



RF TEST REPORT

Applicant Quectel Wireless Solutions Co., Ltd
FCC ID XMR202008EC25AFXD
Product LTE Module
Brand Quectel
Model EC25-AFXD; EC25-AFXD MINIPCIE
Report No. R2203A0238-R3
Issue Date April 11, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 2 (2021)/ FCC CFR47 Part 27C (2021)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of Measurement Results

Number	Test Case	Clause in FCC rules	Verdict
1	RF power output	2.1046	PASS
2	Effective Isotropic Radiated power	27.50(d)(4)/27.50(b)(10)/27.50(c)(10) /27.50(h)(2)	PASS
3	Occupied Bandwidth	2.1049	PASS
4	Band Edge Compliance	27.53(h) /27.53(g) /27.53(f) /27.53(c) /27.53(m)	PASS
5	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS
6	Frequency Stability	2.1055 / 27.54	PASS
7	Spurious Emissions at Antenna Terminals	2.1051 /27.53(h) /27.53(g) /27.53(f)	PASS
8	Radiates Spurious Emission	2.1053 /27.53(h) /27.53(g) /27.53(f)	PASS
Date of Testing: (Original) June 29, 2018~ July 16, 2018 and July 30, 2018~ July 31, 2018 and August 3, 2019~ August 13, 2019 (Variant) March 19, 2022 ~ March 29, 2022 Date of Sample Received: (Variant) March 18, 2022			
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. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.			

EC25-AFXD; EC25-AFXD MINIPCIE (Report No.: R2203A0238-R3) is a variant model of EC25-AFXD; EC25-AFXD MINIPCIE (Report No.: R2007A0434-R3). Test values duplicated from Original for variant. This report adds information and tests related to HSPA+. The detailed product change description please refers to the ANNEX D.

EC25-AFXD; EC25-AFXD MINIPCIE (Report No.: R2007A0434-R3) is a variant model of EC25-AFX; EC25-AFX MINIPCIE (Report No.: R1907A0408-R3V1). Only Radiated Spurious Emissions of the worst band are verified for EC25-AFXD; EC25-AFXD MINIPCIE. The data did not get worse so it was not recorded in this report. The detailed product change description please refers to the ANNEX C.



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

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.

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.
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2 General Description of Equipment under Test

Client Information

Applicant	Quectel Wireless Solutions Co., Ltd
Applicant address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233
Manufacturer	Quectel Wireless Solutions Co., Ltd
Manufacturer address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

General information

EUT Description			
Model	EC25-AFXD; EC25-AFXD MINIPCIE		
IMEI	863010031218428		
Hardware Version	R1.0		
Software Version	EC25AFXDGAR07A01M1G		
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	4dBi		
Test Mode(s)	WCDMA Band IV; LTE Band 4/12/13/ 66/ 71;		
Test Modulation	(WCDMA)QPSK 16QAM; (LTE)QPSK 16QAM;		
HSDPA UE Category	24		
HSUPA UE Category	6		
LTE Category	4		
Maximum E.I.R.P./ E.R.P.	WCDMA Band IV:	25.62dBm	
	LTE Band 4:	26.08dBm	
	LTE Band 12:	20.48dBm	
	LTE Band 13:	23.63dBm	
	LTE Band 66:	27.51dBm	
	LTE Band 71:	22.72dBm	
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)	Mode	Tx (MHz)	Rx (MHz)
	WCDMA Band IV	1710 ~ 1755	2110 ~ 2155
	LTE Band 4	1710 ~ 1755	2110 ~ 2155



	LTE Band 12	699 ~ 716	729 ~ 746
	LTE Band 13	777 ~ 787	746 ~ 756
	LTE Band 66	1710 ~ 1780	2110 ~ 2200
	LTE Band 71	663 ~ 698	617 ~ 652

Note: 1. The information of the EUT is declared by the manufacturer.

Accessory equipment	
Evaluation Board	RF Cable
RS232-to-USB Cable	Antenna: Dipole Antenna
Headset	DC 5V Adaptor

EC25-AFX and EC25-AFX MINIPCIE are all LTE modules. They support the same frequency bands, use the same chipset and share the same software & hardware design. The main difference is on the carrier board.

EC25-AFX MINIPCIE makes up of EC25-AFX module and PCIe transferred board.

The transferred board switches EC25-AFX module to follow PCI Express Mini Card 1.2 standard connector protocol. No any other internal changes in EC25-AFX module.

Two models are identical in interior structure and components, and just connector interface is different for the marketing requirement.



3 Applied Standards

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

Test standards:

FCC CFR47 Part 27C (2019)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2019)

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 (Xaxis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations 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.

The following testing in different Bandwidth is set to detailin the following table:

Test modes are chosen to be reported as the worst case configuration below for WCDMA Band IV:

Test items	Modes/Modulation
	WCDMA Band IV
RF power output	RMC HSDPA/HSUPA DC-HSDPA/HSPA+
Effective Isotropic 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 to be reported as the worst case configuration below for LTE Band 4/12/13/66/71:

Test items	Modes	Bandwidth (MHz)						Modulation		RB			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	50%	100%	L	M	H
RF power output	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	O	O	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	O	O	O	O	O	O
	LTE 66	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 71	-	-	O	O	O	O	O	O	O	O	O	O	O	O
Effective Isotropic	LTE 4	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	O	O	O	O	O	O



Radiated power	LTE 13	-	-	O	O	-	-	O	O	O	O	O	O	O	O
	LTE 66	O	O	O	O	O	O	O	O	O	O	O	O	O	O
	LTE 71	-	-	O	O	O	O	O	O	O	O	O	O	O	O
Occupied Bandwidth	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 66	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 71	-	-	O	O	O	O	O	O	-	-	O	O	O	O
Band Edge Compliance	LTE 4	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	LTE 12	O	O	O	O	-	-	O	O	O	-	O	O	-	O
	LTE 13	-	-	O	O	-	-	O	O	O	-	O	O	-	O
	LTE 66	O	O	O	O	O	O	O	O	O	-	O	O	-	O
	LTE 71	-	-	O	O	O	O	O	O	O	-	O	O	-	O
Peak-to-Average Power Ratio	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	O	O	O
	LTE 66	O	O	O	O	O	O	O	O	-	-	O	O	O	O
	LTE 71	-	-	O	O	O	O	O	O	-	-	O	O	O	O
Frequency Stability	LTE 4	O	O	O	O	O	O	O	O	-	-	O	O	-	O
	LTE 12	O	O	O	O	-	-	O	O	-	-	O	O	-	O
	LTE 13	-	-	O	O	-	-	O	O	-	-	O	O	-	O
	LTE 66	O	O	O	O	O	O	O	O	-	-	O	O	-	O
	LTE 71	-	-	O	O	O	O	O	O	-	-	O	O	-	O
Spurious Emissions at Antenna Terminals	LTE 4	O	O	O	O	O	O	O	-	O	O	O	O	O	O
	LTE 12	O	O	O	O	-	-	O	-	O	O	O	O	O	O
	LTE 13	-	-	O	O	-	-	O	-	O	O	O	O	O	O
	LTE 66	O	O	O	O	O	O	O	-	O	O	O	O	O	O
	LTE 71	-	-	O	O	O	O	O	-	O	O	O	O	O	O
Radiates Spurious Emission	LTE 4	O	-	O	-	-	O	O	-	O	-	-	O	O	O
	LTE 12	O	-	O	O	-	-	O	-	O	-	-	O	O	O
	LTE 13	-	-	O	O	-	-	O	-	O	-	-	O	O	O
	LTE 66	O	-	O	O	-	O	O	-	O	-	-	O	O	O
	LTE 71	-	-	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.														

5 Test Case Results

5.1 RF Power Output

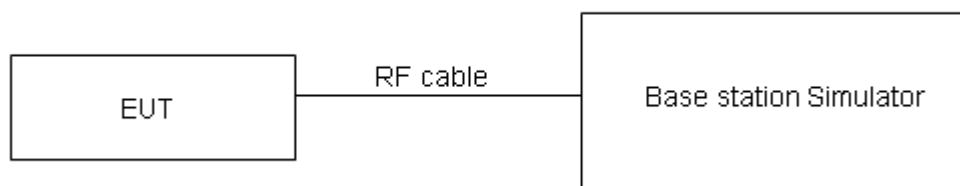
Ambient condition

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 IV		AV Conducted Power(dBm)		
		Channel 1312	Channel 1413	Channel 1513
		1712.4 (MHz)	1732.6 (MHz)	1752.6(MHz)
RMC		23.39	23.34	23.25
HSDPA	Sub - Test 1	22.36	22.16	22.19
	Sub - Test 2	22.44	22.14	22.26
	Sub - Test 3	21.83	21.64	21.78
	Sub - Test 4	21.92	21.69	21.76
HSUPA	Sub - Test 1	22.13	22.15	22.07
	Sub - Test 2	21.80	21.73	21.63
	Sub - Test 3	22.27	22.21	22.12
	Sub - Test 4	22.37	22.13	22.16
	Sub - Test 5	22.44	22.18	22.19
DC-HSDPA	Sub - Test 1	22.73	22.70	22.82
	Sub - Test 2	22.72	22.69	22.58
	Sub - Test 3	22.30	22.18	22.09
	Sub - Test 4	22.29	22.17	22.34
HSPA+	16QAM	20.25	20.14	20.28



LTE Band 4				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	23.55	23.20	23.42
		1	2	23.44	23.53	23.46
		1	5	23.20	23.54	23.68
		3	0	23.32	23.22	23.55
		3	2	23.28	23.33	23.40
		3	3	23.31	23.42	23.39
		6	0	22.30	22.40	22.64
	16QAM	1	0	22.45	22.25	23.27
		1	2	22.52	22.79	23.15
		1	5	22.38	22.98	23.37
		3	0	22.23	22.32	22.43
		3	2	22.32	22.39	22.26
		3	3	22.39	22.47	22.47
		6	0	21.34	21.48	21.68
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	23.57	23.24	23.45
		1	7	23.47	23.58	23.50
		1	14	23.23	23.59	23.72
		8	0	22.42	22.34	22.68
		8	4	22.40	22.43	22.52
		8	7	22.41	22.53	22.49
		15	0	22.33	22.44	22.67
	16QAM	1	0	22.48	22.27	23.30
		1	7	22.55	22.84	23.19
		1	14	22.40	23.02	23.40
		8	0	21.34	21.45	21.55
		8	4	21.43	21.52	21.38
		8	7	21.49	21.59	21.60
		15	0	21.37	21.52	21.71
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	23.54	23.22	23.41
		1	13	23.45	23.54	23.47
		1	24	23.20	23.54	23.68
		12	0	22.39	22.29	22.64
		12	6	22.38	22.39	22.47
		12	13	22.39	22.51	22.45
		25	0	22.31	22.43	22.65



	16QAM	1	0	22.45	22.23	23.27
		1	13	22.52	22.82	23.16
		1	24	22.37	23.00	23.36
		12	0	21.32	21.41	21.52
		12	6	21.40	21.47	21.34
		12	13	21.46	21.54	21.56
		25	0	21.35	21.48	21.66
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	23.56	23.23	23.44
		1	25	23.48	23.59	23.51
		1	49	23.22	23.58	23.71
		25	0	22.42	22.34	22.68
		25	13	22.41	22.44	22.51
		25	25	22.41	22.55	22.50
		50	0	22.39	22.45	22.69
	16QAM	1	0	22.47	22.26	23.29
		1	25	22.55	22.86	23.19
		1	49	22.40	23.02	23.39
		25	0	21.35	21.46	21.56
		25	13	21.42	21.51	21.37
		25	25	21.49	21.59	21.60
		50	0	21.38	21.53	21.70
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	23.55	23.19	23.42
		1	38	23.46	23.58	23.48
		1	74	23.19	23.53	23.67
		36	0	22.40	22.30	22.65
		36	18	22.38	22.39	22.47
		36	39	22.38	22.52	22.46
		75	0	22.37	22.41	22.64
	16QAM	1	0	22.42	22.24	23.27
		1	38	22.53	22.83	23.17
		1	74	22.37	22.98	23.36
		36	0	21.32	21.44	21.53
		36	18	21.39	21.46	21.33
		36	39	21.47	21.55	21.57
		75	0	21.35	21.48	21.66
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	23.52	23.15	23.39
		1	50	23.45	23.54	23.46



		1	99	23.17	23.52	23.64
		50	0	22.37	22.25	22.61
		50	25	22.36	22.35	22.44
		50	50	22.35	22.47	22.42
		100	0	22.34	22.36	22.60
	16QAM	1	0	22.40	22.20	23.22
		1	50	22.49	22.81	23.13
		1	99	22.35	22.95	23.34
		50	0	21.29	21.40	21.50
		50	25	21.36	21.44	21.30
		50	50	21.44	21.50	21.53
		100	0	21.33	21.44	21.63

LTE Band 12				AV Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	23.63	23.64	23.61
		1	2	23.67	23.57	23.69
		1	5	23.61	23.50	23.70
		3	0	23.50	23.54	23.63
		3	2	23.45	23.50	23.54
		3	3	23.66	23.62	23.63
		6	0	22.61	22.57	22.65
	16QAM	1	0	22.95	22.18	22.96
		1	2	22.94	22.55	23.20
		1	5	22.76	22.36	22.86
		3	0	22.58	22.60	22.74
		3	2	22.52	22.50	22.51
		3	3	22.52	22.58	22.46
		6	0	21.71	21.63	21.84
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	23.65	23.68	23.64
		1	7	23.70	23.62	23.73
		1	14	23.64	23.55	23.74
		8	0	22.60	22.66	22.76
		8	4	22.57	22.60	22.66
		8	7	22.76	22.73	22.73
		15	0	22.64	22.61	22.68
	16QAM	1	0	22.98	22.20	22.99
		1	7	22.97	22.60	23.24



		1	14	22.78	22.40	22.89
		8	0	21.69	21.73	21.86
		8	4	21.63	21.63	21.63
		8	7	21.62	21.70	21.59
		15	0	21.74	21.67	21.87
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	23.63	23.63	23.61
		1	13	23.69	23.62	23.71
		1	24	23.60	23.49	23.69
		12	0	22.58	22.62	22.73
		12	6	22.55	22.56	22.61
		12	13	22.73	22.72	22.70
		25	0	22.68	22.58	22.65
	16QAM	1	0	22.92	22.17	22.96
		1	13	22.95	22.59	23.22
		1	24	22.75	22.36	22.85
		12	0	21.67	21.72	21.84
		12	6	21.59	21.57	21.58
		12	13	21.60	21.66	21.56
		25	0	21.72	21.63	21.82
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23060/704	23095/707.5	23130/711
10MHz	QPSK	1	0	23.60	23.59	23.58
		1	25	23.68	23.58	23.69
		1	49	23.58	23.48	23.66
		25	0	22.55	22.57	22.69
		25	13	22.53	22.52	22.58
		25	25	22.70	22.67	22.66
		50	0	22.65	22.53	22.61
	16QAM	1	0	22.90	22.13	22.91
		1	25	22.91	22.57	23.18
		1	49	22.73	22.33	22.83
		25	0	21.64	21.68	21.81
		25	13	21.56	21.55	21.55
		25	25	21.57	21.61	21.52
		50	0	21.70	21.59	21.79



LTE Band 13				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				23205/779.5	23230/782	23255/784.5
5MHz	QPSK	1	0	23.72	23.63	23.78
		1	13	23.79	23.68	23.77
		1	24	23.58	23.69	23.65
		12	0	22.87	22.77	22.82
		12	6	22.85	22.80	22.86
		12	13	22.75	22.82	22.83
		25	0	22.81	22.74	22.80
	16QAM	1	0	23.06	22.41	22.60
		1	13	23.14	22.45	22.35
		1	24	23.03	22.16	22.43
		12	0	21.50	21.52	21.68
		12	6	21.63	21.75	21.65
		12	13	21.76	21.60	21.57
		25	0	21.74	21.96	21.62
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				/	23230/782	/
10MHz	QPSK	1	0	/	23.76	/
		1	25	/	23.85	/
		1	49	/	23.71	/
		25	0	/	22.87	/
		25	13	/	22.79	/
		25	25	/	22.88	/
		50	0	/	22.74	/
	16QAM	1	0	/	23.11	/
		1	25	/	23.41	/
		1	49	/	22.94	/
		25	0	/	21.78	/
		25	13	/	21.83	/
		25	25	/	21.88	/
		50	0	/	21.82	/

LTE Band 66				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131979/1710.7	132322/1745	132665/1779.3
1.4MHz	QPSK	1	0	23.42	23.57	23.56
		1	2	23.30	23.76	23.57
		1	5	23.37	23.64	23.45
		3	0	23.47	23.58	23.26



		3	2	23.35	23.75	23.33
		3	3	23.59	23.55	23.36
		6	0	22.51	22.73	22.34
	16QAM	1	0	22.84	22.38	22.20
		1	2	22.43	22.76	22.57
		1	5	22.57	22.42	22.22
		3	0	22.53	22.57	22.27
		3	2	22.32	22.76	22.43
		3	3	22.69	22.62	22.45
		6	0	21.65	21.84	21.45
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131987/1711.5	132322/1745	132657/1778.5
3MHz	QPSK	1	0	23.44	23.61	23.59
		1	7	23.33	23.81	23.61
		1	14	23.40	23.69	23.49
		8	0	22.57	22.70	22.39
		8	4	22.47	22.85	22.45
		8	7	22.69	22.66	22.46
		15	0	22.54	22.77	22.37
	16QAM	1	0	22.87	22.40	22.23
		1	7	22.46	22.81	22.61
		1	14	22.59	22.46	22.25
		8	0	21.64	21.70	21.39
		8	4	21.43	21.89	21.55
		8	7	21.79	21.74	21.58
		15	0	21.68	21.88	21.48
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				131997/1712.5	132322/1745	132647/1777.5
5MHz	QPSK	1	0	23.41	23.59	23.55
		1	13	23.31	23.77	23.58
		1	24	23.37	23.64	23.45
		12	0	22.54	22.65	22.35
		12	6	22.45	22.81	22.40
		12	13	22.67	22.64	22.42
		25	0	22.52	22.76	22.35
	16QAM	1	0	22.84	22.36	22.20
		1	13	22.43	22.79	22.58
		1	24	22.56	22.44	22.21
		12	0	21.62	21.66	21.36
		12	6	21.40	21.84	21.51
		12	13	21.76	21.69	21.54
		25	0	21.66	21.84	21.43
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		



				132022/1715	132322/1745	132622/1775
10MHz	QPSK	1	0	23.43	23.60	23.58
		1	25	23.34	23.82	23.62
		1	49	23.39	23.68	23.48
		25	0	22.57	22.70	22.39
		25	13	22.48	22.86	22.44
		25	25	22.69	22.68	22.47
		50	0	22.60	22.78	22.39
	16QAM	1	0	22.86	22.39	22.22
		1	25	22.46	22.83	22.61
		1	49	22.59	22.46	22.24
		25	0	21.65	21.71	21.40
		25	13	21.42	21.88	21.54
		25	25	21.79	21.74	21.58
		50	0	21.69	21.89	21.47
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				132047/1717.5	132322/1745	132597/1772.5
15MHz	QPSK	1	0	23.42	23.56	23.56
		1	38	23.32	23.81	23.59
		1	74	23.36	23.63	23.44
		36	0	22.55	22.66	22.36
		36	18	22.45	22.81	22.40
		36	39	22.66	22.65	22.43
		75	0	22.58	22.74	22.34
	16QAM	1	0	22.81	22.37	22.20
		1	38	22.44	22.80	22.59
		1	74	22.56	22.42	22.21
		36	0	21.62	21.69	21.37
		36	18	21.39	21.83	21.50
		36	39	21.77	21.70	21.55
		75	0	21.66	21.84	21.43
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				132072/1720	132322/1745	132572/1770
20MHz	QPSK	1	0	23.39	23.52	23.53
		1	50	23.31	23.77	23.57
		1	99	23.34	23.62	23.41
		50	0	22.52	22.61	22.32
		50	25	22.43	22.77	22.37
		50	50	22.63	22.60	22.39
		100	0	22.55	22.69	22.30
	16QAM	1	0	22.79	22.33	22.15
		1	50	22.40	22.78	22.55
		1	99	22.54	22.39	22.19



		50	0	21.59	21.65	21.34
		50	25	21.36	21.81	21.47
		50	50	21.74	21.65	21.51
		100	0	21.64	21.80	21.40

LTE Band 71				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133147/665.5	133297/680.5	133447/695.5
5MHz	QPSK	1	0	23.15	23.23	22.96
		1	13	23.44	23.23	23.08
		1	24	23.25	23.06	23.07
		12	0	22.15	22.33	22.29
		12	6	22.20	22.19	22.21
		12	13	22.38	22.36	22.33
		25	0	22.17	22.40	22.20
	16QAM	1	0	22.08	22.64	22.90
		1	13	22.20	22.85	22.91
		1	24	22.22	22.43	22.78
		12	0	21.29	21.23	21.07
		12	6	21.25	21.28	21.26
		12	13	21.38	21.23	21.13
		25	0	21.32	21.50	21.31
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133172/668	133297/680.5	133422/693
10MHz	QPSK	1	0	23.17	23.24	22.99
		1	25	23.47	23.28	23.12
		1	49	23.27	23.10	23.10
		25	0	22.18	22.38	22.33
		25	13	22.23	22.24	22.25
		25	25	22.40	22.40	22.38
		50	0	22.25	22.42	22.24
	16QAM	1	0	22.10	22.67	22.92
		1	25	22.23	22.89	22.94
		1	49	22.25	22.45	22.81
		25	0	21.32	21.28	21.11
		25	13	21.27	21.32	21.29
		25	25	21.41	21.28	21.17
		50	0	21.35	21.55	21.35
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133197/670.5	133297/680.5	133397/690.5
15MHz	QPSK	1	0	23.16	23.01	22.97



		1	38	23.45	23.11	23.09
		1	74	23.24	23.09	23.06
		36	0	22.16	22.25	22.30
		36	18	22.20	22.21	22.21
		36	39	22.37	22.13	22.34
		75	0	22.23	22.11	22.19
		1	0	22.05	22.07	22.90
	16QAM	1	38	22.21	22.09	22.92
		1	74	22.22	22.22	22.78
		36	0	21.29	21.25	21.08
		36	18	21.24	21.20	21.25
		36	39	21.39	21.12	21.14
		75	0	21.32	21.11	21.31
Bandwidth	Modulation	RB size	RB offset	Channel/Frequency (MHz)		
				133222/673	133322/683	133372/688
20MHz	QPSK	1	0	23.13	23.16	22.94
		1	50	23.44	23.23	23.07
		1	99	23.22	23.04	23.03
		50	0	22.13	22.29	22.26
		50	25	22.18	22.15	22.18
		50	50	22.34	22.32	22.30
		100	0	22.20	22.33	22.15
	16QAM	1	0	22.03	22.61	22.85
		1	50	22.17	22.84	22.88
		1	99	22.20	22.38	22.76
		50	0	21.26	21.22	21.05
		50	25	21.21	21.25	21.22
		50	50	21.36	21.19	21.10
		100	0	21.30	21.46	21.28



5.2 Effective Isotropic Radiated Power

Ambient condition

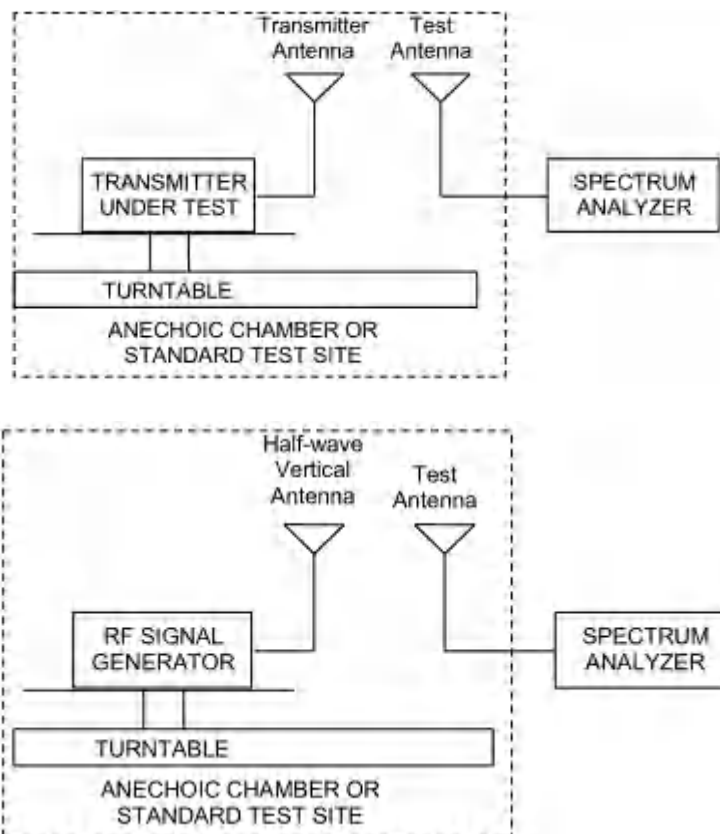
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

1. The testing follows FCC KDB 971168 D01 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. $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$
 - e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation: $ERP \text{ (dBm)} = LVL \text{ (dBm)} + LOSS \text{ (dB)}$
 - 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:
 $EIRP \text{ (dBm)} = \text{Output Power (dBm)} - \text{Losses (dB)} + \text{Antenna Gain (dBi)}$
where: dBd refers to gain relative to an ideal dipole.
 $EIRP \text{ (dBm)} = ERP \text{ (dBm)} + 2.15 \text{ (dB.)}$

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

Test setup



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

**Limits**

Rule Part 27.50(b) (10) specifies that “Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP”

Rule Part 27.50(c) (10) specifies that “Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP”

Rule Part 27.50(d) (4) specifies that “Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.”

Part 27.50(b)(10)Limit	$\leq 3 \text{ W}$ (34.77 dBm)
Part 27.50(c)(10)Limit	$\leq 3 \text{ W}$ (34.77 dBm)
Part 27.50(d)(4)Limit	$\leq 1 \text{ W}$ (30 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	EIRP (dBm)	Limit (dBm)	Conclusion
WCDMA Band IV	Low	1712.4	Horizontal	25.59	30	Pass
	Mid	1732.6	Horizontal	25.62	30	Pass
	High	1752.6	Horizontal	25.26	30	Pass

LTE Band 4						
Bandwidth	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1710.7	Horizontal	26.08	30	Pass
	Mid	1732.5	Horizontal	25.73	30	Pass
	High	1754.3	Horizontal	25.24	30	Pass
3 MHz (QPSK)	Low	1711.5	Horizontal	25.83	30	Pass
	Mid	1732.5	Horizontal	25.57	30	Pass
	High	1753.5	Horizontal	25.23	30	Pass
5 MHz (QPSK)	Low	1712.5	Horizontal	25.90	30	Pass
	Mid	1732.5	Horizontal	25.71	30	Pass
	High	1752.5	Horizontal	24.99	30	Pass
10 MHz (QPSK)	Low	1715	Horizontal	25.56	30	Pass
	Mid	1732.5	Horizontal	25.55	30	Pass
	High	1750	Horizontal	25.69	30	Pass
15 MHz (QPSK)	Low	1717.5	Horizontal	25.87	30	Pass
	Mid	1732.5	Horizontal	25.66	30	Pass
	High	1747.5	Horizontal	25.53	30	Pass
20 MHz (QPSK)	Low	1720	Horizontal	25.51	30	Pass
	Mid	1732.5	Horizontal	25.40	30	Pass
	High	1745	Horizontal	25.79	30	Pass
1.4 MHz (16QAM)	Low	1710.7	Horizontal	25.45	30	Pass
	Mid	1732.5	Horizontal	24.90	30	Pass
	High	1754.3	Horizontal	24.69	30	Pass
3 MHz (16QAM)	Low	1711.5	Horizontal	25.19	30	Pass
	Mid	1732.5	Horizontal	24.76	30	Pass
	High	1753.5	Horizontal	24.67	30	Pass
5 MHz (16QAM)	Low	1712.5	Horizontal	25.52	30	Pass
	Mid	1732.5	Horizontal	25.54	30	Pass
	High	1752.5	Horizontal	24.78	30	Pass
10 MHz (16QAM)	Low	1715	Horizontal	25.22	30	Pass
	Mid	1732.5	Horizontal	25.03	30	Pass
	High	1750	Horizontal	25.36	30	Pass



15 MHz (16QAM)	Low	1717.5	Horizontal	25.19	30	Pass
	Mid	1732.5	Horizontal	25.22	30	Pass
	High	1747.5	Horizontal	24.99	30	Pass
20 MHz (16QAM)	Low	1720	Horizontal	25.22	30	Pass
	Mid	1732.5	Horizontal	24.88	30	Pass
	High	1745	Horizontal	25.35	30	Pass

LTE Band 12						
Bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	699.7	Horizontal	18.96	34.77	Pass
	Mid	707.5	Horizontal	20.31	34.77	Pass
	High	715.3	Horizontal	20.26	34.77	Pass
3 MHz (QPSK)	Low	700.5	Horizontal	19.55	34.77	Pass
	Mid	707.5	Horizontal	19.90	34.77	Pass
	High	714.5	Horizontal	20.16	34.77	Pass
5 MHz (QPSK)	Low	701.5	Horizontal	19.11	34.77	Pass
	Mid	707.5	Horizontal	20.04	34.77	Pass
	High	713.5	Horizontal	20.48	34.77	Pass
10 MHz (QPSK)	Low	704	Horizontal	19.21	34.77	Pass
	Mid	707.5	Horizontal	19.33	34.77	Pass
	High	711	Horizontal	19.83	34.77	Pass
1.4 MHz (16QAM)	Low	699.7	Horizontal	18.66	34.77	Pass
	Mid	707.5	Horizontal	19.77	34.77	Pass
	High	715.3	Horizontal	19.97	34.77	Pass
3 MHz (16QAM)	Low	700.5	Horizontal	19.19	34.77	Pass
	Mid	707.5	Horizontal	19.56	34.77	Pass
	High	714.5	Horizontal	19.92	34.77	Pass
5 MHz (16QAM)	Low	701.5	Horizontal	18.89	34.77	Pass
	Mid	707.5	Horizontal	19.93	34.77	Pass
	High	713.5	Horizontal	20.38	34.77	Pass
10 MHz (16QAM)	Low	704	Horizontal	18.55	34.77	Pass
	Mid	707.5	Horizontal	18.57	34.77	Pass
	High	711	Horizontal	19.30	34.77	Pass



LTE Band 13						
Bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
5MHz (QPSK)	Low	779.5	Horizontal	23.26	34.77	Pass
	Mid	782	Horizontal	23.25	34.77	Pass
	High	784.5	Horizontal	23.36	34.77	Pass
10MHz (QPSK)	Mid	782	Horizontal	23.63	34.77	Pass
5MHz (16QAM)	Low	779.5	Horizontal	22.65	34.77	Pass
	Mid	782	Horizontal	22.89	34.77	Pass
	High	784.5	Horizontal	22.78	34.77	Pass
10MHz (16QAM)	Mid	782	Horizontal	23.26	34.77	Pass

LTE Band 66						
Band width	Channel	Frequency (MHz)	Polarization	EIRP (dBm)	Limit (dBm)	Conclusion
1.4 MHz (QPSK)	Low	1710.70	Horizontal	27.17	30	Pass
	Mid	1745.00	Horizontal	27.10	30	Pass
	High	1779.30	Horizontal	26.05	30	Pass
3 MHz (QPSK)	Low	1711.50	Horizontal	27.51	30	Pass
	Mid	1745.00	Horizontal	27.06	30	Pass
	High	1778.50	Horizontal	26.01	30	Pass
5 MHz (QPSK)	Low	1712.50	Horizontal	26.92	30	Pass
	Mid	1745.00	Horizontal	26.78	30	Pass
	High	1777.50	Horizontal	25.98	30	Pass
10 MHz (QPSK)	Low	1715.00	Horizontal	27.25	30	Pass
	Mid	1745.00	Horizontal	27.30	30	Pass
	High	1775.00	Horizontal	26.13	30	Pass
15 MHz (QPSK)	Low	1717.50	Horizontal	27.01	30	Pass
	Mid	1745.00	Horizontal	27.12	30	Pass
	High	1772.50	Horizontal	26.43	30	Pass
20 MHz (QPSK)	Low	1720.00	Horizontal	26.98	30	Pass
	Mid	1745.00	Horizontal	27.02	30	Pass
	High	1770.00	Horizontal	26.31	30	Pass
1.4 MHz (16QAM)	Low	1710.70	Horizontal	26.54	30	Pass
	Mid	1745.00	Horizontal	26.27	30	Pass
	High	1779.30	Horizontal	25.50	30	Pass
3 MHz (16QAM)	Low	1711.50	Horizontal	26.87	30	Pass
	Mid	1745.00	Horizontal	26.25	30	Pass
	High	1778.50	Horizontal	25.45	30	Pass



5 MHz (16QAM)	Low	1712.50	Horizontal	26.14	30	Pass
	Mid	1745.00	Horizontal	26.21	30	Pass
	High	1777.50	Horizontal	25.37	30	Pass
10 MHz (16QAM)	Low	1715.00	Horizontal	26.61	30	Pass
	Mid	1745.00	Horizontal	26.48	30	Pass
	High	1775.00	Horizontal	25.50	30	Pass
15 MHz (16QAM)	Low	1717.50	Horizontal	26.63	30	Pass
	Mid	1745.00	Horizontal	26.98	30	Pass
	High	1772.50	Horizontal	26.19	30	Pass
20 MHz (16QAM)	Low	1720.00	Horizontal	26.79	30	Pass
	Mid	1745.00	Horizontal	26.60	30	Pass
	High	1770.00	Horizontal	25.97	30	Pass

LTE Band 71						
Bandwidth	Channel	Frequency (MHz)	Polarization	ERP (dBm)	Limit (dBm)	Conclusion
5 MHz (QPSK)	Low	665.5	Horizontal	21.30	34.77	Pass
	Mid	680.5	Horizontal	22.72	34.77	Pass
	High	695.5	Horizontal	22.54	34.77	Pass
10 MHz (QPSK)	Low	668	Horizontal	21.15	34.77	Pass
	Mid	680.5	Horizontal	22.42	34.77	Pass
	High	693	Horizontal	22.17	34.77	Pass
15 MHz (QPSK)	Low	670.5	Horizontal	21.32	34.77	Pass
	Mid	680.5	Horizontal	21.74	34.77	Pass
	High	690.5	Horizontal	22.44	34.77	Pass
20 MHz (QPSK)	Low	673	Horizontal	21.41	34.77	Pass
	Mid	683	Horizontal	22.66	34.77	Pass
	High	688	Horizontal	22.52	34.77	Pass
5 MHz (16QAM)	Low	665.5	Horizontal	20.62	34.77	Pass
	Mid	680.5	Horizontal	22.25	34.77	Pass
	High	695.5	Horizontal	22.03	34.77	Pass
10 MHz (16QAM)	Low	668	Horizontal	20.61	34.77	Pass
	Mid	680.5	Horizontal	21.70	34.77	Pass
	High	693	Horizontal	21.64	34.77	Pass
15 MHz (16QAM)	Low	670.5	Horizontal	20.64	34.77	Pass
	Mid	680.5	Horizontal	21.30	34.77	Pass
	High	690.5	Horizontal	21.90	34.77	Pass
20 MHz (16QAM)	Low	673	Horizontal	20.92	34.77	Pass
	Mid	683	Horizontal	21.94	34.77	Pass
	High	688	Horizontal	21.88	34.77	Pass

Note: 1. EIRP= E.R.P+2.15

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 51 kHz, VBW is set to 160 kHz for WCDMA Band IV.

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/12/66 (1.4MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/66 (3MHz).

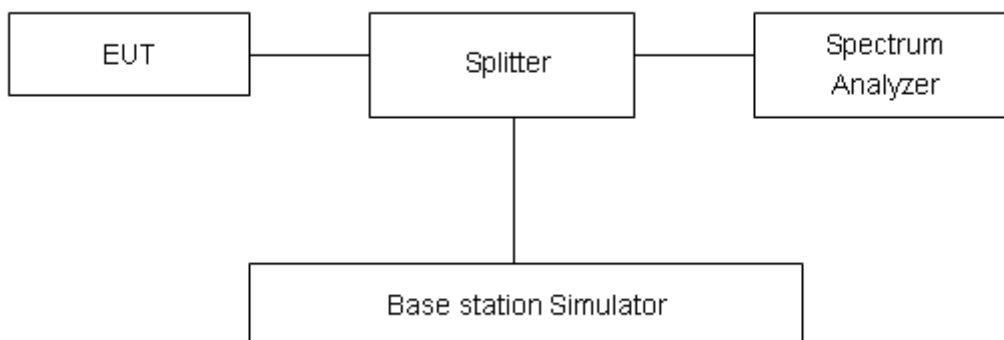
RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 4/12/13/66/71 (5MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/12/13/66/71 (10MHz).

RBW is set to 300 kHz, VBW is set to 1MHz for LTE Band 4/66/71 (15MHz/20MHz).

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

EC25-AFX

Mode	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
WCDMA Band IV (RMC)	1312	1712.4	4.1288	4.696
	1413	1732.6	4.1217	4.714
	1513	1752.6	4.1281	4.715

LTE Band 4						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	19957	1710.7	1.1282	1.366
			20175	1732.5	1.1272	1.362
			20393	1754.3	1.1412	1.369
		3	19965	1711.5	2.7521	3.075
			20175	1732.5	2.7431	3.075
			20385	1753.5	2.7428	3.085
		5	19975	1712.5	4.5161	5.049
			20175	1732.5	4.5341	5.033
			20375	1752.5	4.5121	5.057
		10	20000	1715	9.0083	10.070
			20175	1732.5	9.0383	10.210
			20350	1750	9.0426	10.080
		15	20025	1717.5	13.4140	14.650
			20175	1732.5	13.4770	14.810
			20325	1747.5	13.4540	14.740
		20	20050	1720	17.8660	19.240
			20175	1732.5	17.8520	19.150
			20300	1745	17.8910	19.490
	16QAM	1.4	19957	1710.7	1.1249	1.334
			20175	1732.5	1.1305	1.353
			20393	1754.3	1.1225	1.377
		3	19965	1711.5	2.7348	3.064
			20175	1732.5	2.7630	3.089
			20385	1753.5	2.7407	3.079
		5	19975	1712.5	4.5356	5.040
			20175	1732.5	4.5138	5.037
			20375	1752.5	4.5368	5.045
		10	20000	1715	9.0158	10.050



			20175	1732.5	9.0392	10.000
			20350	1750	9.0281	10.090
		15	20025	1717.5	13.4620	14.740
			20175	1732.5	13.4740	14.730
			20325	1747.5	13.4740	14.810
		20	20050	1720	17.8840	19.410
			20175	1732.5	17.9000	19.320
			20300	1745	17.8550	19.320

LTE Band 12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	23017	699.7	1.1276	1.362
			23095	707.5	1.1259	1.353
			23173	715.3	1.1378	1.342
		3	23025	700.5	2.7511	3.064
			23095	707.5	2.7413	3.074
			23165	714.5	2.7441	3.073
		5	23035	701.5	4.5181	5.050
			23095	707.5	4.5262	5.043
			23155	713.5	4.5110	4.989
		10	23060	704	9.0089	10.040
			23095	707.5	9.0229	10.090
			23130	711	9.0466	10.080
	16QAM	1.4	23017	699.7	1.1233	1.328
			23095	707.5	1.1305	1.335
			23173	715.3	1.1214	1.358
		3	23025	700.5	2.7342	3.065
			23095	707.5	2.7584	3.075
			23165	714.5	2.7401	3.068
		5	23035	701.5	4.5272	5.035
			23095	707.5	4.5071	5.026
			23155	713.5	4.5361	5.063
		10	23060	704	9.0130	10.070
			23095	707.5	9.0272	9.989
			23130	711	9.0403	10.110

LTE Band 13						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23205	779.5	4.5103	5.025



			23230	782	4.5307	5.036
			23255	784.5	4.4991	5.010
		10	23230	782	9.0332	10.120
	16QAM	5	23205	779.5	4.5294	5.034
			23230	782	4.5129	5.021
			23255	784.5	4.5367	5.032
		10	23230	782	9.0348	10.010

LTE Band 66						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	131979	1710.7	1.1295	1.385
			132322	1745	1.1286	1.364
			132665	1779.3	1.1383	1.350
		3	131987	1711.5	2.7481	3.070
			132322	1745	2.7435	3.077
			132657	1778.5	2.7434	3.068
		5	131997	1712.5	4.5159	5.042
			132322	1745	4.5347	5.042
			132647	1777.5	4.5042	5.037
		10	132022	1715	9.0110	10.110
			132322	1745	9.0427	10.200
			132622	1775	9.0373	10.050
		15	132047	1717.5	13.4110	14.730
			132322	1745	13.4790	14.730
			132597	1772.5	13.4530	14.720
		20	132072	1720	17.8570	19.260
			132322	1745	17.8840	19.310
			132572	1770	17.8970	19.500
	16QAM	1.4	131979	1710.7	1.1247	1.332
			132322	1745	1.1301	1.350
			132665	1779.3	1.1222	1.360
		3	131987	1711.5	2.7340	3.056
			132322	1745	2.7701	3.094
			132657	1778.5	2.7384	3.072
		5	131997	1712.5	4.5369	5.046
			132322	1745	4.5175	5.046
			132647	1777.5	4.5340	5.043
		10	132022	1715	9.0146	10.060
			132322	1745	9.0407	10.040



		15	132622	1775	9.0275	10.080
			132047	1717.5	13.4620	14.740
			132322	1745	13.4870	14.740
			132597	1772.5	13.4630	14.850
		20	132072	1720	17.8850	19.500
			132322	1745	17.8840	19.410
			132572	1770	17.8600	19.290

LTE Band 71						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
		5	133147	665.5	4.5101	5.025
			133297	680.5	4.5218	5.037
			133447	695.5	4.5052	5.012
		10	133172	668	9.0070	10.120
			133297	680.5	9.0348	10.180
			133422	693	9.0305	10.040
		15	133197	670.5	13.4130	14.720
			133297	680.5	13.4490	14.760
			133397	690.5	13.4690	14.790
		20	133222	673	17.8330	19.240
			133322	683	17.8680	19.250
			133372	688	17.9120	19.430
		5	133147	665.5	4.5289	5.040
			133297	680.5	4.5090	5.016
			133447	695.5	4.5335	5.047
		10	133172	668	9.0112	10.050
			133297	680.5	9.0370	10.030
			133422	693	9.0266	10.070
		15	133197	670.5	13.4550	14.740
			133297	680.5	13.4680	14.730
			133397	690.5	13.4770	14.790
		20	133222	673	17.8350	19.430
			133322	683	17.8930	19.330
			133372	688	17.8710	19.360



EC25-AFX MINIPCIE

LTE Band 12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	23095	707.5	1.1254	1.353
		3	23095	707.5	2.7455	3.081
		5	23095	707.5	4.5253	5.016
		10	23095	707.5	9.0398	10.140
	16QAM	1.4	23095	707.5	1.1285	1.334
		3	23095	707.5	2.7583	3.074
		5	23095	707.5	4.5101	5.022
		10	23095	707.5	9.0209	10.030

