

# FCC REPORT

## (LTE)

**Applicant:** Sky Phone LLC

**Address of Applicant:** 1348 Washington Av. Suite 350, Miami Beach, Florida, United States

**Equipment Under Test (EUT)**

Product Name: 4G Smart Phone

Model No.: Elite M5Plus

Trade mark: SKY DEVICES

**FCC ID:** 2ABOSSKYELITEM5P

**Applicable standards:** FCC CFR Title 47 Part 2  
FCC CFR Title 47 Part 24 Subpart E

**Date of sample receipt:** 06 Aug., 2018

**Date of Test:** 06 Aug., to 28 Aug., 2018

**Date of report issued:** 29 Aug., 2018

**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.

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## 2. Version

Version No.	Date	Description
00	29 Aug., 2018	Original

**Tested by:**

*Carrey Chen*

**Date:**

29 Aug., 2018

**Test Engineer**

**Reviewed by:**

*Wimer Zhang*

**Date:**

29 Aug., 2018

**Project Engineer**

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## 4. Test Summary

Test Items	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Passed (Please refer to SAR Report)
RF Output Power	Part 2.1046 Part 24.232 (c)	Pass
Peak-to-Average Ratio	Part 24.232 (d)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 24.238(b)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 24.238 (a)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 24.238 (a)	Pass
Out of band emission, Band Edge	Part 24.238 (a)	Pass
Frequency stability vs. temperature	Part 24.235 Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 24.235 Part 2.1055(d)(2)	Pass

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

## 5. General Information

### 5.1 Client Information

Applicant:	Sky Phone LLC
Address:	1348 Washington Av. Suite 350, Miami Beach, Florida, United States
Manufacturer:	Sky Phone LLC
Address:	1348 Washington Av. Suite 350, Miami Beach, Florida, United States

### 5.2 General Description of E.U.T.

Product Name:	4G Smart Phone
Model No.:	Elite M5Plus
Operation Frequency range:	LTE Band 2: TX: 1850MHz-1910MHz, RX: 1930MHz-1990MHz
Modulation type:	QPSK, 16QAM
Antenna type:	Internal Antenna
Antenna gain:	LTE Band 2: 0.3 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-2000mAh
AC adapter:	Model: Elite M5Plus Input: AC100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1.0A

**Operation Frequency List:**

LTE Band 2 (1.4MHz)		LTE Band 2 (3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18607	1850.70	18615	1851.50
18608	1850.80	18616	1851.60
....	....	....	....
18899	1879.90	18899	1879.90
18900	1880.00	18900	1880.00
18901	1880.10	18901	1880.10
...	...	...	...
19193	1909.20	19185	1908.40
19194	1909.30	19186	1908.50
LTE Band 2 (5MHz)		LTE Band 2 (10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18625	1852.50	18650	1855.00
18626	1852.60	18651	1855.10
....	....	....	....
18899	1879.90	18899	1879.90
18900	1880.00	18900	1880.00
18901	1880.10	18901	1880.10
...	...	...	...
19175	1907.40	19150	1904.90
19176	1907.50	19151	1905.00
LTE Band 2 (15MHz)		LTE Band 2 (20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
18675	1857.50	18700	1860.00
18676	1857.60	18701	1860.10
....	....	....	....
18899	1879.90	18899	1879.90
18900	1880.00	18900	1880.00
18901	1880.10	18901	1880.10
...	...	...	...
19125	1902.40	19100	1899.90
19126	1902.50	19101	1900.00

Regards to the operating frequency range, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channels as below:

LTE Band 2 (1.4MHz)			LTE Band 2 (3MHz)		
Channel	Frequency (MHz)		Channel	Frequency (MHz)	
Lowest channel	18607	1850.70	Lowest channel	18615	1851.50
Middle channel	18900	1880.00	Middle channel	18900	1880.00
Highest channel	19193	1909.30	Highest channel	19185	1908.50
LTE Band 2 (5MHz)			LTE Band 2 (10MHz)		
Channel	Frequency (MHz)		Channel	Frequency (MHz)	
Lowest channel	18625	1852.50	Lowest channel	18650	1855.00
Middle channel	18900	1880.00	Middle channel	18900	1880.00
Highest channel	19175	1907.50	Highest channel	19150	1905.00
LTE Band 2 (15MHz)			LTE Band 2 (20MHz)		
Channel	Frequency (MHz)		Channel	Frequency (MHz)	
Lowest channel	18675	1857.50	Lowest channel	18700	1860.00
Middle channel	18900	1880.00	Middle channel	18900	1880.00
Highest channel	19125	1902.50	Highest channel	19100	1900.00

### 5.3 Test environment and mode

Operating Environment:	
Temperature:	Normal: 15°C ~ 35°C, Extreme: -30°C ~ +50°C
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.7Vdc, Extreme: Low 3.5Vdc, High 4.2Vdc
Test mode:	
LTE QPSK mode	Keep the EUT communication with simulated station in QPSK mode
LTE 16-QAM mode	Keep the EUT communication with simulated station in 16-QAM mode
Remark: The EUT has been tested under 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 these modes with power adaptor, earphone and Data cable. Just the worst case position (H mode) shown in report.	

### 5.4 Description of Support Units

Test Equipment	Manufacturer	Model No.	Serial No.
Simulated Station	Anritsu	MT8820C	6201026545

### 5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Radiated Emission (9kHz ~ 30MHz)	±2.76 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.28 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.72 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±2.88 dB (k=2)

### 5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.
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### 5.7 Laboratory Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC - Registration No.: 727551</b> Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.</li> <li>● <b>IC - Registration No.: 10106A-1</b> 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.</li> <li>● <b>CNAS - Registration No.: CNAS L6048</b> 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.</li> <li>● <b>A2LA - Registration No.: 4346.01</b> This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: <a href="https://portal.a2la.org/scopepdf/4346-01.pdf">https://portal.a2la.org/scopepdf/4346-01.pdf</a></li> </ul>
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## 5.8 Laboratory Location

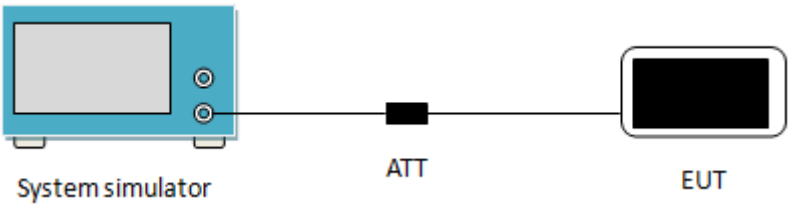
Shenzhen Zhongjian Nanfang Testing Co., Ltd.  
 Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,  
 Bao'an District, Shenzhen, Guangdong, China  
 Tel: +86-755-23118282, Fax: +86-755-23116366  
 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

## 5.9 Test Instruments list

Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-16-2018	03-15-2019
Biconical Antenna	SCHWARZBECK	VUBA9117	359	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-16-2018	03-15-2019
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-07-2018	03-06-2019
Pre-amplifier	CD	PAP-1G18	11804	03-07-2018	03-06-2019
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-07-2018	03-06-2019
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-07-2018	03-06-2019
Spectrum Analyzer	Agilent	N9020A	MY50510123	10-29-2017	10-28-2018
Signal Generator	Rohde & Schwarz	SMX	835454/016	03-07-2018	03-06-2019
Signal Generator	R&S	SMR20	1008100050	03-07-2018	03-06-2019
RF Switch Unit	MWRFTTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTTEST	MTS8200	Version: 2.0.0.0		
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2018	03-06-2019
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2018	03-06-2019
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2018	03-06-2019
DC Power Supply	XinNuoEr	WYK-10020K	1409050110020	10-31-2017	10-30-2018
Temperature Humidity Chamber	HengPu	HPGDS-500	20140828008	09-24-2017	09-23-2018
Simulated Station	Rohde & Schwarz	CMW500	140493	06-24-2018	06-23-2019

## 6. Test results

### 6.1 Conducted Output Power

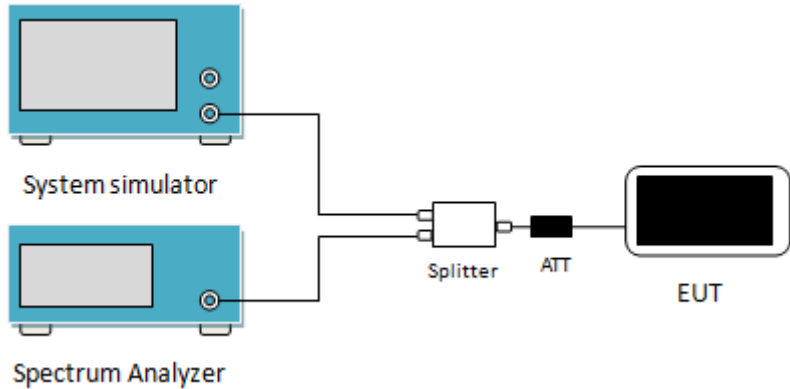
Test Requirement:	Part 24.232(c)
Test Method:	ANSI/TIA-603-D 2010
Limit:	LTE Band 2: 2W
Test Setup:	 <p>The diagram illustrates the test setup. On the left is a blue 'System simulator' with a screen and two ports. A line connects it to a black square labeled 'ATT' (attenuator). Another line connects the 'ATT' to a black rectangle labeled 'EUT' (Equipment Under Test).</p>
Test Procedure:	The transmitter output was connected to a calibrated attenuator, the other end of which was connected to the CMW500. Transmitter output power was read off in dBm.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data:**

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18607	18900	19193
					1850.70MHz	1880.00MHz	1909.30MHz
2	1.4	QPSK	1	0	22.34	22.41	22.25
			1	2	22.45	22.40	22.34
			1	5	22.44	22.48	22.24
			3	0	21.26	21.51	21.43
			3	1	21.30	21.40	21.44
			3	2	21.31	21.34	21.41
		16QAM	6	0	21.94	21.96	21.87
			1	0	22.68	22.30	22.44
			1	2	22.69	22.49	22.58
			1	5	22.58	22.06	22.13
			3	0	21.28	21.23	21.65
			3	1	21.05	21.42	21.36
			3	2	21.34	21.96	21.39
			6	0	21.49	21.50	21.07
LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18615	18900	19185
					1851.5MHz	1880.0MHz	1908.5MHz
2	3	QPSK	1	0	22.48	22.34	22.29
			1	7	22.34	22.38	22.18
			1	14	22.24	22.45	22.18
			8	0	21.93	21.84	21.74
			8	4	21.93	21.94	21.77
			8	7	21.85	21.79	21.77
		16QAM	15	0	21.85	21.79	21.56
			1	0	22.44	22.22	22.79
			1	7	22.99	22.36	22.33
			1	14	22.68	22.32	22.57
			8	0	21.57	21.27	21.18
			8	4	21.25	21.19	21.12
			8	7	21.35	21.15	21.14
			15	0	21.50	21.28	21.49
LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18625	18900	19175
					1852.5MHz	1880.0MHz	1907.5MHz
2	5	QPSK	1	0	22.22	22.23	22.15
			1	12	22.13	22.18	22.03
			1	24	22.19	22.15	22.14
			12	0	21.89	21.74	21.79
			12	6	21.63	21.73	21.68
			12	11	21.96	21.81	21.61
			25	0	21.79	21.77	21.53
		16QAM	1	0	22.26	22.13	22.34
			1	12	22.75	22.14	22.00
			1	24	22.60	22.91	22.48
			12	0	21.37	21.37	21.39
			12	6	21.38	21.32	21.38
			12	11	21.57	21.41	21.34
			25	0	21.43	21.34	21.04

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18650	18900	19150
					1855.0MHz	1880.0MHz	1905.0MHz
2	10	QPSK	1	0	22.30	21.55	22.00
			1	24	22.31	21.22	22.53
			1	49	22.23	22.03	22.17
			25	0	21.96	21.49	21.78
			25	12	21.84	21.79	21.75
			25	24	21.53	21.61	21.87
			50	0	21.87	21.61	21.70
		16QAM	1	0	22.51	22.30	22.46
			1	24	22.40	22.54	22.78
			1	49	22.52	22.39	22.51
			25	0	21.36	21.18	21.83
			25	12	21.21	21.39	21.20
			25	24	21.08	21.34	21.60
			50	0	21.50	21.36	21.17
LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18675	18900	19125
					1857.5MHz	1880.0MHz	1902.5MHz
2	15	QPSK	1	0	22.36	21.80	22.36
			1	37	22.13	21.99	22.24
			1	74	22.08	21.96	21.56
			36	0	21.87	21.89	21.78
			36	16	21.69	21.52	21.76
			36	35	21.90	21.57	21.61
			75	0	21.56	21.57	21.72
		16QAM	1	0	21.89	21.84	21.99
			1	37	21.76	22.88	22.97
			1	74	21.96	22.22	22.97
			36	0	21.32	21.42	20.99
			36	16	21.11	21.22	21.20
			36	35	21.02	21.18	21.22
			75	0	21.06	21.29	21.15
LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18700	18900	19100
					1860.0MHz	1880.0MHz	1900.0MHz
2	20	QPSK	1	0	22.79	22.44	22.03
			1	49	22.10	22.49	22.18
			1	99	21.97	22.39	22.13
			50	0	21.95	21.45	21.68
			50	24	21.63	21.67	21.66
			50	49	21.58	21.81	21.85
			100	0	21.91	21.52	21.75
		16QAM	1	0	21.85	21.76	21.94
			1	49	21.82	22.09	22.85
			1	99	21.70	21.78	22.47
			50	0	21.19	21.20	21.28
			50	24	21.17	21.31	21.30
			50	49	21.15	21.09	21.15
			100	0	21.29	21.17	21.24

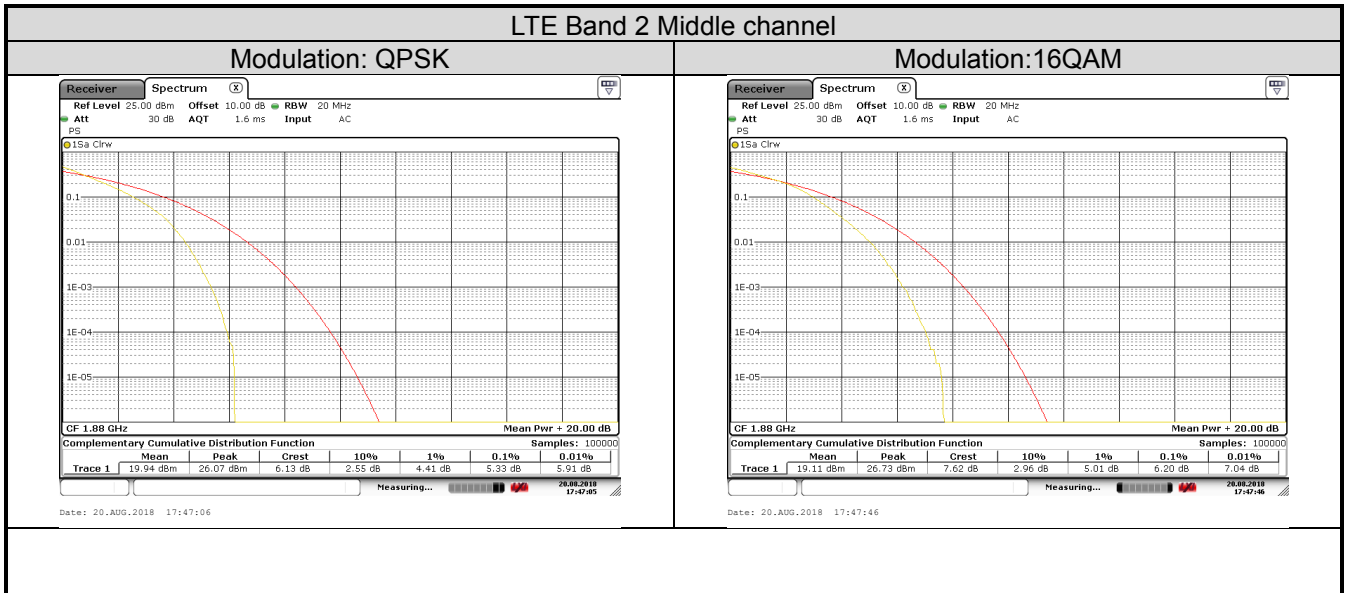
## 6.2 Peak-to-Average Ratio

Test Requirement:	Part 24.232 (d)
Test Method:	ANSI/TIA-603-D 2010
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test Setup:	 <p>The diagram shows a test setup for measuring Peak-to-Average Ratio (PAR). It consists of a System simulator and a Spectrum Analyzer connected to a Splitter. The Splitter is connected to an ATT (Attenuator) and then to the EUT (Equipment Under Test).</p>
Test Procedure:	<ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>2 Set the CCDF option in spectrum analyzer, <math>RBW \geq OBW</math>,</li> <li>3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level.</li> <li>4 Repeat step 1~3 at other frequency and modulations.</li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

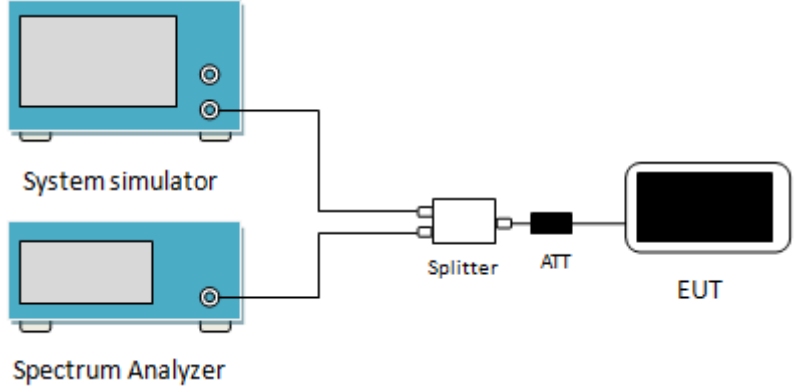
**Measurement Data (Worst case):**

Bandwidth	Modulation	RB Size	RB Offset	PAPR
LTE Band 2 (Middle Channel)				
20MHz	QPSK	100	0	4.41
	16QAM	100	0	5.01

**Test plots as below:**



## 6.3 Occupy Bandwidth

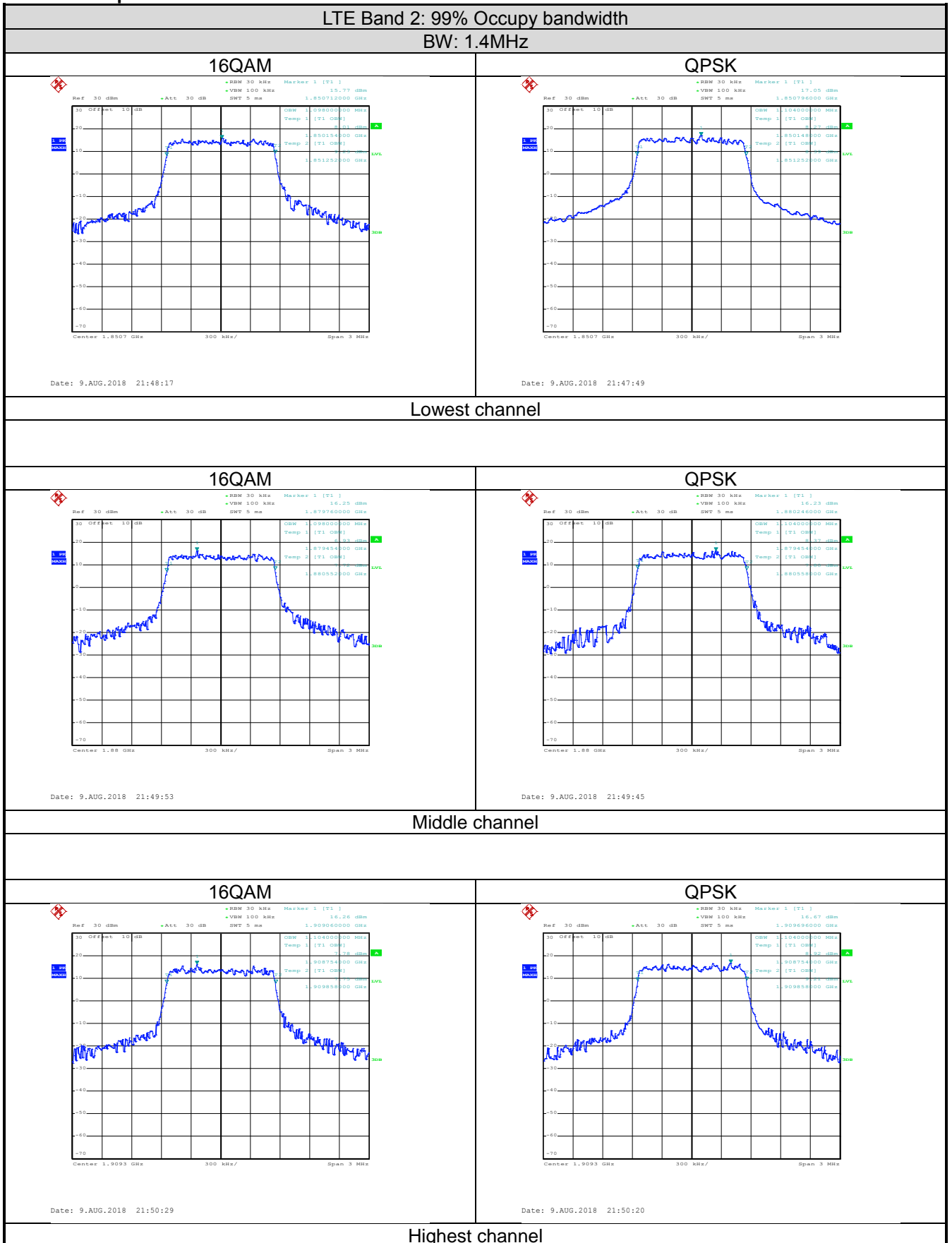
Test Requirement:	Part 24.238(b)
Test Method:	ANSI/TIA-603-D 2010
Test Setup:	 <p>The diagram illustrates the test setup. On the left, there are two blue rectangular units: the top one is labeled 'System simulator' and the bottom one is labeled 'Spectrum Analyzer'. Both have a screen and two ports on the right side. A single cable connects the two ports of the System simulator to the top port of a white 'Splitter' box. Another cable connects the two ports of the Spectrum Analyzer to the bottom port of the Splitter. From the right side of the Splitter, a cable goes to a black 'ATT' (Attenuator) block, which is then connected to the 'EUT' (Equipment Under Test), represented by a black rectangular device with a screen.</p>
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer</li> <li>2. RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW.</li> <li>3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.</li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data:**

LTE Band 2					
Bandwidth	Channel	Frequency (MHz)	Modulation	99% OBW (kHz)	-26dBcEBW (kHz)
1.4MHz	18607	1850.70	16QAM	1908	1272
			QPSK	1104	1278
	18900	1880.00	16QAM	1098	1320
			QPSK	1101	1290
	19193	1909.30	16QAM	1104	1308
			QPSK	1104	1308
3MHz	18615	1851.50	16QAM	2748	3264
			QPSK	2772	3468
	18900	1880.00	16QAM	2760	3324
			QPSK	2772	3204
	19185	1908.50	16QAM	2760	3240
			QPSK	2772	3420
5MHz	18625	1852.50	16QAM	4520	4920
			QPSK	4520	5040
	18900	1880.00	16QAM	4520	4980
			QPSK	4520	4960
	19175	1907.50	16QAM	4520	5000
			QPSK	4500	5020
10MHz	18650	1855.00	16QAM	9120	10440
			QPSK	8960	10360
	18900	1880.00	16QAM	9080	10200
			QPSK	9120	10640
	19150	1905.00	16QAM	9080	10200
			QPSK	9080	10320
15MHz	18675	1857.50	16QAM	13560	14820
			QPSK	13620	15060
	18900	1880.00	16QAM	13560	14940
			QPSK	13560	15120
	19125	1902.50	16QAM	13440	15060
			QPSK	13560	15060
20MHz	18700	1860.00	16QAM	18000	19600
			QPSK	18000	19760
	18900	1880.00	16QAM	17920	19600
			QPSK	18000	19680
	19100	1900.00	16QAM	17920	19600
			QPSK	17920	19920

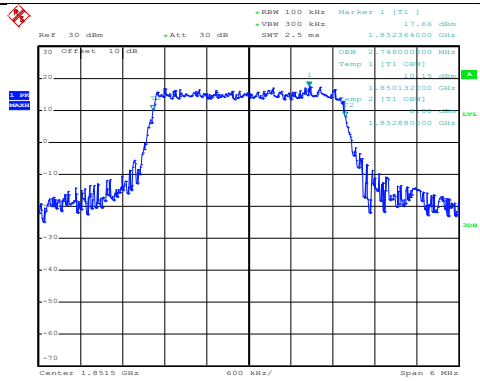


Test plot as follows:  
LTE Band 2 part:



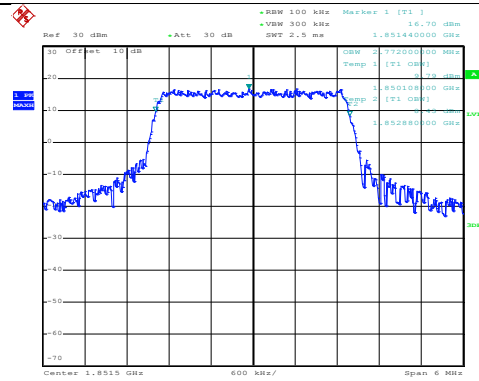
LTE Band 2: 99% Occupancy bandwidth  
BW: 3MHz

16QAM



Date: 9.AUG.2018 21:55:22

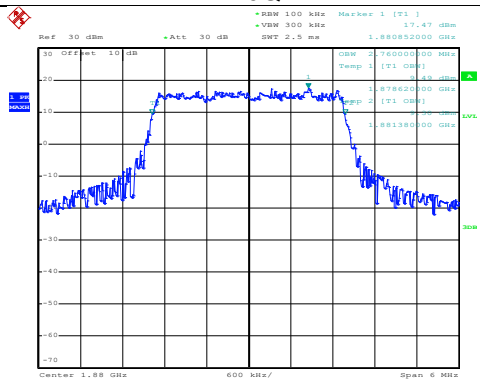
QPSK



Date: 9.AUG.2018 21:55:15

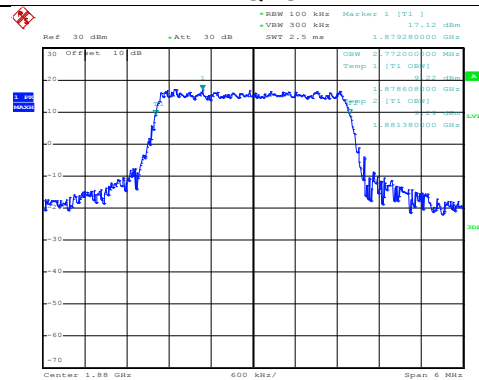
Lowest channel

16QAM



Date: 9.AUG.2018 21:56:04

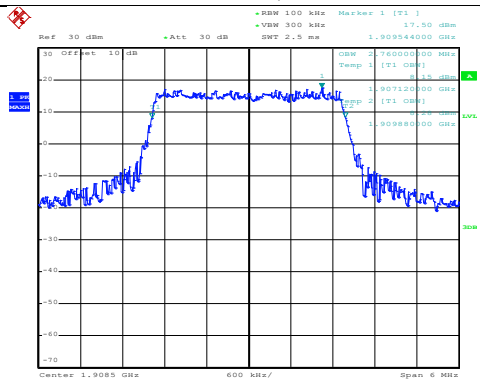
QPSK



Date: 9.AUG.2018 21:55:53

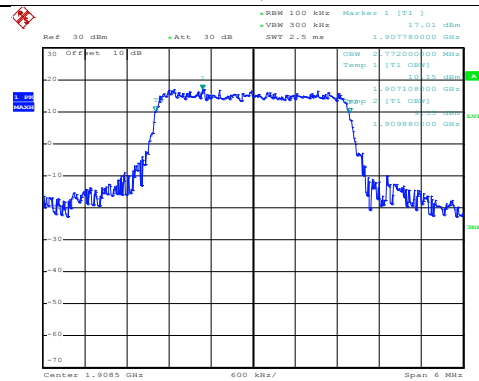
Middle channel

16QAM



Date: 9.AUG.2018 21:58:27

QPSK

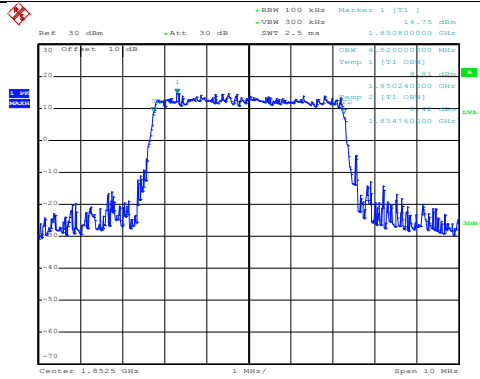


Date: 9.AUG.2018 21:58:15

Highest channel

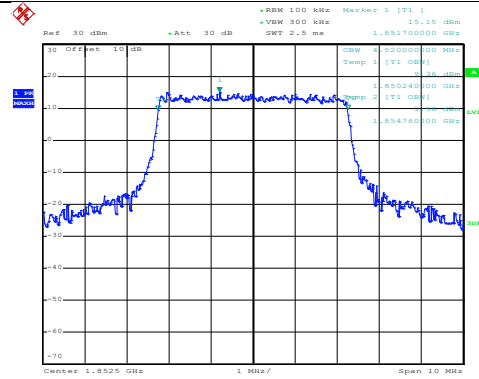
LTE Band 2: 99% Occupancy bandwidth  
BW: 5MHz

