FCC REPORT
(LTE)

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:	mobile wifi
Model No.:	R700
FCC ID:	2AG32R700A
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 27 Subpart M
Date of sample receipt:	07 Aug., 2018
Date of Test:	07 Aug., to 22 Aug., 2018
Date of report issued:	23 Aug., 2018
Test Result:	PASS*

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

Authorized Signature:

Bruce Zhang
Laboratory Manager

2. Version

Version No.	Date	Description
00	*23 Aug., 2018*	*Original*

Tested by: Carey Chen ***Date:*** *23 Aug., 2018*

Test Engineer

Reviewed by: Wimer Zhang ***Date:*** *23 Aug., 2018*

Project Engineer

3. Contents

Page

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 27.50 (h)(2)	Pass
Peak-to-Average Ratio	Part 27.50(d)(5)	Pass
Modulation Characteristics	Part 2.1047	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 27.53(m)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 27.53(m)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 27.53(m)	Pass
Out of band emission, Band Edge	Part 22.917(a) Part 27.53(m)	Pass
Frequency stability vs. temperature	Part 27.54 Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 27.54 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:	Baicells Technologies Co., Ltd.
Address:	3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China
Manufacturer:	Baicells Technologies Co., Ltd.
Address:	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:	mobile wifi
Model No.:	R700
Operation Frequency range:	LTE Band 41: 2496MHz~2690MHz
Modulation type:	QPSK, 16QAM
Antenna type:	Internal Antenna
Antenna gain:	LTE Band 41: 1.0 dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V-2000mAh
AC adapter :	Model: TPA-5950100UU Input: AC100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1A

Test Channel:

LTE Band 41 (5MHz)			LTE Band 41 (10MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	39675	2498.5	Lowest channel	39700	2501.0
Middle channel	40620	2593.0	Middle channel	40620	2593.0
Highest channel	41565	2687.5	Highest channel	41540	2685.0
LTE Band 41 (15MHz)			LTE Band 41 (20MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	39725	2503.5	Lowest channel	39750	2506.0
Middle channel	40620	2593.0	Middle channel	40620	2593.0
Highest channel	41515	2682.5	Highest channel	41490	2680.0

5.3 Test environment and mode

Operating Environment:	
Temperature:	Normal: 15℃ ~ 35℃, Extreme: -30℃ ~ +50℃
Humidity:	20 % ~ 75 % RH
Atmospheric Pressure:	1008 mbar
Voltage:	Nominal: 3.7Vdc, Extreme: Low 3.5Vdc, High 4.25Vdc
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.

5.7 Laboratory Facility

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

- **FCC - Registration No.: 727551**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The Registration No. is 727551.

- **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.

- **A2LA - Registration No.: 4346.01**

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: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

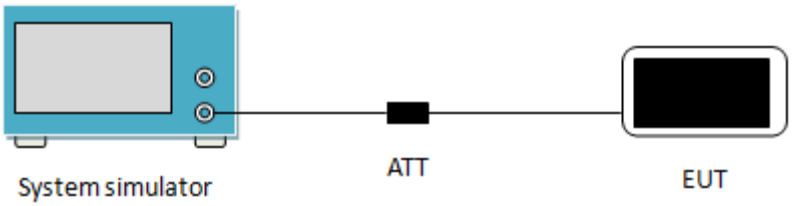
Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

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	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	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

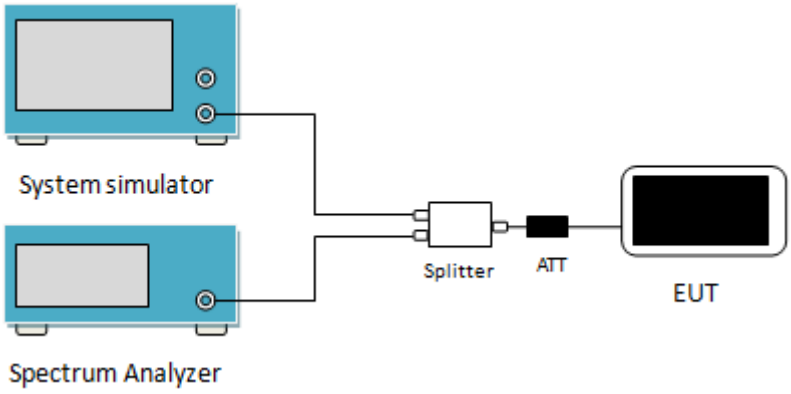
Test Requirement:	Part 22.913(a)(2),Part 27.50 (h)(2)
Test Method:	ANSI/TIA-603-D 2010
Limit:	Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.
Test Setup:	
Test Procedure:	The transmitter output was connected 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)		
					39675	40620	41565
					2498.5MHz	2593.0MHz	2687.5MHz
41	5	QPSK	1	0	22.07	21.86	21.62
			1	12	22.15	22.15	21.74
			1	24	22.04	22.11	21.73
			12	0	21.30	21.24	20.84
			12	6	21.30	21.12	20.83
			12	11	21.29	21.02	20.66
			25	0	21.21	21.01	20.80
		16QAM	1	0	21.35	20.42	20.59
			1	12	20.53	20.46	20.46
			1	24	20.37	20.53	20.52
			12	0	20.32	20.45	20.53
			12	6	20.35	20.56	20.52
			12	11	20.31	20.46	20.42
			25	0	20.37	20.42	20.48
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	22.24	22.15	21.87
			1	24	22.41	22.15	21.77
			1	49	22.28	22.21	21.61
			25	0	21.40	21.53	20.86
			25	12	21.51	21.29	20.83
			25	24	21.28	21.09	20.75
			50	0	21.40	21.09	20.92
		16QAM	1	0	20.74	20.31	20.82
			1	24	20.80	20.39	20.79
			1	49	20.58	20.41	20.78
			25	0	20.49	20.42	20.56
			25	12	20.48	20.46	20.54
			25	24	20.44	20.35	20.51
			50	0	20.38	20.60	20.39

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	22.01	22.07	22.08
			1	37	22.25	22.22	21.84
			1	74	22.05	22.08	21.83
			36	0	21.55	21.27	20.98
			36	16	21.49	21.15	20.88
			36	35	21.16	21.13	20.83
			75	0	21.27	21.13	20.98
		16QAM	1	0	20.77	20.68	20.65
			1	37	20.80	20.52	20.35
			1	74	20.56	20.68	20.41
			36	0	20.63	20.50	20.38
			36	16	20.43	20.36	20.31
			36	35	20.41	20.35	20.36
			75	0	20.33	20.36	20.32
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	22.09	22.09	22.08
			1	49	22.38	22.27	22.00
			1	99	22.08	22.17	21.65
			50	0	21.54	21.29	21.07
			50	24	21.68	21.17	21.05
			50	49	21.19	21.14	20.90
			100	0	21.19	21.12	20.90
		16QAM	1	0	20.70	20.56	20.54
			1	49	20.89	20.68	20.55
			1	99	20.61	20.69	20.41
			50	0	20.37	20.51	20.58
			50	24	20.35	20.55	20.57
			50	49	20.43	20.58	20.54
			100	0	20.45	20.42	20.41

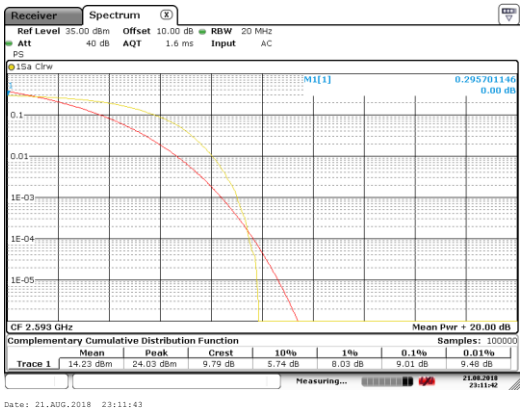
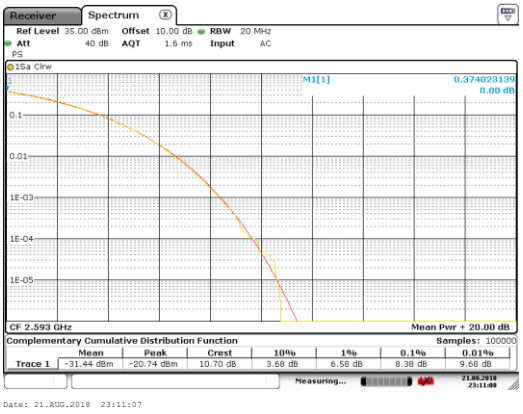
6.2 Peak-to-Average Ratio

Test Requirement:	Part 27.50(d)(5)
Test Method:	ANSI/TIA-603-D 2010
Limit:	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.
Test Setup:	
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 Set the CCDF option in spectrum analyzer, RBW ≥ OBW, 3 Set the EUT working in highest power level, measured and recorded the 0.1% as PAPR level. 4 Repeat step 1~3 at other frequency and modulations.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

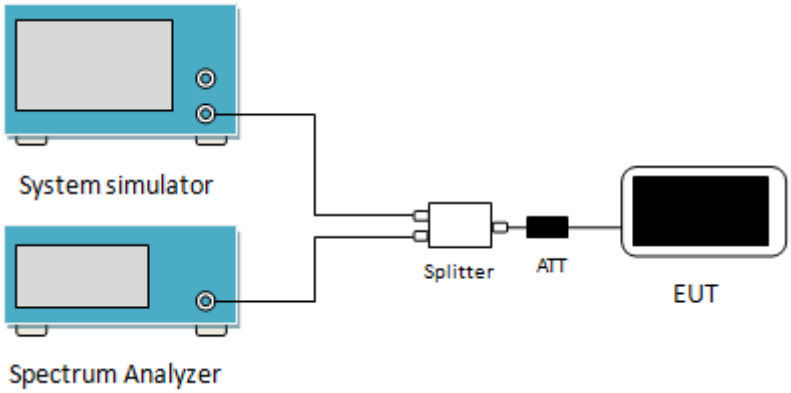
Measurement Data (Worst case):

Bandwidth	Modulation	RB Size	RB Offset	PAPR
LTE Band 41 (Middle Channel)				
20MHz	QPSK	100	0	9.01
	16QAM	100	0	8.38

Test plots as below:

LTE Band 41 Middle channel	
Modulation: QPSK	Modulation:16QAM
	

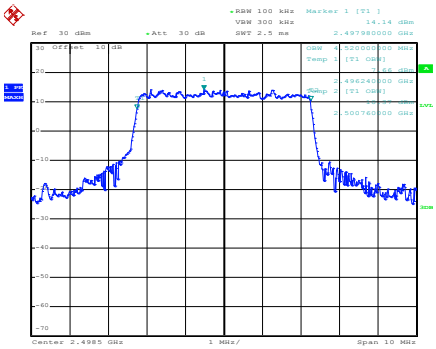
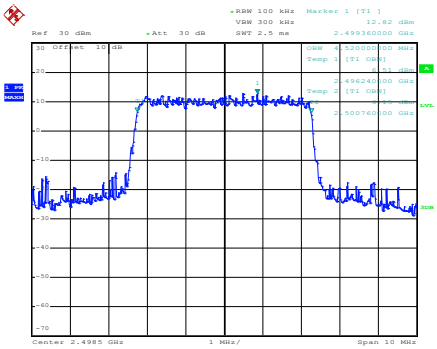
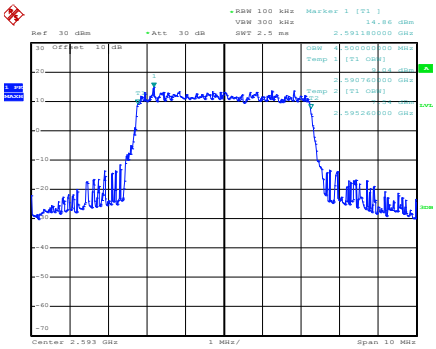
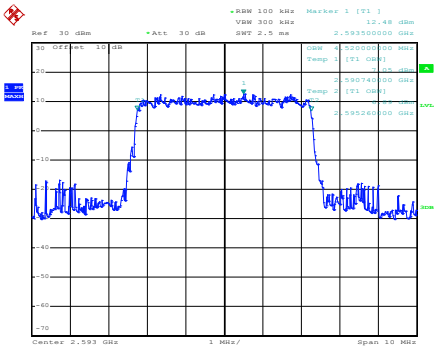
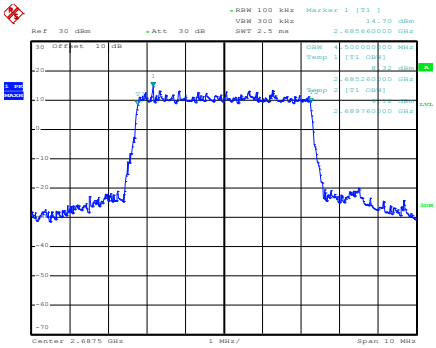
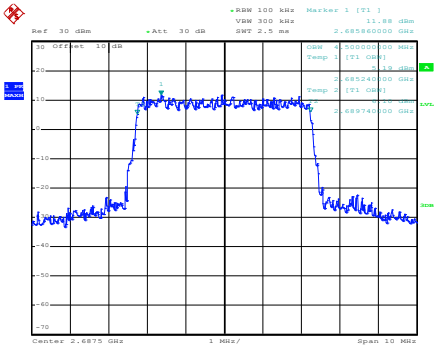
6.3 Occupy Bandwidth

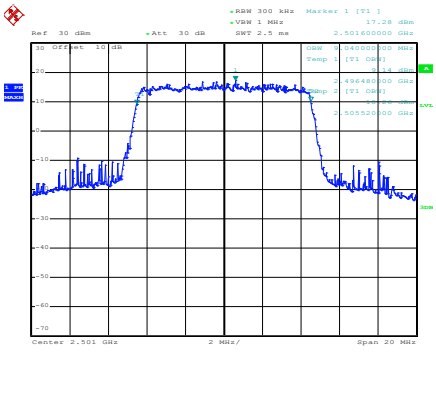
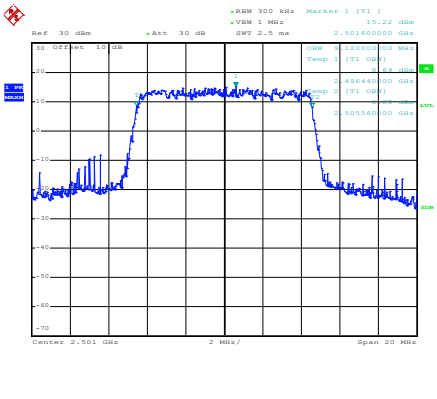
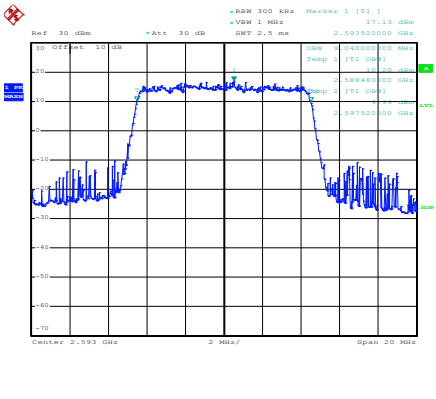
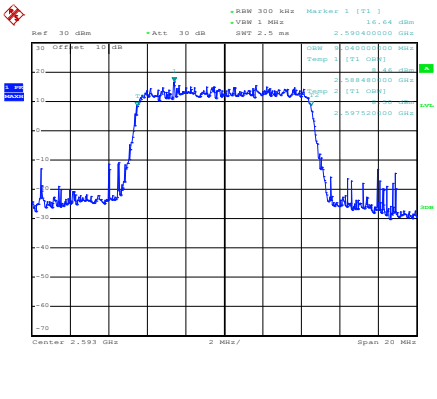
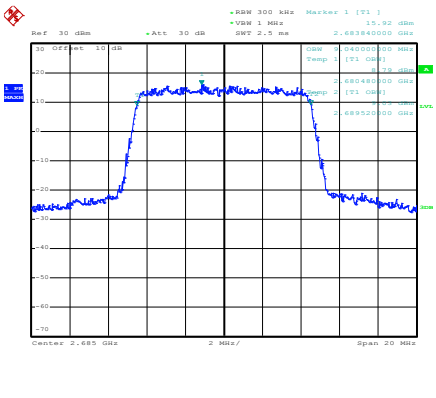
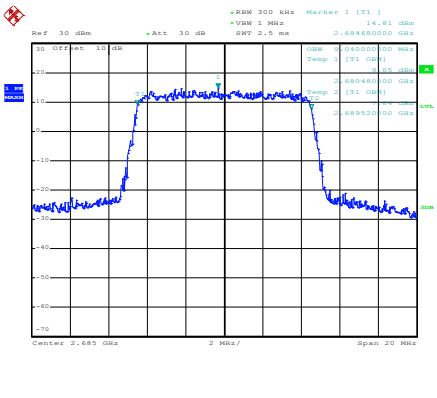
Test Requirement:	Part 27.53(m)
Test Method:	ANSI/TIA-603-D 2010
Test Setup:	
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% ~ 5% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

