

**FCC 47 CFR PART 27
&
INDUSTRY CANADA RSS-130 & RSS-139**

For

Computer

**FCC Model No.: AIM8I, AIM8Ixxxxxxxxxxxxxxxxxx,
AIM-x5ATxxxxxxxxxxxxx**

**(where "x" may be any alphanumeric character, "-" or blank for
marketing purpose and no impact safety related critical components
and constructions)**

**IC Model No.: AIM8I, AIM-25AT, AIM-35AT, AIM-55AT, AIM-65AT,
AIM-75AT**

Trade Name: ADVANTECH

Issued to

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

Issued by

Compliance Certification Services Inc.

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

<http://www.ccsrf.com>

service@ccsrf.com

Issued Date: May 28, 2017



Note: This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document.

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		May 28, 2017		Initial Issue	ALL	Angel Cheng

TABLE OF CONTENTS

1.	TEST RESULT CERTIFICATION	4
2.	EUT DESCRIPTION	5
3.	TEST METHODOLOGY	7
3.1	DESCRIPTION OF TEST TYPE	7
4.	INSTRUMENT CALIBRATION	9
4.1	MEASURING INSTRUMENT CALIBRATION	9
4.2	MEASUREMENT EQUIPMENT USED	9
4.3	MEASUREMENT UNCERTAINTY	9
5.	FACILITIES AND ACCREDITATIONS	10
5.1	FACILITIES	10
5.2	EQUIPMENT	10
5.3	TABLE OF ACCREDITATIONS AND LISTINGS.....	11
6.	SETUP OF EQUIPMENT UNDER TEST	12
6.1	SETUP CONFIGURATION OF EUT	12
6.2	SUPPORT EQUIPMENT	12
7.	TEST PROCEDURE AND RESULT	13
7.1	OUTPUT POWER MEASUREMENT	13
7.2	ERP & EIRP MEASUREMENT	23
7.3	FREQUENCY STABILITY MEASUREMENT	29
7.4	OCCUPIED BANDWIDTH MEASUREMENT	34
7.5	PEAK TO AVERAGE POWER RATIO	46
7.6	BAND EDGE MEASUREMENT	69
7.7	CONDUCTED SPURIOUS EMISSIONS.....	102
7.8	RADIATED EMISSION MEASUREMENT	135
	APPENDIX II PHOTOGRAPHS OF TEST SETUP	170

1. TEST RESULT CERTIFICATION

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

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

Equipment Under Test: Computer

Trade Name: ADVANTECH

FCC Model No.: AIM8I, AIM8Ixxxxxxxxxxxxxxxxxx, AIM-x5ATxxxxxxxxxxxxx
(where "x" may be any alphanumeric character, "-" or blank
for marketing purpose and no impact safety related critical
components and constructions)

IC Model No.: AIM8I, AIM-25AT, AIM-35AT, AIM-55AT, AIM-65AT, AIM-75AT

Date of Test: April 6 ~ May 18, 2017

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

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

Approved by



Sam Chuang
Manager
Compliance Certification Services Inc.

Tested by



Timmy Wang
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Computer	
FCC Model No.	AIM8I, AIM8Ixxxxxxxxxxxxxxxxxx, AIM-x5ATxxxxxxxxxxxxx (where "x" may be any alphanumeric character, "-" or blank for marketing purpose and no impact safety related critical components and constructions)	
IC Model No.	AIM8I, AIM-25AT, AIM-35AT, AIM-55AT, AIM-65AT, AIM-75AT	
Model Discrepancy	All models are electrically identical, different model names are for marketing purpose	
Trade	ADVANTECH	
Received Date	March 28, 2017	
Power Supply	1. VDC from Power Adapter Chicony / A16-018N1A I/P: 100-240Vac, 1A, 50-60Hz O/P: 5.15Vdc, 3A, 9.1Vdc, 2A, 18W 2. Battery ADVANTECH / AIM-BAT-8 Rating: 3.8V, 4900, 18.62Wh	
Modulation Technology	LTE Band 17	QPSK, 16QAM
	LTE Band 4	QPSK, 16QAM
Frequency Range	LTE Band 17 Channel Bandwidth: 5MHz	706.5MHz ~ 713.5MHz
	LTE Band 17 Channel Bandwidth: 10MHz	709MHz ~ 711MHz
	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 17 Channel Bandwidth: 5MHz	QPSK: 20.45 dBm 16QAM: 20.62 dBm
	LTE Band 17 Channel Bandwidth: 10MHz	QPSK : 17.88 dBm 16QAM: 18.31 dBm

Maximum EIRP Power	LTE Band 4 Channel Bandwidth: 1.4MHz	QPSK: 29.68 dBm 16QAM: 29.20 dBm
	LTE Band 4 Channel Bandwidth: 3MHz	QPSK: 28.78 dBm 16QAM: 29.92 dBm
	LTE Band 4 Channel Bandwidth: 5MHz	QPSK: 29.70 dBm 16QAM: 29.95 dBm
	LTE Band 4 Channel Bandwidth: 10MHz	QPSK: 29.92 dBm 16QAM: 29.86 dBm
	LTE Band 4 Channel Bandwidth: 15MHz	QPSK: 29.70 dBm 16QAM: 29.86 dBm
	LTE Band 4 Channel Bandwidth: 20MHz	QPSK: 29.04 dBm 16QAM: 29.13 dBm
Antenna Specification	PIFA Antenna LTE Band 4: Gain: -4.21dBi LTE Band 17: Gain: -2.67dBi	

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 had been tested under operating condition.

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

LTE Band 17: 704 MHz ~ 716 MHz

Three channels had been tested for each channel bandwidth.

Channel Bandwidth	5MHz		10MHz	
	Channel	Frequency(MHz)	Channel	Frequency(MHz)
Low channel (L)	23755	706.5	23780	709.0
Middle channel (M)	23790	710.0	23790	710.0
High channel (H)	23825	713.5	23800	711.0

LTE Band 4: 1710MHz ~ 1755MHz

Three channels had been tested for each channel bandwidth.

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

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
Band17	5M	1 RB ALLOCATED AT THE UPPER EDGE	1.4M	1 RB ALLOCATED AT THE LOWER EDGE
	10M	1 RB ALLOCATED AT THE UPPER EDGE	5M	1 RB ALLOCATED AT THE UPPER EDGE

3.2 The worst mode of measurement

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable. Mode 2:EUT power by Battery.
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	120V/60Hz
Test Mode	Mode 1:EUT power by AC adapter via power cable. 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. The EUT pre-scanned in three axis ,X,Y, Z for radiated measurement. The worst cases (X-Plane) were recorded in this report.
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

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	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	07/04/2016	07/03/2017
Power Sensor	Anritsu	MA2411B	917072	07/04/2016	07/03/2017
Base Station	R&S	CMU 200	101245	07/29/2016	07/28/2017
Base Station	Anritsu	MT-8820C	6200938900	07/26/2016	07/25/2017
Spectrum Analyzer	R&S	FSV 40	101073	10/05/2016	10/04/2017

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/03/2016	07/02/2017
Horn Antenna	EMCO	3117	00055165	02/20/2017	02/19/2018
Pre-Amplifier	EMCI	EMC 012635	980151	06/23/2016	06/22/2017
Pre-Amplifier	EMEC	EM330	060609	06/08/2016	06/07/2017
Spectrum Analyzer	Agilent	E4446A	US42510252	12/05/2016	12/04/2017
Loop Ant	COM-POWER	AL-130	121051	03/02/2017	03/1/2018
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	EZ-EMC (CCS-3A1RE)				

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.

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: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

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

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

5.2 EQUIPMENT

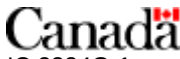
Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

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."

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.

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	Power Cord
	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 17**

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
17	10	23780	709.0	QPSK	1	0	0	23.8	0.23768
					1	24	0	23.3	0.21135
					1	49	0	23.0	0.19953
					25	0	1	22.8	0.19143
					25	12	1	22.4	0.17418
					25	24	1	22.1	0.16218
				16QAM	50	0	1	22.8	0.19099
					1	0	1	22.9	0.19275
					1	24	1	22.4	0.17418
					1	49	1	22.1	0.16218
					25	0	2	21.8	0.15101
					25	12	2	21.3	0.13428
					25	24	2	21.1	0.12882
					50	0	2	21.0	0.12589
		23790	710.0	QPSK	1	0	0	23.5	0.22491
					1	24	0	23.3	0.21577
					1	49	0	23.2	0.20893
					25	0	1	22.6	0.18113
					25	12	1	22.4	0.17458
					25	24	1	22.3	0.16982
				16QAM	50	0	1	22.6	0.18030
					1	0	1	22.6	0.18155
					1	24	1	22.4	0.17418
					1	49	1	22.3	0.16982
					25	0	2	21.6	0.14521
					25	12	2	21.4	0.13868
					25	24	2	21.3	0.13490
					50	0	2	21.2	0.13183
		23800	711.0	QPSK	1	0	0	23.6	0.23014
					1	24	0	23.5	0.22387
					1	49	0	23.2	0.20893
					25	0	1	22.7	0.18408
					25	12	1	22.5	0.17906
					25	24	1	22.2	0.16596
				16QAM	50	0	1	22.6	0.18323
					1	0	1	22.7	0.18408
					1	24	1	22.5	0.17947
					1	49	1	22.3	0.16982
					25	0	2	21.6	0.14521
					25	12	2	21.5	0.14191
					25	24	2	21.3	0.13490
					50	0	2	21.3	0.13397

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
17	5	23755	706.5	QPSK	1	0	0	23.7	0.23388
					1	12	0	22.8	0.19231
					1	24	0	22.9	0.19320
					12	0	1	21.5	0.14125
					12	6	1	21.7	0.14825
					12	11	1	21.8	0.15205
					25	0	1	21.5	0.14223
				16QAM	1	0	1	21.6	0.14322
					1	12	1	21.8	0.14962
					1	24	1	21.9	0.15417
					12	0	2	20.6	0.11429
					12	6	2	20.8	0.11885
					12	11	2	20.9	0.12274
					25	0	2	20.5	0.11194
		23790	710.0	QPSK	1	0	0	23.4	0.22080
					1	12	0	23.3	0.21184
					1	24	0	23.1	0.20512
					12	0	1	22.5	0.17783
					12	6	1	22.3	0.17140
					12	11	1	22.2	0.16672
					25	0	1	22.5	0.17701
				16QAM	1	0	1	22.5	0.17824
					1	12	1	22.3	0.17100
					1	24	1	22.2	0.16672
					12	0	2	21.5	0.14256
					12	6	2	21.3	0.13614
					12	11	2	21.2	0.13243
					25	0	2	21.1	0.12942
		23825	713.5	QPSK	1	0	0	23.5	0.22542
					1	12	0	23.4	0.21928
					1	24	0	23.1	0.20464
					12	0	1	22.6	0.18030
					12	6	1	22.4	0.17539
					12	11	1	22.1	0.16255
					25	0	1	22.5	0.17947
				16QAM	1	0	1	22.6	0.18030
					1	12	1	22.5	0.17579
					1	24	1	22.2	0.16634
					12	0	2	21.5	0.14223
					12	6	2	21.4	0.13900
					12	11	2	21.2	0.13213
					25	0	2	21.2	0.13122

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
17	5	23755	706.5	QPSK	1	0	0	23.7	0.23388
					1	12	0	22.8	0.19231
					1	24	0	22.9	0.19320
					12	0	1	21.5	0.14125
					12	6	1	21.7	0.14825
					12	11	1	21.8	0.15205
					25	0	1	21.5	0.14223
				16QAM	1	0	1	21.6	0.14322
					1	12	1	21.8	0.14962
					1	24	1	21.9	0.15417
					12	0	2	20.6	0.11429
					12	6	2	20.8	0.11885
					12	11	2	20.9	0.12274
					25	0	2	20.5	0.11194
		23790	710.0	QPSK	1	0	0	23.4	0.22080
					1	12	0	23.3	0.21184
					1	24	0	23.1	0.20512
					12	0	1	22.5	0.17783
					12	6	1	22.3	0.17140
					12	11	1	22.2	0.16672
					25	0	1	22.5	0.17701
				16QAM	1	0	1	22.5	0.17824
					1	12	1	22.3	0.17100
					1	24	1	22.2	0.16672
					12	0	2	21.5	0.14256
					12	6	2	21.3	0.13614
					12	11	2	21.2	0.13243
					25	0	2	21.1	0.12942
		23825	713.5	QPSK	1	0	0	23.5	0.22542
					1	12	0	23.4	0.21928
					1	24	0	23.1	0.20464
					12	0	1	22.6	0.18030
					12	6	1	22.4	0.17539
					12	11	1	22.1	0.16255
					25	0	1	22.5	0.17947
				16QAM	1	0	1	22.6	0.18030
					1	12	1	22.5	0.17579
					1	24	1	22.2	0.16634
					12	0	2	21.5	0.14223
					12	6	2	21.4	0.13900
					12	11	2	21.2	0.13213
					25	0	2	21.2	0.13122

LTE Band 4

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	20	20050	1720.0	QPSK	1	0	0	23.5	0.22387
					1	49	0	23.2	0.21086
					1	99	0	23.1	0.20277
					50	0	1	22.5	0.17824
					50	24	1	22.3	0.16943
					50	49	1	22.1	0.16144
					100	0	1	22.5	0.17865
				16QAM	1	0	1	22.5	0.17906
					1	49	1	22.3	0.17140
					1	99	1	22.2	0.16406
					50	0	2	21.6	0.14388
					50	24	2	21.3	0.13614
					50	49	2	21.2	0.13032
					100	0	2	21.1	0.12882
		20175	1732.5	QPSK	1	0	0	23.8	0.23988
					1	49	0	23.3	0.21478
					1	99	0	23.1	0.20464
					50	0	1	22.9	0.19498
					50	24	1	22.4	0.17219
					50	49	1	22.2	0.16558
					100	0	1	22.9	0.19498
				16QAM	1	0	1	22.8	0.19055
					1	49	1	22.4	0.17219
					1	99	1	22.2	0.16444
					50	0	2	21.9	0.15488
					50	24	2	21.3	0.13583
					50	49	2	21.2	0.13183
					100	0	2	21.1	0.12942
		20300	1745.0	QPSK	1	0	0	23.1	0.20606
					1	49	0	23.0	0.19953
					1	99	0	22.9	0.19498
					50	0	1	22.3	0.16788
					50	24	1	22.1	0.16218
					50	49	1	22.0	0.15849
					100	0	1	22.2	0.16596
				16QAM	1	0	1	22.2	0.16749
					1	49	1	22.1	0.16218
					1	99	1	22.0	0.15849
					50	0	2	21.2	0.13213
					50	24	2	21.1	0.12882
					50	49	2	21.0	0.12589
					100	0	2	21.0	0.12531

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	15	20025	1717.5	QPSK	1	0	0	23.4	0.21979
					1	37	0	23.2	0.20701
					1	74	0	23.0	0.19907
					36	0	1	22.4	0.17498
					36	18	1	22.2	0.16634
					36	35	1	22.0	0.15849
					75	0	1	22.4	0.17539
				16QAM	1	0	1	22.5	0.17579
					1	37	1	22.3	0.16827
					1	74	1	22.1	0.16106
					36	0	2	21.5	0.14125
					36	18	2	21.3	0.13366
					36	35	2	21.1	0.12794
					75	0	2	21.0	0.12647
		20175	1732.5	QPSK	1	0	0	23.7	0.23659
					1	37	0	23.3	0.21184
					1	74	0	23.1	0.20184
					36	0	1	22.8	0.19231
					36	18	1	22.3	0.16982
					36	35	1	22.1	0.16331
					75	0	1	22.8	0.19231
				16QAM	1	0	1	22.7	0.18793
					1	37	1	22.3	0.16982
					1	74	1	22.1	0.16218
					36	0	2	21.8	0.15276
					36	18	2	21.3	0.13397
					36	35	2	21.1	0.13002
					75	0	2	21.1	0.12764
		20325	1747.5	QPSK	1	0	0	23.1	0.20370
					1	37	0	23.0	0.19724
					1	74	0	22.9	0.19275
					36	0	1	22.2	0.16596
					36	18	1	22.1	0.16032
					36	35	1	22.0	0.15668
					75	0	1	22.2	0.16406
				16QAM	1	0	1	22.2	0.16558
					1	37	1	22.1	0.16032
					1	74	1	22.0	0.15668
					36	0	2	21.2	0.13062
					36	18	2	21.1	0.12735
					36	35	2	21.0	0.12445
					75	0	2	20.9	0.12388

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	10	20000	1715.0	QPSK	1	0	0	23.4	0.21827
					1	24	0	23.1	0.20559
					1	49	0	23.0	0.19770
					25	0	1	22.4	0.17378
					25	12	1	22.2	0.16520
					25	24	1	22.0	0.15740
					50	0	1	22.4	0.17418
				16QAM	1	0	1	22.4	0.17458
					1	24	1	22.2	0.16711
					1	49	1	22.0	0.15996
					25	0	2	21.5	0.14028
					25	12	2	21.2	0.13274
					25	24	2	21.0	0.12706
					50	0	2	21.0	0.12560
		20175	1732.5	QPSK	1	0	0	23.7	0.23550
					1	24	0	23.2	0.21086
					1	49	0	23.0	0.20091
					25	0	1	22.8	0.19143
					25	12	1	22.3	0.16904
					25	24	1	22.1	0.16255
					50	0	1	22.8	0.19143
				16QAM	1	0	1	22.7	0.18707
					1	24	1	22.3	0.16904
					1	49	1	22.1	0.16144
					25	0	2	21.8	0.15205
					25	12	2	21.3	0.13335
					25	24	2	21.1	0.12942
					50	0	2	21.0	0.12706
		20350	1750.0	QPSK	1	0	0	23.1	0.20277
					1	24	0	22.9	0.19634
					1	49	0	22.8	0.19187
					25	0	1	22.2	0.16520
					25	12	1	22.0	0.15959
					25	24	1	21.9	0.15596
					50	0	1	22.1	0.16331
				16QAM	1	0	1	22.2	0.16482
					1	24	1	22.0	0.15959
					1	49	1	21.9	0.15596
					25	0	2	21.1	0.13002
					25	12	2	21.0	0.12677
					25	24	2	20.9	0.12388
					50	0	2	20.9	0.12331

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	5	19975	1712.5	QPSK	1	0	0	23.4	0.21777
					1	12	0	23.1	0.20512
					1	24	0	23.0	0.19724
					12	0	1	22.4	0.17338
					12	6	1	22.2	0.16482
					12	11	1	22.0	0.15704
					25	0	1	22.4	0.17378
				16QAM	1	0	1	22.4	0.17418
					1	12	1	22.2	0.16672
					1	24	1	22.0	0.15959
					12	0	2	21.5	0.13996
					12	6	2	21.2	0.13243
					12	11	2	21.0	0.12677
					25	0	2	21.0	0.12531
		20175	1732.5	QPSK	1	0	0	23.7	0.23442
					1	12	0	23.2	0.20989
					1	24	0	23.0	0.19999
					12	0	1	22.8	0.19055
					12	6	1	22.3	0.16827
					12	11	1	22.1	0.16181
					25	0	1	22.8	0.19055
				16QAM	1	0	1	22.7	0.18621
					1	12	1	22.3	0.16827
					1	24	1	22.1	0.16069
					12	0	2	21.8	0.15136
					12	6	2	21.2	0.13274
					12	11	2	21.1	0.12882
					25	0	2	21.0	0.12647
		20375	1752.5	QPSK	1	0	0	23.0	0.20137
					1	12	0	22.9	0.19498
					1	24	0	22.8	0.19055
					12	0	1	22.2	0.16406
					12	6	1	22.0	0.15849
					12	11	1	21.9	0.15488
					25	0	1	22.1	0.16218
				16QAM	1	0	1	22.1	0.16368
					1	12	1	22.0	0.15849
					1	24	1	21.9	0.15488
					12	0	2	21.1	0.12912
					12	6	2	21.0	0.12589
					12	11	2	20.9	0.12303
					25	0	2	20.9	0.12246

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	3	19965	1711.5	QPSK	1	0	0	23.4	0.21677
					1	7	0	23.1	0.20417
					1	14	0	22.9	0.19634
					8	0	1	22.4	0.17258
					8	4	1	22.2	0.16406
					8	7	1	21.9	0.15631
					15	0	1	22.4	0.17298
				16QAM	1	0	1	22.4	0.17338
					1	7	1	22.2	0.16596
					1	14	1	22.0	0.15885
					8	0	2	21.4	0.13932
					8	4	2	21.2	0.13183
					8	7	2	21.0	0.12618
					15	0	2	21.0	0.12474
		20175	1732.5	QPSK	1	0	0	23.7	0.23388
					1	7	0	23.2	0.20941
					1	14	0	23.0	0.19953
					8	0	1	22.8	0.19011
					8	4	1	22.3	0.16788
					8	7	1	22.1	0.16144
					15	0	1	22.8	0.19011
				16QAM	1	0	1	22.7	0.18578
					1	7	1	22.3	0.16788
					1	14	1	22.1	0.16032
					8	0	2	21.8	0.15101
					8	4	2	21.2	0.13243
					8	7	2	21.1	0.12853
					15	0	2	21.0	0.12618
		20384	1753.4	QPSK	1	0	0	23.0	0.20091
					1	7	0	22.9	0.19454
					1	14	0	22.8	0.19011
					8	0	1	22.1	0.16368
					8	4	1	22.0	0.15812
					8	7	1	21.9	0.15453
					15	0	1	22.1	0.16181
				16QAM	1	0	1	22.1	0.16331
					1	7	1	22.0	0.15812
					1	14	1	21.9	0.15453
					8	0	2	21.1	0.12882
					8	4	2	21.0	0.12560
					8	7	2	20.9	0.12274
					15	0	2	20.9	0.12218

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power(dBm)	Output Power (W)
4	1.4	19957	1710.7	QPSK	1	0	0	23.4	0.21627
					1	2	0	23.1	0.20370
					1	5	0	22.9	0.19588
					3	0	1	22.4	0.17219
					3	1	1	22.1	0.16368
					3	2	1	21.9	0.15596
					6	0	1	22.4	0.17258
				16QAM	1	0	1	22.4	0.17298
					1	2	1	22.2	0.16558
					1	5	1	22.0	0.15849
					3	0	2	21.4	0.13900
					3	1	2	21.2	0.13152
					3	2	2	21.0	0.12589
					6	0	2	21.0	0.12445
		20175	1732.5	QPSK	1	0	0	23.7	0.23335
					1	2	0	23.2	0.20893
					1	5	0	23.0	0.19907
					3	0	1	22.8	0.18967
					3	1	1	22.2	0.16749
					3	2	1	22.1	0.16106
					6	0	1	22.8	0.18967
				16QAM	1	0	1	22.7	0.18535
					1	2	1	22.2	0.16749
					1	5	1	22.0	0.15996
					3	0	2	21.8	0.15066
					3	1	2	21.2	0.13213
					3	2	2	21.1	0.12823
					6	0	2	21.0	0.12589
		20392	1754.2	QPSK	1	0	0	23.0	0.20045
					1	2	0	22.9	0.19409
					1	5	0	22.8	0.18967
					3	0	1	22.1	0.16331
					3	1	1	22.0	0.15776
					3	2	1	21.9	0.15417
					6	0	1	22.1	0.16144
				16QAM	1	0	1	22.1	0.16293
					1	2	1	22.0	0.15776
					1	5	1	21.9	0.15417
					3	0	2	21.1	0.12853
					3	1	2	21.0	0.12531
					3	2	2	20.9	0.12246
					6	0	2	20.9	0.12190

7.2 ERP & EIRP MEASUREMENT

LIMIT

According to FCC §2.1046

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

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

According to RSS-130, Band 17,

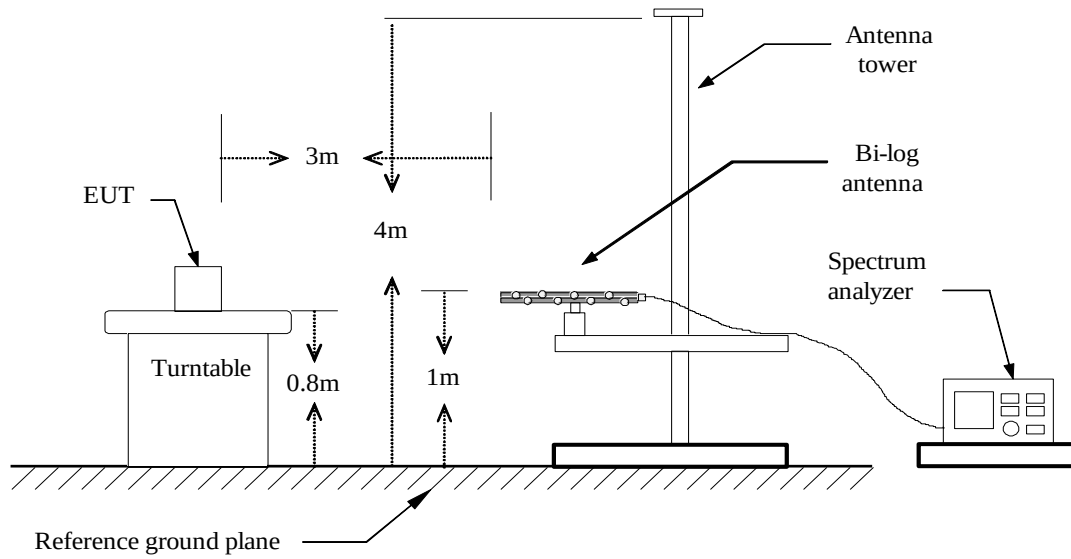
The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

According to RSS-139, Band 4,

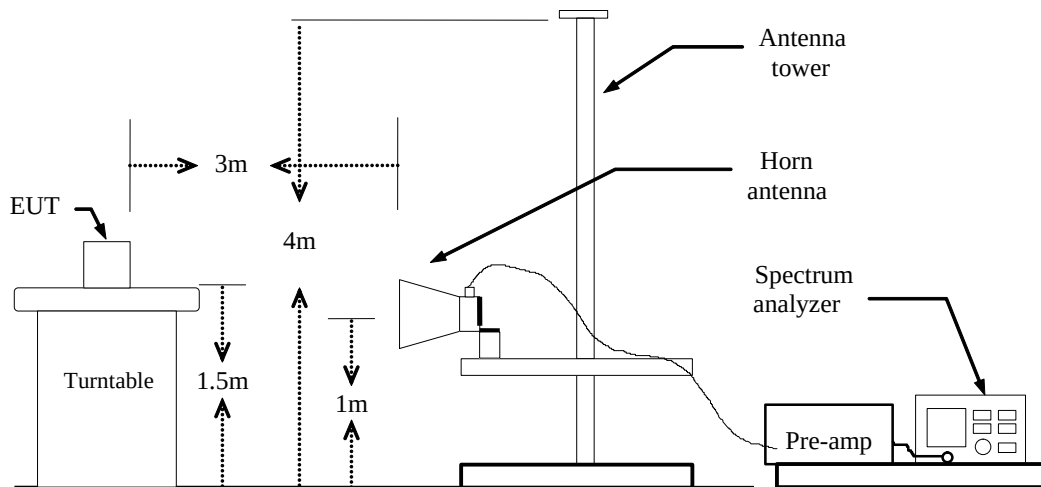
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed 1 watt.

Test Configuration

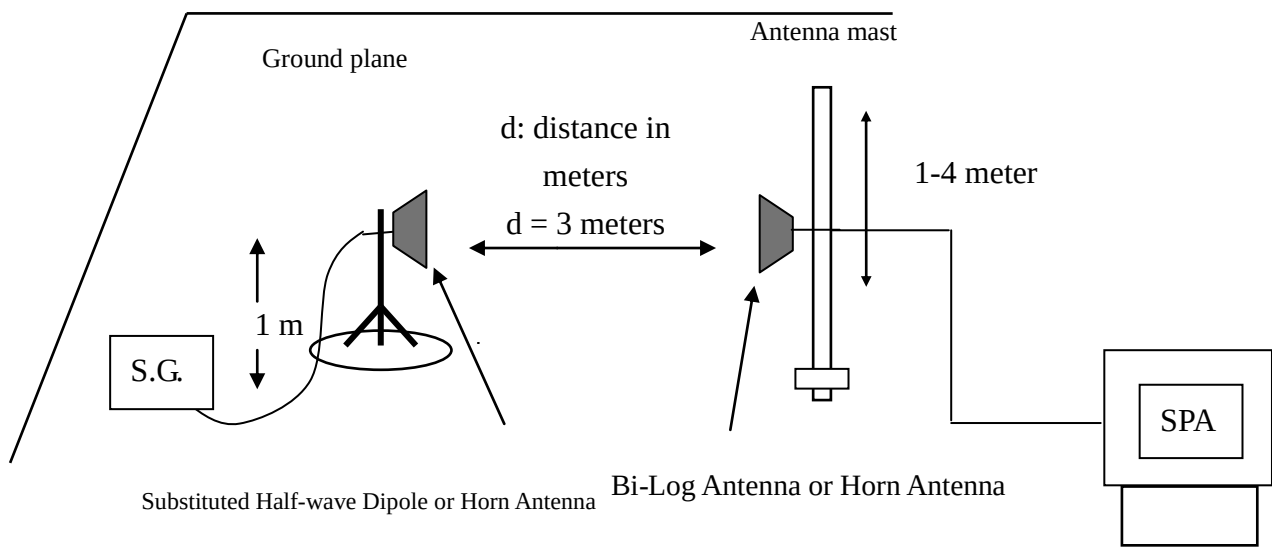
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



TEST PROCEDURE

1. The EUT was placed on a non-conductive rotating platform (0.8m for below 1G and 1.5m for above 1G) in a semi-chamber. The radiated emission at the fundamental frequency was measured at 3m and SA with RMS detector per photograph 5, KDB 971168 D01.
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**LTE Band 17****BW: 5MHz / RB=1, RB Offset=0**

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
17	5	Lowest	QPSK	1	0	18.30	0.067	12.21	0.016
		Middle		1	0	19.02	0.079	14.68	0.029
		Highest		1	0	20.45	0.110	13.84	0.024
		Lowest	16 QAM	1	0	18.88	0.077	12.13	0.016
		Middle		1	0	18.21	0.066	11.42	0.013
		Highest		1	0	20.62	0.115	14.05	0.025

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						ERP (dBm)	ERP (W)	ERP (dBm)	ERP (W)
17	10	Lowest	QPSK	1	0	17.88	0.061	11.33	0.013
		Middle		1	0	17.38	0.054	10.82	0.012
		Highest		1	0	17.52	0.056	10.70	0.011
		Lowest	16 QAM	1	0	18.31	0.067	12.03	0.015
		Middle		1	0	17.85	0.060	11.37	0.013
		Highest		1	0	17.53	0.056	10.96	0.012

LTE Band 4

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

Band	BW (MHz)	Channel	Mode	UL RB Allocation	UL RB offset	Vertical		Horizontal	
						EIRP (dBm)	EIRP (W)	EIRP (dBm)	EIRP (W)
4	1.4	Lowest	QPSK	1	0	19.34	0.085	29.01	0.796
		Middle		1	0	17.72	0.059	29.68	0.928
		Highest		1	0	19.32	0.085	28.77	0.753
		Lowest	16 QAM	1	0	16.34	0.043	29.05	0.803
		Middle		1	0	15.85	0.038	29.20	0.831
		Highest		1	0	16.68	0.046	29.20	0.831

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	19.56	0.090	28.78	0.755
		Middle		1	0	18.76	0.075	27.98	0.628
		Highest		1	0	19.30	0.085	28.36	0.685
		Lowest	16 QAM	1	0	16.27	0.042	28.76	0.751
		Middle		1	0	15.73	0.037	29.40	0.87
		Highest		1	0	16.22	0.041	29.92	0.981

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	19.9	0.097	29.01	0.796
		Middle		1	0	20.63	0.115	29.40	0.870
		Highest		1	0	20.22	0.105	29.70	0.933
		Lowest	16 QAM	1	0	16.53	0.044	29.21	0.833
		Middle		1	0	15.96	0.039	29.95	0.988
		Highest		1	0	16.38	0.043	29.57	0.905

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	19.47	0.088	29.07	0.807
		Middle		1	0	20.52	0.112	29.66	0.924
		Highest		1	0	20.45	0.110	29.92	0.981
		Lowest	16 QAM	1	0	16.53	0.044	28.87	0.770
		Middle		1	0	16.03	0.040	29.42	0.874
		Highest		1	0	16.42	0.043	29.86	0.968

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	19.41	0.087	29.36	0.862
		Middle		1	0	20.24	0.105	29.70	0.933
		Highest		1	0	20.41	0.109	29.70	0.933
		Lowest	16 QAM	1	0	16.36	0.043	29.06	0.805
		Middle		1	0	16.68	0.046	28.36	0.685
		Highest		1	0	16.75	0.047	29.86	0.968

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	19.15	0.082	28.8	0.758
		Middle		1	0	19.27	0.084	27.82	0.605
		Highest		1	0	19.64	0.092	29.04	0.801
		Lowest	16 QAM	1	0	16.38	0.043	28.98	0.790
		Middle		1	0	15.99	0.039	29.13	0.812
		Highest		1	0	15.91	0.038	28.94	0.783

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.

