



FCC ID: 2ATZ6-AT11-22-11
Report No.: T201116W03-RP2

Page: 1 / 134
Rev.: 01

FCC 47 CFR PART 27 SUBPART L

TEST REPORT

For

ActiveTrack

Model No.: AT11-22-11

Trade Name: Upstream S.A

Issued to

UPSTREEM S.A
Rue de Gosselies 13/9 Jumet 6040 Belgium

Issued by

Compliance Certification Services Inc.
Wugu Laboratory
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City, Taiwan. (R.O.C.)
Issued Date: May 3, 2021

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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Report No.: T201116W03-RP2

Page: 2 / 134

Rev.: 01

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	April 13, 2021	Initial Issue	ALL	Allison Chen
01	May 5, 2021	See the following Note Rev.(01)	P.A-2	Allison Chen

Note:

Rev.(01)

1. Revised test setup photo above 1GHz.

TABLE OF CONTENTS

1.	TEST RESULT CERTIFICATION.....	4
2.	EUT DESCRIPTION	5
3.	TEST METHODOLOGY	6
3.1	DESCRIPTION OF TEST TYPE	6
3.2	THE WORST MODE OF MEASUREMENT	7
4.	TEST SUMMARY	8
5.	INSTRUMENT CALIBRATION.....	9
5.1	MEASURING INSTRUMENT CALIBRATION	9
5.2	MEASUREMENT EQUIPMENT USED	9
5.3	MEASUREMENT UNCERTAINTY	11
6.	FACILITIES AND ACCREDITATIONS.....	12
6.1	FACILITIES.....	12
6.2	EQUIPMENT	12
7.	SETUP OF EQUIPMENT UNDER TEST.....	13
7.1	SETUP CONFIGURATION OF EUT	13
7.2	SUPPORT EQUIPMENT	13
8.	TEST PROCEDURE AND RESULT	14
8.1	ERP & EIRP MEASUREMENT	14
8.2	FREQUENCY STABILITY MEASUREMENT	22
8.3	OCCUPIED BANDWIDTH MEASUREMENT	25
8.4	PEAK TO AVERAGE POWER RATIO.....	76
8.5	BAND EDGE MEASUREMENT	90
8.6	CONDUCTED SPURIOUS EMISSIONS	103
8.7	RADIATED EMISSION MEASUREMENT	128
	APPENDIX A PHOTOGRAPHS OF TEST SETUP.....	A-1

1. TEST RESULT CERTIFICATION

Applicant: UPSTREEM S.A
Rue de Gosselies 13/9 Jumet 6040 Belgium

Manufacturer: IMEC Taiwan Co.
4F. No.6-2, Dusing Rd., Hsinchu Science Park, Hsinchu,
Taiwan

Equipment Under Test: ActiveTrack

Trade Name: Upstream S.A

Model No.: AT11-22-11

Date of Test: January 25 ~ 29, 2021

APPLICABLE STANDARDS	
Standard	TEST RESULT
FCC Part 27, Subpart C, L, FCC Part 2	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.	

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:



Kevin Tsai
Deputy Manager
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	ActiveTrack	
Model No.	AT11-22-11	
Model Discrepancy	N/A	
Trade	Upstream S.A	
Received Date	November 16, 2020	
Power Supply	1. Power from Rechargeable Li-ion Polymer Battery. Rating: 3.7VDC, 650mAh 2. Power from Adapter. I/P: 100-230VAC, 50/60Hz, 0.2A O/P: 5.0VDC, 1.0A	
Modulation Technology	Cat-M1 LTE Band 4	QPSK, 16QAM
Frequency Range	Cat-M1 LTE Band 4 Channel Bandwidth: 1.4MHz	1710.7MHz ~1754.2MHz
	Cat-M1 LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.4MHz
	Cat-M1 LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~1752.5MHz
	Cat-M1 LTE Band 4 Channel Bandwidth: 10MHz	1715.0MHz ~1750.0MHz
	Cat-M1 LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	Cat-M1 LTE Band 4 Channel Bandwidth: 20MHz	1720MHz ~1745MHz
Antenna Specification	Antenna type: FPC Antenna Low CH Gain: -1.16 dBi Mid CH Gain: -0.26 dBi High CH Gain: 0.65 dBi	

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.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

3. TEST METHODOLOGY

3.1 DESCRIPTION OF TEST TYPE

The EUT (model: AT11-22-11) had been tested under operating condition.

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 CH	19957	1710.7	19965	1711.5	19975	1712.5
Middle CH	20175	1732.5	20175	1732.5	20175	1732.5
High CH	20393	1754.3	20384	1753.4	20375	1752.5
Channel Bandwidth	10MHz		15MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low CH	20000	1715.0	20025	1717.5	20050	1720.00
Middle CH	20175	1732.5	20175	1732.5	20175	1732.50
High CH	20350	1750.0	20325	1747.5	20300	1745.00

3.2 THE WORST MODE OF MEASUREMENT

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 Adapter Mode 2: EUT power by Battery
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☒ Placed in fixed position at X-Plane (E2-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Adapter Mode 2: EUT power by Battery
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 axis X and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report



Report No.: T201116W03-RP2

Page: 8 / 134

Rev.: 01

4. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
27.50(d)	8.1	EIRP Measurement	Pass
2.1055, 27.54	8.2	Frequency Stability v.s. temperature measurement	Pass
2.1049	8.3	Occupied Bandwidth Measurement	Pass
27.50(d)	8.4	Peak to Average Ratio	Pass
27.53(h)	8.5	Conducted Band Edge	Pass
27.53(h)	8.6	Conducted Spurious Emission	Pass
27.53(h)	8.7	Spurious Radiation Measurement	Pass

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

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
Coaxial Cable	Woken	WC12	CC003	06/29/2020	06/28/2021
Power Divider	Solvang Technology	STI08-0015	008	08/05/2020	08/04/2021
Signal Analyzer	R&S	FSV 40	101561	08/17/2020	08/16/2021
Thermostatic/ Humidity Chamber	GWINSTEK	GTC-288MH-CC	TH160402	05/07/2020	05/06/2021
Radio Communication Analyzer	Anritsu	MT-8821C	6201300618	05/27/2020	05/26/2021
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	02/25/2020	02/24/2021
Bilog Antenna	Sunol Sciences	JB3	A030105	07/24/2020	07/23/2021
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/25/2020	02/24/2021
Coaxial Cable	EMCI	EMC105	190914+327109/4	09/19/2020	09/18/2021
Digital Thermo- Hygro Meter	WISEWIND	1206	D07	01/06/2021	01/05/2022
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/30/2020	09/29/2021
Loop Ant	COM-POWER	AL-130	121051	03/27/2020	03/26/2021
Pre-Amplifier	EMEC	EM330	060609	02/25/2020	02/24/2021
Pre-Amplifier	HP	8449B	3008A00965	02/25/2020	02/24/2021
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	07/24/2020	07/23/2021
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				

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



Report No.: T201116W03-RP2

Page: 10 / 134

Rev.: 01

WWAN 4G					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Radio Communication Analyzer	Anritsu	MT-8820C	6201240043	07/17/2020	07/16/2021
Signal Analyzer	R&S	FSV 40	101073	09/17/2020	09/16/2021
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/19/2020	07/18/2021
Software	N/A				

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



Report No.: T201116W03-RP2

Page: 11 / 134

Rev.: 01

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: 886-2-2299-9721:

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."



Report No.: T201116W03-RP2

Page: 13 / 134

Rev.: 01

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
1	DC Power Source	Agilent	E3640A	N/A	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.

8. TEST PROCEDURE AND RESULT

8.1 EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

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.

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.



Report No.: T201116W03-RP2

Page: 15 / 134

Rev.: 01

TEST RESULTS

No non-compliance noted.

TEST RESULTS

Temperature: 21.5°C

Humidity: 54% RH

Tested by: Dally Hong

Test Date: January 29, 2021

LTE Band 4

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	E.I.R.P. Power (dBm)
Band 4	1.4M	19957	1710.7	QPSK	1	0	0	23.20	22.04
					1	2	0	22.90	21.74
					1	5	0	22.83	21.67
					3	0	1	22.53	21.37
					3	2	1	22.34	21.18
					3	3	1	21.89	20.73
					6	0	2	21.44	20.28
				16QAM	1	0	1	22.33	21.17
					1	2	1	22.11	20.95
					1	4	1	22.20	21.04
					3	0	2	21.58	20.42
					3	2	2	21.39	20.23
					3	3	2	21.17	20.01
					5	0	2	21.25	20.09
		20175	1732.5	QPSK	1	0	0	23.73	23.47
					1	2	0	23.12	22.86
					1	5	0	22.81	22.55
					3	0	1	22.81	22.55
					3	2	1	22.40	22.14
					3	3	1	22.29	22.03
					6	0	2	21.75	21.49
				16QAM	1	0	1	22.84	22.58
					1	2	1	22.25	21.99
					1	4	1	22.15	21.89
					3	0	2	21.82	21.56
					3	2	2	21.48	21.22
					3	3	2	21.34	21.08
					5	0	2	21.89	21.63
		20392	1754.2	QPSK	1	0	0	22.93	23.58
					1	2	0	22.99	23.64
					1	5	0	22.85	23.50
					3	0	1	22.04	22.69
					3	2	1	22.14	22.79
					3	3	1	21.95	22.60
					6	0	2	21.13	21.78
				16QAM	1	0	1	22.16	22.81
					1	2	1	22.03	22.68
					1	4	1	22.08	22.73
					3	0	2	21.33	21.98
					3	2	2	21.21	21.86
					3	3	2	20.98	21.63
					5	0	2	21.10	21.75

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	E.I.R.P. Power (dBm)
Band 4	3M	19965	1711.5	QPSK	1	0	0	23.22	22.06
					1	2	0	23.18	22.02
					1	5	0	22.71	21.55
					3	0	1	22.47	21.31
					3	2	1	22.34	21.18
					3	3	1	21.90	20.74
					6	0	2	21.52	20.36
				16QAM	1	0	1	22.48	21.32
					1	2	1	22.20	21.04
					1	4	1	22.14	20.98
					3	0	2	21.57	20.41
					3	2	2	21.20	20.04
					3	3	2	21.23	20.07
					5	0	2	21.44	20.28
		20175	1732.5	QPSK	1	0	0	23.54	23.28
					1	2	0	23.12	22.86
					1	5	0	22.93	22.67
					3	0	1	22.68	22.42
					3	2	1	22.37	22.11
					3	3	1	22.23	21.97
					6	0	2	21.91	21.65
				16QAM	1	0	1	22.88	22.62
					1	2	1	22.37	22.11
					1	4	1	21.99	21.73
					3	0	2	21.91	21.65
					3	2	2	21.43	21.17
					3	3	2	21.11	20.85
					5	0	2	21.77	21.51
		20384	1753.4	QPSK	1	0	0	22.95	23.60
					1	2	0	22.98	23.63
					1	5	0	22.64	23.29
					3	0	1	22.16	22.81
					3	2	1	22.16	22.81
					3	3	1	21.93	22.58
					6	0	2	21.08	21.73
				16QAM	1	0	1	22.09	22.74
					1	2	1	22.05	22.70
					1	4	1	21.85	22.50
					3	0	2	21.19	21.84
					3	2	2	21.00	21.65
					3	3	2	21.02	21.67
					5	0	2	21.15	21.80

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	E.I.R.P. Power (dBm)
Band 4	5M	19975	1712.5	QPSK	1	0	0	23.22	22.06
					1	2	0	22.94	21.78
					1	5	0	22.87	21.71
					3	0	1	22.65	21.49
					3	2	1	22.32	21.16
					3	3	1	22.10	20.94
					6	0	1	22.51	21.35
				16QAM	1	0	0	22.89	21.73
					1	2	0	22.79	21.63
					1	4	0	22.64	21.48
					3	0	1	22.41	21.25
					3	2	1	22.13	20.97
					3	3	1	22.15	20.99
					5	0	2	21.55	20.39
		20175	1732.5	QPSK	1	0	0	23.54	23.28
					1	2	0	23.15	22.89
					1	5	0	22.81	22.55
					3	0	1	22.93	22.67
					3	2	1	22.48	22.22
					3	3	1	22.27	22.01
					6	0	1	22.69	22.43
				16QAM	1	0	0	23.18	22.92
					1	2	0	22.80	22.54
					1	4	0	22.50	22.24
					3	0	1	22.77	22.51
					3	2	1	22.44	22.18
					3	3	1	22.10	21.84
					5	0	2	21.60	21.34
		20375	1752.5	QPSK	1	0	0	22.92	23.57
					1	2	0	22.96	23.61
					1	5	0	22.89	23.54
					3	0	1	22.08	22.73
					3	2	1	22.04	22.69
					3	3	1	21.95	22.60
					6	0	1	22.04	22.69
				16QAM	1	0	0	22.74	23.39
					1	2	0	22.53	23.18
					1	4	0	22.27	22.92
					3	0	1	22.13	22.78
					3	2	1	22.03	22.68
					3	3	1	22.01	22.66
					5	0	2	21.33	21.98

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	E.I.R.P. Power (dBm)
Band 4	10M	20000	1715.0	QPSK	1	0	0	23.35	22.19
					1	2	0	22.99	21.83
					1	5	0	22.90	21.74
					3	0	0	23.04	21.88
					3	2	0	22.84	21.68
					3	3	0	22.34	21.18
					6	0	1	22.43	21.27
				16QAM	1	0	0	22.86	21.70
					1	2	0	22.70	21.54
					1	4	0	22.62	21.46
					3	0	0	22.86	21.70
					3	2	0	22.68	21.52
					3	3	0	22.53	21.37
					5	0	1	22.45	21.29
		20175	1732.5	QPSK	1	0	0	23.51	23.25
					1	2	0	23.14	22.88
					1	5	0	23.04	22.78
					3	0	0	23.30	23.04
					3	2	0	22.65	22.39
					3	3	0	22.71	22.45
					6	0	1	22.75	22.49
				16QAM	1	0	0	23.35	23.09
					1	2	0	22.66	22.40
					1	4	0	22.69	22.43
					3	0	0	23.39	23.13
					3	2	0	23.02	22.76
					3	3	0	22.58	22.32
					5	0	1	22.72	22.46
		20350	1750.0	QPSK	1	0	0	22.92	23.57
					1	2	0	22.94	23.59
					1	5	0	22.89	23.54
					3	0	0	22.57	23.22
					3	2	0	22.72	23.37
					3	3	0	22.45	23.10
					6	0	1	22.16	22.81
				16QAM	1	0	0	22.76	23.41
					1	2	0	22.49	23.14
					1	4	0	22.48	23.13
					3	0	0	22.57	23.22
					3	2	0	22.64	23.29
					3	3	0	22.41	23.06
					5	0	1	22.26	22.91

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	E.I.R.P. Power (dBm)
Band 4	15M	20025	1717.5	QPSK	1	0	0	23.52	22.36
					1	2	0	22.96	21.80
					1	5	0	23.06	21.90
					3	0	0	22.95	21.79
					3	2	0	22.58	21.42
					3	3	0	22.68	21.52
					6	0	0	23.01	21.85
				16QAM	1	0	0	22.85	21.69
					1	2	0	22.77	21.61
					1	4	0	22.59	21.43
					3	0	0	22.79	21.63
					3	2	0	22.64	21.48
					3	3	0	22.55	21.39
					5	0	0	22.37	21.21
		20175	1732.5	QPSK	1	0	0	23.74	23.48
					1	2	0	23.04	22.78
					1	5	0	23.12	22.86
					3	0	0	23.28	23.02
					3	2	0	22.91	22.65
					3	3	0	22.74	22.48
					6	0	0	23.42	23.16
				16QAM	1	0	0	23.18	22.92
					1	2	0	22.72	22.46
					1	4	0	22.73	22.47
					3	0	0	23.49	23.23
					3	2	0	22.72	22.46
					3	3	0	22.68	22.42
					5	0	0	22.59	22.33
		20325	1747.5	QPSK	1	0	0	22.88	23.53
					1	2	0	23.05	23.70
					1	5	0	22.77	23.42
					3	0	0	22.79	23.44
					3	2	0	22.60	23.25
					3	3	0	22.62	23.27
					6	0	0	22.57	23.22
				16QAM	1	0	0	22.86	23.51
					1	2	0	22.43	23.08
					1	4	0	22.61	23.26
					3	0	0	22.53	23.18
					3	2	0	22.36	23.01
					3	3	0	22.50	23.15
					5	0	0	22.34	22.99

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	E.I.R.P. Power (dBm)
Band 4	20M	20050	1720.0	QPSK	1	0	0	23.32	22.16
					1	2	0	23.08	21.92
					1	5	0	23.15	21.99
					3	0	0	22.97	21.81
					3	2	0	22.67	21.51
					3	3	0	22.55	21.39
					6	0	0	22.96	21.80
				16QAM	1	0	0	23.05	21.89
					1	2	0	23.02	21.86
					1	4	0	22.57	21.41
					3	0	0	23.16	22.00
					3	2	0	22.82	21.66
					3	3	0	22.57	21.41
					5	0	0	22.50	21.34
		20175	1732.5	QPSK	1	0	0	23.89	23.63
					1	2	0	23.14	22.88
					1	5	0	23.15	22.89
					3	0	0	23.29	23.03
					3	2	0	22.82	22.56
					3	3	0	22.65	22.39
					6	0	0	23.26	23.00
				16QAM	1	0	0	23.42	23.16
					1	2	0	22.77	22.51
					1	4	0	22.66	22.40
					3	0	0	23.54	23.28
					3	2	0	23.00	22.74
					3	3	0	22.77	22.51
					5	0	0	22.82	22.56
		20300	1745.0	QPSK	1	0	0	23.05	23.70
					1	2	0	22.87	23.52
					1	5	0	22.78	23.43
					3	0	0	22.69	23.34
					3	2	0	22.71	23.36
					3	3	0	22.67	23.32
					6	0	0	22.70	23.35
				16QAM	1	0	0	22.86	23.51
					1	2	0	22.71	23.36
					1	4	0	22.56	23.21
					3	0	0	22.62	23.27
					3	2	0	22.40	23.05
					3	3	0	22.29	22.94
					5	0	0	22.49	23.14

8.2 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 8821 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**Temperature:** 22.3°C**Humidity:** 57% RH**Tested by:** Dally Hong**Test Date:** January 28, 2021**FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:
LTE Band 4**

Band4_10M_QPSK_Full RB												
Channel	20000	20175	20350	20000	20175	20350	20000	20175	20350	20000	20175	20350
Frequency (MHz)	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750
Test Time	0 Minutes			2 Minutes			5 Minutes			10 Minutes		
Temperature	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation
(°C)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
-20	-4.8	7.5	5.5	-5.7	8.3	4.1	-5.2	8.9	2.8	-8.7	9.6	3.4
-10	-5.7	8.5	2.2	-5.4	5.4	2.6	-5.9	6.3	2.5	-7.1	8.1	4.9
0	-5.3	5.2	-3.6	-4.6	6.7	-3.2	-4.3	5.8	4.6	-6.3	7.5	5.3
10	-6.2	6.4	-4.0	-8.4	5.5	-3.3	-9.0	4.7	-2.2	-10.1	6.8	-4.5
20	-5.8	6.0	-5.2	-9.1	5.2	3.7	-6.5	4.4	-3.3	-7.2	4.2	-2.8
30	-6.9	4.9	-3.3	-9.7	6.2	3.3	-8.3	6.5	-3.0	-5.8	5.6	-3.9
40	-5.0	7.5	-2.7	-10.0	5.1	-3.7	-6.3	6.6	-3.1	-7.4	4.5	-3.4
50	-8.7	5.0	-3.0	-9.3	4.7	-4.1	-9.5	7.0	-3.0	-8.4	7.7	-4.3

Band4_10M_QPSK_Full RB													
Channel	20000	20175	20350	20000	20175	20350	20000	20175	20350	20000	20175	20350	
Frequency (MHz)	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750	
Test Time	0 Minutes			2 Minutes			5 Minutes			10 Minutes			
Temperature	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Limit
(°C)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
-20	-0.003	0.004	0.003	-0.003	0.005	0.002	-0.003	0.005	0.002	-0.005	0.006	0.002	0.1
-10	-0.003	0.005	0.001	-0.003	0.003	0.001	-0.003	0.004	0.001	-0.004	0.005	0.003	0.1
0	-0.003	0.003	-0.002	-0.003	0.004	-0.002	-0.003	0.003	0.003	-0.004	0.004	0.003	0.1
10	-0.004	0.004	-0.002	-0.005	0.003	-0.002	-0.005	0.003	-0.001	-0.006	0.004	-0.003	0.1
20	-0.003	0.003	-0.003	-0.005	0.003	0.002	-0.004	0.003	-0.002	-0.004	0.002	-0.002	0.1
30	-0.004	0.003	-0.002	-0.006	0.004	0.002	-0.005	0.004	-0.002	-0.003	0.003	-0.002	0.1
40	-0.003	0.004	-0.002	-0.006	0.003	-0.002	-0.004	0.004	-0.002	-0.004	0.003	-0.002	0.1
50	-0.005	0.003	-0.002	-0.005	0.003	-0.002	-0.006	0.004	-0.002	-0.005	0.004	-0.002	0.1

Report No.: T201116W03-RP2

Temperature: 22.3°C

Humidity: 57% RH

Tested by: Dally Hong

Test Date: January 28, 2021

FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT: LTE Band 4

Band4_10M_QPSK_Full RB												
Channel	20000	20175	20350	20000	20175	20350	20000	20175	20350	20000	20175	20350
Frequency (MHz)	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750
Test Time	0 Minutes			2 Minutes			5 Minutes			10 Minutes		
Voltage	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation
[V]	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)	(Hz)
102	-6.8	5.0	-3.1	-9.5	6.3	3.4	-8.3	6.6	-2.9	-5.7	5.7	-3.7
120	-5.8	6.0	-5.2	-9.1	5.2	3.7	-6.5	4.4	-3.3	-7.2	4.2	-2.8
138	-6.7	5.0	-3.1	-9.5	6.5	3.5	-8.3	6.7	-2.8	-5.8	5.8	-3.7

Band4_10M_QPSK_Full RB													
Channel	20000	20175	20350	20000	20175	20350	20000	20175	20350	20000	20175	20350	
Frequency (MHz)	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750	1715	1732.5	1750	
Test Time	0 Minutes			2 Minutes			5 Minutes			10 Minutes			
Voltage	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Deviation	Limit
[V]	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
102	-0.004	0.003	-0.002	-0.006	0.004	0.002	-0.005	0.004	-0.002	-0.003	0.003	-0.002	0.1
120	-0.003	0.003	-0.003	-0.005	0.003	0.002	-0.004	0.003	-0.002	-0.004	0.002	-0.002	0.1
138	-0.004	0.003	-0.002	-0.006	0.004	0.002	-0.005	0.004	-0.002	-0.003	0.003	-0.002	0.1



Report No.: T201116W03-RP2

Page: 25 / 134

Rev.: 01

8.3 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 Power Meas License Digital Systems – Section 4.2

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

TEST RESULTS

Temperature: 22.3°C

Humidity: 57% RH

Tested by: Dally Hong

Test Date: January 28, 2021

Band 4 Channel Bandwidth 1.4MHz					
Frequency (MHz)	Channel	99%BW(MHz)		26dB BW(MHz)	
		QPSK	16QAM	QPSK	16QAM
1710.7	19957	1.10	0.93	1.32	1.12
1732.5	20175	1.10	0.93	1.32	1.13
1754.3	20393	1.10	0.93	1.30	1.13

Band 4 Channel Bandwidth 3MHz					
Frequency (MHz)	Channel	99%BW(MHz)		26dB BW(MHz)	
		QPSK	16QAM	QPSK	16QAM
1711.5	19965	1.19	1.03	1.75	1.35
1732.5	20175	1.19	1.03	1.63	1.33
1753.5	20385	1.18	1.03	1.68	1.33

Band 4 Channel Bandwidth 5MHz					
Frequency (MHz)	Channel	99%BW(MHz)		26dB BW(MHz)	
		QPSK	16QAM	QPSK	16QAM
1712.5	19975	1.71	1.06	1.55	1.32
1732.5	20175	1.73	1.06	1.53	1.35
1752.5	20375	1.75	1.06	1.65	1.30

Band 4 Channel Bandwidth 10MHz					
Frequency (MHz)	Channel	99%BW(MHz)		26dB BW(MHz)	
		QPSK	16QAM	QPSK	16QAM
1715	20000	1.56	1.24	3.01	2.03
1732.5	20175	1.53	1.24	3.04	2.06
1750	20350	1.59	1.19	3.01	2.00



Report No.: T201116W03-RP2

Page: 27 / 134

Rev.: 01

Band 4 Channel Bandwidth 15MHz					
Frequency (MHz)	Channel	99%BW(MHz)		26dB BW(MHz)	
		QPSK	16QAM	QPSK	16QAM
1717.5	20025	1.71	1.52	4.04	2.78
1732.5	20175	1.73	1.61	3.78	2.87
1747.5	20325	1.74	1.48	3.86	2.48

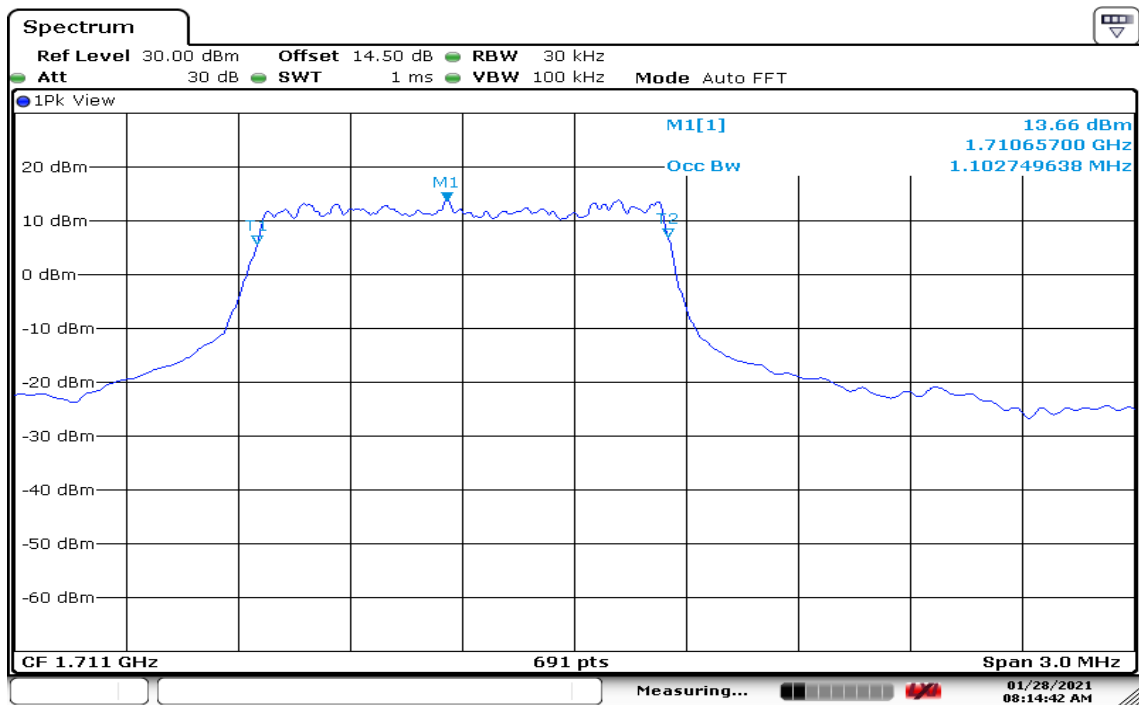
Band 4 Channel Bandwidth 20MHz					
Frequency (MHz)	Channel	99%BW(MHz)		26dB BW(MHz)	
		QPSK	16QAM	QPSK	16QAM
1720	20050	1.71	2.20	5.04	3.47
1732.5	20175	1.72	2.37	4.52	3.88
1745	20300	1.74	2.20	4.81	3.47