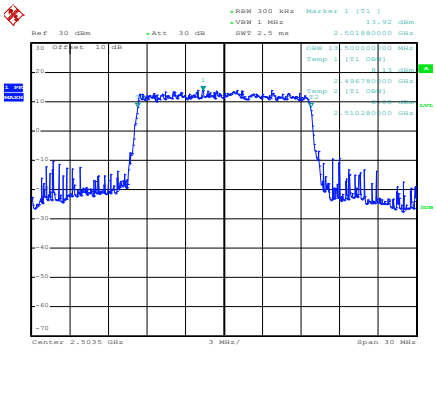
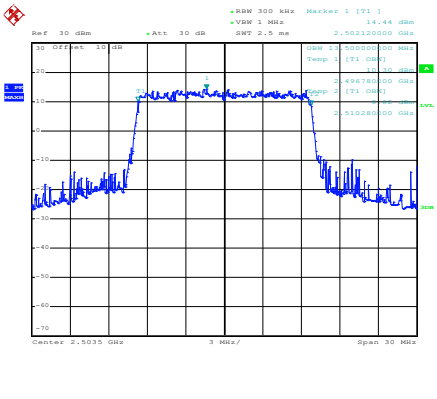
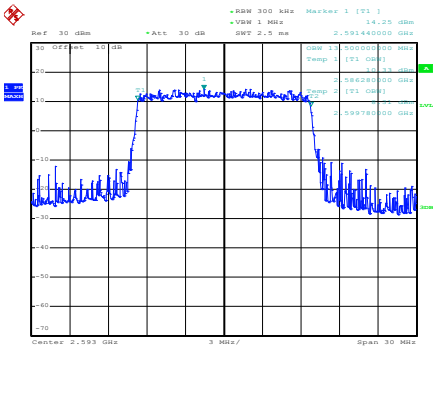
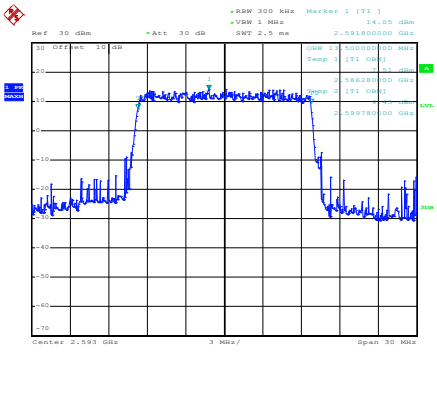
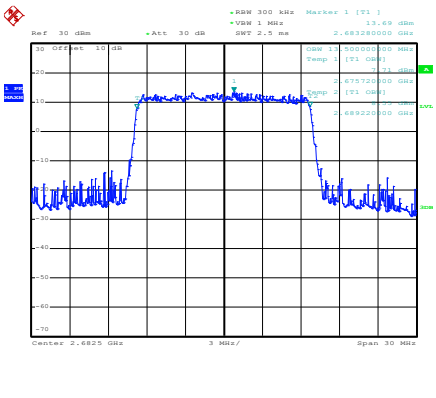
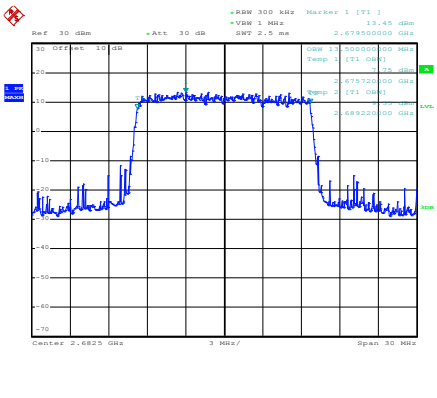
Measurement Data:

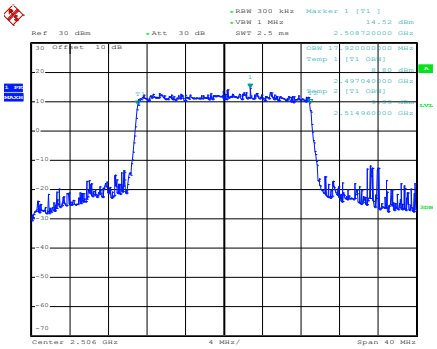
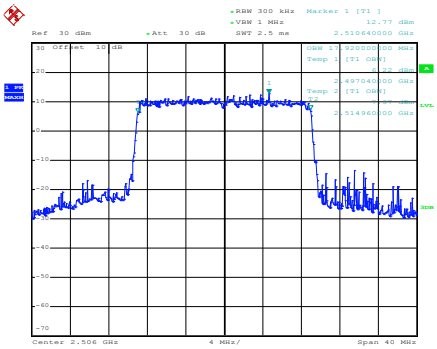
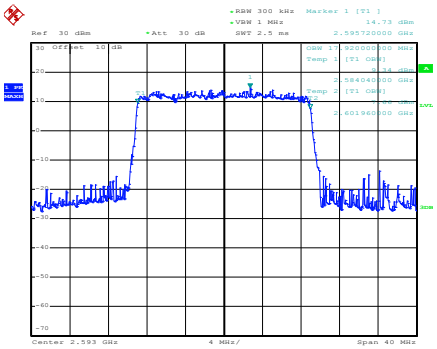
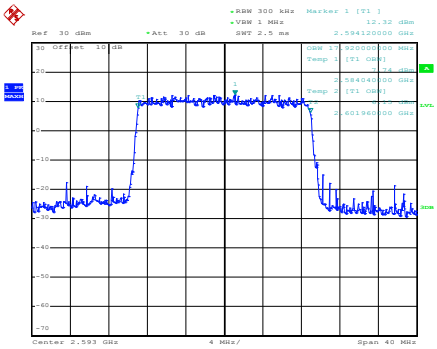
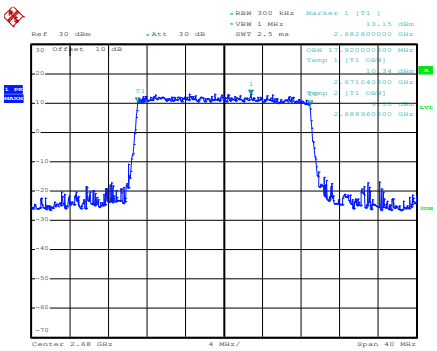
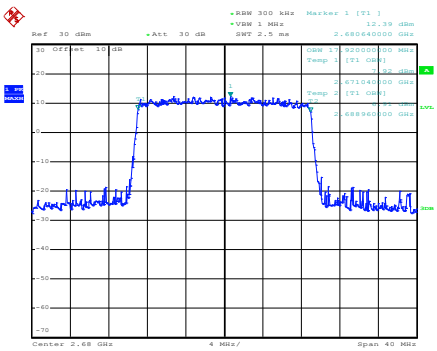
LTE Band 41					
Bandwidth	Channel	Frequency (MHz)	Modulation	99% OBW (kHz)	-26dBcEBW (kHz)
5MHz	39675	2498.5	16QAM	4520	4960
			QPSK	4520	5000
	40620	2593.0	16QAM	4500	4960
			QPSK	4520	4820
	41565	2687.5	16QAM	4500	4980
			QPSK	4500	4940
10MHz	39700	2501.0	16QAM	9040	10160
			QPSK	9120	10000
	40620	2593.0	16QAM	9040	10000
			QPSK	9040	10040
	41540	2685.0	16QAM	9040	10120
			QPSK	9040	10000
15MHz	39725	2503.5	16QAM	13500	15060
			QPSK	13500	14760
	40620	2593.0	16QAM	13500	14760
			QPSK	13500	14520
	41515	2682.5	16QAM	13500	14820
			QPSK	13500	14520
20MHz	39750	2506.0	16QAM	17920	19280
			QPSK	17920	19360
	40620	2593.0	16QAM	17920	19600
			QPSK	17920	19280
	41490	2680.0	16QAM	17920	19280
			QPSK	17920	19120

Test plot as follows:

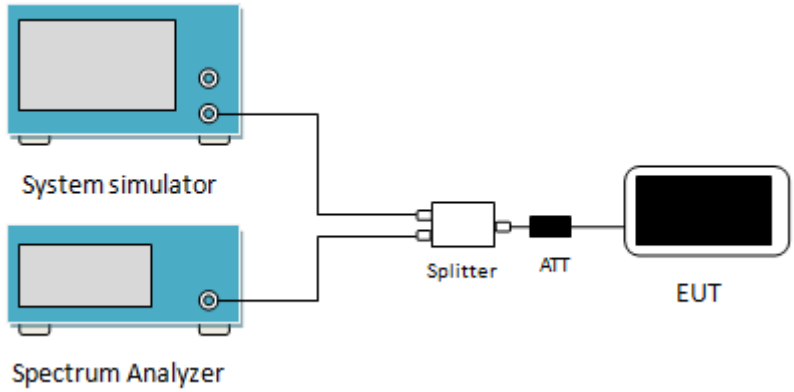
LTE Band 41: 99% Occupy bandwidth	
BW: 5MHz	
16QAM	QPSK
	
Lowest channel	
16QAM	QPSK
	
Middle channel	
16QAM	QPSK
	
Highest channel	

LTE Band 41: 99% Occupy bandwidth	
BW: 10MHz	
16QAM	QPSK
	
Lowest channel	
16QAM	QPSK
	
Middle channel	
16QAM	QPSK
	
Highest channel	

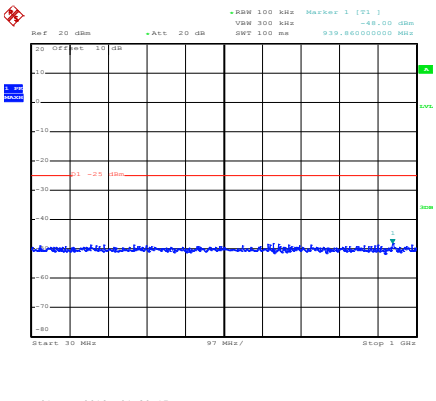
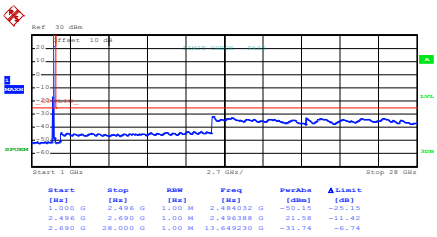
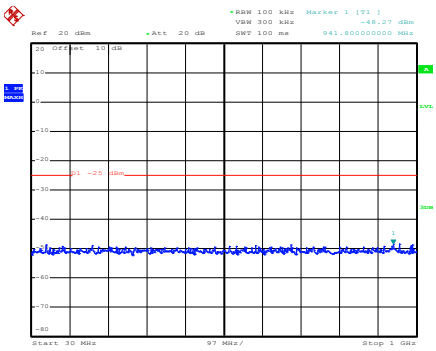
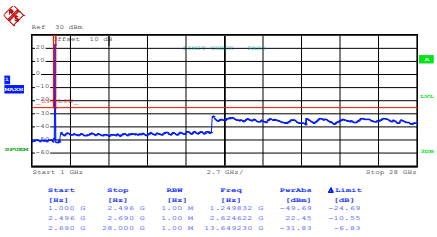
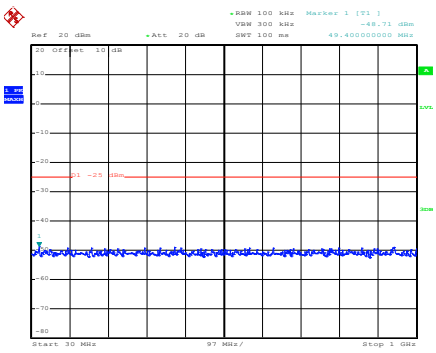
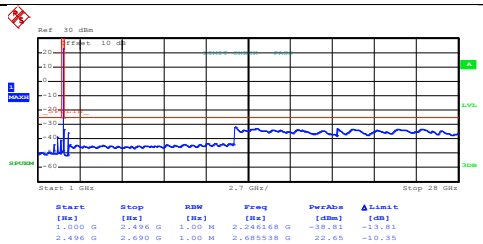
LTE Band 41: 99% Occupy bandwidth	
BW: 15MHz	
16QAM	QPSK
	
Lowest channel	
16QAM	QPSK
	
Middle channel	
16QAM	QPSK
	
Highest channel	

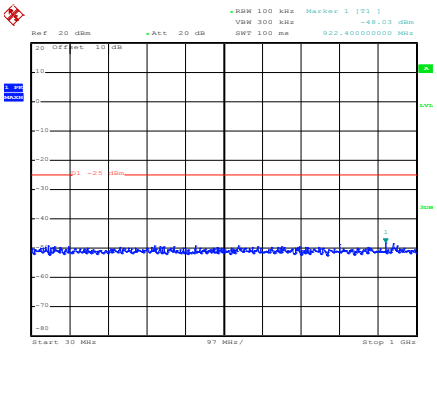
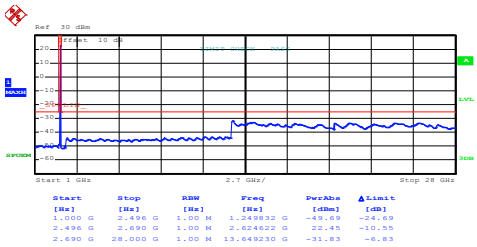
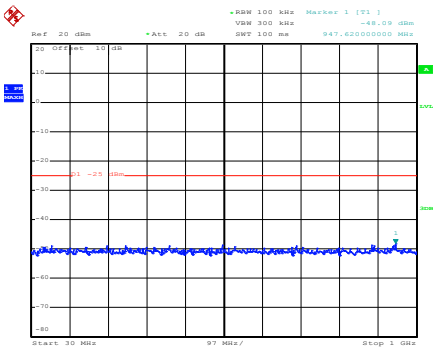
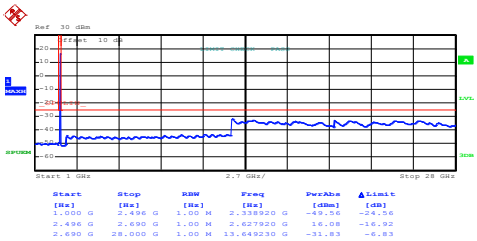
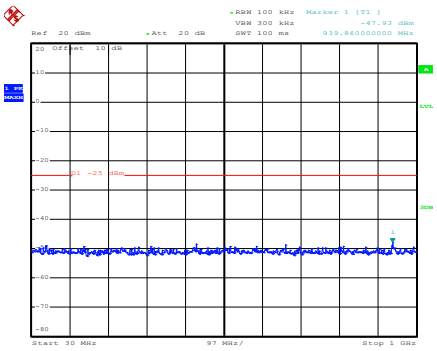
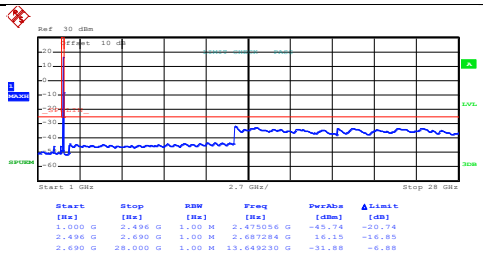
LTE Band 41: 99% Occupy bandwidth	
BW: 20MHz	
16QAM	QPSK
	
