



# RF TEST REPORT

**Applicant** Quectel Wireless Solutions Co., Ltd  
**FCC ID** XMR201903EG91NS  
**Product** LTE Cat 1 Module  
**Brand** Quectel  
**Model** EG91-NS  
**Report No.** R1902A0059-R1  
**Issue Date** March 18, 2019

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2018)/ FCC CFR 47 Part 22H (2018)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Peng Tao

Approved by: Kai Xu

**TA Technology (Shanghai) Co., Ltd.**

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000



## TABLE OF CONTENT

1. Test Laboratory .....	4
1.1. Notes of the Test Report .....	4
1.2. Test facility.....	4
1.3. Testing Location .....	5
2. General Description of Equipment under Test.....	6
3. Applied Standards.....	7
4. Test Configuration.....	8
5. Test Case Results.....	10
5.1. RF Power Output.....	10
5.2. Effective Radiated Power .....	16
5.3. Occupied Bandwidth .....	20
5.4. Band Edge Compliance.....	33
5.5. Peak-to-Average Power Ratio (PAPR) .....	44
5.6. Frequency Stability .....	47
5.7. Spurious Emissions at Antenna Terminals .....	52
5.8. Radiates Spurious Emission .....	63
6. Main Test Instruments .....	71
ANNEX A: EUT Appearance and Test Setup.....	73
A.1 EUT Appearance .....	73
A.2 Test Setup.....	75



## Summary of measurement results

No.	Test Type	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Radiated Power	22.913(a)(5)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	2.1051 / 22.917(a)	PASS
5	Peak-to-Average Power Ratio	22.913(d)/ KDB 971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 22.355	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 / 22.917(a)	PASS
8	Radiates Spurious Emission	2.1053 / 22.917 (a)	PASS

Date of Testing: May 25, 2018 ~ June 27, 2018 & February 17, 2019 ~ March 10, 2019

Note: PASS: The EUT complies with the essential requirements in the standard.  
FAIL: The EUT does not comply with the essential requirements in the standard.



## 1. Test Laboratory

### 1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

### 1.2. Test facility

#### **CNAS (accreditation number: L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

#### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

#### **VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

#### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



### 1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
Country: P. R. China  
Contact: Xu Kai  
Telephone: +86-021-50791141/2/3  
Fax: +86-021-50791141/2/3-8000  
Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)



## 2. General Description of Equipment under Test

### Client Information

Applicant	Quectel Wireless Solutions Co., Ltd
Applicant address	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China
Manufacturer	Quectel Wireless Solutions Co., Ltd
Manufacturer address	7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

### General Information

EUT Description		
Model	EG91-NS	
IMEI	865743040001918	
Hardware Version	R1.0	
Software Version	EG91NSGAR05A02M4G	
Power Supply	External Power Supply	
Antenna Type	The EUT don't have standard Antenna, The Antenna used for testing in this report is the after-market accessory (Dipole Antenna)	
Antenna Gain	4 dBi	
Test Mode(s)	WCDMA Band V;LTE Band 5/26;	
Test Modulation	(WCDMA)QPSK; (LTE)QPSK 16QAM;	
HSDPA UE Category	24	
HSUPA UE Category	6	
DC-HSDPA UE Category	24	
LTE Category	1	
Maximum E.R.P.	WCDMA Band V:	21.81 dBm
	LTE Band 5:	22.07 dBm
	LTE Band 26:	24.35 dBm
Rated Power Supply Voltage	3.8V	
Extreme Voltage	Minimum: 3.3V Maximum: 4.3V	
Extreme Temperature	Lowest: -40°C Highest: +85°C	
Operating Frequency Range(s)	Band	Tx (MHz)
	WCDMA Band V	824 ~ 849
	LTE Band 5	824 ~ 849
	LTE Band 26	824 ~ 849
Rx (MHz)		
869 ~ 894		
869 ~ 894		
869 ~ 894		
Note: 1. The information of the EUT is declared by the manufacturer. 2. For LTE, 16QAM only supports 25%RB.		



### 3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC CFR47 Part 2 (2018)**

**FCC CFR 47 Part 22H (2018)**

**ANSI C63.26 (2015)**

**KDB 971168 D01 Power Meas License Digital Systems v03r01**



## 4. Test Configuration

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions were investigated. Subsequently, only the worst case emissions are reported.

The following testing in WCDMA/LTE is set based on the maximum RF Output Power.

Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation	
	WCDMA Band V	
RF power output	RMC HSDPA/HSUPA DC-HSDPA	
Effective Radiated Power	RMC	
Occupied Bandwidth	RMC	
Band Edge Compliance	RMC	
Peak-to-Average Power Ratio	RMC	
Frequency Stability	RMC	
Spurious Emissions at Antenna Terminals	RMC	
Radiates Spurious Emission	RMC	

Test modes are chosen as the worst case configuration below for LTE Band 5/26.

Test items	Modes	Bandwidth (MHz)					Modulation		RB			Test Channel		
		1.4	3	5	10	15	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 5	O	O	O	O	-	O	O	O	O	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic Radiated power	LTE 5	O	O	O	O	-	O	O	-	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	-	-	O	O	O	O
Occupied Bandwidth	LTE 5	O	O	O	O	-	O	O	O	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	O	-	O	O	O	O
Band Edge Compliance	LTE 5	O	O	O	O	-	O	O	O	-	O	O	-	O
	LTE 26	O	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 5	O	O	O	O	-	O	O	O	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	O	-	O	O	O	O



Frequency Stability	LTE 5	O	O	O	O	-	O	O	O	O	O	O	O	O	O
	LTE 26	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Spurious Emissions at Antenna Terminals	LTE 5	O	O	O	O	-	O	-	O	-	-	O	O	O	O
	LTE 26	O	O	O	O	O	O	-	O	-	-	O	O	O	O
Radiates Spurious Emission	LTE 5	O	-	O	O	-	O	-	O	-	-	O	O	O	O
	LTE 26	O	-	O	O	O	O	-	O	-	-	O	O	O	O
Note	1. The mark "O" means that this configuration is chosen for testing. 2. The mark "-" means that this configuration is not testing. 3. For LTE, 16QAM only supports 25%RB.														

## 5. Test Case Results

### 5.1. RF Power Output

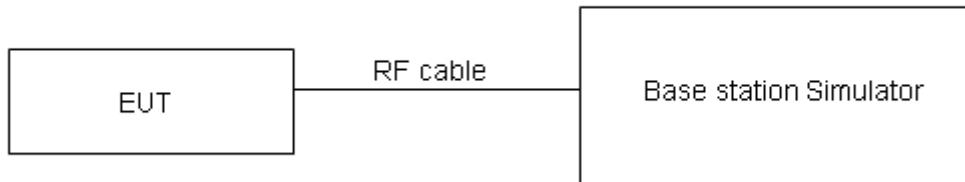
#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

During the process of the testing, The EUT is controlled by the Base Station Simulator to ensure max power transmission and proper modulation.

#### Test Setup



The loss between RF output port of the EUT and the input port of the tester has been taken into consideration.

#### Limits

No specific RF power output requirements in part 2.1046.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.4 dB.



## Test Results

WCDMA Band V		Conducted Power(dBm)		
		Channel 4132	Channel 4183	Channel 4233
		826.4(MHz)	836.6(MHz)	846.6(MHz)
RMC		23.06	22.99	23.12
HSDPA	Sub - Test 1	22.79	22.64	22.69
	Sub - Test 2	22.75	22.68	22.78
	Sub - Test 3	22.39	22.32	22.30
	Sub - Test 4	22.31	22.25	22.26
HSUPA	Sub - Test 1	22.82	22.74	22.75
	Sub - Test 2	22.31	22.26	22.29
	Sub - Test 3	22.76	22.78	22.75
	Sub - Test 4	22.77	22.71	22.76
	Sub - Test 5	22.73	22.76	22.71
DC-HSDPA	Sub - Test 1	22.93	22.86	22.99
	Sub - Test 2	23.02	22.84	22.98
	Sub - Test 3	22.51	22.33	22.47
	Sub - Test 4	22.50	22.32	22.46

LTE Band 5		Conducted Power(dBm)				
		RB size	RB offset	Channel/Frequency(MHz)		
				20407/824.7	20525/836.5	20643/848.3
1.4MHz	QPSK	1	0	23.83	23.93	23.87
		1	2	23.97	24.02	24.23
		1	5	23.76	23.94	23.92
		3	0	23.83	23.77	24.04
		3	2	23.81	23.79	24.03
		3	3	23.87	23.84	23.98
		6	0	22.86	22.86	22.95
	16QAM	1	0	23.44	22.82	22.85
		1	2	23.47	23.03	23.04
		1	5	23.29	22.83	22.84
		3	0	21.51	21.37	21.55
		3	2	21.47	21.60	21.44
		3	3	21.49	21.59	21.46
		6	0	21.53	21.75	21.68



BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20415/825.5	20525/836.5	20635/847.5
3MHz	QPSK	1	0	23.95	24.06	23.83
		1	7	24.19	24.10	24.01
		1	14	23.79	23.77	23.96
		8	0	23.13	23.07	22.92
		8	4	22.92	23.01	22.96
		8	7	22.97	23.01	23.05
		15	0	23.09	23.07	23.04
	16QAM	1	0	22.73	23.28	23.55
		1	7	23.04	23.61	24.09
		1	14	22.82	23.21	23.53
		8	0	21.48	21.35	21.52
		8	4	21.44	21.53	21.40
		8	7	21.47	21.55	21.43
		15	0	21.50	21.70	21.64
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20425/826.5	20525/836.5	20625/846.5
5MHz	QPSK	1	0	23.94	24.02	23.81
		1	13	24.17	24.09	23.98
		1	24	23.76	23.72	23.92
		12	0	23.11	23.03	22.89
		12	6	22.89	22.96	22.92
		12	13	22.94	22.98	23.01
		25	0	23.07	23.03	22.99
	16QAM	1	0	22.68	23.26	23.53
		1	13	23.02	23.58	24.07
		1	24	22.79	23.17	23.50
		12	0	21.45	21.31	21.49
		12	6	21.41	21.53	21.37
		12	13	21.44	21.50	21.39
		25	0	21.48	21.66	21.61
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				20450/829	20525/836.5	20600/844
10MHz	QPSK	1	0	23.91	23.98	23.78
		1	25	24.16	24.05	23.96
		1	49	23.74	23.71	23.89



		25	0	23.08	22.98	22.85
		25	13	22.87	22.92	22.89
		25	25	22.91	22.93	22.97
		50	0	23.04	22.98	22.95
16QAM		1	0	22.66	23.22	23.48
		1	25	22.98	23.56	24.03
		1	49	22.77	23.14	23.48
		25	0	21.48	21.57	21.80
		25	13	21.52	21.55	21.62
		25	25	21.56	21.59	21.55

LTE Band 26				Conducted Power(dBm)		
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26797/824.7	26915/836.5	27033/848.3
1.4MHz	QPSK	1	0	23.23	23.22	23.41
		1	2	23.27	23.32	23.40
		1	5	23.33	23.08	23.39
		3	0	22.95	23.29	23.21
		3	2	22.91	23.25	23.18
		3	3	22.93	23.27	.23.12
		6	0	21.96	22.32	22.21
	16QAM	1	0	22.24	22.68	22.42
		1	2	22.10	22.83	22.59
		1	5	22.08	22.67	22.32
		3	0	22.07	22.38	22.35
		3	2	22.06	22.34	22.30
		3	3	22.04	22.37	22.32
		6	0	20.91	21.44	21.04
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26805/825.5	26915/836.5	27025/847.5
3MHz	QPSK	1	0	23.13	23.37	23.27
		1	7	23.12	23.17	23.03
		1	14	23.52	23.25	23.10
		8	0	21.96	22.29	22.28
		8	4	21.99	22.22	22.31
		8	7	22.02	22.25	22.27



		15	0	22.00	22.28	22.24
16QAM	16QAM	1	0	22.35	22.59	22.11
		1	7	22.41	22.51	22.04
		1	14	22.57	22.49	21.82
		8	0	21.26	21.45	21.05
		8	4	21.31	21.43	21.02
		8	7	21.36	21.42	21.04
		15	0	21.07	21.43	21.19
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26815/826.5	26915/836.5	27015/846.5
5MHz	QPSK	QPSK	1	0	23.31	23.30
			1	13	23.24	23.17
			1	24	23.22	23.14
			12	0	22.10	22.36
			12	6	22.26	22.35
			12	13	22.30	22.28
			25	0	22.19	22.44
	16QAM	16QAM	1	0	22.18	22.49
			1	13	22.33	22.37
			1	24	22.10	22.42
			12	0	21.00	21.33
			12	6	21.20	21.32
			12	13	21.27	21.16
			25	0	21.21	21.34
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26840/829	26915/836.5	26990/844
10MHz	QPSK	QPSK	1	0	23.27	23.35
			1	25	23.39	23.33
			1	49	23.36	23.24
			25	0	22.30	22.39
			25	13	22.37	22.33
			25	25	22.41	22.27
			50	0	22.40	22.34
	16QAM	16QAM	1	0	22.57	23.12
			1	25	23.18	23.22
			1	49	22.74	23.20
			25	0	21.16	21.51
						21.45



		25	13	21.34	21.48	21.44
		25	25	21.42	21.23	21.14
BW	Modulation	RB size	RB offset	Channel/Frequency(MHz)		
				26865/831.5	26915/836.5	26965/841.5
15MHz	QPSK	1	0	23.07	23.51	23.11
		1	38	23.40	23.25	23.27
		1	74	23.18	23.28	23.00
		36	0	22.31	22.42	22.34
		36	18	22.38	22.35	22.41
		36	39	22.45	22.25	22.39
		75	0	22.33	22.44	22.31
	16QAM	1	0	22.38	22.96	22.05
		1	38	22.84	22.89	22.43
		1	74	22.36	22.85	21.66



## 5.2. Effective Radiated Power

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

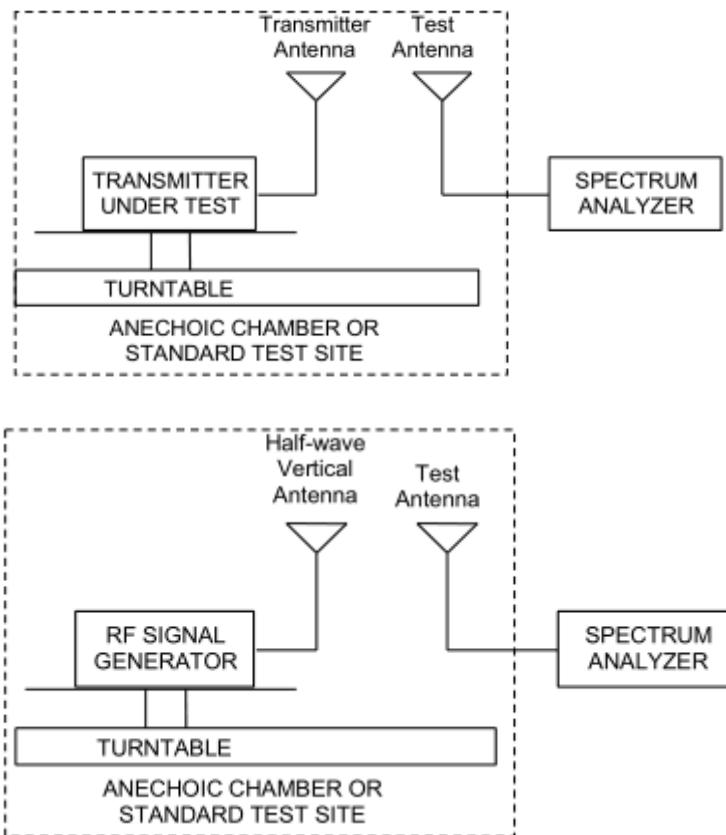
### Methods of Measurement

The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).

- a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
- b) Key the transmitter, then rotate the EUT 360° azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
- c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
- d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.
$$\text{LOSS} = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$$
- e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:
$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
- f) The maximum ERP is the maximum value determined in the preceding step.
- g) When calculating ERP, in addition to knowing the antenna radiation and matching characteristics, it is necessary to know the loss values of all elements (e.g.transmission line attenuation, mismatches, filters, combiners) interposed between the point where transmitter output power is measured, and the point where power is applied to the antenna. ERP can then be calculated as follows:  
$$\text{EIRP (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$$
  
where: dBd refers to gain relative to an ideal dipole.  
$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15 \text{ (dB.)}$$

The RB allocation refers to section 5.1, using the maximum output power configuration.

## Test setup



## Limits

Rule Part 22.913(a)(5) specifies that "Mobile/portable stations are limited to 7 watts ERP".

Limit	$\leq 7 \text{ W} \quad (38.45 \text{ dBm})$
-------	--

## Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 1.19 \text{ dB}$

**Test Results:**

The measurement is performed for both of horizontal and vertical antenna Polarization, and only the data of worst mode is recorded in this report.

Mode	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
WCDMA Band V	Low	826.4	Horizontal	21.81	38.45	Pass
	Mid	836.6	Horizontal	21.69	38.45	Pass
	High	846.6	Horizontal	21.65	38.45	Pass

LTE Band 5						
bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	824.7	Horizontal	21.73	38.45	Pass
	Mid	836.5	Horizontal	21.86	38.45	Pass
	High	848.3	Horizontal	20.95	38.45	Pass
3 MHz (QPSK)	Low	825.5	Horizontal	22.07	38.45	Pass
	Mid	836.5	Horizontal	21.86	38.45	Pass
	High	847.5	Horizontal	21.52	38.45	Pass
5 MHz (QPSK)	Low	826.5	Horizontal	21.76	38.45	Pass
	Mid	836.5	Horizontal	21.84	38.45	Pass
	High	846.5	Horizontal	20.97	38.45	Pass
10 MHz (QPSK)	Low	829	Horizontal	21.93	38.45	Pass
	Mid	836.5	Horizontal	21.46	38.45	Pass
	High	844	Horizontal	21.33	38.45	Pass
1.4 MHz (16QAM)	Low	824.7	Horizontal	21.32	38.45	Pass
	Mid	836.5	Horizontal	21.44	38.45	Pass
	High	848.3	Horizontal	21.51	38.45	Pass
3 MHz (16QAM)	Low	825.5	Horizontal	21.68	38.45	Pass
	Mid	836.5	Horizontal	21.59	38.45	Pass
	High	847.5	Horizontal	21.26	38.45	Pass
5 MHz (16QAM)	Low	826.5	Horizontal	21.34	38.45	Pass
	Mid	836.5	Horizontal	21.52	38.45	Pass
	High	846.5	Horizontal	20.82	38.45	Pass
10 MHz (16QAM)	Low	829	Horizontal	21.54	38.45	Pass
	Mid	836.5	Horizontal	21.13	38.45	Pass
	High	844	Horizontal	20.93	38.45	Pass



LTE Band 26						
bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	824.7	Horizontal	22.88	38.45	Pass
	Mid	836.5	Horizontal	22.96	38.45	Pass
	High	848.3	Horizontal	22.12	38.45	Pass
3 MHz (QPSK)	Low	825.5	Horizontal	23.67	38.45	Pass
	Mid	836.5	Horizontal	23.89	38.45	Pass
	High	847.5	Horizontal	22.27	38.45	Pass
5 MHz (QPSK)	Low	826.5	Horizontal	23.89	38.45	Pass
	Mid	836.5	Horizontal	23.63	38.45	Pass
	High	846.5	Horizontal	23.04	38.45	Pass
10 MHz (QPSK)	Low	829	Horizontal	24.35	38.45	Pass
	Mid	836.5	Horizontal	24.17	38.45	Pass
	High	844	Horizontal	23.60	38.45	Pass
15 MHz (QPSK)	Low	831.5	Horizontal	24.02	38.45	Pass
	Mid	836.5	Horizontal	24.02	38.45	Pass
	High	841.5	Horizontal	23.86	38.45	Pass
1.4 MHz (16QAM)	Low	824.7	Horizontal	22.48	38.45	Pass
	Mid	836.5	Horizontal	22.60	38.45	Pass
	High	848.3	Horizontal	21.53	38.45	Pass
3 MHz (16QAM)	Low	825.5	Horizontal	23.09	38.45	Pass
	Mid	836.5	Horizontal	23.28	38.45	Pass
	High	847.5	Horizontal	21.86	38.45	Pass
5 MHz (16QAM)	Low	826.5	Horizontal	23.54	38.45	Pass
	Mid	836.5	Horizontal	23.06	38.45	Pass
	High	846.5	Horizontal	22.61	38.45	Pass
10 MHz (16QAM)	Low	829	Horizontal	23.79	38.45	Pass
	Mid	836.5	Horizontal	23.61	38.45	Pass
	High	844	Horizontal	23.16	38.45	Pass
15 MHz (16QAM)	Low	831.5	Horizontal	23.53	38.45	Pass
	Mid	836.5	Horizontal	23.44	38.45	Pass
	High	841.5	Horizontal	23.28	38.45	Pass

### 5.3. Occupied Bandwidth

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band V,

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5/26 (1.4MHz),

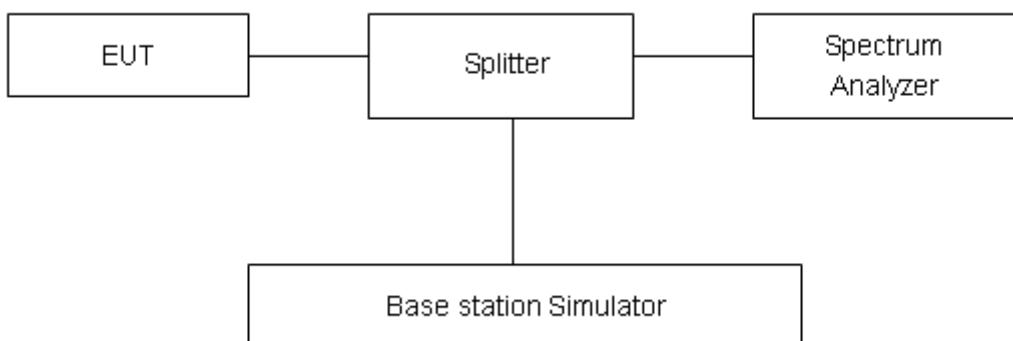
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 5/26 (3MHz/5MHz),

RBW is set to 300 kHz, VBW is set to 1 MHz for LTE Band 5/26 (10MHz),

RBW is set to 300 kHz, VBW is set to 1 MHz for LTE Band 26 (15MHz),

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

#### Test Setup



#### Limits

No specific occupied bandwidth requirements in part 2.1049.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 624\text{Hz}$ .

