



FCC RF TEST REPORT

Report Number : **RP20170313031_03** 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 : **43**

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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

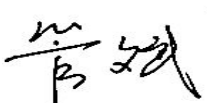
Wu Shuzhong
Name


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 Part1:2016 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
§ 2.1047	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: 415 mm x 352 mm x 137 mm (HxWxD)

Input voltage: -37V~-60V

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

Max RF output power: 49dBm

Gain of the antenna: 15dBi

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.

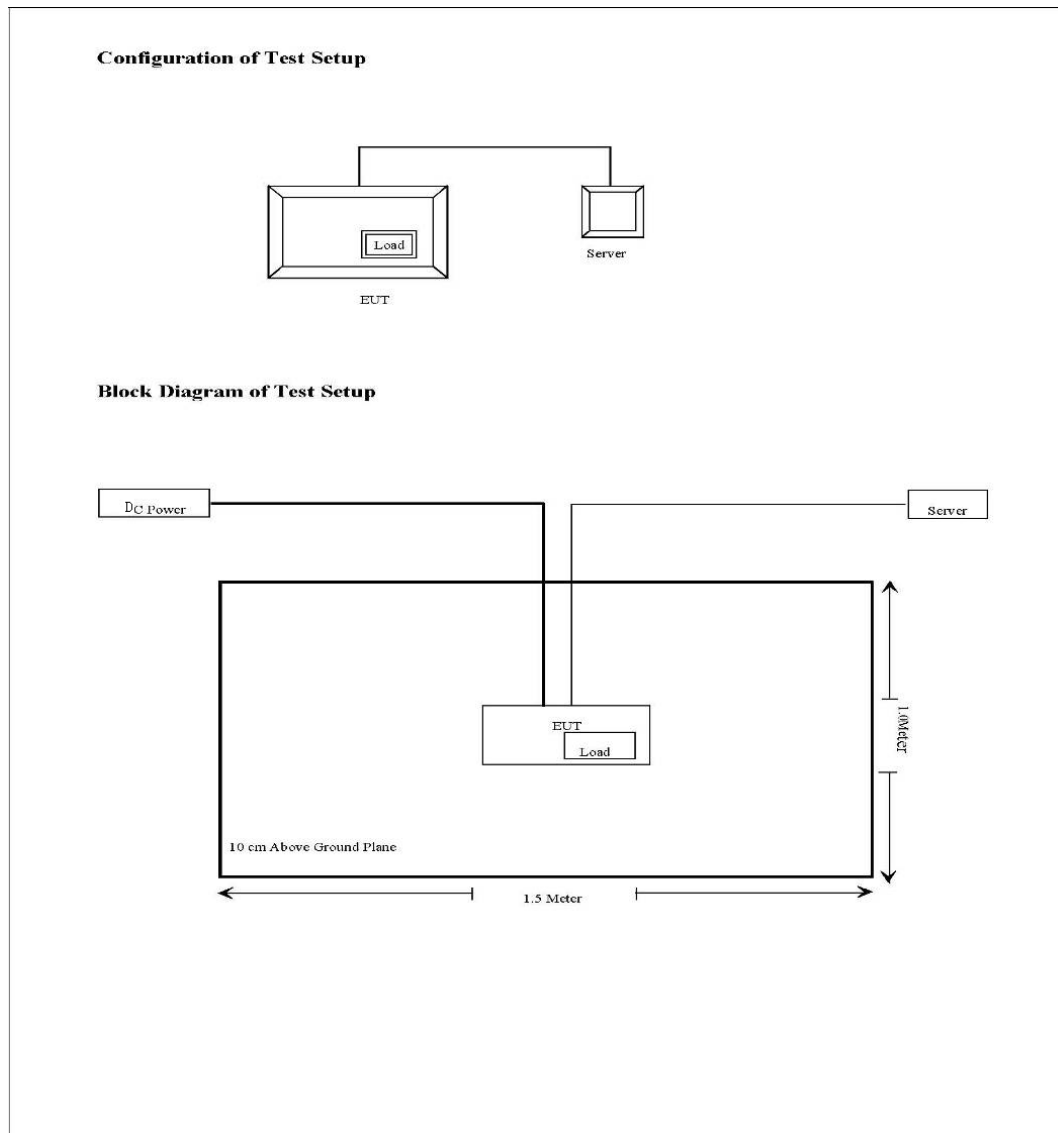


fig 2. Test configuration

6 TRANSMITTER OUTPUT POWER

6.1 Applicable Standard: FCC §2.1046, §22.913

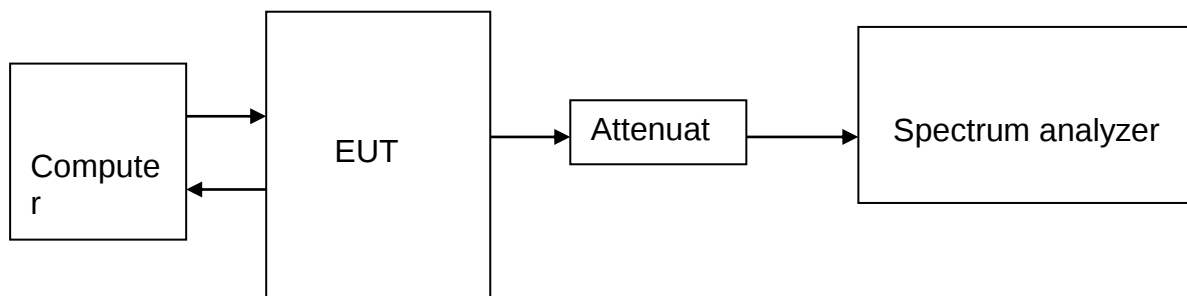
According to FCC §2.1046 & 22.913, the ERP (the effective radiated power) must not exceed 1000 Watts.

6.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.09.12	2017.09.12
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.09.12	2017.09.12
Silverline	Silverline RF Cable	SLA18-NMN1T	100311-04-0001	N/A	N/A

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

6.3 Test Procedure



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

6.4 Environmental Conditions

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

6.5 Test Result: Pass

6.6 Test Mode: Transmitting LTE+UMTS+GSM

6.7 Test Data:

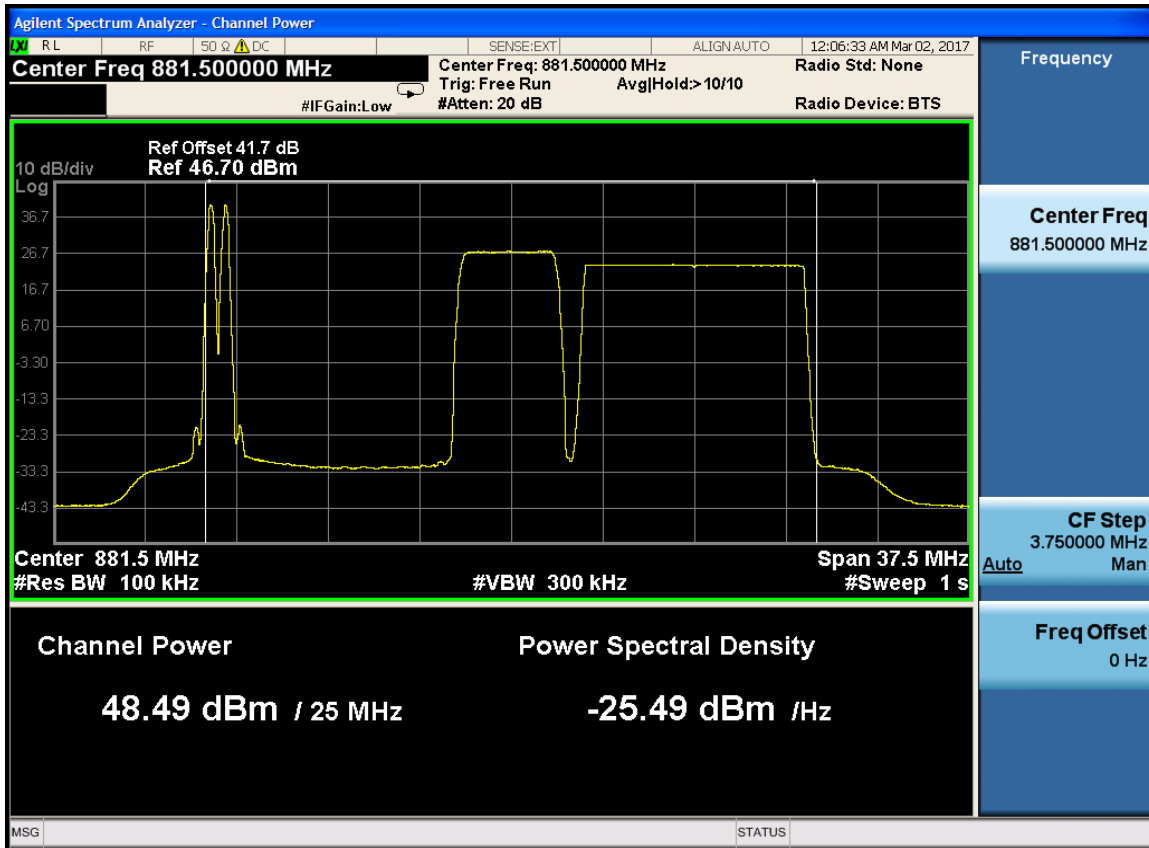
RF Bandwidth :IBW 25M(LTE+UMTS+GSM)

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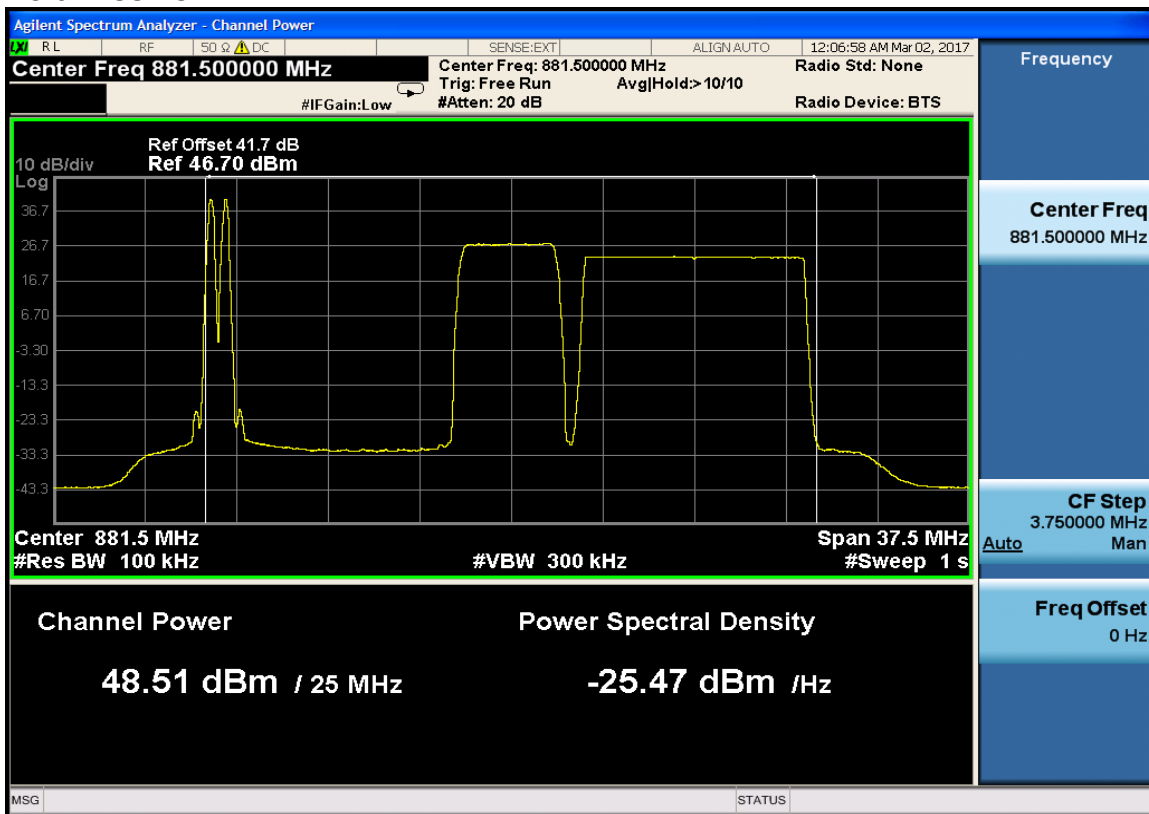


1	881.5	48.49	15	4	2.15	57.34	542.0
4	881.5	48.51	15	4	2.15	57.36	544.5

Port 1 -881.5MHz



Port 4 -881.5MHz



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 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 = 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

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

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

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	N9030A	MY49431143	2016.09.12	2017.09.12
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.09.12	2017.09.12
Silverline	Silverline RF Cable	SLA18-NMN1T	100311-04-0001	N/A	N/A

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

8.3 Test Procedure

GUL digital mode is used by EUT.