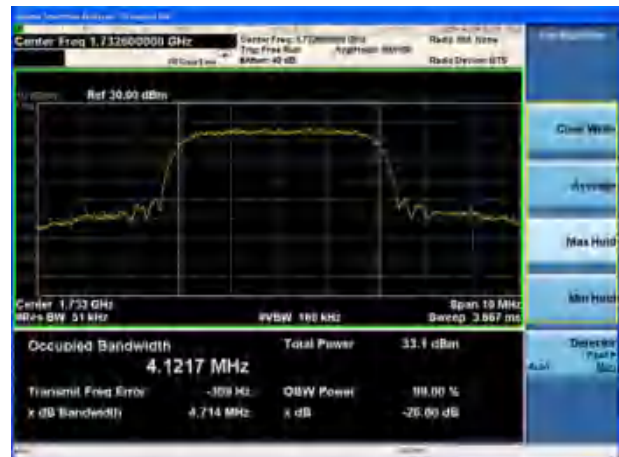


EC25-AFX

WCDMA Band IV CH-Low



WCDMA Band IV CH Middle



WCDMA Band IV CH High





LTE Band 4 QPSK 1.4MHz CH-Low



LTE Band 4 QPSK 3MHz CH-Low



LTE Band 4 QPSK 1.4MHz CH-Middle



LTE Band 4 QPSK 3MHz CH-Middle



LTE Band 4 QPSK 1.4MHz CH-High



LTE Band 4 QPSK 3MHz CH-High

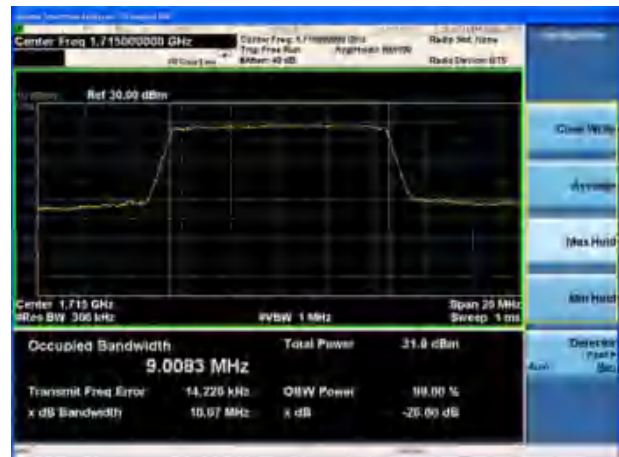




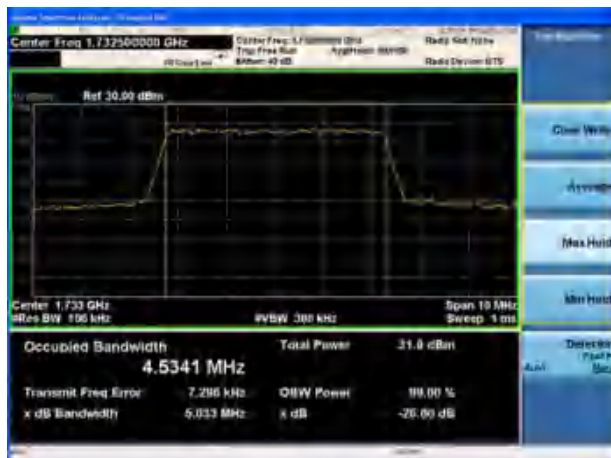
LTE Band 4 QPSK 5MHz CH-Low



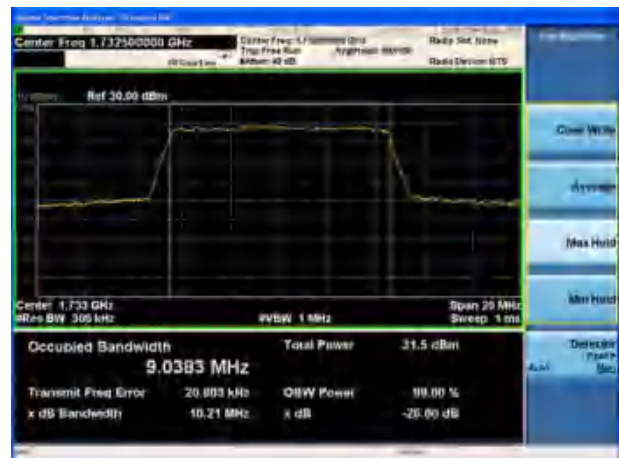
LTE Band 4 QPSK 10MHz CH-Low



LTE Band 4 QPSK 5MHz CH-Middle



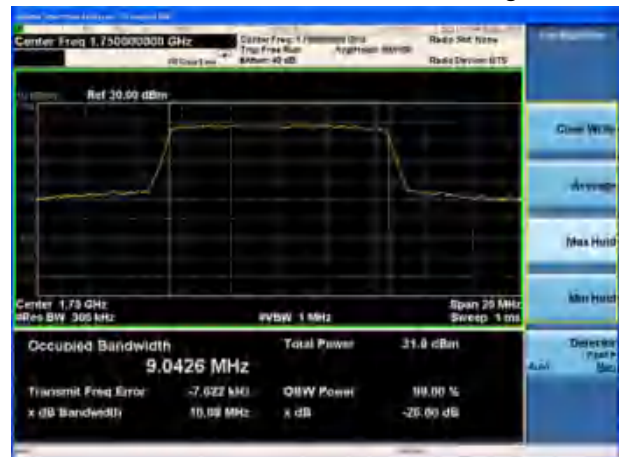
LTE Band 4 QPSK 10MHz CH-Middle



LTE Band 4 QPSK 5MHz CH-High

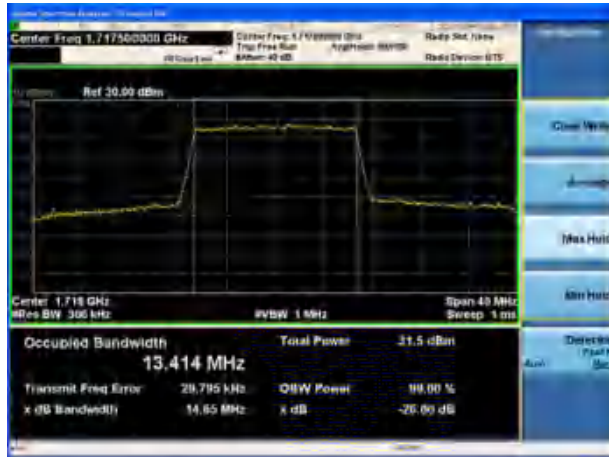


LTE Band 4 QPSK 10MHz CH-High

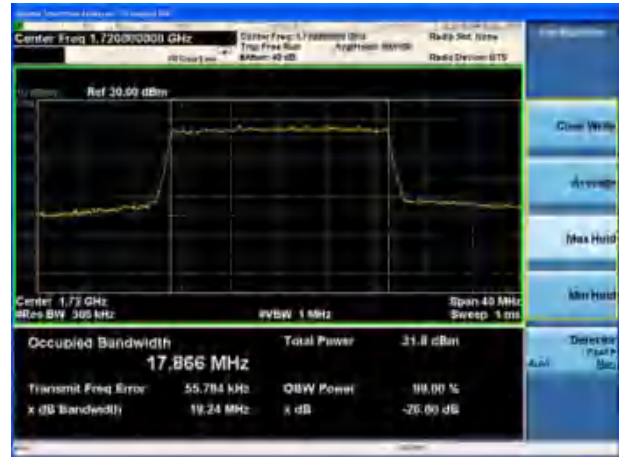




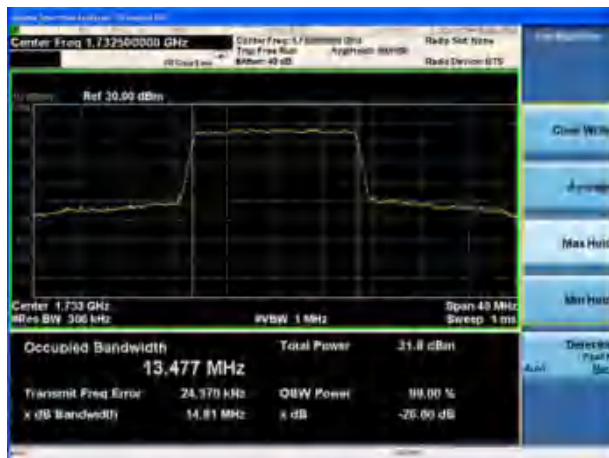
LTE Band 4 QPSK 15MHz CH-Low



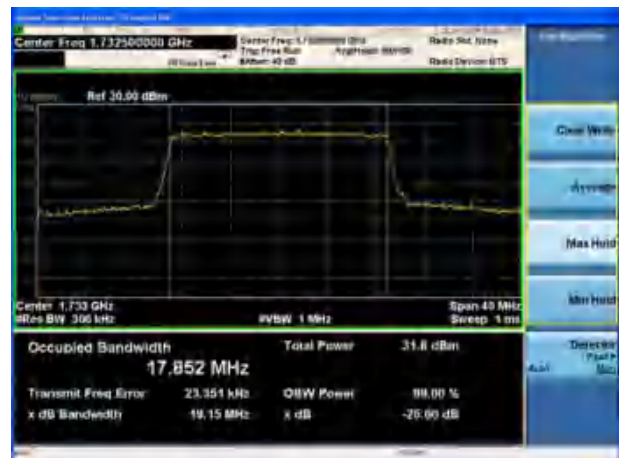
LTE Band 4 QPSK 20MHz CH-Low



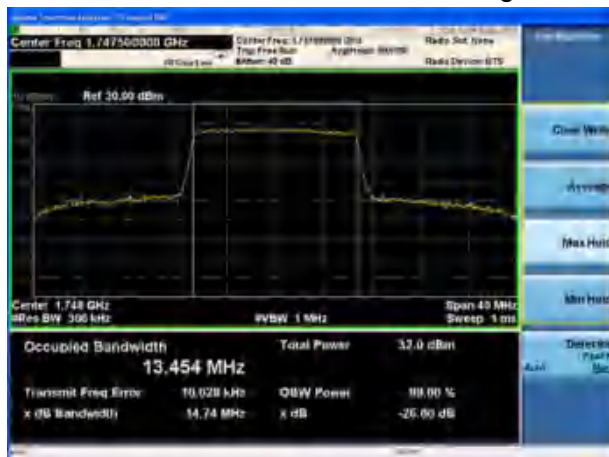
LTE Band 4 QPSK 15MHz CH-Middle



LTE Band 4 QPSK 20MHz CH-Middle



LTE Band 4 QPSK 15MHz CH-High



LTE Band 4 QPSK 20MHz CH-High





LTE Band 4 16QAM 1.4MHz CH-Low



LTE Band 4 16QAM 3MHz CH-Low



LTE Band 4 16QAM 1.4MHz CH-Middle



LTE Band 4 16QAM 3MHz CH-Middle



LTE Band 4 16QAM 1.4MHz CH-High



LTE Band 4 16QAM 3MHz CH-High

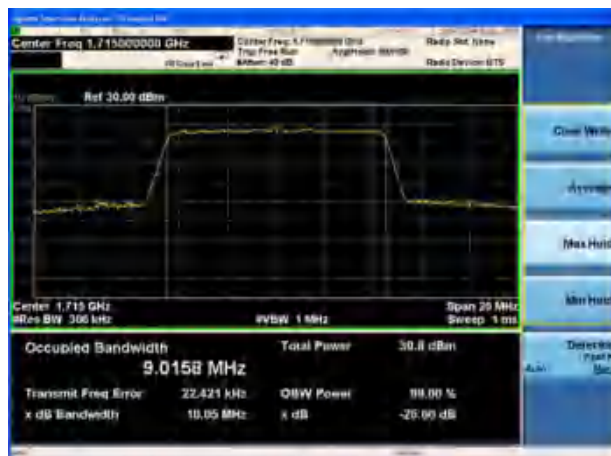




LTE Band 4 16QAM 5MHz CH-Low



LTE Band 4 16QAM 10MHz CH-Low



LTE Band 4 16QAM 5MHz CH-Middle



LTE Band 4 16QAM 10MHz CH-Middle



LTE Band 4 16QAM 5MHz CH-High

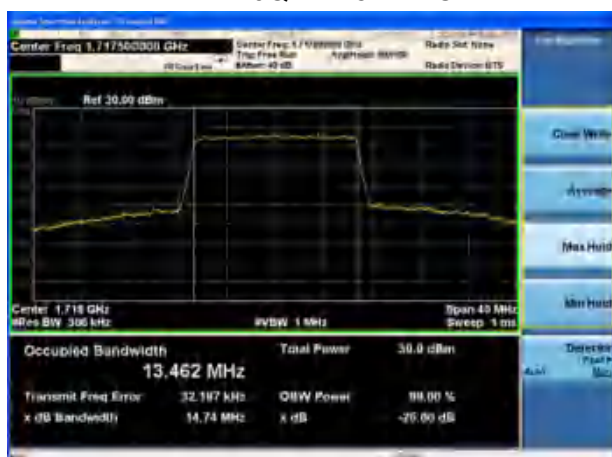


LTE Band 4 16QAM 10MHz CH-High

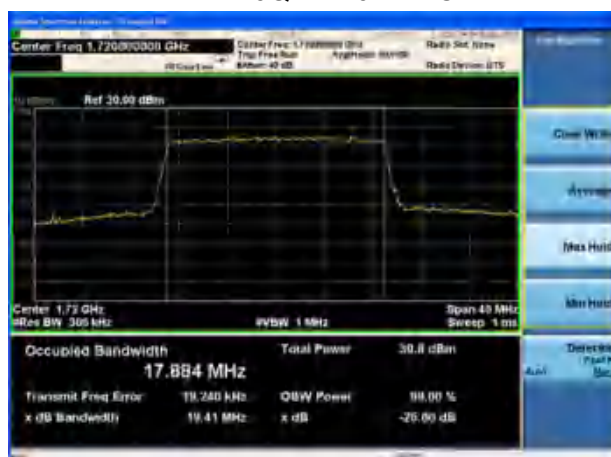




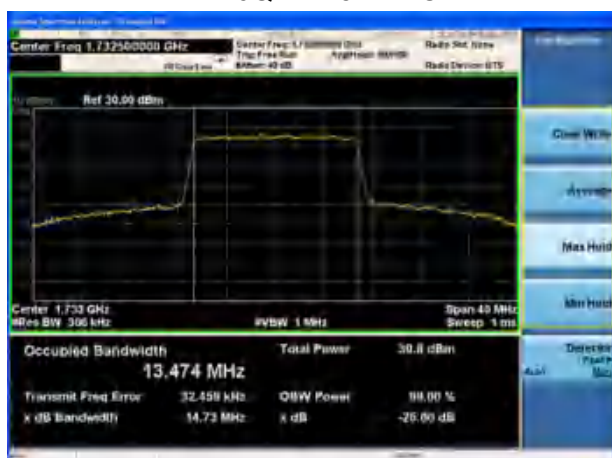
LTE Band 4 16QAM 15MHz CH-Low



LTE Band 4 16QAM 20MHz CH-Low



LTE Band 4 16QAM 15MHz CH-Middle



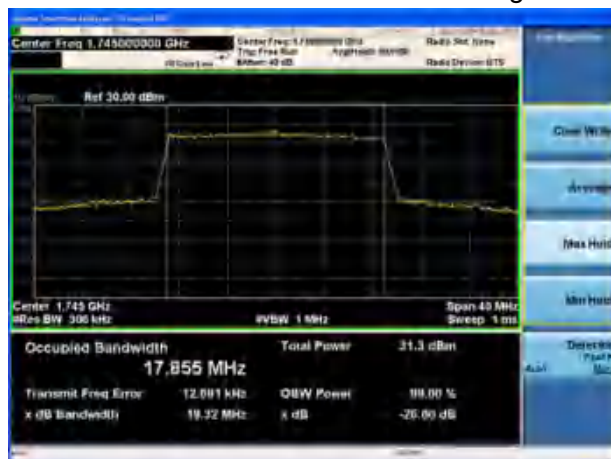
LTE Band 4 16QAM 20MHz CH-Middle



LTE Band 4 16QAM 15MHz CH-High



LTE Band 4 16QAM 20MHz CH-High





LTE Band 12 QPSK 1.4MHz CH-Low



LTE Band 12 QPSK 3MHz CH-Low



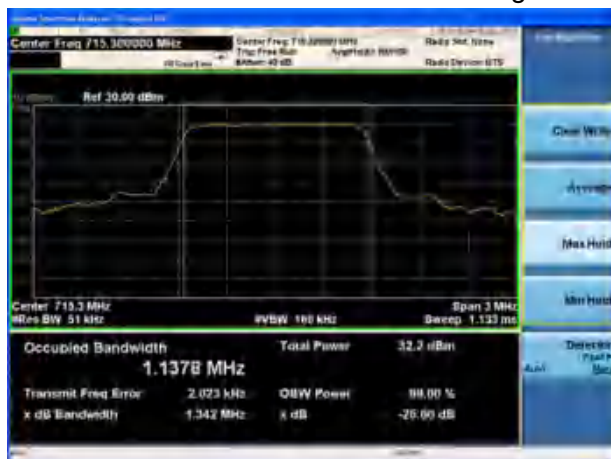
LTE Band 12 QPSK 1.4MHz CH-Middle



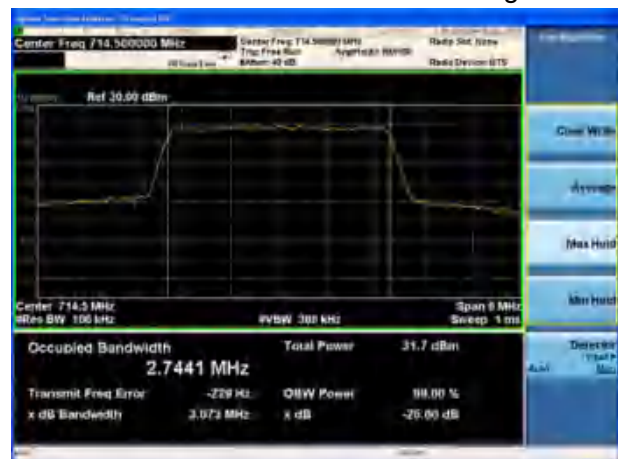
LTE Band 12 QPSK 3MHz CH-Middle



LTE Band 12 QPSK 1.4MHz CH-High

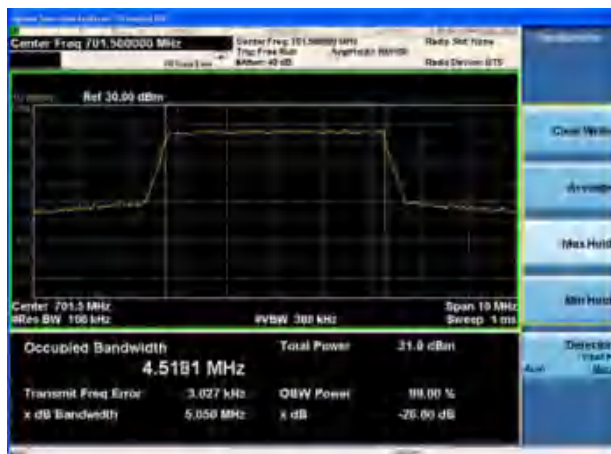


LTE Band 12 QPSK 3MHz CH-High





LTE Band 12 QPSK 5MHz CH-Low



LTE Band 12 QPSK 10MHz CH-Low



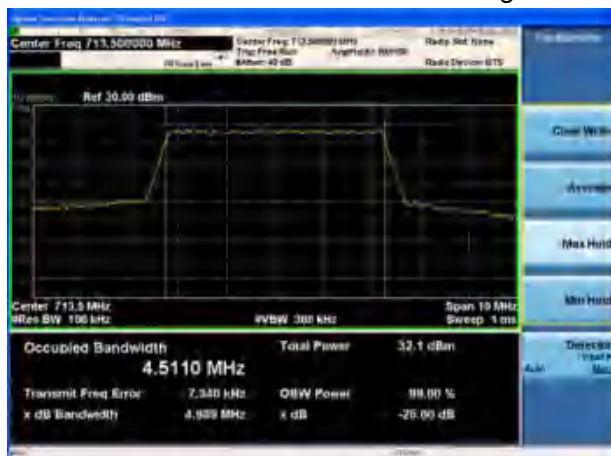
LTE Band 12 QPSK 5MHz CH-Middle



LTE Band 12 QPSK 10MHz CH-Middle



LTE Band 12 QPSK 5MHz CH-High



LTE Band 12 QPSK 10MHz CH-High





LTE Band 12 16QAM 1.4MHz CH-Low



LTE Band 12 16QAM 3MHz CH-Low



LTE Band 12 16QAM 1.4MHz CH-Middle



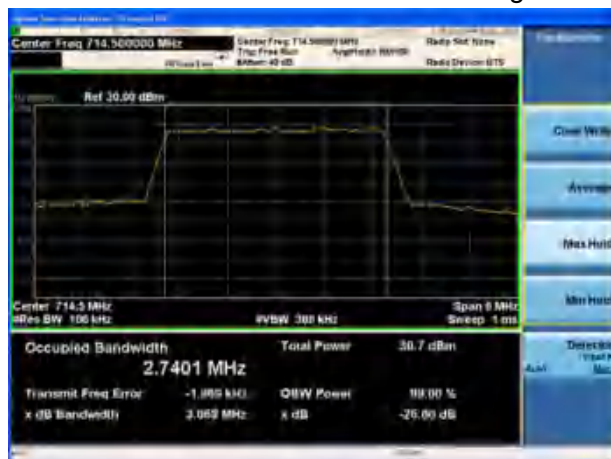
LTE Band 12 16QAM 3MHz CH-Middle



LTE Band 12 16QAM 1.4MHz CH-High



LTE Band 12 16QAM 3MHz CH-High





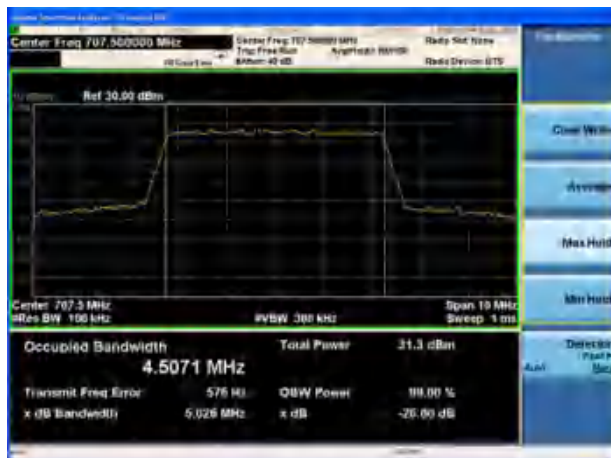
LTE Band 12 16QAM 5MHz CH-Low



LTE Band 12 16QAM 10MHz CH-Low



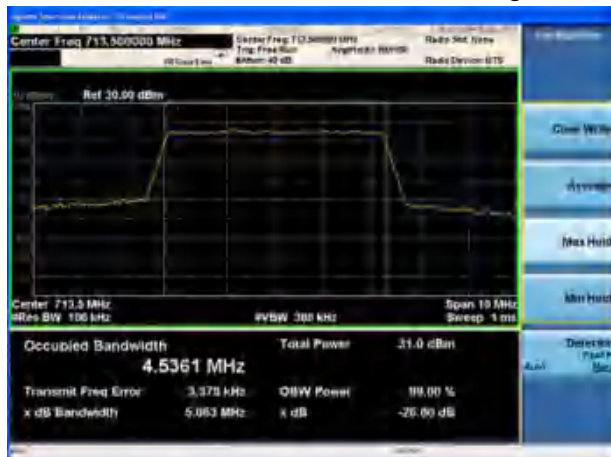
LTE Band 12 16QAM 5MHz CH-Middle



LTE Band 12 16QAM 10MHz CH-Middle



LTE Band 12 16QAM 5MHz CH-High

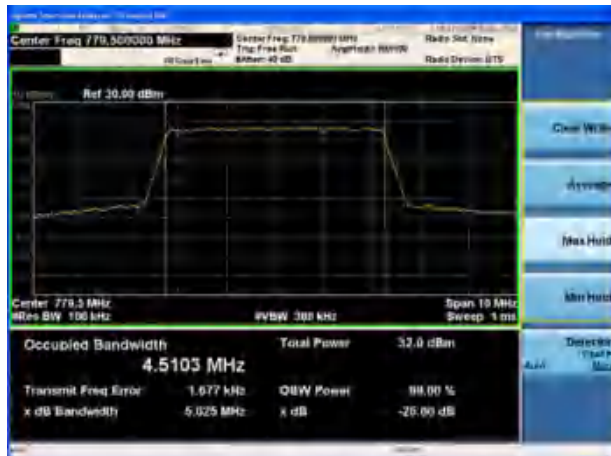


LTE Band 12 16QAM 10MHz CH-High





LTE Band 13 QPSK 5MHz CH-Low



LTE Band 13 16QAM 5MHz CH-Low



LTE Band 13 QPSK 5MHz CH-Middle



LTE Band 13 16QAM 5MHz CH-Middle



LTE Band 13 QPSK 5MHz CH-High



LTE Band 13 16QAM 5MHz CH-High





LTE Band 13 QPSK 10MHz CH- Middle



LTE Band 13 16QAM 10MHz CH-Middle





LTE Band 66 QPSK 1.4MHz CH-Low



LTE Band 66 QPSK 3MHz CH-Low



LTE Band 66 QPSK 1.4MHz CH-Middle



LTE Band 66 QPSK 3MHz CH-Middle



LTE Band 66 QPSK 1.4MHz CH-High



LTE Band 66 QPSK 3MHz CH-High





LTE Band 66 QPSK 5MHz CH-Low



LTE Band 66 QPSK 10MHz CH-Low



LTE Band 66 QPSK 5MHz CH-Middle



LTE Band 66 QPSK 10MHz CH-Middle



LTE Band 66 QPSK 5MHz CH-High



LTE Band 66 QPSK 10MHz CH-High





LTE Band 66 QPSK 15MHz CH-Low



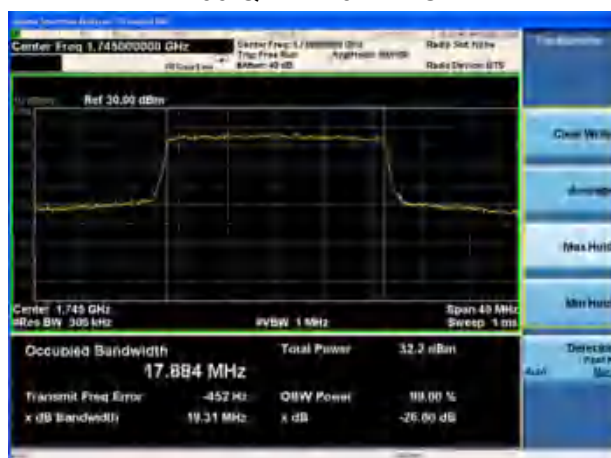
LTE Band 66 QPSK 20MHz CH-Low



LTE Band 66 QPSK 15MHz CH-Middle



LTE Band 66 QPSK 20MHz CH-Middle



LTE Band 66 QPSK 15MHz CH-High



LTE Band 66 QPSK 20MHz CH-High





LTE Band 66 16QAM 1.4MHz CH-Low



LTE Band 66 16QAM 3MHz CH-Low



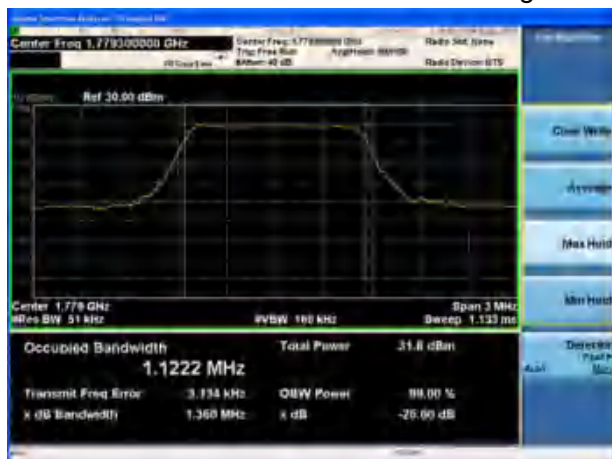
LTE Band 66 16QAM 1.4MHz CH-Middle



LTE Band 66 16QAM 3MHz CH-Middle



LTE Band 66 16QAM 1.4MHz CH-High



LTE Band 66 16QAM 3MHz CH-High





LTE Band 66 16QAM 5MHz CH-Low



LTE Band 66 16QAM 10MHz CH-Low



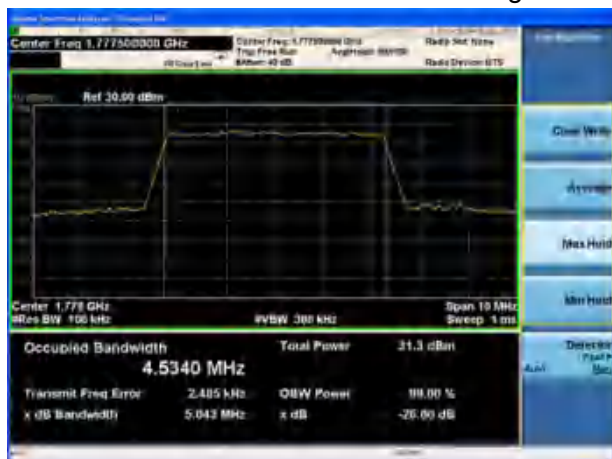
LTE Band 66 16QAM 5MHz CH-Middle



LTE Band 66 16QAM 10MHz CH-Middle



LTE Band 66 16QAM 5MHz CH-High

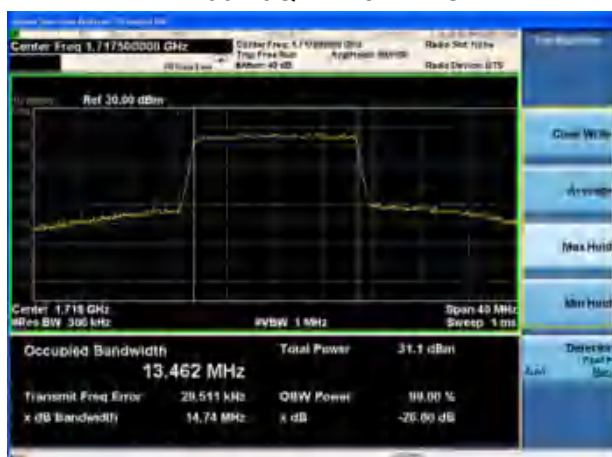


LTE Band 66 16QAM 10MHz CH-High

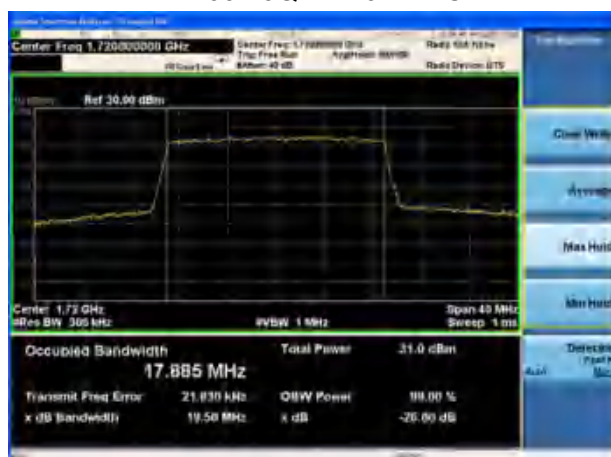




LTE Band 66 16QAM 15MHz CH-Low



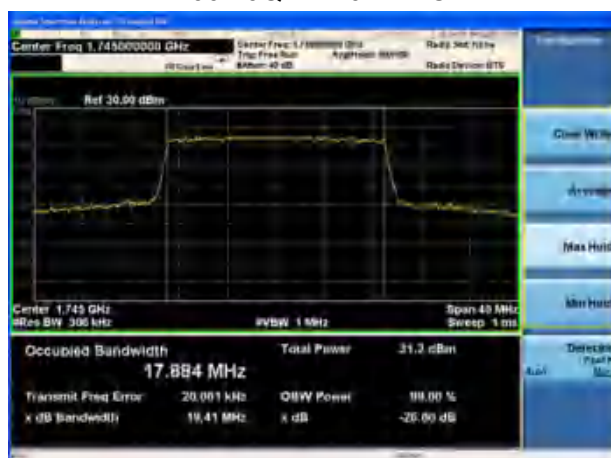
LTE Band 66 16QAM 20MHz CH-Low



LTE Band 66 16QAM 15MHz CH-Middle



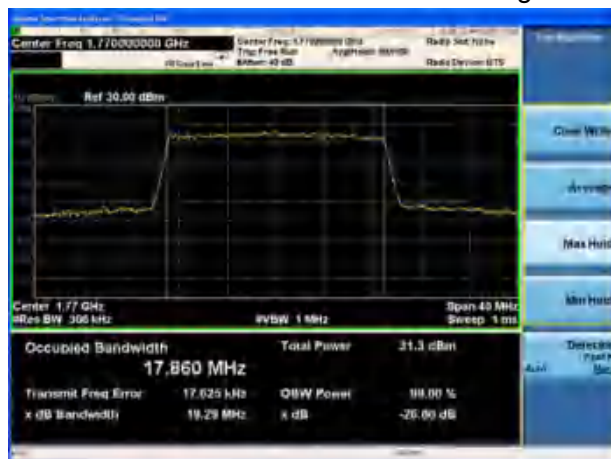
LTE Band 66 16QAM 20MHz CH-Middle



LTE Band 66 16QAM 15MHz CH-High



LTE Band 66 16QAM 20MHz CH-High

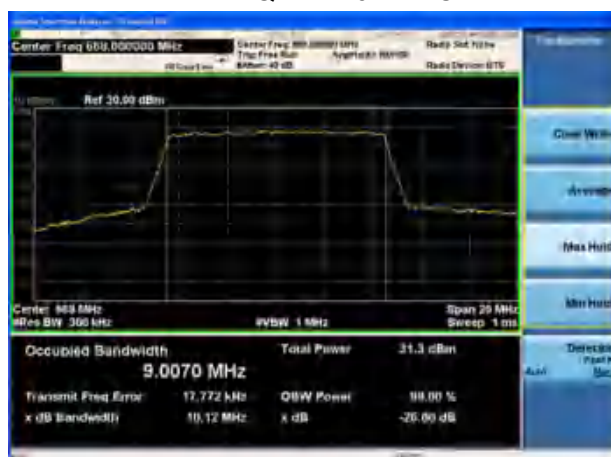




LTE Band 71 QPSK 5MHz CH-Low



LTE Band 71 QPSK 10MHz CH-Low



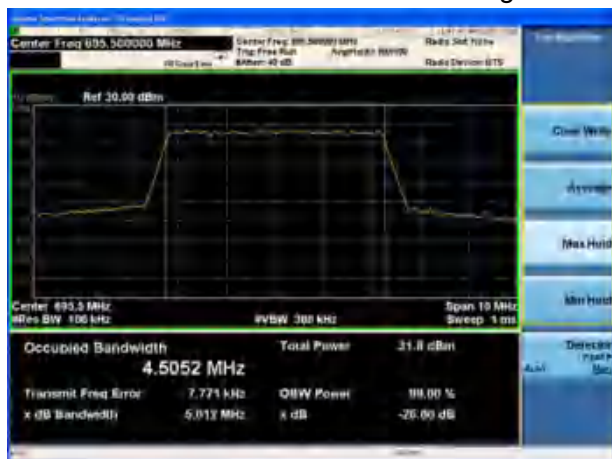
LTE Band 71 QPSK 5MHz CH-Middle



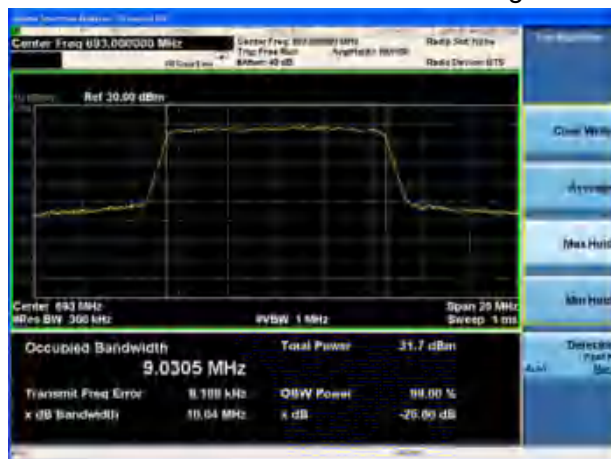
LTE Band 71 QPSK 10MHz CH-Middle



LTE Band 71 QPSK 5MHz CH-High



LTE Band 71 QPSK 10MHz CH-High





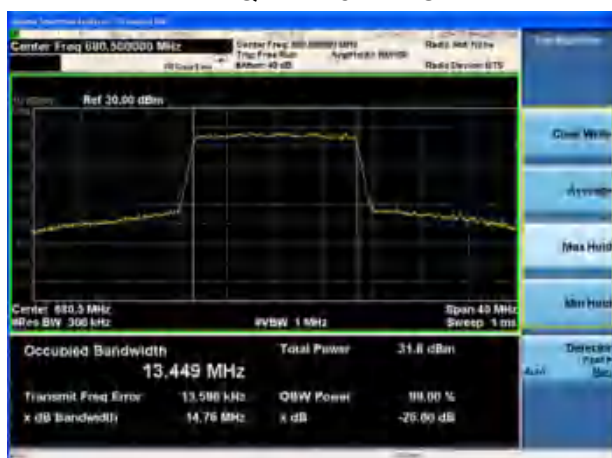
LTE Band 71 QPSK 15MHz CH-Low



LTE Band 71 QPSK 20MHz CH-Low



LTE Band 71 QPSK 15MHz CH-Middle



LTE Band 71 QPSK 20MHz CH-Middle



LTE Band 71 QPSK 15MHz CH-High

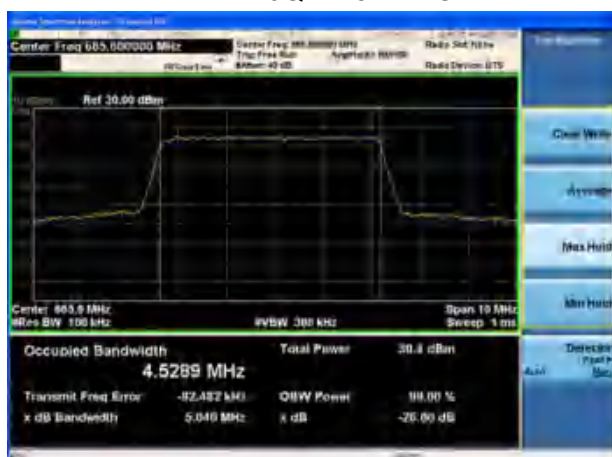


LTE Band 71 QPSK 20MHz CH-High





LTE Band 71 16QAM 5MHz CH-Low



LTE Band 71 16QAM 10MHz CH-Low



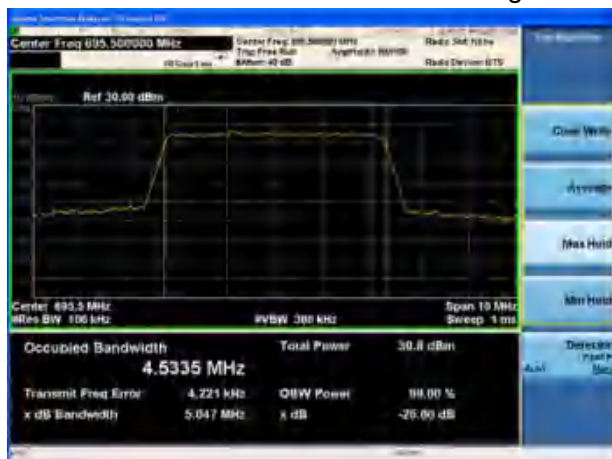
LTE Band 71 16QAM 5MHz CH-Middle



LTE Band 71 16QAM 10MHz CH-Middle



LTE Band 71 16QAM 5MHz CH-High



LTE Band 71 16QAM 10MHz CH-High





LTE Band 71 16QAM 15MHz CH-Low



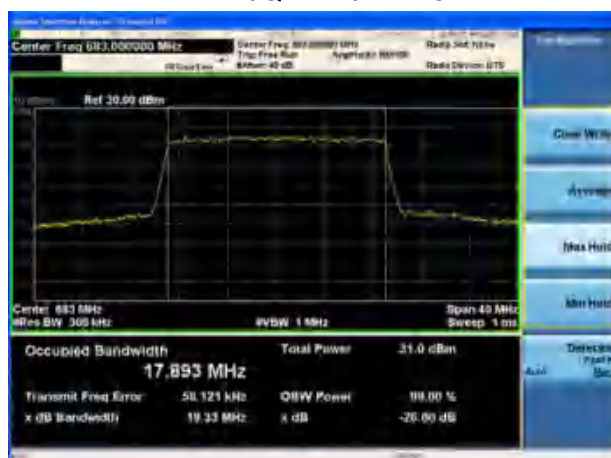
LTE Band 71 16QAM 20MHz CH-Low



LTE Band 71 16QAM 15MHz CH-Middle



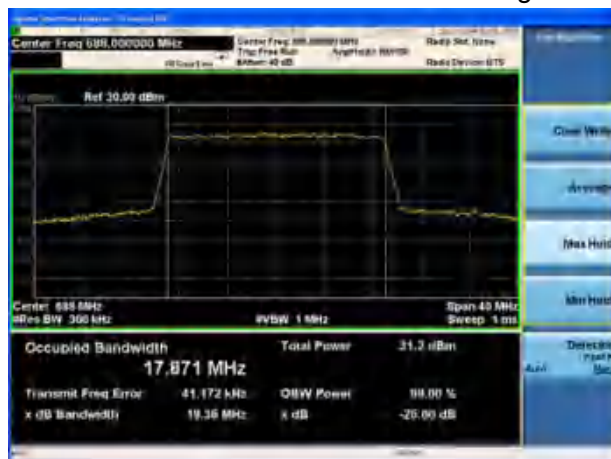
LTE Band 71 16QAM 20MHz CH-Middle



LTE Band 71 16QAM 15MHz CH-High



LTE Band 71 16QAM 20MHz CH-High





EC25-AFX MINIPCIE

LTE Band 12 QPSK 1.4MHz CH- Middle



LTE Band 12 16QAM 1.4MHz CH- Middle



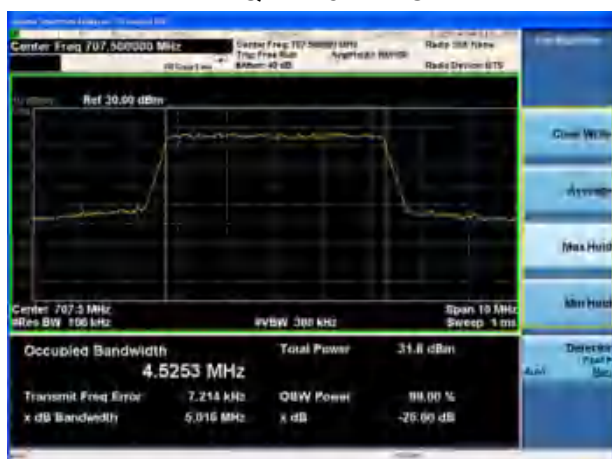
LTE Band 12 QPSK 3MHz CH- Middle



LTE Band 12 16QAM 3MHz CH- Middle



LTE Band 12 QPSK 5MHz CH- Middle

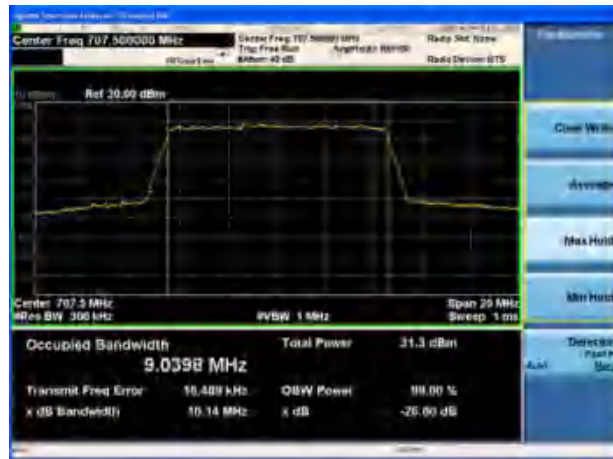


LTE Band 12 16QAM 5MHz CH- Middle

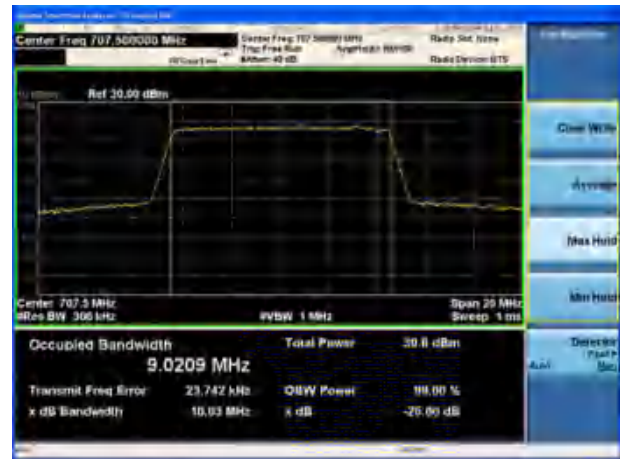




LTE Band 12 QPSK 10MHz CH- Middle



LTE Band 12 16QAM 10MHz CH- Middle





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 testing follows KDB 971168 D01 v03r01 Section 6.0

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.

2. The band edges of low and high channels for the highest RF powers were measured.

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

RBW is set to 15 kHz, VBW is set to 51 kHz for LTE Band 4/66 (1.4MHz).

RBW is set to 30 kHz, VBW is set to 100 kHz for LTE Band 4/66 (3MHz).

RBW is set to 51 kHz, VBW is set to 160 kHz for LTE Band 4/66/71 (5MHz).

RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 4/66/71 (10MHz).

RBW is set to 150 kHz, VBW is set to 510 kHz for LTE Band 4/66/71 (15MHz).

RBW is set to 200 kHz, VBW is set to 620 kHz for LTE Band 4/66/71 (20MHz).

RBW is set to 100 kHz, VBW is set to 300kHz for LTE Band 12(1.4MHz/3MHz/5MHz/10MHz).

RBW is set to 10 kHz, VBW is set to 30 kHz for LTE Band 13 (763MHz~775MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 13 (775MHz~777MHz).

RBW is set to 100 kHz, VBW is set to 300 kHz for LTE Band 13 (787MHz~793MHz).

RBW is set to 10 kHz, VBW is set to 30 kHz for LTE Band 13 (793MHz~805MHz).

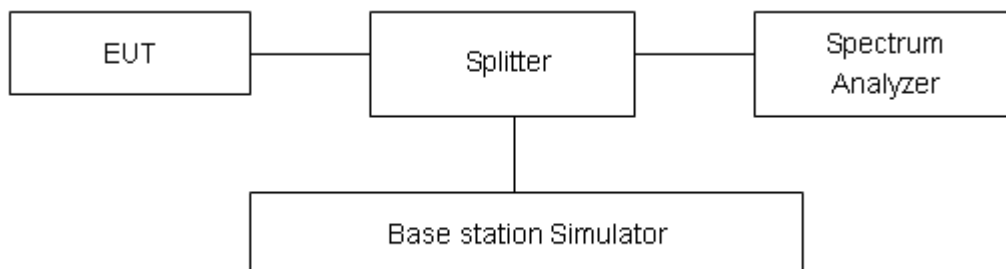
on spectrum analyzer.

4. Set spectrum analyzer with RMS detector.

5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

6. Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(i) By a factor of not less than $43 + 10 \log (P)$ dB on all frequencies between 2305 and 2320 MHz.

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB”

Part 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Part 27.53(m) (4) specifies that “for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log (P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:

The limit line is derived from $43 + 10 \log (P)$ dB below the transmitter power P(Watts)
= $P(W) - [43 + 10 \log (P)]$ (dB)
= $[30 + 10 \log (P)]$ (dBm) - $[43 + 10 \log (P)]$ (dB) = -13dBm.

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;



- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

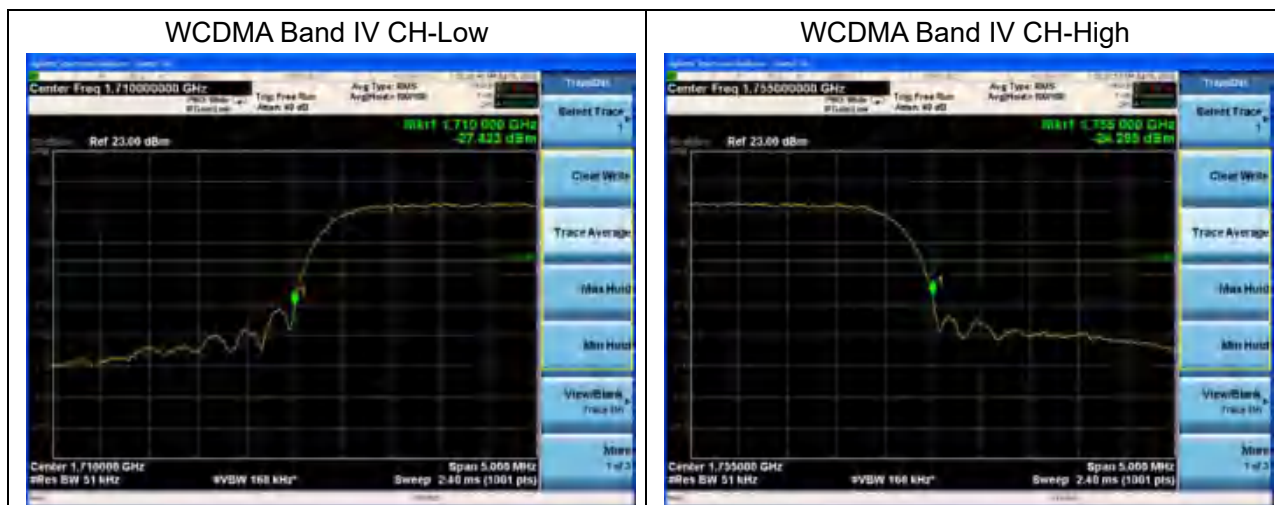
Measurement Uncertainty

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



Test Result

All the test traces in the plots shows the test results clearly.





