

FCC 47 CFR PART 27 SUBPART L

For

Computer

Model No.: DMS-SJ03

Trade Name: ADVANTECH

Issued to

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

Issued by

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 21, 2017	Initial Issue	ALL	Allison Chen
01	November 14, 2017	1. Revised section 7.2 2. Revised section 7.6 3. Revised section 7.8	P.19, P.52, P.109	Angel Cheng
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1. TEST RESULT CERTIFICATION

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

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

Equipment Under Test: Computer

Trade Name: ADVANTECH

Model: DMS-SJ03

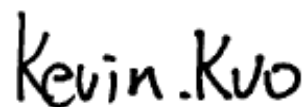
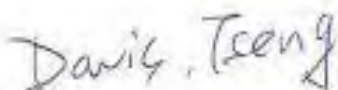
Date of Test: August 10 ~ 18, 2017

APPLICABLE STANDARDS	
Standard	TEST RESULT
FCC Part 27, Subpart C	No non-compliance noted

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

Approved by

Tested by



Davis Tseng
Sr. Engineer
Compliance Certification Services Inc.

Kevin Kuo
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer	
Model No.	DMS-SJ03	
Model Discrepancy	N/A	
Trade Name	ADVANTECH	
Received Date	August 31, 2017	
Power Supply	Powered from host device: DC 12V	
Modulation Technology	LTE Band 4	QPSK, 16QAM
Frequency Range	LTE Band 4 Channel Bandwidth: 1.4MHz	1710.7MHz ~1754.2MHz
	LTE Band 4 Channel Bandwidth: 3MHz	1711.5MHz ~ 1753.4MHz
	LTE Band 4 Channel Bandwidth: 5MHz	1712.5MHz ~1752.5MHz
	LTE Band 4 Channel Bandwidth: 10MHz	1715.0MHz ~1750.0MHz
	LTE Band 4 Channel Bandwidth: 15MHz	1717.5MHz ~ 1747.5MHz
	LTE Band 4 Channel Bandwidth: 20MHz	1720MHz ~1745MHz
Maximum EIRP Power	LTE Band 4 Channel Bandwidth: 1.4MHz	QPSK: 23.39dBm 16QAM: 22.45dBm
	LTE Band 4 Channel Bandwidth: 3MHz	QPSK: 23.40dBm 16QAM: 22.46dBm
	LTE Band 4 Channel Bandwidth: 5MHz	QPSK: 23.41dBm 16QAM: 22.47dBm
	LTE Band 4 Channel Bandwidth: 10MHz	QPSK: 23.44dBm 16QAM: 22.50dBm
	LTE Band 4 Channel Bandwidth: 15MHz	QPSK: 23.46dBm 16QAM: 22.52dBm
	LTE Band 4 Channel Bandwidth: 20MHz	QPSK: 23.52dBm 16QAM: 22.57dBm
Antenna Specification	PIFA Antenna LTE Band 4: Gain: 2.97dBi	

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.

3. TEST METHODOLOGY

3.1 DESCRIPTION OF TEST TYPE

The EUT (model: DMS-SJ03) 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 channel (L)	19957	1710.7	19965	1711.5	19975	1712.5
Middle channel (M)	20175	1732.5	20175	1732.5	20175	1732.5
High channel (H)	20393	1754.3	20384	1753.4	20375	1752.5

Channel Bandwidth	10MHz		15MHz		20MHz	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low channel (L)	20000	1715.0	20025	1717.5	20050	1720.0
Middle channel (M)	20175	1732.5	20175	1732.5	20175	1732.5
High channel (H)	20350	1750.0	20325	1747.5	20300	1745.0

For test mode:

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

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

3.1.1 The worst mode of measurement

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	DC 12V
Test Mode	Mode 1: EUT power by DC Source via cable.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☒ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

Remark:

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

4. INSTRUMENT CALIBRATION

4.1 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.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

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

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Base Station	Anritsu	MT-8820C	6201240043	07/11/2017	07/10/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017
Spectrum Analyzer	R&S	FSU 20Hz....26.5GHz	100258	07/27/2017	07/26/2018
Power Meter	Anritsu	ML2495A	1149001	12/06/2016	12/05/2017
Power Sensor	Anritsu	MA2411B	1126148	12/06/2016	12/05/2017

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Base Station	Anritsu	MT-8820C	6201240043	07/10/2017	07/11/2018
Bi-Log Antenna	TESEQ	CBL 6112D	35404	08/07/2017	08/06/2018
Double Ridged BroadBand Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-285	04/25/2017	04/24/2018
Double Ridged Guide Horn Antenna	ETS • LINDGREN	3117	00078732	07/06/2017	07/05/2018
Horn Antenna	COM-POWER	AH-840	03077	12/02/2016	12/01/2017
Pre-Amplifier	EMCI	EMC001625	980243	04/11/2017	04/10/2018
Pre-Amplifier	COM-POWER	PAM-118A	551043	04/11/2017	04/10/2018
PSA Series Spectrum Analyzer	Agilent	E4446A	MY48250064	04/20/2017	04/19/2018

4.3 MEASUREMENT UNCERTAINTY

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

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

- ☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
- ☐ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan, R.O.C
- ☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan, R.O.C
- ☒ No.989-1, Wenshan Rd., Shangshan Village, Qionglin Township, Hsinchu County 30741, Taiwan, R.O.C

5.2 EQUIPMENT

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

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

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

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

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

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

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable
1	DC Power Source	Agilent	E3640A	N/A	N/A	DC Cable 1.5m shielding
2	NB(D)	ASUS	A8J	R31018	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.

7. TEST PROCEDURE AND RESULT

7.1 OUTPUT POWER MEASUREMENT

TEST PROCEDURES

CONDUCTED POWER MEASUREMENT:

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

TEST RESULTS**LTE Band 4**

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 4	1.4M	19957	1710.7	QPSK	1	0	0	23.37	0.21727
					1	2	0	23.11	0.20464
					1	5	0	22.89	0.19454
					3	0	1	22.50	0.17783
					3	1	1	22.16	0.16444
					3	2	1	21.99	0.15812
					6	0	1	22.47	0.17660
				16QAM	1	0	1	22.38	0.17298
					1	2	1	22.32	0.17061
					1	5	1	21.96	0.15704
					3	0	2	21.34	0.13614
					3	1	2	21.21	0.13213
					3	2	2	21.11	0.12912
					6	0	2	21.04	0.12706
		20175	1732.5	QPSK	1	0	0	23.04	0.20137
					1	2	0	23.19	0.20845
					1	5	0	23.05	0.20184
					3	0	1	22.09	0.16181
					3	1	1	22.29	0.16943
					3	2	1	22.17	0.16482
					6	0	1	22.09	0.16181
				16QAM	1	0	1	22.17	0.16482
					1	2	1	22.24	0.16749
					1	5	1	22.12	0.16293
					3	0	2	22.07	0.16106
					3	1	2	22.16	0.16444
					3	2	2	21.53	0.14223
					6	0	2	21.33	0.13583
		20392	1754.2	QPSK	1	0	0	23.39	0.21827
					1	2	0	23.35	0.21627
					1	5	0	23.04	0.20137
					3	0	1	22.53	0.17906
					3	1	1	22.52	0.17865
					3	2	1	22.17	0.16482
					6	0	1	22.41	0.17418
				16QAM	1	0	1	22.39	0.17338
					1	2	1	22.22	0.16672
					1	5	1	22.09	0.16181
					3	0	2	22.45	0.17579
					3	1	2	22.37	0.17258
					3	2	2	21.07	0.12794
					6	0	2	21.04	0.12706

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 4	3M	19965	1711.5	QPSK	1	0	0	23.38	0.21777
					1	7	0	23.12	0.20512
					1	14	0	22.90	0.19498
					8	0	1	22.51	0.17824
					8	4	1	22.17	0.16482
					8	7	1	22.00	0.15849
					15	0	1	22.48	0.17701
				16QAM	1	0	1	22.39	0.17338
					1	7	1	22.33	0.17100
					1	14	1	21.97	0.15740
					8	0	2	21.35	0.13646
					8	4	2	21.22	0.13243
					8	7	2	21.12	0.12942
					15	0	2	21.05	0.12735
		20175	1732.5	QPSK	1	0	0	23.05	0.20184
					1	7	0	23.20	0.20893
					1	14	0	23.06	0.20230
					8	0	1	22.10	0.16218
					8	4	1	22.30	0.16982
					8	7	1	22.18	0.16520
					15	0	1	22.10	0.16218
				16QAM	1	0	1	22.18	0.16520
					1	7	1	22.25	0.16788
					1	14	1	22.13	0.16331
					8	0	2	22.08	0.16144
					8	4	2	22.17	0.16482
					8	7	2	21.54	0.14256
					15	0	2	21.34	0.13614
		20384	1753.4	QPSK	1	0	0	23.40	0.21878
					1	7	0	23.36	0.21677
					1	14	0	23.05	0.20184
					8	0	1	22.54	0.17947
					8	4	1	22.53	0.17906
					8	7	1	22.18	0.16520
					15	0	1	22.42	0.17458
				16QAM	1	0	1	22.40	0.17378
					1	7	1	22.23	0.16711
					1	14	1	22.10	0.16218
					8	0	2	22.46	0.17620
					8	4	2	22.38	0.17298
					8	7	2	21.08	0.12823
					15	0	2	21.05	0.12735

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 4	5M	19975	1712.5	QPSK	1	0	0	23.40	0.21878
					1	12	0	23.14	0.20606
					1	24	0	22.92	0.19588
					12	0	1	22.53	0.17906
					12	6	1	22.19	0.16558
					12	11	1	22.02	0.15922
					25	0	1	22.50	0.17783
				16QAM	1	0	1	22.41	0.17418
					1	12	1	22.35	0.17179
					1	24	1	21.99	0.15812
					12	0	2	21.37	0.13709
					12	6	2	21.24	0.13305
					12	11	2	21.14	0.13002
					25	0	2	21.07	0.12794
		20175	1732.5	QPSK	1	0	0	23.06	0.20230
					1	12	0	23.21	0.20941
					1	24	0	23.07	0.20277
					12	0	1	22.11	0.16255
					12	6	1	22.31	0.17022
					12	11	1	22.19	0.16558
					25	0	1	22.11	0.16255
				16QAM	1	0	1	22.19	0.16558
					1	12	1	22.26	0.16827
					1	24	1	22.14	0.16368
					12	0	2	22.09	0.16181
					12	6	2	22.18	0.16520
					12	11	2	21.55	0.14289
					25	0	2	21.35	0.13646
		20375	1752.5	QPSK	1	0	0	23.41	0.21928
					1	12	0	23.37	0.21727
					1	24	0	23.06	0.20230
					12	0	1	22.55	0.17989
					12	6	1	22.54	0.17947
					12	11	1	22.19	0.16558
					25	0	1	22.43	0.17498
				16QAM	1	0	1	22.41	0.17418
					1	12	1	22.24	0.16749
					1	24	1	22.11	0.16255
					12	0	2	22.47	0.17660
					12	6	2	22.39	0.17338
					12	11	2	21.09	0.12853
					25	0	2	21.06	0.12764

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 4	10M	20000	1715.0	QPSK	1	0	0	23.41	0.21928
					1	24	0	23.15	0.20654
					1	49	0	22.93	0.19634
					25	0	1	22.54	0.17947
					25	12	1	22.20	0.16596
					25	24	1	22.03	0.15959
					50	0	1	22.51	0.17824
				16QAM	1	0	1	22.42	0.17458
					1	24	1	22.36	0.17219
					1	49	1	22.00	0.15849
					25	0	2	21.38	0.13740
					25	12	2	21.25	0.13335
					25	24	2	21.15	0.13032
					50	0	2	21.08	0.12823
		20175	1732.5	QPSK	1	0	0	23.08	0.20324
					1	24	0	23.23	0.21038
					1	49	0	23.09	0.20370
					25	0	1	22.13	0.16331
					25	12	1	22.33	0.17100
					25	24	1	22.21	0.16634
					50	0	1	22.13	0.16331
				16QAM	1	0	1	22.21	0.16634
					1	24	1	22.28	0.16904
					1	49	1	22.16	0.16444
					25	0	2	22.11	0.16255
					25	12	2	22.20	0.16596
					25	24	2	21.57	0.14355
					50	0	2	21.37	0.13709
		20350	1750.0	QPSK	1	0	0	23.44	0.22080
					1	24	0	23.40	0.21878
					1	49	0	23.09	0.20370
					25	0	1	22.58	0.18113
					25	12	1	22.57	0.18072
					25	24	1	22.22	0.16672
					50	0	1	22.46	0.17620
				16QAM	1	0	1	22.44	0.17539
					1	24	1	22.27	0.16866
					1	49	1	22.14	0.16368
					25	0	2	22.50	0.17783
					25	12	2	22.42	0.17458
					25	24	2	21.12	0.12942
					50	0	2	21.09	0.12853

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 4	15M	20025	1717.5	QPSK	1	0	0	23.44	0.22080
					1	37	0	23.18	0.20797
					1	74	0	22.96	0.19770
					36	0	1	22.57	0.18072
					36	18	1	22.23	0.16711
					36	35	1	22.06	0.16069
					75	0	1	22.54	0.17947
				16QAM	1	0	1	22.45	0.17579
					1	37	1	22.39	0.17338
					1	74	1	22.03	0.15959
					36	0	2	21.41	0.13836
					36	18	2	21.28	0.13428
					36	35	2	21.18	0.13122
					75	0	2	21.11	0.12912
		20175	1732.5	QPSK	1	0	0	23.10	0.20417
					1	37	0	23.25	0.21135
					1	74	0	23.11	0.20464
					36	0	1	22.15	0.16406
					36	18	1	22.35	0.17179
					36	35	1	22.23	0.16711
					75	0	1	22.15	0.16406
				16QAM	1	0	1	22.23	0.16711
					1	37	1	22.30	0.16982
					1	74	1	22.18	0.16520
					36	0	2	22.13	0.16331
					36	18	2	22.22	0.16672
					36	35	2	21.59	0.14421
					75	0	2	21.39	0.13772
		20325	1747.5	QPSK	1	0	0	23.46	0.22182
					1	37	0	23.42	0.21979
					1	74	0	23.11	0.20464
					36	0	1	22.60	0.18197
					36	18	1	22.59	0.18155
					36	35	1	22.24	0.16749
					75	0	1	22.48	0.17701
				16QAM	1	0	1	22.46	0.17620
					1	37	1	22.29	0.16943
					1	74	1	22.16	0.16444
					36	0	2	22.52	0.17865
					36	18	2	22.44	0.17539
					36	35	2	21.14	0.13002
					75	0	2	21.11	0.12912

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
Band 4	20M	20050	1720.0	QPSK	1	0	0	23.52	0.22491
					1	49	0	23.26	0.21184
					1	99	0	23.04	0.20137
					50	0	1	22.65	0.18408
					50	24	1	22.31	0.17022
					50	49	1	22.14	0.16368
					100	0	1	22.62	0.18281
				16QAM	1	0	1	22.53	0.17906
					1	49	1	22.47	0.17660
					1	99	1	22.11	0.16255
					50	0	2	21.49	0.14093
					50	24	2	21.36	0.13677
					50	49	2	21.26	0.13366
					100	0	2	21.19	0.13152
		20175	1732.5	QPSK	1	0	0	23.16	0.20701
					1	49	0	23.31	0.21429
					1	99	0	23.17	0.20749
					50	0	1	22.21	0.16634
					50	24	1	22.41	0.17418
					50	49	1	22.29	0.16943
					100	0	1	22.21	0.16634
				16QAM	1	0	1	22.29	0.16943
					1	49	1	22.36	0.17219
					1	99	1	22.24	0.16749
					50	0	2	22.19	0.16558
					50	24	2	22.28	0.16904
					50	49	2	21.65	0.14622
					100	0	2	21.45	0.13964
		20300	1745.0	QPSK	1	0	0	23.51	0.22439
					1	49	0	23.47	0.22233
					1	99	0	23.16	0.20701
					50	0	1	22.65	0.18408
					50	24	1	22.64	0.18365
					50	49	1	22.29	0.16943
					100	0	1	22.53	0.17906
				16QAM	1	0	1	22.51	0.17824
					1	49	1	22.34	0.17140
					1	99	1	22.21	0.16634
					50	0	2	22.57	0.18072
					50	24	2	22.49	0.17742
					50	49	2	21.19	0.13152
					100	0	2	21.16	0.13062

7.2 ERP & EIRP MEASUREMENT

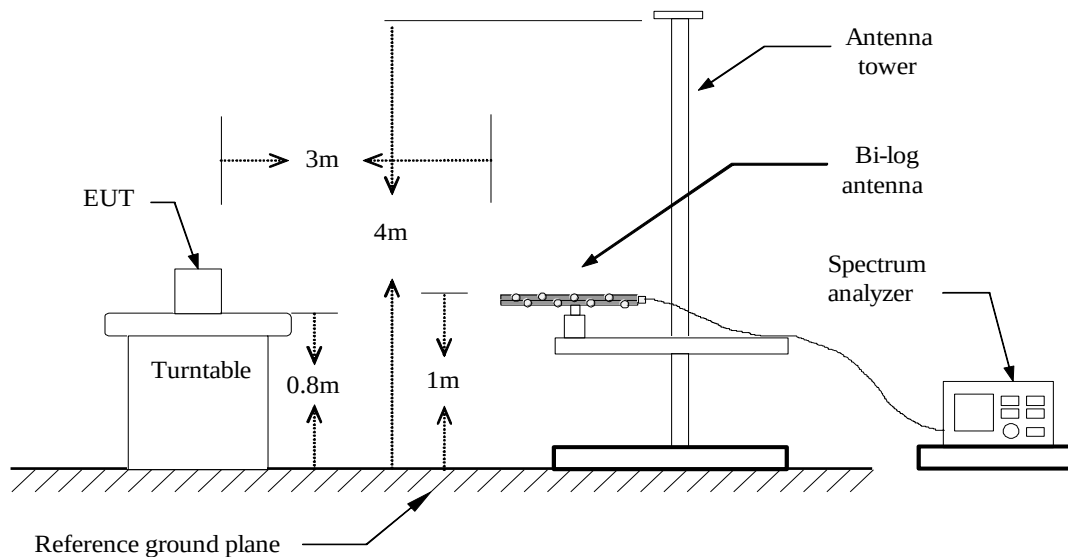
LIMIT

According to FCC §2.1046

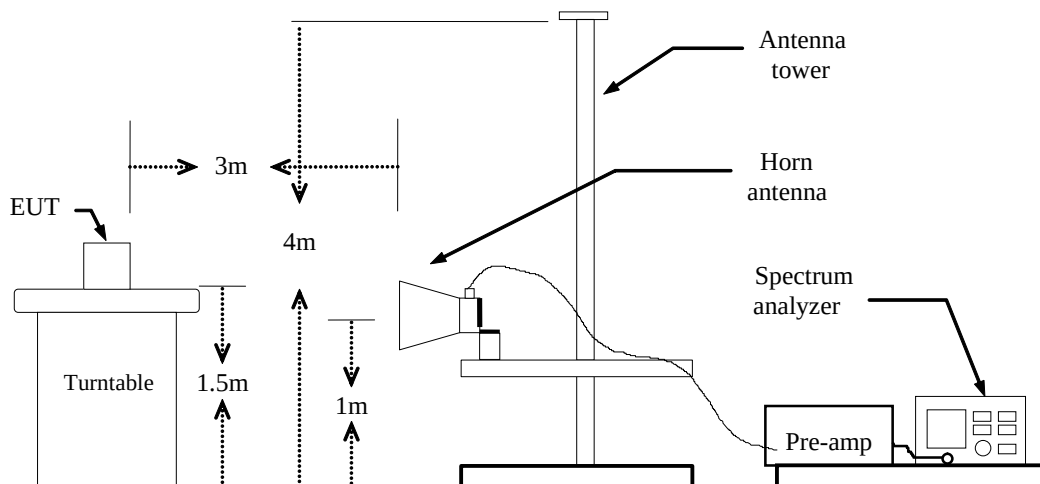
FCC 27.50 (d) (4): Fixed, mobile, and portable (handheld) stations operating in the 1710-1755MHz band and mobile and portable stations operating in the 1695-1710MHz and 1755-1780MHz bands are limited to 1 watt EIRP.

Test Configuration

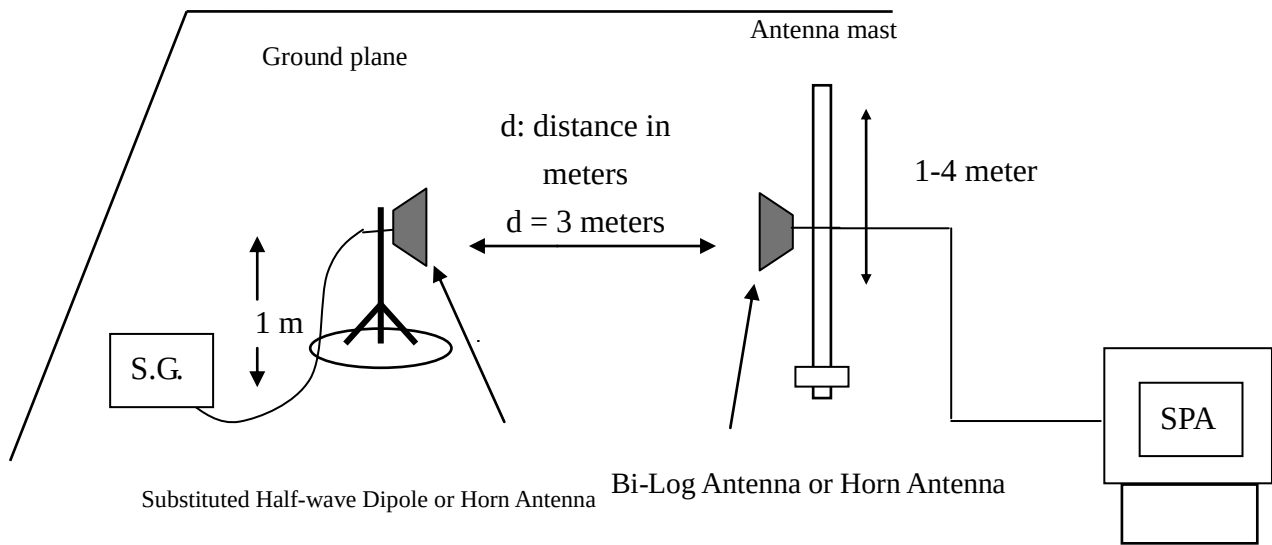
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and 1.5m for above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per photograph 5, KDB 971168 D01.
2. During the measurement, the call box parameters were set to get the maximum output power of the EUT. The maximum emission was recorded from spectrum analyzer power level (LVL) from 360 degrees rotation of turntable and the test antenna raised and lowered over a range from 1m to 4m in both horizontally and vertically polarized orientations.
3. EIRP was measured method according to TIA/EIA-603-D:2010. The EUT was replaced by the substitution antenna at same location, and then record the maximum Analyzer reading through raised and lowered the test antenna.

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

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

TEST RESULTS

No non-compliance noted.

ERP POWER**BW: 1.4MHz / RB=1, RB Offset=0**

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	1.4	Lowest	QPSK	1	0	26.39	0.435	27.31	0.538
		Middle		1	0	29.36	0.862	21.98	0.157
		Highest		1	0	25.77	0.377	28.23	0.665
		175 MHz Lowest	16 QAM	1	0	25.77	0.377	27.53	0.566
		Middle		1	0	23.98	0.250	27.80	0.602
		Highest		1	0	25.68	0.369	28.26	0.669

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	3	Lowest	QPSK	1	0	29.86	0.968	23.93	0.247
		Middle		1	0	28.59	0.722	22.69	0.185
		Highest		1	0	28.95	0.785	22.86	0.193
		175 MHz Lowest	16 QAM	1	0	29.58	0.907	23.90	0.245
		Middle		1	0	28.44	0.698	22.62	0.182
		Highest		1	0	28.82	0.762	23.14	0.206

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	5	Lowest	QPSK	1	0	29.21	0.833	24.97	0.314
		Middle		1	0	28.29	0.674	23.50	0.223
		Highest		1	0	28.80	0.758	24.34	0.271
		175 MHz Lowest	16 QAM	1	0	28.45	0.699	26.28	0.424
		Middle		1	0	27.72	0.591	24.98	0.314
		Highest		1	0	28.12	0.648	26.09	0.406

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	10	Lowest	QPSK	1	0	28.18	0.657	28.19	0.659
		Middle		1	0	26.41	0.437	26.36	0.432
		Highest		1	0	27.35	0.543	26.47	0.443
		175 MHz Lowest	16 QAM	1	0	28.15	0.653	28.08	0.642
		Middle		1	0	26.43	0.439	26.11	0.408
		Highest		1	0	27.59	0.574	26.32	0.428

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	15	Lowest	QPSK	1	0	26.21	0.417	27.82	0.605
		Middle		1	0	25.99	0.397	26.63	0.460
		Highest		1	0	26.61	0.458	26.60	0.457
		175 MHz Lowest	16 QAM	1	0	26.18	0.414	27.68	0.586
		Middle		1	0	25.91	0.389	26.49	0.445
		Highest		1	0	26.66	0.463	26.38	0.434

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	20	Lowest	QPSK	1	0	28.53	0.712	25.67	0.368
		Middle		1	0	28.31	0.677	25.65	0.367
		Highest		1	0	27.19	0.523	24.37	0.273
		175 MHz Lowest	16 QAM	1	0	28.61	0.726	25.89	0.388
		Middle		1	0	27.80	0.602	25.40	0.346
		Highest		1	0	27.00	0.501	24.35	0.272

7.3 FREQUENCY STABILITY MEASUREMENT

LIMIT

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

TEST PROCEDURE

Use Anritsu 8820 with frequency Error measurement capability.

Temp = -30 to +50°C

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

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

TEST RESULTS

FREQUENCY STABILITY V.S. TEMPERATURE MEASUREMENT:

LTE Band 4

Reference Frequency: LTE Band 4 Max Bandwidth QPSK, 1732.5MHz				
Limit: ± 2.5 ppm = 4331.25Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
12	50	0.05	0.000029	+/- 2.5
12	40	0.06	0.000035	
12	30	0.00	0.000003	
12	20	0.03	0.000017	
12	10	0.01	0.000006	
12	0	0.03	0.000017	
12	-10	0.02	0.000012	
12	-20	0.00	0.000000	

Reference Frequency: LTE Band 4 Max Bandwidth 16QAM, 1732.5MHz				
Limit: ± 2.5 ppm = 4331.25Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
12	50	0.06	0.000035	+/- 2.5
12	40	0.00	-0.000002	
12	30	-0.01	-0.000006	
12	20	0.01	0.000006	
12	10	0.02	0.000012	
12	0	0.01	0.000006	
12	-10	0.03	0.000017	
12	-20	0.05	0.000029	

FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:

LTE Band 4

Reference Frequency: LTE Band 4 Max Bandwidth QPSK, MHz				
Limit: ± 2.5 ppm = Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
10.2	20	0.02	0.000012	+/- 2.5
12	20	0.03	0.000017	
13.8	20	0.03	0.000017	

Reference Frequency: LTE Band 4 Max Bandwidth 16QAM, MHz				
Limit: ± 2.5 ppm = Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
10.2	20	0.02	0.000009	+/- 2.5
12	20	0.01	0.000006	
13.8	20	0.01	0.000008	

7.4 OCCUPIED BANDWIDTH MEASUREMENT

LIMITS

For Reporting purpose only.

TEST PROCEDURES

KDB 971168 D01 v02r02 - 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

LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK

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

CHANNEL BANDWIDTH: 3MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	2.6917

CHANNEL BANDWIDTH: 5MHz / QPSK

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

CHANNEL BANDWIDTH: 10MHz / QPSK

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

CHANNEL BANDWIDTH: 15MHz / QPSK

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

CHANNEL BANDWIDTH: 20MHz / QPSK

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

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

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

CHANNEL BANDWIDTH: 3MHz / 16QAM

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

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	4.4717

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	8.9146

CHANNEL BANDWIDTH: 15MHz / 16QAM

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

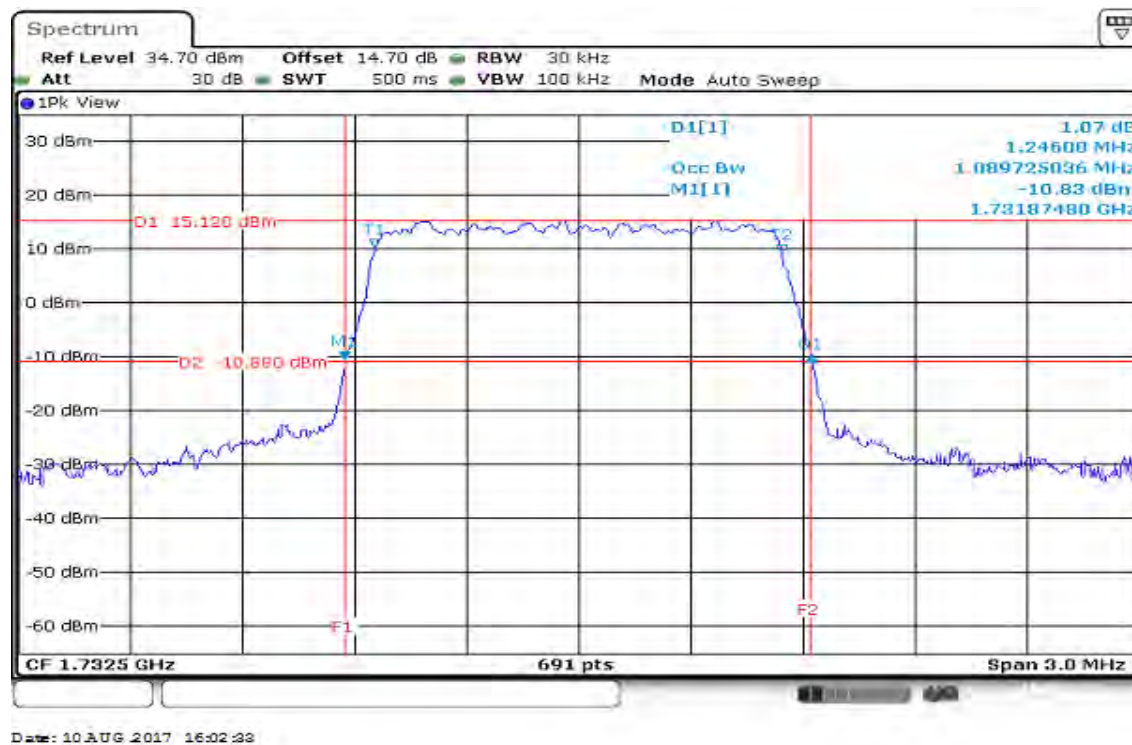
CHANNEL BANDWIDTH: 20MHz / 16QAM

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

LTE Band 4

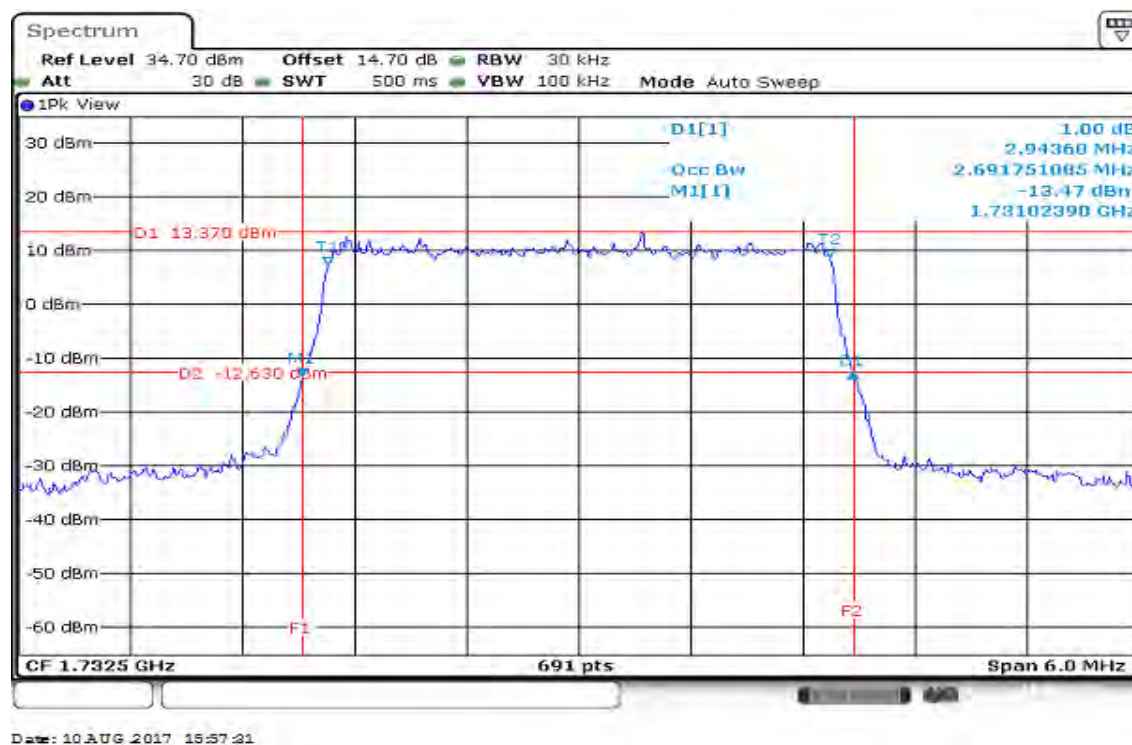
CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH Min



