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Report No.: T200825W02-RP4



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Rev.: 01

FCC 47 CFR PART 27 SUBPART L

TEST REPORT

For

SyncUP Kids Watch

Model No.: TMUS-SKW-1, TMUS-SKW-M

Trade Name: T-Mobile

Issued to

**T-mobile Usa, Inc.
12920 Se 38th Street , Bellevue, Washington, United States, 98006.**

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 8, 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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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	March 25, 2021	Initial Issue	ALL	Mita Wu
01	June 8, 2021	See the following Note Rev. (01)	P.11, P.10, P.47, P.97-98	Doris Chu

Rev. (01)

1. Added FCC register lab number in section 6.1.
2. Revised equipment list in section 5.2.
3. Added how to Calculation the Offset in section 8.5.
4. Added Test Configuration in section 8.7.

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1. TEST RESULT CERTIFICATION

Applicant: T-mobile Usa, Inc.
12920 Se 38th Street , Bellevue, Washington, United States,
98006.

Manufacturer: T-mobile Usa, Inc.
12920 Se 38th Street , Bellevue, Washington, United States,
98006.

Equipment Under Test: SyncUP Kids Watch

Trade Name: T-Mobile

Model No.: TMUS-SKW-1, TMUS-SKW-M

Date of Test: September 14, 2020; December 30, 2020

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	SyncUP Kids Watch	
Model No.	TMUS-SKW-1, TMUS-SKW-M	
Model Discrepancy	Preload profiles in SIM IC are different, but the SIM IC is the same. TMUS-SKW-1 is T-Mobile SKU, TMUS-SKW-M is MPCS SKU.	
Trade	T-Mobile	
Received Date	August 25, 2020	
Power Supply	1. Power from Adapter. PHIHONG TECHNOLOGY / AN05A-050E I/P: 100-240VAC, 0.2A, 50-60Hz O/P: 5.0VDC, 1.0A 2. Power from Battery. EVE / P0963 Rated Capacity: 3.85V, 495mAh, 1.91Wh	
Modulation Technology	LTE Band 4	QPSK, 16QAM
Frequency Range	LTE Band 4 Channel Bandwidth: 1.4MHz	1710.7MHz ~1754.3MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.4MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715.0MHz ~1750.0MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720MHz ~1745MHz
Transmit Power (ERP & EIRP Power)	LTE Band 4 Channel Bandwidth: 1.4MHz	QPSK: 17.09 dBm 16QAM: 15.72 dBm
	LTE Band 4 Channel Bandwidth: 3MHz	QPSK: 17.10 dBm 16QAM: 15.73 dBm
	LTE Band 4 Channel Bandwidth: 5MHz	QPSK: 17.11 dBm 16QAM: 15.74 dBm
	LTE Band 4 Channel Bandwidth: 10MHz	QPSK: 17.14 dBm 16QAM: 15.76 dBm
	LTE Band 4 Channel Bandwidth: 15MHz	QPSK: 17.16 dBm 16QAM: 15.78 dBm
	LTE Band 4 Channel Bandwidth: 20MHz	QPSK: 17.21 dBm 16QAM: 15.84 dBm
Antenna Specification	PIFA Antenna Band 4: -5.54 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. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.

3. TEST METHODOLOGY

3.1 DESCRIPTION OF TEST TYPE

The EUT (model: TMUS-SKW-1) 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	
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. ☐ 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 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 three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Y-Plane) were recorded in this report

4. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
-	2	Antenna Requirement	Pass
27.50(d)	8.1	ERP and 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

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

Date of Test: September 14, 2020

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
Signal Analyzer	R&S	FSV 40	101073	09/25/2019	09/24/2020
Wideband Radio Communication Tester	R&S	CMW 500	116875	07/19/2020	07/18/2021
Software	N/A				

Date of Test: December 30, 2020

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
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
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	01/15/2020	01/14/2021
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
Horn Antenna	SCHWARZBECK	BBHA 9120D	779	03/09/2020	03/08/2021
Bilog Antenna	Sunol Sciences	JB1	A052609	02/23/2020	02/22/2021
S.G.	Agilent	E8257C	US42340383	07/21/2020	07/20/2021
Radio Communication Analyzer	Anritsu	MT-8820C	6201240043	07/17/2020	07/16/2021
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 24891, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2299-9721

Canada Registration number: 2324G

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC public Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

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."

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	NB(J)	TOSHIBA	PT345T-00L002	N/A	N/A
2	DC Power Supplies	GW Instek	SPS-3610	GPE880163	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 ERP & 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.

TEST RESULTS

No non-compliance noted.

TEST RESULTS

Temperature: 24.1°C
Humidity: 50.5 % RH

Test Date: December 30, 2020
Tested by: Rick Lee

LTE Band 4

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	EIRP Power
Band 4	1.4M	19957	1710.7	QPSK	1	0	0	22.36	16.82
					1	2	0	22.10	16.56
					1	5	0	22.17	16.63
					3	0	1	21.13	15.59
					3	1	1	21.04	15.50
					3	2	1	21.17	15.63
					6	0	1	21.14	15.60
				16QAM	1	0	1	21.03	15.49
					1	2	1	21.22	15.68
					1	5	1	21.03	15.49
					3	0	2	20.19	14.65
					3	1	2	20.06	14.52
					3	2	2	20.12	14.58
					6	0	2	20.07	14.53
		20175	1732.5	QPSK	1	0	0	22.36	16.82
					1	2	0	22.09	16.55
					1	5	0	22.13	16.59
					3	0	1	21.22	15.68
					3	1	1	21.05	15.51
					3	2	1	21.27	15.73
					6	0	1	21.08	15.54
				16QAM	1	0	1	21.26	15.72
					1	2	1	21.19	15.65
					1	5	1	21.17	15.63
					3	0	2	20.24	14.70
					3	1	2	20.20	14.66
					3	2	2	20.10	14.56
					6	0	2	20.17	14.63
		20392	1754.3	QPSK	1	0	0	22.63	17.09
					1	2	0	22.17	16.63
					1	5	0	22.16	16.62
					3	0	1	21.23	15.69
					3	1	1	21.27	15.73
					3	2	1	21.17	15.63
					6	0	1	21.10	15.56
				16QAM	1	0	1	21.12	15.58
					1	2	1	21.21	15.67
					1	5	1	21.23	15.69
					3	0	2	20.19	14.65
					3	1	2	20.25	14.71
					3	2	2	20.18	14.64
					6	0	2	20.14	14.60

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	EIRP Power
Band 4	3M	19965	1711.5	QPSK	1	0	0	22.37	16.83
					1	7	0	22.11	16.57
					1	14	0	22.18	16.64
					8	0	1	21.14	15.60
					8	4	1	21.05	15.51
					8	7	1	21.18	15.64
				16QAM	15	0	1	21.15	15.61
					1	0	1	21.04	15.50
					1	7	1	21.23	15.69
					1	14	1	21.04	15.50
					8	0	2	20.20	14.66
					8	4	2	20.07	14.53
					8	7	2	20.13	14.59
					15	0	2	20.08	14.54
		20175	1732.5	QPSK	1	0	0	22.37	16.83
					1	7	0	22.10	16.56
					1	14	0	22.14	16.60
					8	0	1	21.23	15.69
					8	4	1	21.06	15.52
					8	7	1	21.28	15.74
				16QAM	15	0	1	21.09	15.55
					1	0	1	21.27	15.73
					1	7	1	21.20	15.66
					1	14	1	21.18	15.64
					8	0	2	20.25	14.71
					8	4	2	20.21	14.67
					8	7	2	20.11	14.57
					15	0	2	20.18	14.64
		20384	1753.4	QPSK	1	0	0	22.64	17.10
					1	7	0	22.18	16.64
					1	14	0	22.17	16.63
					8	0	1	21.24	15.70
					8	4	1	21.28	15.74
					8	7	1	21.18	15.64
				16QAM	15	0	1	21.11	15.57
					1	0	1	21.13	15.59
					1	7	1	21.22	15.68
					1	14	1	21.24	15.70
					8	0	2	20.20	14.66
					8	4	2	20.26	14.72
					8	7	2	20.19	14.65
					15	0	2	20.15	14.61

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	EIRP Power
Band 4	5M	19975	1712.5	QPSK	1	0	0	22.39	16.85
					1	12	0	22.13	16.59
					1	24	0	22.20	16.66
					12	0	1	21.16	15.62
					12	6	1	21.07	15.53
					12	11	1	21.20	15.66
					25	0	1	21.17	15.63
				16QAM	1	0	1	21.06	15.52
					1	12	1	21.25	15.71
					1	24	1	21.06	15.52
					12	0	2	20.22	14.68
					12	6	2	20.09	14.55
					12	11	2	20.15	14.61
					25	0	2	20.10	14.56
		20175	1732.5	QPSK	1	0	0	22.38	16.84
					1	12	0	22.11	16.57
					1	24	0	22.15	16.61
					12	0	1	21.24	15.70
					12	6	1	21.07	15.53
					12	11	1	21.29	15.75
					25	0	1	21.10	15.56
				16QAM	1	0	1	21.28	15.74
					1	12	1	21.21	15.67
					1	24	1	21.19	15.65
					12	0	2	20.26	14.72
					12	6	2	20.22	14.68
					12	11	2	20.12	14.58
					25	0	2	20.19	14.65
		20375	1752.5	QPSK	1	0	0	22.65	17.11
					1	12	0	22.19	16.65
					1	24	0	22.18	16.64
					12	0	1	21.25	15.71
					12	6	1	21.29	15.75
					12	11	1	21.19	15.65
					25	0	1	21.12	15.58
				16QAM	1	0	1	21.14	15.60
					1	12	1	21.23	15.69
					1	24	1	21.25	15.71
					12	0	2	20.21	14.67
					12	6	2	20.27	14.73
					12	11	2	20.20	14.66
					25	0	2	20.16	14.62

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	EIRP Power
Band 4	10M	20000	1715.0	QPSK	1	0	0	22.40	16.86
					1	24	0	22.14	16.60
					1	49	0	22.21	16.67
					25	0	1	21.17	15.63
					25	12	1	21.08	15.54
					25	24	1	21.21	15.67
					50	0	1	21.18	15.64
				16QAM	1	0	1	21.07	15.53
					1	24	1	21.26	15.72
					1	49	1	21.07	15.53
					25	0	2	20.23	14.69
					25	12	2	20.10	14.56
					25	24	2	20.16	14.62
					50	0	2	20.11	14.57
		20175	1732.5	QPSK	1	0	0	22.40	16.86
					1	24	0	22.13	16.59
					1	49	0	22.17	16.63
					25	0	1	21.26	15.72
					25	12	1	21.09	15.55
					25	24	1	21.31	15.77
					50	0	1	21.12	15.58
				16QAM	1	0	1	21.30	15.76
					1	24	1	21.23	15.69
					1	49	1	21.21	15.67
					25	0	2	20.28	14.74
					25	12	2	20.24	14.70
					25	24	2	20.14	14.60
					50	0	2	20.21	14.67
		20350	1750.0	QPSK	1	0	0	22.68	17.14
					1	24	0	22.22	16.68
					1	49	0	22.21	16.67
					25	0	1	21.28	15.74
					25	12	1	21.32	15.78
					25	24	1	21.22	15.68
					50	0	1	21.15	15.61
				16QAM	1	0	1	21.17	15.63
					1	24	1	21.26	15.72
					1	49	1	21.28	15.74
					25	0	2	20.24	14.70
					25	12	2	20.30	14.76
					25	24	2	20.23	14.69
					50	0	2	20.19	14.65

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	EIRP Power
Band 4	15M	20025	1717.5	QPSK	1	0	0	22.43	16.89
					1	37	0	22.17	16.63
					1	74	0	22.24	16.70
					36	0	1	21.20	15.66
					36	18	1	21.11	15.57
					36	35	1	21.24	15.70
					75	0	1	21.21	15.67
				16QAM	1	0	1	21.10	15.56
					1	37	1	21.29	15.75
					1	74	1	21.10	15.56
					36	0	2	20.26	14.72
					36	18	2	20.13	14.59
					36	35	2	20.19	14.65
					75	0	2	20.14	14.60
		20175	1732.5	QPSK	1	0	0	22.42	16.88
					1	37	0	22.15	16.61
					1	74	0	22.19	16.65
					36	0	1	21.28	15.74
					36	18	1	21.11	15.57
					36	35	1	21.33	15.79
					75	0	1	21.14	15.60
				16QAM	1	0	1	21.32	15.78
					1	37	1	21.25	15.71
					1	74	1	21.23	15.69
					36	0	2	20.30	14.76
					36	18	2	20.26	14.72
					36	35	2	20.16	14.62
					75	0	2	20.23	14.69
		20325	1747.5	QPSK	1	0	0	22.70	17.16
					1	37	0	22.24	16.70
					1	74	0	22.23	16.69
					36	0	1	21.30	15.76
					36	18	1	21.34	15.80
					36	35	1	21.24	15.70
					75	0	1	21.17	15.63
				16QAM	1	0	1	21.19	15.65
					1	37	1	21.28	15.74
					1	74	1	21.30	15.76
					36	0	2	20.26	14.72
					36	18	2	20.32	14.78
					36	35	2	20.25	14.71
					75	0	2	20.21	14.67

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power (dBm)	EIRP Power
Band 4	20M	20050	1720.0	QPSK	1	0	0	22.51	16.97
					1	49	0	22.25	16.71
					1	99	0	22.32	16.78
					50	0	1	21.28	15.74
					50	24	1	21.19	15.65
					50	49	1	21.32	15.78
					100	0	1	21.29	15.75
				16QAM	1	0	1	21.18	15.64
					1	49	1	21.37	15.83
					1	99	1	21.18	15.64
					50	0	2	20.34	14.80
					50	24	2	20.21	14.67
					50	49	2	20.27	14.73
					100	0	2	20.22	14.68
		20175	1732.5	QPSK	1	0	0	22.48	16.94
					1	49	0	22.21	16.67
					1	99	0	22.25	16.71
					50	0	1	21.34	15.80
					50	24	1	21.17	15.63
					50	49	1	21.39	15.85
					100	0	1	21.20	15.66
				16QAM	1	0	1	21.38	15.84
					1	49	1	21.31	15.77
					1	99	1	21.29	15.75
					50	0	2	20.36	14.82
					50	24	2	20.32	14.78
					50	49	2	20.22	14.68
					100	0	2	20.29	14.75
		20300	1745.0	QPSK	1	0	0	22.75	17.21
					1	49	0	22.29	16.75
					1	99	0	22.28	16.74
					50	0	1	21.35	15.81
					50	24	1	21.39	15.85
					50	49	1	21.29	15.75
					100	0	1	21.22	15.68
				16QAM	1	0	1	21.24	15.70
					1	49	1	21.33	15.79
					1	99	1	21.35	15.81
					50	0	2	20.31	14.77
					50	24	2	20.37	14.83
					50	49	2	20.30	14.76
					100	0	2	20.26	14.72

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 8820 with frequency Error measurement capability.

Temp = -35 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

FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:

Temperature: 24.1°C

Test Date: December 30, 2020

Humidity: 50.5 % RH

Tested by: Rick Lee

LTE Band 4

Reference Frequency: LTE Band 4 Max Bandwidth QPSK, 1732.5 MHz				
Limit: ± 2.5 ppm = 4331.25 Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
3.8	55	0.01	0.000006	+/- 2.5
3.8	40	0.01	0.000006	
3.8	30	0.00	0.000000	
3.8	20	0.00	0.000000	
3.8	10	0.01	0.000006	
3.8	0	-0.01	-0.000006	
3.8	-10	-0.01	-0.000006	

Reference Frequency: LTE Band 4 Max Bandwidth 16QAM, 1732.5 MHz				
Limit: ± 2.5 ppm = 4331.25 Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
3.8	55	-0.01	-0.000006	+/- 2.5
3.8	40	0.01	0.000006	
3.8	30	0.00	0.000000	
3.8	20	0.00	0.000000	
3.8	10	-0.01	-0.000006	
3.8	0	0.01	0.000006	
3.8	-10	-0.02	-0.000012	

FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

LTE Band 4

Reference Frequency: LTE Band 4 Max Bandwidth QPSK, 1732.5 MHz				
Limit: ± 2.5 ppm = 4331.25 Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
3.23	20	-0.01	-0.000006	+/- 2.5
3.8	20	0.00	0.000000	
4.37	20	0.01	0.000006	

Reference Frequency: LTE Band 4 Max Bandwidth 16QAM, 1732.5 MHz				
Limit: ± 2.5 ppm = 4331.25 Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
3.23	20	-0.01	-0.000006	+/- 2.5
3.8	20	0.00	0.000000	
4.37	20	-0.01	-0.000006	

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

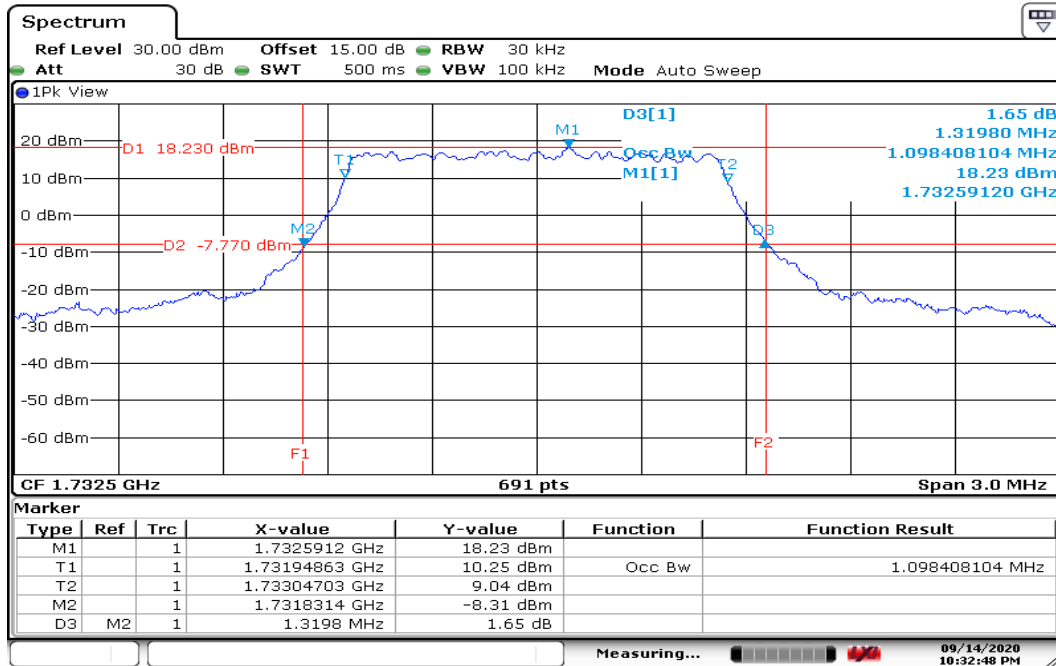
Temperature: 24.2°C
Humidity: 55.9 % RH

Test Date: September 14, 2020
Tested by: Rick Lee

LTE Band 4

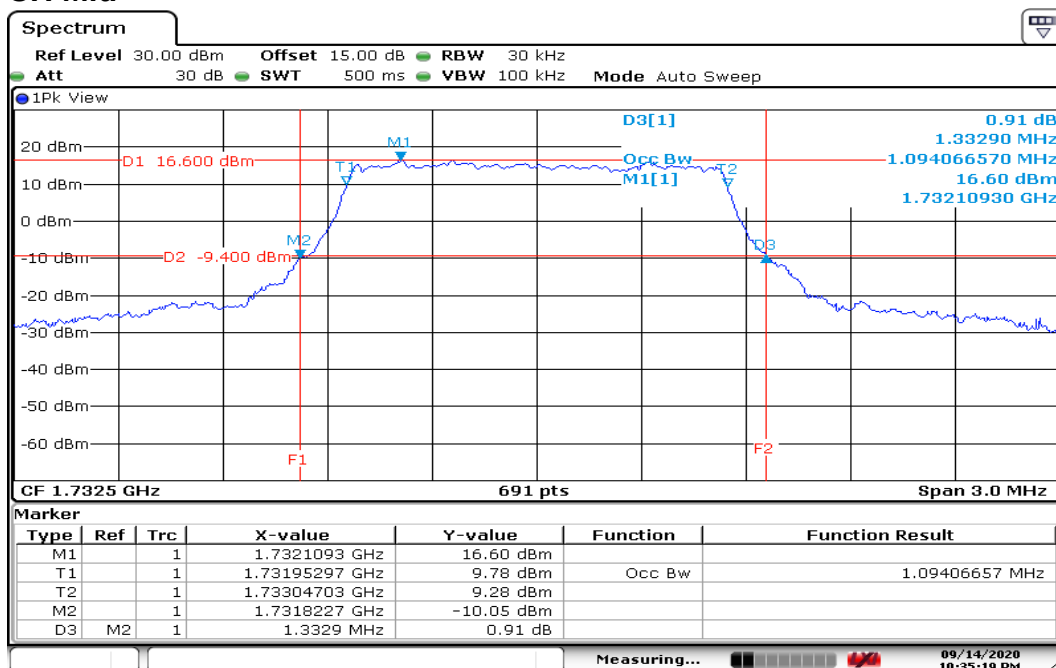
Band	BW (MHz)	Channel	Frequency (MHz)	Mode	OBW(99%)(MHz)	26 dB Bandwidth(MHz)
4	1.4	Middle	1732.5	QPSK	1.0984	1.3199
		Middle	1732.5	16QAM	1.0940	1.3329
	3	Middle	1732.5	QPSK	2.6830	2.9739
		Middle	1732.5	16QAM	2.6830	2.9393
	5	Middle	1732.5	QPSK	4.4862	4.956
		Middle	1732.5	16QAM	4.4717	4.937
	10	Middle	1732.5	QPSK	8.9146	9.828
		Middle	1732.5	16QAM	8.9435	9.863
	15	Middle	1732.5	QPSK	13.4153	14.661
		Middle	1732.5	16QAM	13.4153	14.575
	20	Middle	1732.5	QPSK	18.0607	19.929
		Middle	1732.5	16QAM	18.0607	19.987