**Test Result**

Mode	Channel	Frequency (MHz)	99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)
WCDMA Band V (RMC)	4132	826.4	4.1269	4.685
	4183	836.6	4.1183	4.685
	4233	846.6	4.1231	4.678

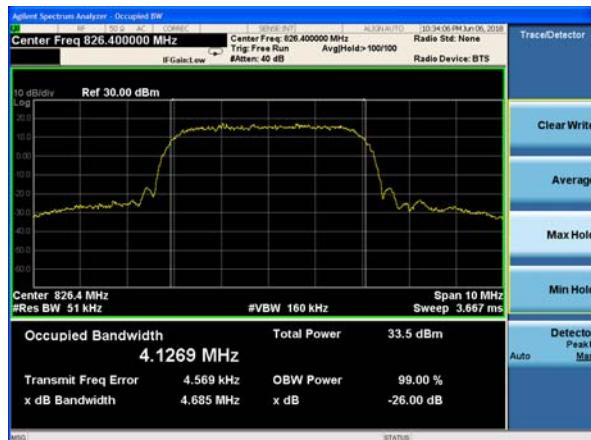
LTE Band 5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20407	824.7	1.1153	1.335
			20525	836.5	1.1105	1.318
			20643	848.3	1.1131	1.333
		3	20415	825.5	2.7631	3.027
			20525	836.5	2.7477	3.062
			20635	847.5	2.7387	3.030
		5	20425	826.5	4.5394	4.990
			20525	836.5	4.5060	4.983
			20625	846.5	4.5035	4.990
		10	20450	829	9.0220	10.000
			20525	836.5	9.0084	10.020
			20600	844	9.0109	10.080
1	16QAM	1.4	20407	824.7	0.3261	0.464
			20525	836.5	0.3211	0.456
			20643	848.3	0.3141	0.452
		3	20415	825.5	0.3980	0.547
			20525	836.5	0.4022	0.554
			20635	847.5	0.4075	0.543
		5	20425	826.5	0.4914	0.687
			20525	836.5	0.4822	0.689
			20625	846.5	0.4648	0.666
		10	20450	829	0.8771	1.232
			20525	836.5	0.8657	1.191
			20600	844	0.8614	1.191



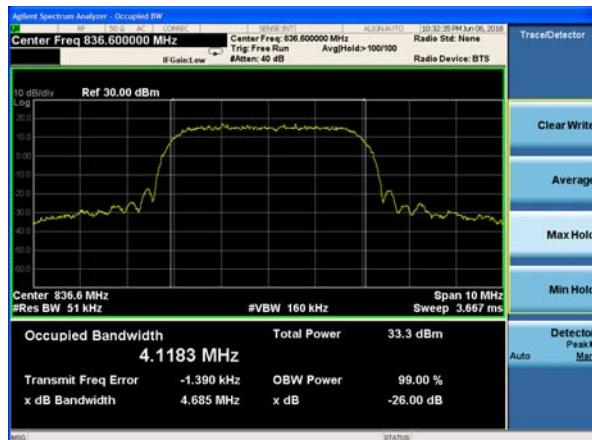
LTE Band 26						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	26797	824.7	1.1255	1.330
			26915	836.5	1.1175	1.333
			27033	848.3	1.1124	1.337
		3	26805	825.5	2.7357	3.040
			26915	836.5	2.7491	3.045
			27025	847.5	2.7342	3.064
		5	26815	826.5	4.5158	4.981
			26915	836.5	4.5172	5.010
			27015	846.5	4.5110	5.038
		10	26840	829	9.0370	10.040
			26915	836.5	9.0150	10.010
			26990	844	9.0046	9.989
		15	26865	831.5	13.4660	14.780
			26915	836.5	13.4540	14.740
			26965	841.5	13.4450	14.610
1	16QAM	1.4	26797	824.7	0.3188	0.459
			26915	836.5	0.3075	0.444
			27033	848.3	0.3220	0.457
		3	26805	825.5	0.3951	0.538
			26915	836.5	0.3960	0.539
			27025	847.5	0.3864	0.545
		5	26815	826.5	0.4646	0.681
			26915	836.5	0.4852	0.696
			27015	846.5	0.4671	0.665
		10	26840	829	0.8769	1.159
			26915	836.5	0.8314	1.138
			26990	844	0.8505	1.169
		15	26865	831.5	1.0861	1.488
			26915	836.5	1.0558	1.499
			26965	841.5	1.0703	1.510