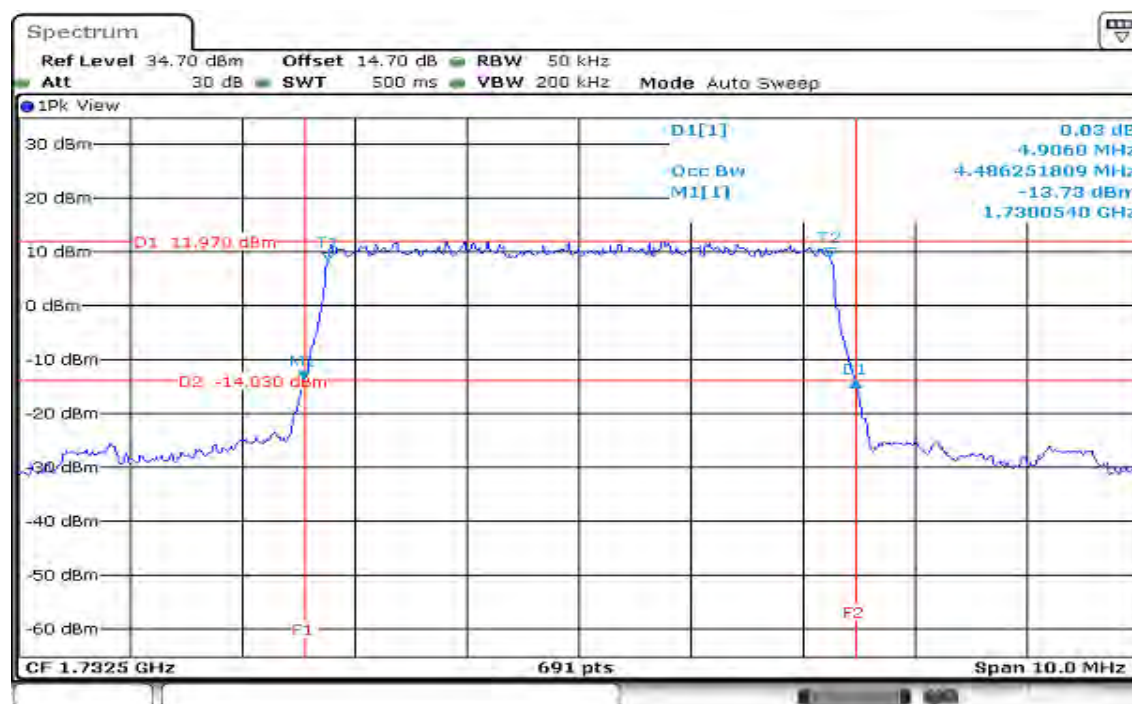
CHANNEL BANDWIDTH: 3MHz / QPSK

CH Min



CHANNEL BANDWIDTH: 5MHz / QPSK

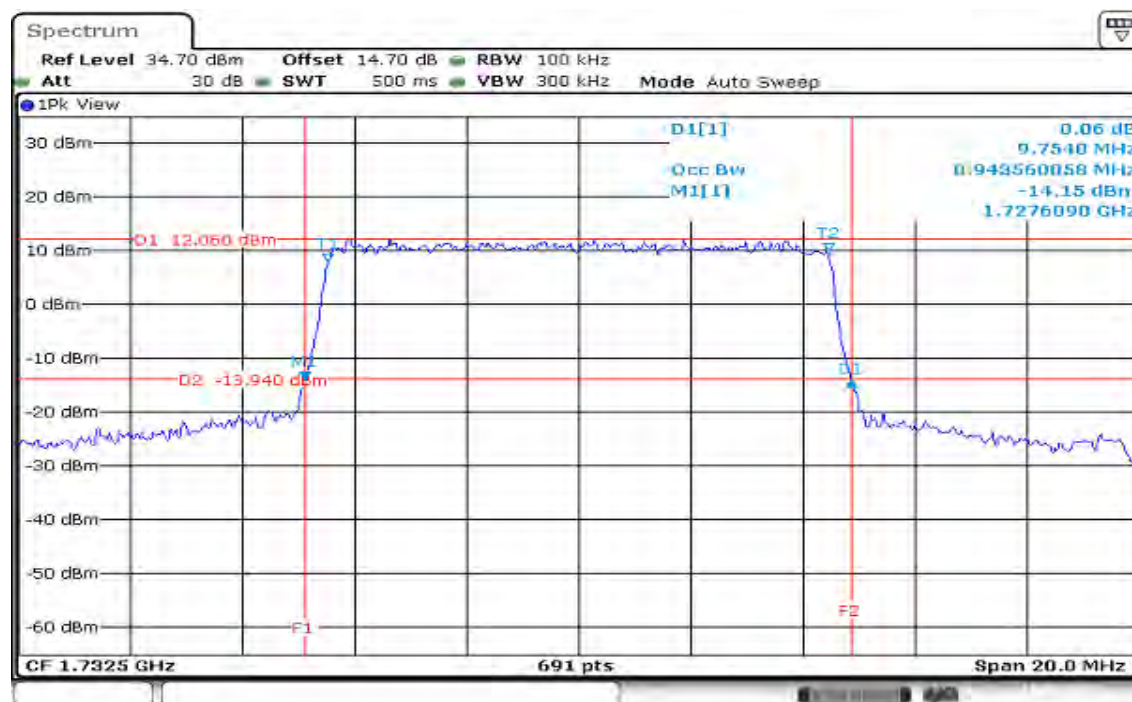
CH Min



Date: 10 AUG 2017 15:52:40

CHANNEL BANDWIDTH: 10MHz / QPSK

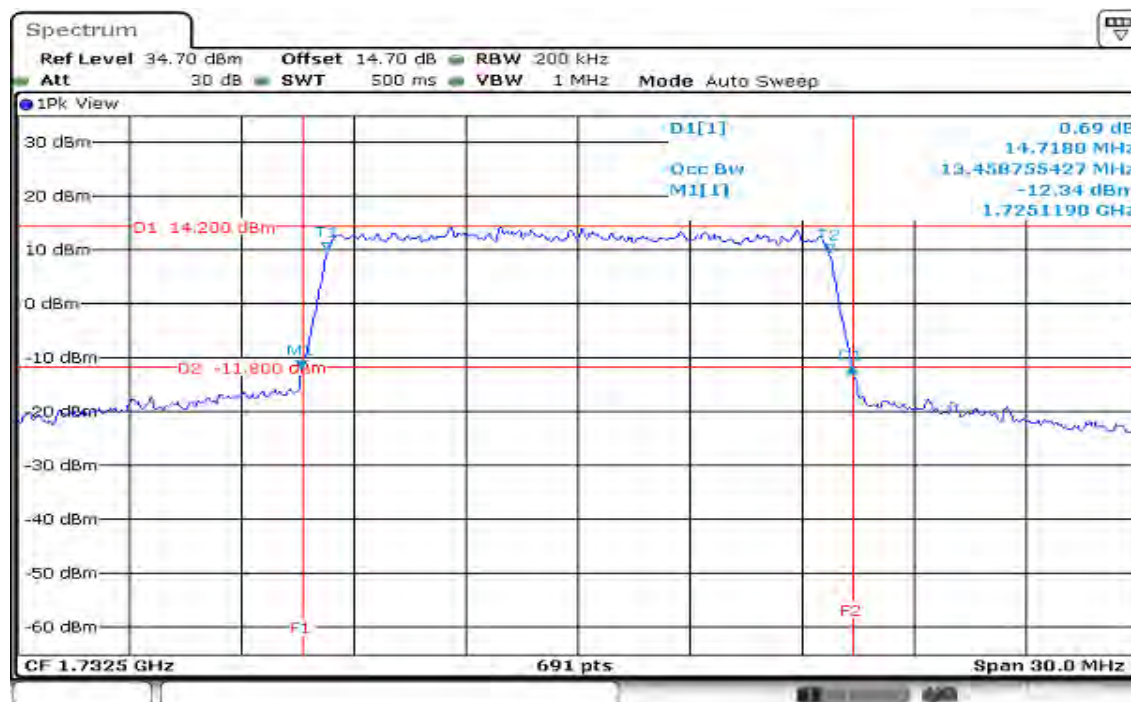
CH Min



Date: 10 AUG 2017 15:48:26

CHANNEL BANDWIDTH: 15MHz / QPSK

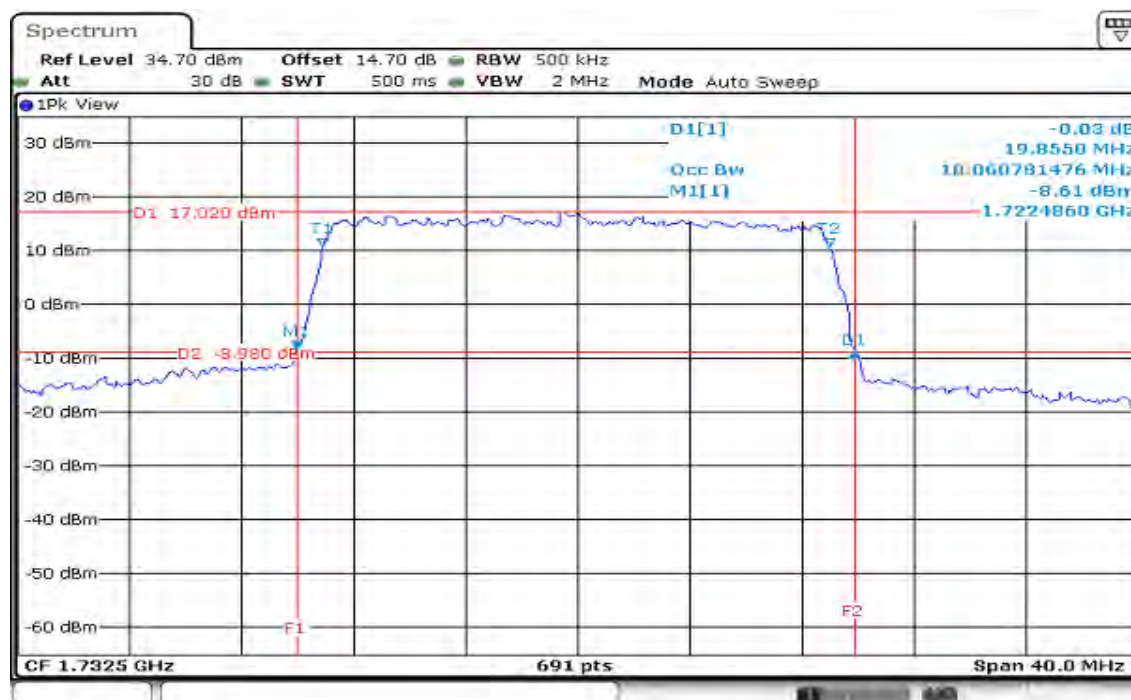
CH Min



Date: 10 AUG 2017 15:43:25

CHANNEL BANDWIDTH: 20MHz / QPSK

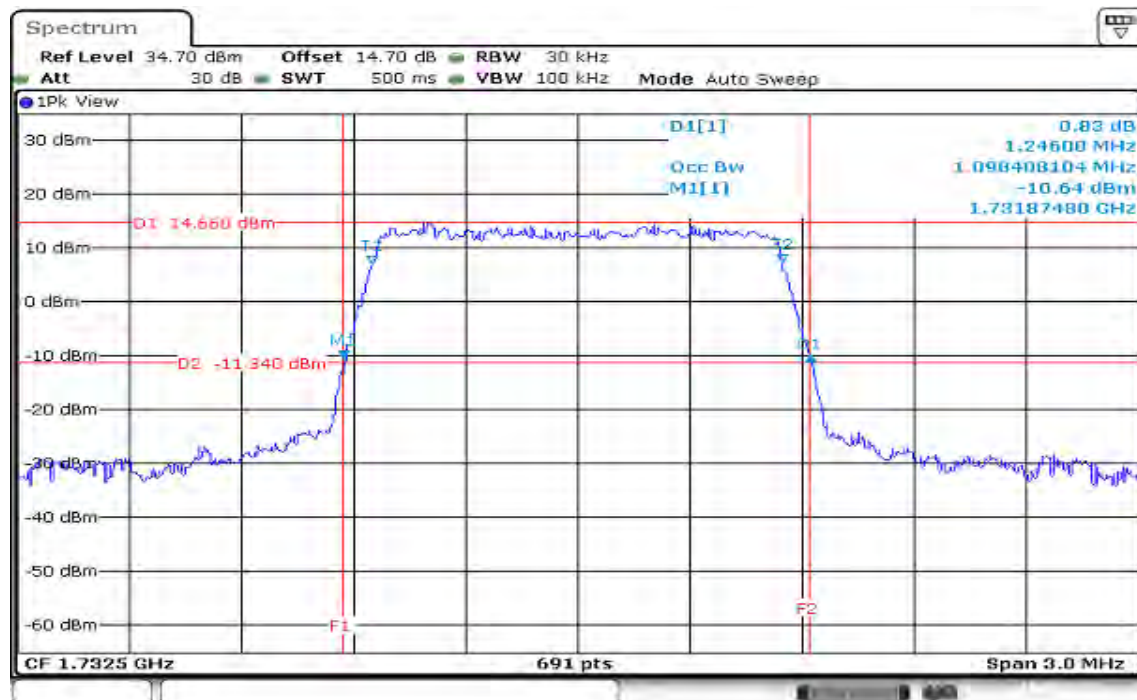
CH Min



Date: 10 AUG 2017 15:40:02

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

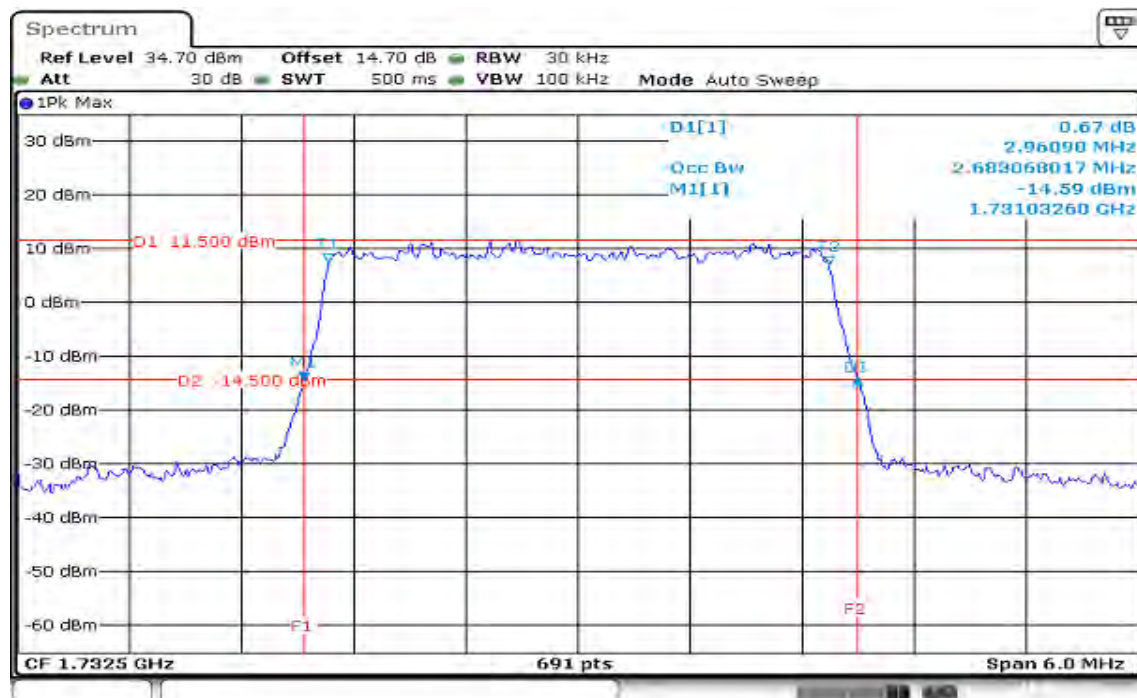
CH Min



Date: 10 AUG 2017 16:01:10

CHANNEL BANDWIDTH: 3MHz / 16QAM

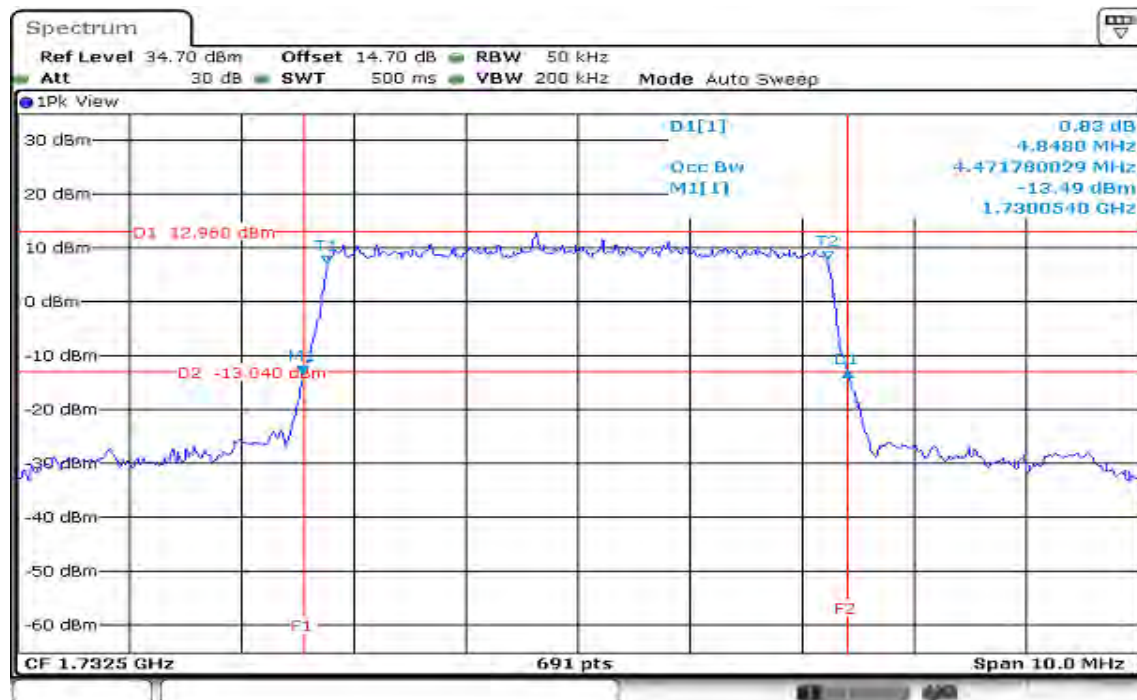
CH Min



Date: 10 AUG 2017 16:55:57

CHANNEL BANDWIDTH: 5MHz / 16QAM

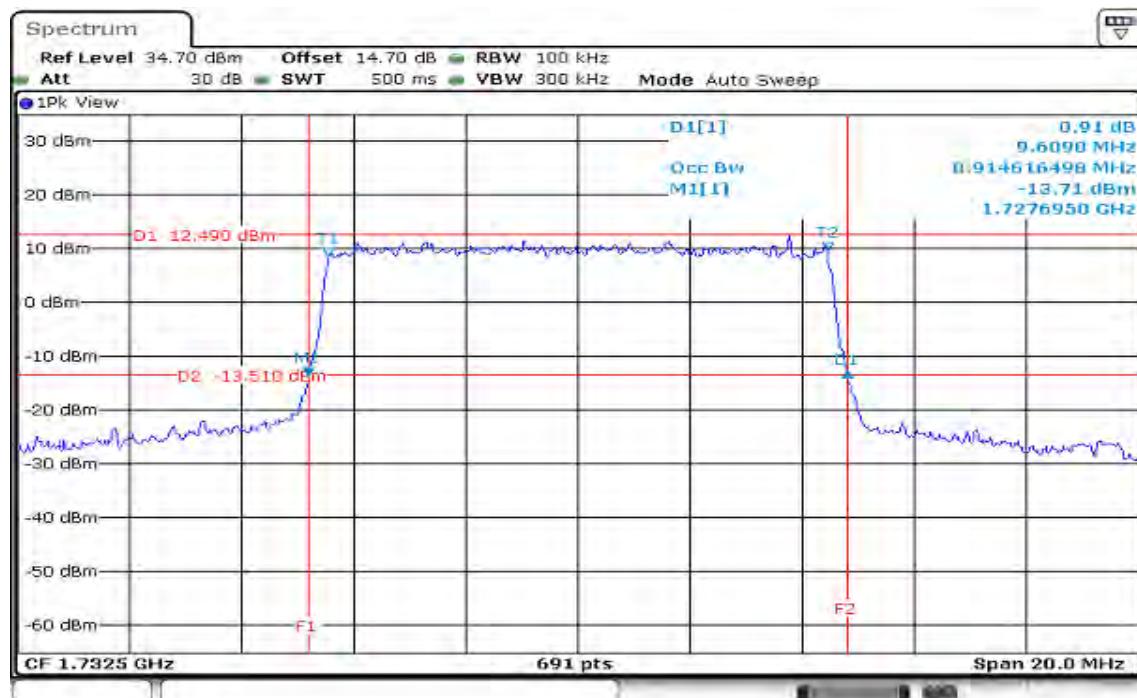
CH Min



Date: 10 AUG 2017 15:51:18

CHANNEL BANDWIDTH: 10MHz / 16QAM

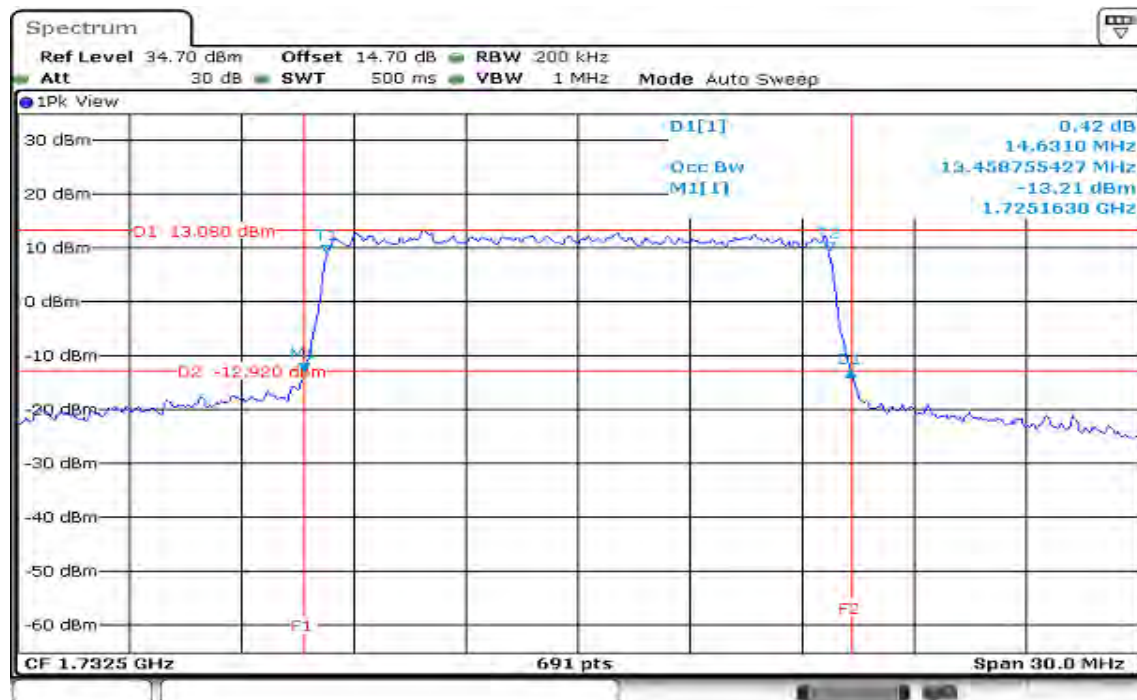
CH Min



Date: 10 AUG 2017 15:46:42

CHANNEL BANDWIDTH: 15MHz / 16QAM

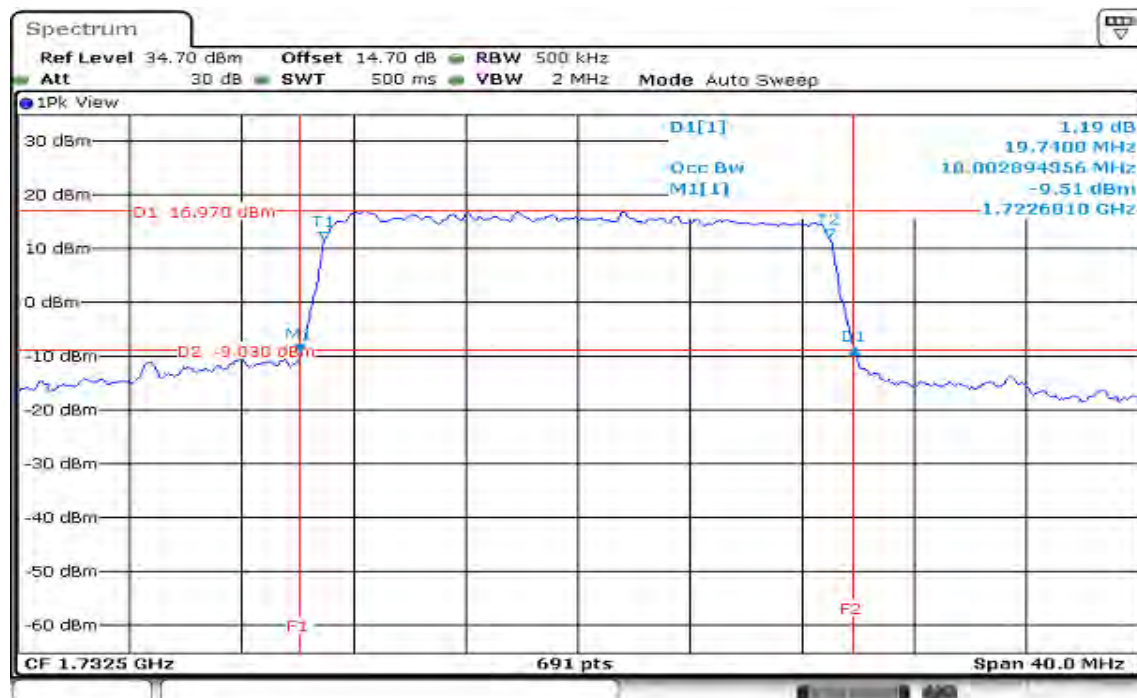
CH Min



Date: 10 AUG 2017 15:42:21

CHANNEL BANDWIDTH: 20MHz / 16QAM

CH Min



Date: 10 AUG 2017 15:44:51

7.5 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, photograph 5.7.1
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

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.81

CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	4.75

CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	4.75

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	4.75

CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	4.70

CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	4.70

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.45

CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.04

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.19

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.07

CHANNEL BANDWIDTH: 15MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.45

CHANNEL BANDWIDTH: 20MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	4.93

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB

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

CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.59

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.57

CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.54

CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.36

CHANNEL BANDWIDTH: 20MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.68

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	6.32

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.97

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	6.09

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	6.06

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

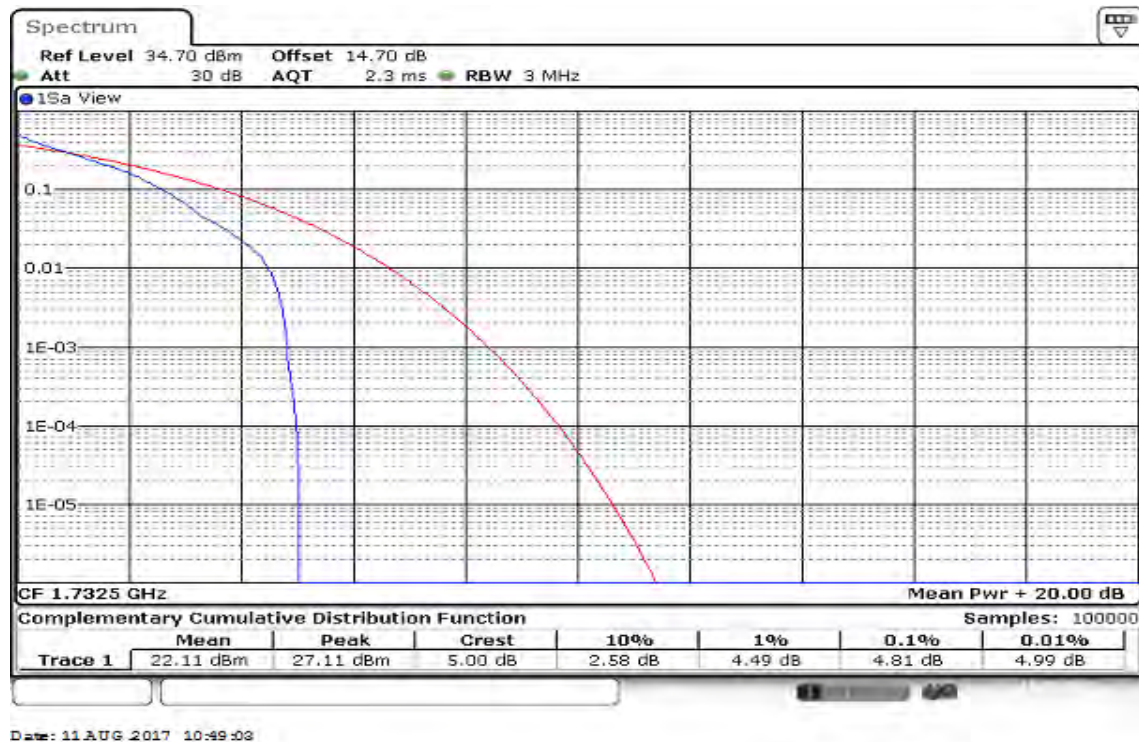
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	6.20

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

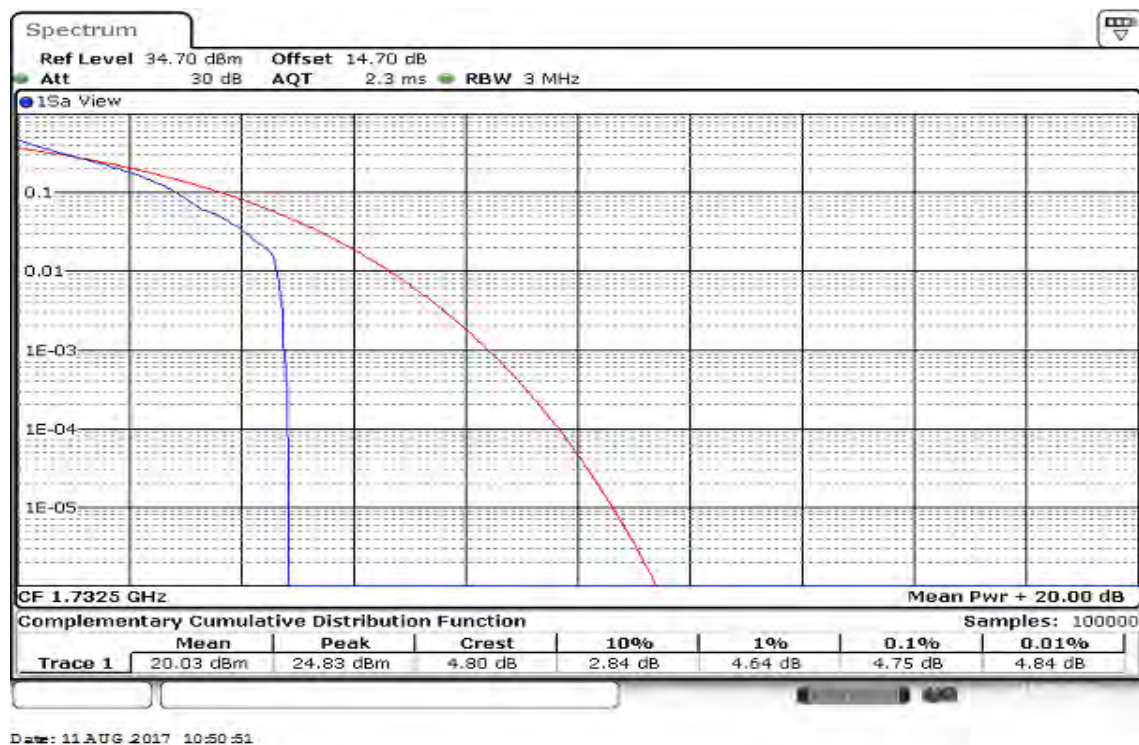
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.97

