

FCC Test Report

(PART 27)

Report No.: RF170808C06-11

FCC ID: 2AJOTTA-1005

Test Model: TA-1005

Received Date: Aug. 08, 2017

Test Date: Aug. 19, 2017 ~ Oct. 25, 2017

Issued Date: Nov. 16, 2017

Applicant: HMD Global Oy

Address: Karaportti 2, 02610 Espoo, Finland

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
(R.O.C.)

Test Location (1): No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Test Location (2): No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan, R.O.C

FCC Registration /
Designation Number: 427177 / TW0011



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agency.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results.....	5
2.1 Measurement Uncertainty.....	5
2.2 Test Site and Instruments	6
3 General Information	8
3.1 General Description of EUT	8
3.2 Configuration of System under Test.....	10
3.2.1 Description of Support Units.....	10
3.3 Test Mode Applicability and Tested Channel Detail	11
3.4 EUT Operating Conditions	15
3.5 General Description of Applied Standards.....	15
4 Test Types and Results	16
4.1 Output Power Measurement	16
4.1.1 Limits of Output Power Measurement.....	16
4.1.2 Test Procedures.....	16
4.1.3 Test Setup.....	17
4.1.4 Test Results	18
4.2 Frequency Stability Measurement	33
4.2.1 Limits of Frequency Stability Measurement.....	33
4.2.2 Test Procedure	33
4.2.3 Test Setup.....	33
4.2.4 Test Results	34
4.3 Occupied Bandwidth Measurement.....	46
4.3.1 Limits of Occupied Bandwidth Measurement	46
4.3.2 Test Procedure	46
4.3.3 Test Setup.....	46
4.3.4 Test Result	47
4.4 Out-of-Band Emissions Measurement.....	53
4.4.1 Limits of Out-of-Band Emissions Measurement.....	53
4.4.2 Test Setup.....	53
4.4.3 Test Procedures.....	53
4.4.4 Test Results	54
4.5 Peak to Average Ratio	78
4.5.1 Limits of Peak to Average Ratio Measurement	78
4.5.2 Test Setup.....	78
4.5.3 Test Procedures.....	78
4.5.4 Test Results	79
4.6 Conducted Spurious Emissions	85
4.6.1 Limits of Conducted Spurious Emissions Measurement.....	85
4.6.2 Test Setup.....	85
4.6.3 Test Procedure	85
4.6.4 Test Results	86
4.7 Radiated Emission Measurement.....	98
4.7.1 Limits of Radiated Emission Measurement	98
4.7.2 Test Procedure	98
4.7.3 Deviation from Test Standard	98
4.7.4 Test Setup.....	99
4.7.5 Test Results	100
5 Pictures of Test Arrangements.....	118
Appendix – Information on the Testing Laboratories	119

Release Control Record

Issue No.	Description	Date Issued
RF170808C06-11	Original Release	Nov. 16, 2017

1 Certificate of Conformity

Product: Smart Phone

Brand: Nokia

Test Model: TA-1005

Sample Status: Identical Prototype

Applicant: HMD Global Oy

Test Date: Aug. 19, 2017 ~ Oct. 25, 2017

Standards: FCC Part 27, Subpart C, M

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Nov. 16, 2017

Ivonne Wu / Supervisor

Approved by :  , **Date:** Nov. 16, 2017

Dylan Chiou / Project Engineer

2 Summary of Test Results

Applied Standard: FCC Part 27 & Part 2			
FCC Clause	Test Item	Result	Remarks
2.1046 27.50(h)	Equivalent Isotropic Radiated Power	Pass	Meet the requirement of limit.
2.1055 27.54	Frequency Stability	Pass	Meet the requirement of limit.
2.1049	Occupied Bandwidth	Pass	Meet the requirement of limit.
--	Peak to Average Ratio	Pass	Meet the requirement of limit.
2.1051 27.53(l)	Out-of-Band Emissions Measurements	Pass	Meet the requirement of limit.
2.1051 27.53(m)	Conducted Spurious Emissions	Pass	Meet the requirement of limit.
2.1053 27.53(m)	Radiated Spurious Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -21.25 dB at 5360.00 MHz.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expended Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~ 1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Test Site and Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent Technologies	N9038A	MY52260177	Jul. 05, 2017	Jul. 04, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 13, 2016	Dec. 12, 2017
HORN Antenna ETS-Lindgren	3117	00143293	Jun. 26, 2017	Jun. 25, 2018
Double Ridge Guide Horn Antenna EMCO	3115	5619	Dec. 15, 2016	Dec. 14, 2017
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 13, 2016	Dec. 12, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 07, 2017	Jul. 06, 2018
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 19, 2016	Oct. 18, 2017
MXG Vector signal generator Agilent	N5182B	MY53050430	Oct. 24, 2017	Oct. 23, 2018
Preamplifier Agilent	310N	187226	Jun. 23, 2017	Jun. 22, 2018
Preamplifier Agilent	83017A	MY39501357	Jun. 23, 2017	Jun. 22, 2018
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(R FC-SMS-100-SM S-120+RFC-SMS -100-SMS-400)	Jun. 26, 2017	Jun. 25, 2018
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(R FC-SMS-100-SM S-24)	Jun. 26, 2017	Jun. 25, 2018
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Communications Tester-Wireless Agilent	8960 Series 10	MY53201073	Jun. 28, 2017	Jun. 27, 2019
Radio Communication Analyzer Anritsu	MT8820C	6201010284	Nov. 30, 2016	Nov. 29, 2017

- Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HsinTien Chamber 1.
 3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is IC7450I-1.

3 General Information

3.1 General Description of EUT

Product	Smart Phone	
Brand	Nokia	
Test Model	TA-1005	
Status of EUT	Identical Prototype	
Power Supply Rating	5 Vdc or 9 Vdc or 12 Vdc (adapter) 5 Vdc (host equipment) 3.85 Vdc (battery)	
Modulation Type	QPSK, 16QAM, 64QAM	
Frequency Range	LTE Band 7 (Channel Bandwidth: 5 MHz)	2502.5 ~ 2567.5 MHz
	LTE Band 7 (Channel Bandwidth: 10 MHz)	2505 ~ 2565 MHz
	LTE Band 7 (Channel Bandwidth: 15 MHz)	2507.5 ~ 2562.5 MHz
	LTE Band 7 (Channel Bandwidth: 20 MHz)	2510 ~ 2560 MHz
	LTE Band 38 (Channel Bandwidth: 5 MHz)	2572.5 ~ 2617.5 MHz
	LTE Band 38 (Channel Bandwidth: 10 MHz)	2575.0 ~ 2615.0 MHz
	LTE Band 38 (Channel Bandwidth: 15 MHz)	2577.5 ~ 2612.5 MHz
	LTE Band 38 (Channel Bandwidth: 20 MHz)	2580.0 ~ 2610.0 MHz
	LTE Band 41 (Channel Bandwidth: 5 MHz)	2498.5 ~ 2687.5 MHz
	LTE Band 41 (Channel Bandwidth: 10 MHz)	2501.0 ~ 2685.0 MHz
	LTE Band 41 (Channel Bandwidth: 15 MHz)	2503.5 ~ 2682.5 MHz
	LTE Band 41 (Channel Bandwidth: 20 MHz)	2506.0 ~ 2680.0 MHz
Max. EIRP Power	LTE Band 7 (Channel Bandwidth: 5 MHz)	244.23 mW
	LTE Band 7 (Channel Bandwidth: 10 MHz)	247.34 mW
	LTE Band 7 (Channel Bandwidth: 15 MHz)	246.43 mW
	LTE Band 7 (Channel Bandwidth: 20 MHz)	241.38 mW
	LTE Band 38 (Channel Bandwidth: 5 MHz)	202.35 mW
	LTE Band 38 (Channel Bandwidth: 10 MHz)	202.44 mW
	LTE Band 38 (Channel Bandwidth: 15 MHz)	205.02 mW
	LTE Band 38 (Channel Bandwidth: 20 MHz)	207.83 mW
	LTE Band 41 (Channel Bandwidth: 5 MHz)	202.16 mW
	LTE Band 41 (Channel Bandwidth: 10 MHz)	205.26 mW
	LTE Band 41 (Channel Bandwidth: 15 MHz)	204.03 mW
	LTE Band 41 (Channel Bandwidth: 20 MHz)	207.83 mW

Emission Designator	LTE Band 7 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 7 (Channel Bandwidth: 10 MHz)	8M97W7D
	LTE Band 7 (Channel Bandwidth: 15 MHz)	13M4G7D
	LTE Band 7 (Channel Bandwidth: 20 MHz)	18M0W7D
	LTE Band 38 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 38 (Channel Bandwidth: 10 MHz)	8M96W7D
	LTE Band 38 (Channel Bandwidth: 15 MHz)	13M5G7D
	LTE Band 38 (Channel Bandwidth: 20 MHz)	17M9W7D
	LTE Band 41 (Channel Bandwidth: 5 MHz)	4M50W7D
	LTE Band 41 (Channel Bandwidth: 10 MHz)	8M97W7D
	LTE Band 41 (Channel Bandwidth: 15 MHz)	13M5W7D
	LTE Band 41 (Channel Bandwidth: 20 MHz)	17M9G7D
Antenna Type	Fixed Internal Antenna	
Accessory Device	Refer to Note as below	
Data Cable Supplied	Refer to Note as below	

Note:

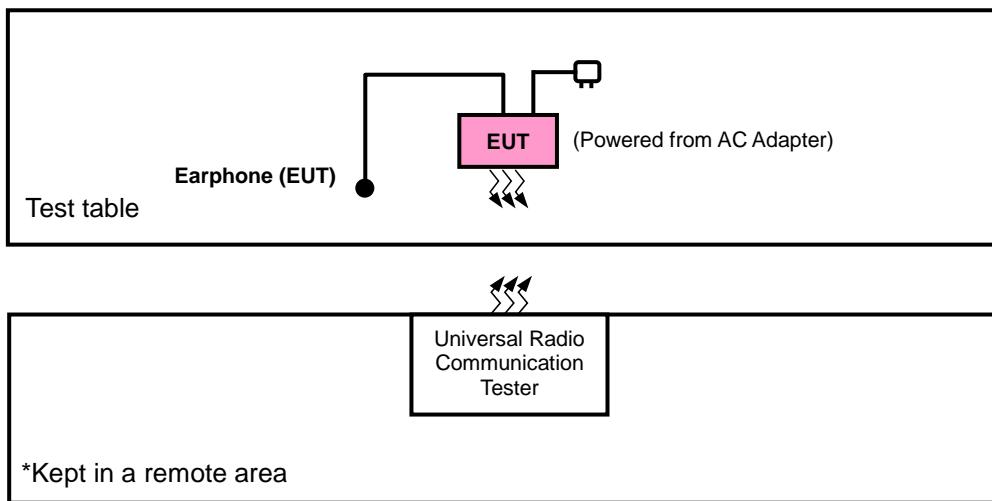
1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Salcomp	FC0302	I/P: 100-240 Vac, 0.5 A O/P: 5 Vdc, 2.5 A or 9 Vdc, 2 A or 12 Vdc, 1.5 A
Adapter 2	DVE	AD-18WU	I/P: 100-240 Vac, 0.5 A O/P: 5 Vdc, 3 A or 9 Vdc, 2 A or 12 Vdc, 1.5 A
Battery	SCUD	HE333	3.85 Vdc, 3250 mAh
Earphone 1	NOKIA	HS-A01	1.15 meter
Earphone 2	NOKIA	HS-A01C	1.15 meter
USB Cable 1	Foxconn	CUDT01E-FA210-EH	0.95 meter Manufacturer: FIT
USB Cable 2	Foxconn	CA-18W	0.95 meter Manufacturer: YinRun
LCD Panel	LG Display	LH546QH1-EDD1-QG1	5.5" OLED
Front Camera	Chicony	CBFH51020005020LH	5M
Main Camera	Primay	FCDC1N	12+13M
eMMC 1 (=ROM 1)	SAMSUNG	IC_UFS2.1_128G	128G
Main Board	AT&S	FIH1883	--
BT/WLAN Module	murata	LBDD5QA1MS-119	--
WWAN Module	Qualcomm	MSM8998	--

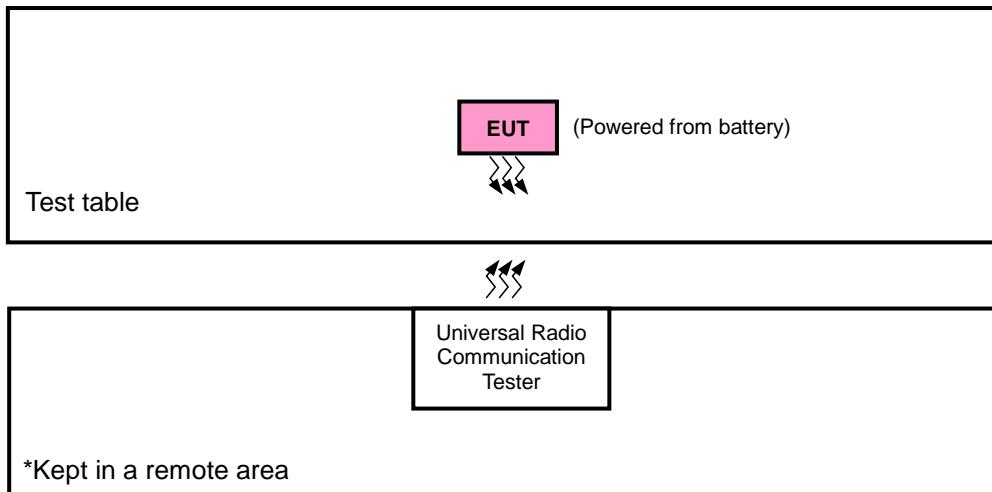
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Configuration of System under Test

<Radiated Emission Test>



<E.I.R.P. Test>



3.2.1 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3 Test Mode Applicability and Tested Channel Detail

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, and antenna ports.

The worst case was found when positioned as the table below. Following channel(s) was (were) selected for the final test as listed below:

Antenna	Band	EIRP	Radiated Emission
0	LTE Band 7	X-plane	X-axis
	LTE Band 38	X-plane	X-axis
	LTE Band 41	X-plane	X-axis

Note: The EUT incorporates WWAN diversity antenna.

LTE Band 7

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Frequency Stability	20775 to 21425	20775, 21425	5 MHz	QPSK	1 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10 MHz	QPSK	1 RB / 0 RB Offset
		20825 to 21375	20825, 21375	15 MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	20850, 21350	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	Out-of-Band Emissions	20775 to 21425	20775, 21425	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		20800 to 21400	20800, 21400	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		20825 to 21375	20825, 21375	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		20850 to 21350	20850, 21350	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Conducted Emission	20775 to 21425	20775, 21100, 21425	5 MHz	QPSK	1 RB / 0 RB Offset
		20800 to 21400	20800, 21100, 21400	10 MHz	QPSK	1 RB / 0 RB Offset
		20825 to 21375	20825, 21100, 21375	15 MHz	QPSK	1 RB / 0 RB Offset
		20850 to 21350	20850, 21100 21350	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	20850 to 21350	20850, 21100 21350	20 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE Band 38

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Frequency Stability	37775 to 38225	37775, 38225	5 MHz	QPSK	1 RB / 0 RB Offset
		37800 to 38200	37800, 38200	10 MHz	QPSK	1 RB / 0 RB Offset
		37825 to 38175	37825, 38175	15 MHz	QPSK	1 RB / 0 RB Offset
		37850 to 38150	37850, 38150	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Out-of-Band Emissions	37775 to 38225	37775, 38225	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		37800 to 38200	37800, 38200	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		37825 to 38175	37825, 38175	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		37850 to 38150	37850, 38150	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Conducted Emission	37775 to 38225	37775, 38000, 38225	5 MHz	QPSK	1 RB / 0 RB Offset
		37800 to 38200	37800, 38000, 38200	10 MHz	QPSK	1 RB / 0 RB Offset
		37825 to 38175	37825, 38000, 38175	15 MHz	QPSK	1 RB / 0 RB Offset
		37850 to 38150	37850, 38000, 38150	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	37850 to 38150	37850, 38000, 38150	20 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

LTE Band 41

EUT Configure Mode	Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
-	EIRP	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Frequency Stability	39675 to 41565	39675, 41565	5 MHz	QPSK	1 RB / 0 RB Offset
		39700 to 41540	39700, 41540	10 MHz	QPSK	1 RB / 0 RB Offset
		39725 to 41515	39725, 41515	15 MHz	QPSK	1 RB / 0 RB Offset
		39750 to 41490	39750, 41490	20 MHz	QPSK	1 RB / 0 RB Offset
-	Occupied Bandwidth	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM, 64QAM	50 RB / 0 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM, 64QAM	75 RB / 0 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM, 64QAM	100 RB / 0 RB Offset
-	Peak to Average Ratio	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK, 16QAM, 64QAM	25 RB / 0 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK, 16QAM, 64QAM	1 RB / 0 RB Offset
-	Out-of-Band Emissions	39675 to 41565	39675, 41565	5 MHz	QPSK, 16QAM	25 RB / 0 RB Offset
		39700 to 41540	39700, 41540	10 MHz	QPSK, 16QAM	50 RB / 0 RB Offset
		39725 to 41515	39725, 41515	15 MHz	QPSK, 16QAM	75 RB / 0 RB Offset
		39750 to 41490	39750, 41490	20 MHz	QPSK, 16QAM	100 RB / 0 RB Offset
-	Conducted Emission	39675 to 41565	39675, 40620, 41565	5 MHz	QPSK	1 RB / 0 RB Offset
		39700 to 41540	39700, 40620, 41540	10 MHz	QPSK	1 RB / 0 RB Offset
		39725 to 41515	39725, 40620, 41515	15 MHz	QPSK	1 RB / 0 RB Offset
		39750 to 41490	39750, 40620, 41490	20 MHz	QPSK	1 RB / 0 RB Offset
-	Radiated Emission	39750 to 41490	39750, 40620, 41490	20 MHz	QPSK	1 RB / 0 RB Offset

Note: This device was tested under all bandwidths, RB configurations and modulations. The worst case was found in QPSK modulation.

Test Condition:

Test Item	Environmental Conditions	Input Power	Tested By
EIRP	25 deg. C, 65 % RH	3.85 Vdc	Charles Hsiao
Frequency Stability	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Occupied Bandwidth	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Out-of-Band Emissions	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Peak to Average Ratio	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Conducted Emission	25 deg. C, 65 % RH	3.85 Vdc	Carlos Chen
Radiated Emission	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao

3.4 EUT Operating Conditions

The EUT makes a call to the communication simulator. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency

3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part 2

FCC 47 CFR Part 27

KDB 971168 D01 Power Meas License Digital Systems v02r02

ANSI/TIA/EIA-603-E 2016

ANSI 63.26-2015

Note: All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Output Power Measurement

4.1.1 Limits of Output Power Measurement

The radiated peak output power shall be according to the specific rule Part 27.50(h)(2) that “User stations are limited to 2 watts” and 27.50(i) specific that “Peak transmit power must be measure over any interval of continuous transmission using instrumentation calibration in terms of rms-equivalent voltage.”

4.1.2 Test Procedures

EIRP Measurement:

- a. All measurements were done at low, middle and high operational frequency range. RBW and VBW is 10 MHz for LTE mode.
- b. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a tx cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value” of step b. Record the power level of S.G.
- d. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.

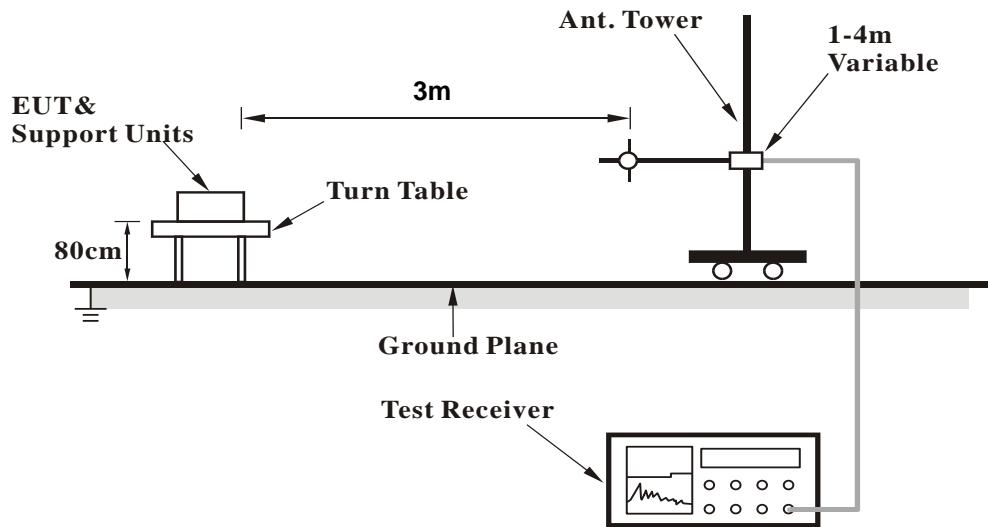
Conducted Power Measurement:

- a. The EUT was set up for the maximum power with LTE link data modulation and link up with simulator.
- b. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

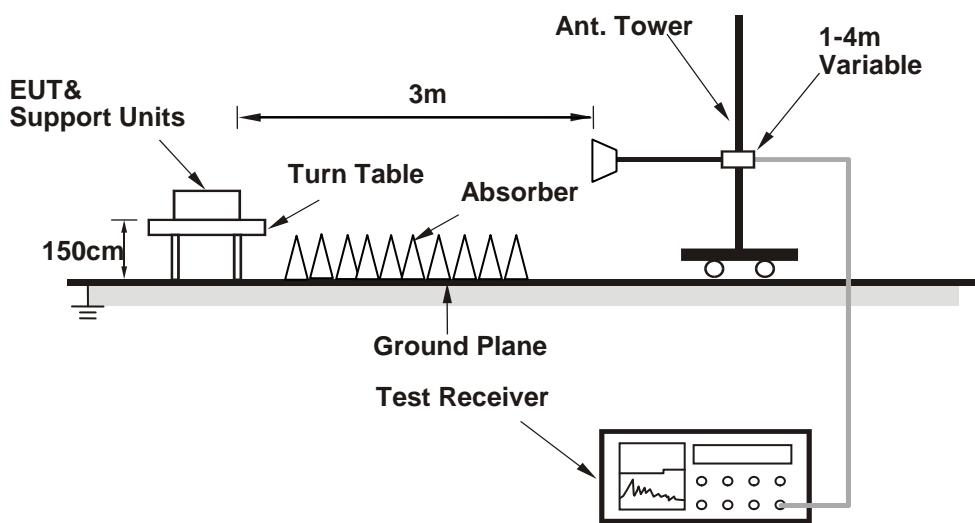
4.1.3 Test Setup

EIRP / ERP Measurement:

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Conducted Power Measurement:



4.1.4 Test Results

Conducted Output Power (dBm)

LTE Band 7															
BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM				
			Low CH 20850	Mid CH 21100	High CH 21350	3GPP MPR (dB)	Low CH 20850	Mid CH 21100	High CH 21350	3GPP MPR (dB)	Low CH 20850	Mid CH 21100	High CH 21350	3GPP MPR (dB)	
			2510.0 MHz	2535.0 MHz	2560.0 MHz		2510.0 MHz	2535.0 MHz	2560.0 MHz		2510.0 MHz	2535.0 MHz	2560.0 MHz		
20	1	0	23.23	23.21	23.35	0	22.19	22.17	22.31	1	21.38	21.21	21.35	2	
	1	50	23.15	23.13	23.27	0	22.11	22.09	22.23	1	21.10	21.25	21.42	2	
	1	99	23.22	23.20	23.34	0	22.18	22.16	22.30	1	21.24	21.34	21.39	2	
	50	0	22.26	22.24	22.38	1	21.22	21.20	21.34	2	20.32	20.36	20.39	3	
	50	25	22.30	22.28	22.35	1	21.26	21.24	21.31	2	20.16	20.23	20.41	3	
	50	50	22.26	22.24	22.38	1	21.22	21.20	21.34	2	20.18	20.16	20.47	3	
	100	0	22.20	22.18	22.32	1	21.16	21.14	21.28	2	20.28	20.32	20.46	3	
15	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 20825	Mid CH 21100	High CH 21375	3GPP MPR (dB)	Low CH 20825	Mid CH 21100	High CH 21375	3GPP MPR (dB)	Low CH 20825	Mid CH 21100	High CH 21375	3GPP MPR (dB)
				2507.5 MHz	2535.0 MHz	2562.5 MHz		2507.5 MHz	2535.0 MHz	2562.5 MHz		2507.5 MHz	2535.0 MHz	2562.5 MHz	
	1	0	23.20	23.18	23.32	0	22.16	22.14	22.28	1	21.23	21.34	21.35	2	
	1	37	23.12	23.10	23.24	0	22.08	22.06	22.20	1	21.16	21.12	21.26	2	
	1	74	23.19	23.17	23.31	0	22.15	22.13	22.27	1	21.17	21.24	21.37	2	
	36	0	22.23	22.21	22.35	1	21.19	21.17	21.31	2	20.27	20.22	20.45	3	
10	36	19	22.27	22.25	22.32	1	21.23	21.21	21.28	2	20.16	20.25	20.39	3	
	36	39	22.23	22.21	22.35	1	21.19	21.17	21.31	2	20.20	20.23	20.45	3	
	75	0	22.17	22.15	22.29	1	21.13	21.11	21.25	2	20.17	20.20	20.30	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 20800	Mid CH 21100	High CH 21400	3GPP MPR (dB)	Low CH 20800	Mid CH 21100	High CH 21400	3GPP MPR (dB)	Low CH 20800	Mid CH 21100	High CH 21400	3GPP MPR (dB)
				2505.0 MHz	2535.0 MHz	2565.0 MHz		2505.0 MHz	2535.0 MHz	2565.0 MHz		2505.0 MHz	2535.0 MHz	2565.0 MHz	
	1	0	23.18	23.16	23.30	0	22.14	22.12	22.26	1	21.23	21.21	21.31	2	
	1	24	23.10	23.08	23.22	0	22.06	22.04	22.18	1	21.14	21.17	21.28	2	
	1	49	23.17	23.15	23.29	0	22.13	22.11	22.25	1	21.29	21.30	21.29	2	
	25	0	22.21	22.19	22.33	1	21.17	21.15	21.29	2	20.38	20.22	20.50	3	
5	25	12	22.25	22.23	22.30	1	21.21	21.19	21.26	2	20.25	20.27	20.42	3	
	25	25	22.21	22.19	22.33	1	21.17	21.15	21.29	2	20.17	20.29	20.30	3	
	50	0	22.15	22.13	22.27	1	21.11	21.09	21.23	2	20.19	20.27	20.32	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				Low CH 20775	Mid CH 21100	High CH 21425	3GPP MPR (dB)	Low CH 20775	Mid CH 21100	High CH 21425	3GPP MPR (dB)	Low CH 20775	Mid CH 21100	High CH 21425	3GPP MPR (dB)
				2502.5 MHz	2535.0 MHz	2567.5 MHz		2502.5 MHz	2535.0 MHz	2567.5 MHz		2502.5 MHz	2535.0 MHz	2567.5 MHz	
	1	0	23.17	23.15	23.29	0	22.13	22.11	22.25	1	21.21	21.20	21.50	2	
	1	12	23.09	23.07	23.21	0	22.05	22.03	22.17	1	21.25	21.10	21.27	2	
	1	24	23.16	23.14	23.28	0	22.12	22.10	22.24	1	21.34	21.23	21.48	2	
	12	0	22.20	22.18	22.32	1	21.16	21.14	21.28	2	20.35	20.19	20.30	3	
	12	6	22.24	22.22	22.29	1	21.20	21.18	21.25	2	20.22	20.24	20.41	3	
	12	13	22.20	22.18	22.32	1	21.16	21.14	21.28	2	20.21	20.27	20.42	3	
	25	0	22.14	22.12	22.26	1	21.10	21.08	21.22	2	20.29	20.27	20.33	3	

LTE Band 38																	
BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM						
			Low Ch 37850	Mid Ch 38000	High Ch 38150	3GPP MPR (dB)	Low Ch 37850	Mid Ch 38000	High Ch 38150	3GPP MPR (dB)	Low Ch 37850	Mid Ch 38000	High Ch 38150	3GPP MPR (dB)			
20	1	0	23.06	23.26	23.44	0	22.08	22.25	22.44	1	21.04	21.23	21.41	2			
	1	50	23.17	23.14	23.37	0	22.21	22.13	22.29	1	21.31	21.02	21.55	2			
	1	99	23.18	23.20	23.43	0	22.17	22.23	22.39	1	21.38	21.31	21.45	2			
	50	0	22.01	22.17	22.40	1	21.10	21.20	21.48	2	20.06	20.23	20.43	3			
	50	25	22.30	22.11	22.43	1	21.20	21.20	21.34	2	20.42	20.19	20.51	3			
	50	50	22.34	22.05	22.40	1	21.26	21.19	21.26	2	20.27	20.18	20.49	3			
	100	0	22.18	22.23	22.33	1	21.21	21.17	21.27	2	20.40	20.20	20.56	3			
15	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM					
				Low Ch 37825	Mid Ch 38000	High Ch 38175	3GPP MPR (dB)	Low Ch 37825	Mid Ch 38000	High Ch 38175	3GPP MPR (dB)	Low Ch 37825	Mid Ch 38000	High Ch 38175	3GPP MPR (dB)		
				2577.5 MHz	2595.0 MHz	2612.5 MHz		2577.5 MHz	2595.0 MHz	2612.5 MHz		2577.5 MHz	2595.0 MHz	2612.5 MHz			
				1	0	23.02	23.26	23.38	0	22.01	22.11	22.41	1	21.07	21.17	21.40	2
				1	37	23.16	23.17	23.27	0	22.34	22.10	22.23	1	21.48	21.18	21.39	2
				1	74	23.17	23.18	23.32	0	22.34	22.11	22.28	1	21.25	21.19	21.42	2
				36	0	22.13	22.20	22.30	1	21.11	21.11	21.33	2	20.01	20.21	20.36	3
10	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM					
				Low Ch 37800	Mid Ch 38000	High Ch 38200	3GPP MPR (dB)	Low Ch 37800	Mid Ch 38000	High Ch 38200	3GPP MPR (dB)	Low Ch 37800	Mid Ch 38000	High Ch 38200	3GPP MPR (dB)		
				2575.0 MHz	2595.0 MHz	2615.0 MHz		2575.0 MHz	2595.0 MHz	2615.0 MHz		2575.0 MHz	2595.0 MHz	2615.0 MHz			
				1	0	23.16	23.18	23.33	0	21.99	22.20	22.44	1	21.05	21.26	21.38	2
				1	24	23.15	23.16	23.33	0	22.29	22.19	22.37	1	21.31	21.08	21.39	2
				1	49	23.35	23.17	23.33	0	22.17	22.17	22.26	1	21.36	21.30	21.48	2
				25	0	22.00	22.24	22.40	1	21.04	21.29	21.37	2	19.94	20.21	20.29	3
5	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM					
				Low Ch 37775	Mid Ch 38000	High Ch 38225	3GPP MPR (dB)	Low Ch 37775	Mid Ch 38000	High Ch 38225	3GPP MPR (dB)	Low Ch 37775	Mid Ch 38000	High Ch 38225	3GPP MPR (dB)		
				2572.5 MHz	2595.0 MHz	2617.5 MHz		2572.5 MHz	2595.0 MHz	2617.5 MHz		2572.5 MHz	2595.0 MHz	2617.5 MHz			
				1	0	22.98	23.21	23.33	0	22.00	22.09	22.39	1	20.97	21.22	21.29	2
				1	12	23.34	23.05	23.40	0	22.31	22.06	22.35	1	21.49	21.19	21.36	2
				1	24	23.30	23.20	23.42	0	22.31	22.10	22.38	1	21.31	21.27	21.45	2
				12	0	22.08	22.18	22.32	1	21.09	21.18	21.47	2	20.10	20.21	20.45	3

LTE Band 41 (Power Class 3)															
BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM				
			L-CH 39750	M-CH 40620	H-CH 41490	3GPP MPR (dB)	L-CH 39750	M-CH 40620	H-CH 41490	3GPP MPR (dB)	L-CH 39750	M-CH 40620	H-CH 41490	3GPP MPR (dB)	
			2506.0 MHz	2593.0 MHz	2680.0 MHz		2506.0 MHz	2593.0 MHz	2680.0 MHz		2506.0 MHz	2593.0 MHz	2680.0 MHz		
20	1	0	23.38	23.28	23.31	0	22.34	22.24	22.27	1	21.38	21.34	21.36	2	
	1	50	23.31	23.21	23.24	0	22.27	22.17	22.20	1	21.30	21.28	21.20	2	
	1	99	23.33	23.23	23.26	0	22.29	22.19	22.22	1	21.30	21.21	21.23	2	
	50	0	22.49	22.39	22.42	1	21.45	21.35	21.38	2	19.59	19.52	19.41	3	
	50	25	22.41	22.31	22.34	1	21.37	21.27	21.30	2	19.56	19.26	19.35	3	
	50	50	22.40	22.30	22.33	1	21.36	21.26	21.29	2	19.42	19.43	19.45	3	
	100	0	22.39	22.29	22.32	1	21.35	21.25	21.28	2	19.39	19.39	19.33	3	
15	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				L-CH 39725	M-CH 40620	H-CH 41515	3GPP MPR (dB)	L-CH 39725	M-CH 40620	H-CH 41515	3GPP MPR (dB)	L-CH 39725	M-CH 40620	H-CH 41515	3GPP MPR (dB)
				2503.5 MHz	2593.0 MHz	2682.5 MHz		2503.5 MHz	2593.0 MHz	2682.5 MHz		2503.5 MHz	2593.0 MHz	2682.5 MHz	
	1	0	23.34	23.24	23.27	0	22.30	22.20	22.23	1	21.49	21.31	21.36	2	
	1	37	23.27	23.17	23.20	0	22.23	22.13	22.16	1	21.26	21.26	21.21	2	
	1	74	23.29	23.19	23.22	0	22.25	22.15	22.18	1	21.34	21.27	21.34	2	
	36	0	22.45	22.35	22.38	1	21.41	21.31	21.34	2	19.59	19.49	19.41	3	
10	36	19	22.37	22.27	22.30	1	21.33	21.23	21.26	2	19.45	19.36	19.43	3	
	36	39	22.36	22.26	22.29	1	21.32	21.22	21.25	2	19.38	19.34	19.37	3	
	75	0	22.35	22.25	22.28	1	21.31	21.21	21.24	2	19.34	19.38	19.35	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				L-CH 39700	M-CH 40620	H-CH 41540	3GPP MPR (dB)	L-CH 39700	M-CH 40620	H-CH 41540	3GPP MPR (dB)	L-CH 39700	M-CH 40620	H-CH 41540	3GPP MPR (dB)
				2501.0 MHz	2593.0 MHz	2685.0 MHz		2501.0 MHz	2593.0 MHz	2685.0 MHz		2501.0 MHz	2593.0 MHz	2685.0 MHz	
	1	0	23.32	23.22	23.25	0	22.28	22.18	22.21	1	21.35	21.28	21.35	2	
	1	24	23.25	23.15	23.18	0	22.21	22.11	22.14	1	21.45	21.23	21.29	2	
	1	49	23.27	23.17	23.20	0	22.23	22.13	22.16	1	21.38	21.20	21.36	2	
	25	0	22.43	22.33	22.36	1	21.39	21.29	21.32	2	19.64	19.50	19.56	3	
5	25	12	22.35	22.25	22.28	1	21.31	21.21	21.24	2	19.45	19.42	19.40	3	
	25	25	22.34	22.24	22.27	1	21.30	21.20	21.23	2	19.43	19.27	19.32	3	
	50	0	22.33	22.23	22.26	1	21.29	21.19	21.22	2	19.40	19.31	19.32	3	
	BW (MHz)	RB Size	RB Offset	QPSK				16QAM				64QAM			
				L-CH 39675	M-CH 40620	H-CH 41565	3GPP MPR (dB)	L-CH 39675	M-CH 40620	H-CH 41565	3GPP MPR (dB)	L-CH 39675	M-CH 40620	H-CH 41565	3GPP MPR (dB)
				2498.5 MHz	2593.0 MHz	2687.5 MHz		2498.5 MHz	2593.0 MHz	2687.5 MHz		2498.5 MHz	2593.0 MHz	2687.5 MHz	
	1	0	23.30	23.20	23.23	0	22.26	22.16	22.19	1	21.39	21.40	21.32	2	
	1	12	23.23	23.13	23.16	0	22.19	22.09	22.12	1	21.40	21.36	21.33	2	
	1	24	23.25	23.15	23.18	0	22.21	22.11	22.14	1	21.42	21.33	21.33	2	
	12	0	22.41	22.31	22.34	1	21.37	21.27	21.30	2	19.50	19.53	19.52	3	
	12	6	22.33	22.23	22.26	1	21.29	21.19	21.22	2	19.44	19.30	19.42	3	
	12	13	22.32	22.22	22.25	1	21.28	21.18	21.21	2	19.55	19.41	19.39	3	
	25	0	22.31	22.21	22.24	1	21.27	21.17	21.20	2	19.47	19.42	19.38	3	