8.4 Test Data Environmental Conditions

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

8.5 Test Result: Pass

8.6 Test Mode: Transmitting LTE+UMTS+GSM

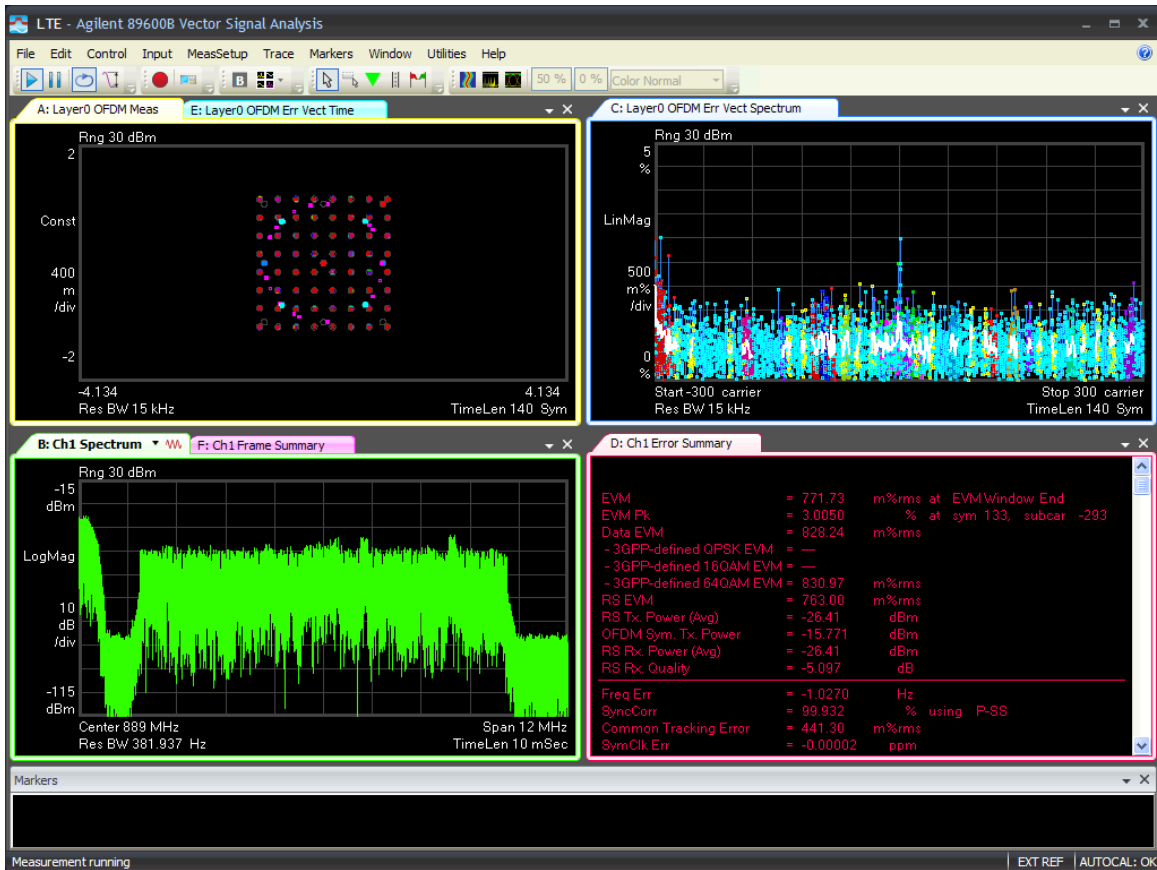
8.7 Test Data (LTE)

RF Bandwidth :IBW 25M(LTE+UMTS+GSM)

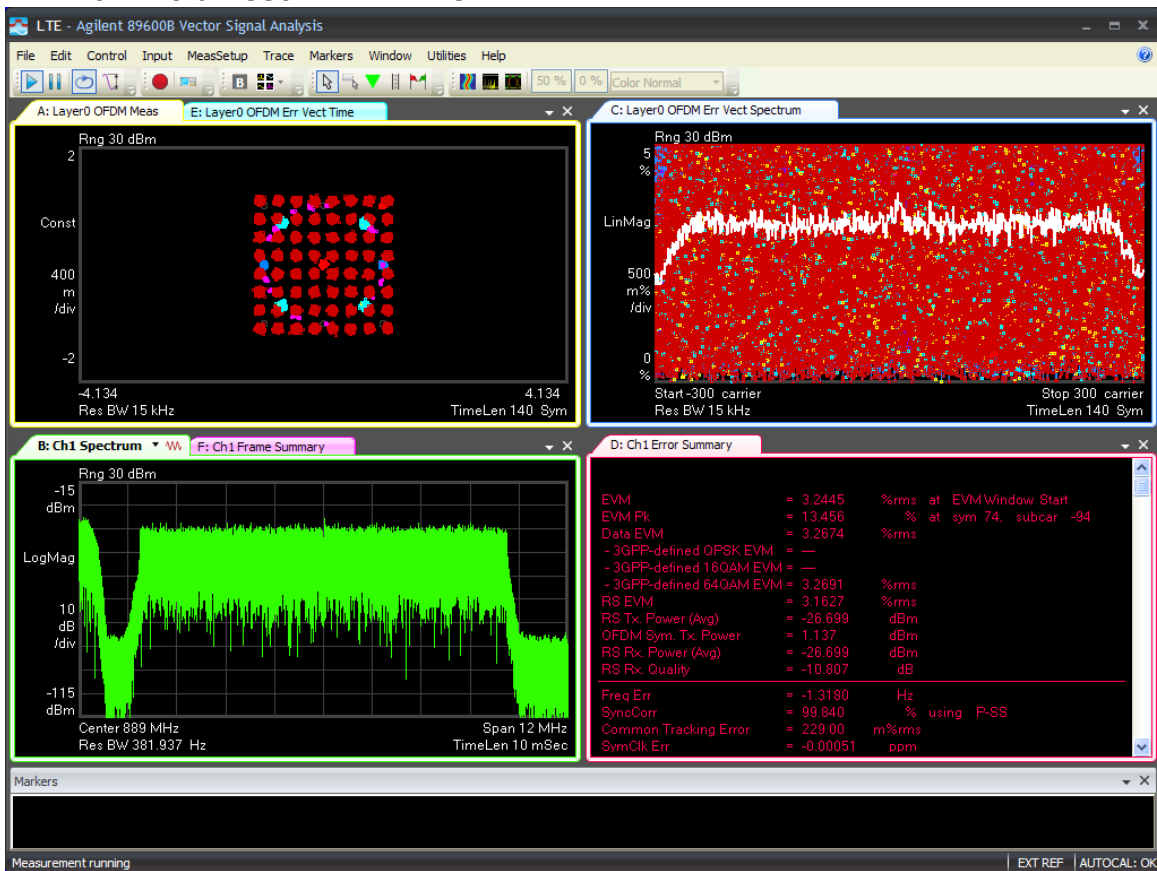
Port	RF Center Freq. (MHz)	LTE Center Freq. (MHz)	Test mode	EVM%
1	881.5	889	E-TM2	0.8309
			E-TM3.1	3.2691
			E-TM 3.2	4.1383
			E-TM 3.3	5.6165
4	881.5	889	E-TM2	0.8519
			E-TM3.1	3.1447
			E-TM 3.2	4.0689
			E-TM 3.3	5.5193

RF 881.5M:

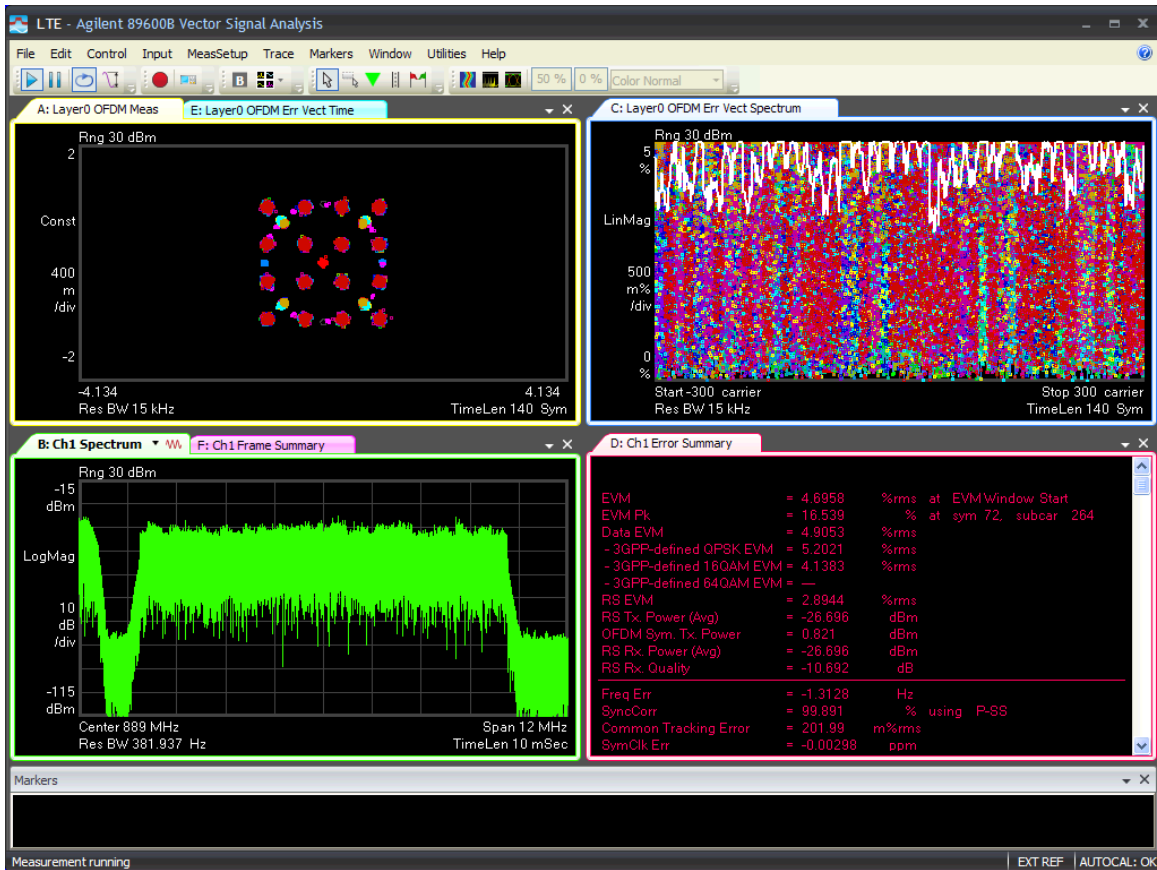
LTE 10M-Port 1-889MHz-E-TM2



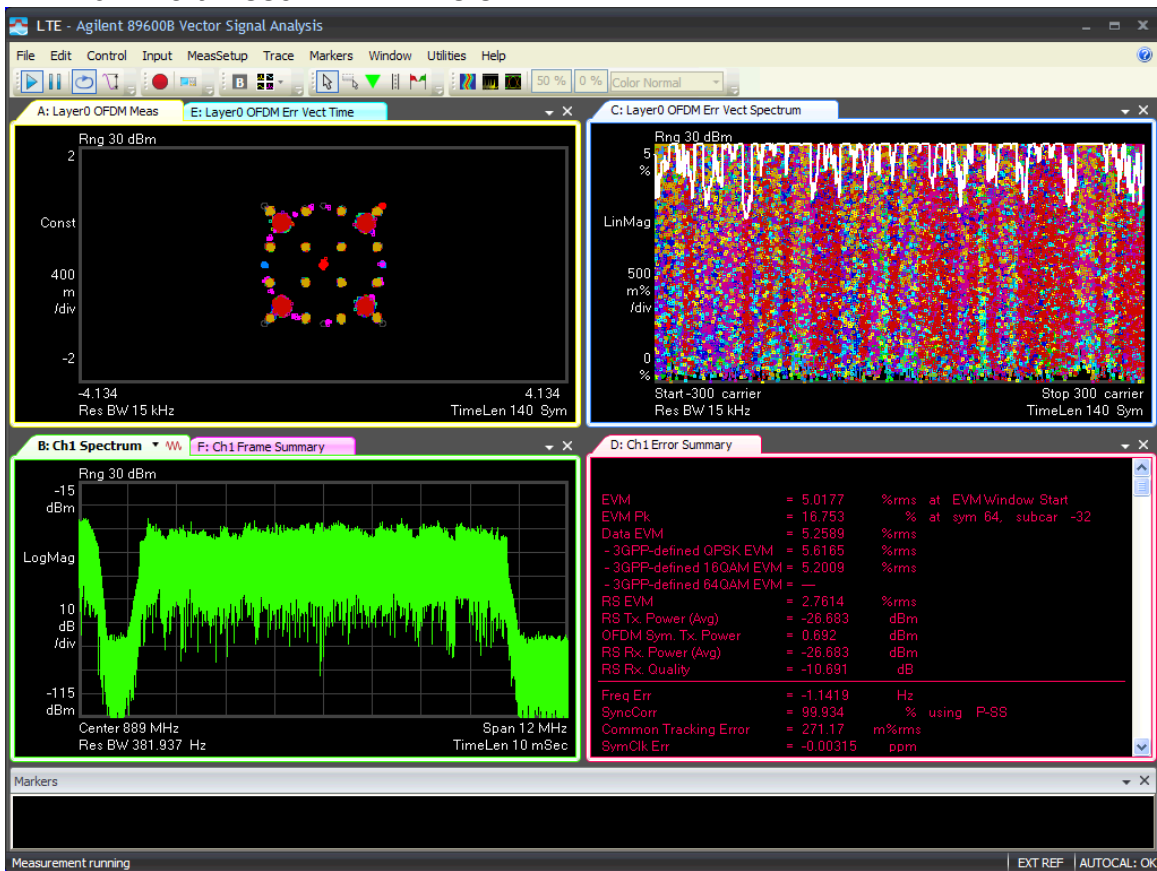
LTE 10M-Port 1-889MHz-E-TM3.1



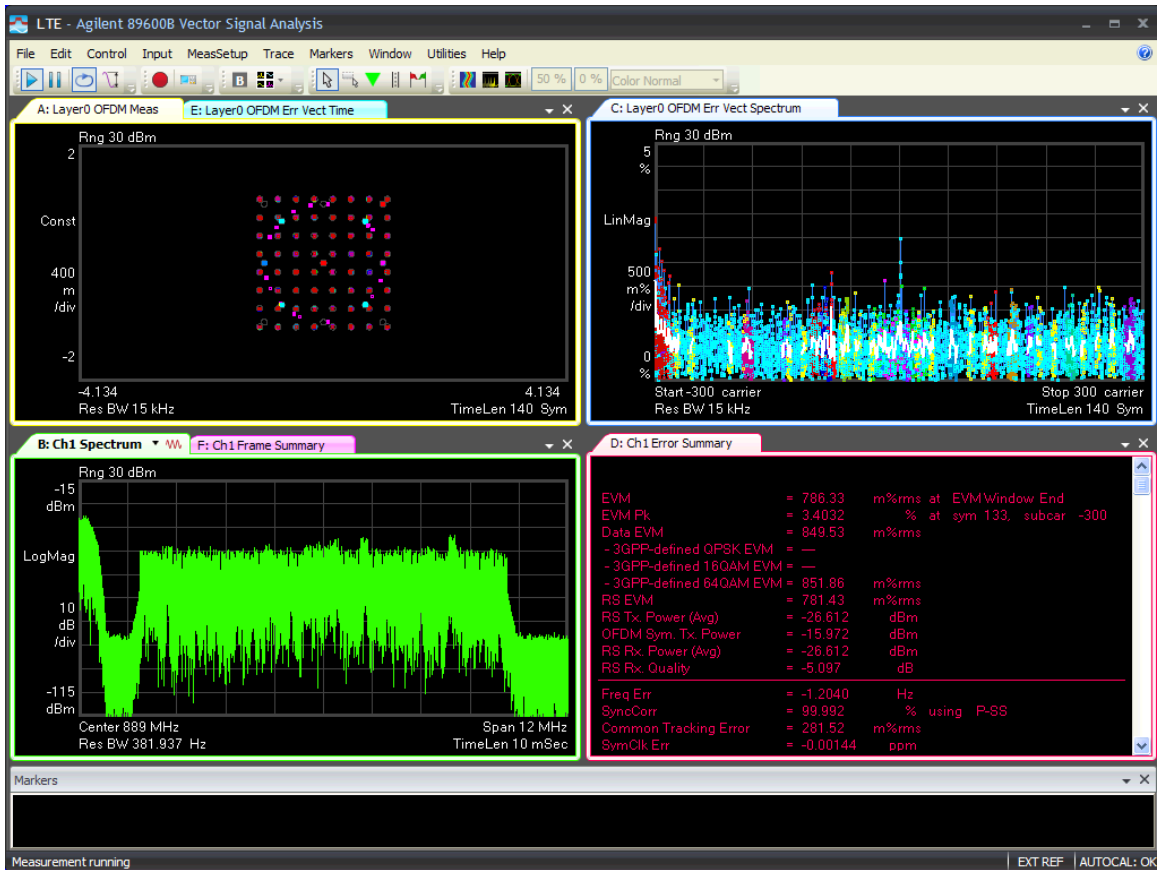
LTE 10M-Port 1-889MHz-E-TM3.2



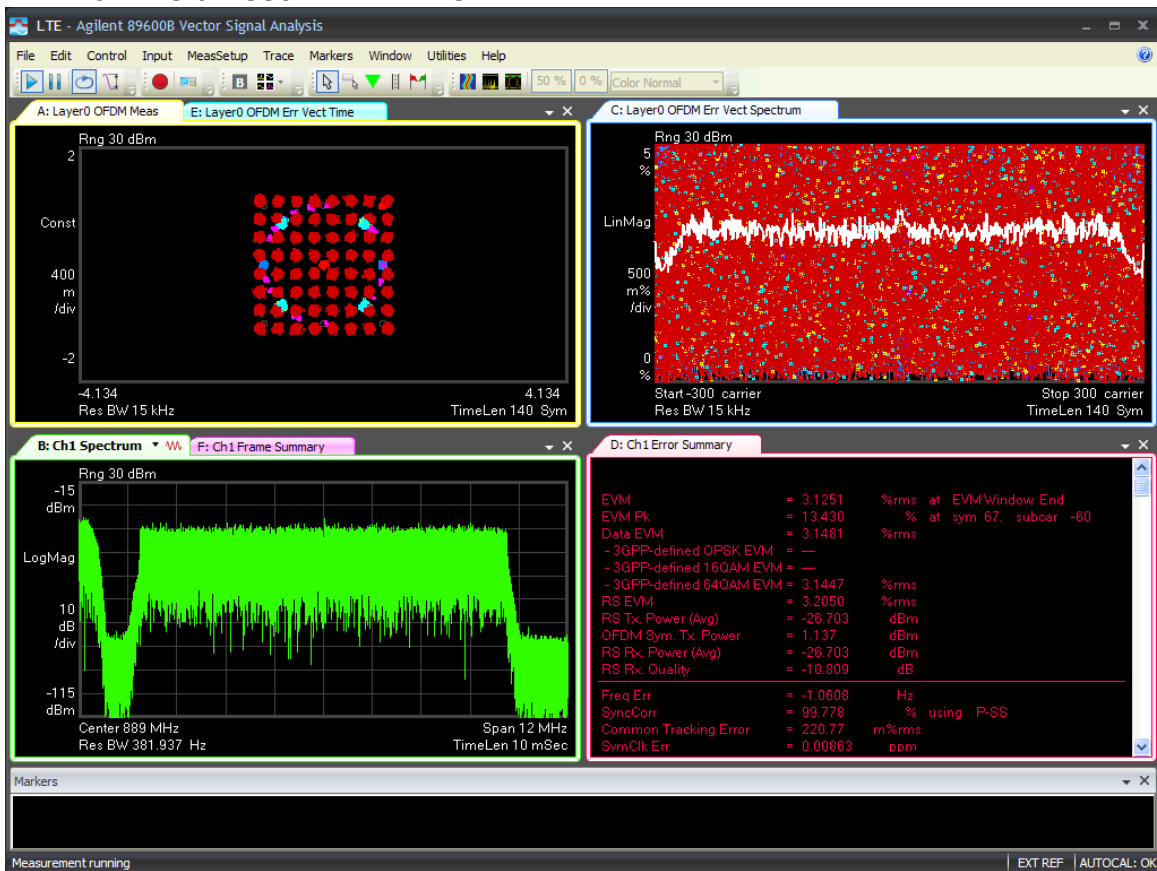
LTE 10M-Port 1-889MHz-E-TM3.3



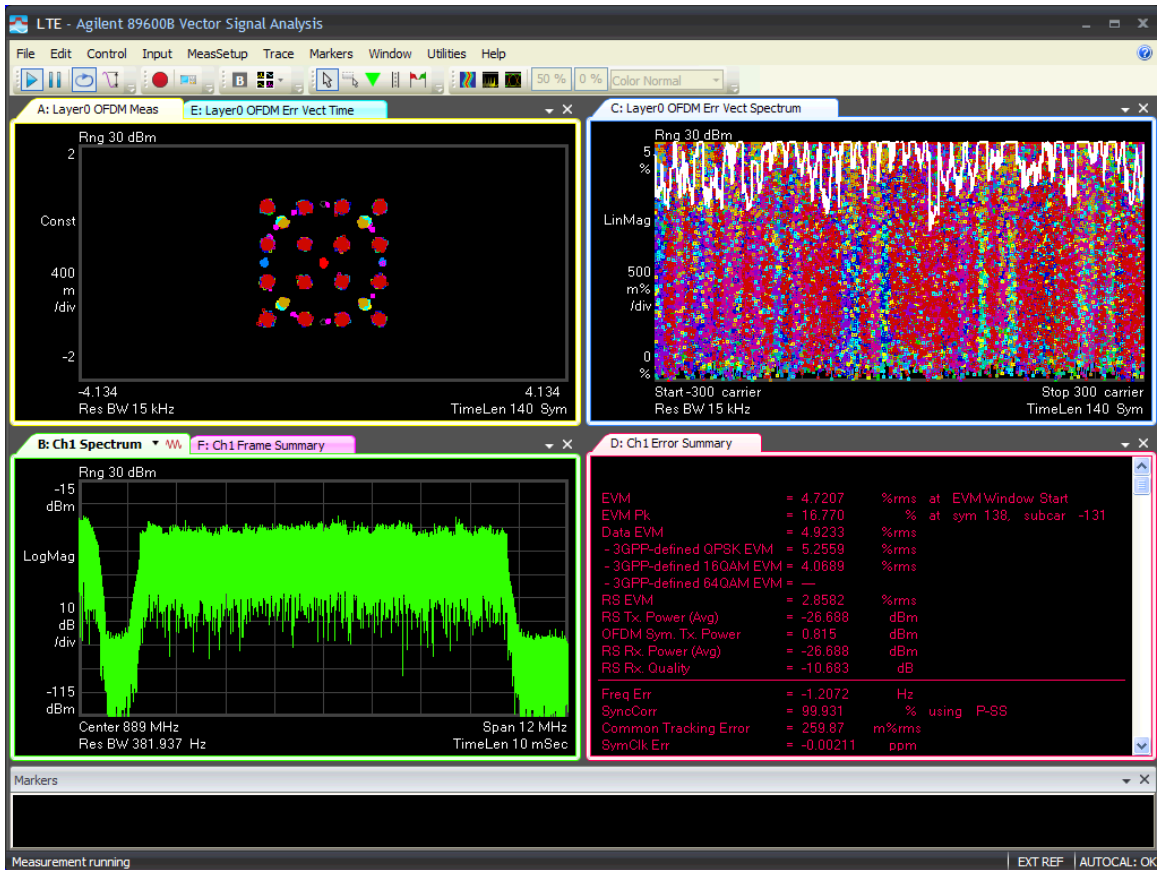
LTE 10M-Port 4-889MHz-E-TM2



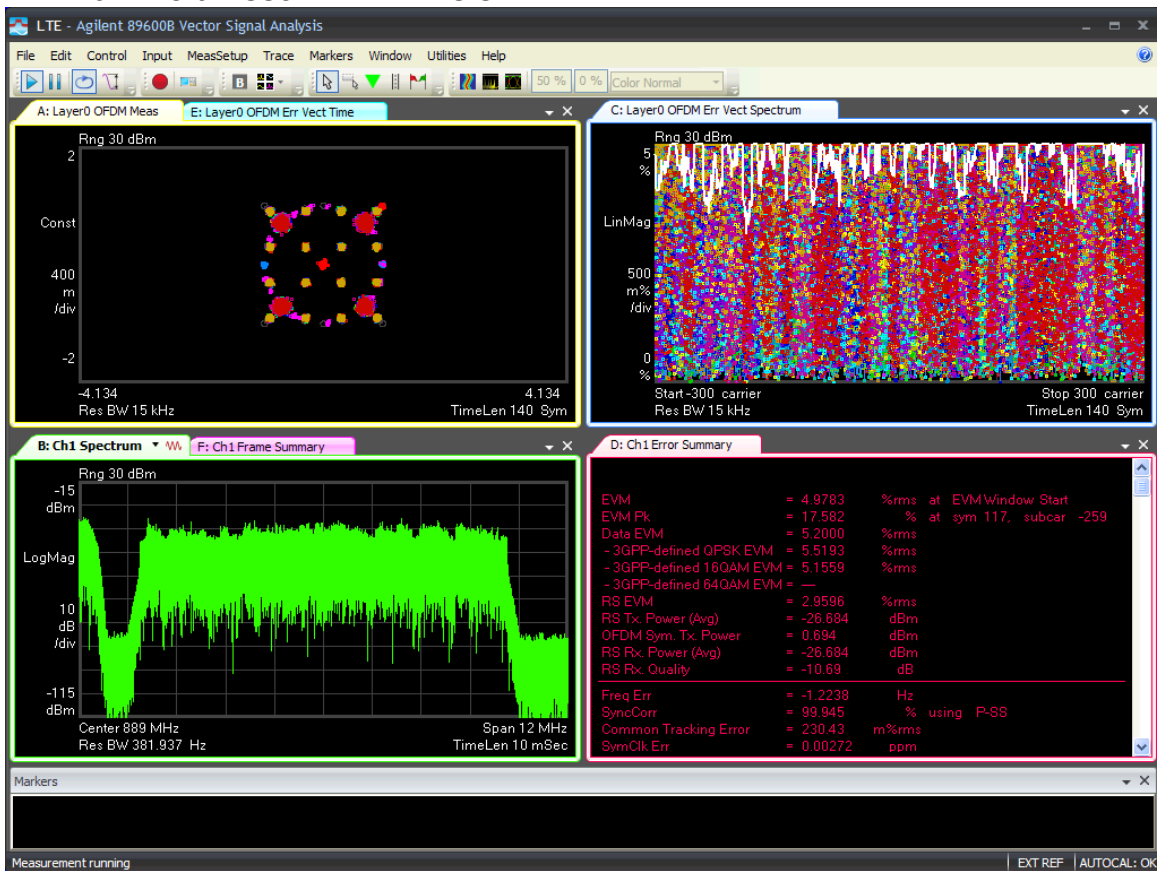