Lowest channel	
16QAM	QPSK
	
Middle channel	
16QAM	QPSK
	
Highest channel	

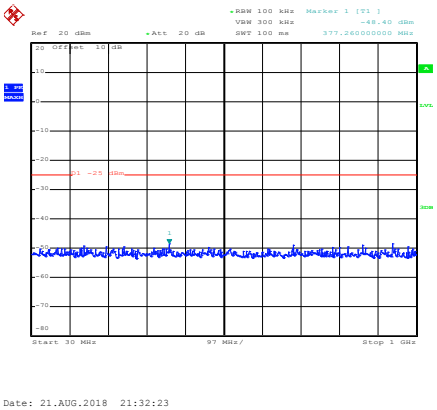
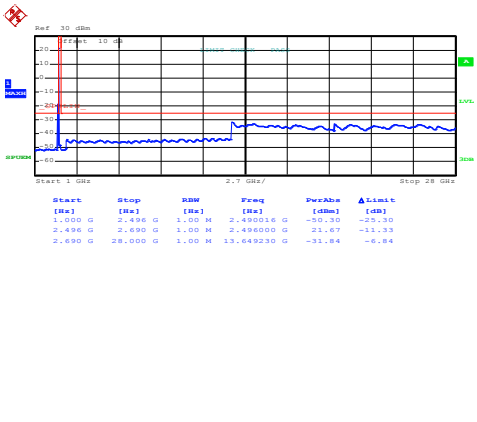
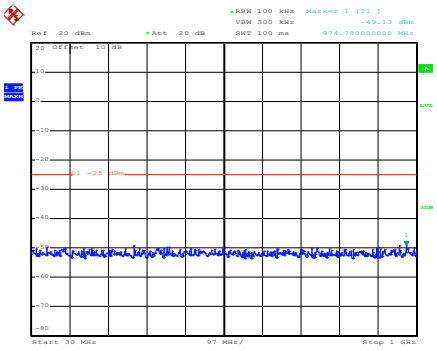
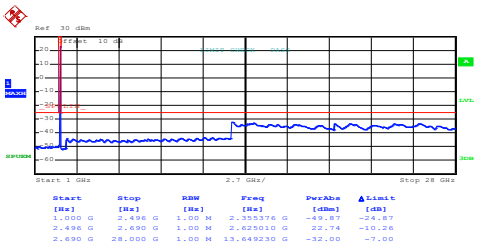
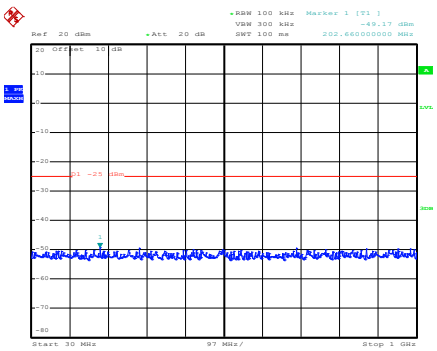
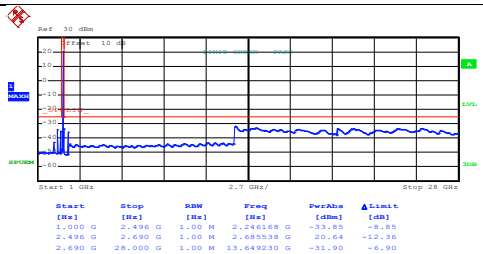
6.4 Out of band emission at antenna terminals

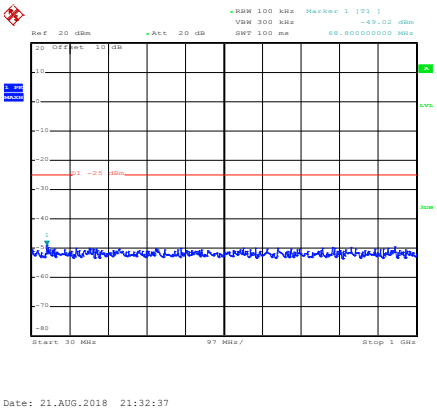
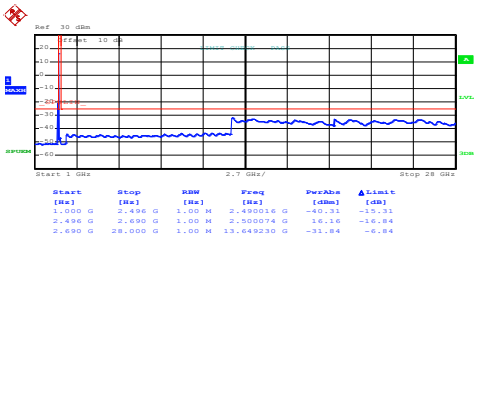
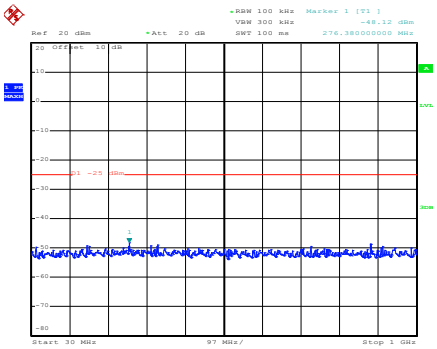
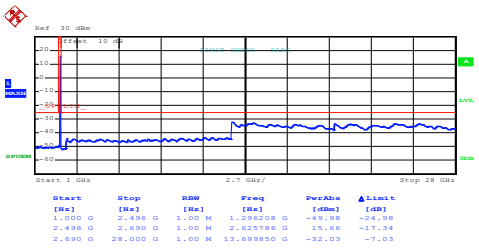
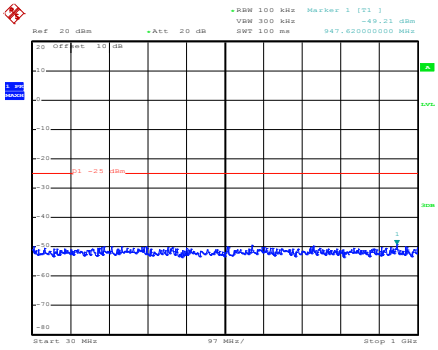
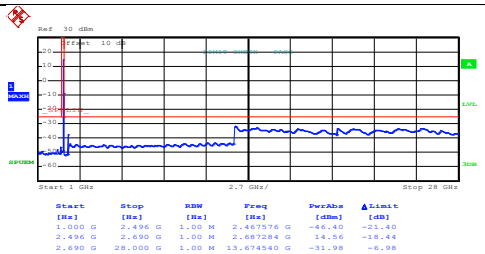
Test Requirement:	Part 22.917(b), Part 27.53(m)
Test Method:	ANSI/TIA-603-D 2010
Limit:	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.
Test Setup:	
Test Procedure:	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
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.

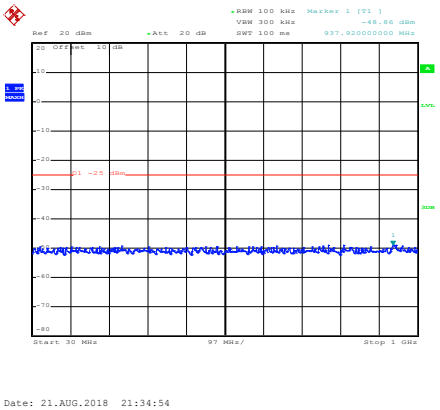
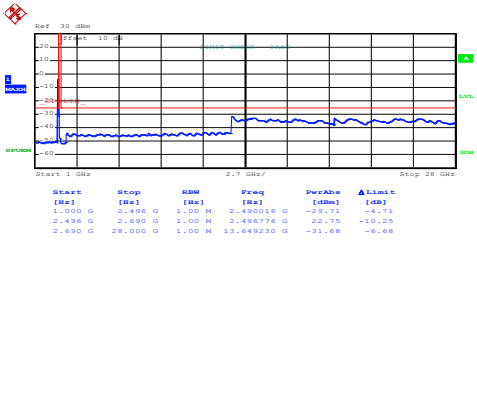
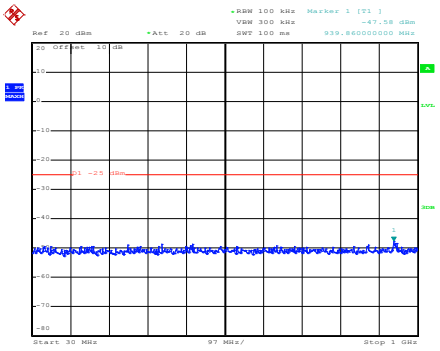
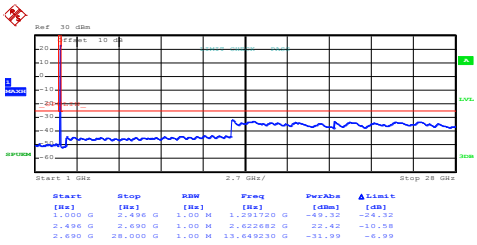
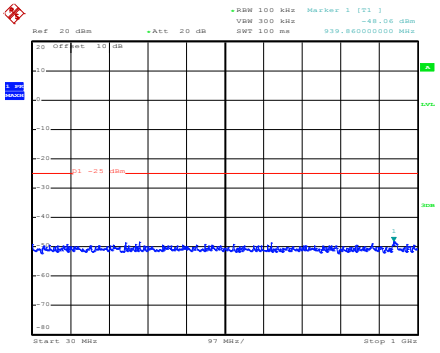
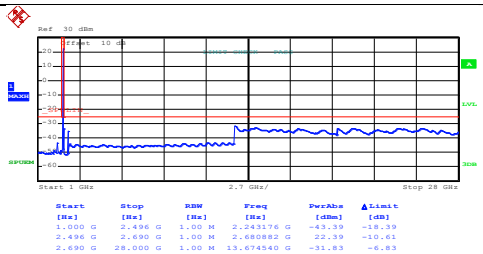
Test plots as follows (Conducted spurious emission) (worst case):

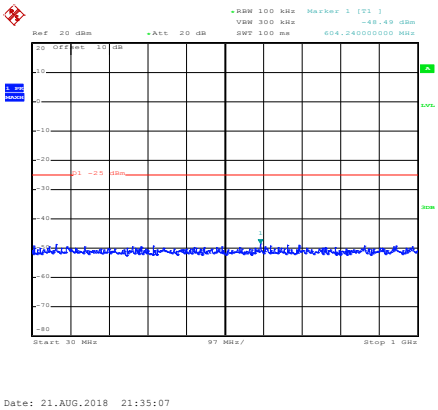
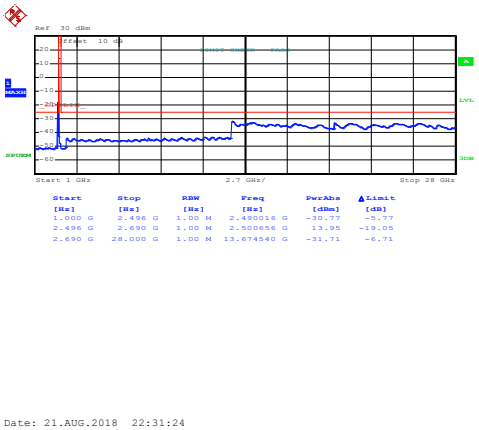
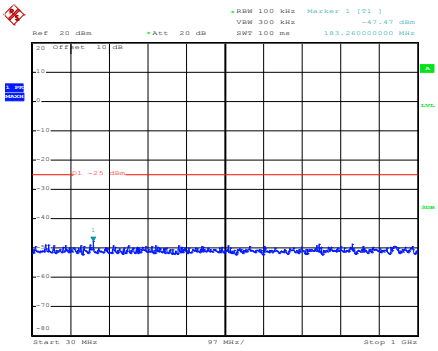
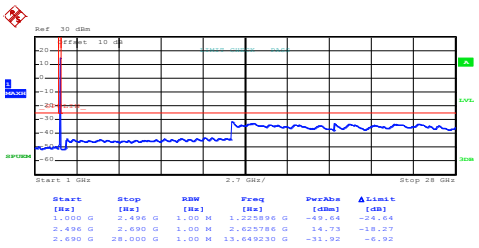
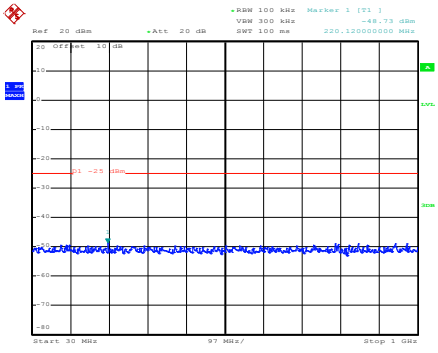
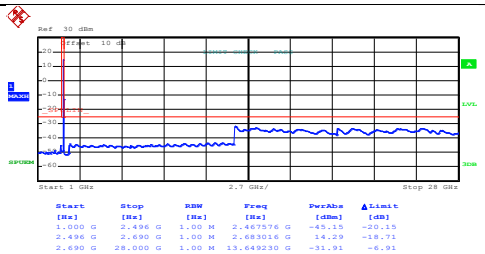
LTE Band 41: 16 QAM & Size 1	
BW: 5MHz	
Lowest channel	
	
Date: 21.AUG.2018 21:32:17	Date: 21.AUG.2018 22:40:03
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
Date: 21.AUG.2018 21:33:06	Date: 21.AUG.2018 22:37:25
30MHz~1GHz	1GHz~27GHz
High channel	
	
Date: 21.AUG.2018 21:33:21	Date: 21.AUG.2018 22:35:54
30MHz~1GHz	1GHz~27GHz

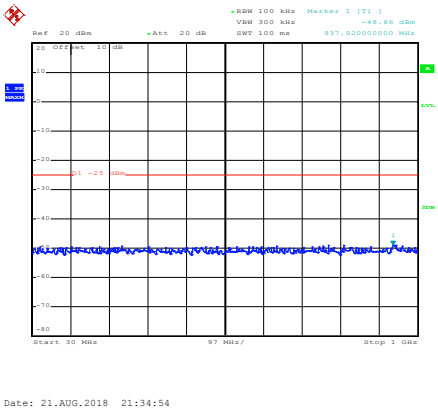
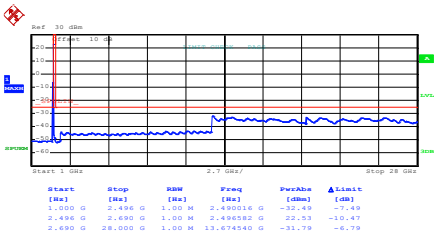
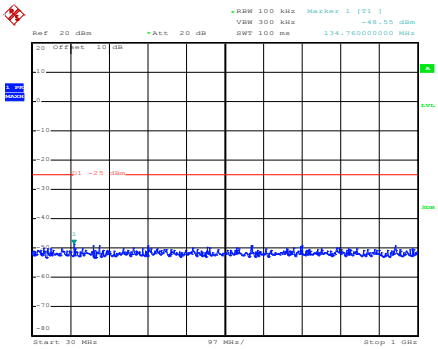
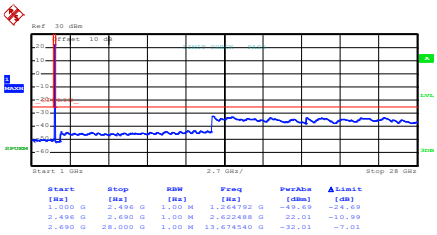
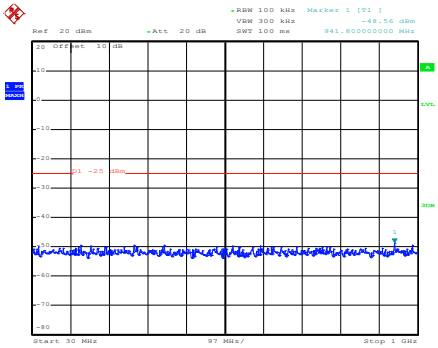
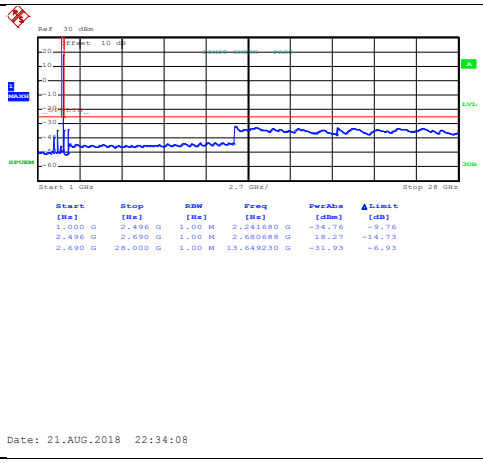
LTE Band 41: 16 QAM & Size 25	
BW:5MHz	
Lowest channel	
	
