

FCC REPORT

Applicant: Baicells Technologies Co., Ltd.

Address of Applicant: 3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China

Equipment Under Test (EUT)

Product Name: LTE Indoor CPE

Model No.: EG2030C-M1

Trade mark: BaiCells

FCC ID: 2AG32EG2030CM1

Applicable standards: FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 27 Subpart M

Date of sample receipt: 26 Jun., 2017

Date of Test: 26 Jun., 2017 to 11 Jul., 2017

Date of report issued: 11 Jul., 2017

Test Result: PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Bruce Zhang

Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2. Version

Version No.	Date	Description
00	11 Jul., 2017	Original

Tested by:



Date:

11 Jul., 2017

Test Engineer

Reviewed by:



Date:

11 Jul., 2017

Project Engineer

3. Contents

	Page
1. COVER PAGE.....	1
2. VERSION.....	2
3. CONTENTS.....	3
4. TEST SUMMARY.....	4
5. GENERAL INFORMATION.....	5
5.1 CLIENT INFORMATION.....	5
5.2 GENERAL DESCRIPTION OF E.U.T.....	5
5.3 TEST MODES.....	6
5.4 DESCRIPTION OF SUPPORT UNITS.....	6
5.5 RELATED SUBMITTAL(S) / GRANT (S).....	6
5.6 TEST METHODOLOGY.....	6
5.7 LABORATORY FACILITY.....	6
5.8 LABORATORY LOCATION	6
5.9 TEST INSTRUMENTS LIST.....	7
6. SYSTEM TEST CONFIGURATION	8
6.1 EUT CONFIGURATION	8
6.2 EUT EXERCISE.....	8
6.3 CONFIGURATION OF TESTED SYSTEM	8
6.4 DESCRIPTION OF TEST MODES.....	8
6.5 TRANSMIT OUTPUT POWER	9
6.6 OCCUPY BANDWIDTH	12
6.7 OUT OF BAND EMISSION AT ANTENNA TERMINALS	22
6.8 ERP, EIRP MEASUREMENT	71
6.9 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT.....	75
6.10 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT.....	81
6.11 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT	84
7. TEST SETUP PHOTO.....	86
8. EUT CONSTRUCTIONAL DETAILS	87

4. Test Summary

Test Item	Section in CFR 47	Result
	FCC	
RF Output Power	Part 2.1046 Part 27.50 (h)(2)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 27.53(m)(6)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(m)(2)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(m)(2)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 27.54	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 27.54	Pass

Pass: The EUT complies with the essential requirements in the standard.

5. General Information

5.1 Client Information

Applicant:	Baicells Technologies Co., Ltd.
Address of Applicant:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China
Manufacturer	Baicells Technologies Co., Ltd.
Address of Manufacturer:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China

5.2 General Description of E.U.T.

Product Name:	LTE Indoor CPE
Model No.:	EG2030C-M1
Operation Frequency range:	Band41: 2496MHz~2690MHz
Modulation type:	BPSK, QPSK, 16QAM
Antenna type:	Internal antenna
Antenna gain:	6 dBi
Power supply:	DC 5V
AC adapter:	Model: ADS-12G-0605010EPCU Input: AC100-240V, 50/60Hz, 0.5 A Output: DC 5V, 2.0A

Test Channel:**Band41**

5MHz		10MHz	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
Lowest	2498.5	Lowest	2501.0
Middle	2593.0	Middle	2593.0
Highest	2687.5	Highest	2685.0
15MHz		20MHz	
Channel:	Frequency (MHz)	Channel:	Frequency (MHz)
Lowest	2503.5	Lowest	2506.0
Middle	2593.0	Middle	2593.0
Highest	2682.5	Highest	2680.0

5.3 Test modes

Data mode (QPSK)	Keep the EUT in data communicating mode (QPSK). (5MHz, 10MHz, 15MHz, 20MHz)
Data mode (16QAM)	Keep the EUT in data communicating mode (16QAM). (5MHz, 10MHz, 15MHz, 20MHz)

5.4 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
/	/	/	/	/

5.5 Related Submittal(s) / Grant (s)

FCC: This submittal(s) (test report) is filing to comply with Section Part 27 subpart M of the FCC CFR 47 Rules.

5.6 Test Methodology

FCC: Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.

Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China

Website: <http://www.ccis-cb.com>

Tel: +86-755-23118282

Fax: +86-755-23116366

Email: info@ccis-cb.com

5.9 Test Instruments list

Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	08-23-2017	08-22-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	CCIS0005	02-25-2017	02-24-2018
Horn Antenna	SCHWARZBECK	BBHA9120D	CCIS0006	02-25-2017	02-24-2018
Pre-amplifier (10kHz-1.3GHz)	HP	8447D	CCIS0003	02-25-2017	02-24-2018
Pre-amplifier (1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	02-25-2017	02-24-2018
Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	02-25-2017	02-24-2018
Horn Antenna	ETS-LINDGREN	3160	GTS217	02-25-2017	02-24-2018
Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP30	CCIS0023	02-25-2017	02-24-2018
Spectrum Analyzer 20Hz-26.5GHz	Agilent	N9020A	MY50510123	02-25-2017	02-24-2018
EMI Test Receiver	Rohde & Schwarz	ESRP7	CCIS0167	02-25-2017	02-24-2018
Loop antenna	Laplace instrument	RF300	EMC0701	02-25-2017	02-24-2018
Coaxial Cable	CCIS	N/A	CCIS0016	02-25-2017	02-24-2018
Coaxial Cable	CCIS	N/A	CCIS0017	02-25-2017	02-24-2018
Coaxial cable	CCIS	N/A	CCIS0018	02-25-2017	02-24-2018
Coaxial Cable	CCIS	N/A	CCIS0019	02-25-2017	02-24-2018
Coaxial Cable	CCIS	N/A	CCIS0087	02-25-2017	02-24-2018
Signal Generator	Rohde & Schwarz	SMR 20	CCIS0024	02-25-2017	02-24-2018
Signal Generator	Rohde & Schwarz	SMX	CCIS0064	02-25-2017	02-24-2018
Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	02-25-2017	02-24-2018
Universal radio communication tester	Anritsu	MT8820C	CCIS0170	02-25-2017	02-24-2018

6. System test configuration

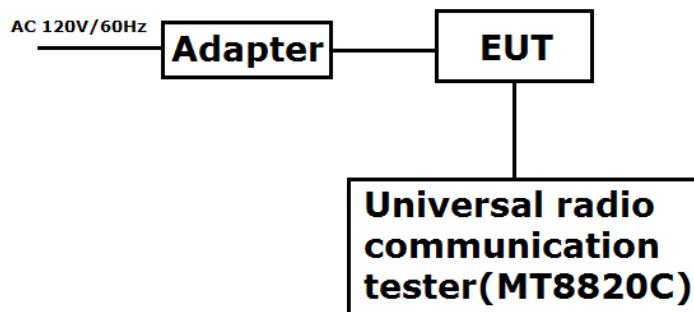
6.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

6.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency which was for the purpose of the measurements.

6.3 Configuration of Tested System



6.4 Description of Test Modes

The EUT has been tested under operating condition.

EUT staying in continuous transmitting mode. Channel Low, Mid and High for each type band with rated data rate were chosen for full testing.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for three modes with power adaptor. The worst-case H mode.

6.5 Transmit Output Power

Test Requirement:	Part 27.50 (h)(2)	
Test Method:	FCC part2.1046	
Limit:	Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.	
Test setup:	 <p>The diagram illustrates the measurement setup. On the left is a box labeled "EUT". A horizontal line extends from the right side of the "EUT" box to the left, then turns vertically upwards to connect to a small rectangular box labeled "ATT". From the right side of the "ATT" box, another horizontal line extends to the right, connecting to a larger rectangular box labeled "Communication Tester".</p> <p><i>Note: Measurement setup for testing on Antenna connector</i></p>	
<p>Test Procedure: The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the simulated station. Transmitter output power was read off in dBm.</p> <p>Test Instruments: Refer to section 5.9 for details</p> <p>Test mode: Refer to section 5.3 for details</p> <p>Test results: Passed</p>		

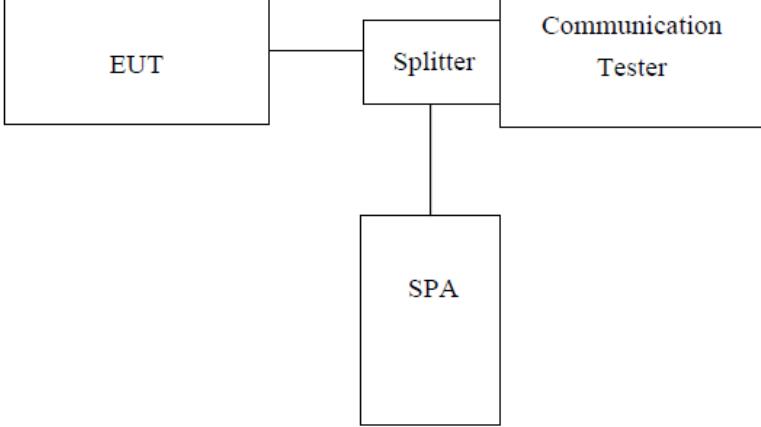
Measurement Data

LTE Band 41 Power:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					39675	40620	41565
					2498.5MHz	2593.0MHz	2687.5MHz
41	5	QPSK	1	0	21.04	22.64	22.87
			1	12	21.36	22.89	23.18
			1	24	21.10	22.56	22.75
			12	0	21.21	22.75	22.92
			12	6	21.31	22.82	23.07
			12	11	21.20	22.71	22.89
			25	0	21.24	22.67	22.88
		16QAM	1	0	21.37	22.88	22.93
			1	12	21.72	23.12	23.18
			1	24	21.39	22.80	22.87
			12	0	21.25	22.85	22.97
			12	6	21.41	22.89	23.08
			12	11	21.25	22.75	23.01
			25	0	21.25	22.73	23.01
LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					39700	40620	41540
					2501.0MHz	2593.0MHz	2685.0MHz
41	10	QPSK	1	0	20.72	22.14	22.41
			1	24	21.49	23.00	23.03
			1	49	20.74	22.34	22.20
			25	0	21.01	22.53	22.70
			25	12	21.29	22.76	22.84
			25	24	21.13	22.61	22.60
			50	0	21.00	22.58	22.58
		16QAM	1	0	20.82	22.32	22.58
			1	24	21.66	23.10	23.20
			1	49	20.97	22.44	22.38
			25	0	21.07	22.61	22.78
			25	12	21.36	22.84	22.87
			25	24	21.13	22.68	22.68
			50	0	21.16	22.67	22.67

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					39725	40620	41515
					2503.5MHz	2593.0MHz	2682.5MHz
41	15	QPSK	1	0	20.99	21.56	21.78
			1	37	21.39	22.90	22.92
			1	74	20.97	21.75	21.62
			36	0	20.80	22.24	22.42
			36	16	21.19	22.64	22.81
			36	35	20.87	22.32	22.37
			75	0	20.77	22.30	22.48
		16QAM	1	0	20.59	22.03	22.29
			1	37	21.81	23.26	23.38
			1	74	20.76	22.22	22.09
			36	0	20.80	22.25	22.50
			36	16	21.19	22.60	22.76
			36	35	20.95	22.41	22.37
			75	0	20.80	22.35	22.51
LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					39750	40620	41490
					2506.0MHz	2593.0MHz	2680.0MHz
41	20	QPSK	1	0	21.77	23.19	23.52
			1	49	21.45	22.92	23.04
			1	99	22.02	23.45	23.23
			50	0	21.51	22.86	23.14
			50	24	21.47	22.88	23.07
			50	49	21.62	23.07	23.01
			100	0	21.62	23.00	23.18
		16QAM	1	0	22.26	23.68	23.97
			1	49	21.93	23.35	23.50
			1	99	22.51	23.85	23.76
			50	0	21.49	22.98	23.23
			50	24	21.53	22.95	23.07
			50	49	21.69	23.14	23.14
			100	0	21.65	23.06	23.29

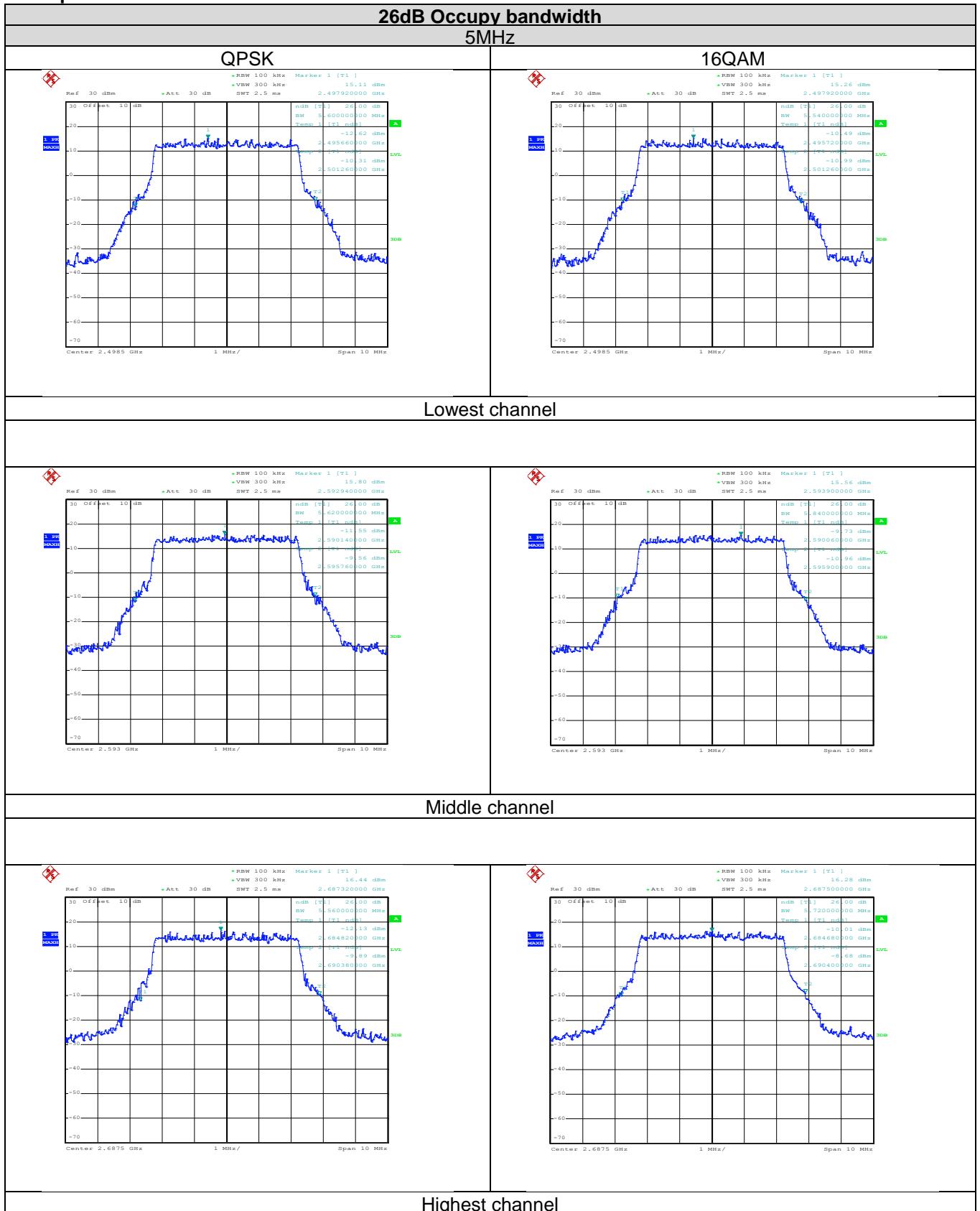
6.6 Occupy Bandwidth

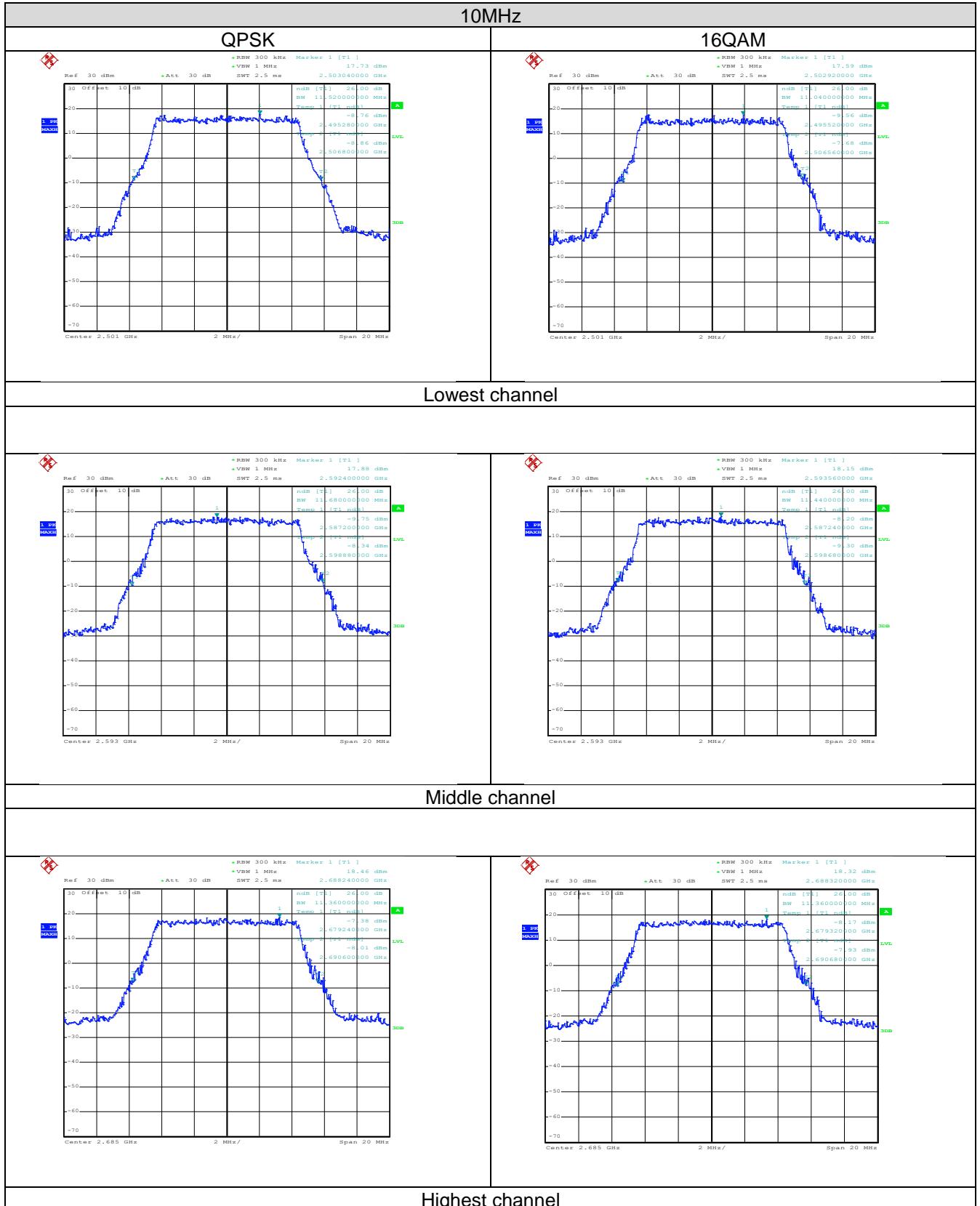
Test Requirement:	Part 27.53(m)(6)
Test Method:	FCC part 2.1049
Test setup:	 <p><i>Note: Measurement setup for testing on Antenna connector</i></p>
Test Procedure:	
<ol style="list-style-type: none"> 1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer. 2. The transmitter shall be operated at its maximum carrier power measured under normal test conditions. 3. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. 4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW. 	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

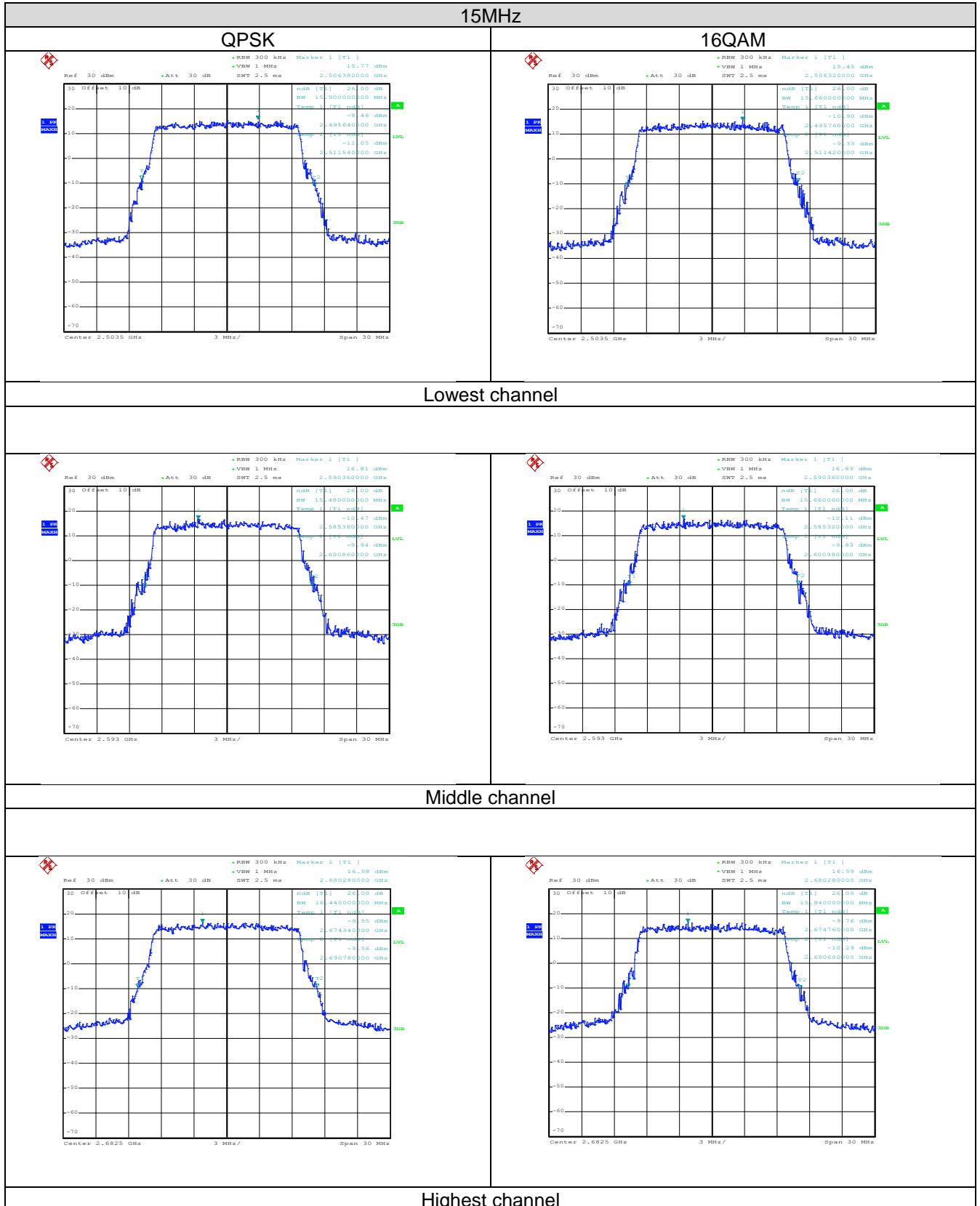
Measurement Data:

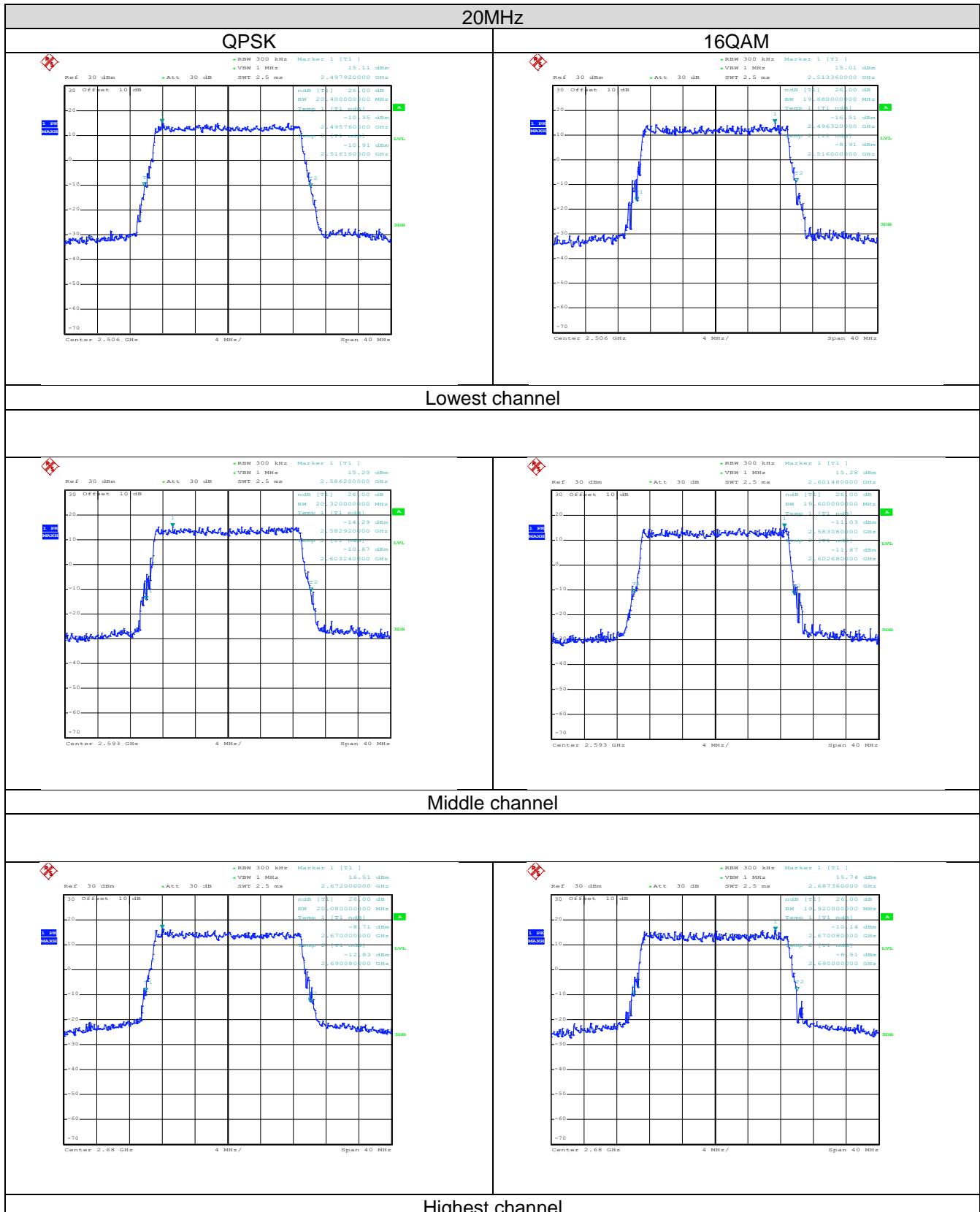
Bandwidth(MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
5	QPSK	Lowest	5.60	4.58
		Middle	5.62	4.54
		Highest	5.56	4.52
	16QAM	Lowest	5.54	4.54
		Middle	5.84	4.54
		Highest	5.72	4.52
10	QPSK	Lowest	11.52	9.20
		Middle	11.68	9.36
		Highest	11.36	9.24
	16QAM	Lowest	11.04	9.20
		Middle	11.44	9.20
		Highest	11.36	9.24
15	QPSK	Lowest	15.90	13.56
		Middle	15.48	13.56
		Highest	16.44	13.56
	16QAM	Lowest	15.66	13.50
		Middle	15.66	13.56
		Highest	15.84	13.56
20	QPSK	Lowest	20.40	18.00
		Middle	20.32	18.00
		Highest	20.08	18.08
	16QAM	Lowest	19.68	18.00
		Middle	19.60	18.00
		Highest	19.92	17.92

