



# FCC RF TEST REPORT

Report Number : **RP20170314030\_02** Date of Issue: **12 Mar 2017**

FCC ID : **Q78-R8862AS8500**

Model / Serial No. : **ZXSDR R8862A 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 : **46**

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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**

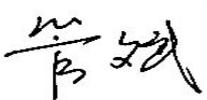
**Wu Shuzhong**  
**Name**

  
**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: Macro Remote Radio Unit**

**MANUFACTURERS MODEL/SERIAL NUMBER: ZXSDR R8862A S8500(GUL)**

**FCC ID : Q78-R8862AS8500**

**SAMPLE NUMBER: S20170314030**

## 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 FCC 47 CFR Part15 FCC 47 CFR Part22



## 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
§ 2.1047	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

### 3 Equipment Specification

#### 3.1 Technical specification

Size: 422 mm x 218 mm x 133 mm (HxWxD)

Input voltage: -37V~-60V

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

Max RF output power: 47.7dBm

Gain of the antenna: 15dBi

Appearance of EUT:



fig 1. FIGURE 1 APPEARANCE OF ZXSDR R8862A 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 27 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.

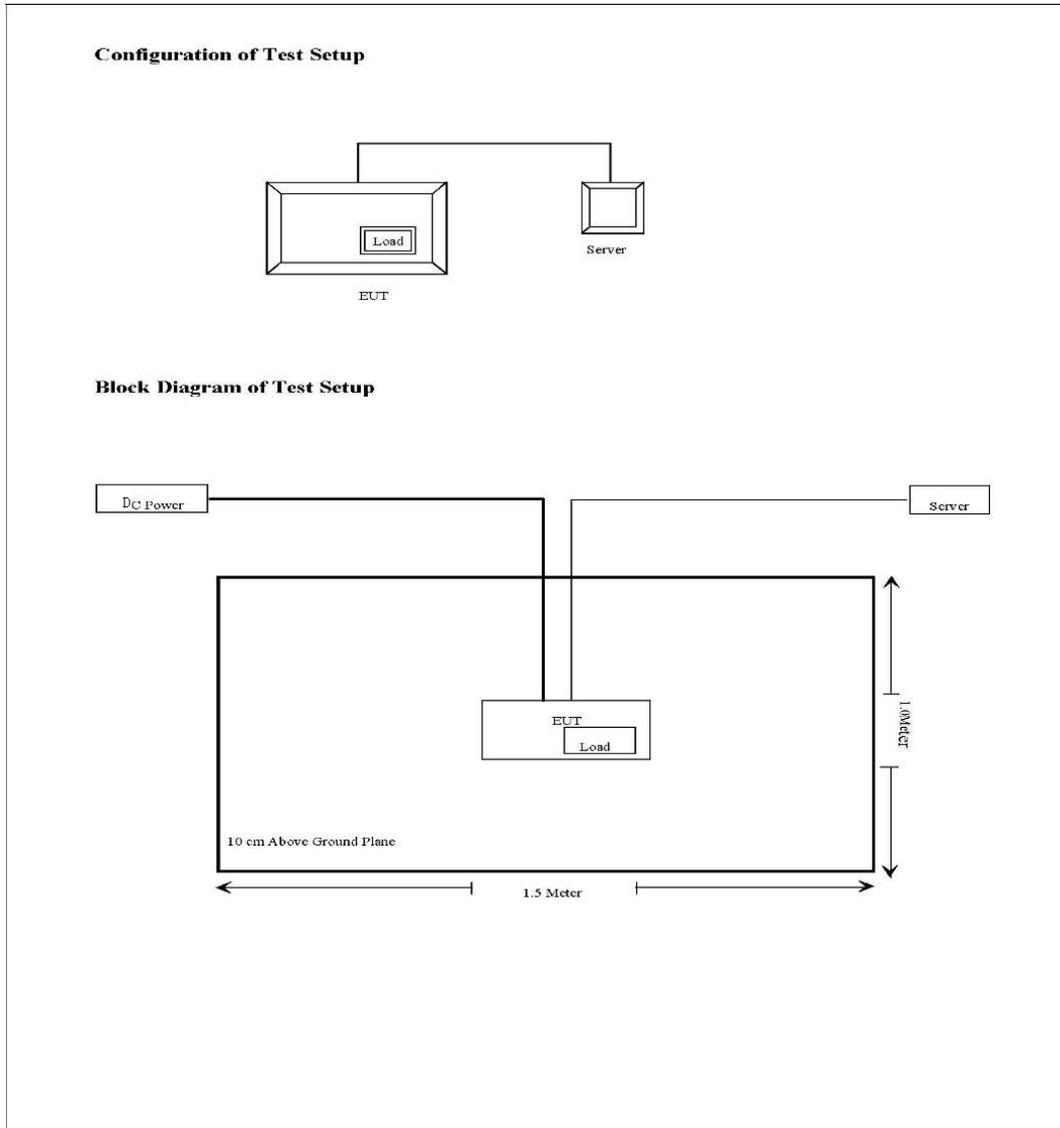


fig 2. Test configuration

## 6 TRANSMITTER OUTPUT POWER

### 6.1 Applicable Standard: FCC §2.1046, §22.913

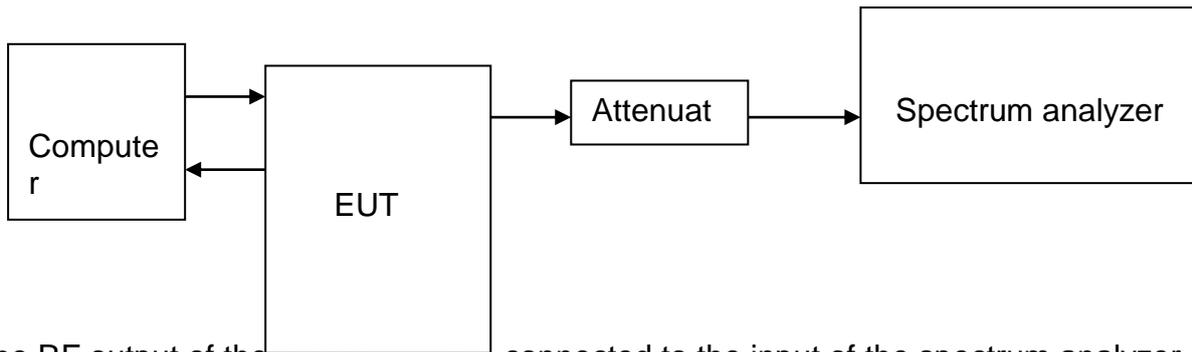
According to FCC §2.1046 & 22.913, the ERP (the effective radiated power) must not exceed 1000Watts.

### 6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.04.17	2017.04.17
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.04.17	2017.04.17
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 1.8dB

### 6.4 Environmental Conditions

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

### 6.5 Test Result: Pass

### 6.6 Test Mode: Transmitting 2GSMTRX 、 1UMTS and 1 LTE carrierscarriers.

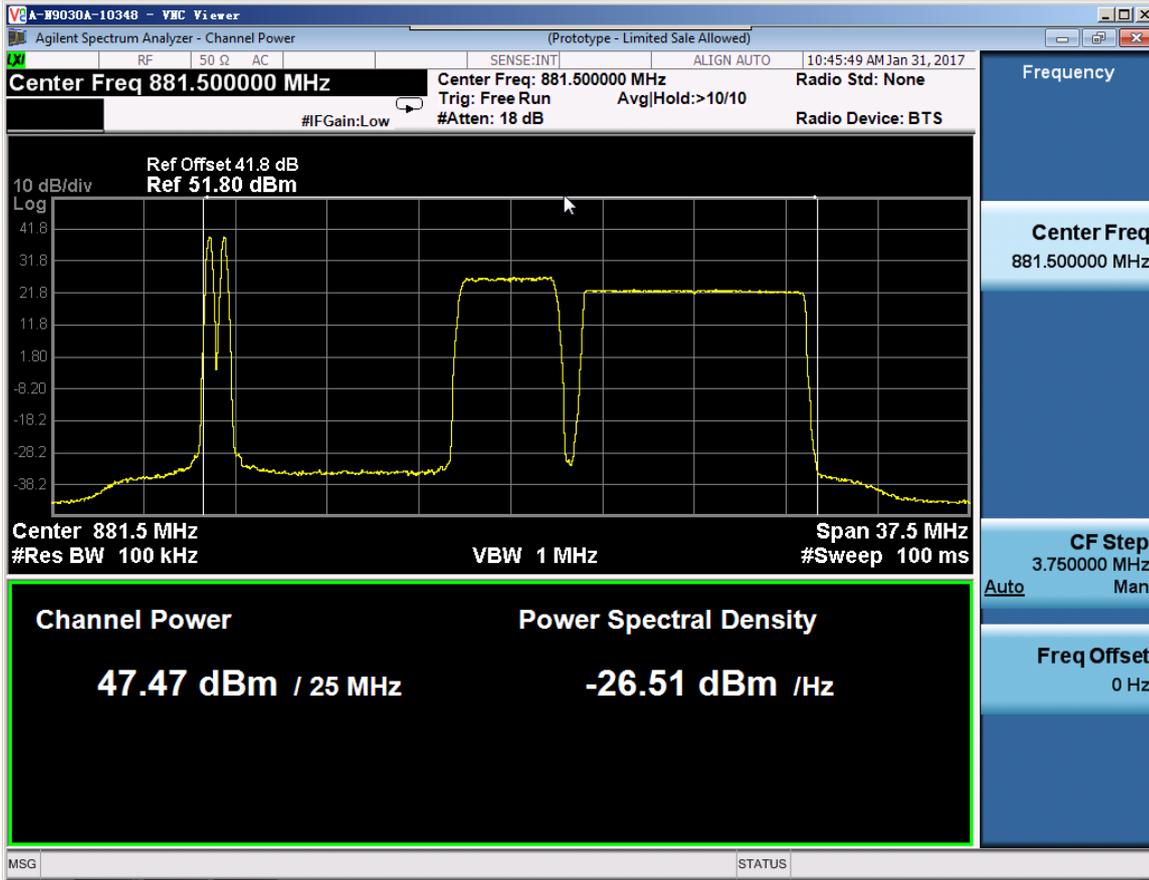
### 6.7 Test Data

Channel Bandwidth :25M(2G+1U+1L)

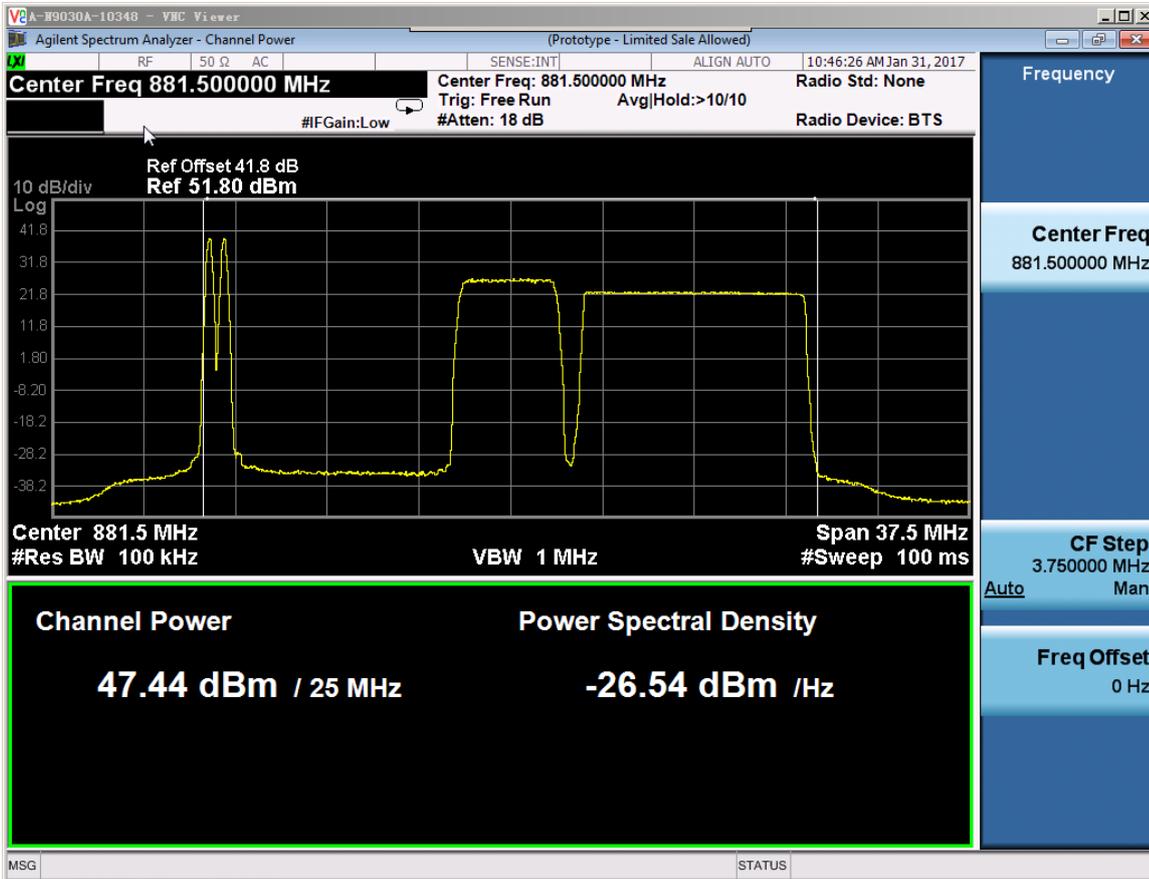
Port	Center Freq. (MHz)	Carry Frequency (MHz)	Max output Power in dBm
1	881.5	869.2/869.8/881.4/889	47.47
4	881.5	869.2/869.8/881.4/889	47.44



### Port 1



### Port 4





## 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 = 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

$$S = f/1500 (\text{mW}/\text{cm}^2) = 0.5793$$

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

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	N9030A	MY49431143	2016.04.17	2017.04.17
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.04.17	2017.04.17
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 、GSM and UMTS 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 2GSMTRX 、1UMTS and 1 LTE carrierscarriers.****8.7 Test Data (LTE)**