Date: 21.AUG.2018 21:32:33	Date: 21.AUG.2018 22:37:25
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
Date: 21.AUG.2018 21:32:50	Date: 21.AUG.2018 22:37:59
30MHz~1GHz	1GHz~27GHz
High channel	
	
Date: 21.AUG.2018 21:33:36	Date: 21.AUG.2018 22:36:30
30MHz~1GHz	1GHz~27GHz

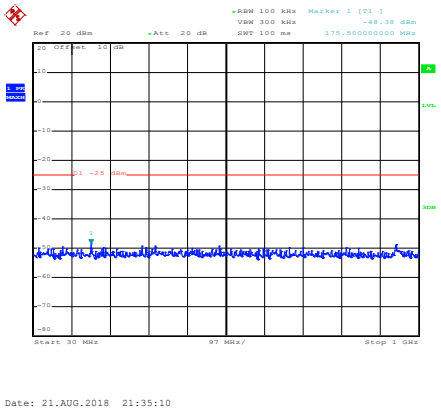
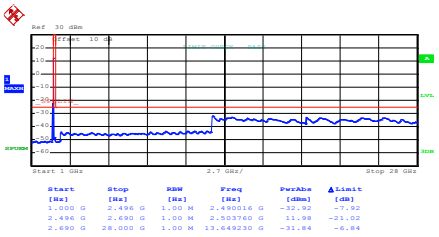
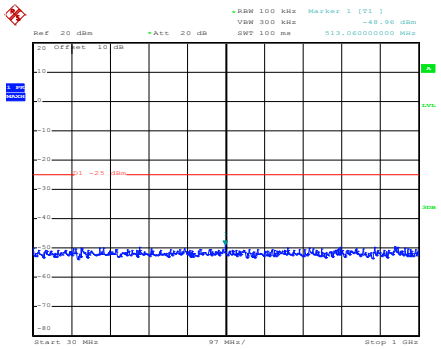
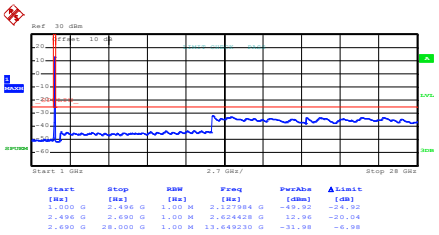
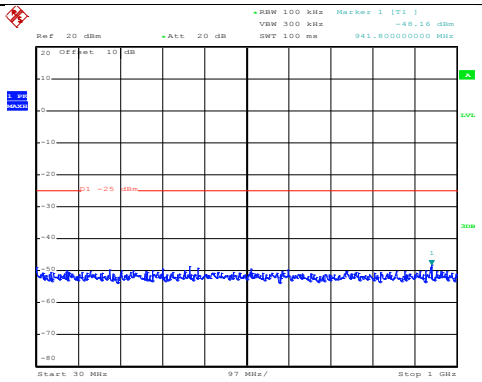
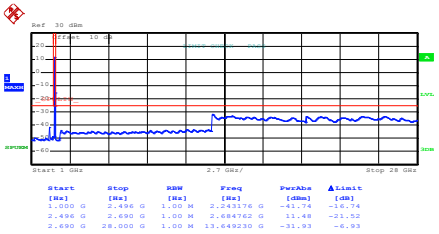
LTE Band 41: QPSK & Size 1	
BW: 5MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

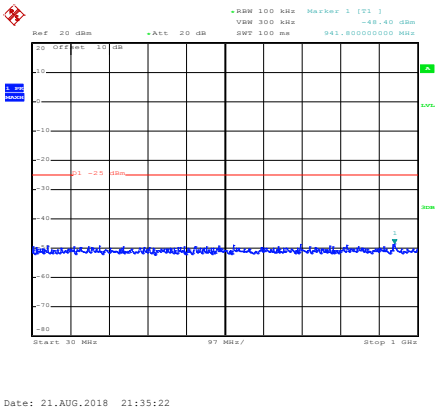
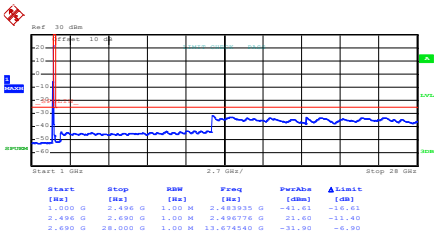
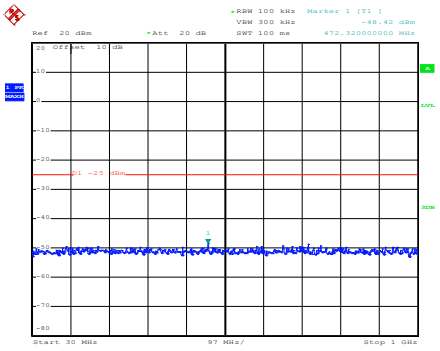
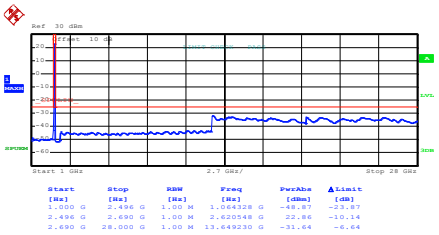
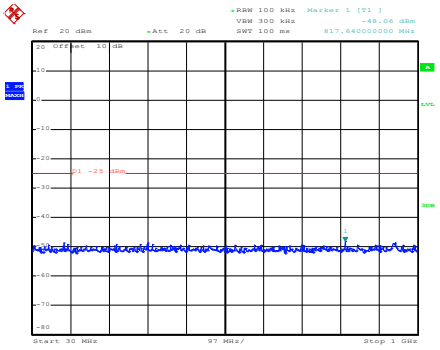
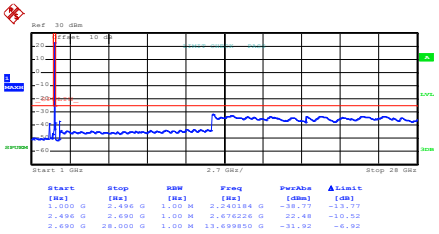
LTE Band 41: QPSK & Size 25	
BW: 5MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

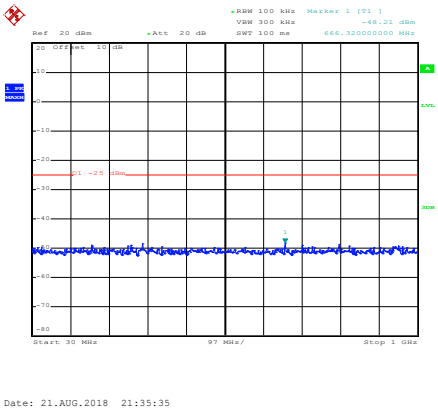
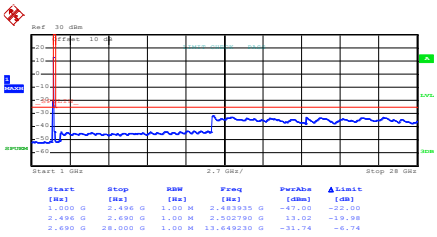
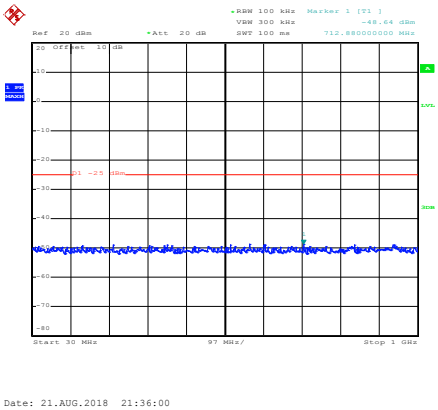
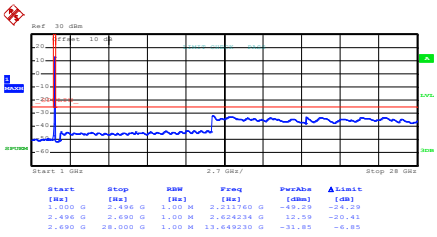
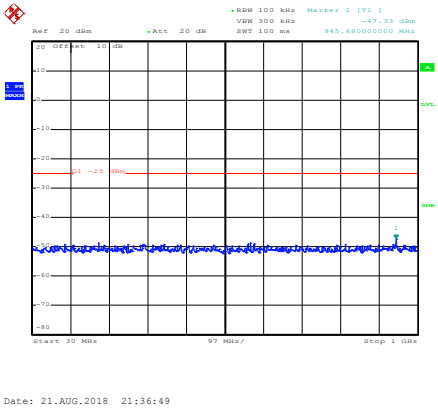
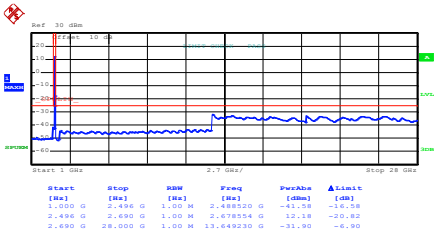
LTE Band 41: 16 QAM & Size 1	
BW: 10MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

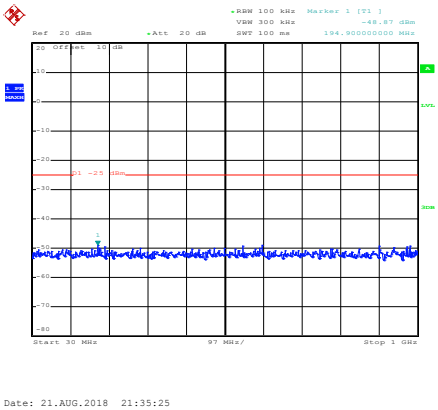
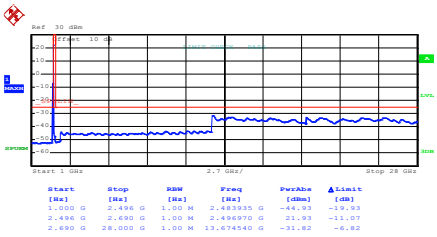
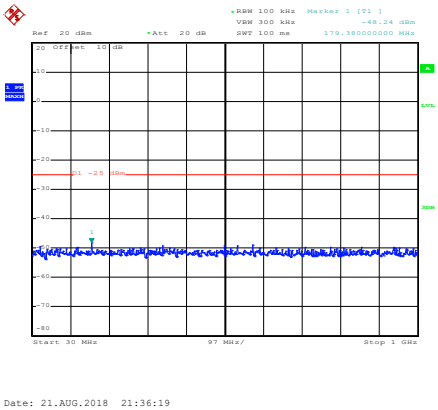
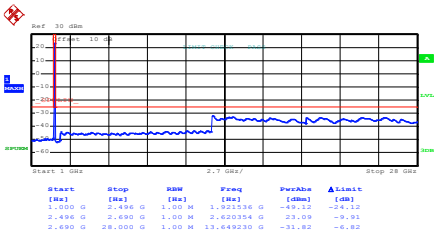
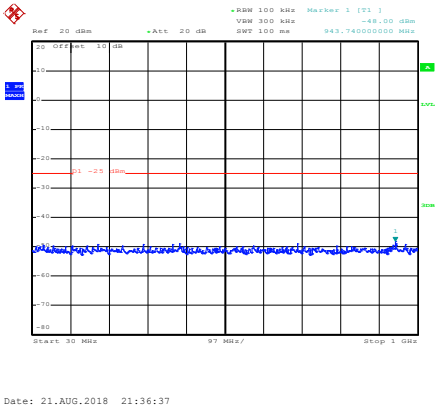
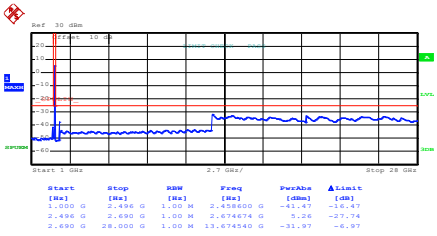
LTE Band 41: 16 QAM & Size 50	
BW: 10MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

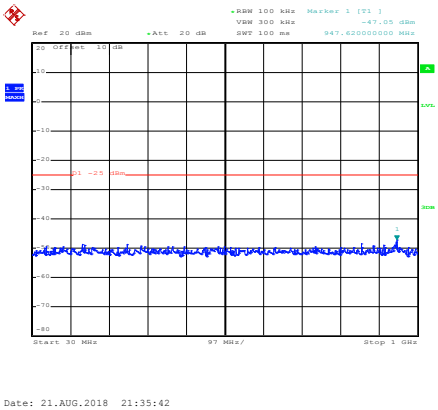
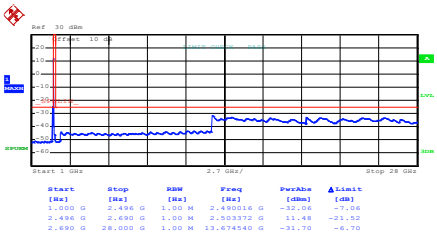
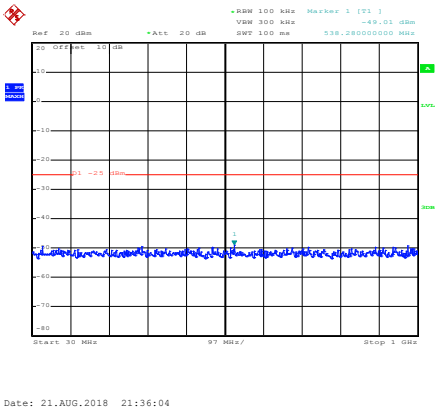
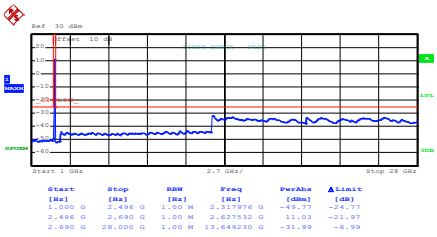
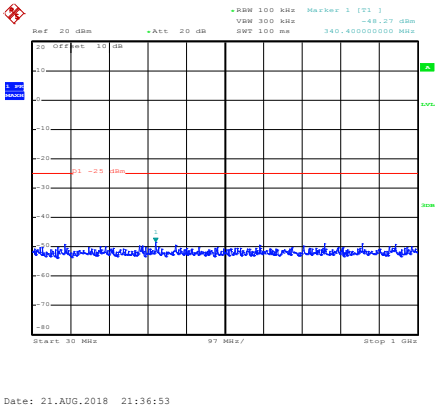
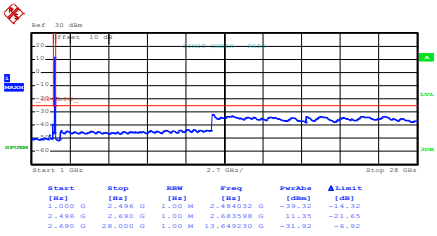
LTE Band 41: QPSK & RB Size 1	
BW: 10MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