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



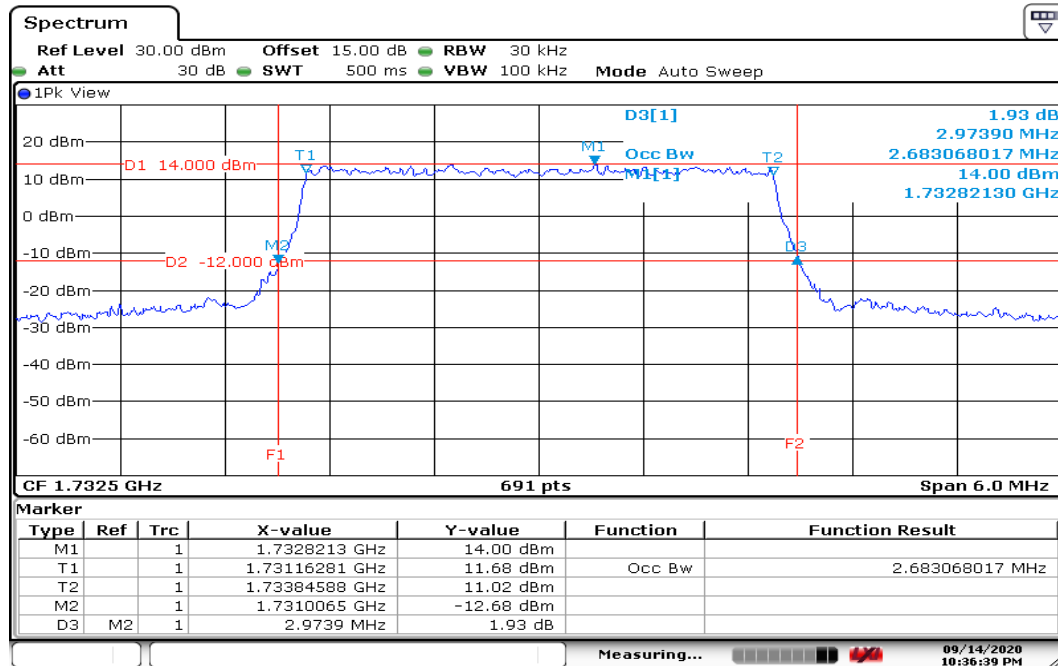
Date: 14 SEP 2020 22:32:48

CHANNEL BANDWIDTH: 1.4MHz / 16QAM CH Mid



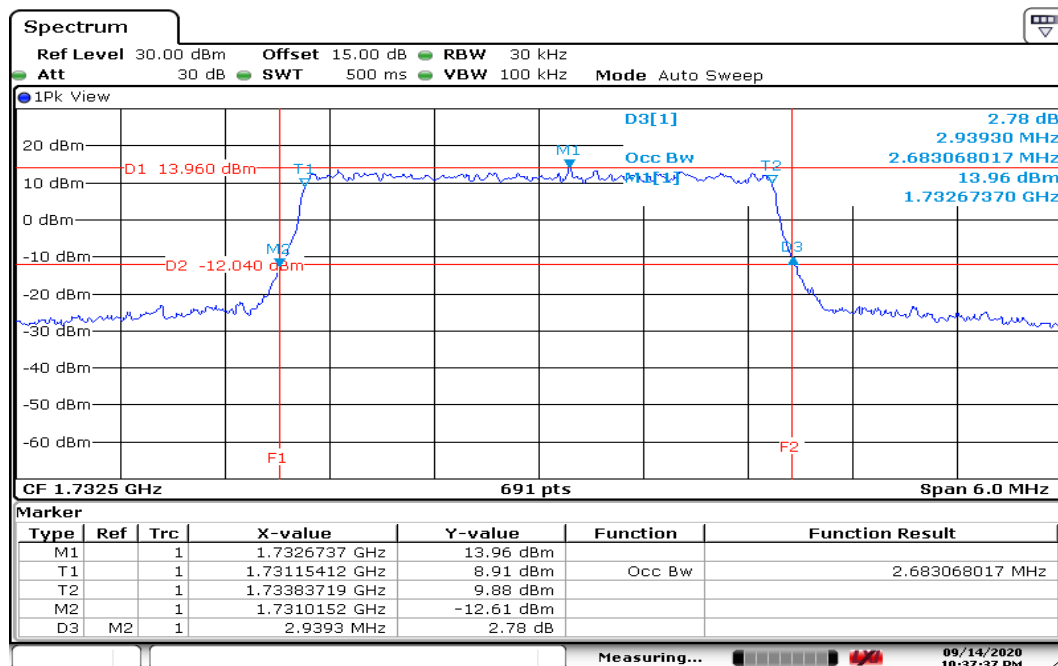
Date: 14 SEP 2020 22:35:19

CHANNEL BANDWIDTH: 3MHz / QPSK CH Mid



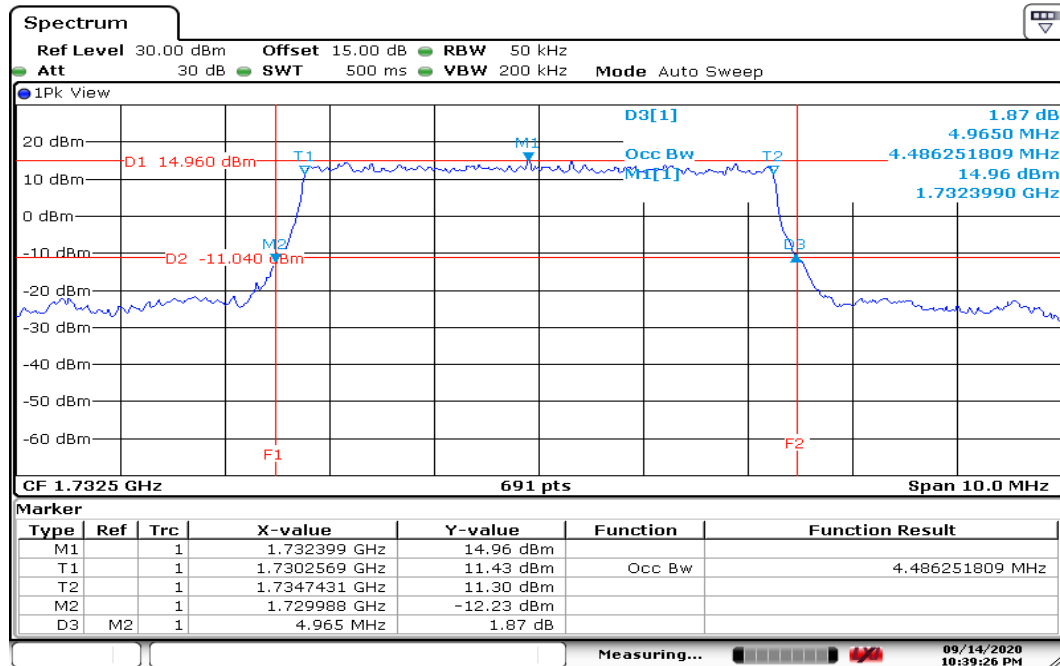
Date: 14 SEP 2020 22:36:39

CHANNEL BANDWIDTH: 3MHz / 16QAM CH Mid



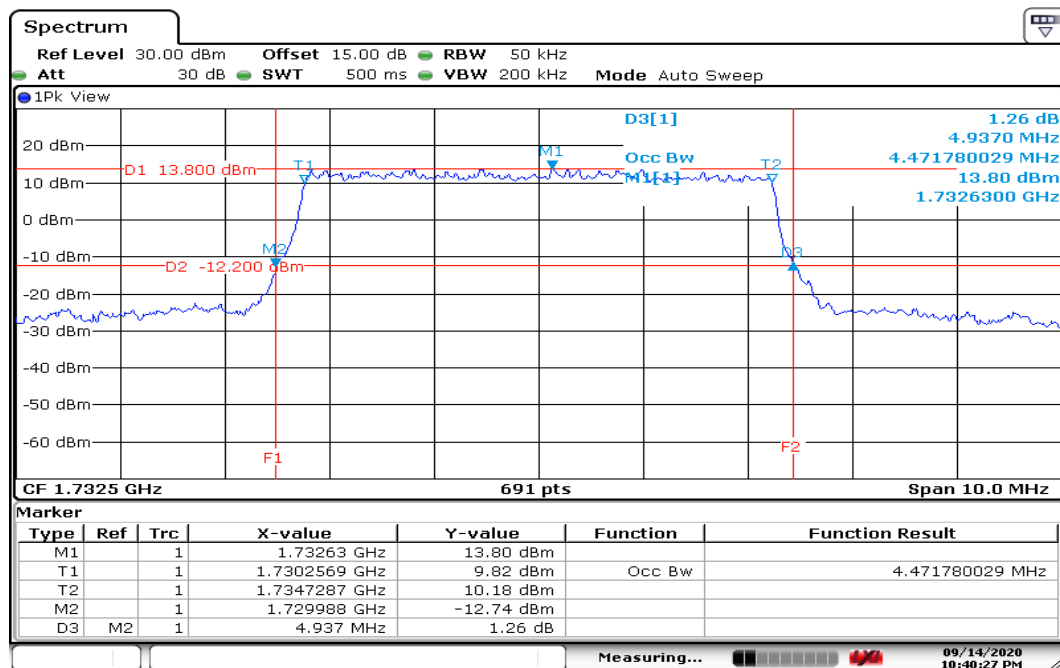
Date: 14 SEP 2020 22:37:38

CHANNEL BANDWIDTH: 5MHz / QPSK CH Mid



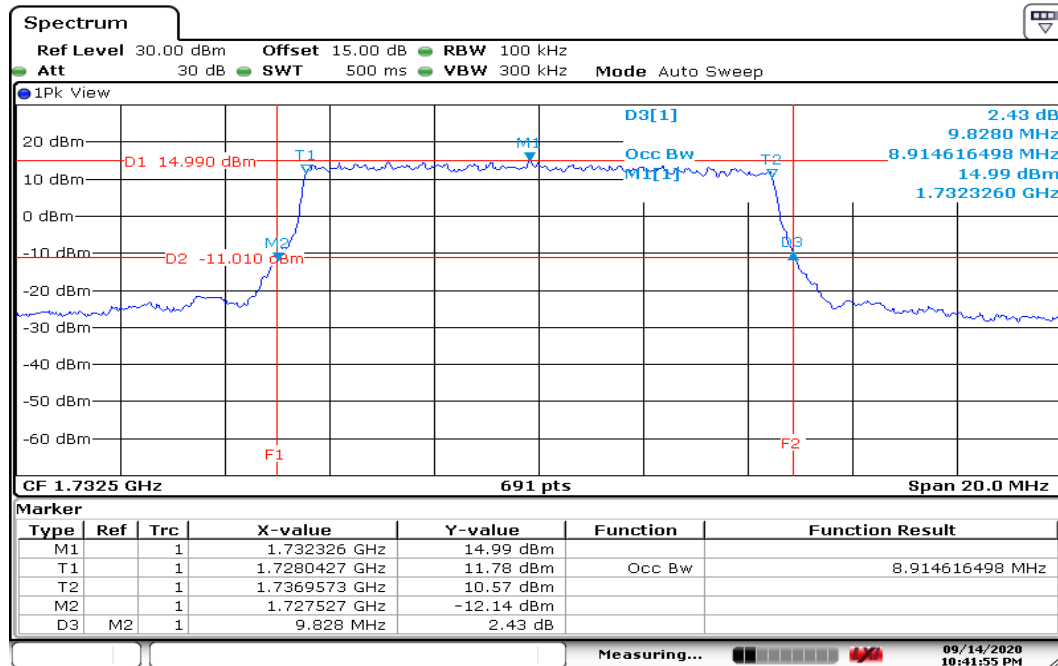
Date: 14 SEP 2020 22:39:27

CHANNEL BANDWIDTH: 5MHz / 16QAM CH Mid



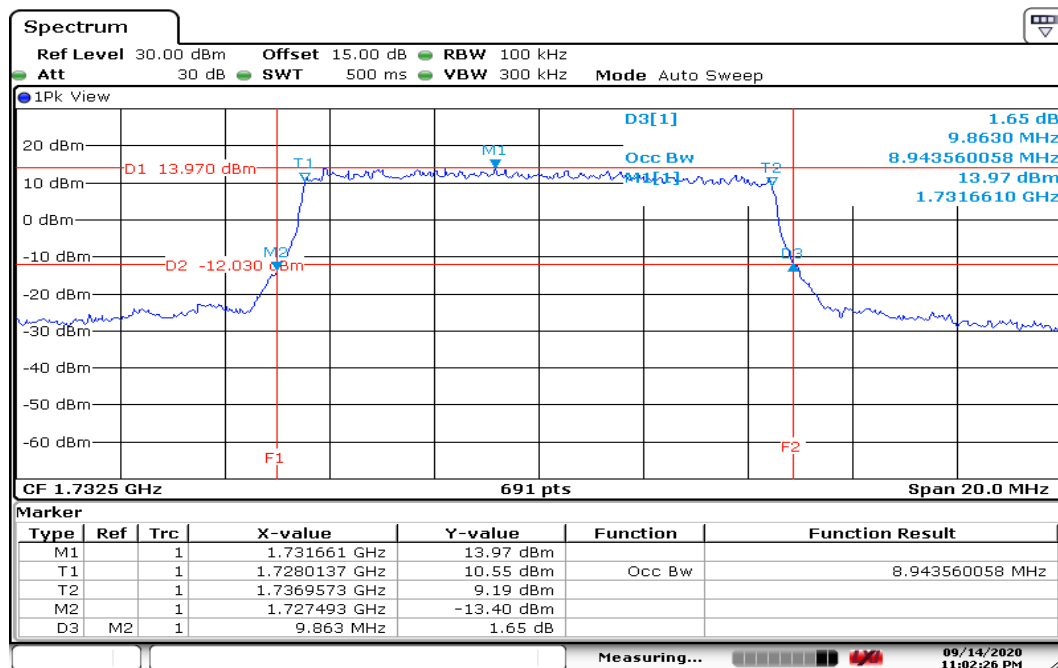
Date: 14 SEP 2020 22:40:27

CHANNEL BANDWIDTH: 10MHz / QPSK CH Mid



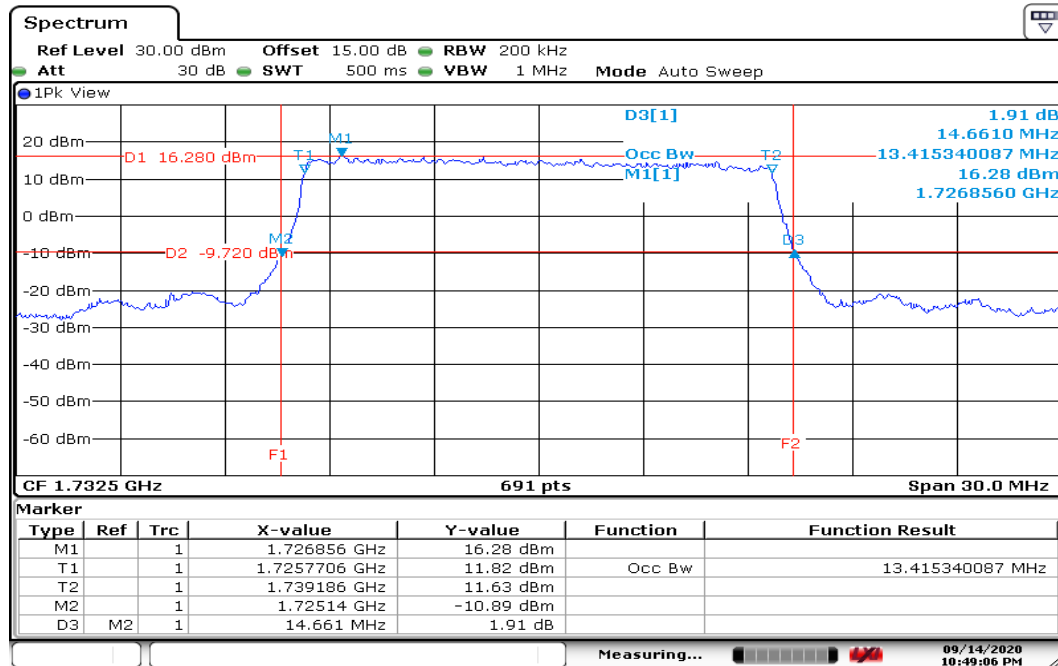
Date: 14 SEP 2020 22:41:56

CHANNEL BANDWIDTH: 10MHz / 16QAM CH Mid



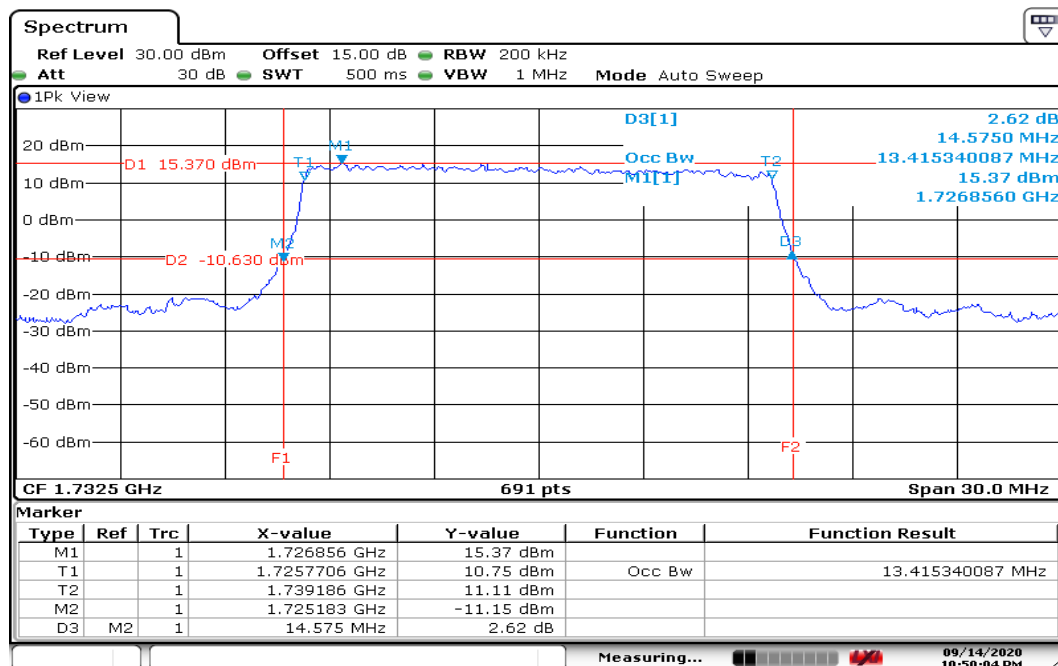
Date: 14 SEP 2020 23:02:27

CHANNEL BANDWIDTH: 15MHz / QPSK CH Mid



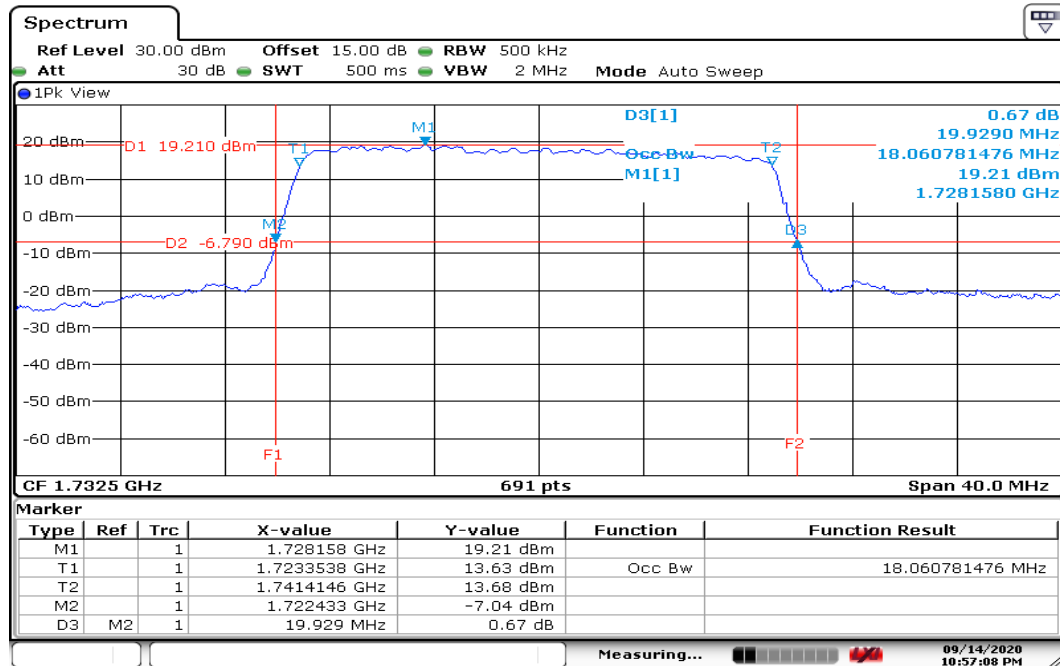
Date: 14 SEP 2020 22:49:06

CHANNEL BANDWIDTH: 15MHz / 16QAM CH Mid



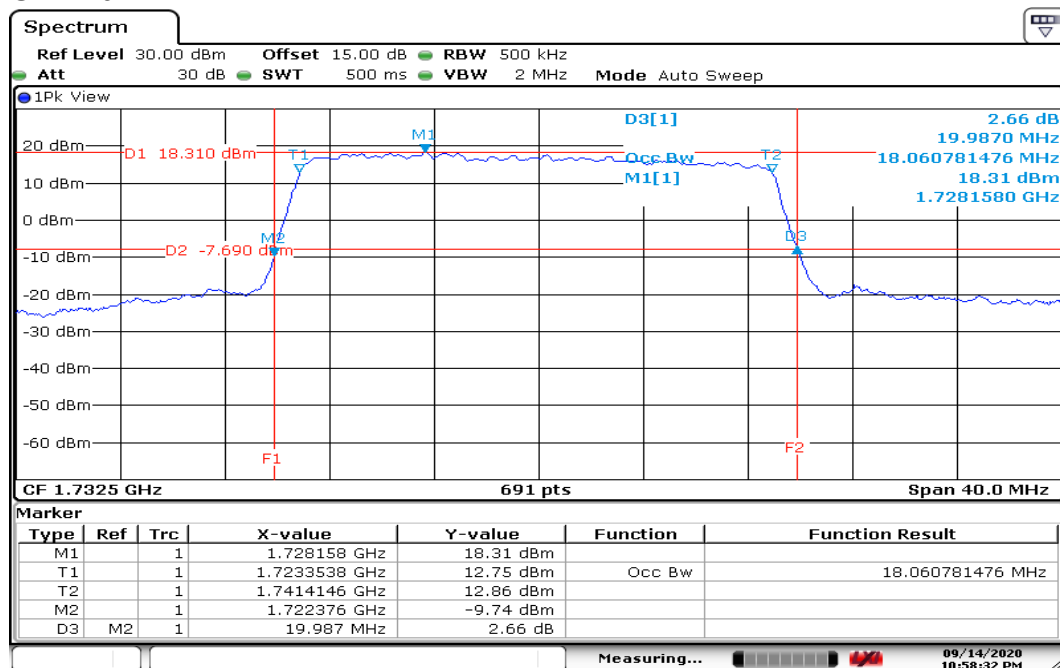
Date: 14 SEP 2020 22:50:04

CHANNEL BANDWIDTH: 20MHz / QPSK CH Mid



Date: 14 SEP 2020 22:57:09

CHANNEL BANDWIDTH: 20MHz / 16QAM CH Mid



Date: 14 SEP 2020 22:58:32

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

Temperature: 24.2°C

Test Date: September 14, 2020

Humidity: 55.9 % RH

Tested by: Rick Lee

LTE Band 4

	Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
1.4MHz / QPSK / 1RB	20175	1732.50	2.96
3MHz / QPSK / 1RB	20175	1732.50	2.90
5MHz / QPSK / 1RB	20175	1732.50	2.90
10MHz / QPSK / 1RB	20175	1732.50	2.84
15MHz / QPSK / 1RB	20175	1732.50	2.84
20MHz / QPSK / 1RB	20175	1732.50	2.84
1.4MHz / QPSK / 100%RB	20175	1732.50	3.94
3MHz / QPSK / 100%RB	20175	1732.50	3.91
5MHz / QPSK / 100%RB	20175	1732.50	3.80
10MHz / QPSK / 100%RB	20175	1732.50	4.00
15MHz / QPSK / 100%RB	20175	1732.50	3.88
20MHz / QPSK / 100%RB	20175	1732.50	3.97

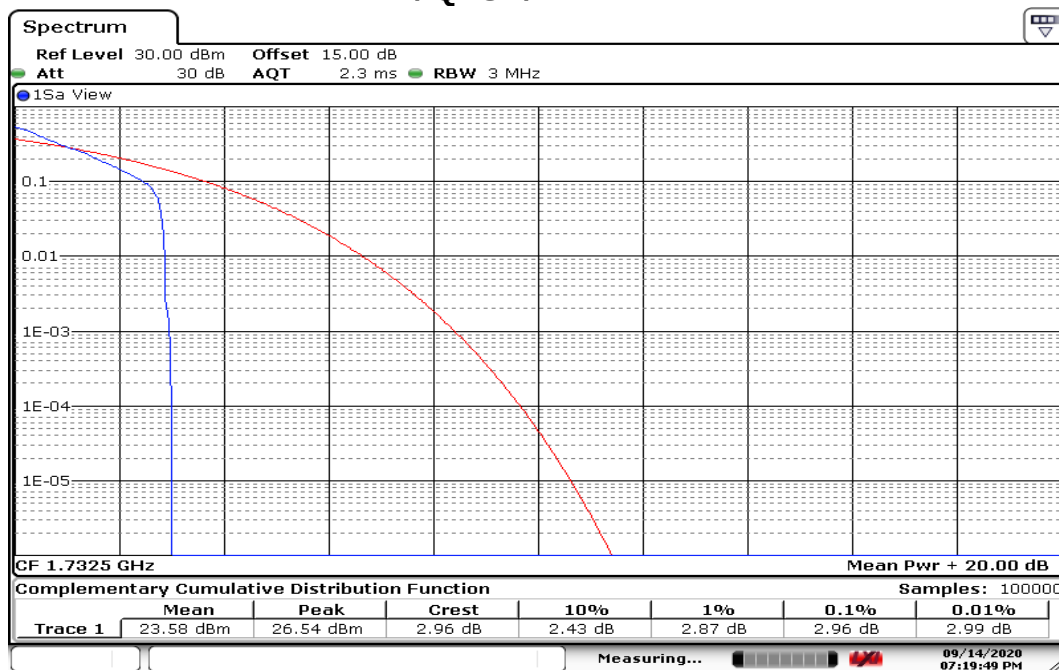
Note: We selected worst case to performed test in middle channel, the results can be meet other channel.

	Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
1.4MHz / 16QAM / 1RB	20175	1732.50	3.74
3MHz / 16QAM / 1RB	20175	1732.50	3.86
5MHz / 16QAM / 1RB	20175	1732.50	3.42
10MHz / 16QAM / 1RB	20175	1732.50	3.74
15MHz / 16QAM / 1RB	20175	1732.50	3.62
20MHz / 16QAM / 1RB	20175	1732.50	3.48
1.4MHz / 16QAM / 100%RB	20175	1732.50	4.64
3MHz / 16QAM / 100%RB	20175	1732.50	4.09
5MHz / 16QAM / 100%RB	20175	1732.50	4.70
10MHz / 16QAM / 100%RB	20175	1732.50	4.00
15MHz / 16QAM / 100%RB	20175	1732.50	3.91
20MHz / 16QAM / 100%RB	20175	1732.50	3.94

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

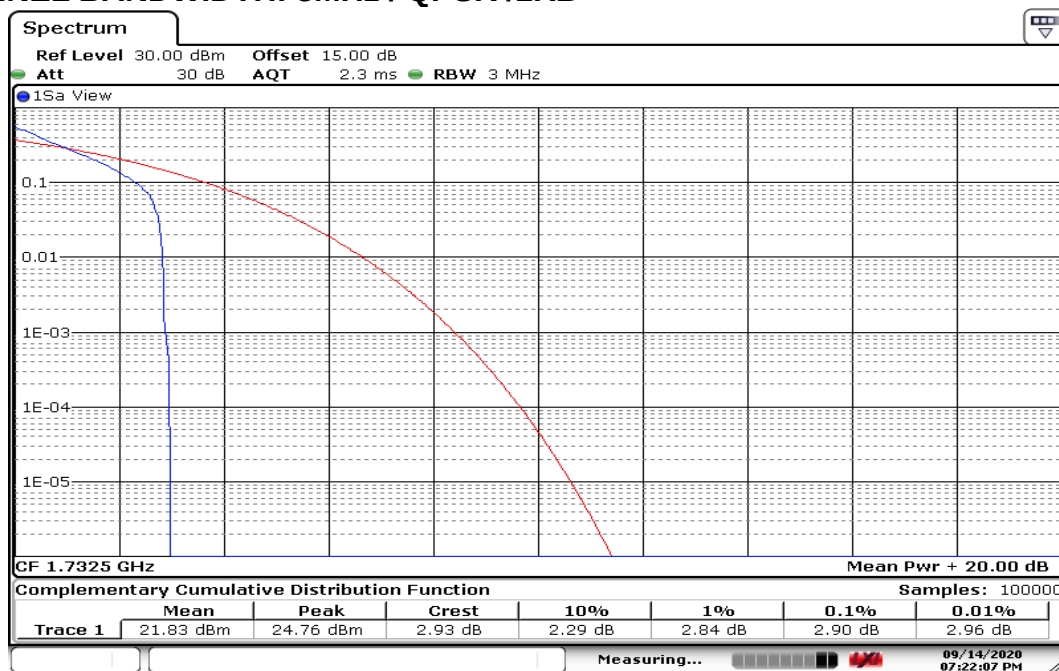
LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK/1RB