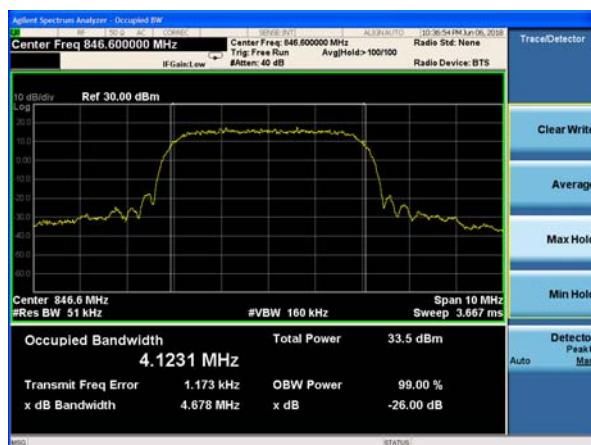
## WCDMA Band V CH-Low



## WCDMA Band V CH-Middle

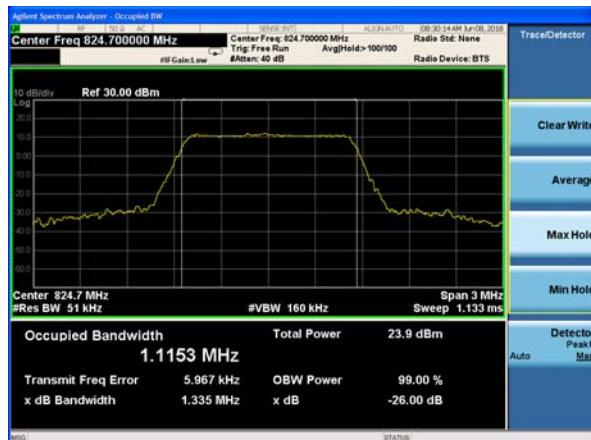


## WCDMA Band V CH-High

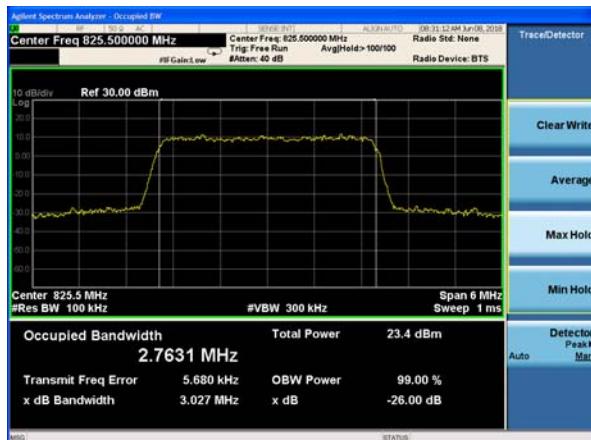




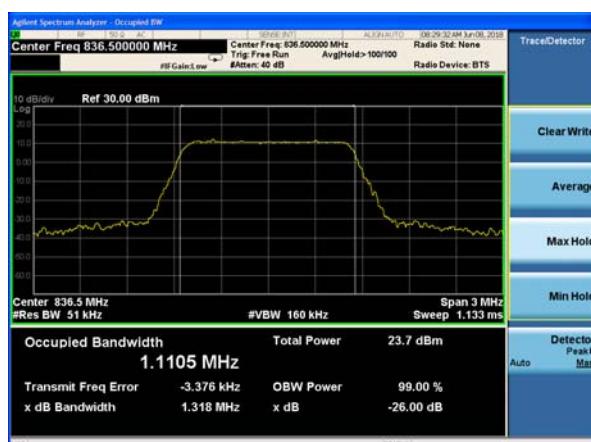
## LTE Band 5 QPSK 1.4MHz CH-Low



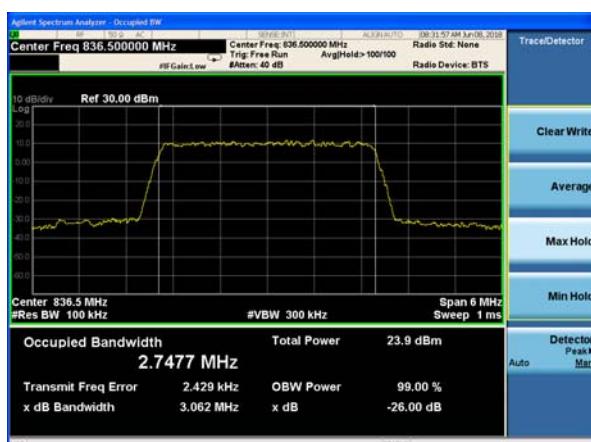
## LTE Band 5 QPSK 3MHz CH-Low



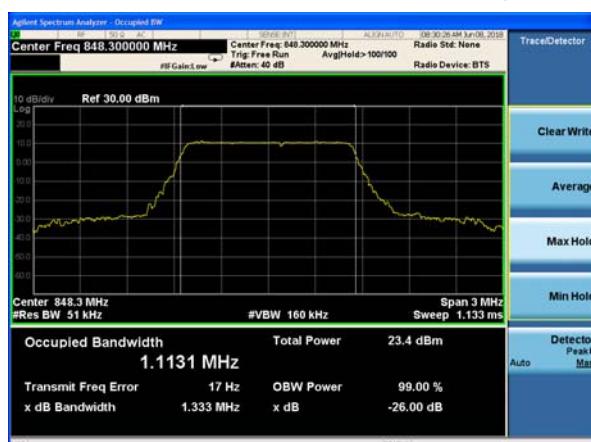
## LTE Band 5 QPSK 1.4MHz CH-Middle



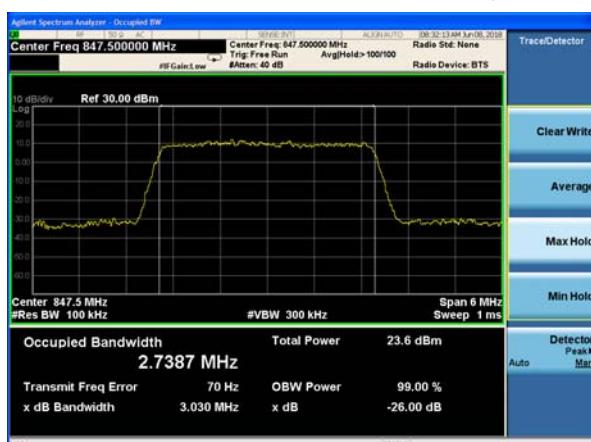
## LTE Band 5 QPSK 3MHz CH-Middle



## LTE Band 5 QPSK 1.4MHz CH-High

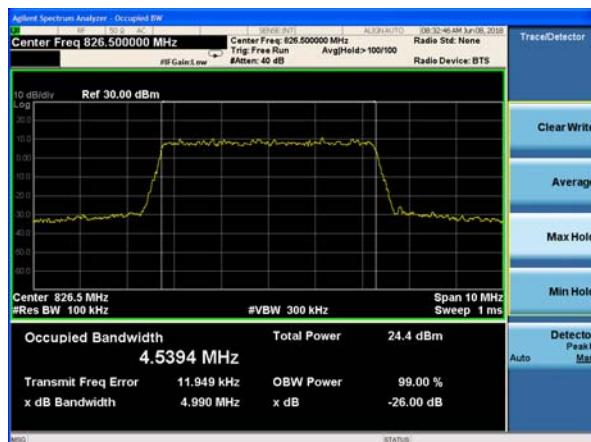


## LTE Band 5 QPSK 3MHz CH-High





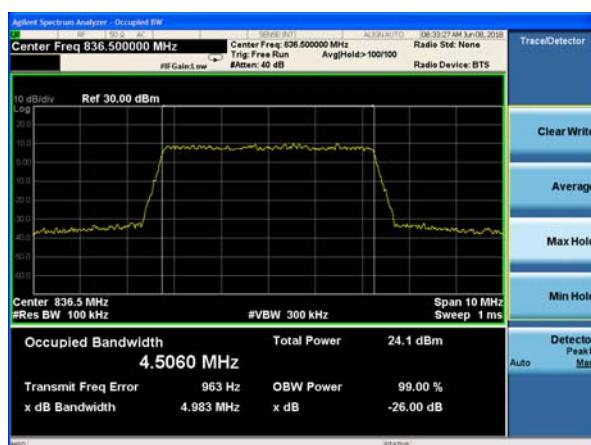
## LTE Band 5 QPSK 5MHz CH-Low



## LTE Band 5 QPSK 10MHz CH-Low



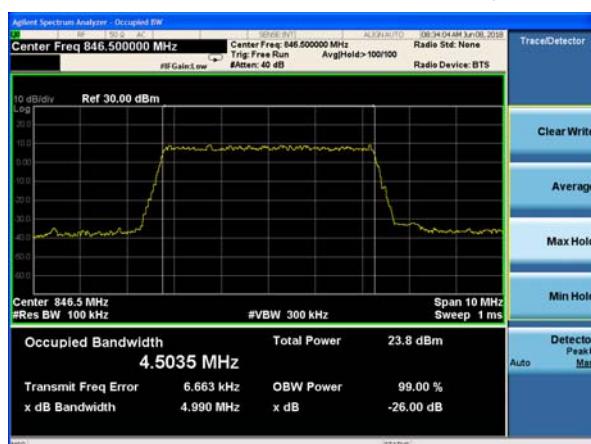
## LTE Band 5 QPSK 5MHz CH-Middle



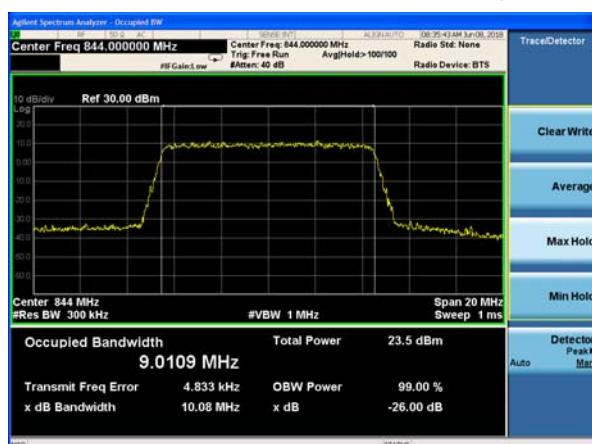
## LTE Band 5 QPSK 10MHz CH-Middle



## LTE Band 5 QPSK 5MHz CH-High

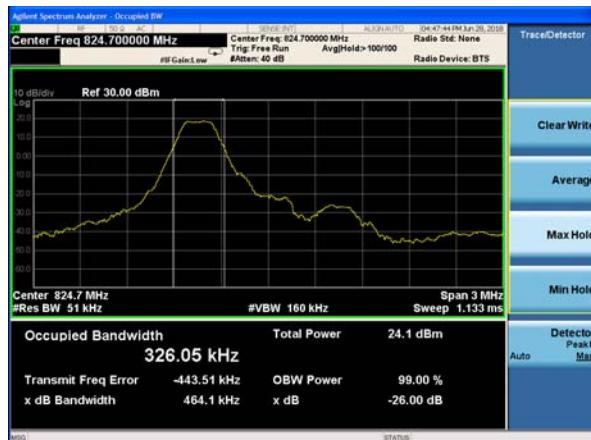


## LTE Band 5 QPSK 10MHz CH-High





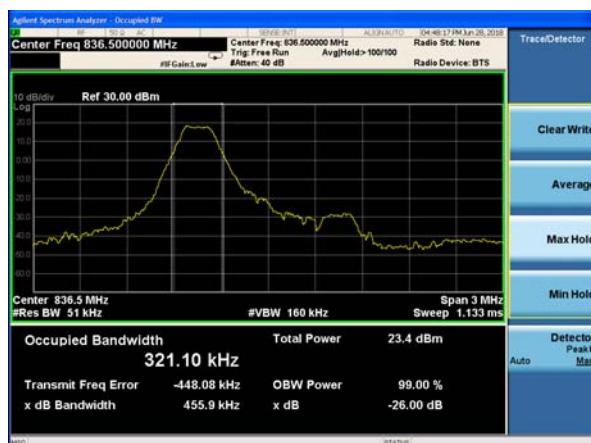
## LTE Band 5 16QAM 1.4MHz CH-Low



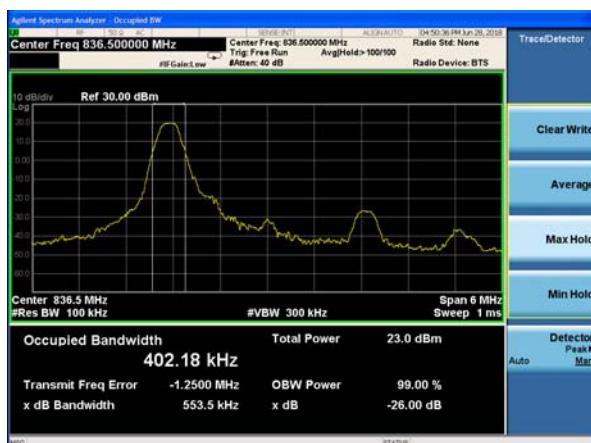
## LTE Band 5 16QAM 3MHz CH-Low



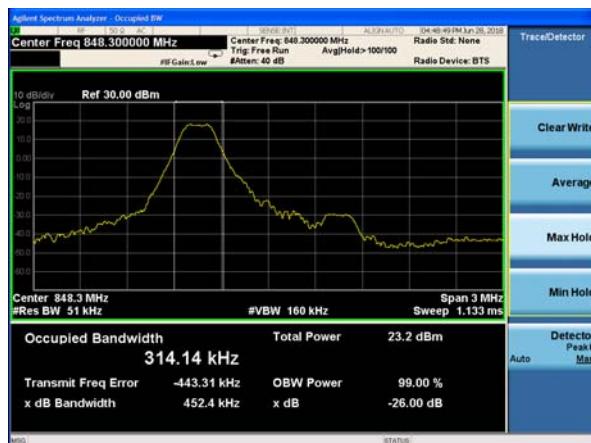
## LTE Band 5 16QAM 1.4MHz CH-Middle



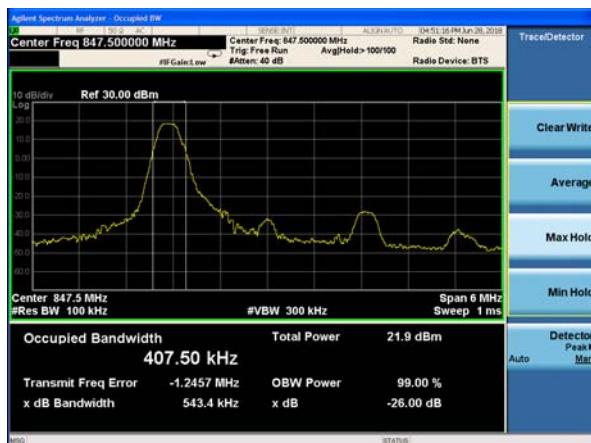
## LTE Band 5 16QAM 3MHz CH-Middle



## LTE Band 5 16QAM 1.4MHz CH-High

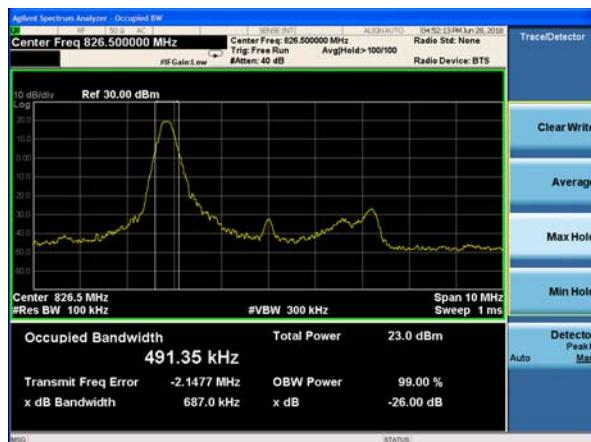


## LTE Band 5 16QAM 3MHz CH-High

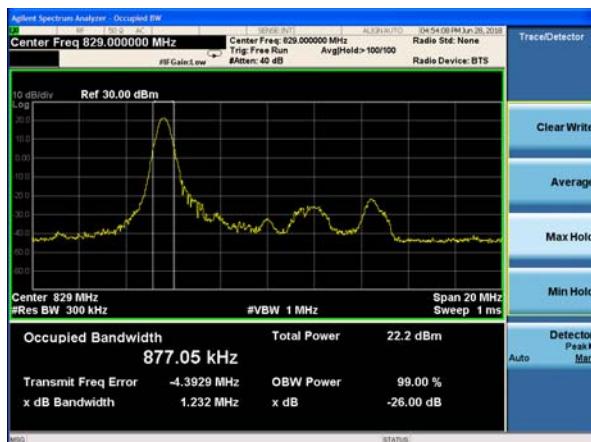




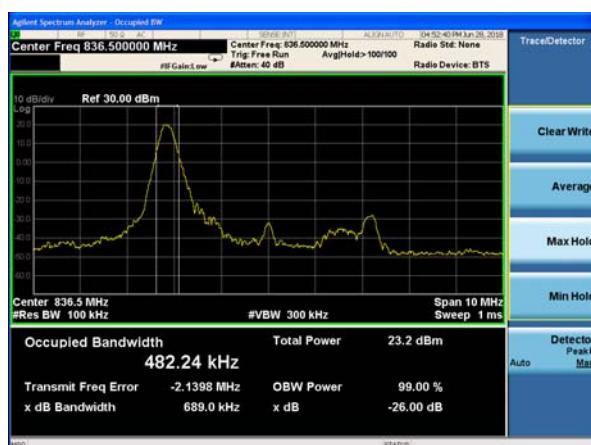
## LTE Band 5 16QAM 5MHz CH-Low



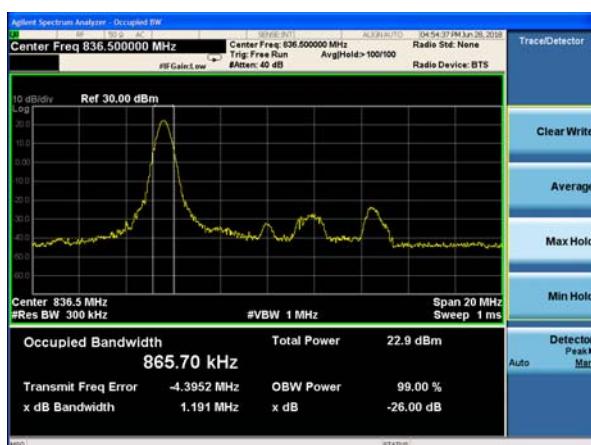
## LTE Band 5 16QAM 10MHz CH-Low



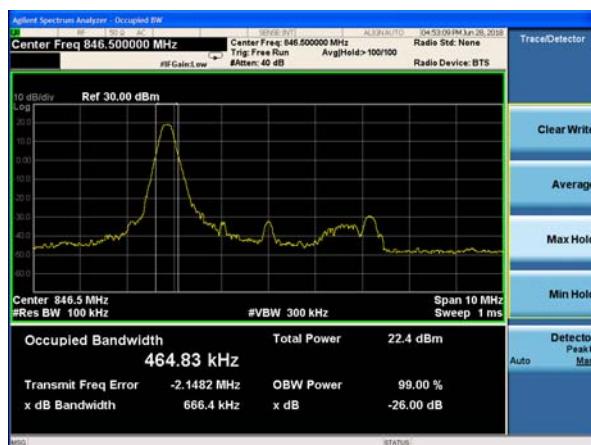
## LTE Band 5 16QAM 5MHz CH-Middle



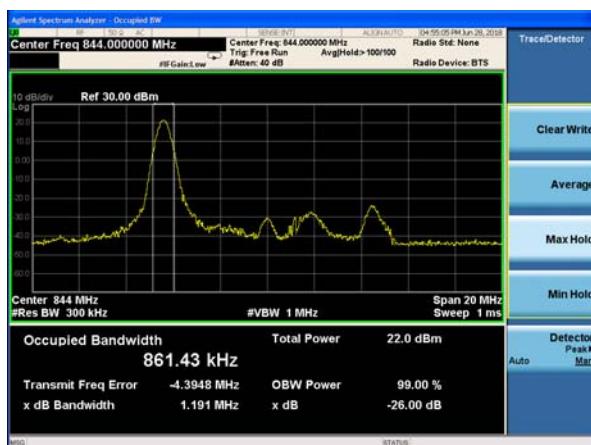
## LTE Band 5 16QAM 10MHz CH-Middle



## LTE Band 5 16QAM 5MHz CH-High

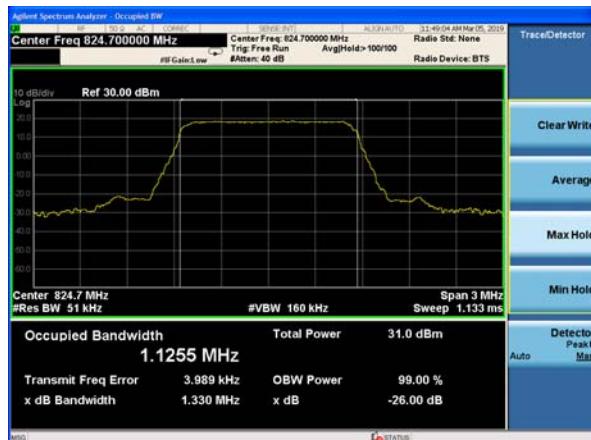


## LTE Band 5 16QAM 10MHz CH-High

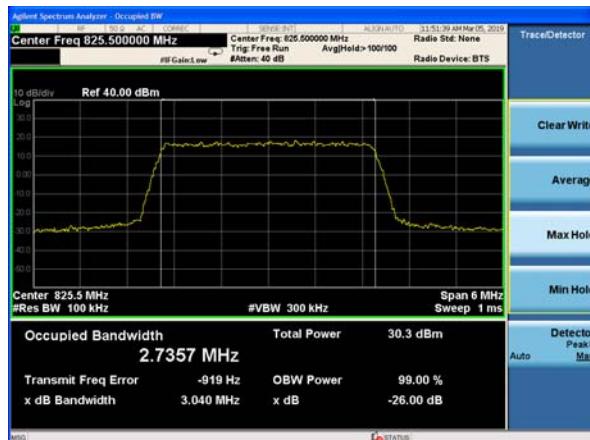




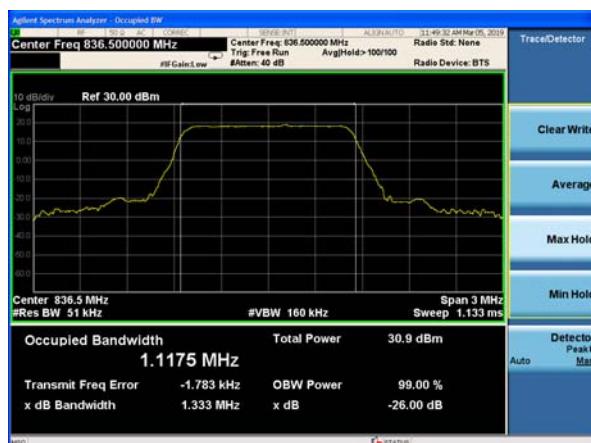
## LTE Band 26 QPSK 1.4MHz CH-Low



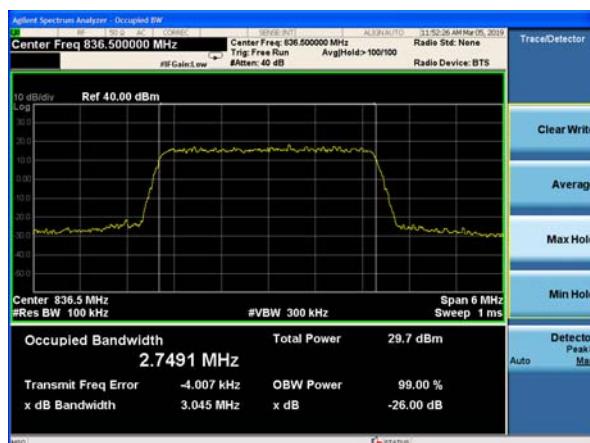
## LTE Band 26 QPSK 3MHz CH-Low



## LTE Band 26 QPSK 1.4MHz CH-Middle



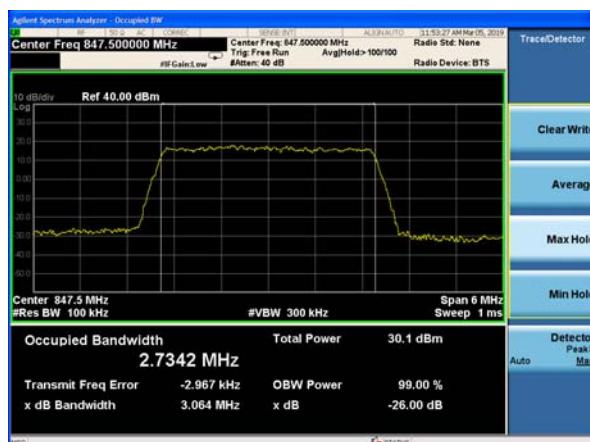
## LTE Band 26 QPSK 3MHz CH-Middle



## LTE Band 26 QPSK 1.4MHz CH-High

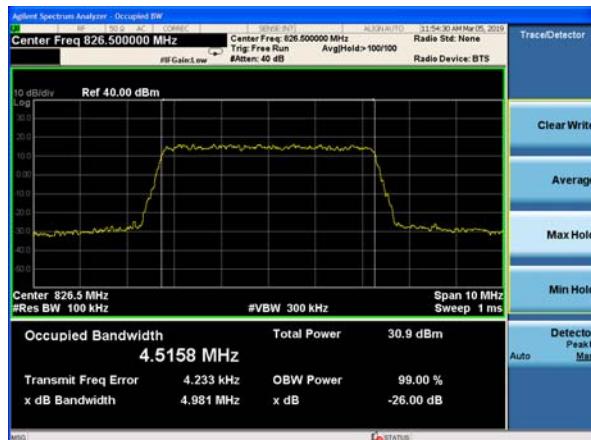


## LTE Band 26 QPSK 3MHz CH-High





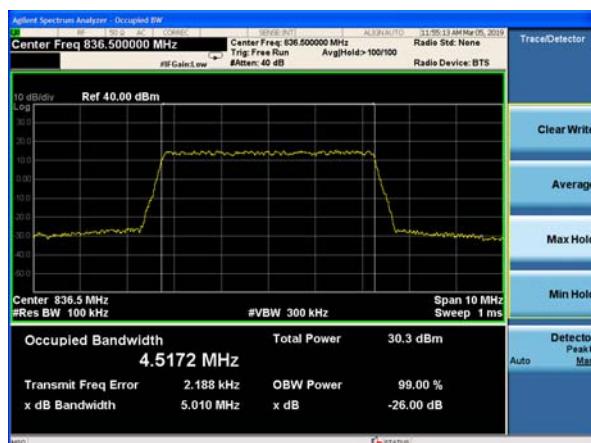
## LTE Band 26 QPSK 5MHz CH-Low



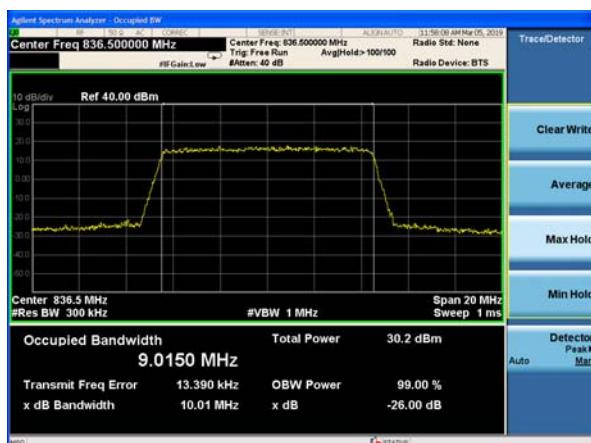
## LTE Band 26 QPSK 10MHz CH-Low



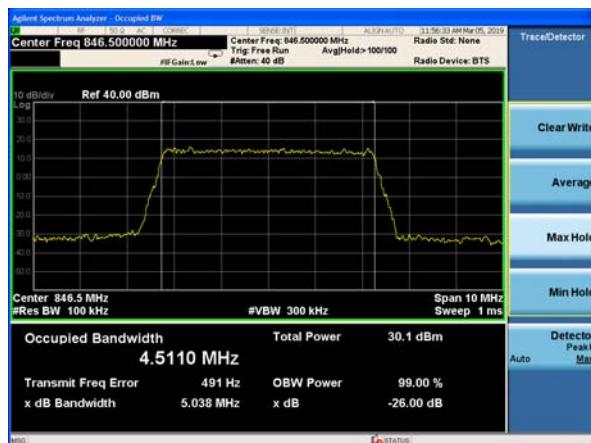
## LTE Band 26 QPSK 5MHz CH-Middle



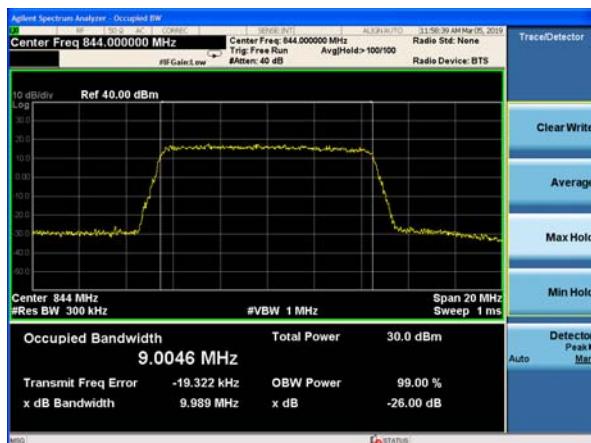
## LTE Band 26 QPSK 10MHz CH-Middle



## LTE Band 26 QPSK 5MHz CH-High

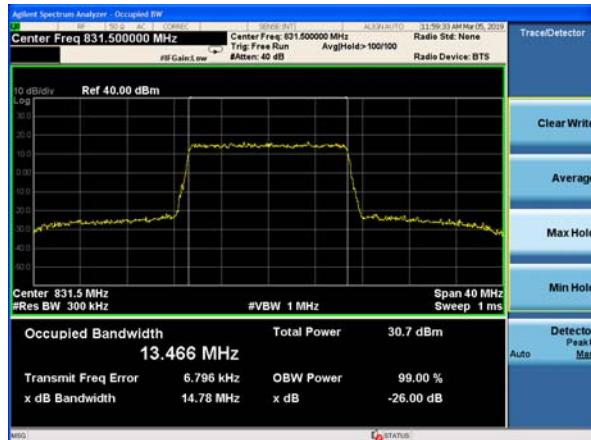


## LTE Band 26 QPSK 10MHz CH-High





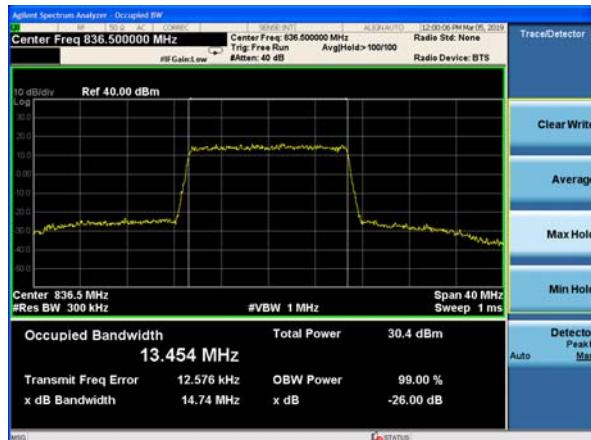
## LTE Band 26 QPSK 15MHz CH-Low



## LTE Band 26 16QAM 1.4MHz CH-Low



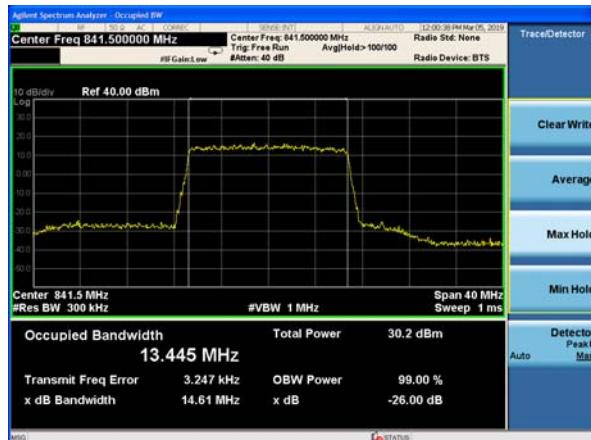
## LTE Band 26 QPSK 15MHz CH-Middle



## LTE Band 26 16QAM 1.4MHz CH-Middle



## LTE Band 26 QPSK 15MHz CH-High

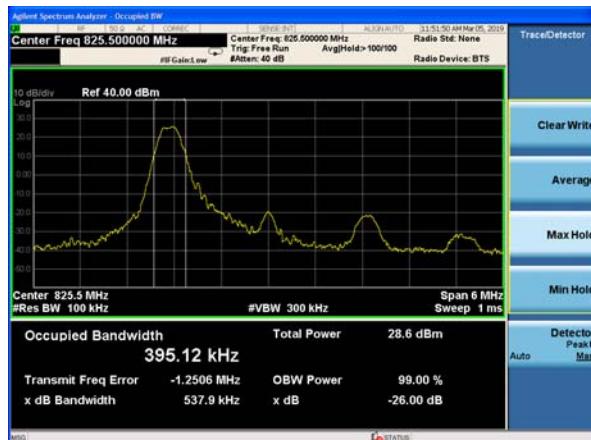


## LTE Band 26 16QAM 1.4MHz CH-High





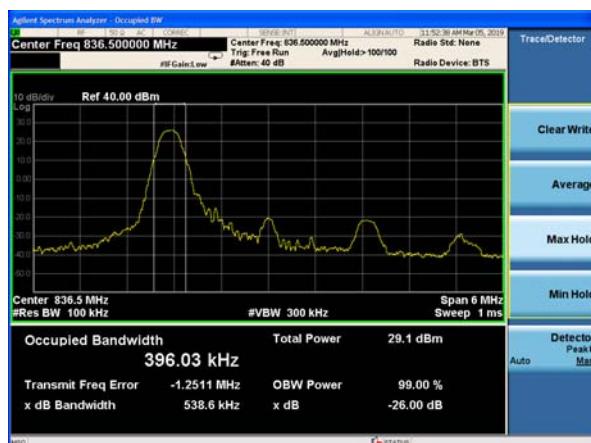
## LTE Band 26 16QAM 3MHz CH-Low



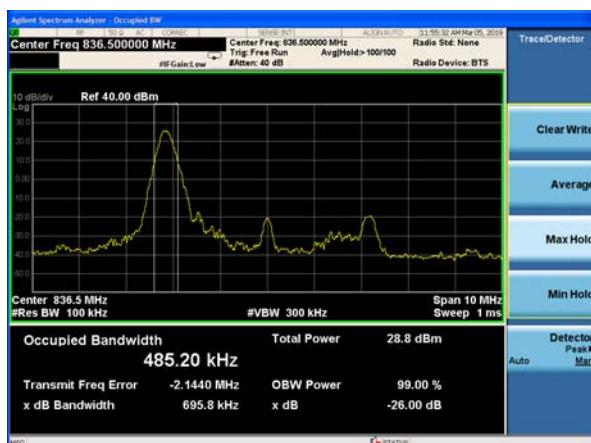
## LTE Band 26 16QAM 5MHz CH-Low



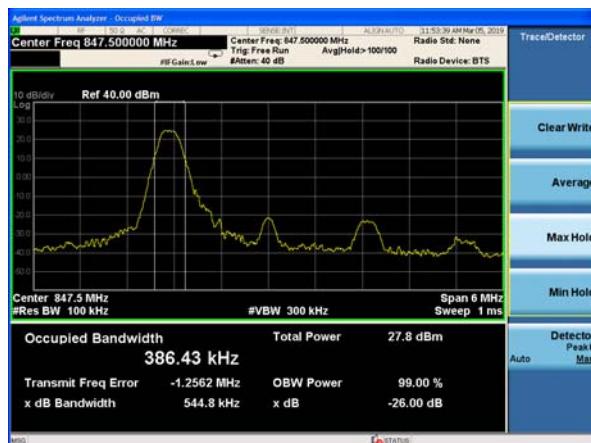
## LTE Band 26 16QAM 3MHz CH-Middle



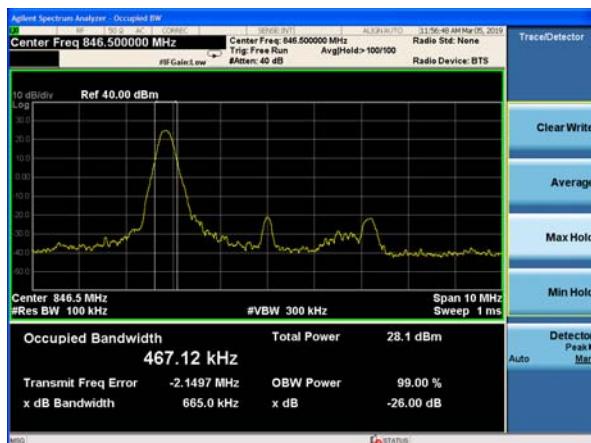
## LTE Band 26 16QAM 5MHz CH-Middle



## LTE Band 26 16QAM 3MHz CH-High

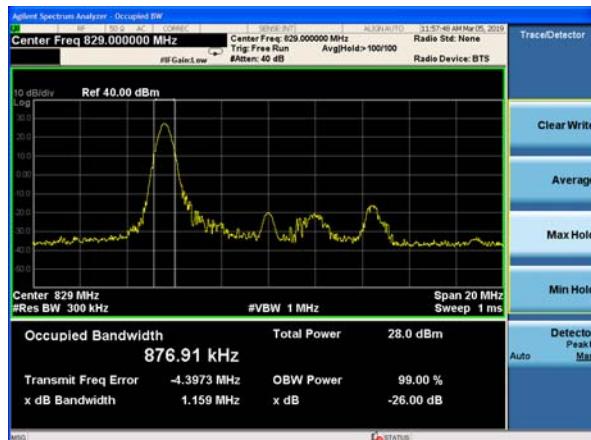


## LTE Band 26 16QAM 5MHz CH-High

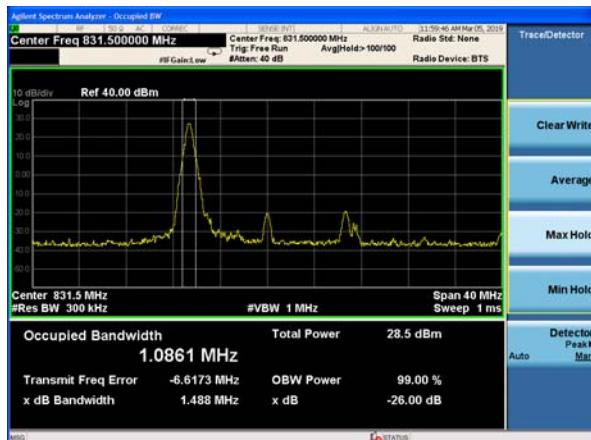




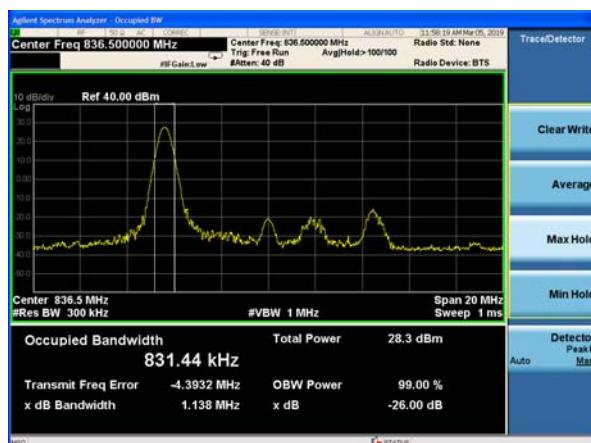
## LTE Band 26 16QAM 10MHz CH-Low



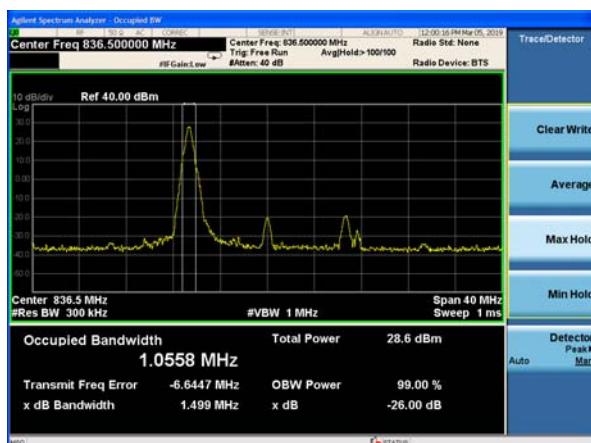
## LTE Band 26 16QAM 15MHz CH-Low



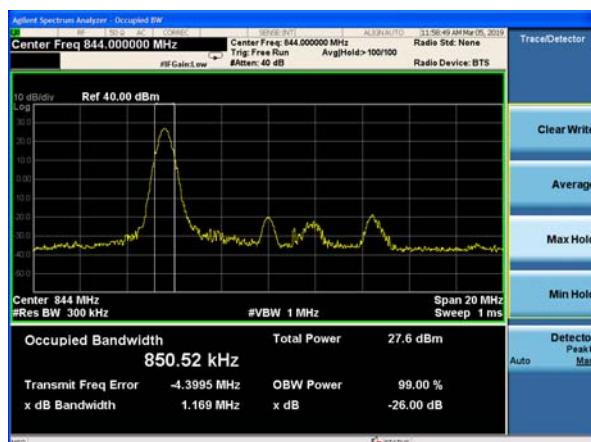
## LTE Band 26 16QAM 10MHz CH-Middle



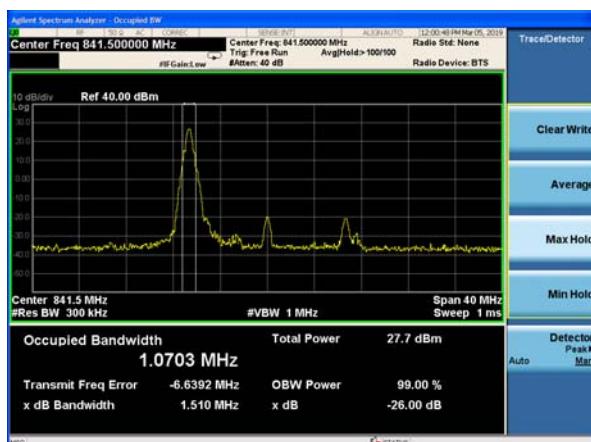
## LTE Band 26 16QAM 15MHz CH-Middle



## LTE Band 26 16QAM 10MHz CH-High



## LTE Band 26 16QAM 15MHz CH-High



## 5.4. Band Edge Compliance

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured. The average detector is used.

RBW is set to 51kHz, VBW is set to 160kHz for WCDMA Band V,

RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 5/26 (1.4MHz),

RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 5/26 (3MHz),

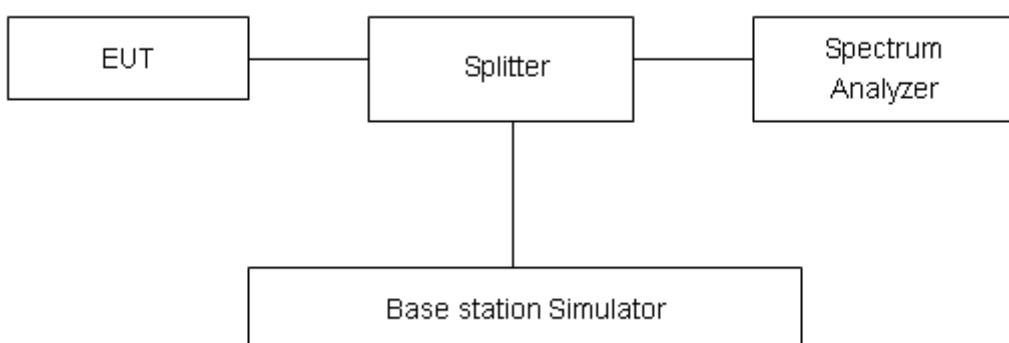
RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 5/26 (5MHz),

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 5/26 (10MHz),

RBW is set to 150 kHz, VBW is set to 510kHz for LTE Band 26 (15MHz).

Spectrum analyzer plots are included on the following pages.

### Test Setup



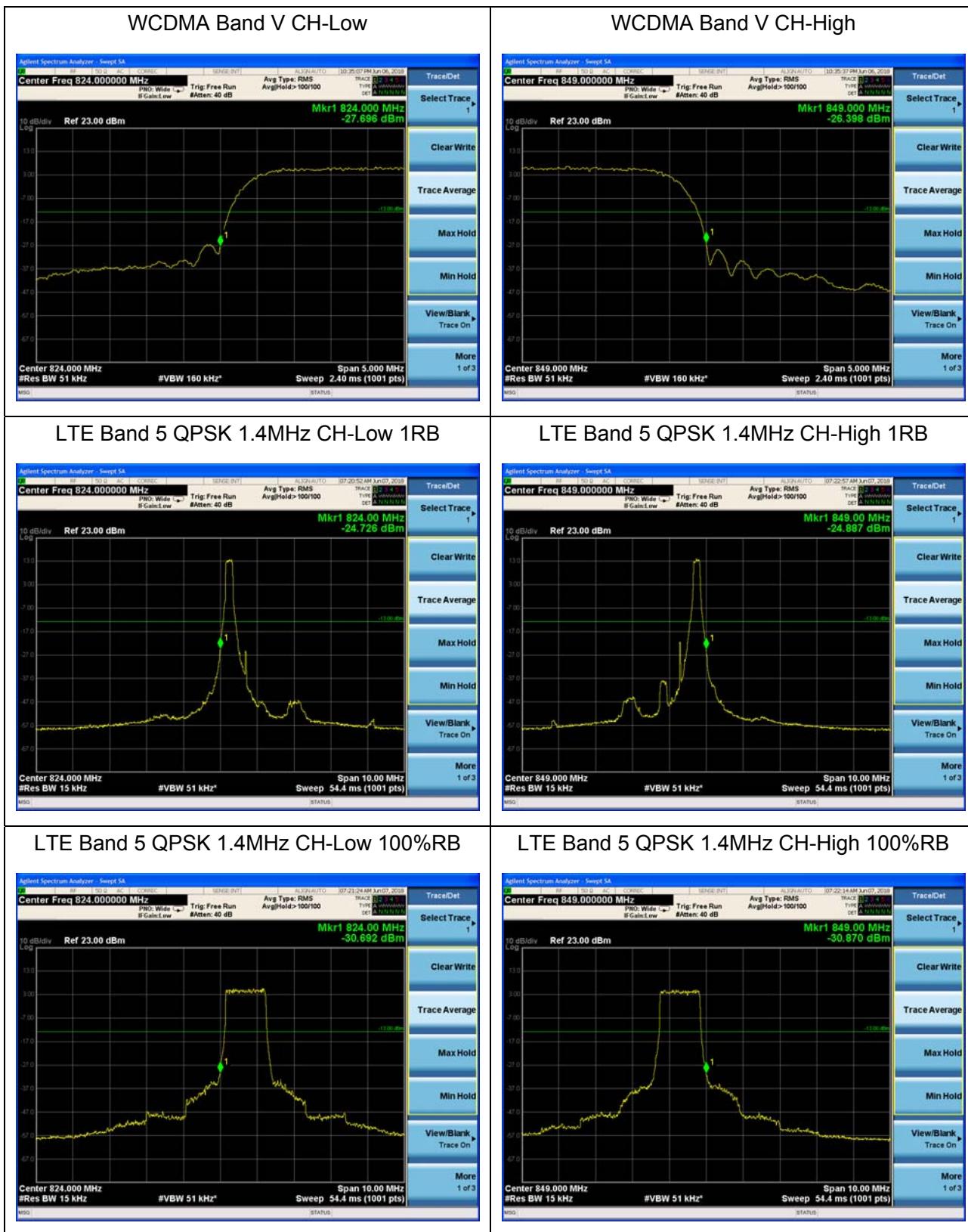
### Limits

Rule Part 22.917(a) specifies that "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."