LTE 10M-Port 4-889MHz-E-TM3.1



LTE 10M-Port 4-889MHz-E-TM3.2



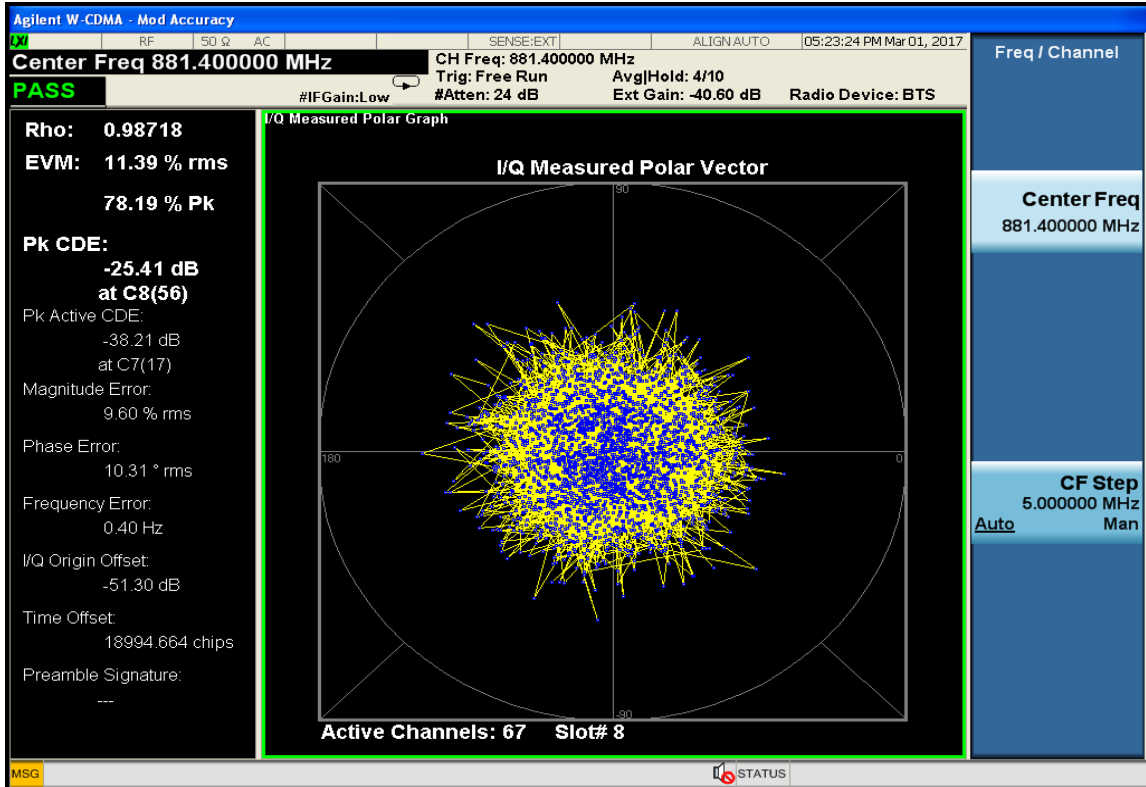
LTE 10M-Port 4-889MHz-E-TM3.3



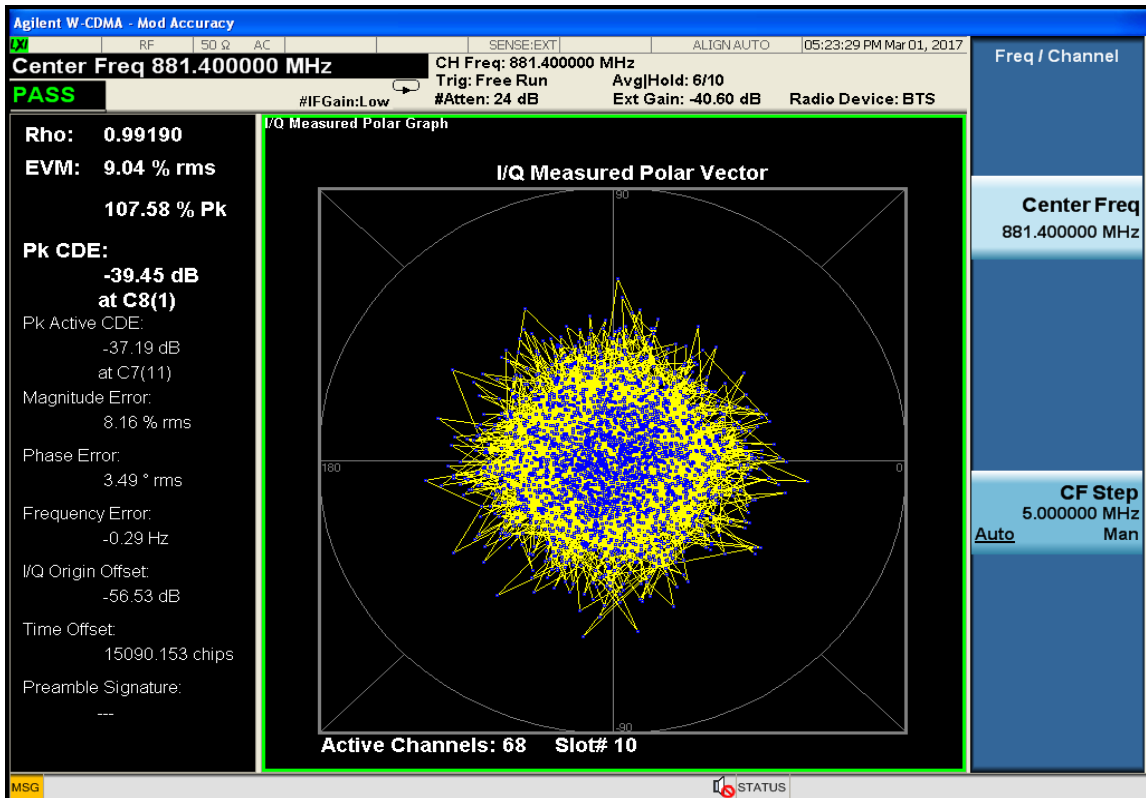
8.8 Test Data (UMTS) :

Port	Frequency (MHz)	EVM%
1	881.4	11.39
4	881.4	9.04

Port 1 -881.4 MHz



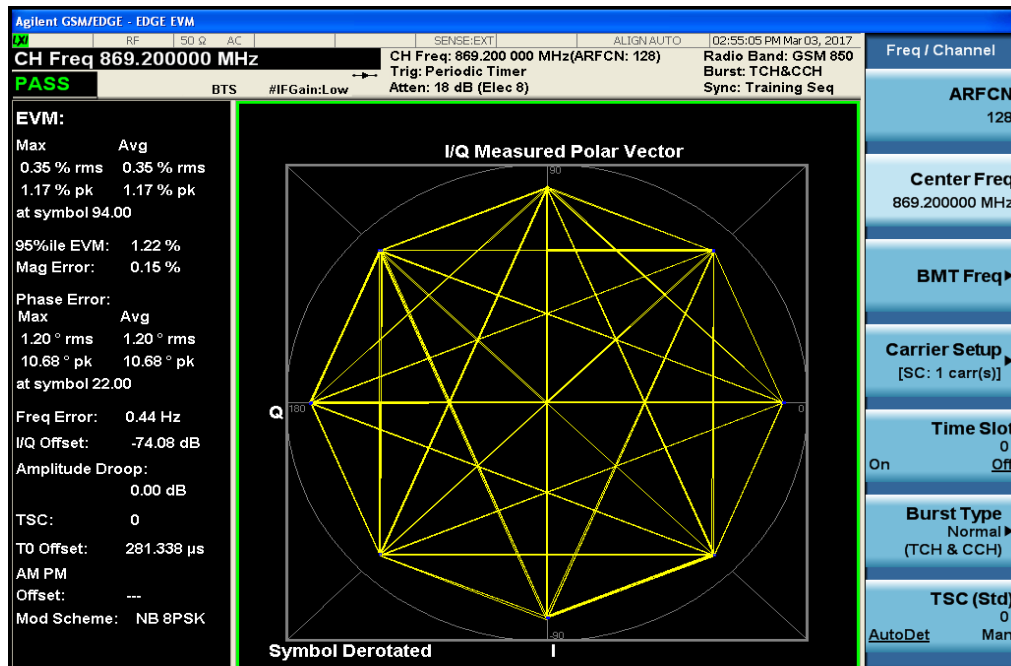
Port 4 -881.4 MHz



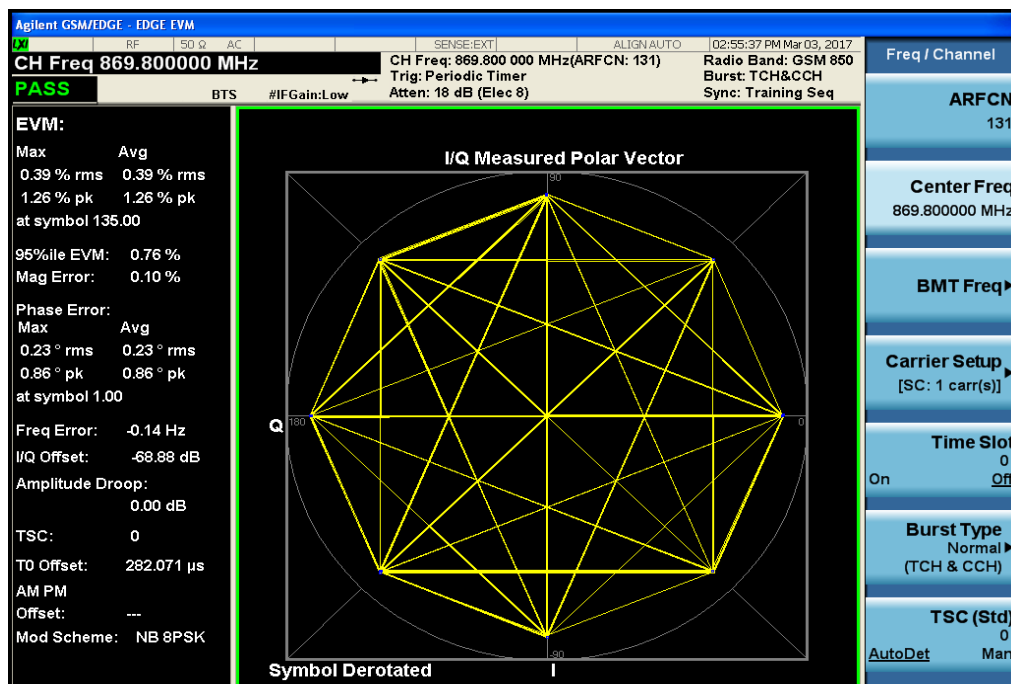
8.9 Test Data (GSM) :