Report No.: T201116W03-RP2

LTE Band 4

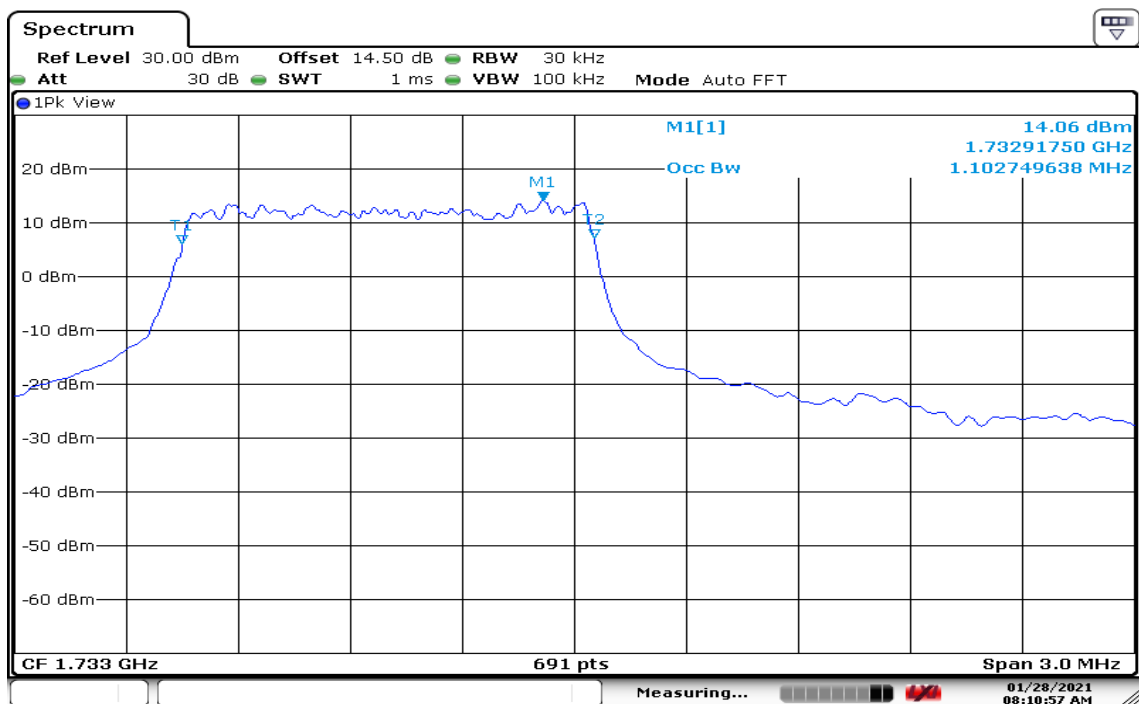
OBW (99%): 1.4MHz / QPSK

CH Low



Date: 28 JAN 2021 08:14:42

CH Mid



Date: 28 JAN 2021 08:10:57

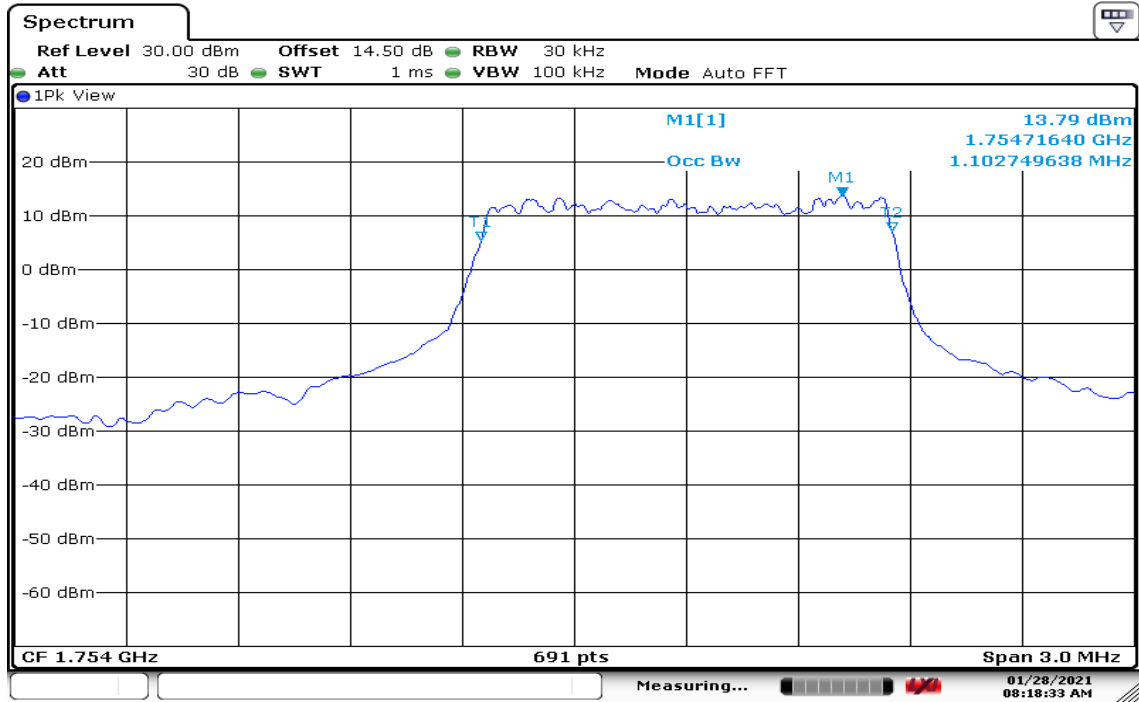


Report No.: T201116W03-RP2

Page: 29 / 134

Rev.: 01

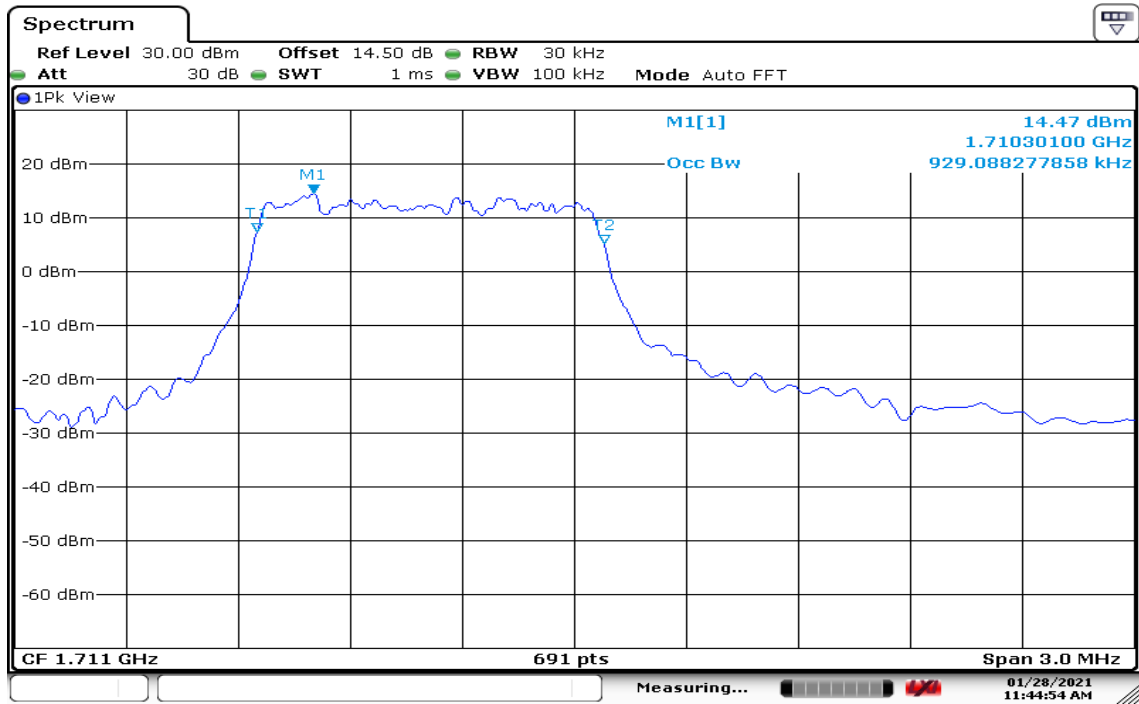
CH High



Date: 28 JAN 2021 08:18:33

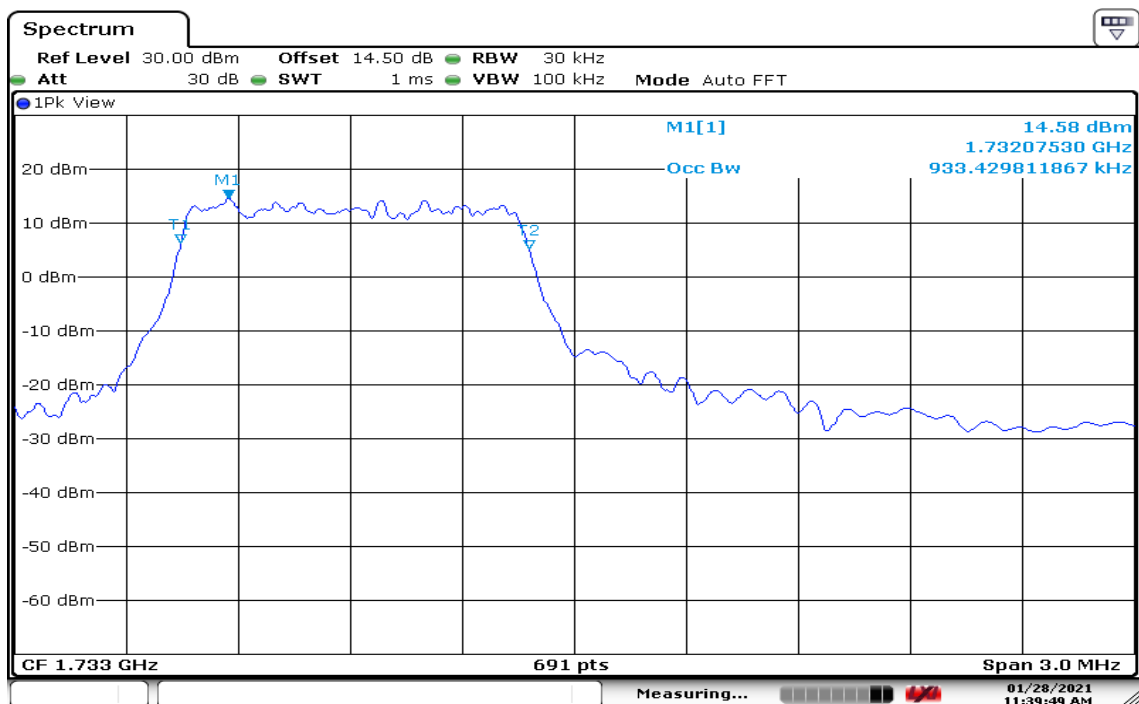
OBW (99%): 1.4MHz / 16QAM

CH Low



Date: 28 JAN 2021 11:44:54

CH Mid



Date: 28 JAN 2021 11:39:49

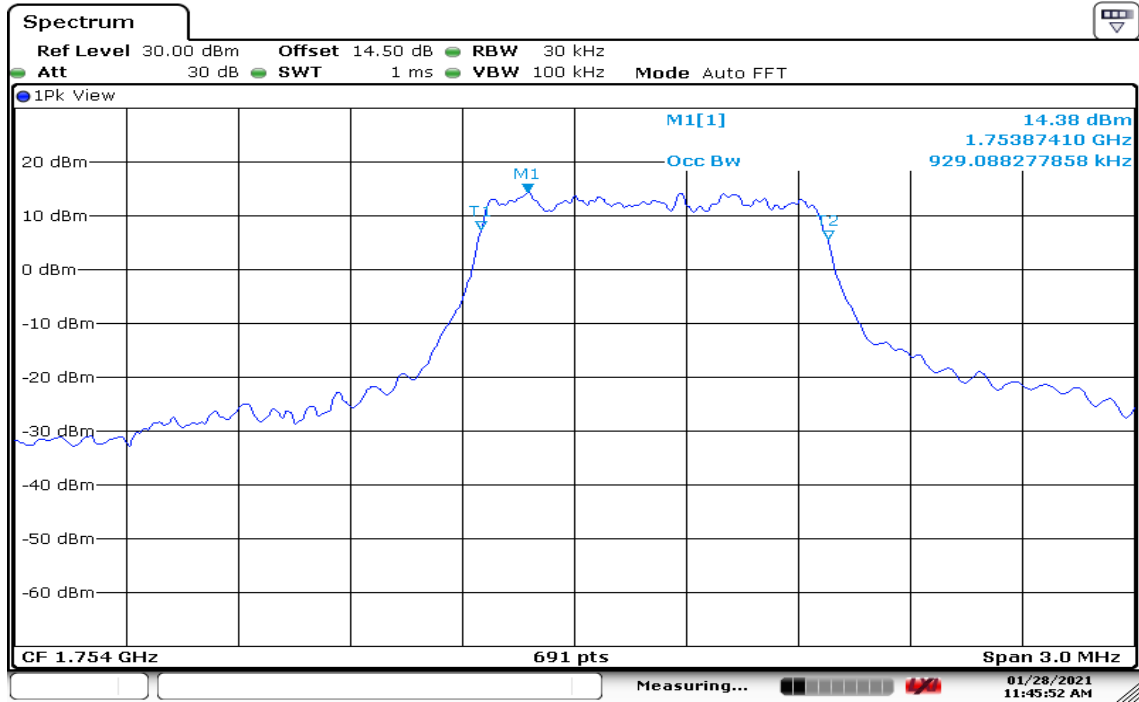


Report No.: T201116W03-RP2

Page: 31 / 134

Rev.: 01

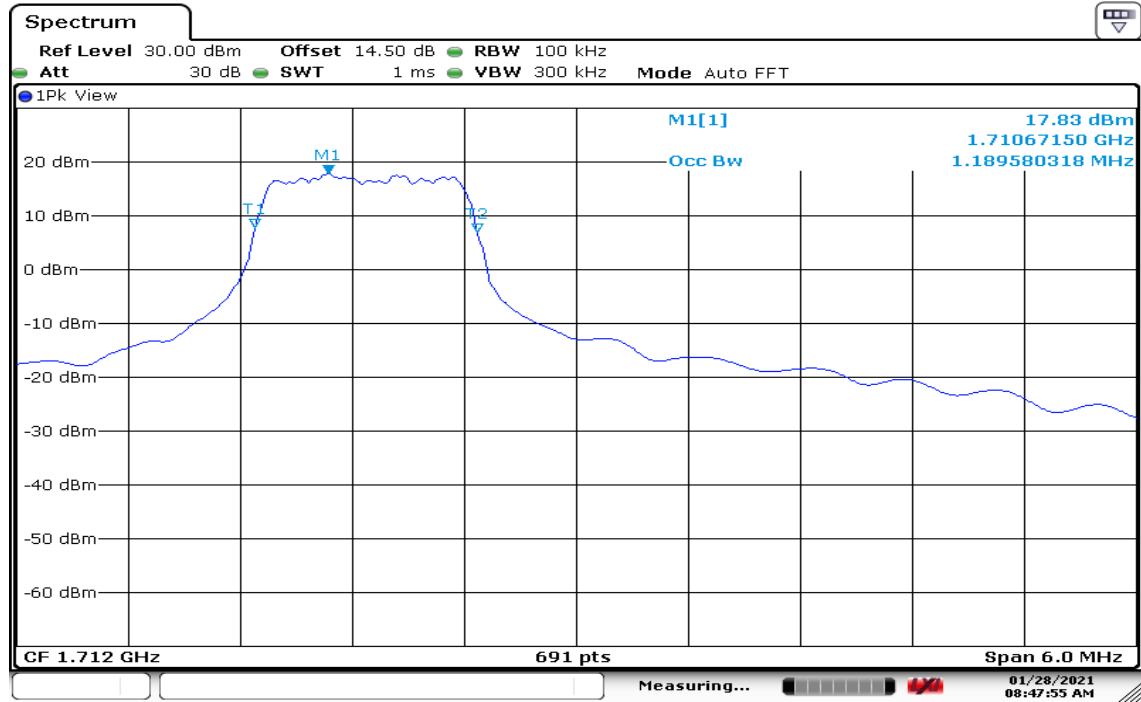
CH High



Date: 28 JAN 2021 11:45:52

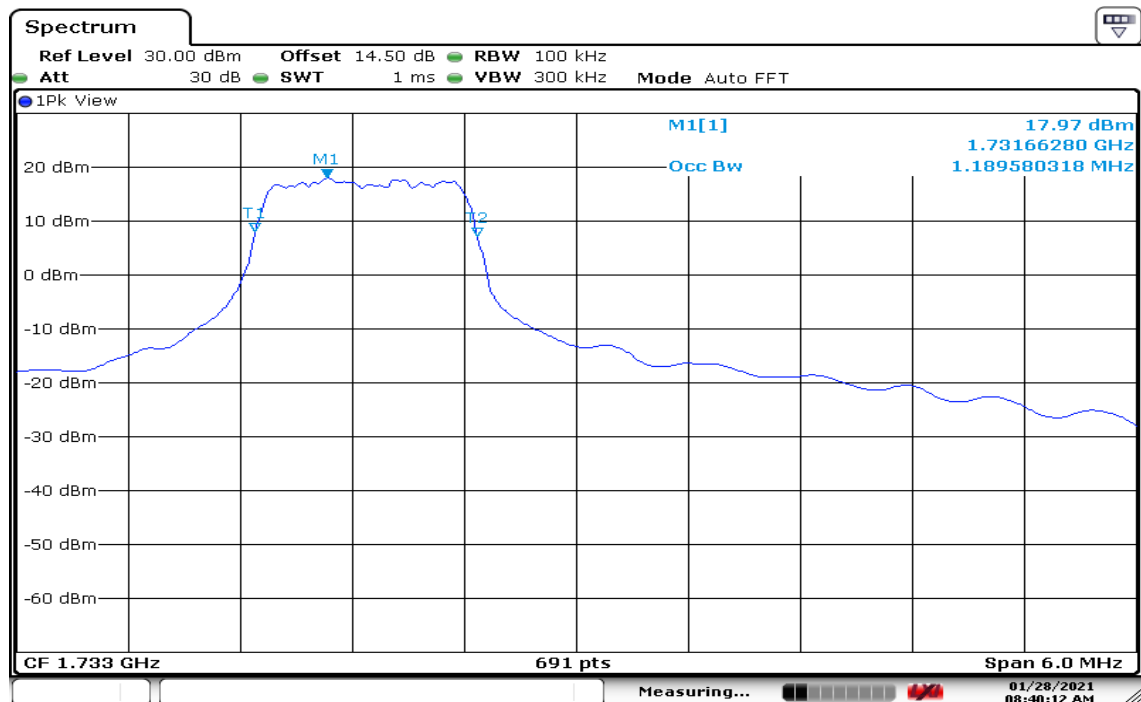
OBW (99%): 3MHz / QPSK

CH Low



Date: 28 JAN 2021 08:47:56

CH Mid



Date: 28 JAN 2021 08:40:12

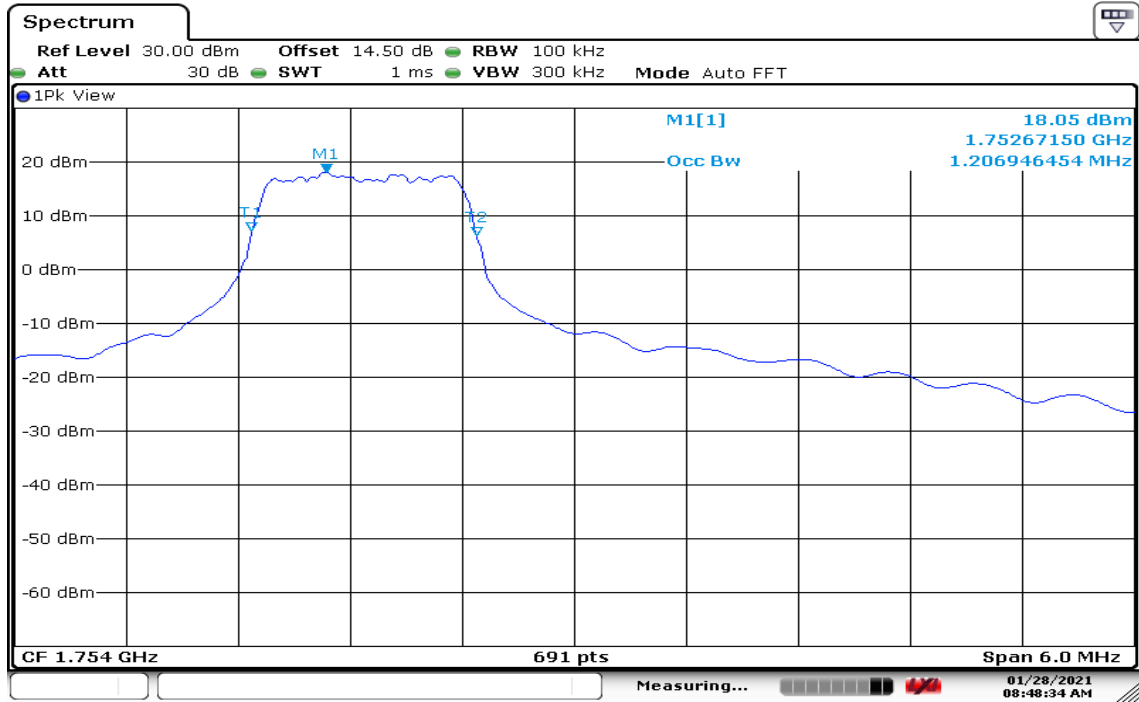


Report No.: T201116W03-RP2

Page: 33 / 134

Rev.: 01

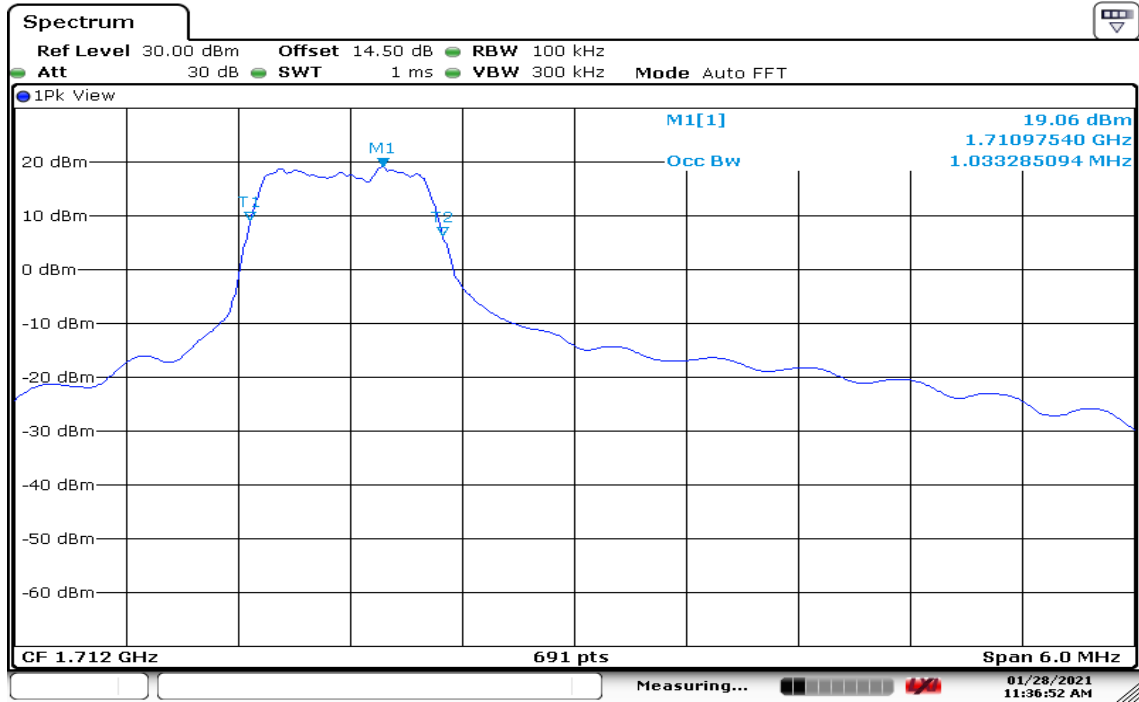
CH High



Date: 28 JAN 2021 08:48:35

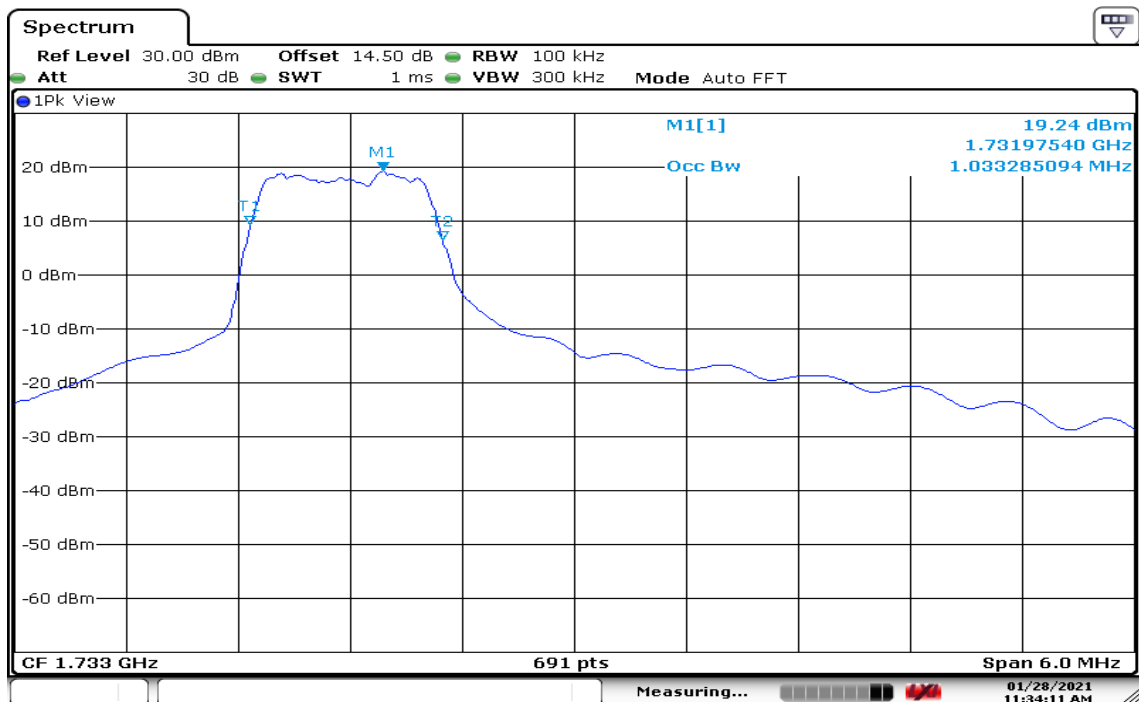
OBW (99%): 3MHz / 16QAM

CH Low



Date: 28 JAN 2021 11:36:53

CH Mid



Date: 28 JAN 2021 11:34:11

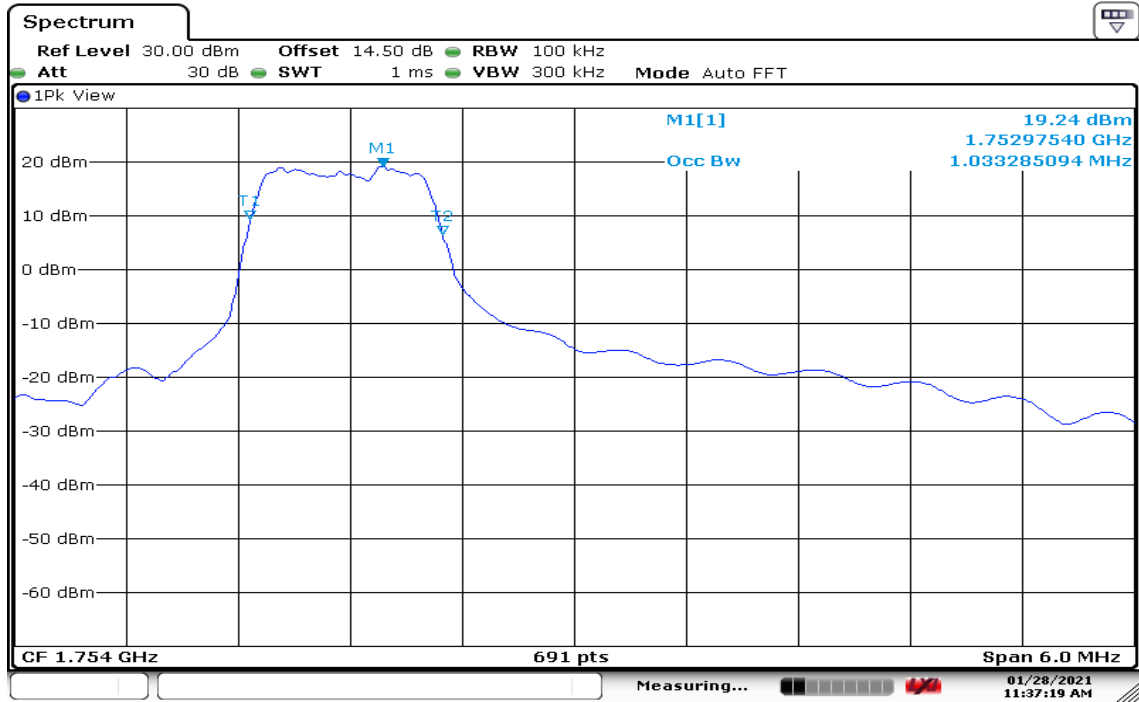


Report No.: T201116W03-RP2

Page: 35 / 134

Rev.: 01

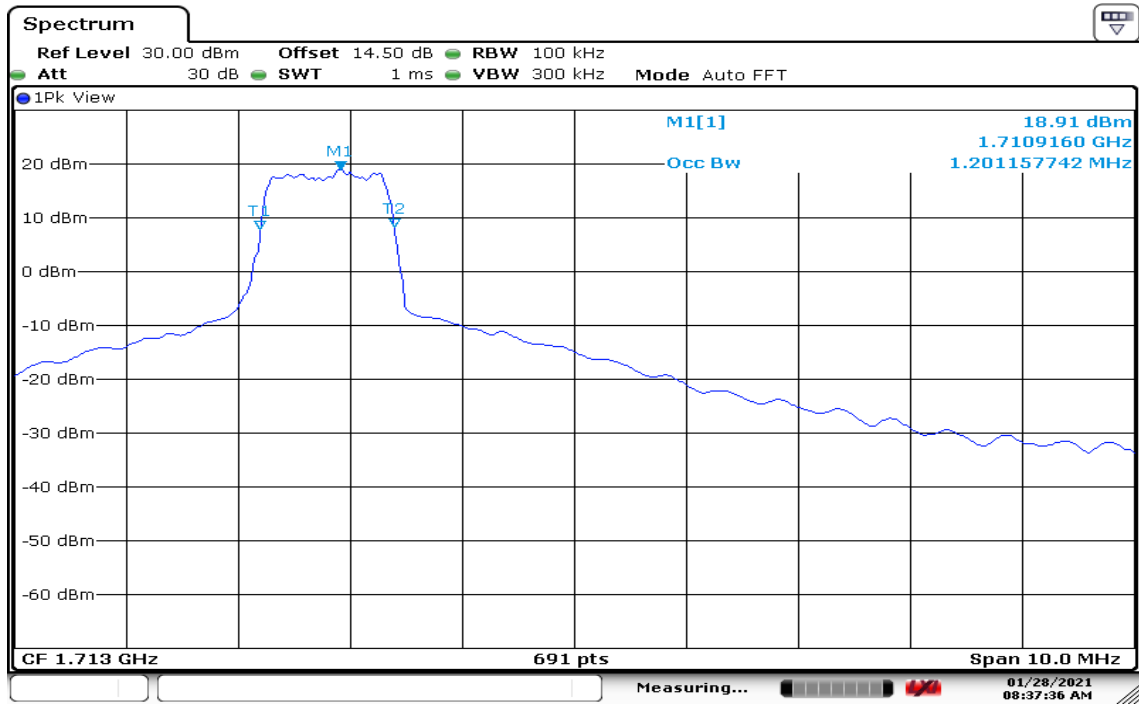
CH High



Date: 28 JAN 2021 11:37:19

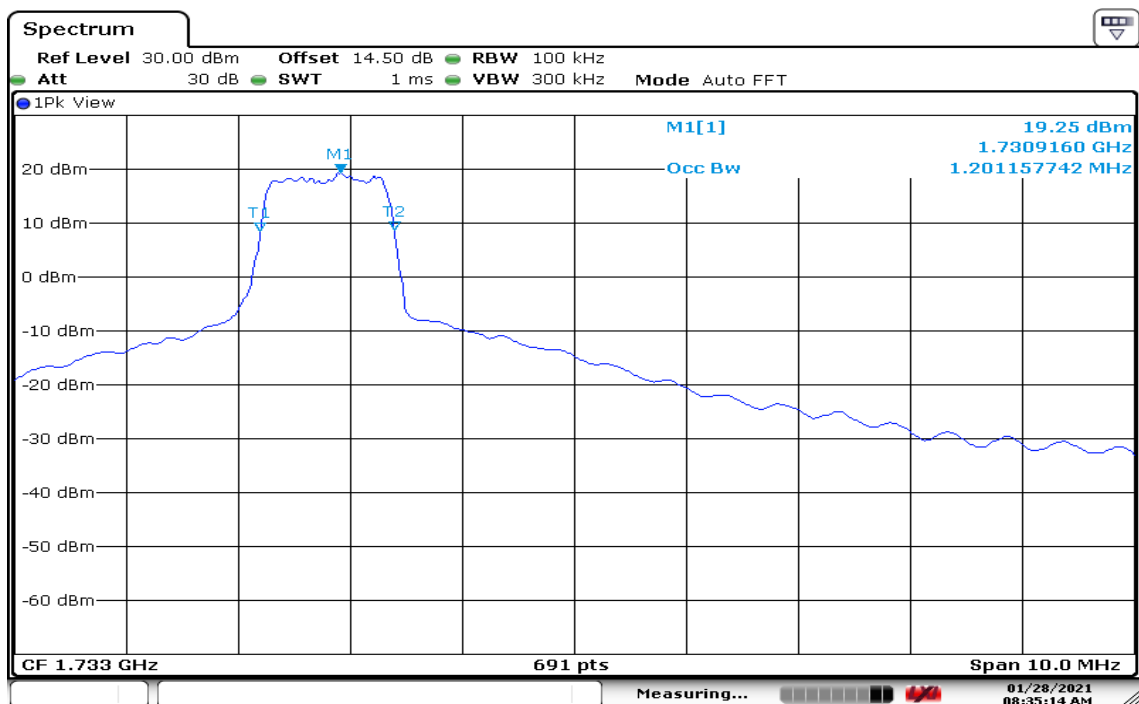
OBW (99%): 5MHz / QPSK

CH Low



Date: 28 JAN 2021 08:37:36

CH Mid



Date: 28 JAN 2021 08:35:14

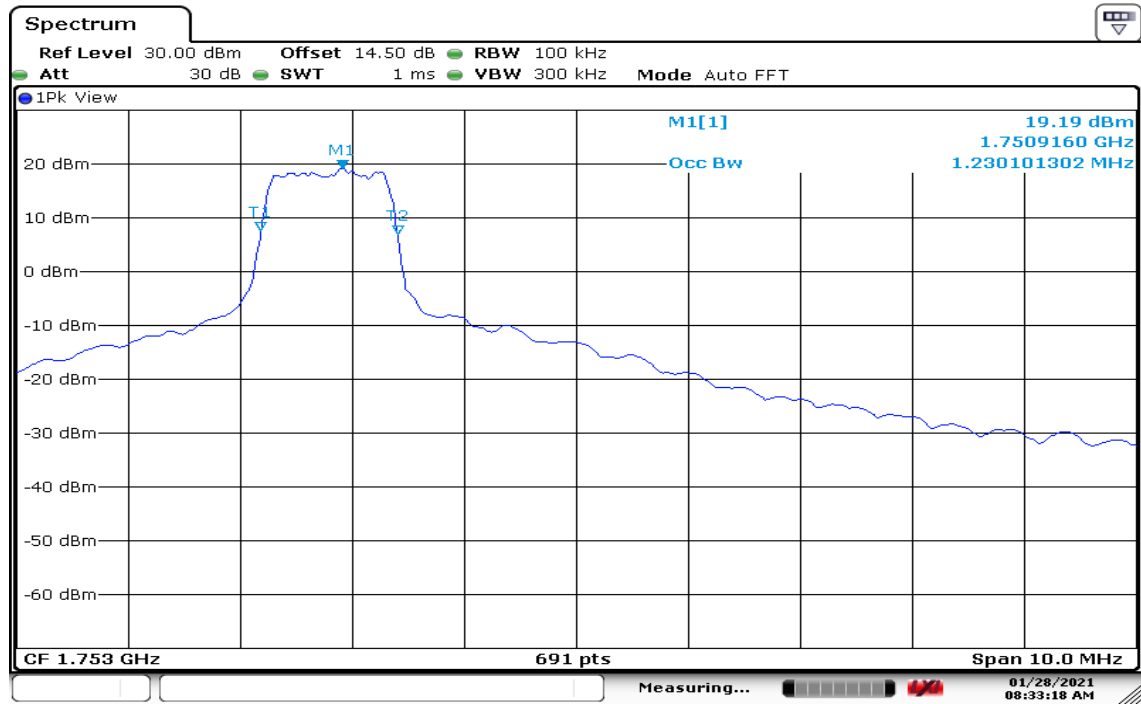


Report No.: T201116W03-RP2

Page: 37 / 134

Rev.: 01

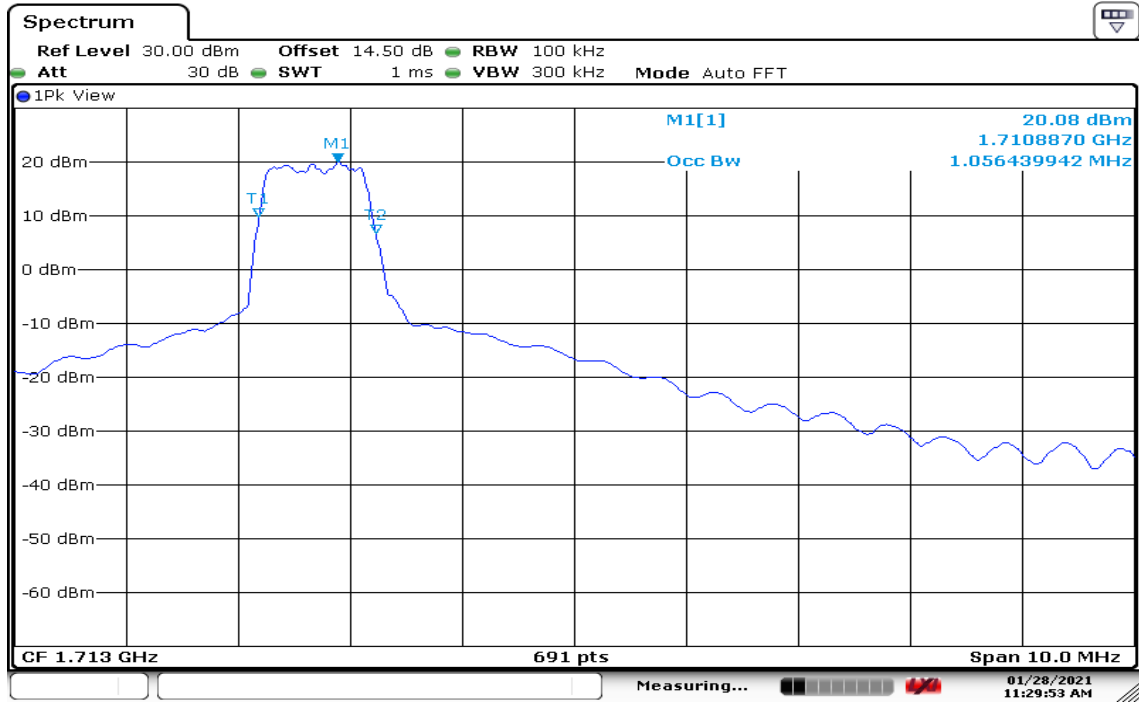
CH High



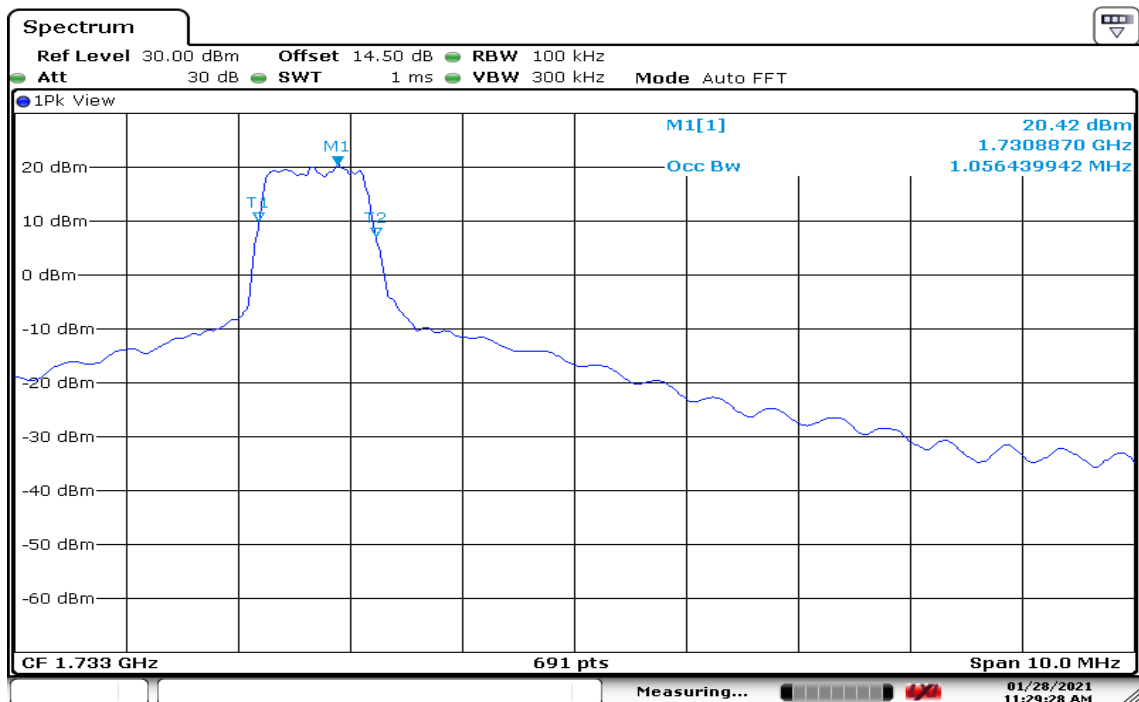
Date: 28 JAN 2021 08:33:18

OBW (99%): 5MHz / 16QAM

CH Low



CH Mid



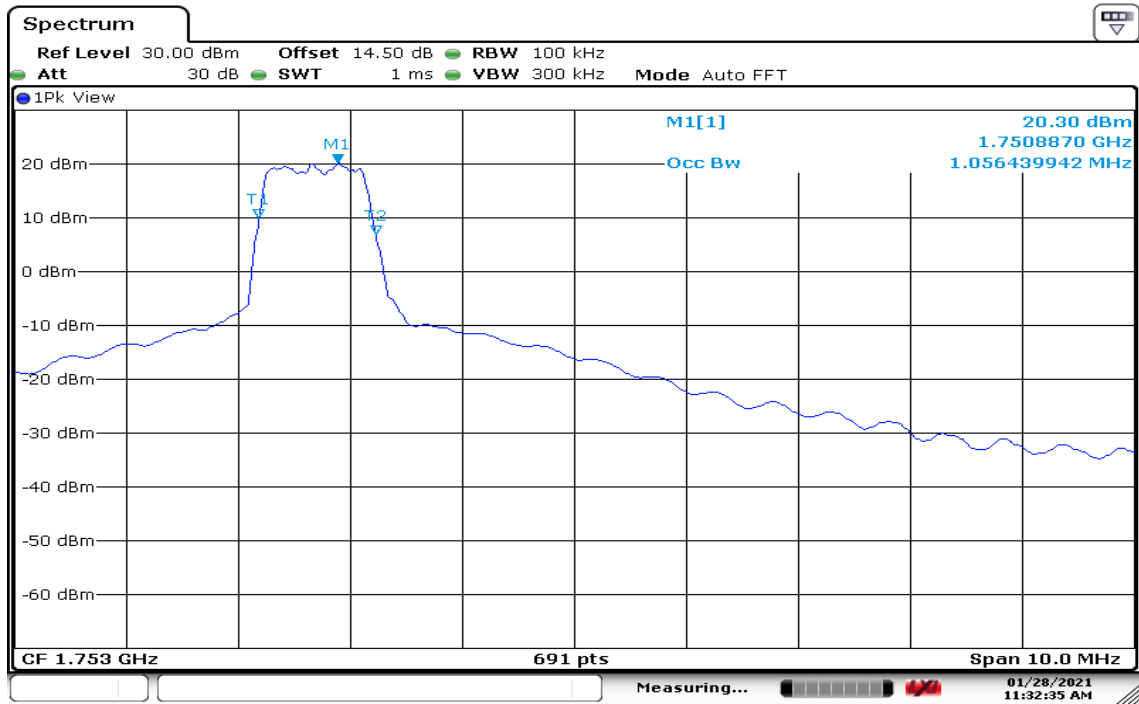


Report No.: T201116W03-RP2

Page: 39 / 134

Rev.: 01

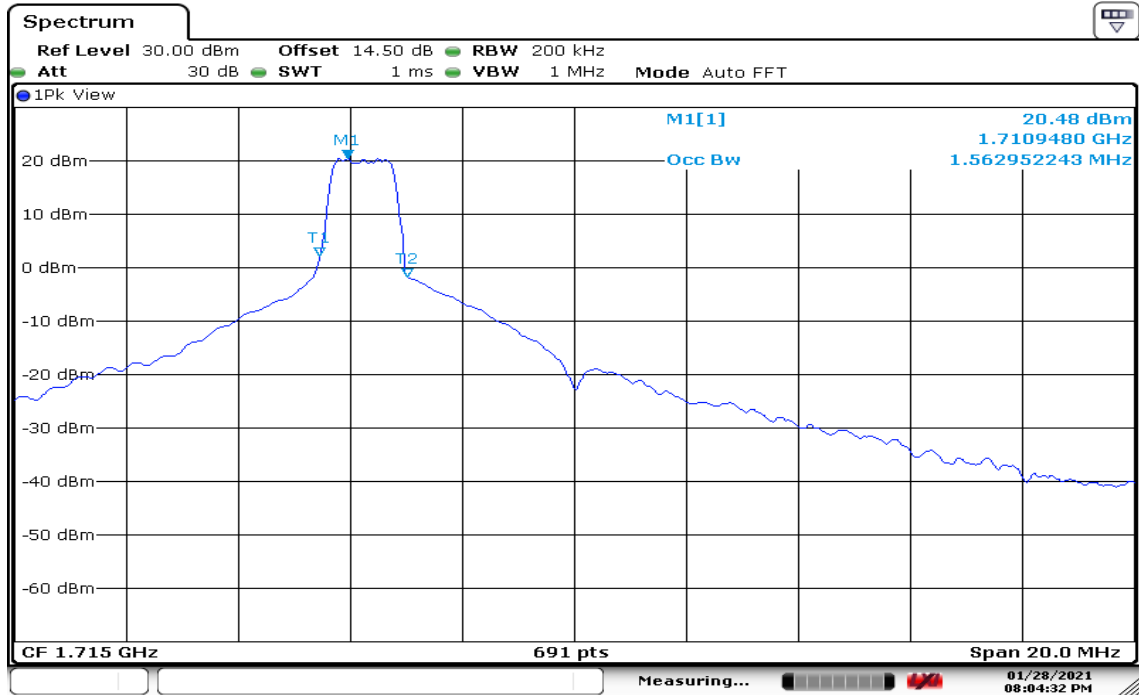
CH High



Date: 28 JAN 2021 11:32:35

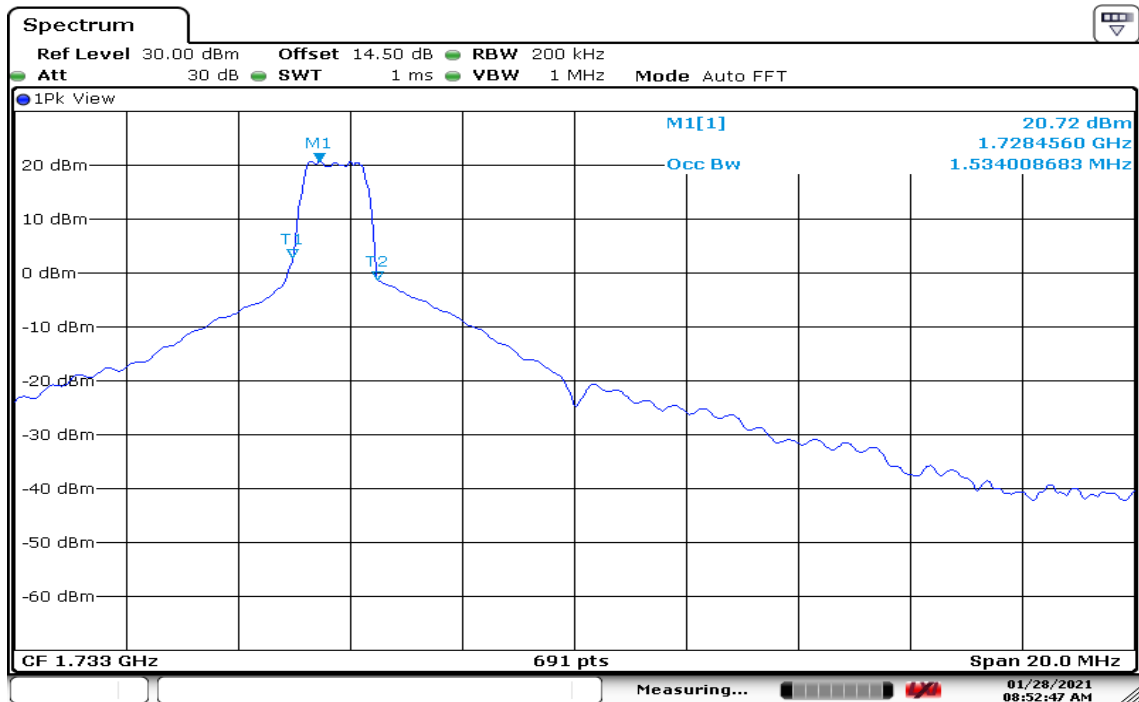
OBW (99%): 10MHz / QPSK

CH Low



Date: 28 JAN 2021 20:04:33

CH Mid



Date: 28 JAN 2021 08:52:48

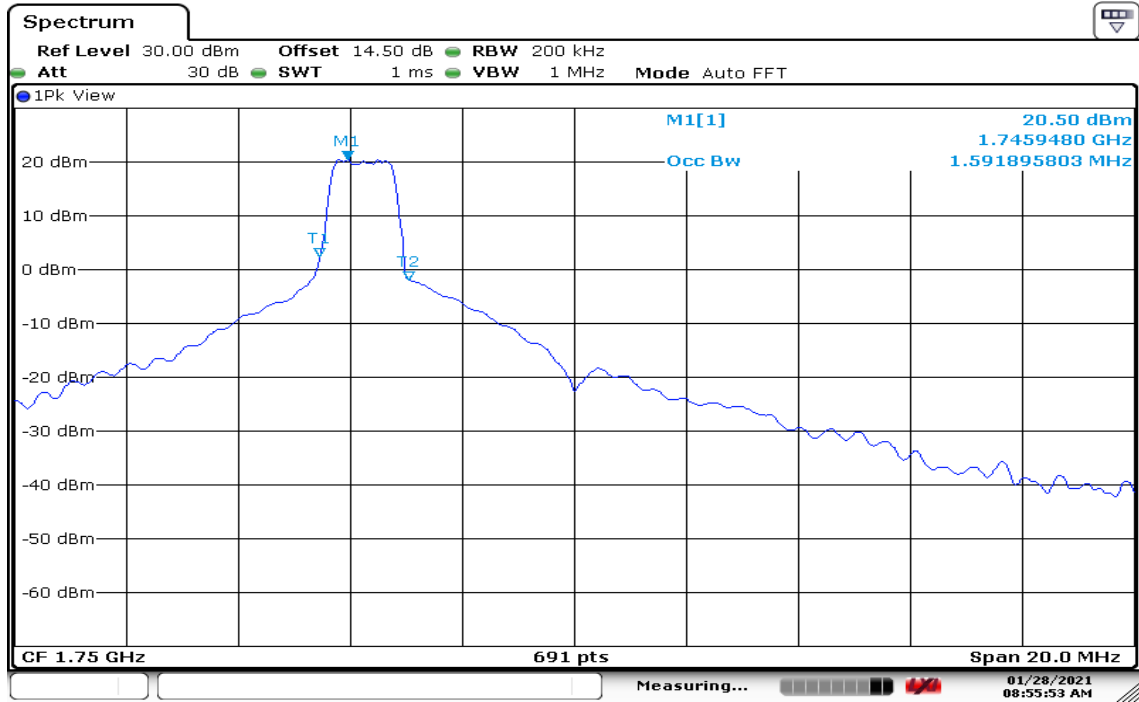


Report No.: T201116W03-RP2

Page: 41 / 134

Rev.: 01

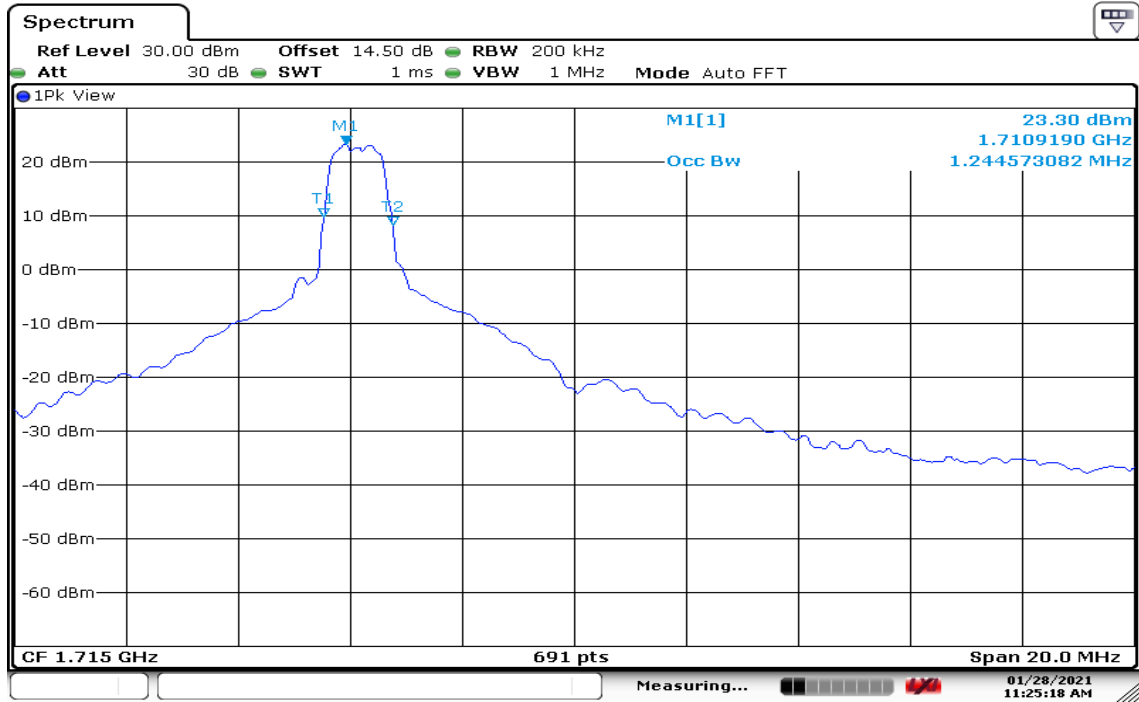
CH High



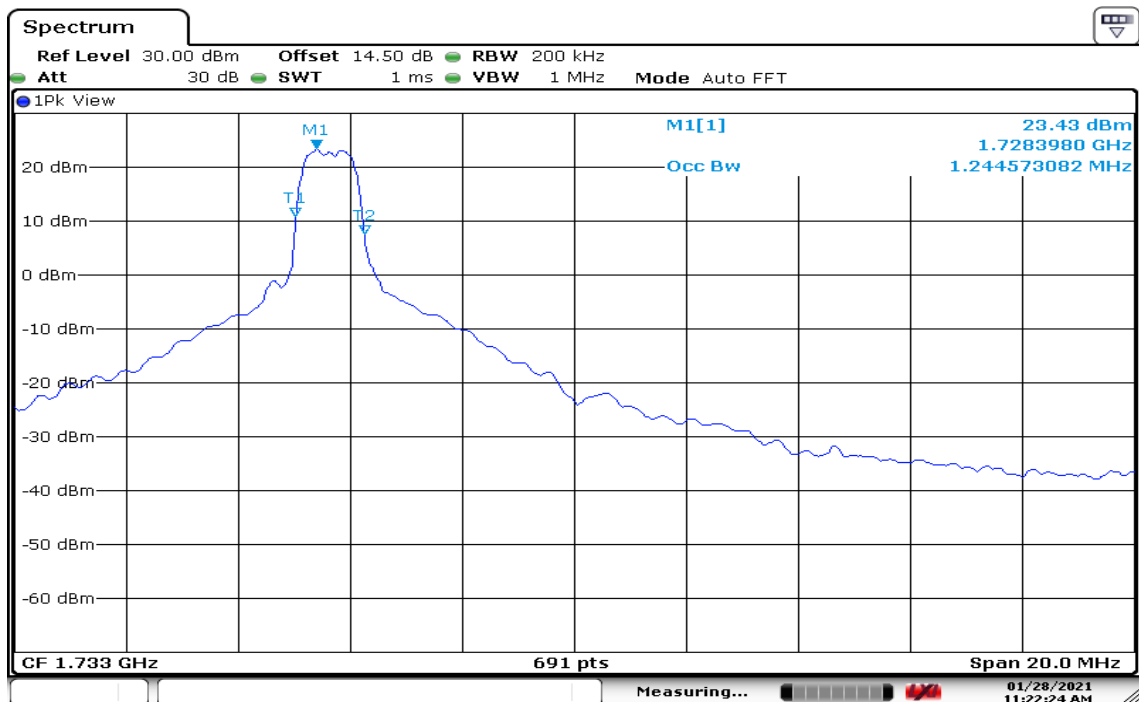
Date: 28 JAN 2021 08:55:53

OBW (99%): 10MHz / 16QAM

CH Low



CH Mid



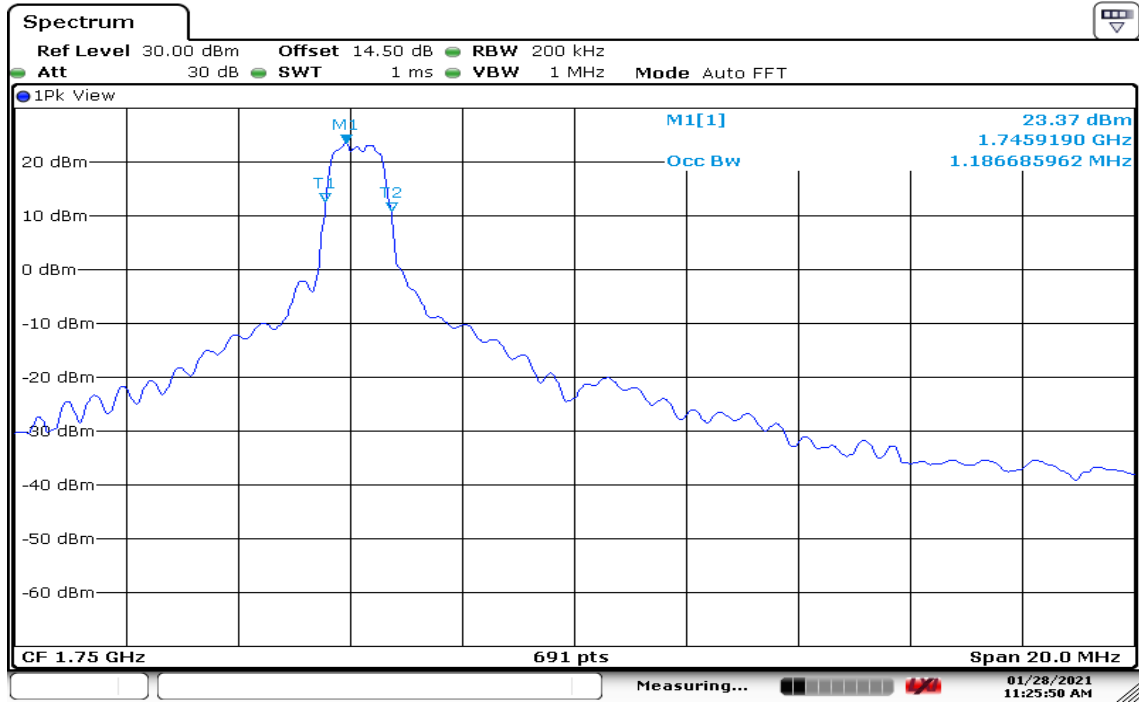


Report No.: T201116W03-RP2

Page: 43 / 134

Rev.: 01

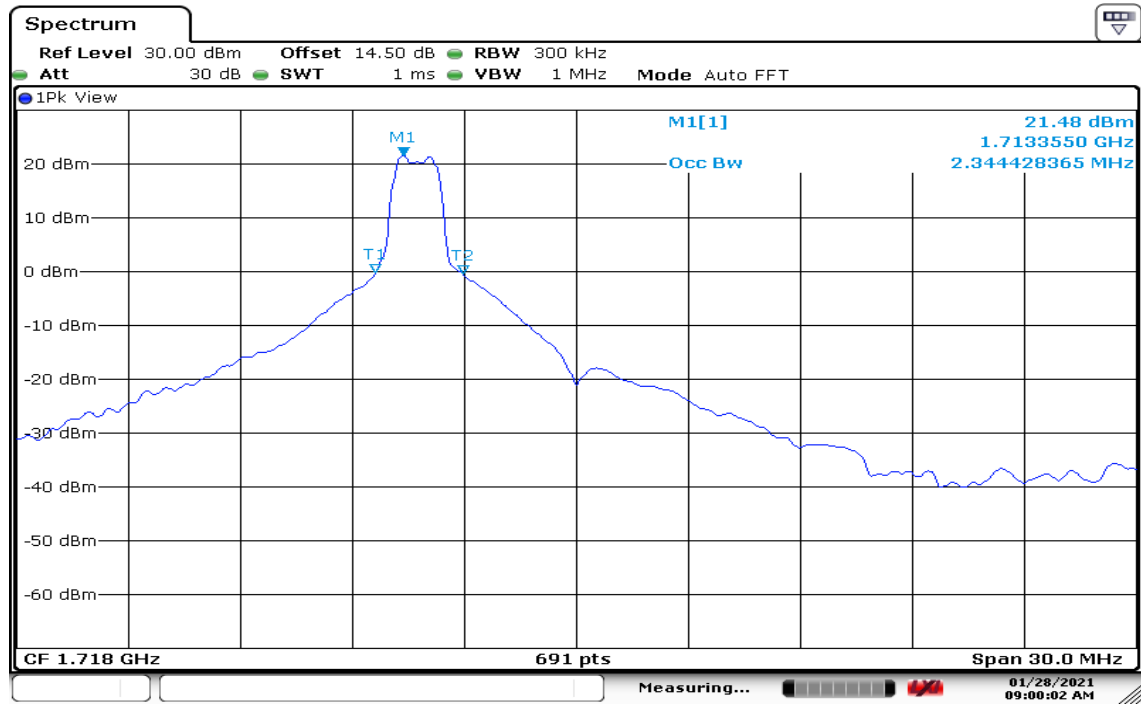
CH High



Date: 28 JAN 2021 11:25:51

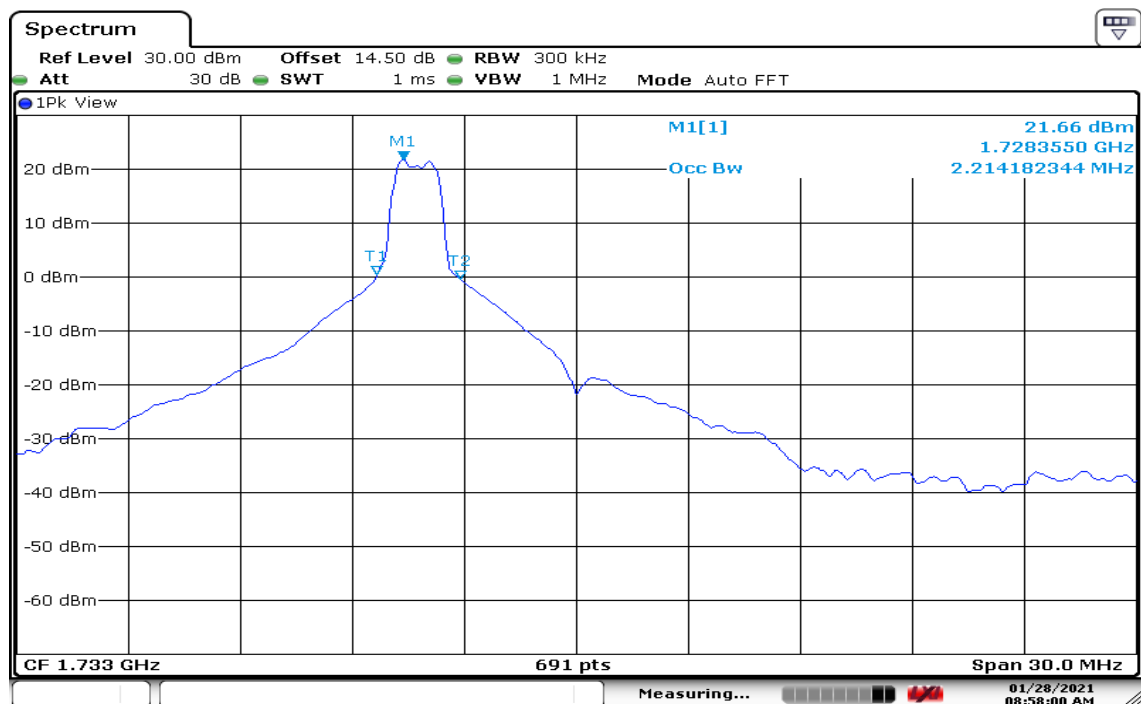
OBW (99%): 15MHz / QPSK

CH Low



Date: 28 JAN 2021 09:00:03

CH Mid



Date: 28 JAN 2021 08:58:00

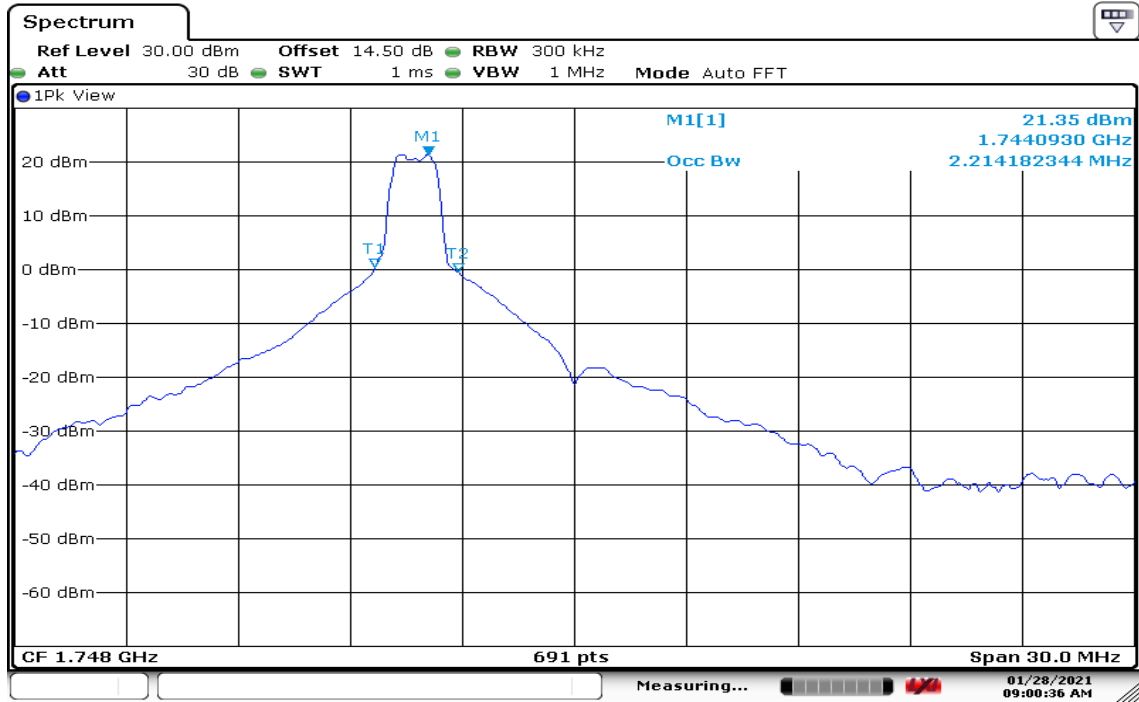


Report No.: T201116W03-RP2

Page: 45 / 134

Rev.: 01

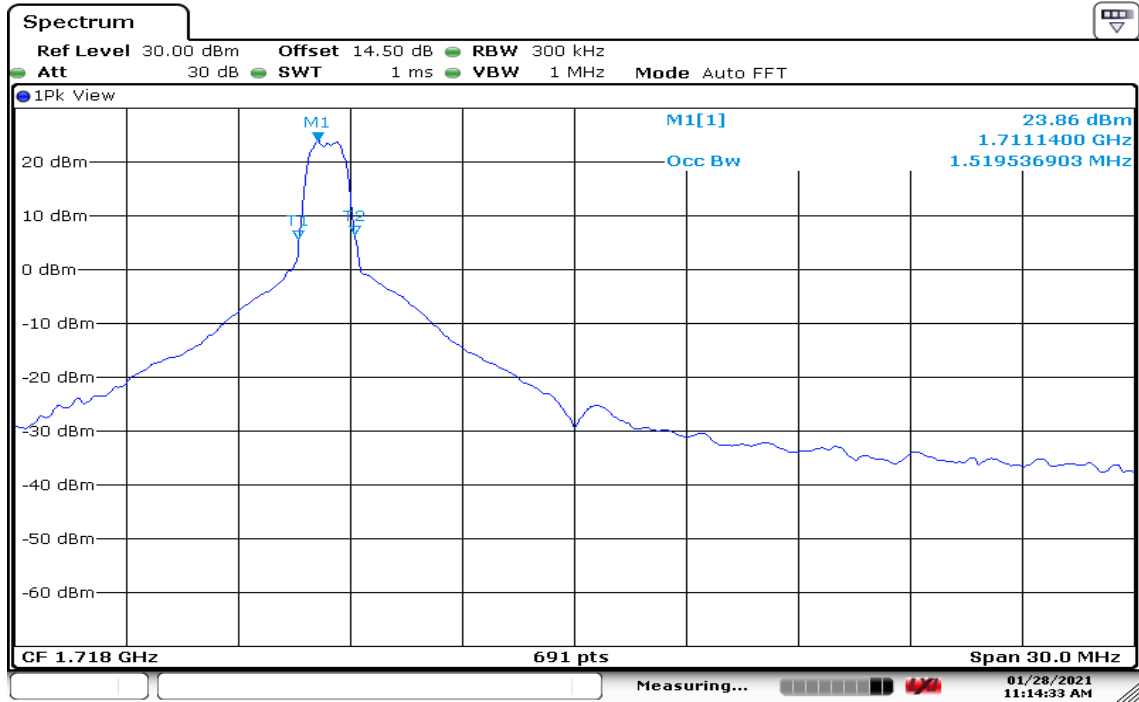
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Date: 28 JAN 2021 09:00:36

