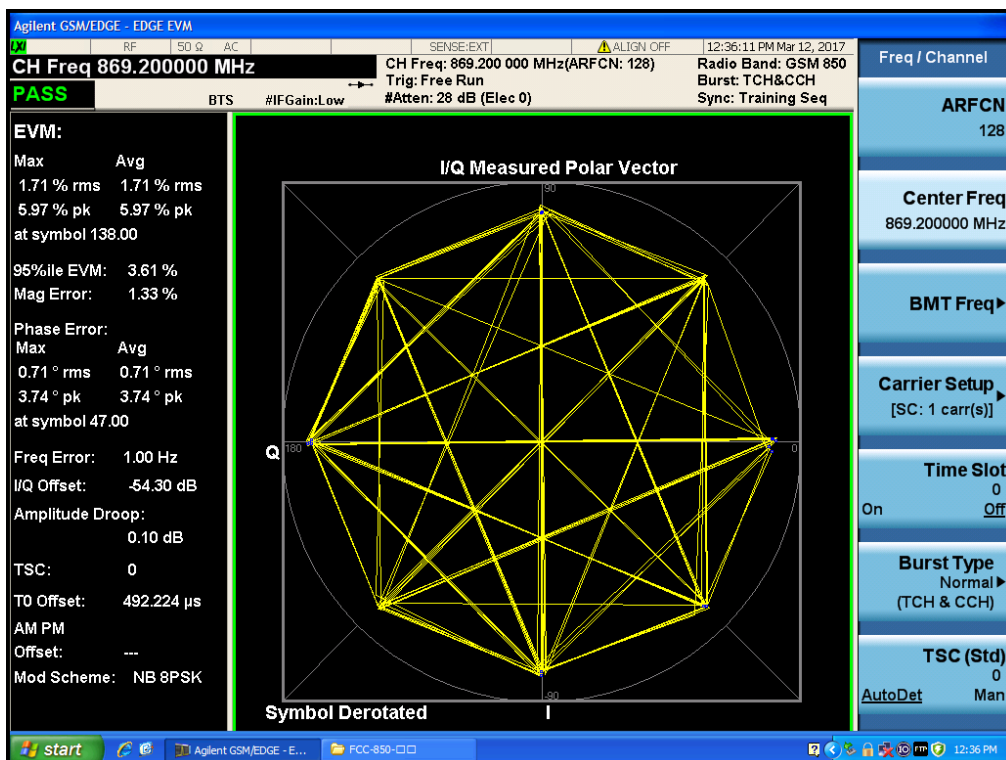
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