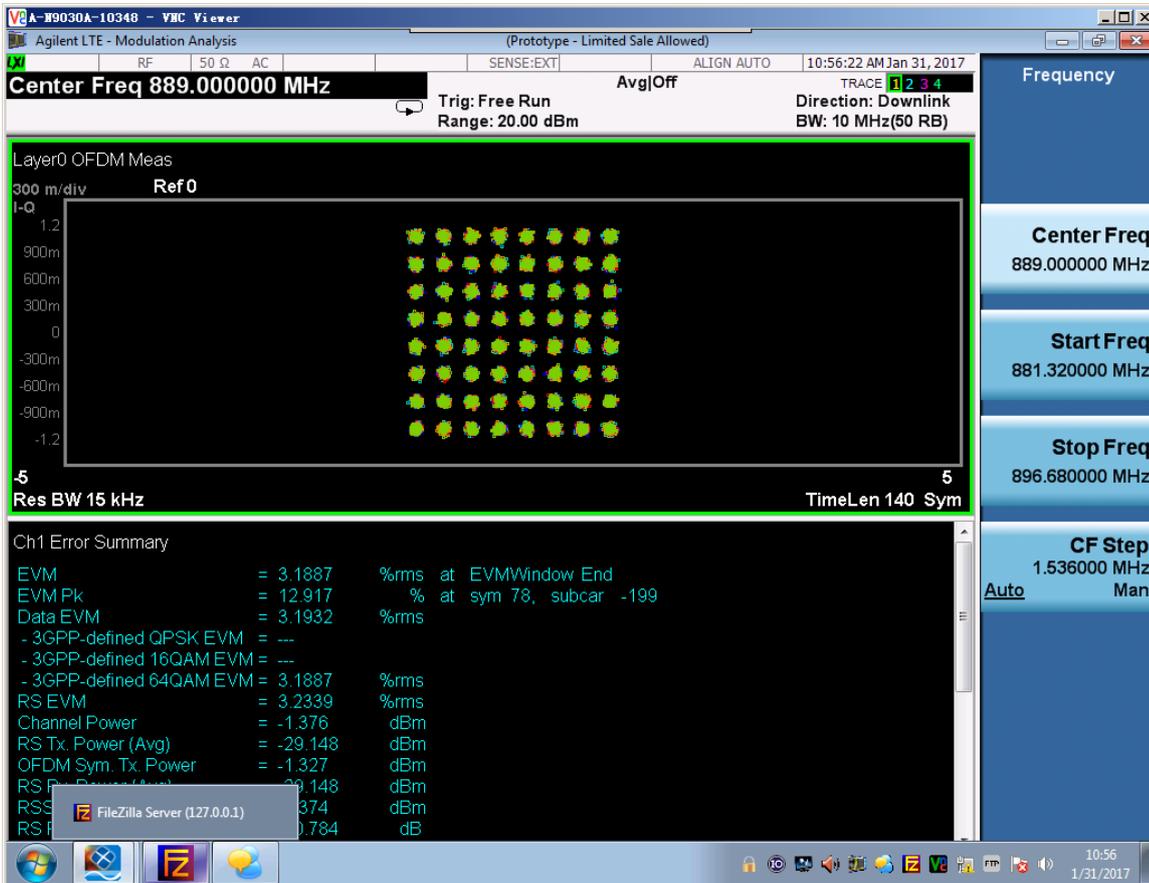
RF Bandwidth :25M LTE:10M

Port	Frequency (MHz)	Test mode	EVM%
1	889	TM2.0	0.7164
		TM3.1	3.1887
		TM3.2	4.6451
		TM3.3	6.090
4	889	TM2.0	0.74938
		TM3.1	3.1445
		TM3.2	4.6525
		TM3.3	6.0706