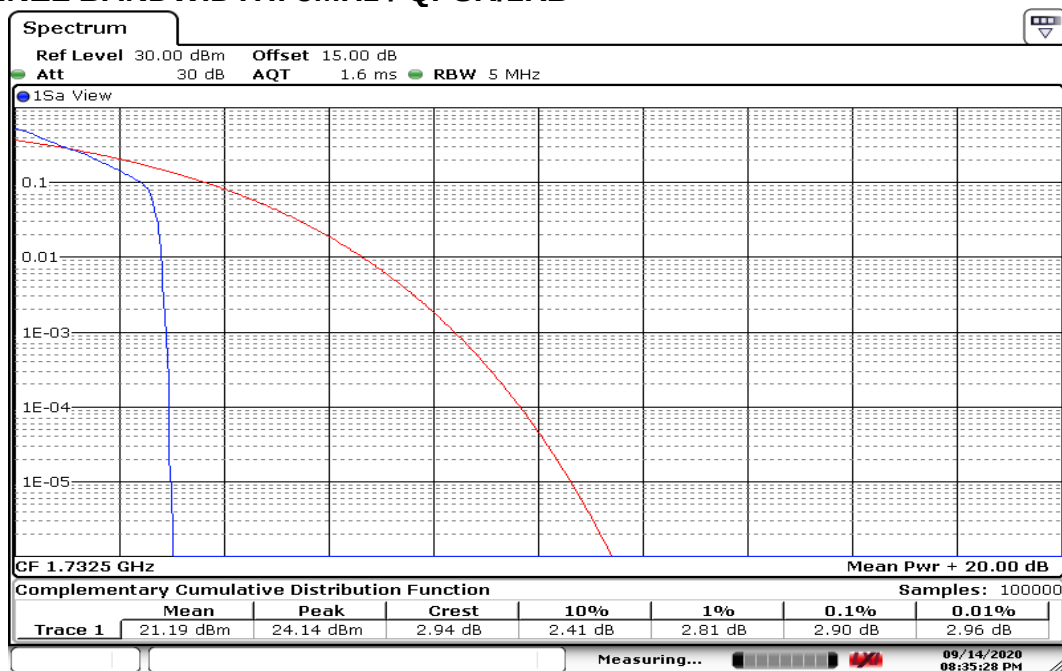
Date: 14 SEP 2020 19:19:50

CHANNEL BANDWIDTH: 3MHz / QPSK /1RB



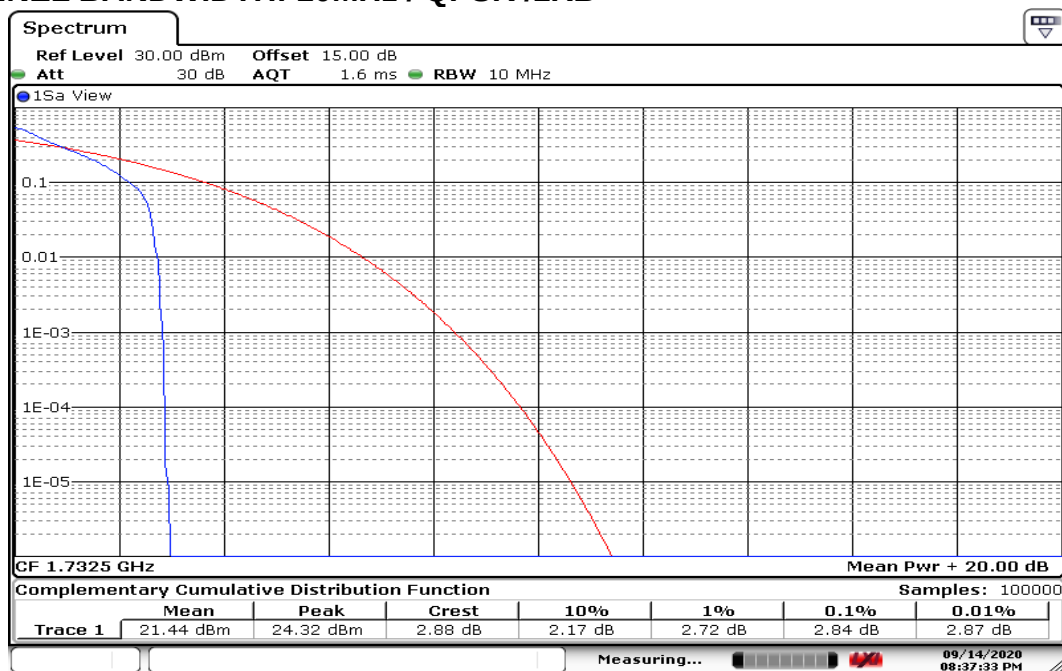
Date: 14 SEP 2020 19:22:08

CHANNEL BANDWIDTH: 5MHz / QPSK/1RB



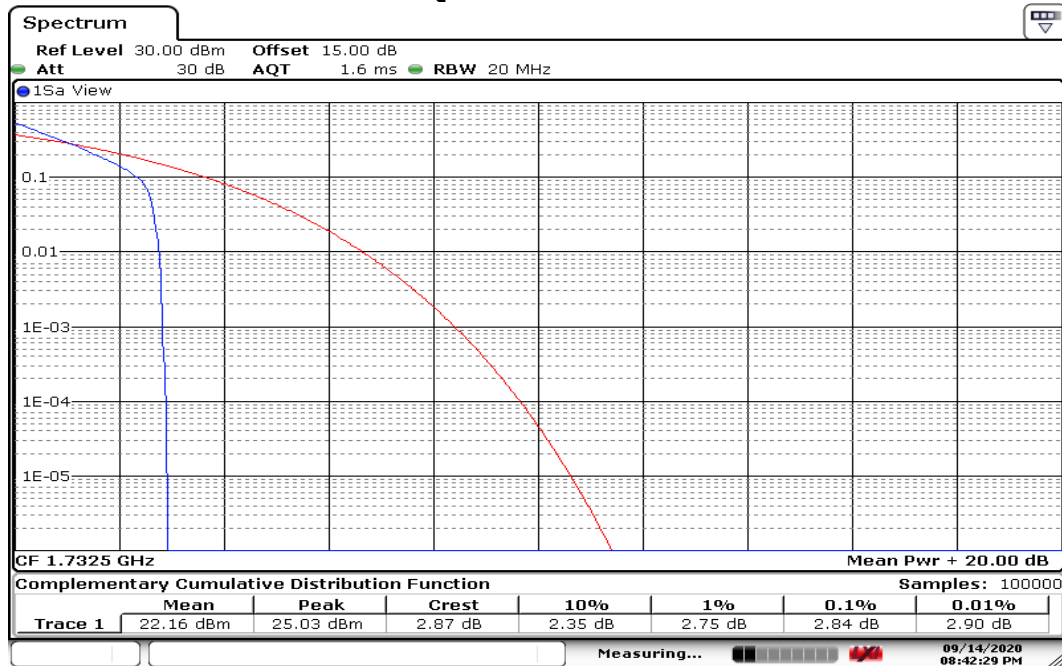
Date: 14 SEP 2020 20:35:28

CHANNEL BANDWIDTH: 10MHz / QPSK /1RB



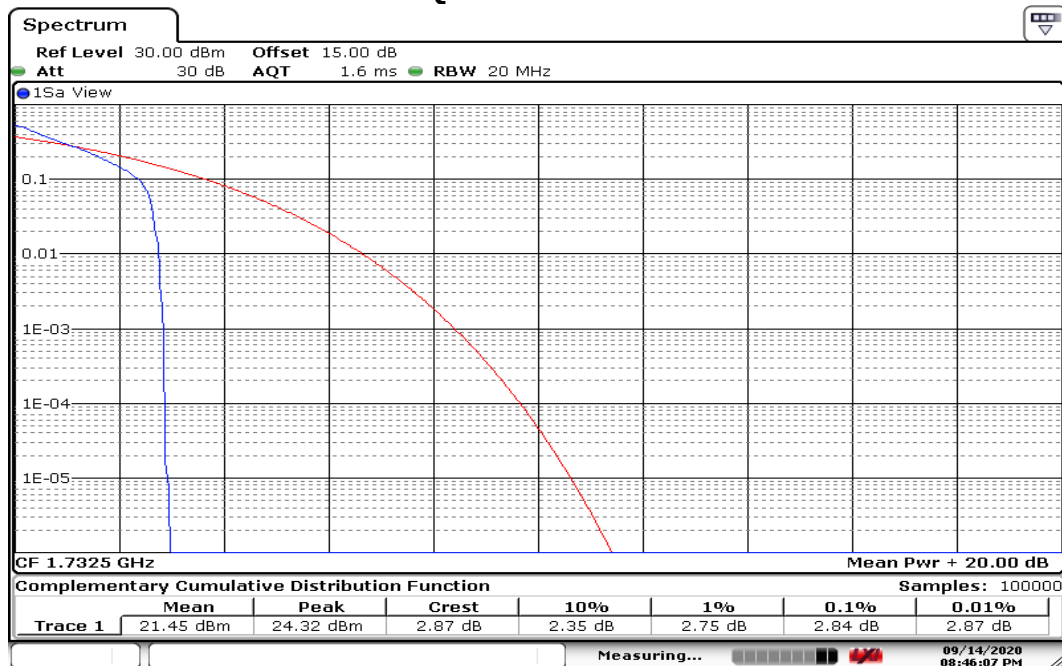
Date: 14 SEP 2020 20:37:34

CHANNEL BANDWIDTH: 15MHz / QPSK/1RB



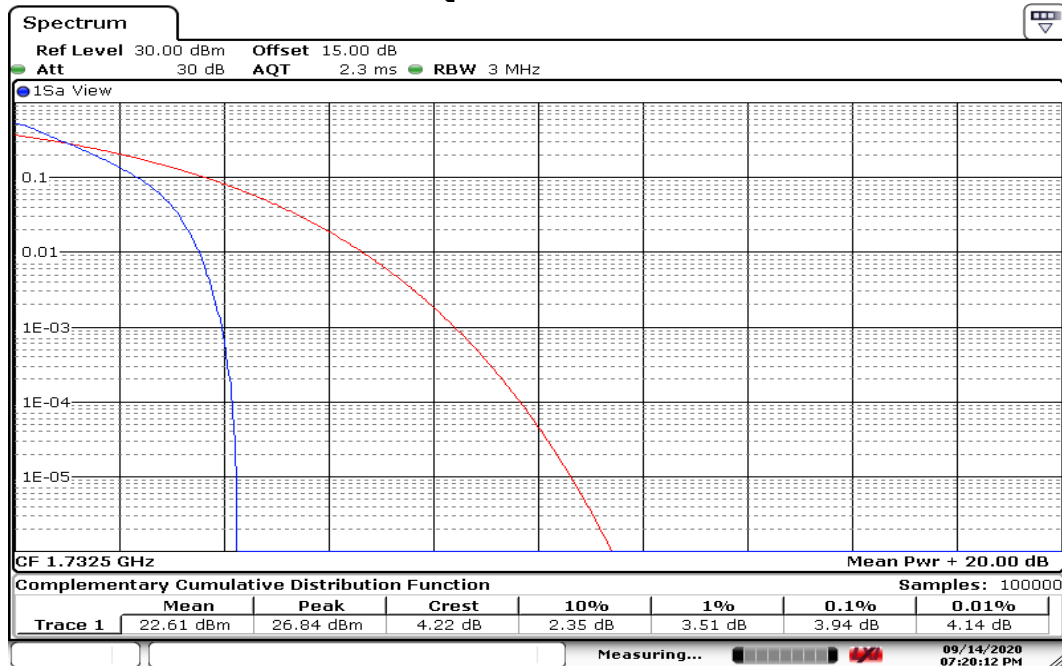
Date: 14 SEP 2020 20:42:29

CHANNEL BANDWIDTH: 20MHz / QPSK /1RB



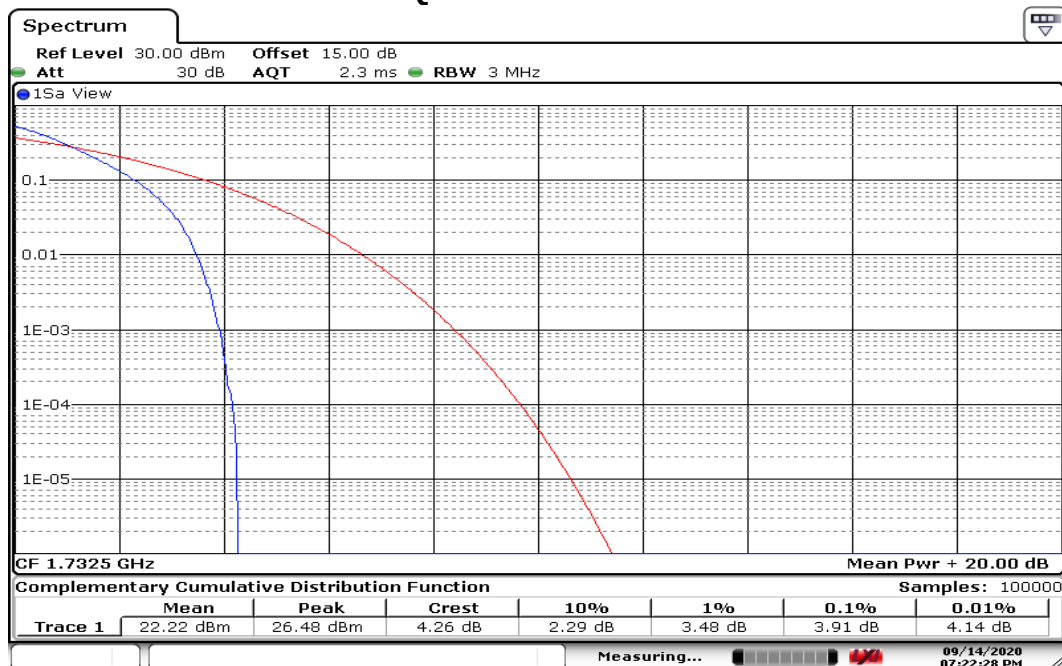
Date: 14 SEP 2020 20:46:08

CHANNEL BANDWIDTH: 1.4MHz / QPSK/100%RB



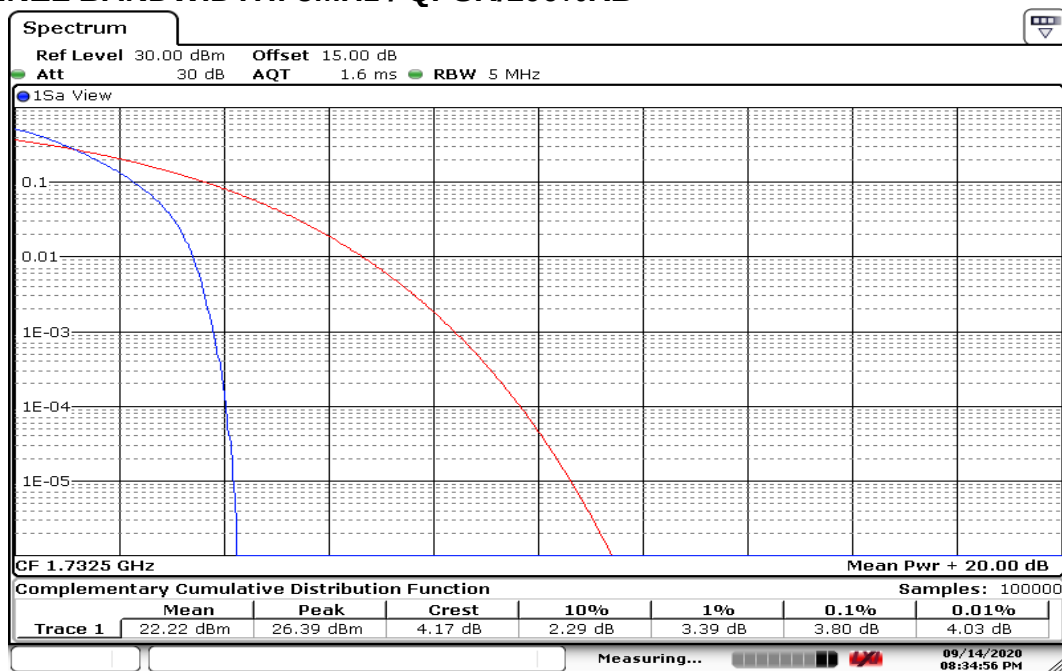
Date: 14.SEP.2020 19:20:12

CHANNEL BANDWIDTH: 3MHz / QPSK /100%RB



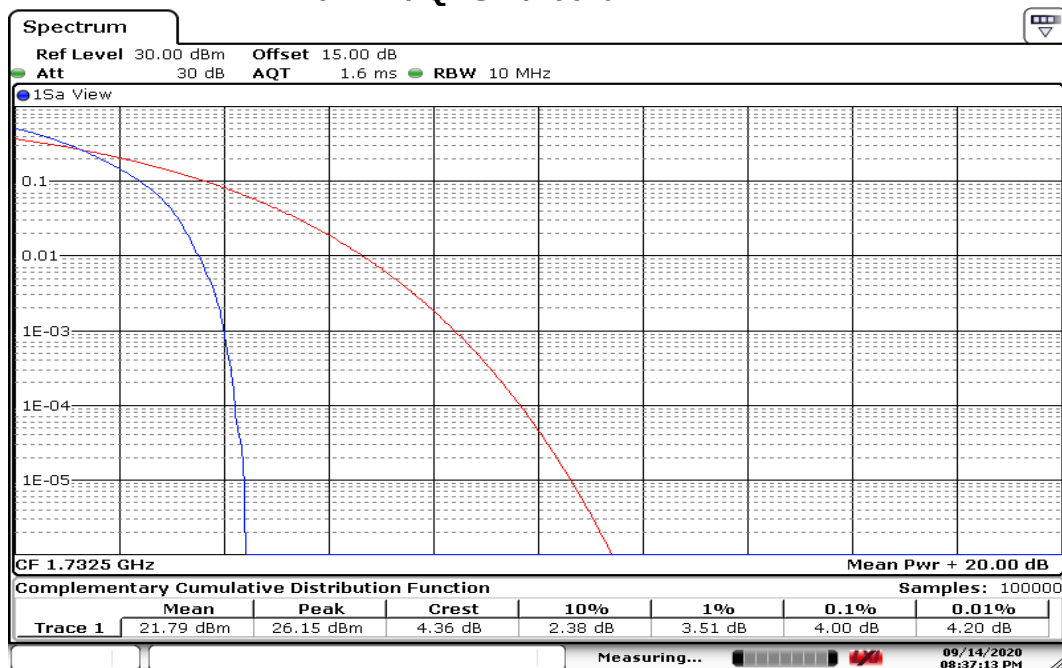
Date: 14.SEP.2020 19:22:28

CHANNEL BANDWIDTH: 5MHz / QPSK/100%RB



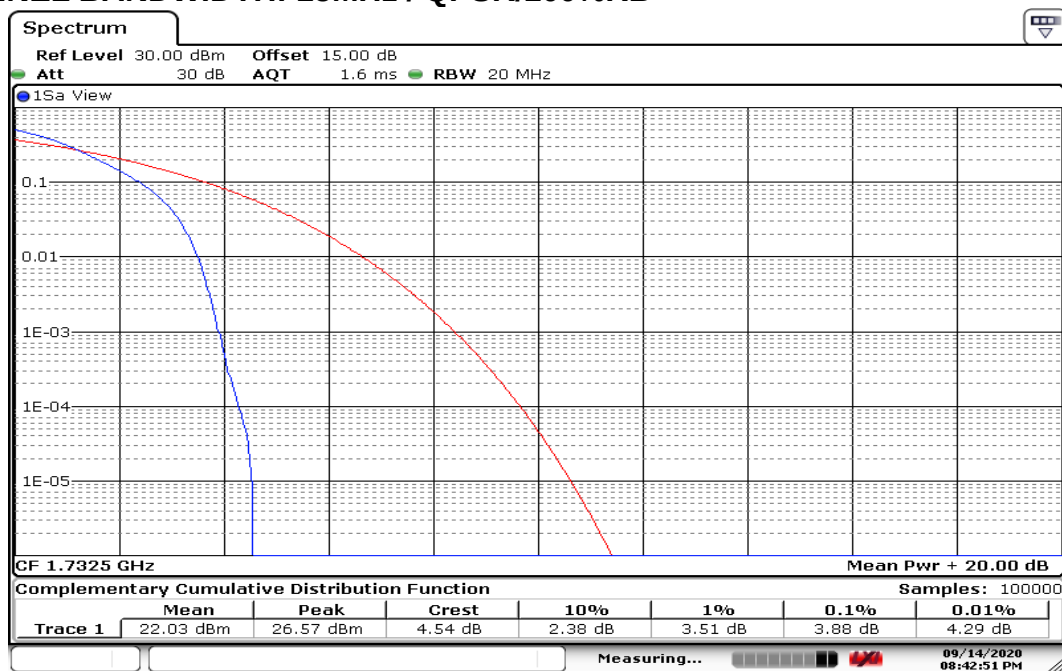
Date: 14 SEP 2020 20:34:56

CHANNEL BANDWIDTH: 10MHz / QPSK /100%RB



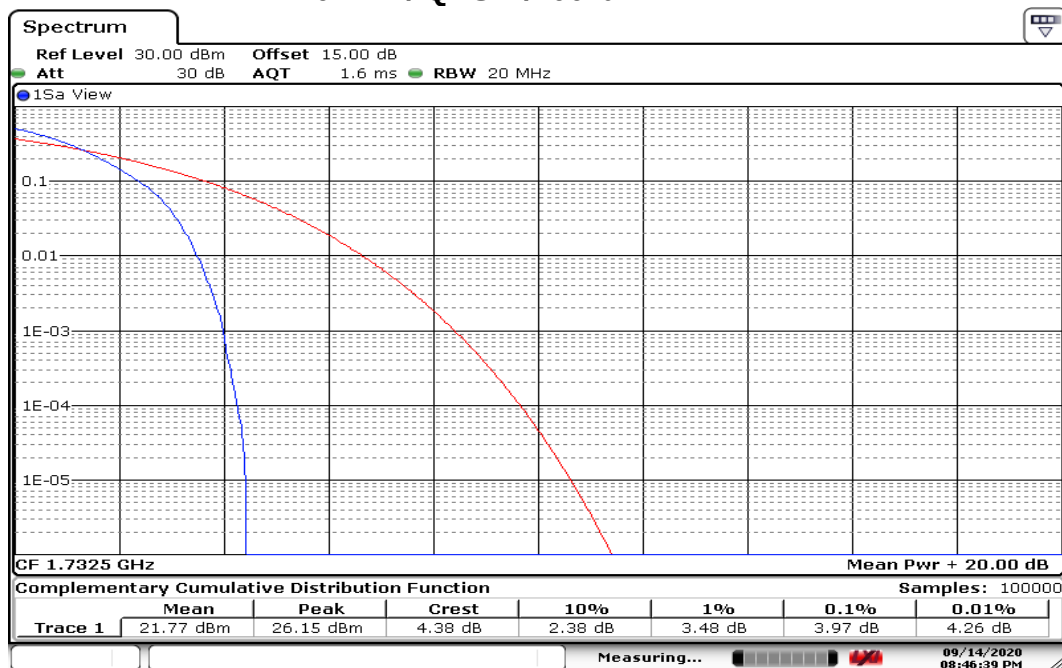
Date: 14 SEP 2020 20:37:14

CHANNEL BANDWIDTH: 15MHz / QPSK/100%RB



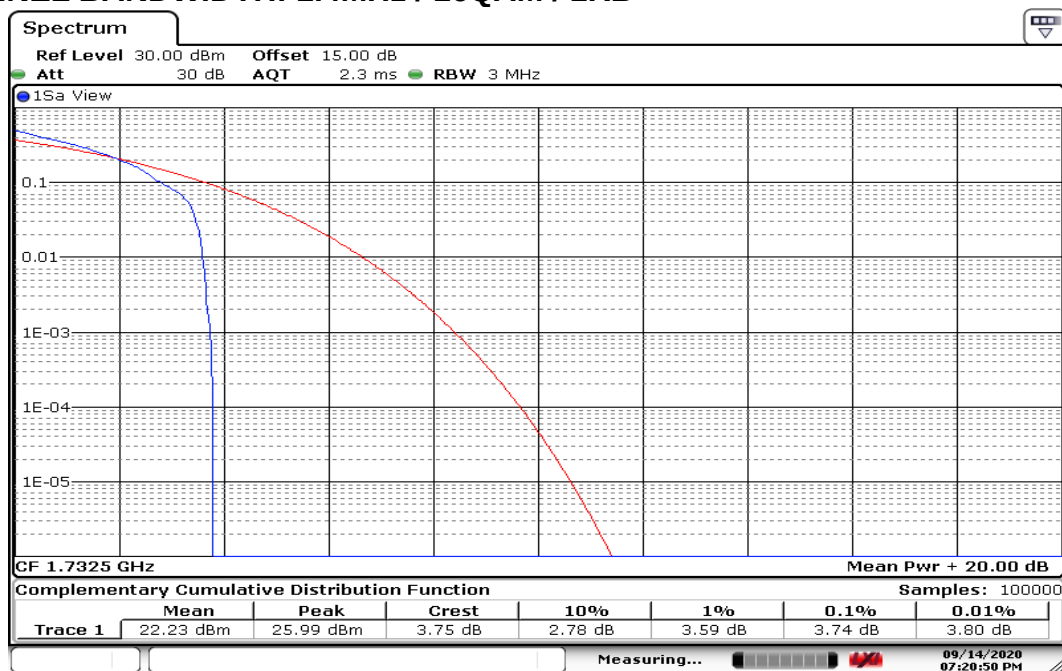
Date: 14.SEP.2020 20:42:51

CHANNEL BANDWIDTH: 20MHz / QPSK /100%RB



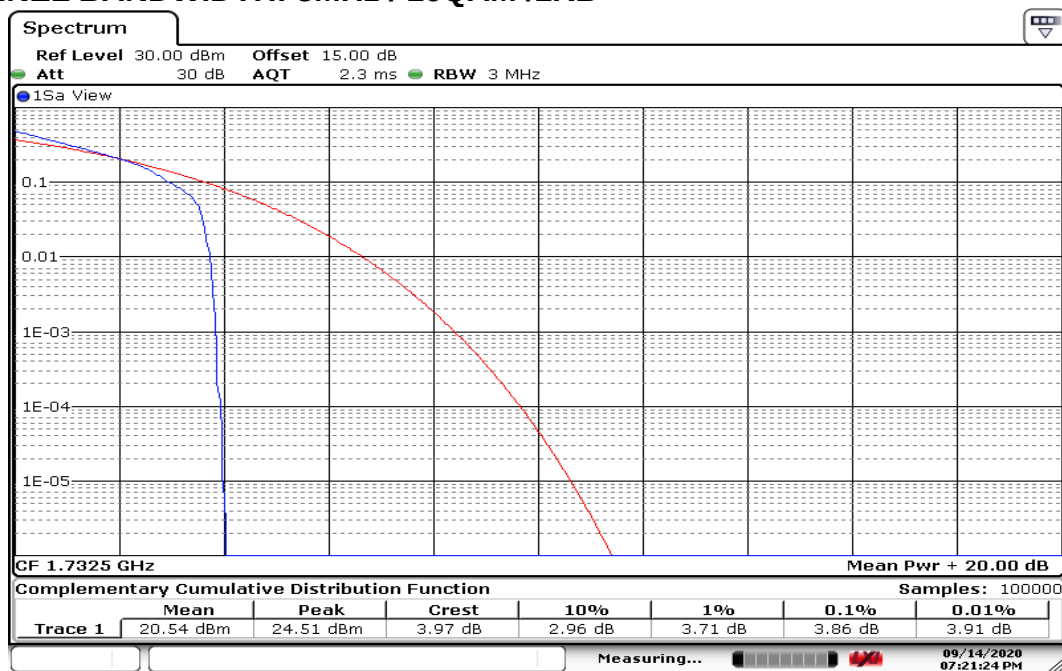
Date: 14.SEP.2020 20:46:39

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB



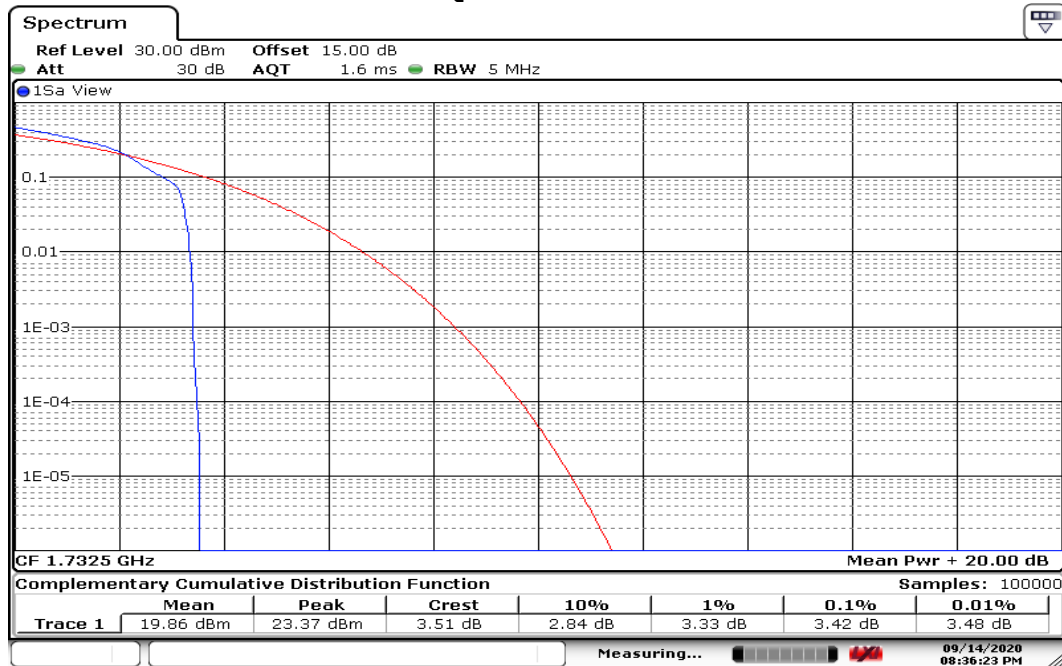
Date: 14 SEP 2020 19:20:51

CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB



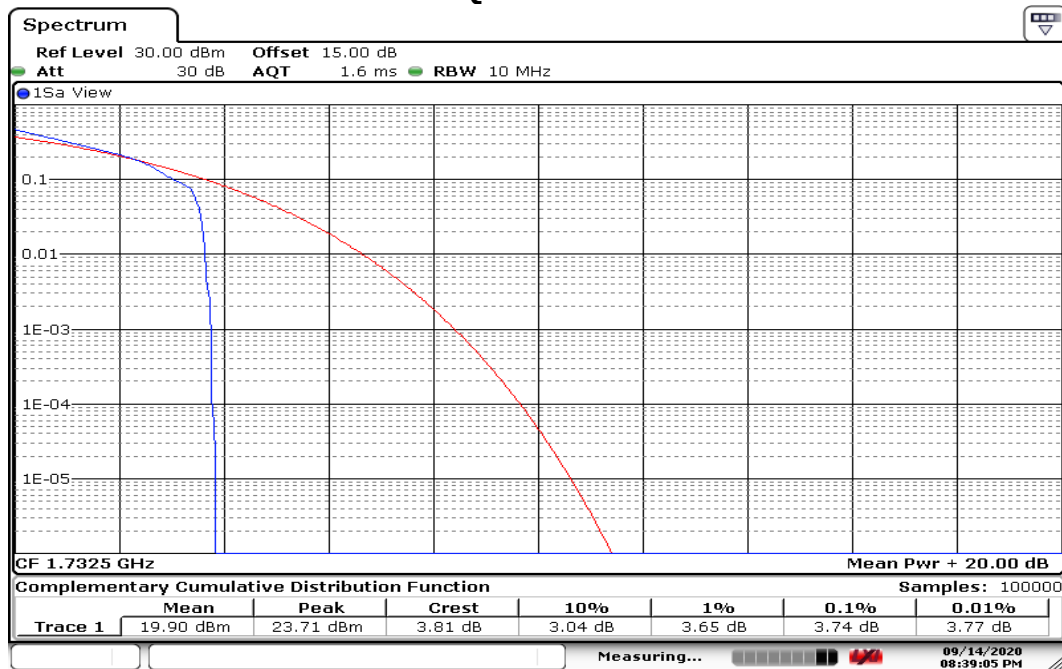
Date: 14 SEP 2020 19:21:24

CHANNEL BANDWIDTH: 5MHz / 16QAM /1RB



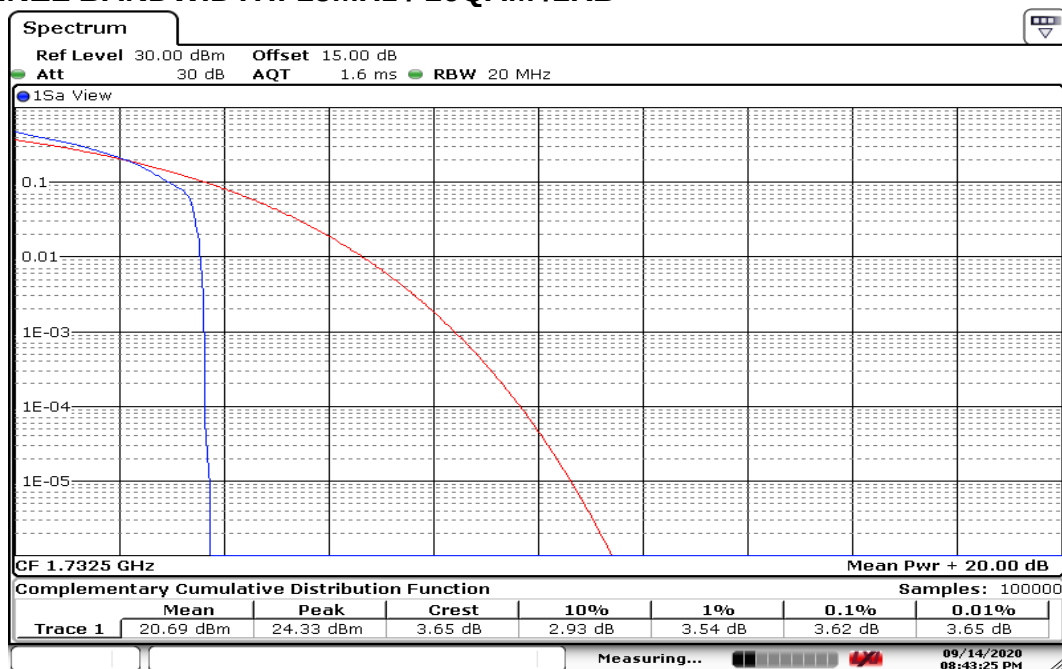
Date: 14.SEP.2020 20:36:24

CHANNEL BANDWIDTH: 10MHz / 16QAM /1RB



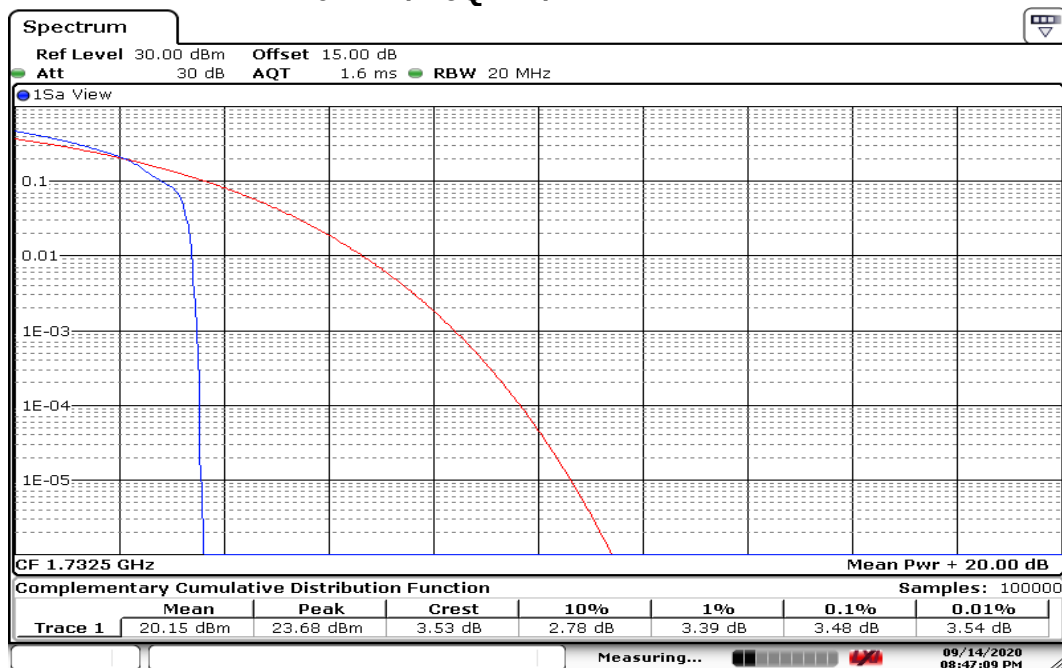
Date: 14.SEP.2020 20:39:05

CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB



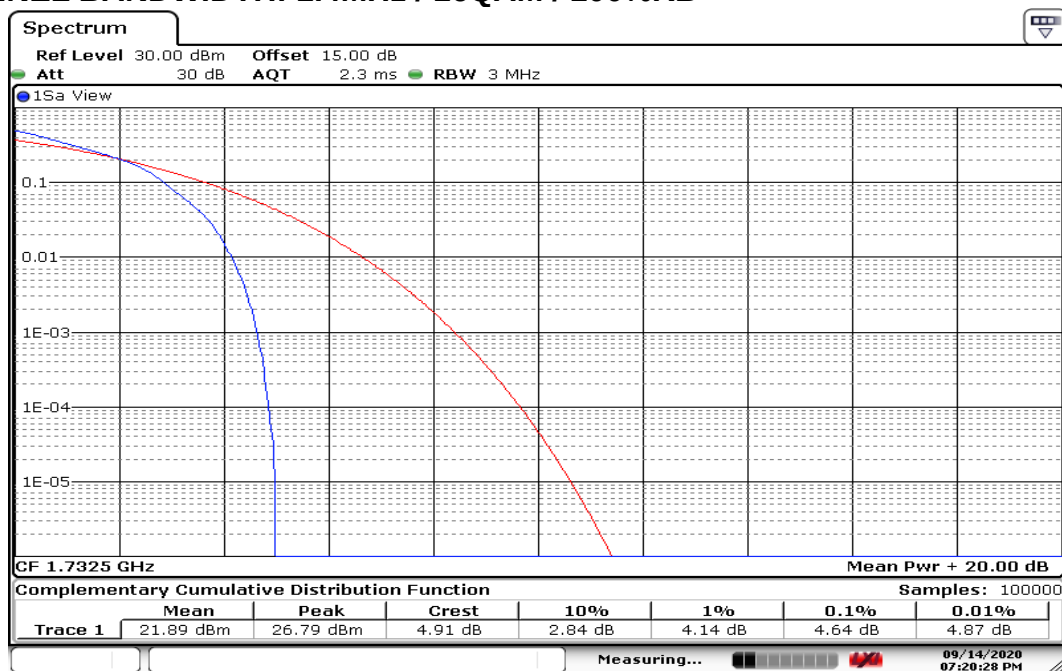
Date: 14 SEP 2020 20:43:26

CHANNEL BANDWIDTH: 20MHz / 16QAM / 1RB



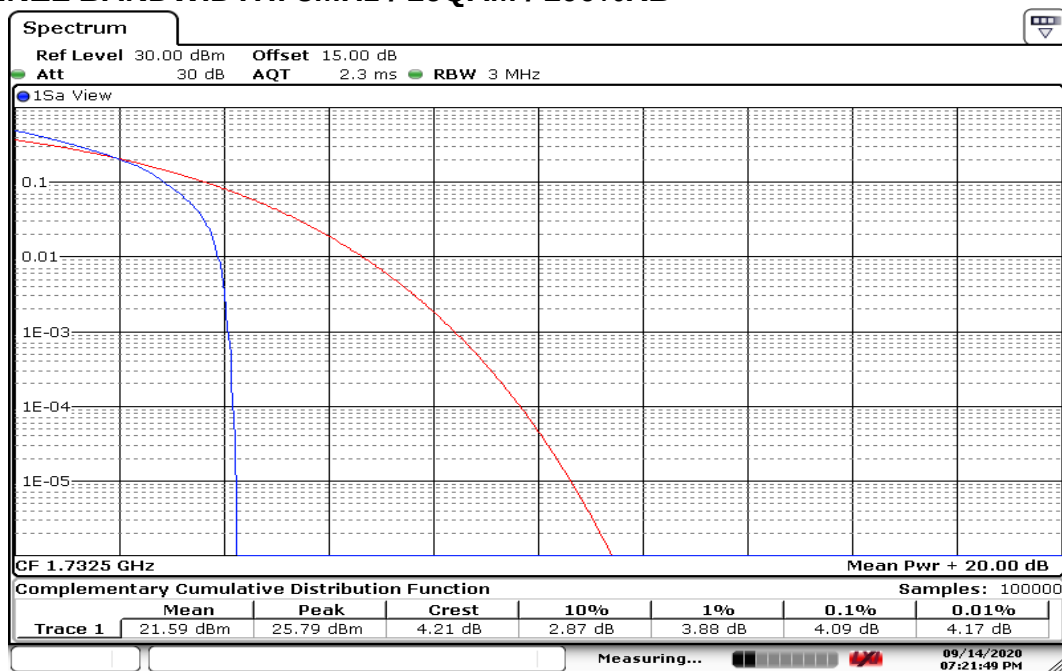
Date: 14 SEP 2020 20:47:10

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



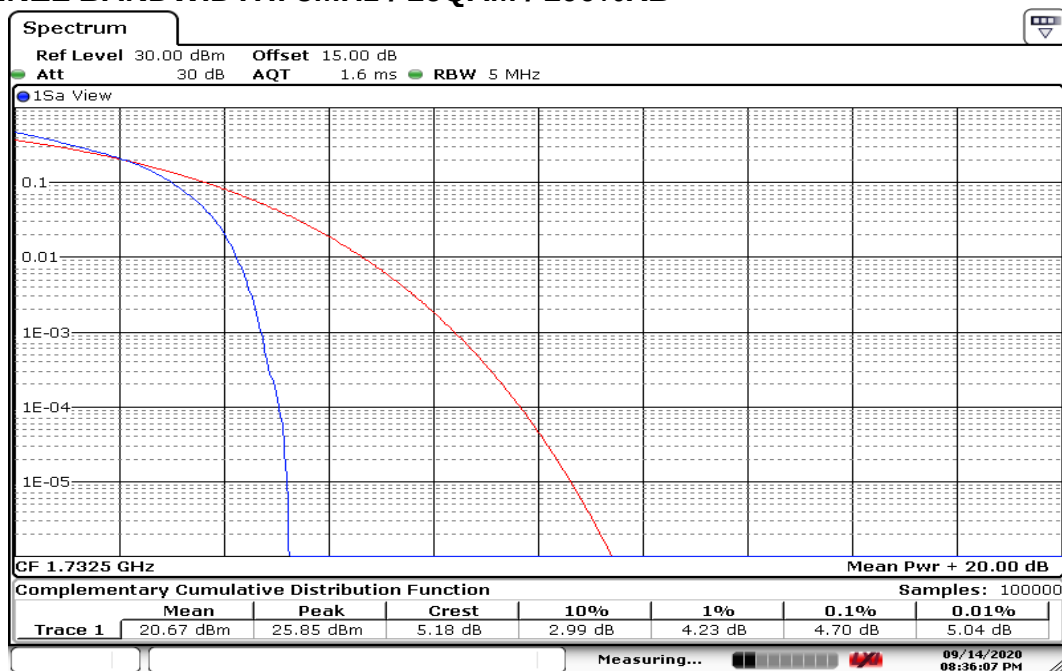
Date: 14 SEP 2020 19:20:28

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



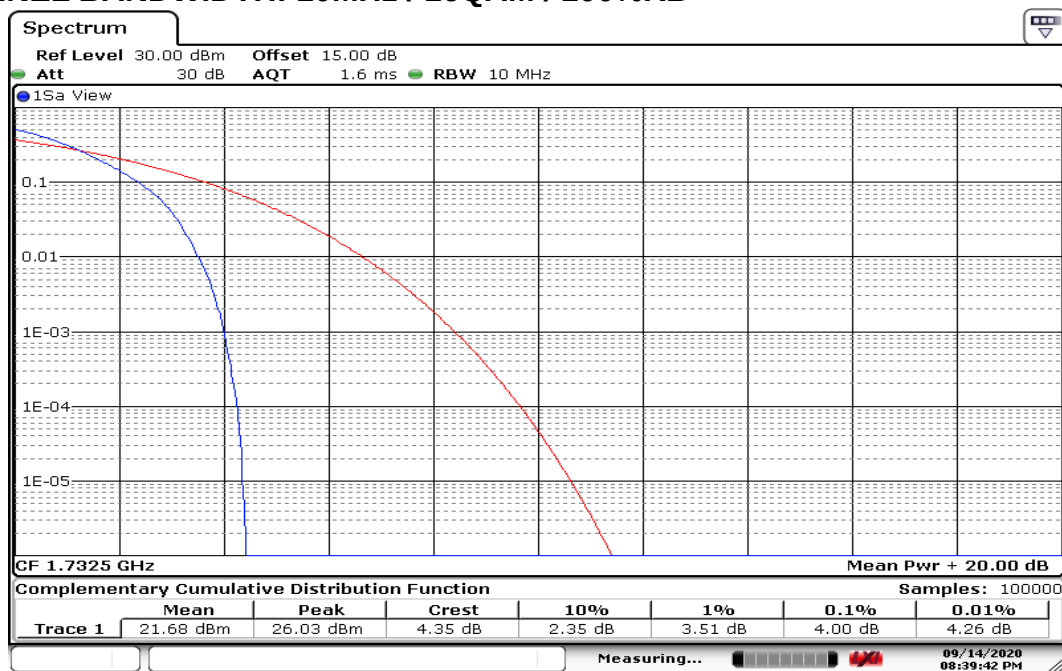
Date: 14 SEP 2020 19:21:49

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



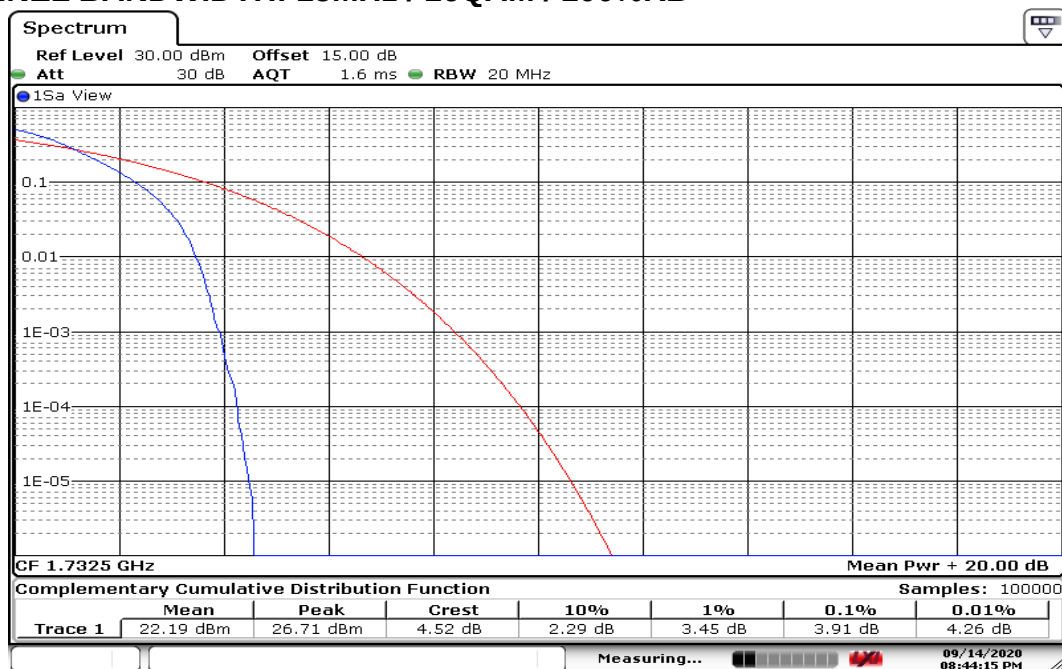
Date: 14.SEP.2020 20:36:08

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



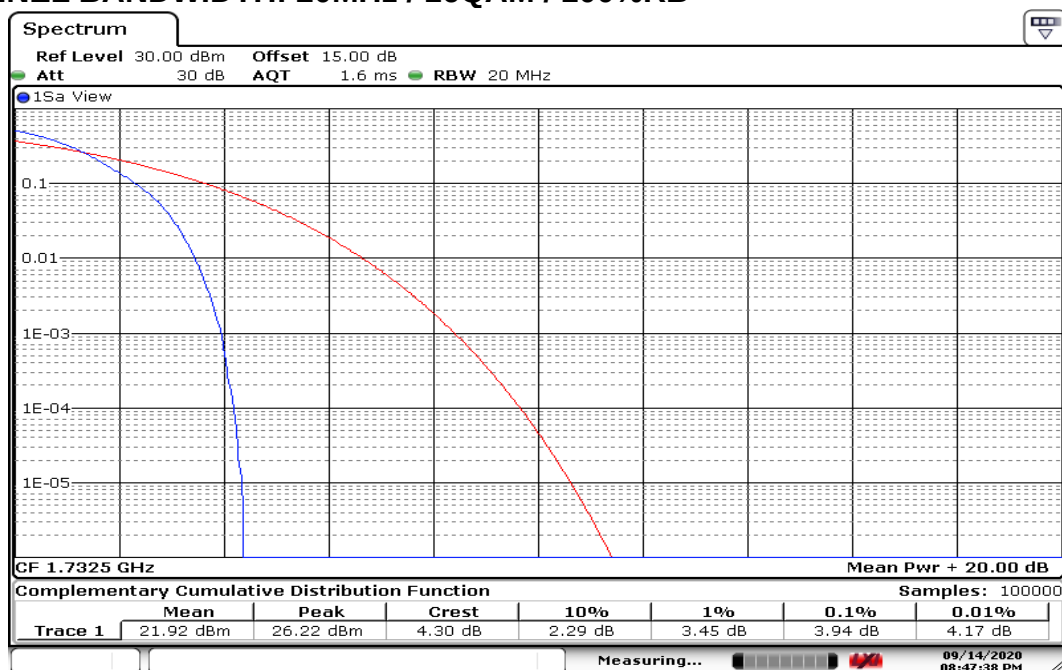
Date: 14.SEP.2020 20:39:42

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



Date: 14 SEP 2020 20:44:15

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



Date: 14 SEP 2020 20:47:38

8.5 BAND EDGE MEASUREMENT

LIMIT

Part 27.53(h) , Band 4

(h) AWS emission limits—(1) 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:

Offset= cable loss+ splitter loss +attenuator
1.21+3.78+10=14.99 (Rounding = 15)