16QAM



Date: 9.AUG.2018 21:59:07

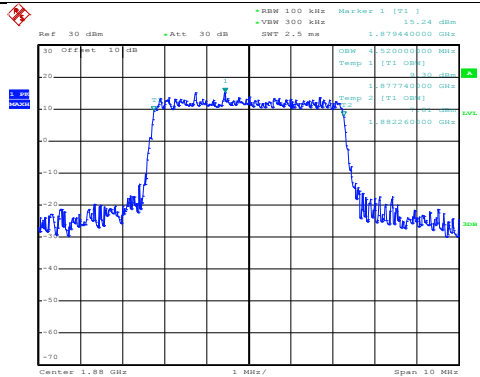
QPSK



Date: 9.AUG.2018 21:59:00

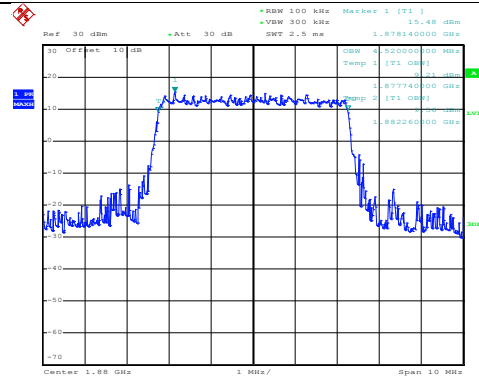
Lowest channel

16QAM



Date: 9.AUG.2018 22:00:18

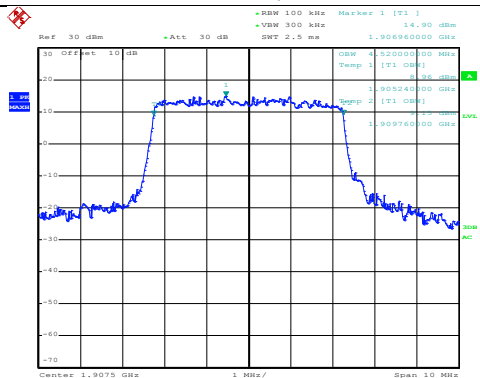
QPSK



Date: 9.AUG.2018 22:00:12

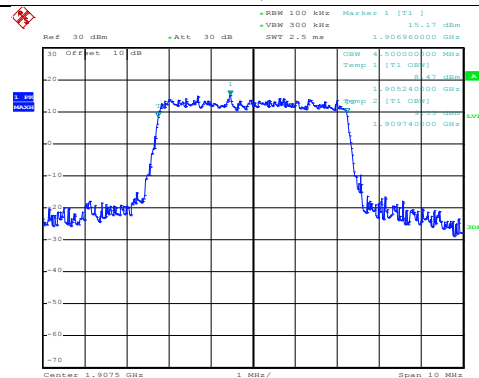
Middle channel

16QAM



Date: 28.AUG.2018 15:42:40

QPSK

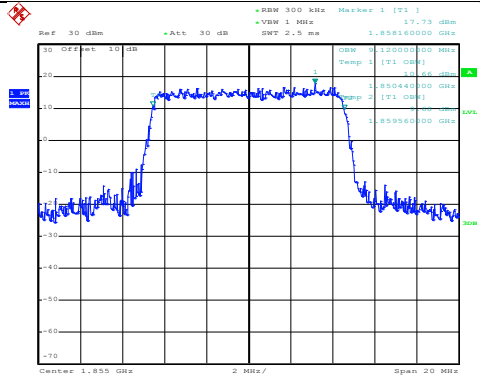


Date: 9.AUG.2018 22:00:35

Highest channel

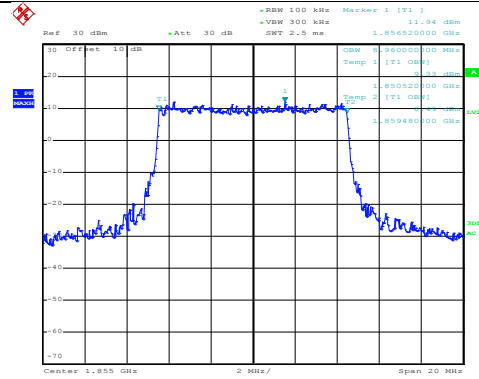
LTE Band 2: 99% Occupy bandwidth  
BW: 10MHz

16QAM



Date: 9.AUG.2018 22:02:28

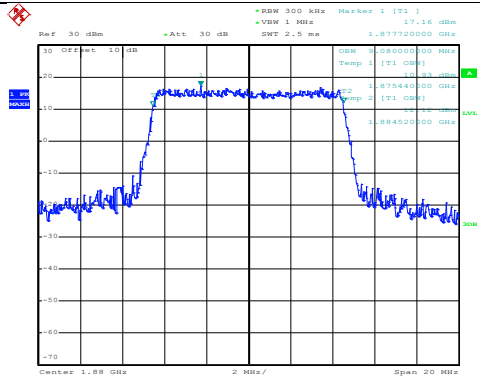
QPSK



Date: 28.AUG.2018 15:43:27

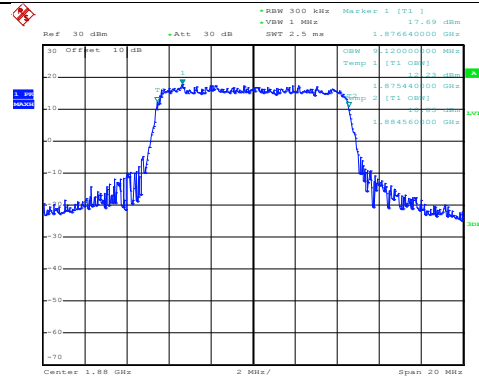
Lowest channel

16QAM



Date: 9.AUG.2018 22:02:56

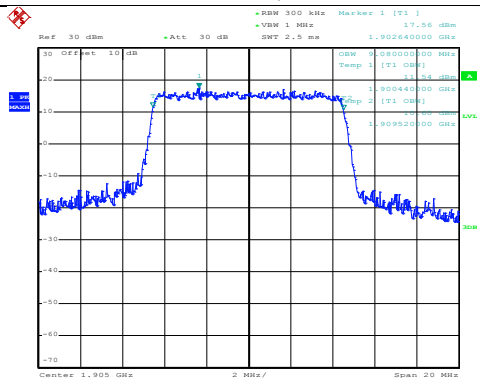
QPSK



Date: 9.AUG.2018 22:02:50

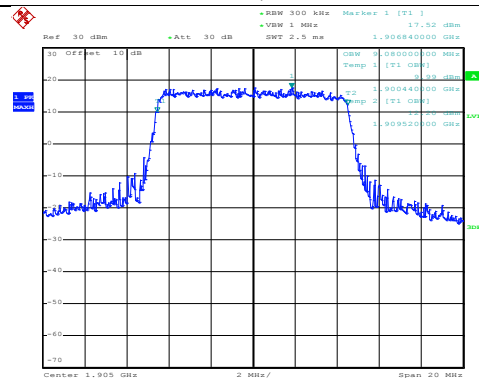
Middle channel

16QAM



Date: 9.AUG.2018 22:04:30

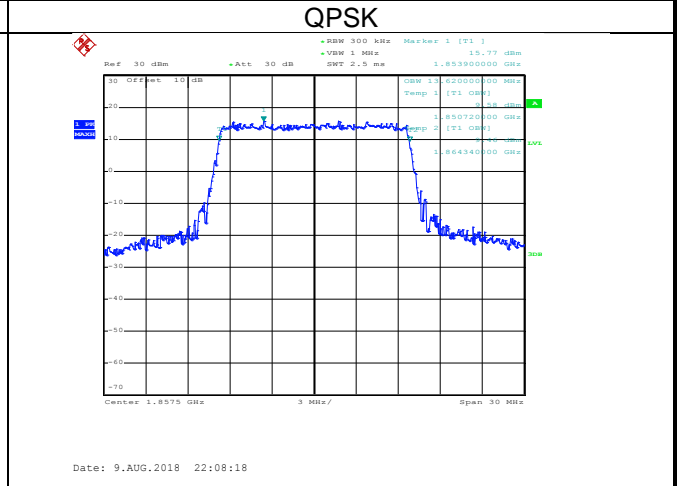
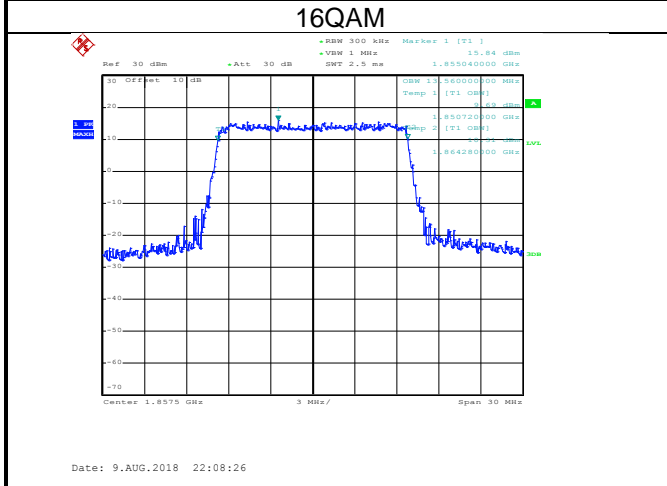
QPSK



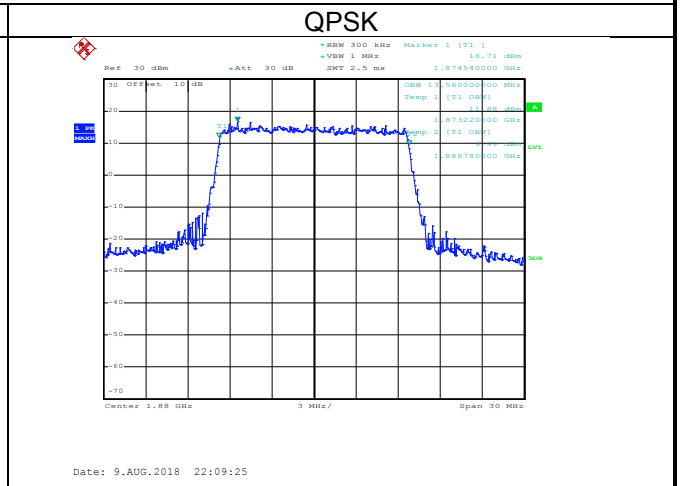
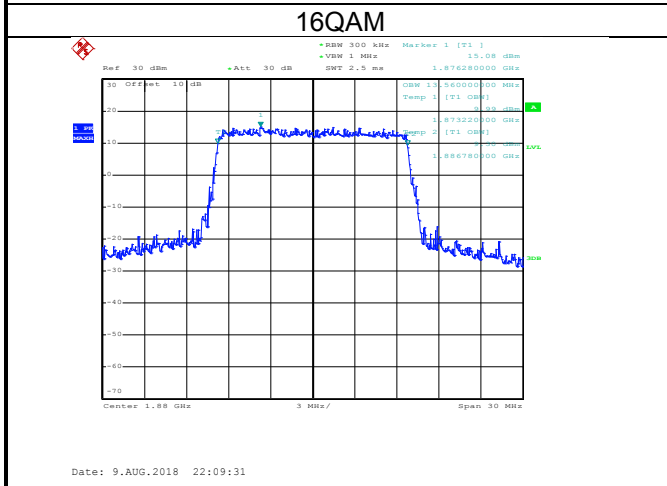
Date: 9.AUG.2018 22:04:23

Highest channel

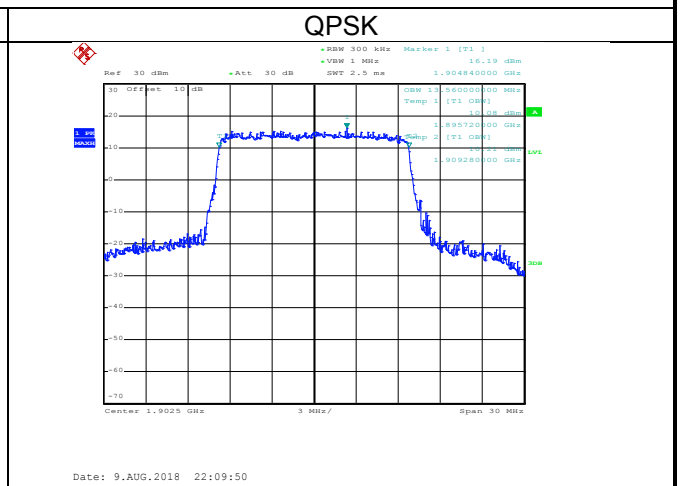
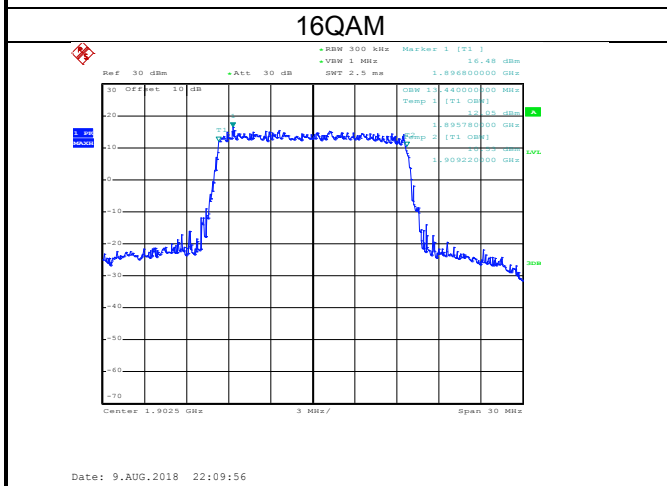
**LTE Band 2: 99% Occupancy bandwidth**  
**BW: 15MHz**



**Lowest channel**



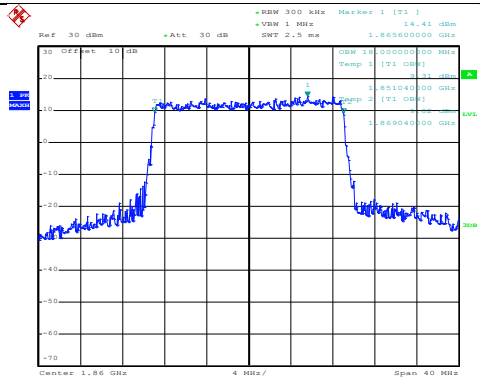
**Middle channel**



**Highest channel**

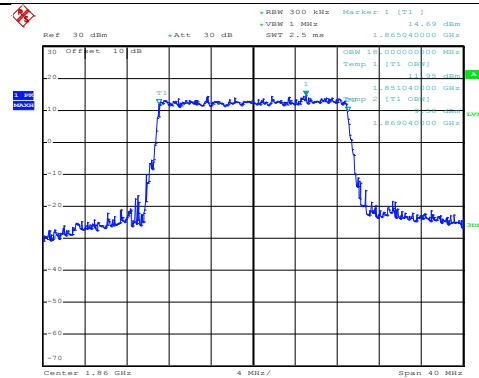
LTE Band 2: 99% Occupy bandwidth  
BW: 20MHz