EIRP Power (dBm)

LTE Band 7							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20775	2502.5	-20.36	44.24	23.88	244.23	H
	21100	2535.0	-20.39	44.20	23.81	240.27	
	21425	2567.5	-20.97	44.80	23.83	241.60	
	20775	2502.5	-24.38	44.19	19.81	95.74	V
	21100	2535.0	-24.24	44.09	19.85	96.56	
	21425	2567.5	-24.68	44.50	19.82	95.92	
Channel Bandwidth: 5 MHz / 16QAM							
X	20775	2502.5	-21.42	44.24	22.82	191.34	H
	21100	2535.0	-21.40	44.20	22.80	190.41	
	21425	2567.5	-22.03	44.80	22.77	189.28	
	20775	2502.5	-25.39	44.19	18.80	75.88	V
	21100	2535.0	-25.21	44.09	18.88	77.23	
	21425	2567.5	-25.62	44.50	18.88	77.25	
Channel Bandwidth: 5 MHz / 64QAM							
X	20775	2502.5	-22.85	44.24	21.39	137.66	H
	21100	2535.0	-22.62	44.20	21.58	143.78	
	21425	2567.5	-22.96	44.80	21.84	152.79	
	20775	2502.5	-26.52	44.19	17.67	58.49	V
	21100	2535.0	-26.48	44.09	17.61	57.65	
	21425	2567.5	-26.84	44.50	17.66	58.33	

LTE Band 7							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20800	2505.0	-20.48	44.34	23.86	243.28	H
	21100	2535.0	-20.33	44.20	23.87	243.61	
	21400	2565.0	-20.79	44.72	23.93	247.34	
	20800	2505.0	-24.35	44.23	19.88	97.19	V
	21100	2535.0	-24.37	44.09	19.72	93.71	
	21400	2565.0	-24.59	44.41	19.82	95.85	
Channel Bandwidth: 10 MHz / 16QAM							
X	20800	2505.0	-21.54	44.34	22.80	190.59	H
	21100	2535.0	-21.33	44.20	22.87	193.51	
	21400	2565.0	-21.80	44.72	22.92	196.02	
	20800	2505.0	-25.48	44.23	18.75	74.92	V
	21100	2535.0	-25.26	44.09	18.83	76.35	
	21400	2565.0	-25.60	44.41	18.81	75.96	
Channel Bandwidth: 10 MHz / 64QAM							
X	20800	2505.0	-22.63	44.34	21.71	148.29	H
	21100	2535.0	-22.84	44.20	21.36	136.68	
	21400	2565.0	-22.74	44.72	21.98	157.87	
	20800	2505.0	-26.52	44.23	17.71	58.97	V
	21100	2535.0	-26.95	44.09	17.14	51.74	
	21400	2565.0	-26.88	44.41	17.53	56.57	

LTE Band 7							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20825	2507.5	-20.46	44.32	23.86	243.11	H
	21100	2535.0	-20.28	44.20	23.92	246.43	
	21375	2562.5	-21.00	44.85	23.85	242.55	
	20825	2507.5	-24.18	43.99	19.81	95.76	V
	21100	2535.0	-24.26	44.09	19.83	96.12	
	21375	2562.5	-24.74	44.51	19.77	94.84	
Channel Bandwidth: 15 MHz / 16QAM							
X	20825	2507.5	-21.53	44.32	22.79	190.02	H
	21100	2535.0	-21.36	44.20	22.84	192.18	
	21375	2562.5	-22.00	44.85	22.85	192.66	
	20825	2507.5	-25.17	43.99	18.82	76.24	V
	21100	2535.0	-25.26	44.09	18.83	76.35	
	21375	2562.5	-25.74	44.51	18.77	75.34	
Channel Bandwidth: 15 MHz / 64QAM							
X	20825	2507.5	-22.62	44.32	21.70	147.84	H
	21100	2535.0	-22.84	44.20	21.36	136.68	
	21375	2562.5	-22.87	44.85	21.98	157.69	
	20825	2507.5	-26.51	43.99	17.48	56.00	V
	21100	2535.0	-26.36	44.09	17.73	59.27	
	21375	2562.5	-26.95	44.51	17.56	57.02	

LTE Band 7							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	20850.0	2510.0	-20.35	44.16	23.81	240.44	H
	21100.0	2535.0	-20.37	44.20	23.83	241.38	
	21350.0	2560.0	-21.06	44.81	23.75	236.97	
	20850.0	2510.0	-24.96	44.78	19.82	95.94	V
	21100.0	2535.0	-24.21	44.09	19.88	97.23	
	21350.0	2560.0	-24.89	44.72	19.83	96.16	
Channel Bandwidth: 20 MHz / 16QAM							
X	20850.0	2510.0	-21.28	44.16	22.88	194.09	H
	21100.0	2535.0	-21.36	44.20	22.84	192.18	
	21350.0	2560.0	-21.95	44.81	22.86	193.06	
	20850.0	2510.0	-26.01	44.78	18.77	75.34	V
	21100.0	2535.0	-25.22	44.09	18.87	77.05	
	21350.0	2560.0	-25.97	44.72	18.75	74.99	
Channel Bandwidth: 20 MHz / 64QAM							
X	20850.0	2510.0	-22.69	44.16	21.47	140.28	H
	21100.0	2535.0	-22.69	44.20	21.51	141.64	
	21350.0	2560.0	-23.14	44.81	21.67	146.79	
	20850.0	2510.0	-26.96	44.78	17.82	60.59	V
	21100.0	2535.0	-26.21	44.09	17.88	61.35	
	21350.0	2560.0	-26.96	44.72	17.76	59.73	

LTE Band 38							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	37775	2572.5	-21.20	44.24	23.04	201.28	H
	38000	2595.0	-21.15	44.20	23.05	201.70	
	38225	2617.5	-21.74	44.80	23.06	202.35	
	37775	2572.5	-26.13	44.19	18.06	63.99	V
	38000	2595.0	-26.02	44.09	18.07	64.09	
	38225	2617.5	-26.40	44.50	18.10	64.55	
Channel Bandwidth: 5 MHz / 16QAM							
X	37775	2572.5	-22.19	44.24	22.05	160.25	H
	38000	2595.0	-22.13	44.20	22.07	160.95	
	38225	2617.5	-22.69	44.80	22.11	162.59	
	37775	2572.5	-27.16	44.19	17.03	50.48	V
	38000	2595.0	-27.05	44.09	17.04	50.56	
	38225	2617.5	-27.48	44.50	17.02	50.34	
Channel Bandwidth: 5 MHz / 64QAM							
X	37775	2572.5	-22.53	44.24	21.71	148.32	H
	38000	2595.0	-22.86	44.20	21.34	136.18	
	38225	2617.5	-23.21	44.80	21.59	144.20	
	37775	2572.5	-28.12	44.19	16.07	40.47	V
	38000	2595.0	-27.85	44.09	16.24	42.05	
	38225	2617.5	-27.93	44.50	16.57	45.38	

LTE Band 38							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	37800	2575.0	-21.32	44.34	23.02	200.49	H
	38000	2595.0	-21.15	44.20	23.05	201.70	
	38200	2615.0	-21.66	44.72	23.06	202.44	
	37800	2575.0	-26.22	44.23	18.01	63.18	V
	38000	2595.0	-26.05	44.09	18.04	63.65	
	38200	2615.0	-26.40	44.41	18.01	63.18	
Channel Bandwidth: 10 MHz / 16QAM							
X	37800	2575.0	-22.31	44.34	22.03	159.62	H
	38000	2595.0	-22.06	44.20	22.14	163.57	
	38200	2615.0	-22.67	44.72	22.05	160.44	
	37800	2575.0	-27.18	44.23	17.05	50.65	V
	38000	2595.0	-27.03	44.09	17.06	50.79	
	38200	2615.0	-27.30	44.41	17.11	51.36	
Channel Bandwidth: 10 MHz / 64QAM							
X	37800	2575.0	-22.89	44.34	21.45	139.67	H
	38000	2595.0	-22.76	44.20	21.44	139.28	
	38200	2615.0	-22.99	44.72	21.73	149.04	
	37800	2575.0	-28.14	44.23	16.08	40.59	V
	38000	2595.0	-27.86	44.09	16.23	41.97	
	38200	2615.0	-27.89	44.41	16.52	44.83	

LTE Band 38							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	37825	2577.5	-21.20	44.32	23.12	205.02	H
	38000	2595.0	-21.11	44.20	23.09	203.56	
	38175	2612.5	-21.83	44.85	23.02	200.35	
	37825	2577.5	-25.93	43.99	18.06	64.00	V
	38000	2595.0	-26.07	44.09	18.02	63.36	
	38175	2612.5	-26.48	44.51	18.03	63.53	
Channel Bandwidth: 15 MHz / 16QAM							
X	37825	2577.5	-22.26	44.32	22.06	160.62	H
	38000	2595.0	-22.15	44.20	22.05	160.21	
	38175	2612.5	-22.84	44.85	22.01	158.78	
	37825	2577.5	-26.94	43.99	17.05	50.72	V
	38000	2595.0	-27.03	44.09	17.06	50.79	
	38175	2612.5	-27.48	44.51	17.03	50.47	
Channel Bandwidth: 15 MHz / 64QAM							
X	37825	2577.5	-22.85	44.32	21.47	140.22	H
	38000	2595.0	-22.96	44.20	21.24	132.95	
	38175	2612.5	-23.21	44.85	21.63	145.68	
	37825	2577.5	-27.53	43.99	16.47	44.32	V
	38000	2595.0	-27.86	44.09	16.23	41.97	
	38175	2612.5	-28.24	44.51	16.28	42.41	

LTE Band 38							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	37850	2580.0	-21.11	44.16	23.05	201.84	H
	38000	2595.0	-21.02	44.20	23.18	207.83	
	38150	2610.0	-21.68	44.81	23.13	205.45	
	37850	2580.0	-26.72	44.78	18.06	63.97	V
	38000	2595.0	-26.00	44.09	18.09	64.39	
	38150	2610.0	-26.60	44.72	18.12	64.86	
Channel Bandwidth: 20 MHz / 16QAM							
X	37850	2580.0	-22.02	44.16	22.14	163.68	H
	38000	2595.0	-22.04	44.20	22.16	164.32	
	38150	2610.0	-22.78	44.81	22.03	159.48	
	37850	2580.0	-27.64	44.78	17.14	51.76	V
	38000	2595.0	-27.03	44.09	17.06	50.79	
	38150	2610.0	-27.63	44.72	17.09	51.17	
Channel Bandwidth: 20 MHz / 64QAM							
X	37850	2580.0	-22.86	44.16	21.30	134.93	H
	38000	2595.0	-22.97	44.20	21.23	132.71	
	38150	2610.0	-23.21	44.81	21.59	144.31	
	37850	2580.0	-28.21	44.78	16.57	45.35	V
	38000	2595.0	-27.96	44.09	16.13	41.04	
	38150	2610.0	-28.21	44.72	16.51	44.77	

LTE Band 41							
Channel Bandwidth: 5 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	39675	2498.5	-21.19	44.24	23.05	201.74	H
	40620	2593.0	-21.14	44.20	23.06	202.16	
	41565	2687.5	-21.76	44.80	23.04	201.42	
	39675	2498.5	-26.12	44.19	18.07	64.14	V
	40620	2593.0	-26.03	44.09	18.06	63.94	
	41565	2687.5	-26.45	44.50	18.05	63.81	
Channel Bandwidth: 5 MHz / 16QAM							
X	39675	2498.5	-22.20	44.24	22.04	159.88	H
	40620	2593.0	-22.16	44.20	22.04	159.85	
	41565	2687.5	-22.67	44.80	22.13	163.34	
	39675	2498.5	-27.10	44.19	17.09	51.18	V
	40620	2593.0	-27.04	44.09	17.05	50.68	
	41565	2687.5	-27.48	44.50	17.02	50.34	
Channel Bandwidth: 5 MHz / 64QAM							
X	39675	2498.5	-22.85	44.24	21.39	137.66	H
	40620	2593.0	-22.96	44.20	21.24	132.95	
	41565	2687.5	-22.90	44.80	21.91	155.10	
	39675	2498.5	-27.85	44.19	16.34	43.06	V
	40620	2593.0	-27.96	44.09	16.13	41.04	
	41565	2687.5	-27.87	44.50	16.63	46.02	

LTE Band 41							
Channel Bandwidth: 10 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	39700	2501.0	-21.26	44.34	23.08	203.28	H
	40620	2593.0	-21.15	44.20	23.05	201.70	
	41540	2685.0	-21.60	44.72	23.12	205.26	
	39700	2501.0	-26.22	44.23	18.01	63.18	V
	40620	2593.0	-26.04	44.09	18.05	63.80	
	41540	2685.0	-26.35	44.41	18.06	63.91	
Channel Bandwidth: 10 MHz / 16QAM							
X	39700	2501.0	-22.30	44.34	22.04	159.99	H
	40620	2593.0	-22.15	44.20	22.05	160.21	
	41540	2685.0	-22.63	44.72	22.09	161.92	
	39700	2501.0	-27.21	44.23	17.02	50.30	V
	40620	2593.0	-27.09	44.09	17.00	50.10	
	41540	2685.0	-27.34	44.41	17.07	50.89	
Channel Bandwidth: 10 MHz / 64QAM							
X	39700	2501.0	-23.01	44.34	21.33	135.86	H
	40620	2593.0	-22.96	44.20	21.24	132.95	
	41540	2685.0	-22.85	44.72	21.88	154.03	
	39700	2501.0	-27.85	44.23	16.38	43.41	V
	40620	2593.0	-27.97	44.09	16.12	40.95	
	41540	2685.0	-27.75	44.41	16.66	46.32	

LTE Band 41							
Channel Bandwidth: 15 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	39725	2503.5	-21.26	44.32	23.06	202.21	H
	40620	2593.0	-21.10	44.20	23.10	204.03	
	41515	2682.5	-21.84	44.85	23.01	199.89	
	39725	2503.5	-25.93	43.99	18.06	64.00	V
	40620	2593.0	-26.04	44.09	18.05	63.80	
	41515	2682.5	-26.50	44.51	18.01	63.24	
Channel Bandwidth: 15 MHz / 16QAM							
X	39725	2503.5	-22.32	44.32	22.00	158.42	H
	40620	2593.0	-22.14	44.20	22.06	160.58	
	41515	2682.5	-22.79	44.85	22.06	160.62	
	39725	2503.5	-26.93	43.99	17.06	50.84	V
	40620	2593.0	-27.04	44.09	17.05	50.68	
	41515	2682.5	-27.49	44.51	17.02	50.35	
Channel Bandwidth: 15 MHz / 64QAM							
X	39725	2503.5	-22.90	44.32	21.42	138.77	H
	40620	2593.0	-22.85	44.20	21.35	136.36	
	41515	2682.5	-22.96	44.85	21.89	154.45	
	39725	2503.5	-27.62	43.99	16.37	43.37	V
	40620	2593.0	-27.53	44.09	16.56	45.31	
	41515	2682.5	-27.97	44.51	16.54	45.10	

LTE Band 41							
Channel Bandwidth: 20 MHz / QPSK							
Plane	Channel	Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (mW)	Polarization (H/V)
X	39750	2506.0	-21.10	44.16	23.06	202.30	H
	40620	2593.0	-21.02	44.20	23.18	207.83	
	41490	2680.0	-21.70	44.81	23.11	204.50	
	39750	2506.0	-26.71	44.78	18.07	64.12	V
	40620	2593.0	-26.02	44.09	18.07	64.09	
	41490	2680.0	-26.64	44.72	18.08	64.27	
Channel Bandwidth: 20 MHz / 16QAM							
X	39750	2506.0	-22.04	44.16	22.12	162.93	H
	40620	2593.0	-22.04	44.20	22.16	164.32	
	41490	2680.0	-22.64	44.81	22.17	164.70	
	39750	2506.0	-27.70	44.78	17.08	51.05	V
	40620	2593.0	-27.04	44.09	17.05	50.68	
	41490	2680.0	-27.71	44.72	17.01	50.23	
Channel Bandwidth: 20 MHz / 64QAM							
X	39750	2506.0	-22.78	44.16	21.38	137.47	H
	40620	2593.0	-22.97	44.20	21.23	132.78	
	41490	2680.0	-22.85	44.81	21.96	156.93	
	39750	2506.0	-28.21	44.78	16.57	45.39	V
	40620	2593.0	-28.01	44.09	16.08	40.53	
	41490	2680.0	-28.22	44.72	16.50	44.67	

4.2 Frequency Stability Measurement

4.2.1 Limits of Frequency Stability Measurement

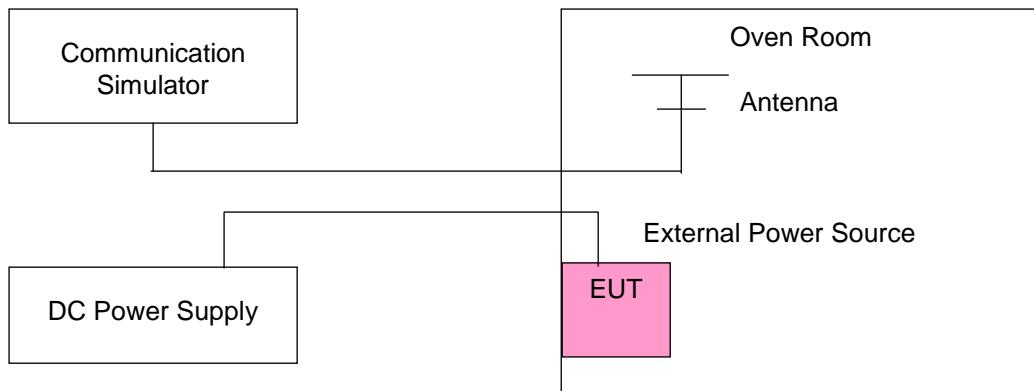
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

4.2.2 Test Procedure

- a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
- b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
- c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the $\pm 0.5^{\circ}\text{C}$ during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.

NOTE: The frequency error was recorded frequency error from the communication simulator.

4.2.3 Test Setup



4.2.4 Test Results

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)			
3.5	2502.500002	0.0008	2567.500003	0.0012	2.5	
3.85	2502.500002	0.0008	2567.500002	0.0006	2.5	
4.3	2502.500001	0.0005	2567.500001	0.0005	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)			
-30	2502.500002	0.0006	2567.500003	0.0012	2.5	
-20	2502.500002	0.0006	2567.500002	0.0008	2.5	
-10	2502.500002	0.0008	2567.500002	0.0008	2.5	
0	2502.500004	0.0015	2567.500002	0.0009	2.5	
10	2502.500002	0.0006	2567.500004	0.0014	2.5	
20	2502.499997	-0.0013	2567.499997	-0.0011	2.5	
30	2502.499998	-0.0008	2567.499999	-0.0005	2.5	
40	2502.499997	-0.0014	2567.499999	-0.0005	2.5	
50	2502.499997	-0.0011	2567.499999	-0.0005	2.5	
55	2502.499997	-0.0014	2567.499998	-0.0008	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2505.000001	0.0005	2565.000002	0.0009	2.5	
3.85	2505.000003	0.0010	2565.000002	0.0007	2.5	
4.3	2505.000001	0.0004	2565.000001	0.0005	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2505.000004	0.0016	2565.000001	0.0004	2.5	
-20	2505.000002	0.0009	2565.000002	0.0009	2.5	
-10	2505.000004	0.0014	2565.000002	0.0006	2.5	
0	2505.000002	0.0010	2565.000003	0.0013	2.5	
10	2505.000004	0.0016	2565.000002	0.0008	2.5	
20	2504.999997	-0.0012	2564.999997	-0.0010	2.5	
30	2504.999998	-0.0007	2564.999998	-0.0009	2.5	
40	2504.999998	-0.0008	2564.999998	-0.0007	2.5	
50	2504.999998	-0.0010	2564.999999	-0.0006	2.5	
55	2504.999997	-0.0011	2564.999996	-0.0015	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2507.500002	0.0008	2562.500004	0.0014	2.5	
3.85	2507.500004	0.0015	2562.500003	0.0012	2.5	
4.3	2507.500004	0.0015	2562.500003	0.0010	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2507.500003	0.0014	2562.500004	0.0015	2.5	
-20	2507.500002	0.0009	2562.500003	0.0011	2.5	
-10	2507.500002	0.0006	2562.500001	0.0004	2.5	
0	2507.500002	0.0007	2562.500003	0.0010	2.5	
10	2507.500004	0.0015	2562.500002	0.0009	2.5	
20	2507.499999	-0.0006	2562.499998	-0.0007	2.5	
30	2507.499996	-0.0016	2562.499999	-0.0004	2.5	
40	2507.499997	-0.0012	2562.499998	-0.0008	2.5	
50	2507.499997	-0.0014	2562.499998	-0.0007	2.5	
55	2507.499998	-0.0007	2562.499997	-0.0013	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2510.000002	0.0006	2560.000003	0.0010	2.5	
3.85	2510.000002	0.0007	2560.000002	0.0009	2.5	
4.3	2510.000002	0.0006	2560.000003	0.0010	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 7				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2510.000004	0.0014	2560.000003	0.0013	2.5	
-20	2510.000003	0.0012	2560.000002	0.0009	2.5	
-10	2510.000001	0.0005	2560.000003	0.0011	2.5	
0	2510.000004	0.0016	2560.000004	0.0014	2.5	
10	2510.000004	0.0016	2560.000003	0.0013	2.5	
20	2509.999997	-0.0011	2559.999996	-0.0015	2.5	
30	2509.999996	-0.0016	2559.999998	-0.0007	2.5	
40	2509.999997	-0.0014	2559.999999	-0.0005	2.5	
50	2509.999998	-0.0007	2559.999996	-0.0014	2.5	
55	2509.999996	-0.0015	2559.999998	-0.0007	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2572.500003	0.0010	2617.500003	0.0010	2.5	
3.85	2572.500001	0.0004	2617.500004	0.0013	2.5	
4.3	2572.500003	0.0011	2617.500003	0.0010	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2572.500003	0.0012	2617.500003	0.0011	2.5	
-20	2572.500003	0.0013	2617.500001	0.0005	2.5	
-10	2572.500003	0.0013	2617.500003	0.0010	2.5	
0	2572.500002	0.0009	2617.500003	0.0010	2.5	
10	2572.500002	0.0007	2617.500004	0.0013	2.5	
20	2572.499999	-0.0004	2617.499998	-0.0009	2.5	
30	2572.499997	-0.0012	2617.499996	-0.0015	2.5	
40	2572.499999	-0.0005	2617.499996	-0.0014	2.5	
50	2572.499998	-0.0008	2617.499997	-0.0013	2.5	
55	2572.499997	-0.0012	2617.499998	-0.0006	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2575.000001	0.0005	2615.000004	0.0015	2.5	
3.85	2575.000002	0.0009	2615.000003	0.0011	2.5	
4.3	2575.000003	0.0011	2615.000001	0.0005	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2575.000002	0.0009	2615.000001	0.0004	2.5	
-20	2575.000004	0.0015	2615.000004	0.0014	2.5	
-10	2575.000002	0.0006	2615.000001	0.0005	2.5	
0	2575.000003	0.0013	2615.000002	0.0007	2.5	
10	2575.000003	0.0013	2615.000002	0.0008	2.5	
20	2574.999996	-0.0015	2614.999999	-0.0005	2.5	
30	2574.999997	-0.0012	2614.999997	-0.0011	2.5	
40	2574.999997	-0.0013	2614.999997	-0.0011	2.5	
50	2574.999998	-0.0008	2614.999997	-0.0013	2.5	
55	2574.999999	-0.0004	2614.999998	-0.0010	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2577.500003	0.0010	2612.500002	0.0007	2.5	
3.85	2577.500001	0.0004	2612.500002	0.0009	2.5	
4.3	2577.500003	0.0012	2612.500004	0.0014	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2577.500003	0.0010	2612.500003	0.0010	2.5	
-20	2577.500003	0.0013	2612.500001	0.0005	2.5	
-10	2577.500002	0.0007	2612.500001	0.0004	2.5	
0	2577.500003	0.0010	2612.500003	0.0012	2.5	
10	2577.500004	0.0014	2612.500002	0.0006	2.5	
20	2577.499999	-0.0005	2612.499998	-0.0008	2.5	
30	2577.499997	-0.0012	2612.499999	-0.0005	2.5	
40	2577.499999	-0.0005	2612.499997	-0.0011	2.5	
50	2577.499997	-0.0012	2612.499997	-0.0012	2.5	
55	2577.499997	-0.0013	2612.499998	-0.0007	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2580.000003	0.0010	2610.000003	0.0013	2.5	
3.85	2580.000002	0.0009	2610.000004	0.0015	2.5	
4.3	2580.000003	0.0010	2610.000003	0.0010	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 38				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2580.000003	0.0010	2610.000002	0.0007	2.5	
-20	2580.000003	0.0013	2610.000004	0.0015	2.5	
-10	2580.000003	0.0011	2610.000002	0.0007	2.5	
0	2580.000002	0.0006	2610.000002	0.0009	2.5	
10	2580.000002	0.0008	2610.000002	0.0006	2.5	
20	2579.999999	-0.0005	2609.999998	-0.0010	2.5	
30	2579.999996	-0.0015	2609.999999	-0.0004	2.5	
40	2579.999997	-0.0014	2609.999998	-0.0006	2.5	
50	2579.999998	-0.0009	2609.999998	-0.0009	2.5	
55	2579.999999	-0.0004	2609.999996	-0.0015	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2498.500004	0.0016	2687.500004	0.0013	2.5	
3.85	2498.500002	0.0010	2687.500002	0.0006	2.5	
4.3	2498.500004	0.0016	2687.500004	0.0015	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 5 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2498.500004	0.0016	2687.500003	0.0010	2.5	
-20	2498.500001	0.0005	2687.500001	0.0004	2.5	
-10	2498.500002	0.0009	2687.500002	0.0007	2.5	
0	2498.500001	0.0005	2687.500003	0.0011	2.5	
10	2498.500002	0.0007	2687.500001	0.0005	2.5	
20	2498.499999	-0.0005	2687.499997	-0.0012	2.5	
30	2498.499998	-0.0008	2687.499997	-0.0010	2.5	
40	2498.499999	-0.0006	2687.499999	-0.0004	2.5	
50	2498.499997	-0.0013	2687.499999	-0.0005	2.5	
55	2498.499999	-0.0006	2687.499998	-0.0009	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2501.000001	0.0005	2685.000004	0.0015	2.5	
3.85	2501.000004	0.0015	2685.000002	0.0007	2.5	
4.3	2501.000003	0.0012	2685.000001	0.0005	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 10 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2501.000003	0.0011	2685.000004	0.0013	2.5	
-20	2501.000004	0.0015	2685.000003	0.0010	2.5	
-10	2501.000002	0.0006	2685.000002	0.0007	2.5	
0	2501.000003	0.0011	2685.000004	0.0014	2.5	
10	2501.000002	0.0008	2685.000003	0.0012	2.5	
20	2500.999997	-0.0011	2684.999996	-0.0014	2.5	
30	2500.999998	-0.0010	2684.999996	-0.0015	2.5	
40	2500.999998	-0.0008	2684.999997	-0.0012	2.5	
50	2500.999997	-0.0013	2684.999998	-0.0009	2.5	
55	2500.999998	-0.0009	2684.999997	-0.0011	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2503.500003	0.0013	2682.500002	0.0007	2.5	
3.85	2503.500002	0.0006	2682.500002	0.0008	2.5	
4.3	2503.500004	0.0015	2682.500001	0.0004	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 15 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2503.500002	0.0007	2682.500003	0.0012	2.5	
-20	2503.500004	0.0015	2682.500002	0.0007	2.5	
-10	2503.500003	0.0011	2682.500003	0.0012	2.5	
0	2503.500002	0.0006	2682.500001	0.0004	2.5	
10	2503.500003	0.0013	2682.500001	0.0004	2.5	
20	2503.499996	-0.0015	2682.499997	-0.0013	2.5	
30	2503.499998	-0.0009	2682.499997	-0.0012	2.5	
40	2503.499996	-0.0016	2682.499998	-0.0009	2.5	
50	2503.499999	-0.0004	2682.499997	-0.0012	2.5	
55	2503.499999	-0.0004	2682.499997	-0.0012	2.5	

Frequency Error vs. Voltage

Voltage (Volts)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
3.5	2506.000002	0.0009	2680.000002	0.0006	2.5	
3.85	2506.000003	0.0011	2680.000004	0.0015	2.5	
4.3	2506.000002	0.0007	2680.000003	0.0012	2.5	

Note: The applicant defined the normal working voltage of the battery is from 3.5 Vdc to 4.3 Vdc.

Frequency Error vs. Temperature

Temp. (°C)	LTE Band 41				Limit (ppm)	
	Channel Bandwidth: 20 MHz					
	Low Channel		High Channel			
	Frequency (MHz)	Frequency Error (ppm)	Frequency (MHz)	Frequency Error (ppm)		
-30	2506.000001	0.0005	2680.000001	0.0004	2.5	
-20	2506.000001	0.0004	2680.000001	0.0004	2.5	
-10	2506.000003	0.0013	2680.000002	0.0006	2.5	
0	2506.000002	0.0009	2680.000003	0.0010	2.5	
10	2506.000001	0.0004	2680.000004	0.0014	2.5	
20	2505.999998	-0.0008	2679.999999	-0.0006	2.5	
30	2505.999997	-0.0014	2679.999997	-0.0011	2.5	
40	2505.999998	-0.0009	2679.999998	-0.0006	2.5	
50	2505.999997	-0.0012	2679.999997	-0.0013	2.5	
55	2505.999998	-0.0010	2679.999997	-0.0011	2.5	

4.3 Occupied Bandwidth Measurement

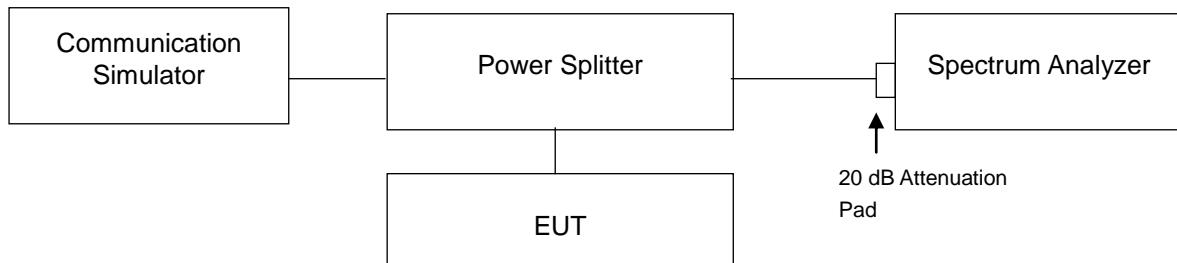
4.3.1 Limits of Occupied Bandwidth Measurement

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.3.2 Test Procedure

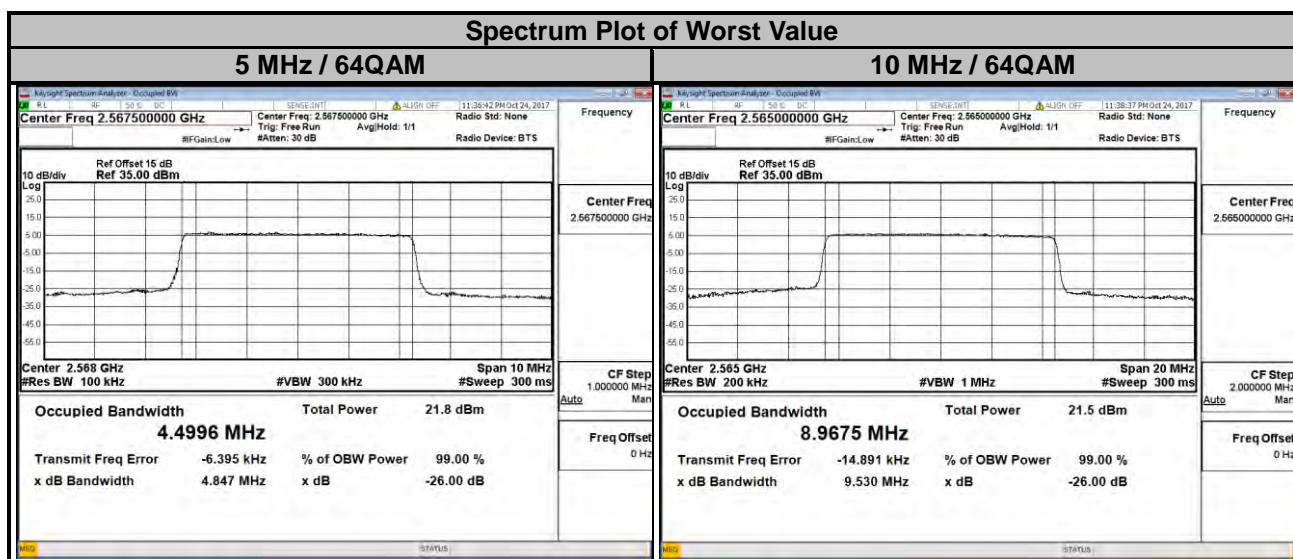
- a. The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- b. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth.