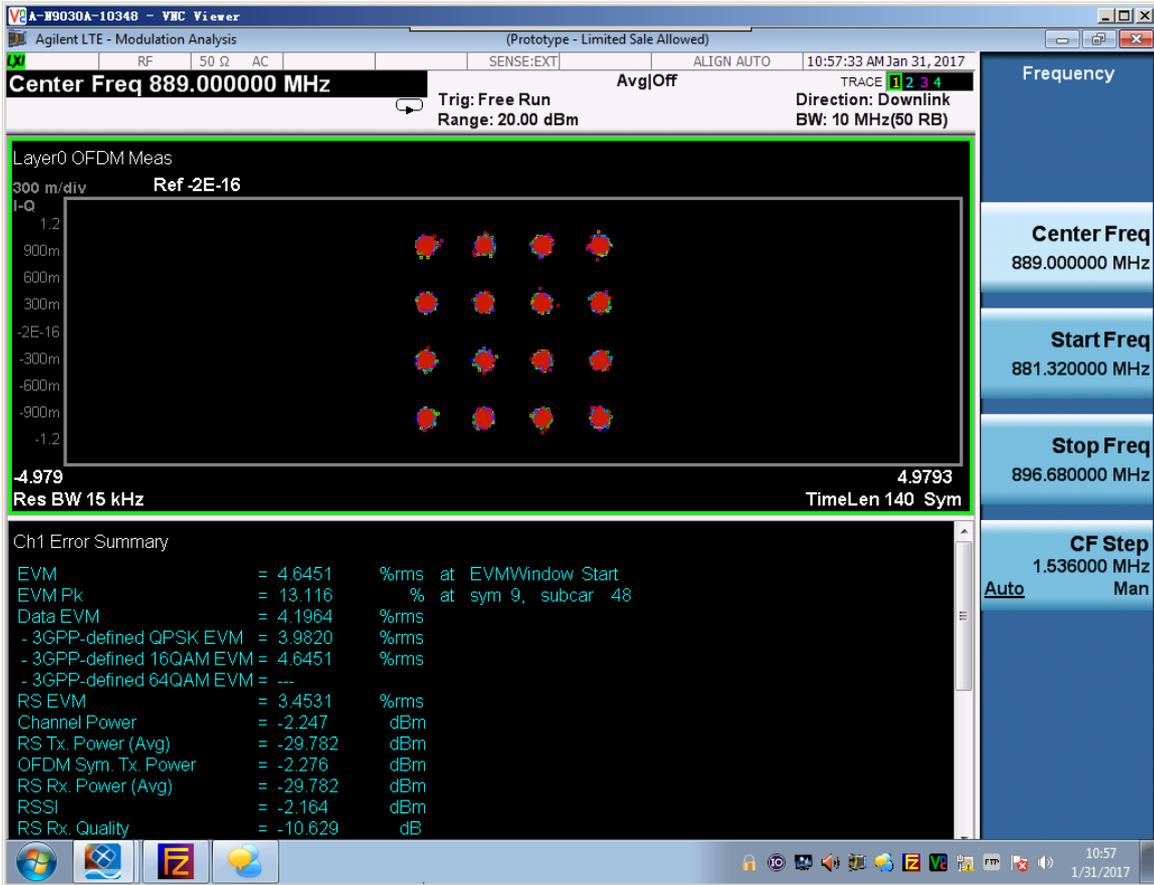
Port 1 -889MHz-TM2.0



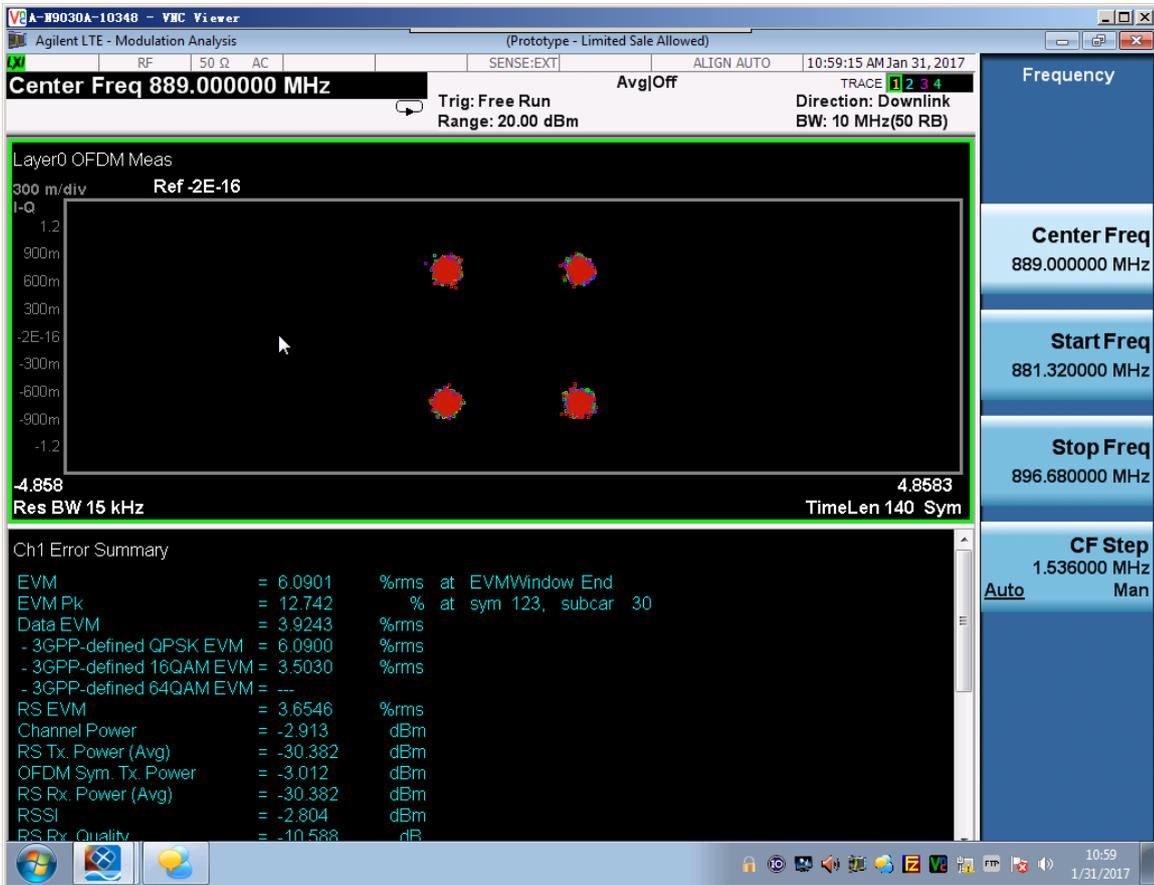
Port 1 -889MHz -TM3.1



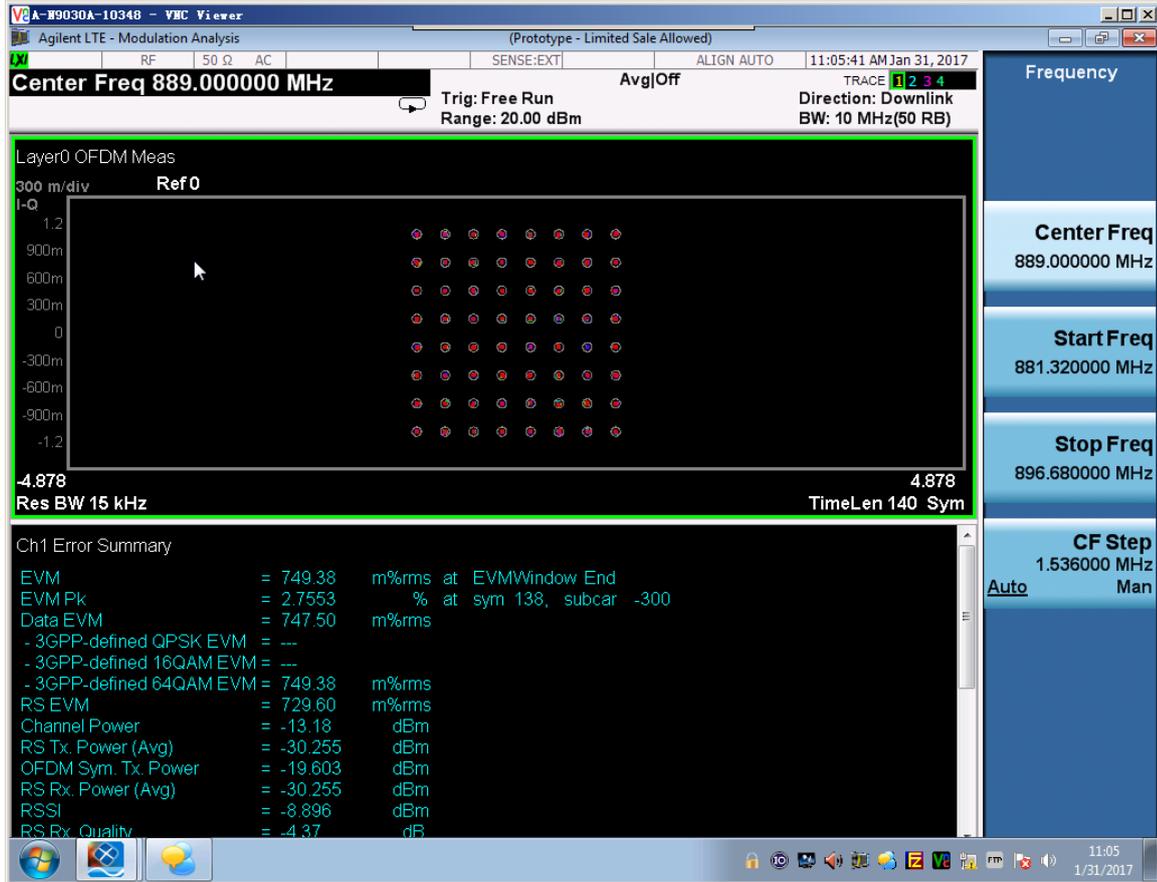
Port 1 -889MHz -TM3.2



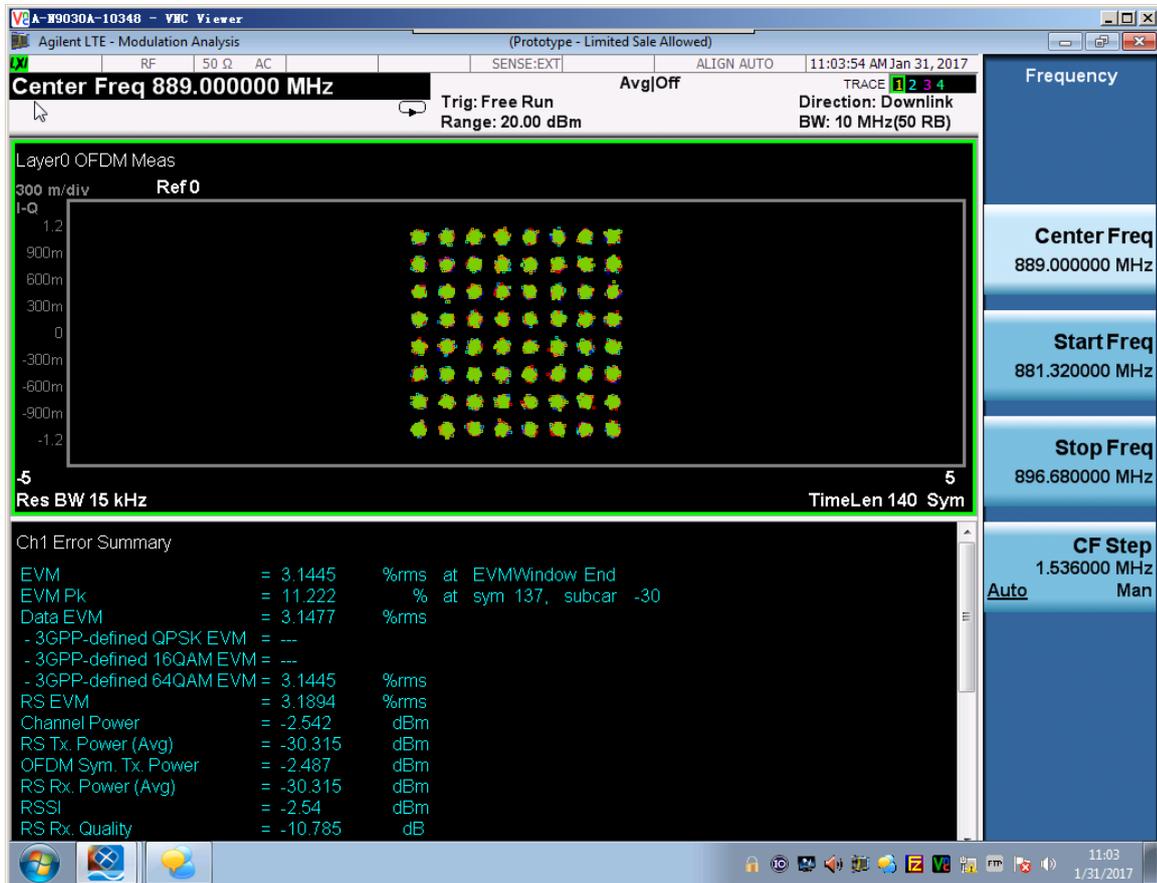
Port 1 -889MHz -TM3.3



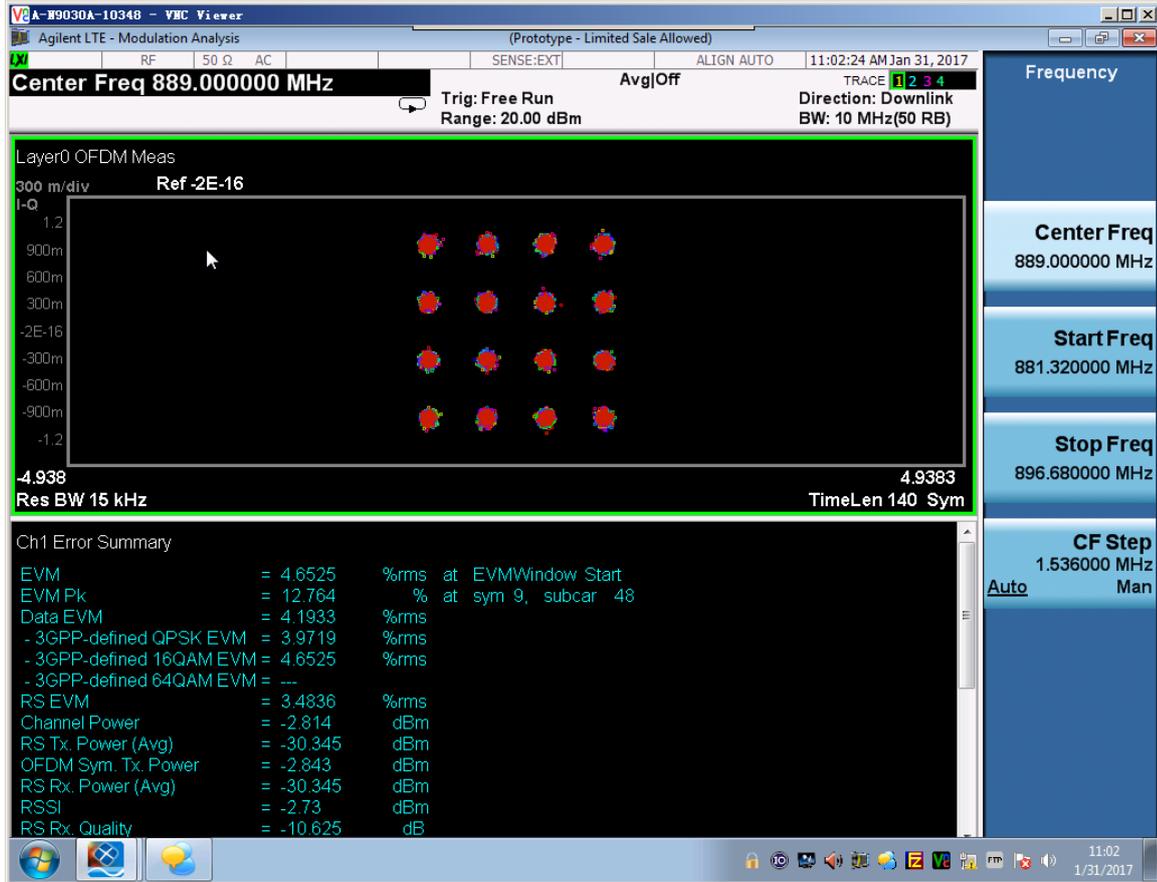
Port 4 -889MHz-TM2.0



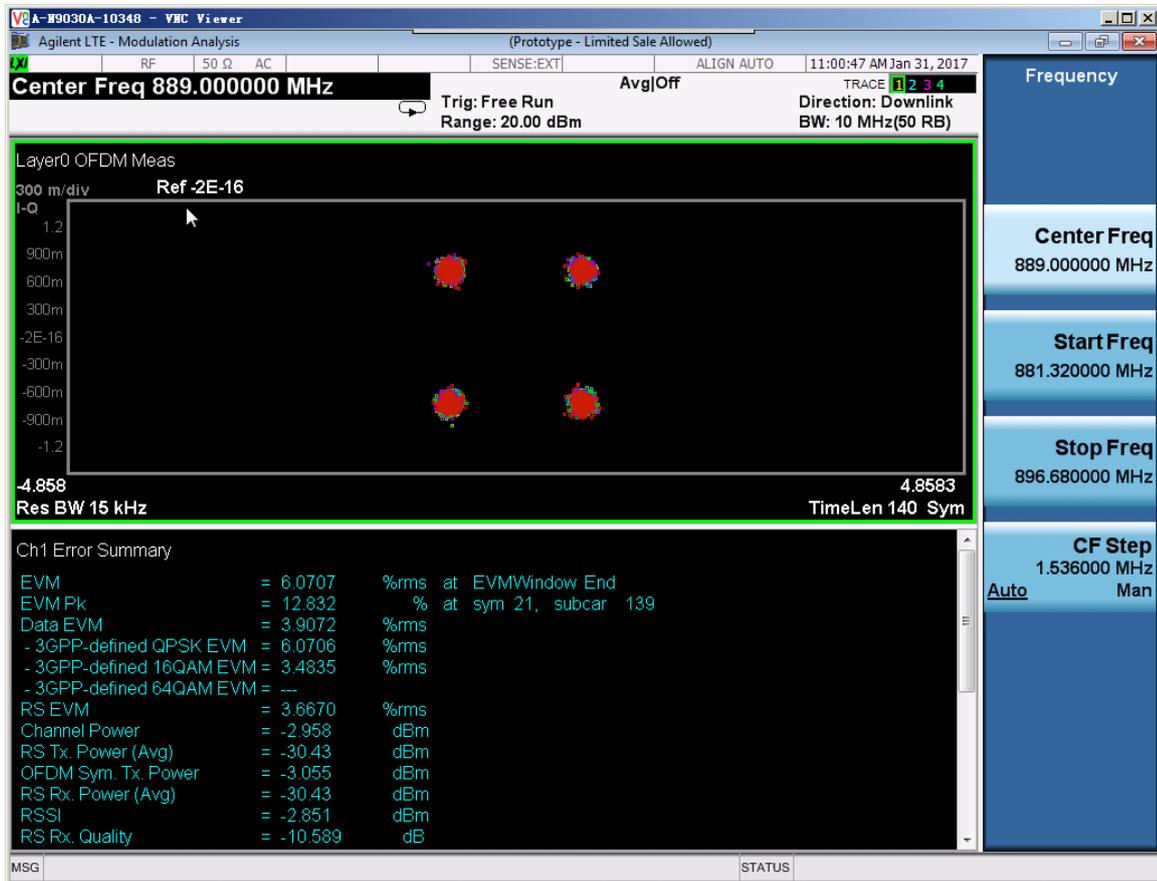
Port 4 -889MHz -TM3.1



### Port 4 -889MHz -TM3.2



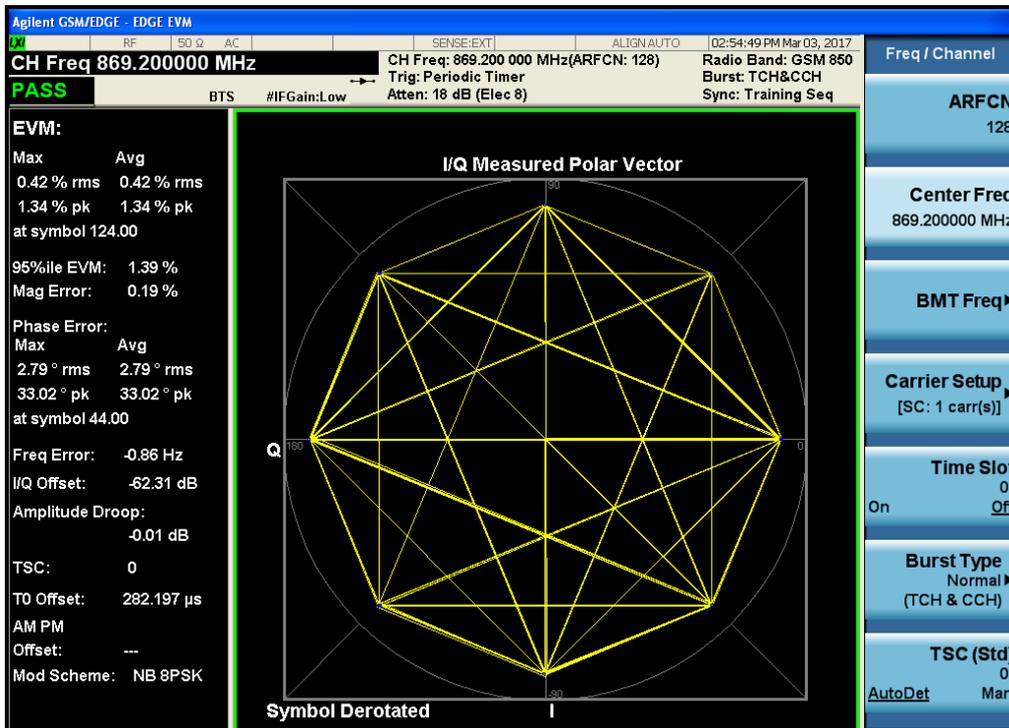
### Port 4 -889MHz -TM3.3



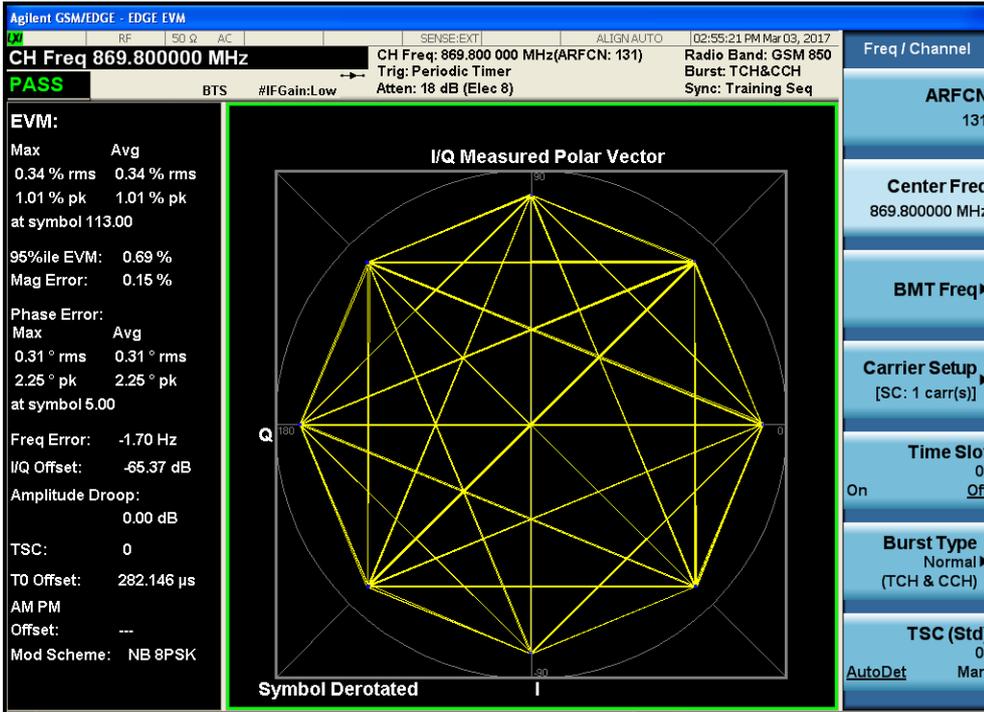
### 8.8 Test Data (GSM)

Port	Frequency (MHz)	测试模式	EVM%
1	869.2	8PSK	0.42
	869.8	8PSK	0.34
4	869.2	8PSK	0.4
	869.8	8PSK	0.39