16QAM



Date: 9.AUG.2018 22:11:36

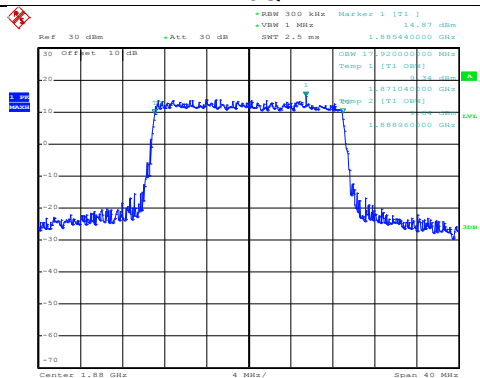
QPSK



Date: 9.AUG.2018 22:11:30

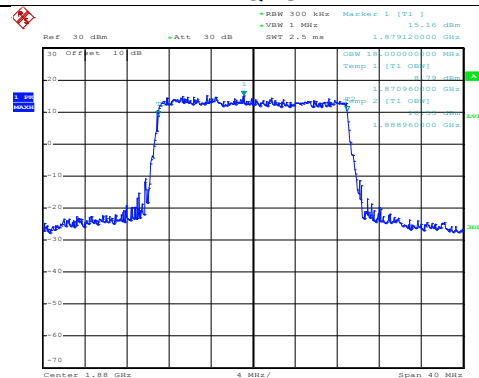
Lowest channel

16QAM



Date: 9.AUG.2018 22:12:02

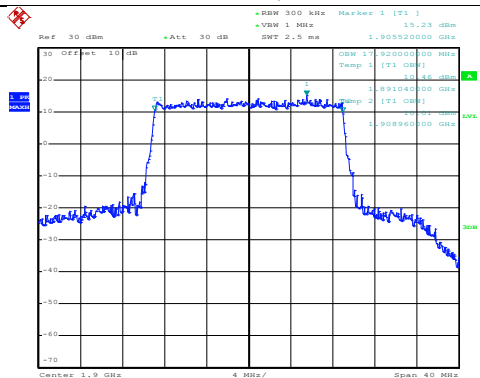
QPSK



Date: 9.AUG.2018 22:11:55

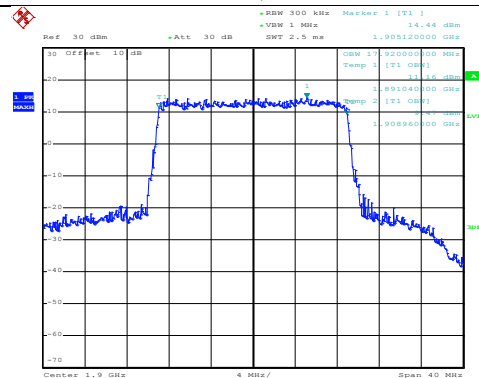
Middle channel

16QAM



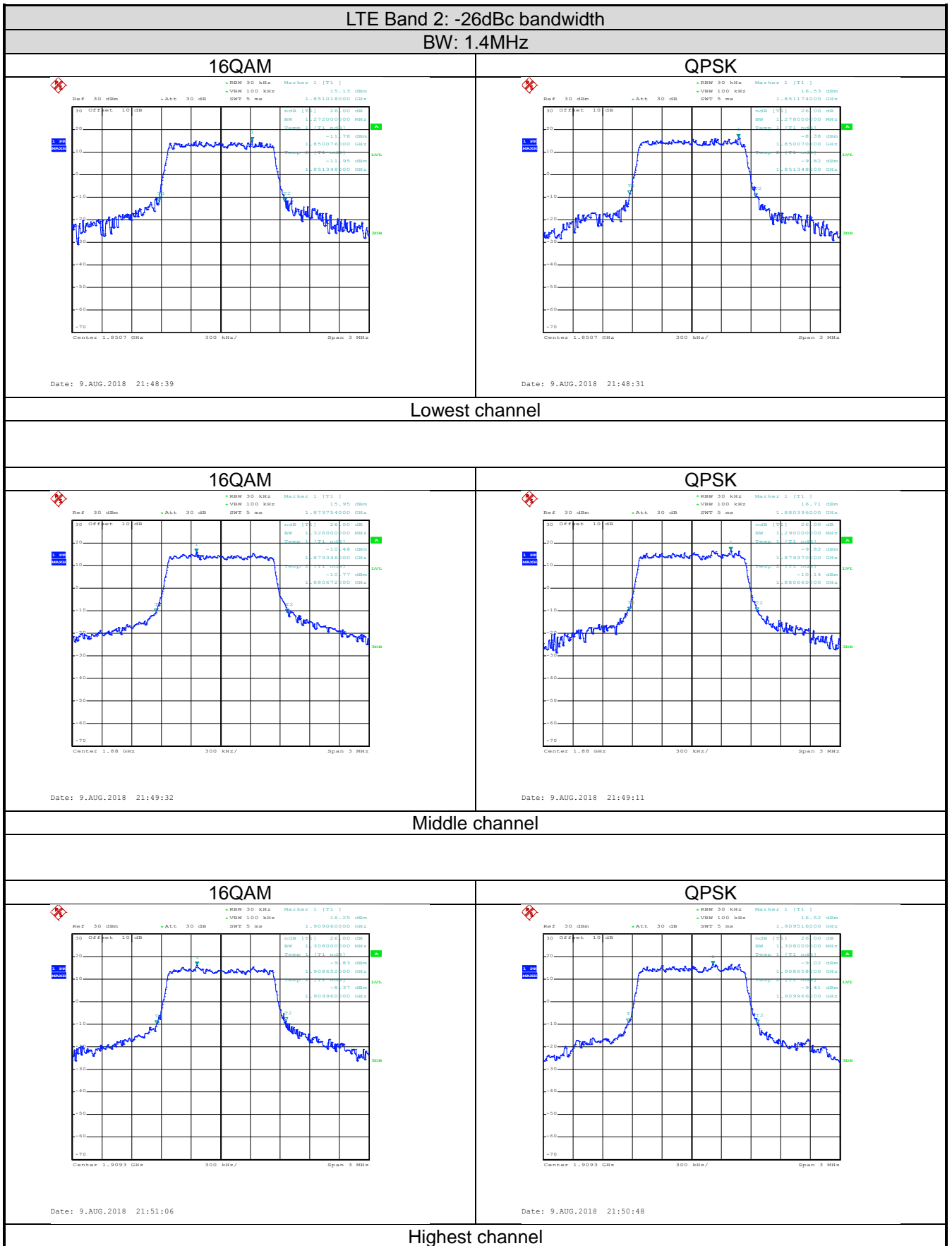
Date: 9.AUG.2018 22:13:09

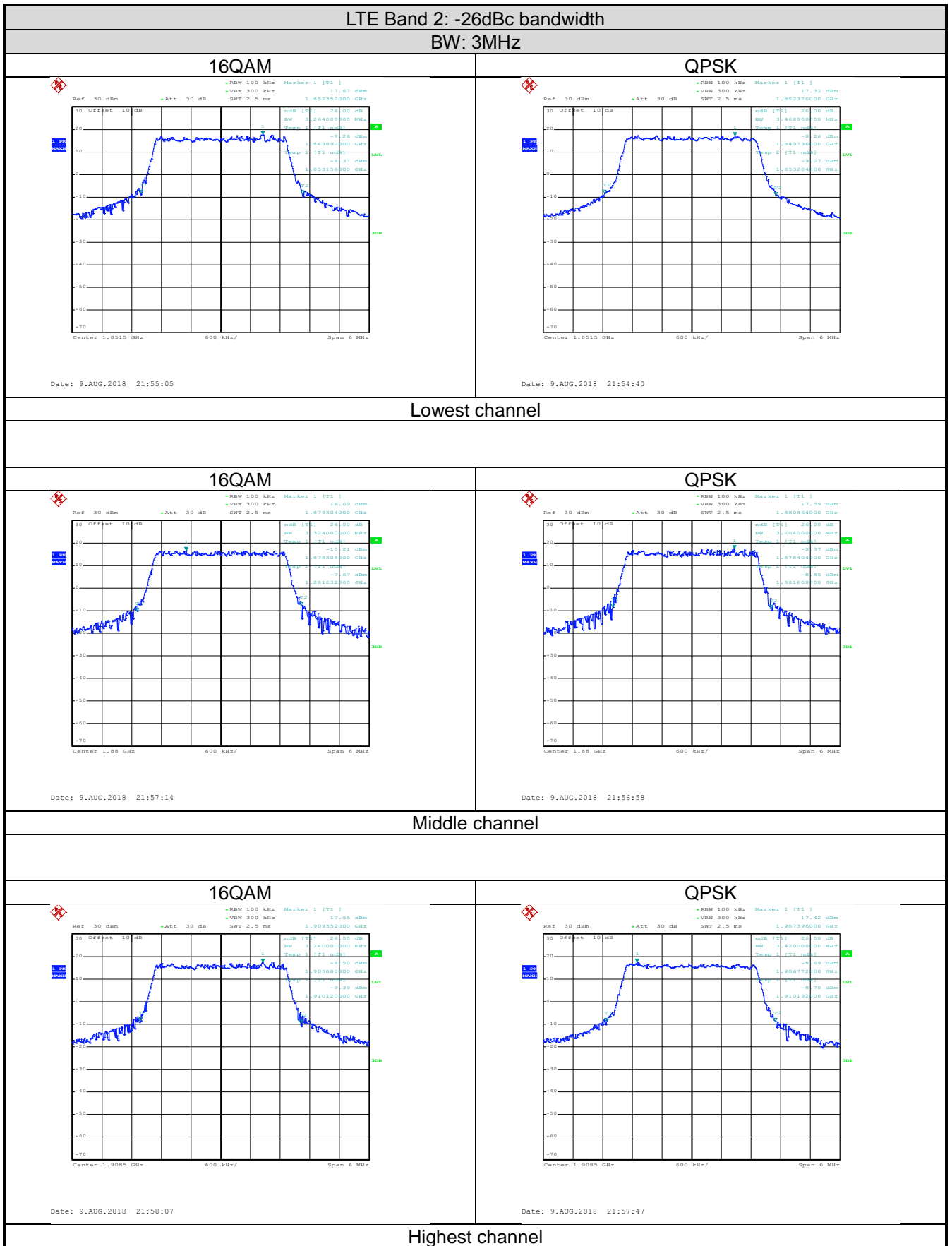
QPSK



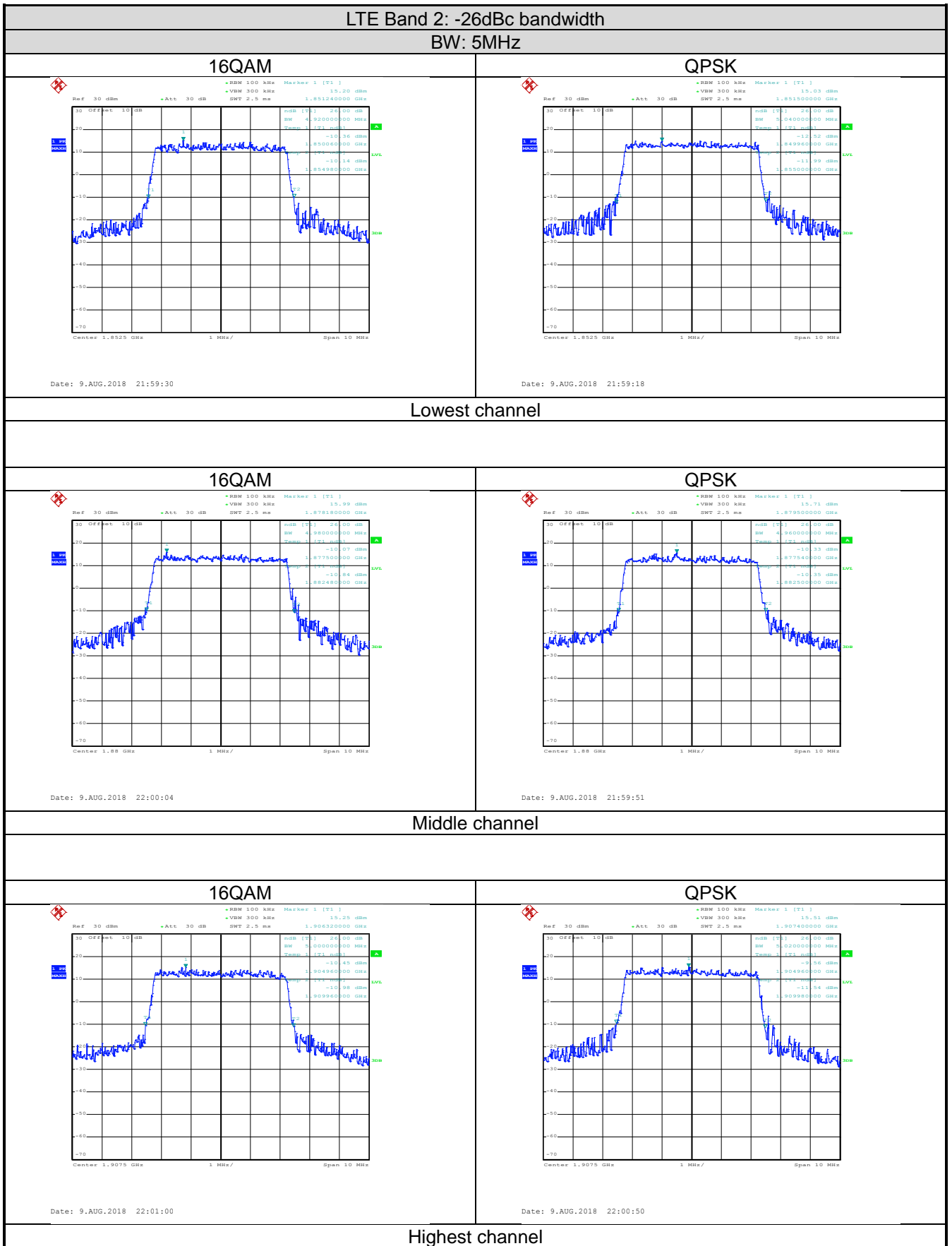
Date: 9.AUG.2018 22:12:59

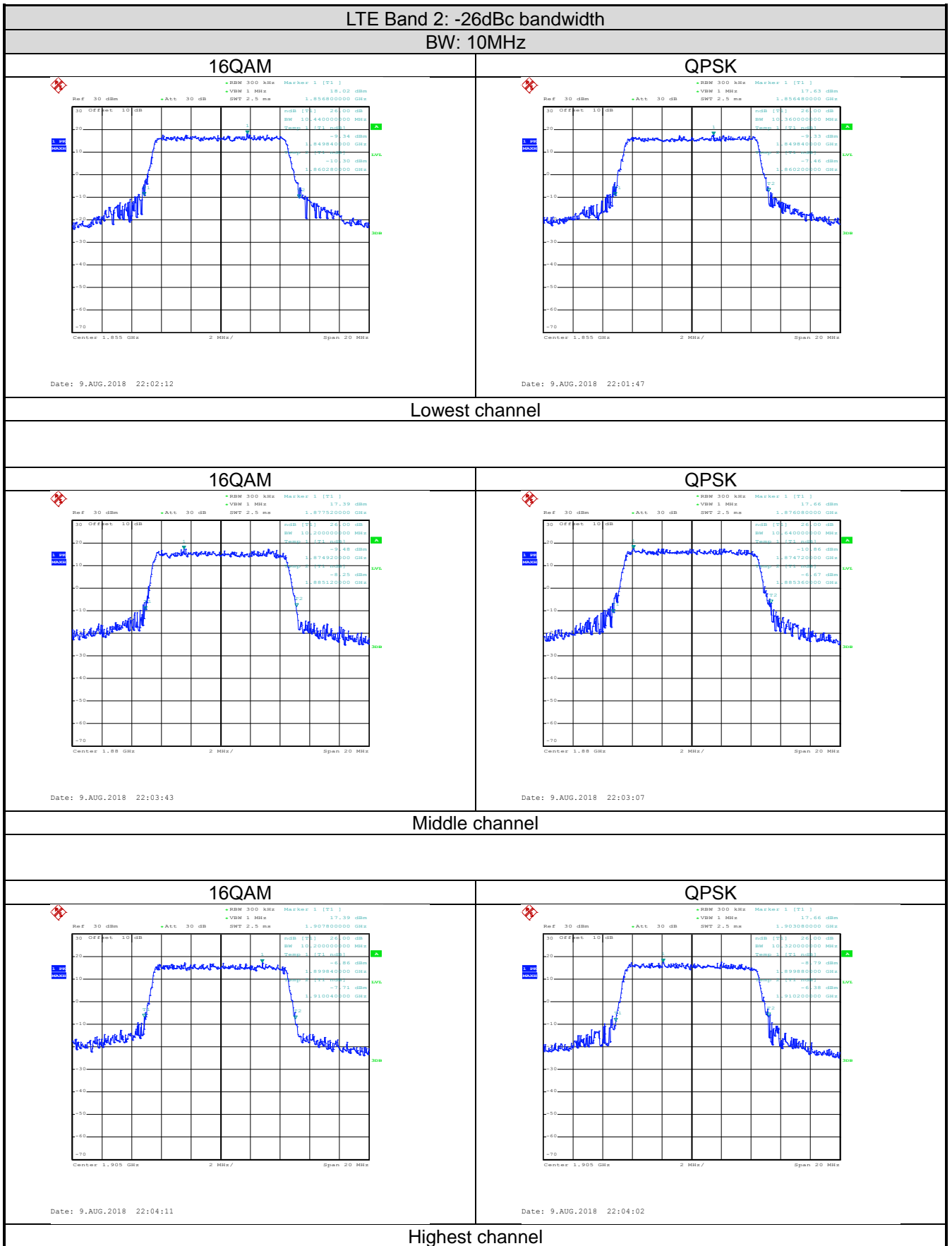
Highest channel

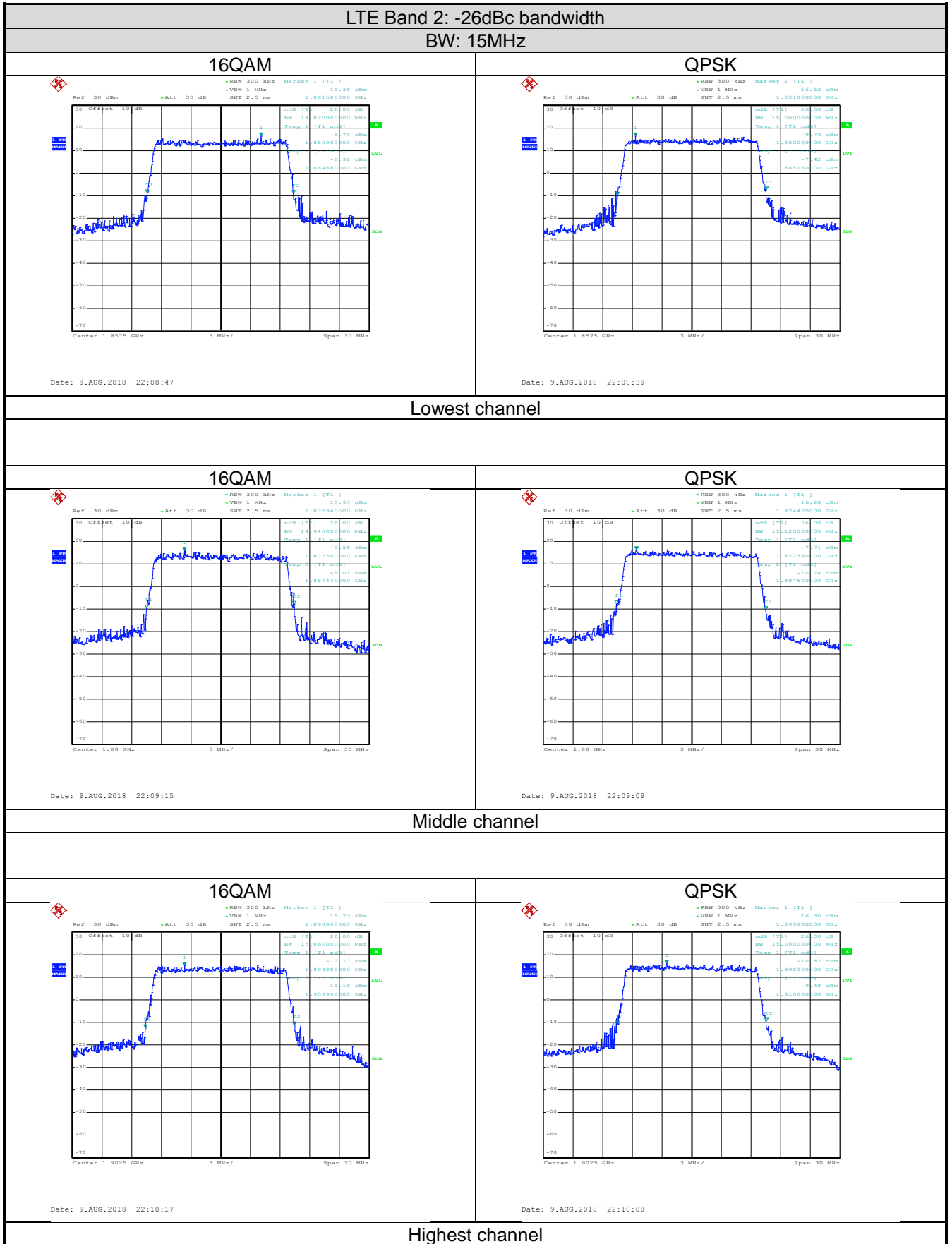


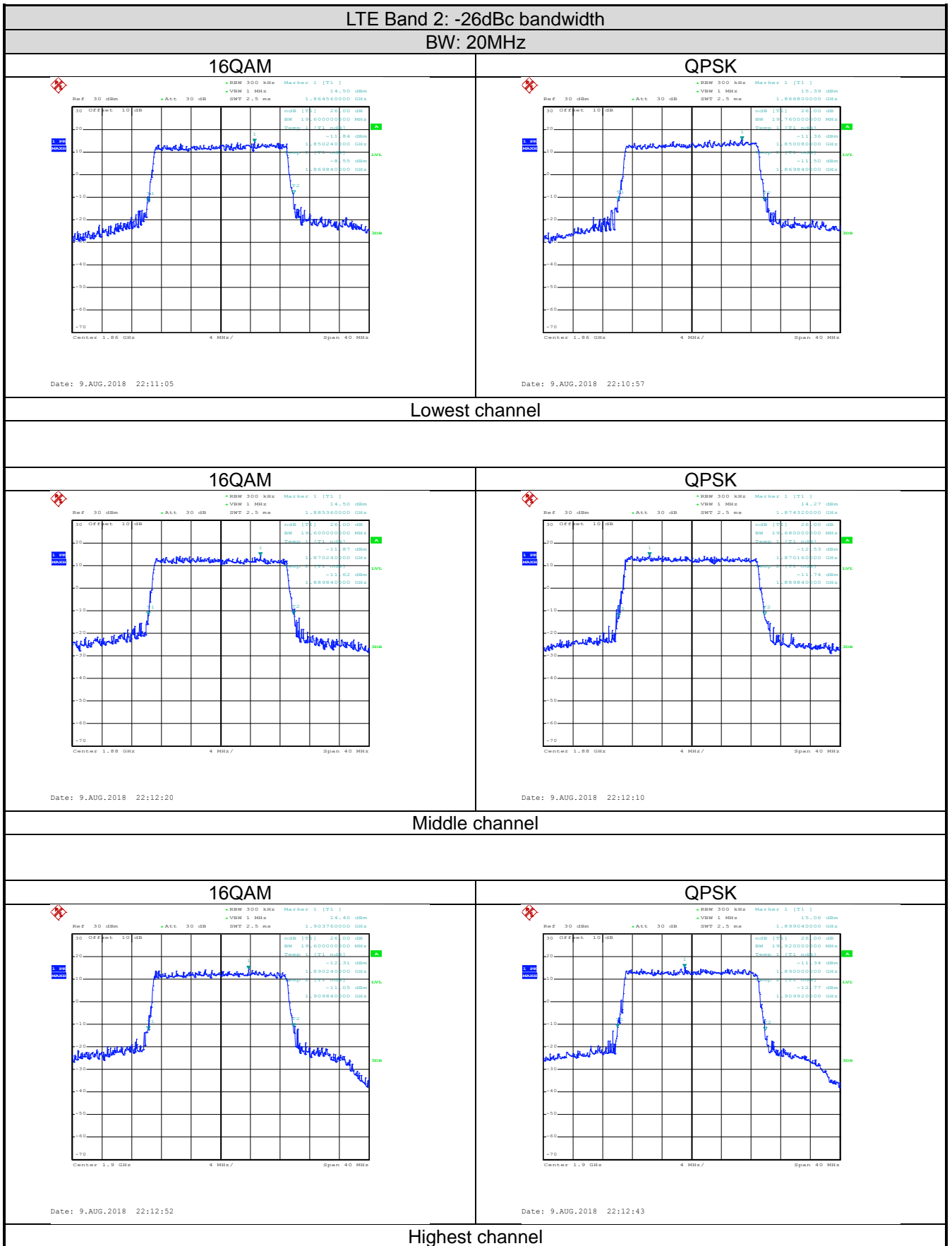




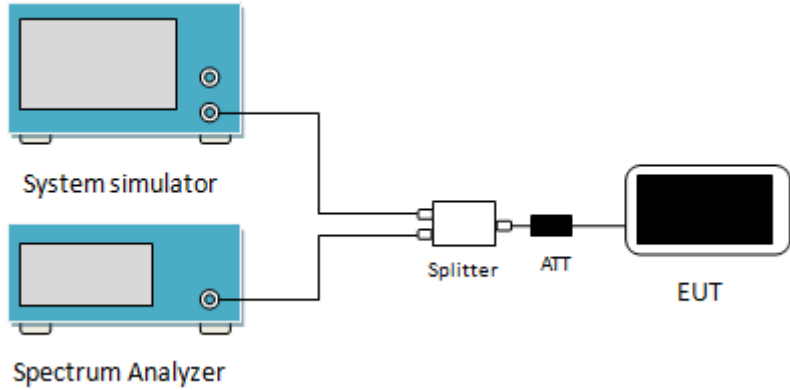




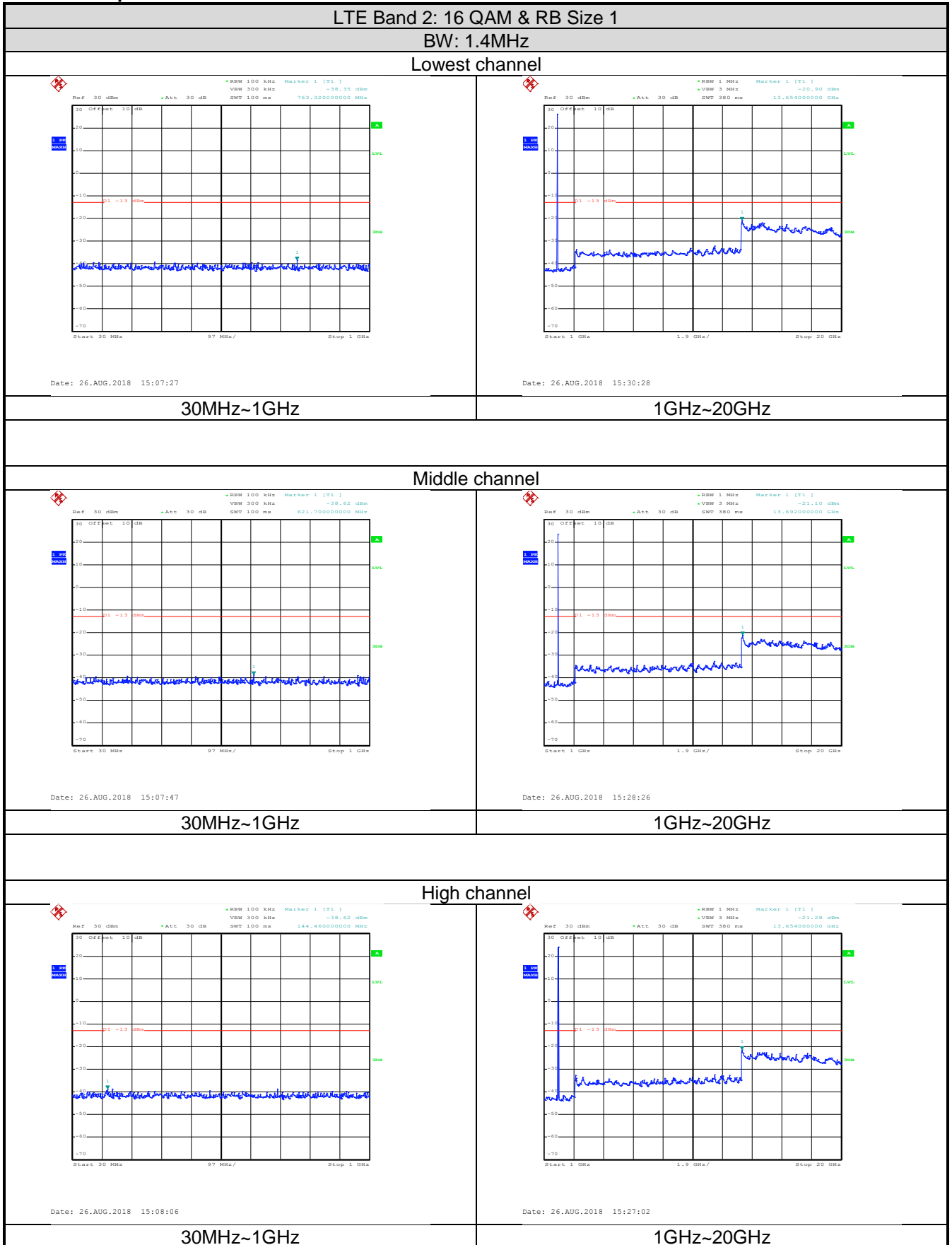


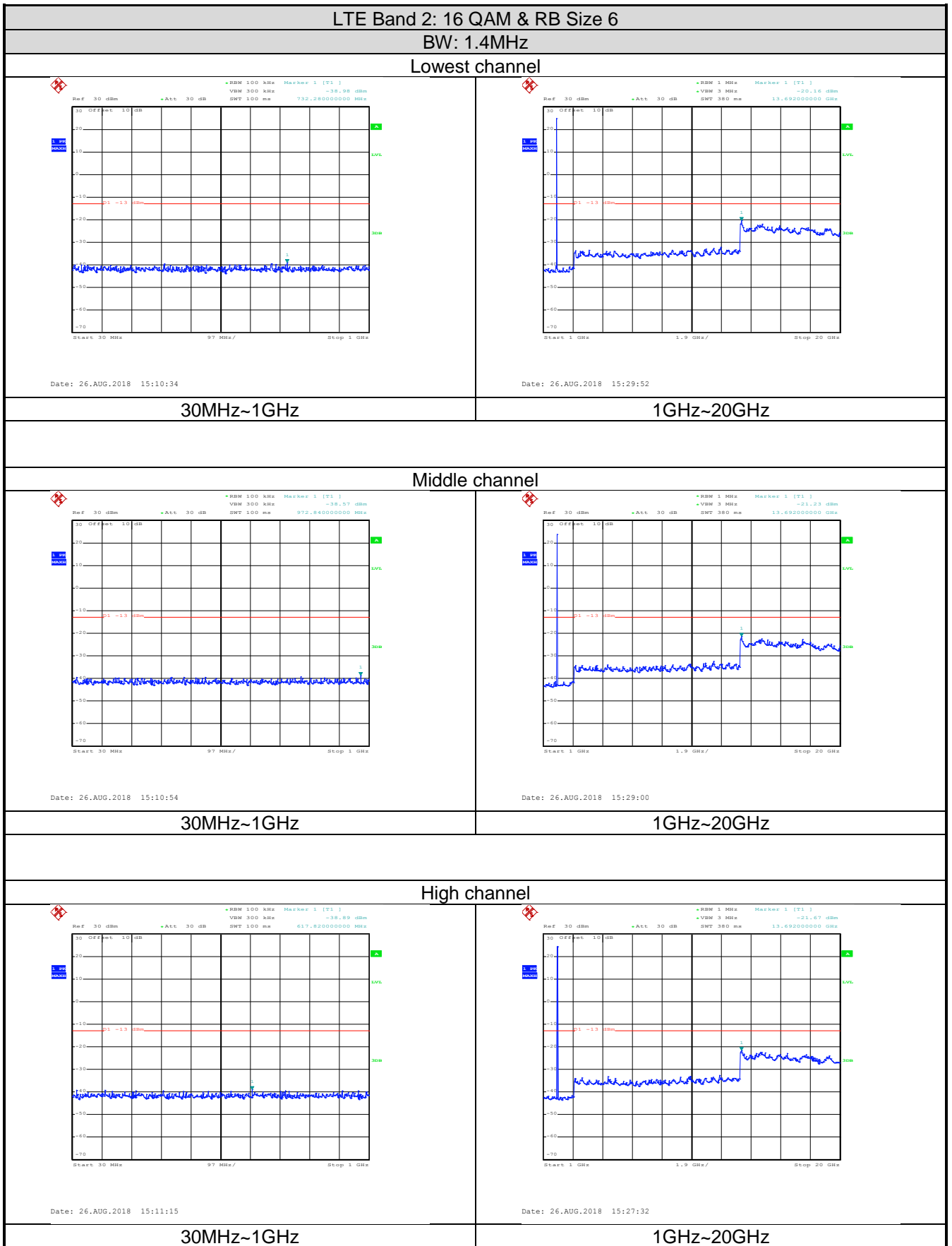


## 6.4 Out of band emission at antenna terminals

Test Requirement:	Part 24.238 (a)
Test Method:	ANSI/TIA-603-D 2010
Limit:	The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB (-13 dBm).
Test Setup:	 <p>The diagram illustrates the test setup. On the left, there are two blue rectangular units: the top one is labeled 'System simulator' and the bottom one is labeled 'Spectrum Analyzer'. Both have a screen and control knobs. A cable connects the System simulator to a white 'Splitter' box. Another cable connects the Spectrum Analyzer to the same Splitter. From the Splitter, a cable goes to a black 'ATT' (attenuator) box, which is then connected to a black rectangular 'EUT' (Equipment Under Test) device.</p>
Test Procedure:	<ol style="list-style-type: none"> <li>1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	Pre-scan all RB Size and offset, and found the RB Size and offset of worst case, so the report shows only the worst case test data.

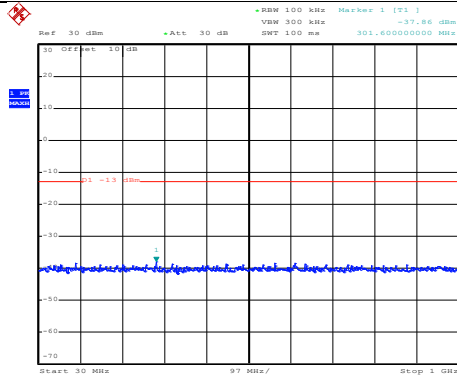
Test plots as follows (Conducted spurious emission) (worst case):  
 LTE Band 2 part:





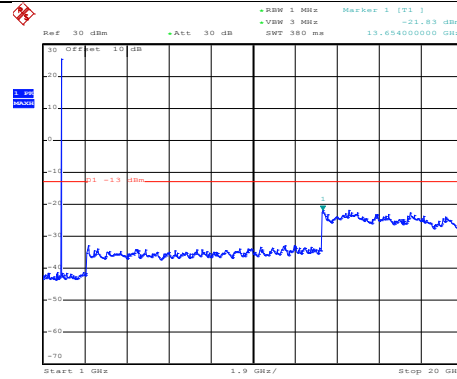
**LTE Band 2: QPSK & RB Size 1**  
**BW: 1.4MHz**