LTE Band 4

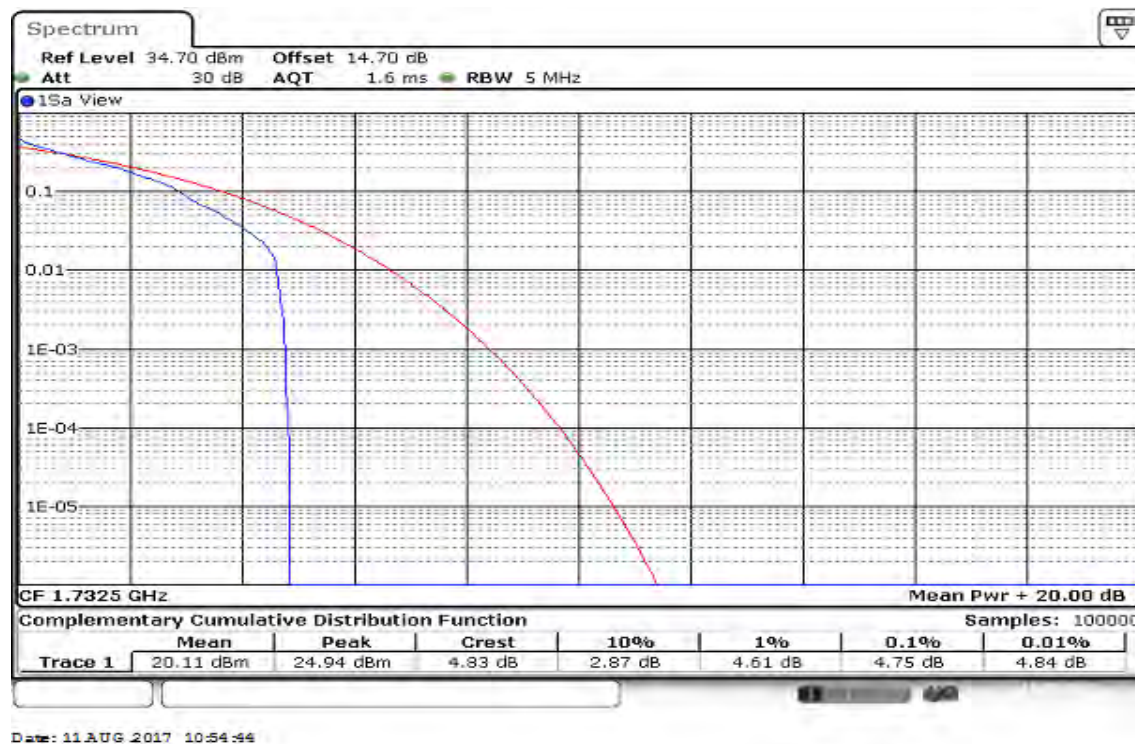
CHANNEL BANDWIDTH: 1.4MHz / QPSK/1RB



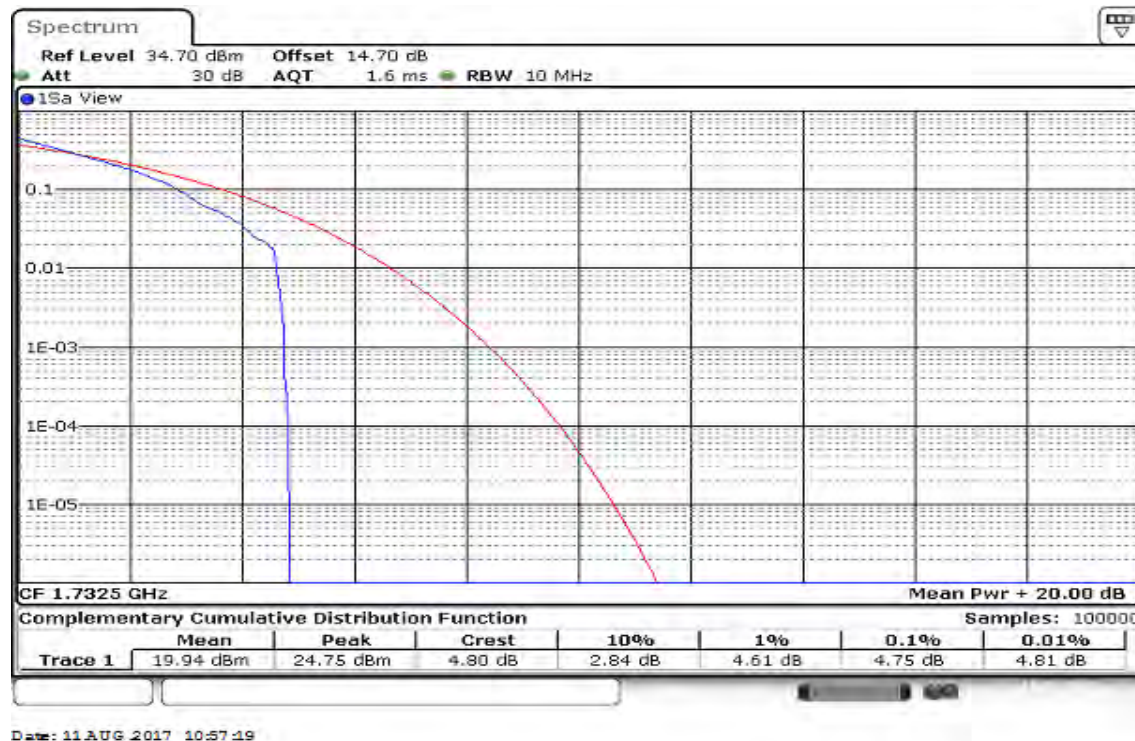
CHANNEL BANDWIDTH: 3MHz / QPSK /1RB



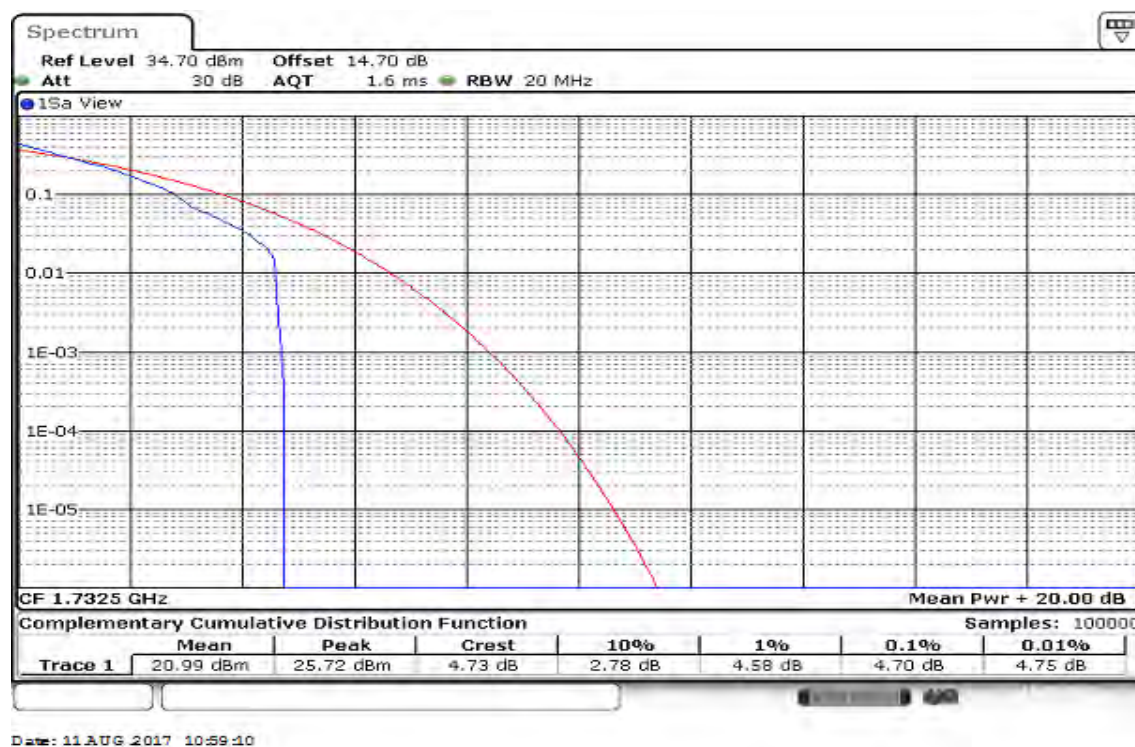
CHANNEL BANDWIDTH: 5MHz / QPSK/1RB



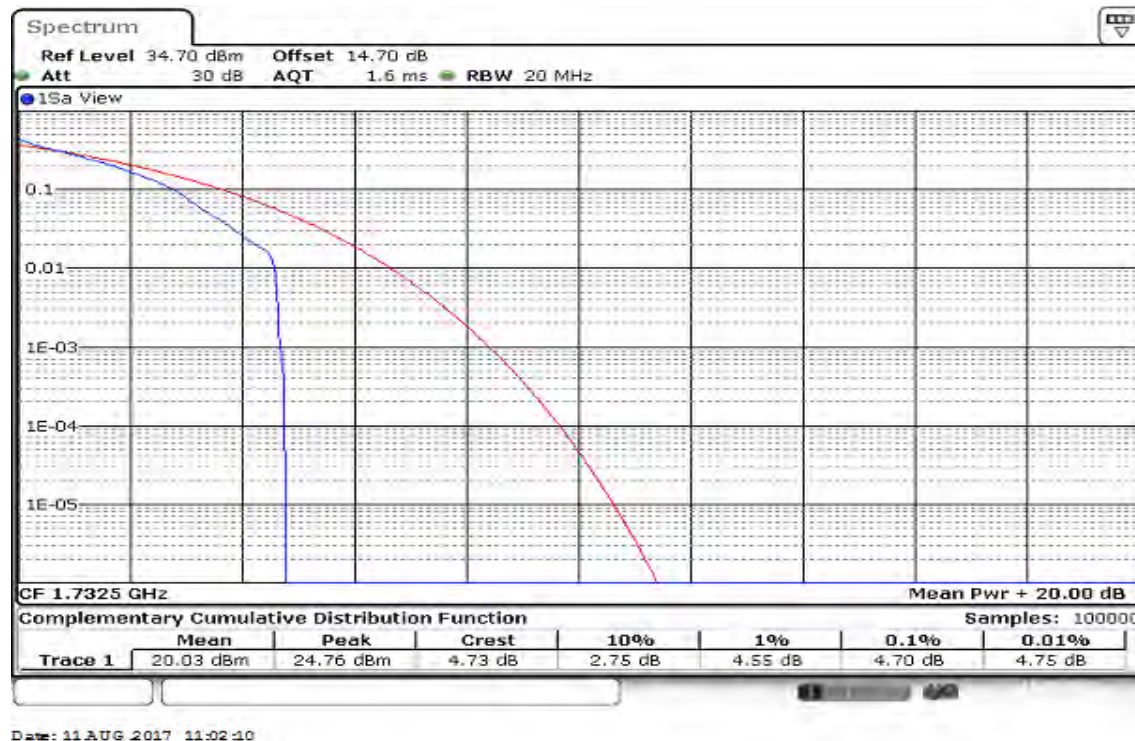
CHANNEL BANDWIDTH: 10MHz / QPSK /1RB



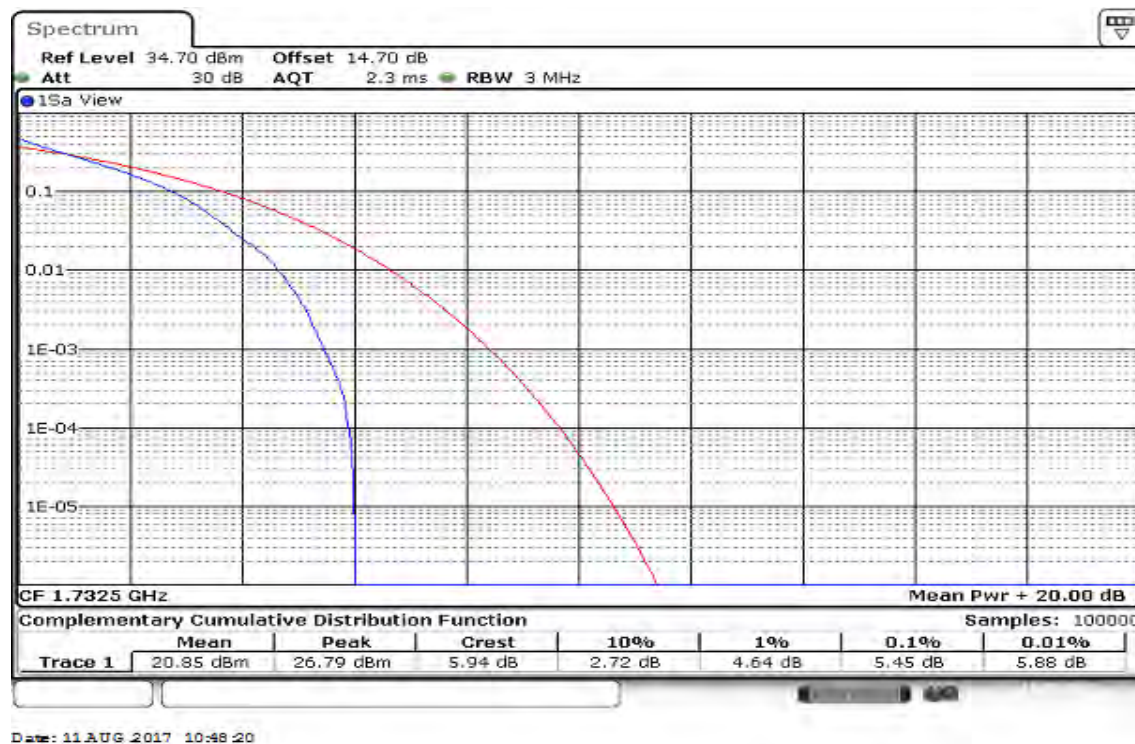
CHANNEL BANDWIDTH: 15MHz / QPSK/1RB



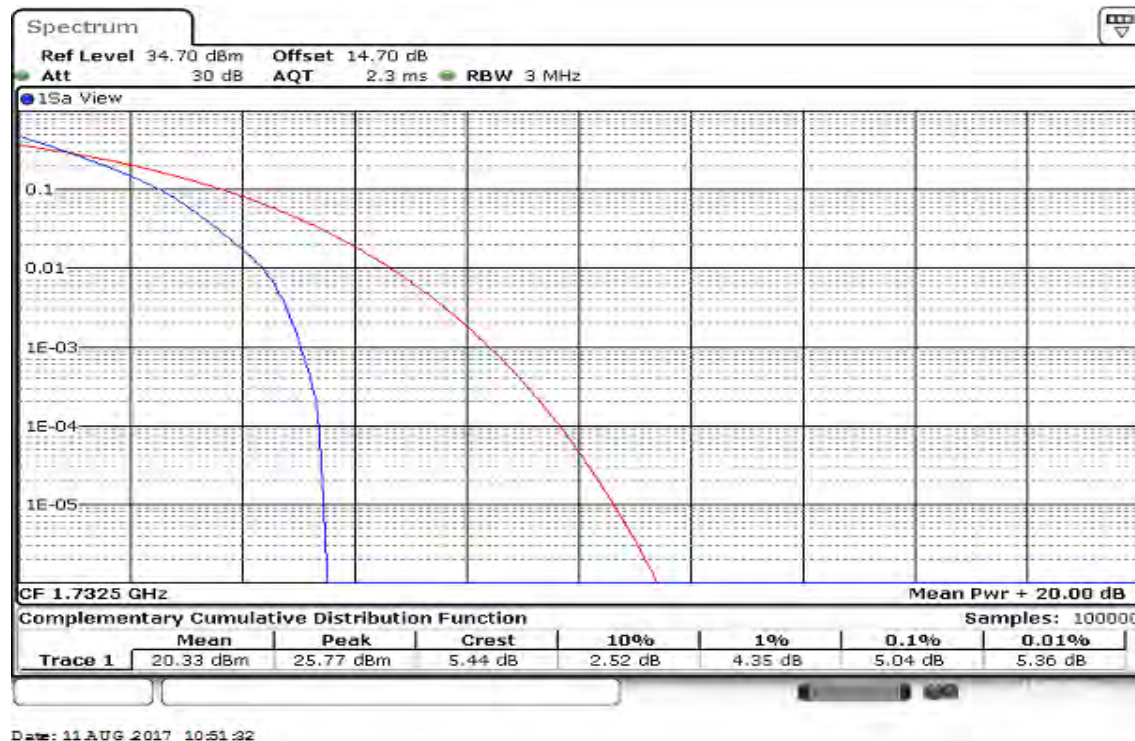
CHANNEL BANDWIDTH: 20MHz / QPSK /1RB



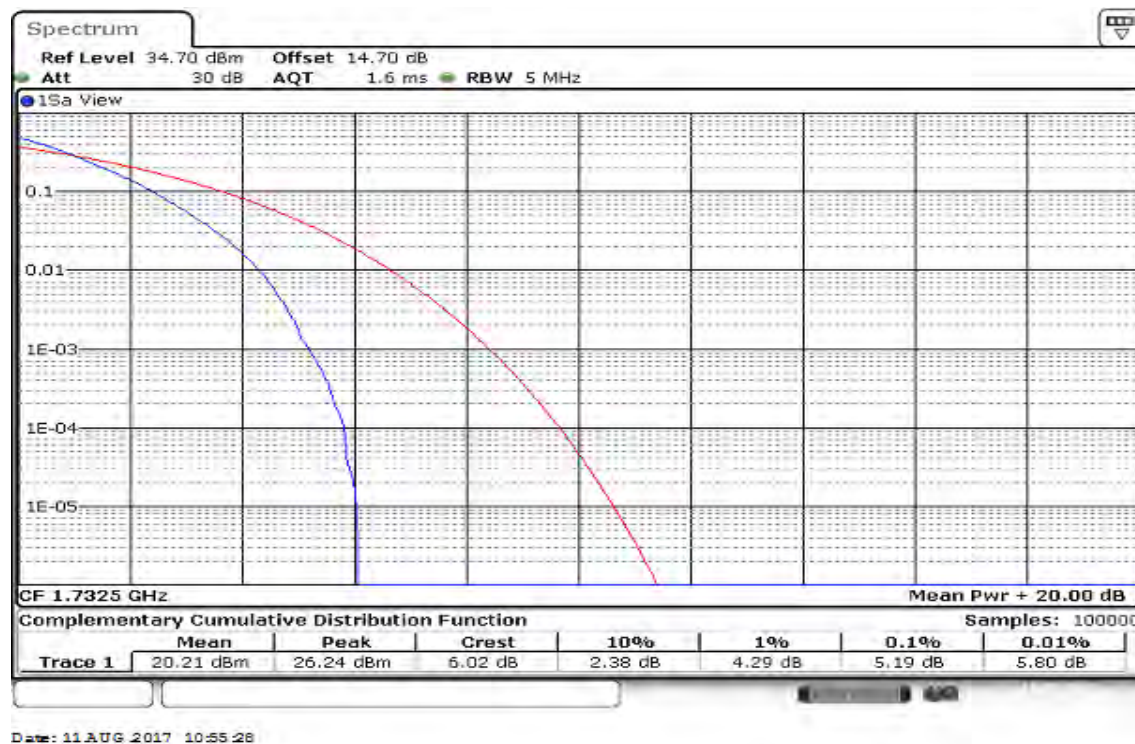
CHANNEL BANDWIDTH: 1.4MHz / QPSK/100%RB



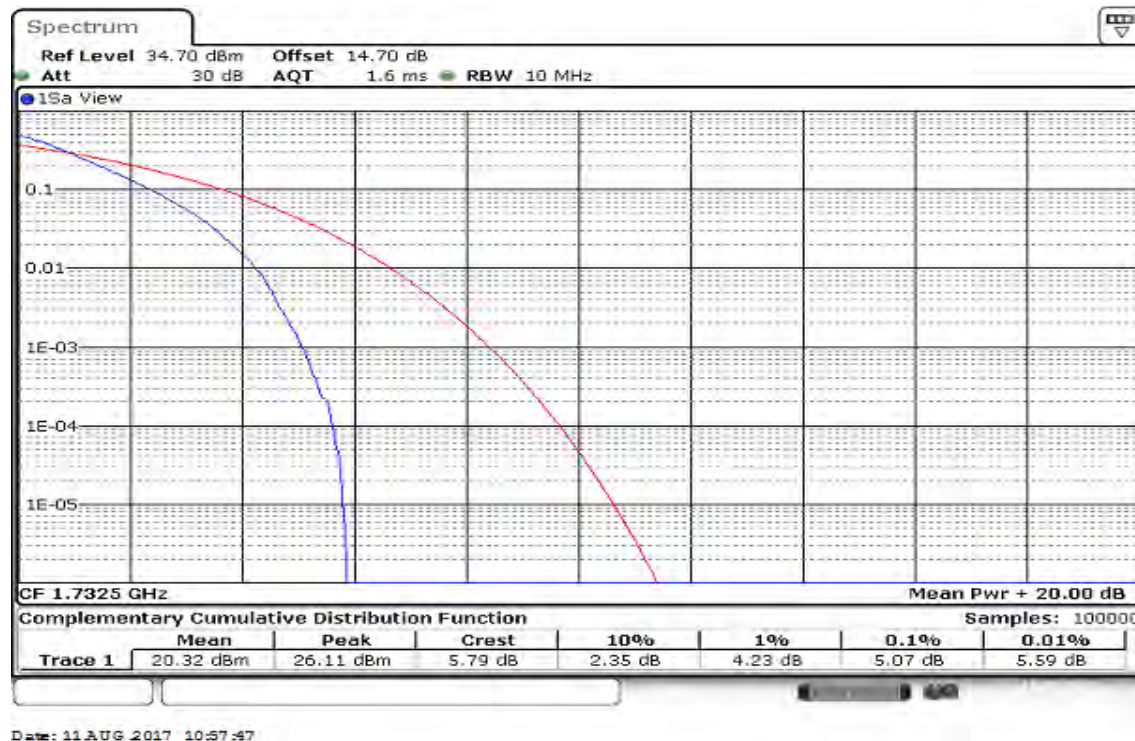
CHANNEL BANDWIDTH: 3MHz / QPSK /100%RB



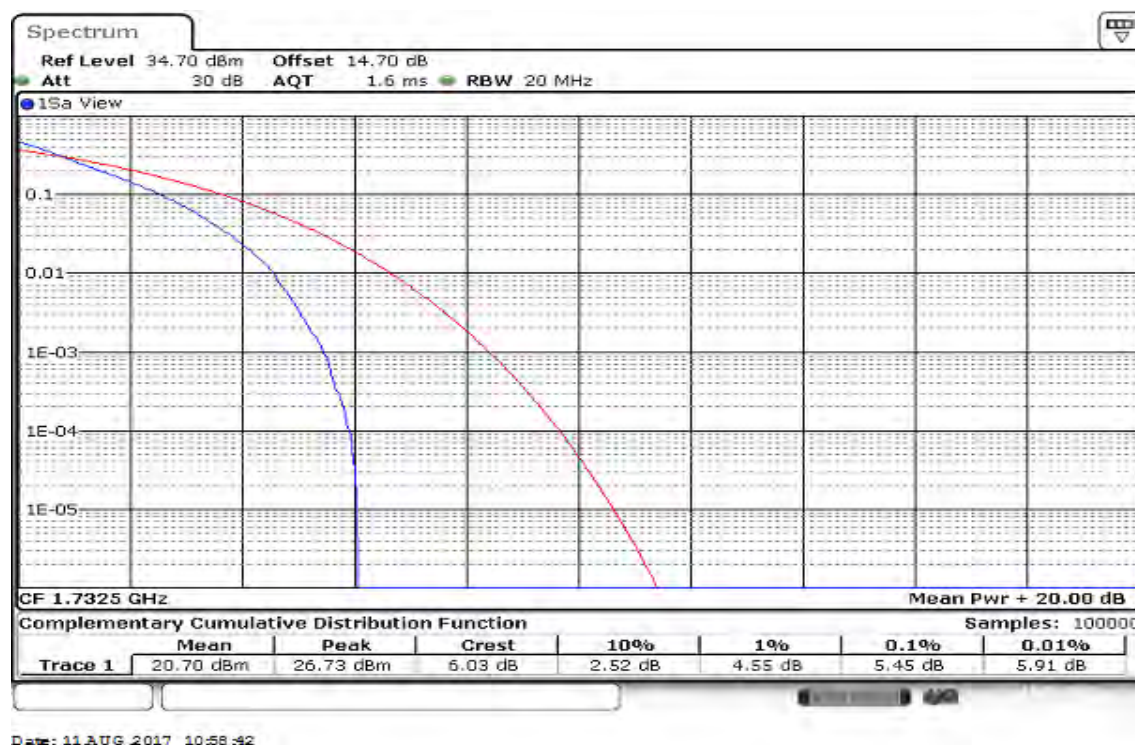
CHANNEL BANDWIDTH: 5MHz / QPSK/100%RB



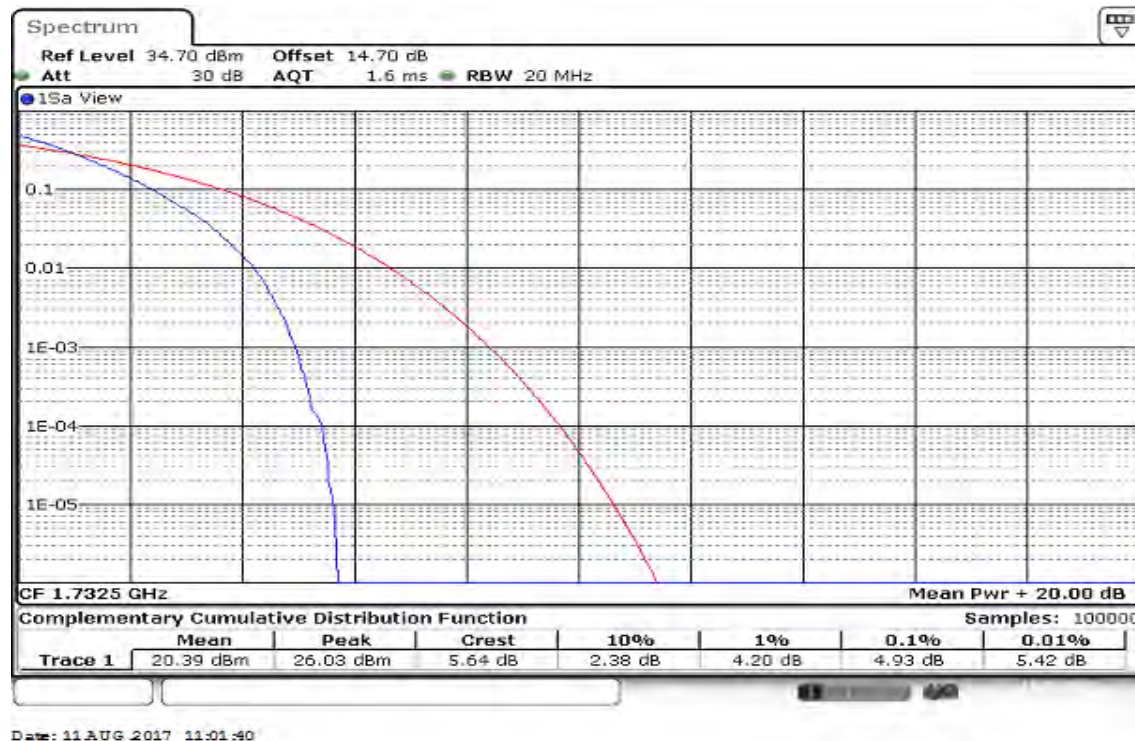
CHANNEL BANDWIDTH: 10MHz / QPSK /100%RB



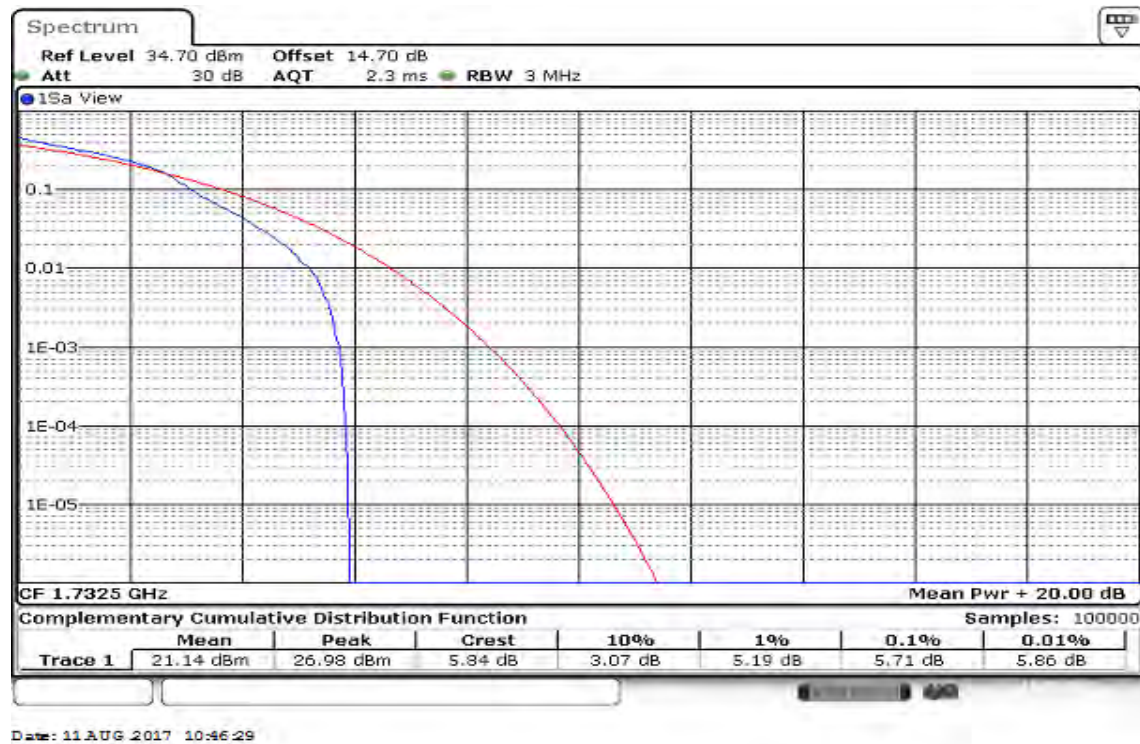
CHANNEL BANDWIDTH: 15MHz / QPSK/100%RB



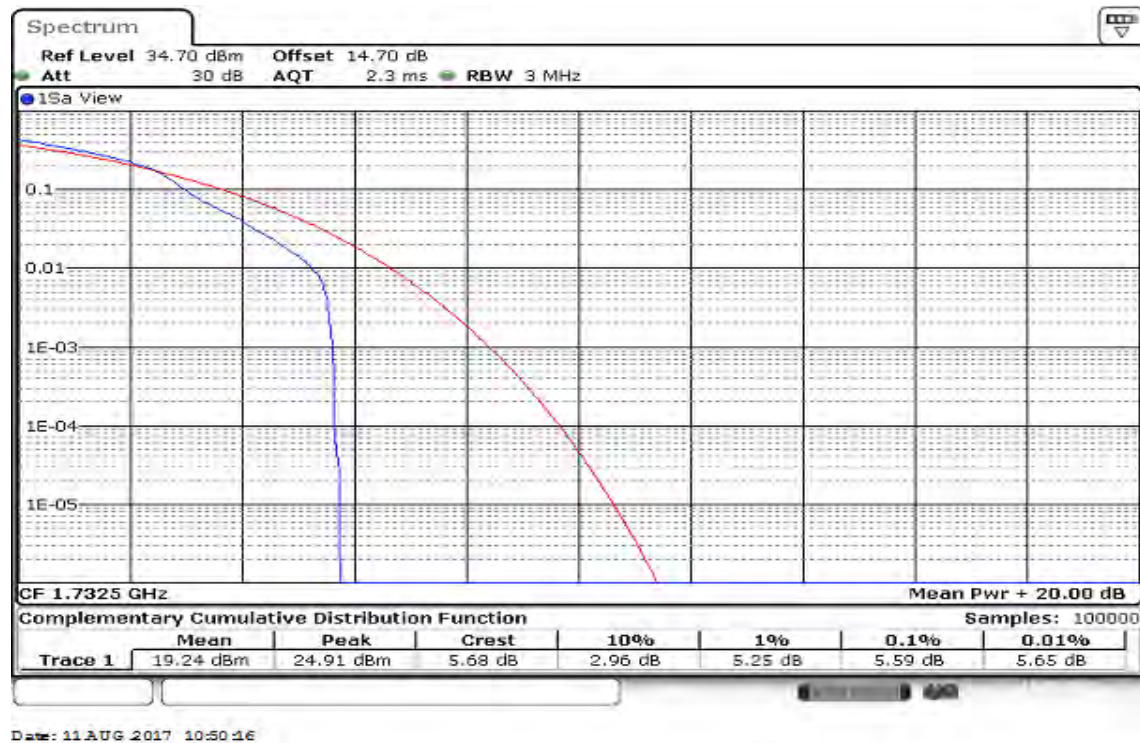
CHANNEL BANDWIDTH: 20MHz / QPSK /100%RB



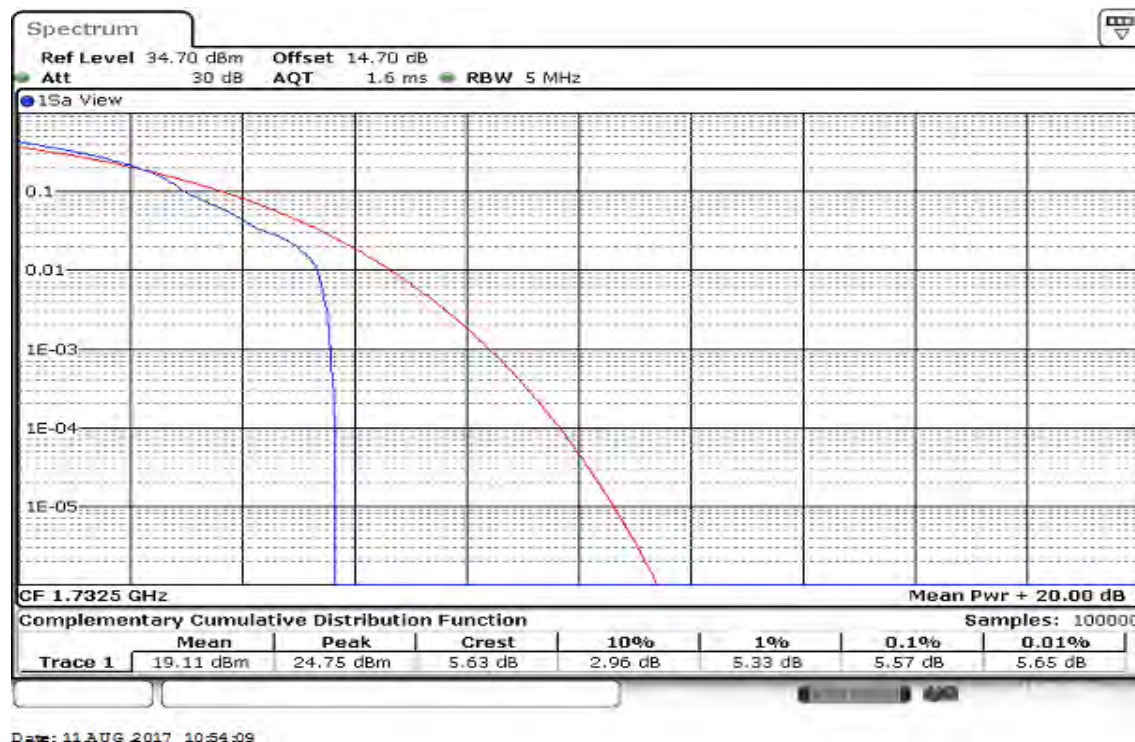
CHANNEL BANDWIDTH: 1.4MHz / 16QAM/1RB



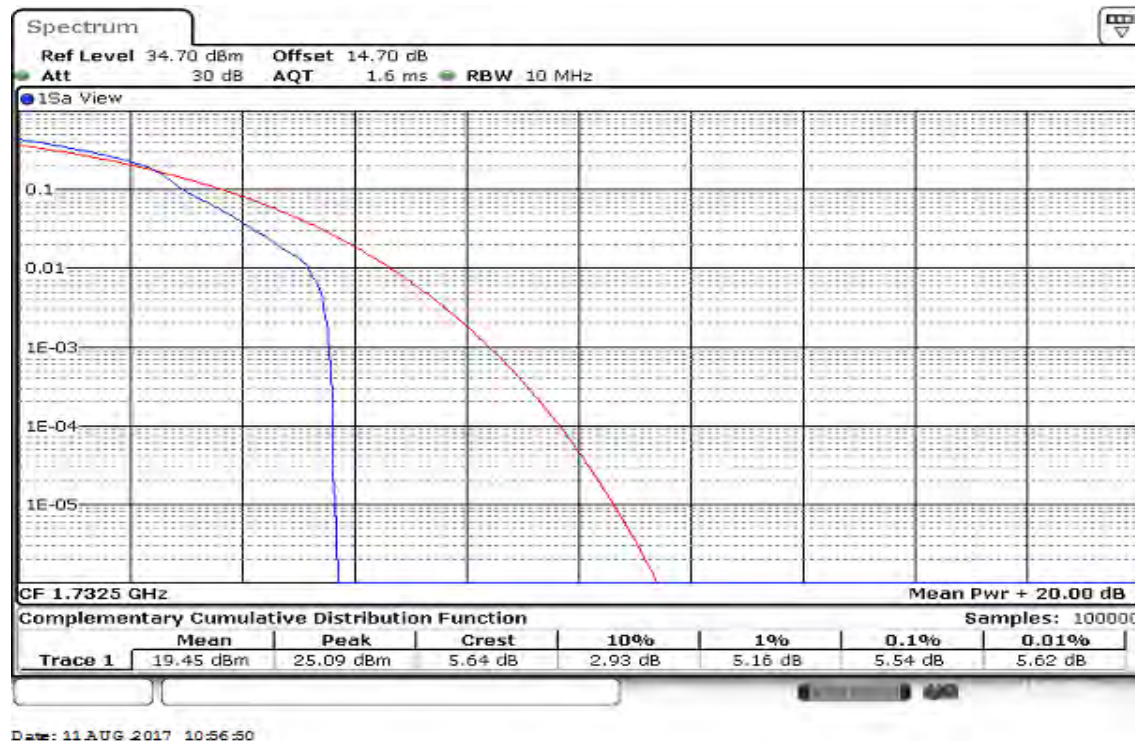
CHANNEL BANDWIDTH: 3MHz / 16QAM /1RB



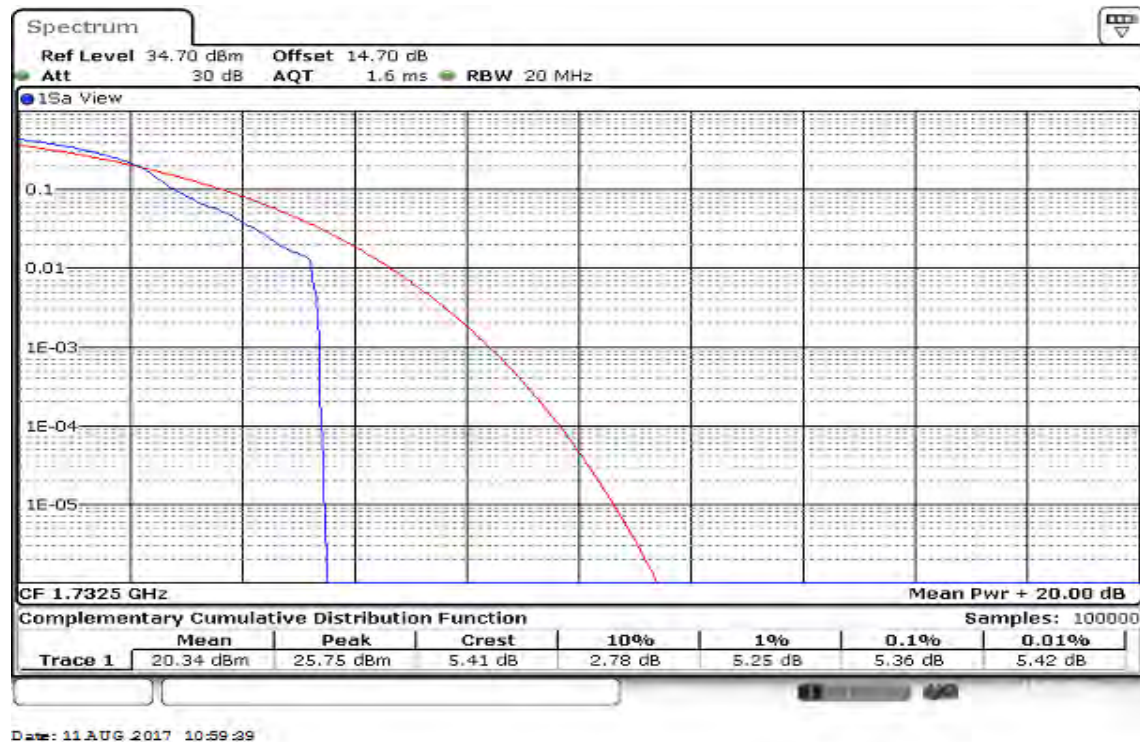
CHANNEL BANDWIDTH: 5MHz / 16QAM /1RB



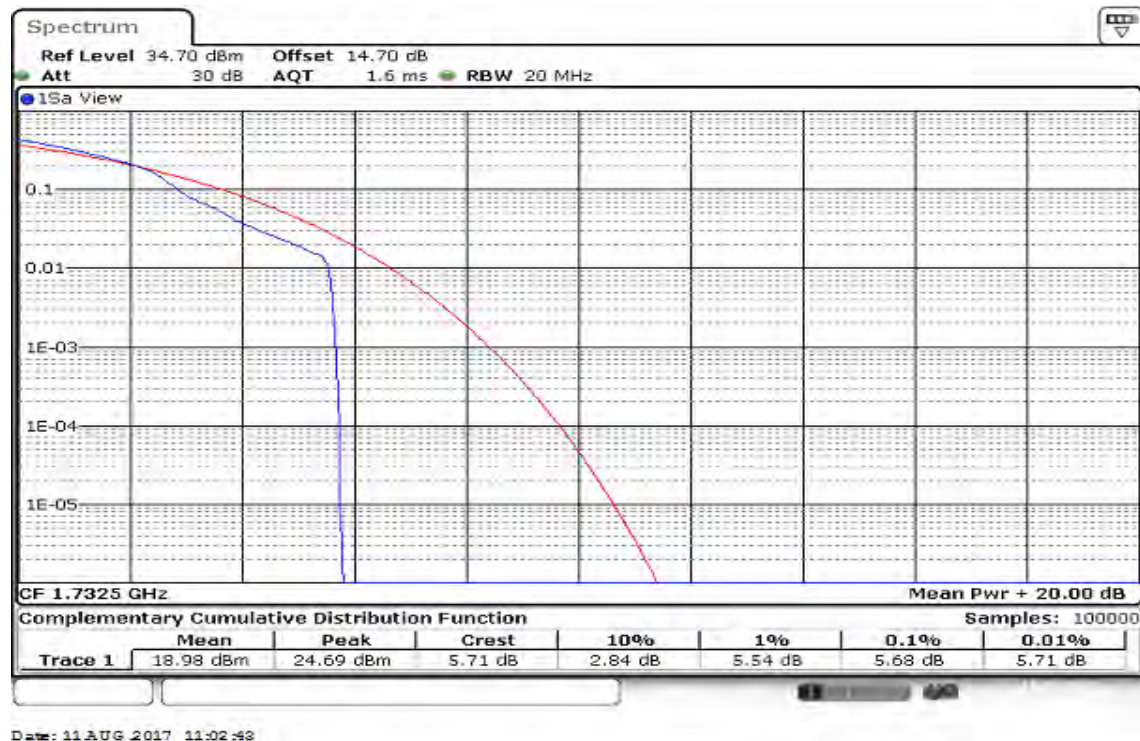
CHANNEL BANDWIDTH: 10MHz / 16QAM /1RB



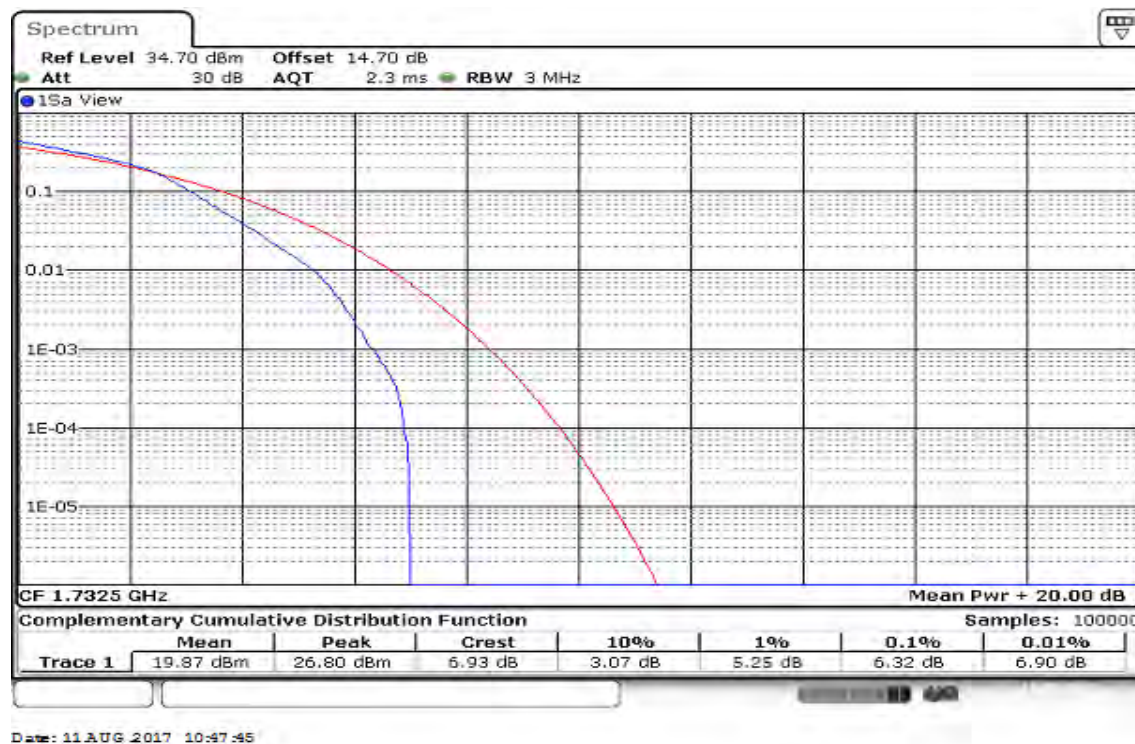
CHANNEL BANDWIDTH: 15MHz / 16QAM /1RB



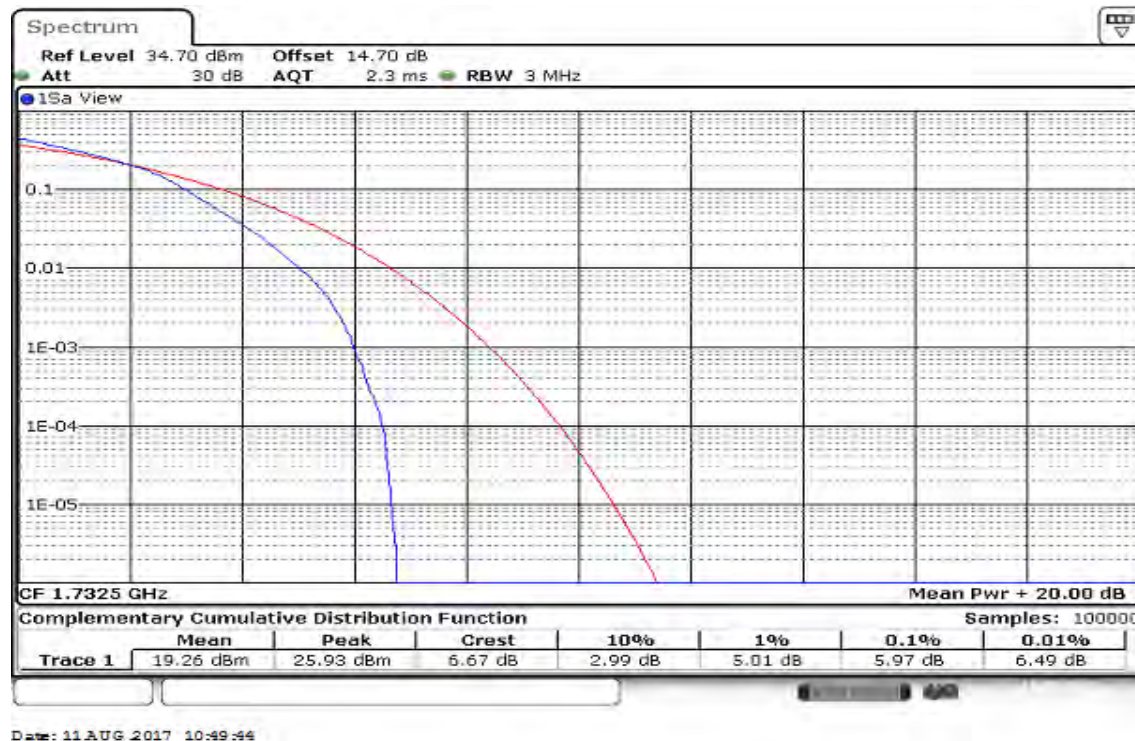
CHANNEL BANDWIDTH: 20MHz / 16QAM /1RB



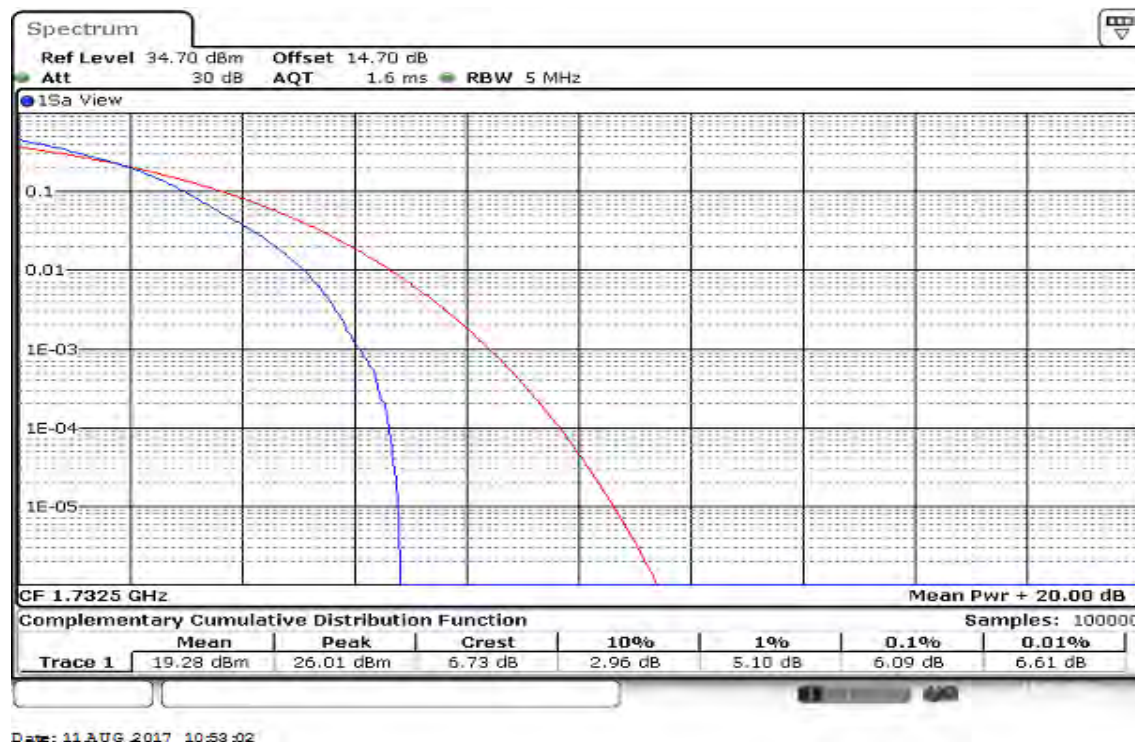
CHANNEL BANDWIDTH: 1.4MHz / 16QAM/100%RB



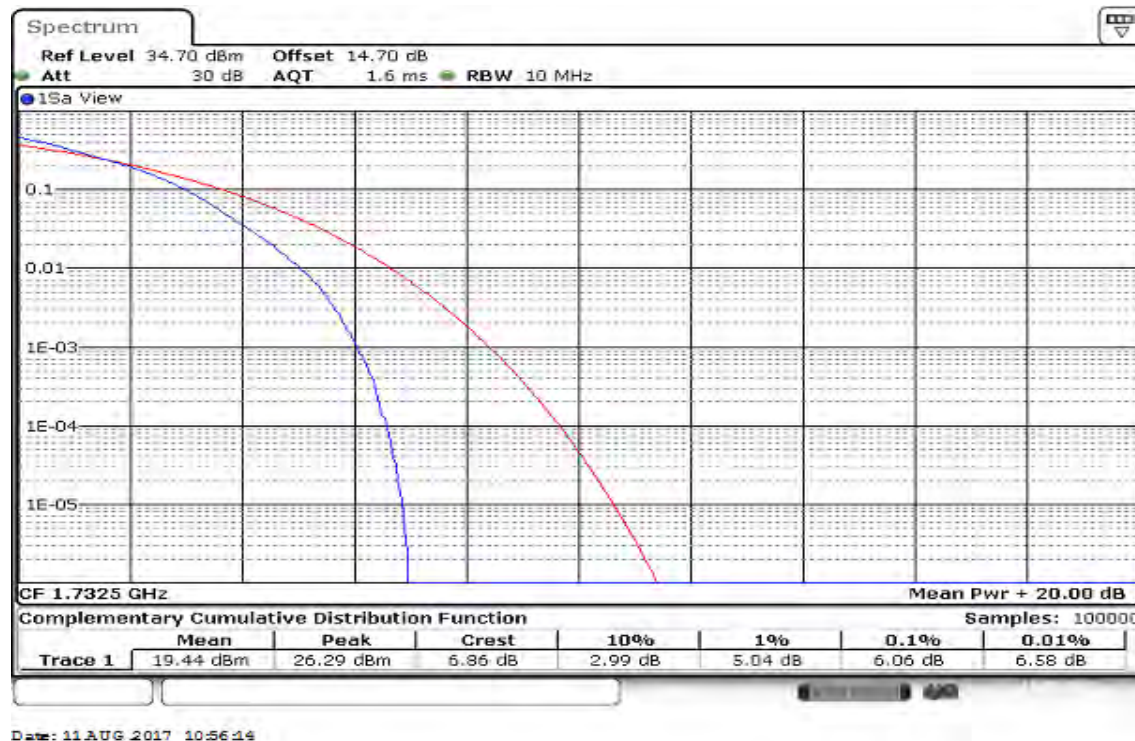
CHANNEL BANDWIDTH: 3MHz / 16QAM /100%RB



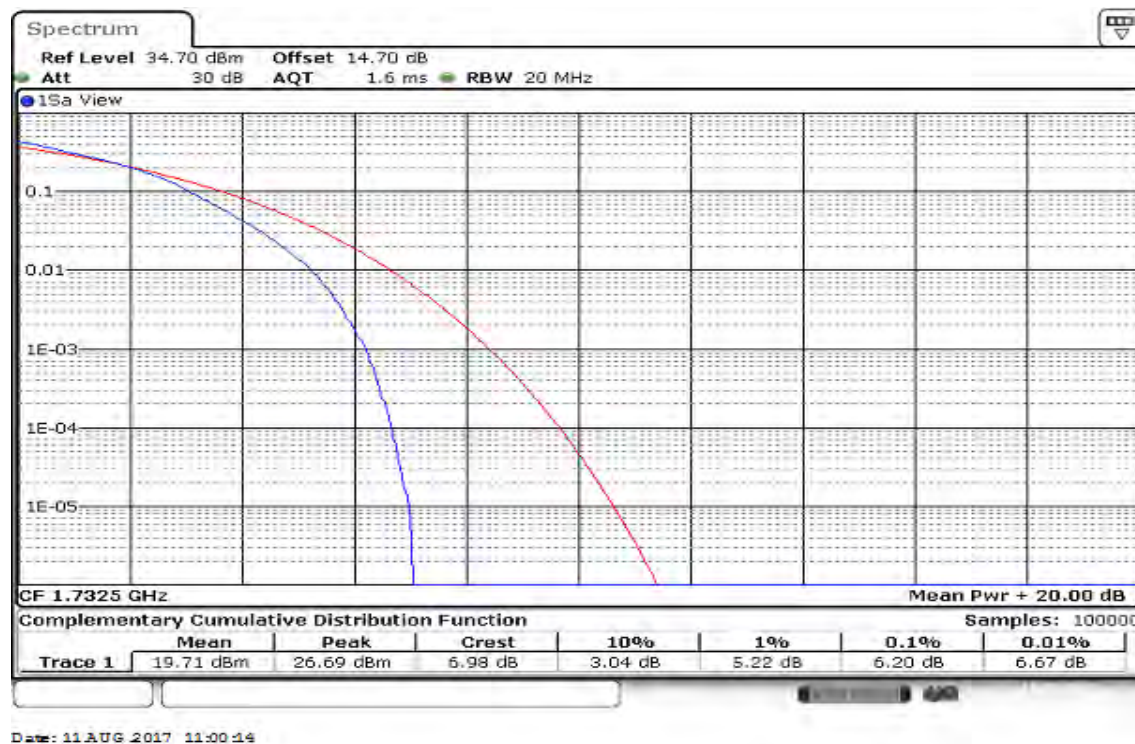
CHANNEL BANDWIDTH: 5MHz / 16QAM /100%RB



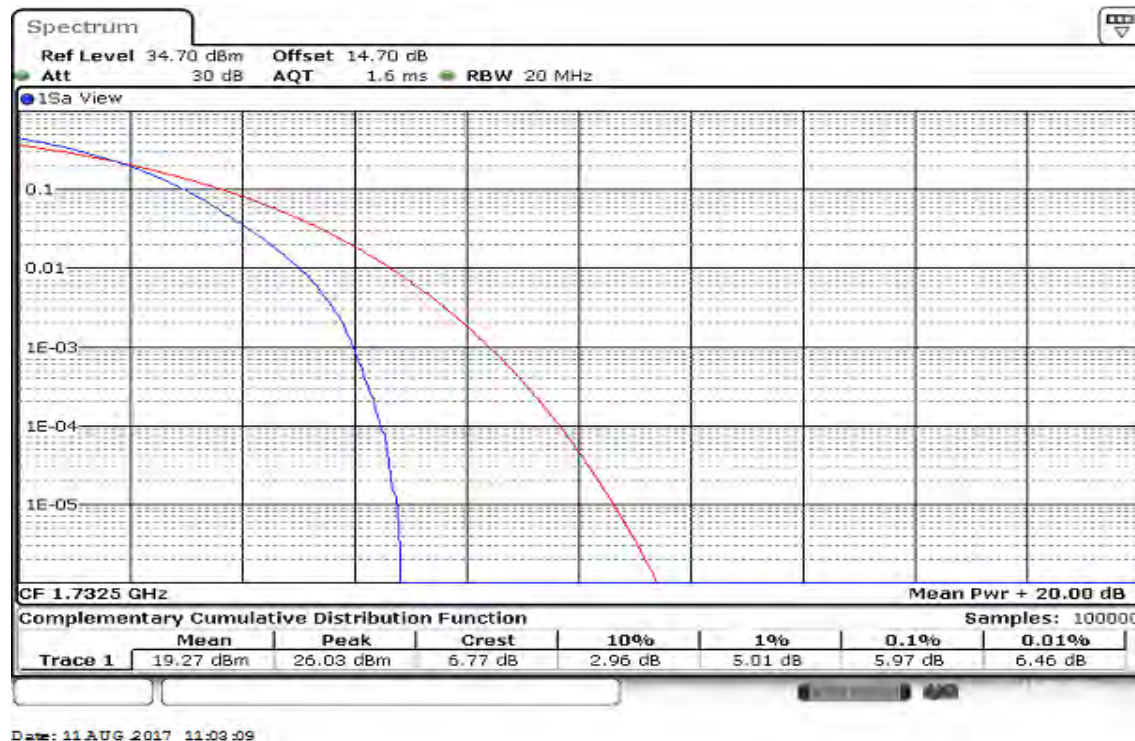
CHANNEL BANDWIDTH: 10MHz / 16QAM /100%RB



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



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



7.6 BAND EDGE MEASUREMENT

LIMIT

FCC §27.53(h), Band 4

For the purpose of this measurement, the test signal shall be a continuous wave (CW) signal with a bandwidth of 100 kHz or less, centered at the carrier frequency. The test signal shall be modulated with a 100 Hz sine wave. The test signal shall be transmitted from the antenna under test (AUT) to the receiving antenna. The receiving antenna shall be a standard gain horn antenna with a gain of 10 dBi or greater. The receiving antenna shall be positioned at a distance of 30 meters from the AUT. The test signal shall be received by the receiving antenna and the power level shall be measured. The power level shall be compared to the limit value of -117 dBm. If the power level is greater than -117 dBm, the AUT is not compliant with the FCC §27.53(h) requirement.

TEST PROCEDURES

KDB 971168 D01 v02r02 - Section 6.0

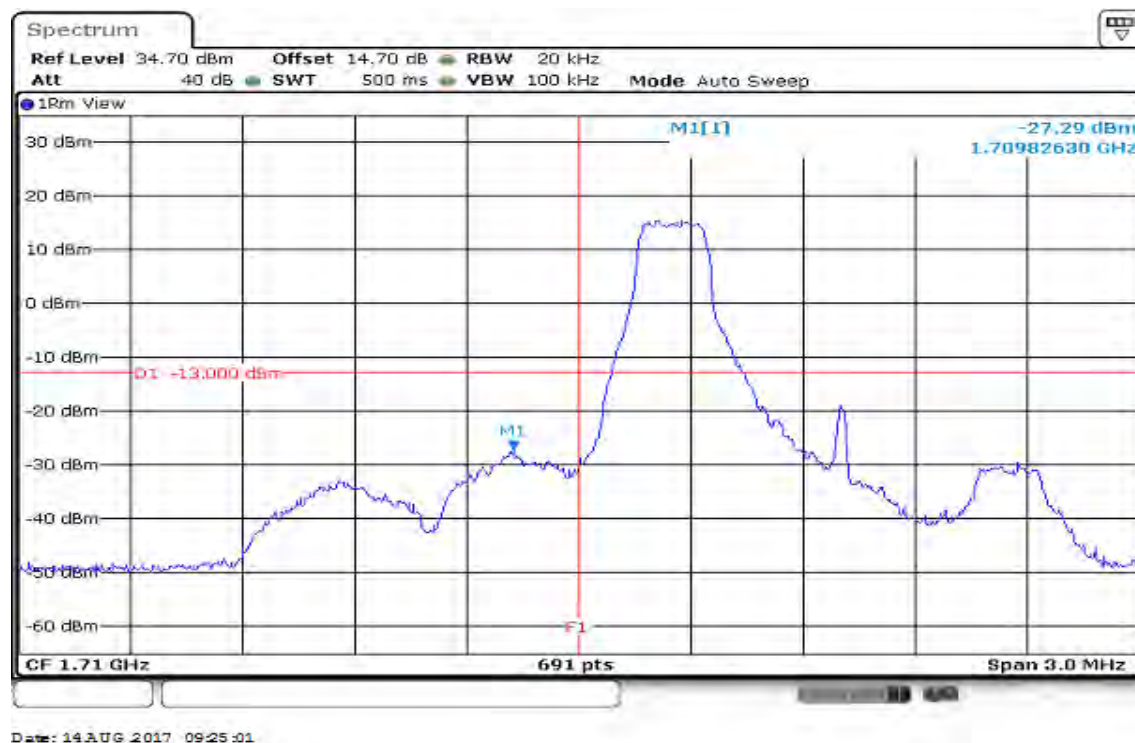
1. RBW $\geq$ 1% of the emission bandwidth
2. VBW $\geq$ 3 x RBW
3. Span was set large enough so as to capture all out of emissions near the band edge.

TEST RESULTS:

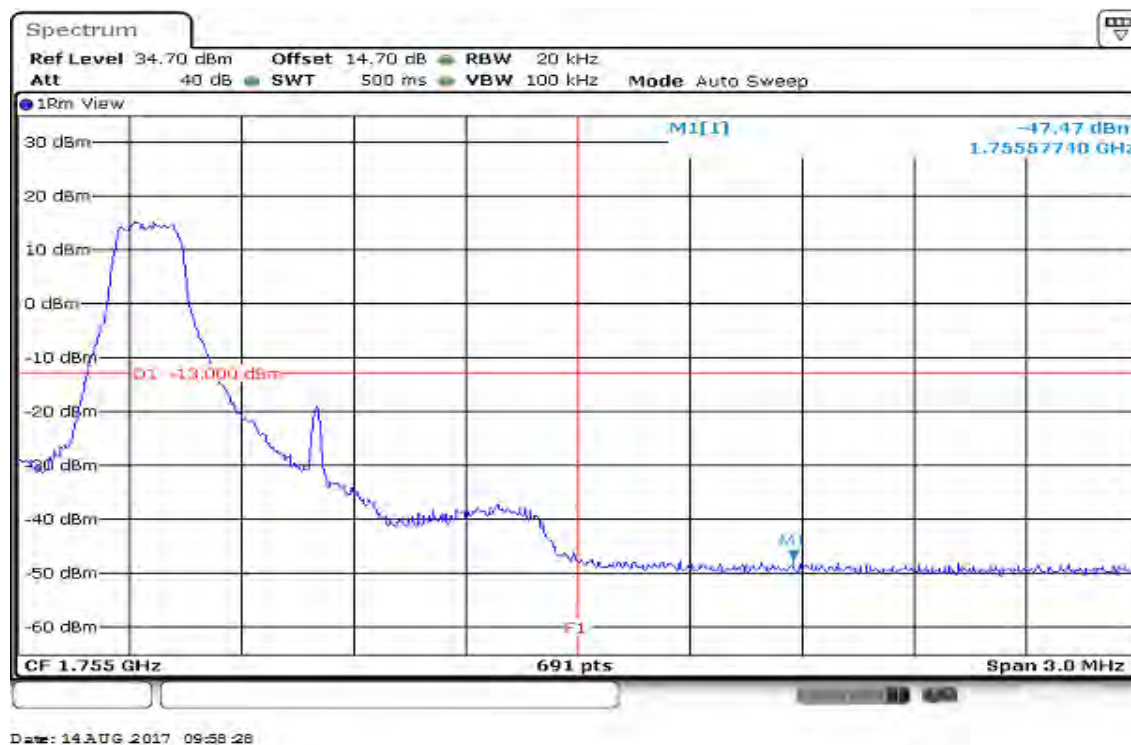
LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

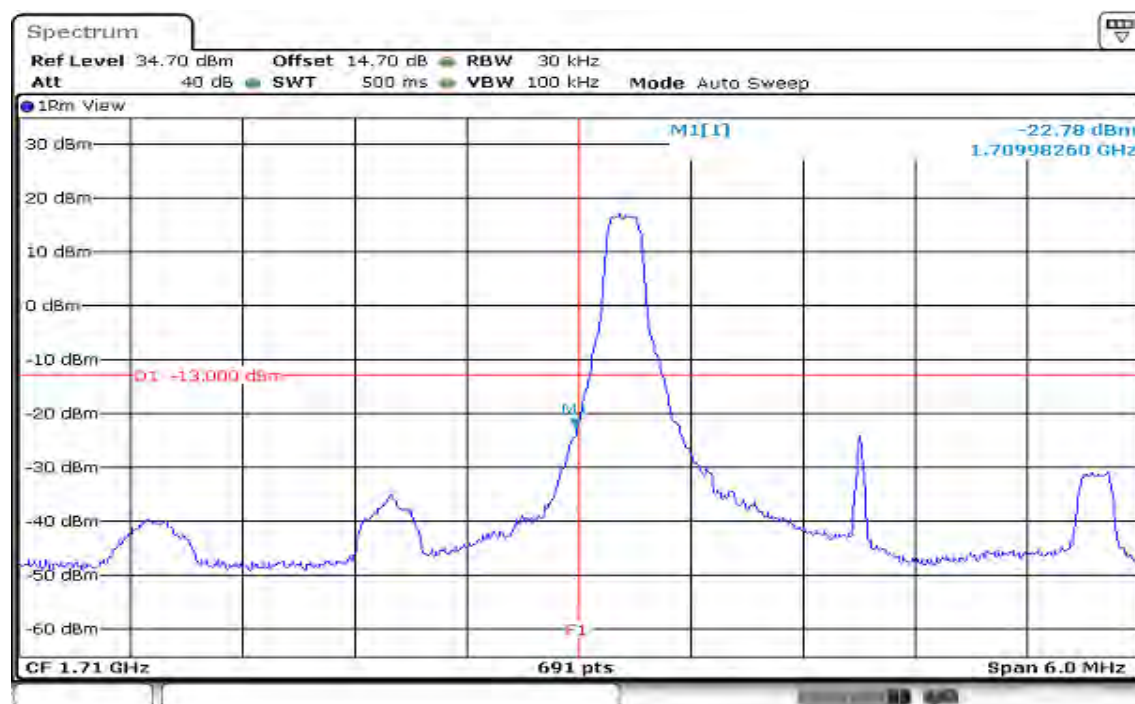


HIGHER BAND EDGE



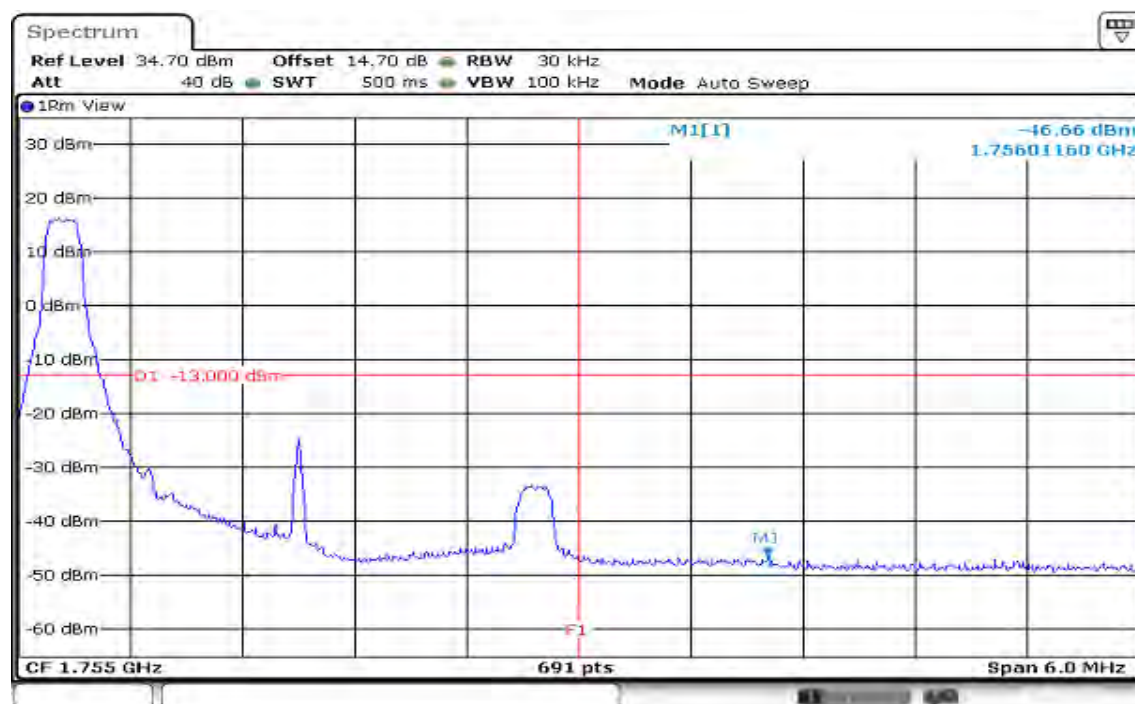
CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:28:29

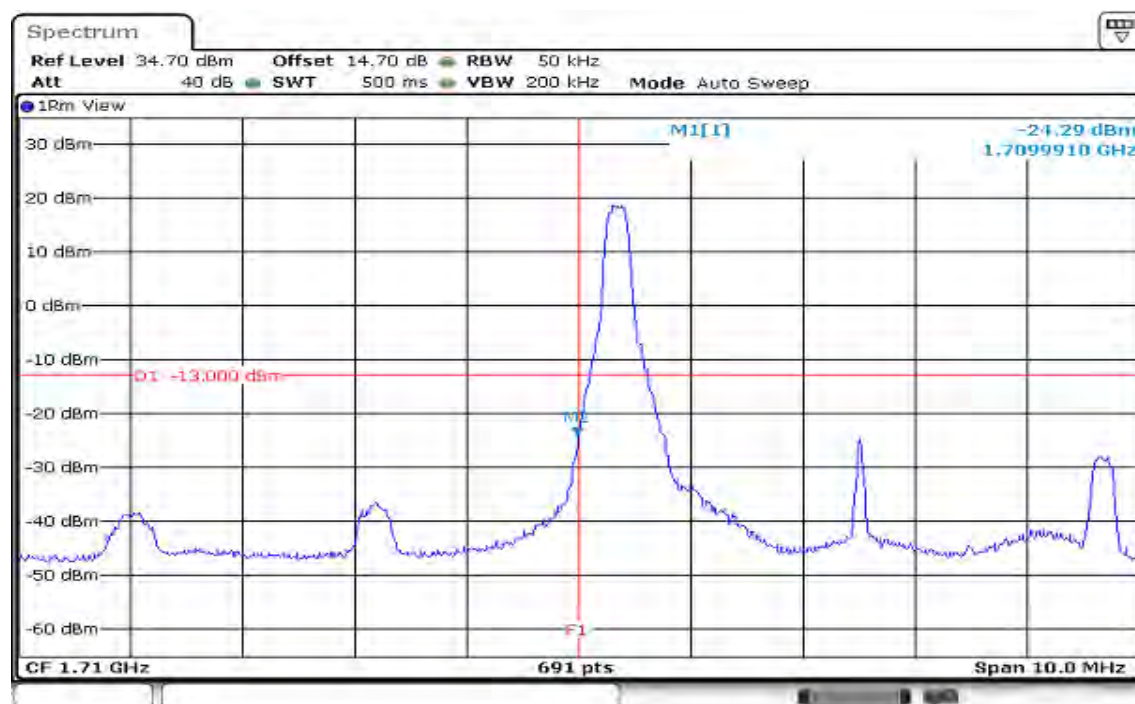
HIGHER BAND EDGE



Date: 14 AUG 2017 10:02:08

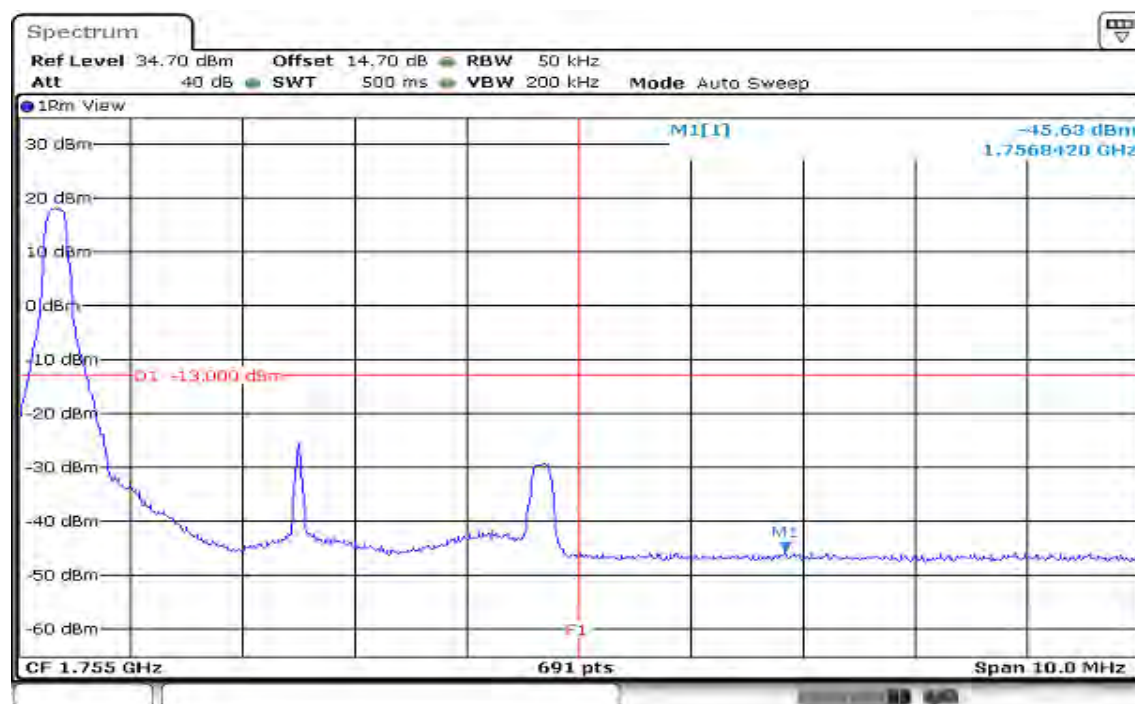
CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:40:42

