



FCC ID: M82-AIM8IEM
Report No.: T181123D04-RP5

ISED No: 9404A-AIM8IEM

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**FCC 47 CFR PART 27 SUBPART C, L
&
INDUSTRY CANADA RSS-130 & RSS-139**

TEST REPORT

For

Computer

FCC Model No.: AIM8IEM; AIM8IEMxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)

IC Model No.: AIM8IEM

Trade Name: ADVANTECH

Issued to

Advantech Co.Ltd.

**No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District, Taipei 114,
Taiwan, R.O.C.**

Issued by

**Compliance Certification Services Inc.
Wugu Laboratory**

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)**

Issued Date: January 3, 2019

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
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Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		January 3, 2019		Initial Issue	ALL	Allison Chen



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1. TEST RESULT CERTIFICATION

Applicant: Advantech Co.Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Manufacturer: Advantech Co.Ltd.
No.1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Equipment Under Test: Computer

Trade Name: ADVANTECH

FCC Model No.: AIM8IEM; AIM8IEMxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)

IC Model No.: AIM8IEM

Date of Test: December 4 ~11, 2018

APPLICABLE STANDARDS	
Standard	TEST RESULT
FCC Part 27, Subpart C, L, FCC Part 2 & RSS-130 Issue 1 October 2013 & RSS-139 Issue 3 July 2015	No non-compliance noted

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by:



Jerry Chuang
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer	
FCC Model No.	AIM8IEM; AIM8IEMxxxxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)	
IC Model No.	AIM8IEM	
Model Discrepancy	All the above models are identical except for the designation of model numbers. The suffix of (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions) on model number is just for marketing purpose only.	
Trade Name	ADVANTECH	
Received Date	November 23, 2018	
Power Supply	1. VDC from Power Adapter Chicony / A16-018N1A I/P: 100-240Vac, 1A, 50-60Hz O/P: 5.15Vdc, 3A, 9.1Vdc, 2A, 18W 2. Battery ADVANTECH / AIM-BAT-8 Rating: 3.8V, 4900, 18.62Wh	
Modulation Technology	LTE Band 13	QPSK, 16QAM
	LTE Band 4	QPSK, 16QAM
Frequency Range	LTE Band 13 Channel Bandwidth: 5MHz	779.5MHz ~ 784.5MHz
	LTE Band 13 Channel Bandwidth: 10MHz	782MHz
	LTE Band 4 Channel Bandwidth: 1.4MHz	1710.7MHz ~1754.2MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.4MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715.0MHz ~1750.0MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720MHz ~1745MHz

Antenna Specification	Dipole Antenna		
	LTE Band 4: 1.8dBi		
Transmit Power (ERP & EIRP Power)	LTE Band 13		QPSK: 24.27 dBm
	Channel Bandwidth: 5MHz		16QAM: 24.29 dBm
	LTE Band 13		QPSK: 23.03 dBm
	Channel Bandwidth: 10MHz		16QAM: 23.71 dBm
	LTE Band 4		QPSK: 29.08 dBm
	Channel Bandwidth: 1.4MHz		16QAM: 29.22 dBm
	LTE Band 4		QPSK: 29.26 dBm
	Channel Bandwidth: 3MHz		16QAM: 29.44 dBm
	LTE Band 4		QPSK: 29.67 dBm
	Channel Bandwidth: 5MHz		16QAM: 29.66 dBm
	LTE Band 4		QPSK: 29.92 dBm
	Channel Bandwidth: 10MHz		16QAM: 29.84 dBm
	LTE Band 4		QPSK: 29.84 dBm
	Channel Bandwidth: 15MHz		16QAM: 29.77 dBm
	LTE Band 4		QPSK: 29.71 dBm
	Channel Bandwidth: 20MHz		16QAM: 29.78 dBm

Note: 1. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



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3. TEST SUMMARY

FCC Standard Section	IC Standard Section	Report Section	Test Item	Result
-	-	2	Antenna Requirement	Pass
2.1046	RSS-GEN 6.12	8.1	Output Power measurement	Pass
27.50(c), 27.50(d), 27.50(b)	RSS-130, section 4.4 RSS-139, section 6.5	8.2	ERP and EIRP Measurement	Pass
2.1055, 27.54	RSS-GEN 6.7	8.3	Frequency Stability v.s. temperature measurement	Pass
2.1049	RSS-130 section 4.6 RSS-139 section 6.5	8.4	Occupied Bandwidth Measurement	Pass
27.50(d)	RSS-130 section 4.4 RSS-133, section 6.4	8.5	Peak to Average Ratio	Pass
27.53(c), 27.53(g), 27.53(h)	RSS-130 section 4.6 RSS-139 section 6.5	8.6	Conducted Band Edge	Pass
27.53(c), 27.53(g), 27.53(h)	RSS-130 section 4.6 RSS-139 section 6.6	8.7	Conducted Spurious Emission	Pass
27.53(c), 27.53(g), 27.53(h)	RSS-130 section 4.3 RSS-139 section 6.4	8.8	Spurious Radiation Measurement	Pass

4. TEST METHODOLOGY

4.1 DESCRIPTION OF TEST TYPE

The EUT had been tested under operating condition.

TIA-603-E and KDB 971168 D01 Power Meas License Digital Systems

Software used to control the EUT for staying in continuous transmitting mode was programmed.

LTE Band 4: 1710MHz ~ 1755MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	1.4MHz		3MHz		5MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	19957	1710.7	19965	1711.5	19975	1712.5
Middle channel (M)	20175	1732.5	20175	1732.5	20175	1732.5
High channel (H)	20393	1754.3	20384	1753.4	20375	1752.5
Channel Bandwidth	10MHz		15MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	20000	1715.0	20025	1717.5	20000	1715.0
Middle channel (M)	20175	1732.5	20175	1732.5	20175	1732.5
High channel (H)	20350	1750.0	20325	1747.5	20350	1750.0

LTE Band 13: 777 MHz ~ 787 MHz

Three channels had been tested for each channel bandwidth.

Channel	5MHz		10MHz	
	Channel	Frequency(MHz)	Channel	Frequency(MHz)
Low CH	23205	779.5	-	-
Middle CH	23230	782.0	23230	782.0
High CH	23255	784.5	-	-

For test mode:

The conducted power be measured in 1, 50% and 100% RB allocation, offset to upper edge, centered and lower edge of the channel bandwidth of each required channel.

	QPSK	Worst Mode	16QAM	Worst Mode
Band4	1.4M	1 RB ALLOCATED AT THE LOWER EDGE	1.4M	1 RB ALLOCATED AT THE LOWER EDGE
	5M	1 RB ALLOCATED AT THE LOWER EDGE	5M	1 RB ALLOCATED AT THE LOWER EDGE
	10M	1 RB ALLOCATED AT THE LOWER EDGE	10M	1 RB ALLOCATED AT THE LOWER EDGE
	20M	1 RB ALLOCATED AT THE LOWER EDGE	20M	1 RB ALLOCATED AT THE LOWER EDGE
Band13	5M	1 RB ALLOCATED AT THE LOWER EDGE	1.4M	1 RB ALLOCATED AT THE LOWER EDGE
	10M	1 RB ALLOCATED AT THE LOWER EDGE	5M	1 RB ALLOCATED AT THE LOWER EDGE

4.2 The worst mode of measurement

LTE Band 13

Radiated Emission Measurement	
Test Condition	Emission for Unwanted and Fundamental
Power supply Mode	Mode 1: EUT Power by Power Adapter Mode 2: EUT Power by battery.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☒ Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (Z-Plane) were recorded in this report.

LTE Band 4

Radiated Emission Measurement	
Test Condition	Emission for Unwanted and Fundamental
Power supply Mode	Mode 1: EUT Power by Power Adapter Mode 2: EUT Power by battery.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

Remark:

1. The worst mode was record in this test report.
2. The EUT pre-scanned in three axis ,X,Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case (X-Plane) were recorded in this report.

5. INSTRUMENT CALIBRATION

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Wugu fully Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB1	A052609	03/14/2018	03/13/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	23452	06/29/2018	06/28/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	33960	06/29/2018	06/28/2019
Digital Radio Communication Tester	R&S	CMU200	116604	07/19/2018	07/18/2019
Digital Thermo-Hygro Meter	WISEWIND	1110	D06	02/08/2018	02/07/2019
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/14/2018	03/13/2019
Pre-Amplifier	Anritsu	MH648A	M89145	06/29/2018	06/28/2019
Pre-Amplifier	EMEC	EM01G26G	060570	06/29/2018	06/28/2019
Signal Analyzer	Agilent	N9010A	MY52220817	03/22/2018	03/21/2019
Wideband Radio Communication Tester	R&S	CMW 500	116875	04/20/2018	04/19/2019
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Coaxial Cable	Woken	WC12	CC002	06/29/2018	06/28/2019
Coaxial Cable	Woken	WC12	CC003	06/29/2018	06/28/2019
Power Divider	Solvang Technology	STI08-0015	008	07/27/2018	07/26/2019
Radio Communication Analyzer	Anritsu	MT-8820C	6201240043	07/12/2018	07/11/2019
Signal Analyzer	R&S	FSV 40	101073	09/27/2018	09/26/2019



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5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



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6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

- ☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
- ☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan, R.O.C

6.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



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7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

7.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable
	N/A					

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



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8. TEST PROCEDURE AND RESULT

8.1 OUTPUT POWER MEASUREMENT

TEST PROCEDURES

CONDUCTED POWER MEASUREMENT:

1. The transmitter output power was connected to the call box.
2. Set EUT at maximum output power via call box.
3. Set Call box at lowest, middle and highest channels for each band and modulation.

TEST RESULTS**LTE Band 4**

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	1.4M	19957	1710.7	QPSK	1	0	0	22.86	0.1932
					1	2	0	22.83	0.1919
					1	5	0	22.54	0.1795
					3	0	1	22.00	0.1585
					3	1	1	22.16	0.1644
					3	2	1	21.91	0.1552
					6	0	1	21.97	0.1574
				16QAM	1	0	1	22.07	0.1611
					1	2	1	22.39	0.1734
					1	5	1	22.01	0.1589
					3	0	2	20.99	0.1256
					3	1	2	21.12	0.1294
					3	2	2	20.87	0.1222
					6	0	2	20.95	0.1245
		20175	1732.5	QPSK	1	0	0	22.89	0.1945
					1	2	0	22.74	0.1879
					1	5	0	22.52	0.1786
					3	0	1	21.94	0.1563
					3	1	1	21.81	0.1517
					3	2	1	21.76	0.1500
					6	0	1	21.89	0.1545
				16QAM	1	0	1	22.10	0.1622
					1	2	1	22.18	0.1652
					1	5	1	22.10	0.1622
					3	0	2	20.89	0.1227
					3	1	2	20.86	0.1219
					3	2	2	20.87	0.1222
					6	0	2	20.86	0.1219
		20392	1754.2	QPSK	1	0	0	22.68	0.1854
					1	2	0	22.88	0.1941
					1	5	0	22.82	0.1914
					3	0	1	21.87	0.1538
					3	1	1	21.89	0.1545
					3	2	1	21.84	0.1528
					6	0	1	21.89	0.1545
				16QAM	1	0	1	22.17	0.1648
					1	2	1	21.98	0.1578
					1	5	1	22.05	0.1603
					3	0	2	20.92	0.1236
					3	1	2	20.89	0.1227
					3	2	2	20.82	0.1208
					6	0	2	20.84	0.1213

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	3M	19665	1711.5	QPSK	1	0	0	22.87	0.1936
					1	7	0	22.84	0.1923
					1	14	0	22.55	0.1799
					8	0	1	22.01	0.1589
					8	4	1	22.17	0.1648
					8	7	1	21.92	0.1556
					15	0	1	21.98	0.1578
				16QAM	1	0	1	22.08	0.1614
					1	7	1	22.40	0.1738
					1	14	1	22.02	0.1592
					8	0	2	21.00	0.1259
					8	4	2	21.13	0.1297
					8	7	2	20.88	0.1225
					15	0	2	20.96	0.1247
		20175	1732.5	QPSK	1	0	0	22.90	0.1950
					1	7	0	22.75	0.1884
					1	14	0	22.53	0.1791
					8	0	1	21.95	0.1567
					8	4	1	21.82	0.1521
					8	7	1	21.77	0.1503
					15	0	1	21.90	0.1549
				16QAM	1	0	1	22.11	0.1626
					1	7	1	22.19	0.1656
					1	14	1	22.11	0.1626
					8	0	2	20.90	0.1230
					8	4	2	20.87	0.1222
					8	7	2	20.88	0.1225
					15	0	2	20.87	0.1222
		20384	1753.4	QPSK	1	0	0	22.69	0.1858
					1	7	0	22.89	0.1945
					1	14	0	22.83	0.1919
					8	0	1	21.88	0.1542
					8	4	1	21.90	0.1549
					8	7	1	21.85	0.1531
					15	0	1	21.90	0.1549
				16QAM	1	0	1	22.18	0.1652
					1	7	1	21.99	0.1581
					1	14	1	22.06	0.1607
					8	0	2	20.93	0.1239
					8	4	2	20.90	0.1230
					8	7	2	20.83	0.1211
					15	0	2	20.85	0.1216

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	5M	19975	1712.5	QPSK	1	0	0	22.89	0.1945
					1	12	0	22.86	0.1932
					1	24	0	22.57	0.1807
					12	0	1	22.03	0.1596
					12	6	1	22.19	0.1656
					12	11	1	21.94	0.1563
					25	0	1	22.00	0.1585
				16QAM	1	0	1	22.10	0.1622
					1	12	1	22.42	0.1746
					1	24	1	22.04	0.1600
					12	0	2	21.02	0.1265
					12	6	2	21.15	0.1303
					12	11	2	20.90	0.1230
					25	0	2	20.98	0.1253
		20175	1732.5	QPSK	1	0	0	22.91	0.1954
					1	12	0	22.76	0.1888
					1	24	0	22.54	0.1795
					12	0	1	21.96	0.1570
					12	6	1	21.83	0.1524
					12	11	1	21.78	0.1507
					25	0	1	21.91	0.1552
				16QAM	1	0	1	22.12	0.1629
					1	12	1	22.20	0.1660
					1	24	1	22.12	0.1629
					12	0	2	20.91	0.1233
					12	6	2	20.88	0.1225
					12	11	2	20.89	0.1227
					25	0	2	20.88	0.1225
		20375	1752.5	QPSK	1	0	0	22.70	0.1862
					1	12	0	22.90	0.1950
					1	24	0	22.84	0.1923
					12	0	1	21.89	0.1545
					12	6	1	21.91	0.1552
					12	11	1	21.86	0.1535
					25	0	1	21.91	0.1552
				16QAM	1	0	1	22.19	0.1656
					1	12	1	22.00	0.1585
					1	24	1	22.07	0.1611
					12	0	2	20.94	0.1242
					12	6	2	20.91	0.1233
					12	11	2	20.84	0.1213
					25	0	2	20.86	0.1219

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	10M	20000	1715.0	QPSK	1	0	0	22.90	0.1950
					1	24	0	22.87	0.1936
					1	49	0	22.58	0.1811
					25	0	1	22.04	0.1600
					25	12	1	22.20	0.1660
					25	24	1	21.95	0.1567
					50	0	1	22.01	0.1589
				16QAM	1	0	1	22.11	0.1626
					1	24	1	22.43	0.1750
					1	49	1	22.05	0.1603
					25	0	2	21.03	0.1268
					25	12	2	21.16	0.1306
					25	24	2	20.91	0.1233
					50	0	2	20.99	0.1256
		20175	1732.5	QPSK	1	0	0	22.93	0.1963
					1	24	0	22.78	0.1897
					1	49	0	22.56	0.1803
					25	0	1	21.98	0.1578
					25	12	1	21.85	0.1531
					25	24	1	21.80	0.1514
					50	0	1	21.93	0.1560
				16QAM	1	0	1	22.14	0.1637
					1	24	1	22.22	0.1667
					1	49	1	22.14	0.1637
					25	0	2	20.93	0.1239
					25	12	2	20.90	0.1230
					25	24	2	20.91	0.1233
					50	0	2	20.90	0.1230
		20350	1750.0	QPSK	1	0	0	22.73	0.1875
					1	24	0	22.93	0.1963
					1	49	0	22.87	0.1936
					25	0	1	21.92	0.1556
					25	12	1	21.94	0.1563
					25	24	1	21.89	0.1545
					50	0	1	21.94	0.1563
				16QAM	1	0	1	22.22	0.1667
					1	24	1	22.03	0.1596
					1	49	1	22.10	0.1622
					25	0	2	20.97	0.1250
					25	12	2	20.94	0.1242
					25	24	2	20.87	0.1222
					50	0	2	20.89	0.1227

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	15M	20025	1717.5	QPSK	1	0	0	22.93	0.1963
					1	37	0	22.90	0.1950
					1	74	0	22.61	0.1824
					36	0	1	22.07	0.1611
					36	18	1	22.23	0.1671
					36	35	1	21.98	0.1578
					75	0	1	22.04	0.1600
				16QAM	1	0	1	22.14	0.1637
					1	37	1	22.46	0.1762
					1	74	1	22.08	0.1614
					36	0	2	21.06	0.1276
					36	18	2	21.19	0.1315
					36	35	2	20.94	0.1242
					75	0	2	21.02	0.1265
		20175	1732.5	QPSK	1	0	0	22.95	0.1972
					1	37	0	22.80	0.1905
					1	74	0	22.58	0.1811
					36	0	1	22.00	0.1585
					36	18	1	21.87	0.1538
					36	35	1	21.82	0.1521
					75	0	1	21.95	0.1567
				16QAM	1	0	1	22.16	0.1644
					1	37	1	22.24	0.1675
					1	74	1	22.16	0.1644
					36	0	2	20.95	0.1245
					36	18	2	20.92	0.1236
					36	35	2	20.93	0.1239
					75	0	2	20.92	0.1236
		20325	1747.5	QPSK	1	0	0	22.75	0.1884
					1	37	0	22.95	0.1972
					1	74	0	22.89	0.1945
					36	0	1	21.94	0.1563
					36	18	1	21.96	0.1570
					36	35	1	21.91	0.1552
					75	0	1	21.96	0.1570
				16QAM	1	0	1	22.24	0.1675
					1	37	1	22.05	0.1603
					1	74	1	22.12	0.1629
					36	0	2	20.99	0.1256
					36	18	2	20.96	0.1247
					36	35	2	20.89	0.1227
					75	0	2	20.91	0.1233

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	20M	20050	1720.0	QPSK	1	0	0	23.01	0.2000
					1	49	0	22.98	0.1986
					1	99	0	22.69	0.1858
					50	0	1	22.15	0.1641
					50	24	1	22.31	0.1702
					50	49	1	22.06	0.1607
					100	0	1	22.12	0.1629
				16QAM	1	0	1	22.22	0.1667
					1	49	1	22.54	0.1795
					1	99	1	22.16	0.1644
					50	0	2	21.14	0.1300
					50	24	2	21.27	0.1340
					50	49	2	21.02	0.1265
					100	0	2	21.10	0.1288
		20175	1732.5	QPSK	1	0	0	23.01	0.2000
					1	49	0	22.86	0.1932
					1	99	0	22.64	0.1837
					50	0	1	22.06	0.1607
					50	24	1	21.93	0.1560
					50	49	1	21.88	0.1542
					100	0	1	22.01	0.1589
				16QAM	1	0	1	22.22	0.1667
					1	49	1	22.30	0.1698
					1	99	1	22.22	0.1667
					50	0	2	21.01	0.1262
					50	24	2	20.98	0.1253
					50	49	2	20.99	0.1256
					100	0	2	20.98	0.1253
		20300	1745.0	QPSK	1	0	0	22.80	0.1905
					1	49	0	23.00	0.1995
					1	99	0	22.94	0.1968
					50	0	1	21.99	0.1581
					50	24	1	22.01	0.1589
					50	49	1	21.96	0.1570
					100	0	1	22.01	0.1589
				16QAM	1	0	1	22.29	0.1694
					1	49	1	22.10	0.1622
					1	99	1	22.17	0.1648
					50	0	2	21.04	0.1271
					50	24	2	21.01	0.1262
					50	49	2	20.94	0.1242
					100	0	2	20.96	0.1247

LTE Band 13

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
13	5	23205	779.5	QPSK	1	0	0	22.55	0.1799
					1	12	0	22.19	0.1656
					1	24	0	22.84	0.1923
					12	0	1	21.56	0.1432
					12	6	1	21.39	0.1377
					12	11	1	21.85	0.1531
					25	0	1	21.55	0.1429
				16QAM	1	0	1	21.8	0.1514
					1	12	1	22.03	0.1596
					1	24	1	21.86	0.1535
					12	0	2	20.71	0.1178
					12	6	2	20.69	0.1172
					12	11	2	20.85	0.1216
					25	0	2	20.86	0.1219
		23230	782.0	QPSK	1	0	0	22.17	0.1648
					1	12	0	22.53	0.1791
					1	24	0	22.82	0.1914
					12	0	1	21.54	0.1426
					12	6	1	21.37	0.1371
					12	11	1	21.83	0.1524
					25	0	1	21.53	0.1422
				16QAM	1	0	1	21.78	0.1507
					1	12	1	22.01	0.1589
					1	24	1	21.84	0.1528
					12	0	2	20.69	0.1172
					12	6	2	20.67	0.1167
					12	11	2	20.83	0.1211
					25	0	2	20.84	0.1213
		23255	784.5	QPSK	1	0	0	22.59	0.1816
					1	12	0	22.23	0.1671
					1	24	0	22.88	0.1941
					12	0	1	21.6	0.1445
					12	6	1	21.43	0.1390
					12	11	1	21.89	0.1545
					25	0	1	21.59	0.1442
				16QAM	1	0	1	21.84	0.1528
					1	12	1	22.07	0.1611
					1	24	1	21.9	0.1549
					12	0	2	20.75	0.1189
					12	6	2	20.73	0.1183
					12	11	2	20.89	0.1227
					25	0	2	20.9	0.1230



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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
13	10	23230	782.0	QPSK	1	0	0	22.61	0.1824
					1	24	0	22.25	0.1679
					1	49	0	22.9	0.1950
					25	0	1	21.62	0.1452
					25	12	1	21.45	0.1396
					25	24	1	21.91	0.1552
					50	0	1	21.61	0.1449
				16QAM	1	0	1	21.86	0.1535
					1	24	1	22.09	0.1618
					1	49	1	21.92	0.1556
					25	0	2	20.77	0.1194
					25	12	2	20.75	0.1189
					25	24	2	20.91	0.1233
					50	0	2	20.92	0.1236

8.2 ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

FCC 27.50 (c) (10): The portable stations (hand-held devices) in the 600MHz uplink band and the 698-746MHz band, and fixed and mobile stations in the 600MHz uplink band are limited to 3 Watts ERP.

FCC 27.50 (d) (4): Fixed, mobile, and portable (handheld)stations operating in the 1710-1755MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780MHz bands are limited to 1 watt EIRP.

FCC 27.50 (b) (10): Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

RSS-130 § 4.4,

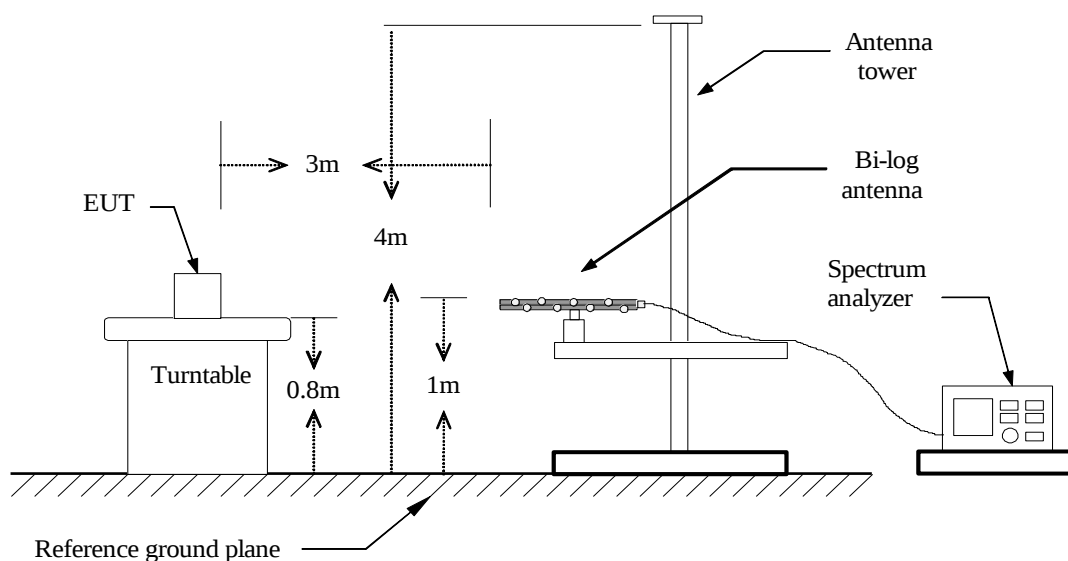
The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

RSS-139 § 6.5,

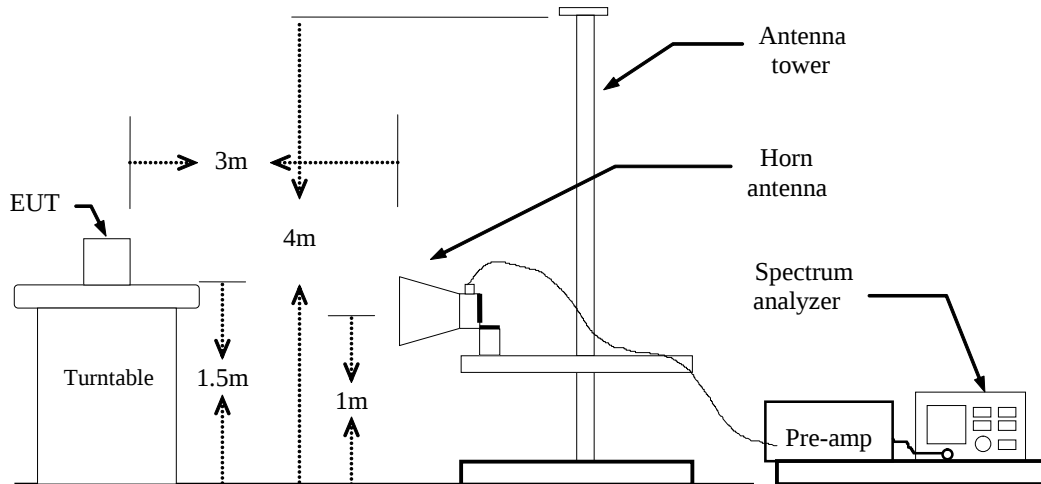
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Test Configuration

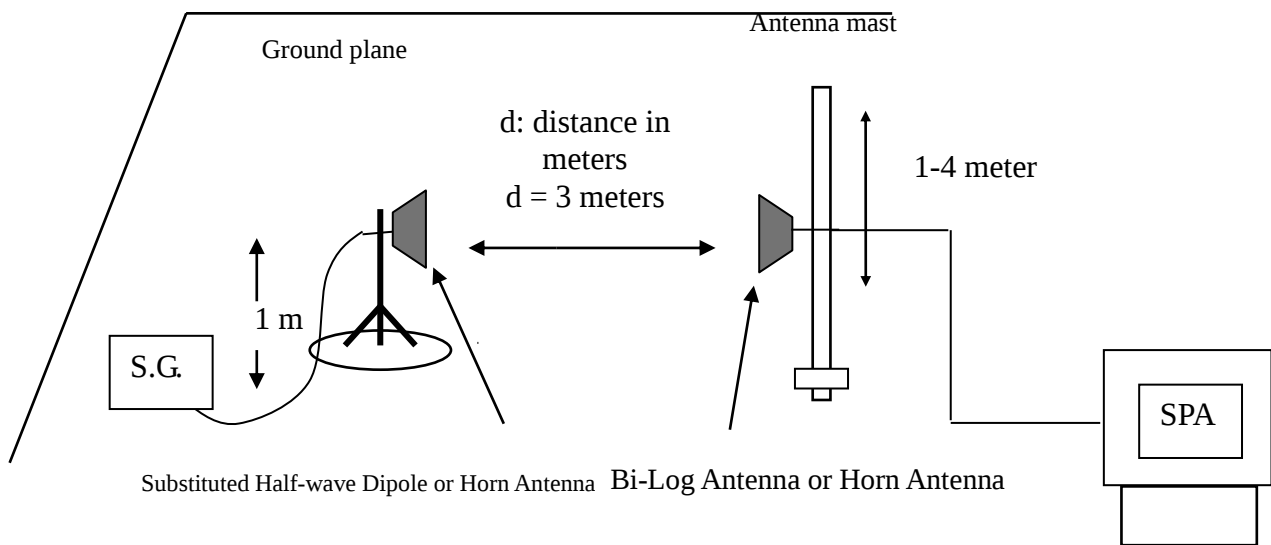
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and 1.5m for above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per photograph 5, KDB 971168 D01 Power Meas License Digital Systems.
2. During the measurement, the call box parameters were set to get the maximum output power of the EUT. The maximum emission was recorded from spectrum analyzer power level (LVL) from 360 degrees rotation of turntable and the test antenna raised and lowered over a range from 1m to 4m in both horizontally and vertically polarized orientations.
3. EIRP was measured method according to TIA-603-E. The EUT was replaced by the substitution antenna at same location, and then record the maximum Analyzer reading through raised and lowered the test antenna.