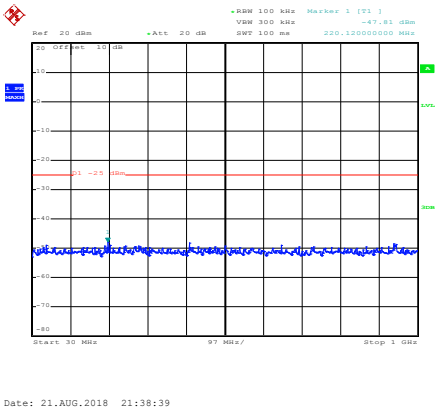
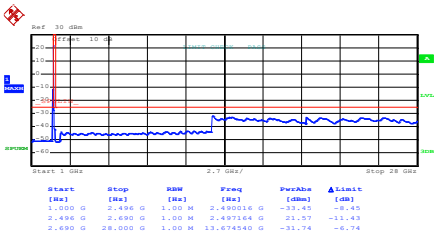
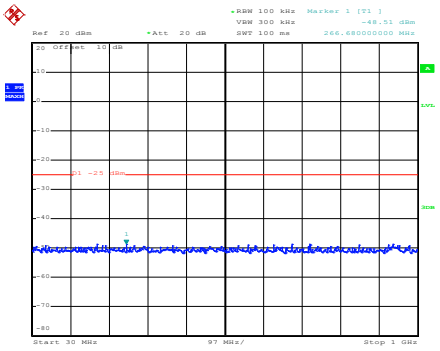
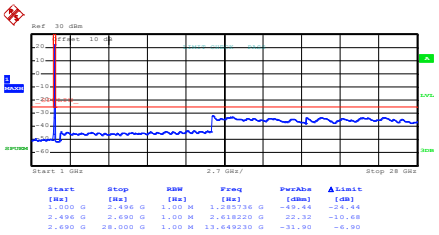
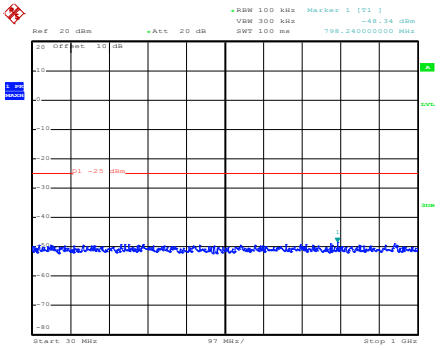
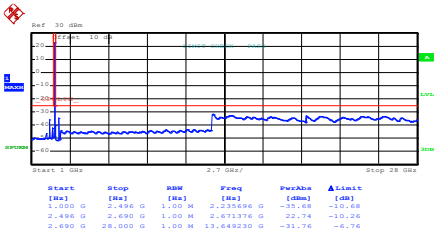
LTE Band 41: QPSK & RB Size 50	
BW: 10MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

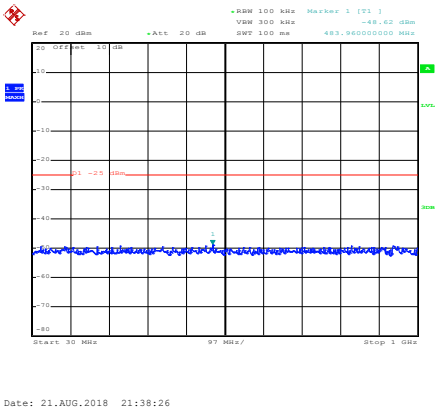
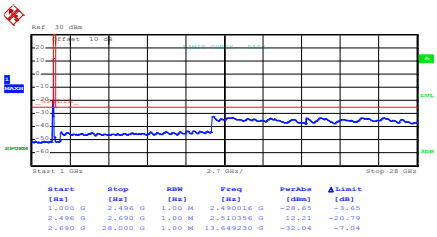
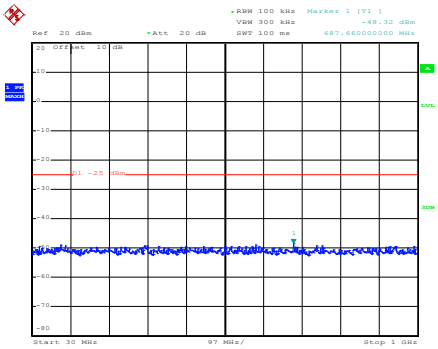
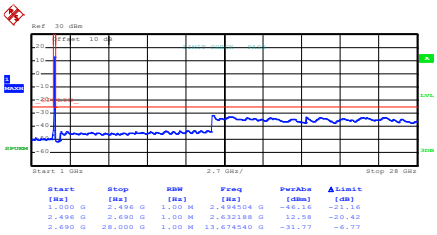
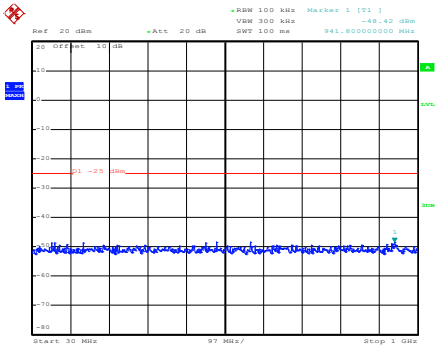
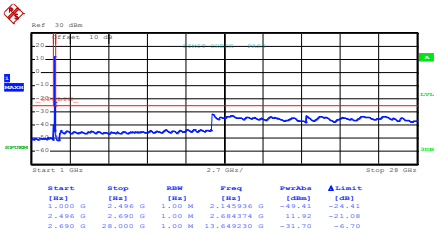
LTE Band 41: 16 QAM & RB Size 1	
BW: 15MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

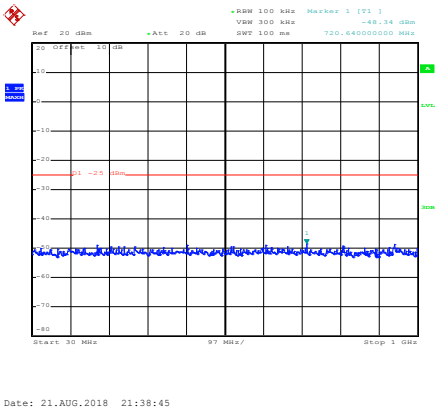
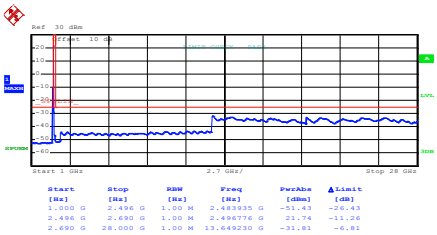
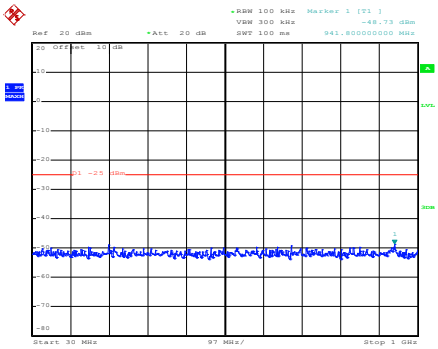
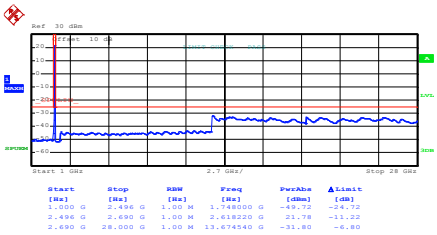
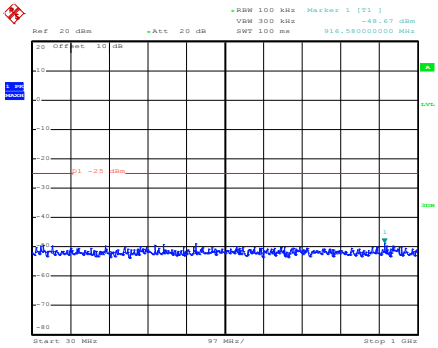
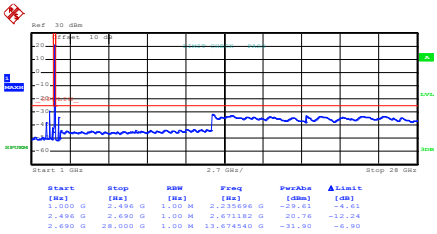
LTE Band41: 16 QAM & RB Size 75	
BW: 15MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

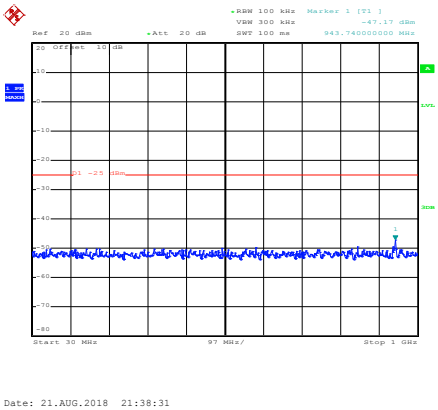
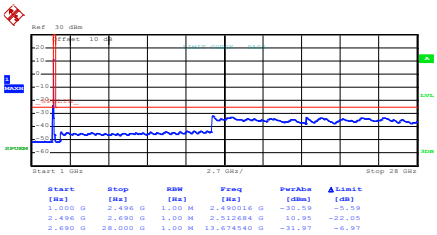
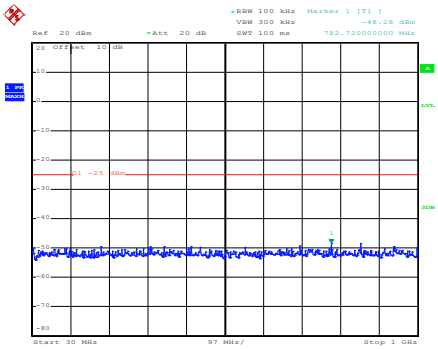
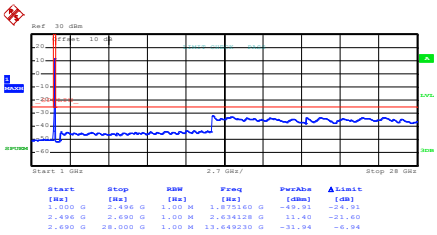
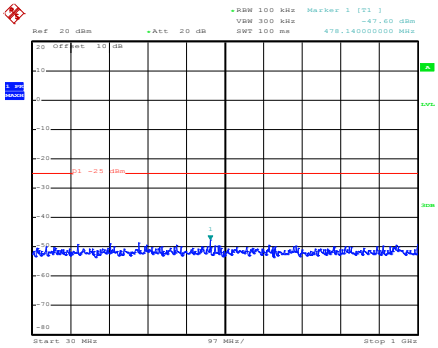
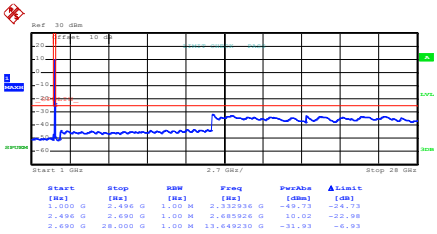
LTE Band 41: QPSK & RB Size 1	
BW: 15MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

LTE Band 41: QPSK & RB Size 75	
BW: 15MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

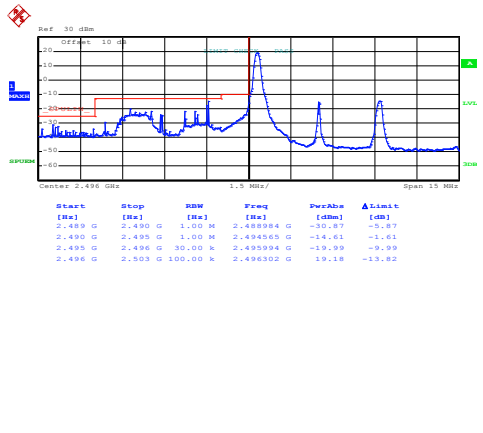
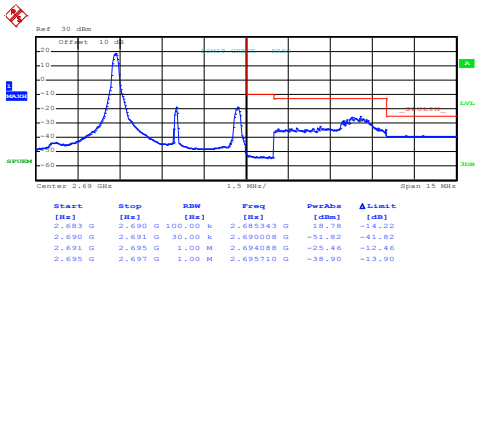
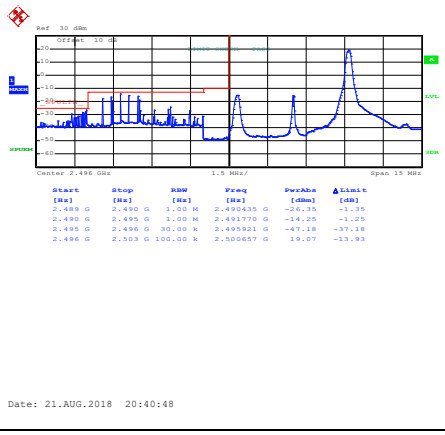
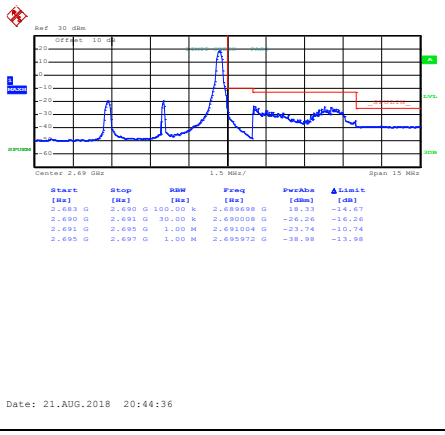
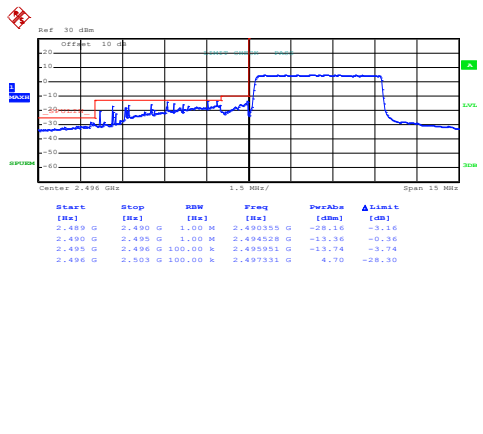
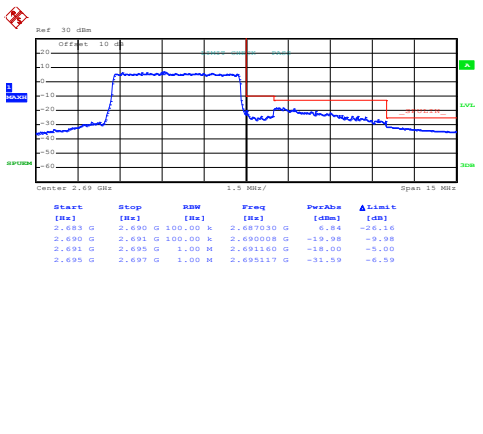
LTE Band 41: 16 QAM & RB Size 1	
BW: 20MHz	
Lowest channel	
	
Date: 21.AUG.2018 21:38:39	Date: 21.AUG.2018 22:11:40
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
Date: 21.AUG.2018 21:37:57	Date: 21.AUG.2018 22:00:59
30MHz~1GHz	1GHz~27GHz
High channel	
	
