



FCC ID: W5Y-1002244
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FCC 47 CFR PART 22 SUBPART H

TEST REPORT

For

GUARDIAN SYSTEM LTE

Model No.: G2-SY-CON2

Trade Name: GUARDIAN

Issued to

**Seeing Machines Pty Ltd
80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia**

Issued by

Compliance Certification Services Inc.

Wugu Laboratory

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

Issued Date: June 6, 2020

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 22, 2020	Initial Issue	ALL	Doris Chu
01	May 29, 2020	See the following Note Rev. (01)	P.1, P.4, P.6, P.21-23, P.55-64	May Lin
02	June 6, 2020	See the following Note Rev. (02)	P.33, P.39-43	Allison Chen

Rev (01):

- 1. Remove IC information.*
- 2. Revised the section 2 · 8.2 · 8.5.*

Rev (02):

- 1. Revised the section 8.4*

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1. TEST RESULT CERTIFICATION

Applicant: Seeing Machines Pty Ltd
80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia

Manufacturer: ADLINK TECHNOLOGY INC.
9F, No. 166, Jian Yi Rd., Zhonghe Dist., New Taipei City, 235
Taiwan

Equipment Under Test: GUARDIAN SYSTEM LTE

Trade Name: GUARDIAN

Model No.: G2-SY-CON2

Date of Test: December 20, 2019 ~ January 8, 2020



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APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR PART 22 SUBPART H	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA -603-E and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rule FCC PART 22 Subpart H.

Approved by:

Kevin Tsai
Deputy Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	GUARDIAN SYSTEM LTE			
Model No.	G2-SY-CON2			
Model Discrepancy	N/A			
Trade	GUARDIAN			
Received Date	November 20, 2019			
Power Supply	Powered from DC supply: DC 12V.			
Frequency Range	LTE Band 26 Channel Bandwidth: 1.4MHz	824.7MHz ~ 843.3MHz		
	LTE Band 26 Channel Bandwidth: 3MHz	825.5MHz ~ 847.5MHz		
	LTE Band 26 Channel Bandwidth: 5MHz	826.5MHz ~ 846.5MHz		
	LTE Band 26 Channel Bandwidth: 10MHz	829MHz ~ 841MHz		
	LTE Band 26 Channel Bandwidth: 15MHz	831.5MHz ~ 841.5MHz		
Modulation Technique	LTE Band 26	QPSK, 16QAM		
Antenna Specification	Dipole Antenna Antenna gain: -0.1 dBi			
Transmit Power (ERP Power)	LTE Band 26 Channel Bandwidth: 1.4MHz	QPSK:	19.98	dBm
		16QAM:	19.53	dBm
	LTE Band 26 Channel Bandwidth: 3MHz	QPSK:	19.99	dBm
		16QAM:	19.54	dBm
	LTE Band 26 Channel Bandwidth: 5MHz	QPSK:	20.04	dBm
	16QAM:	19.59	dBm	
	LTE Band 26 Channel Bandwidth: 10MHz	QPSK:	20.06	dBm
		16QAM:	19.61	dBm
	LTE Band 26 Channel Bandwidth: 15MHz	QPSK:	20.10	dBm
		16QAM:	19.65	dBm
HW Version	V1			
SW Version	V9			

Remark: The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

3. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures document on chapter 13 of TIA-603-E and FCC CFR 47, Part 2 and Part 22 Subpart H, KDB 971168 D01 Power Meas License Digital Systems.

3.1 EUT CONFIGURATION

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

3.2 DESCRIPTION OF TEST MODES

The EUT (Model: G2-SY-CON2) had been tested under operating condition. The EUT be set in maximum power transmission via call box during testing.

LTE Band 26: 824 MHz ~ 849 MHz

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)	26797	824.7	26805	825.5	26815	826.5
Middle channel (M)	26915	836.5	26915	836.5	26915	836.5
High channel (H)	27033	848.3	27025	847.5	27015	846.5
Channel Bandwidth	10MHz		15MHz			
	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
Low channel (L)	26840	829	26865	831.5		
Middle channel (M)	26915	836.5	26915	836.5		
High channel (H)	26960	841	26965	841.5		

3.2.1 The worst mode of measurement

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Power supply
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst 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)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Power supply
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

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

4. TEST SUMMERY

FCC Standard Sec.	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
22.913(a)	8.1	ERP and EIRP Measurement	Pass
2.1055, 22.355	8.2	Frequency Stability v.s. temperature measurement	Pass
2.1049	8.3	Occupied Bandwidth Measurement	Pass
22.917(a)	8.4	Conducted Band Edge	Pass
22.913(d)	8.5	Peak to Average Ratio	Pass
22.917(a)	8.6	Conducted Spurious Emission	Pass
22.917(a)	8.7	Spurious Radiation Measurement	Pass

5. INSTRUMENT CALIBRATION

5.1 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
Radiation	Jerry Chang	-
RF Conducted	Dally Hong	-

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



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5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC001	06/28/2019	06/27/2020
Coaxial Cable	Woken	WC12	CC003	06/28/2019	06/27/2020
Power Divider	Solvang Technology	STI08-0015	008	08/06/2019	08/05/2020
Signal Analyzer	R&S	FSV 40	101073	09/25/2019	09/24/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/29/2019	07/28/2020
DC Power Supplies	GW Instek	SPS-3610	GPE880163	01/14/2019	2020/1/13
Software	N/A				

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/26/2019	02/25/2020
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Coaxial Cable	EMCI	EMC105	190914+25111	09/20/2019	09/19/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	10/04/2019	10/03/2020
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/29/2019	07/28/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
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
Software	e3 6.11-20180413				

5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

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

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.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

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

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

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."

6.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.

7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

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

7.2 SUPPORT EQUIPMENT

No.	Equipment	Brand	Model	Series No.	FCC ID	IC ID
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H	1000M-7260H

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. FCC PART 22 REQUIREMENTS

8.1 ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

FCC 22.913(b):

The Effective Radiated Power (ERP) of mobile transmitters must not exceed 7 Watts.

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

No non-compliance noted.

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LTE Band 26

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
Band 26	1.4M	26797	824.7	QPSK	1	0	0	21.99	19.74
					1	2	0	22.23	19.98
					1	5	0	22.14	19.89
					3	0	1	21.41	19.16
					3	1	1	21.33	19.08
					3	2	1	21.29	19.04
					6	0	1	21.39	19.14
				16QAM	1	0	1	21.53	19.28
					1	2	1	21.51	19.26
					1	5	1	21.78	19.53
					3	0	2	20.36	18.11
					3	1	2	20.29	18.04
					3	2	2	20.26	18.01
					6	0	2	20.49	18.24
		26915	836.5	QPSK	1	0	0	22.15	19.90
					1	2	0	22.11	19.86
					1	5	0	22.07	19.82
					3	0	1	21.20	18.95
					3	1	1	21.14	18.89
					3	2	1	21.15	18.90
					6	0	1	21.16	18.91
				16QAM	1	0	1	21.66	19.41
					1	2	1	21.50	19.25
					1	5	1	21.39	19.14
					3	0	2	20.24	17.99
					3	1	2	20.20	17.95
					3	2	2	20.08	17.83
					6	0	2	20.17	17.92
		27033	848.3	QPSK	1	0	0	22.11	19.86
					1	2	0	22.12	19.87
					1	5	0	21.14	18.89
					3	0	1	21.35	19.10
					3	1	1	21.13	18.88
					3	2	1	21.11	18.86
					6	0	1	21.28	19.03
				16QAM	1	0	1	21.18	18.93
					1	2	1	21.38	19.13
					1	5	1	21.09	18.84
					3	0	2	20.33	18.08
					3	1	2	20.15	17.90
					3	2	2	20.18	17.93
					6	0	2	20.38	18.13

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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
Band 26	3M	26805	825.5	QPSK	1	0	0	22.00	19.75
					1	7	0	22.24	19.99
					1	14	0	22.15	19.90
					8	0	1	21.42	19.17
					8	4	1	21.34	19.09
					8	7	1	21.30	19.05
					15	0	1	21.40	19.15
				16QAM	1	0	1	21.54	19.29
					1	7	1	21.52	19.27
					1	14	1	21.79	19.54
					8	0	2	20.37	18.12
					8	4	2	20.30	18.05
					8	7	2	20.27	18.02
					15	0	2	20.50	18.25
		26915	836.5	QPSK	1	0	0	22.16	19.91
					1	7	0	22.12	19.87
					1	14	0	22.08	19.83
					8	0	1	21.21	18.96
					8	4	1	21.15	18.90
					8	7	1	21.16	18.91
					15	0	1	21.17	18.92
				16QAM	1	0	1	21.67	19.42
					1	7	1	21.51	19.26
					1	14	1	21.40	19.15
					8	0	2	20.25	18.00
					8	4	2	20.21	17.96
					8	7	2	20.09	17.84
					15	0	2	20.18	17.93
		27025	847.5	QPSK	1	0	0	22.13	19.88
					1	7	0	22.14	19.89
					1	14	0	21.16	18.91
					8	0	1	21.37	19.12
					8	4	1	21.15	18.90
					8	7	1	21.13	18.88
					15	0	1	21.30	19.05
				16QAM	1	0	1	21.20	18.95
					1	7	1	21.40	19.15
					1	14	1	21.11	18.86
					8	0	2	20.35	18.10
					8	4	2	20.17	17.92
					8	7	2	20.20	17.95
					15	0	2	20.40	18.15

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
Band 26	5M	26815	826.5	QPSK	1	0	0	22.05	19.80
					1	12	0	22.29	20.04
					1	24	0	22.20	19.95
					12	0	1	21.47	19.22
					12	6	1	21.39	19.14
					12	11	1	21.35	19.10
					25	0	1	21.45	19.20
				16QAM	1	0	1	21.59	19.34
					1	12	1	21.57	19.32
					1	24	1	21.84	19.59
					12	0	2	20.42	18.17
					12	6	2	20.35	18.10
					12	11	2	20.32	18.07
					25	0	2	20.55	18.30
		26915	836.5	QPSK	1	0	0	22.20	19.95
					1	12	0	22.16	19.91
					1	24	0	22.12	19.87
					12	0	1	21.25	19.00
					12	6	1	21.19	18.94
					12	11	1	21.20	18.95
					25	0	1	21.21	18.96
				16QAM	1	0	1	21.71	19.46
					1	12	1	21.55	19.30
					1	24	1	21.44	19.19
					12	0	2	20.29	18.04
					12	6	2	20.25	18.00
					12	11	2	20.13	17.88
					25	0	2	20.22	17.97
		27015	846.5	QPSK	1	0	0	22.18	19.93
					1	12	0	22.19	19.94
					1	24	0	21.21	18.96
					12	0	1	21.42	19.17
					12	6	1	21.20	18.95
					12	11	1	21.18	18.93
					25	0	1	21.35	19.10
				16QAM	1	0	1	21.25	19.00
					1	12	1	21.45	19.20
					1	24	1	21.16	18.91
					12	0	2	20.40	18.15
					12	6	2	20.22	17.97
					12	11	2	20.25	18.00
					25	0	2	20.45	18.20

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
Band 26	10M	26840	829.0	QPSK	1	0	0	22.07	19.82
					1	24	0	22.31	20.06
					1	49	0	22.22	19.97
					25	0	1	21.49	19.24
					25	12	1	21.41	19.16
					25	24	1	21.37	19.12
					50	0	1	21.47	19.22
				16QAM	1	0	1	21.61	19.36
					1	24	1	21.59	19.34
					1	49	1	21.86	19.61
					25	0	2	20.44	18.19
					25	12	2	20.37	18.12
					25	24	2	20.34	18.09
					50	0	2	20.57	18.32
		26915	836.5	QPSK	1	0	0	22.22	19.97
					1	24	0	22.18	19.93
					1	49	0	22.14	19.89
					25	0	1	21.27	19.02
					25	12	1	21.21	18.96
					25	24	1	21.22	18.97
					50	0	1	21.23	18.98
				16QAM	1	0	1	21.73	19.48
					1	24	1	21.57	19.32
					1	49	1	21.46	19.21
					25	0	2	20.31	18.06
					25	12	2	20.27	18.02
					25	24	2	20.15	17.90
					50	0	2	20.24	17.99
		26990	844.0	QPSK	1	0	0	22.21	19.96
					1	24	0	22.22	19.97
					1	49	0	21.24	18.99
					25	0	1	21.45	19.20
					25	12	1	21.23	18.98
					25	24	1	21.21	18.96
					50	0	1	21.38	19.13
				16QAM	1	0	1	21.28	19.03
					1	24	1	21.48	19.23
					1	49	1	21.19	18.94
					25	0	2	20.43	18.18
					25	12	2	20.25	18.00
					25	24	2	20.28	18.03
					50	0	2	20.48	18.23

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Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	EIRP Power (dBm)
Band 26	15M	26865	831.5	QPSK	1	0	0	22.11	19.86
					1	37	0	22.35	20.10
					1	74	0	22.26	20.01
					36	0	1	21.53	19.28
					36	18	1	21.45	19.20
					36	35	1	21.41	19.16
					75	0	1	21.51	19.26
				16QAM	1	0	1	21.65	19.40
					1	37	1	21.63	19.38
					1	74	1	21.90	19.65
					36	0	2	20.48	18.23
					36	18	2	20.41	18.16
					36	35	2	20.38	18.13
					75	0	2	20.61	18.36
		26915	836.5	QPSK	1	0	0	22.29	20.04
					1	37	0	22.25	20.00
					1	74	0	22.21	19.96
					36	0	1	21.34	19.09
					36	18	1	21.28	19.03
					36	35	1	21.29	19.04
					75	0	1	21.30	19.05
				16QAM	1	0	1	21.80	19.55
					1	37	1	21.64	19.39
					1	74	1	21.53	19.28
					36	0	2	20.38	18.13
					36	18	2	20.34	18.09
					36	35	2	20.22	17.97
					75	0	2	20.31	18.06
		26965	841.5	QPSK	1	0	0	22.29	20.04
					1	37	0	22.30	20.05
					1	74	0	21.32	19.07
					36	0	1	21.53	19.28
					36	18	1	21.31	19.06
					36	35	1	21.29	19.04
					75	0	1	21.46	19.21
				16QAM	1	0	1	21.36	19.11
					1	37	1	21.56	19.31
					1	74	1	21.27	19.02
					36	0	2	20.51	18.26
					36	18	2	20.33	18.08
					36	35	2	20.36	18.11
					75	0	2	20.56	18.31



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8.2 FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT

LIMIT

According to FCC §2.1055, FCC §22.355.

Frequency Tolerance: +/- 2.5ppm

TEST PROCEDURE

Use Anritsu 8820 with frequency Error measurement capability.

Temp = -40°C to +65°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

No non-compliance noted.



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Test Results

FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT: LTE Band 26 / QPSK

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)				
Limit: 2.5 ppm = 2091.25 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 10M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	65	0.02	0.000024	+/- 2.5
12	50	0.01	0.000012	
12	40	0.00	0.000000	
12	30	0.01	0.000012	
12	20	0.00	0.000000	
12	10	0.01	0.000012	
12	0	-0.01	-0.000012	
12	-10	0.00	0.000000	
12	-20	-0.01	-0.000012	
12	-30	0.00	0.000000	
12	-40	0.01	0.000012	

LTE Band 26 / 16QAM

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)				
Limit: 2.5 ppm = 2091.25 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 10M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
12	65	0.03	0.000036	+/- 2.5
12	50	0.02	0.000024	
12	40	0.01	0.000012	
12	30	0.01	0.000012	
12	20	0.00	0.000000	
12	10	0.01	0.000012	
12	0	0.02	0.000024	
12	-10	0.02	0.000024	
12	-20	-0.01	-0.000012	
12	-30	0.01	0.000012	
12	-40	0.00	0.000000	



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FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

LTE Band 26 / QPSK

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)				
Limit: 2.5 ppm = 2091.25 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	0.01	0.000012	+/- 2.5
12		0.00	0.000000	
13.8		0.02	0.000024	

LTE Band 26 / 16QAM

Reference Frequency: LTE Band 26, 836.5 MHz at 20(°C)				
Limit: 2.5 ppm = 2091.25 Hz				
Power Supply (Vac)	Environment Temperature (°C)	BW: 20M Frequency Error(Hz)	Frequency Error (ppm)	Limit (ppm)
10.2	20	0.02	0.000024	+/- 2.5
12		0.00	0.000000	
13.8		0.03	0.000036	



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8.3 OCCUPIED BANDWIDTH MEASUREMENT

Limits

For Reporting purposes only.

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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LTE Band 26

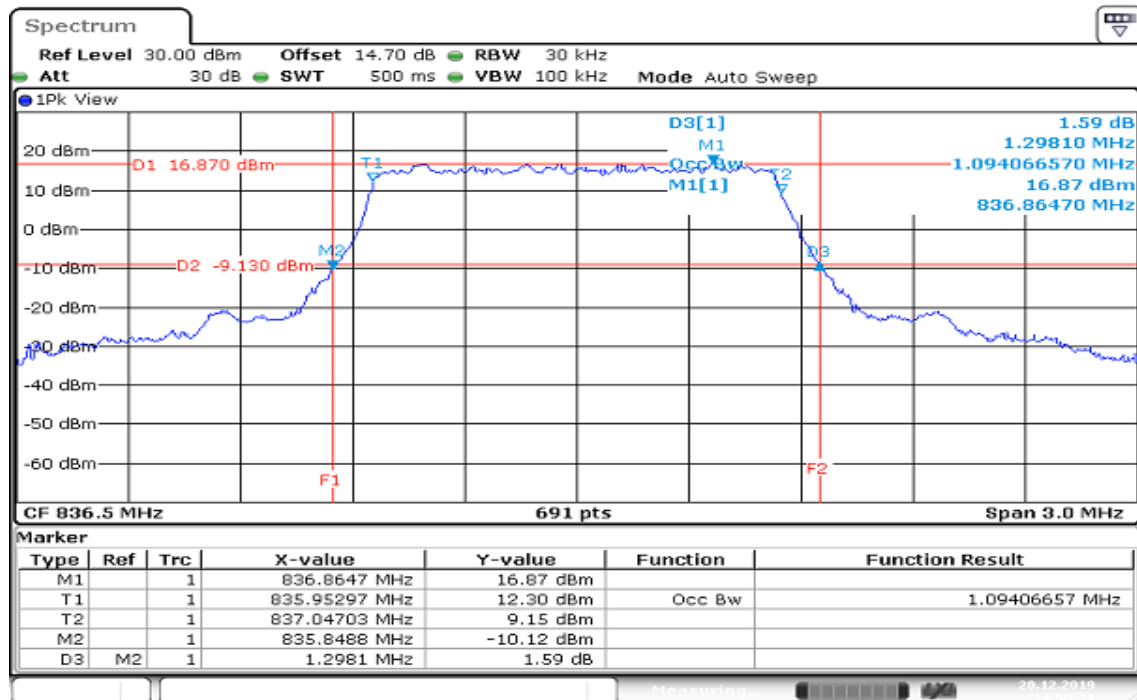
Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	OBW(99%)(MHz)	26 dB Bandwidth(MHz)
26	1.4	Middle	QPSK	6	0	1.0941	1.2981
		Middle	16QAM	6	0	1.1027	1.3155
	3	Middle	QPSK	15	0	2.6831	2.9218
		Middle	16QAM	15	0	2.6831	2.9479
	5	Middle	QPSK	25	0	4.4863	4.9590
		Middle	16QAM	25	0	4.4718	4.8730
	10	Middle	QPSK	50	0	8.9436	9.7060
		Middle	16QAM	50	0	8.9146	9.6480
	15	Middle	QPSK	75	0	13.3719	14.6410
		Middle	16QAM	75	0	13.3719	14.5540