Port	Frequency (MHz)	测试模式	EVM%
1	869.2	8PSK	0.35
	869.8	8PSK	0.39
4	869.2	8PSK	0.36
	869.8	8PSK	0.33

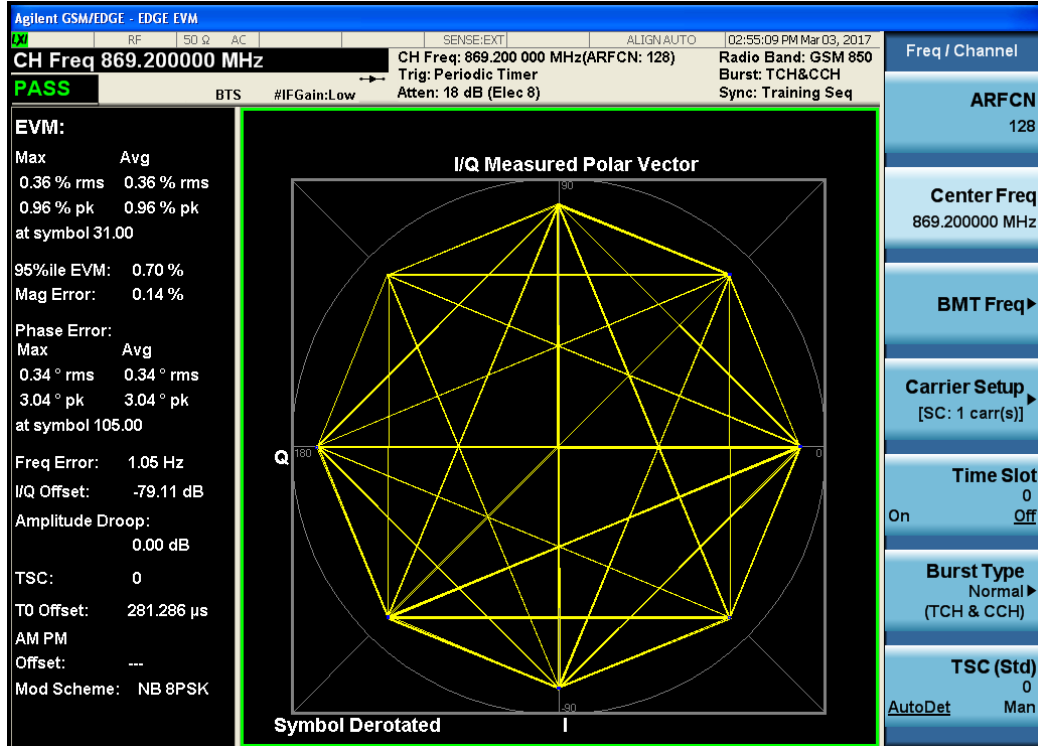
Port 1 -869.2 MHz



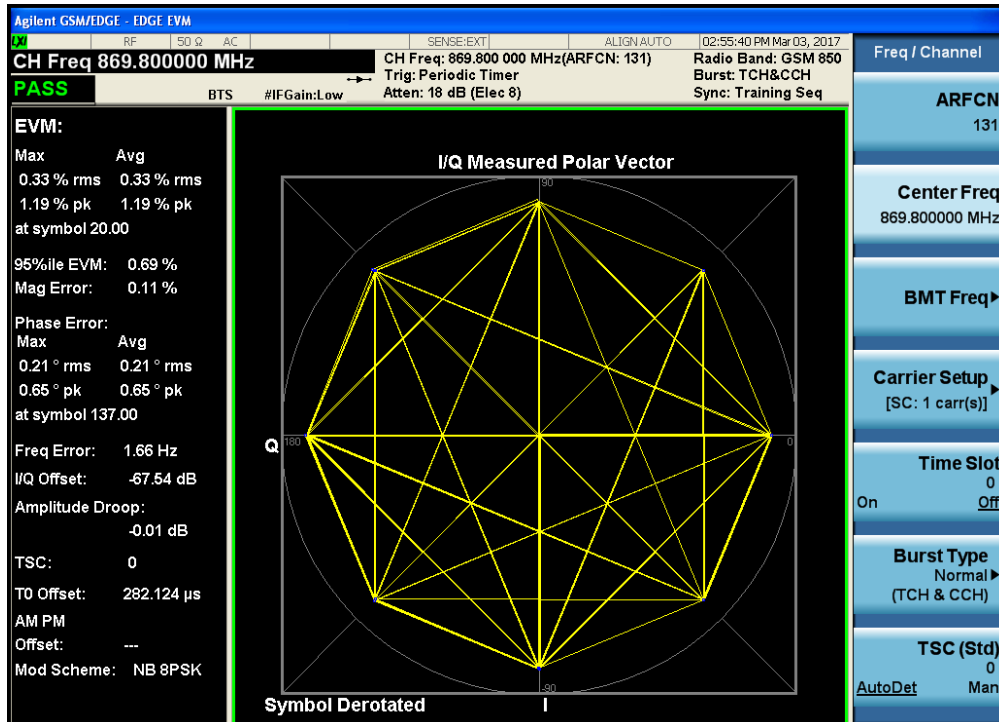
Port 1 -869.8 MHz



Port 4 -869.2 MHz



Port 4 -869.8 MHz



9 SPURIOUS RADIATED EMISSIONS

9.1 Applicable Standard: FCC CFR 47 §2.1053

9.2 Test Equipment List and Details

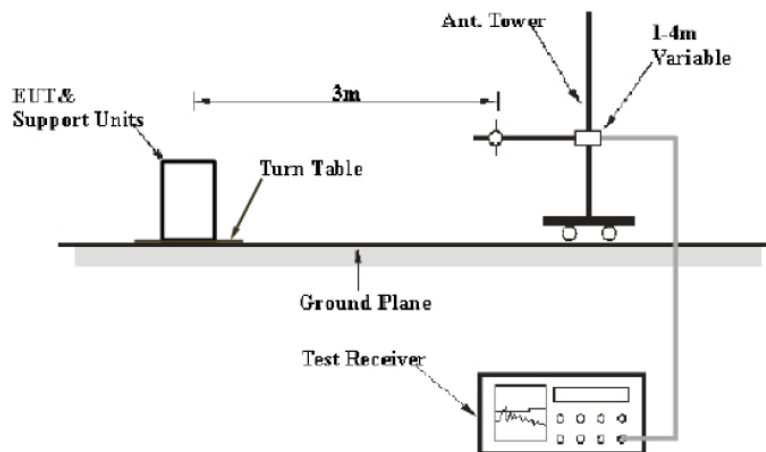
Manufacturer	Equipment	Model	Serial Number	Last Cal.	Cal. Interval
Albatross	Anechoic Chamber	3m Site	A00017354	2016-11-18	1 year
R&S	EMI Test Receiver	ESI26	100058	2016-8-1	1 year
R&S	Log periodic Antenna	SWB-VUBA9163	9163-282	2016-12-7	1 year
R&S	Double-Ridged Waveguide Horn Antenna	HF906 TX	100032	2016-6-29	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.

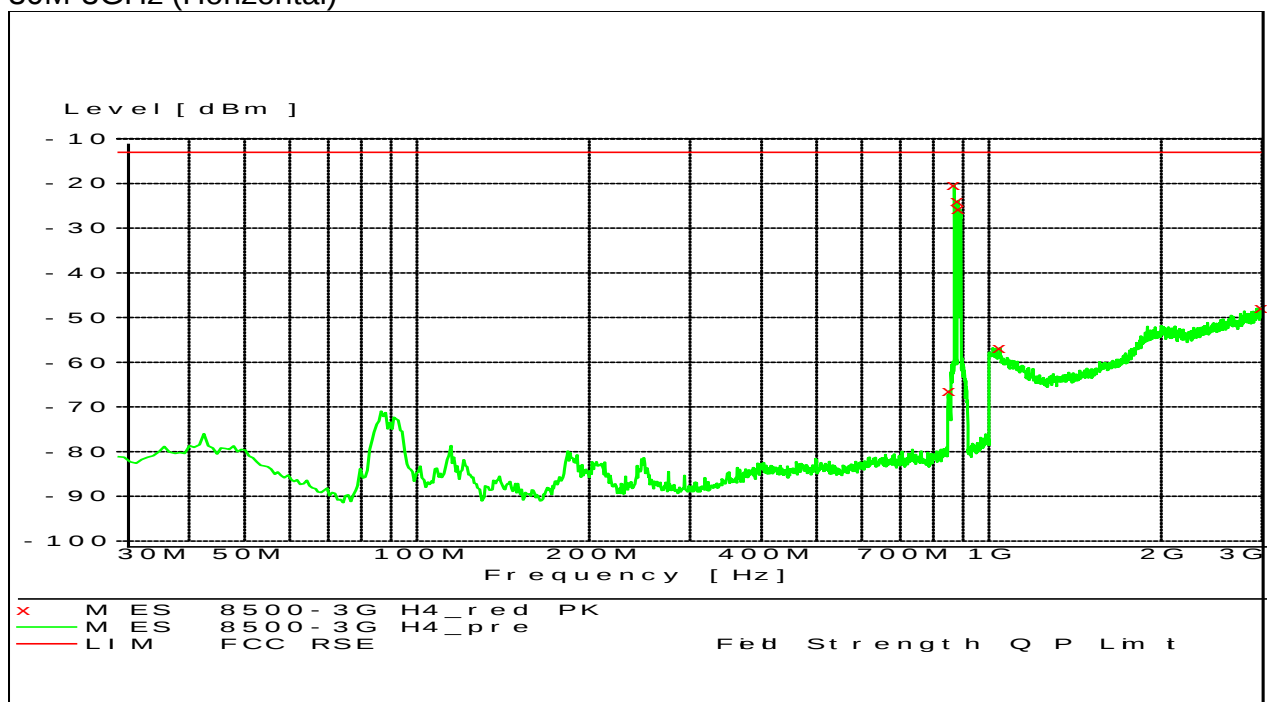
9.4 Test Results Summary: PASS

9.5 Environmental Conditions

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

9.6 Test data

30M-3GHz (Horizontal)