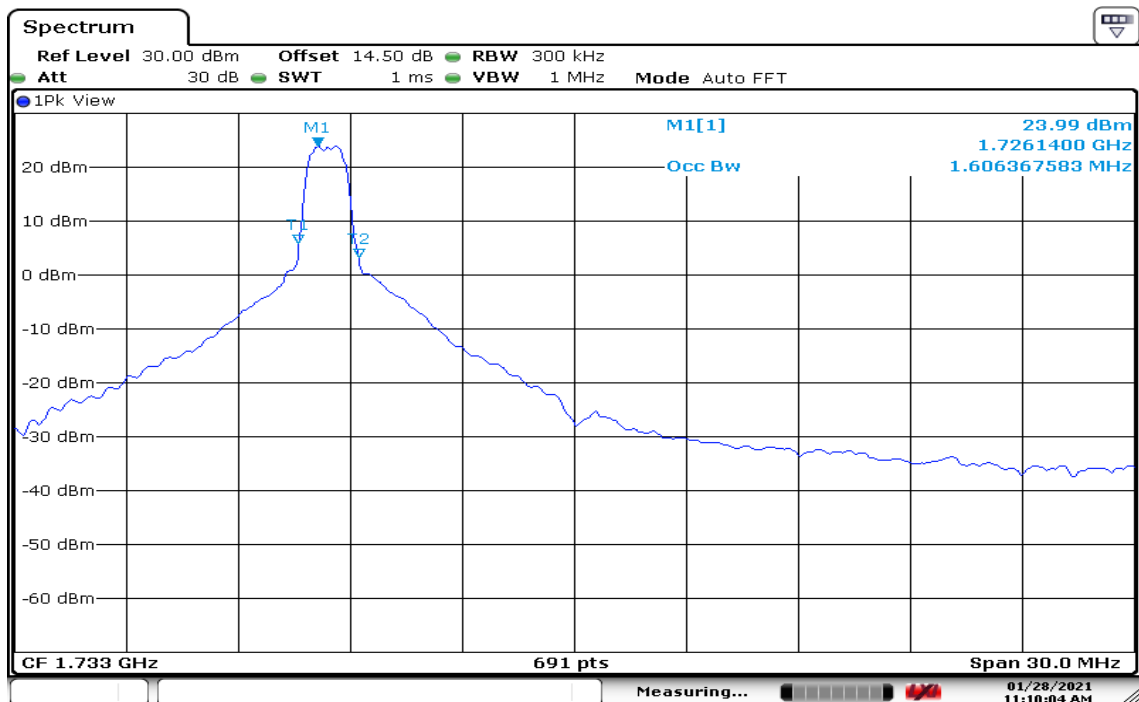
OBW (99%): 15MHz / 16QAM

CH Low



Date: 28 JAN 2021 11:14:34

CH Mid



Date: 28 JAN 2021 11:10:04

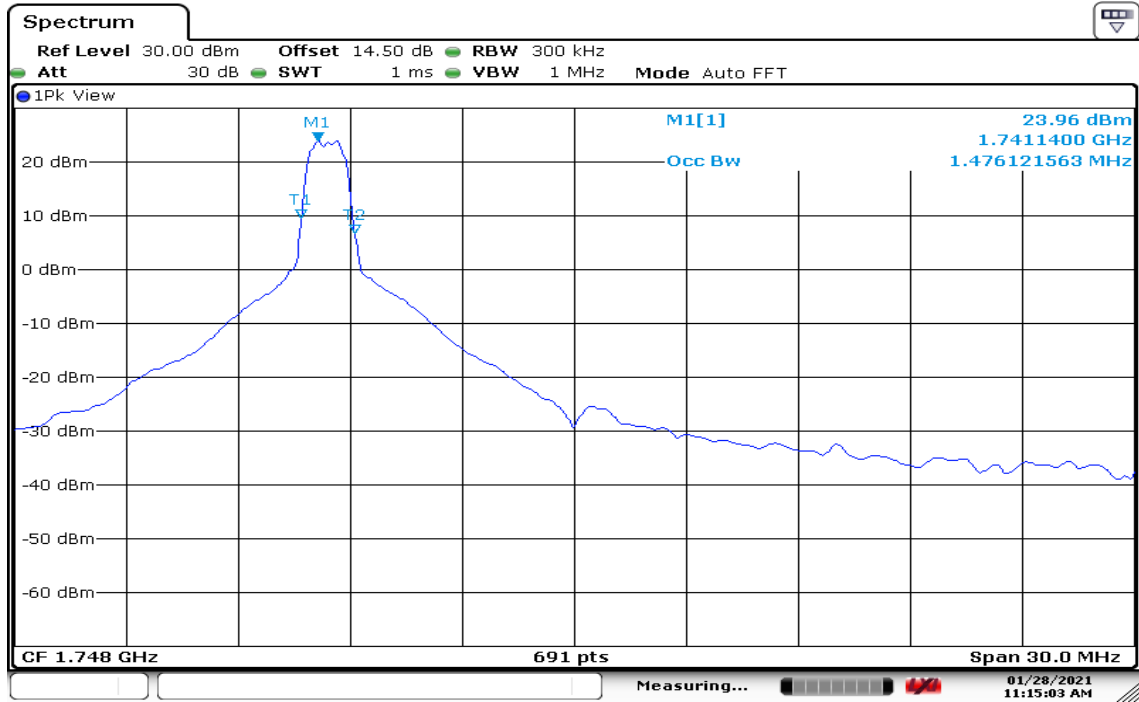


Report No.: T201116W03-RP2

Page: 47 / 134

Rev.: 01

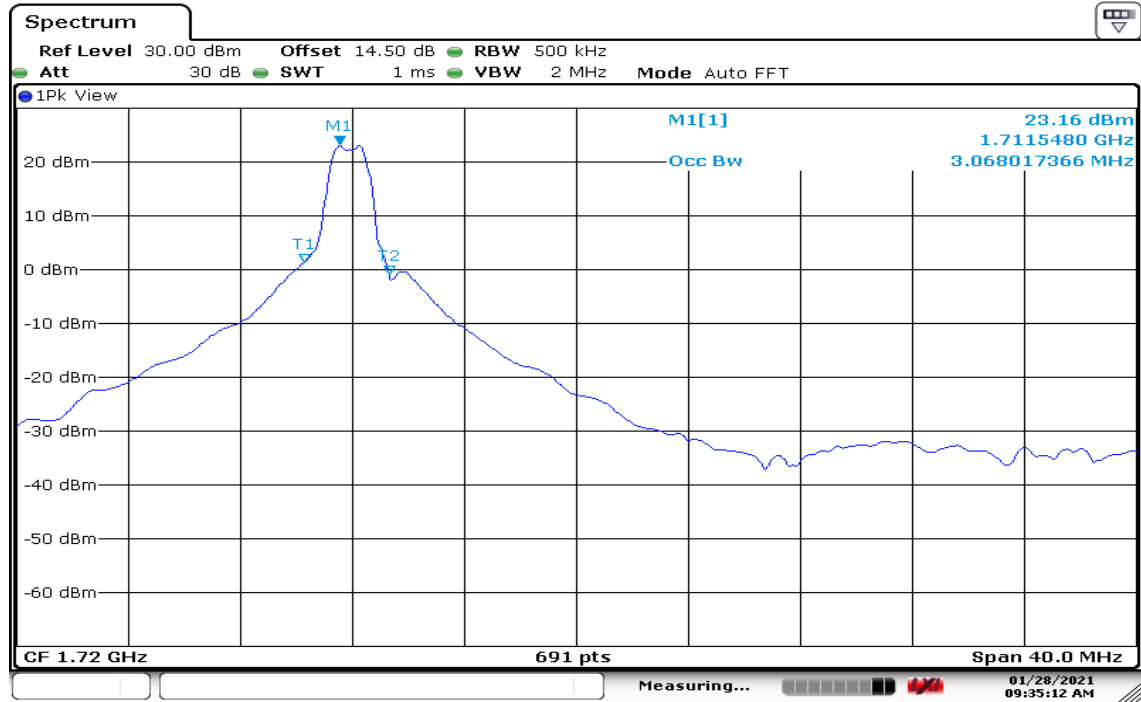
CH High



Date: 28 JAN 2021 11:15:04

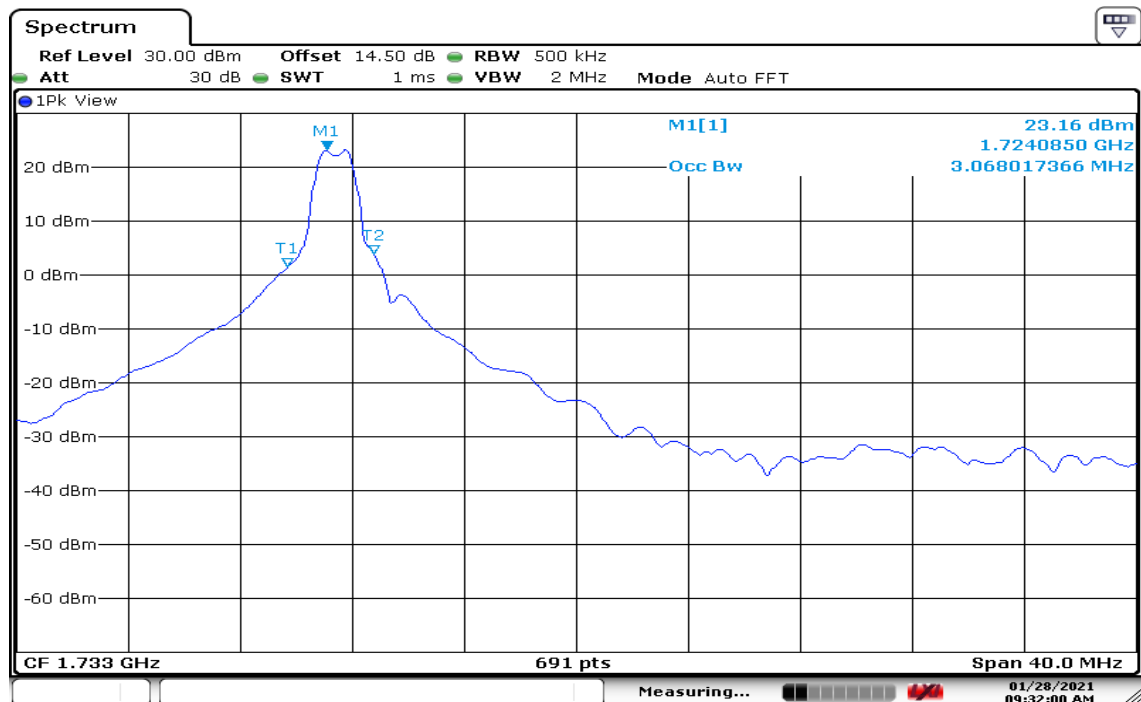
OBW (99%): 20MHz / QPSK

CH Low



Date: 28 JAN 2021 09:35:12

CH Mid



Date: 28 JAN 2021 09:32:00

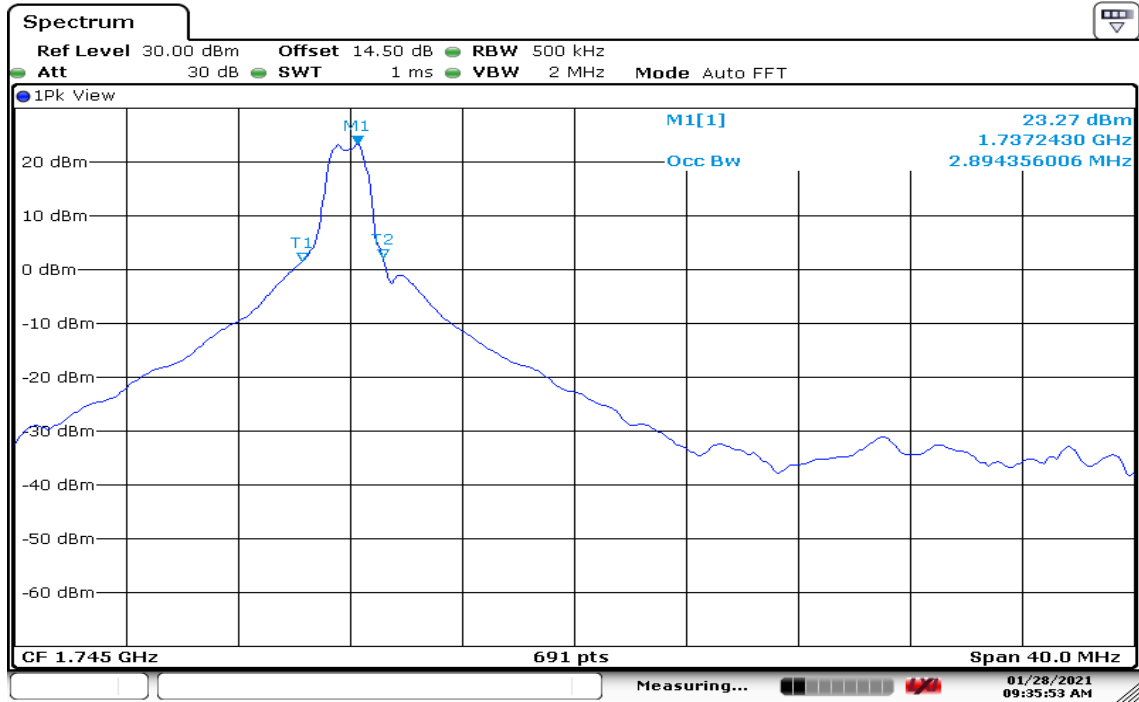


Report No.: T201116W03-RP2

Page: 49 / 134

Rev.: 01

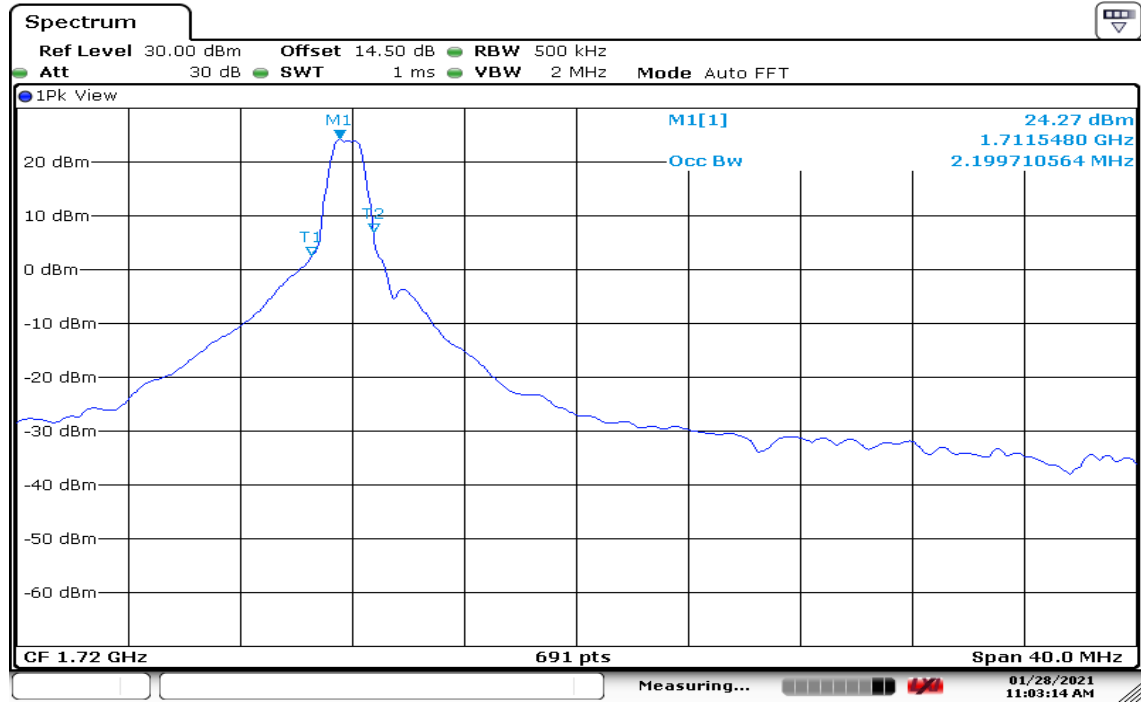
CH High



Date: 28 JAN 2021 09:35:53

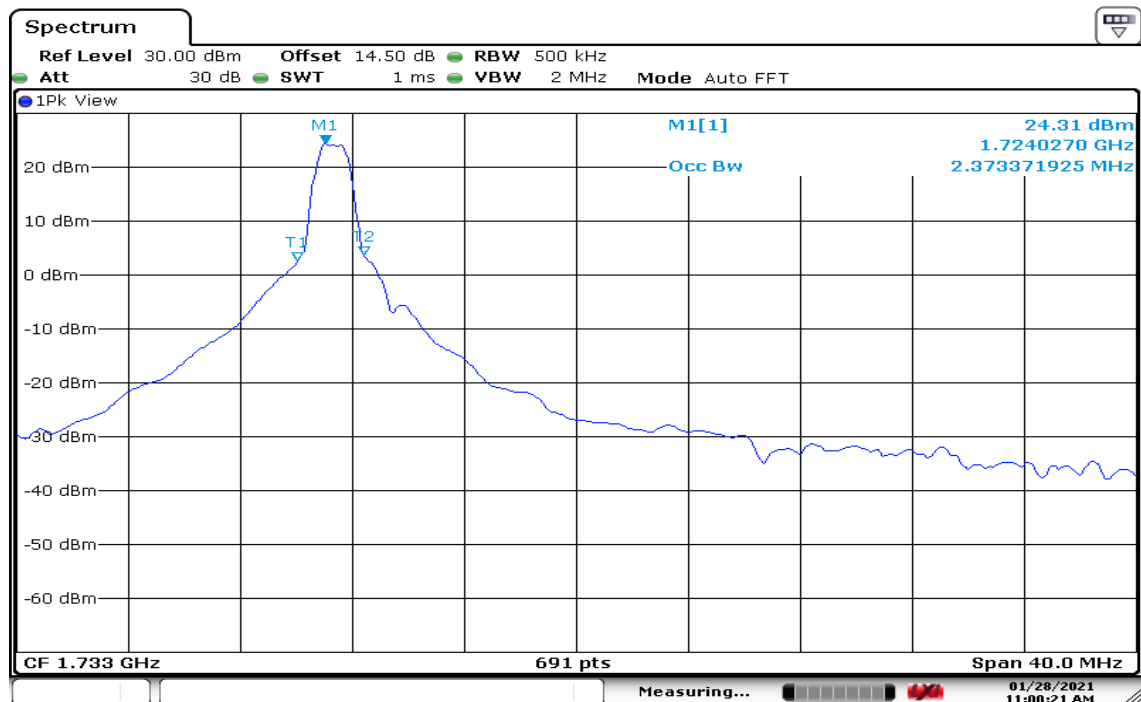
OBW (99%): 20MHz / 16QAM

CH Low



Date: 28 JAN 2021 11:03:15

CH Mid



Date: 28 JAN 2021 11:00:21

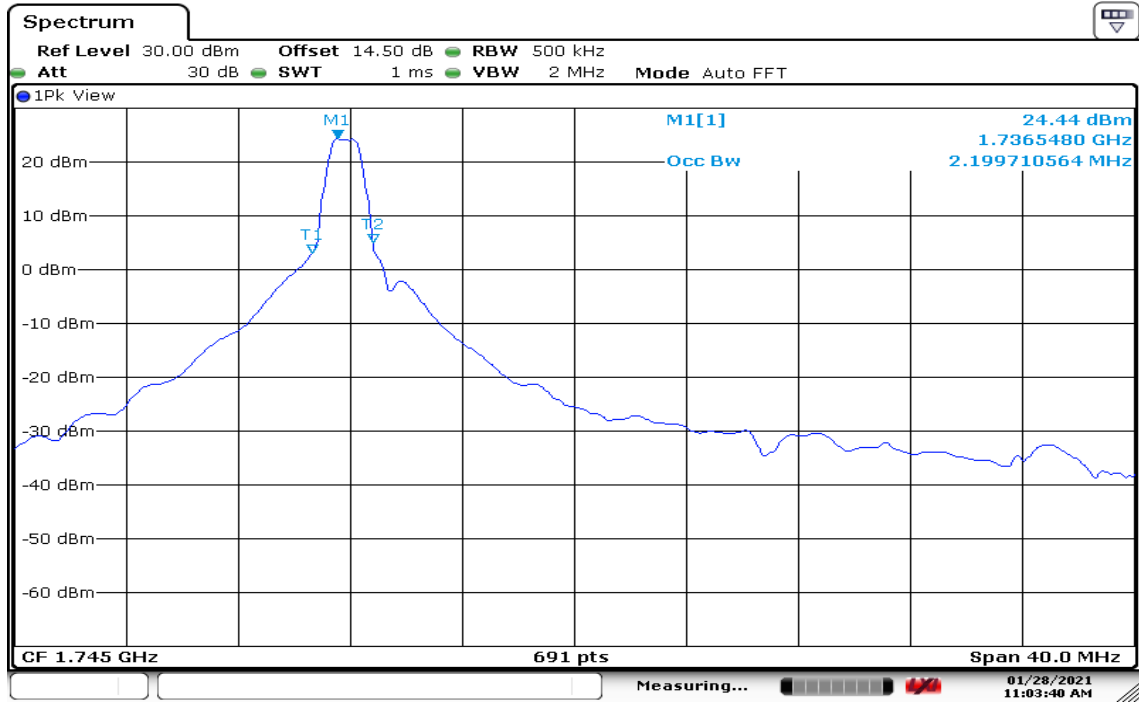


Report No.: T201116W03-RP2

Page: 51 / 134

Rev.: 01

CH High



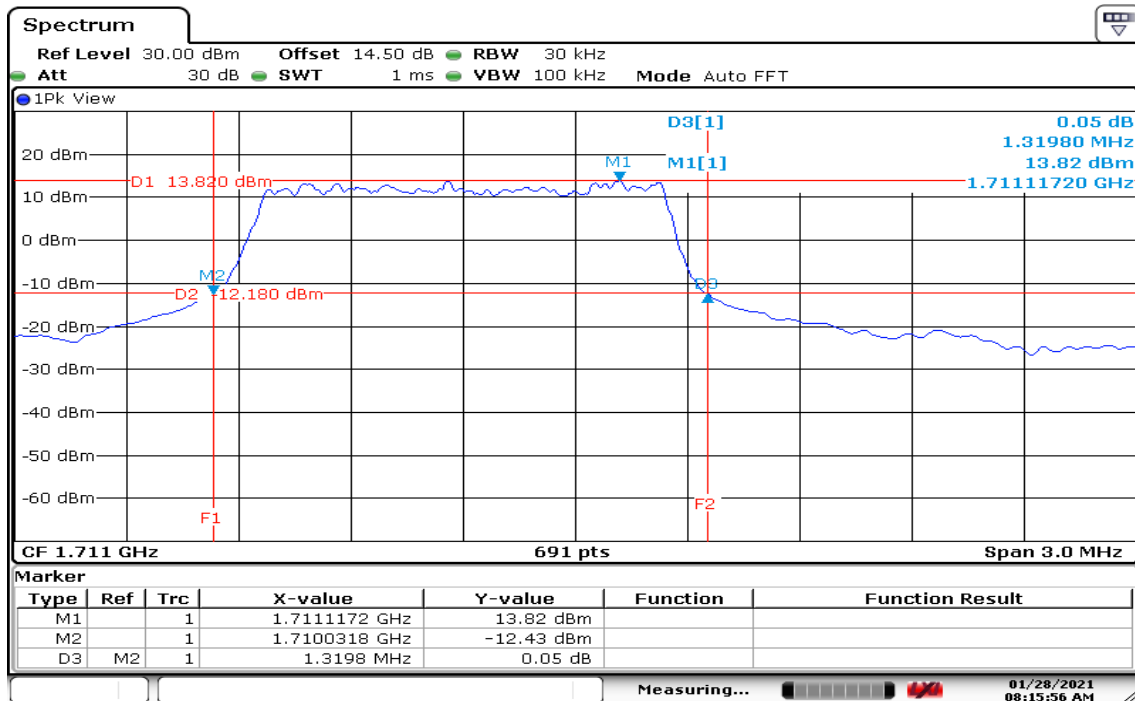
Date: 28 JAN 2021 11:03:40

Report No.: T201116W03-RP2

LTE Band 4

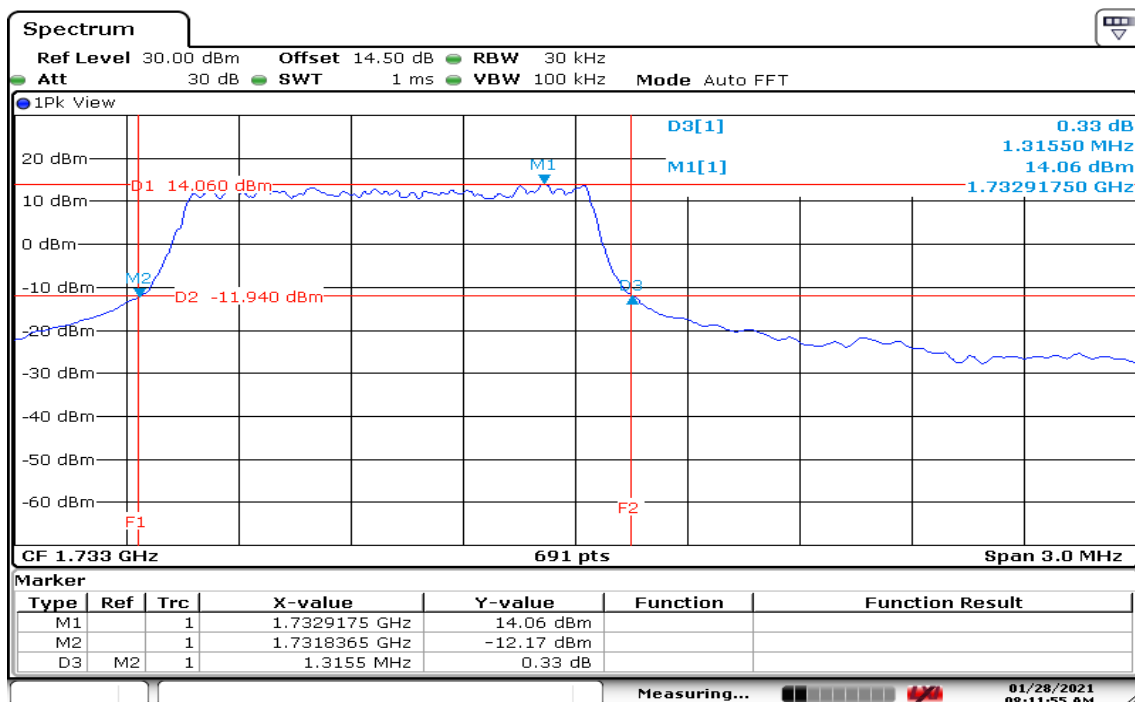
OBW (26dB): 1.4MHz / QPSK

CH Low



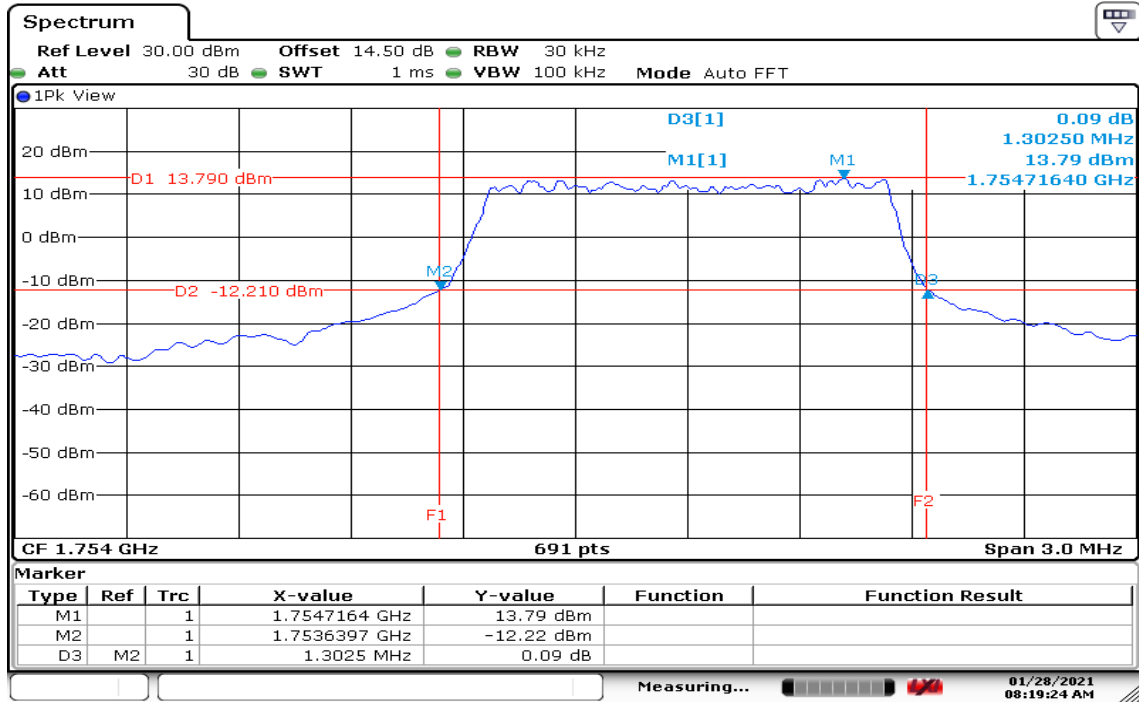
Date: 28 JAN 2021 08:15:56

CH Mid



Date: 28 JAN 2021 08:11:55

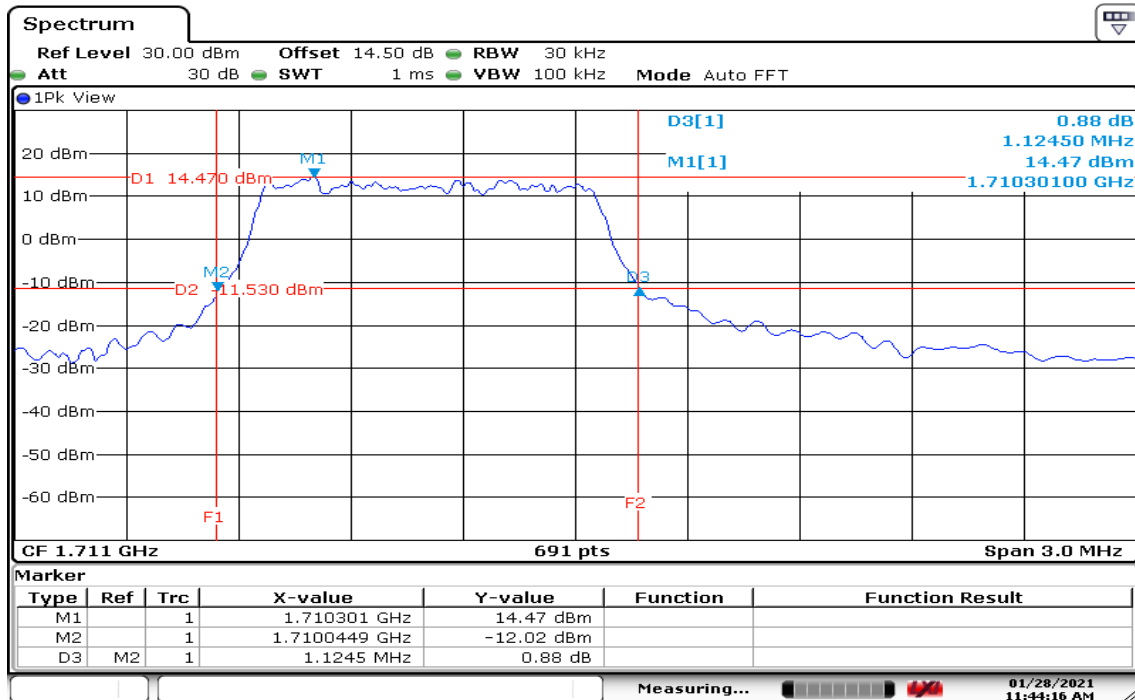
CH High



Date: 28 JAN 2021 08:19:24

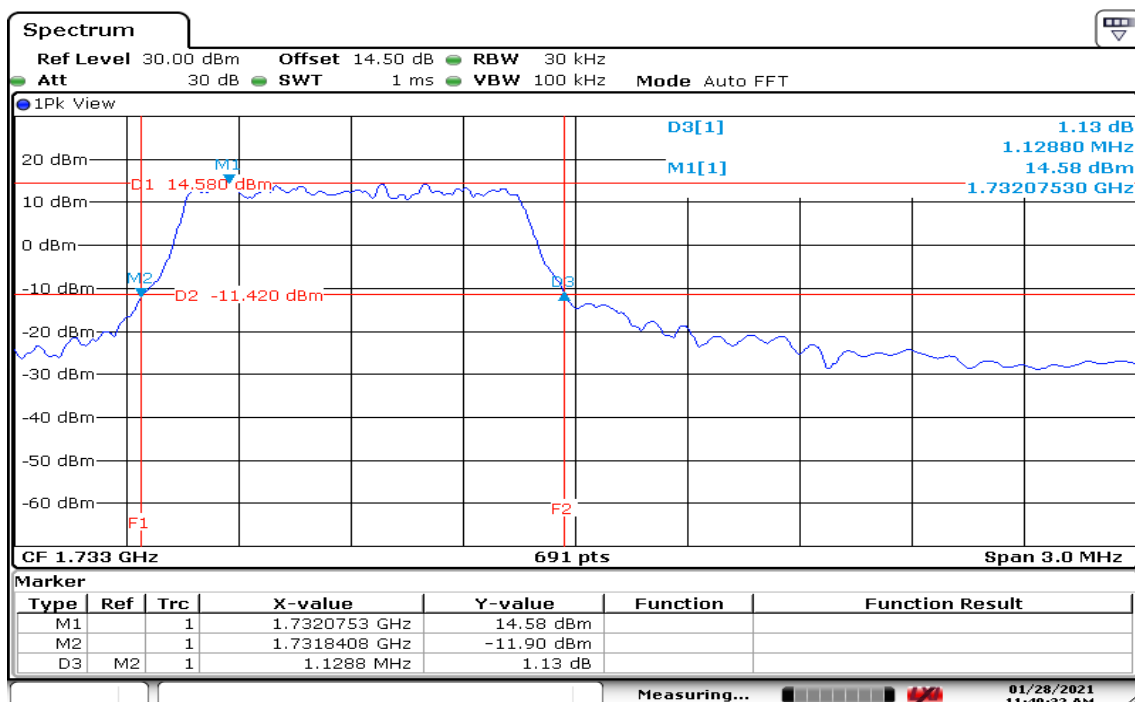
Report No.: T201116W03-RP2

OBW (26dB): 1.4MHz / 16QAM CH Low



Date: 28 JAN 2021 11:44:16

CH Mid



Date: 28 JAN 2021 11:40:33

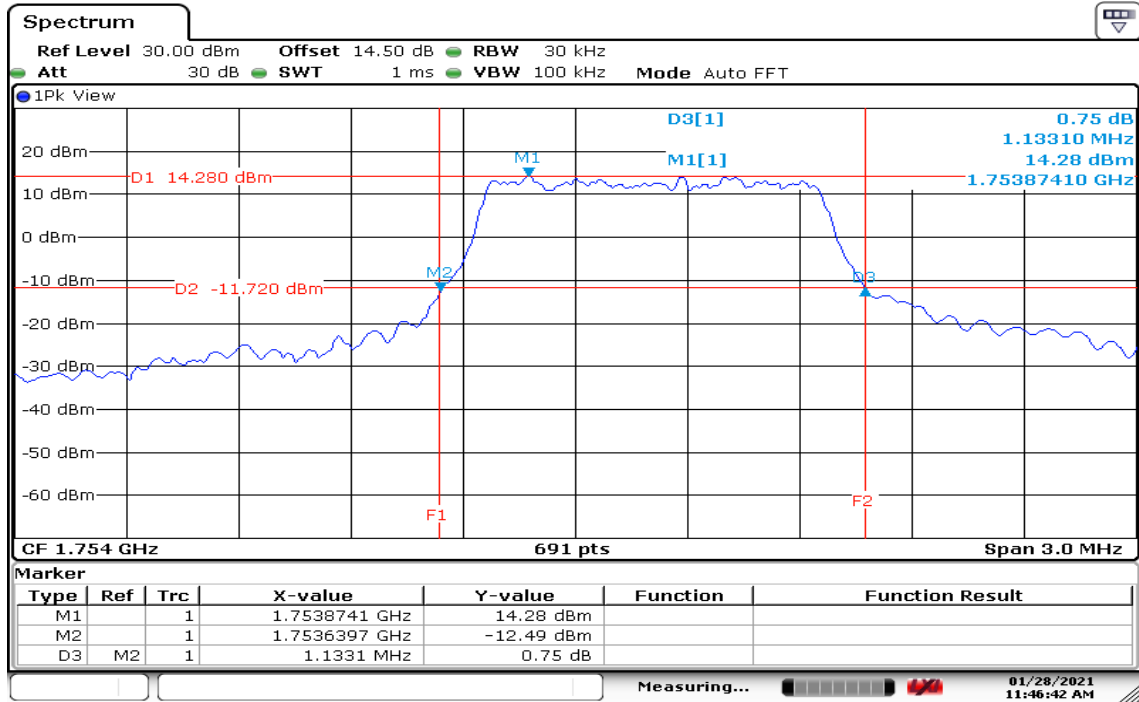


Report No.: T201116W03-RP2

Page: 55 / 134

Rev.: 01

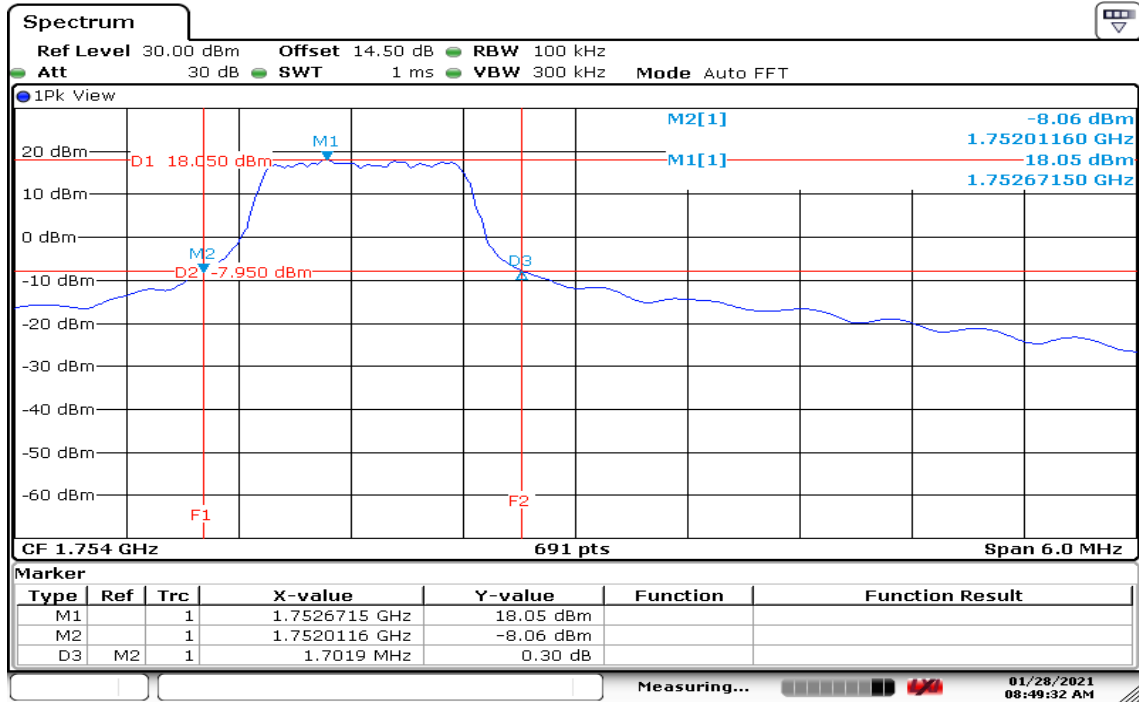
CH High



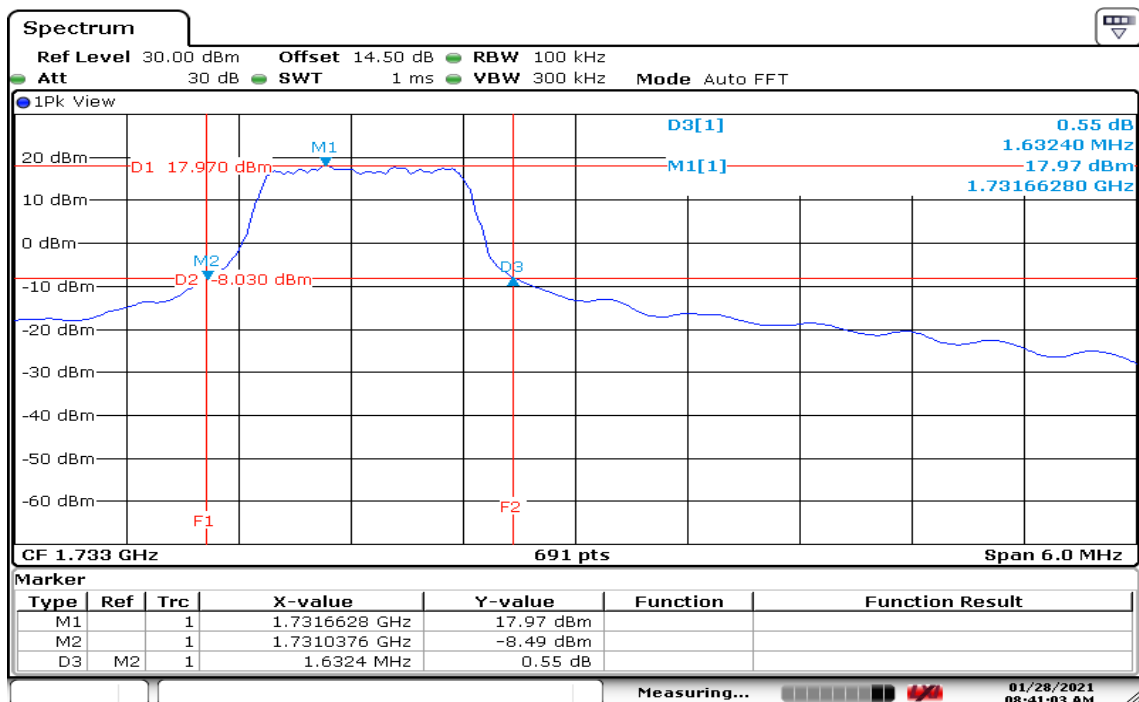
Date: 28 JAN 2021 11:46:42



Report No.: T201116W03-RP2

OBW (26dB): 3MHz / QPSK**CH Low**

Date: 28 JAN 2021 08:49:31

CH Mid

Date: 28 JAN 2021 08:41:04

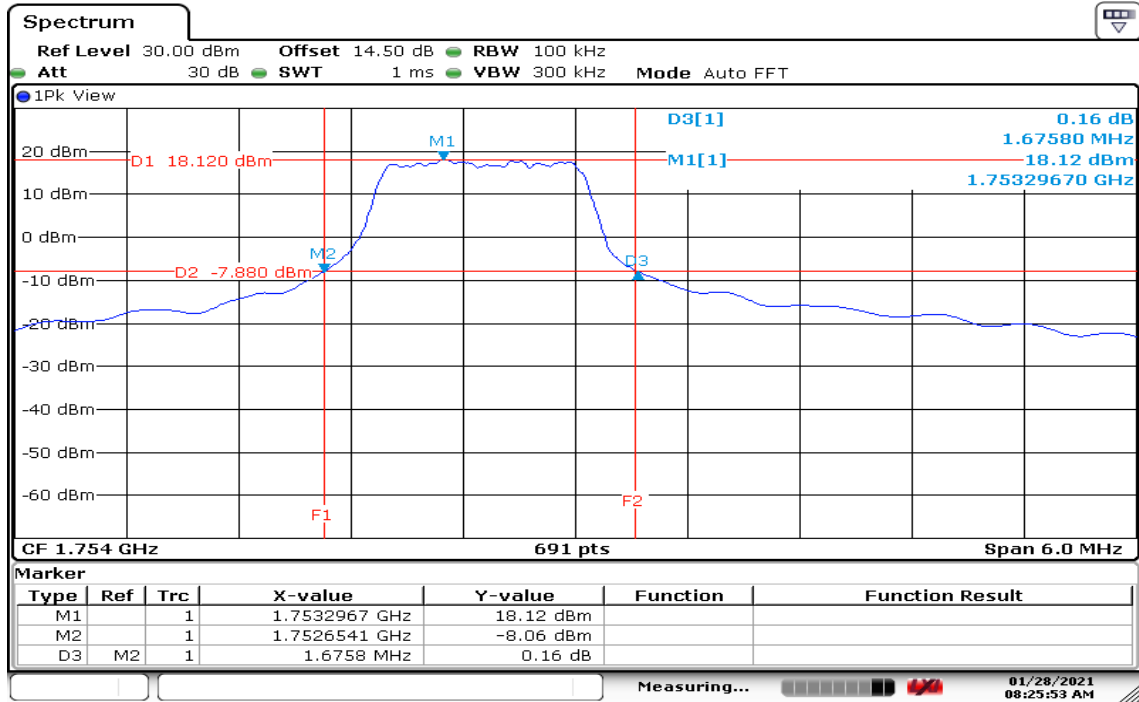


Report No.: T201116W03-RP2

Page: 57 / 134

Rev.: 01

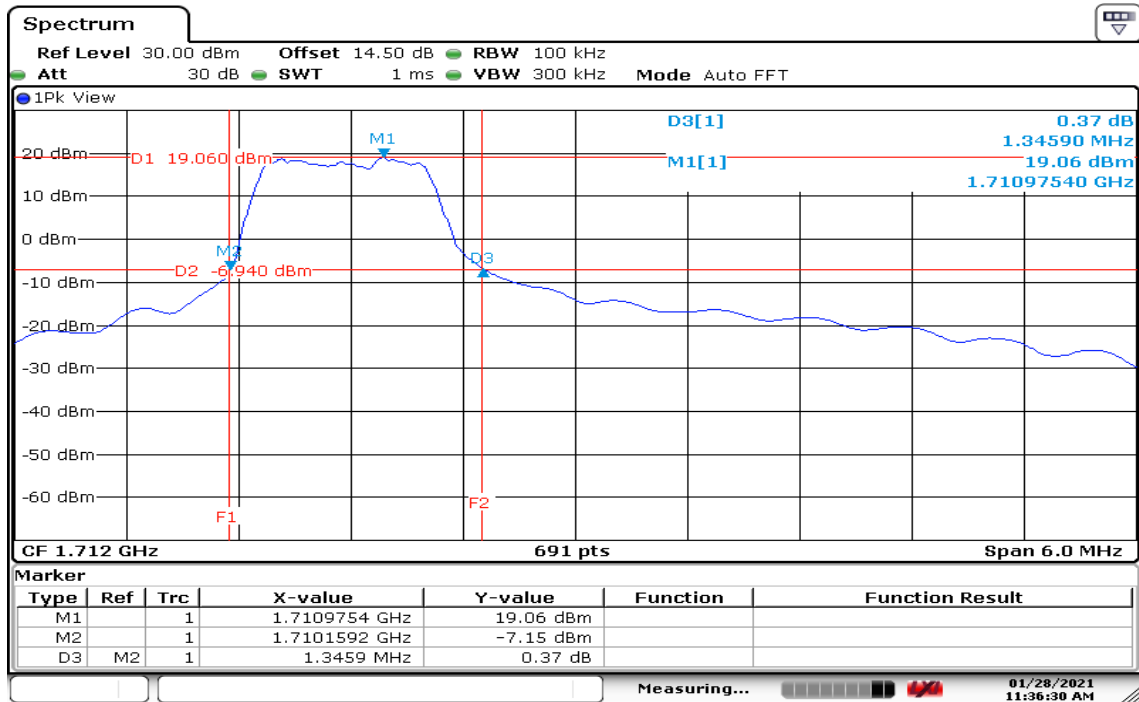
CH High



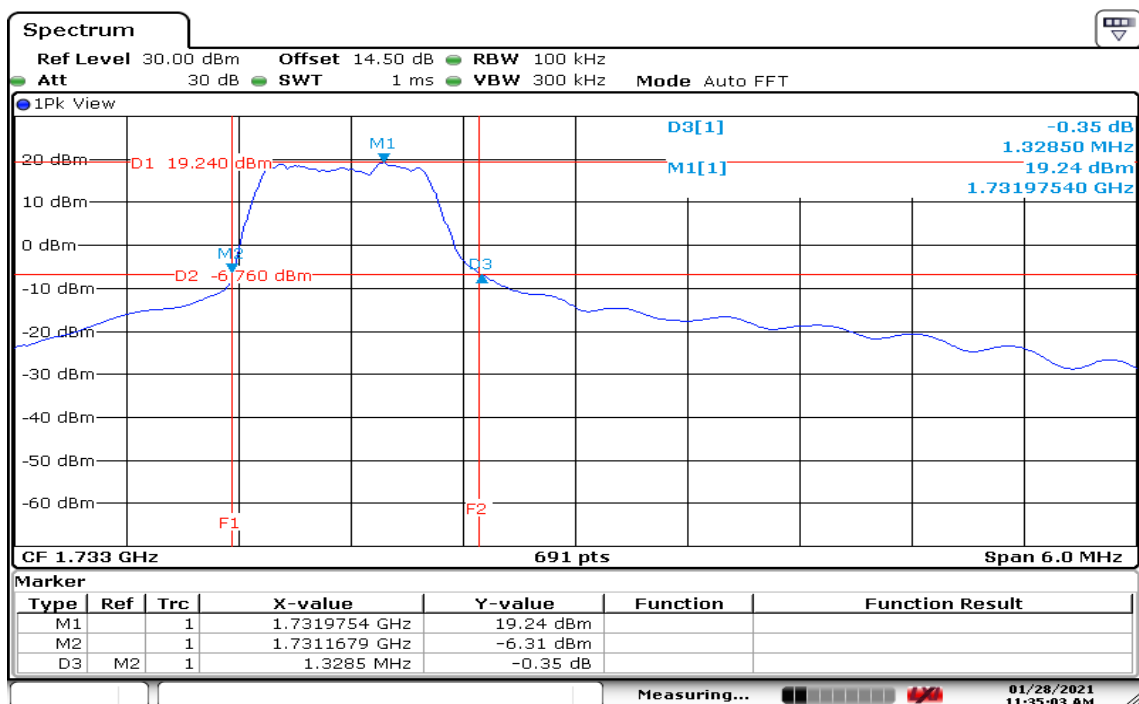
Date: 28 JAN 2021 08:25:53



Report No.: T201116W03-RP2

OBW (26dB): 3MHz / 16QAM**CH Low**

Date: 28 JAN 2021 11:36:30

CH Mid

Date: 28 JAN 2021 11:35:03

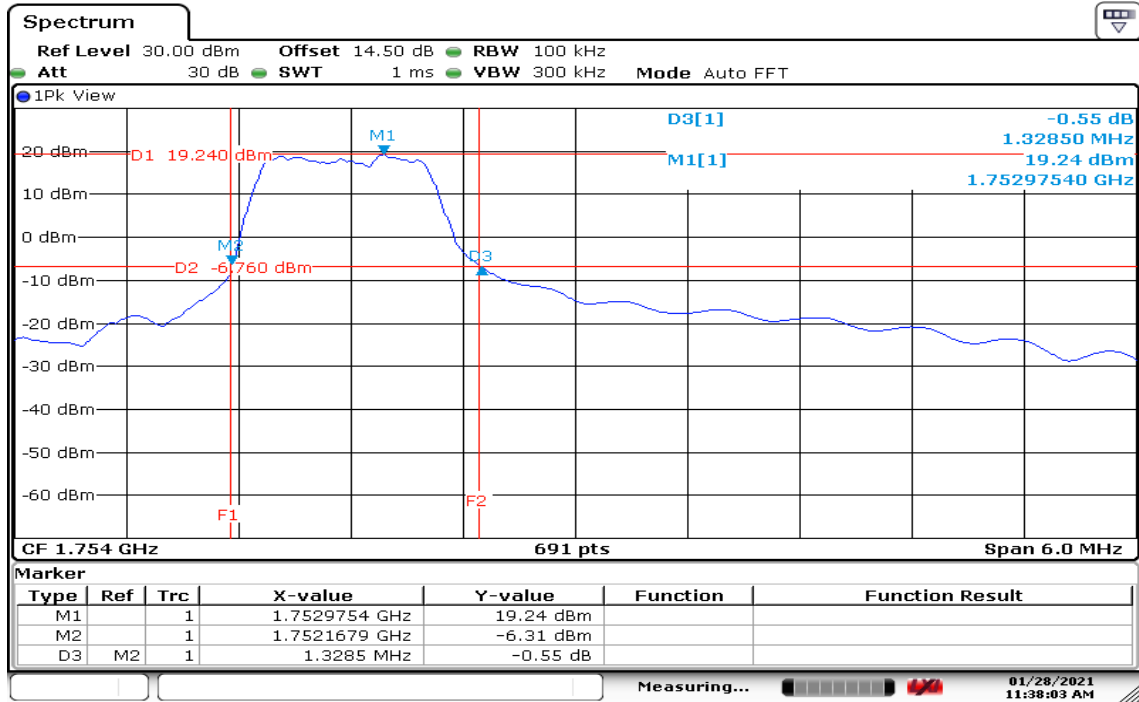


Report No.: T201116W03-RP2

Page: 59 / 134

Rev.: 01

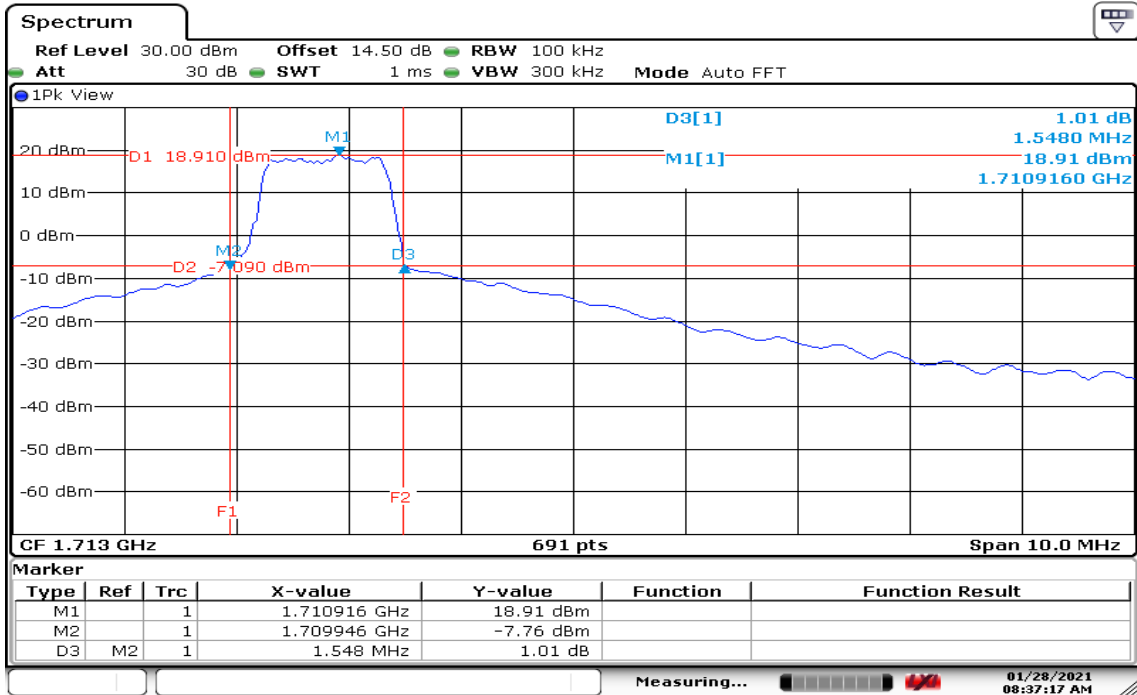
CH High



Date: 28 JAN 2021 11:38:04

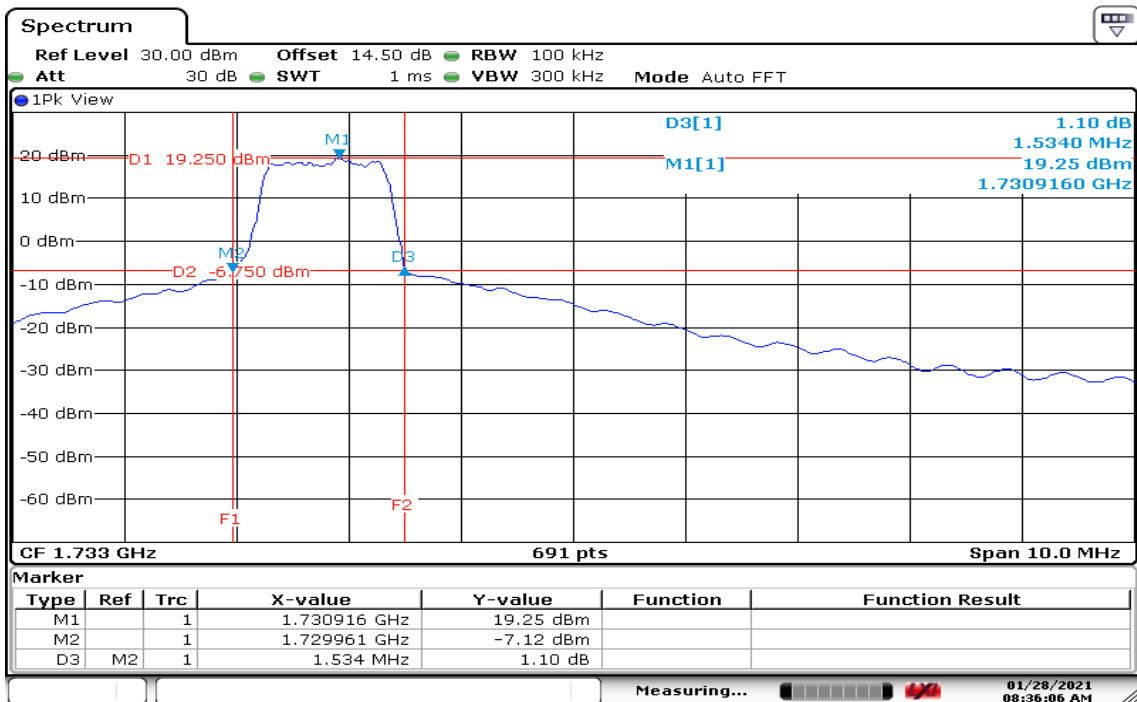
OBW (26dB): 5MHz / QPSK

CH Low



Date: 28 JAN 2021 08:37:18

CH Mid



Date: 28 JAN 2021 08:36:07

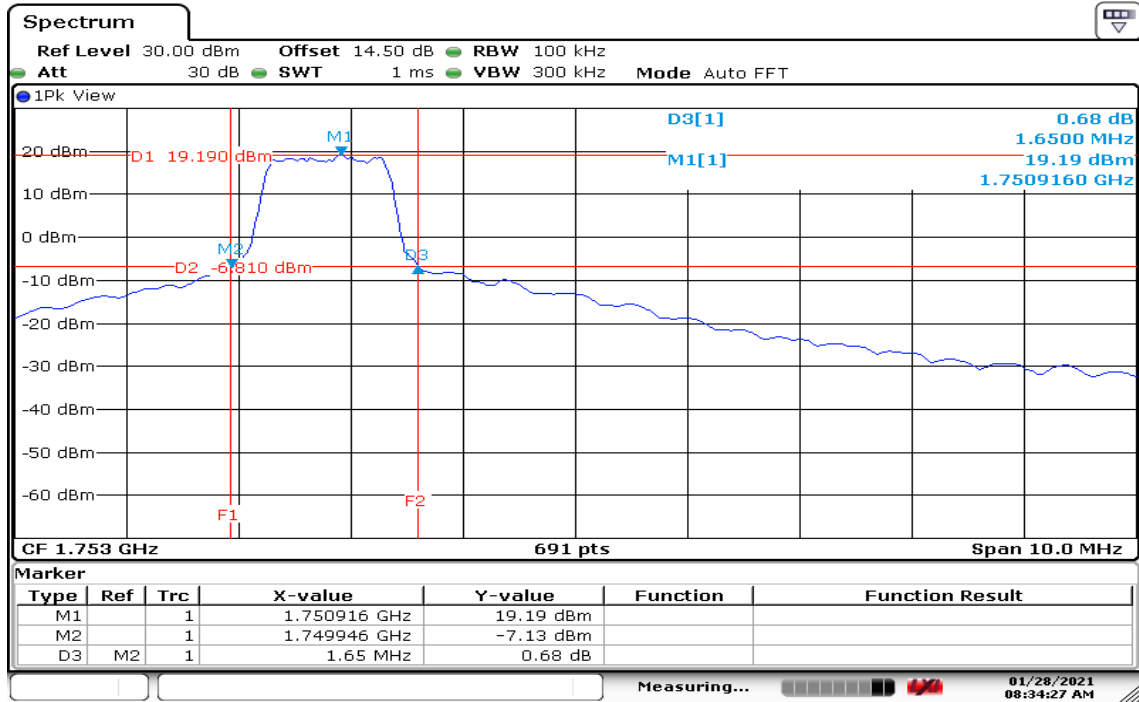


Report No.: T201116W03-RP2

Page: 61 / 134

Rev.: 01

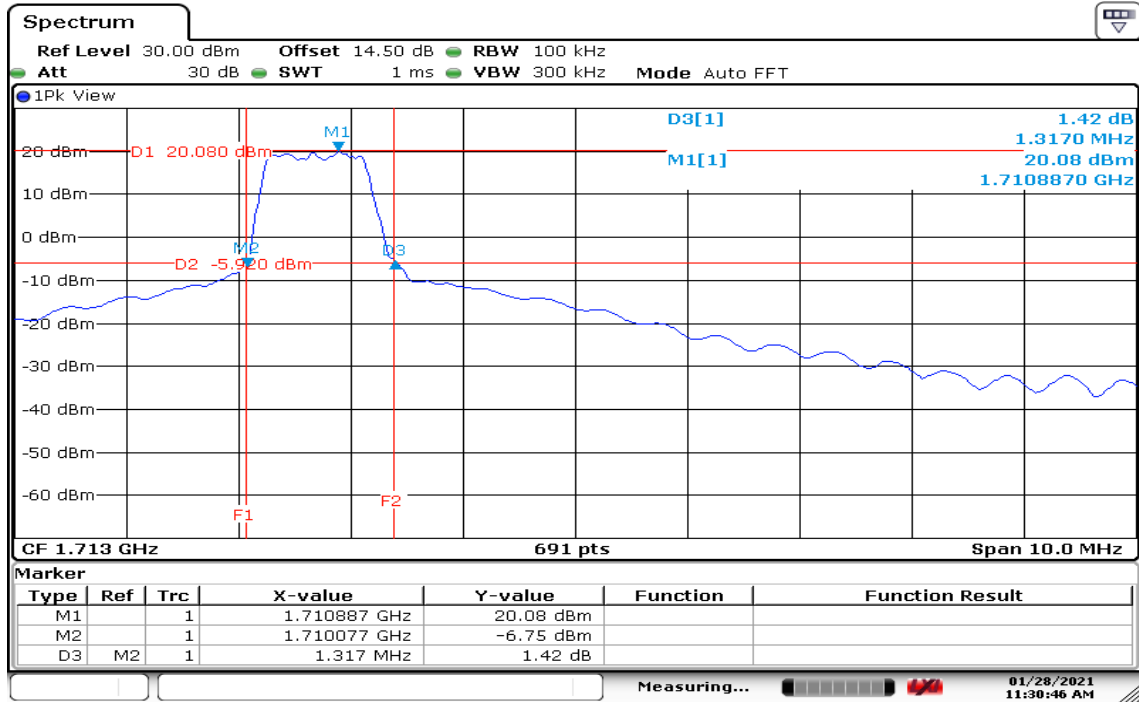
CH High



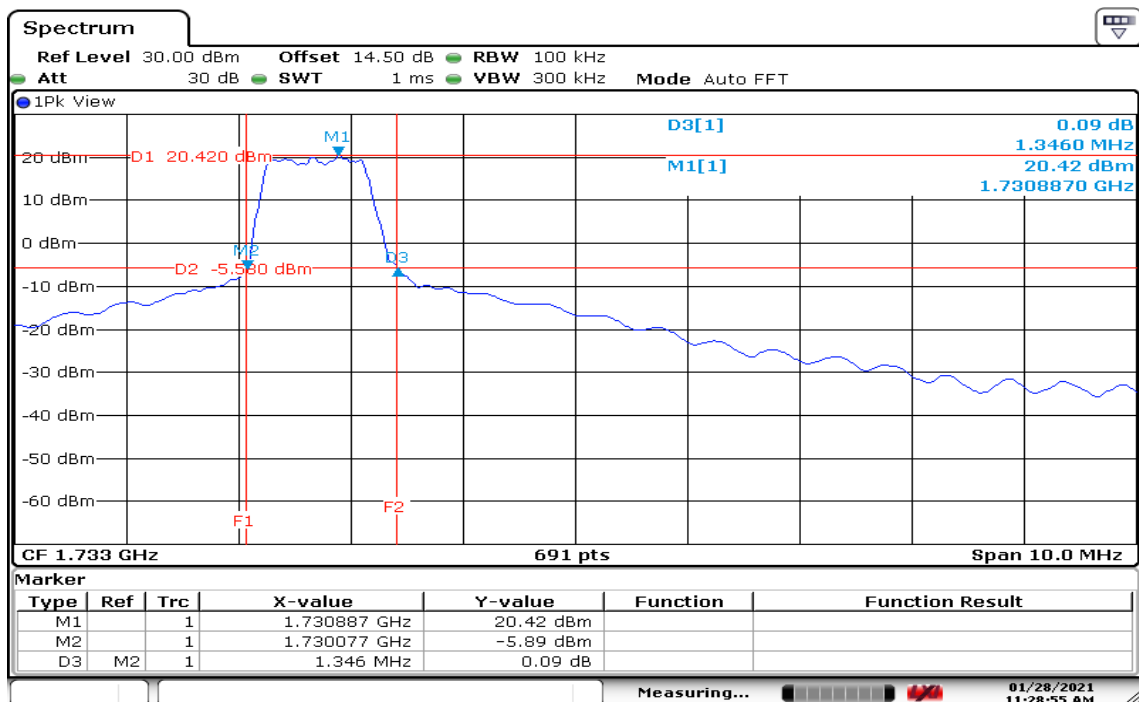
Date: 28 JAN 2021 08:34:27



Report No.: T201116W03-RP2