According to RSS-139 and RSS-130,

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

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 17**

Reference Frequency: LTE Band 17 Max Bandwidth QPSK, 710 MHz				
Limit: ± 2.5 ppm = 1775Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
120	50	0.03	0.000042	+/- 2.5
120	40	0.04	0.000056	
120	30	0.03	0.000042	
120	20	0.01	0.000014	
120	10	0.04	0.000056	
120	0	0.02	0.000028	
120	-10	0.00	0.000000	
120	-20	0.01	0.000014	

Reference Frequency: LTE Band 17 Max Bandwidth 16QAM, 710 MHz				
Limit: ± 2.5 ppm = 1775Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
120	50	0.05	0.000070	+/- 2.5
120	40	0.03	0.000042	
120	30	0.02	0.000028	
120	20	0.03	0.000042	
120	10	0.04	0.000056	
120	0	0.01	0.000014	
120	-10	0.02	0.000028	
120	-20	0.01	0.000014	

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)
120	50	-0.01	-0.000004	+/- 2.5
120	40	-0.01	-0.000005	
120	30	0.00	0.000003	
120	20	0.00	-0.000003	
120	10	0.01	0.000007	
120	0	-0.01	-0.000007	
120	-10	0.01	0.000004	
120	-20	0.01	0.000006	

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)
120	50	0.00	0.000000	+/- 2.5
120	40	0.01	0.000006	
120	30	-0.01	-0.000006	
120	20	-0.02	-0.000012	
120	10	0.00	0.000000	
120	0	0.00	0.000000	
120	-10	-0.03	-0.000017	
120	-20	0.02	0.000012	

FREQUENCY STABILITY V.S. VOLTAGE MEASUREMENT:**LTE Band 17**

Reference Frequency: LTE Band 17 Max Bandwidth QPSK, MHz				
Limit: ± 2.5 ppm = Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
102	20	0.02	0.000028	+/- 2.5
120	20	0.01	0.000014	
138	20	0.04	0.000056	

Reference Frequency: LTE Band 17 Max Bandwidth 16QAM, MHz				
Limit: ± 2.5 ppm = Hz				
Power Supply	Environment	Frequency Error	Frequency Error	Limit (ppm)
Vdc	Temperature (°C)	(Hz)	(ppm)	(ppm)
102	20	0.01	0.000014	+/- 2.5
120	20	0.03	0.000042	
138	20	0.04	0.000056	

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)
102	20	-0.01	-0.000005	+/- 2.5
120	20	0.00	-0.000003	
138	20	0.00	-0.000003	

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)
102	20	0.00	0.000000	+/- 2.5
120	20	0.01	0.000006	
138	20	-0.01	-0.000006	

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 17

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23790	710.00	4.4717

CHANNEL BANDWIDTH: 10MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23790	710.00	8.9725

CHANNEL BANDWIDTH: 5MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23790	710.00	4.4717

CHANNEL BANDWIDTH: 10MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
23790	710.00	8.9435

LTE Band 4**CHANNEL BANDWIDTH: 1.4MHz / QPSK**

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	1.1027

CHANNEL BANDWIDTH: 3MHz / QPSK

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

CHANNEL BANDWIDTH: 5MHz / QPSK

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	4.4573

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	13.4153

CHANNEL BANDWIDTH: 20MHz / QPSK

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

CHANNEL BANDWIDTH: 1.4MHz / 16QAM

Channel	FREQUENCY (MHz)	Occupied bandwidth (MHz)
20175	1732.5	1.1078

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	4.4573

CHANNEL BANDWIDTH: 10MHz / 16QAM

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

CHANNEL BANDWIDTH: 15MHz / 16QAM

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

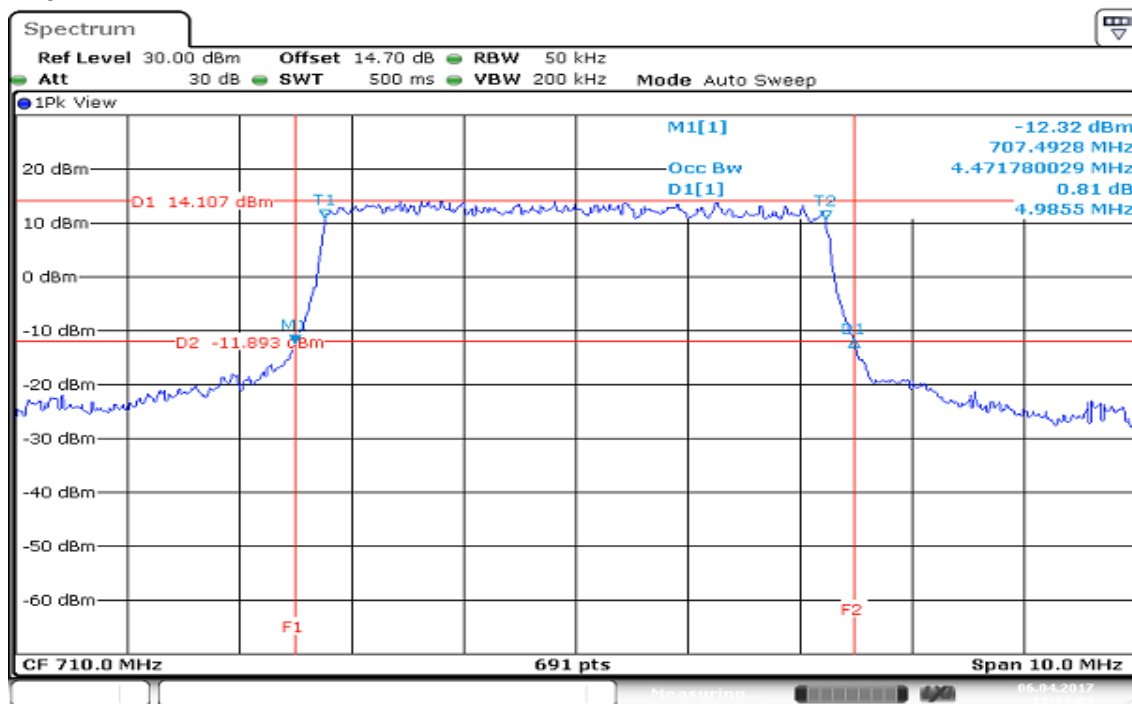
CHANNEL BANDWIDTH: 20MHz / 16QAM

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

LTE Band 17

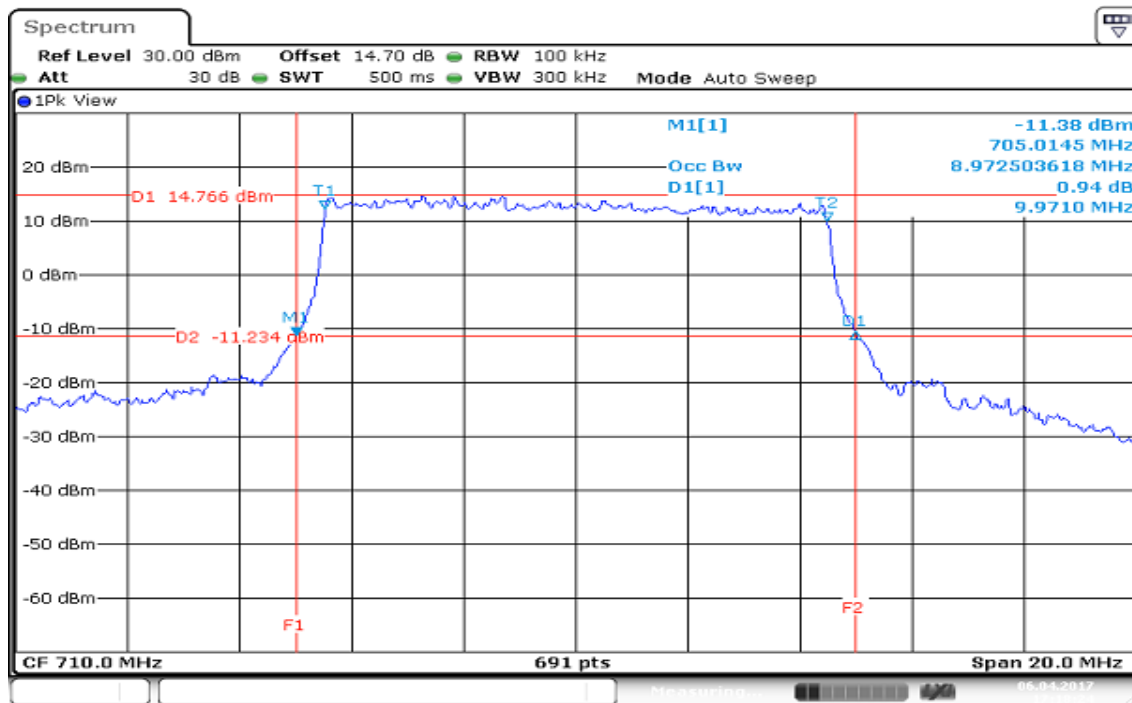
CHANNEL BANDWIDTH: 5MHz / QPSK

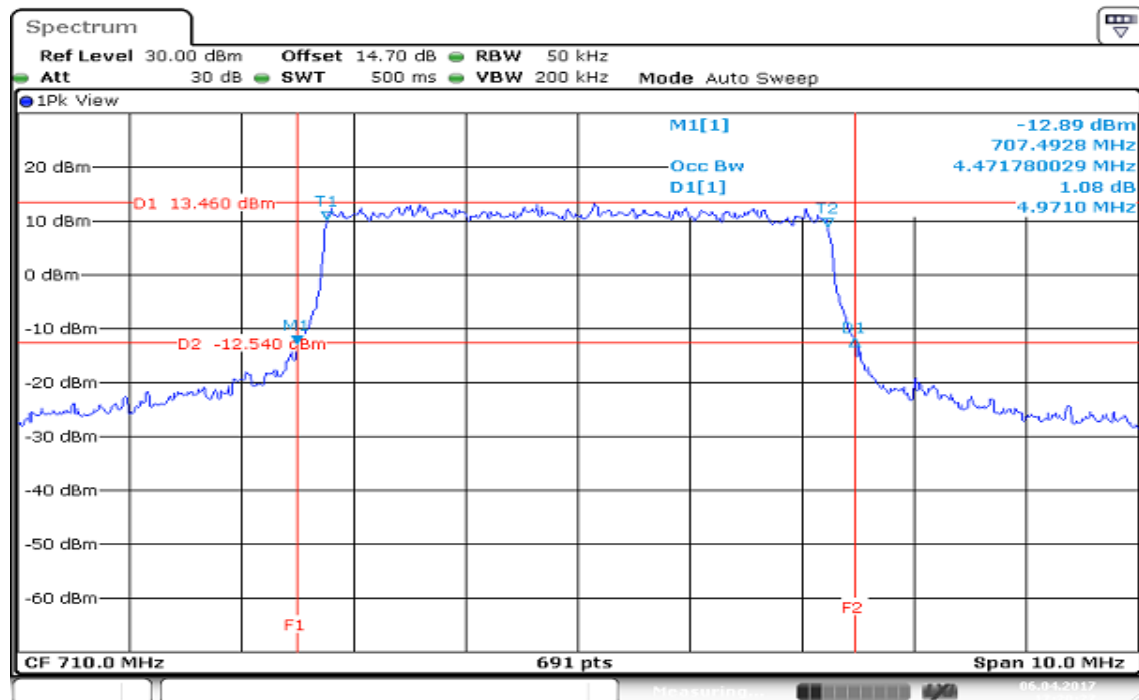
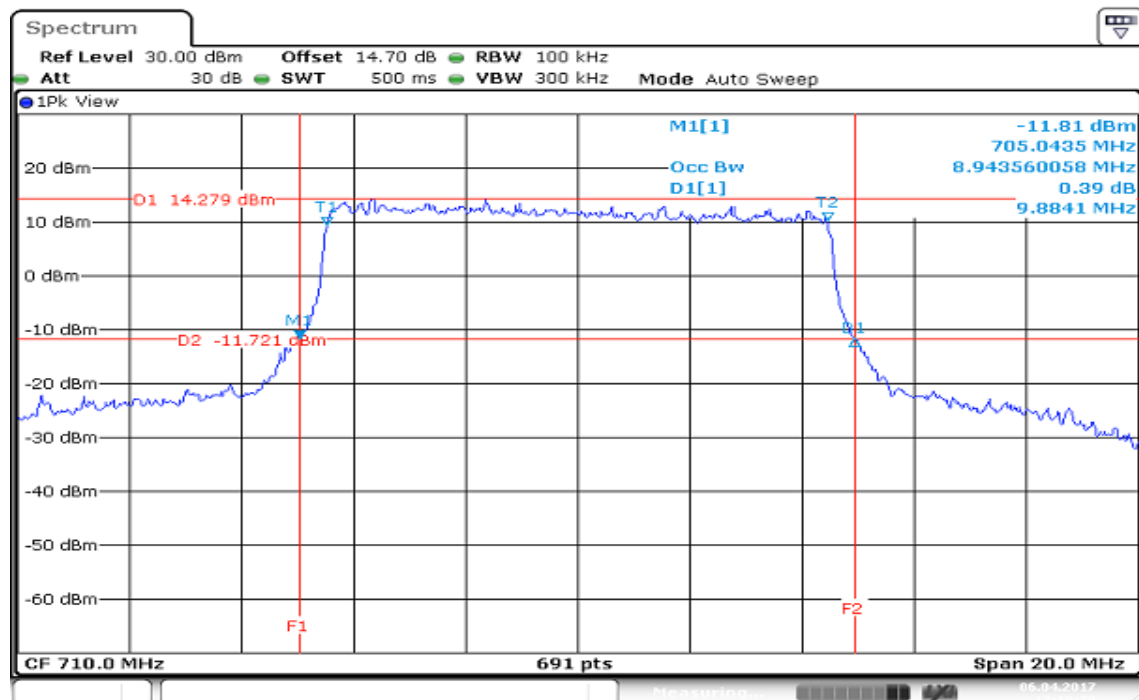
CH Mid



CHANNEL BANDWIDTH: 10MHz / QPSK

CH Mid

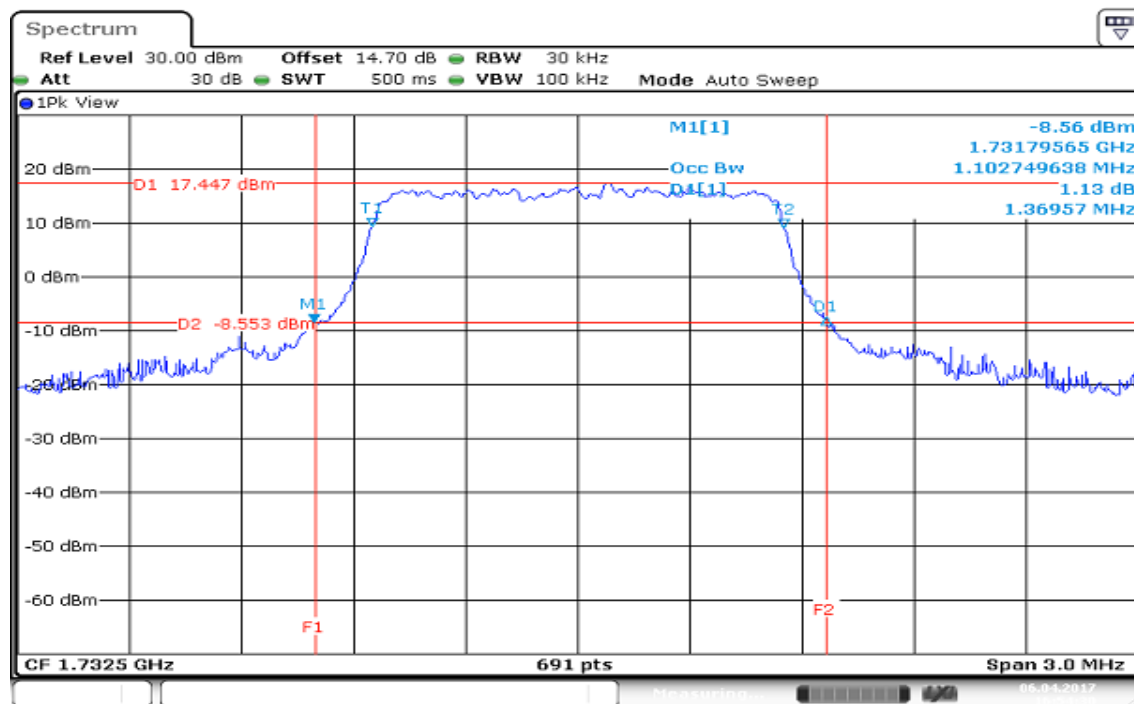


CHANNEL BANDWIDTH: 5MHz / 16QAM
CH Min**CHANNEL BANDWIDTH: 10MHz / 16QAM**
CH Min

LTE Band 4

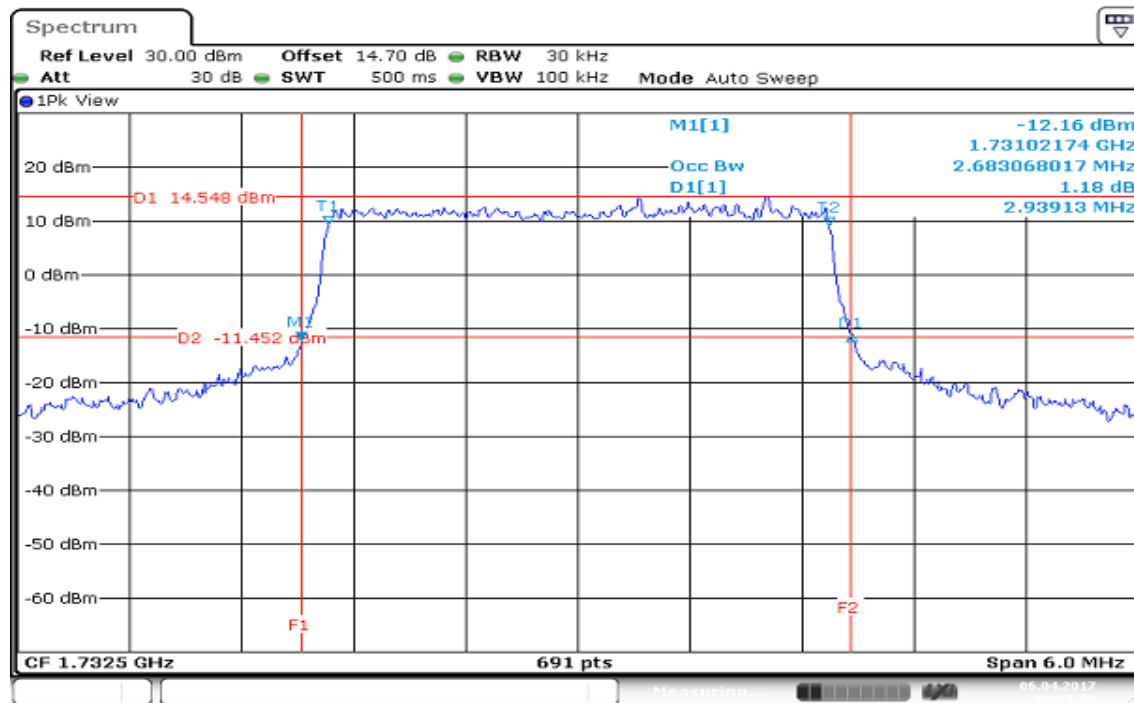
CHANNEL BANDWIDTH: 1.4MHz / QPSK

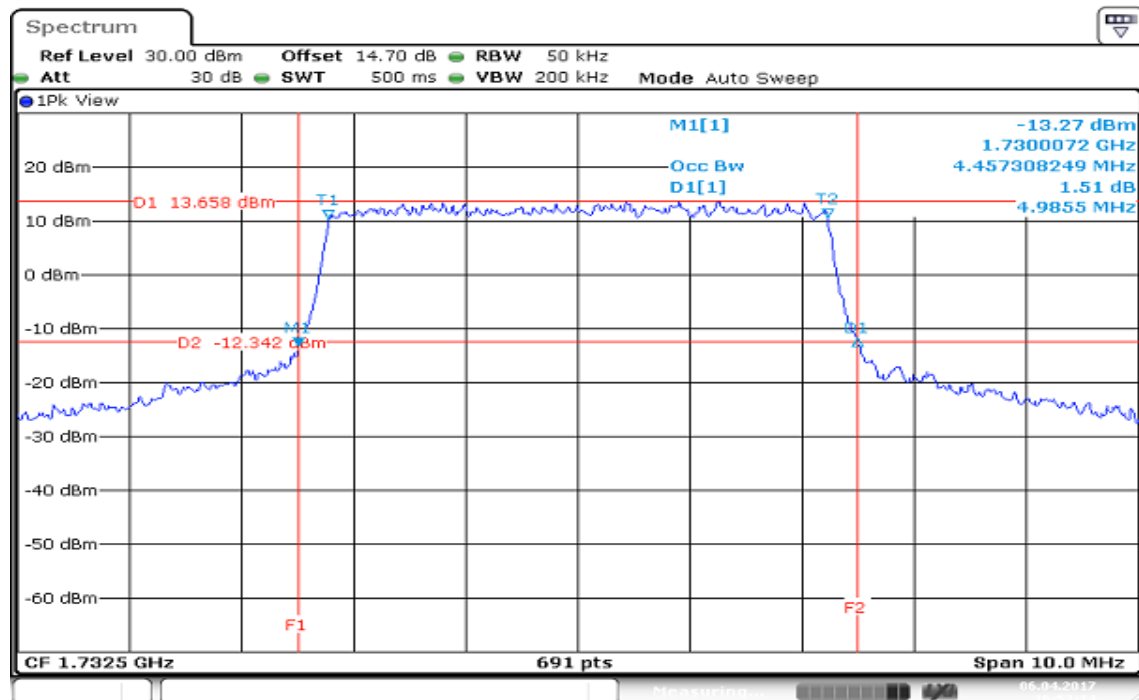
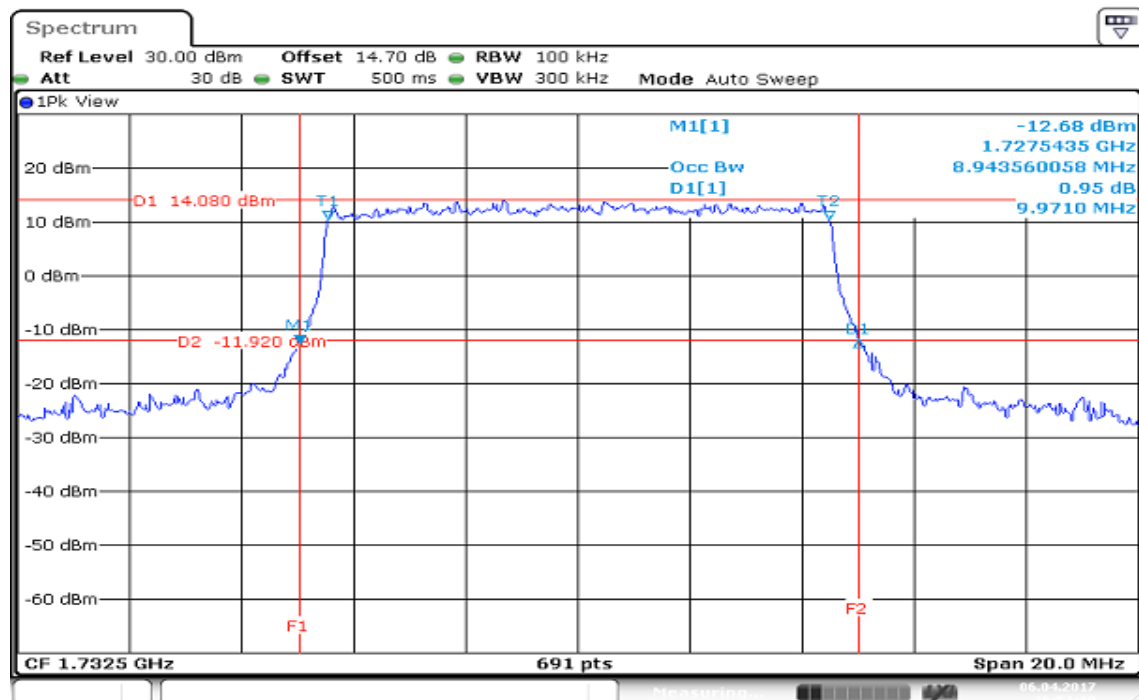
CH Min

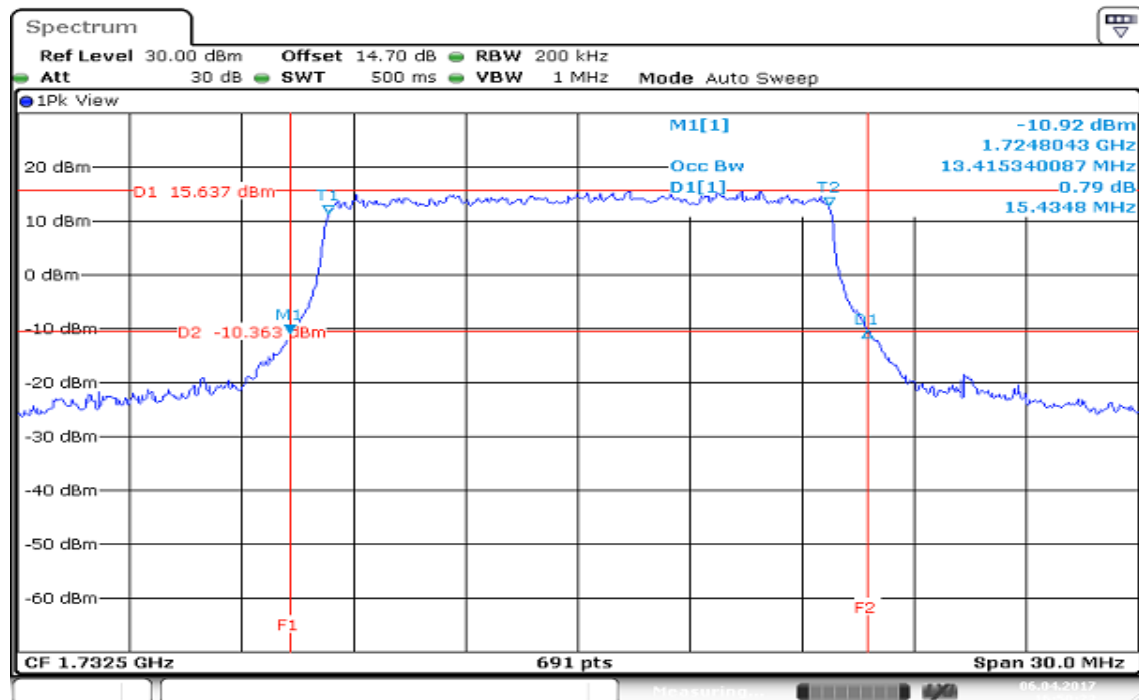
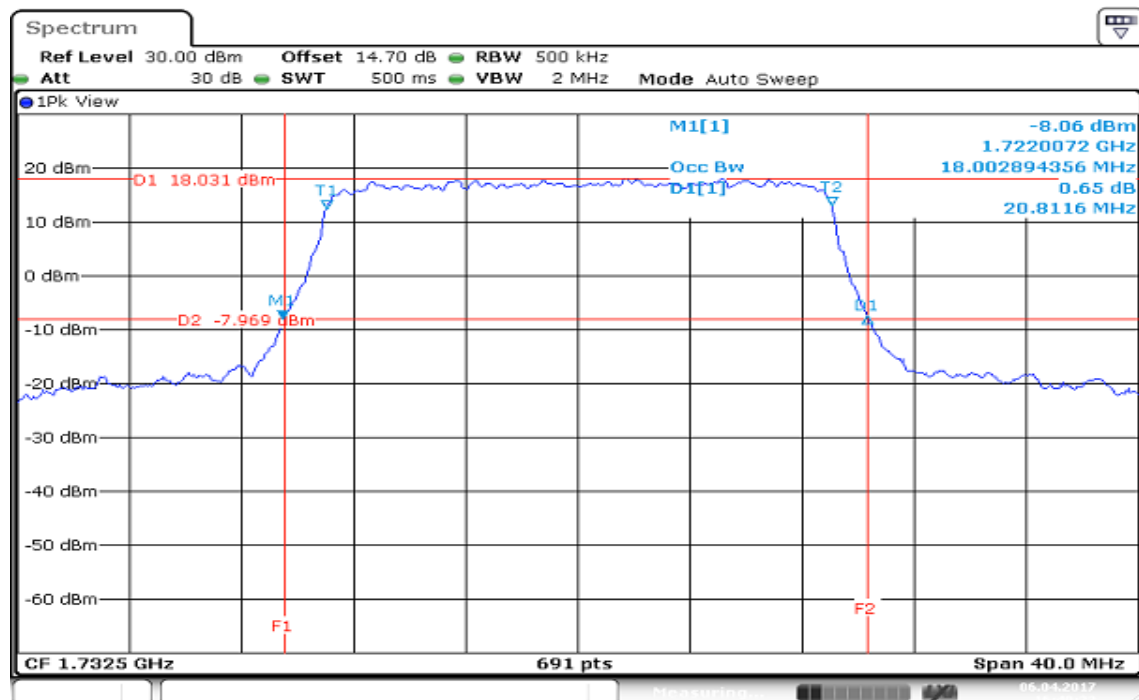