**Lowest channel**



Date: 26.AUG.2018 15:07:19

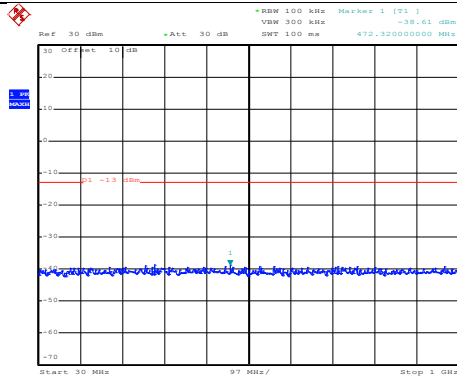
30MHz~1GHz



Date: 26.AUG.2018 15:30:11

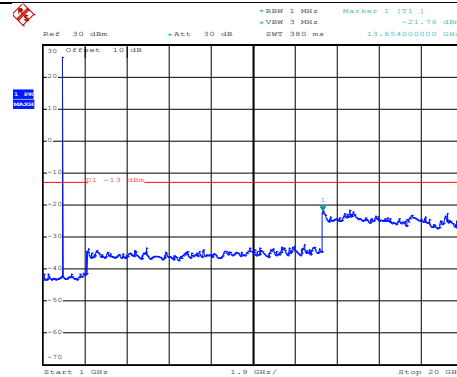
1GHz~20GHz

**Middle channel**



Date: 26.AUG.2018 15:07:41

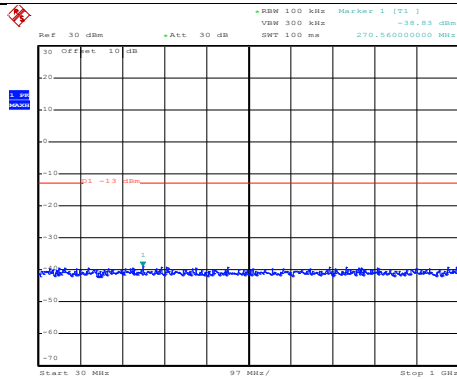
30MHz~1GHz



Date: 26.AUG.2018 15:28:13

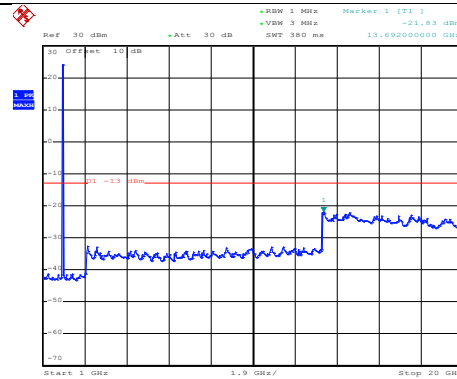
1GHz~20GHz

**High channel**



Date: 26.AUG.2018 15:08:00

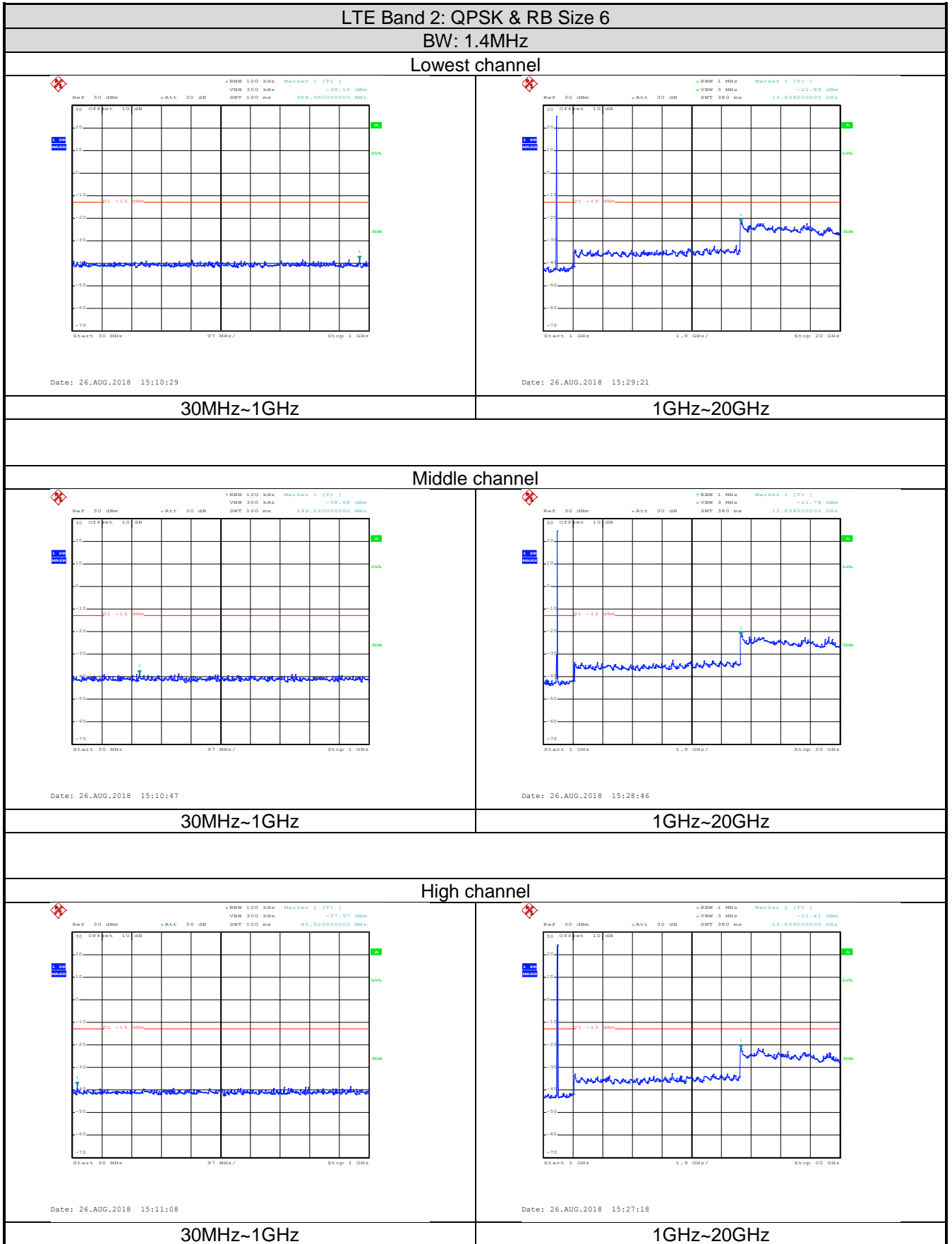
30MHz~1GHz

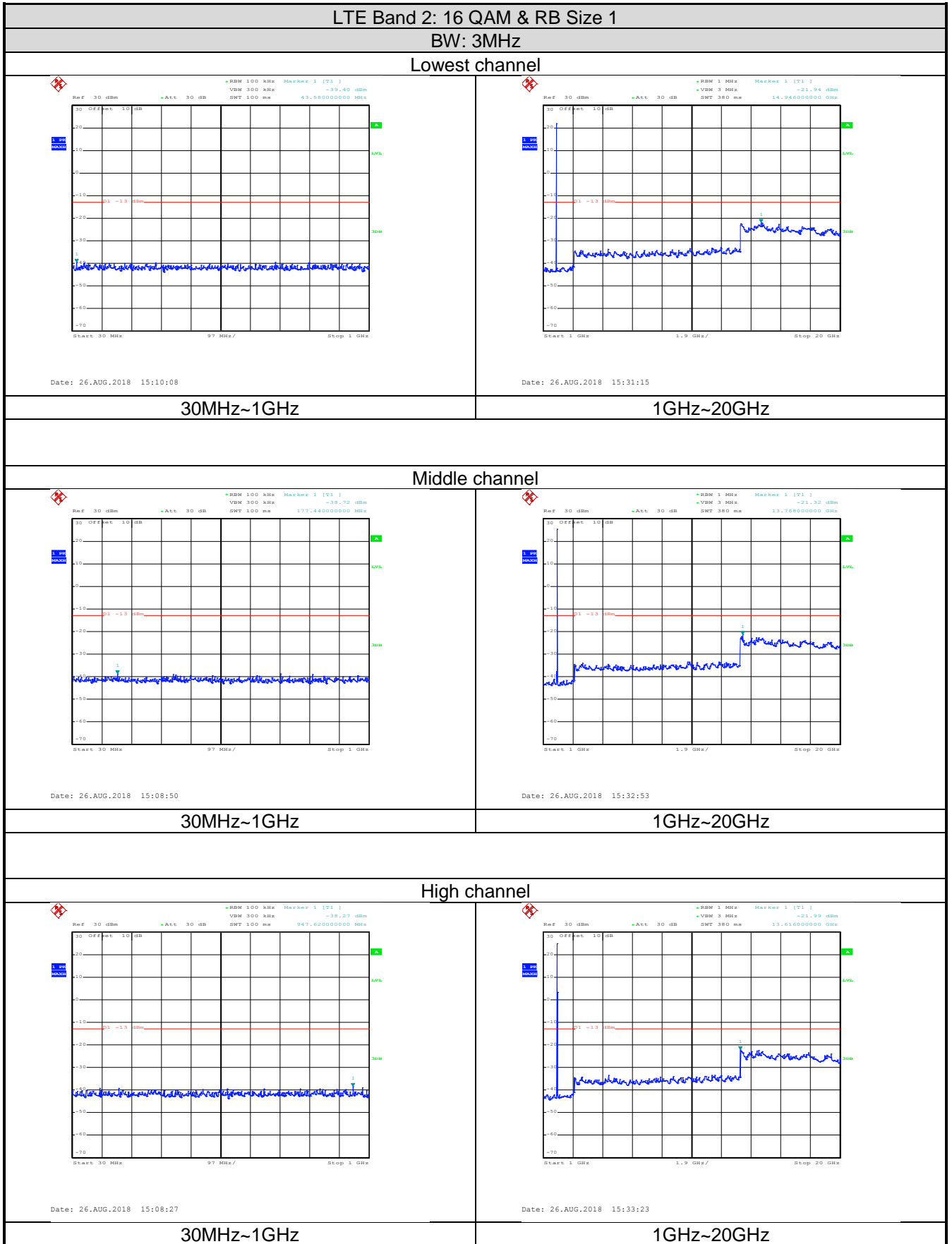


Date: 26.AUG.2018 15:26:49

1GHz~20GHz



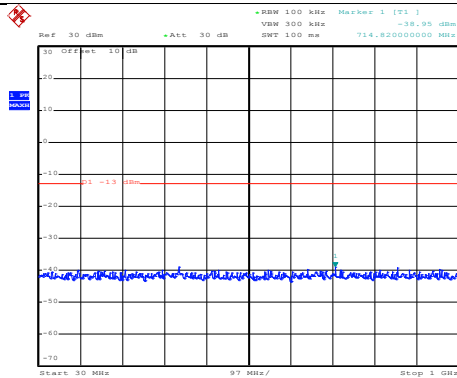




LTE Band 2: 16 QAM & RB Size 15

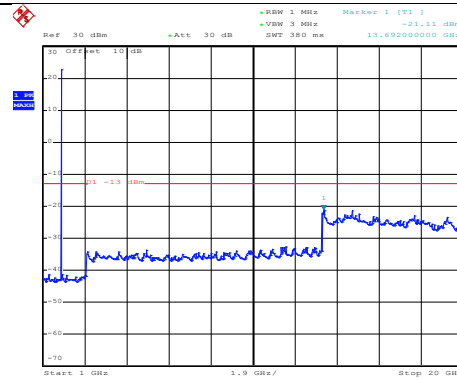
BW: 3MHz

Lowest channel



Date: 26.AUG.2018 15:09:50

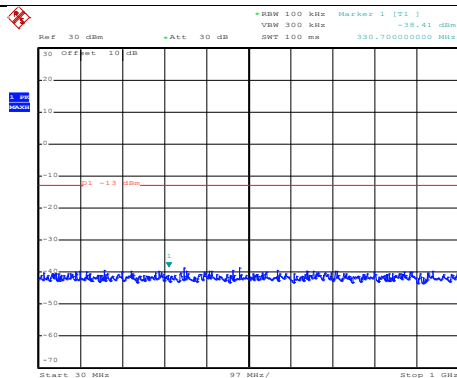
30MHz~1GHz



Date: 26.AUG.2018 15:31:56

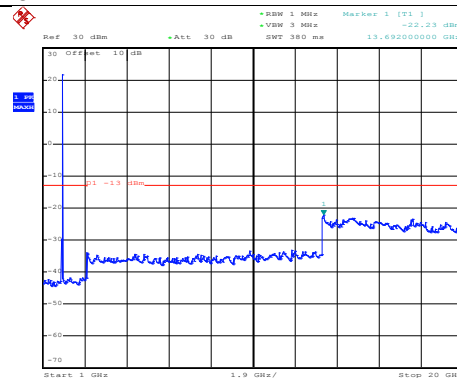
1GHz~20GHz

Middle channel



Date: 26.AUG.2018 15:09:14

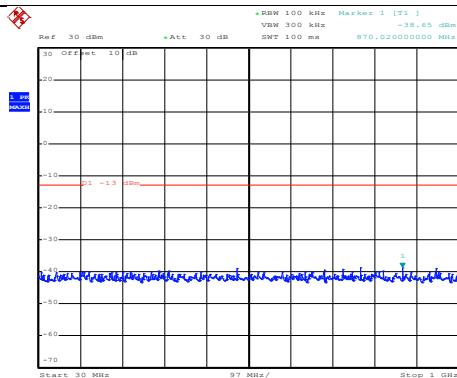
30MHz~1GHz



Date: 26.AUG.2018 15:32:25

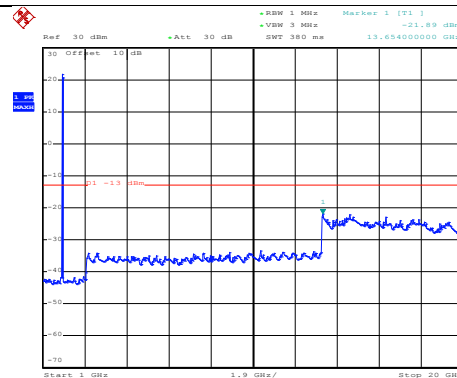
1GHz~20GHz

High channel



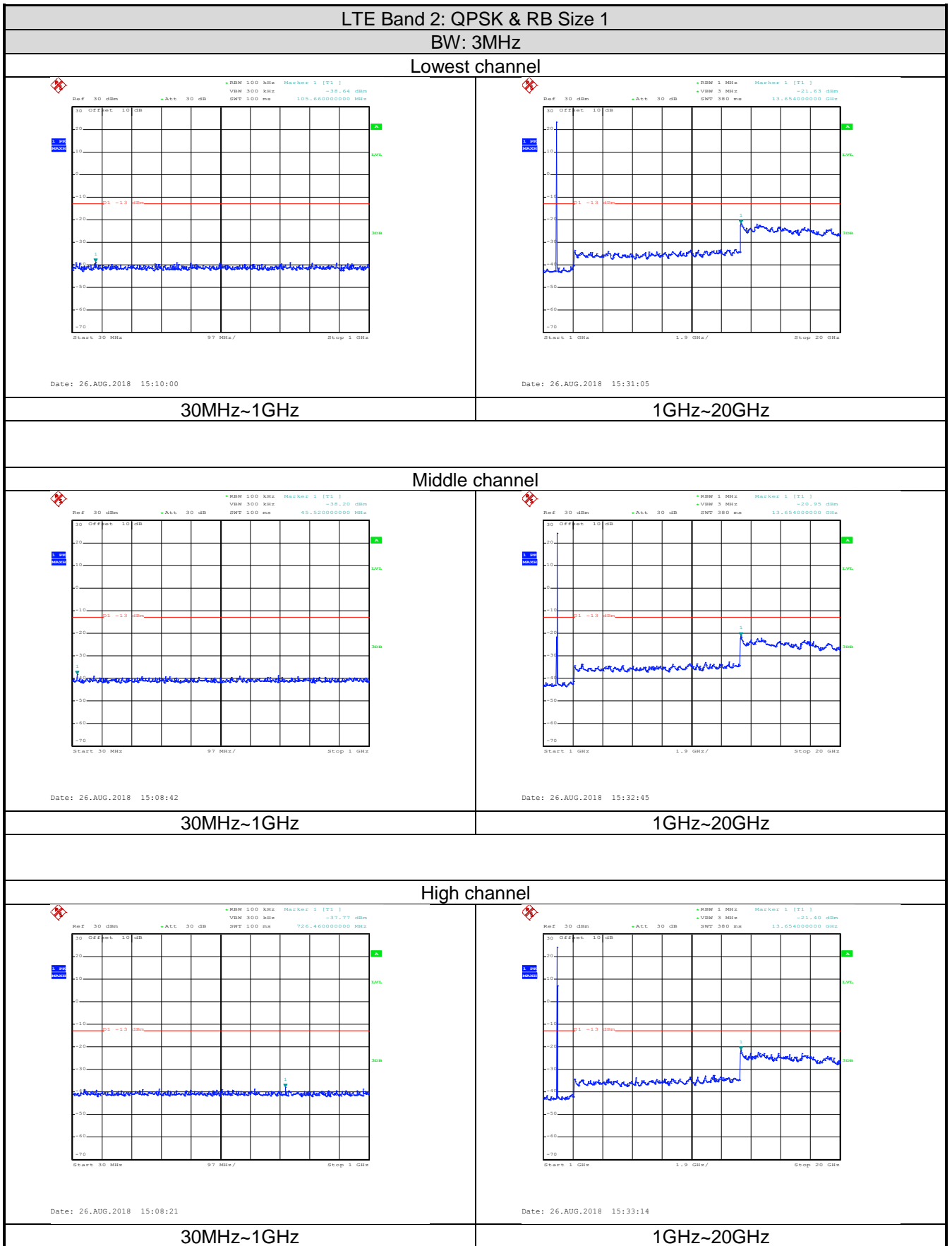
Date: 26.AUG.2018 15:09:31

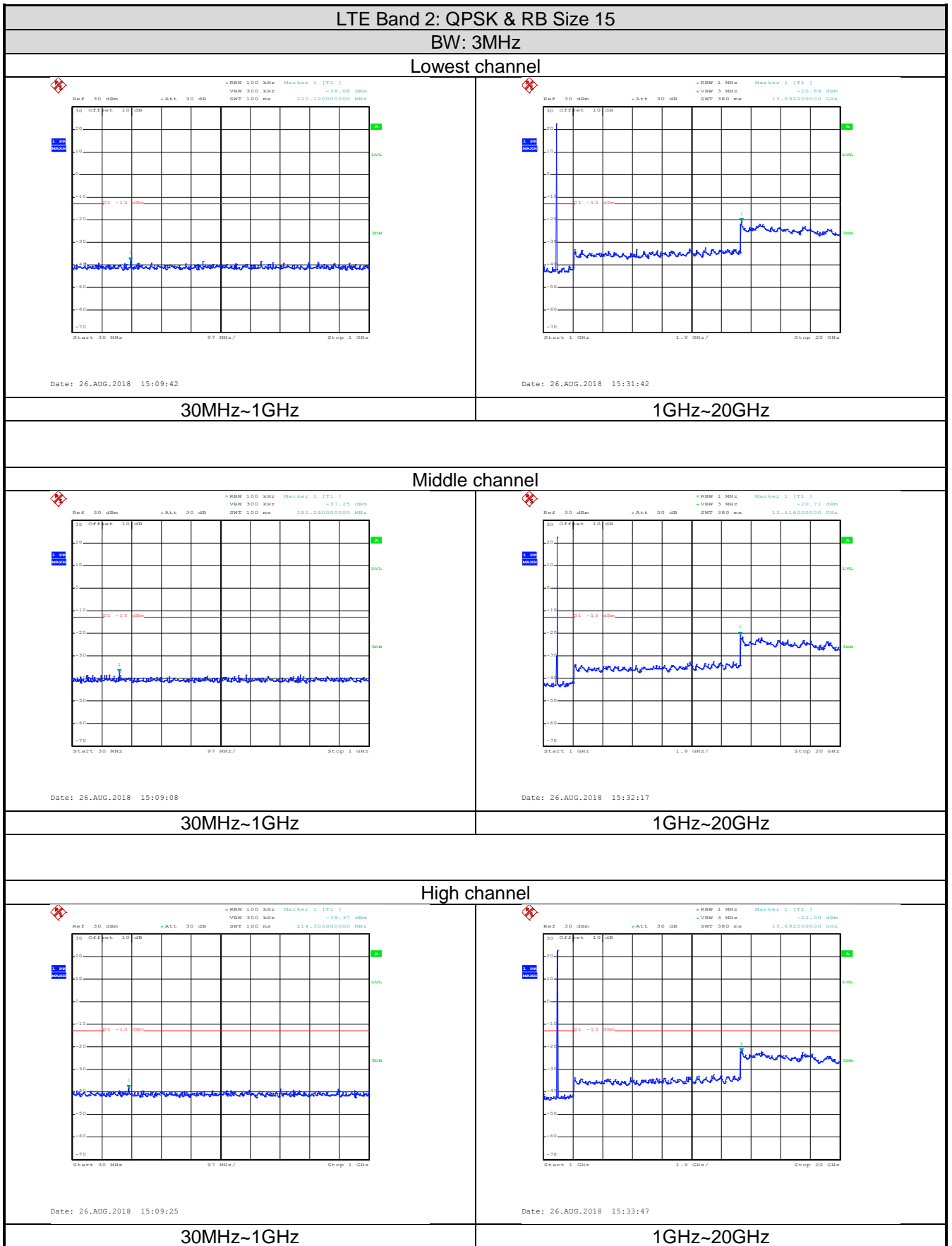
30MHz~1GHz

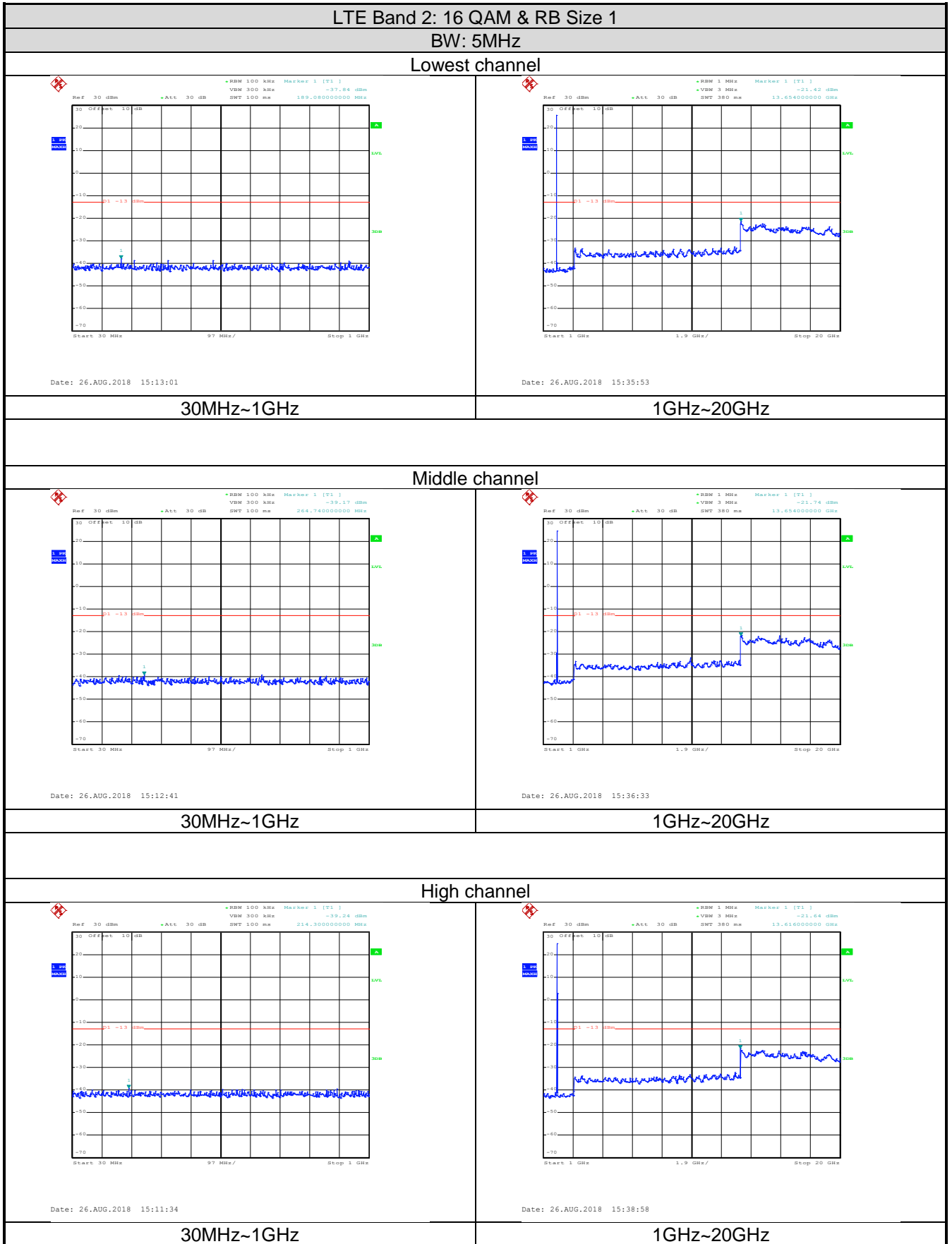


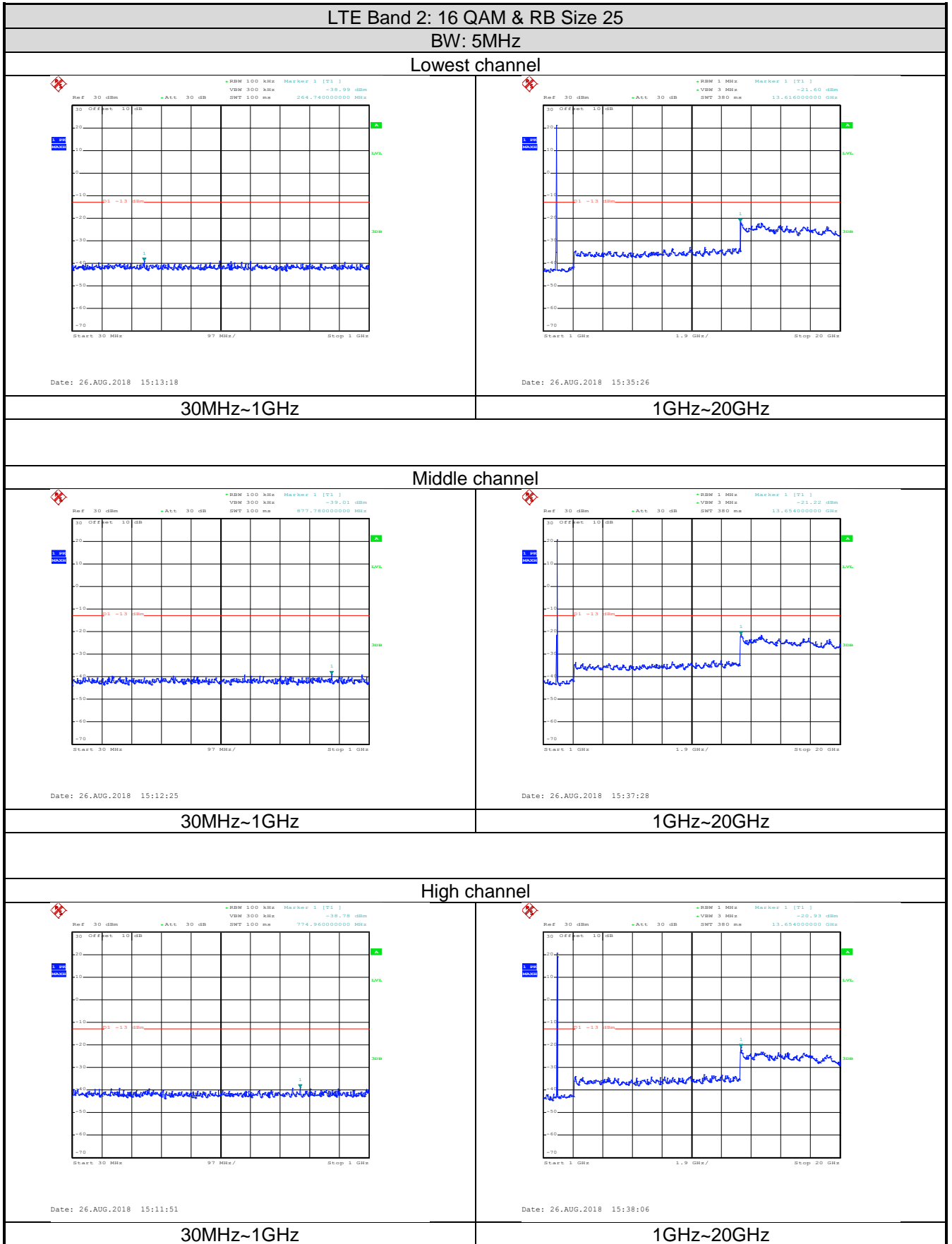
Date: 26.AUG.2018 15:33:57

1GHz~20GHz





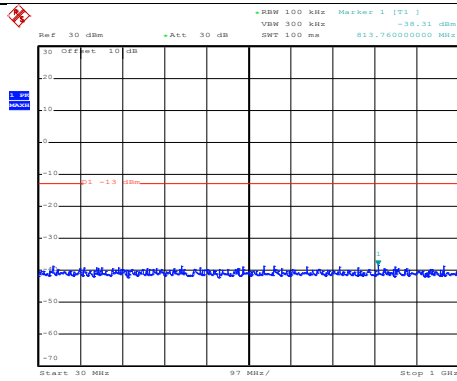




**LTE Band 2: QPSK & RB Size 1**

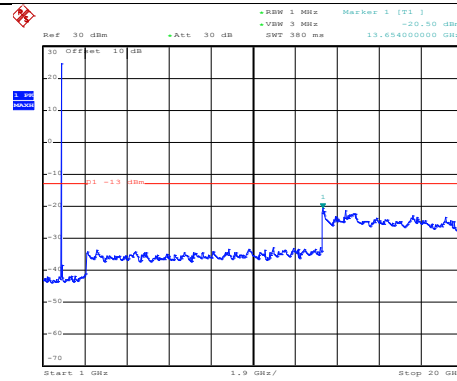
**BW: 5MHz**

**Lowest channel**



Date: 26.AUG.2018 15:12:55

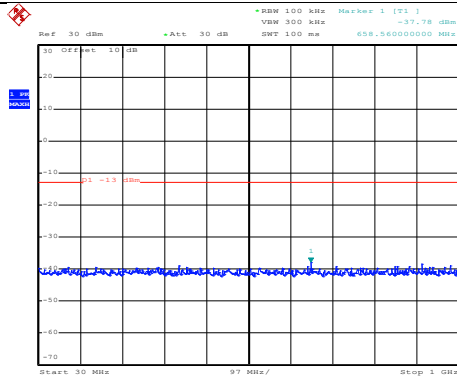
**30MHz~1GHz**



Date: 26.AUG.2018 15:35:42

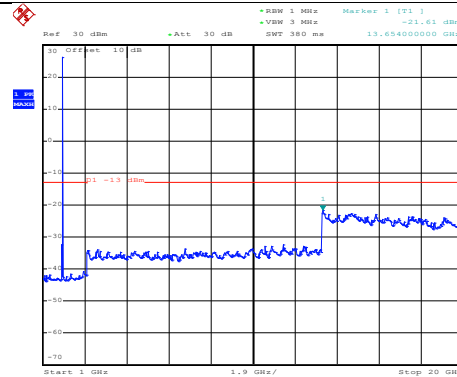
**1GHz~20GHz**

**Middle channel**



Date: 26.AUG.2018 15:12:36

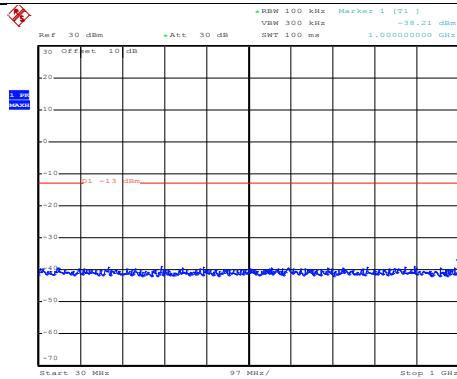
**30MHz~1GHz**



Date: 26.AUG.2018 15:36:09

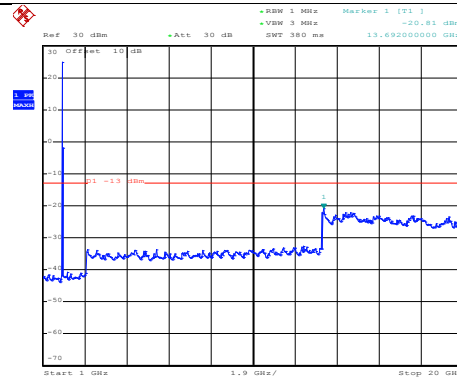
**1GHz~20GHz**

**High channel**



Date: 26.AUG.2018 15:11:28

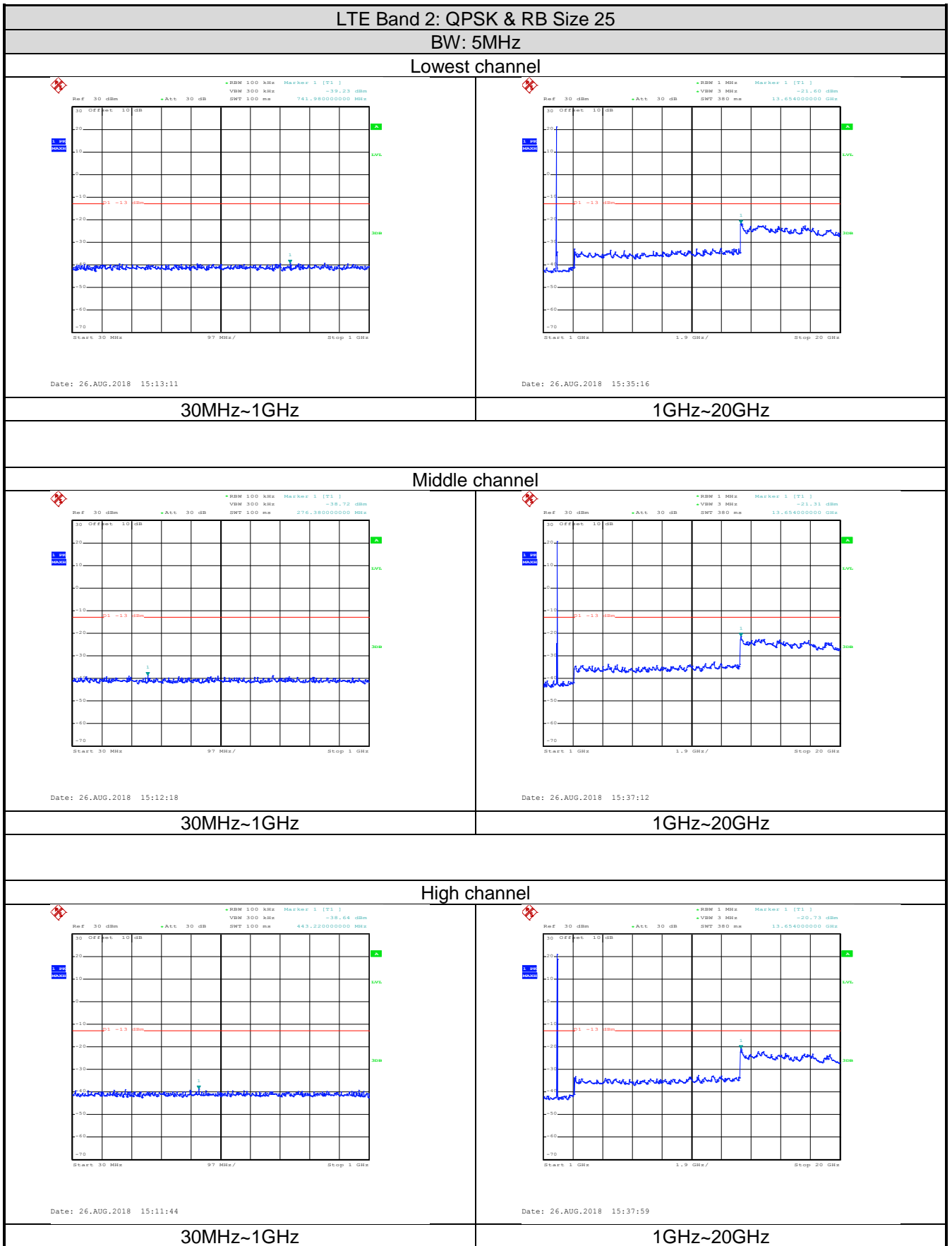
**30MHz~1GHz**



Date: 26.AUG.2018 15:38:36