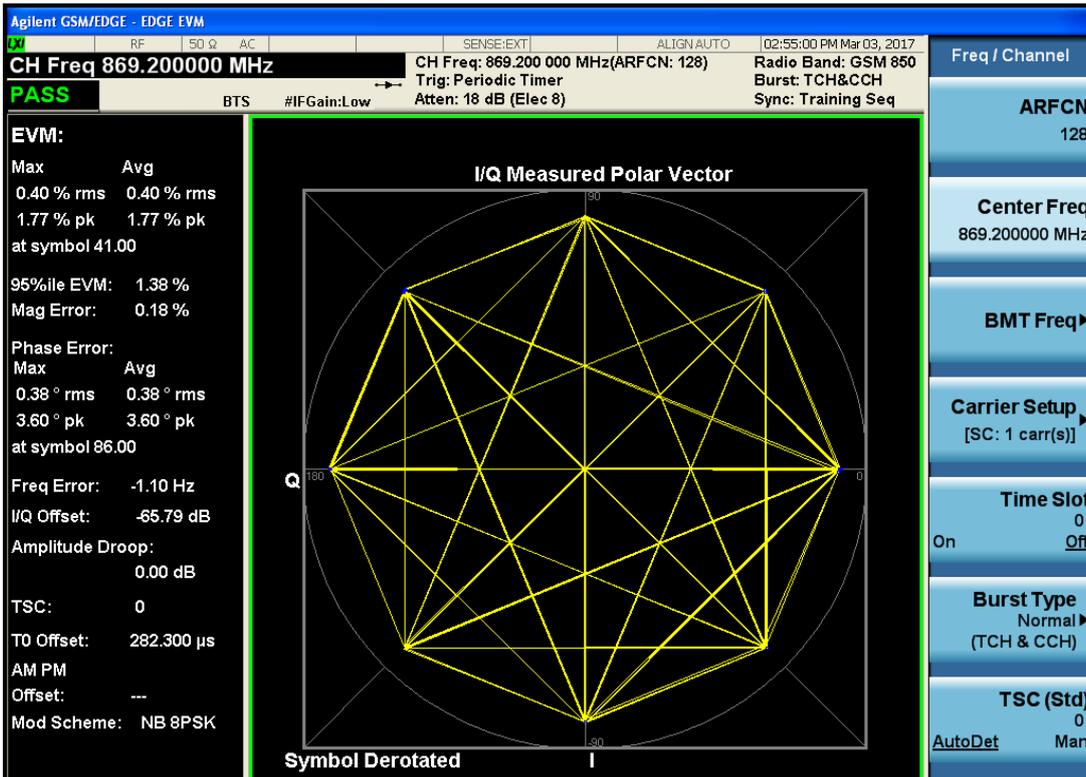
#### Port 1 -869.2 MHz



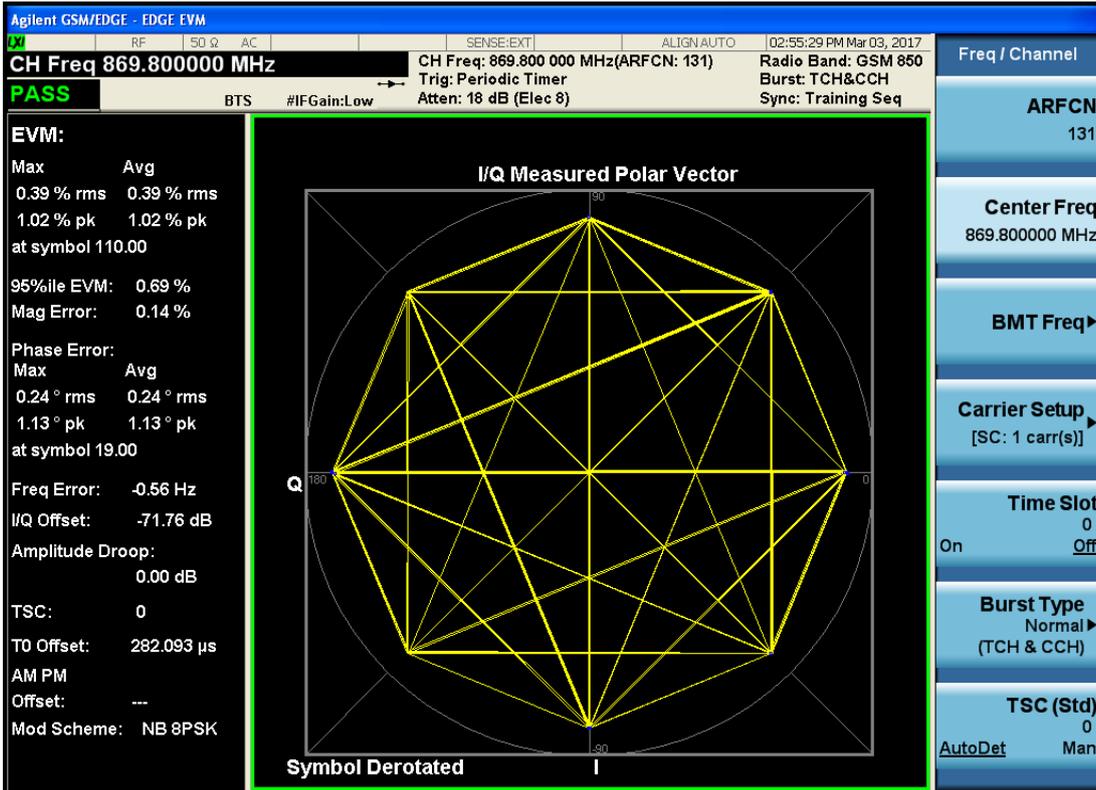
#### Port 1 -869.8 MHz



Port 4 -869.2 MHz



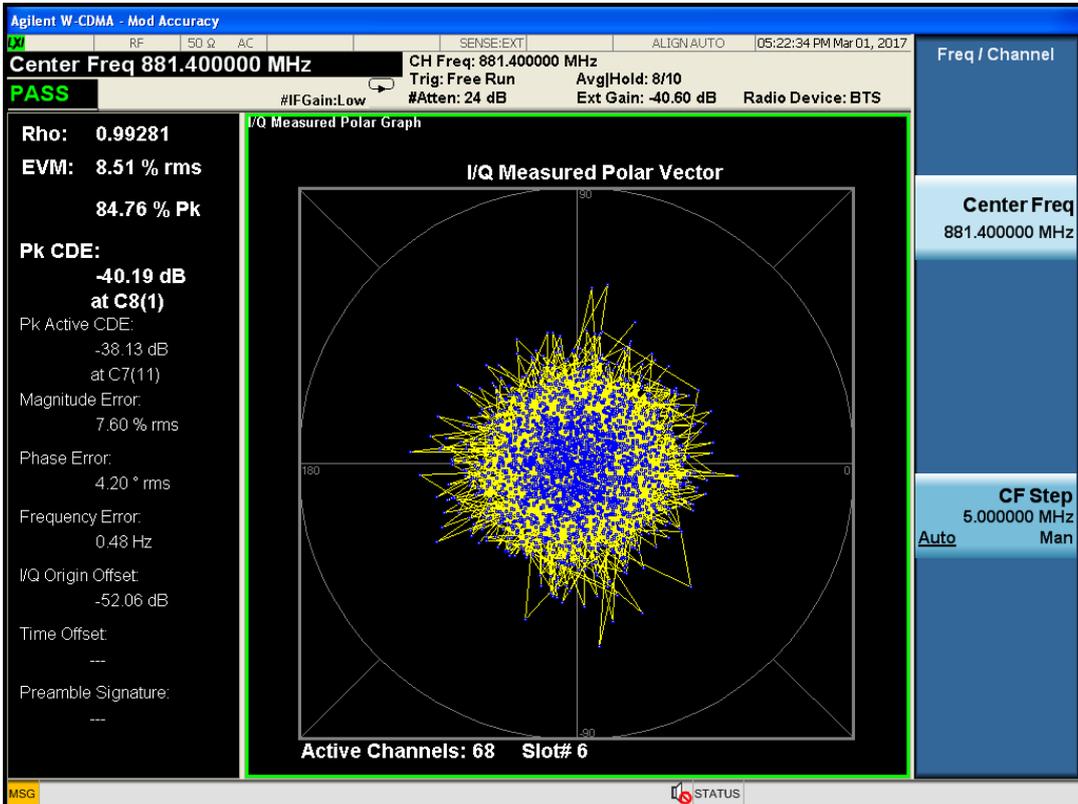
Port 4 8PSK -869.8 MHz



**8.9 Test Data (UMTS)**

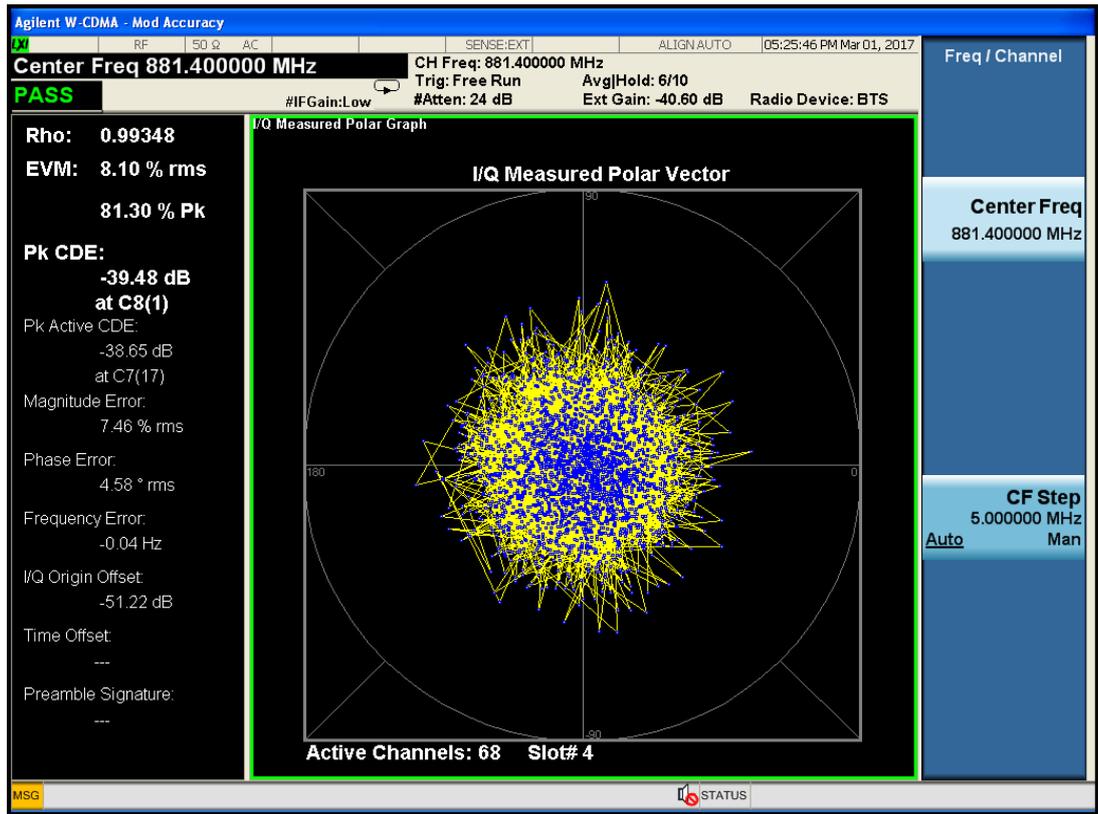
Port	Frequency (MHz)	EVM%
1	881.4	8.51
4	881.4	8.10

**Port 1 -881.4 MHz**





### Port 4 -881.4 MHz



**9 SPURIOUS RADIATED EMISSIONS**

**9.1 Applicable Standard: FCC CFR 47 §2.1053**

**9.2 Test Equipment List and Details**

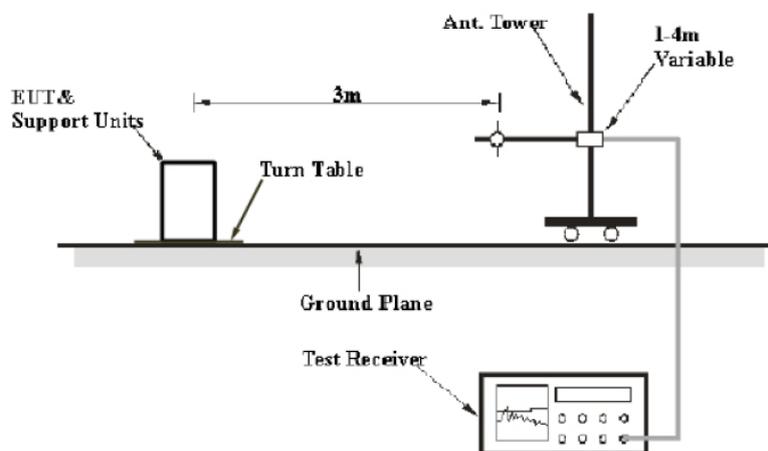
Manufacturer	9.2.1.1.1 Equipment	Model	Serial Number	Last Cal.	Cal. Interval
R&S	SIGNAL GENERATOR	SMR20	A00017351	2016-10-29	1 year
Albatross	Anechoic Chamber	3m Site	A00017354	2016-6-30	1 year
R&S	EMI Test Receiver	ESIB26	100058	2016-10-29	1 year
R&S	Ultra Breitband Antennas	HL562	100022	2016-8-5	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2016-8-5	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100446	2016-8-5	1 year
SCHWARZ-BECK	Biconical Antenna	VUBA9117	9117-122	2016-8-5	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.

**9.3 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 30MHz to 1GHz scanning, set at 1MHz for 1GHz to 20GHz scanning.

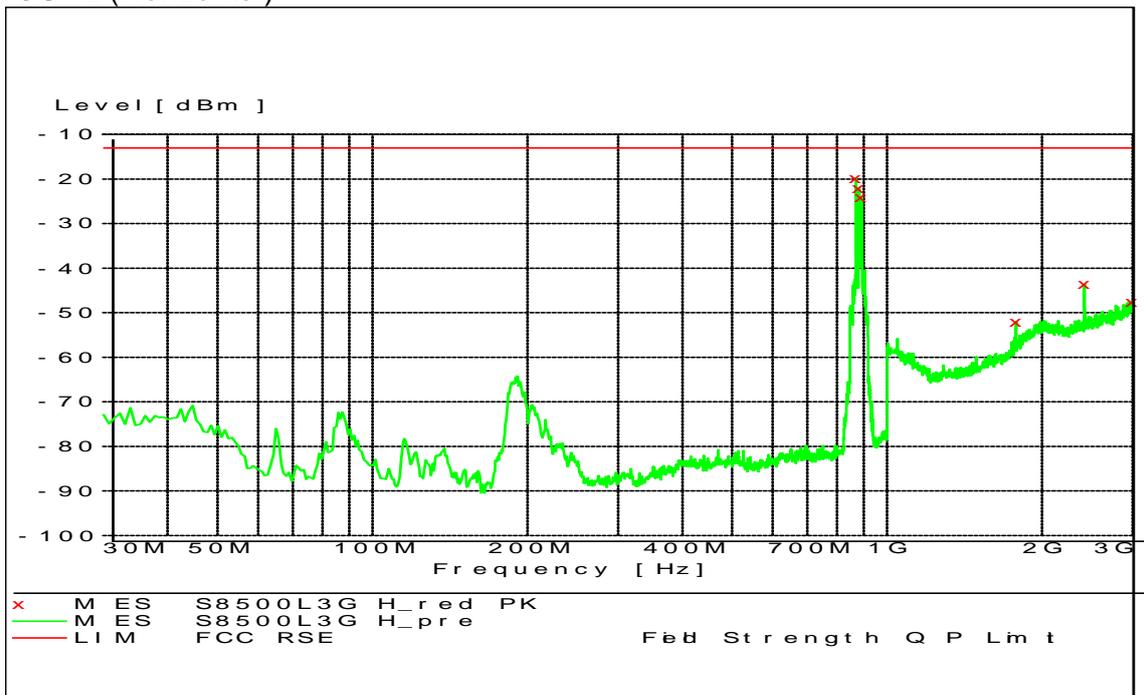
**9.4 Test Results Summary: PASS**

**9.5 Environmental Conditions**

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

**9.6 Test data**

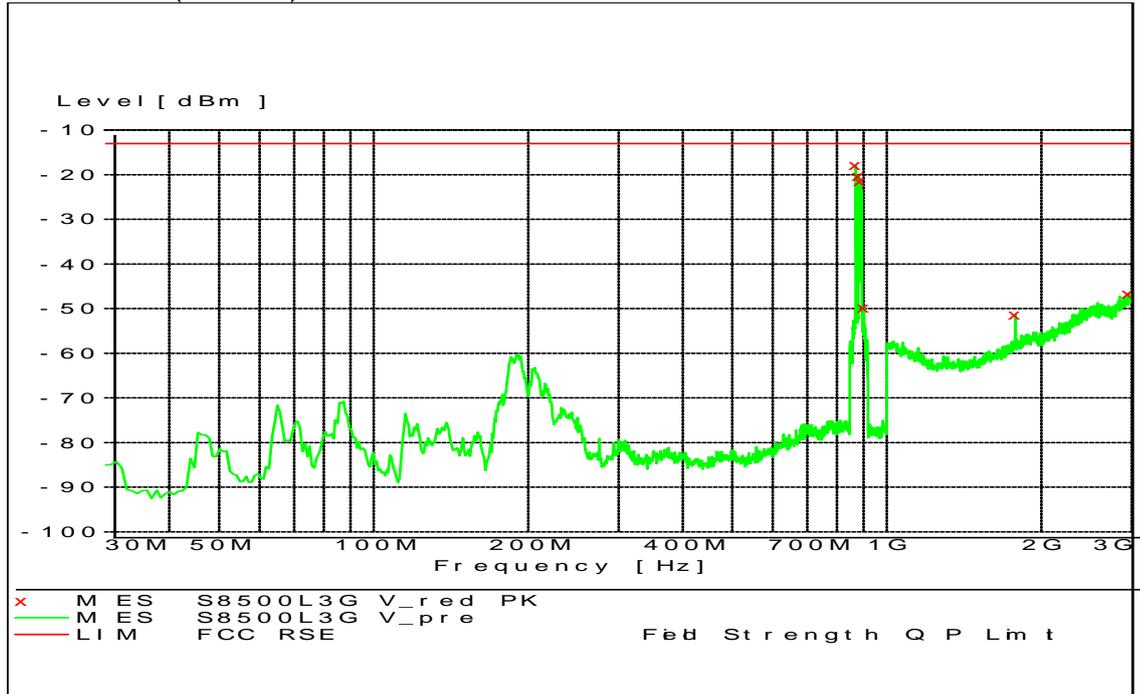
30M-3GHz (Horizontal)





