FCC REPORT
(LTE)

Applicant:	COPPERNIC
Address of Applicant:	185 avenue Archimede, 13857 Aix en Provence, FRANCE
Equipment Under Test (EUT)	
Product Name:	C-One e-ID, RAPID3
Model No.:	C-One e-ID
Trade mark:	COPPERNIC, IDEMIA
FCC ID:	XGK-C-ONE-EID-ELY
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 22 Subpart H FCC CFR Title 47 Part 27 Subpart M
Date of sample receipt:	11 Nov., 2019
Date of Test:	12 Nov., to 30 Dec., 2019
Date of report issued:	31 Dec., 2019
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	*31 Dec., 2019*	*Original*

Tested by: Mike.ou ***Date:*** *31 Dec., 2019*

Test Engineer

Reviewed by: Winner zhang ***Date:*** *31 Dec., 2019*

Project Engineer

3. Contents

Page

1. COVER PAGE **1**

2. VERSION **2**

3. CONTENTS **3**

4. TEST SUMMARY **4**

5. GENERAL INFORMATION **5**

5.1 CLIENT INFORMATION 5
5.2 GENERAL DESCRIPTION OF E.U.T 5
5.3 TEST ENVIRONMENT AND MODE 8
5.4 DESCRIPTION OF SUPPORT UNITS 8
5.5 MEASUREMENT UNCERTAINTY 8
5.6 RELATED SUBMITTAL(S) / GRANT (S) 8
5.7 ADDITIONS TO, DEVIATIONS, OR EXCLUSIONS FROM THE METHOD 8
5.8 LABORATORY FACILITY 8
5.9 LABORATORY LOCATION 9
5.10 TEST INSTRUMENTS LIST 9

6. TEST RESULTS **10**

6.1 CONDUCTED OUTPUT POWER, ERP AND EIRP 10
6.2 PEAK-TO-AVERAGE RATIO 15
6.3 OCCUPY BANDWIDTH 18
6.4 OUT OF BAND EMISSION AT ANTENNA TERMINALS 37
6.5 FIELD STRENGTH OF SPURIOUS RADIATION MEASUREMENT 54
6.6 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT 59
6.7 FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT 62

7 TEST SETUP PHOTO **64**

8 EUT CONSTRUCTIONAL DETAILS **65**

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 22.913 (a)(5) 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 22.917(b) Part 27.53(m)	Pass
Out of band emission at antenna terminals	Part 2.1053 Part 22.917(a) Part 27.53(m)	Pass
Field strength of spurious radiation	Part 22.917(a) Part 27.53(m)	Pass
Frequency stability vs. temperature	Part 22.355 Part 27.54 Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 22.355 Part 27.54 Part 2.1055(d)(2)	Pass

Remark:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI/TIA-603-E-2016* *ANSI C63.26-2015*

5. General Information

5.1 Client Information

Applicant:	COPPERNIC
Address:	185 avenue Archimede, 13857 Aix en Provence, FRANCE
Manufacturer:	ASKEY COMPUTER Corp.
Address:	10 F, N°119, JIANKANG RD., ZHONGHE DIST., New Tapei City, TAIWAN

5.2 General Description of E.U.T.

Product Name:	C-One e-ID, RAPID3
Model No.:	C-One e-ID
Operation Frequency range:	LTE Band 5: 824MHz-849MHz, RX: 869MHz-894MHz LTE Band 7: TX: 2500MHz-2570MHz, RX: 2620MHz-2690MHz
Modulation type:	QPSK, 16QAM
Antenna type:	Internal Antenna
Antenna gain:	LTE Band 5: -5.07dBi LTE Band 7: 2.32dBi
Power supply:	Rechargeable Li-ion Battery DC3.7V/3300mAh
AC adapter:	Model No.: SYS1561-1105-1 Input: AC100-240V, 50/60Hz 1.0 A Output: DC 5.35V, 2.0A
Test Sample Condition:	The applicant provided engineering samples for staying in continuously transmitting for testing.
Remark:	Product Name: C-One e-ID, RAPID3 were identical inside, the electrical circuit design, layout, components used and internal wiring. They only differences were Trade mark: C-One e-ID (for trade mark COPPERNIC) RAPID3 (for trade mark IDEMIA)

Operation Frequency List:

LTE Band 5 (1.4MHz)		LTE Band 5 (3MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20407	824.70	20415	825.50
20408	824.80	20416	825.60
….	….	….	….
20524	836.40	20524	836.40
20525	836.50	20525	836.50
20526	836.60	20526	836.60
…	…	…	…
20642	848.20	20634	847.40
20643	848.30	20635	847.50
LTE Band 5 (5MHz)		LTE Band 5 (10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20425	826.50	20450	829.00
20426	826.60	20451	829.10
….	….	….	….
20524	836.40	20524	836.40
20525	836.50	20525	836.50
20526	836.60	20526	836.60
…	…	…	…
20624	846.40	20599	839.90
20625	846.50	20600	844.00

LTE Band 7 (5MHz)		LTE Band 7 (10MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20775	2502.50	20800	2505.00
20776	2502.60	20801	2502.10
….	….	….	….
21099	2534.90	21099	2534.90
21100	2535.00	21100	2535.00
21101	2535.20	21101	2535.20
…	…	…	…
21424	2567.40	21399	2564.90
21425	2567.50	21400	2565.00
LTE Band 7 (15MHz)		LTE Band 7 (20MHz)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
20825	2507.50	20850	2510.00
20826	2507.60	20851	2510.10
….	….	….	….
21099	2534.90	21099	2534.90
21100	2535.00	21100	2535.00
21101	2535.20	21101	2535.20
…	…	…	…
21374	2562.40	21349	2559.90
21375	2562.50	21350	2560.00

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 5 (1.4MHz)			LTE Band 5 (3MHz)		
Channel:		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20407	824.70	Lowest channel	20415	825.50
Middle channel	20525	836.50	Middle channel	20525	836.50
Highest channel	20643	848.30	Highest channel	20635	847.50
LTE Band 5 (5MHz)			LTE Band 5 (10MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20425	826.50	Lowest channel	20450	829.00
Middle channel	20525	836.50	Middle channel	20525	836.50
Highest channel	20625	846.50	Highest channel	20600	844.00

LTE Band 7 (5MHz)			LTE Band 7 (10MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20775	2502.50	Lowest channel	20800	2505.00
Middle channel	21100	2535.00	Middle channel	21100	2535.00
Highest channel	21425	2567.50	Highest channel	21400	2565.00
LTE Band 7 (15MHz)			LTE Band 7 (20MHz)		
Channel		Frequency (MHz)	Channel		Frequency (MHz)
Lowest channel	20825	2507.50	Lowest channel	20850	2510.00
Middle channel	21100	2535.00	Middle channel	21100	2535.00
Highest channel	21375	2562.50	Highest channel	21350	2560.00

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 4.2Vdc
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)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.38 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.36 dB (k=2)

5.6 Related Submittal(s) / Grant (s)

This is an original grant, no related submittals and grants.

5.7 Additions to, deviations, or exclusions from the method

No

5.8 Laboratory Facility

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

- **FCC - Designation No.: CN1211**
  Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC (Federal Communications Commission). The test firm Registration No. is 727551.
- **ISED – CAB identifier.: CN0021**
  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

5.9 Laboratory Location

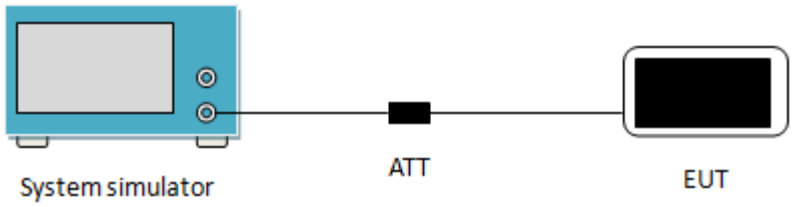
Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No. B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.10 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	03-18-2019	03-17-2020
Biconical Antenna	SCHWARZBECK	VUBA9117	359	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2019	03-17-2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-22-2017	06-21-2020
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-21-2018	11-20-2019
				11-21-2019	11-20-2020
EMI Test Software	AUDIX	E3	Version: 6.110919b		
Pre-amplifier	HP	8447D	2944A09358	03-18-2019	03-17-2020
Pre-amplifier	CD	PAP-1G18	11804	03-18-2019	03-17-2020
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2019	03-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2019	03-17-2020
Spectrum Analyzer	Agilent	N9020A	MY50510123	10-29-2018	10-28-2019
				10-29-2019	10-28-2020
Signal Generator	Rohde & Schwarz	SMX	835454/016	03-18-2019	03-17-2020
Signal Generator	R&S	SMR20	1008100050	03-18-2019	03-17-2020
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	03-18-2019	03-17-2020
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2019	03-17-2020
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2019	03-17-2020
DC Power Supply	XinNuoEr	WYK-10020K	1409050110020	10-31-2018	10-30-2019
				10-31-2019	10-30-2020
Temperature Humidity Chamber	HengPu	HPGDS-500	20140828008	09-24-2018	09-23-2019
				09-24-2019	09-23-2020
Simulated Station	Rohde & Schwarz	CMW500	140493	07-16-2018	07-15-2019
				07-16-2019	07-15-2020

6. Test results

6.1 Conducted Output Power, ERP and EIRP

Test Requirement:	Part 22.913(a)(5), Part 27.50 (h)(2)
Limit:	LTE Band 5: 7W, LTE Band 7: 2W
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 5.10 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)		
					20407	20525	20643
					824.7MHz	836.5MHz	848.3MHz
5	1.4	QPSK	1	0	23.41	23.24	23.45
			1	2	23.51	23.46	23.32
			1	5	23.34	23.30	23.30
			3	0	22.42	22.58	22.32
			3	1	22.47	22.62	22.35
			3	2	22.51	22.57	22.43
			6	0	22.51	22.41	22.27
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			16.29		
		ERP Limit (dBm):			38.45		
		16QAM	1	0	21.78	21.83	21.83
			1	2	21.62	21.93	22.44
			1	5	21.62	21.58	21.95
			3	0	21.41	21.36	21.40
			3	1	21.48	21.62	21.35
			3	2	21.62	21.60	21.48
			6	0	21.68	21.32	21.23
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			15.22		
		ERP Limit (dBm):			38.45		

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20415	20525	20635
					825.5MHz	836.5MHz	847.50MHz
5	3	QPSK	1	0	23.08	23.30	23.28
			1	7	23.27	23.36	23.30
			1	14	23.06	23.35	23.26
			8	0	22.39	22.56	22.50
			8	4	22.40	22.47	22.39
			8	7	22.35	22.57	22.43
			15	0	22.30	22.49	22.47
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			16.17		
		ERP Limit (dBm):			38.45		
		16QAM	1	0	21.70	21.94	21.98
			1	7	21.60	21.37	21.92
			1	14	21.40	21.57	21.60
			8	0	21.27	21.30	21.39
			8	4	21.40	21.37	21.65
			8	7	21.57	21.35	21.28
			15	0	21.38	21.58	21.37
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			14.76		
		ERP Limit (dBm):			38.45		

Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi).
ERP (dBm) = EIRP (dBm) - 2.15 (dB).

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20425	20525	20625
					826.5MHz	836.5MHz	846.5MHz
5	5	QPSK	1	0	23.52	23.38	23.36
			1	12	23.54	23.61	23.51
			1	24	23.30	23.34	23.43
			12	0	22.49	22.44	22.57
			12	6	22.55	22.54	22.68
			12	11	22.55	22.51	22.45
			25	0	22.58	22.53	22.43
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			16.39		
		ERP Limit (dBm):			38.45		
		16QAM	1	0	21.93	22.00	22.03
			1	12	22.02	22.19	21.81
			1	24	22.00	22.13	21.65
			12	0	21.24	21.24	21.31
			12	6	21.62	21.67	21.57
			12	11	21.24	21.16	21.39
			25	0	21.42	21.51	21.52
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			14.97		
		ERP Limit (dBm):			38.45		

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20450	20525	20600
					829.0MHz	836.5MHz	844.0MHz
5	10	QPSK	1	0	23.41	23.12	23.27
			1	24	23.51	23.56	23.57
			1	49	23.47	23.48	23.45
			25	0	22.61	22.58	22.54
			25	12	22.65	22.56	22.77
			25	24	22.61	22.69	22.54
			50	0	22.70	22.54	22.67
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			16.35		
		ERP Limit (dBm):			38.45		
		16QAM	1	0	21.71	22.25	22.24
			1	24	22.13	22.01	22.27
			1	49	21.65	22.00	21.66
			25	0	21.33	21.77	21.78
			25	12	21.76	21.56	21.79
			25	24	21.26	21.69	21.50
			50	0	21.62	21.66	21.56
		Antenna Gain(dBi):			-5.07		
		Max. ERP (dBm):			15.05		
		ERP Limit (dBm):			38.45		

Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi).
ERP (dBm) = EIRP (dBm) - 2.15 (dB).

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20775	21100	21425
					2502.5MHz	2535.0MHz	2567.5MHz
7	5	QPSK	1	0	22.45	22.84	22.81
			1	12	22.64	22.88	22.44
			1	24	22.49	22.49	22.39
			12	0	21.58	21.60	21.55
			12	6	21.09	21.55	21.44
			12	11	21.64	21.49	21.43
			25	0	21.53	21.53	21.55
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			25.20		
		EIRP Limit (dBm):			33.00		
		16QAM	1	0	21.31	21.18	21.70
			1	12	21.31	21.26	21.52
			1	24	20.97	20.87	21.15
			12	0	20.52	20.39	20.65
			12	6	20.62	20.59	20.77
			12	11	20.40	20.50	20.57
			25	0	20.57	20.62	20.81
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			24.02		
		EIRP Limit (dBm):			33.00		

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20800	21100	21400
					2505.0MHz	2535.0MHz	2565.0MHz
7	10	QPSK	1	0	22.34	22.61	22.69
			1	24	22.72	22.76	22.90
			1	49	22.80	22.55	23.16
			25	0	21.47	21.70	21.71
			25	12	21.62	21.65	21.93
			25	24	21.87	21.75	21.46
			50	0	21.72	21.70	21.83
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			25.48		
		EIRP Limit (dBm):			33.00		
		16QAM	1	0	21.74	21.65	21.15
			1	24	21.60	21.85	21.67
			1	49	21.48	21.32	21.11
			25	0	20.89	20.59	20.55
			25	12	20.86	20.56	20.70
			25	24	20.98	20.65	20.73
			50	0	20.89	20.75	20.70
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			24.17		
		EIRP Limit (dBm):			33.00		

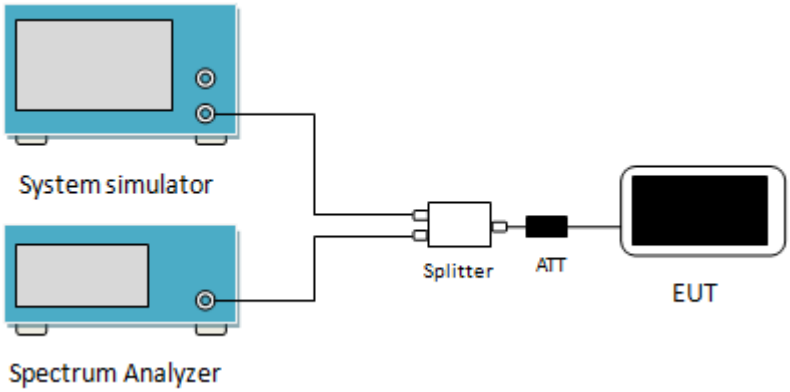
Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi).

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20825	21100	21375
					2507.5MHz	2535.0MHz	2562.5MHz
7	15	QPSK	1	0	22.57	22.63	22.81
			1	37	22.68	22.71	22.88
			1	74	22.59	22.61	22.69
			36	0	21.60	21.77	21.75
			36	16	21.66	21.88	21.72
			36	35	21.68	21.93	21.87
			75	0	21.68	21.74	21.57
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			25.20		
		EIRP Limit (dBm):			33.00		
		16QAM	1	0	21.53	21.76	21.45
			1	37	21.06	21.94	21.36
			1	74	20.81	21.71	21.41
			36	0	20.65	20.52	20.75
			36	16	20.78	20.46	20.83
			36	35	20.66	20.42	20.61
			75	0	20.74	20.65	20.71
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			24.26		
		EIRP Limit (dBm):			33.00		

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20850	21100	21350
					2510.0MHz	2535.0MHz	2560.0MHz
7	20	QPSK	1	0	23.10	23.62	23.33
			1	49	23.56	23.58	23.50
			1	99	23.36	23.20	23.67
			50	0	22.38	22.48	22.59
			50	24	22.53	22.51	22.40
			50	49	22.58	22.54	22.50
			100	0	22.45	22.52	22.59
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			25.99		
		EIRP Limit (dBm):			33.00		
		16QAM	1	0	21.66	21.97	21.94
			1	49	22.48	22.13	21.93
			1	99	21.62	21.81	21.97
			50	0	21.29	21.39	21.69
			50	24	21.52	21.54	21.54
			50	49	21.57	21.46	21.51
			100	0	21.35	21.47	21.54
		Antenna Gain (dBi):			2.32		
		Max. EIRP (dBm):			24.80		
		EIRP Limit (dBm):			33.00		

Note: EIRP (dBm) = Average power (dBm) + Antenna Gain (dBi).

6.2 Peak-to-Average Ratio

Test Requirement:	Part 27.50(d)(5)
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 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

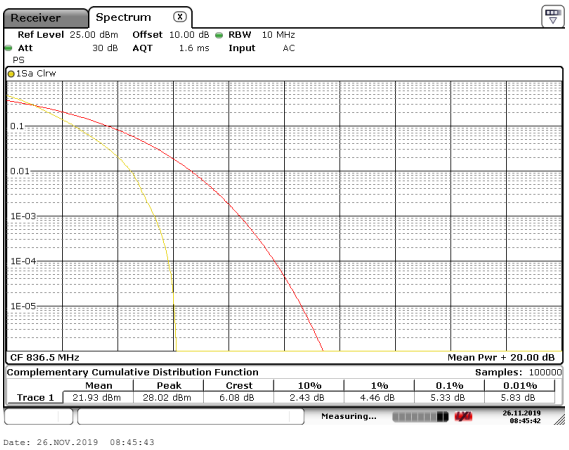
Measurement Data (Worst case):

Bandwidth	Modulation	RB Size	RB Offset	PAPR
LTE Band 5 (Middle Channel)				
10MHz	QPSK	50	0	5.33
	16QAM	50	0	6.23
LTE Band 7 (Middle Channel)				
20MHz	QPSK	100	0	3.91
	16QAM	100	0	5.62

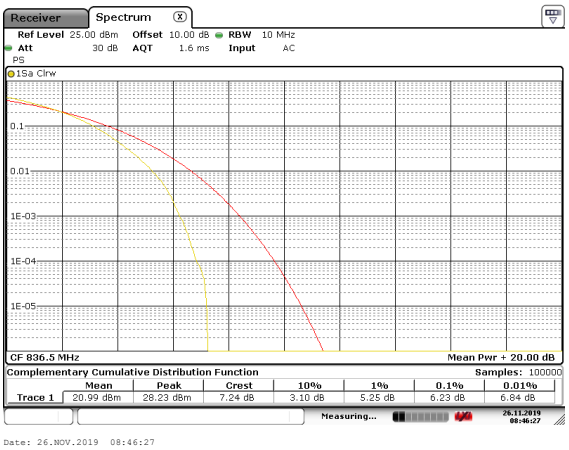
Test plots as below:

LTE Band 5 Middle channel

Modulation: QPSK

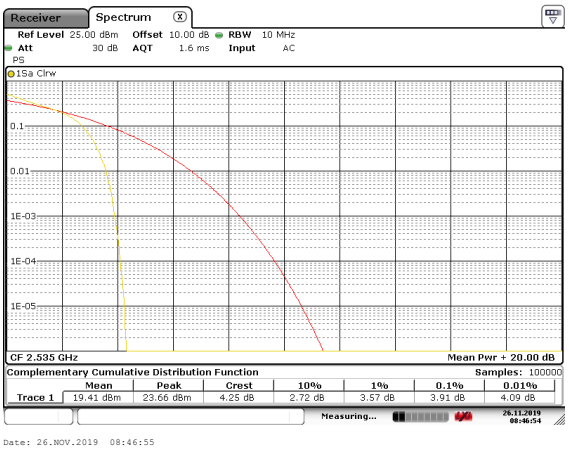


Modulation:16QAM

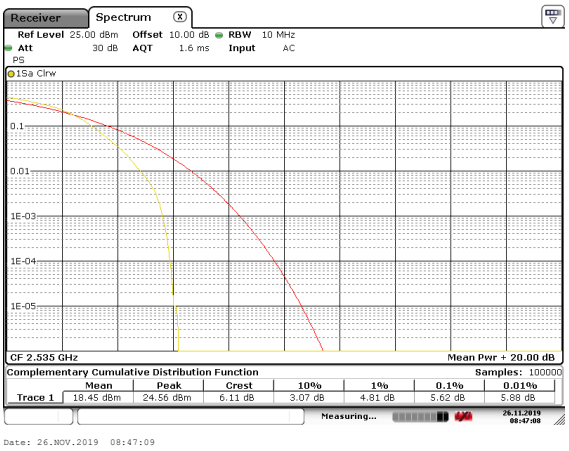


LTE Band 7 Middle channel

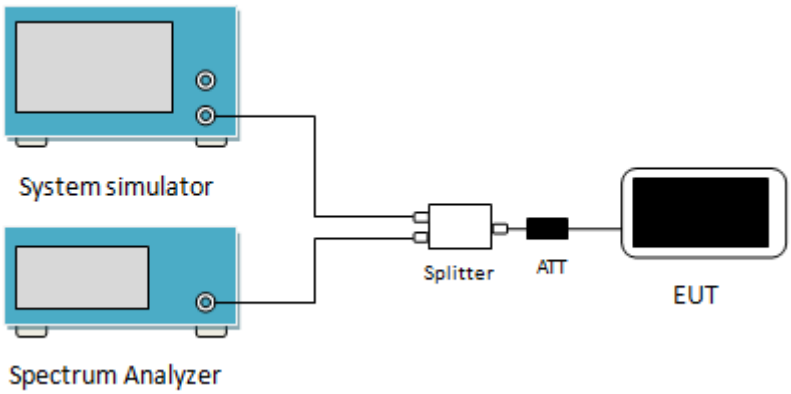
Modulation: QPSK



Modulation:16QAM



6.3 Occupy Bandwidth

Test Requirement:	Part 22.917(b), Part 27.53(m)
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 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

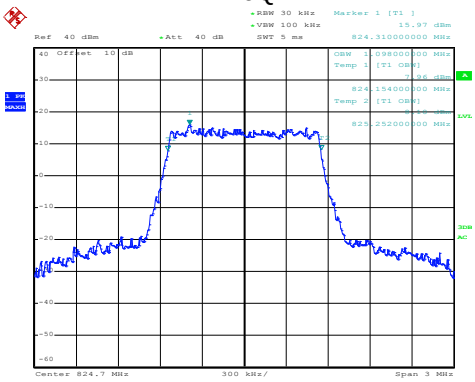
TE Band 5					
Bandwidth	Channel	Frequency (MHz)	Modulation	99% OBW (kHz)	-26dBcEBW (kHz)
1.4MHz	20407	824.7	16QAM	1098	1302
			QPSK	1104	1284
	20525	836.5	16QAM	1098	1290
			QPSK	1098	1290
	20643	848.3	16QAM	1104	1254
			QPSK	1098	1302
3MHz	20415	825.5	16QAM	2724	3048
			QPSK	2748	3036
	20525	836.50	16QAM	2712	3024
			QPSK	2736	3060
	20635	847.50	16QAM	2736	3024
			QPSK	2736	3048
5MHz	20425	826.50	16QAM	4500	4940
			QPSK	4500	5000
	20525	836.50	16QAM	4480	4940
			QPSK	4500	4960
	20625	846.50	16QAM	4480	4820
			QPSK	4480	4980
10MHz	20450	829.00	16QAM	9080	10080
			QPSK	9080	10200
	20525	836.50	16QAM	9040	10120
			QPSK	9080	10120
	20600	844.00	16QAM	9080	10080
			QPSK	9080	10160

LTE Band 7					
Bandwidth	Channel	Frequency (MHz)	Modulation	99% OBW (kHz)	-26dBcEBW (kHz)
5MHz	20775	2502.5	16QAM	4500	4820
			QPSK	4500	4960
	21100	2535.0	16QAM	4500	4960
			QPSK	4500	5000
	21425	2567.5	16QAM	4500	4960
			QPSK	4520	4960
10MHz	20800	2505.0	16QAM	9040	10120
			QPSK	9080	10120
	21100	2535.0	16QAM	9040	10080
			QPSK	9040	10160
	21400	2565.0	16QAM	9080	10120
			QPSK	9080	10240
15MHz	20825	2507.5	16QAM	13500	14700
			QPSK	13440	14880
	21100	2535.0	16QAM	13500	14700
			QPSK	13500	14820
	21375	2562.5	16QAM	13500	14820
			QPSK	13440	14880
20MHz	20850	2510.0	16QAM	17840	19200
			QPSK	18000	19440
	21100	2535.0	16QAM	17920	19280
			QPSK	17920	19360
	21350	2560.0	16QAM	17920	19280
			QPSK	18000	19360

Test plot as follows:
LTE Band 5 part:

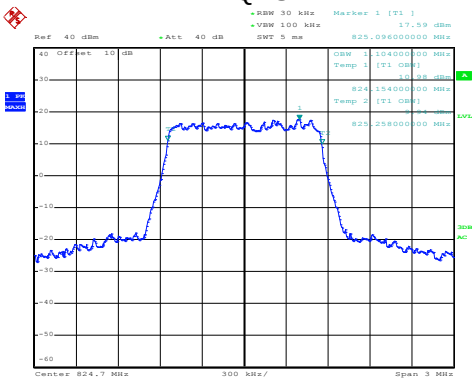
LTE Band 5: 99% Occupy bandwidth
BW: 1.4MHz

16QAM



Date: 20.NOV.2019 17:41:34

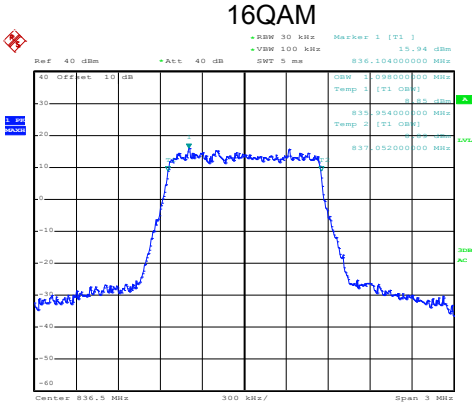
QPSK



Date: 20.NOV.2019 17:41:26

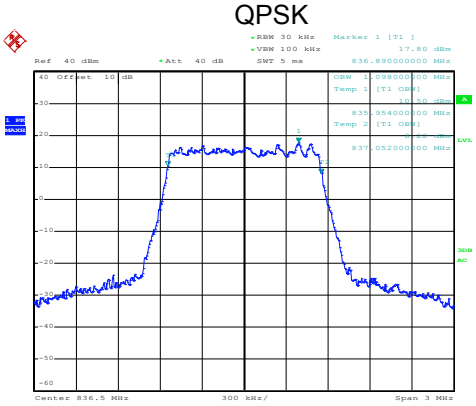
Lowest channel

16QAM



Date: 20.NOV.2019 17:42:08

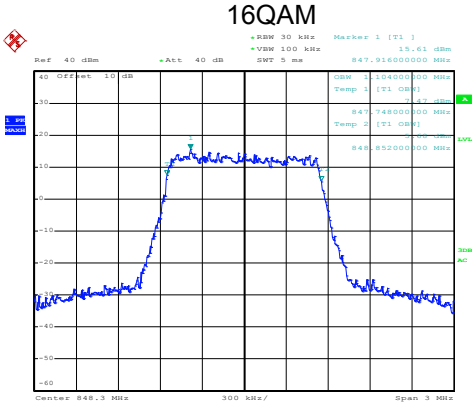
QPSK



Date: 20.NOV.2019 17:42:01

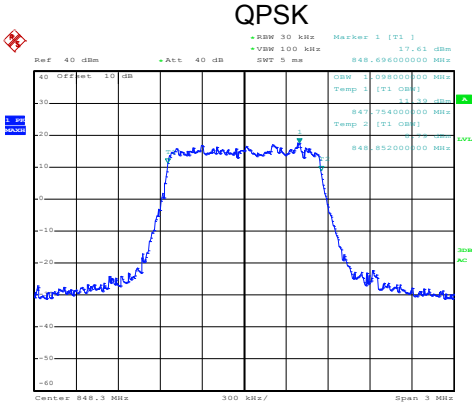
Middle channel

16QAM



Date: 20.NOV.2019 17:43:39

QPSK

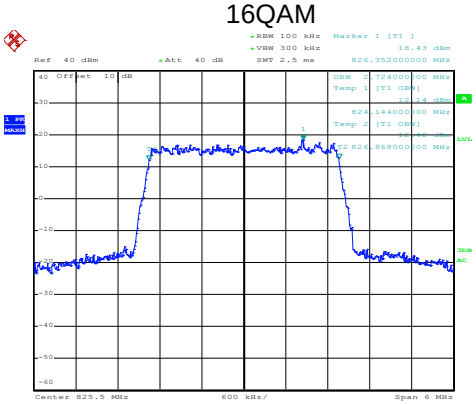


Date: 20.NOV.2019 17:43:33

Highest channel

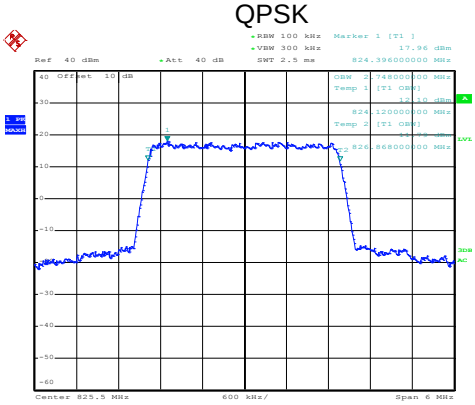
LTE Band 5: 99% Occupy bandwidth
BW: 3MHz

16QAM



Date: 20.NOV.2019 17:44:50

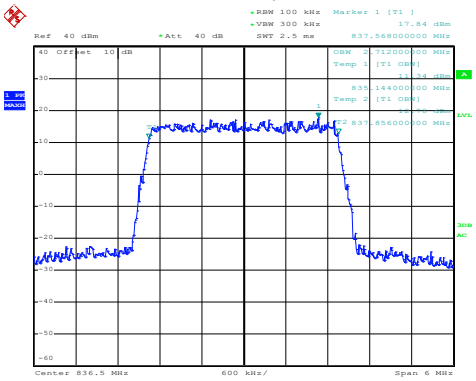
QPSK



Date: 20.NOV.2019 17:44:41

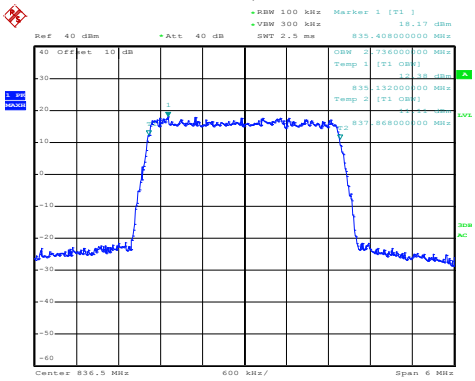
Lowest channel

16QAM



Date: 20.NOV.2019 17:45:54

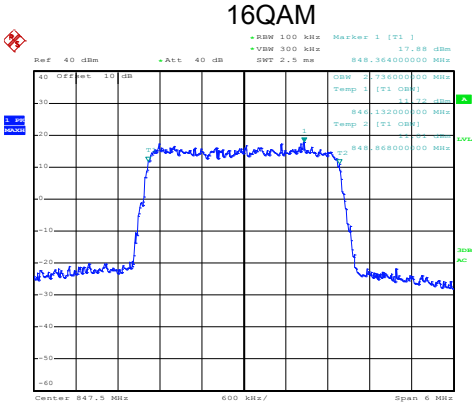
QPSK



Date: 20.NOV.2019 17:45:47

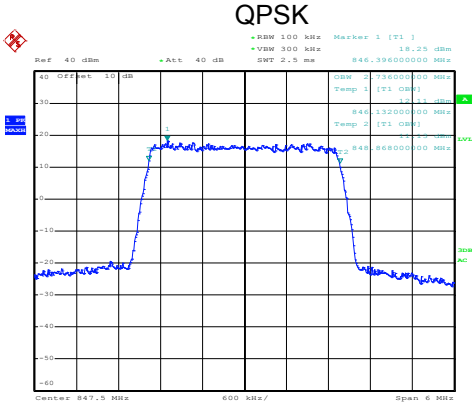
Middle channel

16QAM



Date: 20.NOV.2019 17:46:42

QPSK

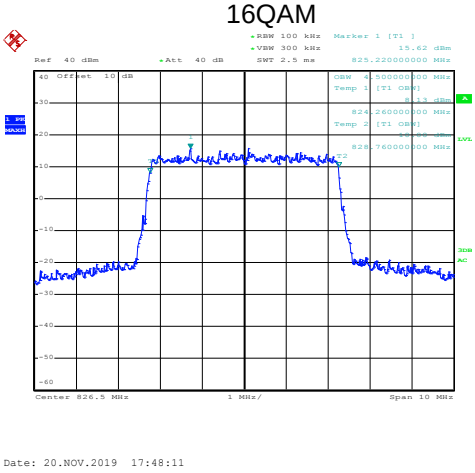


Date: 20.NOV.2019 17:46:35

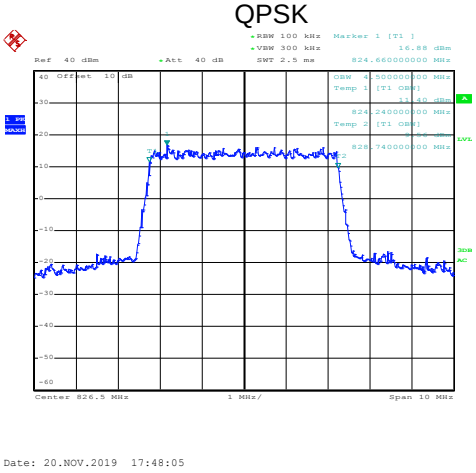
Highest channel

LTE Band 5: 99% Occupy bandwidth
BW: 5MHz

16QAM

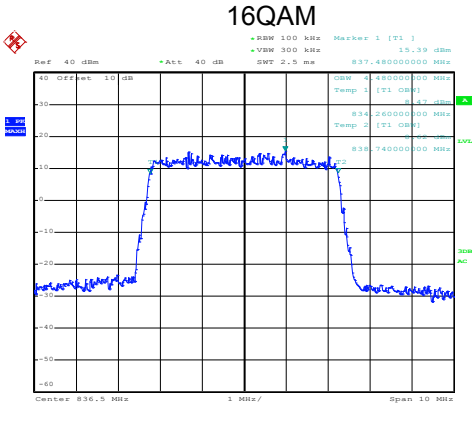


QPSK

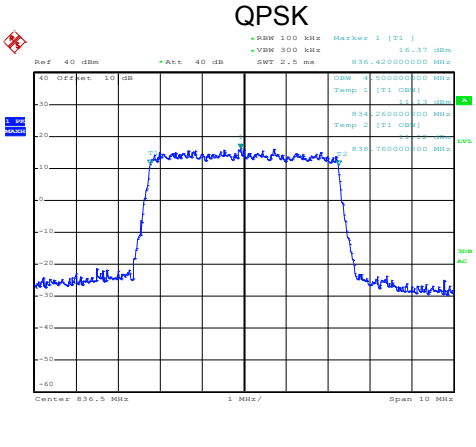


Lowest channel

16QAM

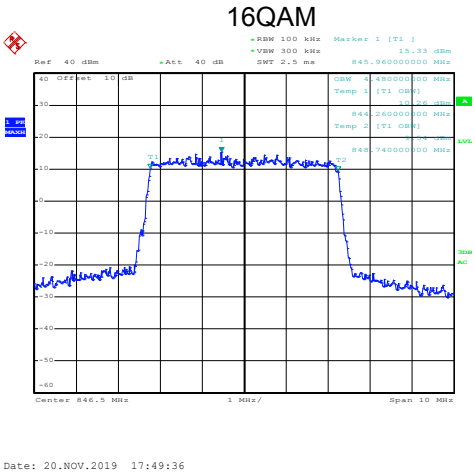


QPSK

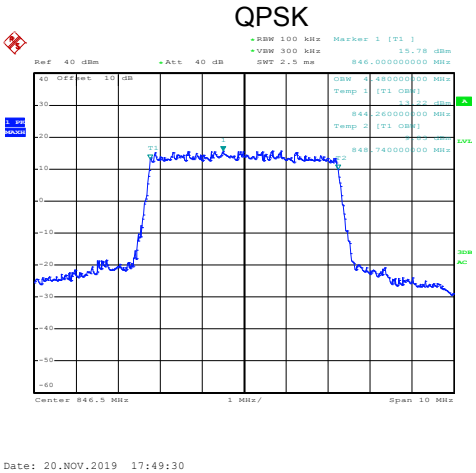


Middle channel

16QAM



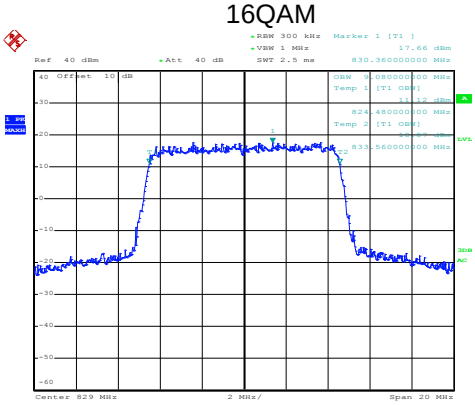
QPSK



Highest channel

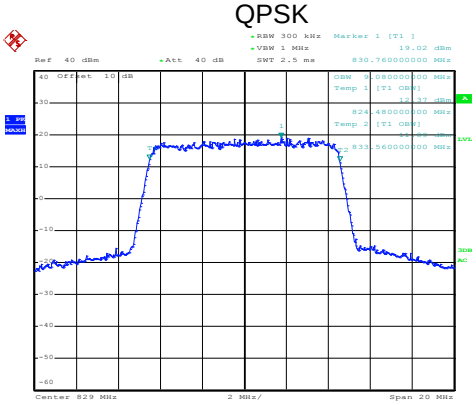
LTE Band 5: 99% Occupy bandwidth
BW: 10MHz