Date: 21.AUG.2018 21:37:05	Date: 21.AUG.2018 21:59:20
30MHz~1GHz	1GHz~27GHz

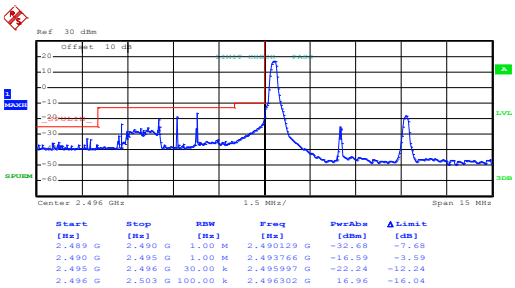
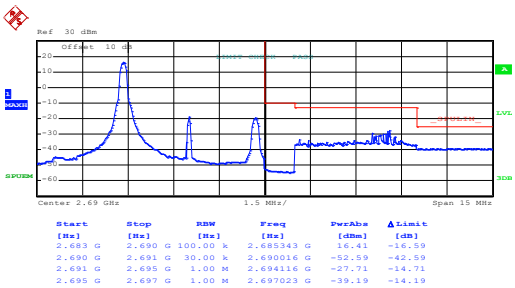
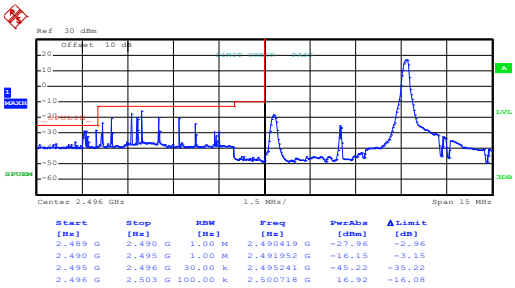
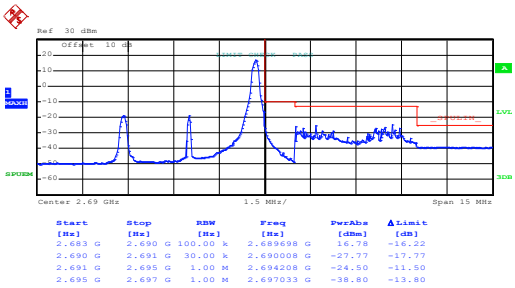
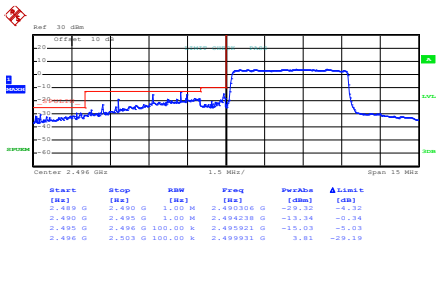
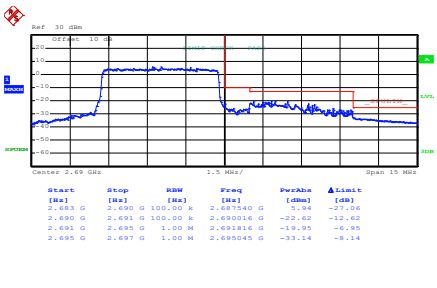
LTE Band 41: 16 QAM & RB Size 100	
BW: 20MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

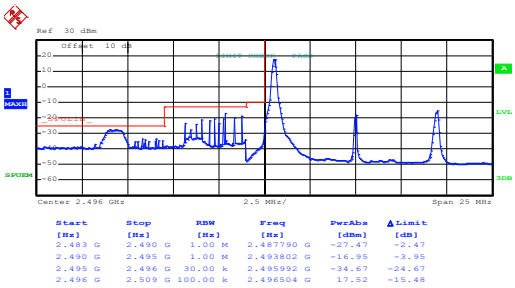
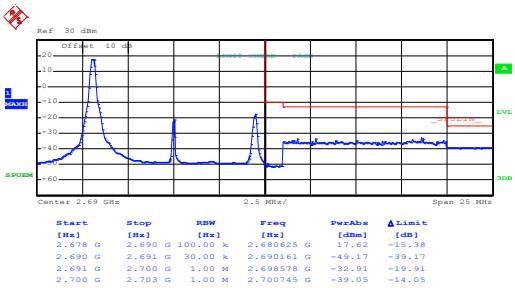
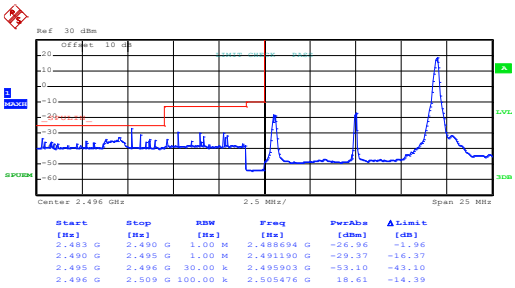
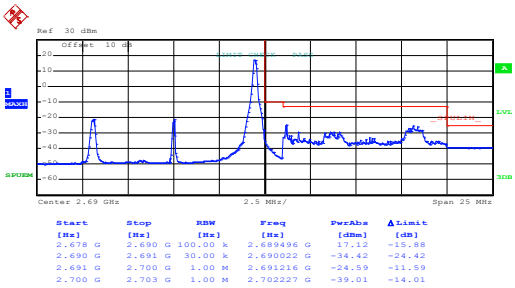
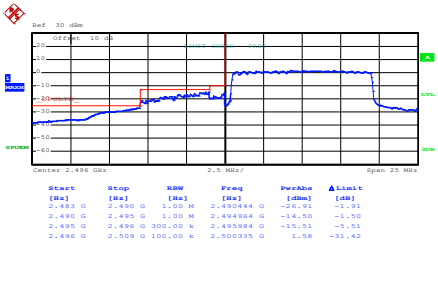
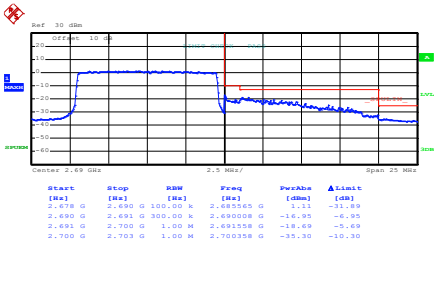
LTE Band 41: QPSK & RB Size 1	
BW: 20MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

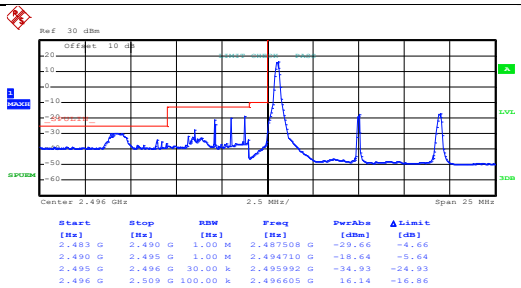
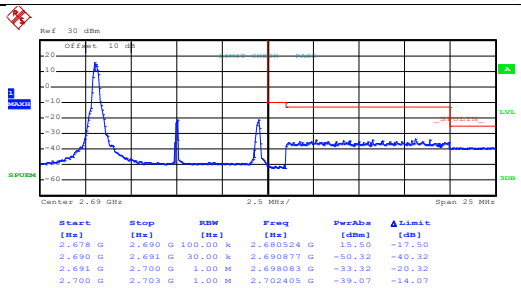
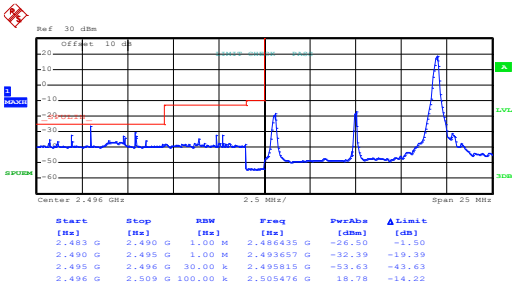
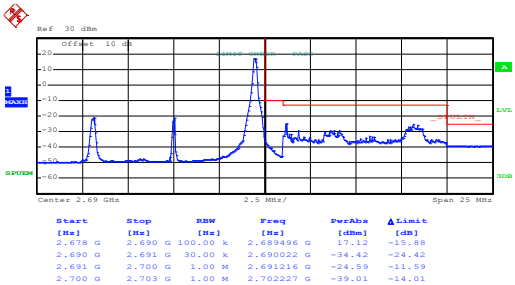
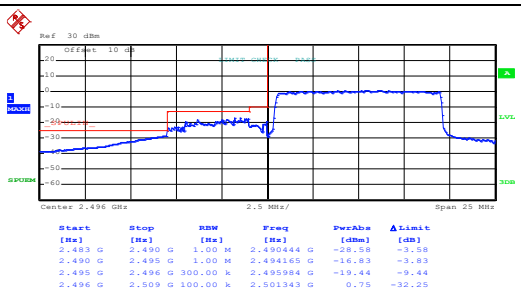
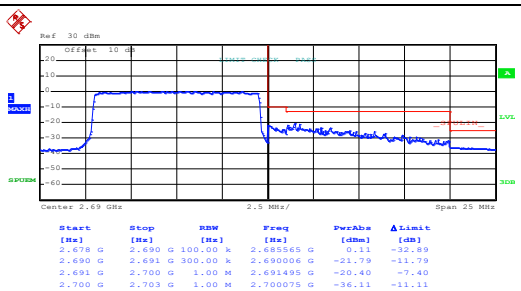
LTE Band 41: QPSK & RB Size 100	
BW: 20MHz	
Lowest channel	
	
30MHz~1GHz	1GHz~27GHz
Middle channel	
	
30MHz~1GHz	1GHz~27GHz
High channel	
	
30MHz~1GHz	1GHz~27GHz

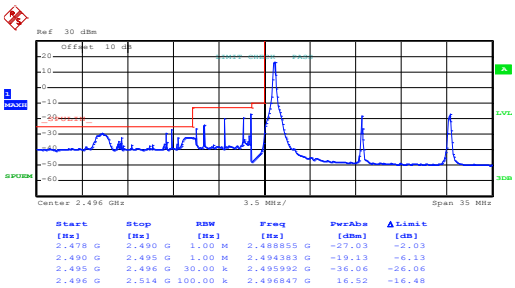
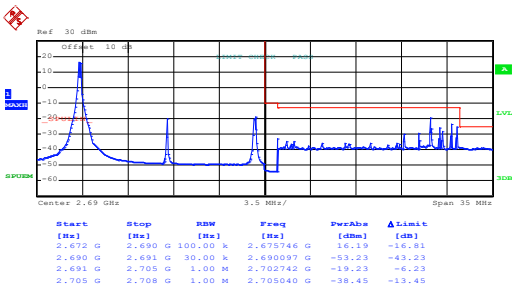
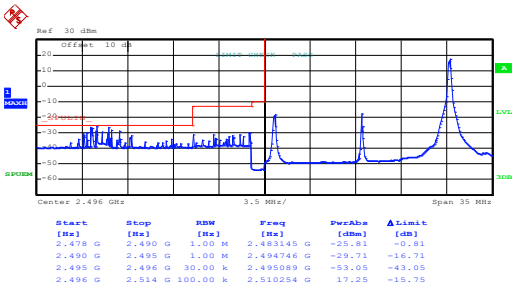
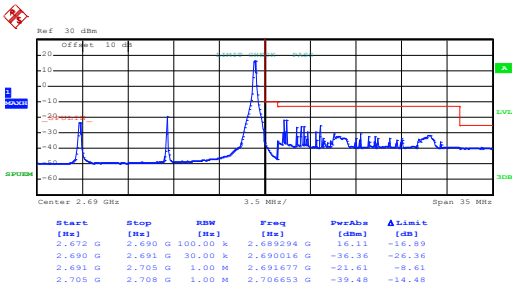
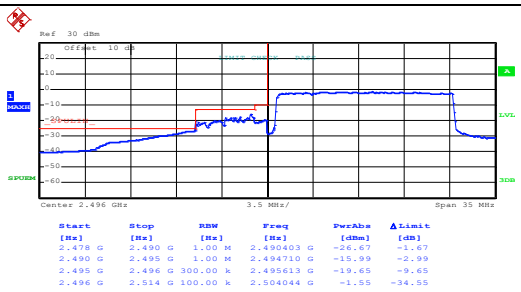
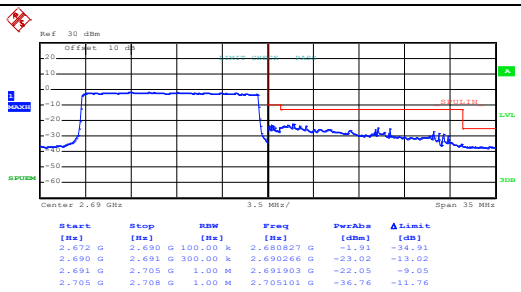
Band edge emission:

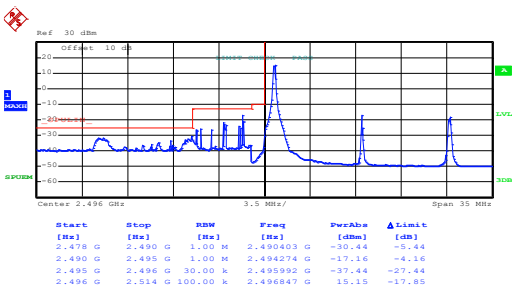
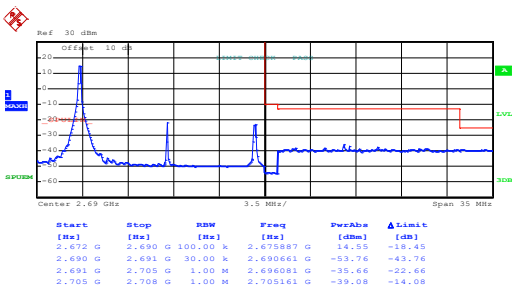
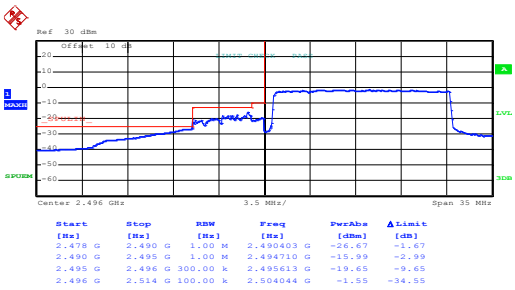
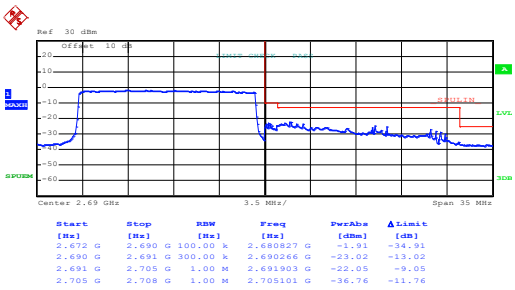
LTE Band 41, BW: 5MHz	
16QAM & RB Size 1	
	