LTE Band 4 QPSK 1.4MHz CH-Low, 1 RB



LTE Band 4 QPSK 1.4MHz CH-High, 1 RB



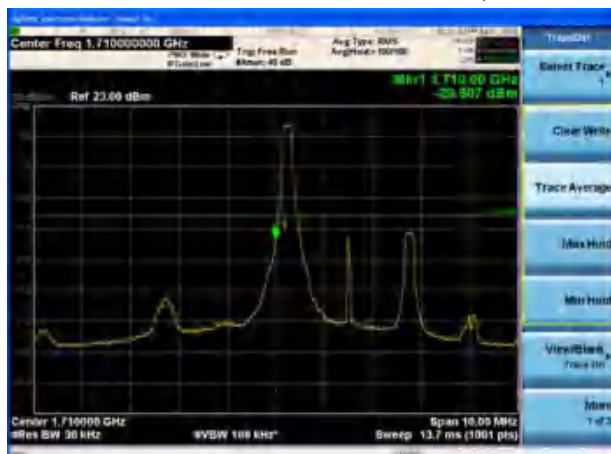
LTE Band 4 QPSK 1.4MHz CH-Low, 100%RB



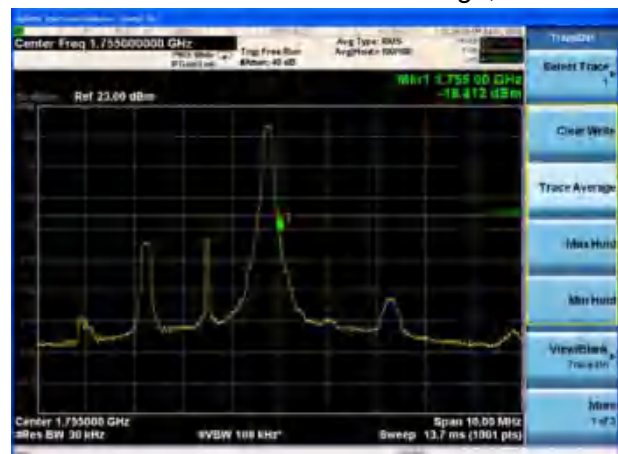
LTE Band 4 QPSK 1.4MHz CH-High, 100%RB



LTE Band 4 QPSK 3MHz CH-Low, 1 RB



LTE Band 4 QPSK 3MHz CH-High, 1 RB





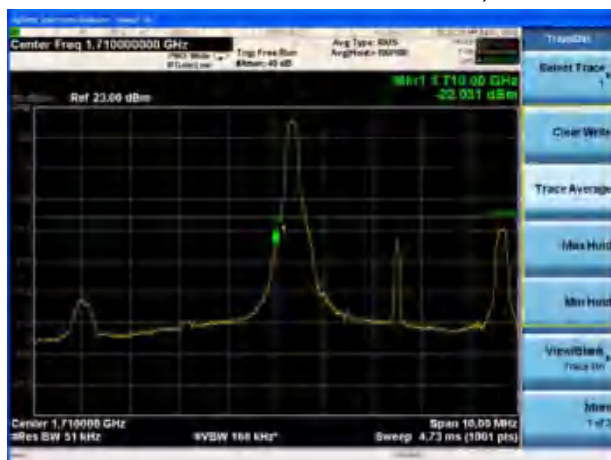
LTE Band 4 QPSK 3MHz CH-Low, 100%RB



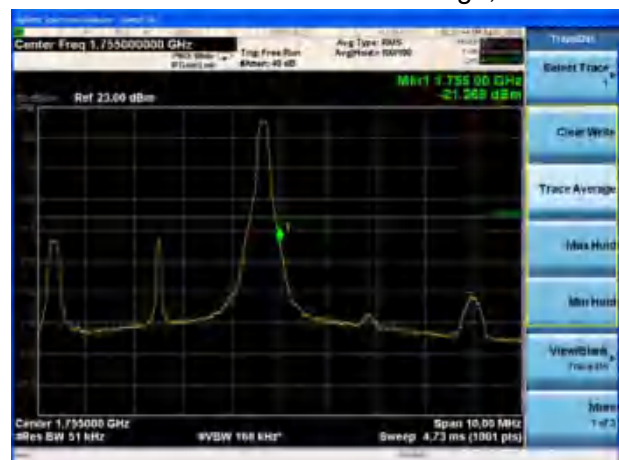
LTE Band 4 QPSK 3MHz CH-High, 100%RB



LTE Band 4 QPSK 5MHz CH-Low, 1 RB



LTE Band 4 QPSK 5MHz CH-High, 1 RB



LTE Band 4 QPSK 5MHz CH-Low, 100%RB

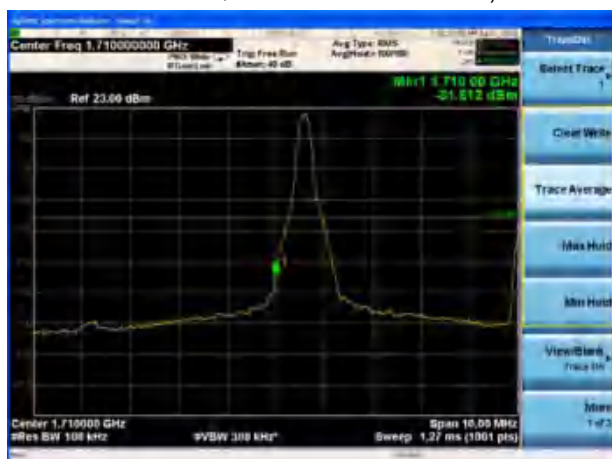


LTE Band 4 QPSK 5MHz CH-High, 100%RB

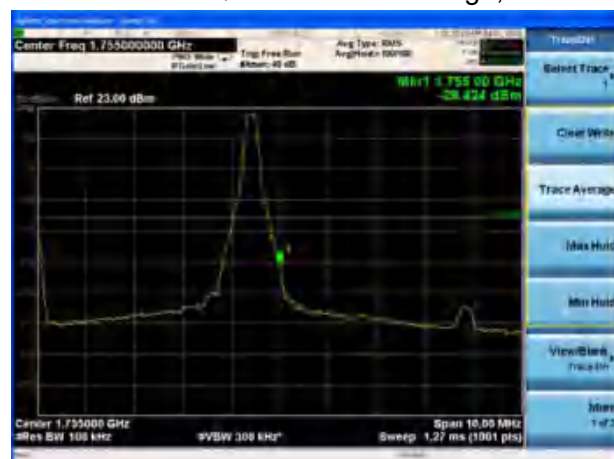




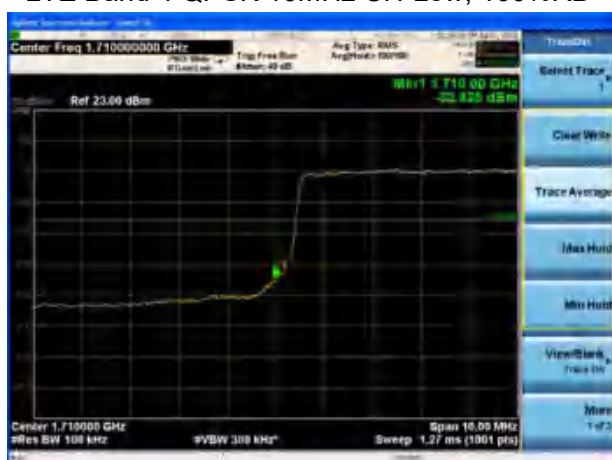
LTE Band 4 QPSK 10MHz CH-Low, 1 RB



LTE Band 4 QPSK 10MHz CH-High, 1 RB



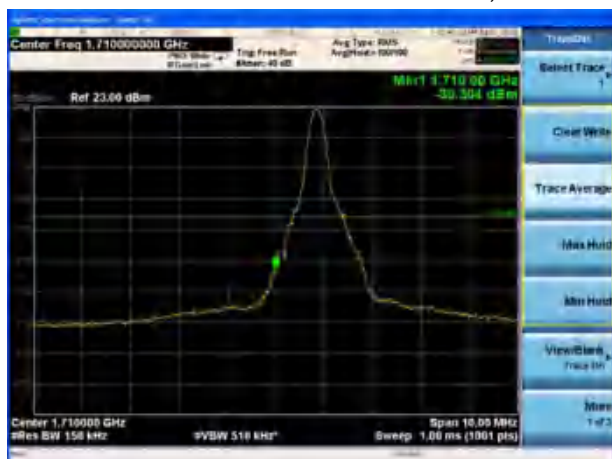
LTE Band 4 QPSK 10MHz CH-Low, 100%RB



LTE Band 4 QPSK 10MHz CH-High, 100%RB



LTE Band 4 QPSK 15MHz CH-Low, 1 RB



LTE Band 4 QPSK 15MHz CH-High, 1 RB





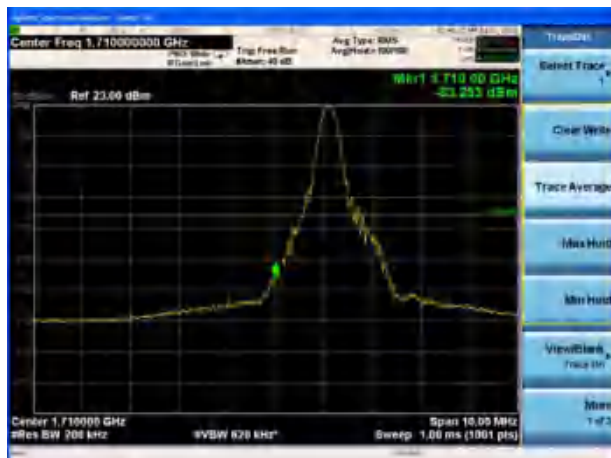
LTE Band 4 QPSK 15MHz CH-Low, 100%RB



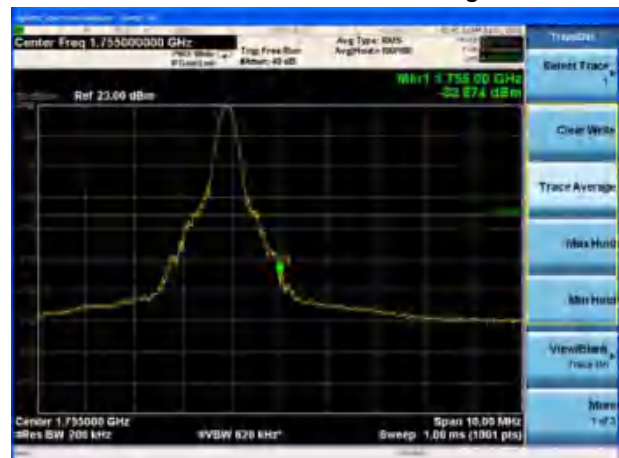
LTE Band 4 QPSK 15MHz CH-High, 100%RB



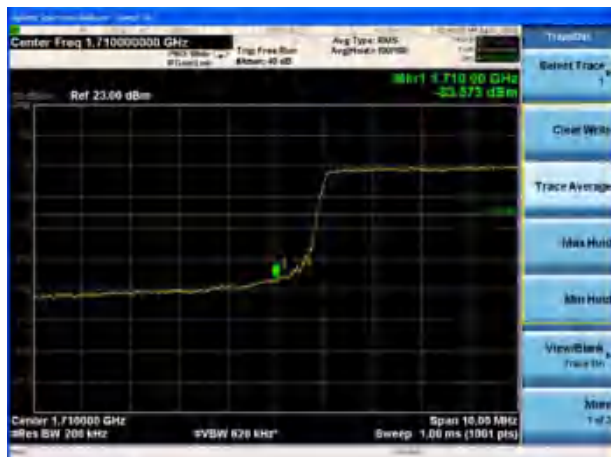
LTE Band 4 QPSK 20MHz CH-Low, 1 RB



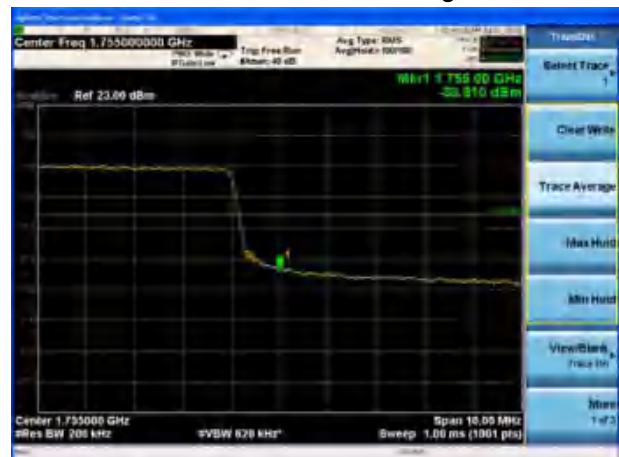
LTE Band 4 QPSK 20MHz CH-High, 1 RB



LTE Band 4 QPSK 20MHz CH-Low, 100%RB

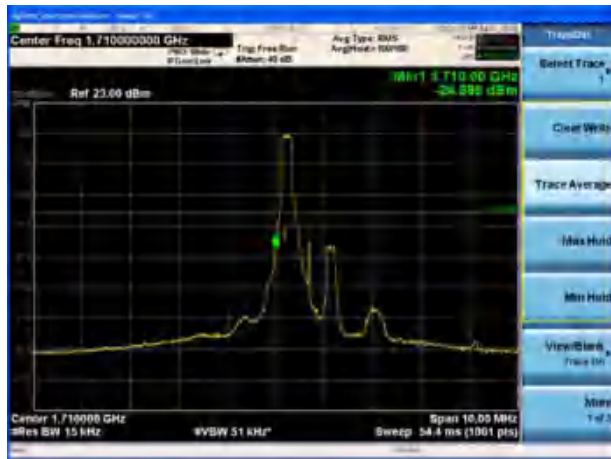


LTE Band 4 QPSK 20MHz CH-High, 100%RB

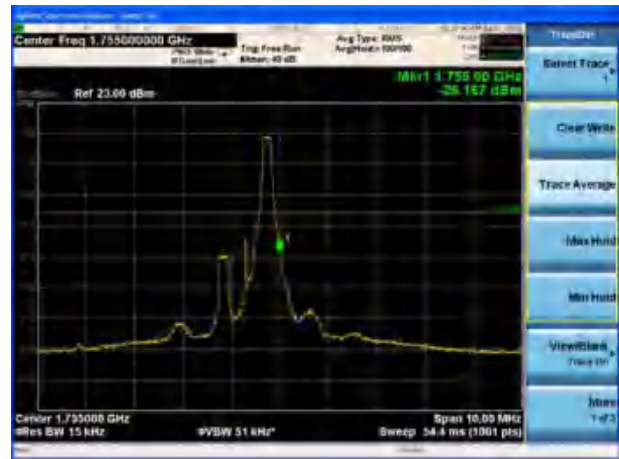




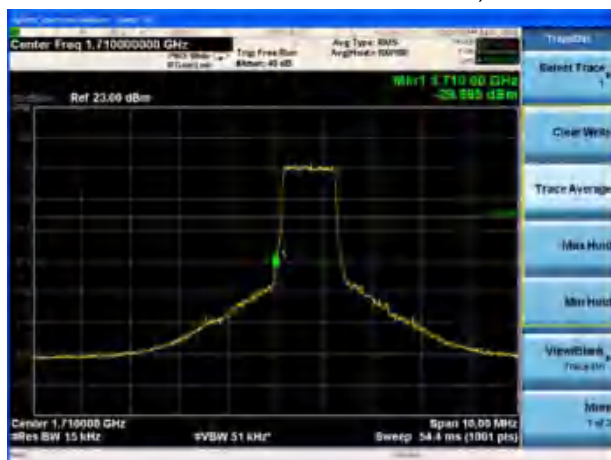
LTE Band 4 16QAM 1.4MHz CH-Low, 1 RB



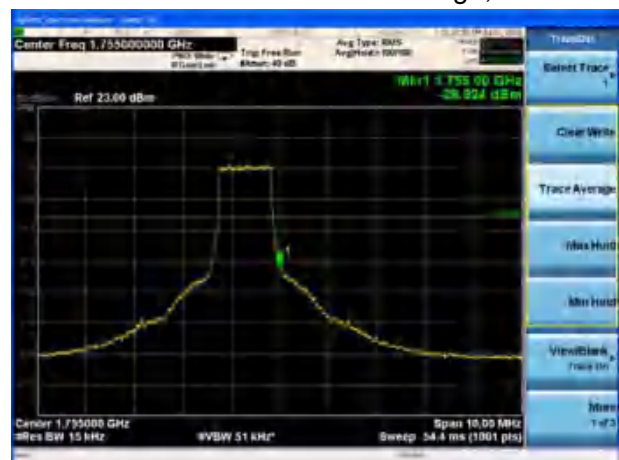
LTE Band 4 16QAM 1.4MHz CH-High, 1 RB



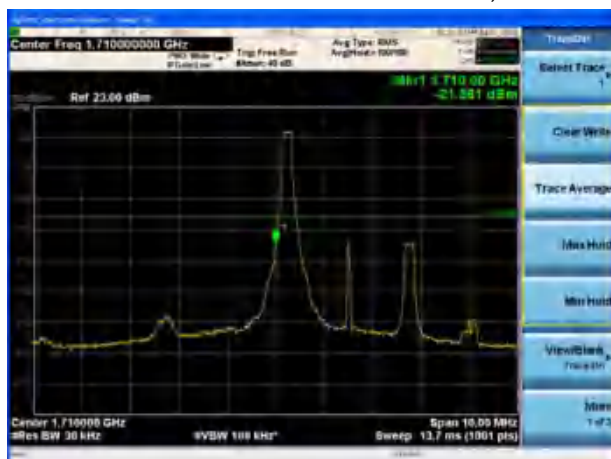
LTE Band 4 16QAM 1.4MHz CH-Low, 100%RB



LTE Band 4 16QAM 1.4MHz CH-High, 100%RB



LTE Band 4 16QAM 3MHz CH-Low, 1 RB

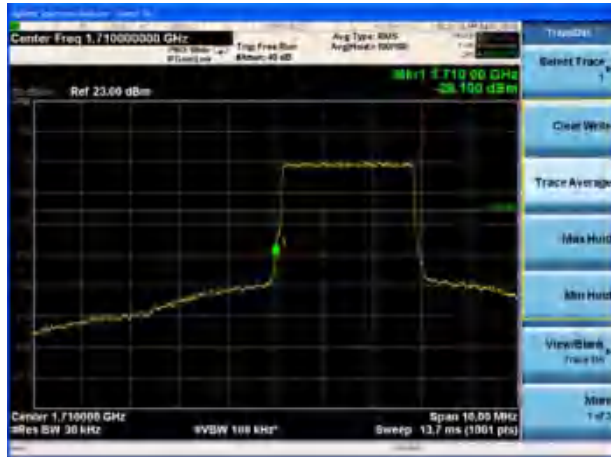


LTE Band 4 16QAM 3MHz CH-High, 1 RB





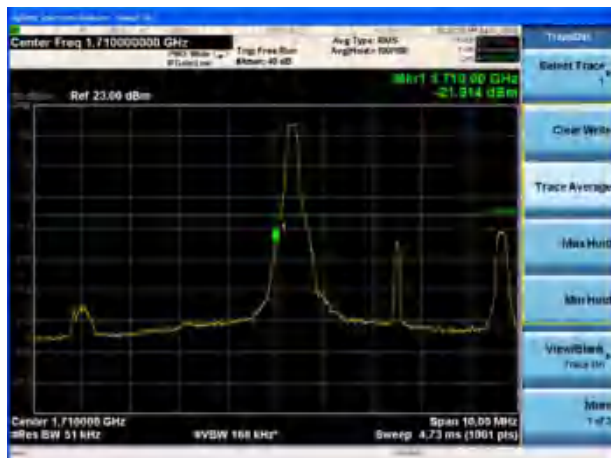
LTE Band 4 16QAM 3MHz CH-Low, 100%RB



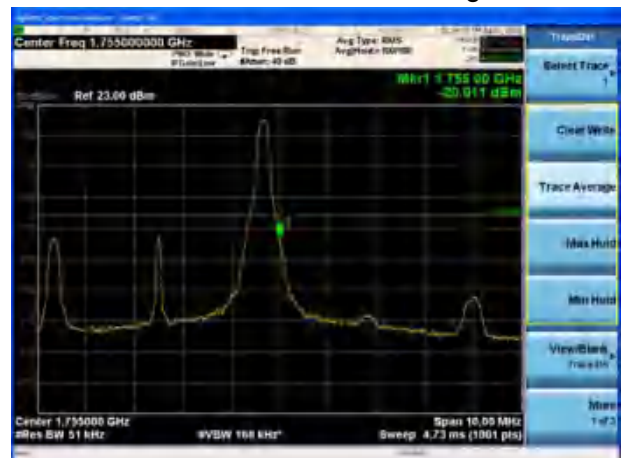
LTE Band 4 16QAM 3MHz CH-High, 100%RB



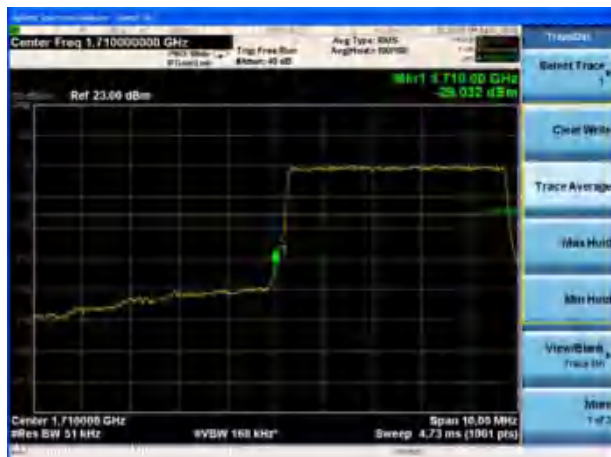
LTE Band 4 16QAM 5MHz CH-Low, 1 RB



LTE Band 4 16QAM 5MHz CH-High, 1 RB



LTE Band 4 16QAM 5MHz CH-Low, 100%RB

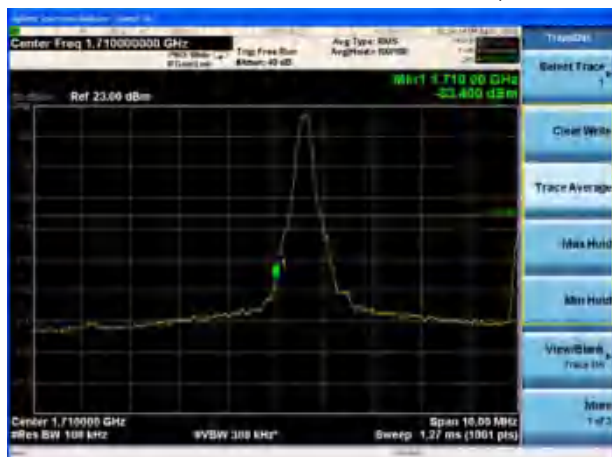


LTE Band 4 16QAM 5MHz CH-High, 100%RB

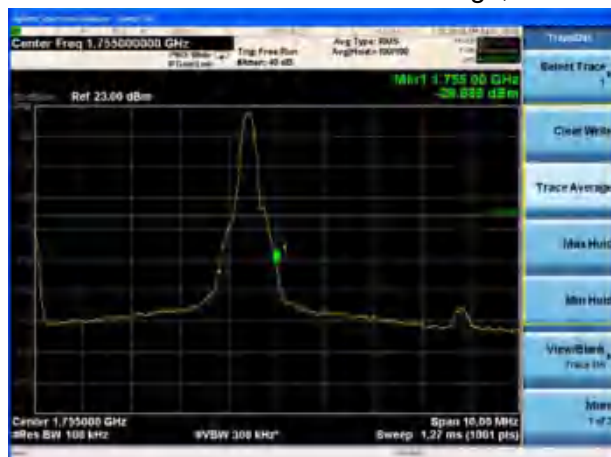




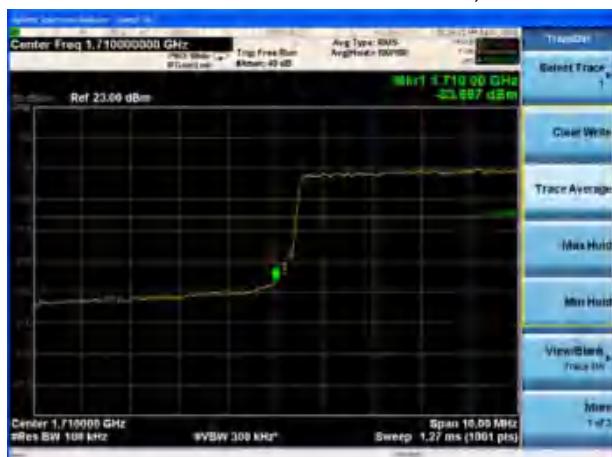
LTE Band 4 16QAM 10MHz CH-Low, 1 RB



LTE Band 4 16QAM 10MHz CH-High, 1 RB



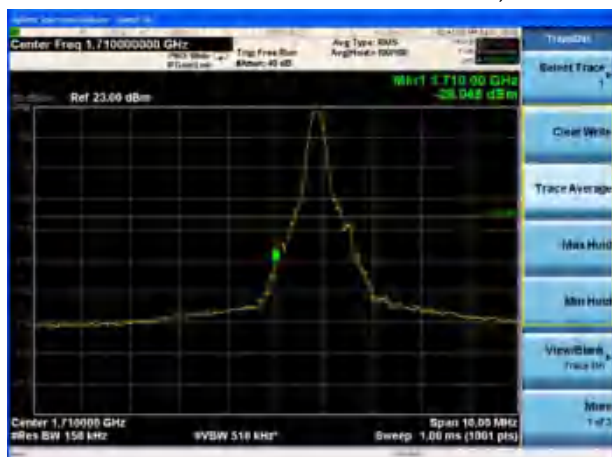
LTE Band 4 16QAM 10MHz CH-Low, 100%RB



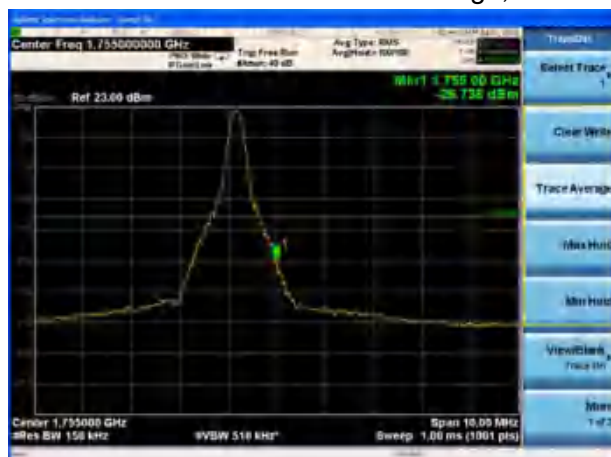
LTE Band 4 16QAM 10MHz CH-High, 100%RB



LTE Band 4 16QAM 15MHz CH-Low, 1 RB



LTE Band 4 16QAM 15MHz CH-High, 1 RB





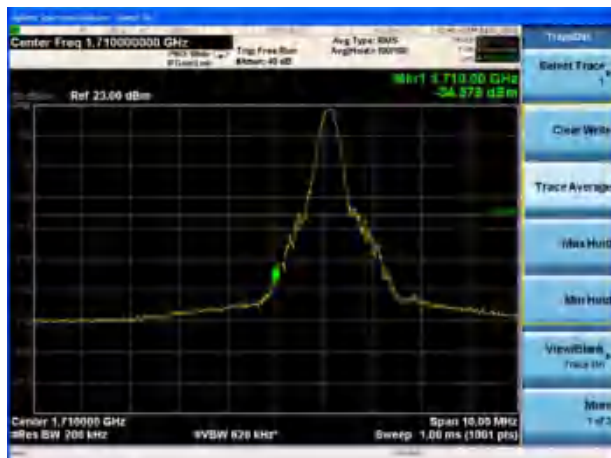
LTE Band 4 16QAM 15MHz CH-Low, 100%RB



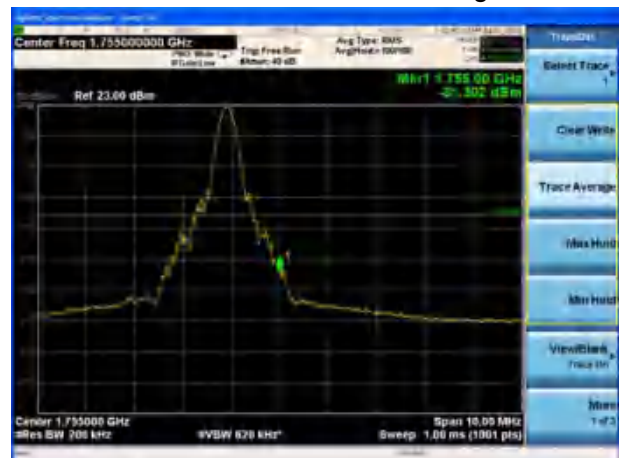
LTE Band 4 16QAM 15MHz CH-High, 100%RB



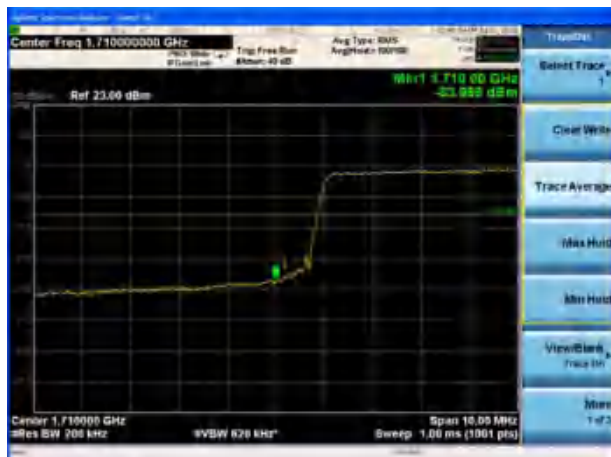
LTE Band 4 16QAM 20MHz CH-Low, 1 RB



LTE Band 4 16QAM 20MHz CH-High, 1 RB



LTE Band 4 16QAM 20MHz CH-Low, 100%RB

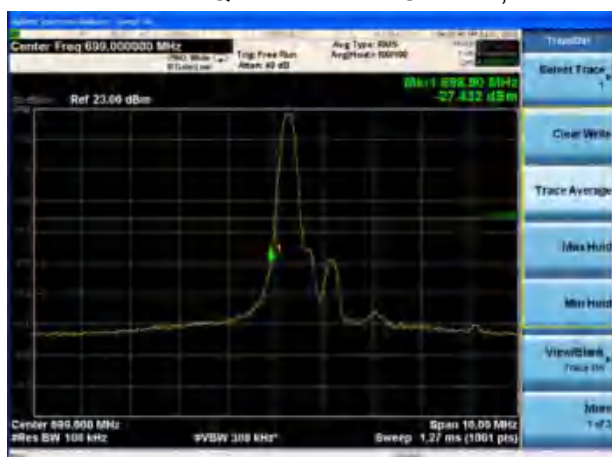


LTE Band 4 16QAM 20MHz CH-High, 100%RB





LTE Band 12 QPSK 1.4MHz CH-Low, 1 RB



LTE Band 12 QPSK 1.4MHz CH-High, 1 RB

LTE Band 12 QPSK 1.4MHz CH-Low, 1 RB
698MHz~699MHzLTE Band 12 QPSK 1.4MHz CH-High, 1 RB
716MHz~717MHz

LTE Band 12 QPSK 1.4MHz CH-Low, 100%RB



LTE Band 12 QPSK 1.4MHz CH-High, 100%RB

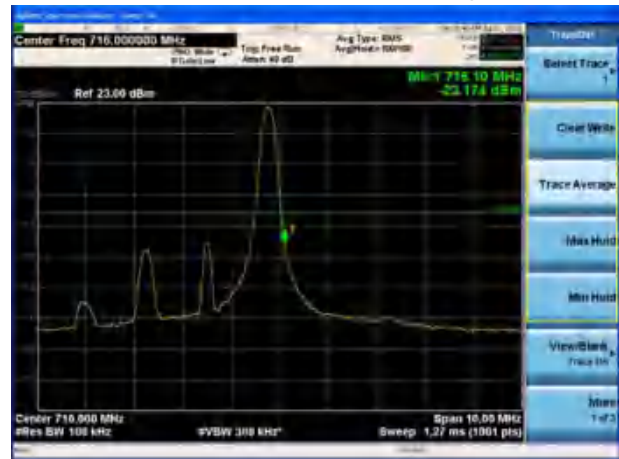




LTE Band 12 QPSK 3MHz CH-Low, 1 RB



LTE Band 12 QPSK 3MHz CH-High, 1 RB

LTE Band 12 QPSK 3MHz CH-Low, 1 RB
698MHz~699MHzLTE Band 12 QPSK 3MHz CH-High, 1 RB
716MHz~717MHz

LTE Band 12 QPSK 3MHz CH-Low, 100%RB

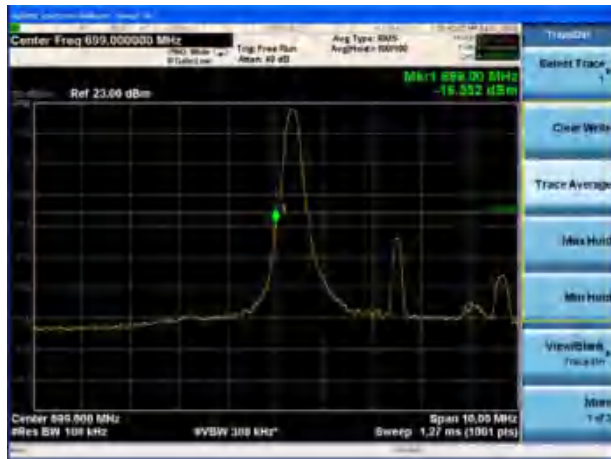


LTE Band 12 QPSK 3MHz CH-High, 100%RB

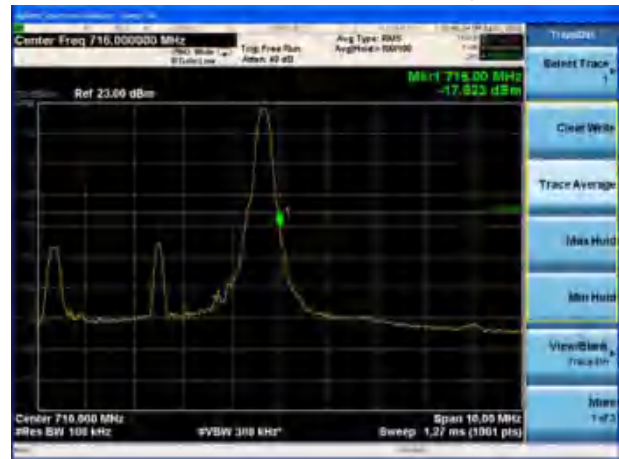




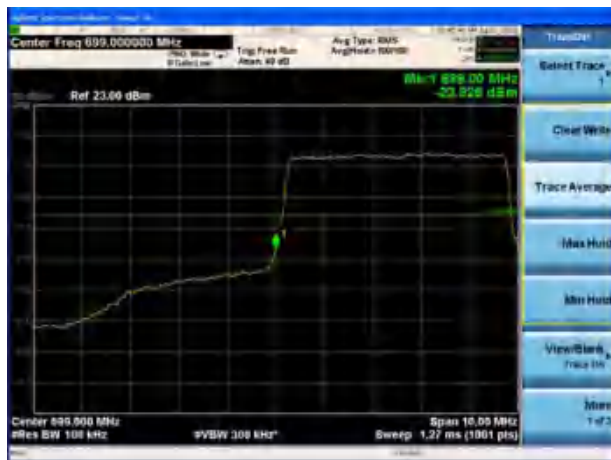
LTE Band 12 QPSK 5MHz CH-Low, 1 RB



LTE Band 12 QPSK 5MHz CH-High, 1 RB



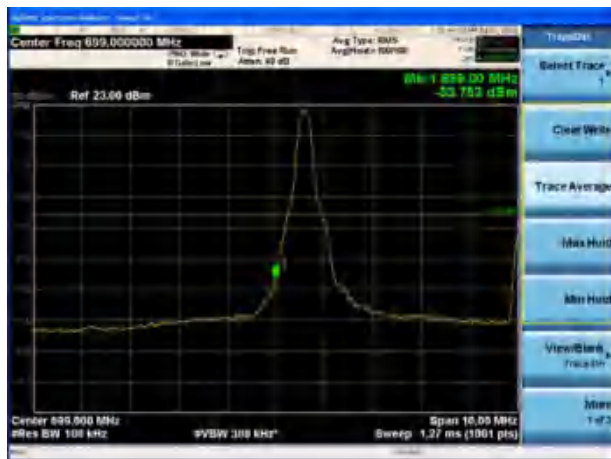
LTE Band 12 QPSK 5MHz CH-Low, 100%RB



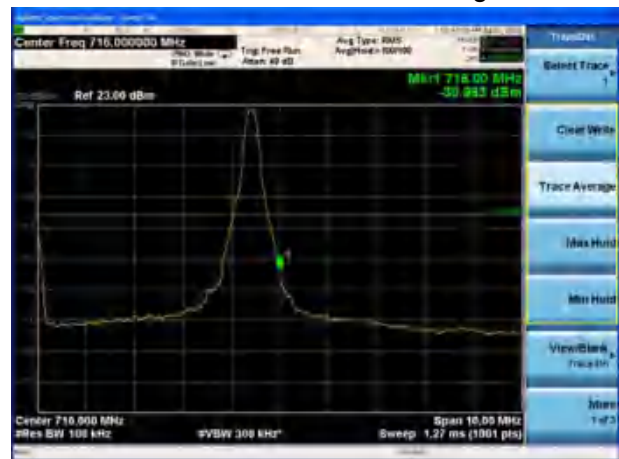
LTE Band 12 QPSK 5MHz CH-High, 100%RB



LTE Band 12 QPSK 10MHz CH-Low, 1 RB

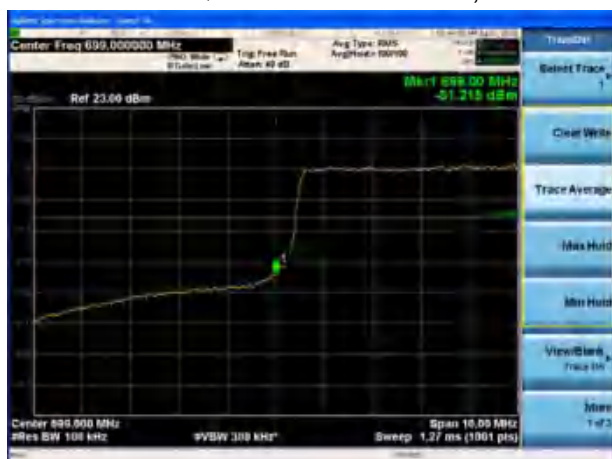


LTE Band 12 QPSK 10MHz CH-High, 1 RB

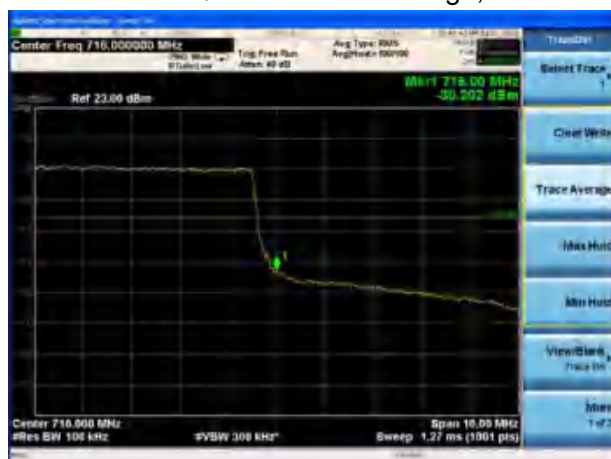




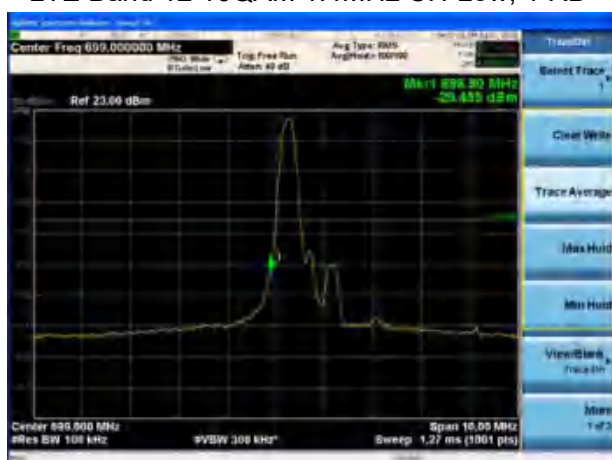
LTE Band 12 QPSK 10MHz CH-Low, 100%RB



LTE Band 12 QPSK 10MHz CH-High, 100%RB



LTE Band 12 16QAM 1.4MHz CH-Low, 1 RB

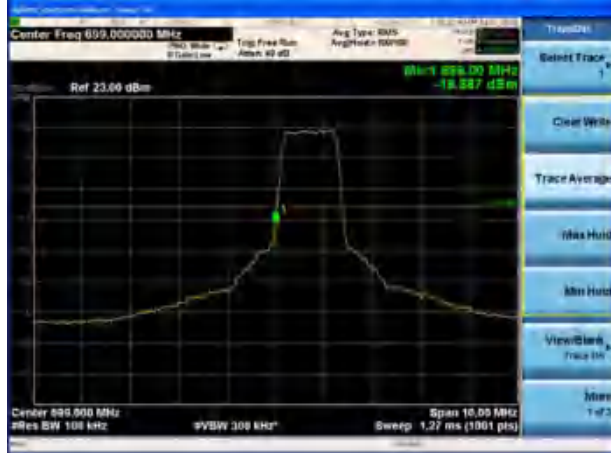


LTE Band 12 16QAM 1.4MHz CH-High, 1 RB

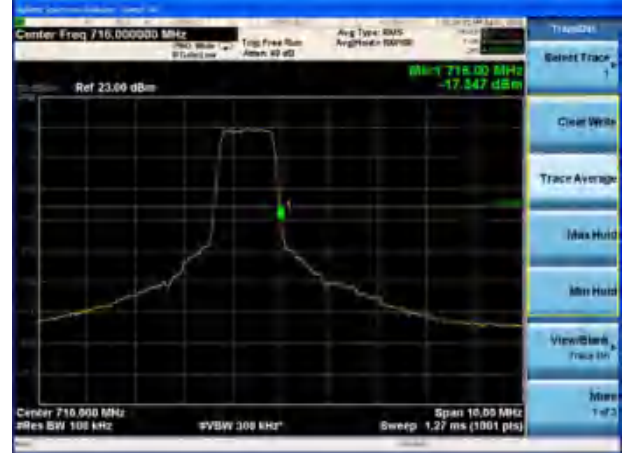
LTE Band 12 16QAM 1.4MHz CH-Low, 1 RB
698MHz~699MHzLTE Band 12 16QAM 1.4MHz CH-High, 1 RB
716MHz~717MHz



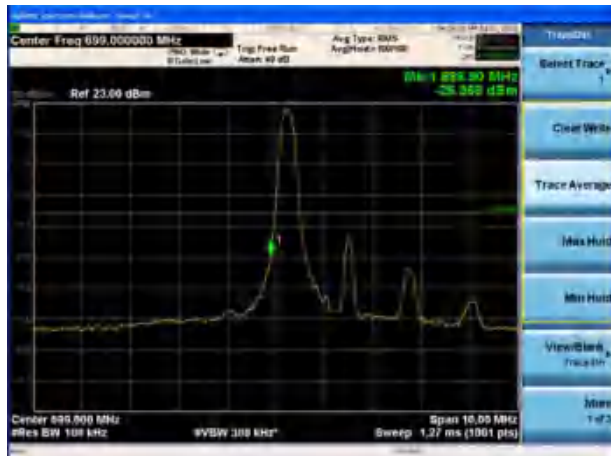
LTE Band 12 16QAM 1.4MHz CH-Low, 100%RB



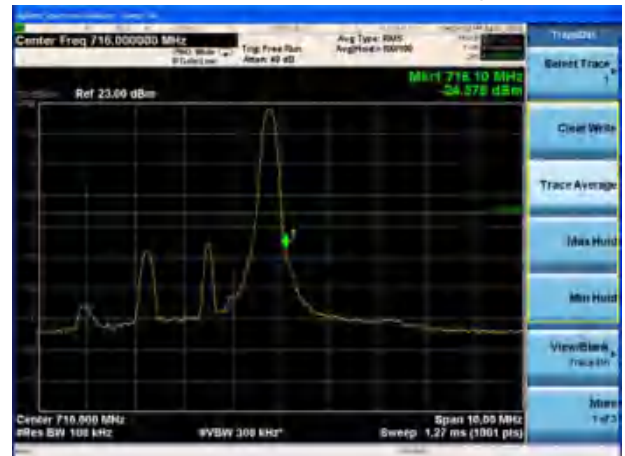
LTE Band 12 16QAM 1.4MHz CH-High, 100%RB



LTE Band 12 16QAM 3MHz CH-Low, 1 RB

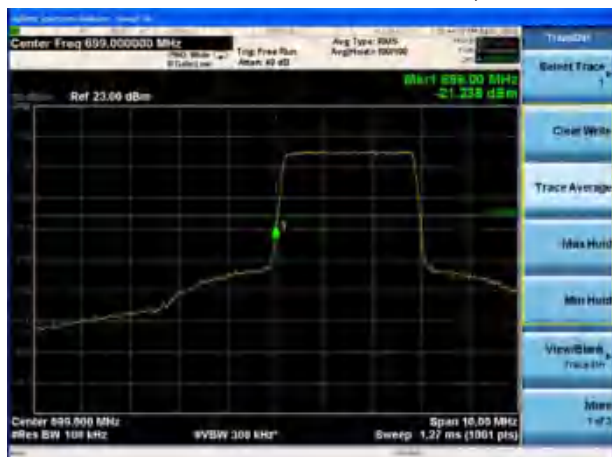


LTE Band 12 16QAM 3MHz CH-High, 1 RB

LTE Band 12 16QAM 3MHz CH-Low, 1 RB
698MHz~699MHzLTE Band 12 16QAM 3MHz CH-High, 1 RB
698MHz~699MHz



LTE Band 12 16QAM 3MHz CH-Low, 100%RB



LTE Band 12 16QAM 3MHz CH-High, 100%RB



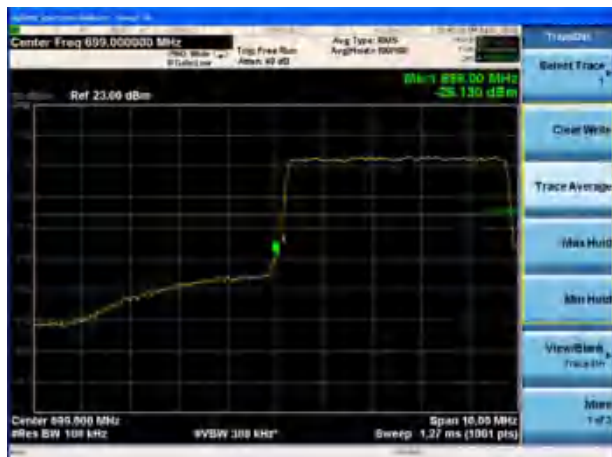
LTE Band 12 16QAM 5MHz CH-Low, 1 RB



LTE Band 12 16QAM 5MHz CH-High, 1 RB



LTE Band 12 16QAM 5MHz CH-Low, 100%RB

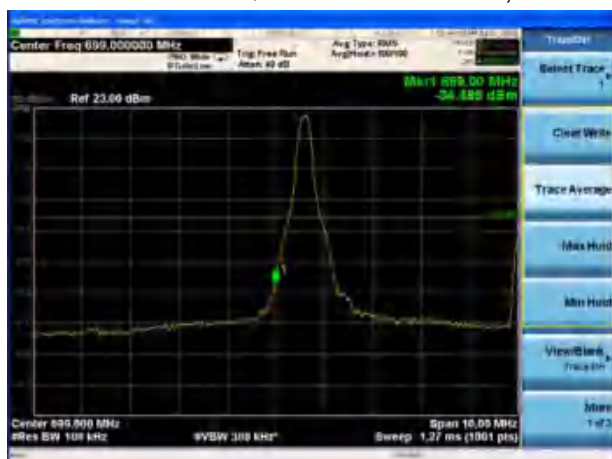


LTE Band 12 16QAM 5MHz CH-High, 100%RB

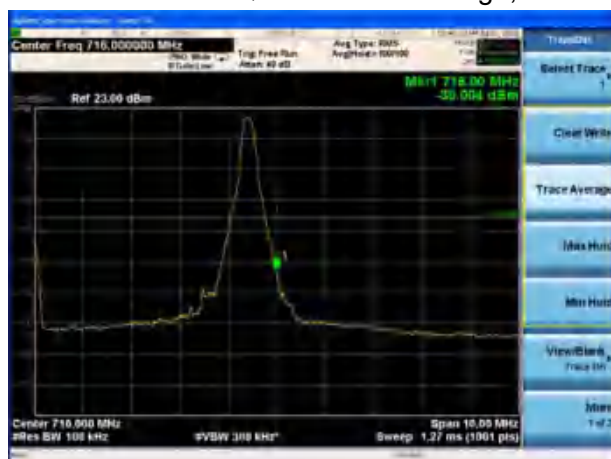




LTE Band 12 16QAM 10MHz CH-Low, 1 RB



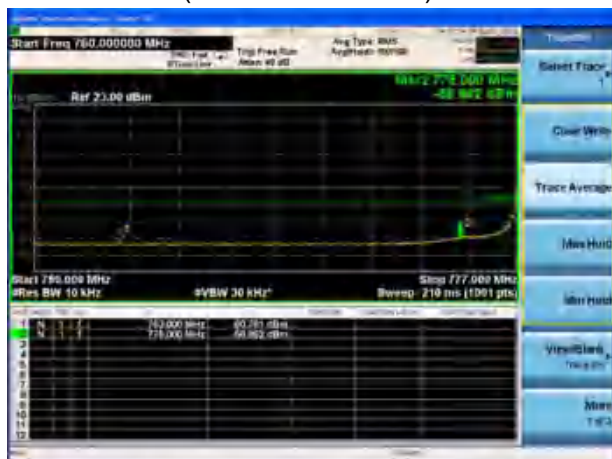
LTE Band 12 16QAM 10MHz CH-High, 1 RB



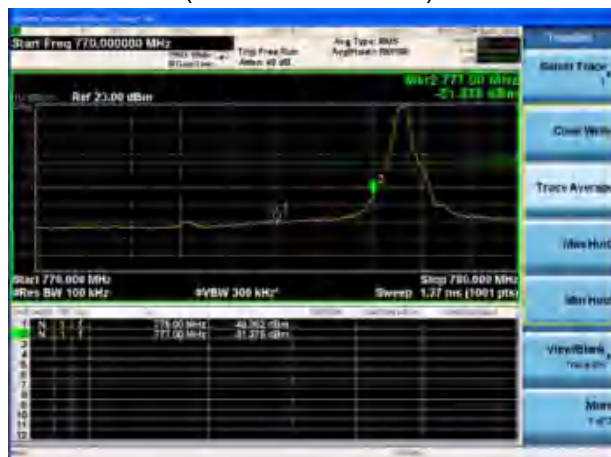
LTE Band 12 16QAM 10MHz CH-Low, 100%RB

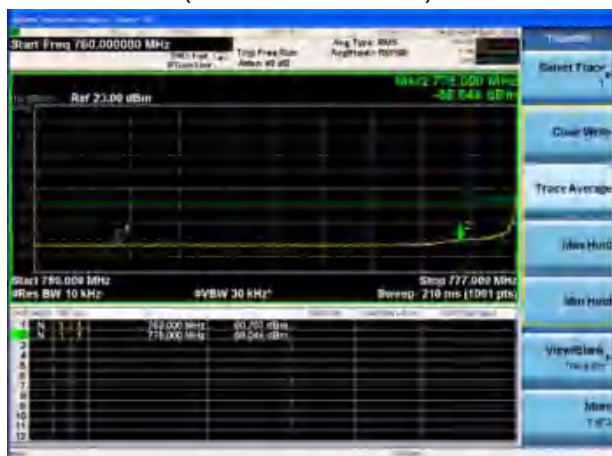
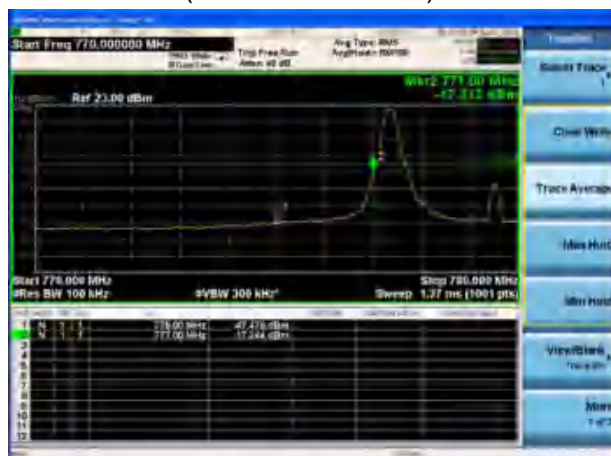