4.3.3 Test Setup

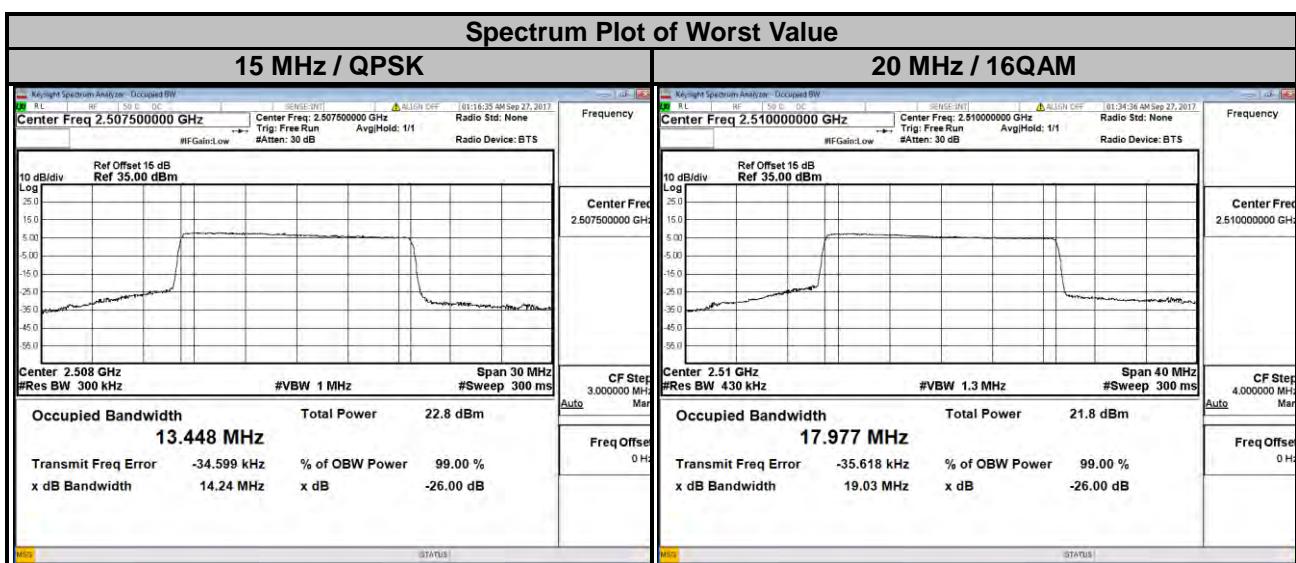


4.3.4 Test Result

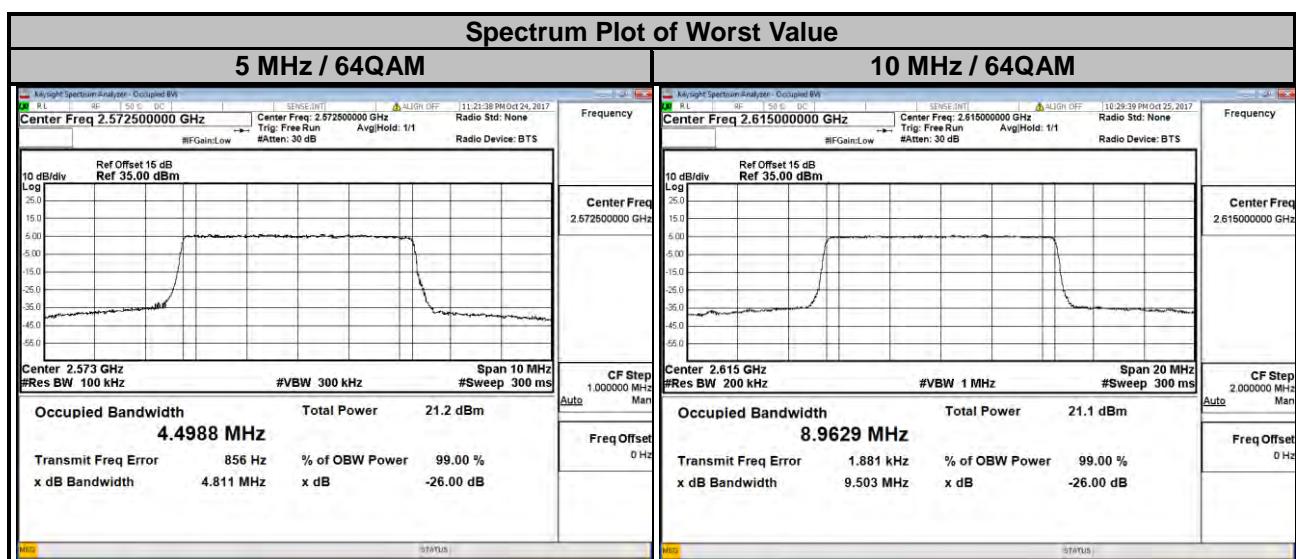
LTE Band 7									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20775	2502.5	4.4829	4.4856	4.4940	20800	2505.0	8.9494	8.9518	8.9538
21100	2535.0	4.4860	4.4869	4.4989	21100	2535.0	8.9577	8.9609	8.9627
21425	2567.5	4.4881	4.4908	4.4996	21400	2565.0	8.9577	8.9569	8.9675



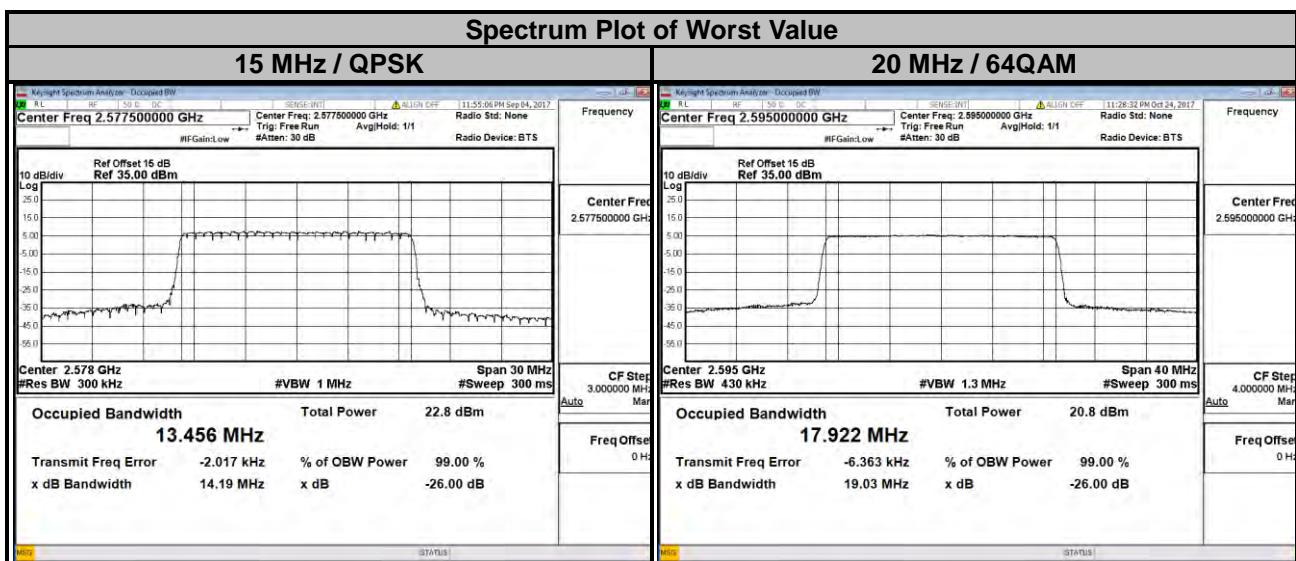
LTE Band 7									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
20825	2507.5	13.448	13.438	13.419	20850	2510.0	17.960	17.977	17.954
21100	2535.0	13.433	13.422	13.411	21100	2535.0	17.873	17.886	17.876
21375	2562.5	13.424	13.415	13.406	21350	2560.0	17.876	17.898	17.884



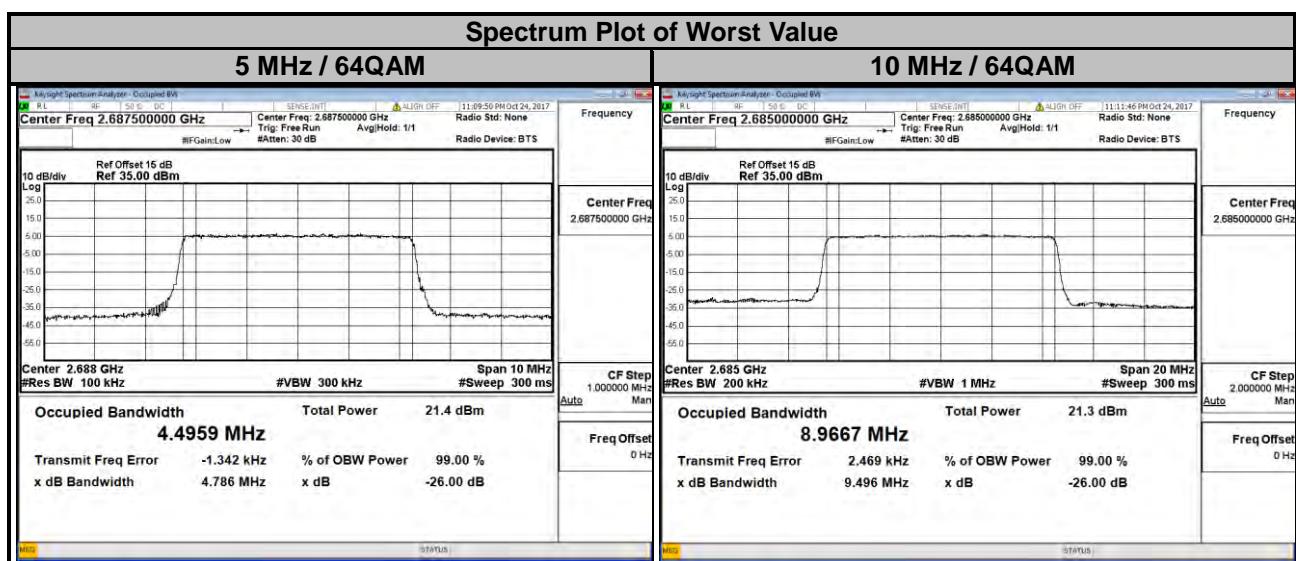
LTE Band 38									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37775	2572.5	4.4843	4.4872	4.4988	37800	2575.0	8.9400	8.9610	8.9600
38000	2595.0	4.4869	4.4855	4.4973	38000	2595.0	8.9511	8.9592	8.9611
38225	2617.5	4.4867	4.4875	4.4979	38200	2615.0	8.9519	8.9612	8.9629



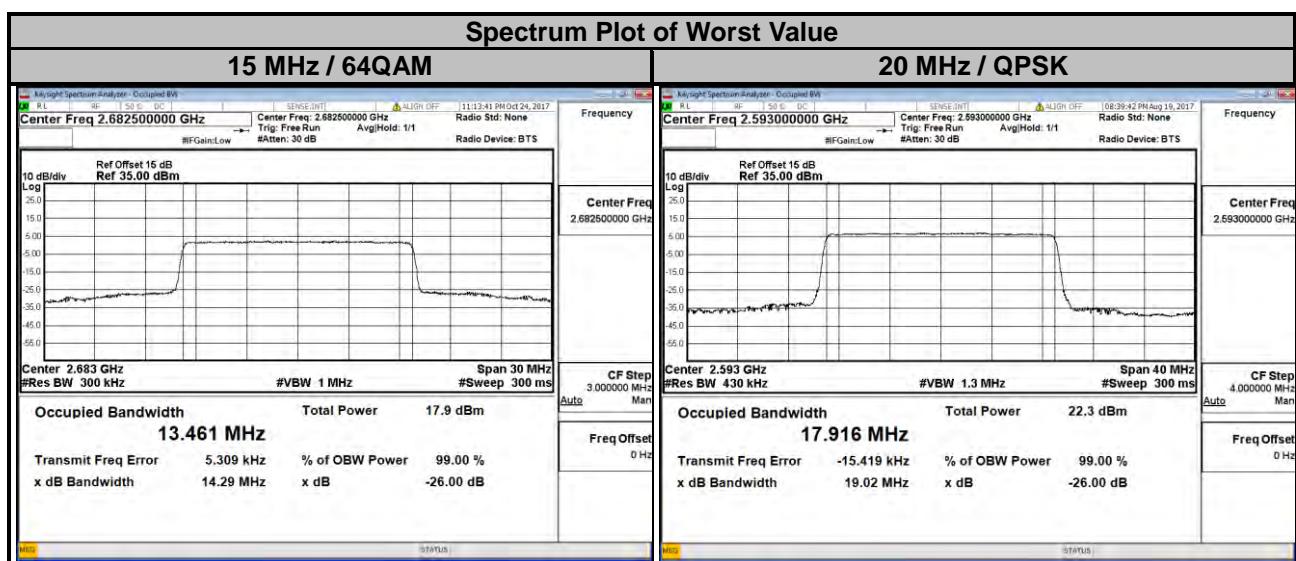
LTE Band 38									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37825	2577.5	13.456	13.435	13.431	37850	2580.0	17.913	17.900	17.914
38000	2595.0	13.445	13.432	13.433	38000	2595.0	17.904	17.902	17.922
38175	2612.5	13.448	13.431	13.435	38150	2610.0	17.911	17.904	17.917



LTE Band 41									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
39675	2498.5	4.4913	4.4882	4.4877	39700	2501.0	8.9630	8.9639	8.9589
40620	2593.0	4.4908	4.4858	4.4890	40620	2593.0	8.9573	8.9590	8.9586
41565	2687.5	4.4889	4.4877	4.4959	41540	2685.0	8.9538	8.9658	8.9667



LTE Band 41									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)			Channel	Frequency (MHz)	99 % Occupied Bandwidth (MHz)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
39725	2503.5	13.439	13.429	13.430	39750	2506.0	17.903	17.884	17.911
40620	2593.0	13.448	13.432	13.445	40620	2593.0	17.916	17.903	17.914
41515	2682.5	13.446	13.431	13.461	41490	2680.0	17.874	17.859	17.914

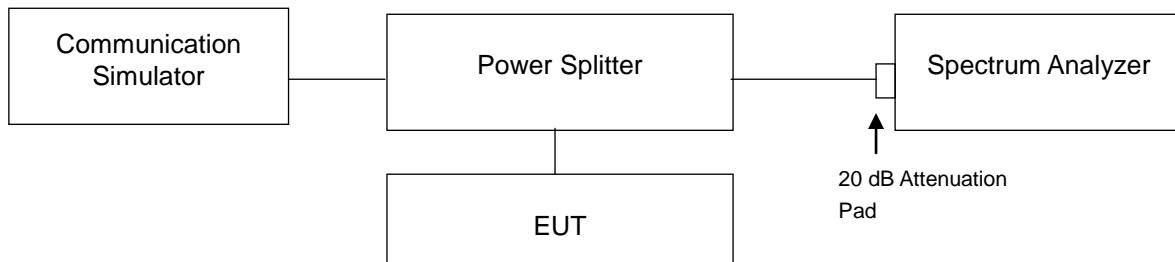


4.4 Out-of-Band Emissions Measurement

4.4.1 Limits of Out-of-Band Emissions Measurement

According to FCC 27.53(l)(4) specified that power of any emission outside of the channel edge must be attenuated below the transmitting power (P) by a 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. 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

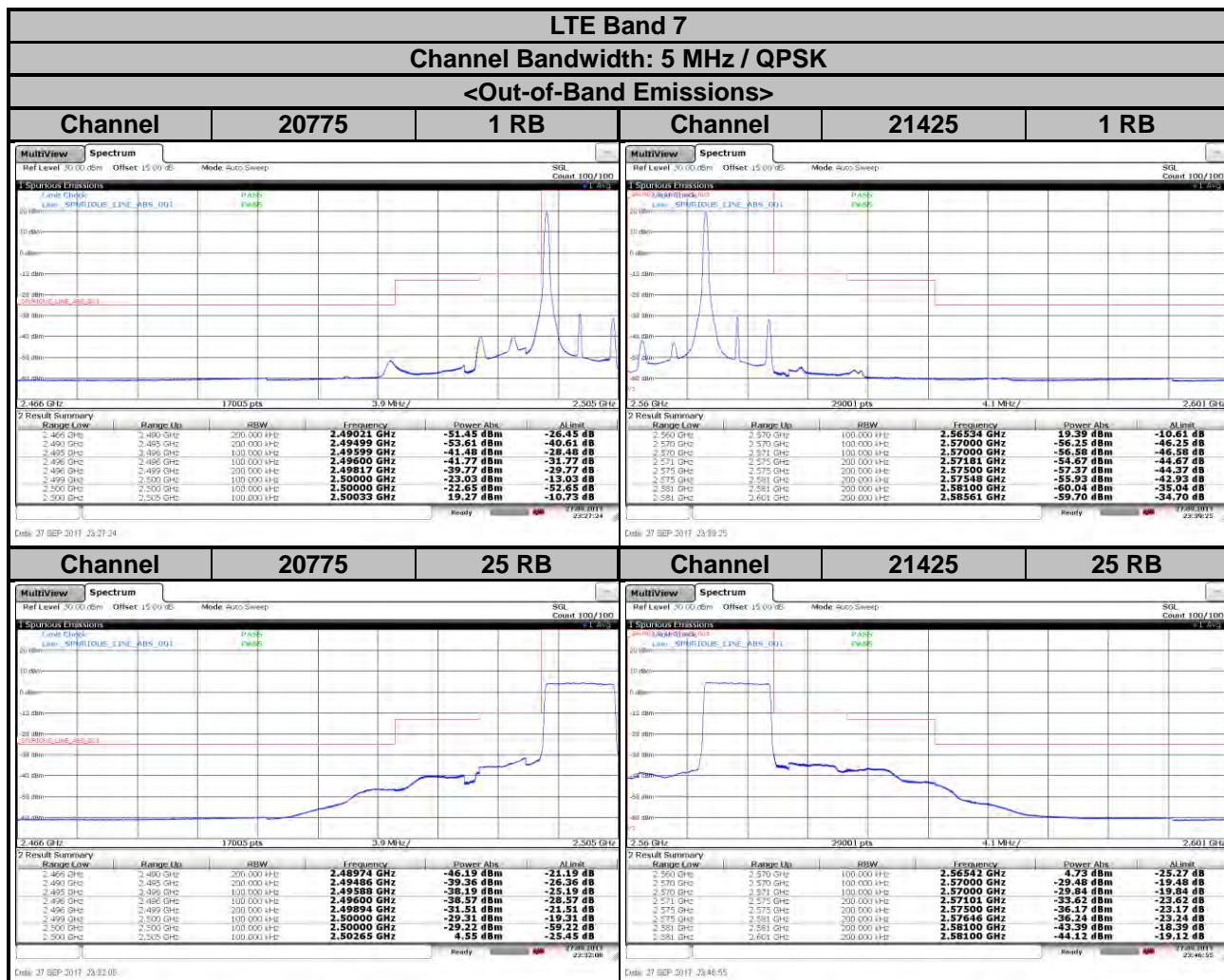
4.4.2 Test Setup

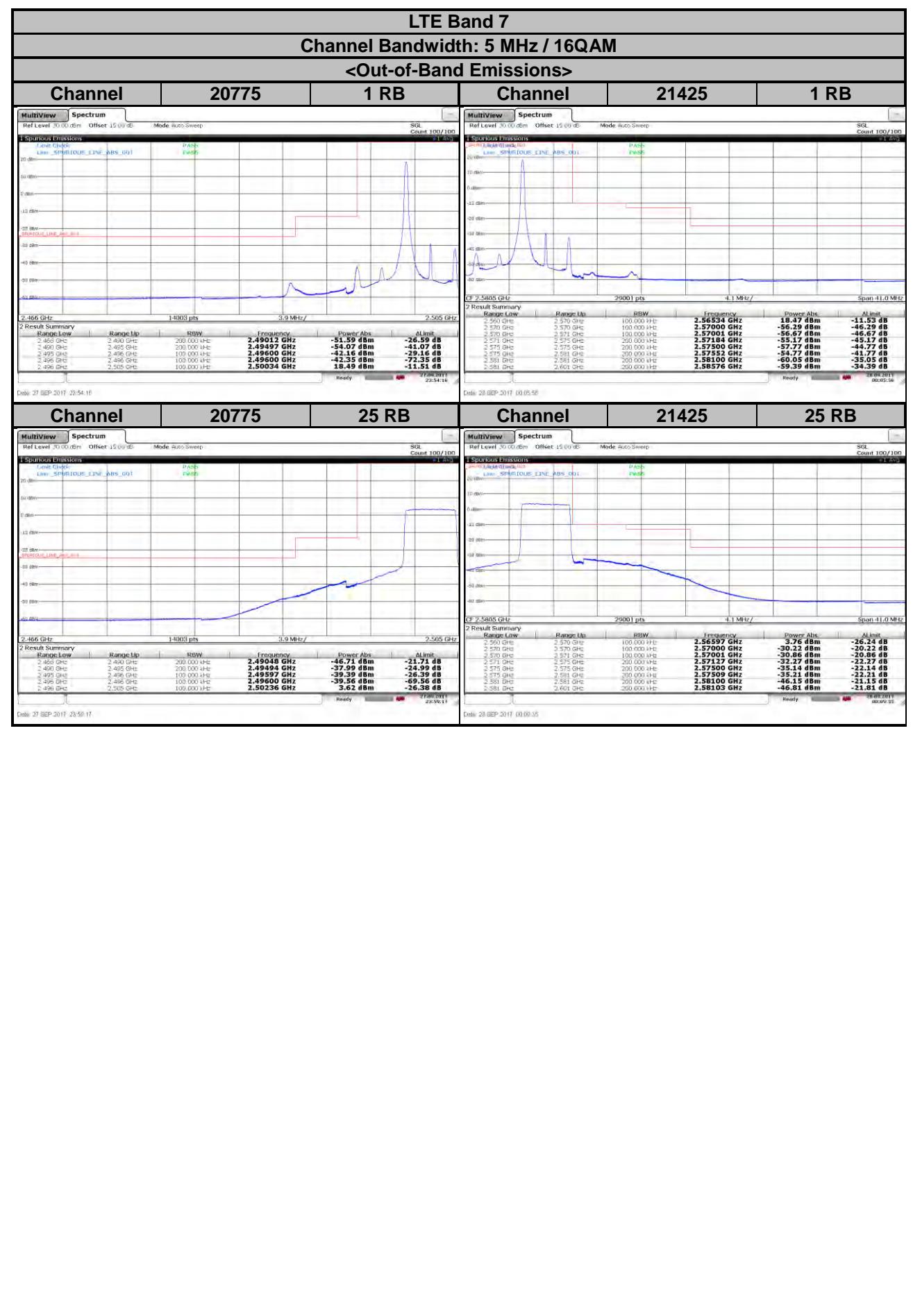


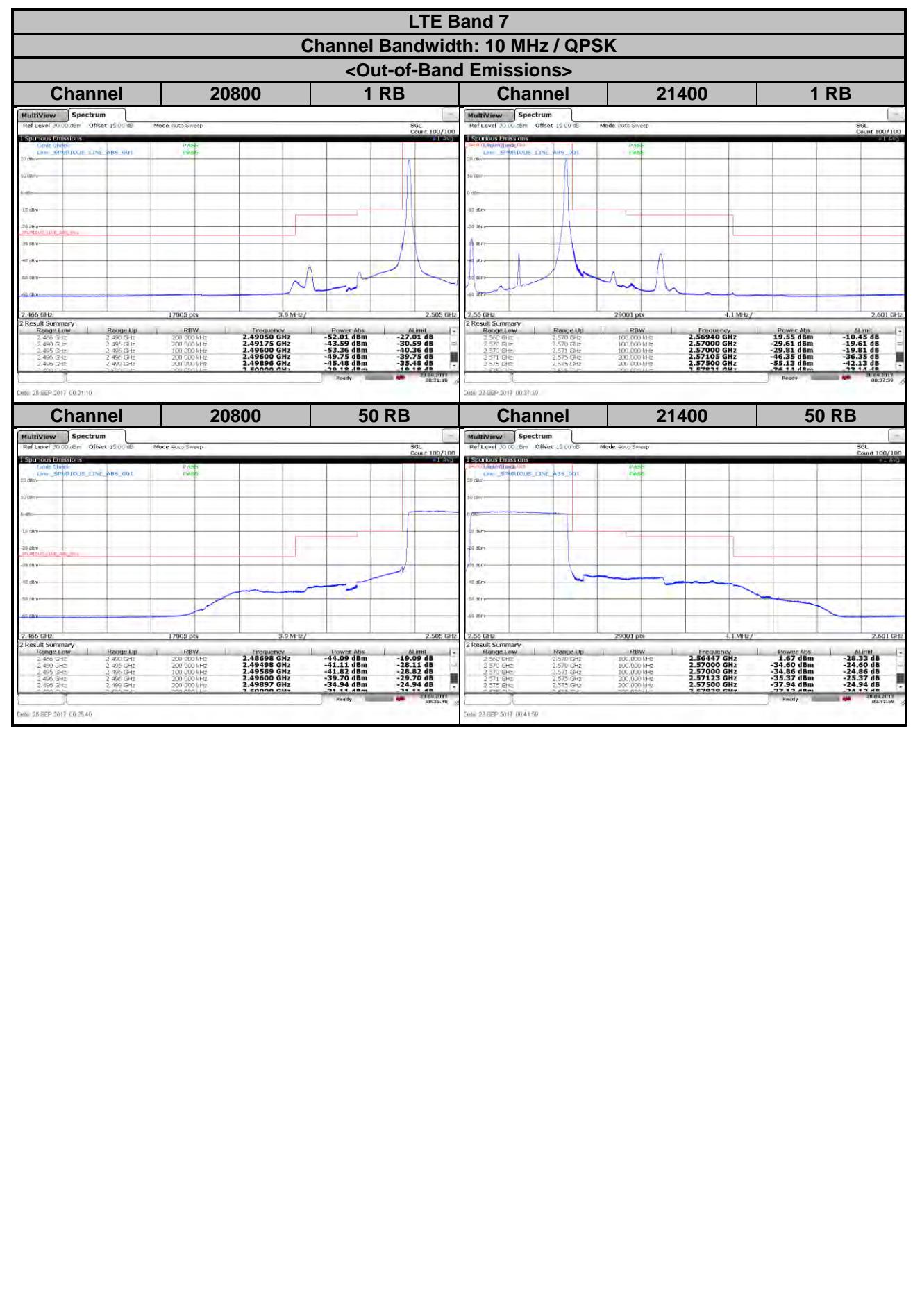
4.4.3 Test Procedures

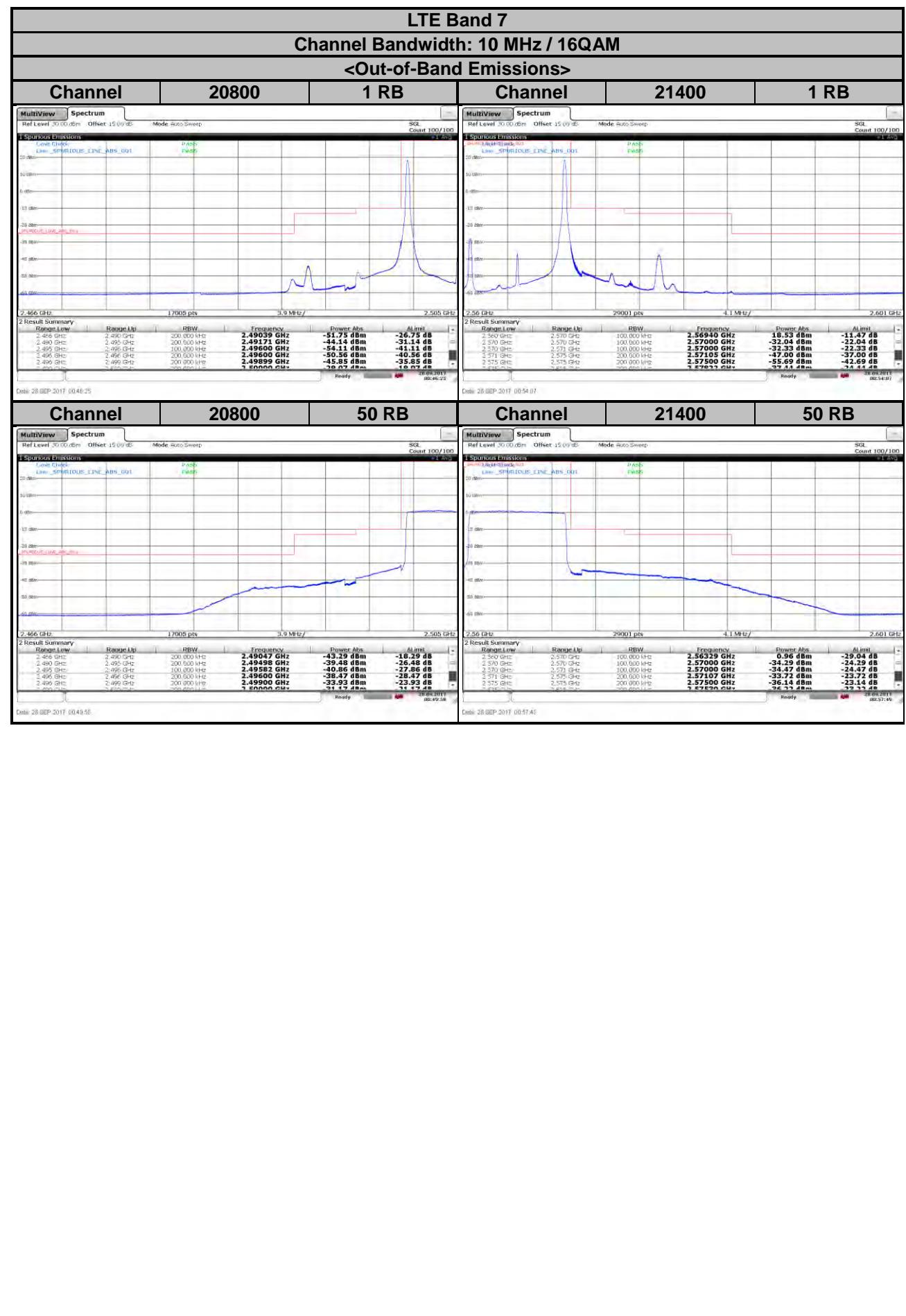
- The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with R&S Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
- The out-of-band emissions measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
- Record the max. trace plot into the test report.