Lowest channel	Highest channel
16QAM & RB Size 24	
	
Lowest channel	Highest channel
16QAM & RB Size 25	
	
Lowest channel	Highest channel

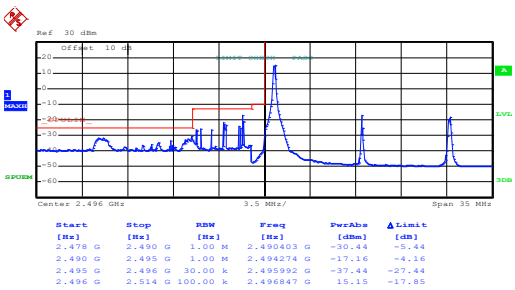
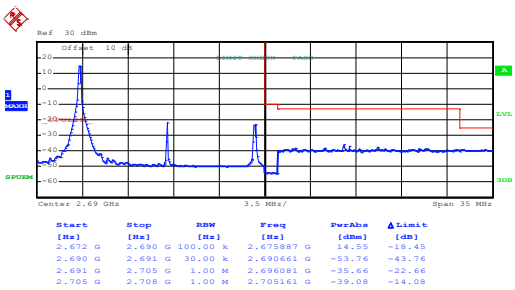
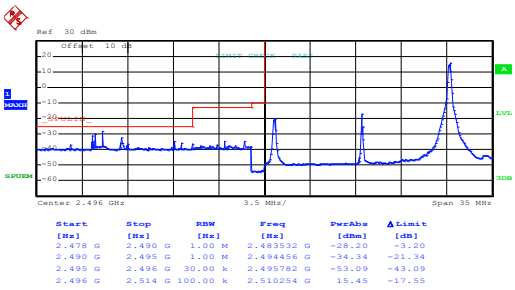
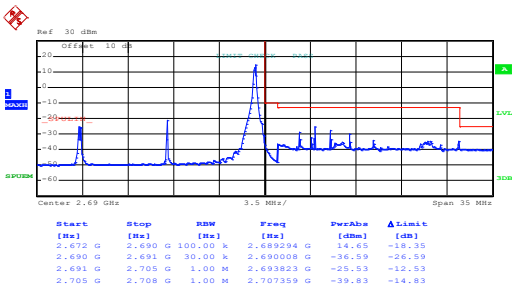
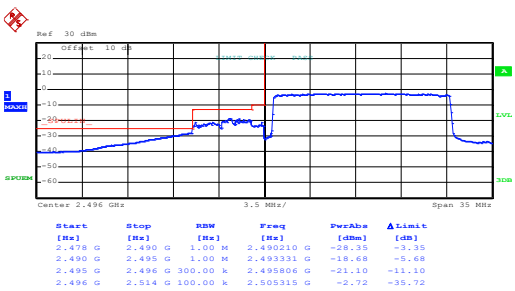
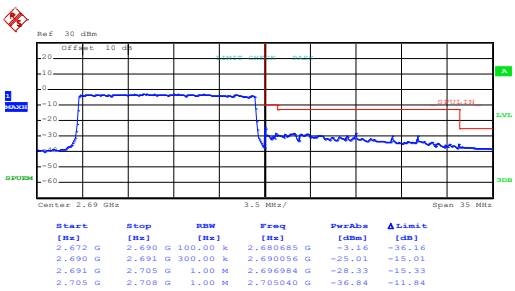
LTE Band 41, BW: 5MHz	
QPSK & RB Size 1	
 Date: 21.AUG.2018 20:37:13	 Date: 21.AUG.2018 20:44:21
Lowest channel	Highest channel
QPSK & RB Size 24	
 Date: 21.AUG.2018 20:41:04	 Date: 21.AUG.2018 20:44:48
Lowest channel	Highest channel
QPSK & RB Size 25	
 Date: 21.AUG.2018 20:42:42	 Date: 21.AUG.2018 20:50:13
Lowest channel	Highest channel

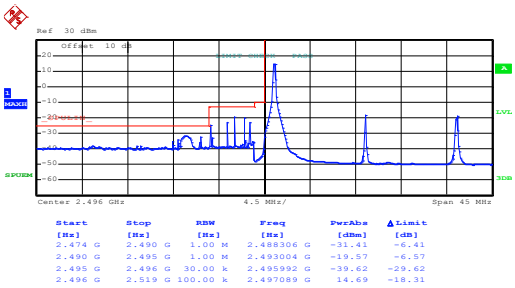
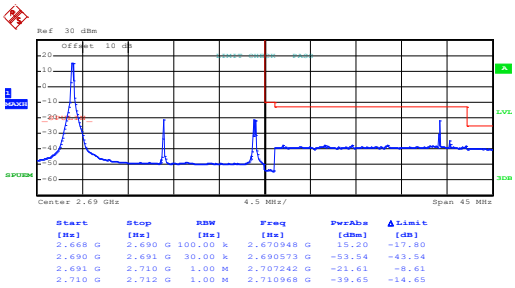
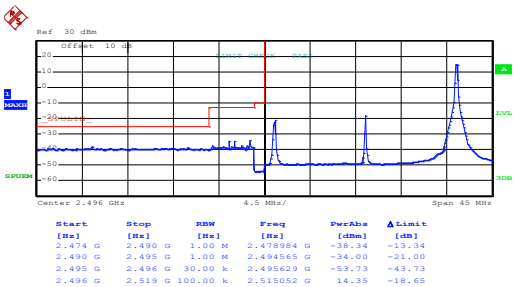
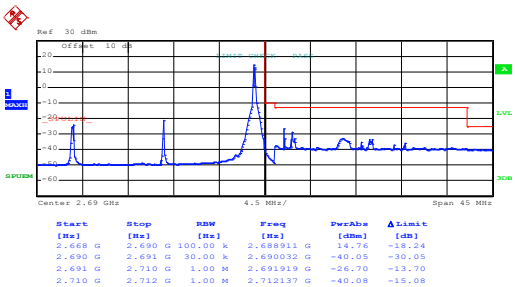
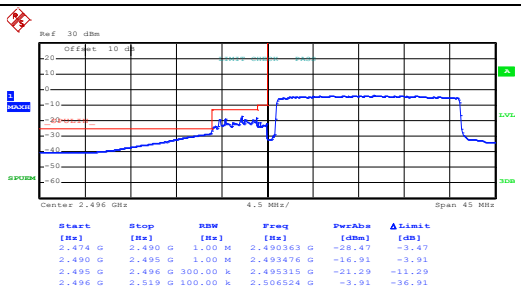
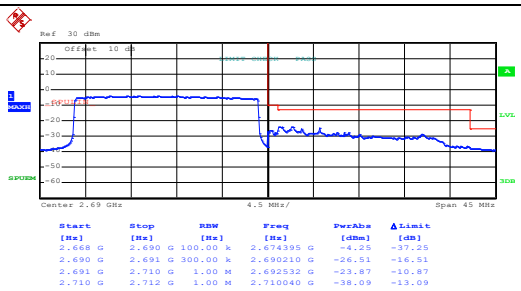
LTE Band 41, BW: 10MHz	
16QAM & RB Size 1	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.483 G / 2.490 G / 1.00 M / 2.487790 G / -27.47 / -2.47 2.490 G / 2.495 G / 1.00 M / 2.493802 G / -16.95 / -3.95 2.495 G / 2.496 G / 30.00 k / 2.495992 G / -34.67 / -24.67 2.496 G / 2.509 G / 100.00 k / 2.496504 G / 17.52 / -15.48 Date: 21.AUG.2018 20:53:53	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.678 G / 2.690 G / 100.00 k / 2.680625 G / 17.62 / -15.38 2.690 G / 2.691 G / 30.00 k / 2.690161 G / -49.17 / -39.17 2.691 G / 2.700 G / 1.00 M / 2.698578 G / -32.91 / -19.91 2.700 G / 2.703 G / 1.00 M / 2.700745 G / -39.05 / -14.05 Date: 21.AUG.2018 21:12:19
Lowest channel	Highest channel
16QAM & RB Size 49	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.483 G / 2.490 G / 1.00 M / 2.488694 G / -26.96 / -1.96 2.490 G / 2.495 G / 1.00 M / 2.491190 G / -29.37 / -16.37 2.495 G / 2.496 G / 30.00 k / 2.495903 G / -53.10 / -43.10 2.496 G / 2.509 G / 100.00 k / 2.505476 G / 18.61 / -14.39 Date: 21.AUG.2018 20:54:11	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.678 G / 2.690 G / 100.00 k / 2.689496 G / 17.12 / -15.88 2.690 G / 2.691 G / 30.00 k / 2.690022 G / -34.42 / -24.42 2.691 G / 2.700 G / 1.00 M / 2.691216 G / -24.59 / -11.59 2.700 G / 2.703 G / 1.00 M / 2.702227 G / -39.01 / -14.01 Date: 21.AUG.2018 21:12:48
Lowest channel	Highest channel
16QAM & RB Size 50	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.483 G / 2.490 G / 1.00 M / 2.490444 G / -26.91 / -1.91 2.490 G / 2.495 G / 1.00 M / 2.494964 G / -14.50 / -1.50 2.495 G / 2.496 G / 300.00 k / 2.495984 G / -15.51 / -5.51 2.496 G / 2.509 G / 100.00 k / 2.500335 G / 1.58 / -31.42 Date: 21.AUG.2018 21:09:47	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.678 G / 2.690 G / 100.00 k / 2.685565 G / 1.11 / -31.89 2.690 G / 2.691 G / 300.00 k / 2.690008 G / -16.95 / -6.95 2.691 G / 2.700 G / 1.00 M / 2.691558 G / -18.69 / -5.69 2.700 G / 2.703 G / 1.00 M / 2.700358 G / -35.30 / -10.30 Date: 21.AUG.2018 21:13:39
Lowest channel	Highest channel

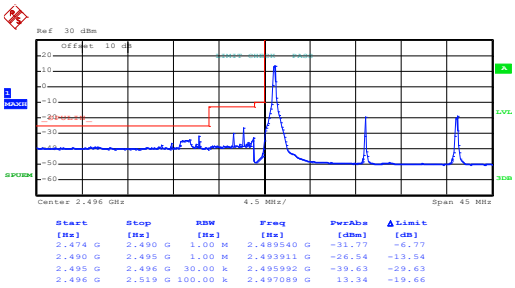
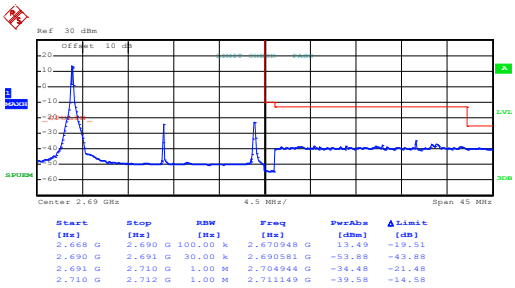
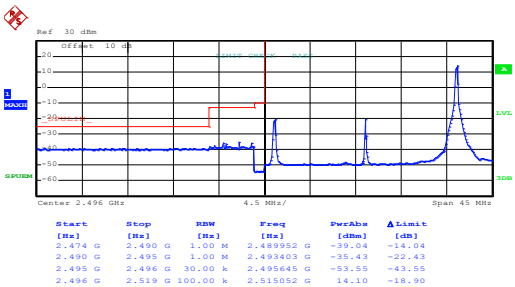
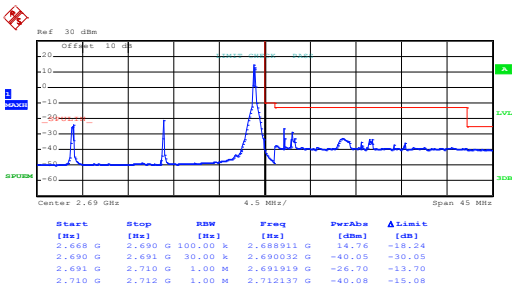
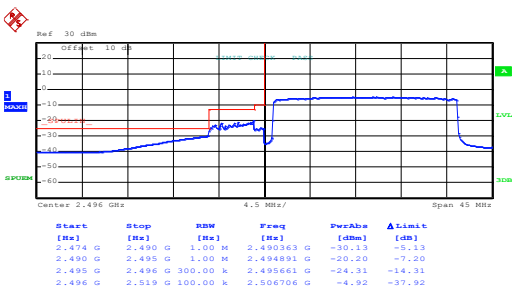
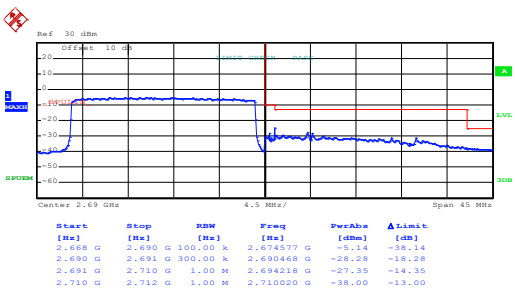
LTE Band 41, BW: 10MHz	
QPSK & RB Size 1	
	
Lowest channel	Highest channel
QPSK & RB Size 49	
	
Lowest channel	Highest channel
QPSK & RB Size 50	
	
Lowest channel	Highest channel

LTE Band 41 BW: 15MHz	
16QAM & RB Size 1	
 Date: 21.AUG.2018 21:15:50	 Date: 21.AUG.2018 21:19:45
Lowest channel	Highest channel
16QAM & RB Size 74	
 Date: 21.AUG.2018 21:16:31	 Date: 21.AUG.2018 21:20:17
Lowest channel	Highest channel
16QAM & RB Size 75	
 Date: 21.AUG.2018 21:17:32	 Date: 21.AUG.2018 21:21:38
Lowest channel	Highest channel

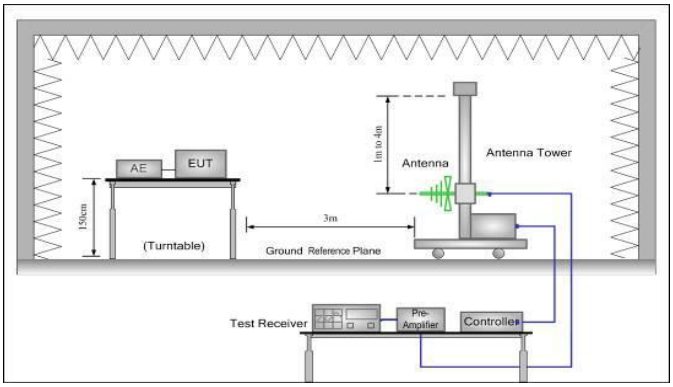
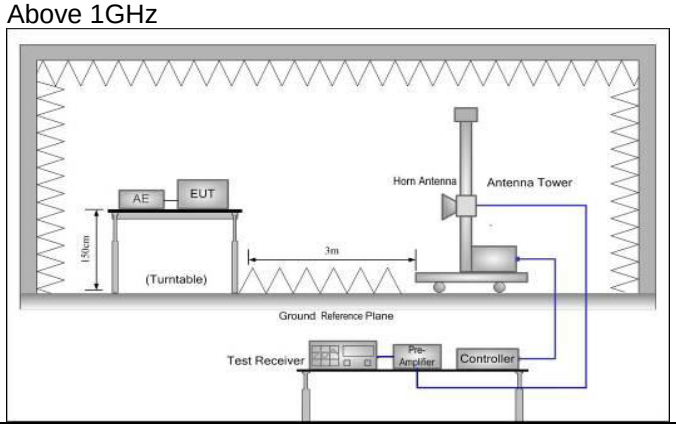
LTE Band 41, BW: 15MHz	
QPSK & RB Size 1	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.478 G / 2.490 G / 1.00 M / 2.490403 G / -30.44 / -5.44 2.490 G / 2.495 G / 1.00 M / 2.494274 G / -17.16 / -4.16 2.495 G / 2.496 G / 30.00 k / 2.495992 G / -37.44 / -27.44 2.496 G / 2.514 G / 100.00 k / 2.496847 G / 15.15 / -17.85 Date: 21.AUG.2018 21:16:08	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.672 G / 2.690 G / 100.00 k / 2.675887 G / 14.55 / -18.45 2.690 G / 2.691 G / 30.00 k / 2.690661 G / -53.76 / -43.76 2.691 G / 2.705 G / 1.00 M / 2.696081 G / -35.66 / -22.66 2.705 G / 2.708 G / 1.00 M / 2.705161 G / -39.08 / -14.08 Date: 21.AUG.2018 21:19:57
Lowest channel	Highest channel
16QAM & RB Size 75	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.478 G / 2.490 G / 1.00 M / 2.490403 G / -26.67 / -1.67 2.490 G / 2.495 G / 1.00 M / 2.494710 G / -15.99 / -2.99 2.495 G / 2.496 G / 300.00 k / 2.495613 G / -19.65 / -9.65 2.496 G / 2.514 G / 100.00 k / 2.504044 G / -1.55 / -34.55 Date: 21.AUG.2018 21:17:32	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.672 G / 2.690 G / 100.00 k / 2.680827 G / -1.91 / -34.91 2.690 G / 2.691 G / 300.00 k / 2.690266 G / -23.02 / -13.02 2.691 G / 2.705 G / 1.00 M / 2.691903 G / -22.05 / -9.05 2.705 G / 2.708 G / 1.00 M / 2.705101 G / -36.76 / -11.76 Date: 21.AUG.2018 21:21:38
Lowest channel	Highest channel