* cable loss:1.21
* splitter loss:3.78
* attenuator:10

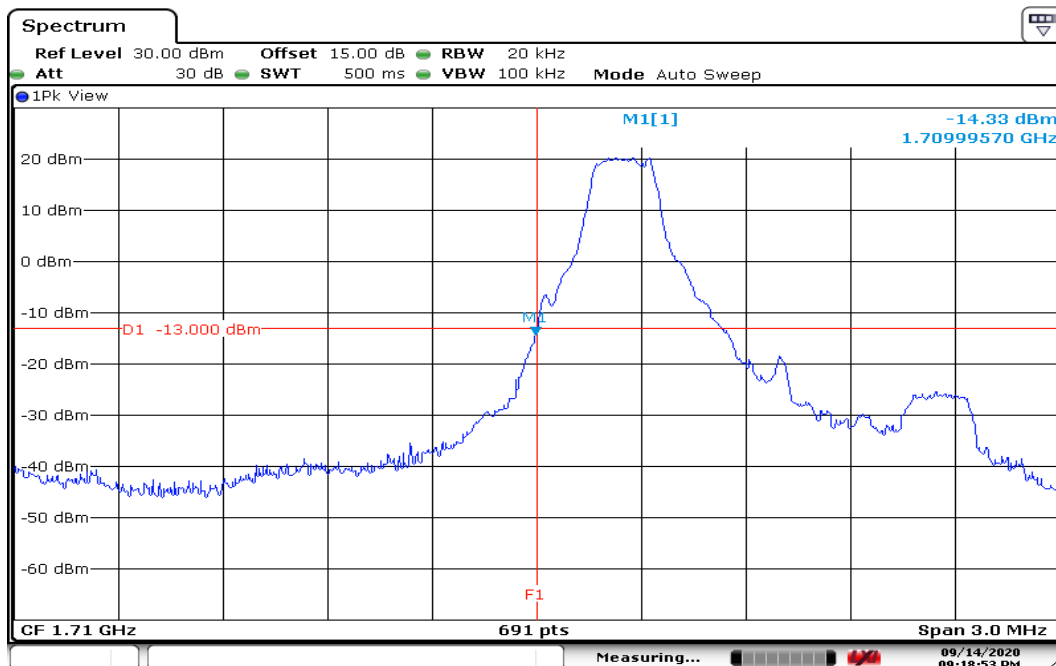
Temperature: 24.2°C
Humidity: 55.9 % RH

Test Date: September 14, 2020
Tested by: Rick Lee

LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



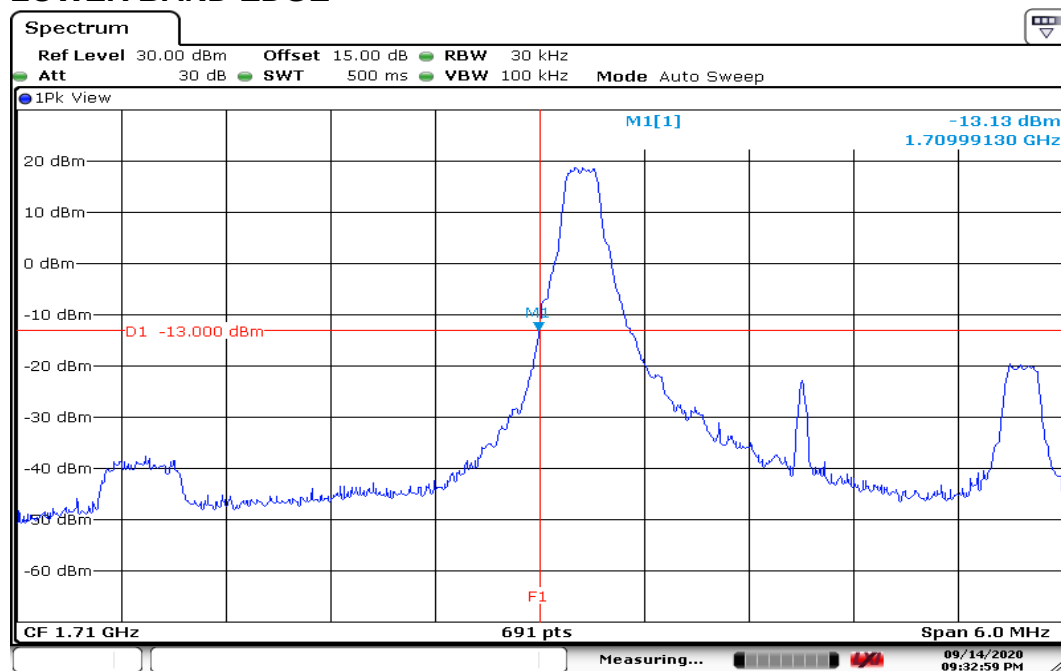
Date: 14 SEP 2020 21:18:53

HIGHER BAND EDGE



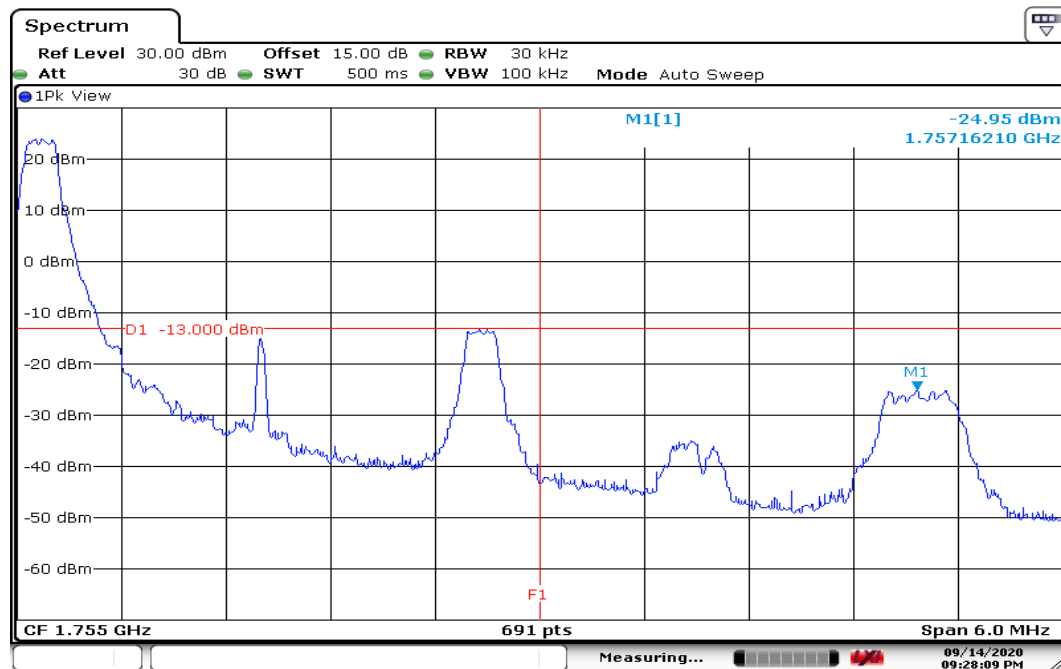
Date: 14 SEP 2020 21:24:43

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



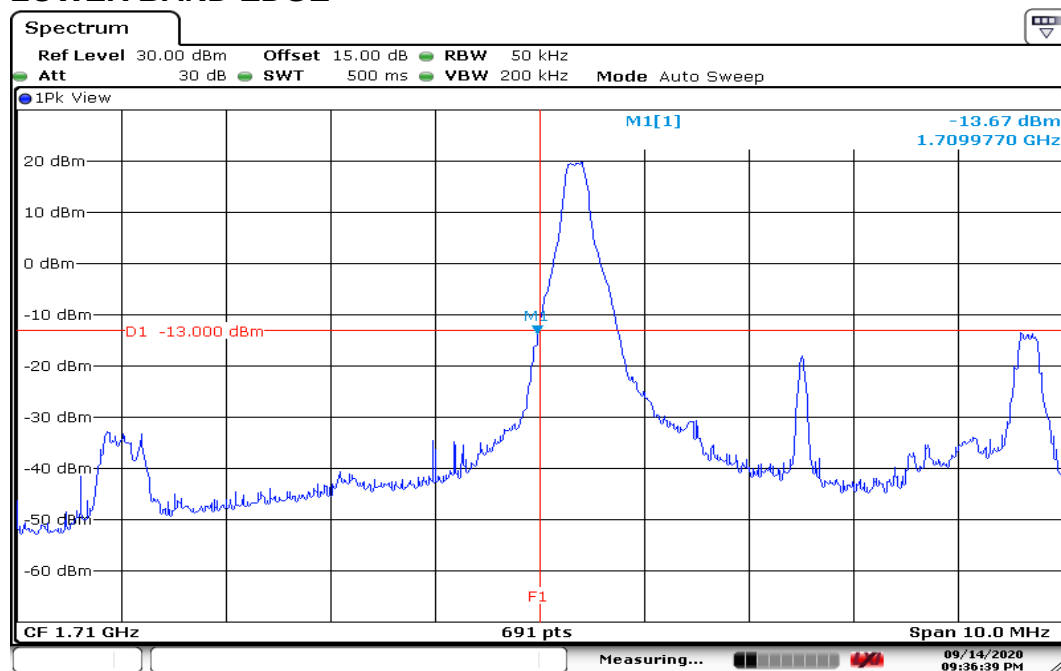
Date: 14 SEP 2020 21:33:00

HIGHER BAND EDGE



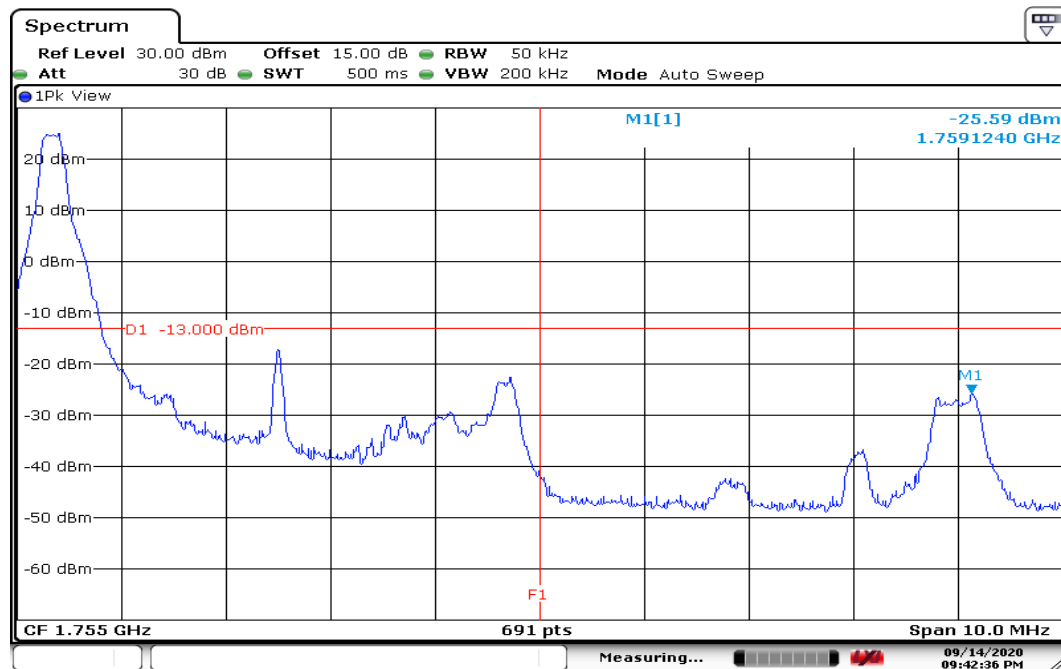
Date: 14 SEP 2020 21:28:10

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



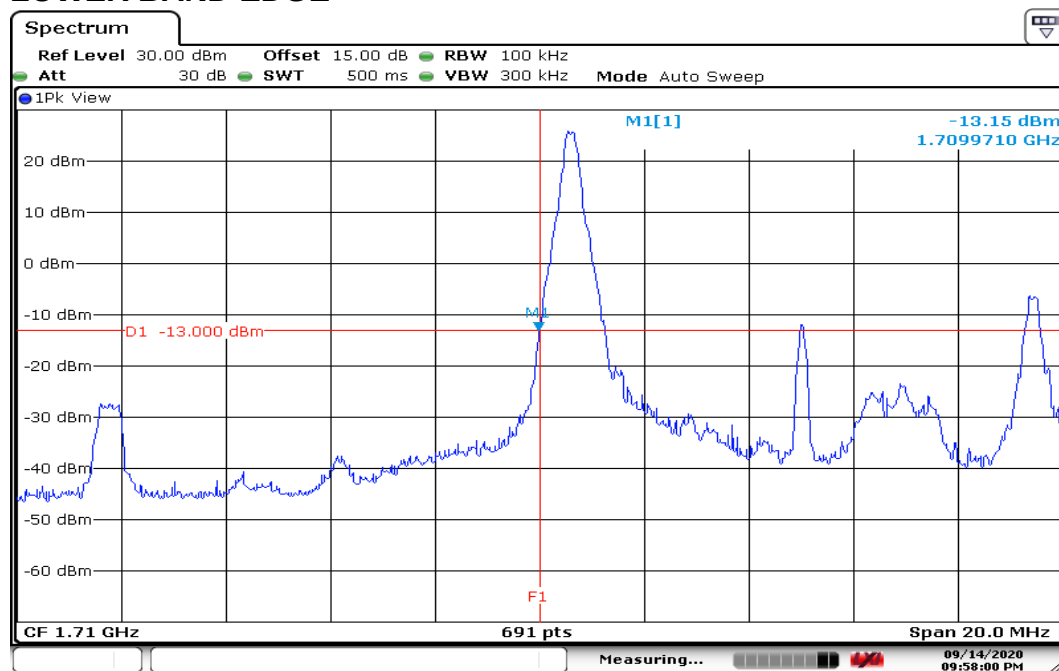
Date: 14 SEP 2020 21:36:39

HIGHER BAND EDGE



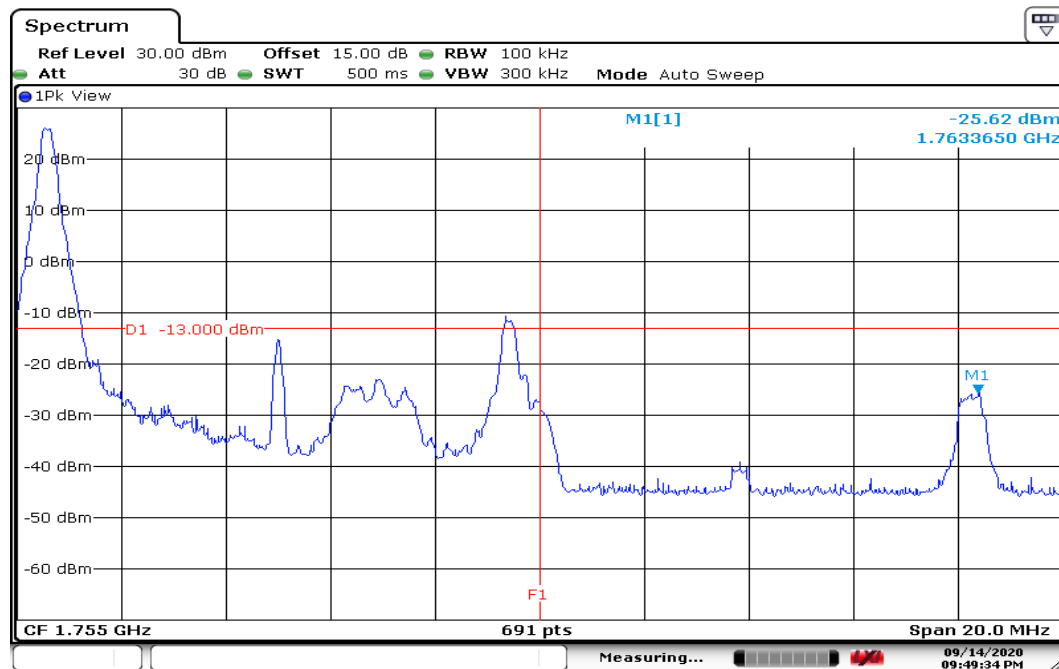
Date: 14 SEP 2020 21:42:37

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



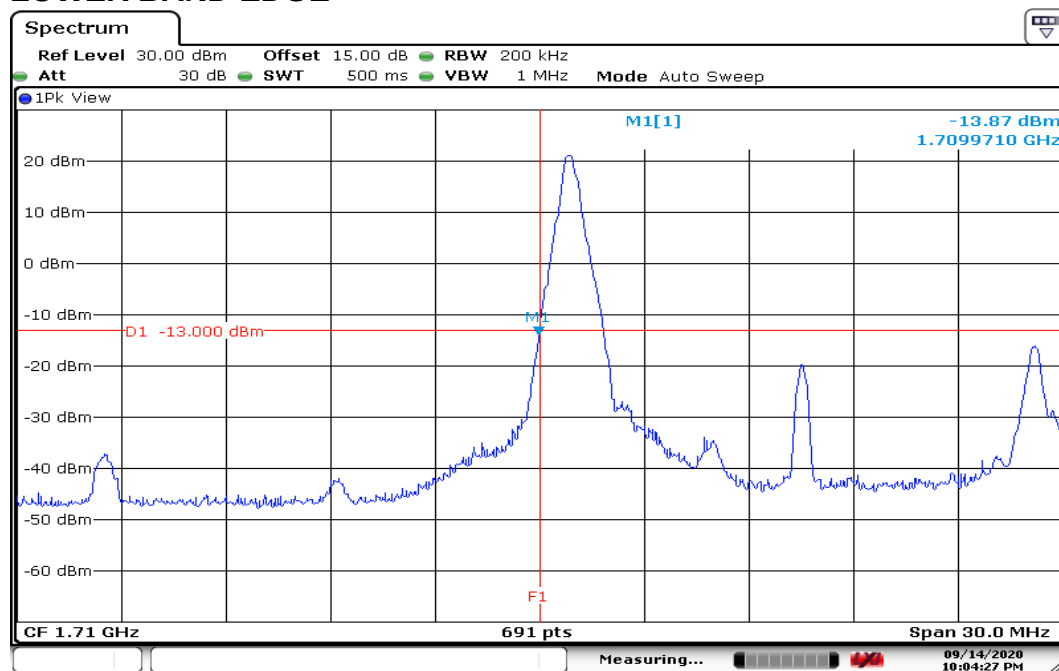
Date: 14 SEP 2020 21:58:00

HIGHER BAND EDGE



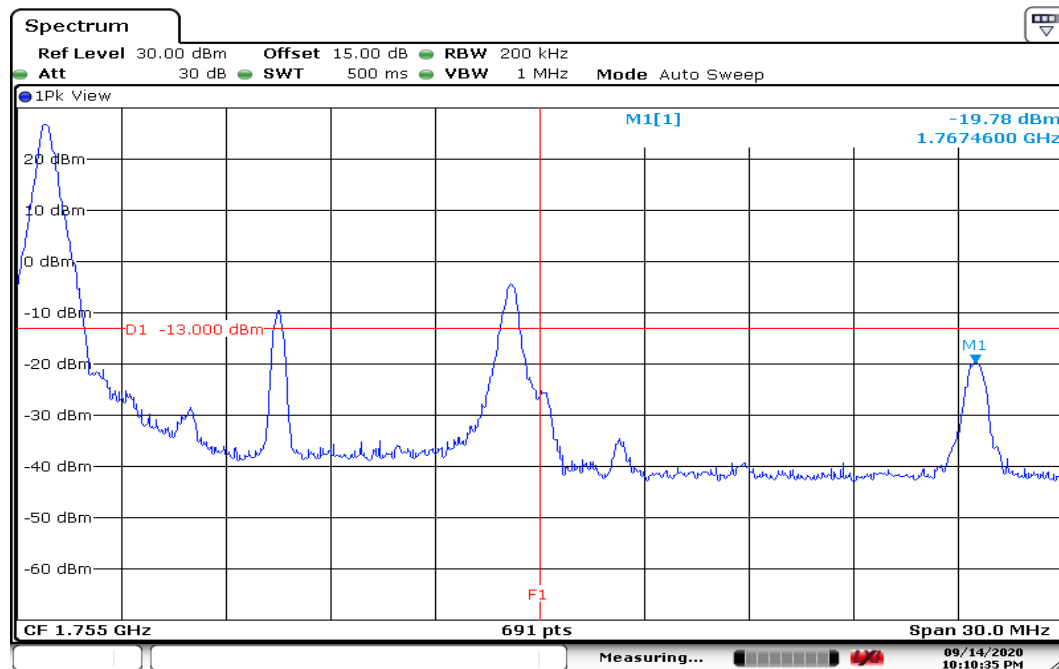
Date: 14 SEP 2020 21:49:34

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



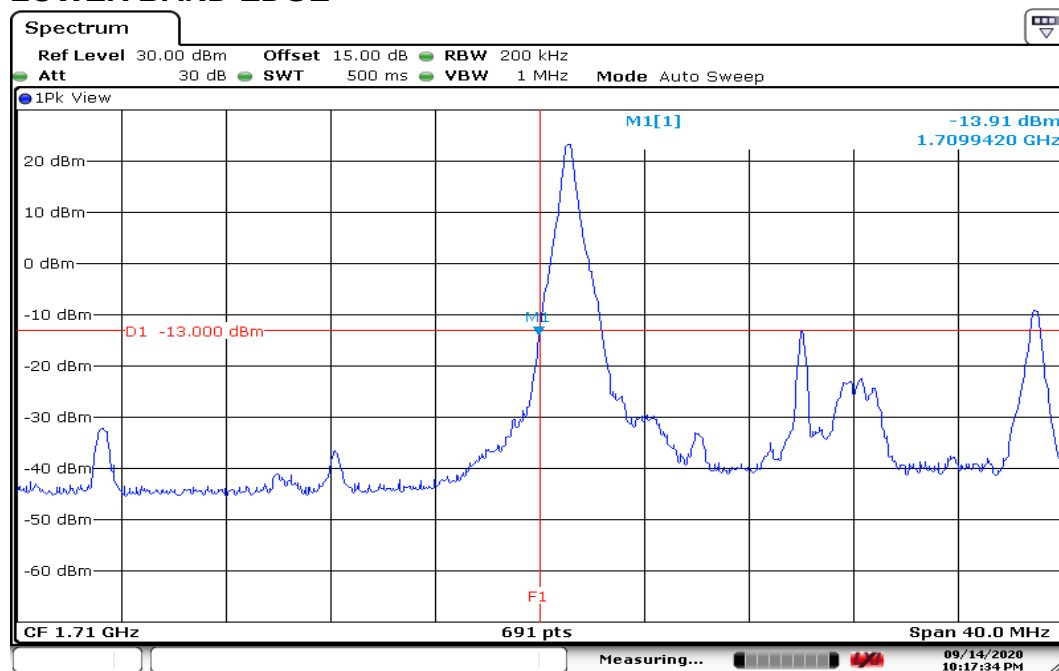
Date: 14 SEP 2020 22:04:27

HIGHER BAND EDGE



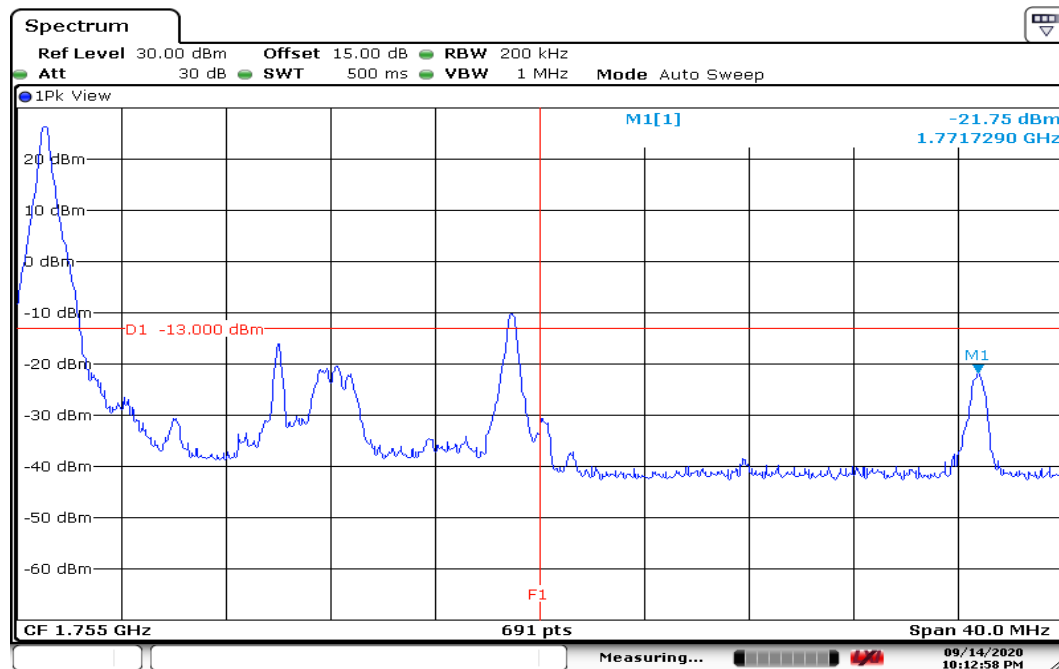
Date: 14 SEP 2020 22:10:36

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



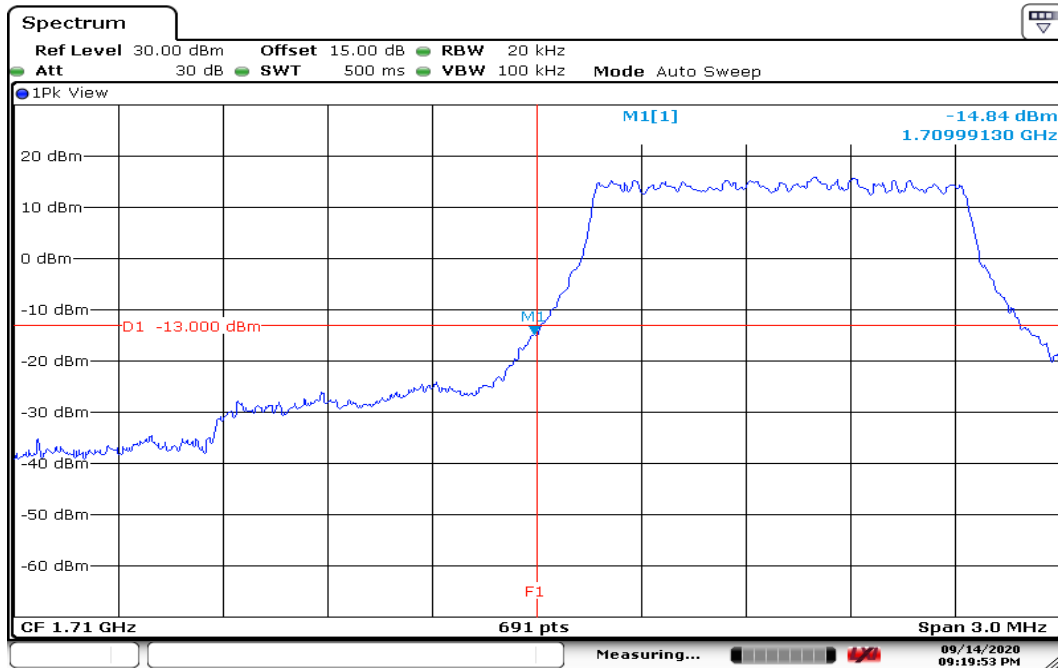
Date: 14 SEP 2020 22:17:34

HIGHER BAND EDGE



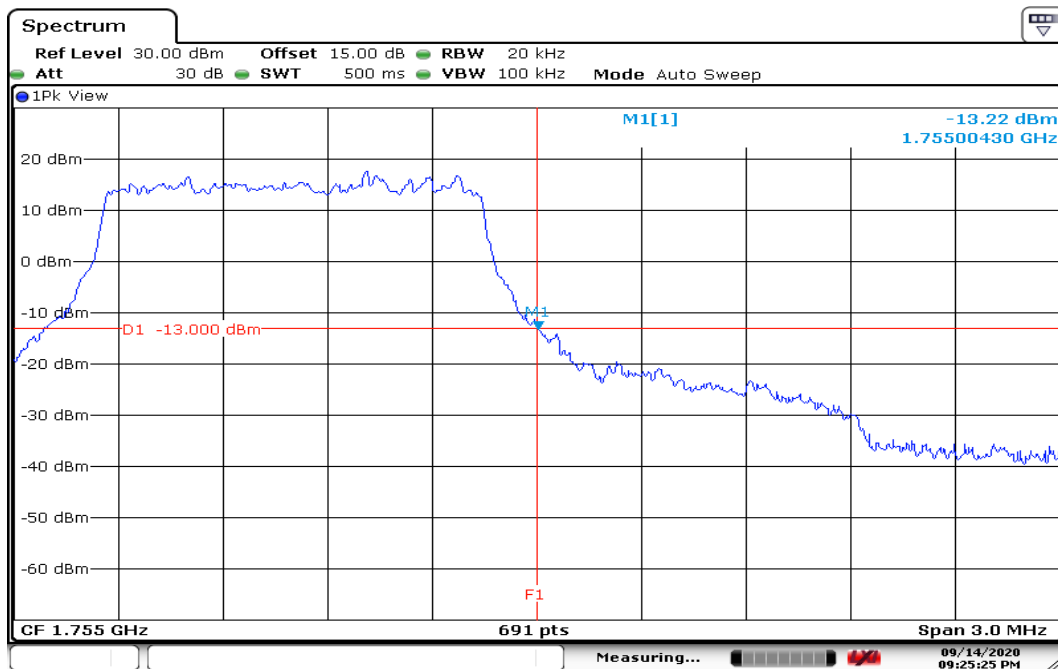
Date: 14 SEP 2020 22:12:59

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



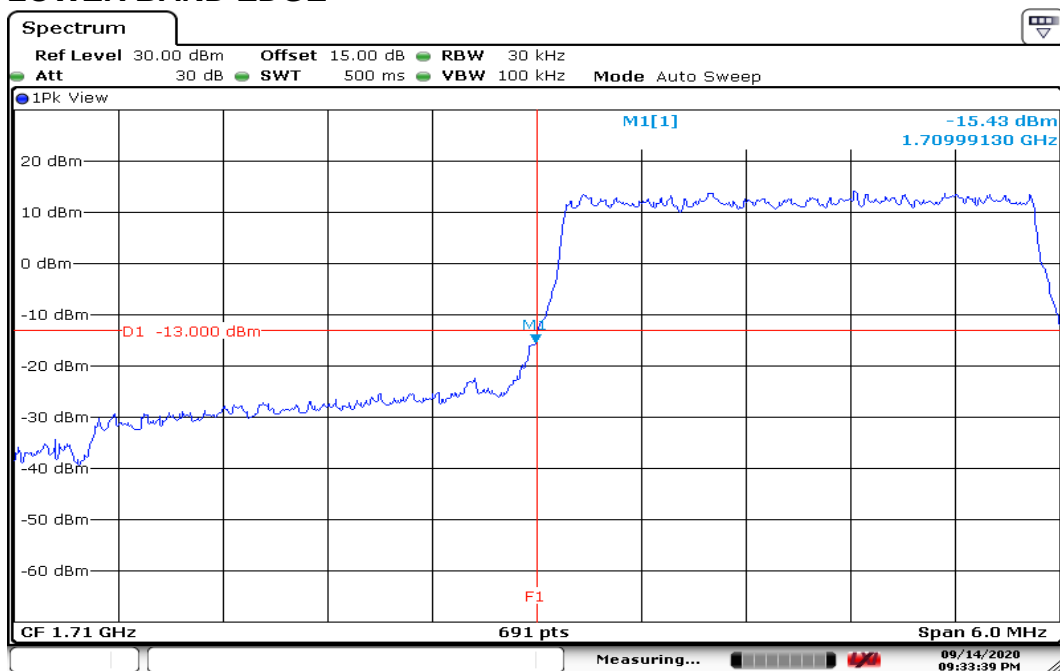
Date: 14 SEP 2020 21:19:54

HIGHER BAND EDGE



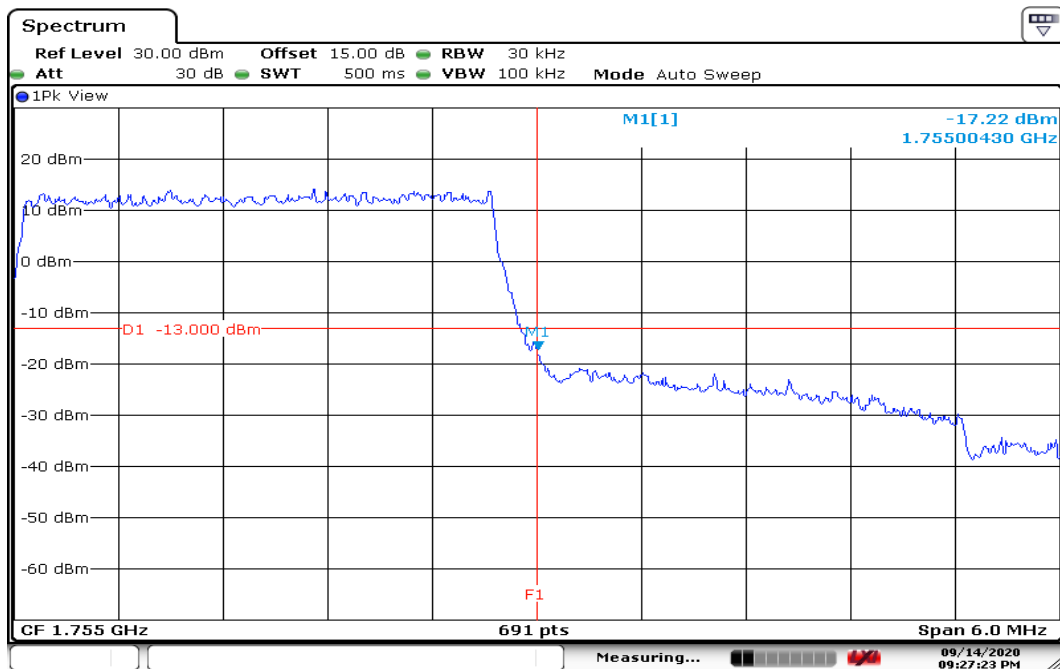
Date: 14 SEP 2020 21:25:26

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



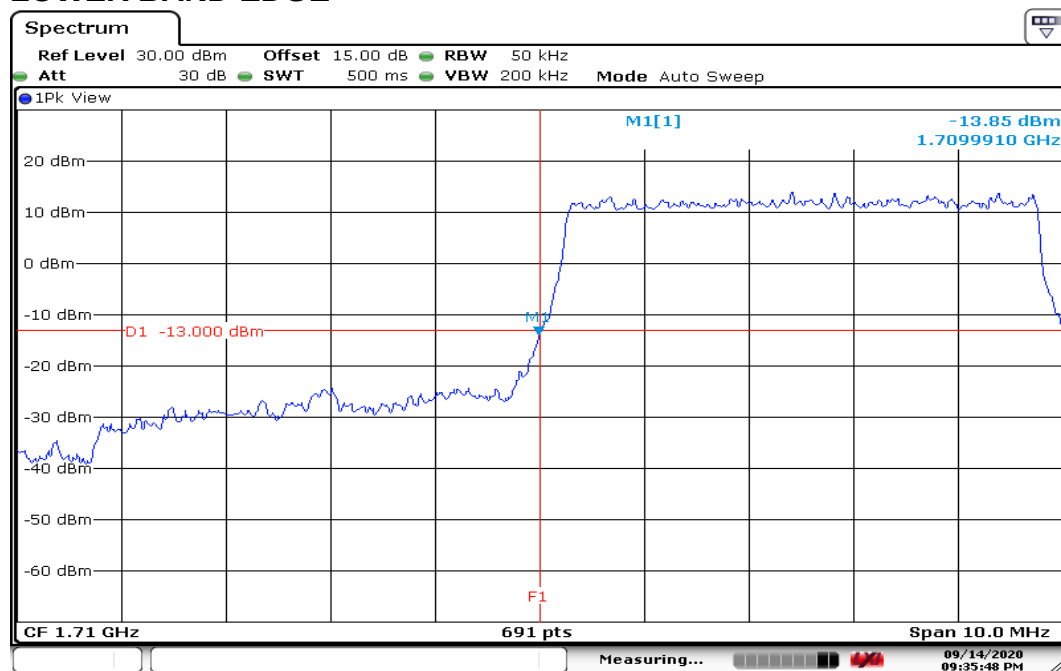
Date: 14 SEP 2020 21:33:39

HIGHER BAND EDGE



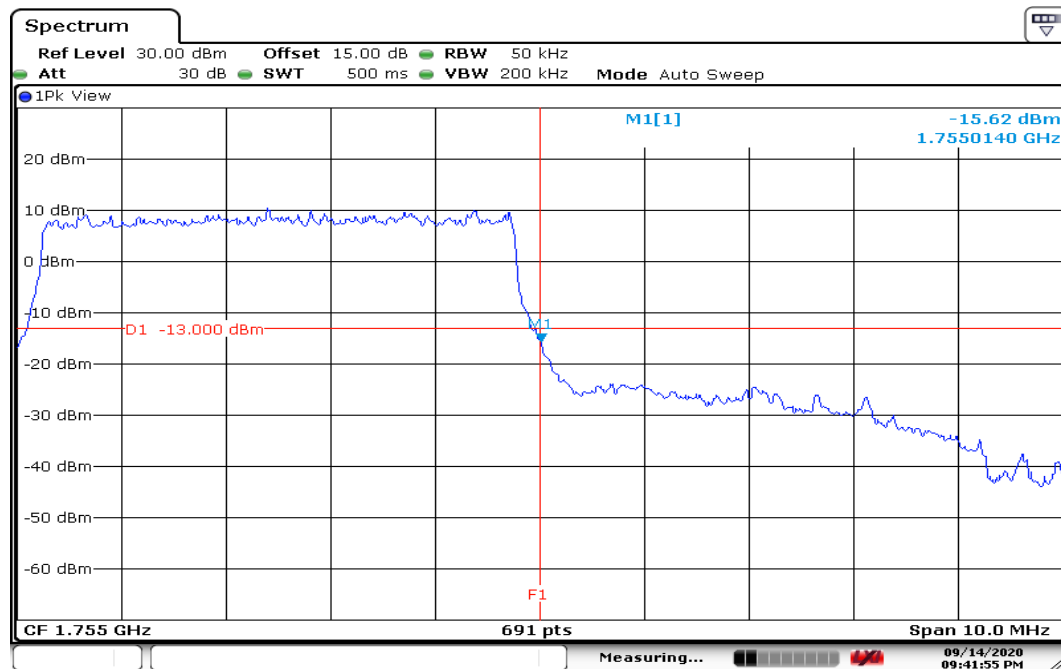
Date: 14 SEP 2020 21:27:23