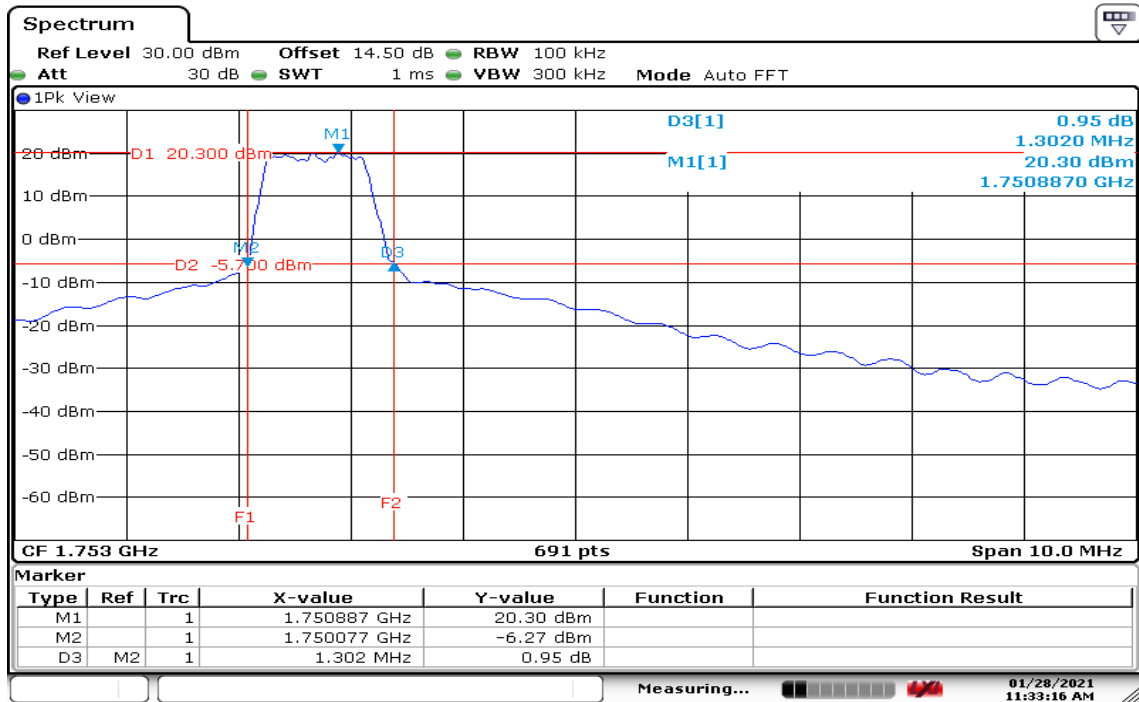
OBW (26dB): 5MHz / 16QAM**CH Low**

Date: 28 JAN 2021 11:30:47

CH Mid

Date: 28 JAN 2021 11:28:55

CH High

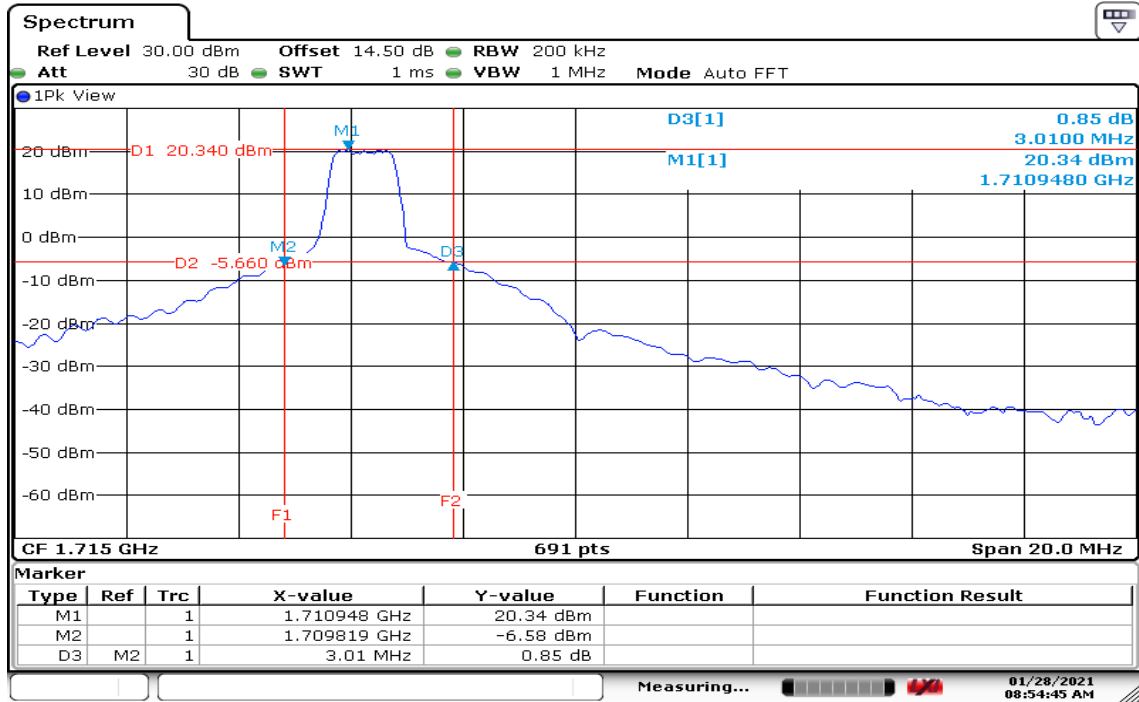


Date: 28 JAN 2021 11:33:17

Report No.: T201116W03-RP2

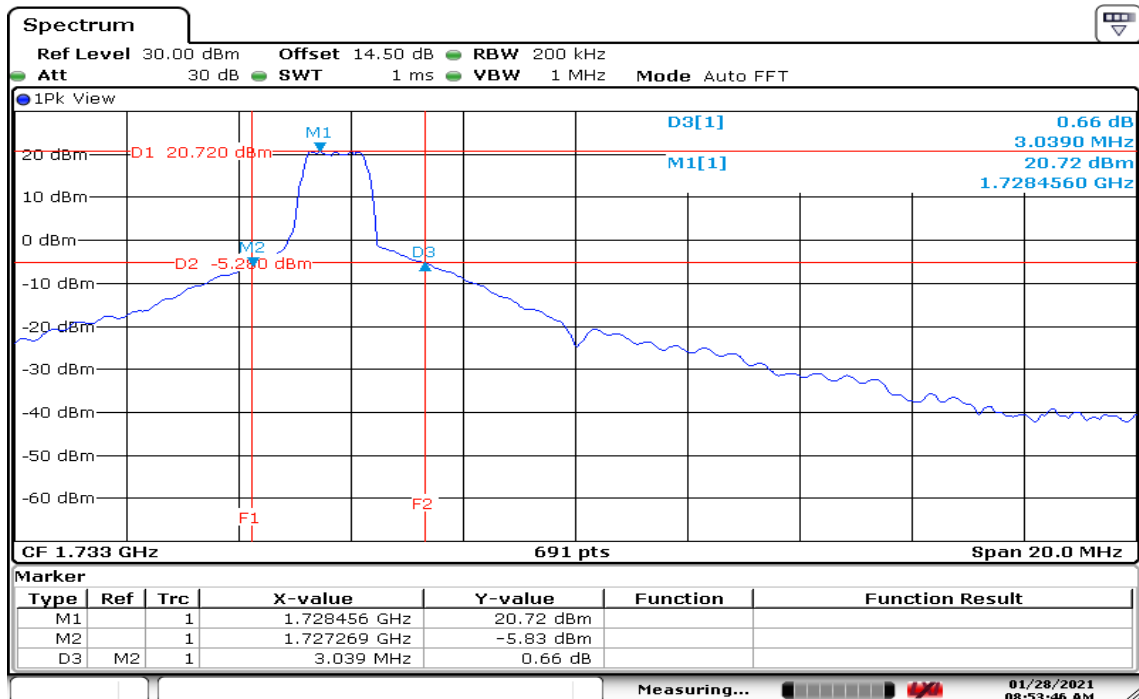
OBW (26dB): 10MHz / QPSK

CH Low



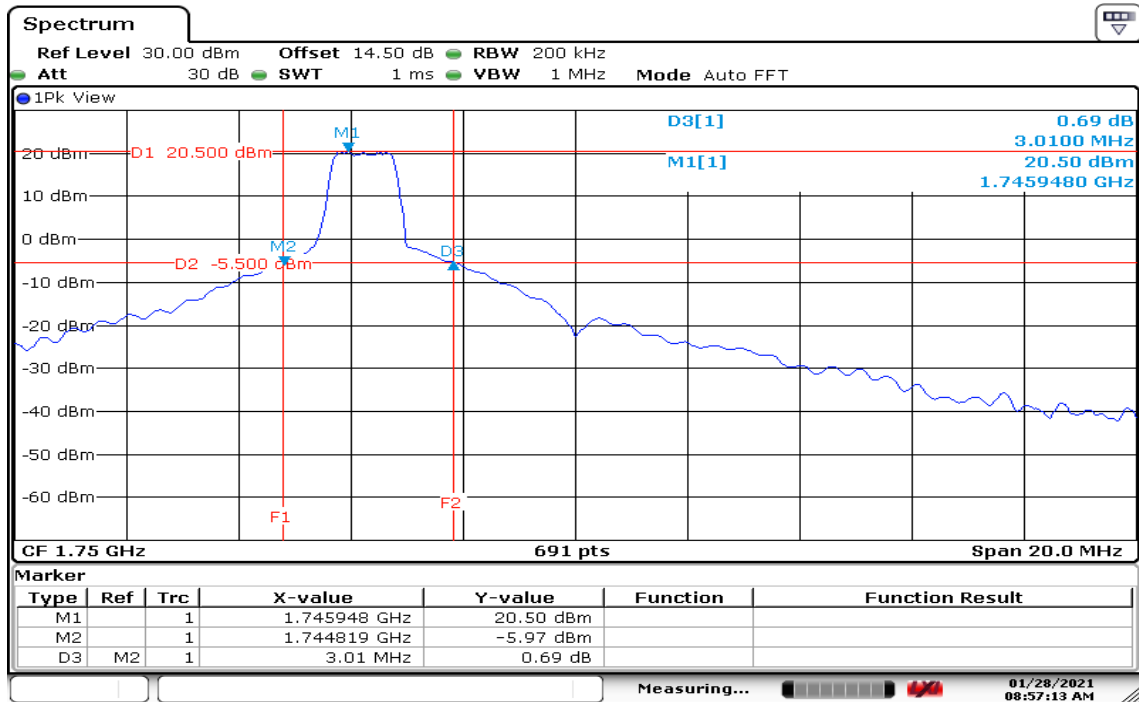
Date: 28 JAN 2021 08:54:45

CH Mid



Date: 28 JAN 2021 08:53:46

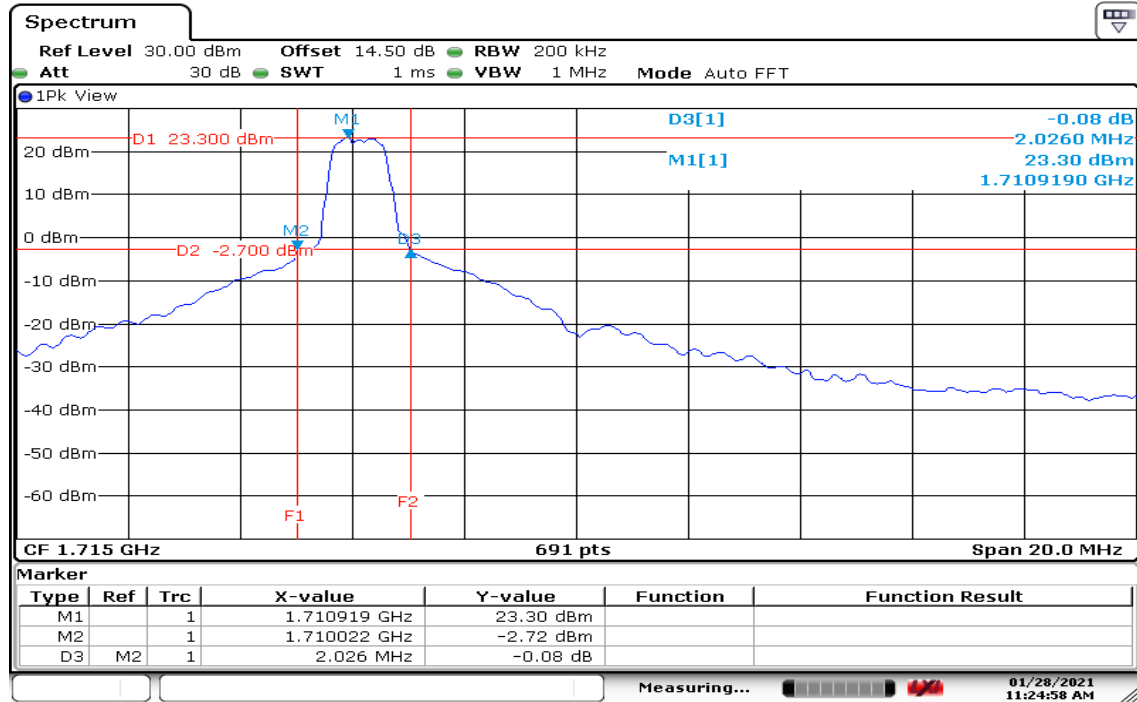
CH High



Date: 28 JAN 2021 08:57:14

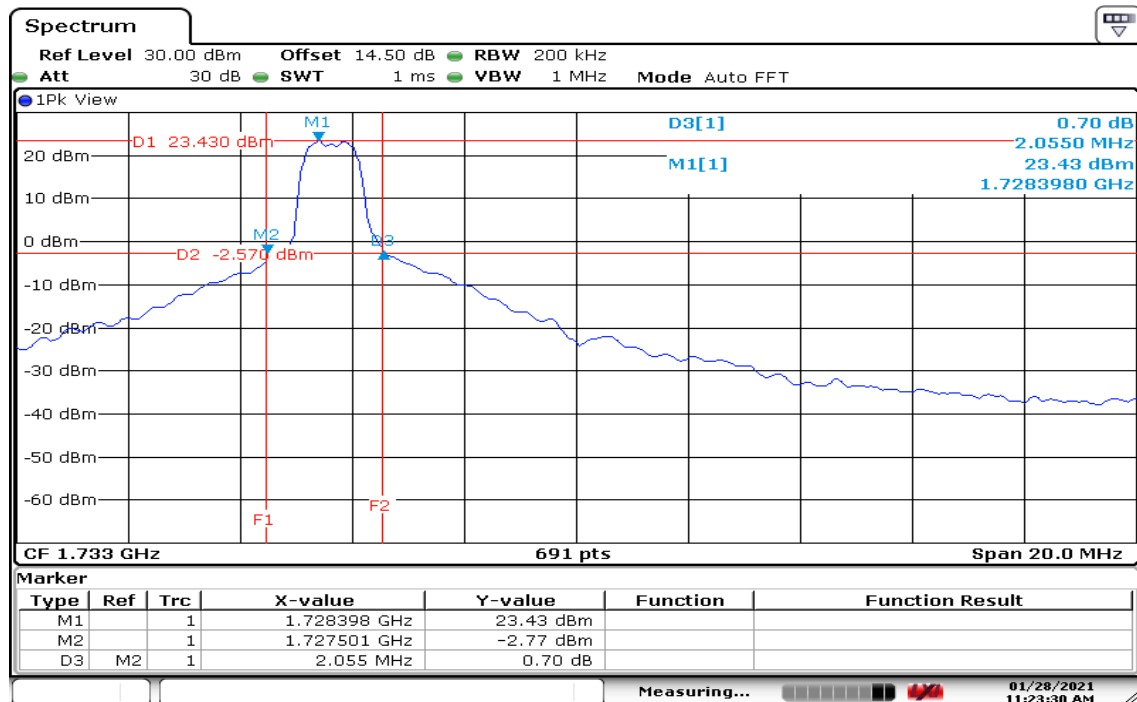
OBW (26dB): 10MHz / 16QAM

CH Low



Date: 28 JAN 2021 11:24:58

CH Mid



Date: 28 JAN 2021 11:23:30

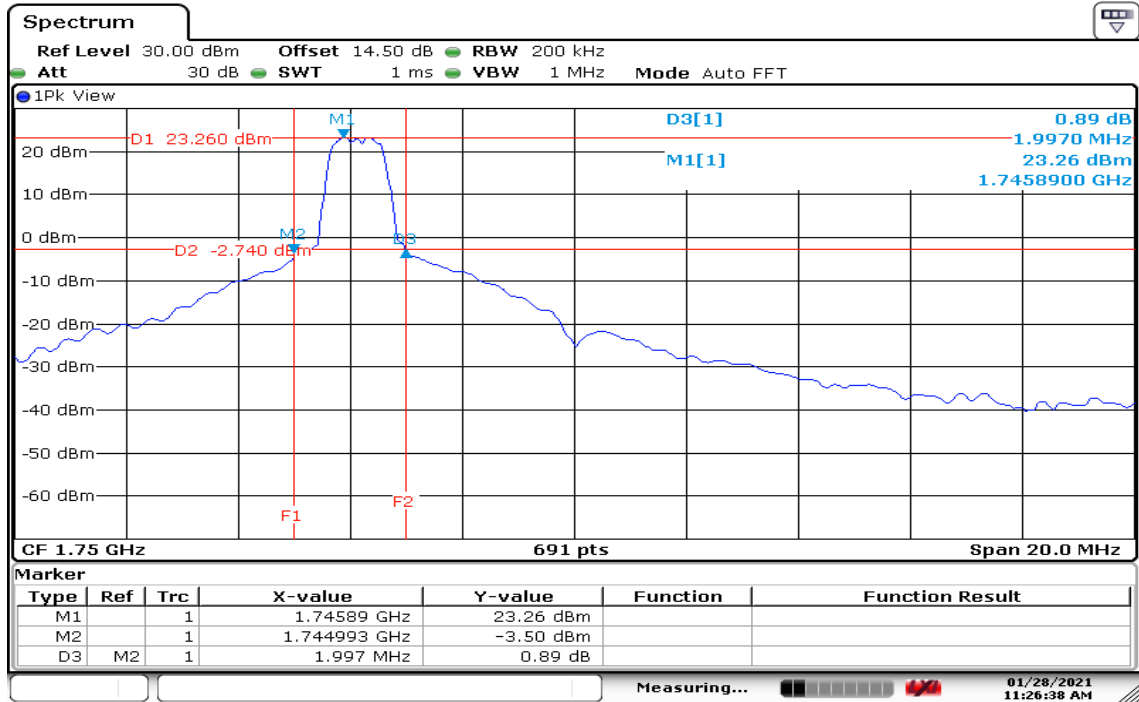


Report No.: T201116W03-RP2

Page: 67 / 134

Rev.: 01

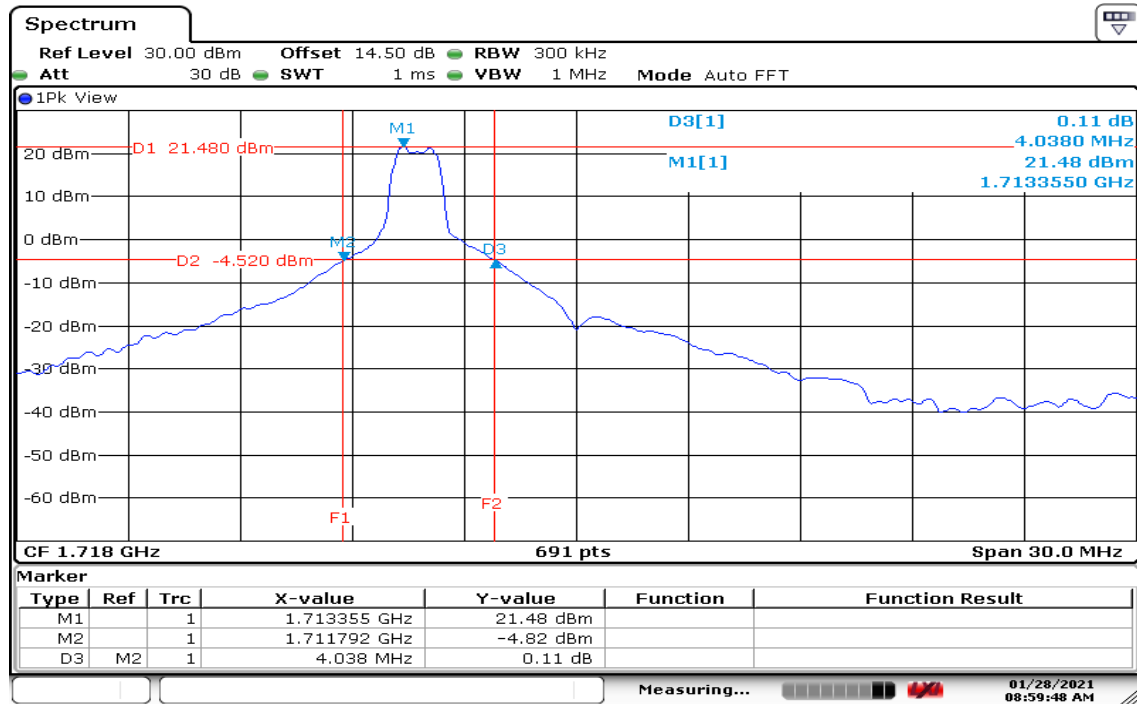
CH High



Date: 28 JAN 2021 11:26:38

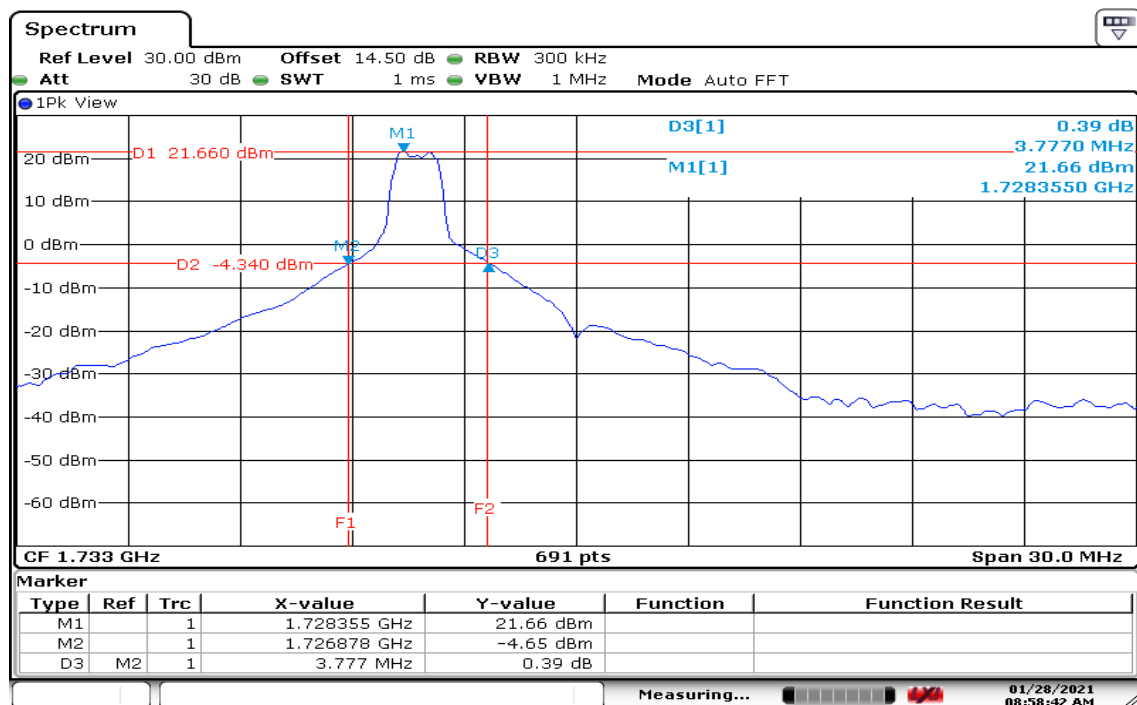
OBW (26dB): 15MHz / QPSK

CH Low



Date: 28 JAN 2021 08:59:49

CH Mid



Date: 28 JAN 2021 08:58:42

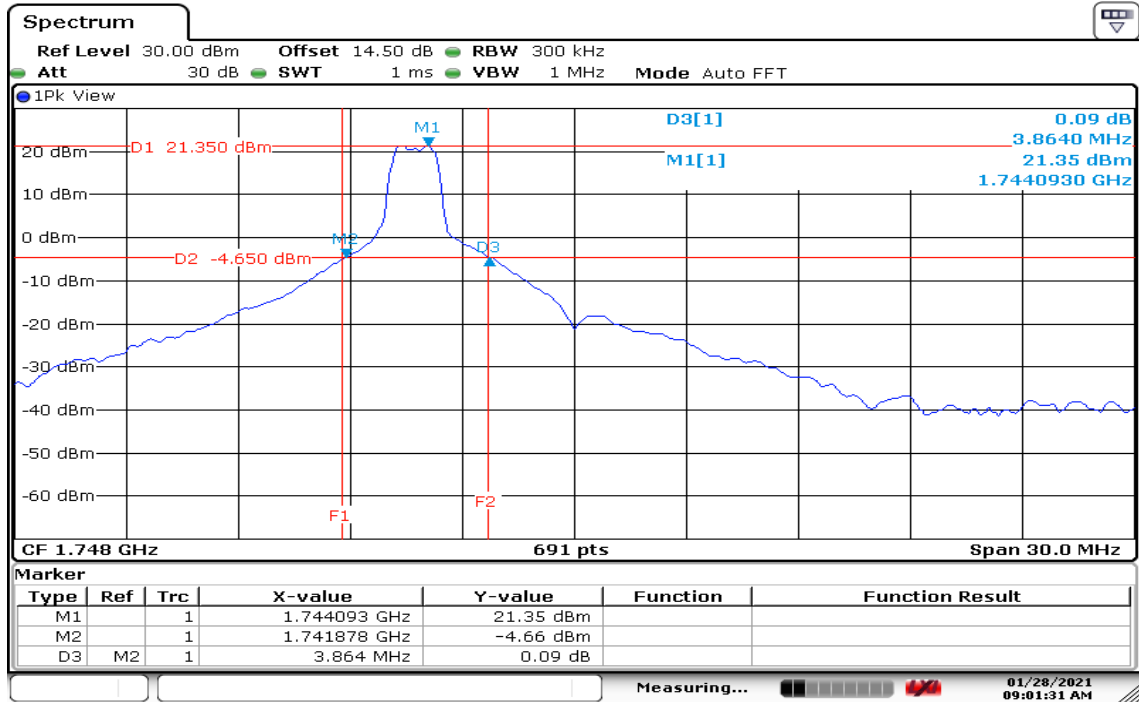


Report No.: T201116W03-RP2

Page: 69 / 134

Rev.: 01

CH High

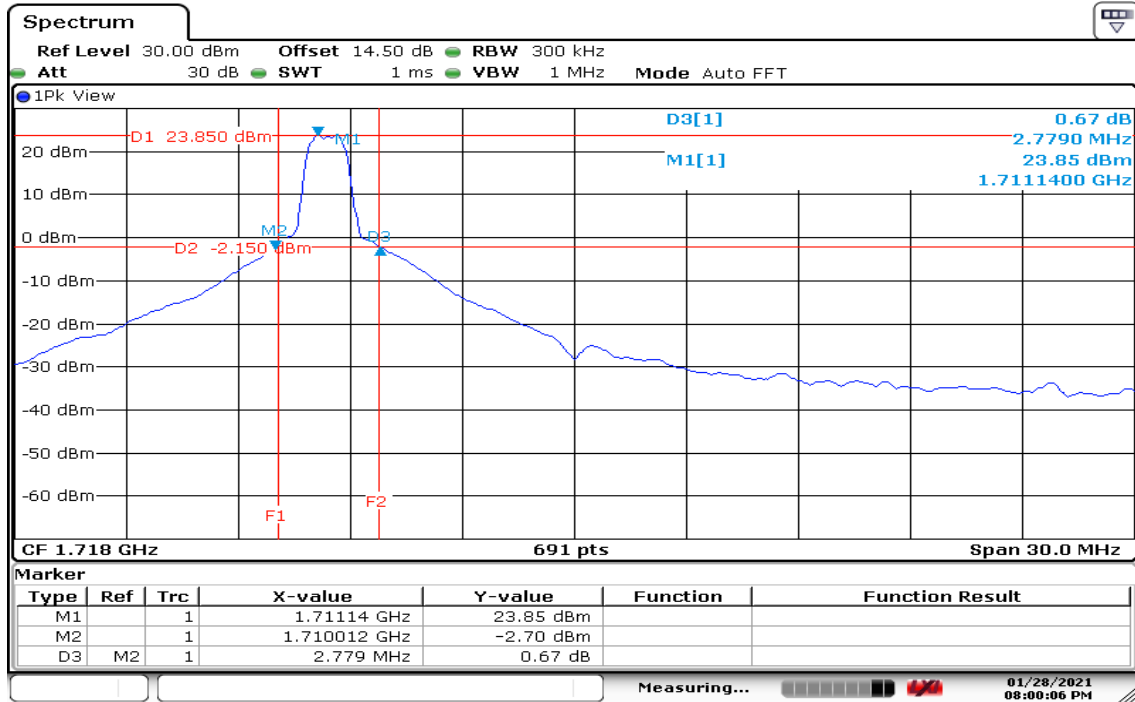


Date: 28 JAN 2021 09:01:31

Report No.: T201116W03-RP2

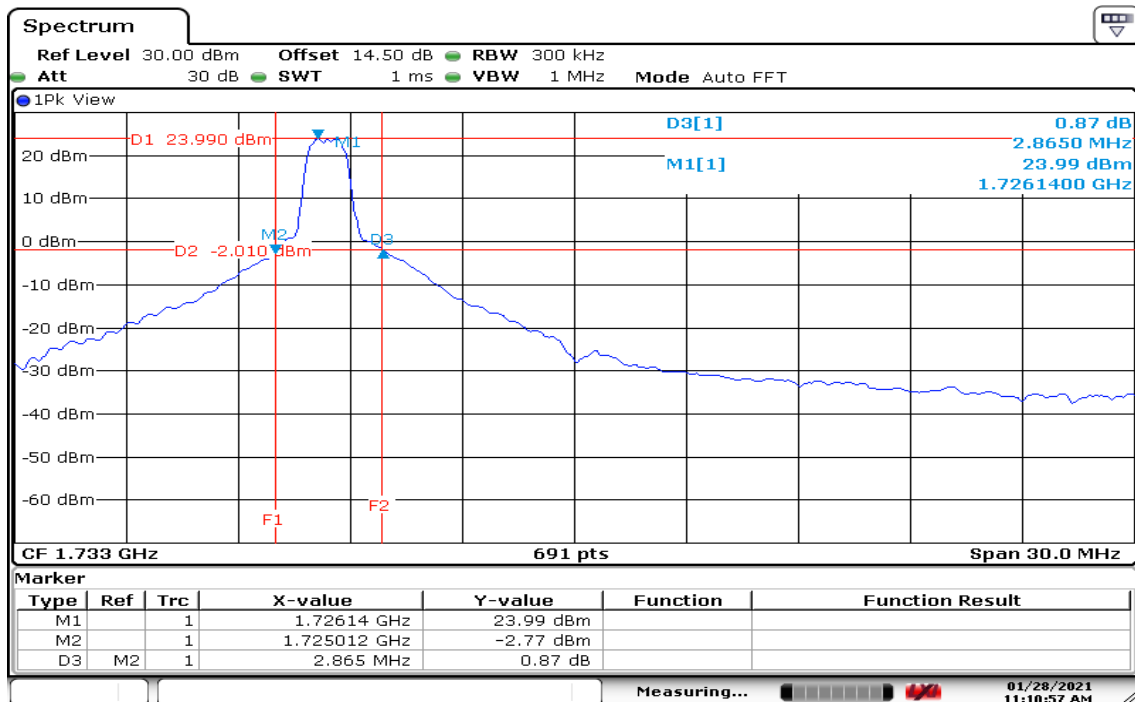
OBW (26dB): 15MHz / 16QAM

CH Low



Date: 28 JAN 2021 20:00:04

CH Mid



Date: 28 JAN 2021 11:10:58

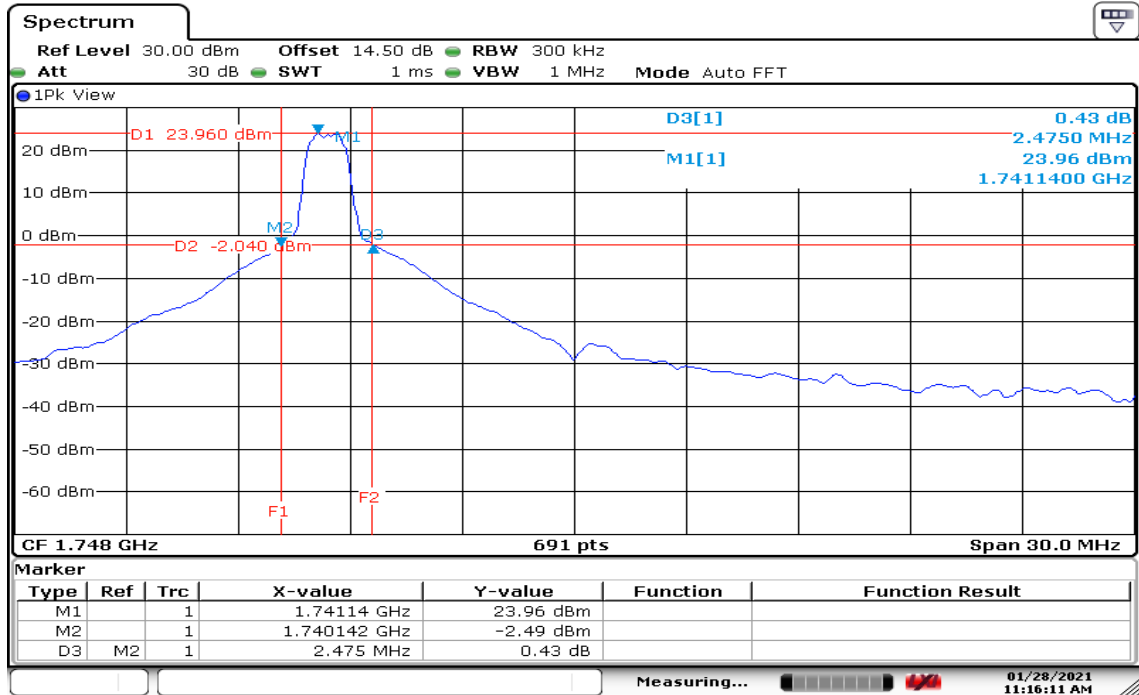


Report No.: T201116W03-RP2

Page: 71 / 134

Rev.: 01

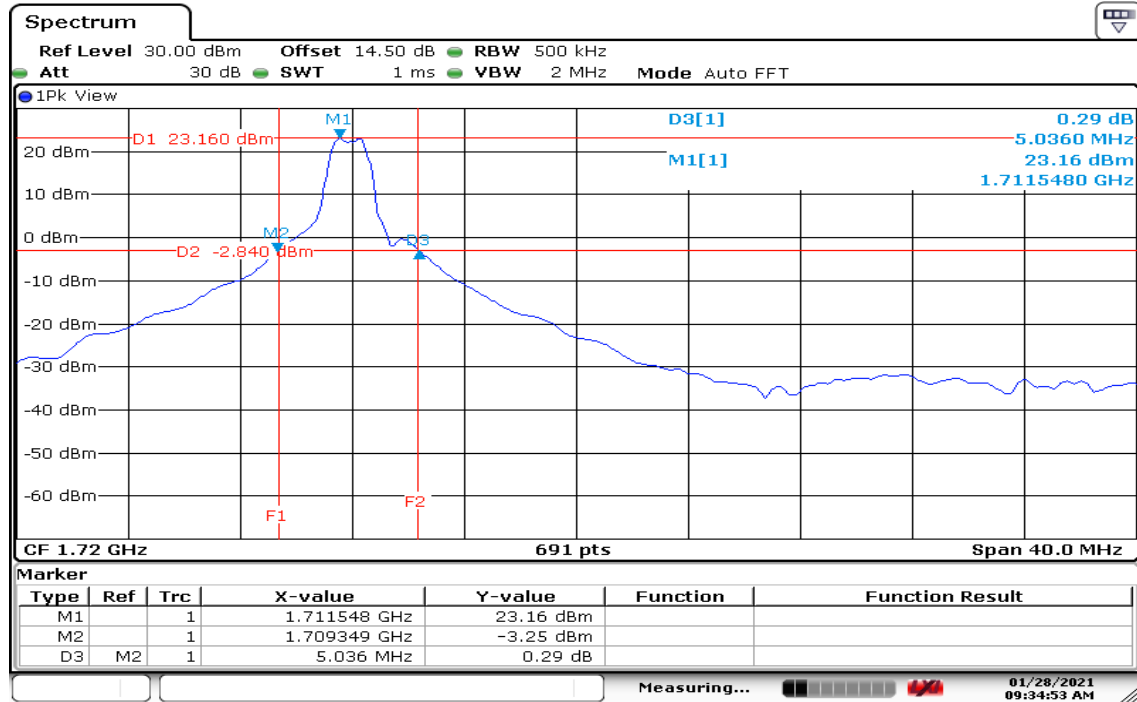
CH High



Date: 28 JAN 2021 11:16:12

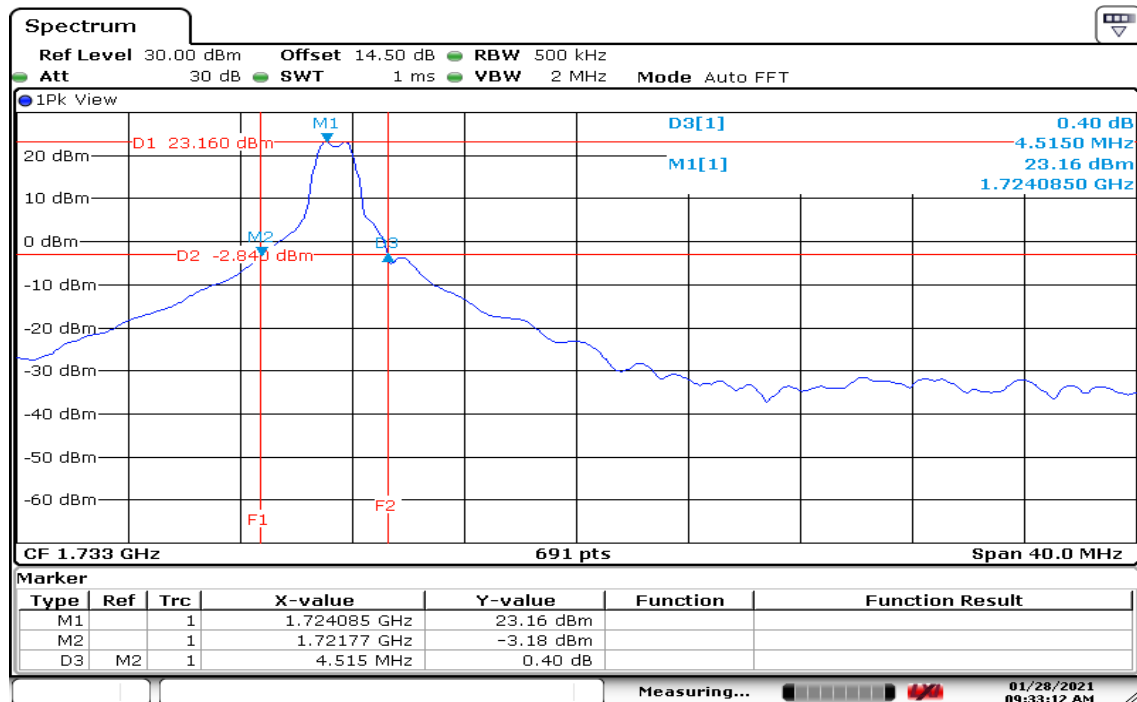
OBW (26dB): 20MHz / QPSK

CH Low



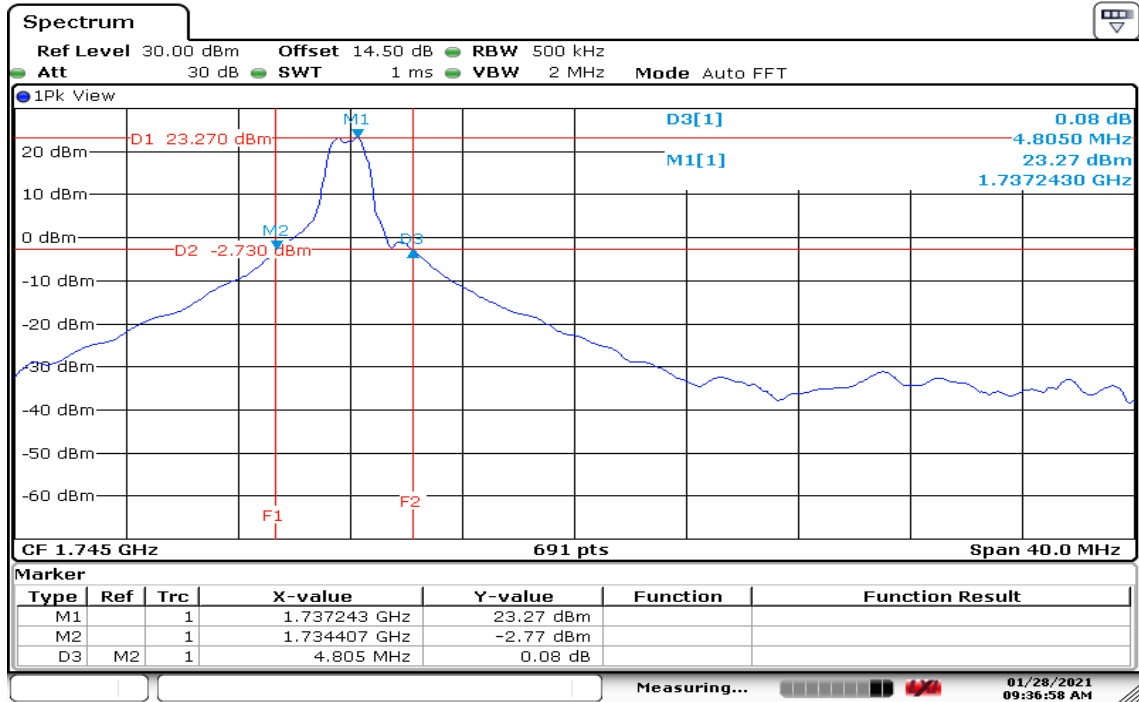
Date: 28 JAN 2021 09:34:54

CH Mid



Date: 28 JAN 2021 09:33:12

CH High

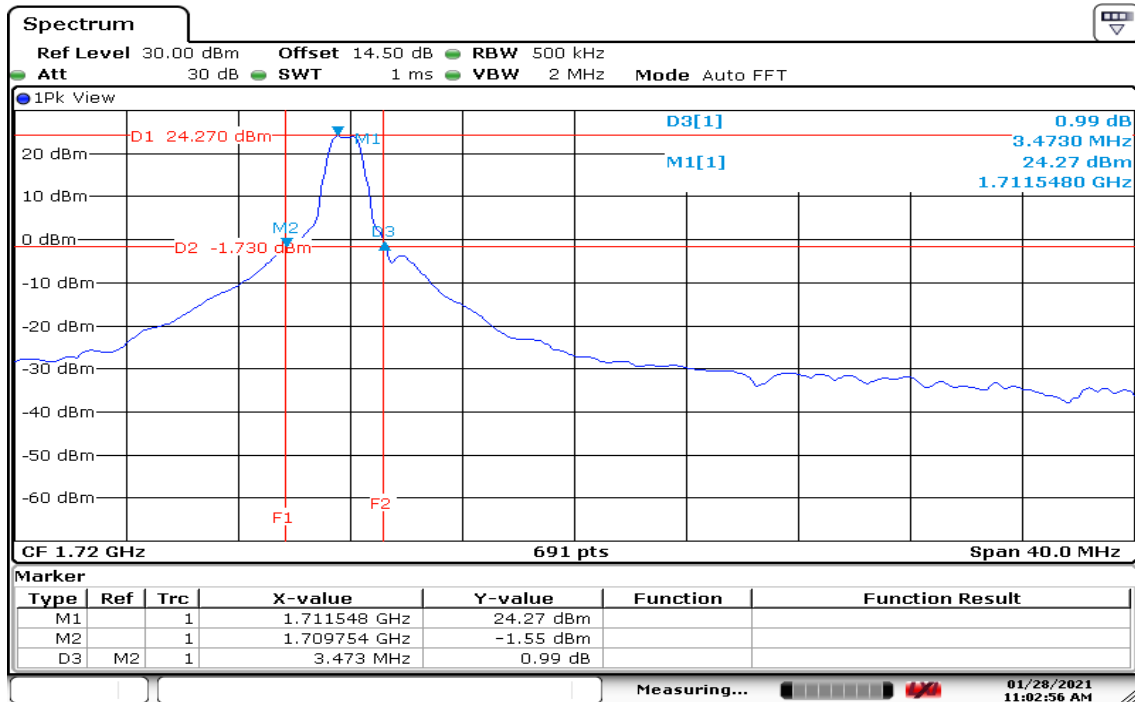


Date: 28 JAN 2021 09:36:58

Report No.: T201116W03-RP2

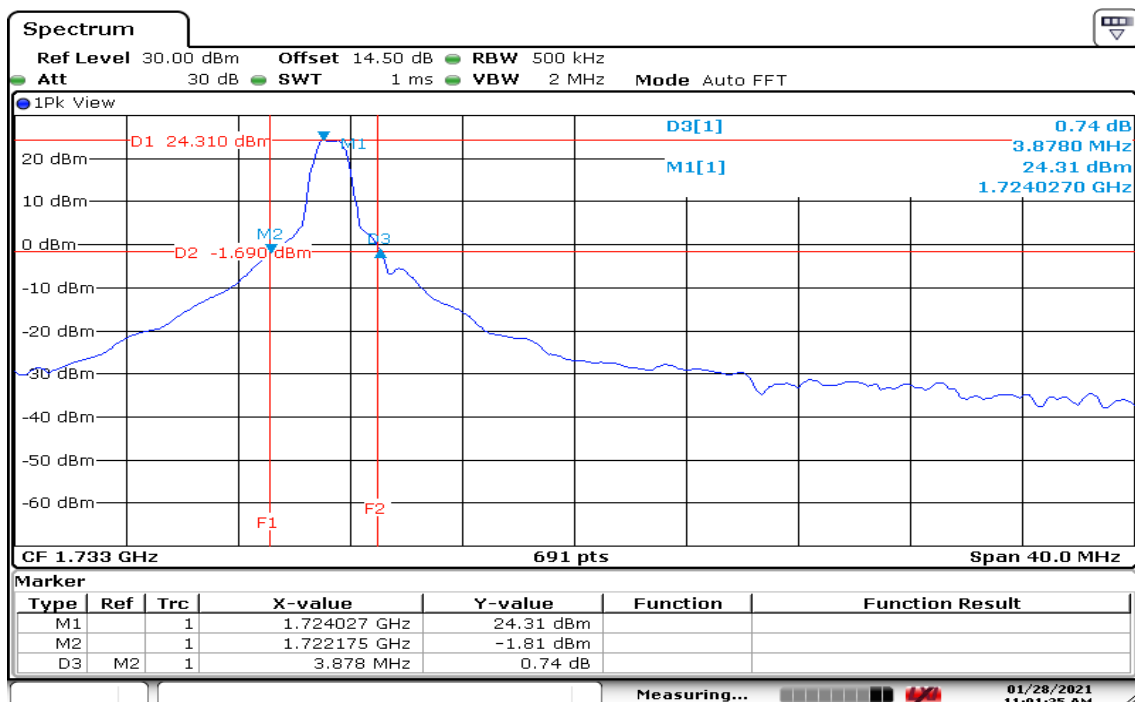
OBW (26dB): 20MHz / 16QAM

CH Low



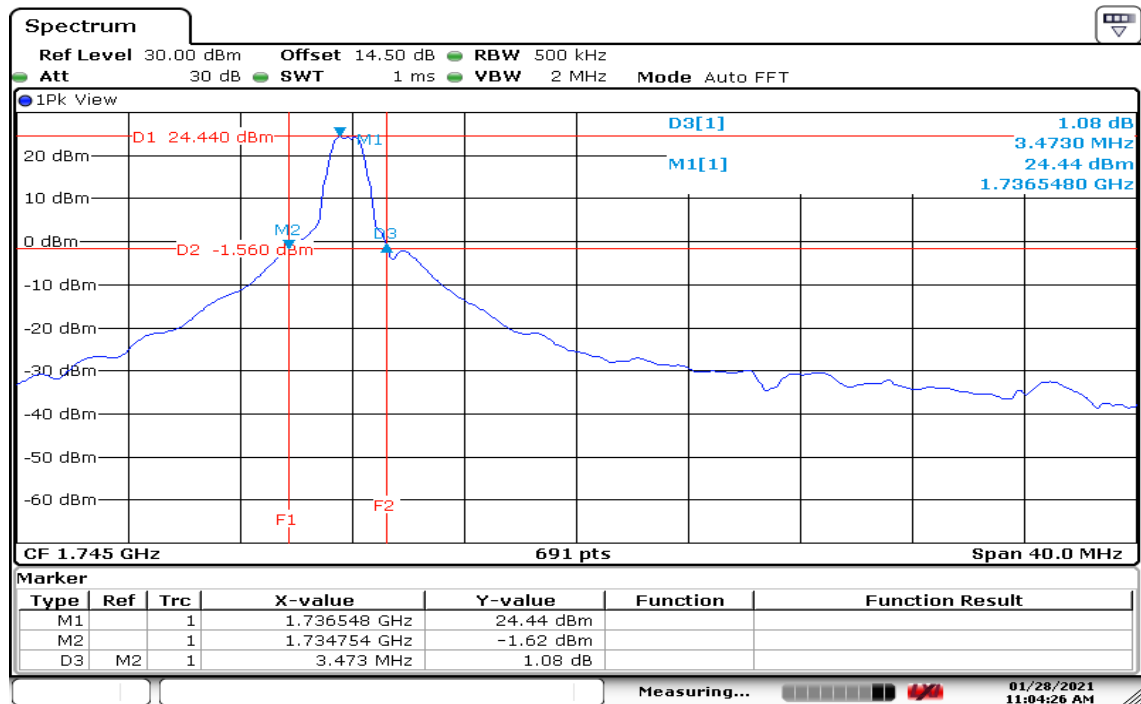
Date: 28 JAN 2021 11:02:57

CH Mid



Date: 28 JAN 2021 11:01:35

CH High



Date: 28 JAN 2021 11:04:27

8.4 PEAK TO AVERAGE POWER RATIO

LIMIT

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

TEST PROCEDURES

1. According to KDB 971168D01.
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.

TEST RESULTS**LTE Band 4**

Temperature: 23.8°C

Humidity: 55.7% RH

Tested by: Dally Hong

Test Date: January 26, 2021

Temperature: 22.3°C

Humidity: 57% RH

Tested by: Dally Hong

Test Date: January 27, 2021

CHANNEL BANDWIDTH: 1.4MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
19957	1710.7	5.07
20175	1732.5	6.20
20393	1754.3	7.88

CHANNEL BANDWIDTH: 3MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
19957	1710.7	4.90
20175	1732.5	5.07
20393	1754.3	8.06

CHANNEL BANDWIDTH: 5MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