$ERP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)} - 2.15$

$EIRP = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$

TEST RESULTS

No non-compliance noted.

LTE Band 4

BW: 1.4MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	1.4	Lowest	QPSK	1	0	18.58	0.0721	29.08	0.8091
		Middle		1	0	16.13	0.0410	28.56	0.7178
		Highest		1	0	18.20	0.0661	28.80	0.7586
		Lowest	16 QAM	1	0	17.72	0.0592	29.22	0.8356
		Middle		1	0	15.80	0.0380	28.36	0.6855
		Highest		1	0	18.34	0.0682	29.18	0.8279

BW: 3MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	3	Lowest	QPSK	1	0	17.68	0.0586	29.14	0.8204
		Middle		1	0	15.67	0.0369	29.26	0.8433
		Highest		1	0	18.01	0.0632	29.25	0.8414
		Lowest	16 QAM	1	0	17.65	0.0582	29.30	0.8511
		Middle		1	0	15.62	0.0365	29.40	0.8710
		Highest		1	0	18.19	0.0659	29.44	0.8790

BW: 5MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	5	Lowest	QPSK	1	0	17.46	0.0557	29.06	0.8054
		Middle		1	0	15.48	0.0353	29.13	0.8185
		Highest		1	0	18.11	0.0647	29.67	0.9268
		Lowest	16 QAM	1	0	17.32	0.0540	28.83	0.7638
		Middle		1	0	15.47	0.0352	28.90	0.7762
		Highest		1	0	18.21	0.0662	29.66	0.9247

BW: 10MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	10	Lowest	QPSK	1	0	16.54	0.0451	28.63	0.7295
		Middle		1	0	15.23	0.0333	29.09	0.8110
		Highest		1	0	16.59	0.0456	29.92	0.9817
		Lowest	16 QAM	1	0	16.78	0.0476	28.89	0.7745
		Middle		1	0	15.93	0.0392	28.87	0.7709
		Highest		1	0	16.63	0.0460	29.84	0.9638

BW: 15MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	15	Lowest	QPSK	1	0	16.51	0.0448	28.62	0.7278
		Middle		1	0	14.70	0.0295	28.98	0.7907
		Highest		1	0	16.01	0.0399	29.84	0.9638
		Lowest	16 QAM	1	0	16.36	0.0433	28.68	0.7379
		Middle		1	0	14.71	0.0296	28.88	0.7727
		Highest		1	0	15.65	0.0367	29.77	0.9484

BW: 20MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	20	Lowest	QPSK	1	0	16.25	0.0422	28.56	0.7178
		Middle		1	0	15.15	0.0327	28.93	0.7816
		Highest		1	0	15.32	0.0340	29.71	0.9354
		Lowest	16 QAM	1	0	16.03	0.0401	28.60	0.7244
		Middle		1	0	15.00	0.0316	29.12	0.8166
		Highest		1	0	15.64	0.0366	29.78	0.9506

LTE Band 13

BW: 5MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
13	5	Lowest	QPSK	1	0	23.15	0.2065	22.03	0.1596
		Middle		1	0	23.41	0.2193	21.43	0.1390
		Highest		1	0	24.27	0.2673	21.94	0.1563
		Lowest	16 QAM	1	0	22.54	0.1795	21.79	0.1510
		Middle		1	0	24.29	0.2685	22.20	0.1660
		Highest		1	0	20.30	0.1072	21.89	0.1545

BW: 10MHz / RB=1, RB Offset=0

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
13	10	Middle	QPSK	1	0	23.03	0.2009	21.92	0.1556
		Middle	16 QAM	1	0	23.71	0.2350	22.98	0.1986



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8.3 FREQUENCY STABILITY MEASUREMENT

LIMIT

According to the FCC part 27.54 shall be tested the frequency stability. The rule is defined that "The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation."

TEST PROCEDURE

Use Anritsu 8820 with frequency Error measurement capability.

Temp = -20 to +50°C

Voltage= 85% to 115% of the nominal value for AC powered equipment.

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

TEST RESULTS

FREQUENCY STABILTY V.S. TEMPERATURE MEASUREMENT

LTE Band 4

Reference Frequency: LTE Band 4 Max Bandwidth QPSK 1732.5 MHz		
Limit: 1720MHz ~1745MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
120	50	0.00
120	40	0.01
120	30	0.00
120	20	-0.01
120	10	0.01
120	0	0.00
120	-10	0.02
120	-20	0.03

Reference Frequency: LTE Band 4 Max Bandwidth 16QAM 1732.5 MHz		
Limit: 1720MHz ~1745MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
120	50	-0.01
120	40	0.01
120	30	0.00
120	20	0.01
120	10	0.02
120	0	0.01
120	-10	-0.02
120	-20	0.01

Note: We selected worst case to performed test in middle channel, The results can be meet other channel.

LTE Band 13

Reference Frequency: LTE Band 13 Max Bandwidth QPSK 782 MHz		
Limit: 782MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
120	50	0.04
120	40	0.02
120	30	0.01
120	20	0.00
120	10	0.01
120	0	0.02
120	-10	0.03
120	-20	0.05

Reference Frequency: LTE Band 13 Max Bandwidth 16QAM 782 MHz		
Limit: 782MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
120	50	0.04
120	40	0.01
120	30	0.01
120	20	0.02
120	10	0.02
120	0	0.03
120	-10	0.02
120	-20	0.00

Note: We selected worst case to performed test in middle channel, The results can be meet other channel.



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FREQUENCY STABILTY V.S. VOLTAGE MEASUREMENT
LTE Band 4

Reference Frequency: LTE Band 4 Max Bandwidth QPSK, 1732.5MHz		
Limit: 1720MHz ~1745MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
102	20	0.00
120	20	-0.01
138	20	0.01

Reference Frequency: LTE Band IV Max Bandwidth 16QAM, 1732.5MHz		
Limit: 1720MHz ~1745MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
102	20	0.00
120	20	0.01
138	20	-0.01



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LTE Band 13

Reference Frequency: LTE Band 13 Max Bandwidth QPSK, 782MHz		
Limit: 782MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
102	20	0.02
120	20	0.00
138	20	0.01

Reference Frequency: LTE Band 13 Max Bandwidth 16QAM, 782MHz		
Limit: 782MHz		
Power Supply	Environment	Frequency Error
Vdc	Temperature (°C)	(Hz)
102	20	0.02
120	20	0.02
138	20	0.03



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8.4 OCCUPIED BANDWIDTH MEASUREMENT

LIMITS

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

TEST PROCEDURES

KDB 971168 D01,

1. The occupied bandwidth was measured with the spectrum analyzer at the lowest, middle and highest channels in each band and different modulation. The 99% and -26dB bandwidth was measured and recorded.
2. RBW = 1-5% of the expected OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max. hold



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TEST RESULTS

LTE Band 13

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23230	782.00	4.4717

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23230	782.00	4.4717

CHANNEL BANDWIDTH: 10MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23230	782.00	8.9146

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23230	782.00	8.9435

LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	1.0897

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	1.0984

CHANNEL BANDWIDTH: 3MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	2.6830

CHANNEL BANDWIDTH: 3MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	2.6830

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	4.4862

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	4.4862



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CHANNEL BANDWIDTH: 10MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	8.9725

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	8.9435

CHANNEL BANDWIDTH: 15MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	13.4587

CHANNEL BANDWIDTH: 15MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	13.4153

CHANNEL BANDWIDTH: 20MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	18.0028

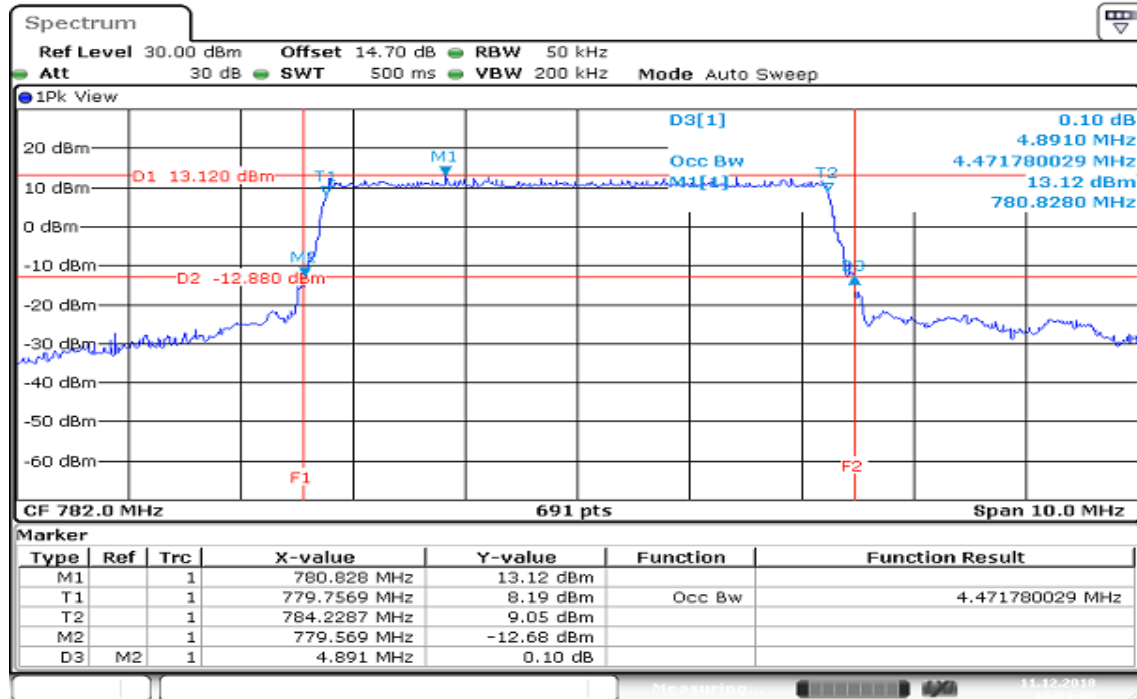
CHANNEL BANDWIDTH: 20MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	18.0607

LTE Band 13

CHANNEL BANDWIDTH: 5MHz / QPSK

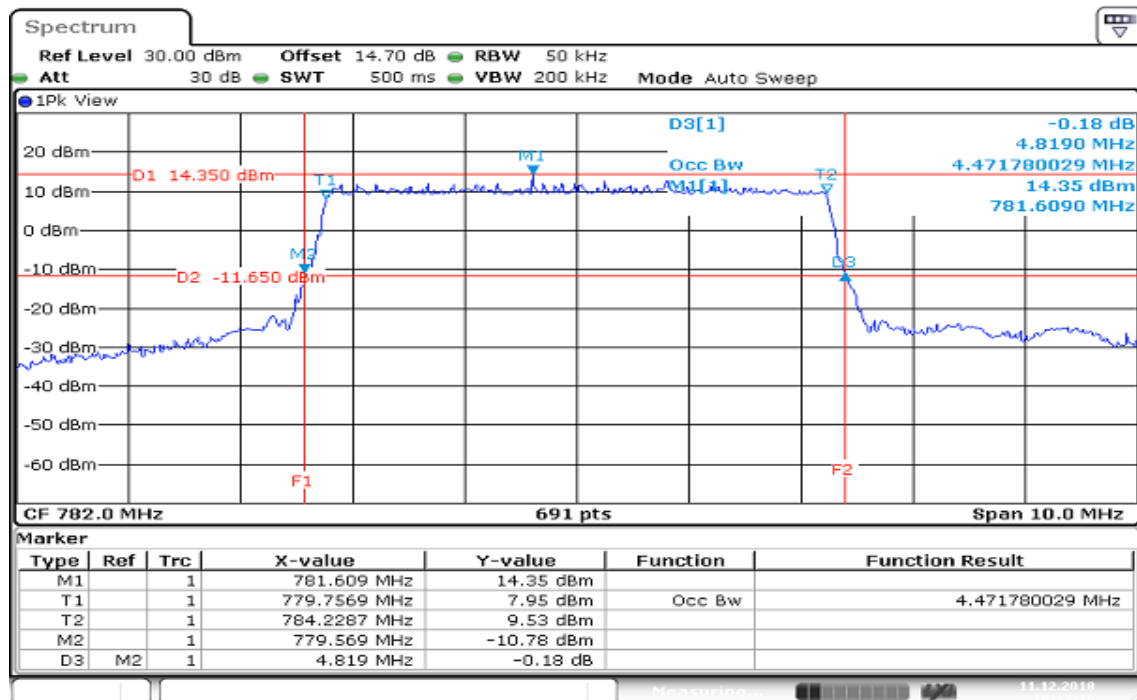
CH Mid



Date: 11 DEC 2018 10:21:00

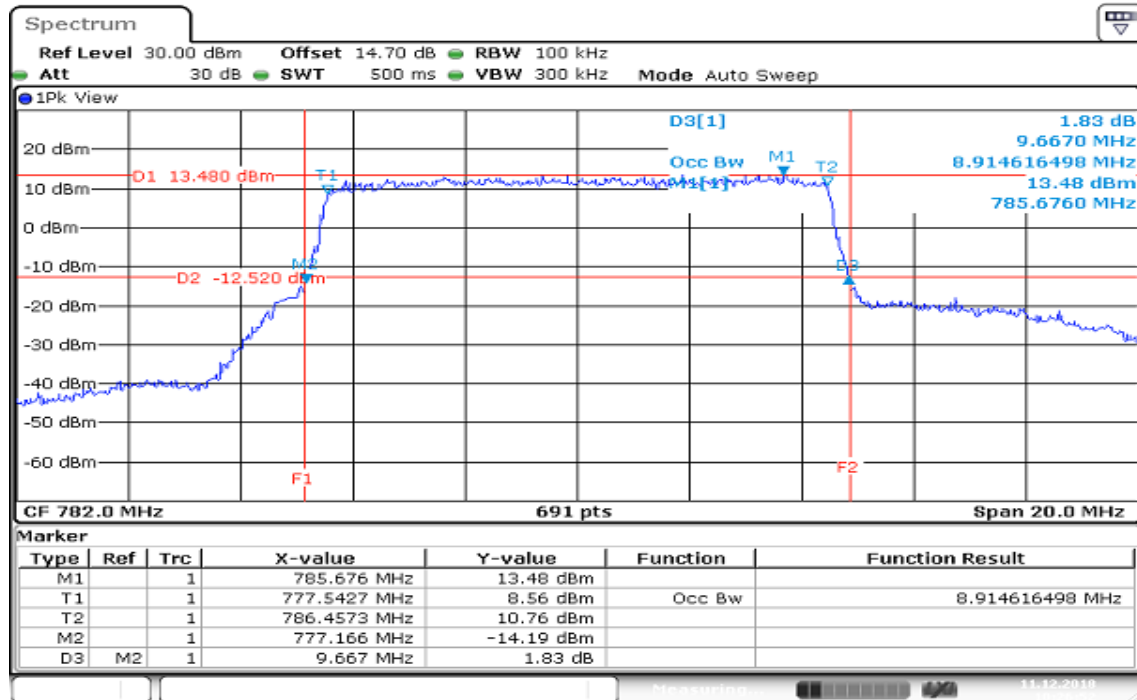
CHANNEL BANDWIDTH: 5MHz / 16QAM

CH Mid



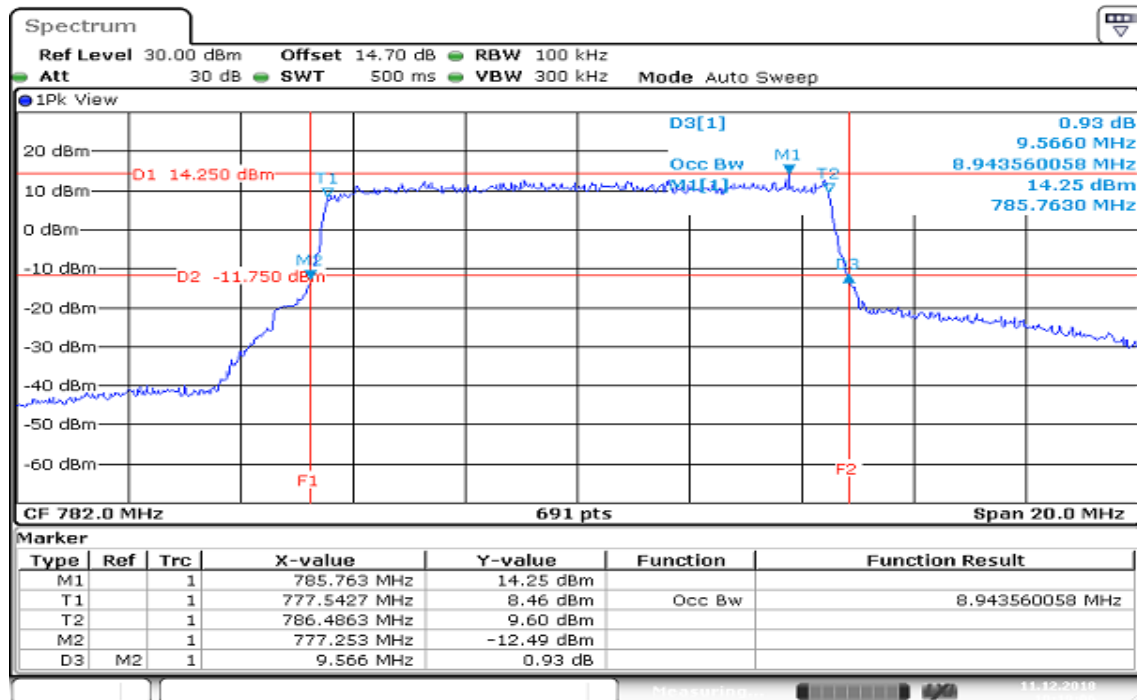
Date: 11 DEC 2018 10:17:16

CHANNEL BANDWIDTH: 10MHz / QPSK CH Mid



Date: 11 DEC 2018 10:26:53

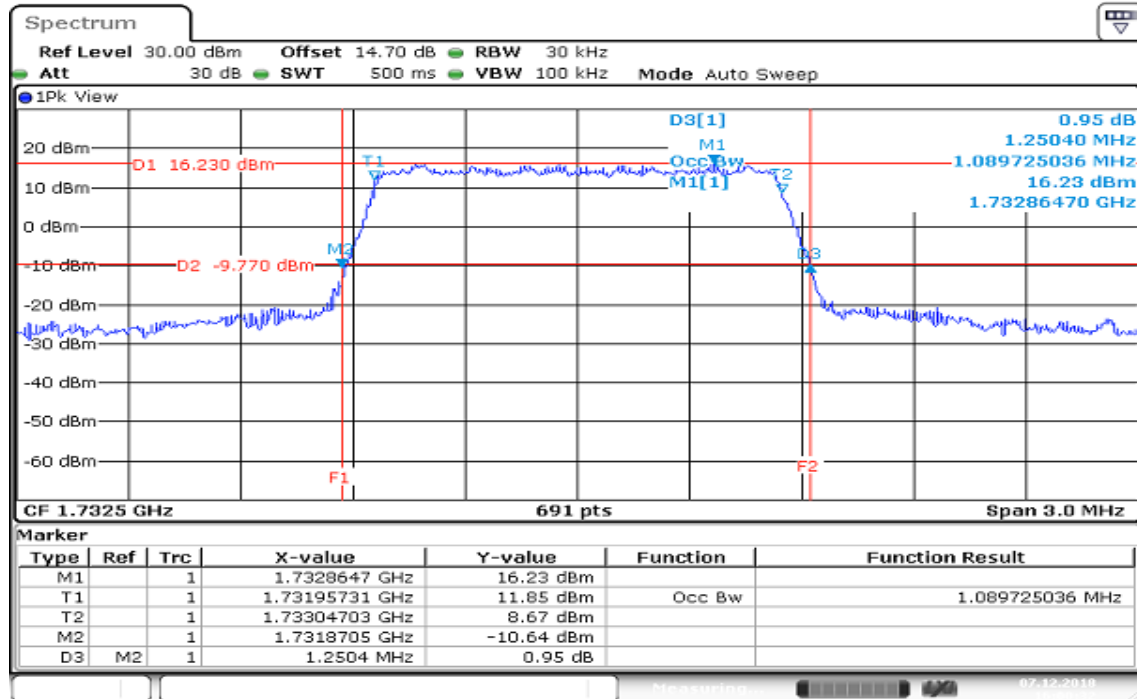
CHANNEL BANDWIDTH: 10MHz / 16QAM CH Mid



Date: 11 DEC 2018 10:19:06

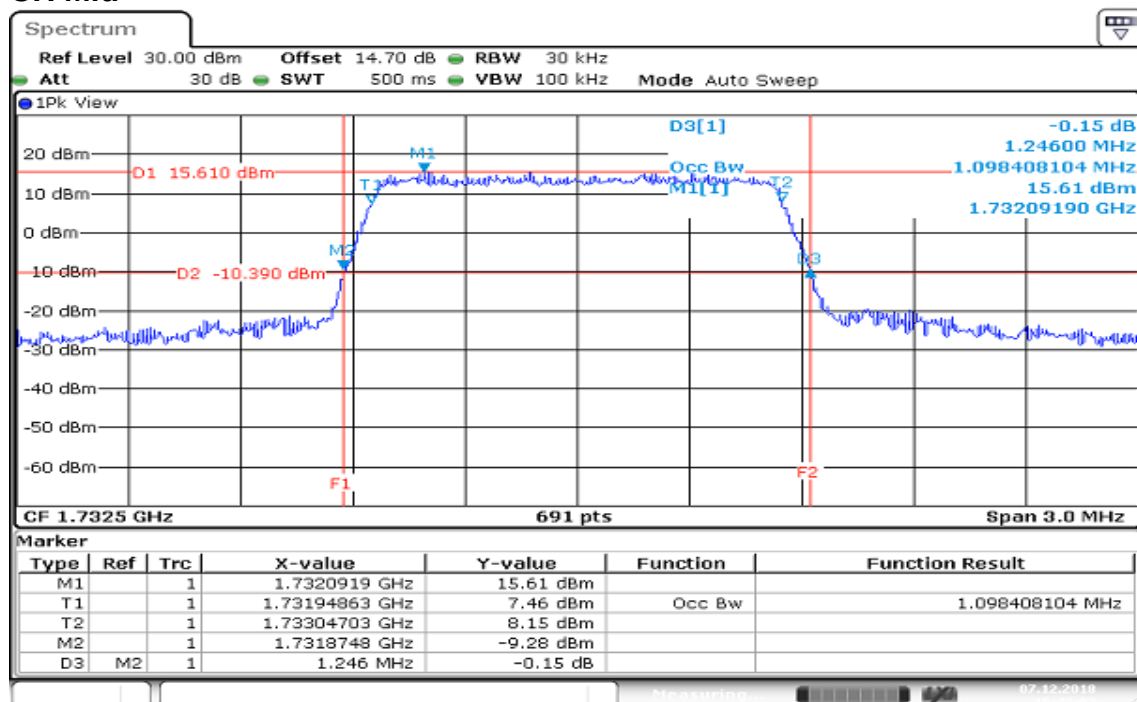
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LTE Band 4 CHANNEL BANDWIDTH: 1.4MHz / QPSK CH Mid