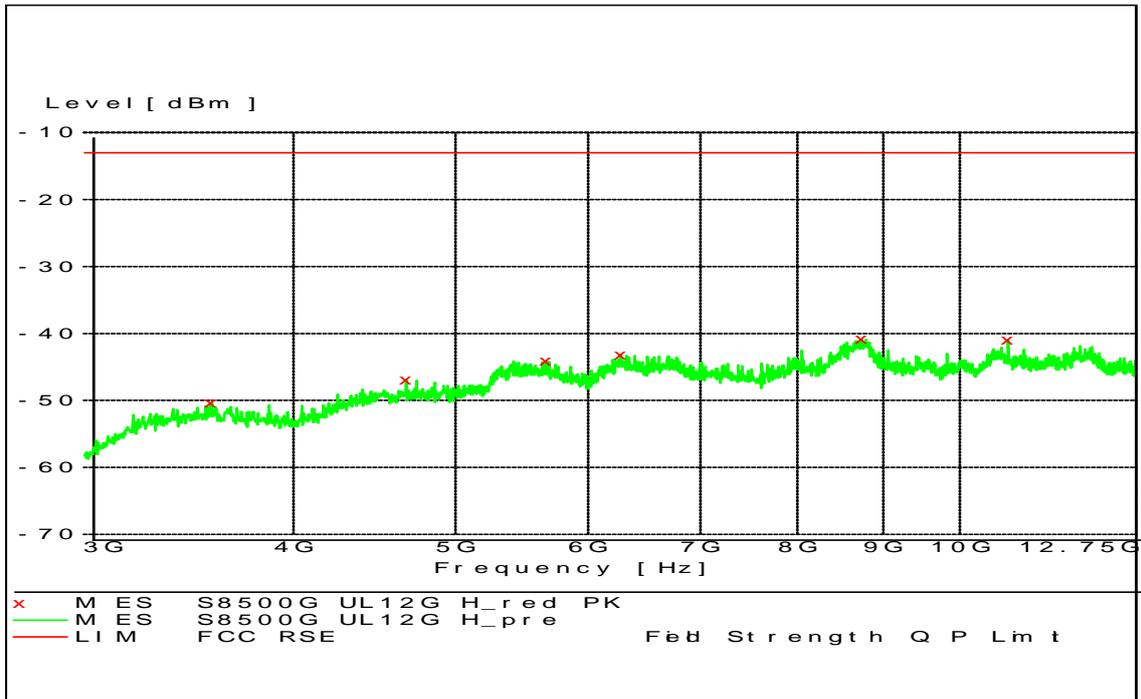
Frequency MHz	Level dBm	Azimuth deg	Height cm	Polarisation	Transd dBm	Limit dBm	Margin dB
869.632000	-19.78	172.50	100.0	HOR	-122.1	-13	6.8
880.496000	-21.92	60.90	100.0	HOR	-121.9	-13	8.9
891.360000	-23.98	71.80	100.0	HOR	-122.2	-13	11.0
1779.200000	-52.00	263.80	200.0	HOR	-108.0	-13	39.0
2416.000000	-43.58	0.00	100.0	HOR	-102.6	-13	30.6
2995.200000	-47.45	308.50	200.0	HOR	-98.6	-13	34.5

30M-3GHz (Vertical)



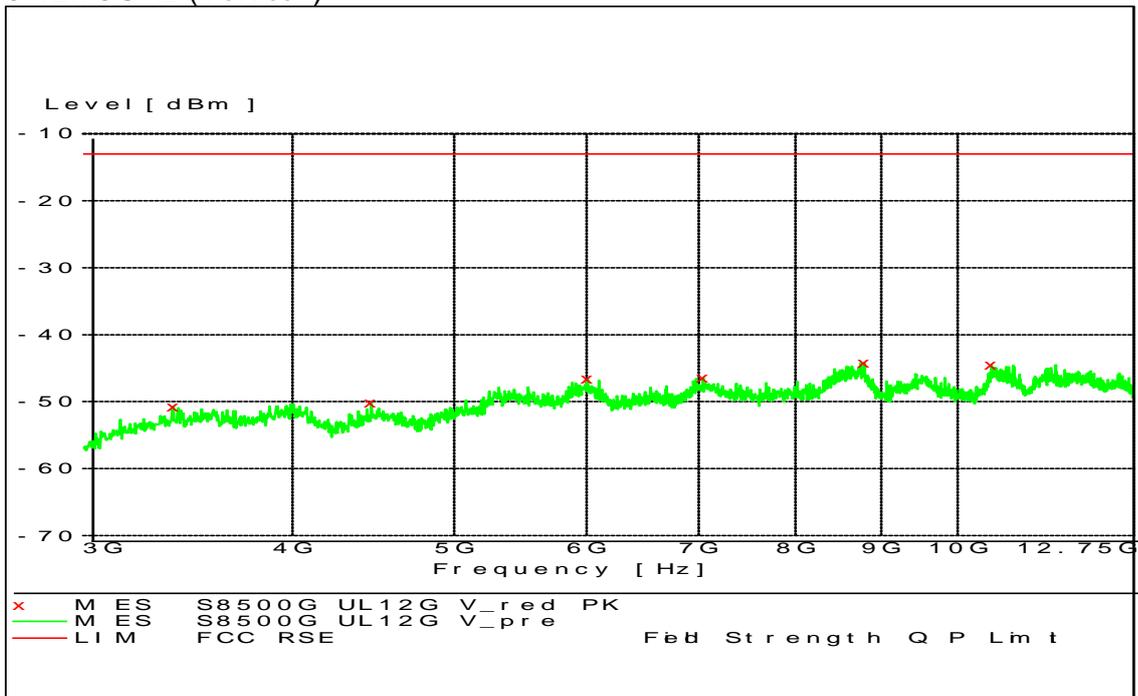
Frequency MHz	Level dBm	Azimuth deg	Height cm	Polarisation	Transd dBm	Limit dBm	Margin dB
869.632000	-17.89	339.00	100.0	VER	-119.9	-13	4.9
880.496000	-20.24	79.30	100.0	VER	-120.2	-13	7.2
885.152000	-21.38	20.40	100.0	VER	-120.0	-13	8.4
900.672000	-49.75	20.40	100.0	VER	-120.3	-13	36.8
1777.600000	-51.33	64.60	100.0	VER	-108.2	-13	38.3
2953.600000	-46.66	291.70	100.0	VER	-97.4	-13	33.7

3-12.75GHz (Horizontal)



Frequency	Level	Azimuth	Height	Polarisation	Transd	Limit	Margin
MHz	dBm	deg	cm		dBm	dBm	dB
3576.000000	-50.26	142.60	200.0	HOR	-89.3	-13	37.3
4670.400000	-46.85	253.20	200.0	HOR	-84.6	-13	33.8
5665.600000	-44.10	14.80	100.0	HOR	-79.4	-13	31.1
6273.600000	-43.09	86.80	200.0	HOR	-77.2	-13	30.1
8743.400000	-40.82	185.60	100.0	HOR	-72.4	-13	27.8
10689.200000	-40.95	121.60	200.0	HOR	-74.0	-13	28.0

3-12.75GHz (Vertical)





Frequency MHz	Level dBm	Azimuth deg	Height cm	Polarisation	Transd dBm	Limit dBm	Margin dB
3396.800000	-50.66	52.60	200.0	VER	-89.9	-13	37.7
4459.200000	-50.14	314.40	100.0	VER	-87.8	-13	37.1
6008.000000	-46.60	316.90	200.0	VER	-81.4	-13	33.6
7046.000000	-46.43	198.40	200.0	VER	-80.0	-13	33.4
8798.600000	-44.16	205.30	200.0	VER	-77.2	-13	31.2
10482.200000	-44.47	191.00	200.0	VER	-76.2	-13	31.5

**10 SPURIOUS EMISSIONS AT ANTENNA TERMINALS**

**10.1 Applicable Standard: FCC§2.1051, §22.917**

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

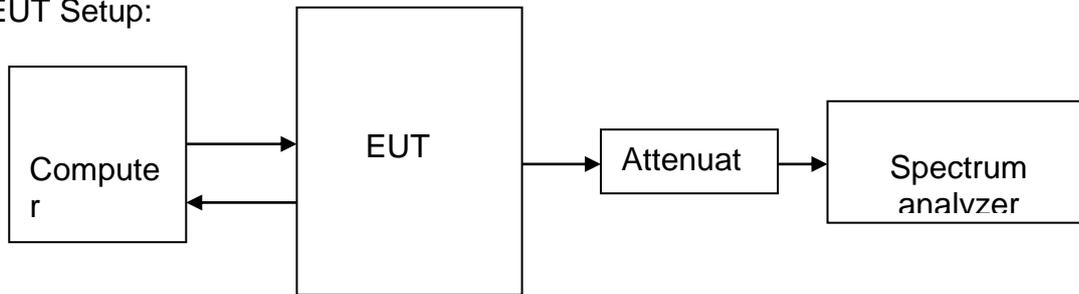
**10.2 Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.04.17	2017.04.17
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.04.17	2017.04.17

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

**10.3 Test Procedure**

EUT Setup:



REMARKS: Attenuator loss (dB)=40dB, Cable Loss (dB)=1.8dB.

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.

**10.4 Test Data Environmental Conditions**

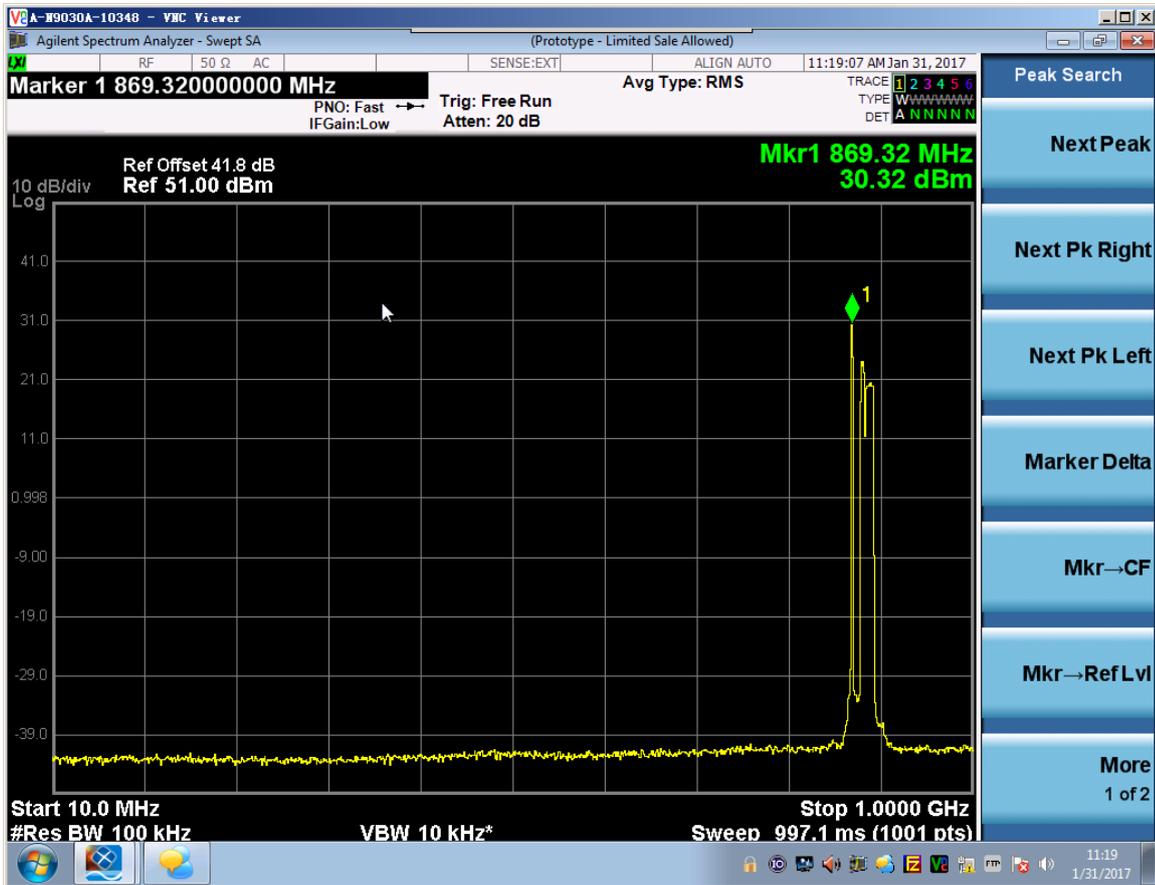
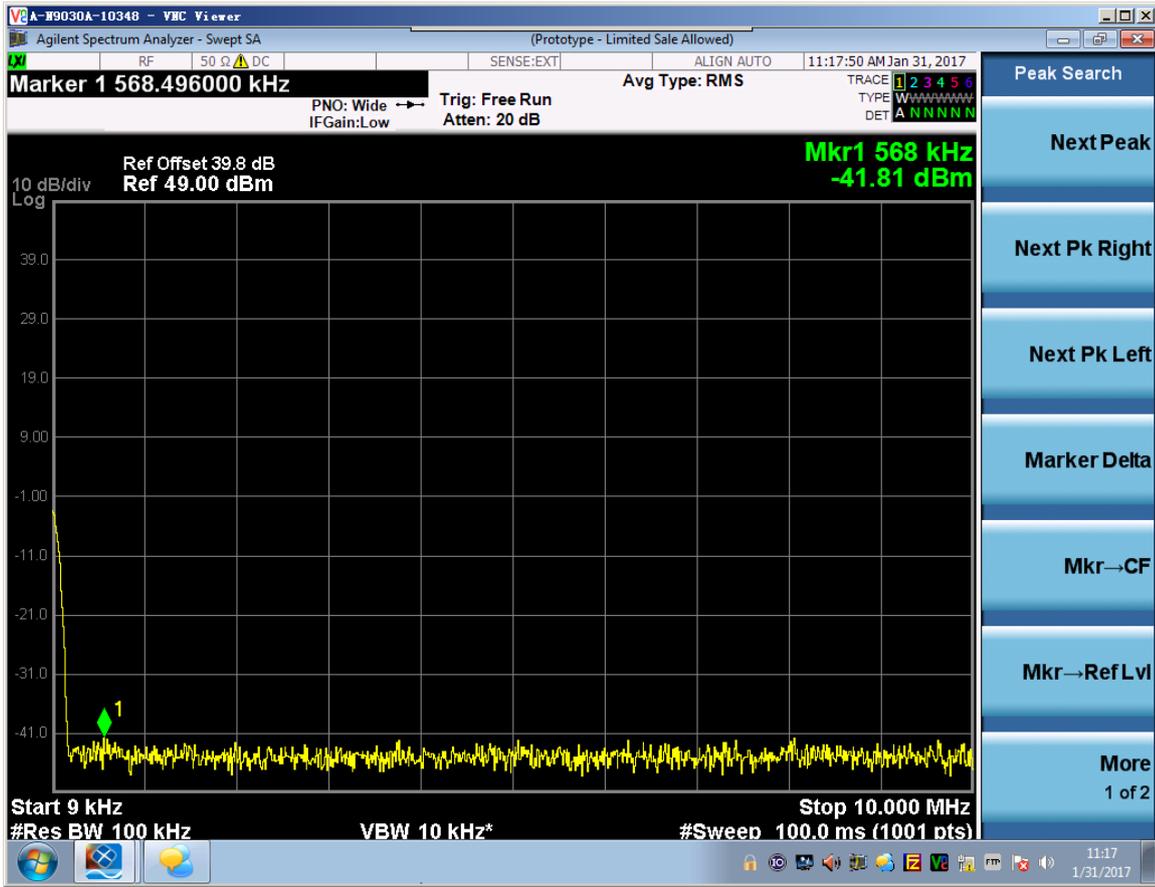
Temperature:	20 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