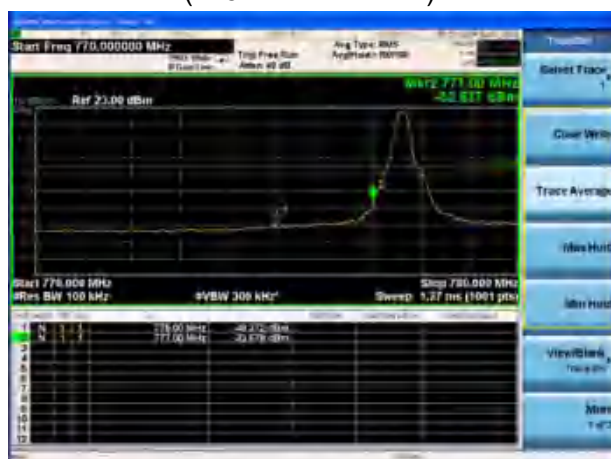
LTE Band 12 16QAM 10MHz CH-High, 100%RB

LTE Band 13 QPSK 5MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 QPSK 5MHz CH-Low, 1 RB
(775MHz ~777MHz)

LTE Band 13 QPSK 5MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 QPSK 5MHz CH-High, 1 RB
(793MHz ~805MHz)LTE Band 13 QPSK 5MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 QPSK 5MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 QPSK 5MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 QPSK 5MHz CH-High, 100%RB
(793MHz ~805MHz)

LTE Band 13 QPSK 10MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 QPSK 10MHz CH-Low, 1 RB
(775MHz ~777MHz)LTE Band 13 QPSK 10MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 QPSK 10MHz CH-High, 1 RB
(793MHz ~805MHz)LTE Band 13 QPSK 10MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 QPSK 10MHz CH-Low, 100%RB
(775MHz ~777MHz)

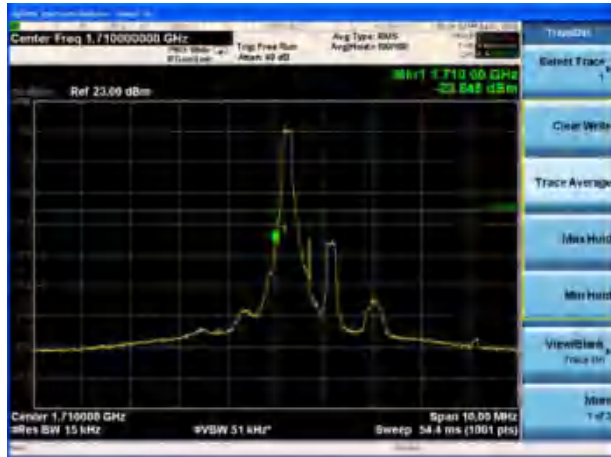
LTE Band 13 QPSK 10MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 QPSK 10MHz CH-High, 100%RB
(793MHz ~805MHz)LTE Band 13 16QAM 5MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 16QAM 5MHz CH-Low, 1 RB
(775MHz ~777MHz)LTE Band 13 16QAM 5MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 16QAM 5MHz CH-High, 1 RB
(793MHz ~805MHz)

LTE Band 13 16QAM 5MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 16QAM 5MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 16QAM 5MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 16QAM 5MHz CH-High, 100%RB
(793MHz ~805MHz)LTE Band 13 16QAM 10MHz CH-Low, 1 RB
(763MHz ~775MHz)LTE Band 13 16QAM 10MHz CH-Low, 1 RB
(775MHz ~777MHz)

LTE Band 13 16QAM 10MHz CH-High, 1 RB
(787MHz ~793MHz)LTE Band 13 16QAM 10MHz CH-High, 1 RB
(793MHz ~805MHz)LTE Band 13 16QAM 10MHz CH-Low, 100%RB
(763MHz ~775MHz)LTE Band 13 16QAM 10MHz CH-Low, 100%RB
(775MHz ~777MHz)LTE Band 13 16QAM 10MHz CH-High, 100%RB
(787MHz ~793MHz)LTE Band 13 16QAM 10MHz CH-High, 100%RB
(793MHz ~805MHz)



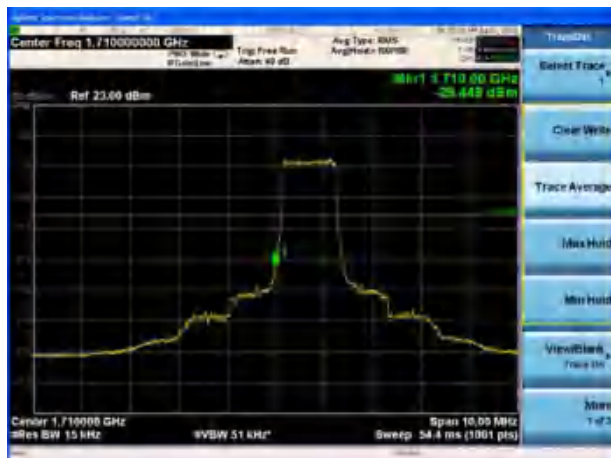
LTE Band 66 QPSK 1.4MHz CH-Low, 1 RB



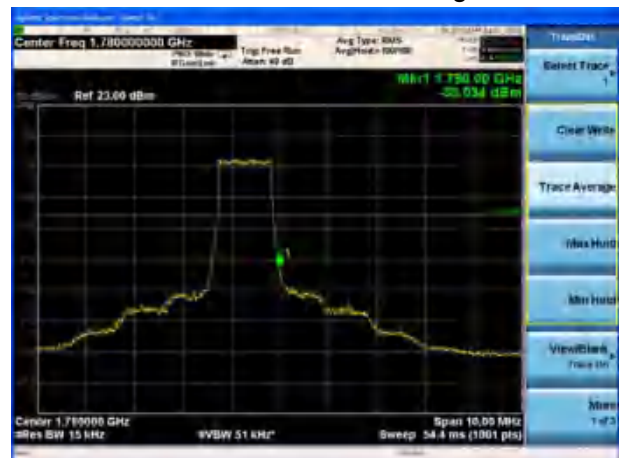
LTE Band 66 QPSK 1.4MHz CH-High, 1 RB



LTE Band 66 QPSK 1.4MHz CH-Low, 100%RB



LTE Band 66 QPSK 1.4MHz CH-High, 100%RB



LTE Band 66 QPSK 3MHz CH-Low, 1 RB

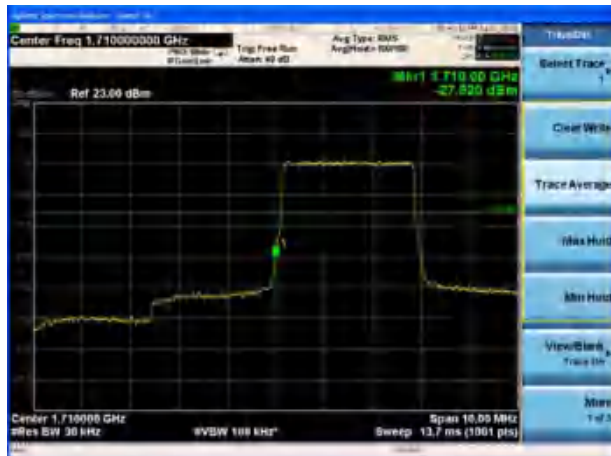


LTE Band 66 QPSK 3MHz CH-High, 1 RB





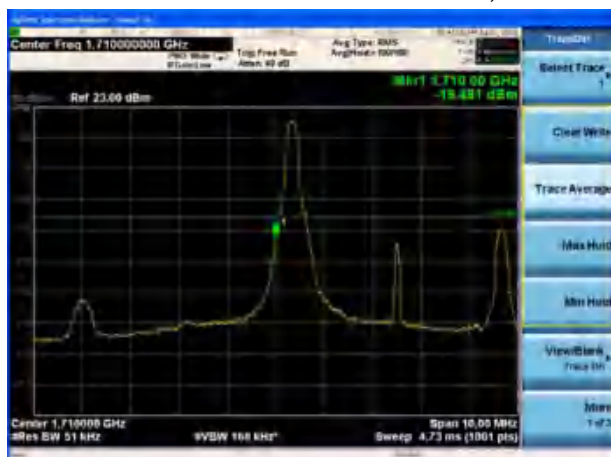
LTE Band 66 QPSK 3MHz CH-Low, 100%RB



LTE Band 66 QPSK 3MHz CH-High, 100%RB



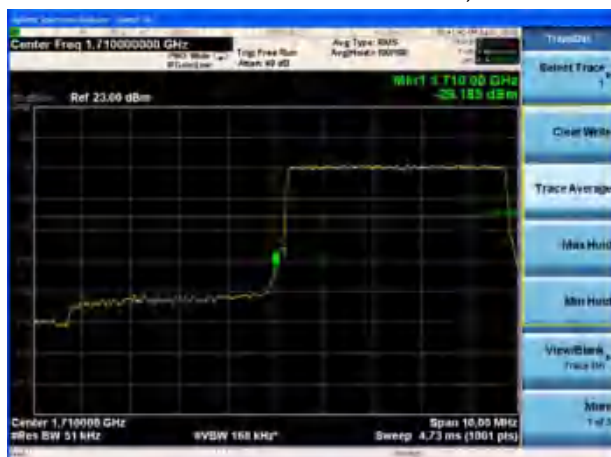
LTE Band 66 QPSK 5MHz CH-Low, 1 RB



LTE Band 66 QPSK 5MHz CH-High, 1 RB



LTE Band 66 QPSK 5MHz CH-Low, 100%RB

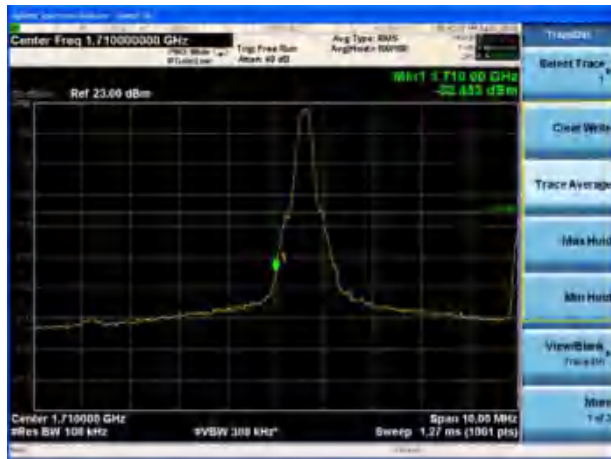


LTE Band 66 QPSK 5MHz CH-High, 100%RB

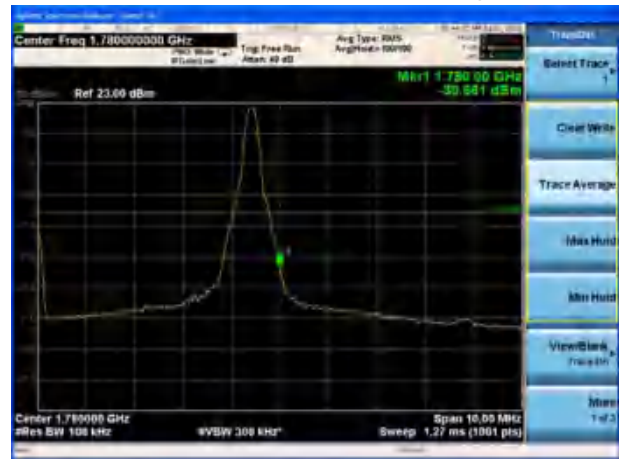




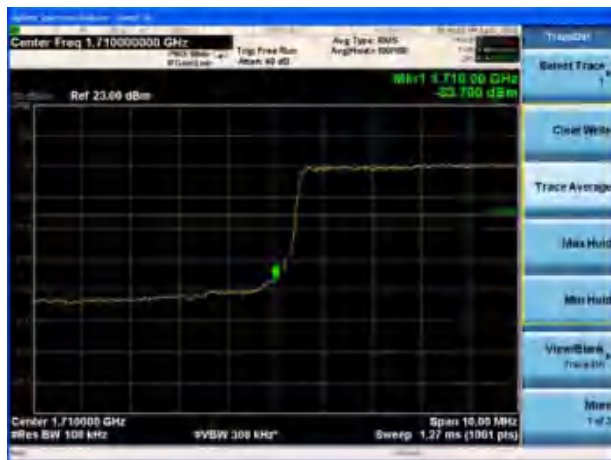
LTE Band 66 QPSK 10MHz CH-Low, 1 RB



LTE Band 66 QPSK 10MHz CH-High, 1 RB



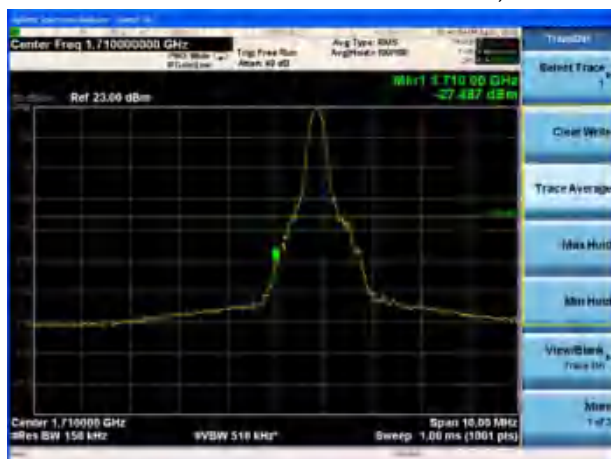
LTE Band 66 QPSK 10MHz CH-Low, 100%RB



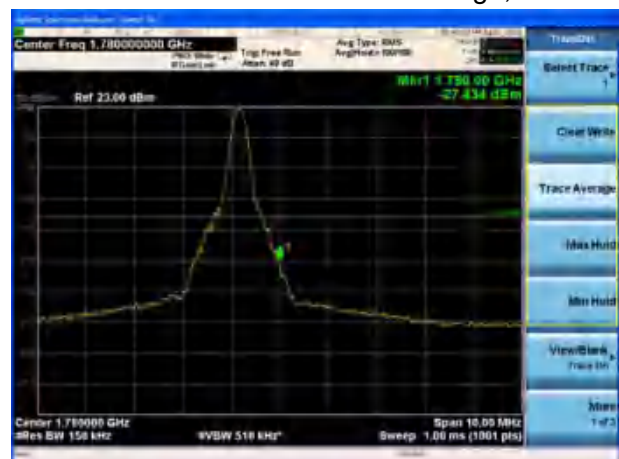
LTE Band 66 QPSK 10MHz CH-High, 100%RB



LTE Band 66 QPSK 15MHz CH-Low, 1 RB



LTE Band 66 QPSK 15MHz CH-High, 1 RB





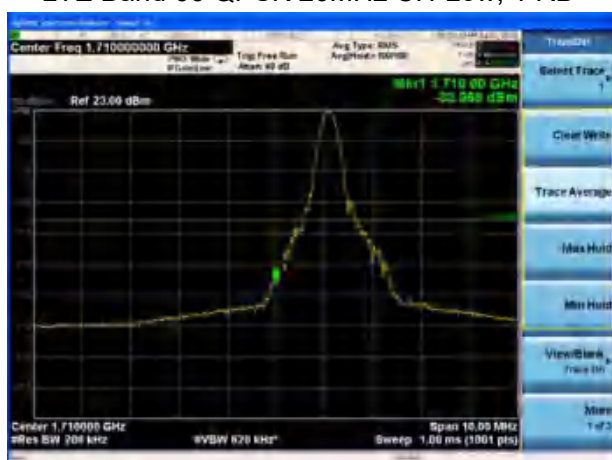
LTE Band 66 QPSK 15MHz CH-Low, 100%RB



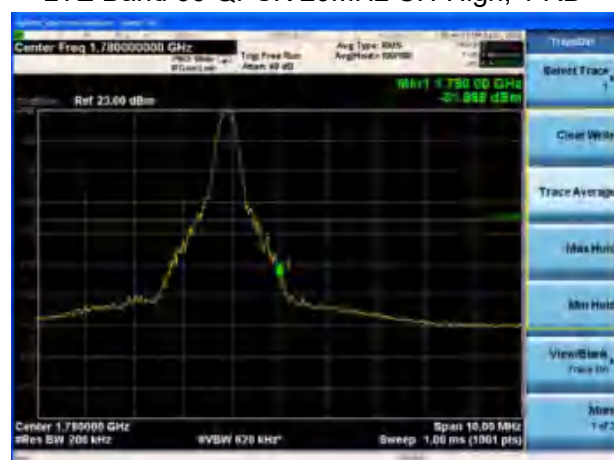
LTE Band 66 QPSK 15MHz CH-High, 100%RB



LTE Band 66 QPSK 20MHz CH-Low, 1 RB



LTE Band 66 QPSK 20MHz CH-High, 1 RB



LTE Band 66 QPSK 20MHz CH-Low, 100%RB



LTE Band 66 QPSK 20MHz CH-High, 100%RB





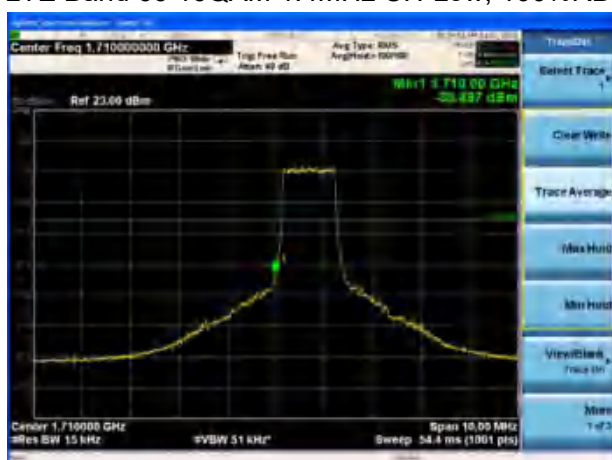
LTE Band 66 16QAM 1.4MHz CH-Low, 1 RB



LTE Band 66 16QAM 1.4MHz CH-High, 1 RB



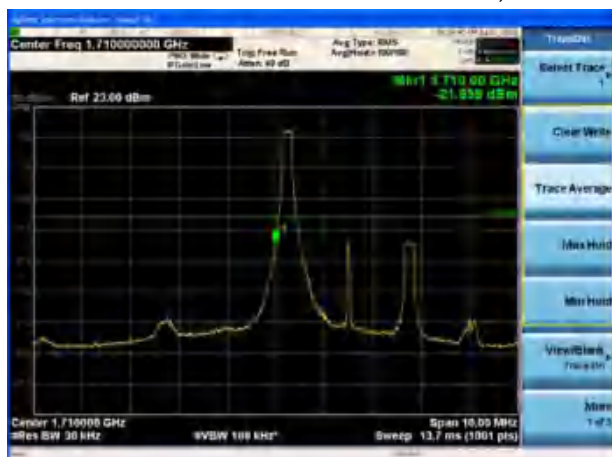
LTE Band 66 16QAM 1.4MHz CH-Low, 100%RB



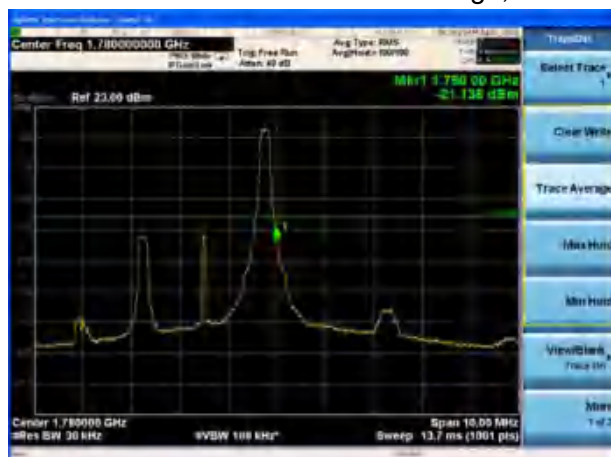
LTE Band 66 16QAM 1.4MHz CH-High, 100%RB