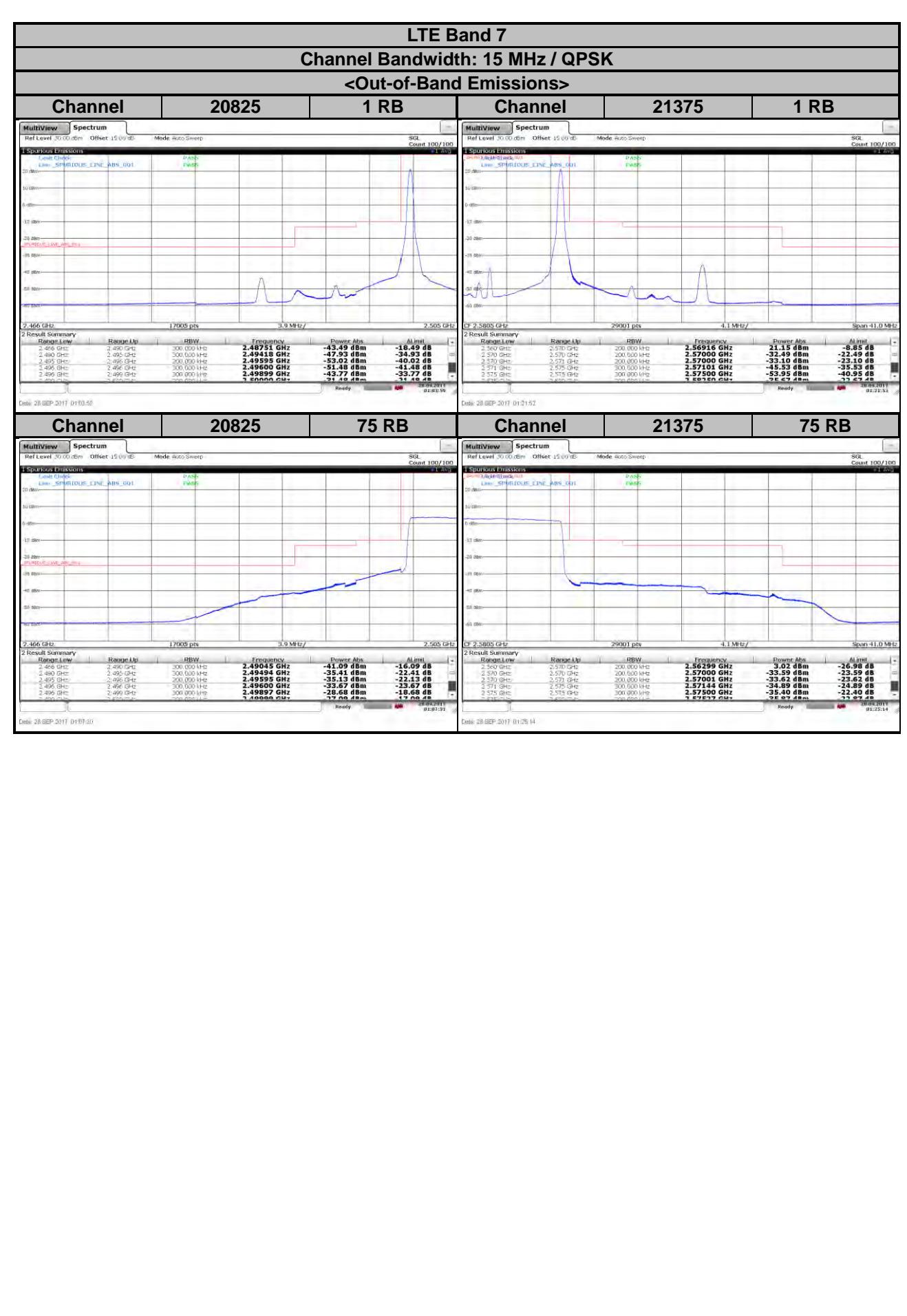
4.4.4 Test Results

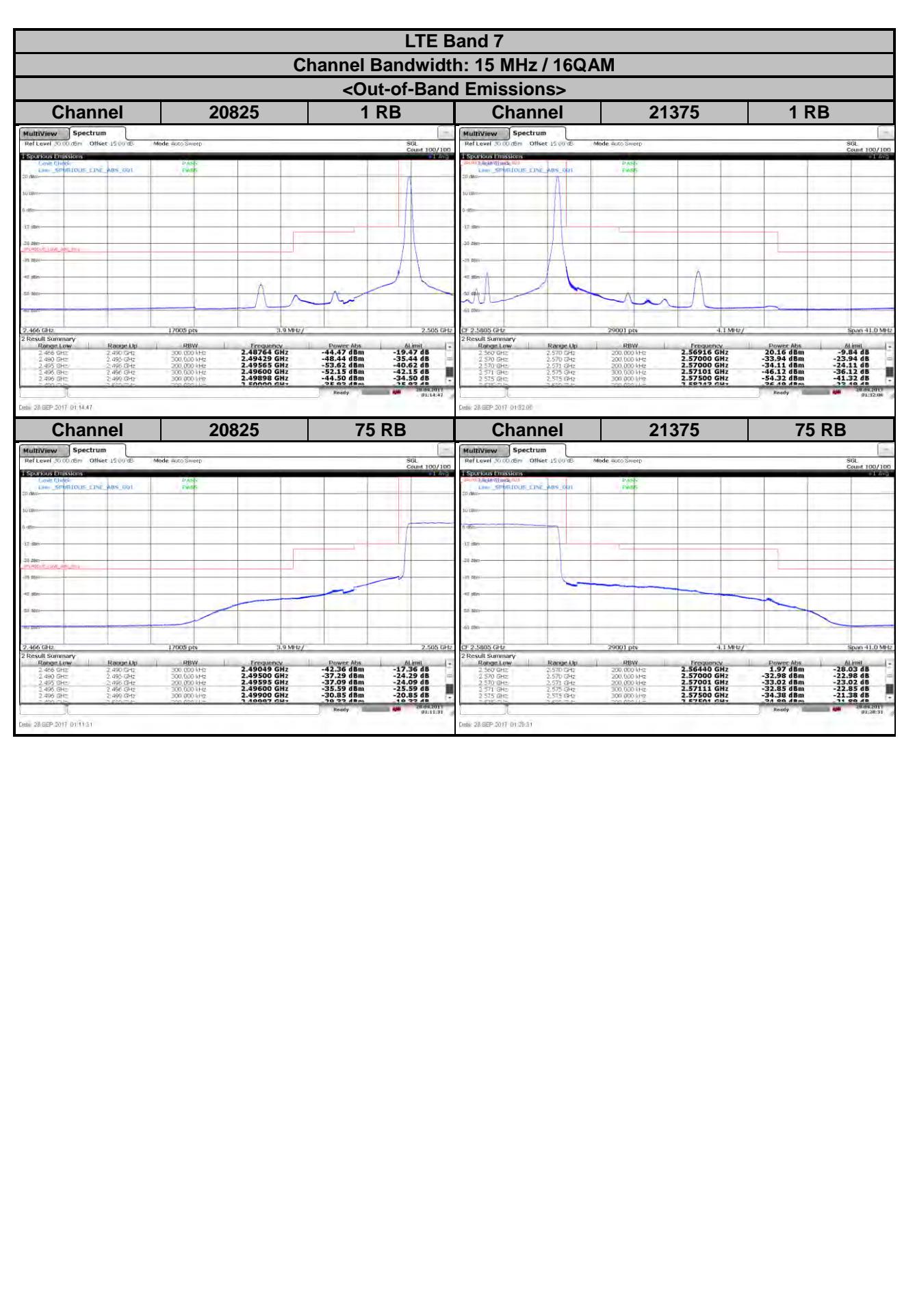


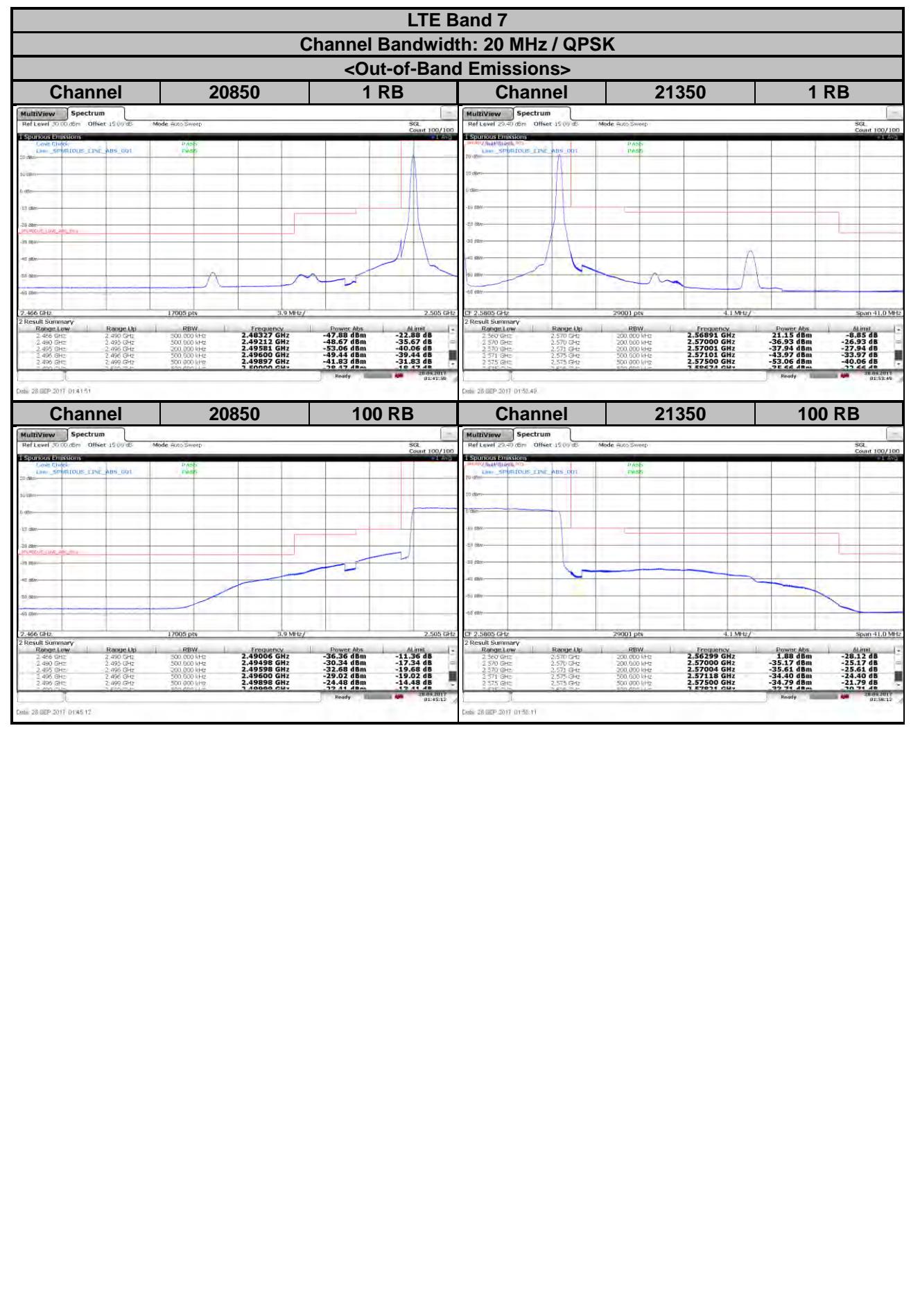


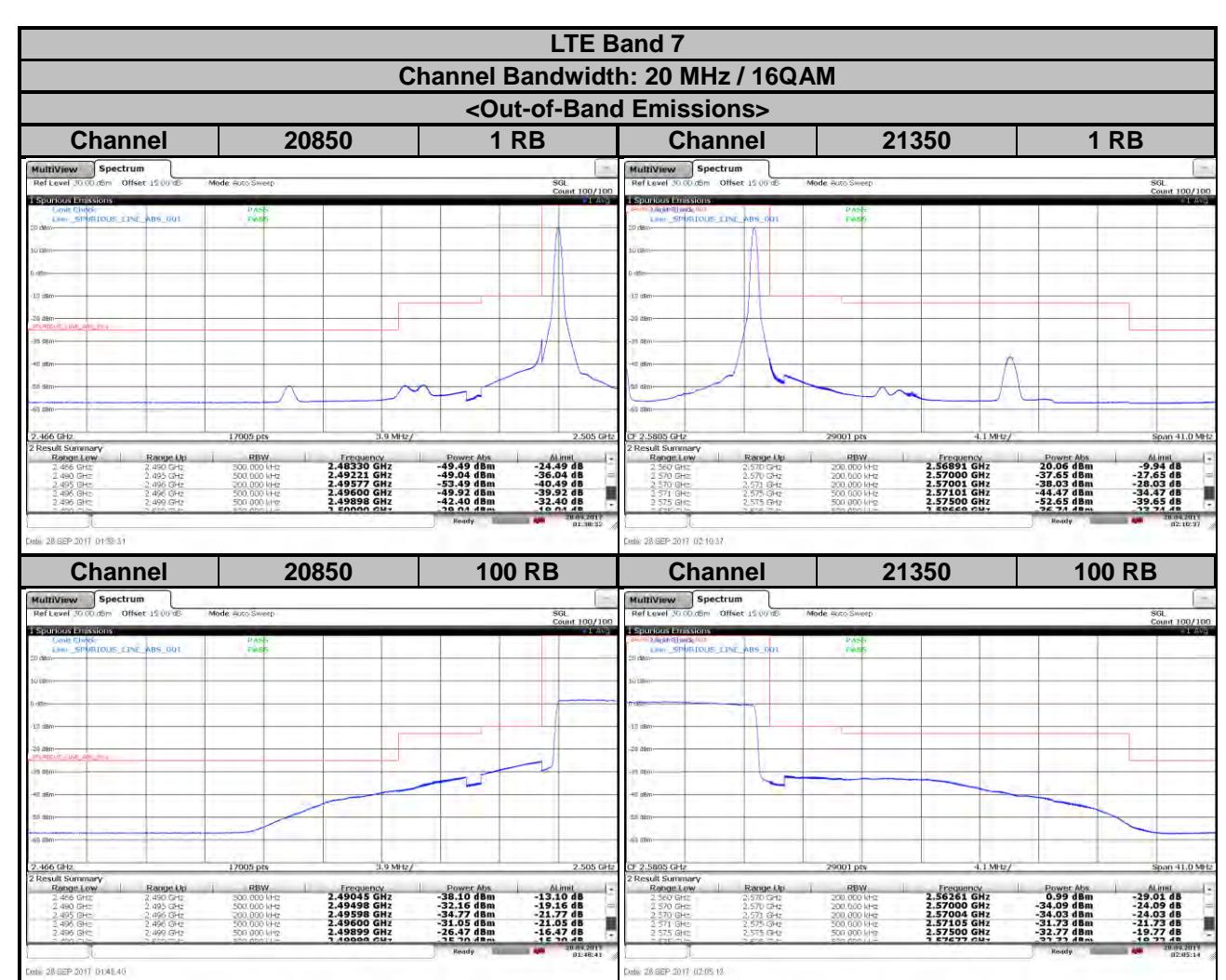








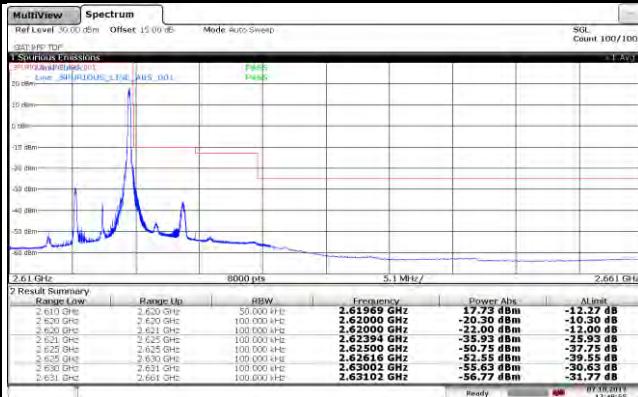
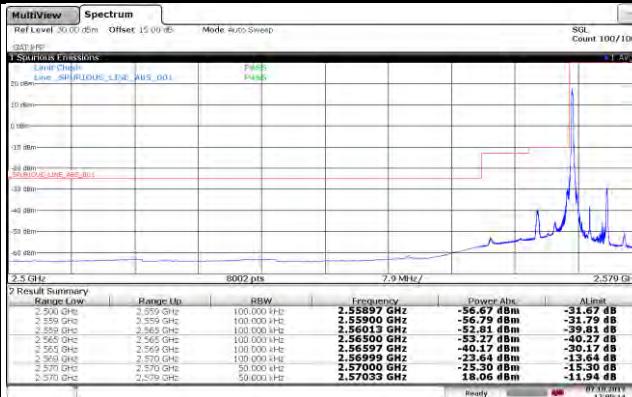






LTE Band 38
Channel Bandwidth: 5 MHz / QPSK
<Out-of-Band Emissions>

Channel 37775 **1 RB** **Channel** 38225 **1 RB**



Date: 7.OCT.2017 17:09:13

Date: 7.OCT.2017 17:48:54

The screenshot shows a spectrum analysis interface. The top header displays "Channel 38225" and "25 RB". Below the header, there's a "MultiView Spectrum" tab. The main window shows a blue waveform on a grid. A red horizontal line marks a signal at approximately 2.621 GHz with a power of -29.82 dBm. The y-axis on the left ranges from -60 dBm to 10 dBm. The x-axis at the bottom has markers for 2.61 GHz, 6000 ps, 5.1 MHz/, and 2.661 GHz. A legend at the top right indicates "Pass" in green and "Fail" in red. The bottom right corner shows the date and time: 07/17/2013 18:10:03.

Date: 7.OCT.2017 17:41 10

Date: 7.OCT.2017 18:10:31

LTE Band 38

Channel Bandwidth: 5 MHz / 16QAM

<Out-of-Band Emissions>

Channel

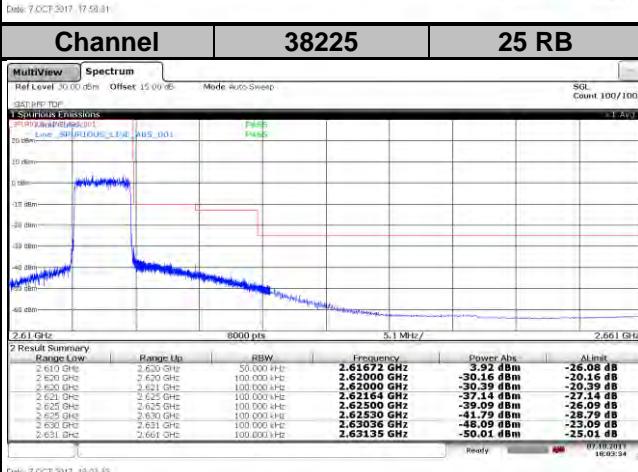
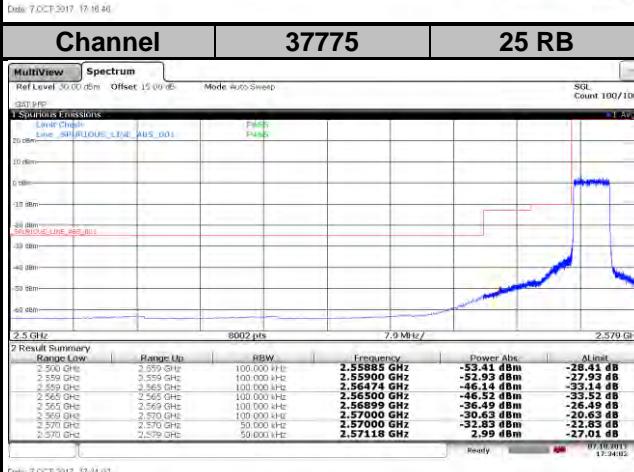
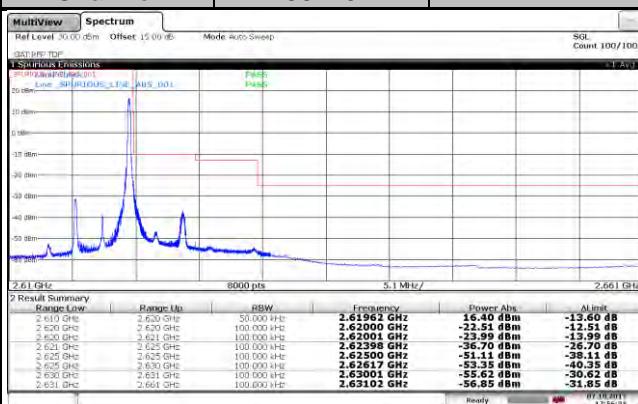
37775

1 RB

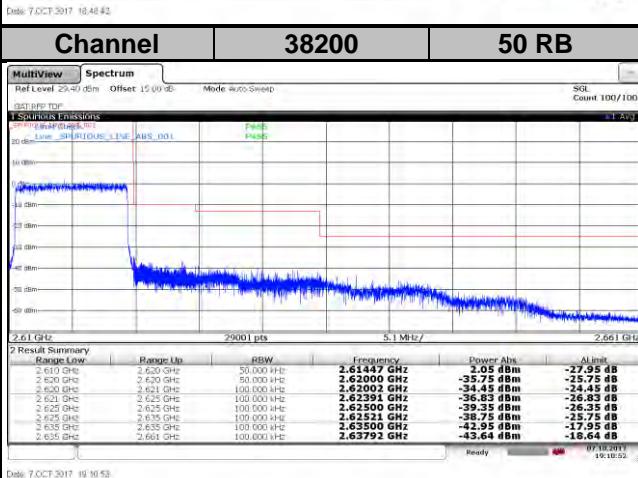
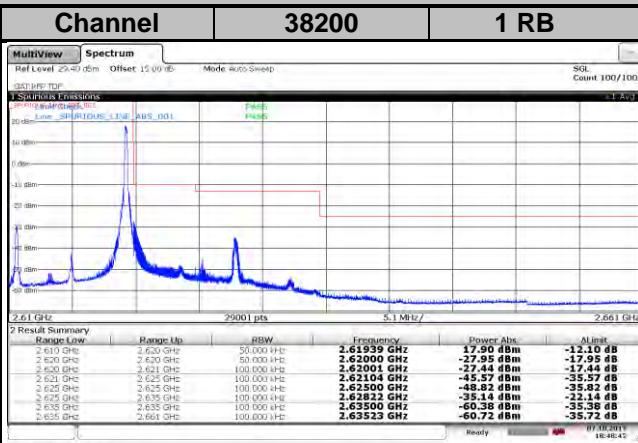
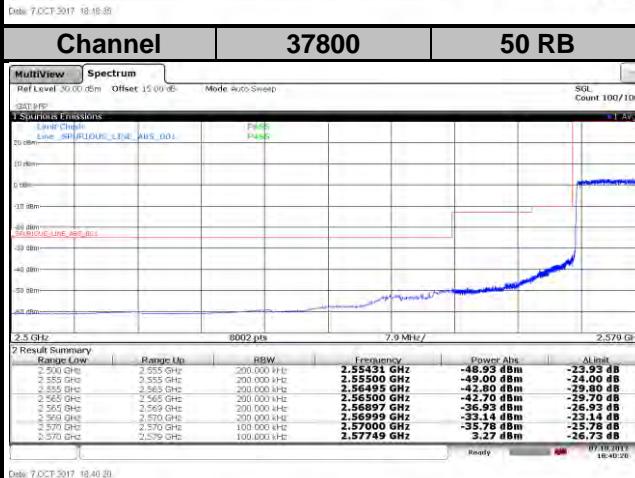
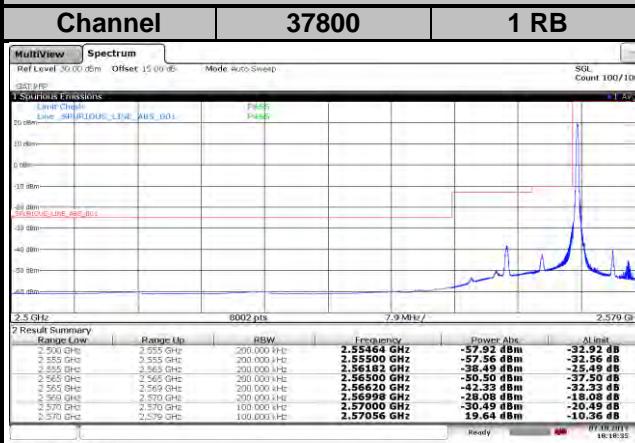
Channel

38225

1 RB



LTE Band 38
Channel Bandwidth: 10 MHz / QPSK
<Out-of-Band Emissions>



LTE Band 38

Channel Bandwidth: 10 MHz / 16QAM

<Out-of-Band Emissions>

Channel

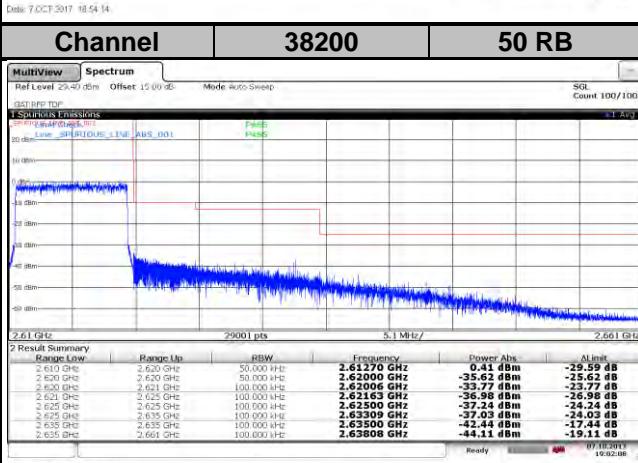
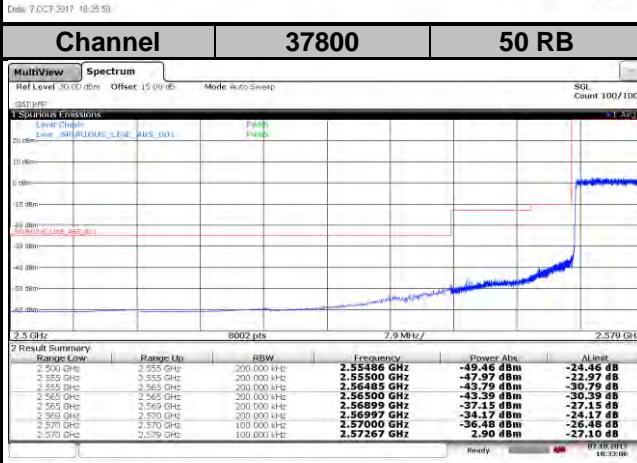
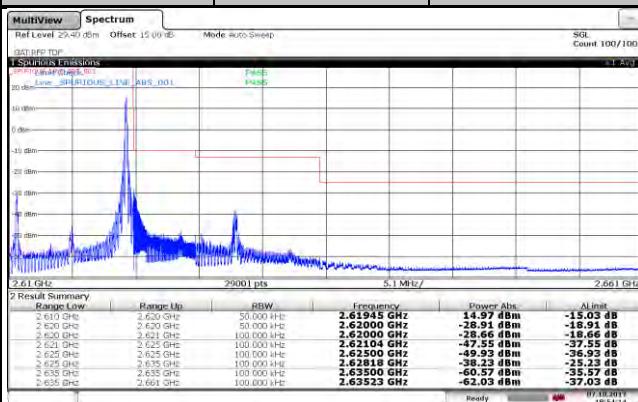
37800

1 RB

Channel

38200

1 RB



LTE Band 38

Channel Bandwidth: 15 MHz / QPSK

<Out-of-Band Emissions>

Channel

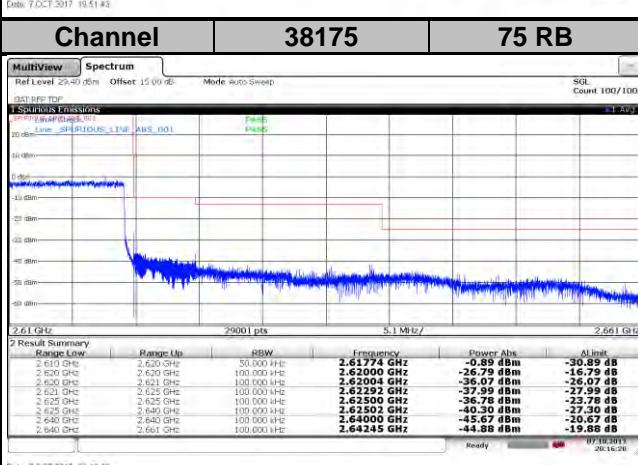
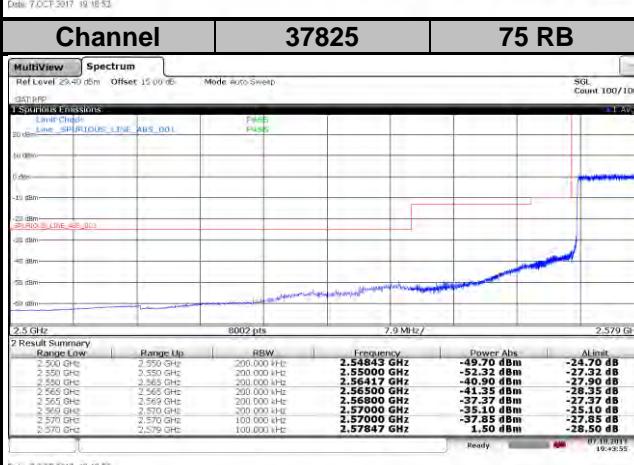
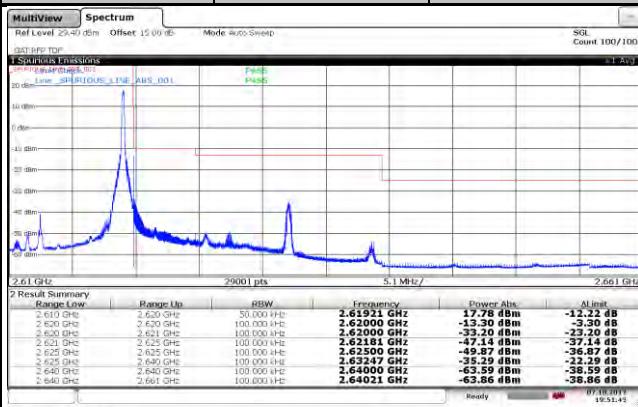
37825

1 RB

Channel

38175

1 RB



LTE Band 38

Channel Bandwidth: 15 MHz / 16QAM

<Out-of-Band Emissions>

Channel

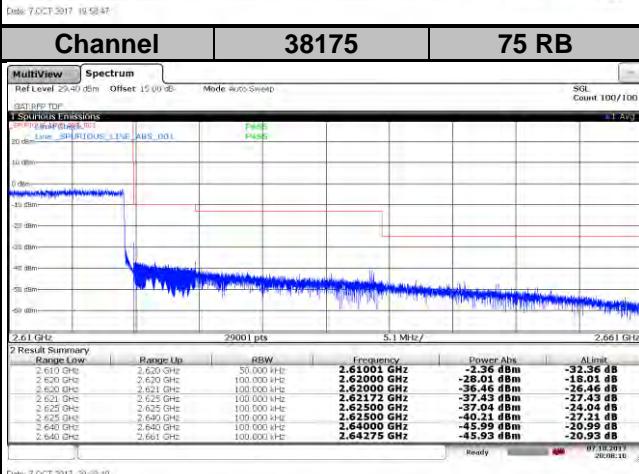
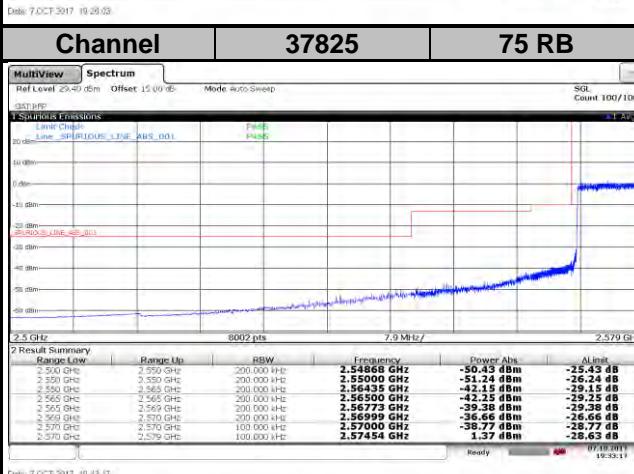
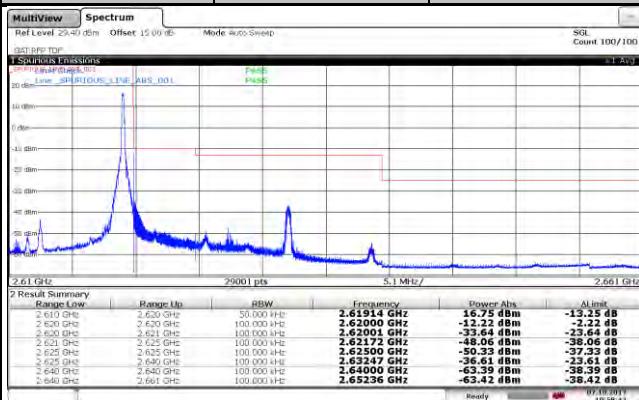
37825

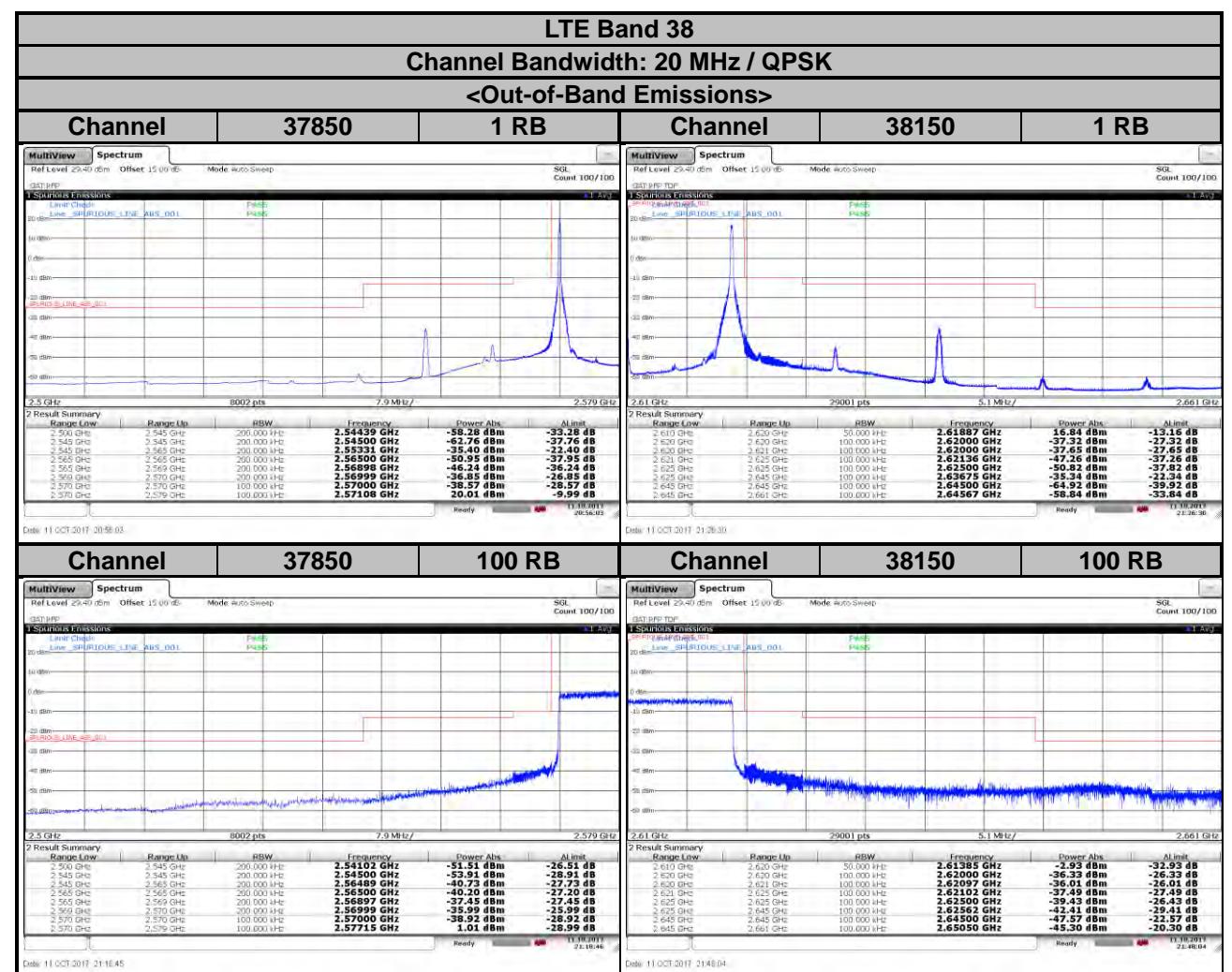
1 RB

Channel

38175

1 RB





LTE Band 38

Channel Bandwidth: 20 MHz / 16QAM

<Out-of-Band Emissions>

Channel

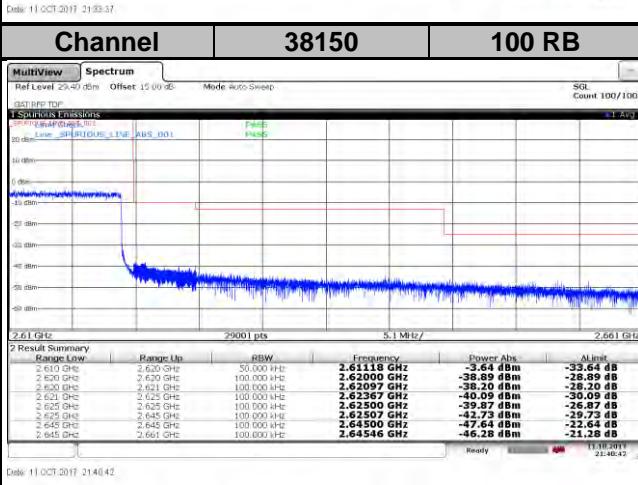
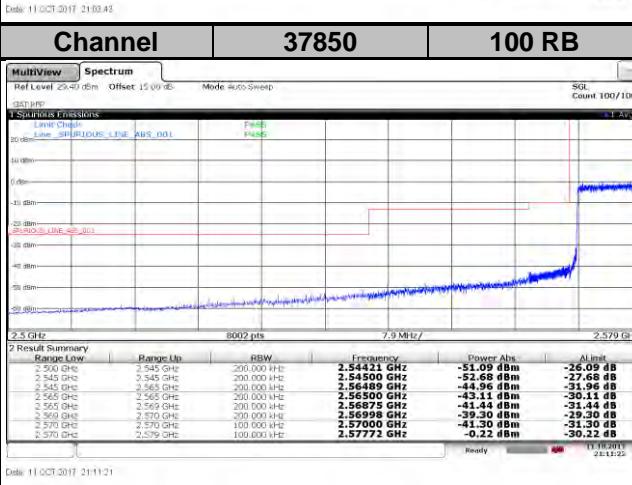
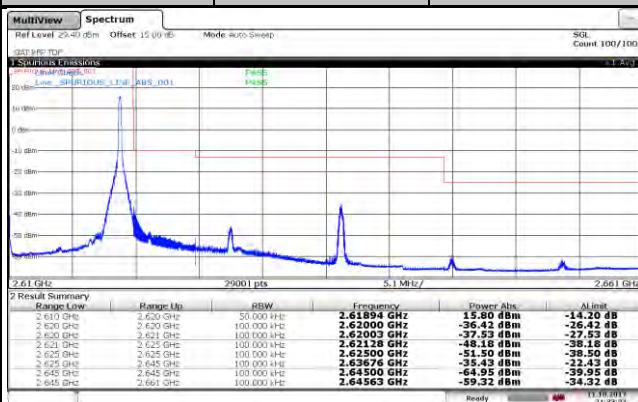
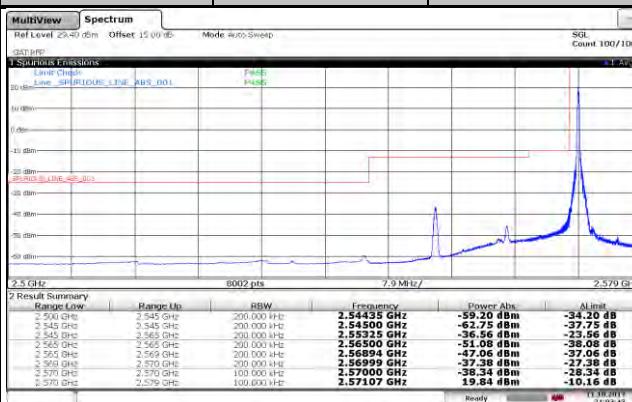
37850