19957	1710.7	8.12
20175	1732.5	4.52
20393	1754.3	3.68

CHANNEL BANDWIDTH: 10MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
19957	1710.7	5.07
20175	1732.5	5.01
20393	1754.3	5.04

CHANNEL BANDWIDTH: 15MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
19957	1710.7	6.12
20175	1732.5	8.38
20393	1754.3	5.22

CHANNEL BANDWIDTH: 20MHz / QPSK / Full RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
19957	1710.7	8.35
20175	1732.5	8.46
20393	1754.3	8.23

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

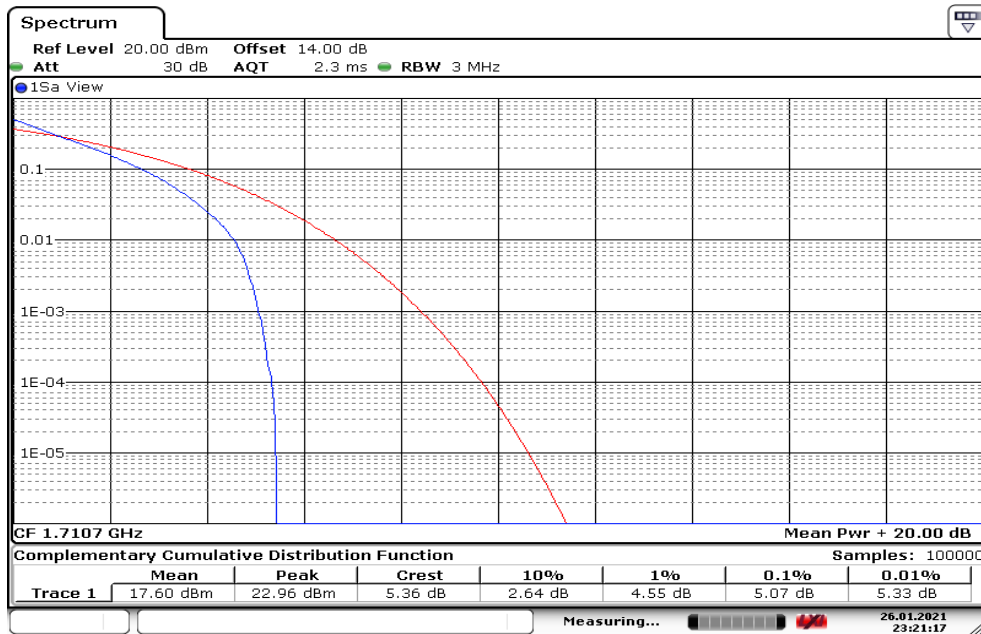
Report No.: T201116W03-RP2

LTE Band 4

QPSK / RB = 6, RB Offset = 0

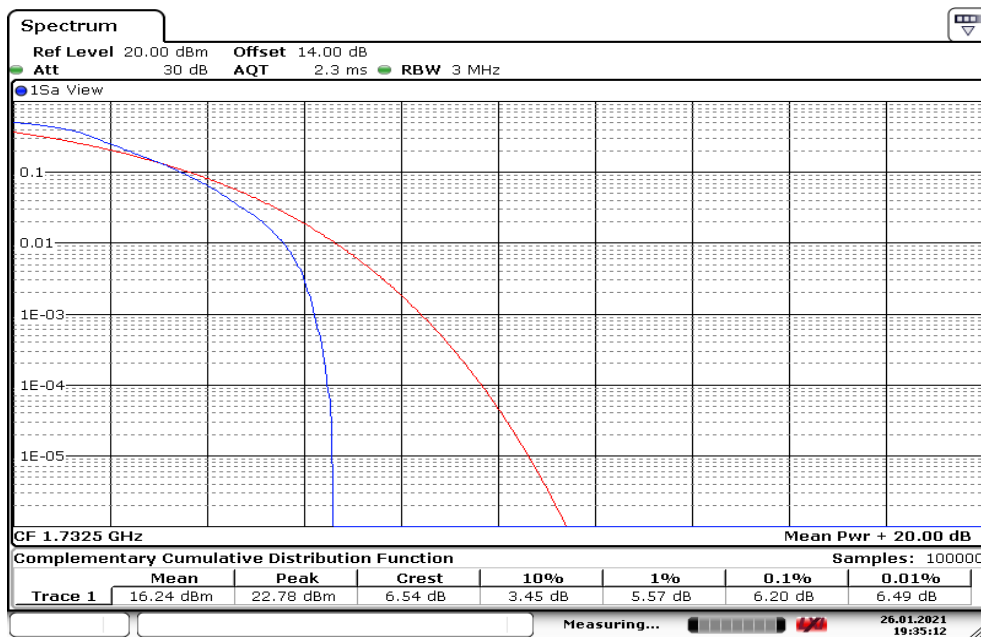
BW: 1.4MHz

CH Low



Date: 26 JAN 2021 23:21:17

CH Mid



Date: 26 JAN 2021 19:35:12

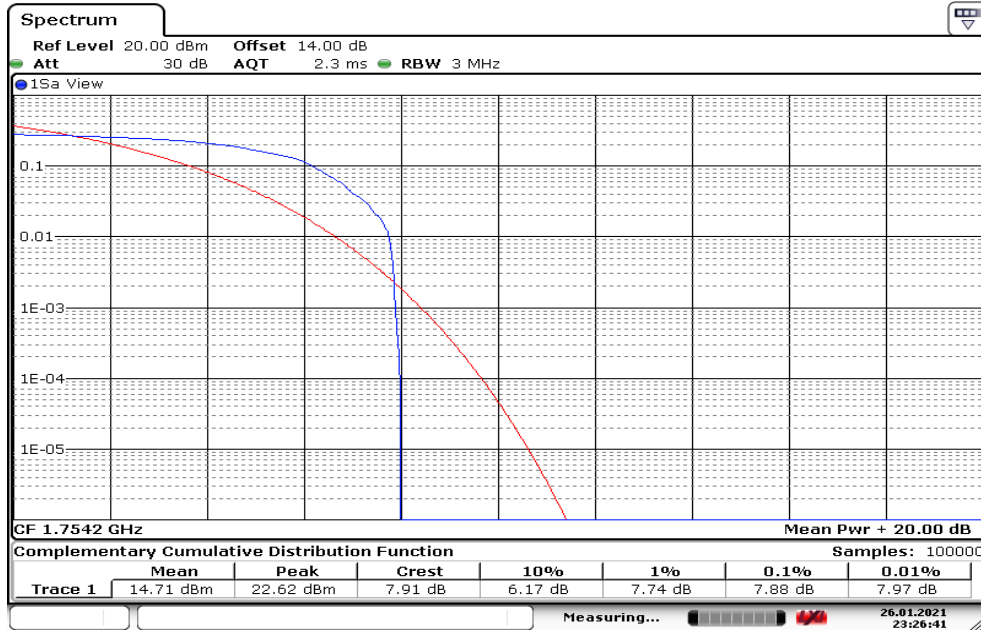


Report No.: T201116W03-RP2

Page: 79 / 134

Rev.: 01

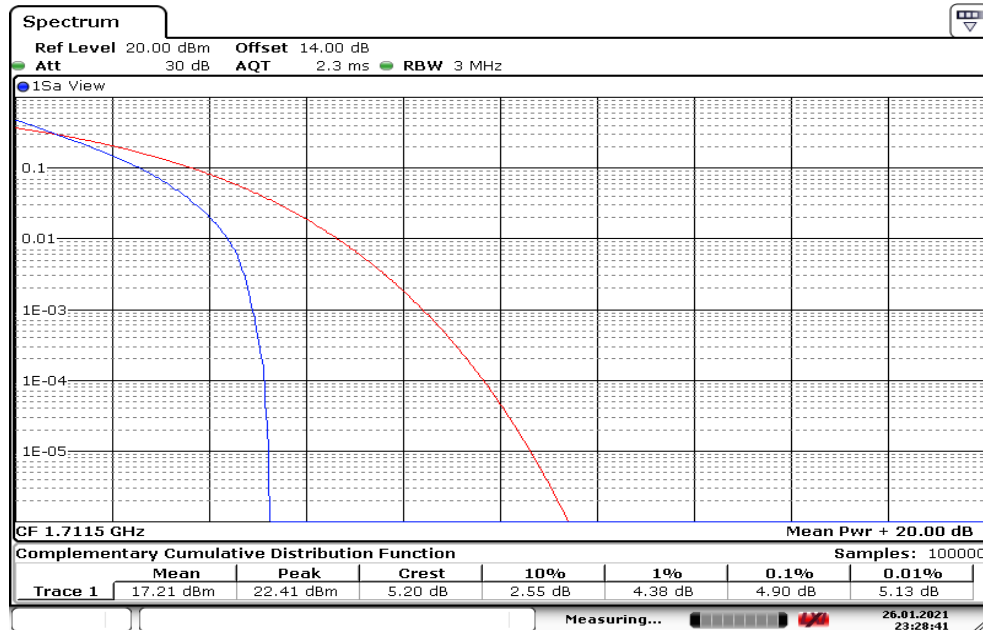
CH High



Date: 26 JAN 2021 23:26:42

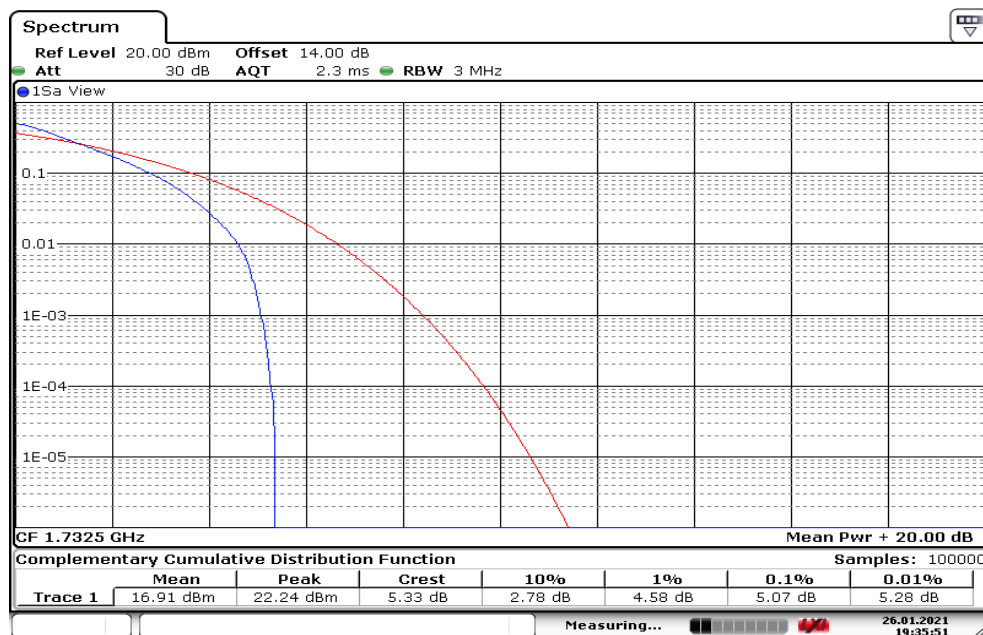
BW: 3MHz

CH Low



Date: 26.JAN.2021 23:28:41

CH Mid



Date: 26.JAN.2021 19:35:51

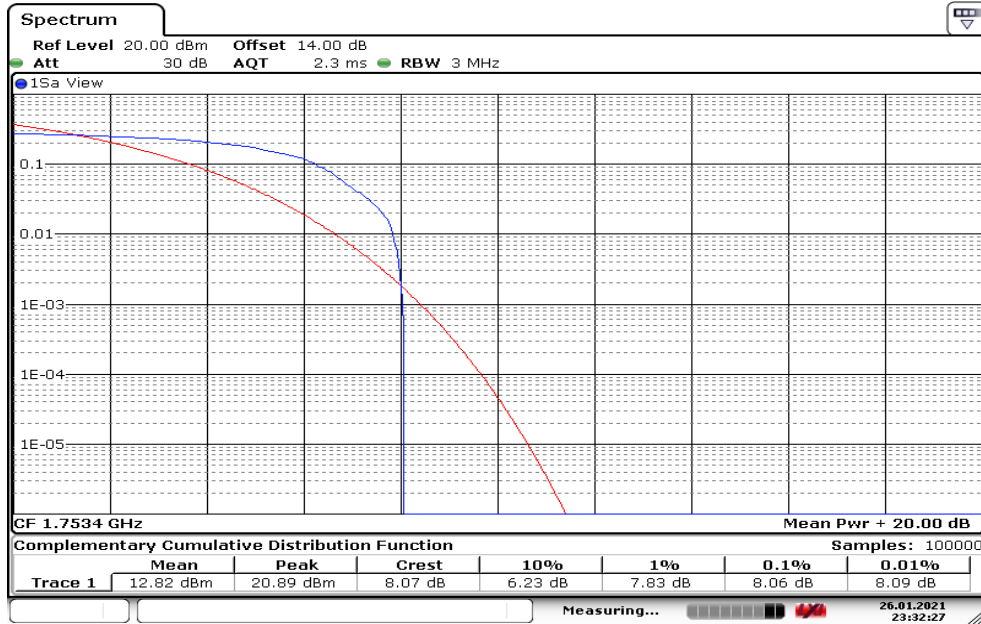


Report No.: T201116W03-RP2

Page: 81 / 134

Rev.: 01

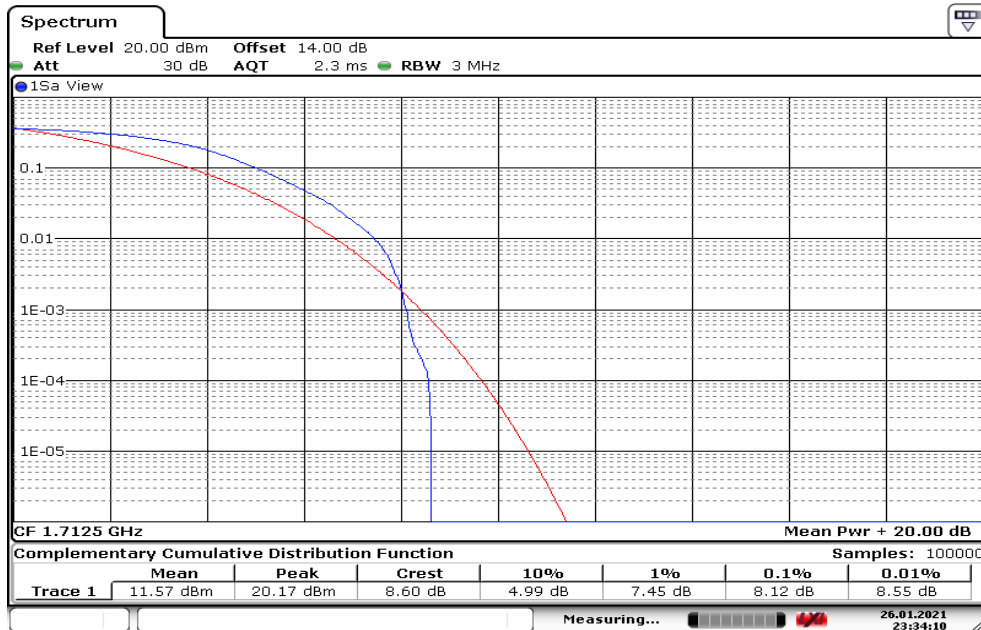
CH High



Date: 26 JAN 2021 23:32:27

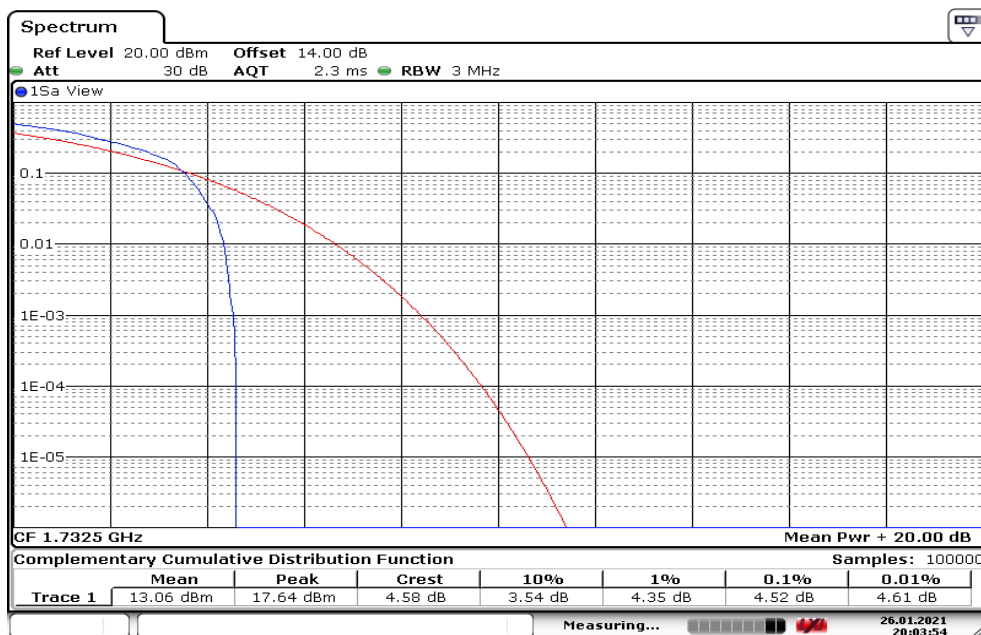
BW: 5MHz

CH Low



Date: 26 JAN 2021 23:34:11

CH Mid



Date: 26 JAN 2021 20:03:54

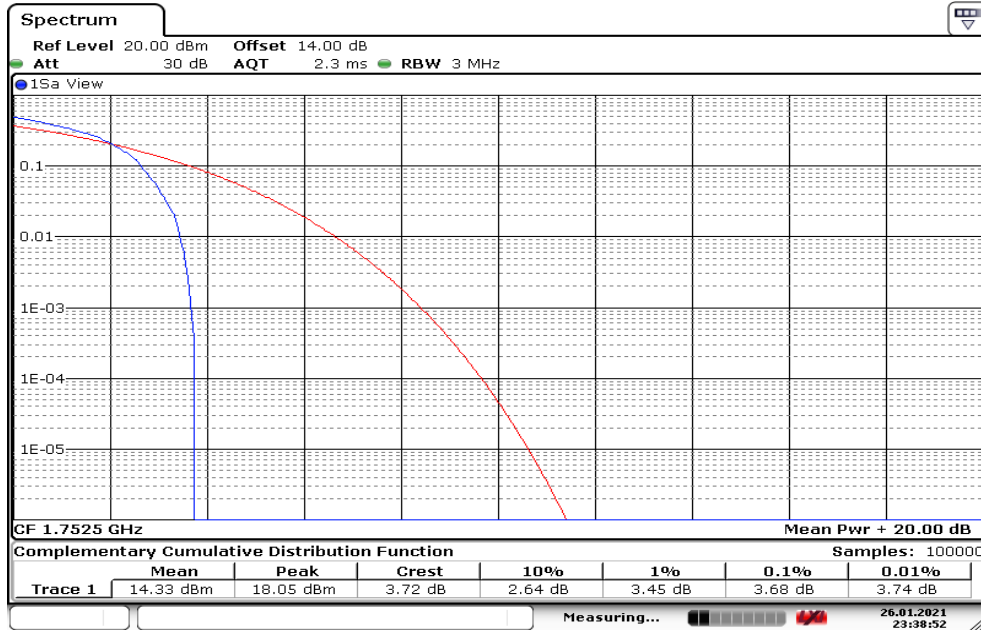


Report No.: T201116W03-RP2

Page: 83 / 134

Rev.: 01

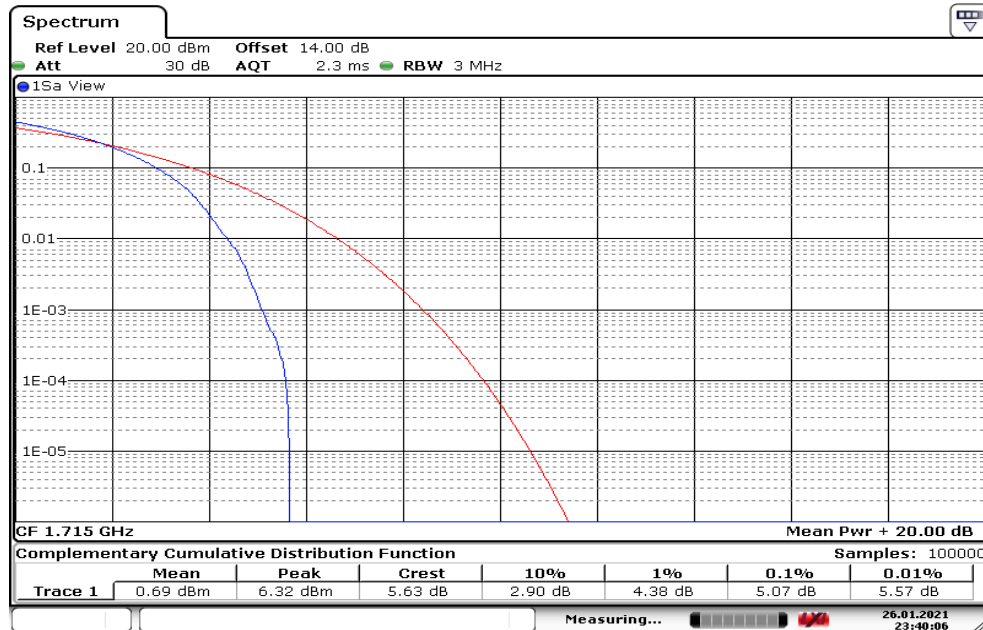
CH High



Date: 26 JAN 2021 23:38:52

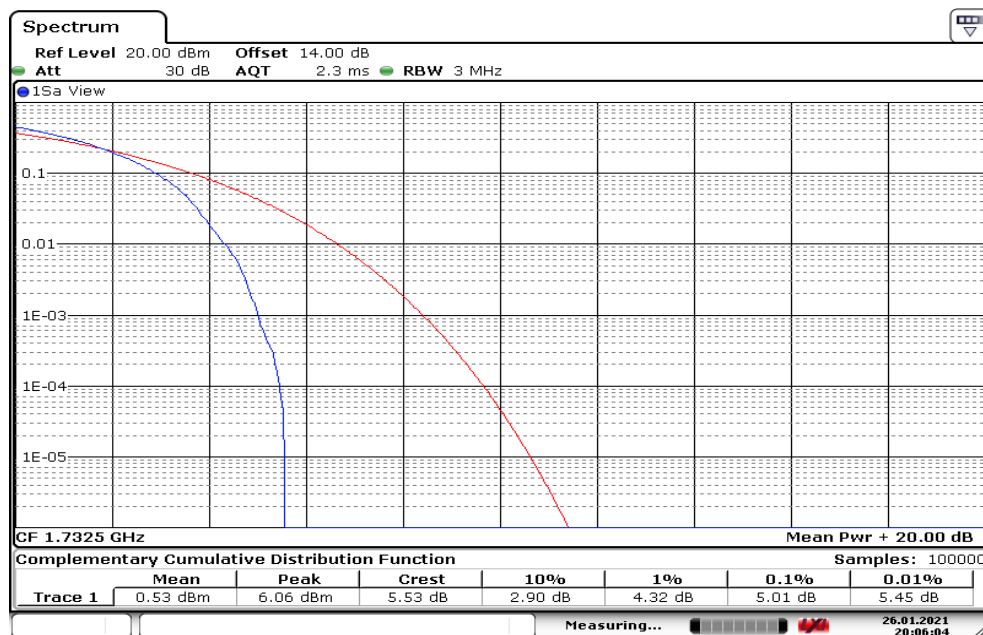
BW: 10MHz

CH Low



Date: 26 JAN 2021 23:40:07

CH Mid



Date: 26 JAN 2021 20:06:04

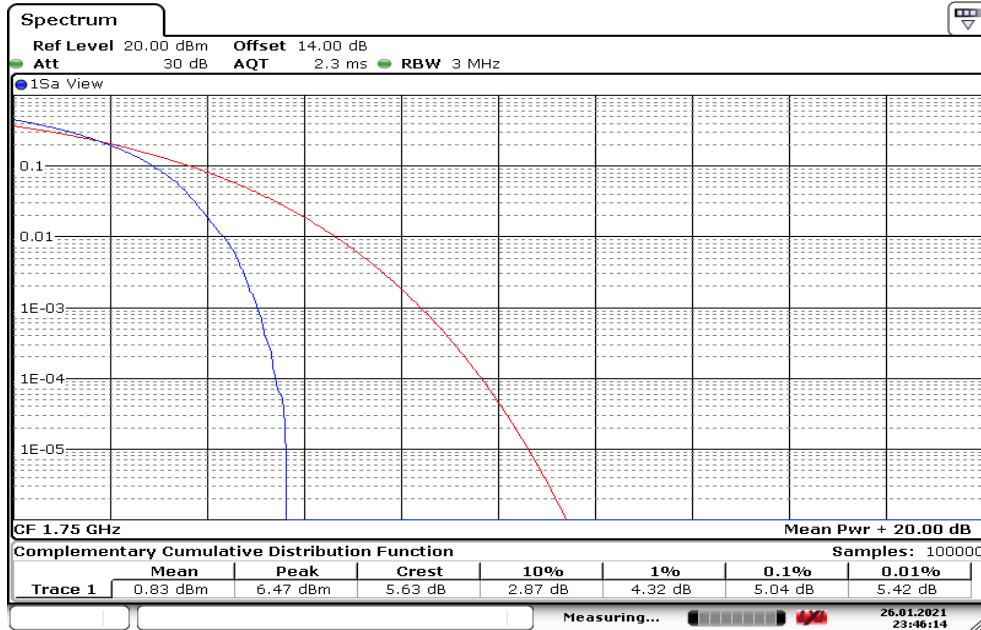


Report No.: T201116W03-RP2

Page: 85 / 134

Rev.: 01

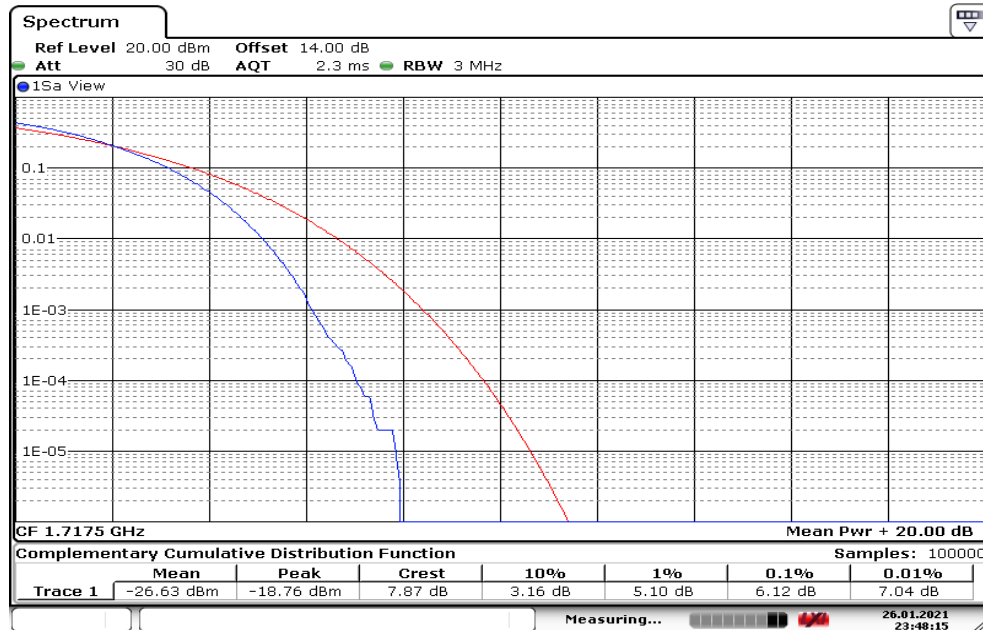
CH High



Date: 26 JAN 2021 23:46:15

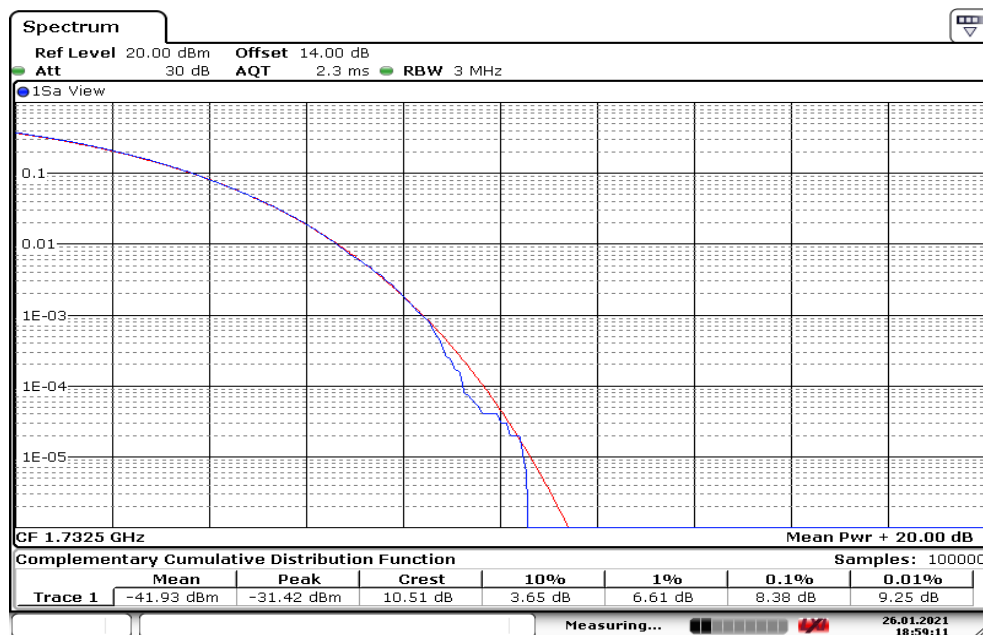
BW: 15MHz

CH Low



Date: 26.JAN.2021 23:48:16

CH Mid



Date: 26.JAN.2021 18:59:11

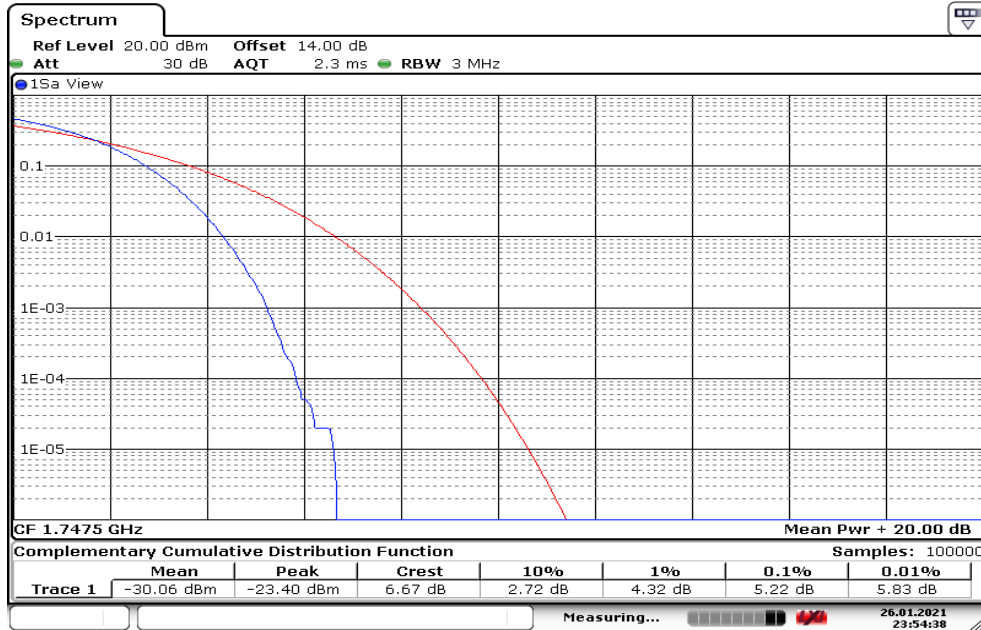


Report No.: T201116W03-RP2

Page: 87 / 134

Rev.: 01

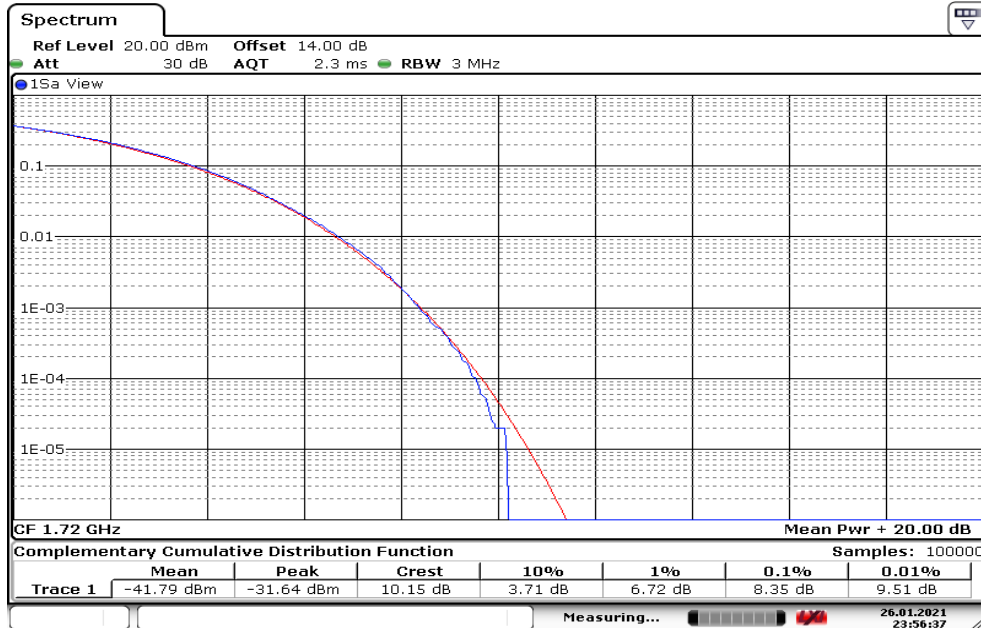
CH High



Date: 26 JAN 2021 23:54:38

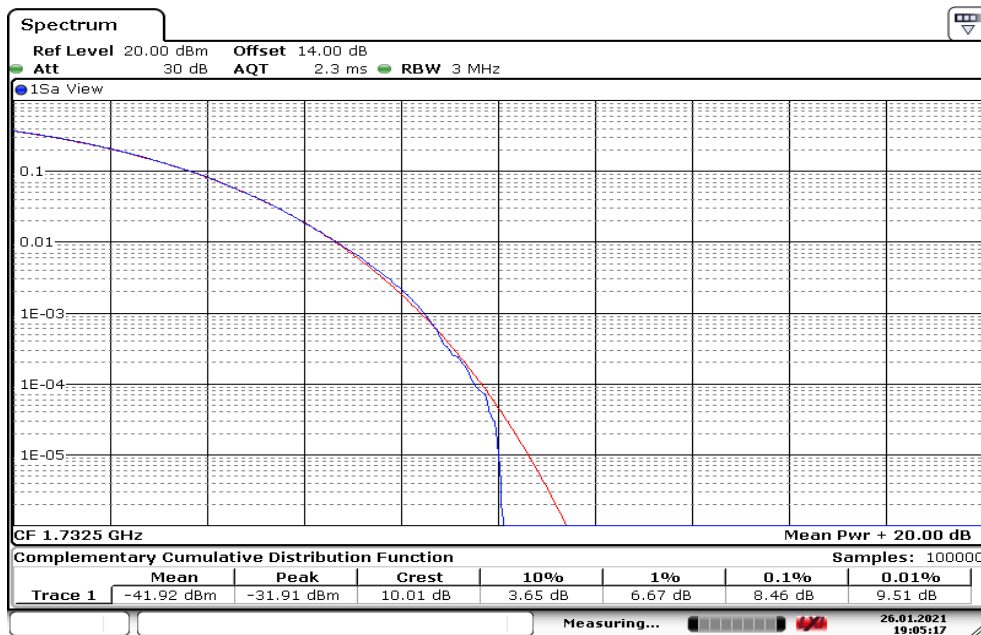
BW: 20MHz

CH Low



Date: 26.JAN.2021 23:56:37

CH Mid



Date: 26.JAN.2021 19:05:18

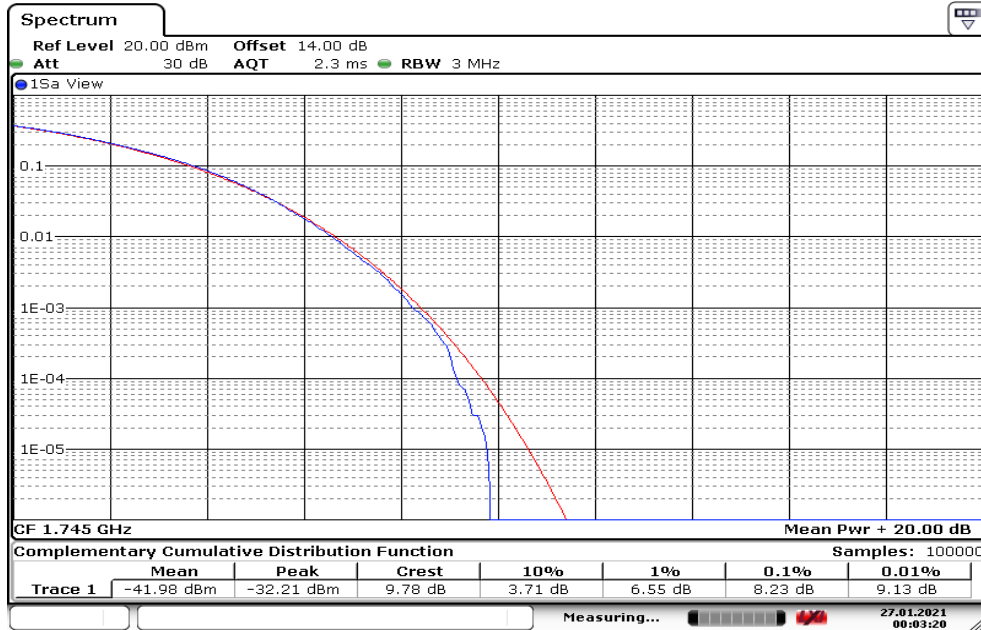


Report No.: T201116W03-RP2

Page: 89 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 00:03:21

8.5 BAND EDGE MEASUREMENT

LIMIT

Part 27.53(h), Band 4

General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

TEST PROCEDURES

KDB 971168 D01 Power Meas License Digital Systems – Section 6.0

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.