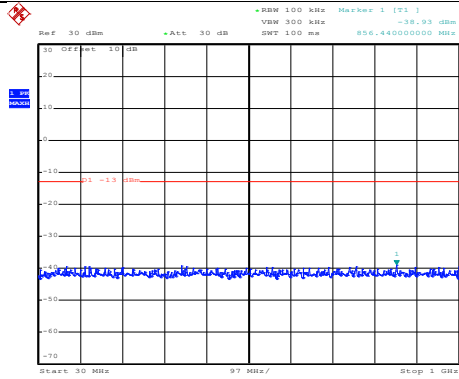
**1GHz~20GHz**





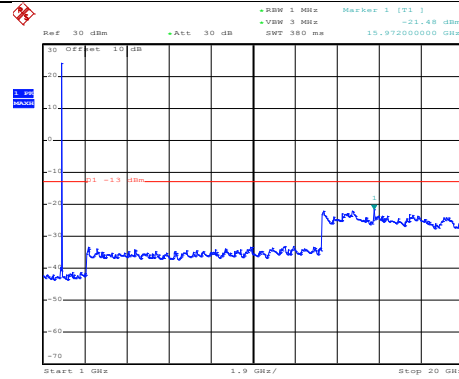
**LTE Band 2: 16 QAM & RB Size 1**  
**BW: 10MHz**

**Lowest channel**



Date: 26.AUG.2018 15:13:55

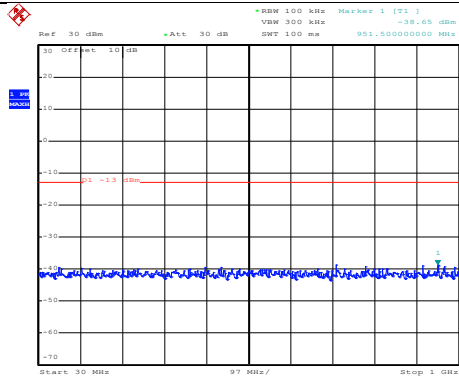
30MHz~1GHz



Date: 26.AUG.2018 15:43:12

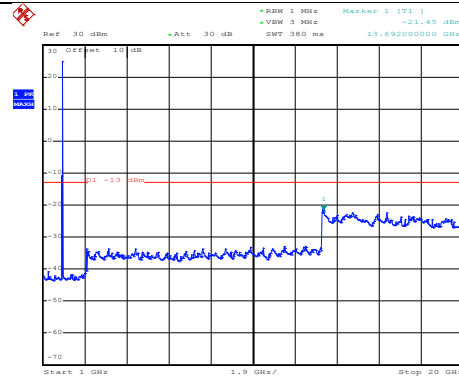
1GHz~20GHz

**Middle channel**



Date: 26.AUG.2018 15:14:55

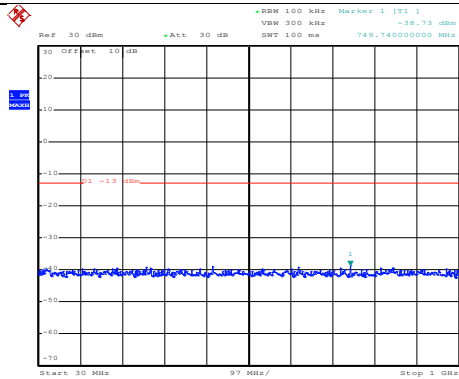
30MHz~1GHz



Date: 26.AUG.2018 15:42:15

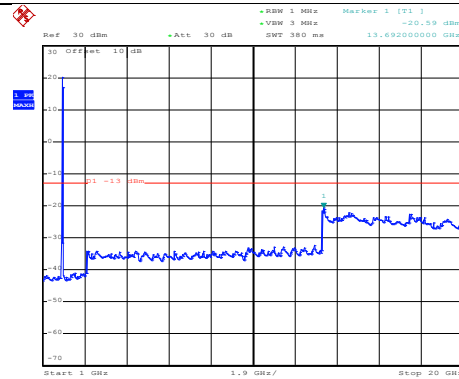
1GHz~20GHz

**High channel**



Date: 26.AUG.2018 15:15:18

30MHz~1GHz



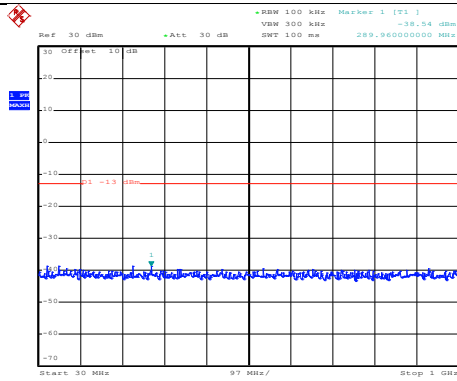
Date: 26.AUG.2018 15:40:26

1GHz~20GHz

LTE Band 2: 16 QAM & RB Size 50

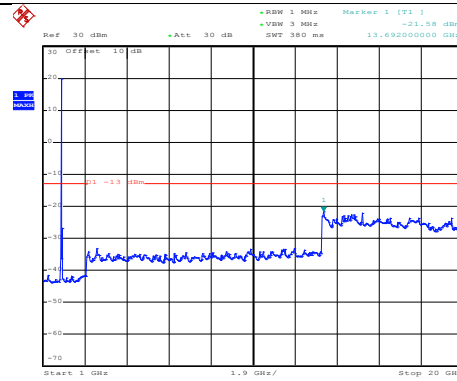
BW: 10MHz

Lowest channel



Date: 26.AUG.2018 15:14:18

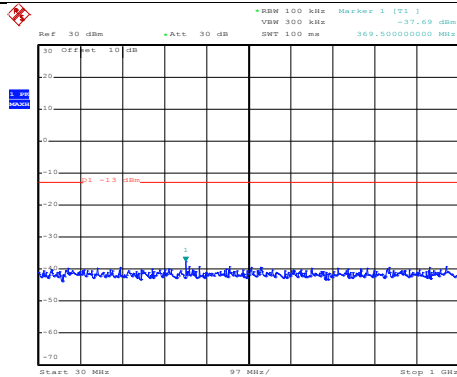
30MHz~1GHz



Date: 26.AUG.2018 15:43:43

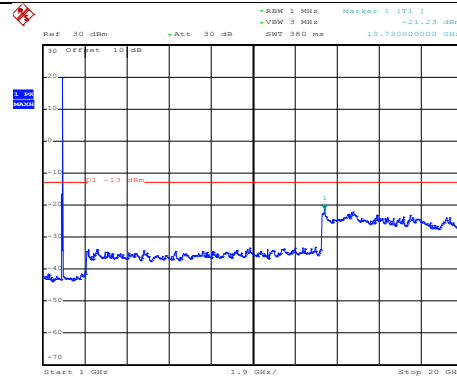
1GHz~20GHz

Middle channel



Date: 26.AUG.2018 15:14:38

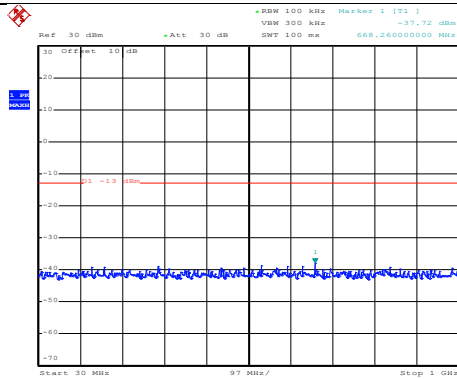
30MHz~1GHz



Date: 26.AUG.2018 15:41:39

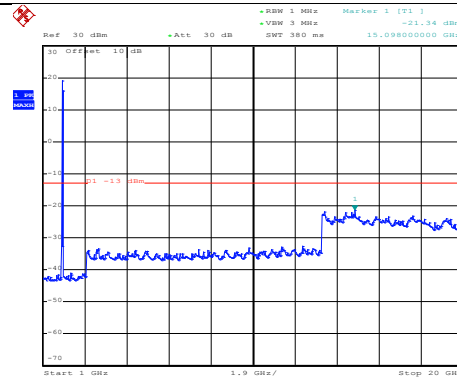
1GHz~20GHz

High channel



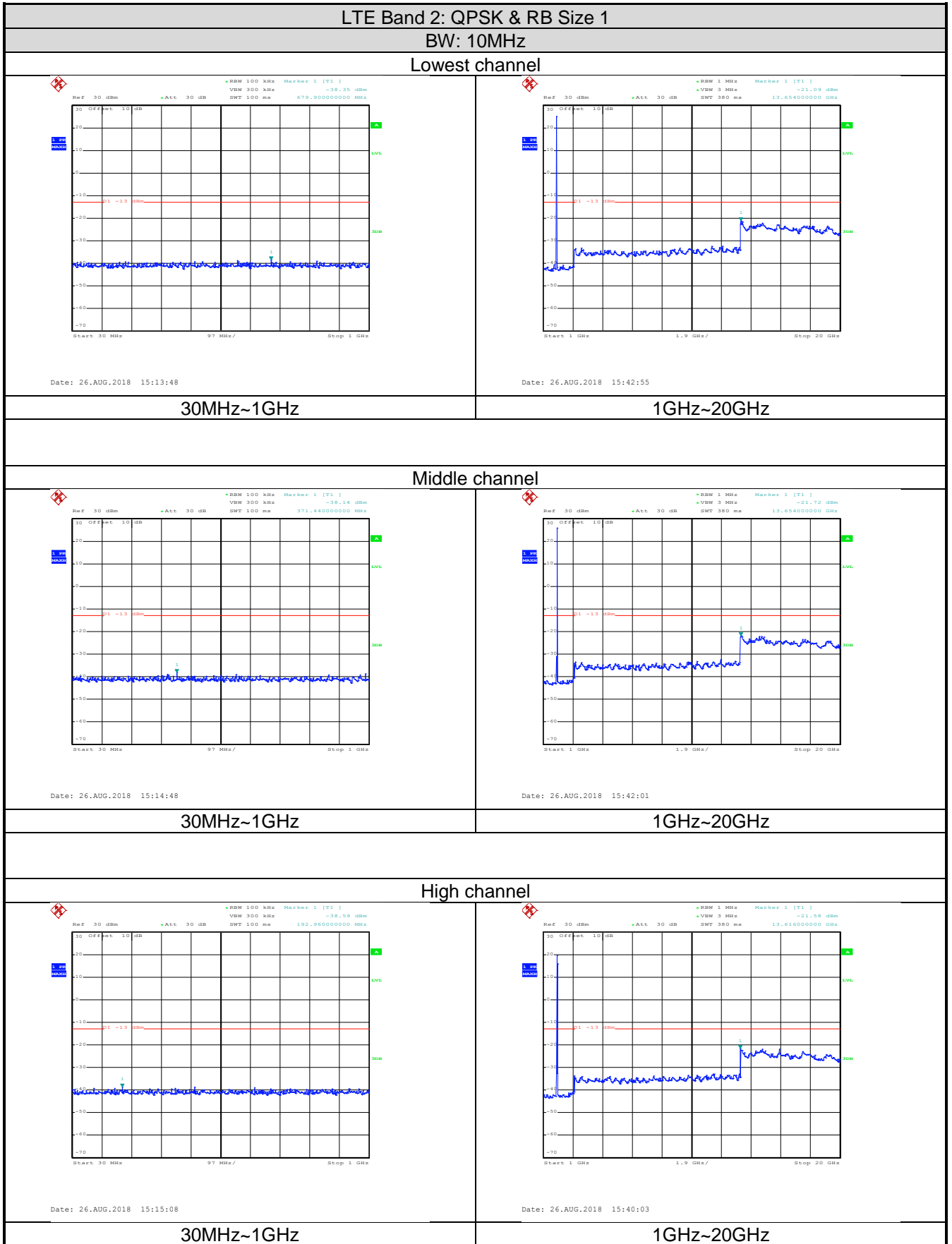
Date: 26.AUG.2018 15:15:38

30MHz~1GHz



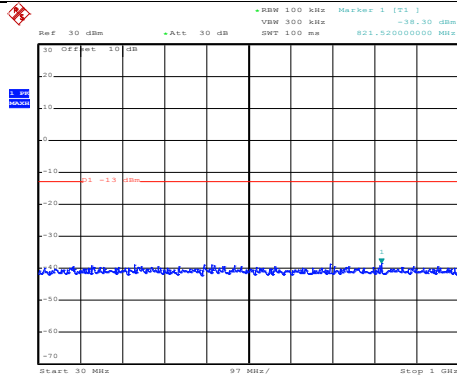
Date: 26.AUG.2018 15:41:04

1GHz~20GHz



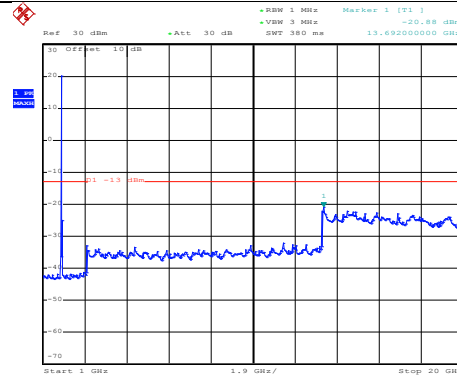
**LTE Band 2: QPSK & RB Size 50**  
**BW: 10MHz**

**Lowest channel**



Date: 26.AUG.2018 15:14:10

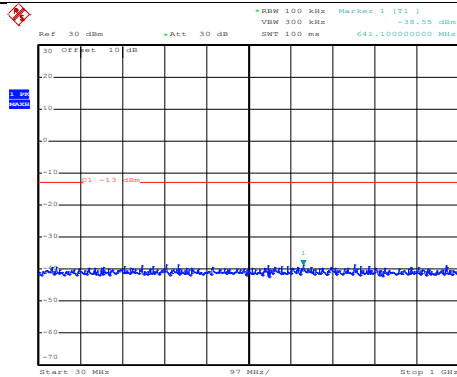
30MHz~1GHz



Date: 26.AUG.2018 15:43:33

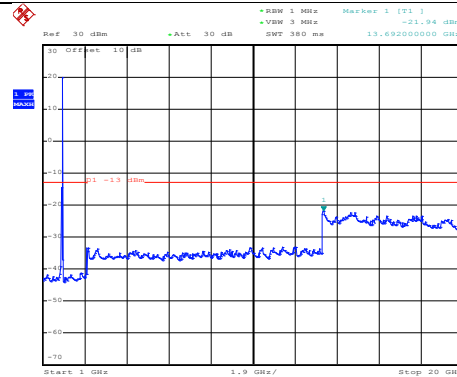
1GHz~20GHz

**Middle channel**



Date: 26.AUG.2018 15:14:31

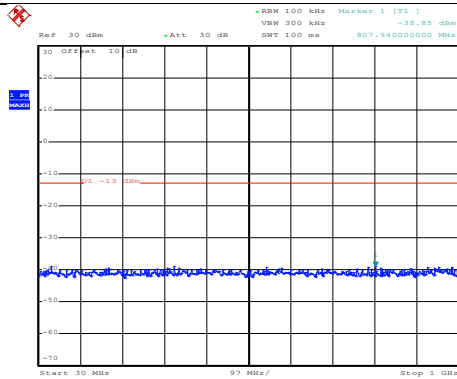
30MHz~1GHz



Date: 26.AUG.2018 15:41:23

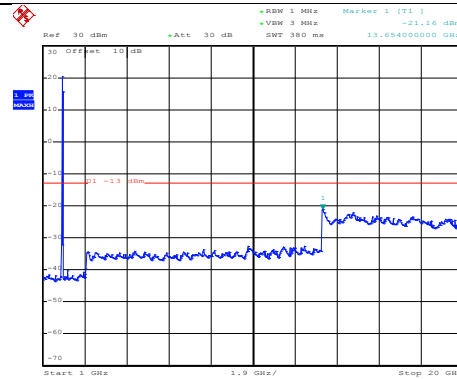
1GHz~20GHz

**High channel**



Date: 26.AUG.2018 15:15:30

30MHz~1GHz

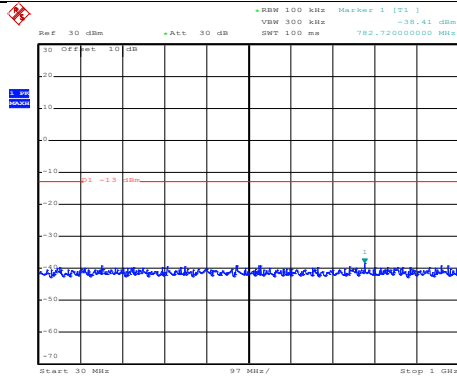


Date: 26.AUG.2018 15:40:49

1GHz~20GHz

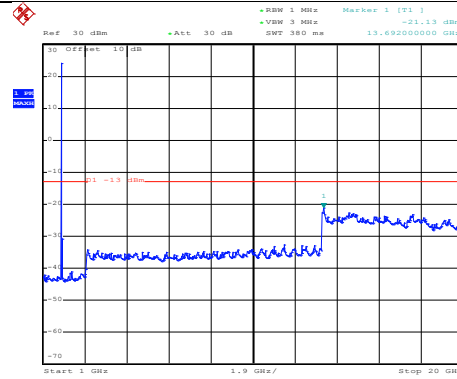
**LTE Band 2: 16 QAM & RB Size 1**  
**BW: 15MHz**