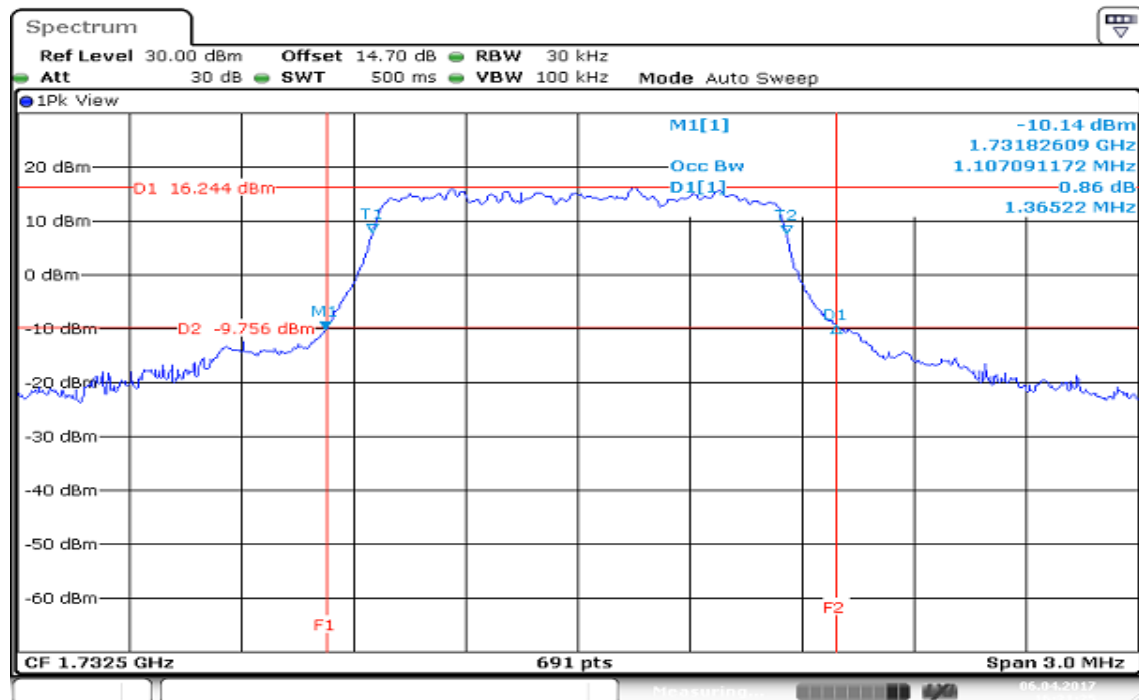
CHANNEL BANDWIDTH: 3MHz / QPSK

CH Min

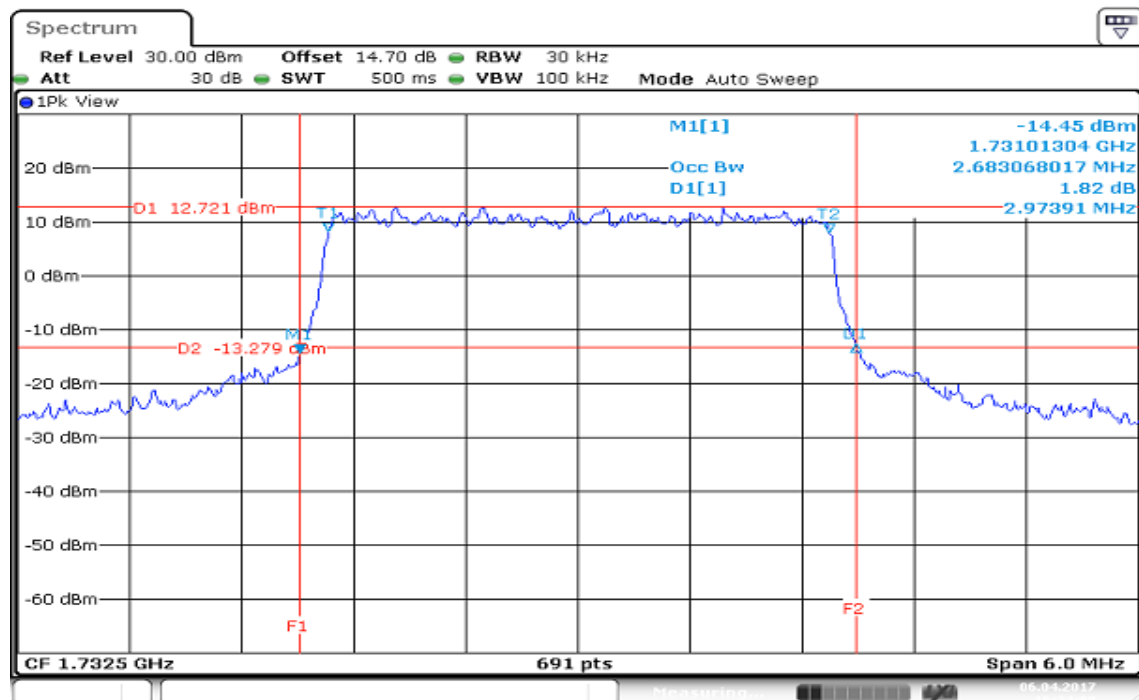


CHANNEL BANDWIDTH: 5MHz / QPSK
CH Min**CHANNEL BANDWIDTH: 10MHz / QPSK**
CH Min

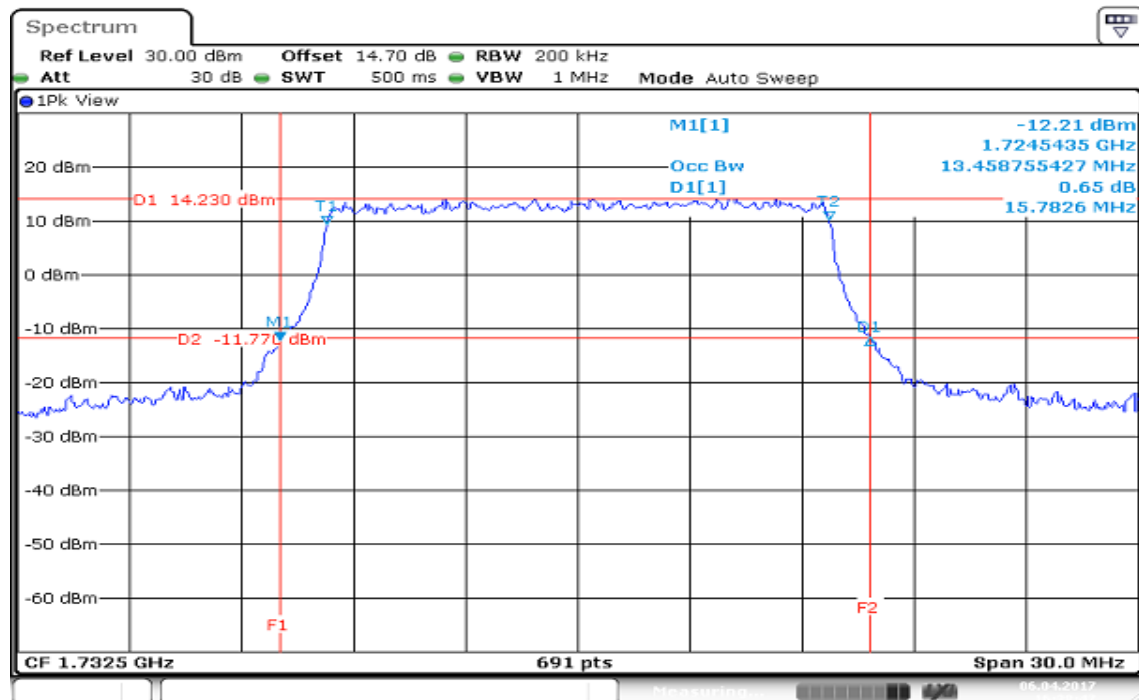
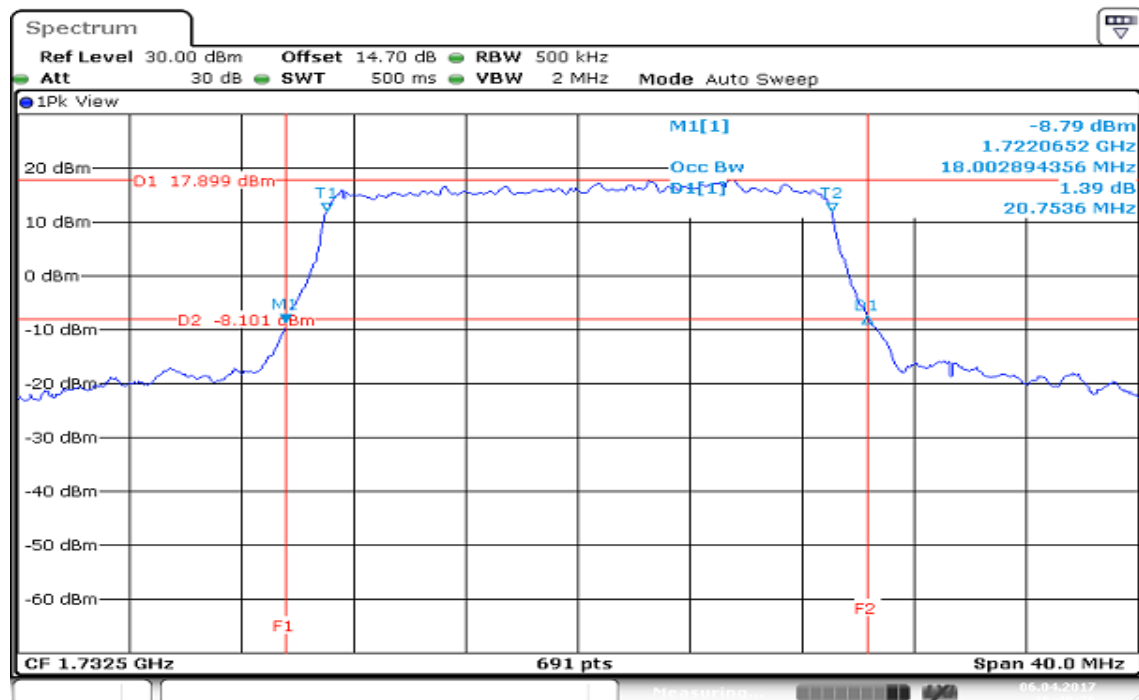
CHANNEL BANDWIDTH: 15MHz / QPSK
CH Min**CHANNEL BANDWIDTH: 20MHz / QPSK**
CH Min

CHANNEL BANDWIDTH: 1.4MHz / 16QAM
CH Min

Date: 6.APR.2017 16:31:25

CHANNEL BANDWIDTH: 3MHz / 16QAM
CH Min

Date: 6.APR.2017 16:34:08

CHANNEL BANDWIDTH: 15MHz / 16QAM
CH Min**CHANNEL BANDWIDTH: 20MHz / 16QAM**
CH Min

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 17

CHANNEL BANDWIDTH: 5Hz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.30

CHANNEL BANDWIDTH: 10Hz / QPSK / 1RB

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

CHANNEL BANDWIDTH: 5Hz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.94

CHANNEL BANDWIDTH: 10Hz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	5.10

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23790	710.00	5.88

CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23790	710.00	5.65

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23790	710.00	5.94

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
23790	710.00	5.86

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	6.12

CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB

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

CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.04

CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.12

CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.12

CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.12

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 100%RB

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

CHANNEL BANDWIDTH: 3MHz / QPSK / 100%RB

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

CHANNEL BANDWIDTH: 5MHz / QPSK / 100%RB

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

CHANNEL BANDWIDTH: 10MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.20

CHANNEL BANDWIDTH: 15MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.12

CHANNEL BANDWIDTH: 20MHz / QPSK / 100%RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.12

CHANNEL BANDWIDTH: 1.4MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	6.06

CHANNEL BANDWIDTH: 3MHz / 16QAM / 1RB

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

CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	5.91

CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.14

CHANNEL BANDWIDTH: 15MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.12

CHANNEL BANDWIDTH: 20MHz / 16QAM / 1RB

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.17

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.5	6.06

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

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

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

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

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

Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.17

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

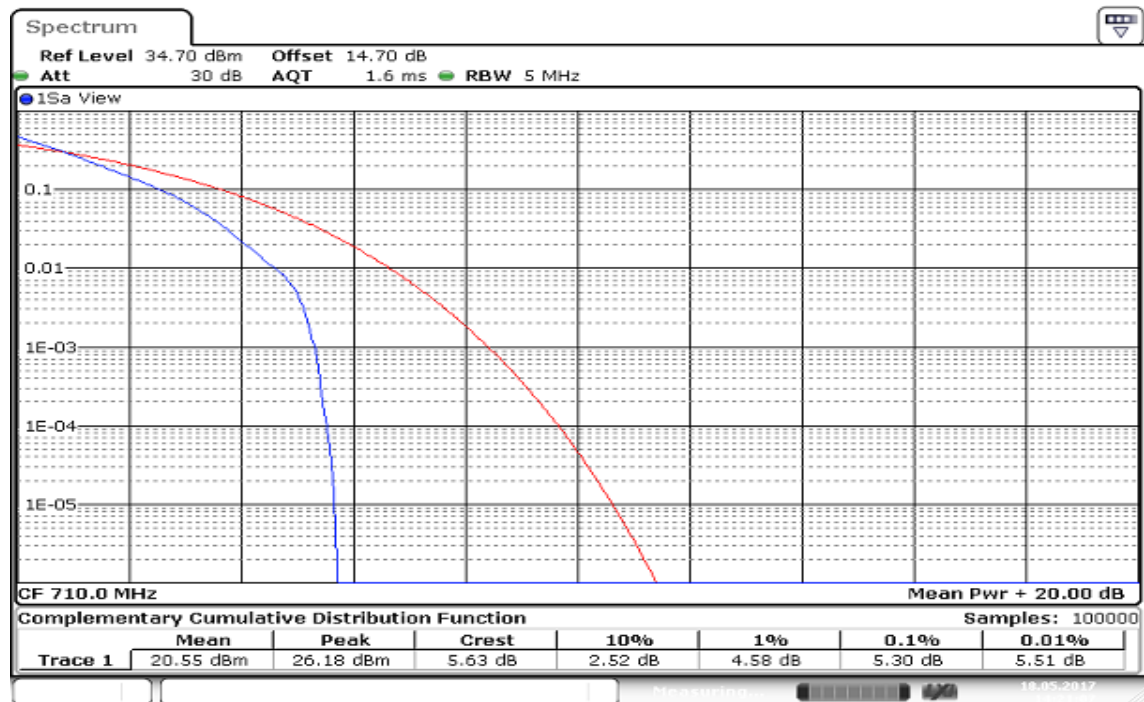
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.17

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

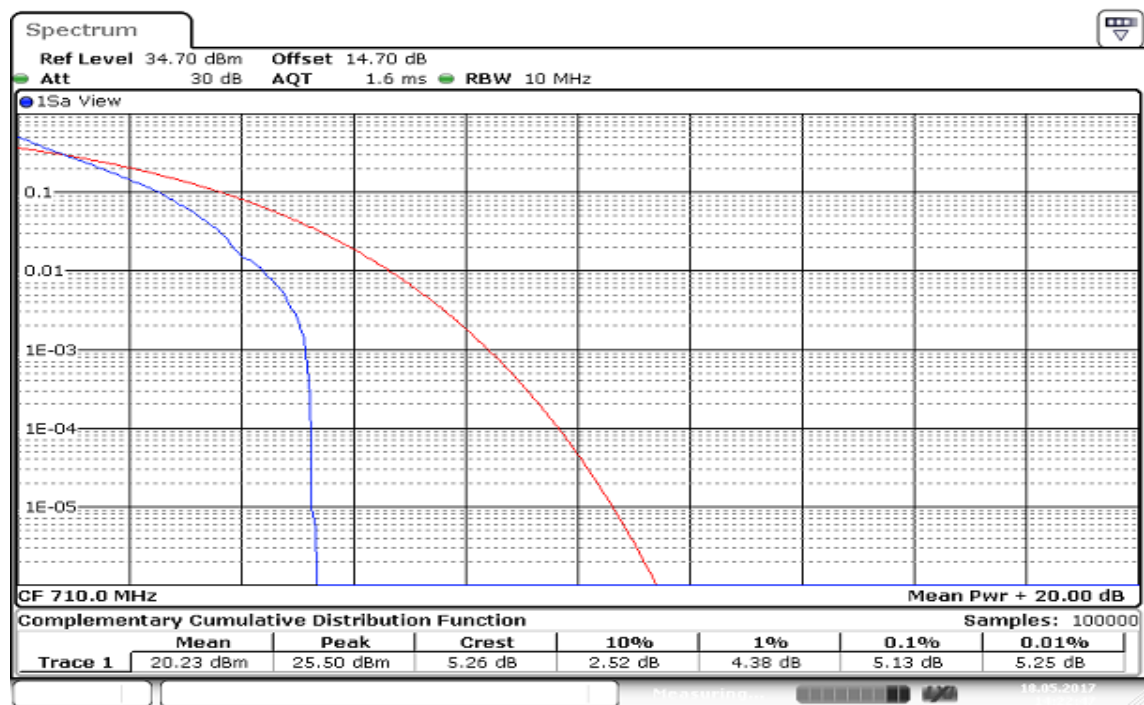
Channel	FREQUENCY (MHz)	PEAK TO AVERAGE RATIO (dB)
20175	1732.50	0.14

LTE Band 17

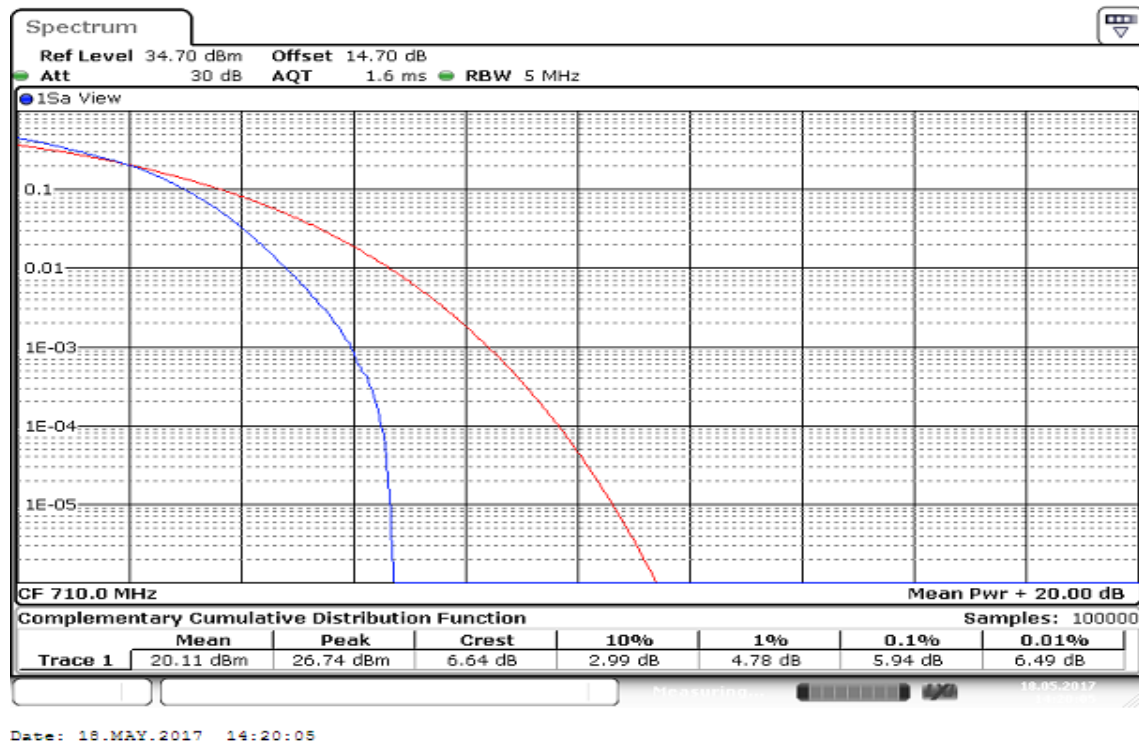
CHANNEL BANDWIDTH: 5MHz / QPSK/ 1RB



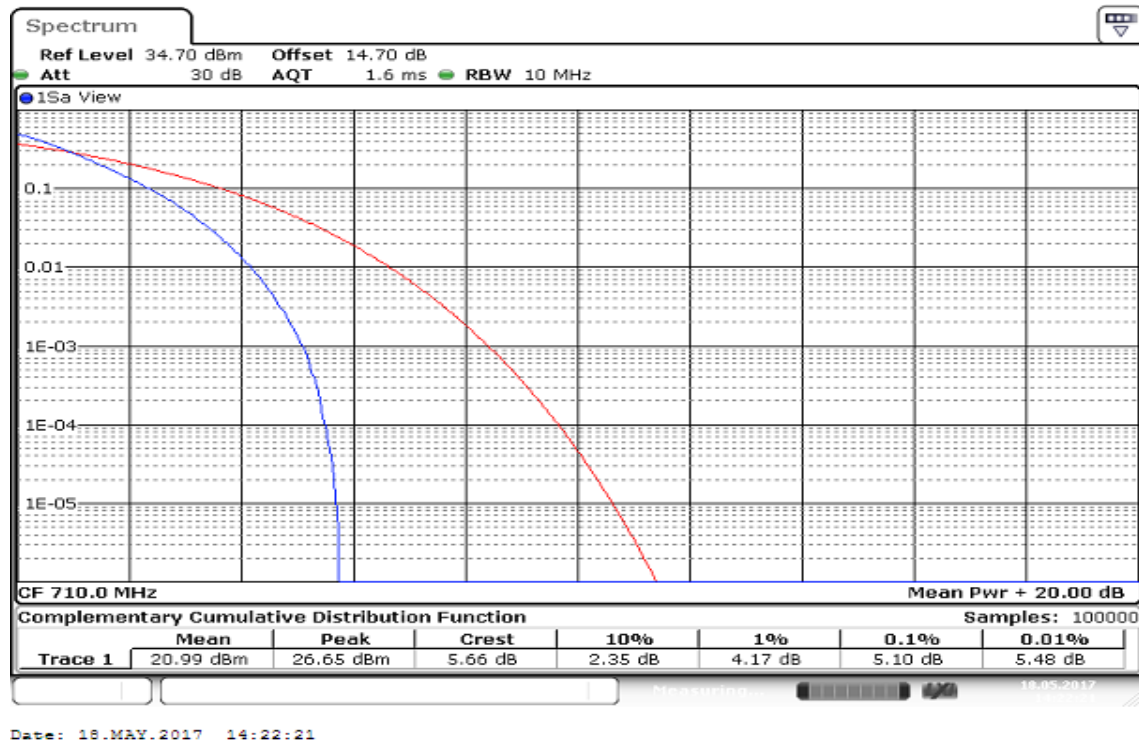
CHANNEL BANDWIDTH: 10MHz / QPSK/ 1RB



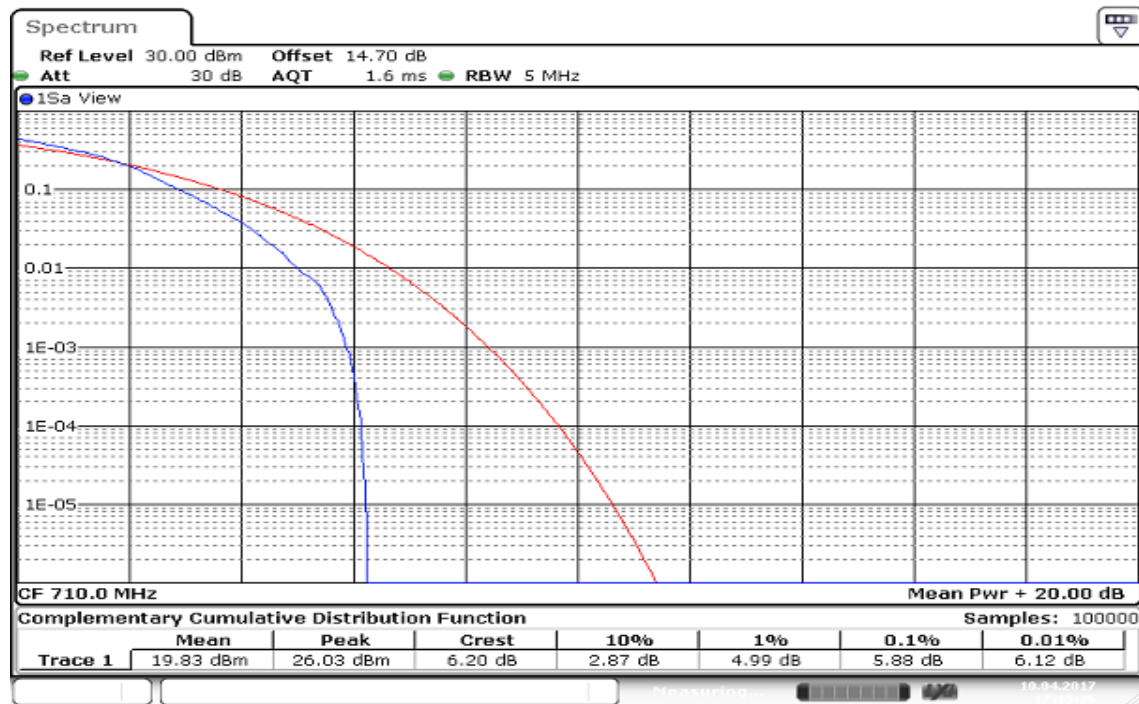
CHANNEL BANDWIDTH: 5MHz / QPSK/ 100%RB



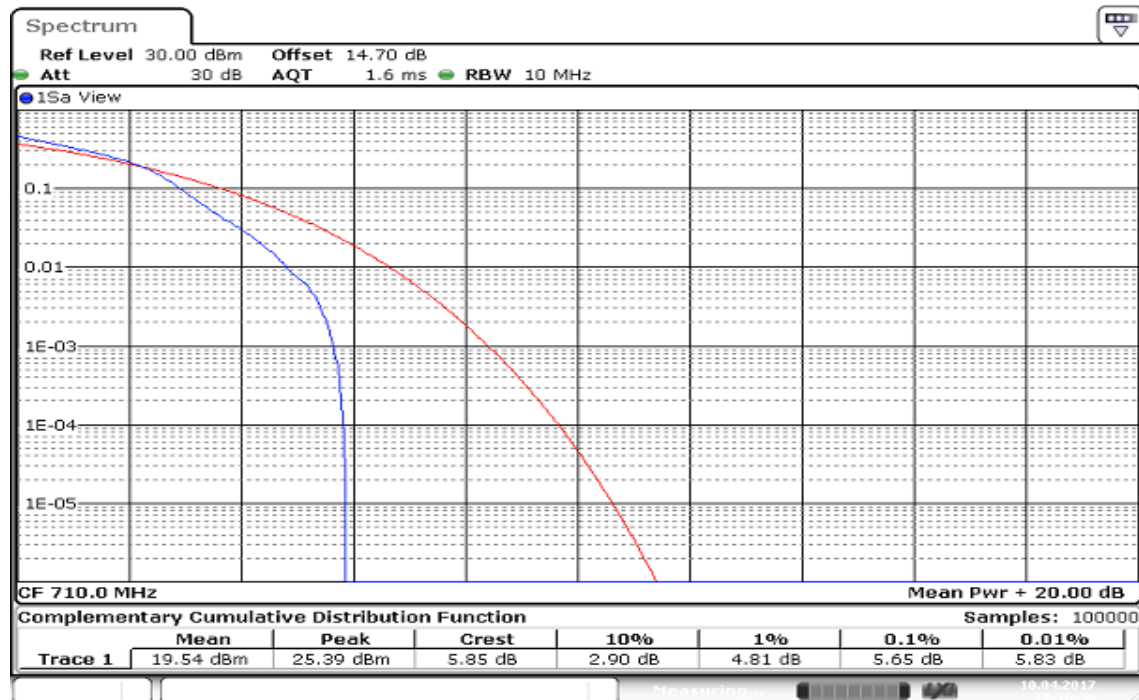
CHANNEL BANDWIDTH: 10MHz / QPSK/ 100%RB



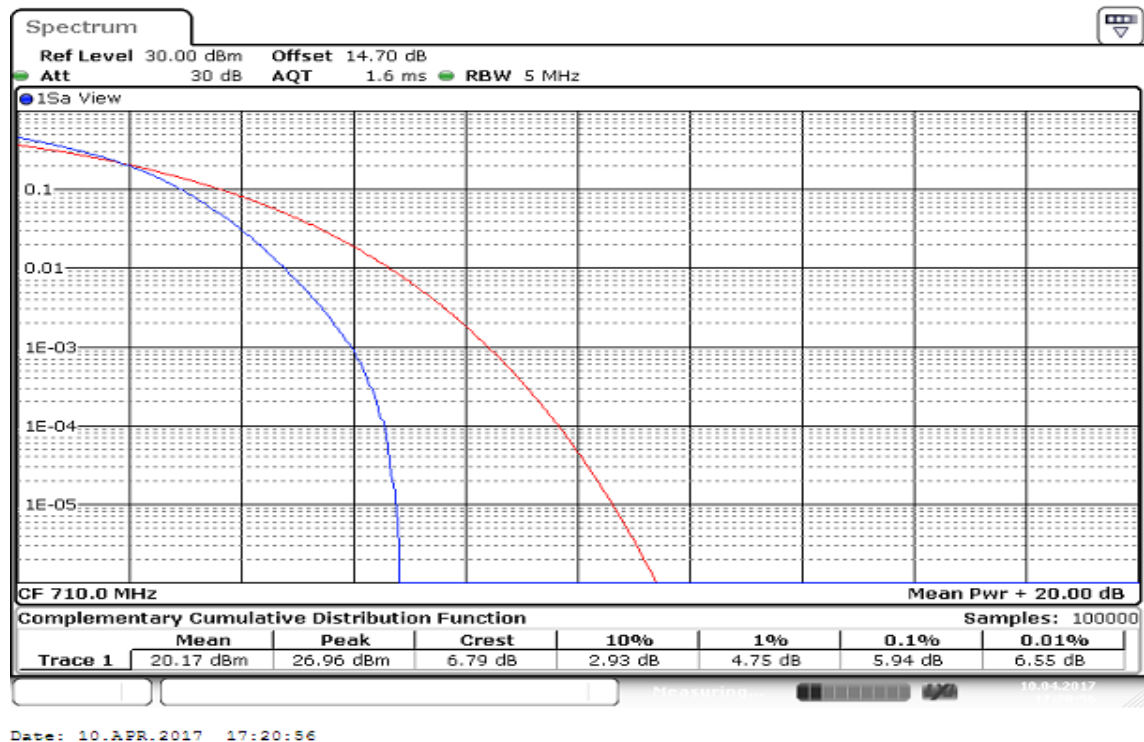
CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB



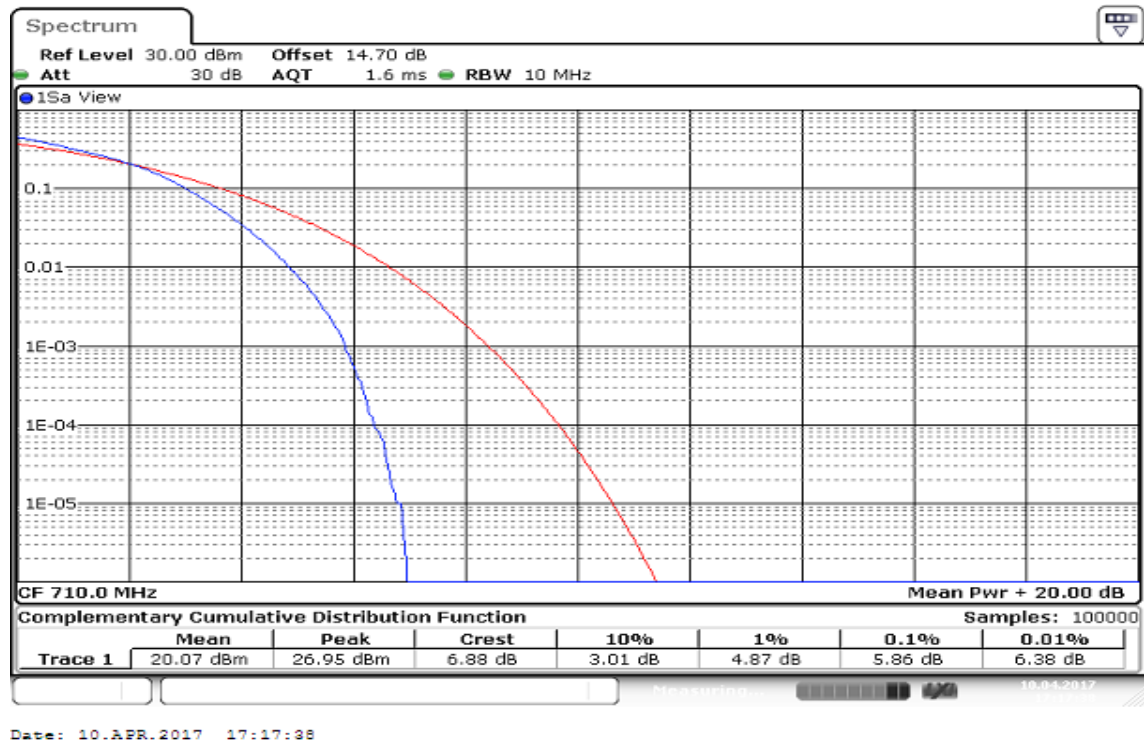
CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB



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

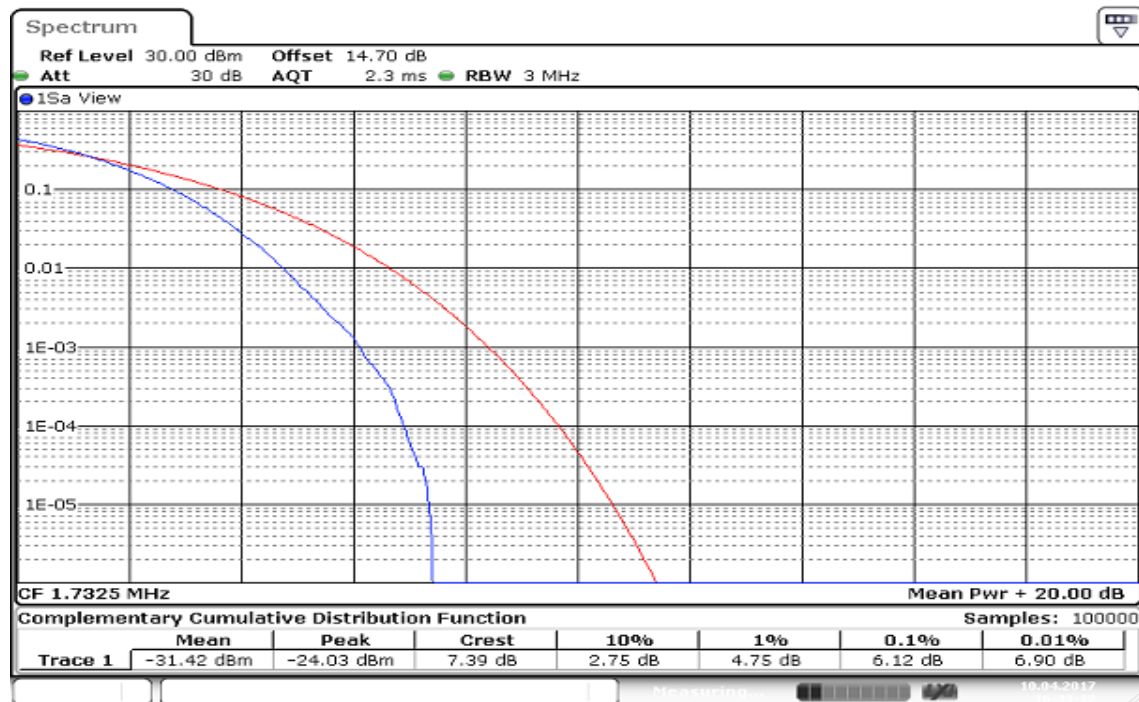


CHANNEL BANDWIDTH: 10MHz / 16QAM / 100%RB

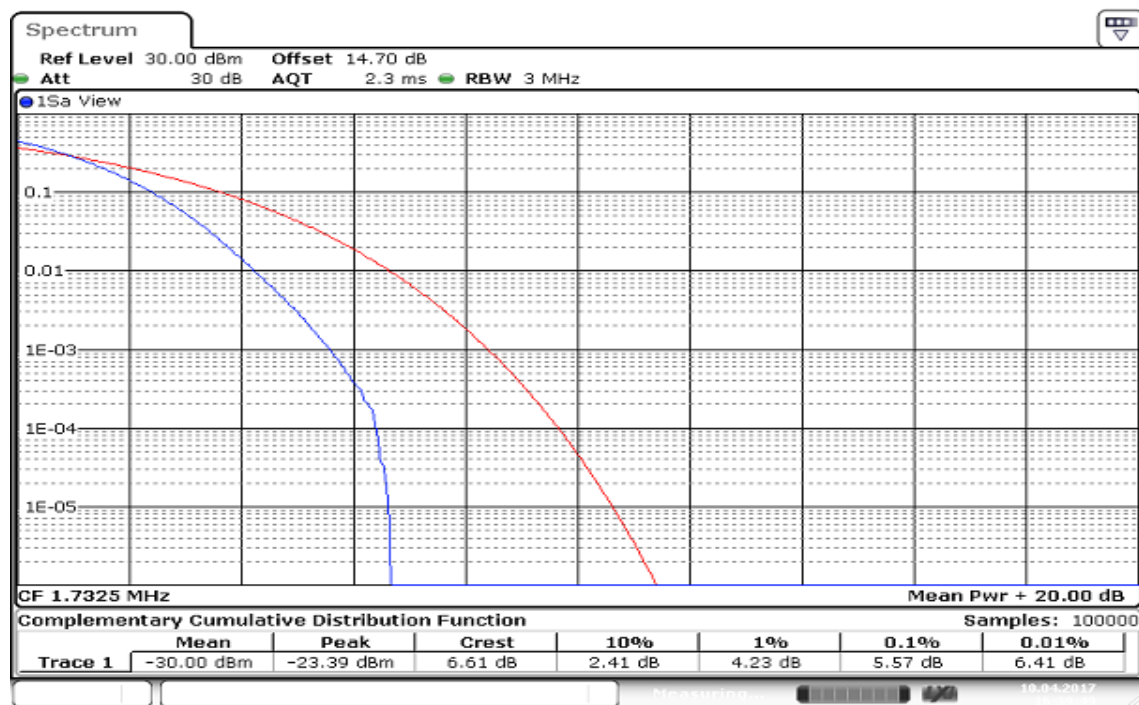


LTE Band 4

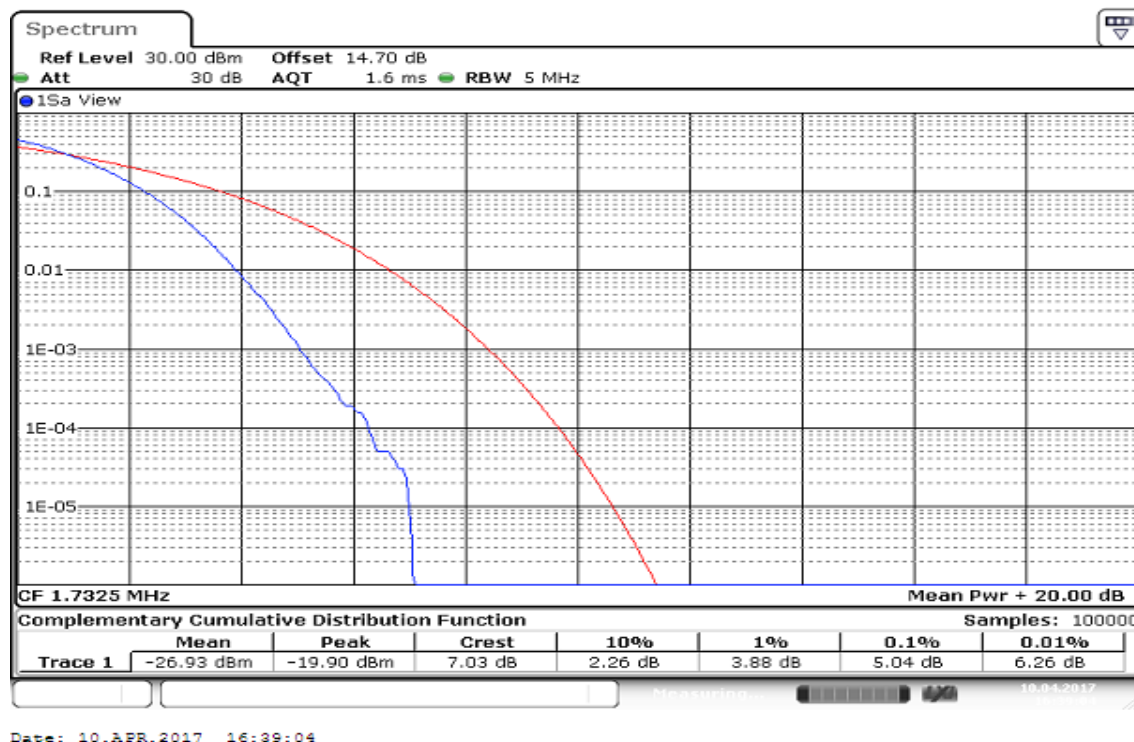
CHANNEL BANDWIDTH: 1.4MHz / QPSK/1RB



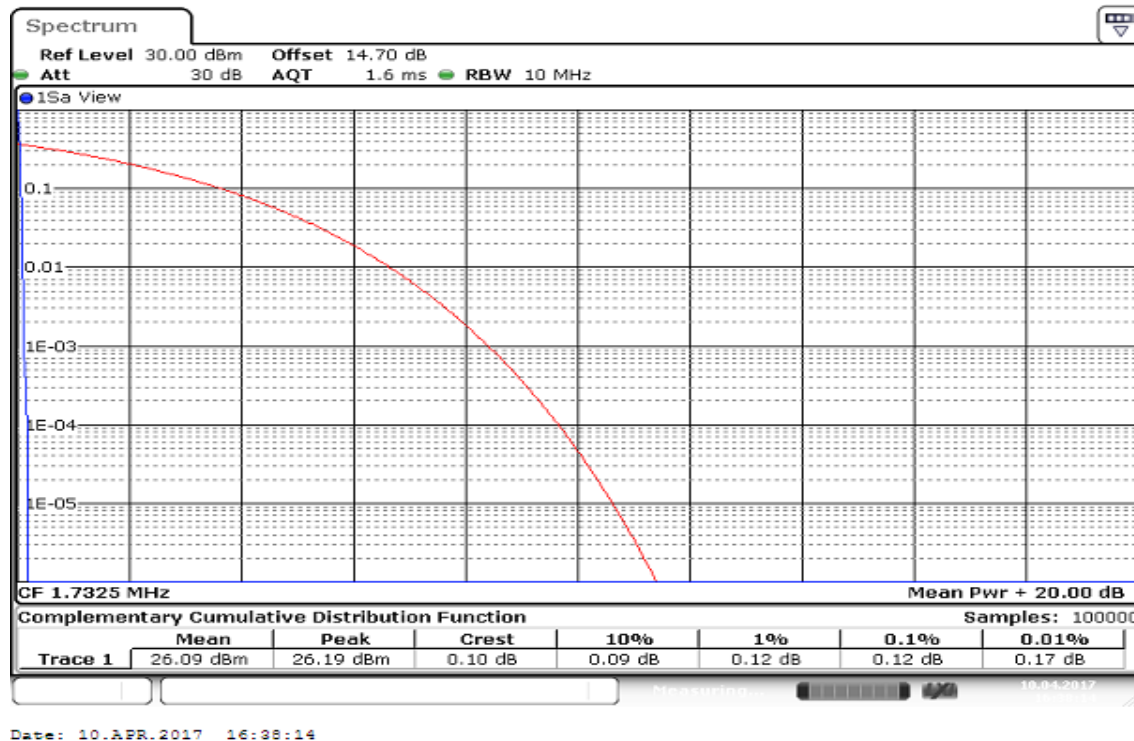
CHANNEL BANDWIDTH: 3MHz / QPSK /1RB



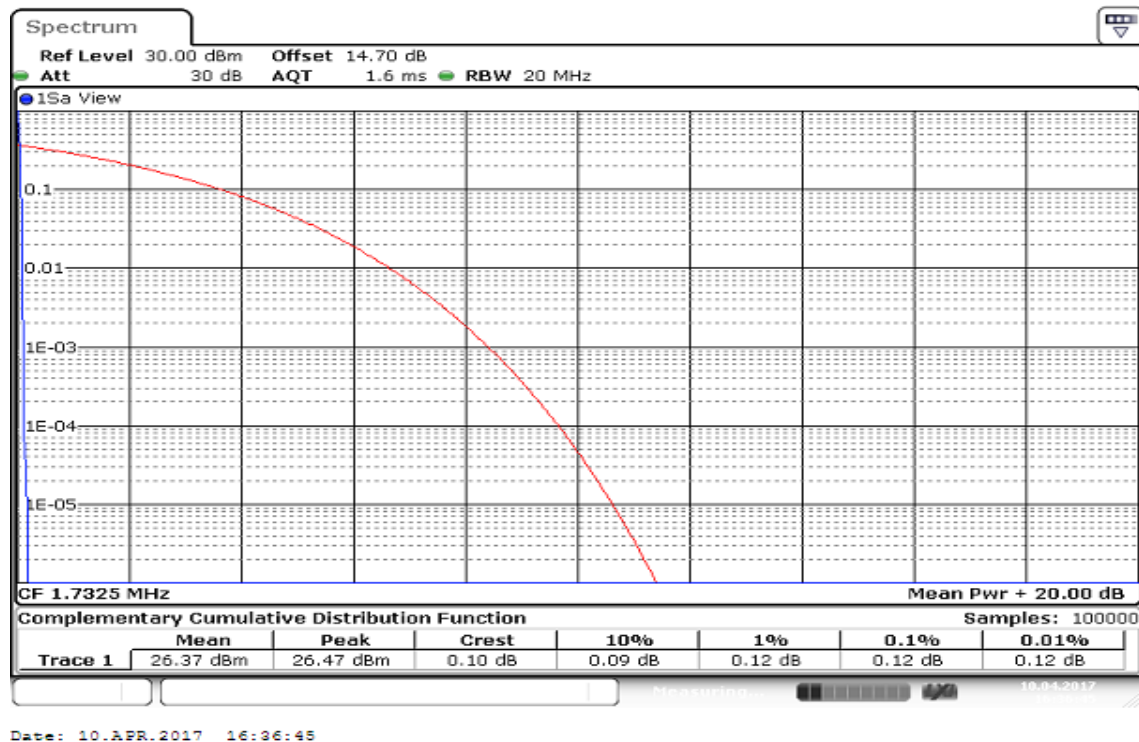
CHANNEL BANDWIDTH: 5MHz / QPSK/1RB



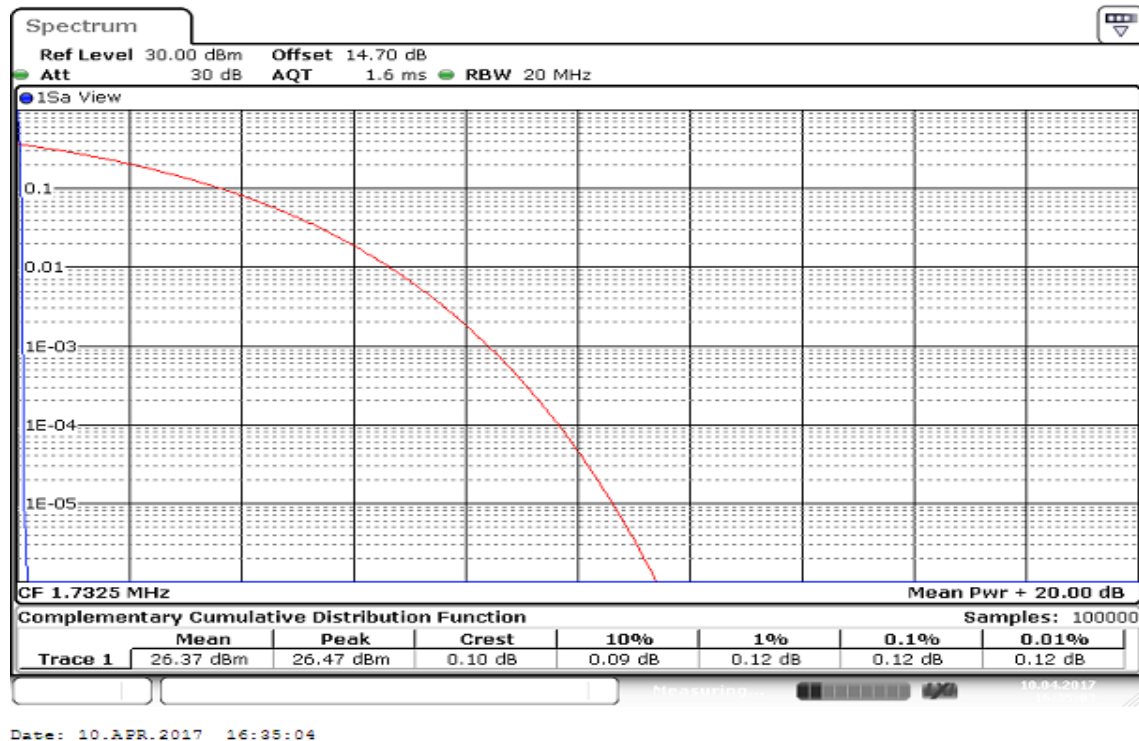
CHANNEL BANDWIDTH: 10MHz / QPSK /1RB



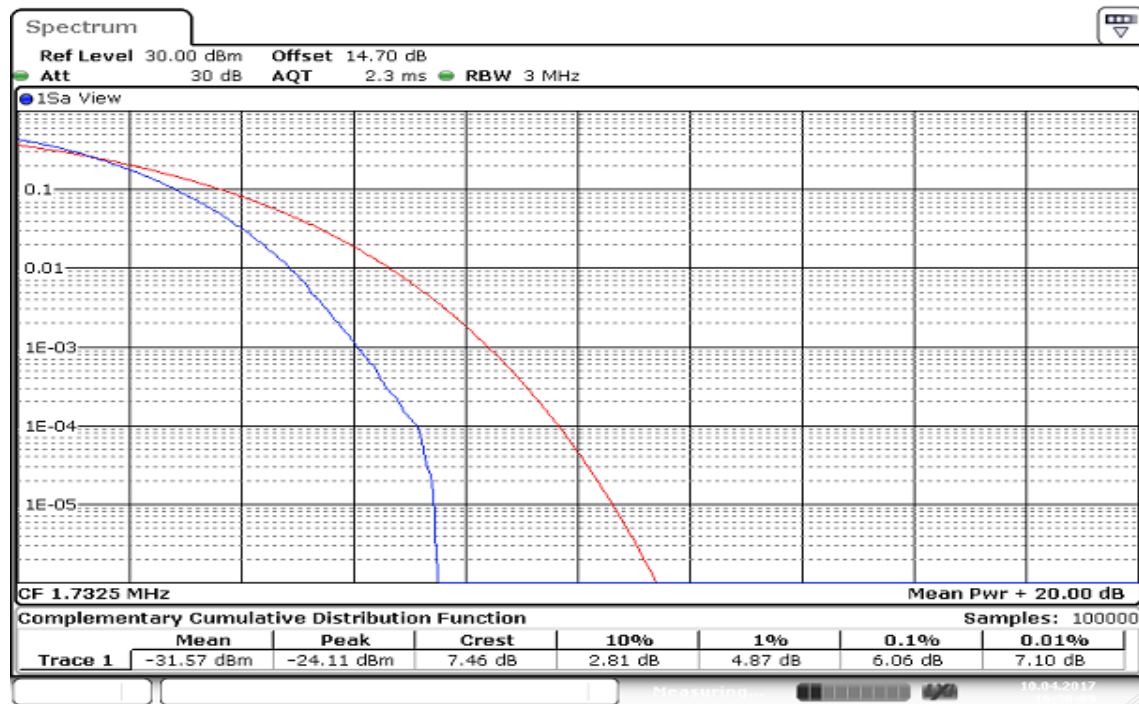
CHANNEL BANDWIDTH: 15MHz / QPSK/1RB



CHANNEL BANDWIDTH: 20MHz / QPSK /1RB

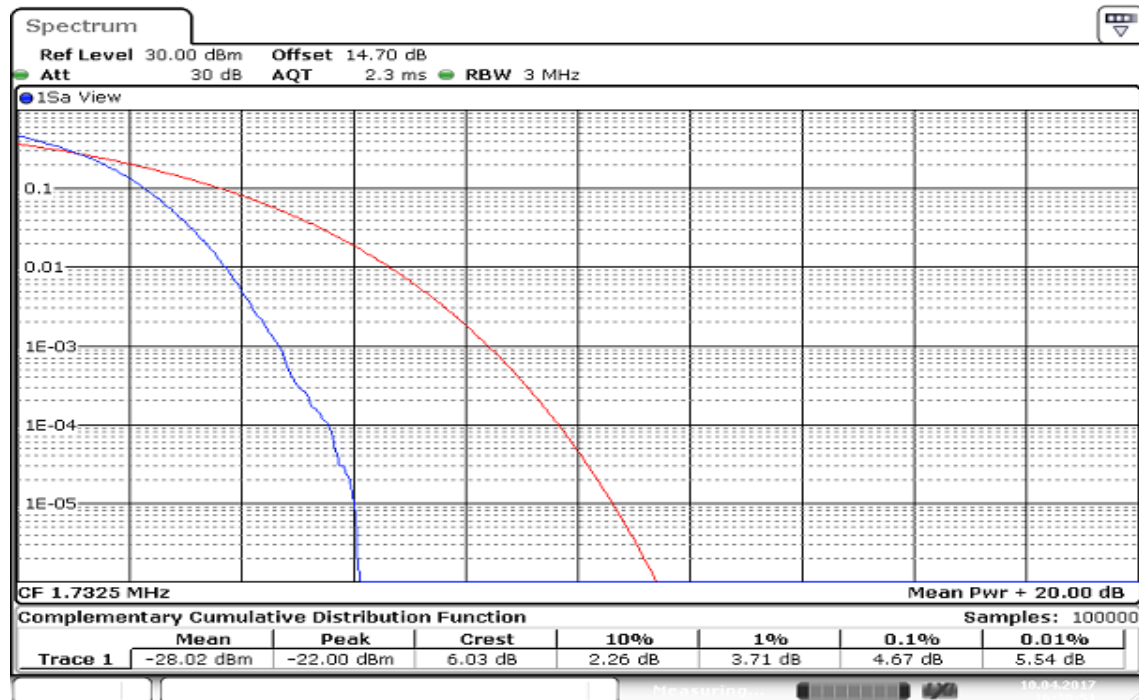


CHANNEL BANDWIDTH: 1.4MHz / QPSK/100%RB



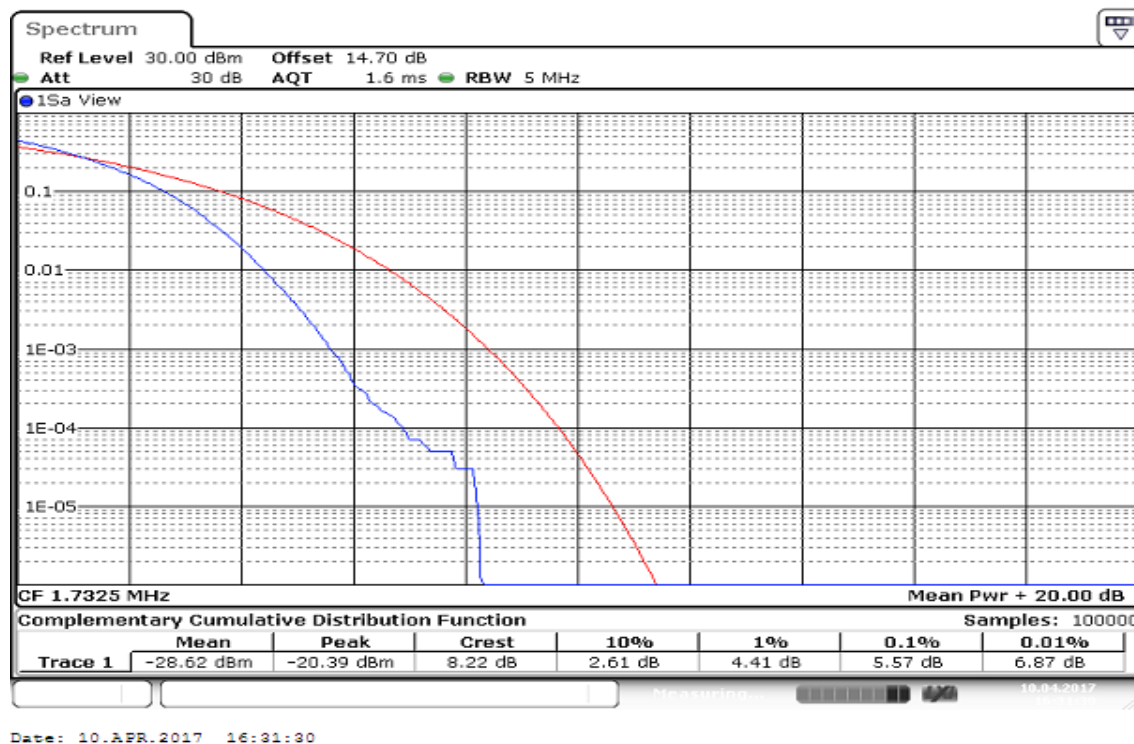
Date: 10.APR.2017 16:30:09

CHANNEL BANDWIDTH: 3MHz / QPSK /100%RB

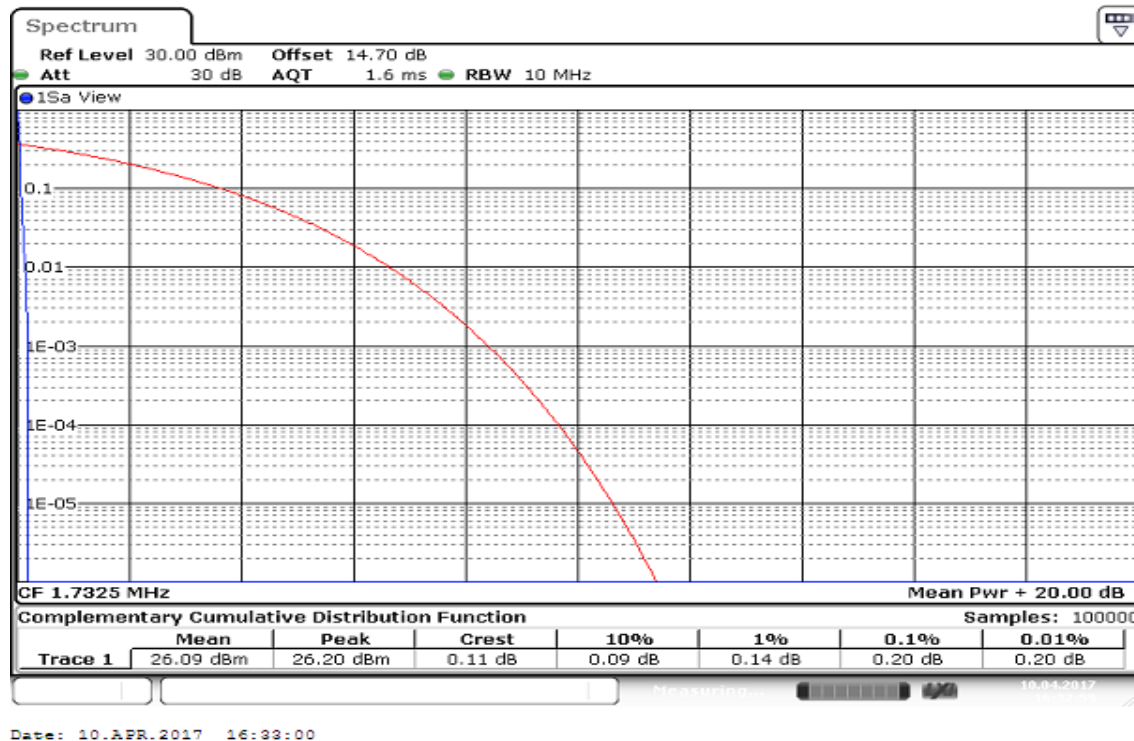


Date: 10.APR.2017 16:30:51

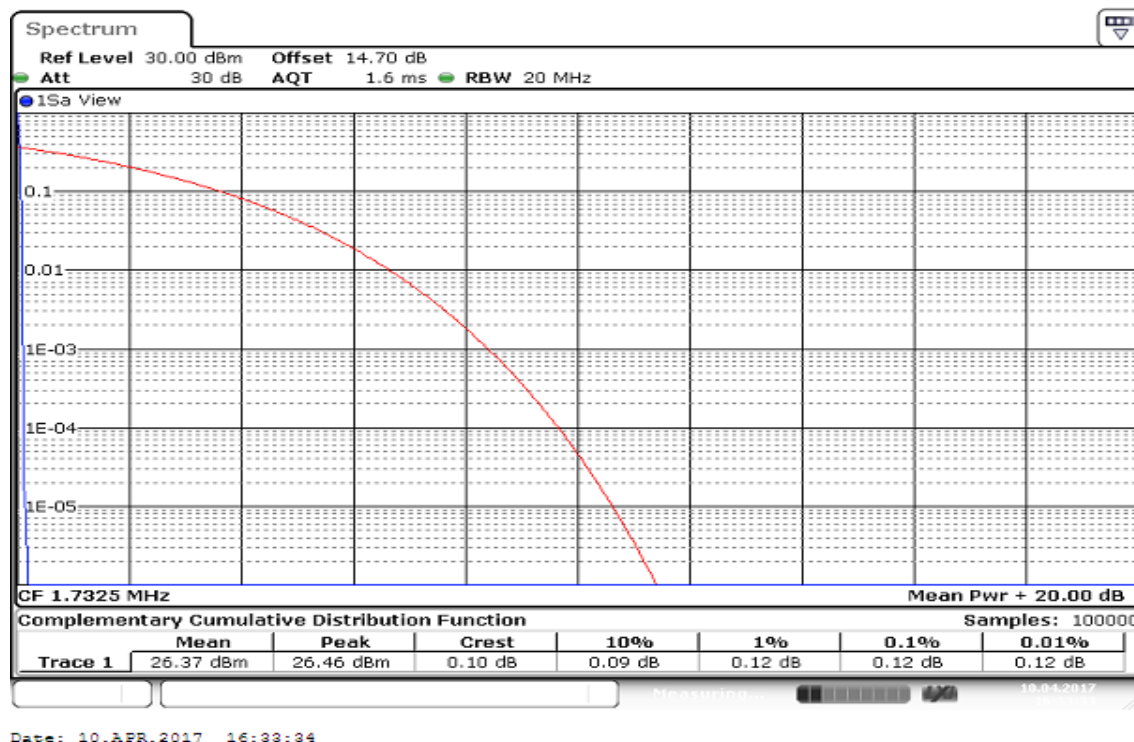
CHANNEL BANDWIDTH: 5MHz / QPSK/100%RB



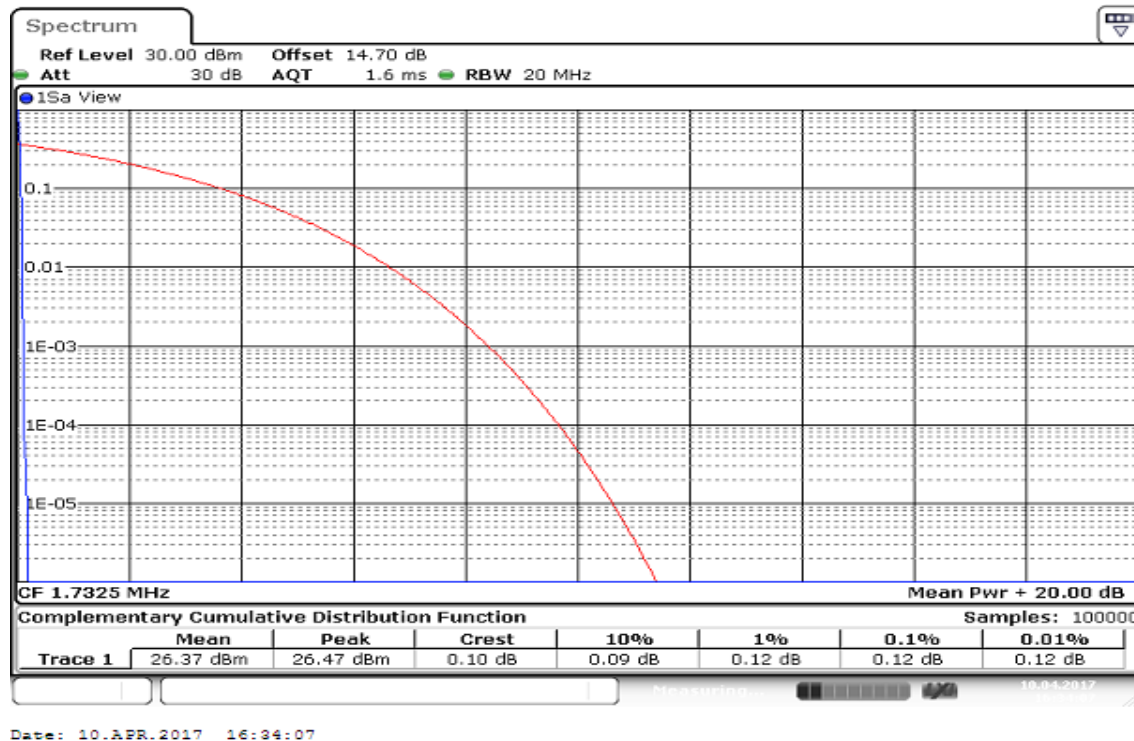
CHANNEL BANDWIDTH: 10MHz / QPSK /100%RB



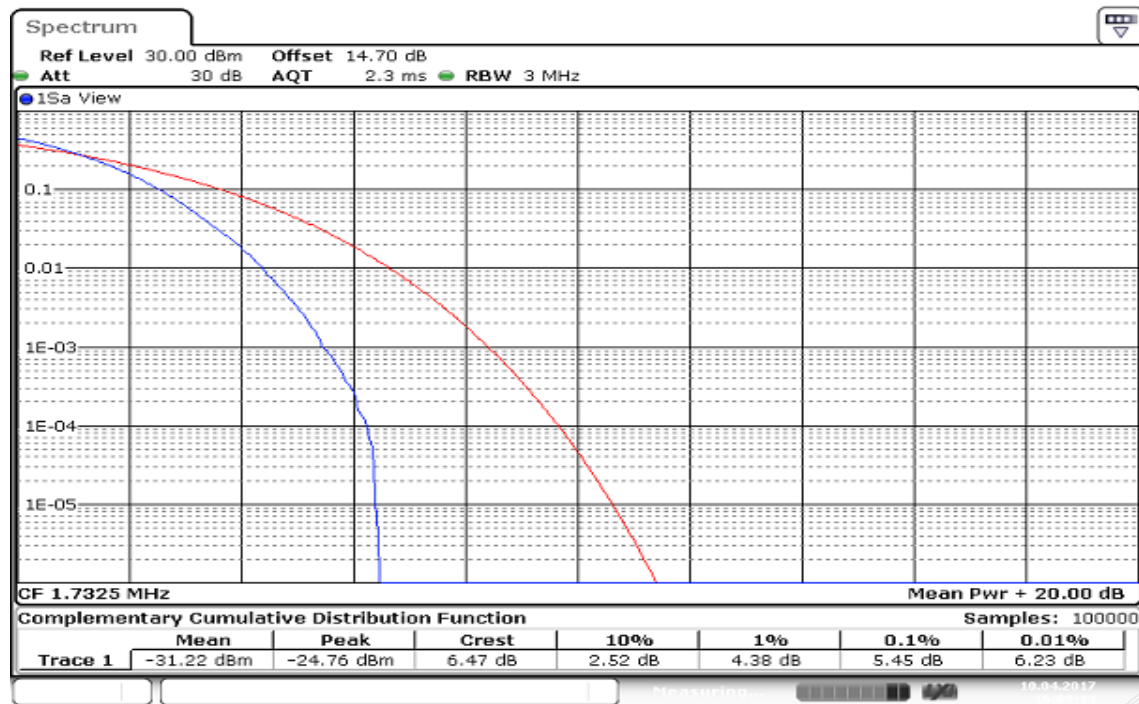
CHANNEL BANDWIDTH: 15MHz / QPSK/100%RB



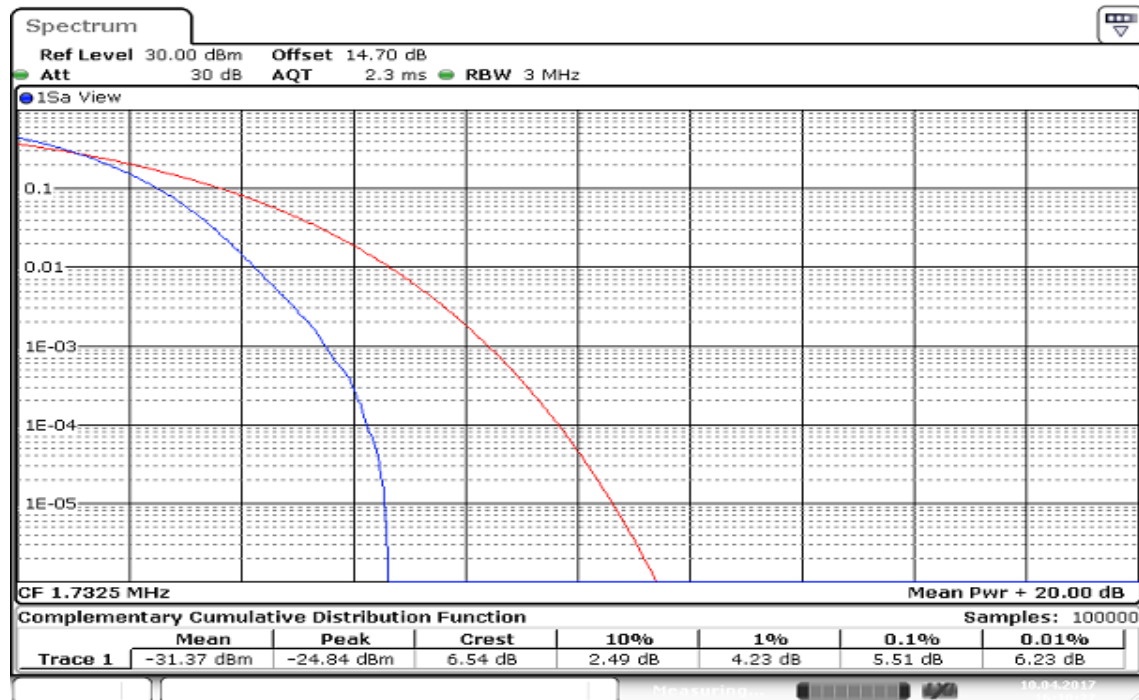
CHANNEL BANDWIDTH: 20MHz / QPSK /100%RB



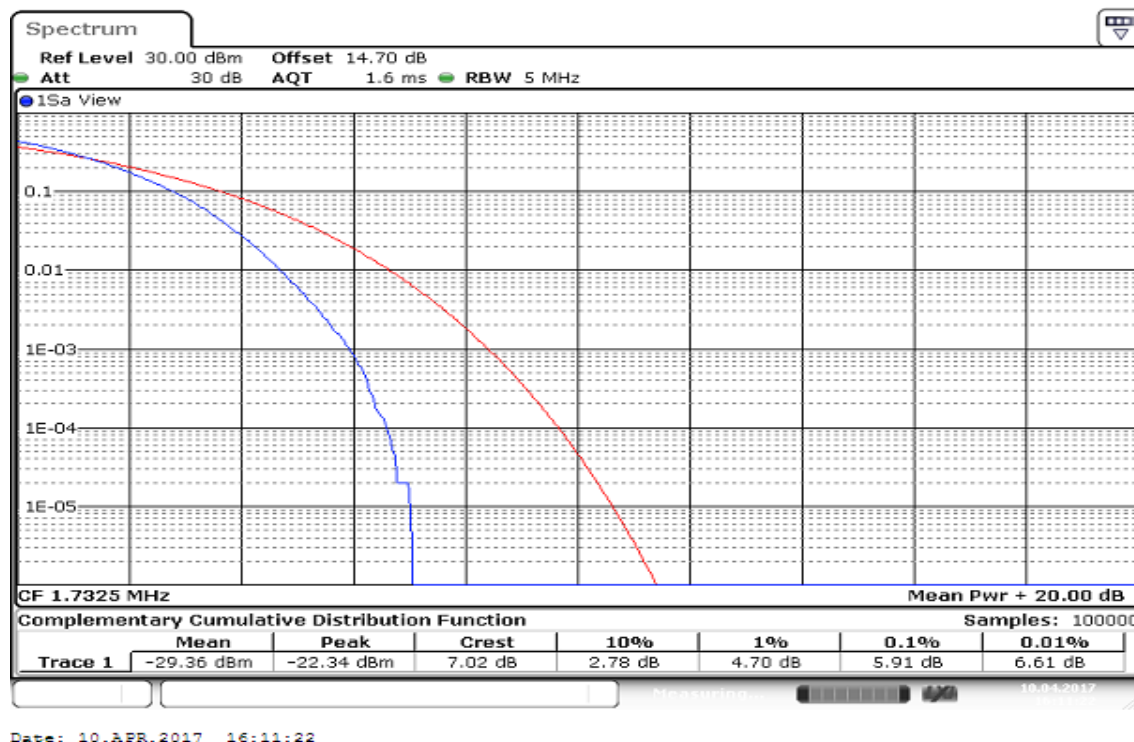
CHANNEL BANDWIDTH: 1.4MHz / 16QAM/1RB



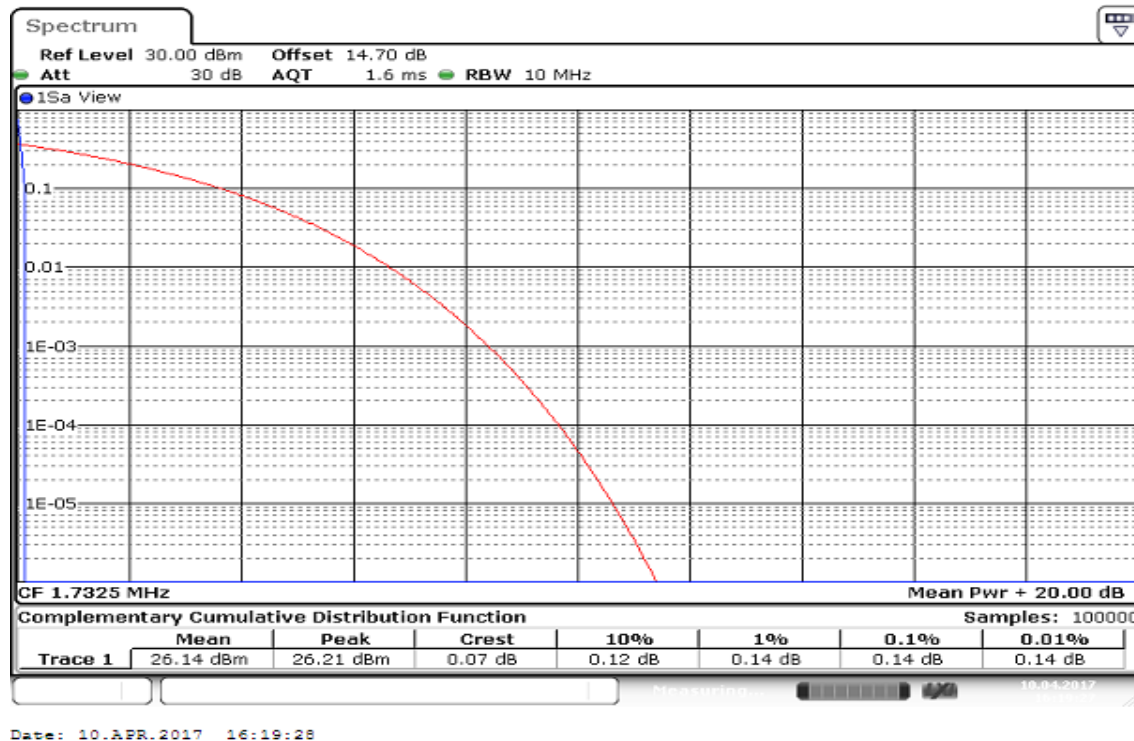
CHANNEL BANDWIDTH: 3MHz / 16QAM /1RB



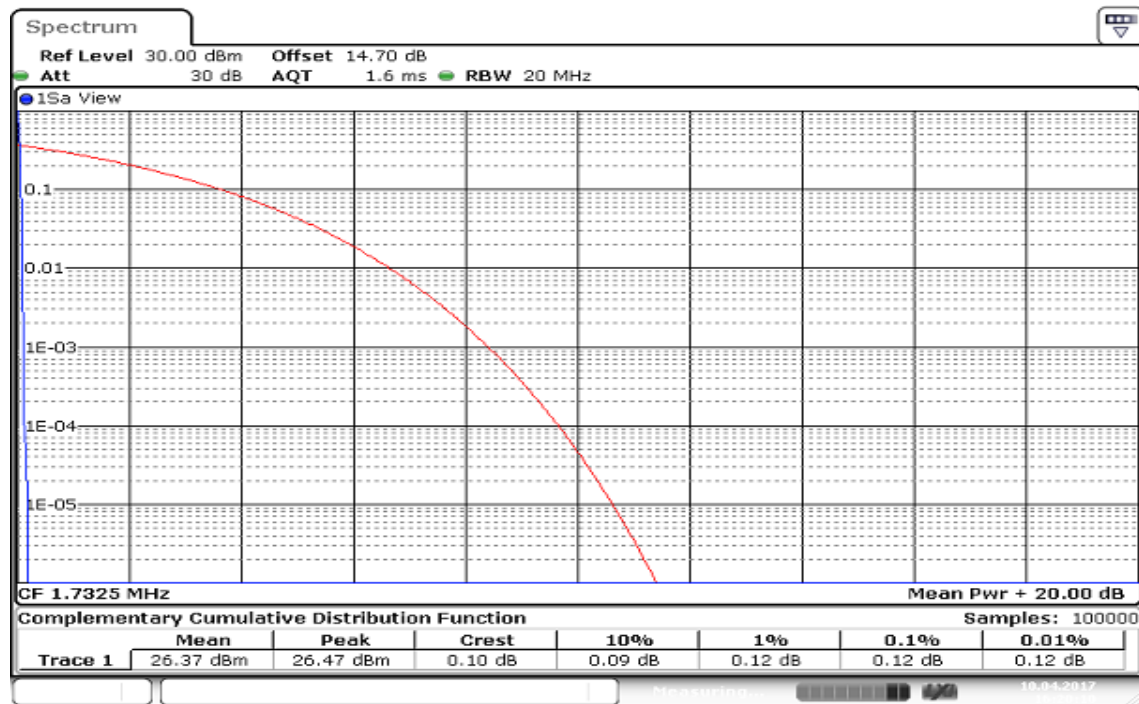
CHANNEL BANDWIDTH: 5MHz / 16QAM /1RB



CHANNEL BANDWIDTH: 10MHz / 16QAM /1RB

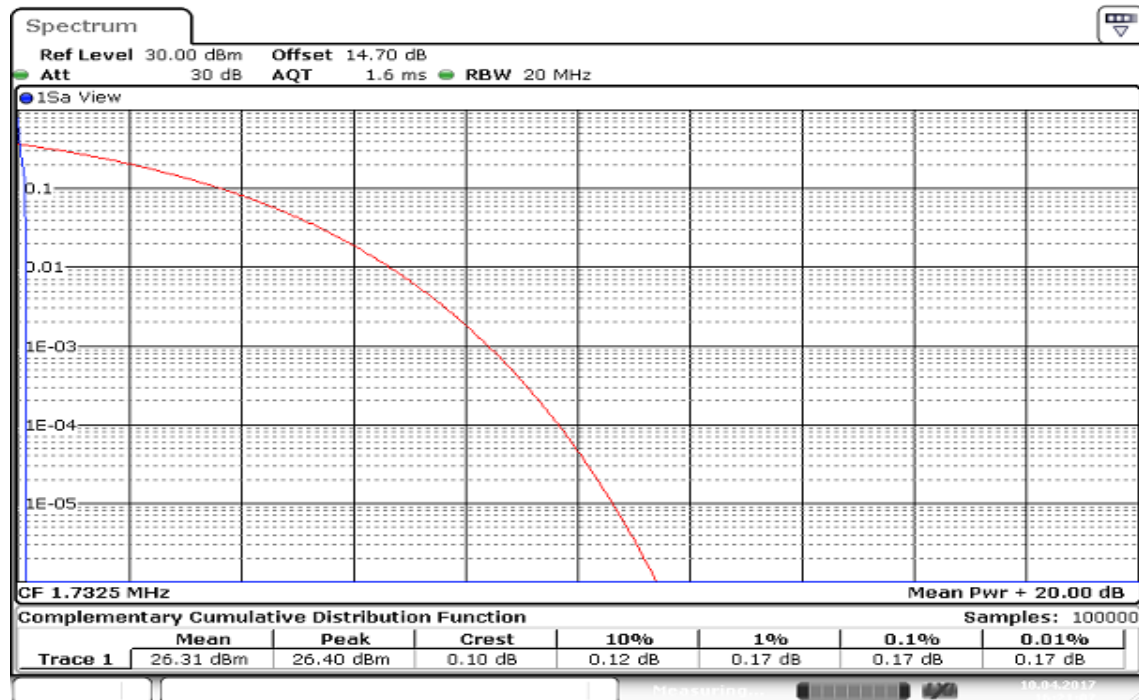


CHANNEL BANDWIDTH: 15MHz / 16QAM /1RB



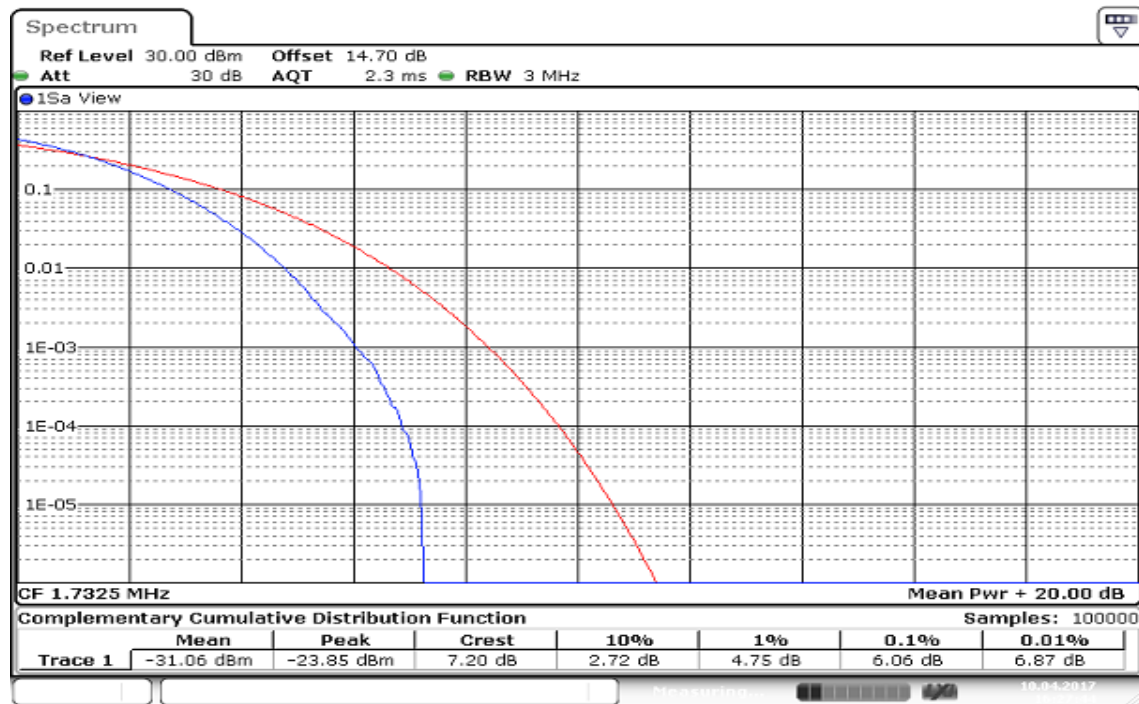
Date: 10.APR.2017 16:20:10

CHANNEL BANDWIDTH: 20MHz / 16QAM /1RB

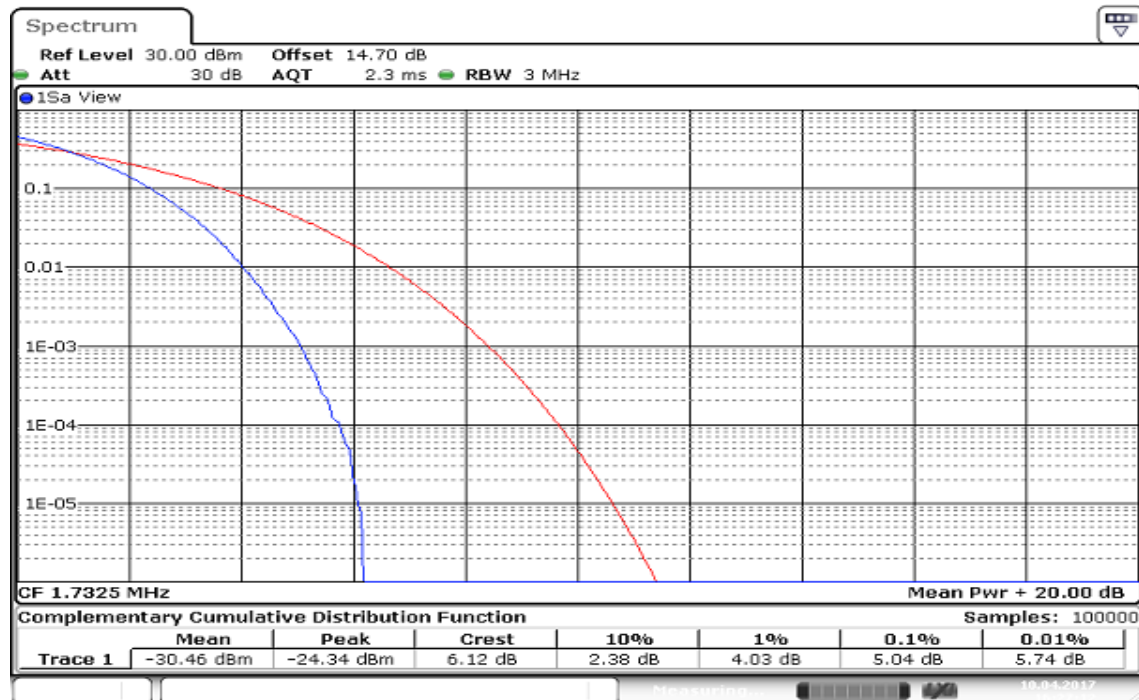


Date: 10.APR.2017 16:21:07

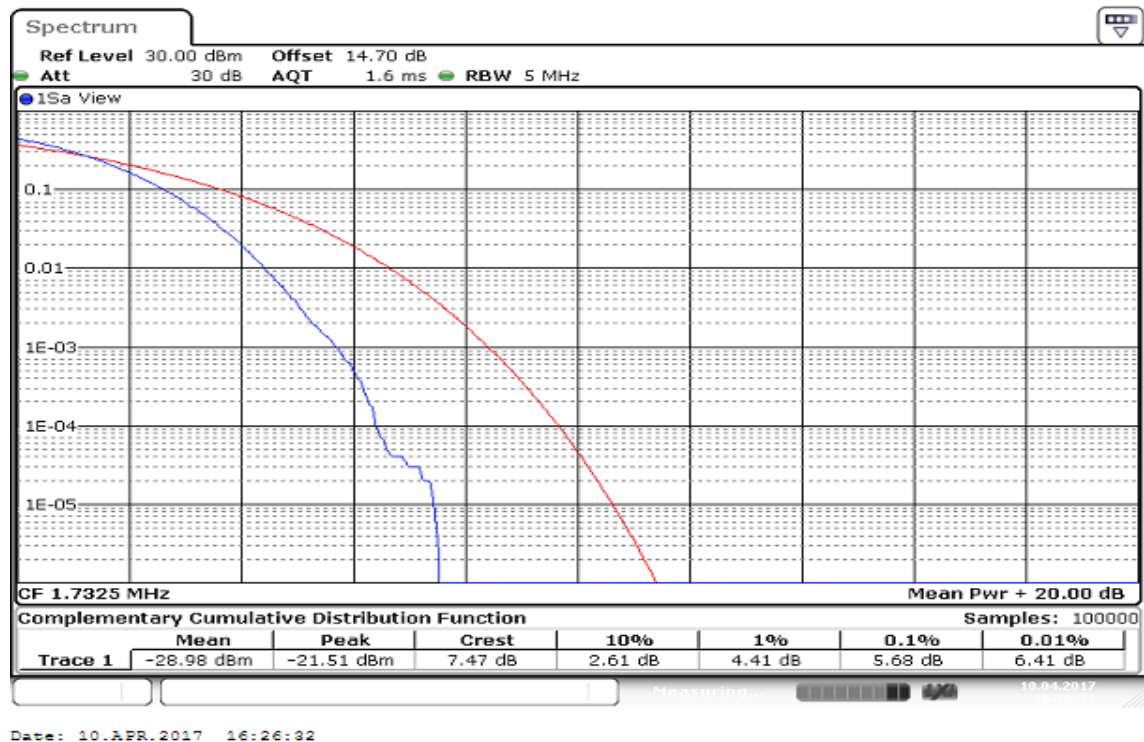
CHANNEL BANDWIDTH: 1.4MHz / 16QAM/100%RB