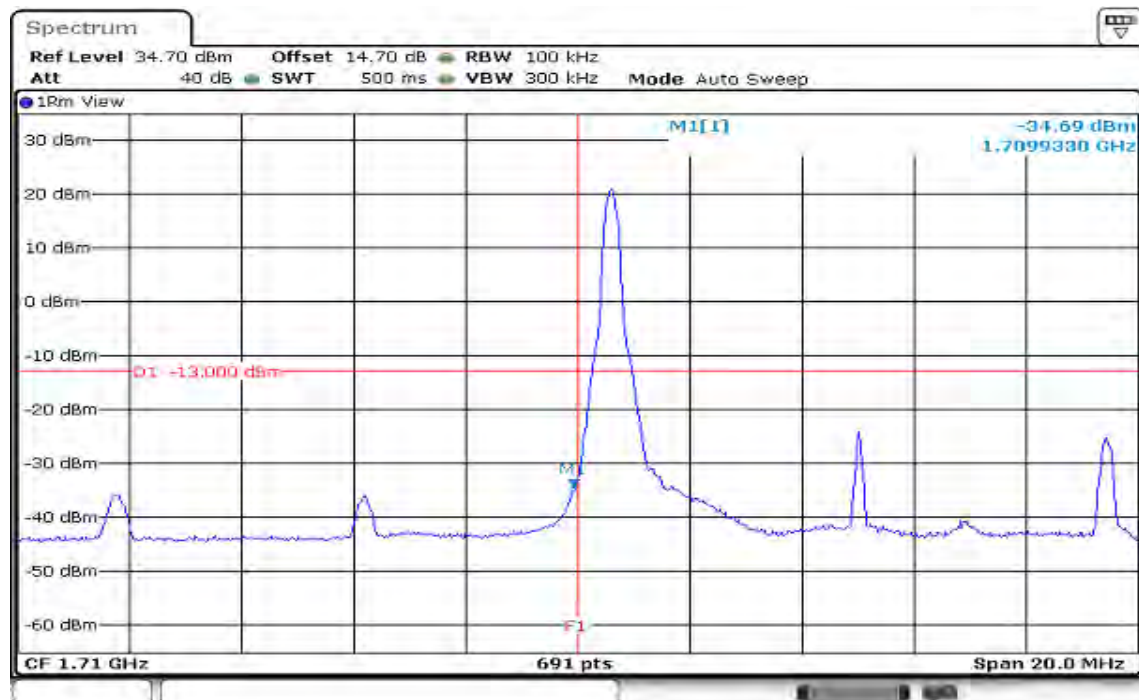
HIGHER BAND EDGE



Date: 14 AUG 2017 10:05:27

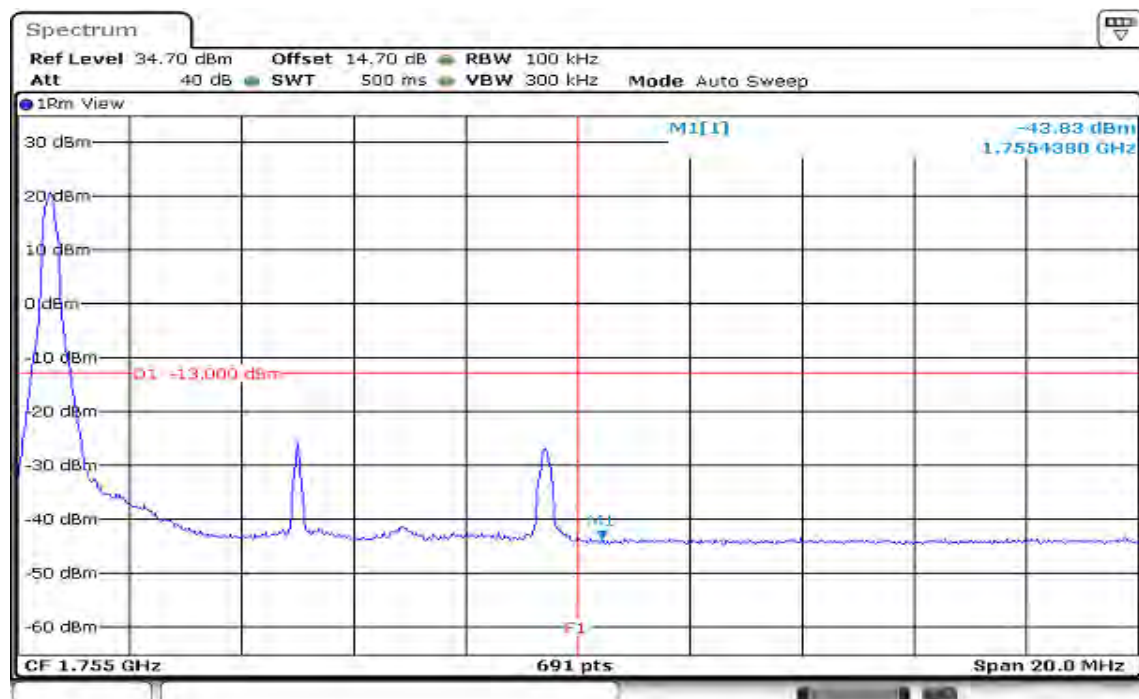
CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:46:51

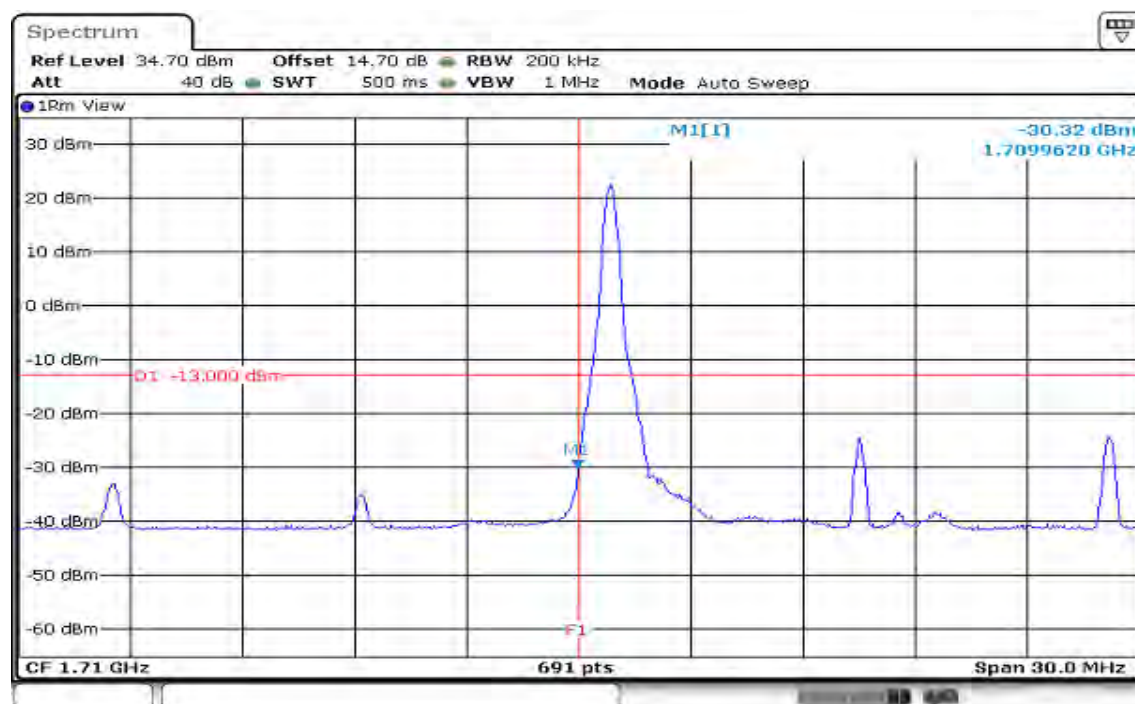
HIGHER BAND EDGE



Date: 14 AUG 2017 10:08:48

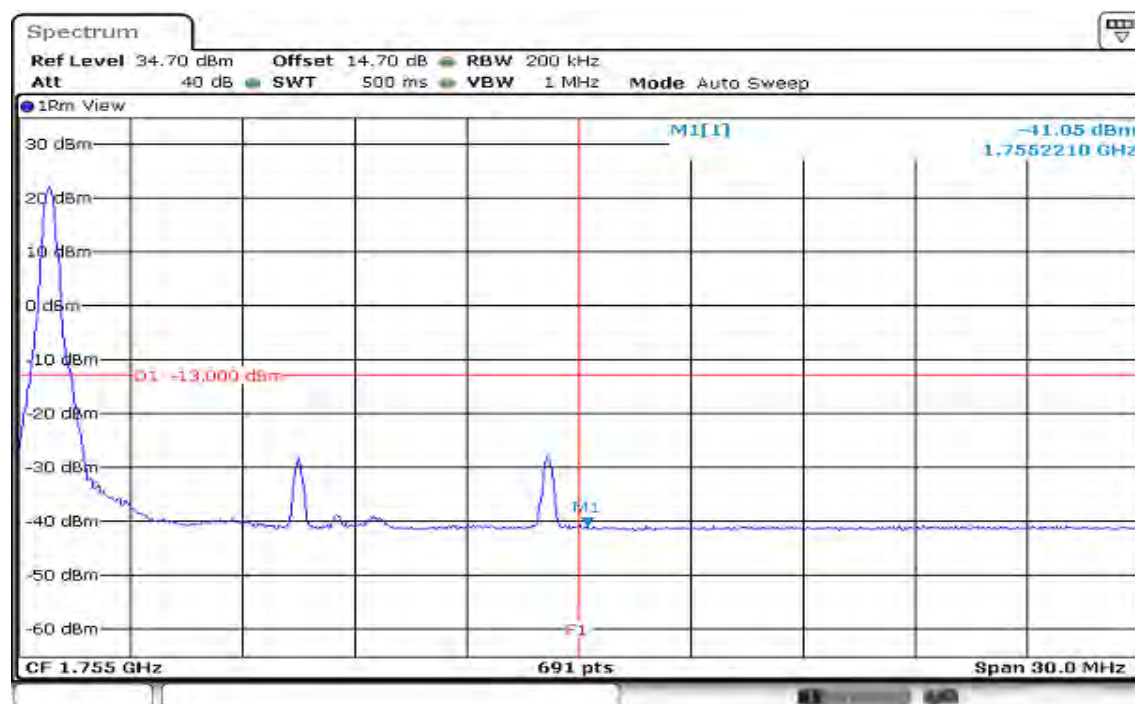
CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:49:35

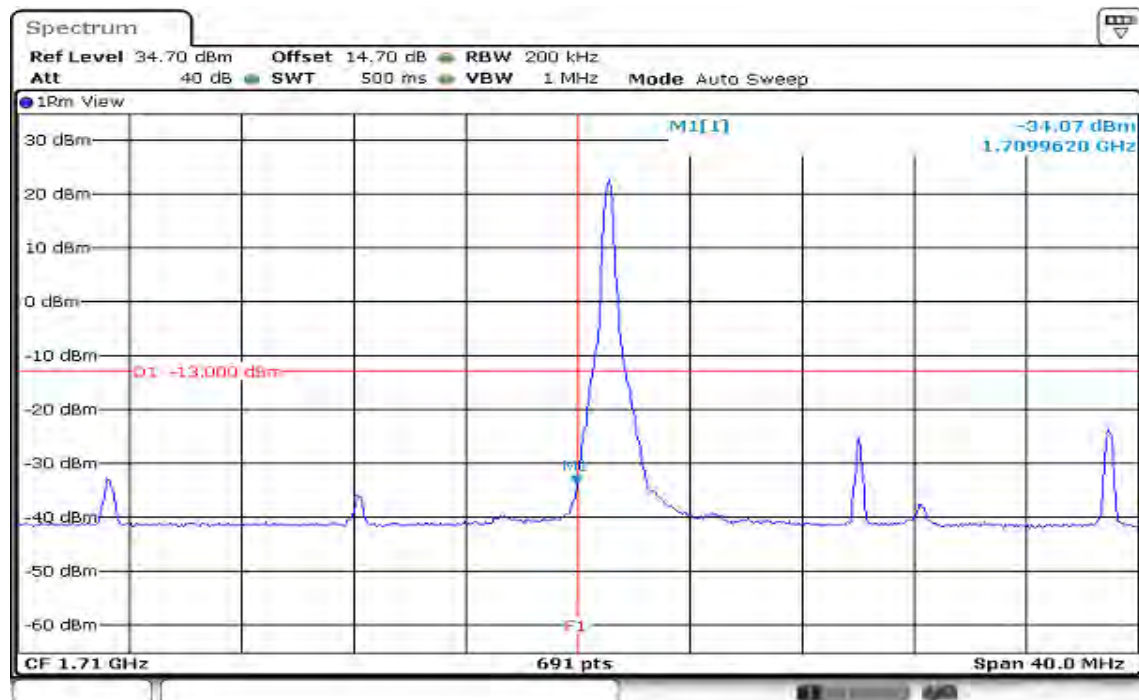
HIGHER BAND EDGE



Date: 14 AUG 2017 10:12:52

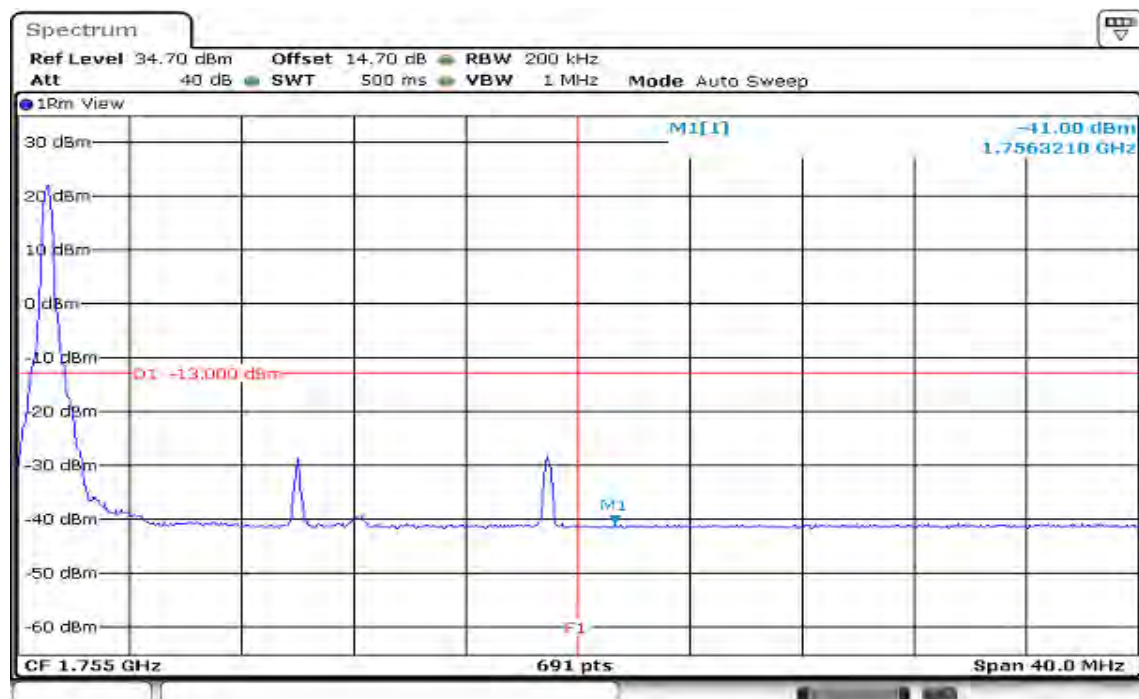
CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:53:24

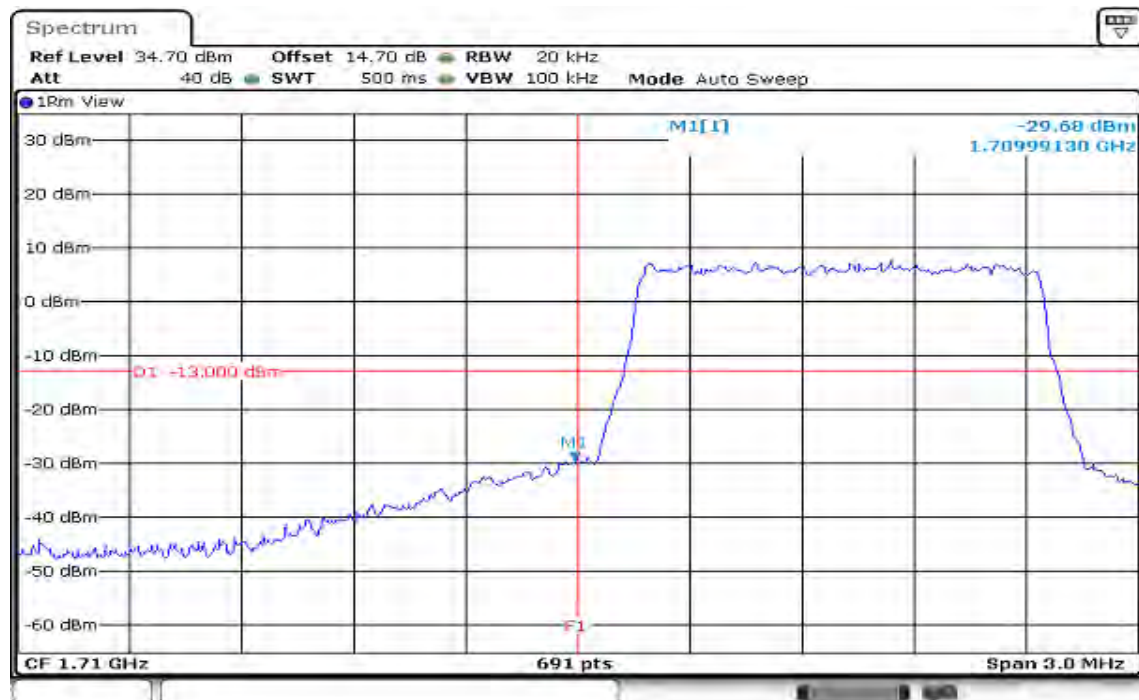
HIGHER BAND EDGE



Date: 14 AUG 2017 10:17:16

CHANNEL BANDWIDTH: 1.4MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:23:38

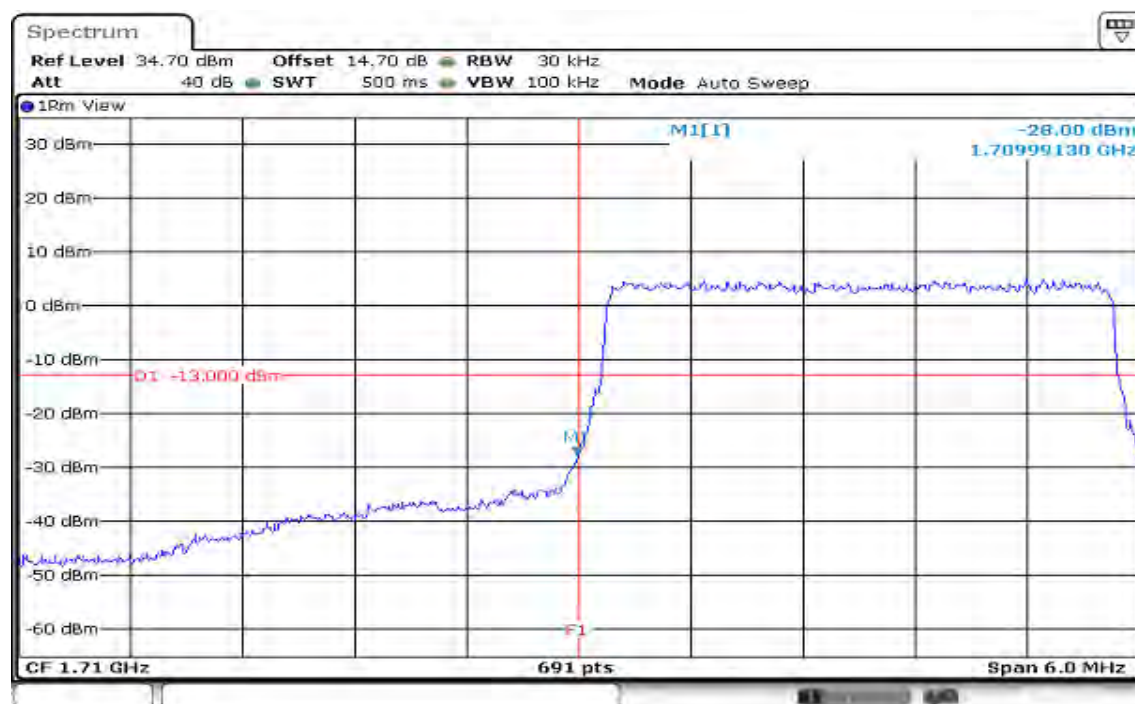
HIGHER BAND EDGE



Date: 14 AUG 2017 09:59:02

CHANNEL BANDWIDTH: 3MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:27:38

HIGHER BAND EDGE



Date: 14 AUG 2017 10:02:27

CHANNEL BANDWIDTH: 5MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:39:26

HIGHER BAND EDGE



Date: 14 AUG 2017 10:06:14

CHANNEL BANDWIDTH: 10MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:46:05

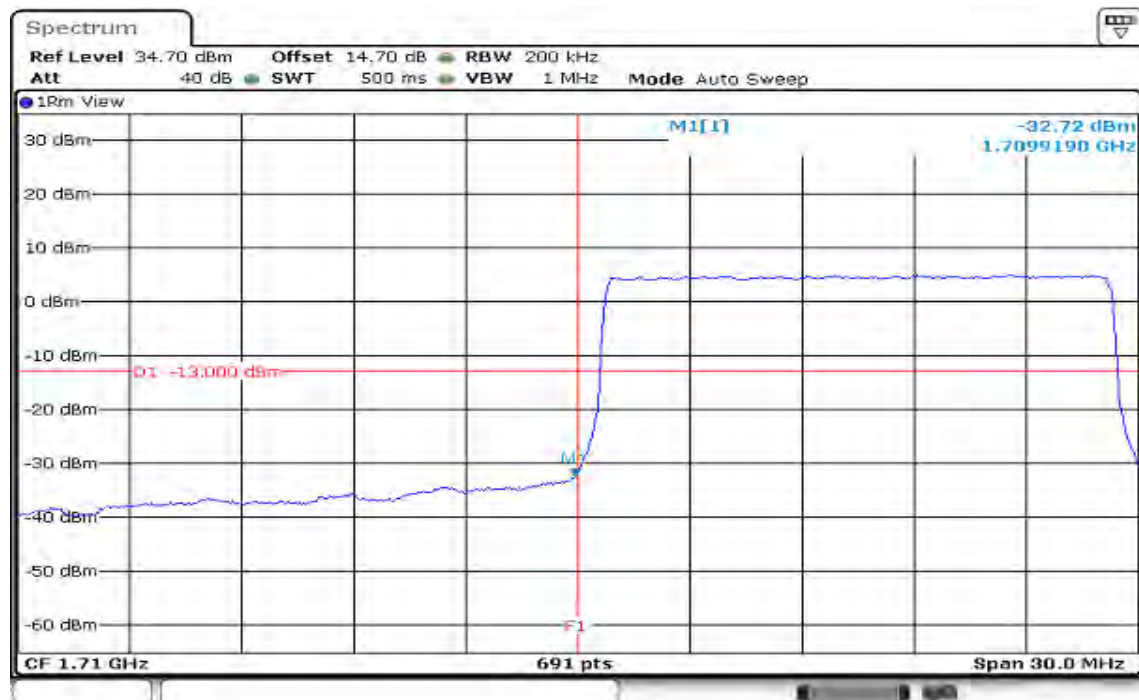
HIGHER BAND EDGE



Date: 14 AUG 2017 10:09:26

CHANNEL BANDWIDTH: 15MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:50:11

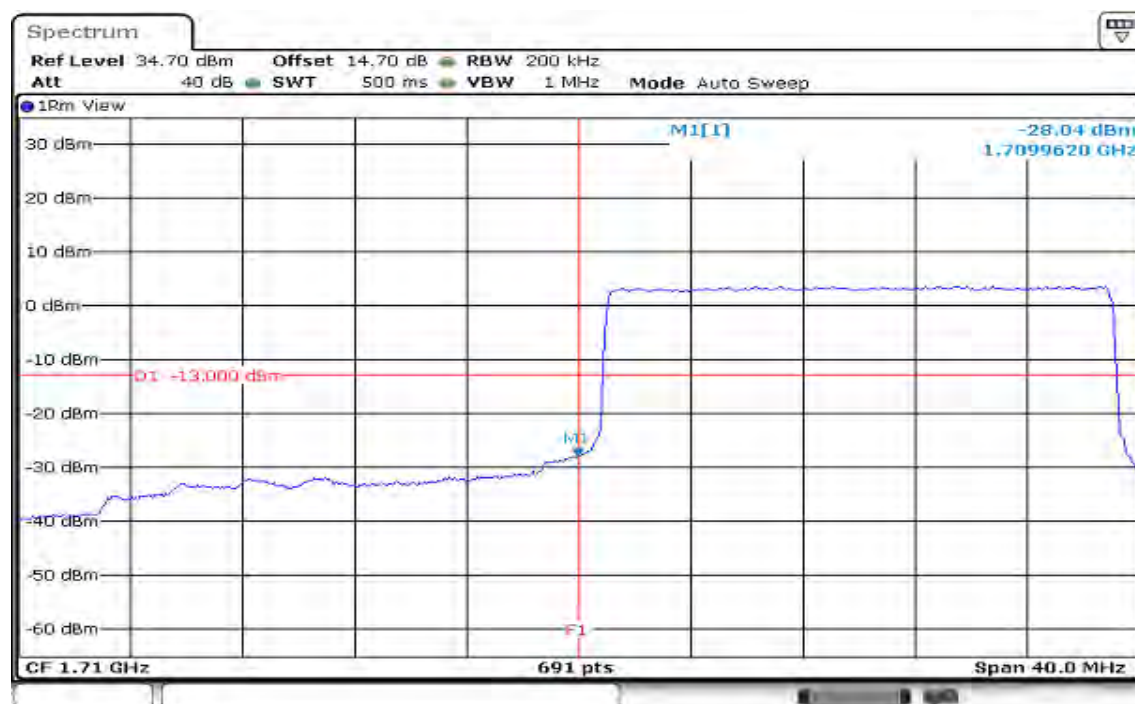
HIGHER BAND EDGE



Date: 14 AUG 2017 10:12:11

CHANNEL BANDWIDTH: 20MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:52:54

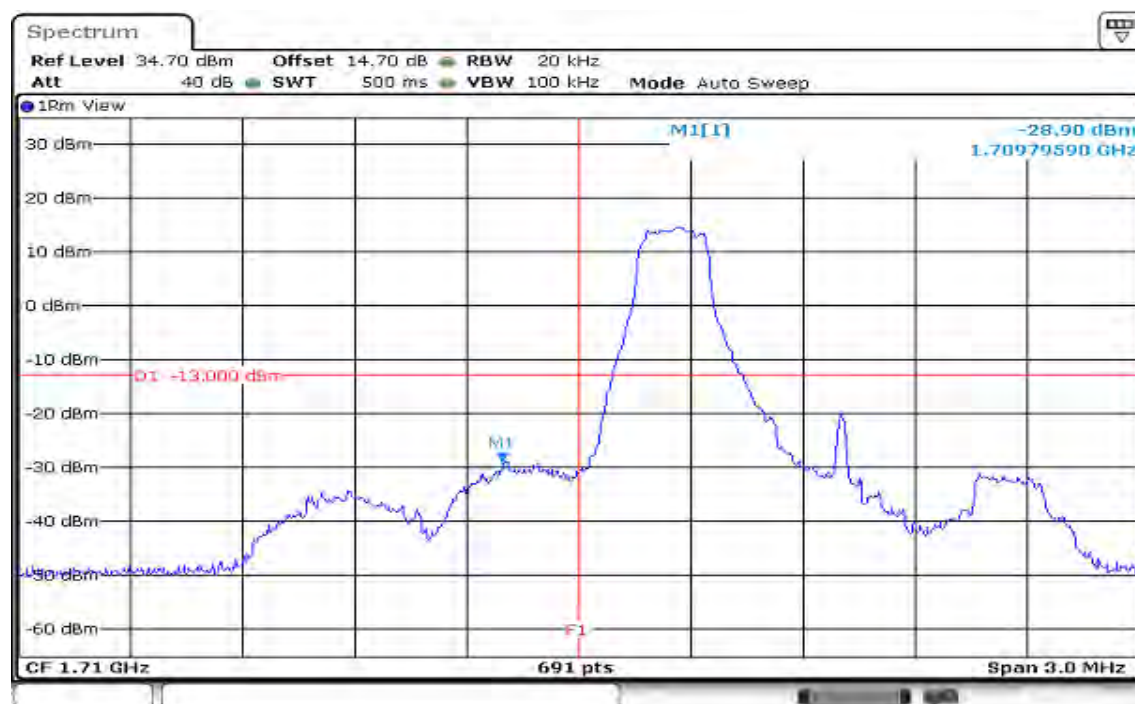
HIGHER BAND EDGE



Date: 14 AUG 2017 10:16:42

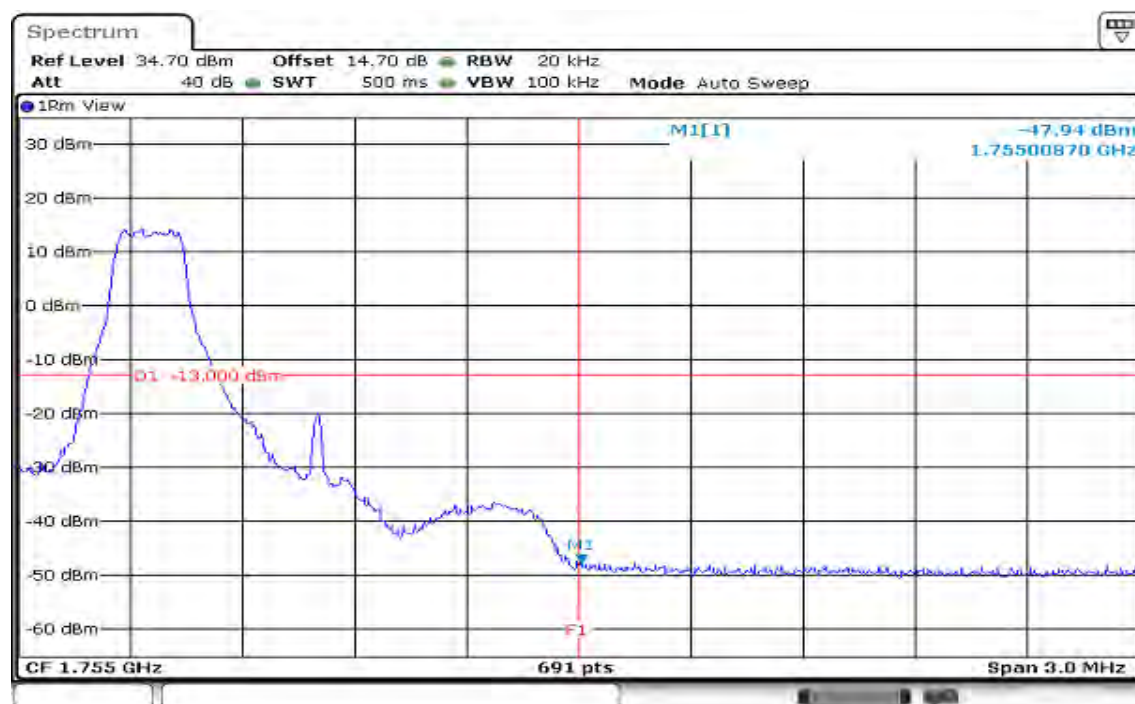
CHANNEL BANDWIDTH: 1.4MHz / 16QAM/ 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:25:42

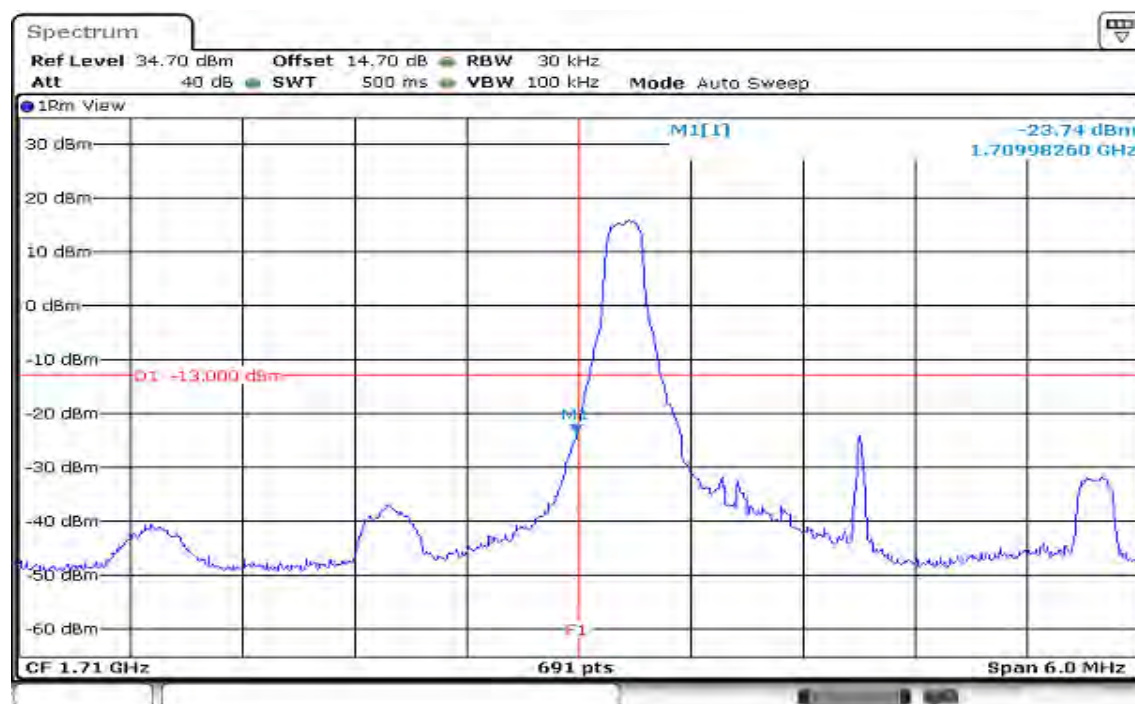
HIGHER BAND EDGE



Date: 14 AUG 2017 09:37:28

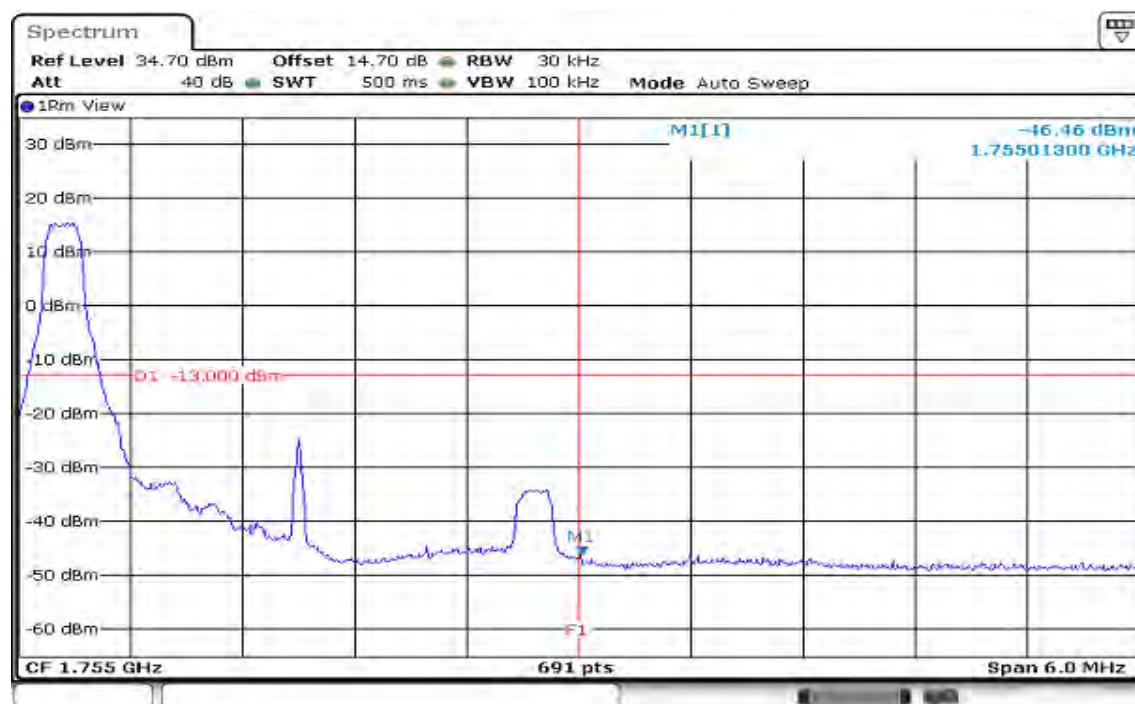
CHANNEL BANDWIDTH: 3MHz / 16QAM/ 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:29:01

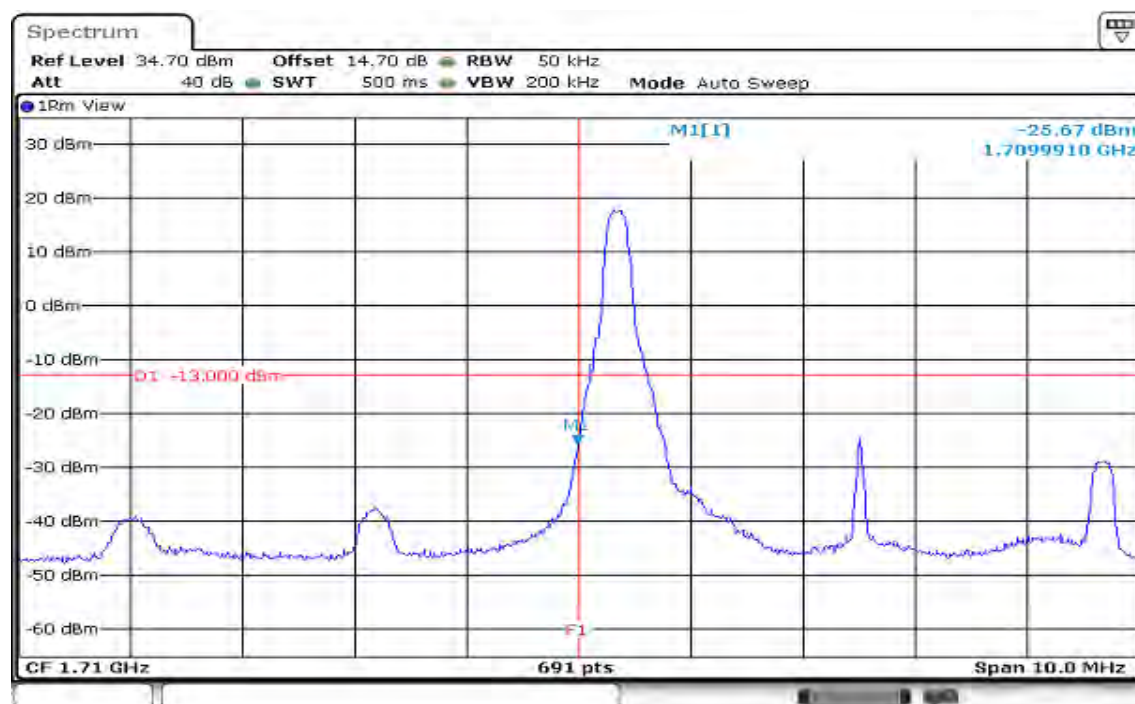
HIGHER BAND EDGE



Date: 14 AUG 2017 10:01:05

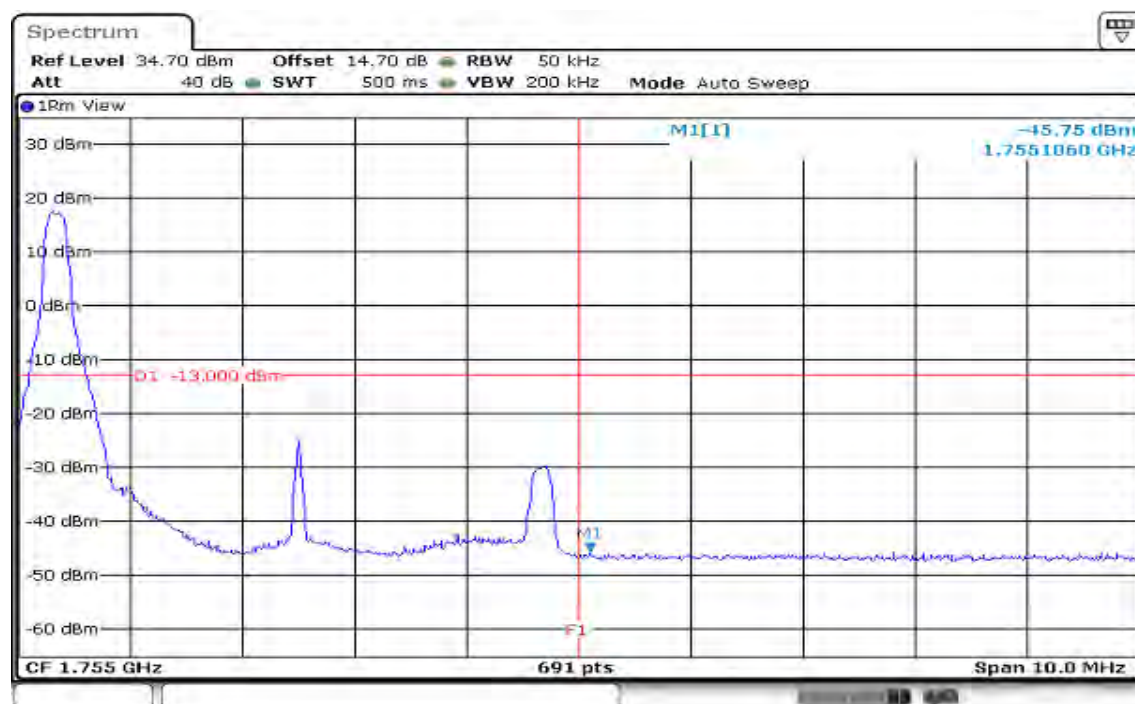
CHANNEL BANDWIDTH: 5MHz / 16QAM/ 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:41:20

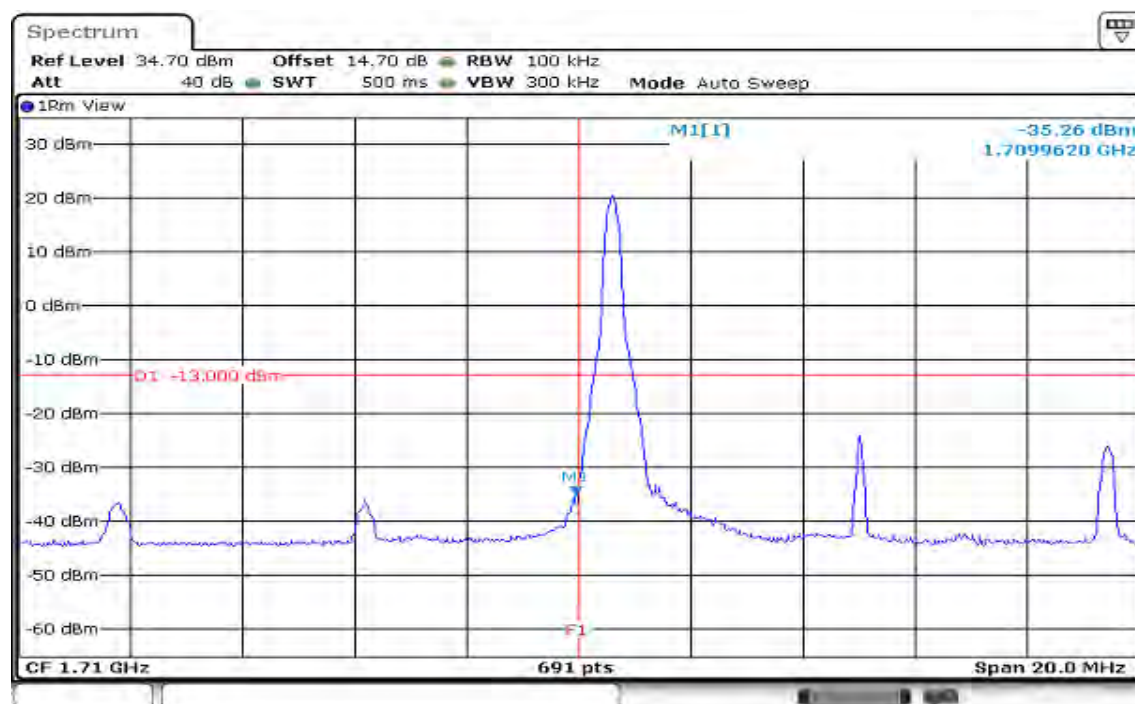
HIGHER BAND EDGE



Date: 14 AUG 2017 10:04:16

CHANNEL BANDWIDTH: 10MHz / 16QAM/ 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:47:24