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



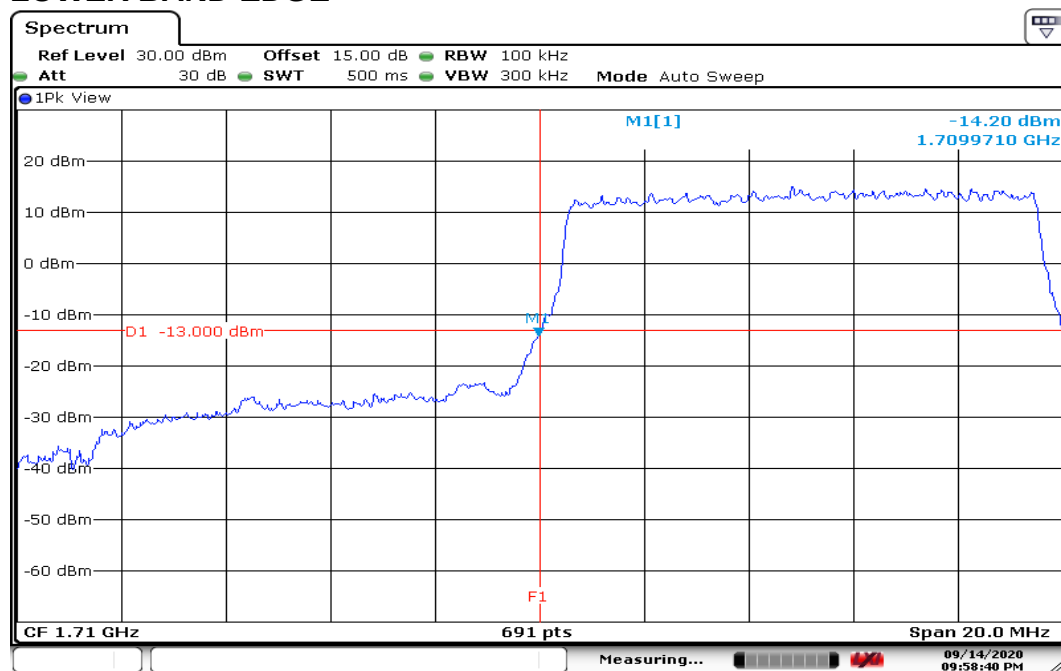
Date: 14 SEP 2020 21:35:48

HIGHER BAND EDGE



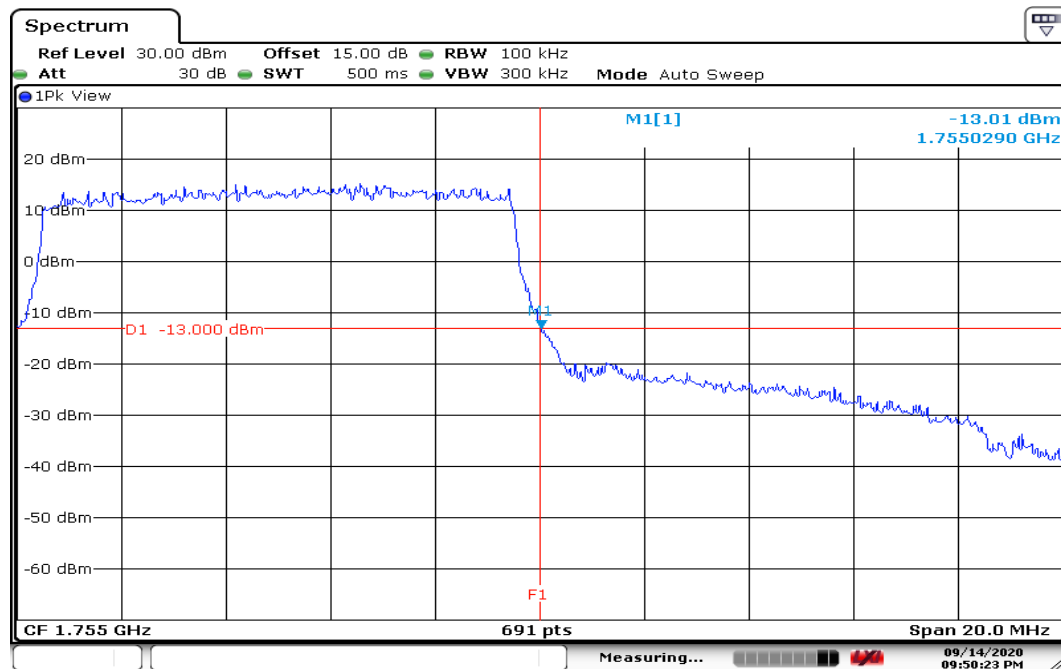
Date: 14 SEP 2020 21:41:55

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



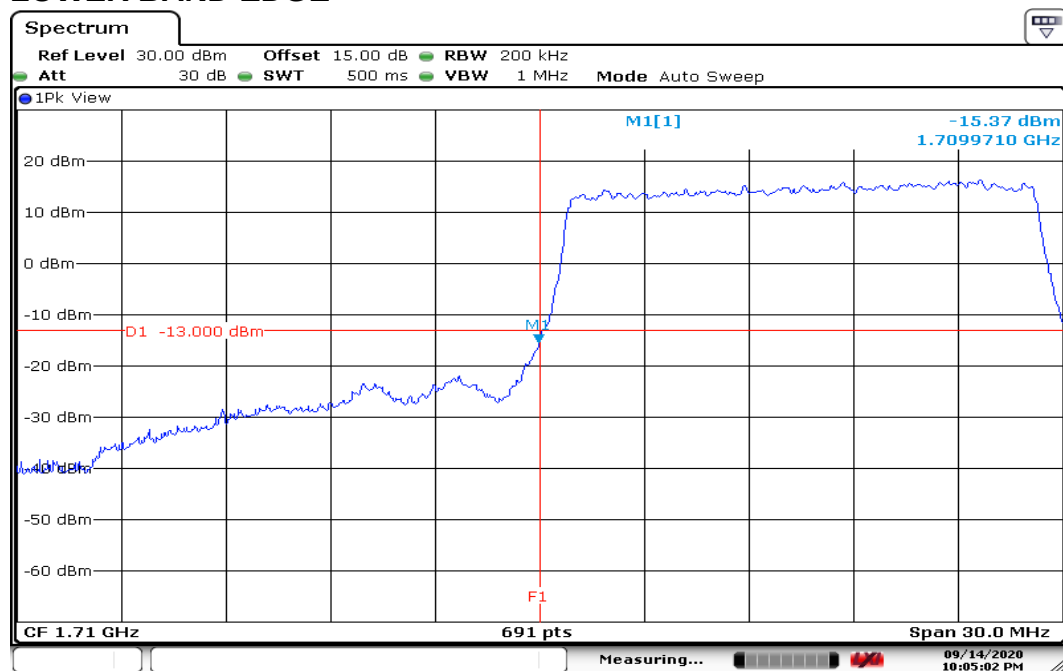
Date: 14 SEP 2020 21:58:40

HIGHER BAND EDGE



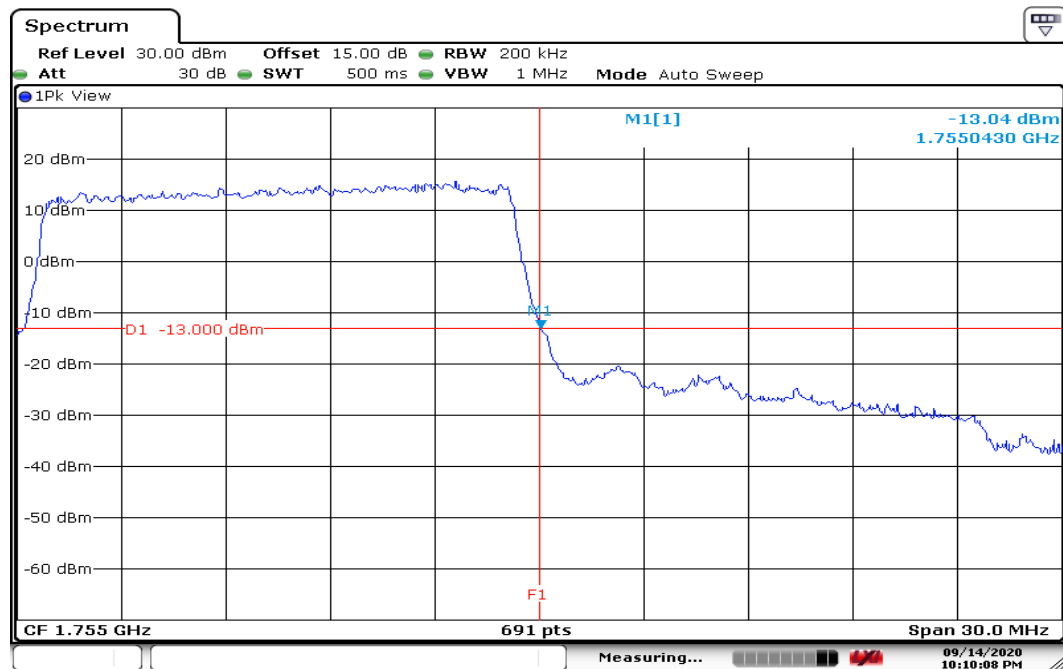
Date: 14 SEP 2020 21:50:23

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



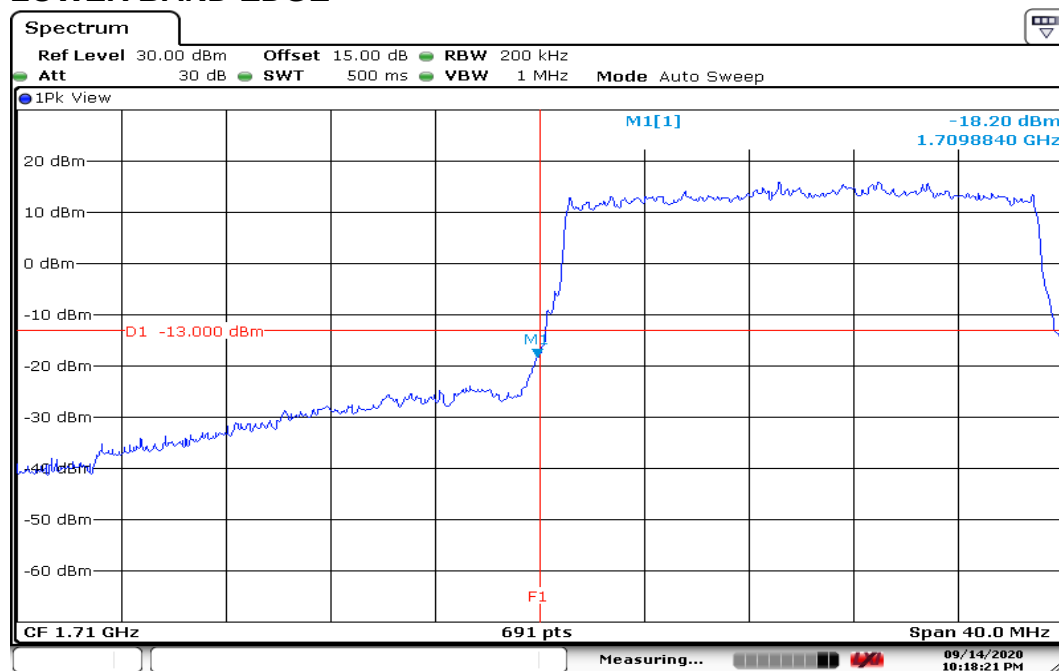
Date: 14 SEP 2020 22:05:02

HIGHER BAND EDGE



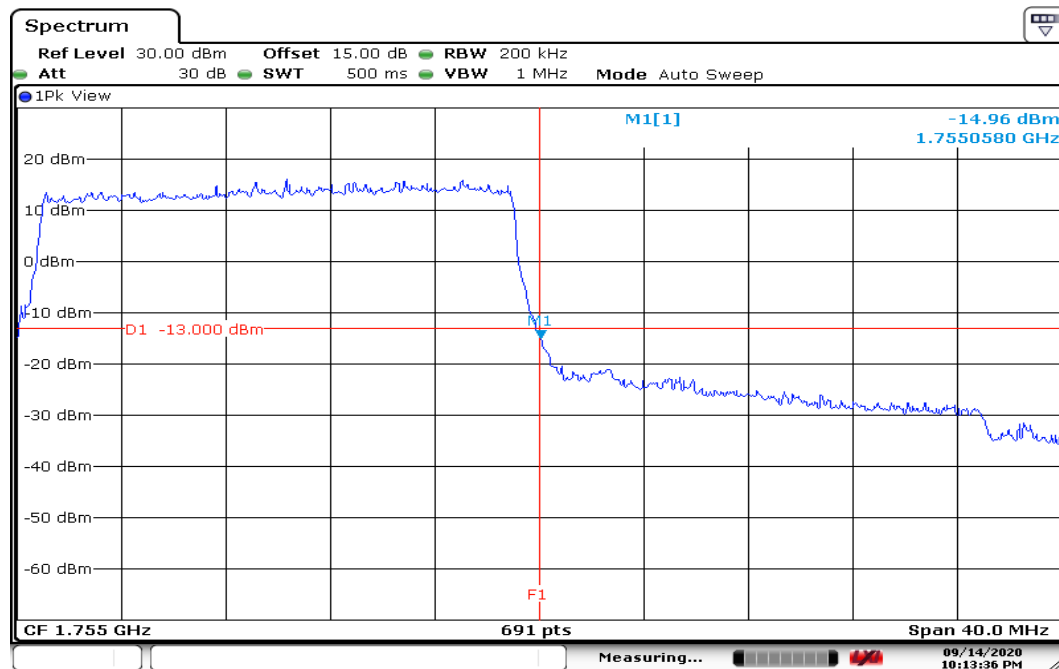
Date: 14 SEP 2020 22:10:08

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



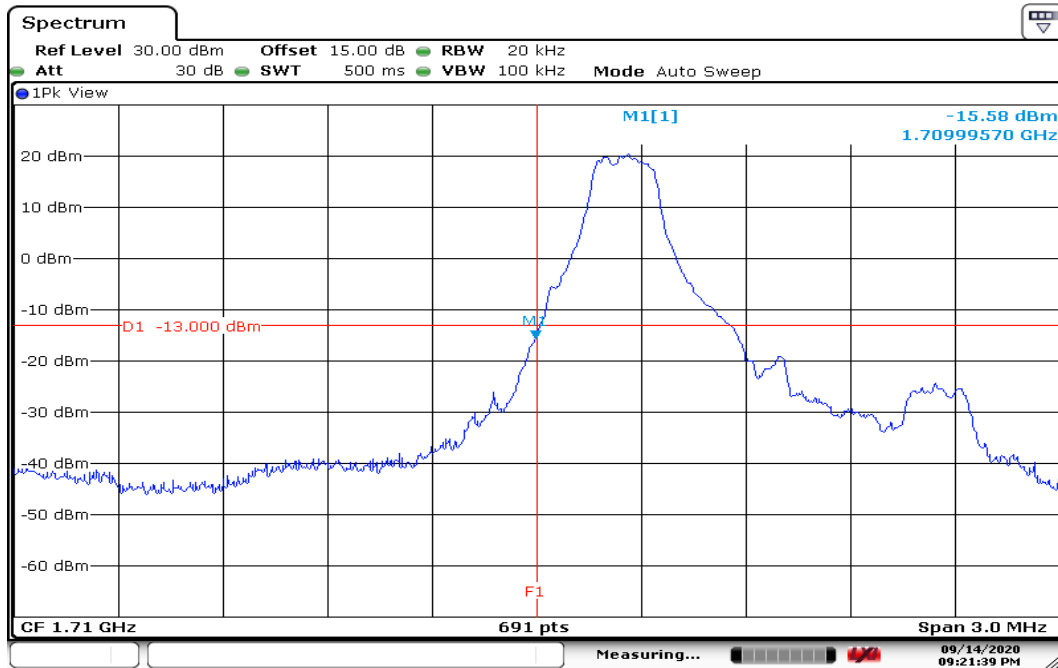
Date: 14 SEP 2020 22:18:21

HIGHER BAND EDGE



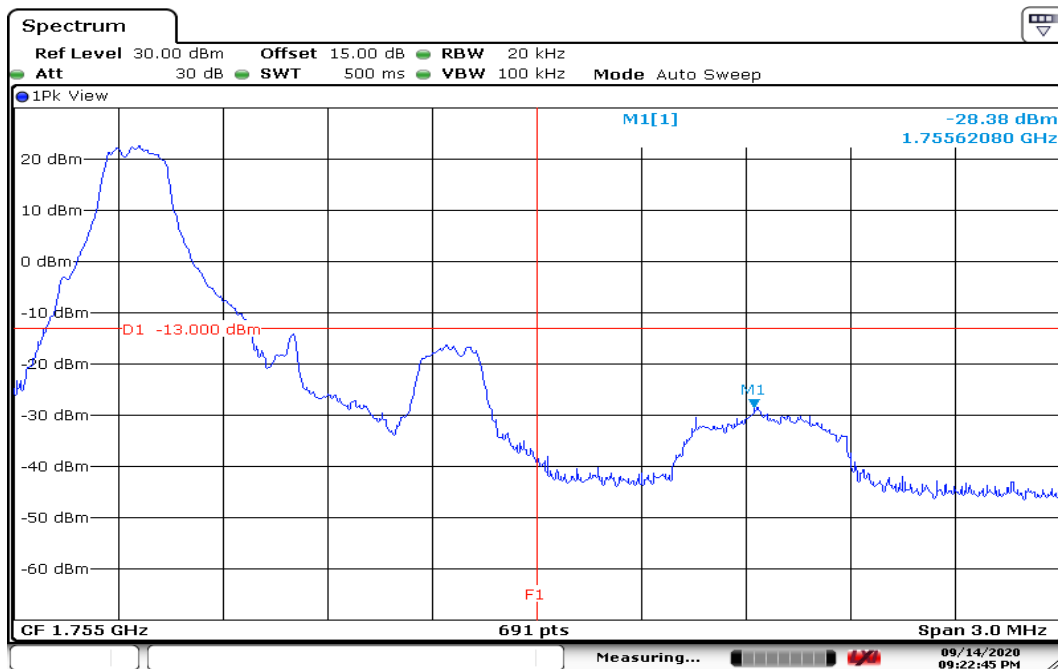
Date: 14 SEP 2020 22:13:37

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



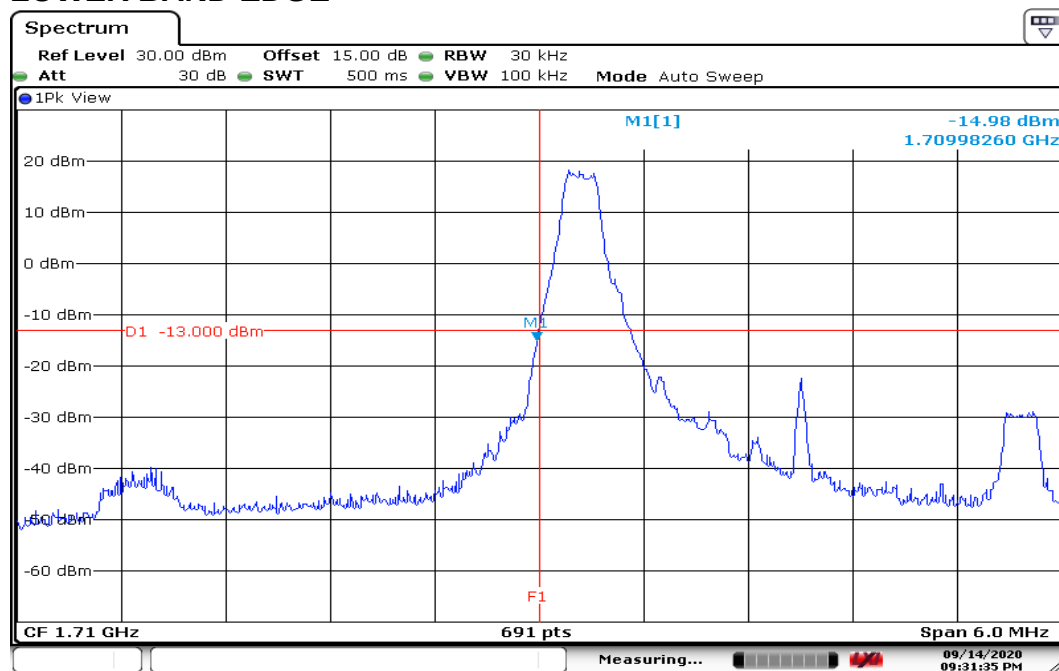
Date: 14 SEP 2020 21:21:39

HIGHER BAND EDGE



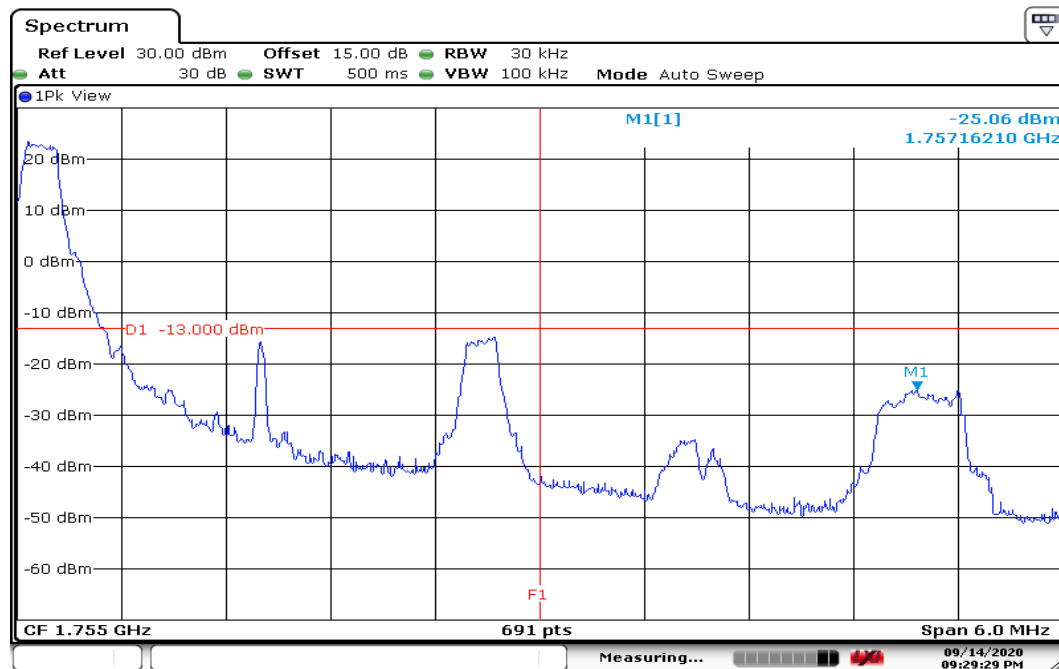
Date: 14 SEP 2020 21:22:45

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



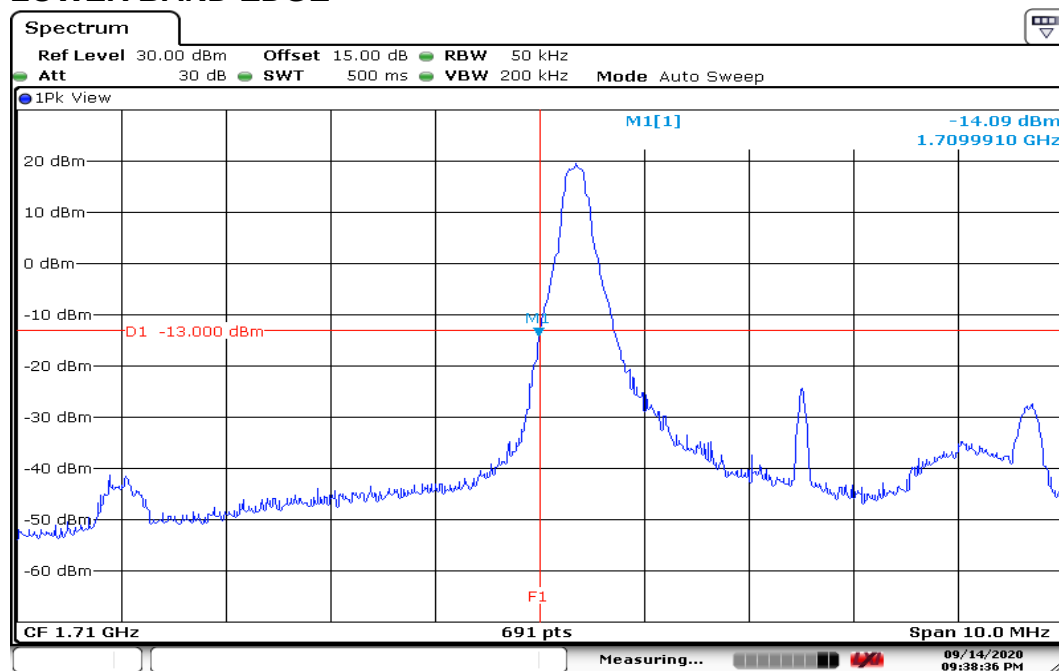
Date: 14 SEP 2020 21:31:35

HIGHER BAND EDGE



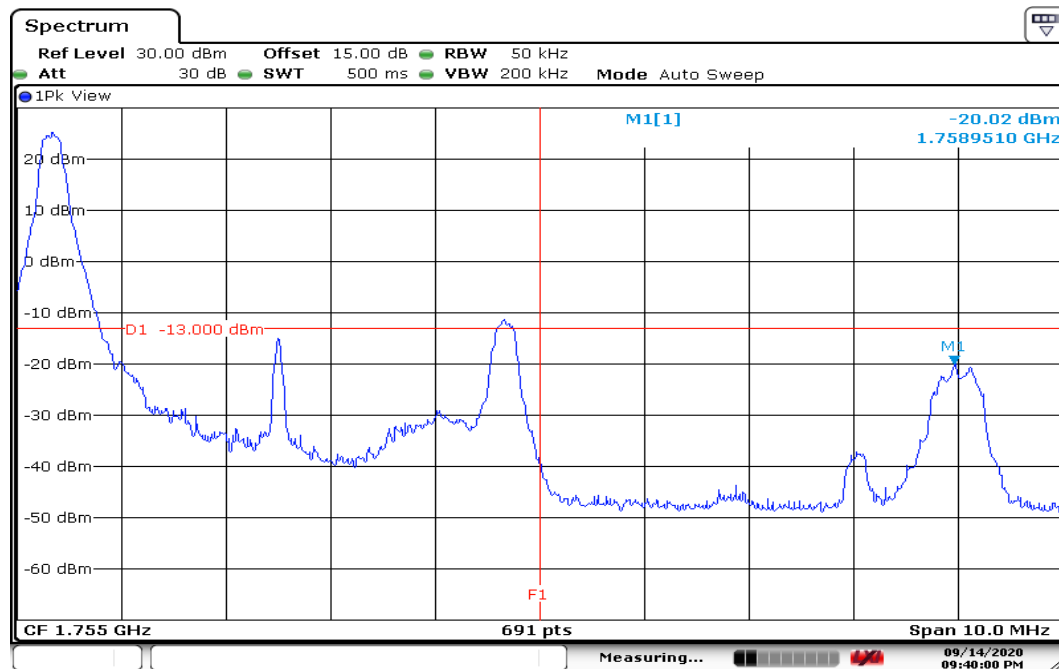
Date: 14 SEP 2020 21:29:29

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



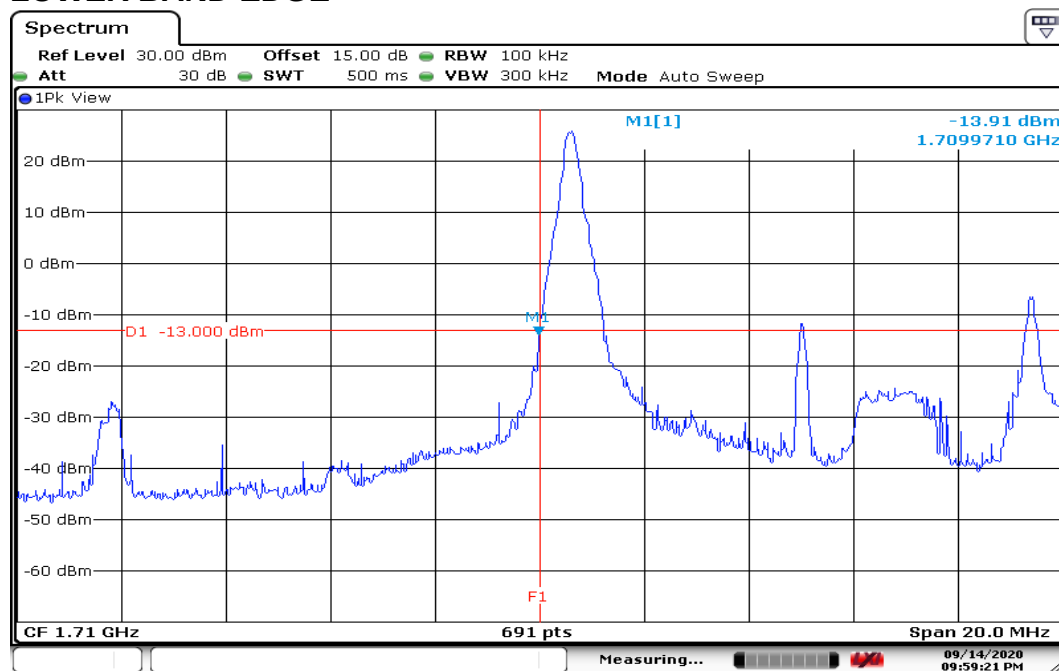
Date: 14 SEP 2020 21:38:37

HIGHER BAND EDGE



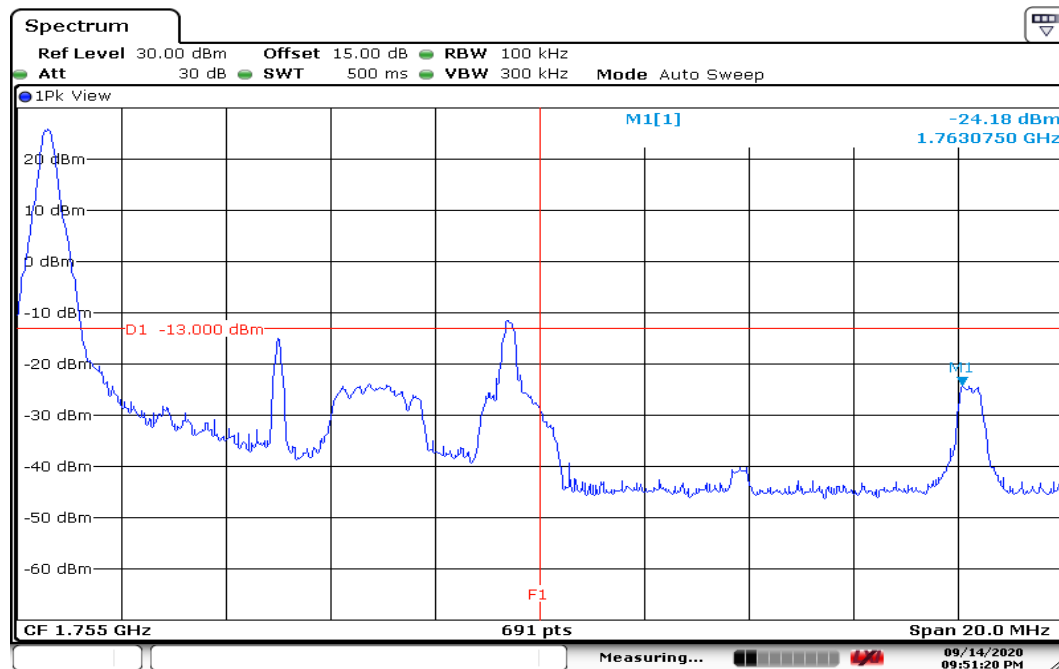
Date: 14 SEP 2020 21:40:01

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



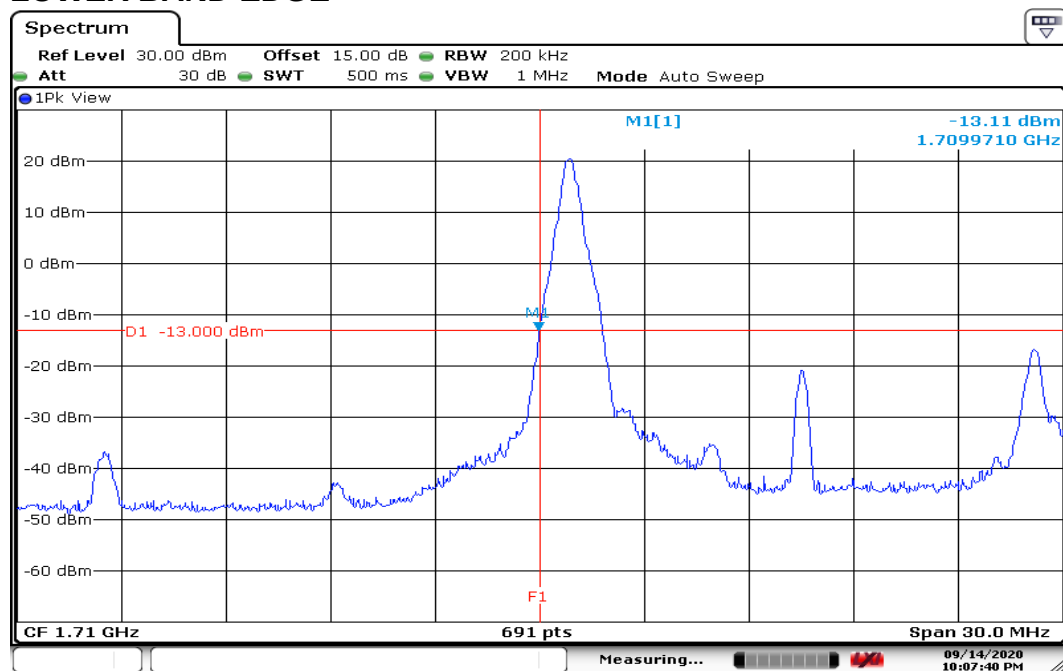
Date: 14 SEP 2020 21:59:21

HIGHER BAND EDGE



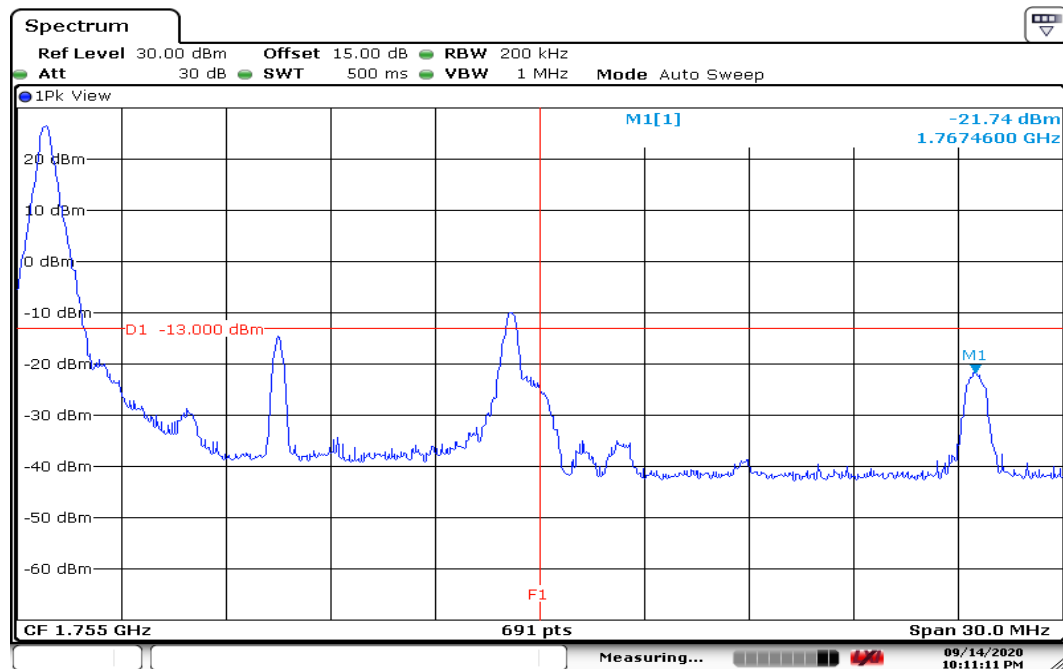
Date: 14 SEP 2020 21:51:21

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



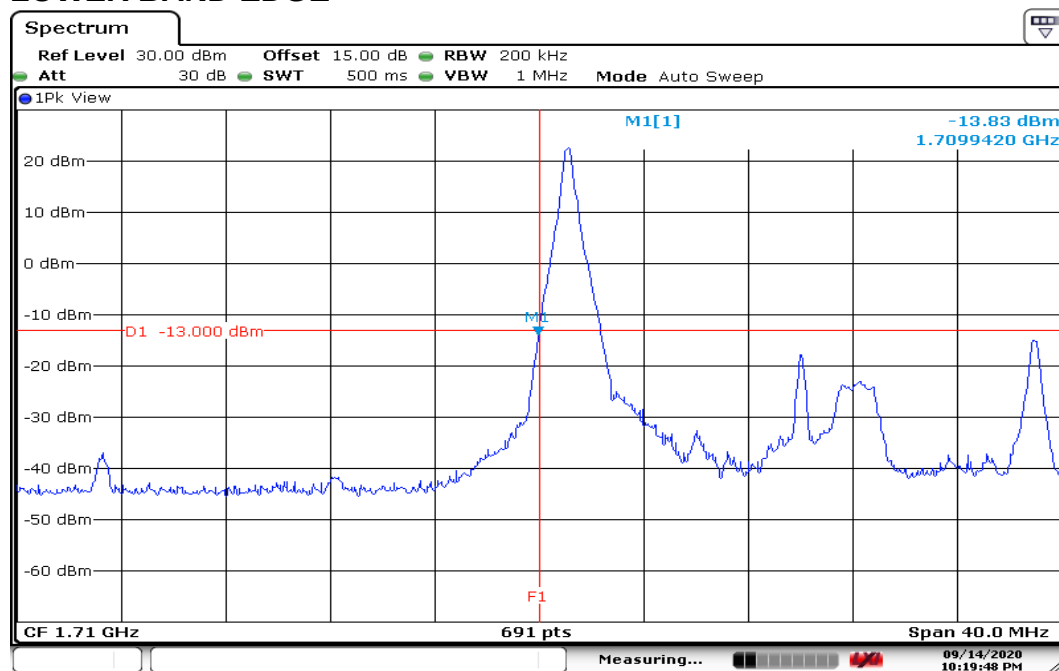
Date: 14 SEP 2020 22:07:40

HIGHER BAND EDGE



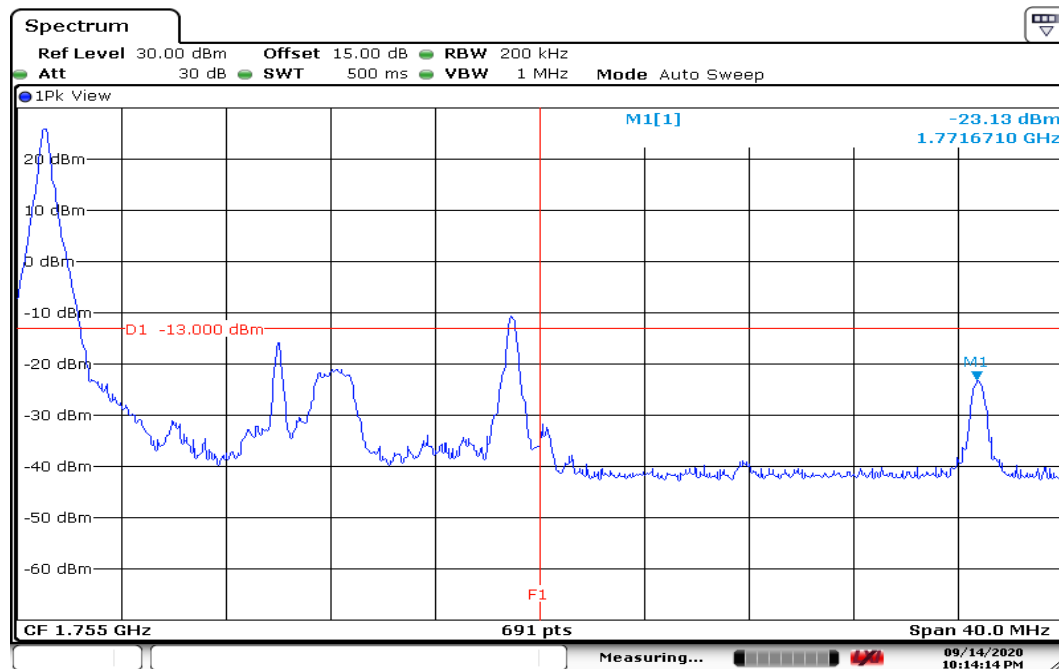