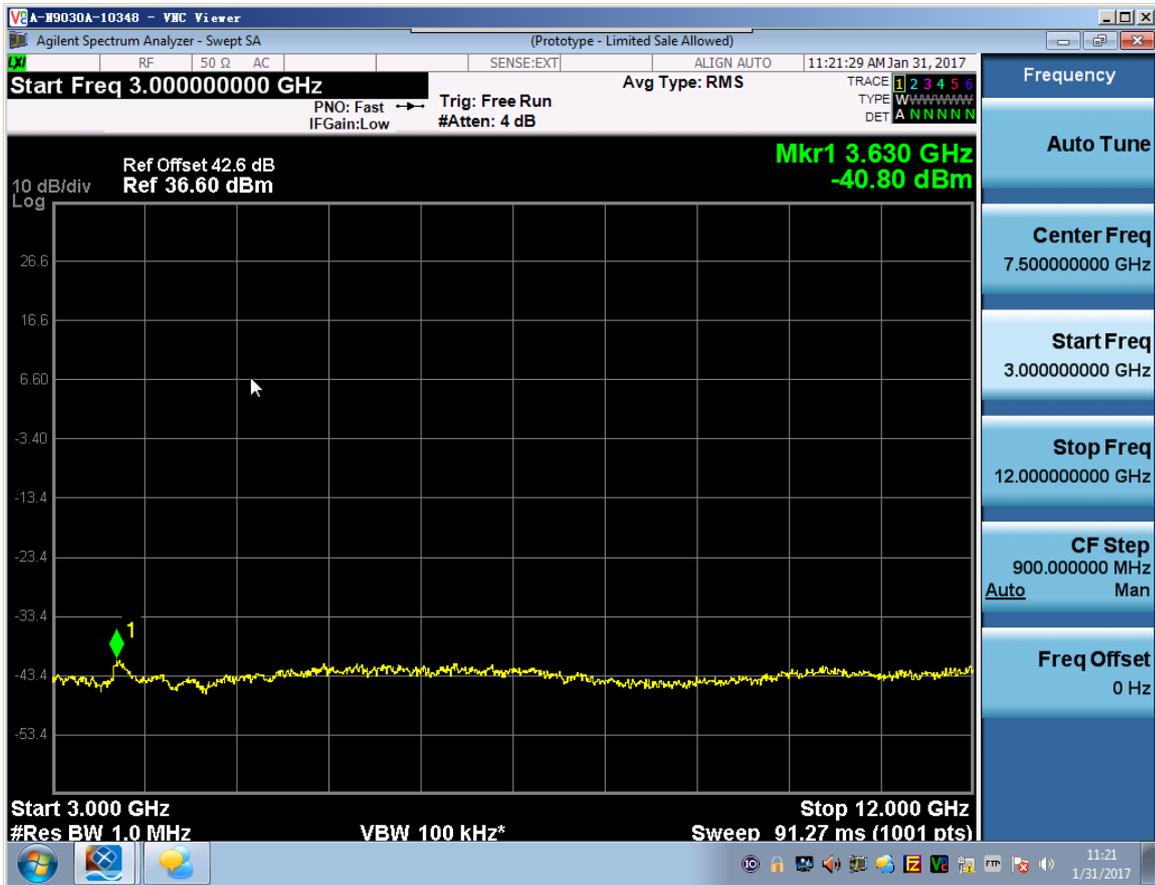
**10.5 Test Result: Pass**

**10.6 Test Mode: Transmitting 2GSMTRX 、 1UMTS and 1 LTE carrierscarriers.**

**10.7 Test Data**

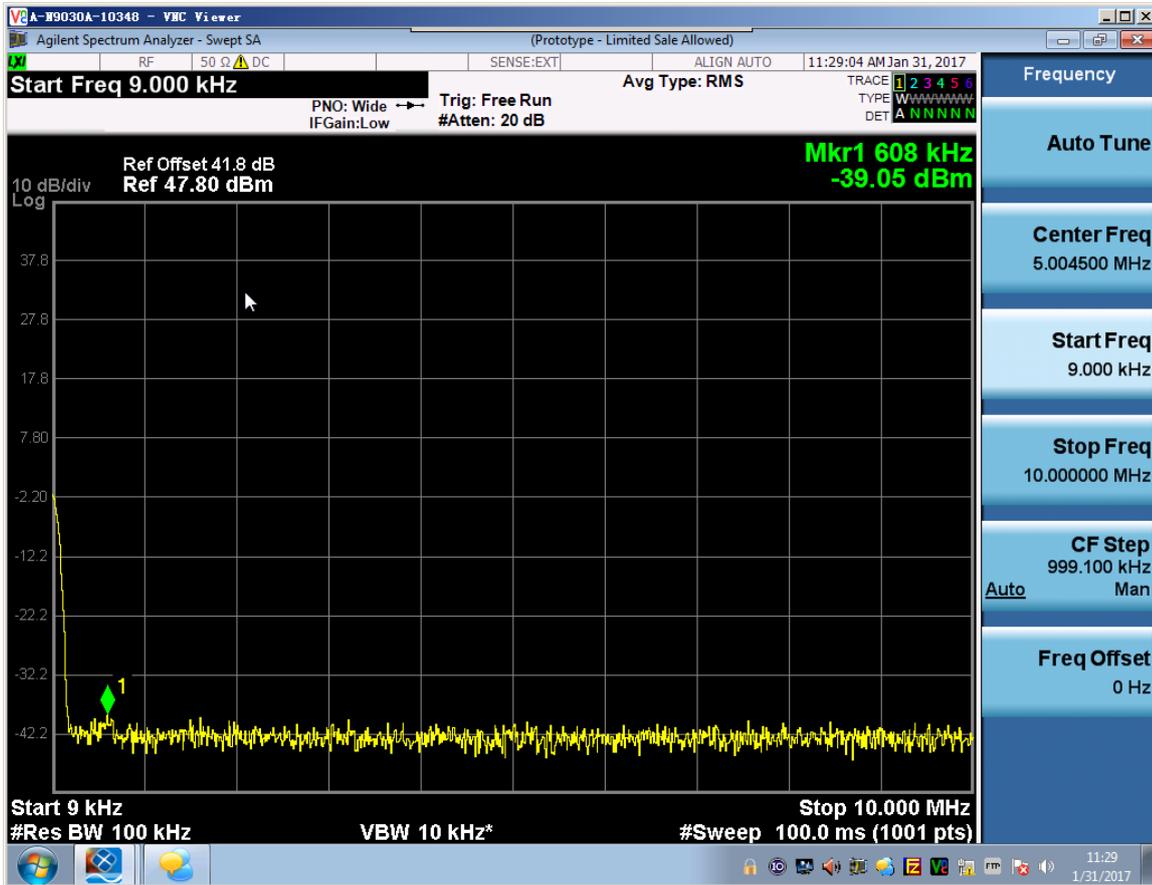
Port 1

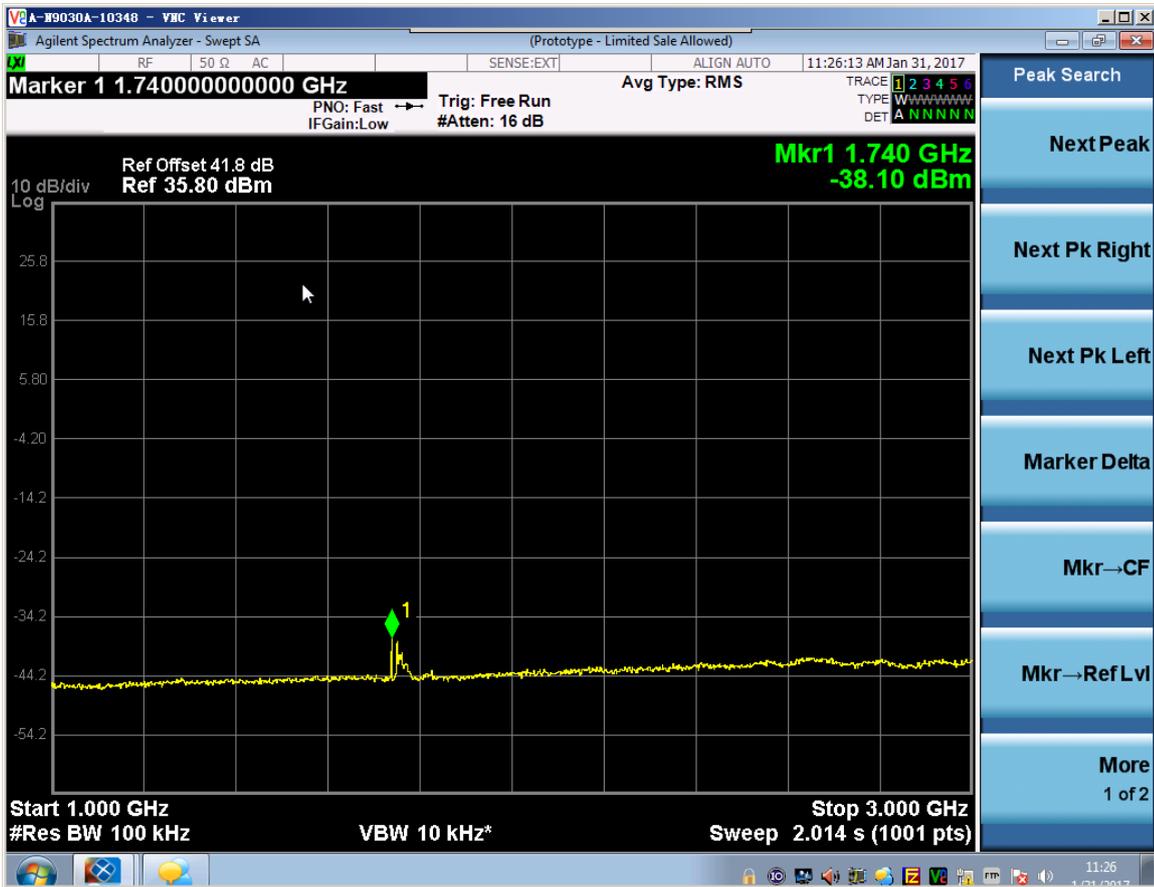
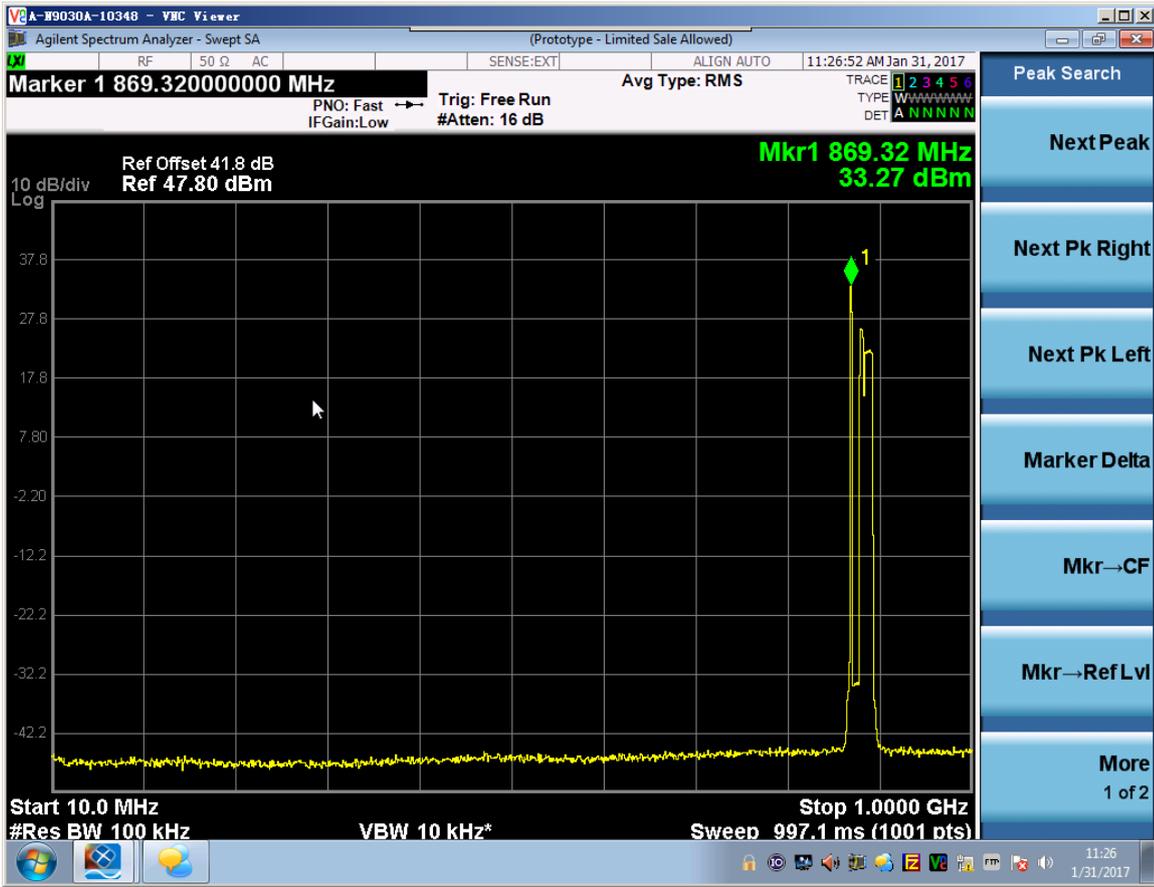






Port 4









## 11 OCCUPIED BANDWIDTH

### 11.1 Applicable Standard: FCC §2.1049

### 11.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.04.17	2017.04.17
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.04.17	2017.04.17

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

### 11.3 Test Procedure

The RF out of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. 99%Power bandwidth was recorded.

### 11.4 Environmental Conditions

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

### 11.5 Test Result: Pass

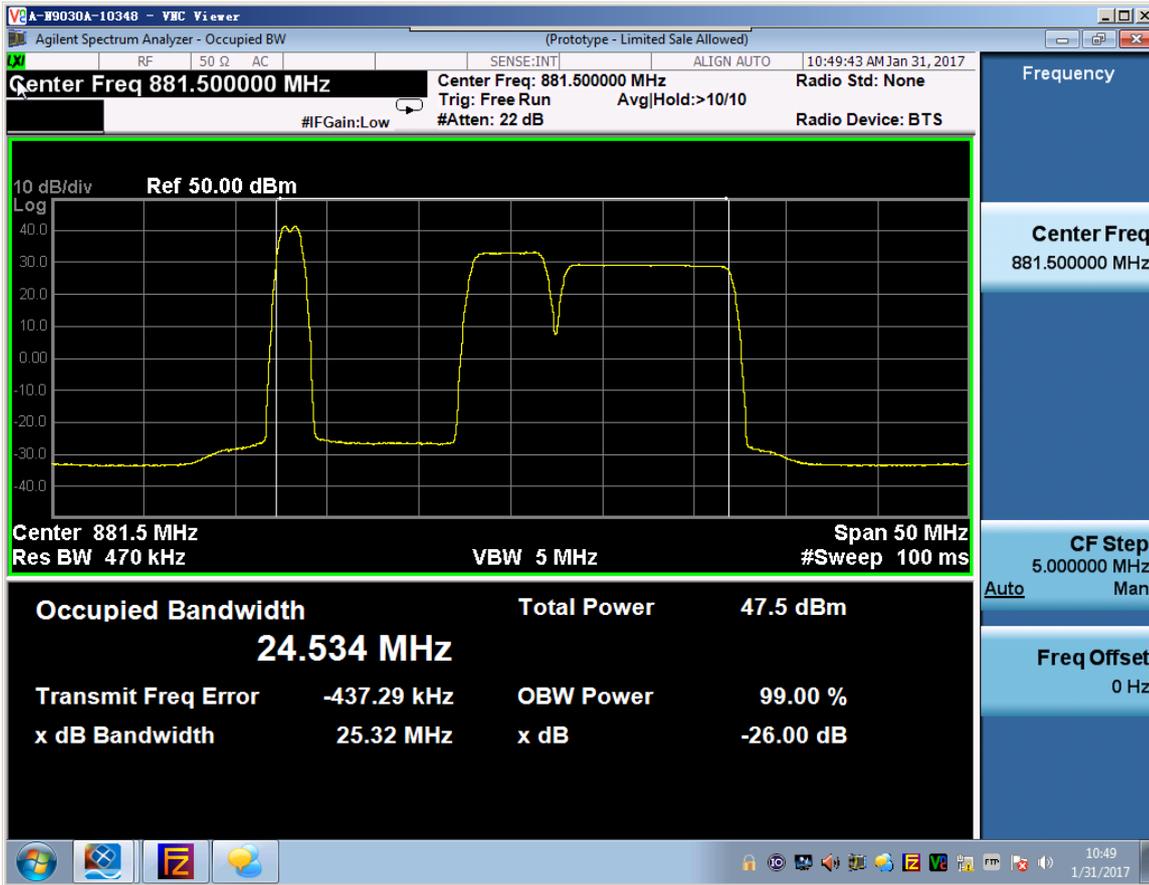
### 11.6 Test Mode: Transmitting 2GSMTRX 、 1UMTS and 1 LTE carrierscarriers.