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LTE Band 26

BW: 1.4MHz / QPSK / RB =6, RB Offset = 0

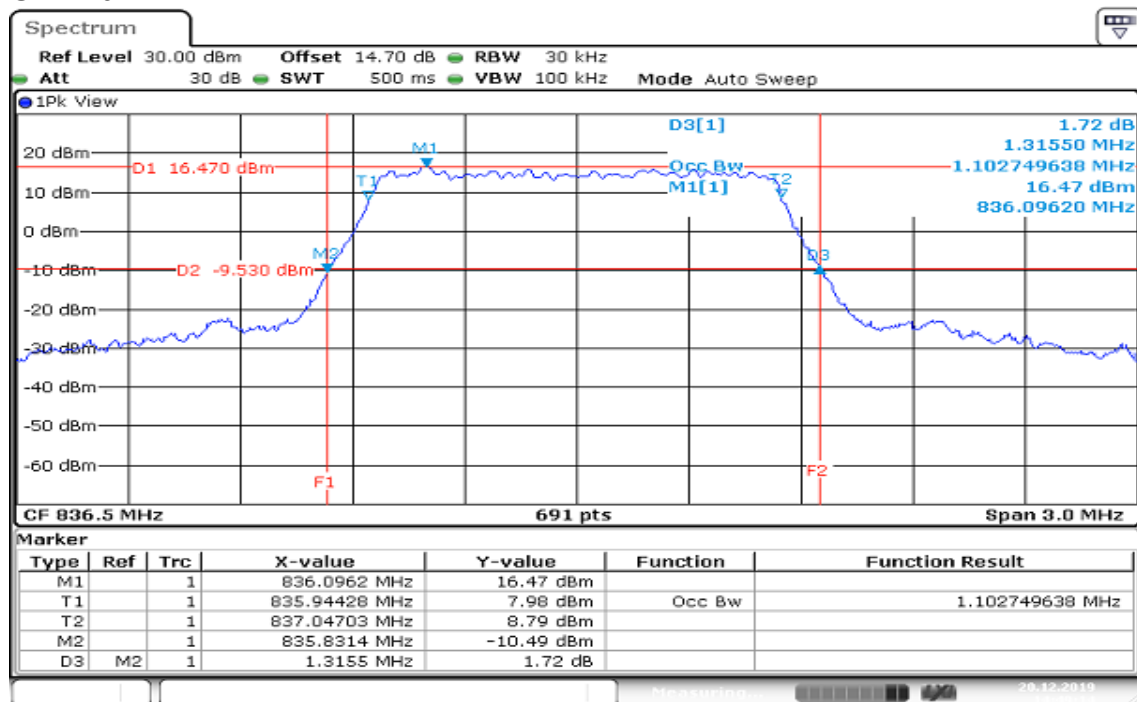
CH Mid



Date: 20.DEC.2019 14:50:32

BW: 1.4MHz / 16QAM / RB =6, RB Offset = 0

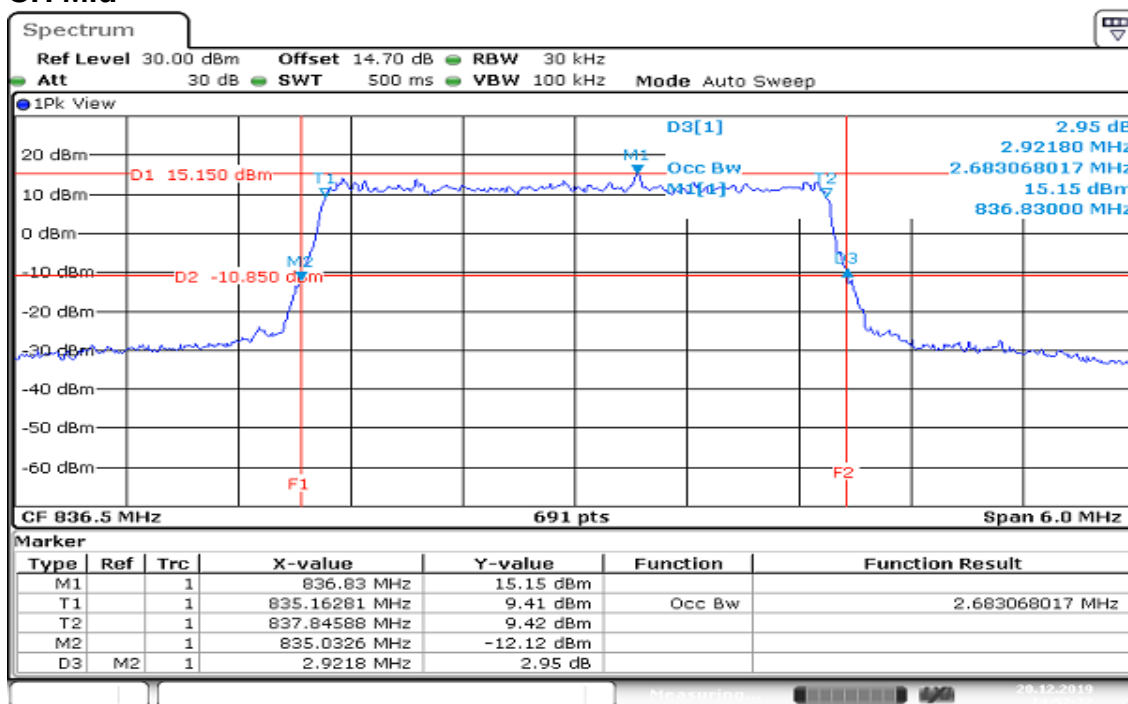
CH Mid



Date: 20.DEC.2019 14:49:15

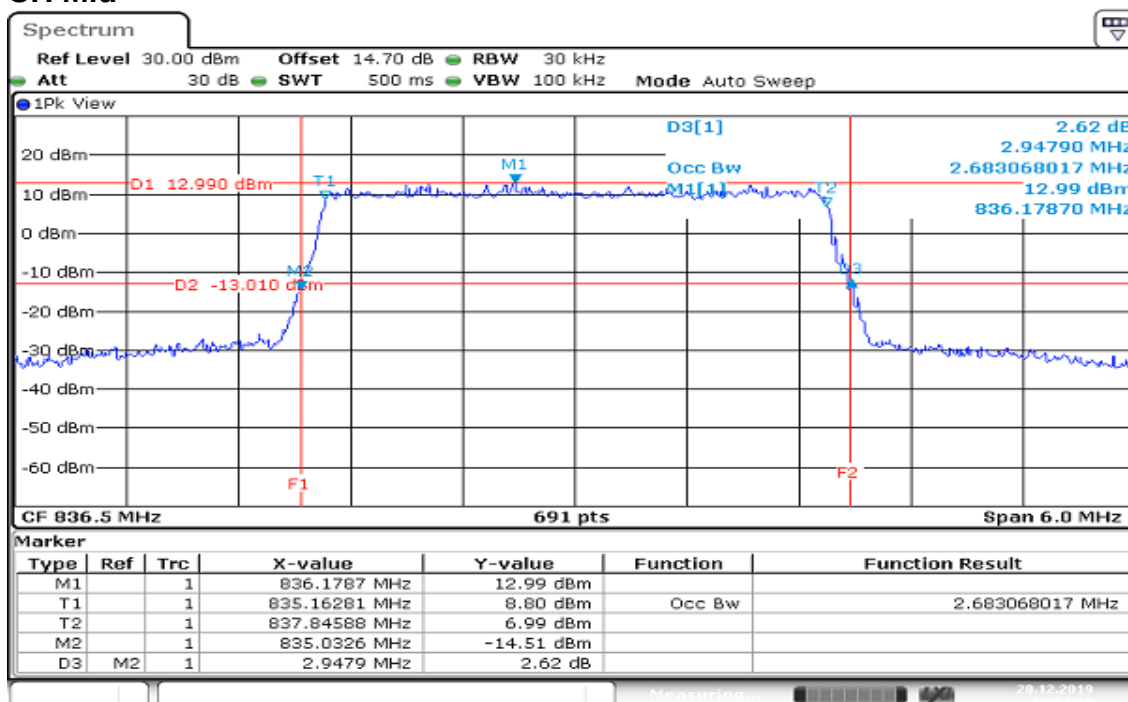
Report No.: T191120D05-RP11

BW: 3MHz / QPSK / RB =15, RB Offset = 0
CH Mid



Date: 20.DEC.2019 14:52:23

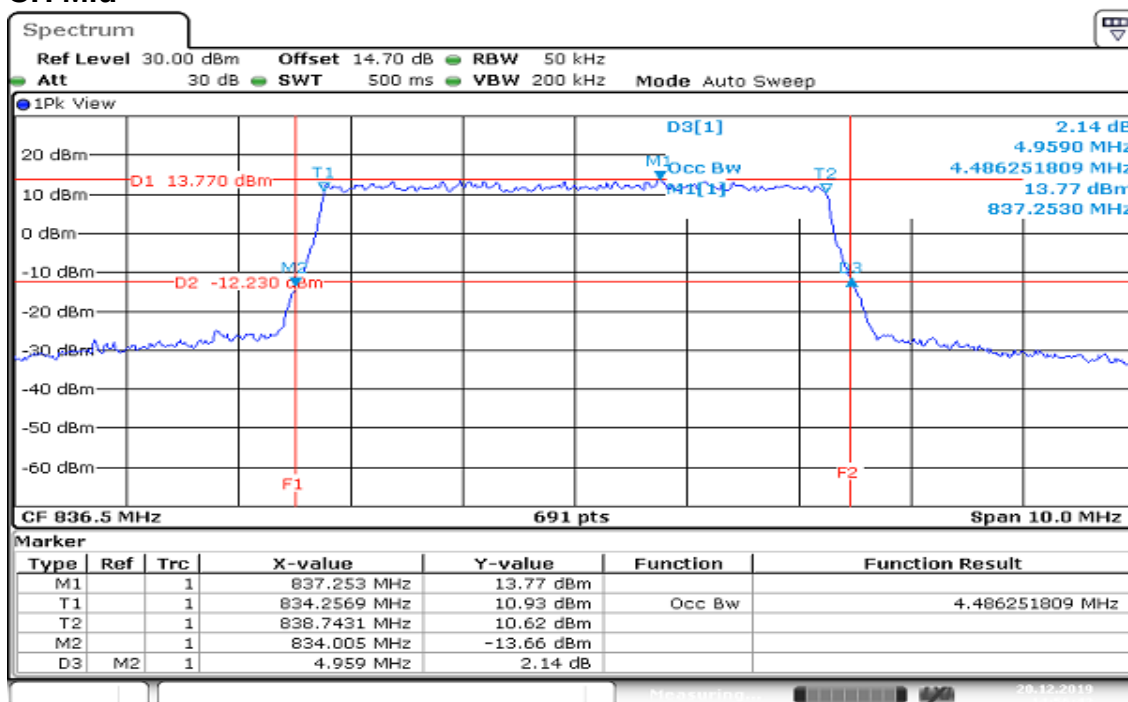
BW: 3MHz / 16QAM / RB =15, RB Offset = 0
CH Mid



Date: 20.DEC.2019 14:54:00

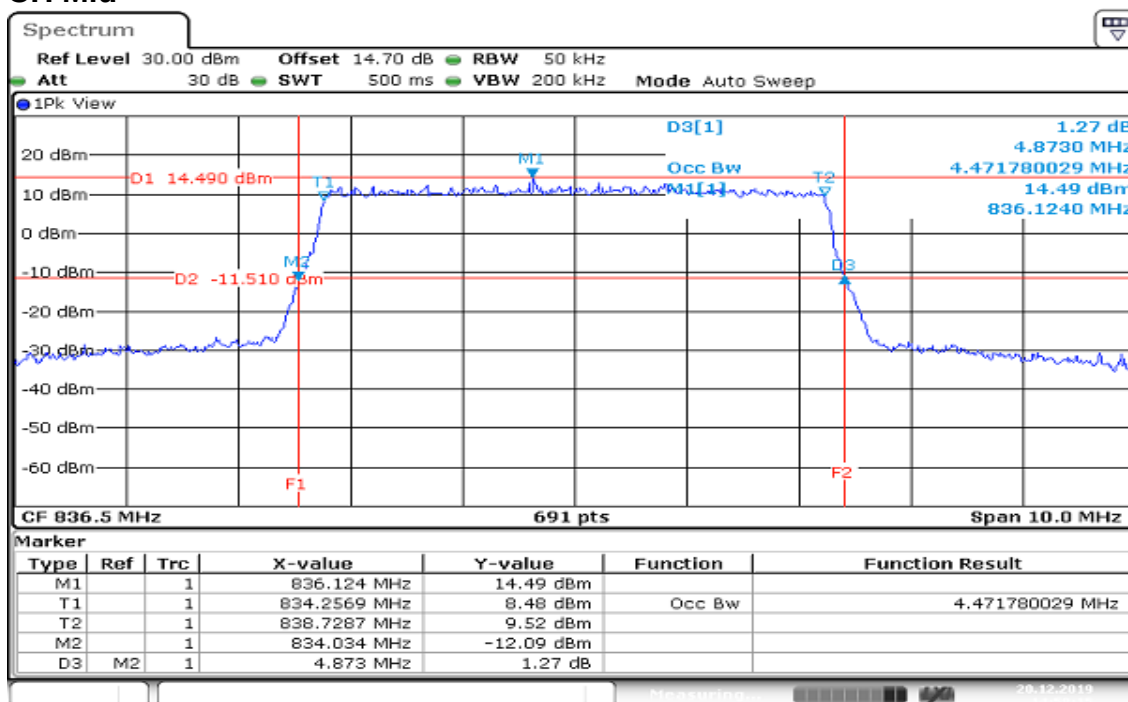
Report No.: T191120D05-RP11

BW: 5MHz / QPSK / RB =25, RB Offset = 0
CH Mid



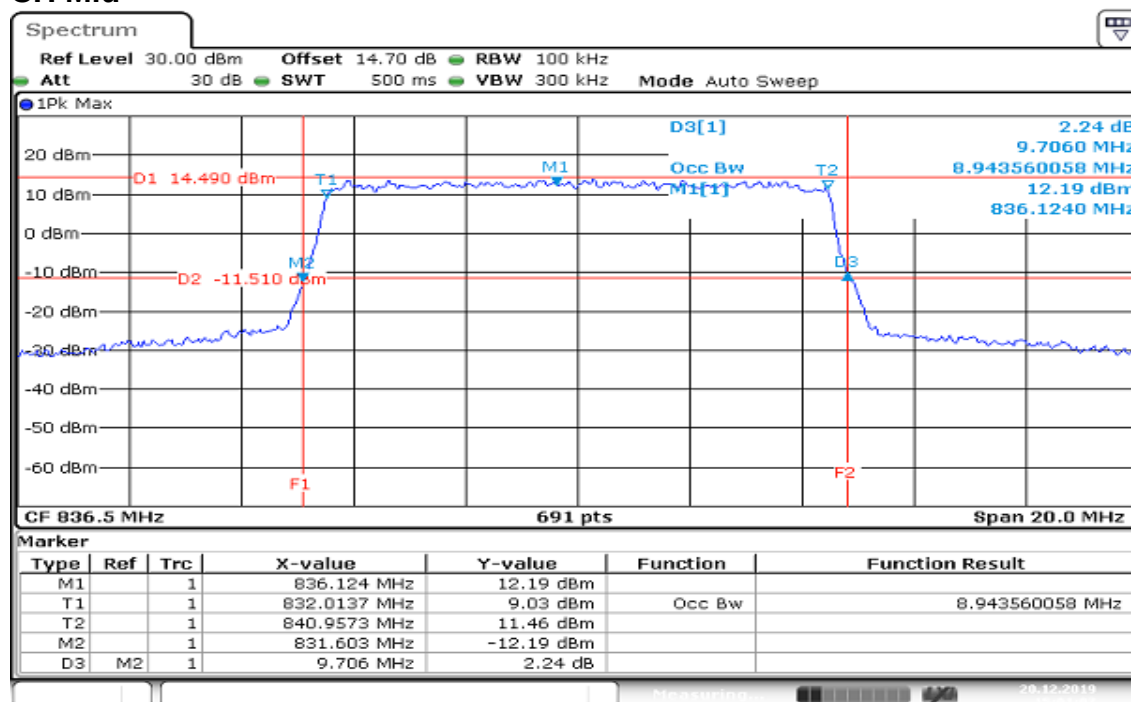
Date: 20.DEC.2019 14:56:43

BW: 5MHz / 16QAM / RB =25, RB Offset = 0
CH Mid

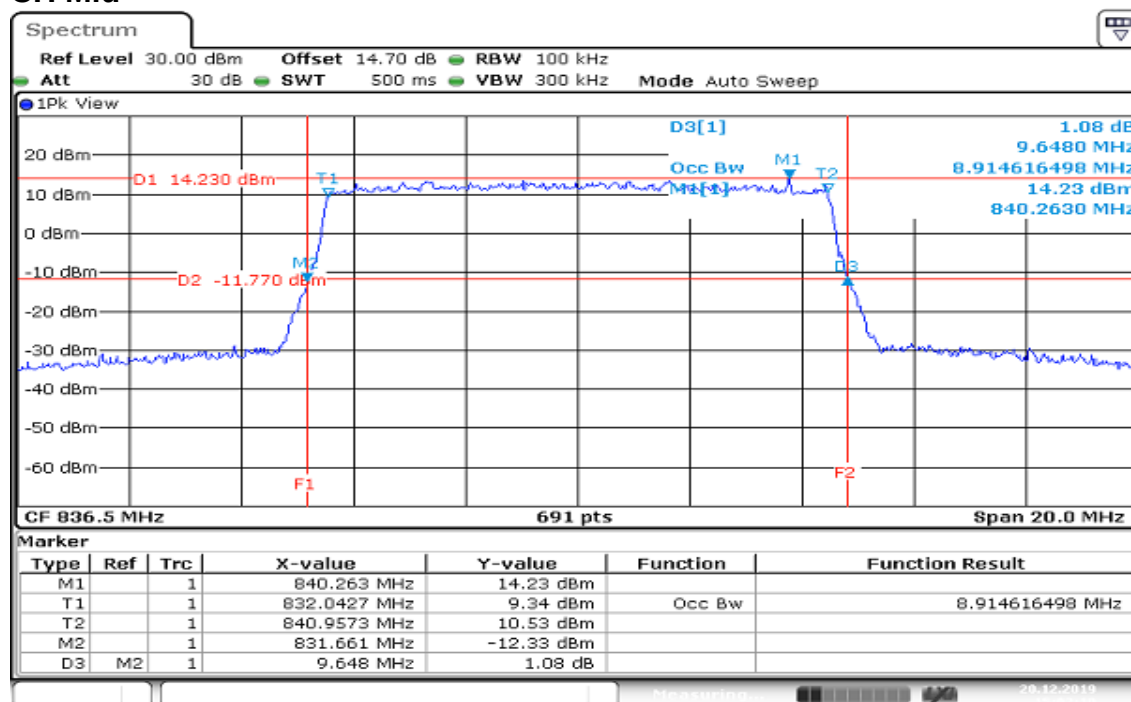


Date: 20.DEC.2019 14:58:16

Report No.: T191120D05-RP11

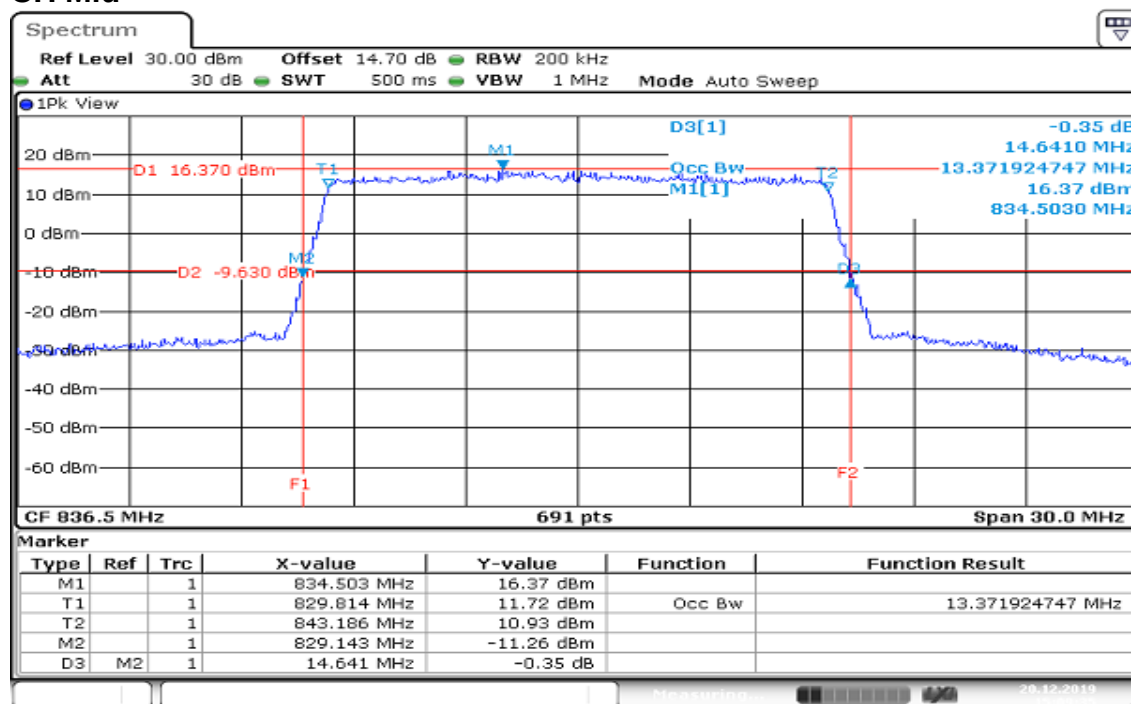
BW: 10MHz / QPSK / RB =50, RB Offset = 0
CH Mid


Date: 20.DEC.2019 15:01:08

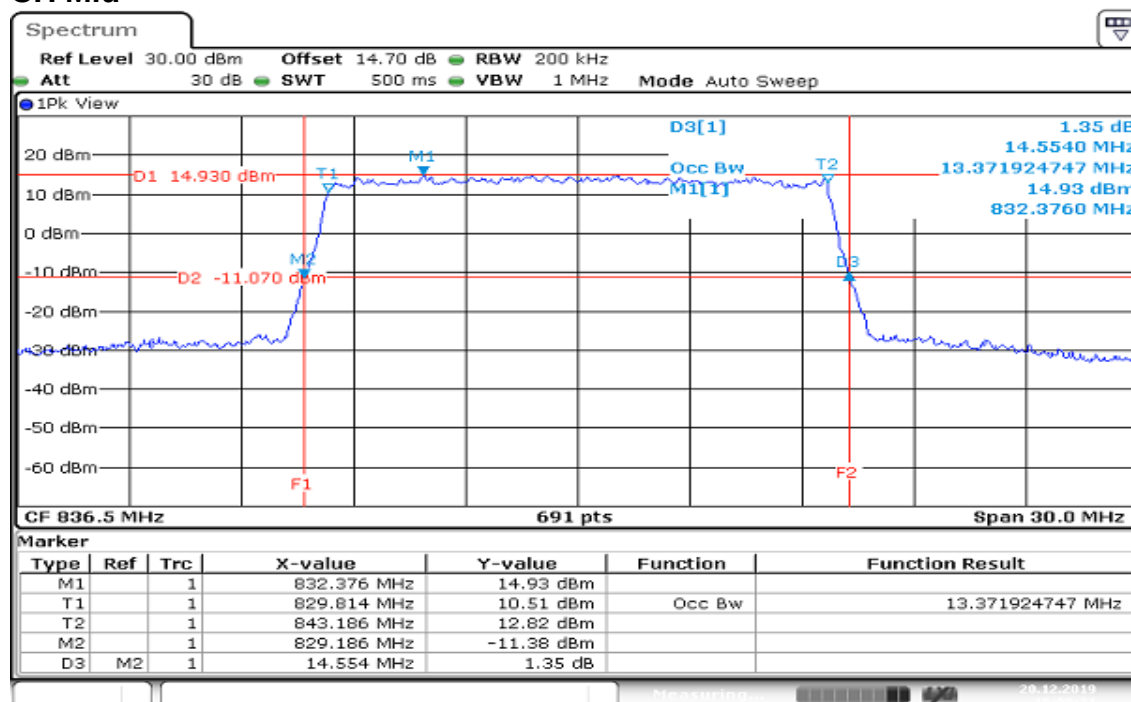
BW: 10MHz / 16QAM / RB =50, RB Offset = 0
CH Mid


Date: 20.DEC.2019 15:02:11

Report No.: T191120D05-RP11

BW: 15MHz / QPSK / RB =75, RB Offset = 0
CH Mid


Date: 20.DEC.2019 15:09:35

BW: 15MHz / 16QAM / RB =75, RB Offset = 0
CH Mid


Date: 20.DEC.2019 15:08:21



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8.4 PEAK TO AVERAGE POWER RATIO

Limit

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

Test Procedures

1. According to KDB 971168 D01,
2. The EUT was connect to spectrum analyzer and call box.
3. Set the CCDF function in spectrum analyzer.
4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
5. Record the Peak to Average Power Ratio.

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

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Test Results

LTE Band 26

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.41

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.10

CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.32

CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.13

CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.55

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.59

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.55

CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.48

CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.72

CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.68

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

CHANNEL BANDWIDTH: 1.4MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.07

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.91

CHANNEL BANDWIDTH: 3MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.90

CHANNEL BANDWIDTH: 3MHz / 16QAM / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.94

CHANNEL BANDWIDTH: 5MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.87

CHANNEL BANDWIDTH: 5MHz / 16QAM / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.91

CHANNEL BANDWIDTH: 10MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	4.93

CHANNEL BANDWIDTH: 10MHz / 16QAM / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.94

CHANNEL BANDWIDTH: 15MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	5.22

CHANNEL BANDWIDTH: 15MHz / 16QAM / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
26915	836.5	6.12

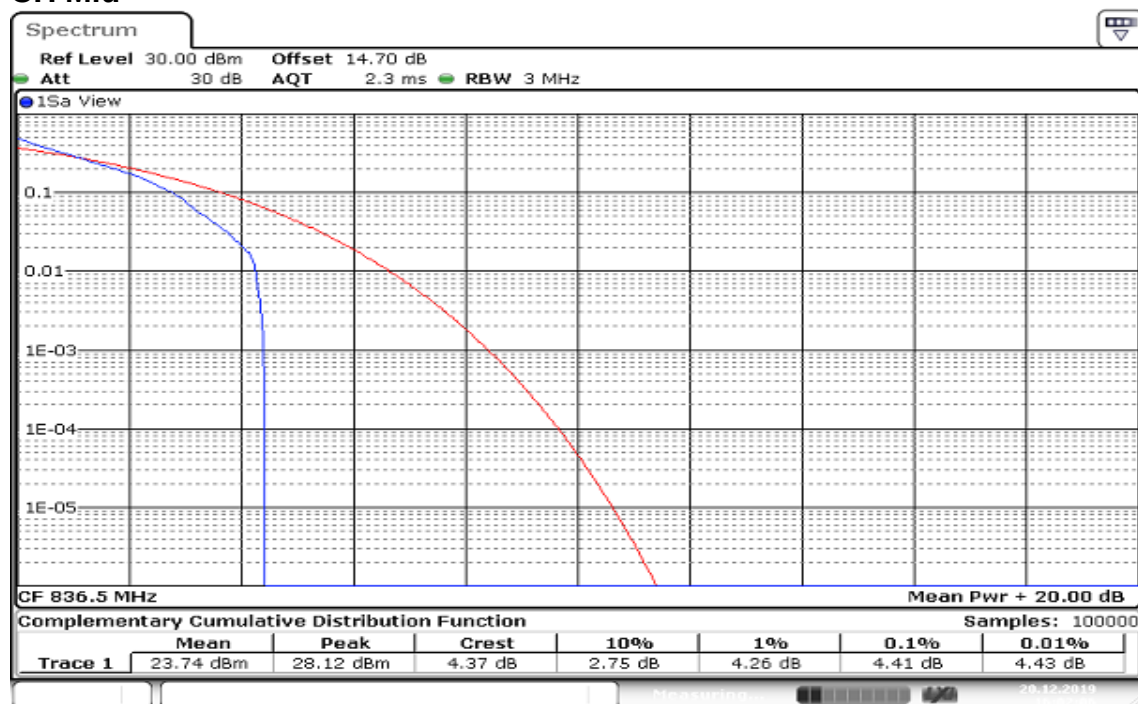
Note: We selected worst case to performed test in middle channel, the results can be meet other channel.