16QAM



Date: 20.NOV.2019 17:50:40

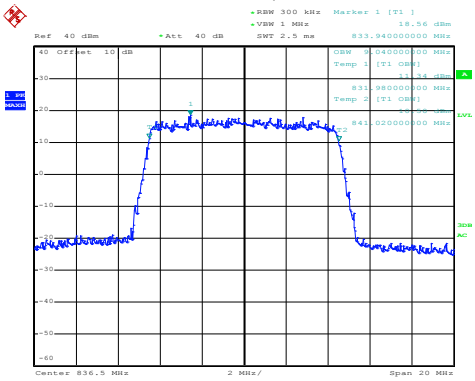
QPSK



Date: 20.NOV.2019 17:50:33

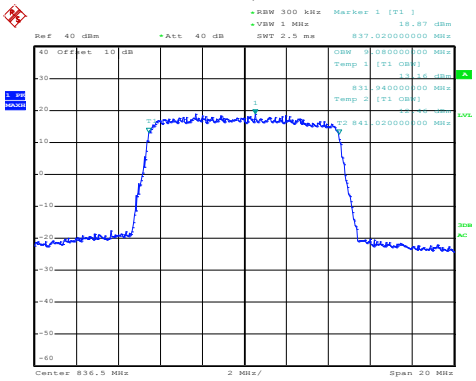
Lowest channel

16QAM



Date: 20.NOV.2019 17:51:46

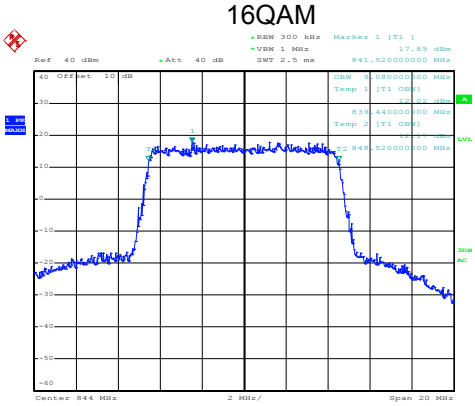
QPSK



Date: 20.NOV.2019 17:51:38

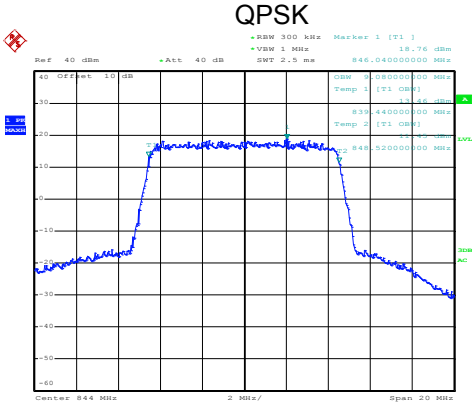
Middle channel

16QAM



Date: 20.NOV.2019 17:52:19

QPSK

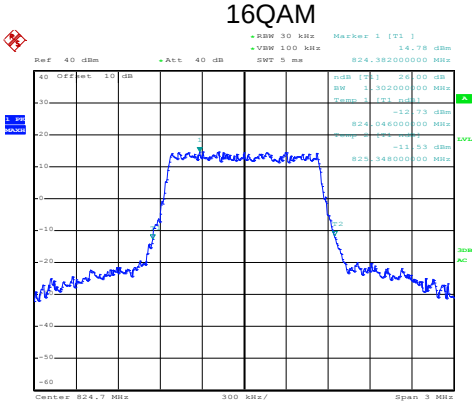


Date: 20.NOV.2019 17:52:13

Highest channel

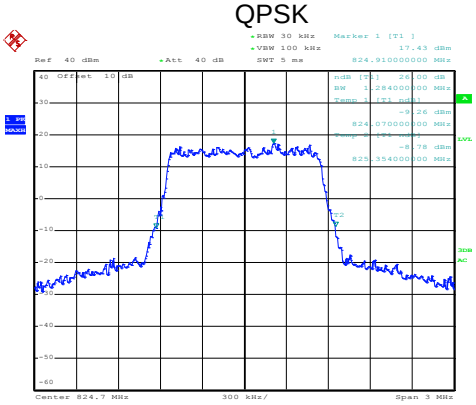
LTE Band 5: -26dBc bandwidth
BW: 1.4MHz

16QAM



Date: 20.NOV.2019 17:42:53

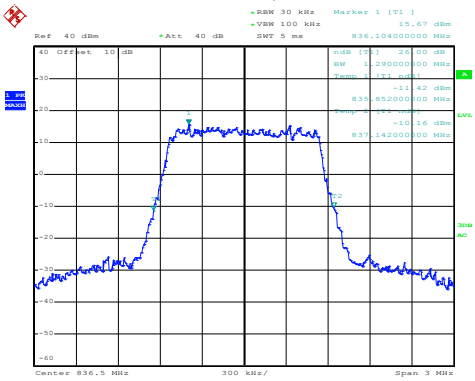
QPSK



Date: 20.NOV.2019 17:42:46

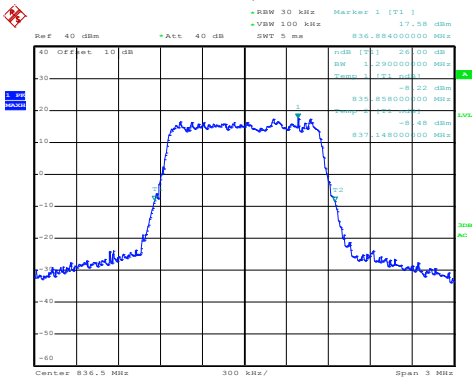
Lowest channel

16QAM



Date: 20.NOV.2019 17:42:27

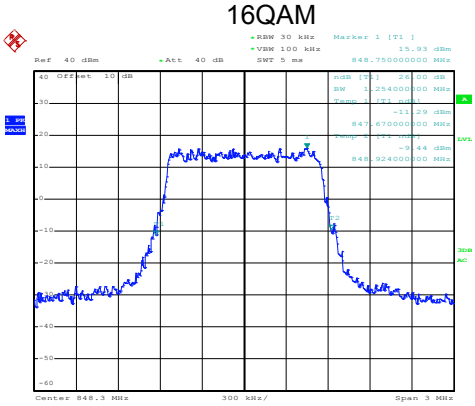
QPSK



Date: 20.NOV.2019 17:42:21

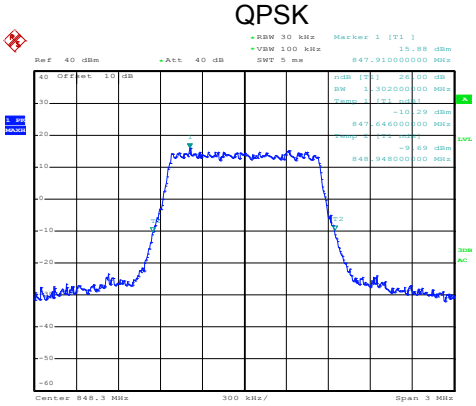
Middle channel

16QAM



Date: 20.NOV.2019 17:43:22

QPSK

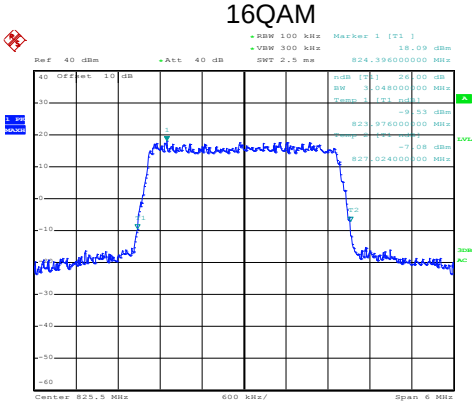


Date: 20.NOV.2019 17:43:13

Highest channel

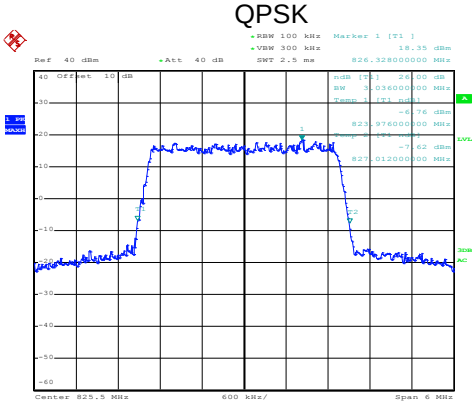
LTE Band 5: -26dBc bandwidth
BW: 3MHz

16QAM



Date: 20.NOV.2019 17:45:08

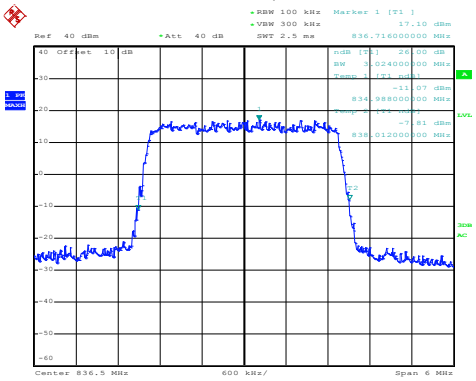
QPSK



Date: 20.NOV.2019 17:45:02

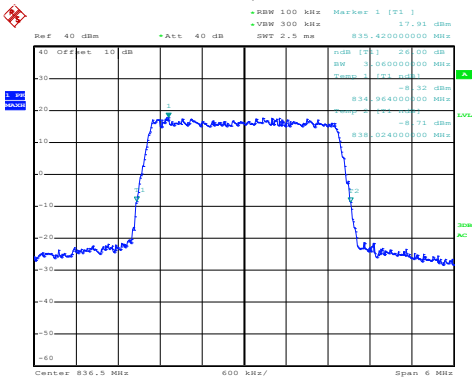
Lowest channel

16QAM



Date: 20.NOV.2019 17:45:34

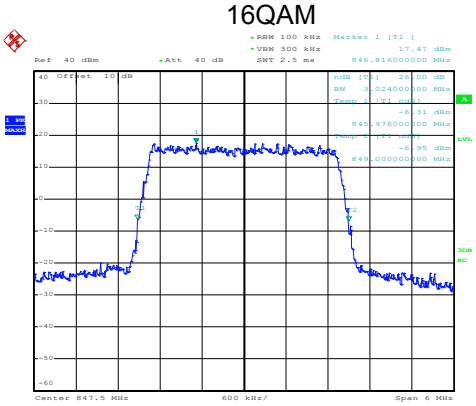
QPSK



Date: 20.NOV.2019 17:45:28

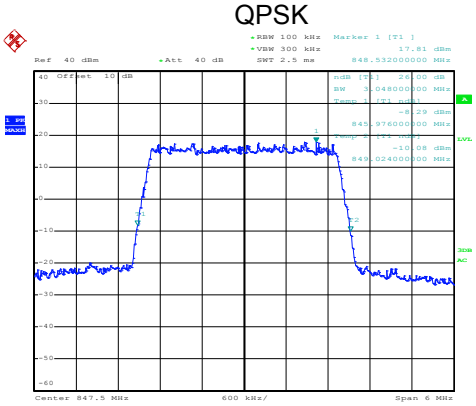
Middle channel

16QAM



Date: 20.NOV.2019 17:46:59

QPSK

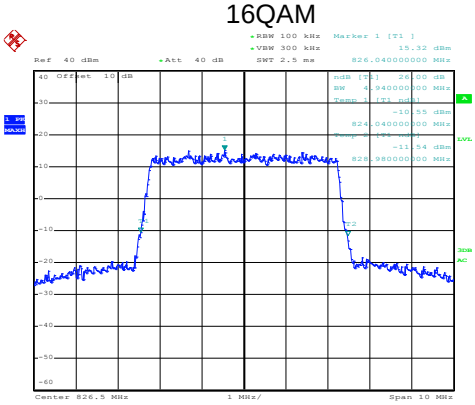


Date: 20.NOV.2019 17:46:52

Highest channel

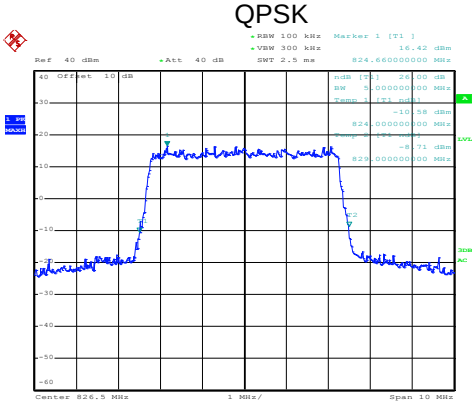
LTE Band 5: -26dBc bandwidth
BW: 5MHz

16QAM



Date: 20.NOV.2019 17:47:53

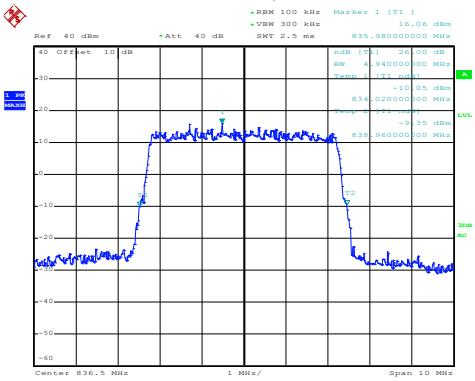
QPSK



Date: 20.NOV.2019 17:47:46

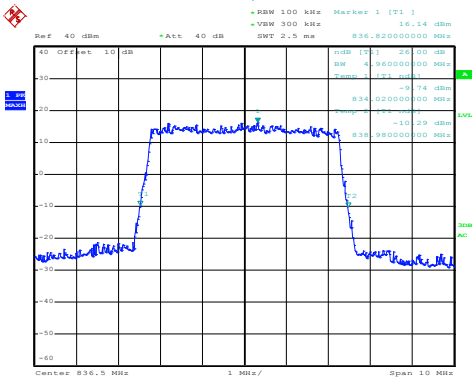
Lowest channel

16QAM



Date: 20.NOV.2019 17:48:50

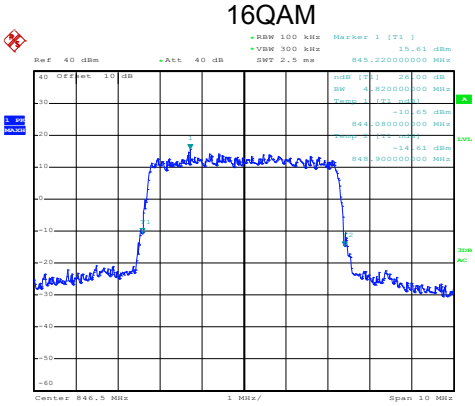
QPSK



Date: 20.NOV.2019 17:48:44

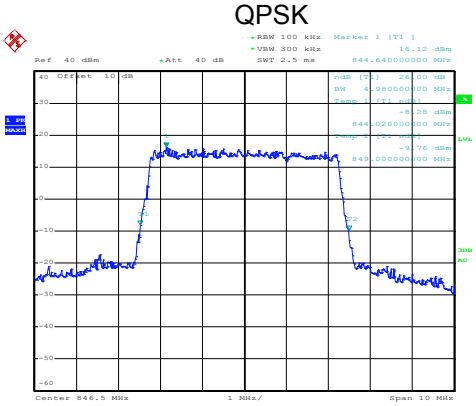
Middle channel

16QAM



Date: 20.NOV.2019 17:49:20

QPSK

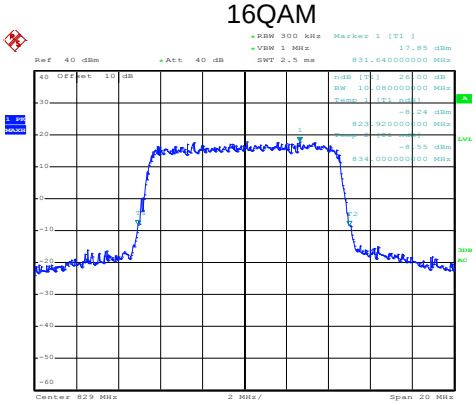


Date: 20.NOV.2019 17:49:14

Highest channel

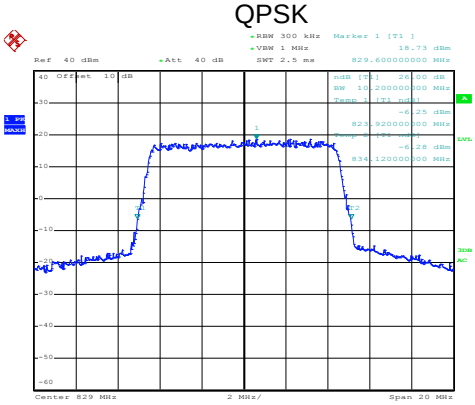
LTE Band 5: -26dBc bandwidth
BW: 10MHz

16QAM



Date: 20.NOV.2019 17:51:00

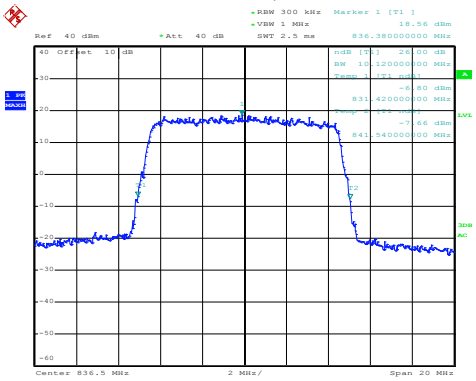
QPSK



Date: 20.NOV.2019 17:50:52

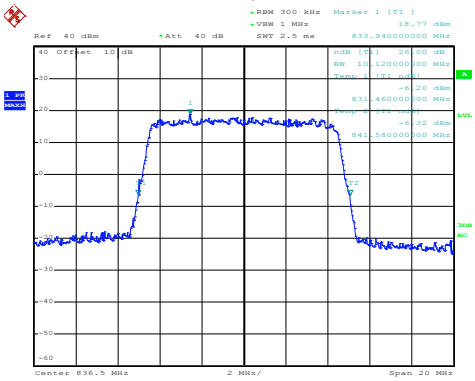
Lowest channel

16QAM



Date: 20.NOV.2019 17:51:28

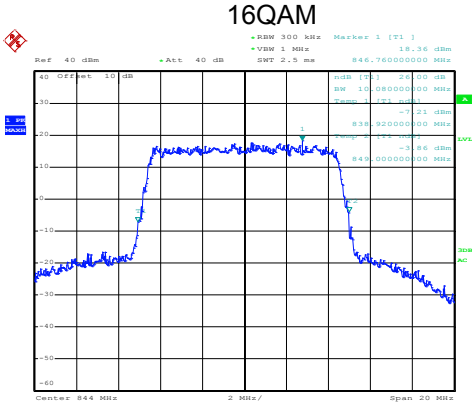
QPSK



Date: 20.NOV.2019 17:51:20

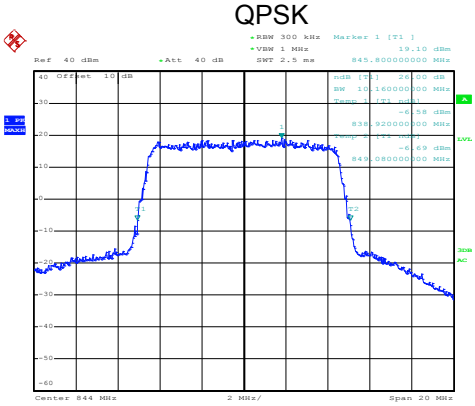
Middle channel

16QAM



Date: 20.NOV.2019 17:52:37

QPSK



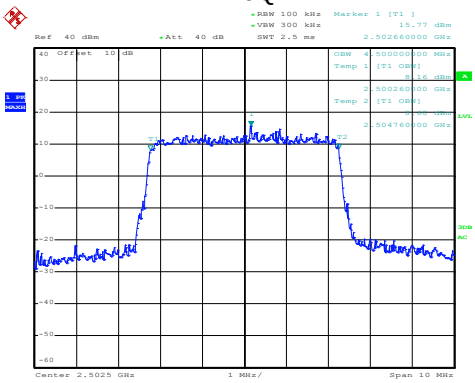
Date: 20.NOV.2019 17:52:31

Highest channel

LTE-Band 7 part:

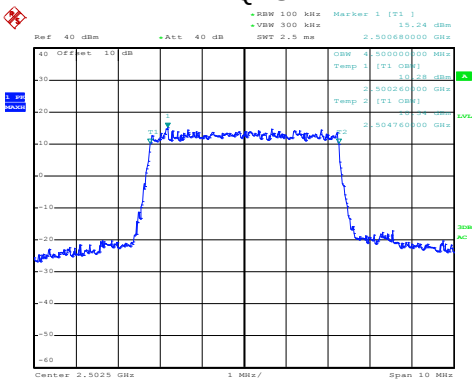
LTE Band 7: 99% Occupy bandwidth
BW: 5MHz

16QAM



Date: 20.NOV.2019 17:53:57

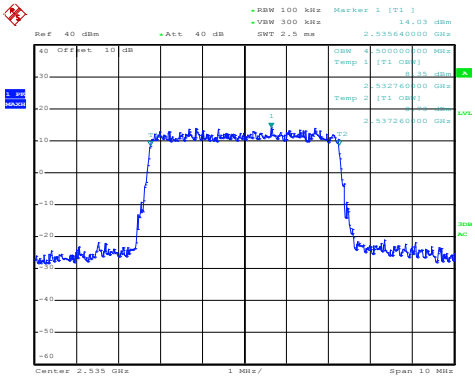
QPSK



Date: 20.NOV.2019 17:53:50

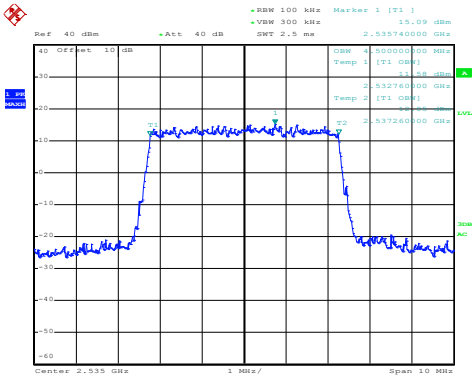
Lowest channel

16QAM



Date: 20.NOV.2019 17:54:21

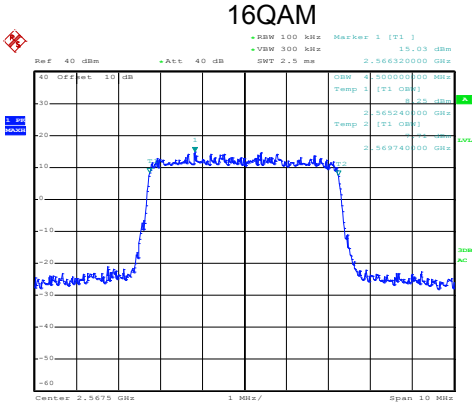
QPSK



Date: 20.NOV.2019 17:54:14

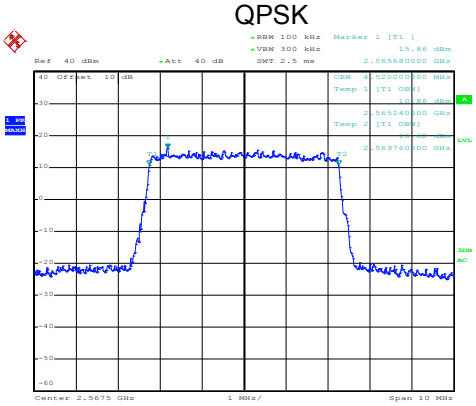
Middle channel

16QAM



Date: 20.NOV.2019 17:55:34

QPSK

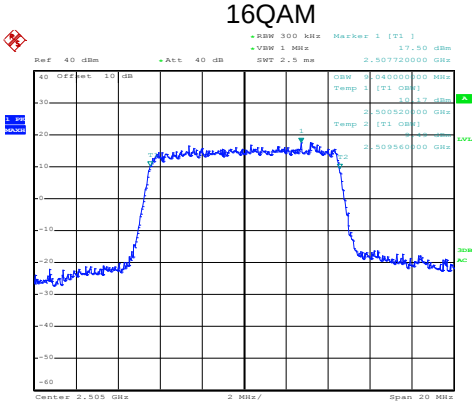


Date: 20.NOV.2019 17:55:26

Highest channel

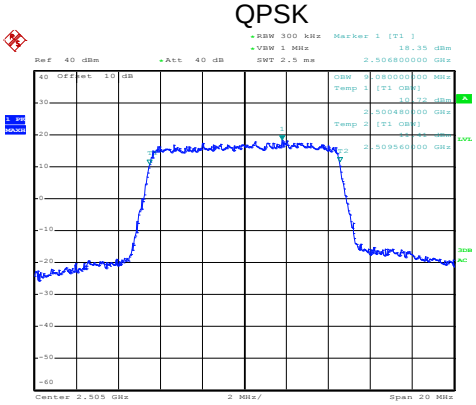
LTE Band 7: 99% Occupy bandwidth
BW: 10MHz