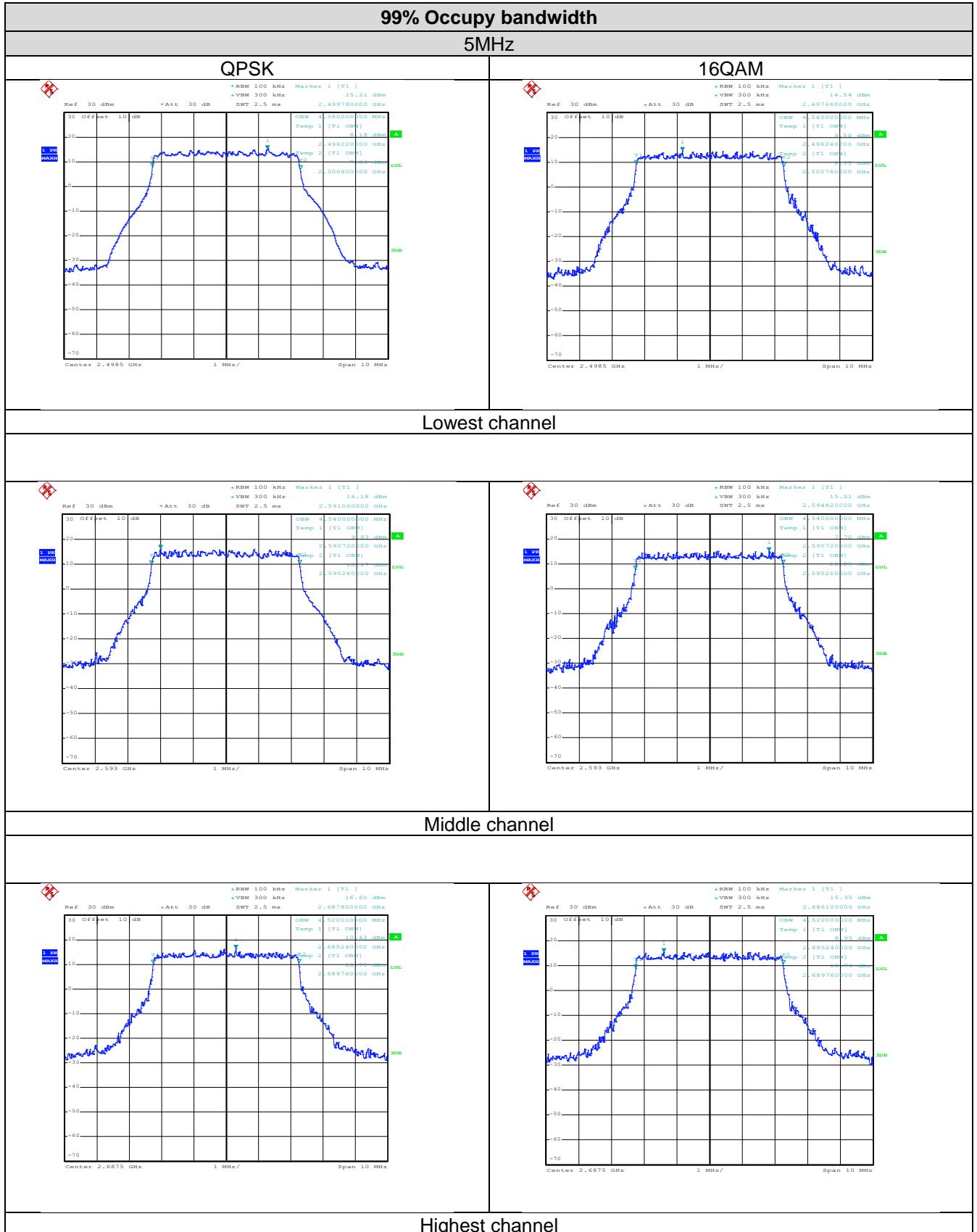
Test plot as follows:

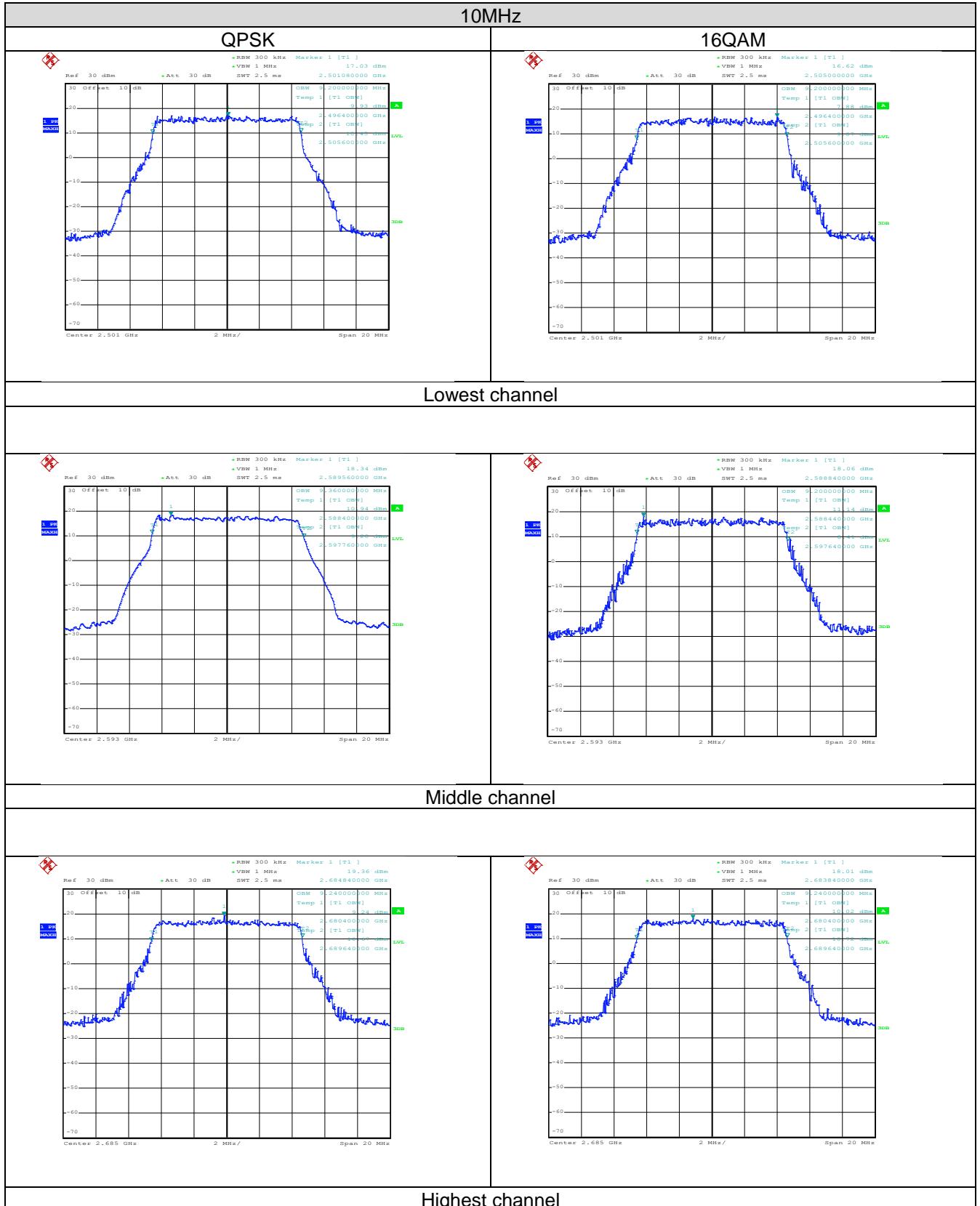


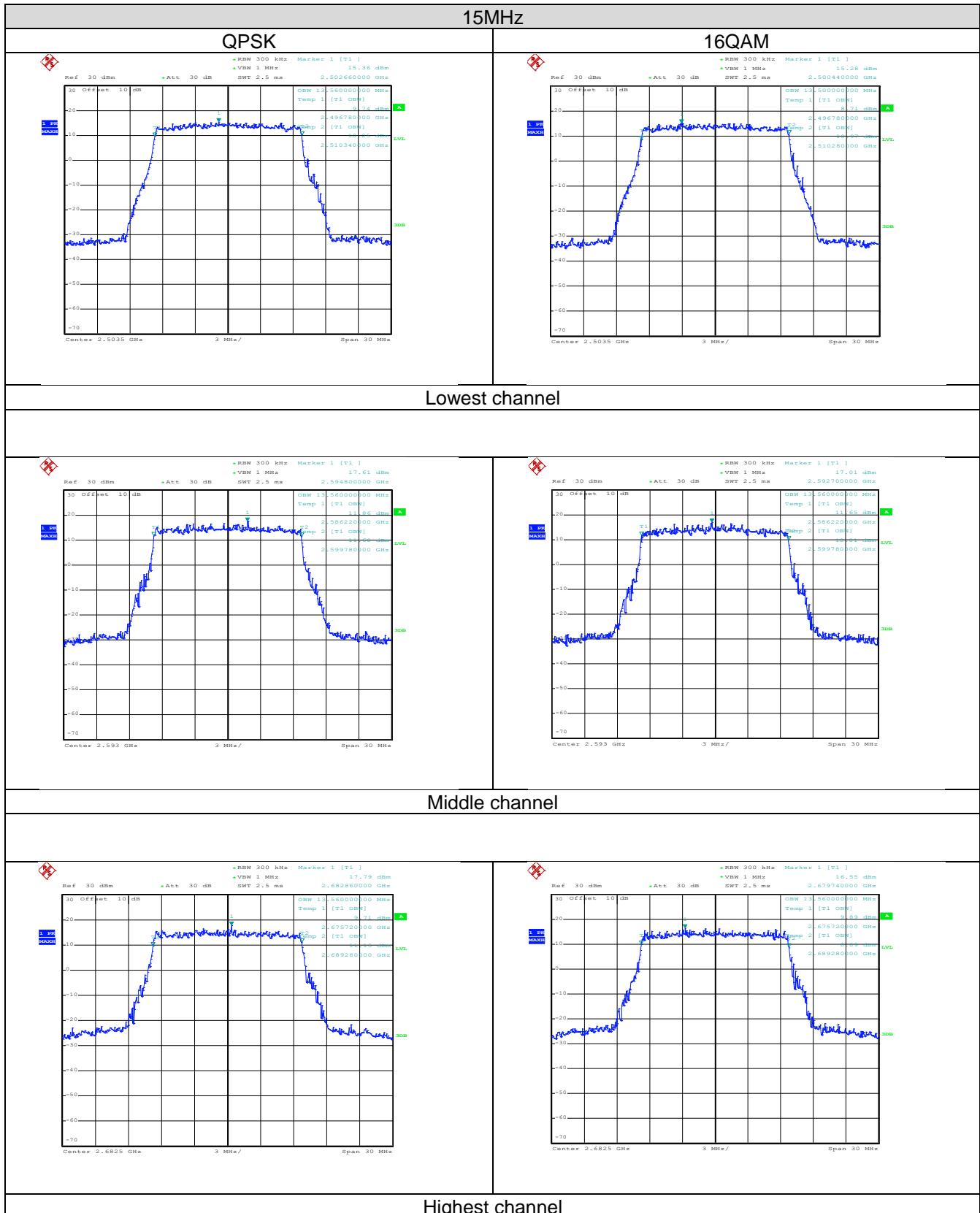


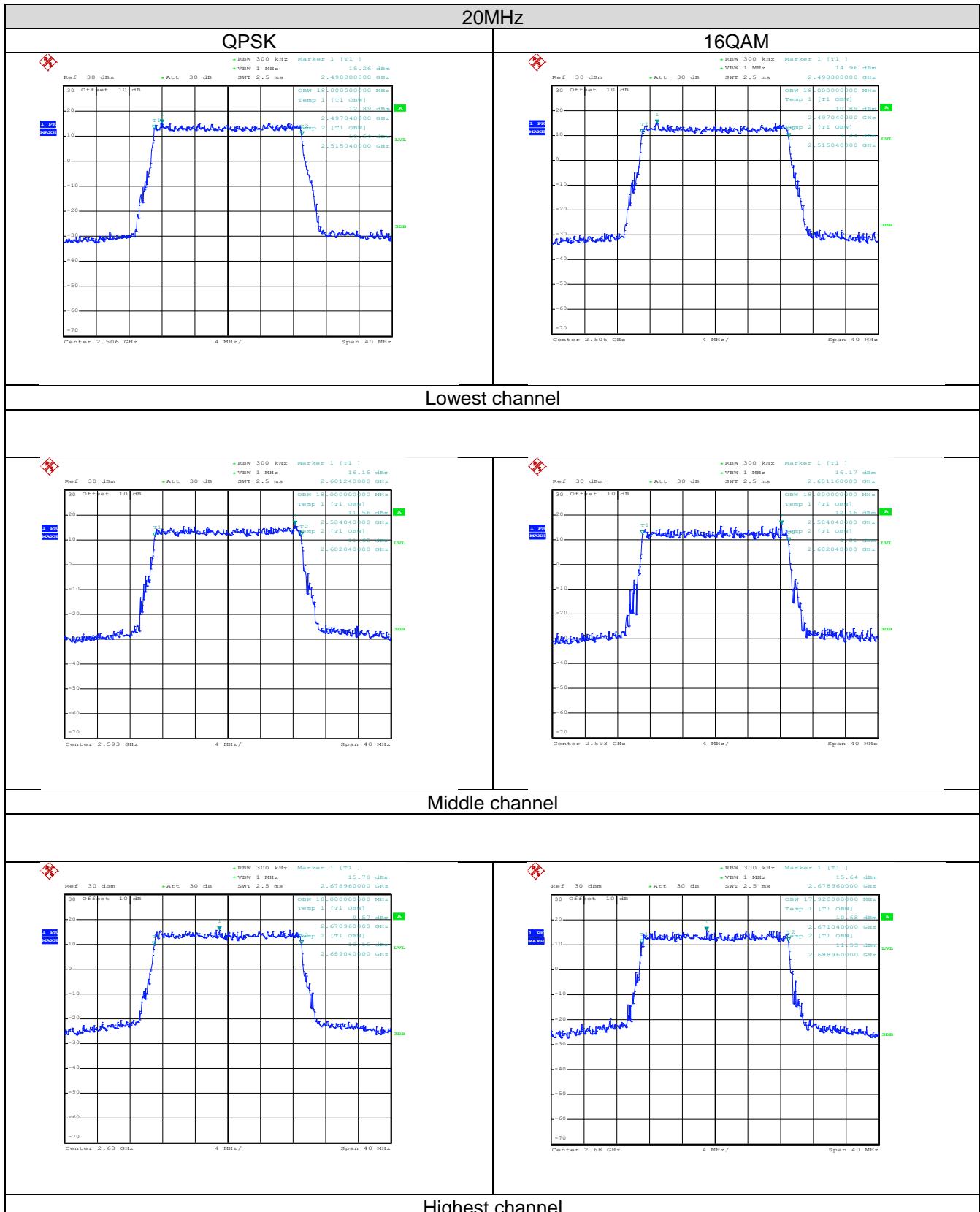








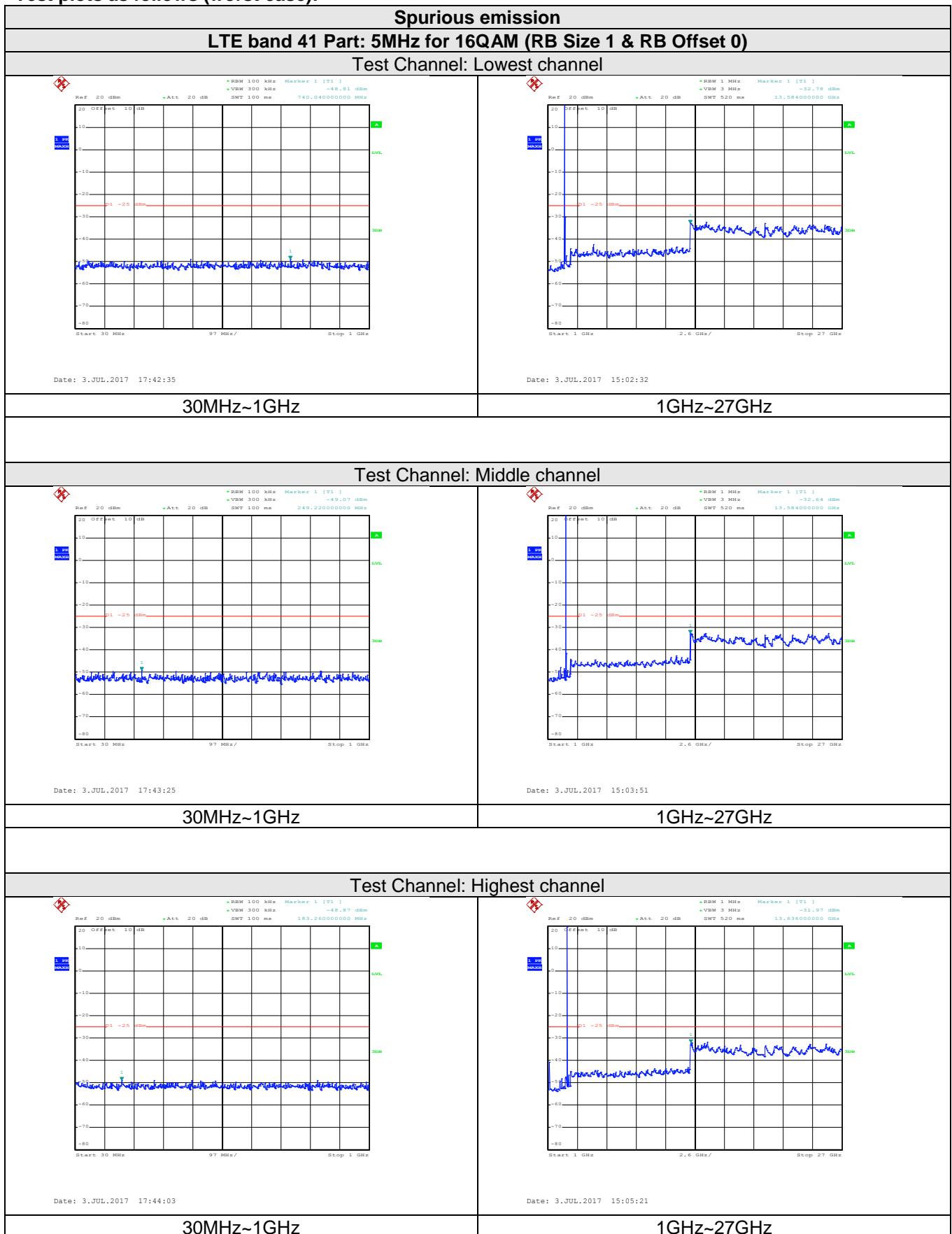


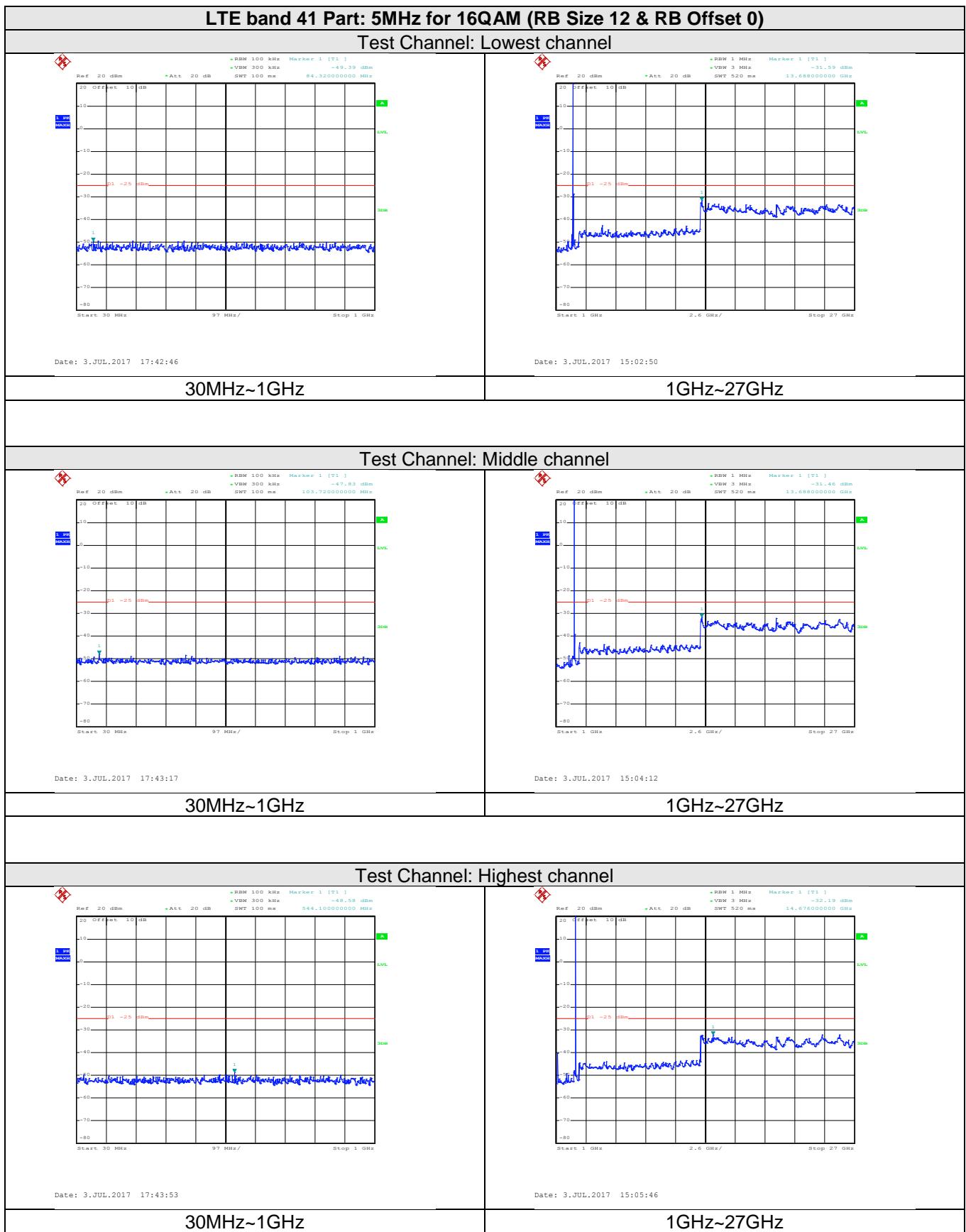


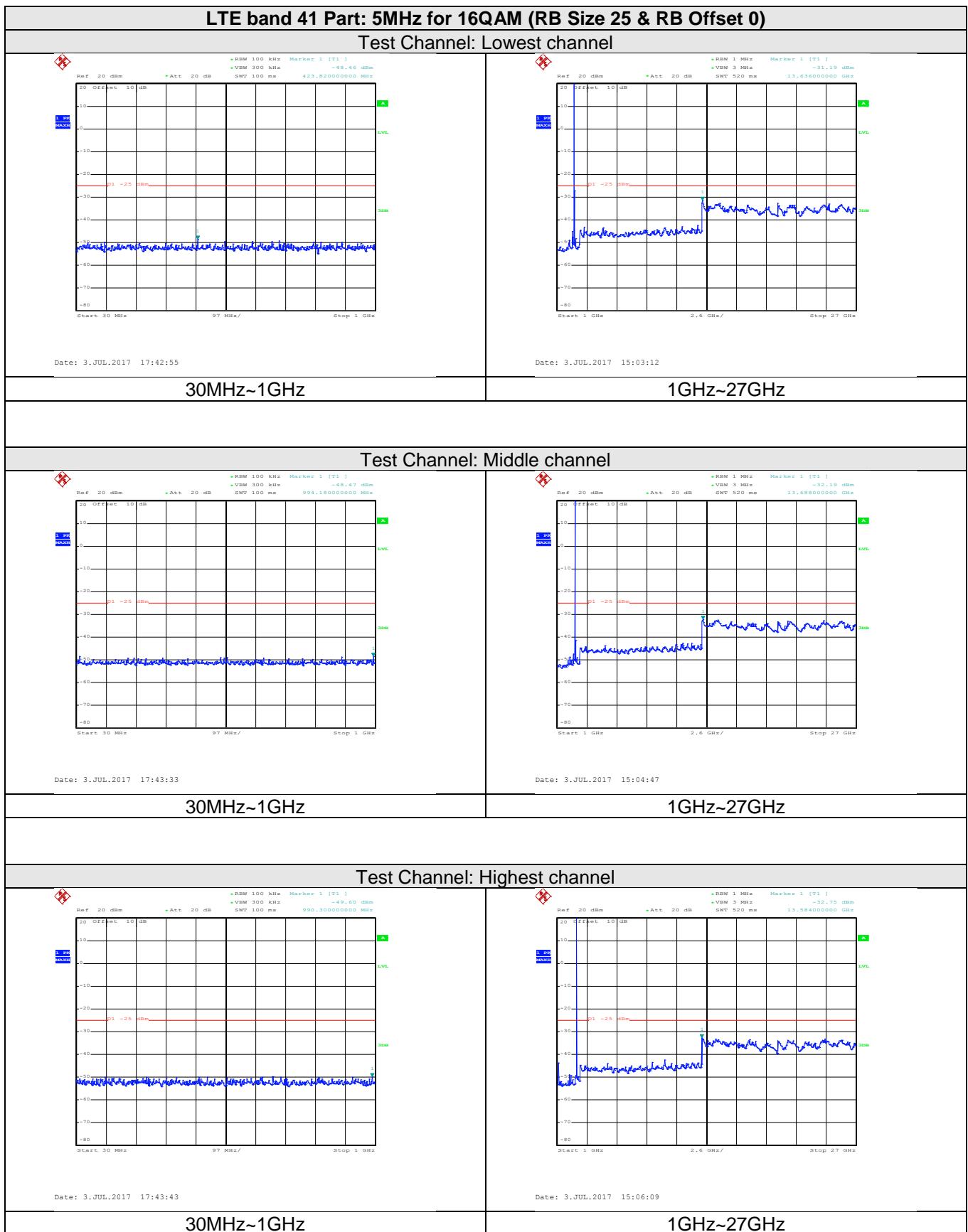
6.7 Out of band emission at antenna terminals

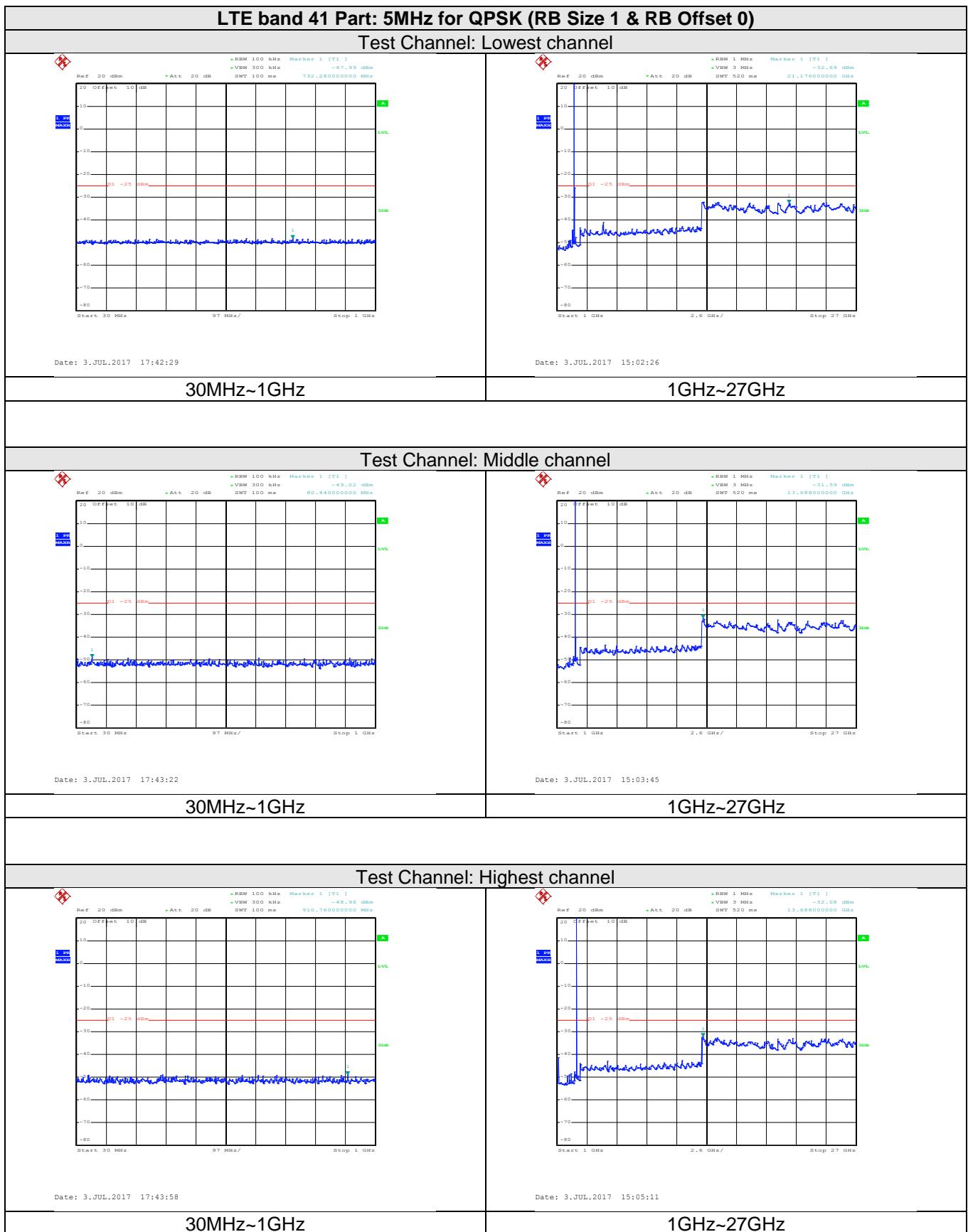
Test Requirement:	Part 27.53(m)(2)(v)
Test Method:	FCC part2.1051
Limit:	For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge.
Test setup:	<pre> graph LR EUT[EUT] --- Splitter[Splitter] Splitter --- CommTester[Communication Tester] Splitter --- ATT[ATT] ATT --- SPA[SPA] </pre>
<i>Note: Measurement setup for testing on Antenna connector</i>	
Test Procedure:	<ol style="list-style-type: none"> 1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 100 kHz when below 1GHz, 1MHz when above 1 GHz; sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