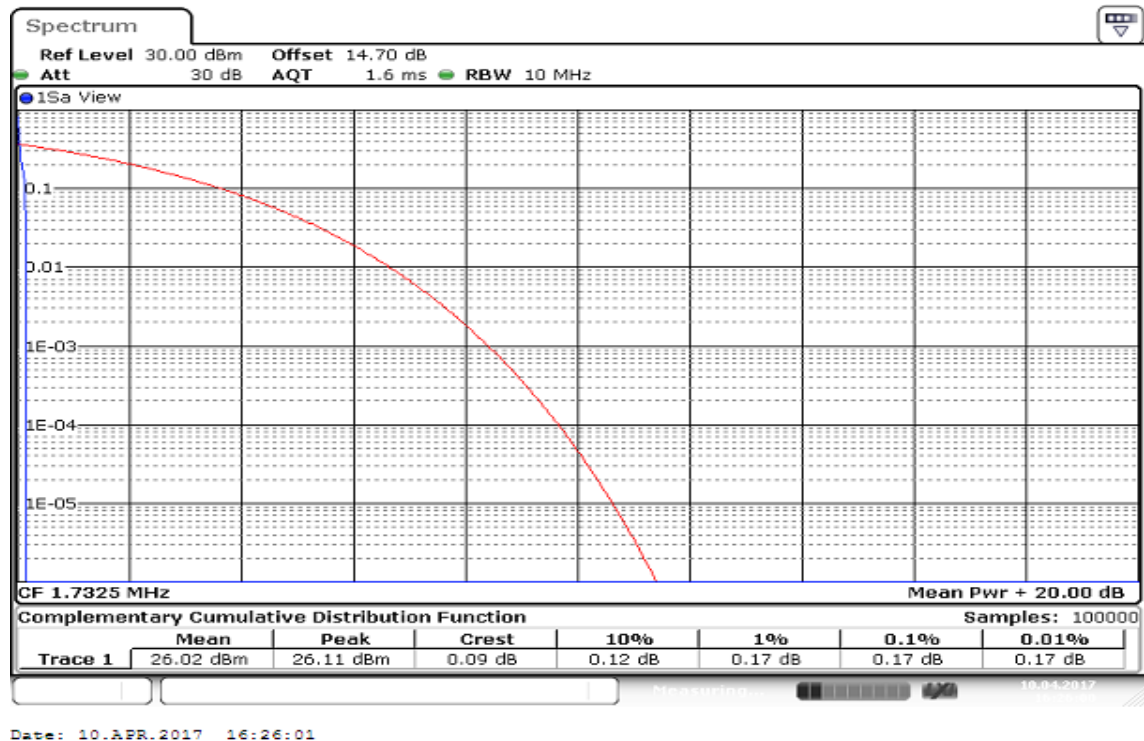
CHANNEL BANDWIDTH: 3MHz / 16QAM /100%RB



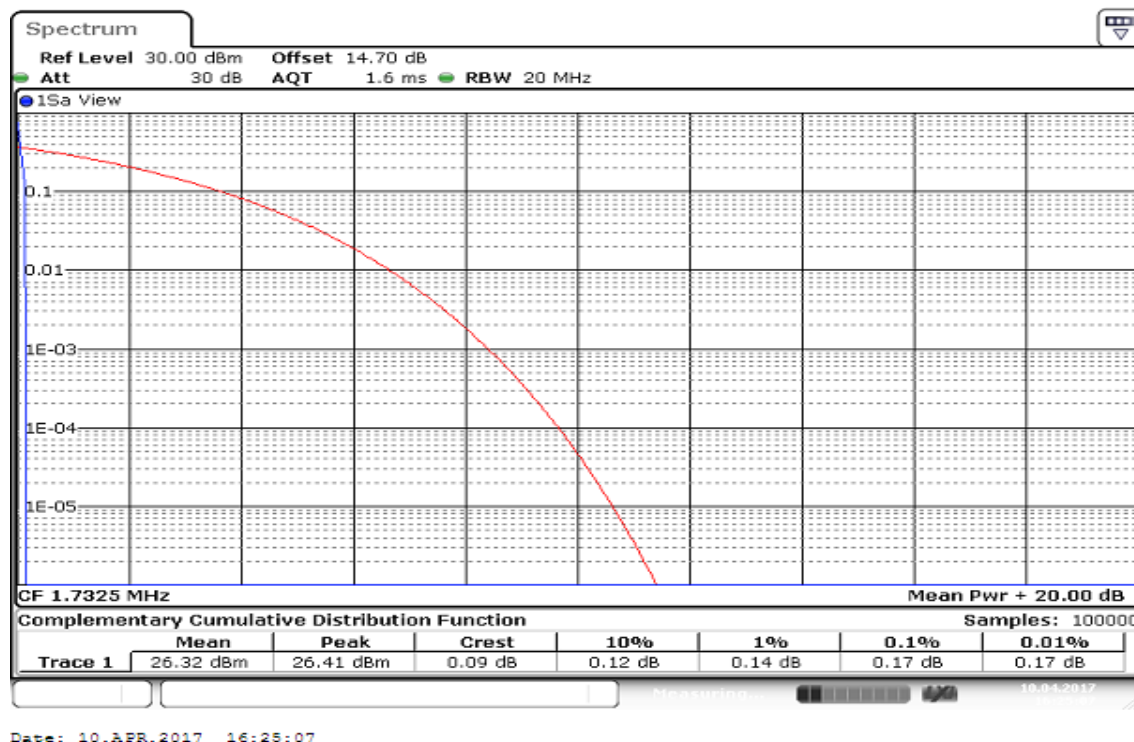
CHANNEL BANDWIDTH: 5MHz / 16QAM /100%RB



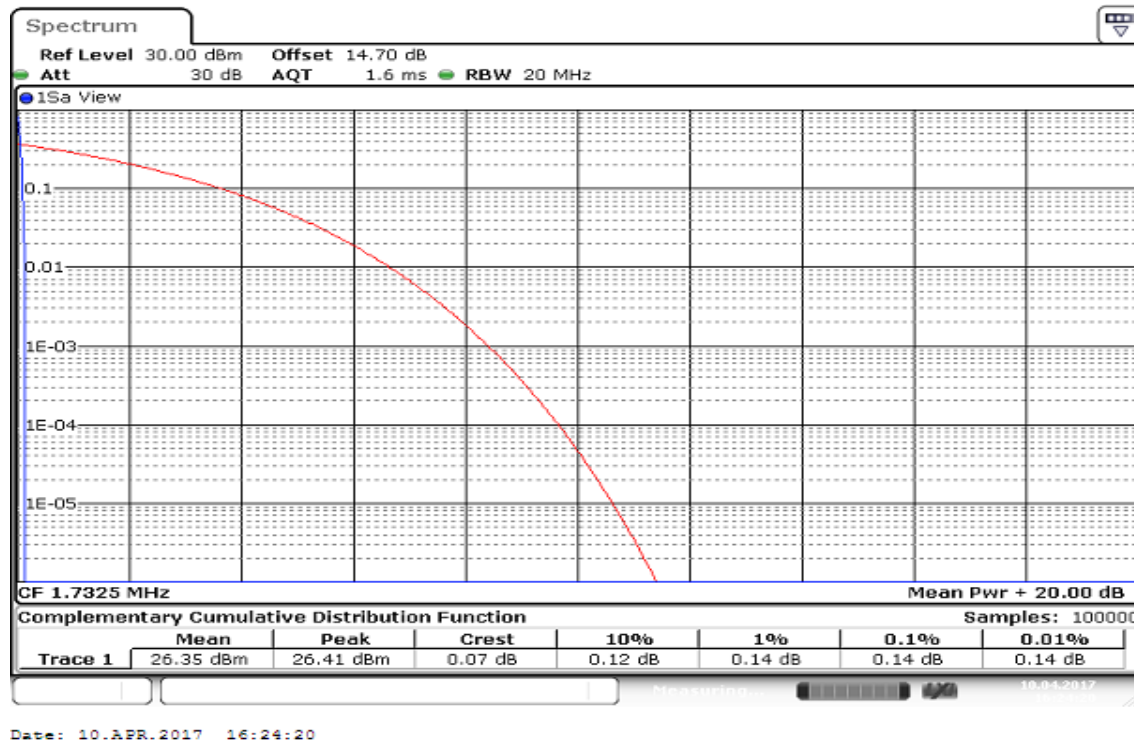
CHANNEL BANDWIDTH: 10MHz / 16QAM /100%RB



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



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



7.6 BAND EDGE MEASUREMENT

LIMIT

FCC §27.53(g), Band 17

For operations in the 600 MHz band and the 698-MHz band, the power of any 746 emission outside a licensee's frequency band(s) of operation shall be attenuated below measured in watts, by ,the transmitter power (P) within the licensed band(s) of operation at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or adjacent to a greater. However, in the 100 kilohertz bands immediately outside and .licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed

FCC §27.53(h), Band 4

General protection levels. Except as otherwise specified below, for operations in the outside a licensee's frequency block MHz bands, the power of any emission1755-1710 shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$.dB

According to RSS-130, Band 17,

The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$ (watts), dB. However, in the100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

According to RSS-139, Band 4,

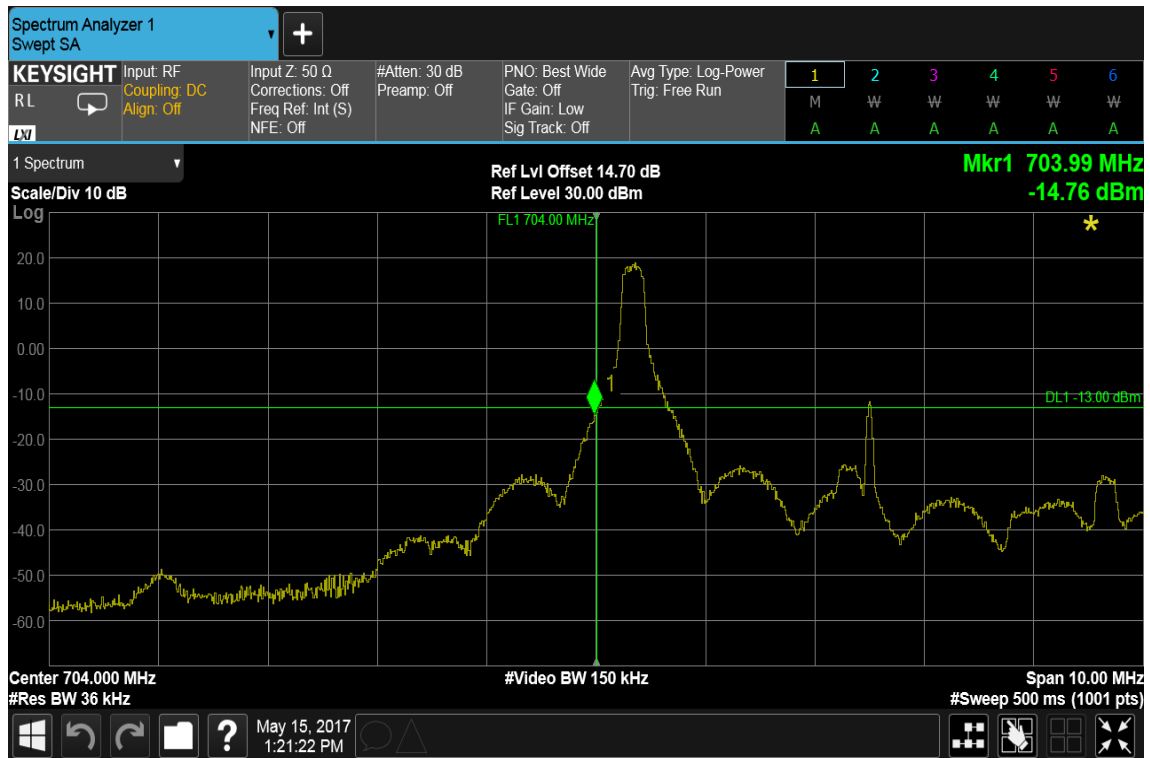
General protection levels. Except as otherwise specified below, for operations in the In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block,² which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB

After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least $43 + 10 \log_{10} p$ (watts) dB.

TEST PROCEDURES

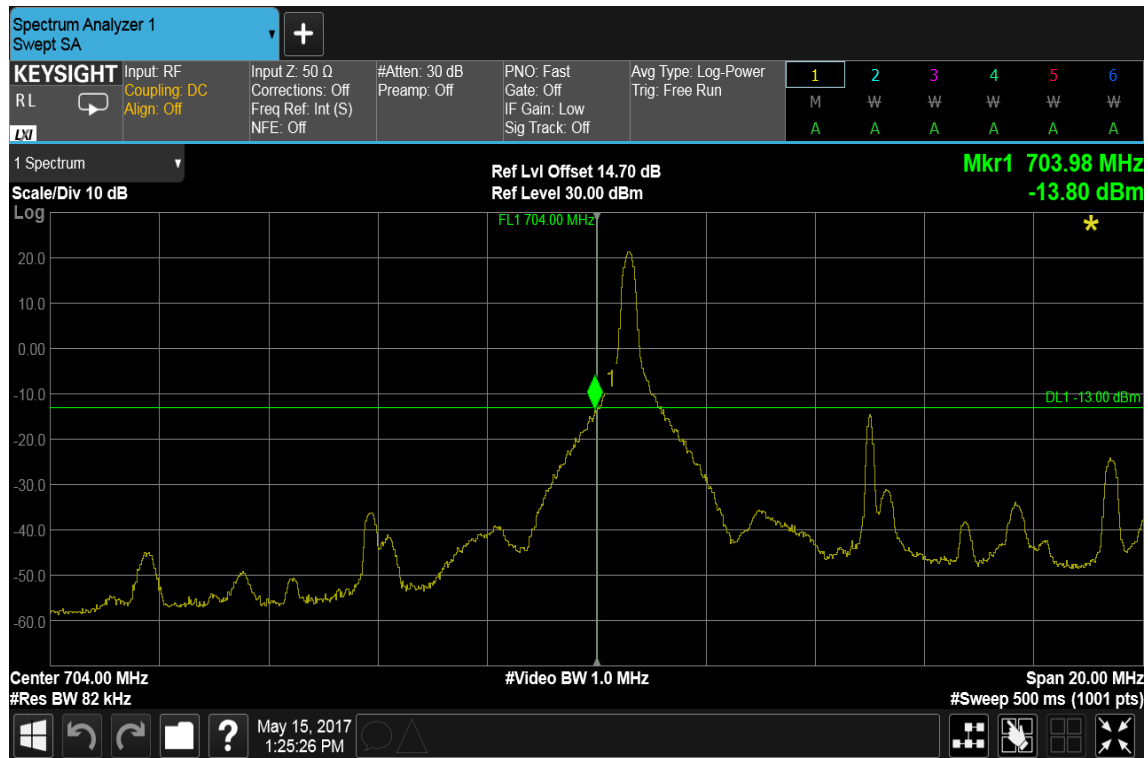
KDB 971168 D01 v02r02 - Section 6.0

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.

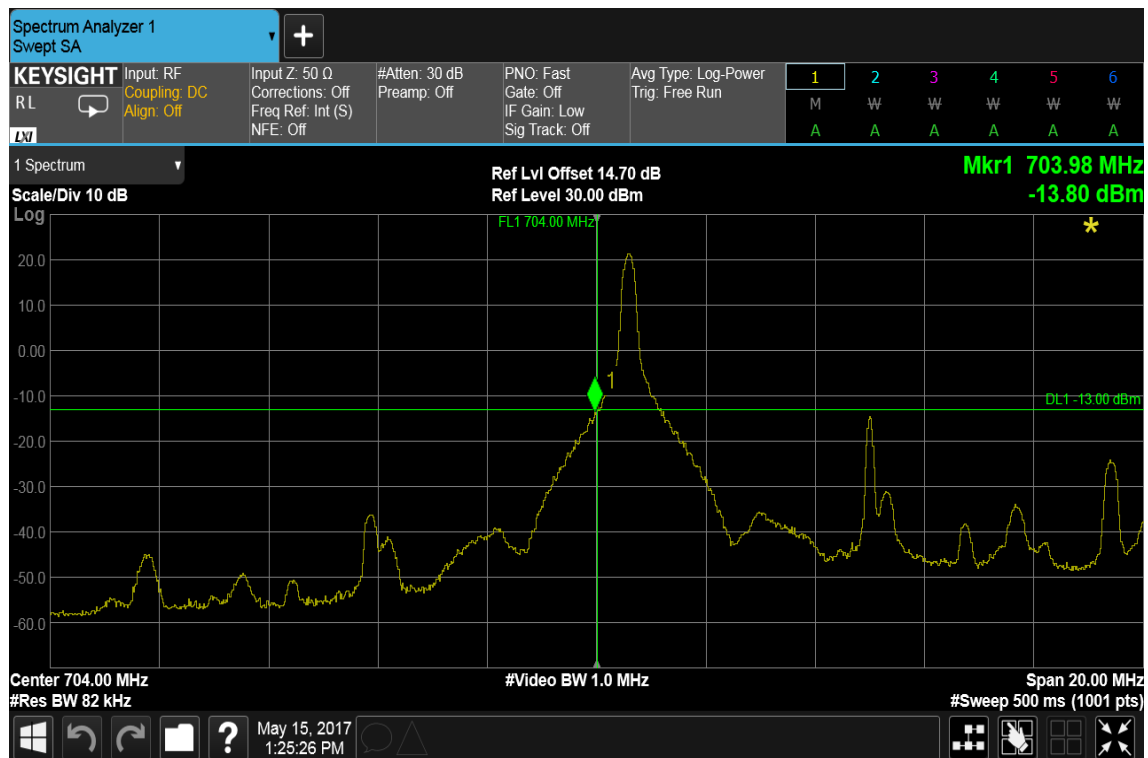
TEST RESULTS:**LTE Band 17****CHANNEL BANDWIDTH: 5MHz / QPSK / 1 RB ALLOCATED****LOWER BAND EDGE****HIGHER BAND EDGE**