16QAM



Date: 20.NOV.2019 17:56:40

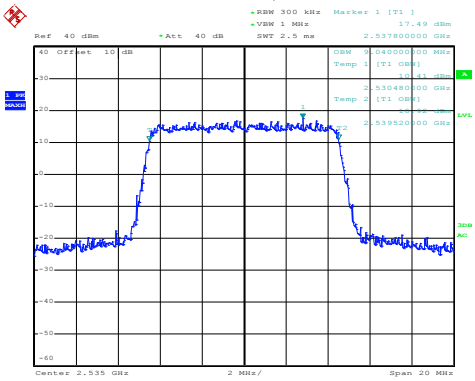
QPSK



Date: 20.NOV.2019 17:56:34

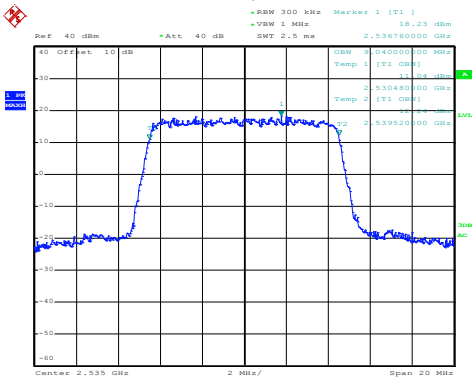
Lowest channel

16QAM



Date: 20.NOV.2019 17:57:36

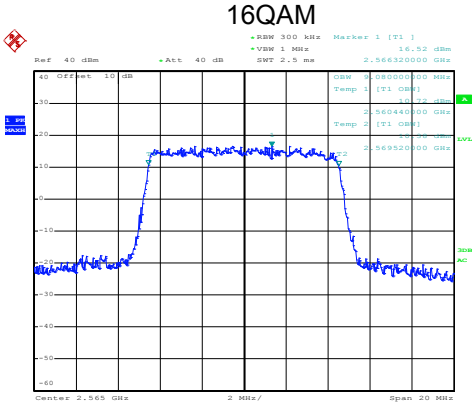
QPSK



Date: 20.NOV.2019 17:57:30

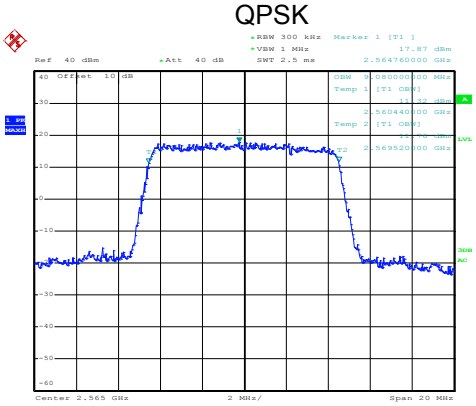
Middle channel

16QAM



Date: 20.NOV.2019 17:58:04

QPSK

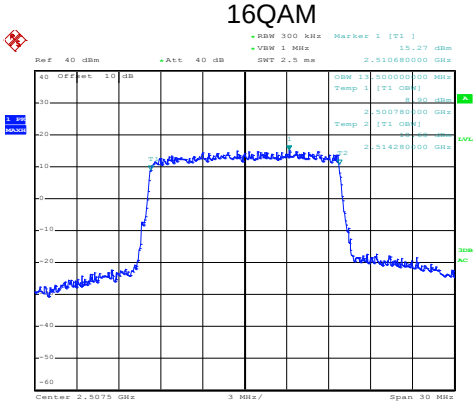


Date: 20.NOV.2019 17:57:57

Highest channel

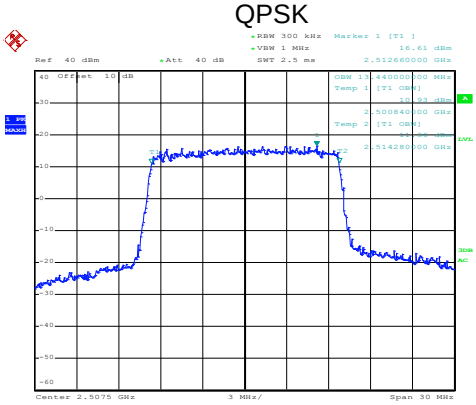
LTE Band 7: 99% Occupy bandwidth
BW: 15MHz

16QAM



Date: 20.NOV.2019 17:59:25

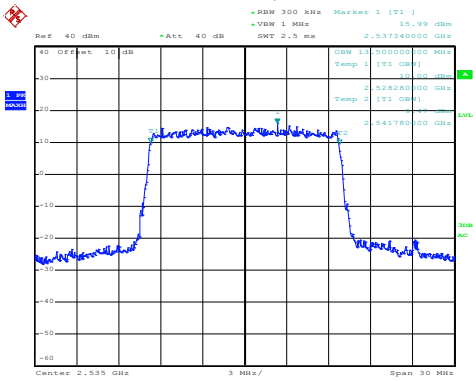
QPSK



Date: 20.NOV.2019 17:59:17

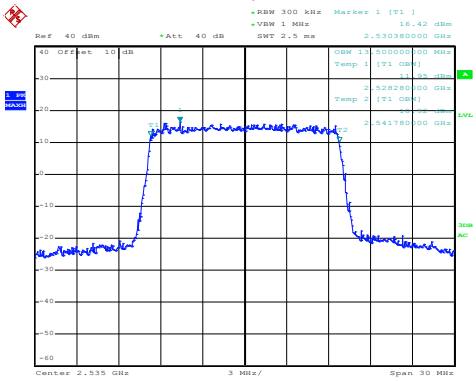
Lowest channel

16QAM



Date: 20.NOV.2019 17:59:46

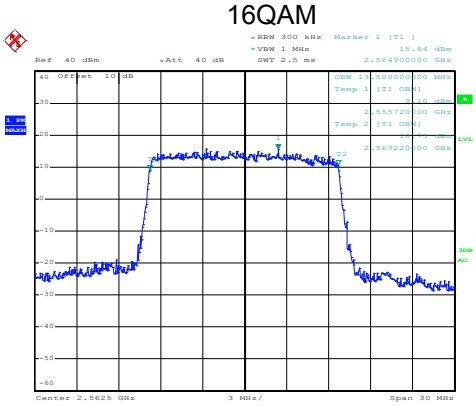
QPSK



Date: 20.NOV.2019 17:59:39

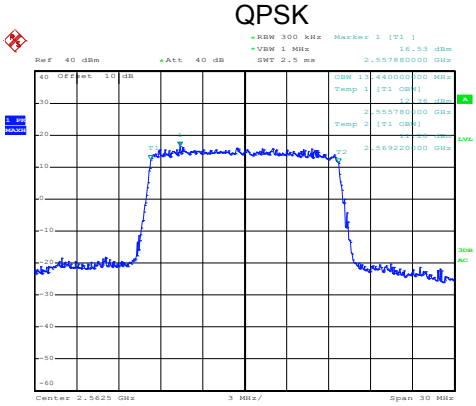
Middle channel

16QAM



Date: 20.NOV.2019 18:00:42

QPSK

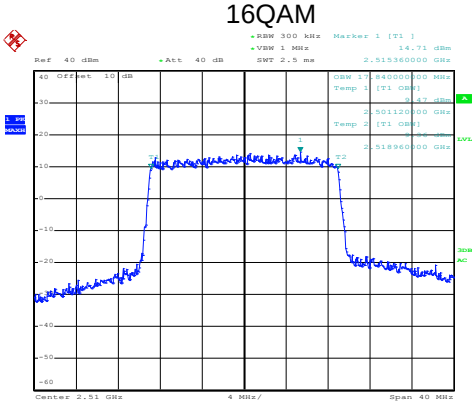


Date: 20.NOV.2019 18:00:36

Highest channel

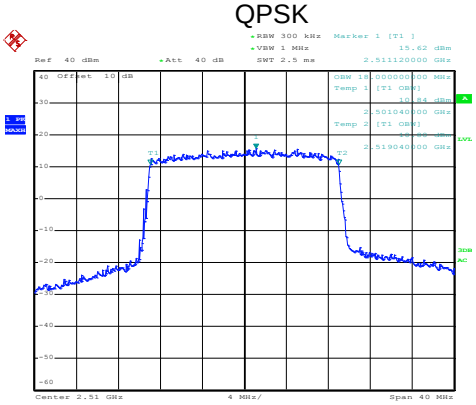
LTE Band 7: 99% Occupy bandwidth
BW: 20MHz