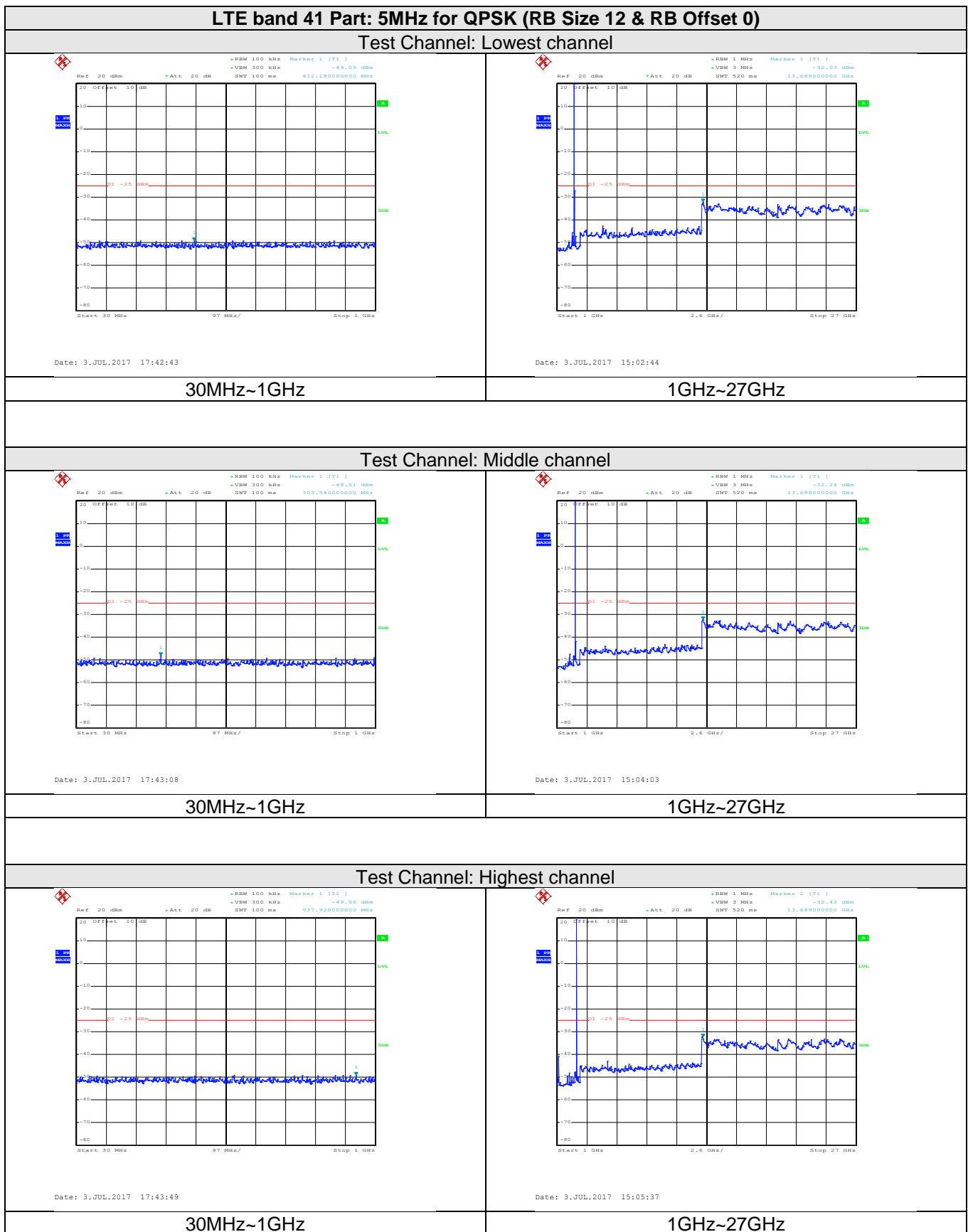
Test plots as follows (worst case):