TEST RESULTS:

Temperature: 22.3°C

Humidity: 57% RH

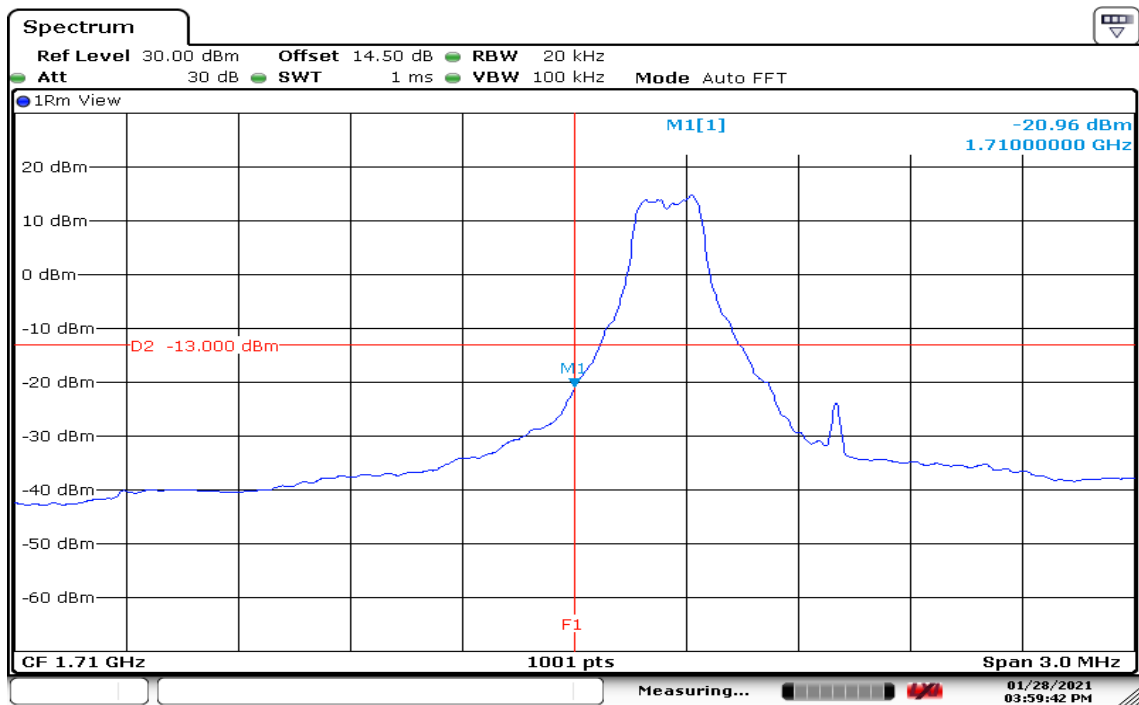
Tested by: Dally Hong

Test Date: January 28, 2021

LTE Band 4

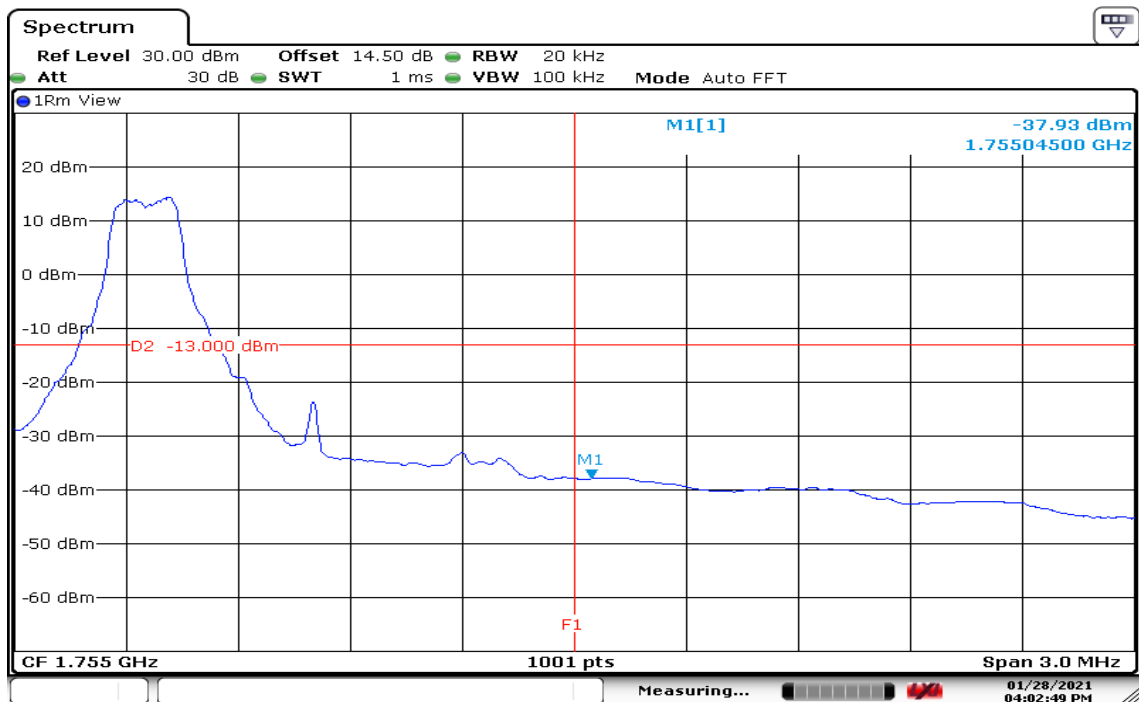
CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



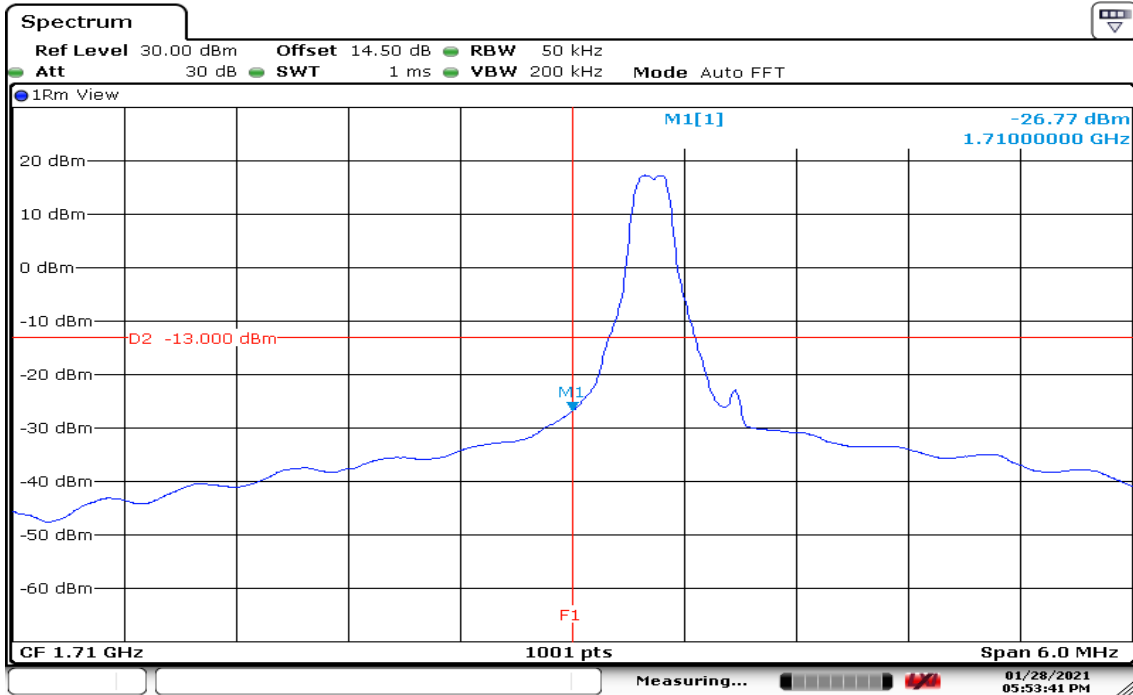
Date: 28 JAN 2021 15:59:42

HIGHER BAND EDGE



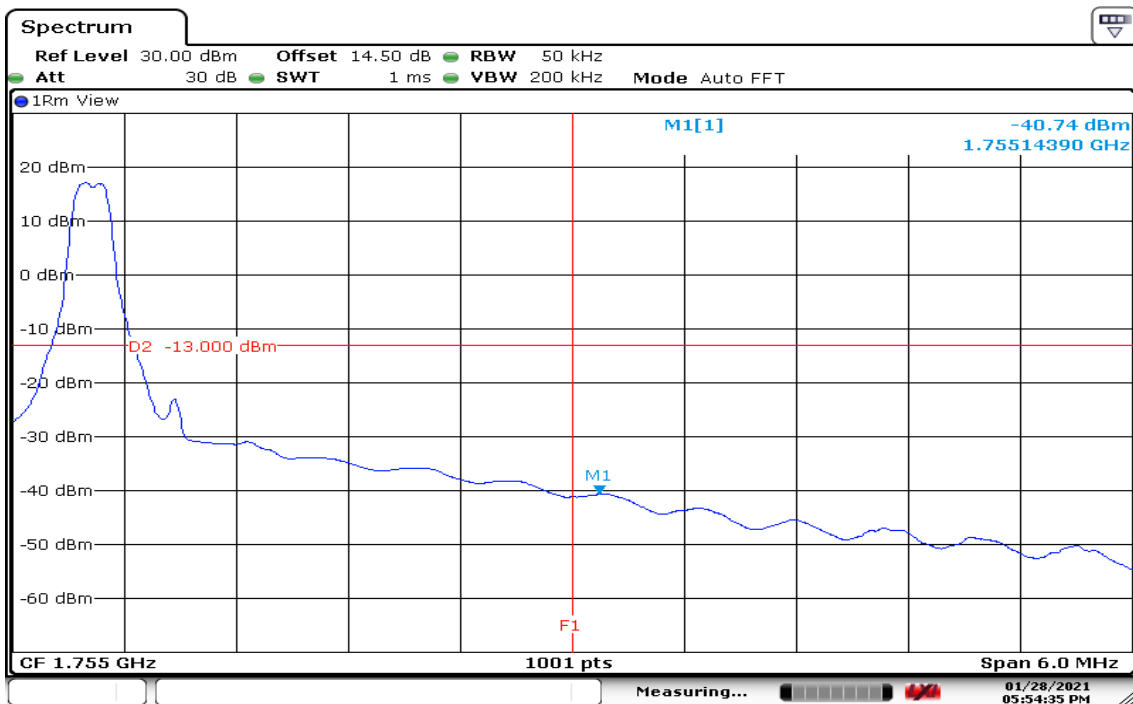
Date: 28 JAN 2021 16:02:49

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



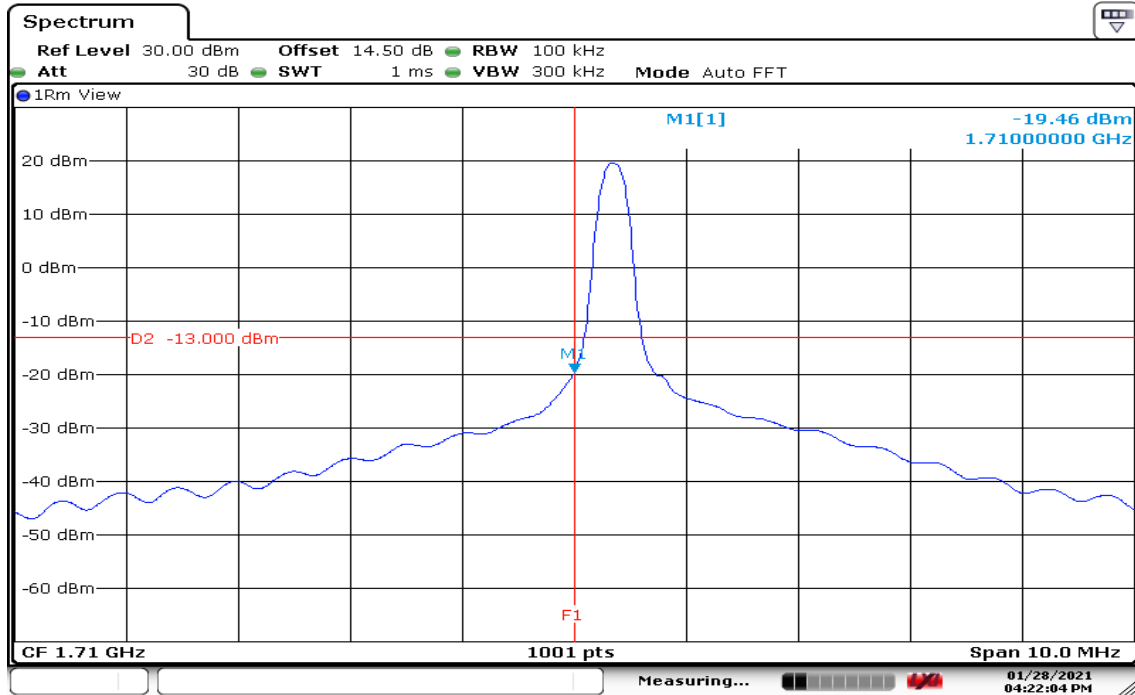
Date: 28 JAN 2021 17:53:41

HIGHER BAND EDGE



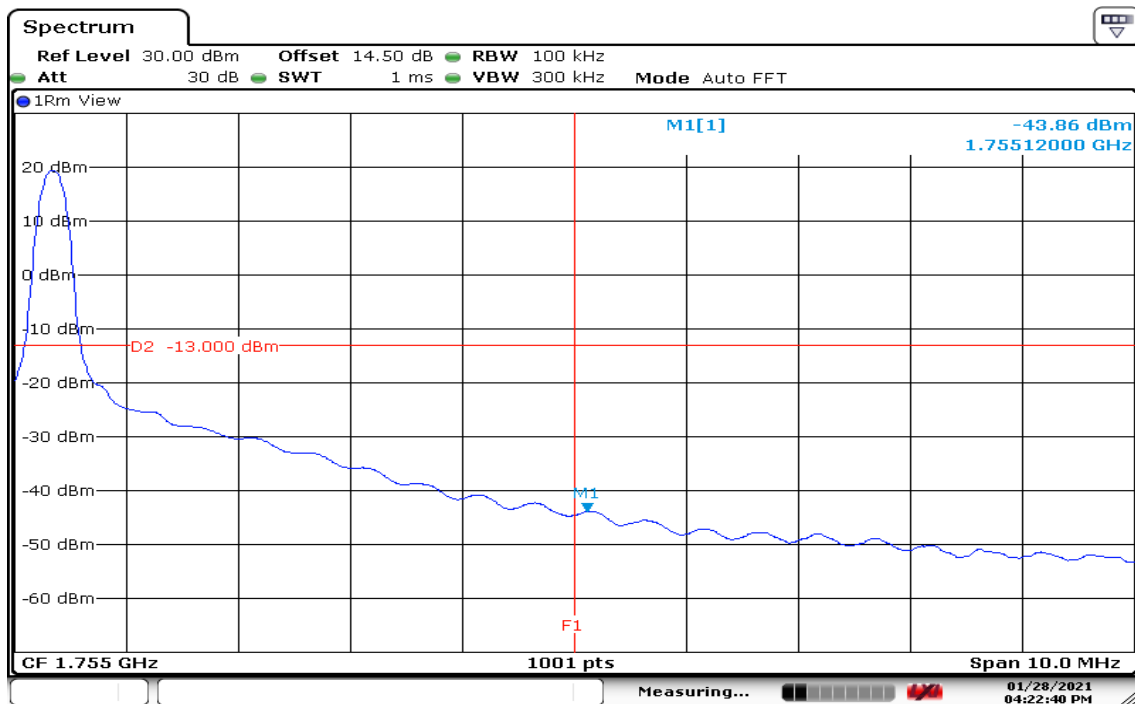
Date: 28 JAN 2021 17:54:35

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



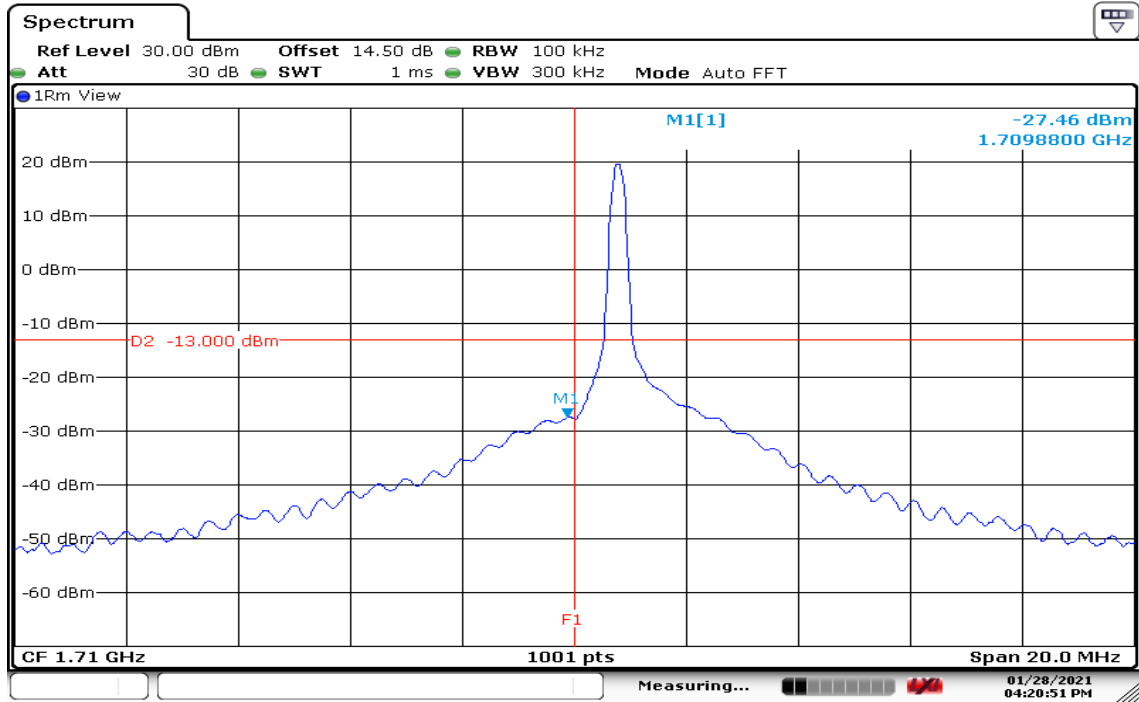
Date: 28 JAN 2021 16:22:04

HIGHER BAND EDGE



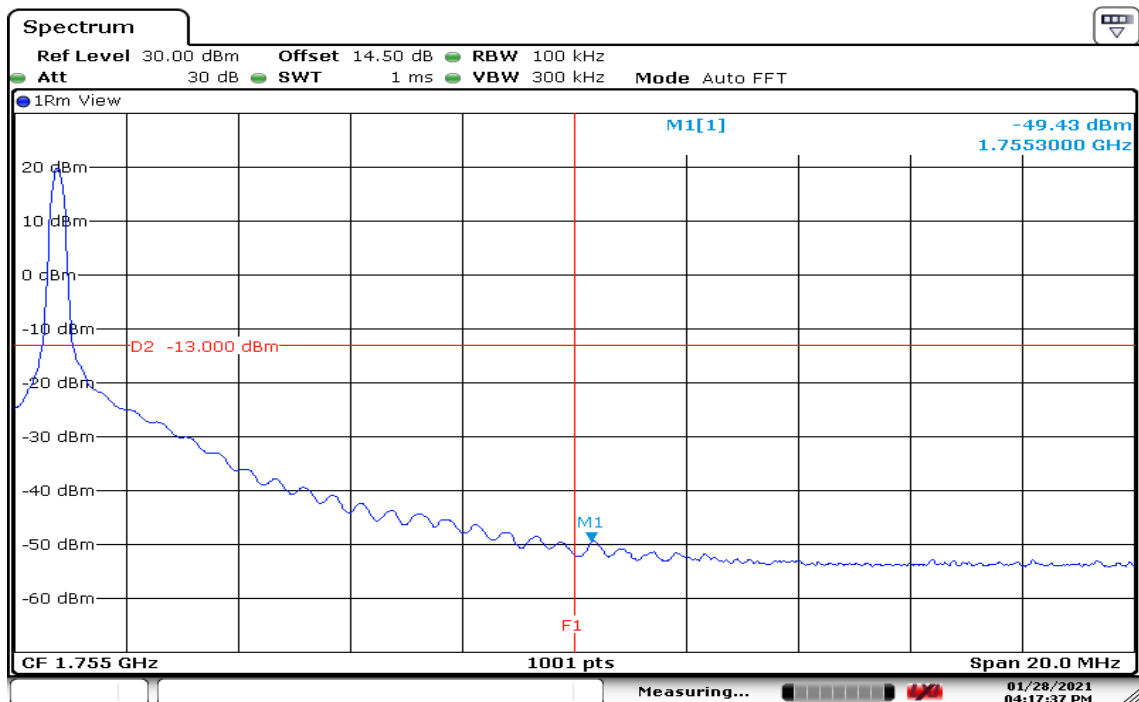
Date: 28 JAN 2021 16:22:41

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



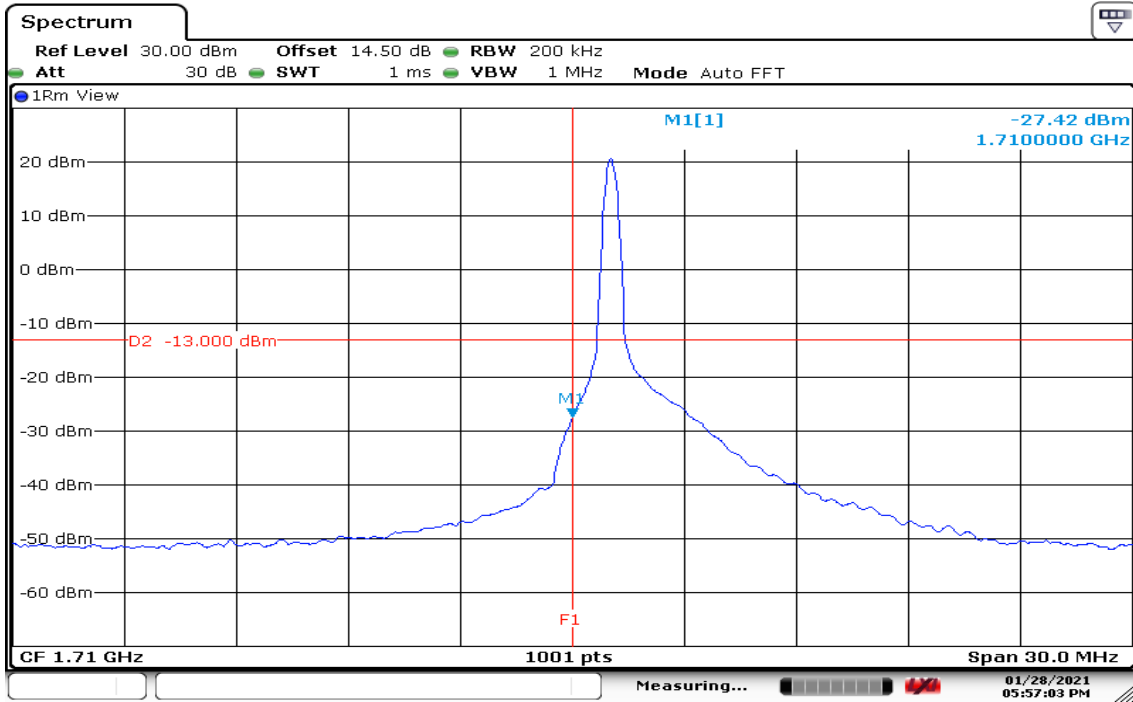
Date: 28 JAN 2021 16:20:51

HIGHER BAND EDGE



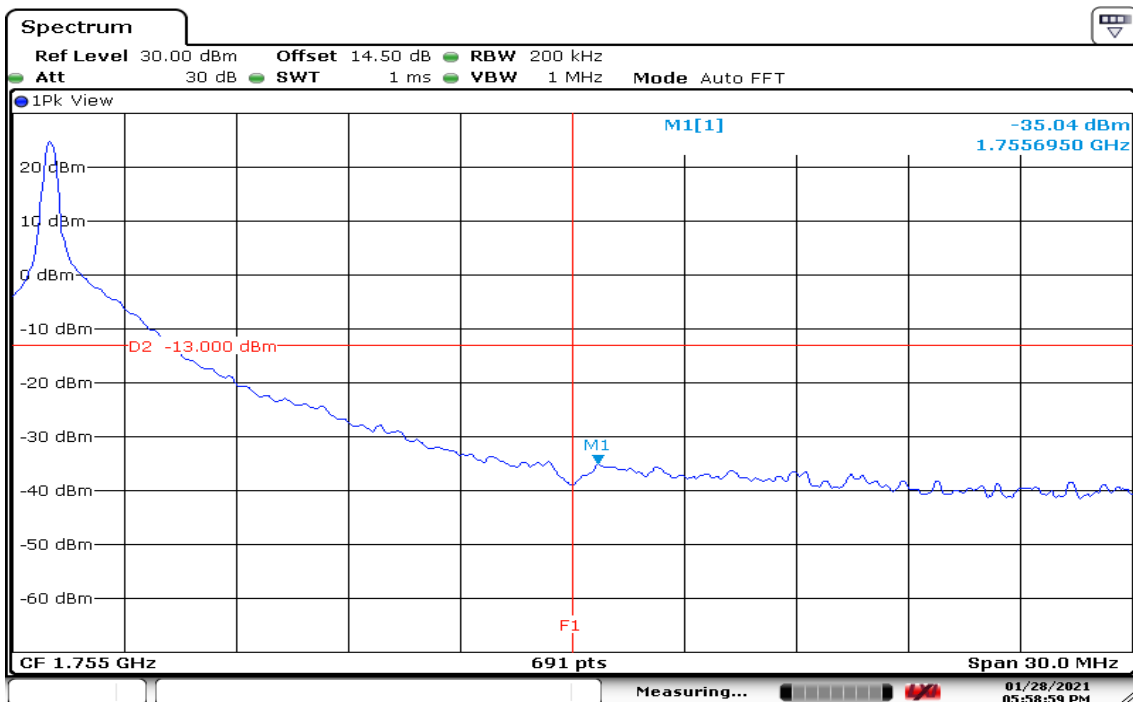
Date: 28 JAN 2021 16:17:37

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



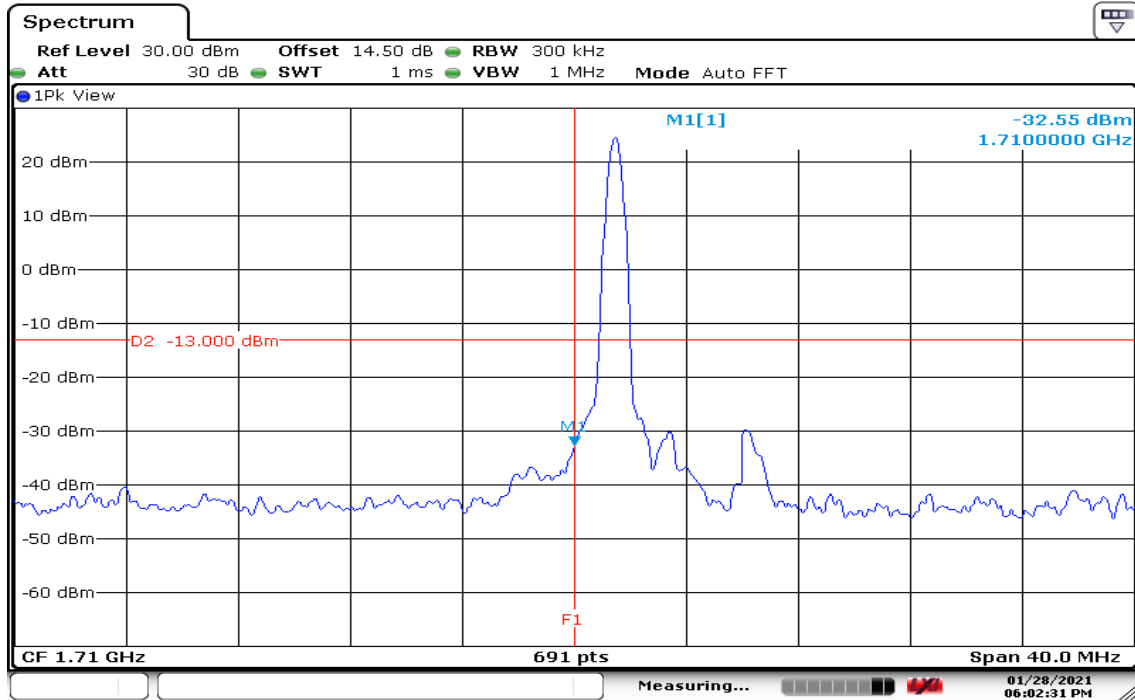
Date: 28 JAN 2021 17:57:04

HIGHER BAND EDGE



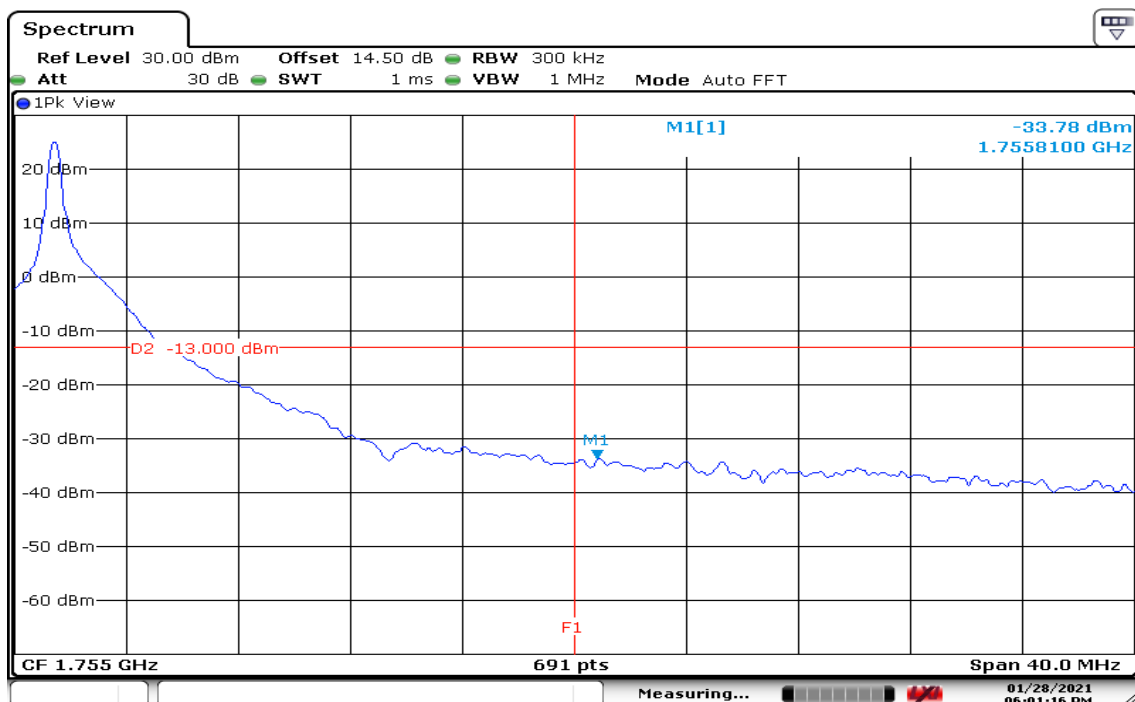
Date: 28 JAN 2021 17:58:59

CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB ALLOCATION LOWER BAND EDGE