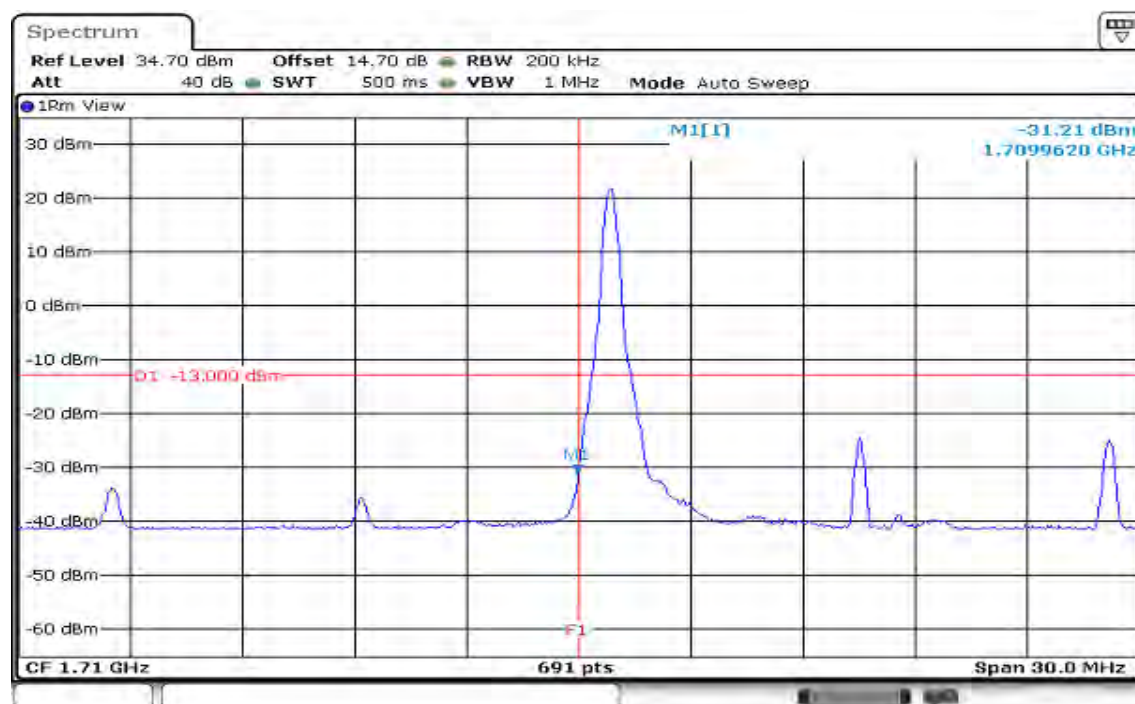
HIGHER BAND EDGE



Date: 14 AUG 2017 10:08:06

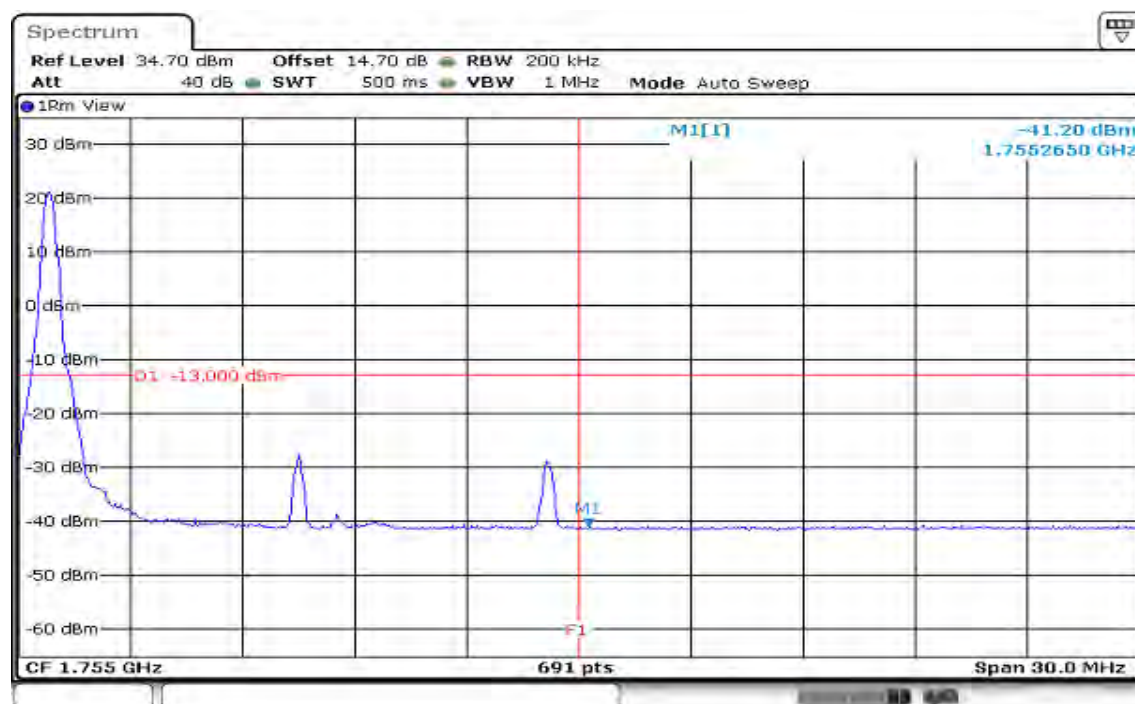
CHANNEL BANDWIDTH: 15MHz / 16QAM/ 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:51:59

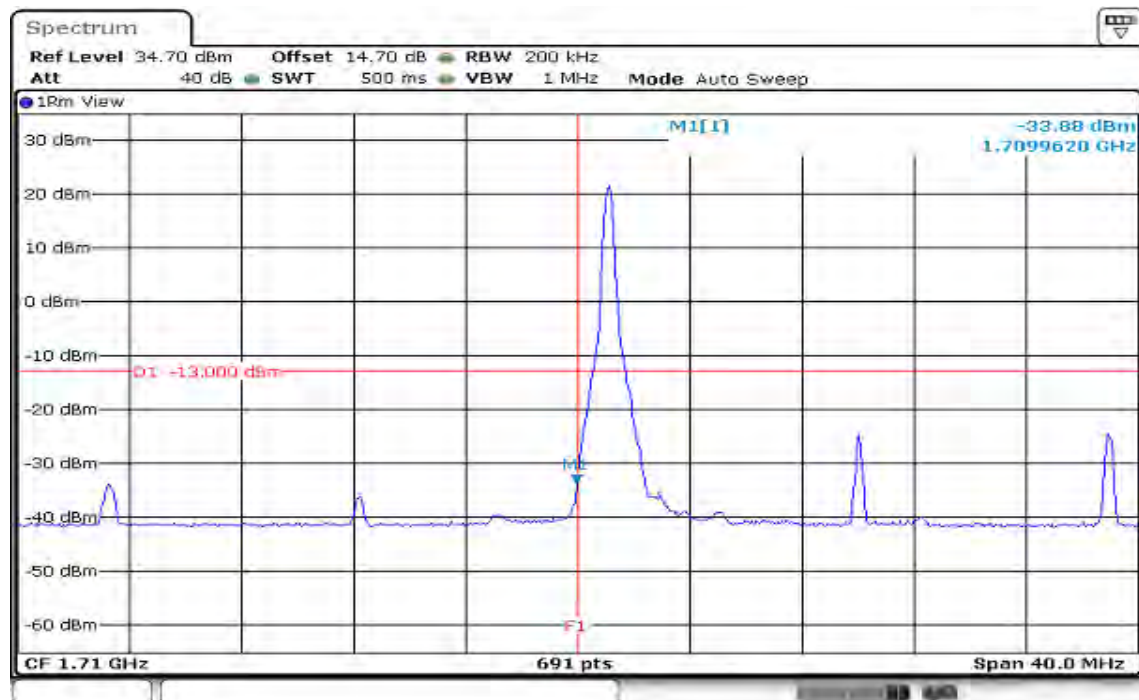
HIGHER BAND EDGE



Date: 14 AUG 2017 10:10:26

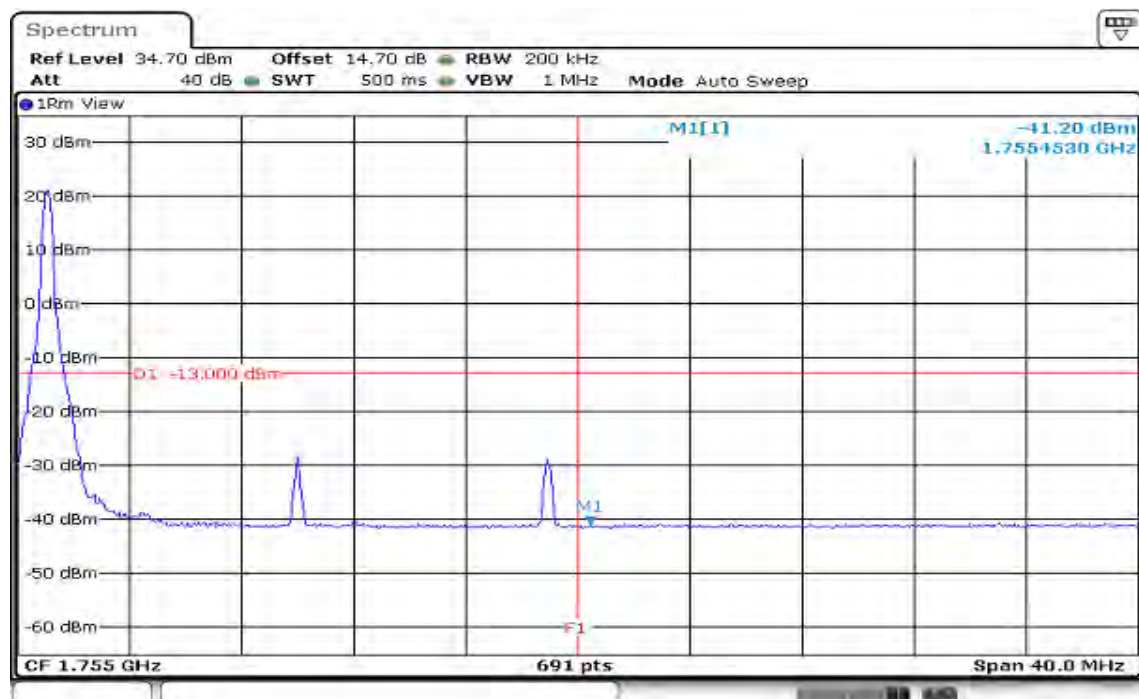
CHANNEL BANDWIDTH: 20MHz / 16QAM/ 1RB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:53:53

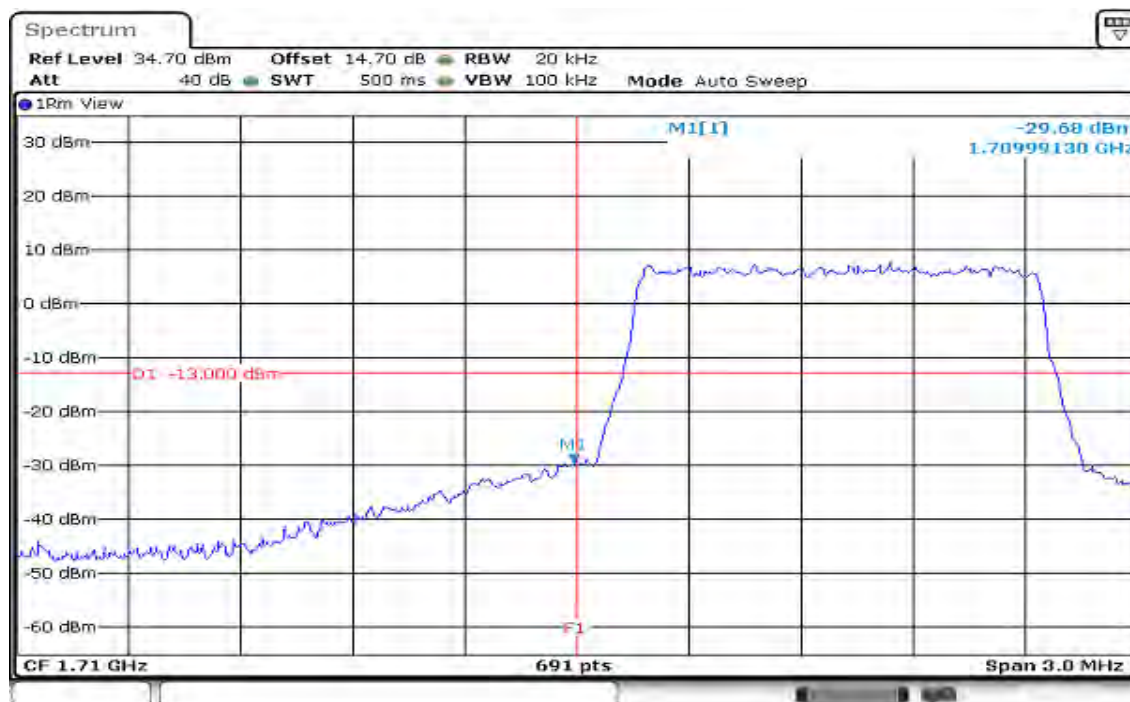
HIGHER BAND EDGE



Date: 14 AUG 2017 10:14:59

CHANNEL BANDWIDTH: 1.4MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:23:28

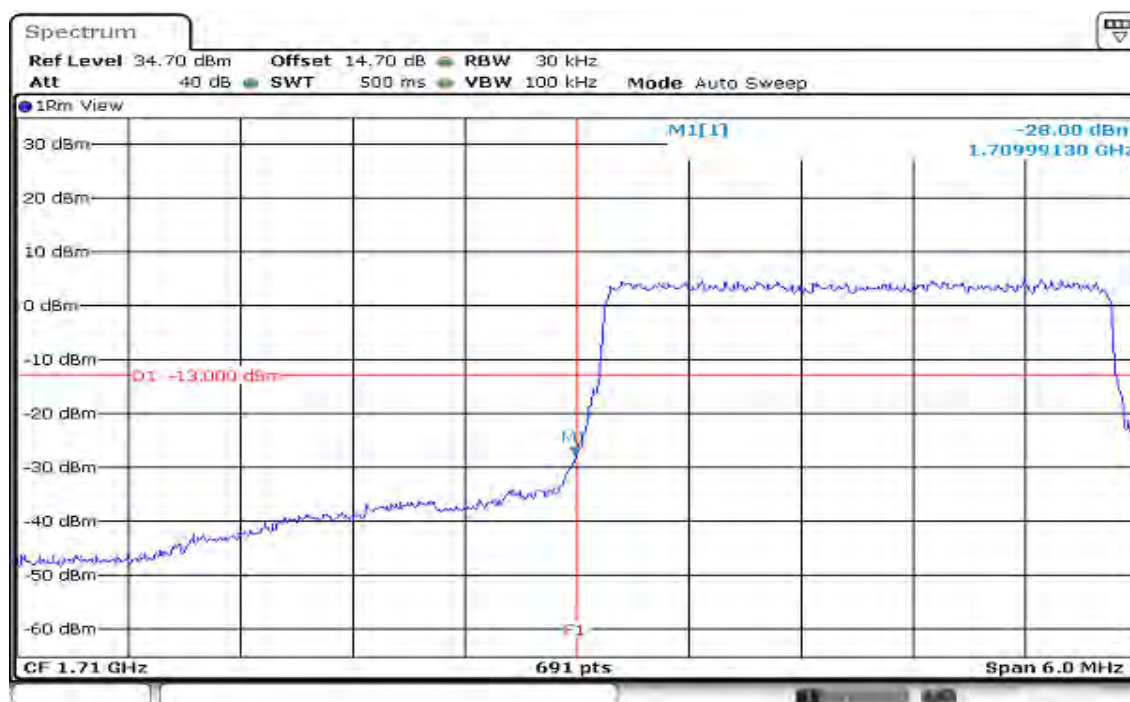
HIGHER BAND EDGE



Date: 14 AUG 2017 09:59:02

CHANNEL BANDWIDTH: 3 MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:27:28

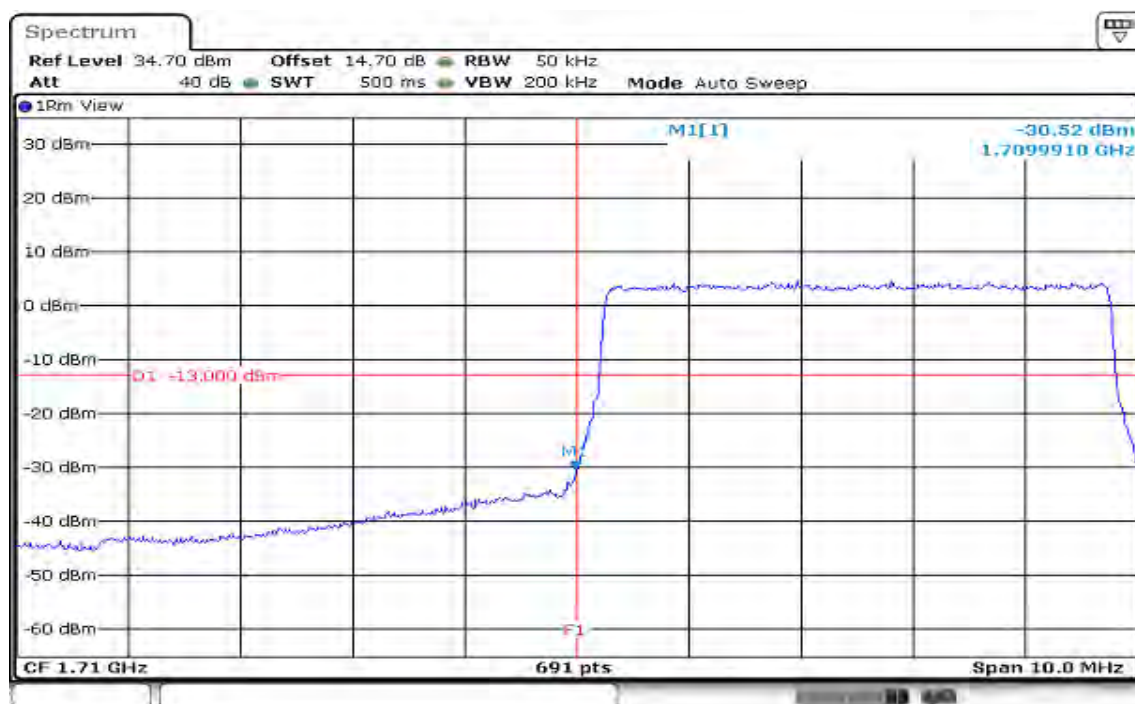
HIGHER BAND EDGE



Date: 14 AUG 2017 10:02:27

CHANNEL BANDWIDTH: 5MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:29:26

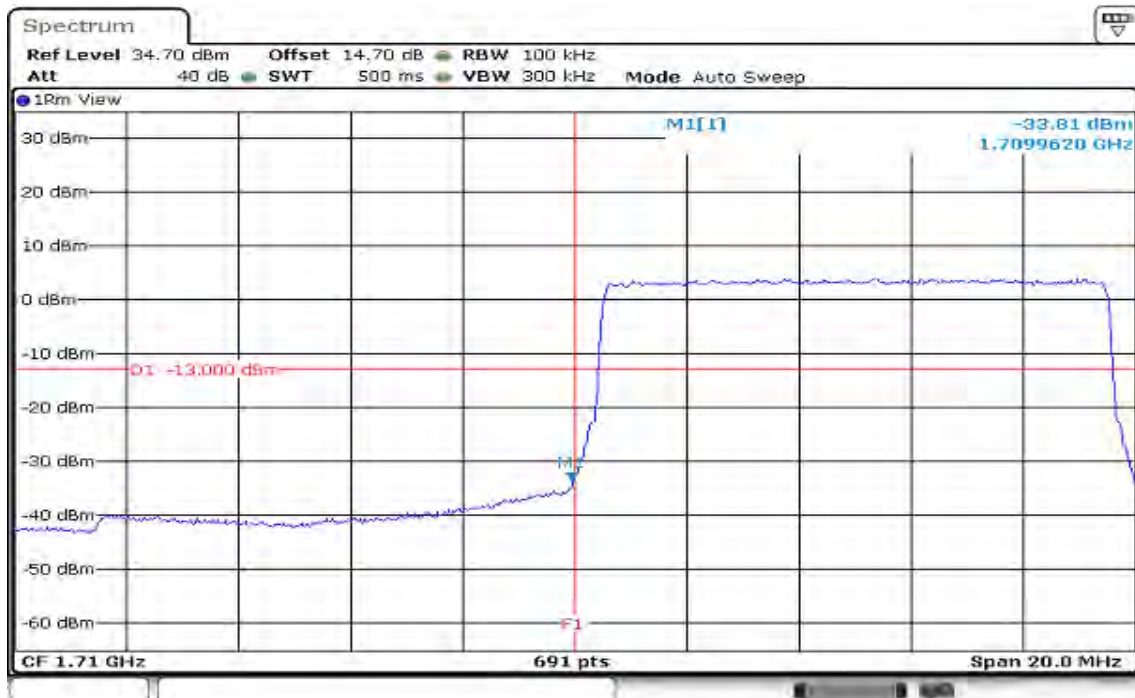
HIGHER BAND EDGE



Date: 14 AUG 2017 10:06:14

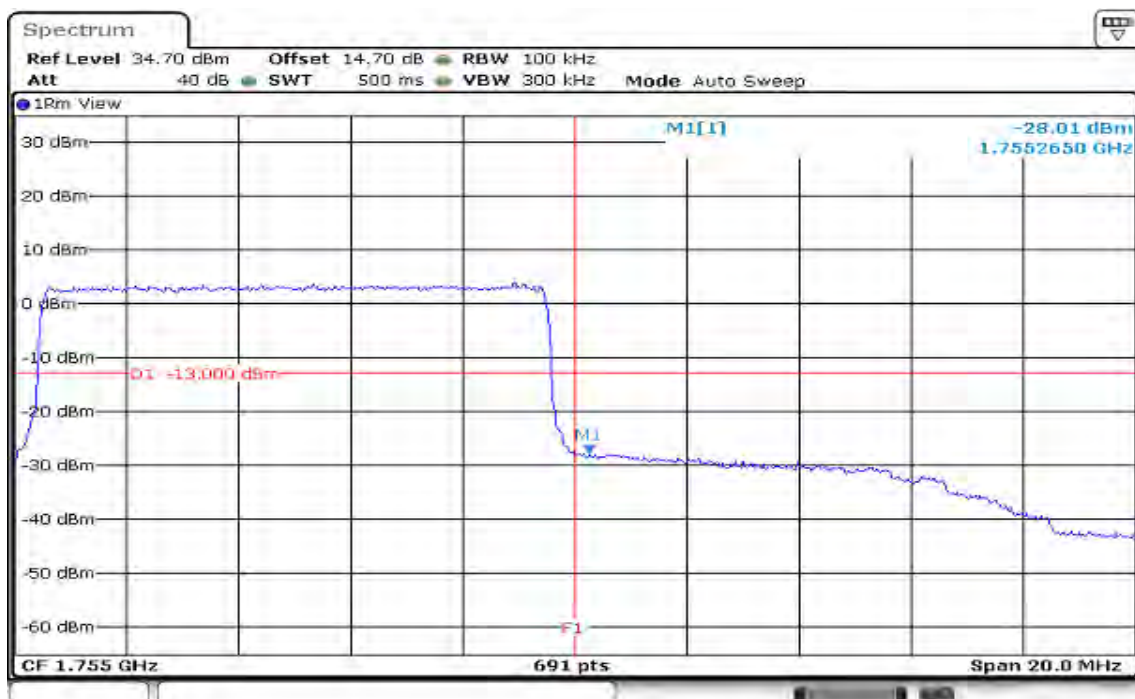
CHANNEL BANDWIDTH: 10MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:46:05

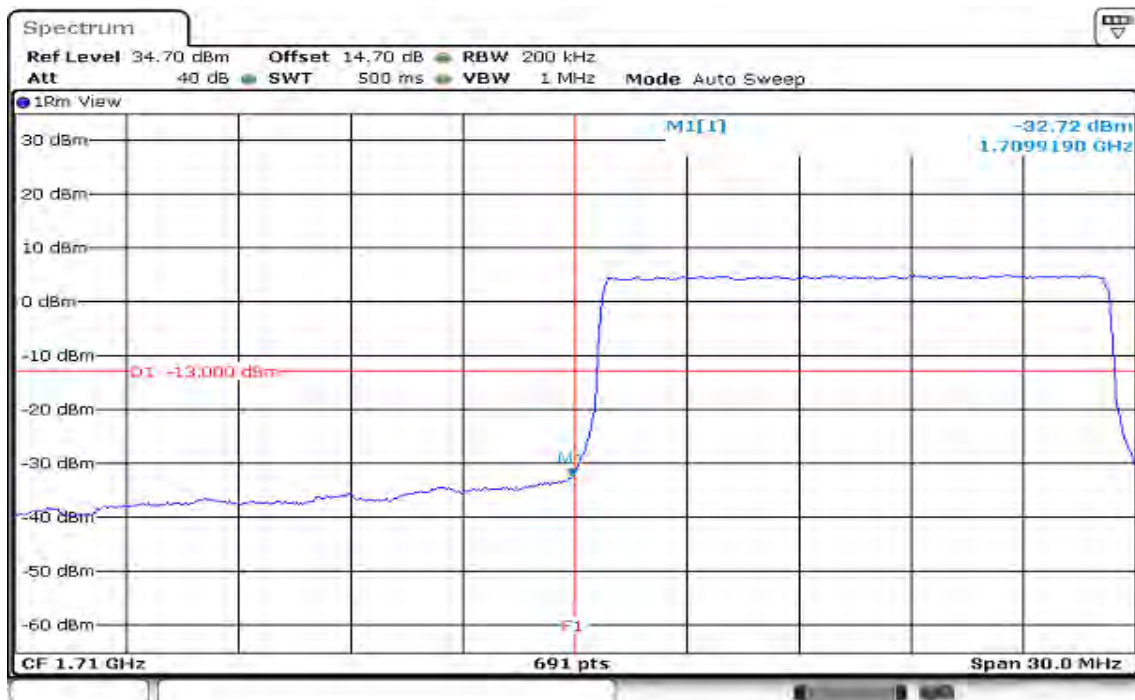
HIGHER BAND EDGE



Date: 14 AUG 2017 10:09:26

CHANNEL BANDWIDTH: 15MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:50:11

HIGHER BAND EDGE



Date: 14 AUG 2017 10:12:11

CHANNEL BANDWIDTH: 20MHz / QPSK/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:52:54

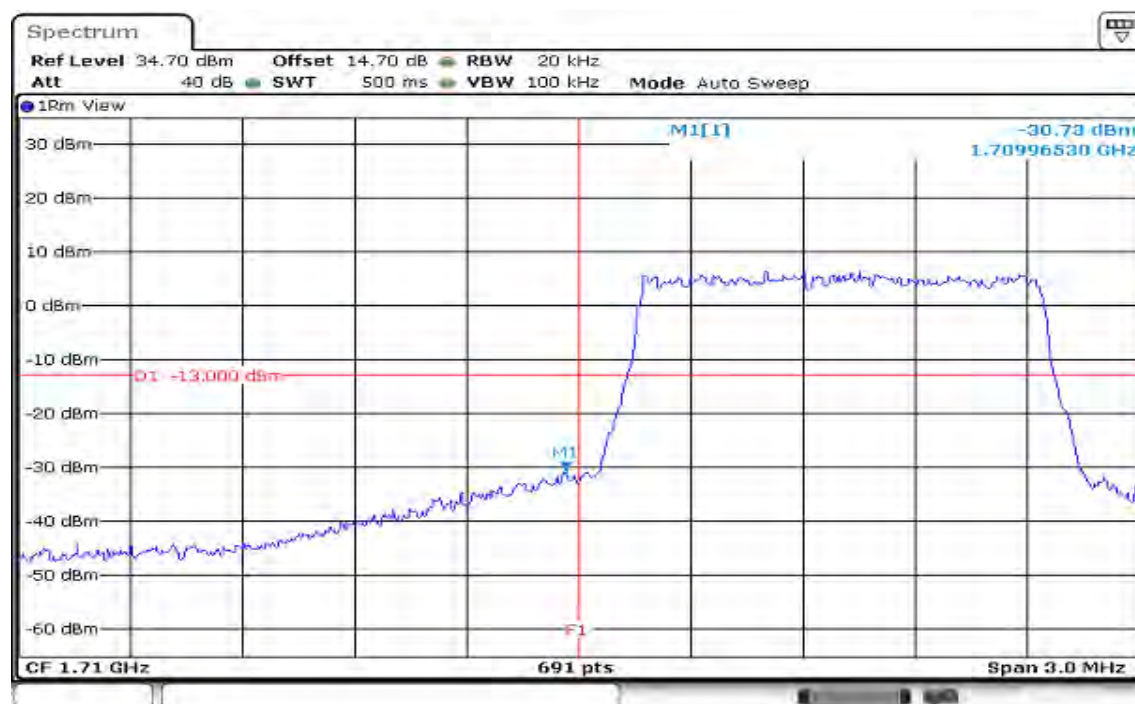
HIGHER BAND EDGE



Date: 14 AUG 2017 10:16:42

CHANNEL BANDWIDTH: 1.4MHz / 16QAM/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:26:20

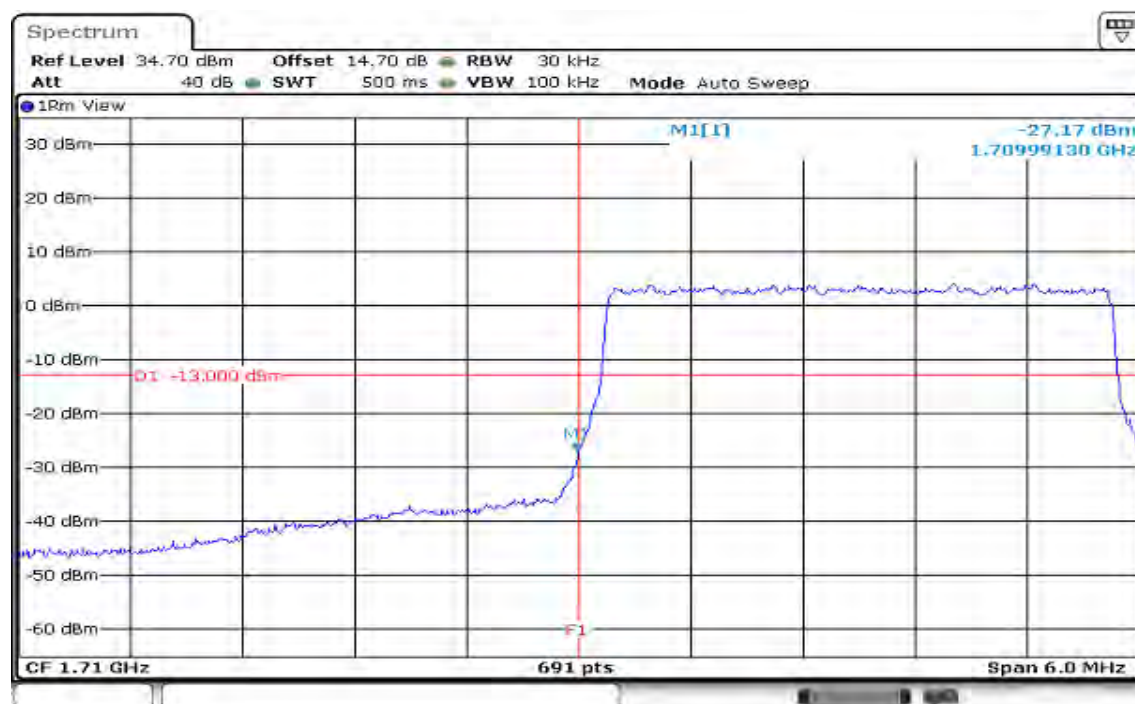
HIGHER BAND EDGE



Date: 14 AUG 2017 09:56:46

CHANNEL BANDWIDTH: 3 MHz / 16QAM/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:36:10

HIGHER BAND EDGE



Date: 14 AUG 2017 10:00:06

CHANNEL BANDWIDTH: 5MHz / 16QAM/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:41:57

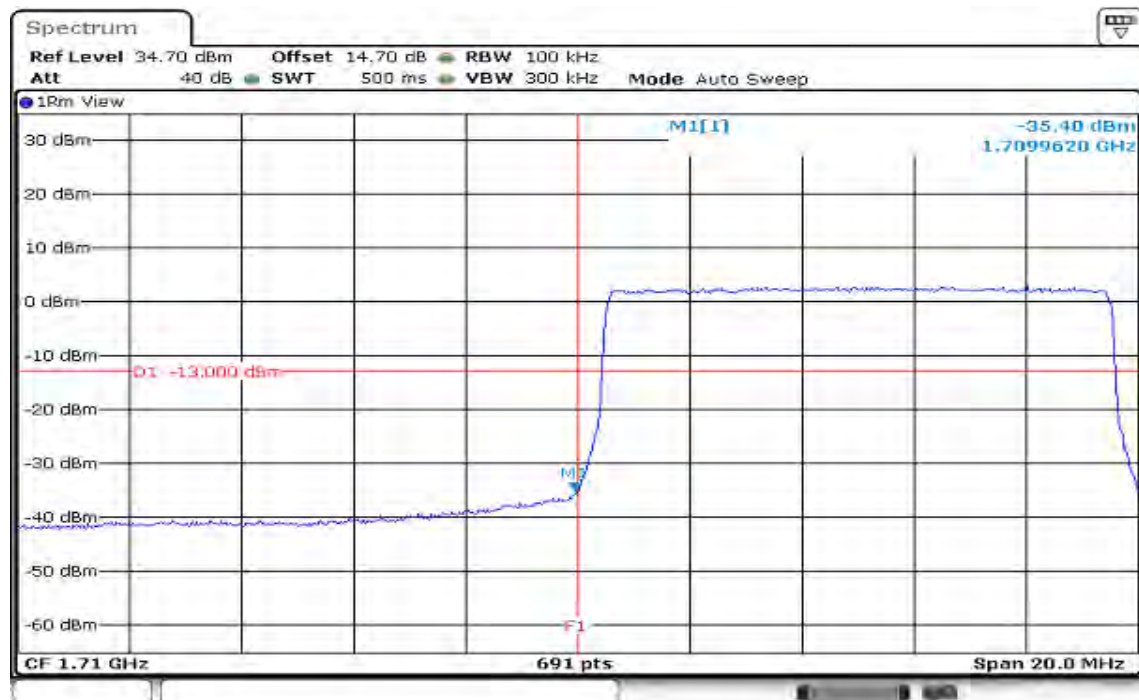
HIGHER BAND EDGE



Date: 14 AUG 2017 10:03:23

CHANNEL BANDWIDTH: 10MHz / 16QAM/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:47:54

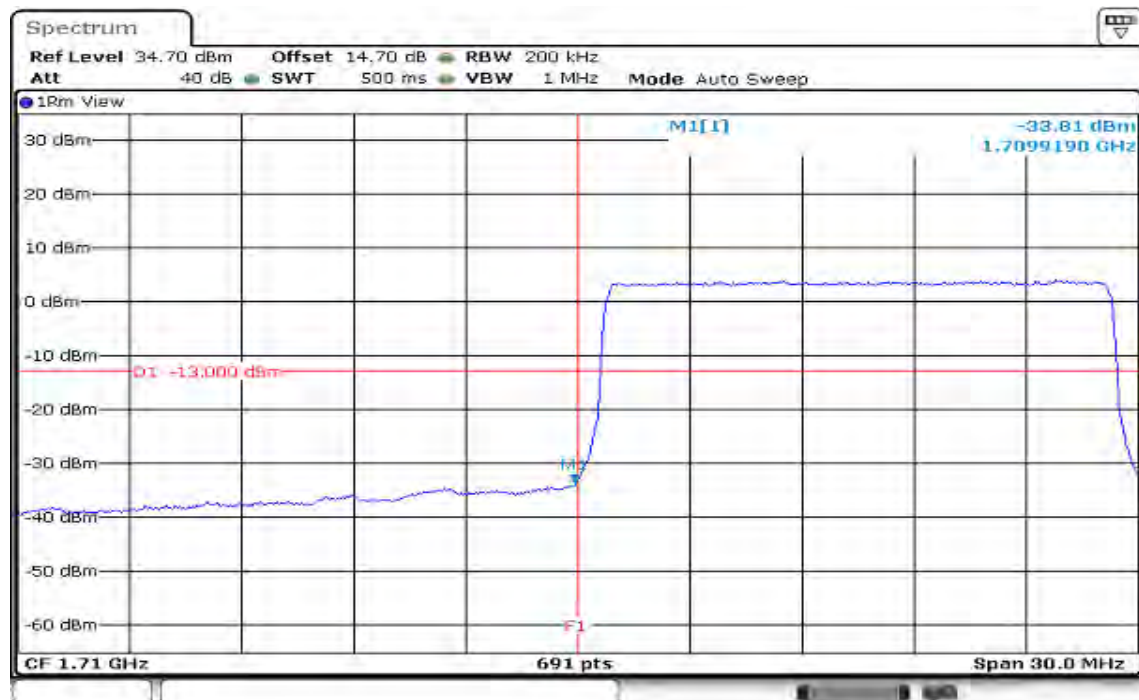
HIGHER BAND EDGE



Date: 14 AUG 2017 10:07:22

CHANNEL BANDWIDTH: 15MHz / 16QAM/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:51:12

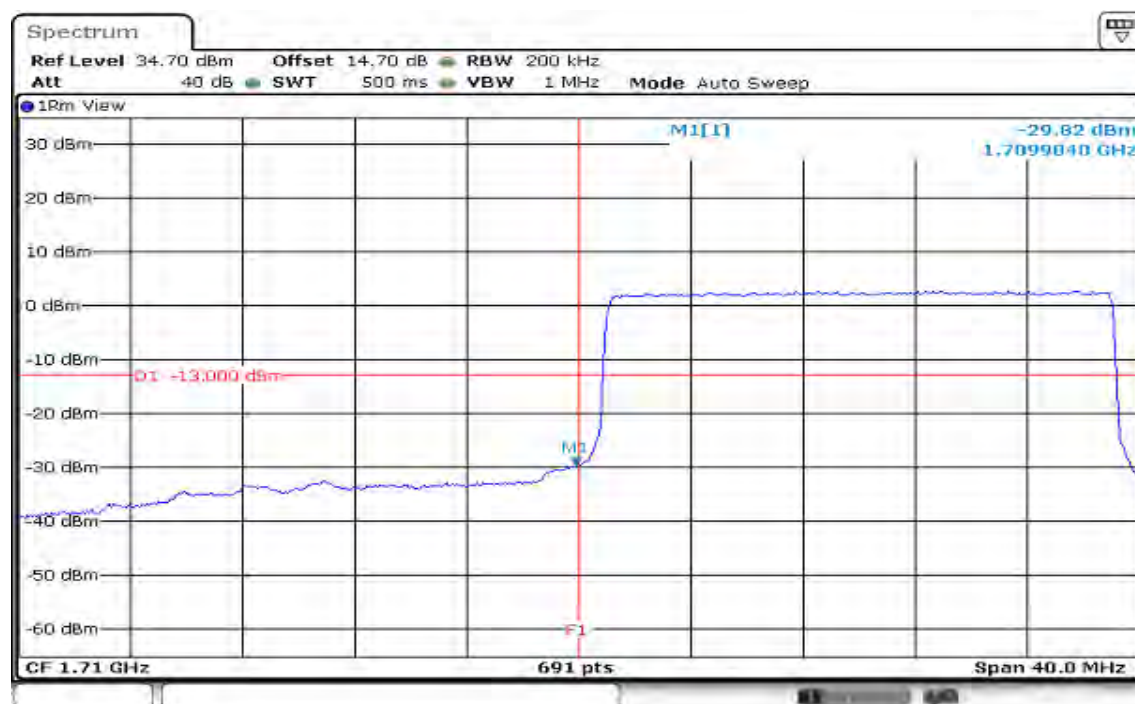
HIGHER BAND EDGE



Date: 14 AUG 2017 10:11:22

CHANNEL BANDWIDTH: 20MHz / 16QAM/ FULLRB ALLOCATION

LOWER BAND EDGE



Date: 14 AUG 2017 09:54:31

HIGHER BAND EDGE



Date: 14 AUG 2017 10:14:15

7.7 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

According to KDB 971168D01, photograph 6.0

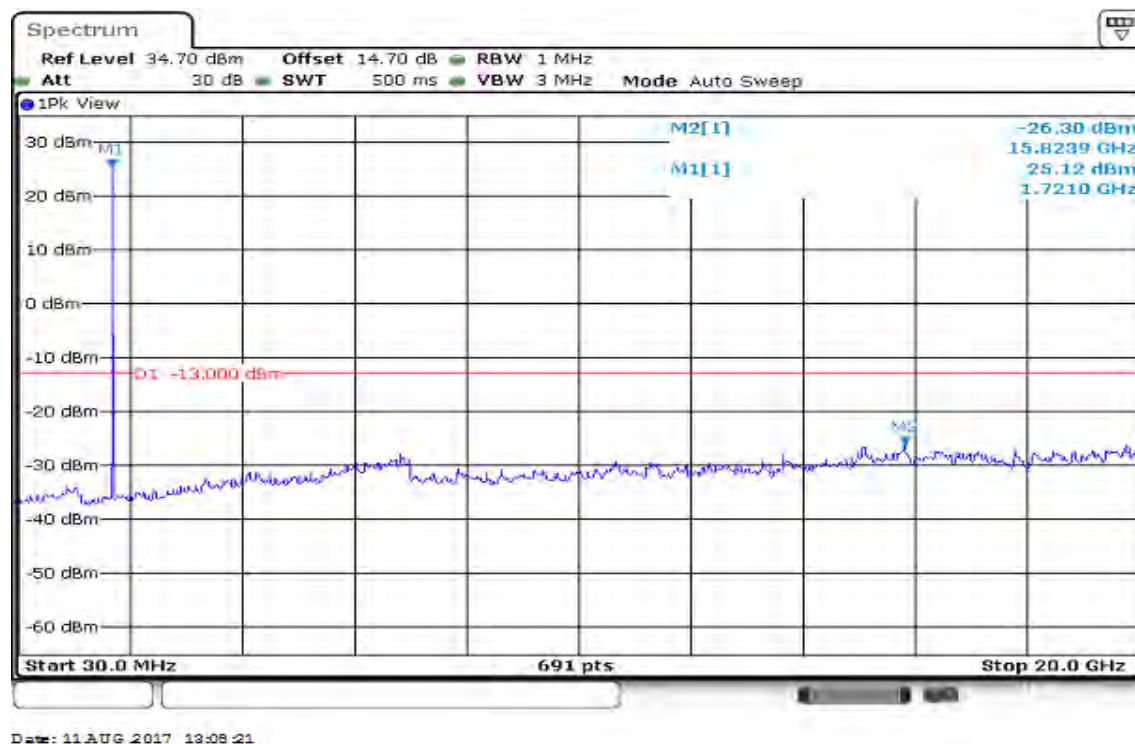
1. The EUT was connect to spectrum analyzer and call box.
2. The RF output of EUT was connected to the spectrum analyzer.
3. Set the spectrum analyzer , RBW=1MHz, VBW=3MHz.
4. Record the maximum spurious emission.
5. The fundamental frequency should be excluded against the limit in operating band.