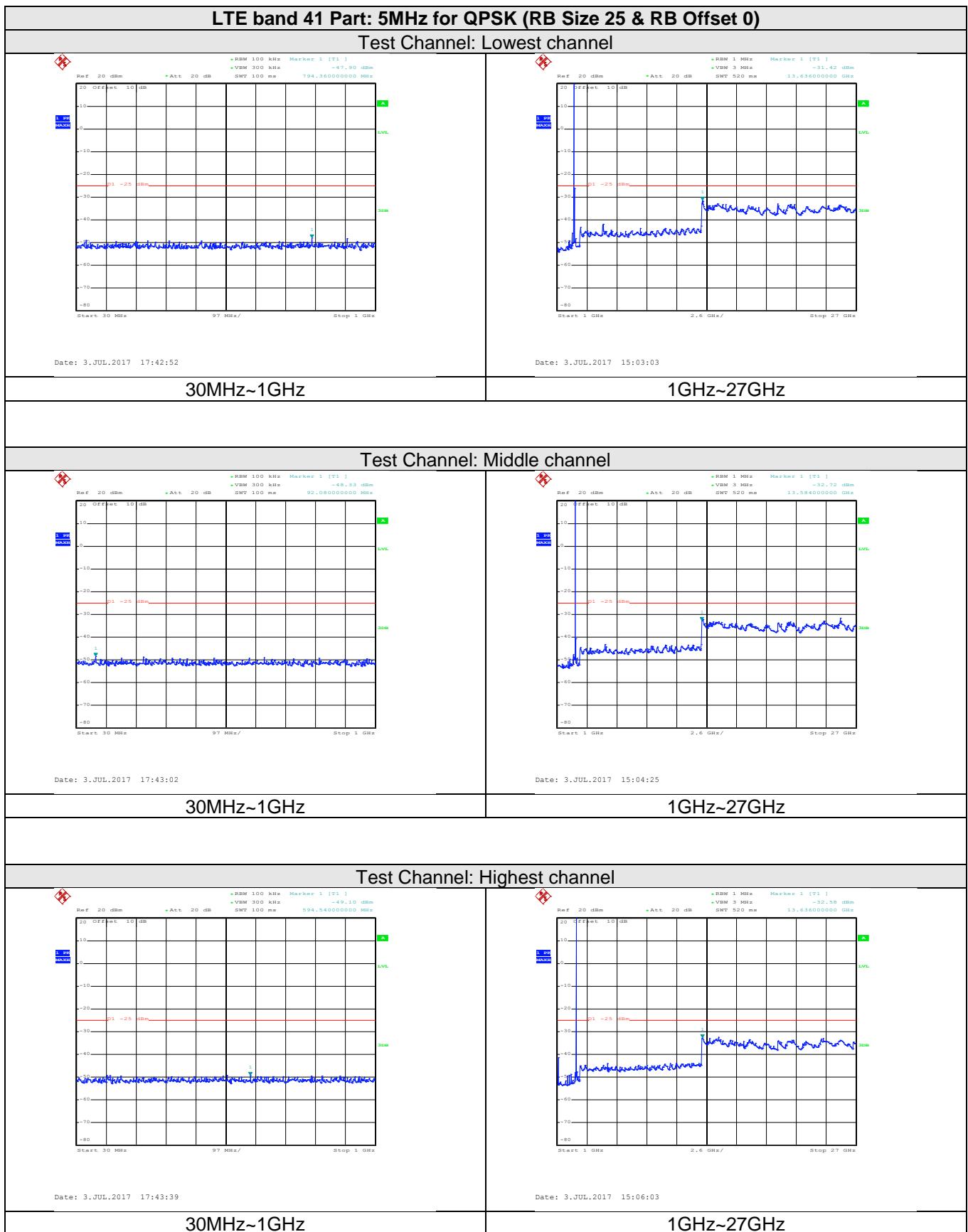


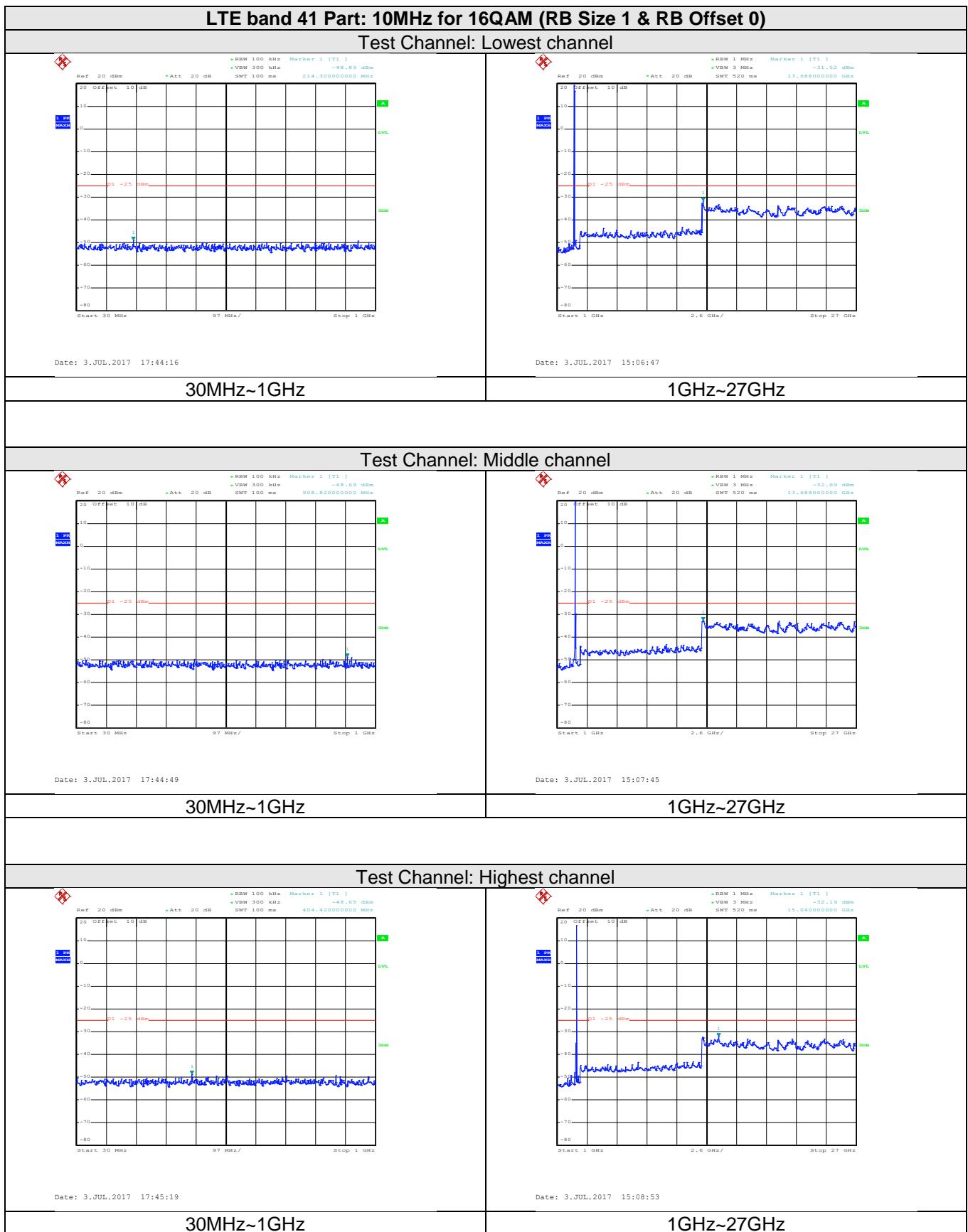


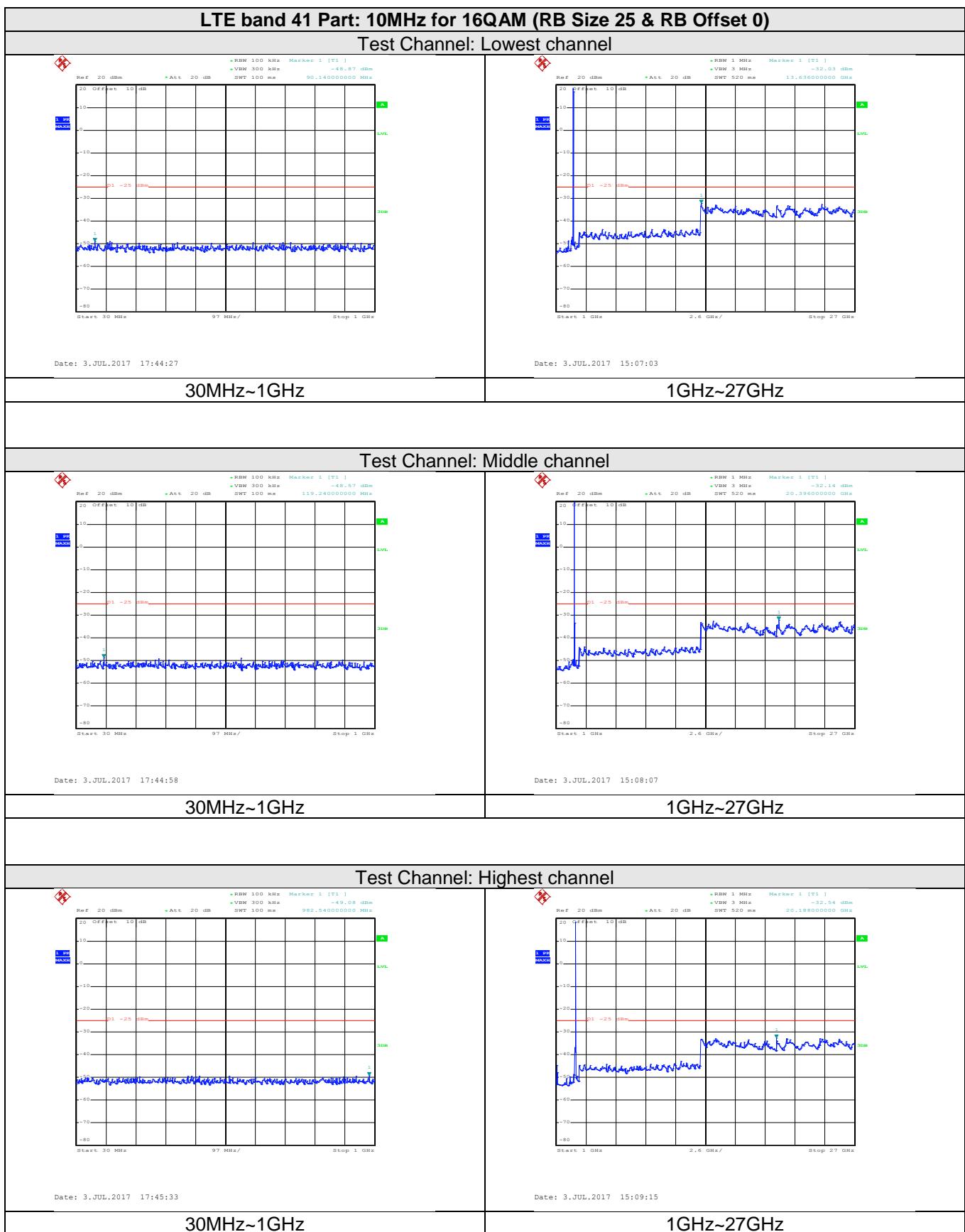


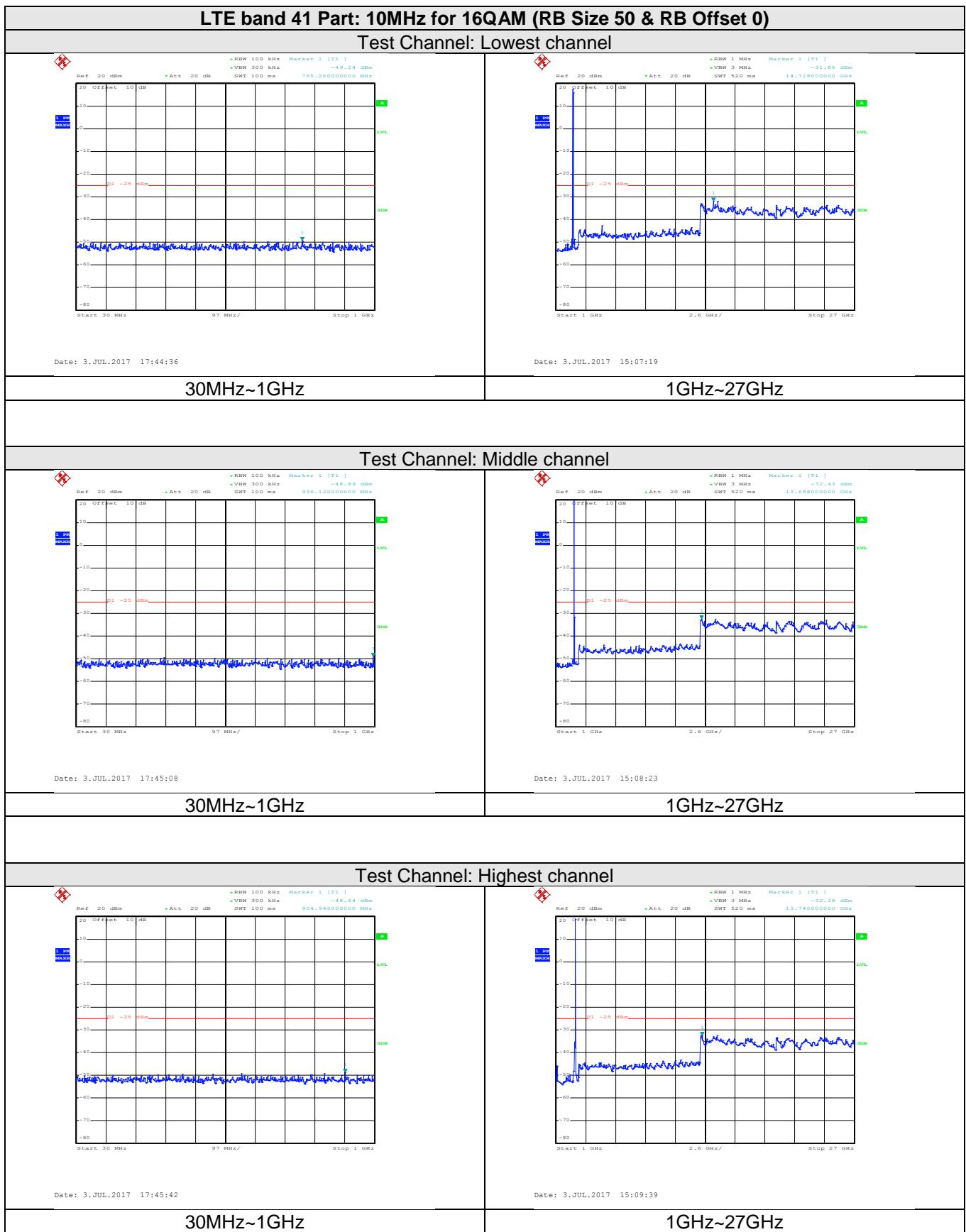


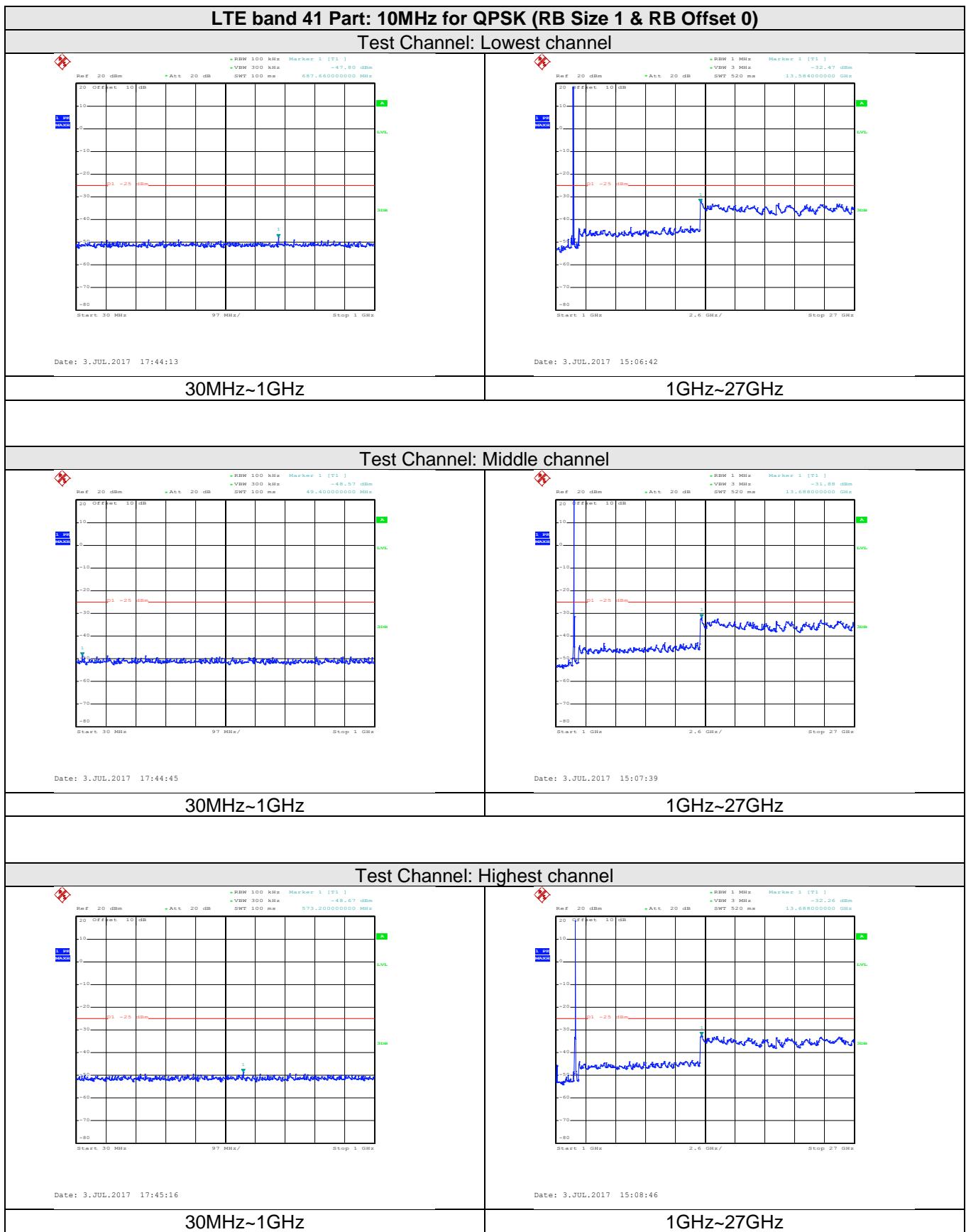


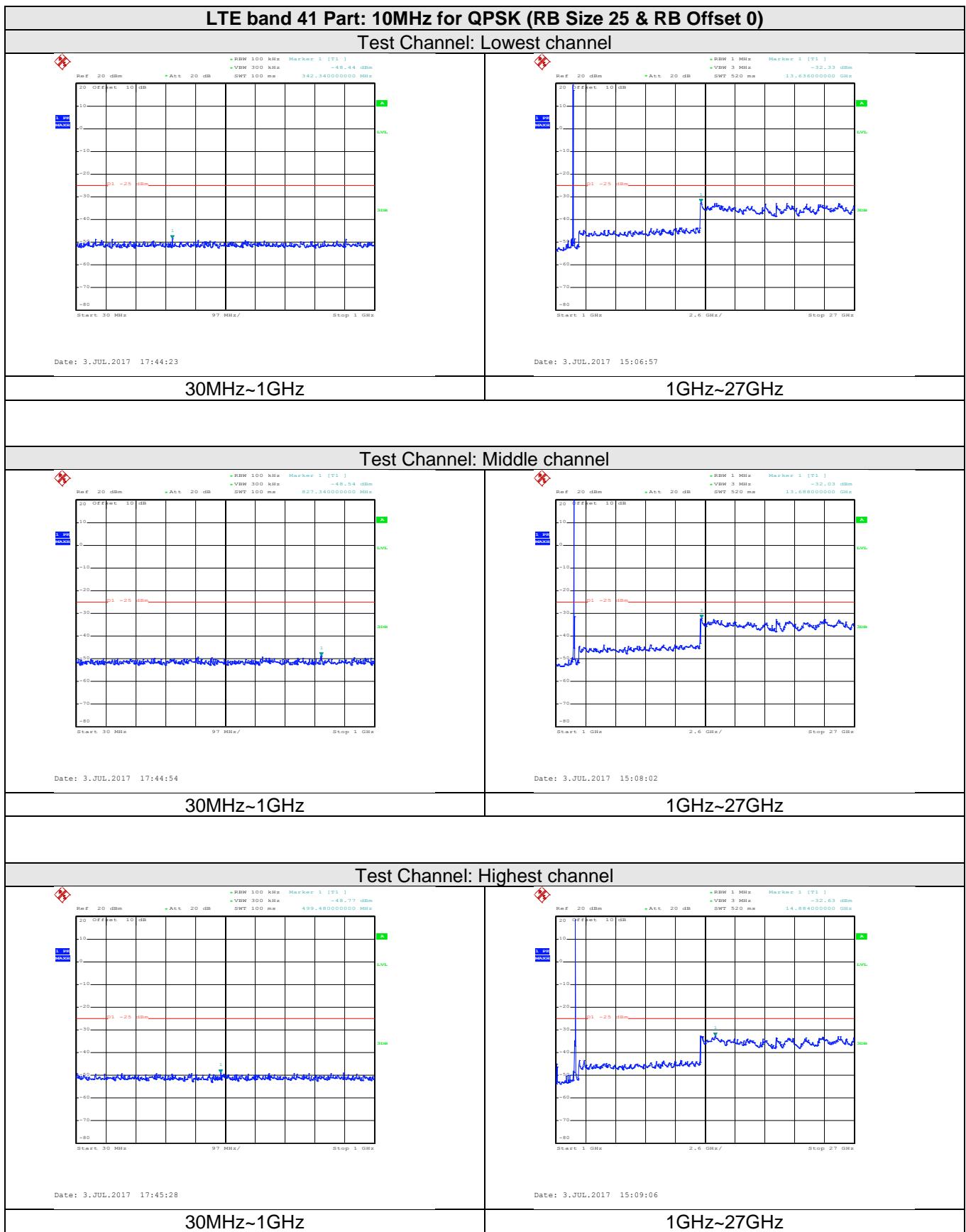


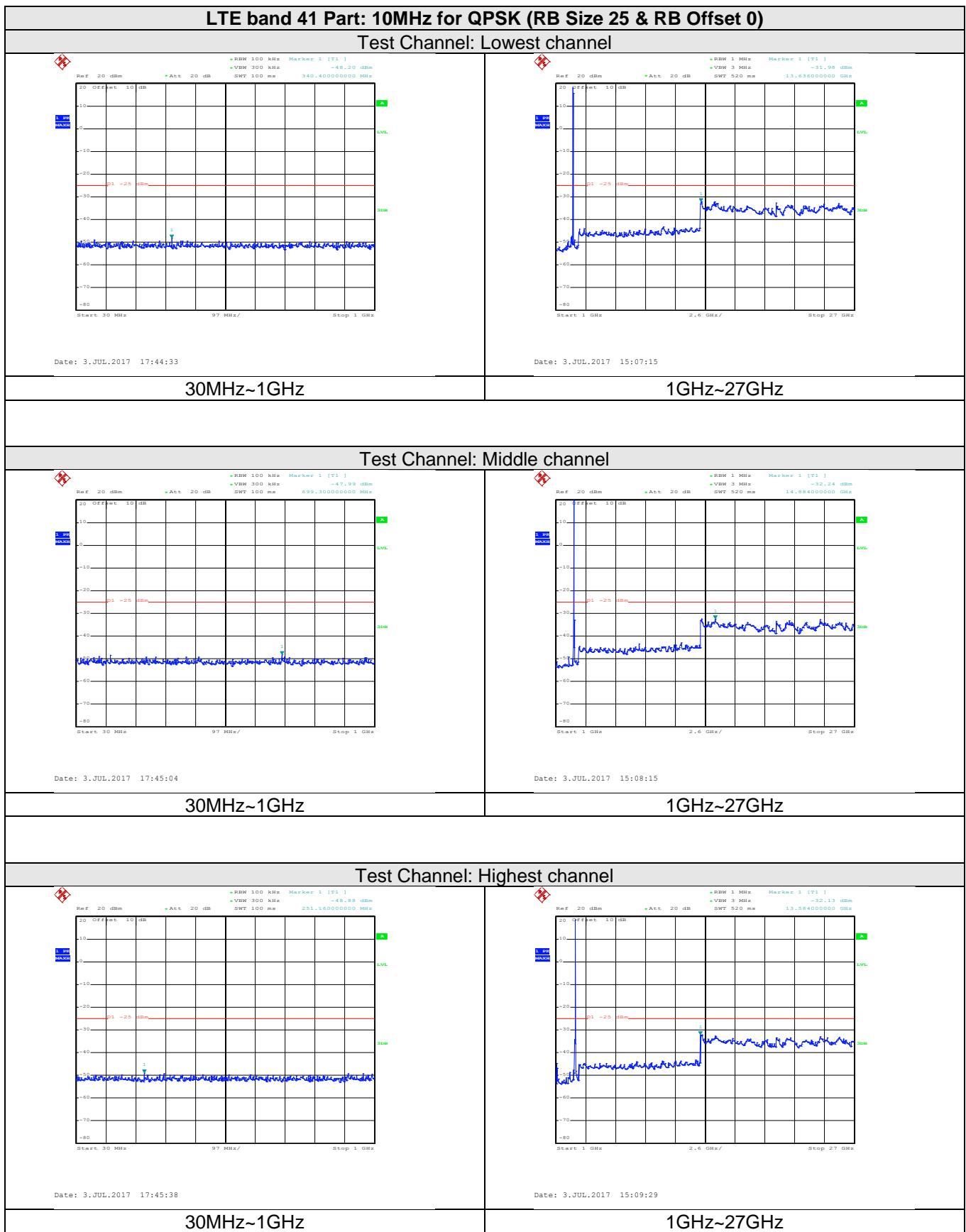


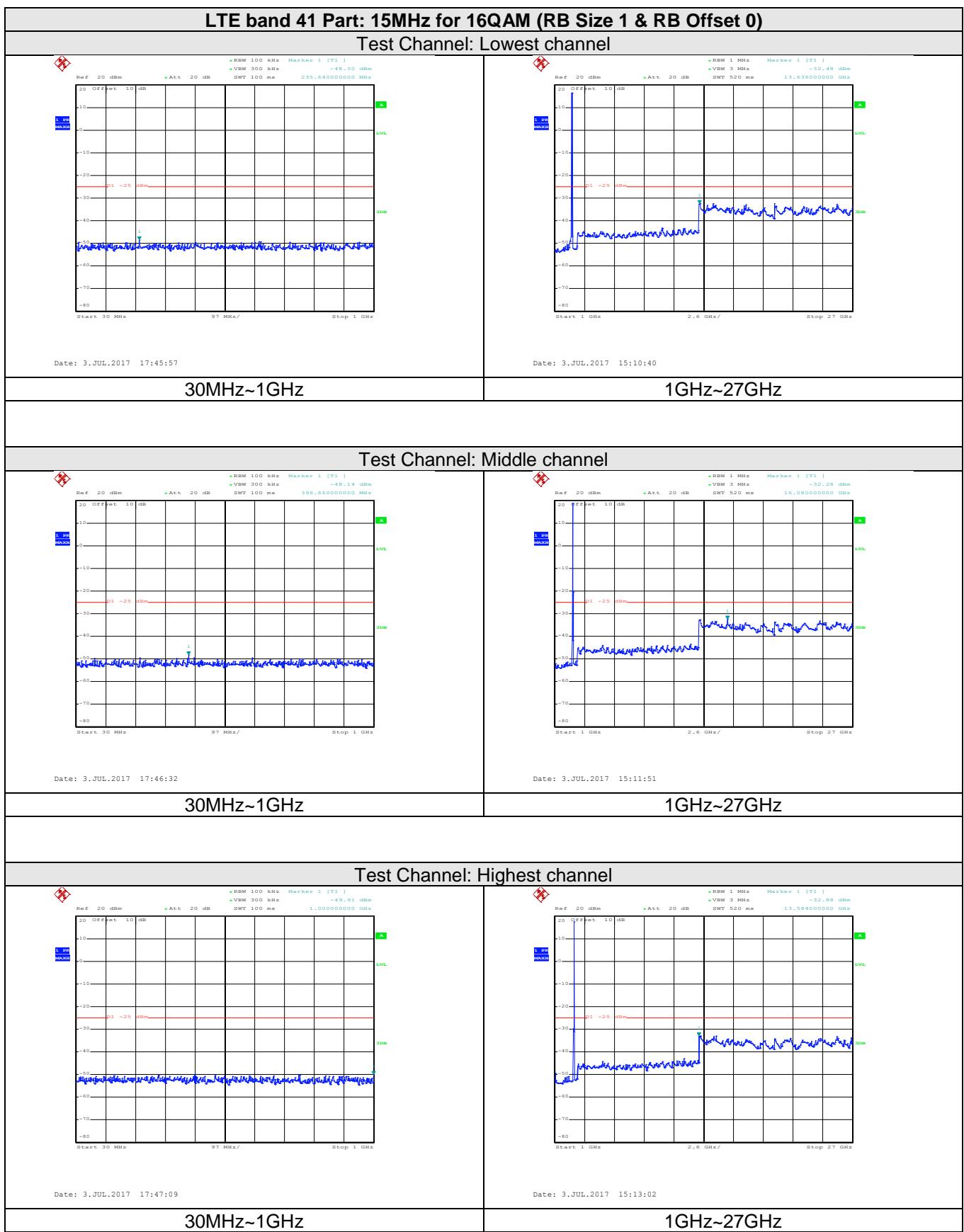


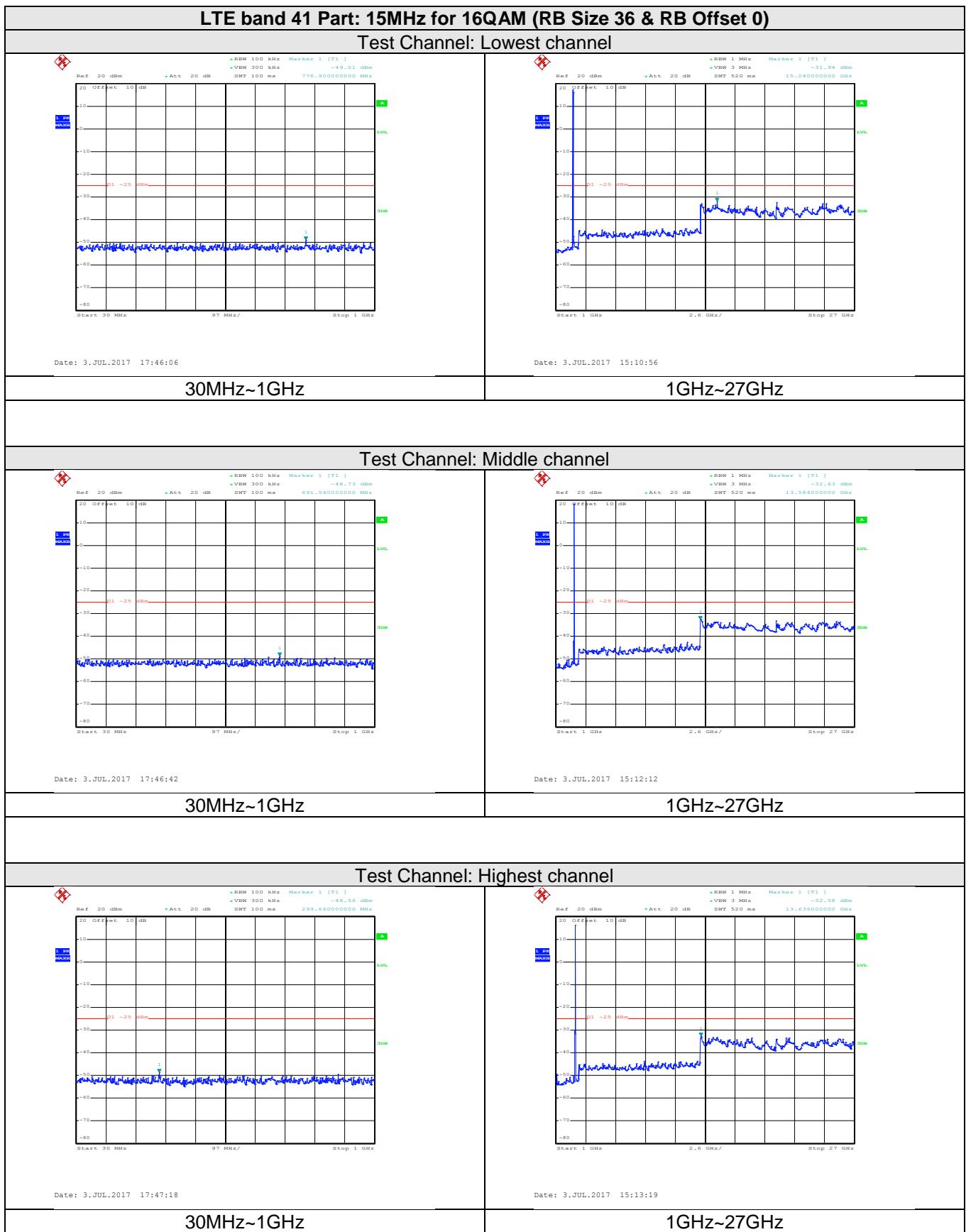


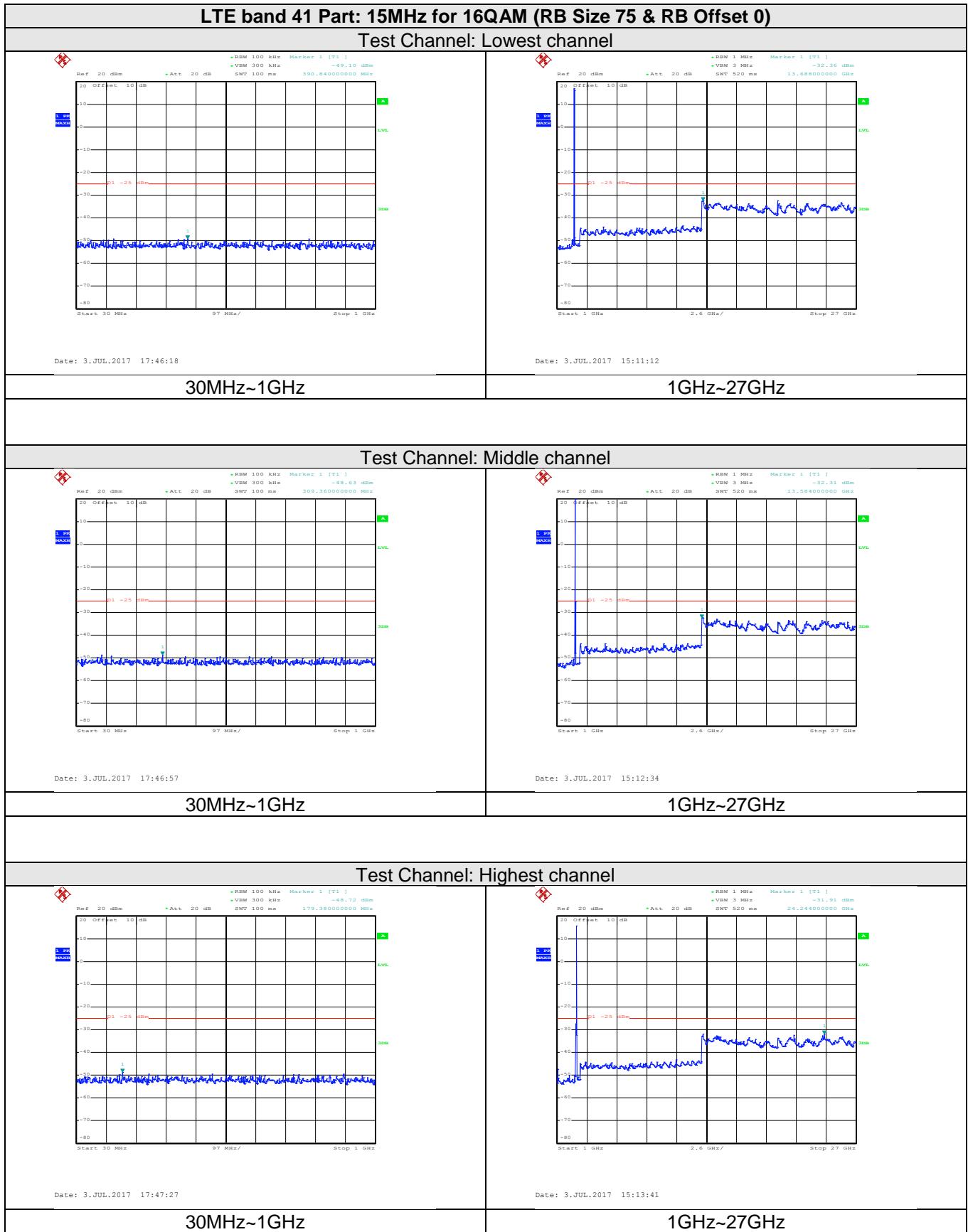


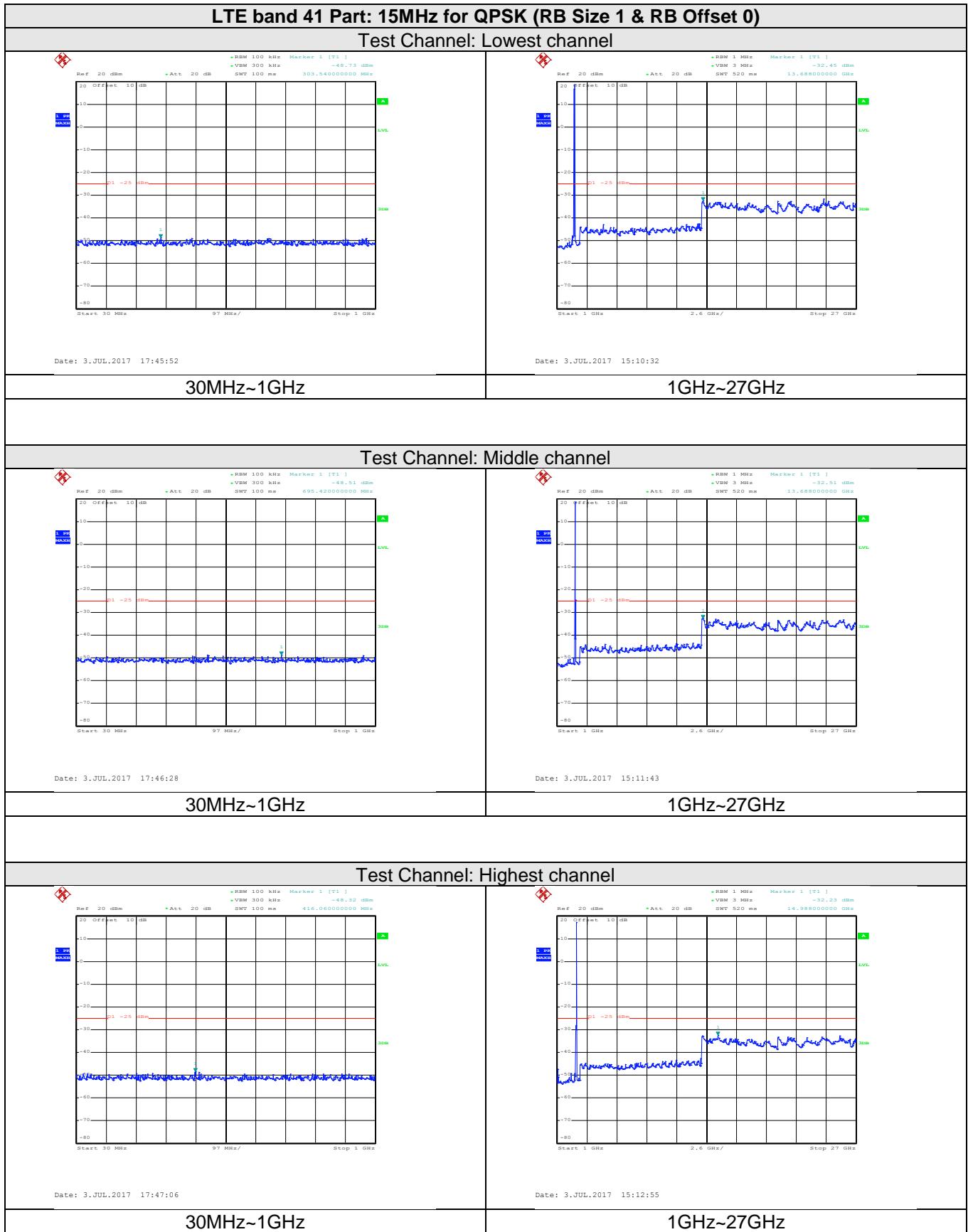


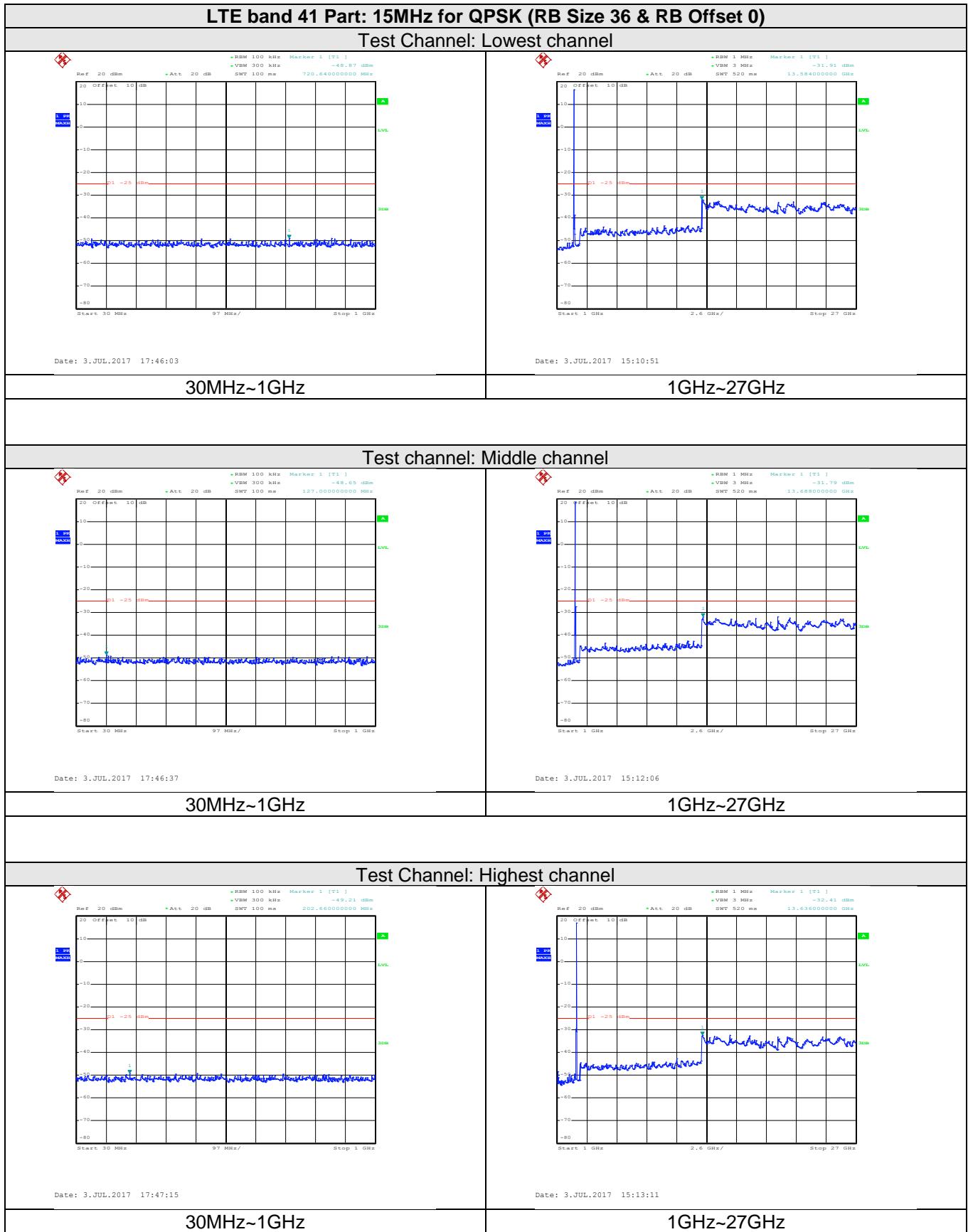


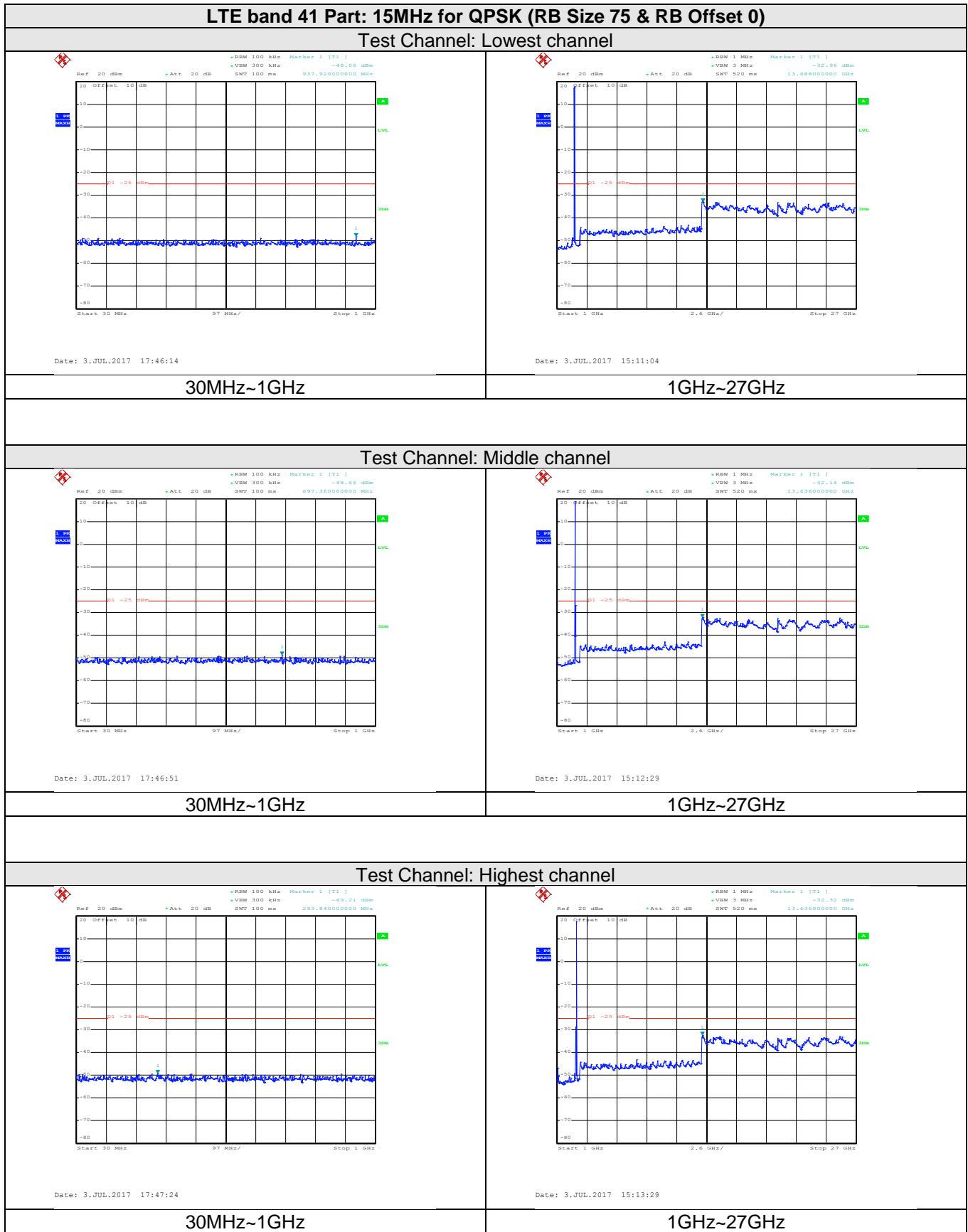


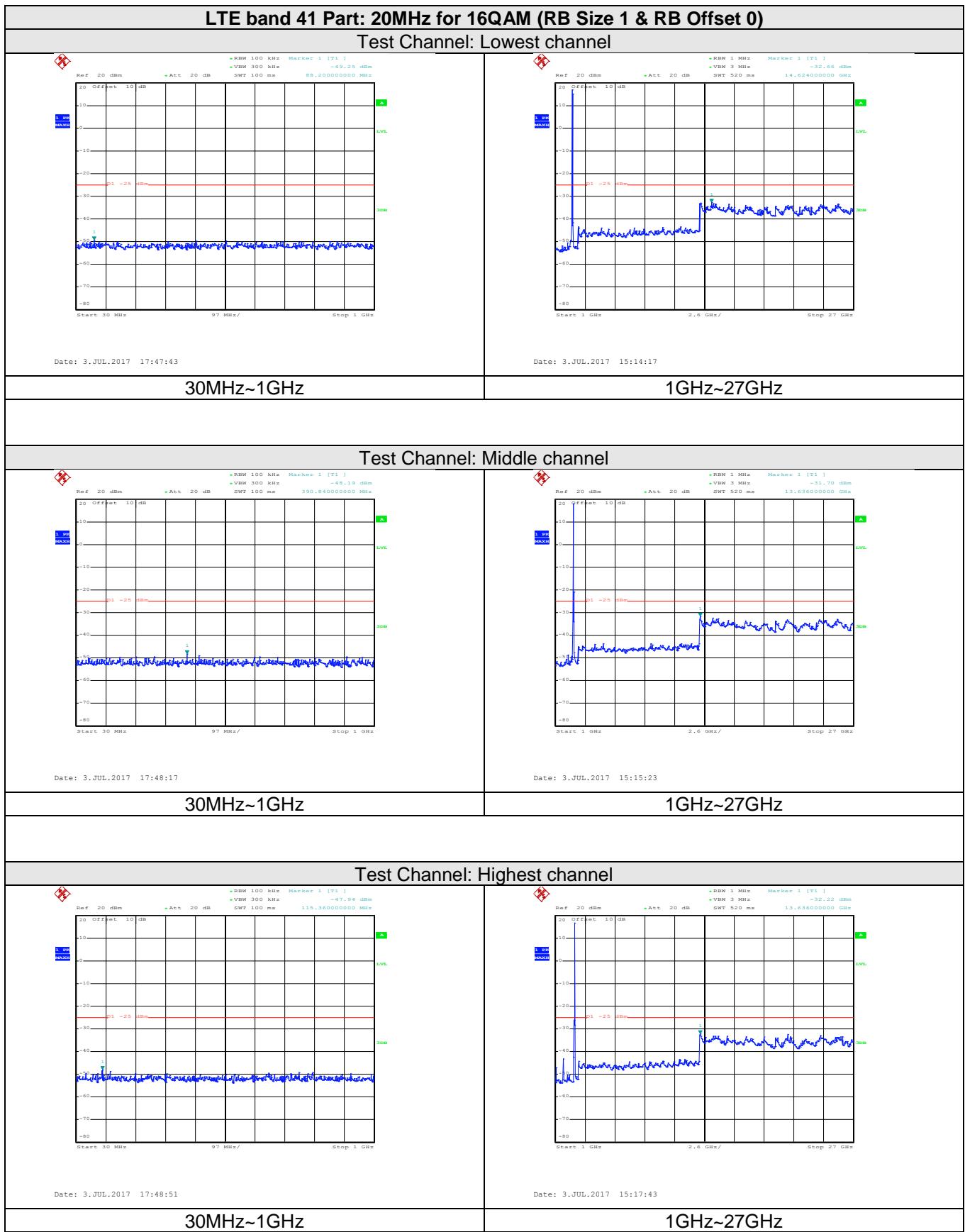


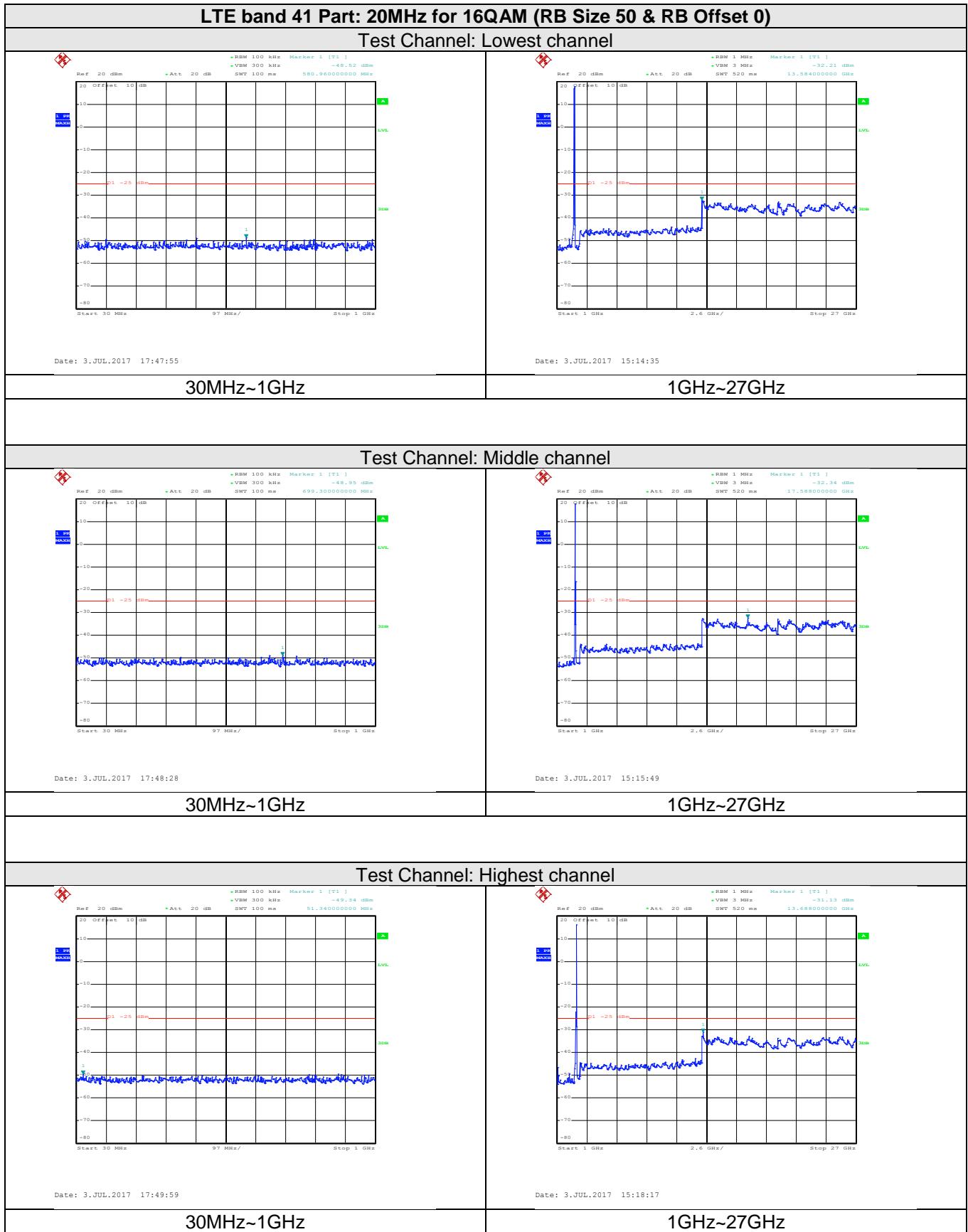


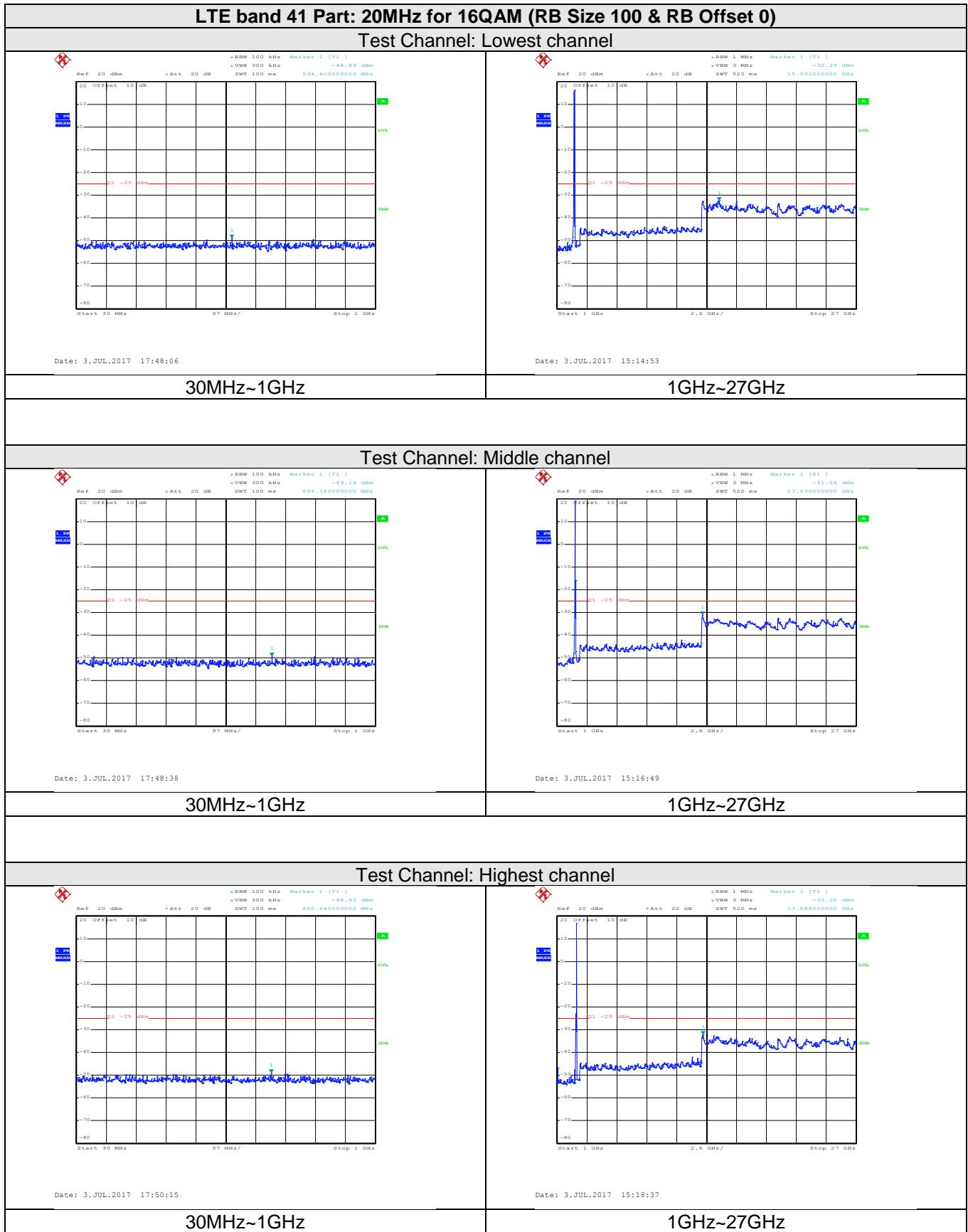


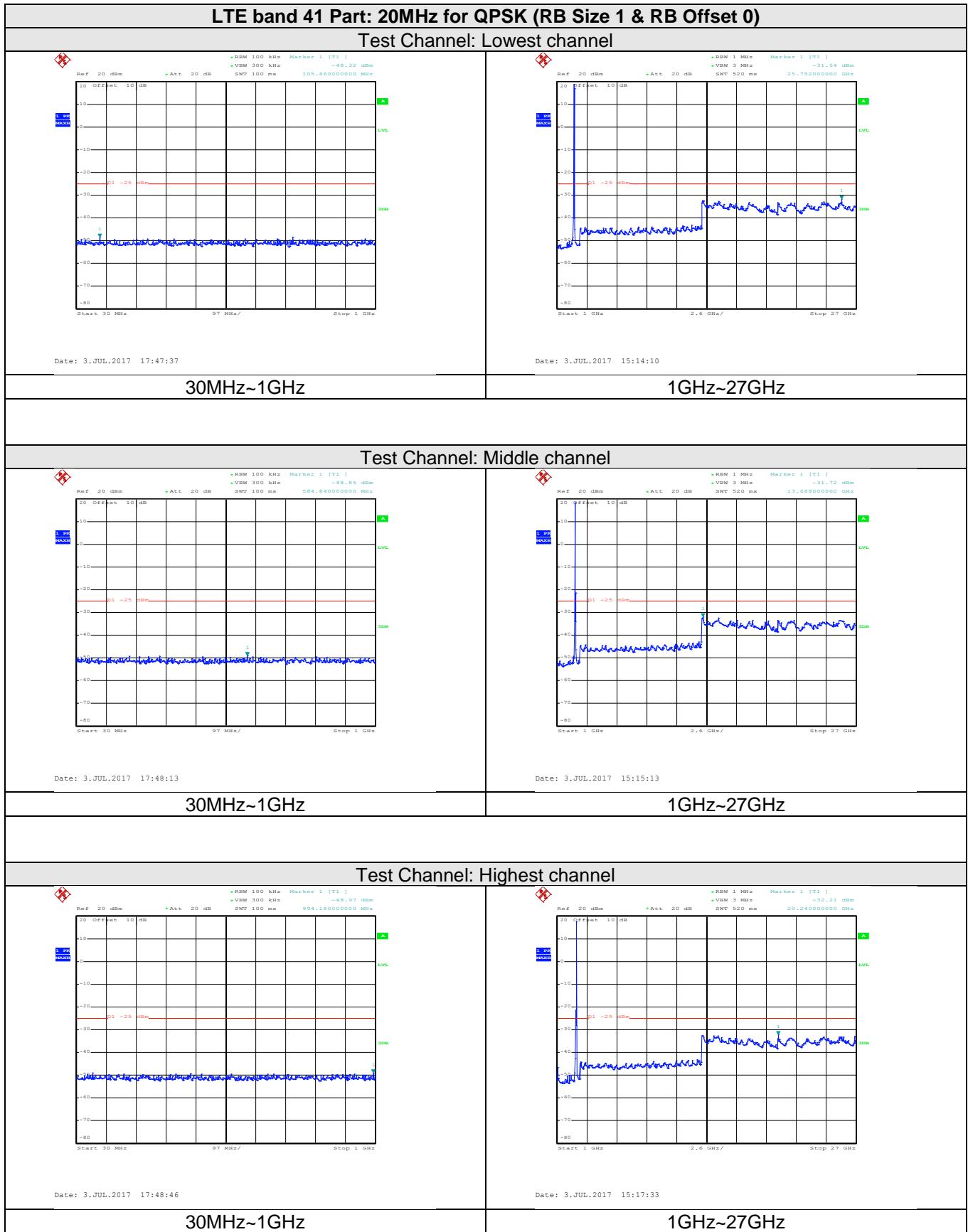


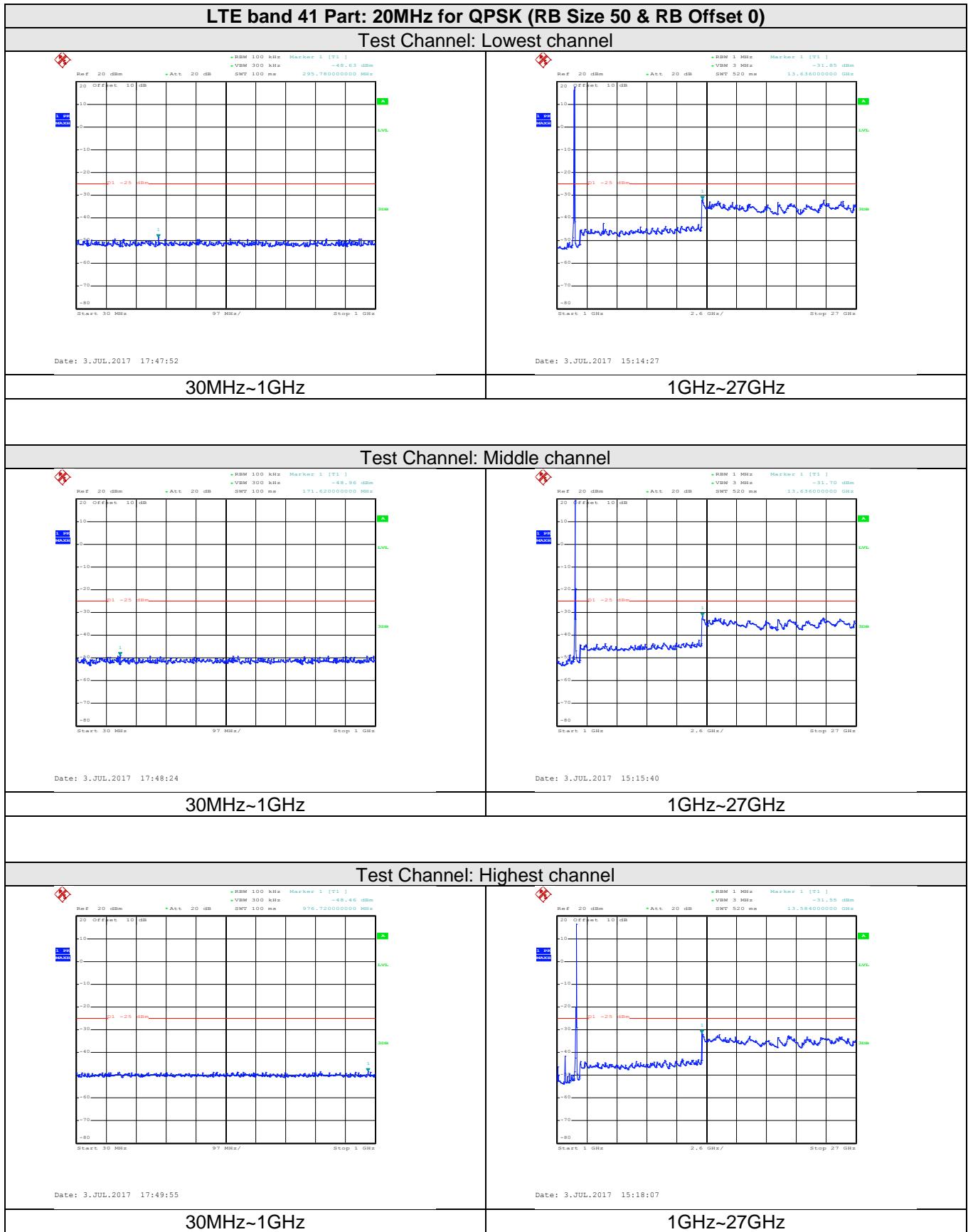


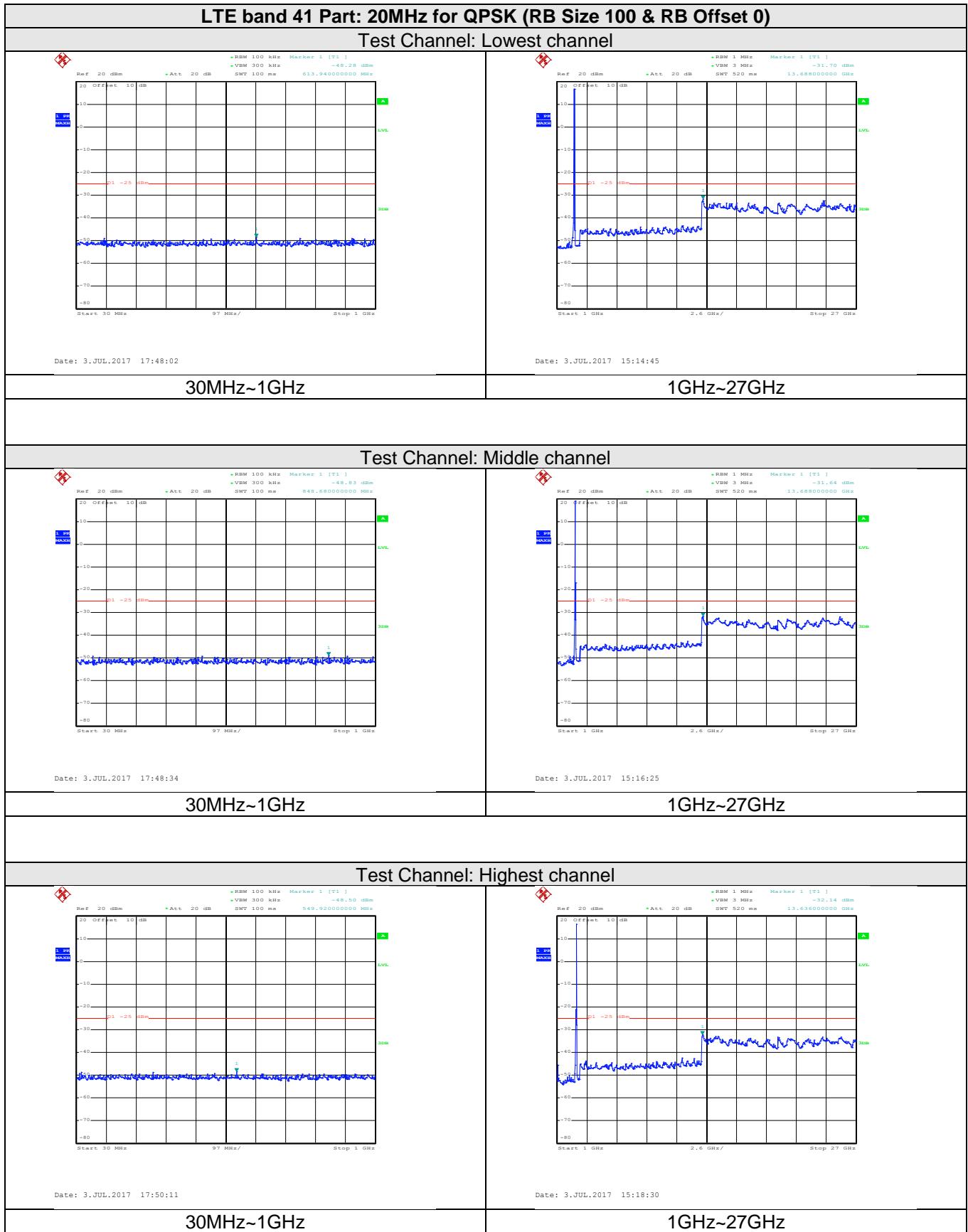


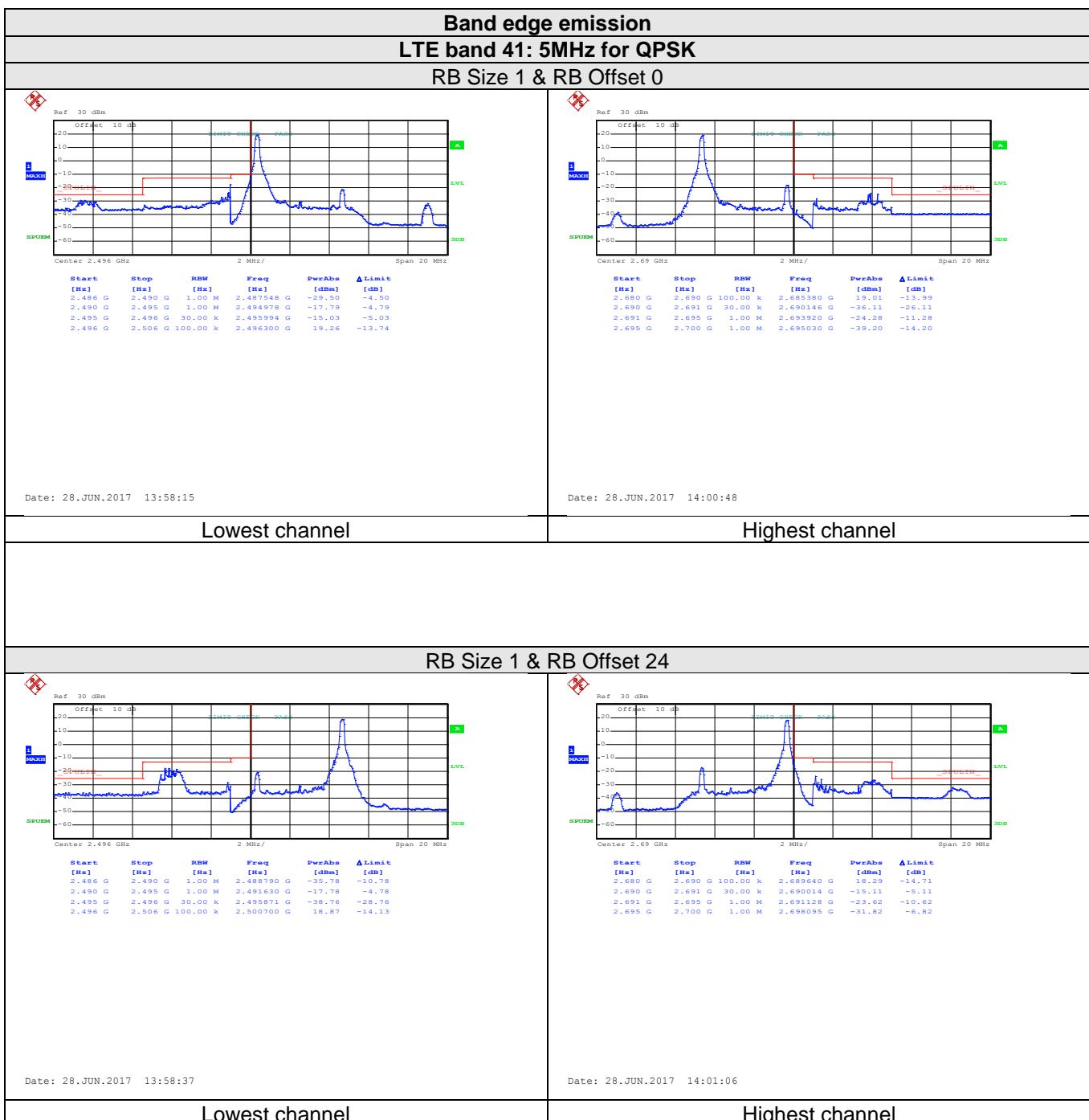


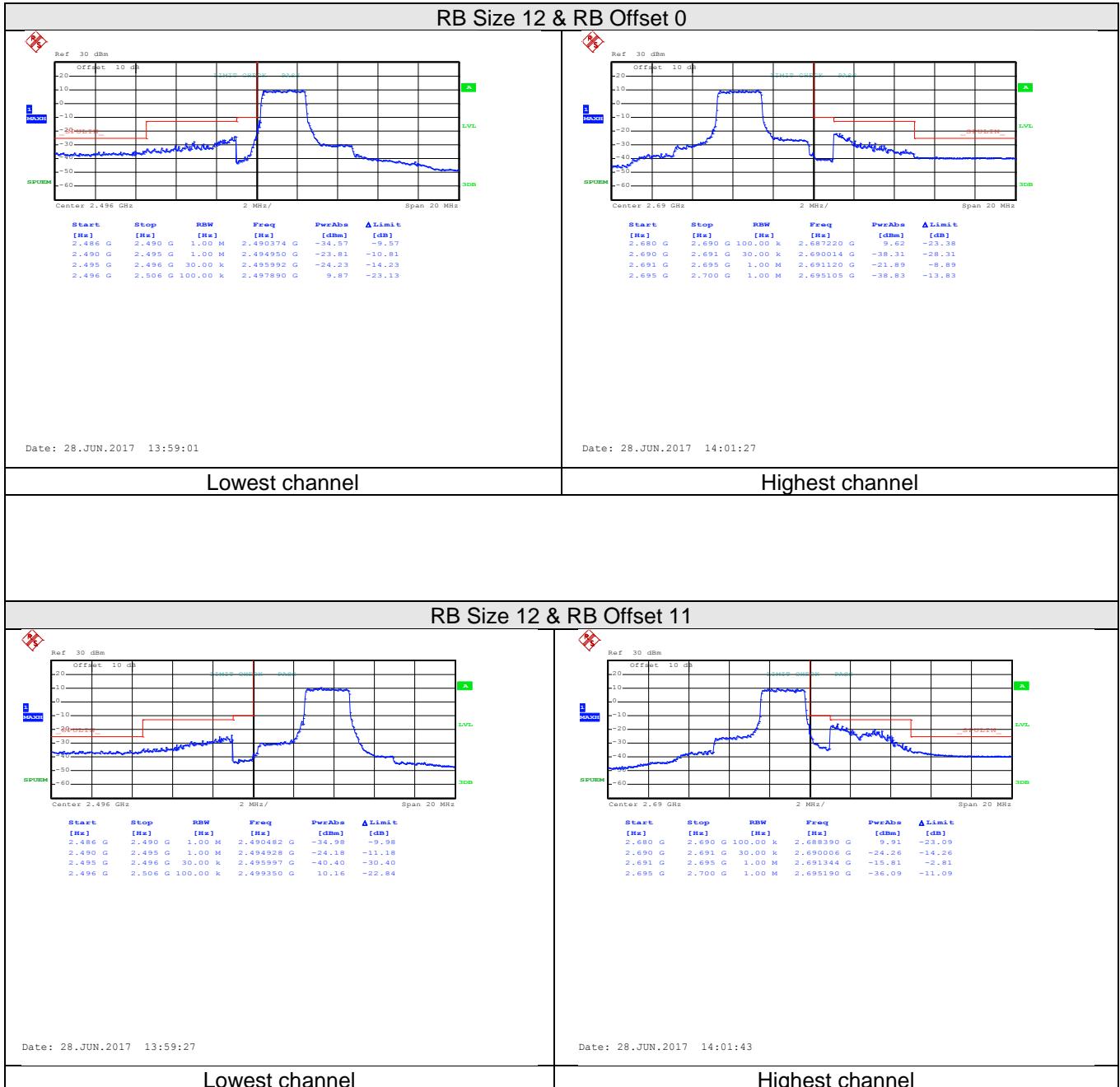


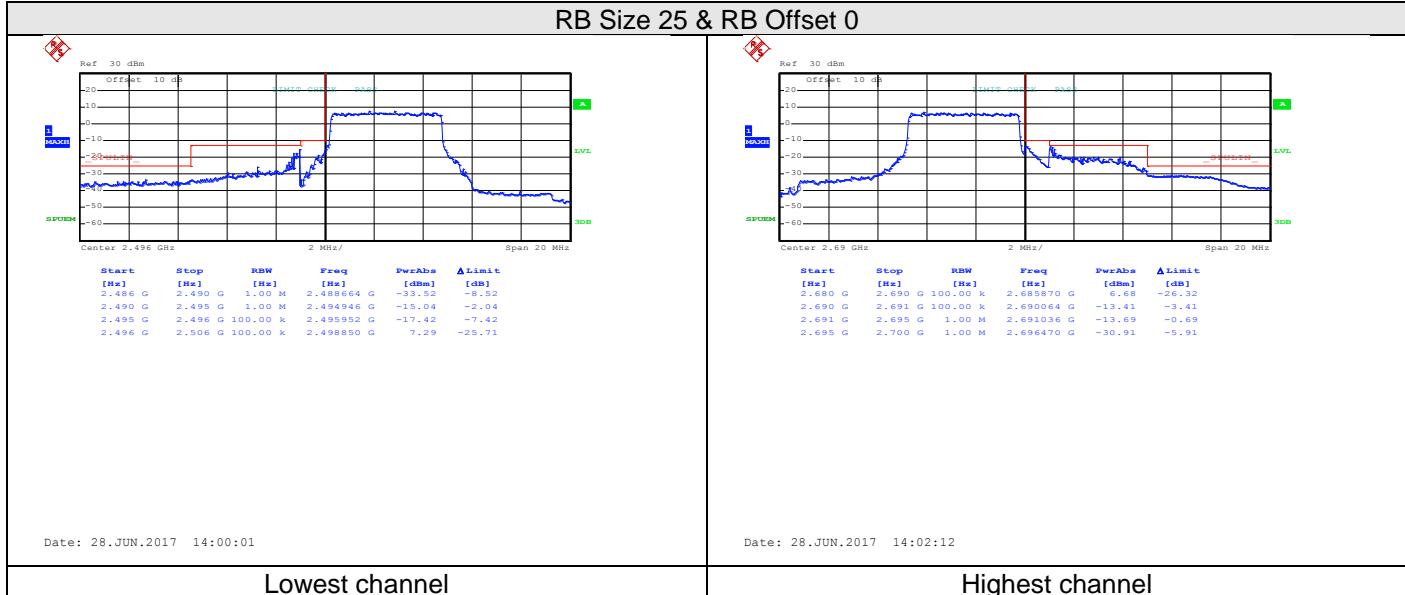


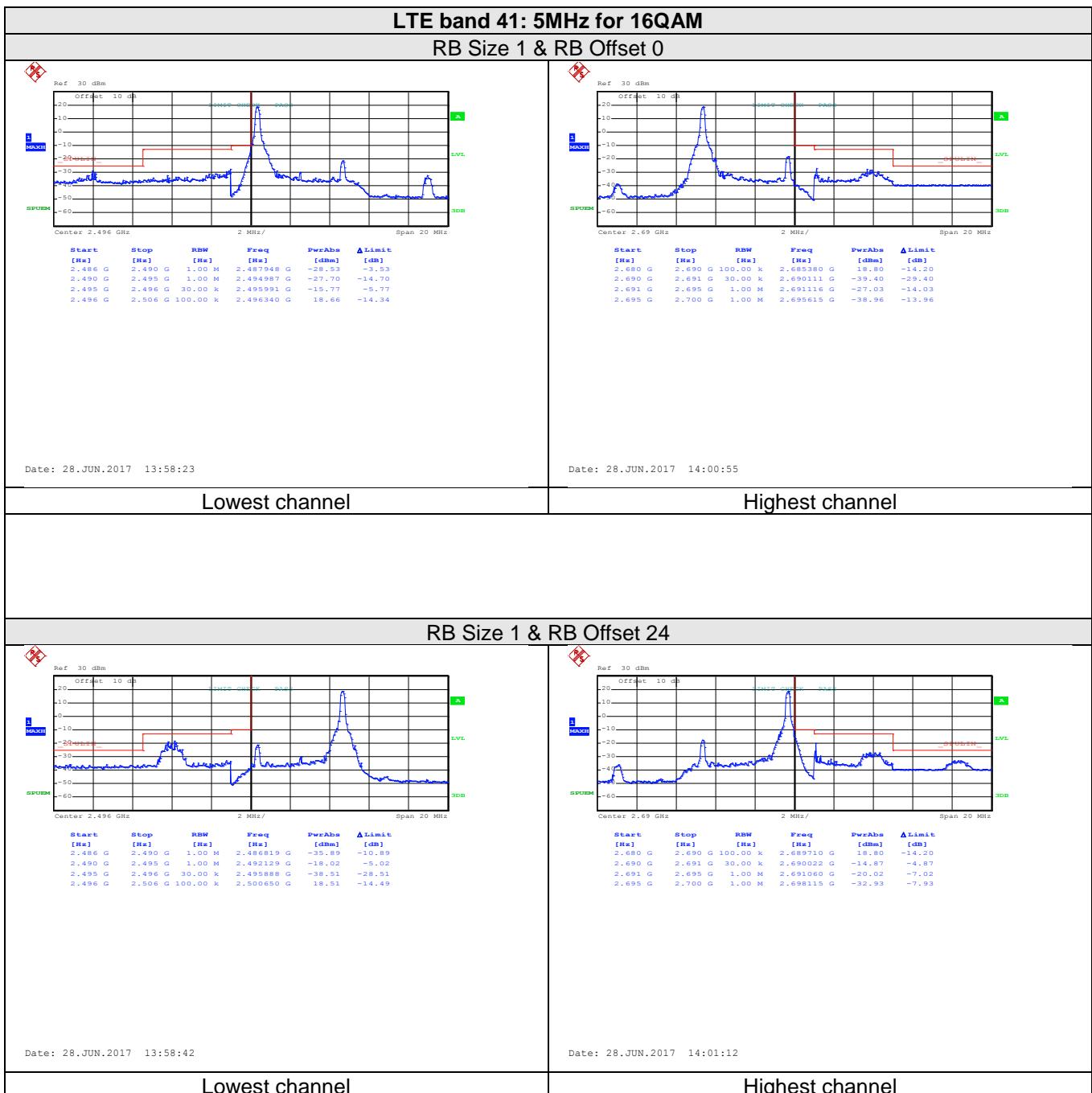


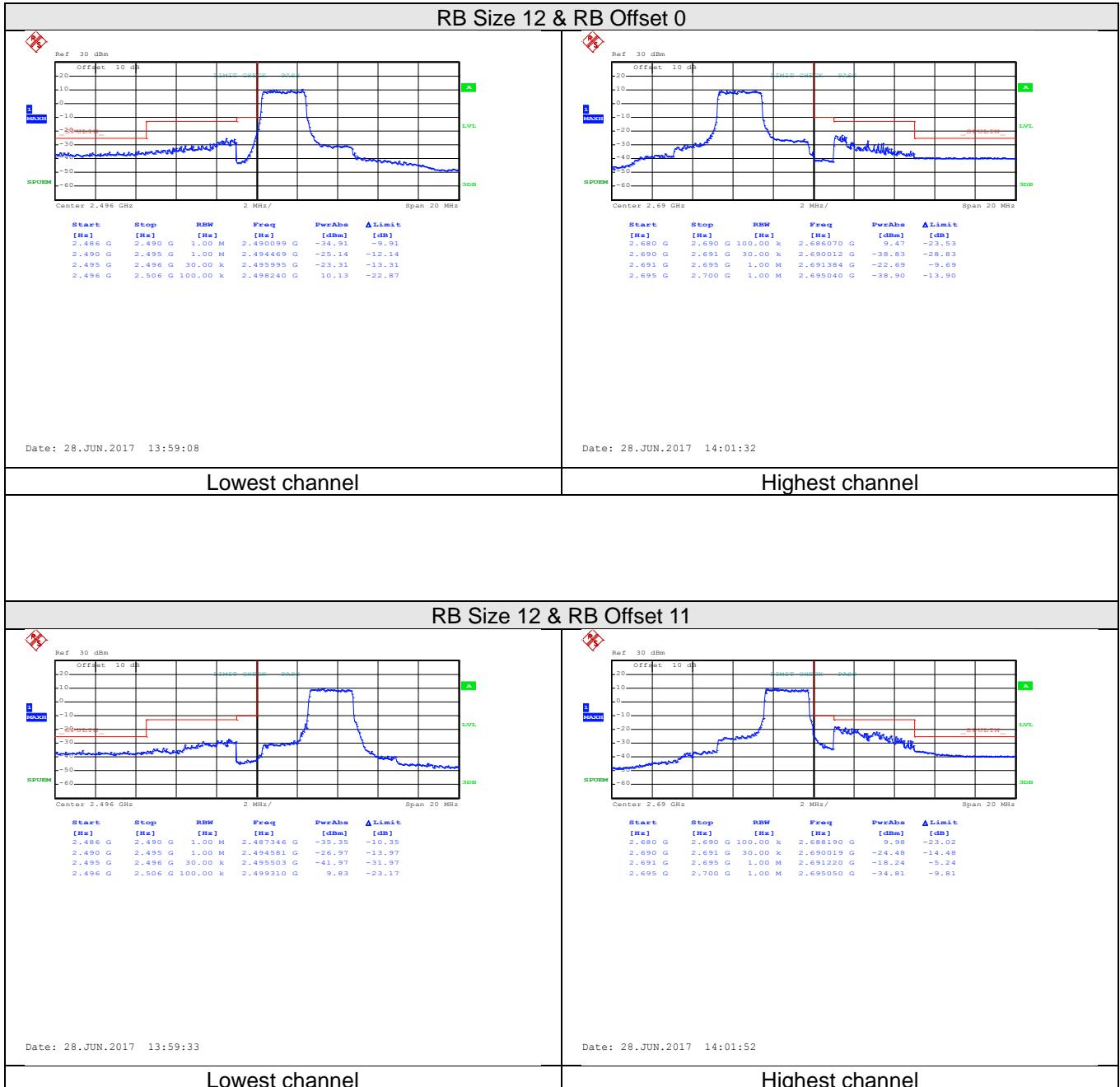


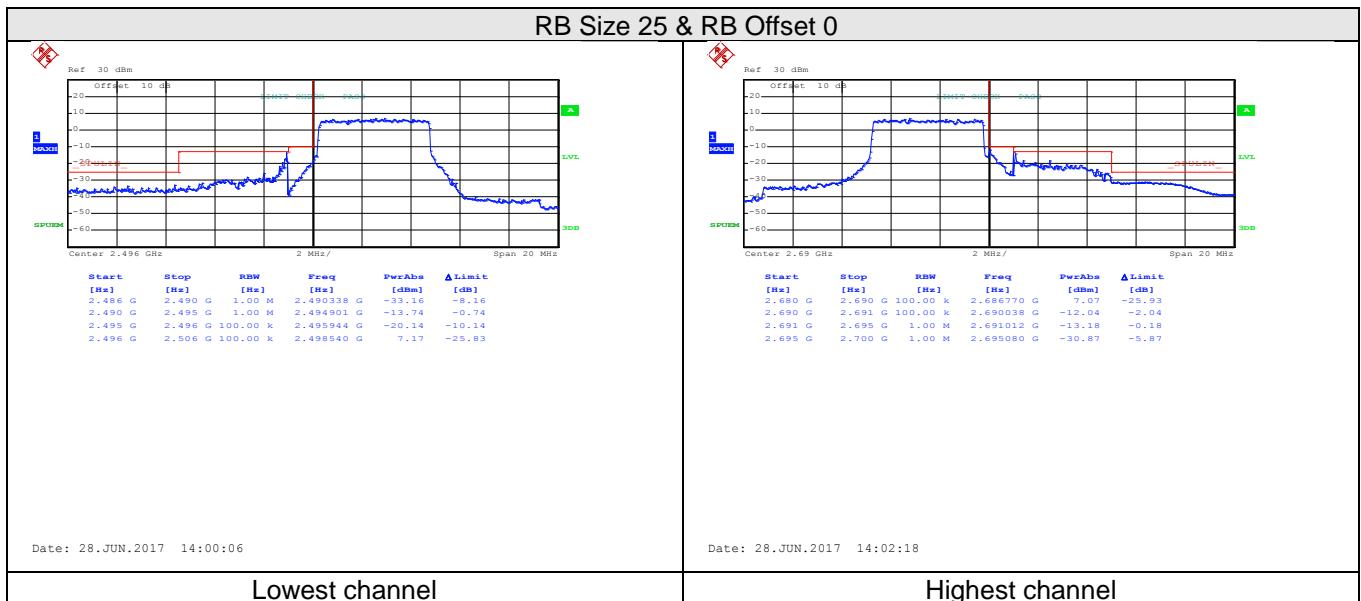


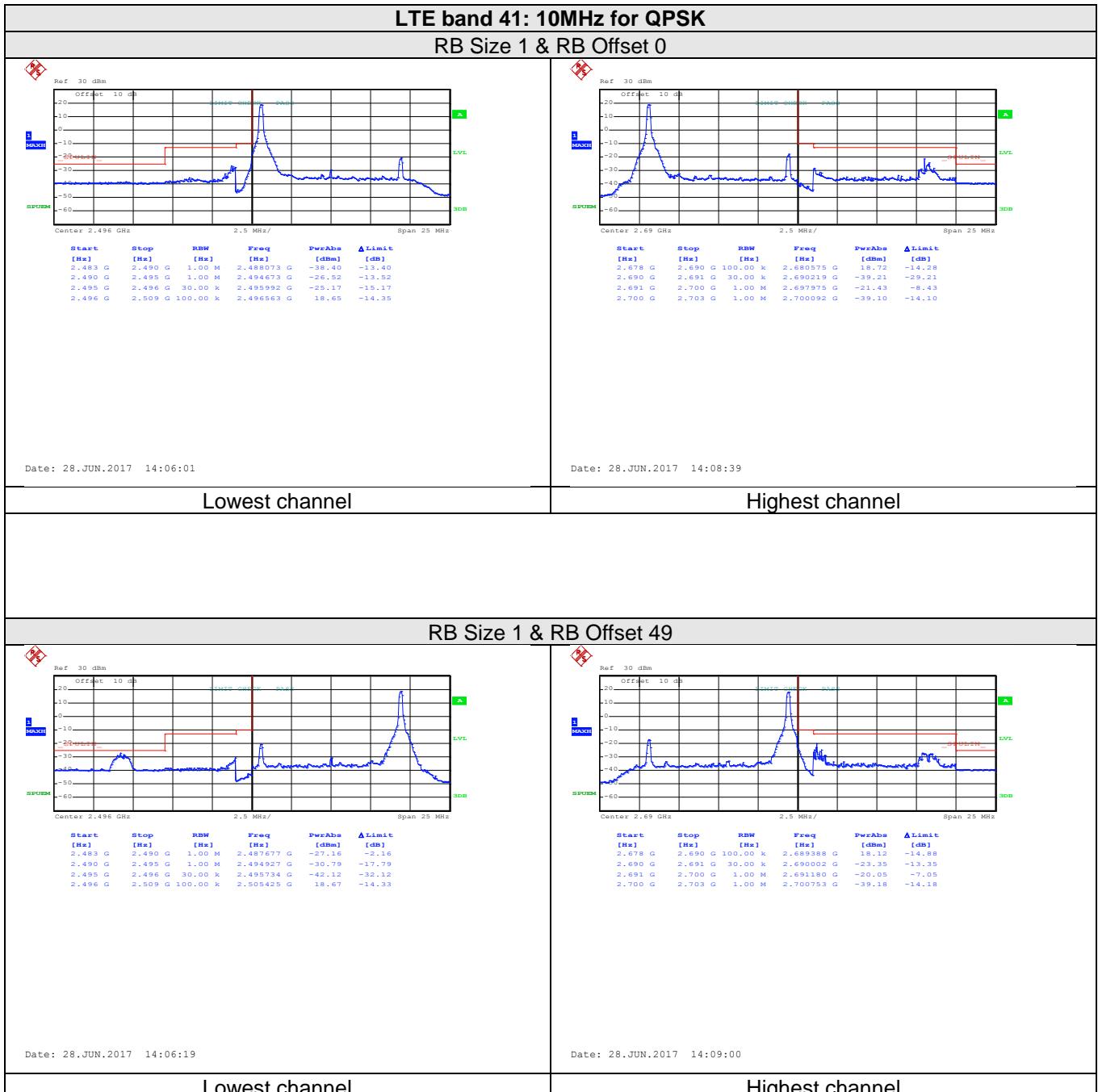


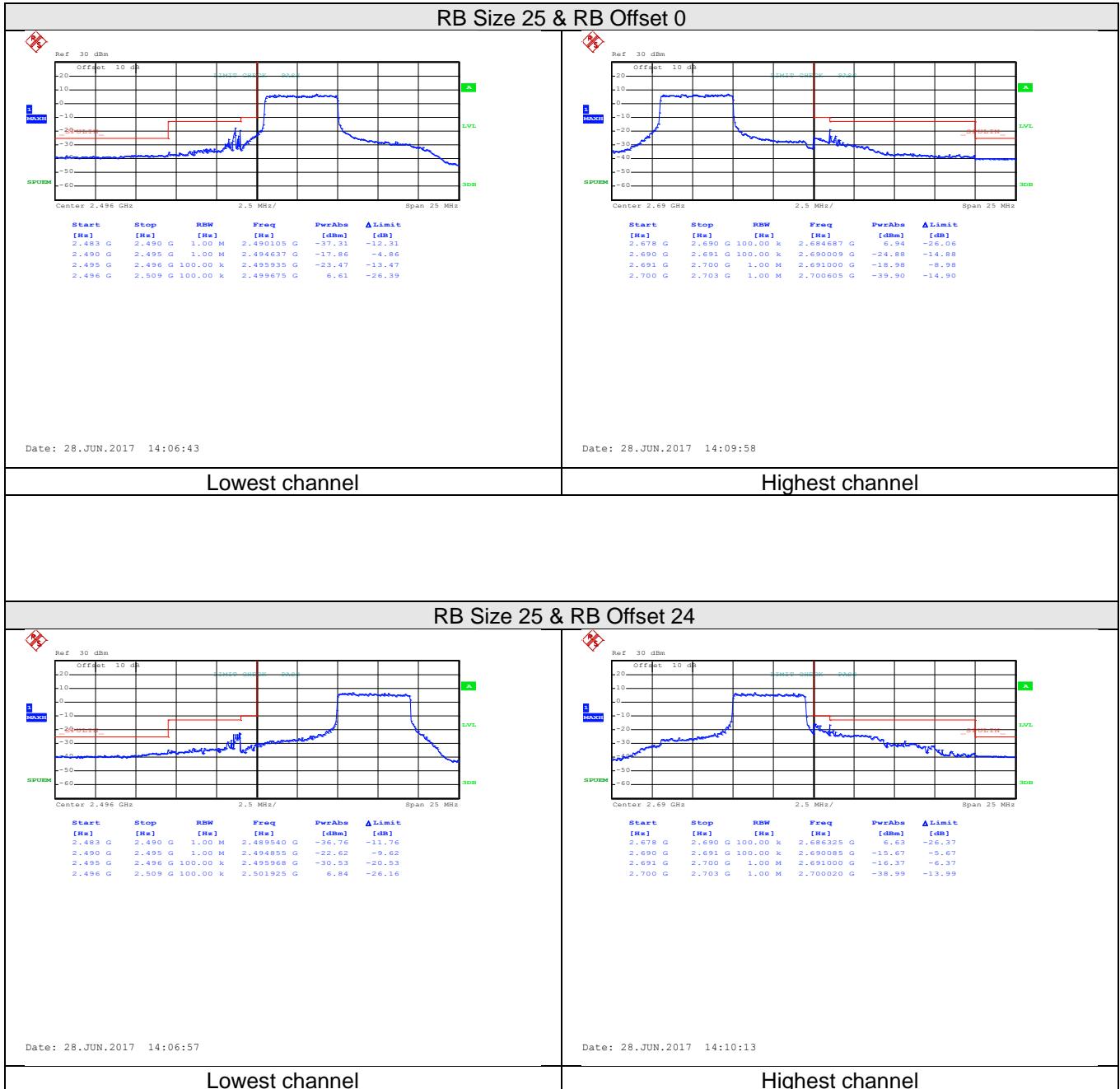


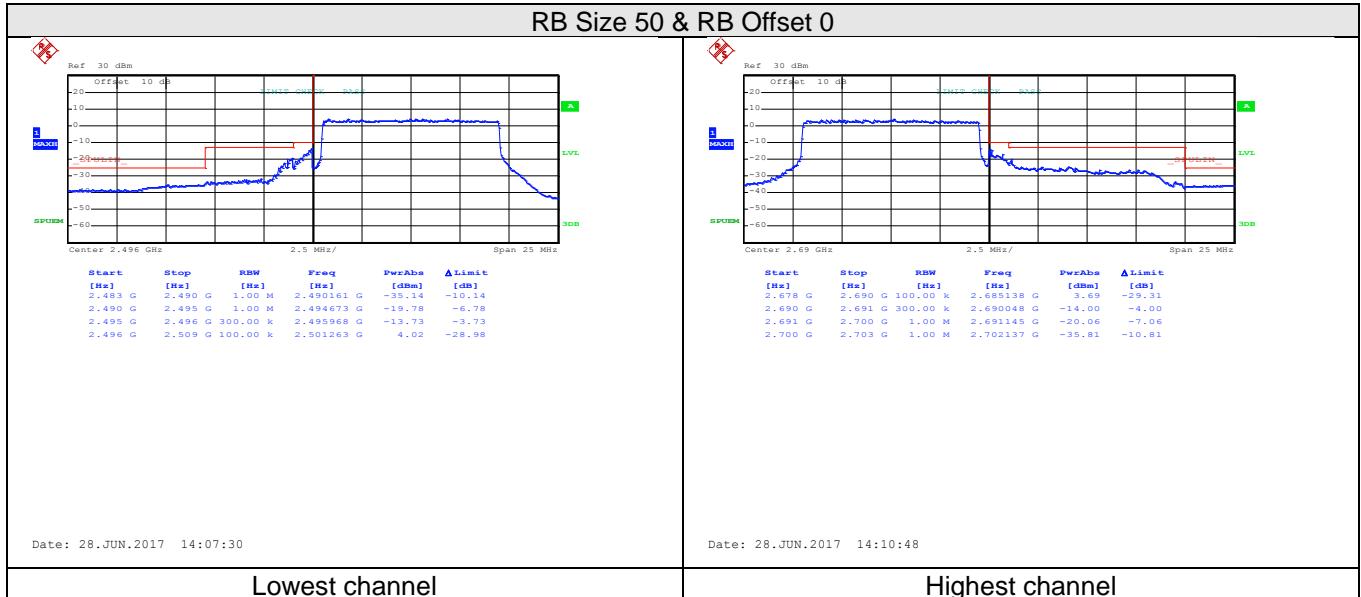


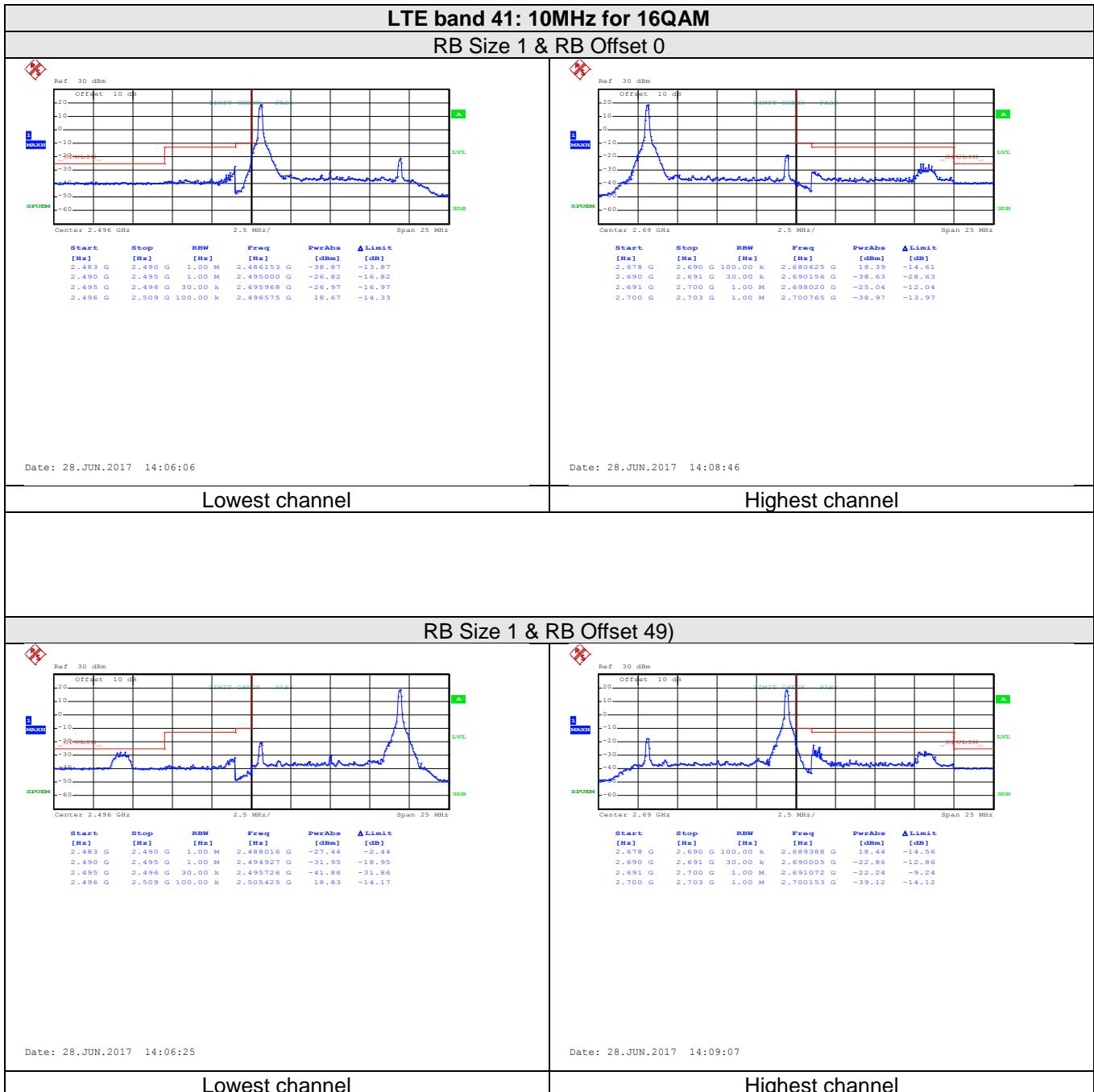


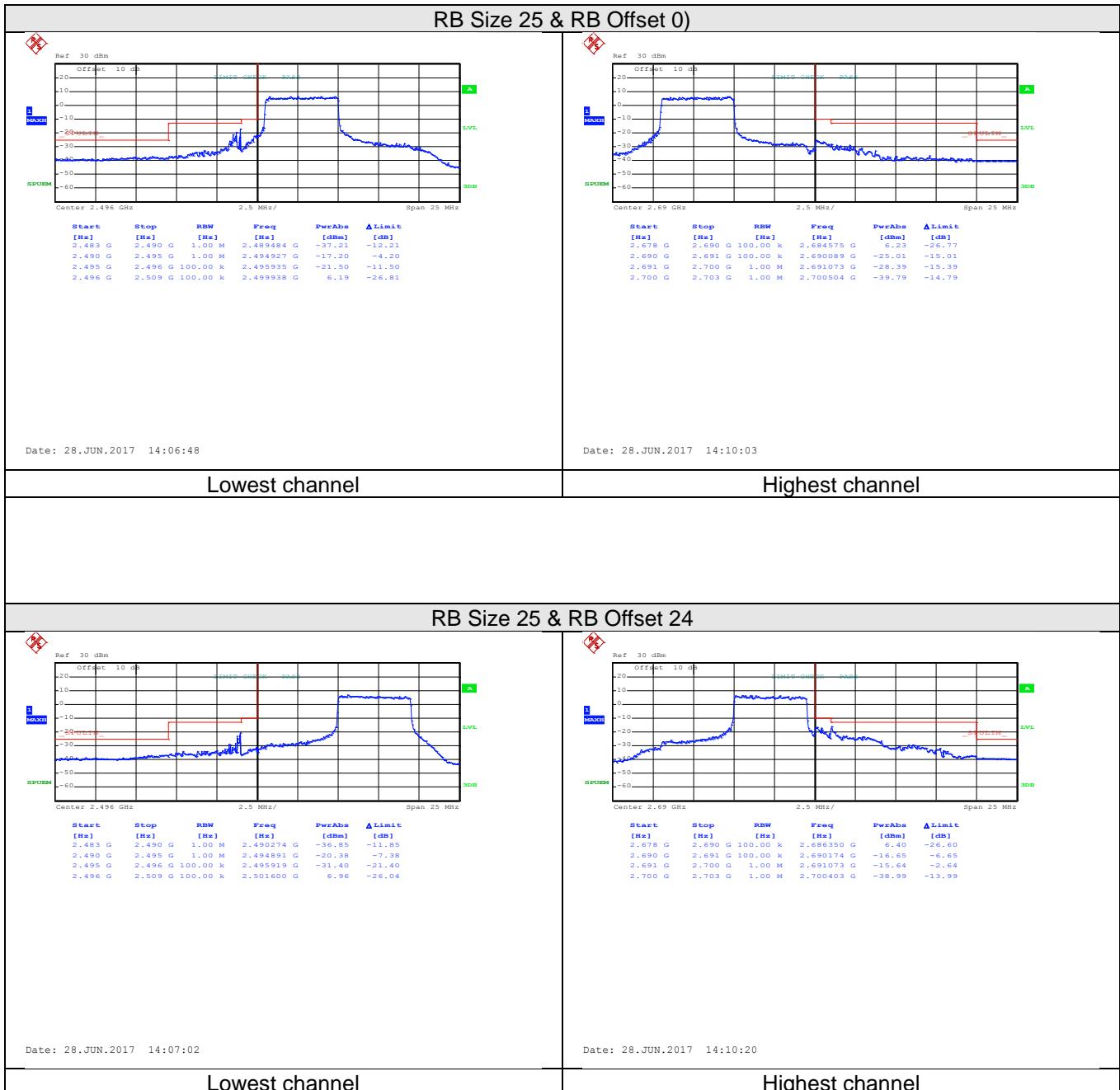


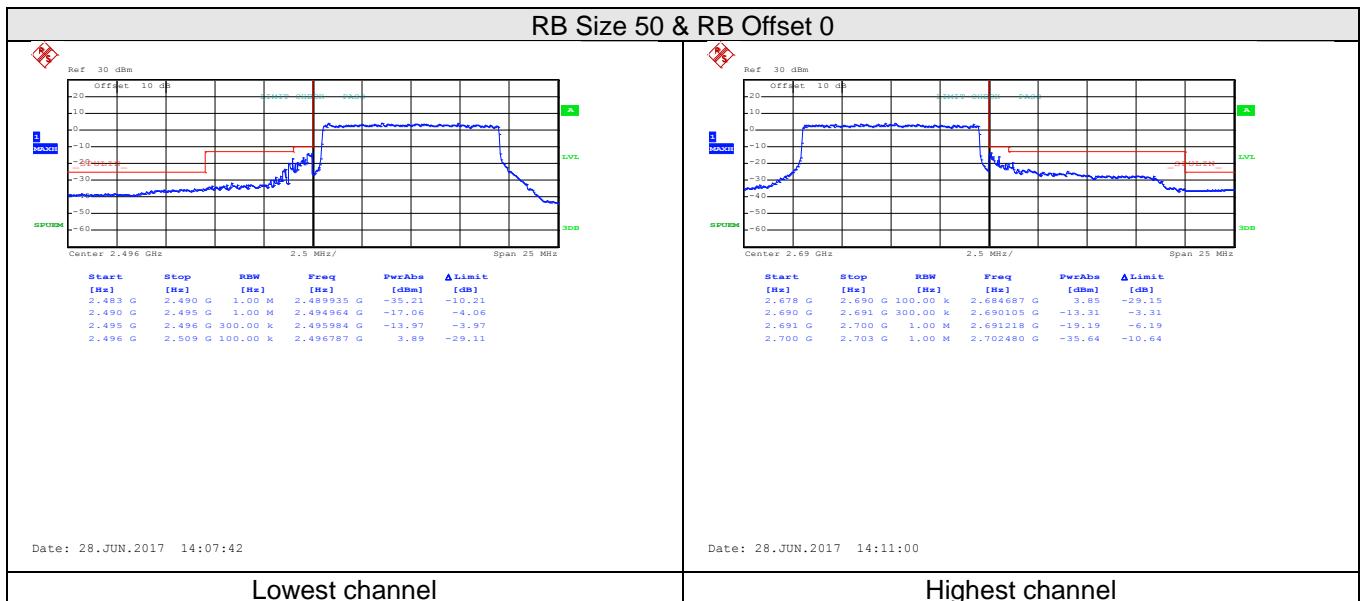


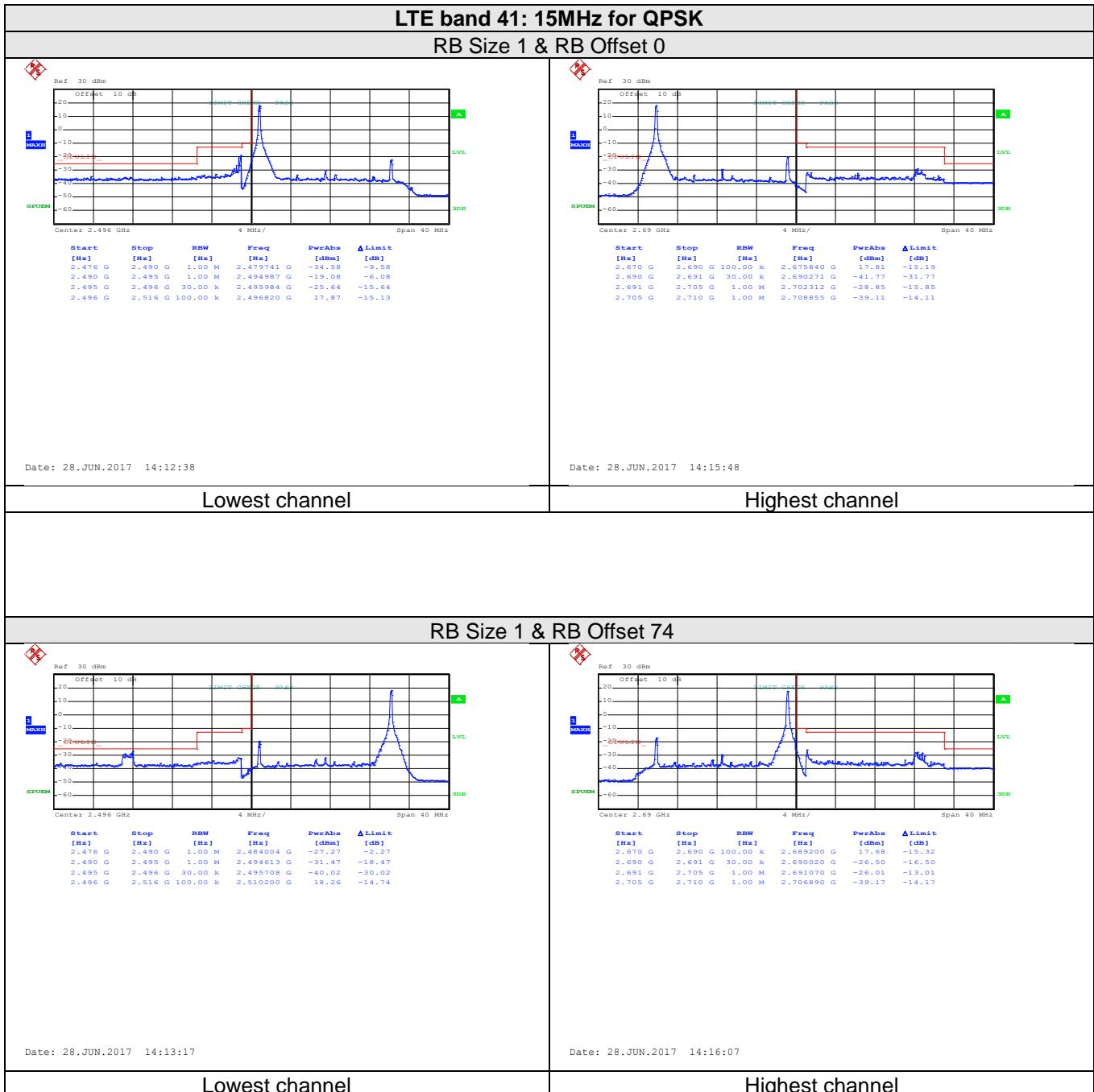


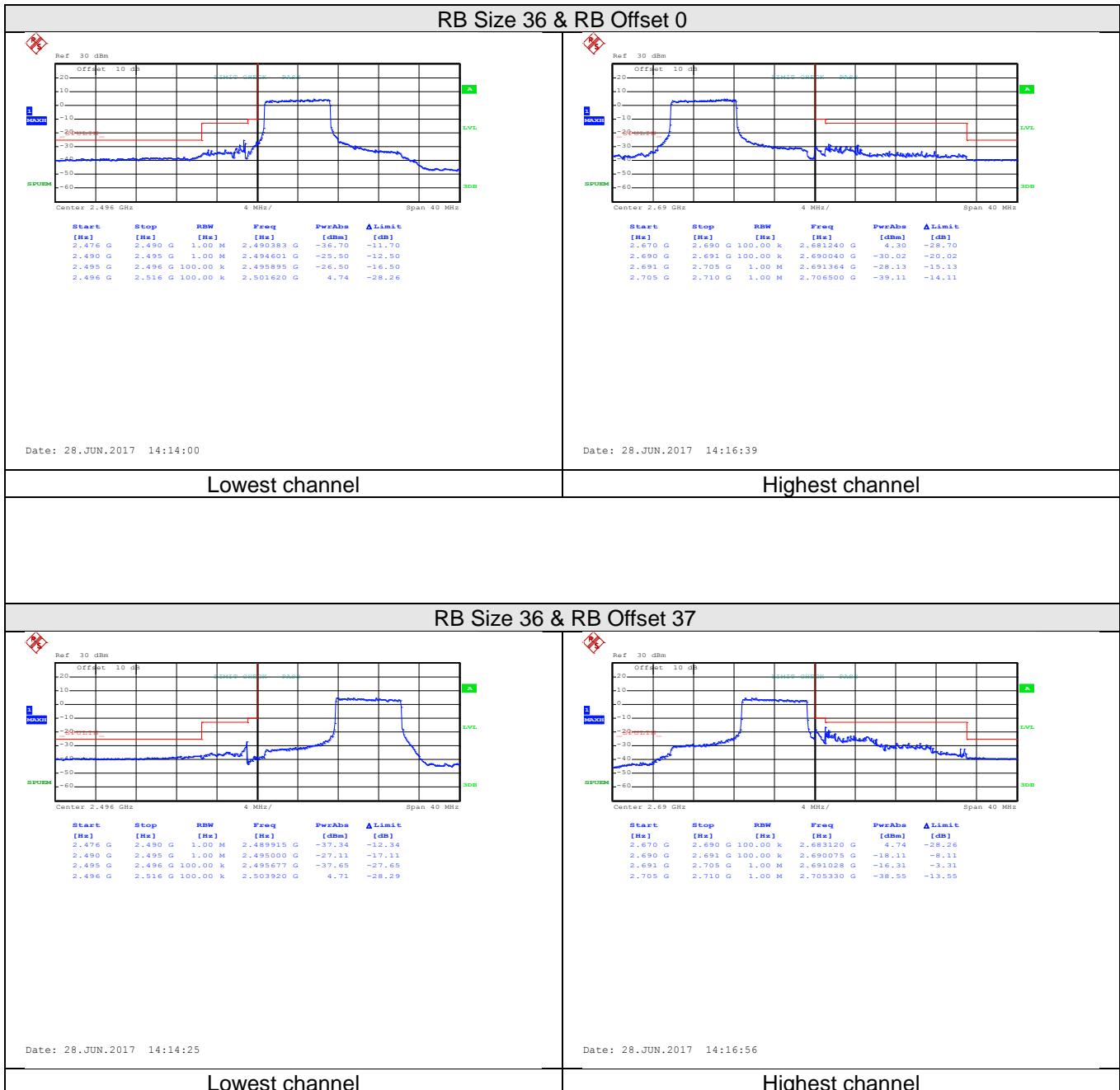


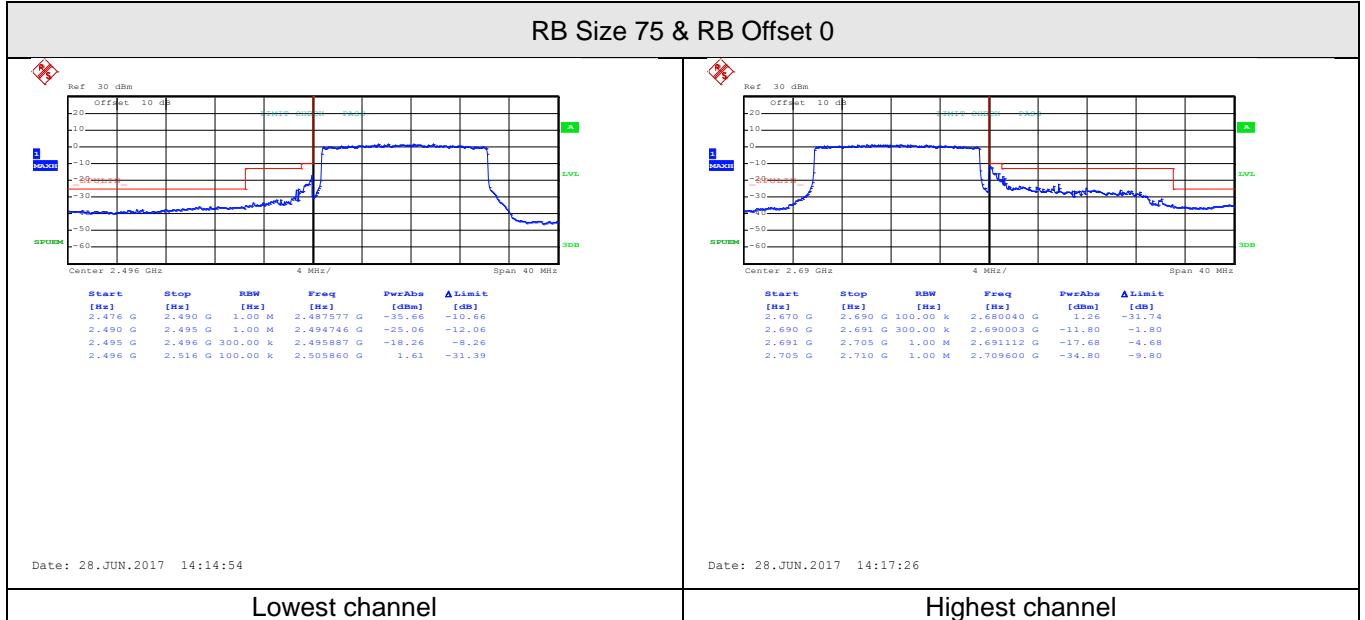


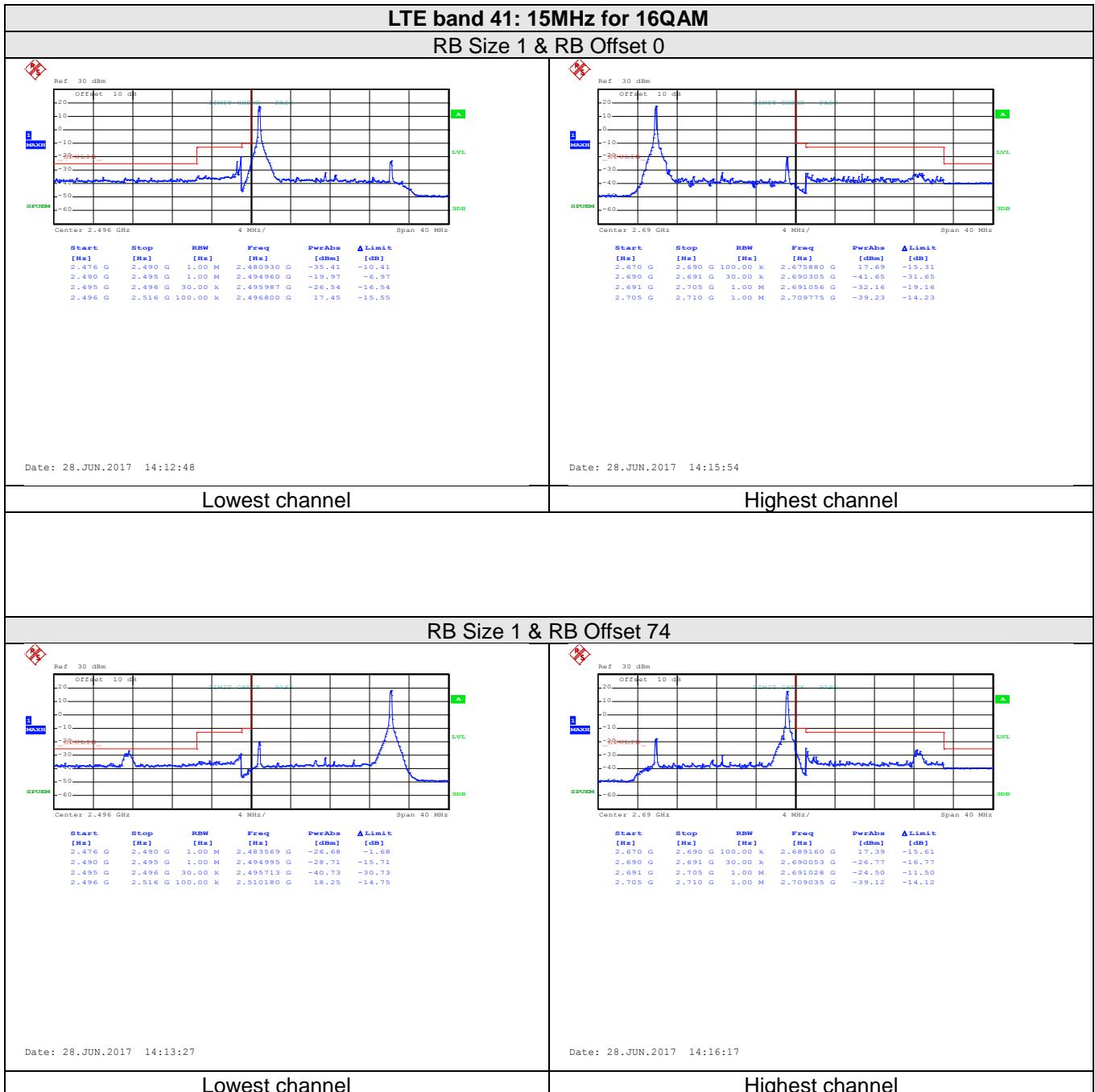


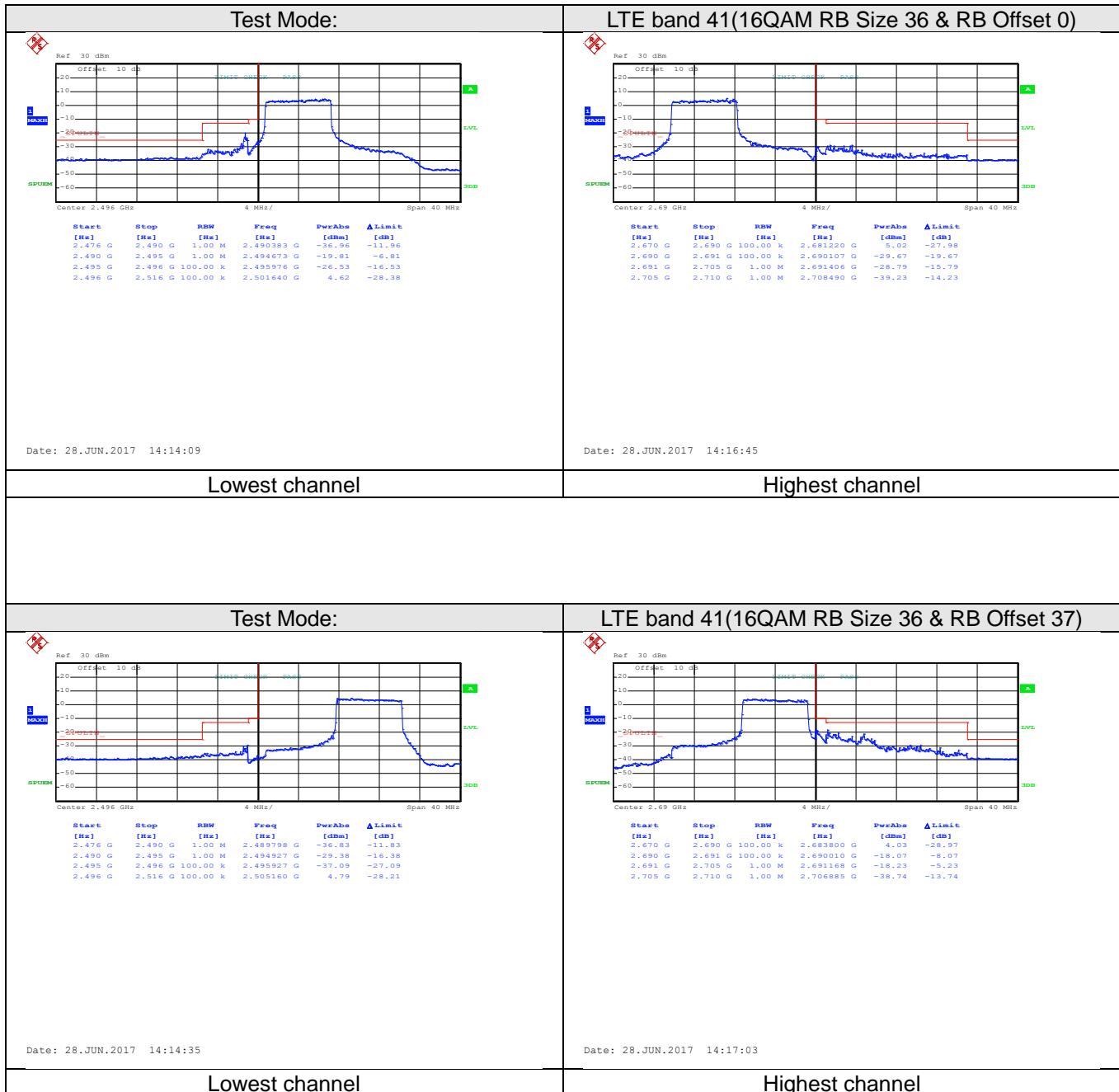


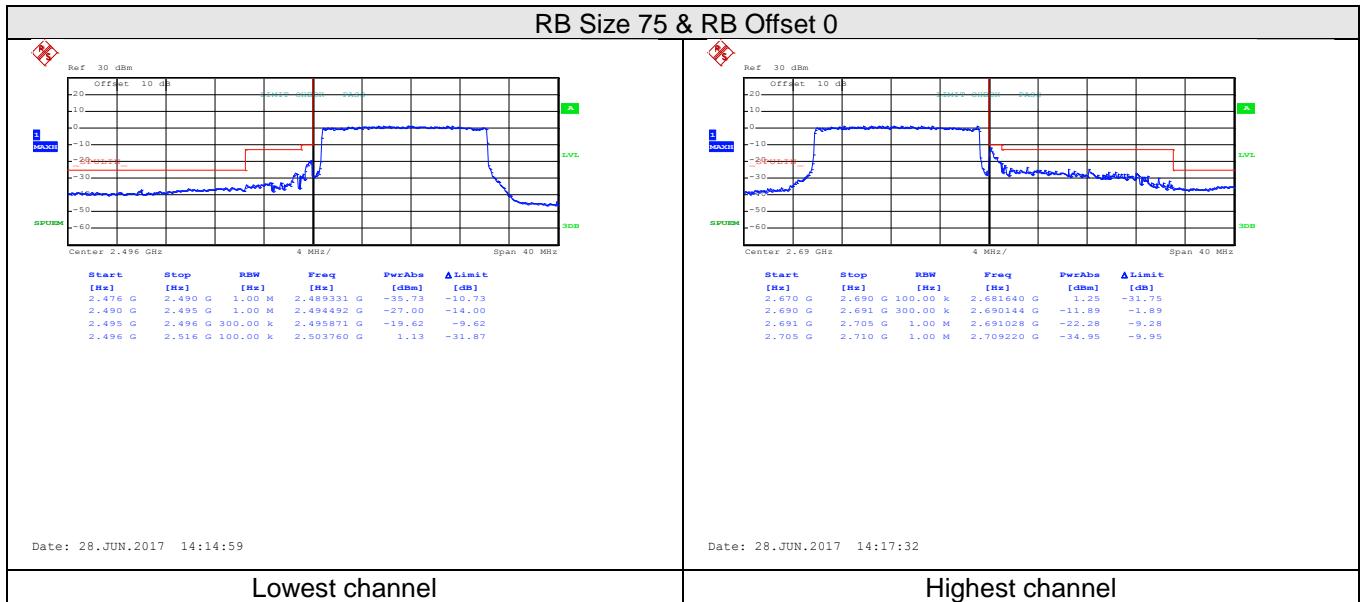


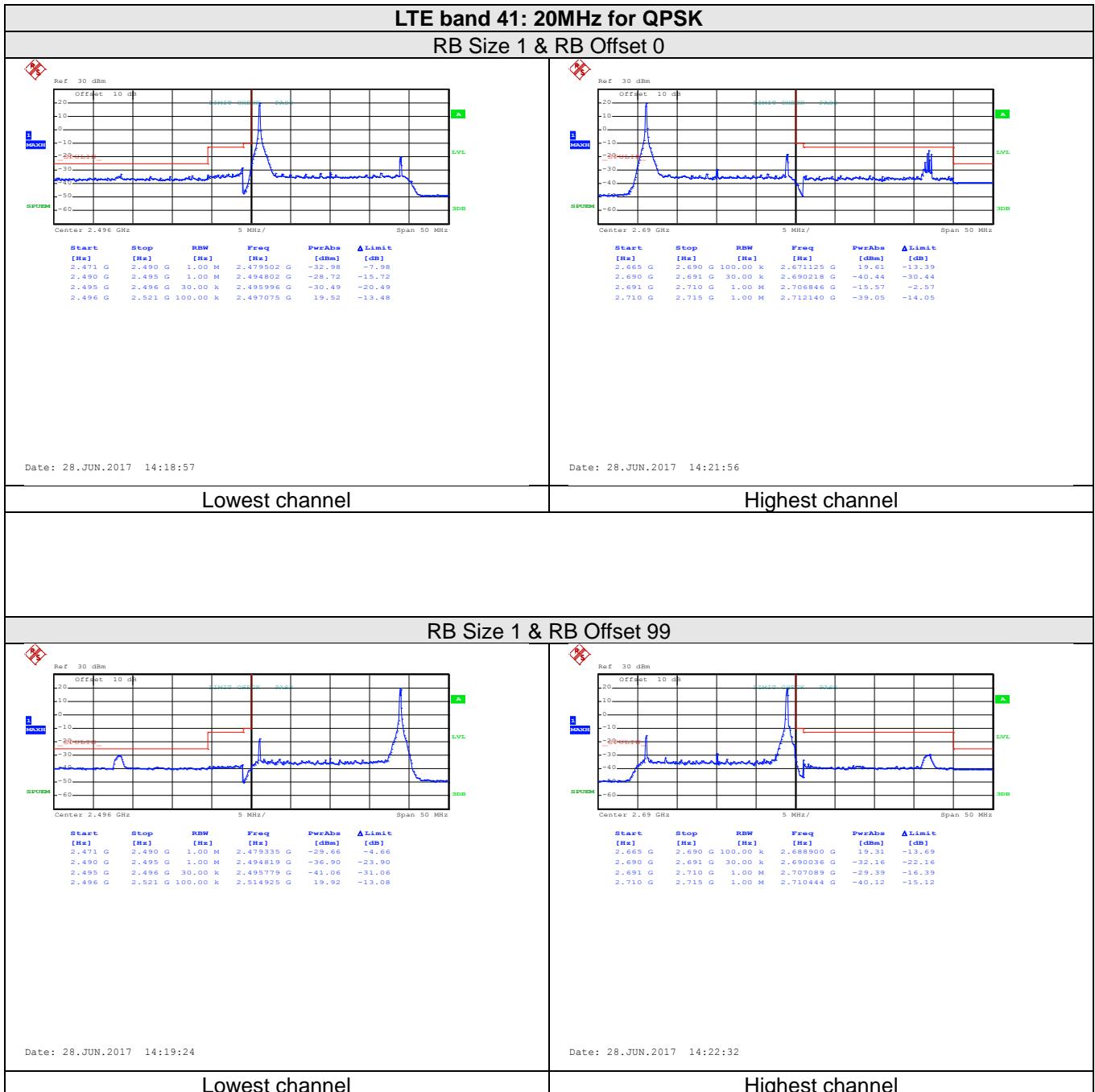


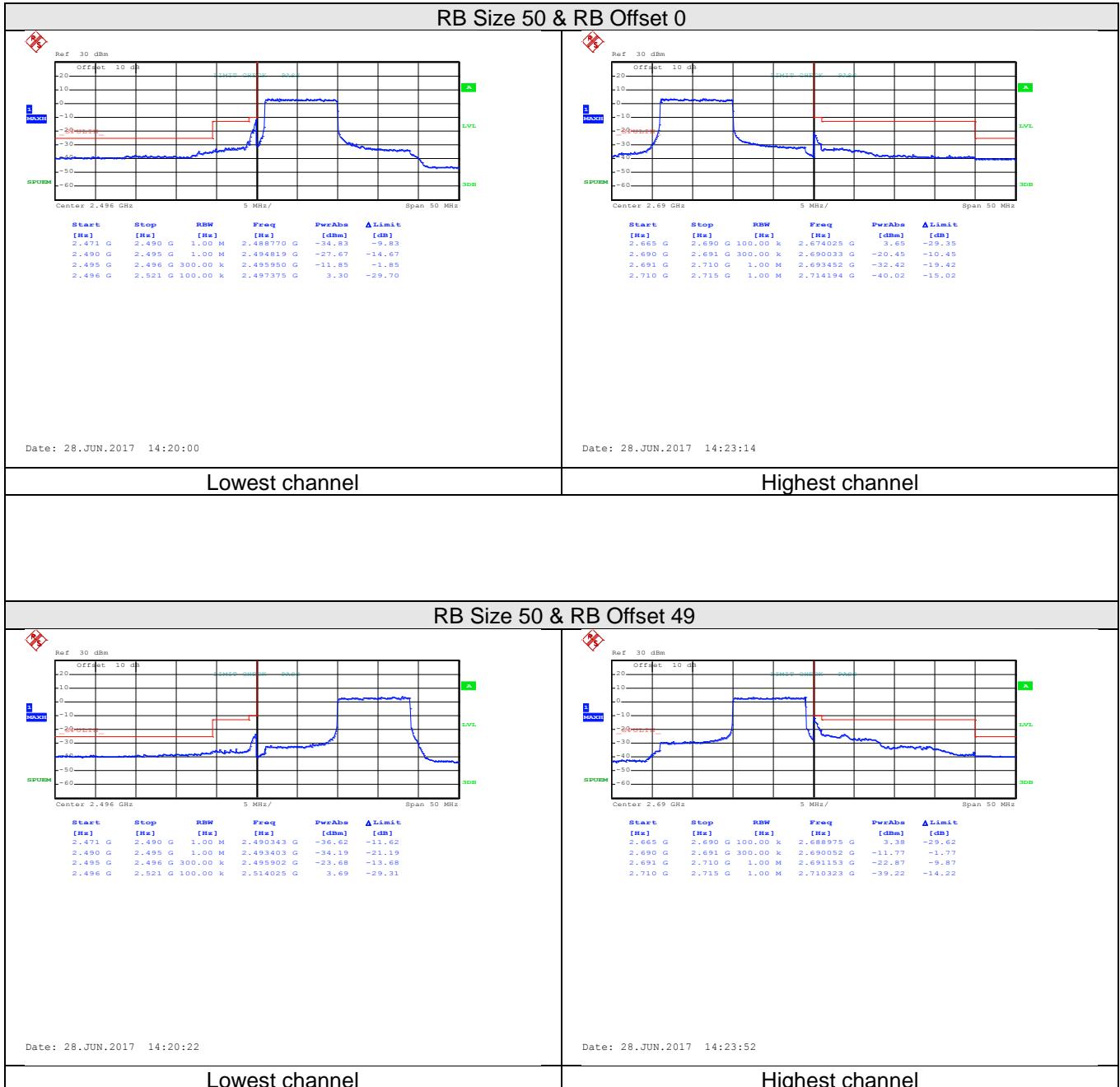


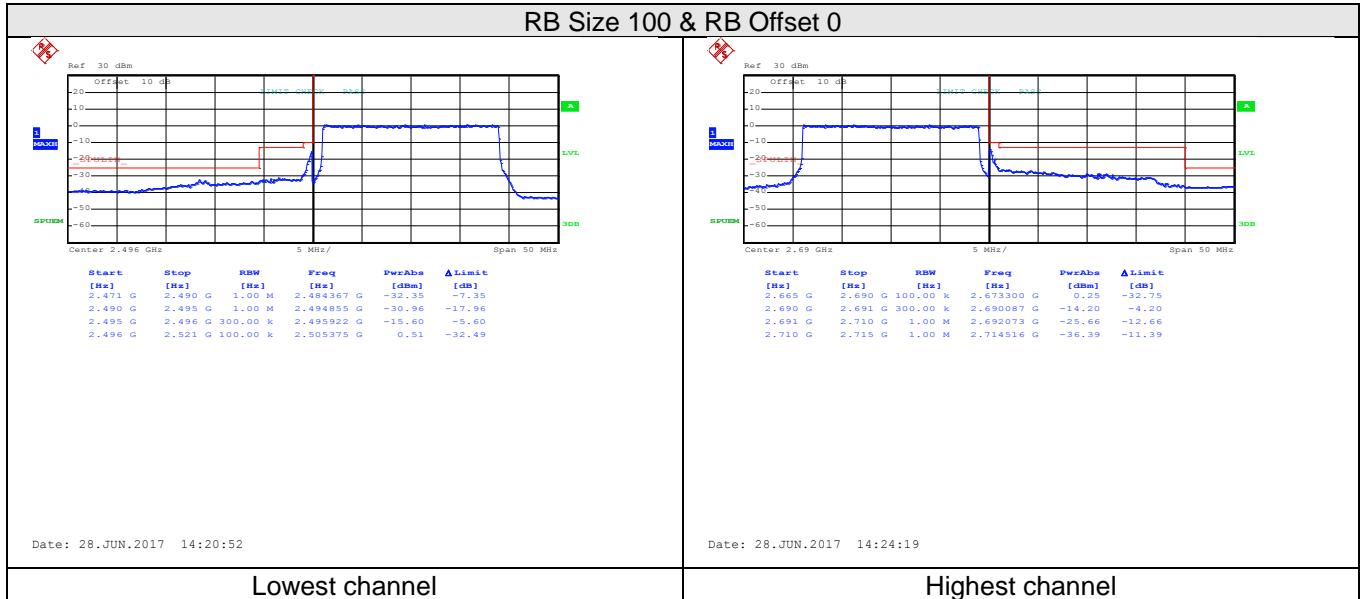


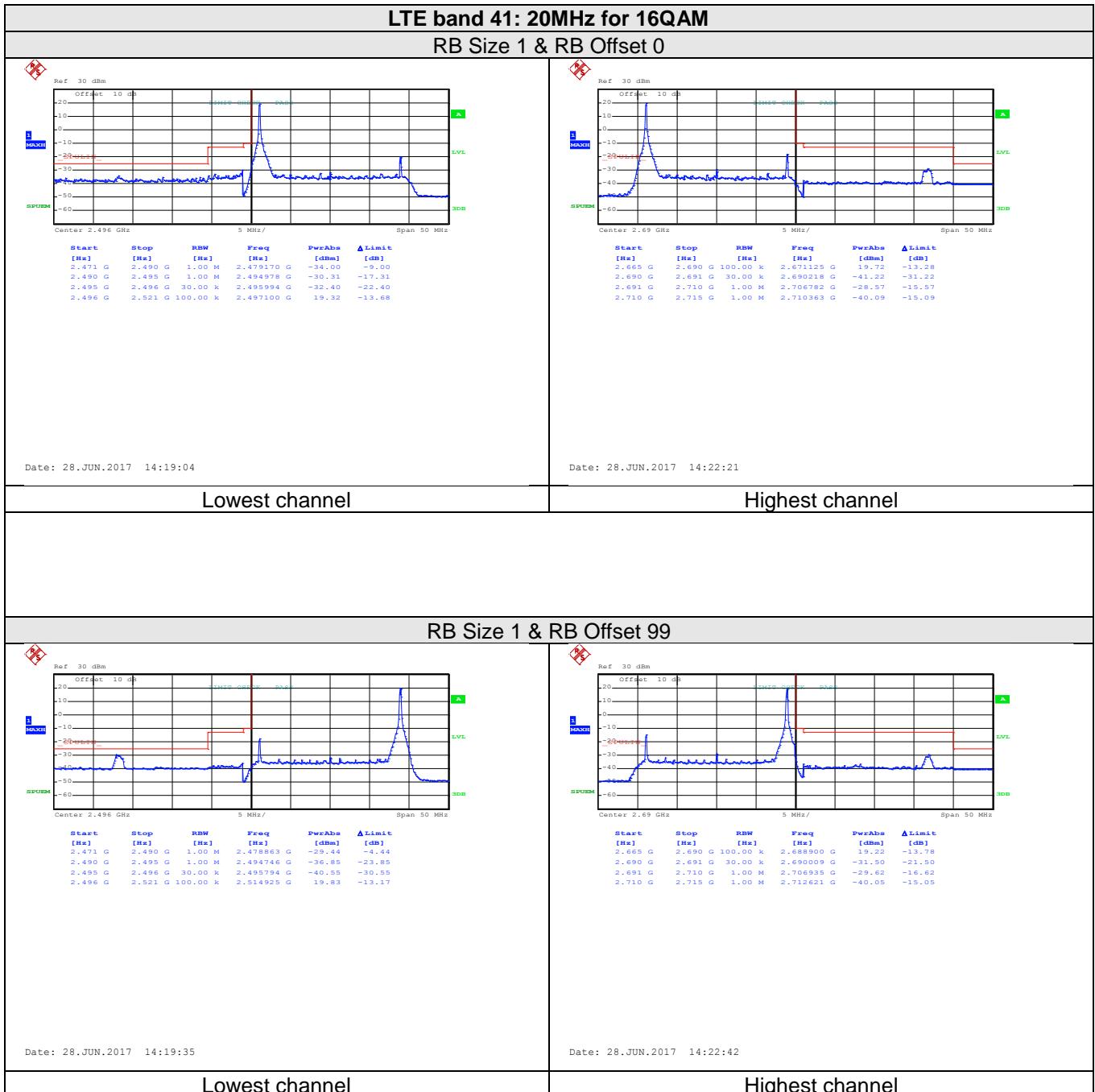


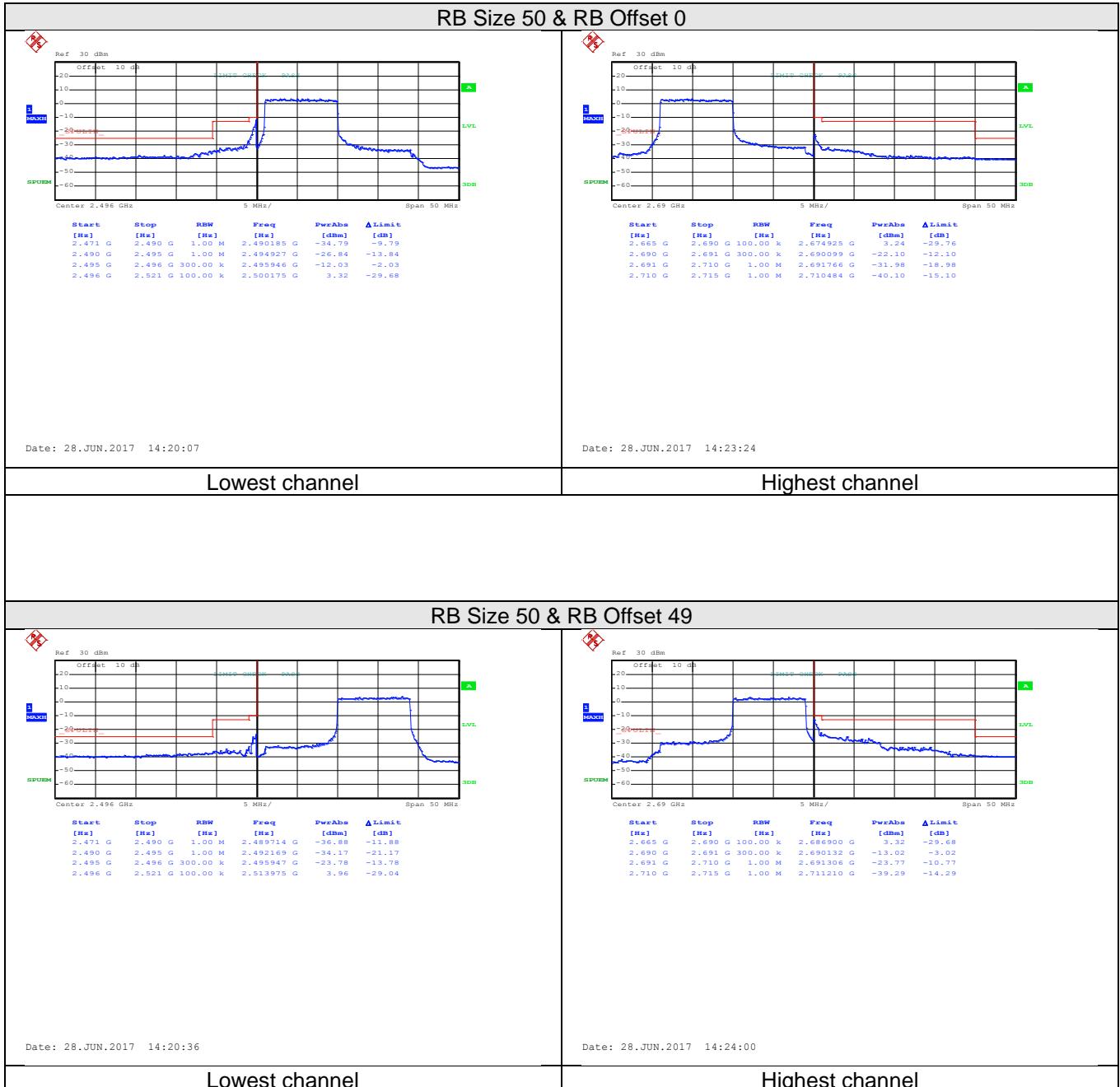


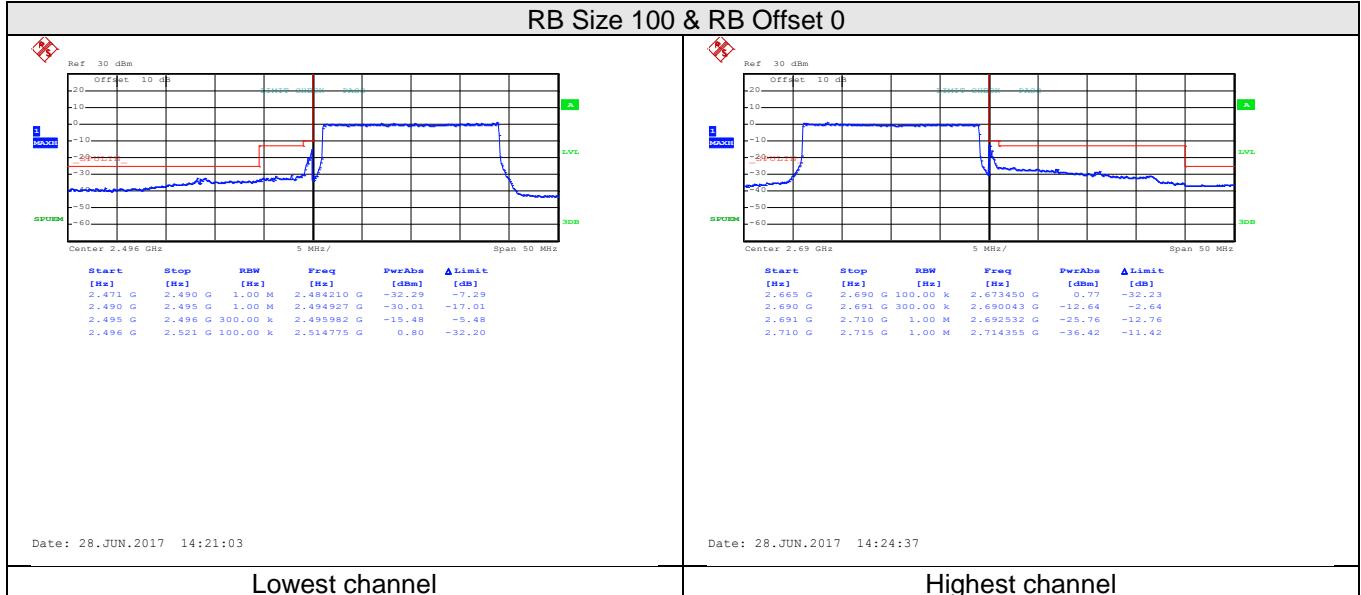












6.8 ERP, EIRP Measurement

Test Requirement:	Part 27.50 (h)(2)
Test Method:	FCC part2.1046
Limit:	Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.
Test setup:	<p>Below 1GHz</p> <p>Above 1GHz</p> <p>Substituted method:</p>

Test Procedure:	<ol style="list-style-type: none">1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.3. ERP in frequency band below 1GHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows: $\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$4. EIRP in frequency band above 1GHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows: $\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$5. The worse case was relating to the conducted output power.
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case):

LTE band 41: 5MHz														
Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result						
Test channel: Lowest channel														
RB size 1 & RB offset 0														
2498.50	39675	QPSK	5	H	V	24.23	33.00	Pass						
					H	20.05								
2498.50	39675	16QAM	5	H	V	24.17	33.00	Pass						
					H	20.02								
RB size 12 & RB offset 0														
2498.50	39675	QPSK	5	H	V	23.80	33.00	Pass						
					H	18.92								
2498.50	39675	16QAM	5	H	V	25.39	33.00	Pass						
					H	19.22								
RB size 25 & RB offset 0														
2498.50	39675	QPSK	5	H	V	22.16	33.00	Pass						
					H	17.33								
2498.50	39675	16QAM	5	H	V	22.98	33.00	Pass						
					H	18.28								
Test channel: Middle channel														
RB size 1 & RB offset 0														
2593.00	40620	QPSK	5	H	V	24.24	33.00	Pass						
					H	20.03								
2593.00	40620	16QAM	5	H	V	24.21	33.00	Pass						
					H	20.22								
RB size 12 & RB offset 0														
2593.00	40620	QPSK	5	H	V	23.83	33.00	Pass						
					H	18.01								
2593.00	40620	16QAM	5	H	V	25.03	33.00	Pass						
					H	19.82								
RB size 25 & RB offset 0														
2593.00	40620	QPSK	5	H	V	22.83	33.00	Pass						
					H	17.36								
2593.00	40620	16QAM	5	H	V	22.37	33.00	Pass						
					H	18.48								
Test channel: Highest channel														
RB size 1 & RB offset 0														
2687.50	41565	QPSK	5	H	V	24.98	33.00	Pass						
					H	20.83								
2687.50	41565	16QAM	5	H	V	24.67	33.00	Pass						
					H	20.21								