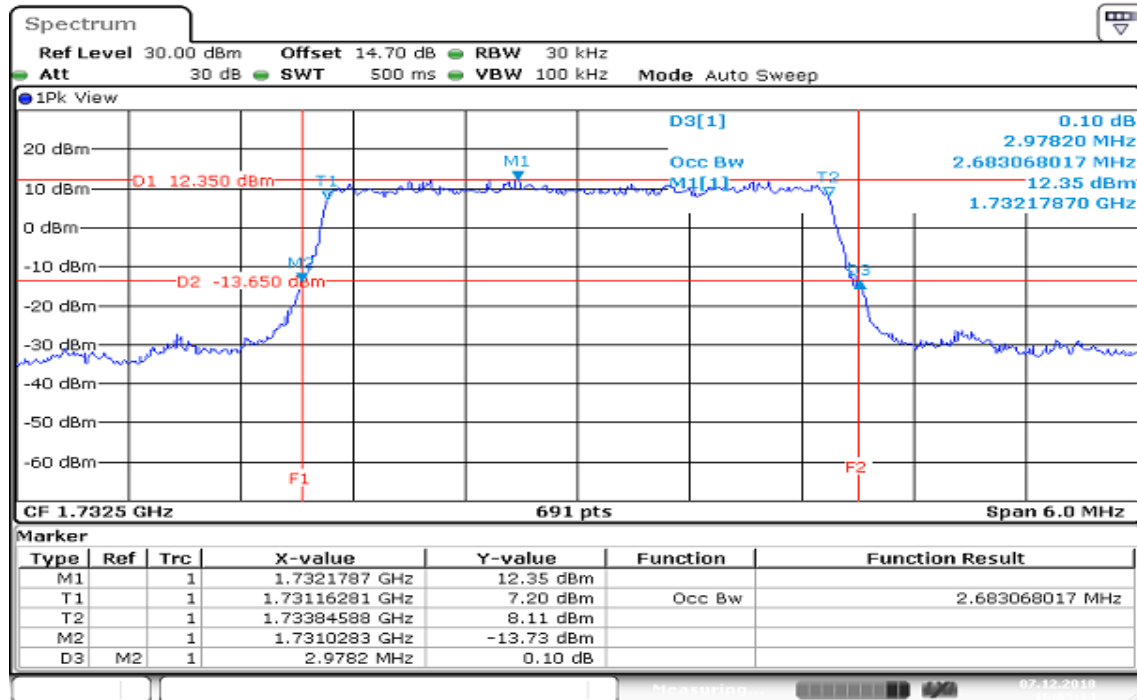
Date: 7 DEC 2018 16:00:23

CHANNEL BANDWIDTH: 1.4MHz / 16QAM CH Mid



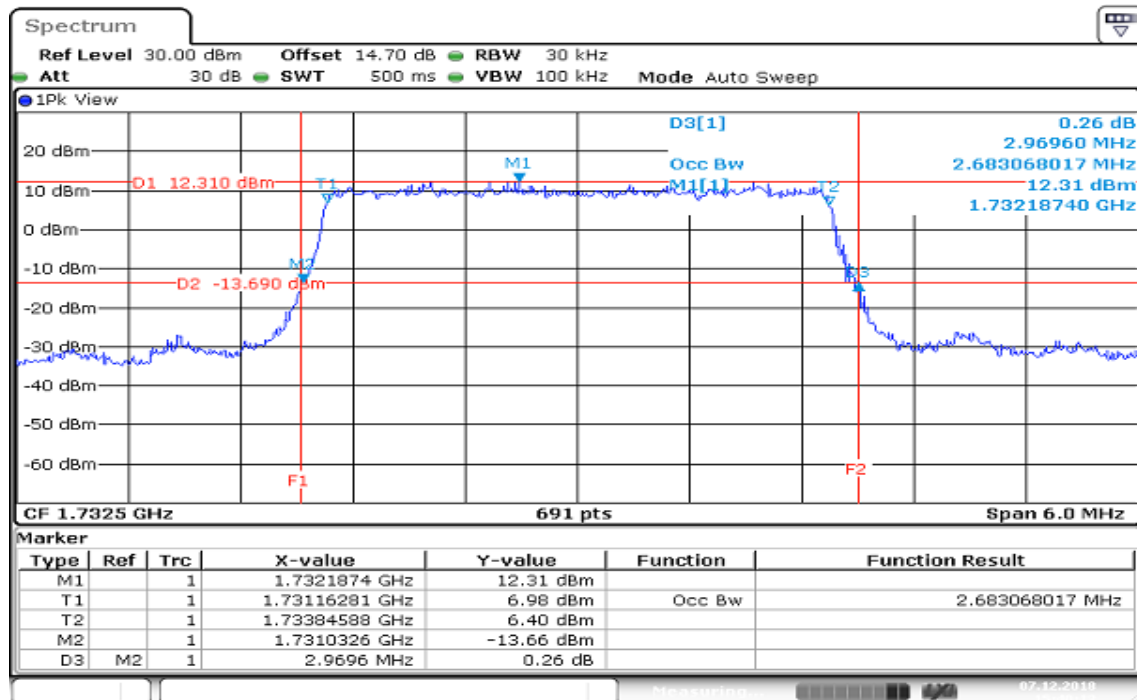
Date: 7 DEC 2018 15:42:02

CHANNEL BANDWIDTH: 3MHz / QPSK CH Mid



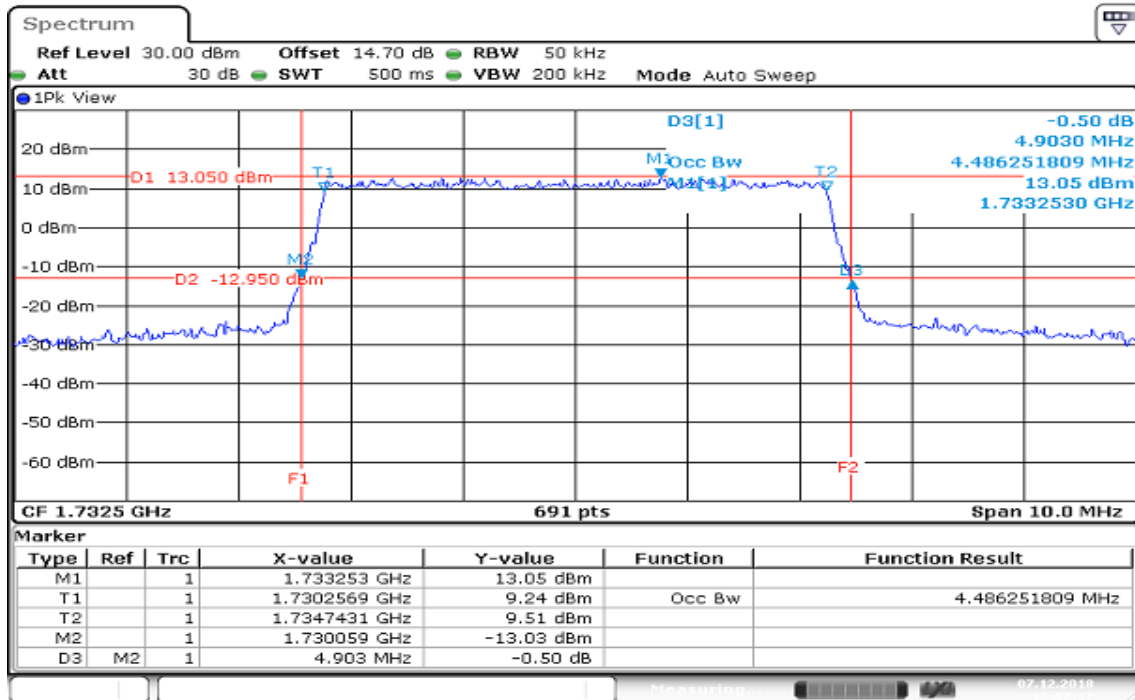
Date: 7 DEC 2018 16:05:15

CHANNEL BANDWIDTH: 3MHz / 16QAM CH Mid



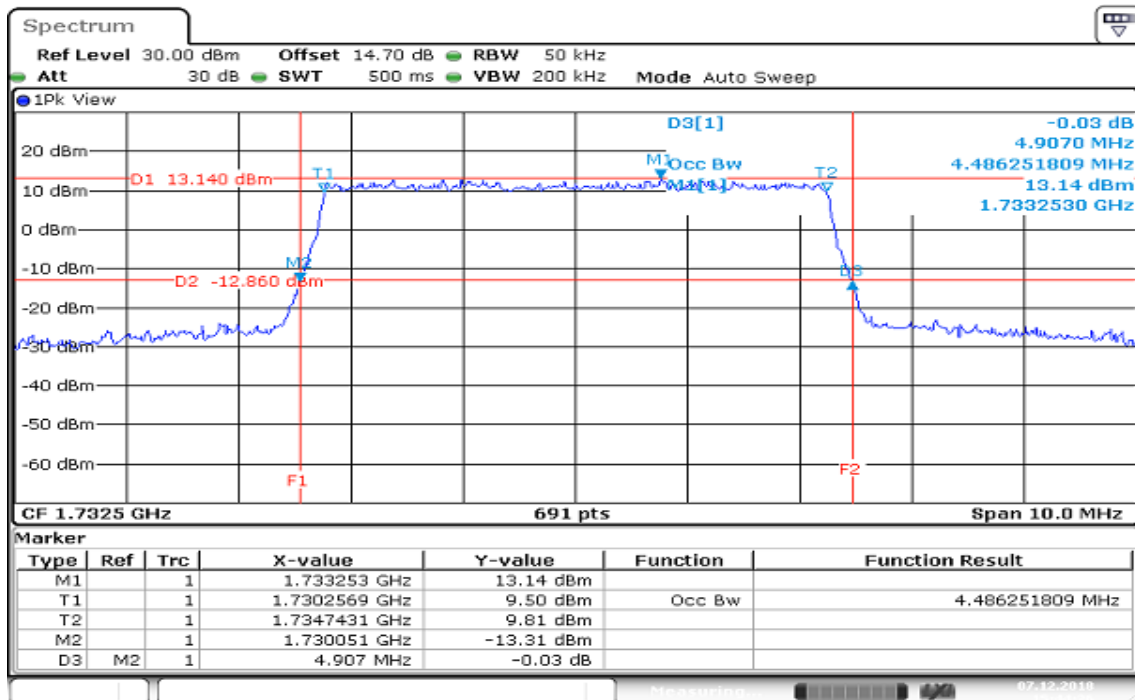
Date: 7 DEC 2018 15:40:14

CHANNEL BANDWIDTH: 5MHz / QPSK CH Mid

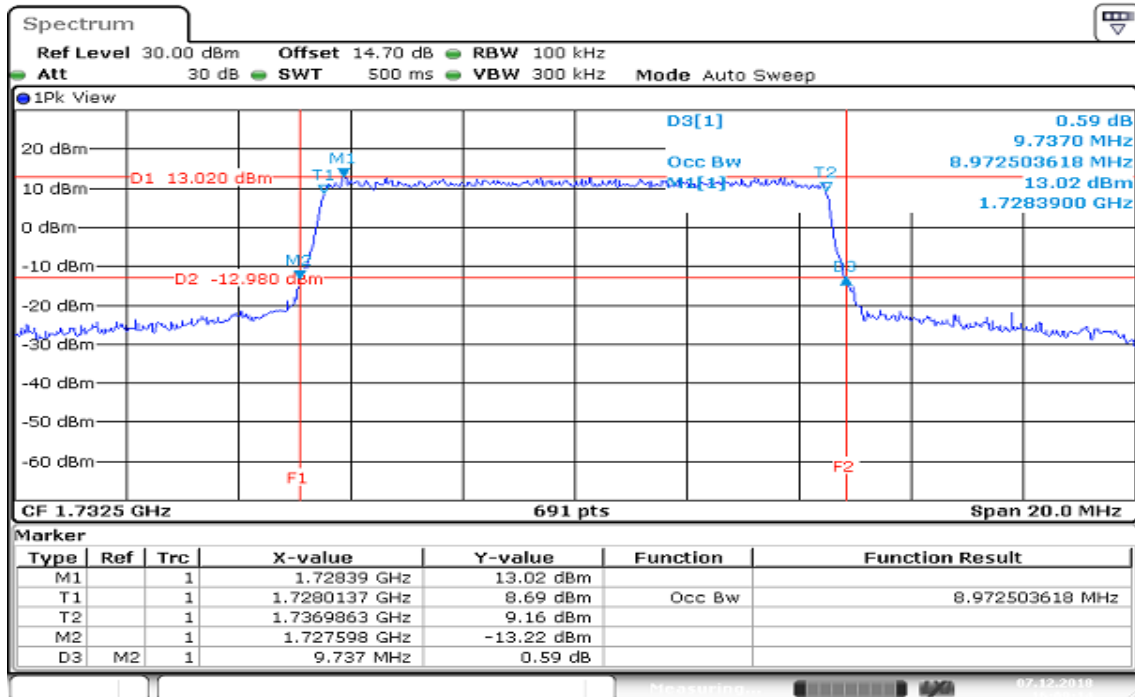


Date: 7 DEC 2018 16:07:17

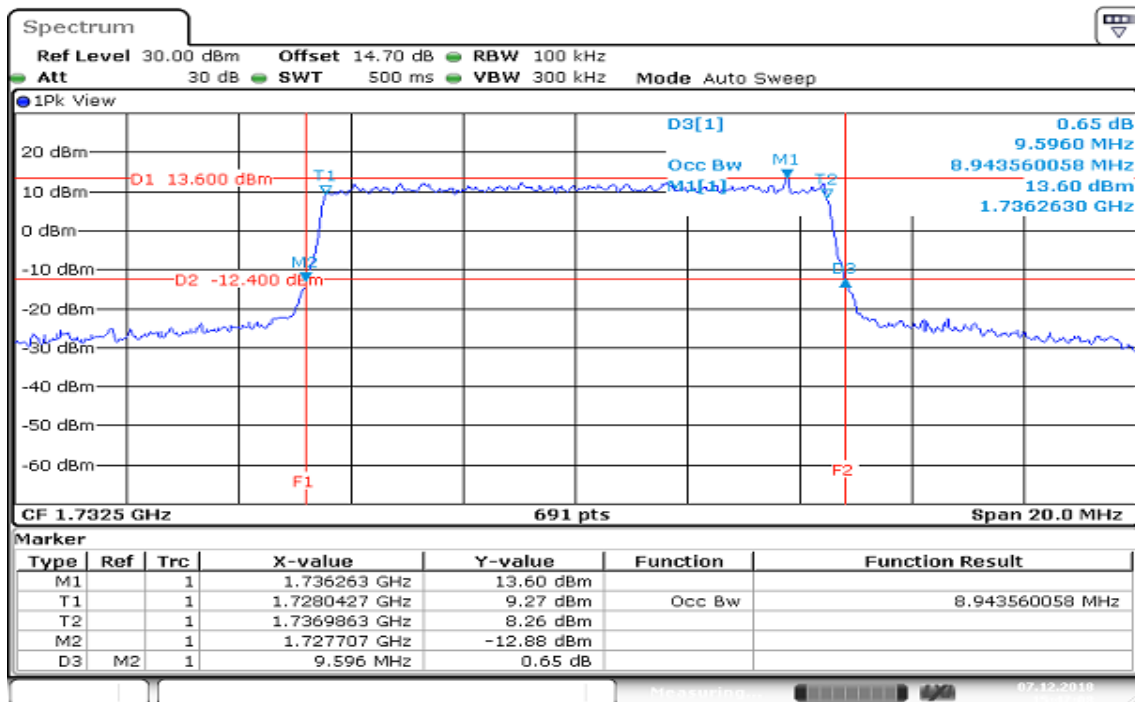
CHANNEL BANDWIDTH: 5MHz / 16QAM CH Mid



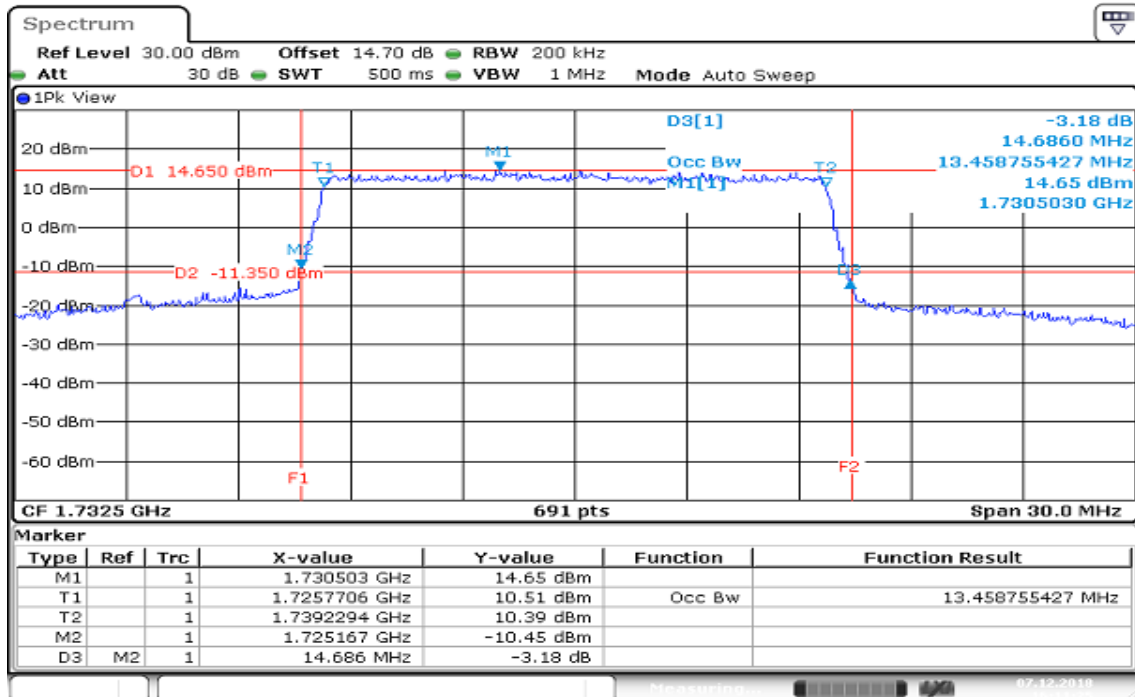
Date: 7 DEC 2018 15:44:26

CHANNEL BANDWIDTH: 10MHz / QPSK
CH Mid

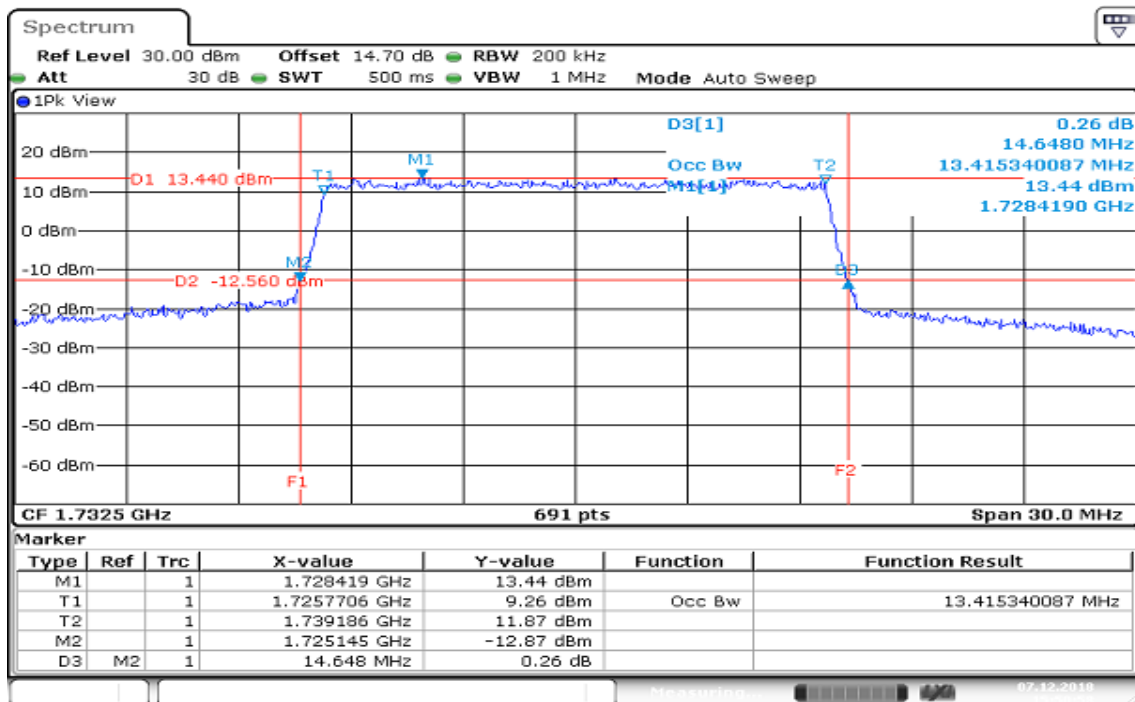
Date: 7 DEC 2018 16:09:14

CHANNEL BANDWIDTH: 10MHz / 16QAM
CH Mid

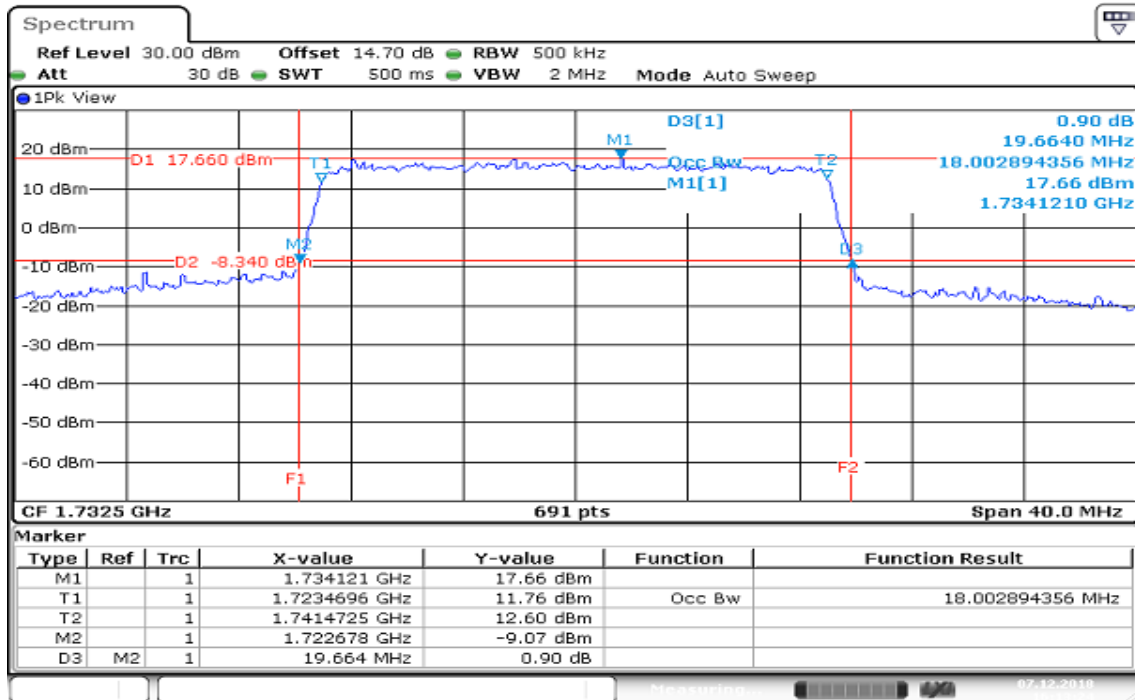
Date: 7 DEC 2018 15:47:09

CHANNEL BANDWIDTH: 15MHz / QPSK
CH Mid

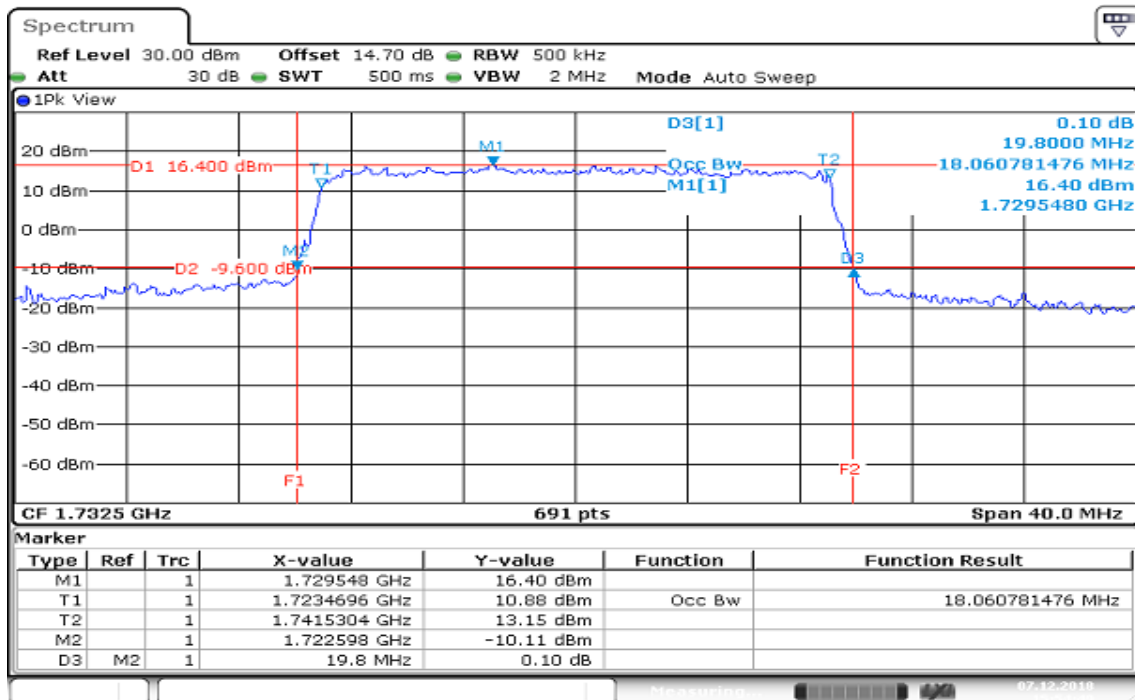
Date: 7 DEC 2018 16:11:25

CHANNEL BANDWIDTH: 15MHz / 16QAM
CH Mid

Date: 7 DEC 2018 15:50:58

CHANNEL BANDWIDTH: 20MHz / QPSK
CH Mid

Date: 7 DEC 2018 16:13:25

CHANNEL BANDWIDTH: 20MHz / 16QAM
CH Mid

Date: 7 DEC 2018 15:54:50



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8.5 PEAK TO AVERAGE POWER RATIO

LIMIT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

TEST PROCEDURES

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

TEST RESULTS

LTE Band 13

CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	4.64

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	3.51

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	5.13

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	5.19

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	5.77

CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	3.51

CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	5.91

CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23230	782.00	6.06

LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.84

CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.96

CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	3.54

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	3.68

CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.32

CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.32

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.55

CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.58

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.49

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.13

CHANNEL BANDWIDTH: 15MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.67

CHANNEL BANDWIDTH: 20MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.41

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.72

CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.71

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.35

CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.64

CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.87

CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.22

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.54

CHANNEL BANDWIDTH: 3MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.57

CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.65

CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.57

CHANNEL BANDWIDTH: 15MHz / 16QAM / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.71

CHANNEL BANDWIDTH: 20MHz / 16QAM / 100%RB

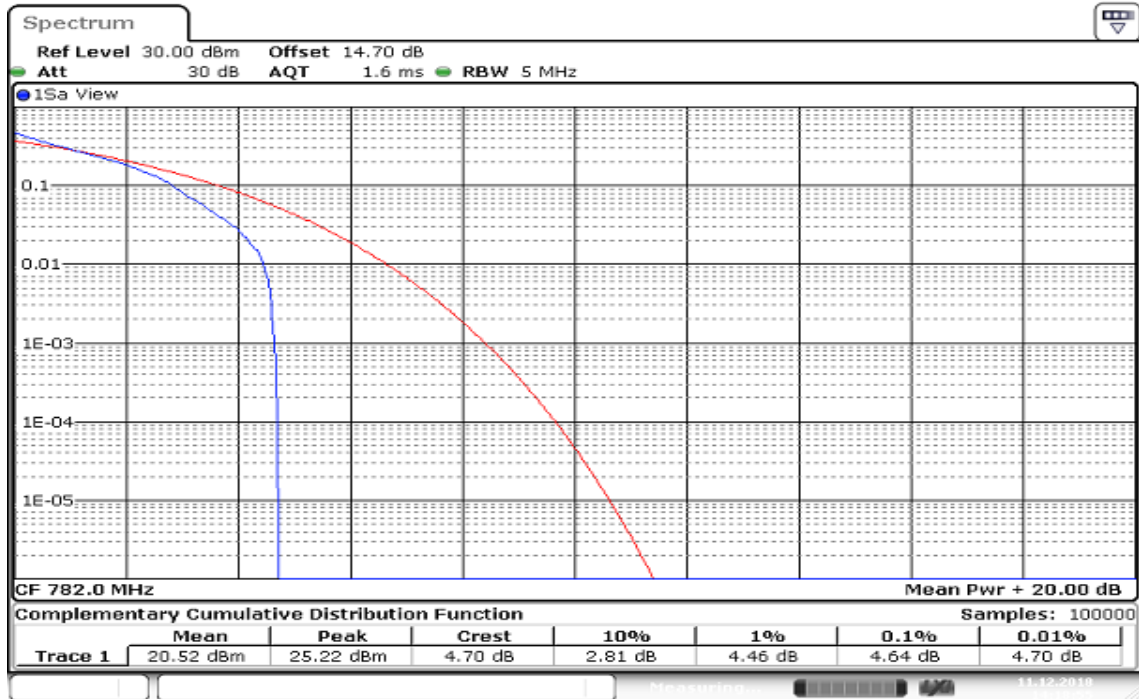
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.88

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CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