16QAM



Date: 20.NOV.2019 18:01:27

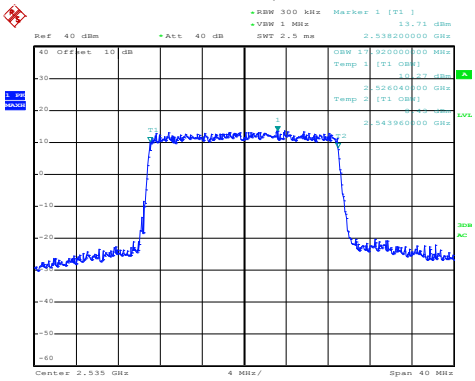
QPSK



Date: 20.NOV.2019 18:01:19

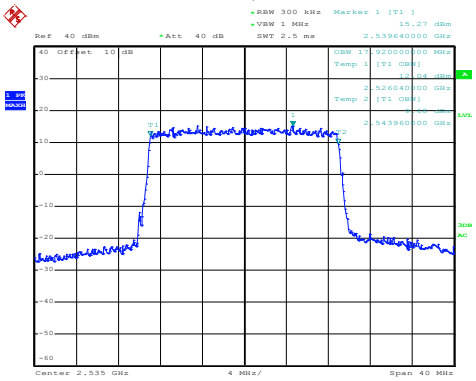
Lowest channel

16QAM



Date: 20.NOV.2019 18:02:22

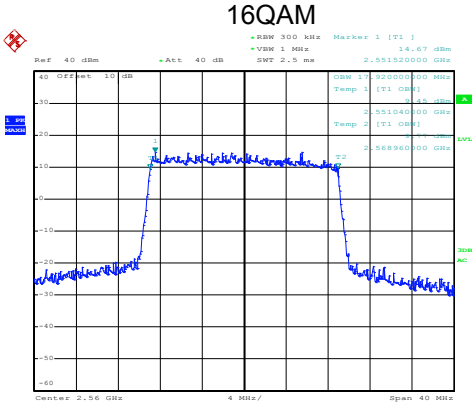
QPSK



Date: 20.NOV.2019 18:02:16

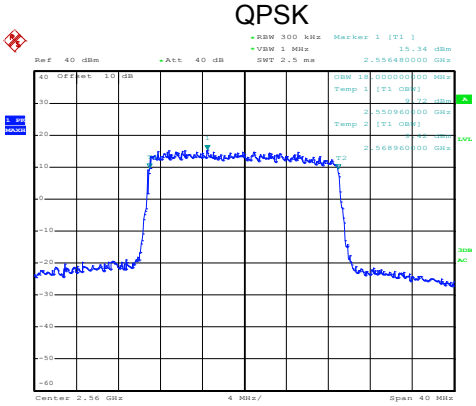
Middle channel

16QAM



Date: 20.NOV.2019 18:02:48

QPSK

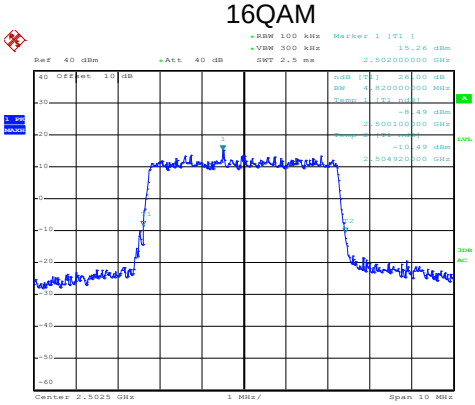


Date: 20.NOV.2019 18:02:42

Highest channel

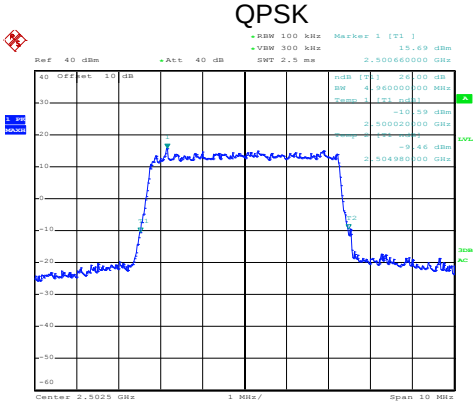
LTE Band 7: -26dBc bandwidth
BW: 5MHz

16QAM



Date: 20.NOV.2019 17:53:41

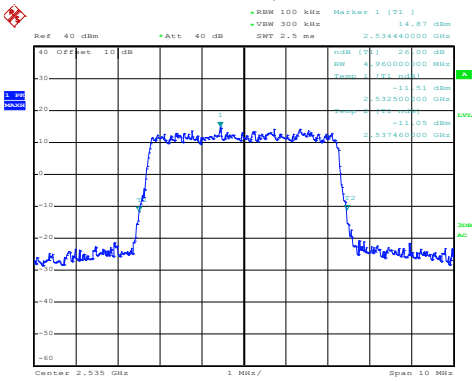
QPSK



Date: 20.NOV.2019 17:53:35

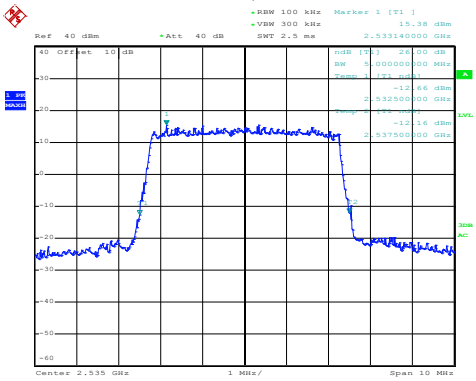
Lowest channel

16QAM



Date: 20.NOV.2019 17:54:38

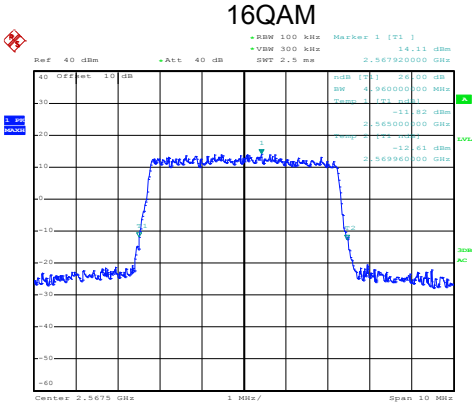
QPSK



Date: 20.NOV.2019 17:54:31

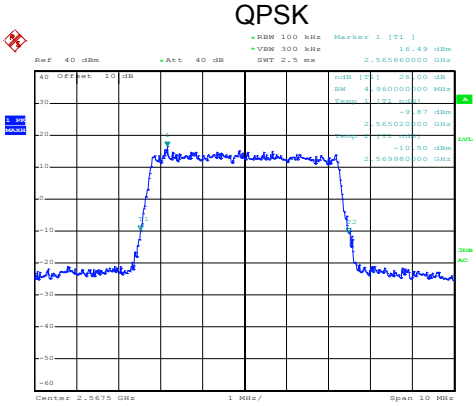
Middle channel

16QAM



Date: 20.NOV.2019 17:55:10

QPSK

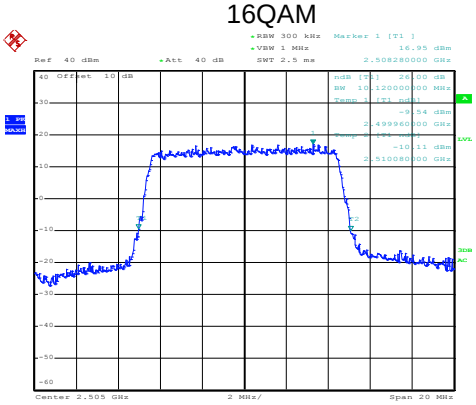


Date: 20.NOV.2019 17:55:04

Highest channel

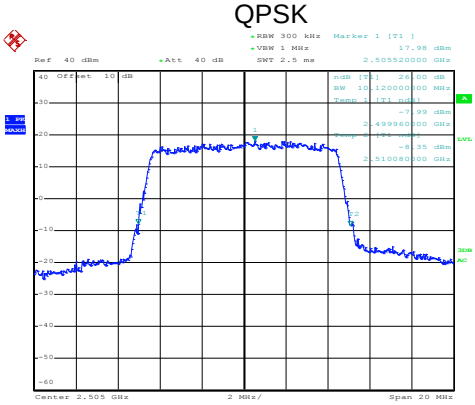
LTE Band 7: -26dBc bandwidth
BW: 10MHz

16QAM



Date: 20.NOV.2019 17:56:59

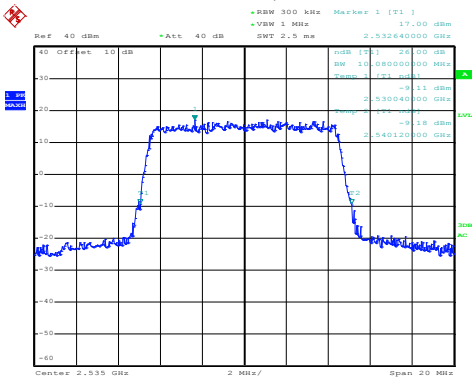
QPSK



Date: 20.NOV.2019 17:56:51

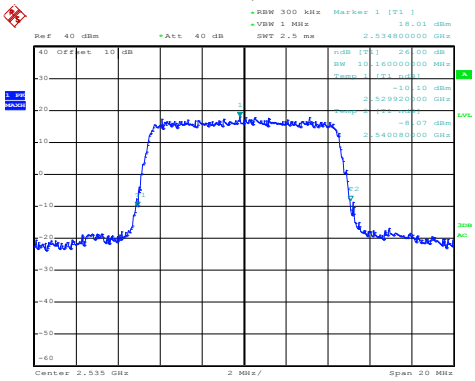
Lowest channel

16QAM



Date: 20.NOV.2019 17:57:21

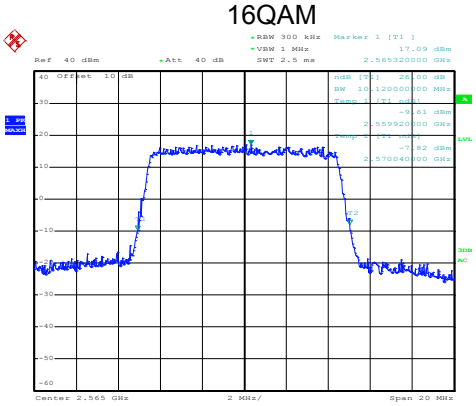
QPSK



Date: 20.NOV.2019 17:57:14

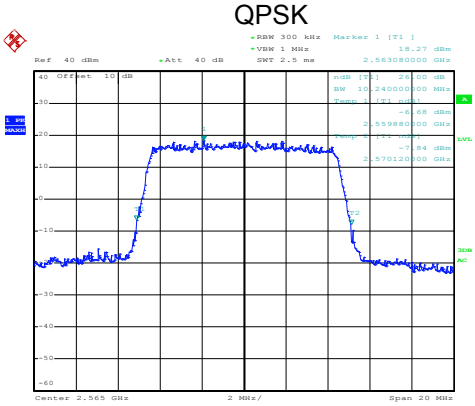
Middle channel

16QAM



Date: 20.NOV.2019 17:58:19

QPSK

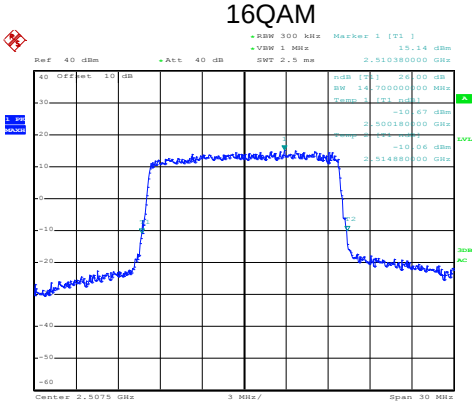


Date: 20.NOV.2019 17:58:13

Highest channel

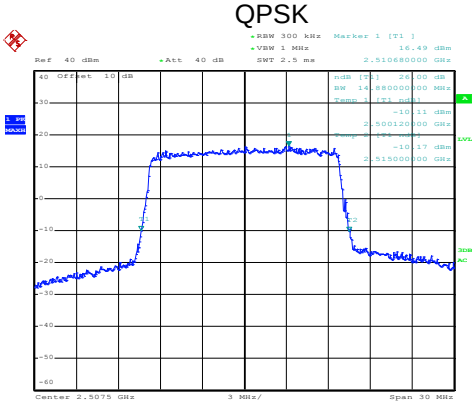
LTE Band 7: -26dBc bandwidth
BW: 15MHz

16QAM



Date: 20.NOV.2019 17:59:08

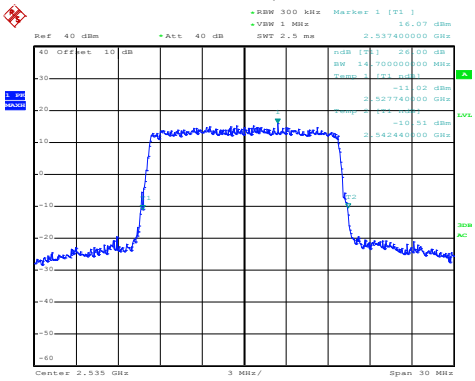
QPSK



Date: 20.NOV.2019 17:59:02

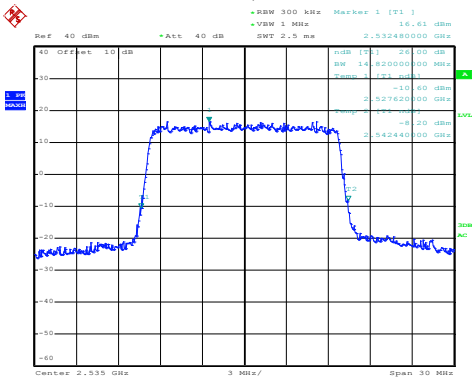
Lowest channel

16QAM



Date: 20.NOV.2019 18:00:02

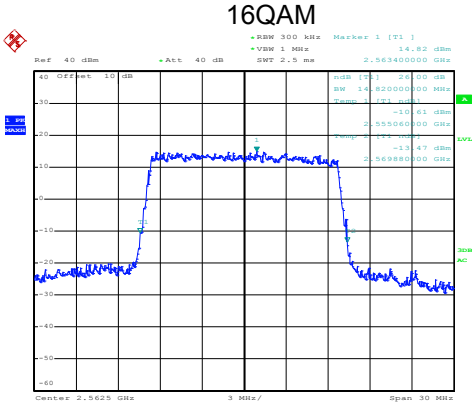
QPSK



Date: 20.NOV.2019 17:59:55

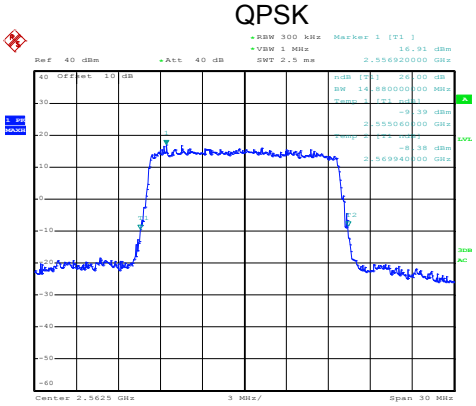
Middle channel

16QAM



Date: 20.NOV.2019 18:00:26

QPSK

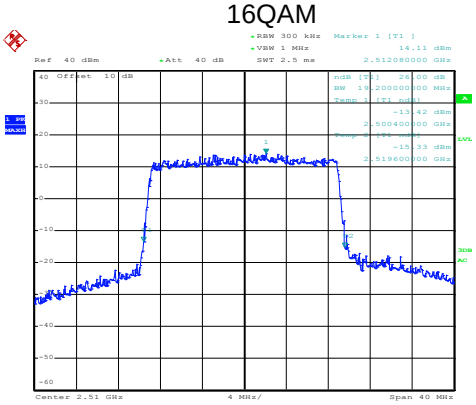


Date: 20.NOV.2019 18:00:20

Highest channel

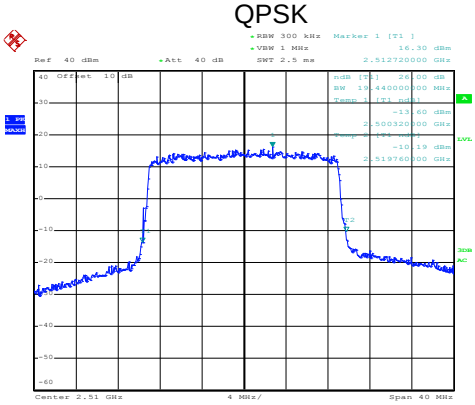
LTE Band 7: -26dBc bandwidth
BW: 20MHz

16QAM



Date: 20.NOV.2019 18:01:44

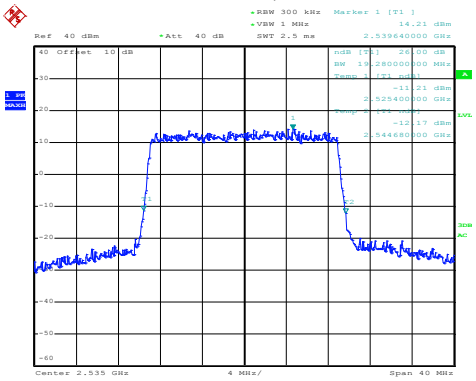
QPSK



Date: 20.NOV.2019 18:01:38

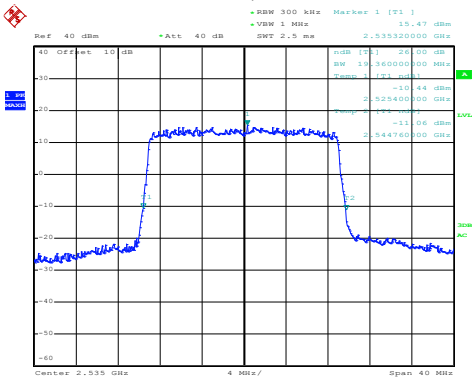
Lowest channel

16QAM



Date: 20.NOV.2019 18:02:07

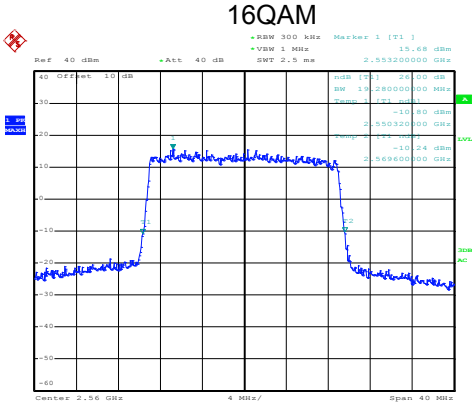
QPSK



Date: 20.NOV.2019 18:02:01

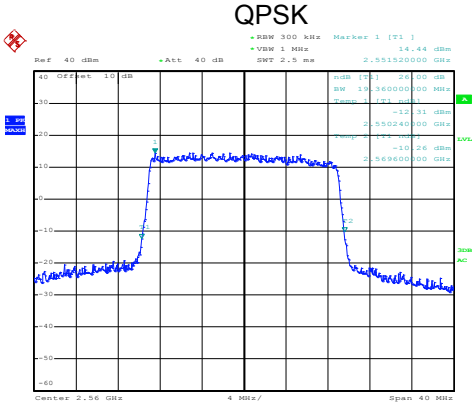
Middle channel

16QAM



Date: 20.NOV.2019 18:03:04

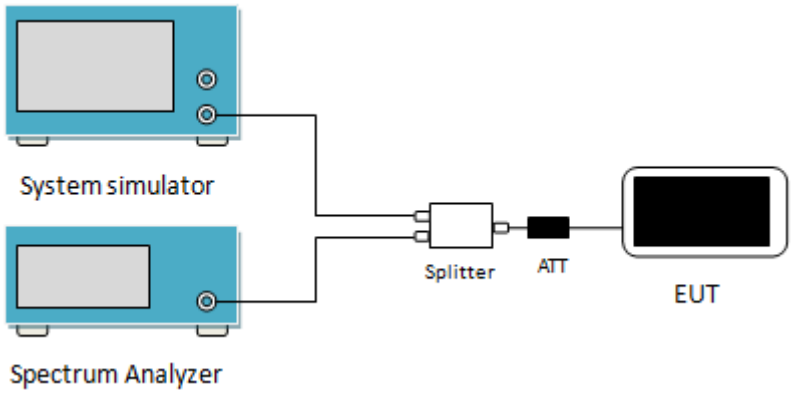
QPSK



Date: 20.NOV.2019 18:02:57

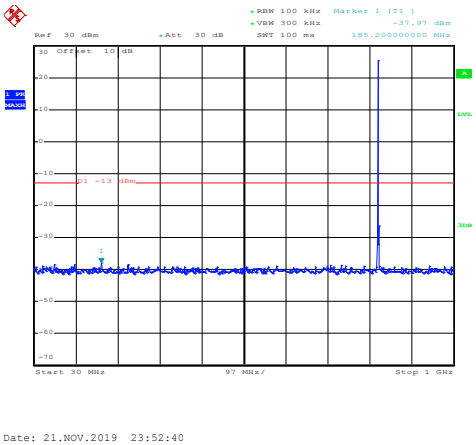
Highest channel

6.4 Out of band emission at antenna terminals

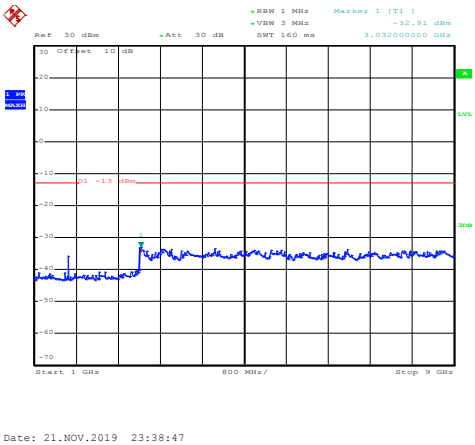
Test Requirement:	Part 22.917(b), Part 27.53(m)
Limit:	LTE Band 5 : The power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 $\log_{10}$(P) dB (-13 dBm). LTE Band 7: For mobile digital stations, the attenuation factor 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.
Test Setup:	
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 For the out of band: For Band 5 set the RBW=100 kHz, VBW=300 kHz when below 1 GHz, for Band 7 set the RBW=1 MHz, VBW=3 MHz when below 1 GHz, RBW =1 MHz, VBW=3 MHz when above 1 GHz, Start=30MHz, Stop= 10th harmonic. 3 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 5.10 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 5 part:

LTE Band 5: 16 QAM & RB Size 1
BW: 1.4MHz
Lowest channel

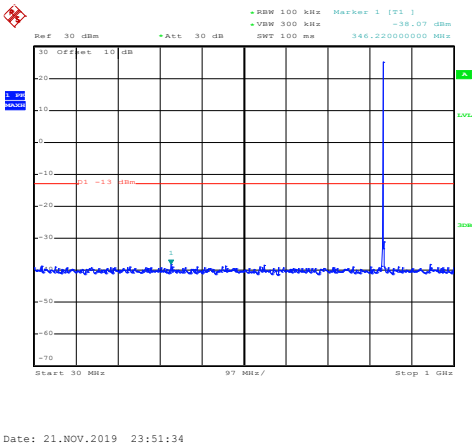


30MHz~1GHz

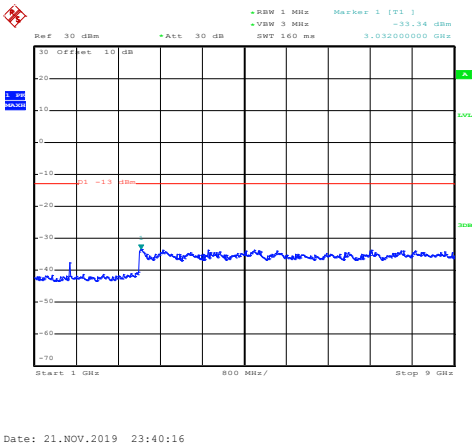


1GHz~9GHz

Middle channel

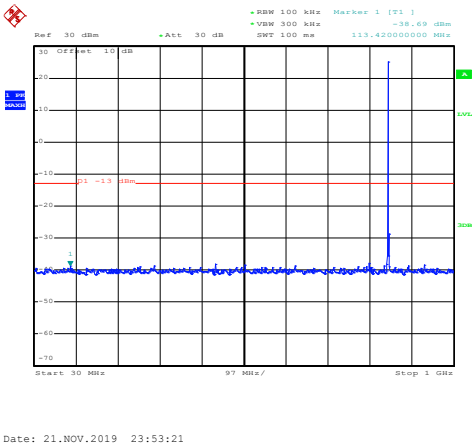


30MHz~1GHz

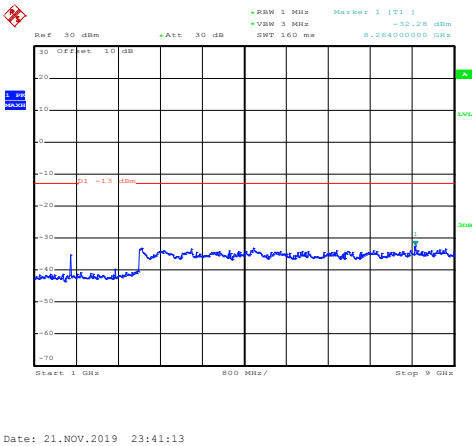


1GHz~9GHz

High channel

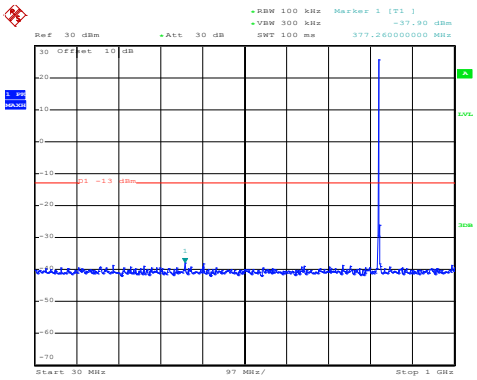


30MHz~1GHz



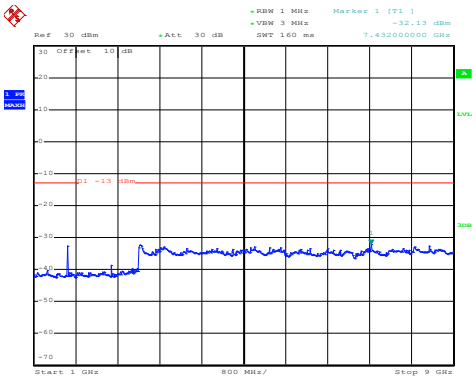
1GHz~9GHz

LTE Band 5: QPSK & RB Size 1
BW: 1.4MHz
Lowest channel



Date: 21.NOV.2019 23:52:09

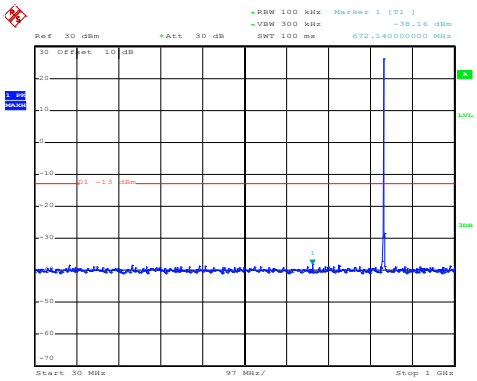
30MHz~1GHz



Date: 21.NOV.2019 23:38:18

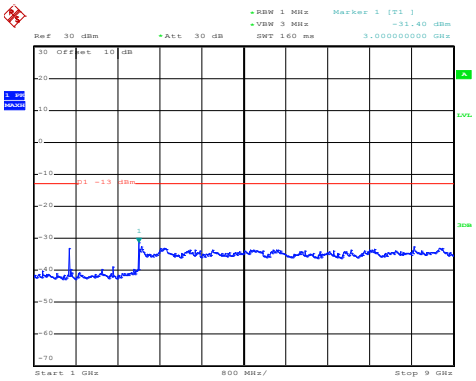
1GHz~9GHz

Middle channel



Date: 21.NOV.2019 23:50:43

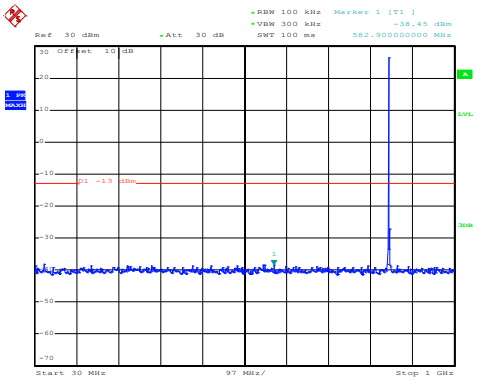
30MHz~1GHz



Date: 21.NOV.2019 23:39:57

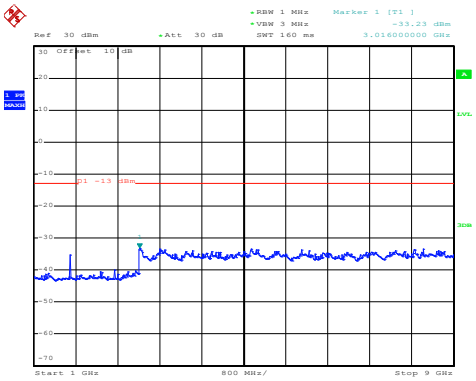
1GHz~9GHz

High channel



Date: 21.NOV.2019 23:54:01

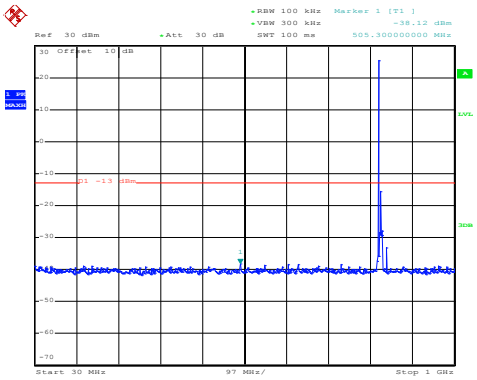
30MHz~1GHz



Date: 21.NOV.2019 23:40:42

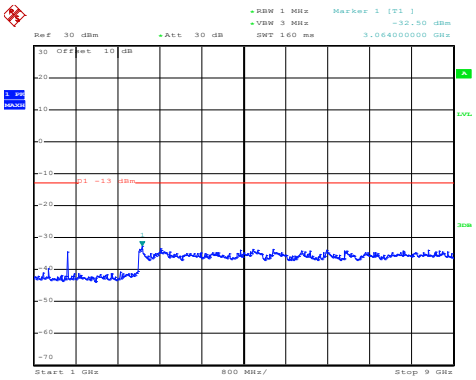
1GHz~9GHz

LTE Band 5: 16 QAM & RB Size 1
BW: 10MHz
Lowest channel



Date: 21.NOV.2019 23:49:17

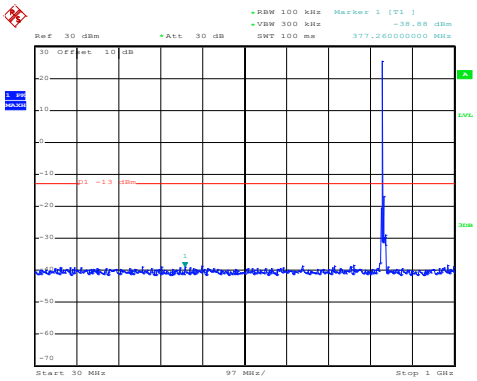
30MHz~1GHz



Date: 21.NOV.2019 23:43:20

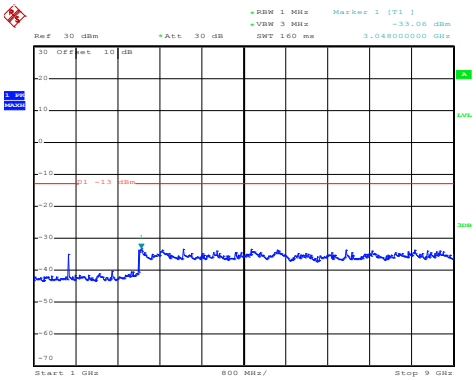
1GHz~9GHz

Middle channel



Date: 21.NOV.2019 23:48:07

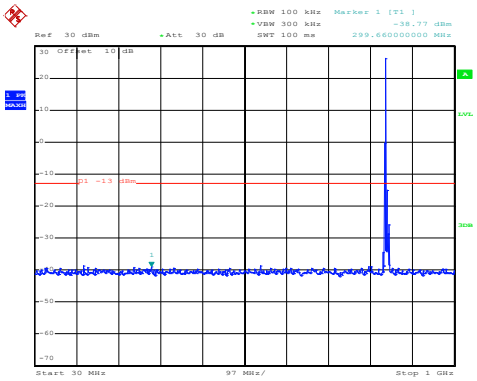
30MHz~1GHz



Date: 21.NOV.2019 23:42:19

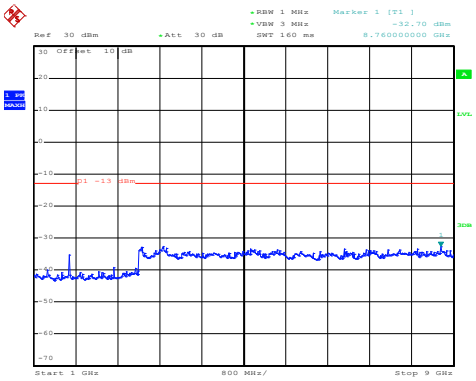
1GHz~9GHz

High channel



Date: 21.NOV.2019 23:46:32

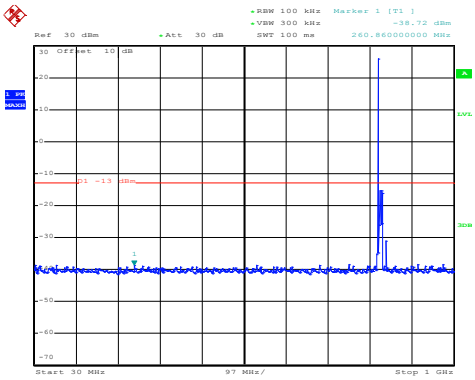
30MHz~1GHz



Date: 21.NOV.2019 23:44:28

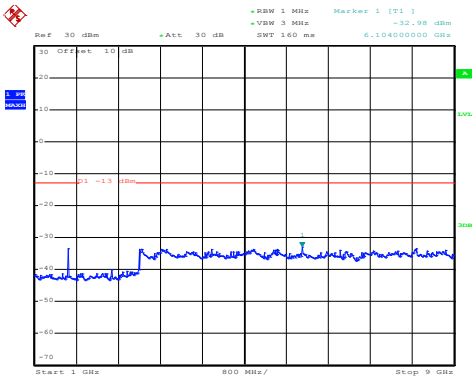
1GHz~9GHz

LTE Band 5: QPSK & RB Size 1
BW: 10MHz
Lowest channel



Date: 21.NOV.2019 23:48:49

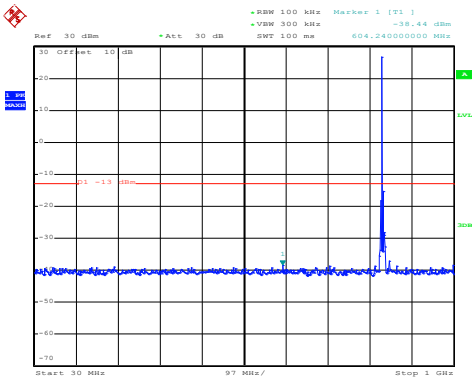
30MHz~1GHz



Date: 21.NOV.2019 23:42:56

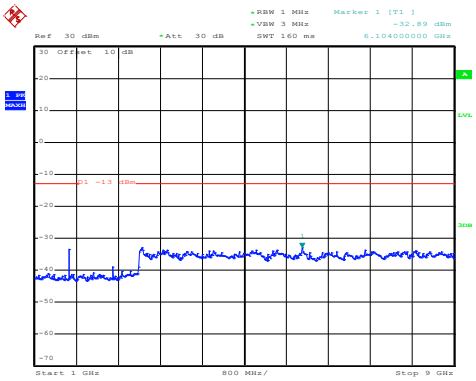
1GHz~9GHz

Middle channel



Date: 21.NOV.2019 23:47:42

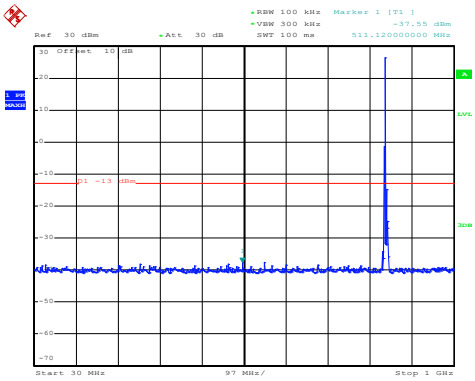
30MHz~1GHz



Date: 21.NOV.2019 23:42:01

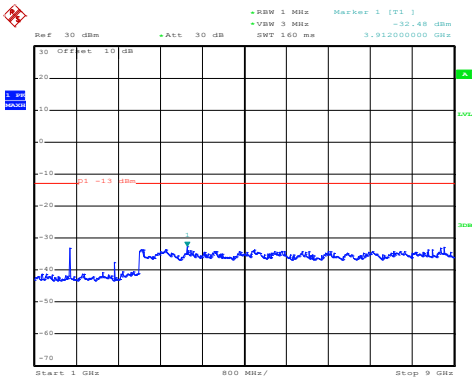
1GHz~9GHz

High channel



Date: 21.NOV.2019 23:46:10

30MHz~1GHz

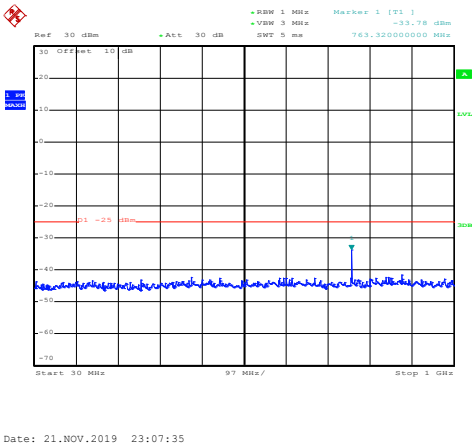


Date: 21.NOV.2019 23:43:48

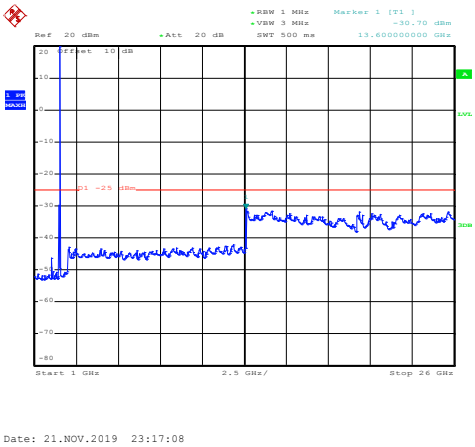
1GHz~9GHz

LTE Band 7 part:

LTE Band 7: 16 QAM & RB Size 1
BW: 5MHz
Lowest channel

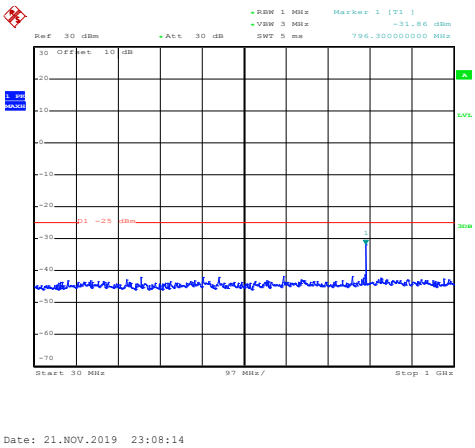


30MHz~1GHz

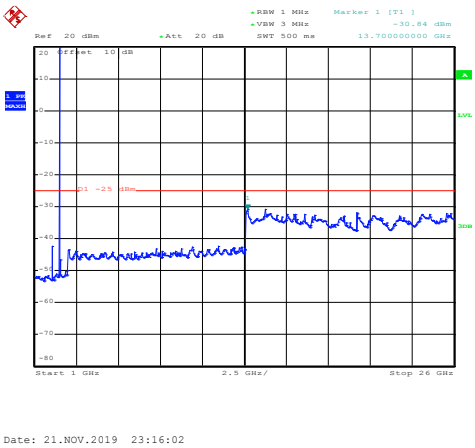


1GHz~25GHz

Middle channel

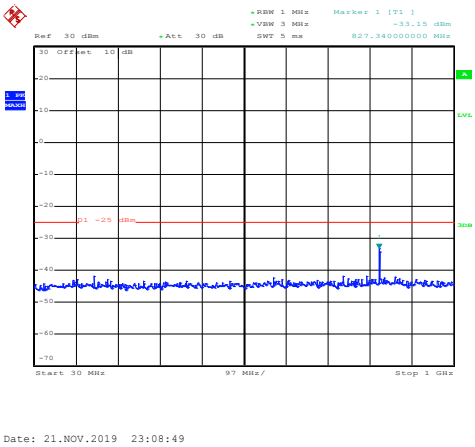


30MHz~1GHz

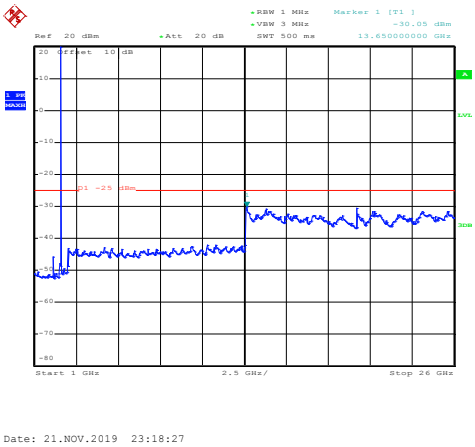


1GHz~25GHz

High channel

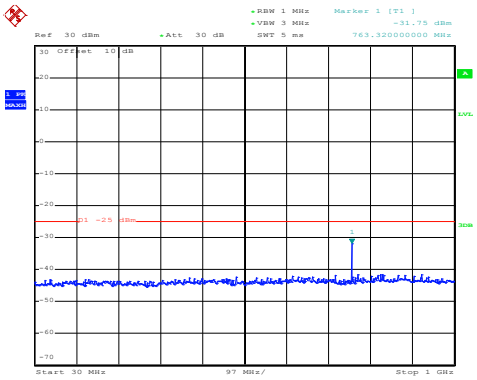


30MHz~1GHz

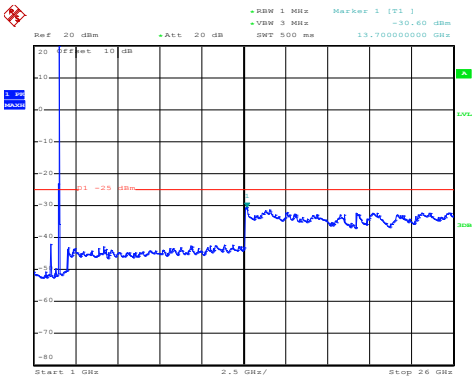


1GHz~25GHz

LTE Band 7: QPSK & RB Size 1
BW: 5MHz
Lowest channel

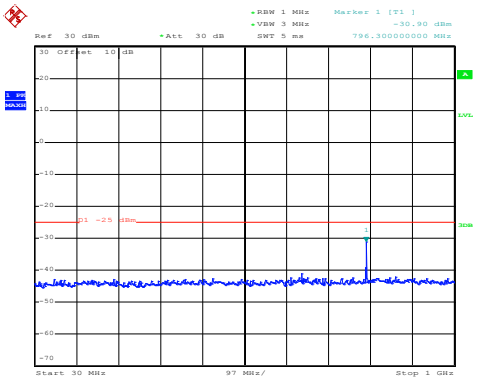


30MHz~1GHz

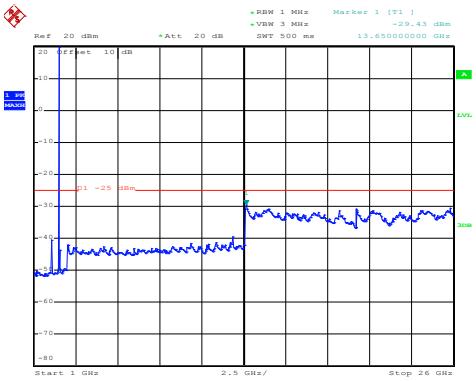


1GHz~25GHz

Middle channel

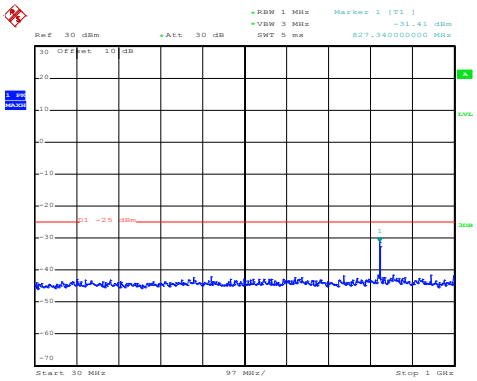


30MHz~1GHz

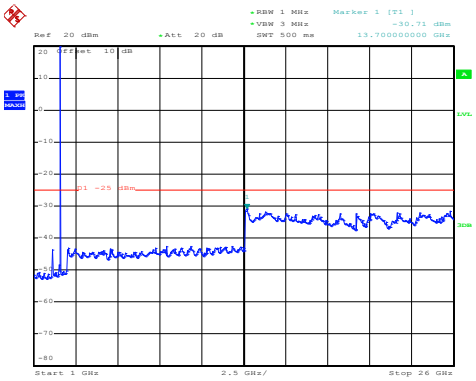


1GHz~25GHz

High channel

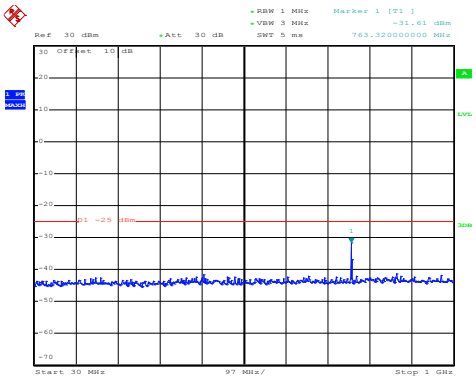


30MHz~1GHz

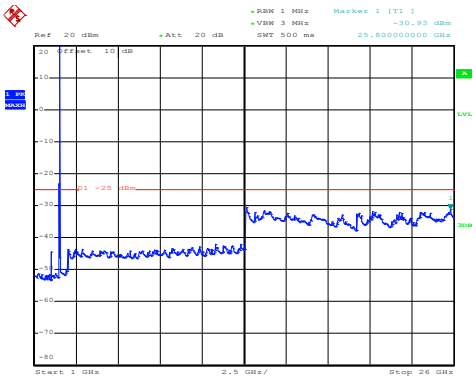


1GHz~25GHz

LTE Band 7: 16 QAM & RB Size 1
BW: 20MHz
Lowest channel

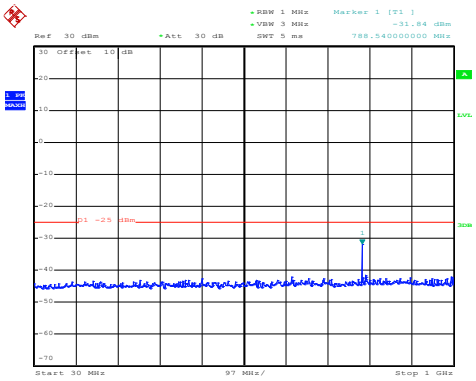


30MHz~1GHz

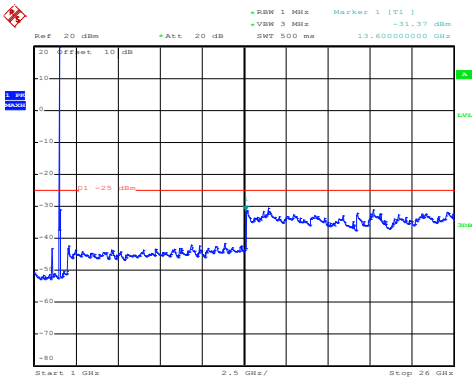


1GHz~25GHz

Middle channel

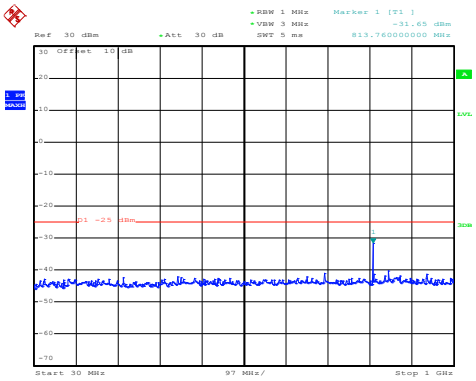


30MHz~1GHz

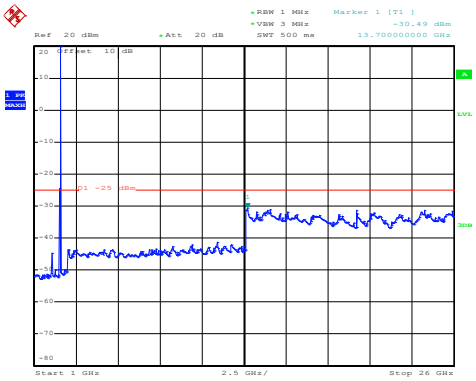


1GHz~25GHz

High channel

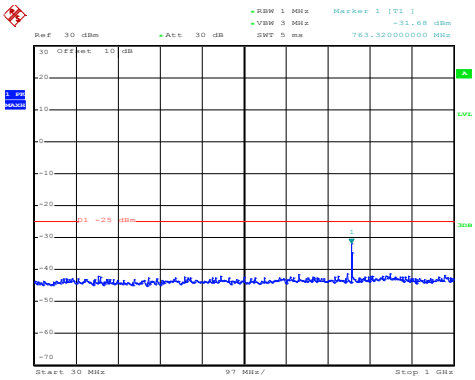


30MHz~1GHz



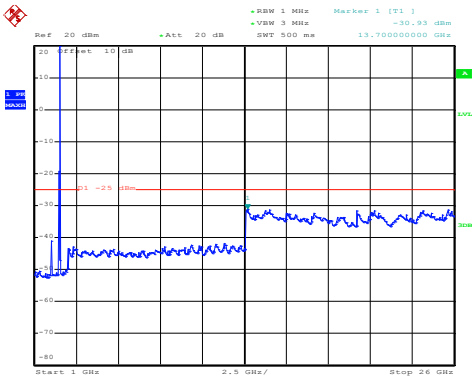
1GHz~25GHz

LTE Band 7: QPSK & RB Size 1
BW: 20MHz
Lowest channel



Date: 21.NOV.2019 22:58:48

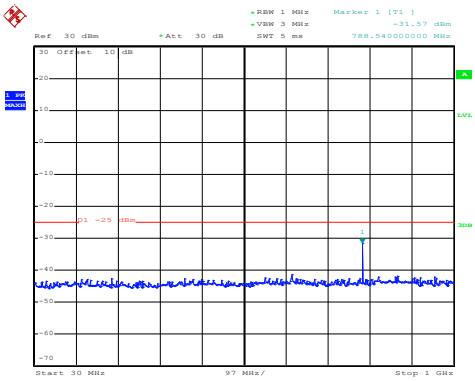
30MHz~1GHz



Date: 21.NOV.2019 23:30:22

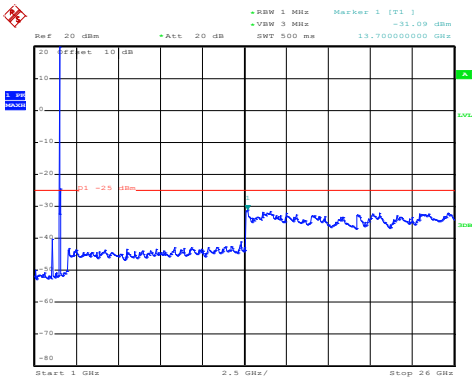
1GHz~25GHz

Middle channel



Date: 21.NOV.2019 22:57:26

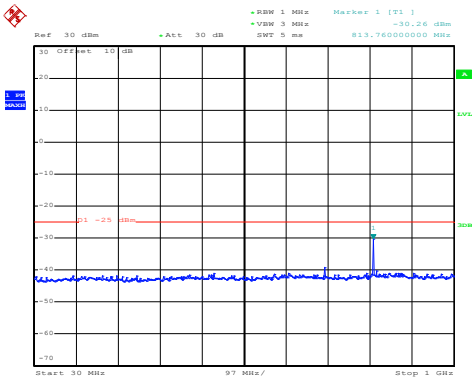
30MHz~1GHz



Date: 21.NOV.2019 23:31:23

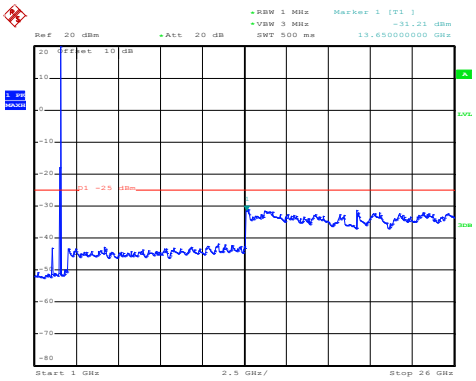
1GHz~25GHz

High channel



Date: 21.NOV.2019 22:55:24

30MHz~1GHz



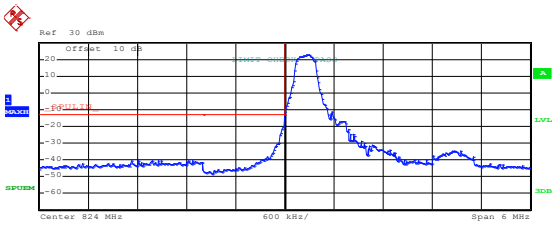
Date: 21.NOV.2019 23:32:34

1GHz~25GHz

Band edge emission:

LTE Band 5 part:

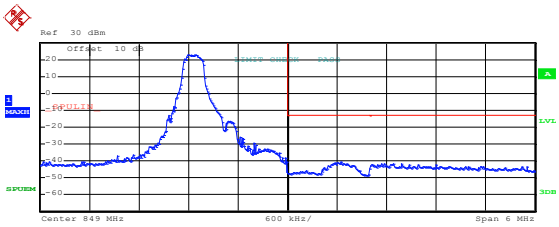
LTE Band 5, BW: 1.4MHz
16QAM & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
821.000 M	823.000 M	100.00 k	822.492000 M	-40.22	-27.22
823.000 M	824.000 M	30.00 k	823.995000 M	-19.96	-6.96
824.000 M	827.000 M	100.00 k	824.261000 M	22.95	-10.05

Date: 21.NOV.2019 22:12:18

Lowest channel

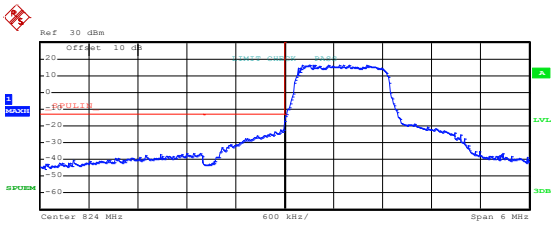


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
846.000 M	849.000 M	100.00 k	847.806000 M	22.81	-10.19
849.000 M	850.000 M	30.00 k	849.646000 M	-40.73	-27.73
850.000 M	852.000 M	100.00 k	850.382000 M	-41.68	-28.68

Date: 21.NOV.2019 22:13:41

Highest channel

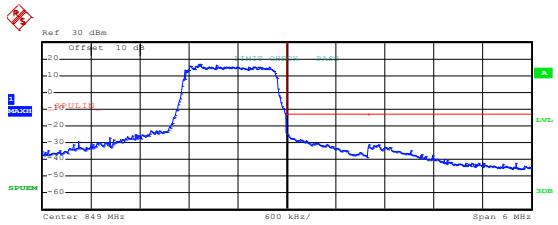
16QAM & RB Size 6



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
821.000 M	823.000 M	100.00 k	822.964000 M	-36.30	-23.30
823.000 M	824.000 M	30.00 k	823.998000 M	-22.29	-9.29
824.000 M	827.000 M	100.00 k	824.345000 M	16.37	-16.63

Date: 29.NOV.2019 10:23:22

Lowest channel



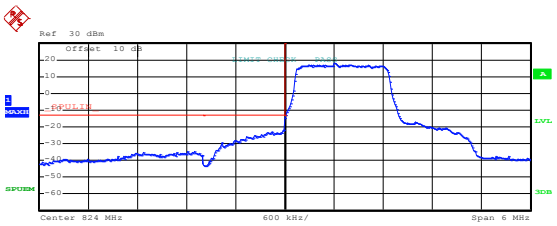
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
846.000 M	849.000 M	100.00 k	847.944000 M	16.87	-16.13
849.000 M	850.000 M	30.00 k	849.003000 M	-24.48	-11.48
850.000 M	852.000 M	100.00 k	850.122000 M	-31.04	-18.04

Date: 29.NOV.2019 10:24:30

Highest channel

LTE Band 5, BW: 1.4MHz

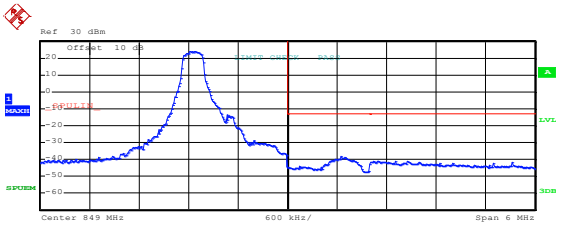
QPSK & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
821.000 M	823.000 M	100.00 k	822.894000 M	-34.58	-21.58
823.000 M	824.000 M	30.00 k	823.999000 M	-22.04	-9.04
824.000 M	827.000 M	100.00 k	824.603000 M	18.11	-14.89

Date: 21.NOV.2019 22:11:31

Lowest channel

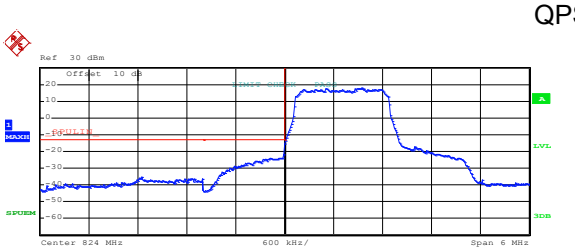


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
846.000 M	849.000 M	100.00 k	847.881000 M	23.87	-9.13
849.000 M	850.000 M	30.00 k	849.650000 M	-38.22	-25.22
850.000 M	852.000 M	100.00 k	850.086000 M	-40.90	-27.90

Date: 21.NOV.2019 22:13:22

Highest channel

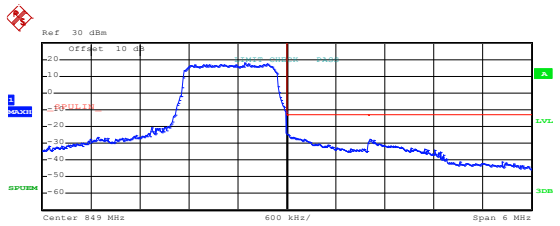
QPSK & RB Size 6



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
821.000 M	823.000 M	100.00 k	822.250000 M	-35.24	-22.24
823.000 M	824.000 M	30.00 k	823.998000 M	-23.25	-10.25
824.000 M	827.000 M	100.00 k	824.942000 M	17.98	-15.02

Date: 29.NOV.2019 10:23:11

Lowest channel

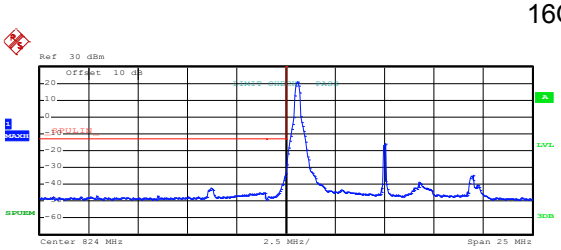


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
846.000 M	849.000 M	100.00 k	848.484000 M	17.85	-15.15
849.000 M	850.000 M	30.00 k	849.018000 M	-24.32	-11.32
850.000 M	852.000 M	100.00 k	850.016000 M	-27.59	-14.59

Date: 29.NOV.2019 10:24:14

Highest channel

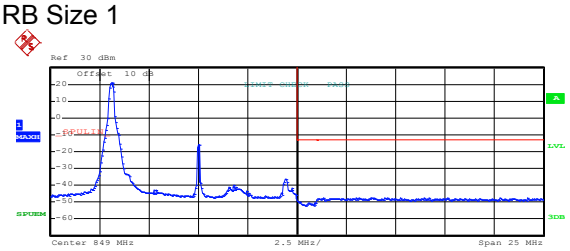
LTE Band 5, BW: 10MHz
16QAM & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
811.500 M	823.000 M	100.00 k	820.182500 M	-42.51	-29.51
823.000 M	824.000 M	30.00 k	823.999000 M	-35.25	-22.25
824.000 M	836.500 M	100.00 k	824.600000 M	20.95	-12.05

Date: 21.NOV.2019 22:21:43

Lowest channel

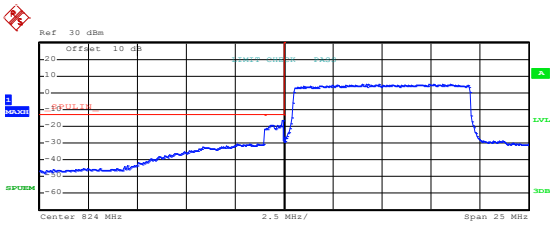


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
836.500 M	849.000 M	100.00 k	839.612500 M	21.20	-11.80
849.000 M	850.000 M	30.00 k	849.003000 M	-48.71	-35.71
850.000 M	861.500 M	100.00 k	856.647000 M	-47.24	-34.24

Date: 21.NOV.2019 22:22:53

Highest channel

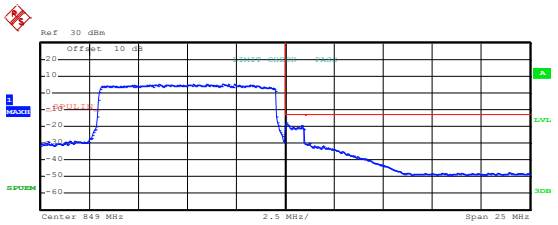
16QAM & RB Size 50



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
811.500 M	823.000 M	100.00 k	822.977000 M	-30.30	-17.30
823.000 M	824.000 M	300.00 k	823.994000 M	-16.36	-3.36
824.000 M	836.500 M	100.00 k	828.312500 M	5.33	-27.67

Date: 29.NOV.2019 10:27:21

Lowest channel



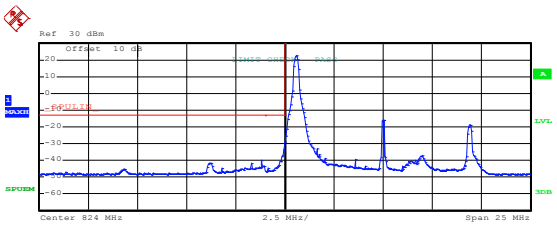
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
836.500 M	849.000 M	100.00 k	842.550000 M	5.13	-27.87
849.000 M	850.000 M	300.00 k	849.031000 M	-17.94	-4.94
850.000 M	861.500 M	100.00 k	850.184000 M	-30.09	-17.09

Date: 29.NOV.2019 10:28:16

Highest channel

LTE Band 5, BW: 10MHz

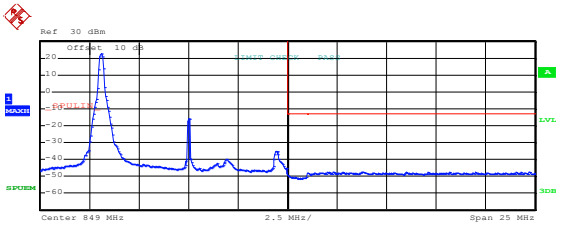
QPSK & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
811.500 M	823.000 M	100.00 k	822.793000 M	-40.01	-27.01
823.000 M	824.000 M	30.00 k	823.997000 M	-33.25	-20.25
824.000 M	836.500 M	100.00 k	824.587500 M	22.46	-10.54

Date: 21.NOV.2019 22:21:19

Lowest channel

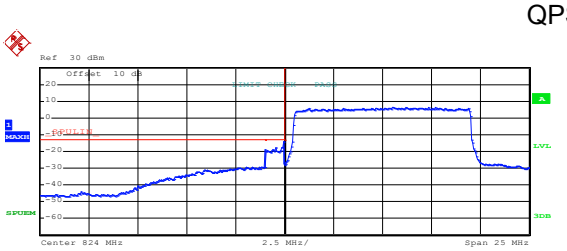


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
836.500 M	849.000 M	100.00 k	839.575000 M	22.51	-10.49
849.000 M	850.000 M	30.00 k	849.047000 M	-49.23	-36.23
850.000 M	861.500 M	100.00 k	852.771500 M	-47.37	-34.37

Date: 21.NOV.2019 22:22:19

Highest channel

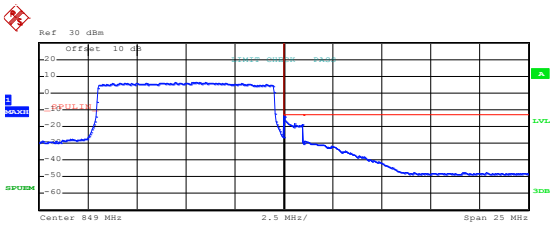
QPSK & RB Size 50



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
811.500 M	823.000 M	100.00 k	822.954000 M	-29.19	-16.19
823.000 M	824.000 M	300.00 k	823.963000 M	-13.93	-0.93
824.000 M	836.500 M	100.00 k	829.512500 M	6.43	-26.57

Date: 29.NOV.2019 10:26:47

Lowest channel



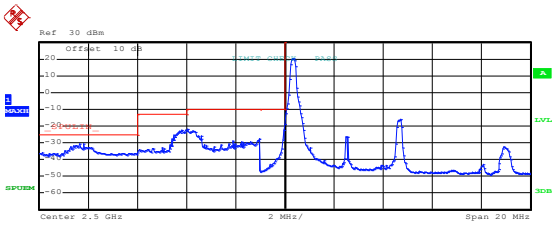
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
836.500 M	849.000 M	100.00 k	844.512500 M	6.43	-26.57
849.000 M	850.000 M	300.00 k	849.007000 M	-13.66	-0.66
850.000 M	861.500 M	100.00 k	850.046000 M	-29.04	-16.04

Date: 29.NOV.2019 10:28:03

Highest channel

LTE Band 7 part:

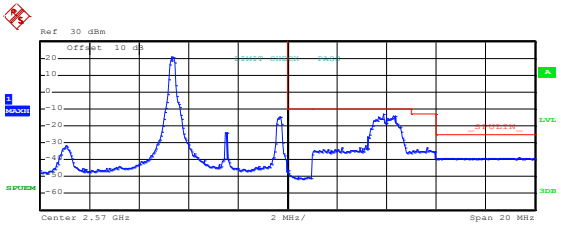
LTE Band 7, BW: 5MHz
16QAM & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.490 G	2.494 G	1.00 M	2.491632 G	-30.64	-5.64
2.494 G	2.496 G	1.00 M	2.495968 G	-22.06	-9.06
2.496 G	2.499 G	1.00 M	2.496030 G	-21.60	-11.60
2.499 G	2.500 G	30.00 k	2.499989 G	-22.11	-12.11
2.500 G	2.510 G	100.00 k	2.500350 G	20.44	-12.56

Date: 21.NOV.2019 22:27:31

Lowest channel

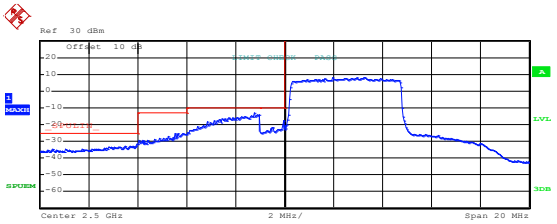


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.560 G	2.570 G	100.00 k	2.565310 G	20.65	-12.35
2.570 G	2.571 G	30.00 k	2.570054 G	-46.08	-36.08
2.571 G	2.575 G	1.00 M	2.573876 G	-13.18	-3.18
2.575 G	2.576 G	1.00 M	2.575623 G	-33.00	-20.00
2.576 G	2.580 G	1.00 M	2.579368 G	-38.90	-13.90

Date: 21.NOV.2019 22:29:34

Highest channel

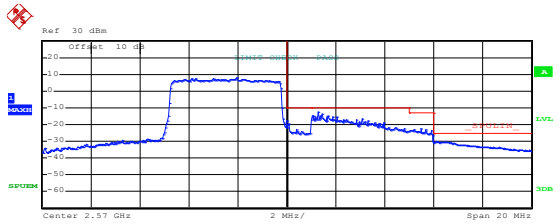
16QAM & RB Size 25



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.490 G	2.494 G	1.00 M	2.493960 G	-31.77	-6.77
2.494 G	2.496 G	1.00 M	2.495830 G	-25.12	-12.12
2.496 G	2.499 G	1.00 M	2.498775 G	-13.08	-3.08
2.499 G	2.500 G	100.00 k	2.499990 G	-17.51	-7.51
2.500 G	2.510 G	100.00 k	2.501960 G	7.97	-25.03

Date: 29.NOV.2019 10:13:48

Lowest channel

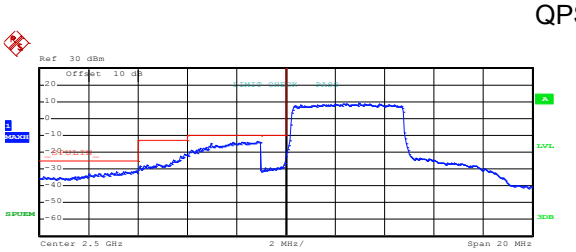


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.560 G	2.570 G	100.00 k	2.567940 G	7.95	-25.05
2.570 G	2.571 G	100.00 k	2.570002 G	-17.79	-7.79
2.571 G	2.575 G	1.00 M	2.571260 G	-12.68	-2.68
2.575 G	2.576 G	1.00 M	2.575482 G	-22.21	-9.21
2.576 G	2.580 G	1.00 M	2.576132 G	-30.06	-5.06

Date: 29.NOV.2019 10:16:55

Highest channel

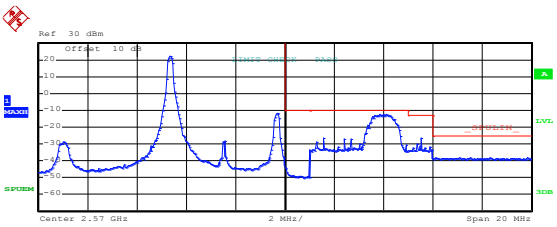
LTE Band 7, BW: 5MHz
QPSK & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.490 G	2.494 G	1.00 M	2.493936 G	-31.20	-6.20
2.494 G	2.496 G	1.00 M	2.495870 G	-21.11	-8.11
2.496 G	2.499 G	1.00 M	2.498826 G	-13.39	-3.39
2.499 G	2.500 G	30.00 k	2.499995 G	-26.18	-16.18
2.500 G	2.510 G	100.00 k	2.502940 G	9.10	-23.90

