FCC LISTED, REGISTRATION NUMBER: 720267

IC LISTED REGISTRATION NUMBER IC 4621A-1

Test report No:

NIE: 45636RRF.003

Test report
REFERENCE STANDARD:
USA FCC Part 27
CANADA IC RSS-139, RSS-130, RSS-199

Identification of item tested.....:	Yotaphone2 Dual screen SmartPhone with EPD back screen
Trade .....:	YotaPhone
Model and /or type reference.....:	YD205
Other identification of the product .....:	FCC ID: 2ADHW205 IC: 12469A-205
Final HW version .....:	P2
Final SW version .....:	4.4.3-S01-003-US1.0.3.63a
Features.....:	CPU: Qualcomm Snapdragon 801, quad-core 2.26 GHz Network: GSM 850, 900, 1800, 1900 MHz, UMTS/HSPA+/DC-HSDPA 850,900,1900,1700/2100,2100 MHz; LTE CAT4 B2 MIMO,B3 MIMO, B4 MIMO, B5 MIMO, B7 MIMO, B12 MIMO and B20 MIMO Connectivity: WiFi 802.11 a/b/g/n/ac, USB 2.0, BT v4.0 LE, GPS w/A-GPS + Glonass, NFC
Manufacturer.....:	YOTA DEVICES LTD Arch. Makariou & Kalograion, 4, Nicolaides Sea View City, 9th Floor, Flat/Offices 903 -904, Block A-B, 6016, Larnaca, Cyprus
Test method requested, standard.....:	USA FCC Part 27 10-1-14 Edition. CANADA IC RSS-139 Issue 2, Feb. 2009. CANADA IC RSS-130 Issue 1, Oct. 2013. CANADA IC RSS-199 Issue 2, Oct. 2014. Measurement Guidance 971168 D01 v02r01 for certification of Licensed Digital Transmitters
Summary.....:	IN COMPLIANCE
Approved by (name / position & signature) .....:	A. Llamas RF Lab. Manager
Date of issue .....:	2015-05-21
Report template No.....:	FDT08_16

Firmado digitalmente por Alejandro Llamas Rodríguez
Fecha: 2015.05.21 16:30:12 +02'00'

Index

Competences and guarantees

AT4 wireless is a laboratory with a measurement facility in compliance with the requirements of Section 2.948 of the FCC rules and has been added to the list of facilities whose measurements data will be accepted in conjuction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Registration Number: 720267.

AT4 wireless is a laboratory with a measurement site in compliance with the requirements of RSS 212, Issue 1 (Provisional) and has been added to the list of filed sites of the Canadian Certification and Engineering Bureau. Reference File Number: IC 4621A-1.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

AT4 wireless is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the AT4 wireless internal document PODT000.

Usage of samples

Samples undergoing test have been selected by: **the client**.

Sample M/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
45636B/007	Smartphone with integral antenna	YD205	IMEI: 356431061029911	2015-04-22

1. Sample M/01 has undergone the test(s).

   All radiated tests indicated in appendix A.

Sample M/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
45636B/016	Smartphone with an antenna connector	YD205	IMEI: 356431061029804	2015-04-05

1. Sample M/01 has undergone the test(s).

   All conducted tests indicated in appendix A.

Test sample description

The test sample consists of a Dual screen SmartPhone with EPD back screen.

Identification of the client

YOTA DEVICES LTD

Arch. Makariou & Kalograion, 4, Nicolaides Sea View City, 9th Floor, Flat/Offices 903 -904, Block A-B, 6016, Larnaca, Cyprus.

Testing period

The performed test started on 2015-04-27 and finished on 2015-05-19.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

In the chamber for conducted measurements the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 0,5 Ω

Remarks and comments

1: Used instrumentation.

Conducted Measurements

		Last Cal. date	Cal. due date
1.	Spectrum analyser Agilent PSA E4440A	2014/05	2016/05
2.	Climatic chamber HERAEUS VM 07/100	2012/10	2015/10
3.	DC power supply R&S NGPE 40/40	2014/11	2017/11
4.	Universal Radio communication Tester R&S CMU200	2014/02	2016/02
5.	Universal Radio communication Tester R&S CMW500	2014/07	2017/07

Radiated Measurements

		Last Cal. date	Cal. due date
1.	Semianechoic Absorber Lined Chamber ETS FACT3 200STP	N.A.	N.A.
2.	BiconicalLog antenna ETS LINDGREN 3142E	2014/03	2017/03
3.	Multi Device Controller EMCO 2090	N.A.	N.A.
4.	Double-ridge Guide Horn antenna 1-18 GHz SCHWARZBECK BBHA 9120 D	2013/11	2016/11
5.	SHF-EHF Horn antenna 15-40 GHz Schwarbeck BBHA 9170	2014/03	2017/03
6.	EMI Test Receiver R&S ESU 26	2013/08	2015/08
7.	Spectrum analyser Rohde & Schwarz FSW50	2013/10	2015/10
8.	RF pre-amplifier 10 MHz-6 GHz SCHWARZBECK BBV9743	2015/03	2016/03
9.	RF pre-amplifier 1-18 GHz Schwarzbeck BBV 9718	2015/02	2016/02
10.	RF pre-amplifier BONN BLMA 1840-1M 18-40 GHz.	2014/02	2016/02
11.	Universal Radio communication Tester R&S CMU200	2014/02	2016/02
12.	Universal Radio communication Tester R&S CMW500	2014/07	2017/07

2. HSDPA modulation mode has not been tested to prove USA FCC Part 27 and Canada IC RSS-139 compliance because it is an improved mode of operation only for Downlink (UE reception), but using the normal WCDMA mode for UL (Up Link, UE transmission). Therefore HSDPA has no associated a Power class or modulation scheme different than WCDMA mode for the UL transmission.

Taking into account the above comments, testing in HSDPA modulation mode is redundant for FCC Parts 27 and IC RSS-139 as it is the same as WCDMA mode as long as UE transmission is concerned. WCDMA modulation mode has been tested as indicated on the present test report.

Testing verdicts

Not applicable ..... :	N/A
Pass ..... :	P
Fail ..... :	F
Not measured ..... :	N/M

FCC PART 27/IC RSS-139 PARAGRAPH	VERDICT			
	NA	P	F	NM
Clause 27.50 / RSS-139 Clause 6.4. / RSS-130 Clause 4.4. / RSS-199 Clause 4.4.: RF output power		P		
Clause 2.1047 / RSS-139 Clause 6.2. / RSS-130 Clause 4.1. / RSS-199 Clause 4.1.: Modulation characteristics		P		
Clause 27.54 / RSS-139 Clause 6.3. / RSS-130 Clause 4.3. / RSS-199 Clause 4.3.: Frequency stability		P		
Clause 2.1049: Occupied Bandwidth		P		
Clause 27.53 / RSS-139 Clause 6.5. / RSS-130 Clause 4.6. / RSS-199 Clause 4.6.: Spurious emissions at antenna terminals		P		
Clause 27.53 / RSS-139 Clause 6.5. / RSS-130 Clause 4.6. / RSS-199 Clause 4.6.: Spurious emissions at antenna terminals		P		

Appendix A – Test result for FCC Part 27/IC RSS-139/IC RSS-130/IC RSS-199

INDEX

TEST RESULTS FOR FCC PART 27 AND IC RSS-139/RSS-130/RSS-199

TEST CONDITIONS

Power supply (V):

V_{nom} = 3.8 Vdc

V_{max} = 4.2 Vdc (*)

V_{min} = 3.4 Vdc (*)

The subscripts nom, min and max indicate voltage test conditions (nominal, minimum and maximum respectively, as declared by the applicant).

(*): Declared by applicant

Type of power supply = DC Voltage from rechargeable battery

Type of antenna = Integral antenna

TEST FREQUENCIES:

WCDMA AND HSUPA MODULATION

Lowest channel (1312): 1712.4 MHz

Middle channel (1762): 1732.5 MHz

Highest channel (1513): 1752.6 MHz

LTE. QPSK AND 16QAM MODULATION (BAND IV)

	Channel (Frequency, MHz)					
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Lowest	19957 (1710.7)	19965 (1711.5)	19975 (1712.5)	20000 (1715.0)	20025 (1717.5)	20050 (1720.0)
Middle	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)	20175 (1732.5)
Highest	20393 (1754.30)	20385 (1753.50)	20375 (1752.50)	20350 (1750.00)	20325 (1747.50)	20300 (1745.00)

LTE. QPSK AND 16QAM MODULATION (BAND VII)

	Channel (Frequency, MHz)			
	BW = 5 MHz	BW = 10 MHz	BW = 15 MHz	BW = 20 MHz
Lowest	20775 (2502.5)	20800 (2505.0)	20825 (2507.5)	20850 (2510.0)
Middle	21100 (2535)	21100 (2535)	21100 (2535)	21100 (2535)
Highest	21425 (2567.5)	21400 (2565.0)	21375 (2562.5)	21350 (2560.0)

LTE. QPSK AND 16QAM MODULATION (BAND XII)

	Channel (Frequency, MHz)			
	BW = 1.4 MHz	BW = 3 MHz	BW = 5 MHz	BW = 10 MHz
Lowest	23017 (699.7)	23025 (700.5)	23035 (701.5)	23060 (704.0)
Middle	23095 (707.5)	23095 (707.5)	23095 (707.5)	23095 (707.5)
Highest	23173 (715.3)	23165 (714.5)	23155 (713.5)	23130 (711.0)

RF Output Power (conducted and E.I.R.P.)

SPECIFICATION

FCC §2.1046 and §27.50. RSS-139 Clause 6.4.

Fixed, mobile and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to a peak Equivalent Isotropically Radiated Power (E.I.R.P.) of 1 Watt (30 dBm).

The peak-to-average ratio (PAR) of the transmission shall not exceed 13 dB.

RSS-130 Clause 4.4.

The e.i.r.p. shall not exceed 50 watts (46.99 dBm) for mobile equipment or for outdoor fixed subscriber equipment nor shall it exceed 5 watts (36.99 dBm) for portable equipment or for indoor fixed subscriber equipment.

The peak-to-average ratio (PAR) of the transmission shall not exceed 13 dB.

RSS-199 Clause 4.4.

For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 watts (33 dBm).

METHOD

The conducted RF output power measurements were made at the RF output terminals of the EUT using the power meter of the Universal Radio Communication tester R&S CMU200 and CMW500, selecting maximum transmission power of the EUT and different modes of modulation.

The maximum effective radiated power e.i.r.p. is calculated by adding the declared maximum antenna gain (dBi).

RESULTS

MAXIMUM OUTPUT POWER (CONDUCTED).

WCDMA MODULATION

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-0.30	-0.10	-0.30
Measured maximum peak power (dBm) at antenna port	26.84	27.03	27.16
Maximum peak equivalent isotropically radiated power E.I.R.P. (dBm)	26.54	26.93	26.86
Measured maximum average power (dBm) at antenna port	22.61	22.78	22.93
Maximum average equivalent isotropically radiated power E.I.R.P. (dBm)	22.31	22.68	22.63
Peak-to-average ratio (PAR) (dB)	4.23	4.25	4.23
Measurement uncertainty (dB)	±0.5		

HSUPA MODULATION

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-0.30	-0.10	-0.30
Measured maximum peak power (dBm) at antenna port	25.83	25.83	25.85
Maximum peak equivalent isotropically radiated power E.I.R.P. (dBm)	25.53	25.73	25.55
Measured maximum average power (dBm) at antenna port	20.95	21.08	21.12
Maximum average equivalent isotropically radiated power E.I.R.P. (dBm)	20.65	20.98	20.82
Peak-to-average ratio (PAR) (dB)	4.88	4.75	4.73
Measurement uncertainty (dB)	±0.5		

LTE. BAND IV.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
1.4	Low 19957	1710.7	QPSK	1	0	22.38	25.62	3.24
				1	2	22.4	25.72	3.32
				1	5	22.4	25.63	3.23
				3	0	22.42	25.6	3.18
				3	1	22.39	25.63	3.24
				3	2	22.26	25.64	3.38
				6	0	21.53	25.87	4.34
			16-QAM	1	0	21.54	25.51	3.97
				1	2	21.72	25.63	3.91
				1	5	21.66	25.64	3.98
				3	0	21.58	25.64	4.06
				3	1	21.67	25.69	4.02
				3	2	21.7	25.72	4.02
				6	0	20.57	25.95	5.38
	Middle 20175	1732.5	QPSK	1	0	23.42	27.18	3.76
				1	2	23.27	27.09	3.82
				1	5	23.35	26.98	3.63
				3	0	23.31	27.24	3.93
				3	1	23.25	27.15	3.9
				3	2	23.43	27.13	3.7
				6	0	22.51	27.37	4.86
			16-QAM	1	0	22.67	27.27	4.6
				1	2	22.59	27.21	4.62
				1	5	22.67	27.06	4.39
				3	0	22.47	27.15	4.68
				3	1	22.41	27.4	4.99
				3	2	22.41	27.35	4.94
				6	0	21.44	27.57	6.13
	High 20393	1754.3	QPSK	1	0	22.5	26.65	4.15
				1	2	22.68	26.7	4.02
				1	5	22.49	26.56	4.07
				3	0	22.64	26.75	4.11
				3	1	22.63	26.7	4.07
				3	2	22.62	26.73	4.11
				6	0	21.65	27.06	5.41
			16-QAM	1	0	21.83	26.74	4.91
				1	2	21.99	26.84	4.85
				1	5	21.81	26.7	4.89
				3	0	21.9	26.86	4.96
				3	1	21.91	26.84	4.93
				3	2	21.92	26.82	4.9
				6	0	20.8	27.07	6.27

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
3	Low 19965	1711.5	QPSK	1	0	22.4	25.86	3.46
				1	7	22.53	25.82	3.29
				1	14	22.75	26.16	3.41
				8	0	21.5	25.8	4.3
				8	4	21.65	25.94	4.29
				8	7	21.78	26.18	4.4
				15	0	21.59	27.01	5.42
			16-QAM	1	0	21.62	25.85	4.23
				1	7	21.83	25.86	4.03
				1	14	21.98	26.25	4.27
				8	0	20.44	25.9	5.46
				8	4	20.73	26.01	5.28
				8	7	20.91	26.26	5.35
				15	0	20.56	26.97	6.41
	Middle 20175	1732.5	QPSK	1	0	23.36	27.57	4.21
				1	7	23.33	27.04	3.71
				1	14	23.39	27.19	3.8
				8	0	22.35	27.48	5.13
				8	4	22.37	27.35	4.98
				8	7	22.46	27.26	4.8
				15	0	22.45	27.92	5.47
			16-QAM	1	0	22.41	27.65	5.24
				1	7	22.39	27.11	4.72
				1	14	22.41	27.3	4.89
				8	0	21.49	27.29	5.8
				8	4	21.46	27.15	5.69
				8	7	21.49	27.28	5.79
				15	0	21.44	28.01	6.57
	High 20385	1753.5	QPSK	1	0	23.32	27.03	3.71
				1	7	23.29	26.85	3.56
				1	14	23.38	26.96	3.58
				8	0	22.42	27.17	4.75
				8	4	22.48	27.12	4.64
				8	7	22.41	27.16	4.75
				15	0	22.36	27.92	5.56
			16-QAM	1	0	22.42	27.18	4.76
				1	7	22.35	27.02	4.67
				1	14	22.4	27.19	4.79
				8	0	21.34	27.22	5.88
				8	4	21.46	27.1	5.64
				8	7	21.37	27.3	5.93
				15	0	22.38	27.15	4.77

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
5	Low 19975	1712.5	QPSK	1	0	22.4	25.7	3.3
				1	12	22.69	26.07	3.38
				1	24	23.29	26.54	3.25
				12	0	21.66	25.88	4.22
				12	6	21.83	26.12	4.29
				12	11	22.19	26.44	4.25
				25	0	21.87	26.66	4.79
			16-QAM	1	0	21.49	25.78	4.29
				1	12	21.97	26.13	4.16
				1	24	22.36	26.6	4.24
				12	0	20.77	25.1	4.33
				12	6	20.92	25.2	4.28
				12	11	21.11	26.04	4.93
				25	0	21.88	26.59	4.71
	Middle 20175	1732.5	QPSK	1	0	23.47	27.57	4.1
				1	12	23.33	27.08	3.75
				1	24	23.39	26.95	3.56
				12	0	22.42	27.51	5.09
				12	6	22.34	27.36	5.02
				12	11	22.44	27.06	4.62
				25	0	22.45	27.71	5.26
			16-QAM	1	0	22.54	27.67	5.13
				1	12	22.46	27.16	4.7
				1	24	22.51	27.05	4.54
				12	0	21.46	26.1	4.64
				12	6	21.48	26.25	4.77
				12	11	21.45	26.34	4.89
				25	0	21.41	27.73	6.32
	High 20375	1752.5	QPSK	1	0	23.37	26.84	3.47
				1	12	23.4	26.91	3.51
				1	24	23.37	26.98	3.61
				12	0	22.41	27.02	4.61
				12	6	22.43	27.04	4.61
				12	11	22.46	27.06	4.6
				25	0	22.39	27.47	5.08
			16-QAM	1	0	22.45	26.95	4.5
				1	12	22.44	27.08	4.64
				1	24	22.49	27.15	4.66
				12	0	21.56	26.58	5.02
				12	6	21.54	26.63	5.09
				12	11	21.58	27.1	5.52
				25	0	21.45	27.46	6.01