### 11.7 Test Data

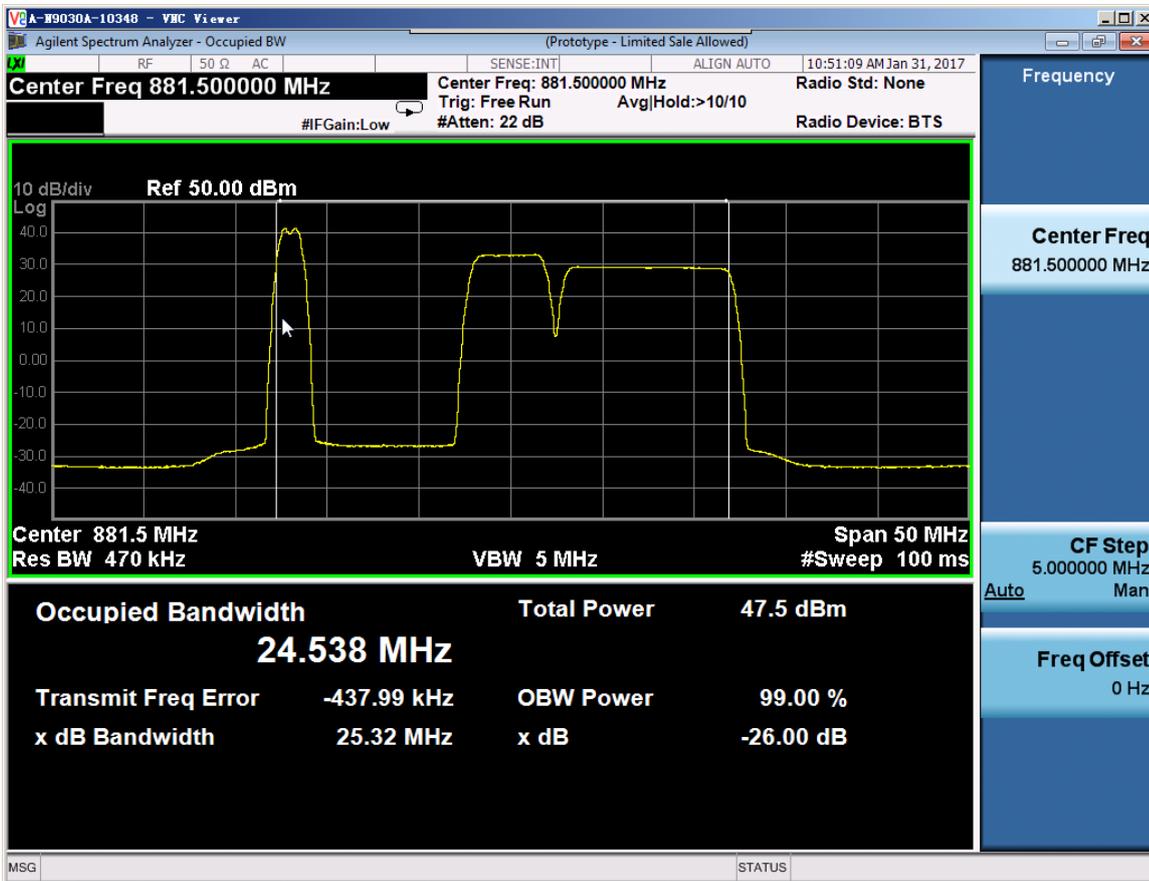
RF Bandwidth :25M

Port	Center Freq. (MHz)	Carry Frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
1	881.5	869.2/869.8/881.4/889	24.534	25
4	881.5	869.2/869.8/881.4/889	24.538	25

Port 1 -881.5MHz



Port 4 -881.5MHz







## 12 BAND EDGES

### 12.1 Applicable Standard: FCC §2.1051, §22.917

According to §2.1051, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of at least  $43 + 10 \log(p)$  dB. The limit (dBm) should  $< P - (43 + 10 \log(P)) = -13 \text{dBm}$ .

### 12.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.04.17	2017.04.17
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.04.17	2017.04.17

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

### 12.3 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency.

### 12.4 Test Data Environmental Conditions

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

### 12.5 Test Result: Pass

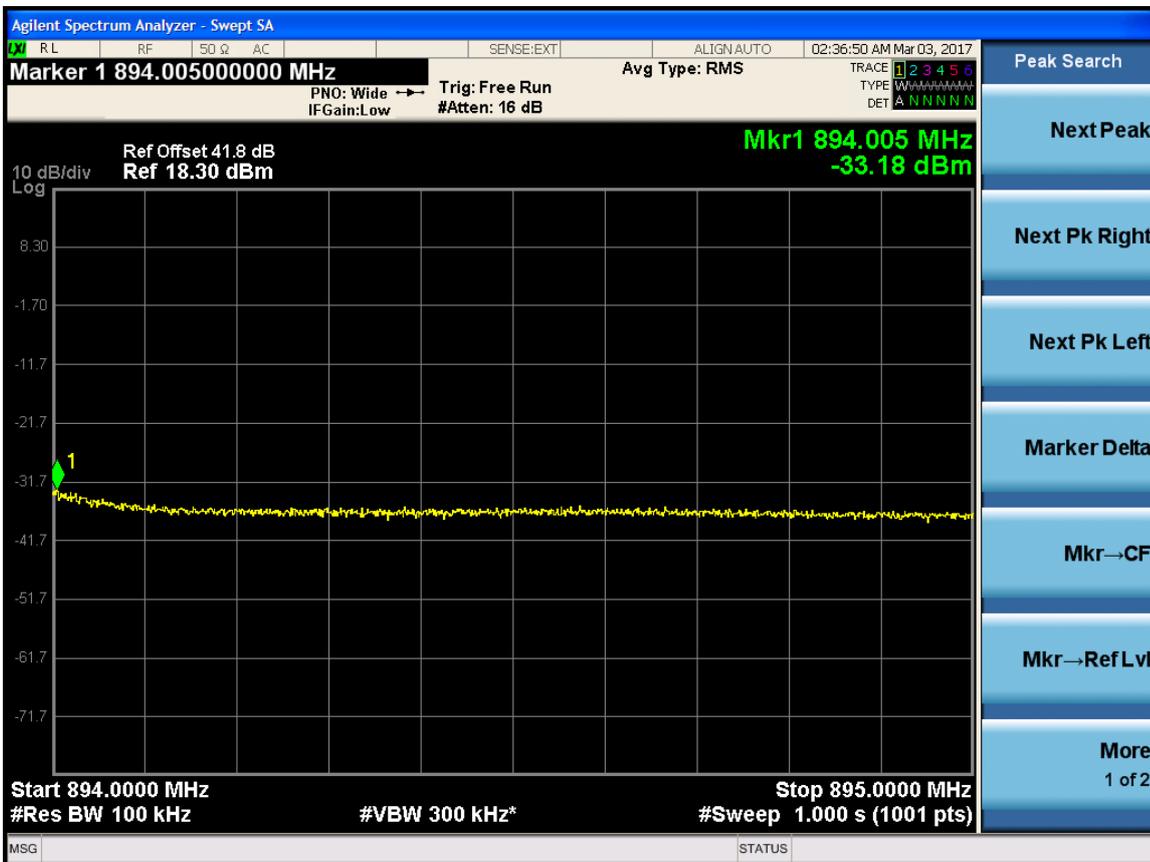
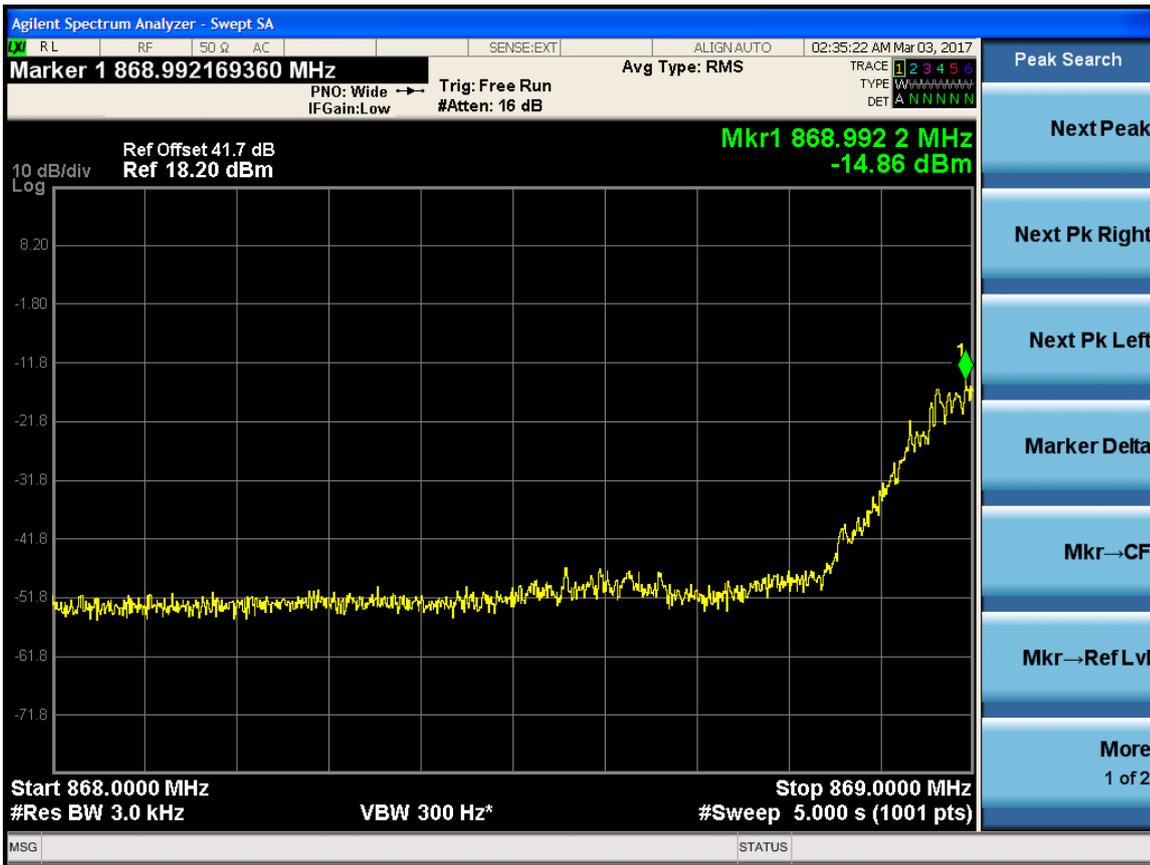
### 12.6 Test Mode: Transmitting 2GSMTRX , 1UMTS and 1 LTE carrierscarriers.

### 12.7 Test Data

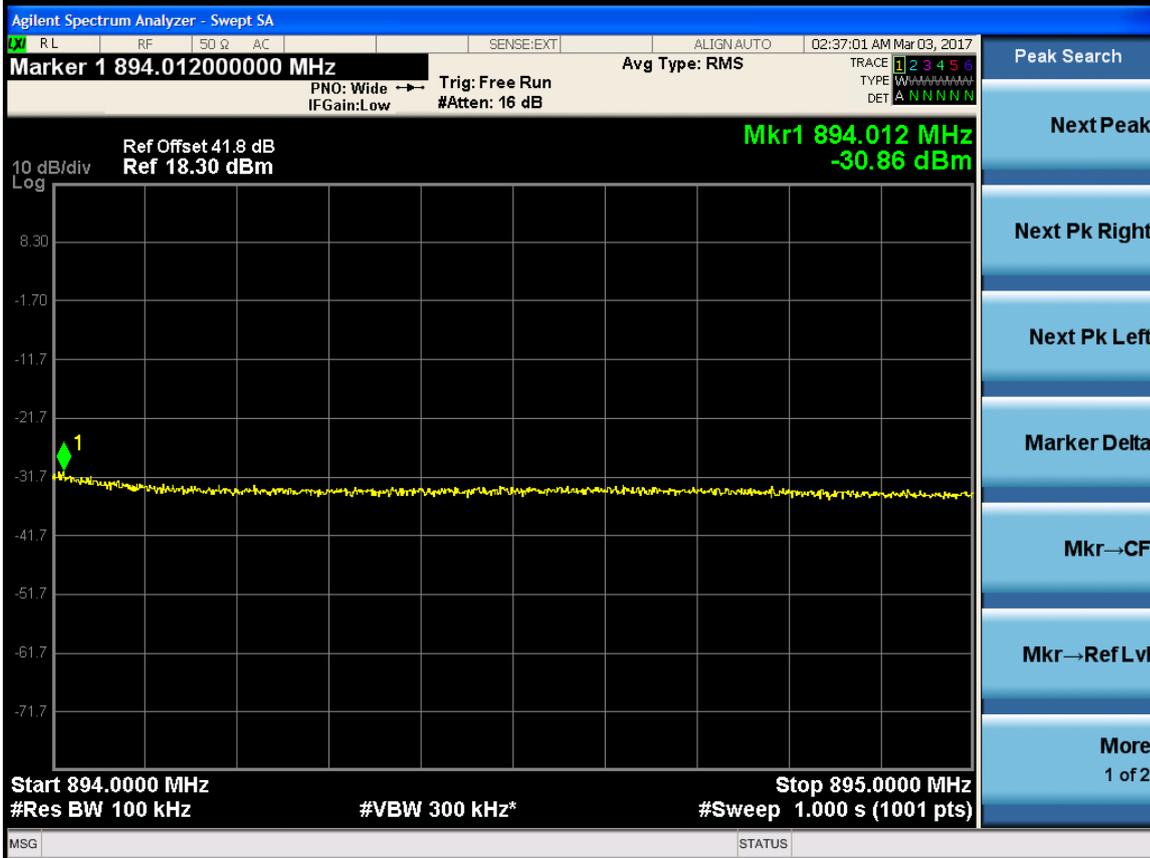
RF Bandwidth : 25MHz

Port	Center Freq. (MHz)	Carry Frequency (MHz)	Max bandedge Emission (dBm)	Limit (dBm)
1	881.5	869.2/869.8/881.4/889	-14.86	-13
4	881.5	869.2/869.8/881.4/889	-14.69	-13

Port 1 -881.5MHz



Port 4 -881.5MHz





### 13 FREQUENCY STABILITY

#### 13.1 Applicable Standard: FCC § 2.1055

Requirements: FCC § 2.1055 (a)(d), The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