Report No.: T191120D05-RP11

LTE Band 26

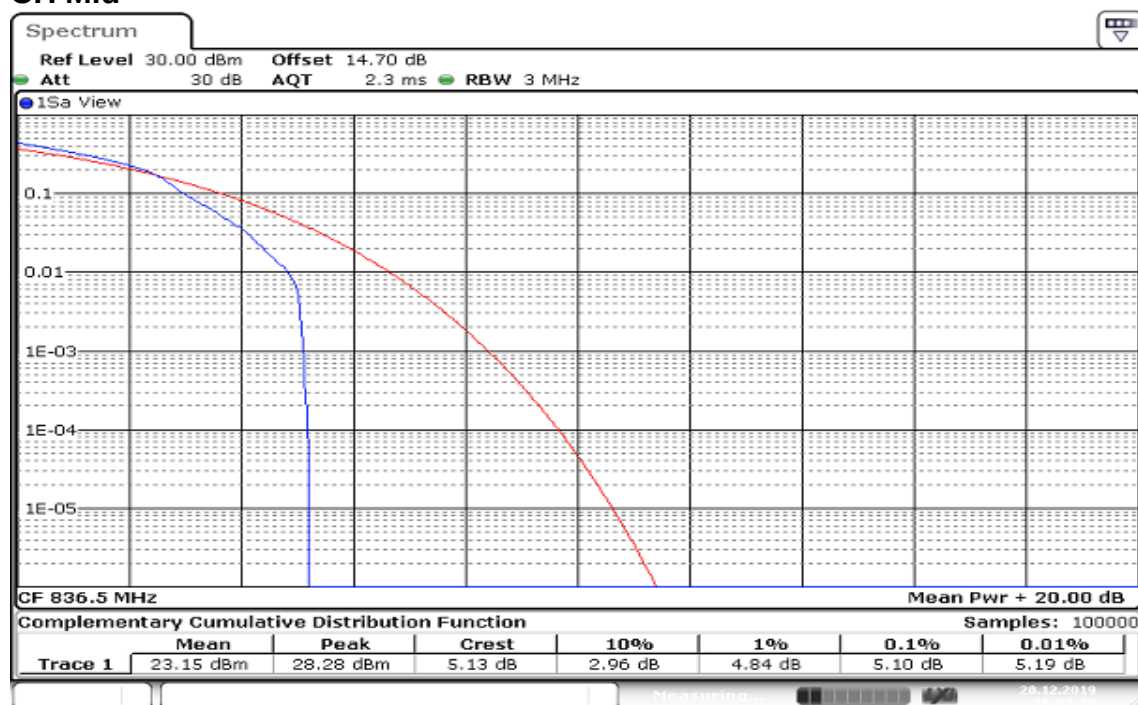
BW: 1.4MHz / QPSK / RB =1, RB Offset = 0

CH Mid



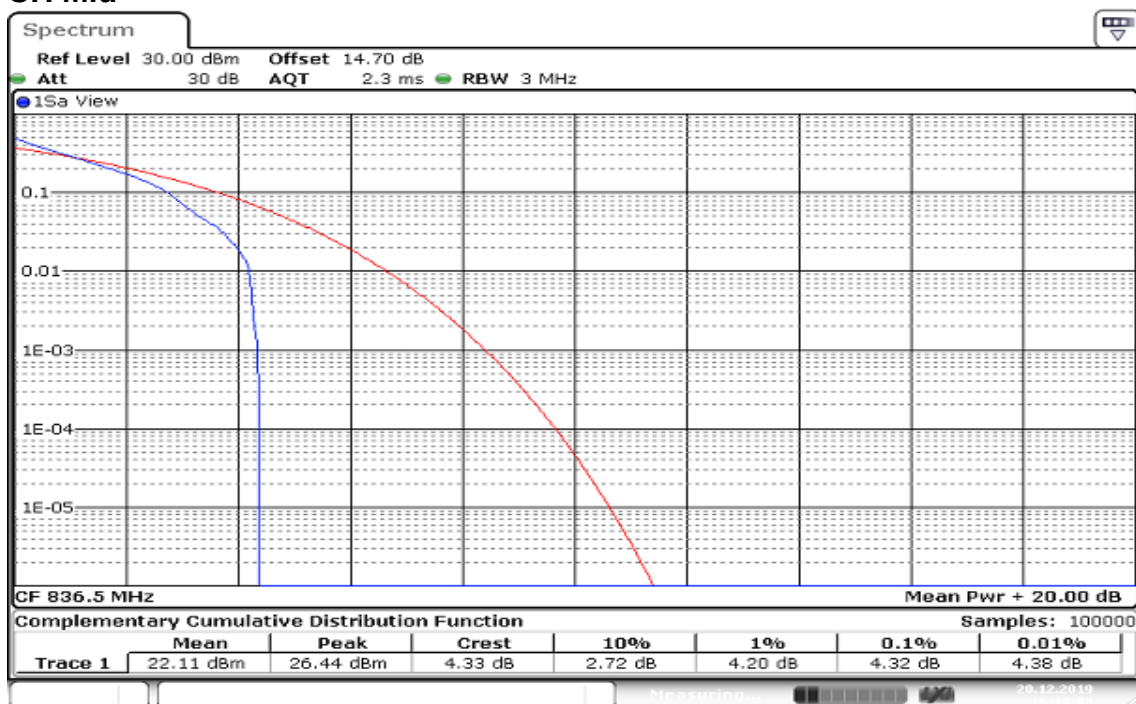
BW: 1.4MHz / 16QAM / RB =1, RB Offset = 0

CH Mid

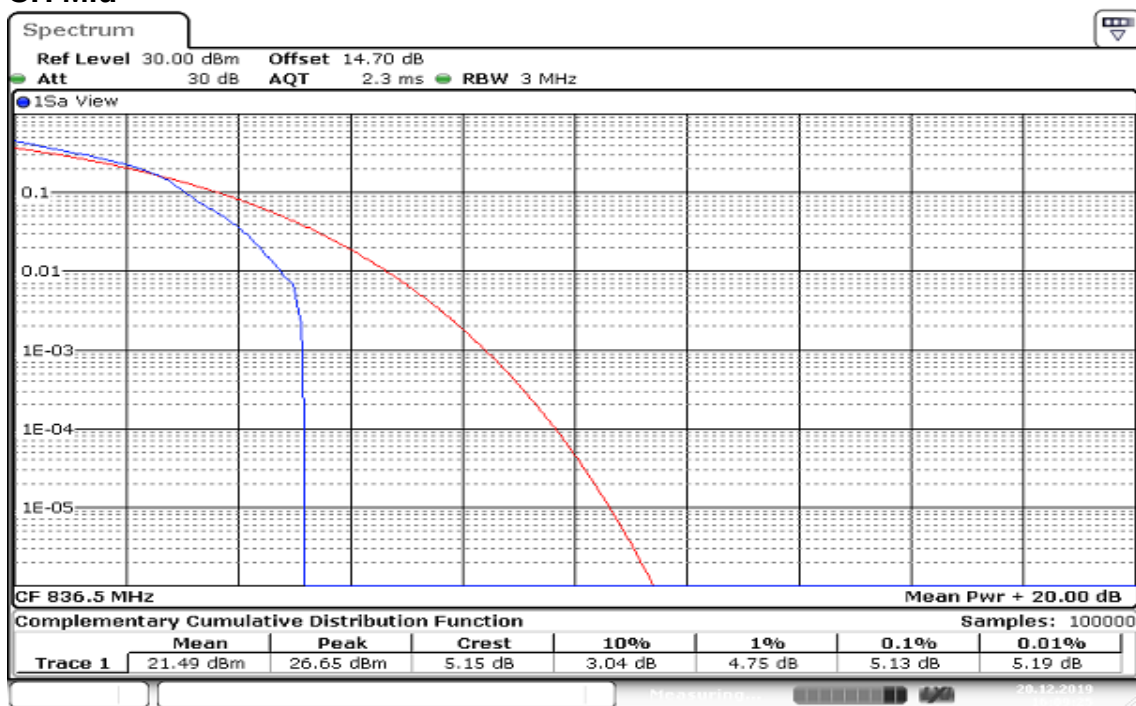


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BW: 3MHz / QPSK / RB =1, RB Offset = 0
CH Mid

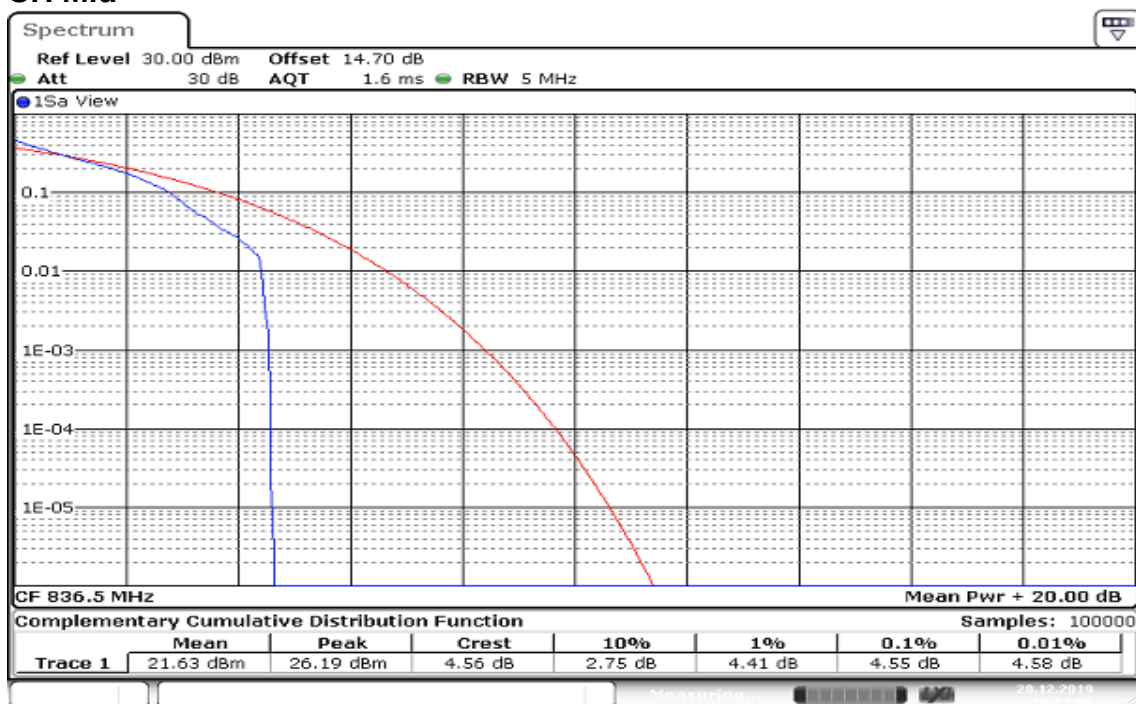


BW: 3MHz / 16QAM / RB =1, RB Offset = 0
CH Mid

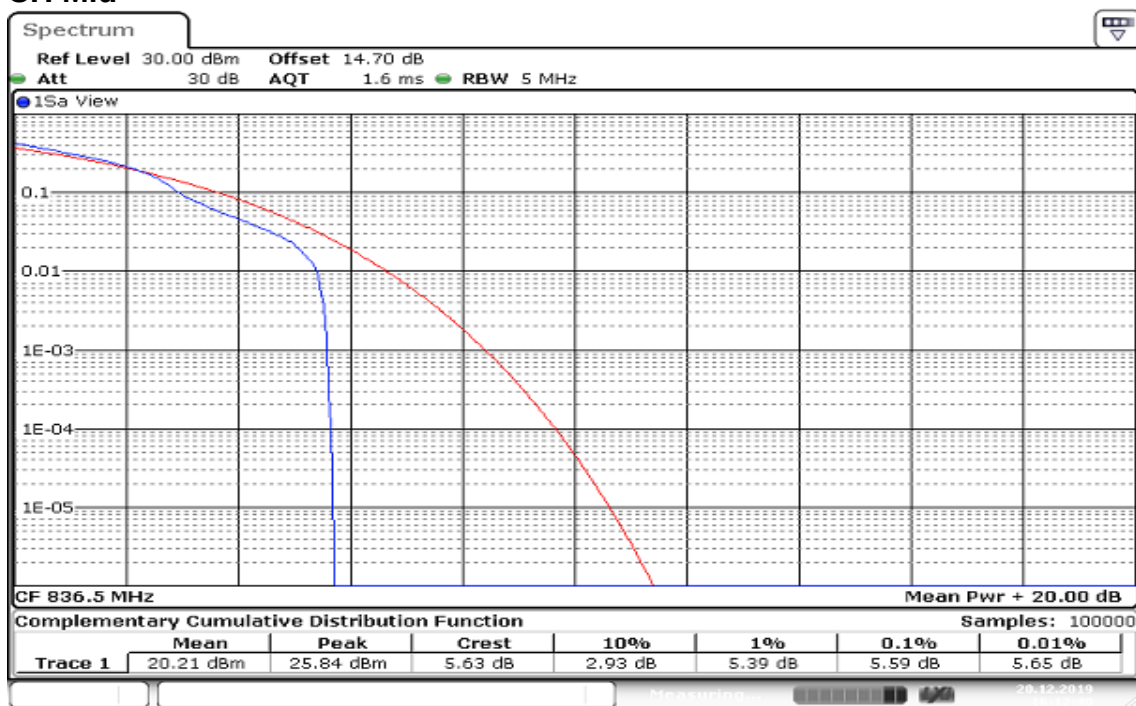


Report No.: T191120D05-RP11

BW: 5MHz / QPSK / RB =1, RB Offset = 0
CH Mid

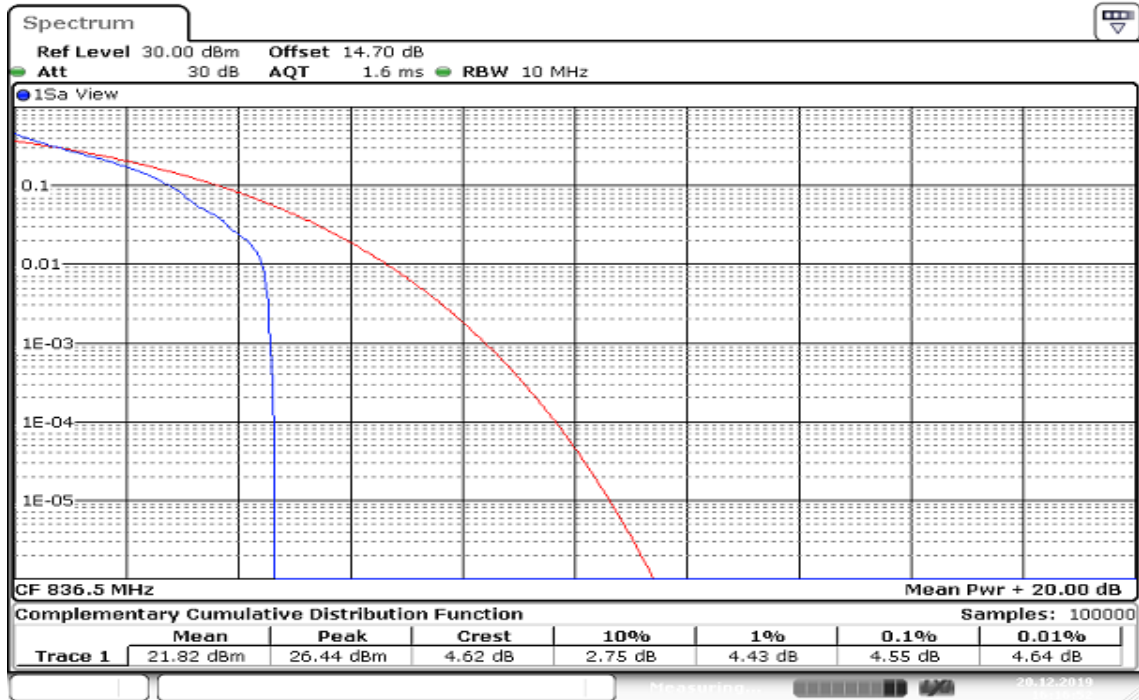


BW: 5MHz / 16QAM / RB =1, RB Offset = 0
CH Mid



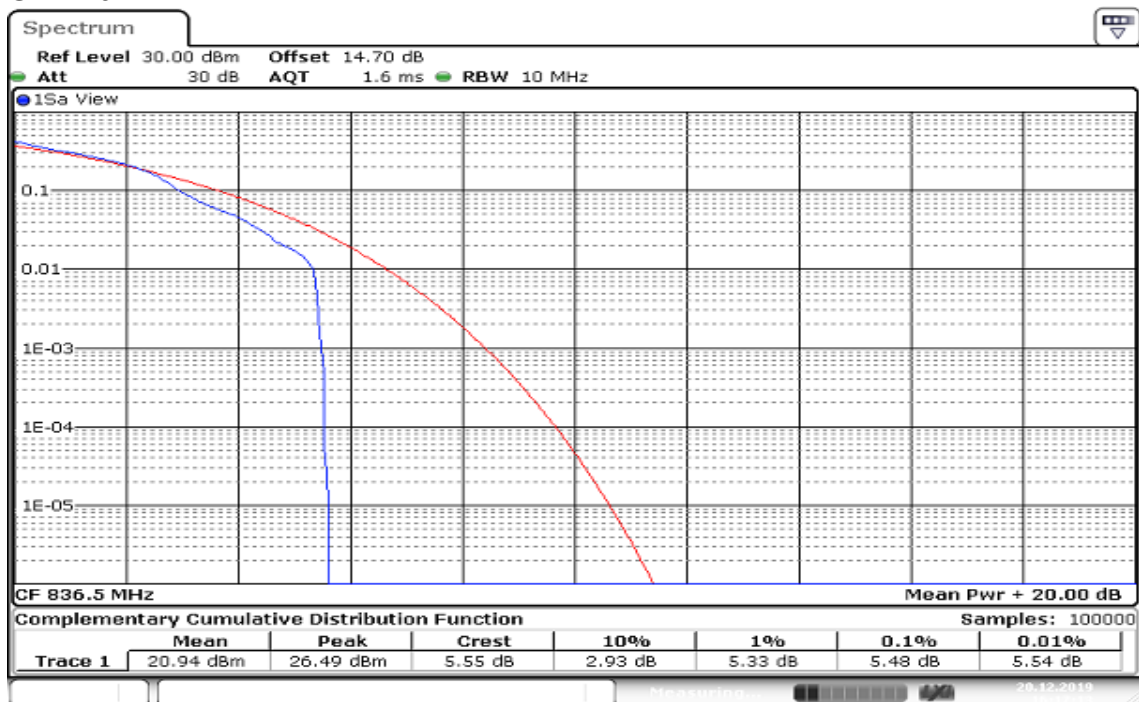
Report No.: T191120D05-RP11

BW: 10MHz / QPSK /RB =1, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:16:52

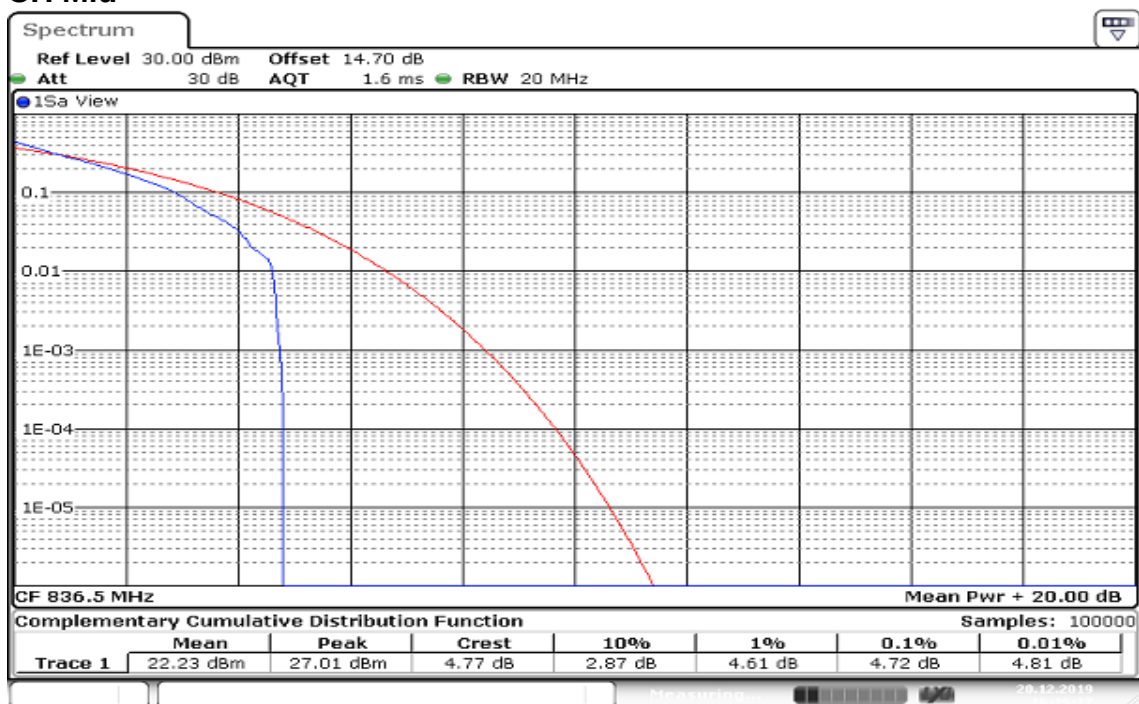
BW: 10MHz / 16QAM /RB =1, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:17:14

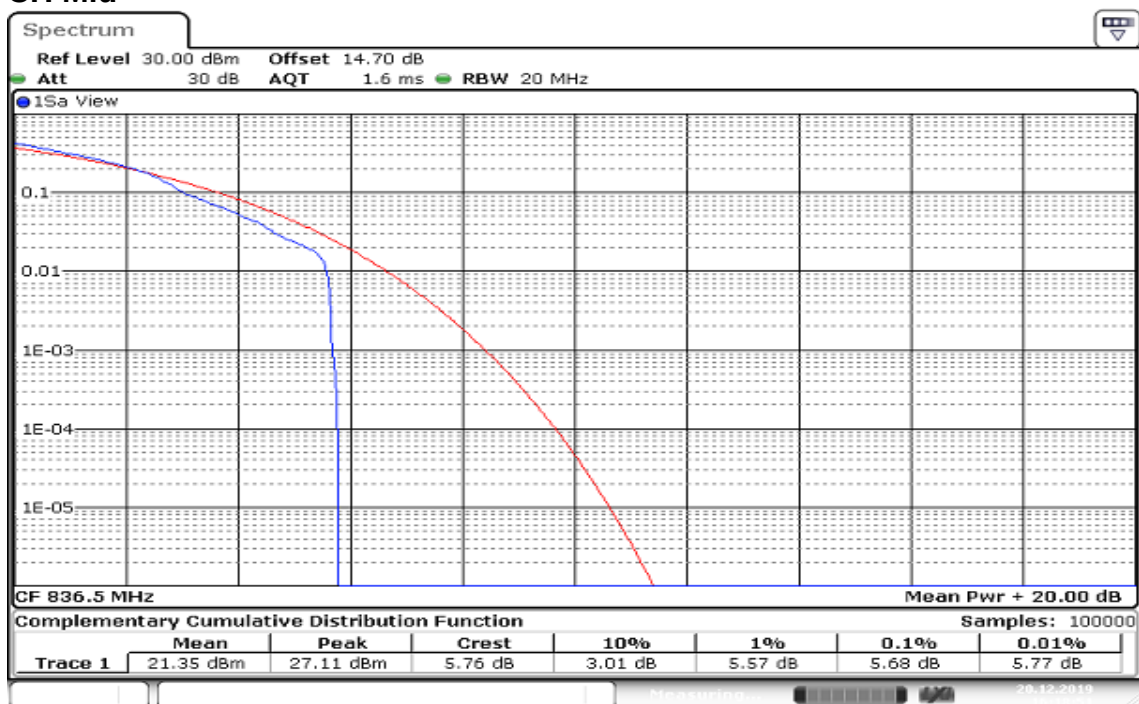
Report No.: T191120D05-RP11

BW: 15MHz / QPSK /RB =1, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:19:17

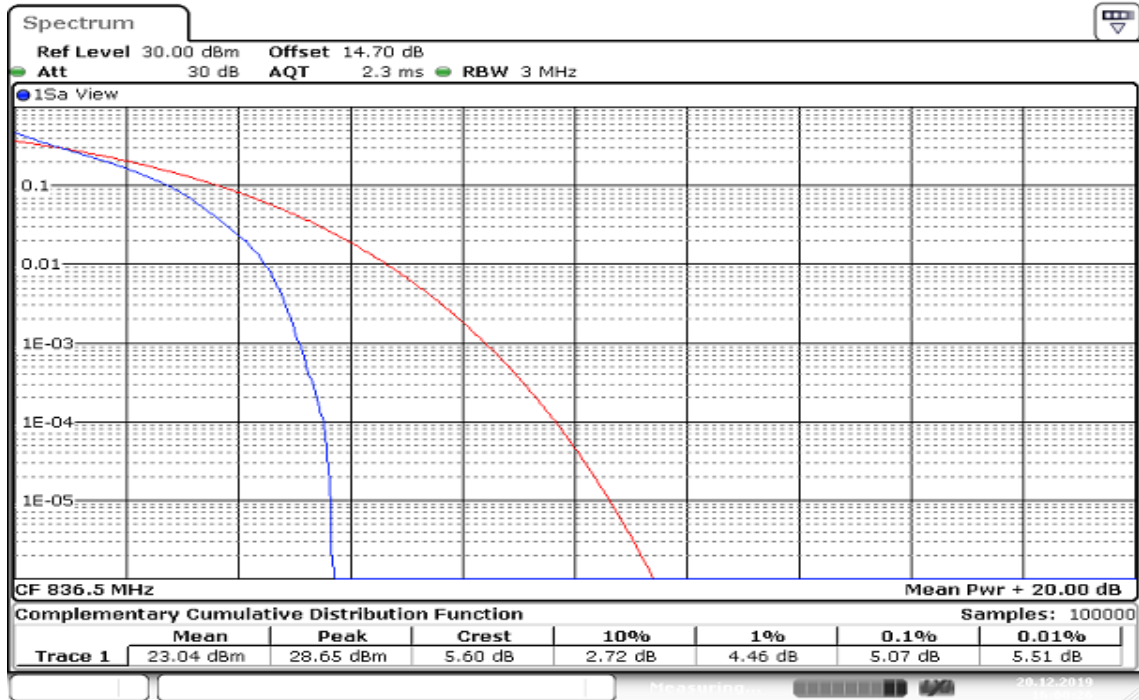
BW: 15MHz / 16QAM /RB =1, RB Offset = 0
CH Mid