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
10	Low 20000	1715	QPSK	1	0	22.53	25.84	3.31
				1	24	23.32	26.57	3.25
				1	49	23.33	27.68	4.35
				25	0	21.95	26.54	4.59
				25	12	22.35	27.15	4.8
				25	24	22.44	27.4	4.96
				50	0	22.38	27.99	5.61
			16-QAM	1	0	21.73	25.88	4.15
				1	24	22.36	26.56	4.2
				1	49	22.4	26.65	4.25
				25	0	21.1	25.5	4.4
				25	12	21.32	25.8	4.48
				25	24	21.34	25.75	4.41
				50	0	21.4	27.77	6.37
	Middle 20175	1732.5	QPSK	1	0	23.45	27.99	4.54
				1	24	23.31	27.03	3.72
				1	49	23.25	26.7	3.45
				25	0	22.38	27.59	5.21
				25	12	22.29	27.45	5.16
				25	24	22.46	27.23	4.77
				50	0	22.42	28.07	5.65
			16-QAM	1	0	22.47	26.88	4.41
				1	24	22.38	27.2	4.82
				1	49	22.46	26.83	4.37
				25	0	21.44	25.52	4.08
				25	12	21.44	25.63	4.19
				25	24	21.46	25.72	4.26
				50	0	23.45	27.97	4.52
	High 20350	1750	QPSK	1	0	23.01	26.43	3.42
				1	24	23.25	26.66	3.41
				1	49	23.36	27.09	3.73
				25	0	22.35	27.09	4.74
				25	12	22.5	27.15	4.65
				25	24	22.43	27.35	4.92
				50	0	23.11	26.44	3.33
			16-QAM	1	0	22.35	26.56	4.21
				1	24	22.39	26.83	4.44
				1	49	22.48	27.3	4.82
				25	0	21.44	26.25	4.81
				25	12	21.47	26.45	4.98
				25	24	21.51	26.49	4.98
				50	0	21.4	27.83	6.43

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
15	Low 20025	1717.5	QPSK	1	0	22.64	27.91	5.27
				1	37	22.63	27.9	5.27
				1	74	22.66	27.88	5.22
				36	0	22.67	27.87	5.2
				36	18	22.67	27.87	5.2
				36	37	22.67	27.85	5.18
				75	0	22.66	27.85	5.19
			16-QAM	1	0	22.64	27.83	5.19
				1	37	22.65	27.82	5.17
				1	74	22.66	27.87	5.21
				36	0	22.33	27.86	5.53
				36	18	22.3	27.88	5.58
				36	37	22.31	27.87	5.56
				75	0	22.3	27.88	5.58
	Middle 20175	1732.5	QPSK	1	0	22.88	27.91	5.03
				1	37	21.26	27.44	6.18
				1	74	21.33	27.24	5.91
				36	0	22.34	27.3	4.96
				36	18	22.35	27.36	5.01
				36	37	22.36	27.37	5.01
				75	0	22.37	27.42	5.05
			16-QAM	1	0	22.33	27.98	5.65
				1	37	22.33	27.99	5.66
				1	74	22.32	27.99	5.67
				36	0	22.31	28.01	5.7
				36	18	22.32	28.01	5.69
				36	37	22.33	27.98	5.65
				75	0	22.86	27.97	5.11
	High 20325	1747.5	QPSK	1	0	22.29	27.08	4.79
				1	37	22.28	27.04	4.76
				1	74	22.27	27.01	4.74
				36	0	22.26	27.04	4.78
				36	18	22.25	27.02	4.77
				36	37	22.25	27.03	4.78
				75	0	22.25	26.97	4.72
			16-QAM	1	0	22.22	26.97	4.75
				1	37	22.23	27.01	4.78
				1	74	22.23	27	4.77
				36	0	21.36	27.04	5.68
				36	18	21.37	27.02	5.65
				36	37	21.37	27.05	5.68
				75	0	21.37	27.04	5.67

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
20	Low 20050	1720	QPSK	1	0	22.42	25.57	3.15
				1	49	22.45	27.7	5.25
				1	99	22.52	27.64	5.12
				50	0	22.56	27.19	4.63
				50	24	22.54	27.13	4.59
				50	49	22.55	27.1	4.55
				100	0	22.53	27.56	5.03
			16-QAM	1	0	22.49	25.6	3.11
				1	49	22.46	26.65	4.19
				1	99	22.46	27.76	5.3
				50	0	22.48	26.45	3.97
				50	24	22.47	26.55	4.08
				50	49	22.44	26.47	4.03
				100	0	22.43	27.68	5.25
	Middle 20175	1732.5	QPSK	1	0	22.44	26.75	4.31
				1	49	22.87	27.06	4.19
				1	99	22.84	26.25	3.41
				50	0	22.39	27.86	5.47
				50	24	22.38	27.55	5.17
				50	49	22.38	27.12	4.74
				100	0	22.37	27.65	5.28
			16-QAM	1	0	21.7	26.76	5.06
				1	49	22.02	27.28	5.26
				1	99	21.88	26.3	4.42
				50	0	21.48	26.23	4.75
				50	24	21.49	26.4	4.91
				50	49	21.52	26.45	4.93
				100	0	21.5	26.42	4.92
	High 20300	1745	QPSK	1	0	23.22	26.48	3.26
				1	49	23.08	26.32	3.24
				1	99	23.43	26.64	3.21
				50	0	21.99	26.72	4.73
				50	24	22.33	26.95	4.62
				50	49	22.28	26.96	4.68
				100	0	22.12	27.22	5.1
			16-QAM	1	0	22.33	26.89	4.56
				1	49	22.32	26.91	4.59
				1	99	22.33	26.9	4.57
				50	0	21.41	26.97	5.56
				50	24	21.4	26.91	5.51
				50	49	21.36	26.92	5.56
				100	0	21.32	26.94	5.62

LTE. BAND VII.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
5	Low 20775	2502,5 MHz	QPSK	1	0	23,22	27,03	3,81
				1	12	23,24	27,17	3,93
				1	24	23,27	27,48	4,21
				12	0	22,26	27,27	5,01
				12	6	22,28	27,33	5,05
				12	11	22,33	27,41	5,08
				25	0	22,27	28,07	5,8
			16-QAM	1	0	22,08	27,15	5,07
				1	12	22,07	27,27	5,2
				1	24	22,15	27,62	5,47
				12	0	21,23	27,27	6,04
				12	6	21,24	27,3	6,06
				12	11	21,29	27,42	6,13
				25	0	21,27	27,88	6,61
	Middle 21100	2535 MHz	QPSK	1	0	23,26	27,36	4,1
				1	12	23,24	27,29	4,05
				1	24	23,26	27,35	4,09
				12	0	22,27	27,43	5,16
				12	6	22,3	27,35	5,05
				12	11	22,3	27,43	5,13
				25	0	22,32	28,09	5,77
			16-QAM	1	0	22,22	27,44	5,22
				1	12	22,19	27,37	5,18
				1	24	22,19	27,42	5,23
				12	0	21,34	27,48	6,14
				12	6	21,36	27,1	5,74
				12	11	21,35	27,44	6,09
				25	0	21,29	28,03	6,74
	High 21425	2567,5 MHz	QPSK	1	0	23,14	26,91	3,77
				1	12	23,1	26,73	3,63
				1	24	22,98	26,65	3,67
				12	0	22,23	27,03	4,8
				12	6	22,15	27,05	4,9
				12	11	22,23	27,03	4,8
				25	0	22,16	27,82	5,66
			16-QAM	1	0	22,1	27,01	4,91
				1	12	22,07	26,82	4,75
				1	24	22,14	26,79	4,65
				12	0	21,24	27,09	5,85
				12	6	21,24	27,09	5,85
				12	11	21,24	27,11	5,87
				25	0	21,26	28,03	6,77

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
10	Low 20800	2505 MHz	QPSK	1	0	23,19	27,05	3,86
				1	24	23,24	27,37	4,13
				1	49	23,31	27,94	4,63
				25	0	22,26	27,3	5,04
				25	12	22,32	27,51	5,19
				25	24	22,37	27,7	5,33
				50	0	22,28	28,36	6,08
			16-QAM	1	0	22,2	27,1	4,9
				1	24	22,26	27,47	5,21
				1	49	22,34	27,99	5,65
				25	0	21,27	27,34	6,07
				25	12	21,28	27,42	6,14
				25	24	21,34	27,64	6,3
				50	0	21,27	28,2	6,93
	Middle 21100	2535 MHz	QPSK	1	0	23,29	27,74	4,45
				1	24	23,26	27,49	4,23
				1	49	23,33	27,77	4,44
				25	0	22,33	27,67	5,34
				25	12	22,27	27,63	5,36
				25	24	22,24	27,71	5,47
				50	0	22,3	28,58	6,28
			16-QAM	1	0	22,42	27,75	5,33
				1	24	22,41	27,51	5,1
				1	49	22,44	27,83	5,39
				25	0	21,27	27,78	6,51
				25	12	21,24	27,62	6,38
				25	24	21,22	27,69	6,47
				50	0	21,25	28,37	7,12
	High 21400	2565 MHz	QPSK	1	0	23,26	27,44	4,18
				1	24	23,19	27,08	3,89
				1	49	23,14	27,07	3,93
				25	0	22,21	27,12	4,91
				25	12	22,22	27,11	4,89
				25	24	22,2	27	4,8
				50	0	22,19	28	5,81
			16-QAM	1	0	22,17	27,6	5,43
				1	24	22,15	27,13	4,98
				1	49	22,12	27,22	5,1
				25	0	21,29	27,47	6,18
				25	12	21,25	27,11	5,86
				25	24	21,19	27,04	5,85
				50	0	21,26	27,96	6,7

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
15	Low 20825	2507,5 MHz	QPSK	1	0	23,09	26,94	3,85
				1	37	23,11	27,68	4,57
				1	74	23,28	27,79	4,51
				36	0	22,19	27,34	5,15
				36	18	22,22	27,45	5,23
				36	37	22,27	27,71	5,44
				75	0	22,25	28,02	5,77
			16-QAM	1	0	22,1	27,02	4,92
				1	37	22,17	27,73	5,56
				1	74	22,28	27,81	5,53
				36	0	21,18	27,38	6,2
				36	18	21,22	27,35	6,13
				36	37	21,28	27,55	6,27
				75	0	21,29	27,98	6,69
	Middle 21100	2535 MHz	QPSK	1	0	23,11	27,26	4,15
				1	37	23,04	27,06	4,02
				1	74	23,1	27,32	4,22
				36	0	22,19	27,28	5,09
				36	18	22,12	27,19	5,07
				36	37	22,14	27,24	5,1
				75	0	22,13	27,74	5,61
			16-QAM	1	0	22,26	27,38	5,12
				1	37	22,17	27,1	4,93
				1	74	22,24	27,4	5,16
				36	0	21,09	27,22	6,13
				36	18	21,11	27,21	6,1
				36	37	21,09	27,3	6,21
				75	0	21,14	27,7	6,56
	High 21375	2562,5 MHz	QPSK	1	0	23,09	28,06	4,97
				1	37	23,06	27,52	4,46
				1	74	23,04	27,26	4,22
				36	0	22,17	27,87	5,7
				36	18	22,12	27,63	5,51
				36	37	22,12	27,59	5,47
				75	0	22,21	28,09	5,88
			16-QAM	1	0	22,25	28,09	5,84
				1	37	22,25	27,59	5,34
				1	74	22,24	27,43	5,19
				36	0	21,2	27,96	6,76
				36	18	21,13	27,69	6,56
				36	37	21,14	27,65	6,51
				75	0	21,21	28,2	6,99

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
20	Low 20850	2510 MHz	QPSK	1	0	22,97	26,72	3,75
				1	49	23,08	27,77	4,69
				1	99	23,13	27,26	4,13
				50	0	22,12	27,49	5,37
				50	24	22,14	27,48	5,34
				50	49	22,31	27,68	5,37
				100	0	22,13	28	5,87
			16-QAM	1	0	21,87	26,78	4,91
				1	49	21,98	27,76	5,78
				1	99	22,02	27,4	5,38
				50	0	21,08	27,46	6,38
				50	24	21,15	27,41	6,26
				50	49	21,2	27,67	6,47
				100	0	21,14	28,04	6,9
	Middle 21100	2535 MHz	QPSK	1	0	23,24	28,046	4,806
				1	49	23,13	27,94	4,81
				1	99	22,96	28,18	5,22
				50	0	22,23	28,14	5,91
				50	24	22,17	27,98	5,81
				50	49	22,14	28,01	5,87
				100	0	22,29	28,45	6,16
			16-QAM	1	0	22,26	28,05	5,79
				1	49	22,16	27,99	5,83
				1	99	22,06	28,24	6,18
				50	0	21,28	28,06	6,78
				50	24	21,23	27,96	6,73
				50	49	21,14	28,1	6,96
				100	0	21,14	28,34	7,2
	High 21350	2560 MHz	QPSK	1	0	22,97	28,13	5,16
				1	49	23,01	27,75	4,74
				1	99	22,74	27,07	4,33
				50	0	22,12	28,06	5,94
				50	24	22,19	27,86	5,67
				50	49	22,1	27,6	5,5
				100	0	22,18	28,47	6,29
			16-QAM	1	0	22,16	28,15	5,99
				1	49	22,14	27,91	5,77
				1	99	22,08	27,2	5,12
				50	0	21,12	28,02	6,9
				50	24	21,18	27,95	6,77
				50	49	21,18	27,67	6,49
				100	0	21,16	28,38	7,22

LTE. BAND XII.

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
1.4	Low 23017	699,7 MHz	QPSK	1	0	23,14	27,8	4,66
				1	2	23,4	28	4,6
				1	5	23,36	28,03	4,67
				3	0	23,26	28,19	4,93
				3	1	23,42	28,3	4,88
				3	2	23,5	28,46	4,96
				6	0	22,45	28,32	5,87
			16-QAM	1	0	22,37	27,82	5,45
				1	2	22,65	27,99	5,34
				1	5	22,59	27,92	5,33
				3	0	22,38	28,19	5,81
				3	1	22,54	28,35	5,81
				3	2	22,63	28,43	5,8
				6	0	21,56	28,18	6,62
	Middle 23095	707,5 MHz	QPSK	1	0	22,86	26,69	3,83
				1	2	22,91	26,78	3,87
				1	5	22,83	26,68	3,85
				3	0	22,87	26,93	4,06
				3	1	22,89	26,91	4,02
				3	2	22,88	26,92	4,04
				6	0	21,97	27,3	5,33
			16-QAM	1	0	22,05	26,72	4,67
				1	2	22,11	26,79	4,68
				1	5	22,03	26,65	4,62
				3	0	21,99	26,87	4,88
				3	1	22,02	26,9	4,88
				3	2	22,01	26,89	4,88
				6	0	21,09	27,17	6,08
	High 23173	715,3 MHz	QPSK	1	0	23,07	27,33	4,26
				1	2	23,16	27,53	4,37
				1	5	23,18	27,43	4,25
				3	0	23,18	27,64	4,46
				3	1	23,22	27,69	4,47
				3	2	23,26	27,72	4,46
				6	0	22,32	27,99	5,67
			16-QAM	1	0	22,34	27,38	5,04
				1	2	22,42	27,51	5,09
				1	5	22,43	27,43	5
				3	0	22,41	27,6	5,19
				3	1	22,45	27,59	5,14
				3	2	22,49	27,66	5,17
				6	0	21,49	27,96	6,47