LTE Band 66 16QAM 3MHz CH-Low, 1 RB

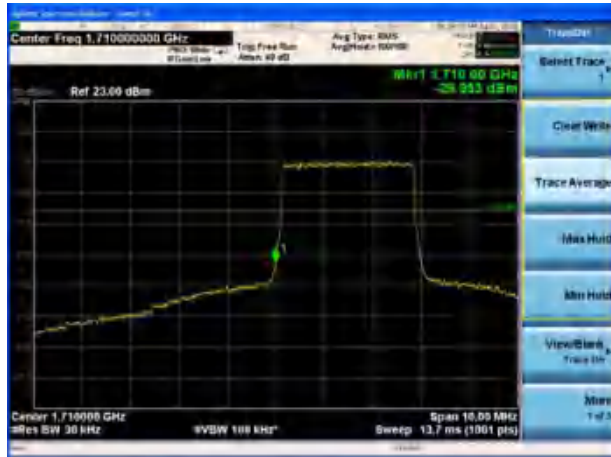


LTE Band 66 16QAM 3MHz CH-High, 1 RB





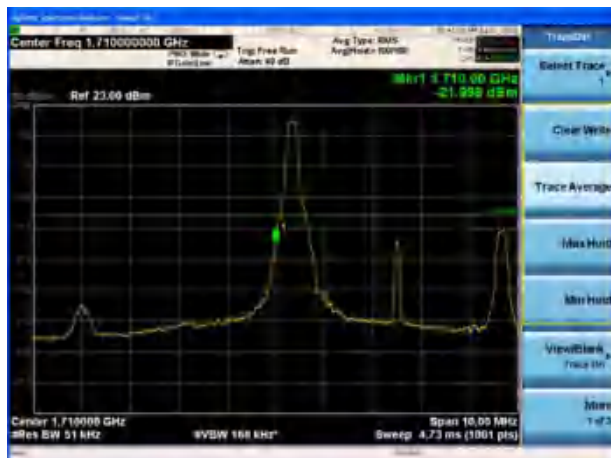
LTE Band 66 16QAM 3MHz CH-Low, 100%RB



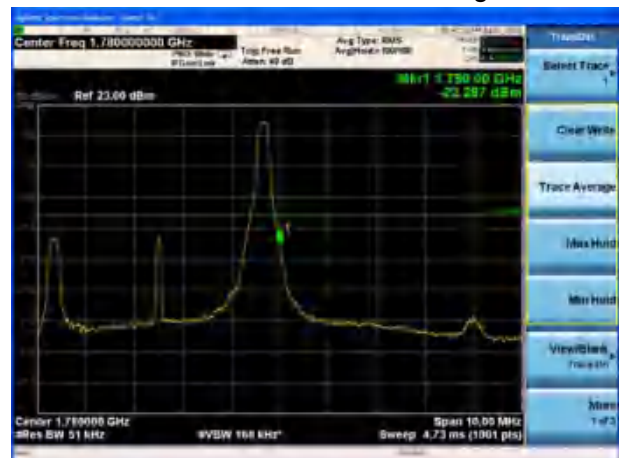
LTE Band 66 16QAM 3MHz CH-High, 100%RB



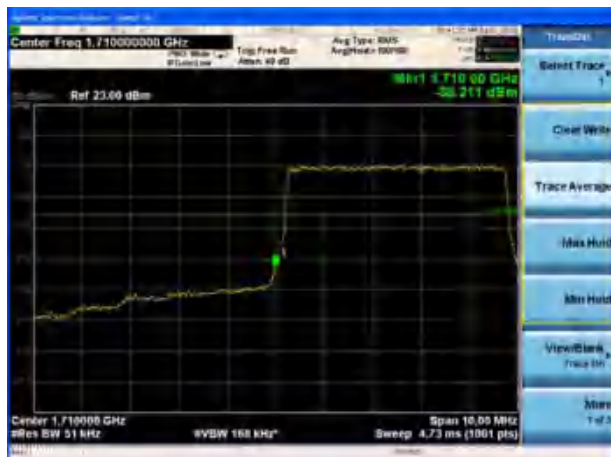
LTE Band 66 16QAM 5MHz CH-Low, 1 RB



LTE Band 66 16QAM 5MHz CH-High, 1 RB



LTE Band 66 16QAM 5MHz CH-Low, 100%RB

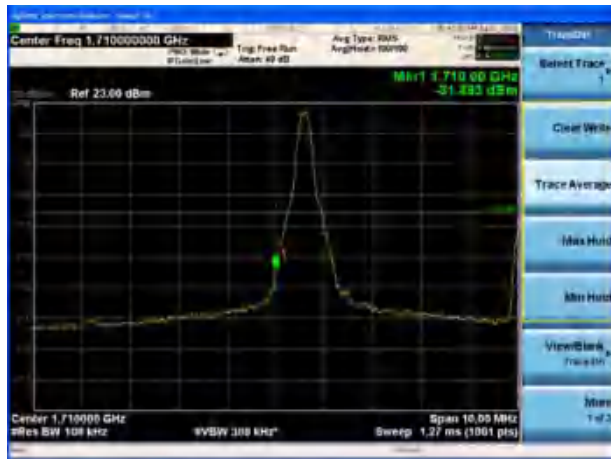


LTE Band 66 16QAM 5MHz CH-High, 100%RB

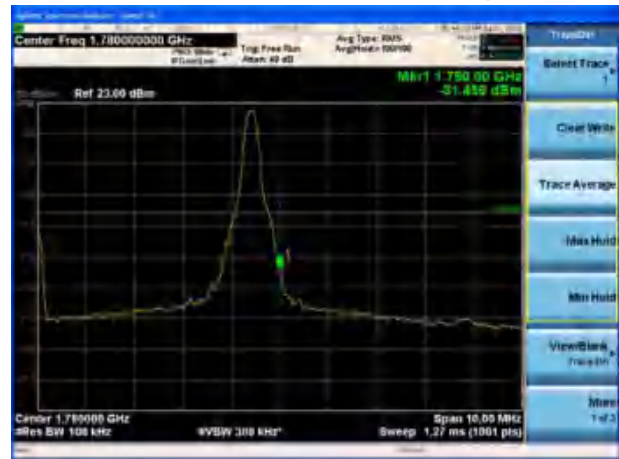




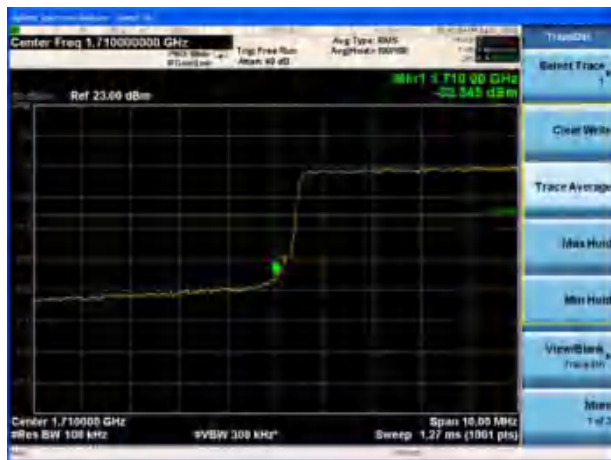
LTE Band 66 16QAM 10MHz CH-Low, 1 RB



LTE Band 66 16QAM 10MHz CH-High, 1 RB



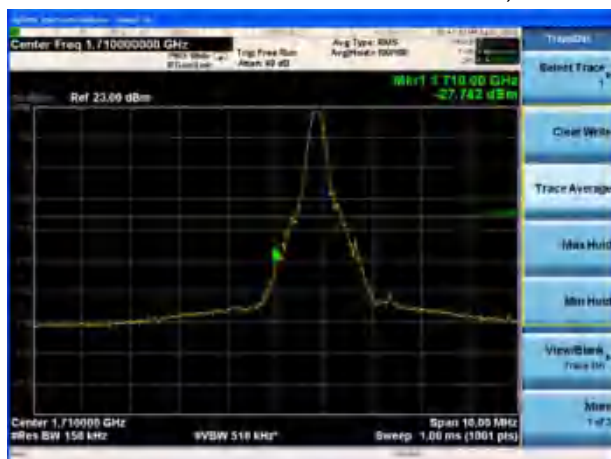
LTE Band 66 16QAM 10MHz CH-Low, 100%RB



LTE Band 66 16QAM 10MHz CH-High, 100%RB



LTE Band 66 16QAM 15MHz CH-Low, 1 RB



LTE Band 66 16QAM 15MHz CH-High, 1 RB





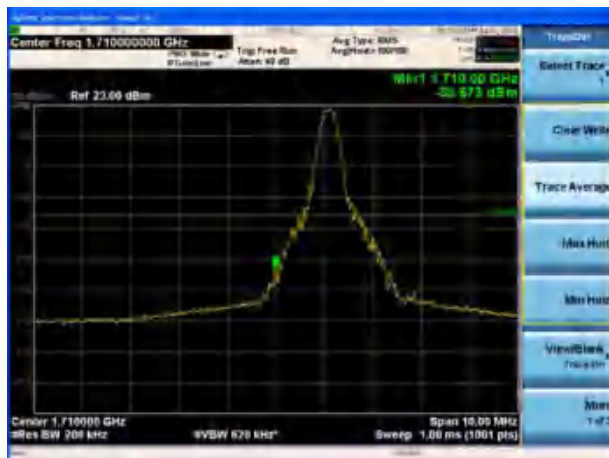
LTE Band 66 16QAM 15MHz CH-Low, 100%RB



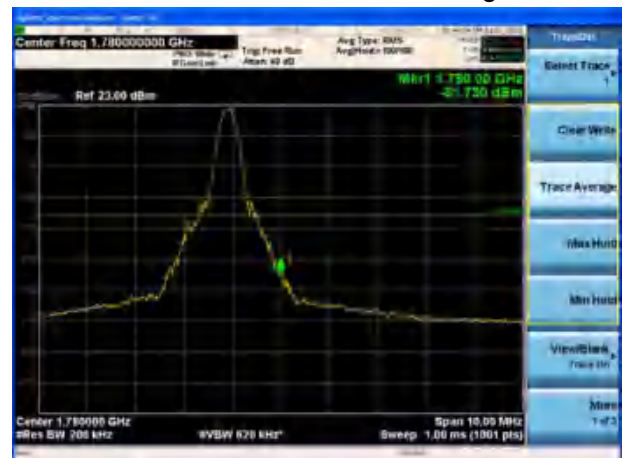
LTE Band 66 16QAM 15MHz CH-High, 100%RB



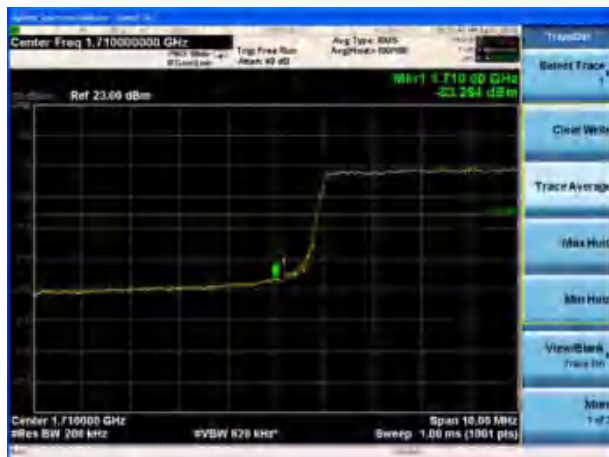
LTE Band 66 16QAM 20MHz CH-Low, 1 RB



LTE Band 66 16QAM 20MHz CH-High, 1 RB



LTE Band 66 16QAM 20MHz CH-Low, 100%RB

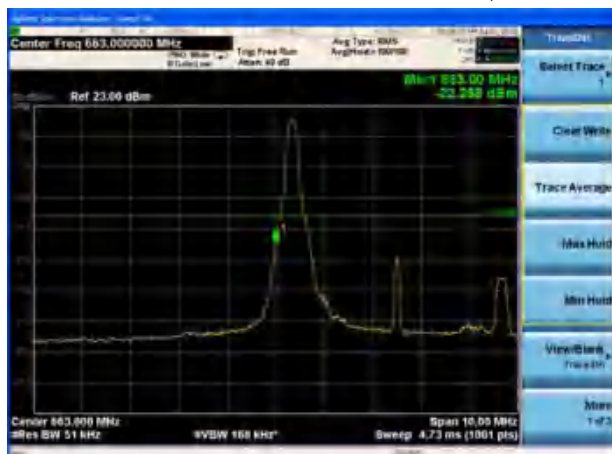


LTE Band 66 16QAM 20MHz CH-High, 100%RB

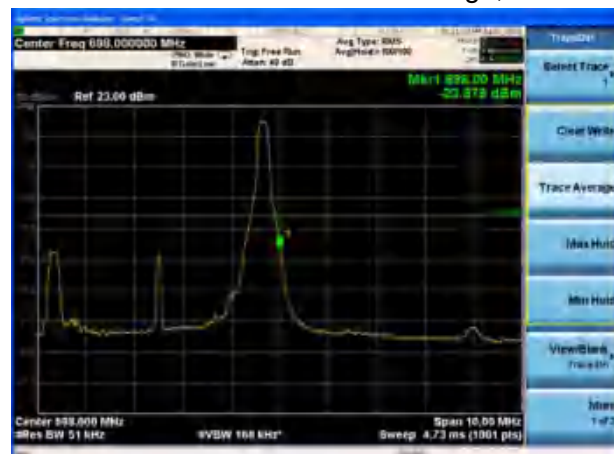




LTE Band 71 QPSK 5MHz CH-Low, 1 RB



LTE Band 71 QPSK 5MHz CH-High, 1 RB



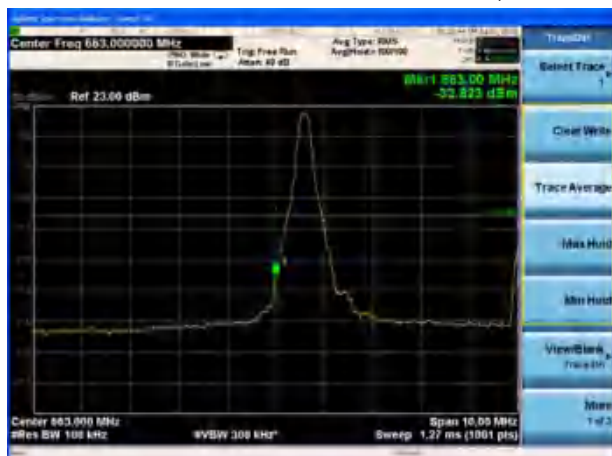
LTE Band 71 QPSK 5MHz CH-Low, 100%RB



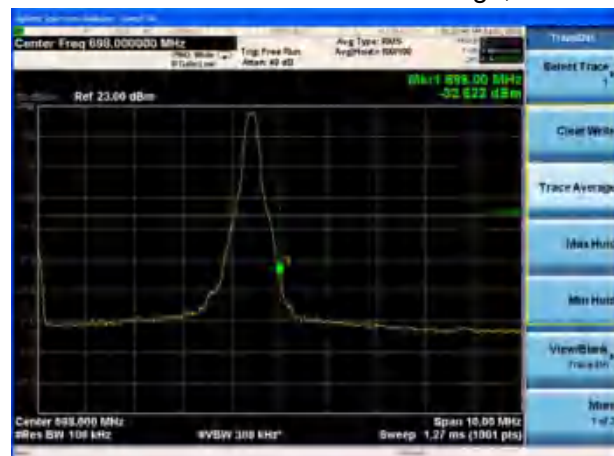
LTE Band 71 QPSK 5MHz CH-High, 100%RB



LTE Band 71 QPSK 10MHz CH-Low, 1 RB

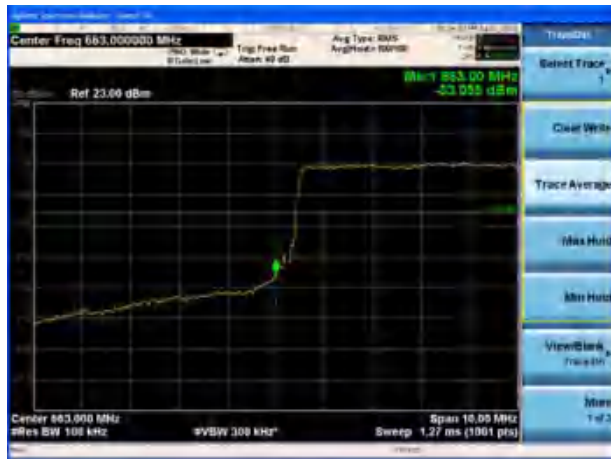


LTE Band 71 QPSK 10MHz CH-High, 1 RB

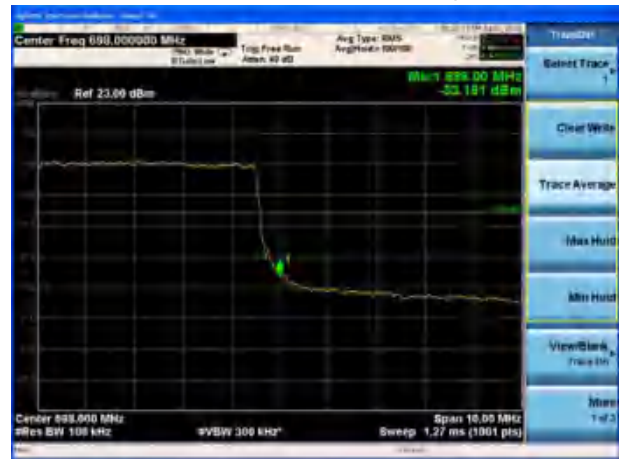




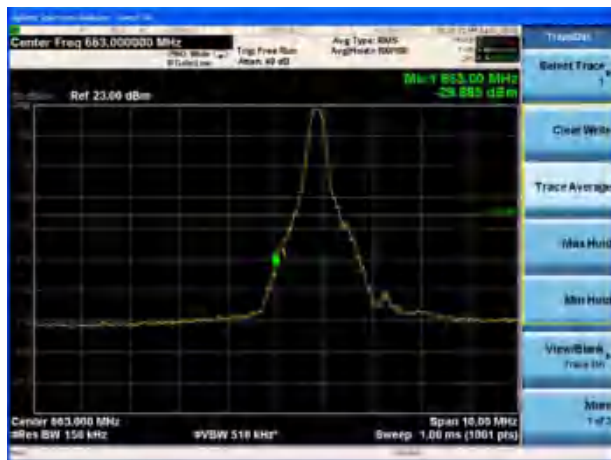
LTE Band 71 QPSK 10MHz CH-Low, 100%RB



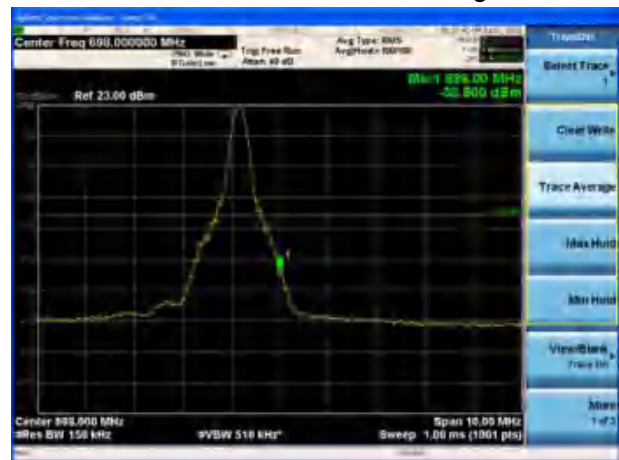
LTE Band 71 QPSK 10MHz CH-High, 100%RB



LTE Band 71 QPSK 15MHz CH-Low, 1 RB



LTE Band 71 QPSK 15MHz CH-High, 1 RB



LTE Band 71 QPSK 15MHz CH-Low, 100%RB

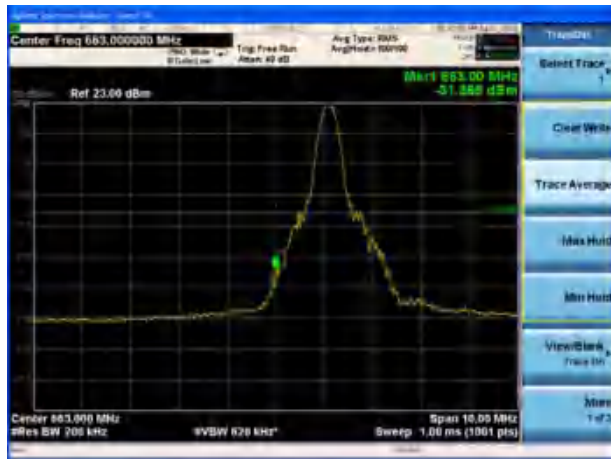


LTE Band 71 QPSK 15MHz CH-High, 100%RB

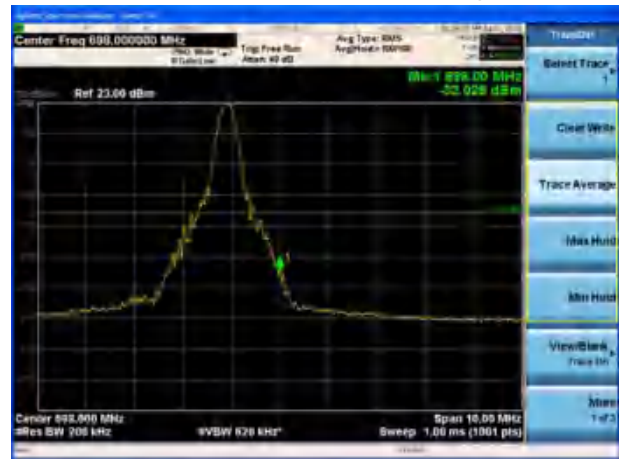




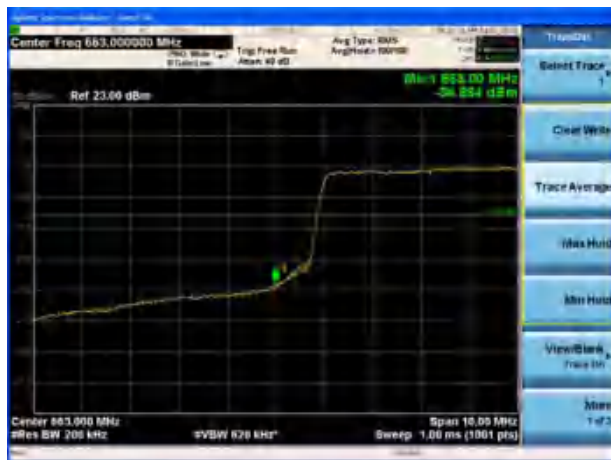
LTE Band 71 QPSK 20MHz CH-Low, 1 RB



LTE Band 71 QPSK 20MHz CH-High, 1 RB



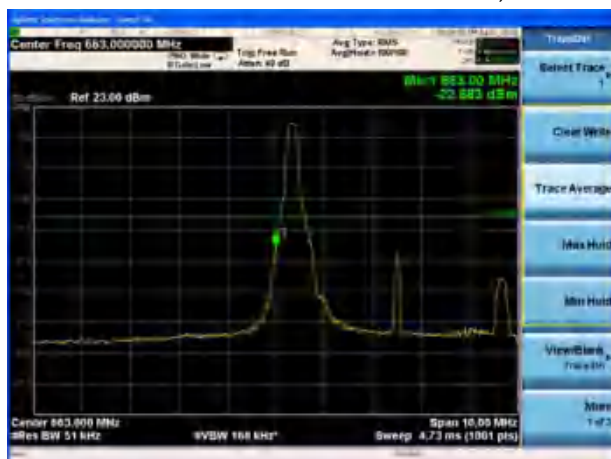
LTE Band 71 QPSK 20MHz CH-Low, 100%RB



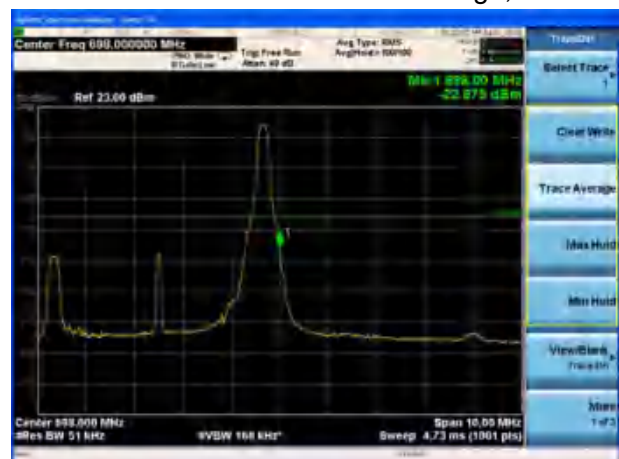
LTE Band 71 QPSK 20MHz CH-High, 100%RB



LTE Band 71 16QAM 5MHz CH-Low, 1 RB



LTE Band 71 16QAM 5MHz CH-High, 1 RB





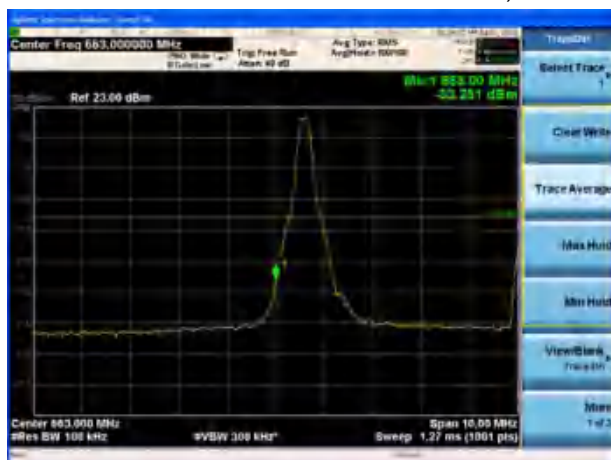
LTE Band 71 16QAM 5MHz CH-Low, 100%RB



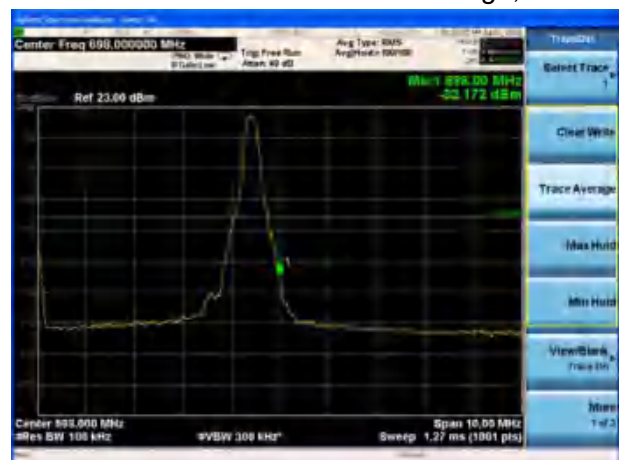
LTE Band 71 16QAM 5MHz CH-High, 100%RB



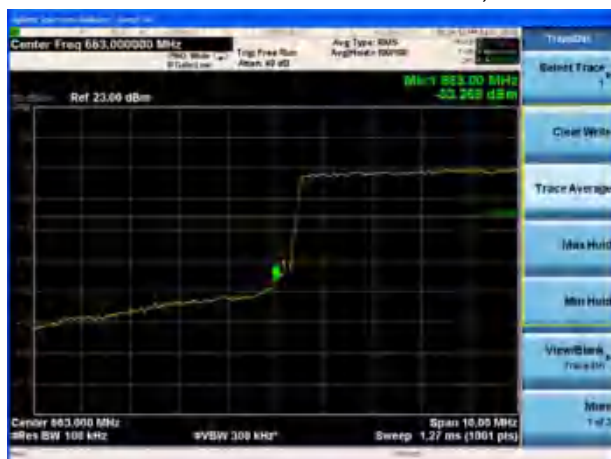
LTE Band 71 16QAM 10MHz CH-Low, 1 RB



LTE Band 71 16QAM 10MHz CH-High, 1 RB



LTE Band 71 16QAM 10MHz CH-Low, 100%RB

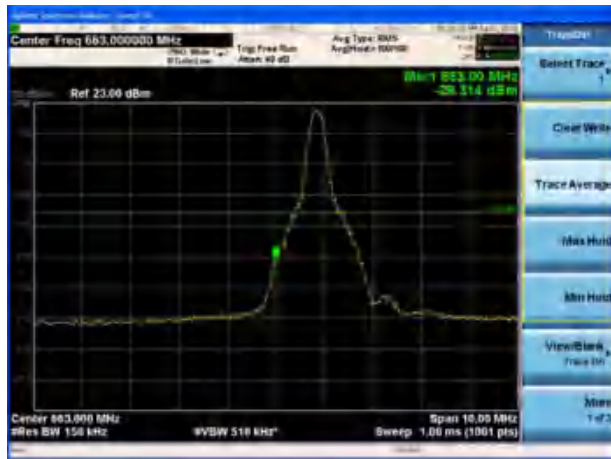


LTE Band 71 16QAM 10MHz CH-High, 100%RB

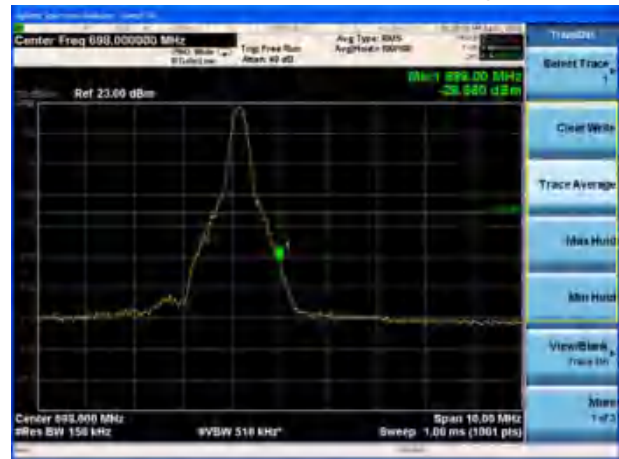




LTE Band 71 16QAM 15MHz CH-Low, 1 RB



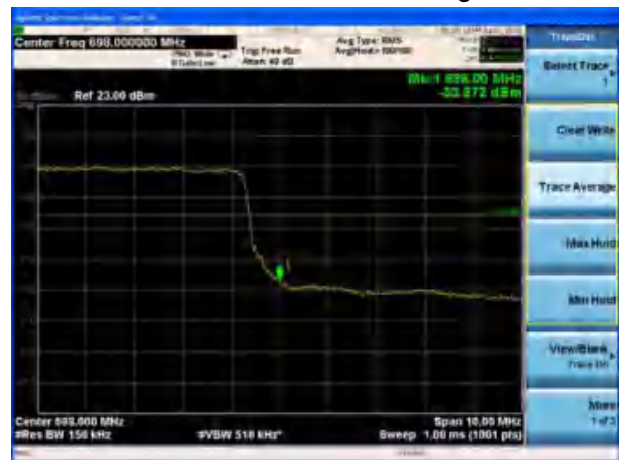
LTE Band 71 16QAM 15MHz CH-High, 1 RB



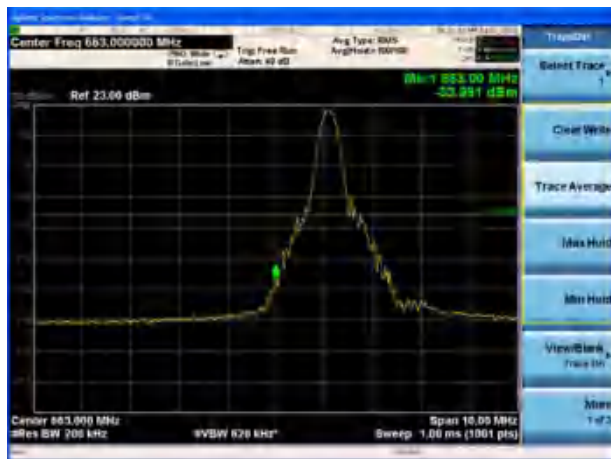
LTE Band 71 16QAM 15MHz CH-Low, 100%RB



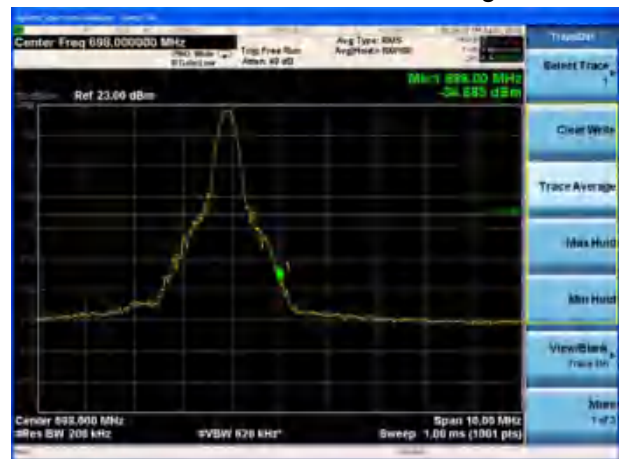
LTE Band 71 16QAM 15MHz CH-High, 100%RB



LTE Band 71 16QAM 20MHz CH-Low, 1 RB

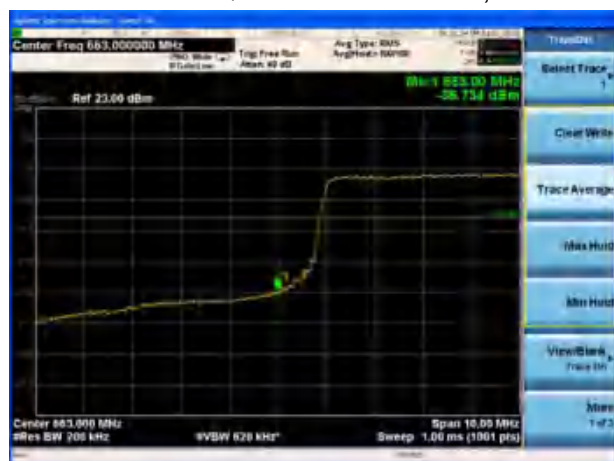


LTE Band 71 16QAM 20MHz CH-High, 1 RB





LTE Band 71 16QAM 20MHz CH-Low, 100%RB



LTE Band 71 16QAM 20MHz CH-High, 100%RB



5.5 Peak-to-Average Power Ratio (PAPR)

Ambient condition

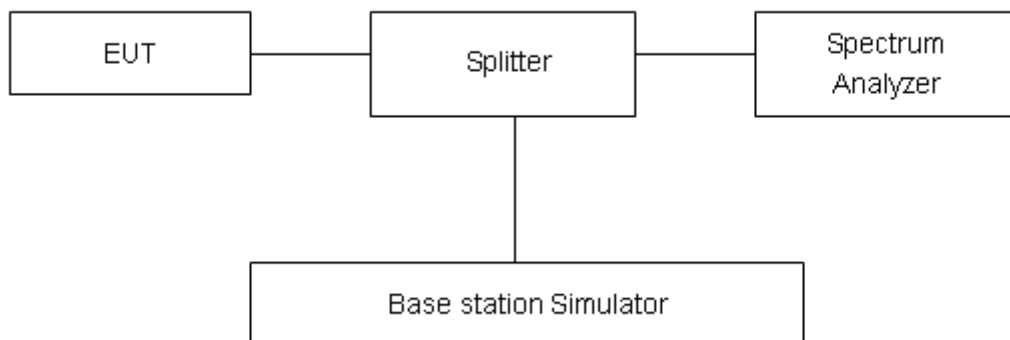
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may 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**

WCDMA Band IV	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
RMC	1312	1712.4	26.51	23.46	3.05	≤13	PASS
	1413	1732.6	26.30	23.35	2.95	≤13	PASS
	1513	1752.6	26.19	23.37	2.82	≤13	PASS

LTE Band 4								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	19957	1710.7	27.15	22.30	4.85	≤13	PASS
		20175	1732.5	27.21	22.40	4.81	≤13	PASS
		20393	1754.3	27.12	22.64	4.48	≤13	PASS
	3	19965	1711.5	27.30	22.33	4.97	≤13	PASS
		20175	1732.5	27.37	22.44	4.93	≤13	PASS
		20385	1753.5	27.37	22.67	4.70	≤13	PASS
	5	19975	1712.5	27.31	22.31	5.00	≤13	PASS
		20175	1732.5	27.33	22.43	4.90	≤13	PASS
		20375	1752.5	27.29	22.65	4.64	≤13	PASS
	10	20000	1715	27.34	22.39	4.95	≤13	PASS
		20175	1732.5	27.28	22.45	4.83	≤13	PASS
		20350	1750	27.31	22.69	4.62	≤13	PASS
	15	20025	1717.5	27.40	22.37	5.03	≤13	PASS
		20175	1732.5	27.27	22.41	4.86	≤13	PASS
		20325	1747.5	27.20	22.64	4.56	≤13	PASS
	20	20050	1720	27.26	22.34	4.92	≤13	PASS
		20175	1732.5	27.14	22.36	4.78	≤13	PASS
		20300	1745	27.23	22.60	4.63	≤13	PASS
16QAM	1.4	19957	1710.7	27.03	21.34	5.69	≤13	PASS
		20175	1732.5	27.07	21.48	5.59	≤13	PASS
		20393	1754.3	26.99	21.68	5.31	≤13	PASS
	3	19965	1711.5	27.15	21.37	5.78	≤13	PASS
		20175	1732.5	27.21	21.52	5.69	≤13	PASS
		20385	1753.5	27.21	21.71	5.50	≤13	PASS
	5	19975	1712.5	27.11	21.35	5.76	≤13	PASS
		20175	1732.5	27.16	21.48	5.68	≤13	PASS
		20375	1752.5	27.05	21.66	5.39	≤13	PASS
	10	20000	1715	27.14	21.38	5.76	≤13	PASS
		20175	1732.5	27.18	21.53	5.65	≤13	PASS
		20350	1750	27.14	21.70	5.44	≤13	PASS



	15	20025	1717.5	27.12	21.35	5.77	≤13	PASS
		20175	1732.5	27.08	21.48	5.60	≤13	PASS
		20325	1747.5	26.95	21.66	5.29	≤13	PASS
	20	20050	1720	27.04	21.33	5.71	≤13	PASS
		20175	1732.5	27.03	21.44	5.59	≤13	PASS
		20300	1745	27.03	21.63	5.40	≤13	PASS

LTE Band 12								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	23017	699.7	27.71	22.61	5.10	≤13	PASS
		23095	707.5	27.72	22.57	5.15	≤13	PASS
		23173	715.3	27.70	22.65	5.05	≤13	PASS
	3	23025	700.5	27.83	22.64	5.19	≤13	PASS
		23095	707.5	27.82	22.61	5.21	≤13	PASS
		23165	714.5	27.87	22.68	5.19	≤13	PASS
	5	23035	701.5	27.87	22.68	5.19	≤13	PASS
		23095	707.5	27.75	22.58	5.17	≤13	PASS
		23155	713.5	27.86	22.65	5.21	≤13	PASS
	10	23060	704	27.83	22.65	5.18	≤13	PASS
		23095	707.5	27.60	22.53	5.07	≤13	PASS
		23130	711	27.76	22.61	5.15	≤13	PASS
16QAM	1.4	23017	699.7	27.73	21.71	6.02	≤13	PASS
		23095	707.5	27.57	21.63	5.94	≤13	PASS
		23173	715.3	27.73	21.84	5.89	≤13	PASS
	3	23025	700.5	27.78	21.74	6.04	≤13	PASS
		23095	707.5	27.71	21.67	6.04	≤13	PASS
		23165	714.5	27.89	21.87	6.02	≤13	PASS
	5	23035	701.5	27.70	21.72	5.98	≤13	PASS
		23095	707.5	27.59	21.63	5.96	≤13	PASS
		23155	713.5	27.81	21.82	5.99	≤13	PASS
	10	23060	704	27.68	21.70	5.98	≤13	PASS
		23095	707.5	27.50	21.59	5.91	≤13	PASS
		23130	711	27.76	21.79	5.97	≤13	PASS

LTE Band 13								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	5	23205	779.5	27.81	22.81	5.00	≤13	PASS



16QAM	10	23230	782	27.79	22.74	5.05	≤13	PASS
		23255	784.5	27.89	22.80	5.09	≤13	PASS
		23230	782	27.75	22.74	5.01	≤13	PASS
	5	23205	779.5	27.57	21.74	5.83	≤13	PASS
		23230	782	27.81	21.96	5.85	≤13	PASS
		23255	784.5	27.47	21.62	5.85	≤13	PASS
	10	23230	782	27.65	21.82	5.83	≤13	PASS

LTE Band 66								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	131979	1710.7	27.40	22.51	4.89	≤13	PASS
		132322	1745	27.22	22.73	4.49	≤13	PASS
		132665	1779.3	27.31	22.34	4.97	≤13	PASS
	3	131987	1711.5	27.51	22.54	4.97	≤13	PASS
		132322	1745	27.47	22.77	4.70	≤13	PASS
		132657	1778.5	27.48	22.37	5.11	≤13	PASS
	5	131997	1712.5	27.52	22.52	5.00	≤13	PASS
		132322	1745	27.40	22.76	4.64	≤13	PASS
		132647	1777.5	27.38	22.35	5.03	≤13	PASS
	10	132022	1715	27.54	22.60	4.94	≤13	PASS
		132322	1745	27.34	22.78	4.56	≤13	PASS
		132622	1775	27.37	22.39	4.98	≤13	PASS
	15	132047	1717.5	27.57	22.58	4.99	≤13	PASS
		132322	1745	27.25	22.74	4.51	≤13	PASS
		132597	1772.5	27.36	22.34	5.02	≤13	PASS
	20	132072	1720	27.46	22.55	4.91	≤13	PASS
		132322	1745	27.25	22.69	4.56	≤13	PASS
		132572	1770	27.21	22.30	4.91	≤13	PASS
16QAM	1.4	131979	1710.7	27.34	21.65	5.69	≤13	PASS
		132322	1745	27.08	21.84	5.24	≤13	PASS
		132665	1779.3	27.26	21.45	5.81	≤13	PASS
	3	131987	1711.5	27.44	21.68	5.76	≤13	PASS
		132322	1745	27.35	21.88	5.47	≤13	PASS
		132657	1778.5	27.37	21.48	5.89	≤13	PASS
	5	131997	1712.5	27.41	21.66	5.75	≤13	PASS
		132322	1745	27.20	21.84	5.36	≤13	PASS
		132647	1777.5	27.23	21.43	5.80	≤13	PASS



	10	132022	1715	27.48	21.69	5.79	≤13	PASS
		132322	1745	27.25	21.89	5.36	≤13	PASS
		132622	1775	27.28	21.47	5.81	≤13	PASS
	15	132047	1717.5	27.39	21.66	5.73	≤13	PASS
		132322	1745	27.08	21.84	5.24	≤13	PASS
		132597	1772.5	27.17	21.43	5.74	≤13	PASS
	20	132072	1720	27.33	21.64	5.69	≤13	PASS
		132322	1745	27.16	21.80	5.36	≤13	PASS
		132572	1770	27.10	21.40	5.70	≤13	PASS

LTE Band 71								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
	5	133147	665.5	27.25	22.17	5.08	≤13	PASS
		133297	680.5	27.48	22.40	5.08	≤13	PASS
		133447	695.5	27.35	22.20	5.15	≤13	PASS
	10	133172	668	27.33	22.25	5.08	≤13	PASS
		133297	680.5	27.47	22.42	5.05	≤13	PASS
		133422	693	27.31	22.24	5.07	≤13	PASS
	15	133197	670.5	27.45	22.23	5.22	≤13	PASS
		133297	680.5	27.28	22.11	5.17	≤13	PASS
		133397	690.5	27.40	22.19	5.21	≤13	PASS
	20	133222	673	27.24	22.20	5.04	≤13	PASS
		133322	683	27.36	22.33	5.03	≤13	PASS
		133372	688	27.23	22.15	5.08	≤13	PASS
	5	133147	665.5	27.14	21.32	5.82	≤13	PASS
		133297	680.5	27.36	21.50	5.86	≤13	PASS
		133447	695.5	27.22	21.31	5.91	≤13	PASS
	10	133172	668	27.22	21.35	5.87	≤13	PASS
		133297	680.5	27.37	21.55	5.82	≤13	PASS
		133422	693	27.24	21.35	5.89	≤13	PASS
	15	133197	670.5	27.25	21.32	5.93	≤13	PASS
		133297	680.5	26.98	21.11	5.87	≤13	PASS
		133397	690.5	27.25	21.31	5.94	≤13	PASS
	20	133222	673	27.16	21.30	5.86	≤13	PASS
		133322	683	27.29	21.46	5.83	≤13	PASS
		133372	688	27.16	21.28	5.88	≤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 -10°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)

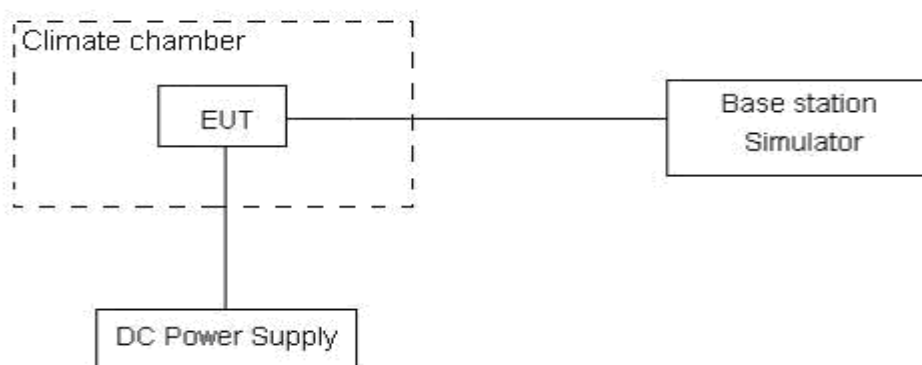
The frequency stability shall be measured with variation of primary supply voltage as follows:

(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

No specific frequency stability requirements in part 27.54

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 IV

WCDMA Band IV					
Condition		1710	1755	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.0279	1754.9113	2.13	0.00113
Extreme (85°C)		1710.0281	1754.9112	-3.16	-0.00168
Extreme (80°C)		1710.0276	1754.9116	0.59	0.00031
Extreme (70°C)		1710.0291	1754.9101	-5.54	-0.00295
Extreme (60°C)		1710.0272	1754.9122	-1.17	-0.00062
Extreme (50°C)		1710.0269	1754.9123	0.16	0.00009
Extreme (40°C)		1710.0284	1754.9108	-5.52	-0.00294
Extreme (30°C)		1710.0273	1754.9119	-3.36	-0.00179
Extreme (20°C)		1710.0271	1754.9122	0.69	0.00037
Extreme (10°C)		1710.0286	1754.9106	0.89	0.00047
Extreme (0°C)		1710.0277	1754.9115	3.19	0.00170
Extreme (-10°C)		1710.0291	1754.9122	0.39	0.00021
Extreme (-20°C)		1710.0323	1754.9153	3.56	0.00189
Extreme (-30°C)		1710.0339	1754.9175	0.19	0.00010
Extreme (-40°C)		1710.0345	1754.9187	2.80	0.00149
25C	LV	1710.0316	1754.9147	2.96	0.00157
	HV	1710.0303	1754.9156	0.49	0.00026

LTE Band 4					
(QPSK, 20MHz BANDWIDTH)					
Condition		1710	1755	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.6538	1754.4302	1.44	0.00083
Extreme (85°C)		1710.6549	1754.4314	0.86	0.00050
Extreme (80°C)		1710.6516	1754.4275	-2.69	-0.00155
Extreme (70°C)		1710.6529	1754.4294	-1.82	-0.00105
Extreme (60°C)		1710.6515	1754.4285	2.10	0.00121
Extreme (50°C)		1710.6521	1754.4286	0.86	0.00050
Extreme (40°C)		1710.6534	1754.4299	-0.07	-0.00004
Extreme (30°C)		1710.6541	1754.4306	0.35	0.00020
Extreme (20°C)		1710.6523	1754.4285	-0.40	-0.00023
Extreme (10°C)		1710.6532	1754.4297	-0.20	-0.00012
Extreme (0°C)		1710.6519	1754.4284	0.56	0.00032



Extreme (-10°C)		1710.6514	1754.4279	-2.60	-0.00150
Extreme (-20°C)		1710.6525	1754.4291	-0.42	-0.00024
Extreme (-30°C)		1710.6558	1754.4323	1.26	0.00073
Extreme (-40°C)		1710.6576	1754.4335	3.50	0.00202
25°C	LV	1710.6522	1754.4287	-1.15	-0.00066
	HV	1710.6528	1754.4293	0.97	0.00056
(16QAM, 20MHz BANDWIDTH)					
Condition		1710	1755	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.6387	1754.5105	-6.99	-0.00403
Extreme (85°C)		1710.6369	1754.5094	3.06	0.00177
Extreme (80°C)		1710.6408	1754.5133	-3.56	-0.00205
Extreme (70°C)		1710.6389	1754.5114	-5.22	-0.00301
Extreme (60°C)		1710.6403	1754.5128	-3.92	-0.00226
Extreme (50°C)		1710.6397	1754.5122	-2.16	-0.00125
Extreme (40°C)		1710.6384	1754.5109	-2.64	-0.00152
Extreme (30°C)		1710.6377	1754.5102	0.55	0.00032
Extreme (20°C)		1710.6398	1754.5123	0.33	0.00019
Extreme (10°C)		1710.6386	1754.5111	-2.00	-0.00115
Extreme (0°C)		1710.6399	1754.5124	0.06	0.00003
Extreme (-10°C)		1710.6404	1754.5129	4.07	0.00235
Extreme (-20°C)		1710.6393	1754.5118	-0.53	-0.00031
Extreme (-30°C)		1710.6363	1754.5085	2.99	0.00173
Extreme (-40°C)		1710.6348	1754.5073	0.55	0.00032
25°C	LV	1710.6396	1754.5121	0.15	0.00009
	HV	1710.6391	1754.5115	3.19	0.00184

LTE Band 12					
(QPSK, 10MHz BANDWIDTH)					
Condition		699	716	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	699.2572	715.7323	-0.91	-0.00109
Extreme (85°C)		699.2583	715.7311	-3.35	-0.00400
Extreme (80°C)		699.2544	715.7272	-3.47	-0.00415
Extreme (70°C)		699.2563	715.7291	-6.40	-0.00765
Extreme (60°C)		699.2549	715.7277	-5.64	-0.00674
Extreme (50°C)		699.2555	715.7283	-0.38	-0.00045
Extreme (40°C)		699.2568	715.7296	-1.02	-0.00122
Extreme (30°C)		699.2575	715.7303	-1.09	-0.00130



Extreme (20°C)		699.2554	715.7282	3.16	0.00378
Extreme (10°C)		699.2566	715.7294	1.15	0.00137
Extreme (0°C)		699.2553	715.7281	-3.64	-0.00435
Extreme (-10°C)		699.2548	715.7276	-4.34	-0.00519
Extreme (-20°C)		699.2559	715.7287	-0.35	-0.00042
Extreme (-30°C)		699.2592	715.7324	2.28	0.00273
Extreme (-40°C)		699.2604	715.7332	-3.92	-0.00469
25°C	LV	699.2556	715.7284	-5.58	-0.00667
	HV	699.2562	715.7295	0.20	0.00024
(16QAM, 10MHz BANDWIDTH)					
Condition		699	716	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	699.3118	715.6805	0.85	0.00102
Extreme (85°C)		699.3107	715.6794	-0.85	-0.00102
Extreme (80°C)		699.3146	715.6833	-0.21	-0.00025
Extreme (70°C)		699.3127	715.6814	-1.63	-0.00195
Extreme (60°C)		699.3141	715.6828	-1.10	-0.00132
Extreme (50°C)		699.3135	715.6822	0.86	0.00103
Extreme (40°C)		699.3122	715.6809	-1.34	-0.00160
Extreme (30°C)		699.3115	715.6802	-3.09	-0.00369
Extreme (20°C)		699.3136	715.6823	-2.91	-0.00348
Extreme (10°C)		699.3124	715.6811	-2.10	-0.00251
Extreme (0°C)		699.3137	715.6824	0.08	0.00010
Extreme (-10°C)		699.3142	715.6829	2.56	0.00306
Extreme (-20°C)		699.3131	715.6818	-1.21	-0.00145
Extreme (-30°C)		699.3098	715.6785	-1.31	-0.00157
Extreme (-40°C)		699.3086	715.6773	0.69	0.00082
25°C	LV	699.3134	715.6821	3.45	0.00412
	HV	699.3128	715.6815	4.51	0.00539

LTE Band 13					
(QPSK, 10MHz BANDWIDTH)					
Condition		777	787	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	777.4363	786.5756	2.53	0.00302
Extreme (85°C)		777.4364	786.5755	-5.60	-0.00669
Extreme (80°C)		777.4360	786.5759	12.94	0.01547
Extreme (70°C)		777.4375	786.5744	-4.47	-0.00534
Extreme (60°C)		777.4356	786.5763	0.11	0.00013



Extreme (50°C)		777.4353	786.5766	0.59	0.00071
Extreme (40°C)		777.4368	786.5751	-0.47	-0.00056
Extreme (30°C)		777.4357	786.5762	3.15	0.00377
Extreme (20°C)		777.4354	786.5765	6.52	0.00779
Extreme (10°C)		777.4370	786.5749	5.15	0.00616
Extreme (0°C)		777.4361	786.5758	1.84	0.00220
Extreme (-10°C)		777.4356	786.5751	-0.64	-0.00077
Extreme (-20°C)		777.4362	786.5765	-1.12	-0.00134
Extreme (-30°C)		777.4356	786.5763	-1.60	-0.00191
Extreme (-40°C)		777.4362	786.5757	-3.90	-0.00466
25°C	LV	777.4356	786.5755	5.91	0.00707
	HV	777.4362	786.5744	3.58	0.00428
(16QAM, 10MHz BANDWIDTH)					
Condition		777	787	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	777.5179	786.5012	-11.34	-0.01356
Extreme (85°C)		777.5180	786.5011	7.20	0.00861
Extreme (80°C)		777.5176	786.5015	-10.21	-0.01221
Extreme (70°C)		777.5191	786.5131	-5.63	-0.00673
Extreme (60°C)		777.5172	786.5019	-5.15	-0.00616
Extreme (50°C)		777.5169	786.5022	-6.21	-0.00742
Extreme (40°C)		777.5184	786.5007	-2.59	-0.00310
Extreme (30°C)		777.5173	786.5018	0.78	0.00093
Extreme (20°C)		777.5170	786.5021	-0.59	-0.00071
Extreme (10°C)		777.5186	786.5005	-3.90	-0.00466
Extreme (0°C)		777.5177	786.5014	-6.38	-0.00763
Extreme (-10°C)		777.5176	786.5011	-6.86	-0.00820
Extreme (-20°C)		777.5169	786.5131	-7.34	-0.00877
Extreme (-30°C)		777.5173	786.5018	-9.64	-0.01152
Extreme (-40°C)		777.5186	786.5005	0.17	0.00020
25°C	LV	777.5172	786.5019	-7.34	-0.00877
	HV	777.5178	786.5013	-2.76	-0.00330



LTE Band 66					
(QPSK, 20MHz BANDWIDTH)					
Condition		1710	1780	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.3406	1779.6709	3.51	0.00201
Extreme (85°C)		1710.3405	1779.6708	4.90	0.00281
Extreme (80°C)		1710.3403	1779.6703	-2.65	-0.00152
Extreme (70°C)		1710.3421	1779.6723	-1.64	-0.00094
Extreme (60°C)		1710.3418	1779.6721	3.59	0.00206
Extreme (50°C)		1710.3409	1779.6712	-7.62	-0.00437
Extreme (40°C)		1710.3394	1779.6697	-2.49	-0.00143
Extreme (30°C)		1710.3413	1779.6716	-1.06	-0.00061
Extreme (20°C)		1710.3416	1779.6719	6.30	0.00361
Extreme (10°C)		1710.3401	1779.6704	-9.93	-0.00569
Extreme (0°C)		1710.3412	1779.6715	5.59	0.00320
Extreme (-10°C)		1710.3415	1779.6718	3.51	0.00201
Extreme (-20°C)		1710.3399	1779.6702	-9.02	-0.00517
Extreme (-30°C)		1710.3409	1779.6712	-7.21	-0.00413
Extreme (-40°C)		1710.3408	1779.6711	-8.13	-0.00466
25°C	LV	1710.3413	1779.6716	3.89	0.00223
	HV	1710.3407	1779.6713	6.47	0.00371
(16QAM, 20MHz BANDWIDTH)					
Condition		1710	1780	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	1710.4049	1779.7132	-1.97	-0.00113
Extreme (85°C)		1710.4051	1779.7131	-2.98	-0.00171
Extreme (80°C)		1710.4069	1779.7131	-6.40	-0.00367
Extreme (70°C)		1710.4047	1779.7144	-4.42	-0.00253
Extreme (60°C)		1710.4042	1779.7145	0.08	0.00005
Extreme (50°C)		1710.4046	1779.7135	-0.67	-0.00038
Extreme (40°C)		1710.4061	1779.7123	-8.29	-0.00475
Extreme (30°C)		1710.4042	1779.7139	-1.03	-0.00059
Extreme (20°C)		1710.4039	1779.7142	0.28	0.00016
Extreme (10°C)		1710.4054	1779.7127	-4.34	-0.00249
Extreme (0°C)		1710.4043	1779.7138	-2.64	-0.00151
Extreme (-10°C)		1710.4043	1779.7141	-2.85	-0.00163
Extreme (-20°C)		1710.4056	1779.7125	-6.34	-0.00363
Extreme (-30°C)		1710.4046	1779.7135	-2.06	-0.00118
Extreme (-40°C)		1710.4047	1779.7134	-5.29	-0.00303



25°C	LV	1710.4042	1779.7139	-3.54	-0.00203
	HV	1710.4048	1779.7133	-7.00	-0.00401

LTE Band 71					
(QPSK, 20MHz BANDWIDTH)					
Condition		663	698	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	663.5332	697.4977	4.02	0.00230
Extreme (85°C)		663.6528	697.6175	6.14	0.00352
Extreme (80°C)		663.5318	697.4965	-2.23	-0.00128
Extreme (70°C)		663.5432	697.5079	-1.56	-0.00089
Extreme (60°C)		663.5391	697.5038	6.49	0.00372
Extreme (50°C)		663.5361	697.5008	-5.08	-0.00291
Extreme (40°C)		663.5318	697.4965	-1.82	-0.00104
Extreme (30°C)		663.5432	697.5079	-0.55	-0.00032
Extreme (20°C)		663.5391	697.5038	7.17	0.00411
Extreme (10°C)		663.5321	697.4968	-9.32	-0.00534
Extreme (0°C)		663.5375	697.5022	7.40	0.00424
Extreme (-10°C)		663.5387	697.5034	4.78	0.00274
Extreme (-20°C)		663.5345	697.4992	-8.13	-0.00466
Extreme (-30°C)		663.5361	697.5008	-6.09	-0.00349
Extreme (-40°C)		663.5311	697.4958	-7.05	-0.00404
25°C	LV	663.5326	697.4973	6.36	0.00364
	HV	663.5361	697.5008	7.38	0.00423
(16QAM, 20MHz BANDWIDTH)					
Condition		663	698	Delta(Hz)	Frequency Stability(ppm)
Temperature	Voltage	F low@-13dBm(MHz)	F high@-13dBm(MHz)		
Normal (25°C)	Normal	663.5258	697.4905	0.97	0.00056
Extreme (85°C)		663.4064	697.3707	3.93	0.00225
Extreme (80°C)		663.5282	697.4926	1.26	0.00072
Extreme (70°C)		663.5161	697.4808	3.21	0.00184
Extreme (60°C)		663.5199	697.4846	4.58	0.00262
Extreme (50°C)		663.5227	697.4874	2.22	0.00127
Extreme (40°C)		663.5273	697.4917	1.50	0.00086
Extreme (30°C)		663.5156	697.4803	0.31	0.00018
Extreme (20°C)		663.5197	697.4844	3.52	0.00202
Extreme (10°C)		663.5267	697.4914	-1.33	-0.00076
Extreme (0°C)		663.5213	697.4867	1.95	0.00112
Extreme (-10°C)		663.5201	697.4848	1.46	0.00084



Extreme (-20°C)		663.5243	697.4891	0.63	0.00036
Extreme (-30°C)		663.5227	697.4874	2.25	0.00129
Extreme (-40°C)		663.5277	697.4924	2.07	0.00119
25°C	LV	663.5262	697.4909	2.96	0.00170
	HV	663.5227	697.4874	0.84	0.00048



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.

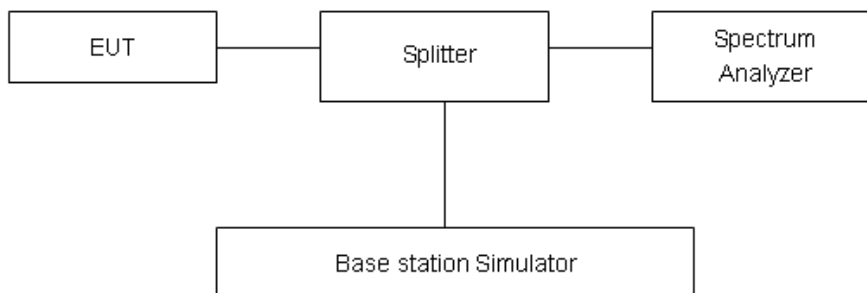
RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

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

Test setup



Limits

LTE -4 Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB..”

LTE -12 Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

LTE -13 Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to –70 dBW/MHz equivalent



isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

LTE 13- Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

Part 27.53(a)/(h)/(g) Limit		-13 dBm
Part 27.53(f) Limit	Limit out of the band 1559-1610 MHz	-13 dBm
	Limit in the band 1559-1610 MHz	-40 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-27GHz	1.407 dB

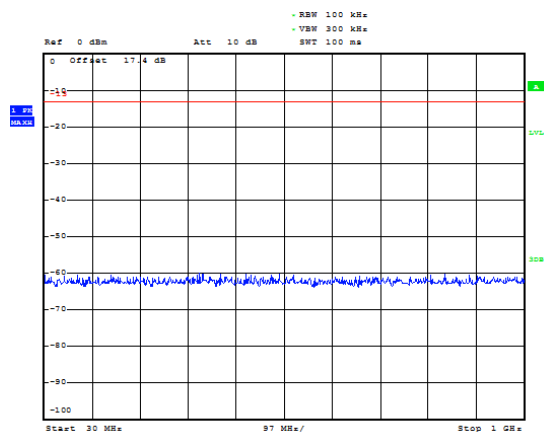


Test Result

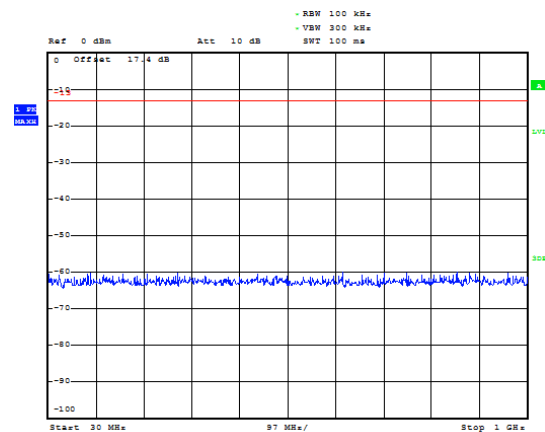
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