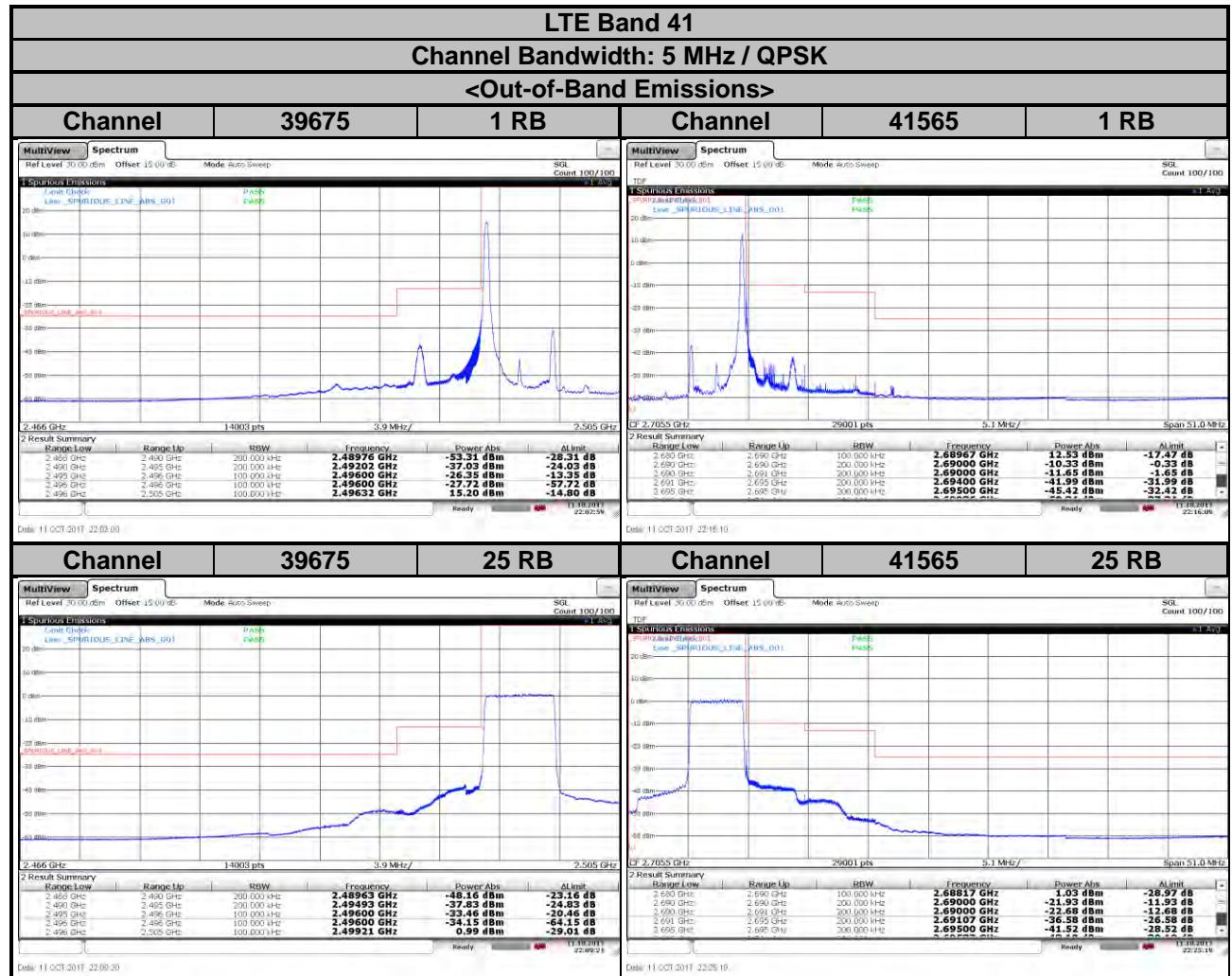
1 RB

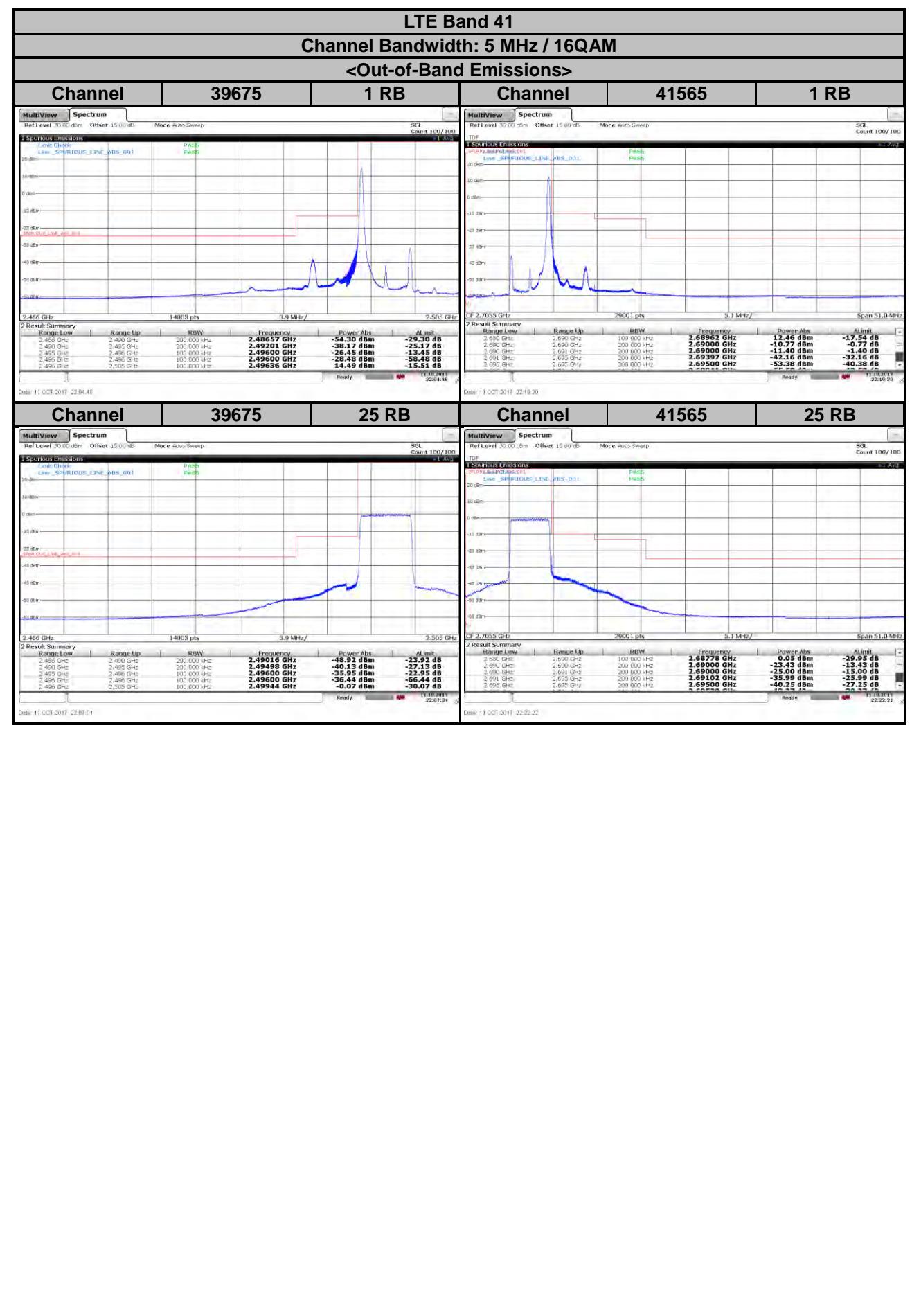
Channel

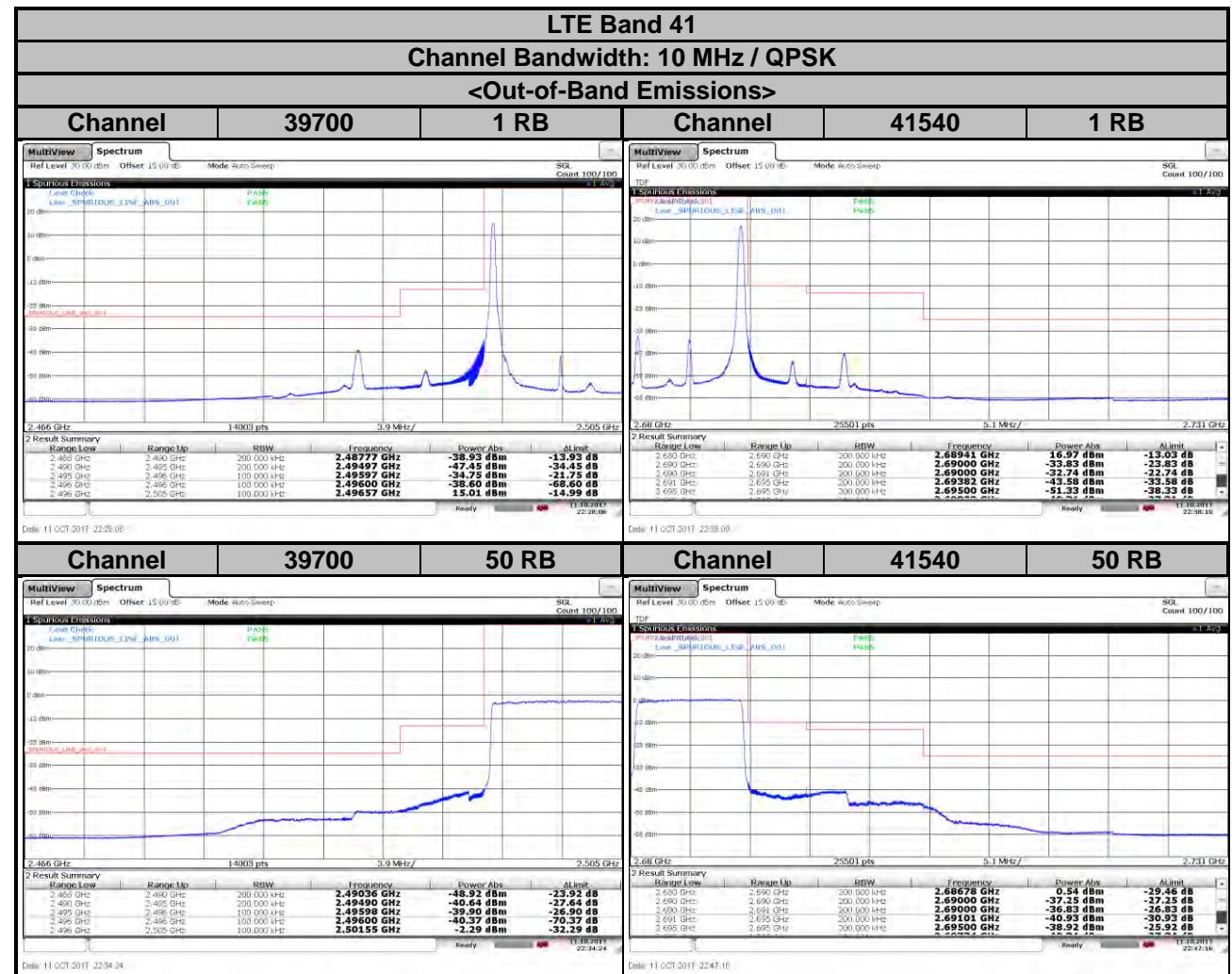
38150

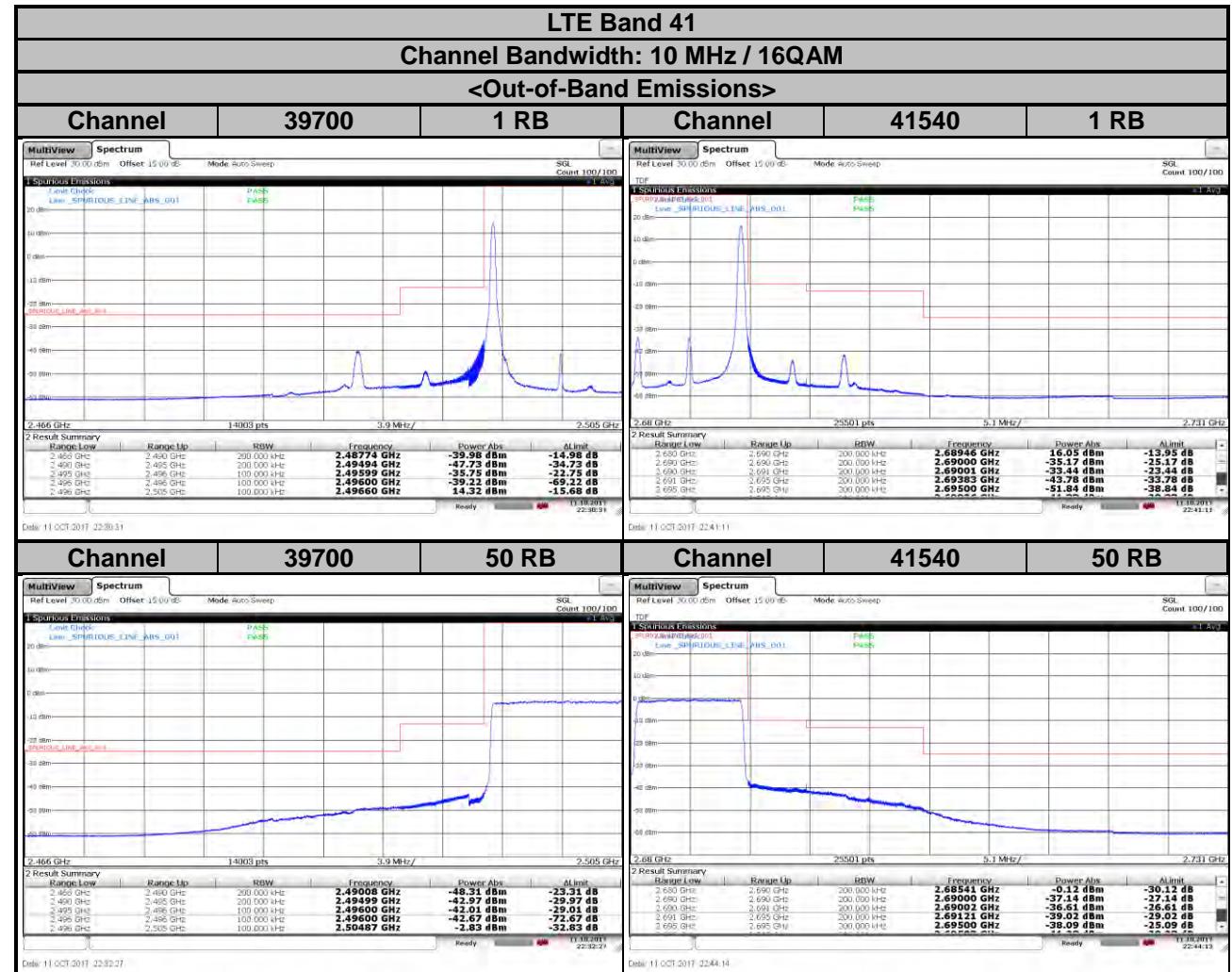
1 RB

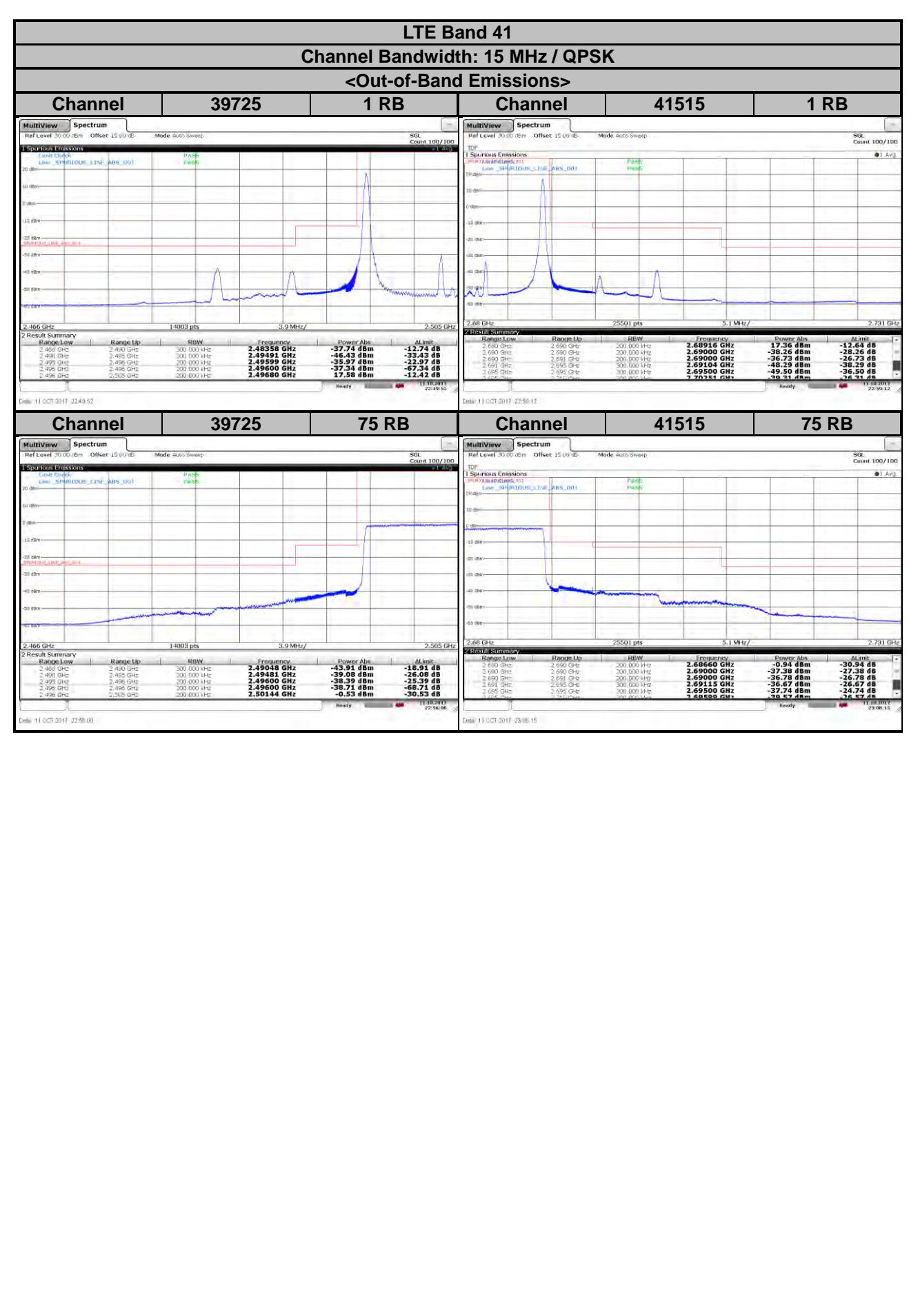


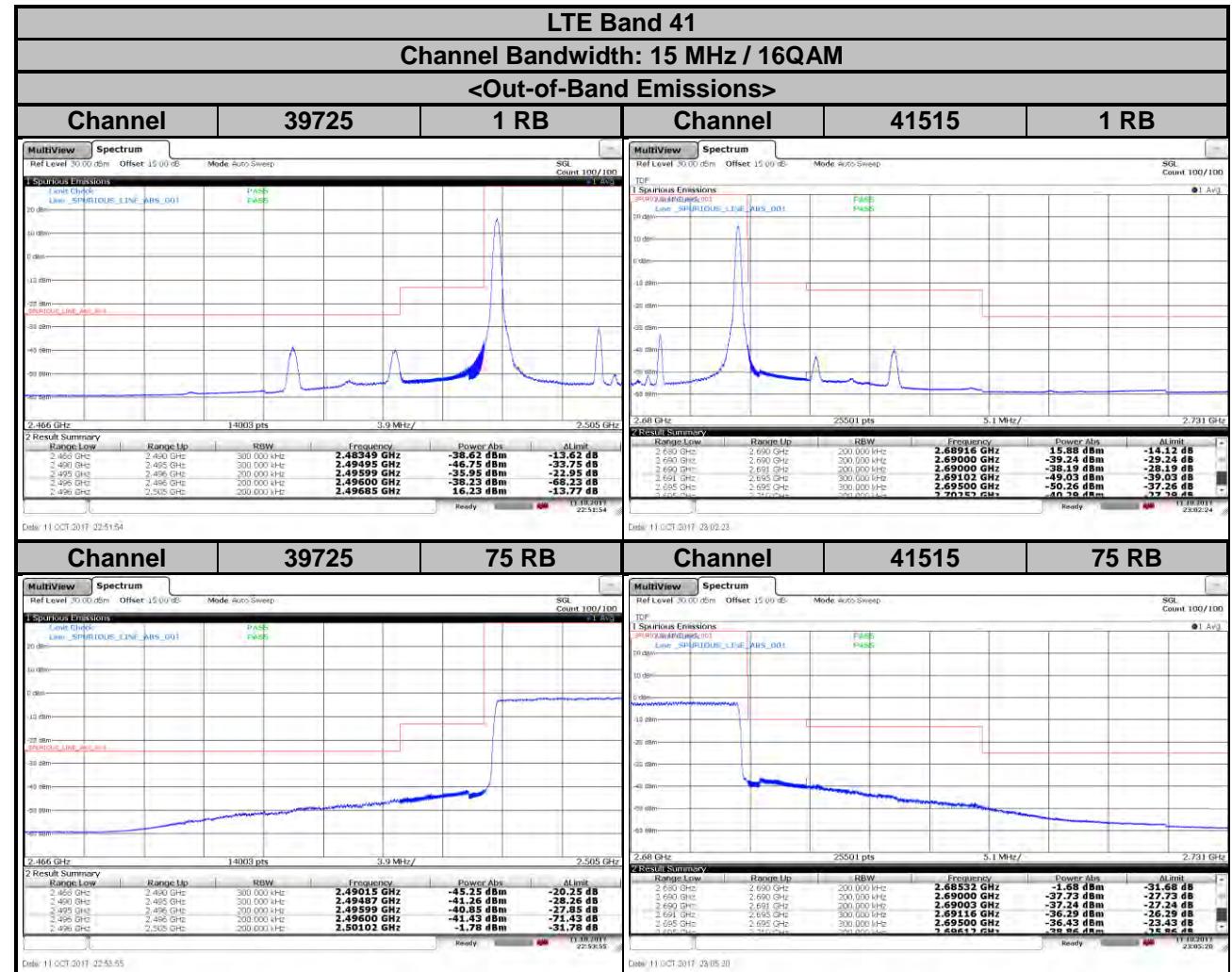


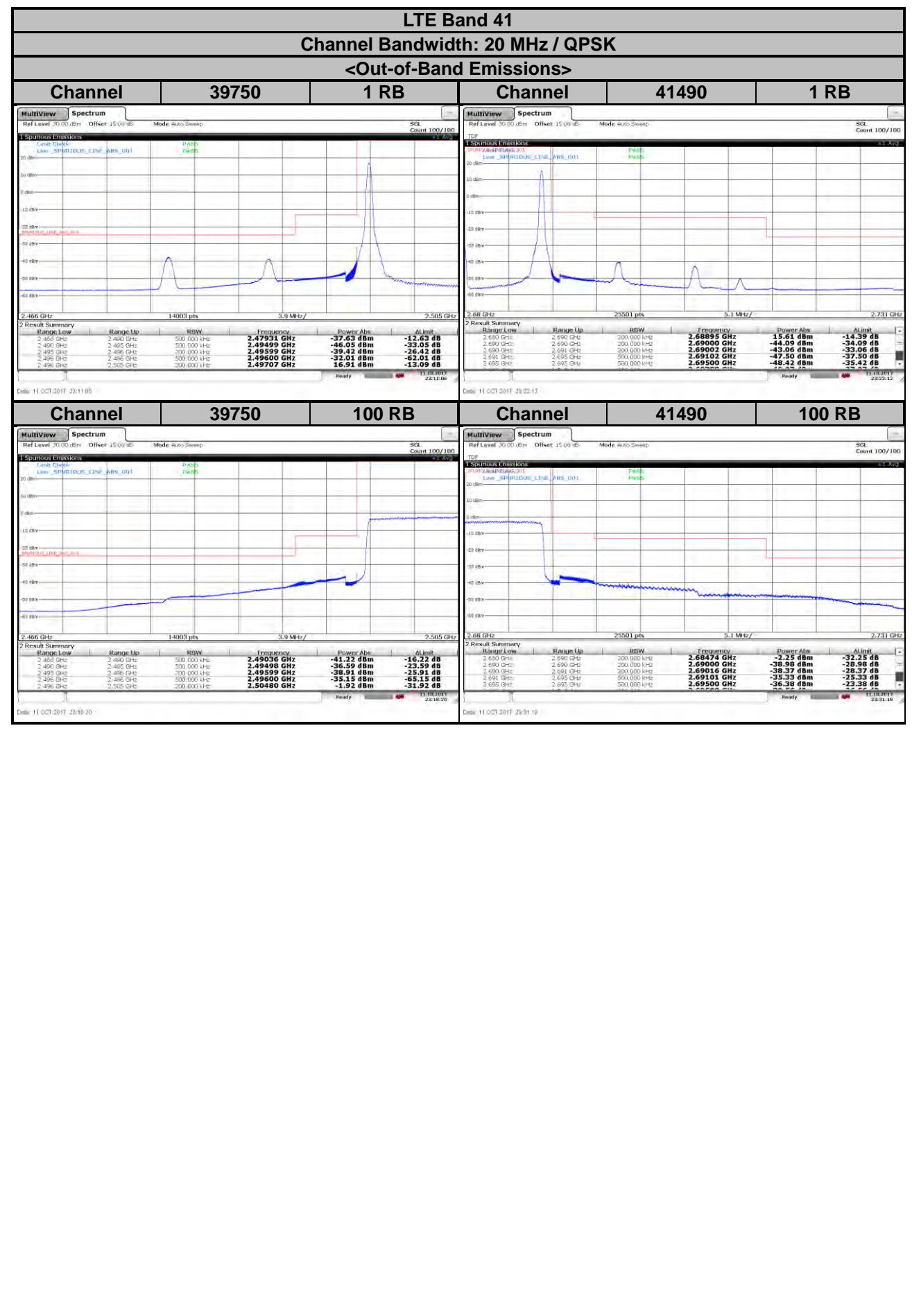


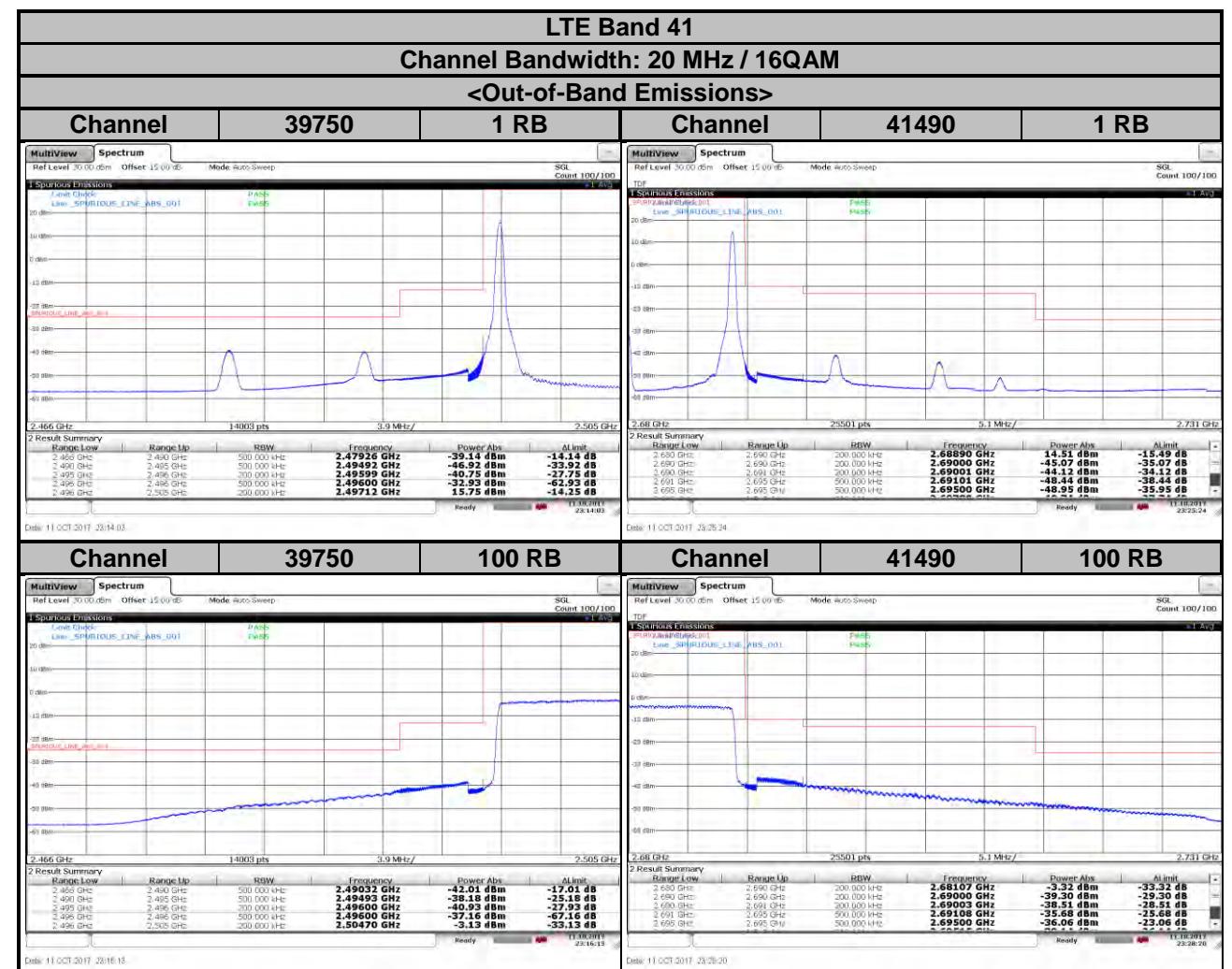










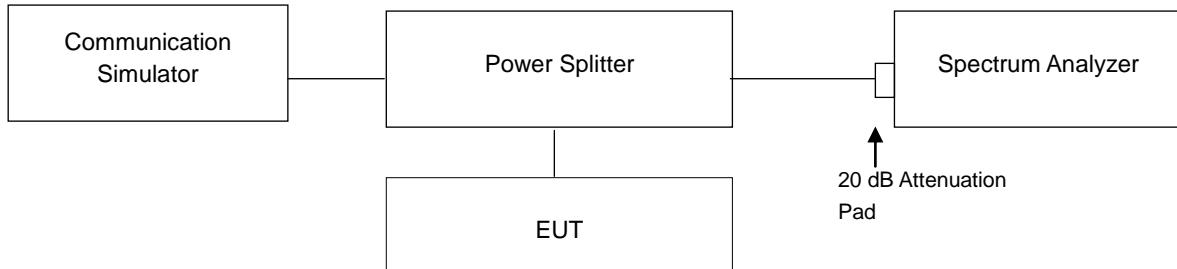


4.5 Peak to Average Ratio

4.5.1 Limits of Peak to Average Ratio Measurement

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.

4.5.2 Test Setup

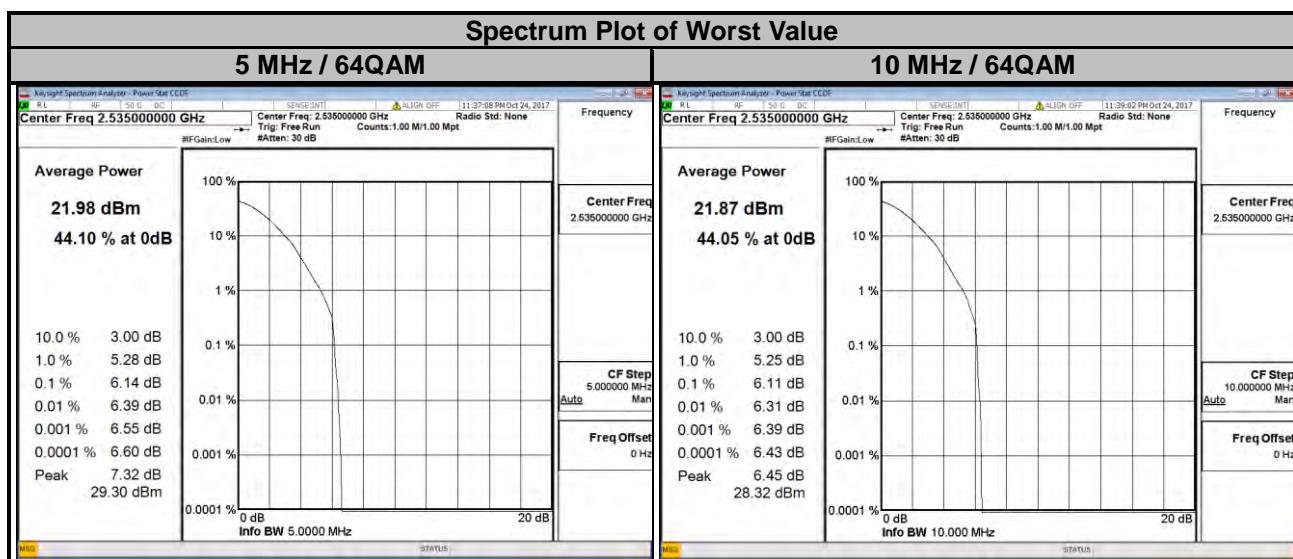


4.5.3 Test Procedures

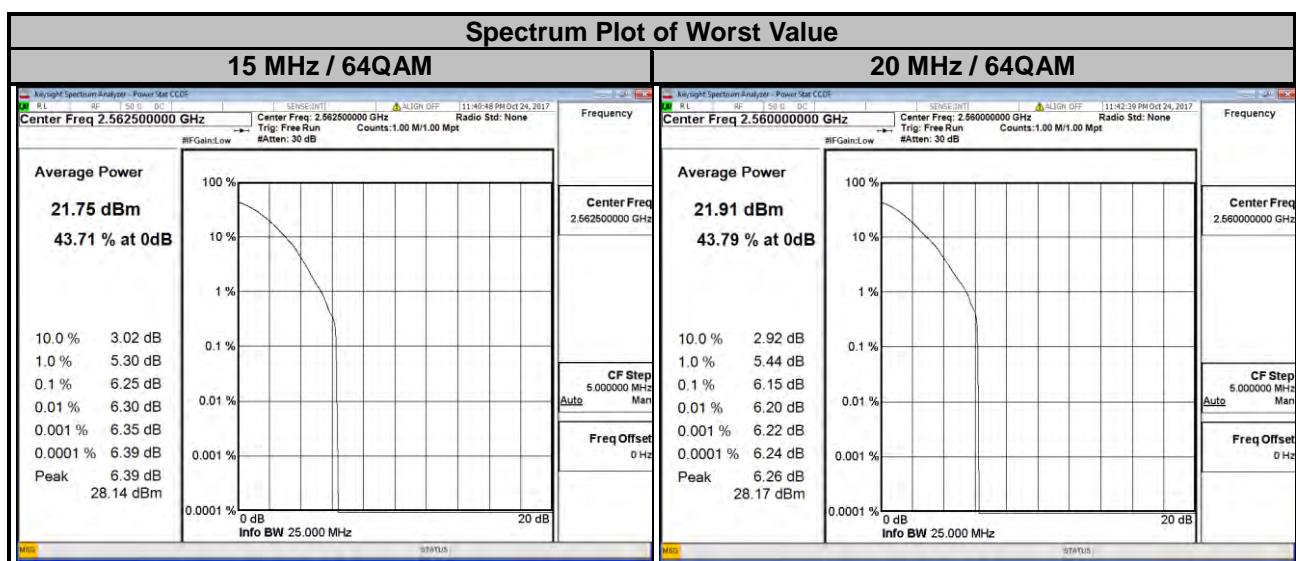
1. Set resolution/measurement bandwidth \geq signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Record the maximum PAPR level associated with a probability of 0.1 %.