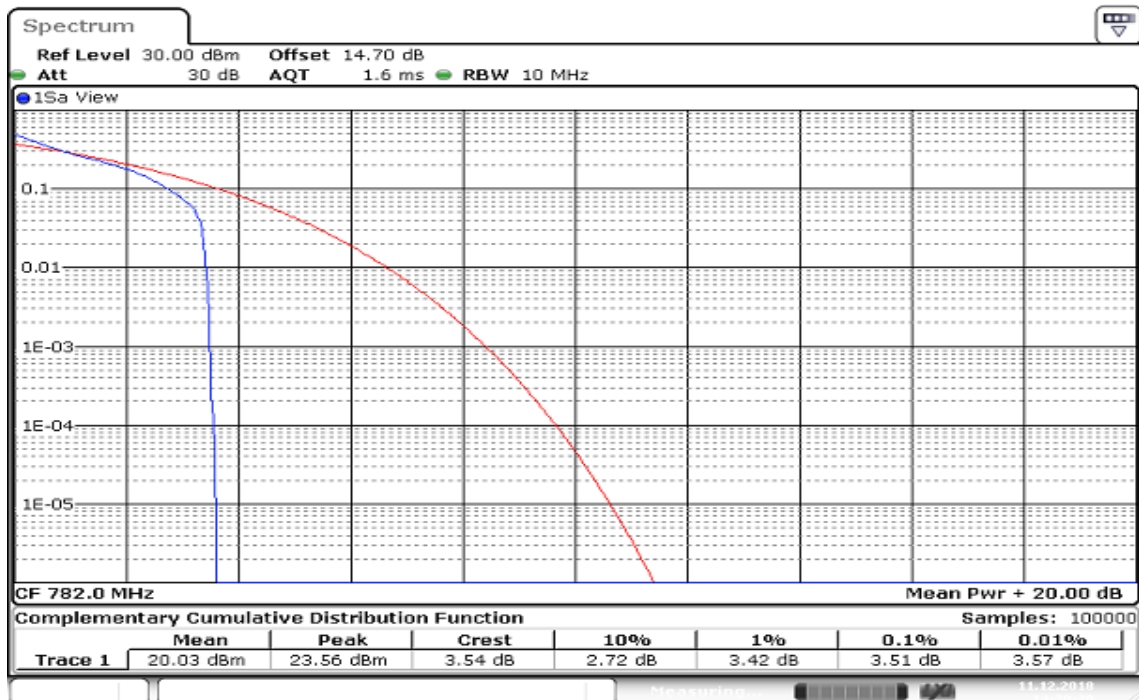
CH Mid



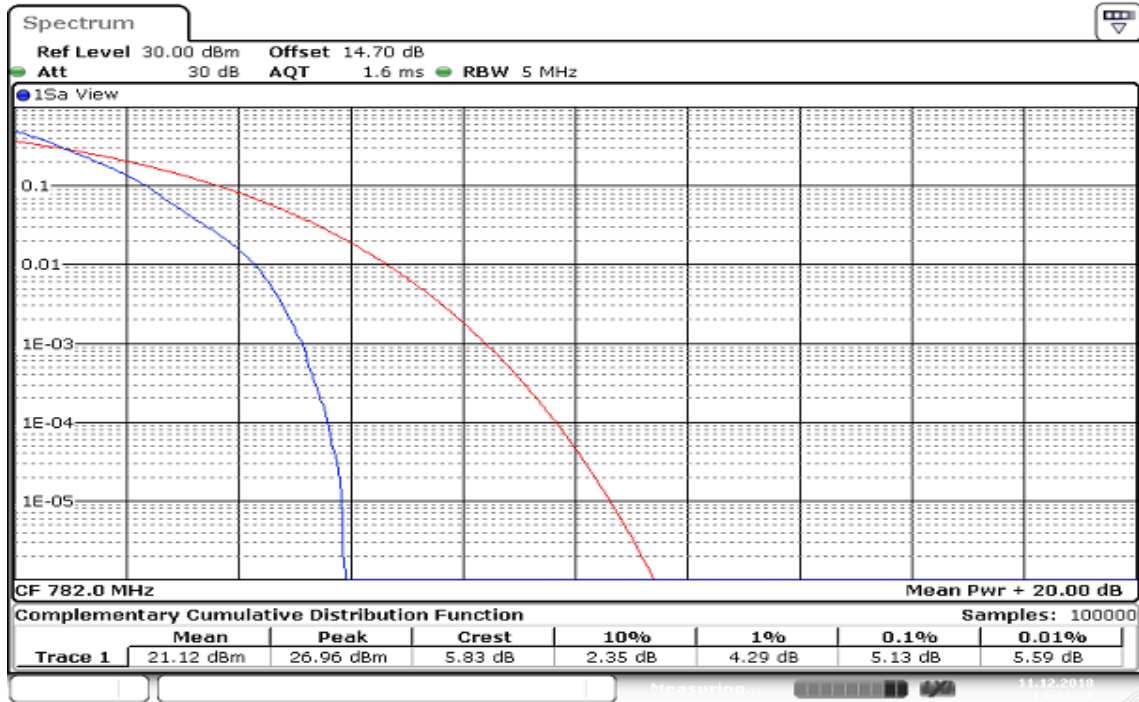
Date: 11 DEC 2018 14:18:55

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

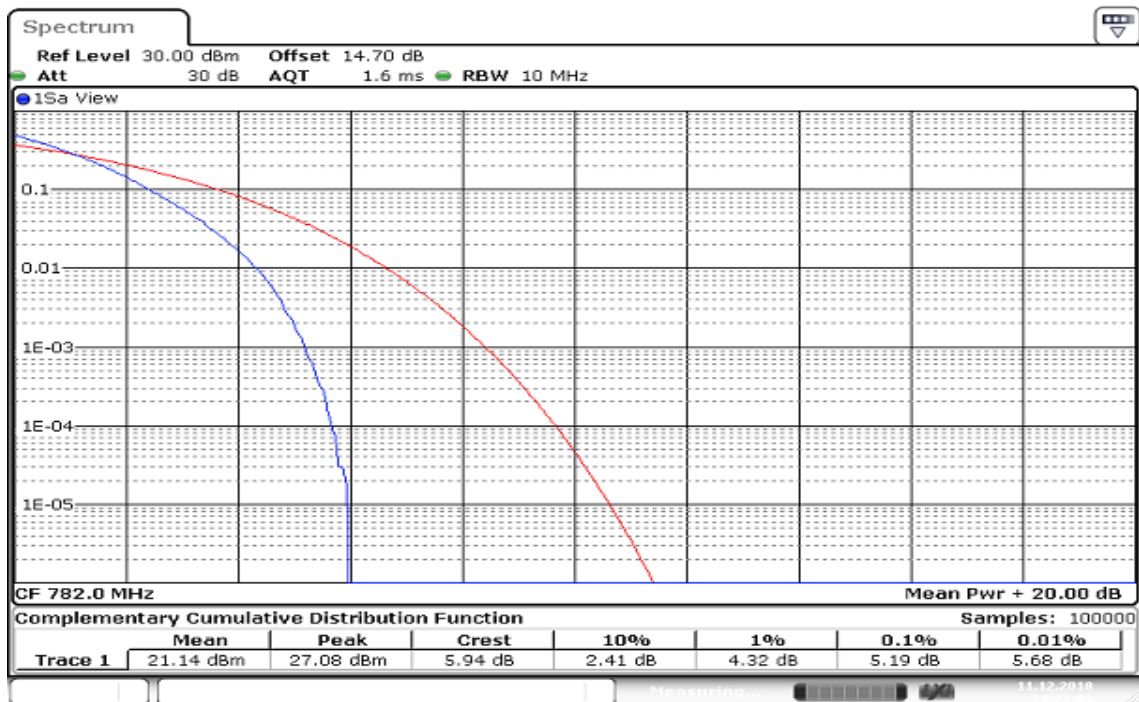
CH Mid



Date: 11 DEC 2018 14:20:30

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB
CH Mid

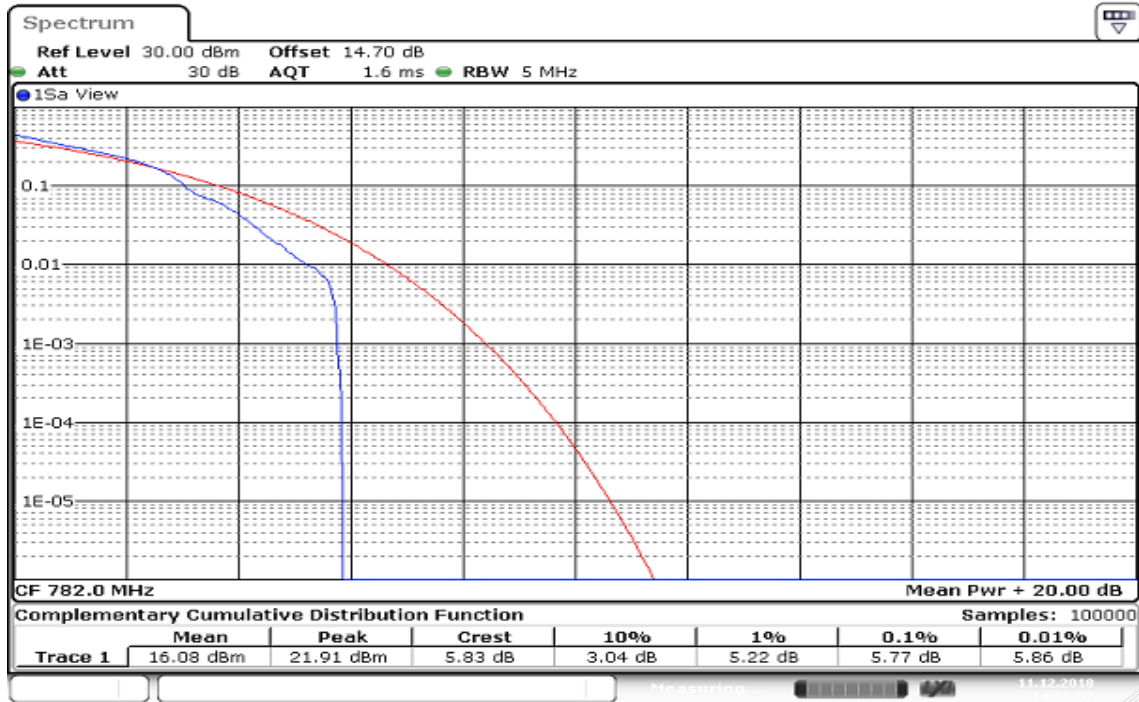
Date: 11 DEC 2018 14:22:37

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB
CH Mid

Date: 11 DEC 2018 14:24:10

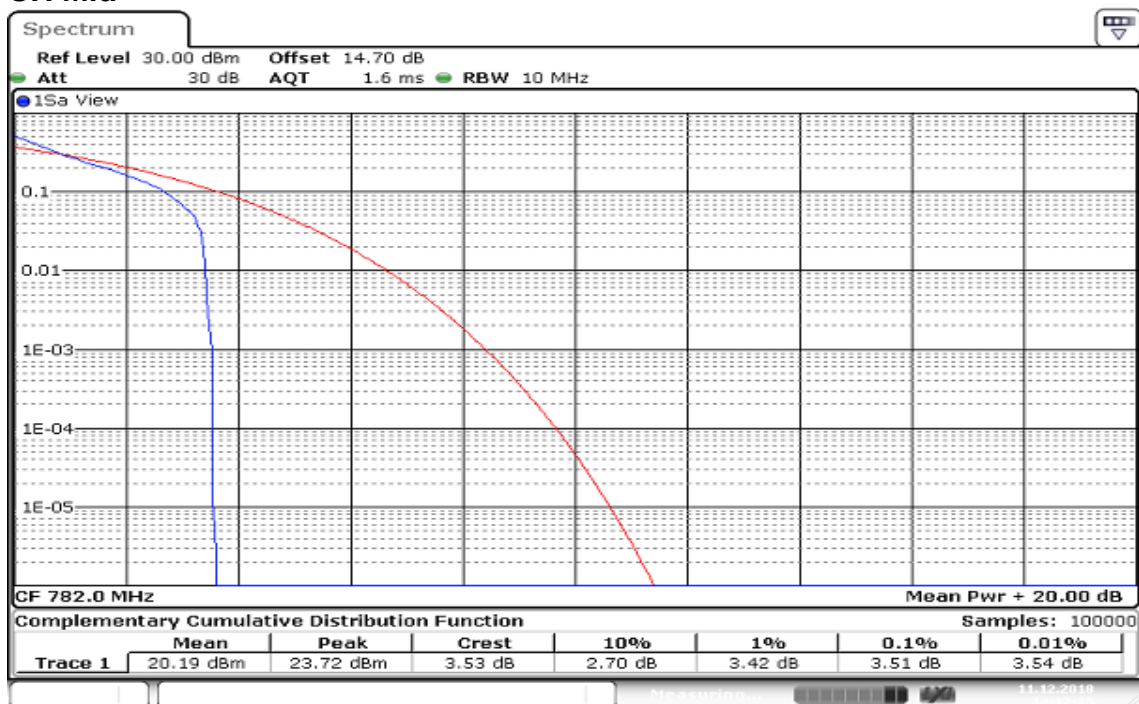
Report No.: T181123D04-RP5

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB CH Mid



Date: 11 DEC 2018 14:10:57

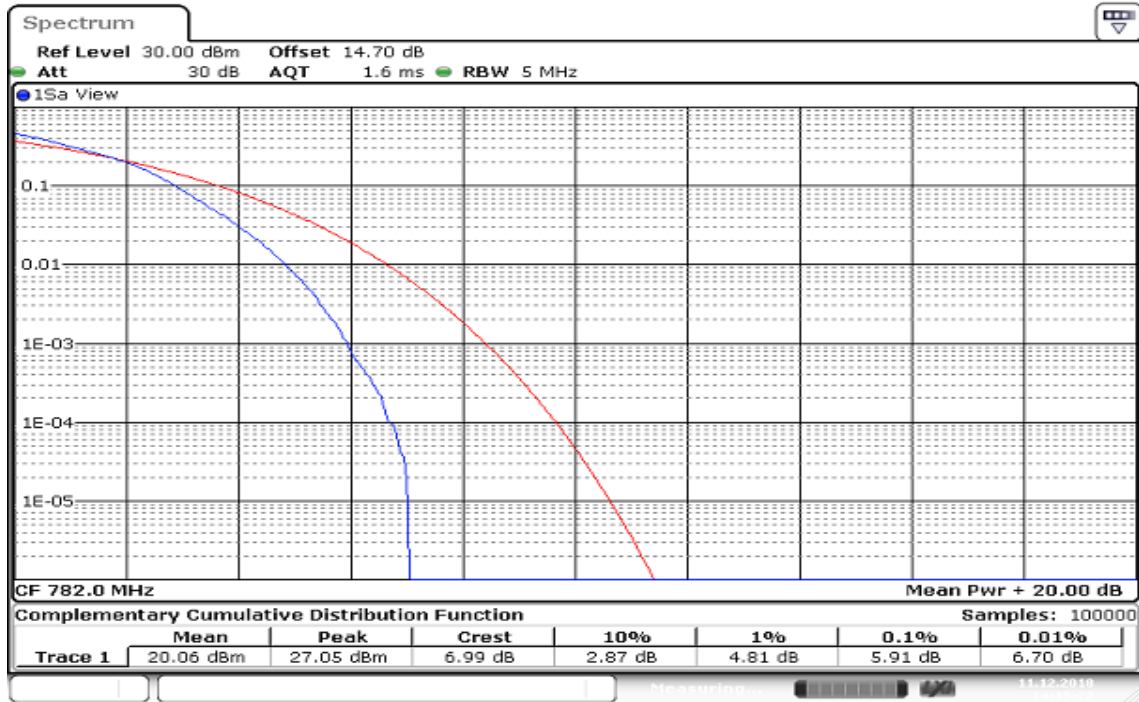
CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB CH Mid



Date: 11 DEC 2018 14:12:25

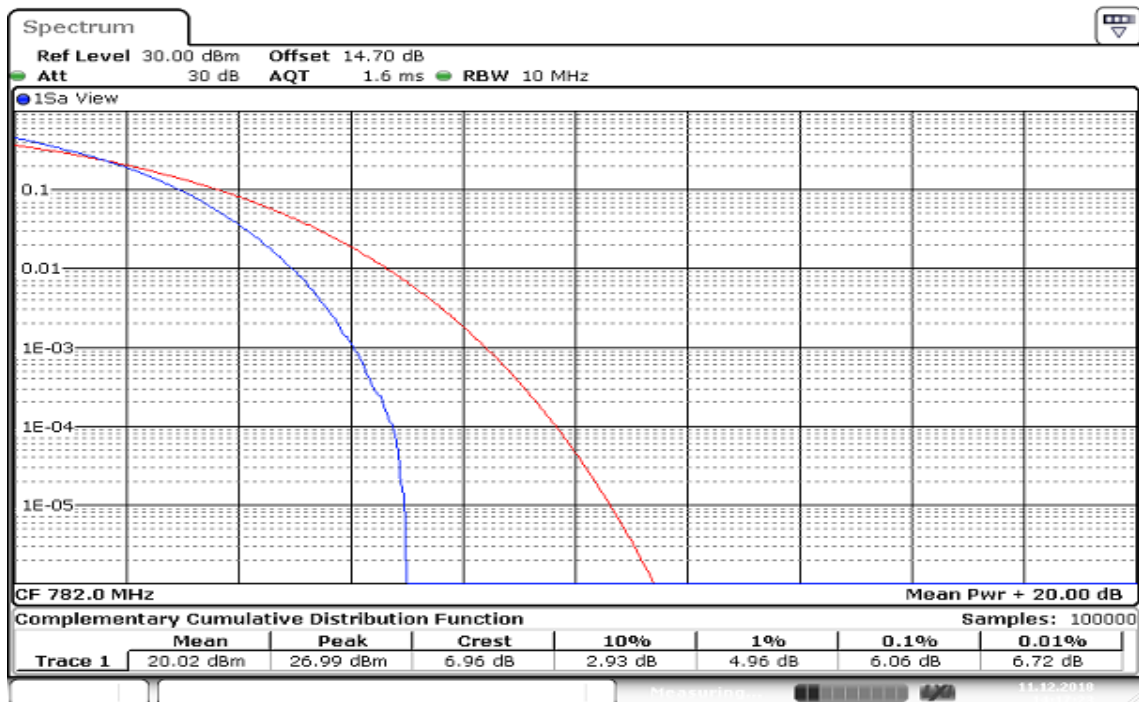
Report No.: T181123D04-RP5

CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB CH Mid



Date: 11 DEC 2018 14:15:22

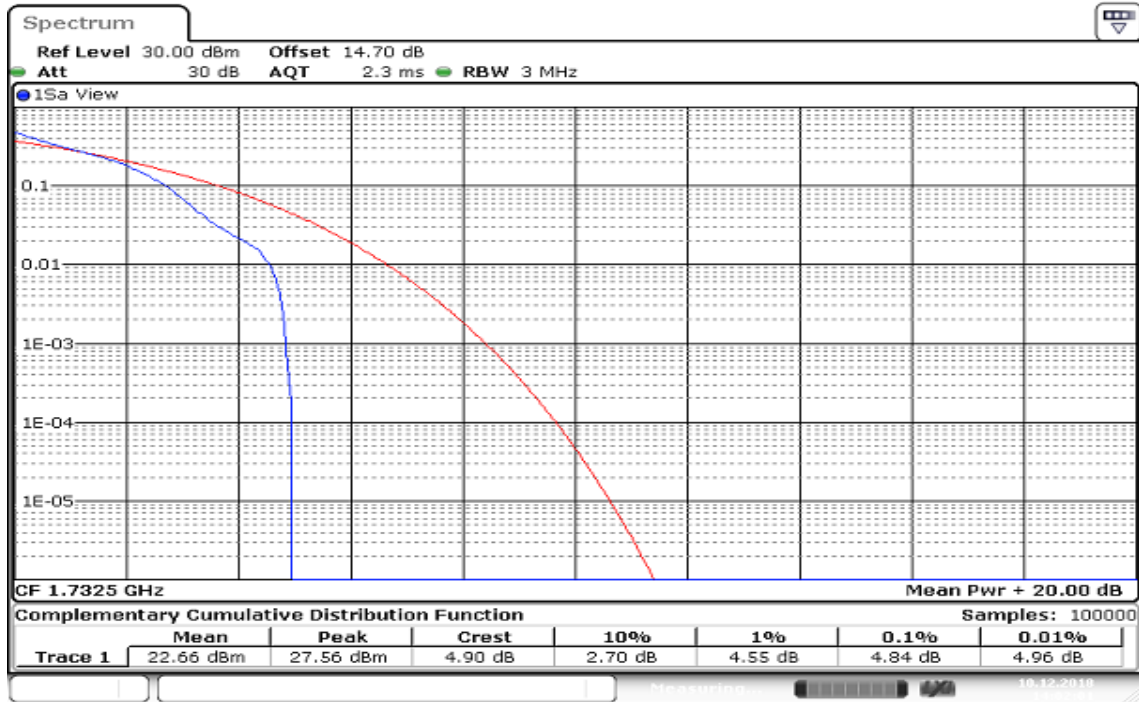
CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB CH Mid



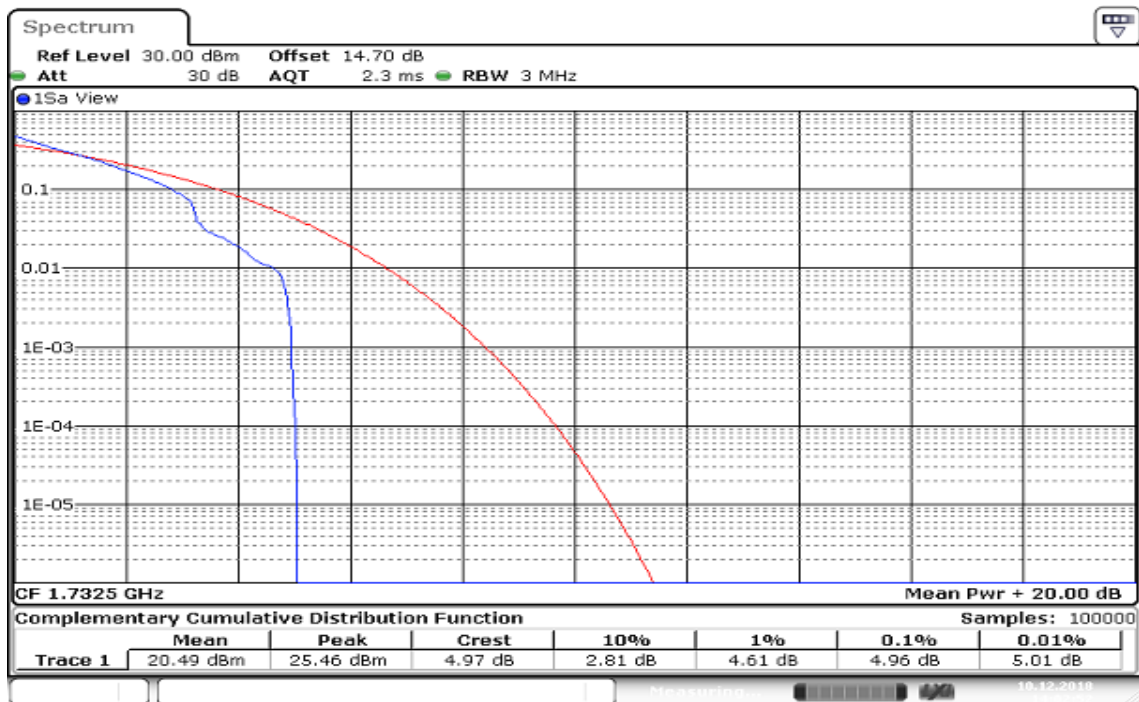
Date: 11 DEC 2018 14:17:24

Report No.: T181123D04-RP5

LTE Band 4 **CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB** **CH Mid**



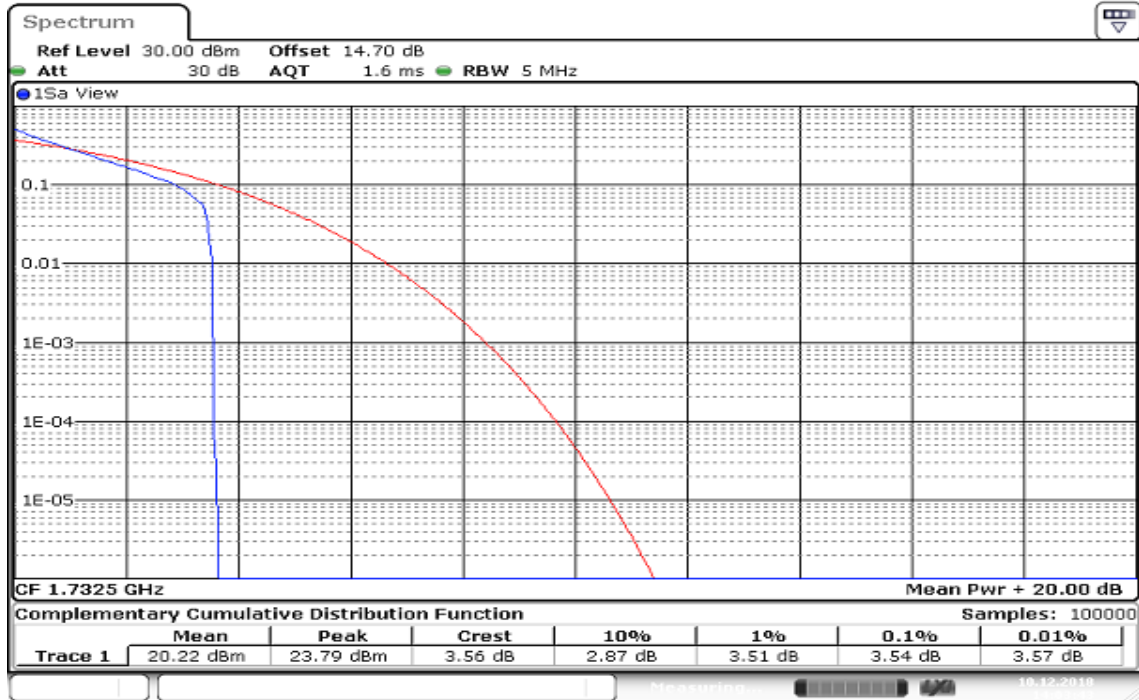
CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB **CH Mid**