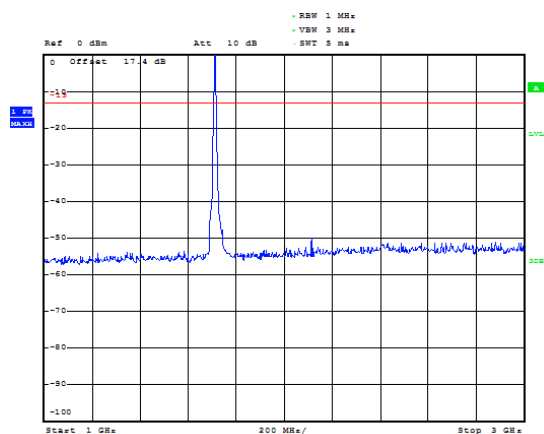
WCDMA Band IV CH-Low 30MHz~1GHz



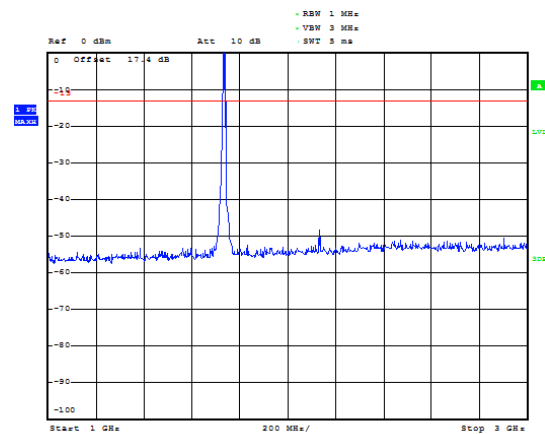
WCDMA Band IV CH-Middle 30MHz~1GHz



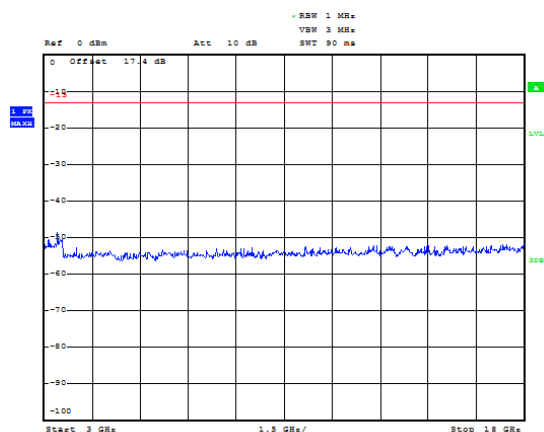
WCDMA Band IV CH-Low 1GHz~3GHz



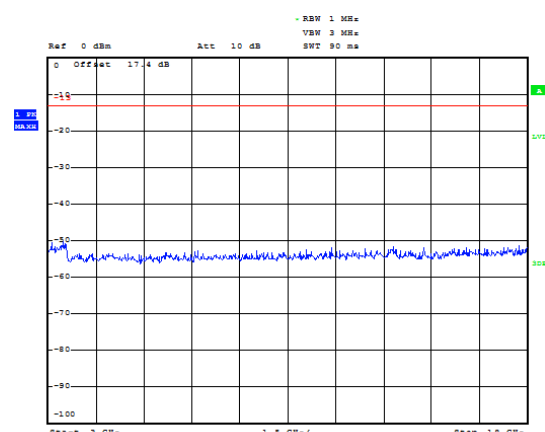
WCDMA Band IV CH-Middle 1GHz~3GHz



WCDMA Band IV CH-Low 3GHz~18GHz

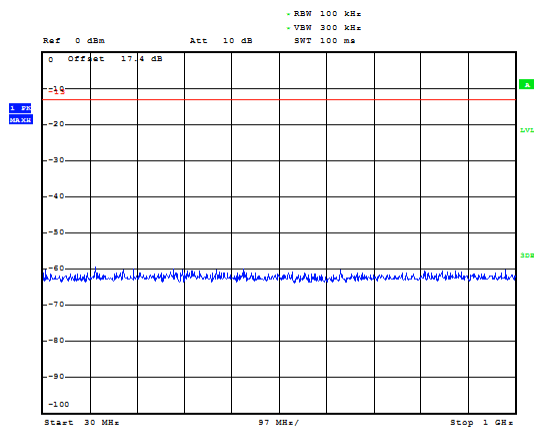


WCDMA Band IV CH-Middle 3GHz~18GHz

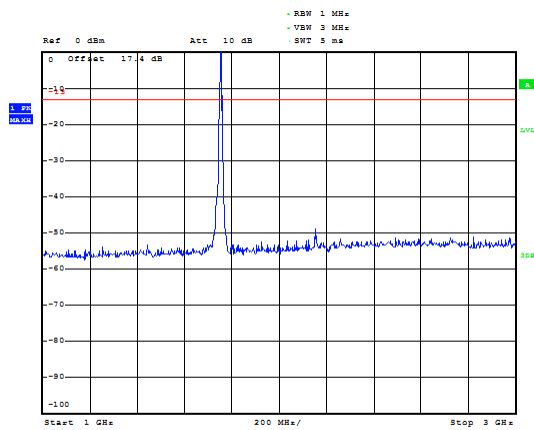




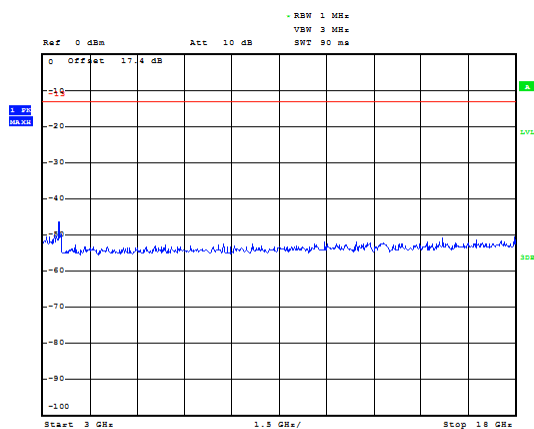
WCDMA Band IV CH-High 30MHz~1GHz



WCDMA Band IV CH-High 1GHz~3GHz

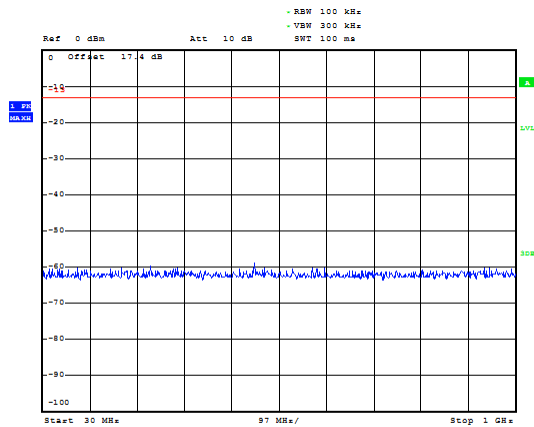


WCDMA Band IV CH-High 3GHz~18GHz

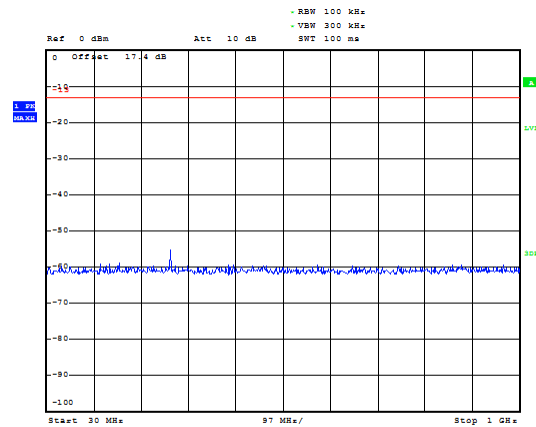




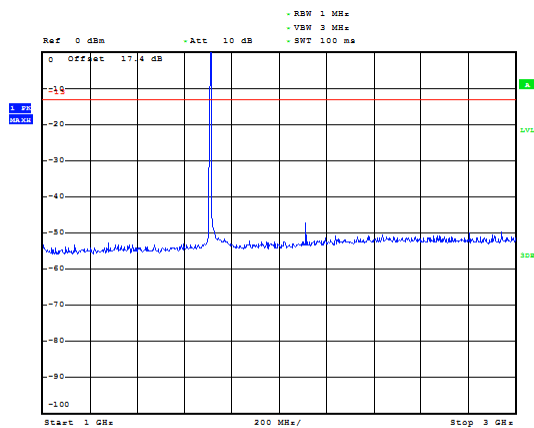
LTE Band 4 1.4MHz CH-Low 30MHz~1GHz



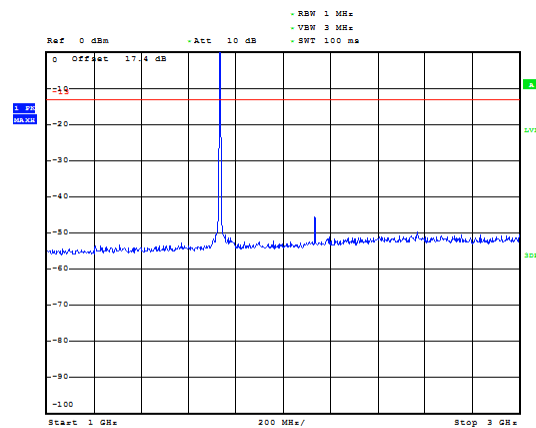
LTE Band 4 1.4MHz CH-Middle 30MHz~1GHz



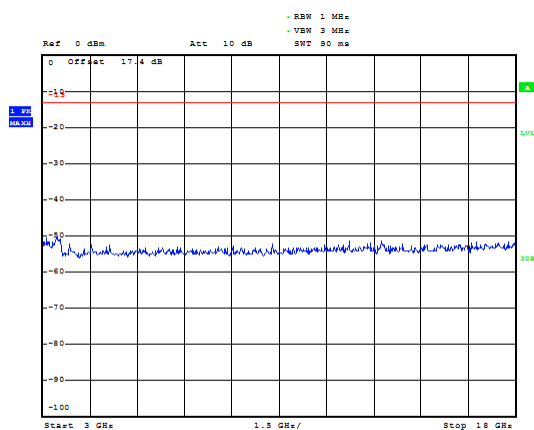
LTE Band 4 1.4MHz CH-Low 1GHz~3GHz



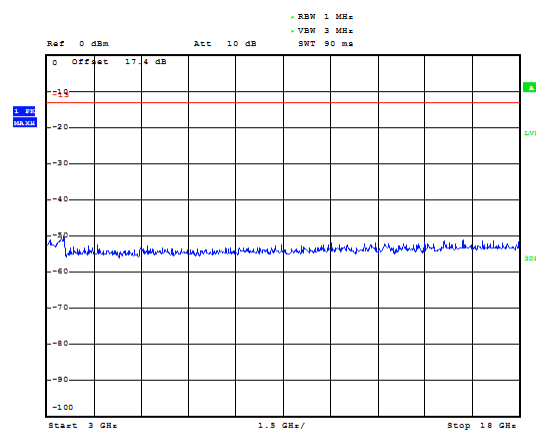
LTE Band 4 1.4MHz CH-Middle 1GHz~3GHz



LTE Band 4 1.4MHz CH-Low 3GHz~18GHz

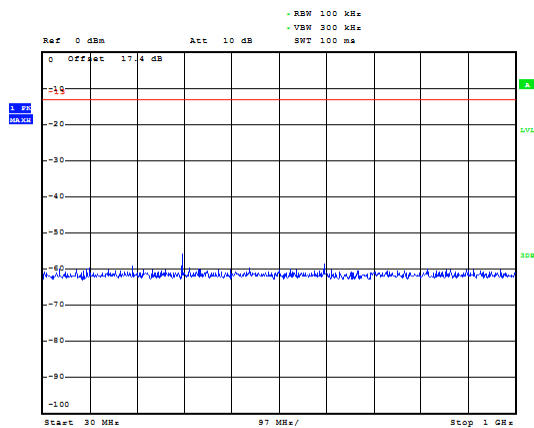


LTE Band 4 1.4MHz CH-Middle 3GHz~18GHz

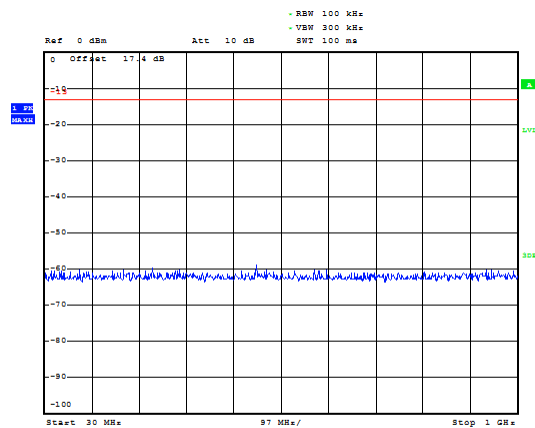




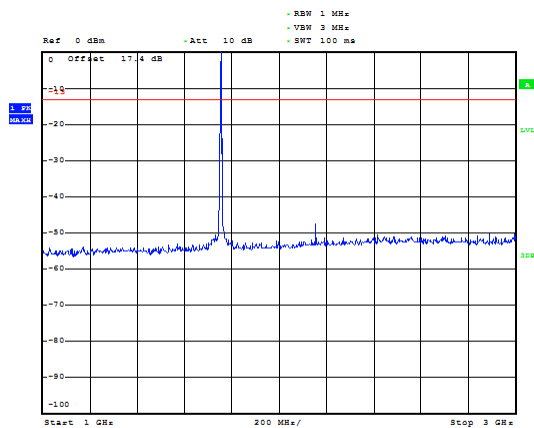
LTE Band 4 1.4MHz CH-High 30MHz~1GHz



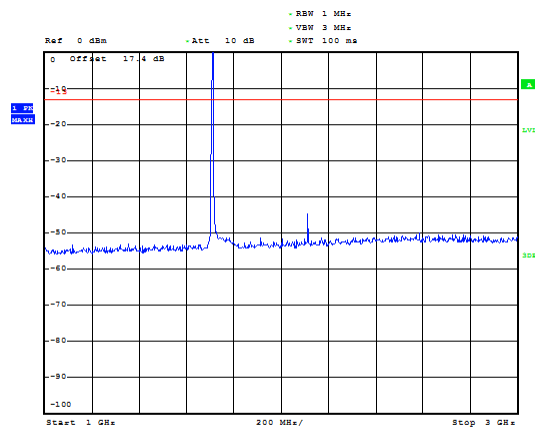
LTE Band 4 3MHz CH-Low 30MHz~1GHz



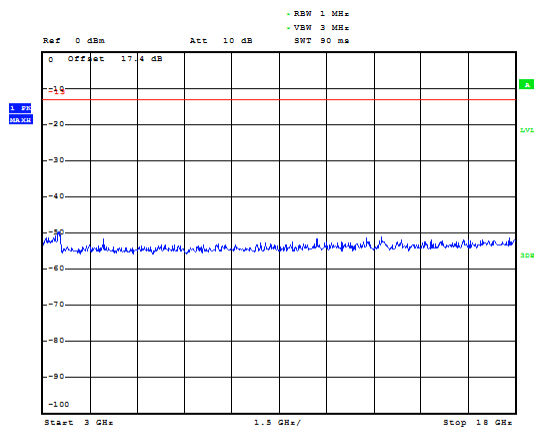
LTE Band 4 1.4MHz CH-High 1GHz~3GHz



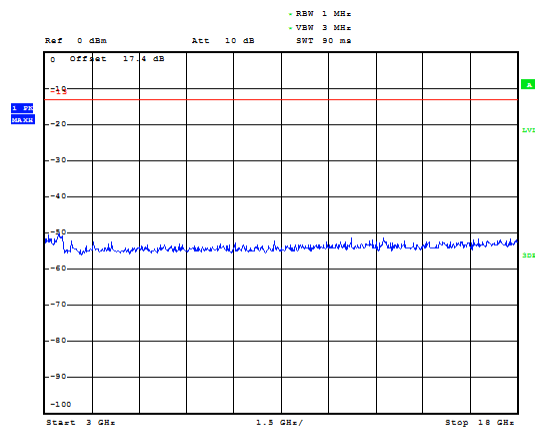
LTE Band 4 3MHz CH-Low 1GHz~3GHz



LTE Band 4 1.4MHz CH-High 3GHz~18GHz

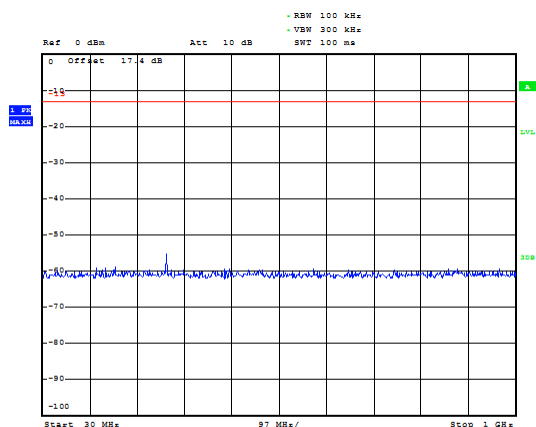


LTE Band 4 3MHz CH-Low 3GHz~18GHz

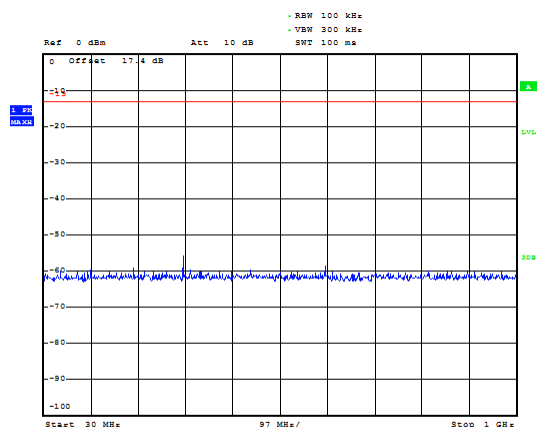




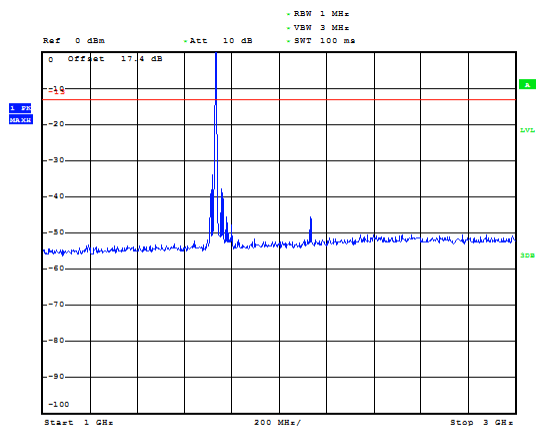
LTE Band 4 3MHz CH-Middle 30MHz~1GHz



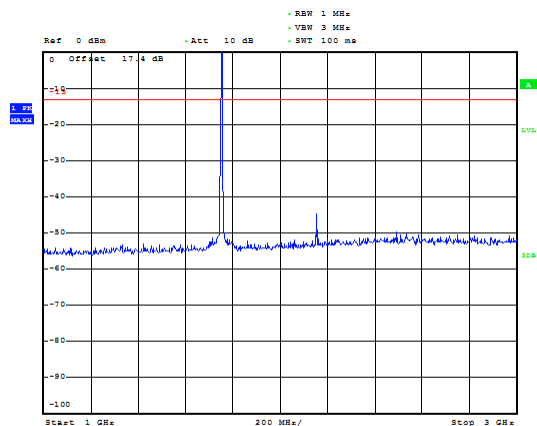
LTE Band 4 3MHz CH-High 30MHz~1GHz



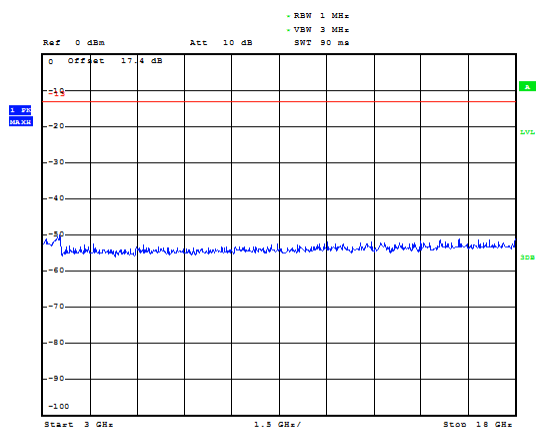
LTE Band 4 3MHz CH-Middle 1GHz~3GHz



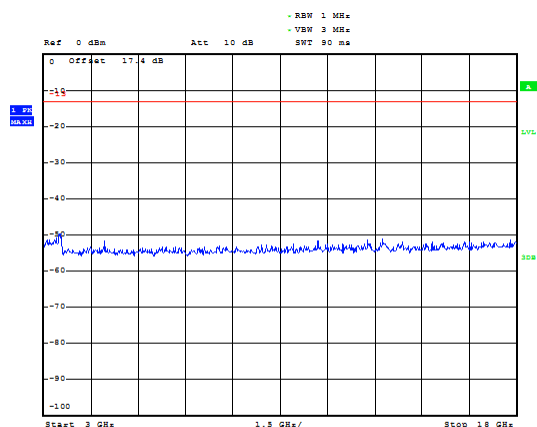
LTE Band 4 3MHz CH-High 1GHz~3GHz



LTE Band 4 3MHz CH-Middle 3GHz~18GHz

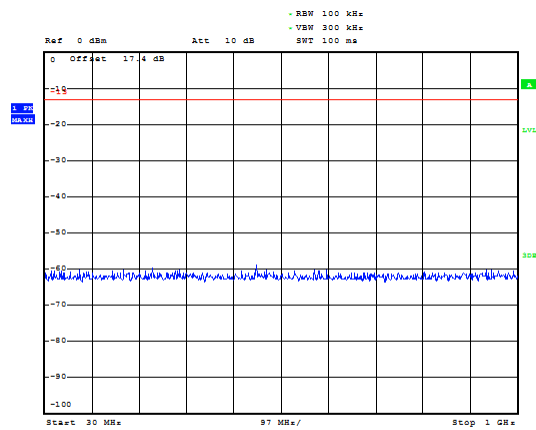


LTE Band 4 3MHz CH-High 3GHz~18GHz

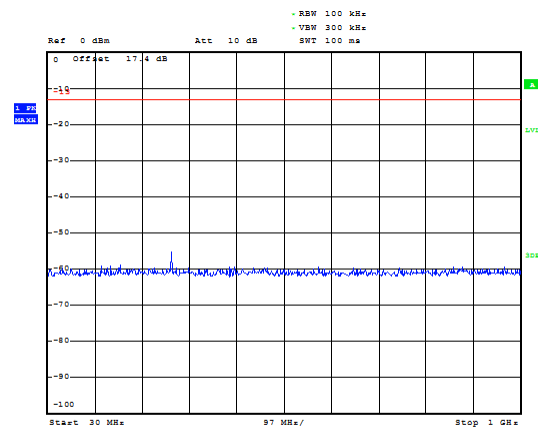




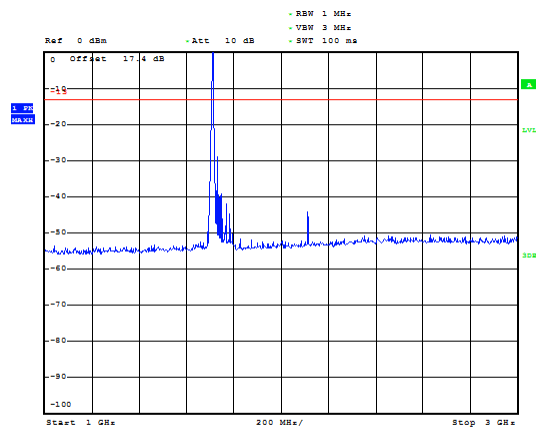
LTE Band 4 5MHz CH-Low 30MHz~1GHz



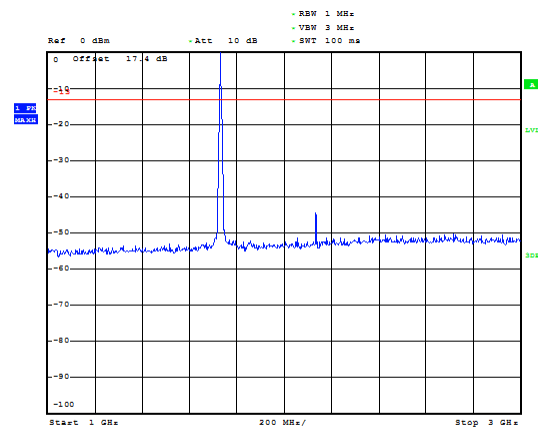
LTE Band 4 5MHz CH-Middle 30MHz~1GHz



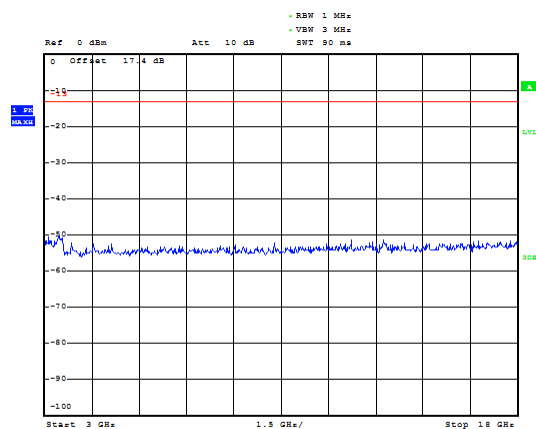
LTE Band 4 5MHz CH-Low 1GHz~3GHz



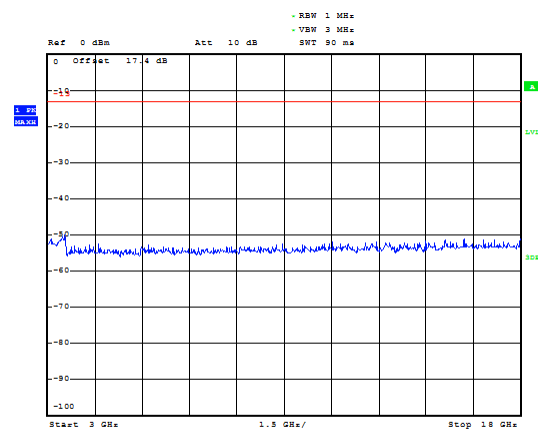
LTE Band 4 5MHz CH-Middle 1GHz~3GHz



LTE Band 4 5MHz CH-Low 3GHz~18GHz

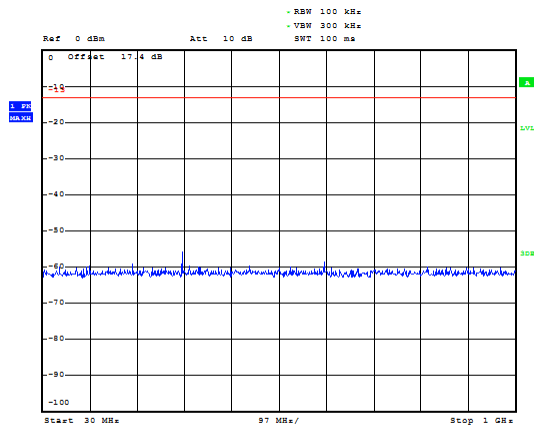


LTE Band 4 5MHz CH-Middle 3GHz~18GHz

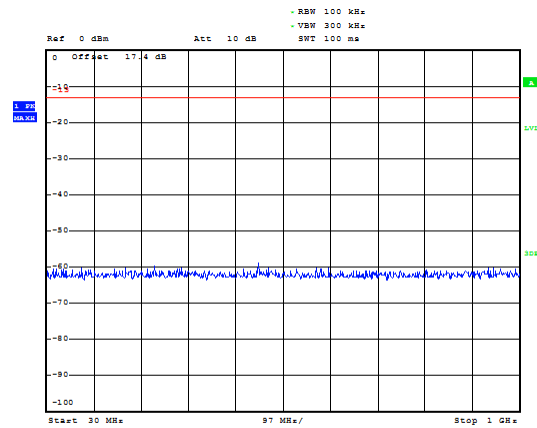




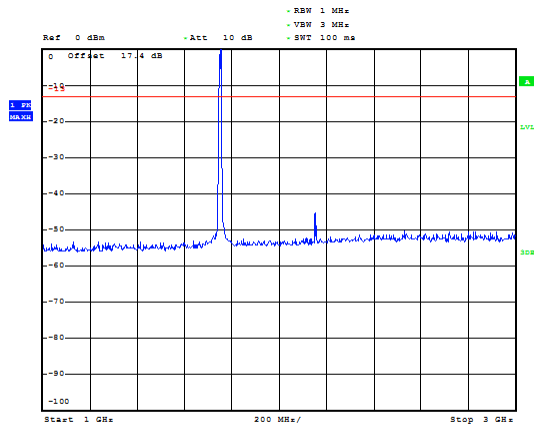
LTE Band 4 5MHz CH-High 30MHz~1GHz



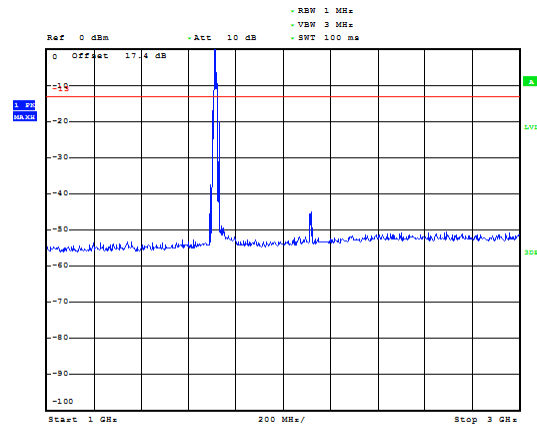
LTE Band 4 10MHz CH-Low 30MHz~1GHz



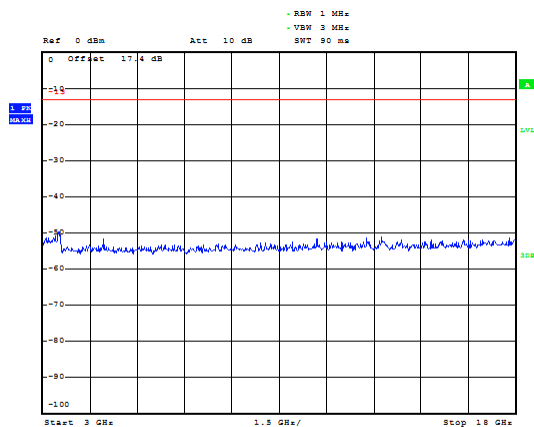
LTE Band 4 5MHz CH-High 1GHz~3GHz



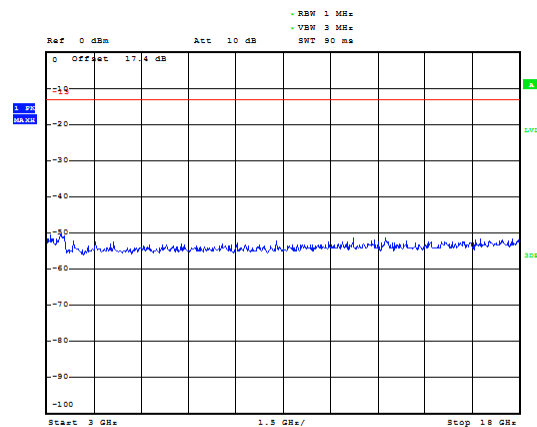
LTE Band 4 10MHz CH-Low 1GHz~3GHz



LTE Band 4 5MHz CH-High 3GHz~18GHz

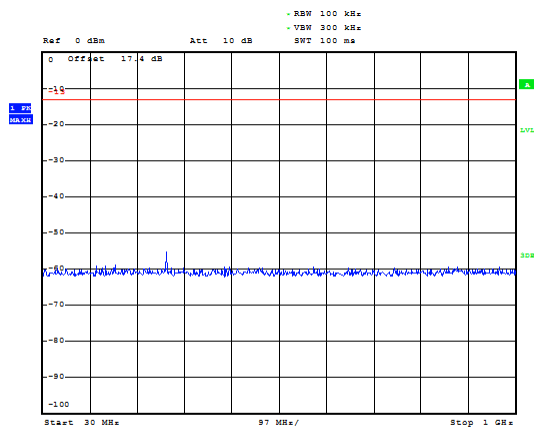


LTE Band 4 10MHz CH-Low 3GHz~18GHz

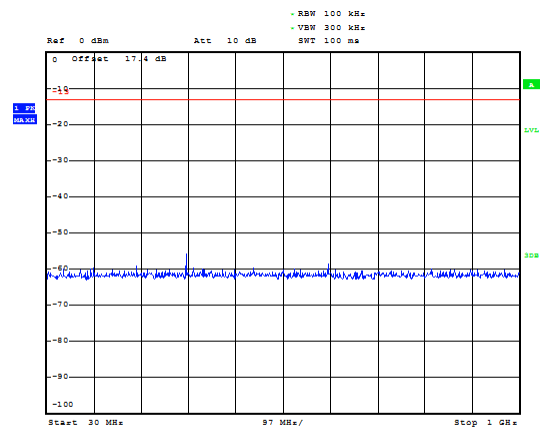




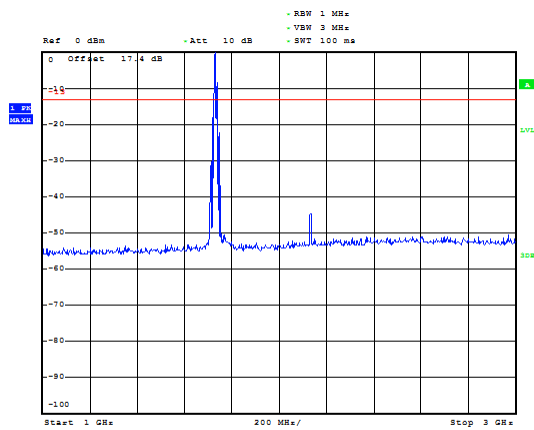
LTE Band 4 10MHz CH-Middle 30MHz~1GHz



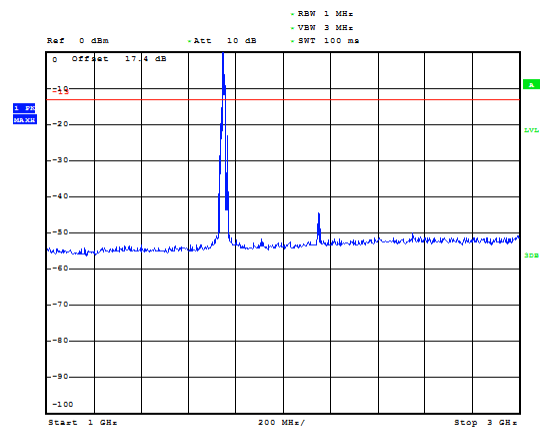
LTE Band 4 10MHz CH-High 30MHz~1GHz



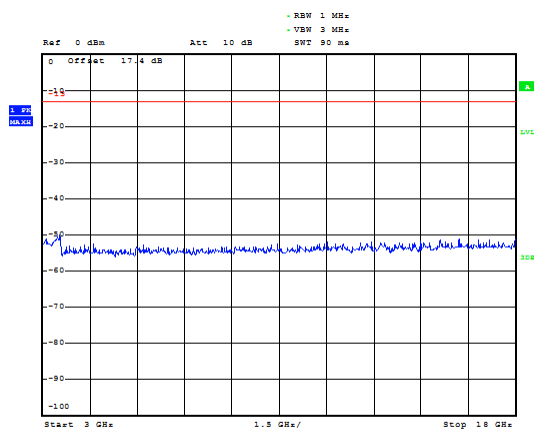
LTE Band 4 10MHz CH-Middle 1GHz~3GHz



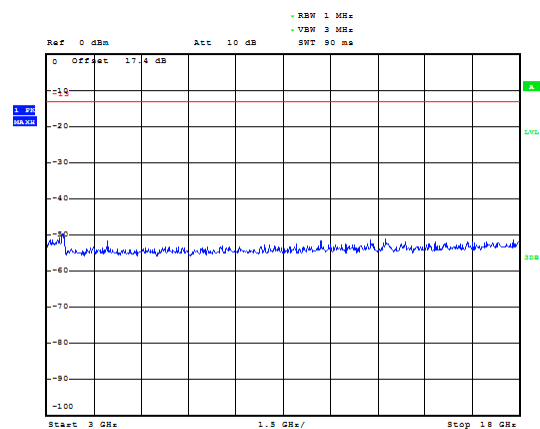
LTE Band 4 10MHz CH-High 1GHz~3GHz



LTE Band 4 10MHz CH-Middle 3GHz~18GHz

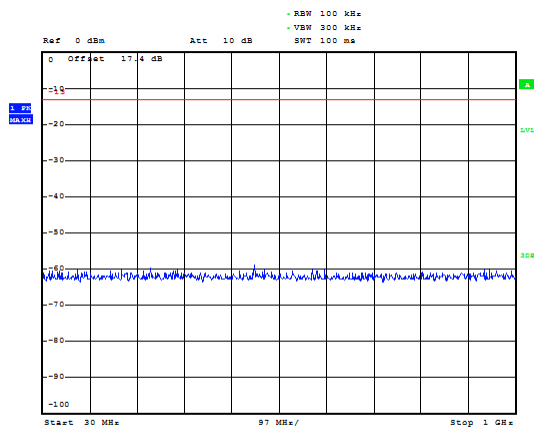


LTE Band 4 10MHz CH-High 3GHz~18GHz

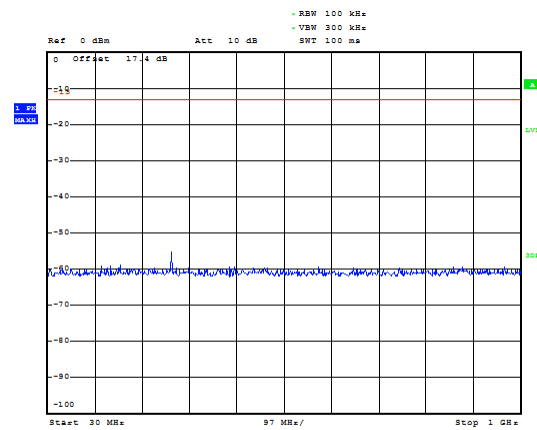




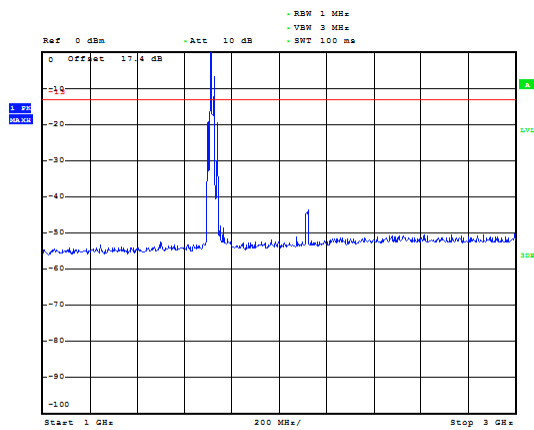
LTE Band 4 15MHz CH-Low 30MHz~1GHz



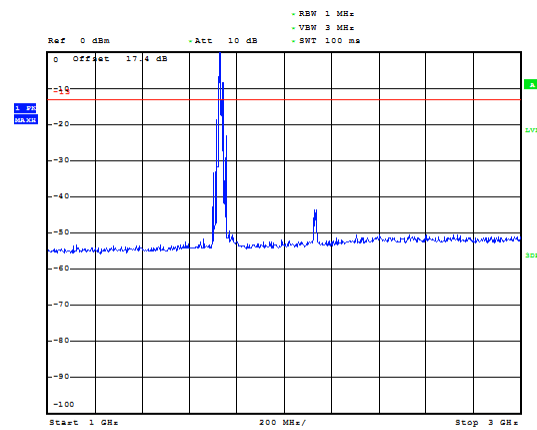
LTE Band 4 15MHz CH-Middle 30MHz~1GHz



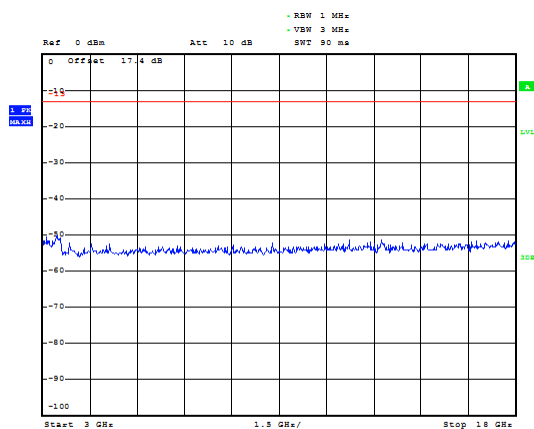
LTE Band 4 15MHz CH-Low 1GHz~3GHz



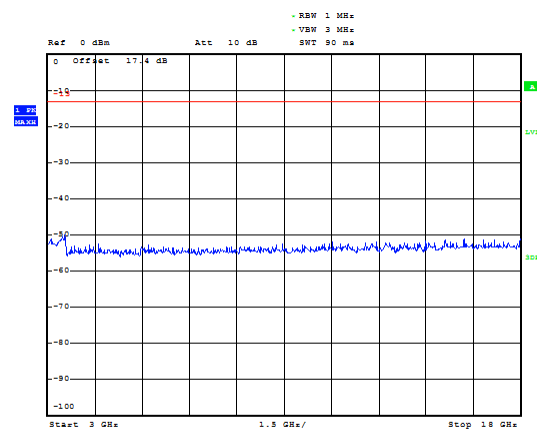
LTE Band 4 15MHz CH-Middle 1GHz~3GHz



LTE Band 4 15MHz CH-Low 3GHz~18GHz

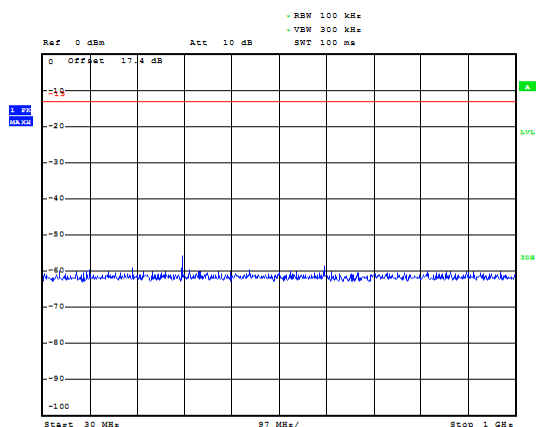


LTE Band 4 15MHz CH-Middle 3GHz~18GHz

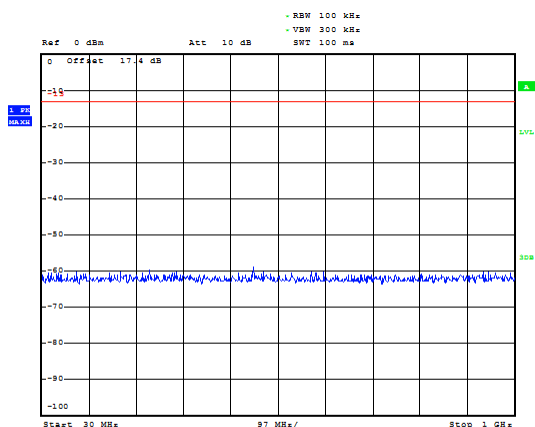




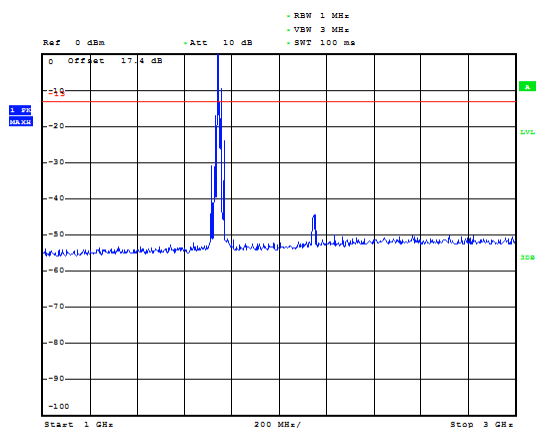
LTE Band 4 15MHz CH-High 30MHz~1GHz



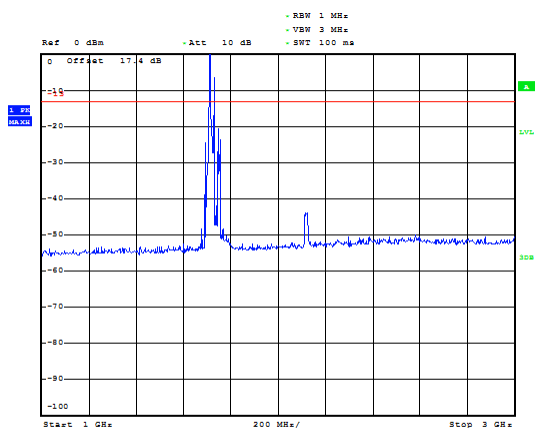
LTE Band 4 20MHz CH-Low 30MHz~1GHz



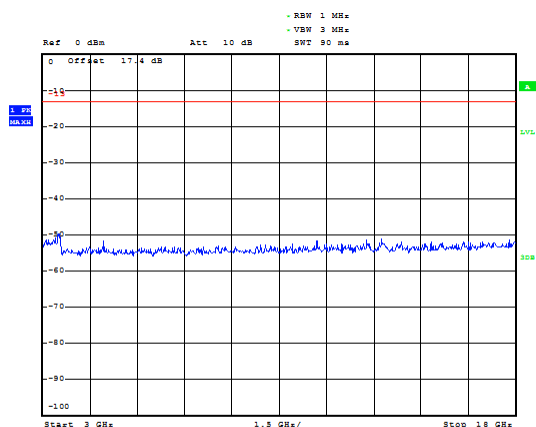
LTE Band 4 15MHz CH-High 1GHz~3GHz



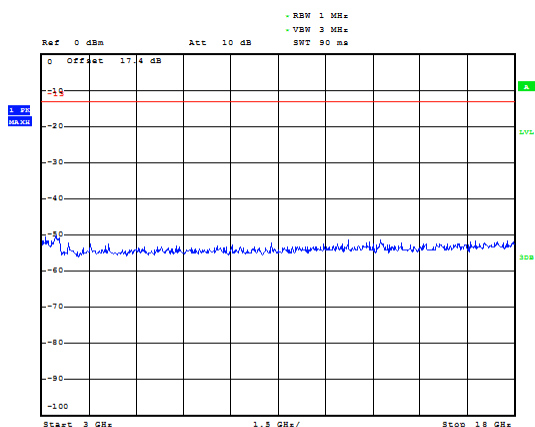
LTE Band 4 20MHz CH-Low 1GHz~3GHz



LTE Band 4 15MHz CH-High 3GHz~18GHz

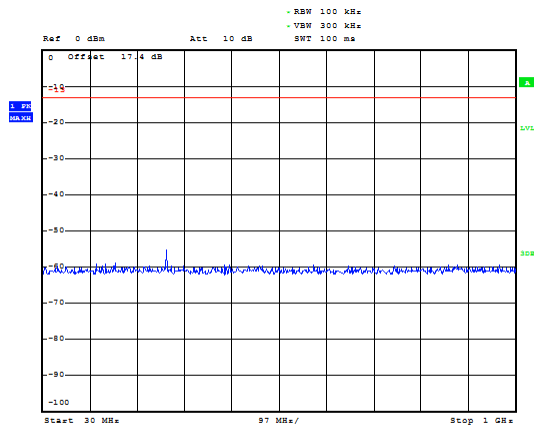


LTE Band 4 20MHz CH-Low 3GHz~18GHz

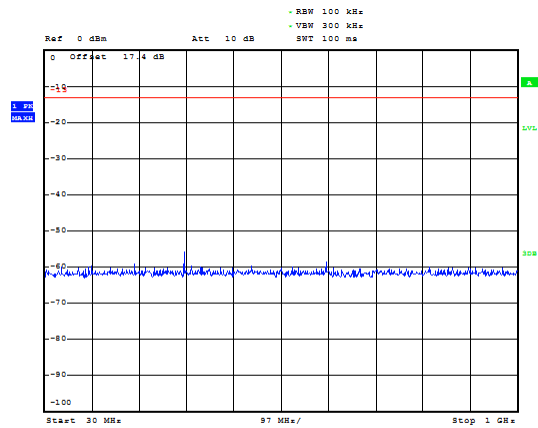




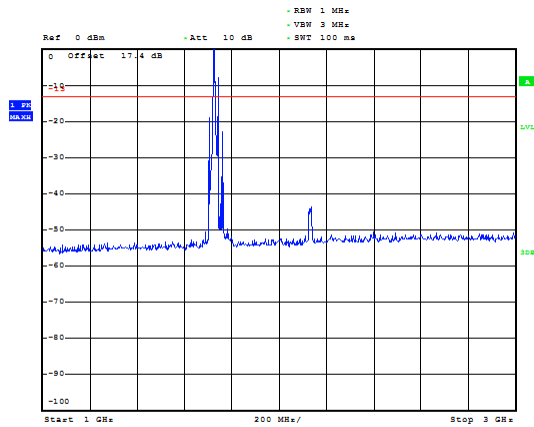
LTE Band 4 20MHz CH-Middle 30MHz~1GHz



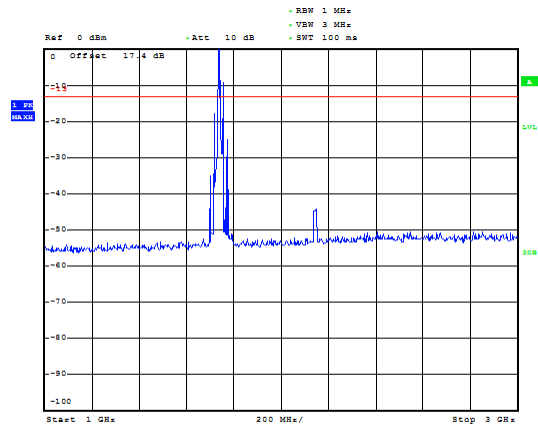
LTE Band 4 20MHz CH-High 30MHz~1GHz



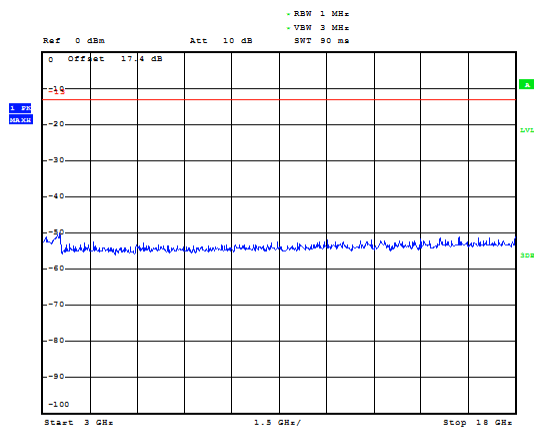
LTE Band 4 20MHz CH-Middle 1GHz~3GHz



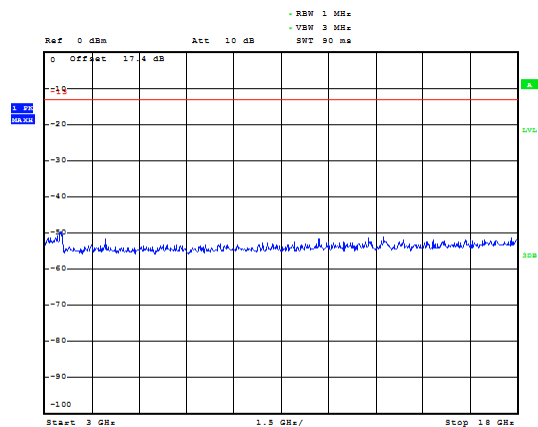
LTE Band 4 20MHz CH-High 1GHz~3GHz



LTE Band 4 20MHz CH-Middle 3GHz~18GHz

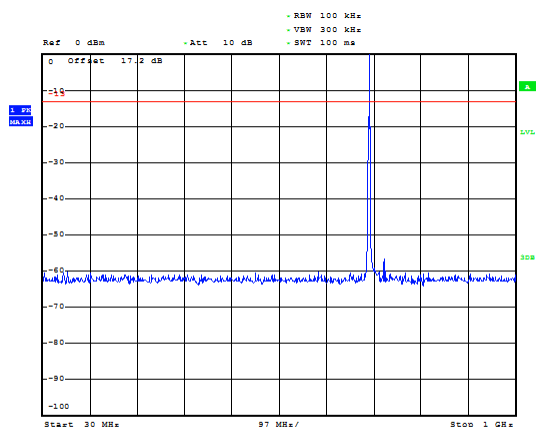


LTE Band 4 20MHz CH-High 3GHz~18GHz

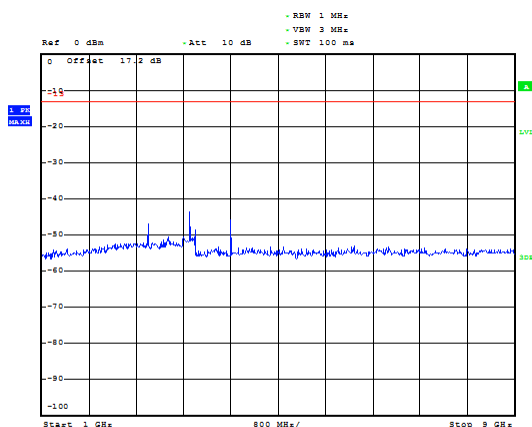




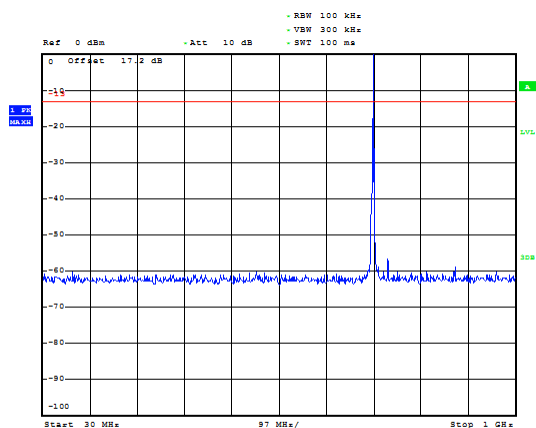
LTE Band 12 1.4MHz CH-Low 30MHz~1GHz



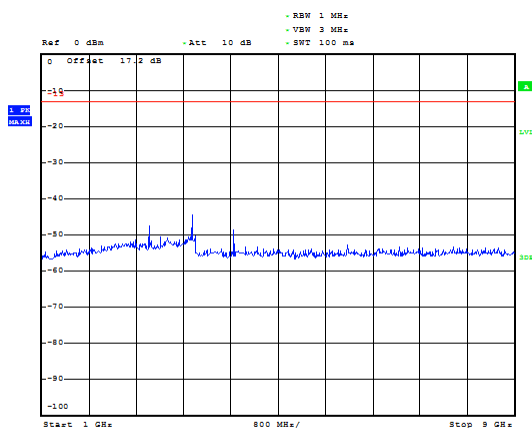
LTE Band 12 1.4MHz CH-Low 1GHz~9GHz



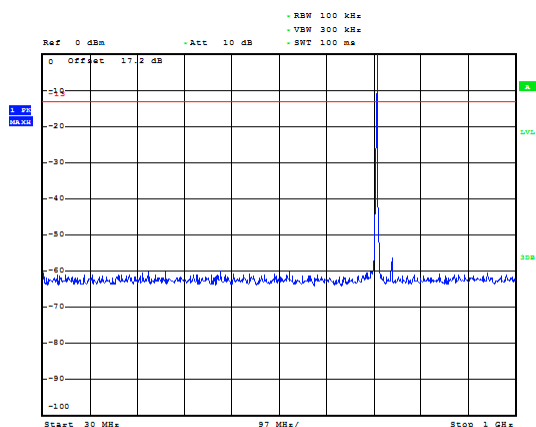
LTE Band 12 1.4MHz CH- Middle 30MHz~1GHz