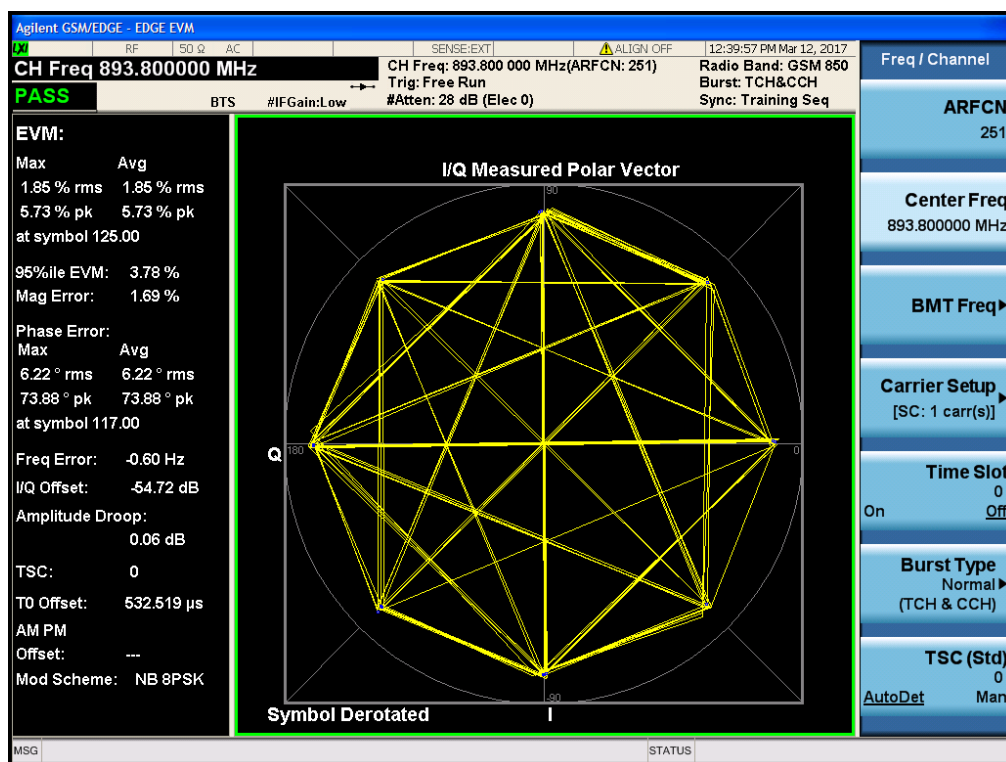
8.5 Test Result: Pass

8.6 Test Mode: Transmitting GSM

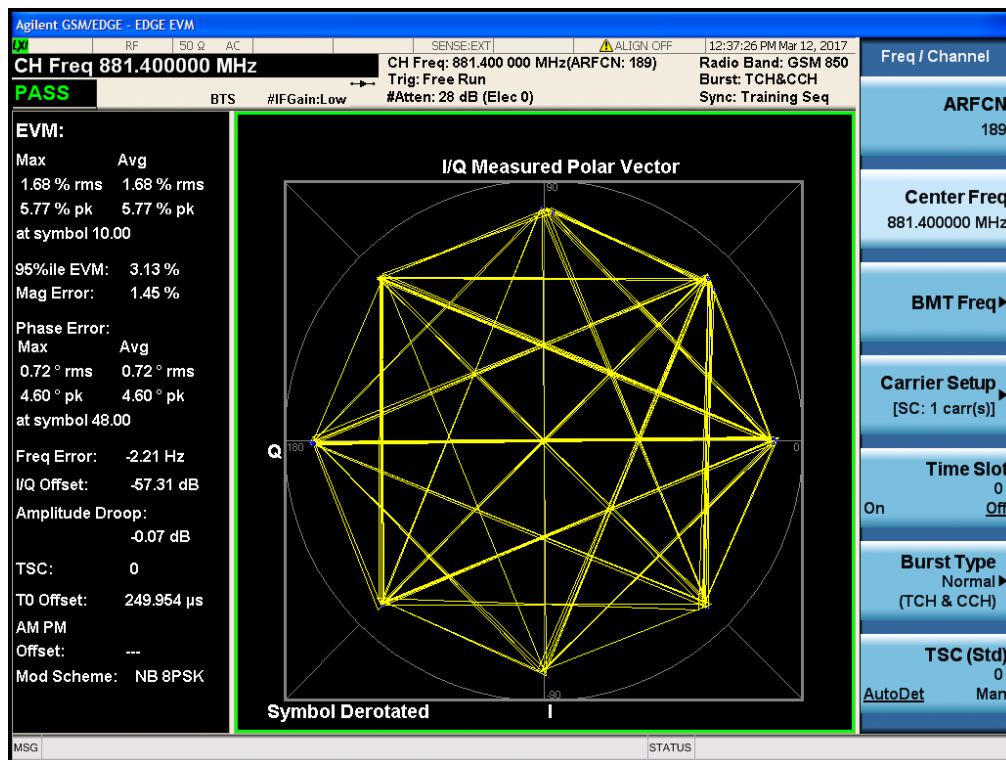
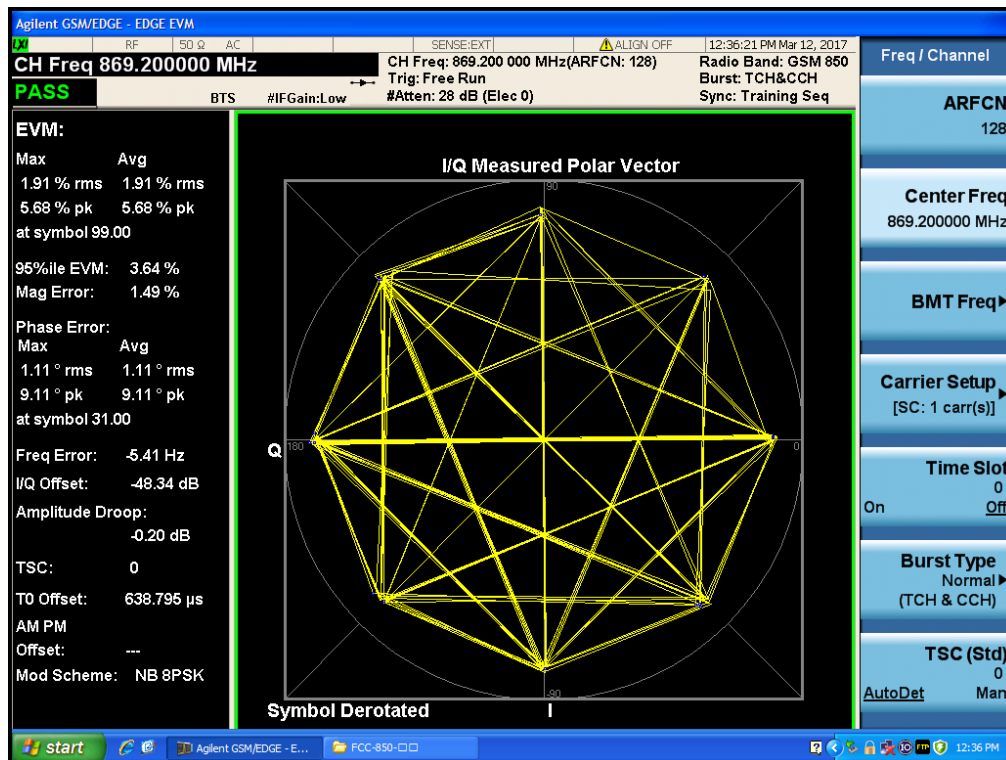
8.7 Test Data