Limit	-13 dBm
-------	---------

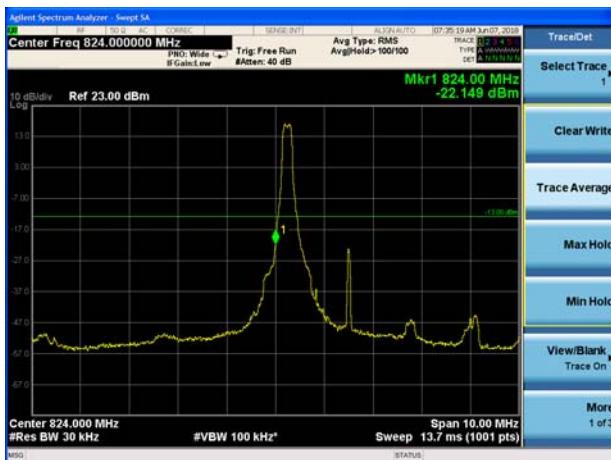
### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U=0.684\text{dB}$ .

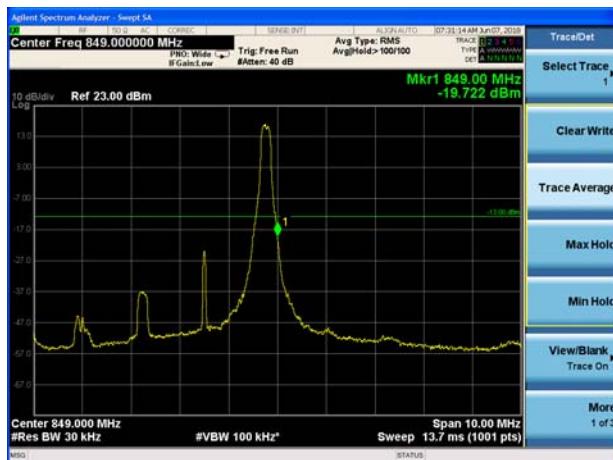
**Test Result:**



## LTE Band 5 QPSK 3MHz CH-Low 1RB



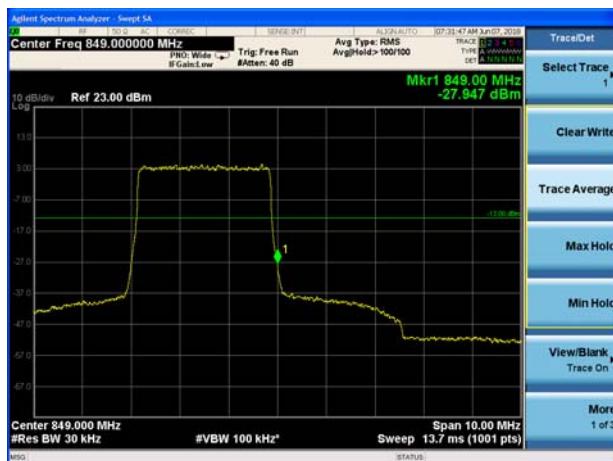
## LTE Band 5 QPSK 3MHz CH-High 1RB



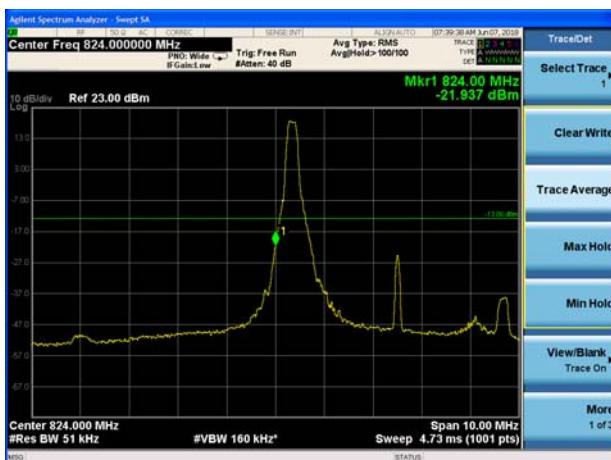
## LTE Band 5 QPSK 3MHz CH-Low 100%RB



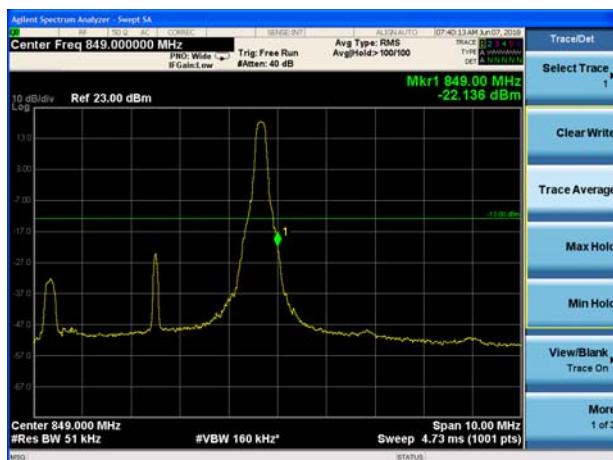
## LTE Band 5 QPSK 3MHz CH-High 100%RB



## LTE Band 5 QPSK 5MHz CH-Low 1RB



## LTE Band 5 QPSK 5MHz CH-High 1RB





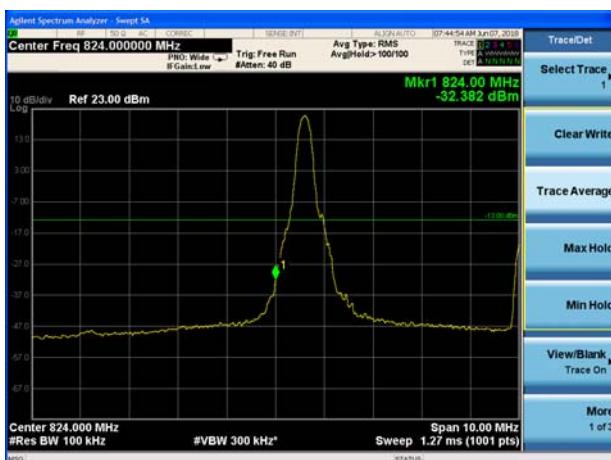
## LTE Band 5 QPSK 5MHz CH-Low 100%RB



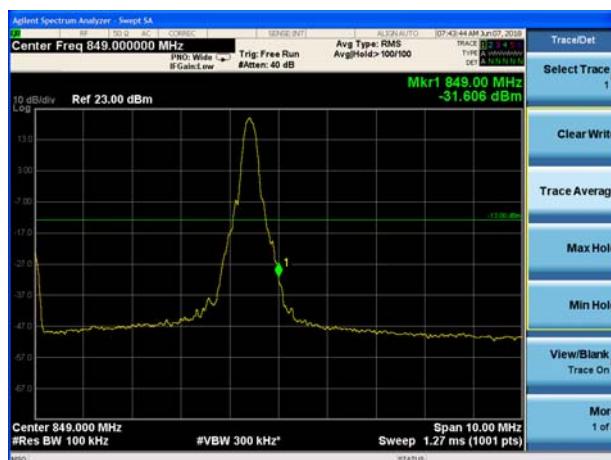
## LTE Band 5 QPSK 5MHz CH-High 100%RB



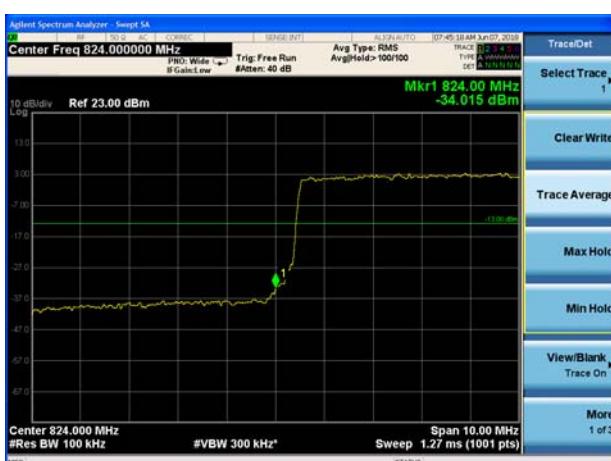
## LTE Band 5 QPSK 10MHz CH-Low 1RB



## LTE Band 5 QPSK 10MHz CH-High 1RB



## LTE Band 5 QPSK 10MHz CH-Low 100%RB

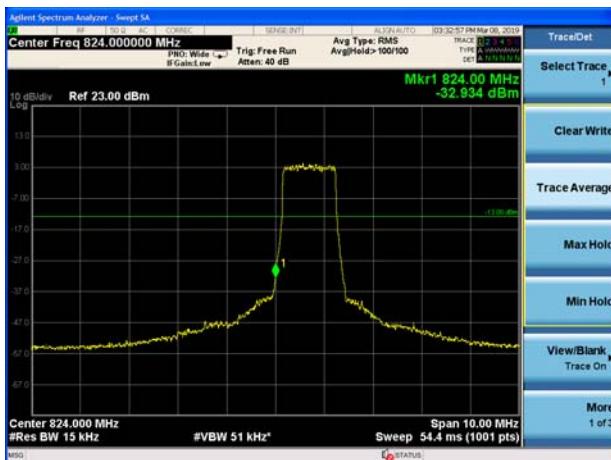


## LTE Band 5 QPSK 10MHz CH-High 100%RB

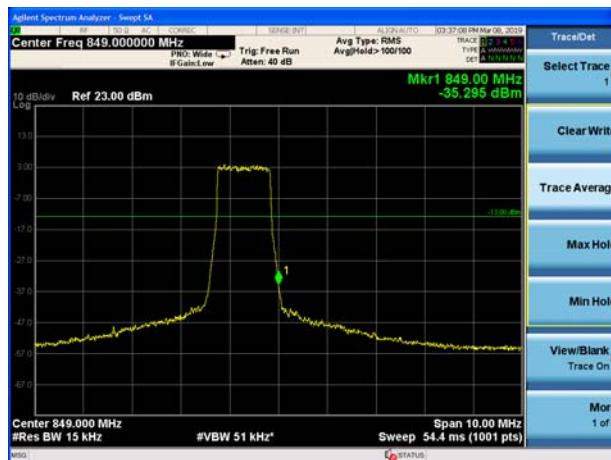




## LTE Band 5 16QAM 1.4MHz CH-Low 1RB



## LTE Band 5 16QAM 1.4MHz CH-High 1RB



## LTE Band 5 16QAM 3MHz CH-Low 1RB



## LTE Band 5 16QAM 3MHz CH-High 1RB



## LTE Band 5 16QAM 5MHz CH-Low 1RB

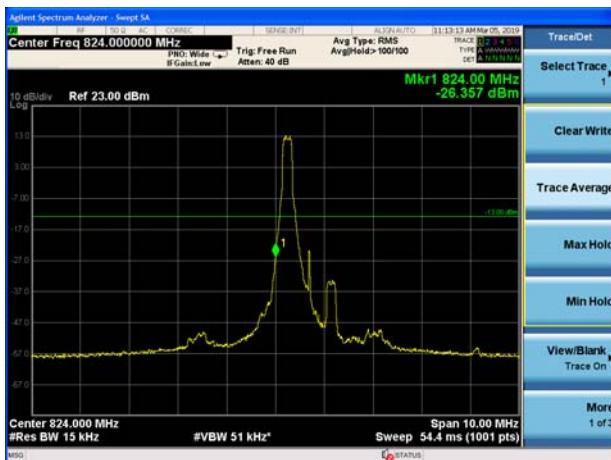


## LTE Band 5 16QAM 5MHz CH-High 1RB

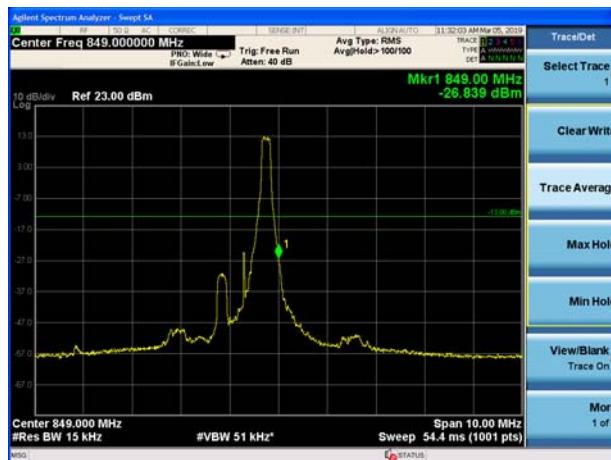




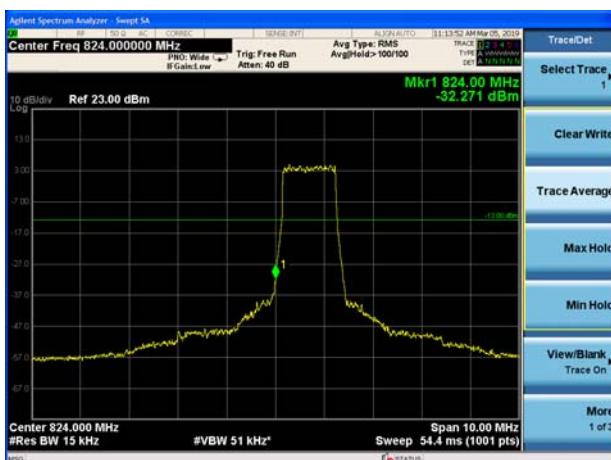
## LTE Band 26 QPSK 1.4MHz CH-Low 1RB



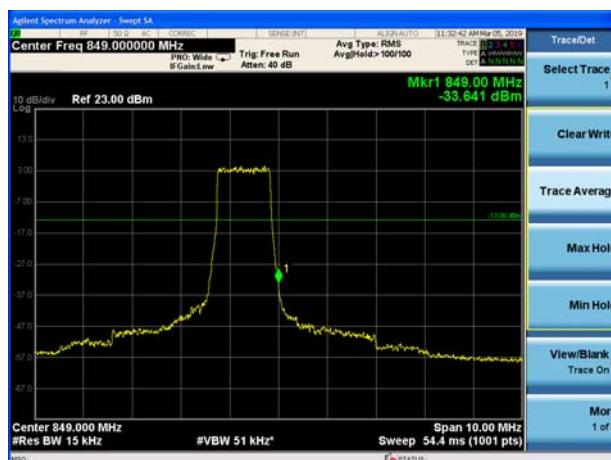
## LTE Band 26 QPSK 1.4MHz CH-High 1RB



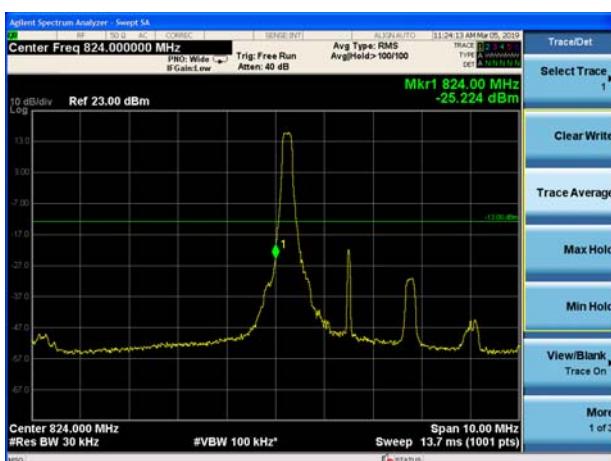
## LTE Band 26 QPSK 1.4MHz CH-Low 100%RB



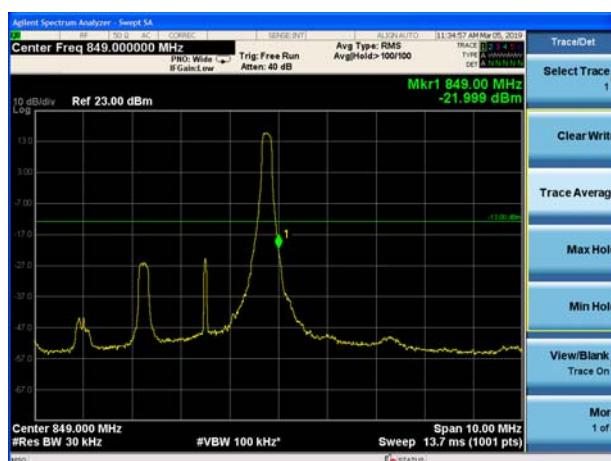
## LTE Band 26 QPSK 1.4MHz CH-High 100%RB



## LTE Band 26 QPSK 3MHz CH-Low 1RB



## LTE Band 26 QPSK 3MHz CH-High 1RB





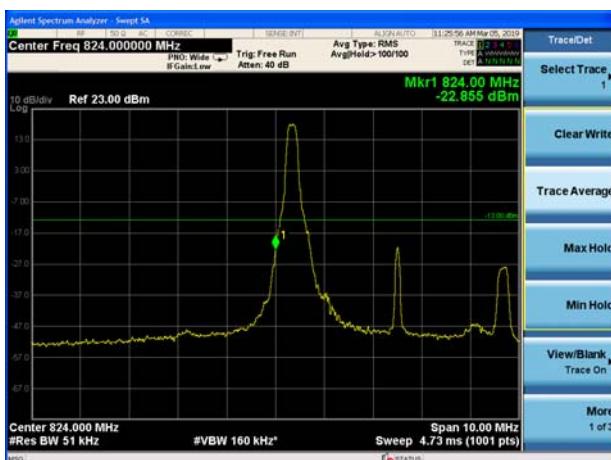
## LTE Band 26 QPSK 3MHz CH-Low 100%RB



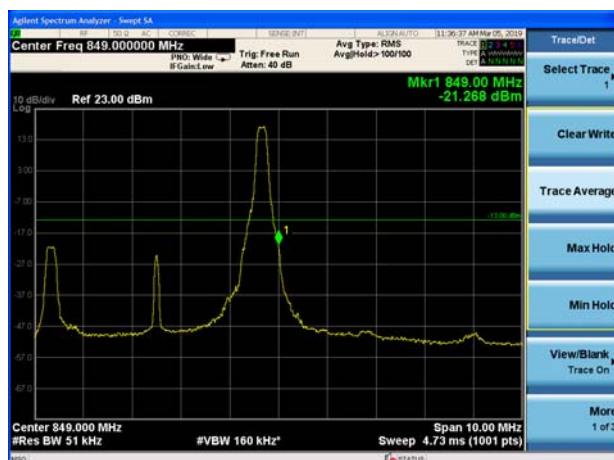
## LTE Band 26 QPSK 3MHz CH-High 100%RB



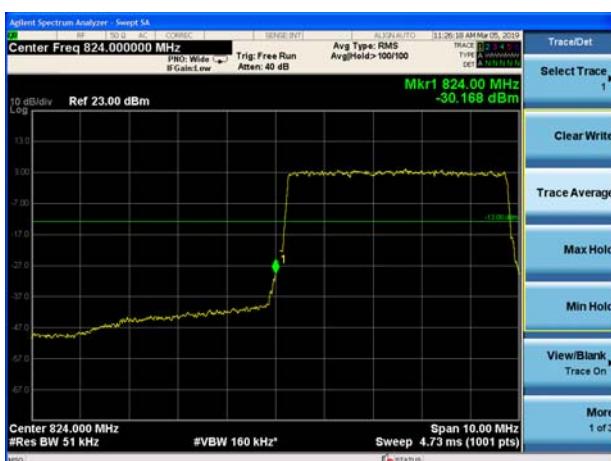
## LTE Band 26 QPSK 5MHz CH-Low 1RB



## LTE Band 26 QPSK 5MHz CH-High 1RB



## LTE Band 26 QPSK 5MHz CH-Low 100%RB

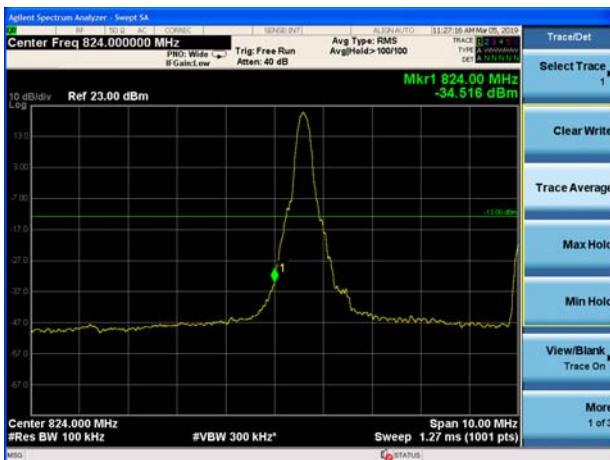


## LTE Band 26 QPSK 5MHz CH-High 100%RB

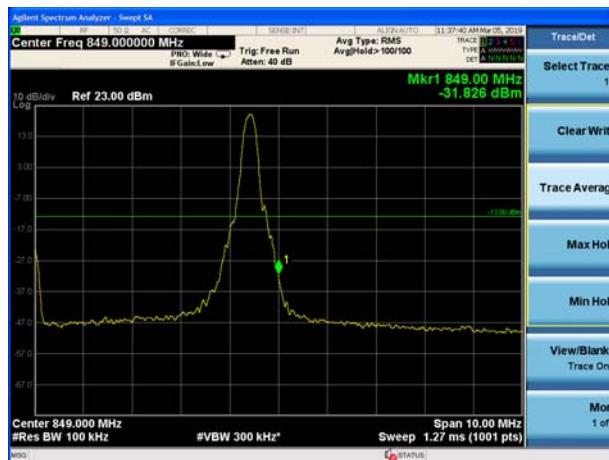




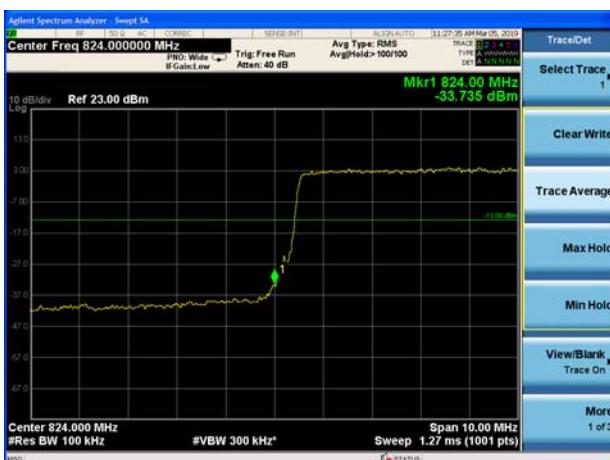
## LTE Band 26 QPSK 10MHz CH-Low 1RB



## LTE Band 26 QPSK 10MHz CH-High 1RB



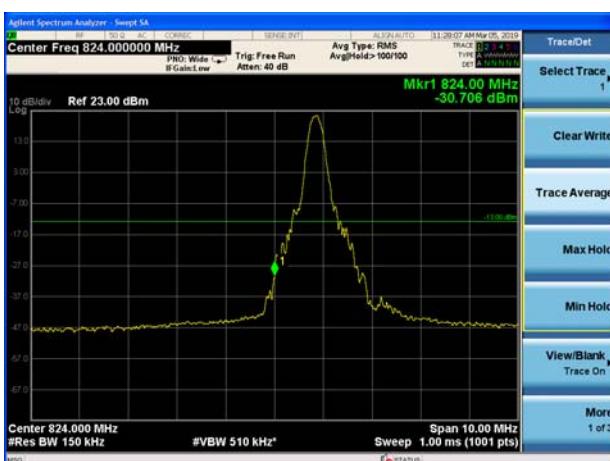
## LTE Band 26 QPSK 10MHz CH-Low 100%RB



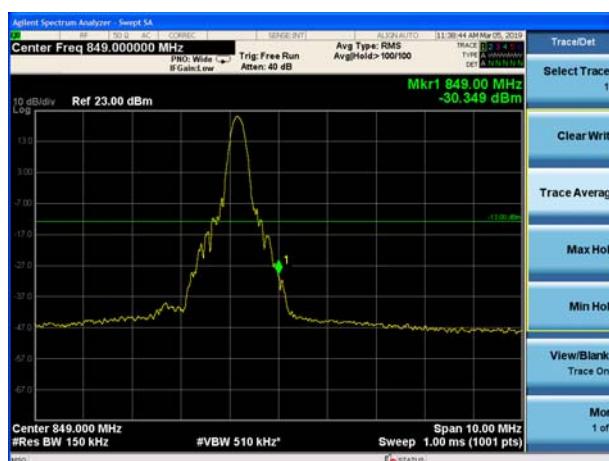
## LTE Band 26 QPSK 10MHz CH-High 100%RB