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
3	Low 23025	700,5 MHz	QPSK	1	0	23,19	27,99	4,8
				1	7	23,43	28,12	4,69
				1	14	22,93	26,49	3,56
				8	0	22,47	27,78	5,31
				8	4	22,56	27,73	5,17
				8	7	22,1	26,88	4,78
				15	0	22,6	28,67	6,07
			16-QAM	1	0	22,41	27,87	5,46
				1	7	22,69	28,08	5,39
				1	14	22,16	26,56	4,4
				8	0	21,58	27,66	6,08
				8	4	21,66	27,69	6,03
				8	7	21,18	26,89	5,71
				15	0	21,68	28,74	7,06
	Middle 23095	707,5 MHz	QPSK	1	0	22,97	26,78	3,81
				1	7	22,97	26,84	3,87
				1	14	22,91	26,74	3,83
				8	0	22,04	27,1	5,06
				8	4	22,05	27	4,95
				8	7	22,02	27,04	5,02
				15	0	22,03	27,84	5,81
			16-QAM	1	0	22,24	26,77	4,53
				1	7	22,2	26,9	4,7
				1	14	22,17	26,77	4,6
				8	0	21,17	27,07	5,9
				8	4	21,18	26,99	5,81
				8	7	21,14	26,95	5,81
				15	0	21,1	27,79	6,69
	High 23165	714,5 MHz	QPSK	1	0	23,28	27,9	4,62
				1	7	23,26	27,81	4,55
				1	14	23,32	27,57	4,25
				8	0	22,41	28,02	5,61
				8	4	22,5	27,89	5,39
				8	7	22,47	27,98	5,51
				15	0	22,45	28,67	6,22
			16-QAM	1	0	22,55	27,84	5,29
				1	7	22,54	27,88	5,34
				1	14	22,56	27,58	5,02
				8	0	21,6	28,04	6,44
				8	4	21,68	27,88	6,2
				8	7	21,63	27,98	6,35
				15	0	21,58	28,56	6,98

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
5	Low 23035	701,5 MHz	QPSK	1	0	23,26	27,86	4,6
				1	12	22,93	26,61	3,68
				1	24	22,93	26,61	3,68
				12	0	22,58	27,8	5,22
				12	6	22,21	26,96	4,75
				12	11	22,2	27,01	4,81
				25	0	22,15	27,52	5,37
			16-QAM	1	0	22,65	27,9	5,25
				1	12	22,32	26,77	4,45
				1	24	22,31	26,68	4,37
				12	0	21,7	27,81	6,11
				12	6	21,29	26,95	5,66
				12	11	21,31	27,02	5,71
				25	0	21,22	27,76	6,54
	Middle 23095	707,5 MHz	QPSK	1	0	22,91	26,63	3,72
				1	12	22,82	26,8	3,98
				1	24	22,83	26,59	3,76
				12	0	22,16	27,06	4,9
				12	6	22,05	26,95	4,9
				12	11	22,07	26,95	4,88
				25	0	22,14	27,8	5,66
			16-QAM	1	0	22,15	26,7	4,55
				1	12	22,05	26,81	4,76
				1	24	22,1	26,66	4,56
				12	0	21,29	27,11	5,82
				12	6	21,18	26,98	5,8
				12	11	21,18	26,95	5,77
				25	0	21,25	27,69	6,44
	High 23155	713,5 MHz	QPSK	1	0	23,05	26,7	3,65
				1	12	23,26	28,07	4,81
				1	24	23,77	27,66	3,89
				12	0	22,6	28,06	5,46
				12	6	22,59	28,04	5,45
				12	11	22,56	27,95	5,39
				25	0	22,52	28,67	6,15
			16-QAM	1	0	22,25	26,73	4,48
				1	12	22,5	28,03	5,53
				1	24	22,49	27,69	5,2
				12	0	21,74	27,99	6,25
				12	6	21,76	27,87	6,11
				12	11	21,72	27,97	6,25
				25	0	21,66	28,59	6,93

BANDWIDTH (MHz)	CHANNEL	FREQUENCY (MHz)	MODULATION	RB SIZE	RB OFFSET	AVERAGE POWER (dBm)	PK POWER (dBm)	PAPR (dB)
10	Low 23060	704 MHz	QPSK	1	0	23,5	28,17	4,67
				1	24	23,01	26,78	3,77
				1	49	22,95	26,73	3,78
				25	0	22,66	27,97	5,31
				25	12	22,25	27,17	4,92
				25	24	22,11	27,17	5,06
				50	0	22,16	27,81	5,65
			16-QAM	1	0	22,74	28,12	5,38
				1	24	22,27	26,88	4,61
				1	49	22,14	26,75	4,61
				25	0	21,17	27,96	6,79
				25	12	21,35	27,22	5,87
				25	24	21,2	27,16	5,96
				50	0	21,26	27,85	6,59
	Middle 23095	707,5 MHz	QPSK	1	0	23,08	27	3,92
				1	24	22,9	27,04	4,14
				1	49	23,02	26,84	3,82
				25	0	22,25	27,46	5,21
				25	12	22,14	27,38	5,24
				25	24	22,1	27,43	5,33
				50	0	22,17	28,31	6,14
			16-QAM	1	0	22,33	27,03	4,7
				1	24	22,18	27,1	4,92
				1	49	22,29	26,88	4,59
				25	0	21,36	27,49	6,13
				25	12	21,25	27,33	6,08
				25	24	21,2	27,34	6,14
				50	0	21,25	28,24	6,99
	High 23130	711 MHz	QPSK	1	0	22,95	27,04	4,09
				1	24	23,05	26,98	3,93
				1	49	23,41	27,92	4,51
				25	0	22,13	27,49	5,36
				25	12	22,18	27,38	5,2
				25	24	22,66	28,34	5,68
				50	0	22,64	29,24	6,6
			16-QAM	1	0	22,15	27,06	4,91
				1	24	22,28	27,03	4,75
				1	49	22,66	27,96	5,3
				25	0	21,32	27,41	6,09
				25	12	21,27	27,36	6,09
				25	24	21,77	28,22	6,45
				50	0	21,75	29,27	7,52

LTE QPSK AND 16QAM MODULATION. BAND IV. Bandwidth = 1.4 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-2.00	-0.40	-0.70
Measured maximum peak power (dBm) at antenna port	25.95	27.57	27.07
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	23.95	27.17	26.37
Measured maximum average power (dBm) at antenna port	22.42	23.43	22.68
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	20.42	23.03	21.98
Peak-to-average ratio (PAR) (dB)	3.53	4.14	4.39
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND IV. Bandwidth = 3 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-2.00	-0.40	-0.70
Measured maximum peak power (dBm) at antenna port	27.01	28.01	27.92
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	25.01	27.61	27.22
Measured maximum average power (dBm) at antenna port	22.75	23.39	23.38
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	20.75	22.99	22.68
Peak-to-average ratio (PAR) (dB)	4.26	4.62	4.54
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND IV. Bandwidth = 5 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-2.00	-0.40	-0.70
Measured maximum peak power (dBm) at antenna port	26.66	27.73	27.47
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	24.66	27.33	26.77
Measured maximum average power (dBm) at antenna port	23.29	23.47	23.40
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	21.29	23.07	22.70
Peak-to-average ratio (PAR) (dB)	3.37	4.26	4.07
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND IV. Bandwidth = 10 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-2.00	-0.40	-0.70
Measured maximum peak power (dBm) at antenna port	27.99	28.07	27.83
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	25.99	27.67	27.13
Measured maximum average power (dBm) at antenna port	23.33	23.45	23.36
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	21.33	23.05	22.66
Peak-to-average ratio (PAR) (dB)	4.66	4.62	4.47
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND IV. Bandwidth = 15 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-2.00	-0.40	-0.70
Measured maximum peak power (dBm) at antenna port	27.91	28.01	27.08
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	25.91	27.61	26.38
Measured maximum average power (dBm) at antenna port	22.67	22.88	22.29
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	20.67	22.48	21.59
Peak-to-average ratio (PAR) (dB)	5.24	5.13	4.79
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND IV. Bandwidth = 20 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-2.00	-0.40	-0.70
Measured maximum peak power (dBm) at antenna port	27.76	27.86	27.22
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	25.76	27.46	26.52
Measured maximum average power (dBm) at antenna port	22.56	22.87	23.43
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	20.56	22.47	22.73
Peak-to-average ratio (PAR) (dB)	5.20	4.99	3.79
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND VII. Bandwidth = 5 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-1.80	-2.30	-2.30
Measured maximum peak power (dBm) at antenna port	28.07	28.09	28.03
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	26.27	25.79	25.73
Measured maximum average power (dBm) at antenna port	23.27	23.26	23.14
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	21.47	20.96	20.84
Peak-to-average ratio (PAR) (dB)	4.80	4.83	4.89
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND VII. Bandwidth = 10 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-1.80	-2.30	-2.30
Measured maximum peak power (dBm) at antenna port	28.36	28.58	28.00
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	26.56	26.28	25.70
Measured maximum average power (dBm) at antenna port	23.31	23.33	23.26
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	21.51	21.03	20.96
Peak-to-average ratio (PAR) (dB)	5.05	5.25	4.74
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND VII. Bandwidth = 15 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-1.80	-2.30	-2.30
Measured maximum peak power (dBm) at antenna port	28.02	27.74	28.20
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	26.22	25.44	25.90
Measured maximum average power (dBm) at antenna port	23.28	23.11	23.09
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	21.48	20.81	20.79
Peak-to-average ratio (PAR) (dB)	4.74	4.63	5.11
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND VII. Bandwidth = 20 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-1.80	-2.30	-2.30
Measured maximum peak power (dBm) at antenna port	28.04	28.45	28.47
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	26.24	26.15	26.17
Measured maximum average power (dBm) at antenna port	23.13	23.24	23.01
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	21.33	20.94	20.71
Peak-to-average ratio (PAR) (dB)	4.91	5.21	5.46
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND XII. Bandwidth = 1.4 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-4.30	-5.00	-5.40
Measured maximum peak power (dBm) at antenna port	28.46	27.30	27.99
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	24.16	22.30	22.59
Measured maximum average power (dBm) at antenna port	23.50	22.91	23.26
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	19.20	17.91	17.86
Peak-to-average ratio (PAR) (dB)	4.96	4.39	4.73
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND XII. Bandwidth = 3 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-4.30	-5.00	-5.40
Measured maximum peak power (dBm) at antenna port	28.74	27.84	28.67
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	24.44	22.84	23.27
Measured maximum average power (dBm) at antenna port	23.43	22.97	23.32
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	19.13	17.97	17.92
Peak-to-average ratio (PAR) (dB)	5.31	4.87	5.35
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND XII. Bandwidth = 5 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-4.30	-5.00	-5.40
Measured maximum peak power (dBm) at antenna port	27.90	27.80	28.67
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	23.60	22.80	23.27
Measured maximum average power (dBm) at antenna port	23.26	22.91	23.77
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	18.96	17.91	18.37
Peak-to-average ratio (PAR) (dB)	4.64	4.89	4.90
Measurement uncertainty (dB)	±0.5		

LTE QPSK AND 16QAM MODULATION. BAND XII. Bandwidth = 10 MHz

Channel	Lowest	Middle	Highest
Maximum declared antenna gain (dBi)	-4.30	-5.00	-5.40
Measured maximum peak power (dBm) at antenna port	28.17	28.31	29.27
Maximum effective isotropic radiated peak power E.I.R.P. (dBm)	23.87	23.31	23.87
Measured maximum average power (dBm) at antenna port	23.50	23.08	23.41
Maximum effective isotropic radiated average power E.I.R.P. (dBm)	19.20	18.08	18.01
Peak-to-average ratio (PAR) (dB)	4.67	5.23	5.86
Measurement uncertainty (dB)	±0.5		

Verdict: PASS

Modulation Characteristics

SPECIFICATION

FCC §2.1047.
RSS-139. Clause 6.2. RSS-130. Clause 4.1. RSS-199. Clause 4.1.: The devices shall employ digital modulation techniques.

METHOD

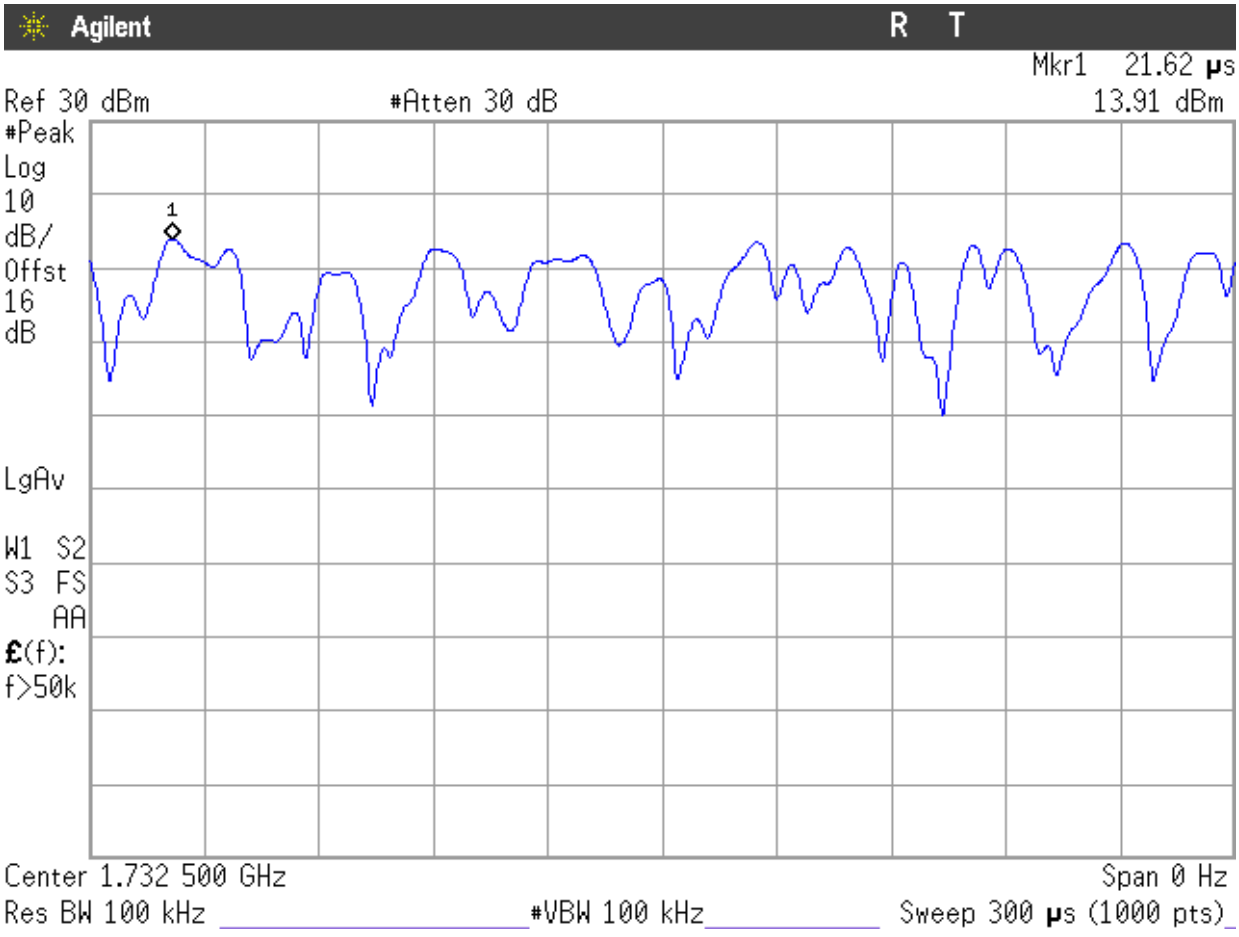
For 3G, the EUT operates with WCDMA (QPSK) and HSUPA (QPSK) modes, in which the information is digitised and coded into a bit stream.

For LTE the EUT operates with QPSK and 16QAM modulation modes in which the information is digitised and coded into a bit stream. The RF transmission is multiplexed using *Orthogonal Frequency Division Multiplexing (OFDM)* using different possible arrangement of subcarriers (Resource Blocks RB).