Date: 14 SEP 2020 22:11:12

CHANNEL BANDWIDTH: 20MHz / 16QAM/ 1RB ALLOCATION LOWER BAND EDGE



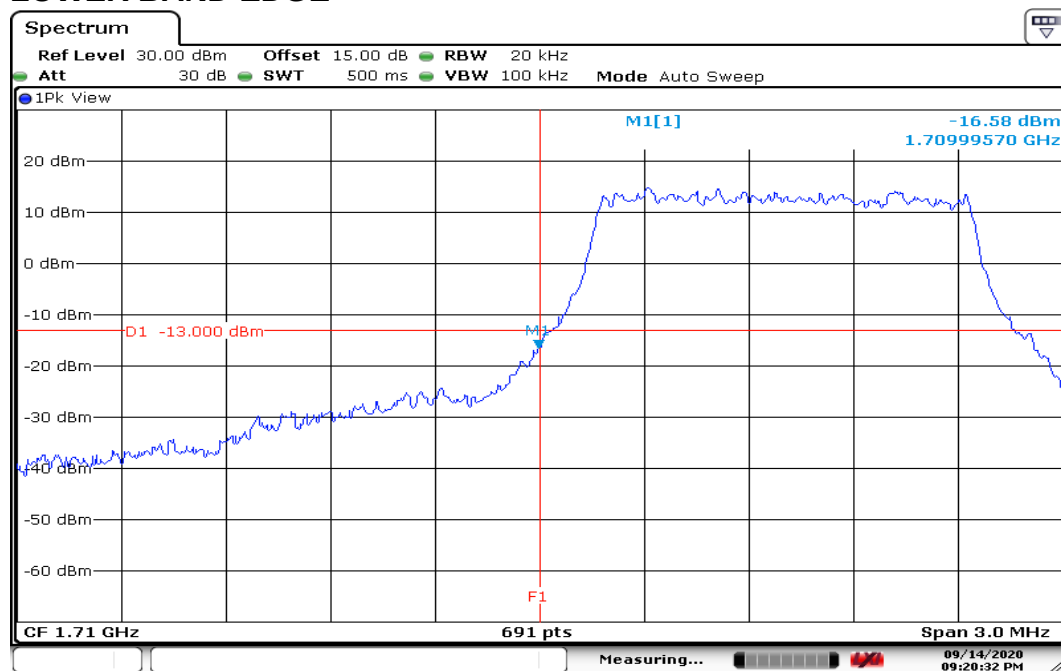
Date: 14 SEP 2020 22:19:49

HIGHER BAND EDGE



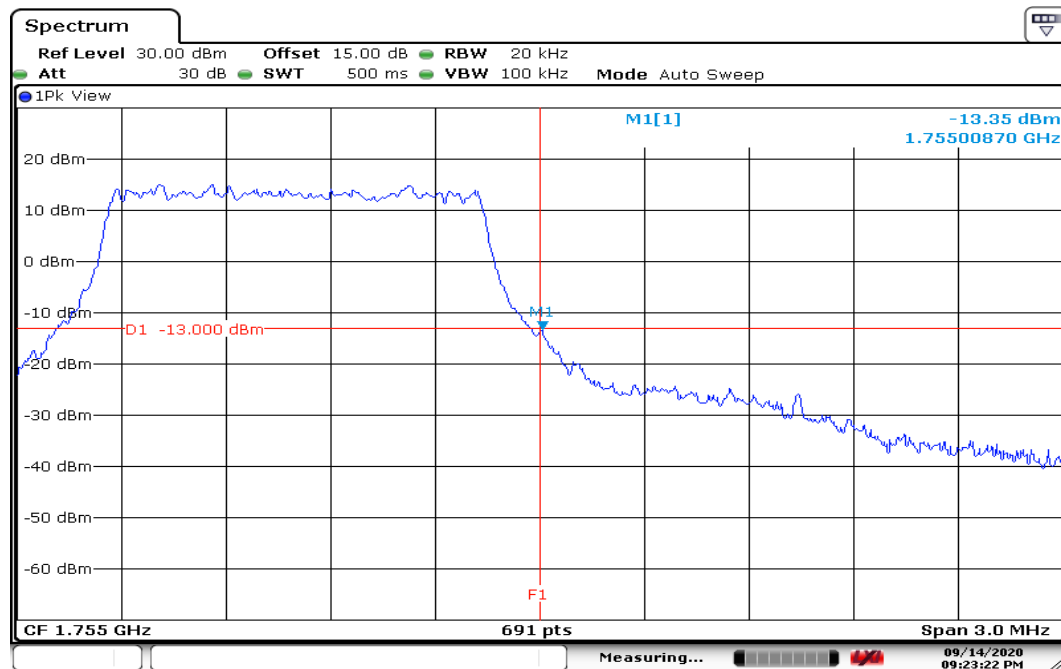
Date: 14 SEP 2020 22:14:15

CHANNEL BANDWIDTH: 1.4MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



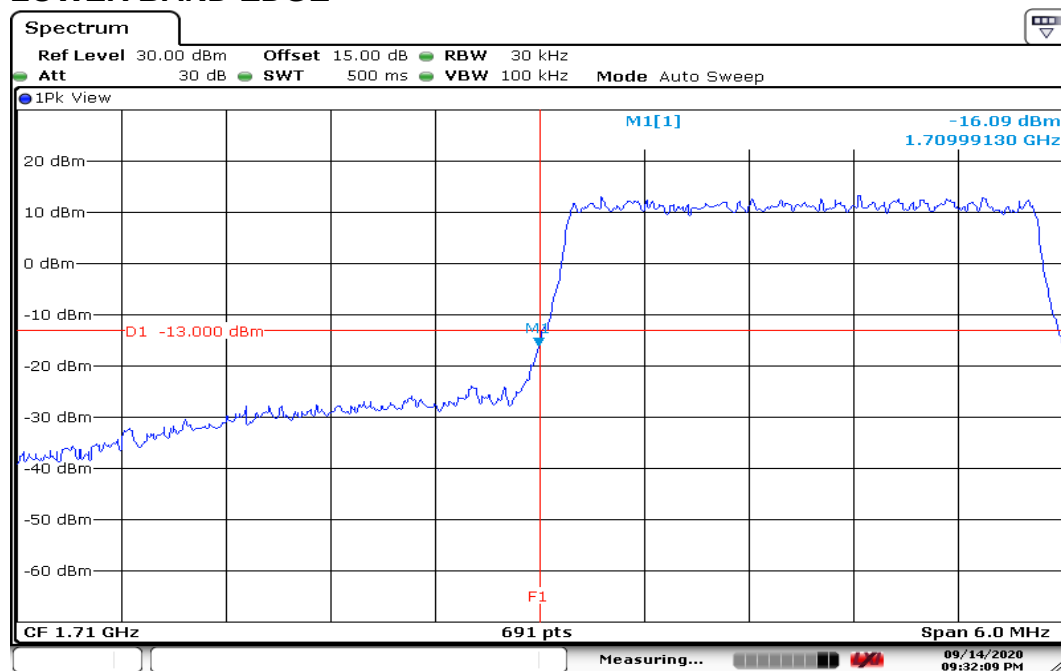
Date: 14 SEP 2020 21:20:32

HIGHER BAND EDGE



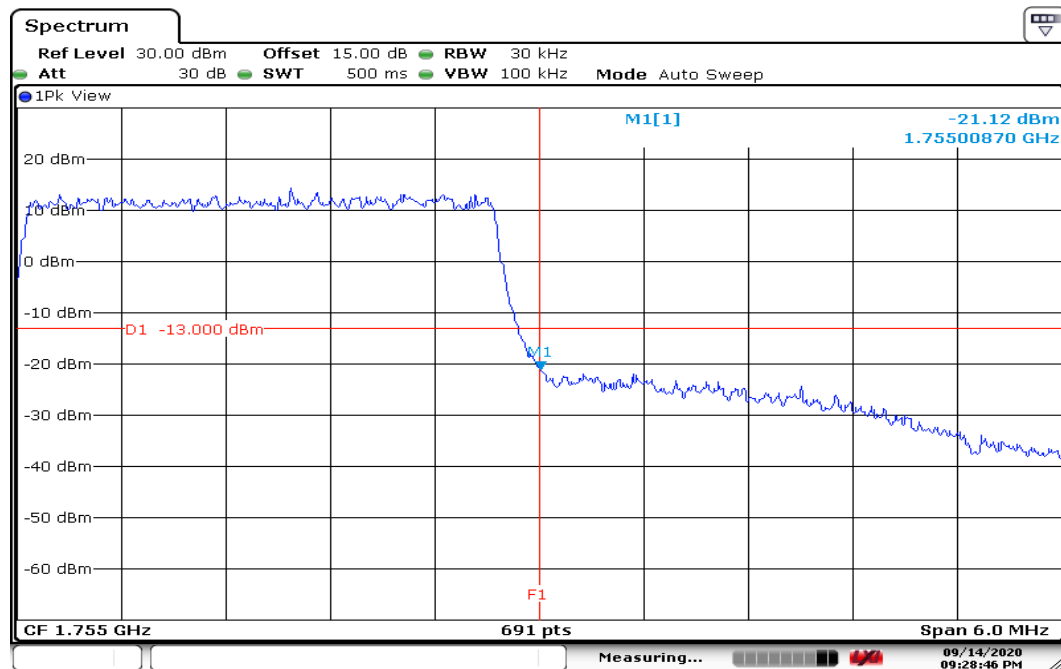
Date: 14 SEP 2020 21:23:23

CHANNEL BANDWIDTH: 3MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



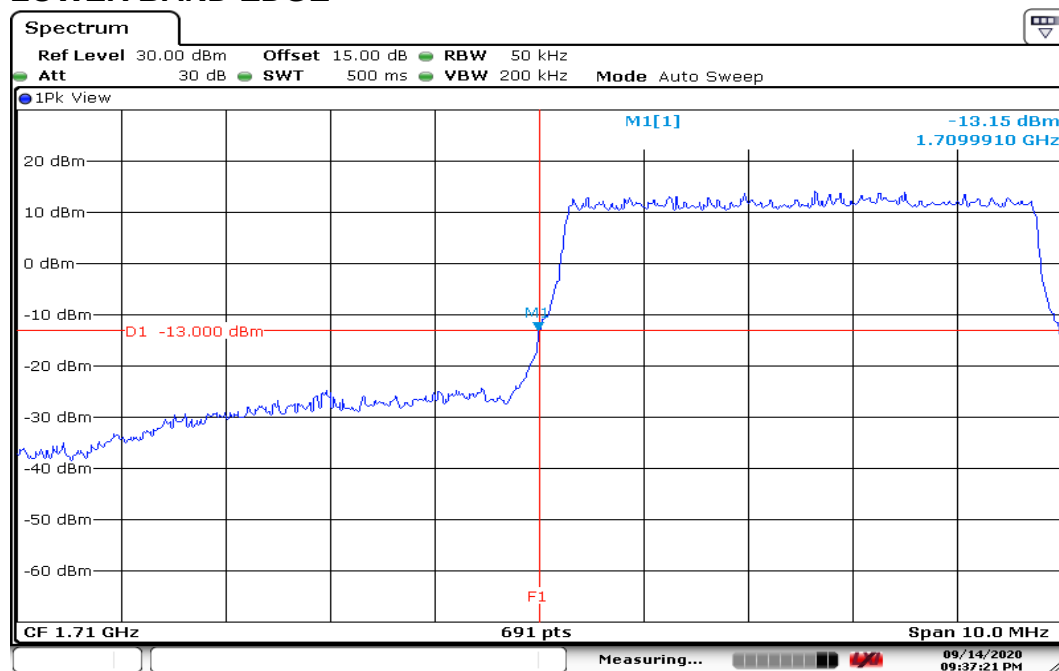
Date: 14 SEP 2020 21:32:09

HIGHER BAND EDGE



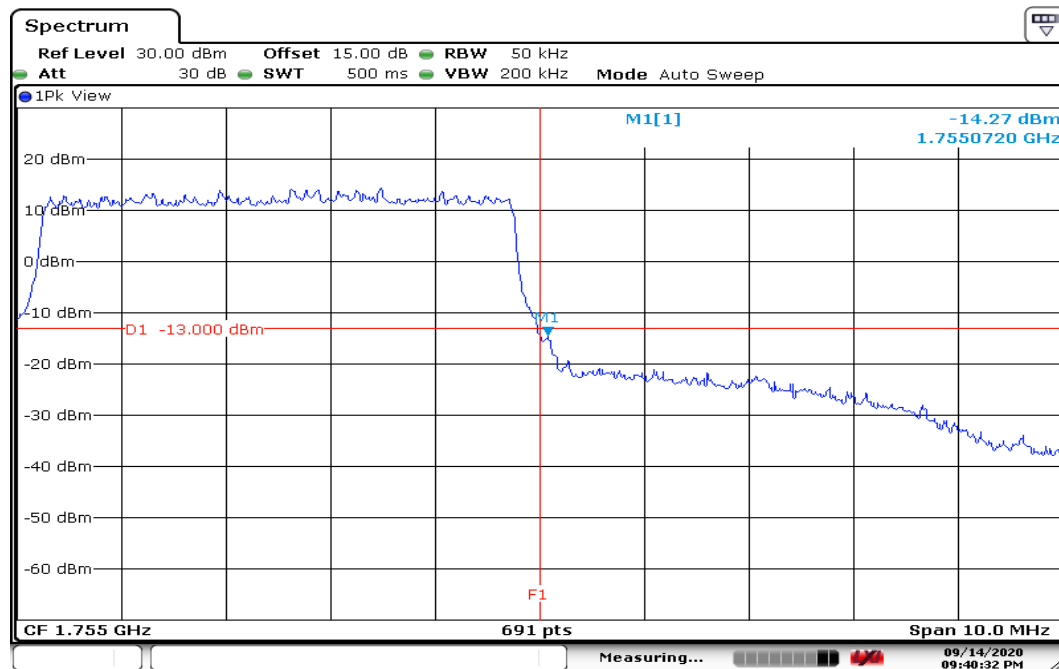
Date: 14 SEP 2020 21:28:47

CHANNEL BANDWIDTH: 5MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



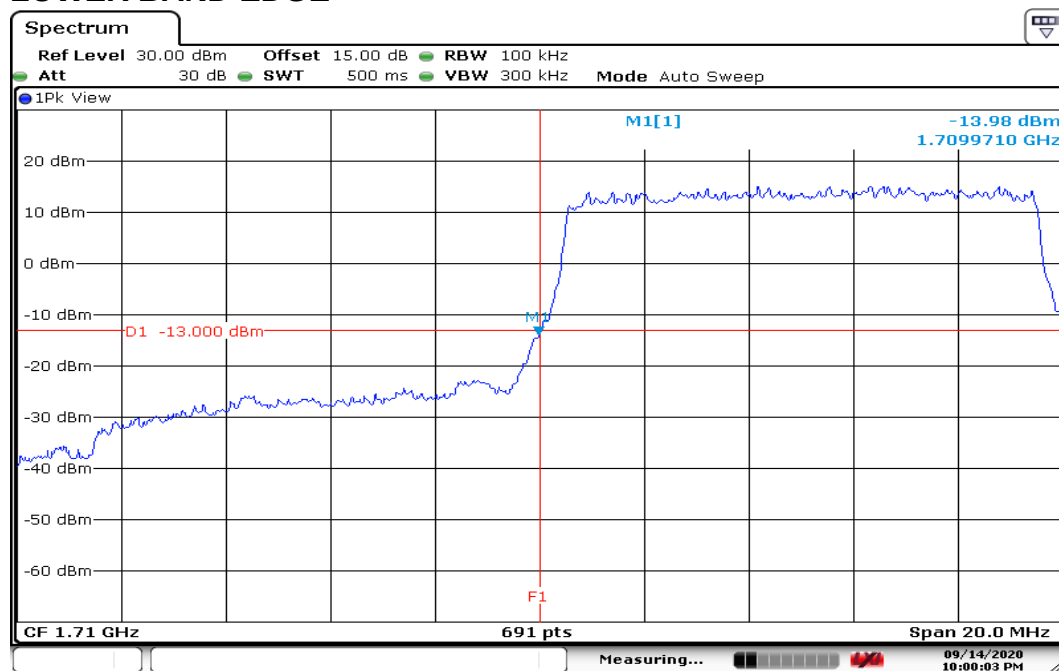
Date: 14 SEP 2020 21:37:21

HIGHER BAND EDGE



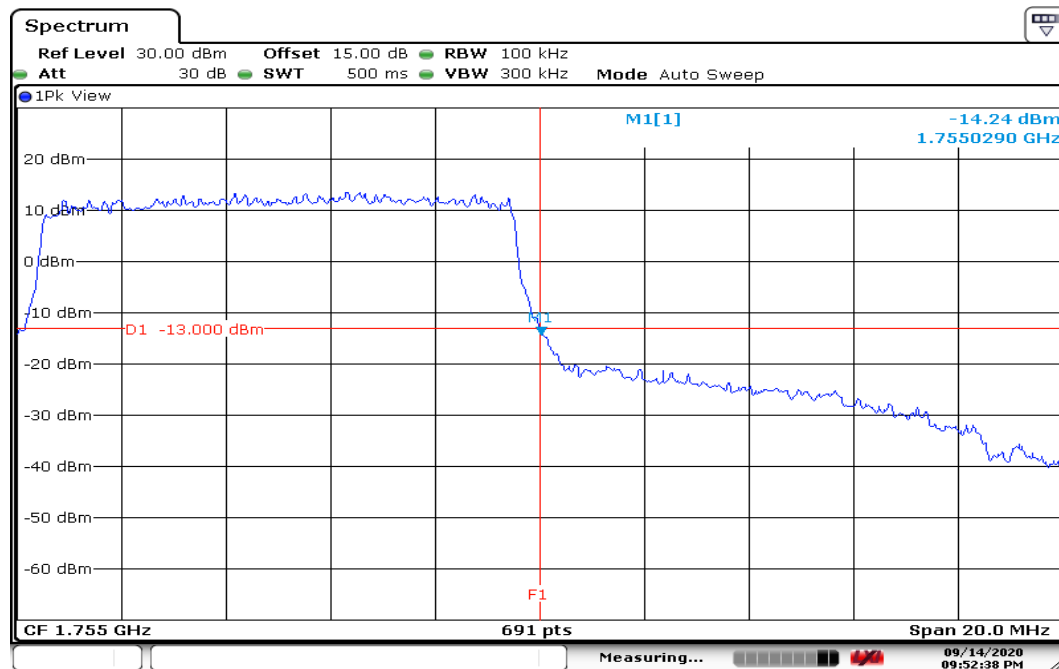
Date: 14 SEP 2020 21:40:32

CHANNEL BANDWIDTH: 10MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



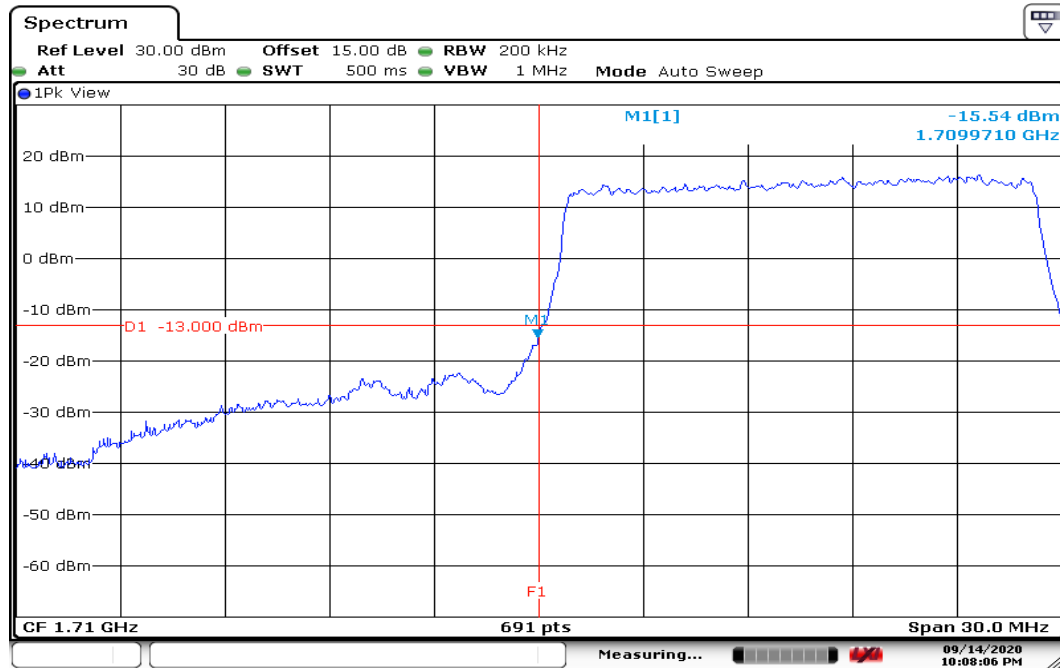
Date: 14 SEP 2020 22:00:03

HIGHER BAND EDGE



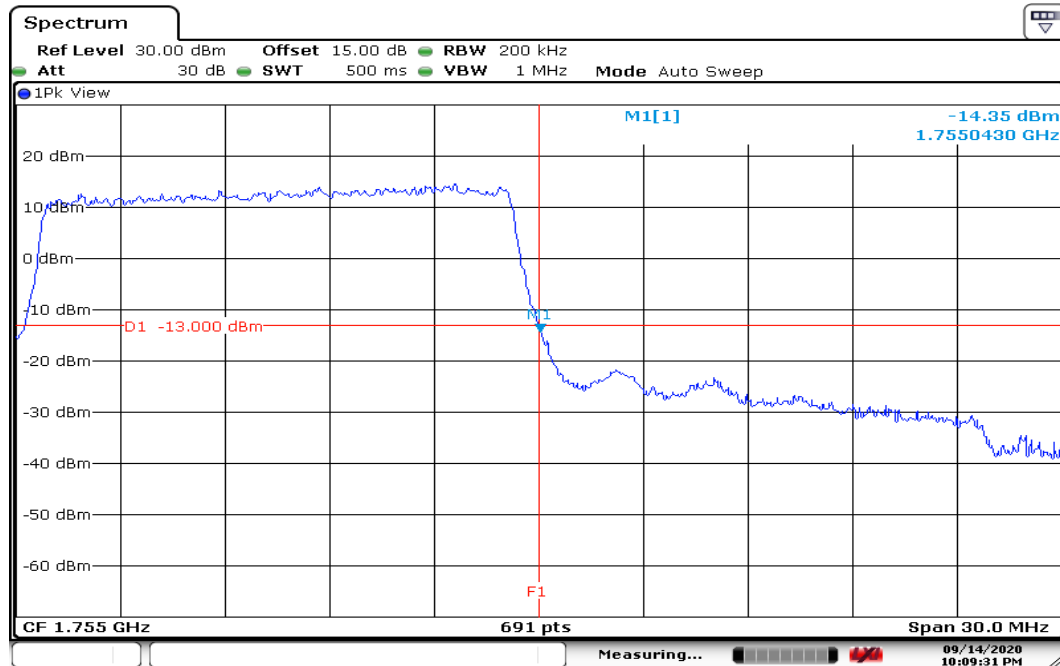
Date: 14 SEP 2020 21:52:38

CHANNEL BANDWIDTH: 15MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



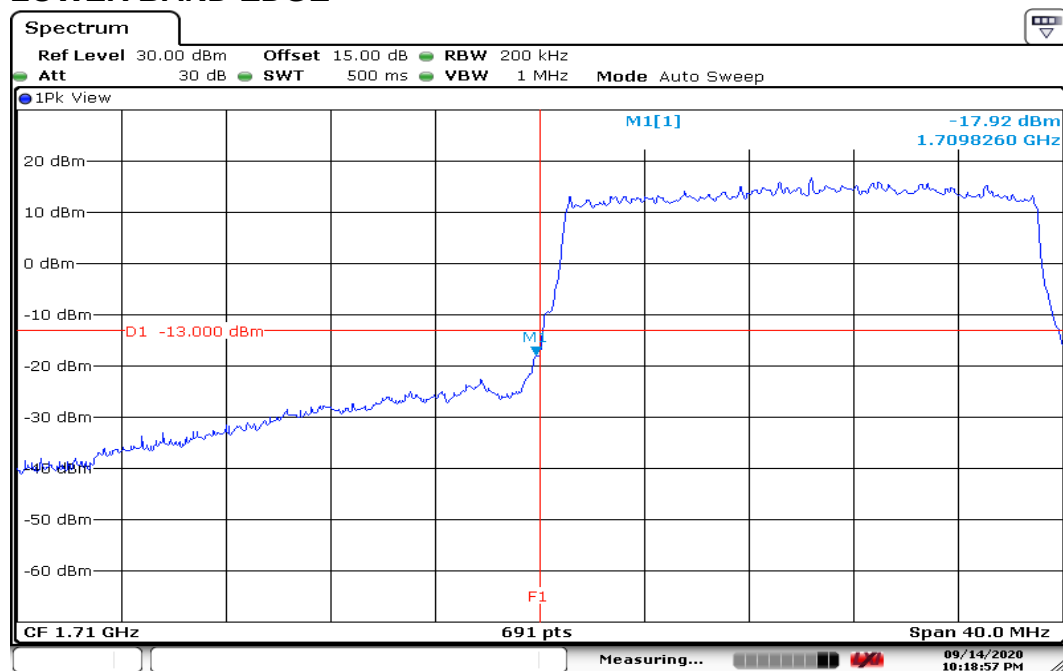
Date: 14 SEP 2020 22:08:07

HIGHER BAND EDGE



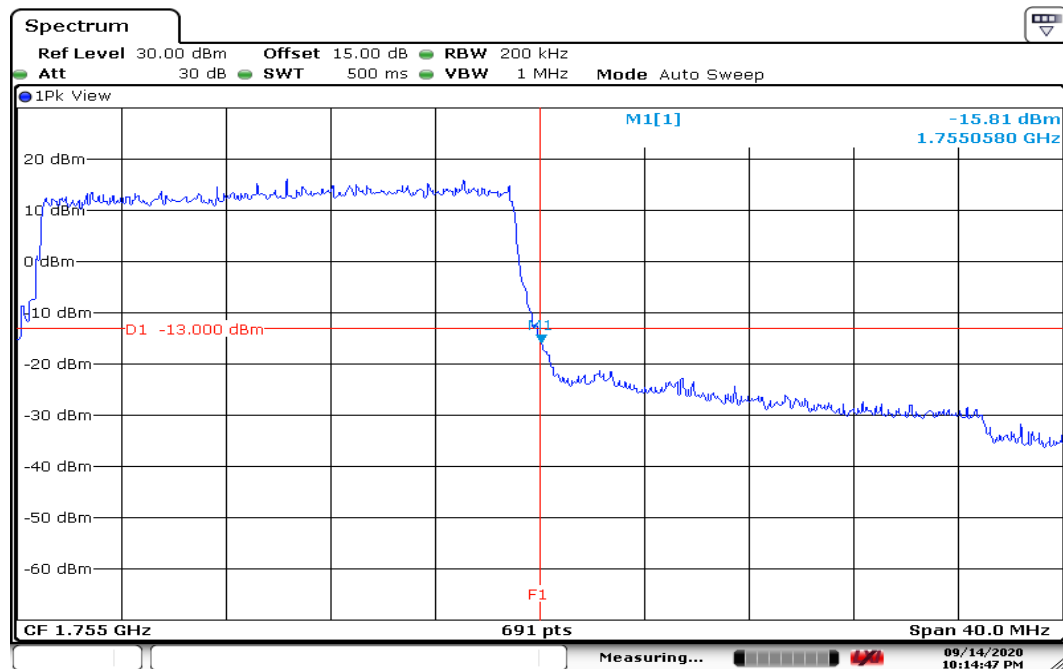
Date: 14 SEP 2020 22:09:31

CHANNEL BANDWIDTH: 20MHz / 16QAM/ FULLRB ALLOCATION LOWER BAND EDGE



Date: 14 SEP 2020 22:18:58

HIGHER BAND EDGE



Date: 14 SEP 2020 22:14:48

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

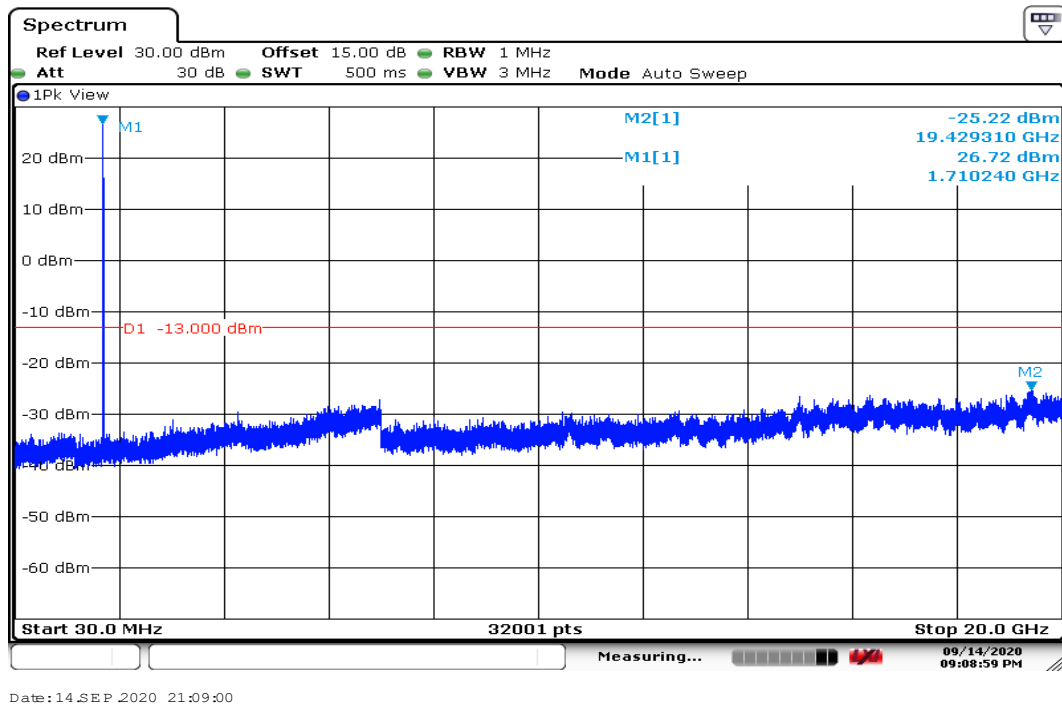
Temperature: 24.2°C

Test Date: September 14, 2020

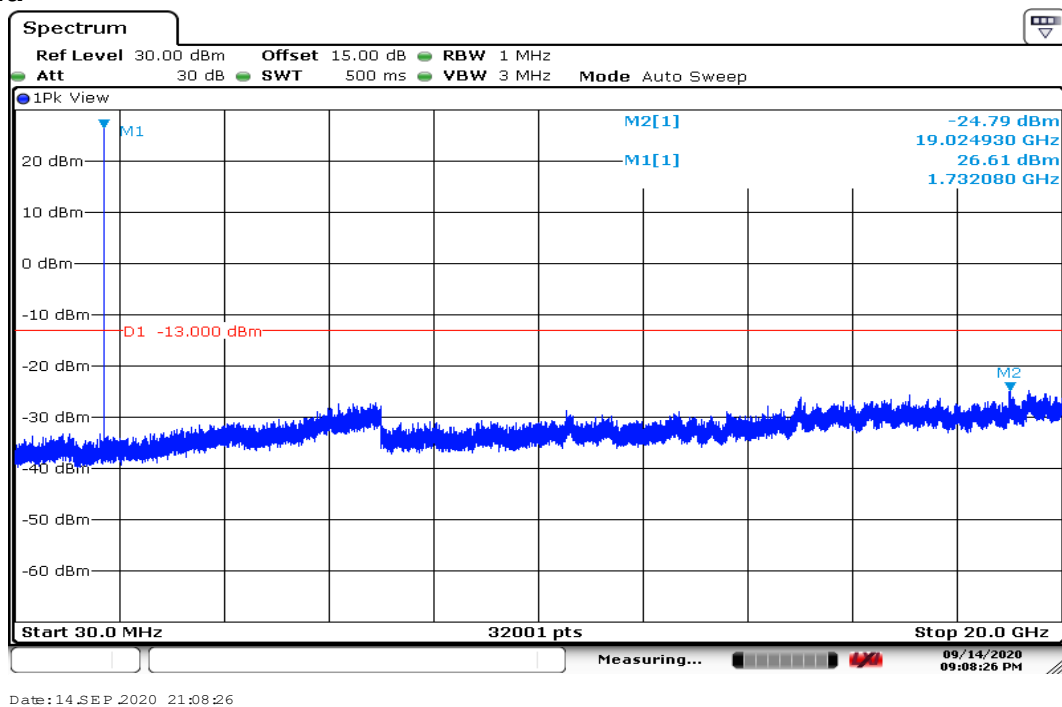
Humidity: 55.9 % RH

Tested by: Rick Lee

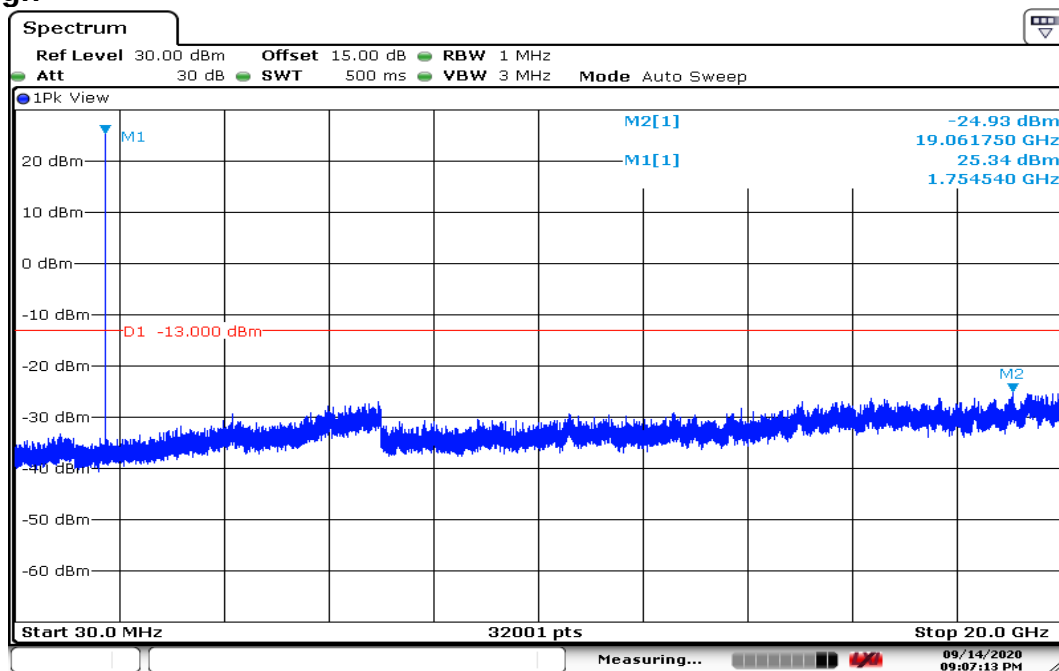
LTE Band 4 CHANNEL BANDWIDTH: 1.4MHz /QPSK CH Low