## LTE Band 26 QPSK 15MHz CH-Low 1RB



## LTE Band 26 QPSK 15MHz CH-High 1RB





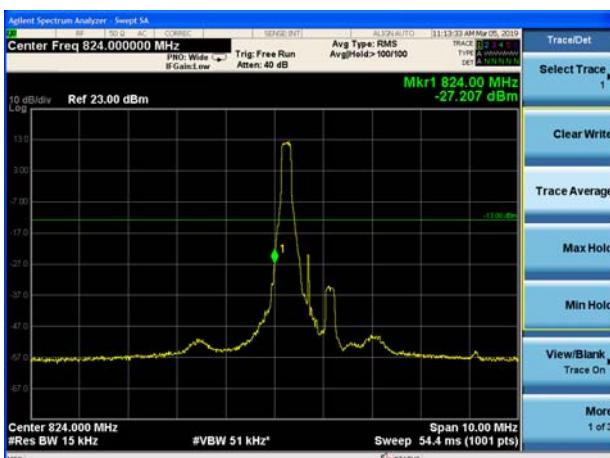
## LTE Band 26 QPSK 15MHz CH-Low 100%RB



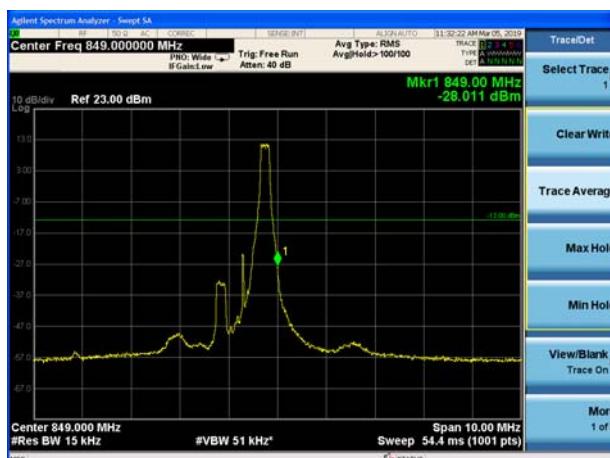
## LTE Band 26 QPSK 15MHz CH-High 100%RB



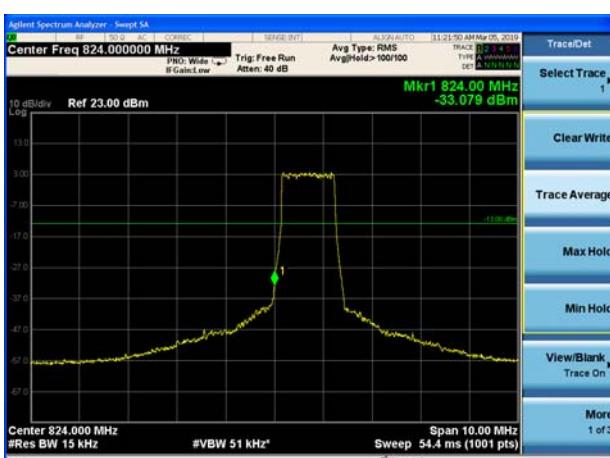
## LTE Band 26 16QAM 1.4MHz CH-Low 1RB



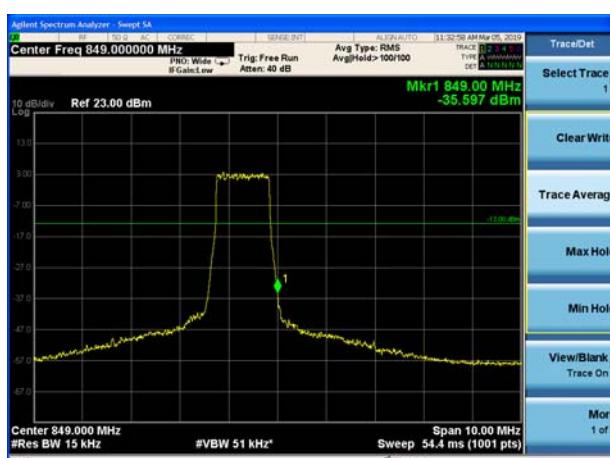
## LTE Band 26 16QAM 1.4MHz CH-High 1RB



## LTE Band 26 16QAM 1.4MHz CH-Low 100%RB

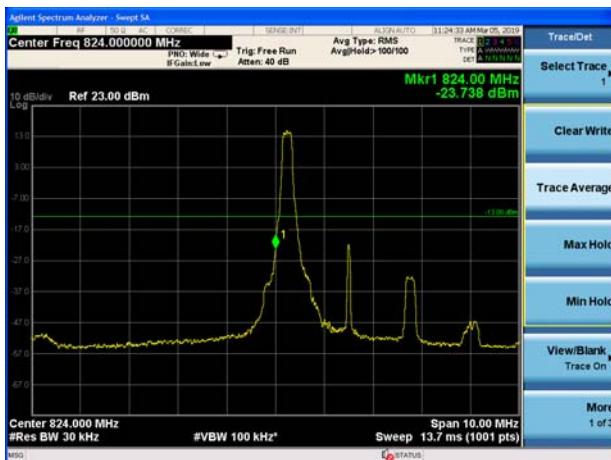


## LTE Band 26 16QAM 1.4MHz CH-High 100%RB

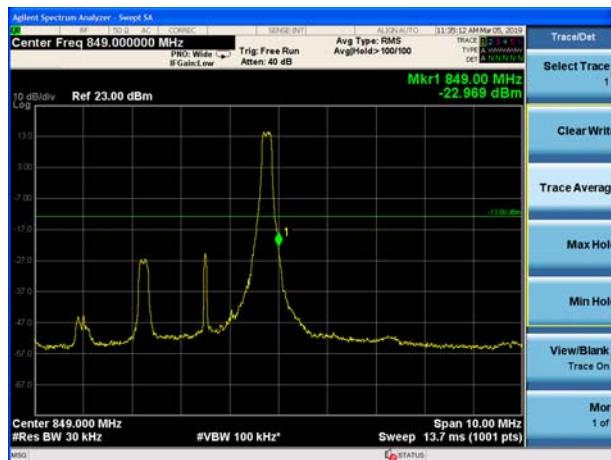




## LTE Band 26 16QAM 3MHz CH-Low 1RB



## LTE Band 26 16QAM 3MHz CH-High 1RB



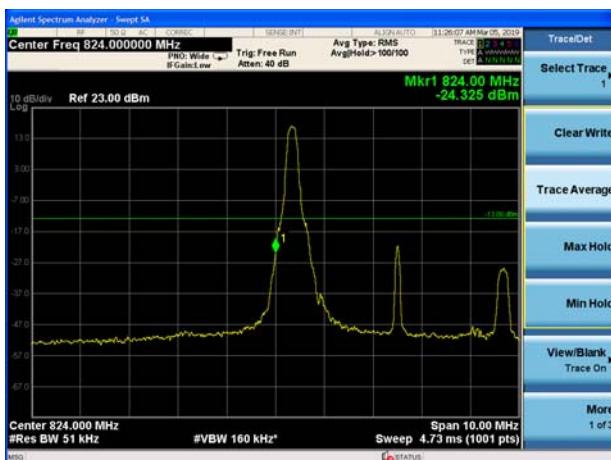
## LTE Band 26 16QAM 3MHz CH-Low 100%RB



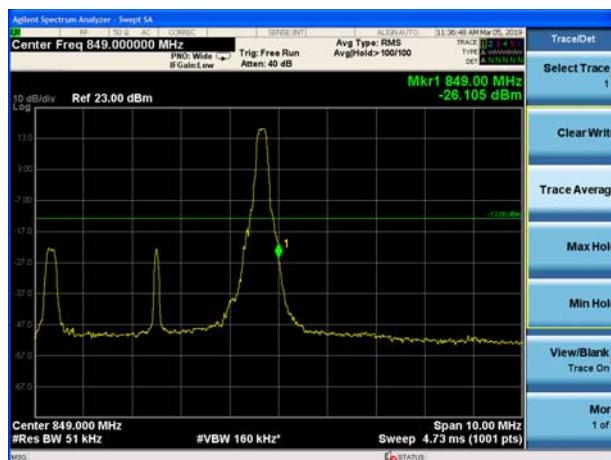
## LTE Band 26 16QAM 3MHz CH-High 100%RB



## LTE Band 26 16QAM 5MHz CH-Low 1RB

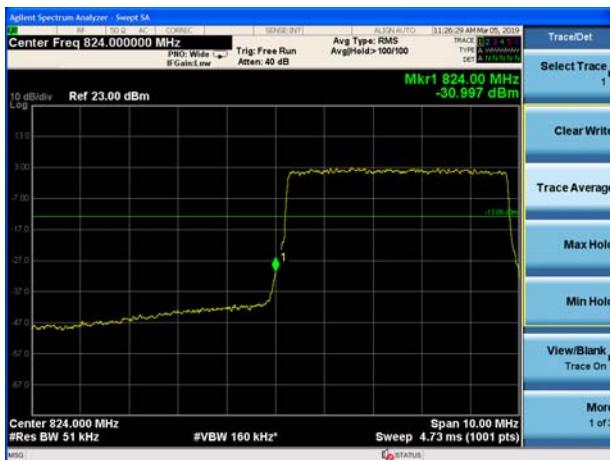


## LTE Band 26 16QAM 5MHz CH-High 1RB





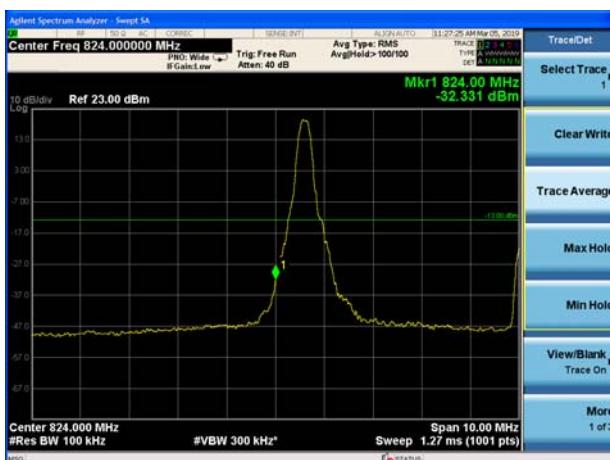
## LTE Band 26 16QAM 5MHz CH-Low 100%RB



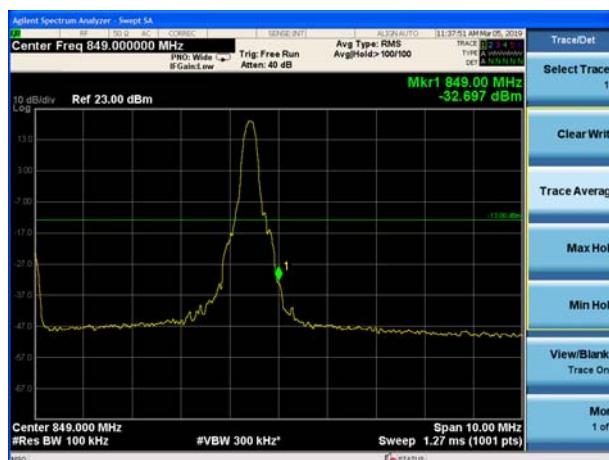
## LTE Band 26 16QAM 5MHz CH-High 100%RB



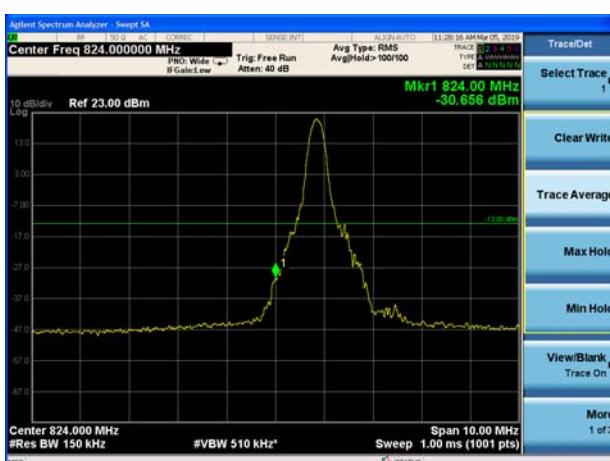
## LTE Band 26 16QAM 10MHz CH-Low 1RB



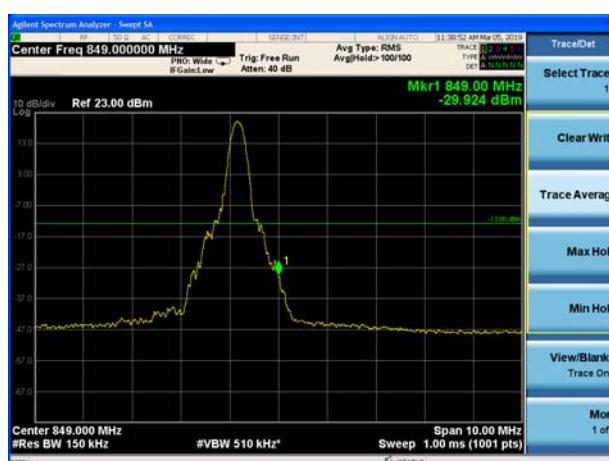
## LTE Band 26 16QAM 10MHz CH-High 1RB



## LTE Band 26 16QAM 15MHz CH-Low 1RB



## LTE Band 26 16QAM 15MHz CH-High 1RB



## 5.5. Peak-to-Average Power Ratio (PAPR)

### Ambient condition

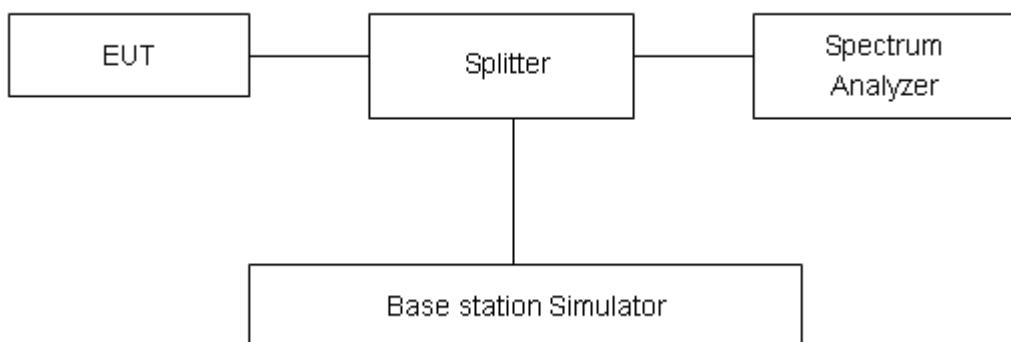
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Methods of Measurement

Measure the total peak power and record as  $P_{Pk}$ . And measure the total average power and record as  $P_{Avg}$ . Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = P_{Pk} (\text{dBm}) - P_{Avg} (\text{dBm}).$$

### Test Setup



### Limits

According to the Sec. 22.913(d), The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.4$  dB.

**Test Results**

Mode	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
WCDMA Band V (RMC)	4132	826.4	26.20	23.06	3.14	≤13	PASS
	4183	836.6	26.09	22.99	3.10	≤13	PASS
	4233	846.6	26.07	23.12	2.95	≤13	PASS

LTE Band 5									
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
100%	QPSK	1.4	20407	824.7	29.33	22.86	6.47	≤13	PASS
			20525	836.5	28.79	22.86	5.93	≤13	PASS
			20643	848.3	28.85	22.95	5.90	≤13	PASS
		3	20415	825.5	28.85	23.09	5.76	≤13	PASS
			20525	836.5	28.98	23.07	5.91	≤13	PASS
			20635	847.5	29.34	23.04	6.30	≤13	PASS
		5	20425	826.5	30.20	23.07	7.13	≤13	PASS
			20525	836.5	29.22	23.03	6.19	≤13	PASS
			20625	846.5	29.64	22.99	6.65	≤13	PASS
		10	20450	829	29.01	23.04	5.97	≤13	PASS
			20525	836.5	28.78	22.98	5.80	≤13	PASS
			20600	844	28.70	22.95	5.75	≤13	PASS
1	16QAM	1.4	20407	824.7	30.69	23.44	7.25	≤13	PASS
			20525	836.5	30.54	22.82	7.72	≤13	PASS
			20643	848.3	29.89	22.85	7.04	≤13	PASS
		3	20415	825.5	29.36	22.73	6.63	≤13	PASS
			20525	836.5	29.79	23.28	6.51	≤13	PASS
			20635	847.5	30.15	23.55	6.60	≤13	PASS
		5	20425	826.5	30.09	22.68	7.41	≤13	PASS
			20525	836.5	30.67	23.26	7.41	≤13	PASS
			20625	846.5	30.91	23.53	7.38	≤13	PASS
		10	20450	829	29.60	22.66	6.94	≤13	PASS
			20525	836.5	29.88	23.22	6.66	≤13	PASS
			20600	844	30.09	23.48	6.61	≤13	PASS



LTE Band 26									
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
100%	QPSK	1.4	26797	824.7	27.65	22.92	4.73	≤13	PASS
			26915	836.5	27.29	22.45	4.84	≤13	PASS
			27033	848.3	26.77	22.52	4.25	≤13	PASS
		3	26805	825.5	27.66	22.91	4.75	≤13	PASS
			26915	836.5	27.82	23.01	4.81	≤13	PASS
			27025	847.5	26.77	22.56	4.21	≤13	PASS
		5	26815	826.5	27.37	22.67	4.70	≤13	PASS
			26915	836.5	27.13	22.34	4.79	≤13	PASS
			27015	846.5	26.91	22.68	4.23	≤13	PASS
		10	26840	829	27.59	22.91	4.68	≤13	PASS
			26915	836.5	27.49	22.76	4.73	≤13	PASS
			26990	844	27.21	22.60	4.61	≤13	PASS
		15	26865	831.5	27.29	22.66	4.63	≤13	PASS
			26915	836.5	27.38	22.64	4.74	≤13	PASS
			26965	841.5	27.15	22.40	4.75	≤13	PASS
1	16QAM	1.4	26797	824.7	27.75	22.10	5.65	≤13	PASS
			26915	836.5	27.68	21.95	5.73	≤13	PASS
			27033	848.3	26.80	21.74	5.06	≤13	PASS
		3	26805	825.5	27.26	21.66	5.60	≤13	PASS
			26915	836.5	27.84	22.10	5.74	≤13	PASS
			27025	847.5	26.66	21.56	5.10	≤13	PASS
		5	26815	826.5	27.15	21.52	5.63	≤13	PASS
			26915	836.5	27.42	21.84	5.58	≤13	PASS
			27015	846.5	26.83	21.85	4.98	≤13	PASS
		10	26840	829	27.30	21.78	5.52	≤13	PASS
			26915	836.5	27.87	22.22	5.65	≤13	PASS
			26990	844	26.92	21.39	5.53	≤13	PASS
		15	26865	831.5	27.80	22.25	5.55	≤13	PASS
			26915	836.5	27.24	21.72	5.52	≤13	PASS
			26965	841.5	26.97	21.37	5.60	≤13	PASS

## 5.6. Frequency Stability

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

#### Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +85°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +85°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements. Frequency Stability (Voltage Variation)

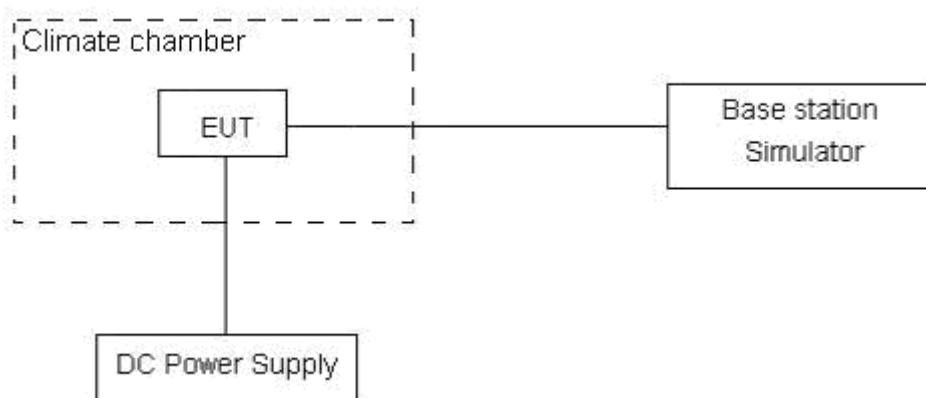
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.3 V and 4.3 V, with a nominal voltage of 3.8V.

### Test setup





## Limits

According to the Sec. 22.355, the frequency stability of the carrier shall be accurate to within 2.5 ppm of the received frequency for mobile stations.

Limits	≤ 2.5 ppm
--------	-----------

## Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 3$ ,  $U = 0.01\text{ppm}$ .



## Test Result

WCDMA Band 5					
Condition		824	849	Delta (Hz)	Frequency Stability (ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	824.0309	848.9667	-5.69	-0.00680
Extreme (85°C)		824.0277	848.9681	-2.12	-0.00253
Extreme (80°C)		824.0316	848.9639	-2.60	-0.00311
Extreme (70°C)		824.0297	848.9660	-4.94	-0.00590
Extreme (60°C)		824.0311	848.9644	-0.79	-0.00094
Extreme (50°C)		824.0305	848.9650	-1.76	-0.00210
Extreme (40°C)		824.0292	848.9663	-2.69	-0.00321
Extreme (30°C)		824.0285	848.9670	-4.68	-0.00559
Extreme (20°C)		824.0306	848.9649	0.33	0.00040
Extreme (10°C)		824.0294	848.9661	-1.79	-0.00214
Extreme (0°C)		824.0307	848.9650	-2.63	-0.00314
Extreme (-10°C)		824.0312	848.9643	-2.46	-0.00294
Extreme (-20°C)		824.0301	848.9654	-4.45	-0.00532
Extreme (-30°C)		824.0271	848.9687	0.56	0.00067
Extreme (-40°C)		824.0256	848.9699	-1.56	-0.00186
25°C	LV	824.0304	848.9651	-0.53	-0.00063
	HV	824.0301	848.9657	-2.09	-0.00249

LTE Band 5 (QPSK, 10MHz BANDWIDTH)					
Condition		824	849	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	824.2285	848.7889	1.91	0.00228
Extreme (85°C)		824.2274	848.7876	6.74	0.00806
Extreme (80°C)		824.2313	848.7915	6.81	0.00814
Extreme (70°C)		824.2294	848.7896	1.24	0.00148
Extreme (60°C)		824.2308	848.7910	4.49	0.00537
Extreme (50°C)		824.2302	848.7904	3.67	0.00439
Extreme (40°C)		824.2289	848.7891	1.32	0.00158
Extreme (30°C)		824.2282	848.7884	0.60	0.00072
Extreme (20°C)		824.2303	848.7905	11.60	0.01387



Extreme (10°C)		824.2291	848.7893	-6.07	-0.00726
Extreme (0°C)		824.2304	848.7906	9.98	0.01193
Extreme (-10°C)		824.2309	848.7911	-2.31	-0.00276
Extreme (-20°C)		824.2298	848.7900	0.51	0.00061
Extreme (-30°C)		824.2265	848.7870	-2.13	-0.00255
Extreme (-40°C)		824.2253	848.7855	-5.16	-0.00617
25°C	LV	824.2301	848.7903	1.87	0.00224
	HV	824.2295	848.7903	4.96	0.00593

(16QAM,10MHz BANDWIDTH)

Condition		824	849	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	824.3669	848.7291	-2.30	-0.00275
Extreme (85°C)		824.3680	848.7302	0.55	0.00066
Extreme (80°C)		824.3641	848.7263	2.78	0.00332
Extreme (70°C)		824.3660	848.7282	-2.29	-0.00274
Extreme (60°C)		824.3646	848.7268	-4.21	-0.00503
Extreme (50°C)		824.3652	848.7274	-1.75	-0.00209
Extreme (40°C)		824.3665	848.7290	-2.42	-0.00289
Extreme (30°C)		824.3672	848.7294	-0.98	-0.00117
Extreme (20°C)		824.3651	848.7273	4.06	0.00485
Extreme (10°C)		824.3663	848.7285	-0.26	-0.00031
Extreme (0°C)		824.3650	848.7272	-0.82	-0.00098
Extreme (-10°C)		824.3645	848.7269	1.60	0.00191
Extreme (-20°C)		824.3656	848.7278	-2.07	-0.00247
Extreme (-30°C)		824.3689	848.7311	-4.80	-0.00574
Extreme (-40°C)		824.3701	848.7323	2.50	0.00299
25°C	LV	824.3653	848.7275	-1.78	-0.00213
	HV	824.3659	848.7281	-0.89	-0.00106

LTE Band 26					
(QPSK, 10MHz BANDWIDTH)					
Condition		824	849	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	824.5171	848.6958	4.81	0.00661
Extreme (85°C)		824.5172	848.6957	16.74	0.02299
Extreme (80°C)		824.5168	848.6961	12.16	0.01670
Extreme (70°C)		824.5183	848.6946	2.60	0.00357



Extreme (60°C)		824.5160	848.6965	5.92	0.00813
Extreme (50°C)		824.5161	848.6968	17.07	0.02345
Extreme (40°C)		824.5176	848.6956	6.05	0.00831
Extreme (30°C)		824.5167	848.6964	14.93	0.02051
Extreme (20°C)		824.5162	848.6967	4.95	0.00679
Extreme (10°C)		824.5178	848.6951	15.31	0.02103
Extreme (0°C)		824.5169	848.6966	3.69	0.00507
Extreme (-10°C)		824.5164	848.6965	3.94	0.00541
Extreme (-20°C)		824.5175	848.6959	4.33	0.00595
Extreme (-30°C)		824.5174	848.6967	16.53	0.02270
Extreme (-40°C)		824.5185	848.6948	17.09	0.02347
25°C	LV	824.5169	848.6974	8.78	0.01205
	HV	824.5165	848.6972	8.50	0.01167
(16QAM,10MHz BANDWIDTH)					
Condition		824	849	Delta (Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	824.5716	848.6151	3.15	0.00433
Extreme (85°C)		824.5709	848.6152	7.24	0.00995
Extreme (80°C)		824.5713	848.6148	17.20	0.02363
Extreme (70°C)		824.5698	848.6165	14.01	0.01924
Extreme (60°C)		824.5717	848.6144	8.64	0.01187
Extreme (50°C)		824.5725	848.6141	4.61	0.00633
Extreme (40°C)		824.5707	848.6156	12.54	0.01723
Extreme (30°C)		824.5716	848.6145	6.94	0.00953
Extreme (20°C)		824.5719	848.6142	11.34	0.01558
Extreme (10°C)		824.5703	848.6158	7.13	0.00979
Extreme (0°C)		824.5712	848.6149	5.24	0.00720
Extreme (-10°C)		824.5717	848.6144	9.22	0.01266
Extreme (-20°C)		824.5711	848.6151	8.87	0.01218
Extreme (-30°C)		824.5713	848.6162	5.64	0.00775
Extreme (-40°C)		824.5718	848.6147	3.48	0.00478
25°C	LV	824.5728	848.6151	15.11	0.02076
	HV	824.5707	848.6162	13.54	0.01860

## 5.7. Spurious Emissions at Antenna Terminals

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

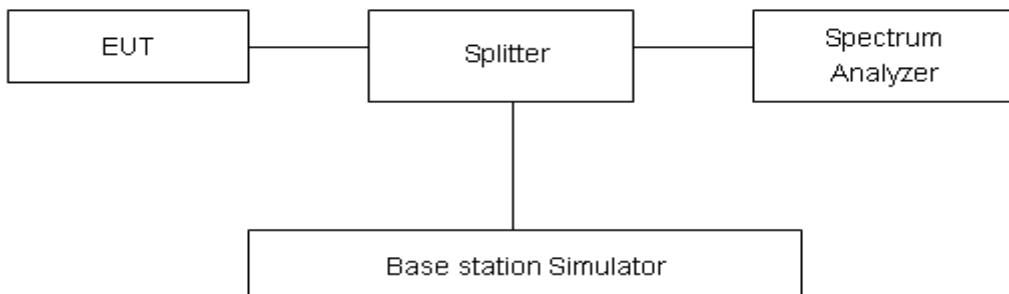
### Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier.