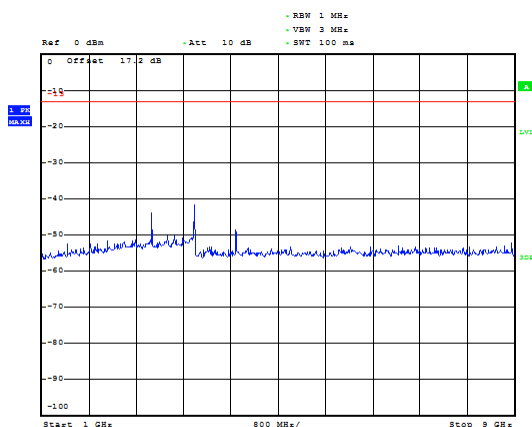
LTE Band 12 1.4MHz CH- Middle 1GHz~9GHz



LTE Band 12 1.4MHz CH-High 30MHz~1GHz

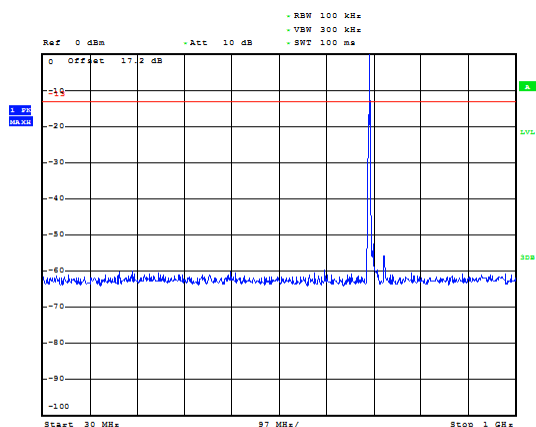


LTE Band 12 1.4MHz CH-High 1GHz~9GHz

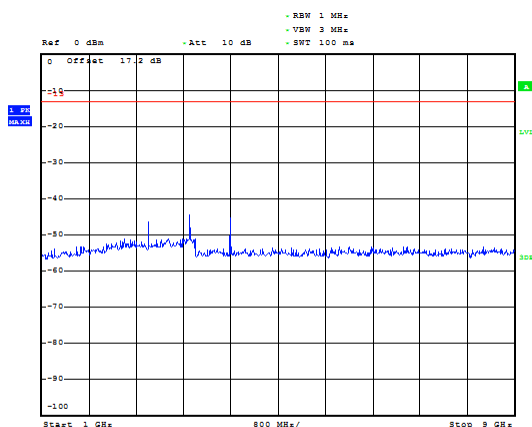




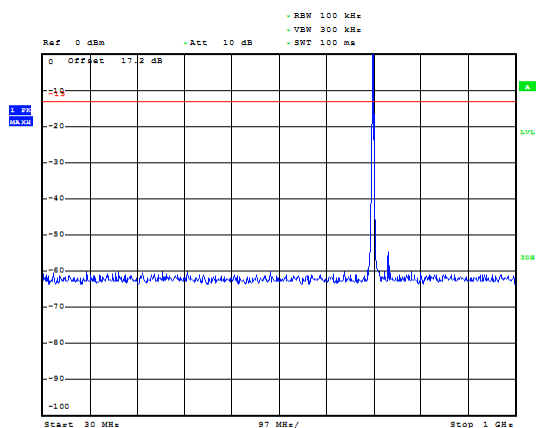
LTE Band 12 3MHz CH-Low 30MHz~1GHz



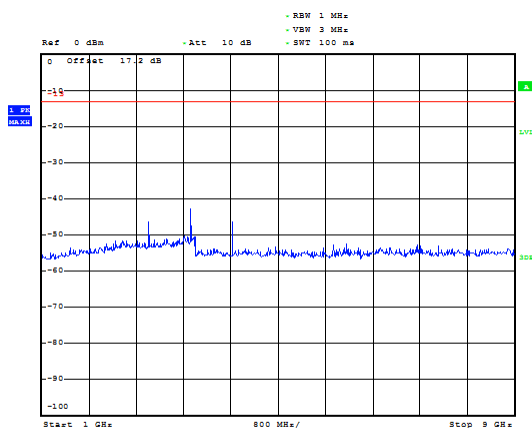
LTE Band 12 3MHz CH-Low 1GHz~9GHz



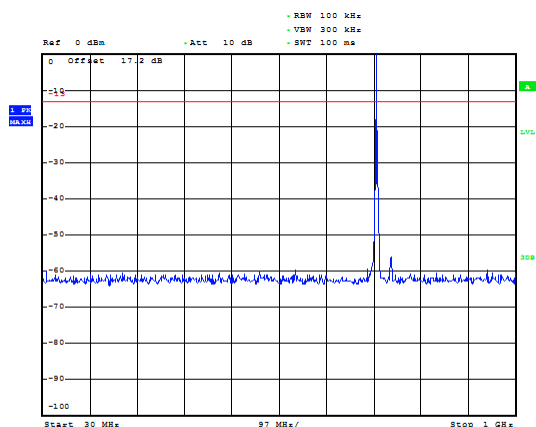
LTE Band 12 3MHz CH- Middle 30MHz~1GHz



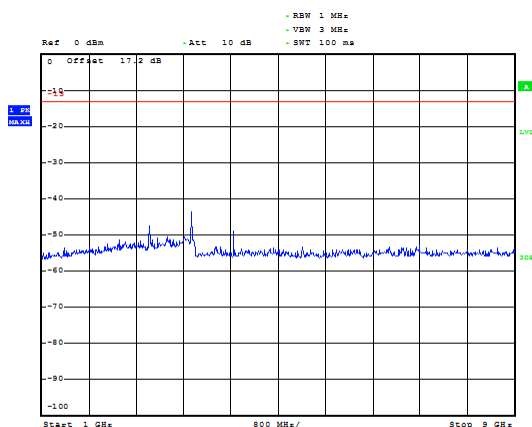
LTE Band 12 3MHz CH- Middle 1GHz~9GHz



LTE Band 12 3MHz CH-High 30MHz~1GHz

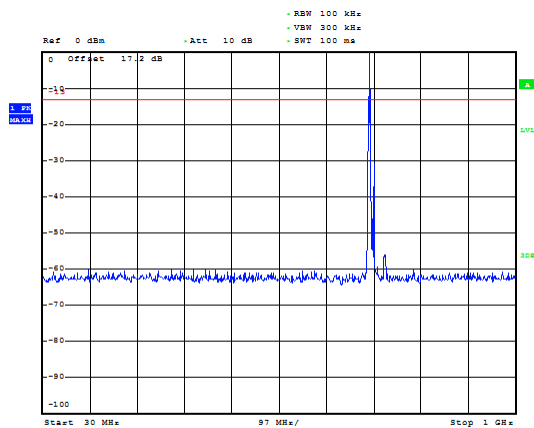


LTE Band 12 3MHz CH-High 1GHz~9GHz

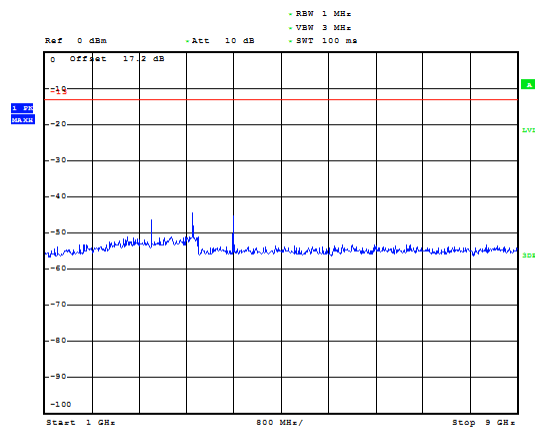




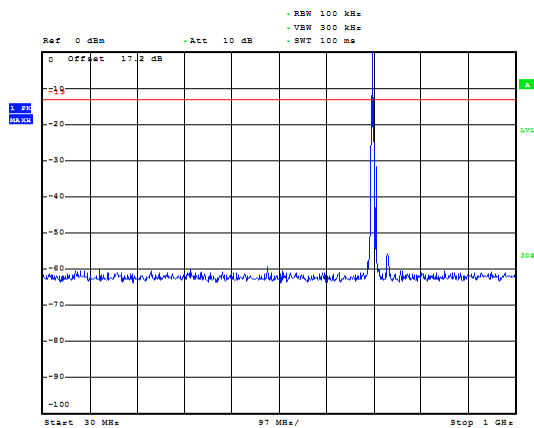
LTE Band 12 5MHz CH-Low 30MHz~1GHz



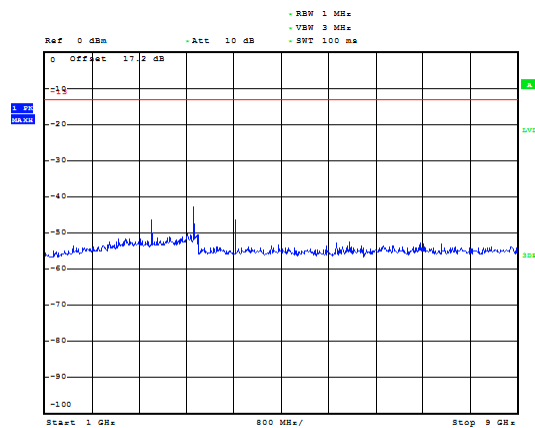
LTE Band 12 5MHz CH-Low 1GHz~9GHz



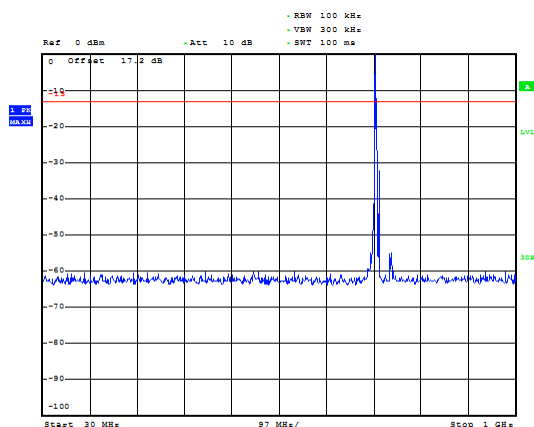
LTE Band 12 5MHz CH- Middle 30MHz~1GHz



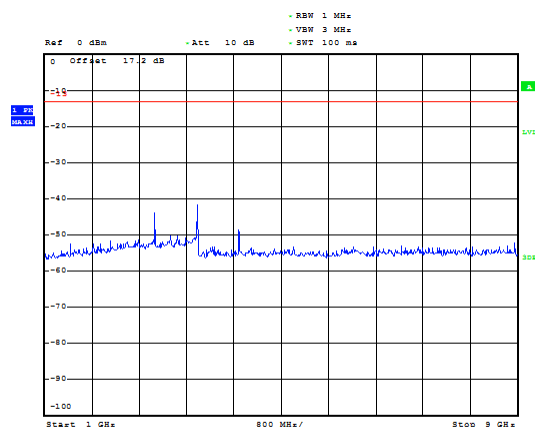
LTE Band 12 5MHz CH- Middle 1GHz~9GHz



LTE Band 12 5MHz CH-High 30MHz~1GHz

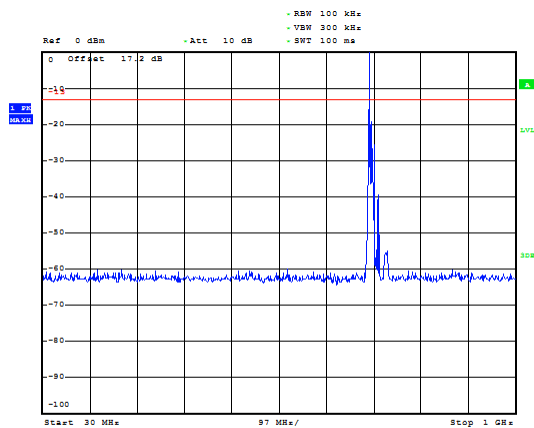


LTE Band 12 5MHz CH-High 1GHz~9GHz

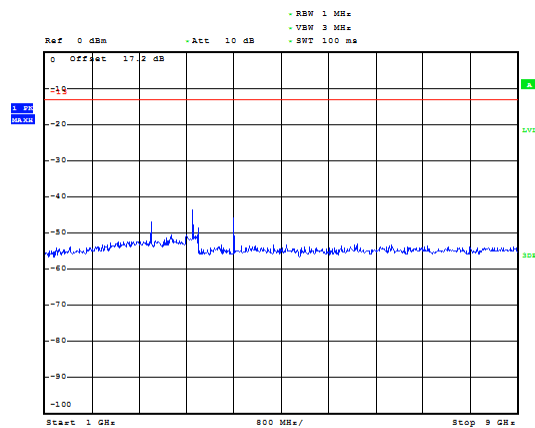




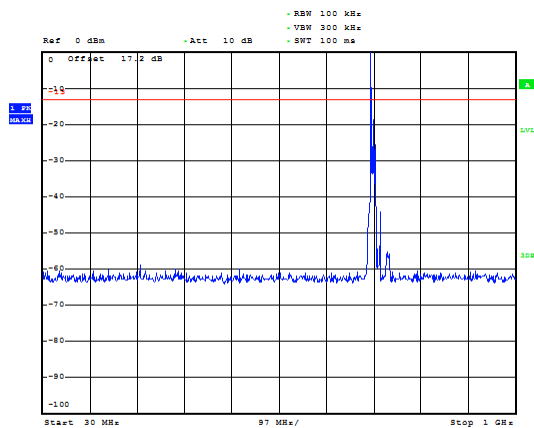
LTE Band 12 10MHz CH-Low 30MHz~1GHz



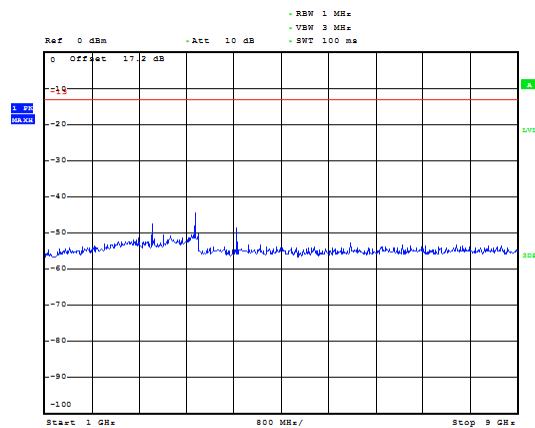
LTE Band 12 10MHz CH-Low 1GHz~9GHz



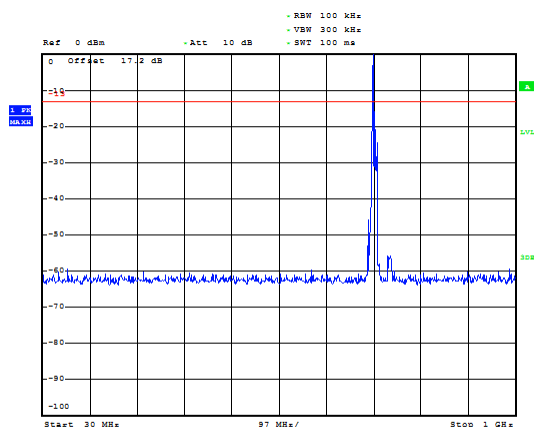
LTE Band 12 10MHz CH- Middle 30MHz~1GHz



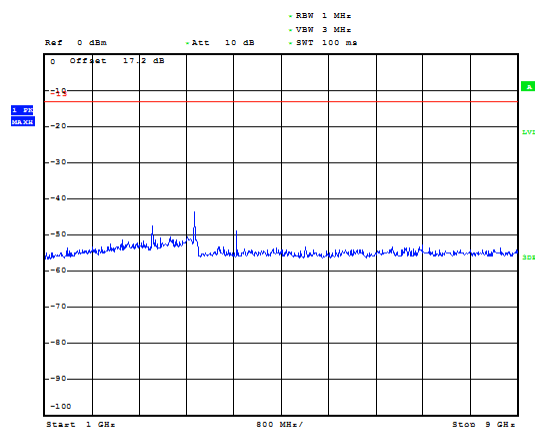
LTE Band 12 10MHz CH- Middle 1GHz~9GHz



LTE Band 12 10MHz CH-High 30MHz~1GHz

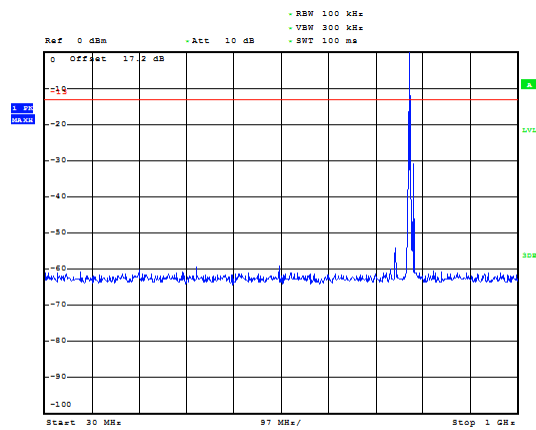


LTE Band 12 10MHz CH-High 1GHz~9GHz

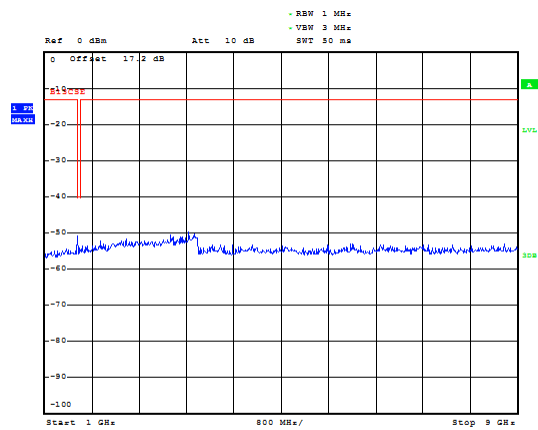




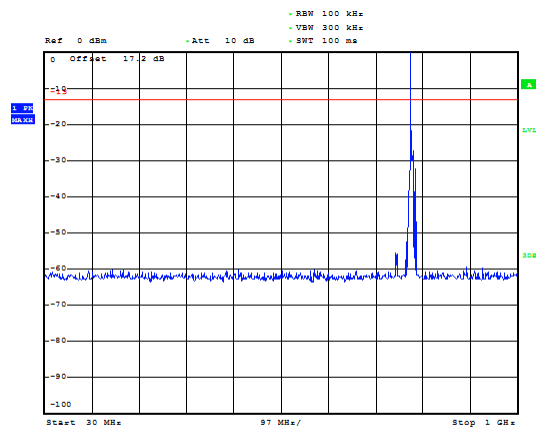
LTE Band 13 5MHz CH-Low 30MHz~1GHz



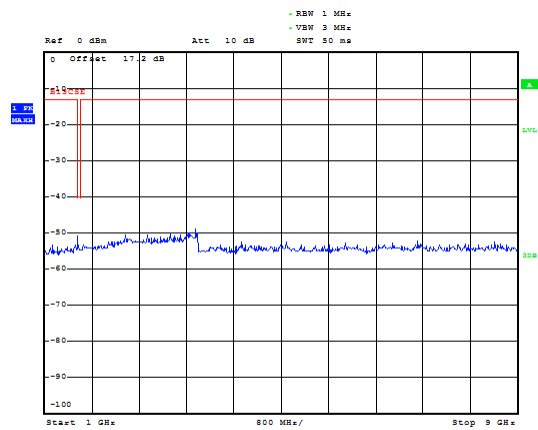
LTE Band 13 5MHz CH-Low 1GHz~9GHz



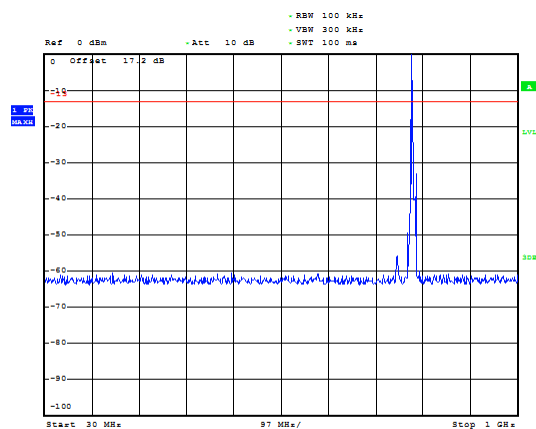
LTE Band 13 5MHz CH-Middle 30MHz~1GHz



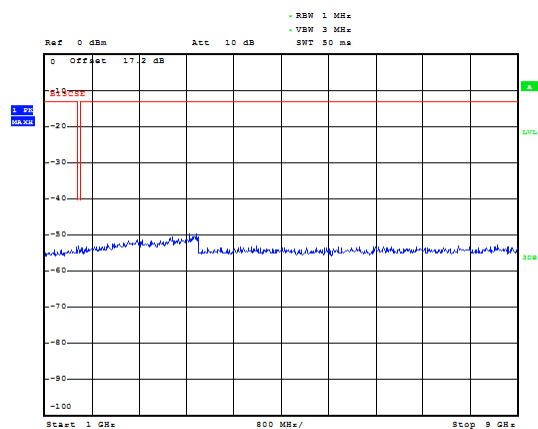
LTE Band 13 5MHz CH-Middle 1GHz~9GHz



LTE Band 13 5MHz CH-High 30MHz~1GHz

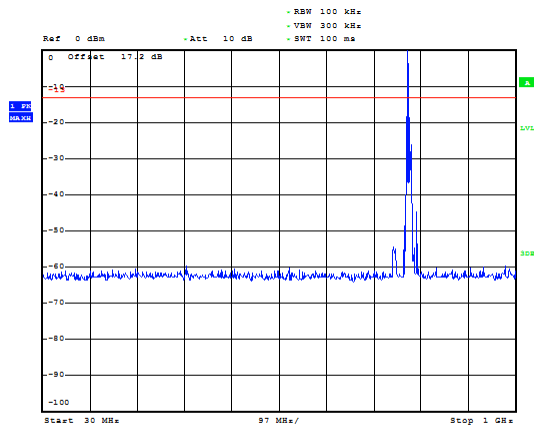


LTE Band 13 5MHz CH-High 1GHz~9GHz

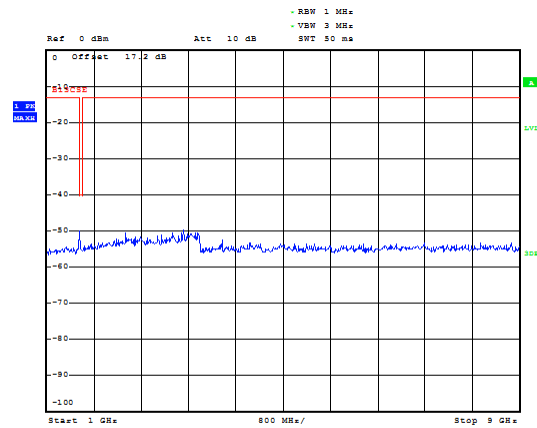




LTE Band 13 10MHz CH-Middle 30MHz~1GHz

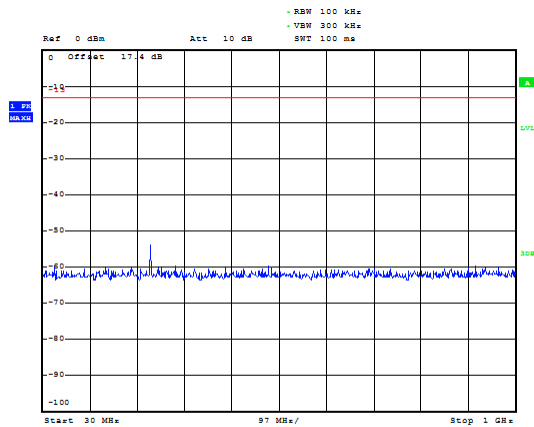


LTE Band 13 10MHz CH-Middle 1GHz~9GHz

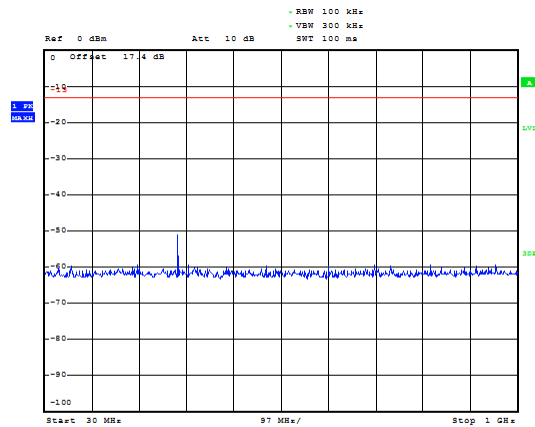




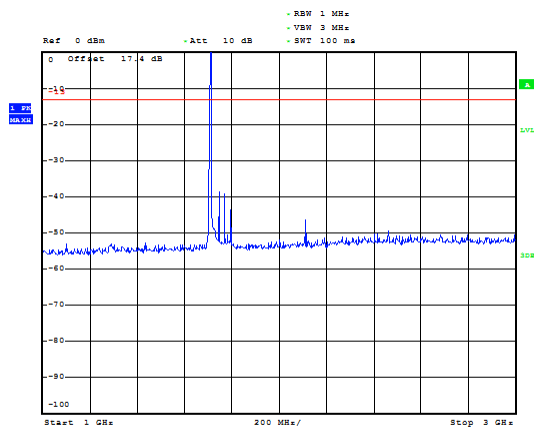
LTE Band 66 1.4MHz CH-Low 30MHz~1GHz



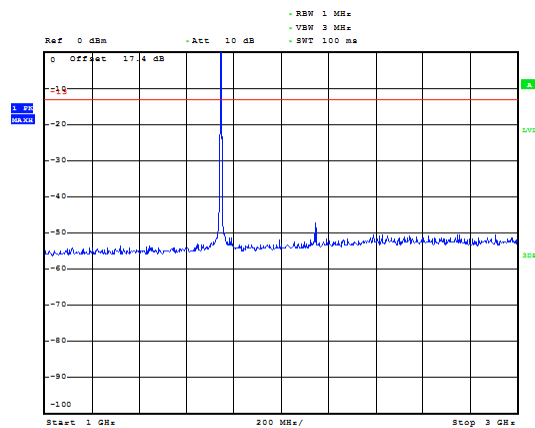
LTE Band 66 1.4MHz CH-Middle 30MHz~1GHz



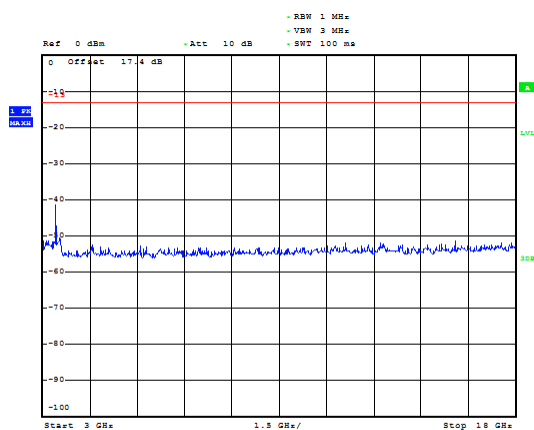
LTE Band 66 1.4MHz CH-Low 1GHz~3GHz



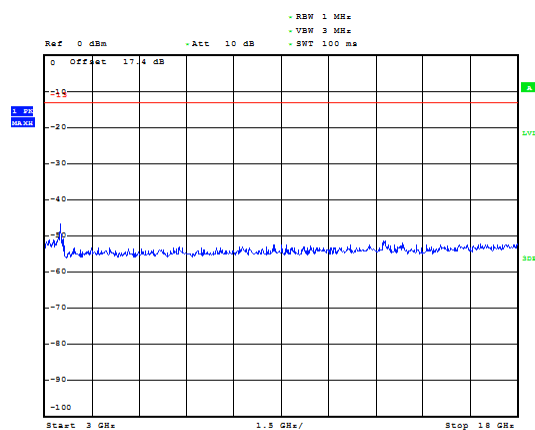
LTE Band 66 1.4MHz CH-Middle 1GHz~3GHz



LTE Band 66 1.4MHz CH-Low 3GHz~18GHz

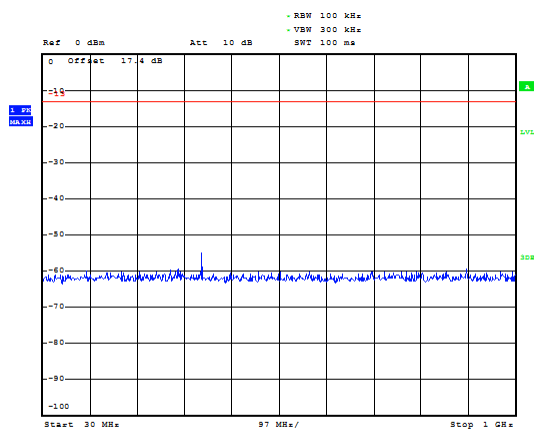


LTE Band 66 1.4MHz CH-Middle 3GHz~18GHz

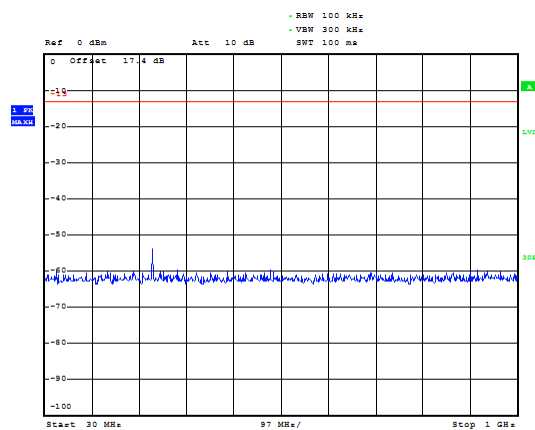




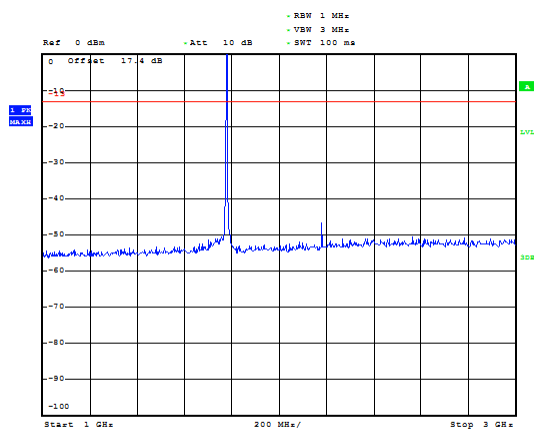
LTE Band 66 1.4MHz CH-High 30MHz~1GHz



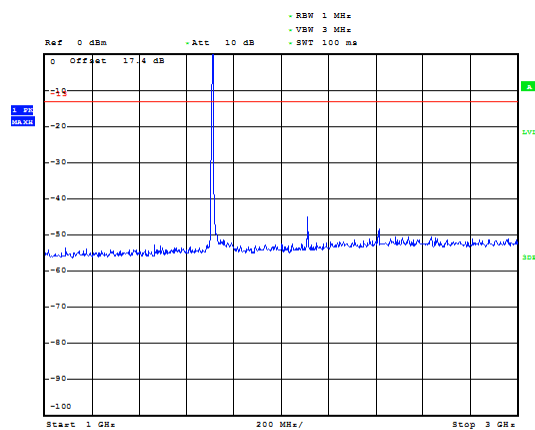
LTE Band 66 3MHz CH-Low 30MHz~1GHz



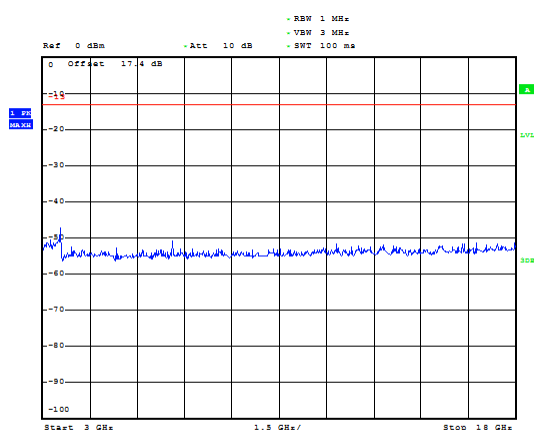
LTE Band 66 1.4MHz CH-High 1GHz~3GHz



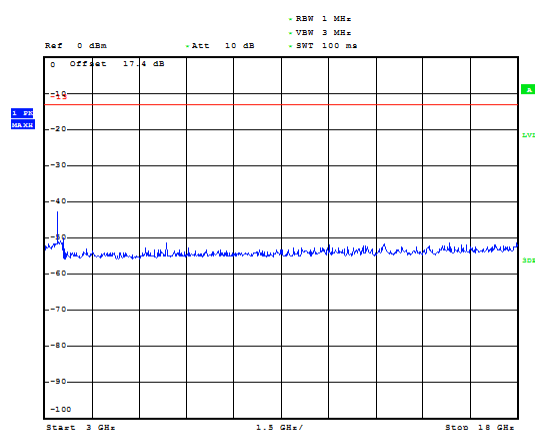
LTE Band 66 3MHz CH-Low 1GHz~3GHz



LTE Band 66 1.4MHz CH-High 3GHz~18GHz

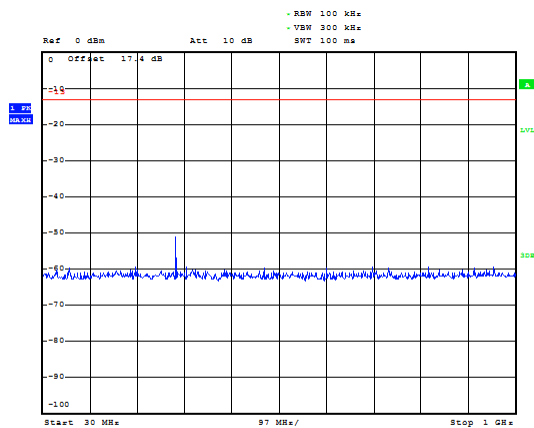


LTE Band 66 3MHz CH-Low 3GHz~18GHz

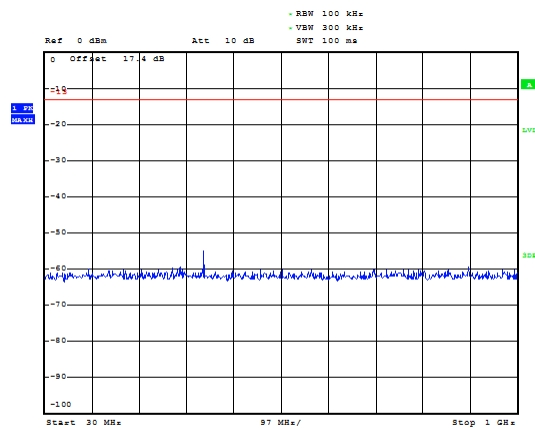




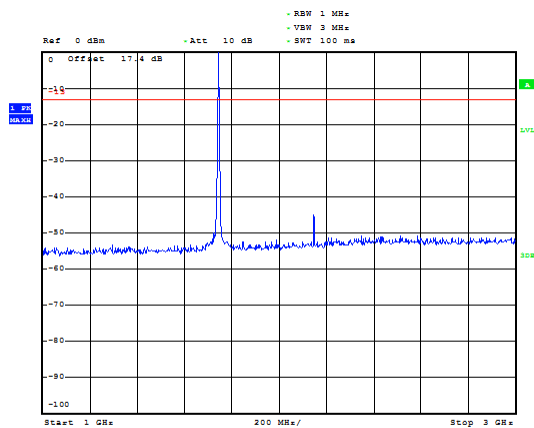
LTE Band 66 3MHz CH-Middle 30MHz~1GHz



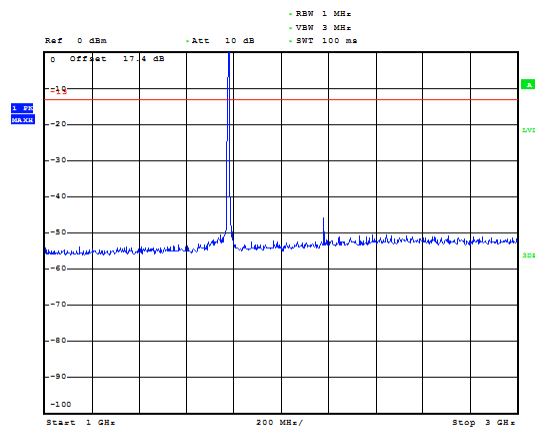
LTE Band 66 3MHz CH-High 30MHz~1GHz



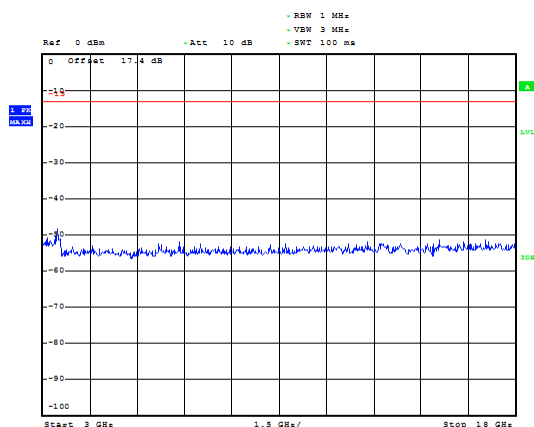
LTE Band 66 3MHz CH-Middle 1GHz~3GHz



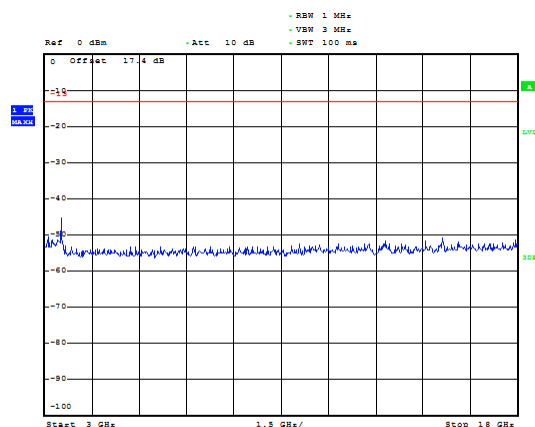
LTE Band 66 3MHz CH-High 1GHz~3GHz



LTE Band 66 3MHz CH-Middle 3GHz~18GHz

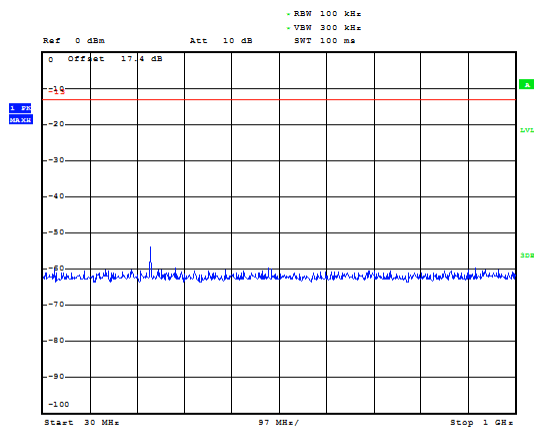


LTE Band 66 3MHz CH-High 3GHz~18GHz

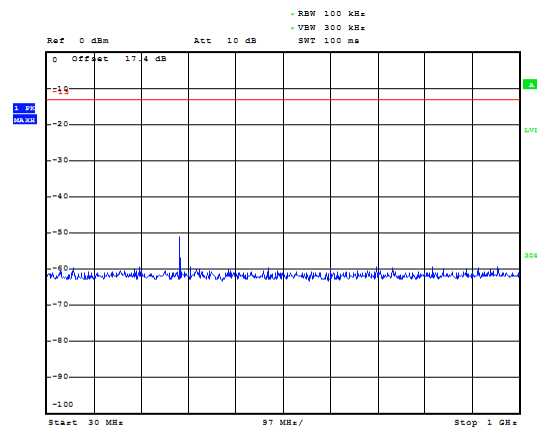




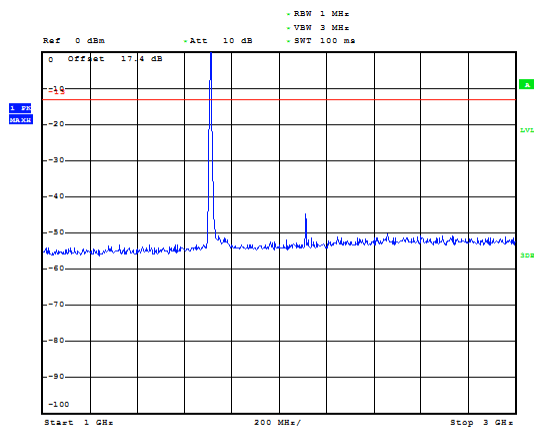
LTE Band 66 5MHz CH-Low 30MHz~1GHz



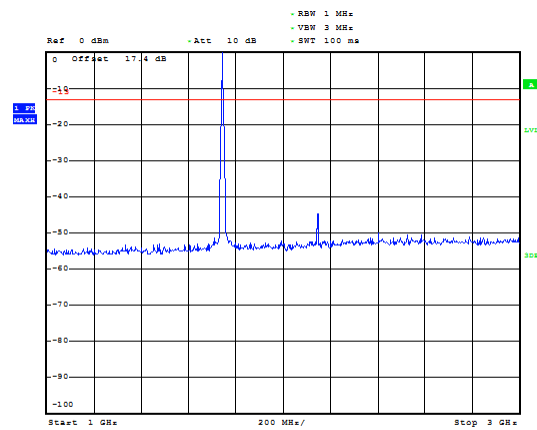
LTE Band 66 5MHz CH-Middle 30MHz~1GHz



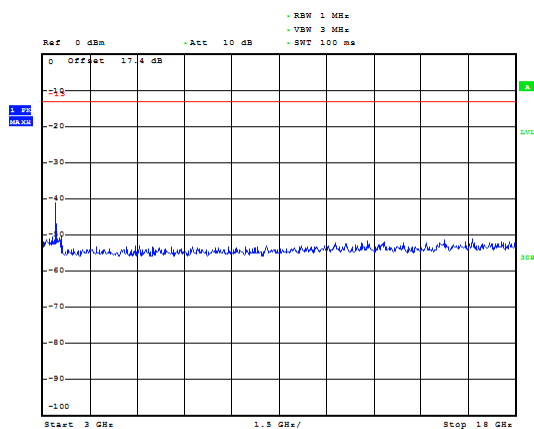
LTE Band 66 5MHz CH-Low 1GHz~3GHz



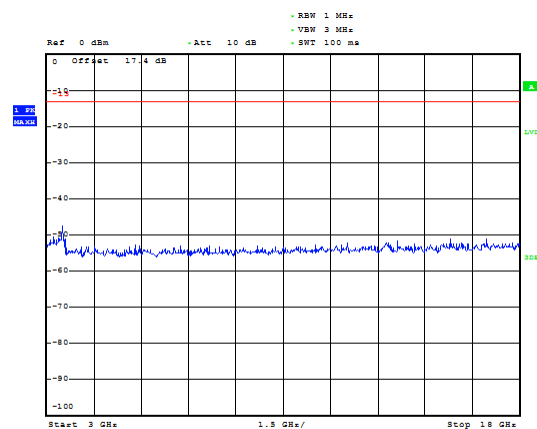
LTE Band 66 5MHz CH-Middle 1GHz~3GHz



LTE Band 66 5MHz CH-Low 3GHz~18GHz

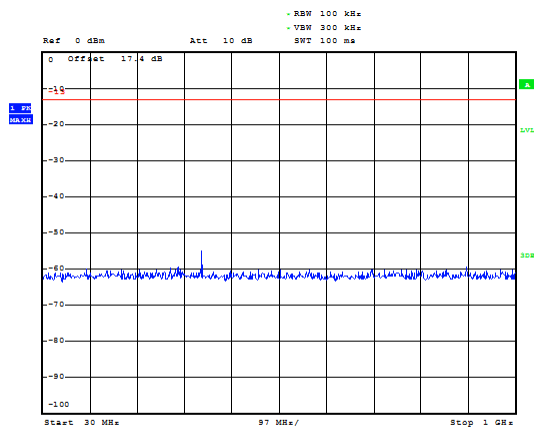


LTE Band 66 5MHz CH-Middle 3GHz~18GHz

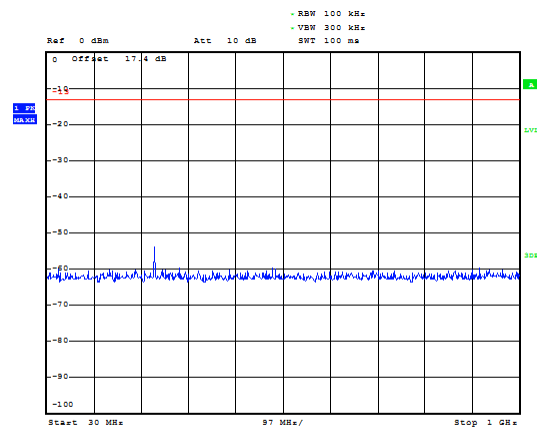




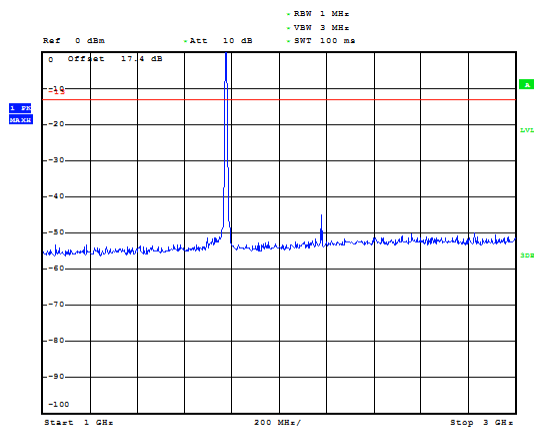
LTE Band 66 5MHz CH-High 30MHz~1GHz



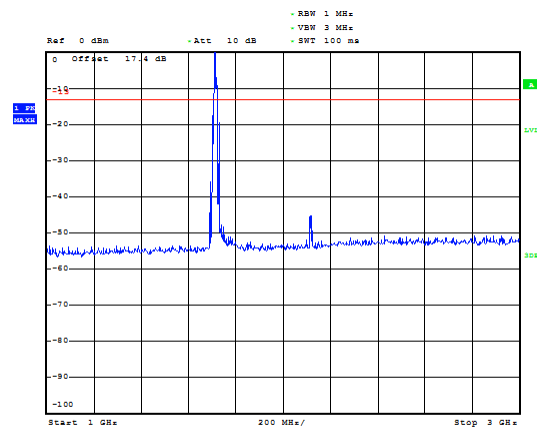
LTE Band 66 10MHz CH-Low 30MHz~1GHz



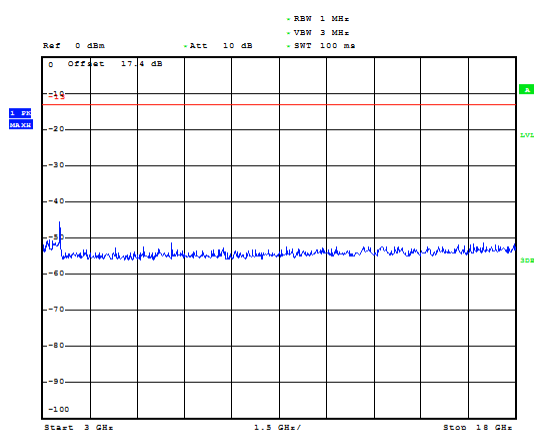
LTE Band 66 5MHz CH-High 1GHz~3GHz



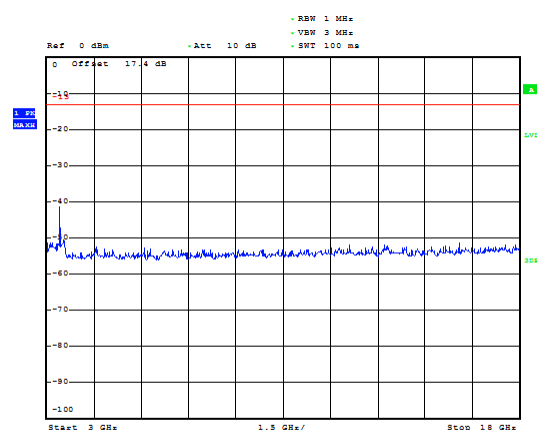
LTE Band 66 10MHz CH-Low 1GHz~3GHz



LTE Band 66 5MHz CH-High 3GHz~18GHz

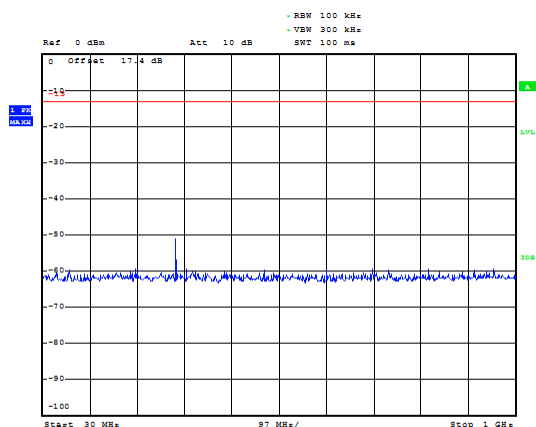


LTE Band 66 10MHz CH-Low 3GHz~18GHz

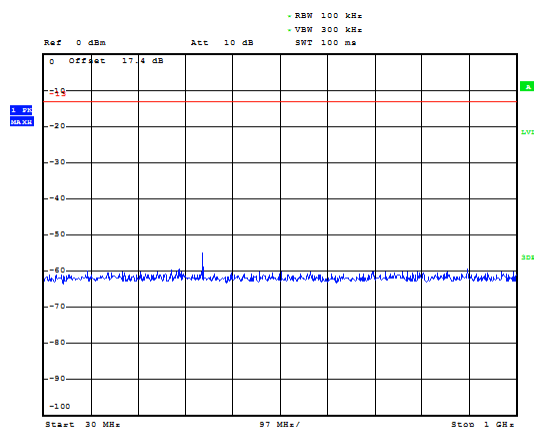




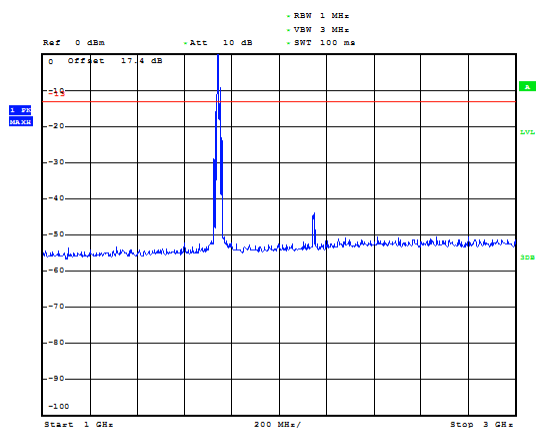
LTE Band 66 10MHz CH-Middle 30MHz~1GHz



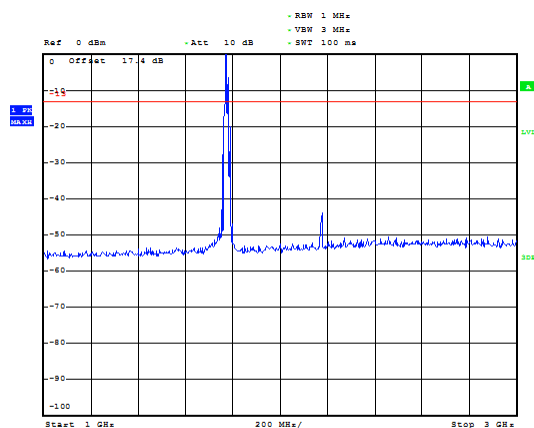
LTE Band 66 10MHz CH-High 30MHz~1GHz



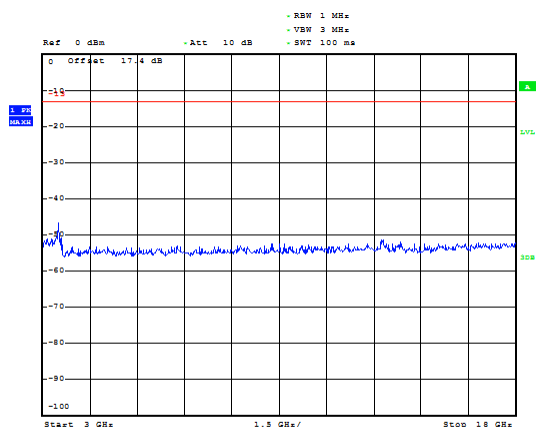
LTE Band 66 10MHz CH-Middle 1GHz~3GHz



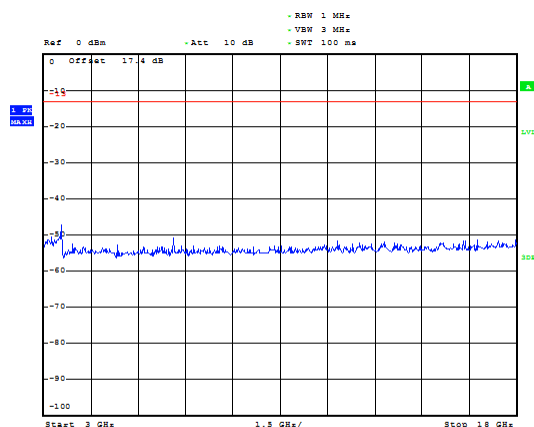
LTE Band 66 10MHz CH-High 1GHz~3GHz



LTE Band 66 10MHz CH-Middle 3GHz~18GHz

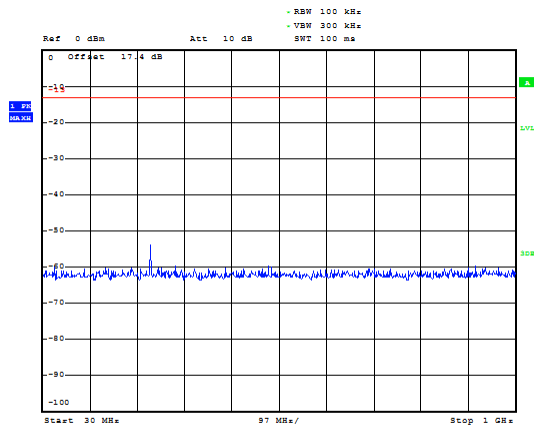


LTE Band 66 10MHz CH-High 3GHz~18GHz

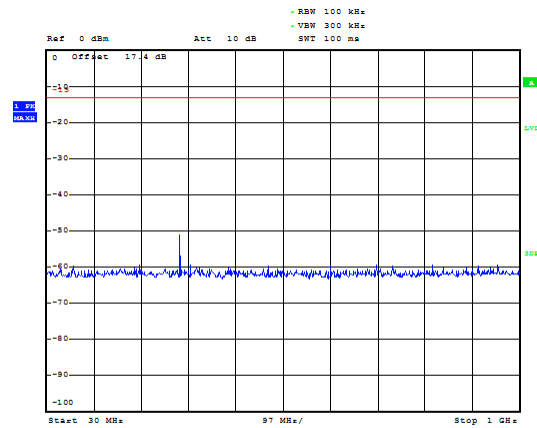




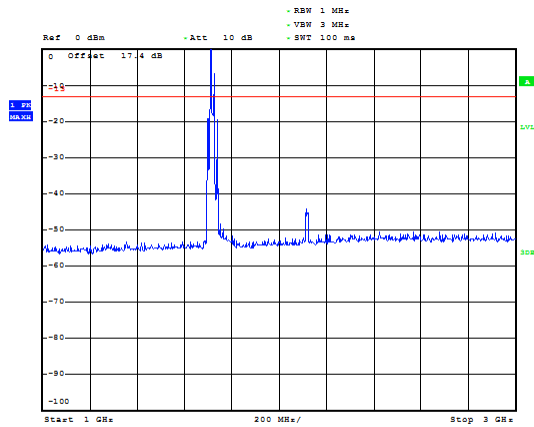
LTE Band 66 15MHz CH-Low 30MHz~1GHz



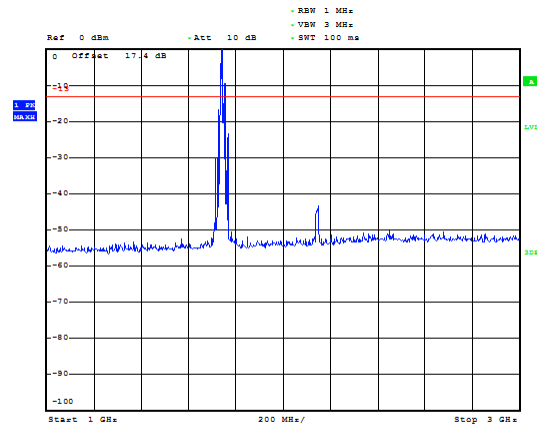
LTE Band 66 15MHz CH-Middle 30MHz~1GHz



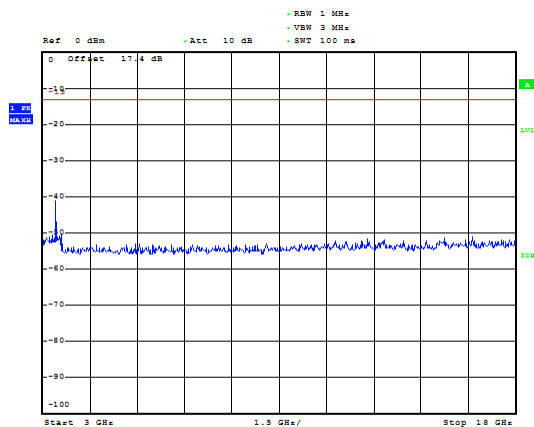
LTE Band 66 15MHz CH-Low 1GHz~3GHz



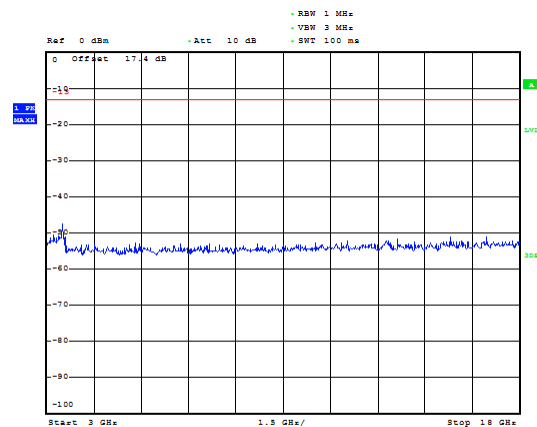
LTE Band 66 15MHz CH-Middle 1GHz~3GHz



LTE Band 66 15MHz CH-Low 3GHz~18GHz

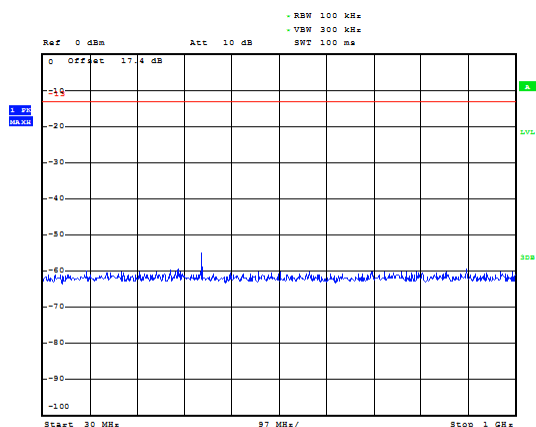


LTE Band 66 15MHz CH-Middle 3GHz~18GHz

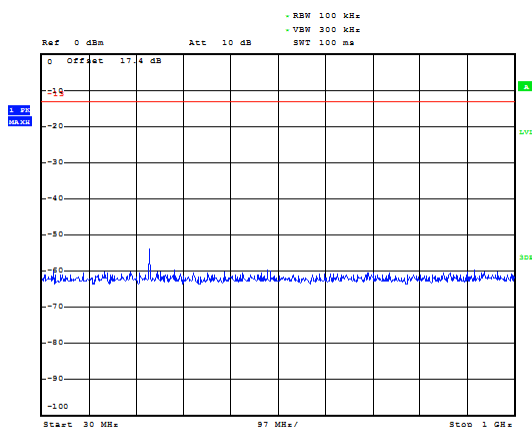




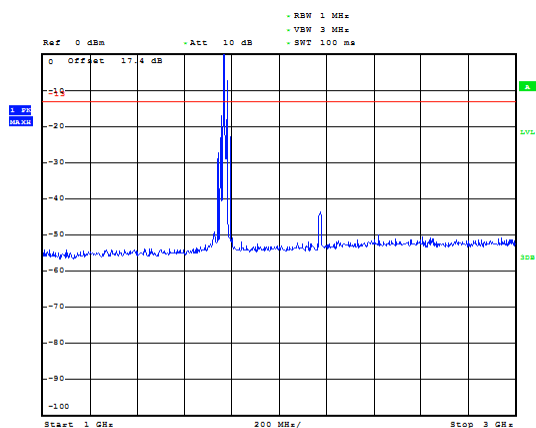
LTE Band 66 15MHz CH-High 30MHz~1GHz



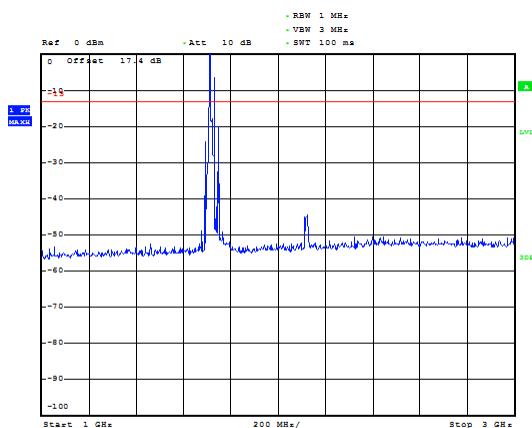
LTE Band 66 20MHz CH-Low 30MHz~1GHz



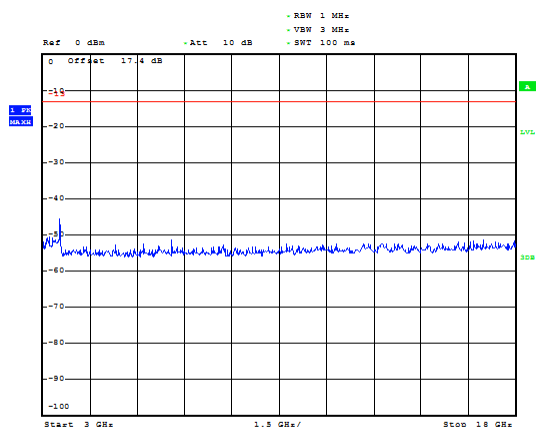
LTE Band 66 15MHz CH-High 1GHz~3GHz



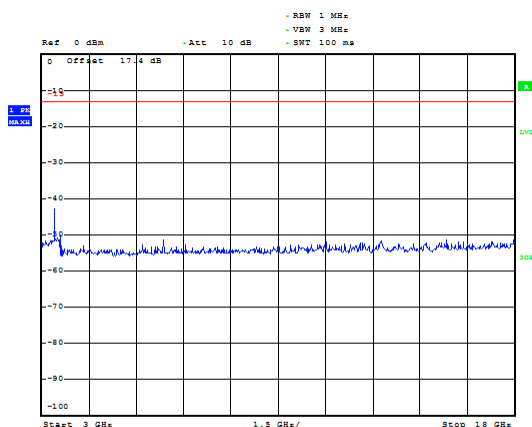
LTE Band 66 20MHz CH-Low 1GHz~3GHz



LTE Band 66 15MHz CH-High 3GHz~18GHz

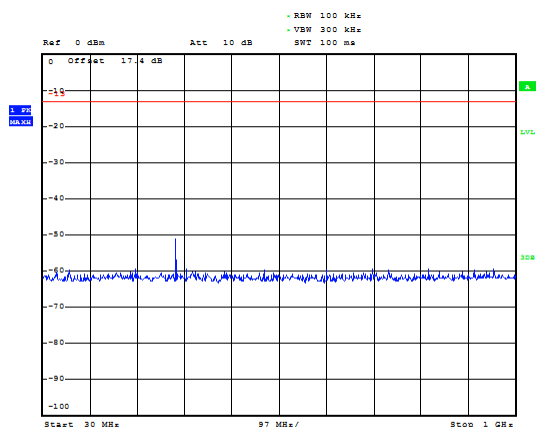


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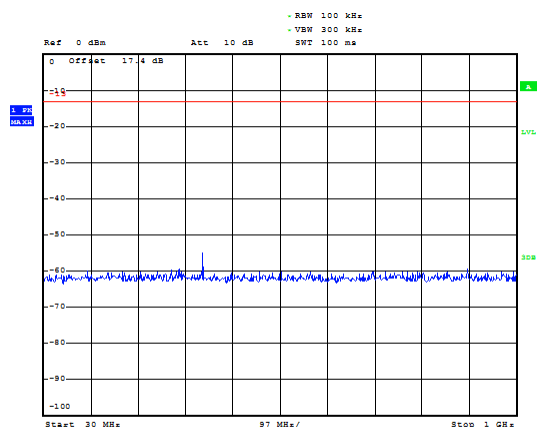




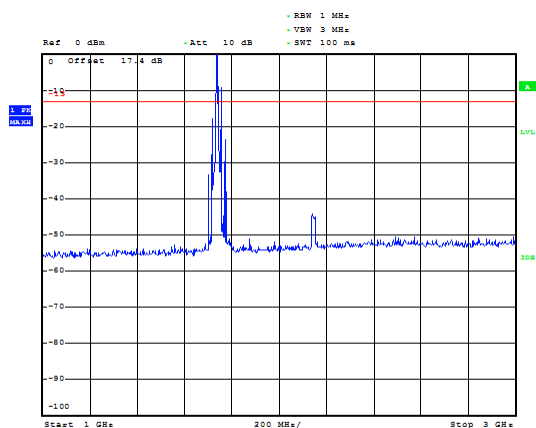
LTE Band 66 20MHz CH-Middle 30MHz~1GHz



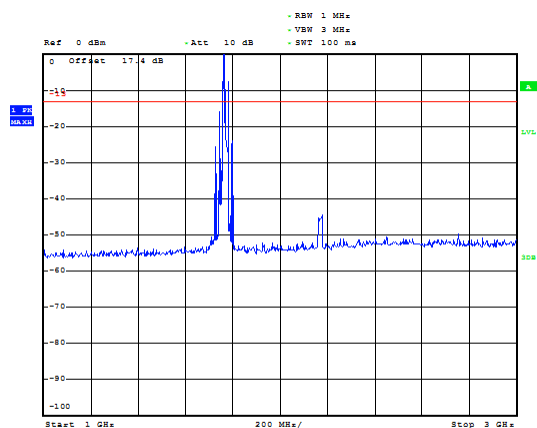
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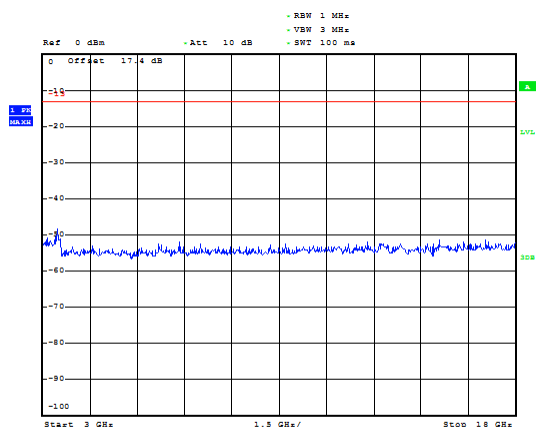
LTE Band 66 20MHz CH-Middle 1GHz~3GHz



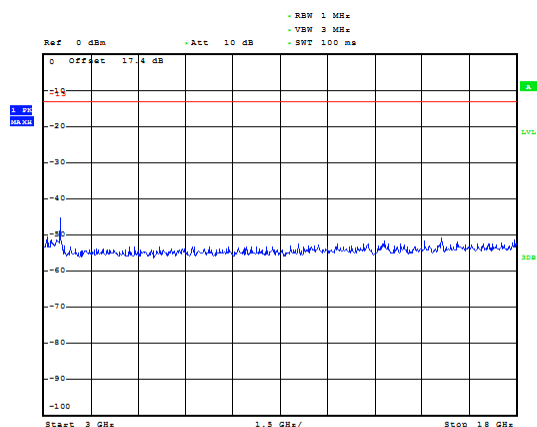
LTE Band 66 20MHz CH-High 1GHz~3GHz



LTE Band 66 20MHz CH-Middle 3GHz~18GHz

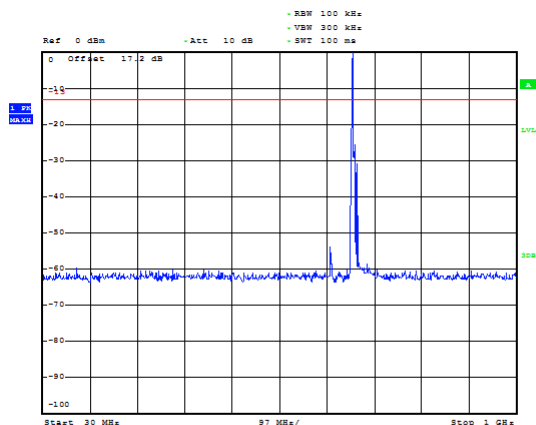


LTE Band 66 20MHz CH-High 3GHz~18GHz

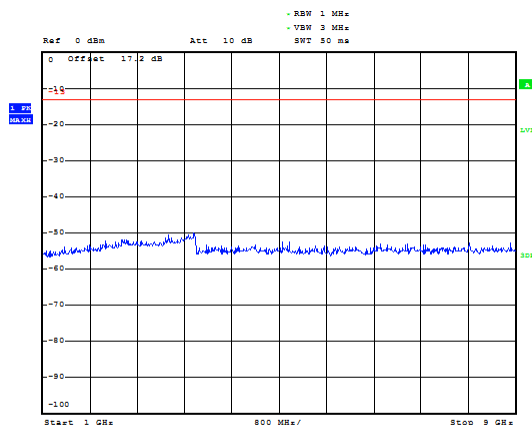




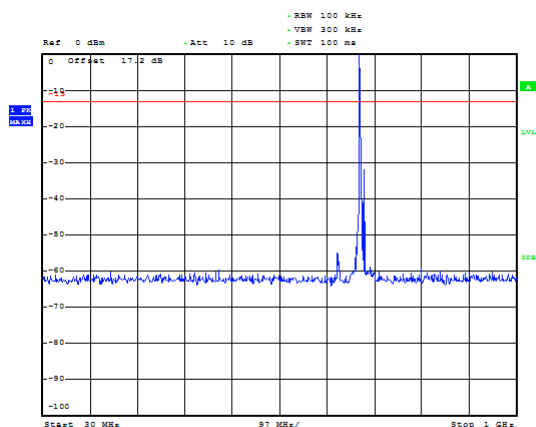
LTE Band 71 5MHz CH-Low 30MHz~1GHz



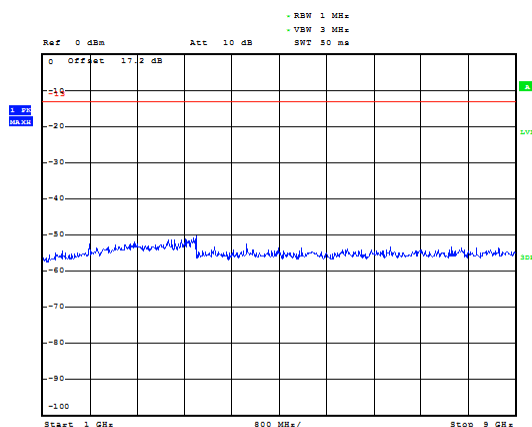
LTE Band 71 5MHz CH-Low 1GHz~9GHz



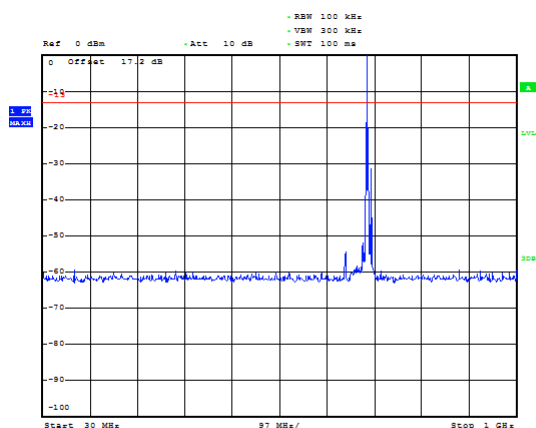
LTE Band 71 5MHz CH-Middle 30MHz~1GHz



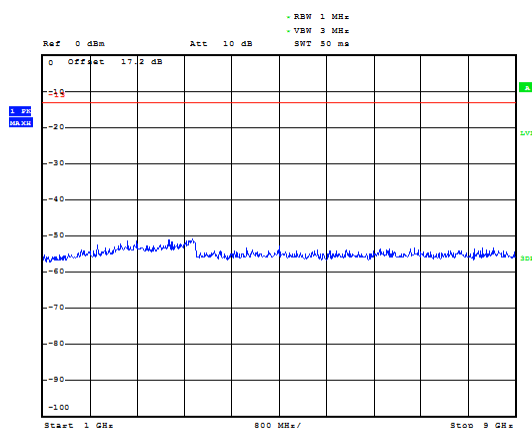
LTE Band 71 5MHz CH-Middle 1GHz~9GHz



LTE Band 71 5MHz CH-High 30MHz~1GHz

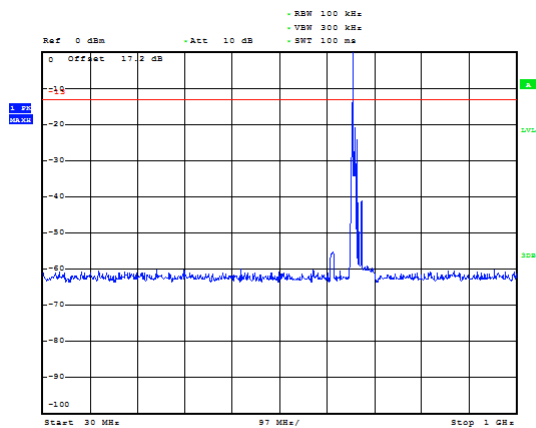


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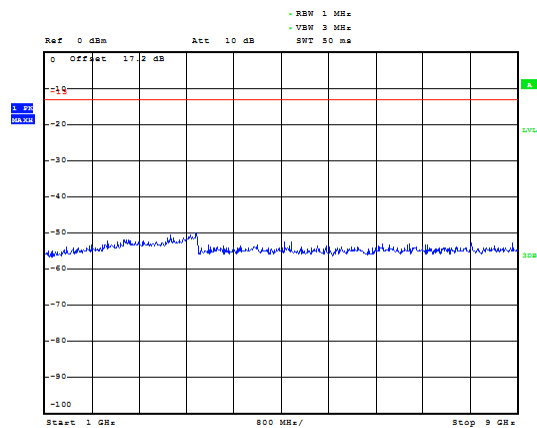




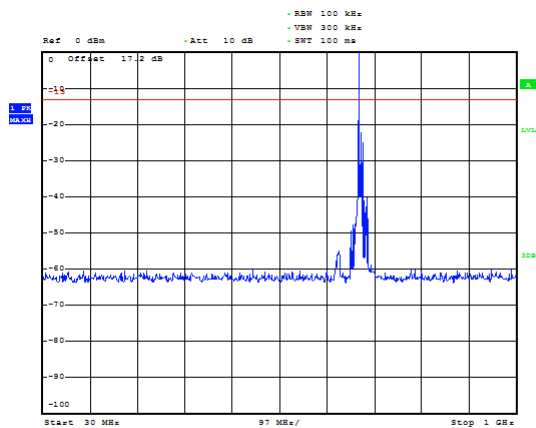
LTE Band 71 10MHz CH-Low 30MHz~1GHz



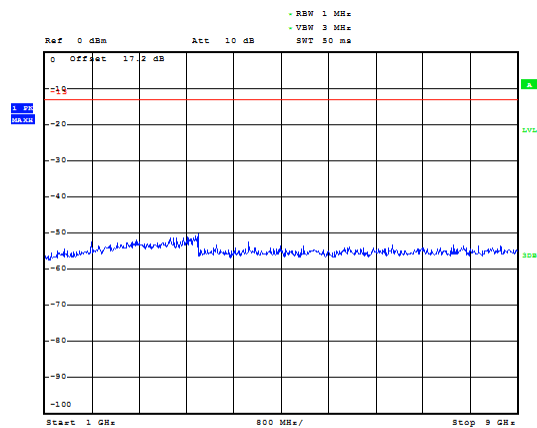
LTE Band 71 10MHz CH-Low 1GHz~9GHz



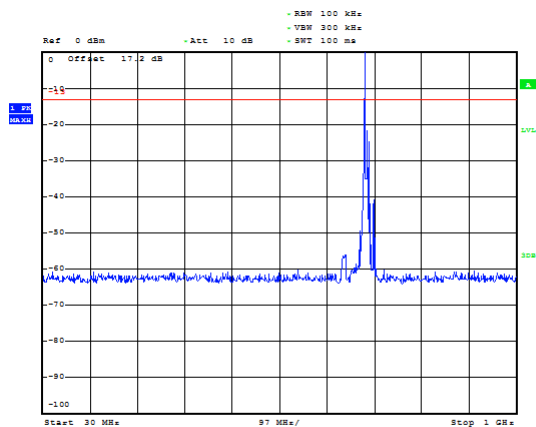
LTE Band 71 10MHz CH-Middle 30MHz~1GHz



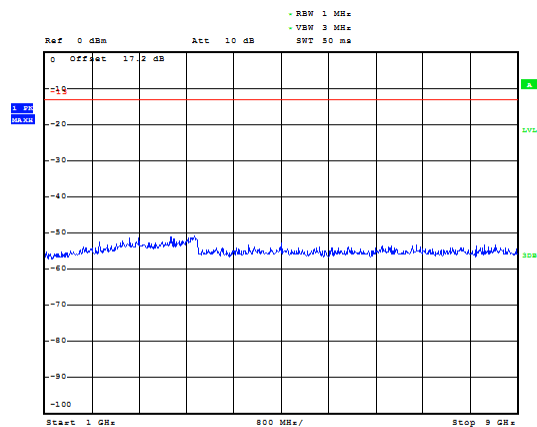
LTE Band 71 10MHz CH-Middle 1GHz~9GHz



LTE Band 71 10MHz CH-High 30MHz~1GHz

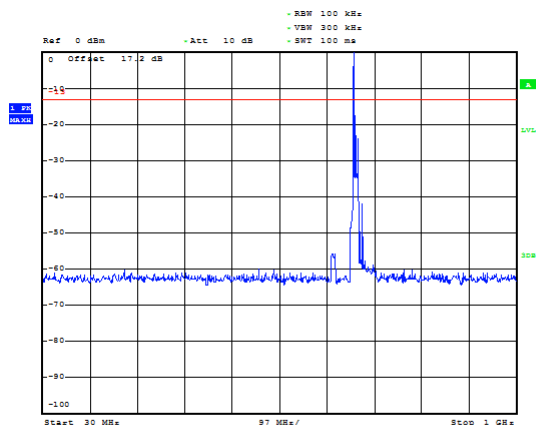


LTE Band 71 10MHz CH-High 1GHz~9GHz

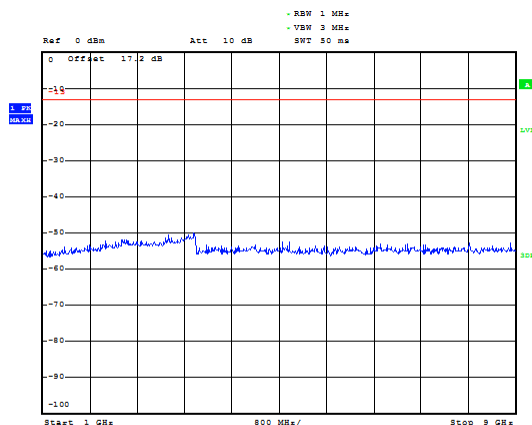




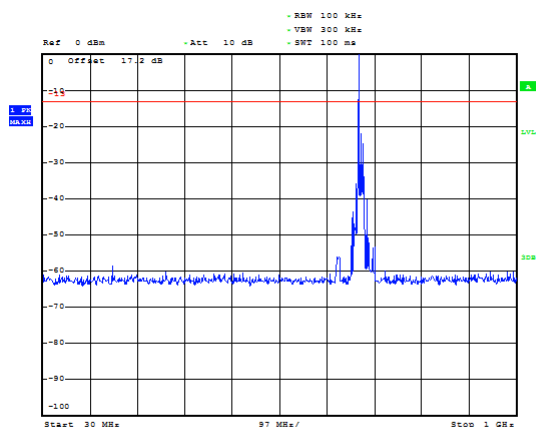
LTE Band 71 15MHz CH-Low 30MHz~1GHz



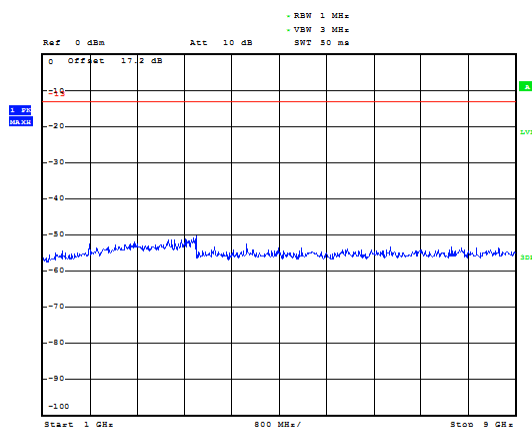
LTE Band 71 15MHz CH-Low 1GHz~9GHz



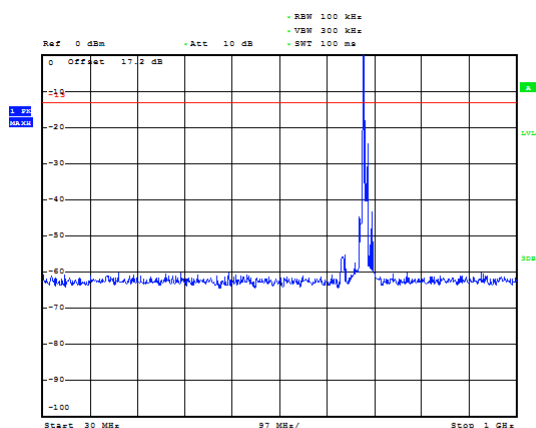
LTE Band 71 15MHz CH-Middle 30MHz~1GHz



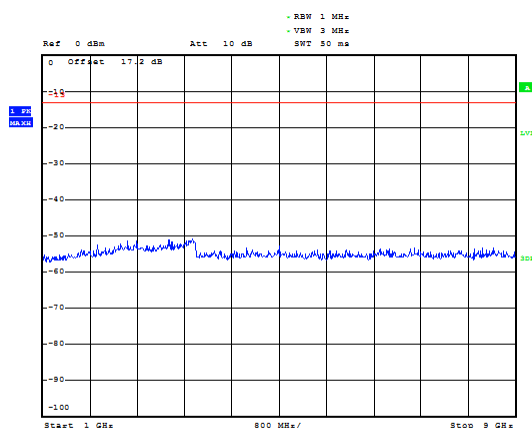
LTE Band 71 15MHz CH-Middle 1GHz~9GHz



LTE Band 71 15MHz CH-High 30MHz~1GHz

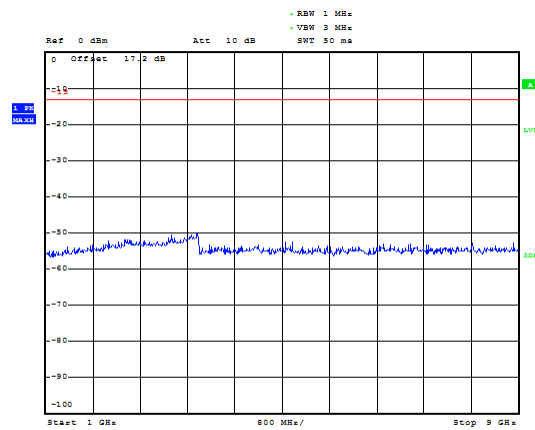
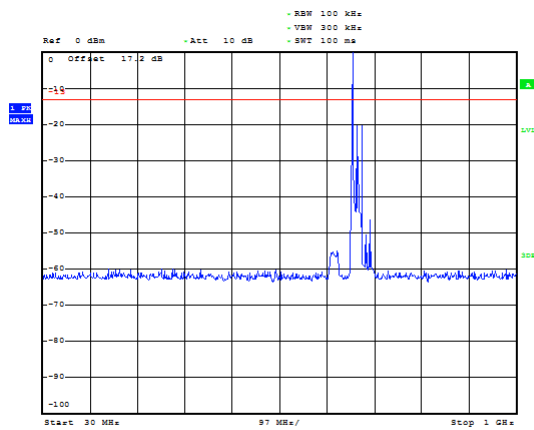


LTE Band 71 15MHz CH-High 1GHz~9GHz

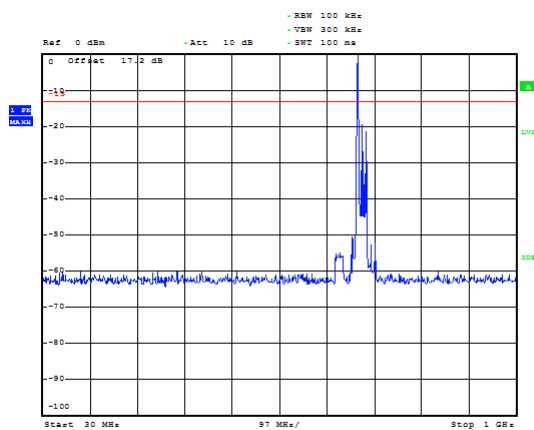


LTE Band 71 20MHz CH-Low 30MHz~1GHz

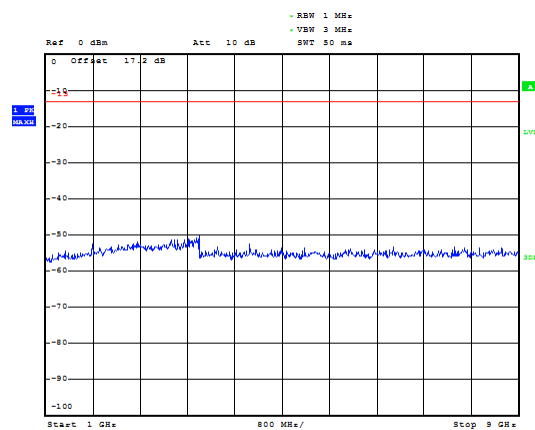