**Lowest channel**



Date: 26.AUG.2018 15:17:47

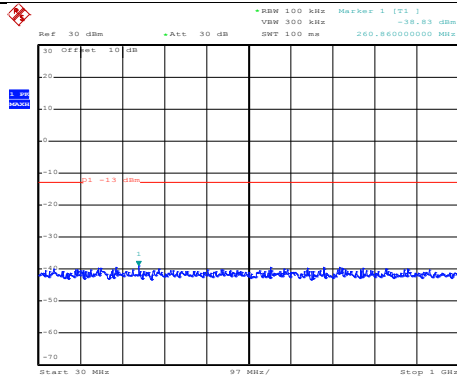
30MHz~1GHz



Date: 26.AUG.2018 15:45:32

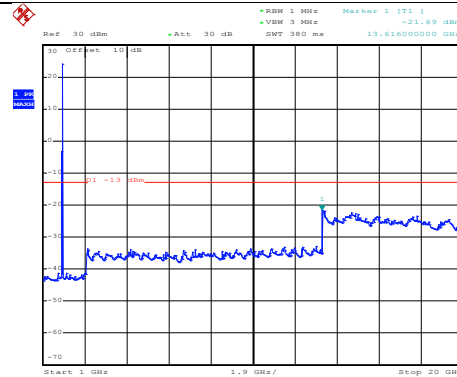
1GHz~20GHz

**Middle channel**



Date: 26.AUG.2018 15:16:41

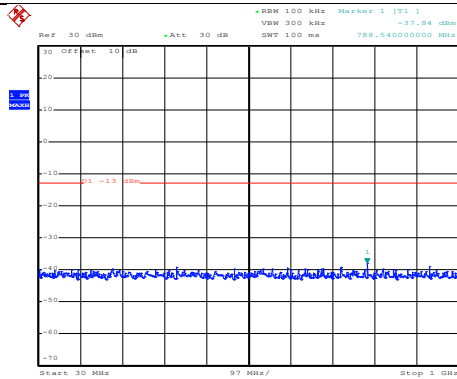
30MHz~1GHz



Date: 26.AUG.2018 15:46:22

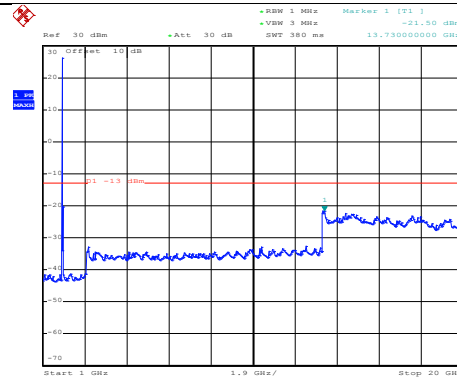
1GHz~20GHz

**High channel**



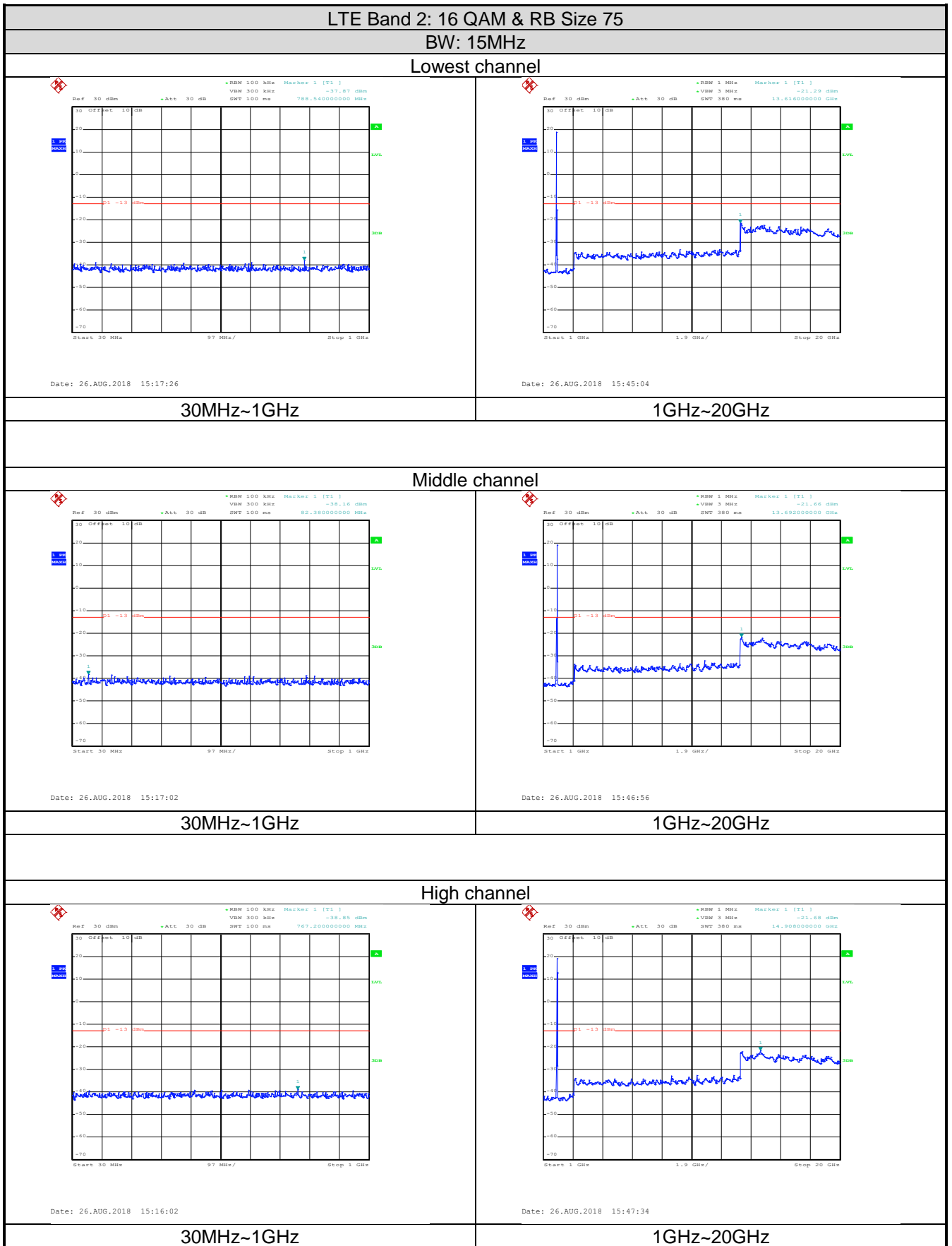
Date: 26.AUG.2018 15:16:20

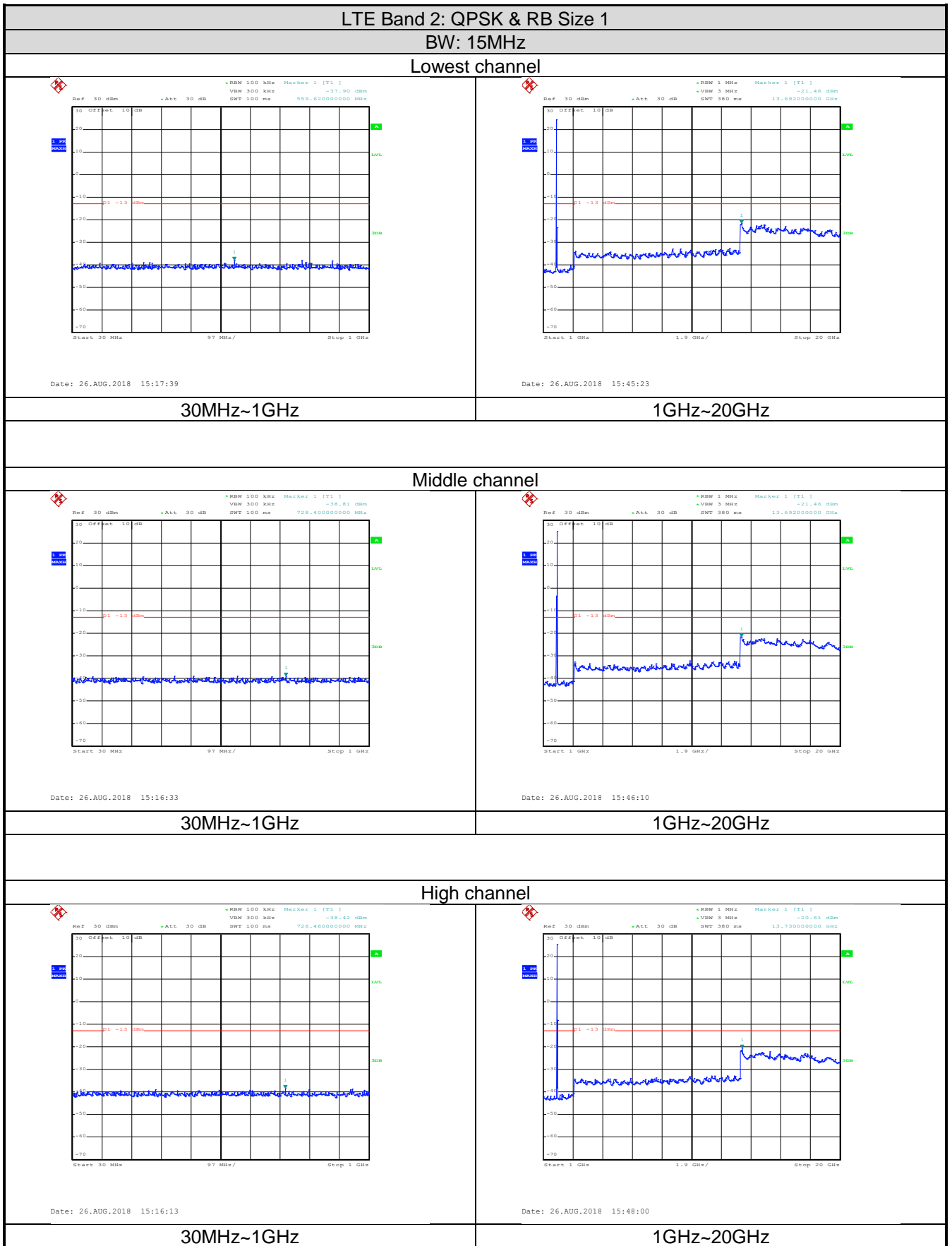
30MHz~1GHz



Date: 26.AUG.2018 15:48:16

1GHz~20GHz

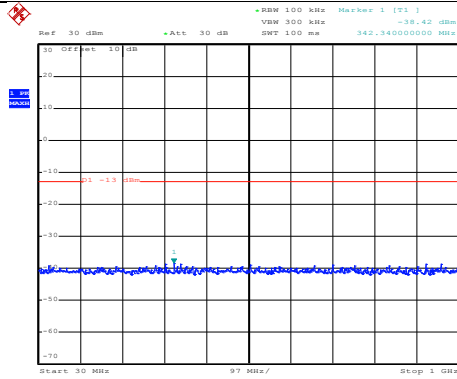






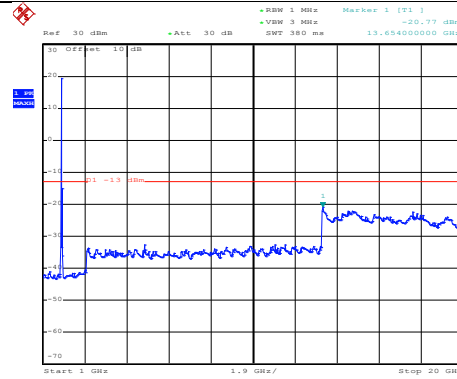
**LTE Band 2: QPSK & RB Size 75**  
**BW: 15MHz**

**Lowest channel**



Date: 26.AUG.2018 15:17:18

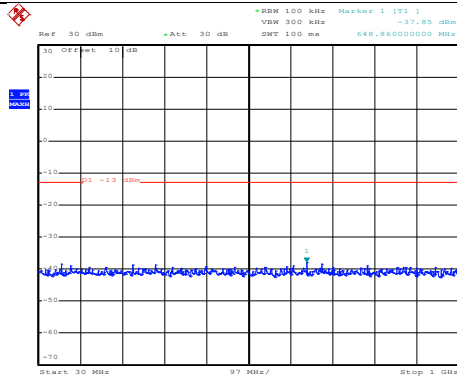
30MHz~1GHz



Date: 26.AUG.2018 15:44:52

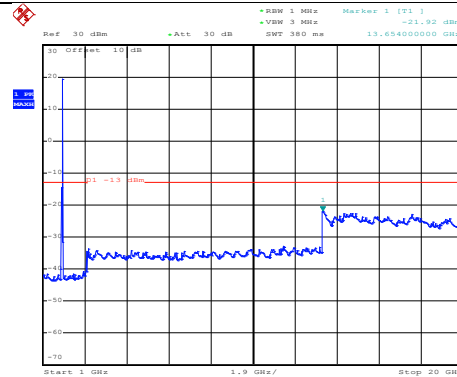
1GHz~20GHz

**Middle channel**



Date: 26.AUG.2018 15:16:53

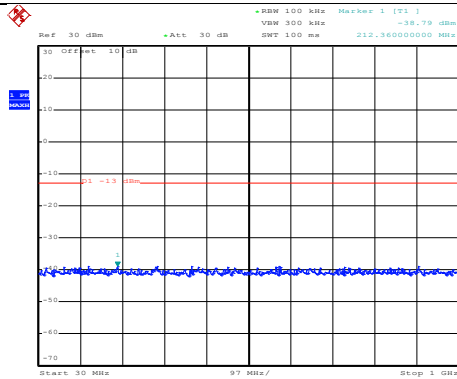
30MHz~1GHz



Date: 26.AUG.2018 15:46:40

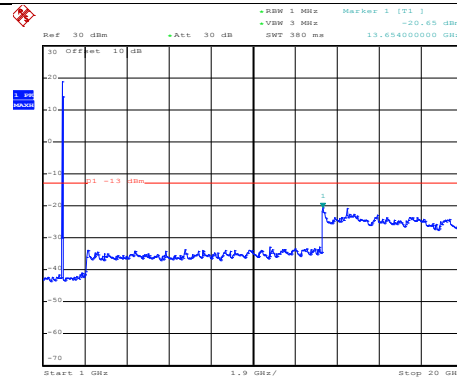
1GHz~20GHz

**High channel**



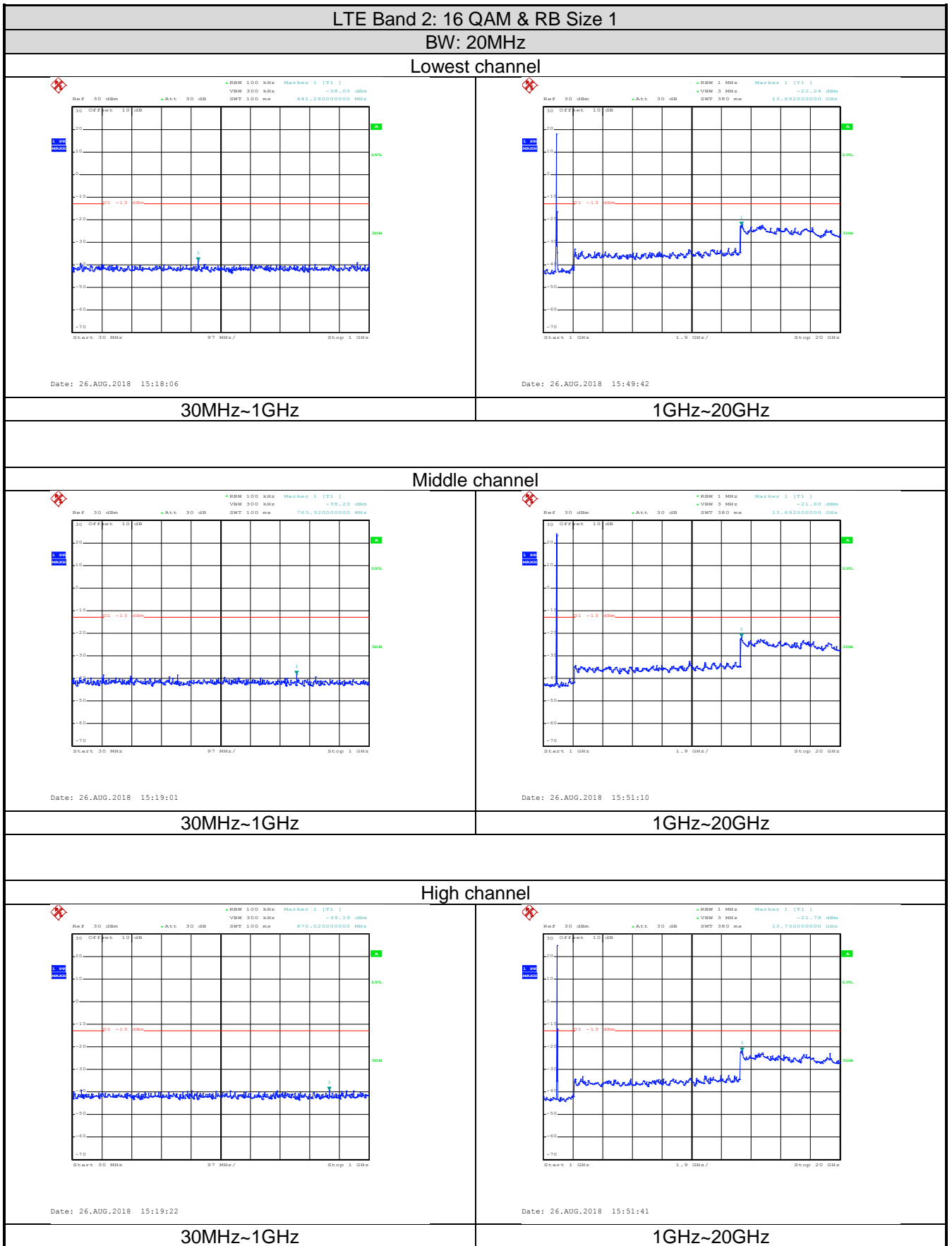
Date: 26.AUG.2018 15:15:54

30MHz~1GHz



Date: 26.AUG.2018 15:47:21

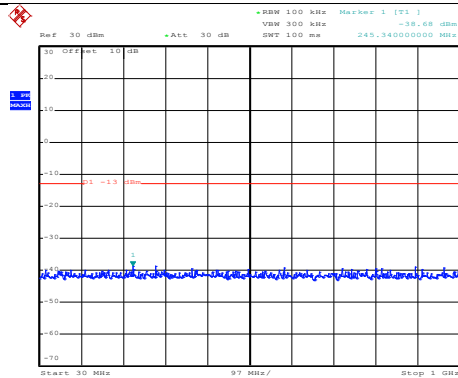
1GHz~20GHz



LTE Band 2: 16 QAM & RB Size 100

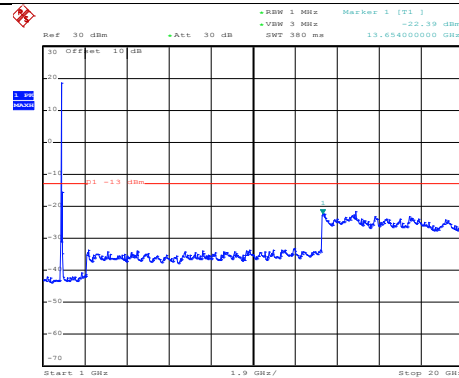
BW: 20MHz

Lowest channel



Date: 26.AUG.2018 15:18:23

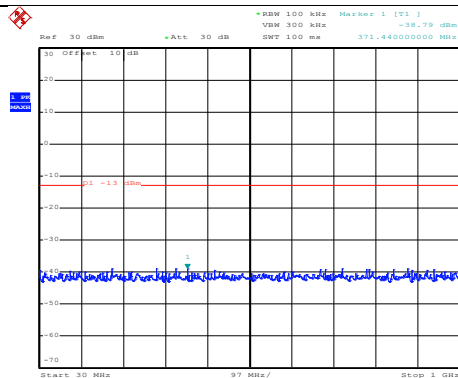
30MHz~1GHz



Date: 26.AUG.2018 15:50:10

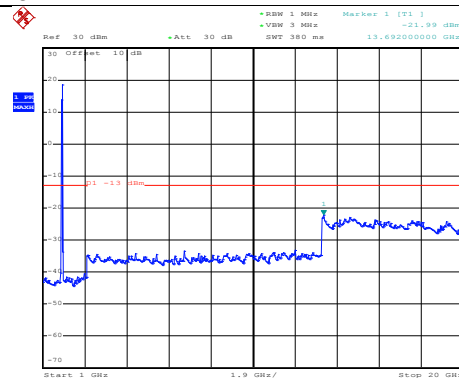
1GHz~20GHz

Middle channel



Date: 26.AUG.2018 15:18:44

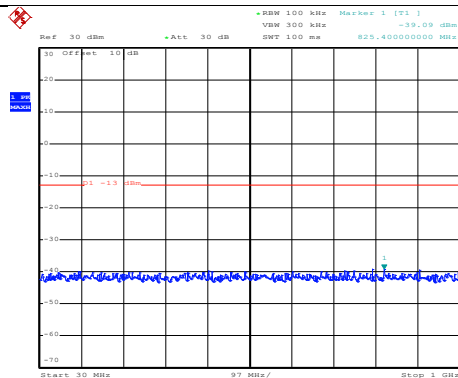
30MHz~1GHz



Date: 26.AUG.2018 15:50:39

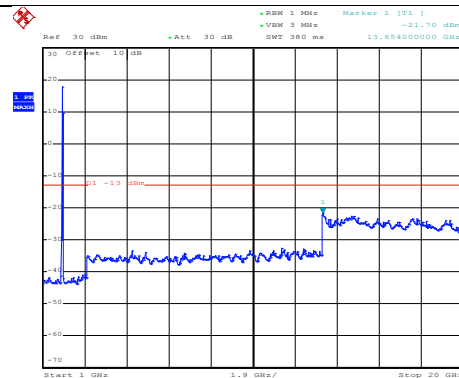
1GHz~20GHz

High channel



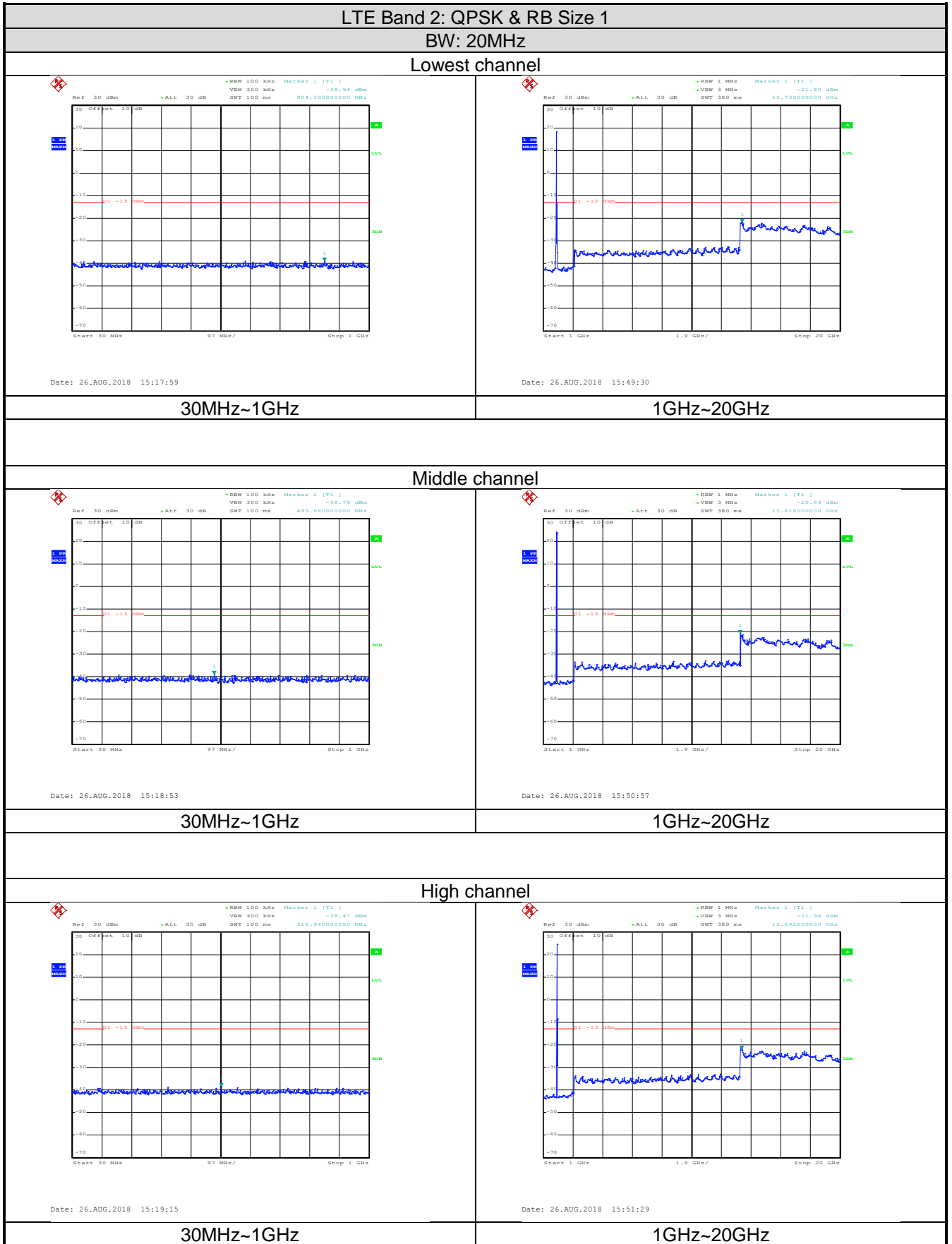
Date: 26.AUG.2018 15:19:40

30MHz~1GHz



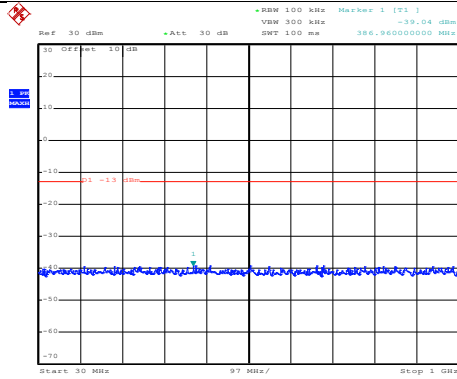
Date: 26.AUG.2018 15:52:12

1GHz~20GHz



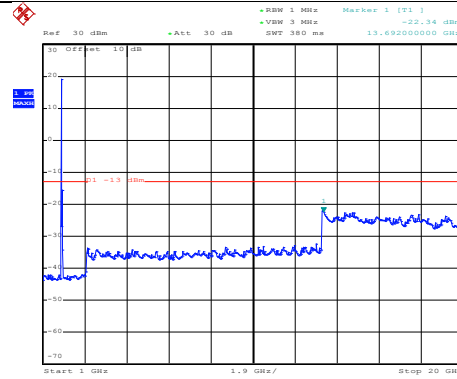
**LTE Band 2: QPSK & RB Size 100**  
**BW: 20MHz**