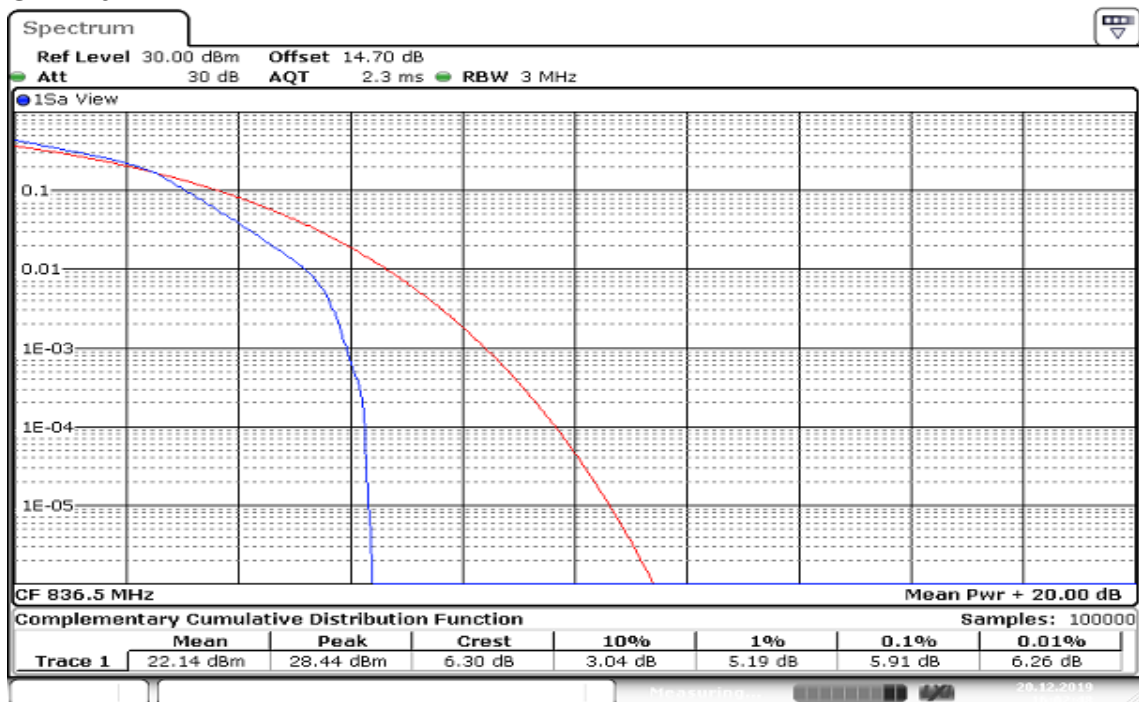
Date: 20.DEC.2019 16:18:51

Report No.: T191120D05-RP11

BW: 1.4MHz / QPSK / RB =Full, RB Offset = 0
CH Mid

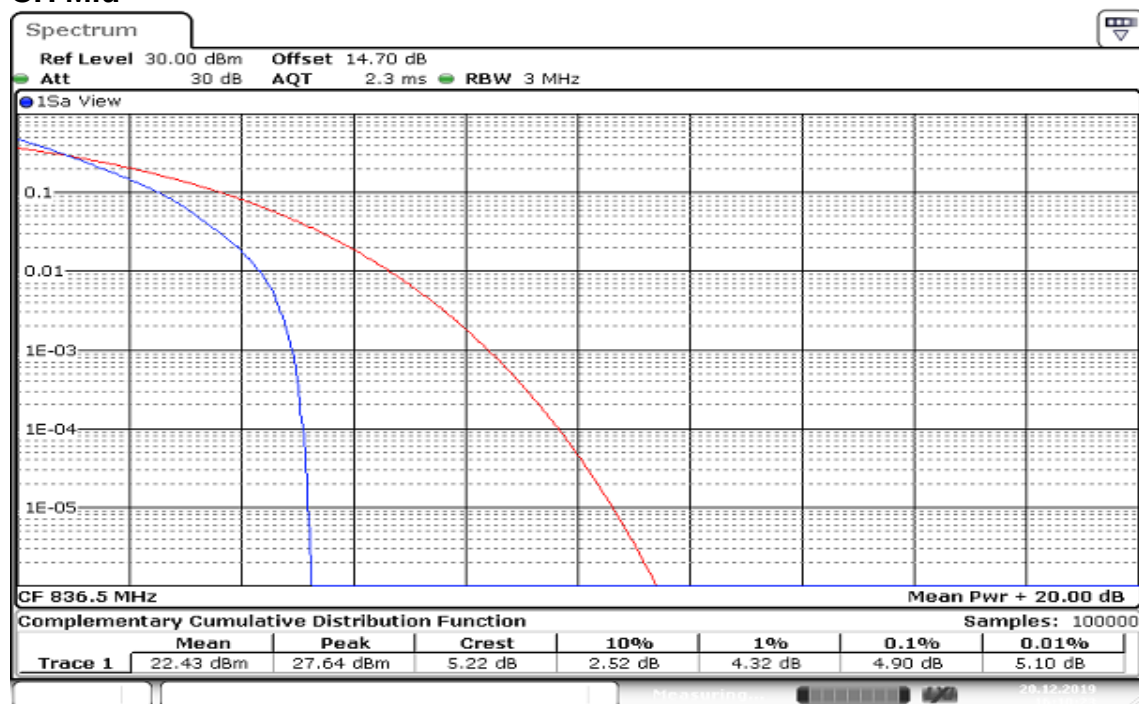


BW: 1.4MHz / 16QAM / RB =Full, RB Offset = 0
CH Mid



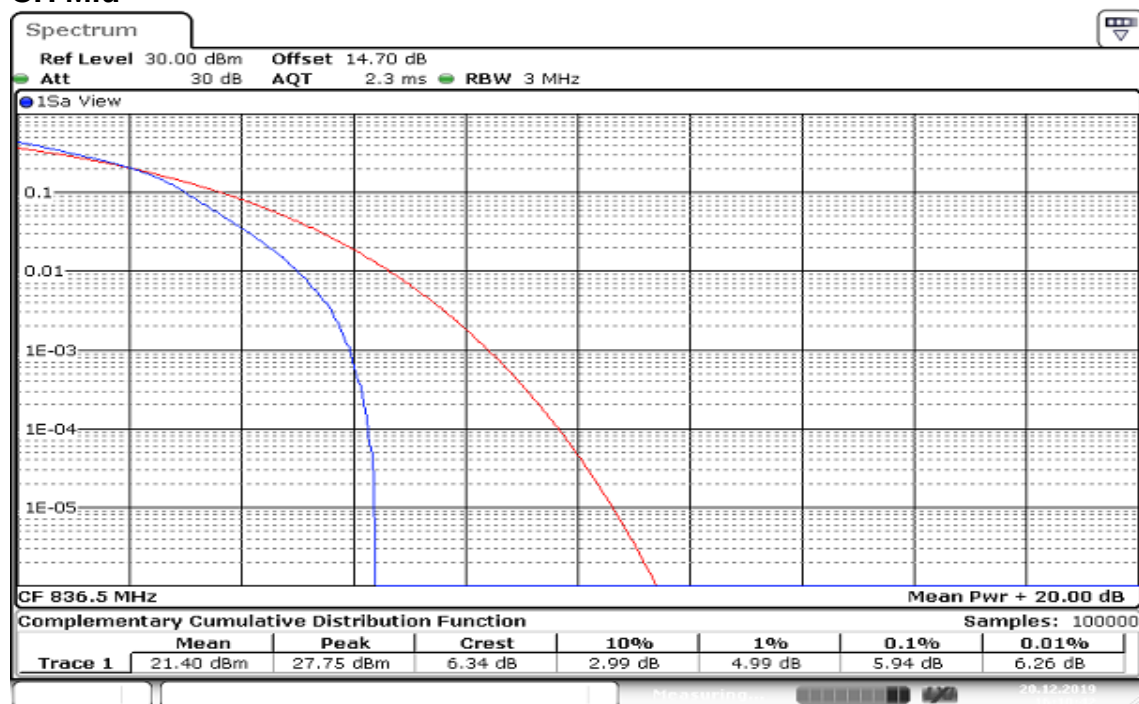
Report No.: T191120D05-RP11

BW: 3MHz / QPSK / RB =Full, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:10:23

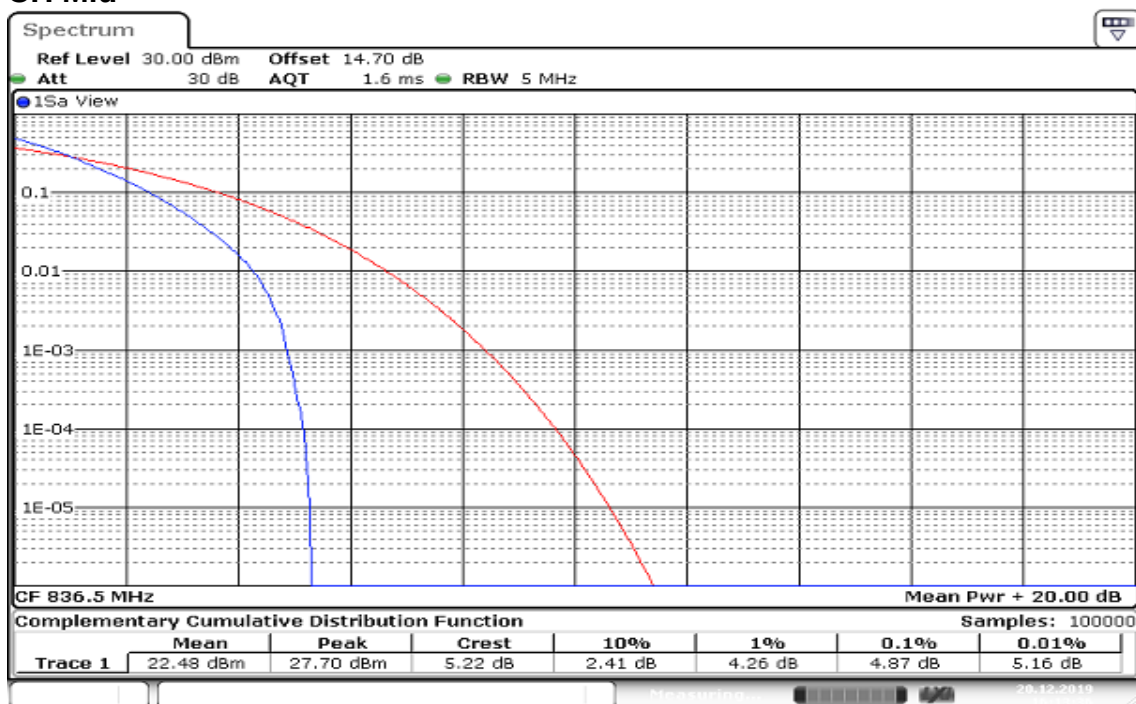
BW: 3MHz / 16QAM / RB =Full, RB Offset = 0
CH Mid



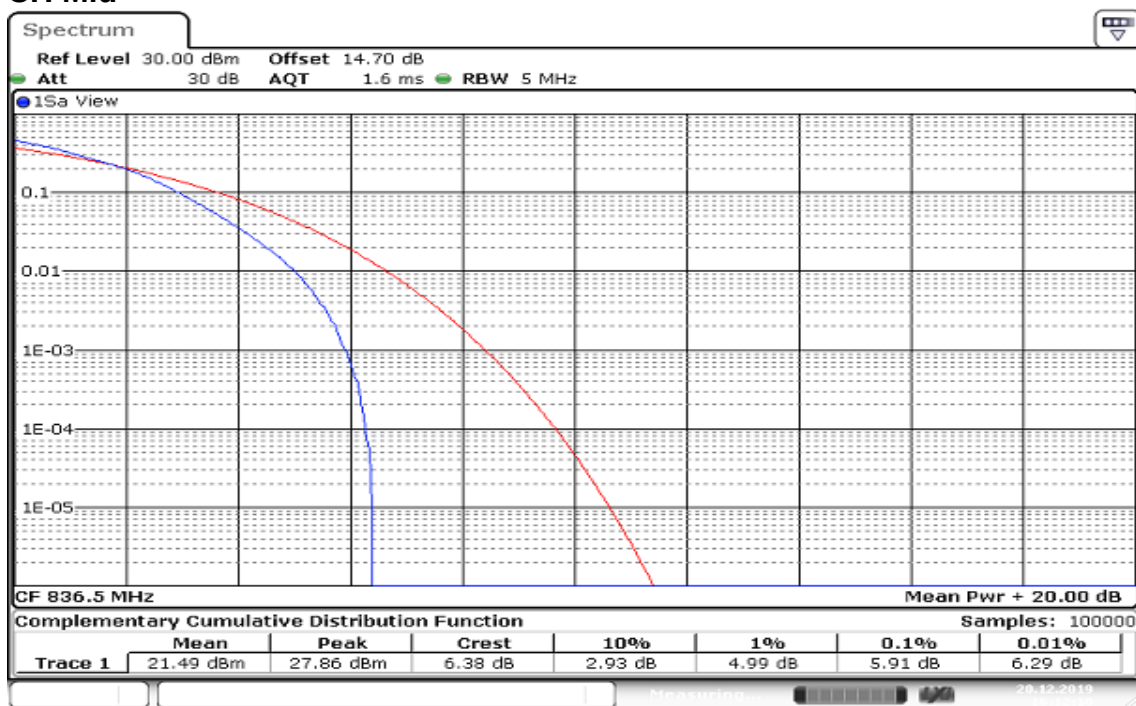
Date: 20.DEC.2019 16:10:43

Report No.: T191120D05-RP11

BW: 5MHz / QPSK / RB =Full, RB Offset = 0
CH Mid

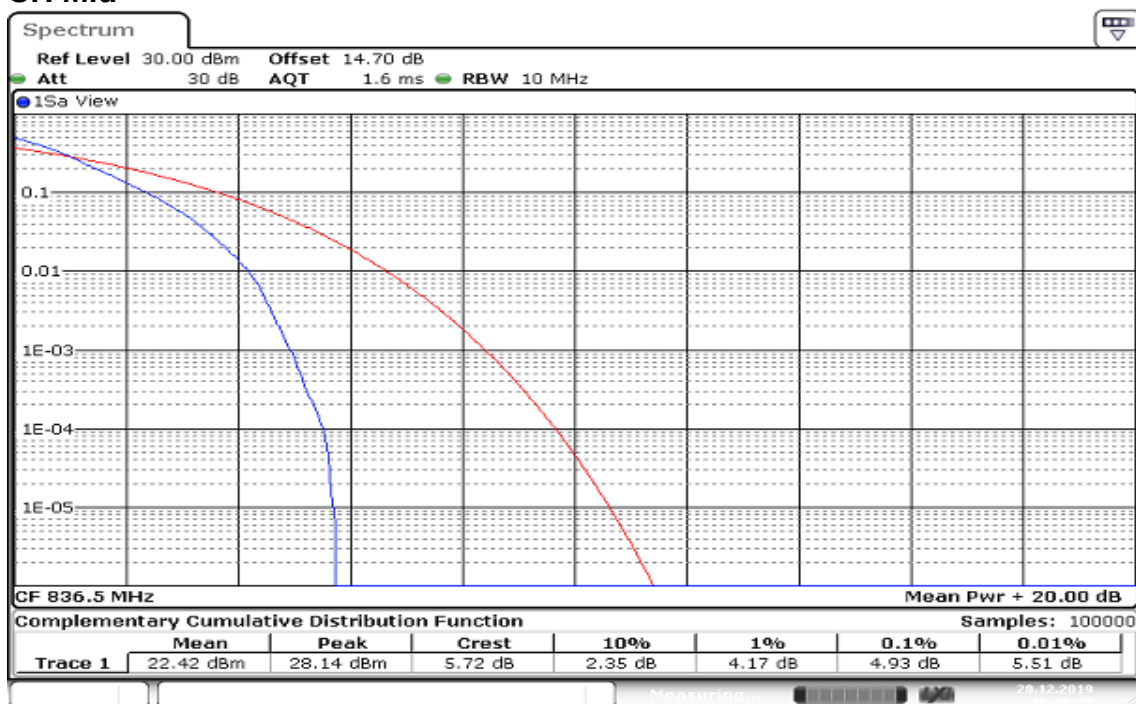


BW: 5MHz / 16QAM / RB =Full, RB Offset = 0
CH Mid



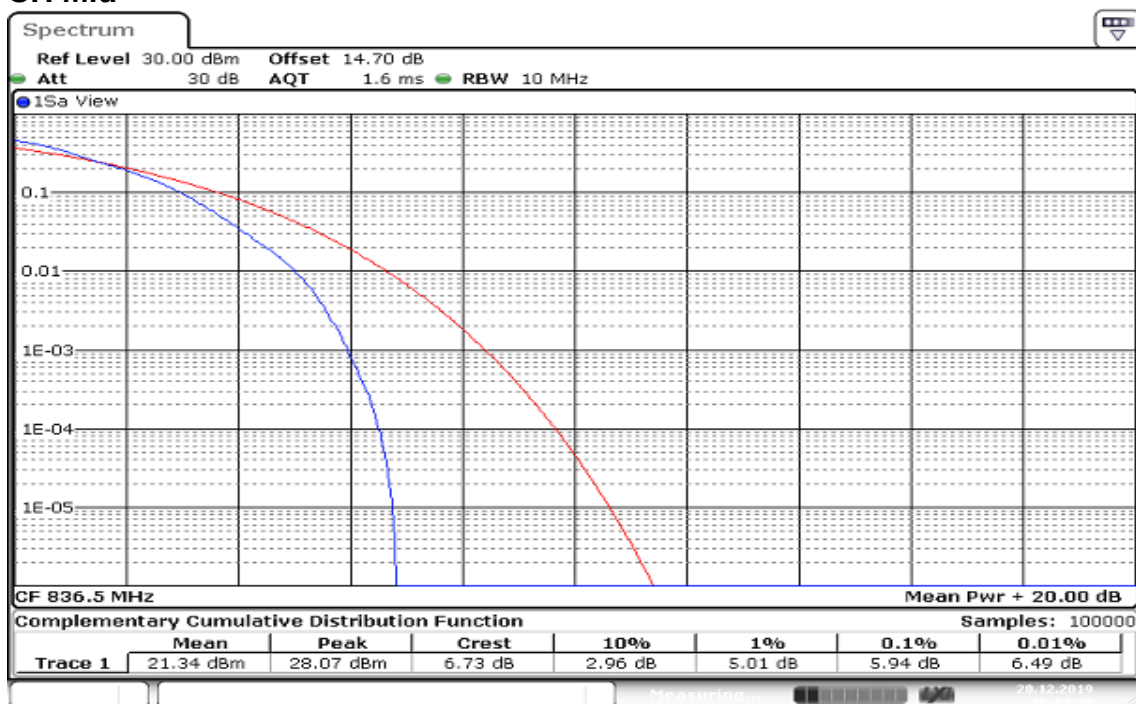
Report No.: T191120D05-RP11

BW: 10MHz / QPSK /RB =Full, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:16:28

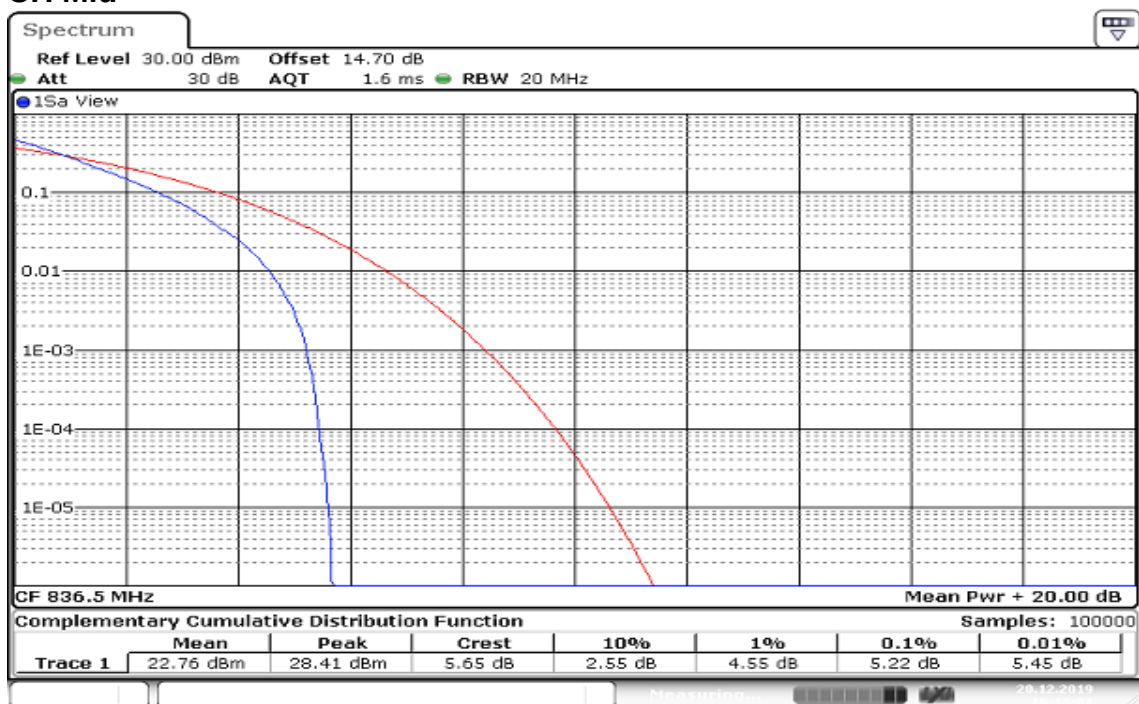
BW: 10MHz / 16QAM /RB =Full, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:14:48

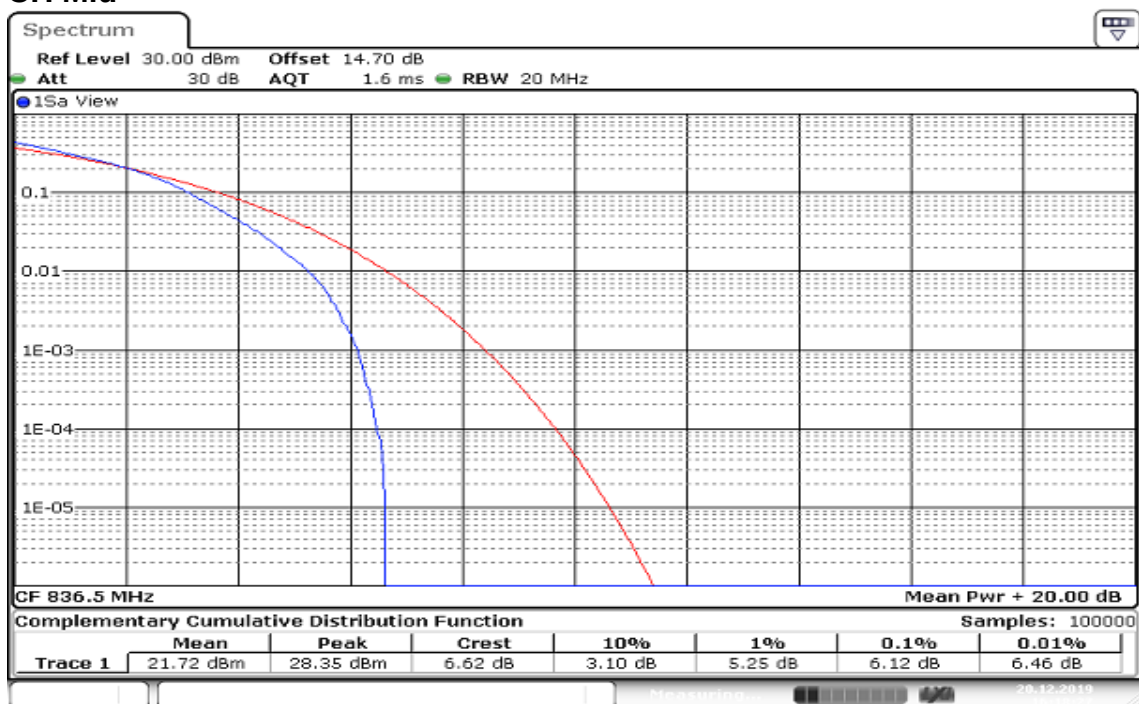
Report No.: T191120D05-RP11

BW: 15MHz / QPSK /RB =Full, RB Offset = 0
CH Mid



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

BW: 15MHz / 16QAM /RB =Full, RB Offset = 0
CH Mid



Date: 20.DEC.2019 16:18:27



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8.5 CONDUCTED BAND EDGE MEASUREMENT

Limit

FCC §22.917(a), Band 5

For operations in the 824-849 MHz band, Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

Test Procedures

KDB 971168 D01,

1. RBW $\geq$ 1% of the emission bandwidth
2. VBW $\geq$ 3 x RBW
3. Span was set large enough so as to capture all out of emissions near the band edge.