RB size 12 & RB offset 0														
2687.50	41565	QPSK	5	H	V	23.28	33.00	Pass						
					H	18.49								
2687.50	41565	16QAM	5	H	V	25.61	33.00	Pass						
					H	19.98								
RB size 25 & RB offset 0														
2687.50	41565	QPSK	5	H	V	22.83	33.00	Pass						
					H	17.39								
2687.50	41565	16QAM	5	H	V	22.82	33.00	Pass						
					H	18.03								

LTE band 41: 20MHz														
Frequency (MHz)	UL Channel	Modulation	BW (MHz)	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result						
Test channel: Lowest channel														
RB size 1 & RB offset 0														
2506.00	39750	QPSK	20	H	V	24.25	33.00	Pass						
					H	20.32								
2506.00	39750	16QAM	20	H	V	24.82	33.00	Pass						
					H	20.83								
RB size 50 & RB offset 0														
2506.00	39750	QPSK	20	H	V	23.12	33.00	Pass						
					H	18.39								
2506.00	39750	16QAM	20	H	V	25.93	33.00	Pass						
					H	19.27								
RB size 100 & RB offset 0														
2506.00	39750	QPSK	20	H	V	22.25	33.00	Pass						
					H	17.27								
2506.00	39750	16QAM	20	H	V	22.32	33.00	Pass						
					H	18.48								
Test channel: Middle channel														
RB size 1 & RB offset 0														
2593.00	40620	QPSK	20	H	V	24.83	33.00	Pass						
					H	20.33								
2593.00	40620	16QAM	20	H	V	24.39	33.00	Pass						
					H	20.01								
RB size 50 & RB offset 0														
2593.00	40620	QPSK	20	H	V	23.25	33.00	Pass						
					H	18.24								
2593.00	40620	16QAM	20	H	V	25.99	33.00	Pass						
					H	19.22								
RB size 100 & RB offset 0														
2593.00	40620	QPSK	20	H	V	22.49	33.00	Pass						
					H	17.39								
2593.00	40620	16QAM	20	H	V	22.48	33.00	Pass						
					H	18.82								
Test channel: Highest channel														
RB size 1 & RB offset 0														
2680.00	41490	QPSK	20	H	V	24.37	33.00	Pass						
					H	20.01								
2680.00	41490	16QAM	20	H	V	24.39	33.00	Pass						
					H	20.31								
RB size 12 & RB offset 0														
2593.00	40620	QPSK	20	H	V	23.25	33.00	Pass						
					H	18.24								
2593.00	40620	16QAM	20	H	V	25.99	33.00	Pass						
					H	19.22								
RB size 25 & RB offset 0														
2680.00	41490	QPSK	20	H	V	22.29	33.00	Pass						
					H	17.96								
2680.00	41490	16QAM	20	H	V	22.82	33.00	Pass						
					H	18.73								

6.9 Field strength of spurious radiation measurement

Test Requirement:	Part 27.53(m)(2)(v)
Test Method:	FCC part 2.1053
Limit:	For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge.
Test setup:	<p>Below 1GHz</p> <p>Above 1GHz</p> <p>Substituted method:</p>
Test Procedure:	<ol style="list-style-type: none"> The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. The frequency range up to tenth harmonic was investigated for each

	<p>of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method.</p> <p>4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.</p> $\text{ERP / EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}$
Test Uncertainty:	± 4.88 dB
Test Instruments:	Refer to section 5.8 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed
Remark:	During the test, pre-scan the QPSK, 16QAM modulation, and found the QPSK modulation is the worst case.

Measurement Data (worst case):

LTE band 41				
5MHz for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Test channel: Lowest channel				
4997.00	Vertical	-43.59	-13	Pass
7495.50	V	-43.53		
9994.00	V	-31.86		
4997.00	Horizontal	-43.49		
7495.50	H	-40.65		
9994.00	H	-30.06		
Test channel: Middle channel				
5186.00	Vertical	-41.03	-13	Pass
7779.00	V	-42.07		
10372.00	V	-37.55		
5186.00	Horizontal	-44.27		
7779.00	H	-38.53		
10372.00	H	-29.64		
Test channel: Highest channel				
5375.00	Vertical	-38.58	-13	Pass
8062.50	V	-41.11		
10750.00	V	-35.30		
5375.00	Horizontal	-46.39		
8062.50	H	-42.01		
10750.00	H	-32.86		

Remark:

1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

10MHz for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Test channel: Lowest channel				
5002.00	Vertical	-43.54	-13	Pass
7503.00	V	-43.65		
10004.00	V	-50.99		
5002.00	Horizontal	-43.94		
7503.00	H	-40.63		
10004.00	H	-30.85		
Test channel: Middle channel				