**Lowest channel**



Date: 26.AUG.2018 15:18:16

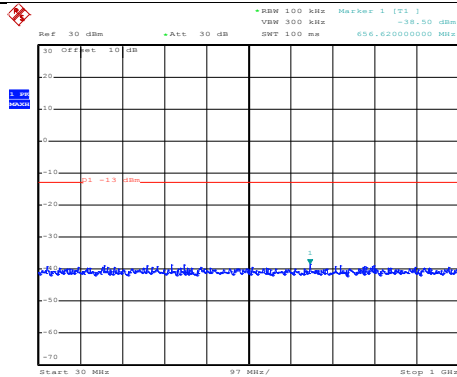
30MHz~1GHz



Date: 26.AUG.2018 15:49:59

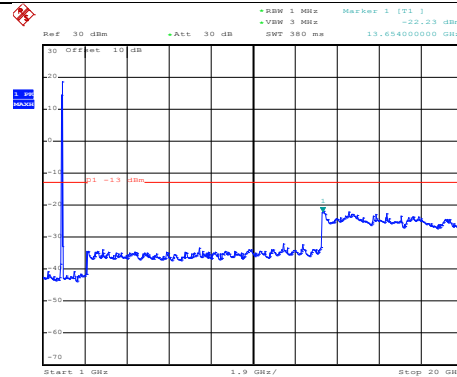
1GHz~20GHz

**Middle channel**



Date: 26.AUG.2018 15:18:38

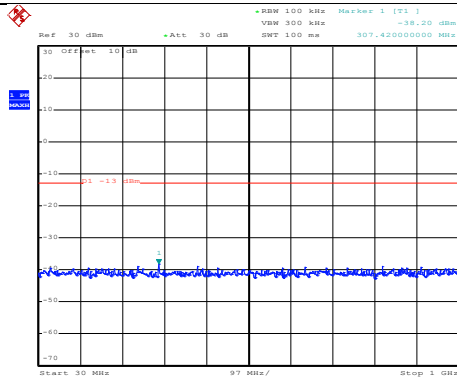
30MHz~1GHz



Date: 26.AUG.2018 15:50:29

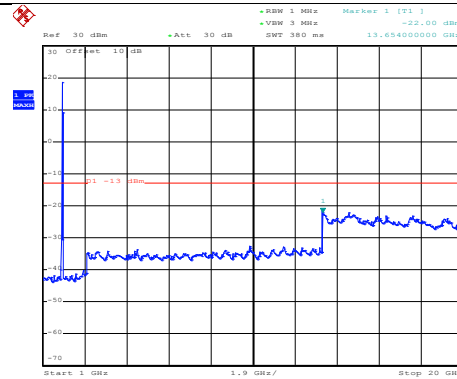
1GHz~20GHz

**High channel**



Date: 26.AUG.2018 15:19:33

30MHz~1GHz

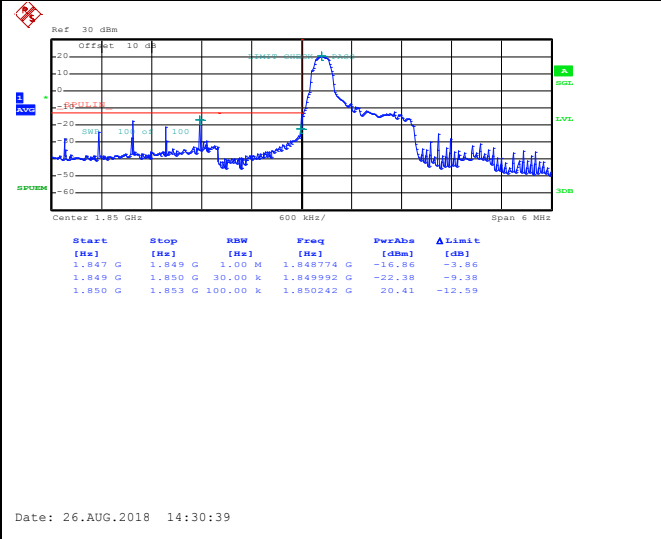


Date: 26.AUG.2018 15:51:59

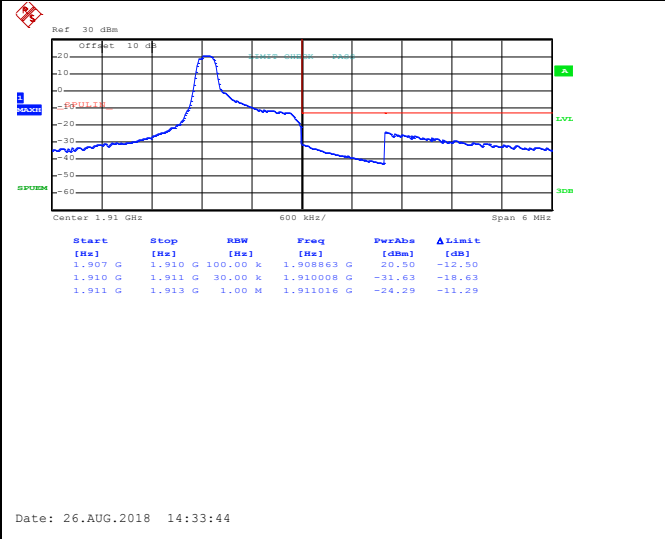
1GHz~20GHz

## Band edge emission

### LTE Band 2, BW: 1.4MHz 16QAM & RB Size 1

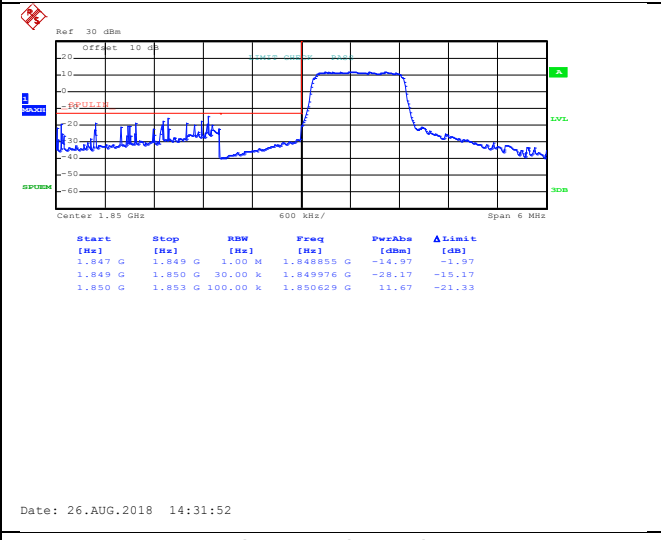


Lowest channel

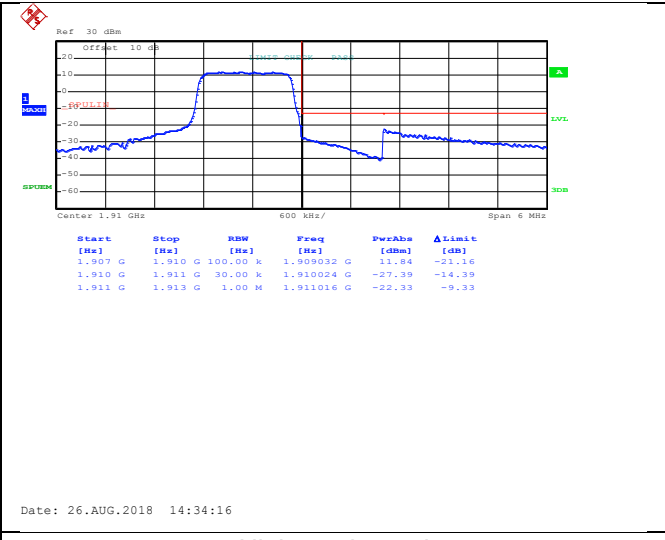


Highest channel

### 16QAM & RB Size 6

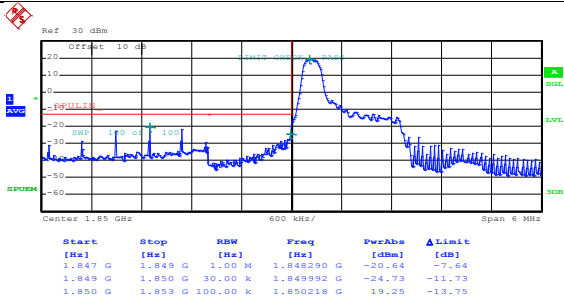


Lowest channel



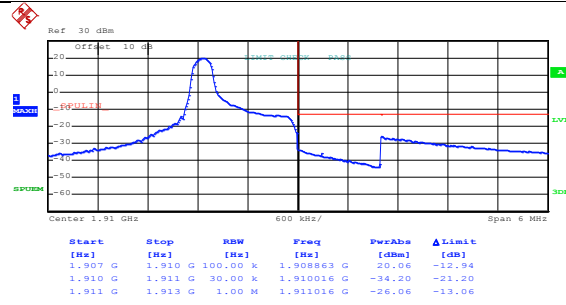
Highest channel

## LTE Band 2, BW: 1.4MHz QPSK & RB Size 1



Date: 26.AUG.2018 14:29:03

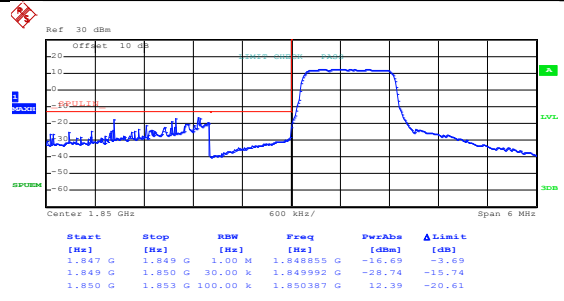
Lowest channel



Date: 26.AUG.2018 14:32:58

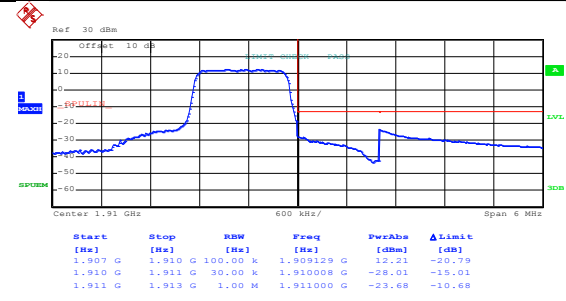
Highest channel

## QPSK & RB Size 6



Date: 26.AUG.2018 14:31:40

Lowest channel



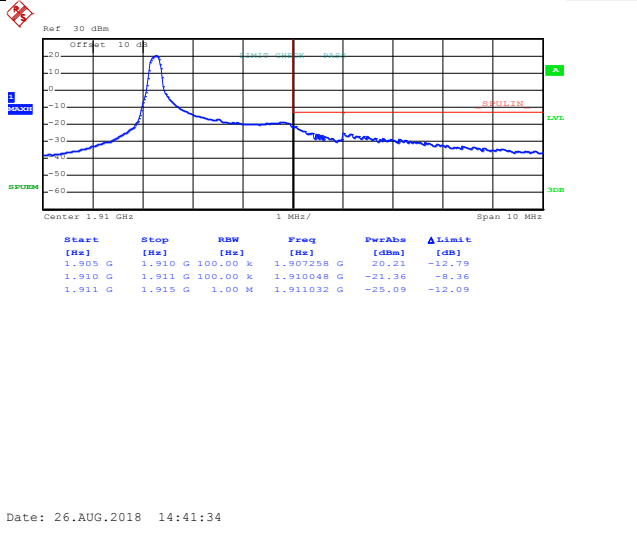
Date: 26.AUG.2018 14:34:02

Highest channel

## LTE Band 2, BW: 3MHz 16QAM & RB Size 1

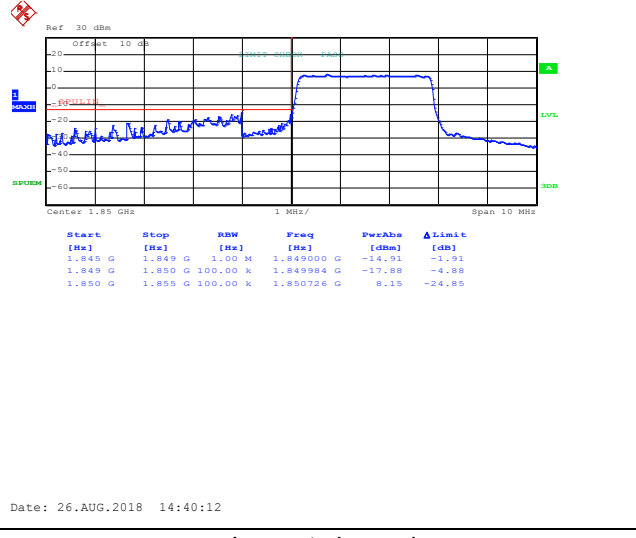


Lowest channel

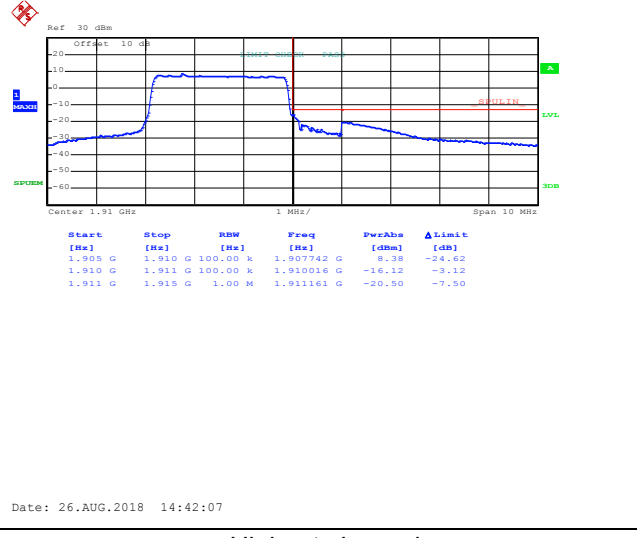


Highest channel

## 16QAM & RB Size 15



Lowest channel



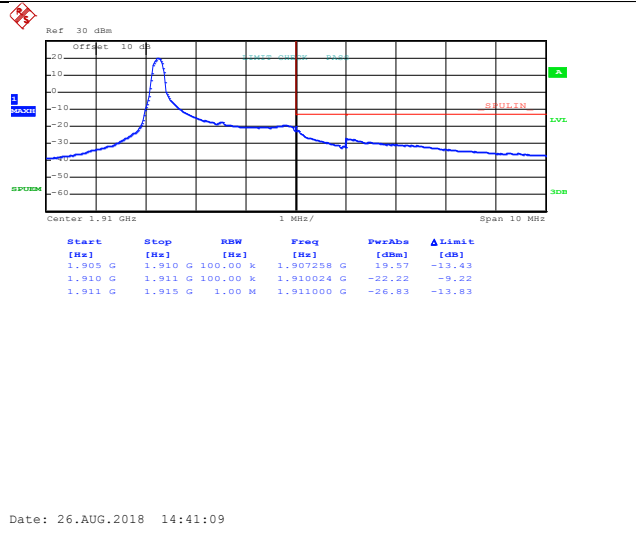
Highest channel



## LTE Band 2, BW: 3MHz QPSK & RB Size 1

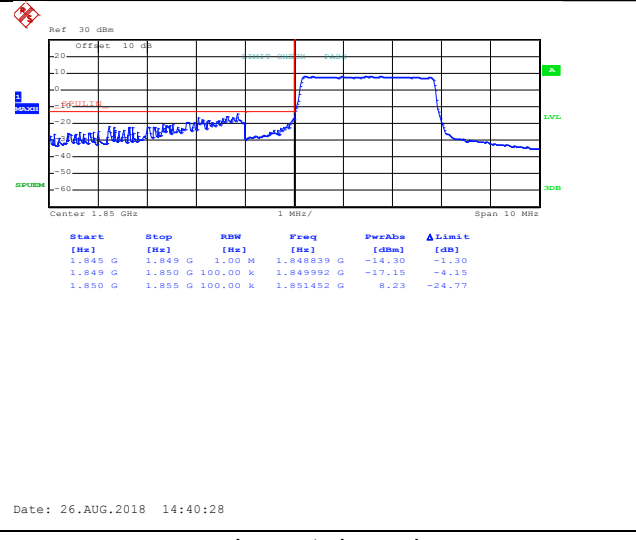


Lowest channel

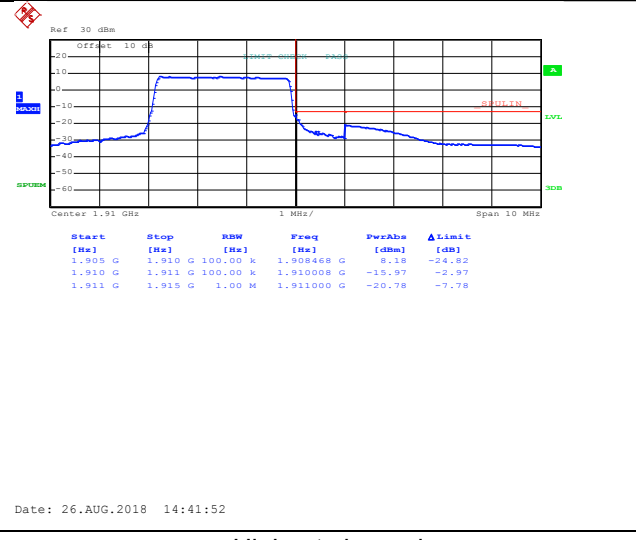


Highest channel

## QPSK & RB Size 15

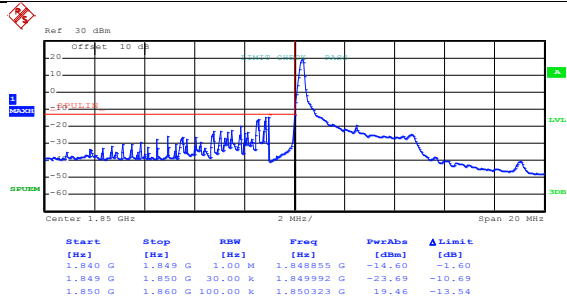


Lowest channel



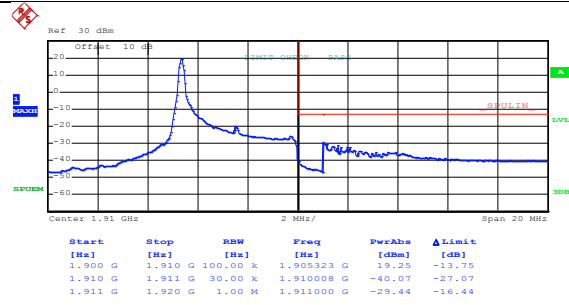
Highest channel

## LTE Band 2, BW: 5MHz 16QAM & RB Size 1



Date: 26.AUG.2018 14:44:52

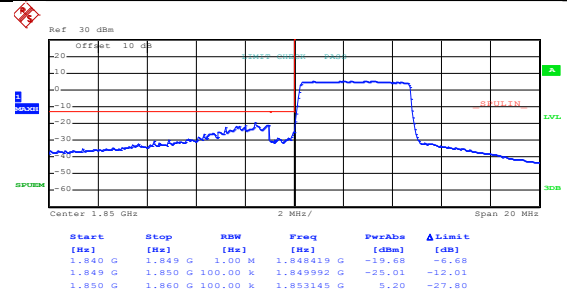
Lowest channel



Date: 26.AUG.2018 14:46:51

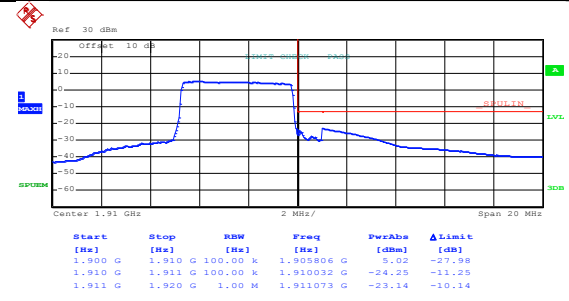
Highest channel

## 16QAM & RB Size 25



Date: 26.AUG.2018 14:45:48

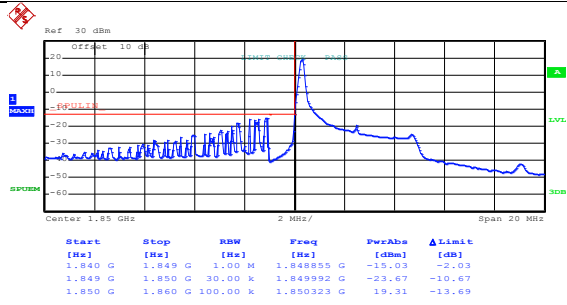
Lowest channel



Date: 26.AUG.2018 14:47:32

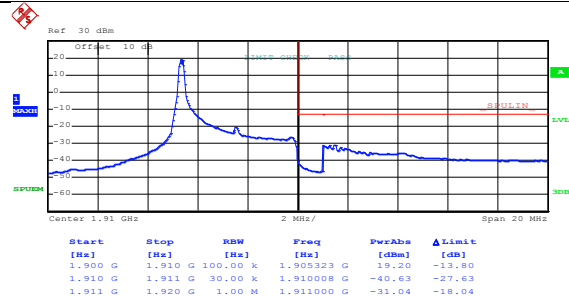
Highest channel

## LTE Band 2, BW: 5MHz QPSK & RB Size 1



Date: 26.AUG.2018 14:44:37

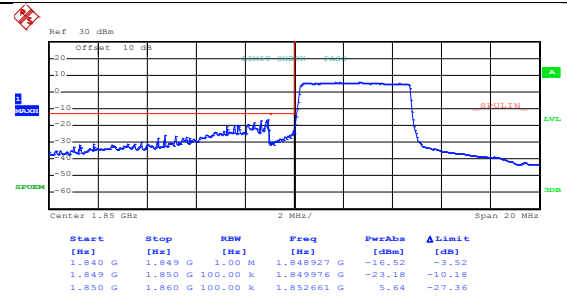
Lowest channel



Date: 26.AUG.2018 14:46:35

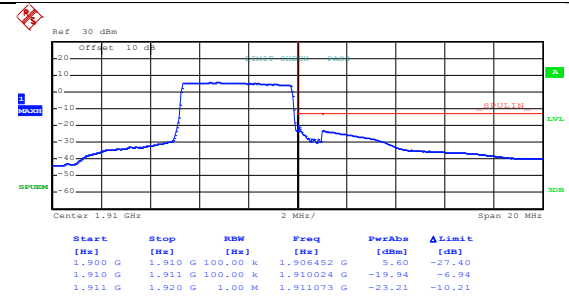
Highest channel

## QPSK & RB Size 25



Date: 26.AUG.2018 14:45:35

Lowest channel

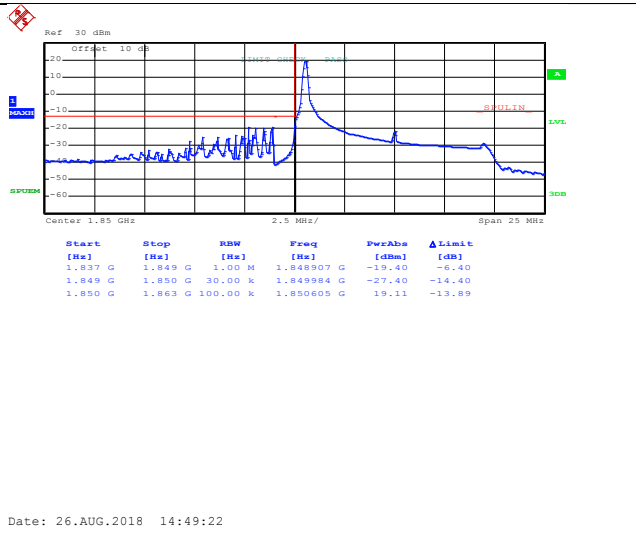


Date: 26.AUG.2018 14:47:17

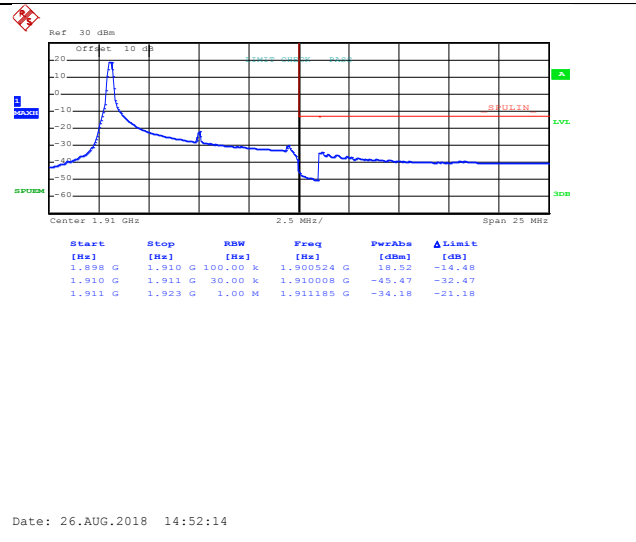
Highest channel

## LTE Band 2, BW: 10MHz

### 16QAM & RB Size 1

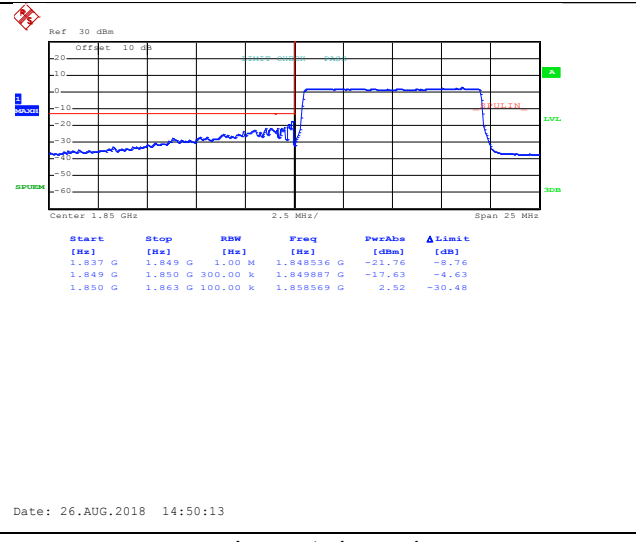


Lowest channel

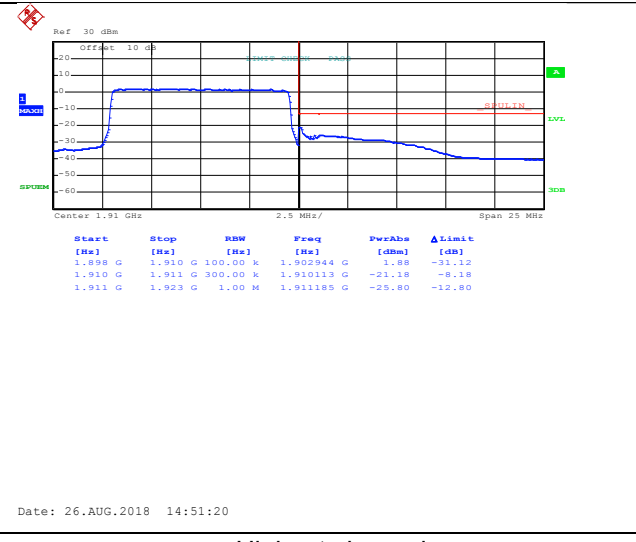


Highest channel

### 16QAM & RB Size 50



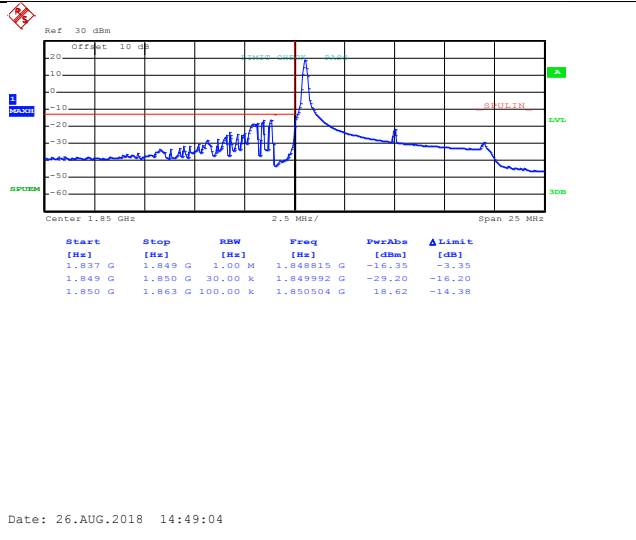
Lowest channel



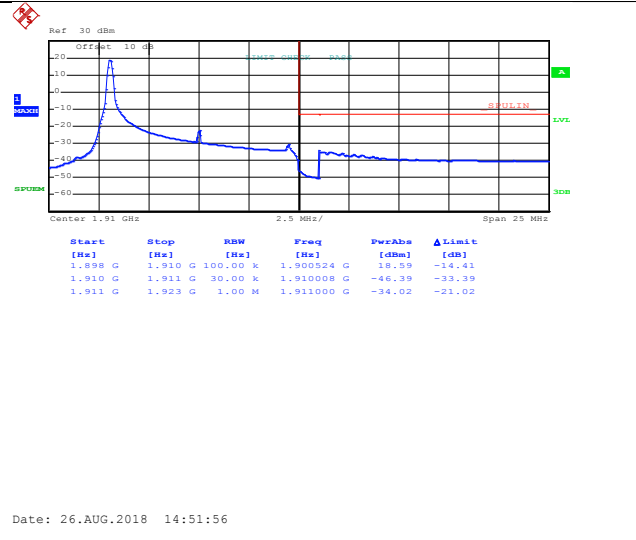
Highest channel

## LTE Band 2, BW: 10MHz

### QPSK & RB Size 1

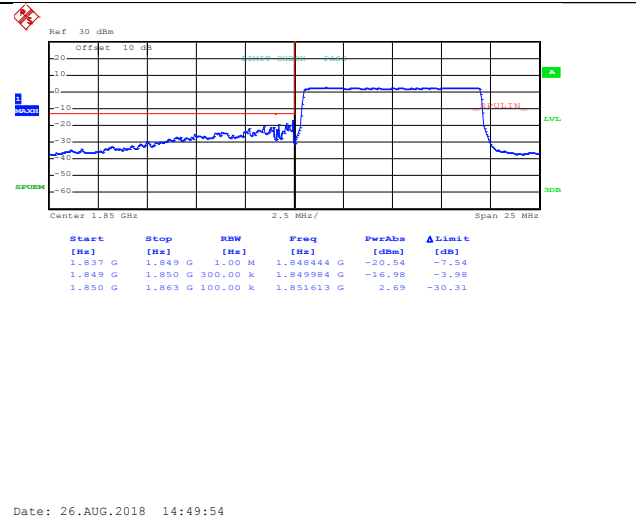


Lowest channel

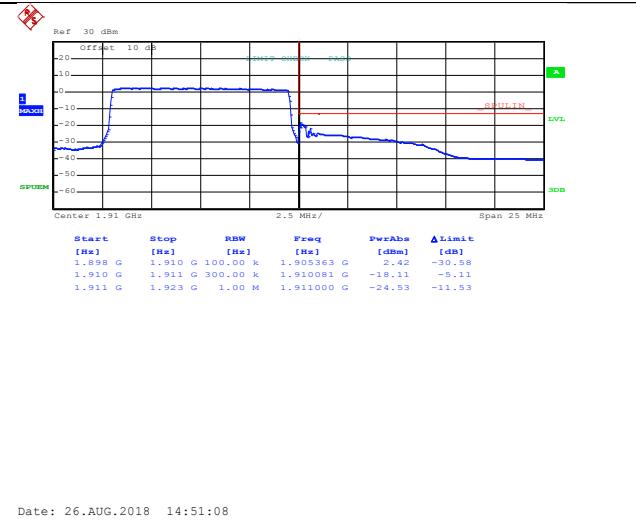


Highest channel

### QPSK & RB Size 50



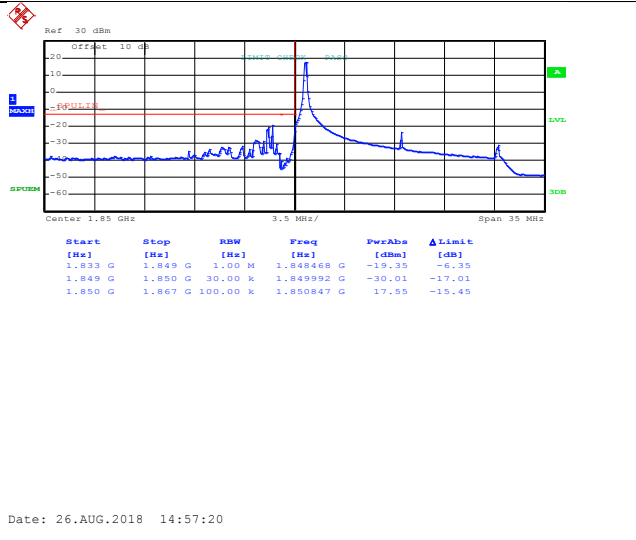
Lowest channel



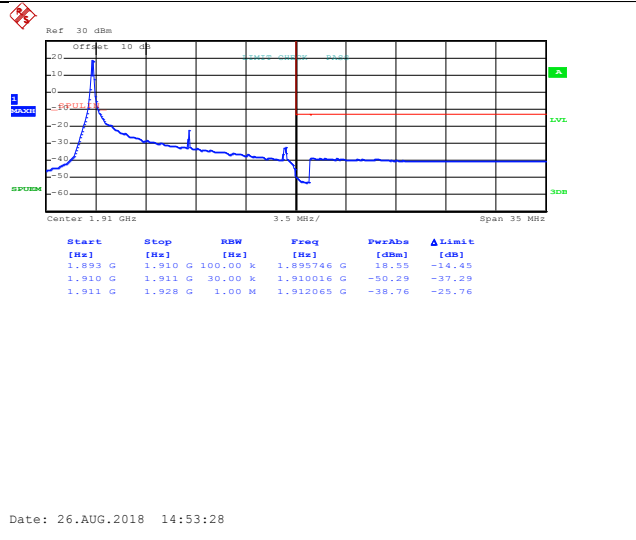
Highest channel

## LTE Band 2, BW: 15MHz

### 16QAM & RB Size 1

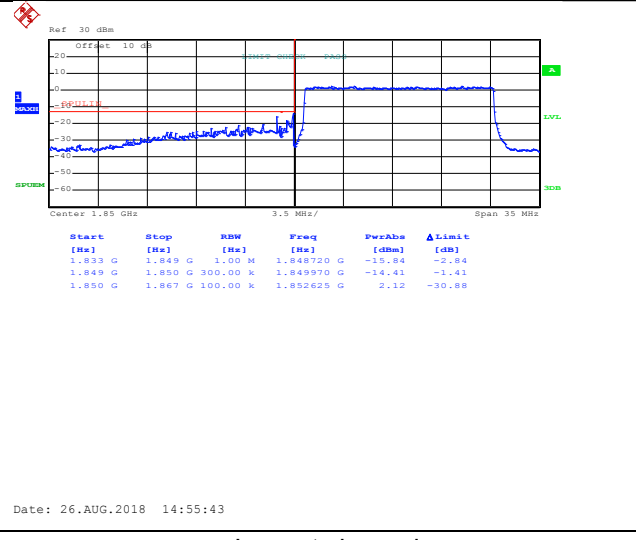


Lowest channel

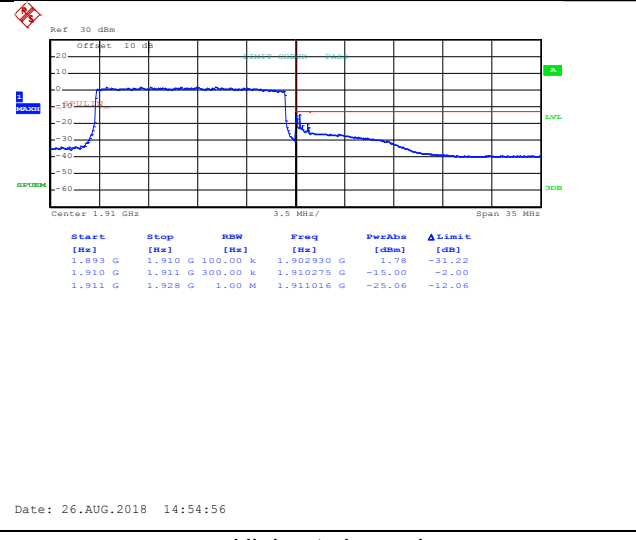


Highest channel

### 16QAM & RB Size 75



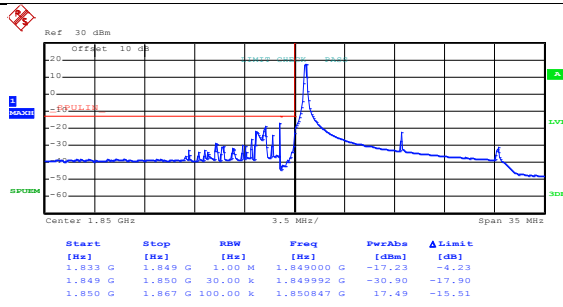
Lowest channel



Highest channel

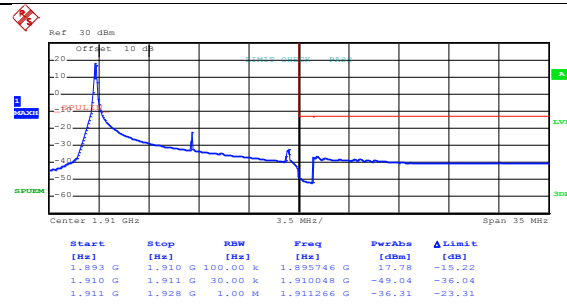
## LTE Band 2, BW: 15MHz

### QPSK & RB Size 1



Date: 26.AUG.2018 14:56:58

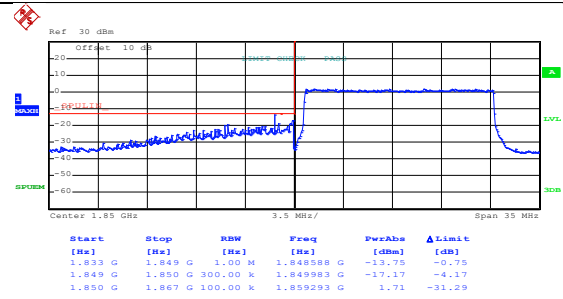
Lowest channel



Date: 26.AUG.2018 14:53:04

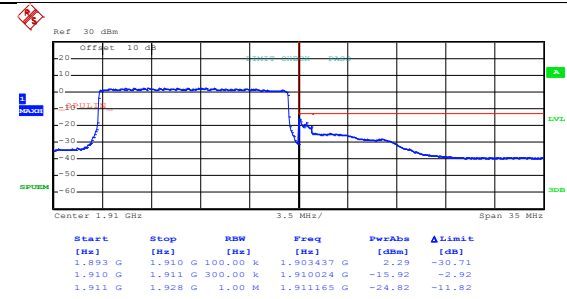
Highest channel

### QPSK & RB Size 75



Date: 26.AUG.2018 14:55:26

Lowest channel

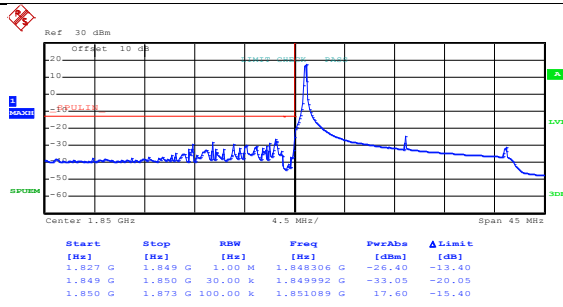


Date: 26.AUG.2018 14:54:45

Highest channel

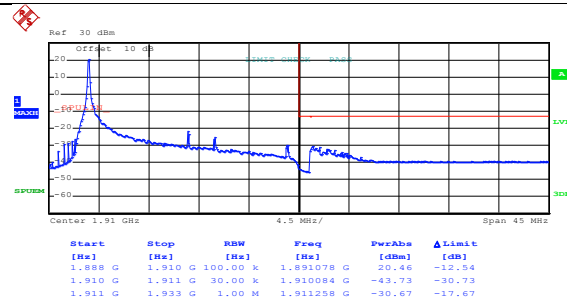
## LTE Band 2, BW: 20MHz

### 16QAM & RB Size 1



Date: 26.AUG.2018 14:59:09

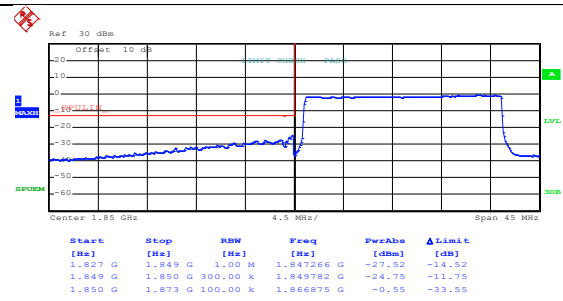
Lowest channel



Date: 26.AUG.2018 15:02:22

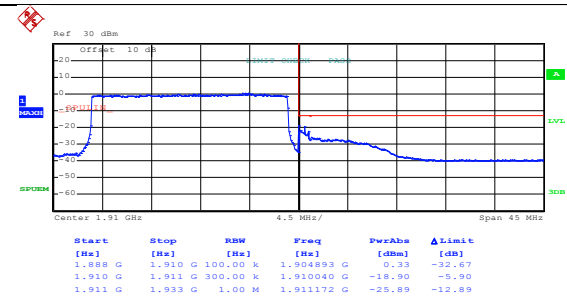
Highest channel

### 16QAM & RB Size 100



Date: 26.AUG.2018 14:59:50

Lowest channel



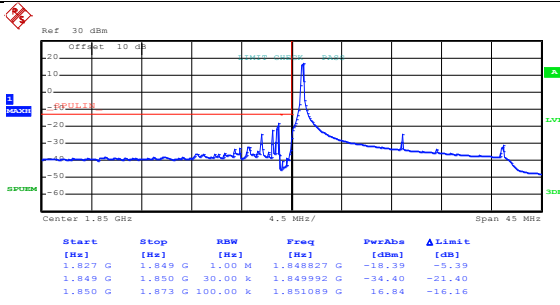
Date: 26.AUG.2018 15:01:38

Highest channel



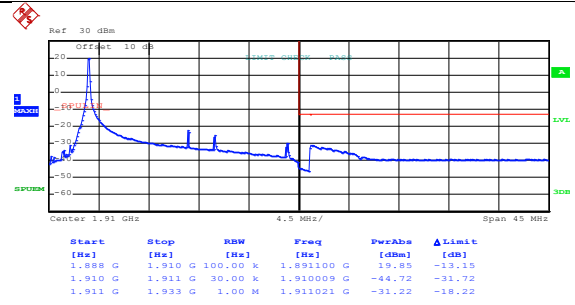
## LTE Band 2, BW: 20MHz

### QPSK & RB Size 1



Date: 26.AUG.2018 14:58:51

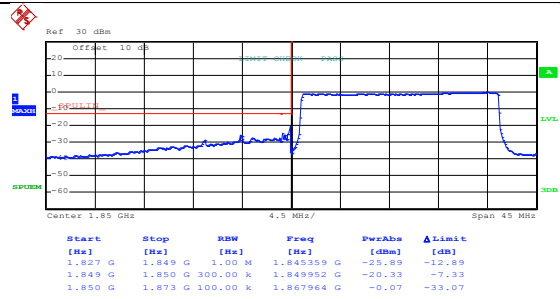
Lowest channel



Date: 26.AUG.2018 15:02:01

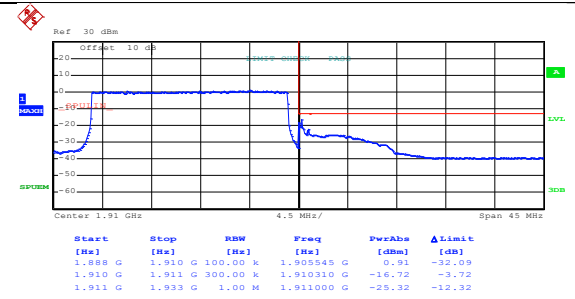
Highest channel

### QPSK & RB Size 100



Date: 26.AUG.2018 14:59:35

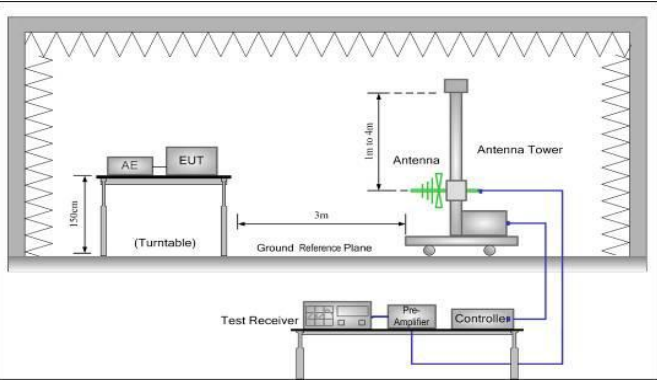
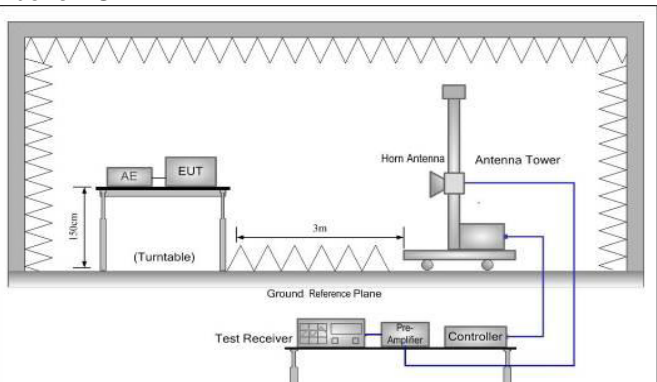
Lowest channel



Date: 26.AUG.2018 15:01:27

Highest channel

## 6.5 ERP, EIRP Measurement

Test Requirement:	Part 24.232(c)
Test Method:	ANSI/TIA-603-D 2010
Limit:	LTE Band 2: 2W EIRP,
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test Procedure:	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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:  <math display="block">ERP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}</math> </li> <li>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:  <math display="block">EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}</math> </li> <li>5. The worst case was relating to the conducted output power.</li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data:**

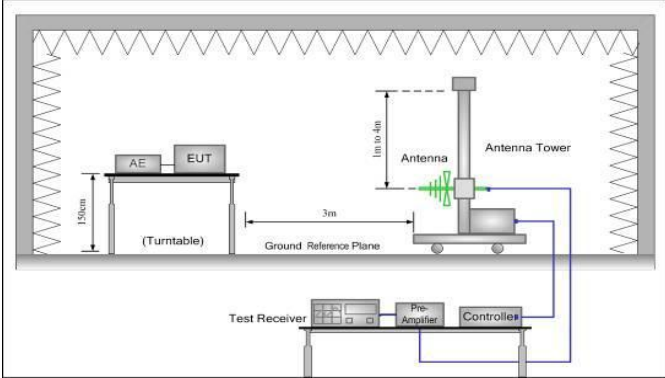
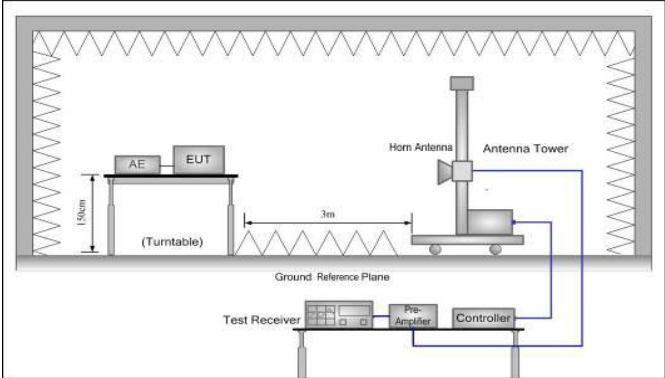
**LTE Band 2 part:**

LTE Band 2, BW: 1.4MHz							
RB size 1 & RB offset 0							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
1850.70	18607	QPSK	H	V	19.98	33.00	Pass
				H	25.19		
1850.70	18607	16QAM	H	V	19.67		
				H	25.06		
Middle Channel							
1880.00	18900	QPSK	H	V	19.35	33.00	Pass
				H	24.89		
1880.00	18900	16QAM	H	V	19.21		
				H	24.69		
Highest Channel							
1909.30	19193	QPSK	H	V	19.14	33.00	Pass
				H	20.64		
1909.30	19193	16QAM	H	V	18.97		
				H	20.43		
LTE Band 2, BW: 3MHz							
RB size 1 & RB offset 0							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
1851.50	18615	QPSK	H	V	19.85	33.00	Pass
				H	25.63		
1851.50	18615	16QAM	H	V	19.74		
				H	25.13		
Middle Channel							
1880.00	18900	QPSK	H	V	19.25	33.00	Pass
				H	24.69		
1880.00	18900	16QAM	H	V	19.11		
				H	24.53		
Highest Channel							
1908.50	19185	QPSK	H	V	18.53	33.00	Pass
				H	20.15		
1909.30	19185	16QAM	H	V	18.67		
				H	20.22		

LTE Band 2, BW: 5MHz							
RB size 1 & RB offset 0							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
1852.50	18625	QPSK	H	V	19.72	33.00	Pass
				H	25.24		
1852.50	18625	16QAM	H	V	19.63		
				H	25.71		
Middle Channel							
1880.00	18900	QPSK	H	V	19.31	33.00	Pass
				H	24.84		
1880.00	18900	16QAM	H	V	19.34		
				H	24.69		
Highest Channel							
1907.50	19175	QPSK	H	V	18.94	33.00	Pass
				H	20.63		
1907.50	19175	16QAM	H	V	18.76		
				H	20.74		
LTE Band 2, BW: 10MHz							
RB size 1 & RB offset 0							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
1855.00	18650	QPSK	H	V	19.24	33.00	Pass
				H	25.53		
1855.00	18650	16QAM	H	V	19.67		
				H	25.58		
Middle Channel							
1880.00	18900	QPSK	H	V	19.15	33.00	Pass
				H	24.17		
1880.00	18900	16QAM	H	V	19.21		
				H	24.50		
Highest Channel							
1905.00	19150	QPSK	H	V	18.43	33.00	Pass
				H	20.67		
1905.00	19150	16QAM	H	V	18.68		
				H	20.52		

LTE Band 2, BW: 15MHz							
RB size 1 & RB offset 0							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
1857.50	18675	QPSK	H	V	19.41	33.00	Pass
				H	25.85		
1857.50	18675	16QAM	H	V	19.31		
				H	25.17		
Middle Channel							
1880.00	18900	QPSK	H	V	19.36	33.00	Pass
				H	24.52		
1880.00	18900	16QAM	H	V	19.34		
				H	24.67		
Highest Channel							
1902.50	19125	QPSK	H	V	18.66	33.00	Pass
				H	20.74		
1902.50	19125	16QAM	H	V	18.92		
				H	20.73		
LTE Band 2, BW: 20MHz							
RB size 1 & RB offset 0							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
1860.00	18700	QPSK	H	V	19.34	33.00	Pass
				H	25.43		
1860.00	18700	16QAM	H	V	19.15		
				H	24.89		