TEST RESULTS

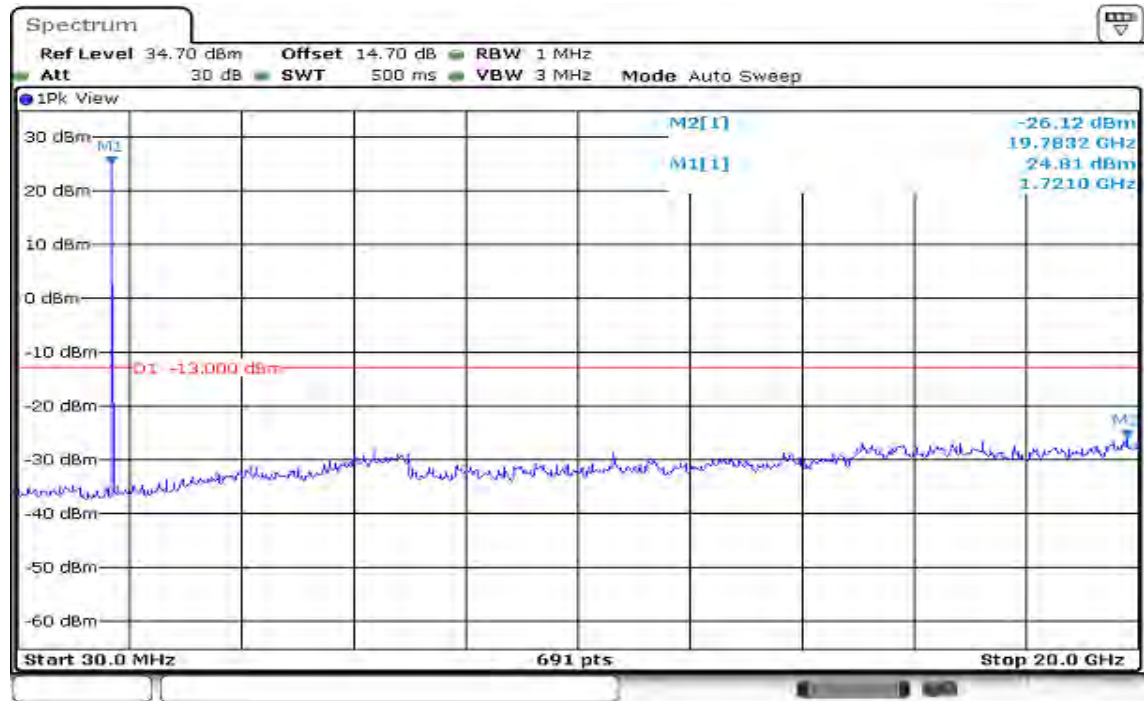
LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK

CH Low

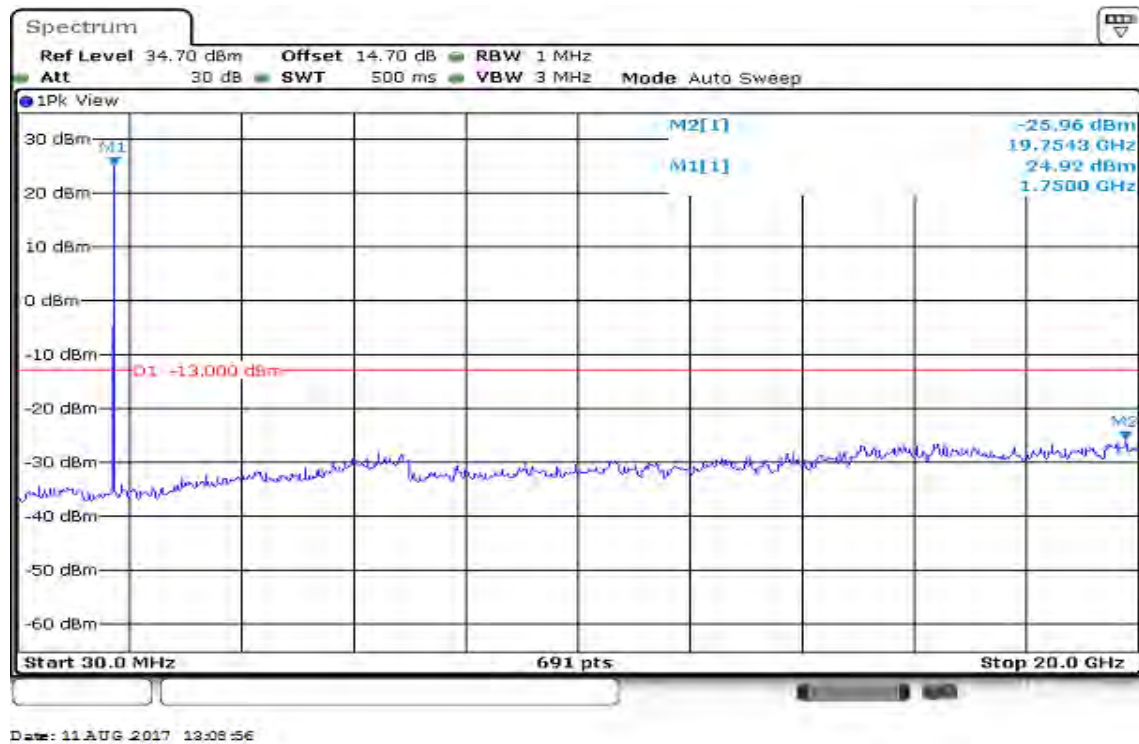


CH Mid



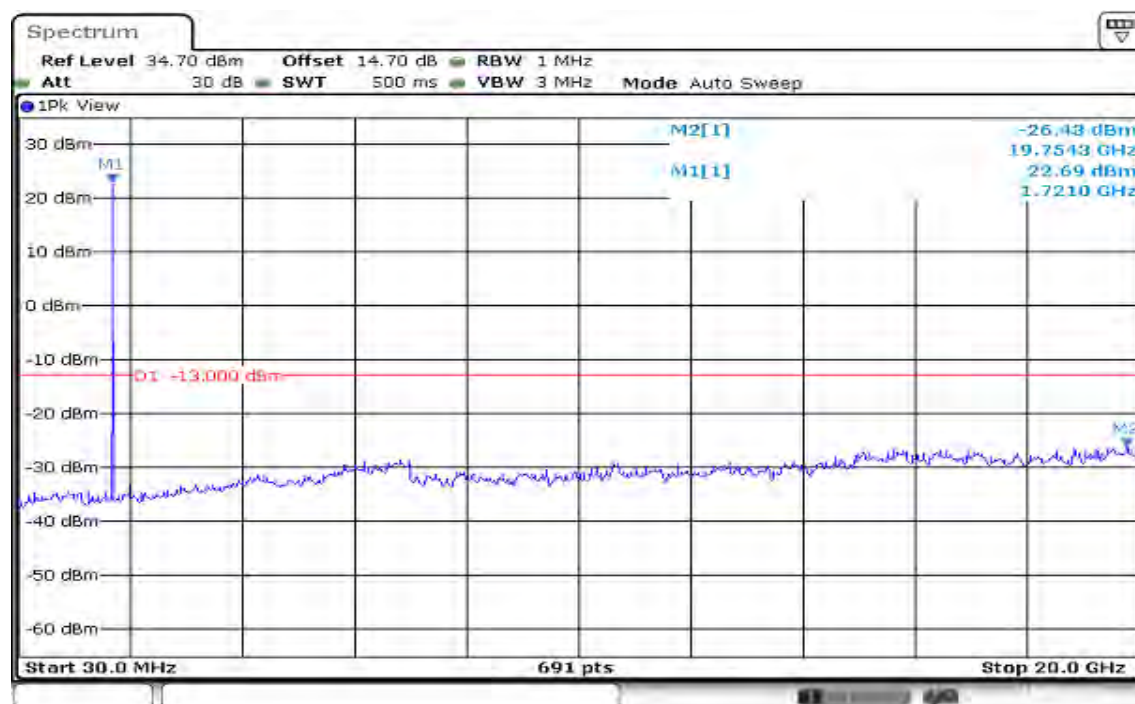
Date: 11 AUG 2017 13:07:40

CH High



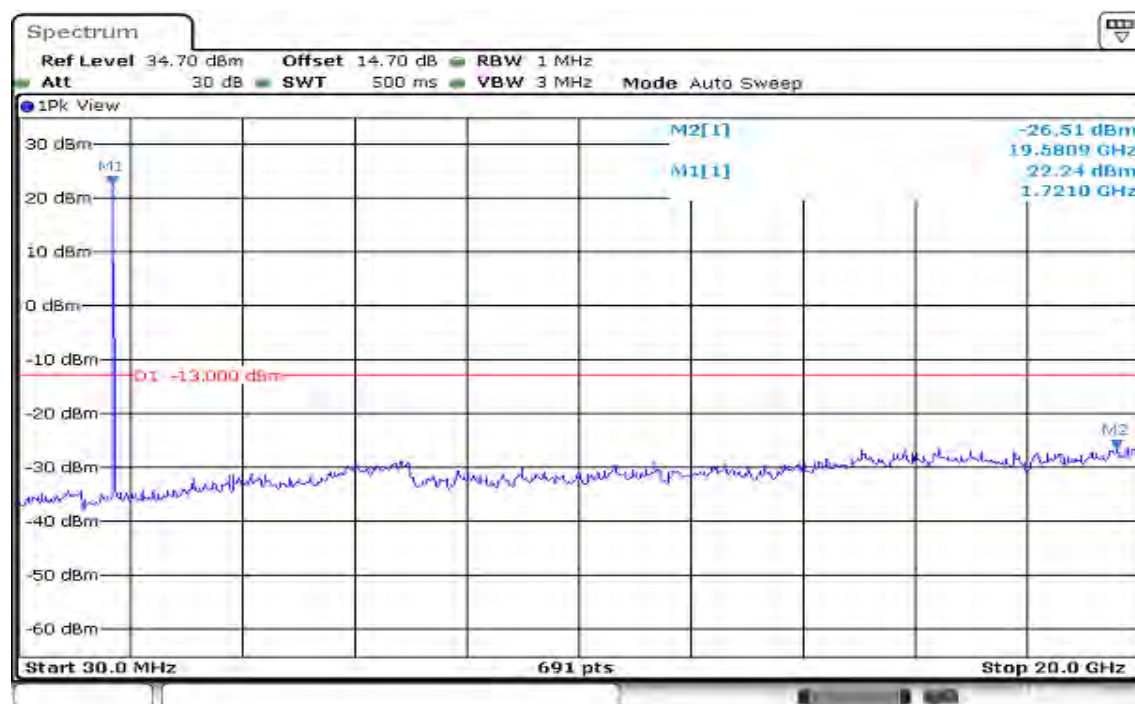
CHANNEL BANDWIDTH: 3MHz /QPSK

CH Low



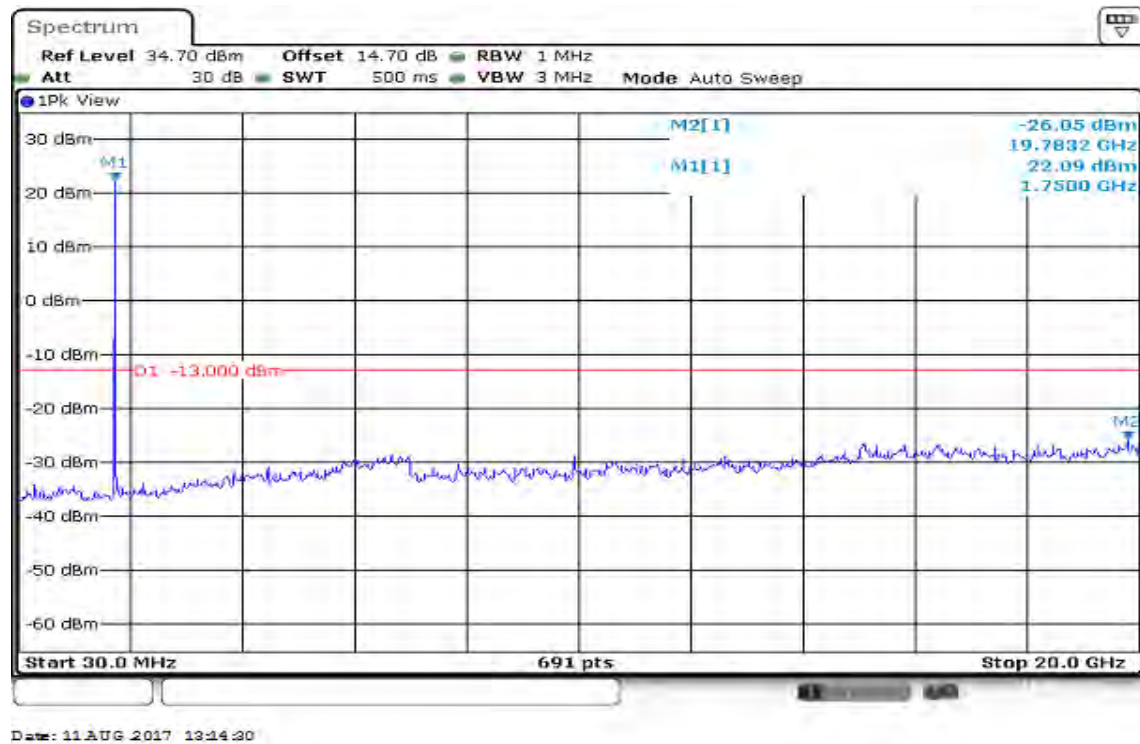
Date: 11 AUG 2017 13:15:13

CH Mid



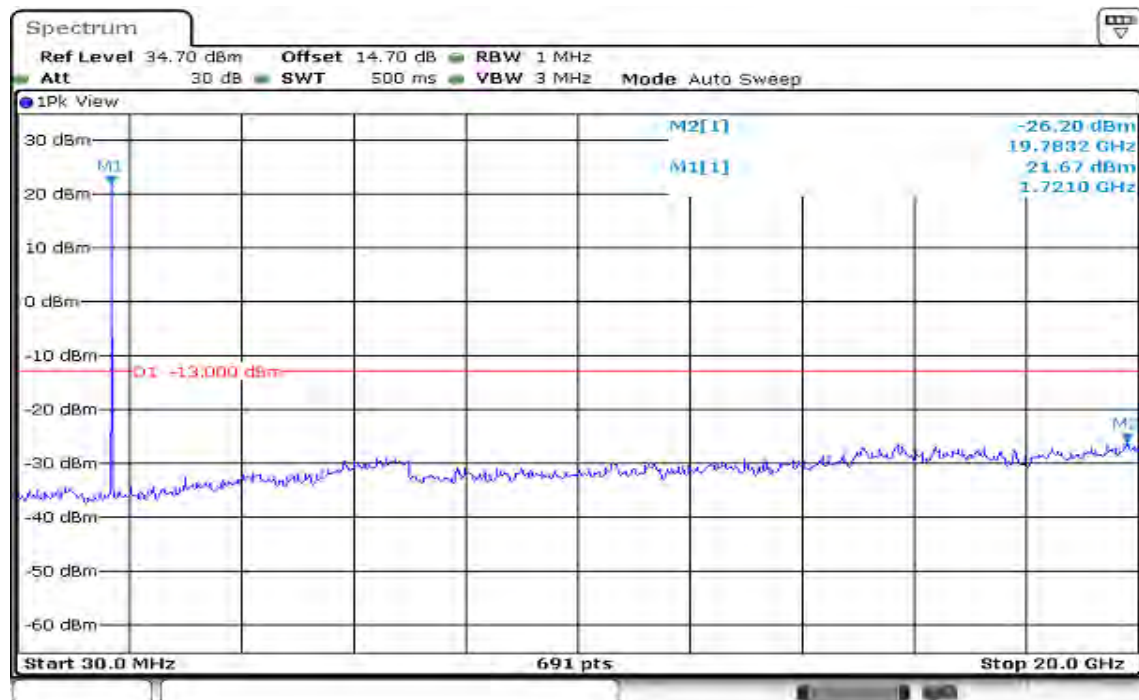
Date: 11 AUG 2017 13:15:50

CH High



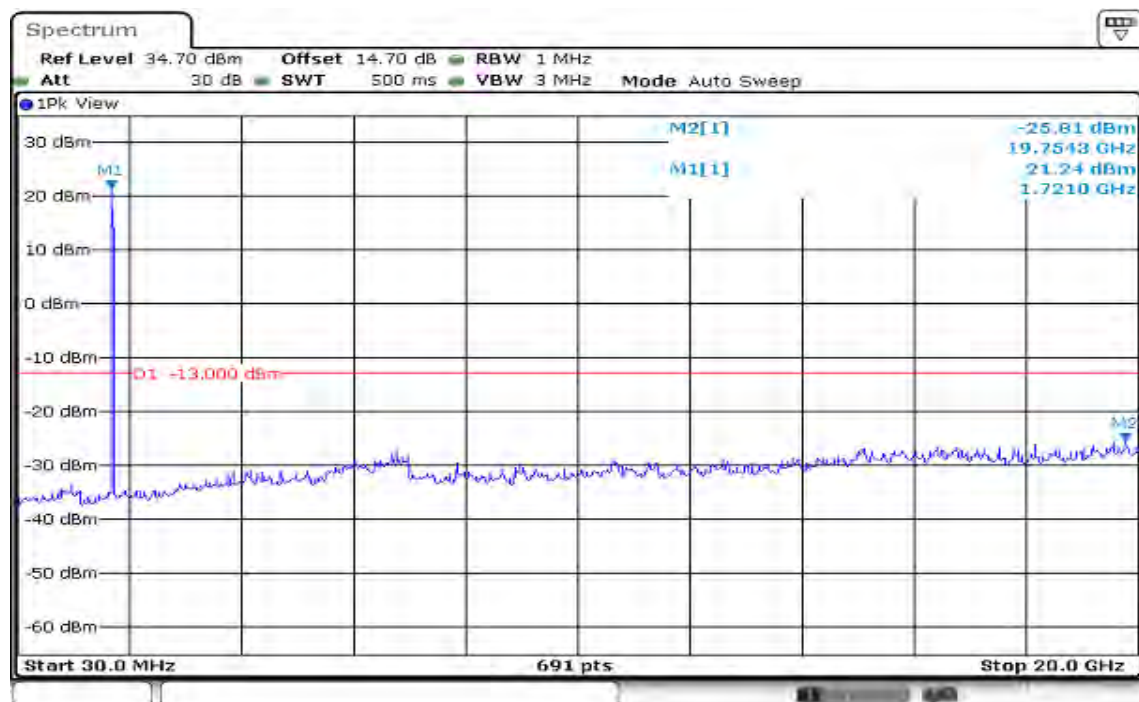
CHANNEL BANDWIDTH: 5MHz /QPSK

CH Low



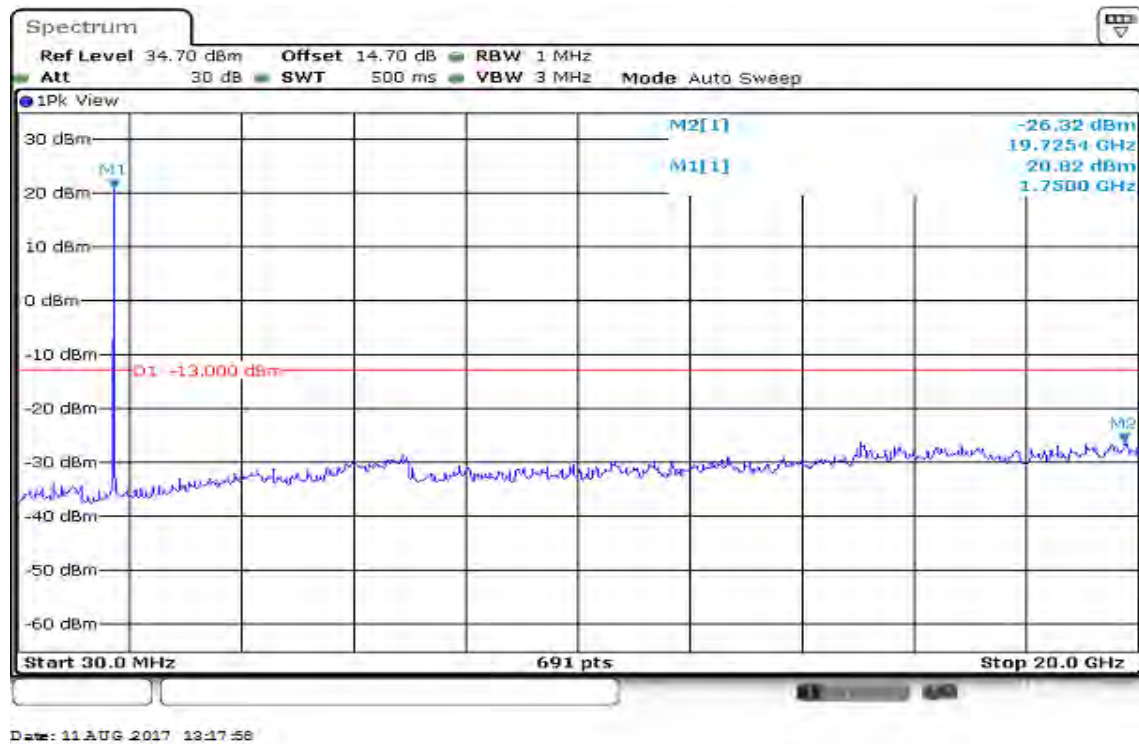
Date: 11 AUG 2017 13:17:11

CH Mid



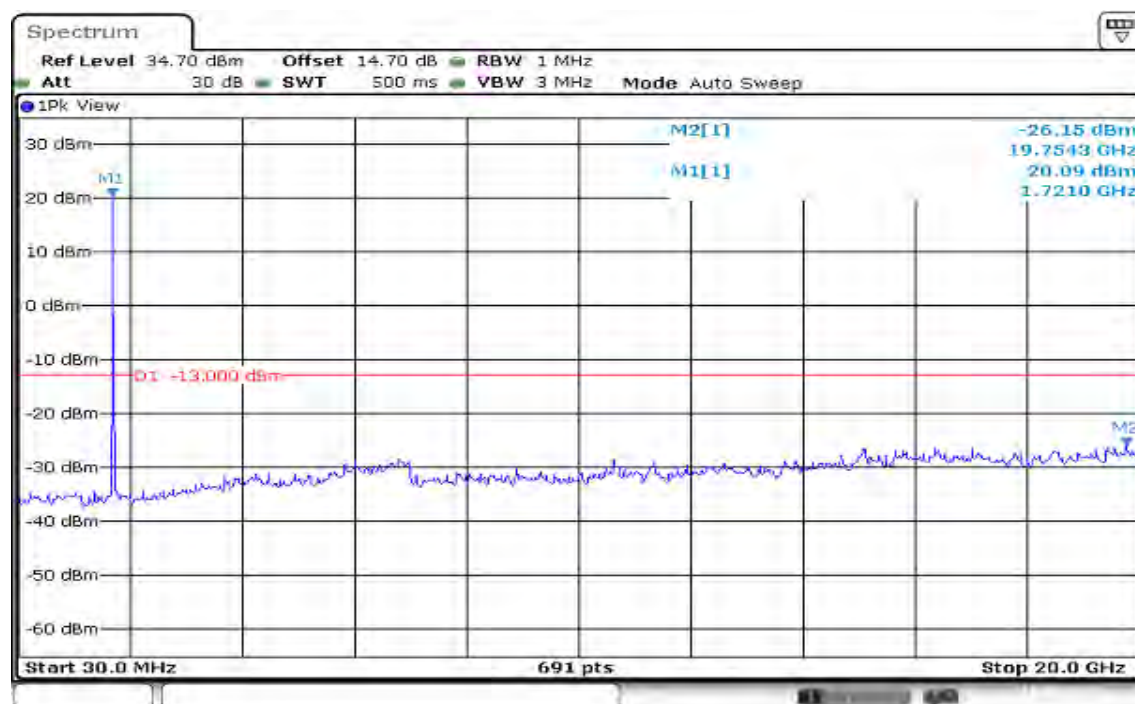
Date: 11 AUG 2017 13:16:29

CH High



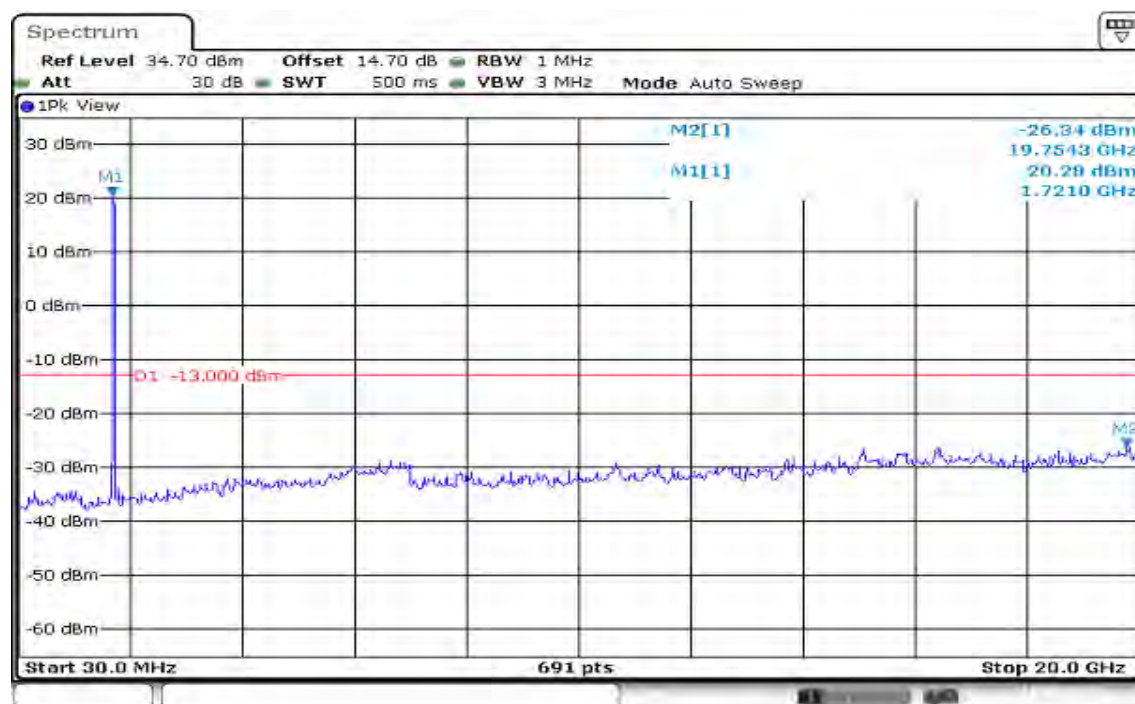
CHANNEL BANDWIDTH: 10MHz /QPSK

CH Low



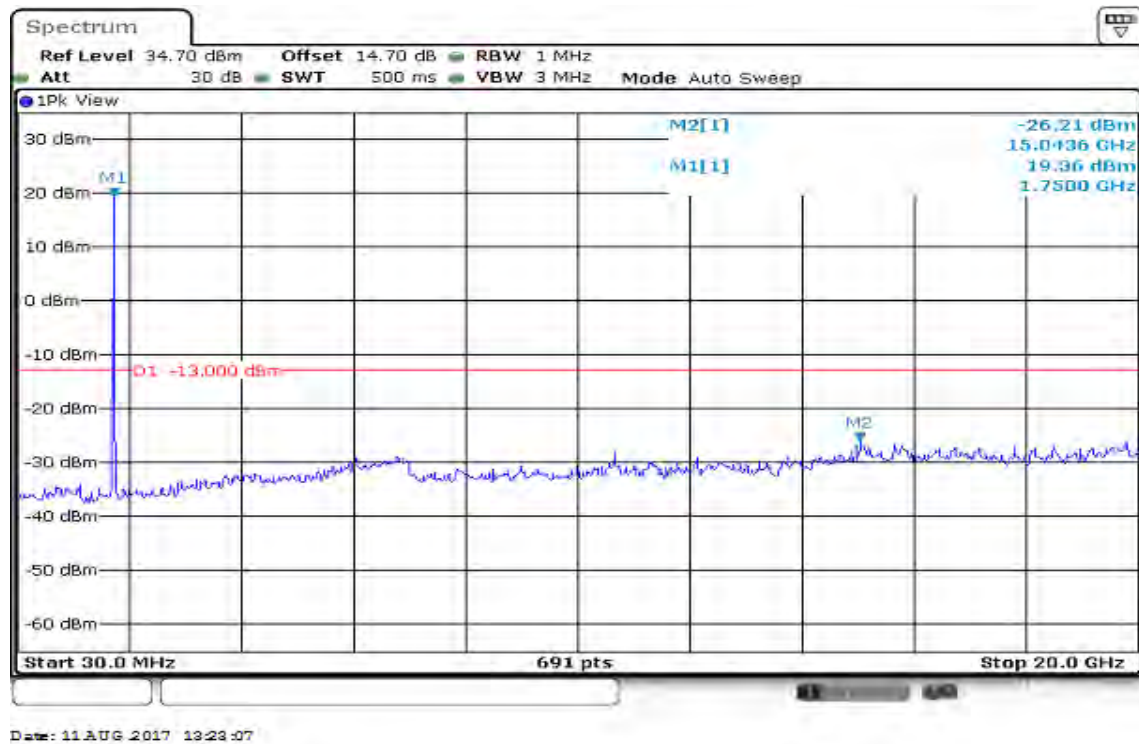
Date: 11 AUG 2017 13:22:31

CH Mid



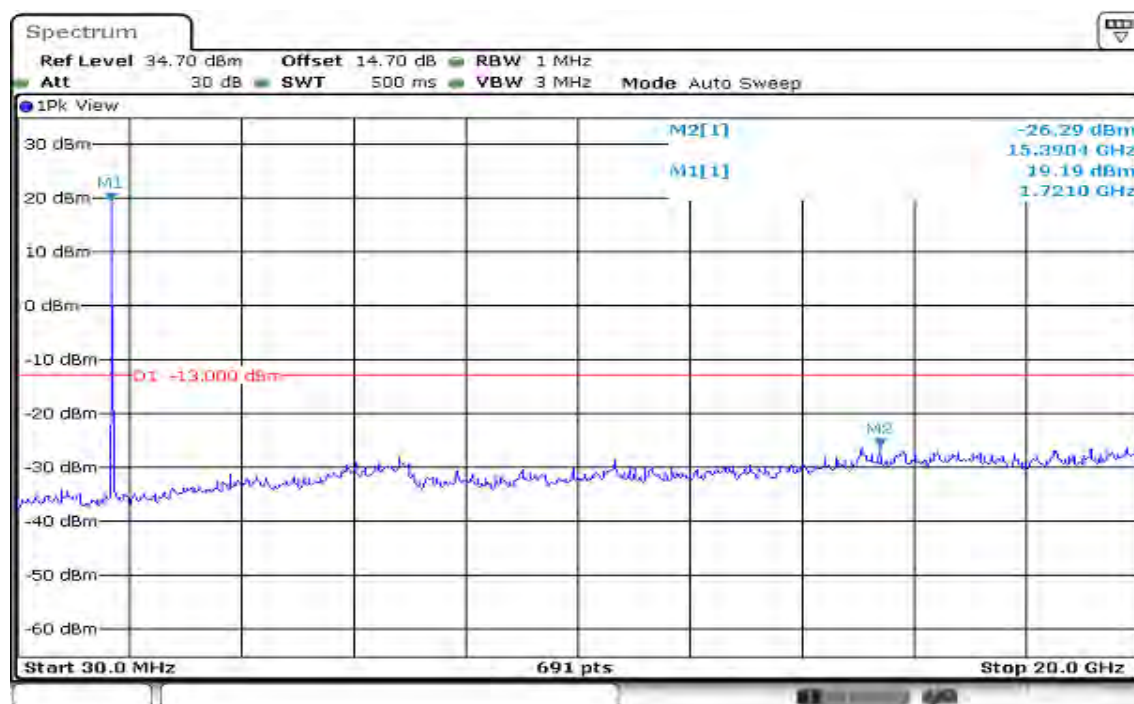
Date: 11 AUG 2017 13:20:17

CH High



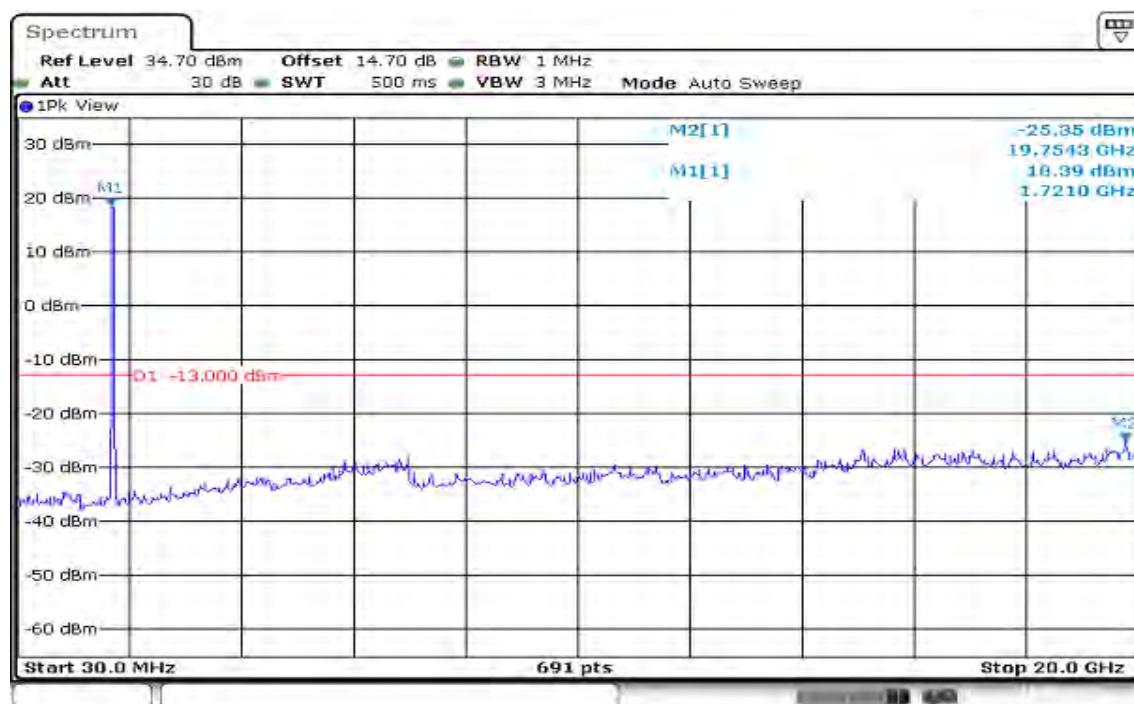
CHANNEL BANDWIDTH: 15MHz /QPSK

CH Low



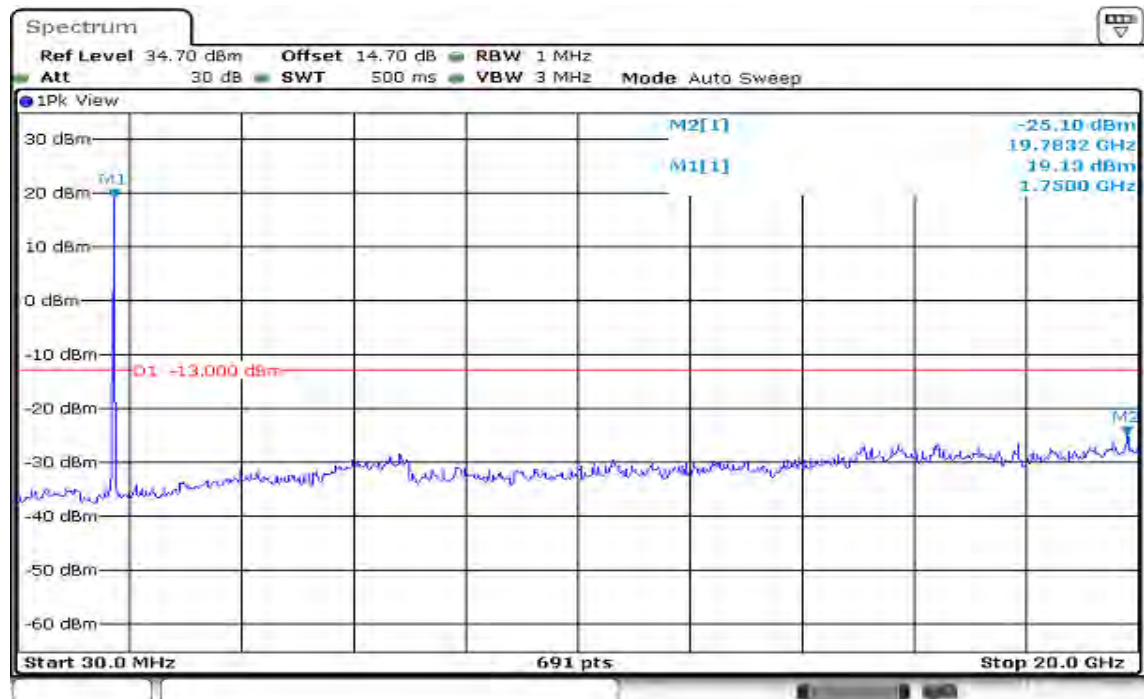
Date: 11 AUG 2017 13:26:25

CH Mid



Date: 11 AUG 2017 13:25:24

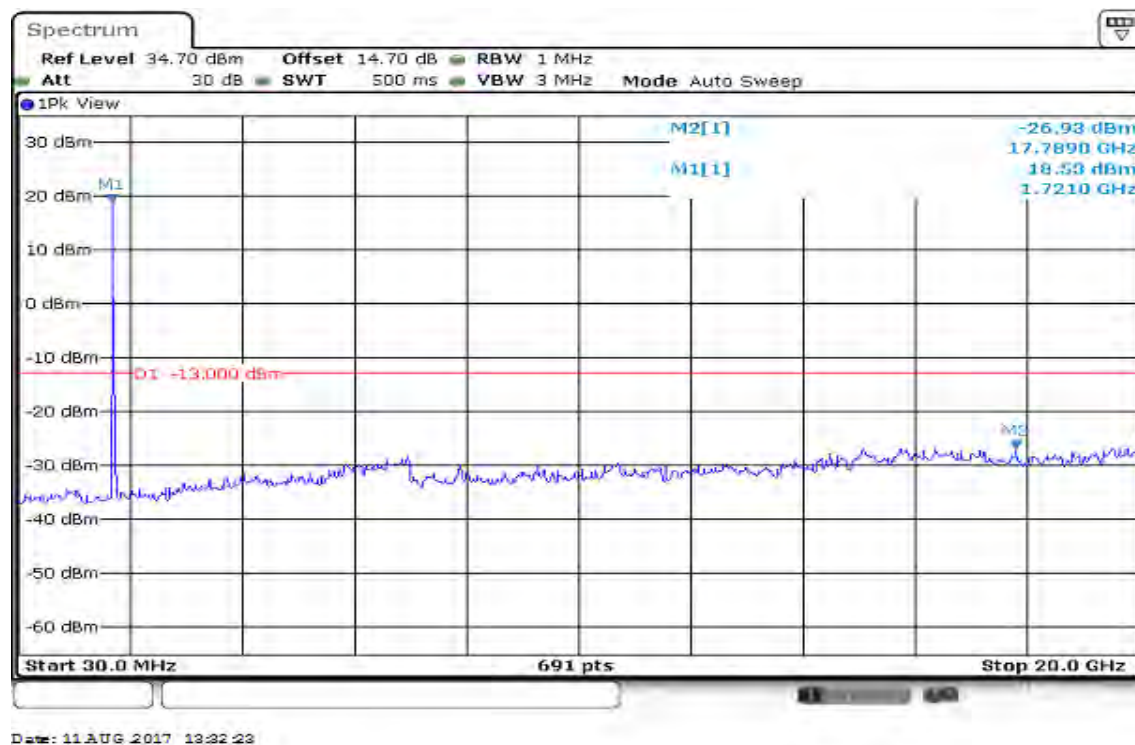
CH High



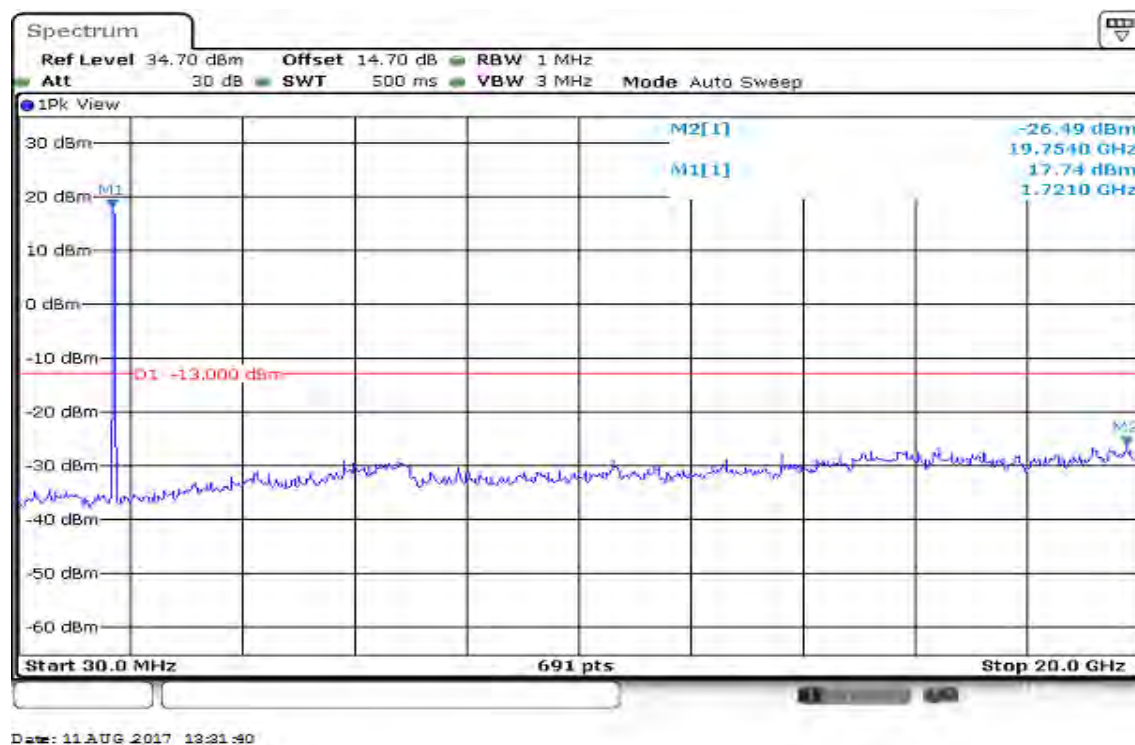
Date: 11 AUG 2017 13:27:15

CHANNEL BANDWIDTH: 20MHz /QPSK

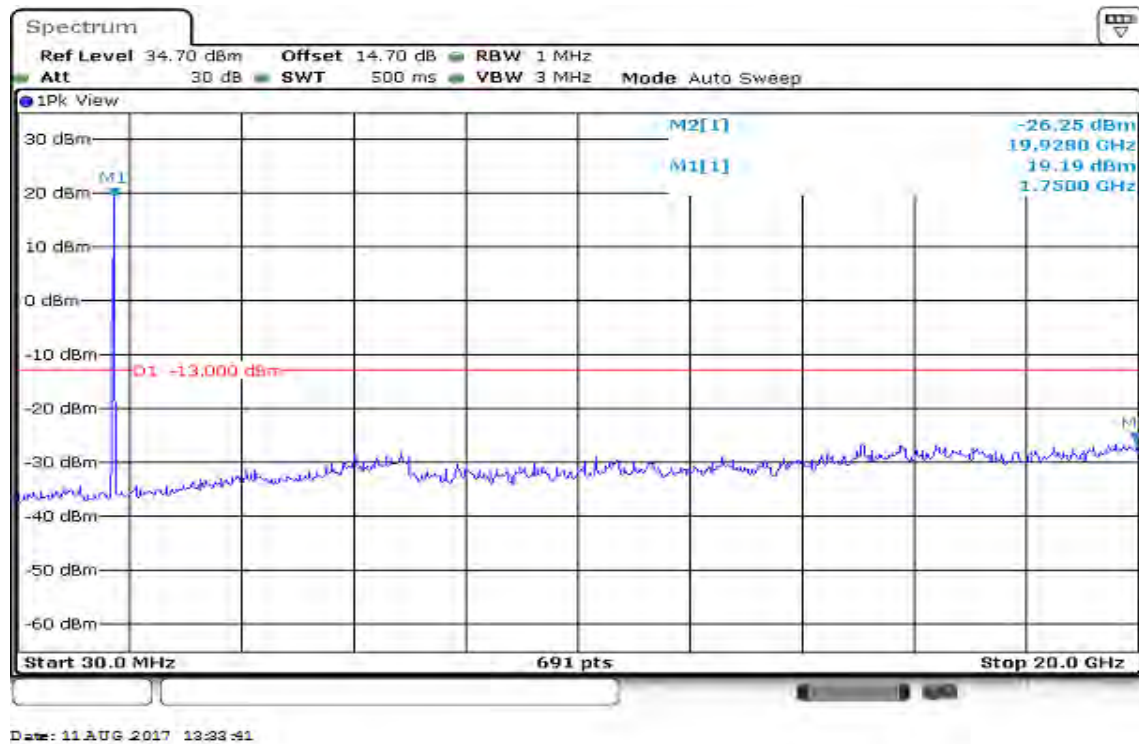
CH Low



CH Mid

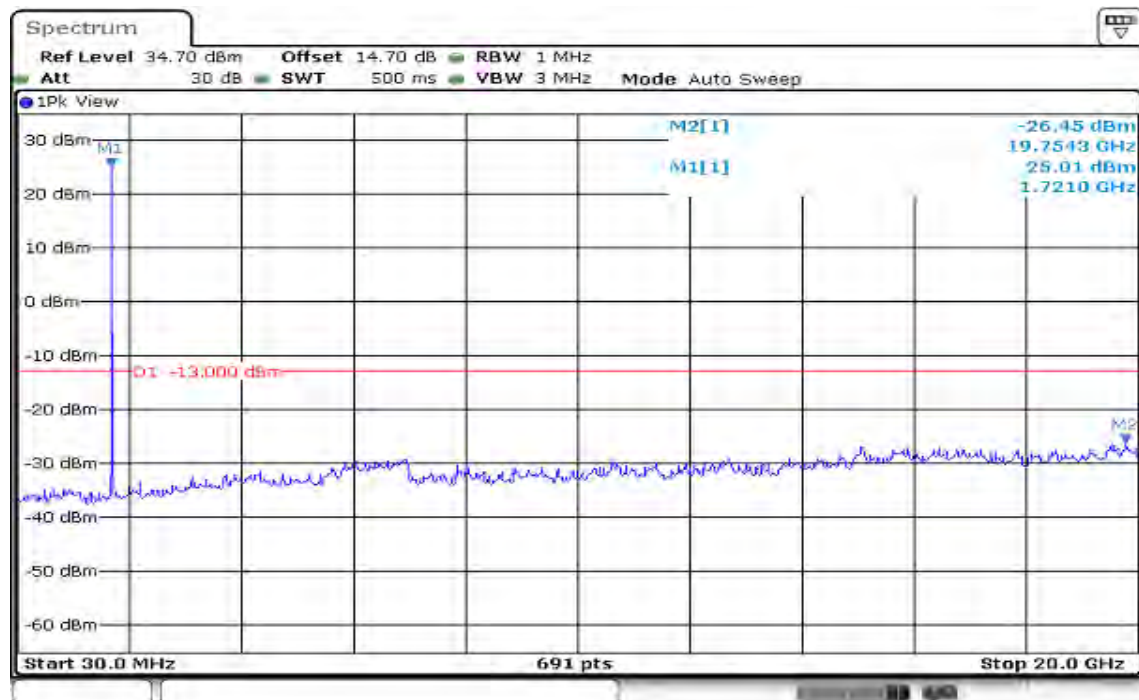


CH High



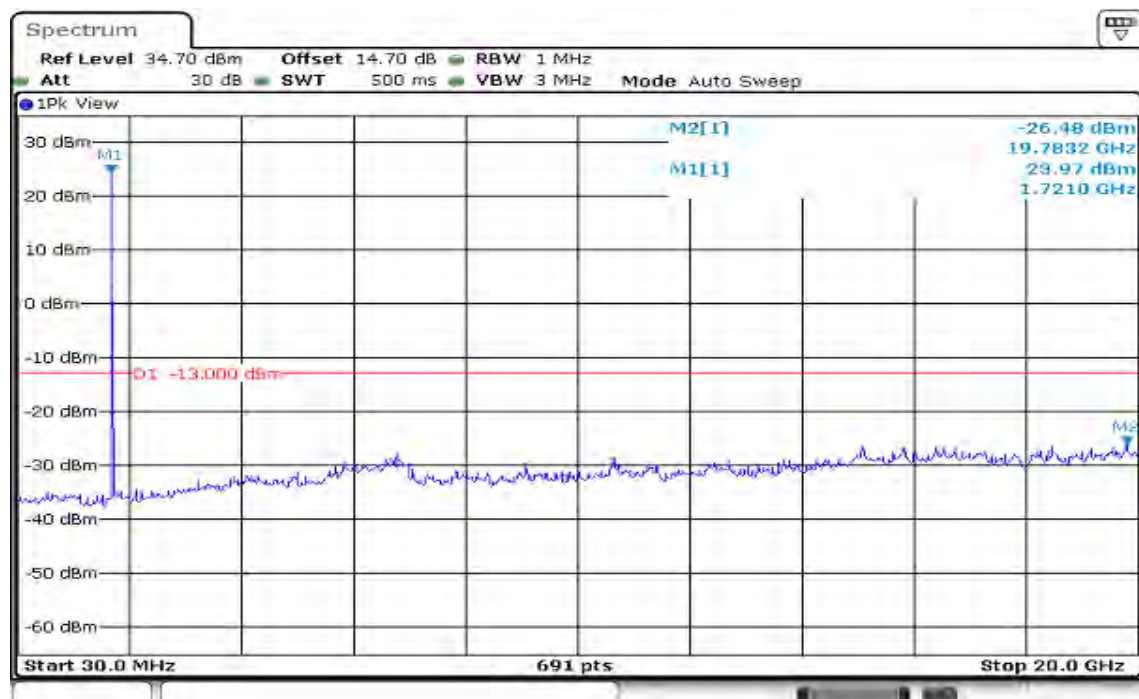
CHANNEL BANDWIDTH:1.4MHz /16QAM

CH Low



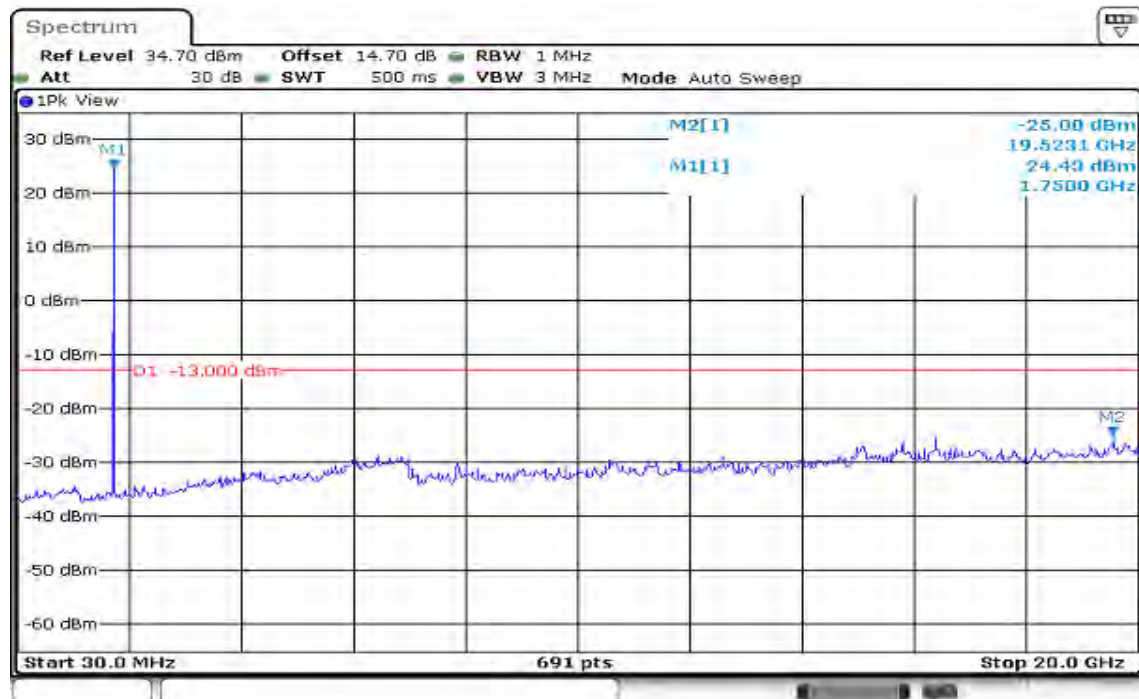
Date: 11 AUG 2017 13:10:58

CH Mid



Date: 11 AUG 2017 13:10:18

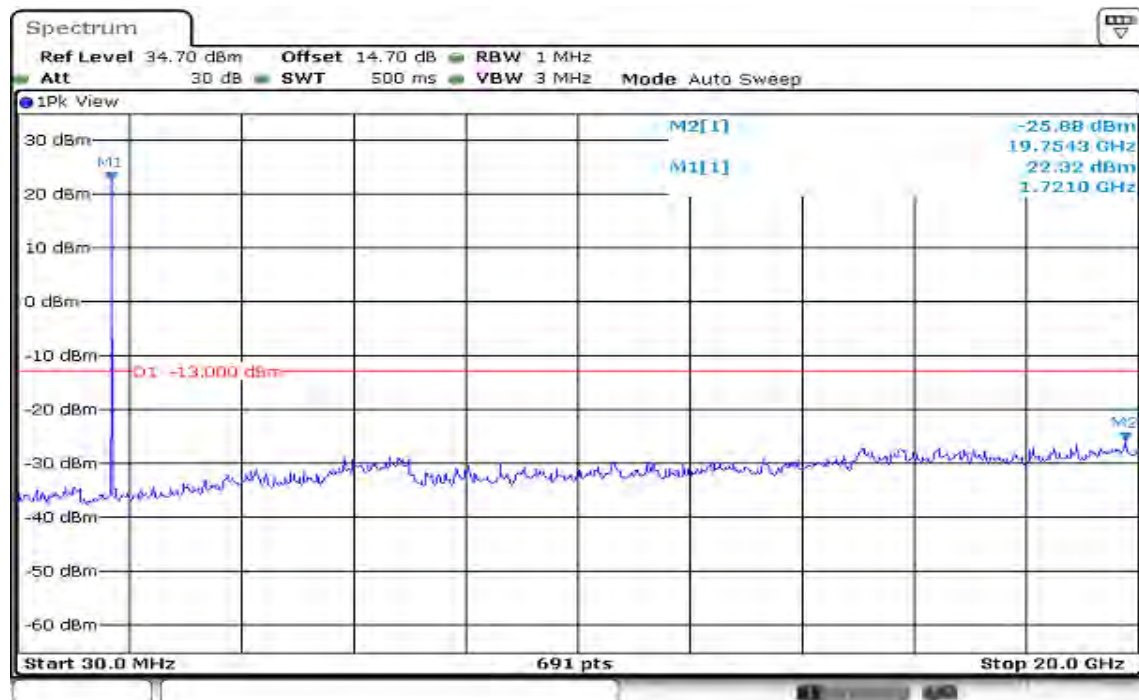
CH High



Date: 11 AUG 2017 13:09:32

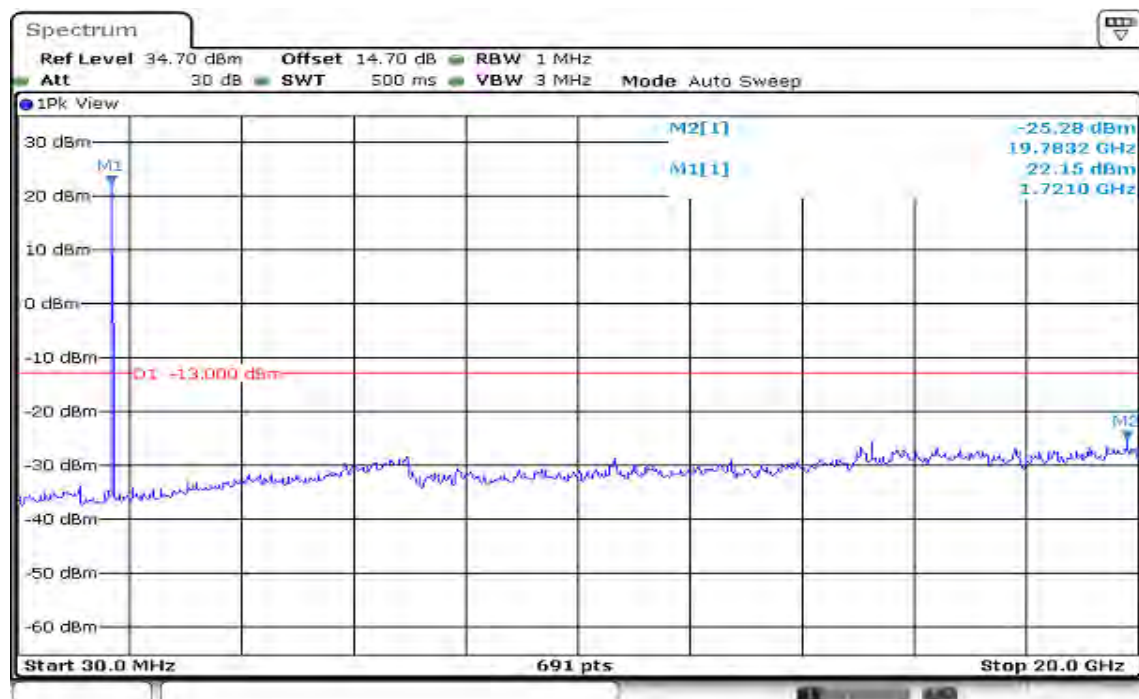
CHANNEL BANDWIDTH:3MHz /16QAM

CH Low



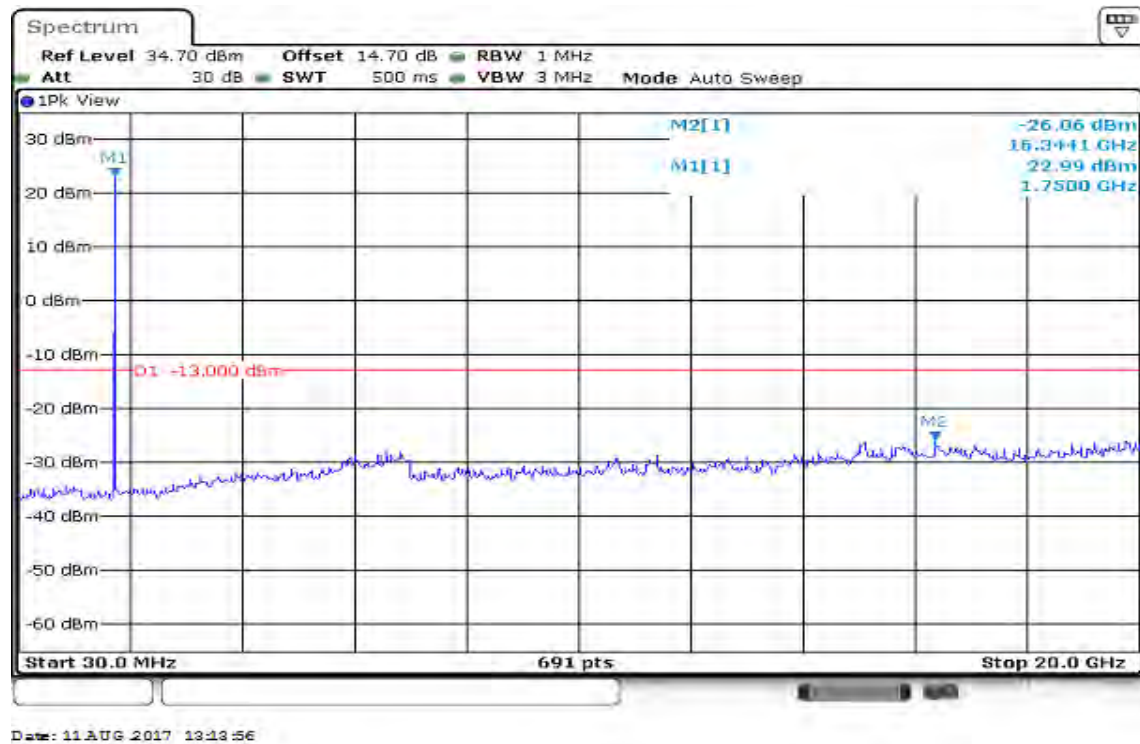
Date: 11 AUG 2017 13:13:20

CH Mid



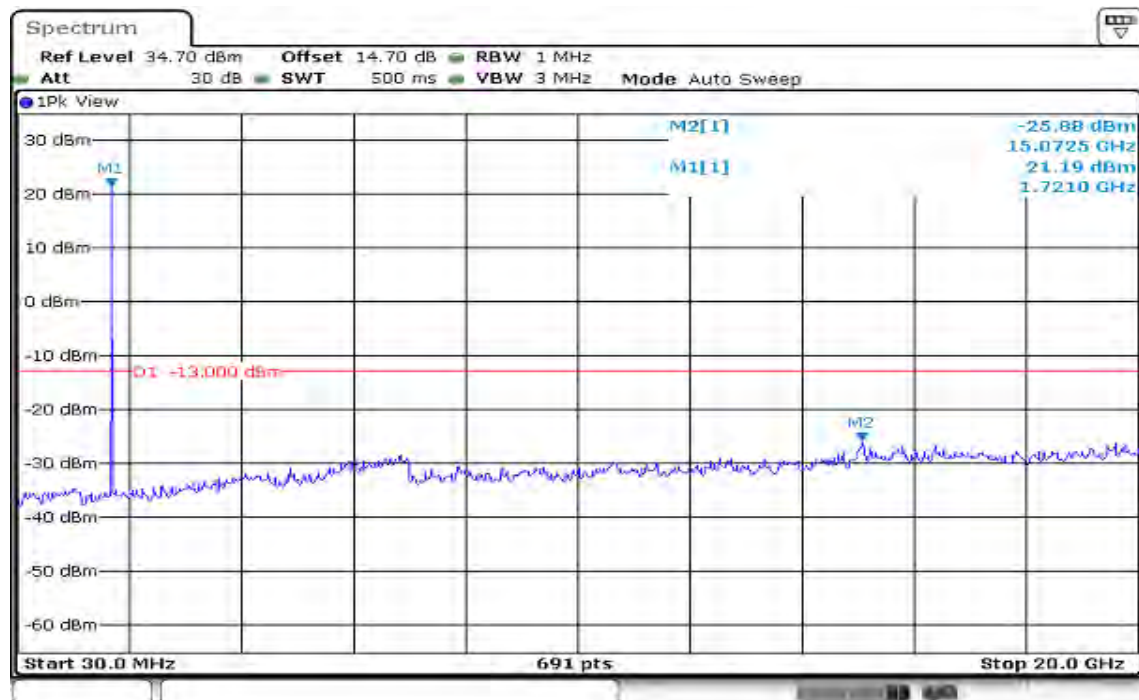
Date: 11 AUG 2017 13:12:40

CH High



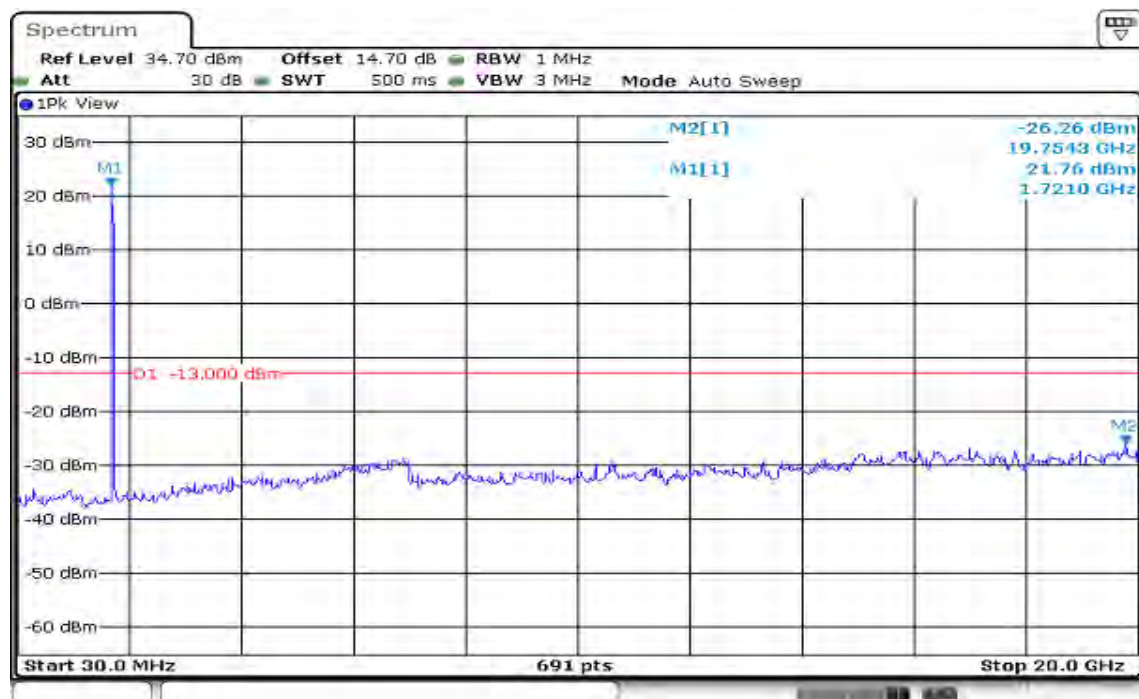
CHANNEL BANDWIDTH:5MHz /16QAM

CH Low



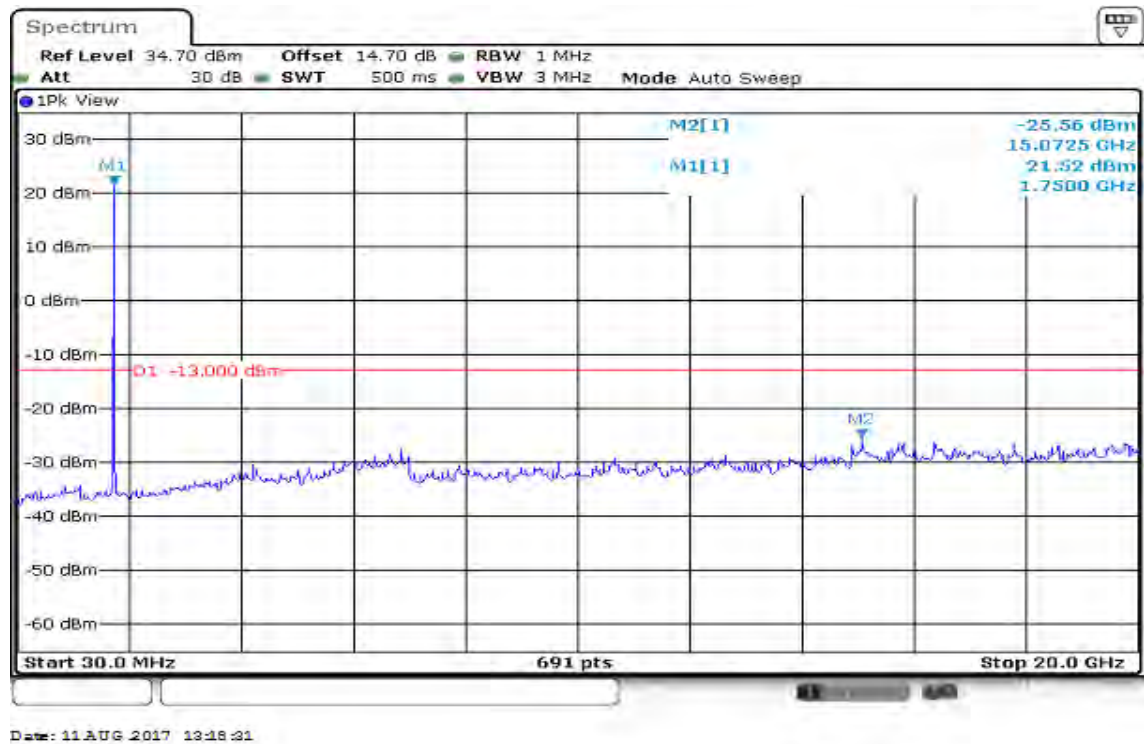
Date: 11 AUG 2017 13:19:09

CH Mid



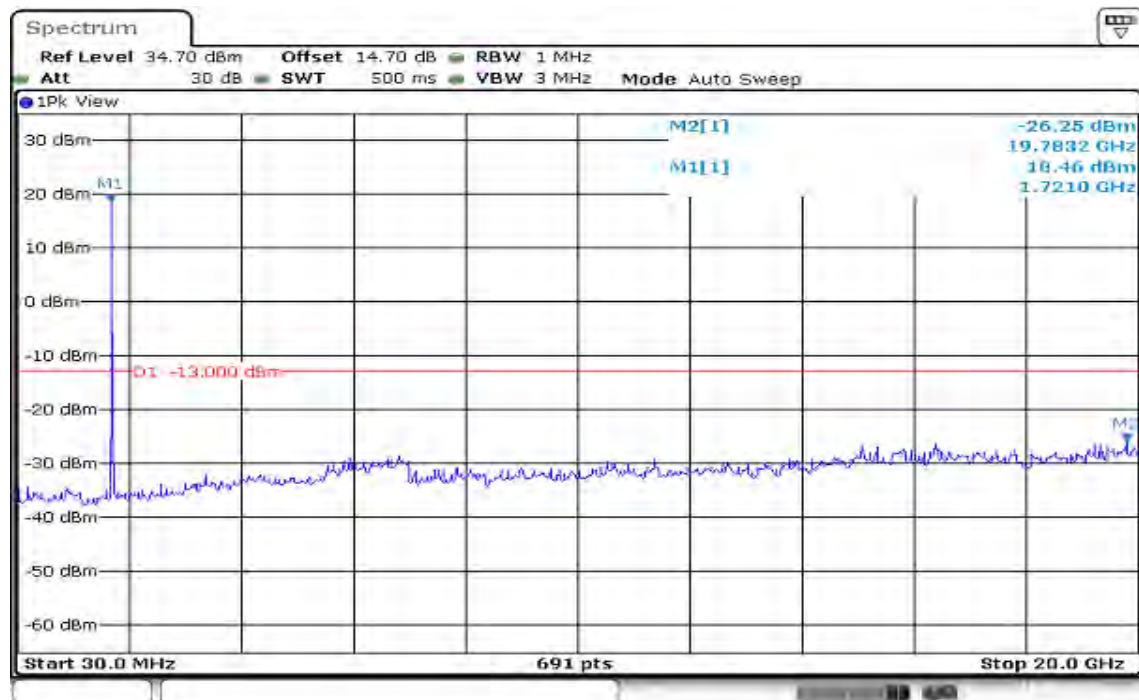
Date: 11 AUG 2017 13:19:29

CH High



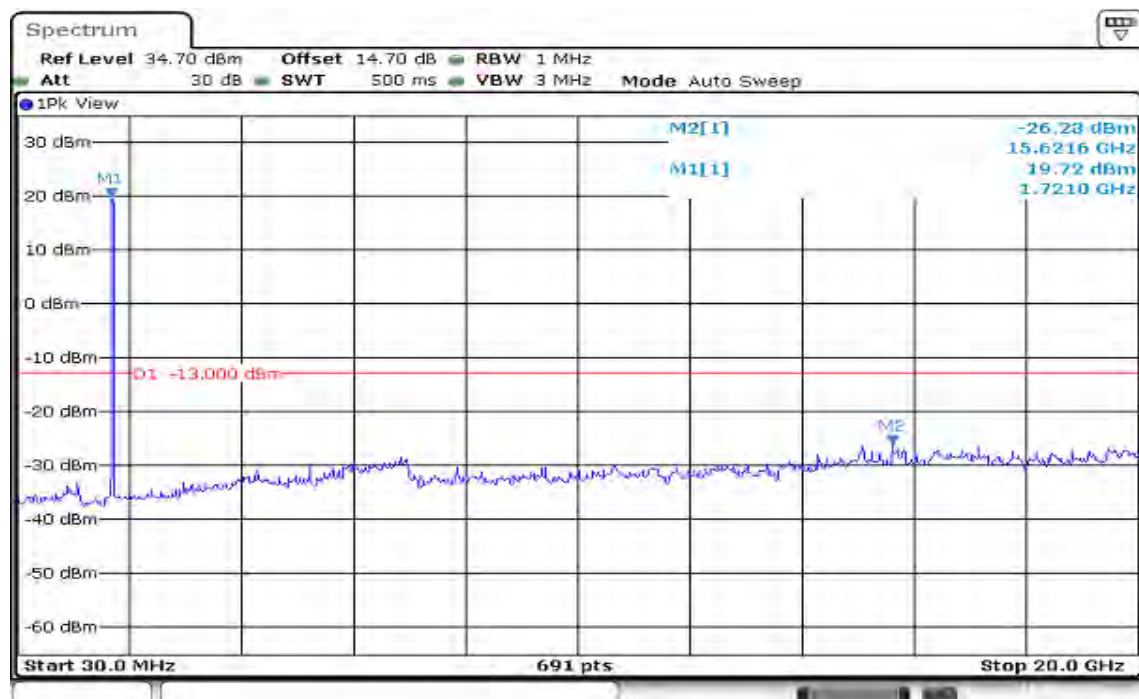
CHANNEL BANDWIDTH:10MHz /16QAM

CH Low



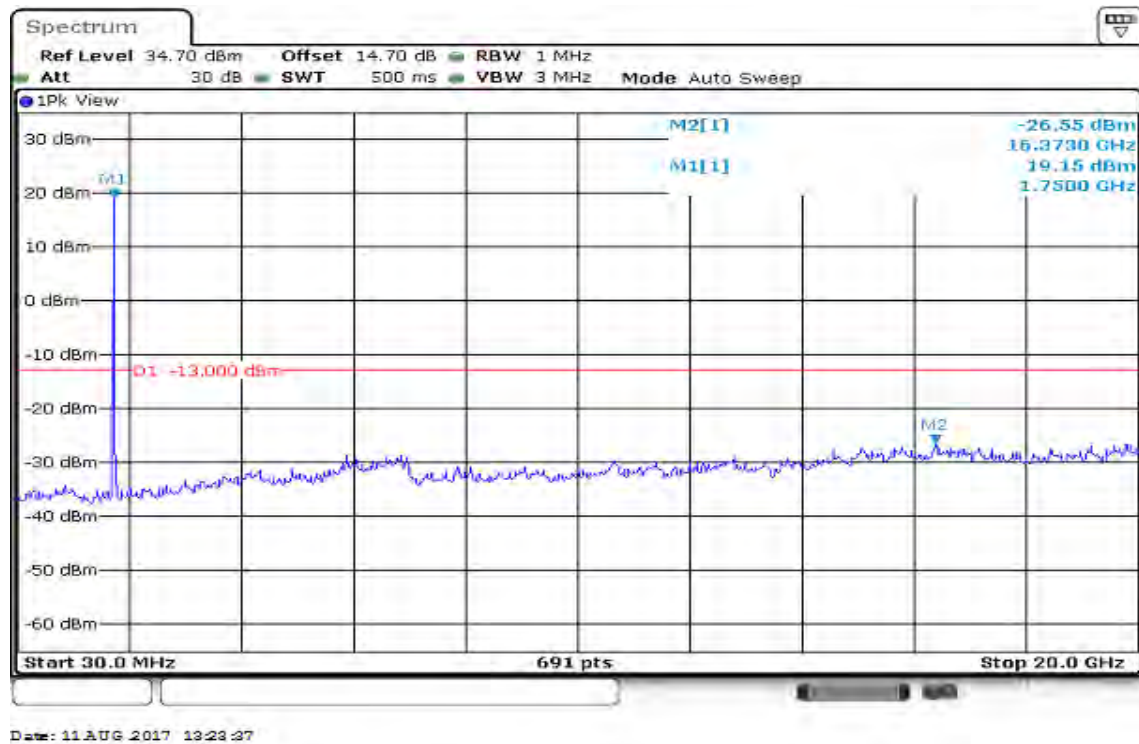
Date: 11 AUG 2017 13:24:15

CH Mid



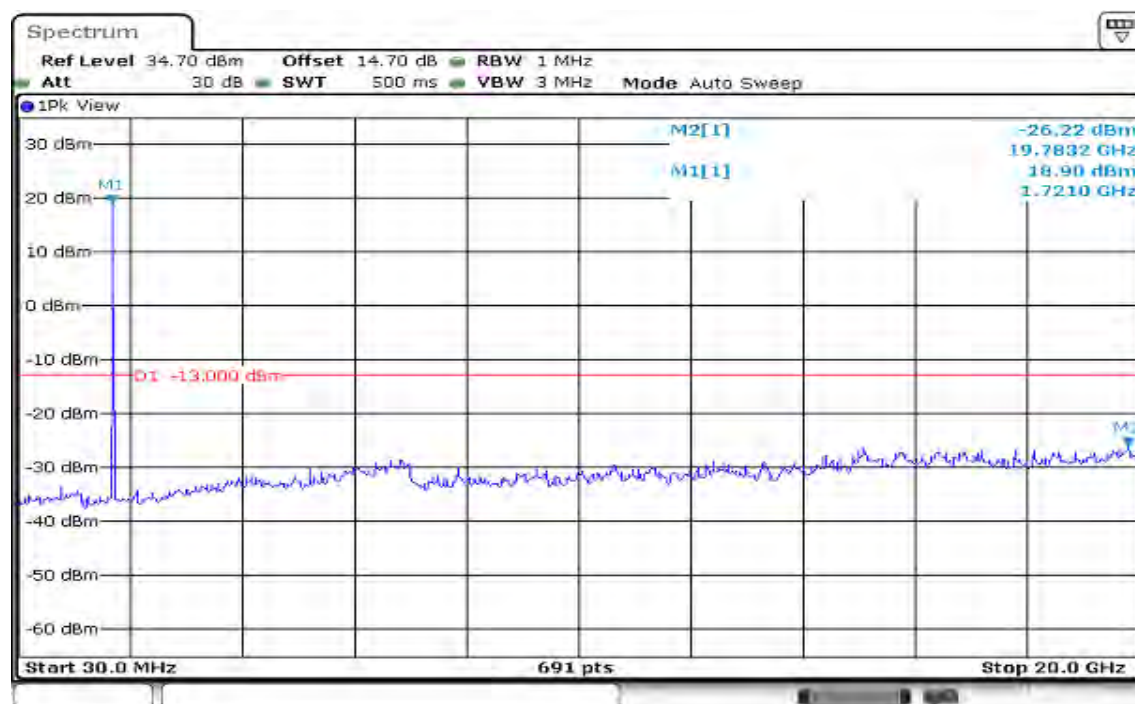
Date: 11 AUG 2017 13:24:44

CH High



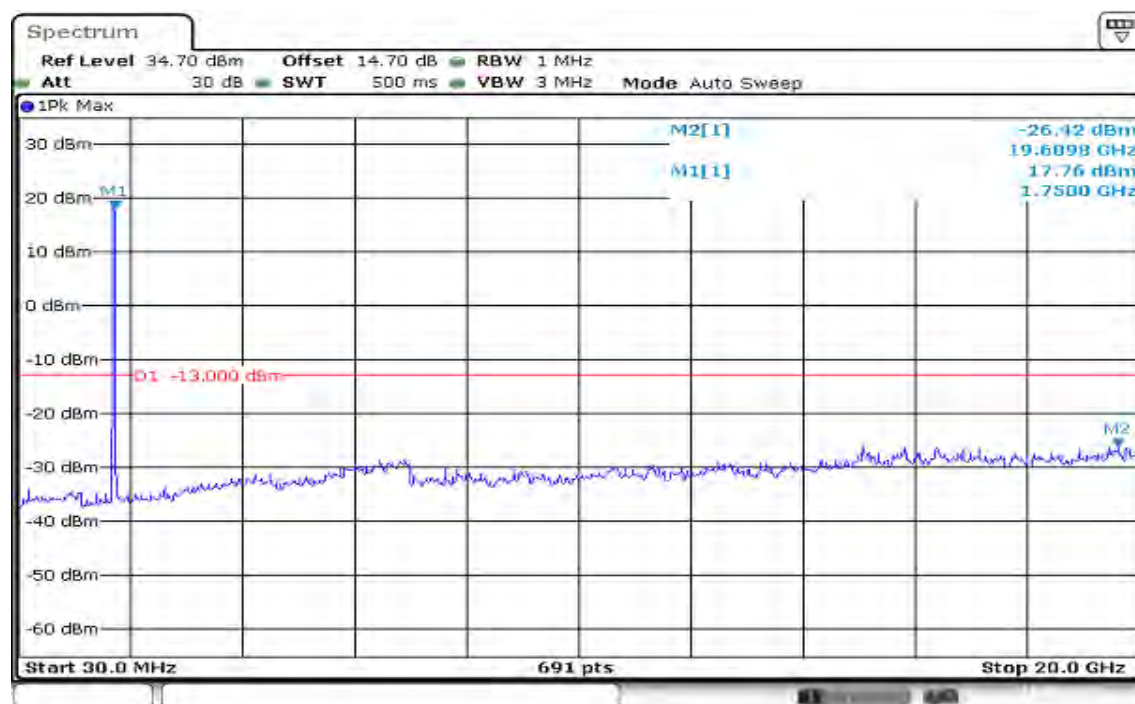
CHANNEL BANDWIDTH:15MHz /16QAM

CH Low



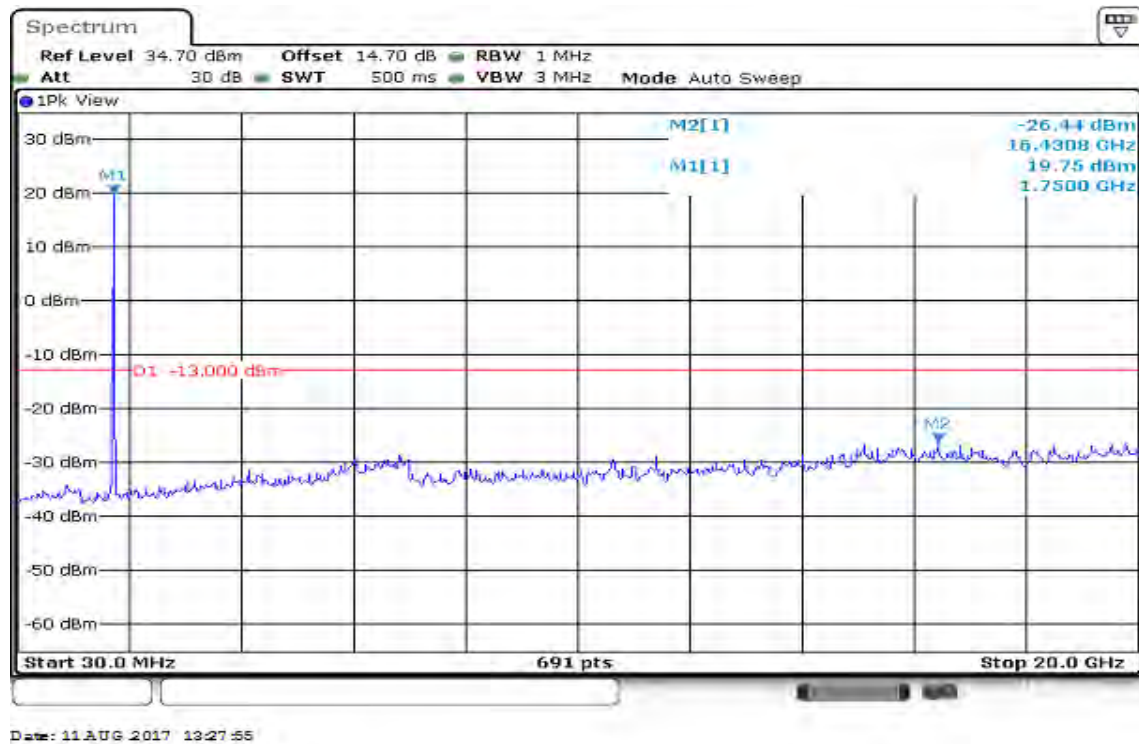
Date: 11 AUG 2017 13:28:36

CH Mid



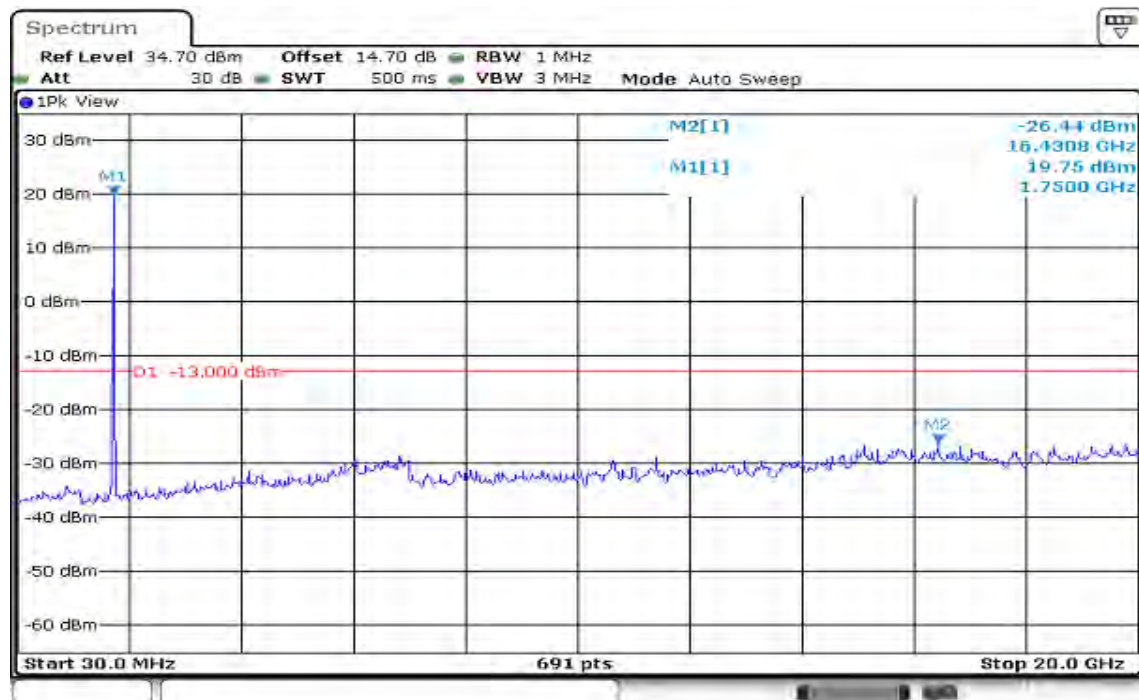
Date: 11 AUG 2017 13:29:00

CH High



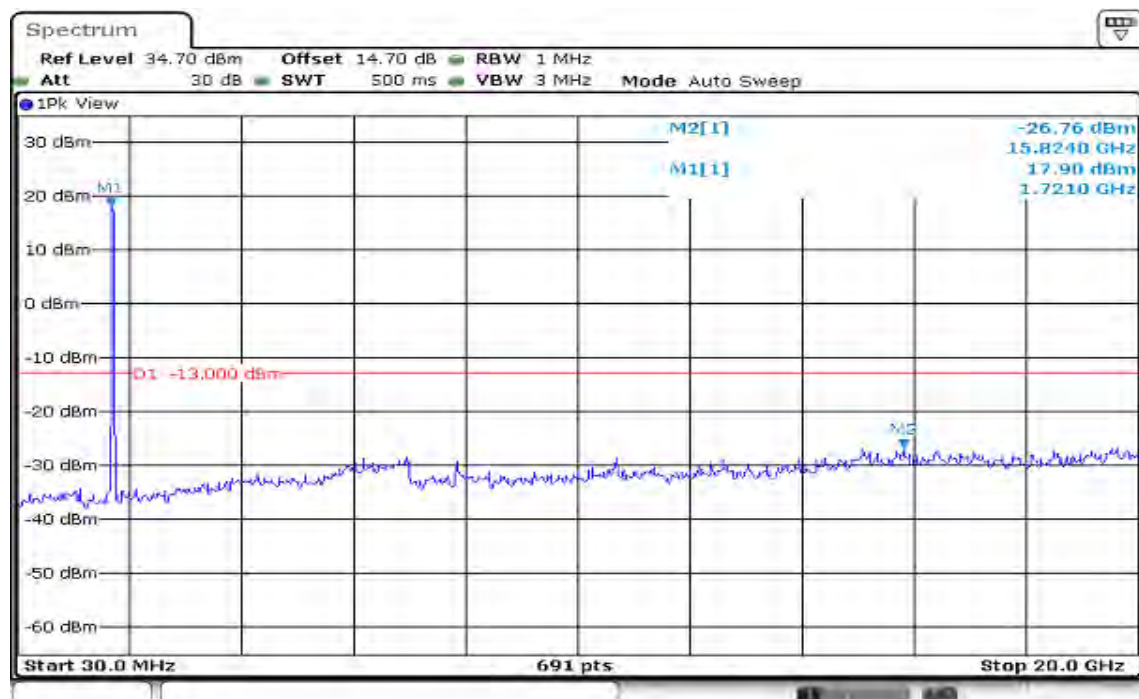
CHANNEL BANDWIDTH:20MHz /16QAM

CH Low



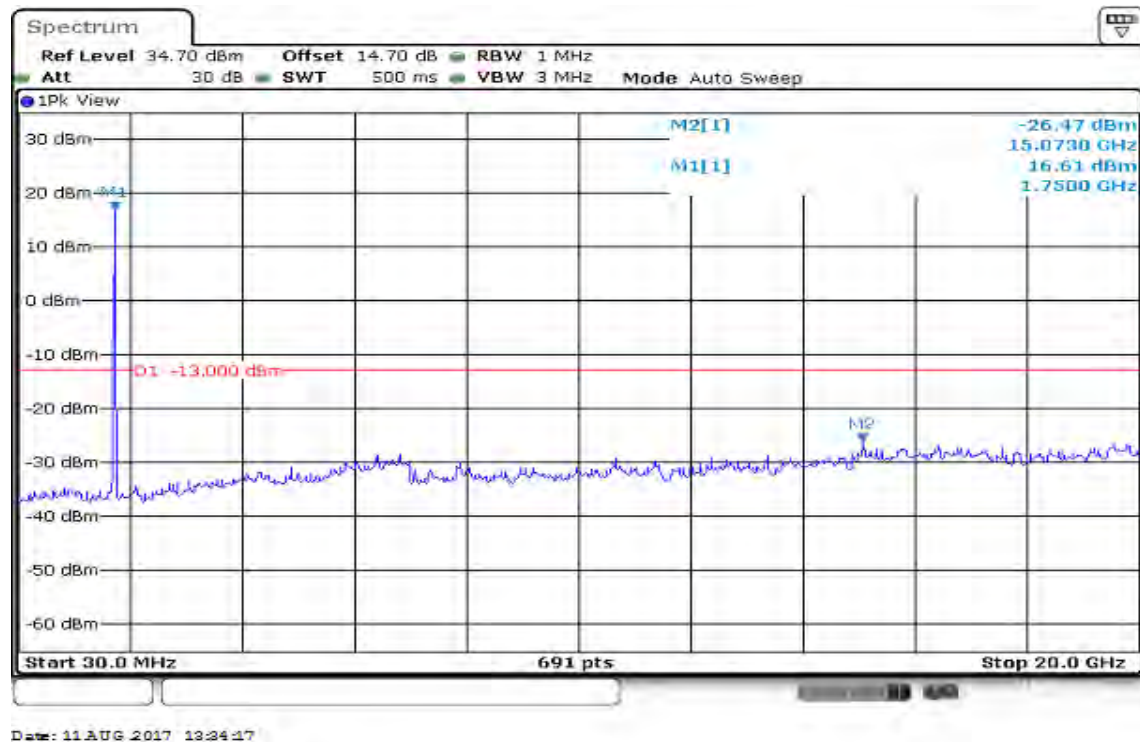
Date: 11 AUG 2017 13:27:55

CH Mid



Date: 11 AUG 2017 13:24:52

CH High



7.8 RADIATED EMISSION MEASUREMENT

LIMITS

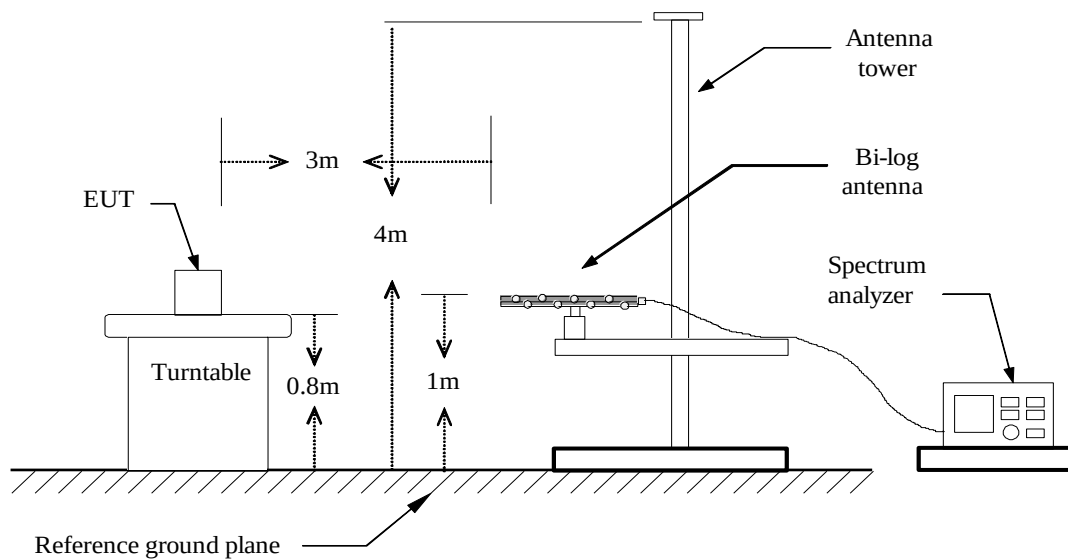
FCC §27.53(h), Band 4

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.