CH Mid

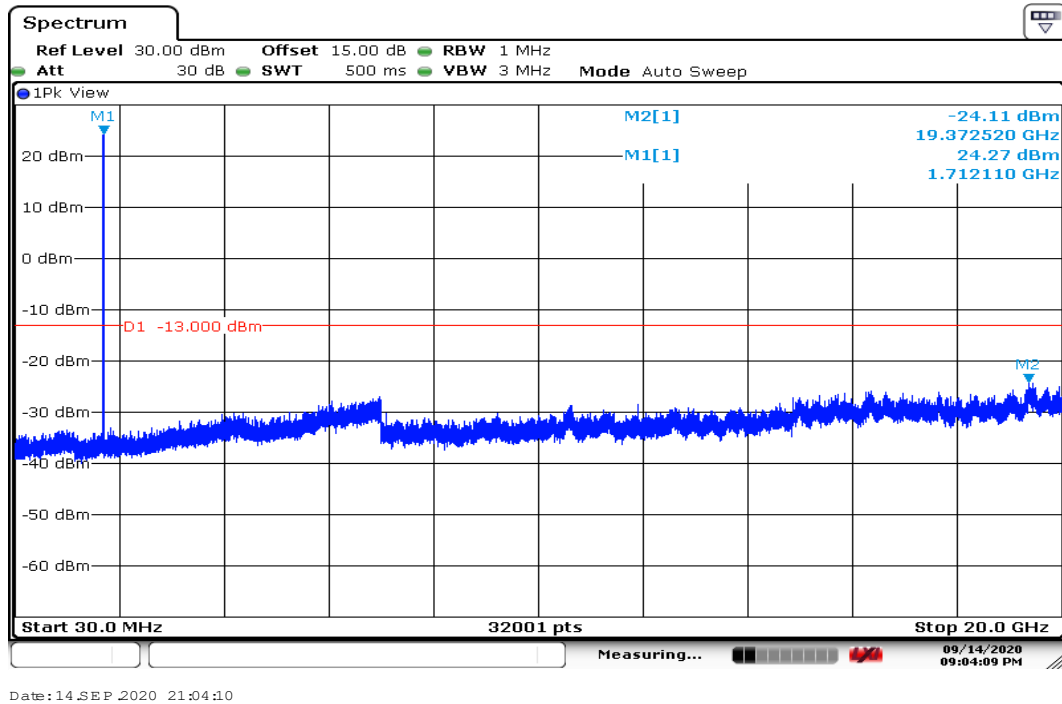


CH High

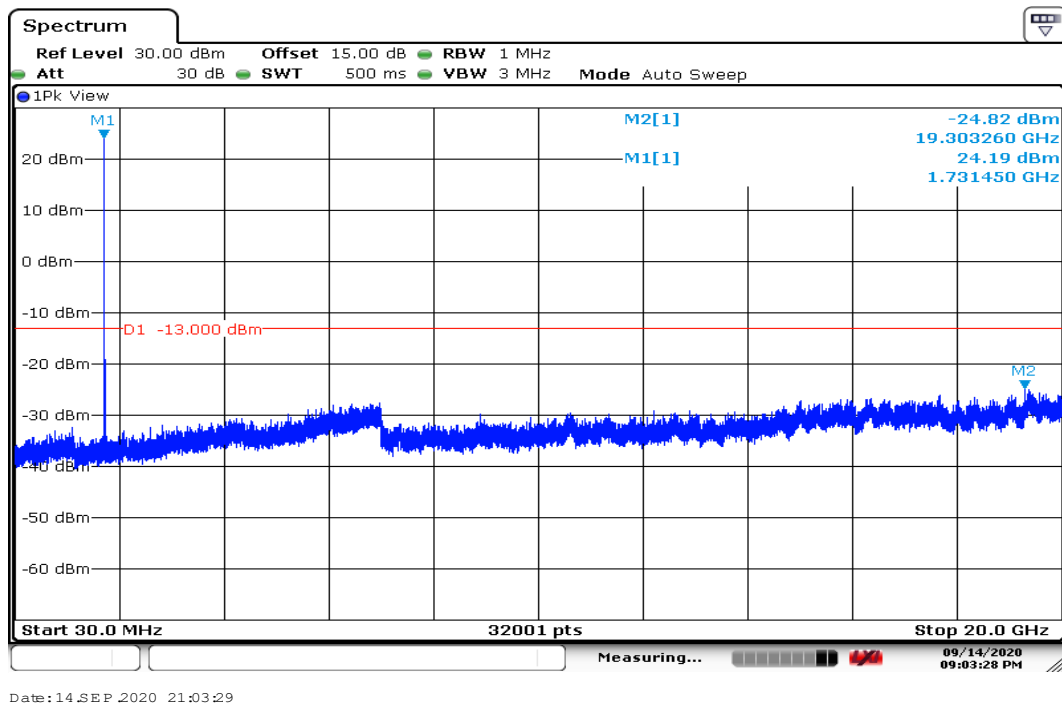


Date: 14 SEP 2020 21:07:13

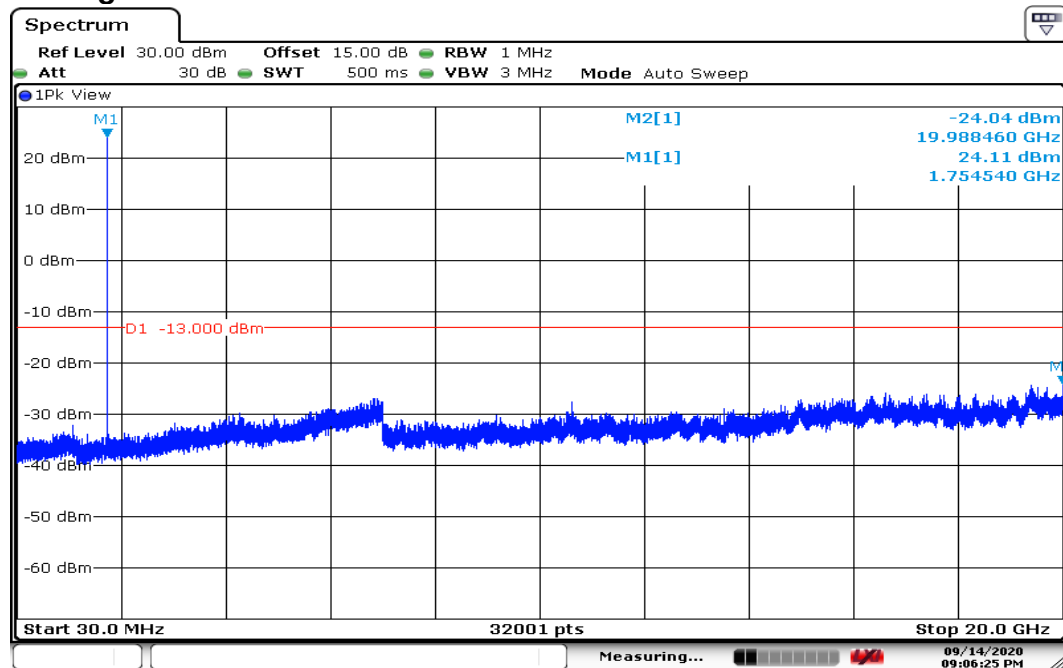
CHANNEL BANDWIDTH: 3MHz /QPSK CH Low



CH Mid

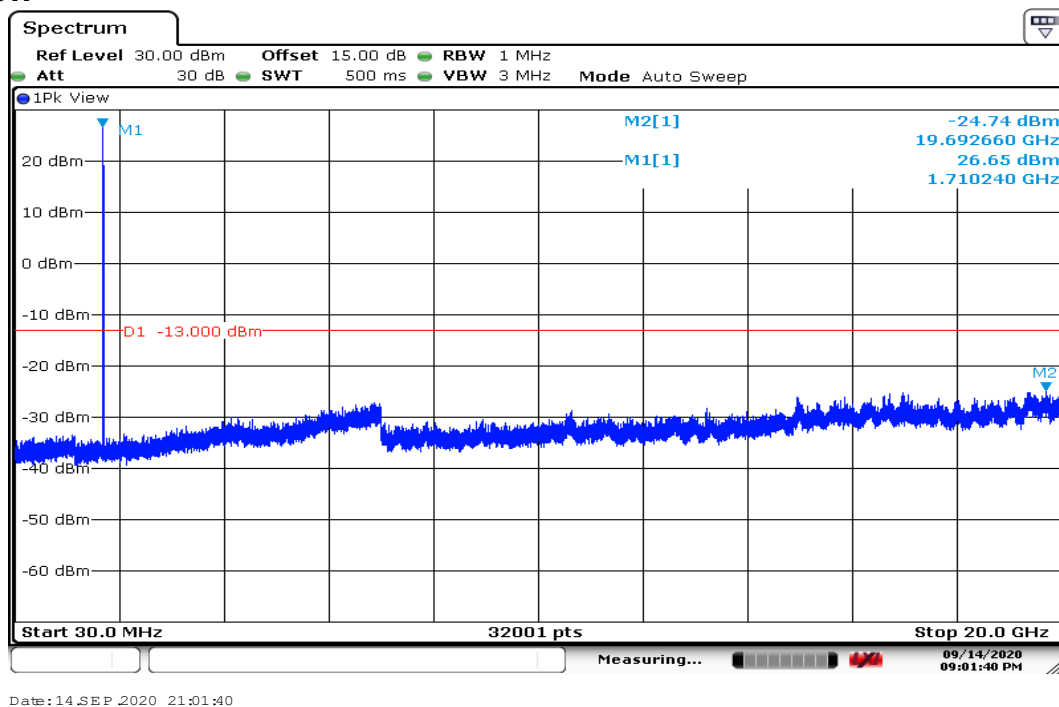


CH High

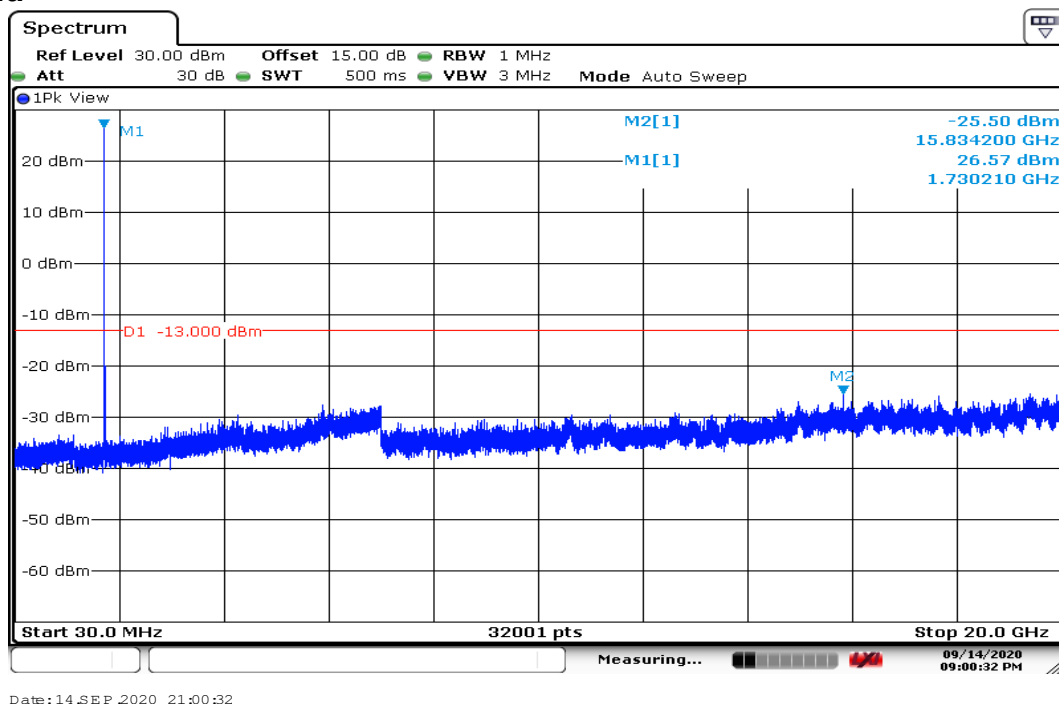


Date: 14 SEP 2020 21:06:25

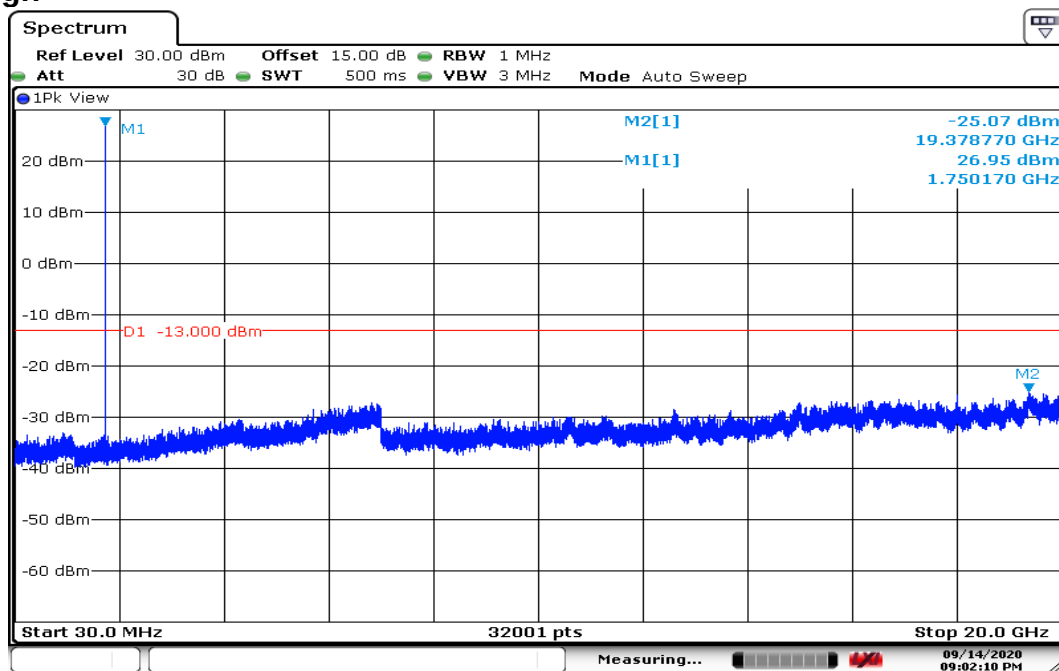
CHANNEL BANDWIDTH: 5MHz /QPSK CH Low



CH Mid

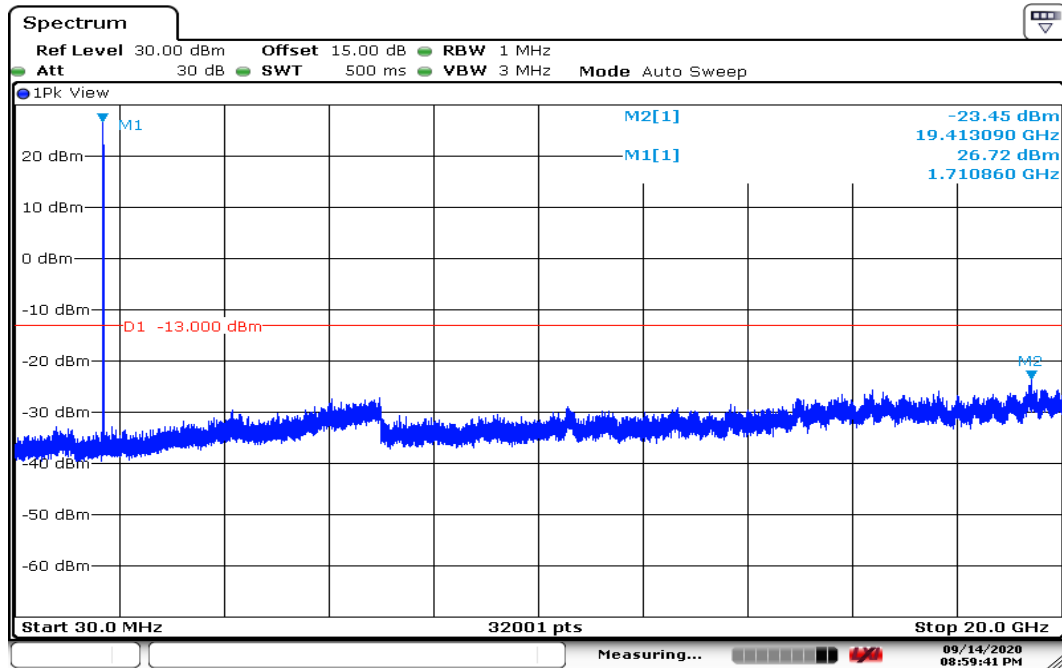


CH High



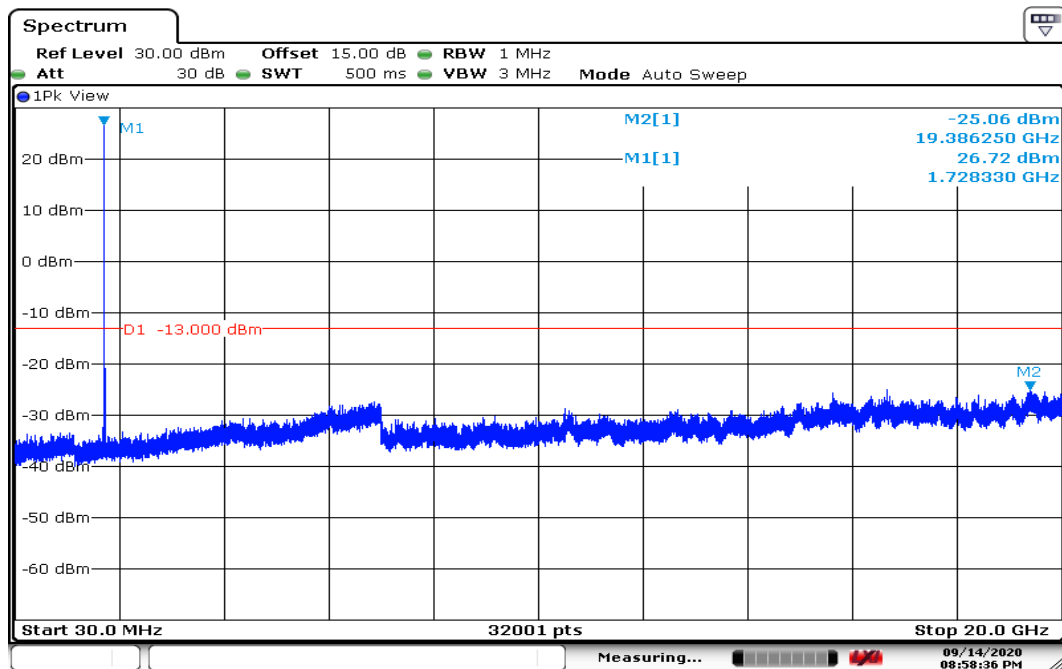
Date: 14 SEP 2020 21:02:11

CHANNEL BANDWIDTH: 10MHz /QPSK CH Low



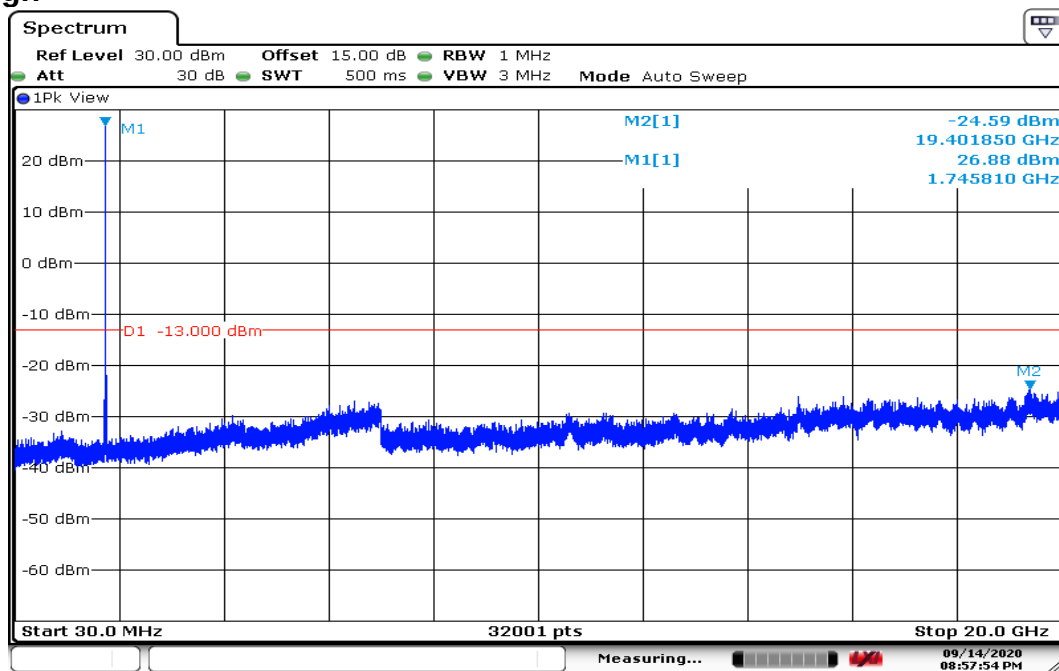
Date: 14 SEP 2020 20:59:41

CH Mid



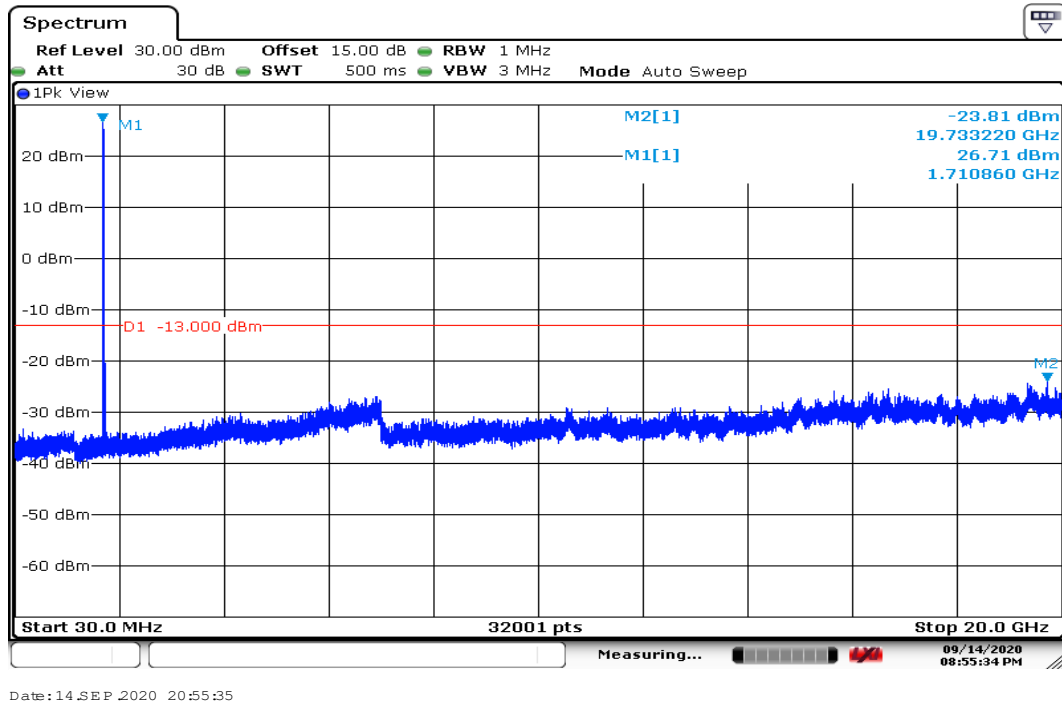
Date: 14 SEP 2020 20:58:37

CH High

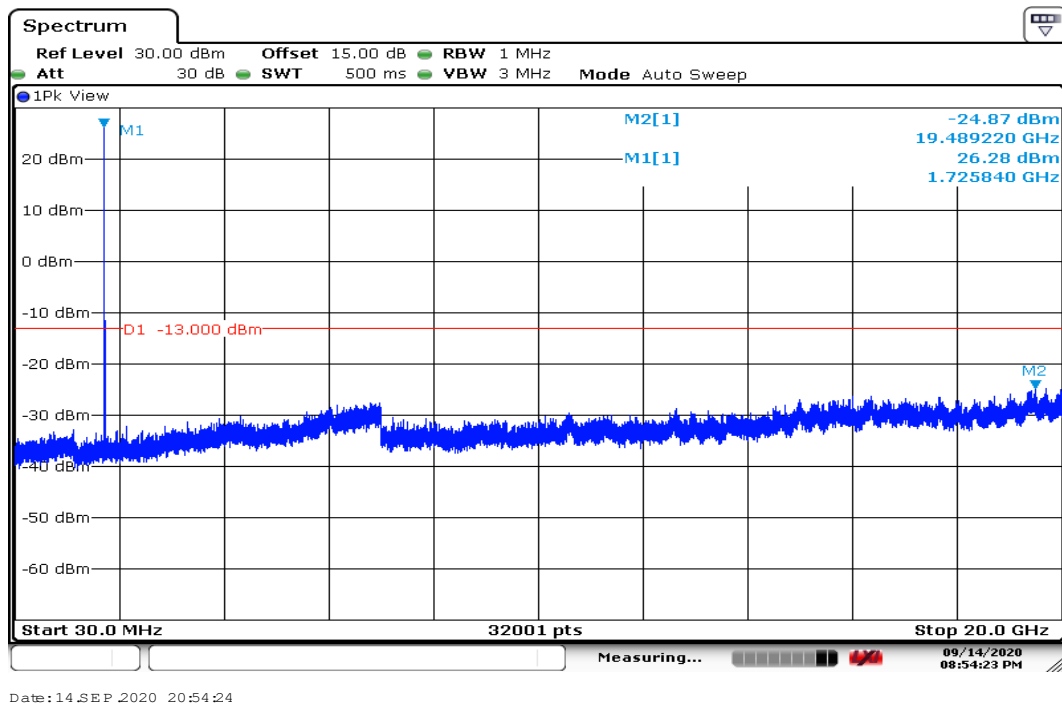


Date: 14 SEP 2020 20:57:55

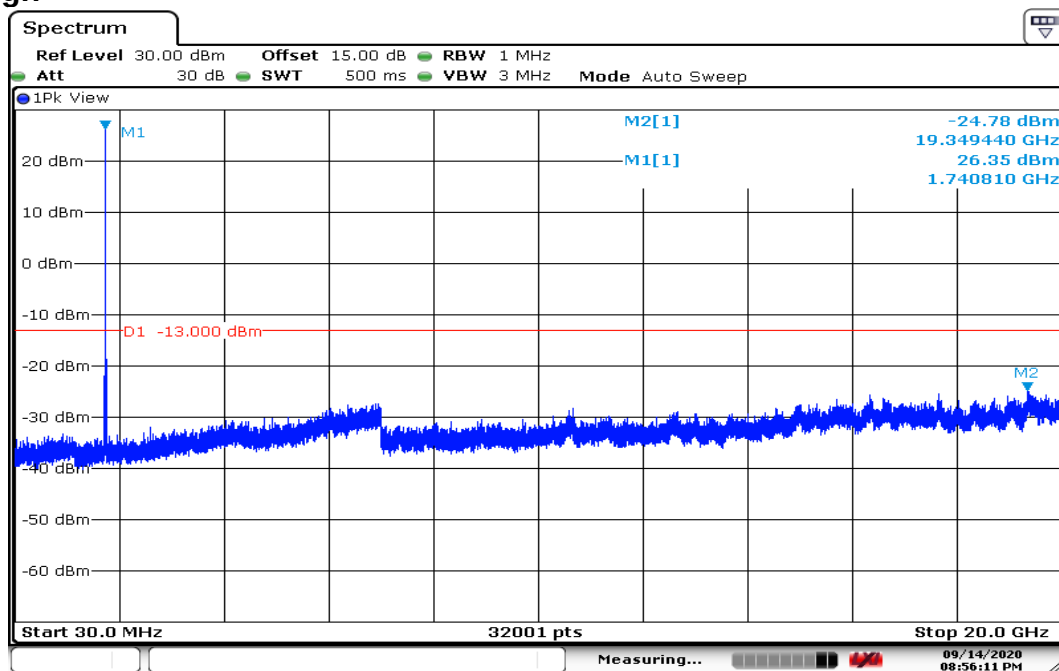
CHANNEL BANDWIDTH: 15MHz /QPSK CH Low



CH Mid

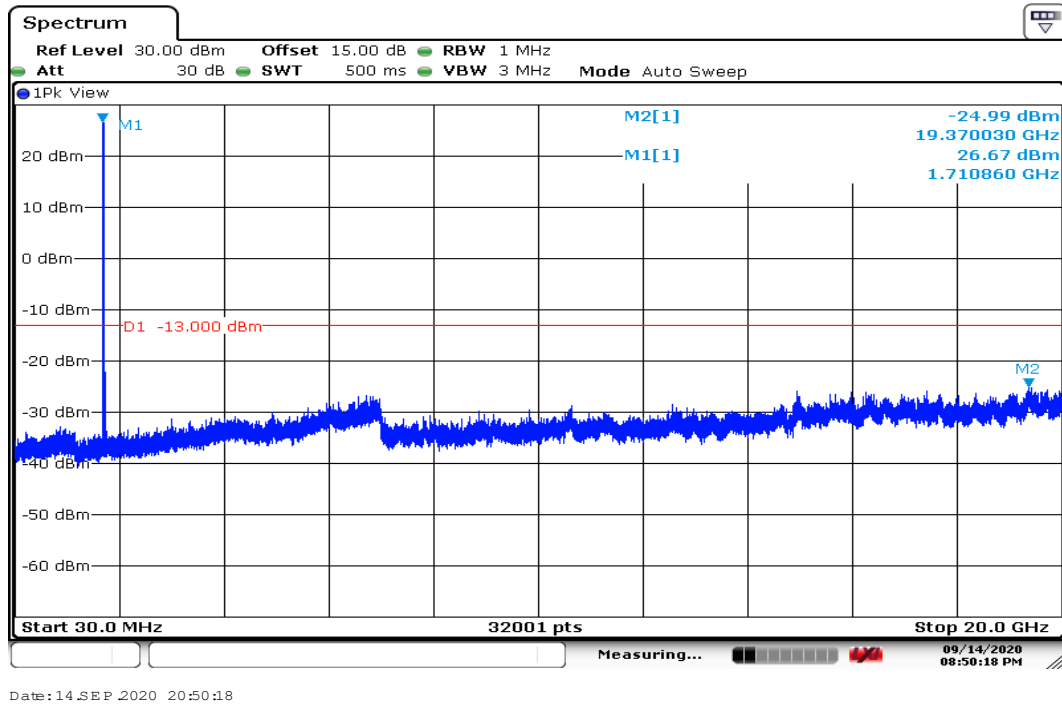


CH High

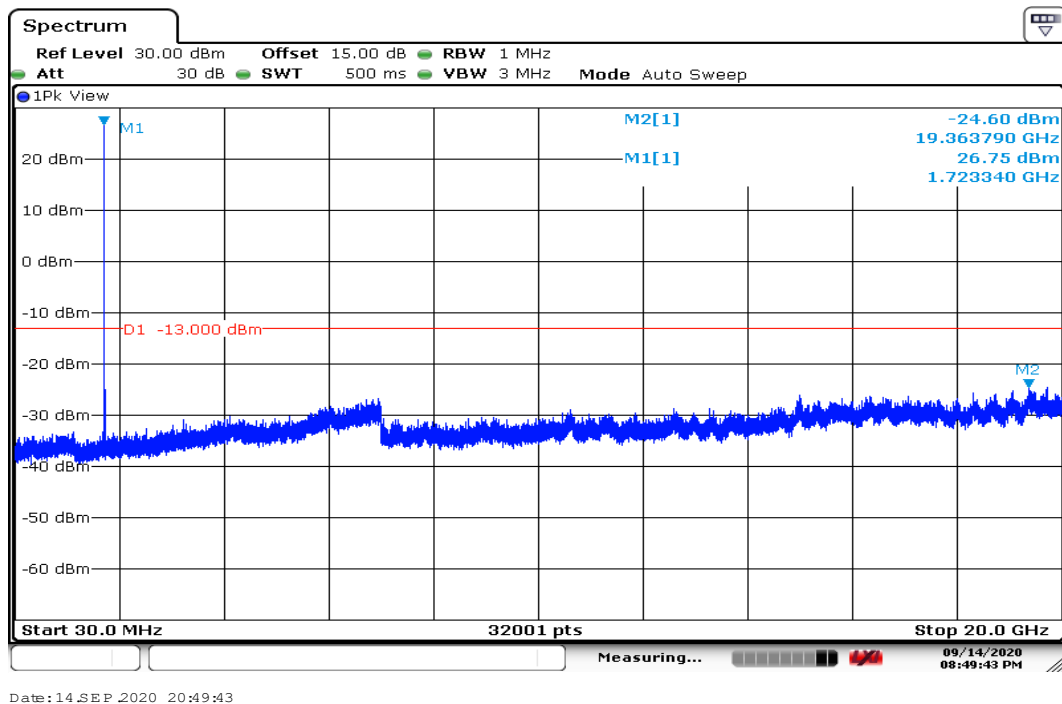


Date: 14 SEP 2020 20:56:11

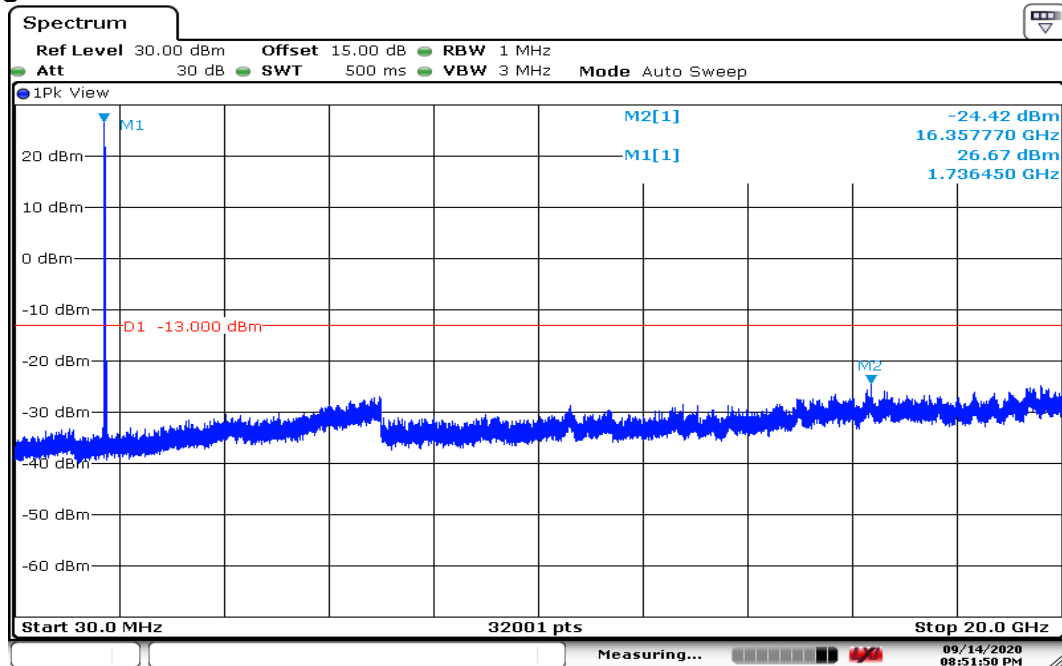
CHANNEL BANDWIDTH: 20MHz /QPSK CH Low



CH Mid

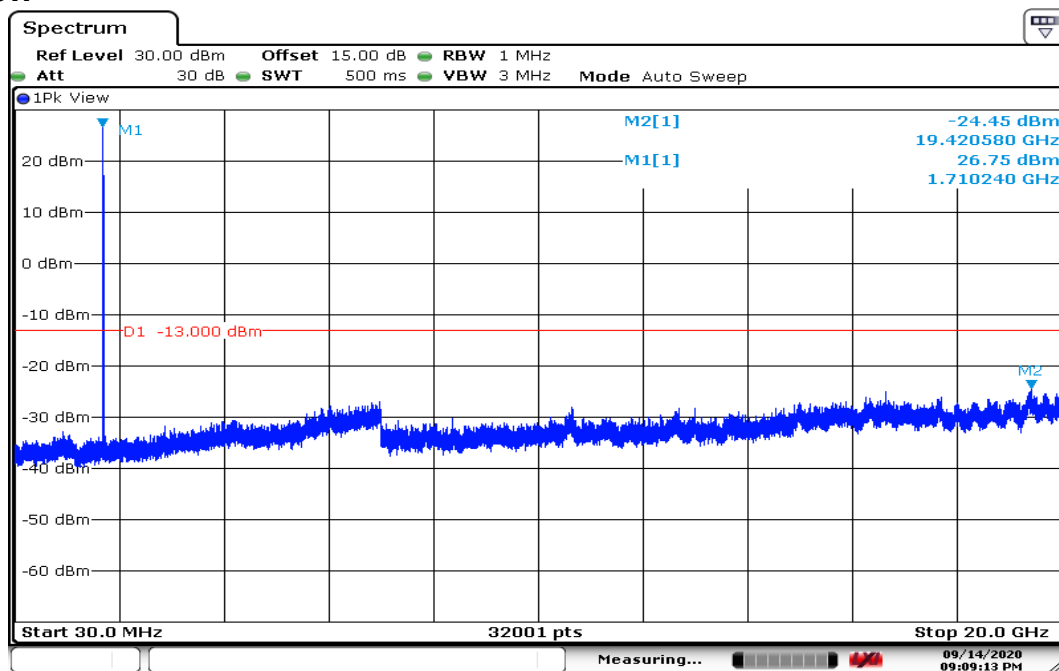


CH High



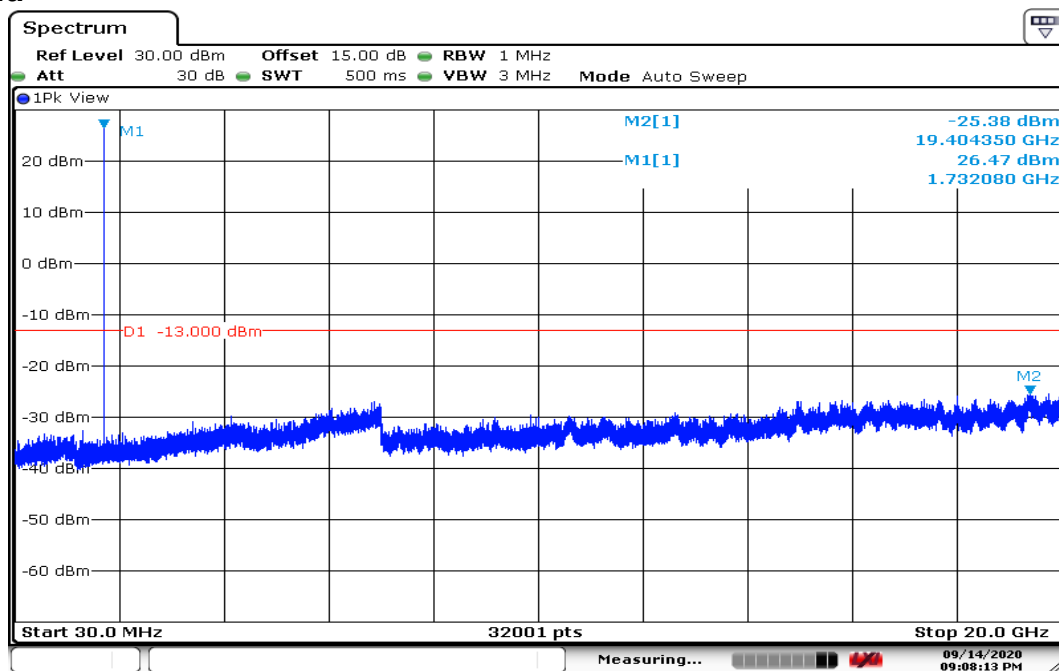
Date: 14 SEP 2020 20:51:50

CHANNEL BANDWIDTH: 1.4MHz /16QAM CH Low



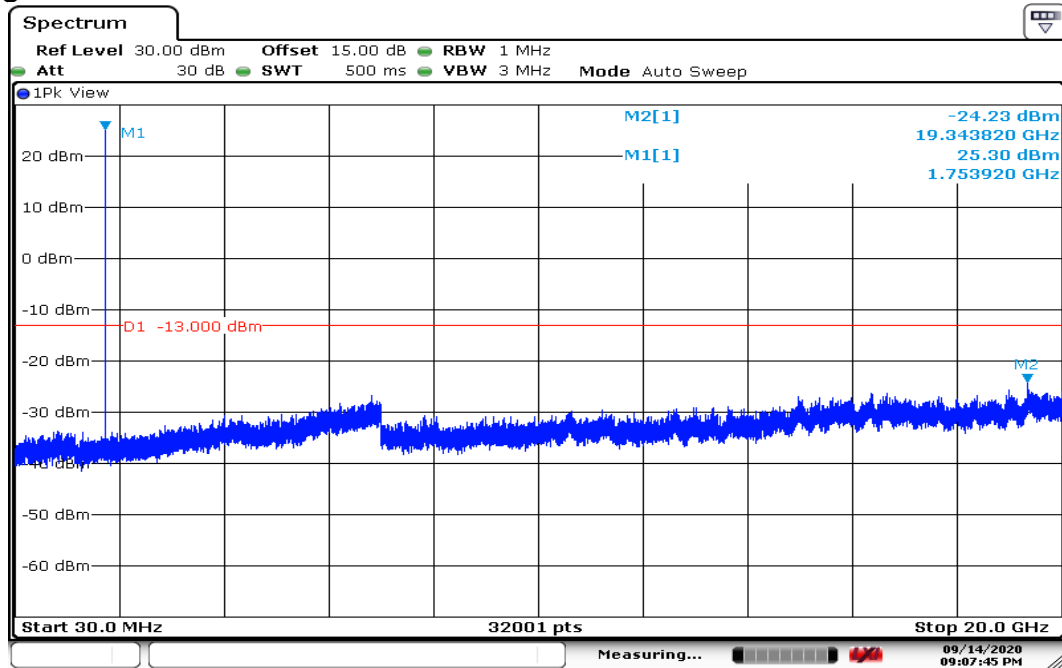
Date: 14 SEP 2020 21:09:13

CH Mid



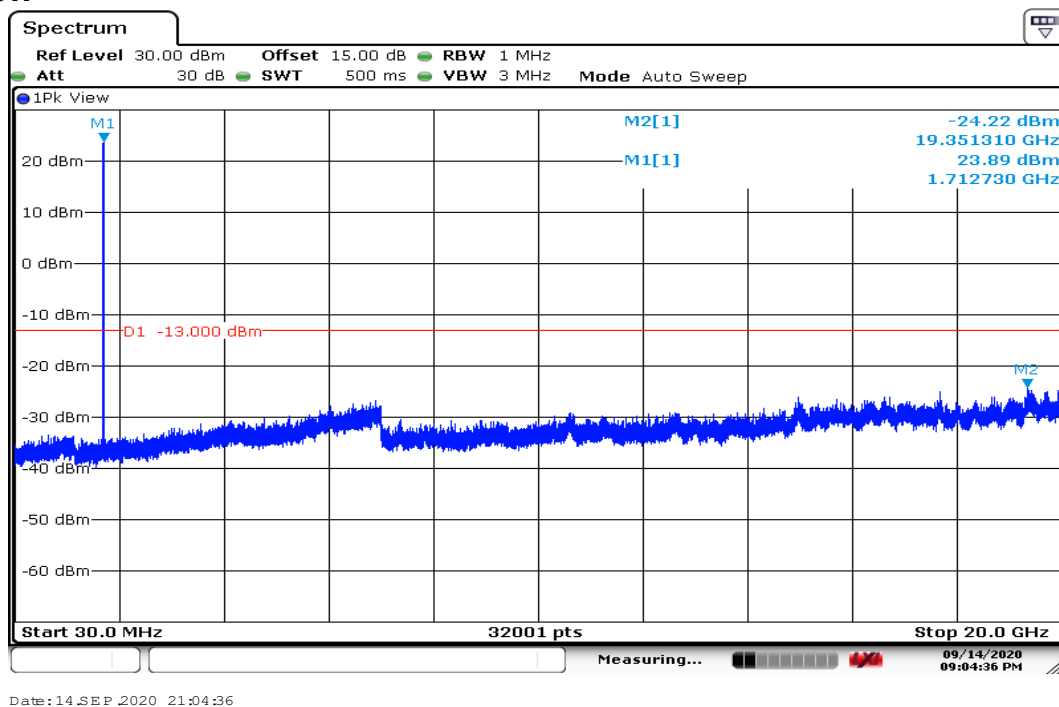
Date: 14 SEP 2020 21:08:13

CH High

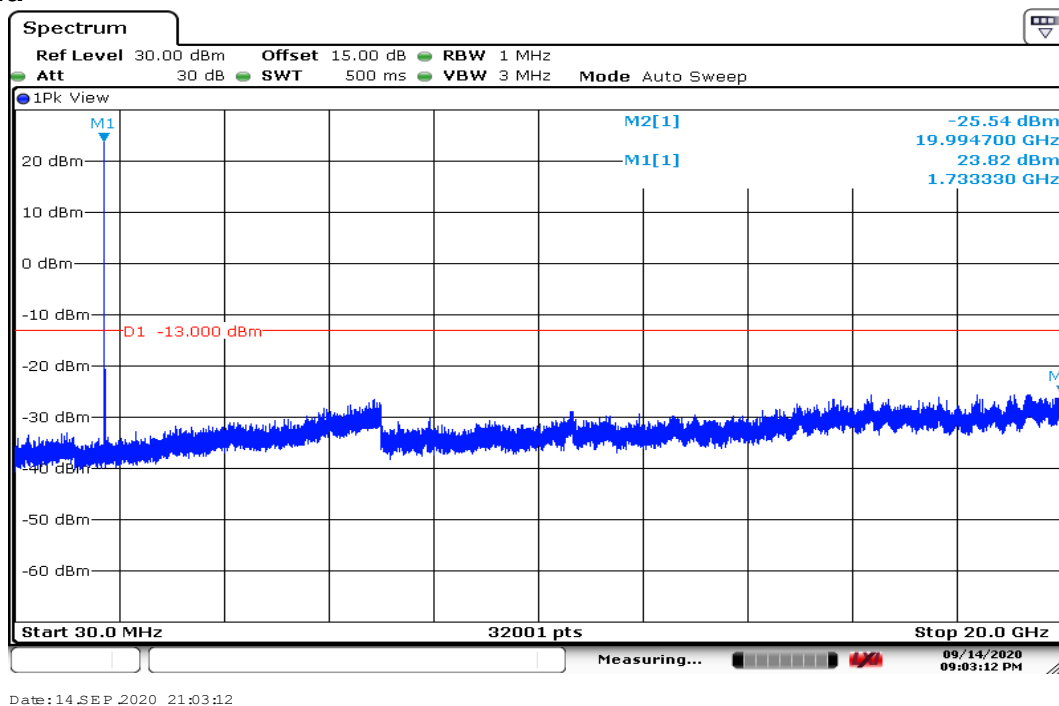


Date: 14 SEP 2020 21:07:45

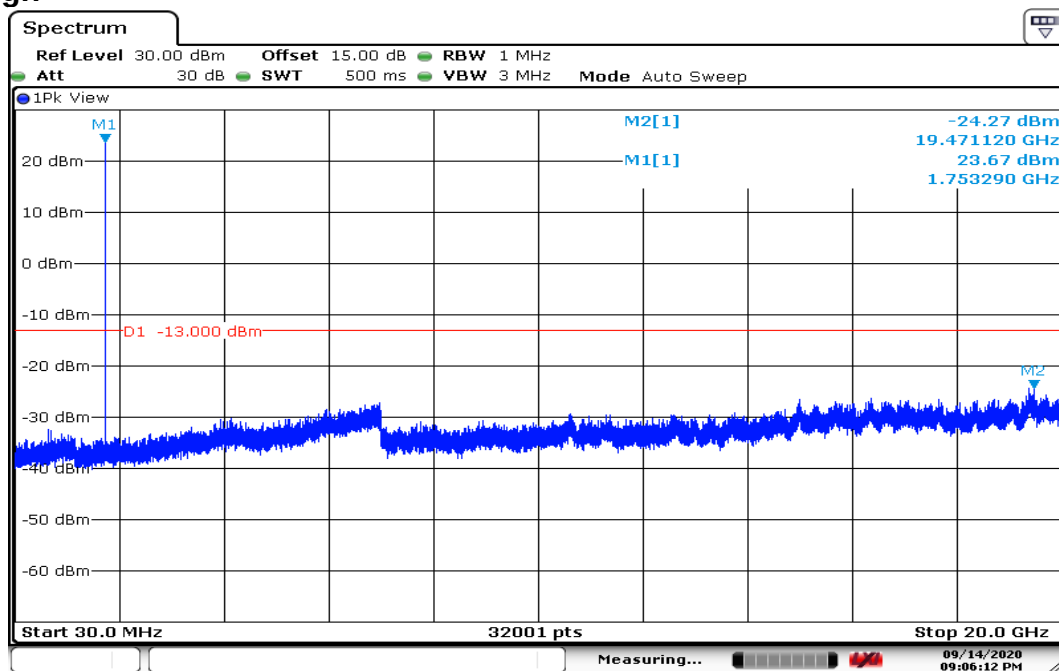
CHANNEL BANDWIDTH: 3MHz /16QAM CH Low



CH Mid

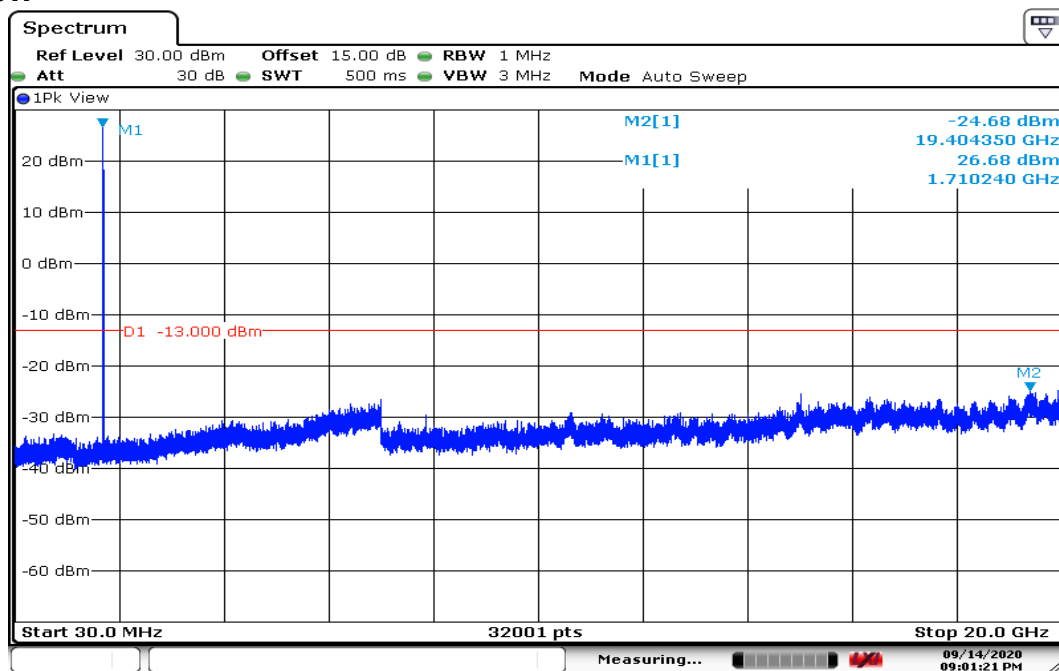


CH High



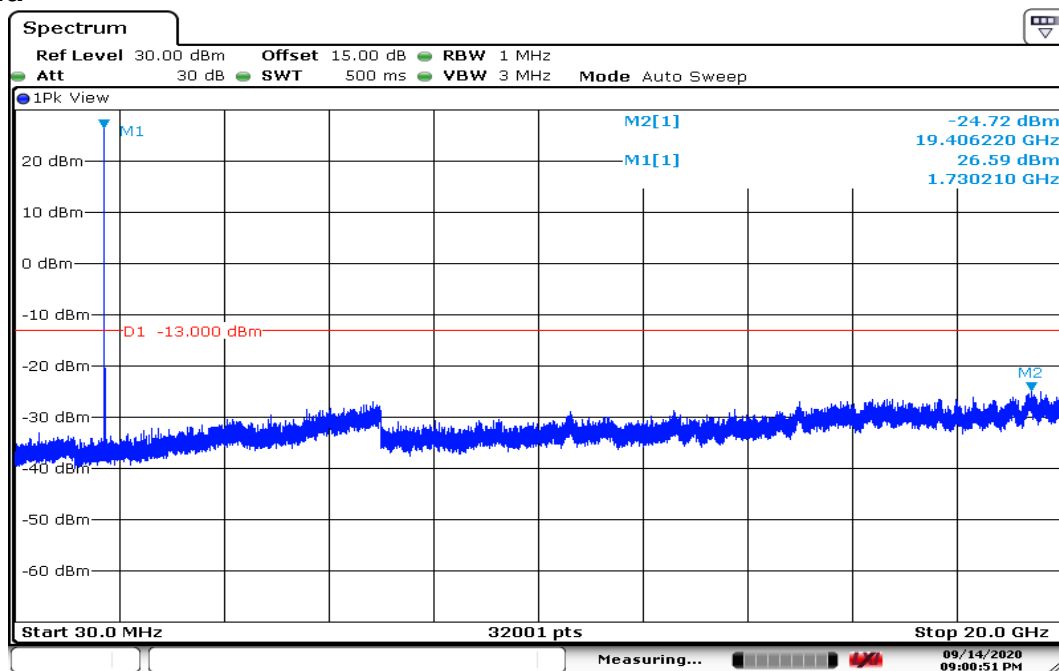
Date: 14 SEP 2020 21:06:12

CHANNEL BANDWIDTH:5MHz /16QAM CH Low



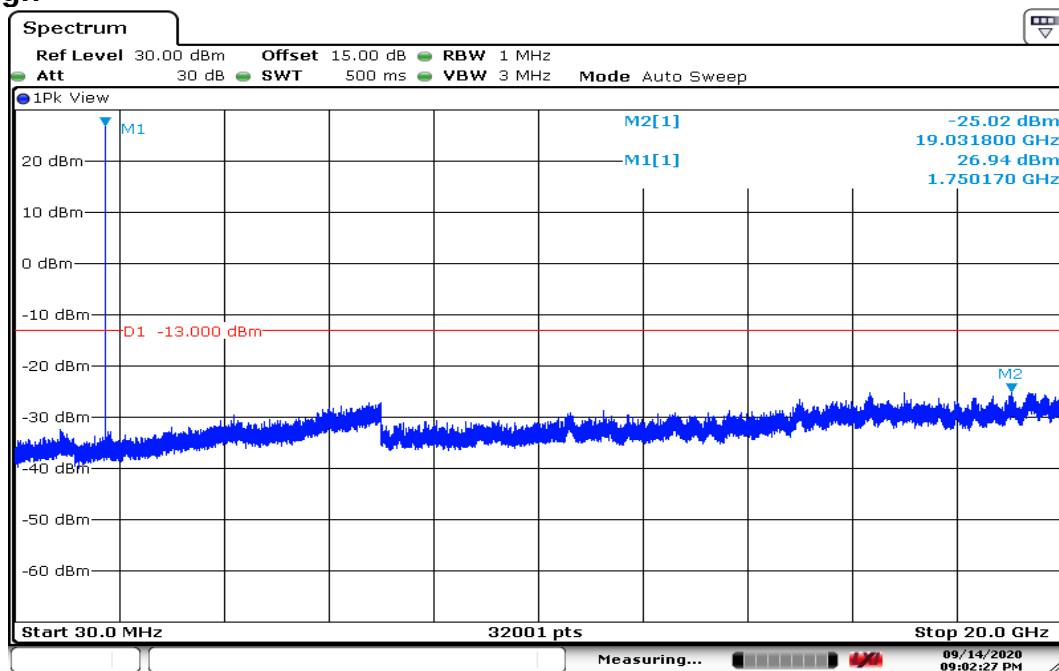
Date:14.SEP.2020 21:01:22

CH Mid



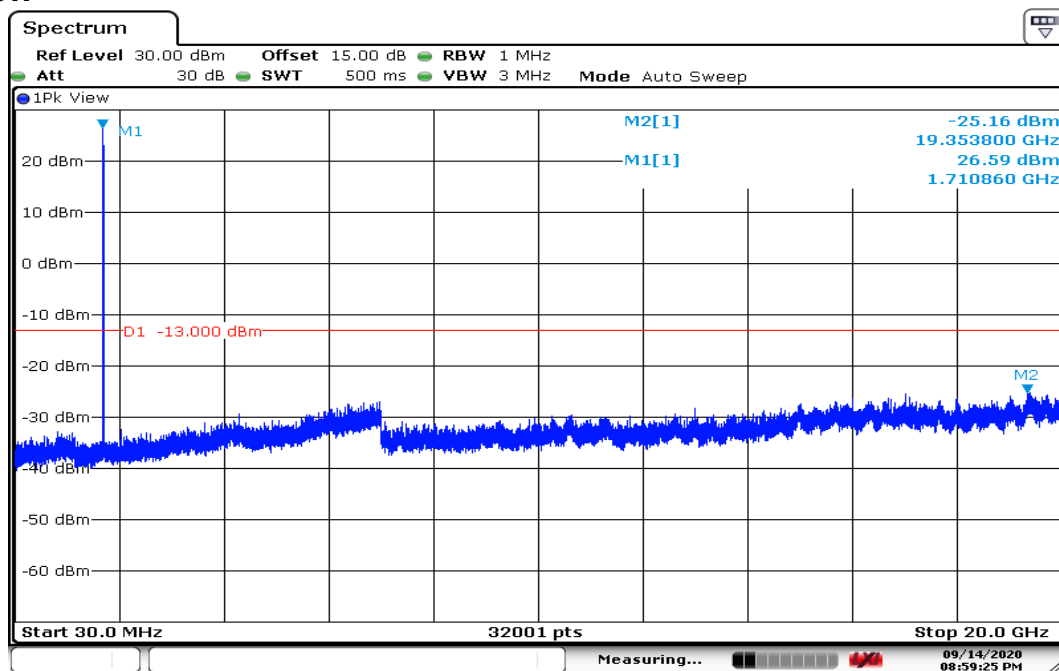
Date:14.SEP.2020 21:00:51

CH High



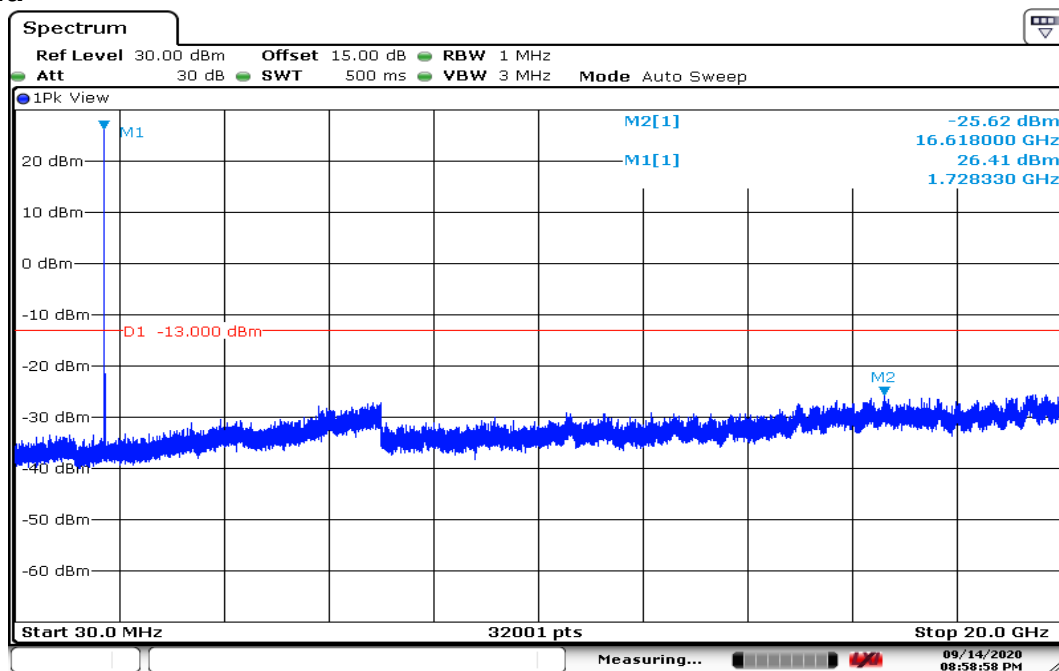
Date: 14 SEP 2020 21:02:28

CHANNEL BANDWIDTH:10MHz /16QAM CH Low



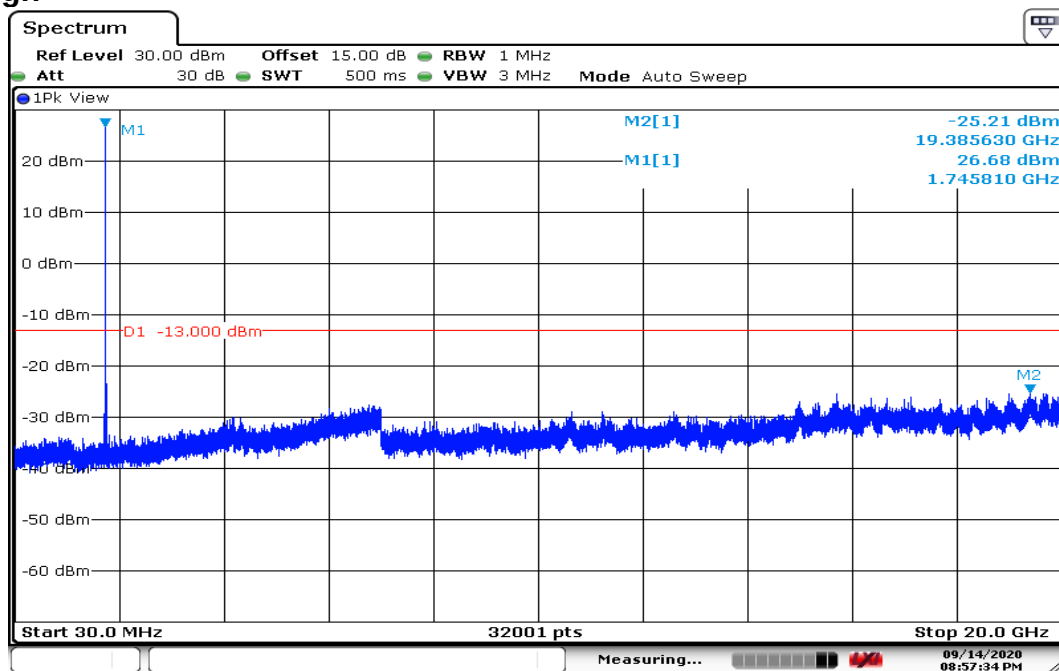
Date:14.SEP.2020 20:59:26

CH Mid



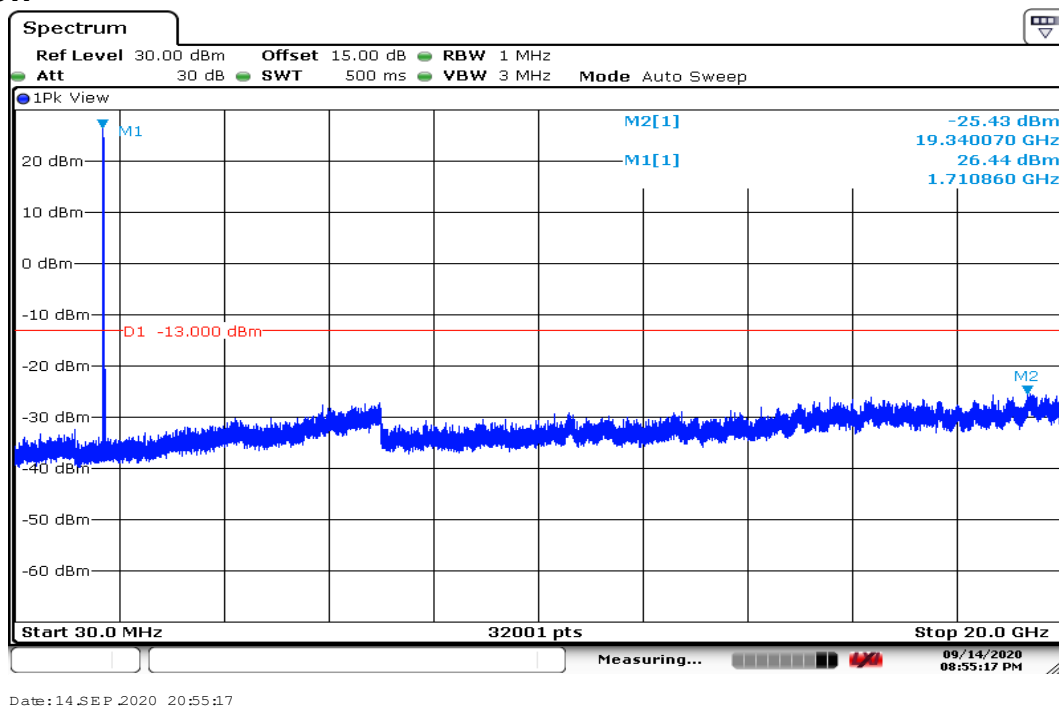
Date:14.SEP.2020 20:58:59

CH High

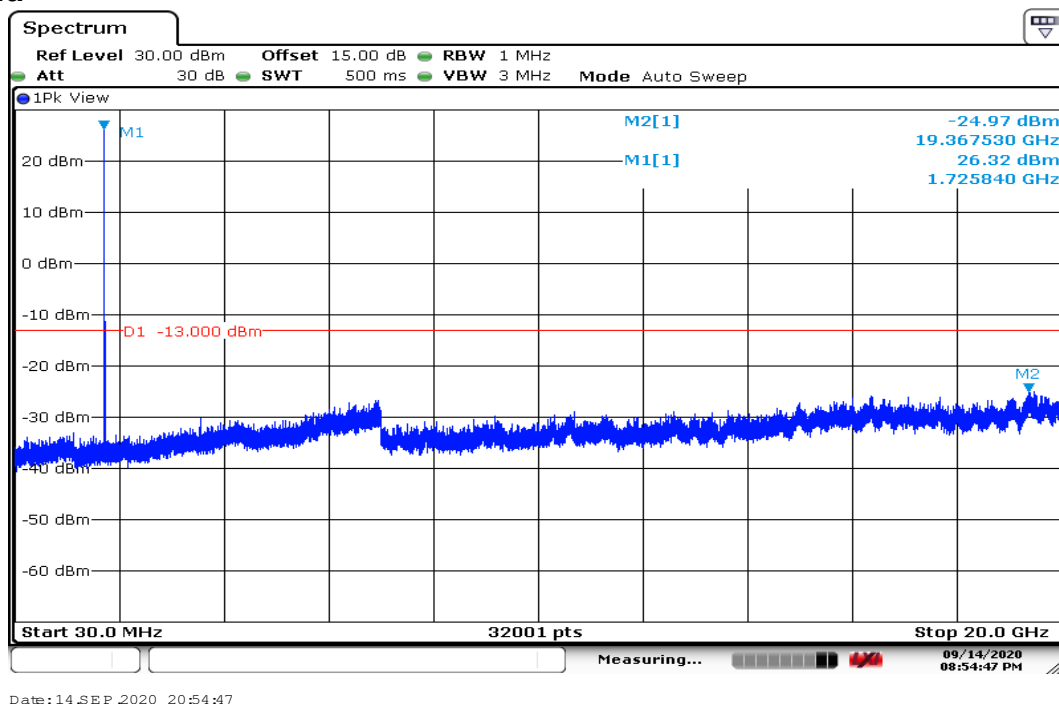


Date: 14 SEP 2020 20:57:34

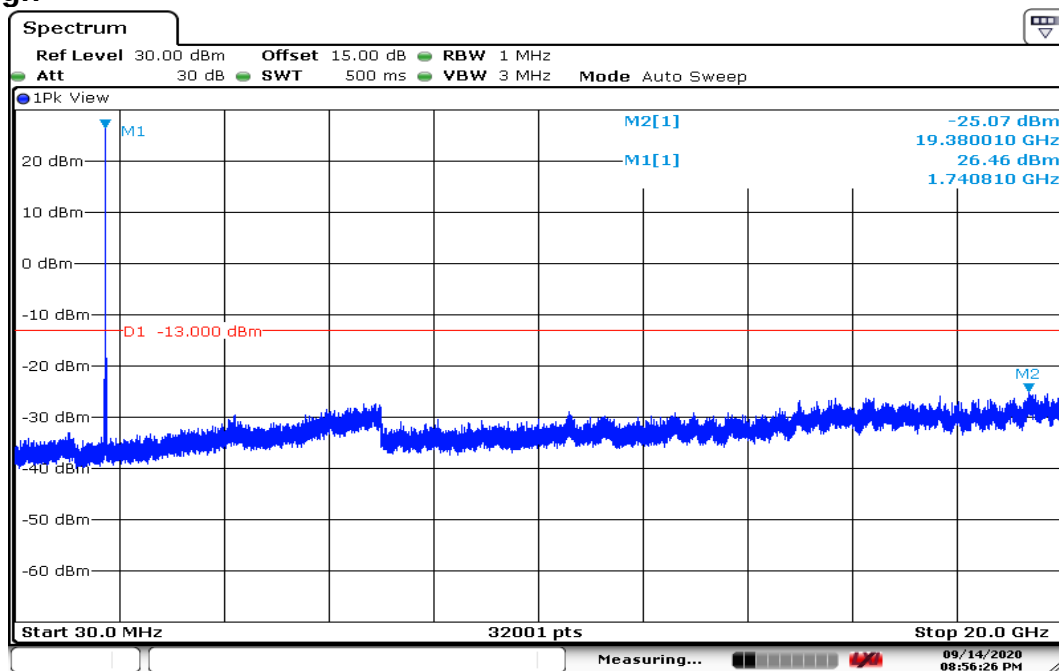
CHANNEL BANDWIDTH:15MHz /16QAM CH Low



CH Mid

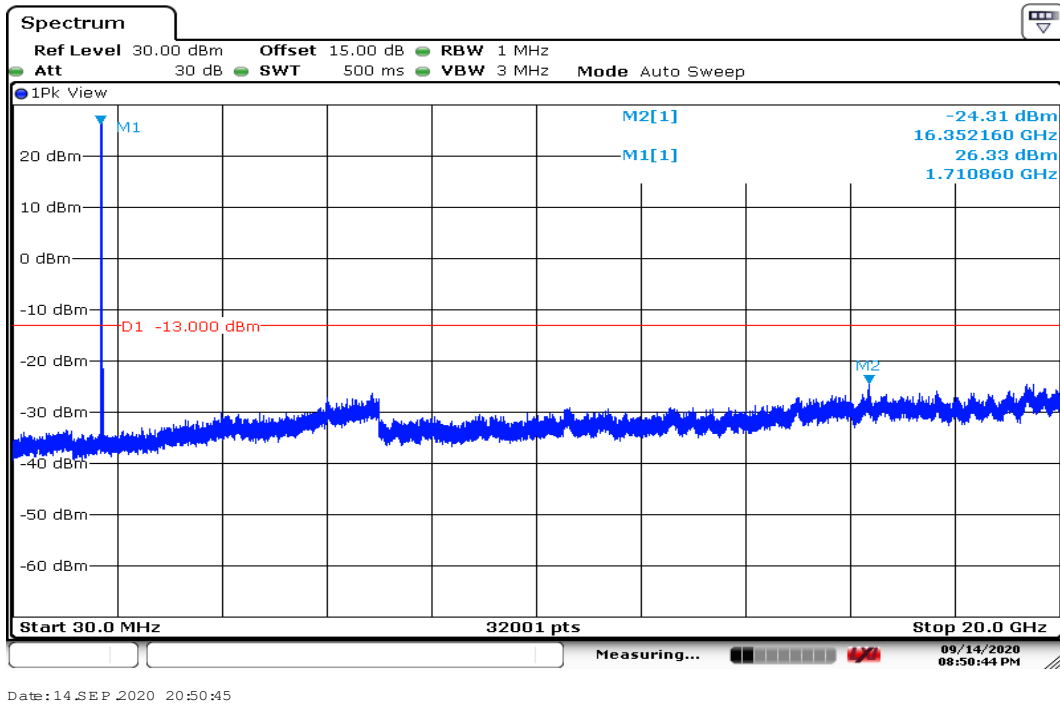


CH High

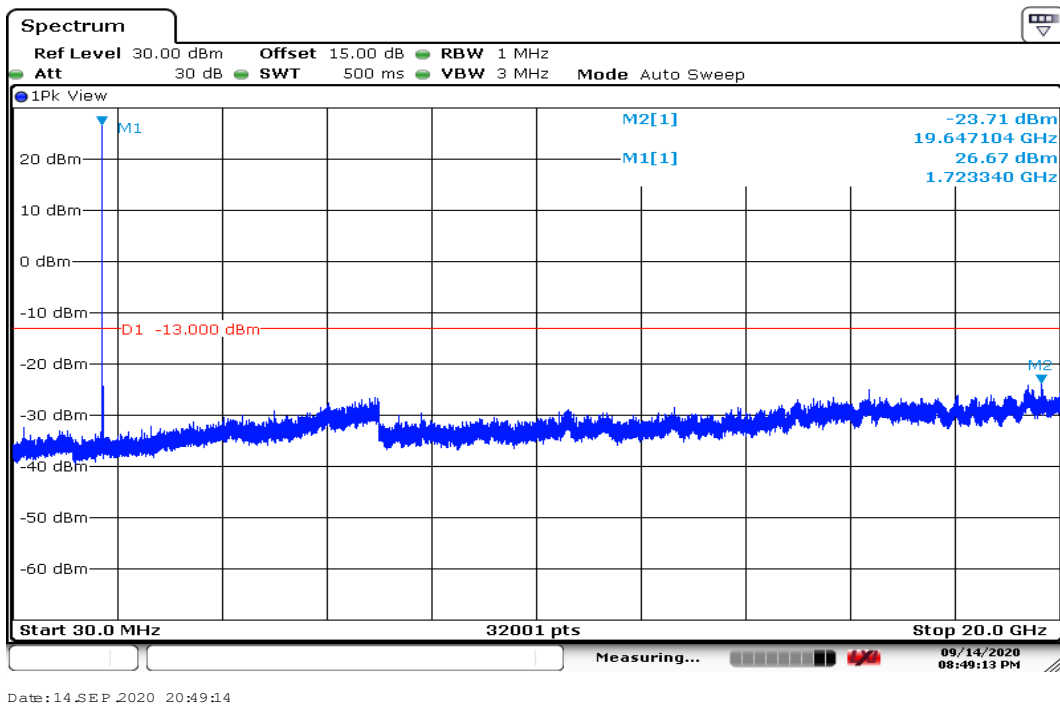


Date: 14 SEP 2020 20:56:26

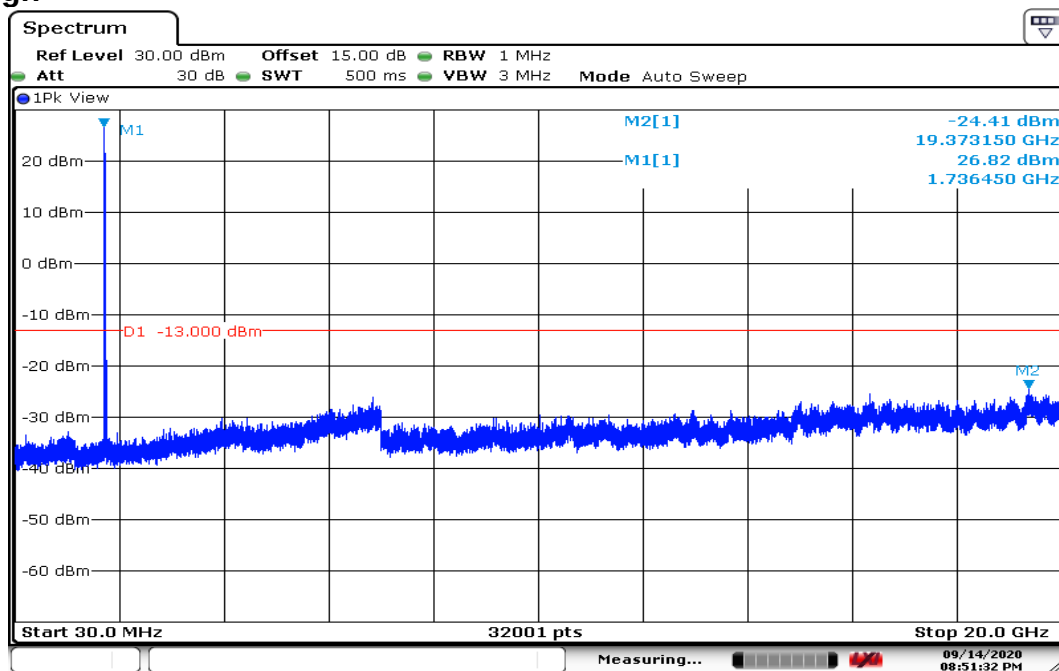
CHANNEL BANDWIDTH:20MHz /16QAM CH Low



CH Mid



CH High



Date: 14 SEP 2020 20:51:32

8.7 RADIATED EMISSION MEASUREMENT

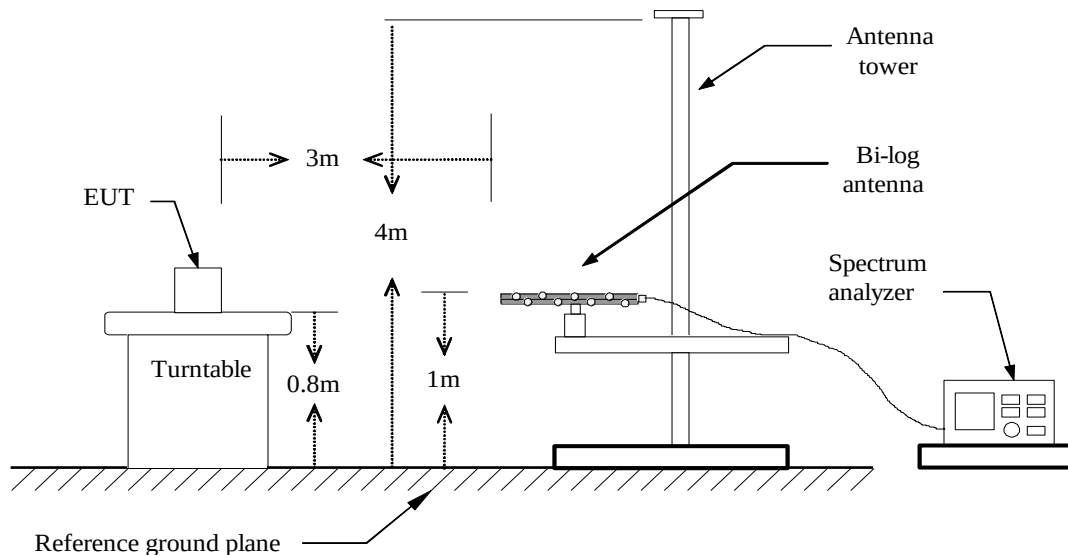
LIMITS

FCC §27.53(h), Band 4

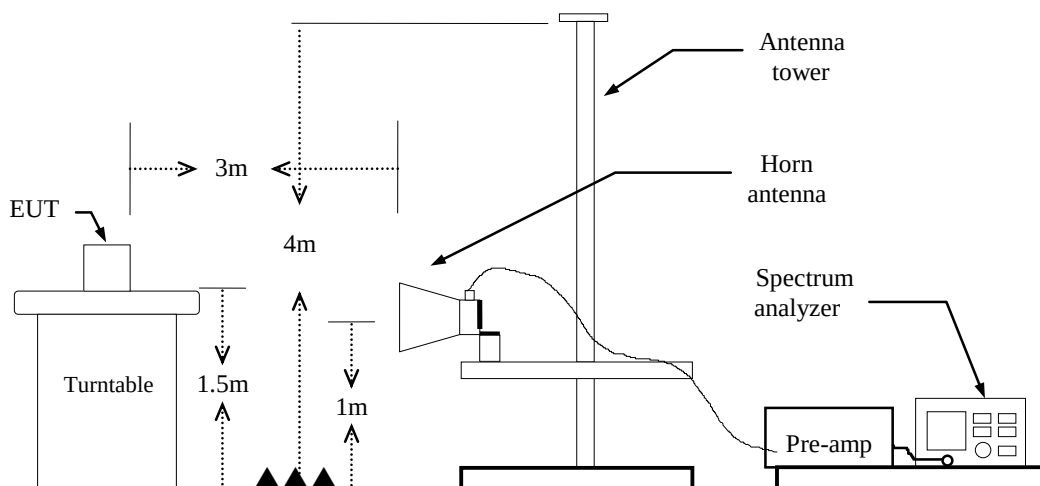
(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

Test Configuration

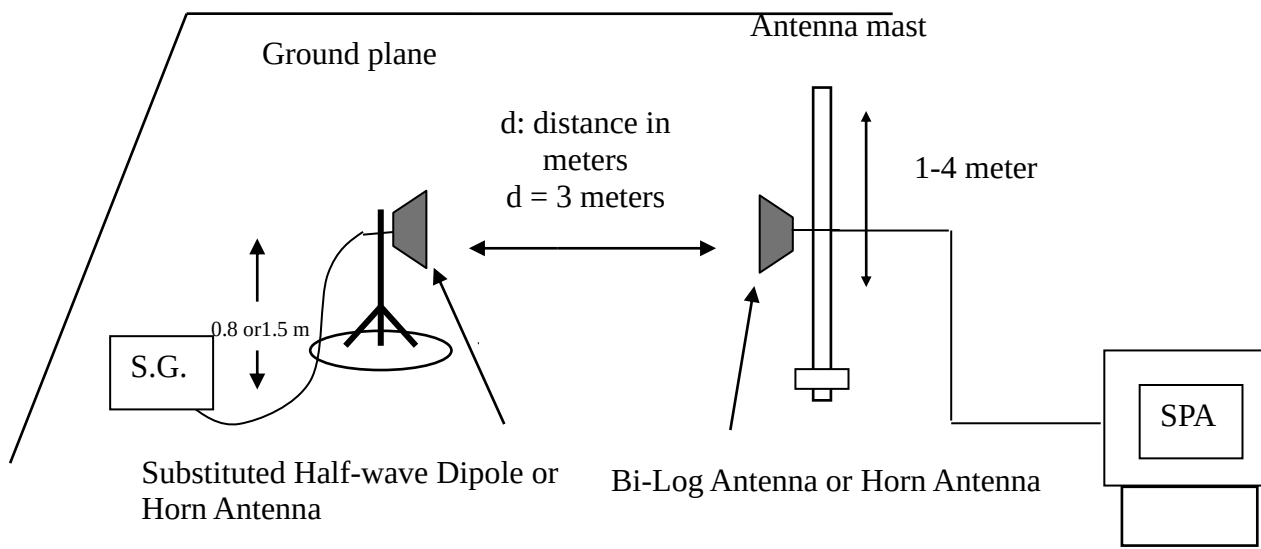
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



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

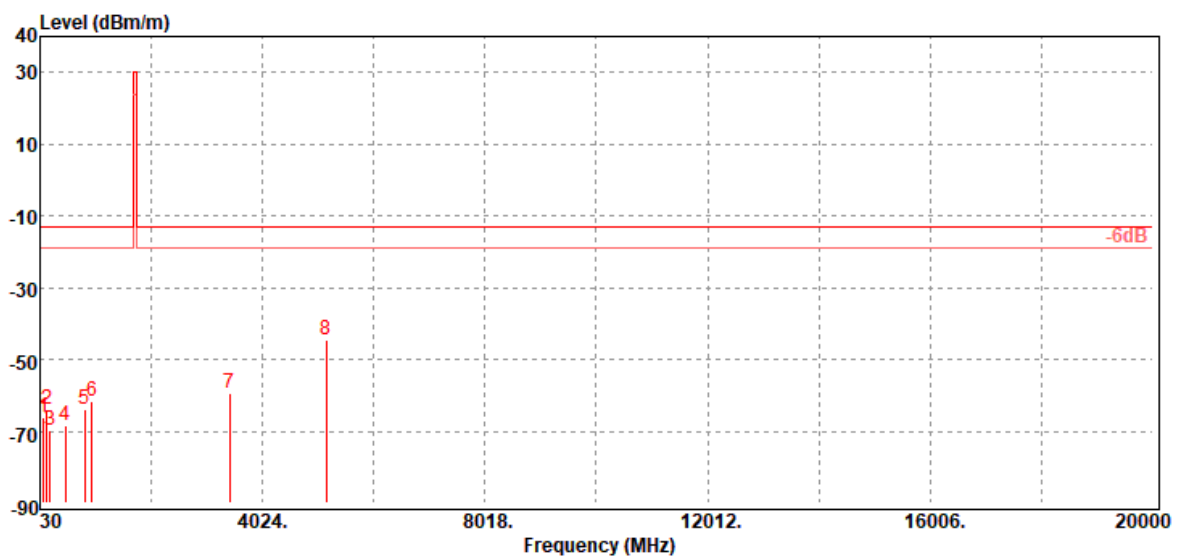
Test Date: December 29, 2020

Temperature: 20.4°C

Tested by: Jerry Chang

Humidity: 66% RH

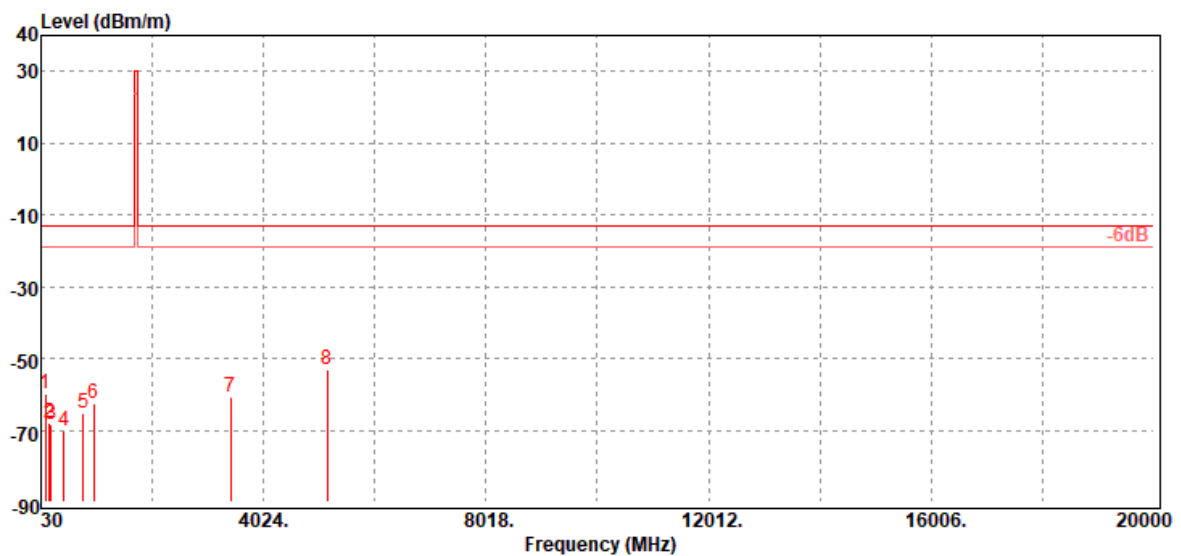
Polarity: Ver.



Freq. MHz	ERP/EIRP dBm	SG Output Level dBm	Antenna Gain dBd/dBi	Cable Loss dB	Limit dBm	Margin dB	Antenna Polarization (V/H)
100.81	-66.38	-57.10	-8.46	-0.82	-13.00	-53.38	V