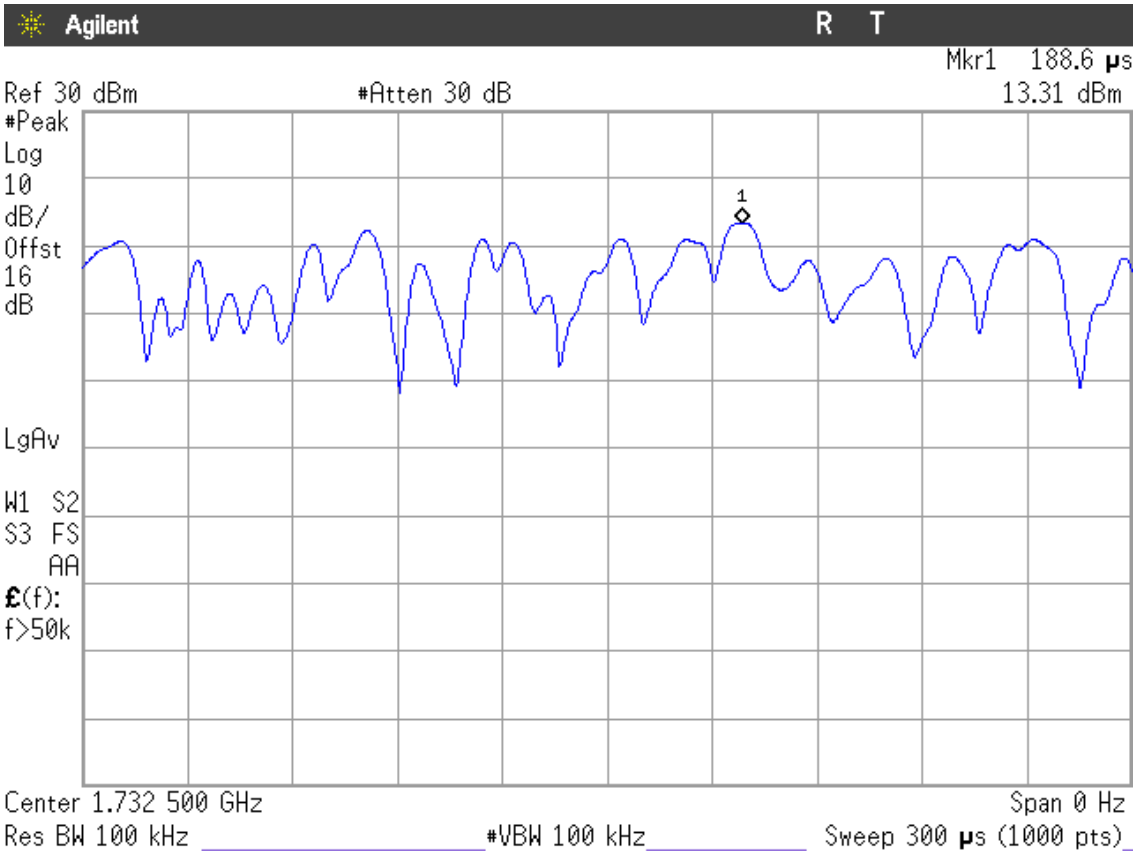
RESULTS

The following plots show the modulation schemes in the EUT.