The peak detector is used. RBW are set to 100 kHz and VBW are set to 300 kHz for below 1G, RBW are set to 1MHz and VBW are set to 3MHz for above 1G, Sweep is set to ATUO.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

### Test setup



### Limits

Rule Part 22.917(a) specifies that "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."

Limit	-13 dBm

### Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

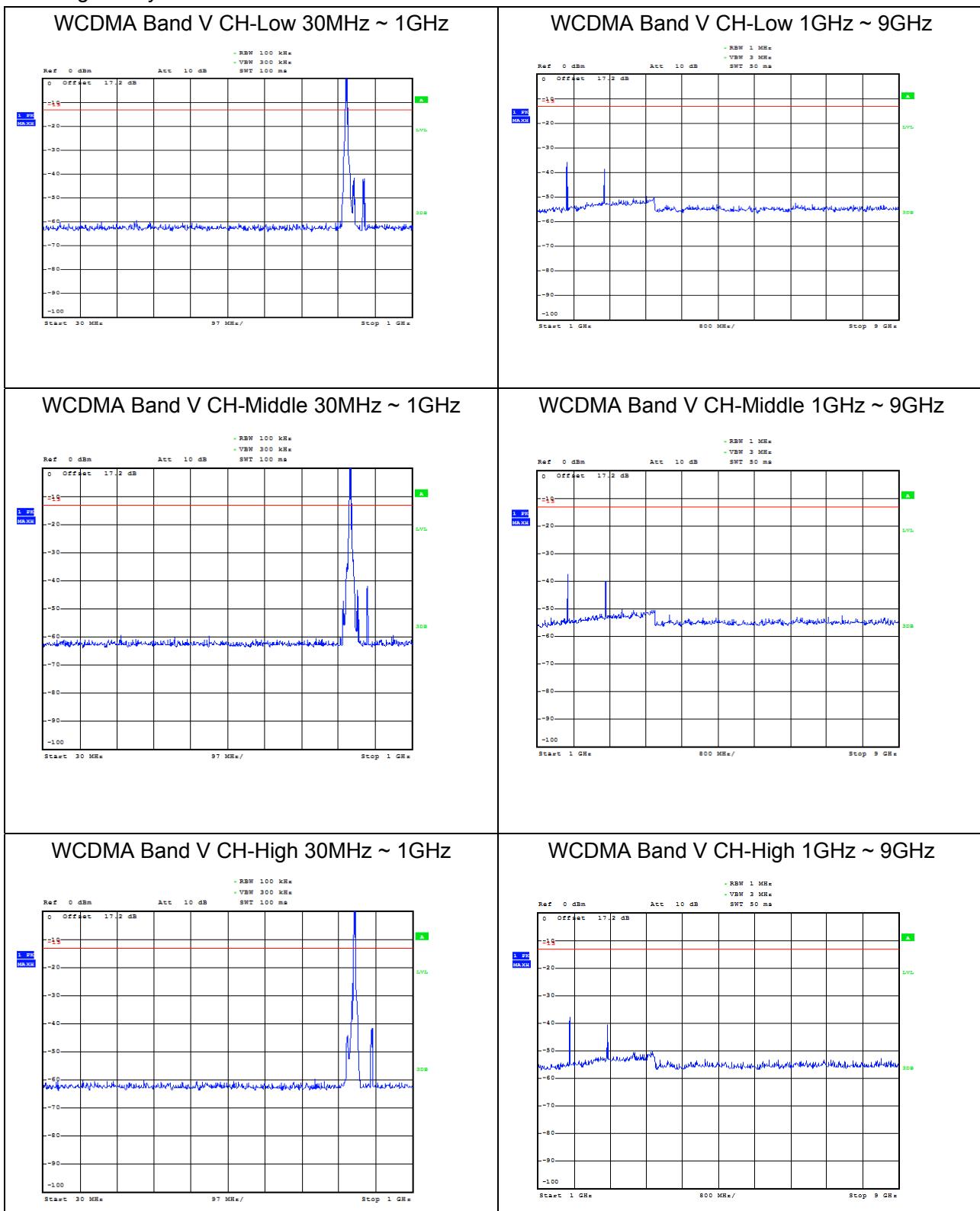
Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-18GHz	1.407 dB



## Test Result

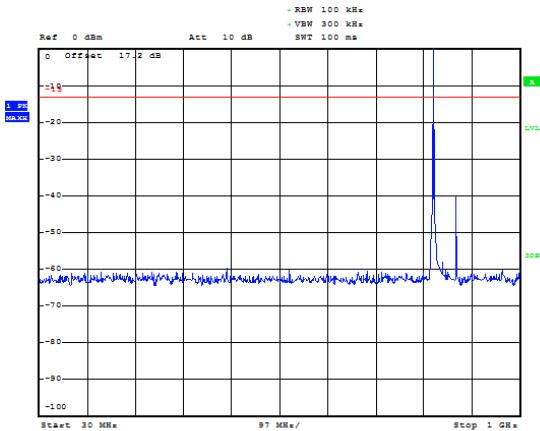
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

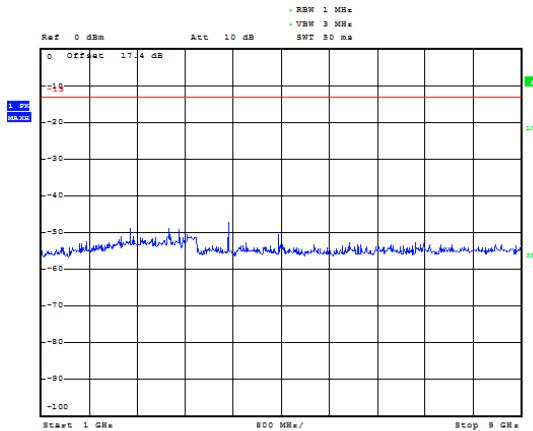




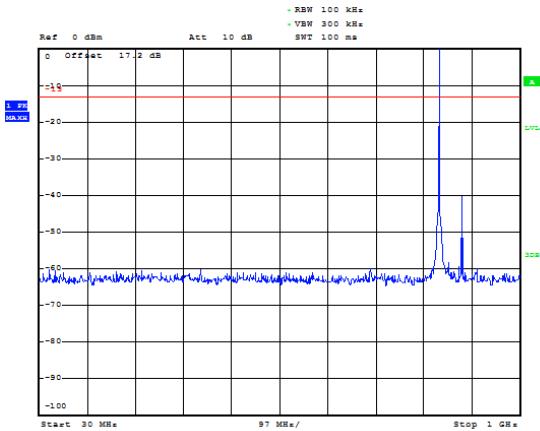
## LTE Band 5 1.4MHz CH-Low 30MHz~1GHz



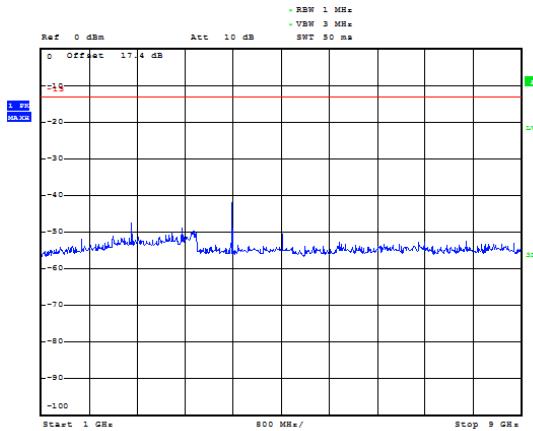
## LTE Band 5 1.4MHz CH-Low 1GHz~9GHz



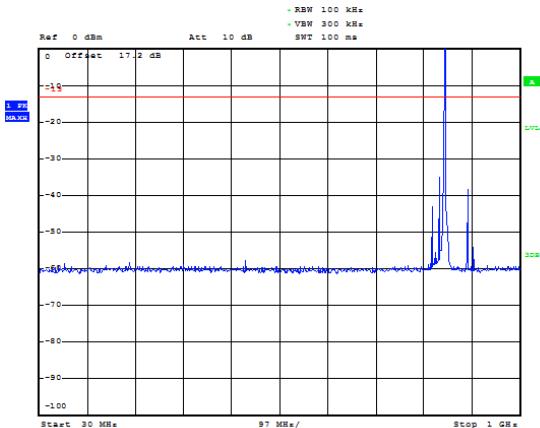
## LTE Band 5 1.4MHz CH-Middle 30MHz~1GHz



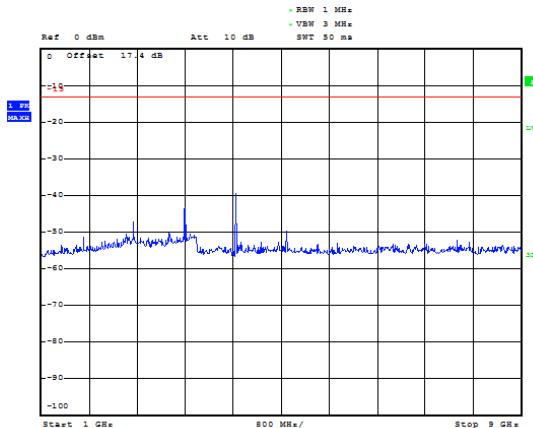
## LTE Band 5 1.4MHz CH-Middle 1GHz~9GHz



## LTE Band 5 1.4MHz CH-High 30MHz~1GHz

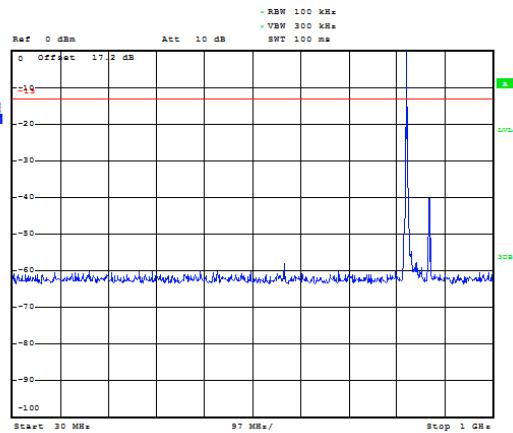


## LTE Band 5 1.4MHz CH-High 1GHz~9GHz

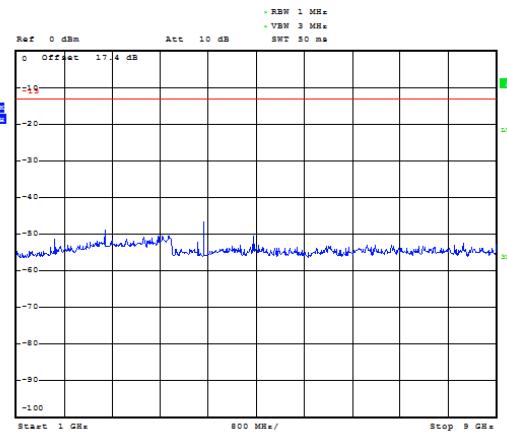




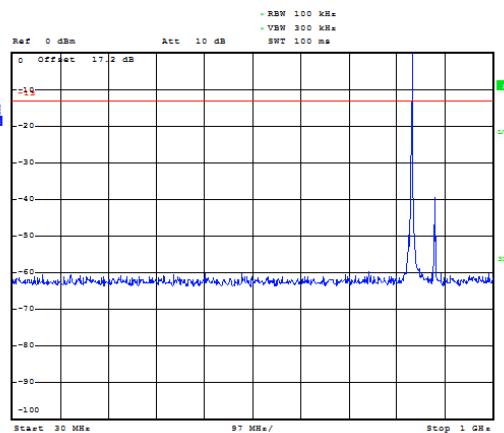
## LTE Band 5 3MHz CH-Low 30MHz~1GHz



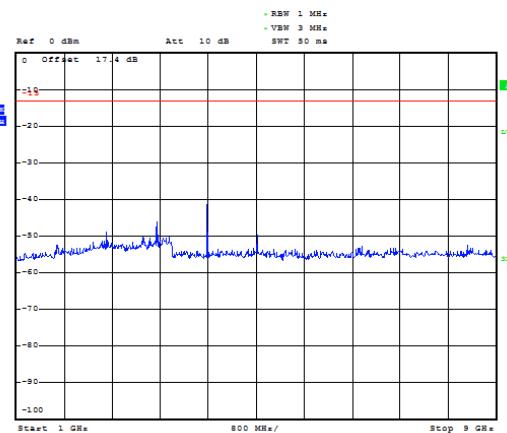
## LTE Band 5 3MHz CH-Low 1GHz~9GHz



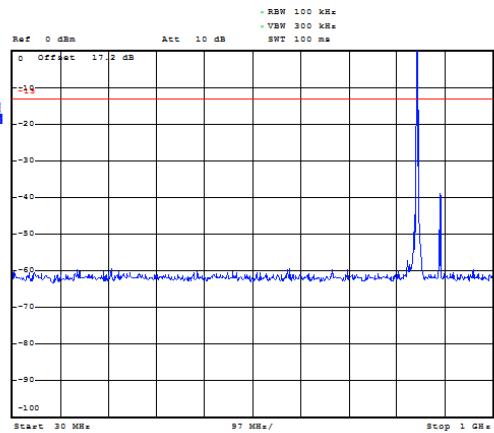
## LTE Band 5 3MHz CH-Middle 30MHz~1GHz



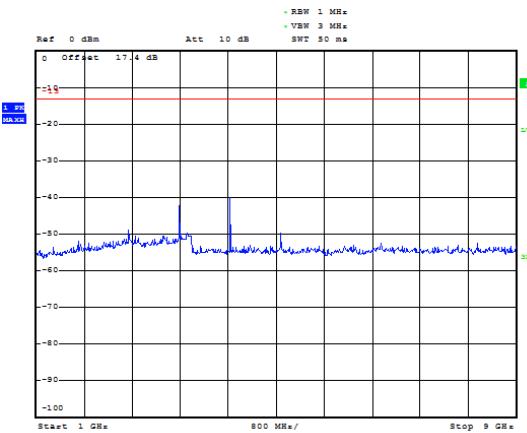
## LTE Band 5 3MHz CH-Middle 1GHz~9GHz



## LTE Band 5 3MHz CH-High 30MHz~1GHz

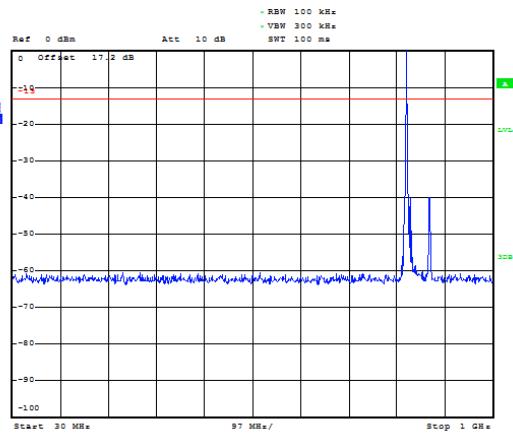


## LTE Band 5 3MHz CH-High 1GHz~9GHz

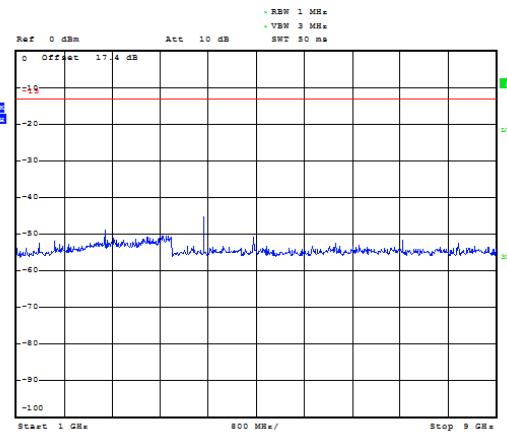




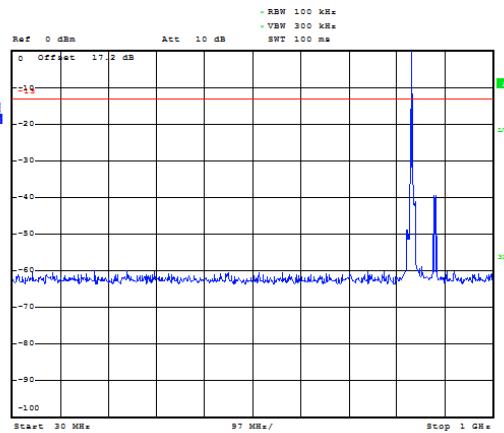
## LTE Band 5 5MHz CH-Low 30MHz~1GHz



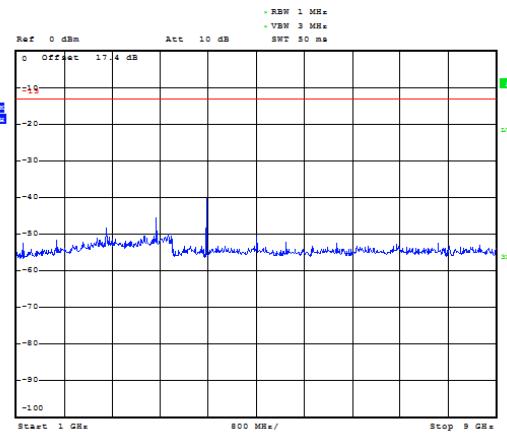
## LTE Band 5 5MHz CH-Low 1GHz~9GHz



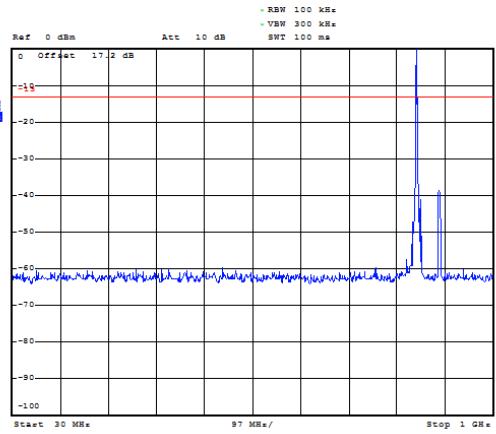
## LTE Band 5 5MHz CH-Middle 30MHz~1GHz



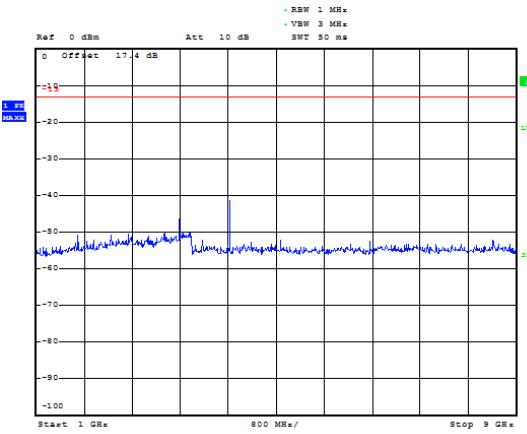
## LTE Band 5 5MHz CH-Middle 1GHz~9GHz



## LTE Band 5 5MHz CH-High 30MHz~1GHz

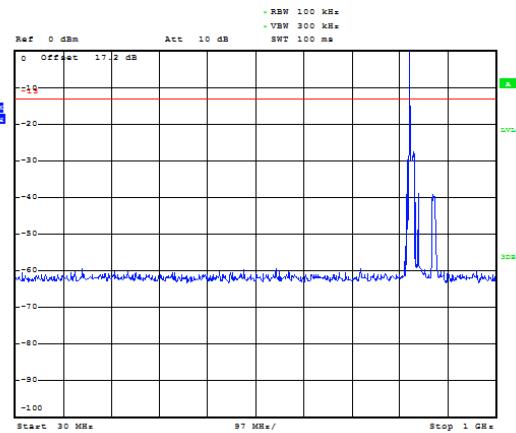


## LTE Band 5 5MHz CH-High 1GHz~9GHz

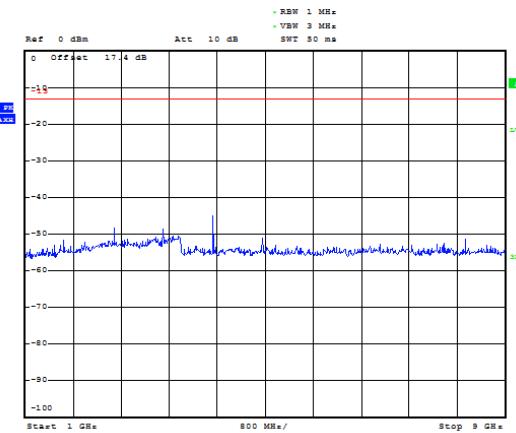




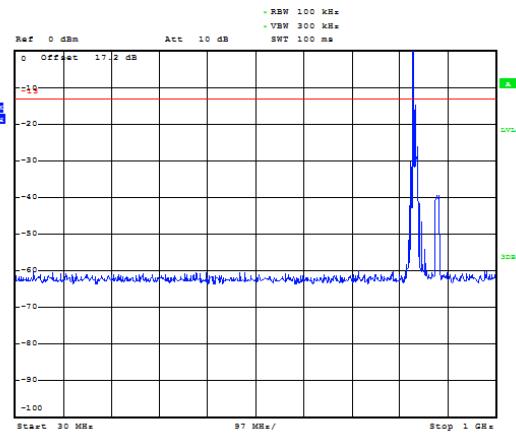
## LTE Band 5 10MHz CH-Low 30MHz~1GHz



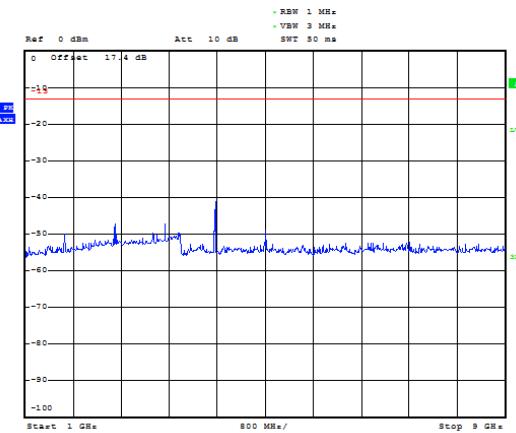
## LTE Band 5 10MHz CH-Low 1GHz~9GHz



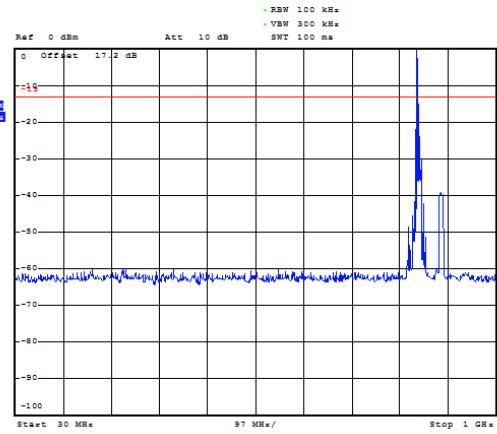
## LTE Band 5 10MHz CH-Middle 30MHz~1GHz