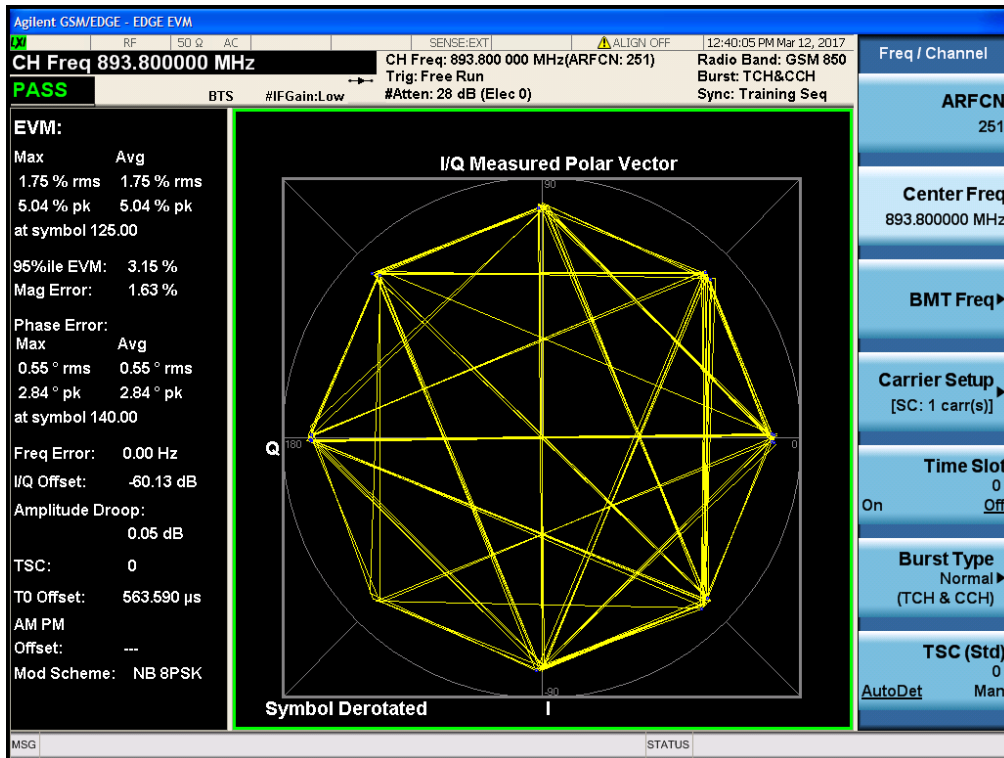
Port	Modulation	Frequency (MHz)	EVM
1	8PSK	869.2	3.61%
		881.4	2.47%
		893.8	3.78%





Port	Modulation	Frequency (MHz)	EVM
4	8PSK	869.2	3.64%
		881.4	3.13%
		893.8	3.15%





Port	Modulation	Frequency (MHz)	Phase Error(°)	Frequency Error(Hz)
1	GMSK	869.2	0.51	0.51
		881.4	0.47	0.57
		893.8	0.44	-0.77