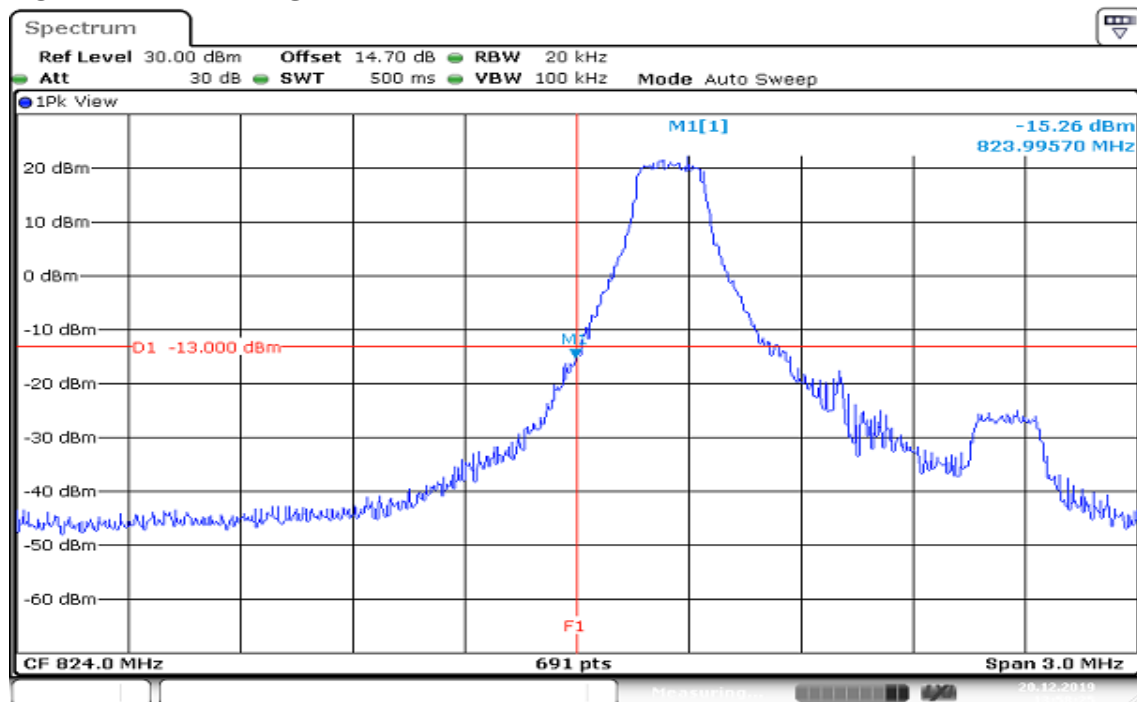
Report No.: T191120D05-RP11

Test Results:

LTE Band 26

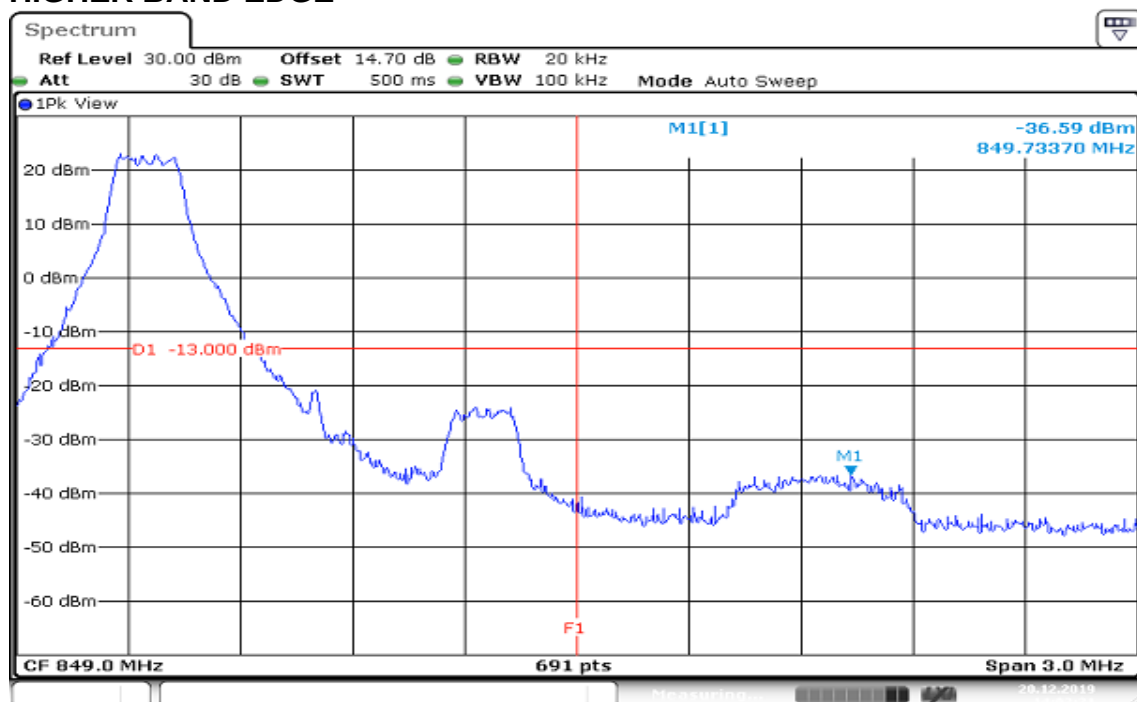
CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATED

LOWER BAND EDGE



Date: 20.DEC.2019 13:58:25

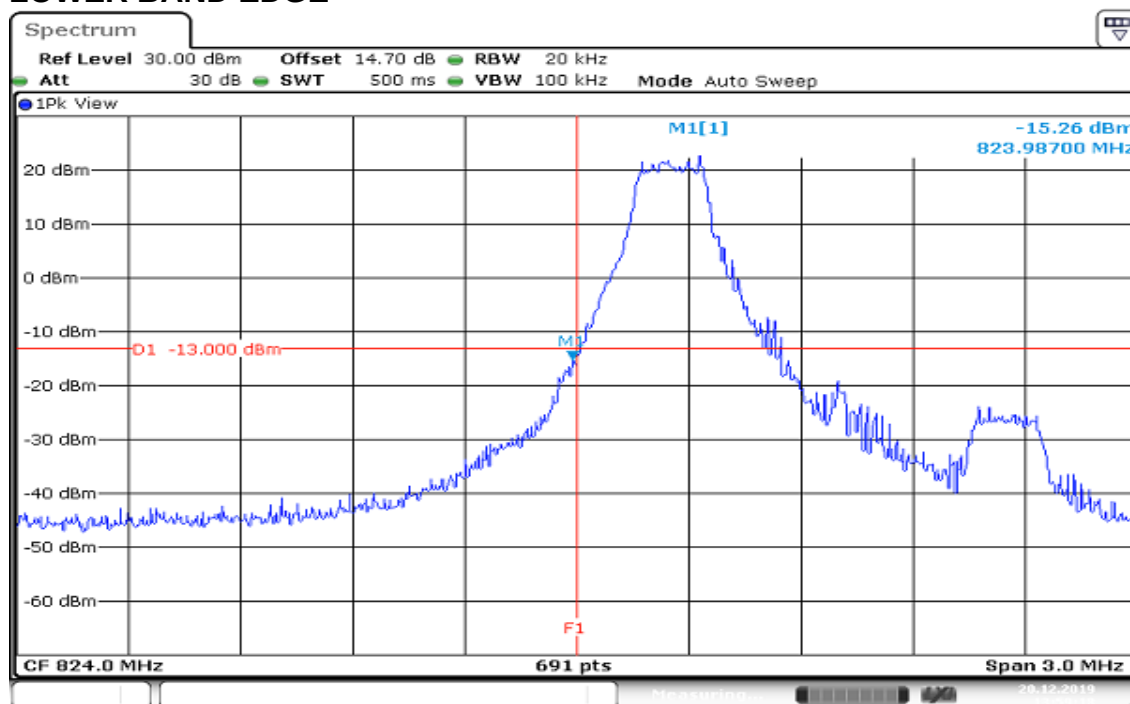
HIGHER BAND EDGE



Date: 20.DEC.2019 14:02:21

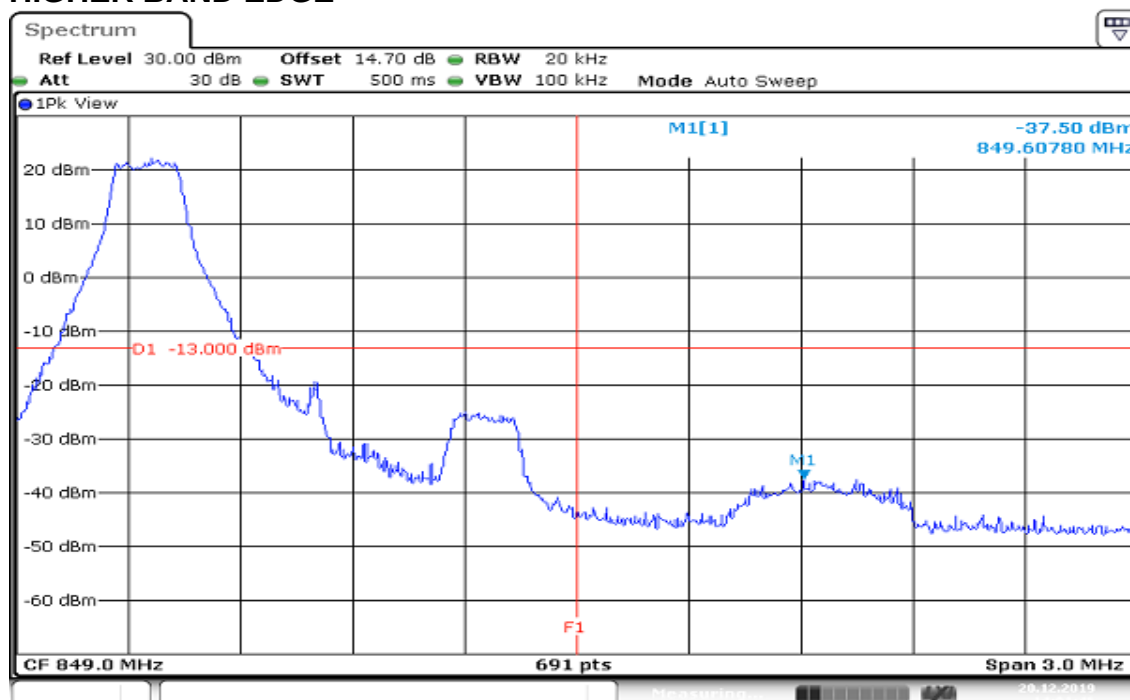
Report No.: T191120D05-RP11

**CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB ALLOCATED
LOWER BAND EDGE**



Date: 20.DEC.2019 13:59:19

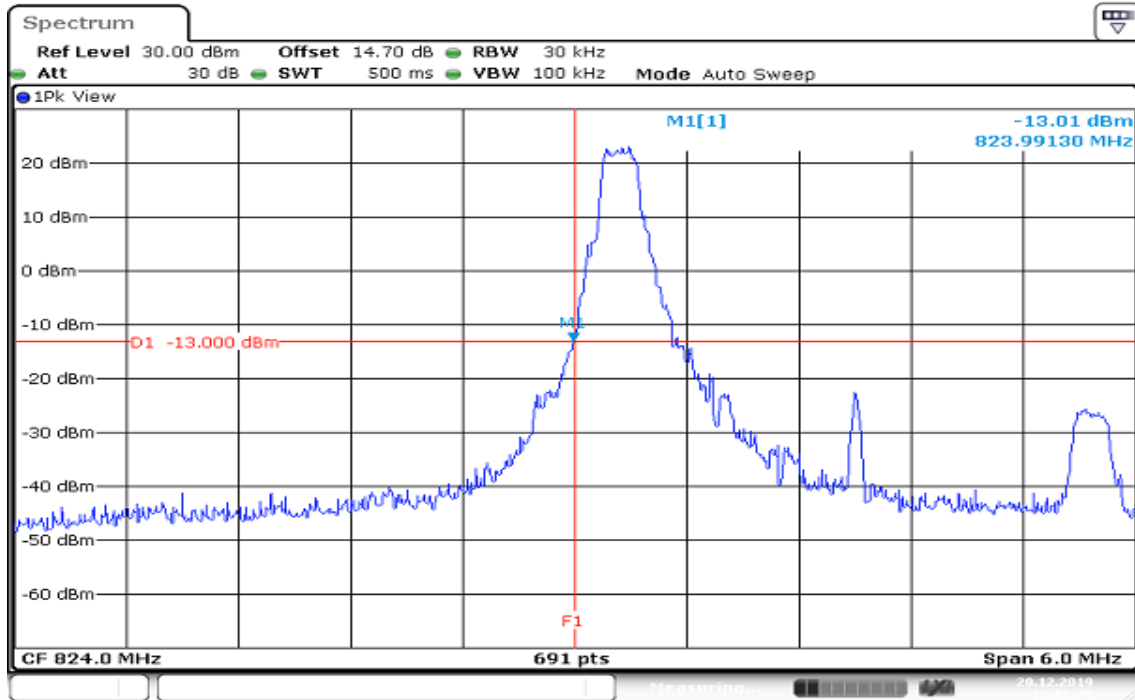
HIGHER BAND EDGE



Date: 20.DEC.2019 14:01:46

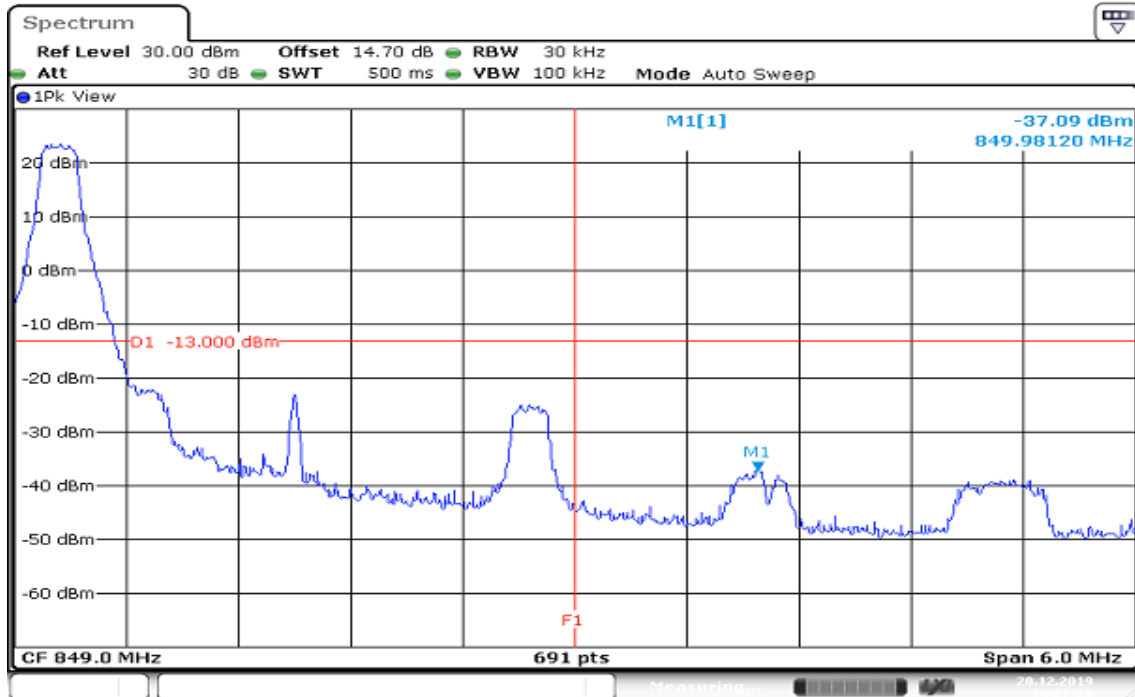
Report No.: T191120D05-RP11

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

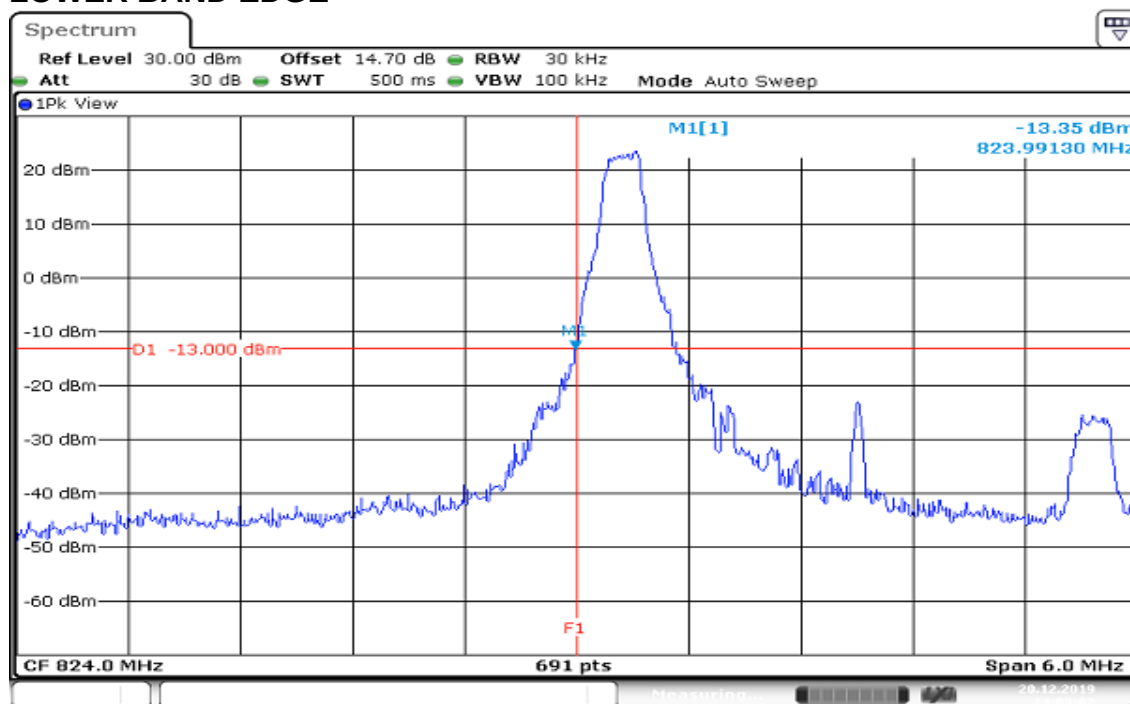


Date: 20.DEC.2019 14:08:40

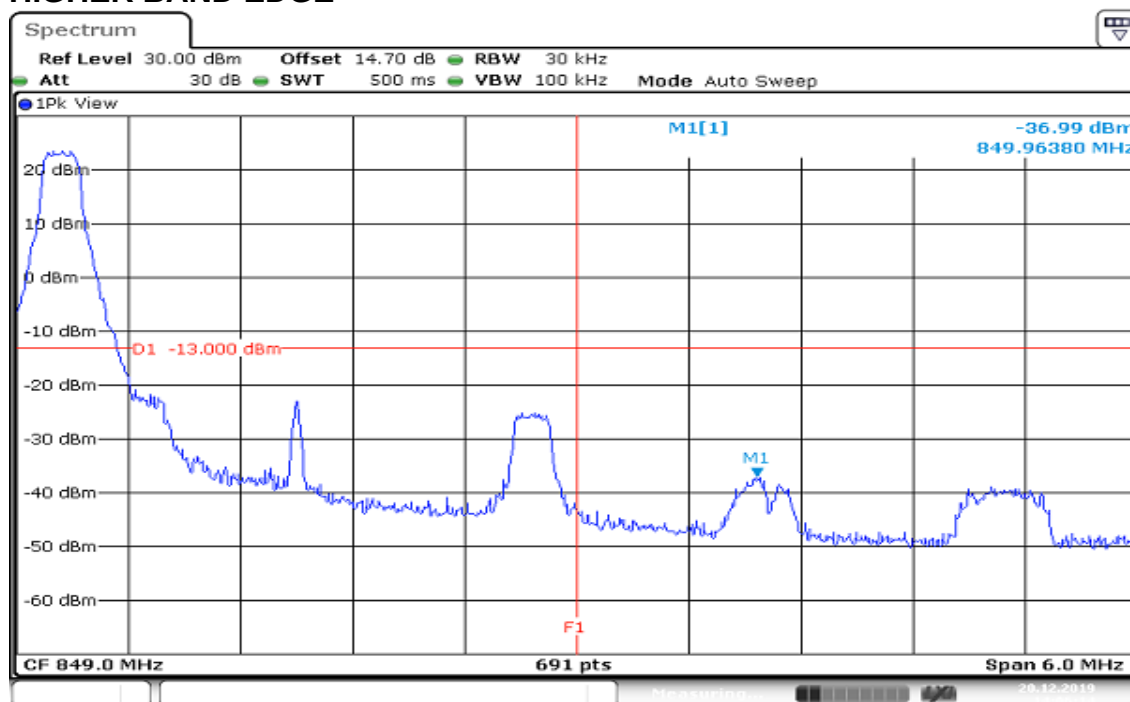
HIGHER BAND EDGE



Date: 20.DEC.2019 14:07:30

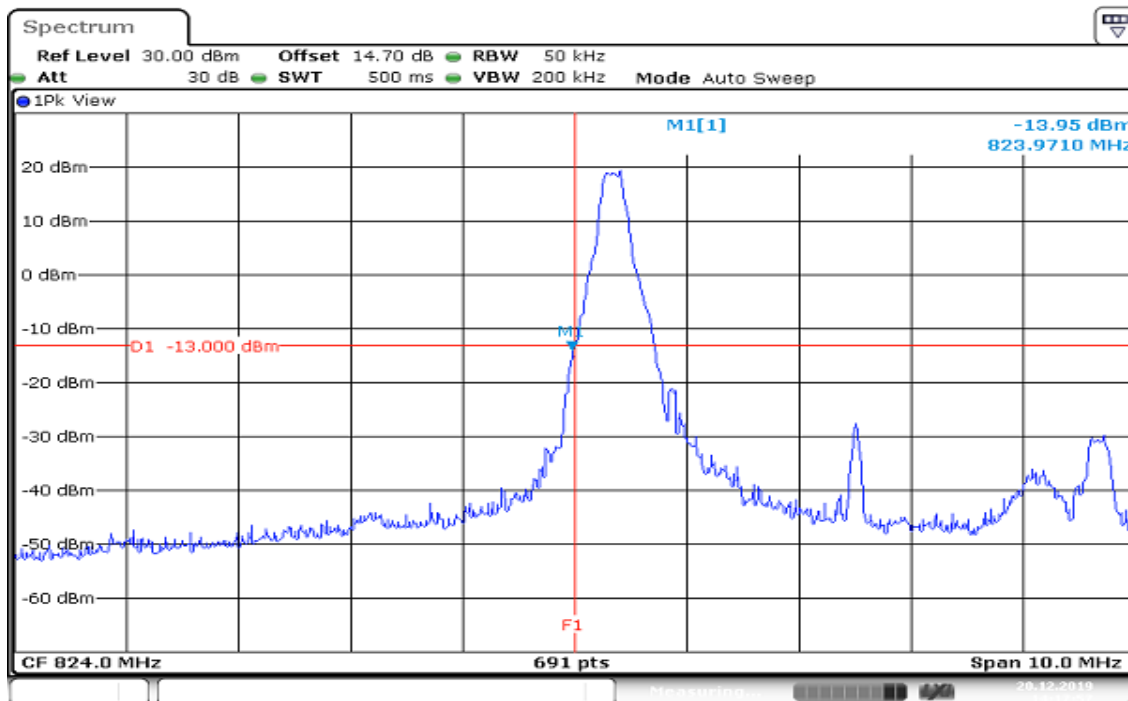
**CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB ALLOCATED
LOWER BAND EDGE**