4.5.4 Test Results

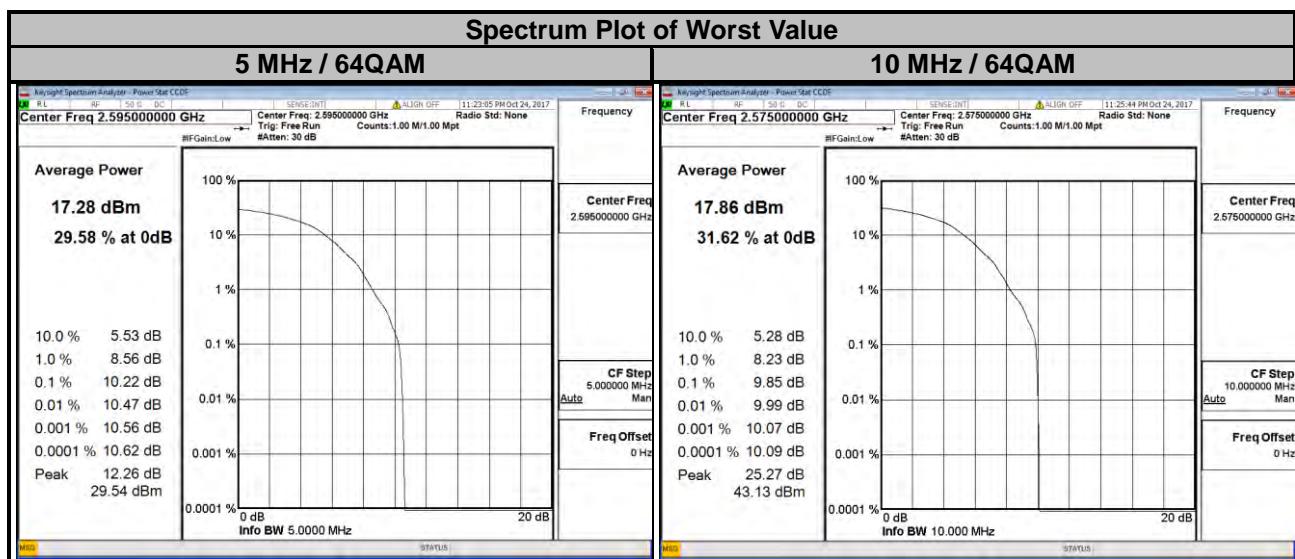
LTE Band 7										
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz					
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)			
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM	
20775	2502.5	4.46	5.05	5.95	20800	2505.0	4.46	4.98	5.81	
21100	2535.0	3.94	4.83	6.14	21100	2535.0	4.08	4.97	6.11	
21425	2567.5	3.97	4.89	4.32	21400	2565.0	4.41	4.08	5.82	



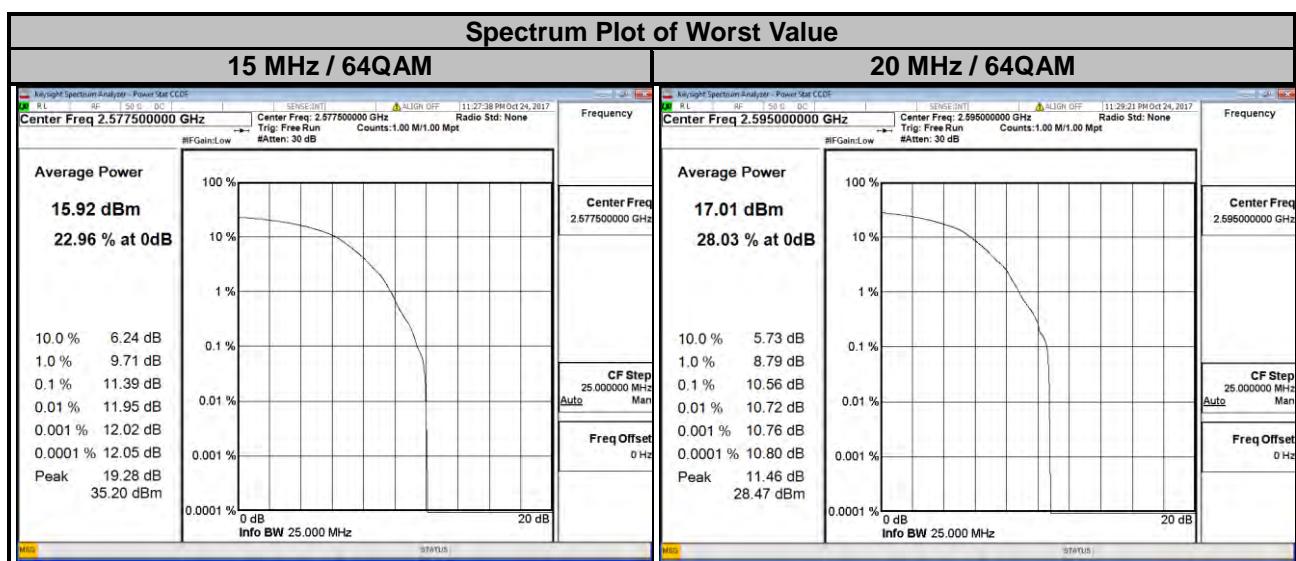
LTE Band 7										
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz					
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)			
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM	
20825	2507.5	4.46	5.13	5.64	20850	2510.0	4.44	5.05	5.55	
21100	2535.0	4.21	4.99	5.93	21100	2535.0	4.06	4.89	5.96	
21375	2562.5	3.57	4.40	6.25	21350	2560.0	4.49	5.21	6.15	



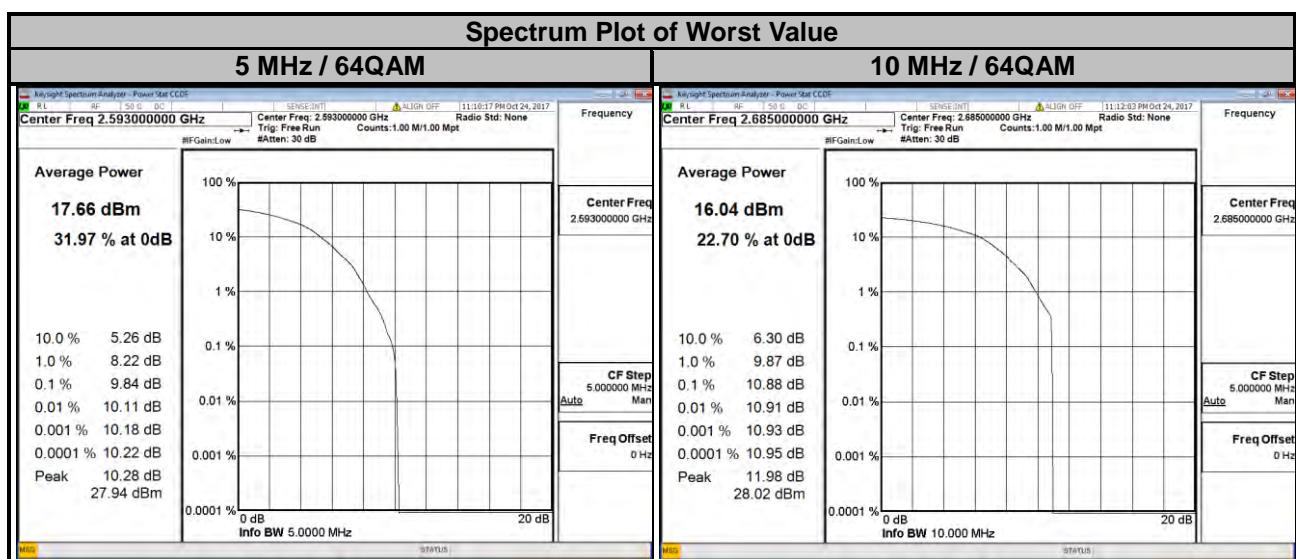
LTE Band 38									
Channel Bandwidth: 5 MHz					Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37775	2572.5	8.91	9.35	10.14	37800	2575.0	8.94	9.75	9.85
38000	2595.0	9.02	9.48	10.22	38000	2595.0	8.98	9.14	9.54
38225	2617.5	7.94	9.30	7.97	38200	2615.0	7.81	8.92	9.63



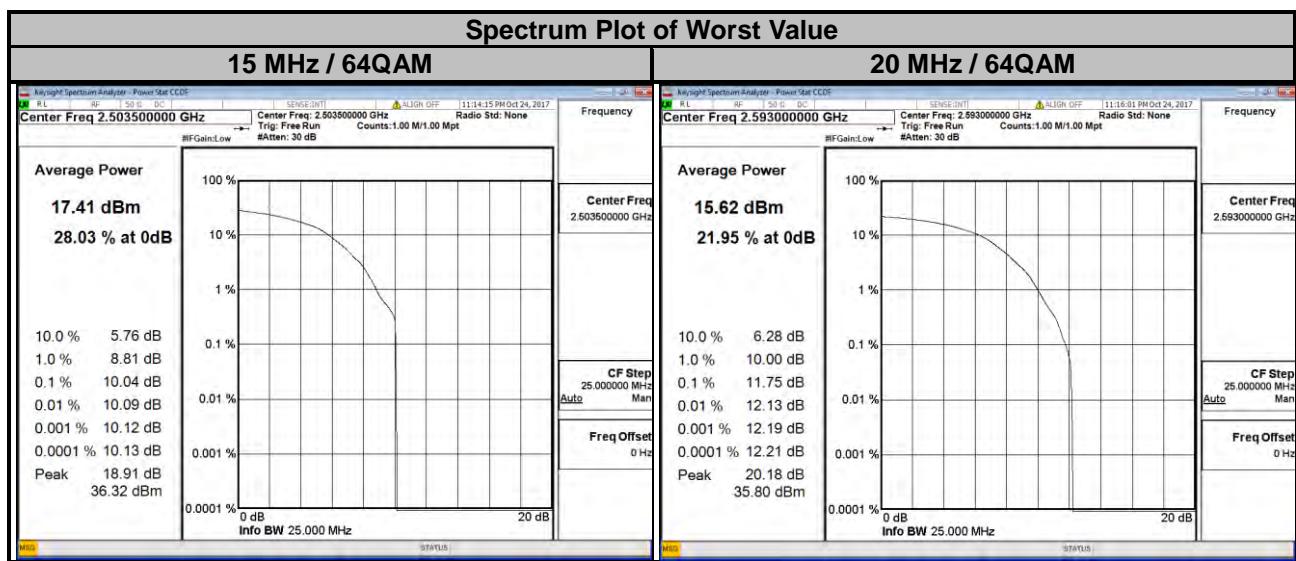
LTE Band 38									
Channel Bandwidth: 15 MHz					Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)			Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM			QPSK	16QAM	64QAM
37825	2577.5	8.53	8.87	11.39	37850	2580.0	8.61	9.07	9.41
38000	2595.0	8.23	9.24	7.99	38000	2595.0	8.51	8.97	10.56
38175	2612.5	8.40	10.05	9.24	38150	2610.0	7.98	8.85	10.47



LTE Band 41										
Channel Bandwidth: 5 MHz						Channel Bandwidth: 10 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)				Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM				QPSK	16QAM	64QAM
39675	2498.5	8.92	9.51	9.49		39700	2501.0	9.01	9.24	9.49
40620	2593.0	8.42	9.50	9.84		40620	2593.0	8.31	9.59	10.86
41565	2687.5	8.97	9.16	9.29		41540	2685.0	8.89	8.95	10.88



LTE Band 41										
Channel Bandwidth: 15 MHz						Channel Bandwidth: 20 MHz				
Channel	Frequency (MHz)	Peak to Average Ratio (dB)				Channel	Frequency (MHz)	Peak to Average Ratio (dB)		
		QPSK	16QAM	64QAM				QPSK	16QAM	64QAM
39725	2503.5	8.46	9.82	10.04		39750	2506.0	8.32	9.20	8.96
40620	2593.0	8.51	9.94	10.02		40620	2593.0	9.94	8.78	11.75
41515	2682.5	7.90	9.71	8.82		41490	2680.0	10.19	9.17	9.23

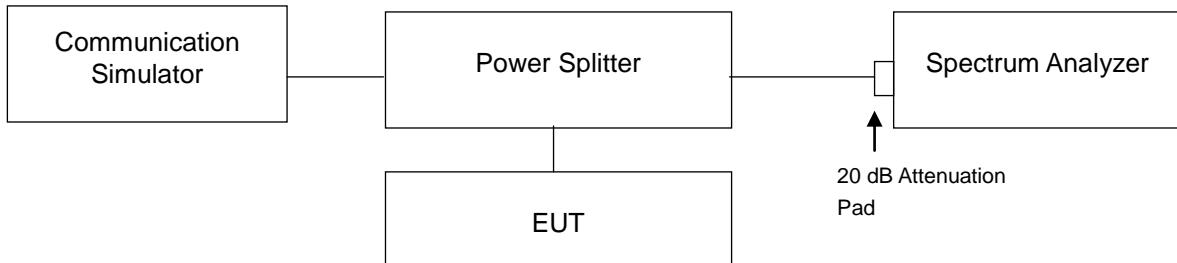


4.6 Conducted Spurious Emissions

4.6.1 Limits of Conducted Spurious Emissions Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25 dBm.

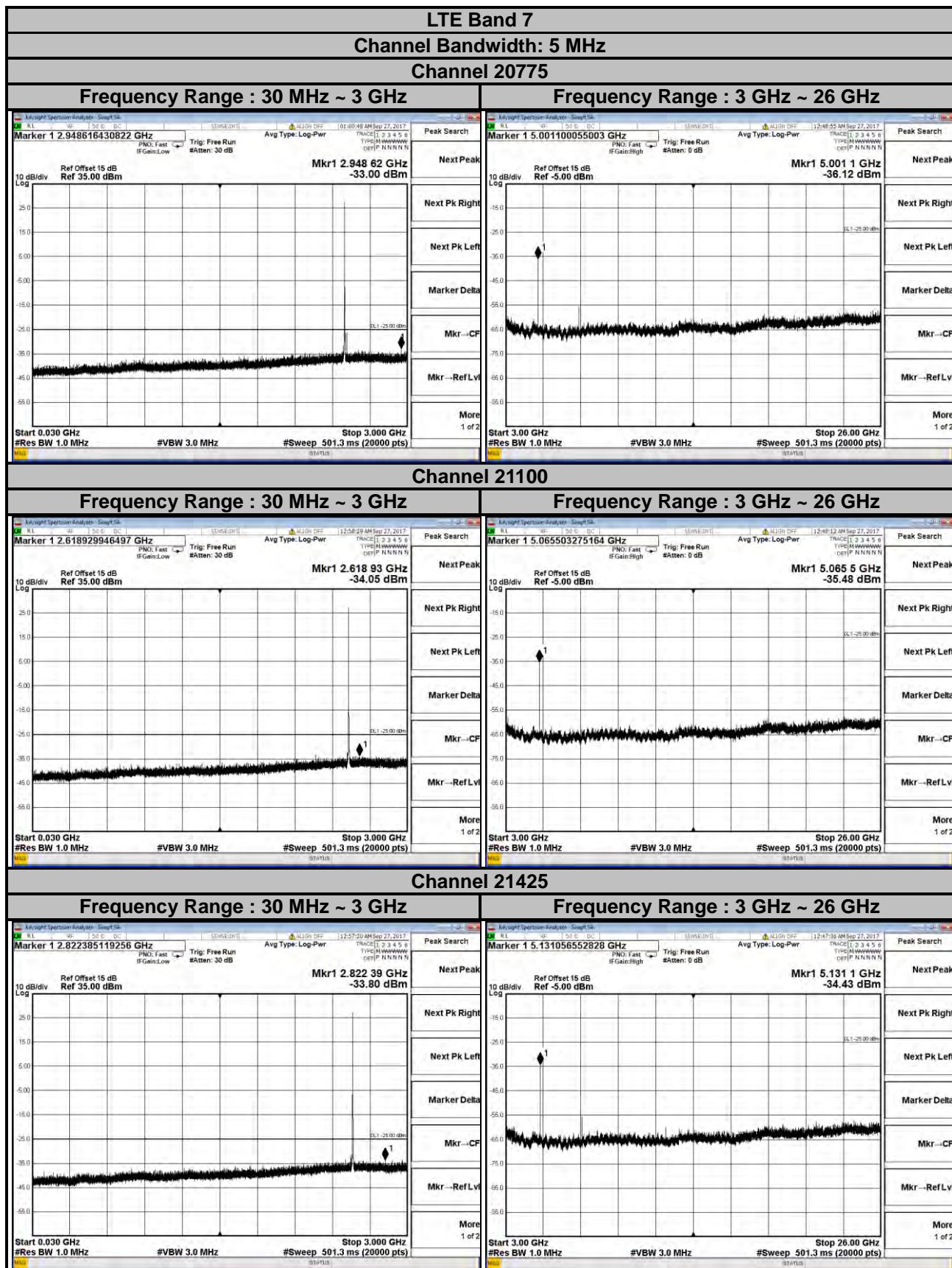
4.6.2 Test Setup

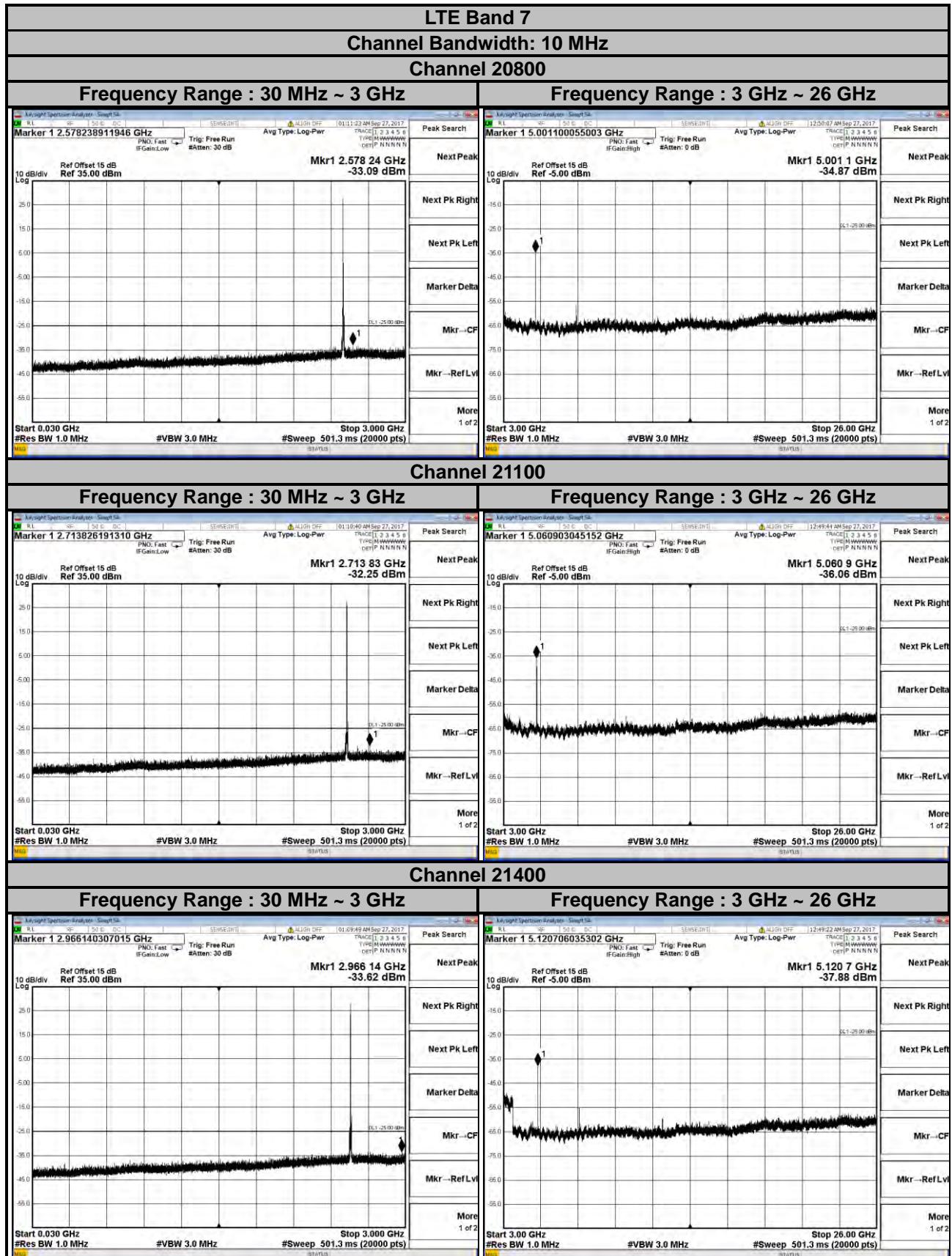


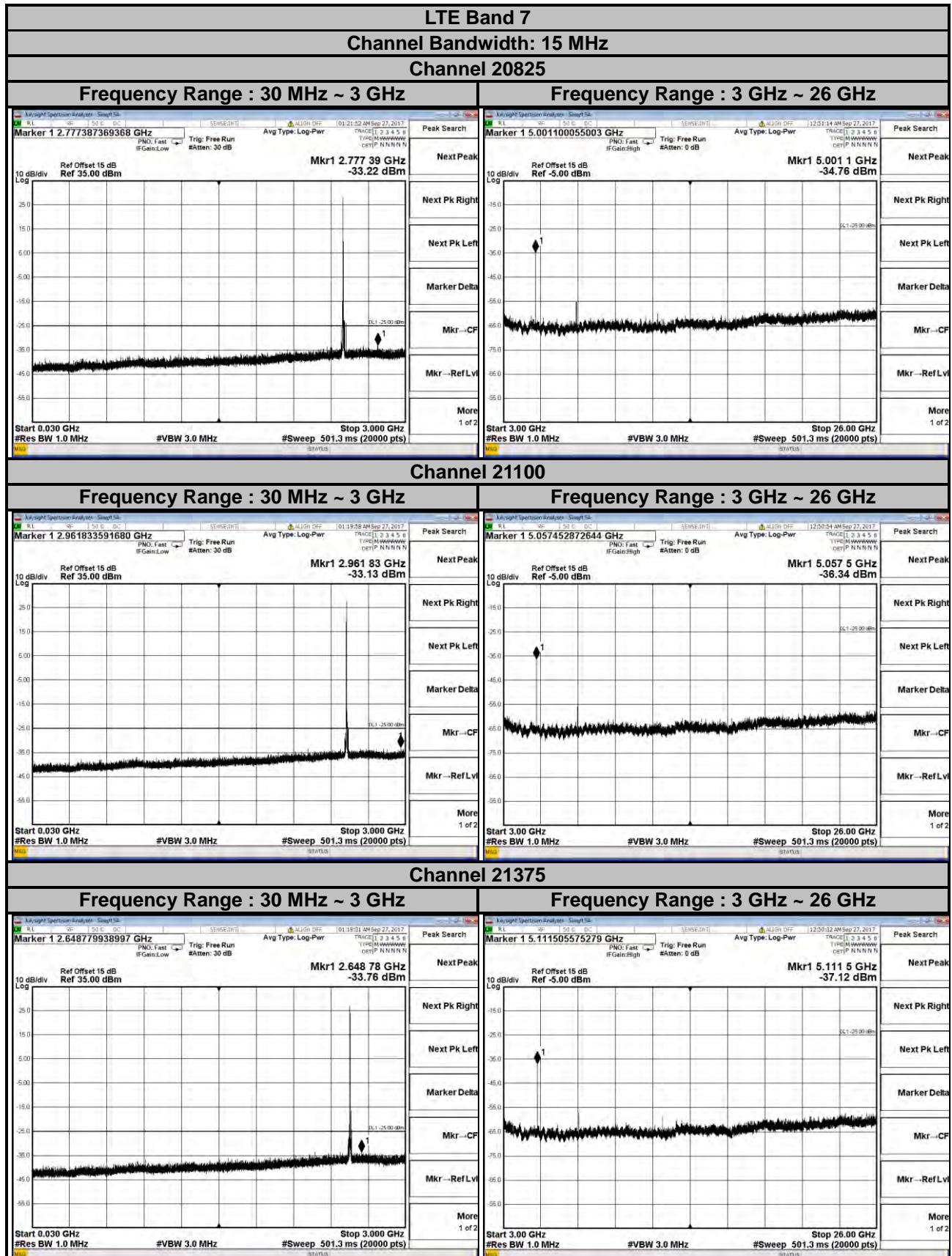
4.6.3 Test Procedure

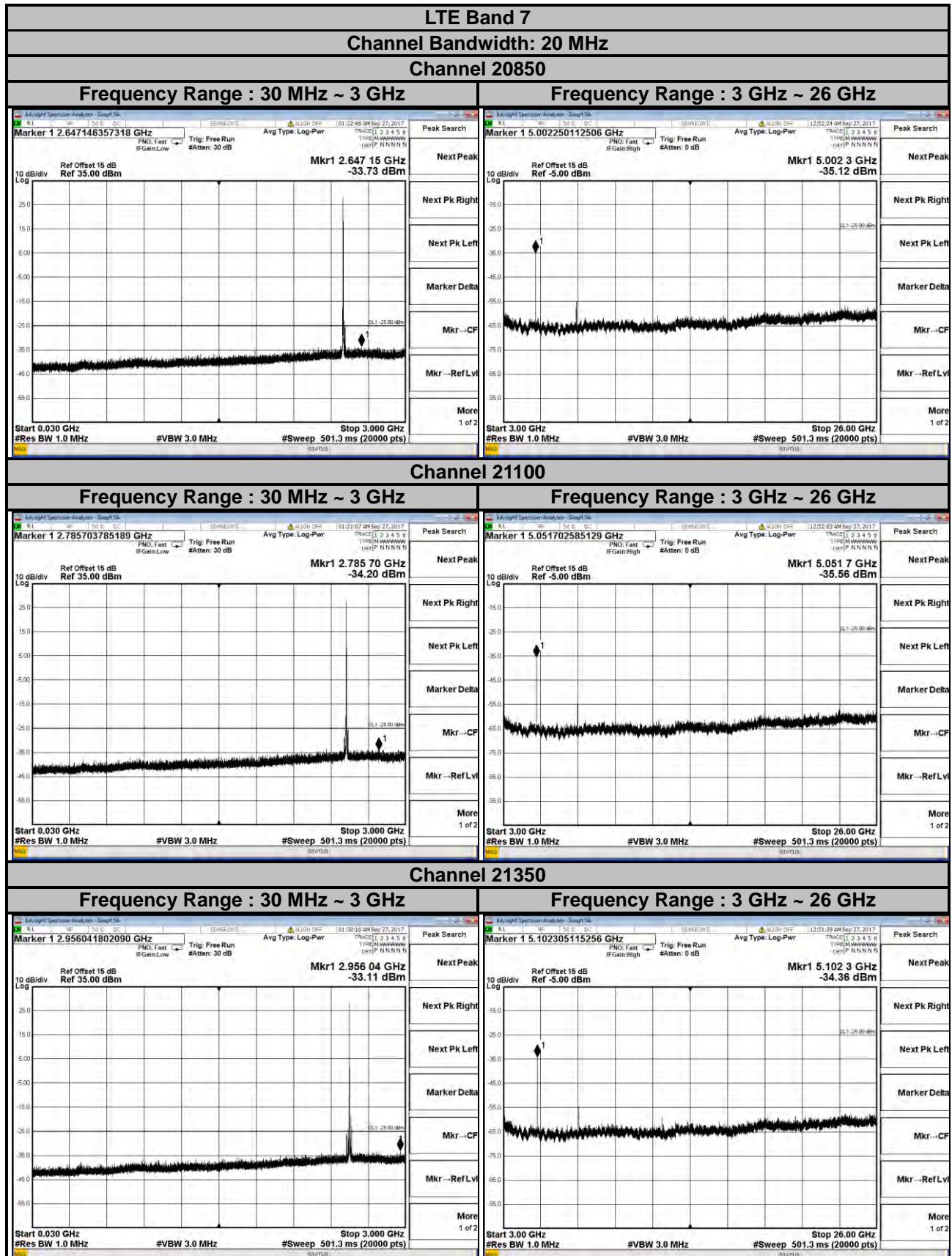
- The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range.
- Measuring frequency range is from 30 MHz to 26 GHz for LTE Band 7 and from 30 MHz to 27 GHz for LTE Band 38/41. 10 dB attenuation pad is connected with spectrum. RBW = 1 MHz and VBW = 3 MHz are used for conducted emission measurement.