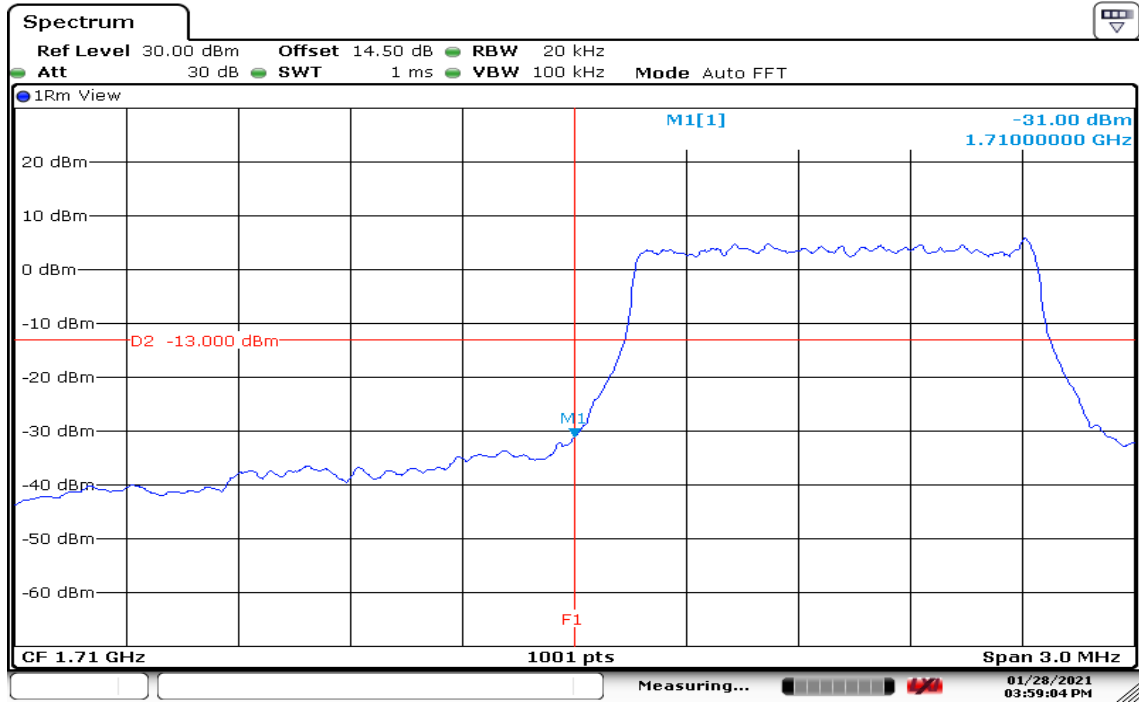
Date: 28 JAN 2021 18:02:32

HIGHER BAND EDGE



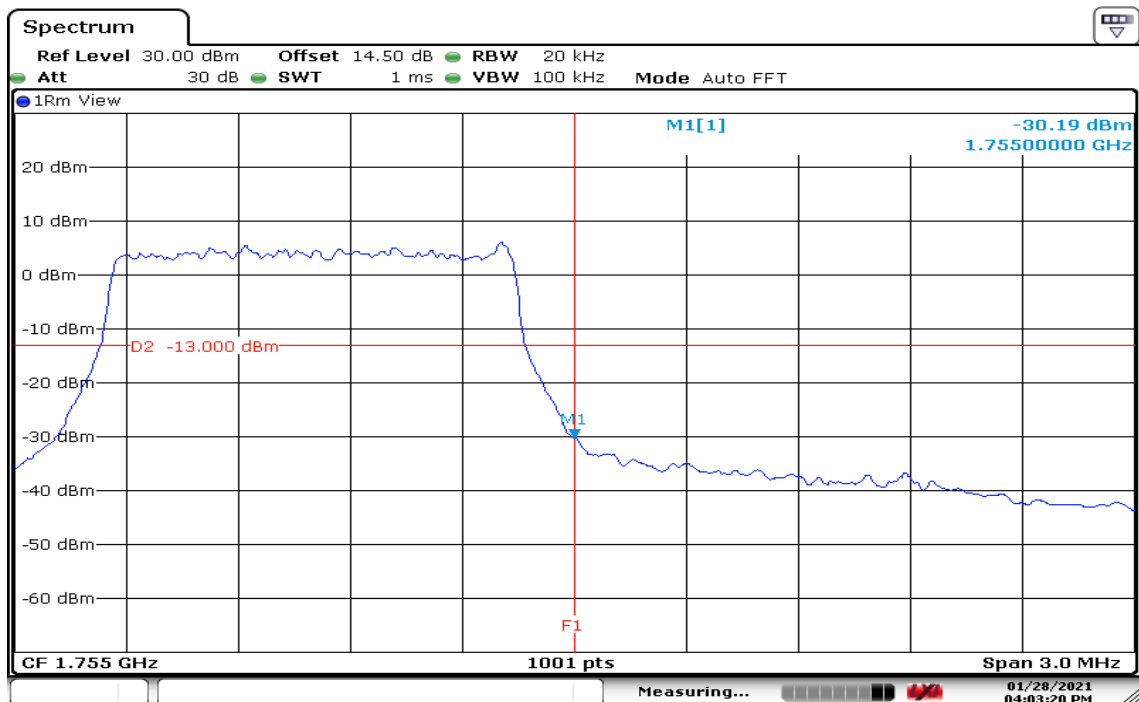
Date: 28 JAN 2021 18:01:17

CHANNEL BANDWIDTH: 1.4MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



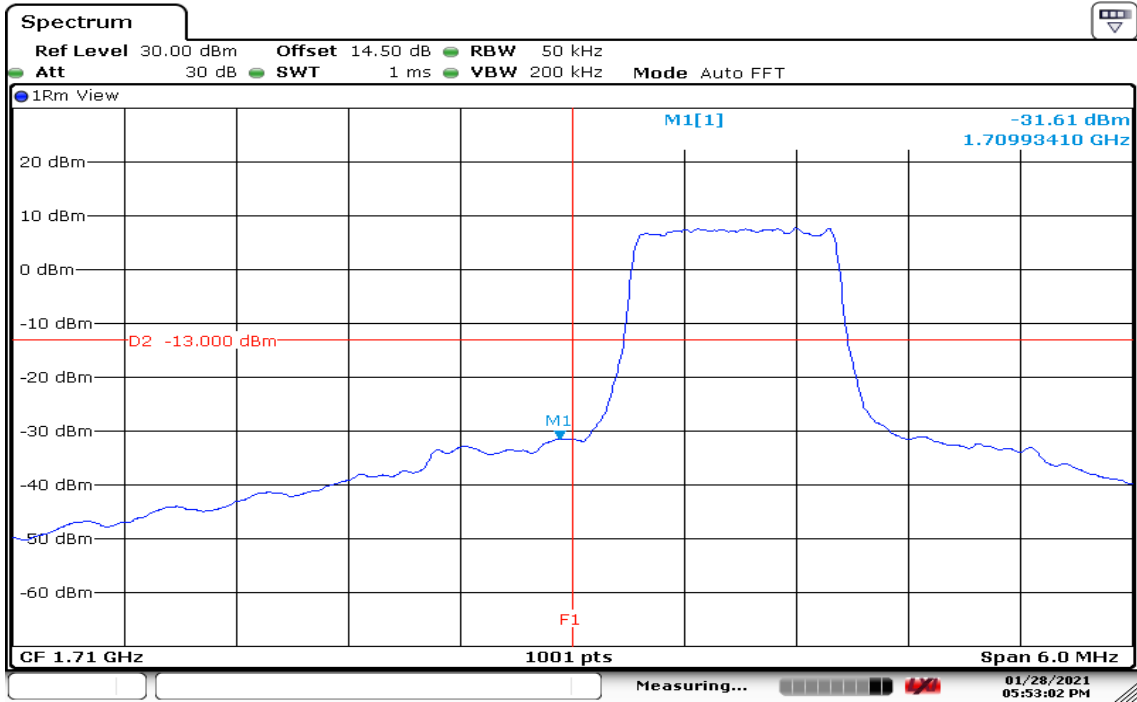
Date: 28 JAN 2021 15:59:04

HIGHER BAND EDGE



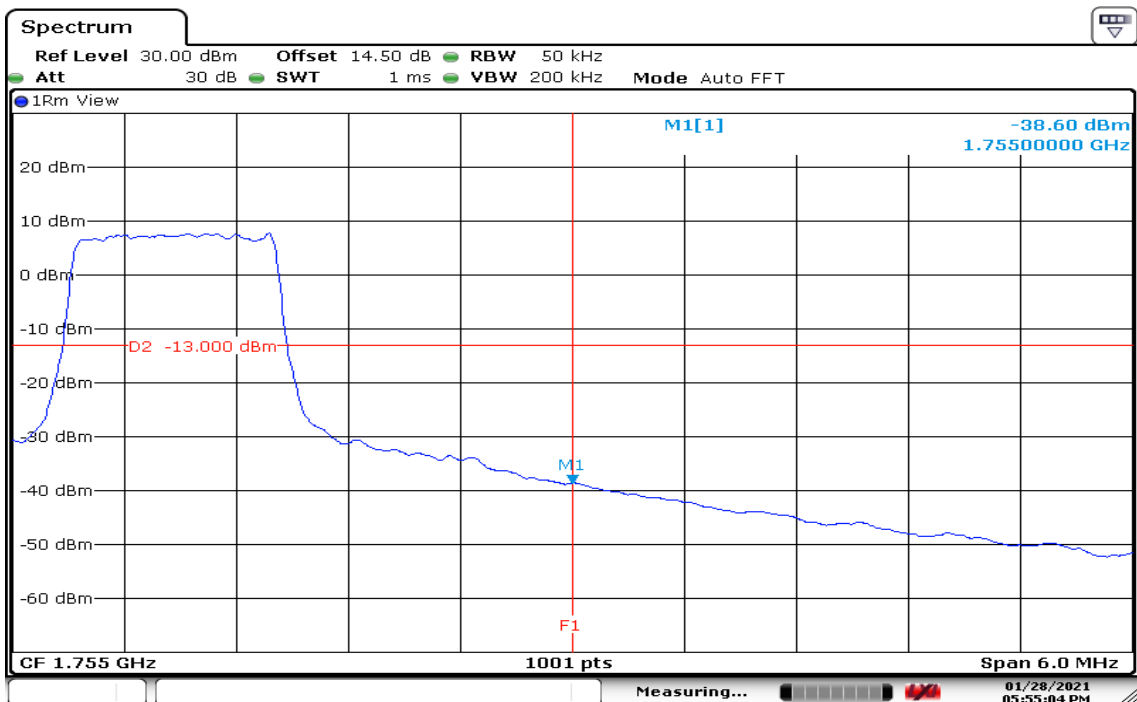
Date: 28 JAN 2021 16:03:20

CHANNEL BANDWIDTH: 3MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



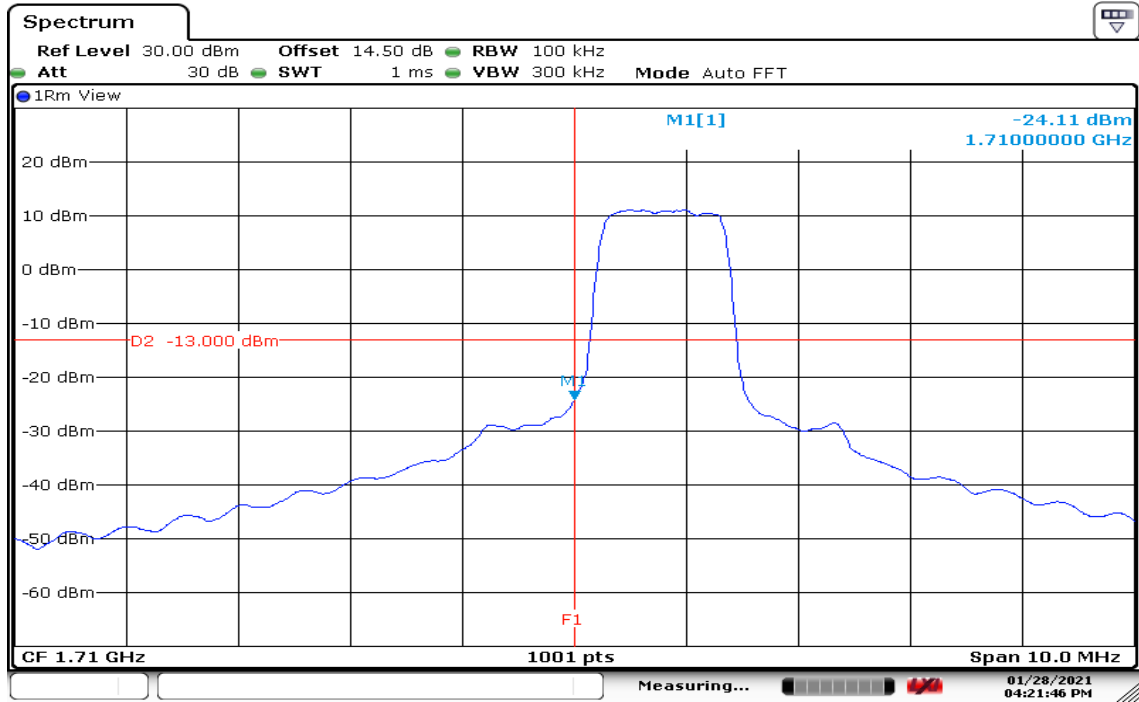
Date: 28 JAN 2021 17:53:02

HIGHER BAND EDGE



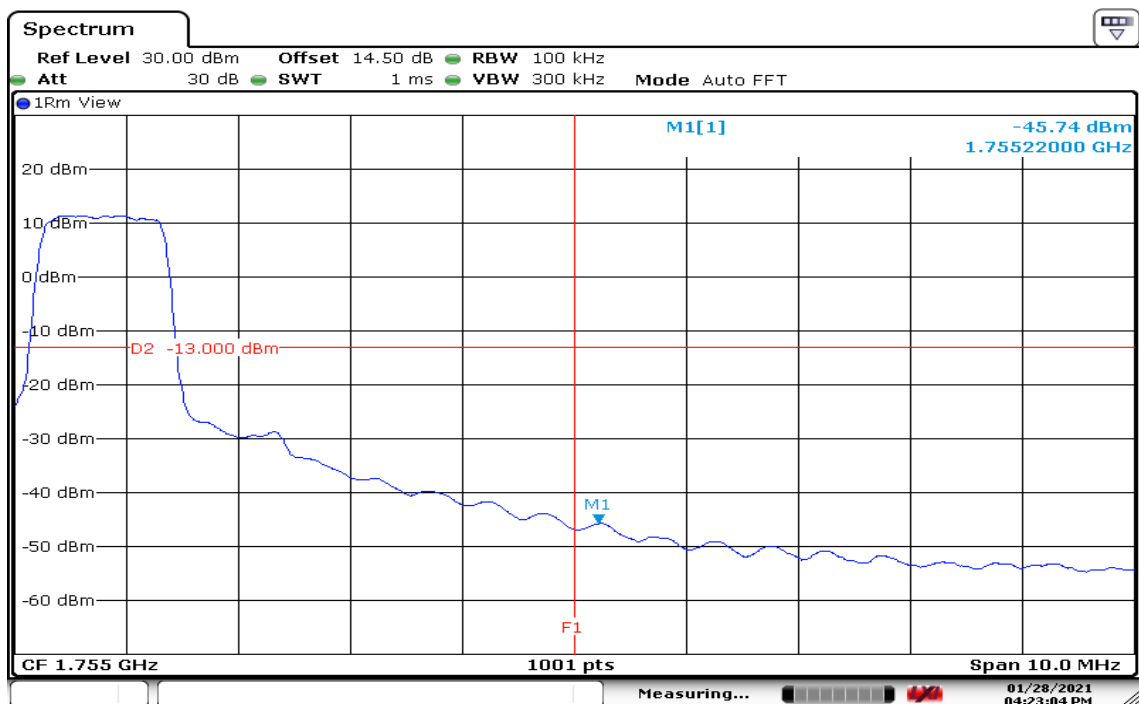
Date: 28 JAN 2021 17:55:05

CHANNEL BANDWIDTH: 5MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



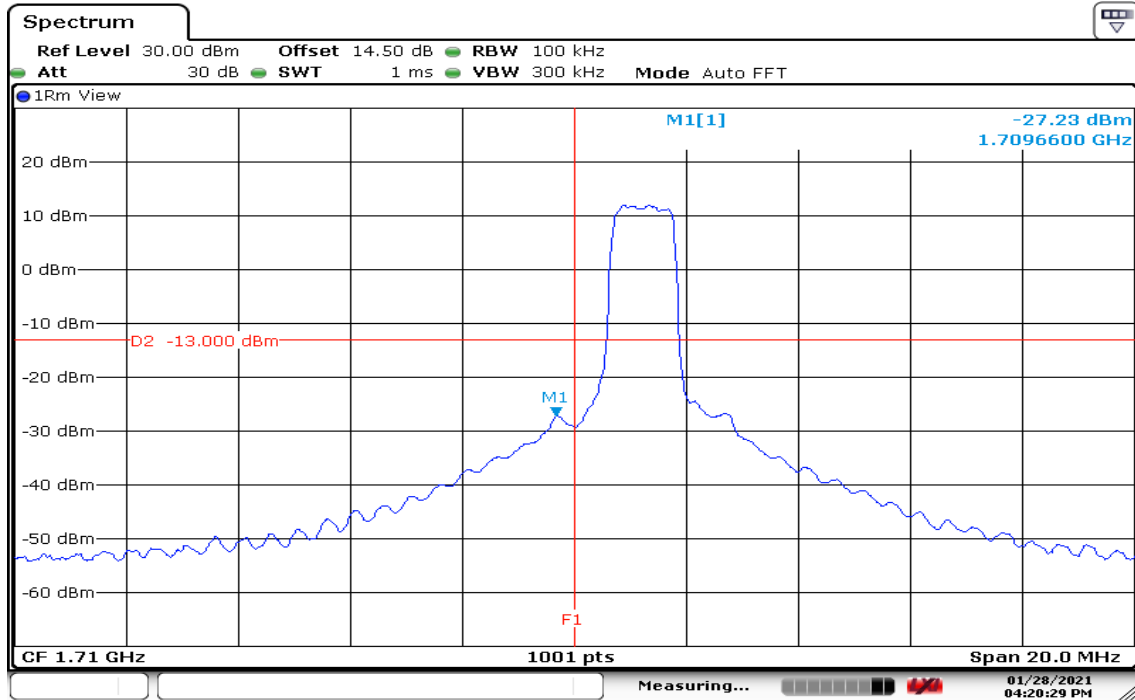
Date: 28 JAN 2021 16:21:46

HIGHER BAND EDGE



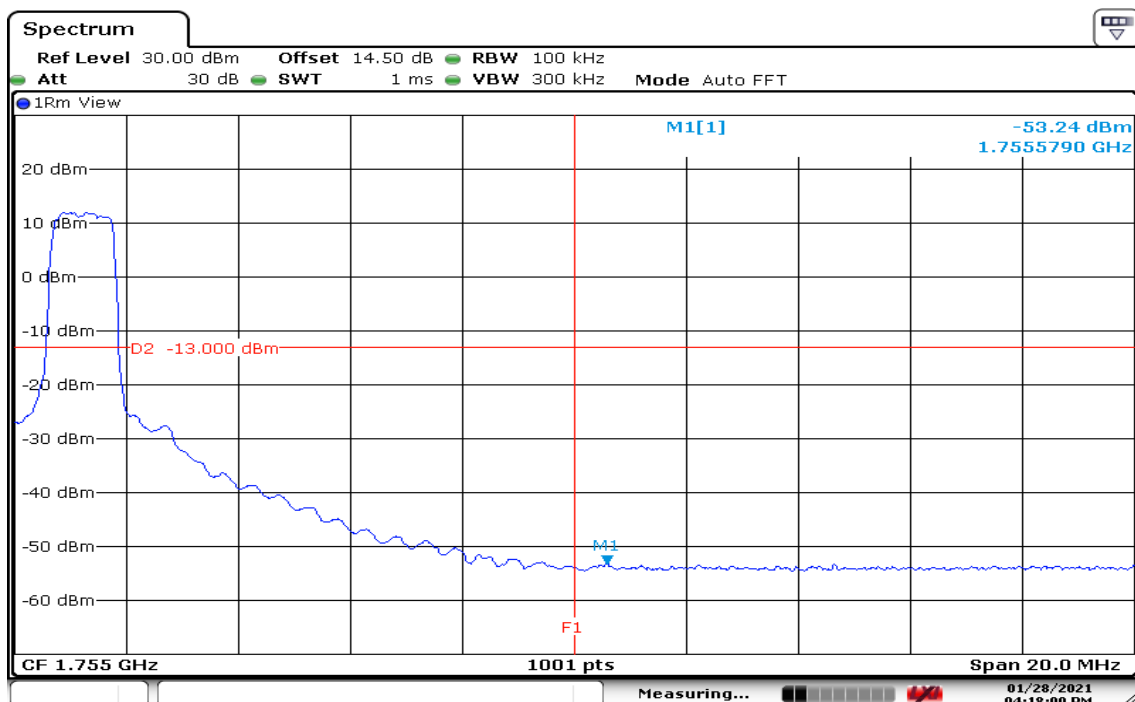
Date: 28 JAN 2021 16:23:05

CHANNEL BANDWIDTH: 10MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



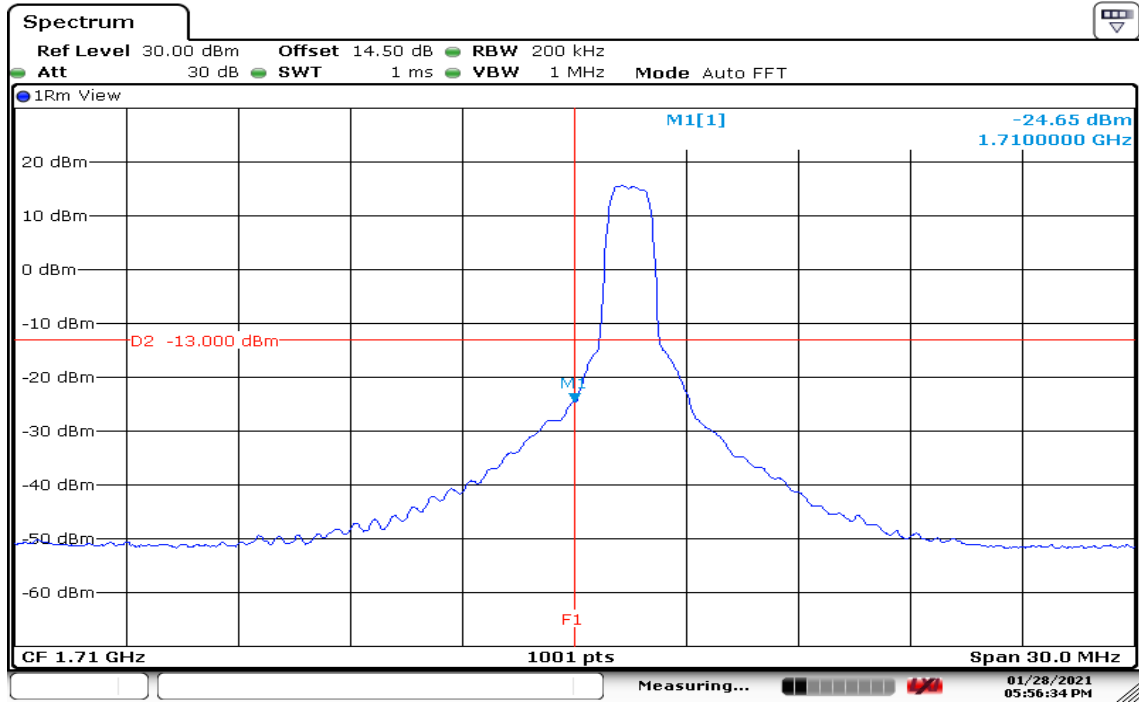
Date: 28 JAN 2021 16:20:29

HIGHER BAND EDGE



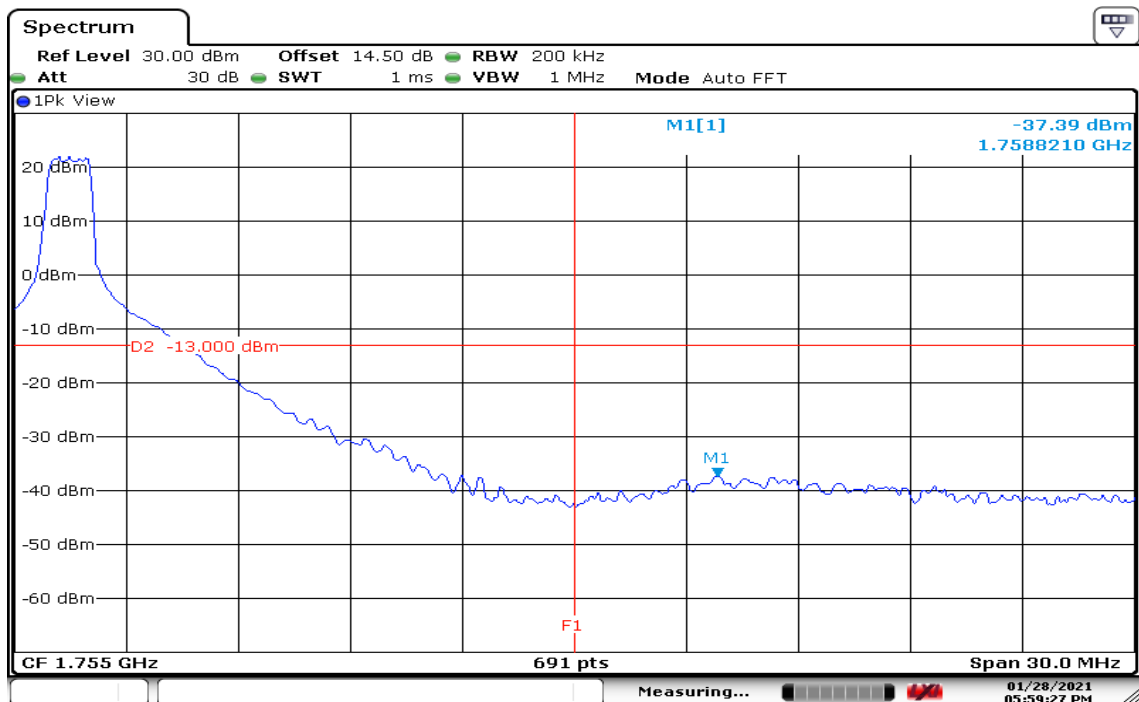
Date: 28 JAN 2021 16:18:01

CHANNEL BANDWIDTH: 15MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



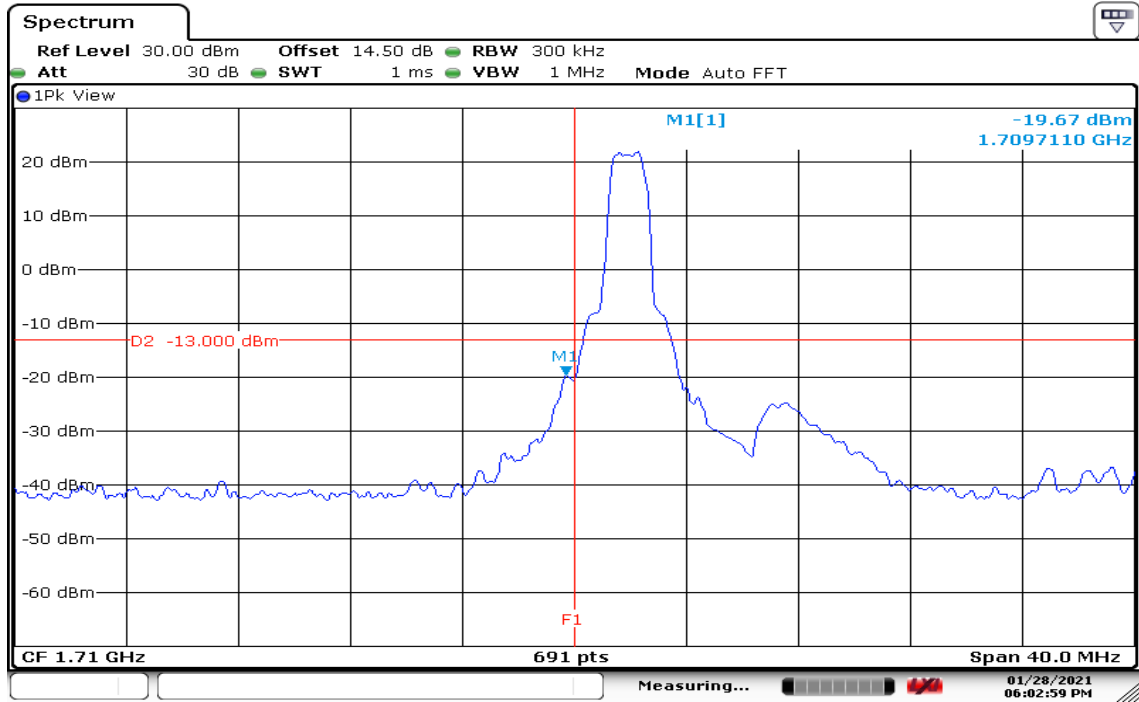
Date: 28 JAN 2021 17:56:34

HIGHER BAND EDGE



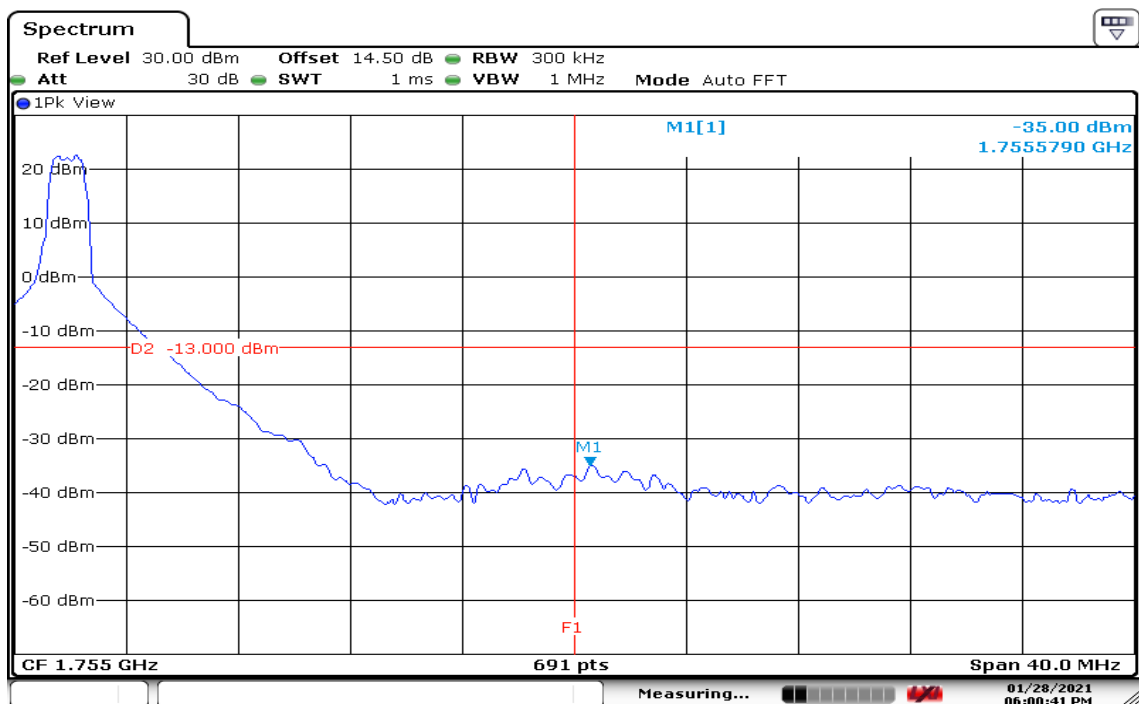
Date: 28 JAN 2021 17:59:27

CHANNEL BANDWIDTH: 20MHz / QPSK / FULLRB ALLOCATION LOWER BAND EDGE



Date: 28 JAN 2021 18:02:59

HIGHER BAND EDGE



Date: 28 JAN 2021 18:00:42

8.6 CONDUCTED SPURIOUS EMISSIONS

LIMITS

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

TEST PROCEDURES

1. According to KDB 971168D01, photograph 6.0
2. The EUT was connect to spectrum analyzer and call box.
3. The RF output of EUT was connected to the spectrum analyzer.
4. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
5. Record the maximum spurious emission.
6. The fundamental frequency should be excluded against the limit in operating band.