Report No.: T181123D04-RP5

CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

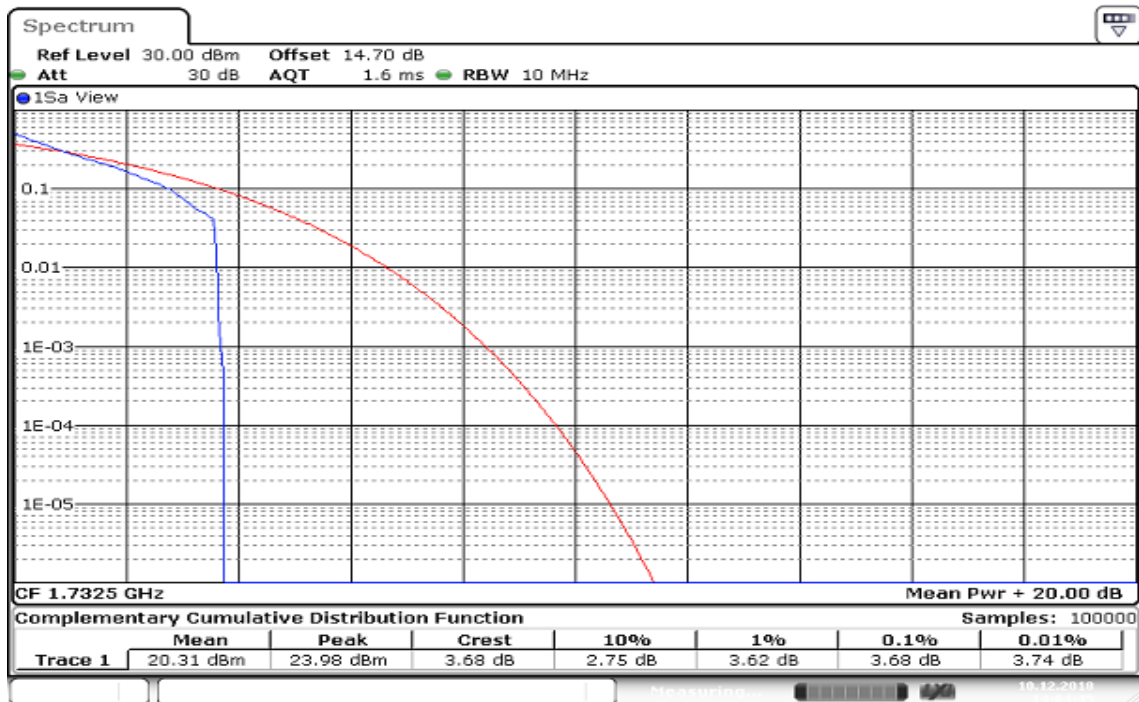
CH Mid



Date: 10 DEC 2018 14:03:44

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

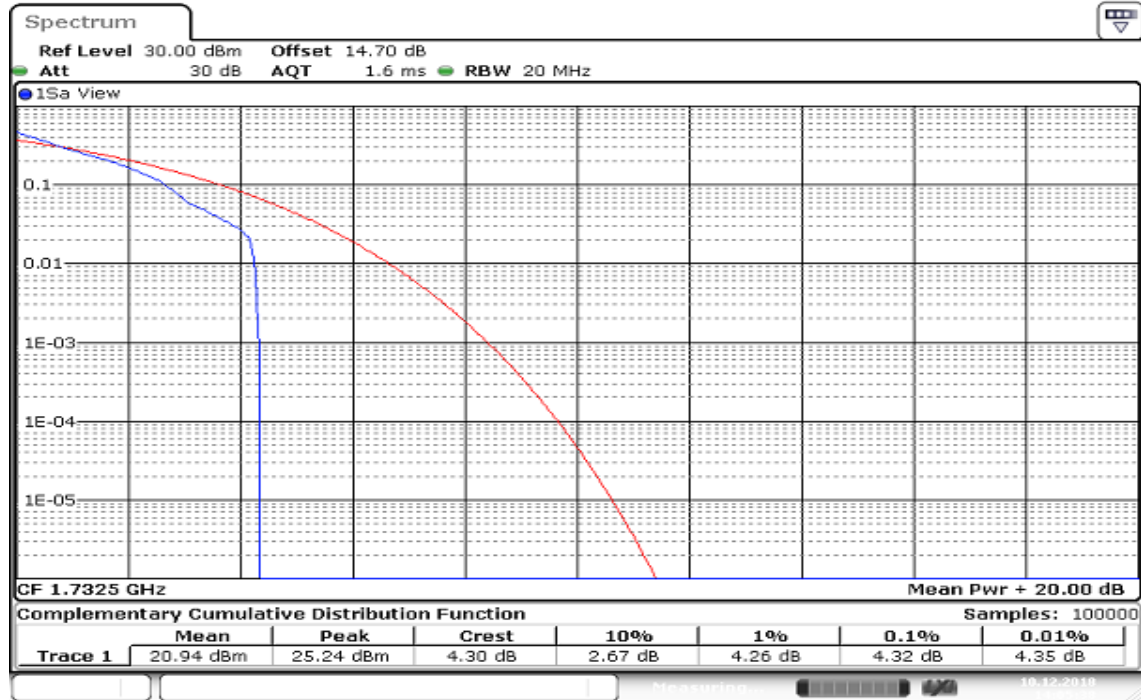
CH Mid



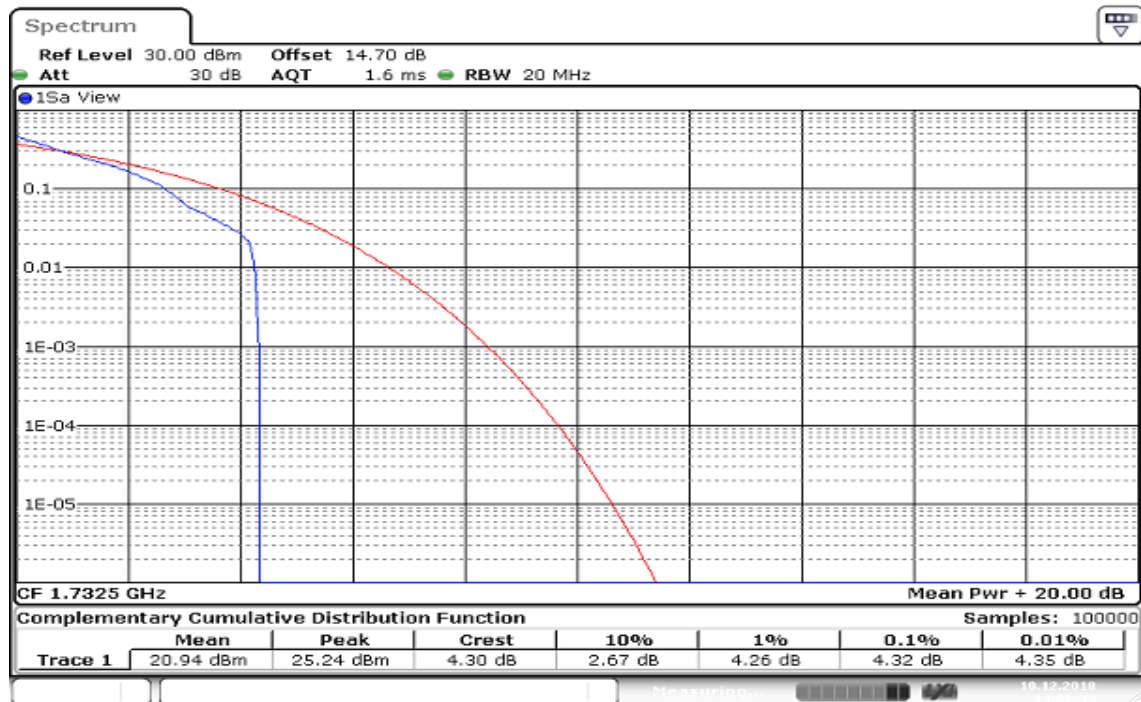
Date: 10 DEC 2018 14:04:45

Report No.: T181123D04-RP5

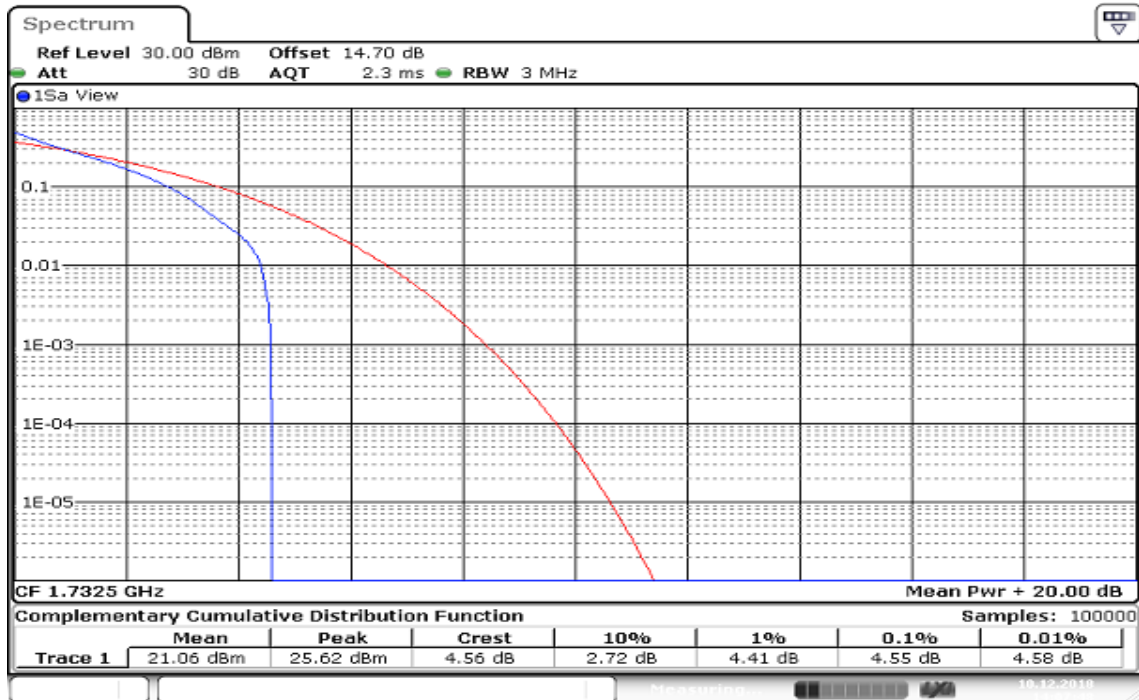
CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB CH Mid



CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB CH Mid

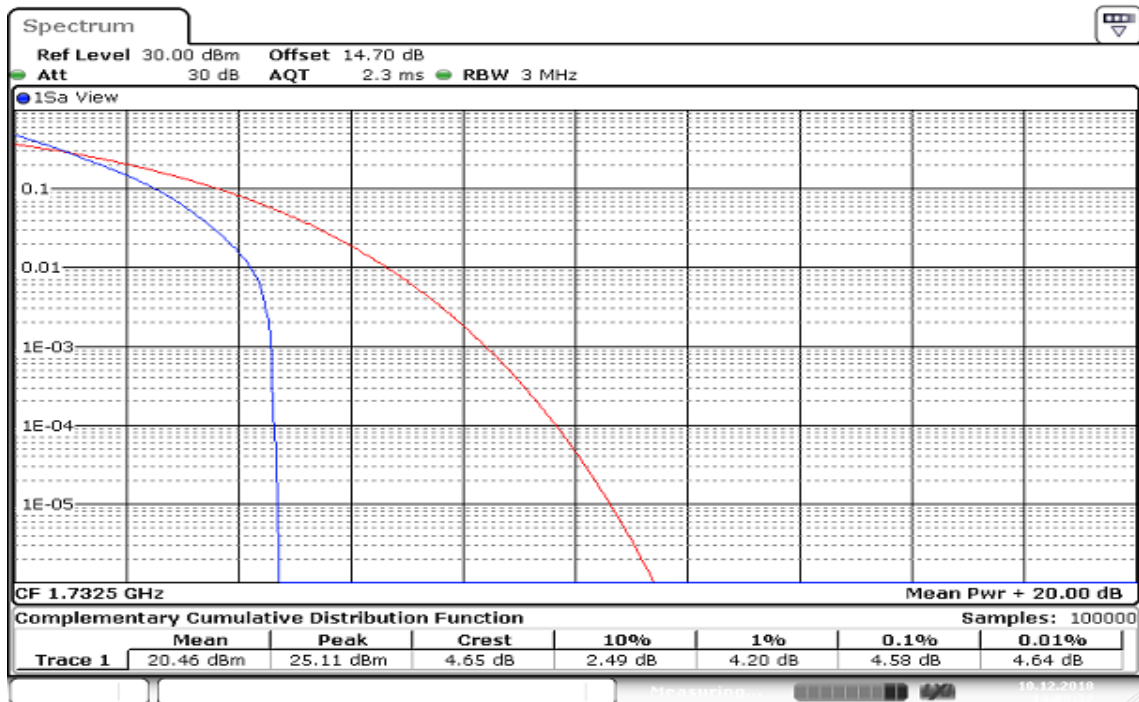


CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100%RB CH Mid



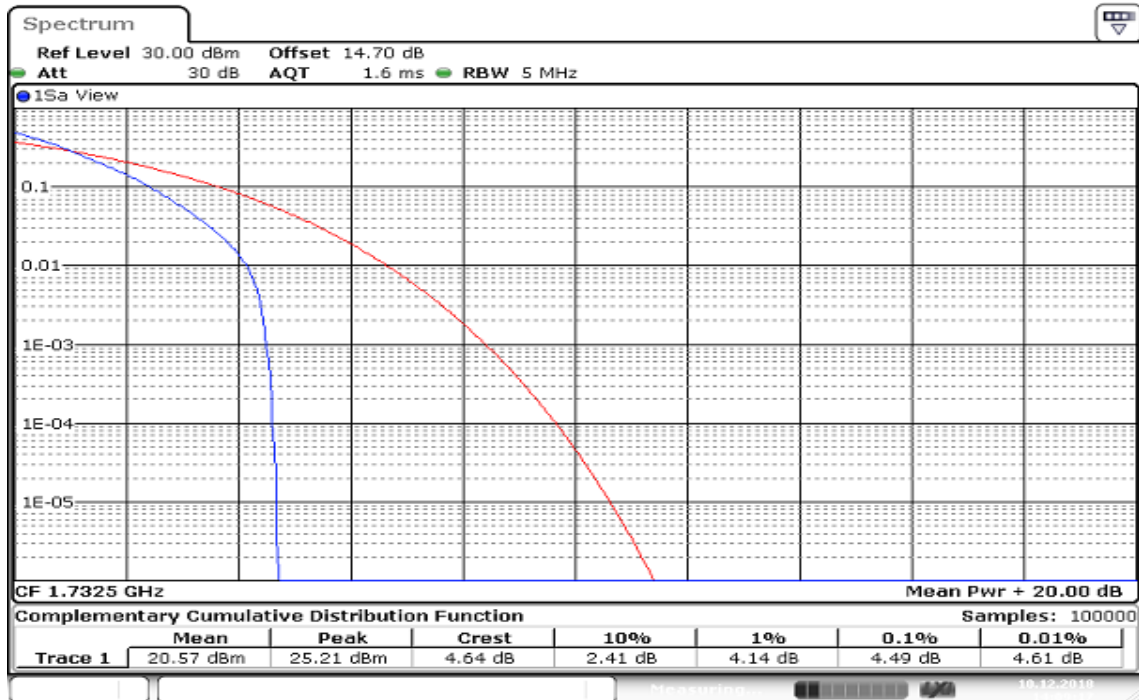
Date: 10 DEC 2018 14:07:48

CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB CH Mid



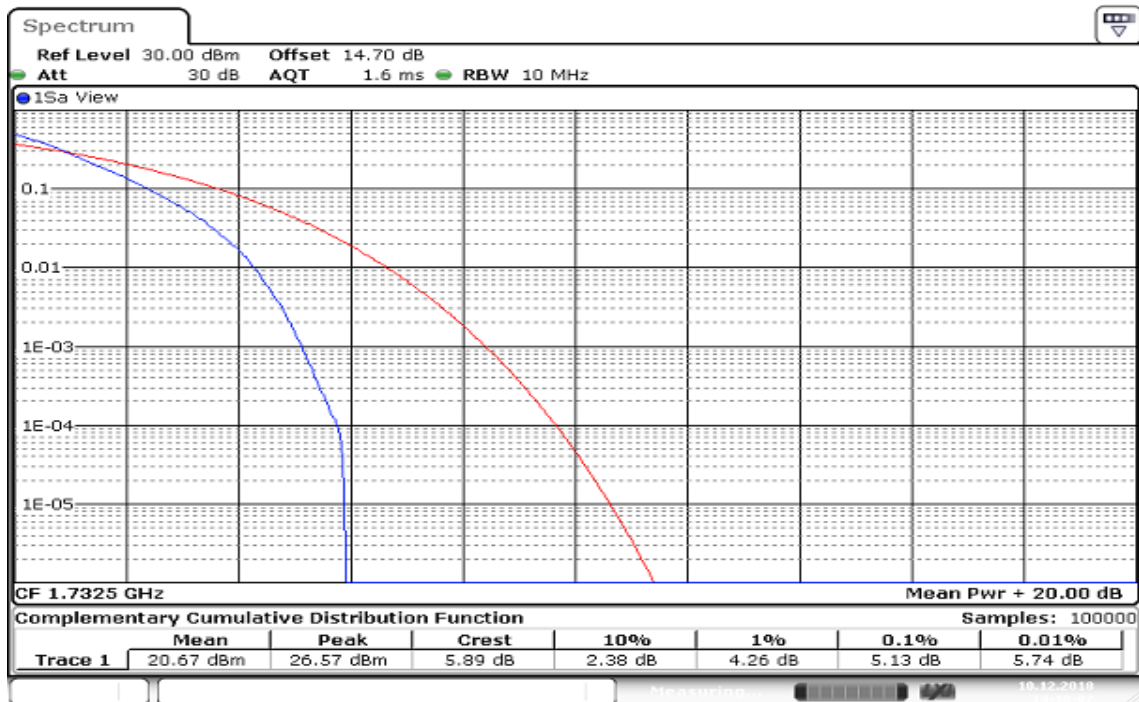
Date: 10 DEC 2018 14:08:32

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB CH Mid



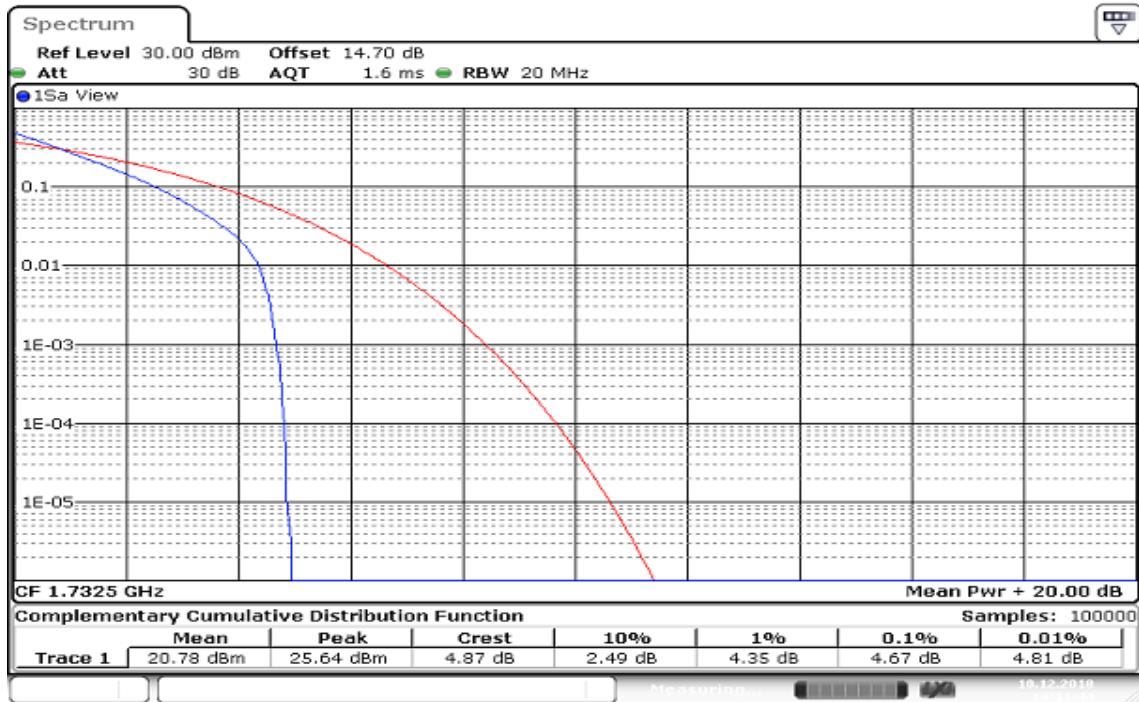
Date: 10 DEC 2018 14:09:17

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB CH Mid



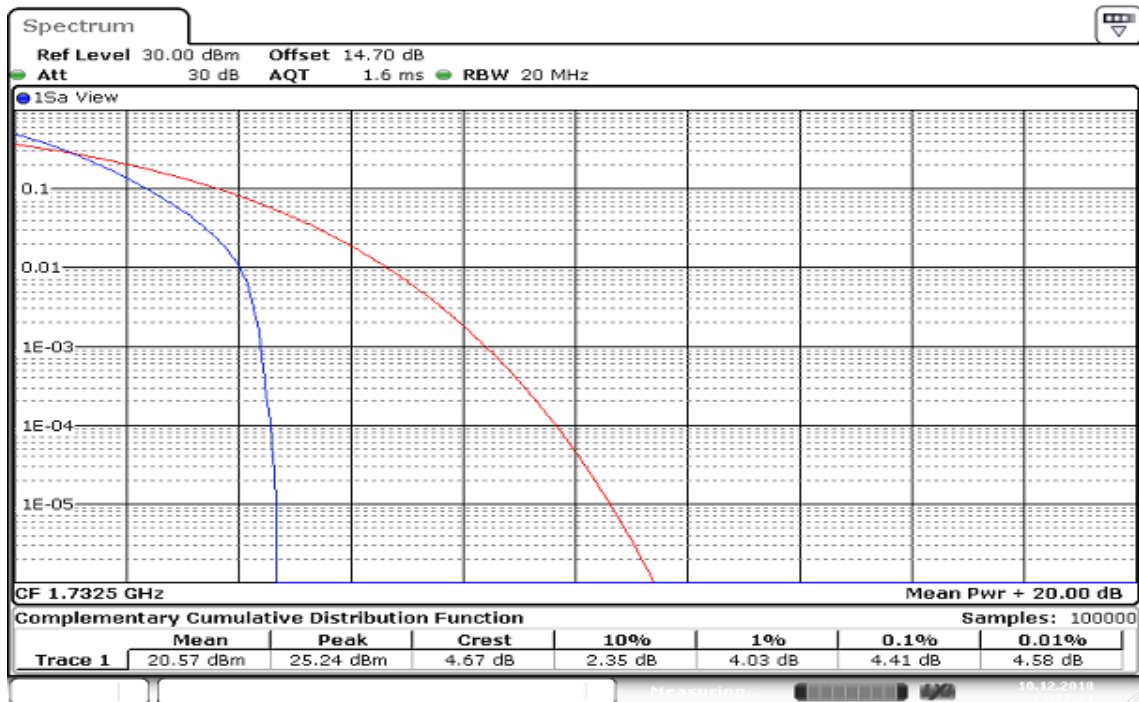
Date: 10 DEC 2018 14:10:02

CHANNEL BANDWIDTH: 15MHz / QPSK / 100%RB
CH Mid



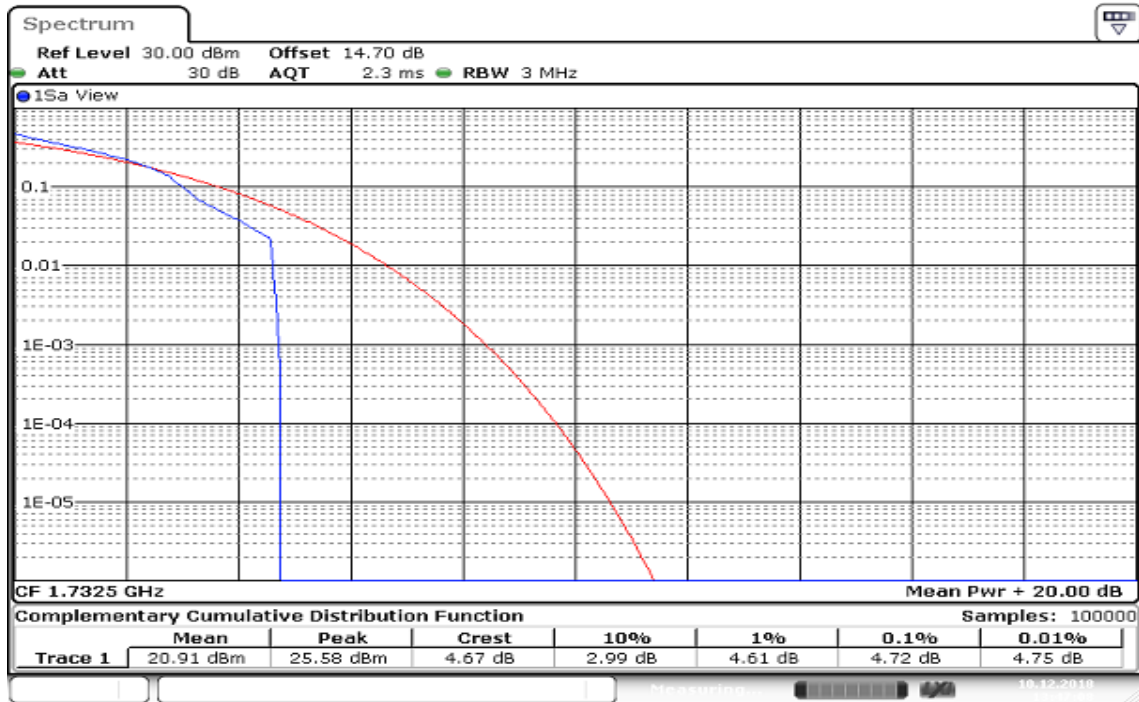
Date: 10 DEC 2018 14:11:44

CHANNEL BANDWIDTH: 20MHz / QPSK / 100%RB
CH Mid

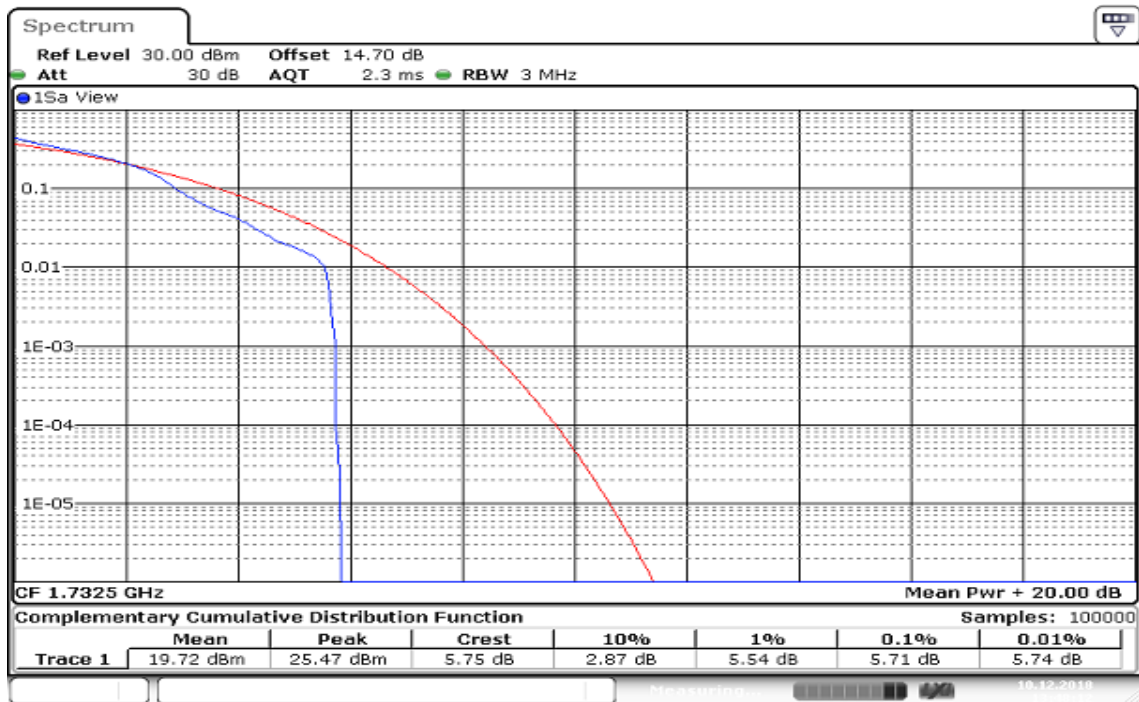


Date: 10 DEC 2018 14:12:20

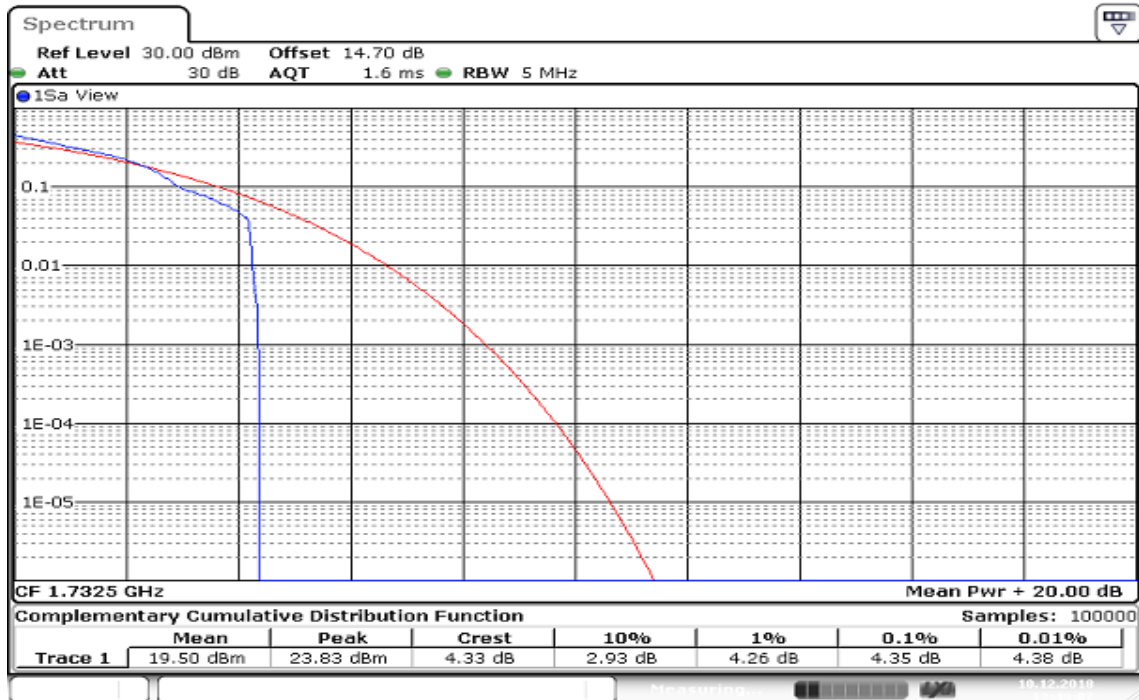
CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB
CH Mid



CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB
CH Mid

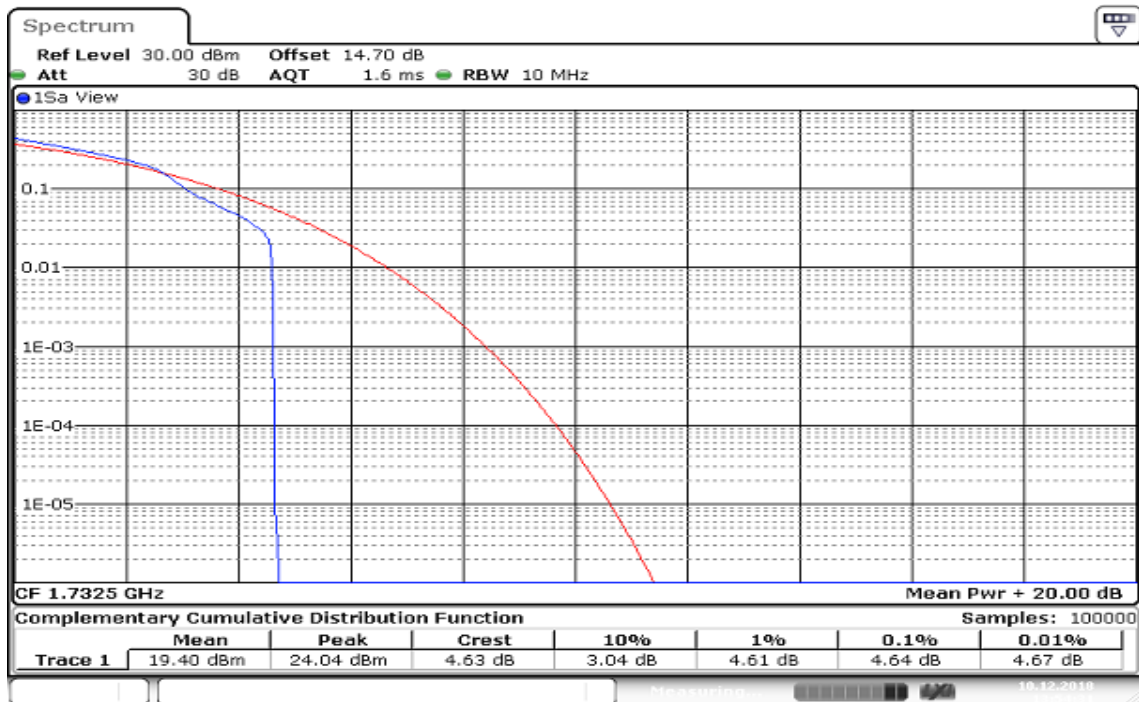


CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB CH Mid



Date: 10 DEC 2018 13:49:07

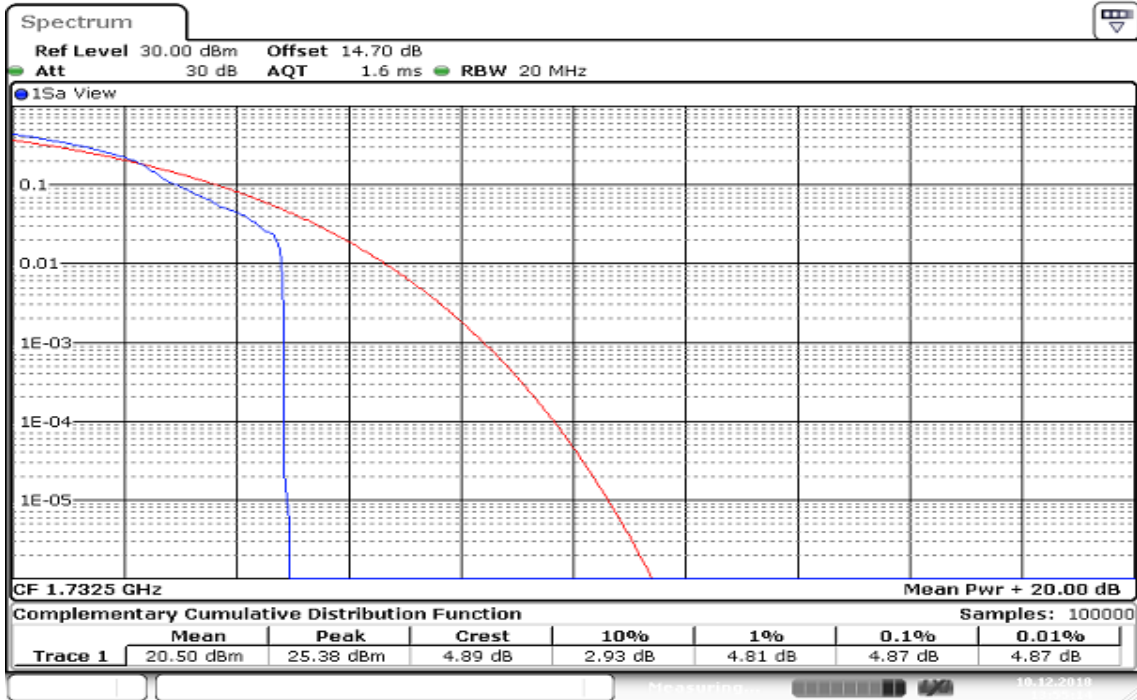
CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB CH Mid



Date: 10 DEC 2018 13:54:32

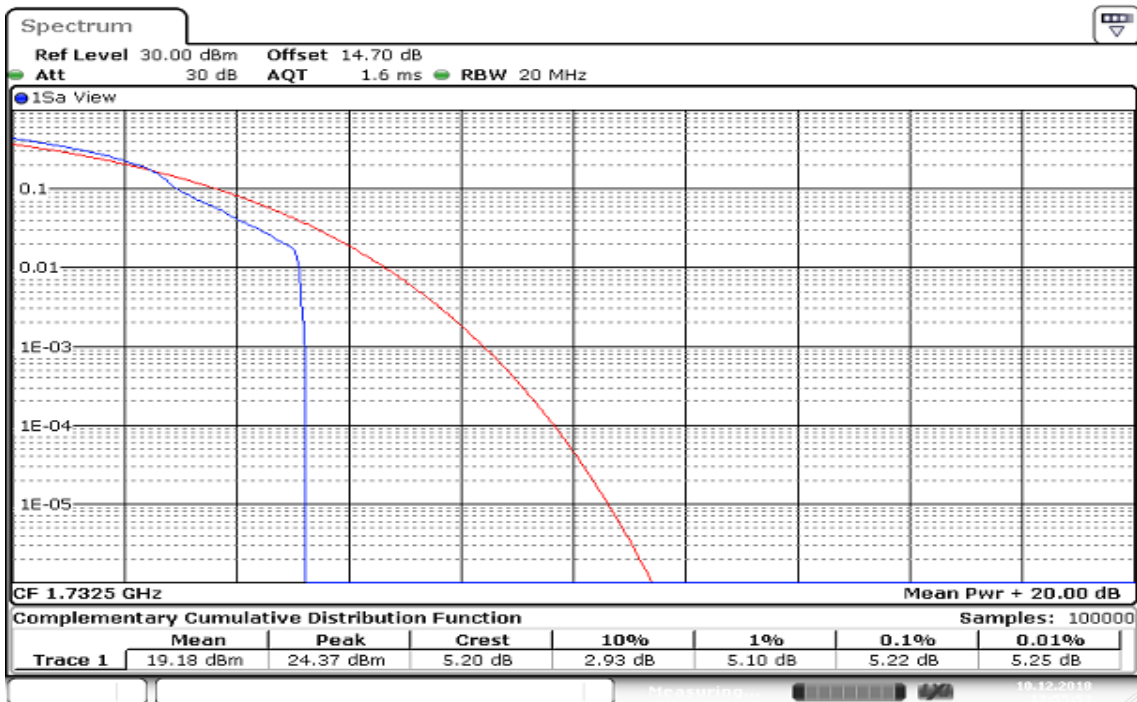
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CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB CH Mid



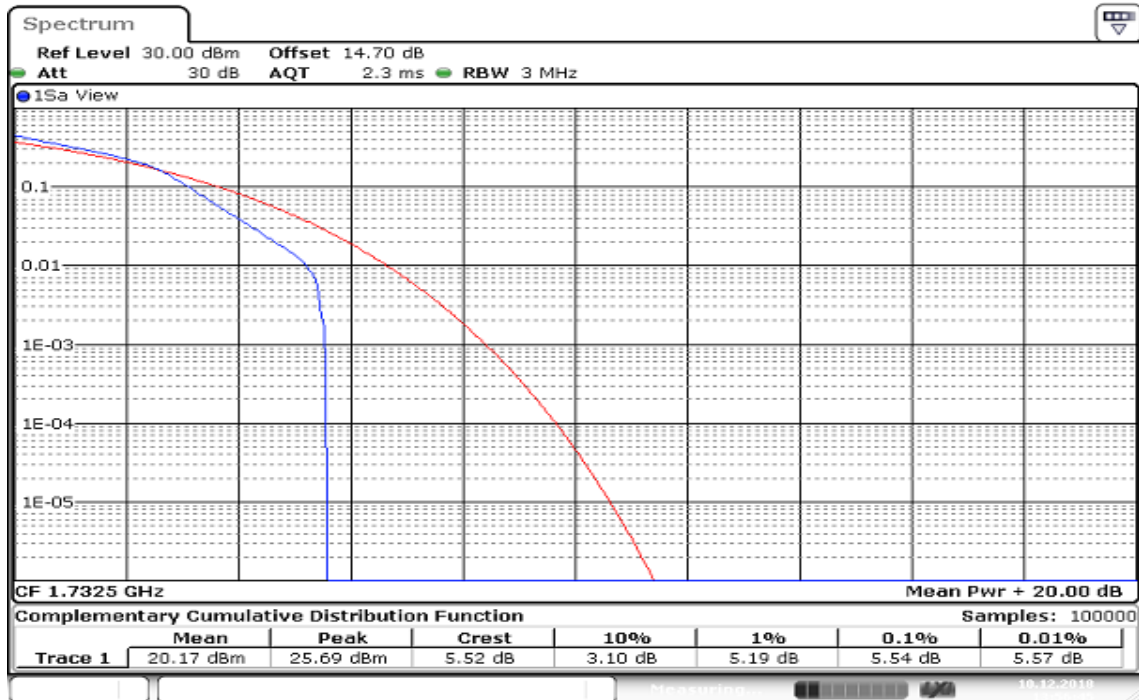
Date: 10 DEC 2018 13:55:15

CHANNEL BANDWIDTH: 20MHz / 16QAM / 1RB CH Mid

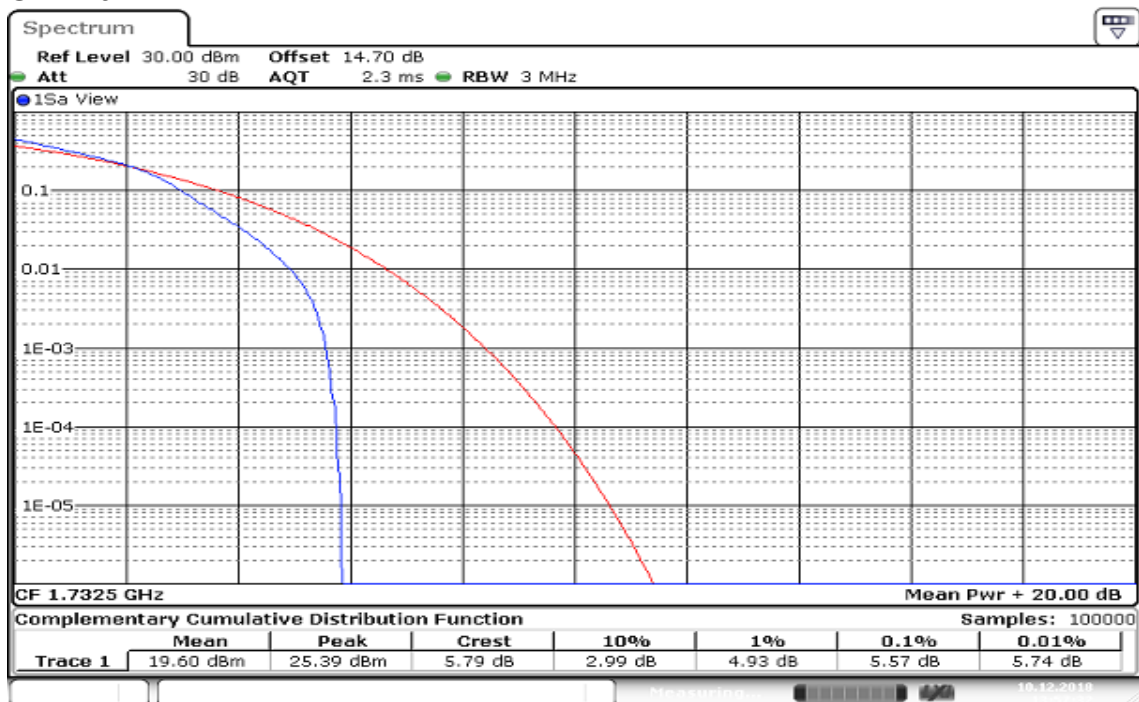


Date: 10 DEC 2018 13:55:53

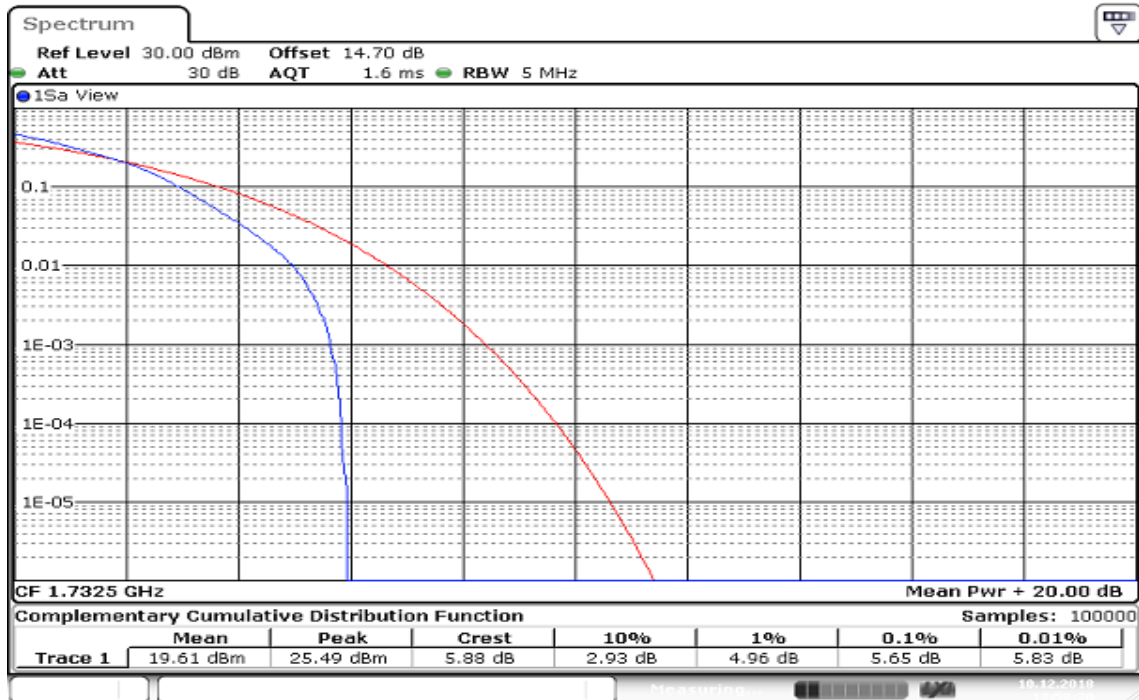
CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 100%RB
CH Mid



CHANNEL BANDWIDTH: 3MHz / 16QAM / 100%RB
CH Mid

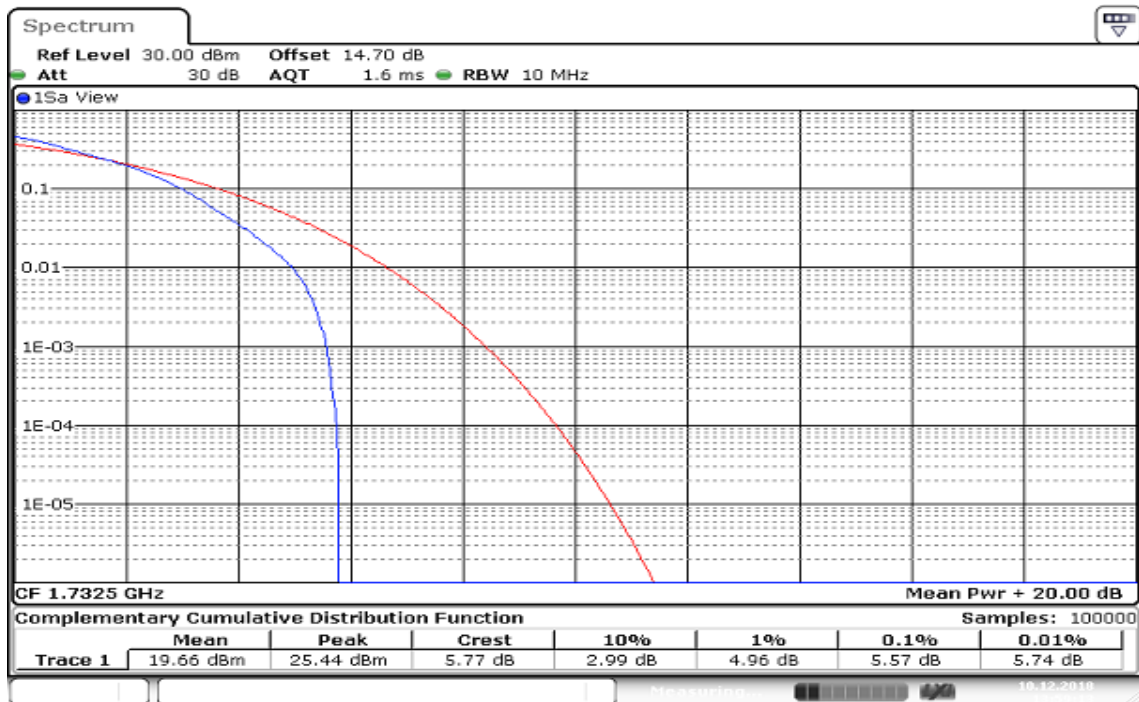


CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB CH Mid



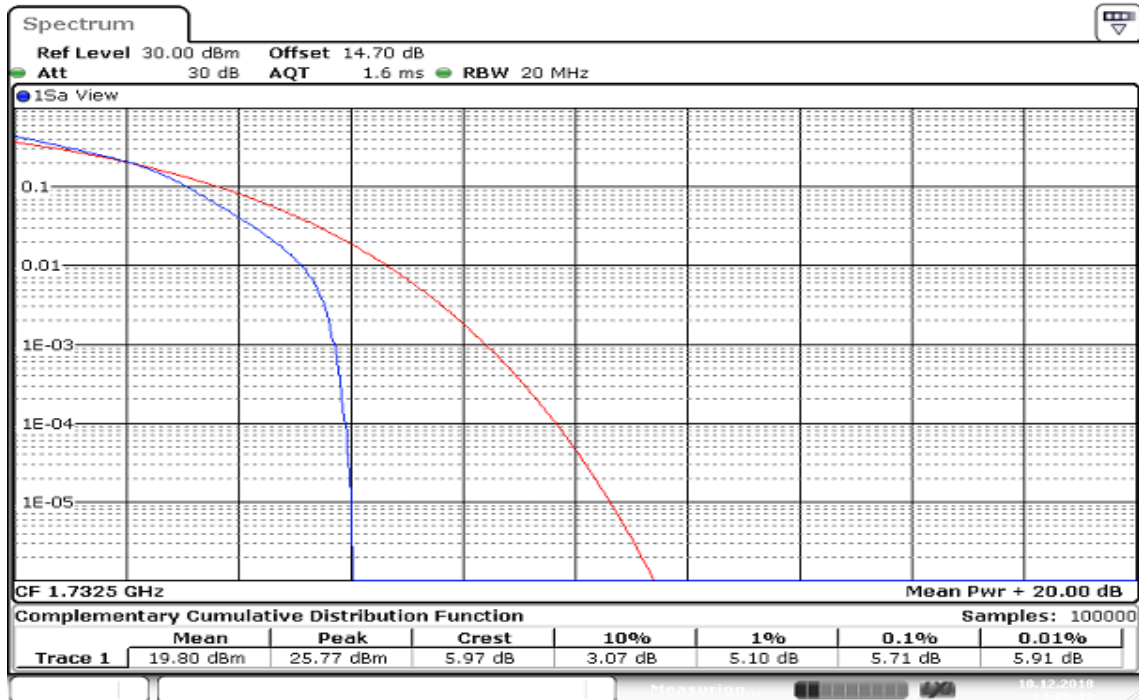
Date: 10 DEC 2018 13:58:20

CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB CH Mid

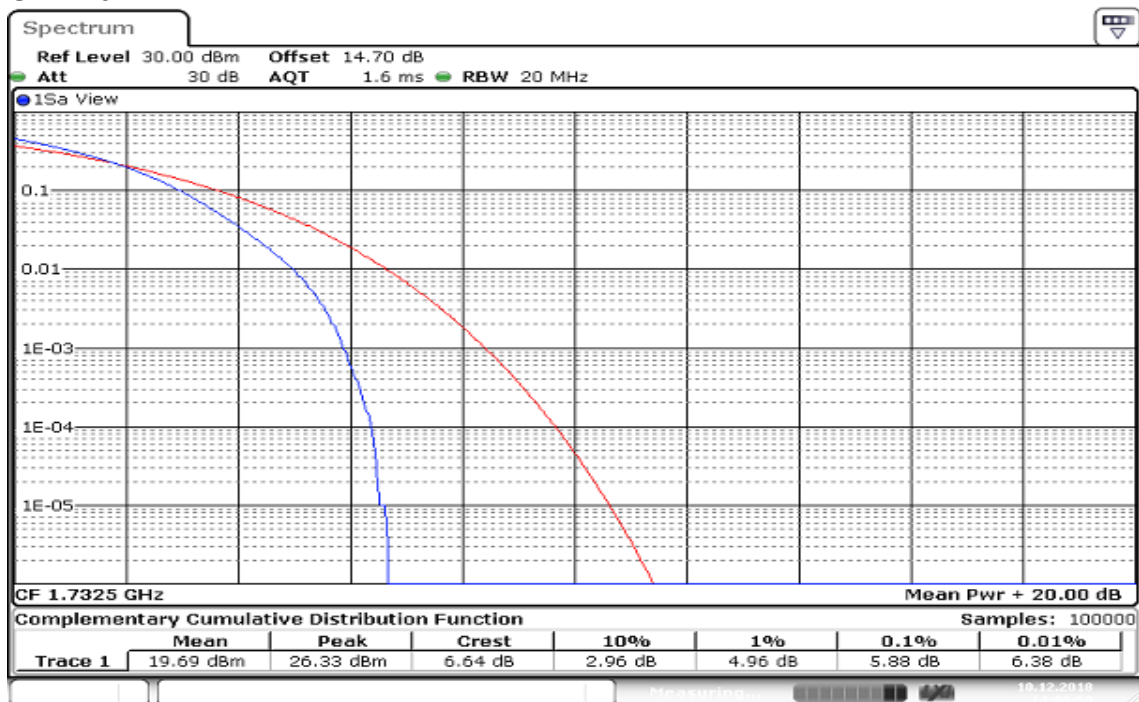


Date: 10 DEC 2018 13:59:13

CHANNEL BANDWIDTH: 15MHz / 16QAM / 100%RB CH Mid



CHANNEL BANDWIDTH: 20MHz / 16QAM / 100%RB CH Mid



8.6 BAND EDGE MEASUREMENT

LIMIT

For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

The limit of emission equal to -13dBm . In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

TEST PROCEDURE

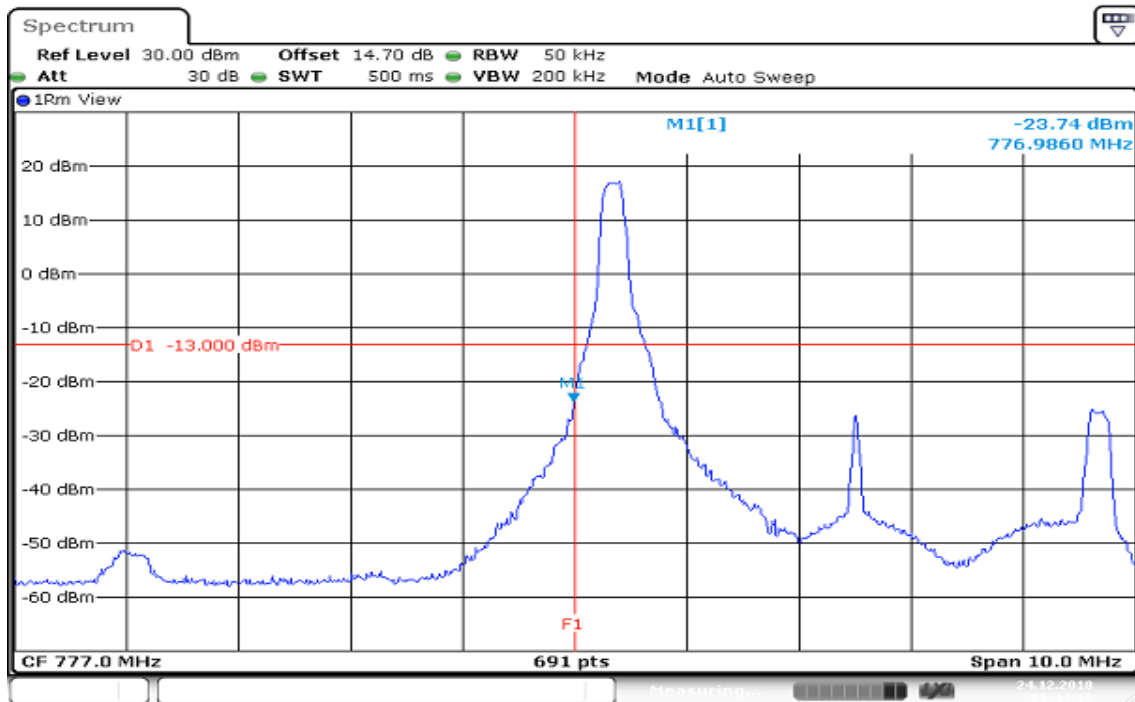
1. The EUT was set up for the maximum peak power with LTE link data modulation. The power was measured with Spectrum Analyzer. All measurements were done at 2 channels (low and high operational frequency range.).
2. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer. This splitter loss and cable loss are the worst loss 7.2 dB in the transmitted path track.
3. The center frequency of spectrum is the band edge frequency and span is 1 MHz. RB of the spectrum is 50kHz and VB of the spectrum is 200kHz.
4. Record the max trace plot into the test report.