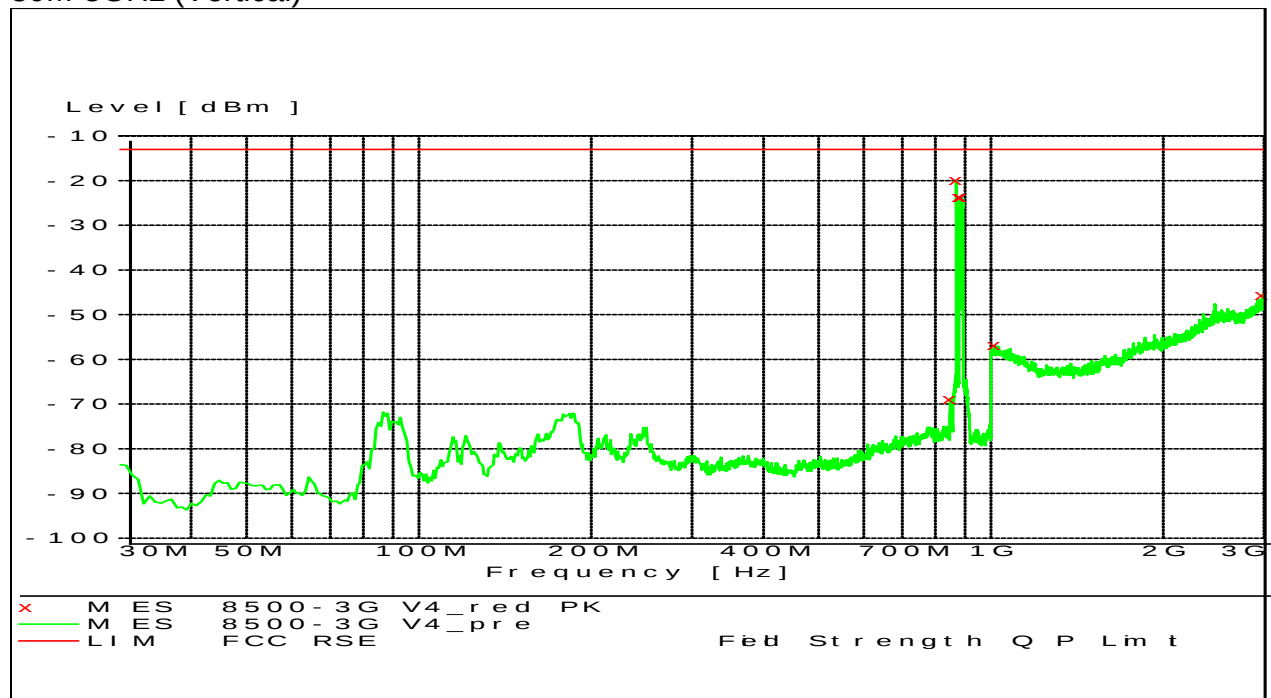


Frequency (MHz)	Level (dBm)	Azimuth (deg)	Height (cm)	Polarisation	Transd (dB)	Limit (dBm)	Margin (dB)
853.336	-66.35	338.2	100	HOR	-123	-13	53.3
870.408	-20.33	307.3	100	HOR	-122	-13	7.3
882.824	-23.86	348.4	100	HOR	-122	-13	10.9
885.152	-25.78	317.8	100	HOR	-122.1	-13	12.8
1044.8	-56.74	72.6	200	HOR	-109.3	-13	43.7



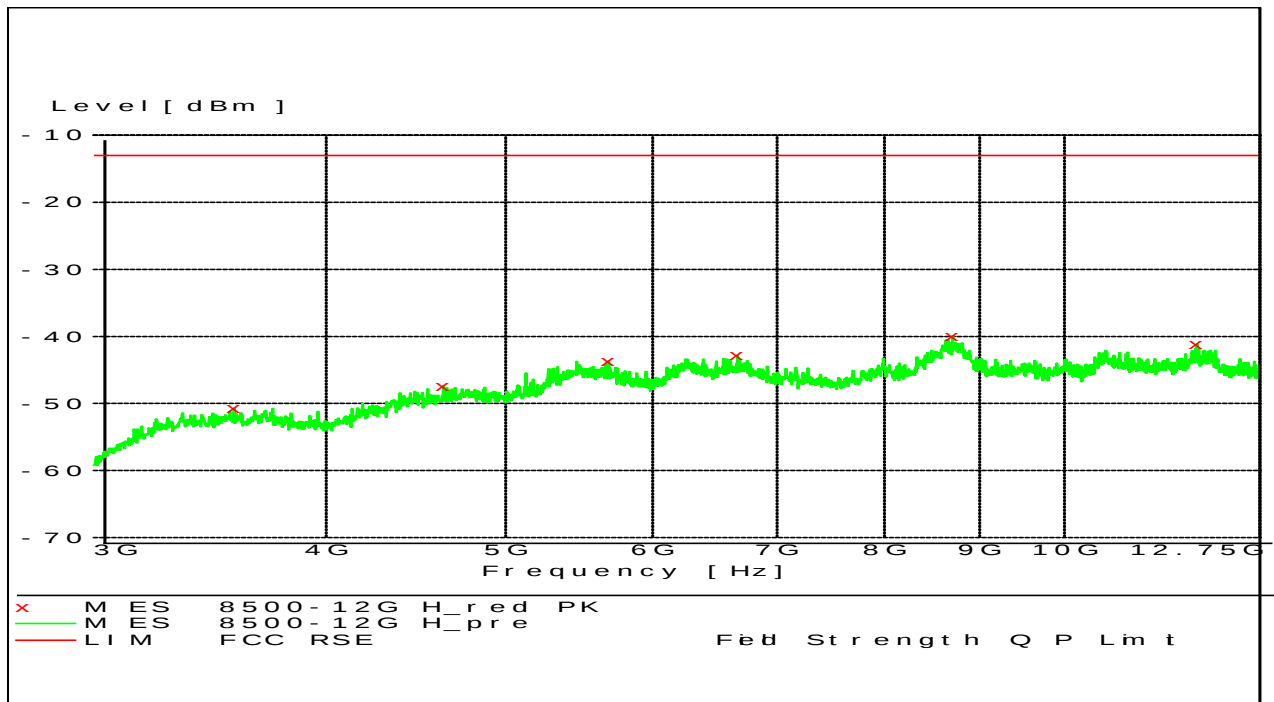
2996.8	-47.77	70.3	100	HOR	-98.5	-13	34.8
--------	--------	------	-----	-----	-------	-----	------

30M-3GHz (Vertical)



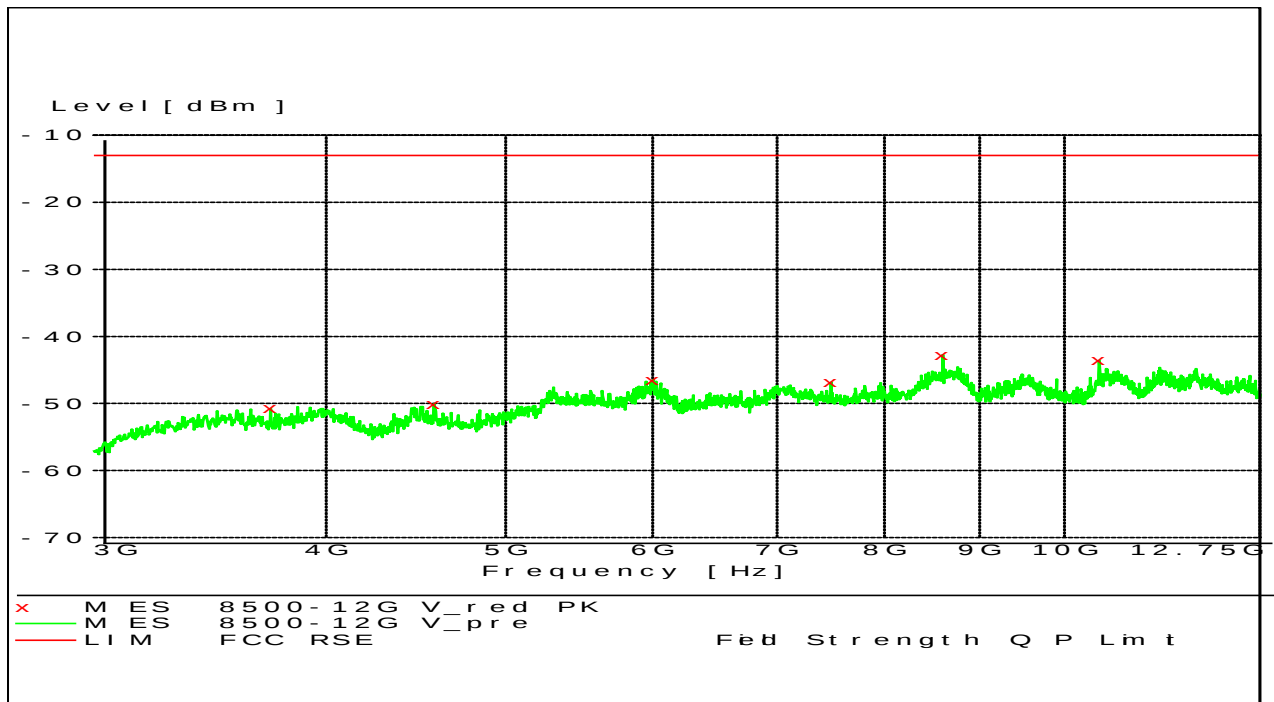
Frequency (MHz)	Level (dBm)	Azimuth (deg)	Height (cm)	Polarisation	Transd (dB)	Limit (dBm)	Margin (dB)
848.68	-68.8	6.5	100	VER	-120.2	-13	55.8
870.408	-19.86	351.9	100	VER	-119.8	-13	6.9
880.496	-23.7	34.9	100	VER	-120.2	-13	10.7
885.152	-23.65	0.1	100	VER	-120	-13	10.6
1016	-56.81	20	200	VER	-108.9	-13	43.8
2979.2	-45.48	103.2	200	VER	-97.3	-13	32.5

3-12.75GHz (Horizontal)



Frequency (MHz)	Level (dBm)	Azimuth (deg)	Height (cm)	Polarisation	Transd (dB)	Limit (dBm)	Margin (dB)
3569.6	-50.69	79.6	200	HOR	-89.3	-13	37.7
4628.8	-47.38	114.4	200	HOR	-84.9	-13	34.4
5681.6	-43.63	100.7	200	HOR	-79.6	-13	30.6
6667.2	-42.81	183.3	100	HOR	-77.6	-13	29.8
8706.6	-39.94	176.4	100	HOR	-72.6	-13	26.9
11788.6	-41.13	218.7	200	HOR	-72.7	-13	28.1

3-12.75GHz (Vertical)



Frequency (MHz)	Level (dBm)	Azimuth (deg)	Height (cm)	Polarisation	Transd (dB)	Limit (dBm)	Margin (dB)
3736	-50.71	56.7	200	VER	-89.3	-13	37.7
4574.4	-50.1	105.1	200	VER	-88.1	-13	37.1
6001.6	-46.45	172.8	100	VER	-81.4	-13	33.4
7487.6	-46.82	7.8	100	VER	-81.1	-13	33.8
8600.8	-42.75	99.2	100	VER	-77	-13	29.8
10445.4	-43.58	167.8	200	VER	-76.9	-13	30.6

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.

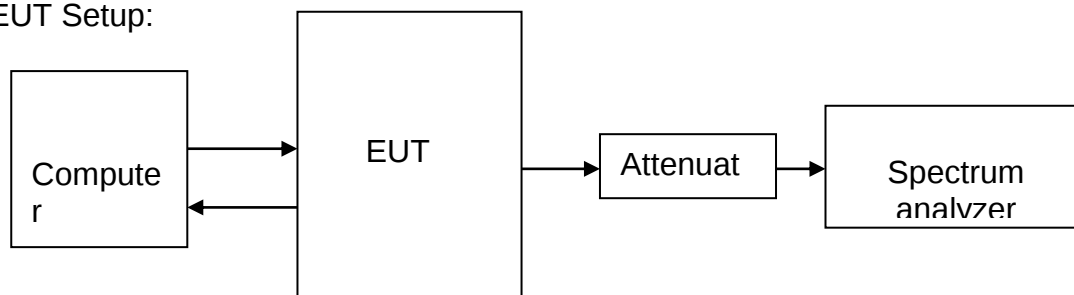
10.2 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.09.12	2017.09.12
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.09.12	2017.09.12

***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)=1.5dB.

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.