CHANNEL BANDWIDTH: 10MHz / QPSK / 1 RB ALLOCATED

LOWER BAND EDGE

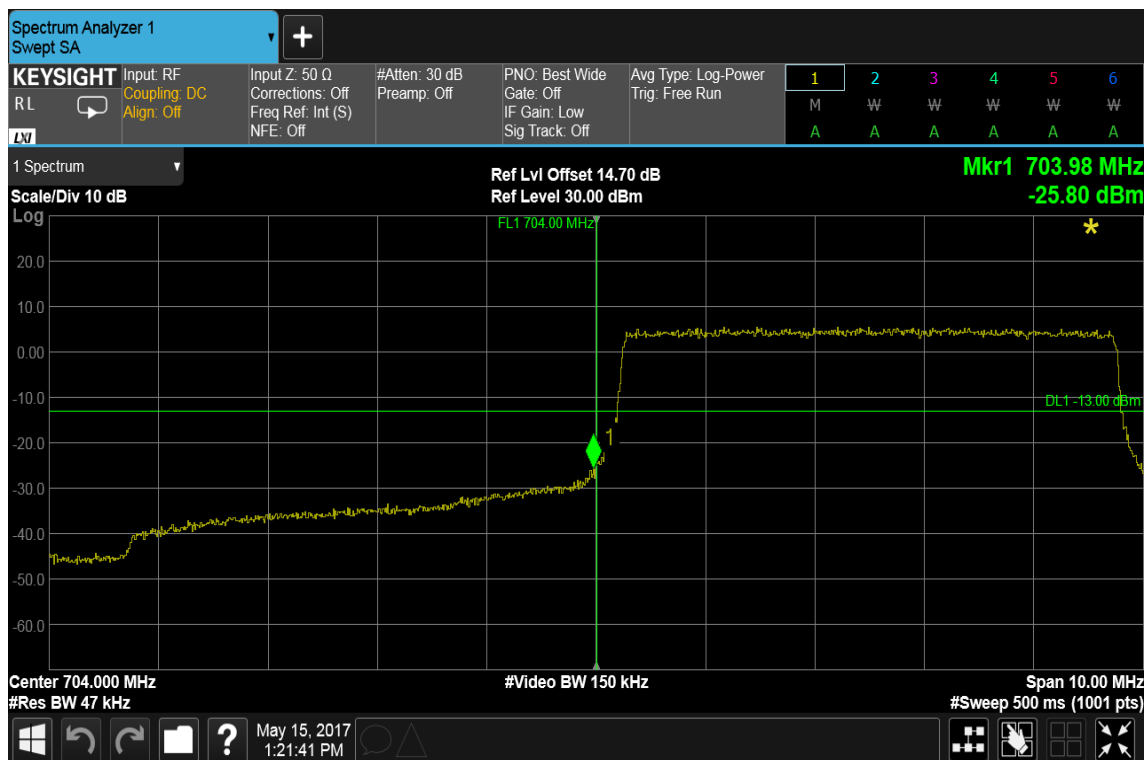


HIGHER BAND EDGE

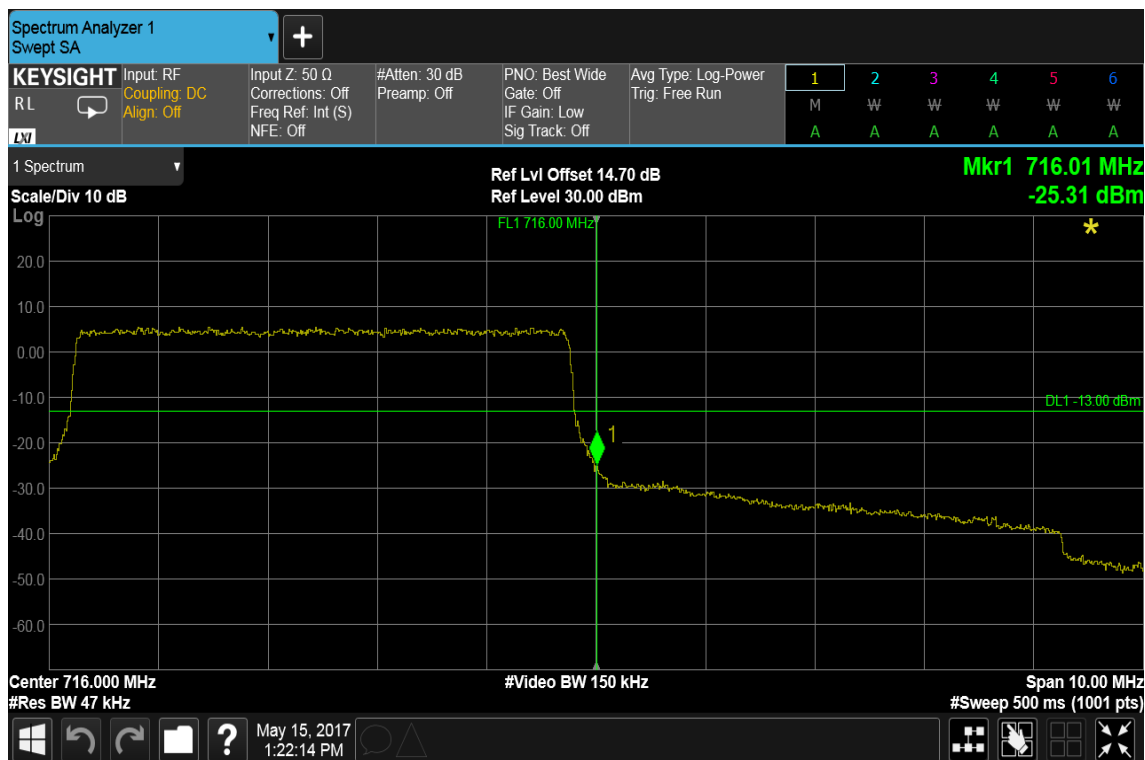


CHANNEL BANDWIDTH: 5MHz / QPSK / FULL RB ALLOCATED

LOWER BAND EDGE

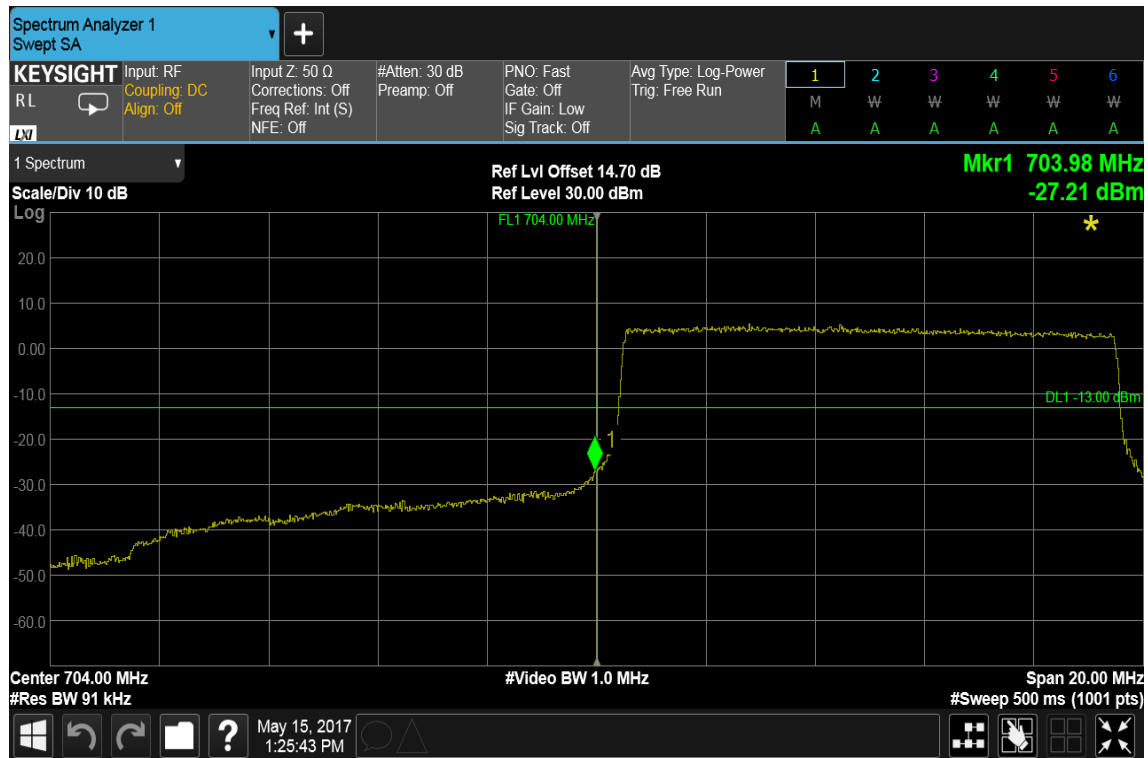


HIGHER BAND EDGE

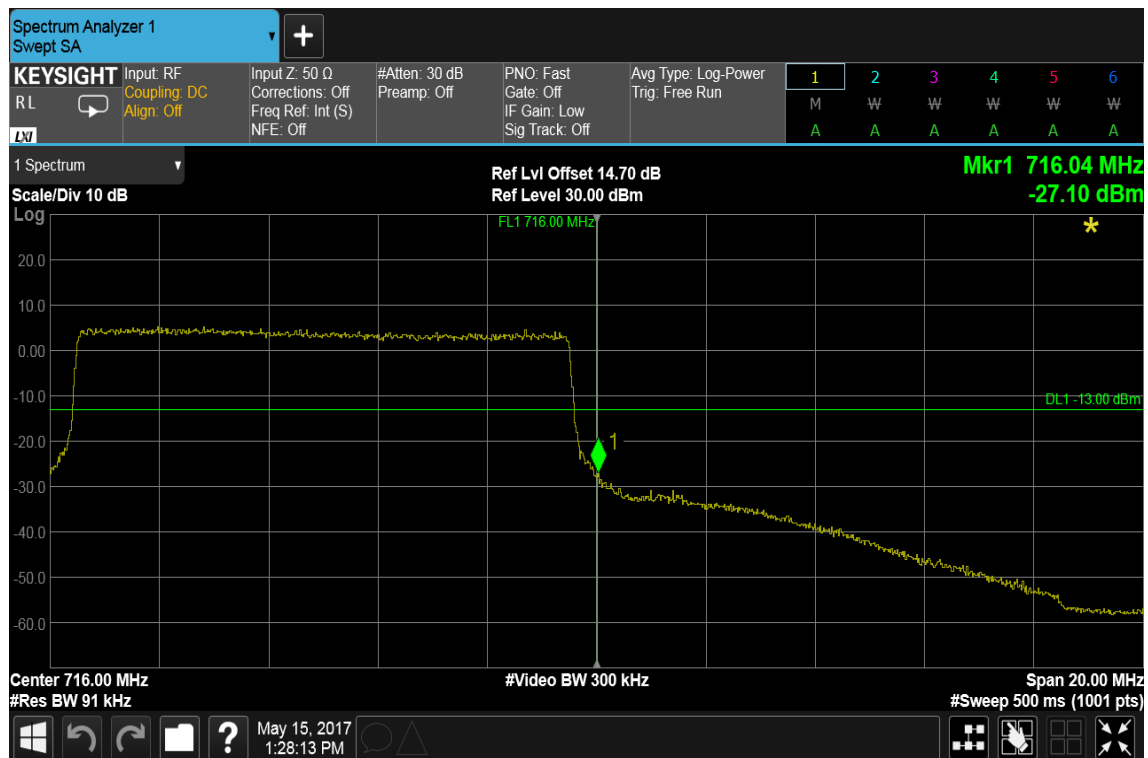


CHANNEL BANDWIDTH: 10MHz / QPSK / FULL RB ALLOCATED

LOWER BAND EDGE

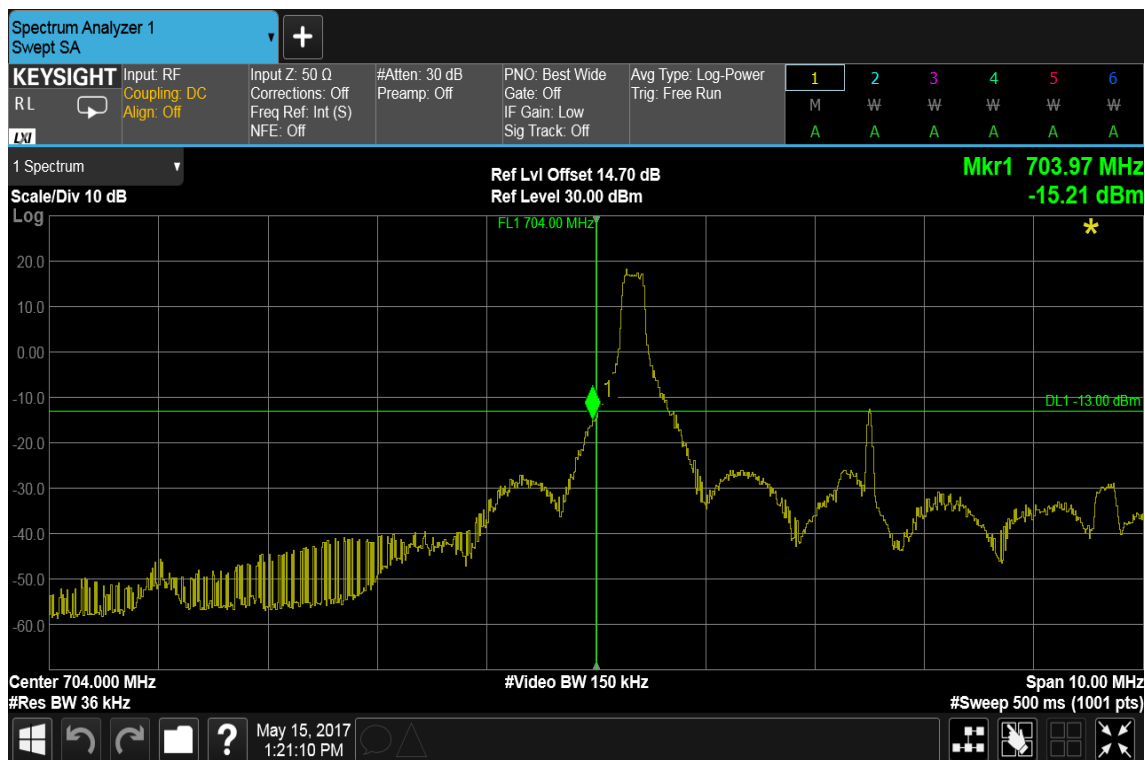


HIGHER BAND EDGE

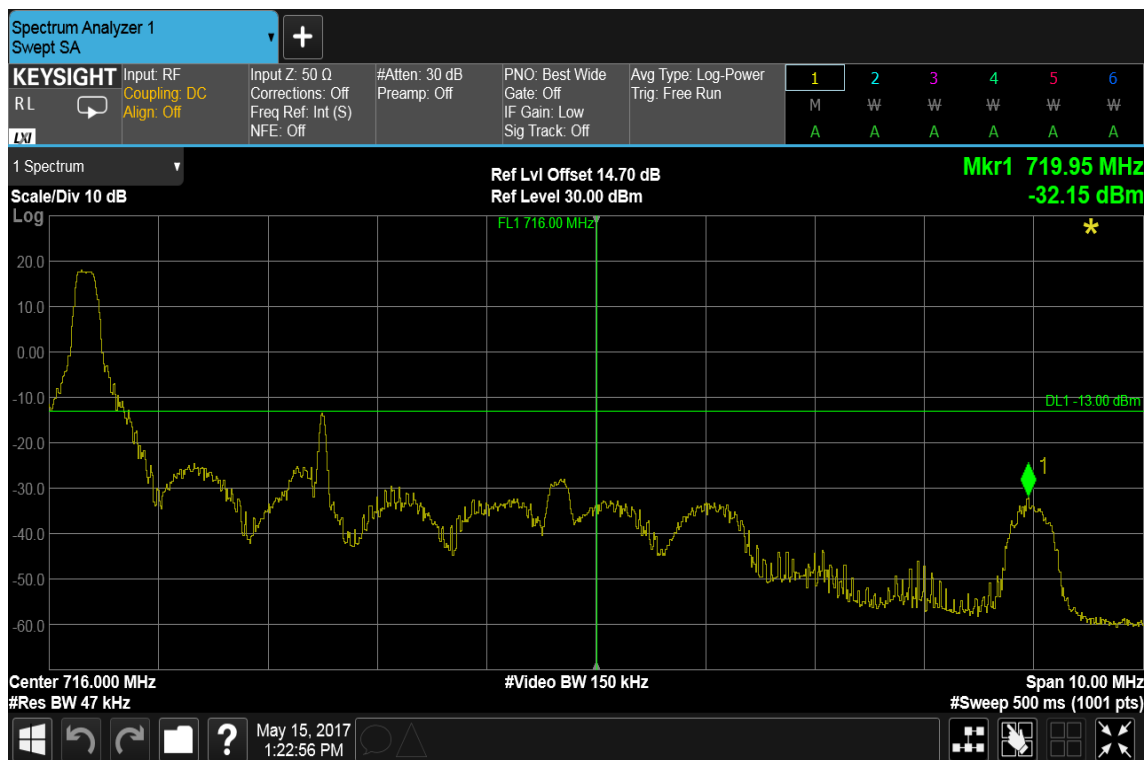


CHANNEL BANDWIDTH: 5MHz / 16QAM / 1RB ALLOCATED

LOWER BAND EDGE

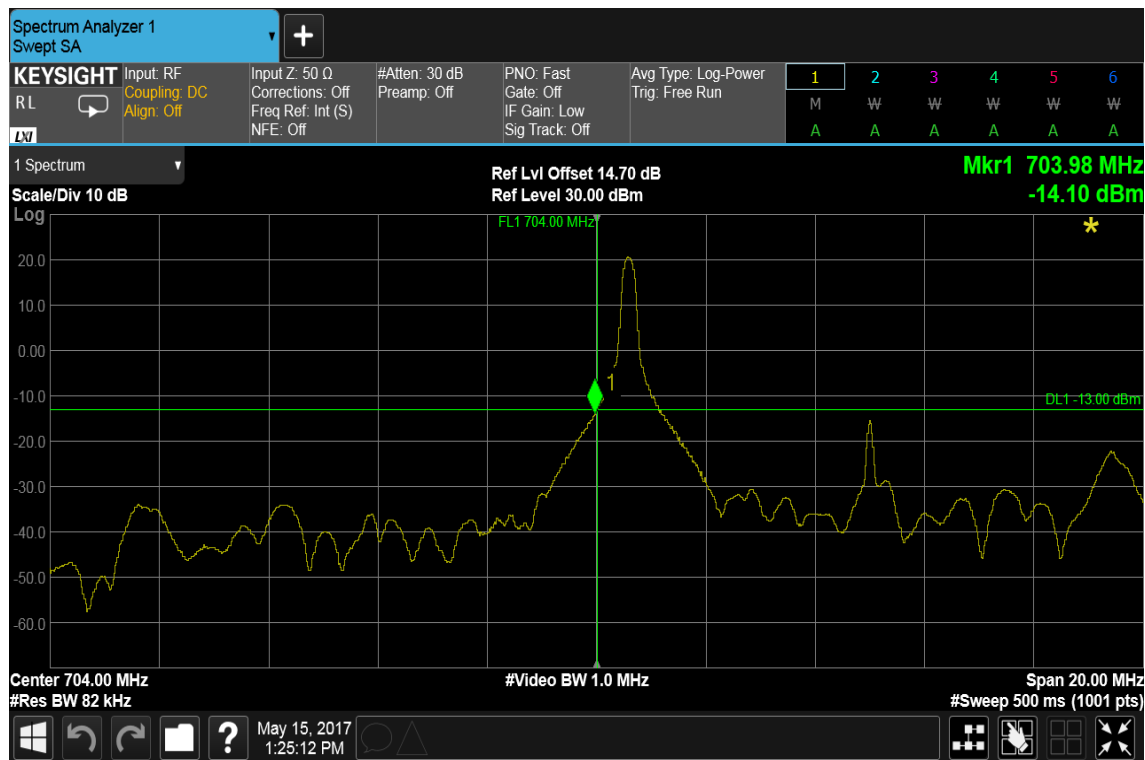


HIGHER BAND EDGE

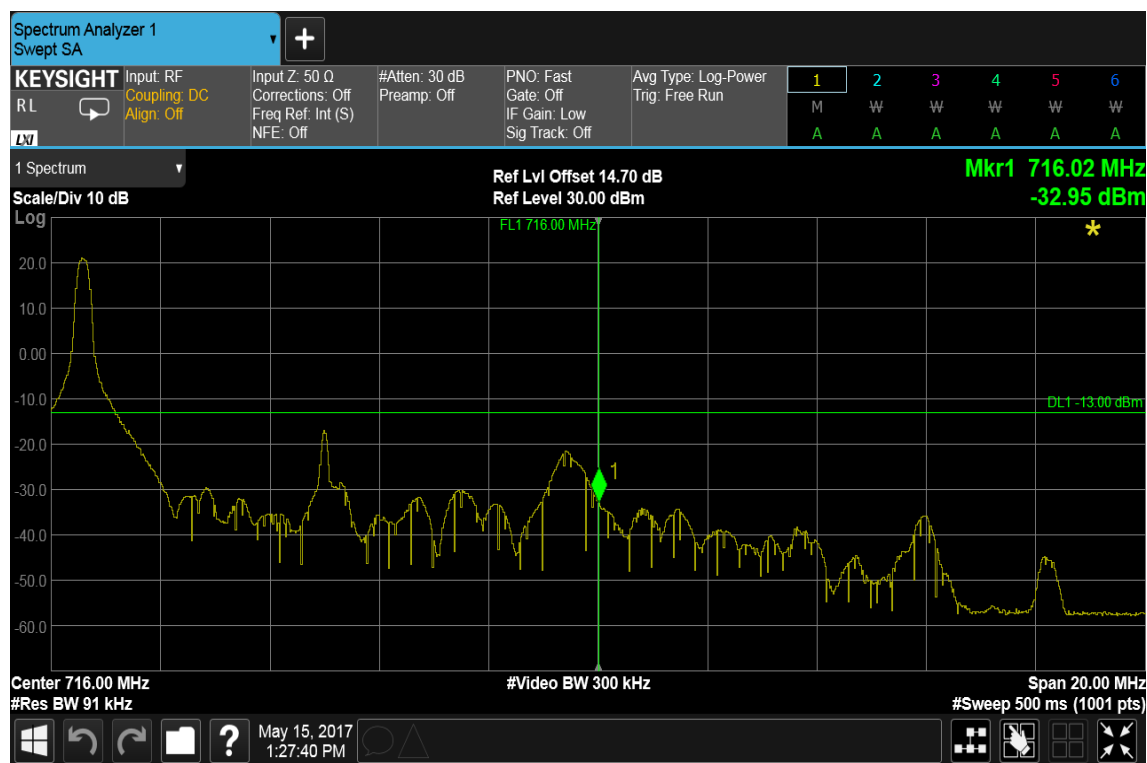


CHANNEL BANDWIDTH: 10MHz / 16QAM / 1RB ALLOCATED

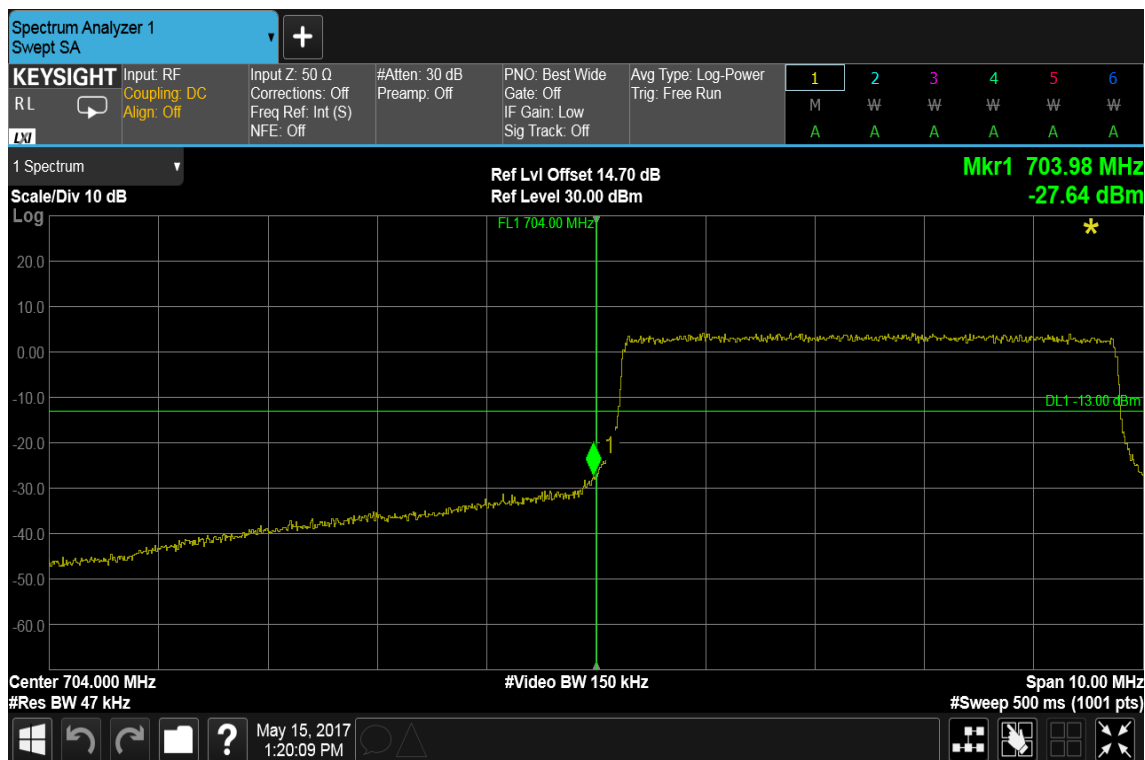
LOWER BAND EDGE



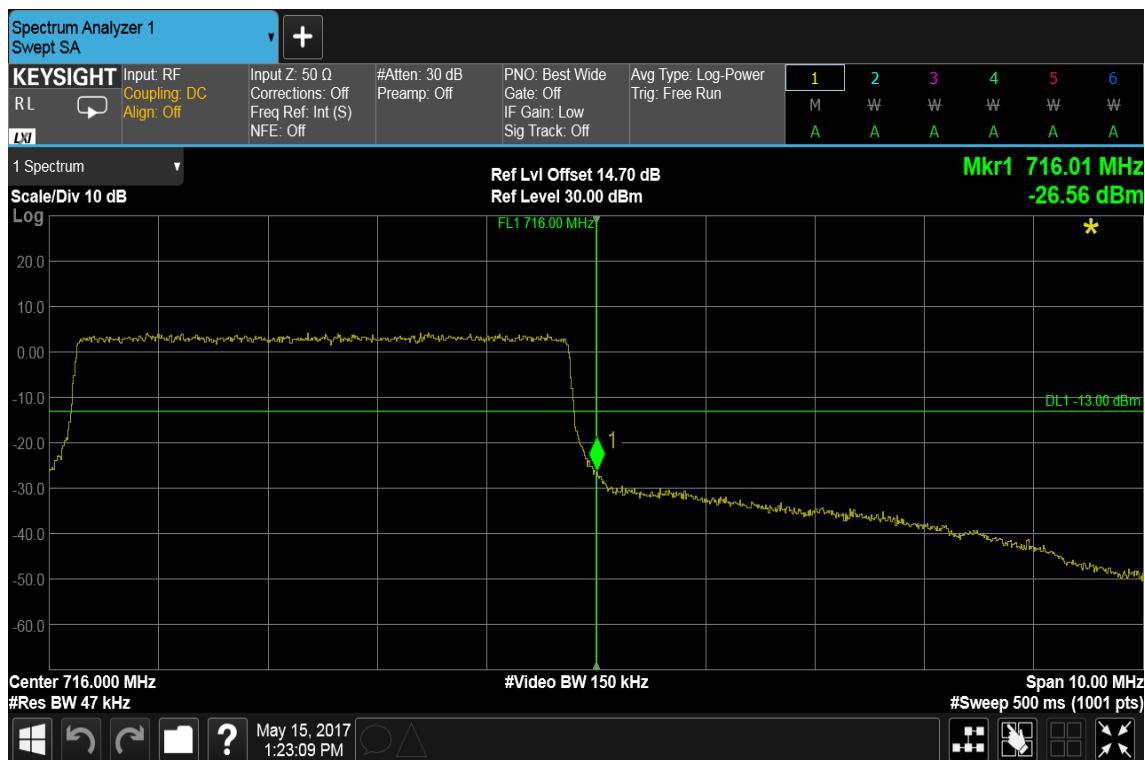
HIGHER BAND EDGE



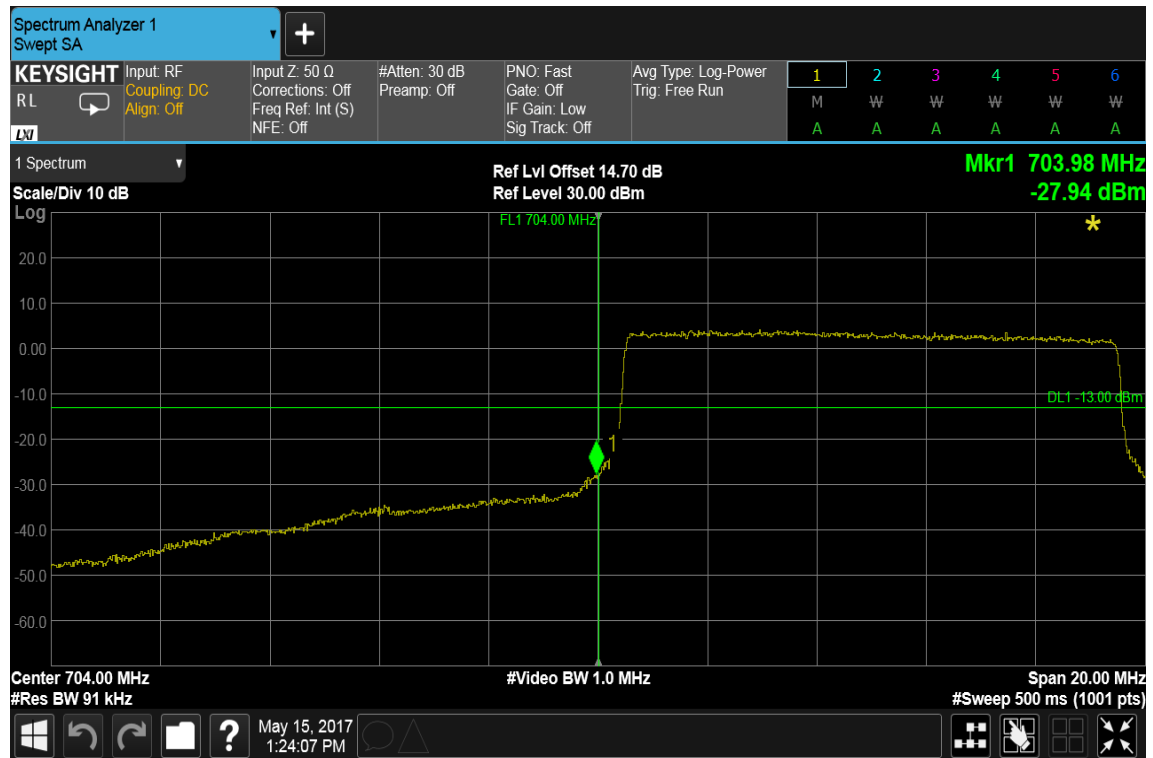
CHANNEL BANDWIDTH: 5MHz / 16QAM / FULLRB ALLOCATED LOWER BAND EDGE