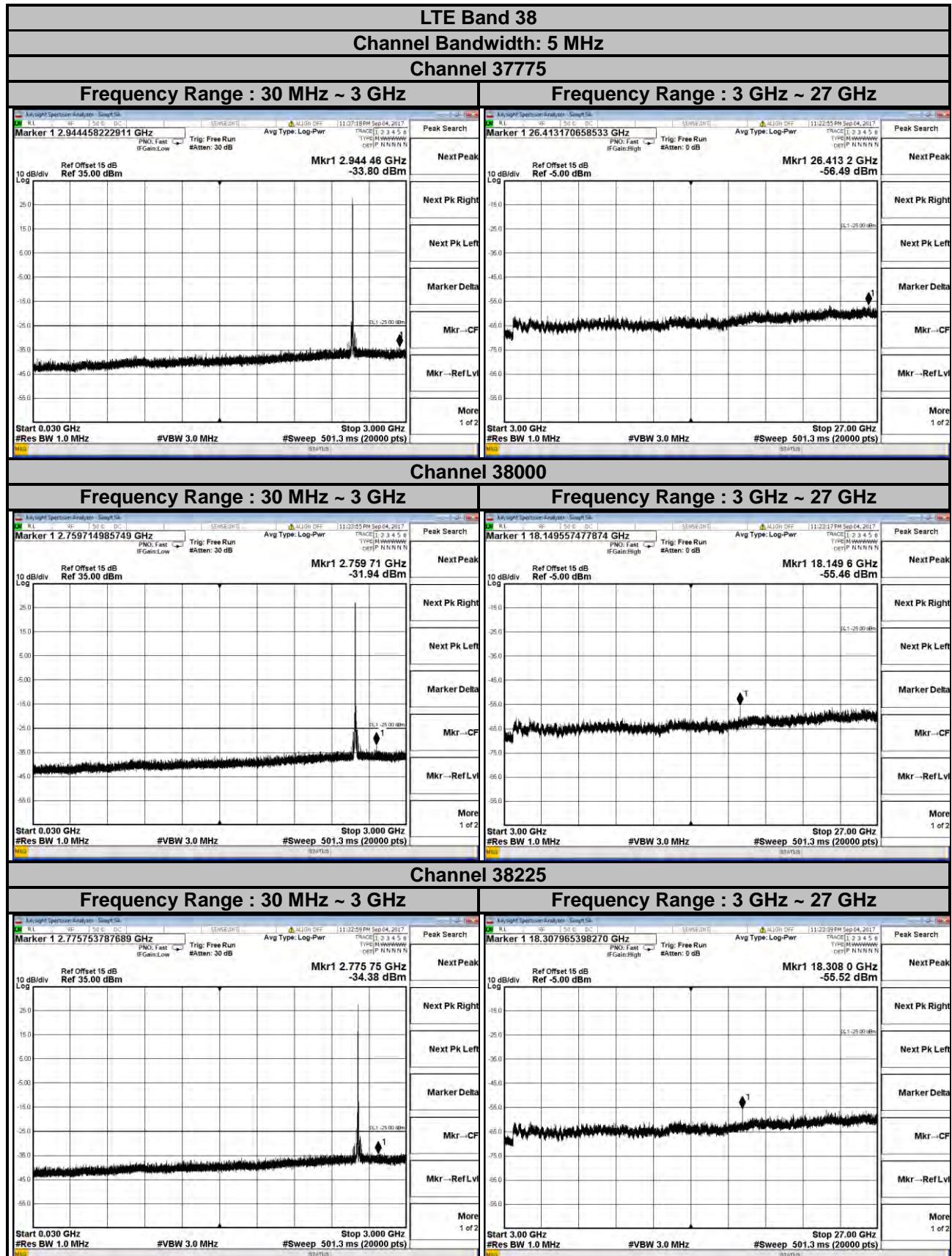
4.6.4 Test Results

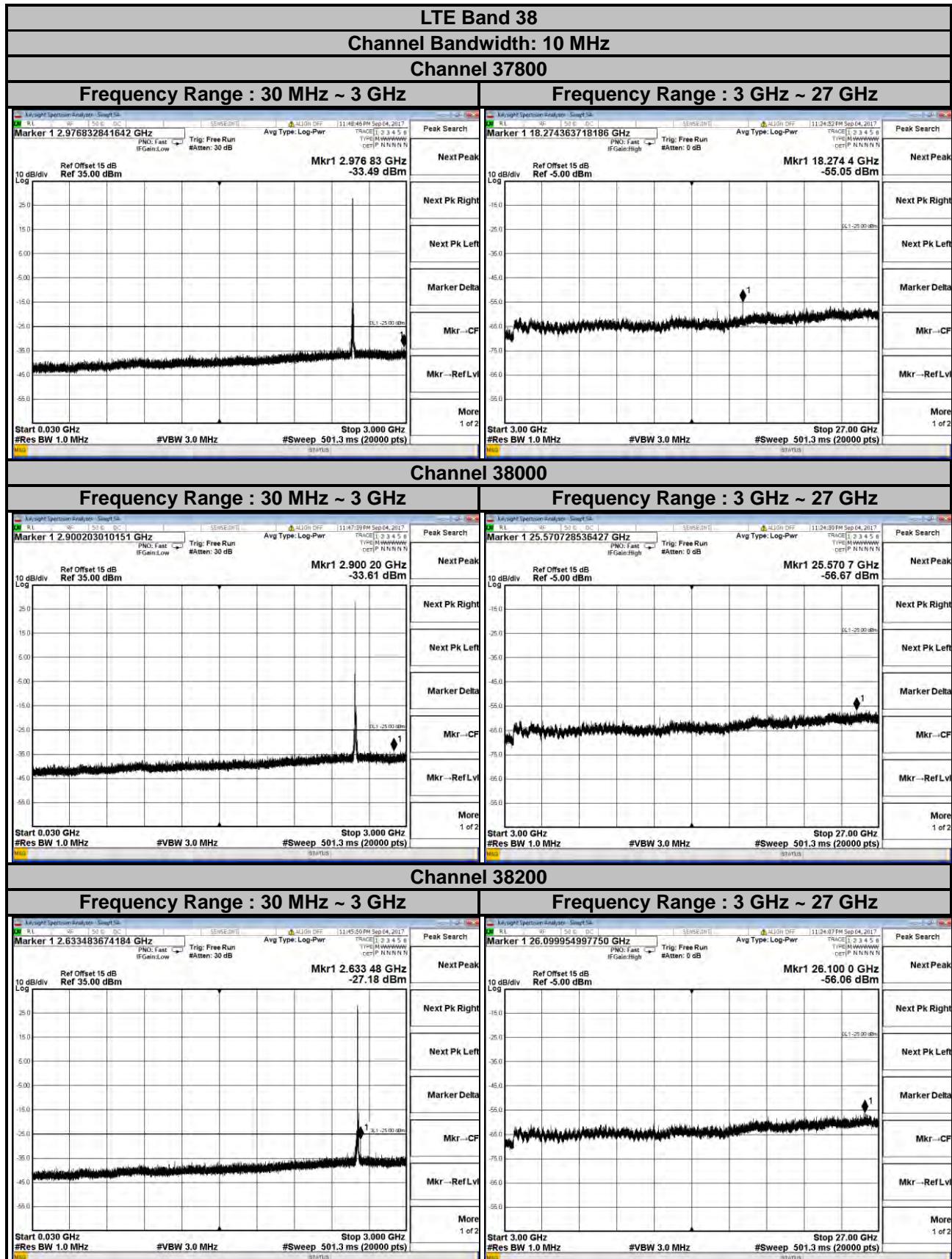


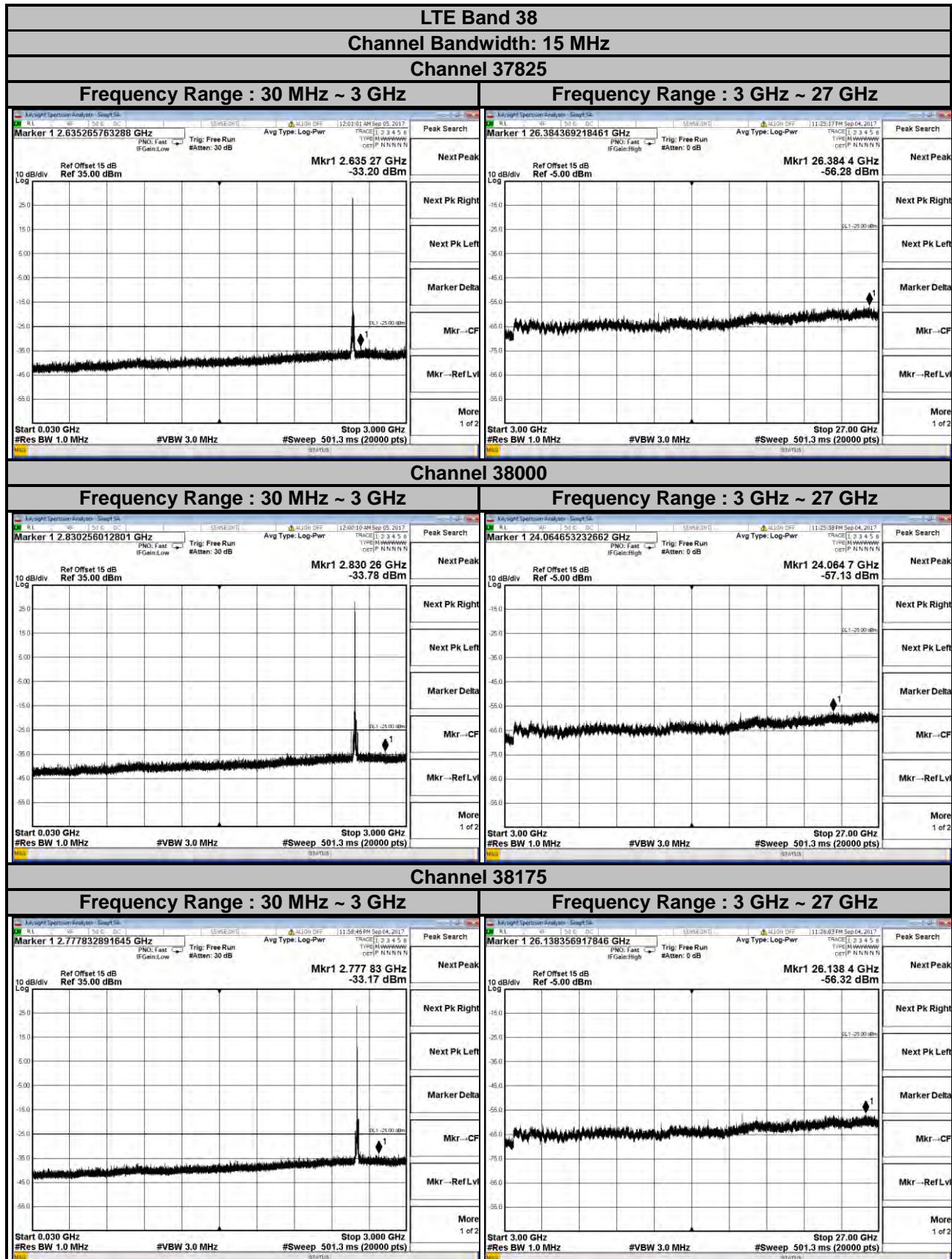


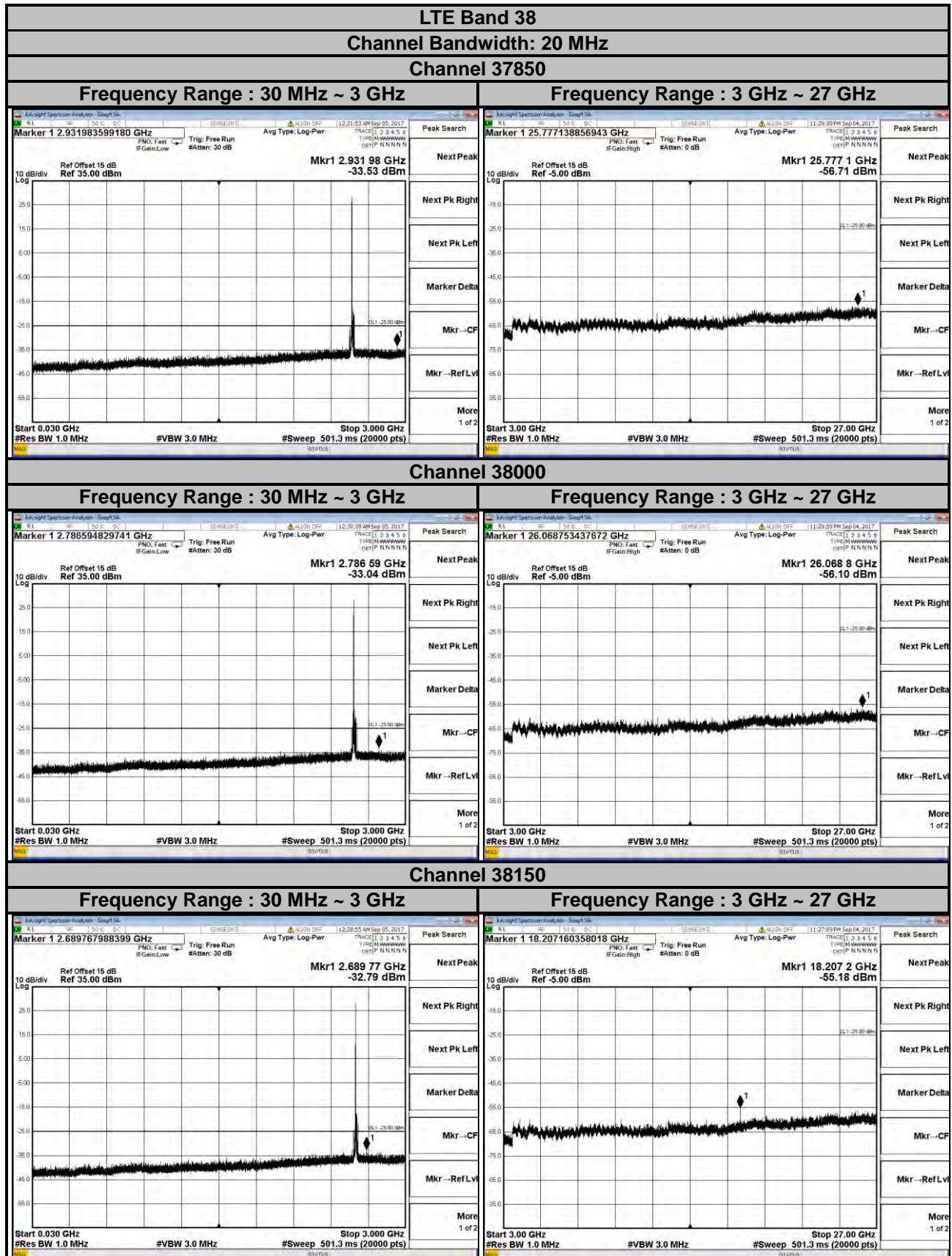


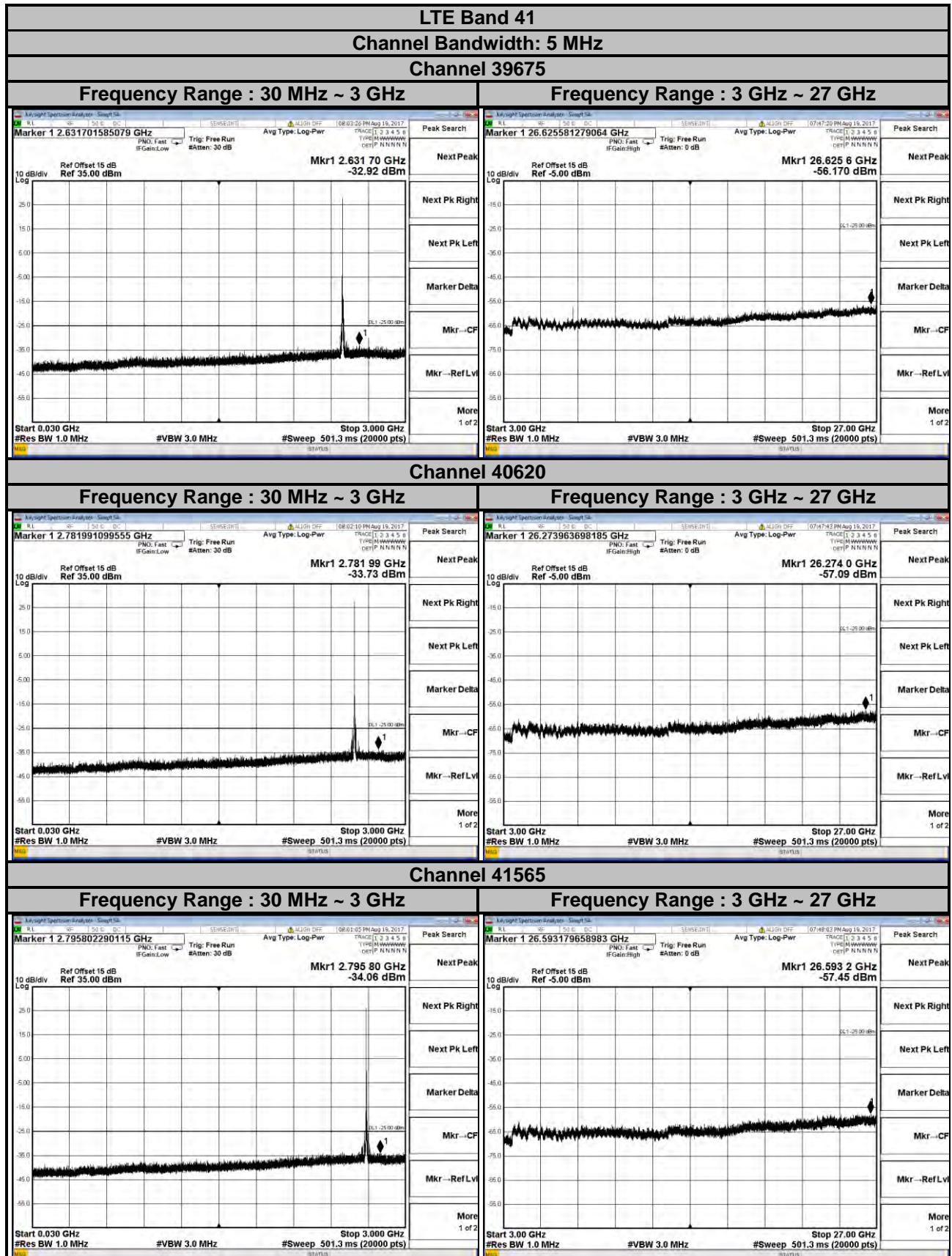


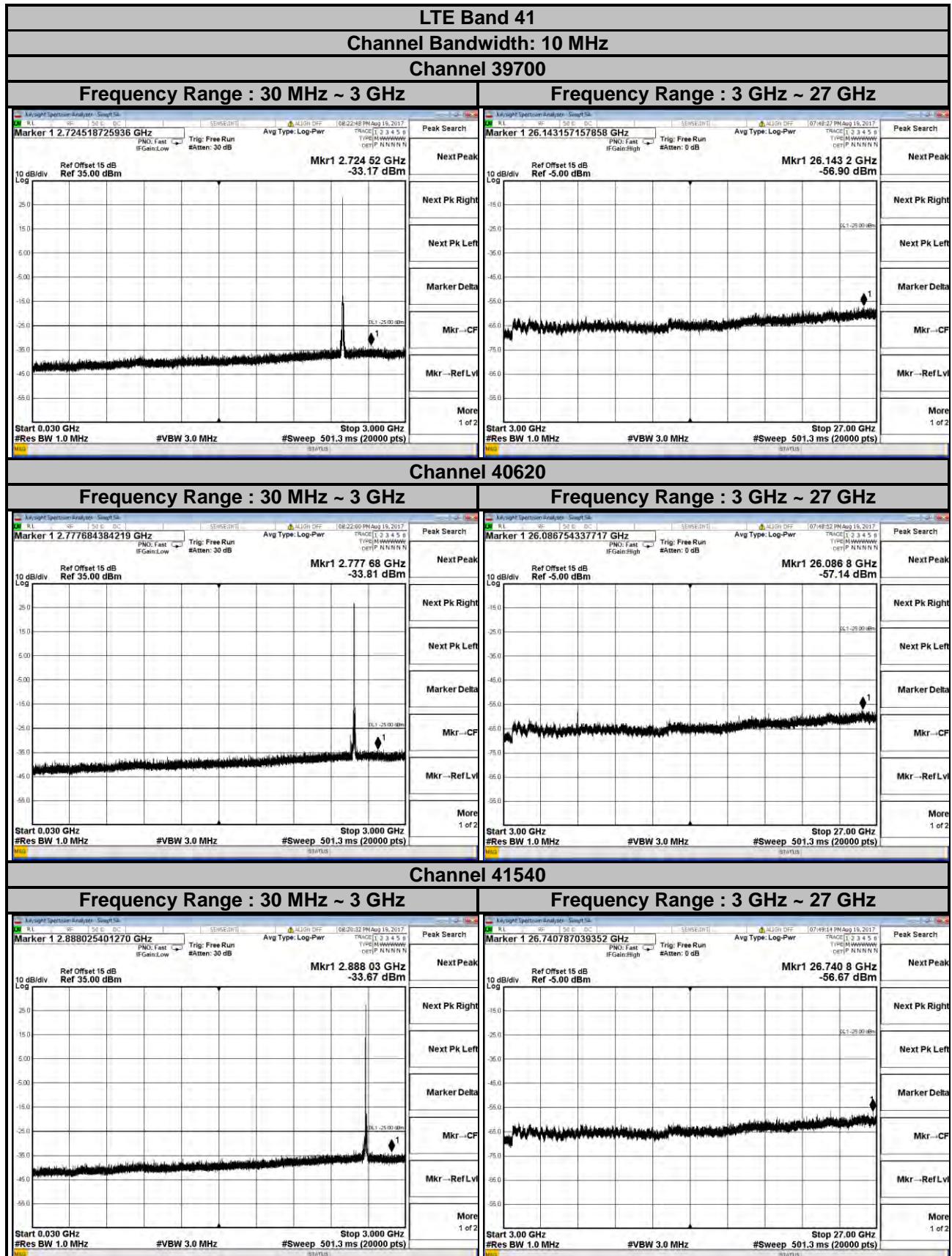


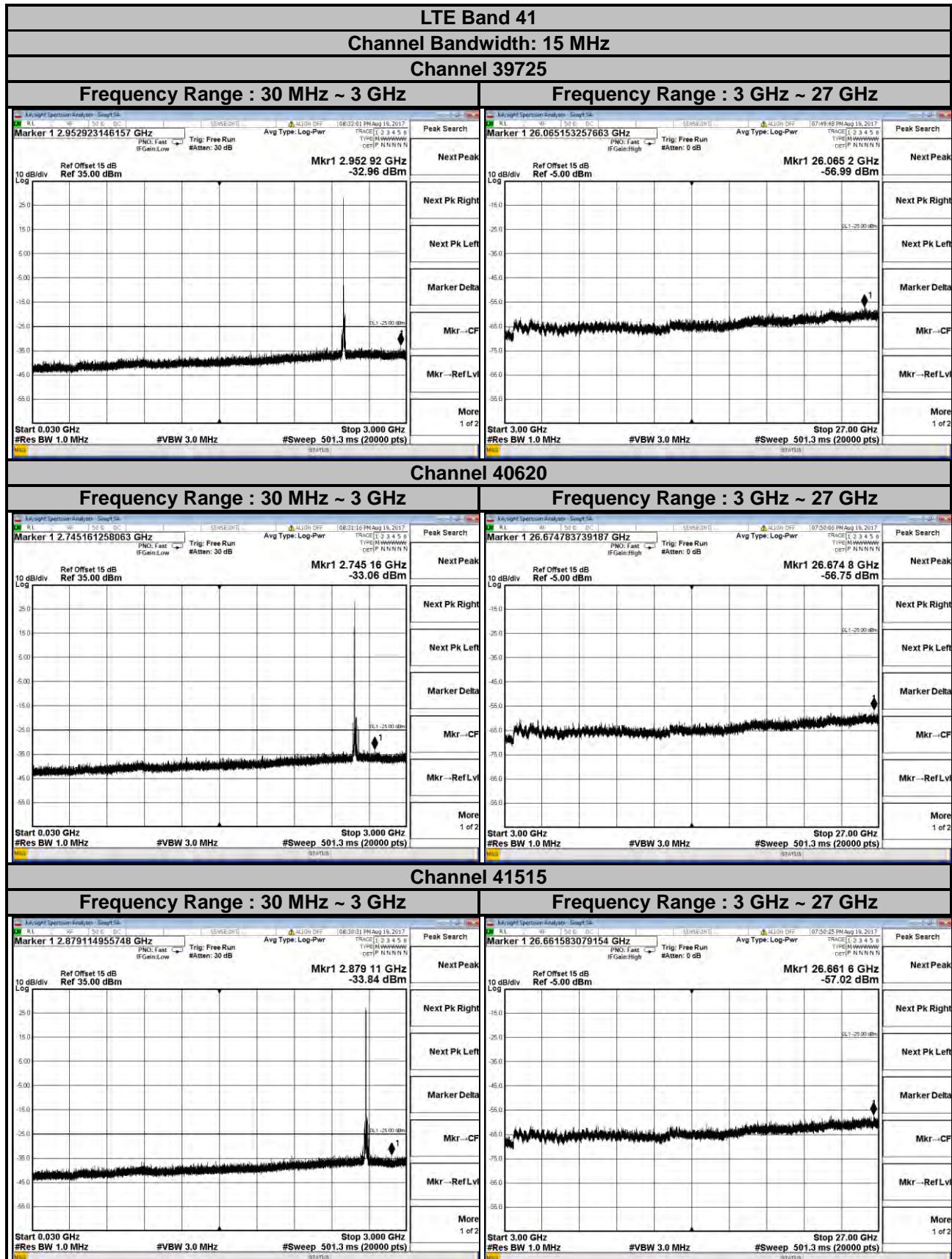


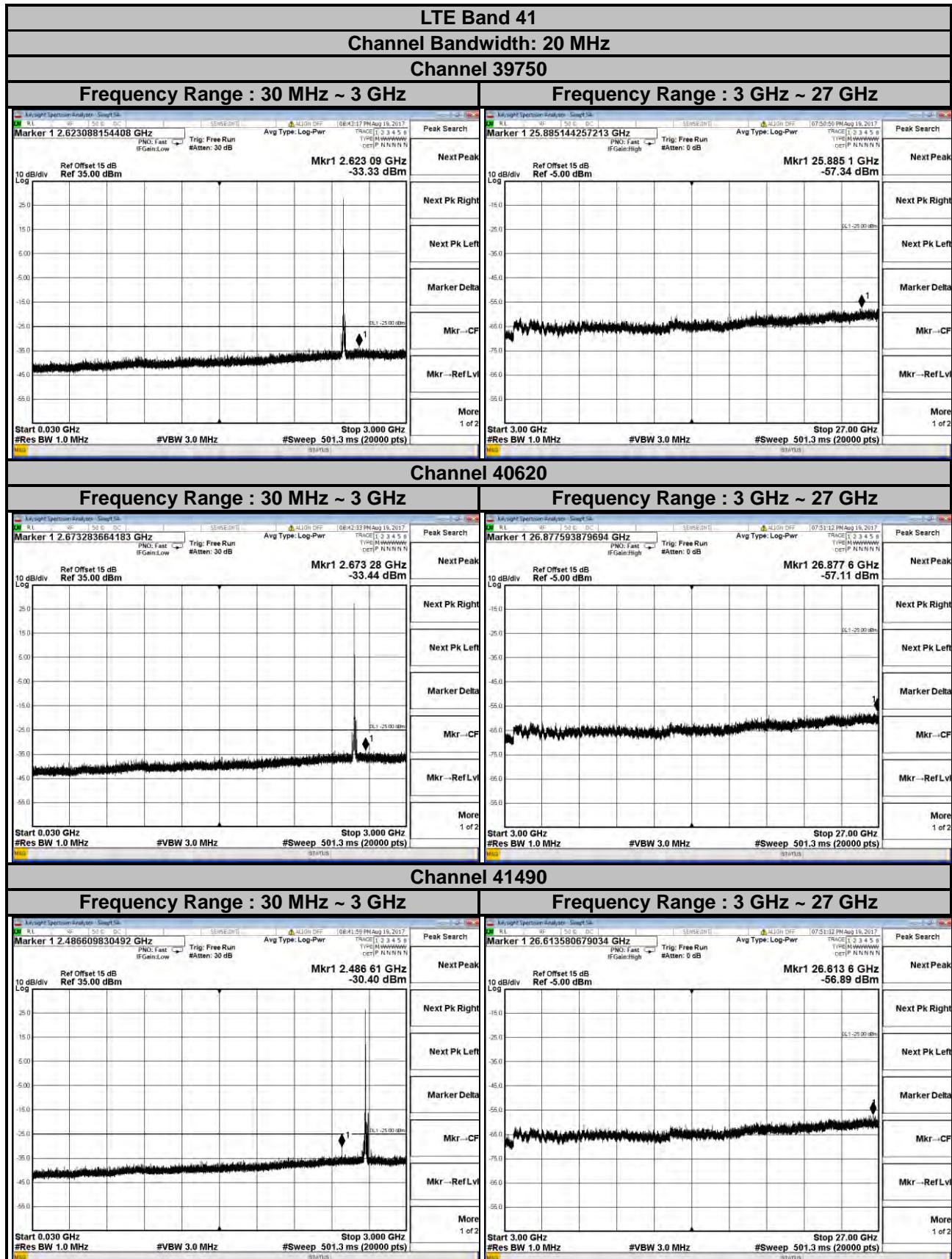












4.7 Radiated Emission Measurement

4.7.1 Limits of Radiated Emission Measurement

The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $55 + 10 \log_{10}(P)$ dB. The limit of emission is equal to -25 dBm.

4.7.2 Test Procedure

- a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8 m (below or equal 1 GHz) and/or 1.5 m (above 1 GHz) height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1 m to 4 m to find the maximum polar radiated power. The "Read Value" is the spectrum reading the maximum power value.
- b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to "Read Value" of step a. Record the power level of S.G.
- c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
- d. E.R.P power can be calculated form E.I.R.P power by subtracting the gain of dipole, E.R.P power = E.I.P.R power - 2.15 dBi.

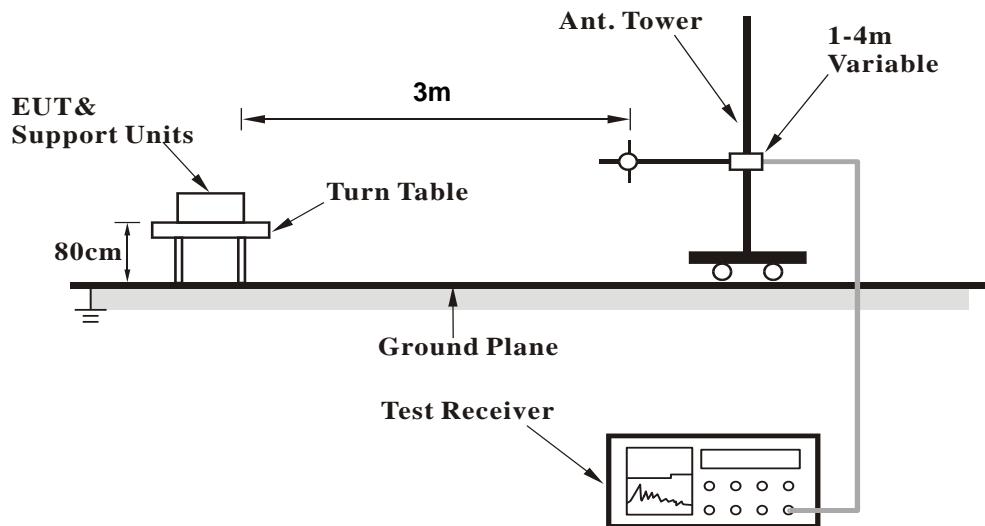
NOTE: The resolution bandwidth of spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz.

4.7.3 Deviation from Test Standard

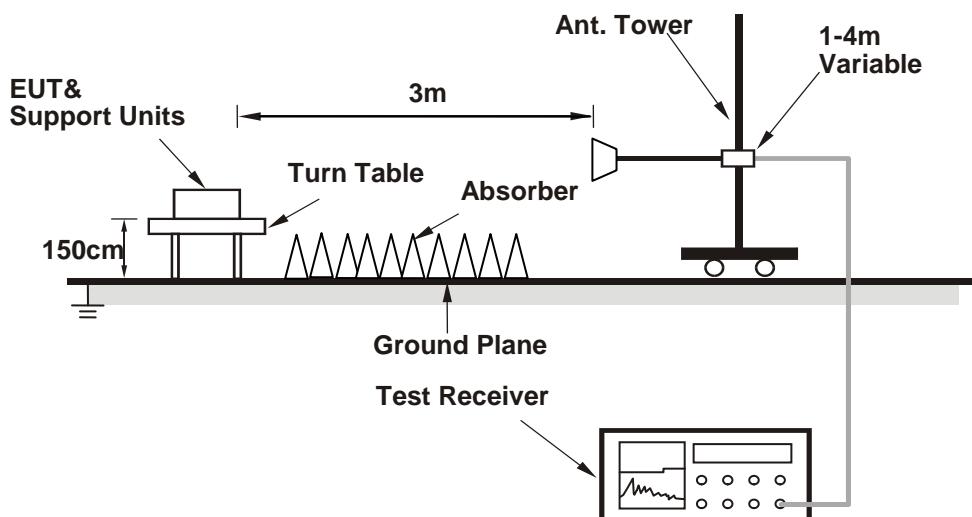
No deviation.

4.7.4 Test Setup

<Radiated Emission below or equal 1 GHz>



<Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.7.5 Test Results

LTE Band 7

Channel Bandwidth: 20 MHz / QPSK

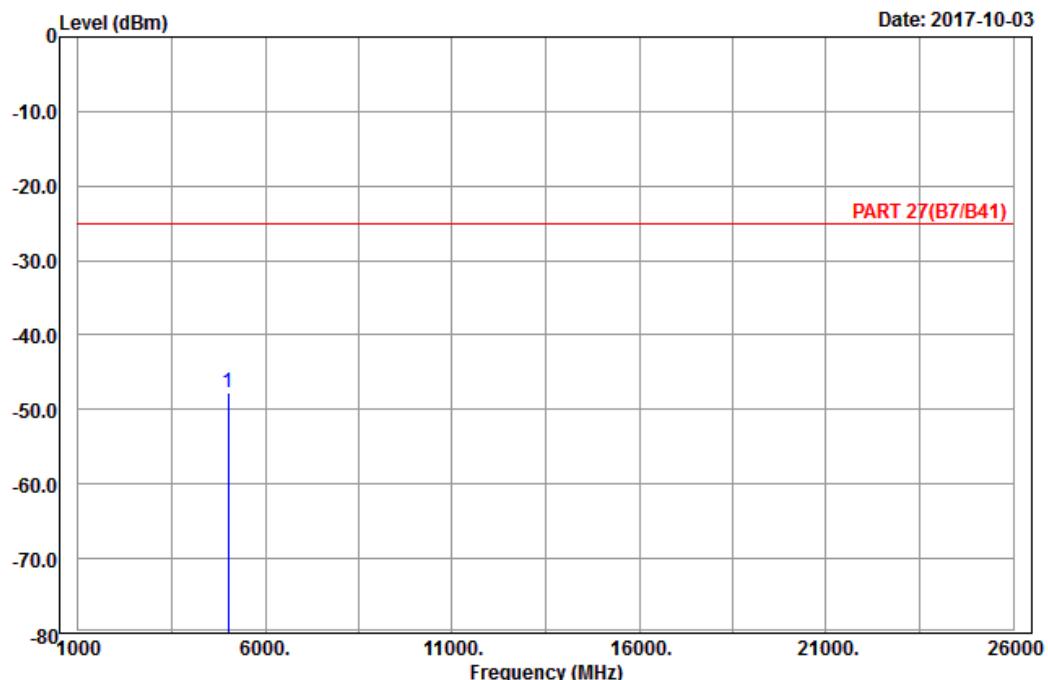
Low Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 7_Link_CH20850

Tested by: Charles Hsiao

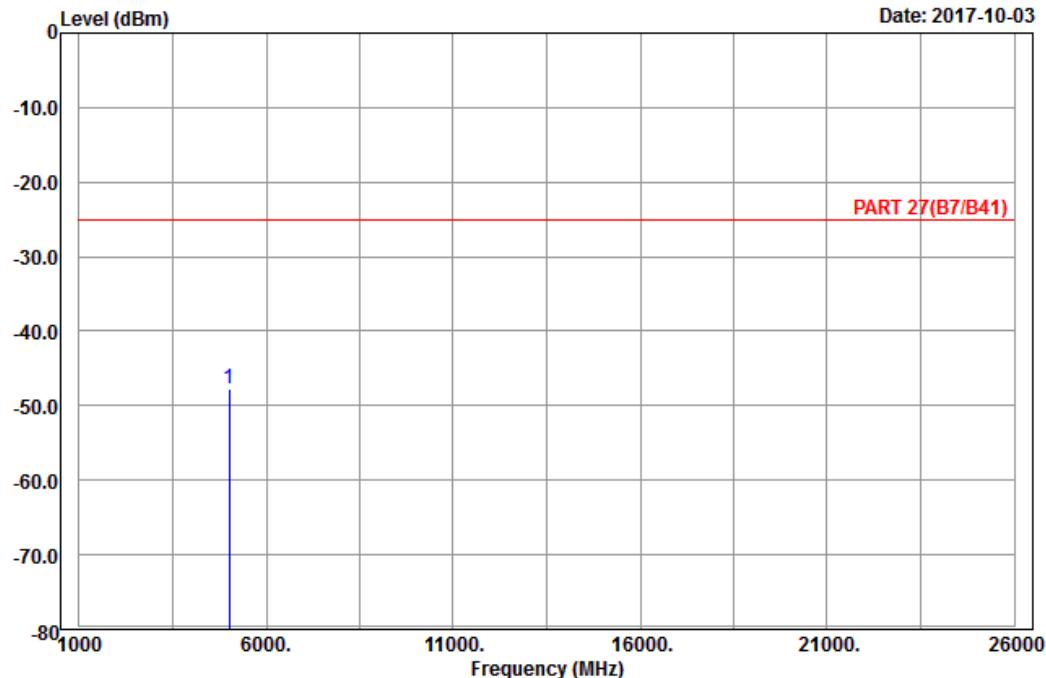
Freq	Level	Read	Limit	Over	Remark
		MHz	dBm	dBm	
1 pp	5020.00	-47.74	-66.82	-25.00	-22.74 19.08 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 7_Link_CH20850
Tested by: Charles Hsiao

Freq	Read Level		Limit Level	Over Line	Limit Factor	Remark
	MHz	dBm	dBm	dBm	dB	
1 pp	5020.00	-47.66	-66.74	-25.00	-22.66	19.08 Peak

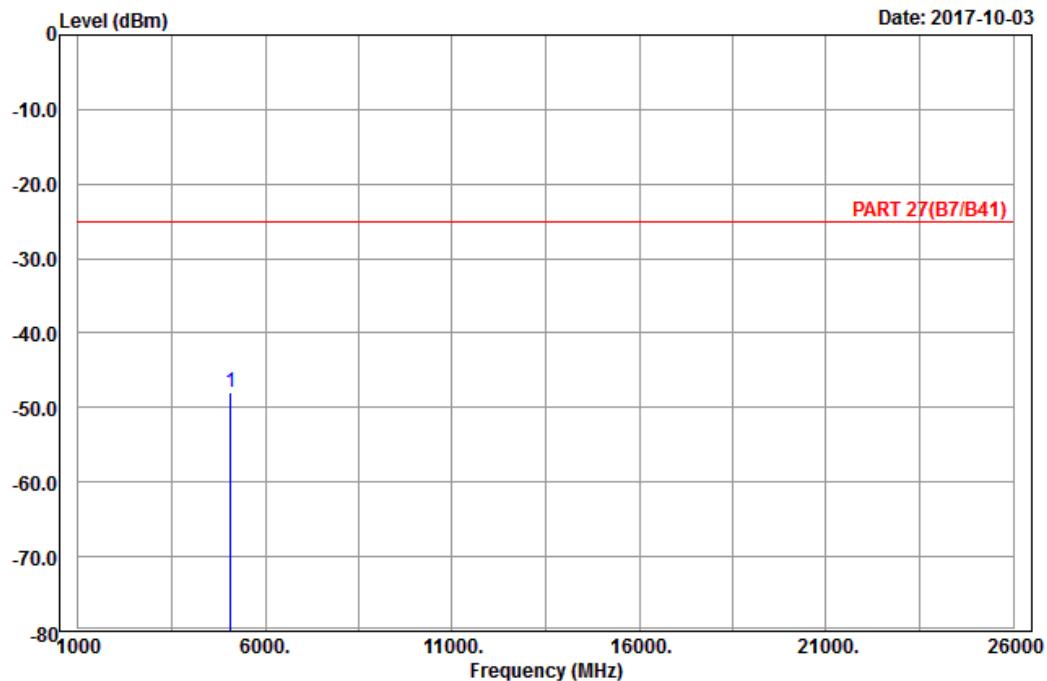
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 7_Link_CH21100

Tested by: Charles Hsiao

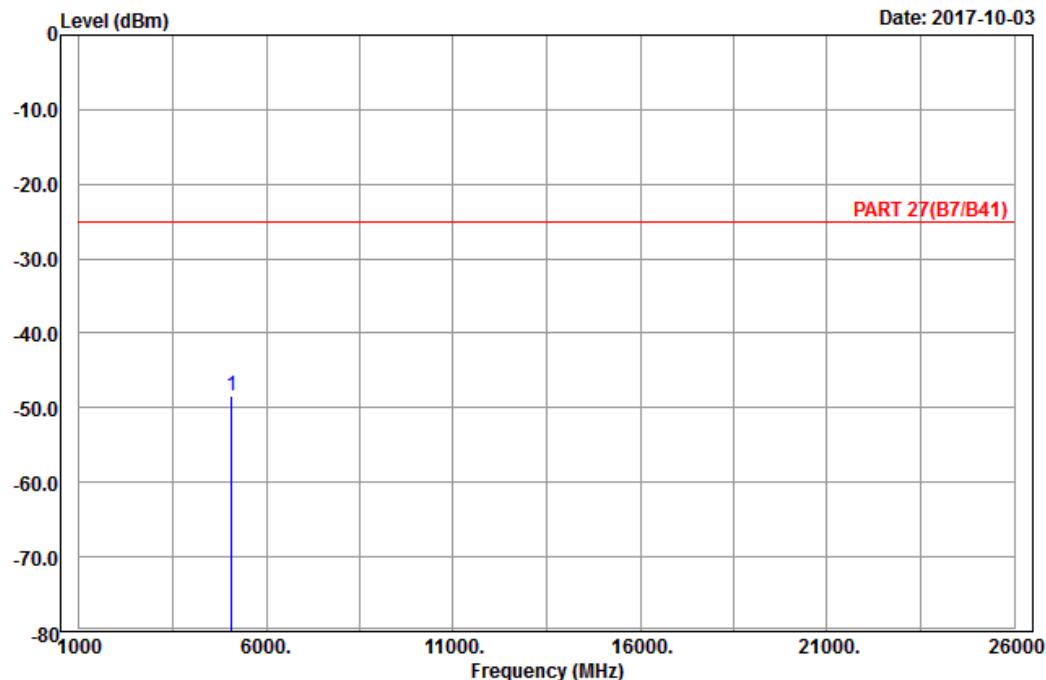
Freq	Read	Limit	Over	Factor	Remark
	Level	Level	Line		
MHz	dBm	dBm	dBm	dB	dB
1 pp	5070.00	-47.88	-67.27	-25.00	-22.88 19.39 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 7_Link_CH21100
Tested by: Charles Hsiao

Freq	Read		Limit	Over	Factor	Remark
	Level	Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	5070.00	-48.32	-67.71	-25.00	-23.32	19.39 Peak

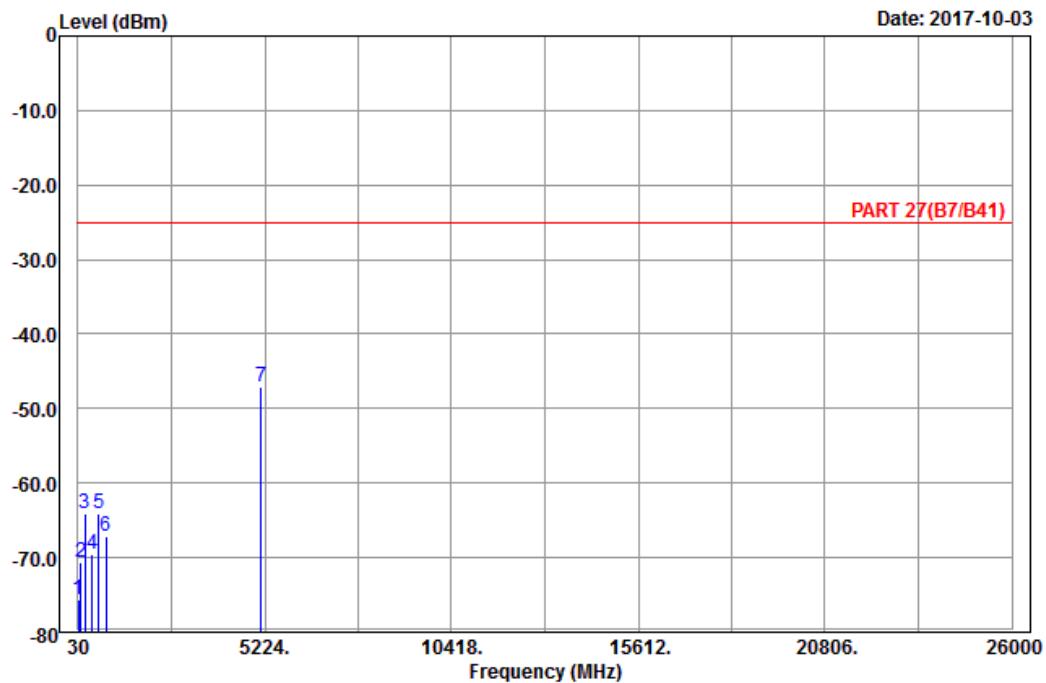
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 7_Link_CH21350