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 LTE+UMTS+GSM

10.7 Test Data

RF 25M (GUL):

RF 25M (GUL) -Port 1 -881.5MHz





RF 25M (GUL) -Port 4 -881.5MHz







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	2016.09.12	2017.09.12
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.09.12	2017.09.12

***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

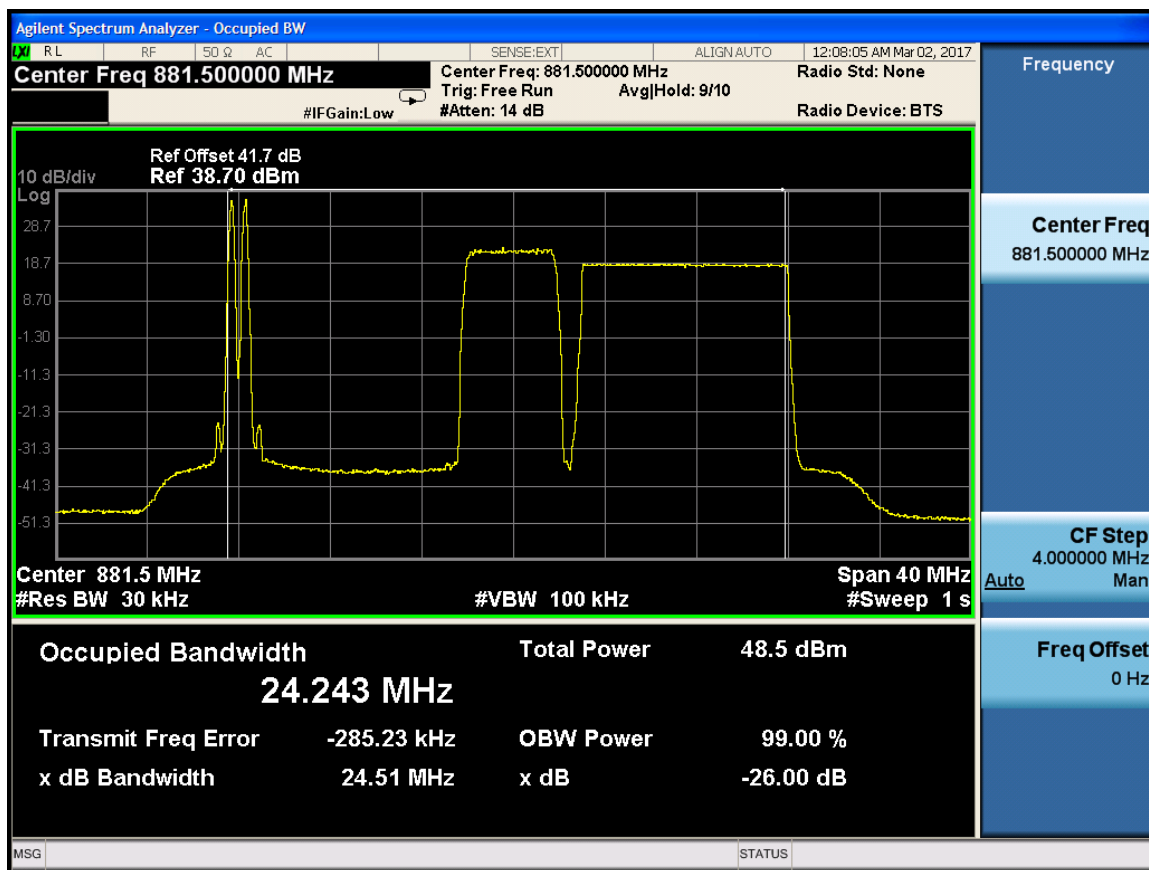
11.6 Test Mode: Transmitting LTE+UMTS+GSM

11.7 Test Data

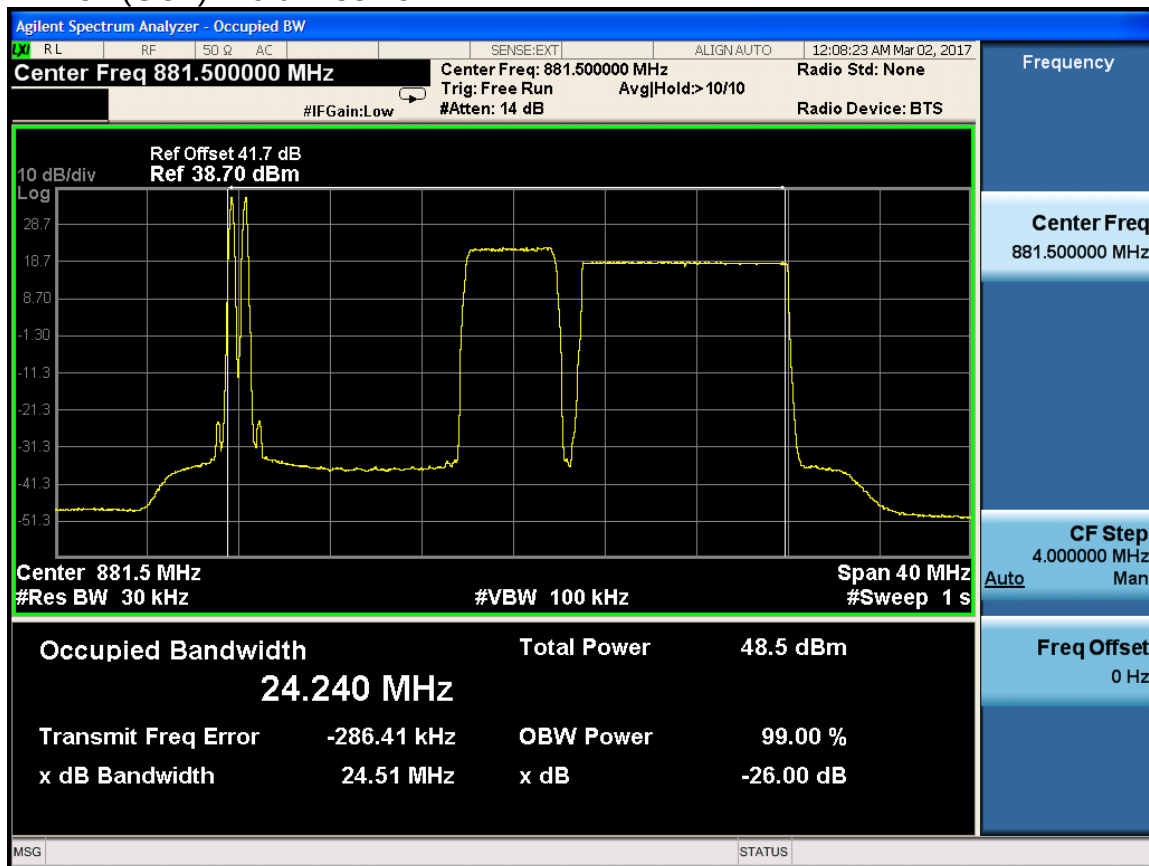
RF Bandwidth :IBW 25M(LTE+UMTS+GSM)

Port	RF Center Freq. (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
1	881.5	24.243	25M
4	881.5	24.240	25M

RF 25M(GUL) -Port 1-881.5MHz



RF 25M(GUL) -Port 4 -881.5MHz





12 11 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	2016.09.12	2017.09.12
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2016.09.12	2017.09.12

***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 LTE+UMTS+GSM

12.7 Test Data

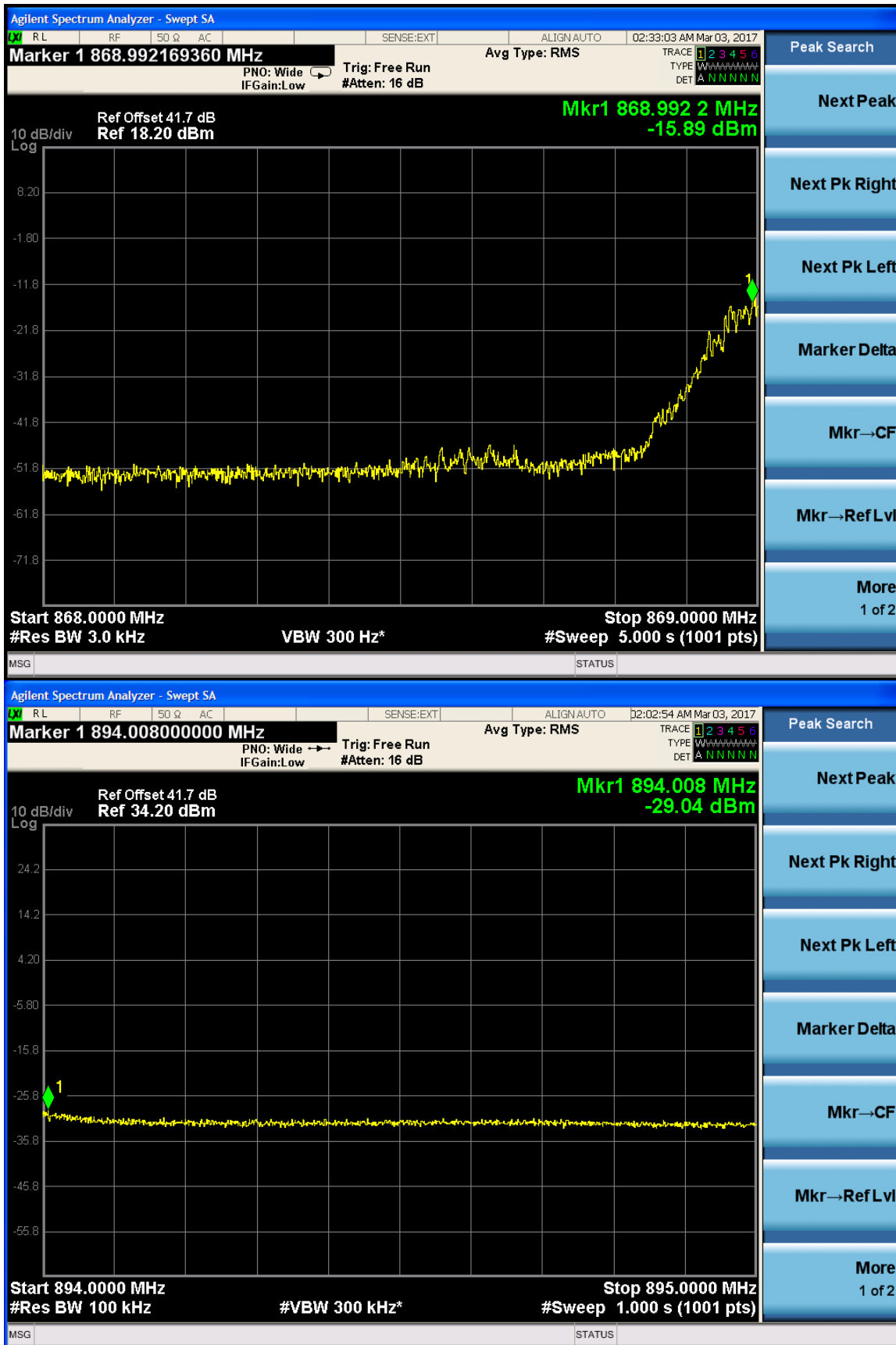
RF Bandwidth :IBW 25M(GUL)

Port	RF Center Freq. (MHz)	Max bandedge Emission (dBm)	Limit (dBm)
1	881.5	-14.82	-13
4	881.5	-15.89	-13

RF 25M(GUL) -Port 1-881.5MHz



RF 25M(GUL) -Port 4-881.5MHz





13 12 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	2016.09.12	2017.09.12
Agilent	MXA Series Spectrum Analyzer	N9030A	MY49431143	2016.09.12	2017.09.12
DTS	DTS 40dB Attenuator	DTS100-40-3-1	09112005	2015.04.17	2016.04.17

***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 LTE+UMTS+GSM

13.7 Test Data (LTE)

13.7.1 Frequency Stability Versus Temperature

Frequency Stability vs Temperature (RF Bandwidth:25M(LTE+UMTS+GSM) RF Frequency :881.5MHz)



Temperature (°C)	Power Supplied (V _{DC})	Port	LTE Frequency (MHz)	Frequency Measure Error (Hz)	E-TM	Limit (ppm)	Limit (Hz)	Result
-40	-48	1	889	1.120	TM2.0	0.05	44.7	PASS
				1.293	TM3.1	0.05	44.7	PASS
				1.064	TM3.2	0.05	44.7	PASS
				1.221	TM3.3	0.05	44.7	PASS
		4	889	1.192	TM2.0	0.05	44.7	PASS
				1.171	TM3.1	0.05	44.7	PASS
				1.342	TM3.2	0.05	44.7	PASS
				1.173	TM3.3	0.05	44.7	PASS
-30	-48	1	889	1.197	TM2.0	0.05	44.7	PASS
				1.108	TM3.1	0.05	44.7	PASS
				1.285	TM3.2	0.05	44.7	PASS
				1.110	TM3.3	0.05	44.7	PASS
		4	889	1.253	TM2.0	0.05	44.7	PASS
				1.136	TM3.1	0.05	44.7	PASS
				1.079	TM3.2	0.05	44.7	PASS
				1.174	TM3.3	0.05	44.7	PASS
-20	-48	1	889	1.157	TM2.0	0.05	44.7	PASS
				1.292	TM3.1	0.05	44.7	PASS
				1.290	TM3.2	0.05	44.7	PASS
				1.219	TM3.3	0.05	44.7	PASS
		4	889	1.240	TM2.0	0.05	44.7	PASS
				1.275	TM3.1	0.05	44.7	PASS
				1.075	TM3.2	0.05	44.7	PASS
				1.260	TM3.3	0.05	44.7	PASS
-10	-48	1	889	1.184	TM2.0	0.05	44.7	PASS
				1.328	TM3.1	0.05	44.7	PASS
				1.097	TM3.2	0.05	44.7	PASS
				1.191	TM3.3	0.05	44.7	PASS
		4	889	1.261	TM2.0	0.05	44.7	PASS
				1.184	TM3.1	0.05	44.7	PASS
				1.163	TM3.2	0.05	44.7	PASS
				1.192	TM3.3	0.05	44.7	PASS
0	-48	1	889	1.327	TM2.0	0.05	44.7	PASS
				1.322	TM3.1	0.05	44.7	PASS
				1.284	TM3.2	0.05	44.7	PASS
				1.291	TM3.3	0.05	44.7	PASS
		4	889	1.286	TM2.0	0.05	44.7	PASS
				1.346	TM3.1	0.05	44.7	PASS