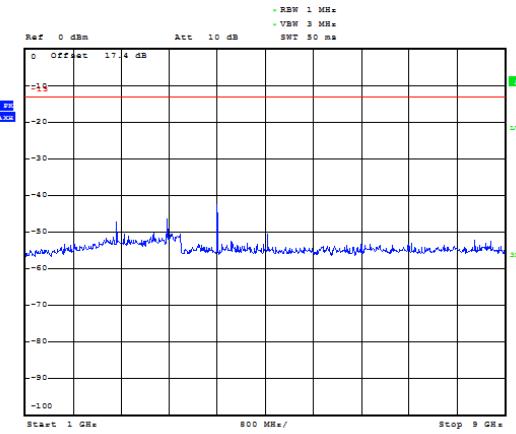
## LTE Band 5 10MHz CH-Middle 1GHz~9GHz



## LTE Band 5 10MHz CH-High 30MHz~1GHz

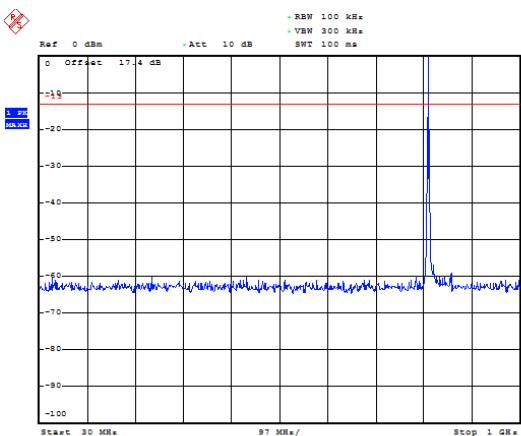


## LTE Band 5 10MHz CH-High 1GHz~9GHz

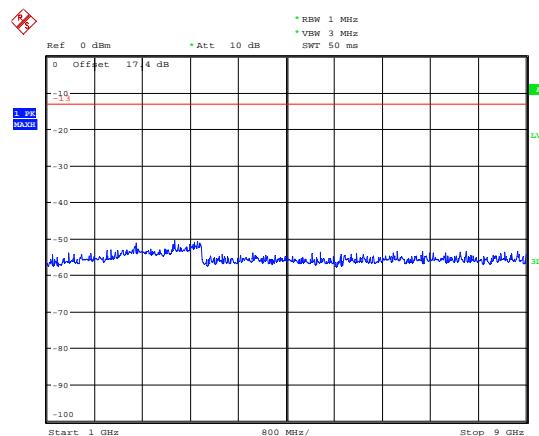




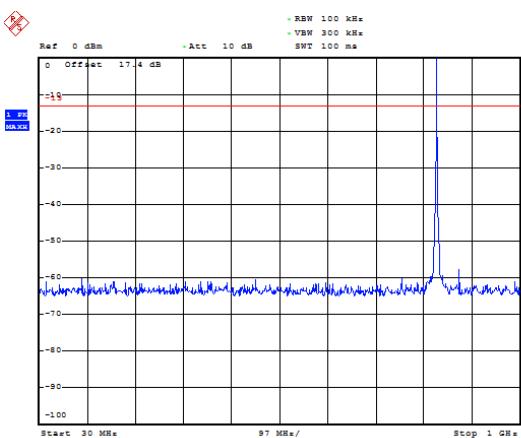
## LTE Band 26 1.4MHz CH-Low 30MHz~1GHz



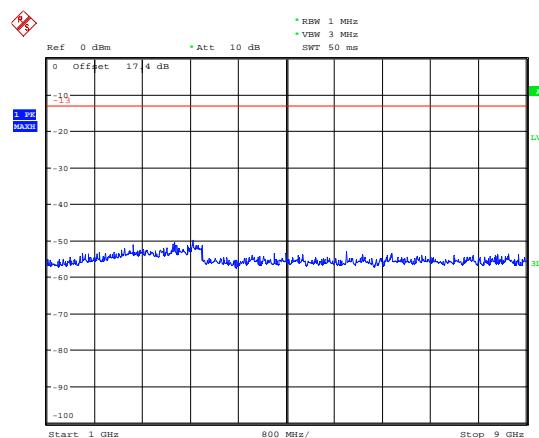
## LTE Band 26 1.4MHz CH-Low 1GHz~9GHz



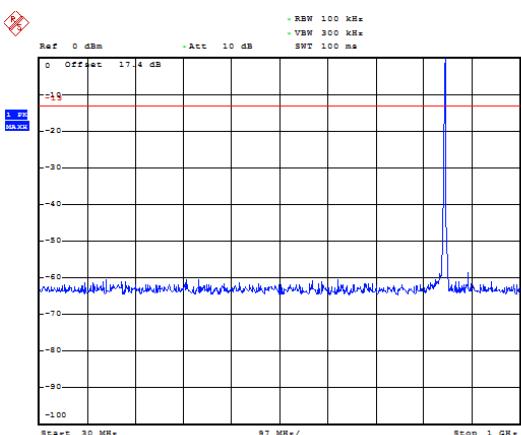
## LTE Band 26 1.4MHz CH-Middle 30MHz~1GHz



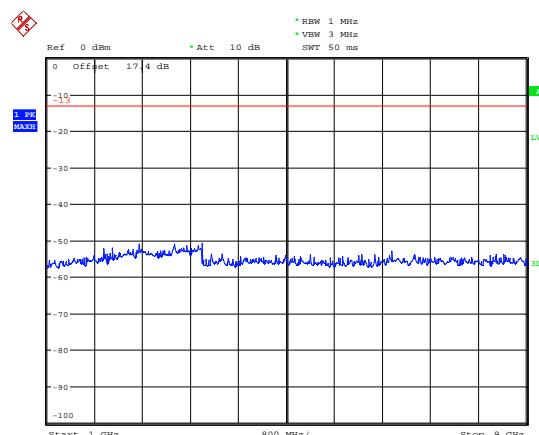
## LTE Band 26 1.4MHz CH-Middle 1GHz~9GHz



## LTE Band 26 1.4MHz CH-High 30MHz~1GHz

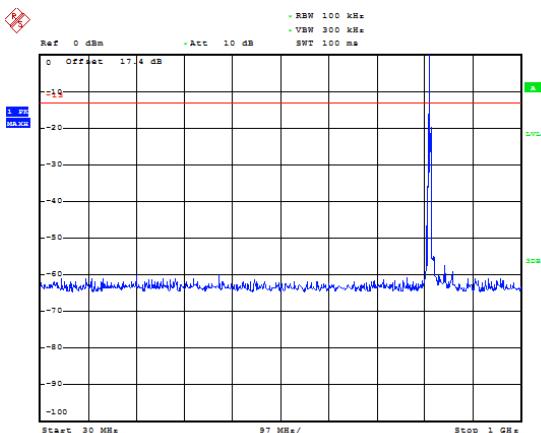


## LTE Band 26 1.4MHz CH-High 1GHz~9GHz

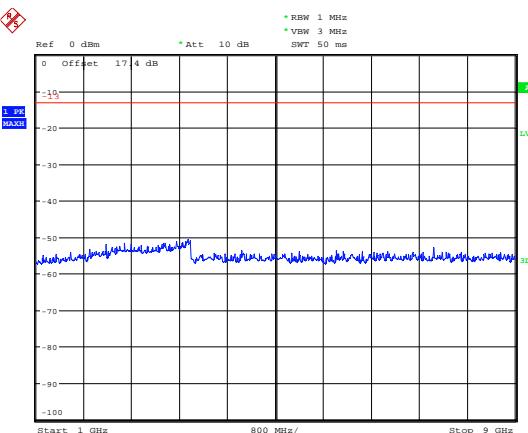




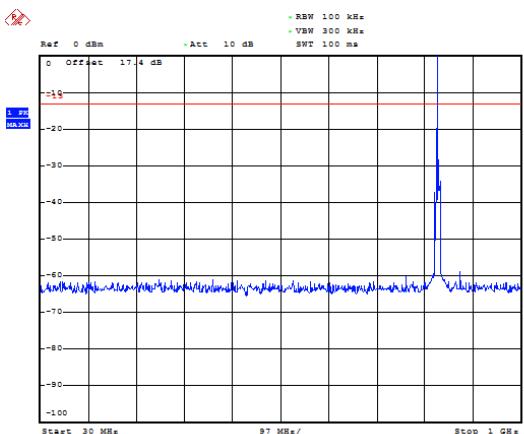
## LTE Band 26 3MHz CH-Low 30MHz~1GHz



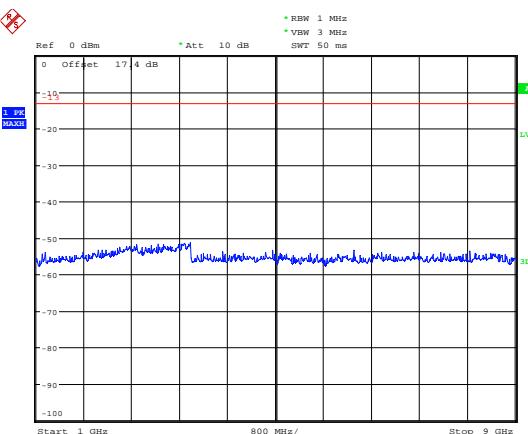
## LTE Band 26 3MHz CH-Low 1GHz~9GHz



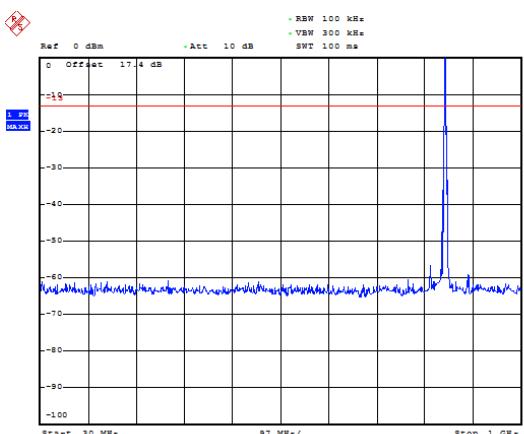
## LTE Band 26 3MHz CH-Middle 30MHz~1GHz



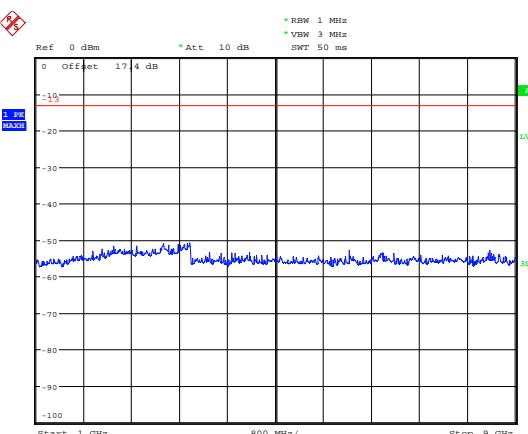
## LTE Band 26 3MHz CH-Middle 1GHz~9GHz



## LTE Band 26 3MHz CH-High 30MHz~1GHz

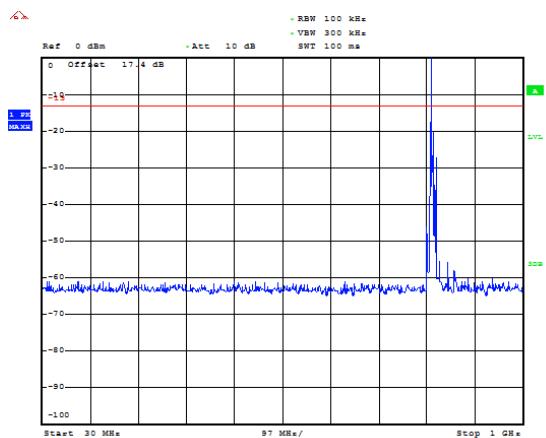


## LTE Band 26 3MHz CH-High 1GHz~9GHz



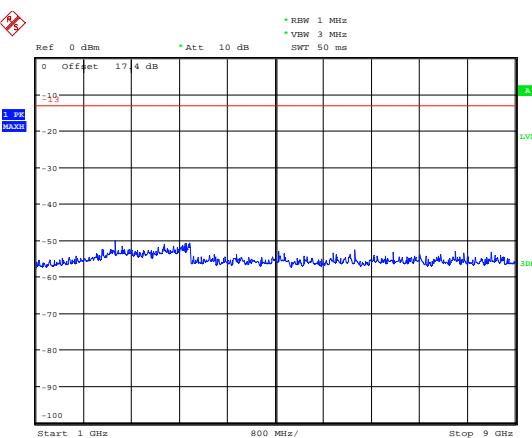


## LTE Band 26 5MHz CH-Low 30MHz~1GHz



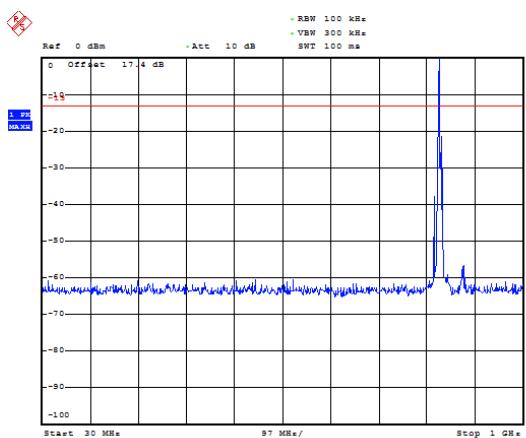
Date: 25.FEB.2019 14:22:50

## LTE Band 26 5MHz CH-Low 1GHz~9GHz



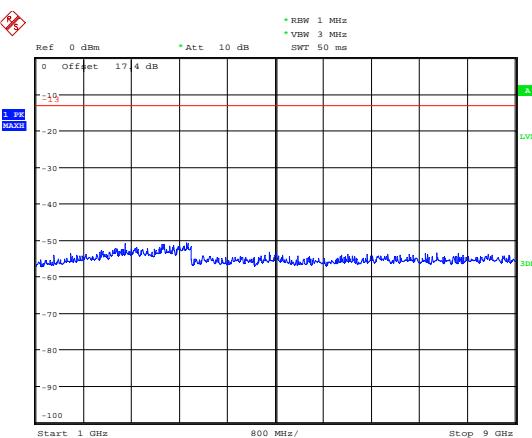
Date: 25.FEB.2019 14:28:52

## LTE Band 26 5MHz CH-Middle 30MHz~1GHz



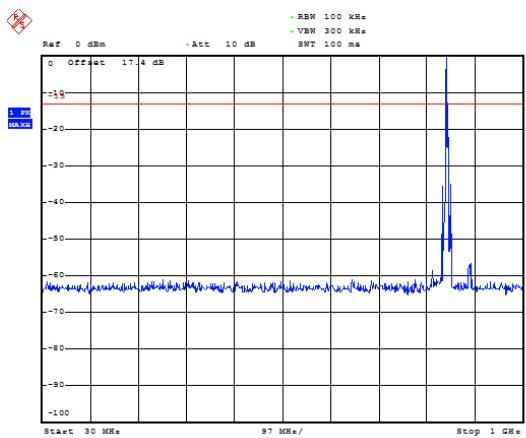
Date: 25.FEB.2019 14:20:56

## LTE Band 26 5MHz CH-Middle 1GHz~9GHz



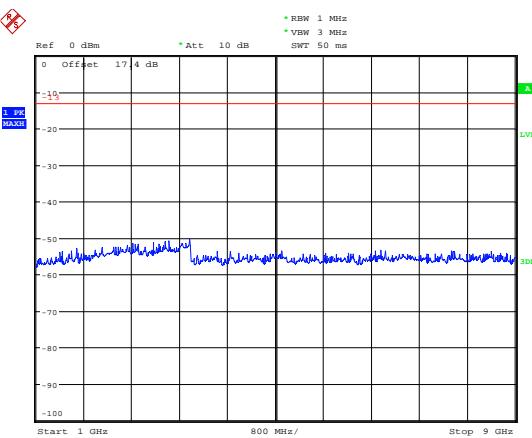
Date: 25.FEB.2019 14:27:07

## LTE Band 26 5MHz CH-High 30MHz~1GHz



Date: 25.FEB.2019 14:23:08

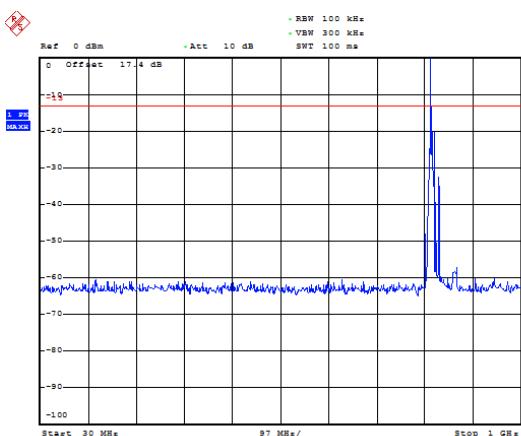
## LTE Band 26 5MHz CH-High 1GHz~9GHz



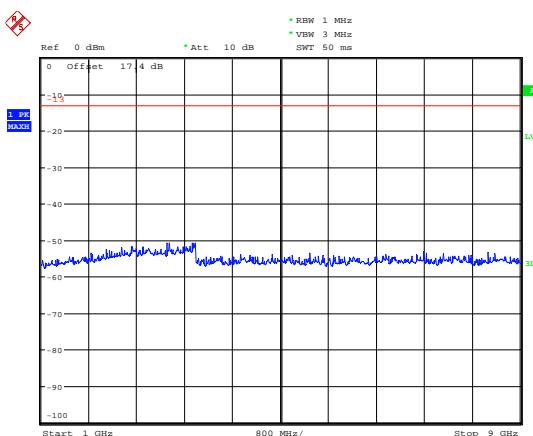
Date: 25.FEB.2019 14:29:06



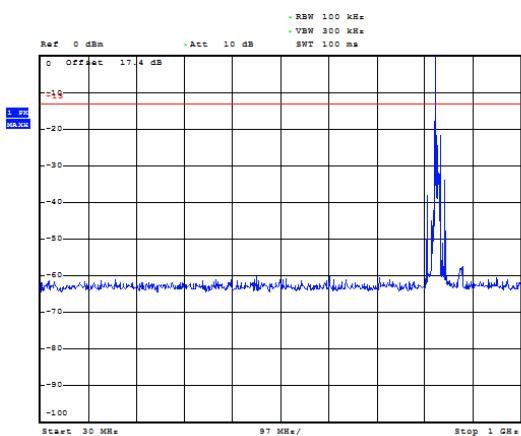
## LTE Band 26 10MHz CH-Low 30MHz~1GHz



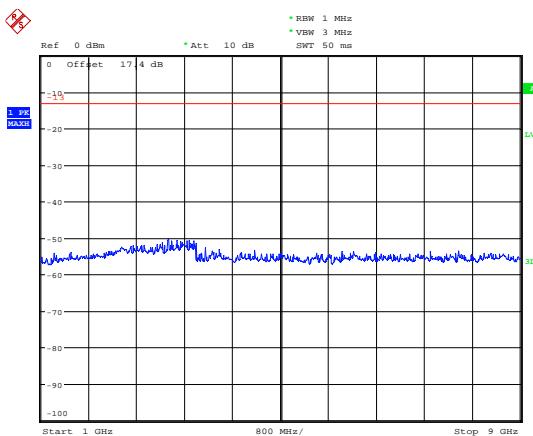
## LTE Band 26 10MHz CH-Low 1GHz~9GHz



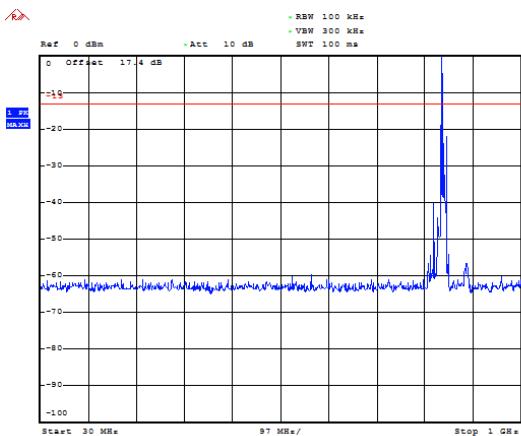
## LTE Band 26 10MHz CH-Middle 30MHz~1GHz



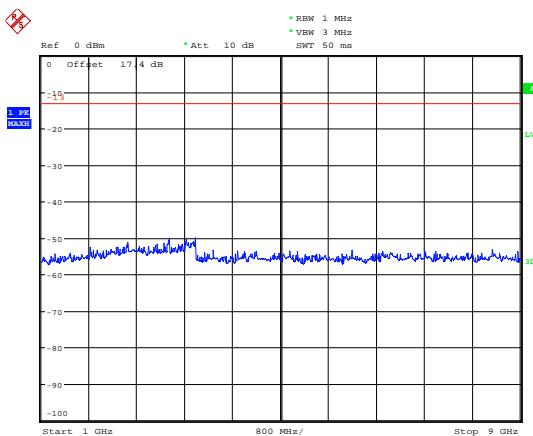
## LTE Band 26 10MHz CH-Middle 1GHz~9GHz



## LTE Band 26 10MHz CH-High 30MHz~1GHz

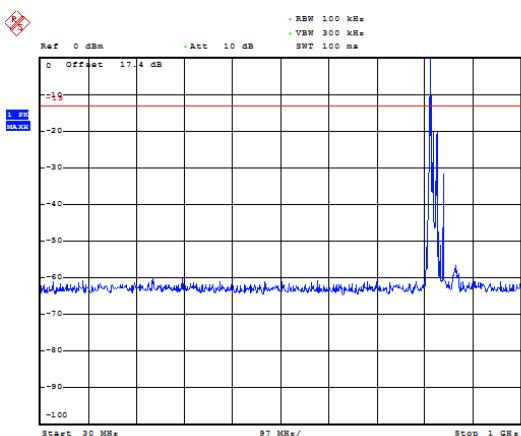


## LTE Band 26 10MHz CH-High 1GHz~9GHz



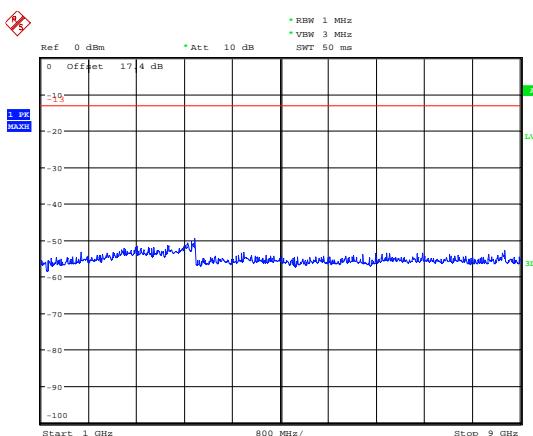


## LTE Band 26 15MHz CH-Low 30MHz~1GHz



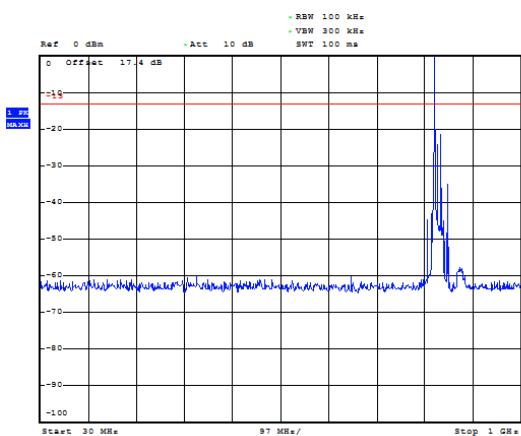
Date: 25.FEB.2019 14:24:14

## LTE Band 26 15MHz CH-Low 1GHz~9GHz



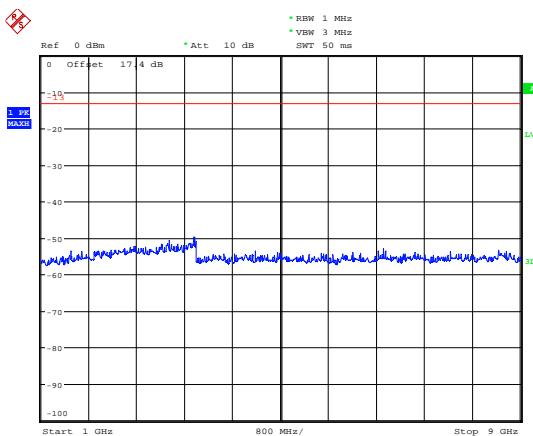
Date: 25.FEB.2019 14:26:22

## LTE Band 26 15MHz CH-Middle 30MHz~1GHz



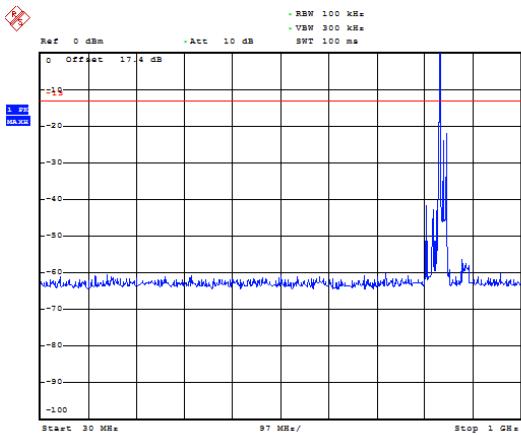
Date: 25.FEB.2019 14:21:19

## LTE Band 26 15MHz CH-Middle 1GHz~9GHz



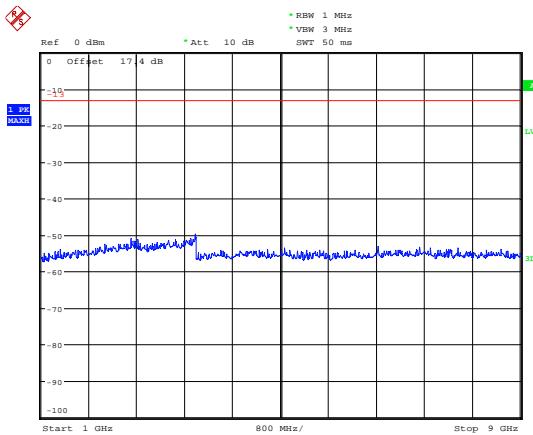
Date: 25.FEB.2019 14:26:34

## LTE Band 26 15MHz CH-High 30MHz~1GHz



Date: 25.FEB.2019 14:24:28

## LTE Band 26 15MHz CH-High 1GHz~9GHz



Date: 25.FEB.2019 14:26:11



## 5.8. Radiates Spurious Emission

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

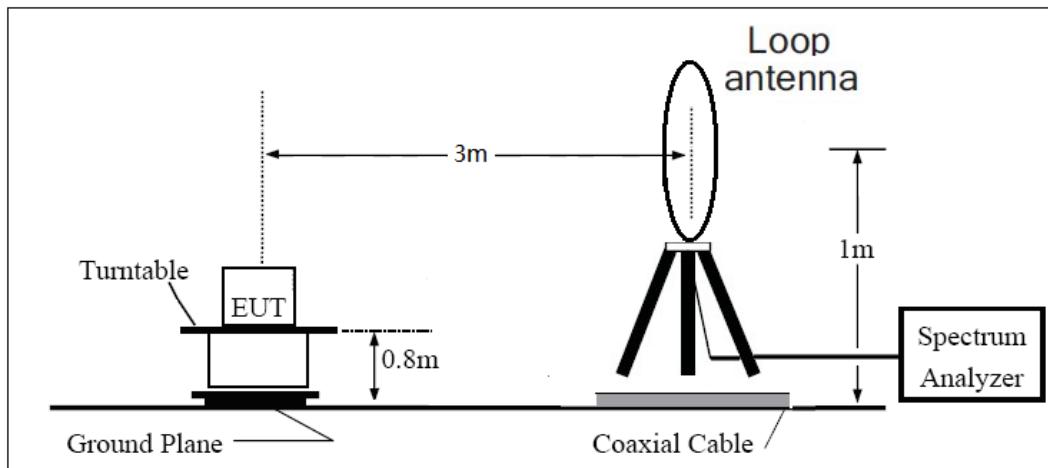
1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=200Hz,VBW=600Hz for 9kHz150kHz , RBW=10kHz, VBW=30kHz 150kHz-30MHz , RBW=100kHz,VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, And the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:  
Power(EIRP)=PMea- PAg - Pcl + Ga
- The measurement results are amend as described below:  
Power(EIRP)=PMea- Pcl + Ga
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi)

and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15\text{dBi}$ .