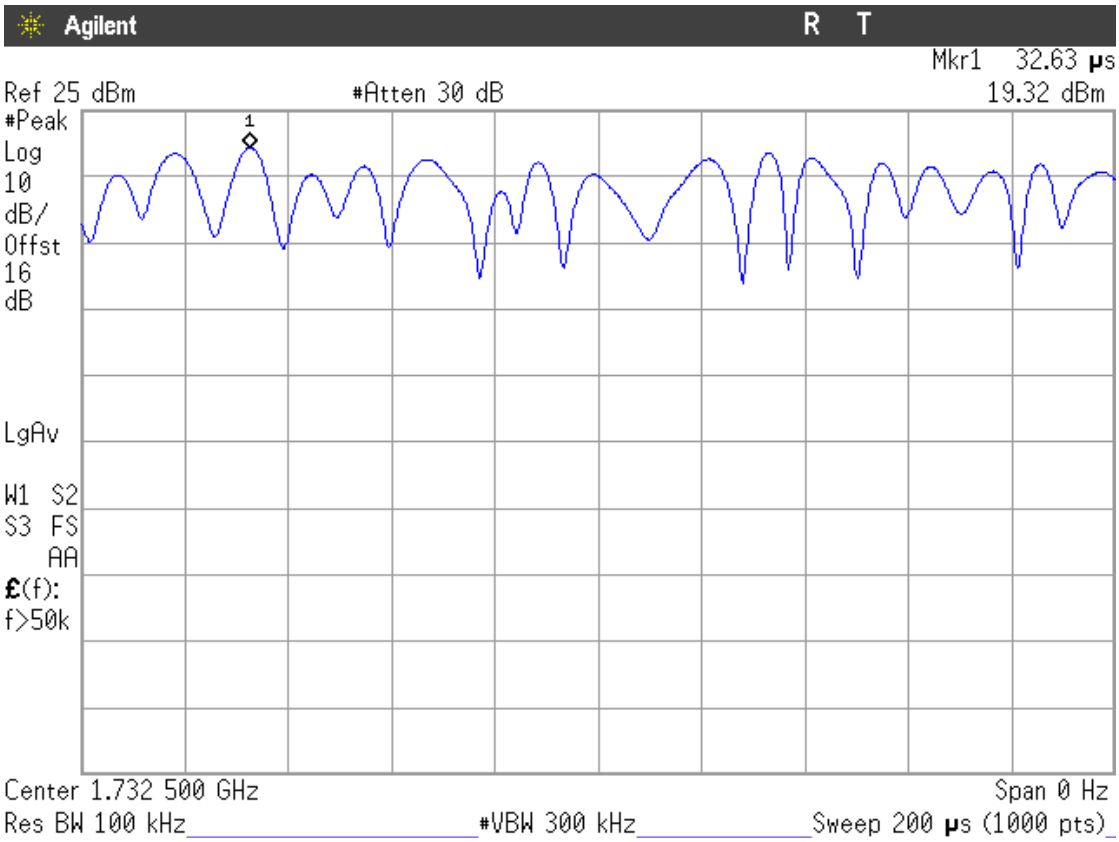
WCDMA MODULATION



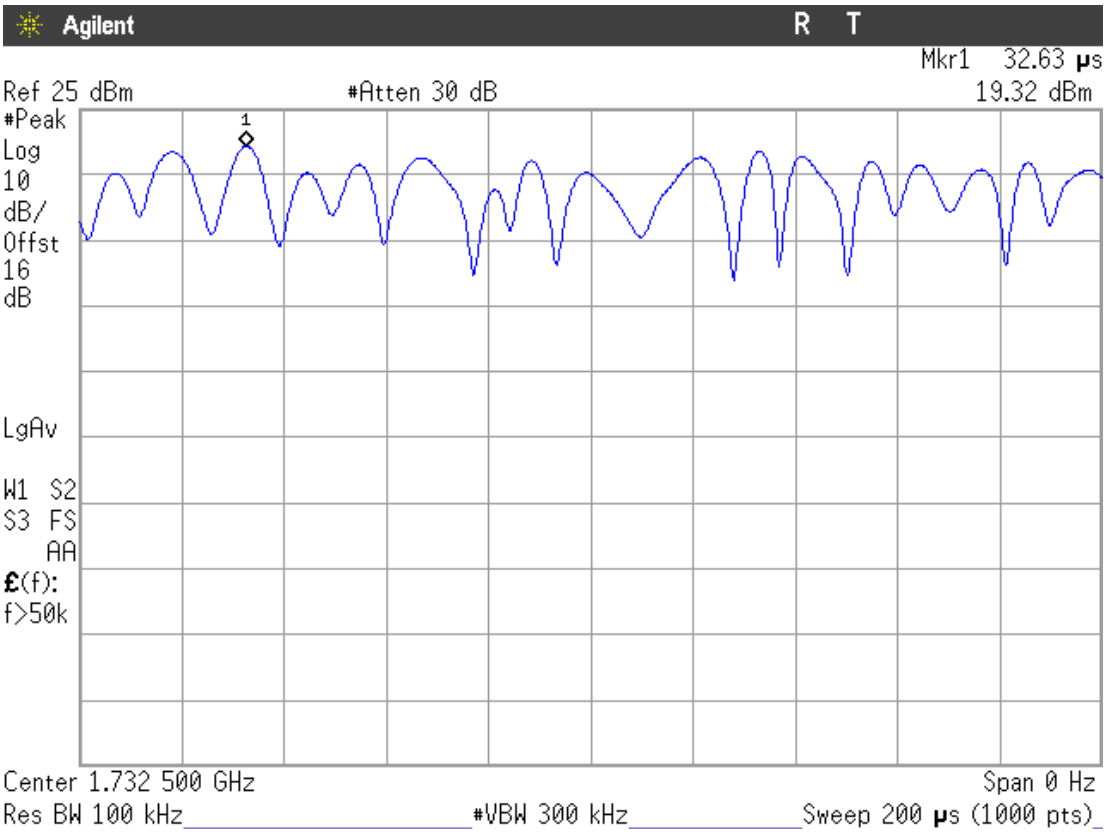
HSUPA MODULATION



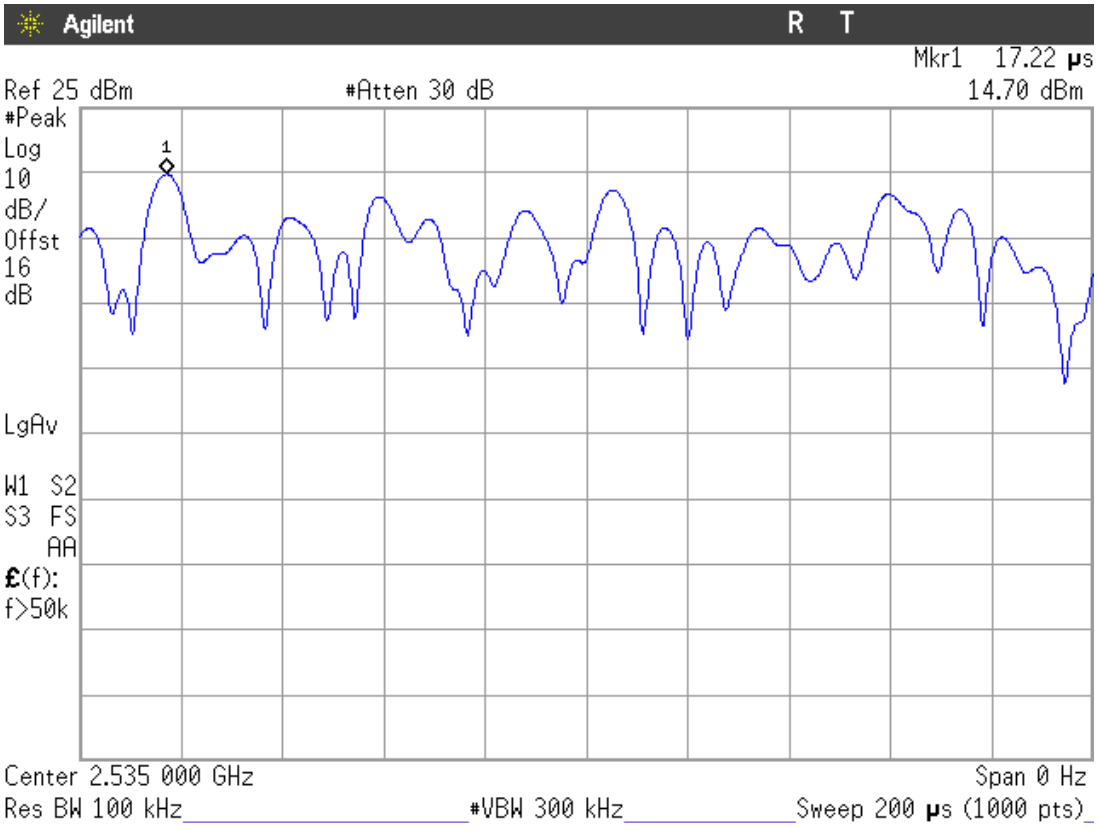
LTE MODULATION. QPSK. Band IV



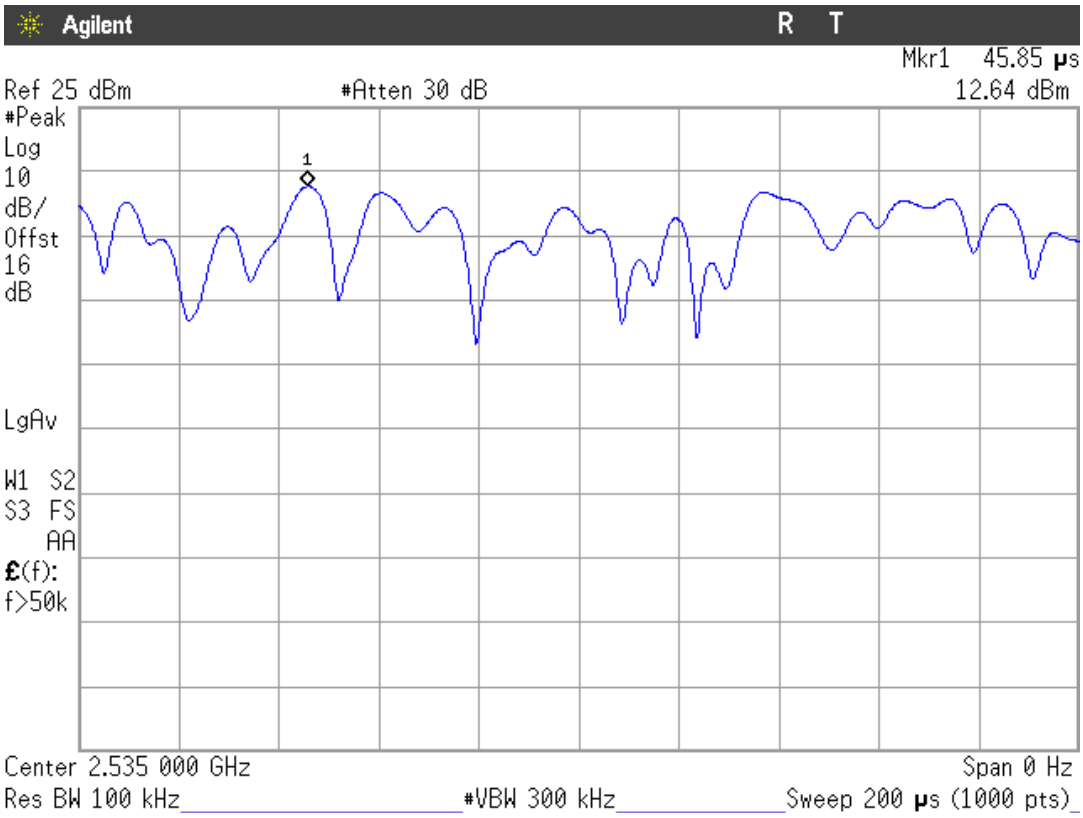
LTE MODULATION. 16QAM. Band IV



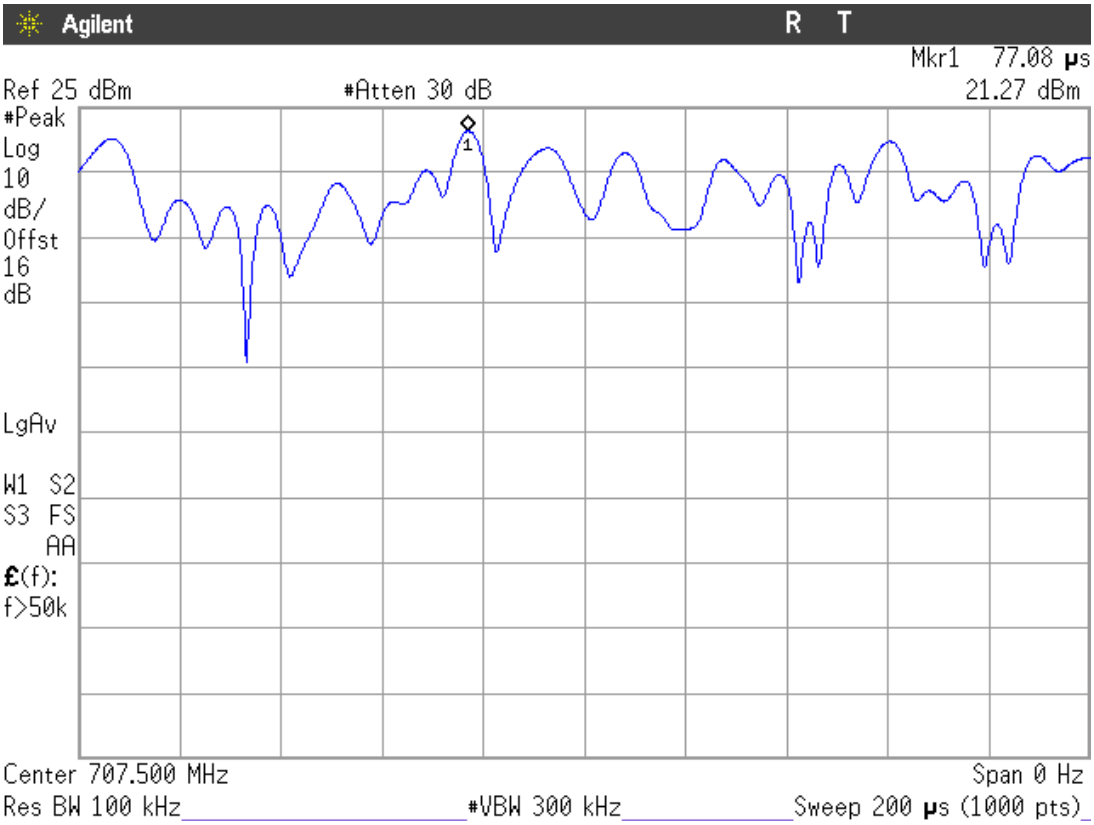
LTE MODULATION. QPSK. Band VII



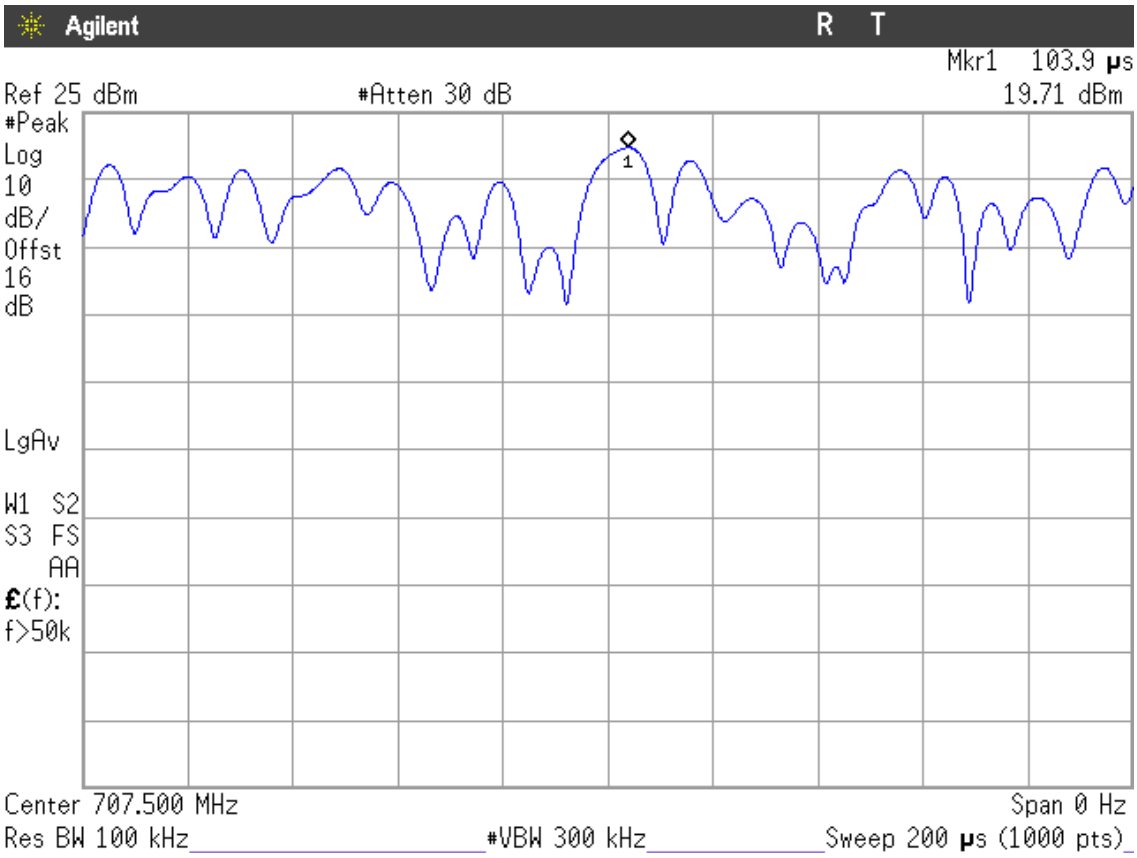
LTE MODULATION. 16QAM. Band VII



LTE MODULATION. QPSK. Band XII



LTE MODULATION. 16QAM. Band XII



Frequency Stability

SPECIFICATION

FCC §2.1055 and §27.54. RSS-139 Clause 6.3. RSS-130. Clause 4.3. RSS-199. Clause 4.3.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

METHOD

The frequency tolerance measurements over temperature variations were made over the temperature range of –30ºC to +50ºC. The EUT was placed inside a climatic chamber and the temperature was raised hourly in 10ºC steps from –30ºC up to +50ºC.
For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.

The EUT was set in "call mode" in the middle channel using the Universal Radio Communication tester R&S CMU200 or CMW500 and the maximum frequency error was measured using the built-in calibrated frequency meter.

For LTE mode the QPSK modulation was used for the test as it is the worst case for conducted power.

RESULTS

All measured frequency errors are less than ± 35 Hz which is sufficient to ensure that the fundamental emissions at Band Edges stays within the authorized blocks (see test results for "Spurious emissions at antenna terminals at Block Edges" in the next pages).

Verdict: PASS

Frequency stability over temperature variations.

WCDMA AND HSUPA MODULATION

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-6.80	-0.0039	-0.00000039
+40	5.02	0.0029	0.00000029
+30	6.11	0.0035	0.00000035
+20	5.74	0.0033	0.00000033
+10	-5.29	-0.0031	-0.00000031
0	7.63	0.0044	0.00000044
-10	5.89	0.0034	0.00000034
-20	6.55	0.0038	0.00000038
-30	5.26	0.0030	0.00000030

LTE QPSK MODULATION. BW = 1.4 MHz. (Band IV)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	8.43	0.0049	0.00000049
+40	11.10	0.0064	0.00000064
+30	12.49	0.0072	0.00000072
+20	8.47	0.0049	0.00000049
+10	8.31	0.0048	0.00000048
0	12.40	0.0072	0.00000072
-10	9.84	0.0057	0.00000057
-20	8.20	0.0047	0.00000047
-30	8.68	0.0050	0.00000050

LTE QPSK MODULATION. BW = 3 MHz. (Band IV)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	9.71	0.0056	0.00000056
+40	11.07	0.0064	0.00000064
+30	10.06	0.0058	0.00000058
+20	10.83	0.0063	0.00000063
+10	9.96	0.0057	0.00000057
0	10.41	0.0060	0.00000060
-10	8.84	0.0051	0.00000051
-20	8.18	0.0047	0.00000047
-30	8.75	0.0051	0.00000051

LTE QPSK MODULATION. BW = 5 MHz. (Band IV)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	8.50	0.0049	0.00000049
+40	10.01	0.0058	0.00000058
+30	9.76	0.0056	0.00000056
+20	9.98	0.0058	0.00000058
+10	8.93	0.0052	0.00000052
0	9.76	0.0056	0.00000056
-10	8.87	0.0051	0.00000051
-20	8.17	0.0047	0.00000047
-30	7.80	0.0045	0.00000045

LTE QPSK MODULATION. BW = 10 MHz. (Band IV)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	8.54	0.0049	0.00000049
+40	12.39	0.0072	0.00000072
+30	8.24	0.0048	0.00000048
+20	10.19	0.0059	0.00000059
+10	10.29	0.0059	0.00000059
0	10.46	0.0060	0.00000060
-10	10.16	0.0059	0.00000059
-20	9.41	0.0054	0.00000054
-30	9.93	0.0057	0.00000057

LTE QPSK MODULATION. BW = 15 MHz. (Band IV)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	9.03	0.0052	0.00000052
+40	9.43	0.0054	0.00000054
+30	7.34	0.0042	0.00000042
+20	8.23	0.0048	0.00000048
+10	7.75	0.0045	0.00000045
0	8.31	0.0048	0.00000048
-10	9.06	0.0052	0.00000052
-20	8.64	0.0050	0.00000050
-30	9.11	0.0053	0.00000053

LTE QPSK MODULATION. BW = 20 MHz. (Band IV)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	8.58	0.0050	0.00000050
+40	-7.61	-0.0044	-0.00000044
+30	8.45	0.0049	0.00000049
+20	6.95	0.0040	0.00000040
+10	11.70	0.0068	0.00000068
0	8.27	0.0048	0.00000048
-10	10.59	0.0061	0.00000061
-20	9.70	0.0056	0.00000056
-30	8.74	0.0050	0.00000050

LTE QPSK MODULATION. BW = 5 MHz. (Band VII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	28.37	0.0112	0.00000112
+40	31.99	0.0126	0.00000126
+30	26.29	0.0104	0.00000104
+20	25.86	0.0102	0.00000102
+10	29.15	0.0115	0.00000115
0	30.16	0.0119	0.00000119
-10	25.88	0.0102	0.00000102
-20	28.02	0.0111	0.00000111
-30	27.97	0.0110	0.00000110

LTE QPSK MODULATION. BW = 10 MHz. (Band VII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	31.39	0.0124	0.00000124
+40	26.38	0.0104	0.00000104
+30	28.37	0.0112	0.00000112
+20	28.28	0.0112	0.00000112
+10	25.33	0.0100	0.00000100
0	26.76	0.0106	0.00000106
-10	27.91	0.0110	0.00000110
-20	26.75	0.0106	0.00000106
-30	27.49	0.0108	0.00000108

LTE QPSK MODULATION. BW = 15 MHz. (Band VII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	29.48	0.0116	0.00000116
+40	26.12	0.0103	0.00000103
+30	24.09	0.0095	0.00000095
+20	26.08	0.0103	0.00000103
+10	29.03	0.0115	0.00000115
0	29.14	0.0115	0.00000115
-10	27.87	0.0110	0.00000110
-20	27.65	0.0109	0.00000109
-30	28.00	0.0110	0.00000110

LTE QPSK MODULATION. BW = 20 MHz. (Band VII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	24.72	0.0098	0.00000098
+40	34.62	0.0137	0.00000137
+30	30.17	0.0119	0.00000119
+20	31.49	0.0124	0.00000124
+10	21.94	0.0087	0.00000087
0	32.42	0.0128	0.00000128
-10	29.81	0.0118	0.00000118
-20	29.37	0.0116	0.00000116
-30	31.06	0.0123	0.00000123

LTE QPSK MODULATION. BW = 1.4 MHz. (Band XII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-5.85	-0.0083	-0.00000083
+40	-5.28	-0.0075	-0.00000075
+30	-5.15	-0.0073	-0.00000073
+20	-5.06	-0.0072	-0.00000072
+10	-4.61	-0.0065	-0.00000065
0	-4.11	-0.0058	-0.00000058
-10	-4.11	-0.0058	-0.00000058
-20	-3.76	-0.0053	-0.00000053
-30	-3.99	-0.0056	-0.00000056

LTE QPSK MODULATION. BW = 3 MHz. (Band XII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-6.25	-0.0088	-0.00000088
+40	-5.66	-0.0080	-0.00000080
+30	-4.91	-0.0069	-0.00000069
+20	-4.38	-0.0062	-0.00000062
+10	-3.91	-0.0055	-0.00000055
0	-4.92	-0.0070	-0.00000070
-10	-4.35	-0.0061	-0.00000061
-20	-4.18	-0.0059	-0.00000059
-30	-3.86	-0.0055	-0.00000055

LTE QPSK MODULATION. BW = 5 MHz. (Band XII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-4.79	-0.0068	-0.00000068
+40	-4.79	-0.0068	-0.00000068
+30	4.18	0.0059	0.00000059
+20	-3.72	-0.0053	-0.00000053
+10	-4.39	-0.0062	-0.00000062
0	3.69	0.0052	0.00000052
-10	-4.46	-0.0063	-0.00000063
-20	-4.32	-0.0061	-0.00000061
-30	-5.82	-0.0082	-0.00000082

LTE QPSK MODULATION. BW = 10 MHz. (Band XII)

Temperature (ºC)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
+50	-4.81	-0.0068	-0.00000068
+40	-5.15	-0.0073	-0.00000073
+30	-5.59	-0.0079	-0.00000079
+20	-4.01	-0.0057	-0.00000057
+10	-4.55	-0.0064	-0.00000064
0	-3.26	-0.0046	-0.00000046
-10	-4.43	-0.0063	-0.00000063
-20	-3.83	-0.0054	-0.00000054
-30	-4.86	-0.0069	-0.00000069

Frequency stability over voltage variations.

WCDMA AND HSUPA MODULATION

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	-4.23	-0.0024	-0.00000024
Vmin	3.4 (*)	5.19	0.0030	0.00000030

LTE QPSK MODULATION. BW = 1.4 MHz (Band IV)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	7.81	0.0045	0.00000045
Vmin	3.4 (*)	9.98	0.0058	0.00000058

LTE QPSK MODULATION. BW = 3 MHz (Band IV)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	9.77	0.0056	0.00000056
Vmin	3.4 (*)	8.65	0.0050	0.00000050

LTE QPSK MODULATION. BW = 5 MHz (Band IV)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	7.70	0.0044	0.00000044
Vmin	3.4 (*)	9.80	0.0057	0.00000057

LTE QPSK MODULATION. BW = 10 MHz (Band IV)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	8.44	0.0049	0.00000049
Vmin	3.4 (*)	7.27	0.0042	0.00000042

LTE QPSK MODULATION. BW = 15 MHz (Band IV)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	8.68	0.0050	0.00000050
Vmin	3.4 (*)	-8.38	-0.0048	-0.00000048

LTE QPSK MODULATION. BW = 20 MHz (Band IV)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	9.93	0.0057	0.00000057
Vmin	3.4 (*)	-7.58	-0.0044	-0.00000044

LTE QPSK MODULATION. BW = 5 MHz (Band VII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	29.50	0.0116	0.00000116
Vmin	3.4 (*)	29.27	0.0115	0.00000115

LTE QPSK MODULATION. BW = 10 MHz (Band VII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	26.68	0.0105	0.00000105
Vmin	3.4 (*)	25.46	0.0100	0.00000100

LTE QPSK MODULATION. BW = 15 MHz (Band VII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	27.84	0.0110	0.00000110
Vmin	3.4 (*)	22.85	0.0090	0.00000090

LTE QPSK MODULATION. BW = 20 MHz (Band VII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	26.32	0.0104	0.00000104
Vmin	3.4 (*)	32.62	0.0129	0.00000129

LTE QPSK MODULATION. BW = 1.4 MHz (Band XII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	-6.12	-0.0087	-0.00000087
Vmin	3.4 (*)	6.67	0.0094	0.00000094

LTE QPSK MODULATION. BW = 3 MHz (Band XII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	4.86	0.0069	0.00000069
Vmin	3.4 (*)	-6.15	-0.0087	-0.00000087

LTE QPSK MODULATION. BW = 5 MHz (Band XII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	-4.45	-0.0063	-0.00000063
Vmin	3.4 (*)	5.71	0.0081	0.00000081

LTE QPSK MODULATION. BW = 10 MHz (Band XII)

Battery Supply voltage	Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)	Frequency Error (%)
Vmax	4.2	5.19	0.0073	0.00000073
Vmin	3.4 (*)	4.55	0.0064	0.00000064

(*): Operating end point specified by the manufacturer.

Occupied Bandwidth

SPECIFICATION

§2.1049

METHOD

The EUT was configured to transmit a modulated carrier signal with different possible modulations and nominal bandwidths, where applicable. The 99% occupied bandwidth and the -26 dBc bandwidth were measured directly using the built-in bandwidth measuring option of spectrum analyser E4440A.