Date: 20.DEC.2019 14:09:03

HIGHER BAND EDGE

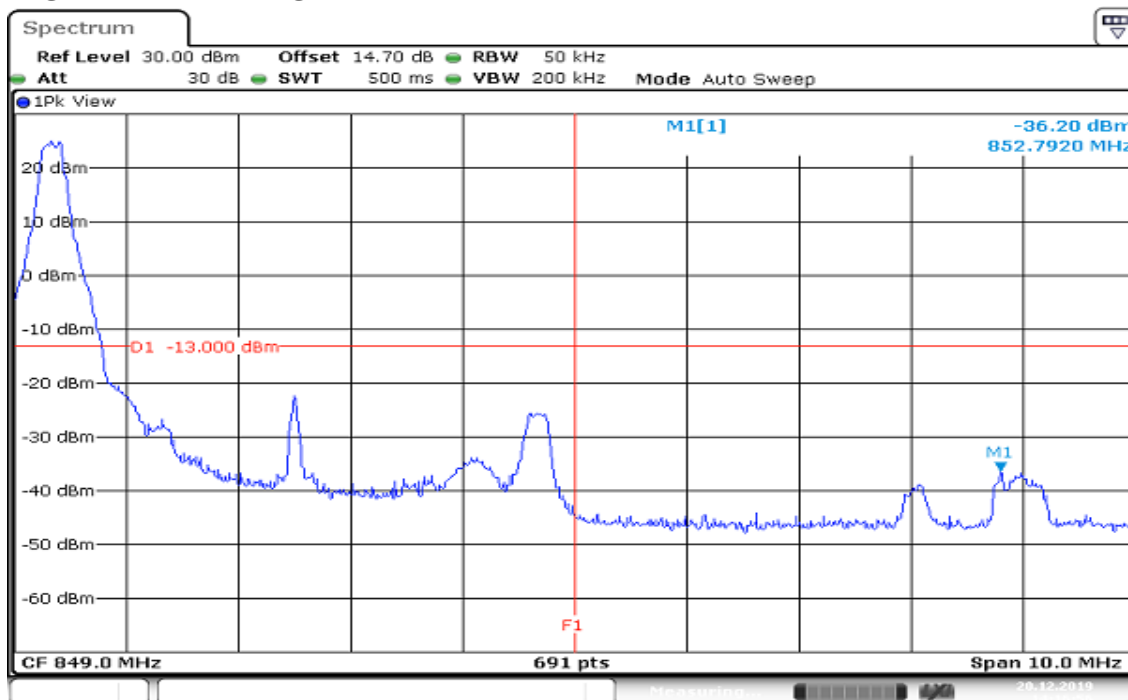
Date: 20.DEC.2019 14:06:15

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



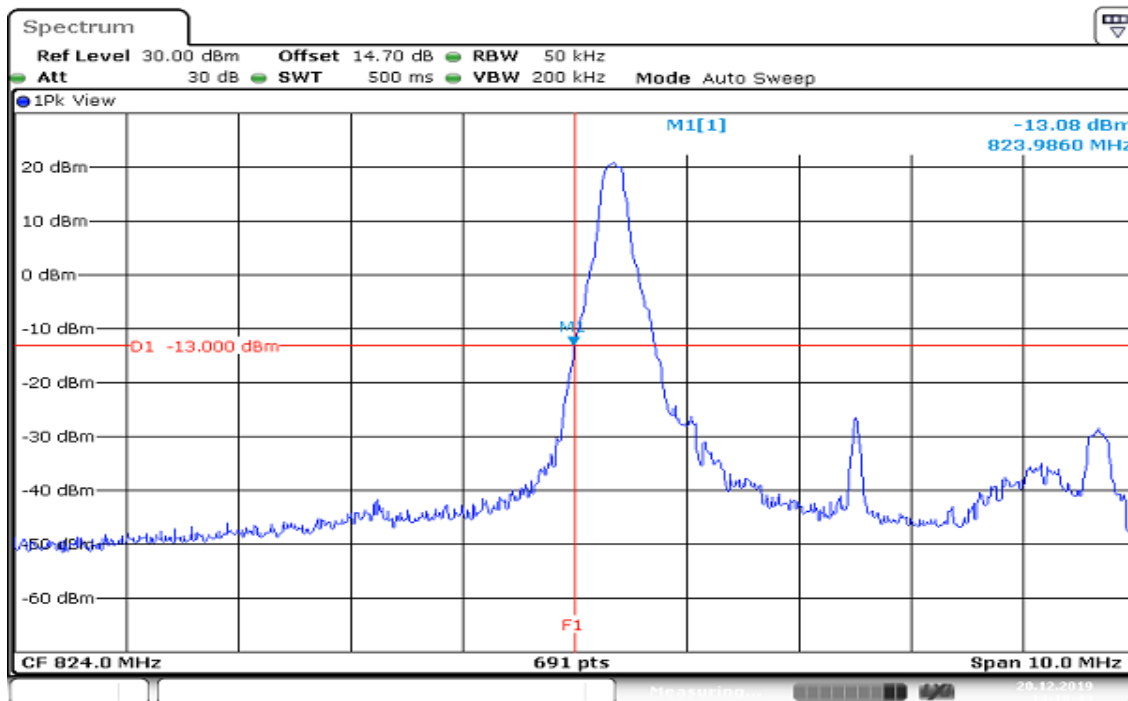
Date: 20.DEC.2019 14:17:57

HIGHER BAND EDGE

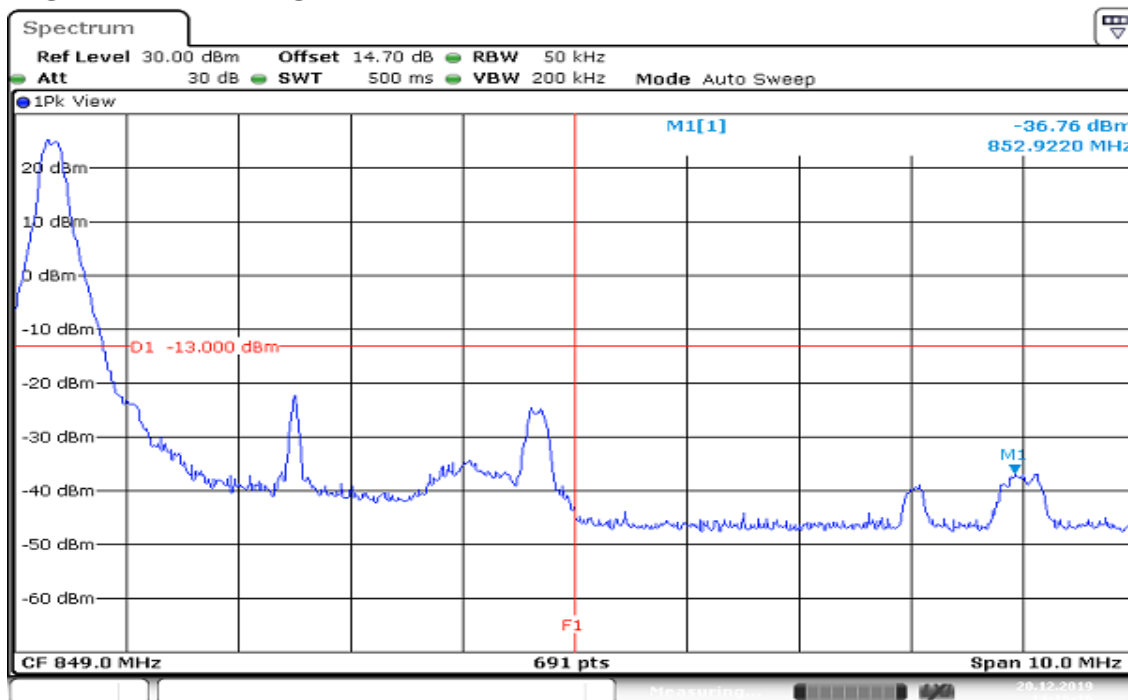


Date: 20.DEC.2019 14:16:57

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE

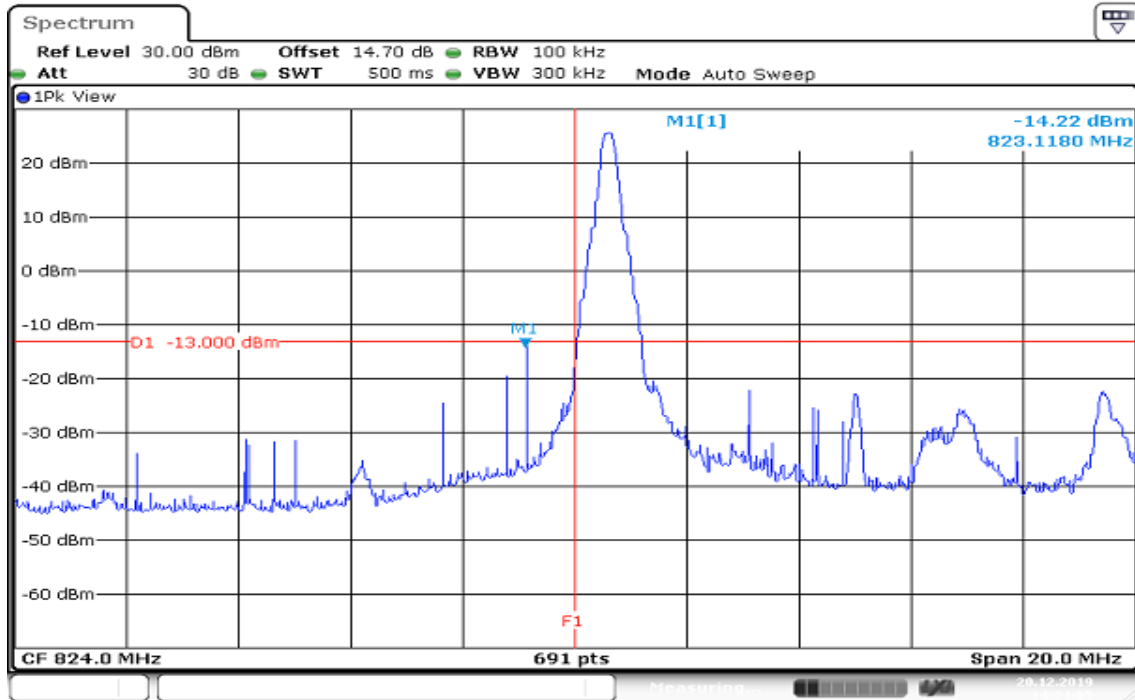


HIGHER BAND EDGE



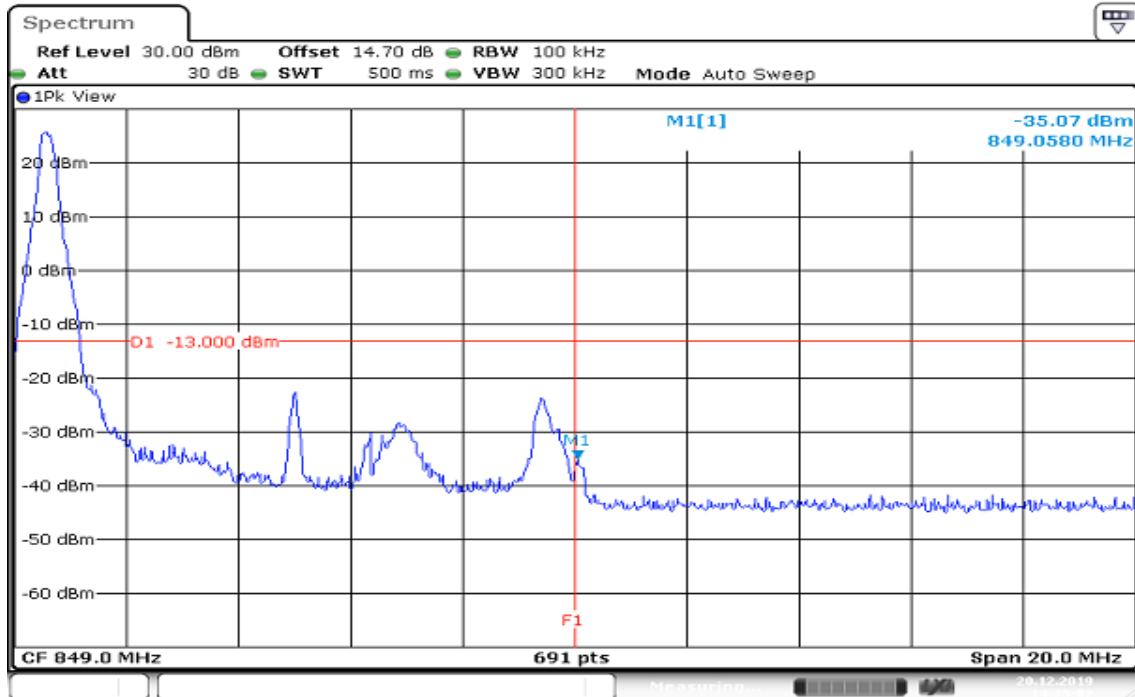
Report No.: T191120D05-RP11

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



Date: 20.DEC.2019 14:24:05

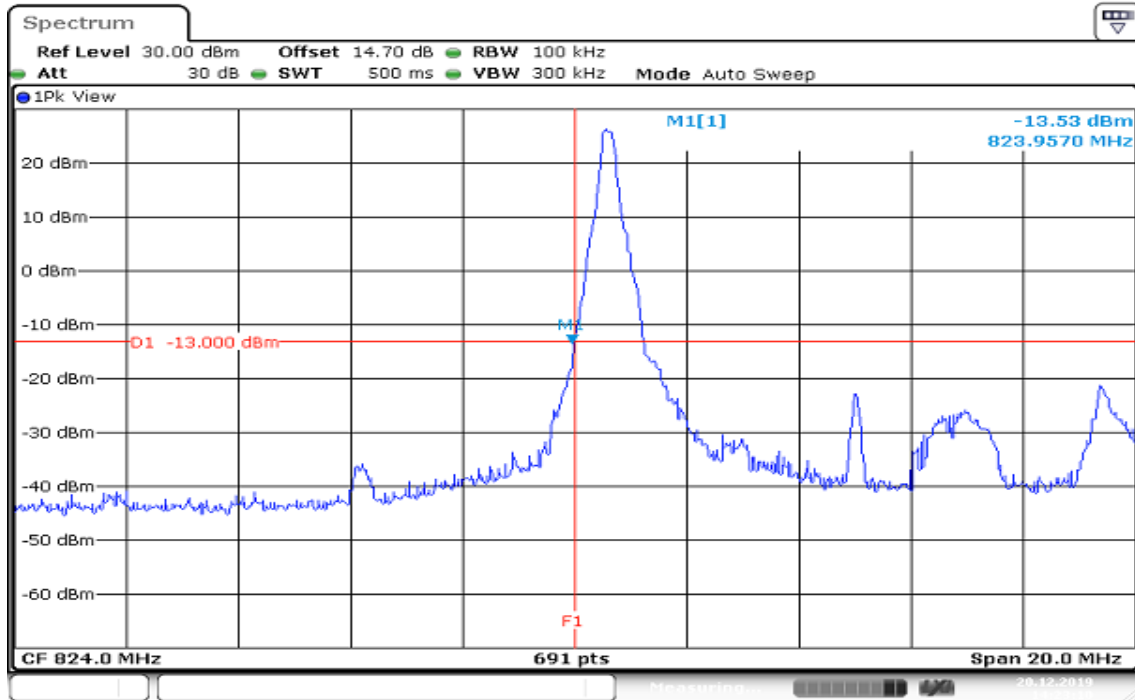
HIGHER BAND EDGE



Date: 20.DEC.2019 14:25:03

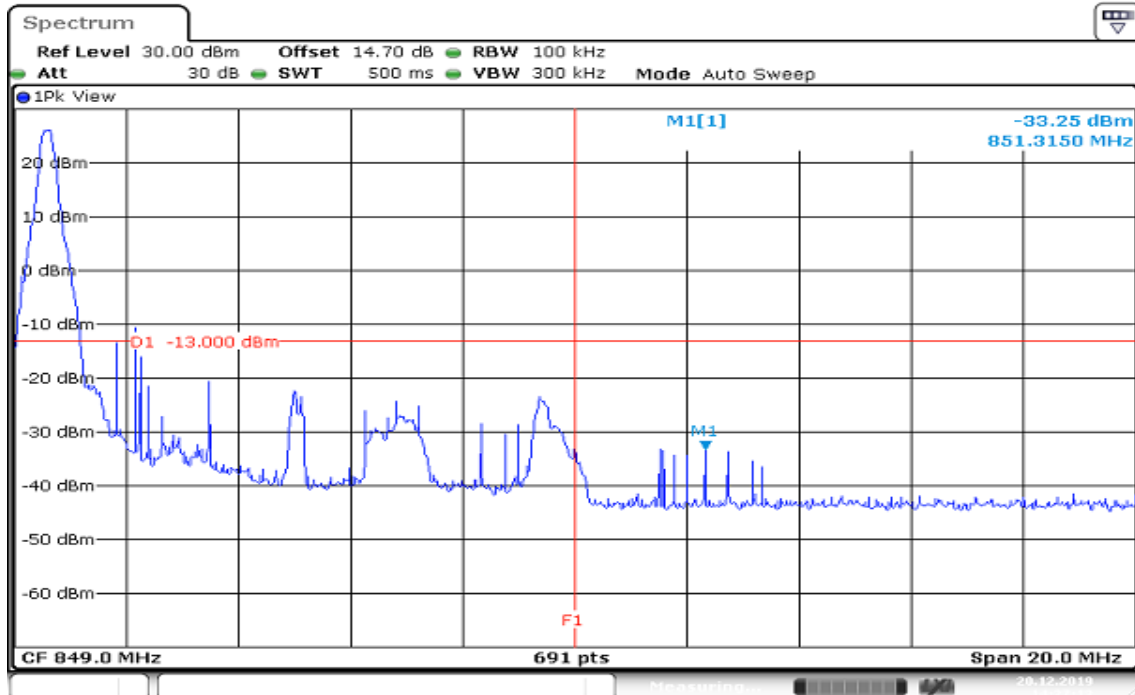
Report No.: T191120D05-RP11

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



Date: 20.DEC.2019 14:23:11

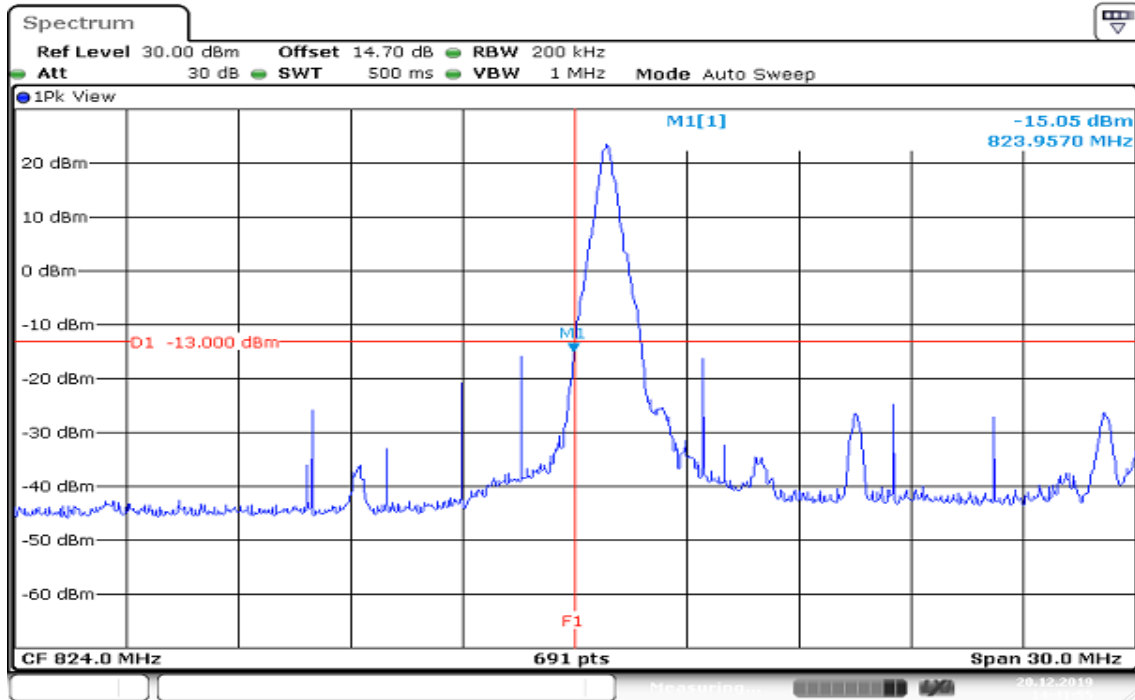
HIGHER BAND EDGE



Date: 20.DEC.2019 14:27:14

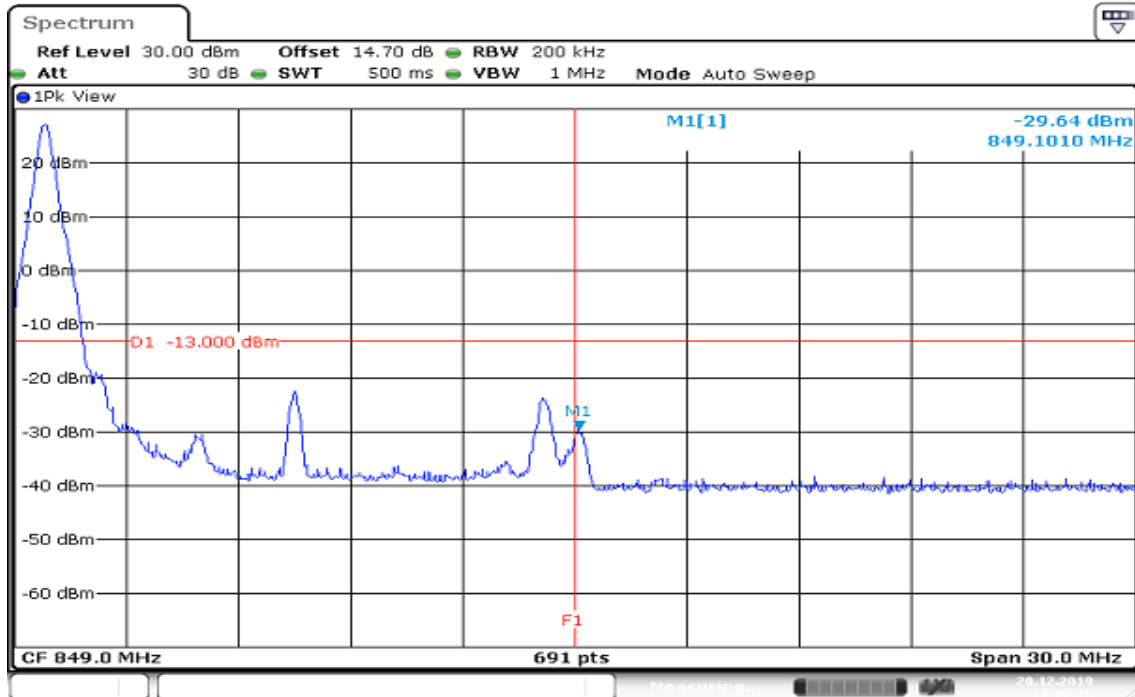
Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:41:56

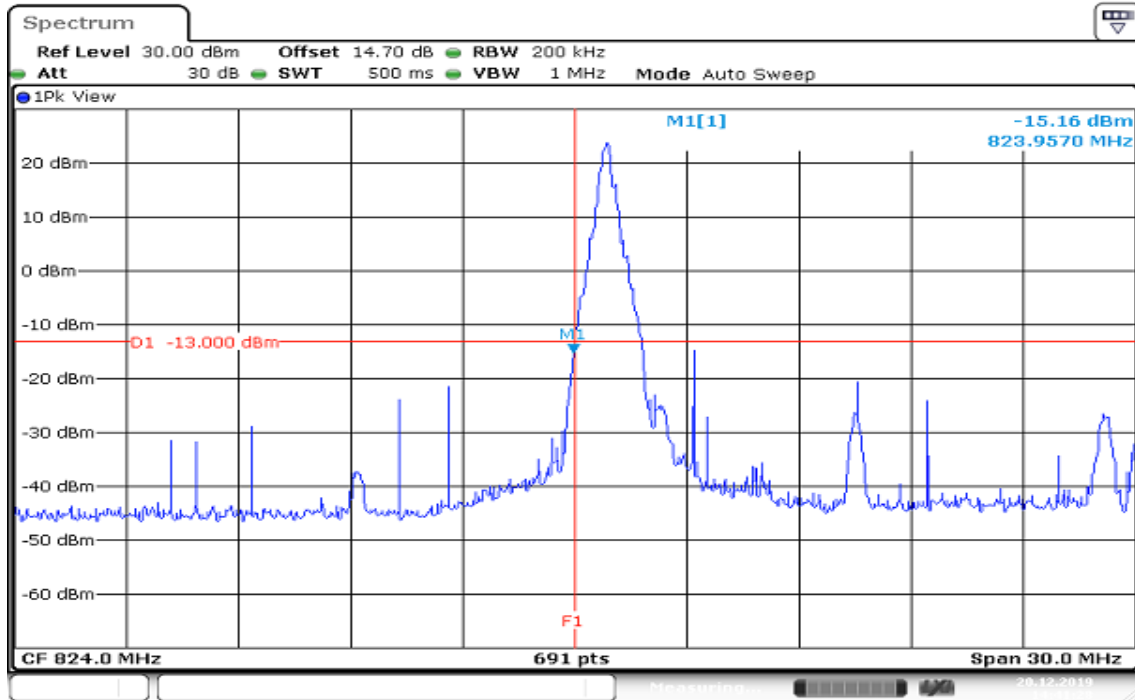
HIGHER BAND EDGE



Date: 20.DEC.2019 14:39:26

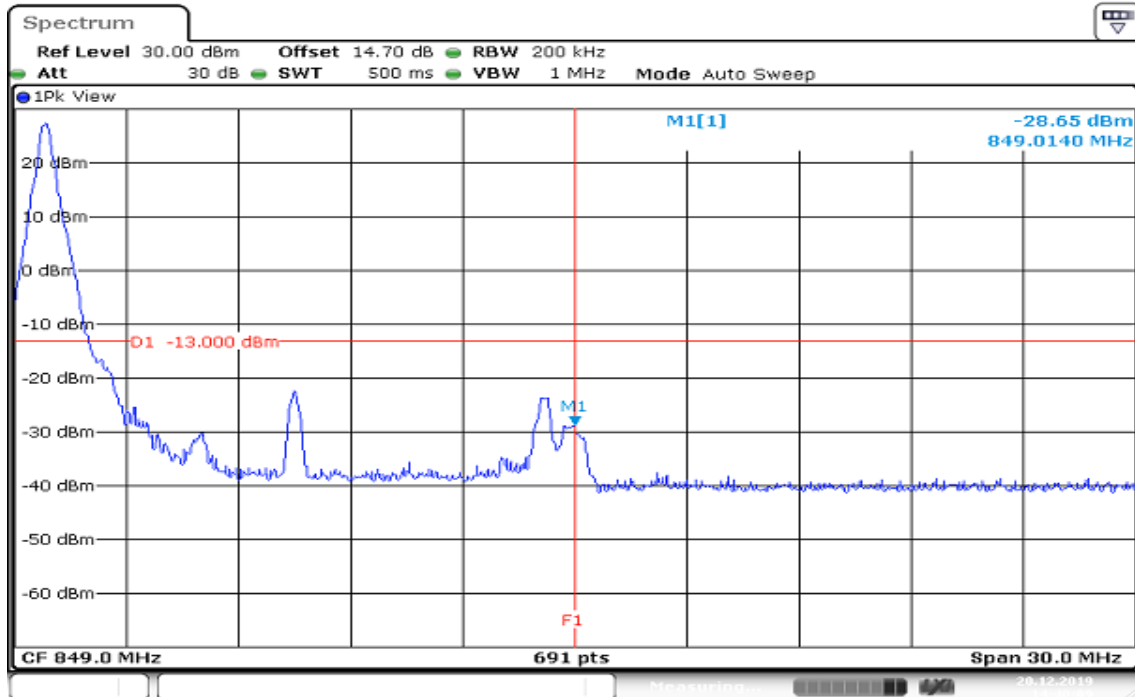
Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:41:28