LTE Band 71 20MHz CH-Low 1GHz~9GHz



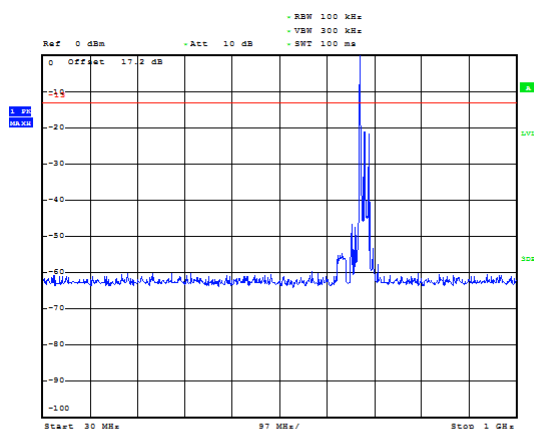
LTE Band 71 20MHz CH-Middle 30MHz~1GHz



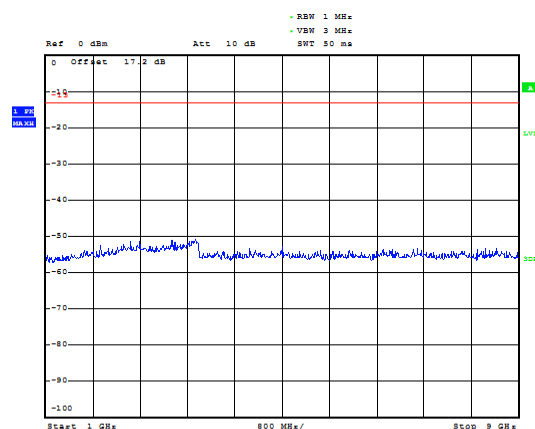
LTE Band 71 20MHz CH-Middle 1GHz~9GHz



LTE Band 71 20MHz CH-High 30MHz~1GHz



LTE Band 71 20MHz CH-High 1GHz~9GHz





5.8 Radiates Spurious Emission

Ambient condition

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

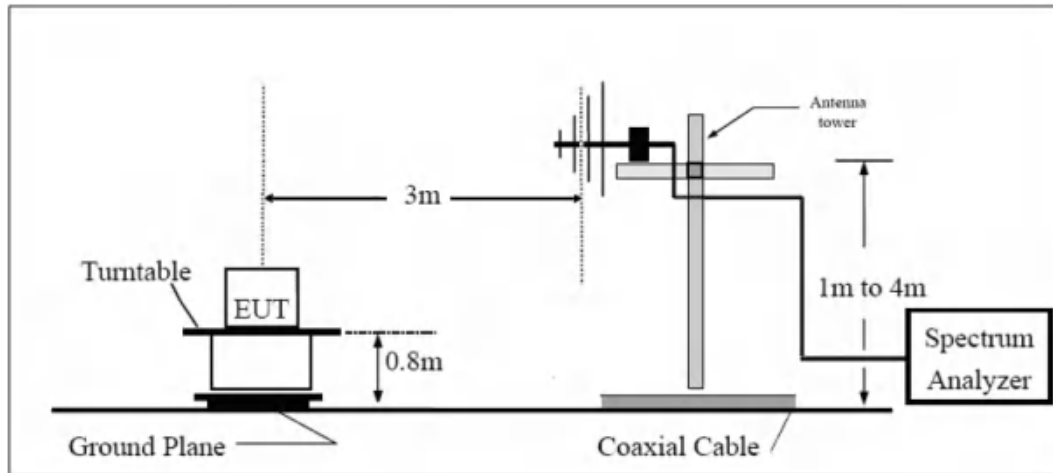
Method of Measurement

1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. 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).
3. A log-periodic antenna or double-ridged waveguide 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=1MHz, VBW=3MHz, 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:
$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$

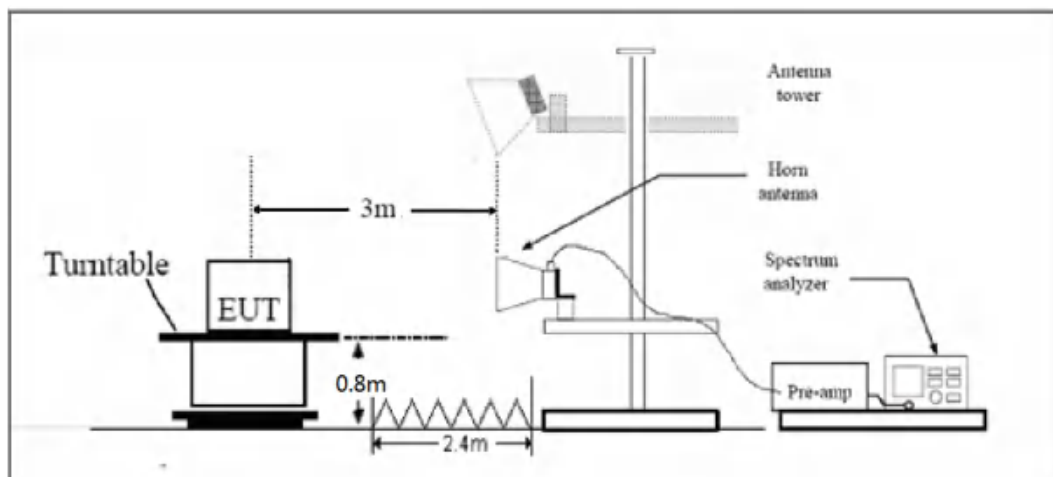
The measurement results are amend as described below:
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, $\text{ERP} = \text{EIRP} - 2.15\text{dBi}$.
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

Limits

Rule Part 27.53(h) specifies that “for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB..”

Rule Part 27.53 (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands



immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Rule Part 27.53(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

Part 27.53 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log (P)$ dB;
- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

Part 27.53(a)/(h)/(g) Limit		-13 dBm
Part 27.53(f) Limit	Limit out of the band 1559-1610 MHz	-13 dBm
	Limit in the band 1559-1610 MHz	-40 dBm

Measurement Uncertainty

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

**Test Result**

Sweep the whole frequency band through the range from 30MHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

WCDMA Band IV CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.2	-58.16	2.6	10.75	Horizontal	-50.01	-13.00	37.01	90
3	5197.8	-62.42	2.4	11.05	Horizontal	-53.77	-13.00	40.77	135
4	6930.4	-52.92	4.5	11.15	Horizontal	-46.27	-13.00	33.27	45
5	8663.0	-55.39	5.1	11.35	Horizontal	-49.14	-13.00	36.14	0
6	10395.6	-55.25	5.3	11.95	Horizontal	-48.60	-13.00	35.60	225
7	12128.2	-54.80	5.5	13.55	Horizontal	-46.75	-13.00	33.75	270
8	13860.8	-52.18	6.3	13.75	Horizontal	-44.73	-13.00	31.73	180
9	15593.4	-53.33	6.7	13.85	Horizontal	-46.18	-13.00	33.18	225
10	17326.0	-51.33	6.8	14.25	Horizontal	-43.88	-13.00	30.88	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 4 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3460.5	-54.46	2.6	10.75	Horizontal	-46.31	-13.00	33.31	90
3	5191.5	-59.67	2.4	11.05	Horizontal	-51.02	-13.00	38.02	315
4	6930.0	-45.66	4.5	11.15	Horizontal	-39.01	-13.00	26.01	225
5	8662.5	-56.26	5.1	11.35	Horizontal	-50.01	-13.00	37.01	270
6	10395.0	-55.48	5.3	11.95	Horizontal	-48.83	-13.00	35.83	90
7	12127.5	-53.74	5.5	13.55	Horizontal	-45.69	-13.00	32.69	135
8	13860.0	-52.20	6.3	13.75	Horizontal	-44.75	-13.00	31.75	45
9	15592.5	-53.93	6.7	13.85	Horizontal	-46.78	-13.00	33.78	45
10	17325.0	-47.52	6.8	14.25	Horizontal	-40.07	-13.00	27.07	0

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 12 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1415.0	-67.96	2.00	10.75	Horizontal	-61.36	-13.00	48.36	180
3	2122.5	-56.18	2.51	11.05	Horizontal	-49.79	-13.00	36.79	225
4	2830.0	-57.29	4.20	11.15	Horizontal	-52.49	-13.00	39.49	315
5	3537.5	-52.01	5.20	11.15	Horizontal	-48.21	-13.00	35.21	135
6	4245.0	-53.13	5.50	11.95	Horizontal	-48.83	-13.00	35.83	0
7	4952.5	-61.19	5.70	13.55	Horizontal	-55.49	-13.00	42.49	45
8	5660.0	-60.70	6.30	13.75	Horizontal	-55.40	-13.00	42.40	315
9	6367.5	-56.87	6.80	13.85	Horizontal	-51.97	-13.00	38.97	180
10	7075.0	-55.40	6.90	14.25	Horizontal	-50.20	-13.00	37.20	135

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 13 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1564.0	-65.63	2.00	10.75	Horizontal	-59.03	-40.00	19.03	135
3	2346.0	-53.93	2.51	11.05	Horizontal	-47.54	-13.00	34.54	45
4	3128.0	-61.26	4.20	11.15	Horizontal	-56.46	-13.00	43.46	90
5	3910.0	-60.06	5.20	11.15	Horizontal	-56.26	-13.00	43.26	135
6	4692.0	-59.82	5.50	11.95	Horizontal	-55.52	-13.00	42.52	180
7	5474.0	-61.02	5.70	13.55	Horizontal	-55.32	-13.00	42.32	225
8	6256.0	-59.25	6.30	13.75	Horizontal	-53.95	-13.00	40.95	315
9	7038.0	-54.98	6.80	13.85	Horizontal	-50.08	-13.00	37.08	270
10	7820.0	-54.13	6.90	14.25	Horizontal	-48.93	-13.00	35.93	135

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 66 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3460.5	-60.24	2.6	10.75	Horizontal	-52.09	-13.00	39.09	180
3	5191.5	-63.42	2.4	11.05	Horizontal	-54.77	-13.00	41.77	135
4	6930	-50.34	4.5	11.15	Horizontal	-43.69	-13.00	30.69	90
5	8662.5	-56.33	5.1	11.35	Horizontal	-50.08	-13.00	37.08	45
6	10395	-51.45	5.3	11.95	Horizontal	-44.80	-13.00	31.80	315
7	12127.5	-54.58	5.5	13.55	Horizontal	-46.53	-13.00	33.53	270
8	13860	-52.05	6.3	13.75	Horizontal	-44.60	-13.00	31.60	90
9	15592.5	-54.03	6.7	13.85	Horizontal	-46.88	-13.00	33.88	135
10	17325	-50.05	6.8	14.25	Horizontal	-42.60	-13.00	29.60	0
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 71 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	ERP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	1361.0	-56.30	2.00	10.75	Horizontal	-47.55	-13.00	34.55	135
3	2041.5	-60.98	2.51	11.05	Horizontal	-52.44	-13.00	39.44	315
4	2722.0	-65.41	4.20	11.15	Horizontal	-58.46	-13.00	45.46	90
5	3402.5	-63.41	5.20	11.15	Horizontal	-57.46	-13.00	44.46	90
6	4083.0	-62.97	5.50	11.95	Horizontal	-56.52	-13.00	43.52	135
7	4763.5	-63.39	5.70	13.55	Horizontal	-55.54	-13.00	42.54	45
8	5444.0	-61.71	6.30	13.75	Horizontal	-54.26	-13.00	41.26	225
9	6124.5	-61.77	6.80	13.85	Horizontal	-54.72	-13.00	41.72	315
10	6805.0	-60.38	6.90	14.25	Horizontal	-53.03	-13.00	40.03	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

Date of Testing: (Original) June 29, 2018~ July 16, 2018 and July 30, 2018~ July 31, 2018 and August 3, 2019~ August 13, 2019

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
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
Horn Antenna	STEATITE	QSH-SL-26-40-K-15	16779	2017-07-20	2019-07-19
Signal generator	R&S	SMB 100A	102594	2019-05-19	2020-05-18
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2019-05-19	2020-05-18
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2019-05-19	2020-05-18
RF Cable	Agilent	SMA 15cm	0001	2019-06-14	2019-09-13
Software	R&S	EMC32	9.26.0	/	/

Date of Testing: (Variant) March 19, 2022 ~ March 29, 2022

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Communication Tester	Anritsu	MT8821C	6201538758	2021-05-15	2022-05-14

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



ANNEX A: The EUT Appearance

The EUT Appearance is submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos is submitted separately.



ANNEX C: Product Change Description 1

Quectel Wireless Solutions Co., Ltd.

Statement

We, Quectel Wireless Solutions Co., Ltd, declare the following models as series application.

Name: LTE Module

Parent Model: EC25-AFX

Variant Model: EC25-AFXD, EC25-AFXD MINIPCIE

EC25-AFX, EC25-AFXD and EC25-AFXD MINIPCIE are all LTE modules. They use the same chipset, support same bands and share the same software & hardware design. The only difference is EC25-AFXD and EC25-AFXD MINIPCIE are data only modules which is configured by firmware based on EC25-AFX.

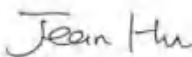
Following details are the difference of these modules.

Module	Frequency bands	Capability
EC25-AFX EC25-AFX MINIPCIE	FDD: B2/B4/B5/B12/B13/B14/B66/B71 WCDMA: B2/B4/B5	Cat.4 Data&Voice
EC25-AFXD EC25-AFXD MINIPCIE	FDD: B2/B4/B5/B12/B13/B14/B66/B71 WCDMA: B2/B4/B5	Cat.4 Data Only

Meanwhile, EC25-AFXD MINIPCIE makes up of EC25-AFXD module and PCIe carrier board. The carrier board switches EC25-AFXD module to follow PCI Express Mini Card 1.2 standard connector protocol. No any other internal changes in EC25-AFXD module. We hereby state that two models are identical in interior structure and components, and just connector interface is different for the marketing requirement.

Your assistance on this matter is highly appreciated.

Sincerely,

Name: Jean Hu 

Title: Certification Section



ANNEX D: Product Change Description 2

The Product Change Description are submitted separately.