RESULTS

WCDMA MODULATION

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4170.9	4149.1	4158.9
-26 dBc bandwidth (kHz)	4642	4624	4650
Measurement uncertainty (kHz)	<±27.1		

HSUPA MODULATION

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4165.5	4166.7	4171.1
-26 dBc bandwidth (kHz)	4636	4639	4636
Measurement uncertainty (kHz)	<±27.1		

LTE QPSK MODULATION. BW = 1.4 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	1095.4	1101.7	1103.5
-26 dBc bandwidth (kHz)	1290	1291	1289
Measurement uncertainty (kHz)	<±9.9		

LTE 16QAM MODULATION. BW = 1.4 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	1099.9	1096.6	1097.3
-26 dBc bandwidth (kHz)	1299	1280	1294
Measurement uncertainty (kHz)	<±9.9		

LTE QPSK MODULATION. BW = 3 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	2746.5	2746.0	2749.4
-26 dBc bandwidth (kHz)	3073	3042	3068
Measurement uncertainty (kHz)	<±23		

LTE 16QAM MODULATION. BW = 3 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	2742.4	2742.8	2739.6
-26 dBc bandwidth (kHz)	3080	3059	3044
Measurement uncertainty (kHz)	<±23		

LTE QPSK MODULATION. BW = 5 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4517.8	4505.7	4515.3
-26 dBc bandwidth (kHz)	5025	5062	4983
Measurement uncertainty (kHz)	<±35		

LTE 16QAM MODULATION. BW = 5 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4511.2	4512.1	4503.4
-26 dBc bandwidth (kHz)	5009	4996	4993
Measurement uncertainty (kHz)	<±35		

LTE QPSK MODULATION. BW = 10 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	9052.1	9018.8	9038.4
-26 dBc bandwidth (kHz)	10079	10087	10034
Measurement uncertainty (kHz)	<±75		

LTE 16QAM MODULATION. BW = 10 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	9045.6	9011.3	9043.1
-26 dBc bandwidth (kHz)	10021	10048	10015
Measurement uncertainty (kHz)	<±75		

LTE QPSK MODULATION. BW = 15 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	13460.3	13422.3	13454.7
-26 dBc bandwidth (kHz)	14756	14632	14850
Measurement uncertainty (kHz)	<±105		

LTE 16QAM MODULATION. BW = 15 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	13455.7	13441.5	13471.4
-26 dBc bandwidth (kHz)	14777	14762	14614
Measurement uncertainty (kHz)	<±105		

LTE QPSK MODULATION. BW = 20 MHz (Band IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	17848.5	17816.1	17834.6
-26 dBc bandwidth (kHz)	19258	19220	19271
Measurement uncertainty (kHz)	<±135		

LTE 16QAM MODULATION. BW = 20 MHz (IV)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	17865.3	17809.2	17819.1
-26 dBc bandwidth (kHz)	19358	19311	19193
Measurement uncertainty (kHz)	<±135		

LTE QPSK MODULATION. BW = 5 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4519.3	4515.2	4510.4
-26 dBc bandwidth (kHz)	5024	5048	4970
Measurement uncertainty (kHz)	<±35		

LTE 16QAM MODULATION. BW = 5 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4513.9	4505.8	4516.1
-26 dBc bandwidth (kHz)	5008	5022	4998
Measurement uncertainty (kHz)	<±35		

LTE QPSK MODULATION. BW = 10 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	9036.3	9033.5	9049.1
-26 dBc bandwidth (kHz)	10104	10070	10122
Measurement uncertainty (kHz)	<±75		

LTE 16QAM MODULATION. BW = 10 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	9031.1	9027.2	9025.6
-26 dBc bandwidth (kHz)	9995	10059	10012
Measurement uncertainty (kHz)	<±75		

LTE QPSK MODULATION. BW = 15 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	13402.8	13460.9	13418.6
-26 dBc bandwidth (kHz)	14604	10612	14738
Measurement uncertainty (kHz)	<±105		

LTE 16QAM MODULATION. BW = 15 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	13410.4	13428.4	13445.8
-26 dBc bandwidth (kHz)	14729	14559	14564
Measurement uncertainty (kHz)	<±105		

LTE QPSK MODULATION. BW = 20 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	17859.4	17836.6	17843.5
-26 dBc bandwidth (kHz)	19118	19198	19327
Measurement uncertainty (kHz)	<±135		

LTE 16QAM MODULATION. BW = 20 MHz (Band VII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	17887.7	17817.9	17842.3
-26 dBc bandwidth (kHz)	19300	19040	19232
Measurement uncertainty (kHz)	<±135		

LTE QPSK MODULATION. BW = 1.4 MHz (Band XII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	1095.3	1096.6	1095.4
-26 dBc bandwidth (kHz)	1278	1285	1295
Measurement uncertainty (kHz)	<±9.9		

LTE 16QAM MODULATION. BW = 1.4 MHz (Band XII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	1100.7	1100.9	1098.0
-26 dBc bandwidth (kHz)	1303	1292	1279
Measurement uncertainty (kHz)	<±9.9		

LTE QPSK MODULATION. BW = 3 MHz (Band XII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	2749.5	2743.7	2736.9
-26 dBc bandwidth (kHz)	3071	3059	3039
Measurement uncertainty (kHz)	<±23		

LTE 16QAM MODULATION. BW = 3 MHz (Band XII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	2758.8	2738.4	2755.5
-26 dBc bandwidth (kHz)	3072	3061	3064
Measurement uncertainty (kHz)	<±23		

LTE QPSK MODULATION. BW = 5 MHz (Band XII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4528.3	4502.5	4524.0
-26 dBc bandwidth (kHz)	4965	4971	5033
Measurement uncertainty (kHz)	<±35		

LTE 16QAM MODULATION. BW = 5 MHz (Band XII)

Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	4519.8	4516.5	4530.3
-26 dBc bandwidth (kHz)	5027	5012	4985
Measurement uncertainty (kHz)	<±35		

LTE QPSK MODULATION. BW = 10 MHz (Band XII)

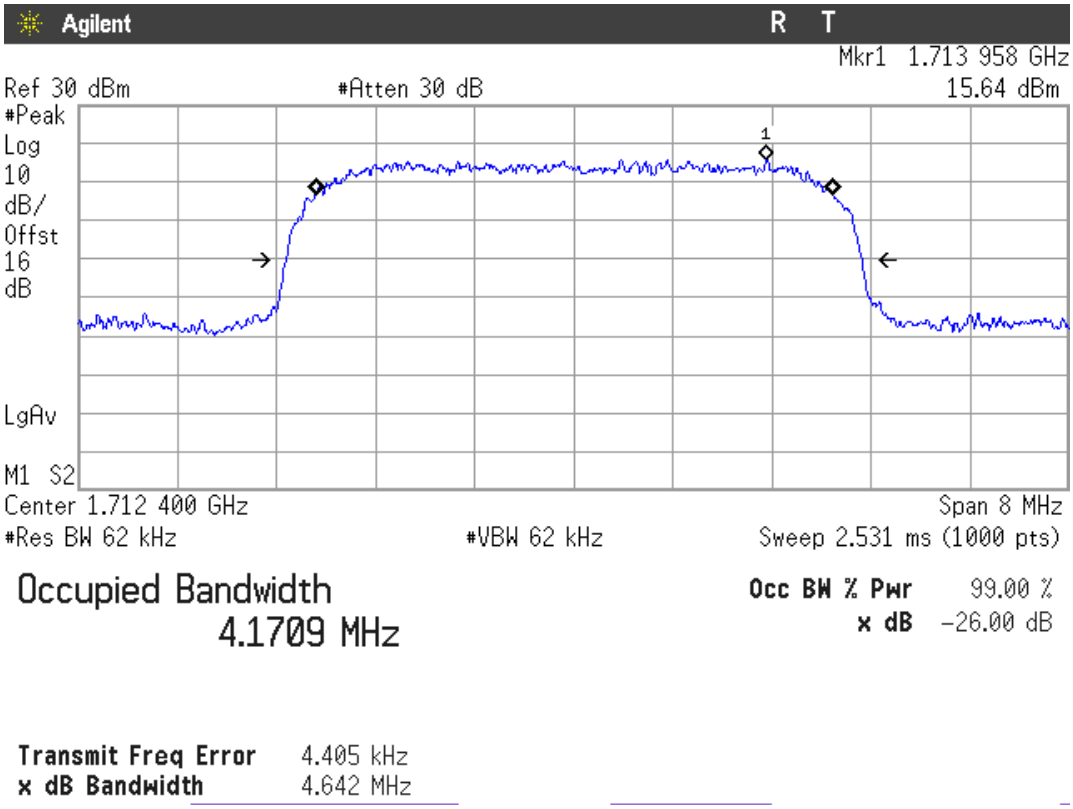
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	9080.9	9020.6	9016.1
-26 dBc bandwidth (kHz)	10020	9983	9979
Measurement uncertainty (kHz)	<±75		

LTE 16QAM MODULATION. BW = 10 MHz (Band XII)

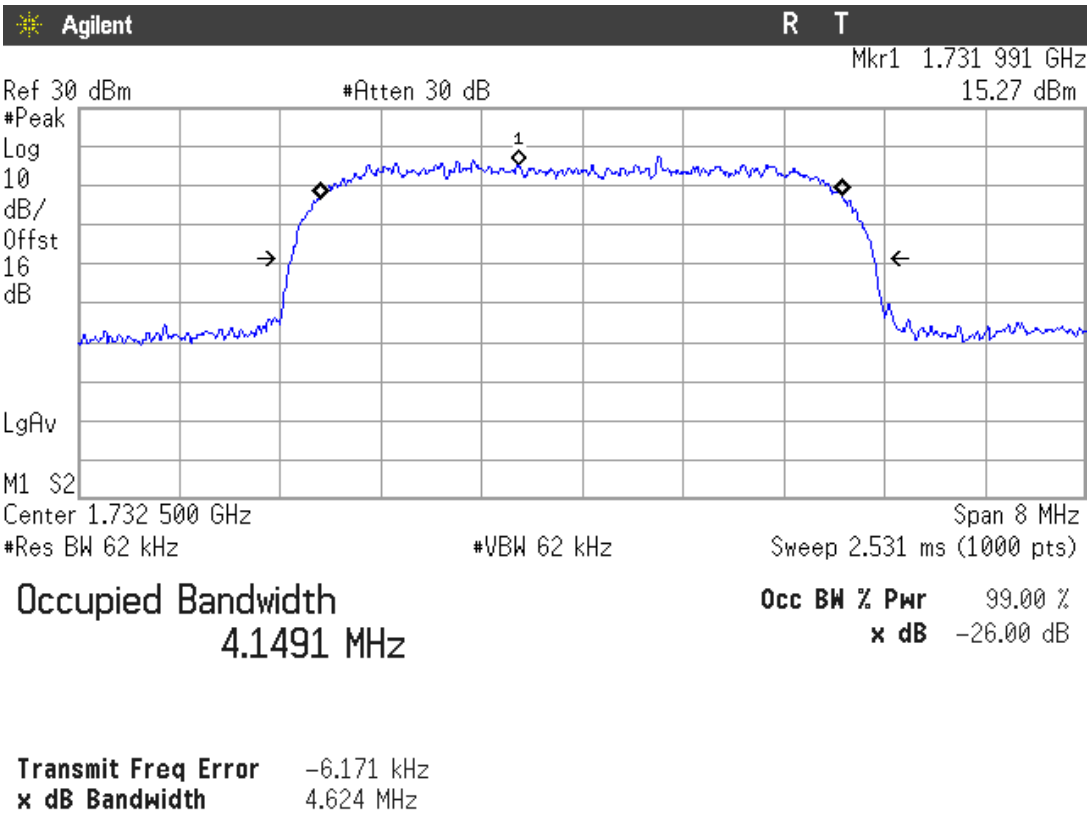
Channel	Lowest	Middle	Highest
99% Occupied bandwidth (kHz)	9080.6	9007.7	9035.0
-26 dBc bandwidth (kHz)	10046	10012	9989
Measurement uncertainty (kHz)	<±75		