#### 13.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
GZ-ESPEC	Temperature Chamber	EW0470	06113028	2016.04.17	2017.04.17
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.04.17	2017.04.17
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.04.17	2017.04.17

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

#### 13.3 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose. After the temperature stabilized for approximately 150 minutes, the frequency output was recorded from the counter.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

#### 13.4 Environmental Conditions

Normal condition:	25° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

#### 13.5 Test Result: Pass

#### 13.6 Test Mode: Transmitting 2GSMTRX 、 1UMTS and 1 LTE carrierscarriers.

#### 13.7 Test Data (LTE)

##### 13.7.1 Frequency Stability Versus Temperature

<b>Frequency Stability vs Temperature ( Channel Bandwidth:10M Frequency :889MHz)</b>
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Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Port	Frequency Measure Error	E-TM	Limit (ppm)	Limit (Hz)	Result
			(Hz)				
-40		1	0.7576	TM2.0	0.05	44.45	PASS
			0.8186	TM3.1	0.05	44.45	PASS
			1.2680	TM3.2	0.05	44.45	PASS
			0.7519	TM3.3	0.05	44.45	PASS
		4	1.4328	TM2.0	0.05	44.45	PASS
			1.0317	TM3.1	0.05	44.45	PASS
			0.9231	TM3.2	0.05	44.45	PASS
			1.7416	TM3.3	0.05	44.45	PASS
-30		1	1.2274	TM2.0	0.05	44.45	PASS
			0.6828	TM3.1	0.05	44.45	PASS
			1.0918	TM3.2	0.05	44.45	PASS
			0.4988	TM3.3	0.05	44.45	PASS
		4	0.5986	TM2.0	0.05	44.45	PASS
			1.6334	TM3.1	0.05	44.45	PASS
			0.7219	TM3.2	0.05	44.45	PASS
			0.8929	TM3.3	0.05	44.45	PASS
-20		1	0.6135	TM2.0	0.05	44.45	PASS
			0.4527	TM3.1	0.05	44.45	PASS
			0.3809	TM3.2	0.05	44.45	PASS
			1.2400	TM3.3	0.05	44.45	PASS
		4	1.1484	TM2.0	0.05	44.45	PASS
			0.7811	TM3.1	0.05	44.45	PASS
			0.6018	TM3.2	0.05	44.45	PASS
			0.6292	TM3.3	0.05	44.45	PASS
-10		1	0.9264	TM2.0	0.05	44.45	PASS
			0.6531	TM3.1	0.05	44.45	PASS
			1.0110	TM3.2	0.05	44.45	PASS
			1.0220	TM3.3	0.05	44.45	PASS
		4	0.7183	TM2.0	0.05	44.45	PASS
			0.8558	TM3.1	0.05	44.45	PASS
			0.9311	TM3.2	0.05	44.45	PASS
			1.0847	TM3.3	0.05	44.45	PASS
0	-48	1	0.2868	TM2.0	0.05	44.45	PASS
			0.3454	TM3.1	0.05	44.45	PASS
			1.0323	TM3.2	0.05	44.45	PASS
			0.6214	TM3.3	0.05	44.45	PASS
		2	0.5618	TM2.0	0.05	44.45	PASS
			0.3523	TM3.1	0.05	44.45	PASS



10		1.2314	TM3.2	0.05	44.45	PASS	
		0.4617	TM3.3	0.05	44.45	PASS	
	1	0.5966	TM2.0	0.05	44.45	PASS	
		0.5942	TM3.1	0.05	44.45	PASS	
		0.2644	TM3.2	0.05	44.45	PASS	
		0.7800	TM3.3	0.05	44.45	PASS	
	4	0.2074	TM2.0	0.05	44.45	PASS	
		0.2983	TM3.1	0.05	44.45	PASS	
		0.8515	TM3.2	0.05	44.45	PASS	
		1.1029	TM3.3	0.05	44.45	PASS	
20	1	0.7619	TM2.0	0.05	44.45	PASS	
		0.4602	TM3.1	0.05	44.45	PASS	
		0.4108	TM3.2	0.05	44.45	PASS	
		0.6833	TM3.3	0.05	44.45	PASS	
	4	0.8240	TM2.0	0.05	44.45	PASS	
		1.1035	TM3.1	0.05	44.45	PASS	
		0.5390	TM3.2	0.05	44.45	PASS	
		0.4789	TM3.3	0.05	44.45	PASS	
	30	1	0.5953	TM2.0	0.05	44.45	PASS
			1.0878	TM3.1	0.05	44.45	PASS
0.8106			TM3.2	0.05	44.45	PASS	
0.8099			TM3.3	0.05	44.45	PASS	
4		1.6804	TM2.0	0.05	44.45	PASS	
		1.6459	TM3.1	0.05	44.45	PASS	
		1.6622	TM3.2	0.05	44.45	PASS	
		0.7861	TM3.3	0.05	44.45	PASS	
40		1	0.3989	TM2.0	0.05	44.45	PASS
			0.5485	TM3.1	0.05	44.45	PASS
	0.7387		TM3.2	0.05	44.45	PASS	
	1.0365		TM3.3	0.05	44.45	PASS	
	4	0.7616	TM2.0	0.05	44.45	PASS	
		0.7722	TM3.1	0.05	44.45	PASS	
		0.3492	TM3.2	0.05	44.45	PASS	
		0.4601	TM3.3	0.05	44.45	PASS	
	50	1	1.0383	TM2.0	0.05	44.45	PASS
			1.6130	TM3.1	0.05	44.45	PASS
1.1377			TM3.2	0.05	44.45	PASS	
0.9887			TM3.3	0.05	44.45	PASS	
4		1.9497	TM2.0	0.05	44.45	PASS	
		1.3002	TM3.1	0.05	44.45	PASS	
		0.9982	TM3.2	0.05	44.45	PASS	



55	1	0.7956	TM3.3	0.05	44.45	PASS
		1.0340	TM2.0	0.05	44.45	PASS
		1.5270	TM3.1	0.05	44.45	PASS
		0.6744	TM3.2	0.05	44.45	PASS
		1.4151	TM3.3	0.05	44.45	PASS
	4	1.4492	TM2.0	0.05	44.45	PASS
		1.8398	TM3.1	0.05	44.45	PASS
		1.1049	TM3.2	0.05	44.45	PASS
		0.9379	TM3.3	0.05	44.45	PASS

13.7.2 Frequency Stability Versus Voltage

Frequency Stability vs Voltage (Channel Bandwidth:10M Frequency :889MHz)							
Power Supplied (V <sub>DC</sub> )	Temperature (°C)	Port	Frequency Measure Error (Hz)	E-TM	Limit (ppm)	Limit (Hz)	Result
-37	20	1	1.6245	TM2.0	0.05	44.45	PASS
			0.8254	TM3.1	0.05	44.45	PASS
			1.1325	TM3.2	0.05	44.45	PASS
			0.9099	TM3.3	0.05	44.45	PASS
		4	2.0228	TM2.0	0.05	44.45	PASS
			1.6407	TM3.1	0.05	44.45	PASS
			0.9619	TM3.2	0.05	44.45	PASS
			0.7388	TM3.3	0.05	44.45	PASS
-42		1	0.8280	TM2.0	0.05	44.45	PASS
			1.3208	TM3.1	0.05	44.45	PASS
			1.1326	TM3.2	0.05	44.45	PASS
			2.3771	TM3.3	0.05	44.45	PASS
		4	1.6615	TM2.0	0.05	44.45	PASS
			0.5010	TM3.1	0.05	44.45	PASS
			0.7321	TM3.2	0.05	44.45	PASS
			1.0914	TM3.3	0.05	44.45	PASS
-48	1	0.4613	TM2.0	0.05	44.45	PASS	
		0.9833	TM3.1	0.05	44.45	PASS	
		0.7666	TM3.2	0.05	44.45	PASS	
		0.6375	TM3.3	0.05	44.45	PASS	
	4	0.5305	TM2.0	0.05	44.45	PASS	
		0.9605	TM3.1	0.05	44.45	PASS	
		0.8961	TM3.2	0.05	44.45	PASS	
		1.1019	TM3.3	0.05	44.45	PASS	
-54	1	0.7644	TM2.0	0.05	44.45	PASS	
		1.2851	TM3.1	0.05	44.45	PASS	



		4	1.1520	TM3.2	0.05	44.45	PASS
			1.9731	TM3.3	0.05	44.45	PASS
			1.2899	TM2.0	0.05	44.45	PASS
			1.0618	TM3.1	0.05	44.45	PASS
			1.3412	TM3.2	0.05	44.45	PASS
			1.0903	TM3.3	0.05	44.45	PASS
		1	1.0140	TM2.0	0.05	44.45	PASS
			1.4142	TM3.1	0.05	44.45	PASS
			0.9064	TM3.2	0.05	44.45	PASS
			0.8734	TM3.3	0.05	44.45	PASS
			1.2157	TM2.0	0.05	44.45	PASS
			0.9343	TM3.1	0.05	44.45	PASS
-60	4	1.1583	TM3.2	0.05	44.45	PASS	
		0.5587	TM3.3	0.05	44.45	PASS	

**13.8 Test Data (GSM)**

**13.8.1 Frequency Stability Versus Temperature**

Frequency Stability vs Temperature					
Temperature (°C)	Power Supplied (V <sub>dc</sub> )	Frequency Measure Error (Hz)	Limit (ppm)	Limit (Hz)	Result
Port 1 (869.2MHz)					
-40	-48	0.13	0.05	44.46	PASS
-30	-48	0.25	0.05	44.46	PASS
-20	-48	0.38	0.05	44.46	PASS
-10	-48	-0.15	0.05	44.46	PASS
0	-48	1	0.05	44.46	PASS
10	-48	-0.59	0.05	44.46	PASS
20	-48	0.65	0.05	44.46	PASS
30	-48	1.23	0.05	44.46	PASS
40	-48	0.59	0.05	44.46	PASS
50	-48	0.56	0.05	44.46	PASS
55	-48	-0.87	0.05	44.46	PASS
Port 1 (869.8MHz)					
-40	-48	0.54	0.05	44.49	PASS
-30	-48	0.34	0.05	44.49	PASS
-20	-48	0.18	0.05	44.49	PASS
-10	-48	0.28	0.05	44.49	PASS
0	-48	1.25	0.05	44.49	PASS
10	-48	-1.32	0.05	44.49	PASS
20	-48	0.57	0.05	44.49	PASS



30	-48	-0.56	0.05	44.49	PASS
40	-48	-0.61	0.05	44.49	PASS
50	-48	0.14	0.05	44.49	PASS
55	-48	-0.47	0.05	44.49	PASS
Port 4 (869.2MHz)					
-40	-48	0.47	0.05	44.46	PASS
-30	-48	0.94	0.05	44.46	PASS
-20	-48	0.90	0.05	44.46	PASS
-10	-48	0.32	0.05	44.46	PASS
0	-48	1.14	0.05	44.46	PASS
10	-48	-2.8	0.05	44.46	PASS
20	-48	2.2	0.05	44.46	PASS
30	-48	-0.48	0.05	44.46	PASS
40	-48	-1.9	0.05	44.46	PASS
50	-48	1.45	0.05	44.46	PASS
55	-48	-2.31	0.05	44.46	PASS
Port 4 (869.8MHz)					
-40	-48	0.45	0.05	44.49	PASS
-30	-48	0.94	0.05	44.49	PASS
-20	-48	0.75	0.05	44.49	PASS
-10	-48	0.81	0.05	44.49	PASS
0	-48	1.21	0.05	44.49	PASS
10	-48	-2.8	0.05	44.49	PASS
20	-48	2.2	0.05	44.49	PASS
30	-48	-1.54	0.05	44.49	PASS
40	-48	-1.35	0.05	44.49	PASS
50	-48	2.5	0.05	44.49	PASS
55	-48	-0.42	0.05	44.49	PASS

**13.8.2 Frequency Stability Versus Voltage**

Frequency Stability vs. Voltage					
VoltageV <sub>d</sub> c	Temperature °C	Frequency Measure Error Hz	Limit (ppm)	Limit (Hz)	Result
Port 1 (869.2MHz)					
-37	25	1.54	0.05	44.46	PASS
-42	25	-0.46	0.05	44.46	PASS
-48	25	-1.94	0.05	44.46	PASS
-54	25	-2.84	0.05	44.46	PASS
-60	25	0.46	0.05	44.46	PASS
Port 1 (869.8MHz)					



-37	25	2.72	0.05	44.49	PASS
-42	25	-1.54	0.05	44.49	PASS
-48	25	-1.63	0.05	44.49	PASS
-54	25	-0.54	0.05	44.49	PASS
-60	25	0.87	0.05	44.49	PASS
Port 4 (869.2MHz)					
-37	25	0.68	0.05	44.46	PASS
-42	25	-1.48	0.05	44.46	PASS
-48	25	-2.65	0.05	44.46	PASS
-54	25	0.24	0.05	44.46	PASS
-60	25	-1.24	0.05	44.46	PASS
Port 4 (869.8MHz)					
-37	25	2.12	0.05	44.49	PASS
-42	25	-0.24	0.05	44.49	PASS
-48	25	-0.64	0.05	44.49	PASS
-54	25	1.31	0.05	44.49	PASS
-60	25	-0.29	0.05	44.49	PASS

### 13.9 Test Data (UMTS)

#### 13.9.1 Frequency Stability Versus Temperature

Frequency Stability vs Temperature					
Temperature (°C)	Power Supplied (V <sub>dc</sub> )	Frequency Measure Error (Hz)	Limit (ppm)	Limit (Hz)	Result
Port 1 (881.4MHz)					
-40	-48	-1.9	0.05	44.07	PASS
-30	-48	-2.5	0.05	44.07	PASS
-20	-48	-2.3	0.05	44.07	PASS
-10	-48	1.7	0.05	44.07	PASS
0	-48	-3.3	0.05	44.07	PASS
10	-48	-2.8	0.05	44.07	PASS
20	-48	2.2	0.05	44.07	PASS
30	-48	-3.6	0.05	44.07	PASS
40	-48	-1.9	0.05	44.07	PASS
50	-48	2.5	0.05	44.07	PASS
55	-48	-4.2	0.05	44.07	PASS
Port 4 (881.4MHz)					
-40	-48	2.5	0.05	44.07	PASS
-30	-48	-2.8	0.05	44.07	PASS
-20	-48	-3.2	0.05	44.07	PASS
-10	-48	2.3	0.05	44.07	PASS



0	-48	-3.6	0.05	44.07	PASS
10	-48	2.4	0.05	44.07	PASS
20	-48	-3.5	0.05	44.07	PASS
30	-48	-3.3	0.05	44.07	PASS
40	-48	-4.1	0.05	44.07	PASS
50	-48	2.7	0.05	44.07	PASS
55	-48	-3.7	0.05	44.07	PASS

### 13.9.2 Frequency Stability Versus Voltage

Frequency Stability vs. Voltage					
VoltageV <sub>d</sub> c	Temperature °C	Frequency Measure Error Hz	Limit ( ppm)	Limit ( Hz)	Result
Port 1 (881.4MHz)					
-37	25	2.7	0.05	44.07	PASS
-42	25	-3.8	0.05	44.07	PASS
-48	25	-3.2	0.05	44.07	PASS
-54	25	-4.3	0.05	44.07	PASS
-60	25	3.2	0.05	44.07	PASS
Port 4 (881.4MHz)					
-37	25	2.8	0.05	44.07	PASS
-42	25	-3.6	0.05	44.07	PASS
-48	25	-3.1	0.05	44.07	PASS
-54	25	3.4	0.05	44.07	PASS
-60	25	-4.5	0.05	44.07	PASS

---End of Report---