Date: 21.NOV.2019 22:27:07

Lowest channel

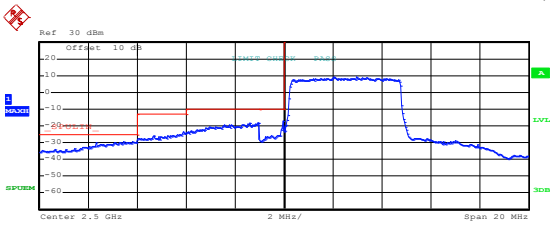


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.560 G	2.570 G	100.00 k	2.565350 G	22.22	-10.78
2.570 G	2.571 G	30.00 k	2.570005 G	-43.57	-33.57
2.571 G	2.575 G	1.00 M	2.573848 G	-12.20	-2.20
2.575 G	2.576 G	1.00 M	2.575519 G	-26.29	-13.29
2.576 G	2.580 G	1.00 M	2.577500 G	-37.86	-12.86

Date: 21.NOV.2019 22:29:16

Highest channel

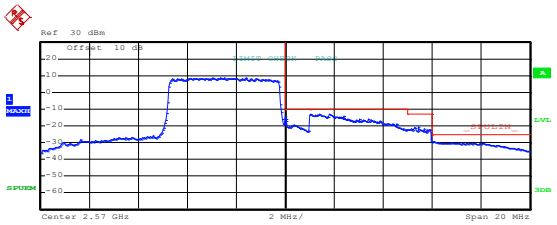
QPSK & RB Size 25



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.490 G	2.494 G	1.00 M	2.493436 G	-29.51	-4.51
2.494 G	2.496 G	1.00 M	2.495878 G	-23.31	-10.31
2.496 G	2.499 G	1.00 M	2.498961 G	-18.35	-8.35
2.499 G	2.500 G	100.00 k	2.499998 G	-17.07	-7.07
2.500 G	2.510 G	100.00 k	2.502020 G	9.11	-23.89

Date: 29.NOV.2019 10:12:44

Lowest channel

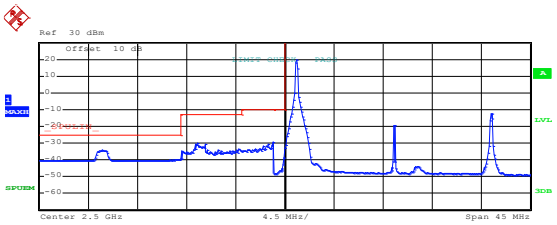


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.560 G	2.570 G	100.00 k	2.567510 G	8.78	-24.22
2.570 G	2.571 G	100.00 k	2.570015 G	-13.94	-3.94
2.571 G	2.575 G	1.00 M	2.571020 G	-13.09	-3.09
2.575 G	2.576 G	1.00 M	2.575426 G	-20.49	-7.49
2.576 G	2.580 G	1.00 M	2.576028 G	-29.42	-4.42

Date: 29.NOV.2019 10:16:37

Highest channel

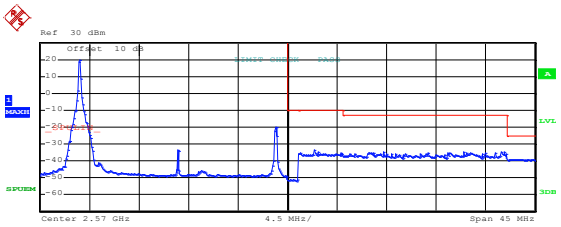
LTE Band 7, BW: 20MHz
16QAM & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.478 G	2.490 G	1.00 M	2.483266 G	-34.32	-9.32
2.490 G	2.496 G	1.00 M	2.492013 G	-30.06	-17.06
2.496 G	2.499 G	1.00 M	2.498949 G	-29.45	-19.45
2.499 G	2.500 G	30.00 k	2.499994 G	-38.66	-28.66
2.500 G	2.523 G	100.00 k	2.501103 G	19.70	-13.30

Date: 21.NOV.2019 22:39:50

Lowest channel

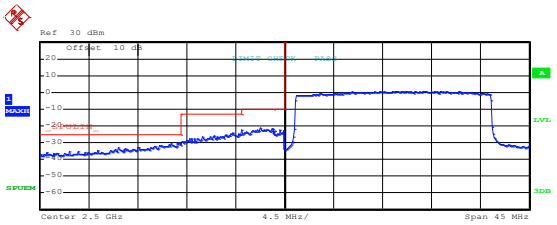


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.547 G	2.570 G	100.00 k	2.551077 G	19.86	-13.14
2.570 G	2.571 G	30.00 k	2.570939 G	-50.97	-40.97
2.571 G	2.575 G	1.00 M	2.572448 G	-33.40	-23.40
2.575 G	2.590 G	1.00 M	2.589400 G	-34.36	-21.36
2.590 G	2.592 G	1.00 M	2.590343 G	-39.16	-14.16

Date: 21.NOV.2019 22:41:01

Highest channel

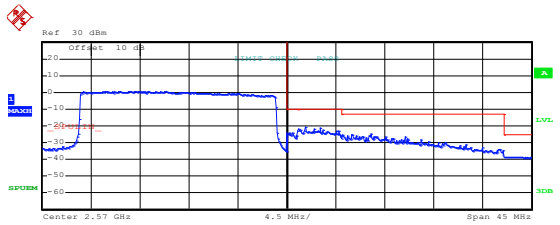
16QAM & RB Size 100



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.478 G	2.490 G	1.00 M	2.490253 G	-30.12	-5.12
2.490 G	2.496 G	1.00 M	2.495208 G	-24.31	-11.31
2.496 G	2.499 G	1.00 M	2.497764 G	-21.26	-11.26
2.499 G	2.500 G	300.00 k	2.499520 G	-22.35	-12.35
2.500 G	2.523 G	100.00 k	2.512983 G	0.75	-32.25

Date: 29.NOV.2019 10:18:35

Lowest channel



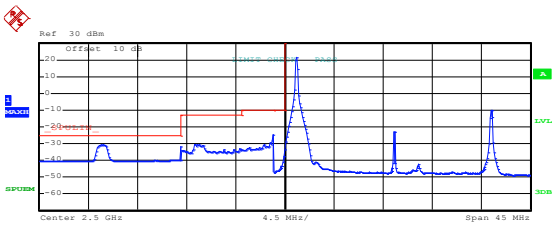
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.547 G	2.570 G	100.00 k	2.556545 G	0.74	-32.26
2.570 G	2.571 G	300.00 k	2.570523 G	-23.88	-13.88
2.571 G	2.575 G	1.00 M	2.571736 G	-20.82	-10.82
2.575 G	2.590 G	1.00 M	2.577700 G	-24.85	-11.85
2.590 G	2.592 G	1.00 M	2.590552 G	-38.52	-13.52

Date: 29.NOV.2019 10:19:32

Highest channel

LTE Band 7, BW: 20MHz

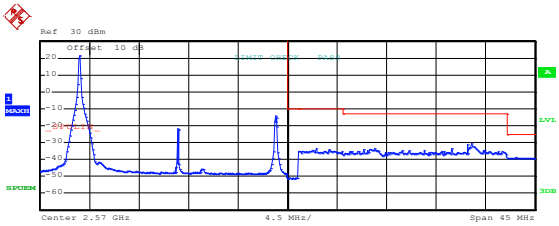
QPSK & RB Size 1



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.478 G	2.490 G	1.00 M	2.483161 G	-30.75	-5.75
2.490 G	2.496 G	1.00 M	2.491804 G	-30.33	-17.33
2.496 G	2.499 G	1.00 M	2.498892 G	-24.61	-14.61
2.499 G	2.500 G	30.00 k	2.499999 G	-37.28	-27.28
2.500 G	2.523 G	100.00 k	2.501080 G	21.40	-11.60

Date: 21.NOV.2019 22:39:25

Lowest channel

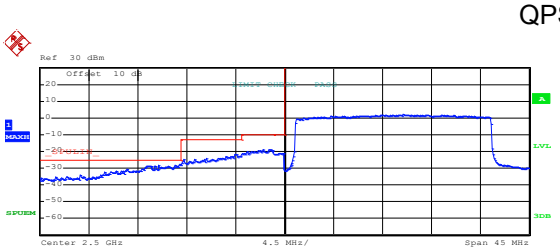


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.547 G	2.570 G	100.00 k	2.551100 G	21.44	-11.56
2.570 G	2.571 G	30.00 k	2.570243 G	-50.85	-40.85
2.571 G	2.575 G	1.00 M	2.572632 G	-33.48	-23.48
2.575 G	2.590 G	1.00 M	2.586760 G	-30.64	-17.64
2.590 G	2.592 G	1.00 M	2.590752 G	-38.98	-13.98

Date: 21.NOV.2019 22:40:48

Highest channel

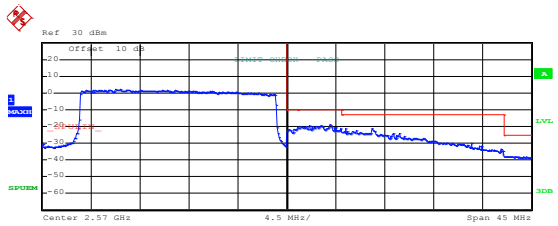
QPSK & RB Size 100



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.478 G	2.490 G	1.00 M	2.490370 G	-27.81	-2.81
2.490 G	2.496 G	1.00 M	2.495544 G	-21.67	-8.67
2.496 G	2.499 G	1.00 M	2.498001 G	-18.63	-8.63
2.499 G	2.500 G	300.00 k	2.499497 G	-20.93	-10.93
2.500 G	2.523 G	100.00 k	2.510912 G	1.97	-31.03

Date: 29.NOV.2019 10:18:17

Lowest channel

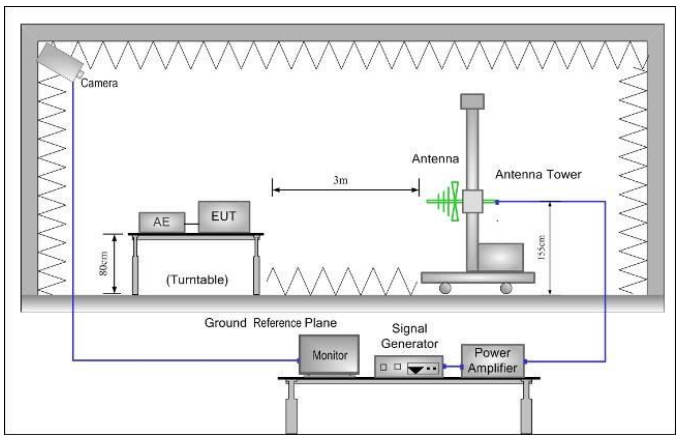
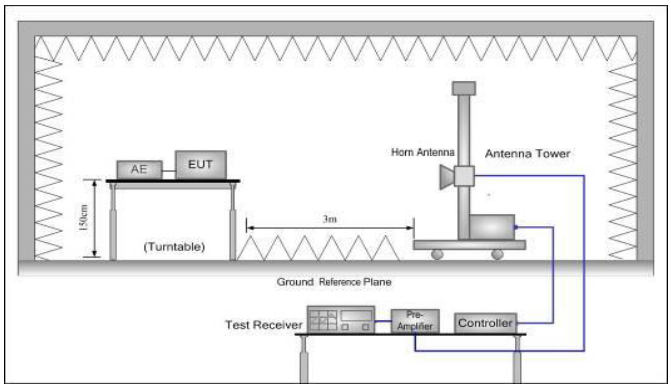


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
2.547 G	2.570 G	100.00 k	2.554273 G	2.28	-30.72
2.570 G	2.571 G	300.00 k	2.570678 G	-21.60	-11.60
2.571 G	2.575 G	1.00 M	2.573920 G	-18.83	-8.83
2.575 G	2.590 G	1.00 M	2.577775 G	-21.19	-8.19
2.590 G	2.592 G	1.00 M	2.590033 G	-37.95	-12.95

Date: 29.NOV.2019 10:19:19

Highest channel

6.5 Field strength of spurious radiation measurement

Test Requirement:	Part 22.917(b), Part 27.53(h)
Limit:	LTE Band 5: 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). LTE Band 7: 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.
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 5.10 for details
Test mode:	Refer to section 5.3 for details.
Test results:	Passed

Measurement Data:

LTE Band 5 part:

LTE Band 5, WB: 1.4MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
1649.40	Vertical	-55.70	-13.00	Pass
2474.10	V	-54.72		
3298.80	V	-50.96		
1649.40	Horizontal	-54.23		
2474.10	H	-54.16		
3298.80	H	-50.84		
Middle Channel				
1673.00	Vertical	-55.64	-13.00	Pass
2509.50	V	-54.83		
3346.00	V	-50.92		
1673.00	Horizontal	-54.37		
2509.50	H	-54.08		
3346.00	H	-50.89		
Highest Channel				
1696.60	Vertical	-55.69	-13.00	Pass
2544.90	V	-54.37		
3393.20	V	-50.89		
1696.60	Horizontal	-54.37		
2544.90	H	-54.98		
3393.20	H	-50.89		

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 5, WB: 10MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
1658.00	Vertical	-55.47	-13.00	Pass
2487.00	V	-54.89		
3316.00	V	-50.98		
1658.00	Horizontal	-54.37		
2487.00	H	-54.26		
3316.00	H	-50.91		
Middle Channel				
1673.00	Vertical	-55.87	-13.00	Pass
2509.50	V	-54.91		
3346.00	V	-50.86		
1673.00	Horizontal	-54.38		
2509.50	H	-54.86		
3346.00	H	-50.91		
Highest Channel				
1688.00	Vertical	-55.72	-13.00	Pass
2532.00	V	-54.38		
3376.00	V	-50.97		
1688.00	Horizontal	-54.00		
2532.00	H	-54.38		
3376.00	H	-50.91		

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 7 part:

LTE Band 7, WB: 5MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
5005.00	Vertical	-35.39	-25.00	Pass
7507.50	V	-38.18		
10010.00	V	-33.43		
5005.00	Horizontal	-37.49		
7507.50	H	-38.18		
10010.00	H	-34.97		
Middle Channel				
5070.00	Vertical	-35.28	-25.00	Pass
7605.00	V	-38.26		
10140.00	V	-33.52		
5070.00	Horizontal	-37.38		
7605.00	H	-38.26		
10140.00	H	-34.97		
Highest Channel				
5135.00	Vertical	-35.47	-25.00	Pass
7702.50	V	-38.64		
10270.00	V	-33.58		
5135.00	Horizontal	-37.29		
7702.50	H	-38.67		
10270.00	H	-34.85		

Note:

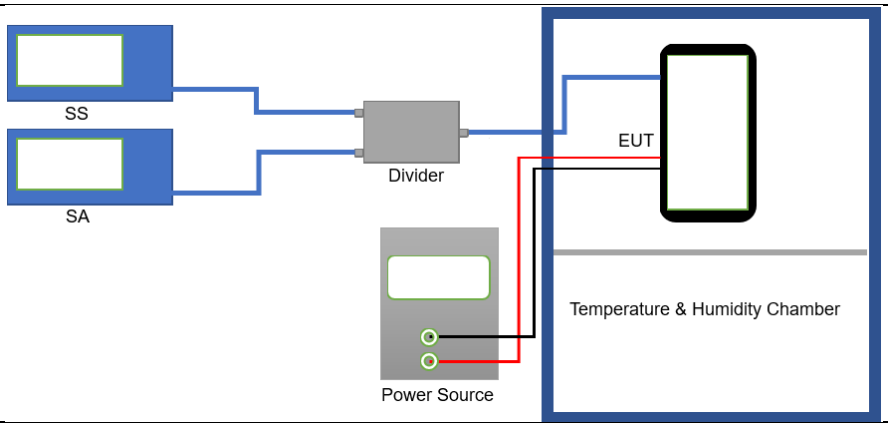
1. *The emission levels of below 1 GHz are 20 dB lower than the limit so not show in this report.*
2. *For above 1 GHz, all test modes were performed, and just the worst case shown in the report.*

LTE Band 7, WB: 20MHz				
RB size 1 & RB offset 0				
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
Lowest Channel				
5020.00	Vertical	-35.42	-25.00	Pass
7530.00	V	-38.29		
10040.00	V	-33.61		
5020.00	Horizontal	-37.52		
7530.00	H	-38.26		
10040.00	H	-34.89		
Middle Channel				
5070.00	Vertical	-35.32	-25.00	Pass
7605.00	V	-38.67		
10140.00	V	-33.56		
5070.00	Horizontal	-37.61		
7605.00	H	-38.59		
10140.00	H	-34.96		
Highest Channel				
5120.00	Vertical	-35.58	-25.00	Pass
7680.00	V	-38.69		
10240.00	V	-33.67		
5120.00	Horizontal	-37.86		
7680.00	H	-38.98		
10240.00	H	-35.12		

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.*

6.6 Frequency stability V.S. Temperature measurement

Test Requirement:	Part 22.355, Part 27.54, Part 2.1055(a)(1)(b)
Limit:	±2.5ppm For Band 5 Within authorized band for Band 7
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 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case):

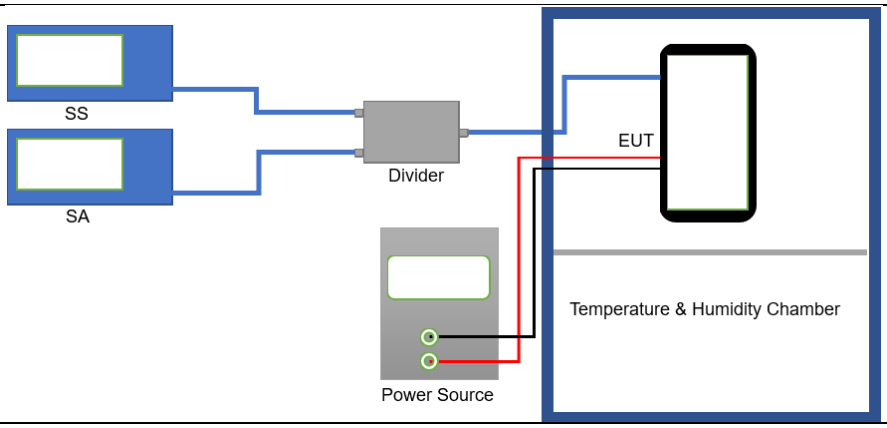
LTE Band 5 part:

Reference Frequency: LTE Band 5 (10MHz) Middle channel=20525 channel=836.50MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.70	-30	182	0.217573	±2.5	Pass
	-20	124	0.148237		
	-10	163	0.194860		
	0	117	0.139868		
	10	158	0.188882		
	20	126	0.150628		
	30	122	0.145846		
	40	108	0.129109		
	50	119	0.142259		
16QAM					
3.70	-30	176	0.210400	±2.5	Pass
	-20	112	0.133891		
	-10	103	0.123132		
	0	149	0.178123		
	10	155	0.185296		
	20	126	0.150628		
	30	123	0.147041		
	40	185	0.221160		
	50	163	0.194860		
Note: Only the worst case shown in the report.					

LTE Band 7 part:

Reference Frequency: LTE Band 7 (10MHz) Middle channel=21100 Frequency=2535.00MHz					
Power supplied (Vdc)	Temperature (℃)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
3.70	-30	196	0.077318	Within authorized band for Band 7	Pass
	-20	135	0.053254		
	-10	147	0.057988		
	0	185	0.072978		
	10	124	0.048915		
	20	130	0.051282		
	30	149	0.058777		
	40	165	0.065089		
	50	166	0.065483		
16QAM					
3.70	-30	175	0.069034	Within authorized band for Band 7	Pass
	-20	148	0.058383		
	-10	132	0.052071		
	0	172	0.067850		
	10	165	0.065089		
	20	114	0.044970		
	30	129	0.050888		
	40	130	0.051282		
	50	170	0.067061		
Note: Only the worst case shown in the report.					

6.7 Frequency stability V.S. Voltage measurement

Test Requirement:	Part 22.355, Part 27.54, Part 2.1055(d)(2)
Limit:	±2.5ppm for Band 5 Within authorized band for Band 7
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 5.10 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data (worst case):

LTE Band 5 part:

Reference Frequency: LTE Band 5(10MHz) Middle channel=20525 channel=836.50MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	4.20	172	0.205619	±2.5	Pass
	3.70	158	0.188882		
	3.50	162	0.193664		
16QAM					
25	4.20	168	0.200837	±2.5	Pass
	3.70	147	0.175732		
	3.50	154	0.184100		
Note: Only the worst case shown in the report.					

LTE Band 7 part:

Reference Frequency: LTE Band 7(10MHz) Middle channel=21100 Frequency=2535.00MHz					
Temperature (℃)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
QPSK					
25	4.20	88	0.034714	Within authorized band for Band 7	Pass
	3.70	63	0.024852		
	3.50	70	0.027613		
16QAM					
25	4.20	88	0.034714	Within authorized band for Band 7	Pass
	3.70	69	0.027219		
	3.50	36	0.014201		
Note: Only the worst case shown in the report.					

8 EUT Constructional Details

Reference to the test report No. CCISE191106901

------End of report------