WCDMA MODULATION

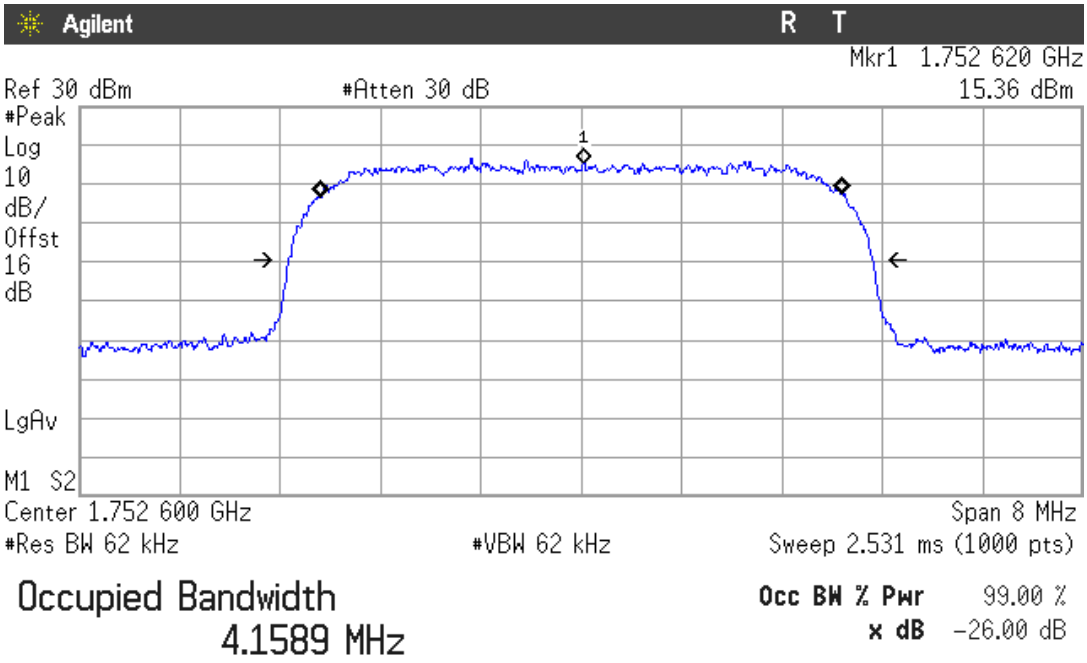
Lowest Channel



Middle Channel

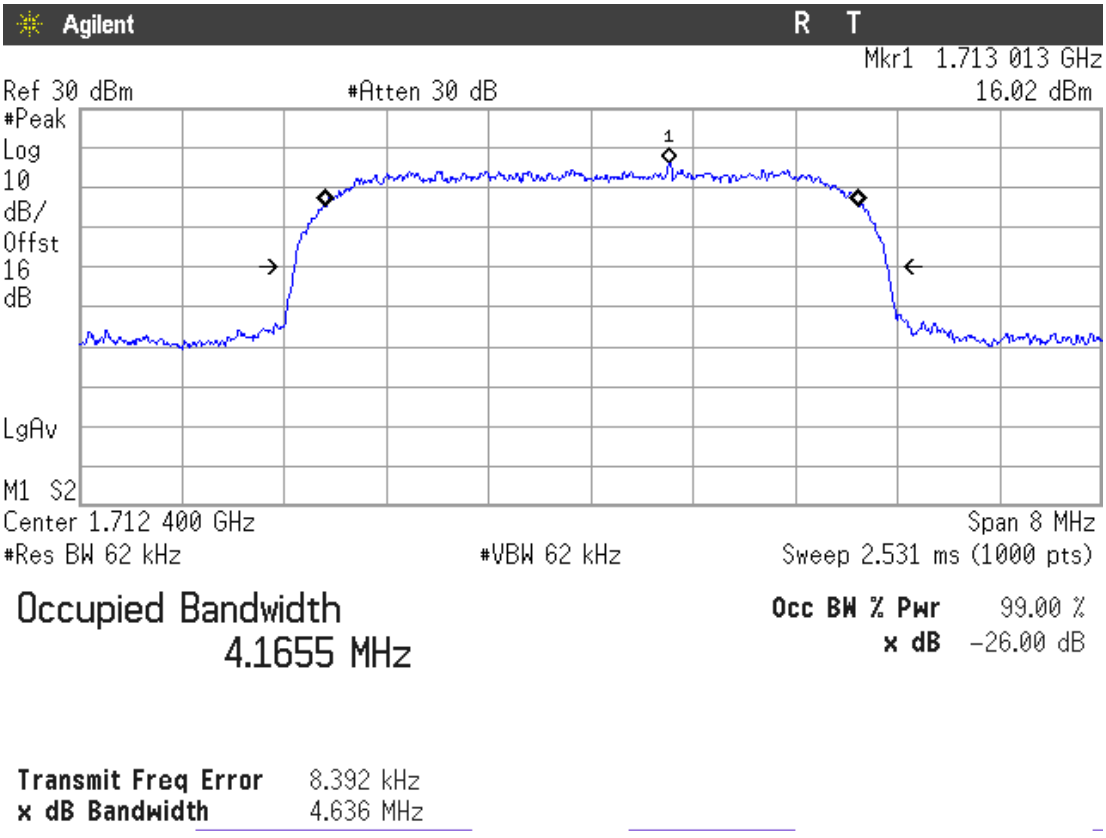


Highest Channel

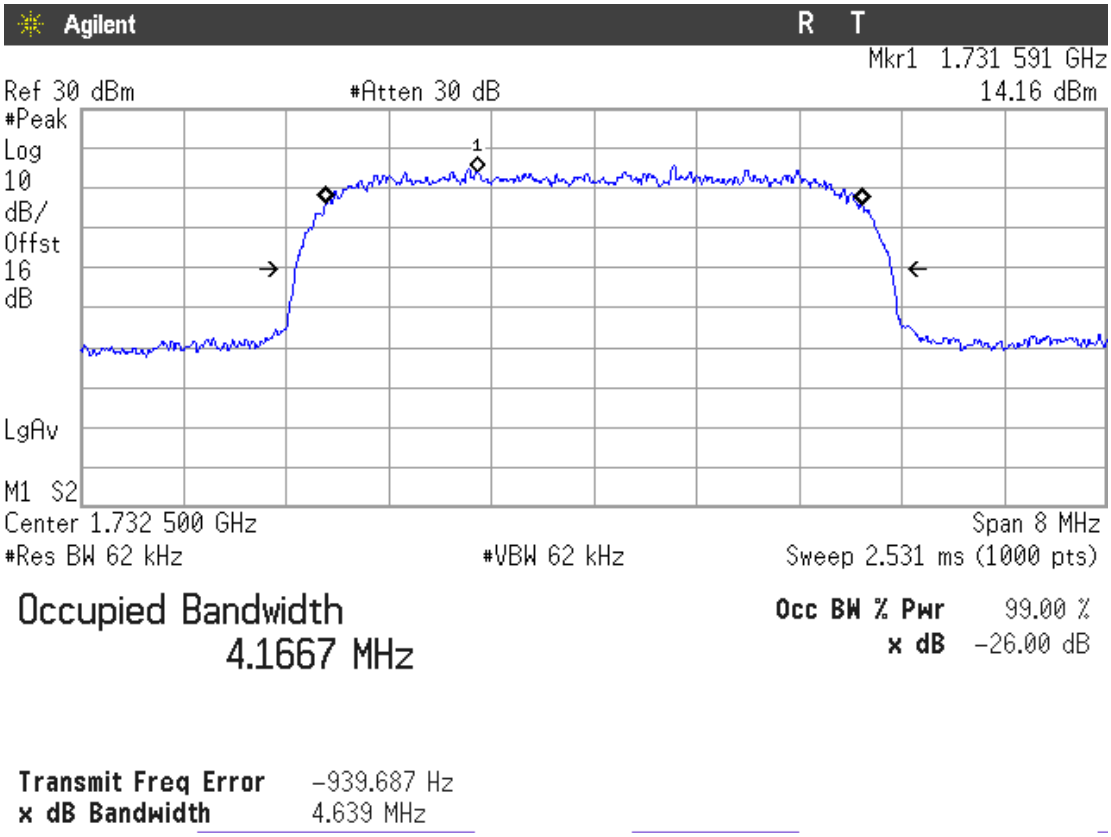


HSUPA MODULATION

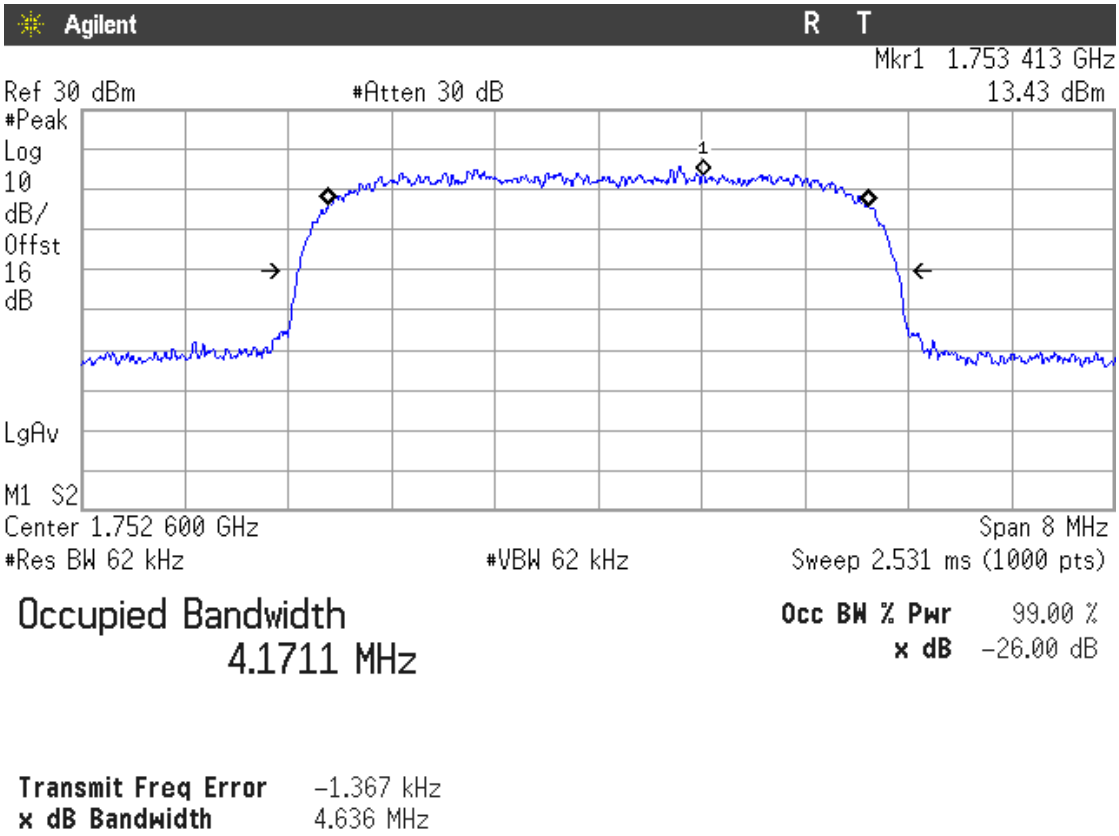
Lowest Channel



Middle Channel

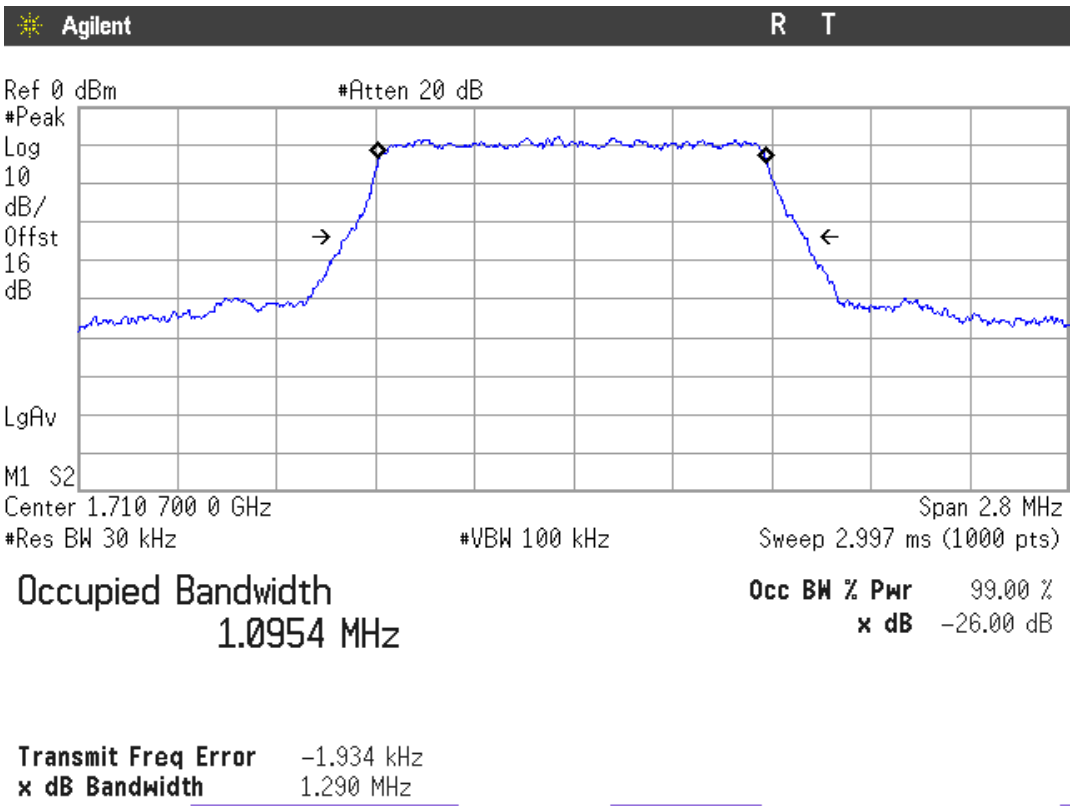


Highest Channel

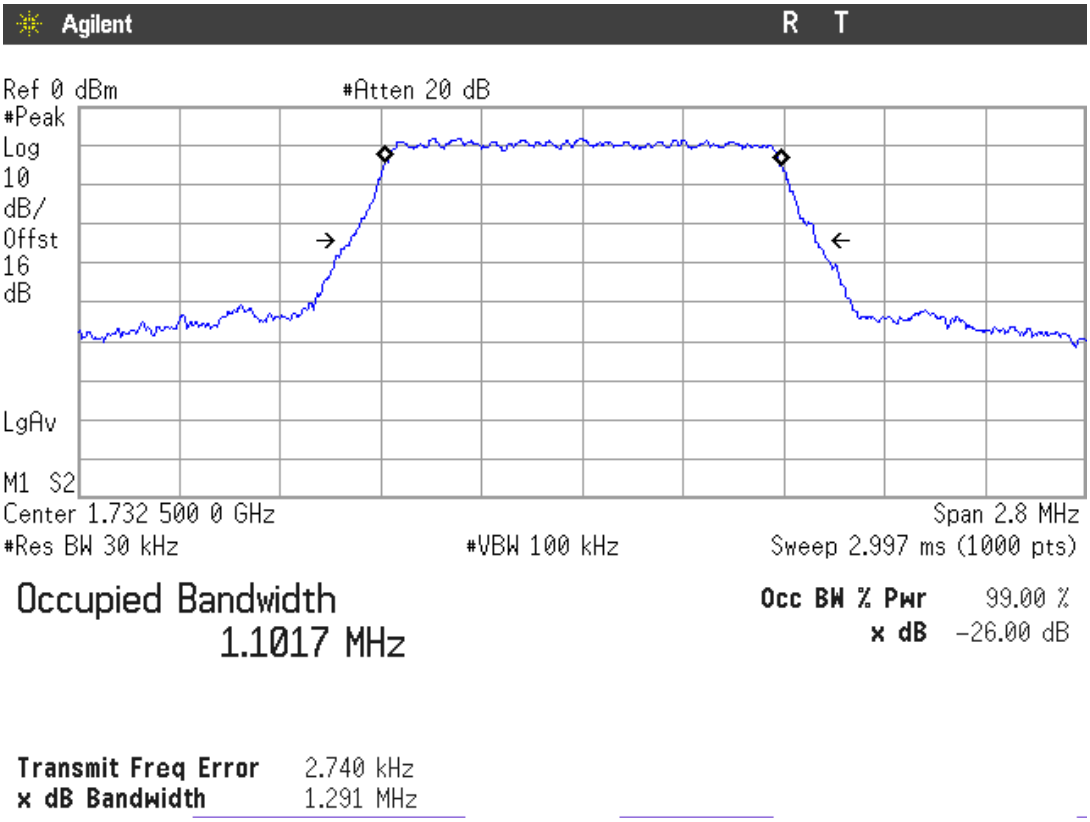


LTE QPSK MODULATION. BW = 1.4 MHz (Band IV)

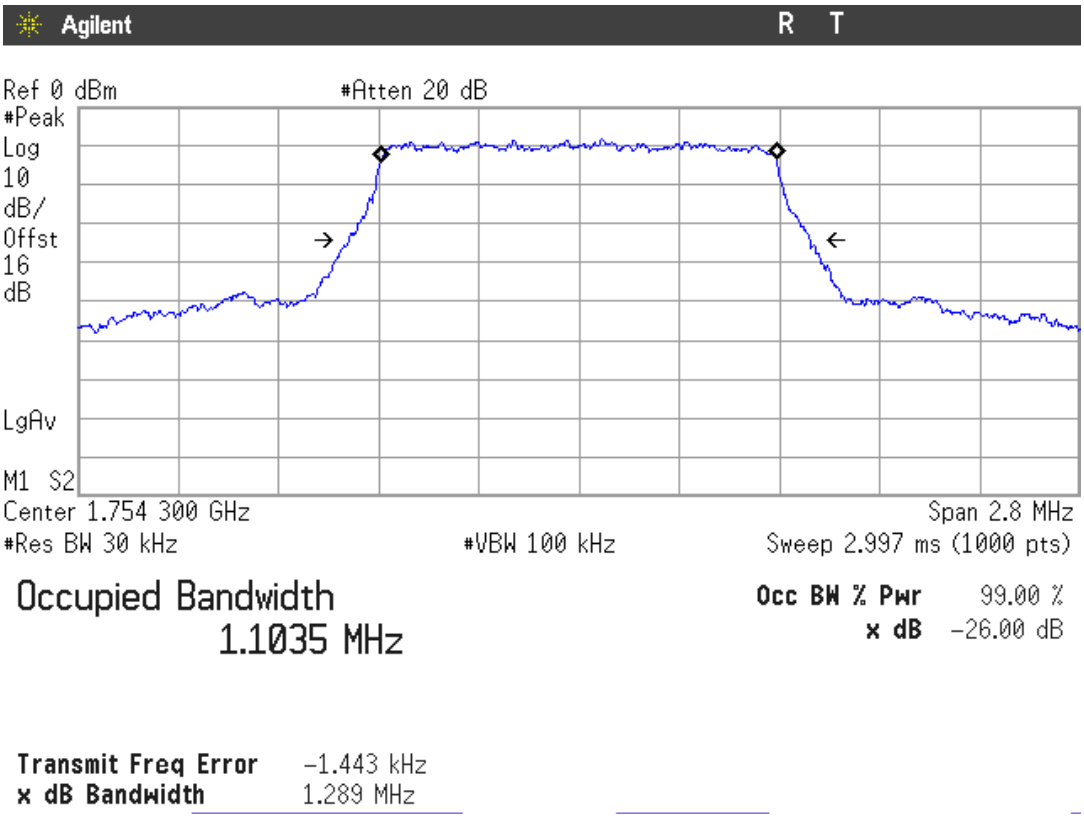
Lowest Channel



Middle Channel

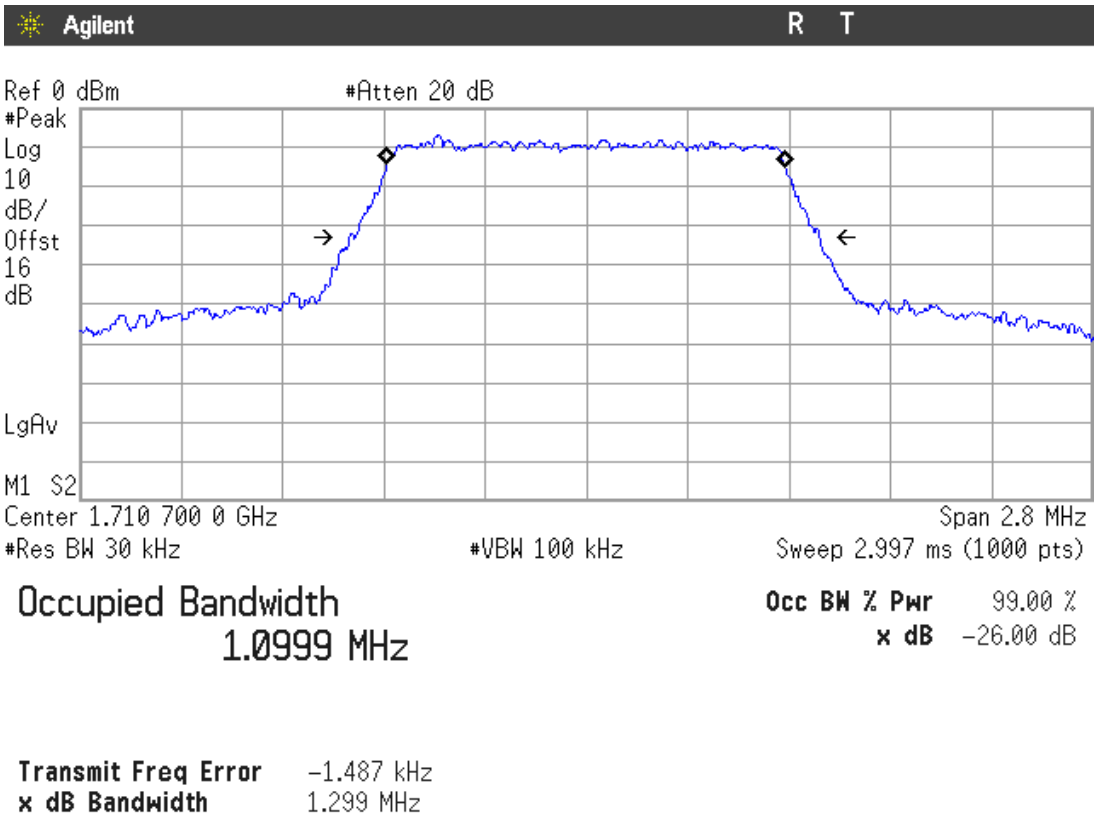


Highest Channel

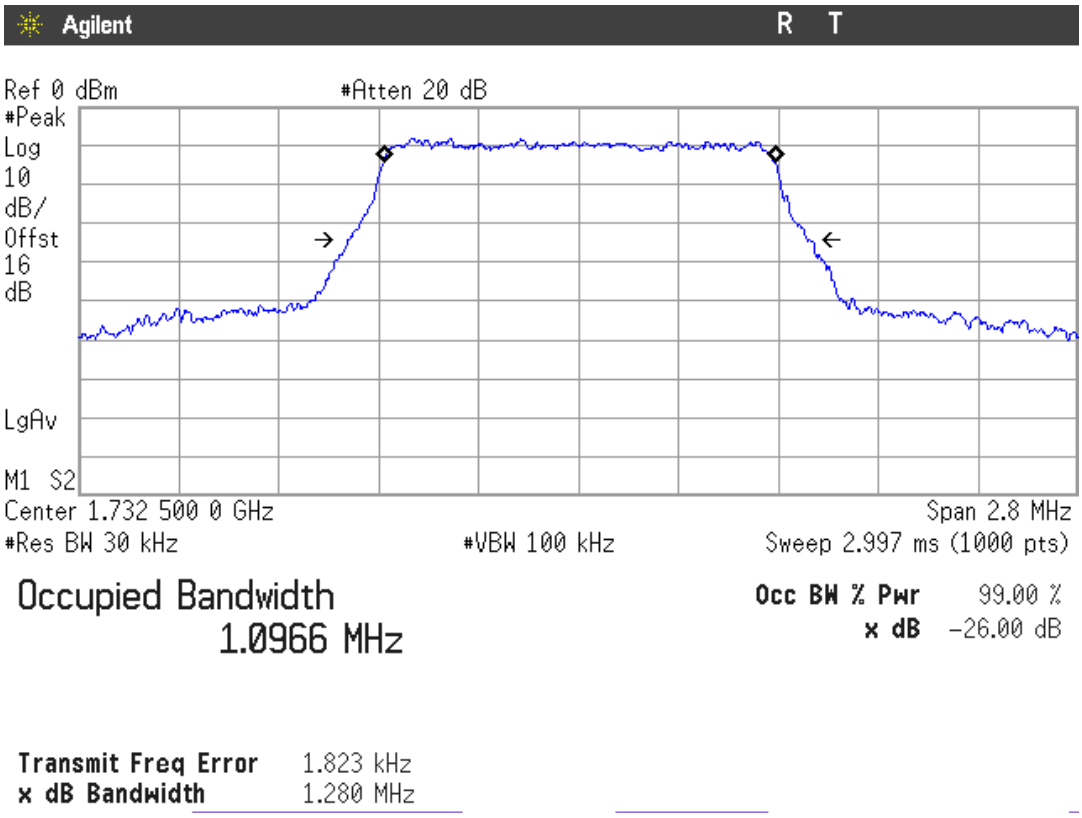


LTE 16QAM MODULATION. BW = 1.4 MHz (Band IV)