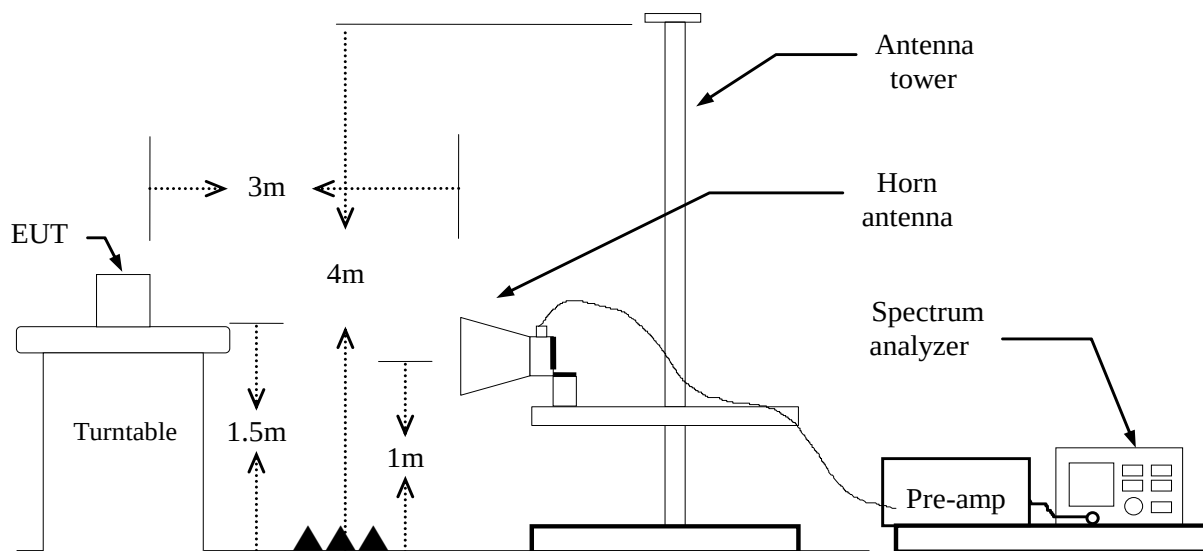
Limit Line: -13dBm

Test Configuration

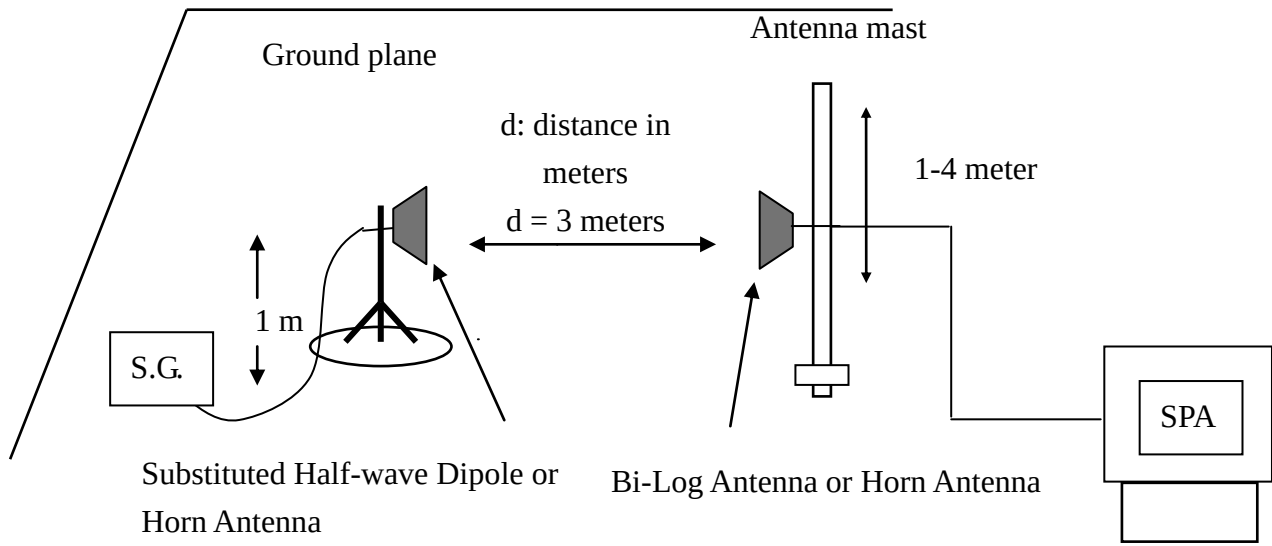
Below 1 GHz



Above 1 GHz



Substituted Method Test Set-up



TEST PROCEDURES

1. According to KDB 971168 D01. section 5.8 and TIA-603-D:2010 section 2.2.12.
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**Below 1GHz****LTE Band 4 / BW: 20MHz / QPSK / RB =1, RB Offset = 0****Operation Mode:** Tx / Mid CH**Test Date:**

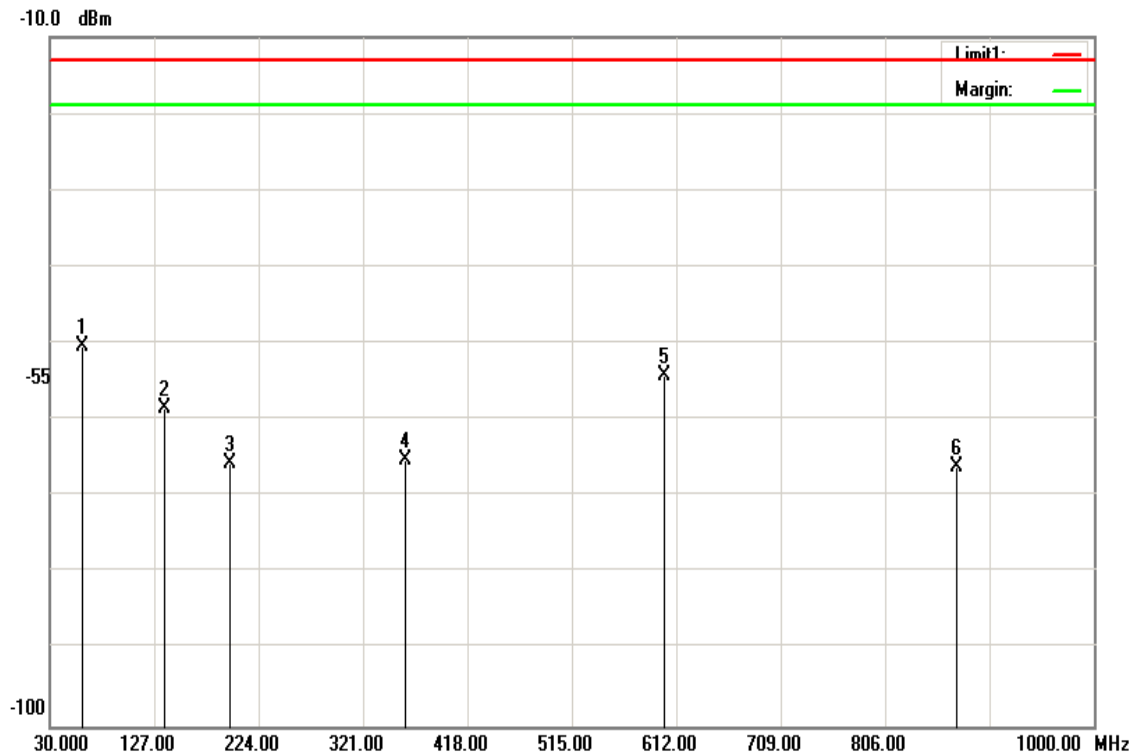
August 16, 2017

Temperature: 21°C**Tested by:**

Kevin Kuo

Humidity: 52% RH**Polarity:**

Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
60.0700	-49.01	-1.29	-50.30	-13.00	-37.30	V
136.7000	-59.73	1.15	-58.58	-13.00	-45.58	V
197.8100	-69.75	4.1	-65.65	-13.00	-52.65	V
360.7700	-72.45	7.14	-65.31	-13.00	-52.31	V
600.3600	-52.55	-1.56	-54.11	-13.00	-41.11	V
871.9600	-67.46	1.29	-66.17	-13.00	-53.17	V

Operation Mode: Tx / Mid CH

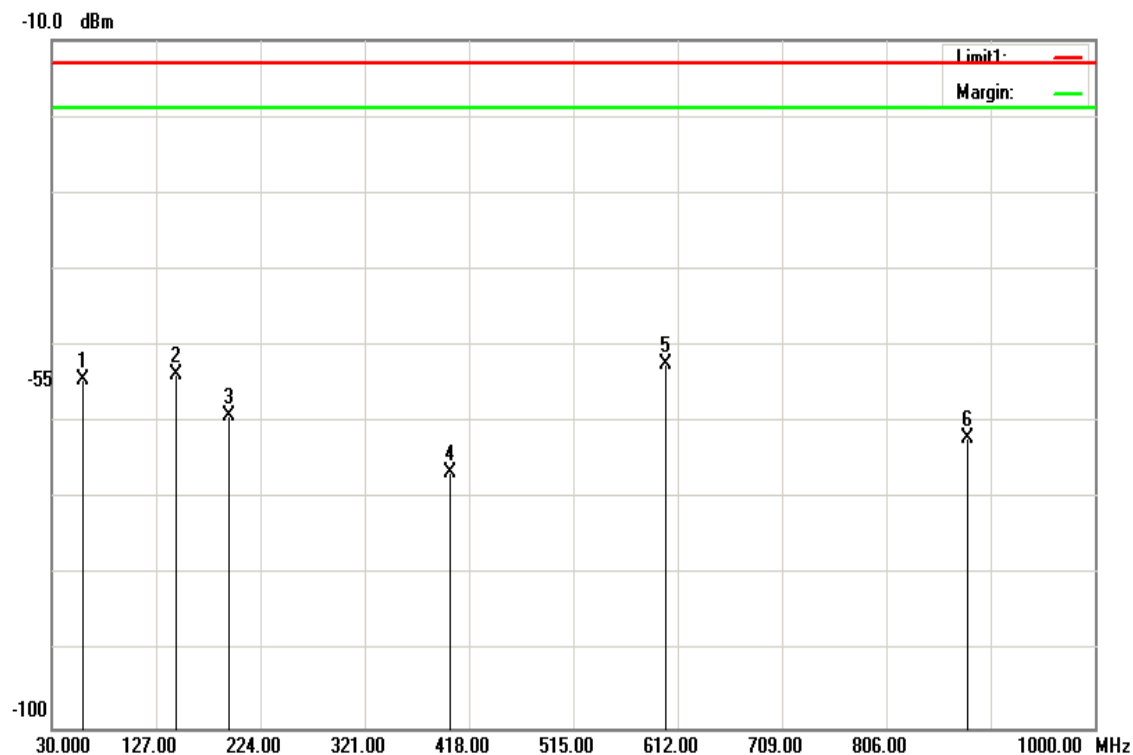
Test Date: August 16, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
59.1000	-53.16	-1.39	-54.55	-13.00	-41.55	H
145.4300	-54.57	0.71	-53.86	-13.00	-40.86	H
194.9000	-63.31	4.1	-59.21	-13.00	-46.21	H
400.5400	-73.8	7.3	-66.50	-13.00	-53.50	H
600.3600	-50.88	-1.56	-52.44	-13.00	-39.44	H
881.6600	-63.37	1.35	-62.02	-13.00	-49.02	H

LTE Band 4 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0

Operation Mode: Tx / Mid CH

Test Date:

August 16, 2017

Temperature: 21°C

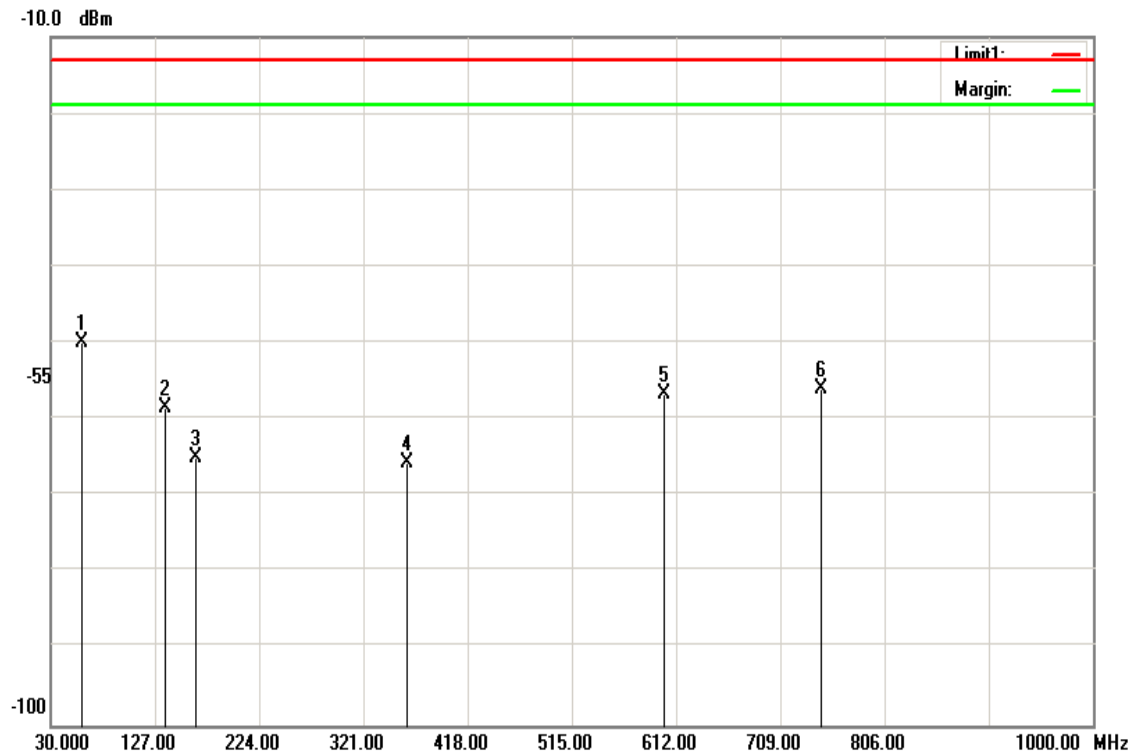
Tested by:

Kevin Kuo

Humidity: 52% RH

Polarity:

Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
59.1000	-48.59	-1.39	-49.98	-13.00	-36.98	V
136.7000	-59.61	1.15	-58.46	-13.00	-45.46	V
164.8300	-65.52	0.54	-64.98	-13.00	-51.98	V
361.7400	-72.76	7.15	-65.61	-13.00	-52.61	V
600.3600	-55.06	-1.56	-56.62	-13.00	-43.62	V
746.8300	-57.61	1.69	-55.92	-13.00	-42.92	V

Operation Mode: Tx / Mid CH

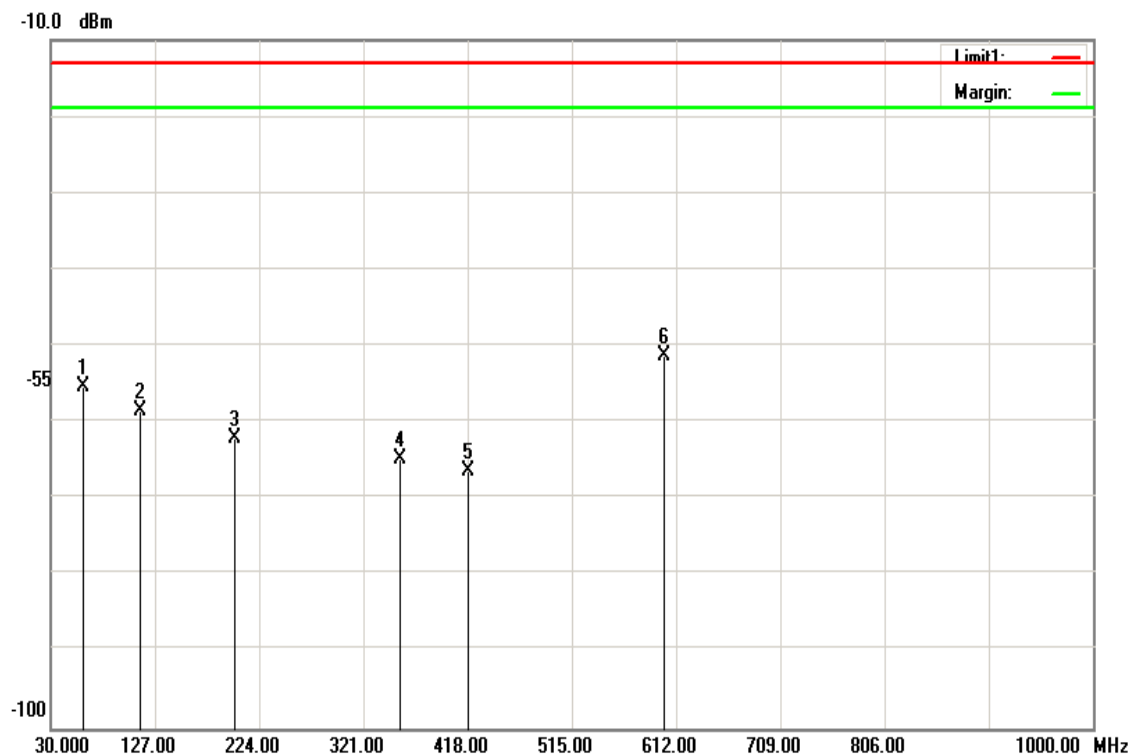
Test Date: August 16, 2017

Temperature: 21°C

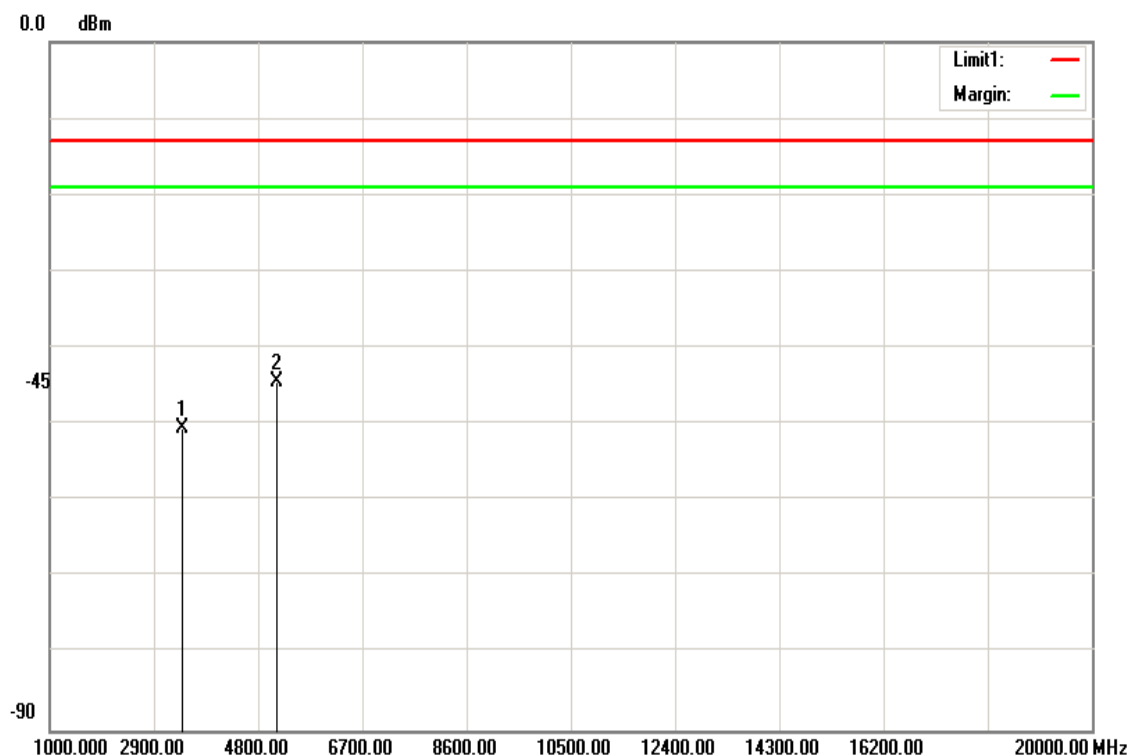
Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
60.0700	-53.98	-1.29	-55.27	-13.00	-42.27	H
113.4200	-59.04	0.64	-58.40	-13.00	-45.40	H
200.7200	-66.3	4.15	-62.15	-13.00	-49.15	H
354.9500	-71.82	7.12	-64.70	-13.00	-51.70	H
418.0000	-73.68	7.21	-66.47	-13.00	-53.47	H
600.3600	-49.74	-1.56	-51.30	-13.00	-38.30	H

Above 1GHz**LTE Band 4 / BW: 20MHz / QPSK RB =1, RB Offset = 0****Operation Mode:** Tx / Low CH**Test Date:** August 18, 2017**Temperature:** 21°C**Tested by:** Kevin Kuo**Humidity:** 52% RH**Polarity:** Ver.

Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-62.77	12.3	-50.47	-13.00	-37.47	V
5137.000	-56.96	12.61	-44.35	-13.00	-31.35	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Low CH

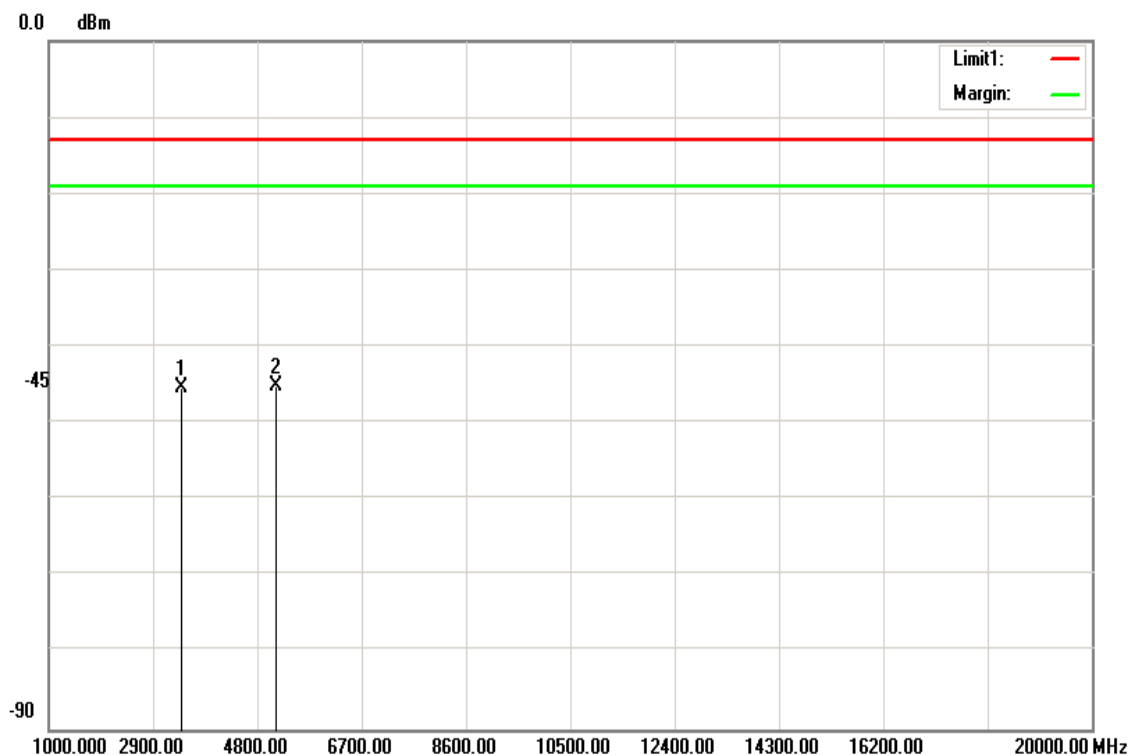
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-57.66	12.3	-45.36	-13.00	-32.36	H
5137.000	-57.76	12.61	-45.15	-13.00	-32.15	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Mid CH

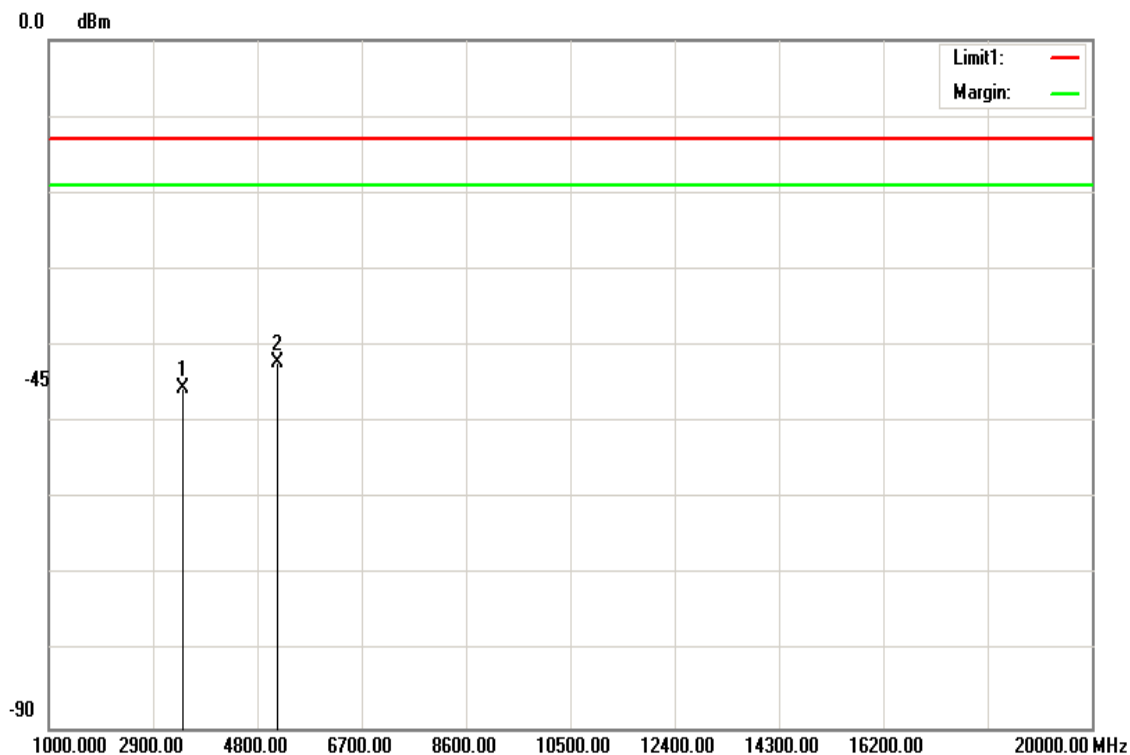
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3450.000	-57.98	12.37	-45.61	-13.00	-32.61	V
5172.000	-54.9	12.64	-42.26	-13.00	-29.26	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Mid CH

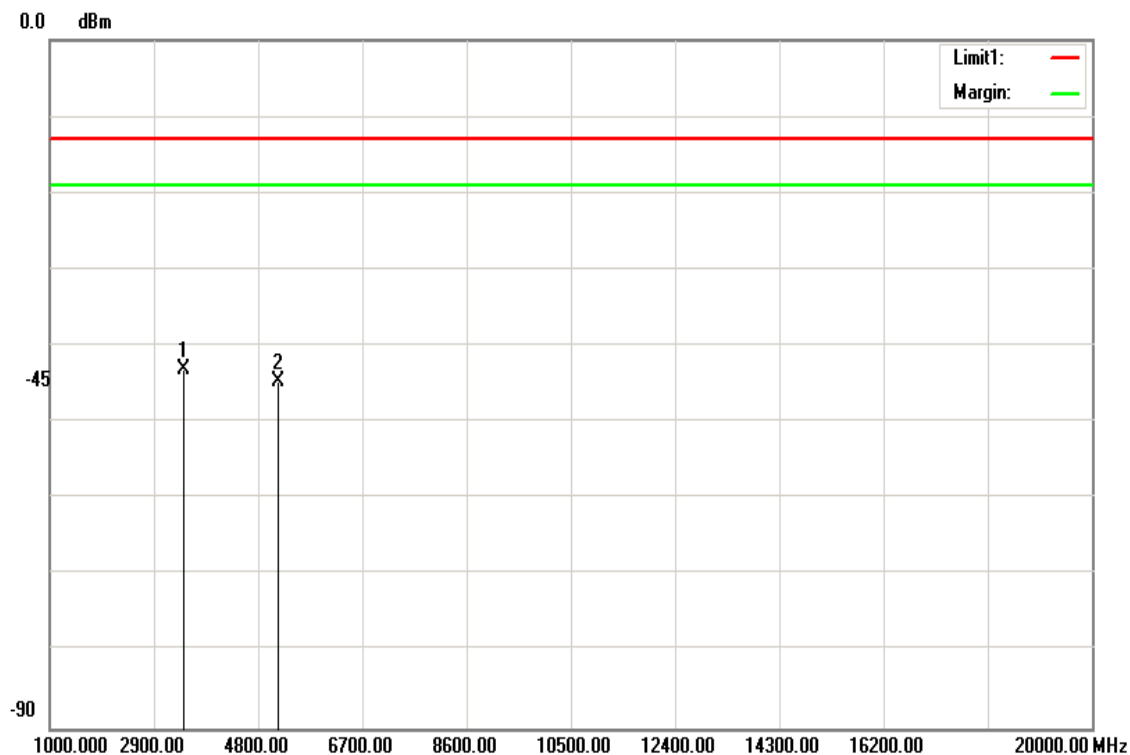
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3450.000	-55.42	12.37	-43.05	-13.00	-30.05	H
5172.000	-57.37	12.64	-44.73	-13.00	-31.73	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / High CH

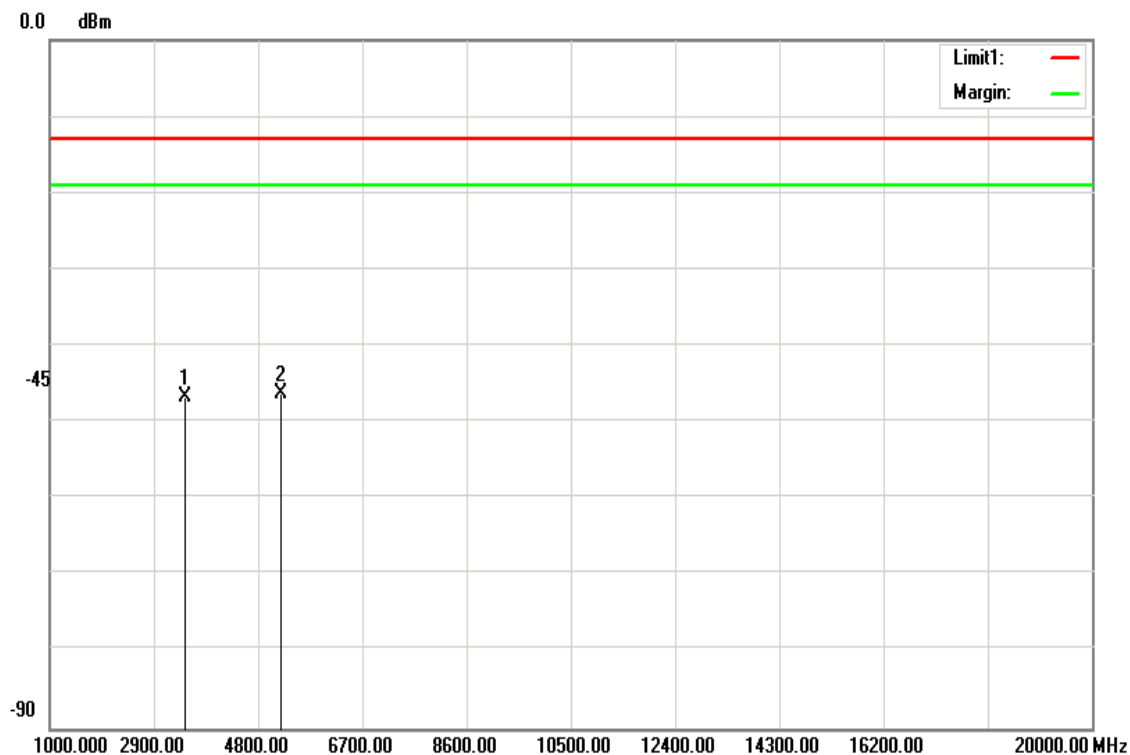
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3471.000	-59.21	12.42	-46.79	-13.00	-33.79	V
5207.000	-58.91	12.67	-46.24	-13.00	-33.24	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / High CH

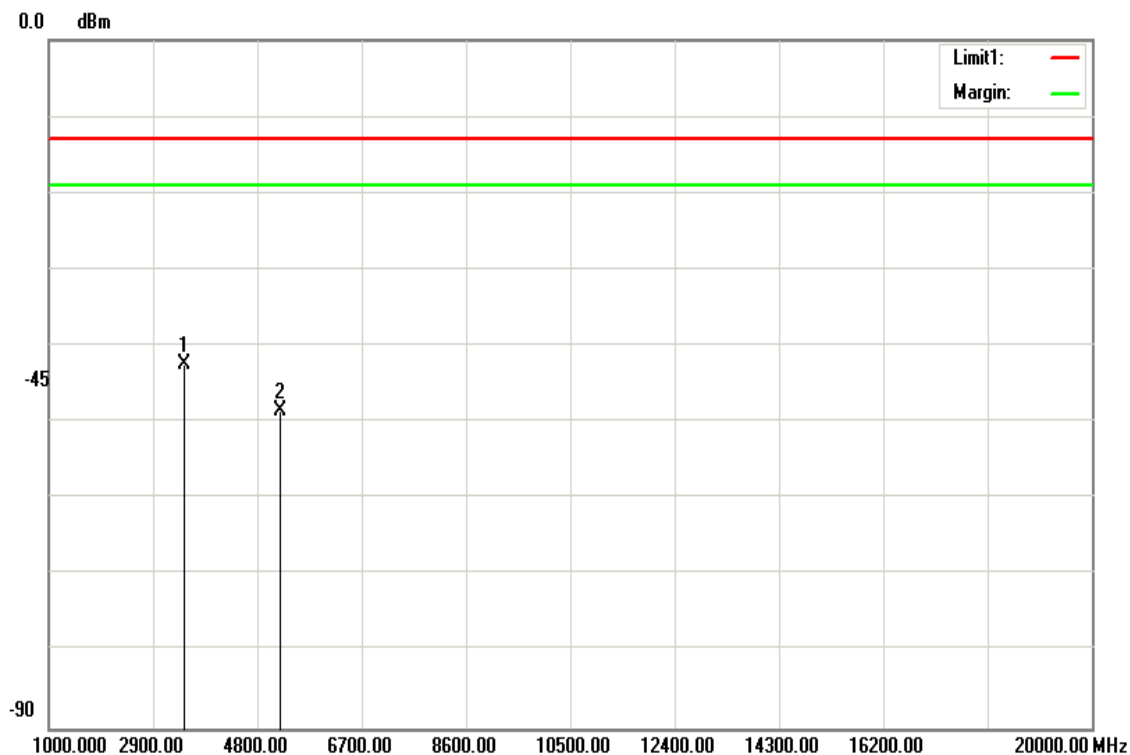
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3471.000	-54.91	12.42	-42.49	-13.00	-29.49	H
5207.000	-61.23	12.67	-48.56	-13.00	-35.56	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

LTE Band 4 / BW: 20MHz / 16QAM / RB =1, RB Offset = 0**Operation Mode:** Tx / Low CH**Test Date:**

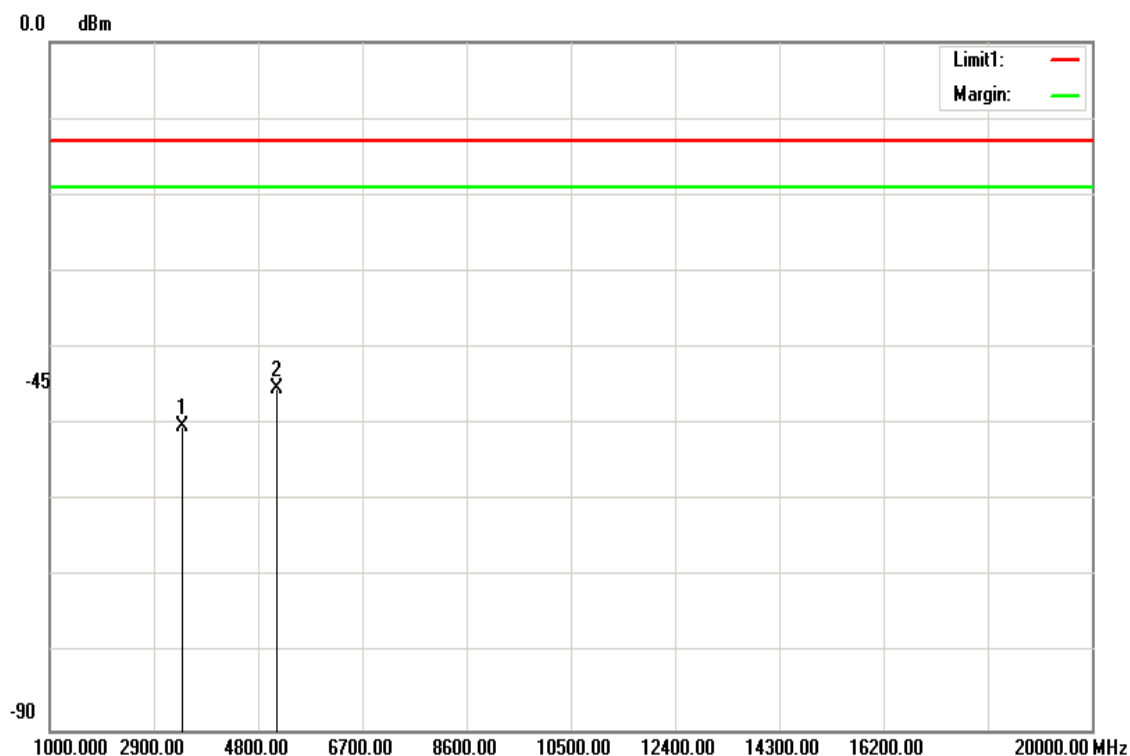
August 18, 2017

Temperature: 21°C**Tested by:**

Kevin Kuo

Humidity: 52% RH**Polarity:**

Ver.



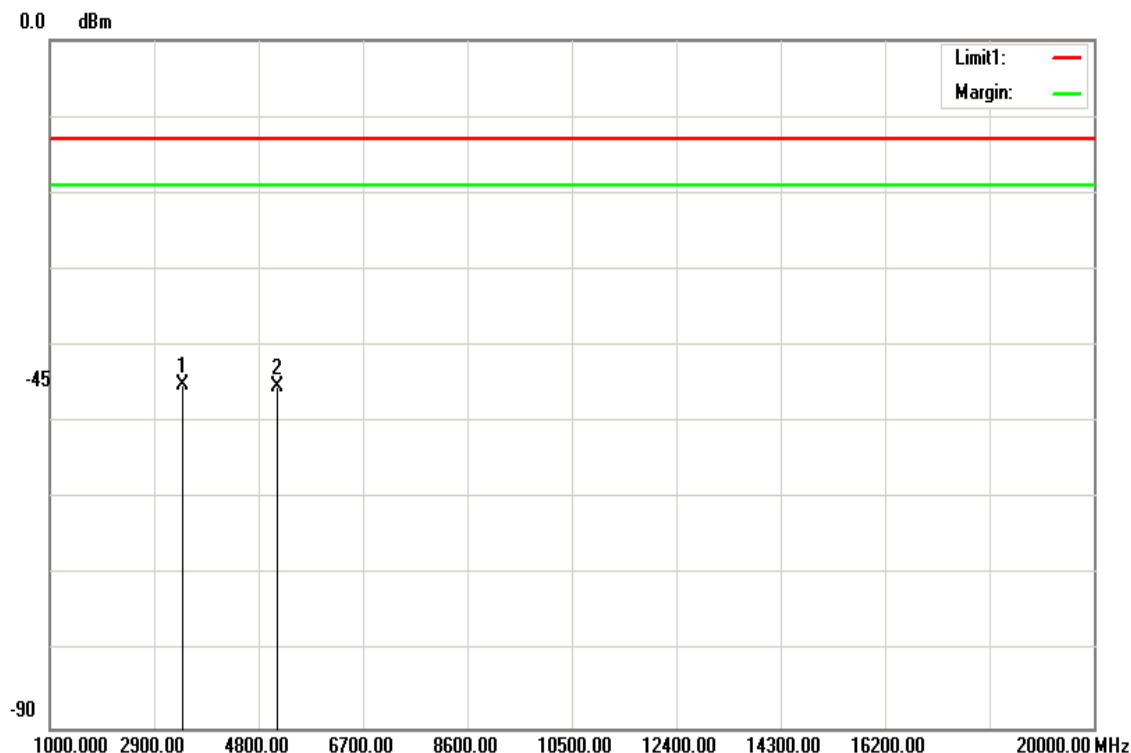
Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-62.6	12.3	-50.30	-13.00	-37.30	V
5130.000	-57.85	12.6	-45.25	-13.00	-32.25	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Low CH
Temperature: 21°C
Humidity: 52% RH

Test Date: August 18, 2017
Tested by: Kevin Kuo
Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3422.000	-57.49	12.3	-45.19	-13.00	-32.19	H
5130.000	-57.95	12.6	-45.35	-13.00	-32.35	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Mid CH

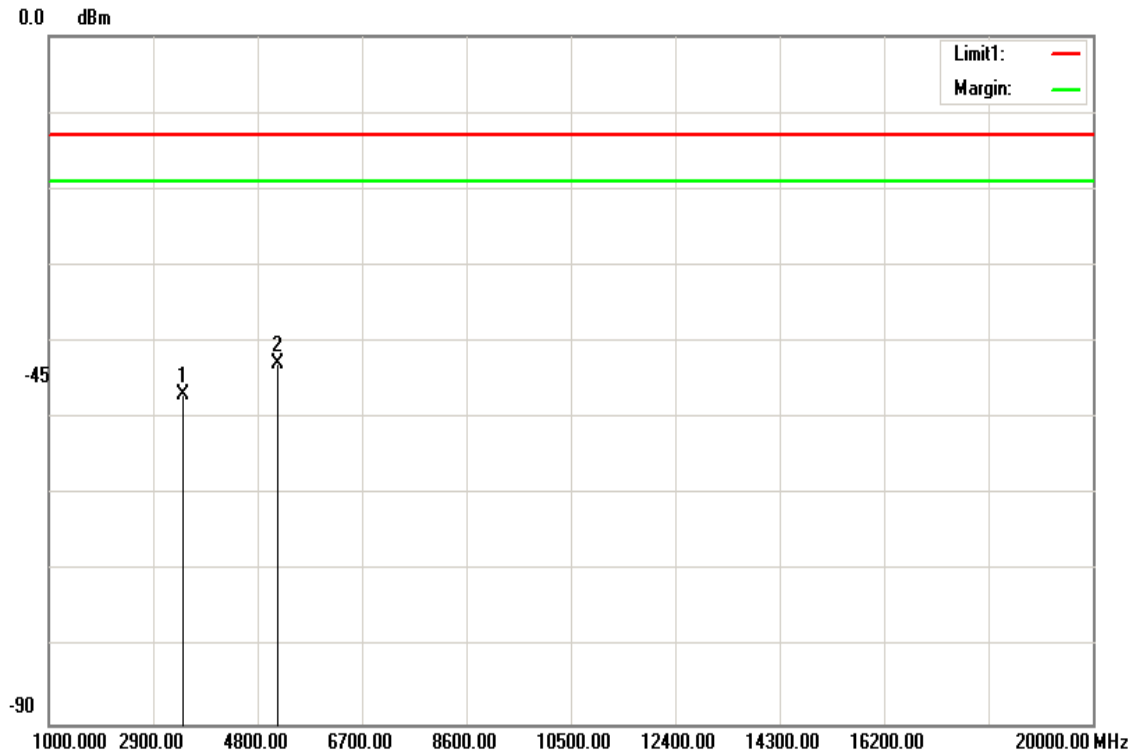
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3450.000	-59.37	12.37	-47.00	-13.00	-34.00	V
5172.000	-55.4	12.64	-42.76	-13.00	-29.76	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / Mid CH

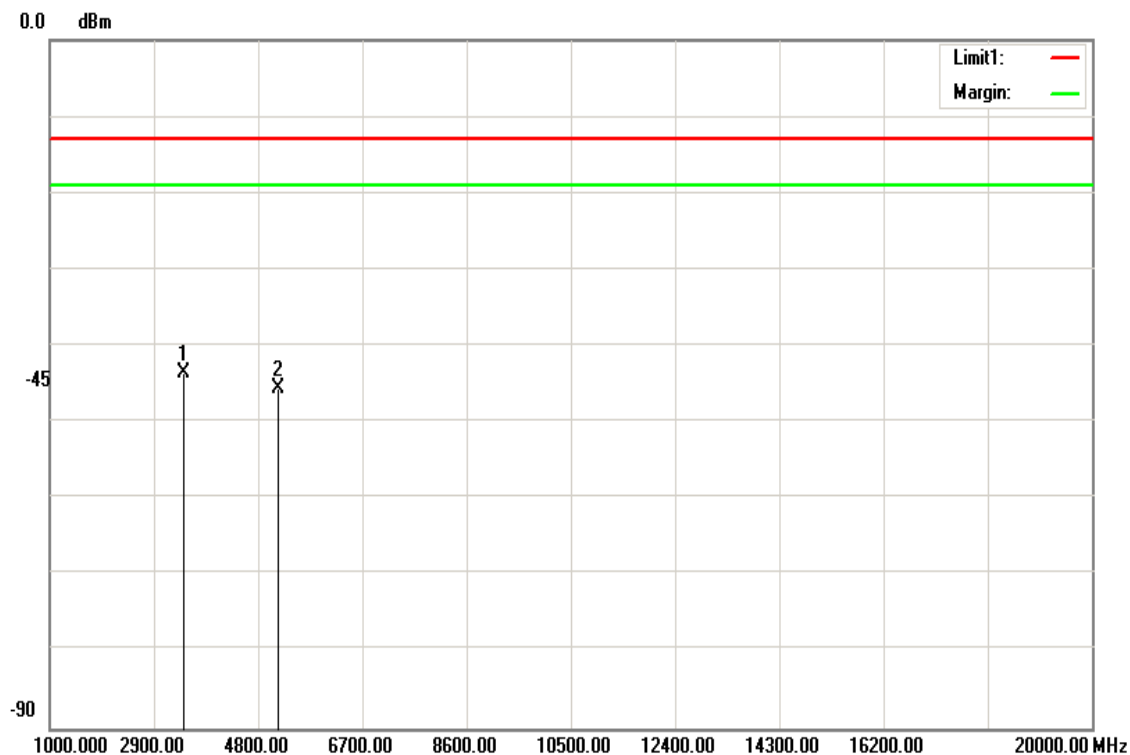
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3450.000	-56.02	12.37	-43.65	-13.00	-30.65	H
5172.000	-58.2	12.64	-45.56	-13.00	-32.56	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / High CH

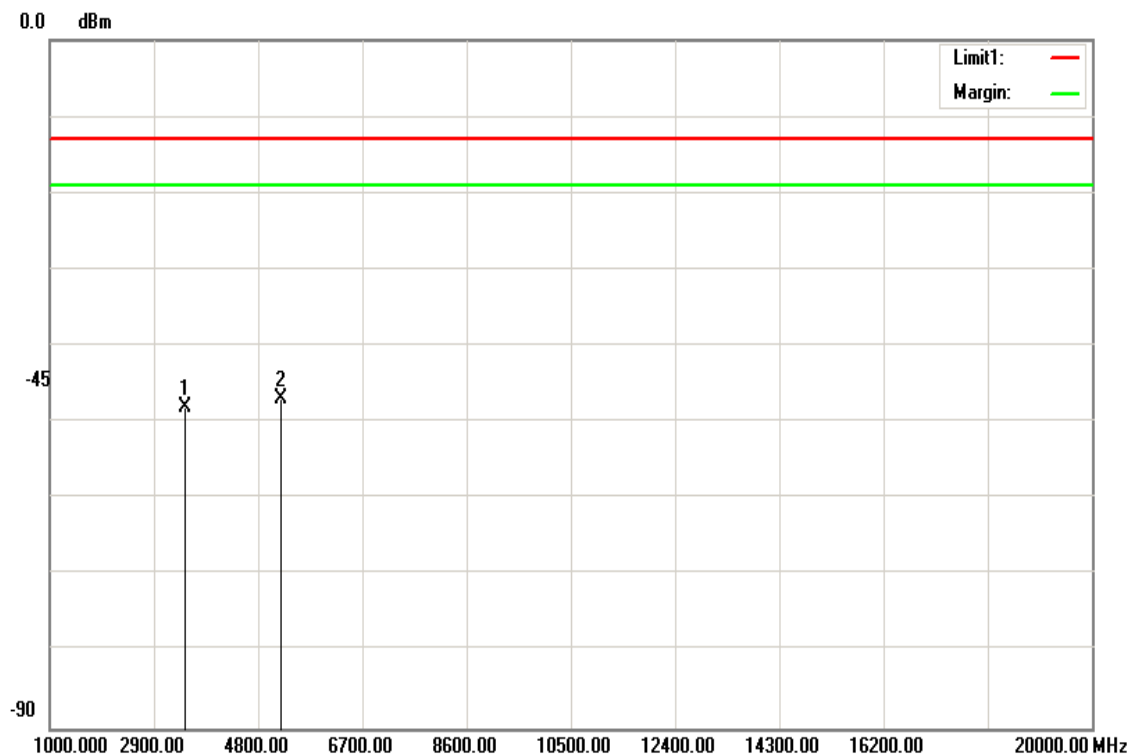
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Ver.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3471.000	-60.49	12.42	-48.07	-13.00	-35.07	V
5207.000	-59.57	12.67	-46.90	-13.00	-33.90	V
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Operation Mode: Tx / High CH

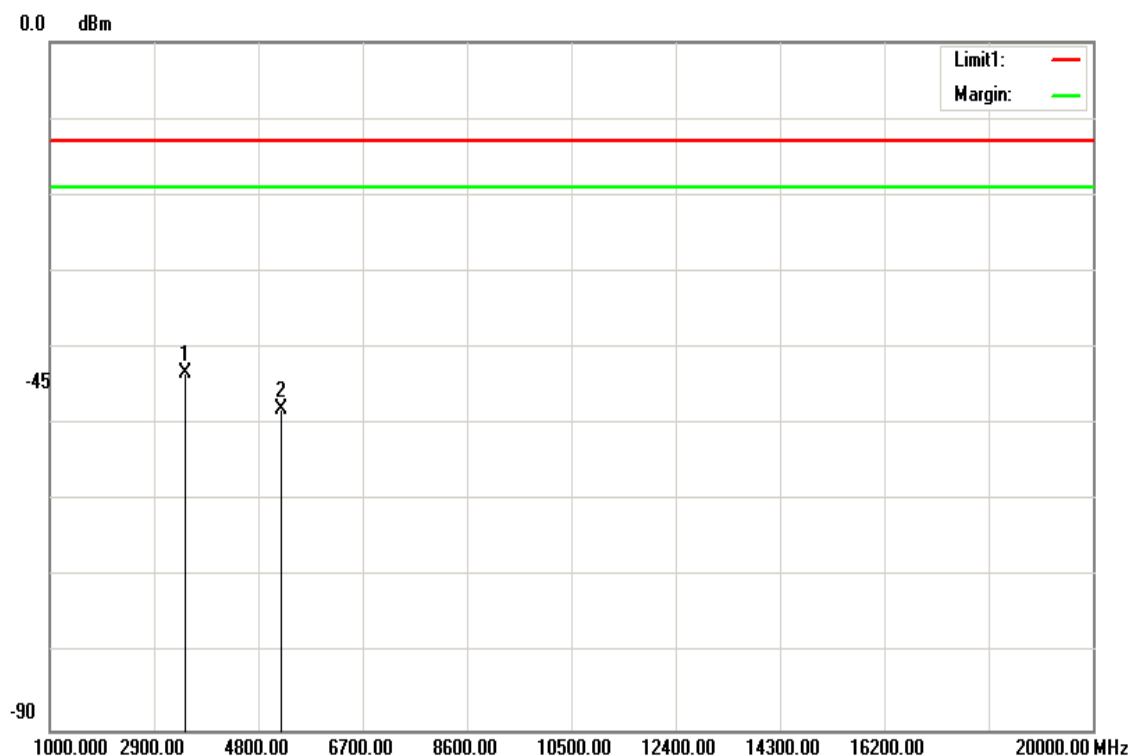
Test Date: August 18, 2017

Temperature: 21°C

Tested by: Kevin Kuo

Humidity: 52% RH

Polarity: Hor.



Frequency (MHz)	S.G. (dBm)	Ant.Gain (dBi)	Emission level (dBm)	Limit (dBm)	Margin (dB)	Antenna Polarization (V/H)
3471.000	-55.75	12.42	-43.33	-13.00	-30.33	H
5207.000	-60.62	12.67	-47.95	-13.00	-34.95	H
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.