149.31	-63.83	-55.66	-7.17	-1.00	-13.00	-50.83	V
217.21	-69.82	-66.55	-2.06	-1.21	-13.00	-56.82	V
487.84	-68.31	-64.23	-2.24	-1.84	-13.00	-55.31	V
828.31	-64.09	-60.17	-1.50	-2.42	-13.00	-51.09	V
964.11	-61.68	-57.75	-1.30	-2.63	-13.00	-48.68	V
3440.00	-59.31	-66.52	12.72	-5.51	-13.00	-46.31	V
5160.00	-44.72	-50.77	12.76	-6.71	-13.00	-31.72	V

Operation Mode: Tx / Low CH
Temperature: 20.4°C
Humidity: 66% RH

Test Date: December 29, 2020
Tested by: Jerry Chang
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)
102.75	-60.05	-50.34	-8.88	-0.83	-13.00	-47.05	H
175.50	-67.88	-61.94	-4.85	-1.09	-13.00	-54.88	H
217.21	-68.43	-65.16	-2.06	-1.21	-13.00	-55.43	H
439.34	-70.08	-66.25	-2.09	-1.74	-13.00	-57.08	H
784.66	-65.29	-61.63	-1.31	-2.35	-13.00	-52.29	H
970.90	-62.45	-58.49	-1.32	-2.64	-13.00	-49.45	H
3440.00	-60.97	-68.18	12.72	-5.51	-13.00	-47.97	H
5160.00	-52.93	-58.98	12.76	-6.71	-13.00	-39.93	H

Operation Mode: Tx / Mid CH

Test Date:

December 29, 2020

Temperature: 20.4°C

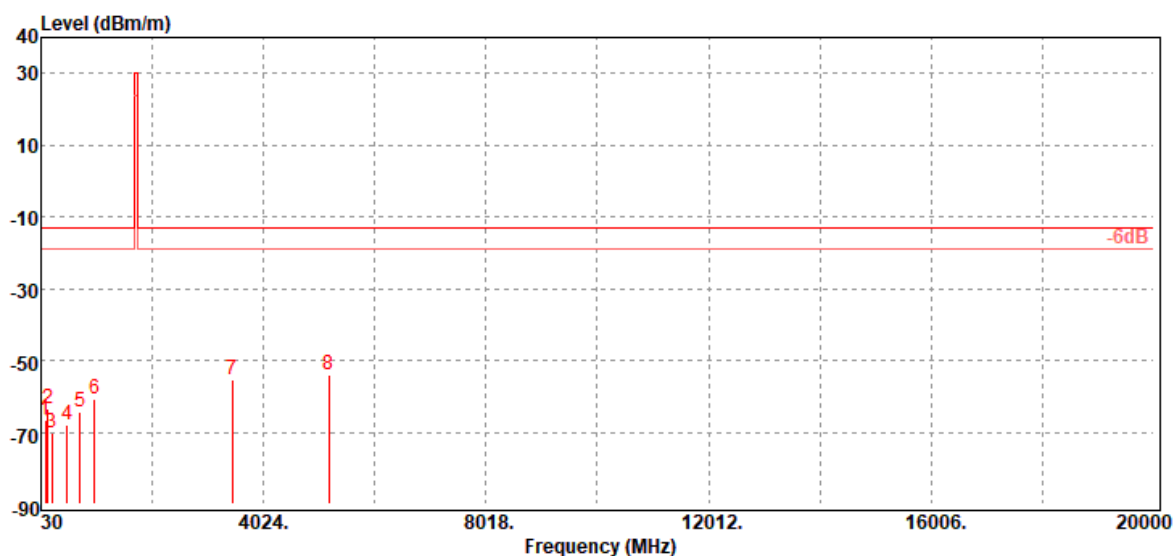
Tested by:

Jerry Chang

Humidity: 66% 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)
102.75	-66.45	-56.74	-8.88	-0.83	-13.00	-53.45	V
149.31	-63.33	-55.16	-7.17	-1.00	-13.00	-50.33	V
228.85	-70.23	-66.94	-2.05	-1.24	-13.00	-57.23	V
500.45	-67.85	-63.99	-1.99	-1.87	-13.00	-54.85	V
733.25	-64.56	-60.95	-1.33	-2.28	-13.00	-51.56	V
988.36	-60.71	-56.65	-1.40	-2.66	-13.00	-47.71	V
3465.00	-55.21	-62.32	12.64	-5.53	-13.00	-42.21	V
5197.50	-54.19	-60.42	12.98	-6.75	-13.00	-41.19	V

Operation Mode: Tx / Mid CH

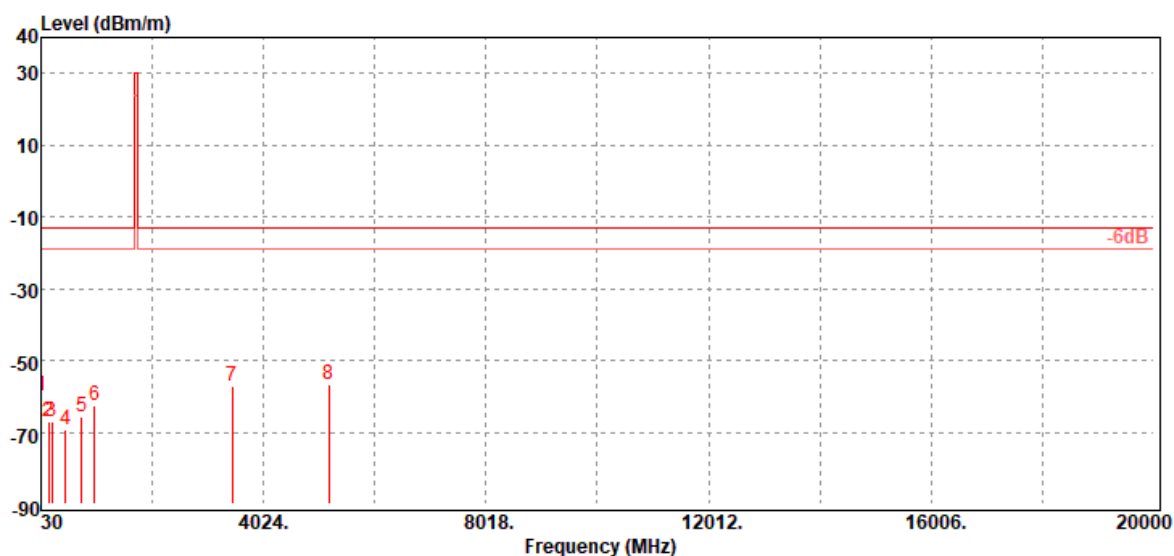
Test Date: December 29, 2020

Temperature: 20.4°C

Tested by: Jerry Chang

Humidity: 66% 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	-59.96	-31.33	-28.16	-0.47	-13.00	-46.96	H
163.86	-66.85	-59.89	-5.91	-1.05	-13.00	-53.85	H
219.15	-67.28	-64.04	-2.02	-1.22	-13.00	-54.28	H
474.26	-69.34	-65.13	-2.40	-1.81	-13.00	-56.34	H
755.56	-65.51	-61.79	-1.40	-2.32	-13.00	-52.51	H
987.39	-62.75	-58.69	-1.40	-2.66	-13.00	-49.75	H
3465.00	-57.33	-64.44	12.64	-5.53	-13.00	-44.33	H
5197.50	-56.60	-62.83	12.98	-6.75	-13.00	-43.60	H

Operation Mode: Tx / High CH

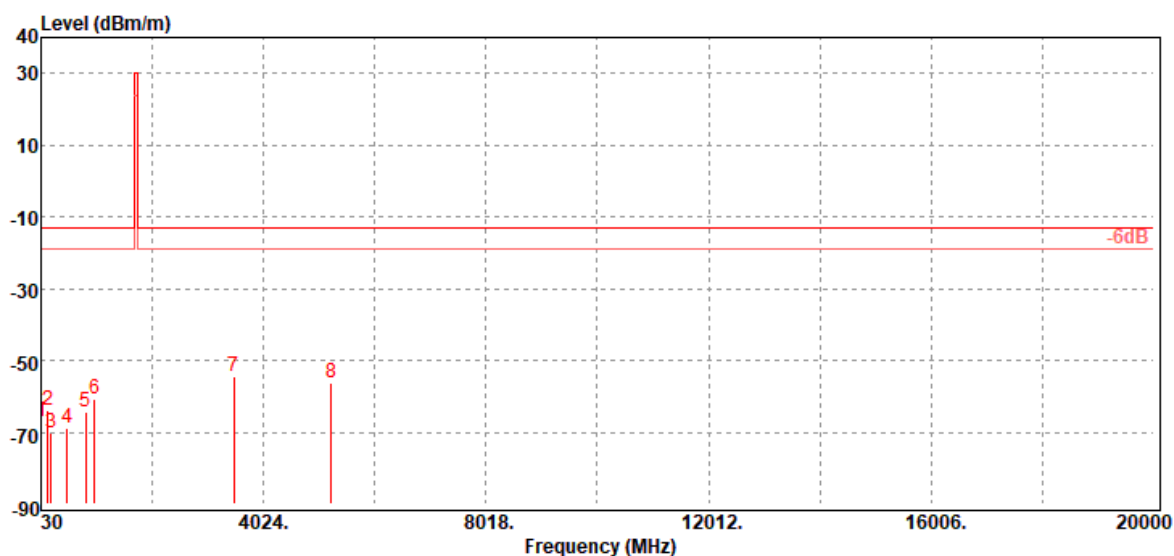
Test Date: December 29, 2020

Temperature: 20.4°C

Tested by: Jerry Chang

Humidity: 66% 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)
32.91	-66.99	-39.33	-27.19	-0.47	-13.00	-53.99	V
149.31	-63.90	-55.73	-7.17	-1.00	-13.00	-50.90	V
209.45	-70.28	-66.91	-2.18	-1.19	-13.00	-57.28	V
500.45	-68.76	-64.90	-1.99	-1.87	-13.00	-55.76	V
830.25	-64.26	-60.34	-1.50	-2.42	-13.00	-51.26	V
985.45	-60.94	-56.88	-1.40	-2.66	-13.00	-47.94	V
3490.00	-54.37	-61.36	12.54	-5.55	-13.00	-41.37	V
5235.00	-56.35	-62.70	13.14	-6.79	-13.00	-43.35	V

Operation Mode: Tx / High CH

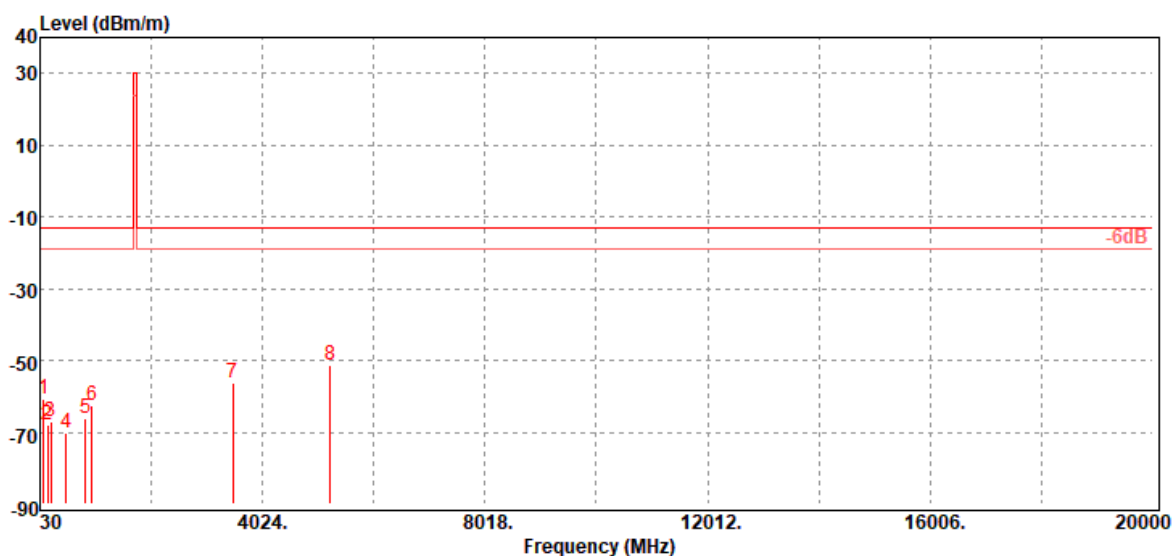
Test Date: December 29, 2020

Temperature: 20.4°C

Tested by: Jerry Chang

Humidity: 66% 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)
100.81	-60.66	-51.38	-8.46	-0.82	-13.00	-47.66	H
168.71	-68.12	-61.62	-5.43	-1.07	-13.00	-55.12	H
221.09	-67.27	-64.07	-1.98	-1.22	-13.00	-54.27	H
495.60	-70.31	-66.45	-2.00	-1.86	-13.00	-57.31	H
844.80	-66.00	-62.15	-1.40	-2.45	-13.00	-53.00	H
956.35	-62.75	-58.90	-1.23	-2.62	-13.00	-49.75	H
3490.00	-56.40	-63.39	12.54	-5.55	-13.00	-43.40	H
5235.00	-51.38	-57.73	13.14	-6.79	-13.00	-38.38	H

- End of Test Report -