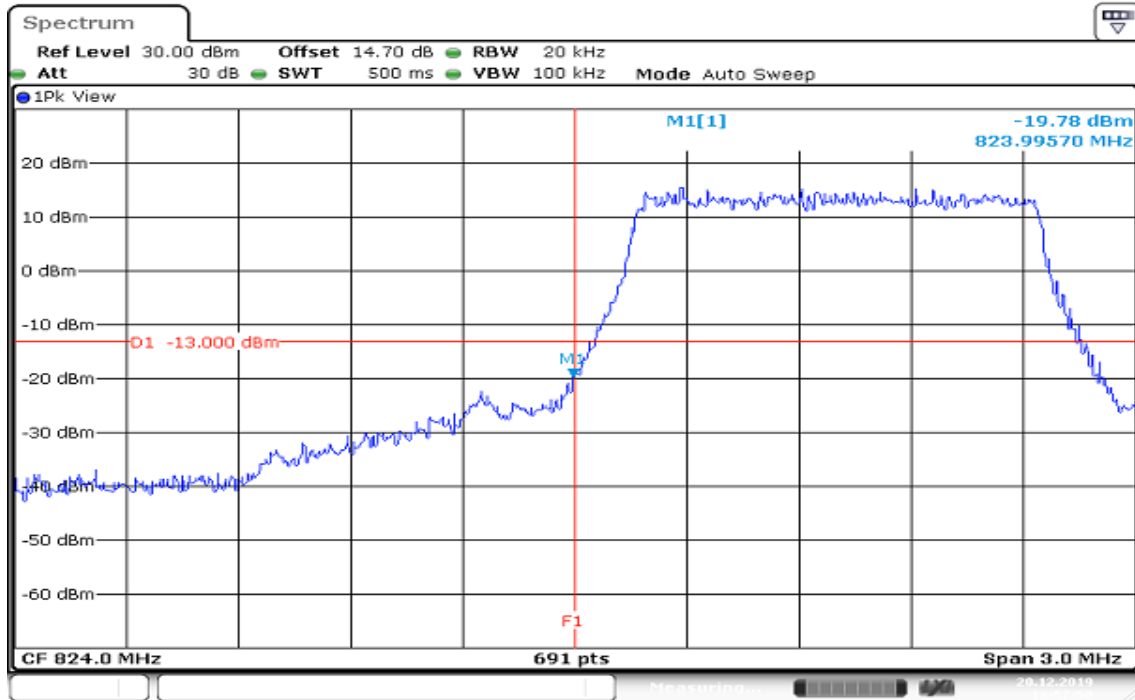
HIGHER BAND EDGE



Date: 20.DEC.2019 14:40:10

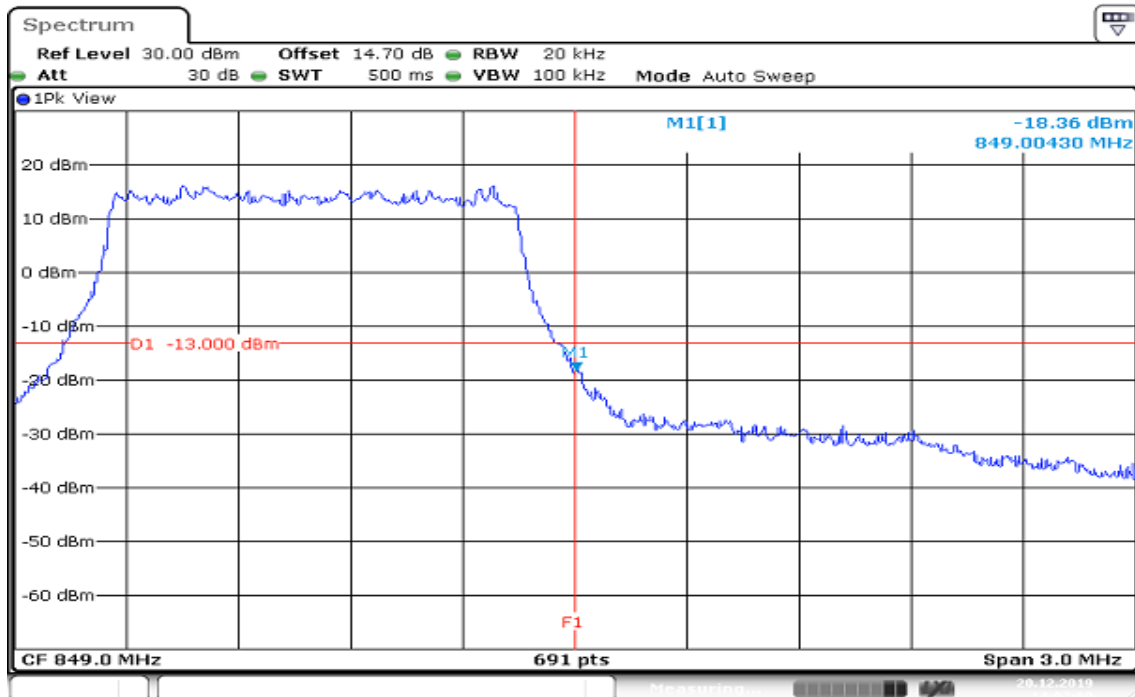
Report No.: T191120D05-RP11

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



Date: 20.DEC.2019 13:57:51

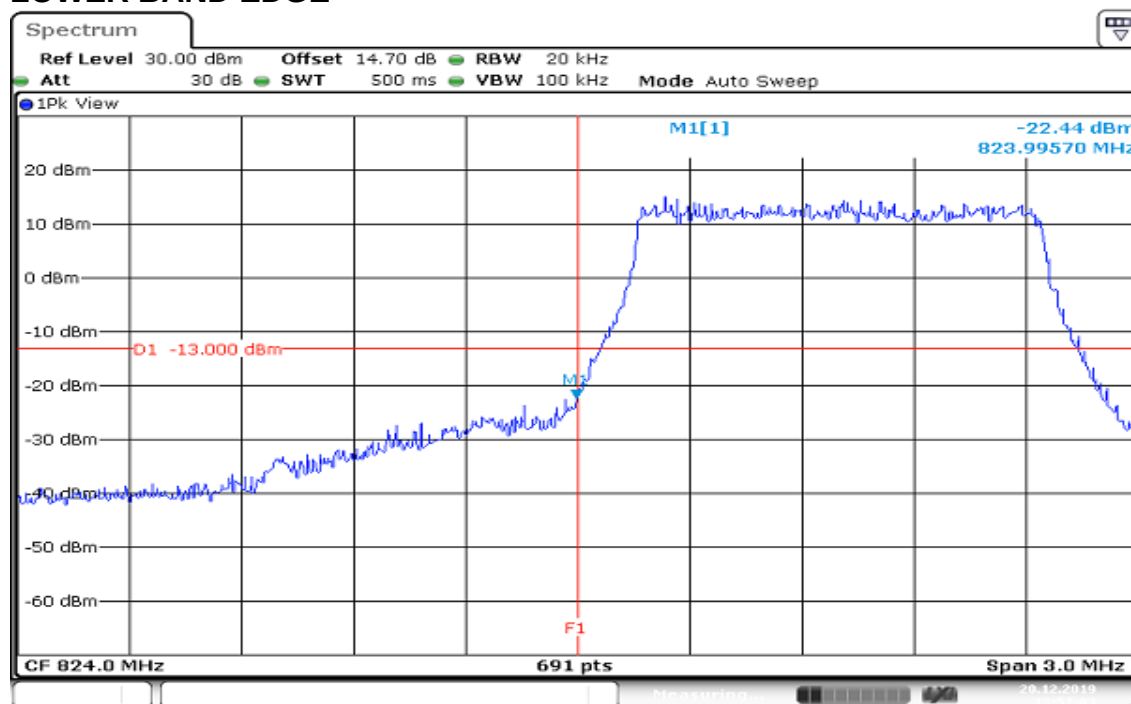
HIGHER BAND EDGE



Date: 20.DEC.2019 14:03:01

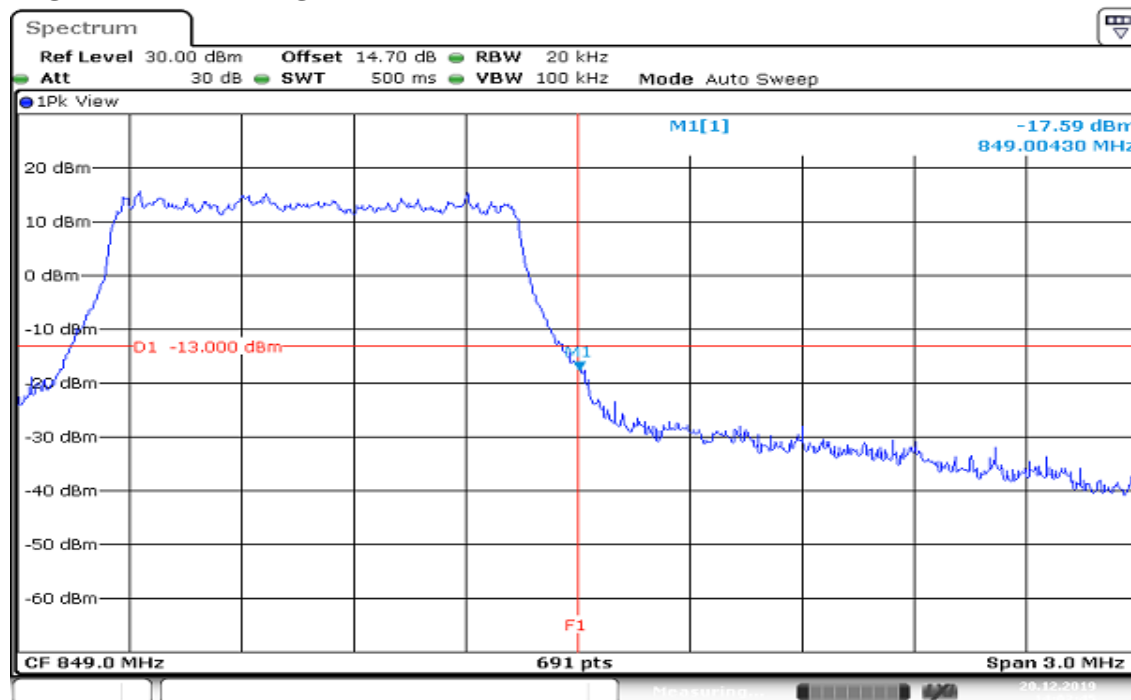
Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 13:57:04

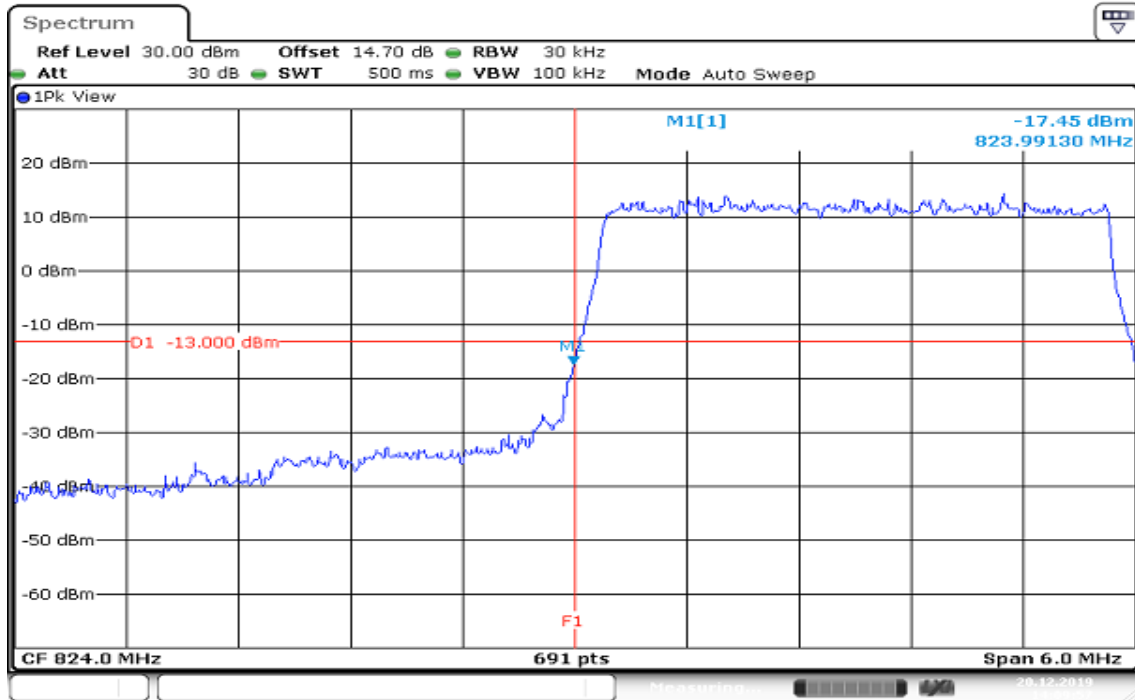
HIGHER BAND EDGE



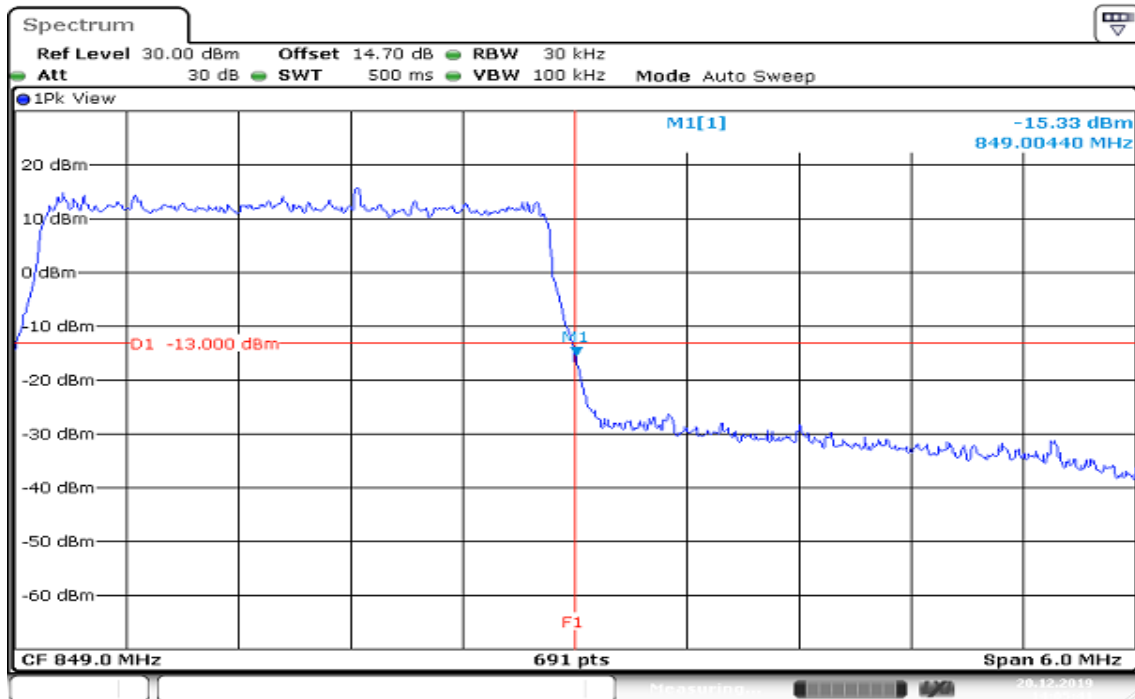
Date: 20.DEC.2019 14:03:45

Report No.: T191120D05-RP11

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

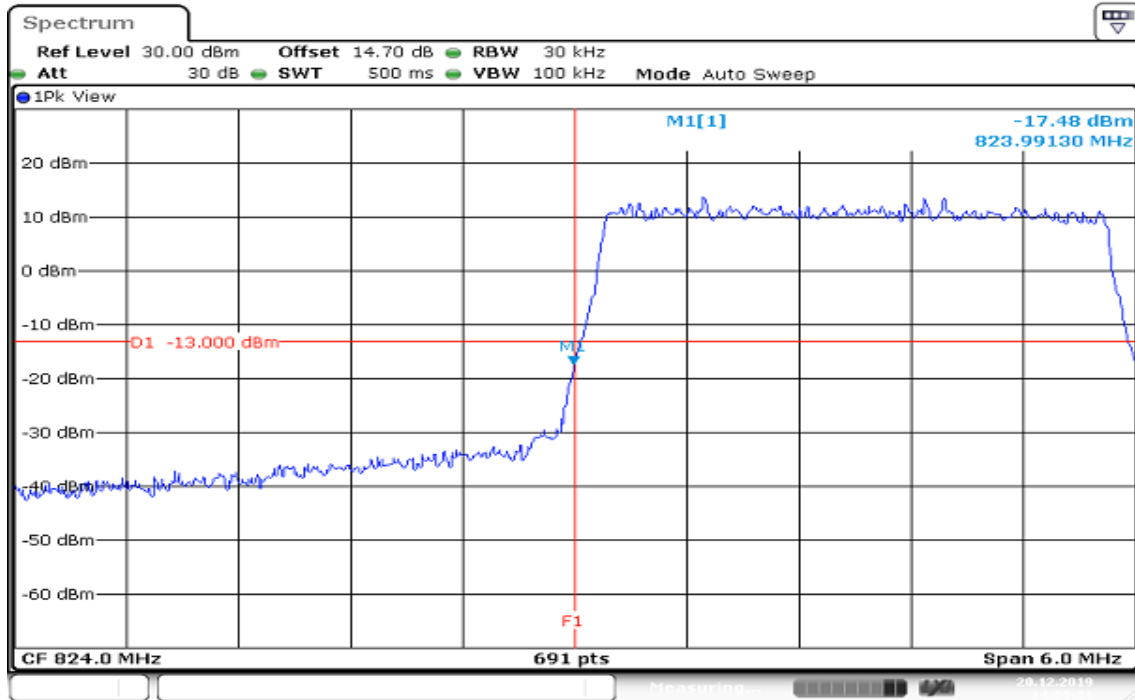


HIGHER BAND EDGE

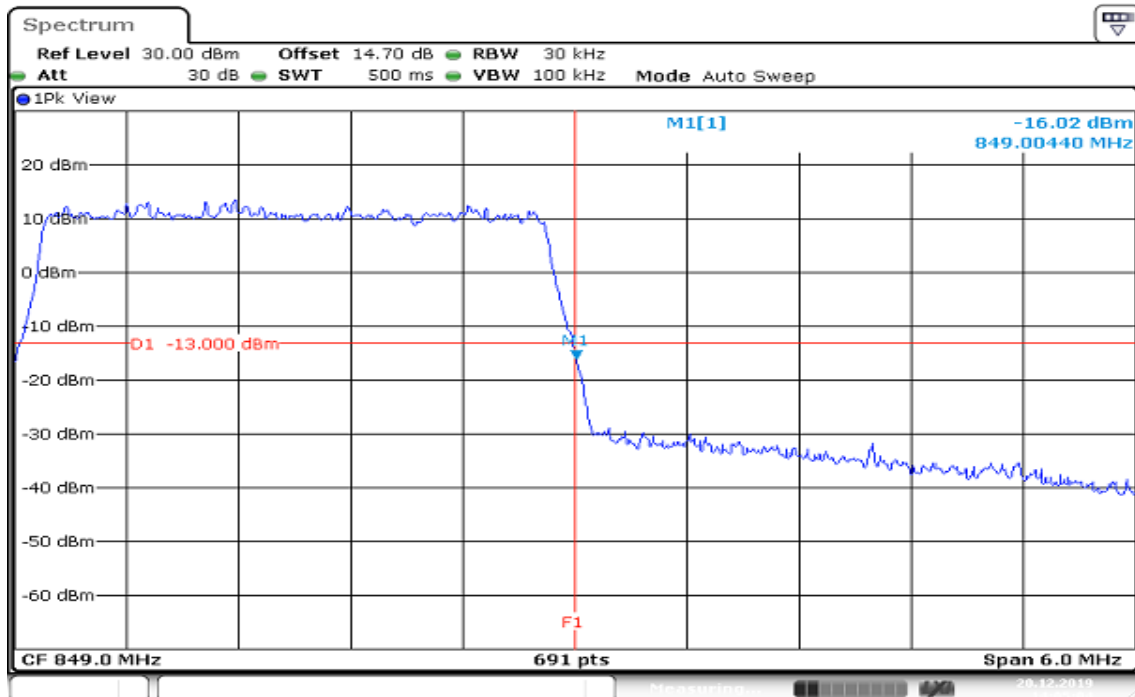


Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 3MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE

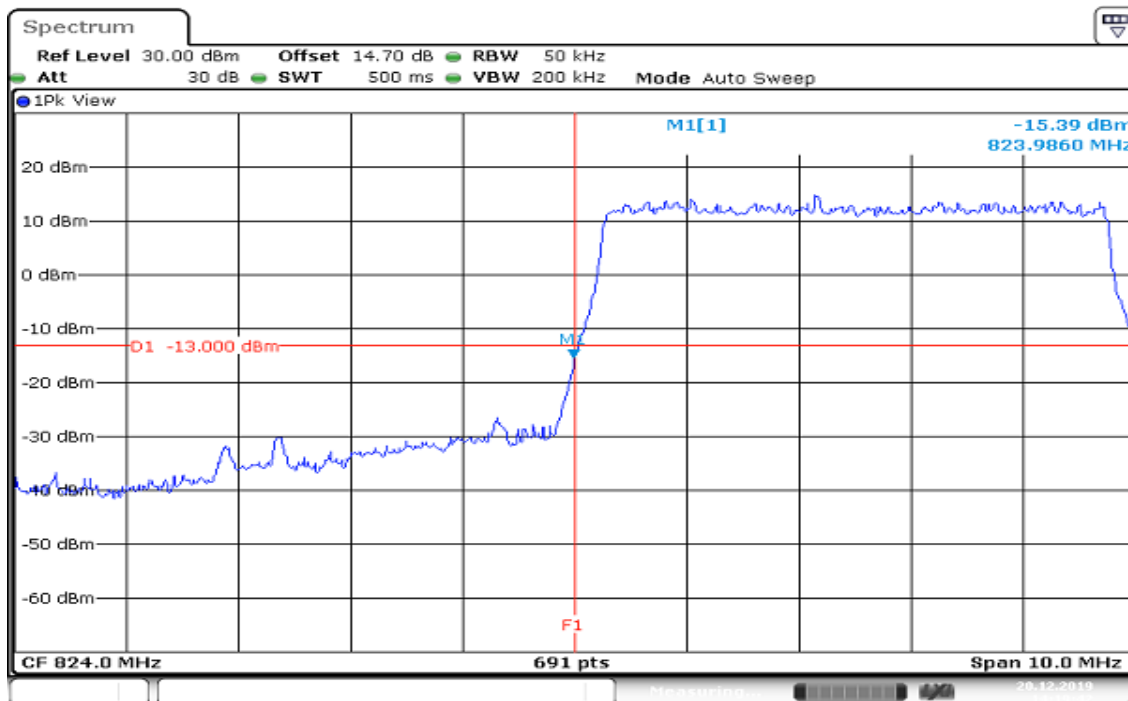


HIGHER BAND EDGE

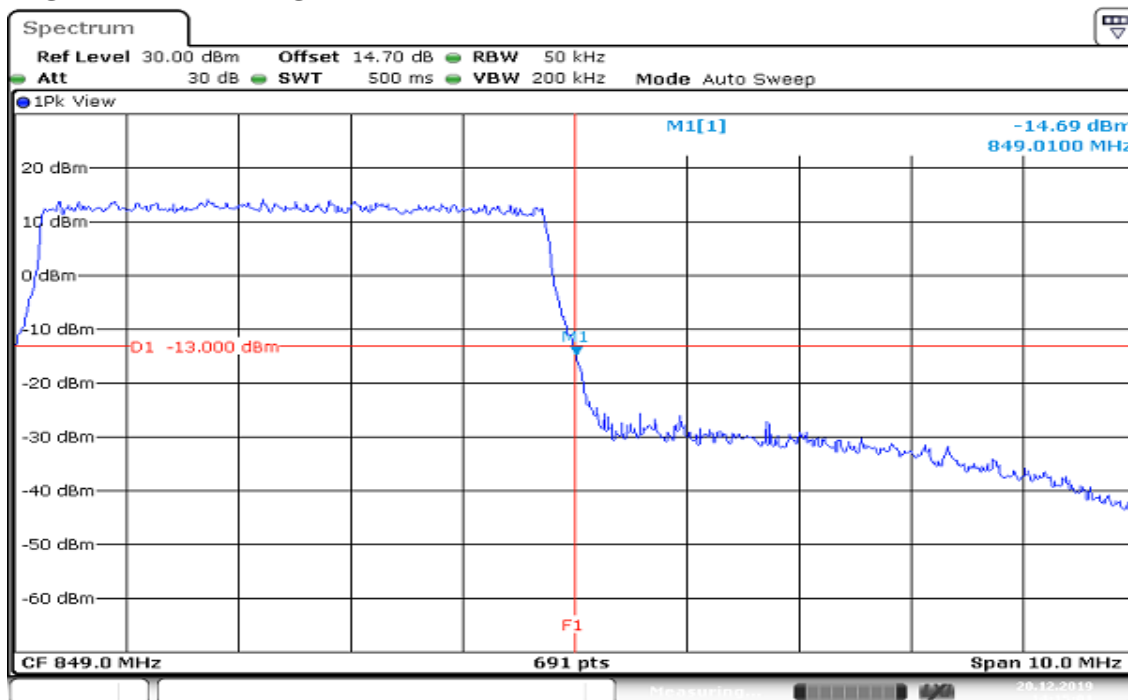


Report No.: T191120D05-RP11

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

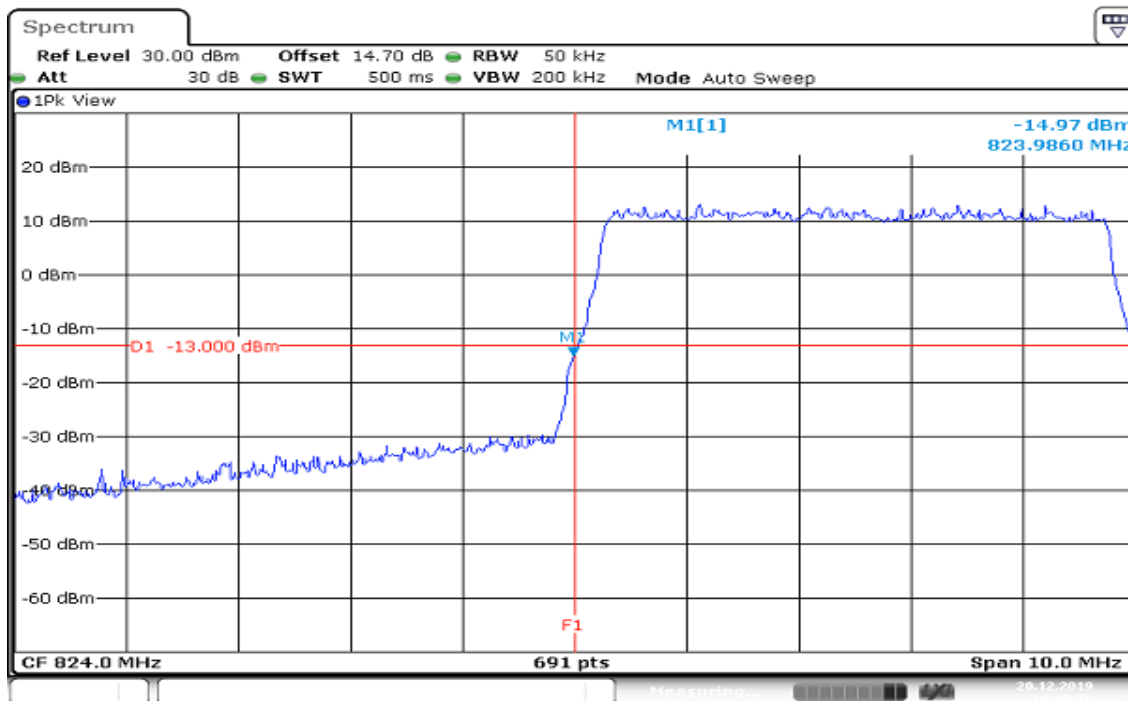


HIGHER BAND EDGE



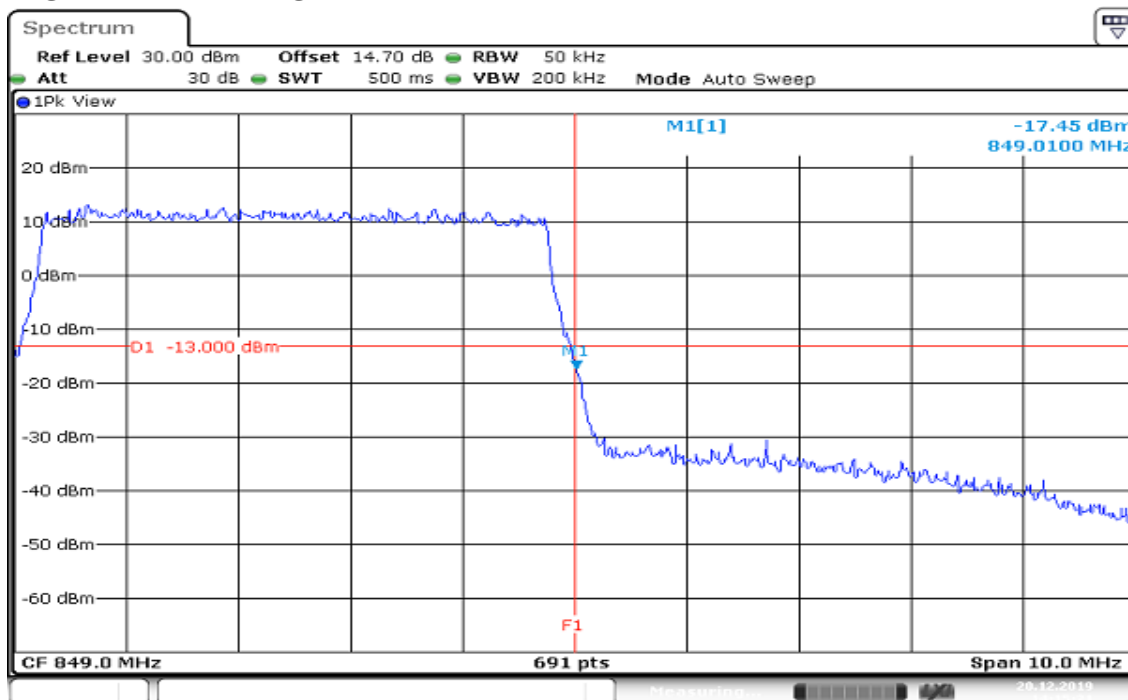
Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 5MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:19:16

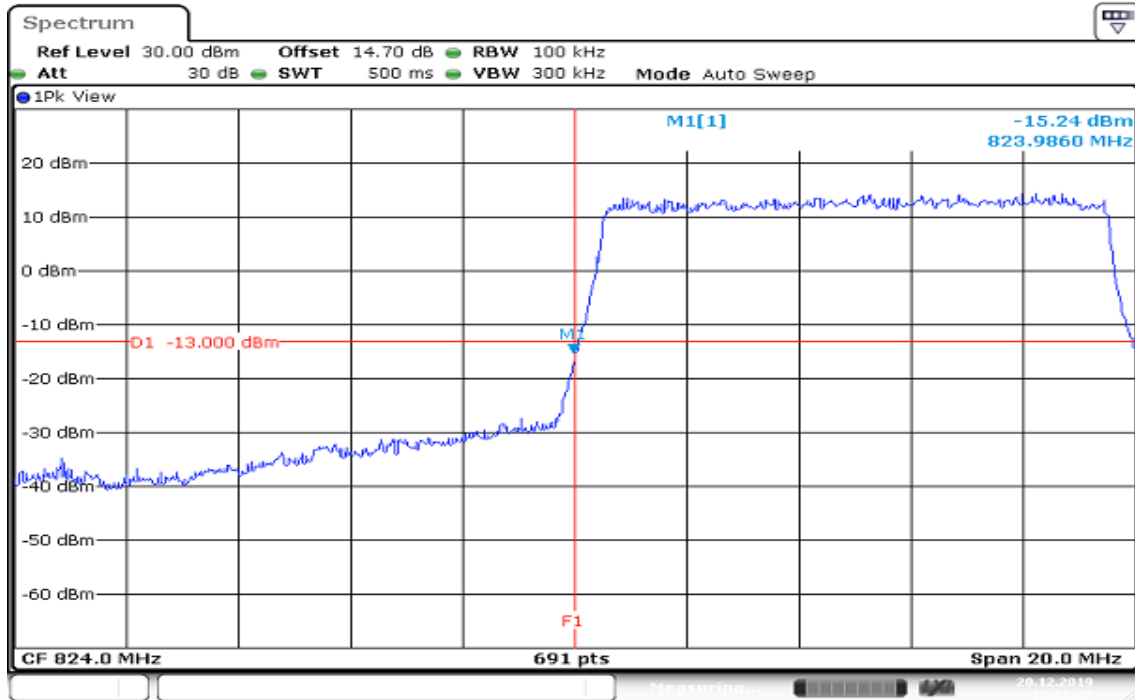
HIGHER BAND EDGE



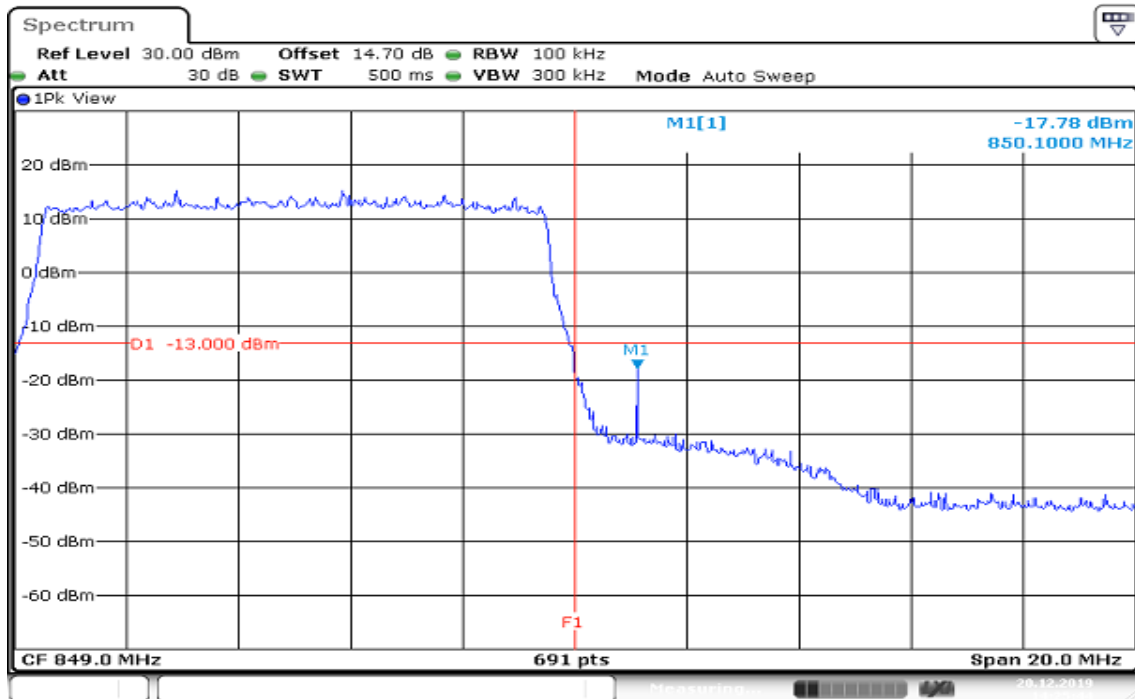
Date: 20.DEC.2019 14:15:32

Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 10MHz / QPSK / Full RB ALLOCATED LOWER BAND EDGE

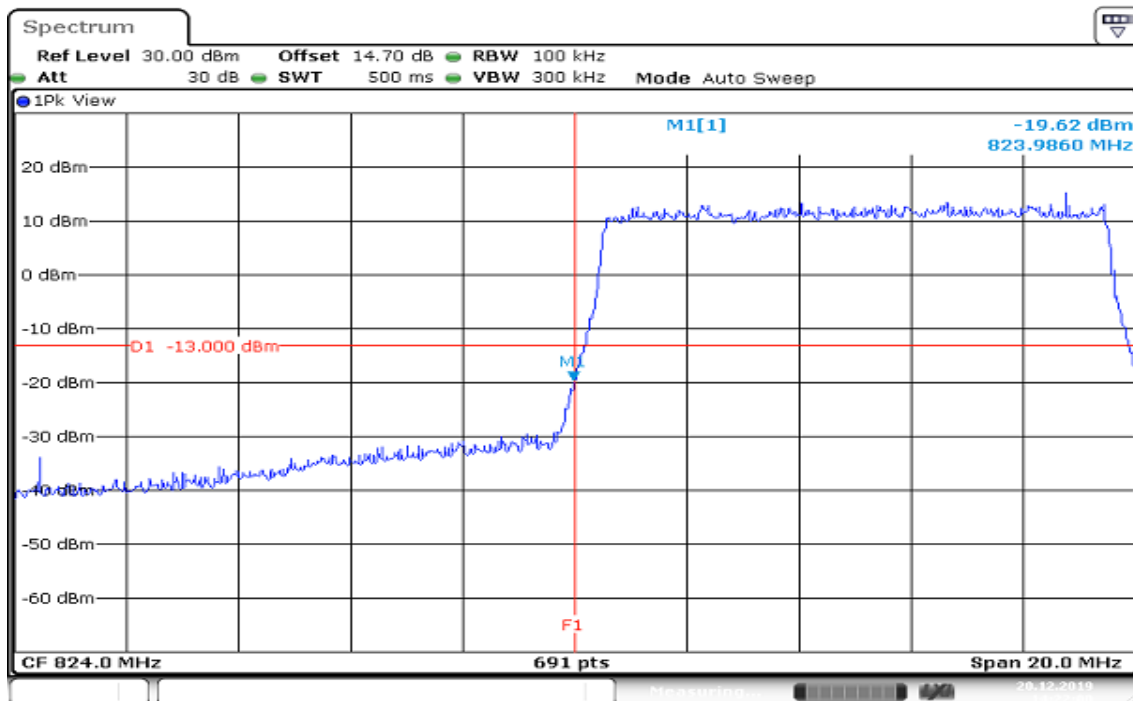


HIGHER BAND EDGE



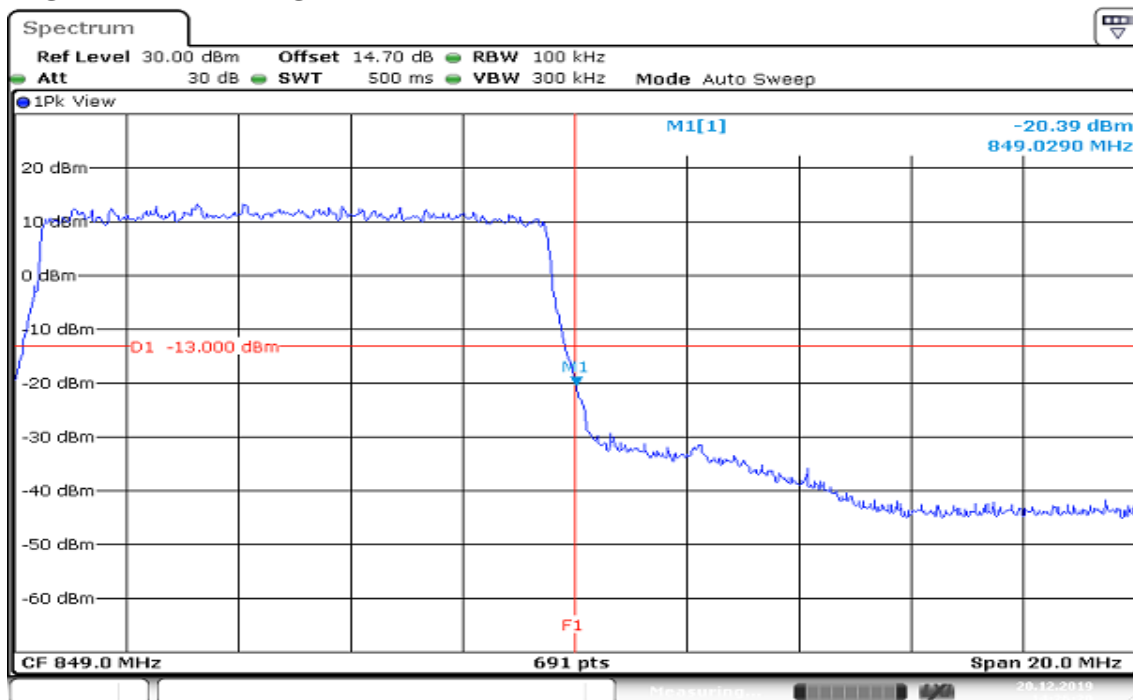
Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 10MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:22:01

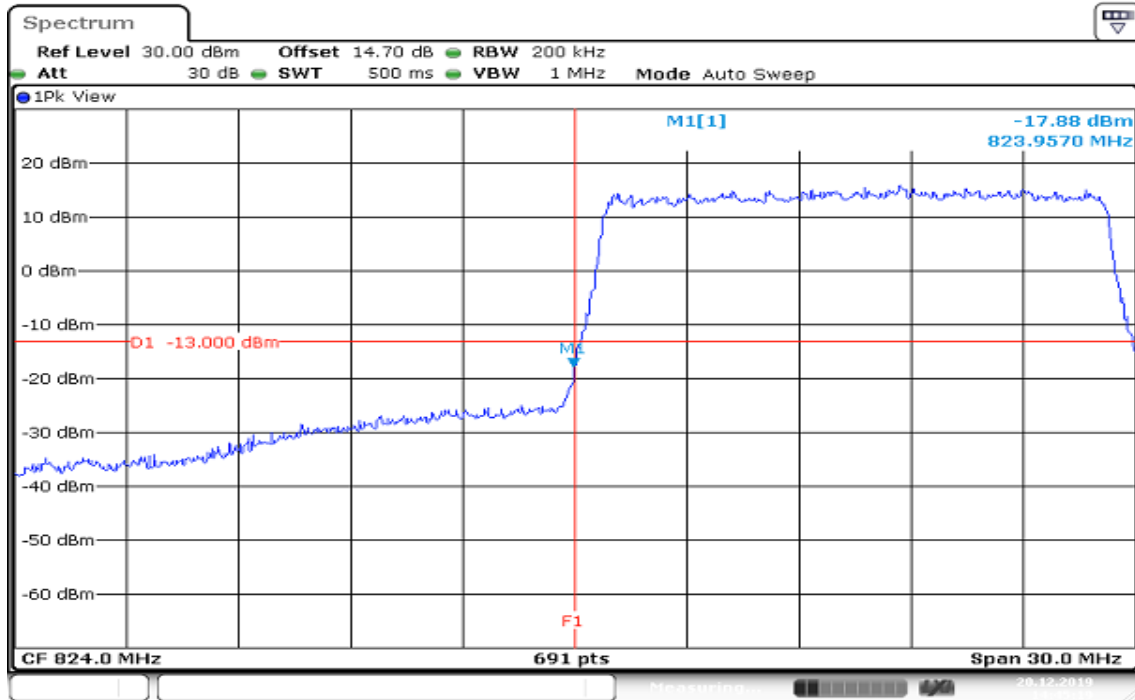
HIGHER BAND EDGE



Date: 20.DEC.2019 14:26:21

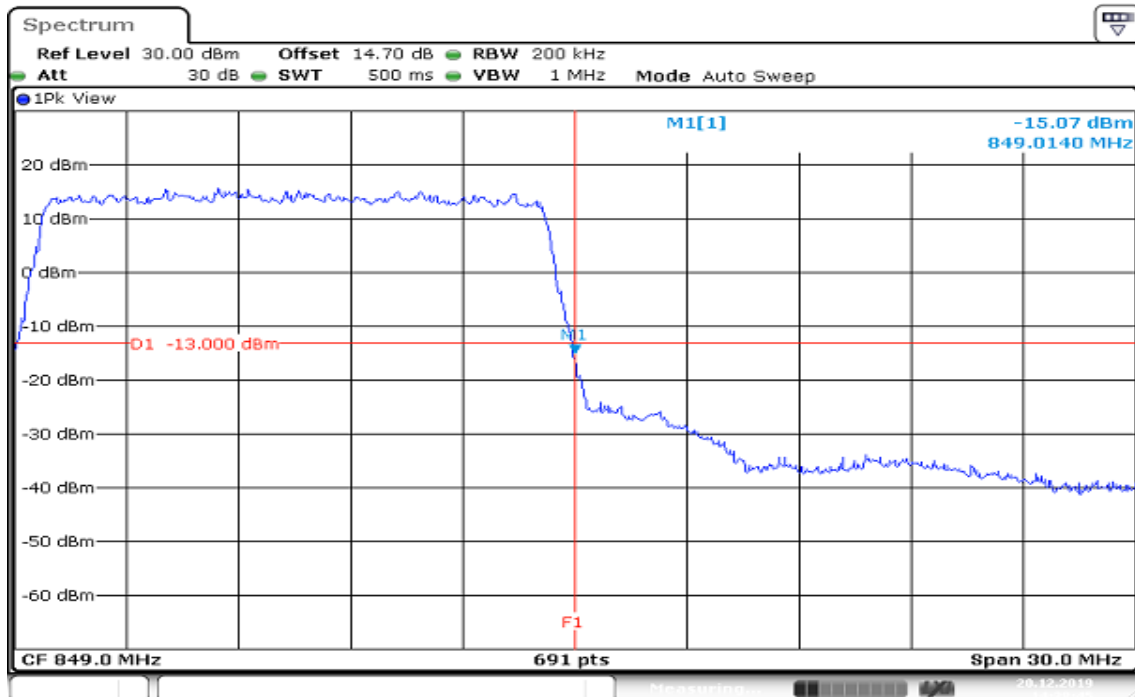
Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 15MHz / QPSK / Full RB ALLOCATED LOWER BAND EDGE



Date: 20.DEC.2019 14:45:20

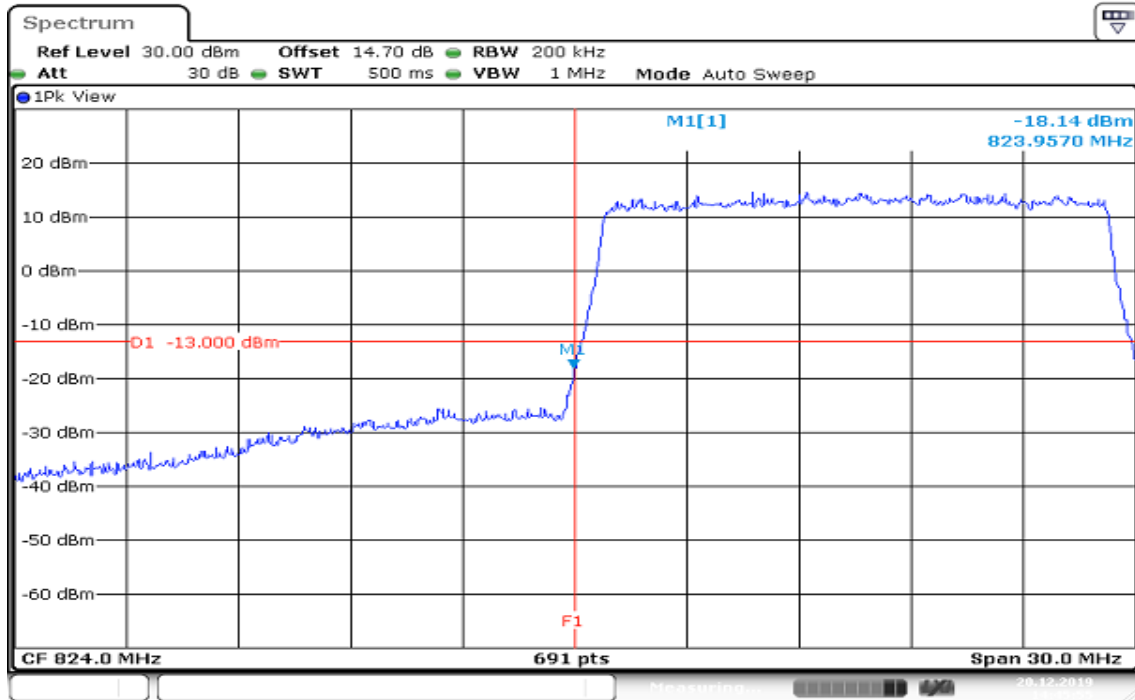
HIGHER BAND EDGE



Date: 20.DEC.2019 14:38:46

Report No.: T191120D05-RP11

CHANNEL BANDWIDTH: 15MHz / 16QAM / Full RB ALLOCATED LOWER BAND EDGE



HIGHER BAND EDGE