Tested by: Charles Hsiao

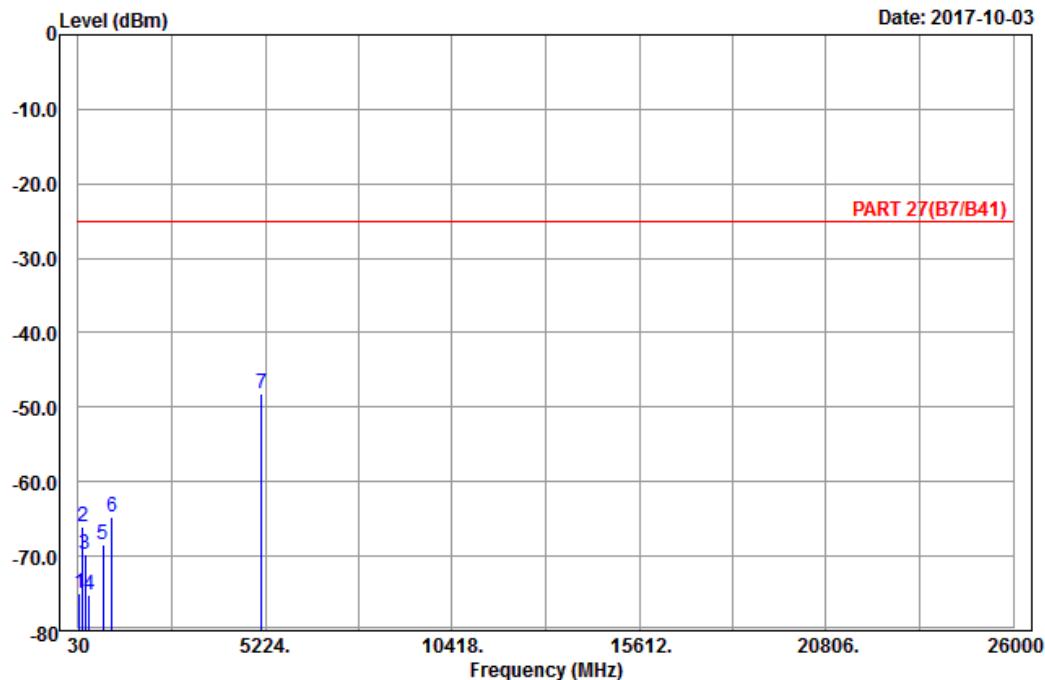
	Read	Limit	Over		
Freq	Level	Level	Line	Limit	Factor
	MHz	dBm	dBm	dBm	dB
1	40.80	-75.58	-65.78	-25.00	-50.58
2	103.98	-70.73	-61.08	-25.00	-45.73
3	232.23	-63.98	-58.23	-25.00	-38.98
4	419.70	-69.45	-66.26	-25.00	-44.45
5	615.00	-64.09	-64.35	-25.00	-39.09
6	801.20	-67.23	-69.23	-25.00	-42.23
7 pp	5120.00	-47.03	-66.74	-25.00	-22.03
					19.71
					Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14



Site : 966 chamber 1

Condition: PART 27(B7/B41) Vertical

Remark : LTE_Band 7_Link_CH21350

Tested by: Charles Hsiao

	Freq	Read Level	Limit Level	Over Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	57.27	-75.00	-60.94	-25.00	-50.00	-14.06	Peak
2	158.25	-66.05	-58.33	-25.00	-41.05	-7.72	Peak
3	218.73	-69.85	-63.93	-25.00	-44.85	-5.92	Peak
4	333.60	-75.17	-69.60	-25.00	-50.17	-5.57	Peak
5	709.50	-68.50	-67.94	-25.00	-43.50	-0.56	Peak
6	968.50	-64.67	-69.84	-25.00	-39.67	5.17	Peak
7 pp	5120.00	-48.12	-67.83	-25.00	-23.12	19.71	Peak

LTE Band 38

Channel Bandwidth: 20 MHz / QPSK

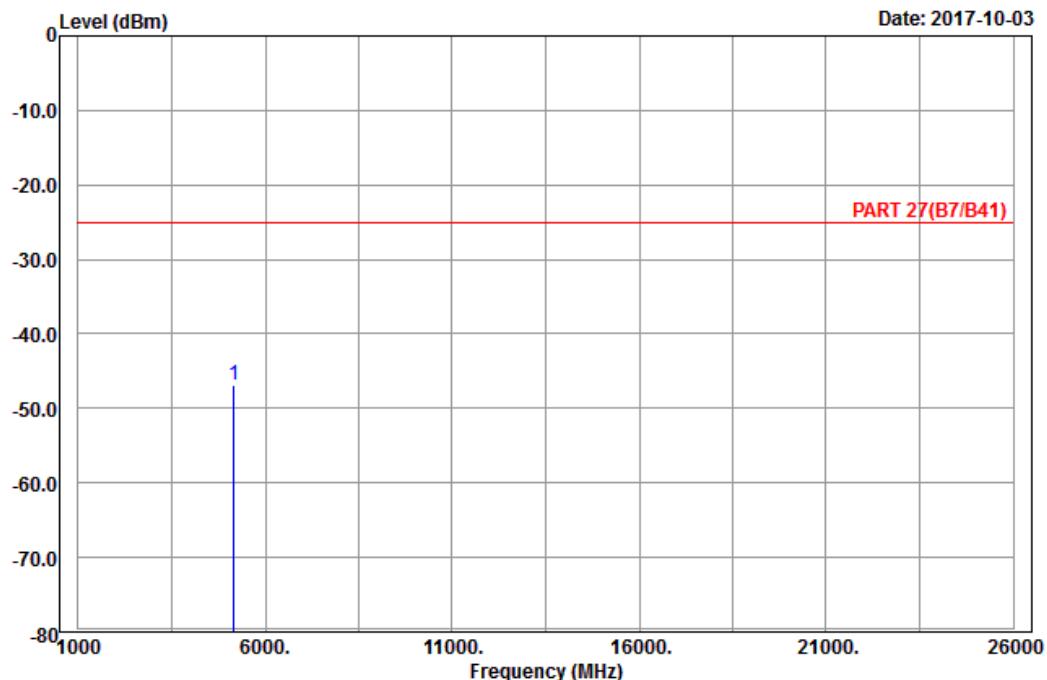
Low Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band_38_Link_CH37850

Tested by: Charles Hsiao

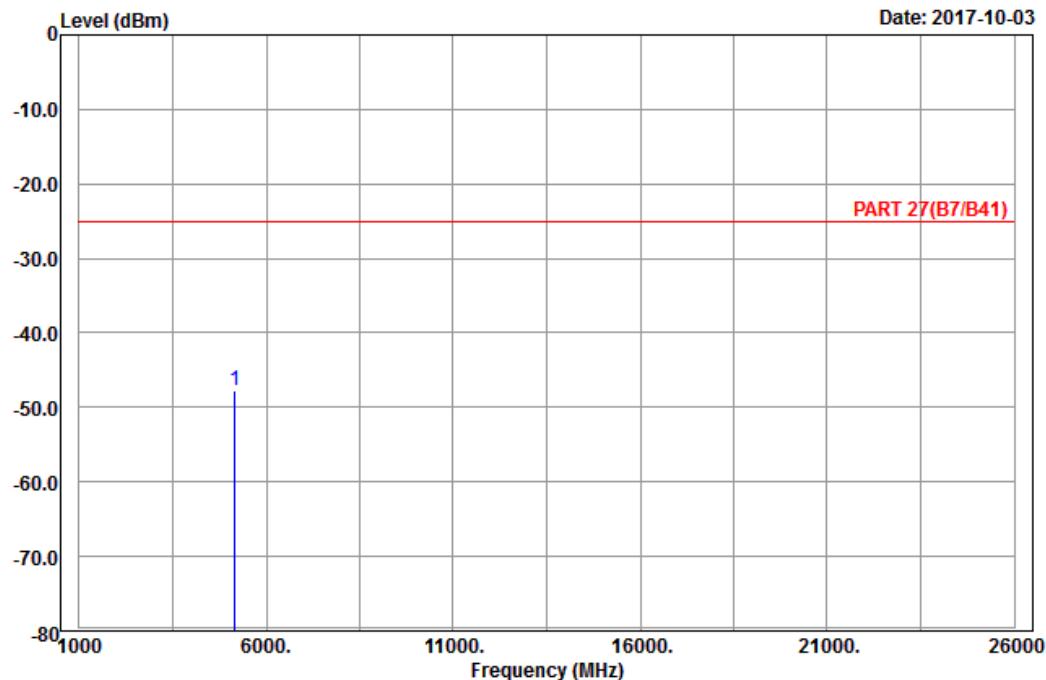
Freq	Level	Read	Limit	Over	Factor	Remark
		Level	Line	Limit		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	5160.00	-46.85	-66.77	-25.00	-21.85	19.92 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 27(B7/B41) Vertical

Remark : LTE_Band 38_Link_CH37850

Tested by: Charles Hsiao

Freq	Read Level	Limit Level	Over Line	Limit Factor	Remark
MHz	dBm	dBm	dBm	dB	
5160.00	-47.65	-67.57	-25.00	-22.65	19.92 Peak

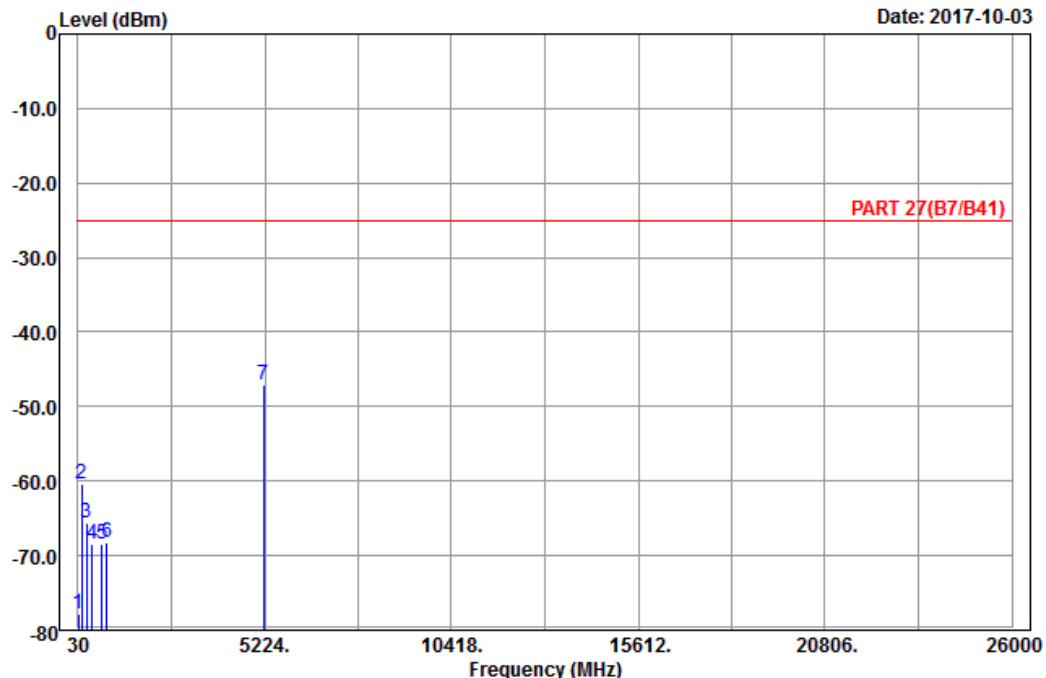
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 38_Link_CH38000

Tested by: Charles Hsiao

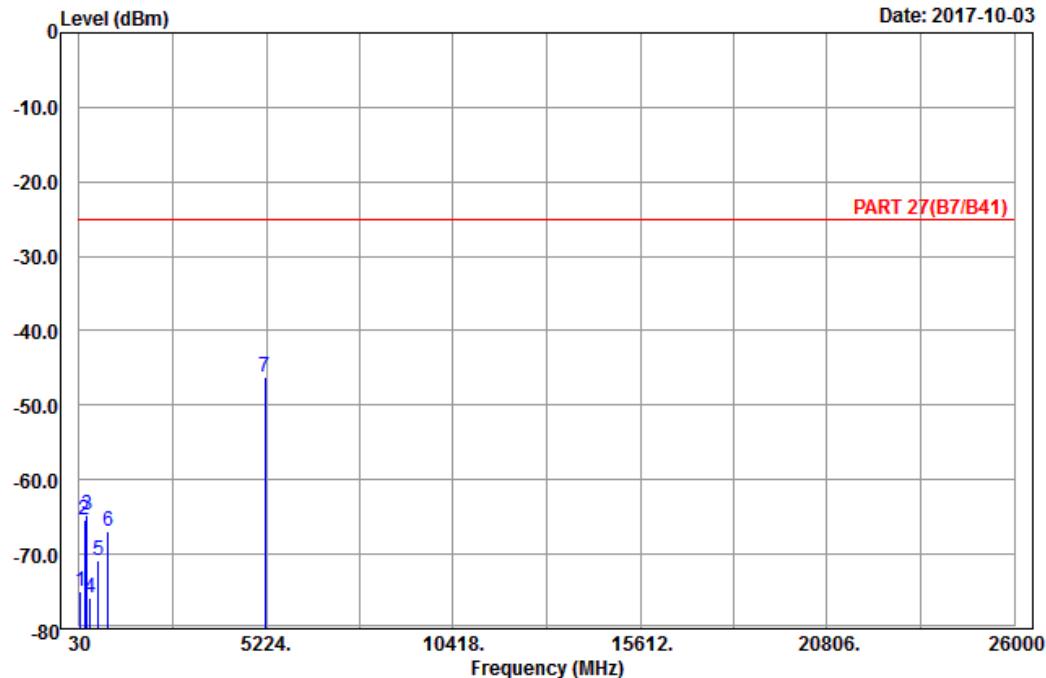
	Freq	Read Level	Limit Level	Over Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	41.07	-77.75	-67.95	-25.00	-52.75	-9.80	Peak
2	138.54	-60.43	-52.74	-25.00	-35.43	-7.69	Peak
3	261.66	-65.63	-60.02	-25.00	-40.63	-5.61	Peak
4	415.50	-68.36	-65.28	-25.00	-43.36	-3.08	Peak
5	685.00	-68.43	-68.13	-25.00	-43.43	-0.30	Peak
6	834.10	-68.20	-69.82	-25.00	-43.20	1.62	Peak
7 pp	5190.00	-47.16	-67.28	-25.00	-22.16	20.12	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14



Site : 966 chamber 1

Condition: PART 27(B7/B41) Vertical

Remark : LTE_Band_38_Link_CH38000

Tested by: Charles Hsiao

	Freq	Read Level	Limit Level	Over Line	Limit Factor	Remark
	MHz	dBm	dBm	dBm	dB	
1	60.78	-74.91	-60.98	-25.00	-49.91	-13.93 Peak
2	169.05	-65.33	-58.53	-25.00	-40.33	-6.80 Peak
3	237.90	-64.79	-59.11	-25.00	-39.79	-5.68 Peak
4	340.60	-75.75	-70.26	-25.00	-50.75	-5.49 Peak
5	568.80	-70.79	-69.89	-25.00	-45.79	-0.90 Peak
6	828.50	-66.94	-68.63	-25.00	-41.94	1.69 Peak
7 pp	5190.00	-46.30	-66.42	-25.00	-21.30	20.12 Peak

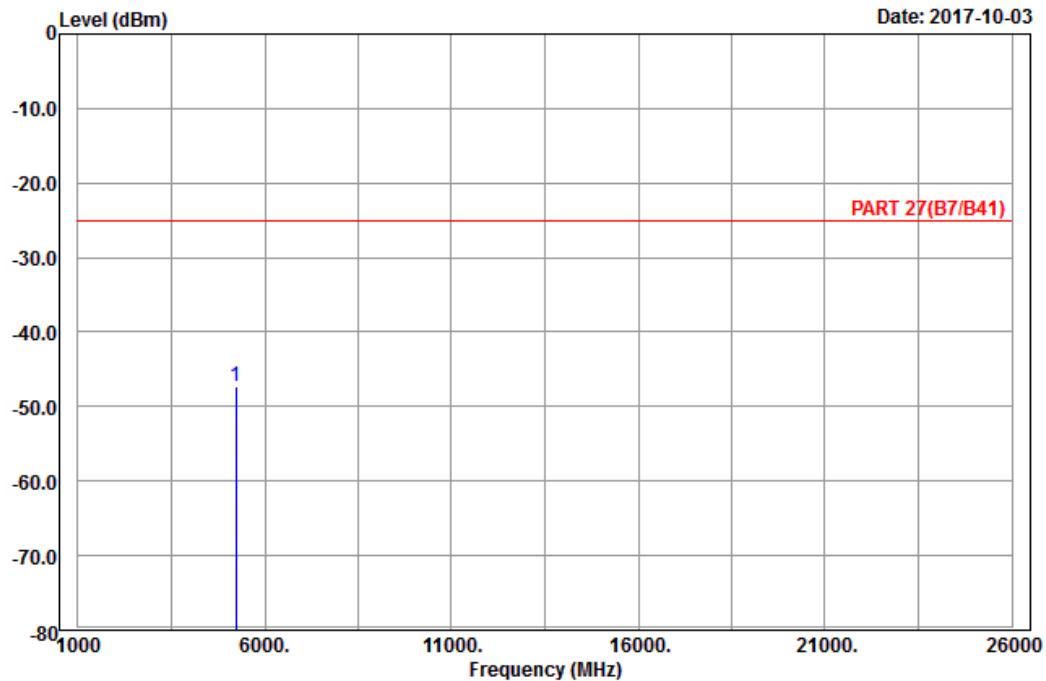
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 38_Link_CH38150

Tested by: Charles Hsiao

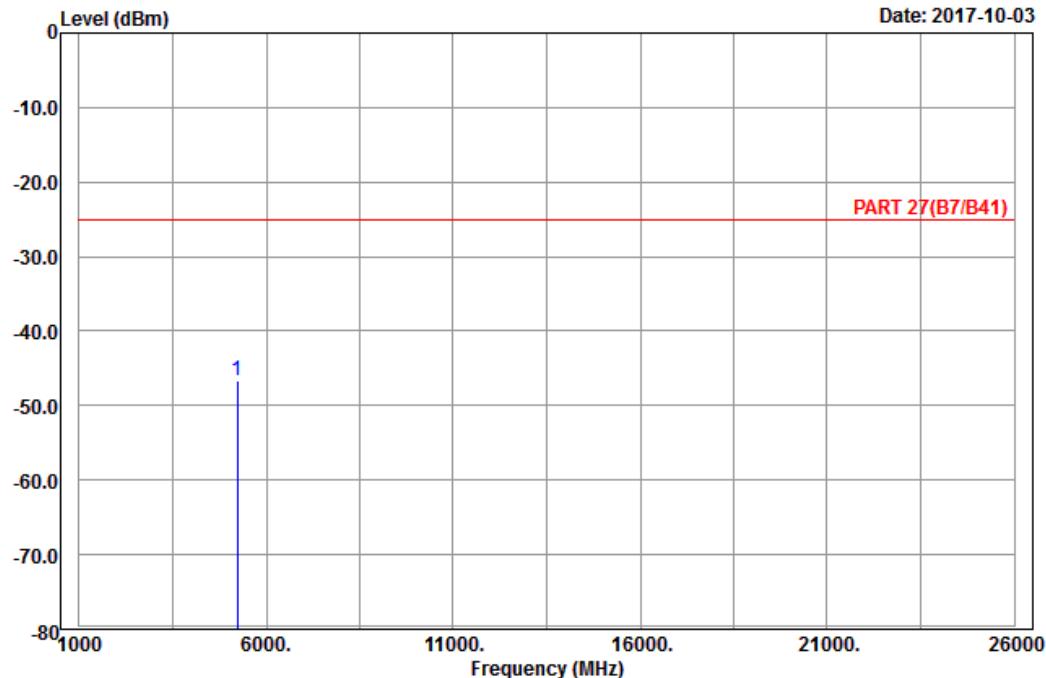
Freq	Read	Limit	Over	Remark		
	Level	Line	Limit Factor			
MHz	dBm	dBm	dBm	dB		
1 pp	5220.00	-47.37	-67.51	-25.00	-22.37	20.14 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 38_Link_CH38150
Tested by: Charles Hsiao

Freq	Read Level		Limit Level	Over Line	Limit Factor	Remark
	MHz	dBm	dBm	dBm	dB	
1 pp	5220.00	-46.65	-66.79	-25.00	-21.65	20.14 Peak

LTE Band 41

Channel Bandwidth: 20 MHz / QPSK

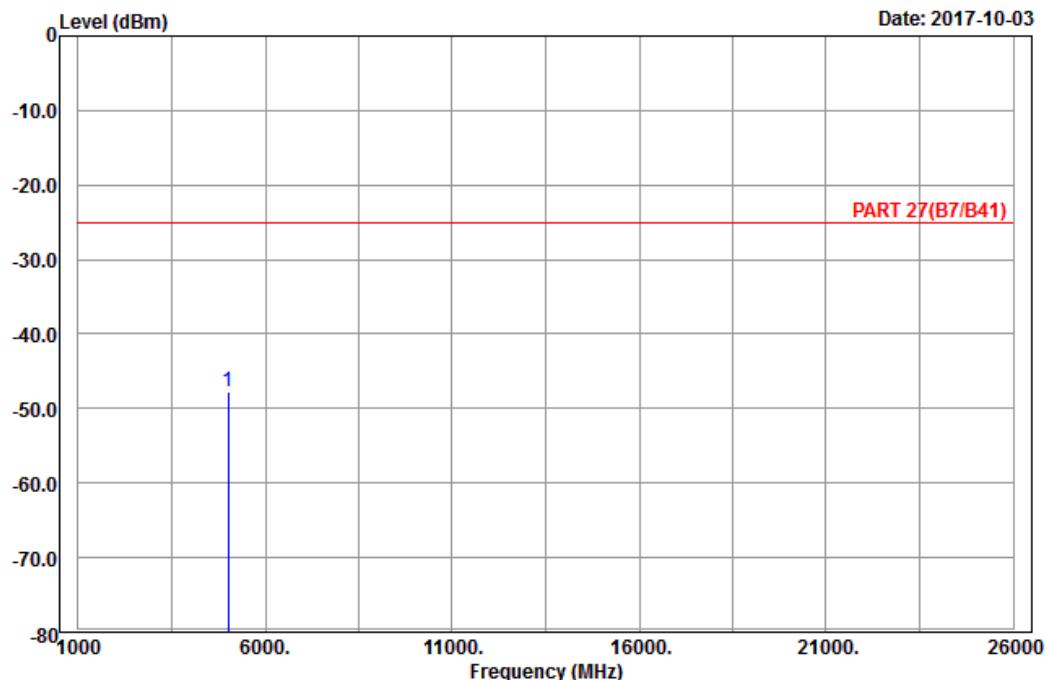
Low Channel



Bureau Veritas Consumer Products Services Ltd.,Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 41_Link_CH39750

Tested by: Charles Hsiao

Freq	Read Level	Limit Level	Over Line	Over Limit Factor	Remark
------	------------	-------------	-----------	-------------------	--------

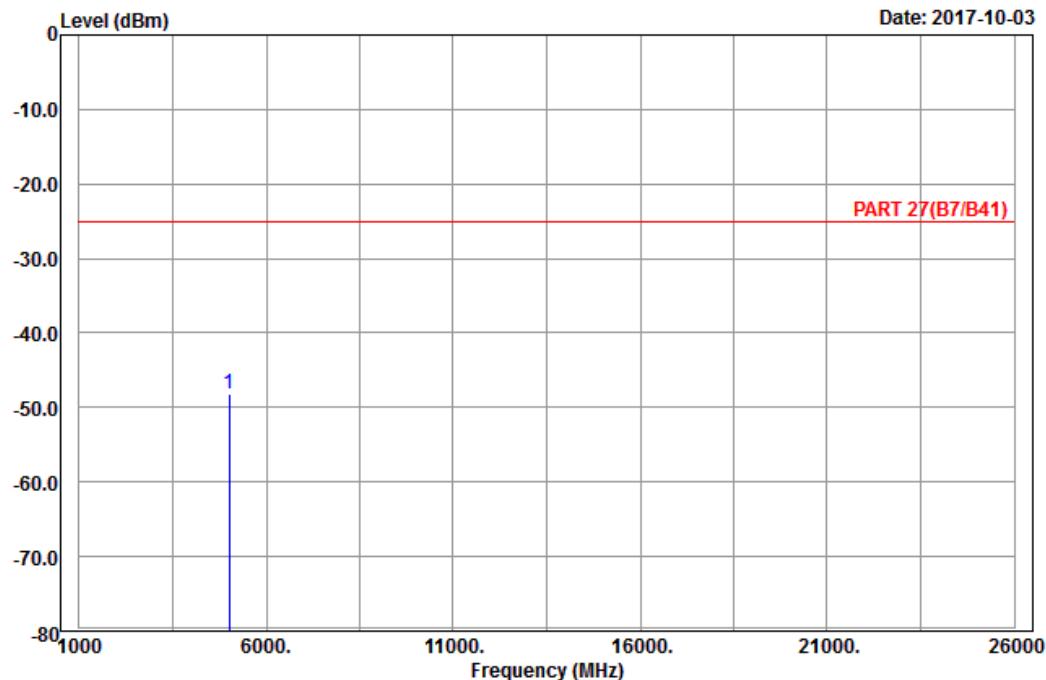
1 pp	5012.00	-47.82	-66.90	-25.00	-22.82	19.08 Peak
------	---------	--------	--------	--------	--------	------------



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1
Condition: PART 27(B7/B41) Vertical
Remark : LTE_Band 41_Link_CH39750
Tested by: Charles Hsiao

Freq	Read		Limit	Over	Remark	
	Level	Level	Line	Limit Factor		
MHz	dBm	dBm	dBm	dB	dB	
1 pp	5012.00	-48.20	-67.28	-25.00	-23.20	19.08 Peak

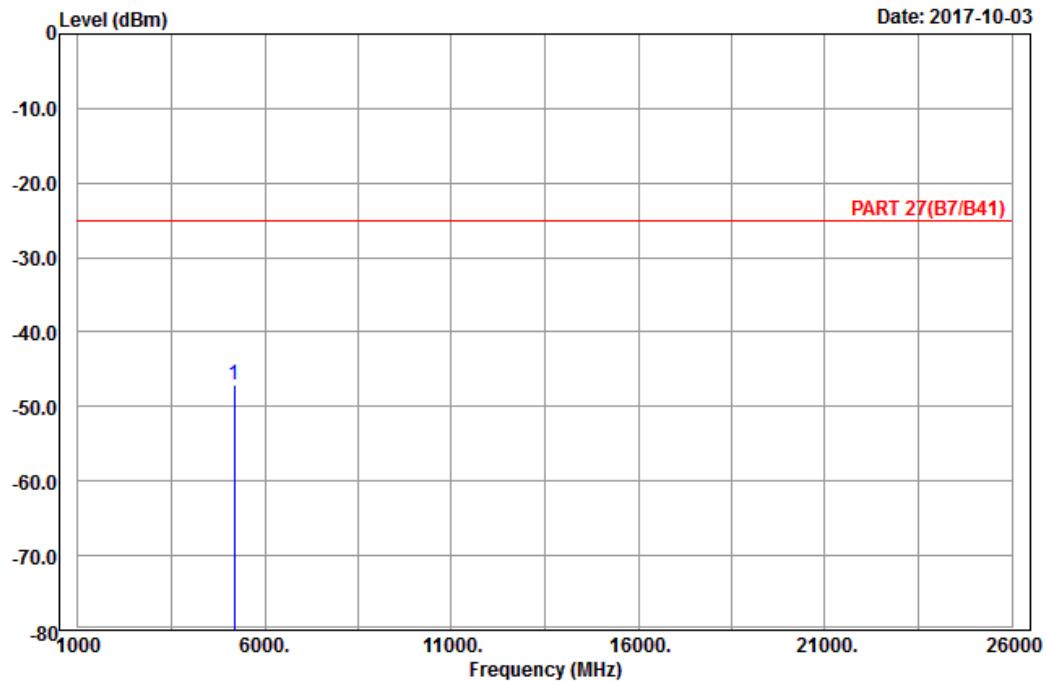
Middle Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 9



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 41_Link_CH40620

Tested by: Charles Hsiao

Freq	Read Level	Limit Level	Over Line	Limit Factor	Remark
MHz	dBm	dBm	dBm	dB	dB

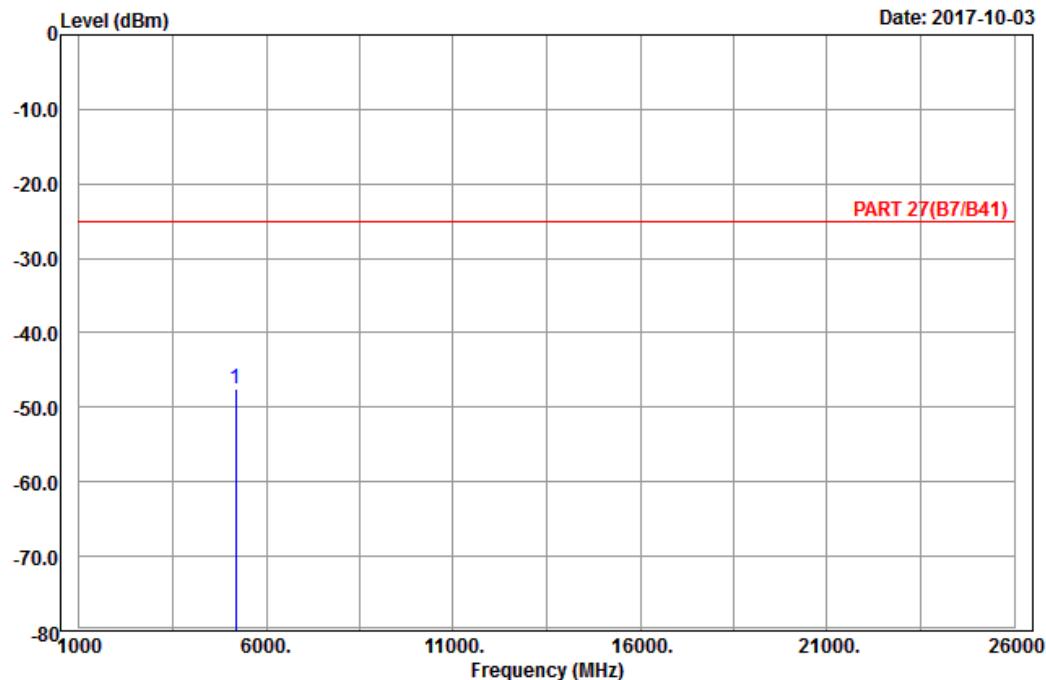
1 pp 5186.00 -47.02 -67.14 -25.00 -22.02 20.12 Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 10



Site : 966 chamber 1

Condition: PART 27(B7/B41) Vertical

Remark : LTE_Band 41_Link_CH40620

Tested by: Charles Hsiao

Freq	Read Level		Limit Level	Over Line	Limit Factor	Remark
	MHz	dBm	dBm	dBm	dB	
1 pp	5186.00	-47.51	-67.63	-25.00	-22.51	20.12 Peak

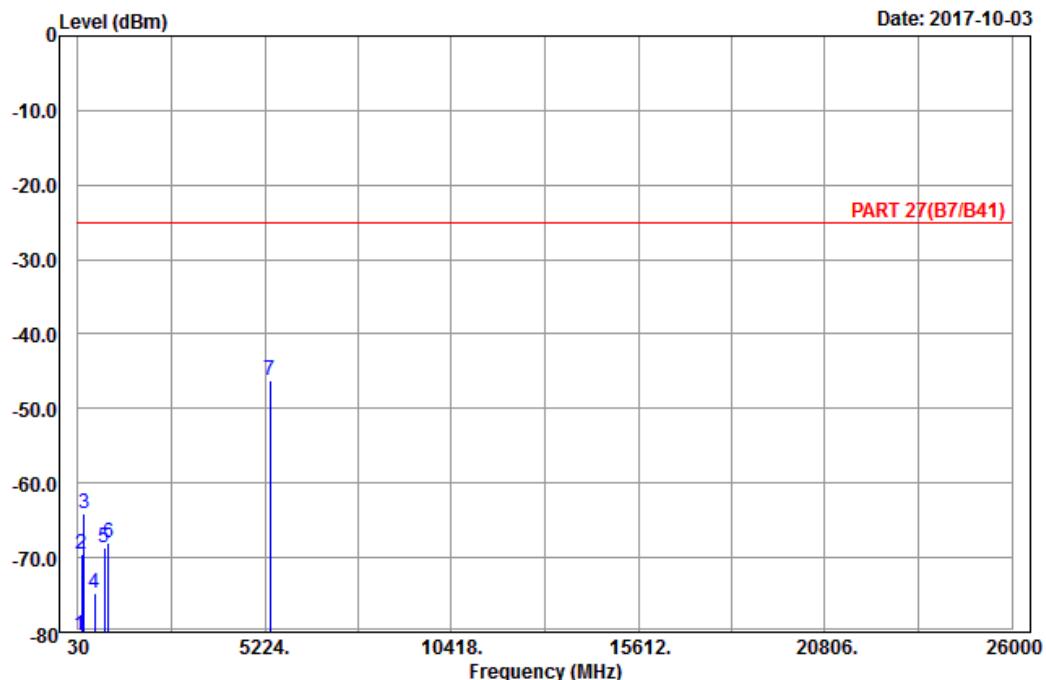
High Channel



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 13



Site : 966 chamber 1

Condition: PART 27(B7/B41) Horizontal

Remark : LTE_Band 41_Link_CH41490

Tested by: Charles Hsiao

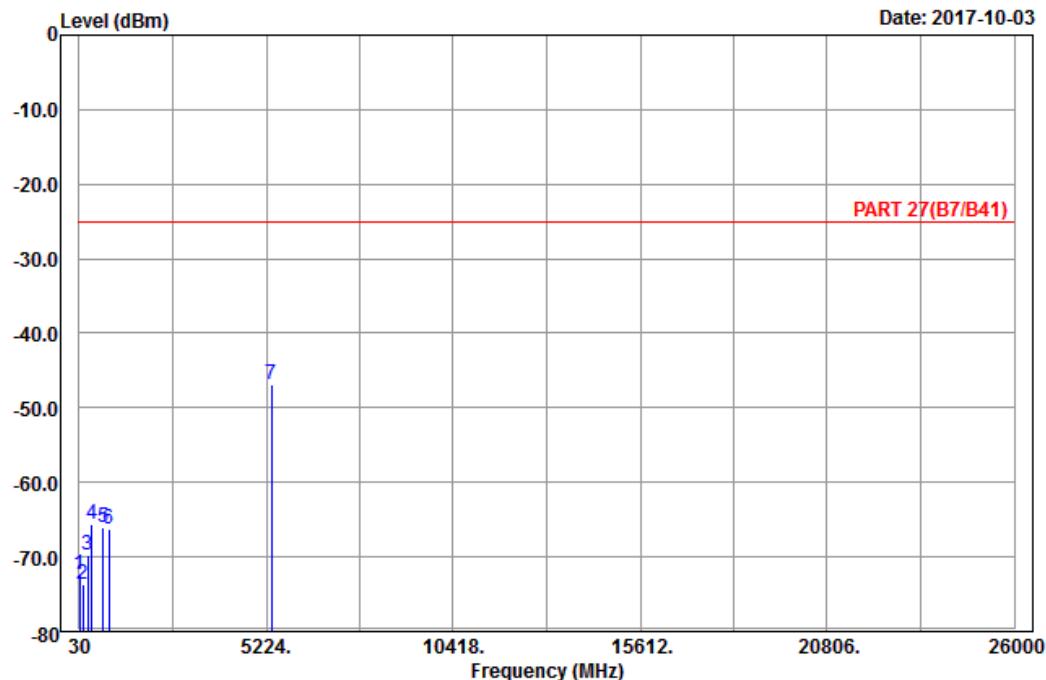
	Freq	Read Level	Limit Level	Over Line	Over Limit	Factor	Remark
	MHz	dBm	dBm	dBm	dB	dB	
1	52.68	-80.39	-66.33	-25.00	-55.39	-14.06	Peak
2	121.26	-69.58	-61.39	-25.00	-44.58	-8.19	Peak
3	207.39	-64.18	-58.10	-25.00	-39.18	-6.08	Peak
4	500.90	-74.86	-69.58	-25.00	-49.86	-5.28	Peak
5	760.60	-68.56	-67.95	-25.00	-43.56	-0.61	Peak
6	869.10	-68.06	-70.06	-25.00	-43.06	2.00	Peak
7 pp	5360.00	-46.25	-66.55	-25.00	-21.25	20.30	Peak



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 14



Site : 966 chamber 1

Condition: PART 27(B7/B41) Vertical

Remark : LTE_Band 41_Link_CH41490

Tested by: Charles Hsiao

Freq	Level	Read	Limit	Over	Factor	Remark	
		MHz	dBm	dBm	Line	Limit	
1	36.75	-72.29	-61.95	-25.00	-47.29	-10.34	Peak
2	126.66	-73.66	-65.83	-25.00	-48.66	-7.83	Peak
3	259.23	-69.65	-64.06	-25.00	-44.65	-5.59	Peak
4	387.50	-65.71	-62.35	-25.00	-40.71	-3.36	Peak
5	687.10	-65.95	-65.64	-25.00	-40.95	-0.31	Peak
6	854.40	-66.22	-67.81	-25.00	-41.22	1.59	Peak
7 pp	5360.00	-46.96	-67.26	-25.00	-21.96	20.30	Peak

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab

Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---