TEST RESULTS:

LTE Band 13

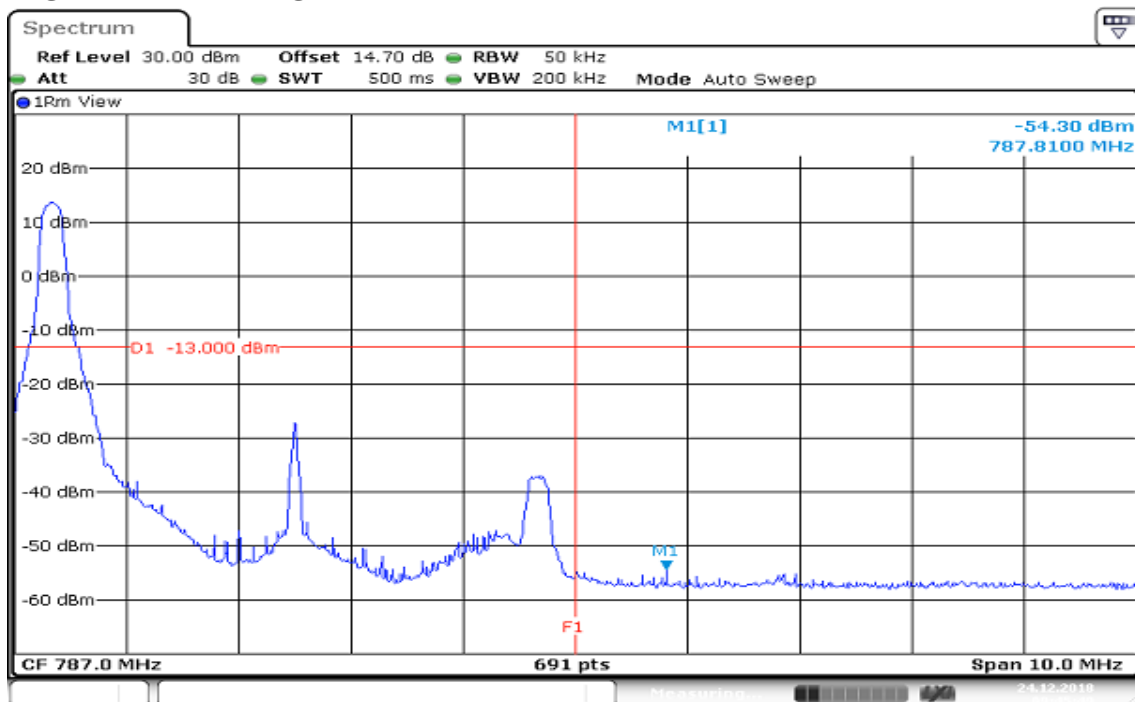
CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATED

LOWER BAND EDGE



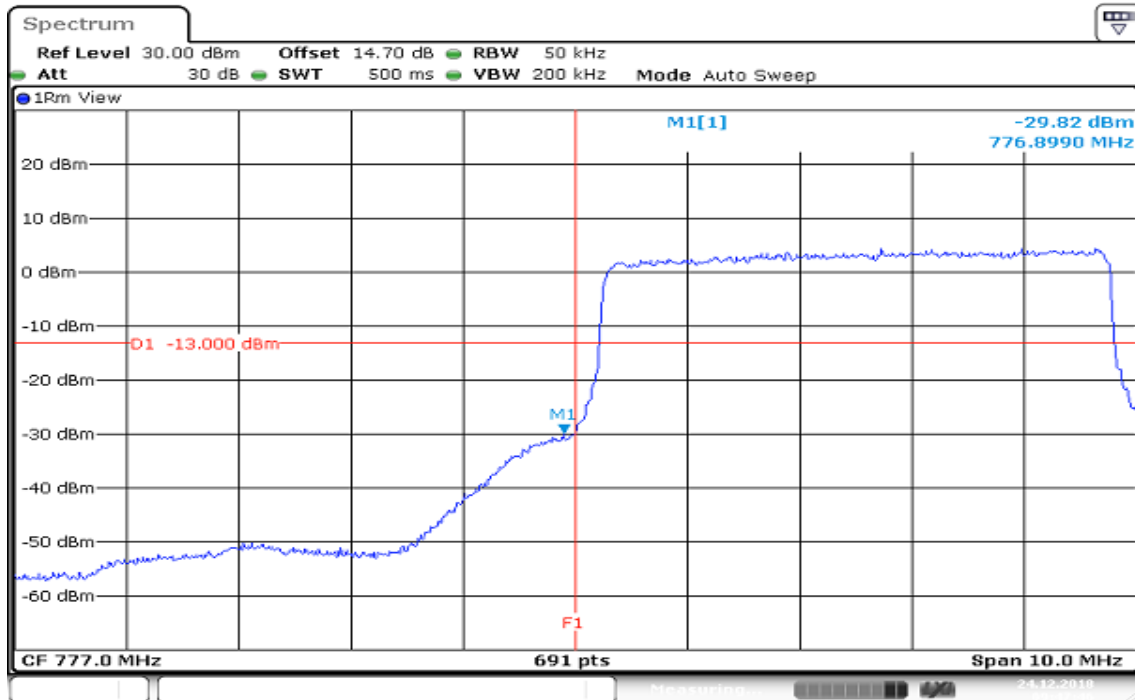
Date: 24 DEC 2018 09:44:16

HIGHER BAND EDGE



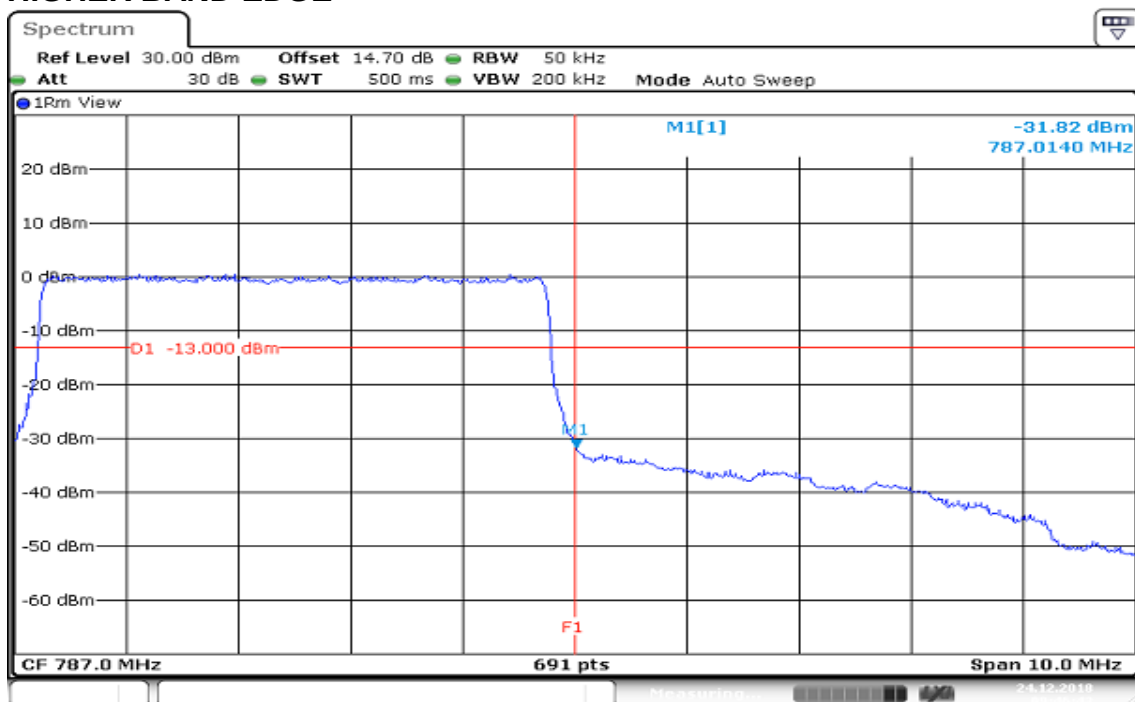
Date: 24 DEC 2018 09:45:49

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB ALLOCATED LOWER BAND EDGE



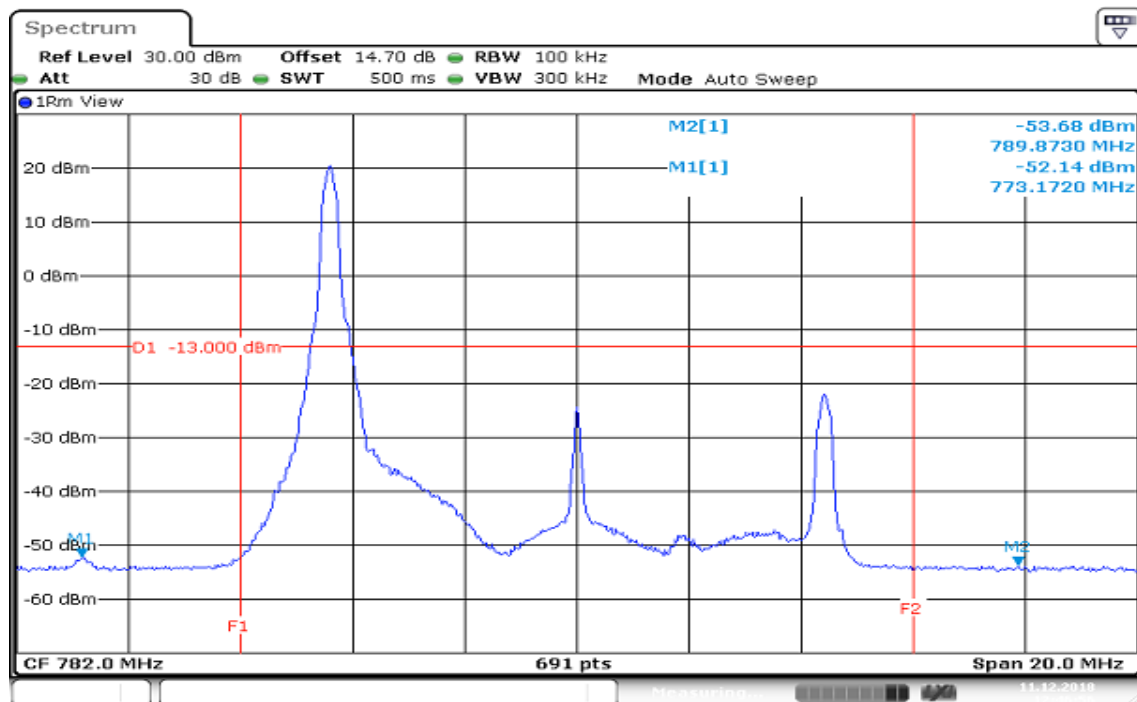
Date: 24 DEC 2018 09:47:46

HIGHER BAND EDGE



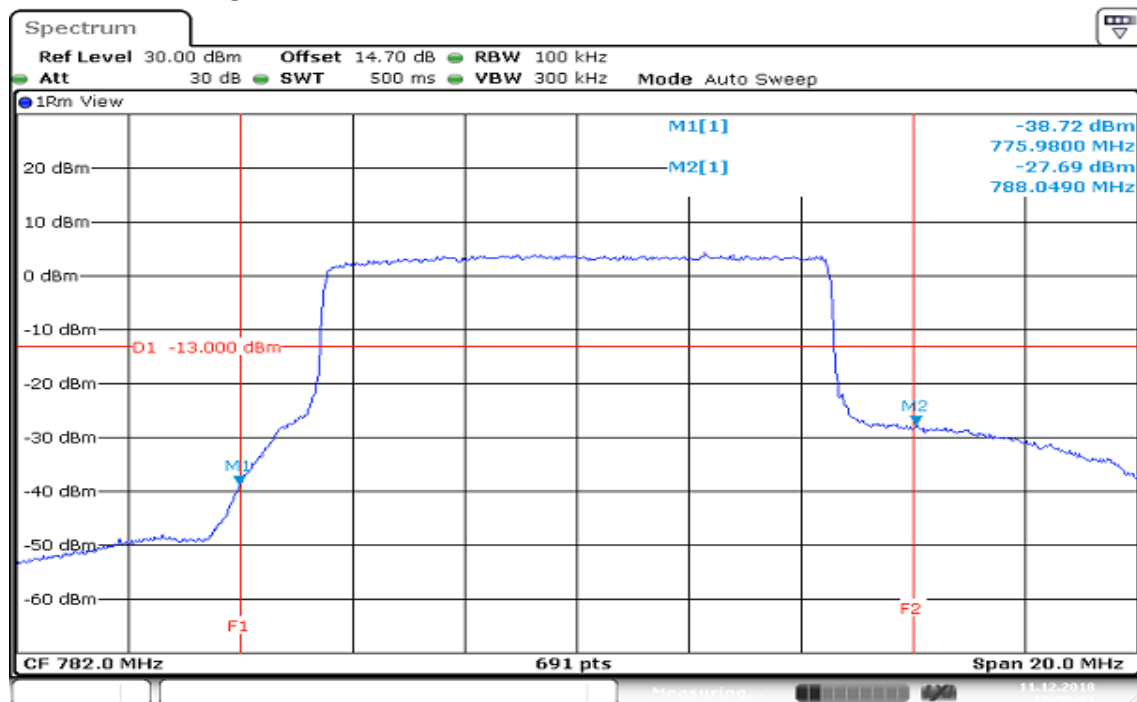
Date: 24 DEC 2018 09:46:44

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATED MID BAND EDGE



Date: 11 DEC 2018 12:46:57

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB ALLOCATED MID BAND EDGE

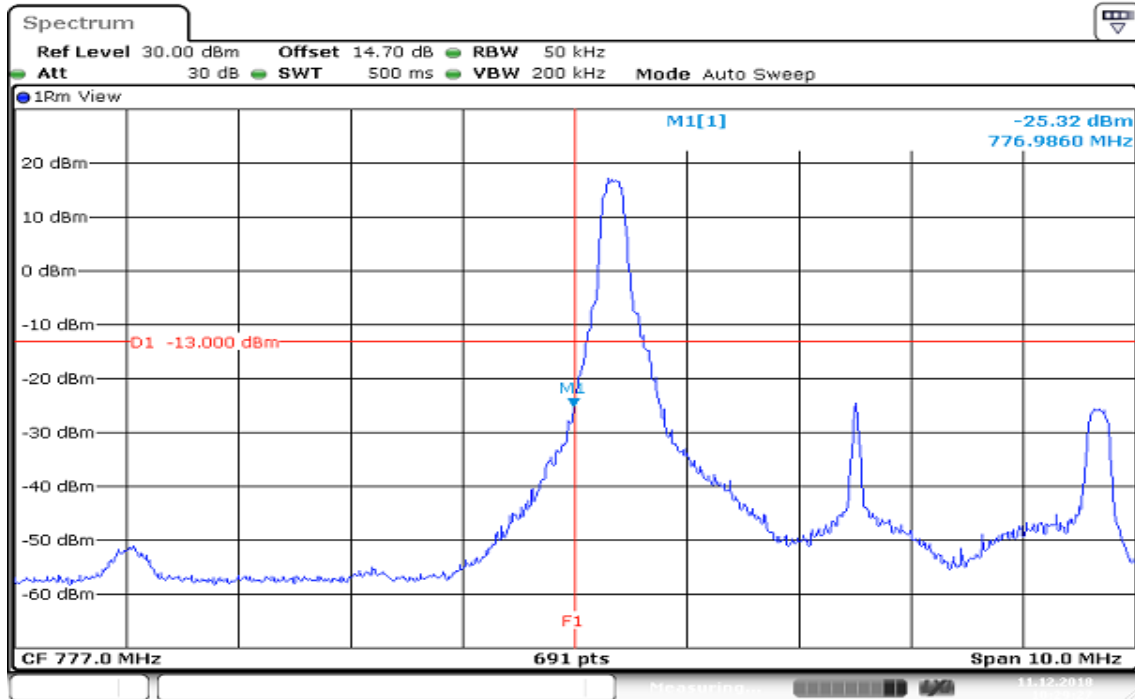


Date: 11 DEC 2018 12:48:01

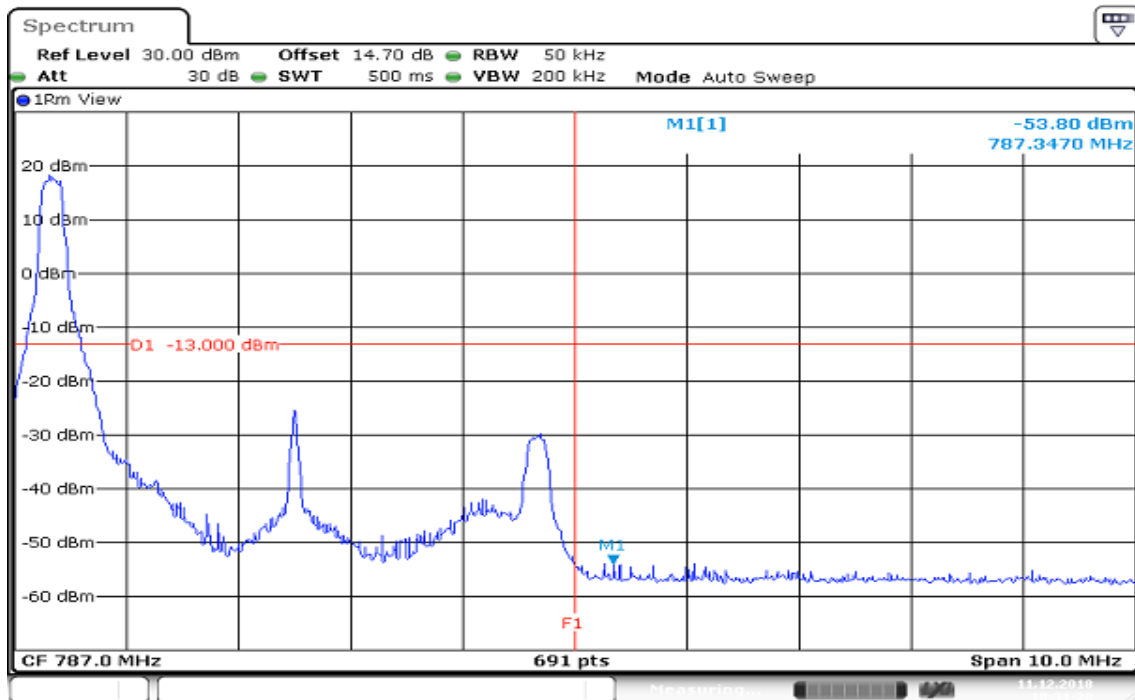
LTE Band 13

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED

LOWER BAND EDGE



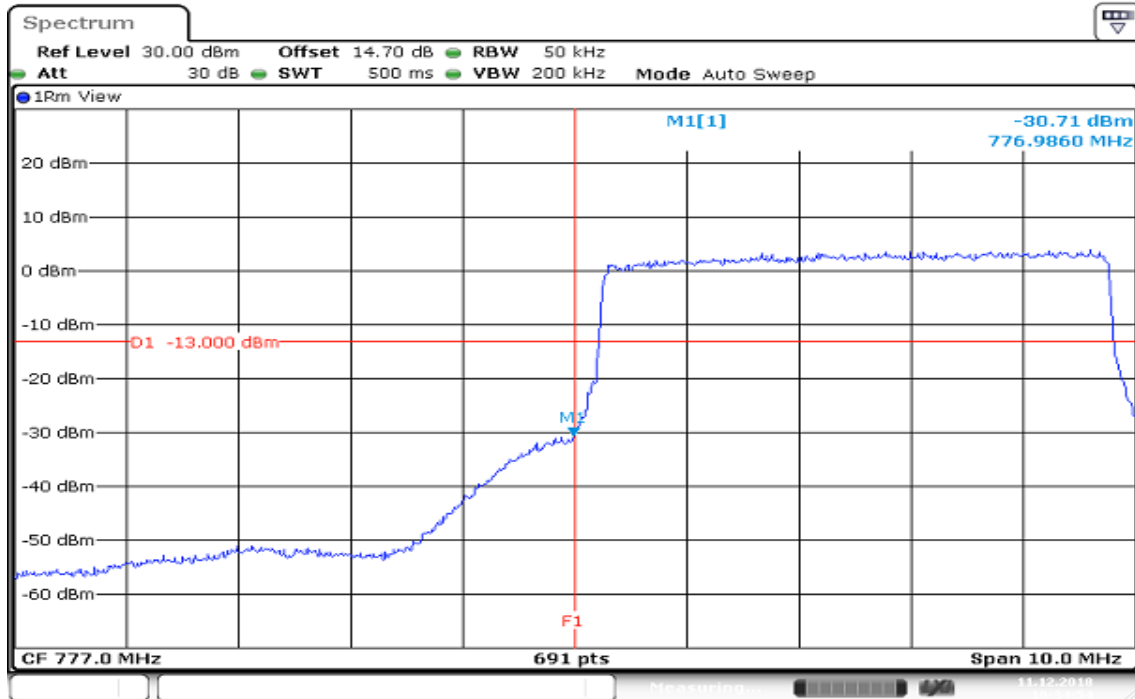
HIGHER BAND EDGE



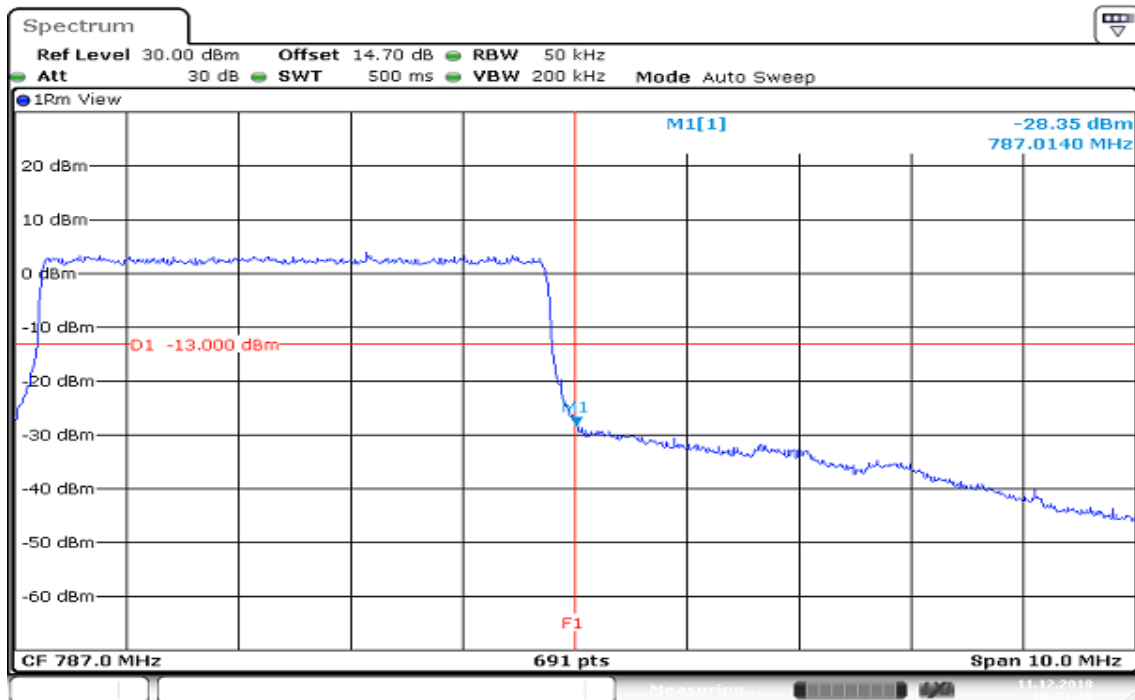
LTE Band 13

CHANNEL BANDWIDTH: 5MHz / 16QAM / 100%RB ALLOCATED

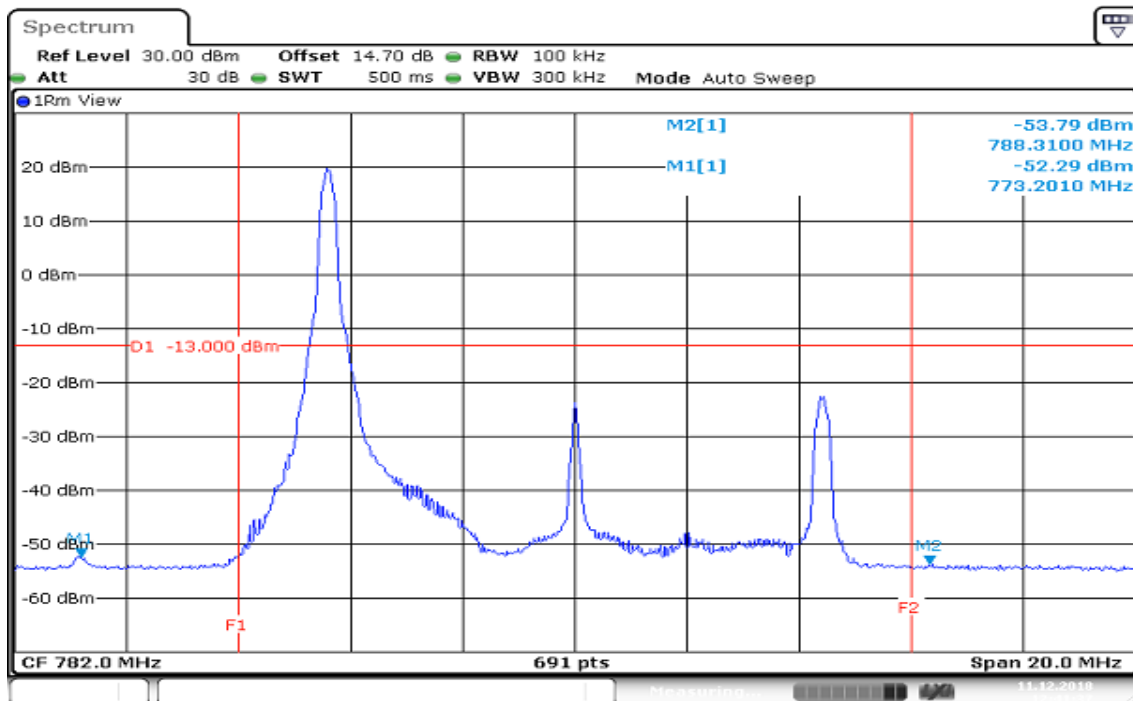
LOWER BAND EDGE



HIGHER BAND EDGE

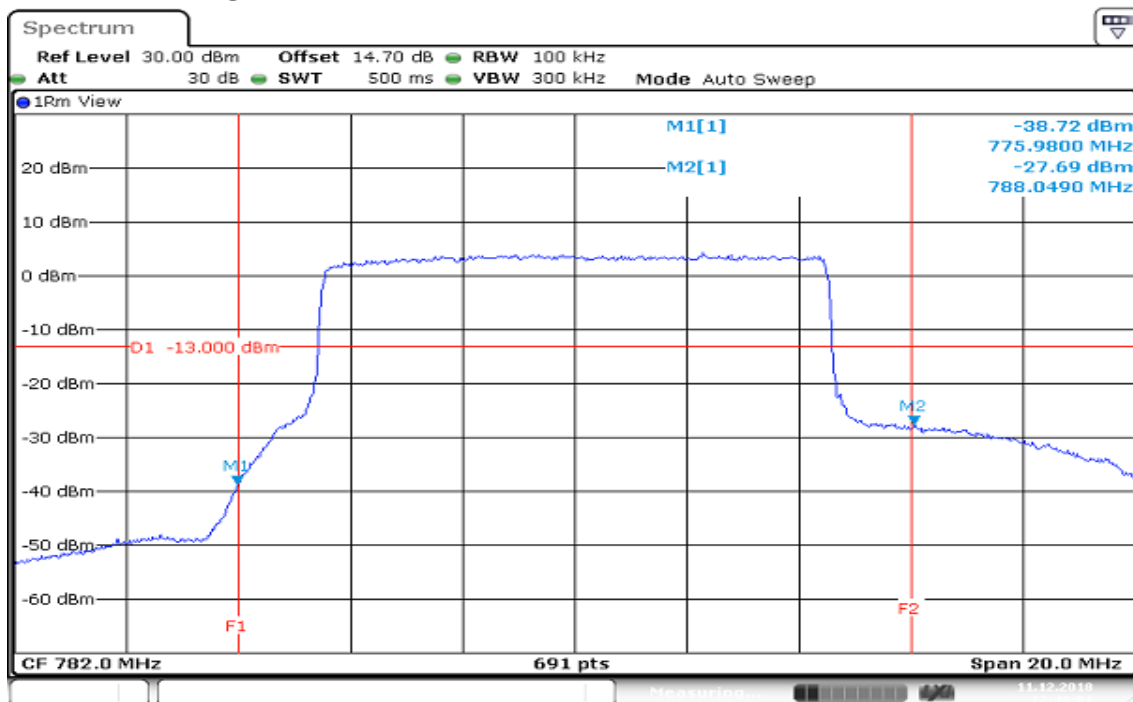


CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB ALLOCATED MID BAND EDGE



Date: 11 DEC 2018 12:41:28

CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB ALLOCATED MID BAND EDGE

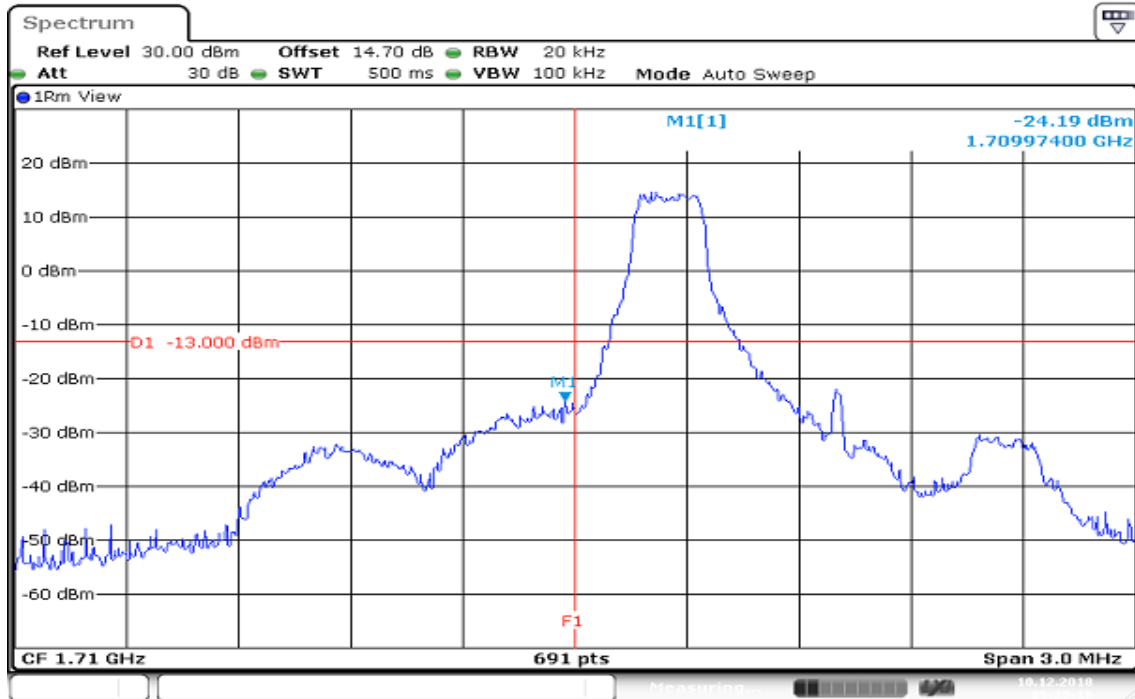


Date: 11 DEC 2018 12:48:01

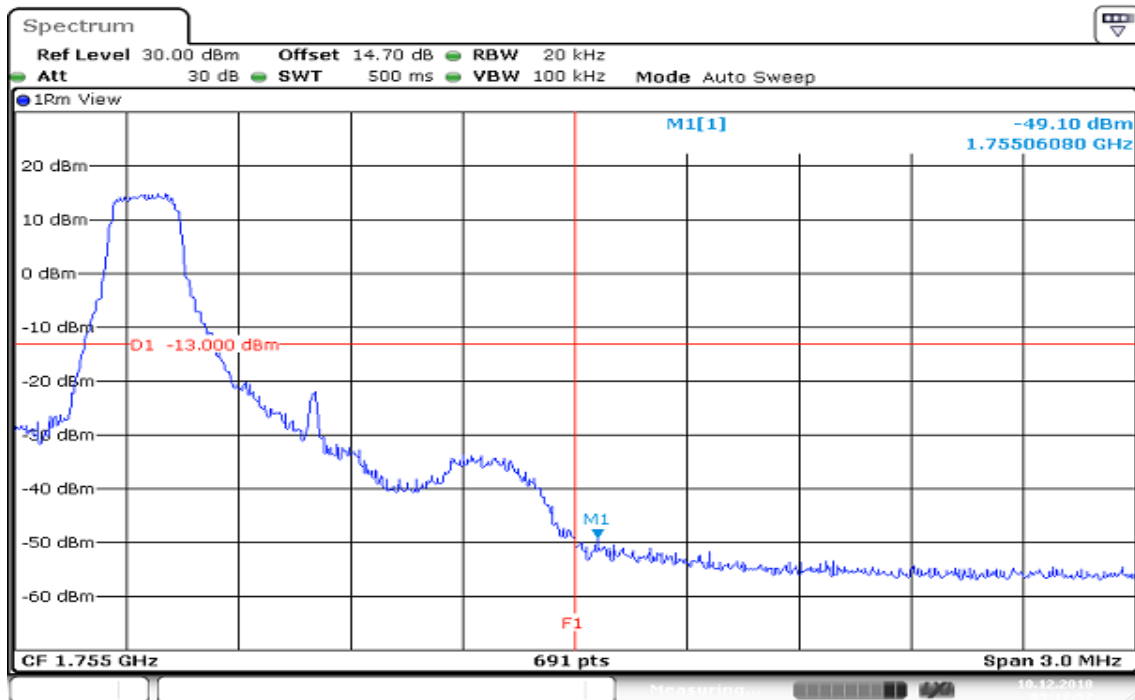
LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATED

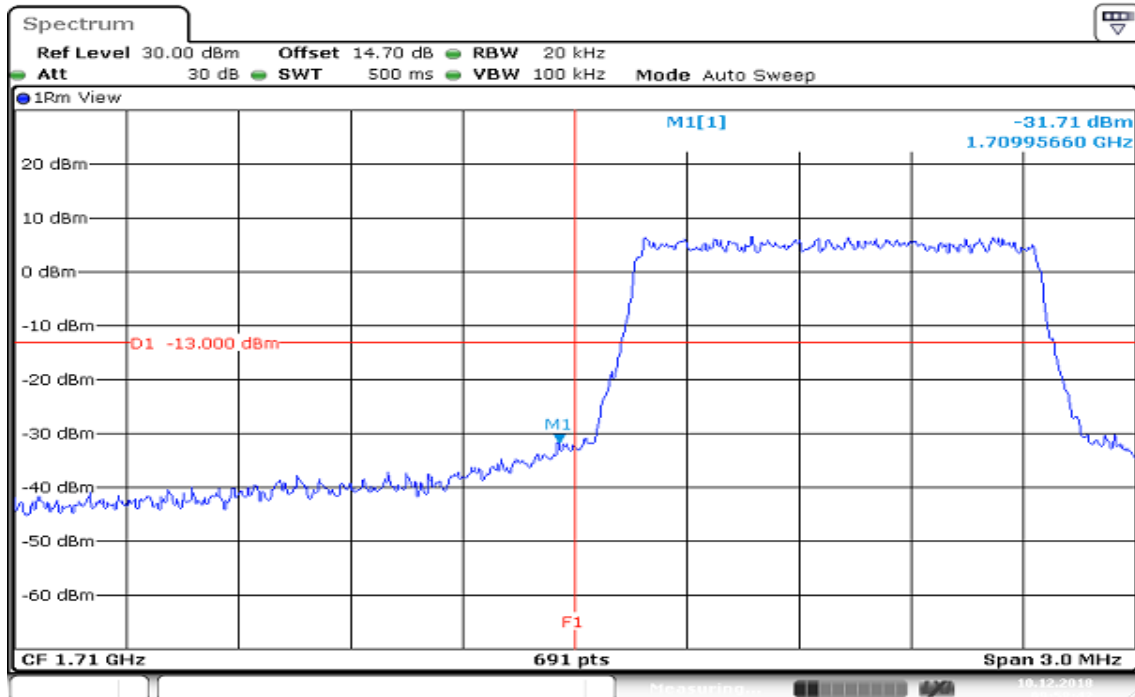
LOWER BAND EDGE



HIGHER BAND EDGE

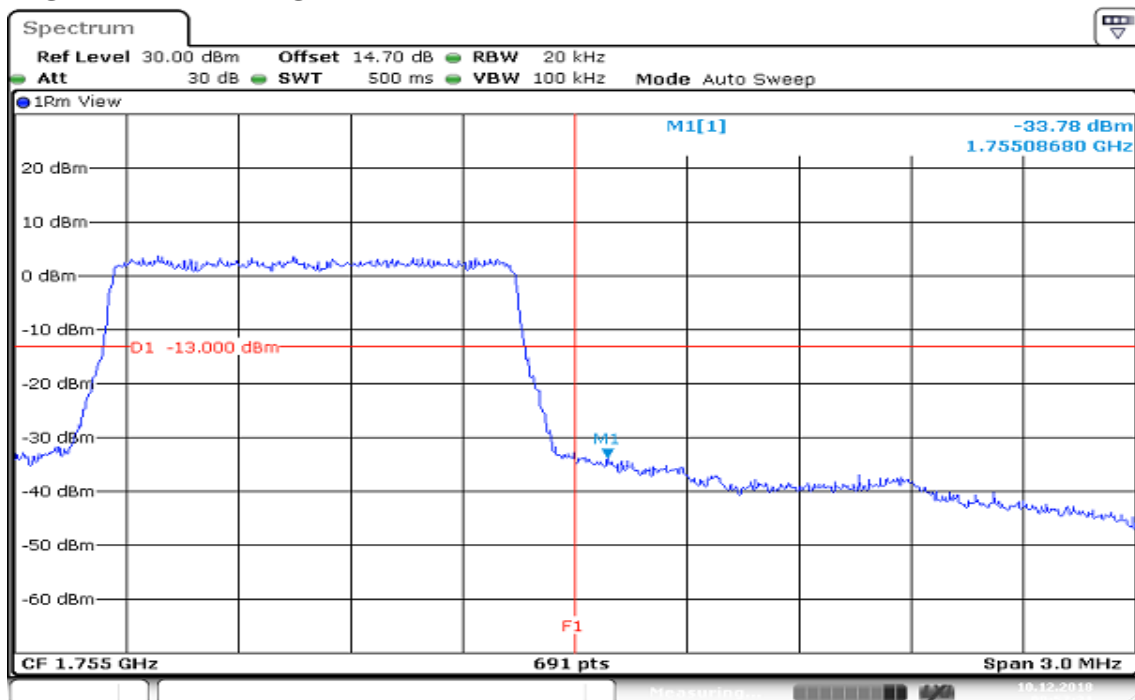


CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100%RB ALLOCATED LOWER BAND EDGE



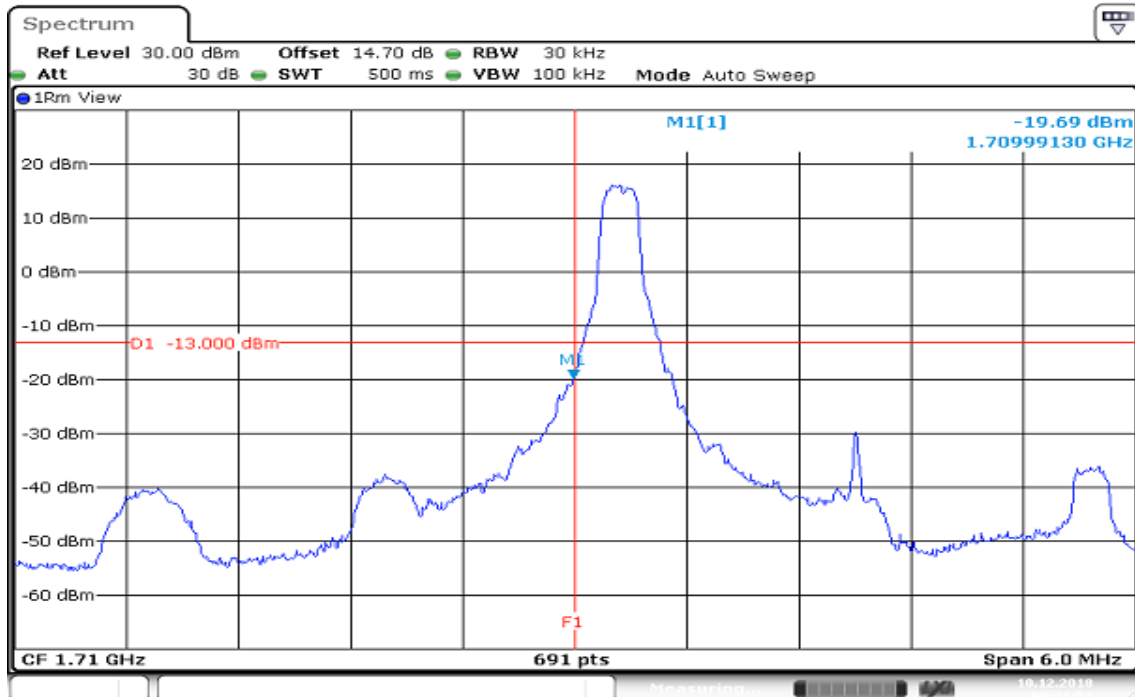
Date: 10 DEC 2018 09:58:42

HIGHER BAND EDGE



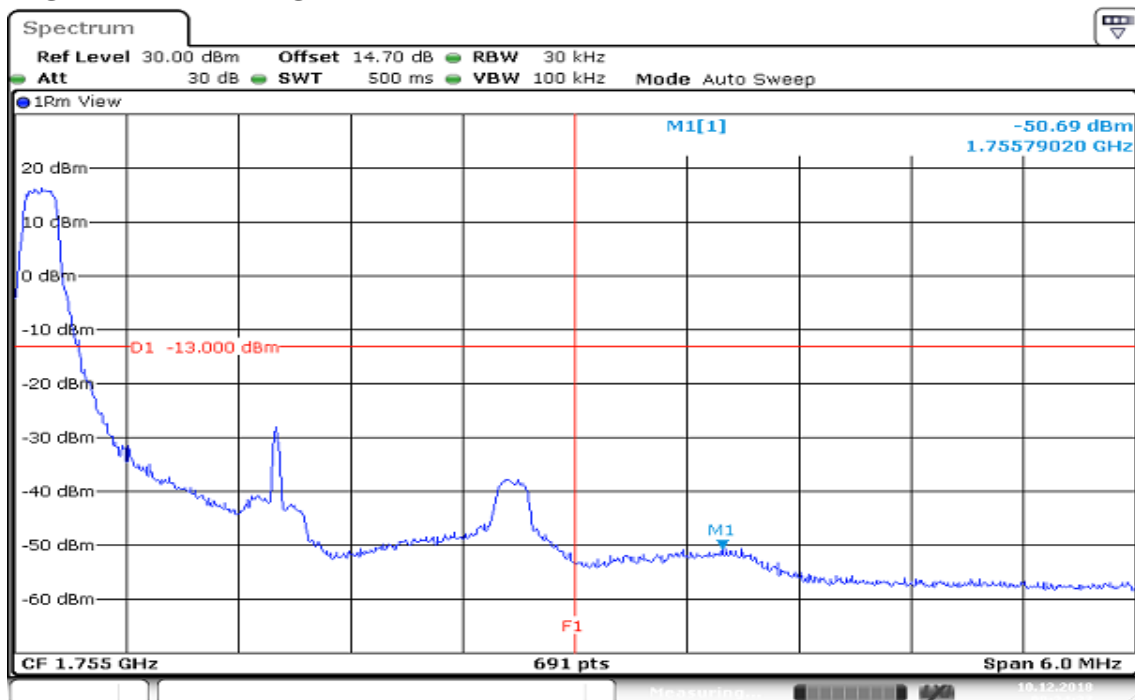
Date: 10 DEC 2018 09:57:32

CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



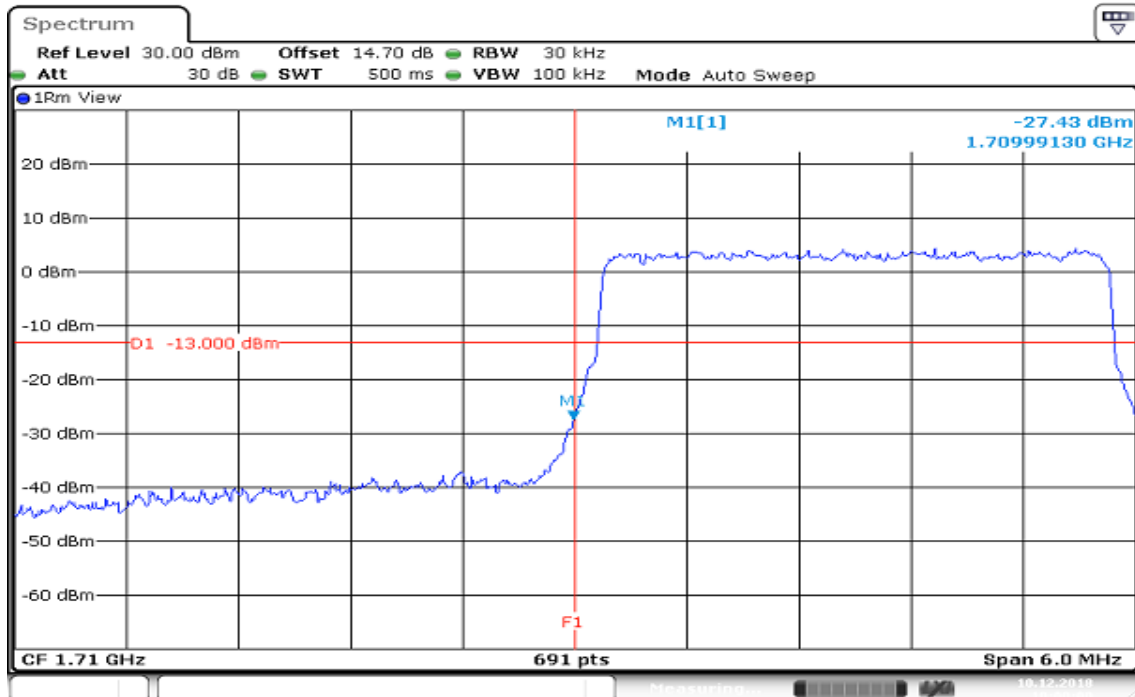
Date: 10 DEC 2018 09:21:52

HIGHER BAND EDGE

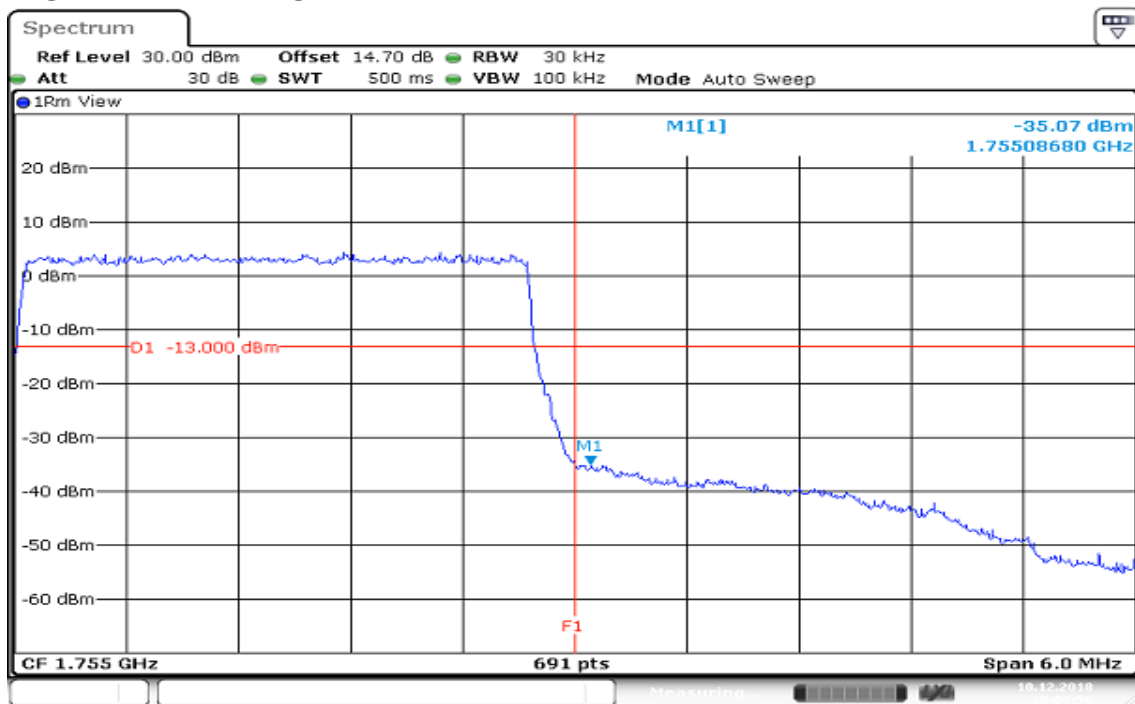


Date: 10 DEC 2018 09:24:27

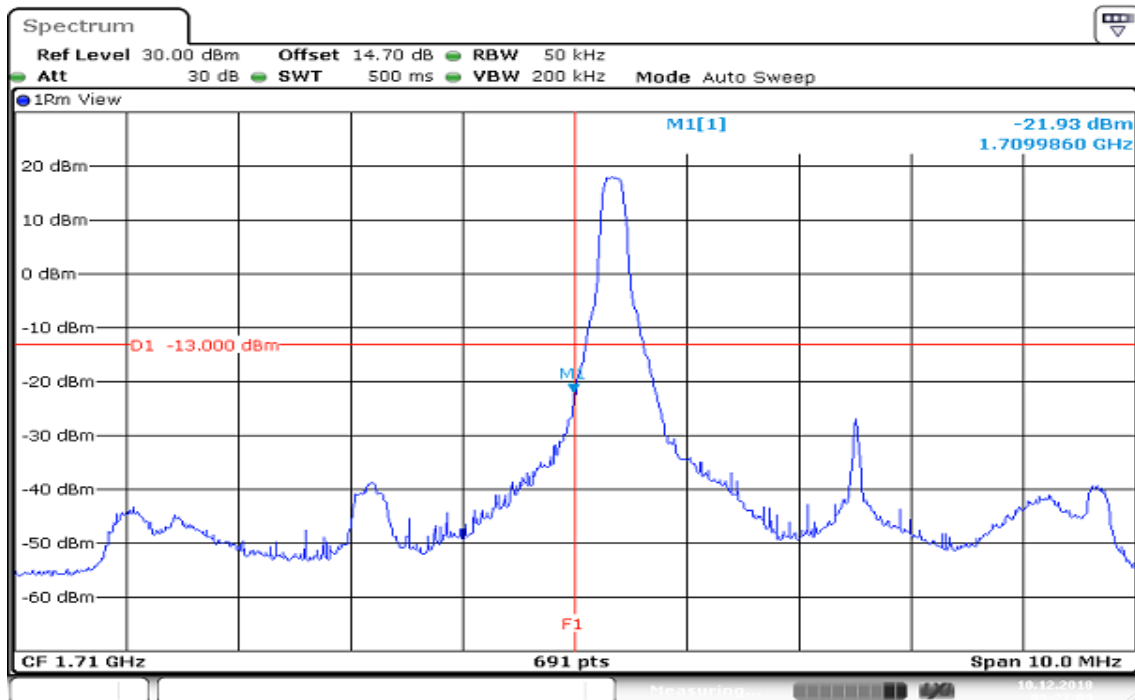
CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB ALLOCATED LOWER BAND EDGE



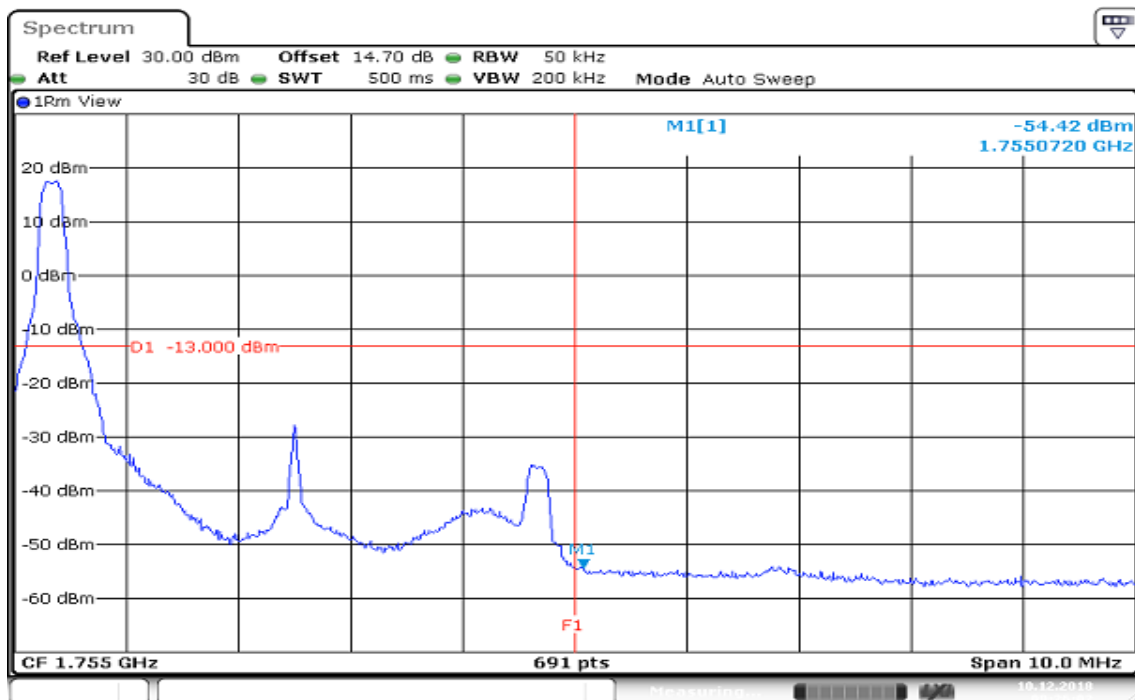
HIGHER BAND EDGE



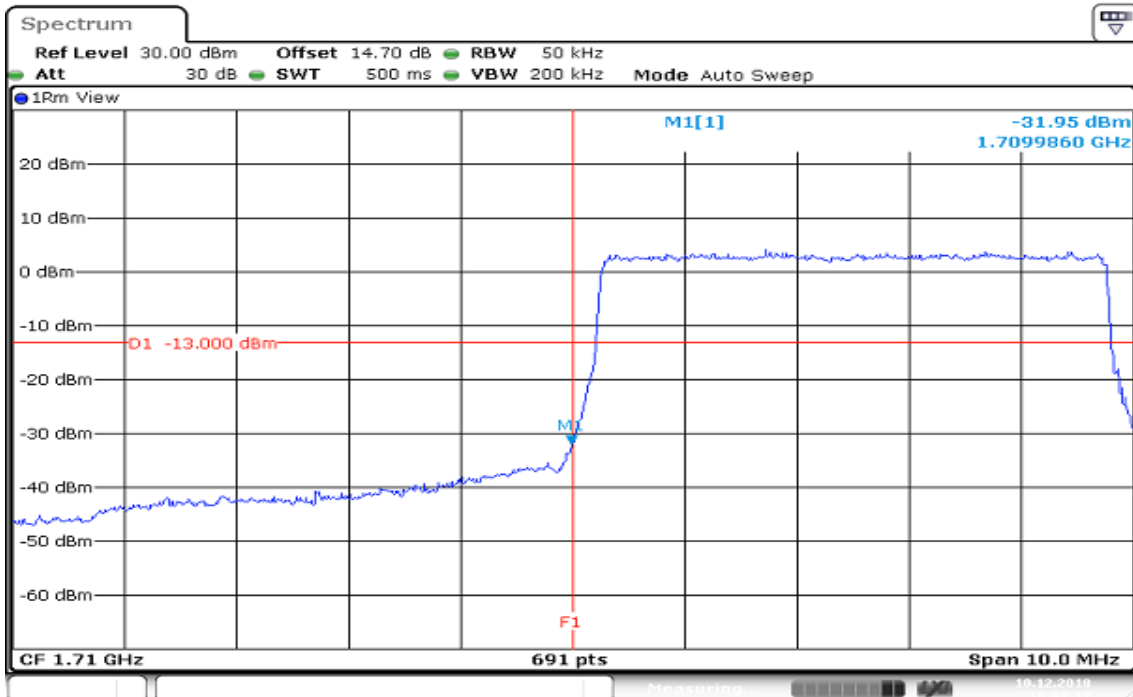
CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



HIGHER BAND EDGE



CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB ALLOCATED LOWER BAND EDGE



HIGHER BAND EDGE