5186.00	Vertical	-41.53	-13	Pass
7779.00	V	-42.77		
10372.00	V	-37.55		
5186.00	Horizontal	-44.82		
7779.00	H	-38.49		
10372.00	H	-29.28		
Test channel: Highest channel				
5370.00	Vertical	-38.59	-13	Pass
8055.00	V	-41.24		
10740.00	V	-35.67		
5370.00	Horizontal	-46.47		
8055.00	H	-42.81		
10740.00	H	-32.75		

Remark:

1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

15MHz for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Test channel: Lowest channel				
5007.00	Vertical	-43.53	-13	Pass
7510.50	V	-43.79		
10014.00	V	-31.80		
5007.00	Horizontal	-43.17		
7510.50	H	-40.50		
10014.00	H	-30.47		
Test channel: Middle channel				
5186.00	Vertical	-41.79	-13	Pass
7779.00	V	-42.63		
10372.00	V	-37.75		
5186.00	Horizontal	-44.54		
7779.00	H	-38.43		
10372.00	H	-29.86		
Test channel: Highest channel				
5365.00	Vertical	-38.41	-13	Pass
8047.50	V	-41.12		
10730.00	V	-35.24		
5365.00	Horizontal	-46.99		
8047.50	H	-42.16		
10730.00	H	-32.59		

Remark:

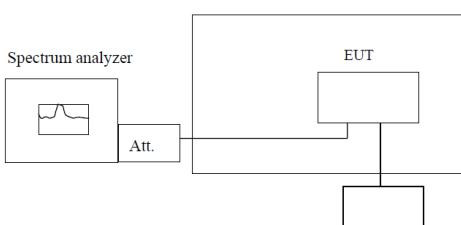
1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

20MHz for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Test channel: Lowest channel				
5012.00	Vertical	-43.49	-13	Pass
7518.00	V	-43.57		
10024.00	V	-50.37		
5012.00	Horizontal	-43.43		
7518.00	H	-40.18		
10024.00	H	-30.57		
Test channel: Middle channel				
5186.00	Vertical	-41.51	-13	Pass
7779.00	V	-42.92		
10372.00	V	-37.76		
5186.00	Horizontal	-44.69		
7779.00	H	-38.43		
10372.00	H	-29.49		
Test channel: Highest channel				
5360.00	Vertical	-38.36	-13	Pass
8040.00	V	-41.18		
10720.00	V	-35.42		
5360.00	Horizontal	-46.63		
8040.00	H	-42.51		
10720.00	H	-32.76		

Remark:

1. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

6.10 Frequency stability V.S. Temperature measurement

Test Requirement:	Part 27.54																																																																														
Test Method:	FCC Part2.1055(a)(1)(b)																																																																														
Limit:	<p>FCC:</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th rowspan="2">Fixed and base stations (\pmppm)</th> <th colspan="2">Mobile stations (\pmppm)</th> </tr> <tr> <th>Over 2 watts output power</th> <th>2 watts or less output power</th> </tr> </thead> <tbody> <tr><td>Below 25</td><td>100</td><td>100</td><td>200</td></tr> <tr><td>25-50</td><td>20</td><td>20</td><td>50</td></tr> <tr><td>72-76</td><td>5</td><td></td><td>50</td></tr> <tr><td>150-174</td><td>5</td><td>5</td><td>50</td></tr> <tr><td>216-220</td><td>1.0</td><td></td><td>1.0</td></tr> <tr><td>220-222</td><td>0.1</td><td>1.5</td><td>1.5</td></tr> <tr><td>421-512</td><td>2.5</td><td>5</td><td>5</td></tr> <tr><td>806-809</td><td>1.0</td><td>1.5</td><td>1.5</td></tr> <tr><td>809-824</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>851-854</td><td>1.0</td><td>1.5</td><td>1.5</td></tr> <tr><td>854-869</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>896-901</td><td>0.1</td><td>1.5</td><td>1.5</td></tr> <tr><td>902-928</td><td>2.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>928-928</td><td>2.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>929-930</td><td>1.5</td><td></td><td></td></tr> <tr><td>935-940</td><td>0.1</td><td>1.5</td><td>1.5</td></tr> <tr><td>1427-1435</td><td>300</td><td>300</td><td>300</td></tr> <tr><td>Above 2450</td><td></td><td></td><td></td></tr> </tbody> </table>	Frequency range (MHz)	Fixed and base stations (\pm ppm)	Mobile stations (\pm ppm)		Over 2 watts output power	2 watts or less output power	Below 25	100	100	200	25-50	20	20	50	72-76	5		50	150-174	5	5	50	216-220	1.0		1.0	220-222	0.1	1.5	1.5	421-512	2.5	5	5	806-809	1.0	1.5	1.5	809-824	1.5	2.5	2.5	851-854	1.0	1.5	1.5	854-869	1.5	2.5	2.5	896-901	0.1	1.5	1.5	902-928	2.5	2.5	2.5	928-928	2.5	2.5	2.5	929-930	1.5			935-940	0.1	1.5	1.5	1427-1435	300	300	300	Above 2450			
Frequency range (MHz)	Fixed and base stations (\pm ppm)			Mobile stations (\pm ppm)																																																																											
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806-809	1.0	1.5	1.5																																																																												