LTE Band 41, BW: 15MHz	
QPSK & RB Size 1	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.478 G / 2.490 G / 1.00 M / 2.490403 G / -30.44 / -5.44 2.490 G / 2.495 G / 1.00 M / 2.494274 G / -17.16 / -4.16 2.495 G / 2.496 G / 30.00 k / 2.495992 G / -37.44 / -27.44 2.496 G / 2.514 G / 100.00 k / 2.496847 G / 15.15 / -17.85 Date: 21.AUG.2018 21:16:08	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.672 G / 2.690 G / 100.00 k / 2.675887 G / 14.55 / -18.45 2.690 G / 2.691 G / 30.00 k / 2.690661 G / -53.76 / -43.76 2.691 G / 2.705 G / 1.00 M / 2.696081 G / -35.66 / -22.66 2.705 G / 2.708 G / 1.00 M / 2.705161 G / -39.08 / -14.08 Date: 21.AUG.2018 21:19:57
Lowest channel	Highest channel
QPSK & RB Size 74	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.478 G / 2.490 G / 1.00 M / 2.483532 G / -28.20 / -3.20 2.490 G / 2.495 G / 1.00 M / 2.494456 G / -34.34 / -21.34 2.495 G / 2.496 G / 30.00 k / 2.495782 G / -53.09 / -43.09 2.496 G / 2.514 G / 100.00 k / 2.510254 G / 15.45 / -17.55 Date: 21.AUG.2018 21:16:43	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.672 G / 2.690 G / 100.00 k / 2.689294 G / 14.65 / -18.35 2.690 G / 2.691 G / 30.00 k / 2.690008 G / -36.59 / -26.59 2.691 G / 2.705 G / 1.00 M / 2.693823 G / -25.53 / -12.53 2.705 G / 2.708 G / 1.00 M / 2.707359 G / -39.83 / -14.83 Date: 21.AUG.2018 21:20:30
Lowest channel	Highest channel
QPSK & RB Size 75	
 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.478 G / 2.490 G / 1.00 M / 2.490210 G / -28.35 / -3.35 2.490 G / 2.495 G / 1.00 M / 2.493331 G / -18.68 / -5.68 2.495 G / 2.496 G / 300.00 k / 2.495806 G / -21.10 / -11.10 2.496 G / 2.514 G / 100.00 k / 2.505315 G / -2.72 / -35.72 Date: 21.AUG.2018 21:17:52	 Start [Hz] / Stop [Hz] / RBW [Hz] / Freq [Hz] / PwrAbs [dBm] / ΔLimit [dB] 2.672 G / 2.690 G / 100.00 k / 2.680685 G / -3.16 / -36.16 2.690 G / 2.691 G / 300.00 k / 2.690056 G / -25.01 / -15.01 2.691 G / 2.705 G / 1.00 M / 2.696984 G / -28.33 / -15.33 2.705 G / 2.708 G / 1.00 M / 2.705040 G / -36.84 / -11.84 Date: 21.AUG.2018 21:21:47
Lowest channel	Highest channel

LTE Band 41 BW: 20MHz	
16QAM & RB Size 1	
	
Lowest channel	Highest channel
16QAM & RB Size 99	
	
Lowest channel	Highest channel
16QAM & RB Size 100	
	
Lowest channel	Highest channel

LTE Band 41, BW: 20MHz	
QPSK & RB Size 1	
	
Lowest channel	Highest channel
16QAM & RB Size 99	
	
Lowest channel	Highest channel
16QAM & RB Size 1010	
	
Lowest channel	Highest channel

6.5 ERP, EIRP Measurement

Test Requirement:	Part 22.913(a)(2),Part 27.50 (h)
Test Method:	ANSI/TIA-603-D 2010
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:	Below 1GHz  Above 1GHz 
Test Procedure:	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: ERP = S.G. output (dBm) + Antenna Gain (dBd) – 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: EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB) 5. The worse case was relating to the conducted output power.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

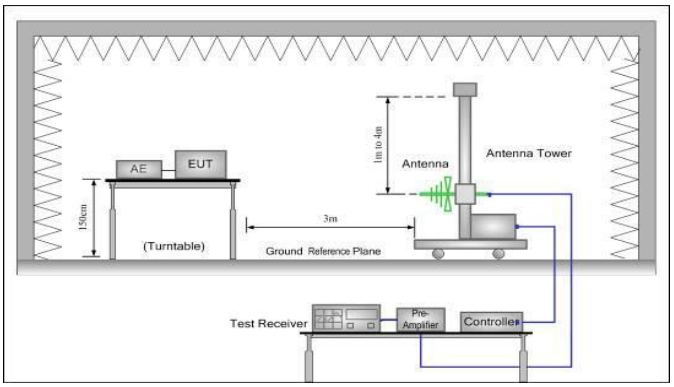
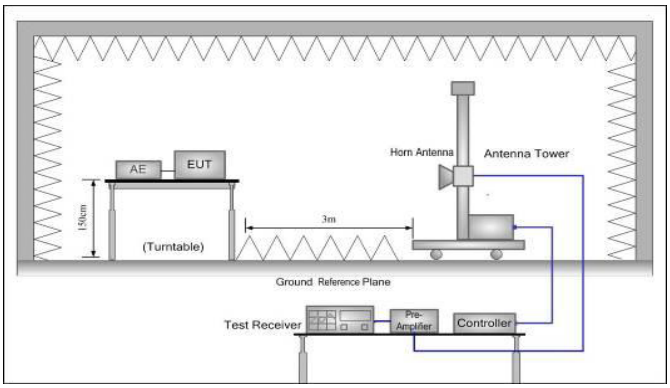
Measurement Data

LTE Band 41							
BW: 5MHz							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
2498.50	39675	QPSK	H	V	20.95	33.00	Pass
				H	18.69		
2498.50	39675	16QAM	H	V	20.93		
				H	18.47		
Middle Channel							
2593.00	40620	QPSK	H	V	21.02	33.00	Pass
				H	18.95		
2593.00	40620	16QAM	H	V	20.96		
				H	18.42		
Highest Channel							
2687.50	41565	QPSK	H	V	20.63	33.00	Pass
				H	18.25		
2687.50	41565	16QAM	H	V	20.11		
				H	18.37		
BW: 10MHz							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
2501.00	39700	QPSK	H	V	20.74	33.00	Pass
				H	18.36		
2501.00	39700	16QAM	H	V	20.49		
				H	18.30		
Middle Channel							
2593.00	40620	QPSK	H	V	20.92	33.00	Pass
				H	18.24		
2593.00	40620	16QAM	H	V	20.69		
				H	18.32		
Highest Channel							
2685.00	41540	QPSK	H	V	20.43	33.00	Pass
				H	18.39		
2685.00	41540	16QAM	H	V	20.32		
				H	18.69		

BW: 15MHz							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
2503.50	39725	QPSK	H	V	20.69	33.00	Pass
				H	18.52		
2503.50	39725	16QAM	H	V	20.62		
				H	18.32		
Middle Channel							
2593.00	40620	QPSK	H	V	20.22	33.00	Pass
				H	18.58		
2593.00	40620	16QAM	H	V	20.01		
				H	18.24		
Highest Channel							
2682.50	41515	QPSK	H	V	20.24	33.00	Pass
				H	18.47		
2682.50	41515	16QAM	H	V	20.43		
				H	18.52		

BW: 20MHz							
Frequency (MHz)	UL Channel	Modulation	EUT Pol.	Antenna Pol.	EIRP(dBm)	Limit (dBm)	Result
Lowest Channel							
2506.00	39750	QPSK	H	V	20.55	33.00	Pass
				H	18.95		
2506.00	39750	16QAM	H	V	20.24		
				H	18.33		
Middle Channel							
2593.00	40620	QPSK	H	V	20.41	33.00	Pass
				H	18.83		
2593.00	40620	16QAM	H	V	20.77		
				H	18.99		
Highest Channel							
2680.00	41490	QPSK	H	V	20.83	33.00	Pass
				H	18.25		
2680.00	41490	16QAM	H	V	20.99		
				H	18.41		

6.6 Field strength of spurious radiation measurement

Test Requirement:	Part 22.917(b), Part 27.53(m)
Test Method:	ANSI/TIA-603-D 2010
Limit:	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.
Test setup:	Below 1GHz  Above 1GHz 
Test Procedure:	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 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. 3. 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. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)
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 41, WB: 5MHz				
RB size 1 & RB offset 0 for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
4997.00	Vertical	-41.96	-25.00	Pass
7495.50	V	-34.42		
9994.00	V	-31.03		
4997.00	Horizontal	-42.71		
7495.50	H	-34.91		
9994.00	H	-32.62		
Middle Channel				
5186.00	Vertical	-41.55	-25.00	Pass
7779.00	V	-34.53		
10372.00	V	-33.03		
5186.00	Horizontal	-41.68		
7779.00	H	-34.64		
10372.00	H	-32.75		
Highest Channel				
5375.00	Vertical	-40.72	-25.00	Pass
8062.50	V	-33.57		
10750.00	V	-31.64		
5375.00	Horizontal	-40.16		
8062.50	H	-34.33		
10750.00	H	-30.24		

Note:
1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.
2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

LTE Band 41, WB: 10MHz				
RB size 1 & RB offset 0 for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
5002.00	Vertical	-41.83	-25.00	Pass
7503.00	V	-34.81		
10004.00	V	-31.45		
5002.00	Horizontal	-42.31		
7503.00	H	-34.51		
10004.00	H	-32.54		
Middle Channel				
5186.00	Vertical	-41.46	-25.00	Pass
7779.00	V	-34.16		
10372.00	V	-33.76		
5186.00	Horizontal	-41.83		
7779.00	H	-34.52		
10372.00	H	-32.75		
Highest Channel				
5370.00	Vertical	-40.71	-25.00	Pass
8055.00	V	-33.33		
10740.00	V	-31.24		
5370.00	Horizontal	-40.49		
8055.00	H	-34.93		
10740.00	H	-30.25		

Note:

1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.

2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

LTE Band 41, WB: 15MHz				
RB size 1 & RB offset 0 for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
5007.00	Vertical	-41.53	-25.00	Pass
7510.50	V	-34.50		
10014.00	V	-31.55		
5007.00	Horizontal	-42.12		
7510.50	H	-34.24		
10014.00	H	-32.45		
Middle Channel				
5186.00	Vertical	-41.77	-25.00	Pass
7779.00	V	-34.46		
10372.00	V	-33.51		
5186.00	Horizontal	-41.75		
7779.00	H	-34.75		
10372.00	H	-32.41		
Highest Channel				
5365.00	Vertical	-40.83	-25.00	Pass
8047.50	V	-34.00		
10730.00	V	-31.66		
5365.00	Horizontal	-40.95		
8047.50	H	-34.17		
10730.00	H	-30.42		

Note:

1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.

2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

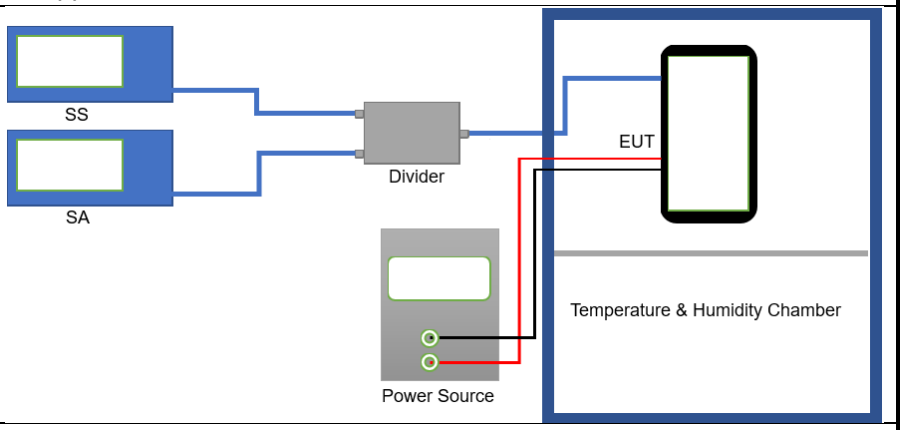
LTE Band 41, WB: 20MHz				
RB size 1 & RB offset 0 for QPSK				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
5012.00	Vertical	-41.53	-25.00	Pass
7518.00	V	-34.80		
10024.00	V	-31.10		
5012.00	Horizontal	-42.37		
7518.00	H	-34.08		
10024.00	H	-32.07		
Middle Channel				
5186.00	Vertical	-41.79	-25.00	Pass
7779.00	V	-34.83		
10372.00	V	-33.75		
5186.00	Horizontal	-41.95		
7779.00	H	-34.39		
10372.00	H	-32.50		
Highest Channel				
5360.00	Vertical	-40.54	-25.00	Pass
8040.00	V	-33.55		
10720.00	V	-31.81		
5360.00	Horizontal	-40.08		
8040.00	H	-34.14		
10720.00	H	-30.52		

Note:

1. The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.

2. For above 1 GHz, all test modes were performed, and just the worst case shown in the report.

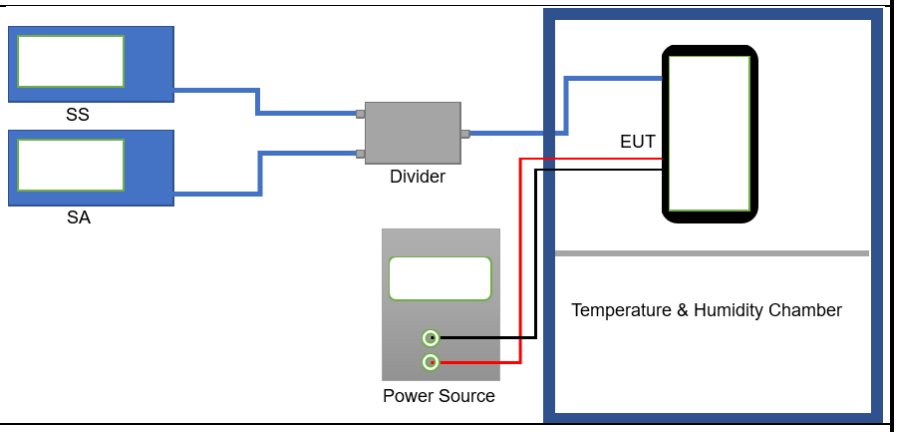
6.7 Frequency stability V.S. Temperature measurement

Test Requirement:	Part 27.54, Part 2.1055(a)(1)(b)
Test Method:	ANSI/TIA-603-D 2010
Limit:	±2.5ppm
Test setup:	
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25℃ operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached
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):

Reference Frequency: LTE Band 41 (10MHz) Middle channel=40620 channel=2593.00MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.70	-30	199	0.105851	±2.5	Pass
	-20	156	0.082979		
	-10	164	0.087234		
	0	124	0.065957		
	10	189	0.100532		
	20	175	0.093085		
	30	115	0.061170		
	40	106	0.056383		
	50	151	0.080319		
16QAM					
3.70	-30	124	0.065957	±2.5	Pass
	-20	151	0.080319		
	-10	167	0.088830		
	0	123	0.065426		
	10	145	0.077128		
	20	141	0.075000		
	30	157	0.083511		
	40	134	0.071277		
	50	139	0.073936		
Note: Only the worst case shown in the report.					

6.8 Frequency stability V.S. Voltage measurement

Test Requirement:	Part 27.54, Part 2.1055(d)(2)
Test Method:	ANSI/TIA-603-D 2010
Limit:	±2.5ppm
Test setup:	
Test procedure:	1. Set chamber temperature to 25℃. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specify extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
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 41 part:

Reference Frequency: LTE Band 41(10MHz) Middle channel=40620 channel=2593.00MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	4.25	99	0.052660	±2.5	Pass
	3.70	66	0.035106		
	3.50	75	0.039894		
16QAM					
25	4.25	81	0.043085	±2.5	Pass
	3.70	97	0.051596		
	3.50	49	0.026064		
Note: Only the worst case shown in the report.					