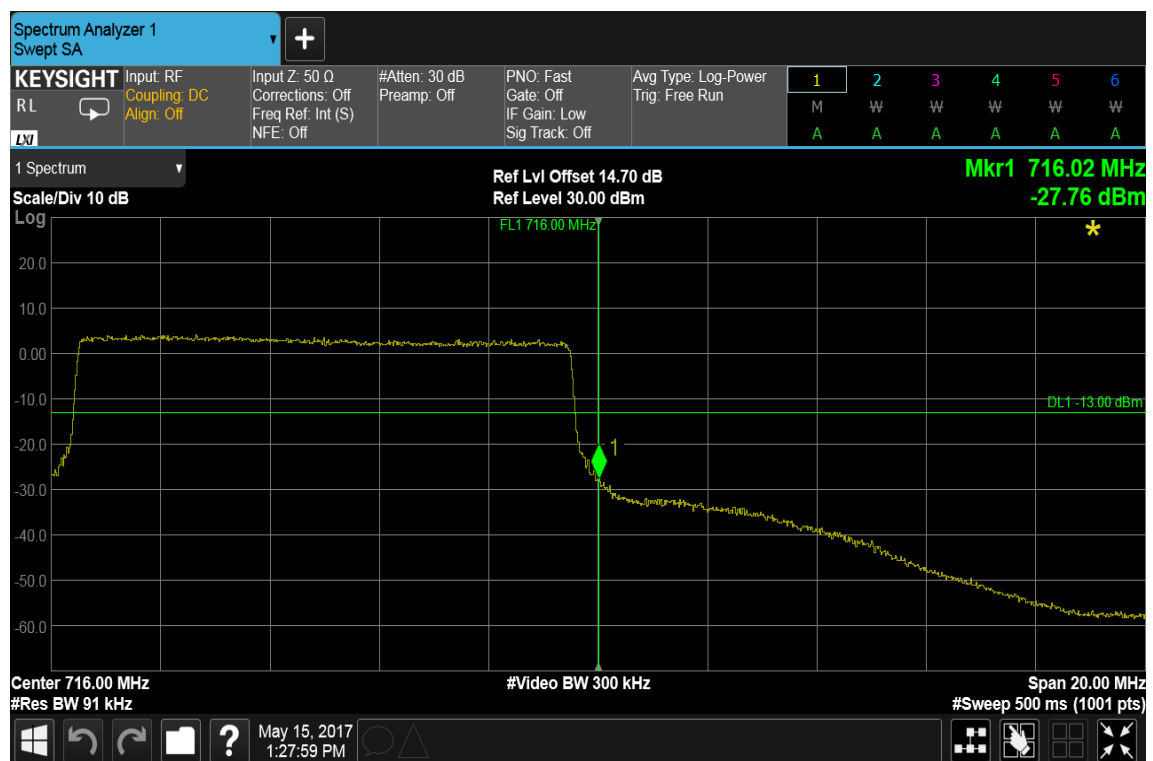
HIGHER BAND EDGE



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



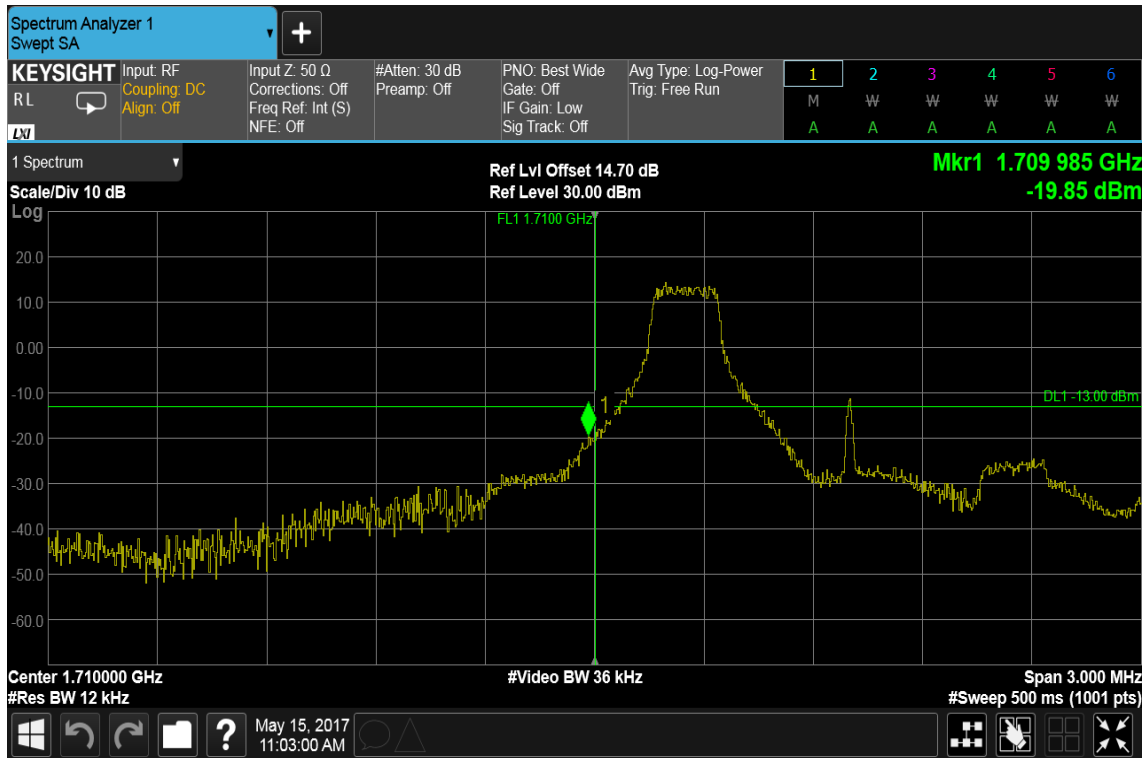
HIGHER BAND EDGE



LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

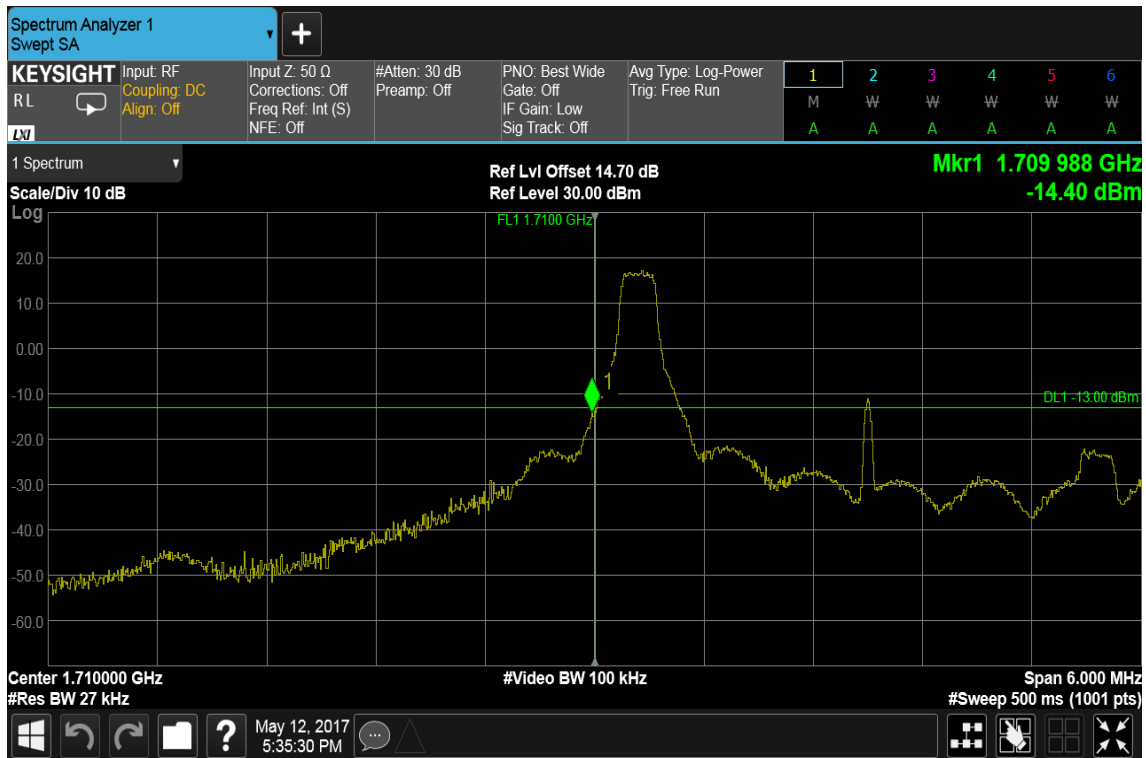


HIGHER BAND EDGE



CHANNEL BANDWIDTH: 3MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

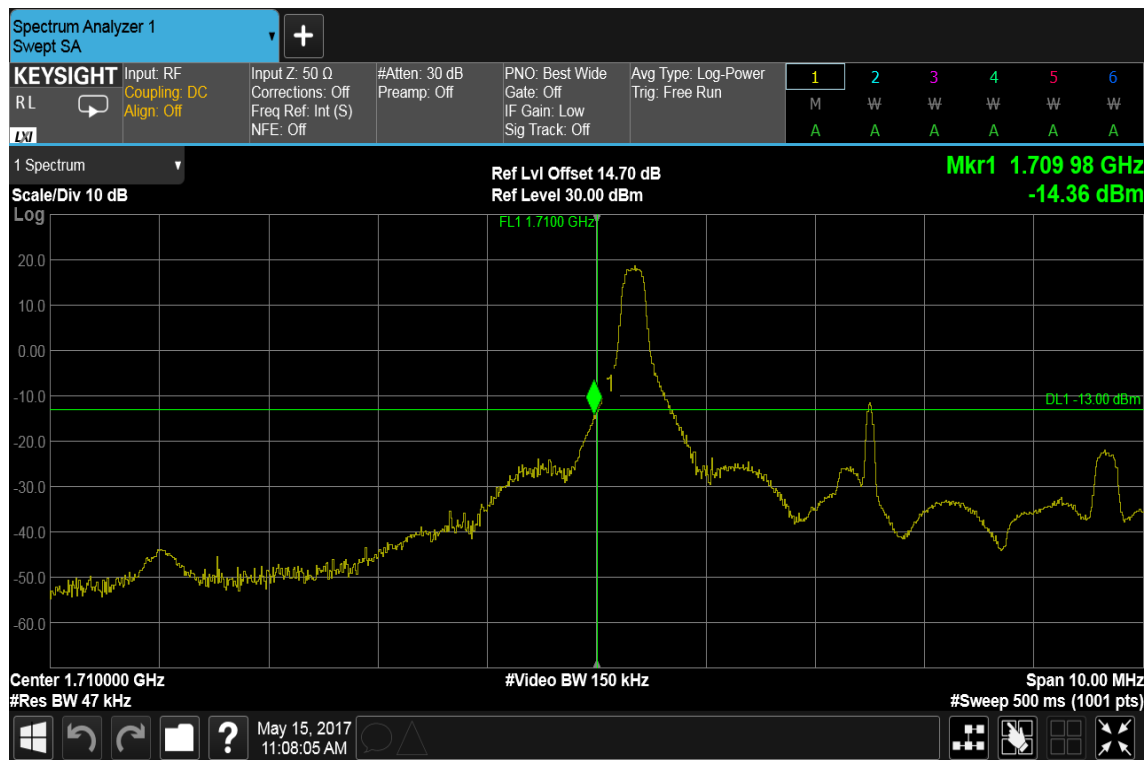


HIGHER BAND EDGE



CHANNEL BANDWIDTH: 5MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

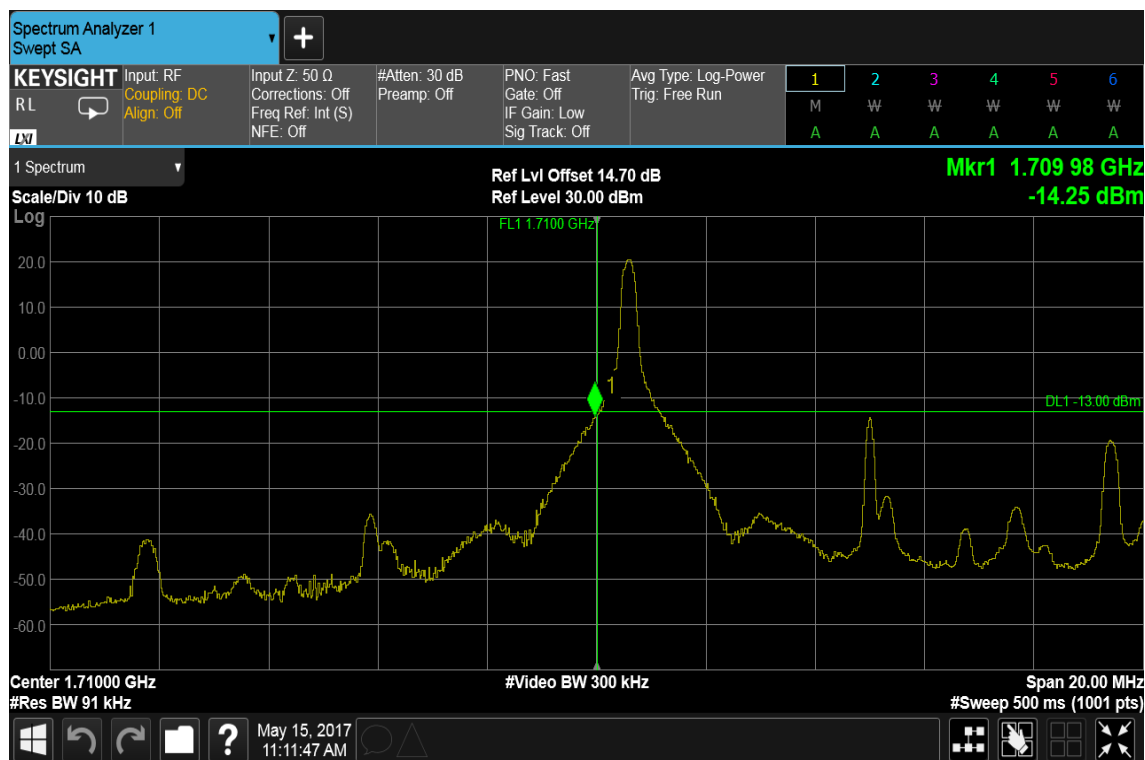


HIGHER BAND EDGE

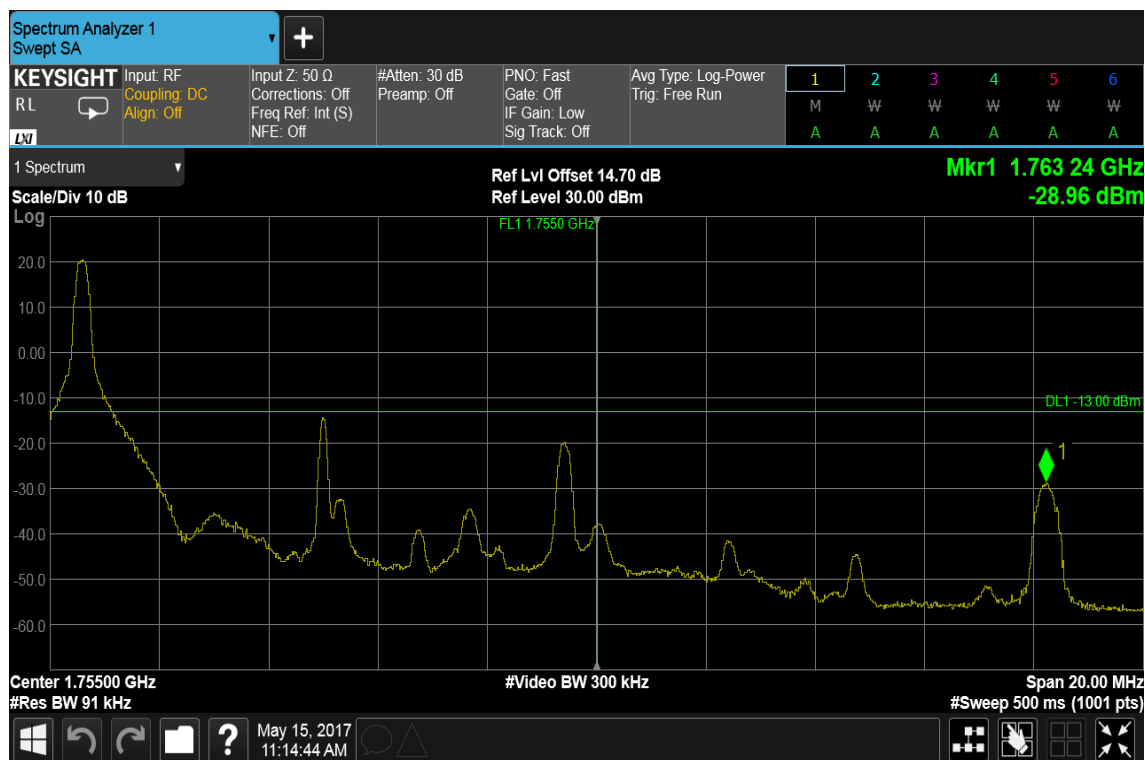


CHANNEL BANDWIDTH: 10MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

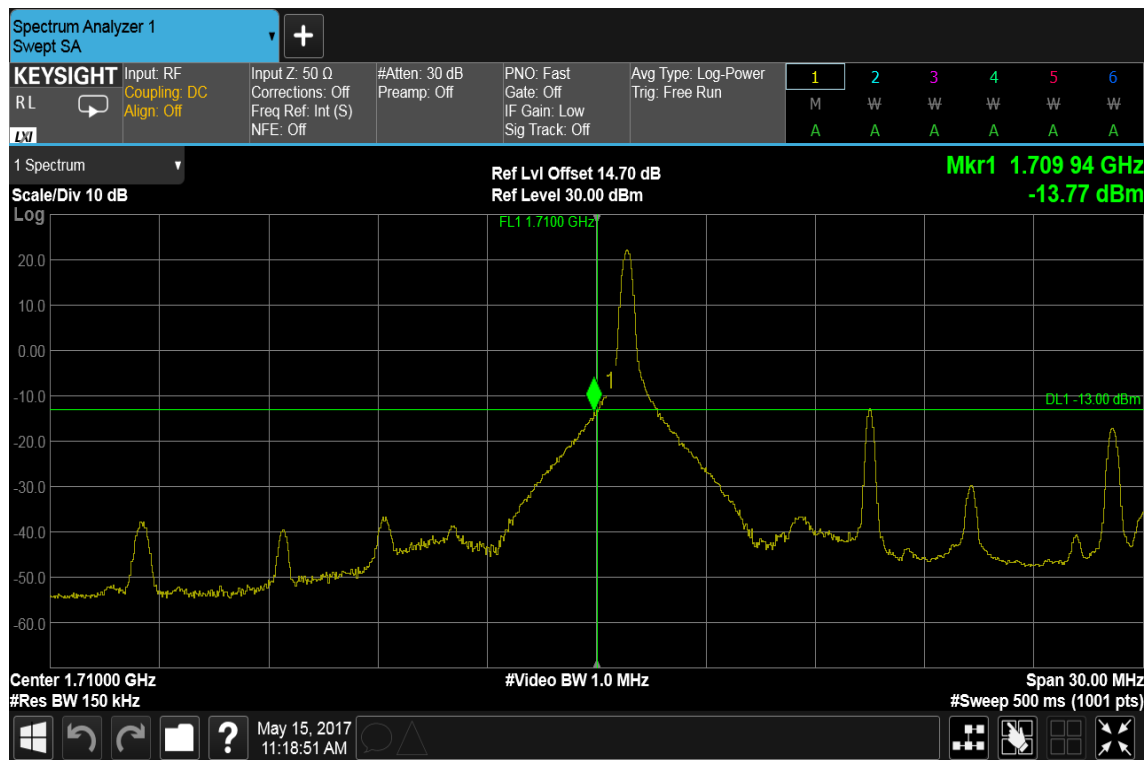


HIGHER BAND EDGE

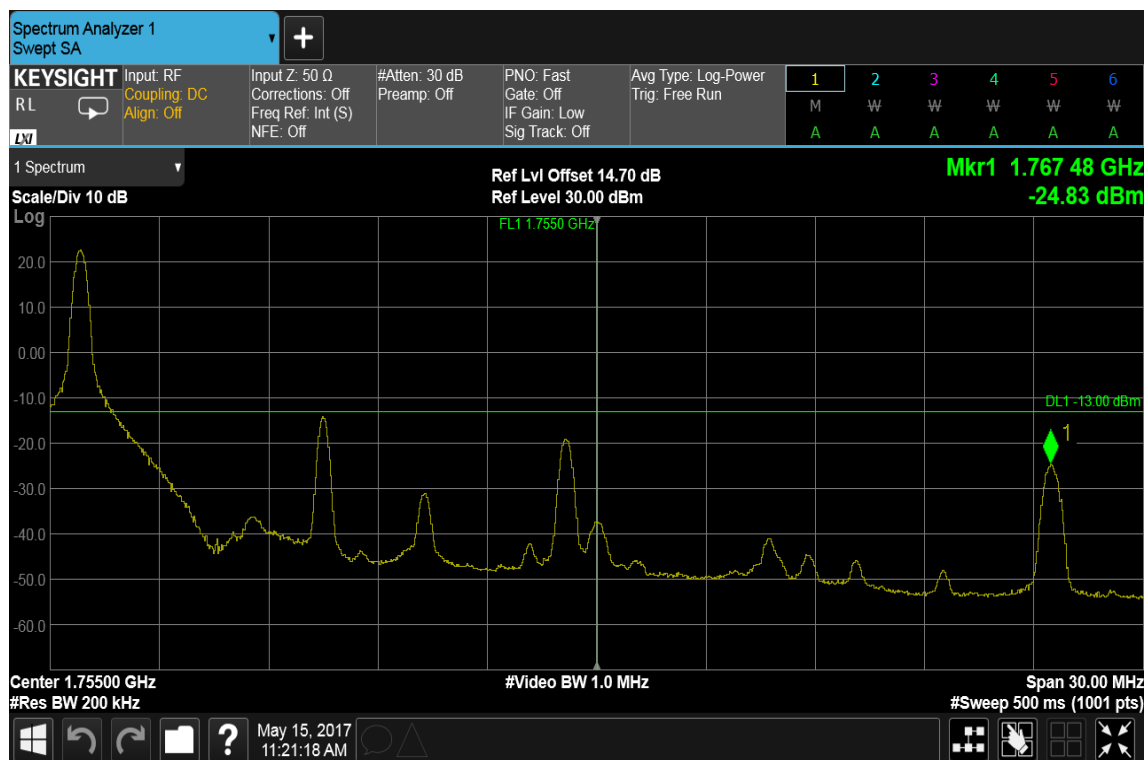


CHANNEL BANDWIDTH: 15MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

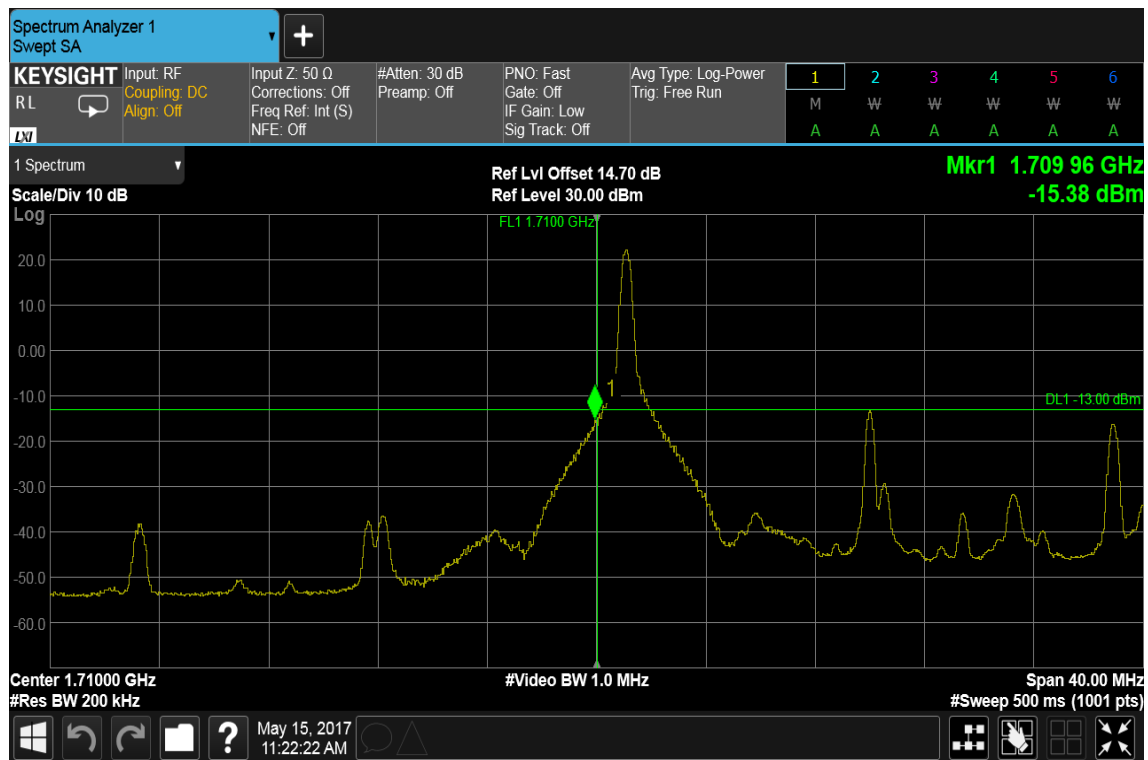


HIGHER BAND EDGE

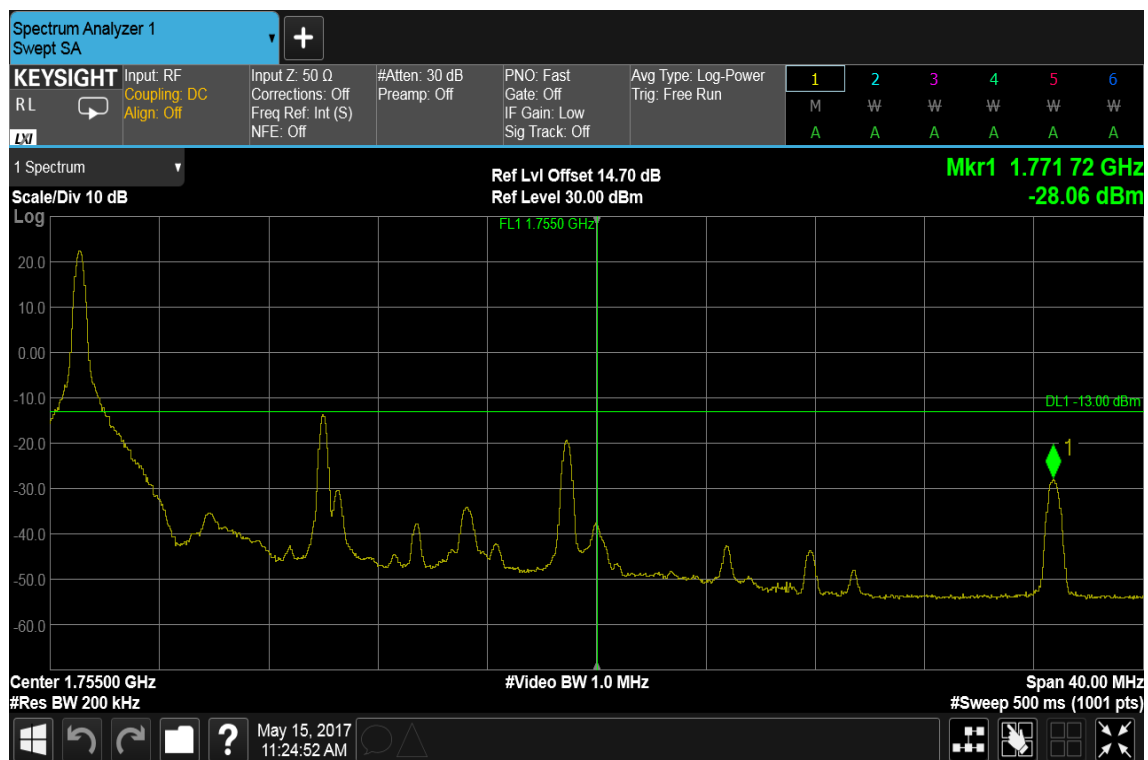


CHANNEL BANDWIDTH: 20MHz / QPSK / 1RB ALLOCATION

LOWER BAND EDGE

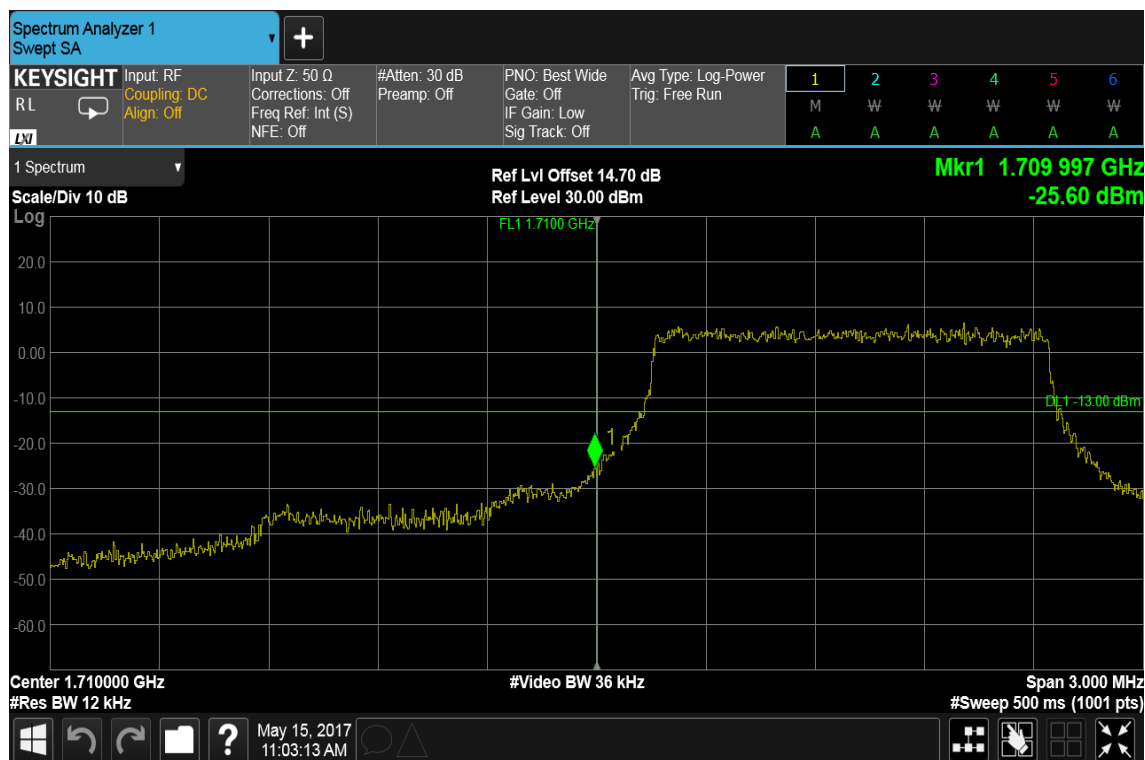


HIGHER BAND EDGE

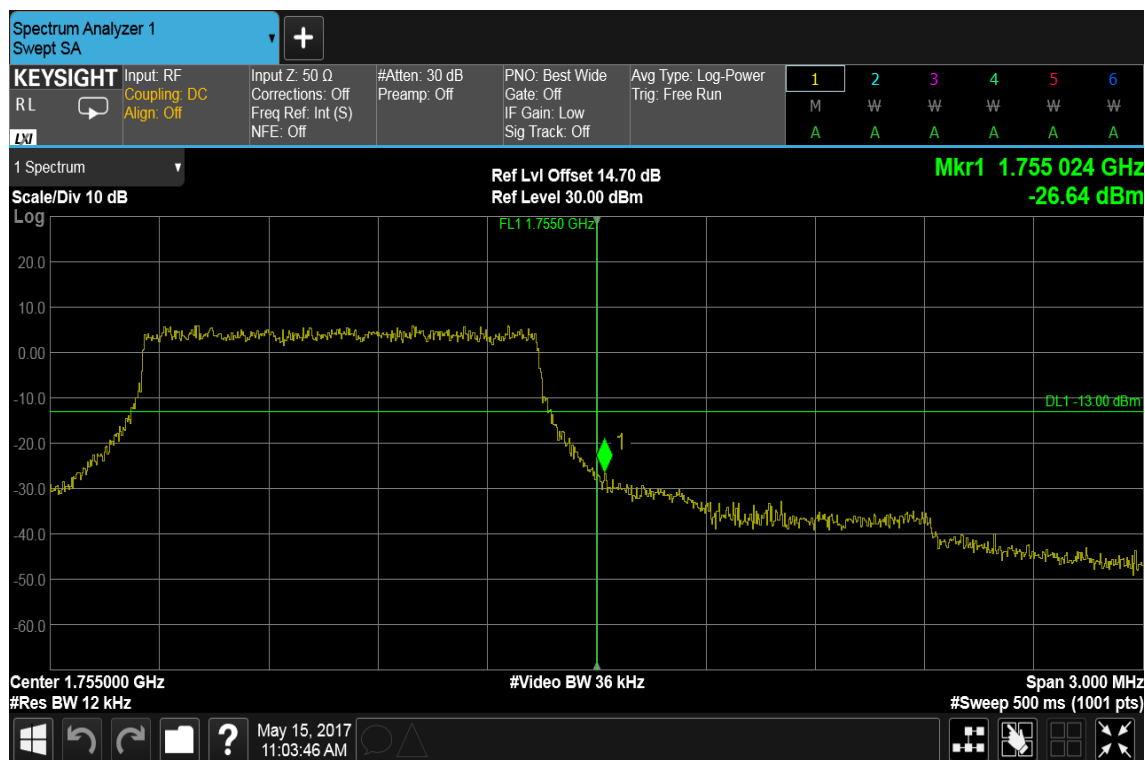


CHANNEL BANDWIDTH: 1.4MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE

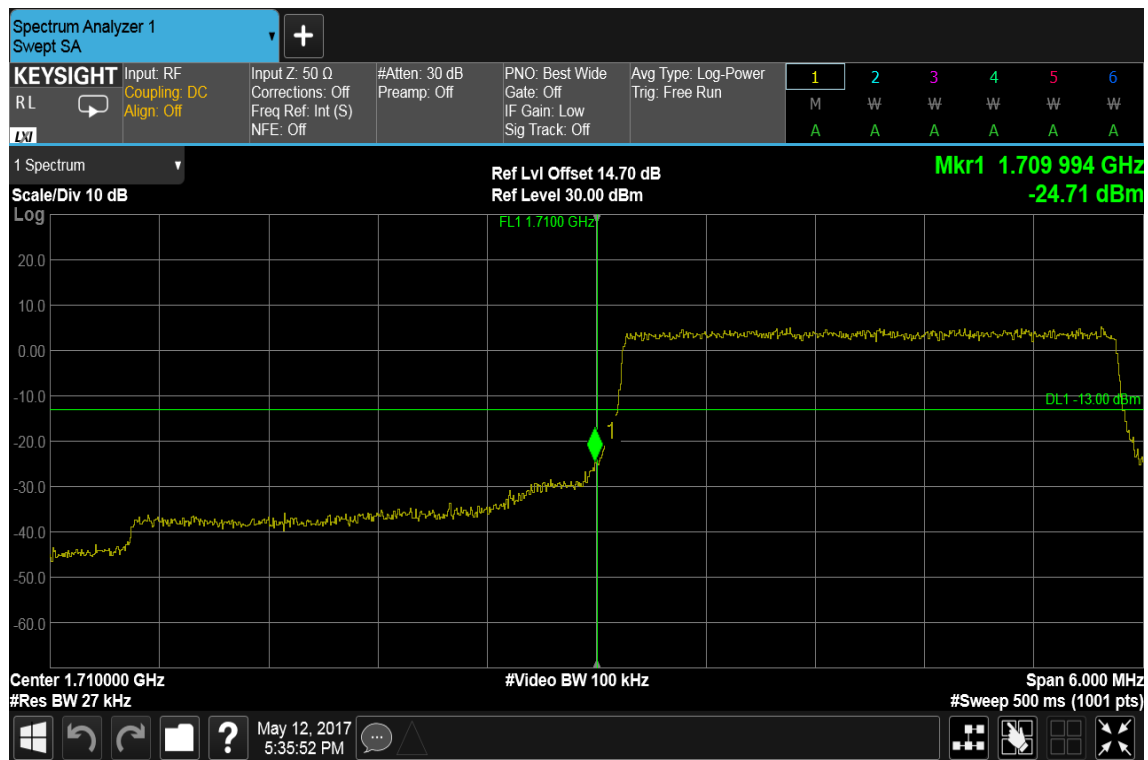


HIGHER BAND EDGE

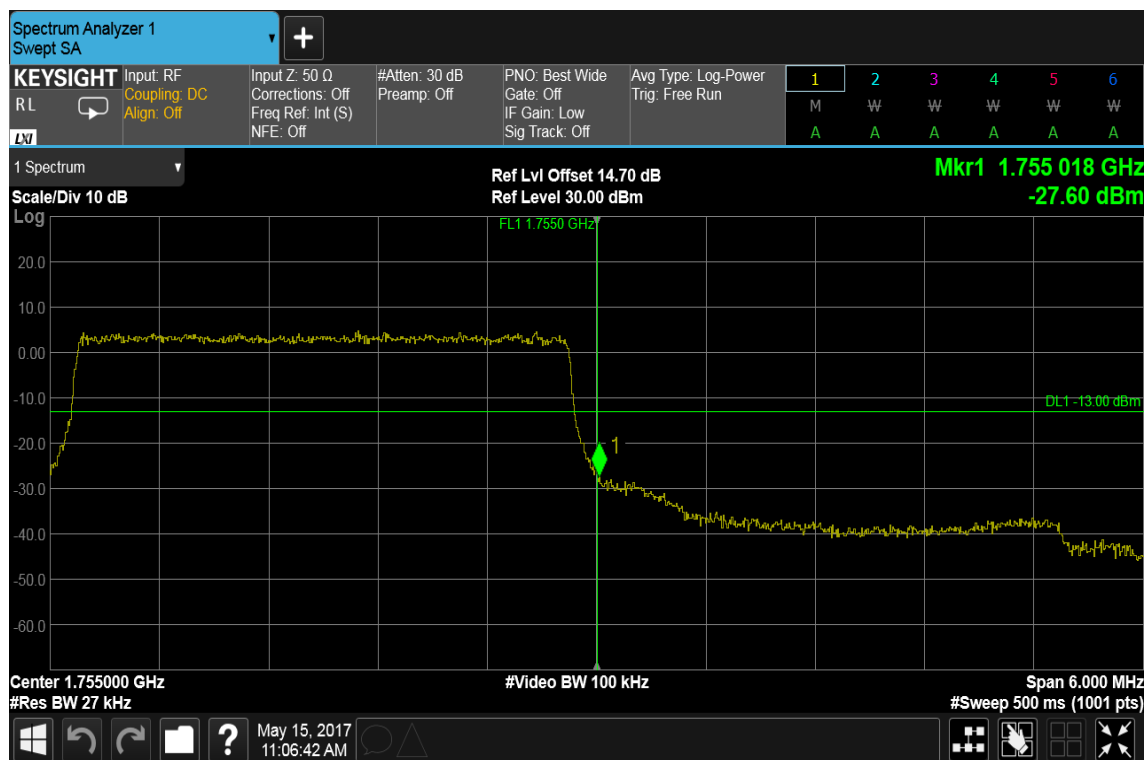


CHANNEL BANDWIDTH: 3MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE

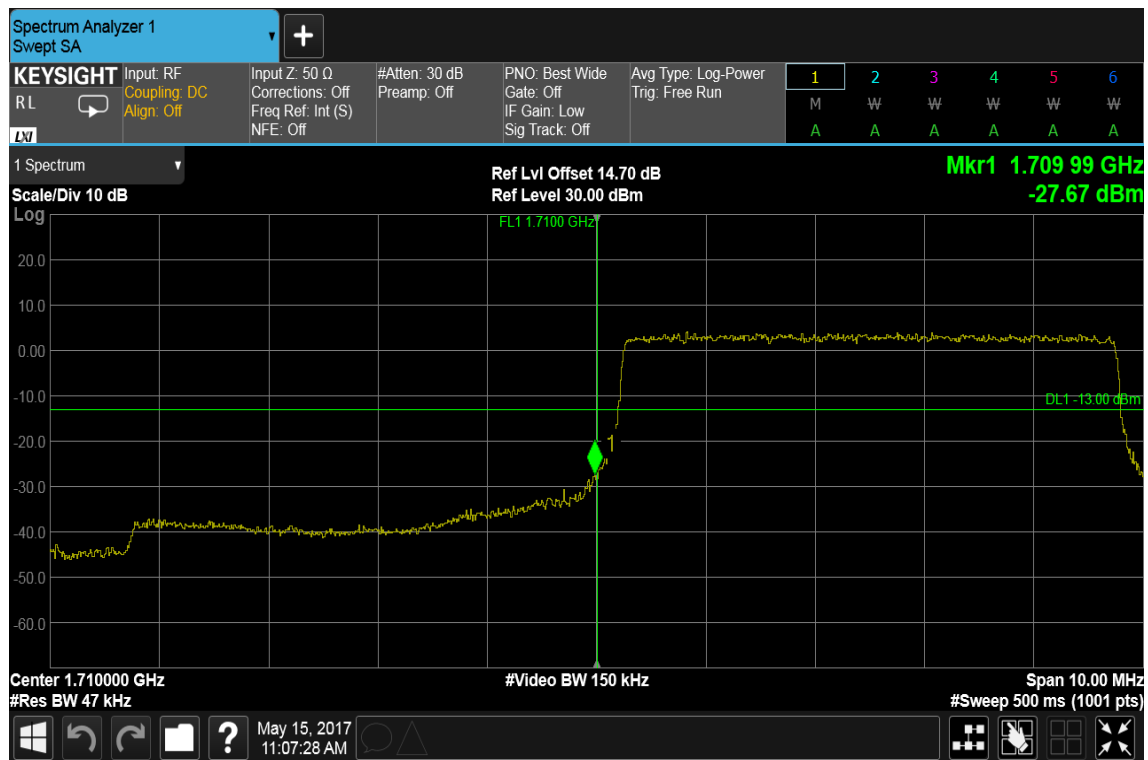


HIGHER BAND EDGE



CHANNEL BANDWIDTH: 5MHz / QPSK / FULLRB ALLOCATION

LOWER BAND EDGE



HIGHER BAND EDGE