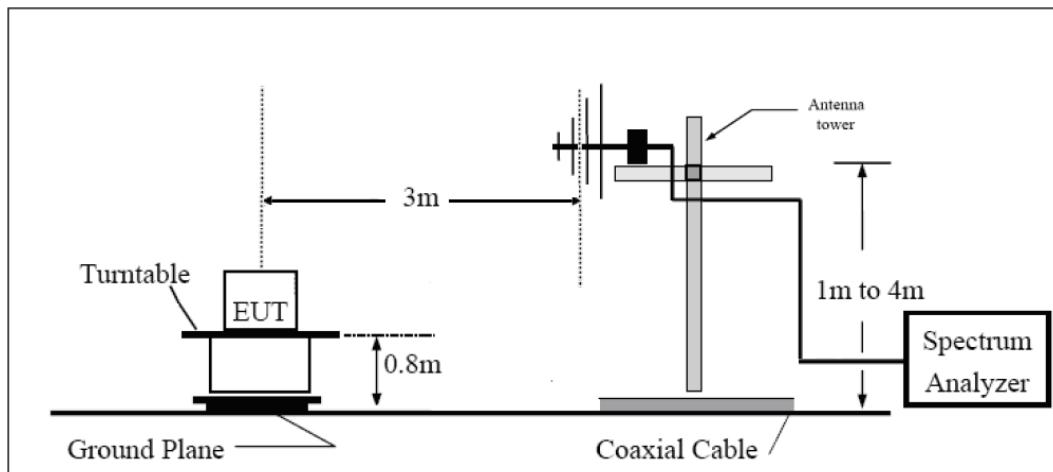
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

### Test setup

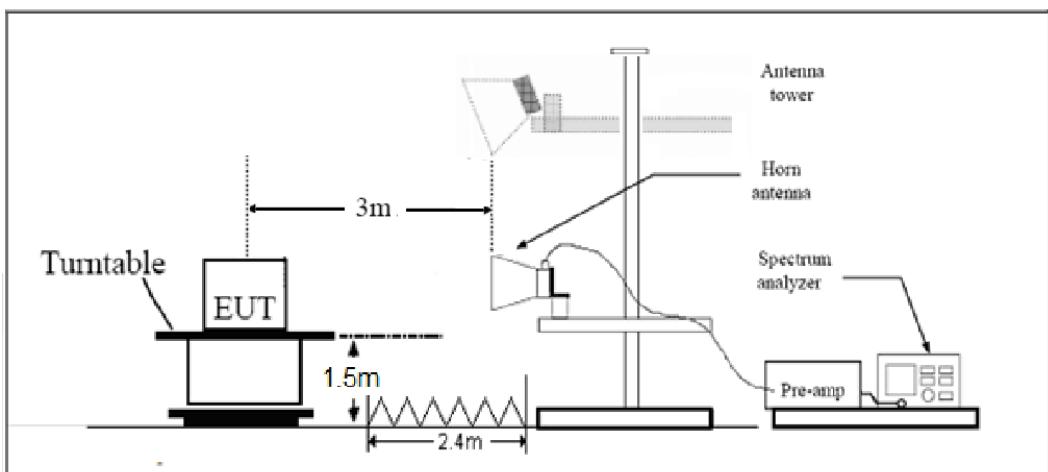
**9KHz ~ 30MHz**



**30MHz ~ 1GHz**



**Above 1GHz**





Note: Area side:2.4mX3.6m

## Limits

Rule Part 22.917(a) specifies that "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."

Limit	-13 dBm
-------	---------

## Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 3.55$  dB.



## Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

### WCDMA Band V CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1645.5	-58.99	2.00	10.15	Horizontal	-52.99	-13.00	39.99	315
3	2482.1	-60.53	2.51	11.35	Horizontal	-53.84	-13.00	40.84	135
4	3305.6	-62.56	4.20	10.85	Horizontal	-58.06	-13.00	45.06	315
5	4132.0	-60.29	5.20	11.35	Horizontal	-56.29	-13.00	43.29	135
6	4958.4	-58.81	5.50	11.95	Horizontal	-54.51	-13.00	41.51	225
7	5784.8	-59.46	5.70	13.55	Horizontal	-53.76	-13.00	40.76	45
8	6611.2	-55.72	6.30	13.75	Horizontal	-50.42	-13.00	37.42	90
9	7437.6	-53.59	6.80	13.85	Horizontal	-48.69	-13.00	35.69	0
10	8264.0	-53.34	6.90	14.25	Horizontal	-48.14	-13.00	35.14	225

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

### WCDMA Band V CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1675.1	-59.66	2.00	10.75	Horizontal	-53.06	-13.00	40.06	180
3	2509.7	-60.60	2.51	11.05	Horizontal	-54.21	-13.00	41.21	270
4	3346.4	-63.76	4.20	11.15	Horizontal	-58.96	-13.00	45.96	180
5	4183.0	-59.49	5.20	11.15	Horizontal	-55.69	-13.00	42.69	135
6	5019.6	-57.59	5.50	11.95	Horizontal	-53.29	-13.00	40.29	315
7	5856.2	-58.85	5.70	13.55	Horizontal	-53.15	-13.00	40.15	270
8	6692.8	-56.02	6.30	13.75	Horizontal	-50.72	-13.00	37.72	135
9	7529.4	-54.05	6.80	13.85	Horizontal	-49.15	-13.00	36.15	315
10	8366.0	-52.67	6.90	14.25	Horizontal	-47.47	-13.00	34.47	270

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



## WCDMA Band V CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1691.6	-60.42	2.00	10.15	Horizontal	-54.42	-13.00	41.42	135
3	2536.3	-60.86	2.51	11.05	Horizontal	-54.47	-13.00	41.47	45
4	3386.4	-63.54	4.20	11.15	Horizontal	-58.74	-13.00	45.74	45
5	4233.0	-59.39	5.20	11.15	Horizontal	-55.59	-13.00	42.59	270
6	5079.6	-57.58	5.50	11.95	Horizontal	-53.28	-13.00	40.28	90
7	5926.2	-57.85	5.70	13.55	Horizontal	-52.15	-13.00	39.15	45
8	6772.8	-56.05	6.30	13.75	Horizontal	-50.75	-13.00	37.75	225
9	7619.4	-53.63	6.80	13.85	Horizontal	-48.73	-13.00	35.73	135
10	8466.0	-54.99	6.90	14.25	Horizontal	-49.79	-13.00	36.79	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

## LTE Band 5 10MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1649.0	-55.18	2.00	10.75	Horizontal	-48.58	-13.00	35.58	135
3	2473.7	-57.92	2.51	11.05	Horizontal	-51.53	-13.00	38.53	315
4	3316.0	-63.62	4.20	11.15	Horizontal	-58.82	-13.00	45.82	135
5	4145.0	-57.93	5.20	11.15	Horizontal	-54.13	-13.00	41.13	225
6	4974.0	-57.92	5.50	11.95	Horizontal	-53.62	-13.00	40.62	180
7	5803.0	-58.53	5.70	13.55	Horizontal	-52.83	-13.00	39.83	270
8	6632.0	-55.78	6.30	13.75	Horizontal	-50.48	-13.00	37.48	45
9	7461.0	-54.06	6.80	13.85	Horizontal	-49.16	-13.00	36.16	225
10	8290.0	-52.93	6.90	14.25	Horizontal	-47.73	-13.00	34.73	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



## LTE Band 5 10MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1664.1	-58.81	2.00	10.75	Horizontal	-52.21	-13.00	39.21	270
3	2496.2	-57.82	2.51	11.05	Horizontal	-51.43	-13.00	38.43	90
4	3346.0	-63.70	4.20	11.15	Horizontal	-58.90	-13.00	45.90	135
5	4182.5	-57.93	5.20	11.15	Horizontal	-54.13	-13.00	41.13	90
6	5019.0	-57.24	5.50	11.95	Horizontal	-52.94	-13.00	39.94	45
7	5855.5	-58.83	5.70	13.55	Horizontal	-53.13	-13.00	40.13	90
8	6692.0	-55.84	6.30	13.75	Horizontal	-50.54	-13.00	37.54	90
9	7528.5	-53.82	6.80	13.85	Horizontal	-48.92	-13.00	35.92	135
10	8365.0	-53.35	6.90	14.25	Horizontal	-48.15	-13.00	35.15	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

## LTE Band 5 10MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1679.1	-54.32	2.00	10.75	Horizontal	-47.72	-13.00	34.72	315
3	2518.7	-53.00	2.51	11.05	Horizontal	-46.61	-13.00	33.61	45
4	3376.0	-62.69	4.20	11.15	Horizontal	-57.89	-13.00	44.89	225
5	4220.0	-56.46	5.20	11.15	Horizontal	-52.66	-13.00	39.66	135
6	5064.0	-56.93	5.50	11.95	Horizontal	-52.63	-13.00	39.63	270
7	5908.0	-57.57	5.70	13.55	Horizontal	-51.87	-13.00	38.87	315
8	6752.0	-55.92	6.30	13.75	Horizontal	-50.62	-13.00	37.62	135
9	7596.0	-54.62	6.80	13.85	Horizontal	-49.72	-13.00	36.72	225
10	8440.0	-54.28	6.90	14.25	Horizontal	-49.08	-13.00	36.08	180

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



## LTE Band 26 15MHz CH-Low

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1663.00	-55.75	2.00	10.75	Horizontal	-49.15	-13.00	36.15	0
3	2494.50	-53.81	2.51	11.05	Horizontal	-47.42	-13.00	34.42	45
4	3286.00	-62.75	4.20	11.15	Horizontal	-57.95	-13.00	44.95	45
5	4107.50	-60.06	5.20	11.15	Horizontal	-56.26	-13.00	43.26	45
6	4929.00	-57.99	5.50	11.95	Horizontal	-53.69	-13.00	40.69	0
7	5750.50	-59.45	5.70	13.55	Horizontal	-53.75	-13.00	40.75	45
8	6572.00	-56.86	6.30	13.75	Horizontal	-51.56	-13.00	38.56	45
9	7393.50	-54.13	6.80	13.85	Horizontal	-49.23	-13.00	36.23	225
10	8215.00	-52.78	6.90	14.25	Horizontal	-47.58	-13.00	34.58	315

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.

## LTE Band 26 15MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1673.00	-53.01	2.00	10.75	Horizontal	-46.41	-13.00	33.41	90
3	2509.50	-51.82	2.51	11.05	Horizontal	-45.43	-13.00	32.43	45
4	3346.00	-63.16	4.20	11.15	Horizontal	-58.36	-13.00	45.36	225
5	4182.50	-59.43	5.20	11.15	Horizontal	-55.63	-13.00	42.63	315
6	5019.00	-57.79	5.50	11.95	Horizontal	-53.49	-13.00	40.49	135
7	5855.50	-59.01	5.70	13.55	Horizontal	-53.31	-13.00	40.31	45
8	6692.00	-56.96	6.30	13.75	Horizontal	-51.66	-13.00	38.66	225
9	7528.50	-54.34	6.80	13.85	Horizontal	-49.44	-13.00	36.44	315
10	8365.00	-54.56	6.90	14.25	Horizontal	-49.36	-13.00	36.36	225

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



## LTE Band 26 15MHz CH-High

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1683.00	-56.45	2.00	10.75	Horizontal	-49.85	-13.00	36.85	0
3	2524.50	-52.09	2.51	11.05	Horizontal	-45.70	-13.00	32.70	45
4	3366.00	-63.33	4.20	11.15	Horizontal	-58.53	-13.00	45.53	315
5	4207.50	-60.39	5.20	11.15	Horizontal	-56.59	-13.00	43.59	135
6	5049.00	-58.54	5.50	11.95	Horizontal	-54.24	-13.00	41.24	90
7	5890.50	-58.78	5.70	13.55	Horizontal	-53.08	-13.00	40.08	45
8	6732.00	-56.72	6.30	13.75	Horizontal	-51.42	-13.00	38.42	0
9	7573.50	-54.58	6.80	13.85	Horizontal	-49.68	-13.00	36.68	45
10	8415.00	-55.45	6.90	14.25	Horizontal	-50.25	-13.00	37.25	90

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2.The worst emission was found in the antenna is Horizontal position.



## 6. Main Test Instruments

May 25, 2018 ~ June 27, 2018

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	NA	NA
Spectrum Analyzer	Agilent	N9010A	MY47191109	2018-05-20	2019-05-19
Universal Radio Communication Tester	Agilent	E5515C	MY48367192	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV30	100815	2017-12-17	2018-12-16
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Signal generator	R&S	SMB 100A	102594	2018-05-13	2019-05-12
Signal generator	R&S	SMR27	100365	2018-05-14	2019-05-13
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2014-12-06	2019-12-05
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102644	2015-01-30	2020-01-29
Climatic Chamber	Re Ce	PT-30B	20101891	2015-07-18	2018-07-17
RF Cable	Agilent	SMA 15cm	0001	2018-02-03	2018-08-02
Preampflier	R&S	SCU18	102327	2018-05-20	2019-05-19
Software	R&S	EMC32	V 8.52.0	NA	NA
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-07	2019-05-06



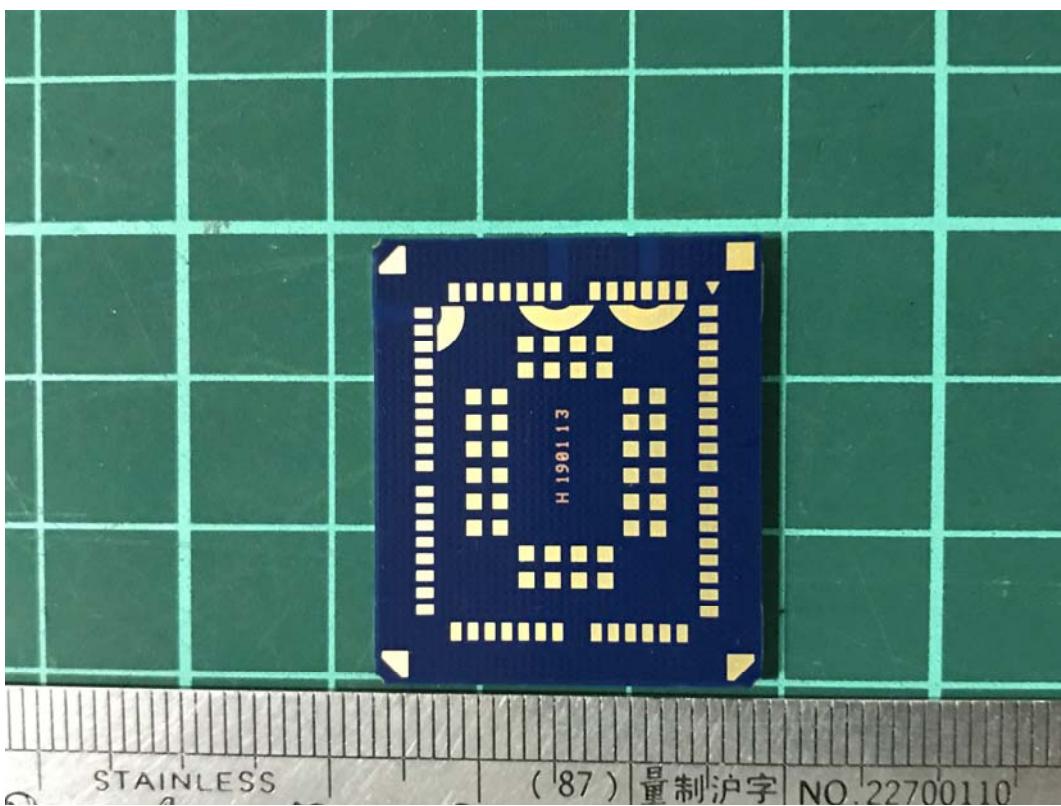
February 17, 2019 ~ March 10, 2019

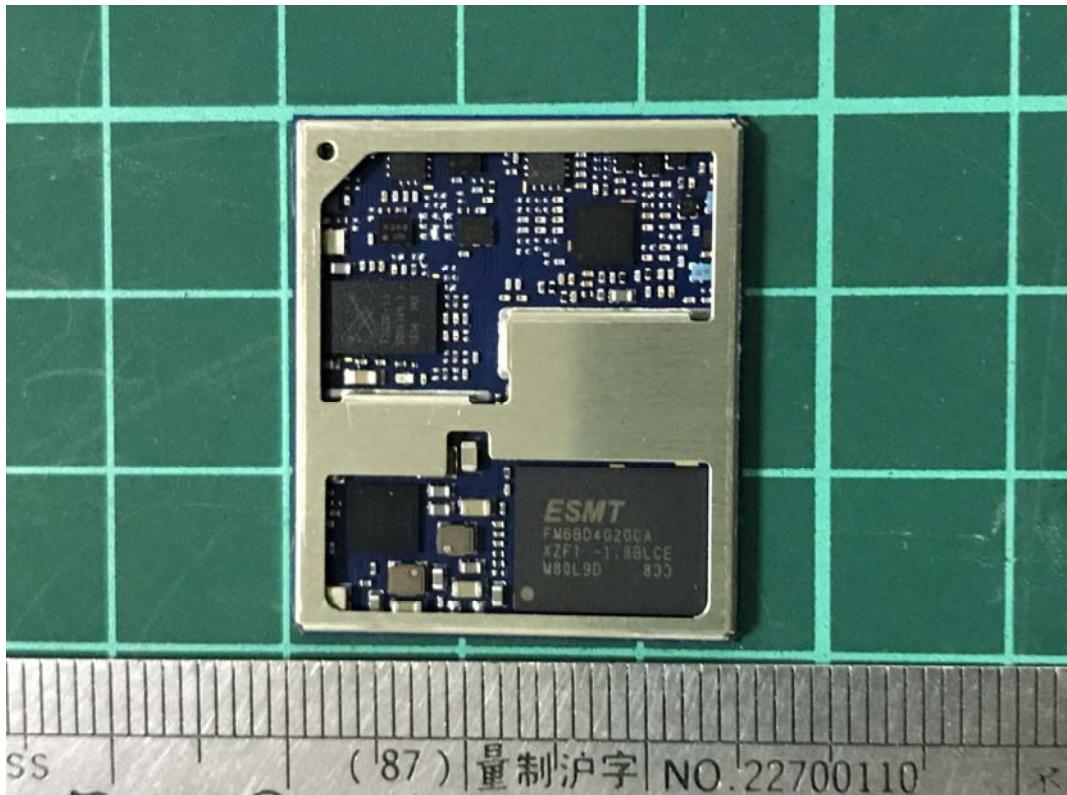
Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2018-05-20	2019-05-19
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2018-05-20	2019-05-19
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2018-05-20	2019-05-19
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
Signal generator	R&S	SMB 100A	102594	2018-05-20	2019-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2019-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2019-11-17
Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2018-05-20	2019-05-19
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-21	2019-05-20
RF Cable	Agilent	SMA 15cm	0001	/	/
Software	R&S	EMC32	9.26.0	/	/

\*\*\*\*\*END OF REPORT \*\*\*\*\*

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance

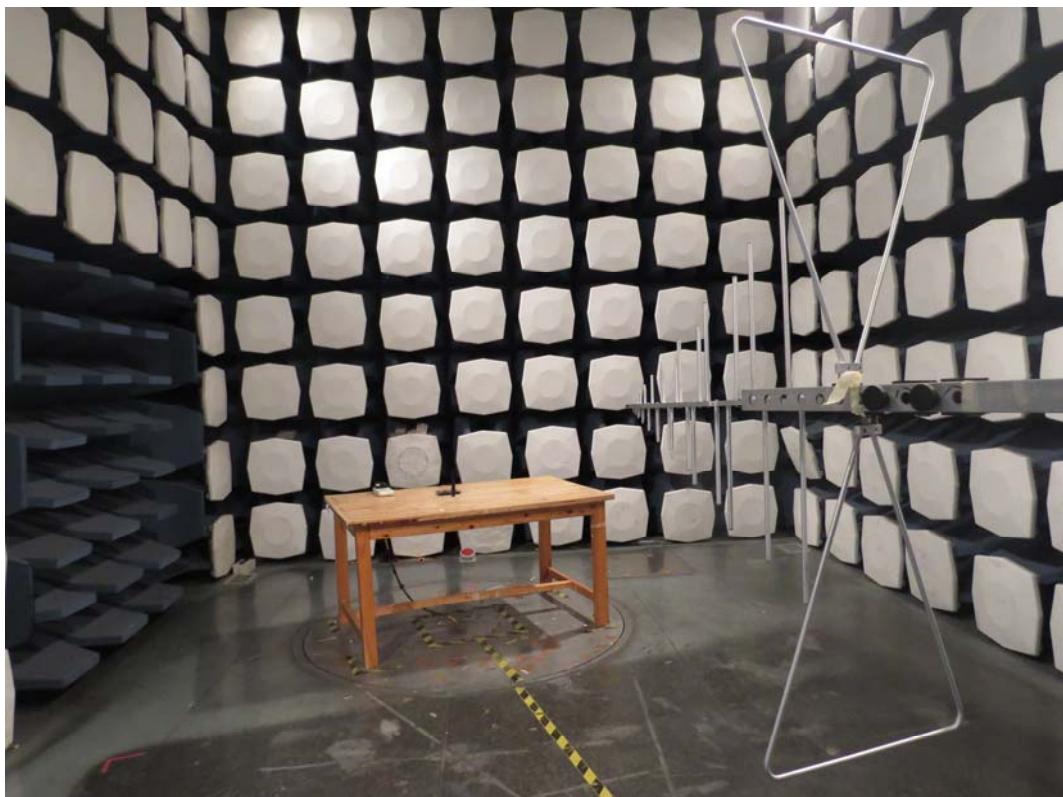




a: EUT

Picture 1 EUT and Accessory

## A.2 Test Setup



**Picture 2 Radiated Spurious Emissions Test setup**