TEST RESULTS

Temperature: 22.3°C

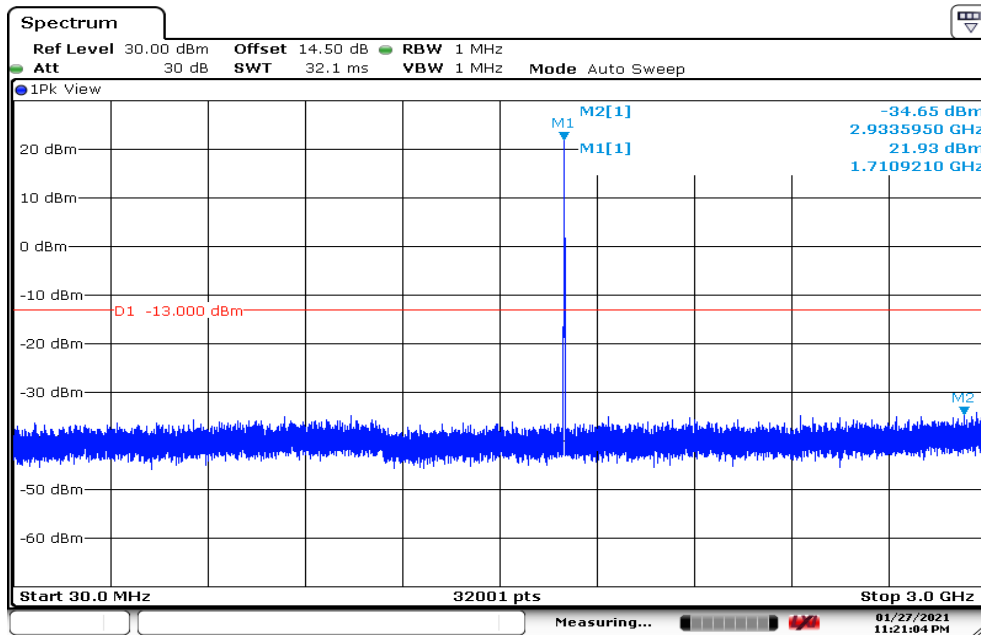
Humidity: 57% RH

Tested by: Dally Hong

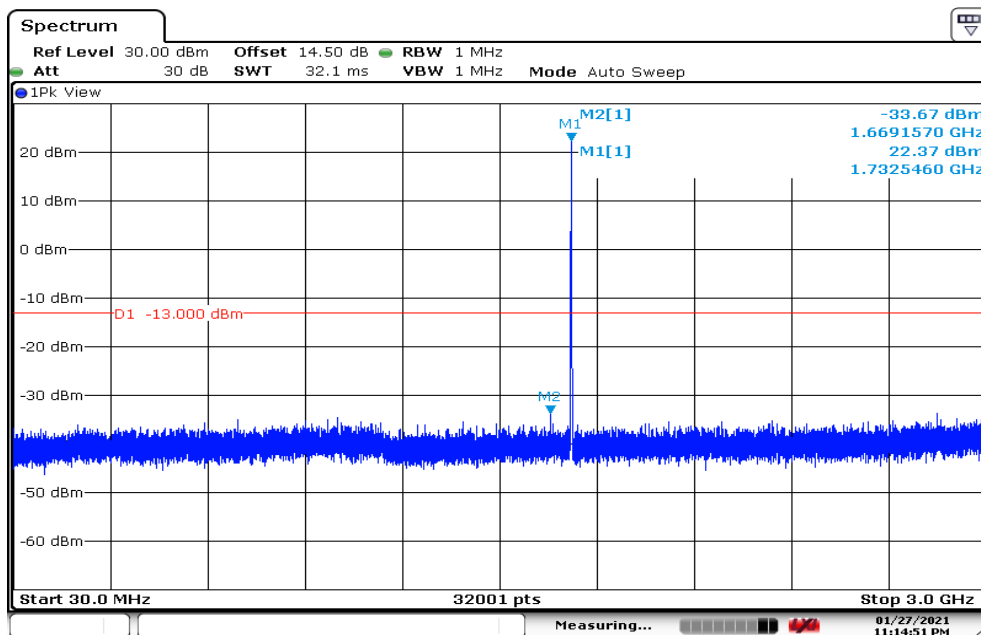
Test Date: January 27, 2021



Report No.: T201116W03-RP2

LTE Band 4**QPSK / 1RB****CHANNEL BANDWIDTH: 1.4MHz / 30MHz-3GHz****CH Low**

Date: 27 JAN 2021 23:21:05

CH Mid

Date: 27 JAN 2021 23:14:51

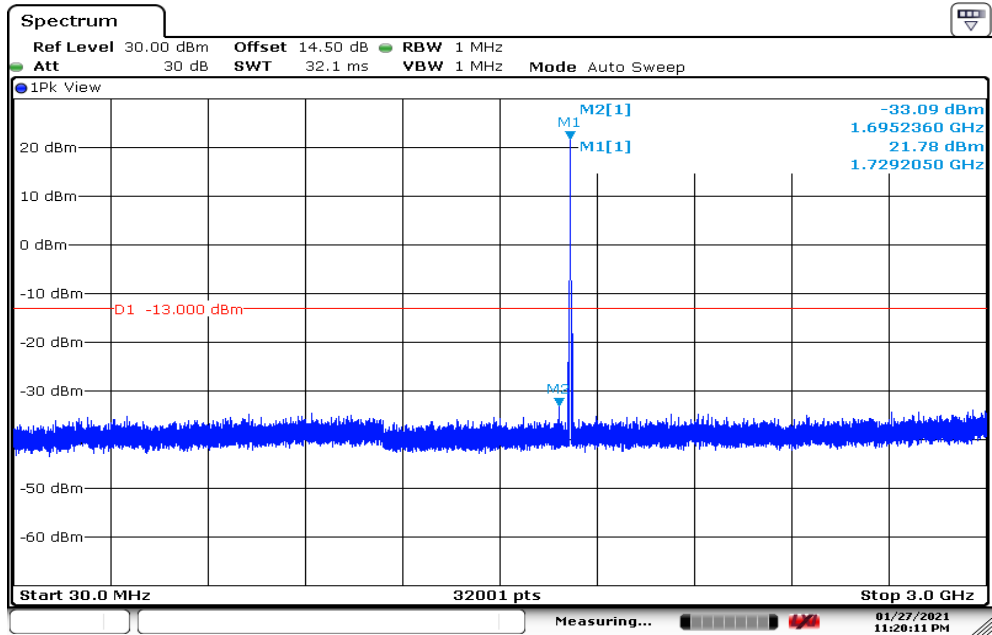


Report No.: T201116W03-RP2

Page: 105 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:20:12



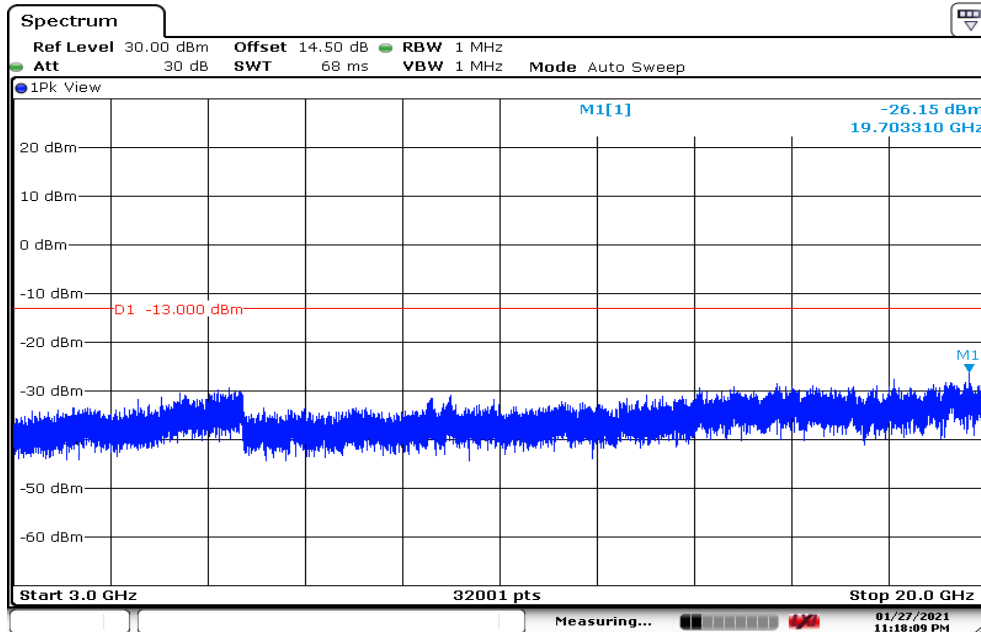
Report No.: T201116W03-RP2

Page: 106 / 134

Rev.: 01

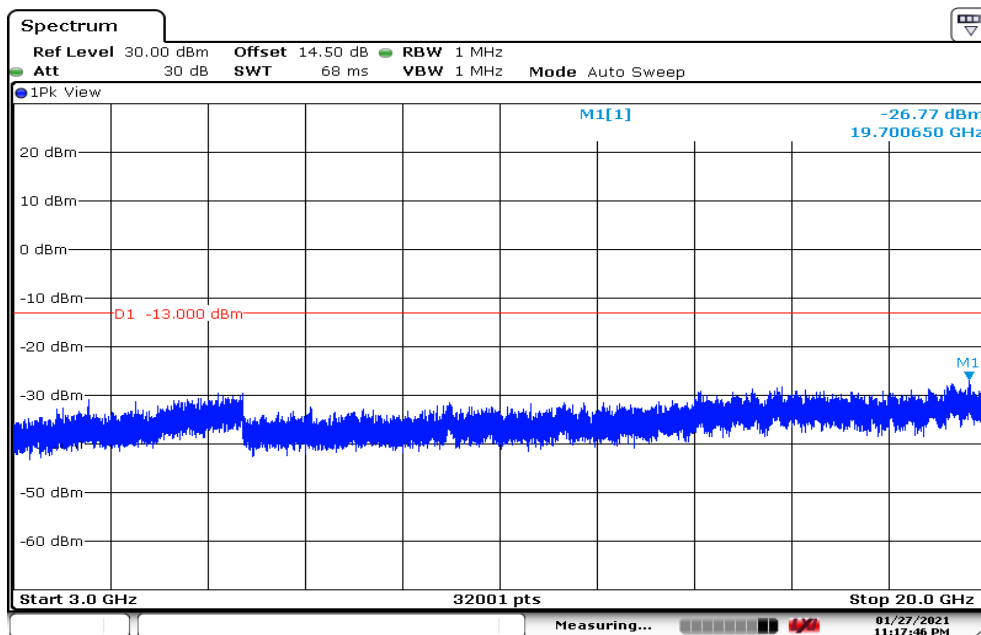
CHANNEL BANDWIDTH: 1.4MHz / 3GHz-20GHz

CH Low



Date: 27 JAN 2021 23:18:09

CH Mid



Date: 27 JAN 2021 23:17:47

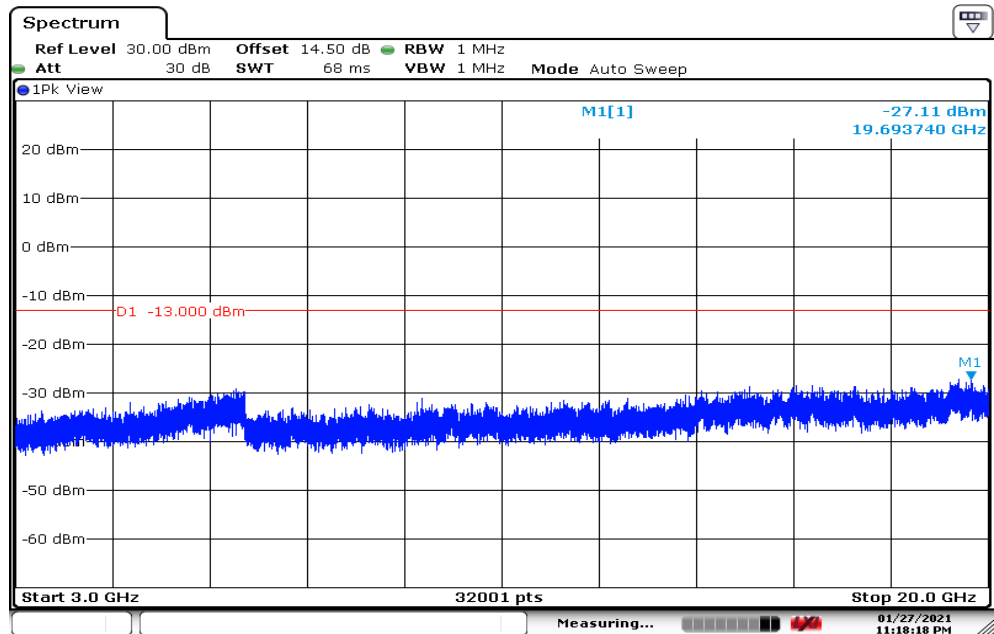


Report No.: T201116W03-RP2

Page: 107 / 134

Rev.: 01

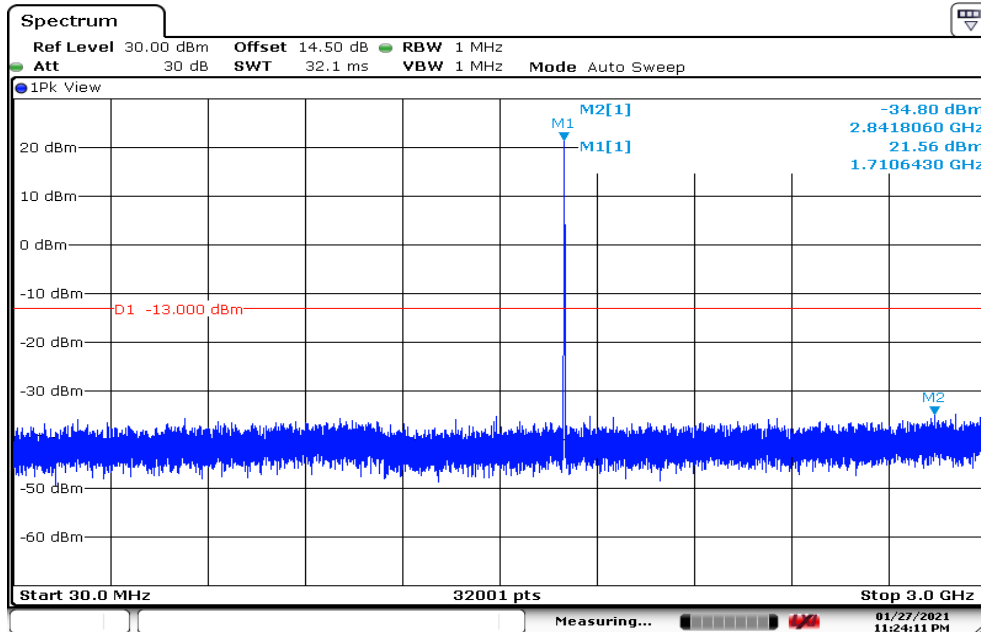
CH High



Date: 27 JAN 2021 23:18:18

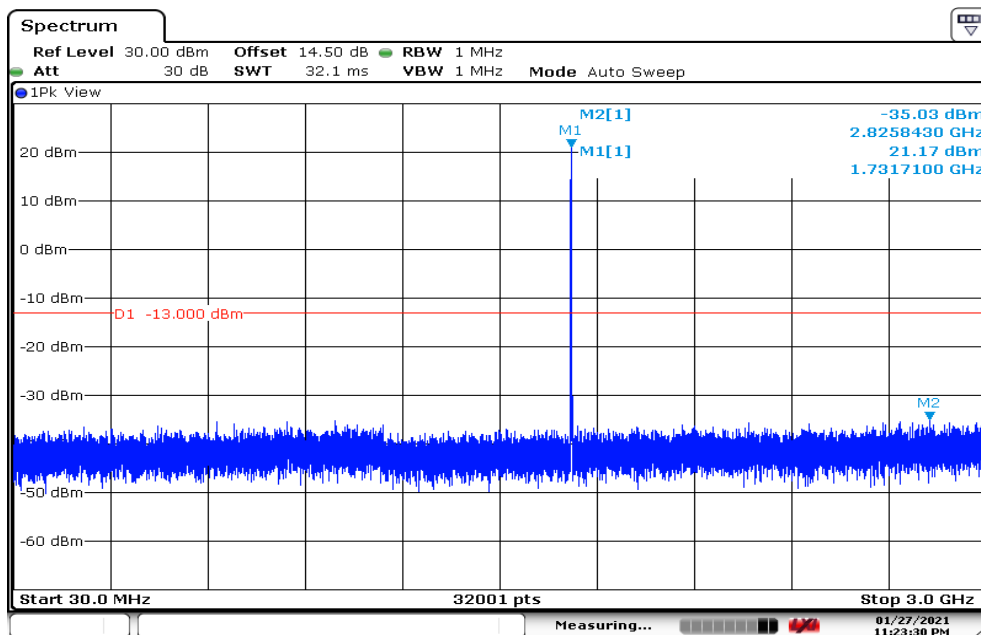
CHANNEL BANDWIDTH: 3MHz / 30MHz-3GHz

CH Low



Date: 27 JAN 2021 23:24:11

CH Mid



Date: 27 JAN 2021 23:23:31

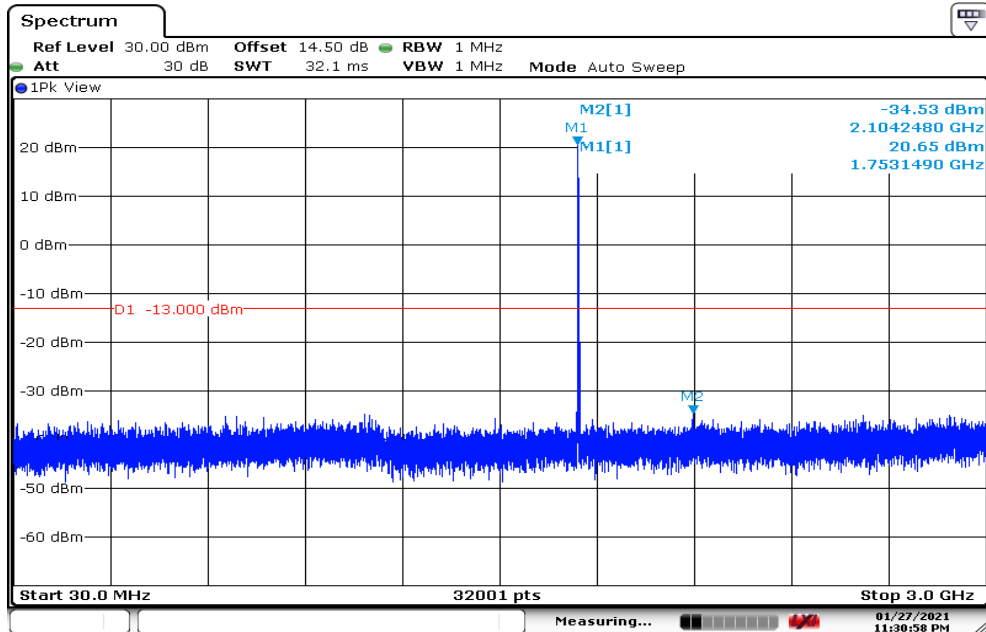


Report No.: T201116W03-RP2

Page: 109 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:30:58



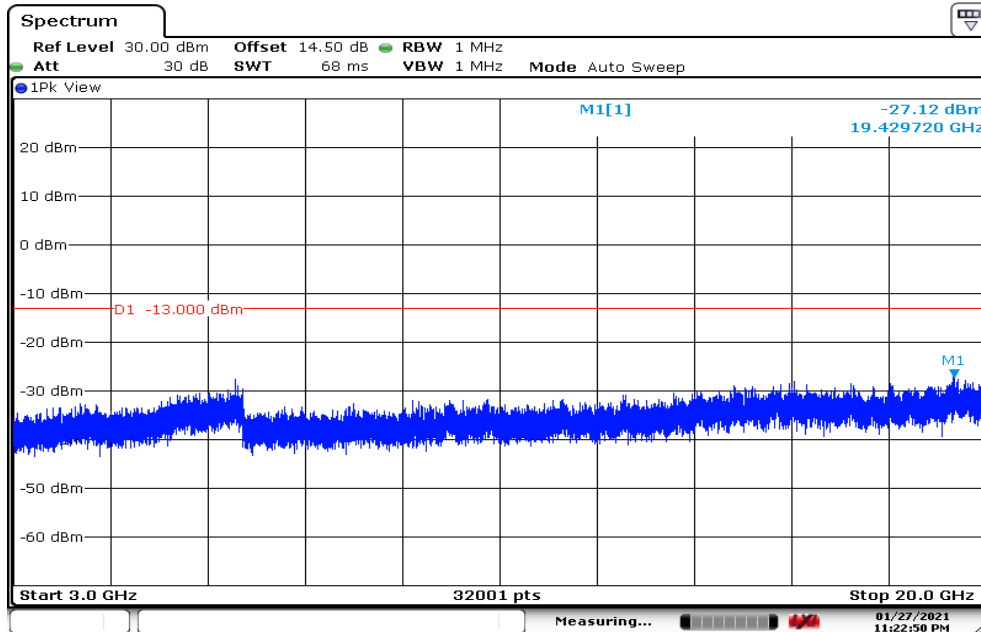
Report No.: T201116W03-RP2

Page: 110 / 134

Rev.: 01

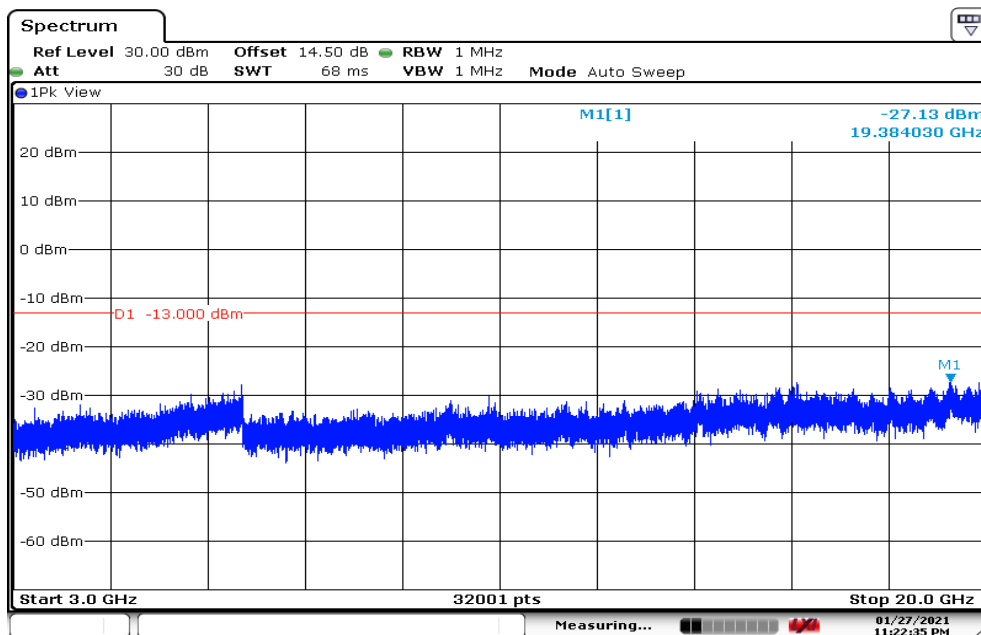
CHANNEL BANDWIDTH: 3MHz / 3GHz-20GHz

CH Low



Date: 27 JAN 2021 23:22:51

CH Mid



Date: 27 JAN 2021 23:22:35

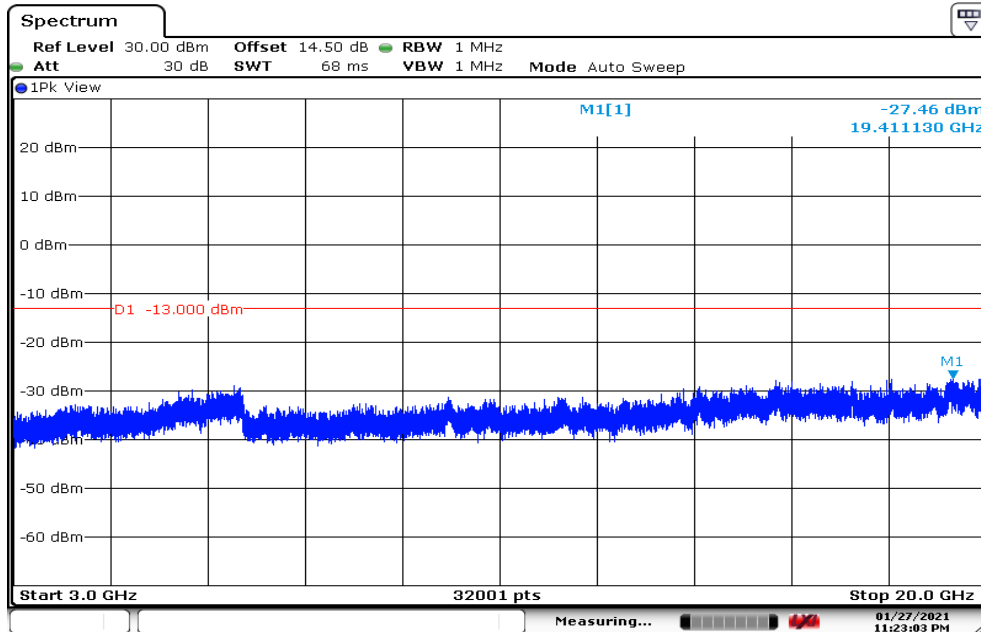


Report No.: T201116W03-RP2

Page: 111 / 134

Rev.: 01

CH High

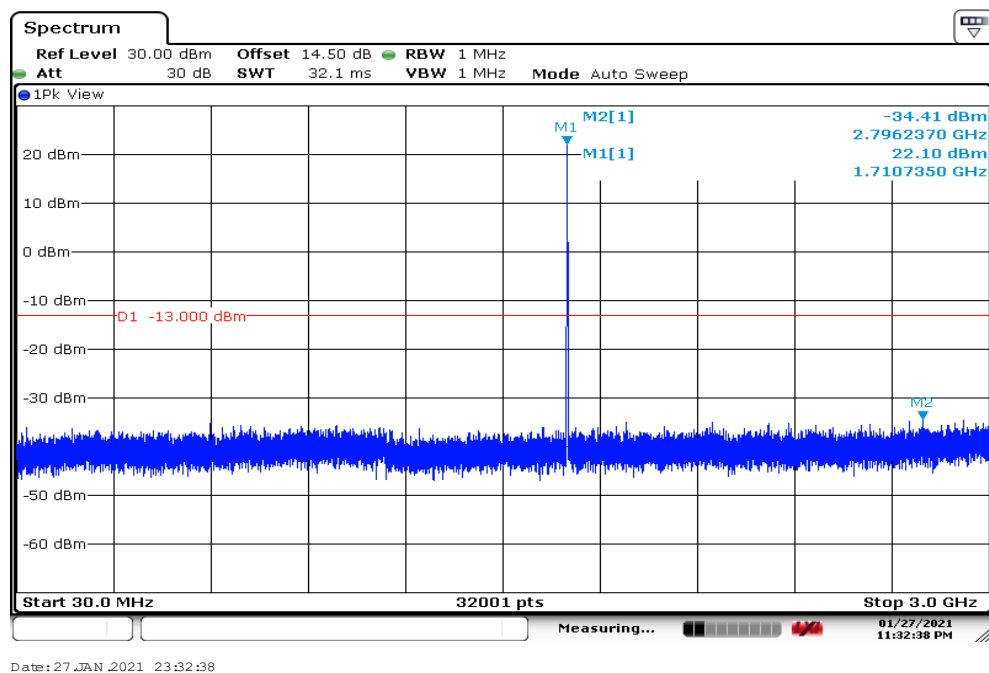


Date: 27 JAN 2021 23:23:03

Report No.: T201116W03-RP2

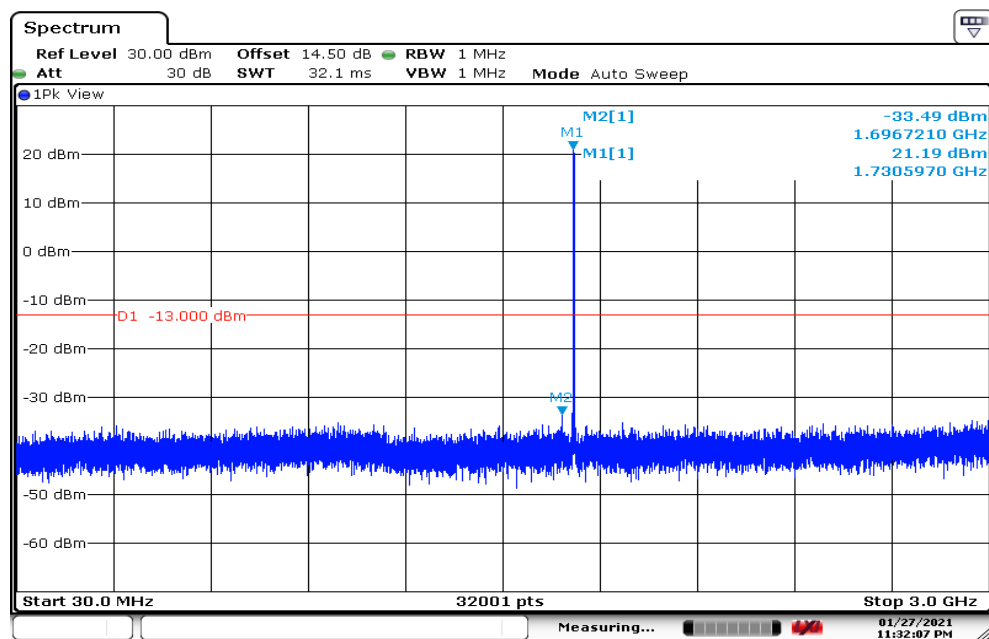
CHANNEL BANDWIDTH: 5MHz / 30MHz-3GHz

CH Low



Date: 27 JAN 2021 23:32:38

CH Mid



Date: 27 JAN 2021 23:32:08

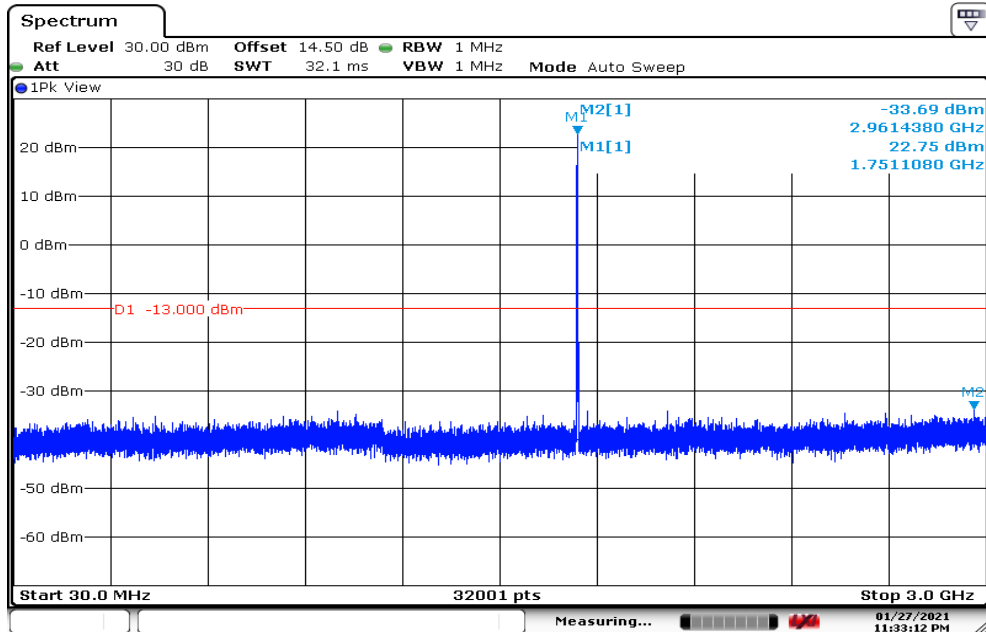


Report No.: T201116W03-RP2

Page: 113 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:33:12



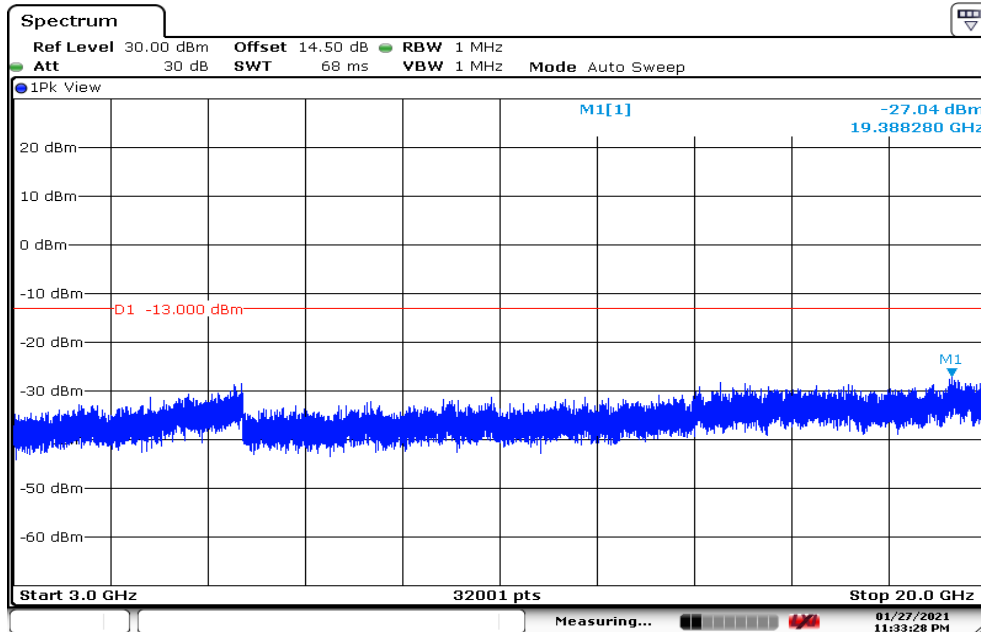
Report No.: T201116W03-RP2

Page: 114 / 134

Rev.: 01

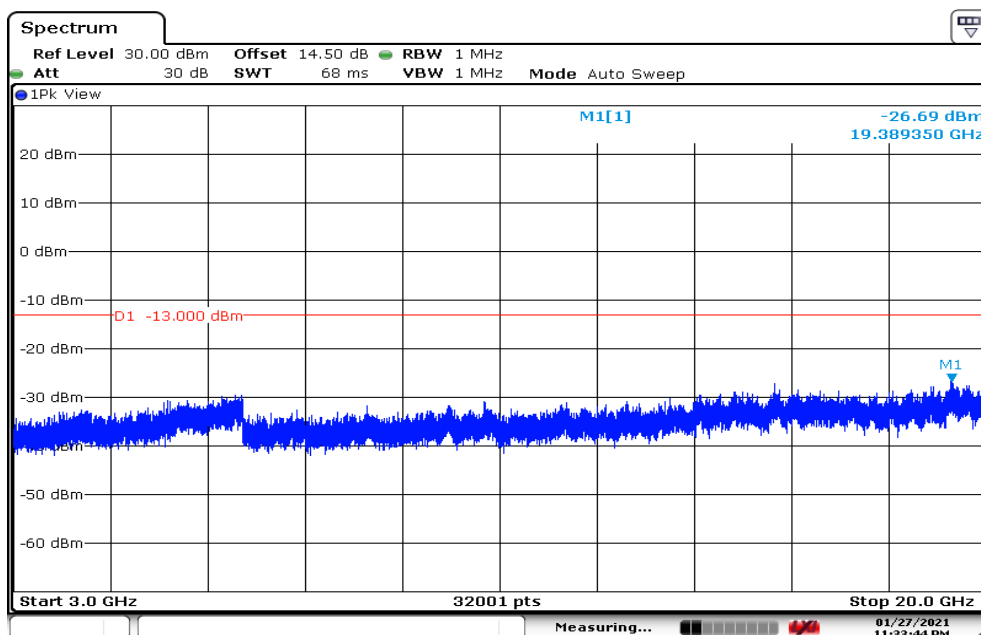
CHANNEL BANDWIDTH: 5MHz / 3GHz-20GHz

CH Low



Date: 27 JAN 2021 23:33:28

CH Mid



Date: 27 JAN 2021 23:33:45

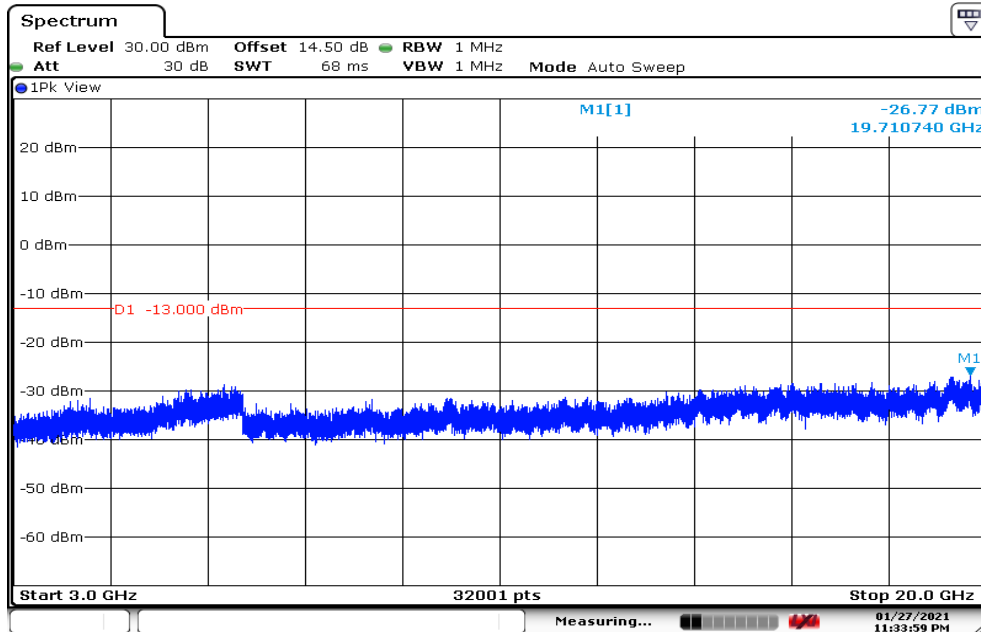


Report No.: T201116W03-RP2

Page: 115 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:33:59



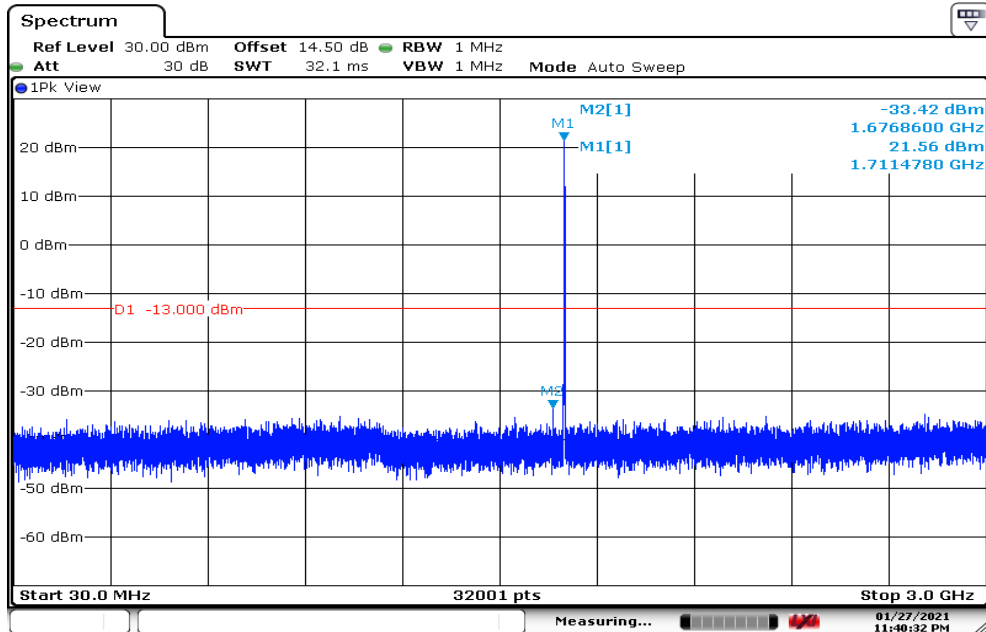
Report No.: T201116W03-RP2

Page: 116 / 134

Rev.: 01

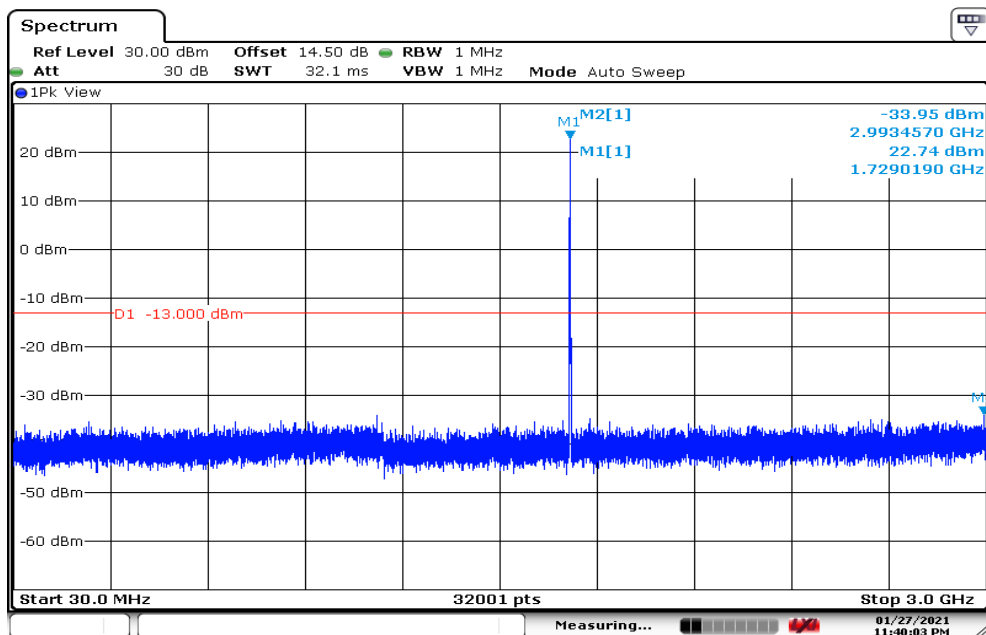
CHANNEL BANDWIDTH: 10MHz / 30MHz-3GHz

CH Low



Date: 27 JAN 2021 23:40:32

CH Mid



Date: 27 JAN 2021 23:40:03

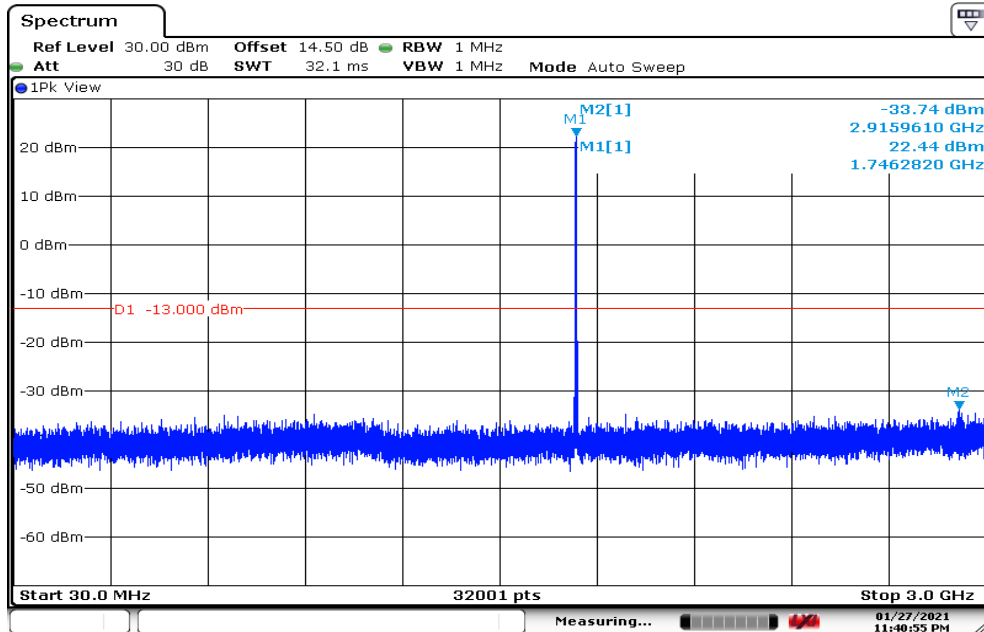


Report No.: T201116W03-RP2

Page: 117 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:40:56



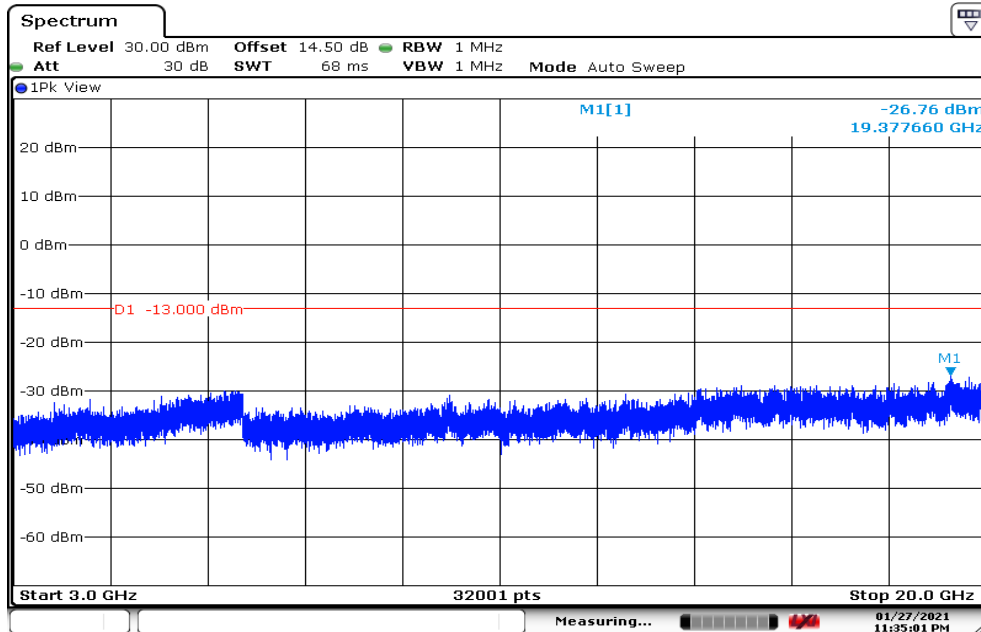
Report No.: T201116W03-RP2

Page: 118 / 134

Rev.: 01

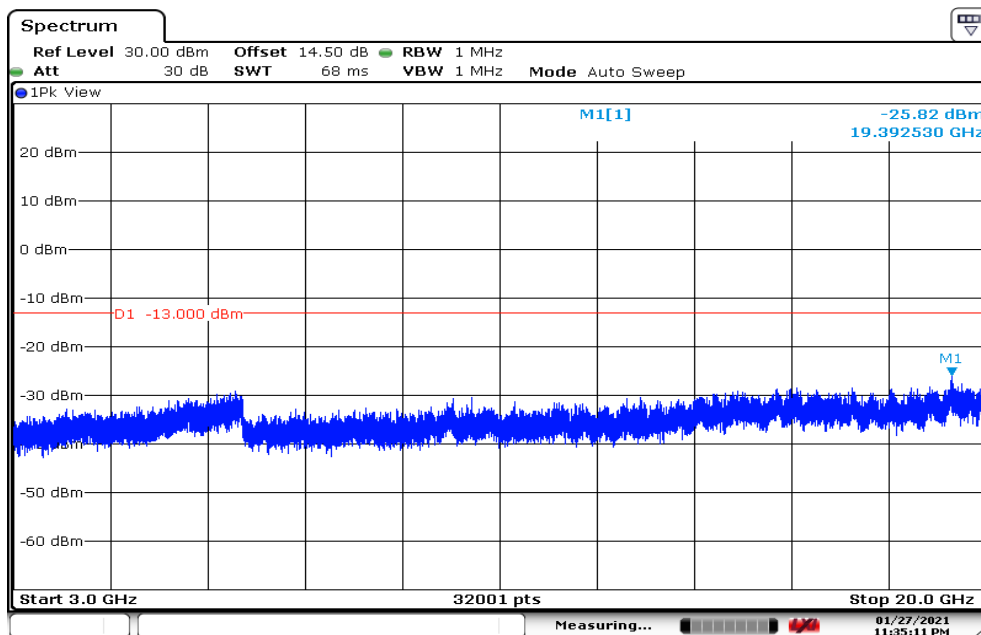
CHANNEL BANDWIDTH: 10MHz / 3GHz-20GHz

CH Low



Date: 27 JAN 2021 23:35:00

CH Mid



Date: 27 JAN 2021 23:35:11

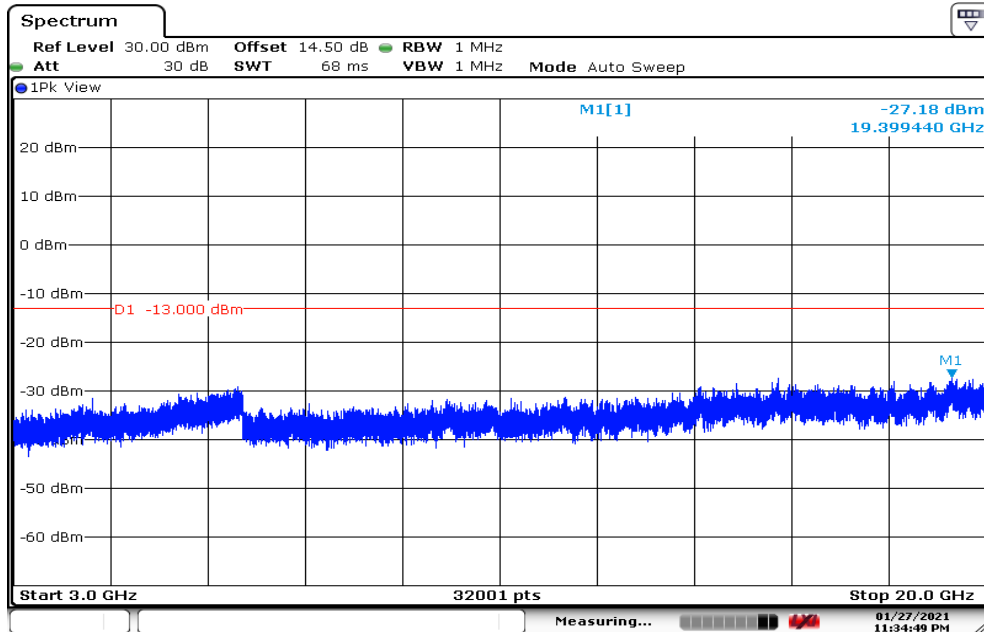


Report No.: T201116W03-RP2

Page: 119 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:34:49



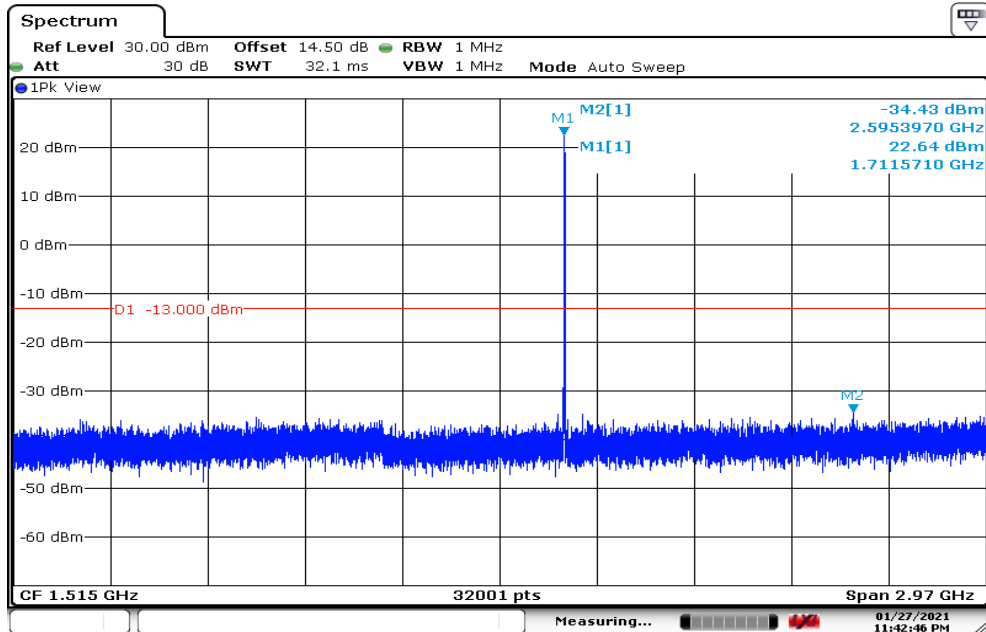
Report No.: T201116W03-RP2

Page: 120 / 134

Rev.: 01

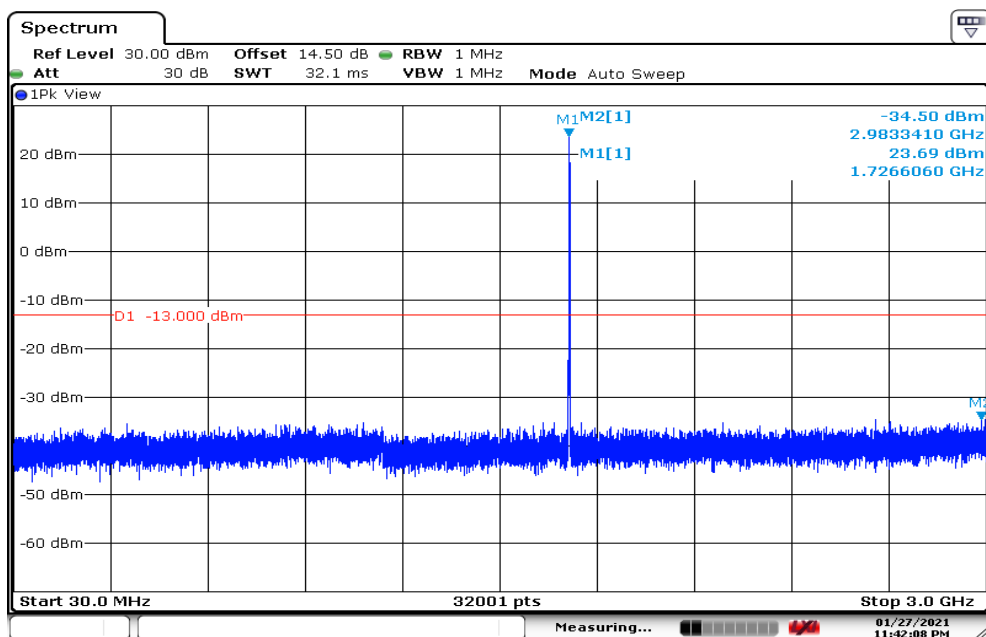
CHANNEL BANDWIDTH: 15MHz / 30MHz-3GHz

CH Low



Date: 27 JAN 2021 23:42:46

CH Mid



Date: 27 JAN 2021 23:42:08

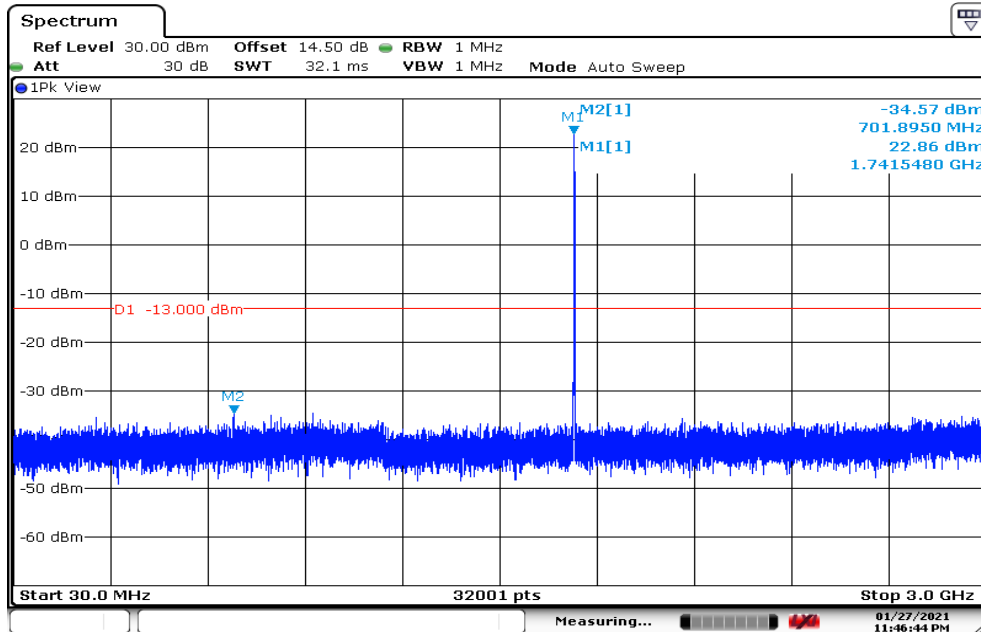


Report No.: T201116W03-RP2

Page: 121 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:46:45



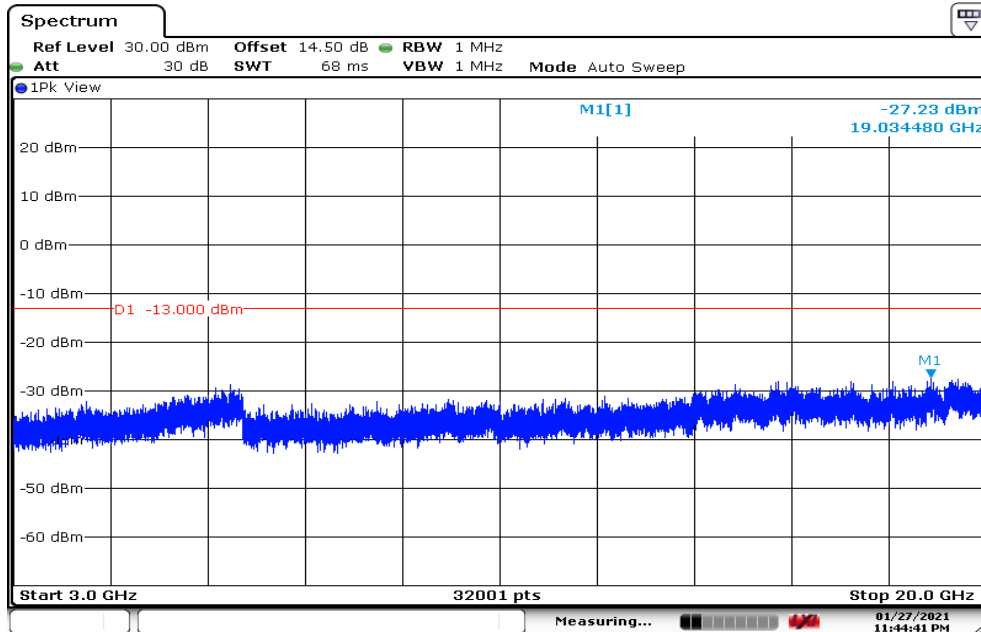
Report No.: T201116W03-RP2

Page: 122 / 134

Rev.: 01

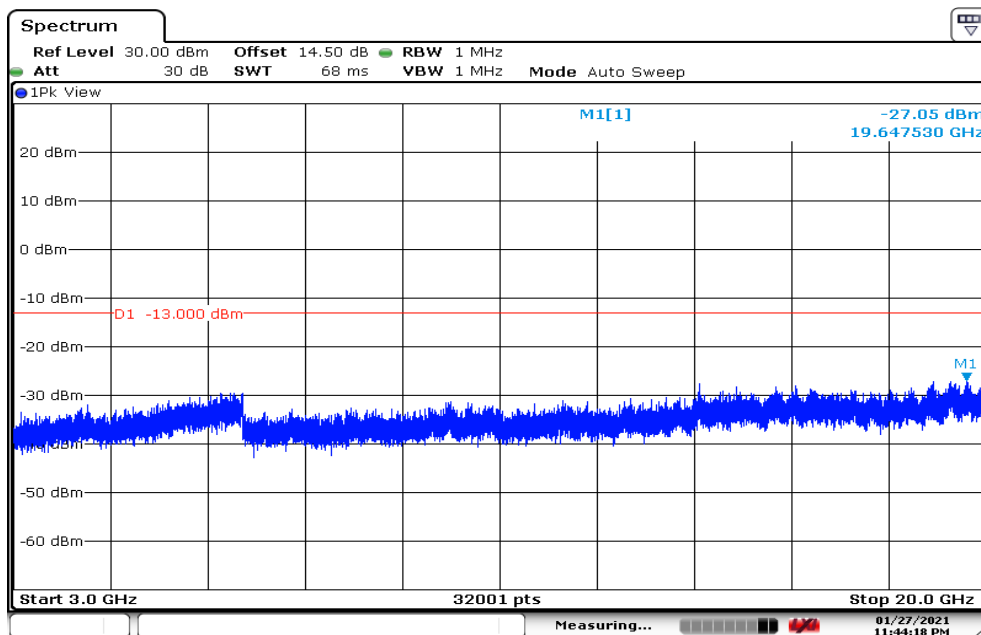
CHANNEL BANDWIDTH: 15MHz / 3GHz-20GHz

CH Low



Date: 27 JAN 2021 23:44:41

CH Mid



Date: 27 JAN 2021 23:44:18

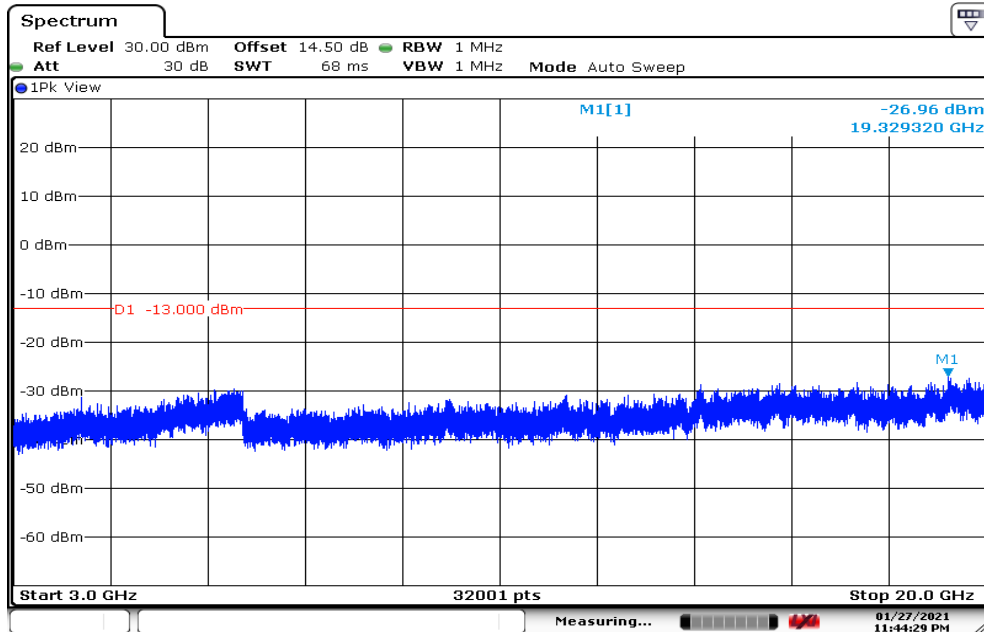


Report No.: T201116W03-RP2

Page: 123 / 134

Rev.: 01

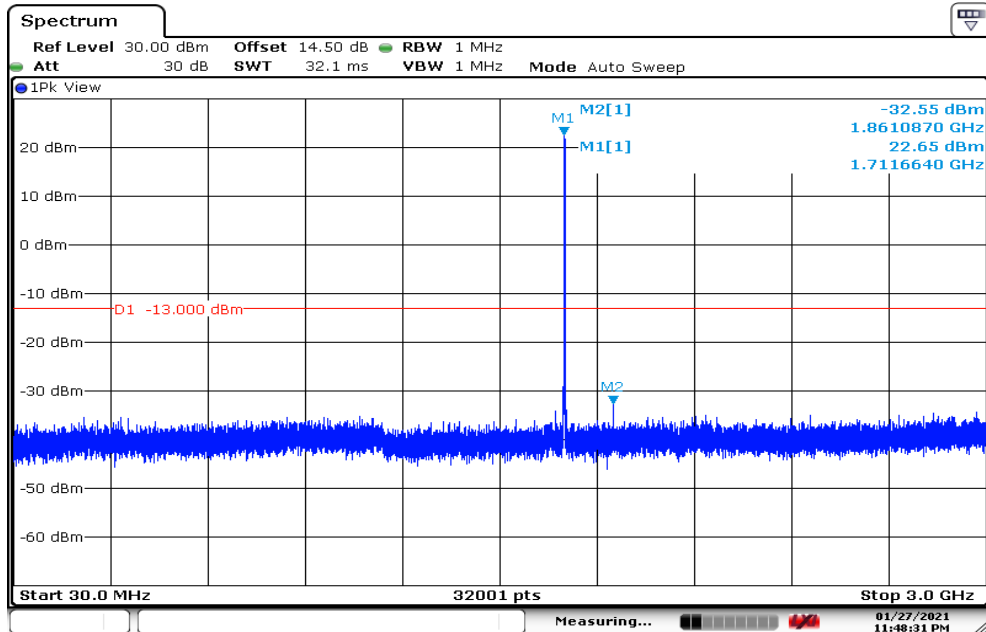
CH High



Date: 27 JAN 2021 23:44:30

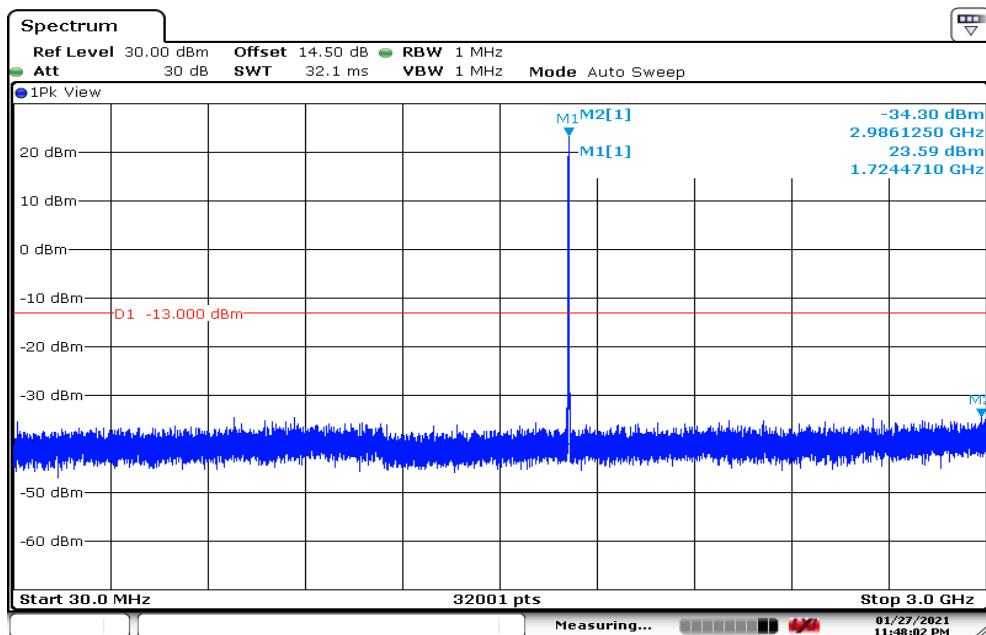
CHANNEL BANDWIDTH: 20MHz / 30MHz-3GHz

CH Low



Date: 27 JAN 2021 23:48:31

CH Mid



Date: 27 JAN 2021 23:48:03

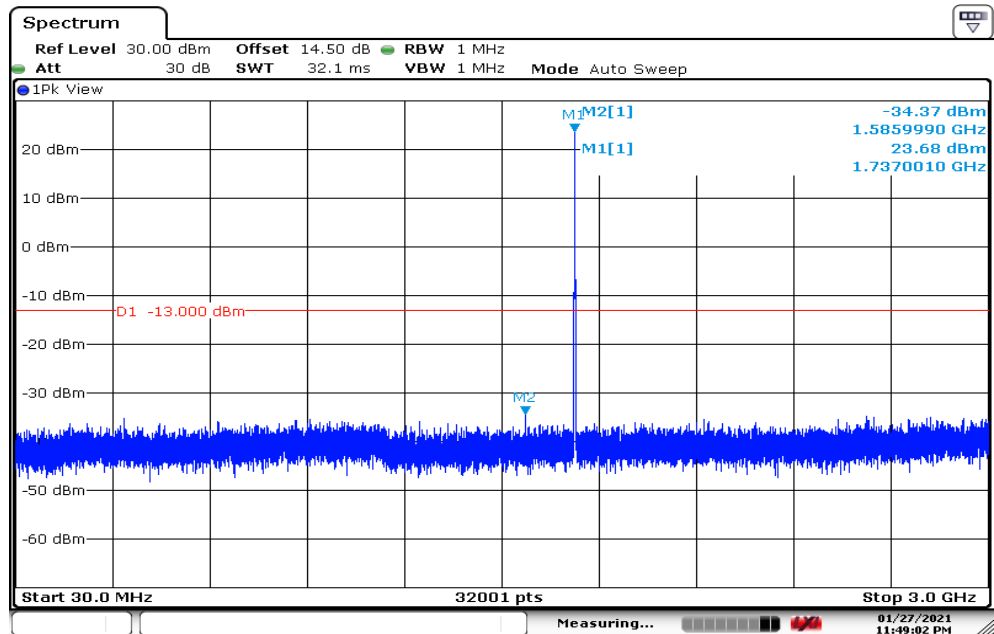


Report No.: T201116W03-RP2

Page: 125 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:49:02



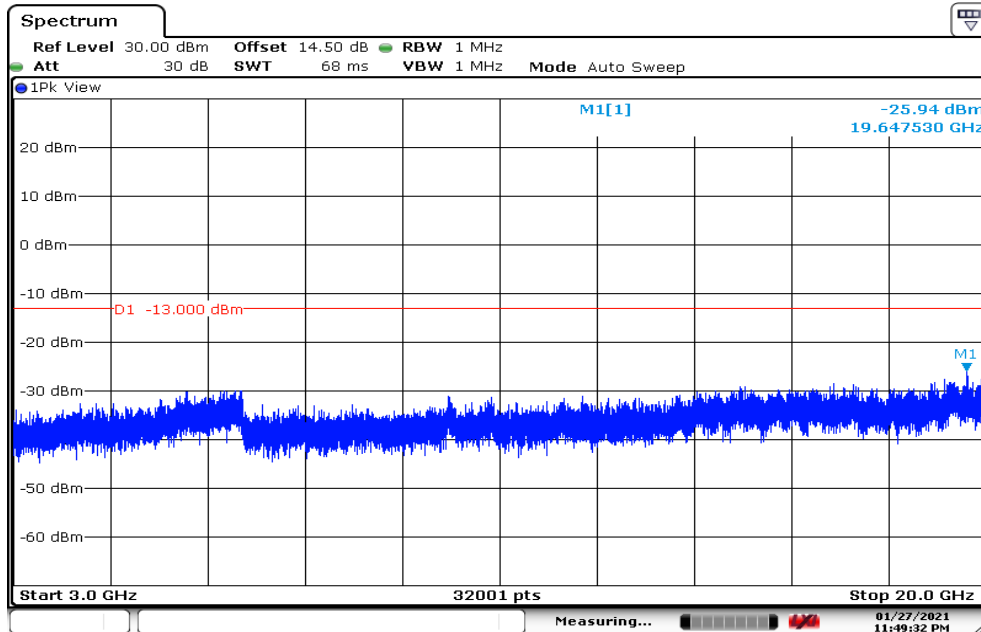
Report No.: T201116W03-RP2

Page: 126 / 134

Rev.: 01

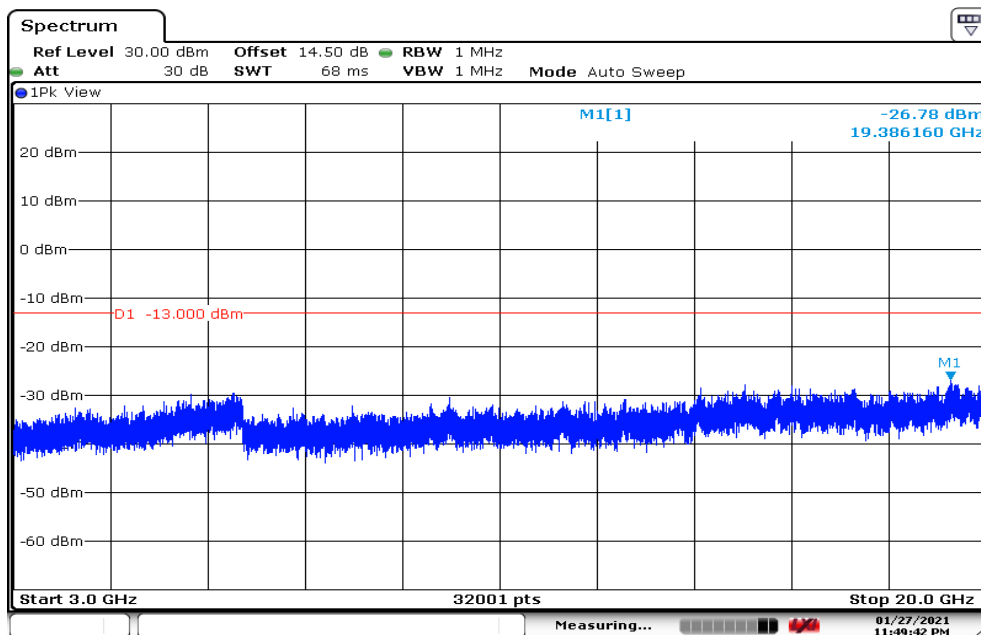
CHANNEL BANDWIDTH: 20MHz / 3GHz-20GHz

CH Low



Date: 27 JAN 2021 23:49:31

CH Mid



Date: 27 JAN 2021 23:49:43

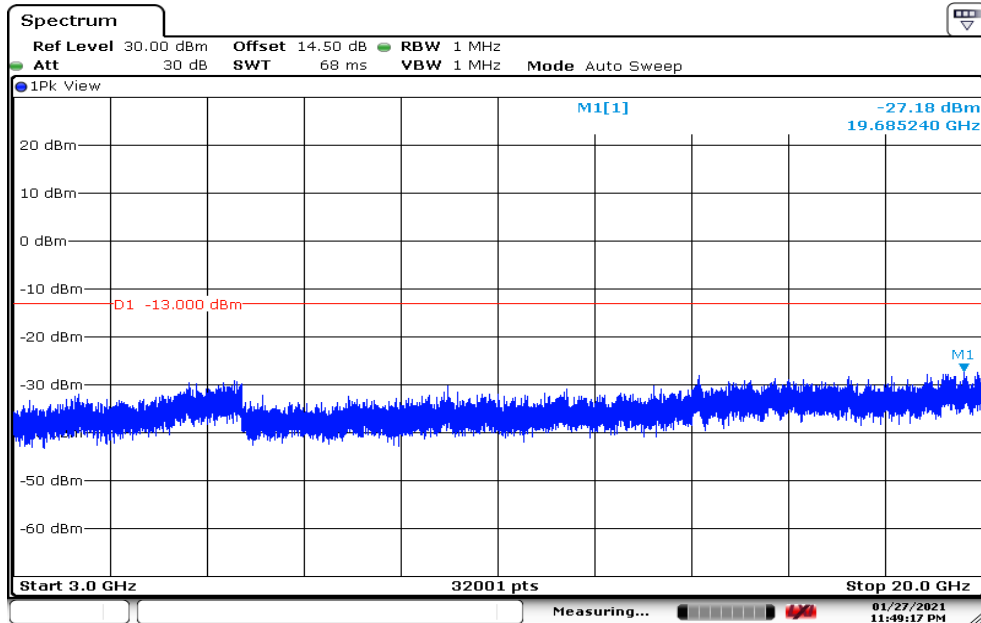


Report No.: T201116W03-RP2

Page: 127 / 134

Rev.: 01

CH High



Date: 27 JAN 2021 23:49:18

8.7 RADIATED EMISSION MEASUREMENT

LIMITS

FCC §27.53(h), Band 4

General protection levels. Except as otherwise specified below, for operations in the 1710-1755MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

TEST PROCEDURES

1. According to KDB 971168 D01 and TIA-603-E.
2. The EUT was placed on a turntable
 - (1) Below 1G : 0.8m
 - (2) Above 1G : 1.5m
 - (3) EUT set 3m from the receiving antenna
 - (4) The table was rotated 360 degrees of the highest spurious emission to determine the position.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. A horn antenna was driven by a signal generator.
5. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.

Test Results**LTE Band 4 / BW: 20MHz / QPSK / RB =1, RB Offset = 0****Operation Mode:** Tx / Low CH**Test Date:**

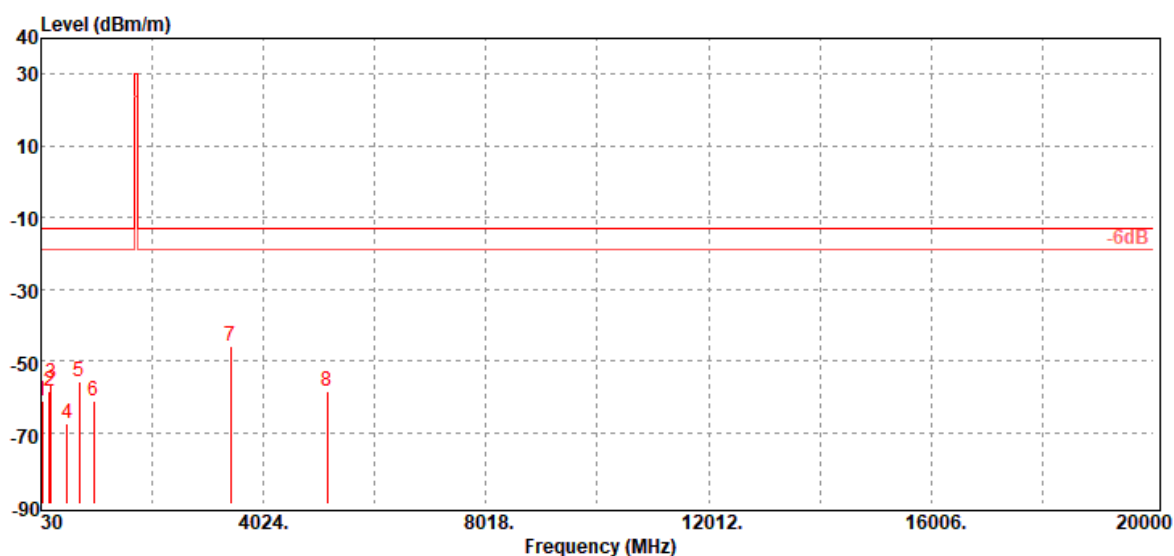
January 25, 2021

Temperature: 22.4°C**Tested by:**

Ray Li

Humidity: 64% RH**Polarity:**

Ver.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
47.46	-61.32	-47.23	-13.53	-0.56	-13.00	-48.32	V
187.14	-58.51	-53.39	-3.99	-1.13	-13.00	-45.51	V
209.45	-56.13	-52.76	-2.18	-1.19	-13.00	-43.13	V
497.54	-67.44	-63.58	-2.00	-1.86	-13.00	-54.44	V
713.85	-55.99	-52.34	-1.40	-2.25	-13.00	-42.99	V
983.51	-61.06	-57.04	-1.37	-2.65	-13.00	-48.06	V
3440.00	-46.02	-53.23	12.72	-5.51	-13.00	-33.02	V
5160.00	-58.67	-64.72	12.76	-6.71	-13.00	-45.67	V

Operation Mode: Tx / Low CH

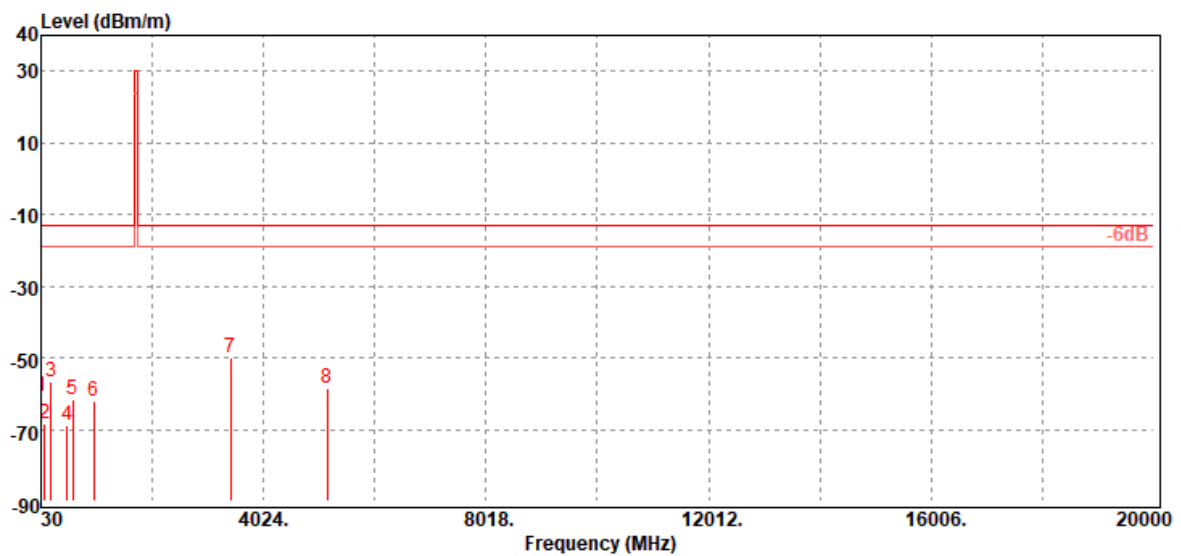
Test Date: January 25, 2021

Temperature: 22.4°C

Tested by: Ray Li

Humidity: 64% RH

Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
32.91	-60.82	-33.16	-27.19	-0.47	-13.00	-47.82	H
94.99	-68.58	-60.48	-7.30	-0.80	-13.00	-55.58	H
209.45	-56.74	-53.37	-2.18	-1.19	-13.00	-43.74	H
498.51	-69.04	-65.17	-2.00	-1.87	-13.00	-56.04	H
599.39	-61.87	-58.91	-0.89	-2.07	-13.00	-48.87	H
972.84	-62.10	-58.10	-1.36	-2.64	-13.00	-49.10	H
3440.00	-50.14	-57.35	12.72	-5.51	-13.00	-37.14	H
5160.00	-58.49	-64.54	12.76	-6.71	-13.00	-45.49	H

Operation Mode: Tx / Mid CH

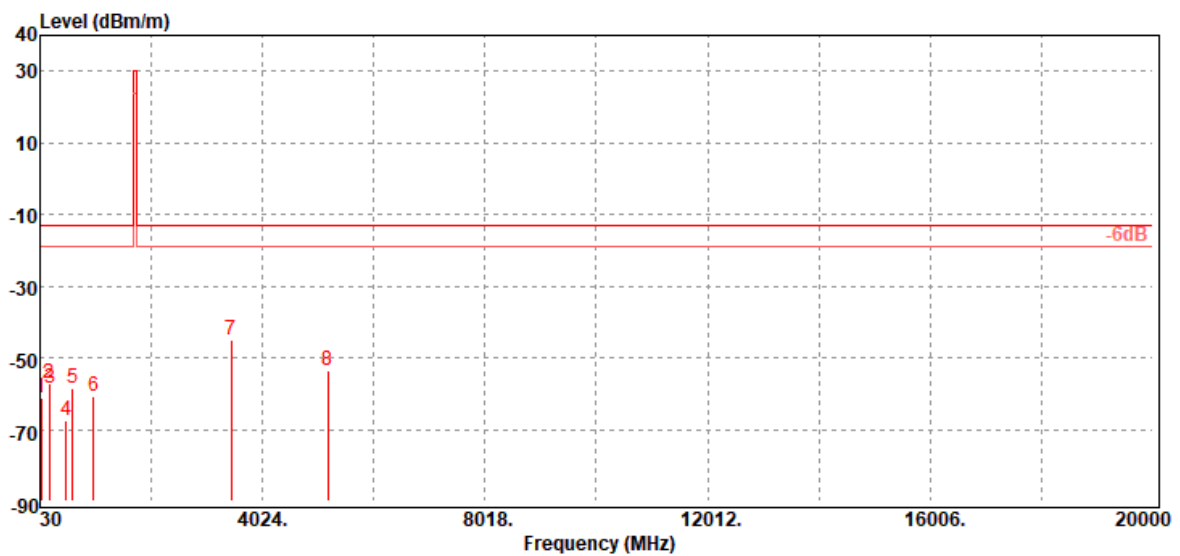
Test Date: January 25, 2021

Temperature: 22.4°C

Tested by: Ray Li

Humidity: 64% RH

Polarity: Ver.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
49.40	-60.99	-48.12	-12.30	-0.57	-13.00	-47.99	V
192.96	-57.23	-51.99	-4.10	-1.14	-13.00	-44.23	V
212.36	-58.40	-55.10	-2.10	-1.20	-13.00	-45.40	V
500.45	-67.67	-63.81	-1.99	-1.87	-13.00	-54.67	V
609.09	-58.66	-55.50	-1.08	-2.08	-13.00	-45.66	V
988.36	-60.75	-56.69	-1.40	-2.66	-13.00	-47.75	V
3465.00	-45.03	-52.14	12.64	-5.53	-13.00	-32.03	V
5197.50	-53.35	-59.58	12.98	-6.75	-13.00	-40.35	V

Report No.: T201116W03-RP2

Operation Mode: Tx / Mid CH

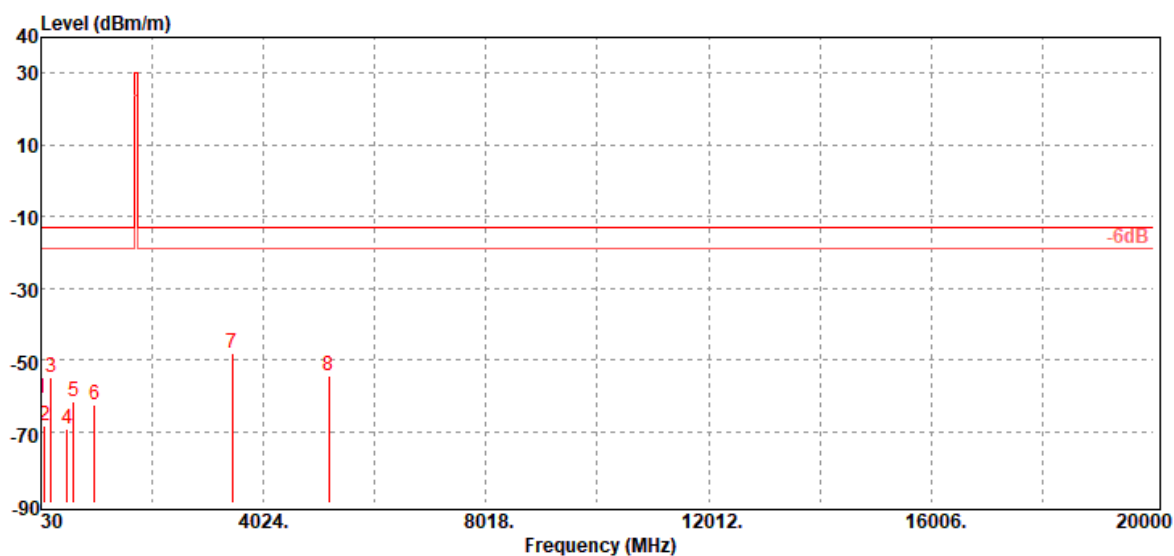
Test Date: January 25, 2021

Temperature: 22.4°C

Tested by: Ray Li

Humidity: 64% RH

Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
31.94	-60.92	-32.29	-28.16	-0.47	-13.00	-47.92	H
95.96	-68.44	-60.24	-7.40	-0.80	-13.00	-55.44	H
207.51	-55.05	-51.42	-2.45	-1.18	-13.00	-42.05	H
498.51	-69.35	-65.48	-2.00	-1.87	-13.00	-56.35	H
609.09	-61.70	-58.54	-1.08	-2.08	-13.00	-48.70	H
990.30	-62.48	-58.42	-1.40	-2.66	-13.00	-49.48	H
3465.00	-48.01	-55.12	12.64	-5.53	-13.00	-35.01	H
5197.00	-54.30	-60.53	12.98	-6.75	-13.00	-41.30	H

Operation Mode: Tx / High CH

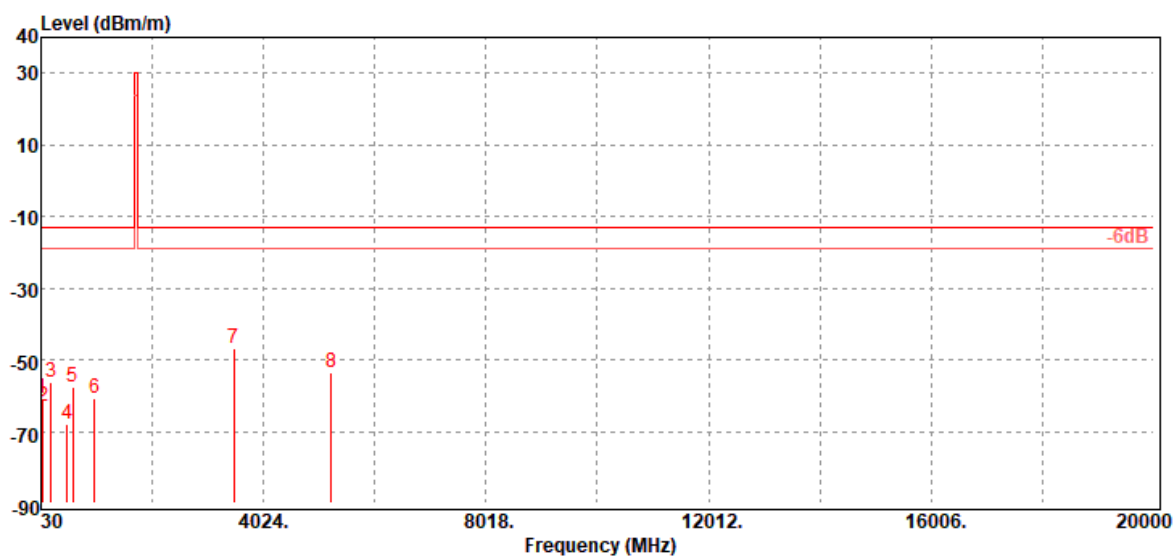
Test Date: January 25, 2021

Temperature: 22.4°C

Tested by: Ray Li

Humidity: 64% RH

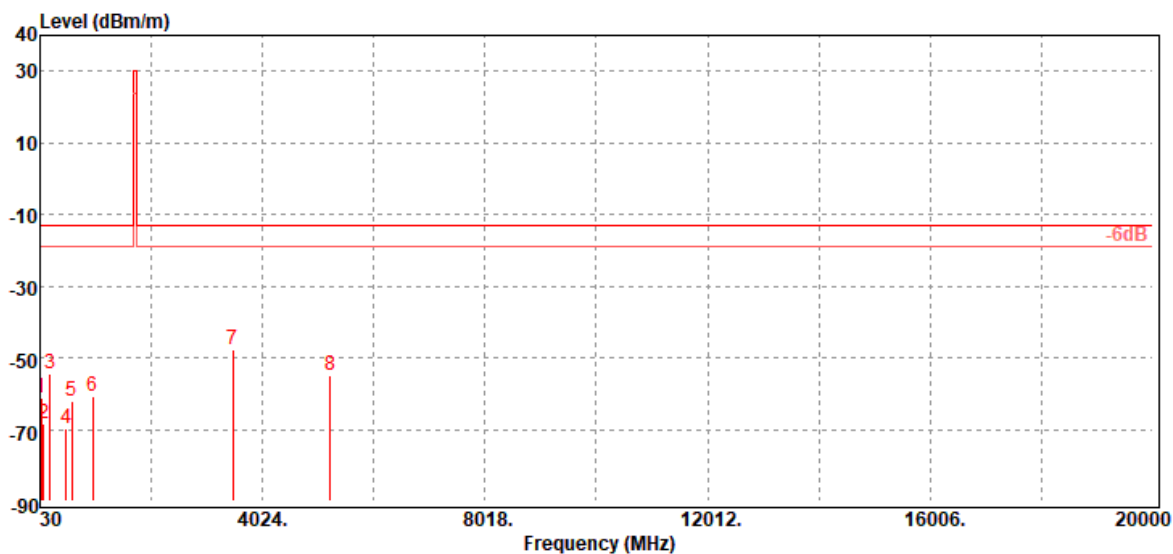
Polarity: Ver.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
49.40	-60.91	-48.04	-12.30	-0.57	-13.00	-47.91	V
65.89	-63.14	-52.63	-9.84	-0.67	-13.00	-50.14	V
204.60	-56.11	-51.97	-2.96	-1.18	-13.00	-43.11	V
495.60	-67.95	-64.09	-2.00	-1.86	-13.00	-54.95	V
605.21	-57.58	-54.50	-1.00	-2.08	-13.00	-44.58	V
987.39	-60.95	-56.89	-1.40	-2.66	-13.00	-47.95	V
3490.00	-46.93	-53.92	12.54	-5.55	-13.00	-33.93	V
5235.00	-53.41	-59.76	13.14	-6.79	-13.00	-40.41	V

Operation Mode: Tx / High CH
Temperature: 22.4°C
Humidity: 64% RH

Test Date: January 25, 2021
Tested by: Ray Li
Polarity: Hor.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
49.40	-61.43	-48.56	-12.30	-0.57	-13.00	-48.43	H
95.96	-68.57	-60.37	-7.40	-0.80	-13.00	-55.57	H
207.51	-54.54	-50.91	-2.45	-1.18	-13.00	-41.54	H
495.60	-69.74	-65.88	-2.00	-1.86	-13.00	-56.74	H
602.30	-62.28	-59.26	-0.95	-2.07	-13.00	-49.28	H
975.75	-60.90	-56.88	-1.38	-2.64	-13.00	-47.90	H
3490.00	-47.81	-54.80	12.54	-5.55	-13.00	-34.81	H
5235.00	-54.93	-61.28	13.14	-6.79	-13.00	-41.93	H

- End of Test Report -