809-824	1.5	2.5	2.5																																																																												
851-854	1.0	1.5	1.5																																																																												
854-869	1.5	2.5	2.5																																																																												
896-901	0.1	1.5	1.5																																																																												
902-928	2.5	2.5	2.5																																																																												
928-928	2.5	2.5	2.5																																																																												
929-930	1.5																																																																														
935-940	0.1	1.5	1.5																																																																												
1427-1435	300	300	300																																																																												
Above 2450																																																																															
Test setup:	 <p>Note : Measurement setup for testing on Antenna connector</p>																																																																														
Test procedure:	<ol style="list-style-type: none"> The equipment under test was connected to an external DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached 																																																																														
Test Instruments:	Refer to section 5.8 for details																																																																														
Test mode:	Refer to section 5.3 for details																																																																														
Test results:	Passed																																																																														
Remark:	All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item.																																																																														

Measurement Data (the worst channel):

LTE band 41 for QPSK			
Power supplied (Vac)	Temperature (°C)	Frequency error	
		Hz	ppm
Reference Frequency: Lowest channel=2498.5MHz (for 5MHz)			
-40	185	0.074044	
-25	126	0.050430	
-10	102	0.040824	
0	122	0.048829	
10	136	0.054433	
20	147	0.058835	
30	138	0.055233	
40	169	0.067641	
55	157	0.062838	
Reference Frequency: Lowest channel=2501.0MHz (for 10MHz)			
-40	180	0.071971	
-20	136	0.054378	
-10	162	0.064774	
0	174	0.069572	
10	129	0.051579	
20	133	0.053179	
30	156	0.062375	
40	169	0.067573	
55	177	0.070772	
Reference Frequency: Lowest channel=2503.5MHz (for 15MHz)			
-40	179	0.071500	
-25	163	0.065109	
-10	125	0.049930	
0	152	0.060715	
10	138	0.055123	
20	147	0.058718	
30	126	0.050330	
40	119	0.047533	
55	108	0.043140	
Reference Frequency: Lowest channel=2506.0MHz (for 20MHz)			
-40	185	0.073823	
-20	163	0.065044	
-10	170	0.067837	
0	159	0.063448	
10	180	0.071828	
20	157	0.062650	
30	163	0.065044	
40	175	0.069832	
55	129	0.051476	

120

LTE band 41 for 16QAM			
Power supplied (Vac)	Temperature (°C)	Frequency error	
		Hz	ppm
Reference Frequency: Lowest channel=2498.5MHz (for 5MHz)			
120	-40	174	0.069642
	-25	163	0.065239
	-10	152	0.060837
	0	108	0.043226
	10	126	0.050430
	20	135	0.054032
	30	146	0.058435
	40	125	0.050030
	55	122	0.048829
	Reference Frequency: Lowest channel=2501.0MHz (for 10MHz)		
	-40	188	0.075170
	-20	162	0.064774
	-10	105	0.041983
	0	146	0.058377
	10	135	0.053978
	20	162	0.064774
	30	125	0.049980
	40	107	0.042783
	55	174	0.069572
	Reference Frequency: Lowest channel=2503.5MHz (for 15MHz)		
	-40	182	0.072698
	-25	163	0.065109
	-10	146	0.058318
	0	155	0.061913
	10	126	0.050330
	20	128	0.051128
	30	107	0.042740
	40	153	0.061114
	55	146	0.058318
	Reference Frequency: Lowest channel=2506.0MHz (for 20MHz)		
	-40	177	0.070630
	-20	163	0.065044
	-10	152	0.060654
	0	118	0.047087
	10	162	0.064645
	20	158	0.063049
	30	127	0.050678
	40	155	0.061852
	55	136	0.054270

6.11 Frequency stability V.S. Voltage measurement

Test Requirement:	Part 27.54																																																																														
Test Method:	FCC Part 2.1055(a)(1)(b)																																																																														