				1.333	TM3.2	0.05	44.7	PASS
				1.122	TM3.3	0.05	44.7	PASS
10		1	889	1.203	TM2.0	0.05	44.7	PASS
				1.223	TM3.1	0.05	44.7	PASS
				1.104	TM3.2	0.05	44.7	PASS
				1.116	TM3.3	0.05	44.7	PASS
				1.155	TM2.0	0.05	44.7	PASS
		4	889	1.242	TM3.1	0.05	44.7	PASS
				1.157	TM3.2	0.05	44.7	PASS
				1.123	TM3.3	0.05	44.7	PASS
20		1	889	1.109	TM2.0	0.05	44.7	PASS
				1.201	TM3.1	0.05	44.7	PASS
				1.233	TM3.2	0.05	44.7	PASS
				1.215	TM3.3	0.05	44.7	PASS
		4	889	1.216	TM2.0	0.05	44.7	PASS
				1.198	TM3.1	0.05	44.7	PASS
				1.319	TM3.2	0.05	44.7	PASS
				1.151	TM3.3	0.05	44.7	PASS
30		1	889	1.304	TM2.0	0.05	44.7	PASS
				1.115	TM3.1	0.05	44.7	PASS
				1.146	TM3.2	0.05	44.7	PASS
				1.132	TM3.3	0.05	44.7	PASS
		4	889	1.230	TM2.0	0.05	44.7	PASS
				1.213	TM3.1	0.05	44.7	PASS
				1.262	TM3.2	0.05	44.7	PASS
				1.300	TM3.3	0.05	44.7	PASS
40		1	889	1.339	TM2.0	0.05	44.7	PASS
				1.223	TM3.1	0.05	44.7	PASS
				1.162	TM3.2	0.05	44.7	PASS
				1.160	TM3.3	0.05	44.7	PASS
		4	889	1.059	TM2.0	0.05	44.7	PASS
				1.252	TM3.1	0.05	44.7	PASS
				1.216	TM3.2	0.05	44.7	PASS
				1.293	TM3.3	0.05	44.7	PASS
50		1	889	1.094	TM2.0	0.05	44.7	PASS
				1.192	TM3.1	0.05	44.7	PASS
				1.176	TM3.2	0.05	44.7	PASS
				1.174	TM3.3	0.05	44.7	PASS
		4	889	1.120	TM2.0	0.05	44.7	PASS
				1.205	TM3.1	0.05	44.7	PASS
				1.081	TM3.2	0.05	44.7	PASS
				1.270	TM3.3	0.05	44.7	PASS



55		1	889	1.124	TM2.0	0.05	44.7	PASS
				1.258	TM3.1	0.05	44.7	PASS
				1.253	TM3.2	0.05	44.7	PASS
				1.330	TM3.3	0.05	44.7	PASS
		4	889	1.249	TM2.0	0.05	44.7	PASS
				1.185	TM3.1	0.05	44.7	PASS
				1.074	TM3.2	0.05	44.7	PASS
				1.287	TM3.3	0.05	44.7	PASS

13.7.2 Frequency Stability Versus Voltage

Frequency Stability vs Voltage (RF Bandwidth:25M(LTE+UMTS+GSM) RF Frequency :881.5MHz)								
Power Supplied (V _{DC})	Temperature (℃)	Port	LTE Freque ncy(M Hz)	Freque ncy Measu re Error (Hz)	E-TM	Limit (ppm)	Limit (Hz)	Result
-37	20	1	889	1.307	TM2.0	0.05	44.7	PASS
				1.196	TM3.1	0.05	44.7	PASS
				1.171	TM3.2	0.05	44.7	PASS
				1.327	TM3.3	0.05	44.7	PASS
		4	889	1.087	TM2.0	0.05	44.7	PASS
				1.318	TM3.1	0.05	44.7	PASS
				1.058	TM3.2	0.05	44.7	PASS
				1.094	TM3.3	0.05	44.7	PASS
-42		1	889	1.221	TM2.0	0.05	44.7	PASS
				1.147	TM3.1	0.05	44.7	PASS
				1.240	TM3.2	0.05	44.7	PASS
				1.166	TM3.3	0.05	44.7	PASS
		4	889	1.348	TM2.0	0.05	44.7	PASS
				1.135	TM3.1	0.05	44.7	PASS
				1.278	TM3.2	0.05	44.7	PASS
				1.292	TM3.3	0.05	44.7	PASS
-48		1	889	1.253	TM2.0	0.05	44.7	PASS
				1.304	TM3.1	0.05	44.7	PASS
				1.269	TM3.2	0.05	44.7	PASS
				1.304	TM3.3	0.05	44.7	PASS
		4	889	1.264	TM2.0	0.05	44.7	PASS
				1.088	TM3.1	0.05	44.7	PASS
				1.335	TM3.2	0.05	44.7	PASS
				1.115	TM3.3	0.05	44.7	PASS



-54		1	889	1.221	TM2.0	0.05	44.7	PASS
				1.338	TM3.1	0.05	44.7	PASS
				1.247	TM3.2	0.05	44.7	PASS
				1.178	TM3.3	0.05	44.7	PASS
		4	889	1.292	TM2.0	0.05	44.7	PASS
				1.257	TM3.1	0.05	44.7	PASS
				1.244	TM3.2	0.05	44.7	PASS
				1.184	TM3.3	0.05	44.7	PASS
-60		1	889	1.057	TM2.0	0.05	44.7	PASS
				1.199	TM3.1	0.05	44.7	PASS
				1.165	TM3.2	0.05	44.7	PASS
				1.132	TM3.3	0.05	44.7	PASS
		4	889	1.140	TM2.0	0.05	44.7	PASS
				1.275	TM3.1	0.05	44.7	PASS
				1.248	TM3.2	0.05	44.7	PASS
				1.096	TM3.3	0.05	44.7	PASS

13.8 Test Data (UMTS)

13.8.1 Frequency Stability Versus Temperature

Frequency Stability vs Temperature					
Temperature (°C)	Power Supplied (V _{dc})	Frequency Measure Error (Hz)	Limit (ppm)	Limit (Hz)	Result
Port 1 (881.4MHz)					
-40	-48	-2.8	0.05	44.07	PASS
-30	-48	-3.2	0.05	44.07	PASS
-20	-48	-4.3	0.05	44.07	PASS
-10	-48	2.1	0.05	44.07	PASS
0	-48	-3.5	0.05	44.07	PASS
10	-48	-2.2	0.05	44.07	PASS
20	-48	2.9	0.05	44.07	PASS
30	-48	-4.1	0.05	44.07	PASS
40	-48	-3.5	0.05	44.07	PASS
50	-48	3.4	0.05	44.07	PASS
55	-48	-4.8	0.05	44.07	PASS
Port 4 (881.4MHz)					
-40	-48	3.9	0.05	44.07	PASS
-30	-48	-4.4	0.05	44.07	PASS
-20	-48	-4.9	0.05	44.07	PASS
-10	-48	2.6	0.05	44.07	PASS



0	-48	-3.3	0.05	44.07	PASS
10	-48	4.1	0.05	44.07	PASS
20	-48	-5.2	0.05	44.07	PASS
30	-48	-2.4	0.05	44.07	PASS
40	-48	-3.5	0.05	44.07	PASS
50	-48	2.5	0.05	44.07	PASS
55	-48	-4.3	0.05	44.07	PASS

13.8.2 Frequency Stability Versus Voltage

Frequency Stability vs. Voltage					
VoltageV _d c	Temperature ℃	Frequency Measure Error Hz	Limit (ppm)	Limit (Hz)	Result
Port 1 (881.4MHz)					
-37	25	-4.5	0.05	44.07	PASS
-42	25	-3.3	0.05	44.07	PASS
-48	25	2.8	0.05	44.07	PASS
-54	25	-5.1	0.05	44.07	PASS
-60	25	2.9	0.05	44.07	PASS
Port 4 (881.4MHz)					
-37	25	3.8	0.05	44.07	PASS
-42	25	-4.5	0.05	44.07	PASS
-48	25	-3.8	0.05	44.07	PASS
-54	25	2.8	0.05	44.07	PASS
-60	25	-3.9	0.05	44.07	PASS

13.9 Test Data (GSM)

13.9.1 Frequency Stability Versus Temperature

Frequency Stability vs Temperature					
Temperatur e (℃)	Power Supplied (V _{dc})	Frequency Measure Error (Hz)	Limit (ppm)	Limit (Hz)	Result
Port 1 (869.2MHz)					
-40	-48	0.16	0.05	44.46	PASS
-30	-48	0.29	0.05	44.46	PASS
-20	-48	1.42	0.05	44.46	PASS
-10	-48	-0.19	0.05	44.46	PASS
0	-48	1.02	0.05	44.46	PASS
10	-48	0.68	0.05	44.46	PASS
20	-48	-0.85	0.05	44.46	PASS



30	-48	1.63	0.05	44.46	PASS
40	-48	0.58	0.05	44.46	PASS
50	-48	0.57	0.05	44.46	PASS
55	-48	-0.25	0.05	44.46	PASS
Port 1 (869.8MHz)					
-40	-48	0.62	0.05	44.49	PASS
-30	-48	0.65	0.05	44.49	PASS
-20	-48	-0.85	0.05	44.49	PASS
-10	-48	0.73	0.05	44.49	PASS
0	-48	-1.02	0.05	44.49	PASS
10	-48	-1.36	0.05	44.49	PASS
20	-48	0.56	0.05	44.49	PASS
30	-48	-0.56	0.05	44.49	PASS
40	-48	-0.92	0.05	44.49	PASS
50	-48	0.16	0.05	44.49	PASS
55	-48	-0.49	0.05	44.49	PASS
Port 4 (869.2MHz)					
-40	-48	0.45	0.05	44.46	PASS
-30	-48	0.83	0.05	44.46	PASS
-20	-48	0.61	0.05	44.46	PASS
-10	-48	0.53	0.05	44.46	PASS
0	-48	1.02	0.05	44.46	PASS
10	-48	-1.64	0.05	44.46	PASS
20	-48	1.46	0.05	44.46	PASS
30	-48	-0.74	0.05	44.46	PASS
40	-48	-1.9	0.05	44.46	PASS
50	-48	1.32	0.05	44.46	PASS
55	-48	-1.42	0.05	44.46	PASS
Port 4 (869.8MHz)					
-40	-48	0.38	0.05	44.49	PASS
-30	-48	0.84	0.05	44.49	PASS
-20	-48	0.69	0.05	44.49	PASS
-10	-48	0.58	0.05	44.49	PASS
0	-48	1.06	0.05	44.49	PASS
10	-48	-1.46	0.05	44.49	PASS
20	-48	1.46	0.05	44.49	PASS
30	-48	-1.48	0.05	44.49	PASS
40	-48	-1.89	0.05	44.49	PASS
50	-48	1.68	0.05	44.49	PASS
55	-48	-0.38	0.05	44.49	PASS

**13.9.2 Frequency Stability Versus Voltage**

Frequency Stability vs. Voltage					
VoltageV _d c	Temperature ℃	Frequency Measure Error Hz	Limit (ppm)	Limit (Hz)	Result
Port 1 (869.2MHz)					
-37	25	1.65	0.05	44.46	PASS
-42	25	-0.86	0.05	44.46	PASS
-48	25	-1.93	0.05	44.46	PASS
-54	25	-1.54	0.05	44.46	PASS
-60	25	0.37	0.05	44.46	PASS
Port 1 (869.8MHz)					
-37	25	2.32	0.05	44.49	PASS
-42	25	-1.63	0.05	44.49	PASS
-48	25	-1.34	0.05	44.49	PASS
-54	25	-0.58	0.05	44.49	PASS
-60	25	0.90	0.05	44.49	PASS
Port 4 (869.2MHz)					
-37	25	0.67	0.05	44.46	PASS
-42	25	-1.24	0.05	44.46	PASS
-48	25	-2.06	0.05	44.46	PASS
-54	25	0.26	0.05	44.46	PASS
-60	25	-1.28	0.05	44.46	PASS
Port 4 (869.8MHz)					
-37	25	1.54	0.05	44.49	PASS
-42	25	-0.24	0.05	44.49	PASS
-48	25	-0.58	0.05	44.49	PASS
-54	25	1.05	0.05	44.49	PASS
-60	25	-0.27	0.05	44.49	PASS

---End of Report---