Middle Channel							
1880.00	18900	QPSK	H	V	19.24	33.00	Pass
				H	24.13		
1880.00	18900	16QAM	H	V	19.41		
				H	24.26		
Highest Channel							
1900.00	19100	QPSK	H	V	18.47	33.00	Pass
				H	20.92		
1900.00	19100	16QAM	H	V	19.13		
				H	20.85		

## 6.6 Field strength of spurious radiation measurement

Test Requirement:	Part 24.238 (a)
Test Method:	ANSI/TIA-603-D 2010
Limit:	LTE Band 2 The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB (-13 dBm).
Test setup:	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
Test Procedure:	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>The frequency range up to tenth harmonic was investigated for each 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.</li> <li>The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency.  <math display="block">ERP / EIRP = S.G. \text{ output (dBm)} + \text{Antenna Gain(dB/dBi)} - \text{Cable Loss (dB)}</math> </li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

**Measurement Data:**

**LTE Band 2 part:**

LTE Band 2, WB: 1.4MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
<b>Lowest Channel</b>				
3701.40	Vertical	-38.28	-13.00	Pass
5552.10	V	-41.43		
7402.00	V	-36.86		
3701.40	Horizontal	-37.42		
5552.10	H	-41.90		
7402.00	H	-35.19		
<b>Middle Channel</b>				
3760.00	Vertical	-38.76	-13.00	Pass
5640.00	V	-40.39		
7520.00	V	-36.16		
3760.00	Horizontal	-39.14		
5640.00	H	-40.90		
7520.00	H	-36.69		
<b>Highest Channel</b>				
3816.60	Vertical	-38.83	-13.00	Pass
5724.90	V	-39.46		
7633.20	V	-34.74		
3816.60	Horizontal	-42.74		
5724.90	H	-38.52		
7633.20	H	-35.28		
<p><i>Note:</i></p> <ol style="list-style-type: none"> <li><i>The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.</i></li> <li><i>For above 1 GHz, all test modes were performed, and just the worst case shown in the report.</i></li> </ol>				

LTE Band 2, WB: 3MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
<b>Lowest Channel</b>				
3703.00	Vertical	-38.41	-13.00	Pass
5554.50	V	-41.29		
7406.00	V	-36.93		
3703.00	Horizontal	-37.85		
5554.50	H	-41.49		
7406.00	H	-35.67		
<b>Middle Channel</b>				
3760.00	Vertical	-38.21	-13.00	Pass
5640.00	V	-40.13		
7520.00	V	-36.55		
3760.00	Horizontal	-39.34		
5640.00	H	-40.13		
7520.00	H	-36.92		
<b>Highest Channel</b>				
3817.00	Vertical	-38.59	-13.00	Pass
5725.50	V	-39.73		
7634.00	V	-34.11		
3817.00	Horizontal	-42.53		
5725.50	H	-38.69		
7634.00	H	-35.34		
<p><i>Note:</i></p> <ol style="list-style-type: none"> <li><i>The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.</i></li> <li><i>For above 1 GHz, all test modes were performed, and just the worst case shown in the report.</i></li> </ol>				



LTE Band 2, WB: 5MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
<b>Lowest Channel</b>				
3705.00	Vertical	-38.57	-13.00	Pass
5557.50	V	-41.19		
7410.00	V	-36.29		
3705.00	Horizontal	-37.58		
5557.50	H	-41.97		
7410.00	H	-35.29		
<b>Middle Channel</b>				
3760.00	Vertical	-38.19	-13.00	Pass
5640.00	V	-40.23		
7520.00	V	-36.73		
3760.00	Horizontal	-39.51		
5640.00	H	-40.19		
7520.00	H	-36.85		
<b>Highest Channel</b>				
3815.00	Vertical	-38.79	-13.00	Pass
5722.50	V	-39.47		
7630.00	V	-34.21		
3815.00	Horizontal	-42.52		
5722.50	H	-38.19		
7630.00	H	-35.83		
<p><i>Note:</i></p> <ol style="list-style-type: none"> <li><i>The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.</i></li> <li><i>For above 1 GHz, all test modes were performed, and just the worst case shown in the report.</i></li> </ol>				

LTE Band 2, WB: 10MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
<b>Lowest Channel</b>				
3710.00	Vertical	-38.29	-13.00	Pass
5565.00	V	-41.38		
7420.00	V	-36.29		
3710.00	Horizontal	-37.41		
5565.00	H	-41.57		
7420.00	H	-35.92		
<b>Middle Channel</b>				
3760.00	Vertical	-38.49	-13.00	Pass
5640.00	V	-40.73		
7520.00	V	-36.49		
3760.00	Horizontal	-39.34		
5640.00	H	-40.51		
7520.00	H	-36.55		
<b>Highest Channel</b>				
3810.00	Vertical	-38.69	-13.00	Pass
5715.00	V	-39.37		
7620.00	V	-34.29		
3810.00	Horizontal	-42.50		
5715.00	H	-38.41		
7620.00	H	-35.39		
<p><i>Note:</i></p> <ol style="list-style-type: none"> <li><i>The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.</i></li> <li><i>For above 1 GHz, all test modes were performed, and just the worst case shown in the report.</i></li> </ol>				

LTE Band 2, WB: 15MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
<b>Lowest Channel</b>				
3715.00	Vertical	-38.45	-13.00	Pass
5572.50	V	-41.25		
7430.00	V	-36.97		
3715.00	Horizontal	-37.13		
5572.50	H	-41.26		
7430.00	H	-35.85		
<b>Middle Channel</b>				
3760.00	Vertical	-38.96	-13.00	Pass
5640.00	V	-40.03		
7520.00	V	-36.51		
3760.00	Horizontal	-39.43		
5640.00	H	-40.27		
7520.00	H	-36.54		
<b>Highest Channel</b>				
3805.00	Vertical	-38.46	-13.00	Pass
5707.50	V	-39.53		
7610.00	V	-34.71		
3805.00	Horizontal	-42.29		
5707.50	H	-38.93		
7610.00	H	-35.47		
<p><i>Note:</i></p> <ol style="list-style-type: none"> <li><i>The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.</i></li> <li><i>For above 1 GHz, all test modes were performed, and just the worst case shown in the report.</i></li> </ol>				

LTE Band 2, WB: 20MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
<b>Lowest Channel</b>				
3720.00	Vertical	-38.46	-13.00	Pass
5580.00	V	-41.52		
7440.00	V	-36.79		
3720.00	Horizontal	-37.54		
5580.00	H	-41.55		
7440.00	H	-35.17		
<b>Middle Channel</b>				
3760.00	Vertical	-38.25	-13.00	Pass
5640.00	V	-40.03		
7520.00	V	-36.41		
3760.00	Horizontal	-39.59		
5640.00	H	-40.74		
7520.00	H	-36.19		
<b>Highest Channel</b>				
3800.00	Vertical	-38.52	-13.00	Pass
5700.00	V	-39.21		
7600.00	V	-34.15		
3800.00	Horizontal	-42.13		
5700.00	H	-38.26		
7600.00	H	-35.64		
<p><i>Note:</i></p> <ol style="list-style-type: none"> <li><i>The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.</i></li> <li><i>For above 1 GHz, all test modes were performed, and just the worst case shown in the report.</i></li> </ol>				

## 6.7 Frequency stability V.S. Temperature measurement

Test Requirement:	Part 24.235, Part 2.1055(a)(1)(b)
Test Method:	ANSI/TIA-603-D 2010
Limit:	±2.5ppm
Test setup:	
Test procedure:	<ol style="list-style-type: none"> <li>1. The equipment under test was connected to an external DC power supply and input rated voltage.</li> <li>2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.</li> <li>3. The EUT was placed inside the temperature chamber.</li> <li>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.</li> <li>5. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.</li> <li>6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached</li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data (worst case):**

**LTE Band 2 part:**

Reference Frequency: LTE Band 2 (10MHz) Middle channel=18900 channel=1880.00MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
<b>QPSK</b>					
3.70	-30	198	0.105851	±2.5	Pass
	-20	155	0.082979		
	-10	163	0.087234		
	0	123	0.065957		
	10	188	0.100532		
	20	174	0.093085		
	30	114	0.061170		
	40	105	0.056383		
	50	150	0.080319		
<b>16QAM</b>					
3.70	-30	123	0.065957	±2.5	Pass
	-20	150	0.080319		
	-10	166	0.088830		
	0	122	0.065426		
	10	144	0.077128		
	20	140	0.075000		
	30	156	0.083511		
	40	133	0.071277		
	50	138	0.073936		
<i>Note: Only the worst case shown in the report.</i>					

## 6.8 Frequency stability V.S. Voltage measurement

Test Requirement:	Part 24.235, Part 2.1055(d)(2)
Test Method:	ANSI/TIA-603-D 2010
Limit:	±2.5ppm
Test setup:	
Test procedure:	<ol style="list-style-type: none"> <li>1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage.</li> <li>2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.</li> <li>3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.</li> </ol>
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

**Measurement Data (worst case):**

**LTE Band 2 part:**

Reference Frequency: LTE Band 2(10MHz) Middle channel=18900 channel=1880.00MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	4.20	98	0.052660	±2.5	Pass
	3.70	65	0.035106		
	3.50	74	0.039894		
16QAM					
25	4.20	80	0.043085	±2.5	Pass
	3.70	96	0.051596		
	3.50	48	0.026064		
<i>Note: Only the worst case shown in the report.</i>					