Limit:	<p>FCC:</p> <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th rowspan="2">Fixed and base stations (\pmppm)</th> <th colspan="2">Mobile stations (\pmppm)</th> </tr> <tr> <th>Over 2 watts output power</th> <th>2 watts or less output power</th> </tr> </thead> <tbody> <tr><td>Below 25</td><td>100</td><td>100</td><td>200</td></tr> <tr><td>25-50</td><td>20</td><td>20</td><td>50</td></tr> <tr><td>72-76</td><td>5</td><td></td><td>50</td></tr> <tr><td>150-174</td><td>5</td><td>5</td><td>50</td></tr> <tr><td>216-220</td><td>1.0</td><td></td><td>1.0</td></tr> <tr><td>220-222</td><td>0.1</td><td>1.5</td><td>1.5</td></tr> <tr><td>421-512</td><td>2.5</td><td>5</td><td>5</td></tr> <tr><td>806-809</td><td>1.0</td><td>1.5</td><td>1.5</td></tr> <tr><td>809-824</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>851-854</td><td>1.0</td><td>1.5</td><td>1.5</td></tr> <tr><td>854-869</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>896-901</td><td>0.1</td><td>1.5</td><td>1.5</td></tr> <tr><td>902-928</td><td>2.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>902-928</td><td>2.5</td><td>2.5</td><td>2.5</td></tr> <tr><td>929-930</td><td>1.5</td><td></td><td></td></tr> <tr><td>935-940</td><td>0.1</td><td>1.5</td><td>1.5</td></tr> <tr><td>1427-1435</td><td>300</td><td>300</td><td>300</td></tr> <tr><td>Above 2450</td><td></td><td></td><td></td></tr> </tbody> </table>	Frequency range (MHz)	Fixed and base stations (\pm ppm)	Mobile stations (\pm ppm)		Over 2 watts output power	2 watts or less output power	Below 25	100	100	200	25-50	20	20	50	72-76	5		50	150-174	5	5	50	216-220	1.0		1.0	220-222	0.1	1.5	1.5	421-512	2.5	5	5	806-809	1.0	1.5	1.5	809-824	1.5	2.5	2.5	851-854	1.0	1.5	1.5	854-869	1.5	2.5	2.5	896-901	0.1	1.5	1.5	902-928	2.5	2.5	2.5	902-928	2.5	2.5	2.5	929-930	1.5			935-940	0.1	1.5	1.5	1427-1435	300	300	300	Above 2450			
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Test setup:	<p>Temperature Chamber</p> <p>Note : Measurement setup for testing on Antenna connector</p>																																																																														
Test procedure:	<ol style="list-style-type: none"> Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change. 																																																																														
Test Instruments:	Refer to section 5.8 for details																																																																														
Test mode:	Refer to section 5.3 for details, and all channels have been tested, only shows the worst channel data in this report.																																																																														
Test results:	Passed																																																																														
Remark:	All three channels of all modulations have been tested, but only the worst channel and the worst modulation show in this test item.																																																																														

Measurement Data (the worst channel):

LTE band 41 for QPSK			
Temperature (°C)	Power supplied (Vdc)	Frequency error	
		Hz	ppm
Reference Frequency: Lowest channel=2498.5MHz (for 5MHz)			
25	102	74	0.029618
	120	86	0.034421
	132	82	0.032820
	Reference Frequency: Lowest channel=2501.0MHz (for 10MHz)		
	102	77	0.030788
	120	63	0.025190
	132	90	0.035986
	Reference Frequency: Lowest channel=2503.5MHz (for 15MHz)		
	102	58	0.023168
	120	74	0.029559
	132	72	0.028760
	Reference Frequency: Lowest channel=2506.0MHz (for 20MHz)		
	108	63	0.025140
	120	90	0.035914
	132	78	0.031125
LTE band 41 for QPSK			
Temperature (°C)	Power supplied (Vdc)	Frequency error	
		Hz	ppm
Reference Frequency: Lowest channel=2498.5MHz (for 5MHz)			
25	102	68	0.027216
	120	90	0.036022
	132	45	0.018011
	Reference Frequency: Lowest channel=2501.0MHz (for 10MHz)		
	102	87	0.034786
	120	96	0.038385
	132	88	0.035186
	Reference Frequency: Lowest channel=2503.5MHz (for 15MHz)		
	102	92	0.036749
	120	74	0.029559
	132	90	0.035950
	Reference Frequency: Lowest channel=2506.0MHz (for 20MHz)		
	102	86	0.034318
	120	89	0.035515
	132	79	0.031524