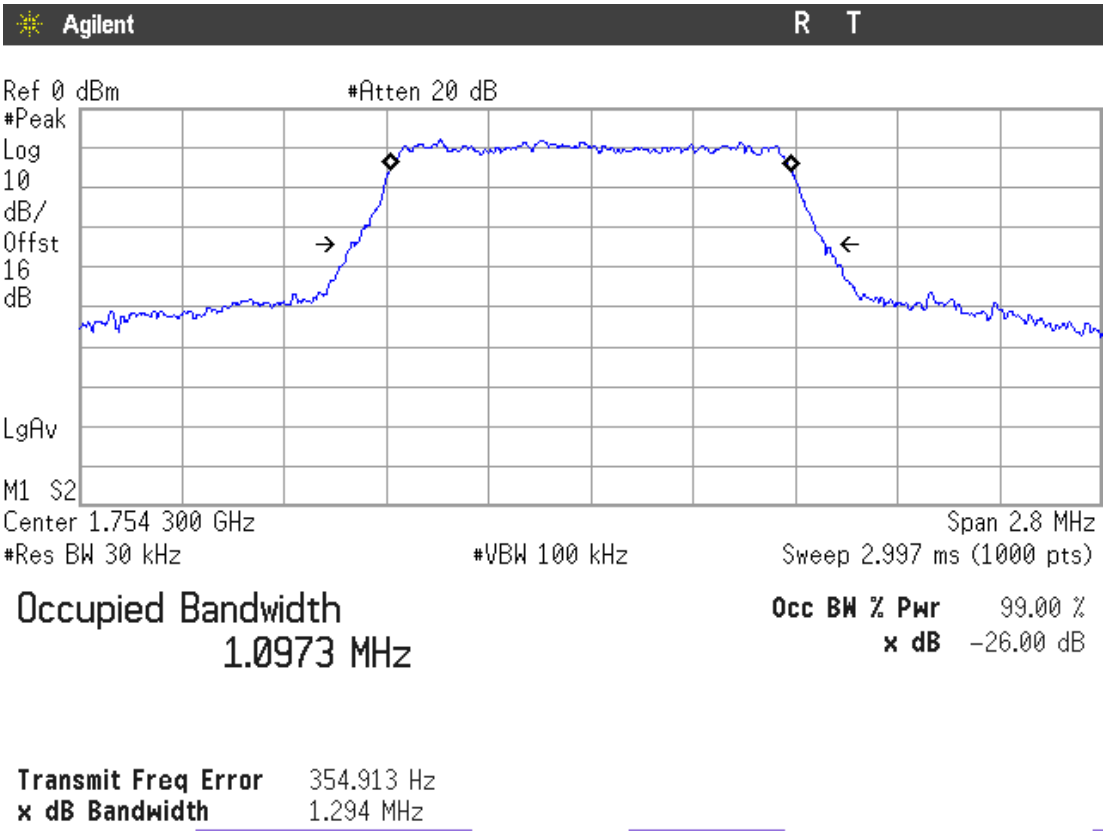
Lowest Channel



Middle Channel

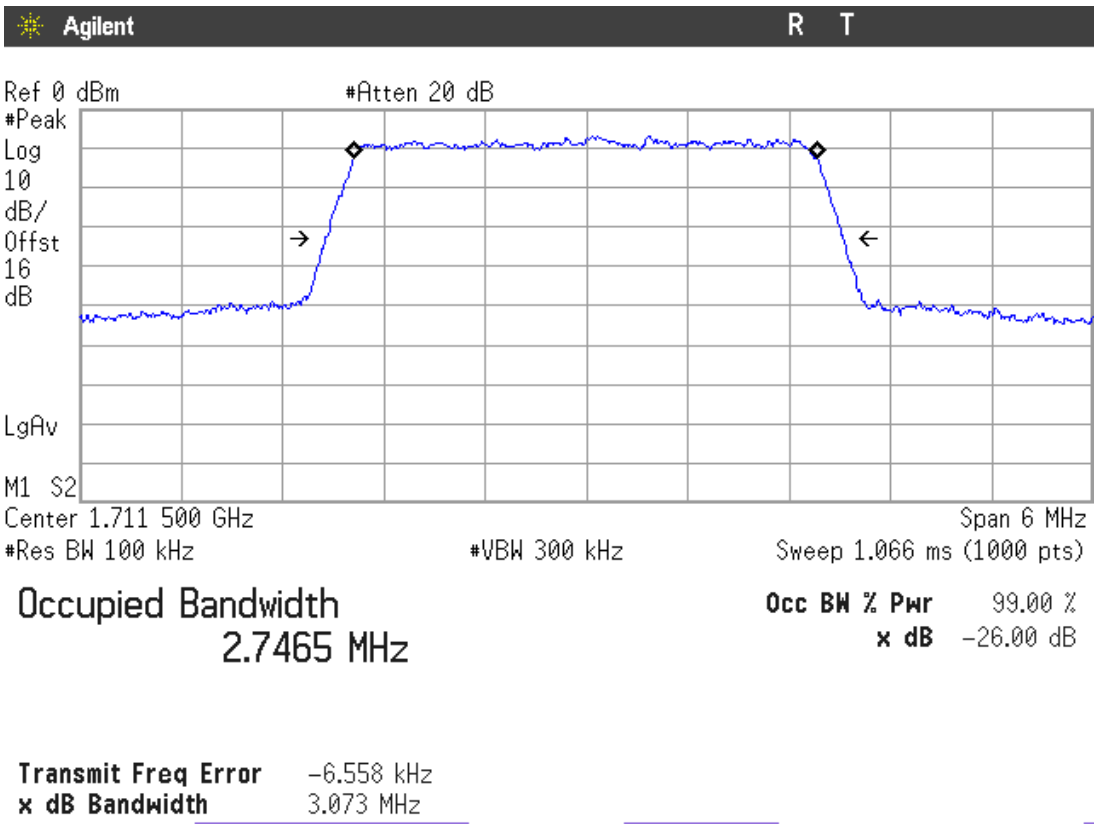


Highest Channel

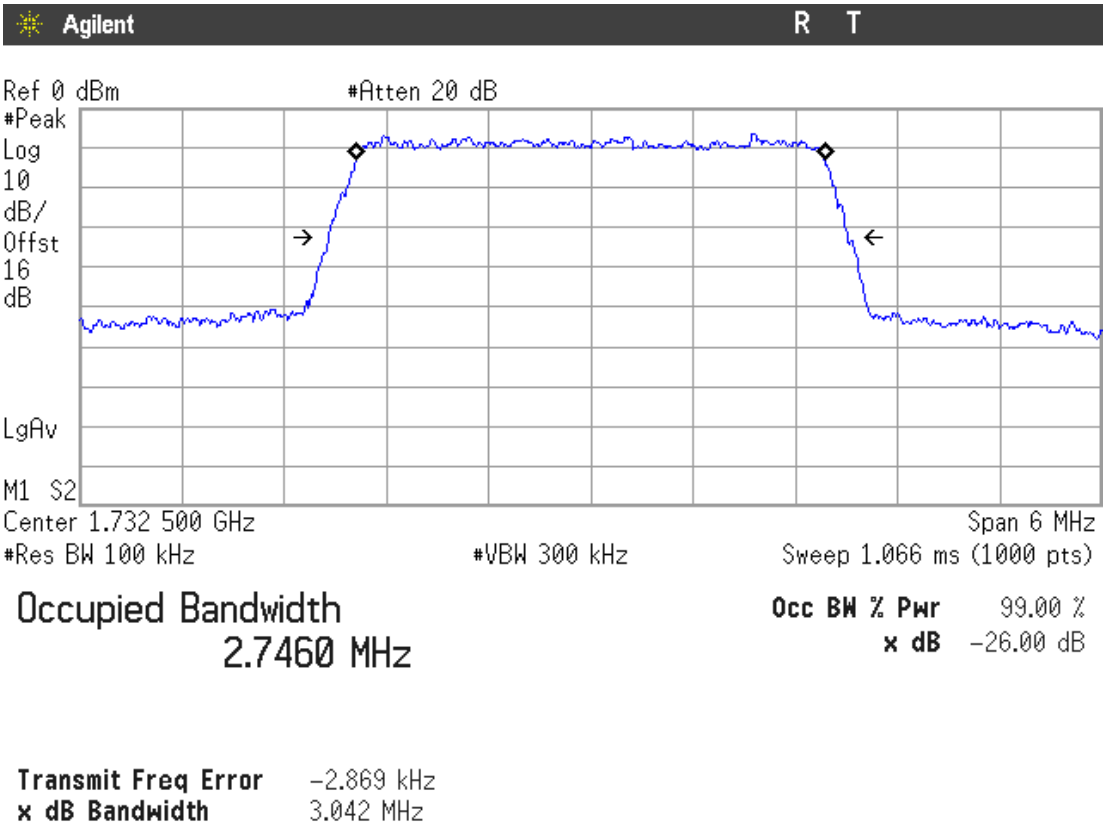


LTE QPSK MODULATION. BW = 3 MHz (Band IV)

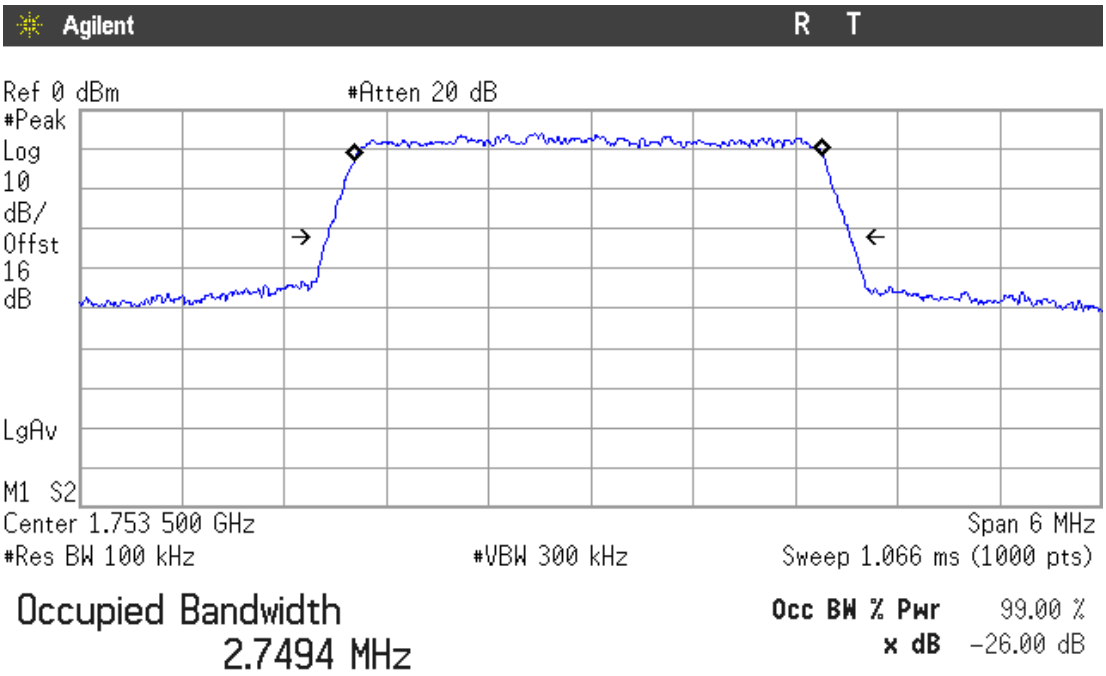
Lowest Channel



Middle Channel

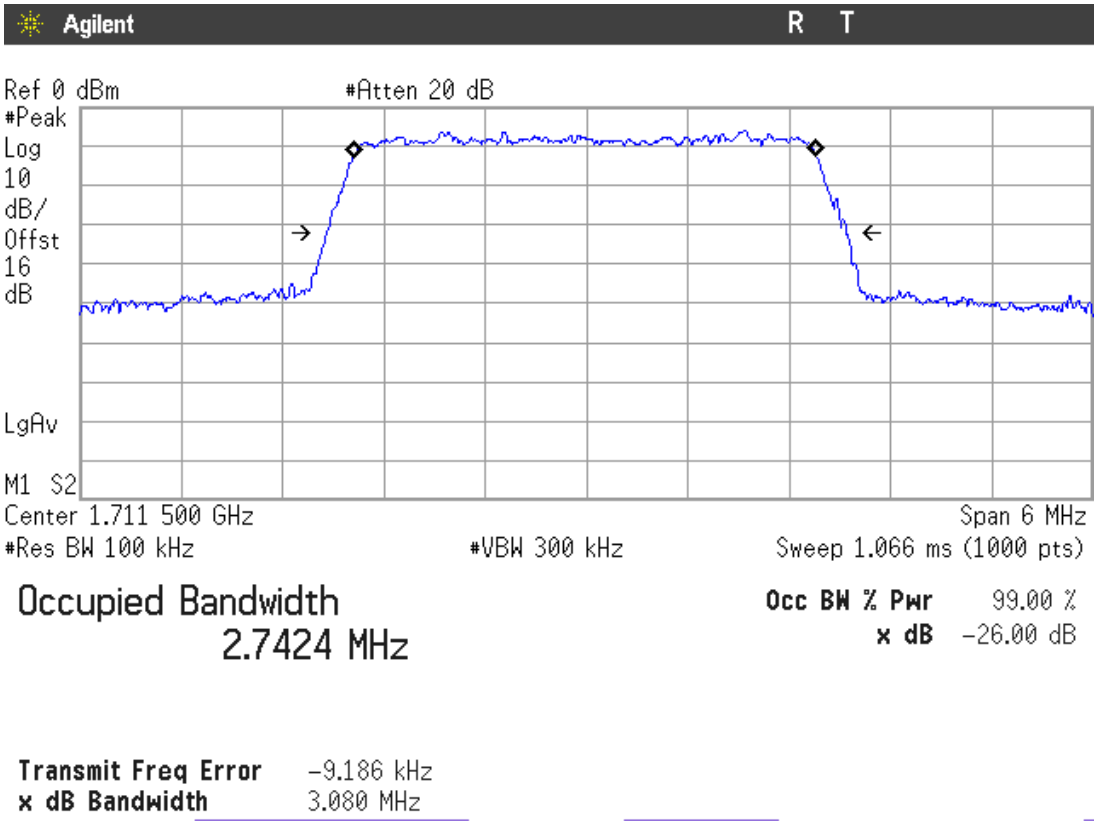


Highest Channel

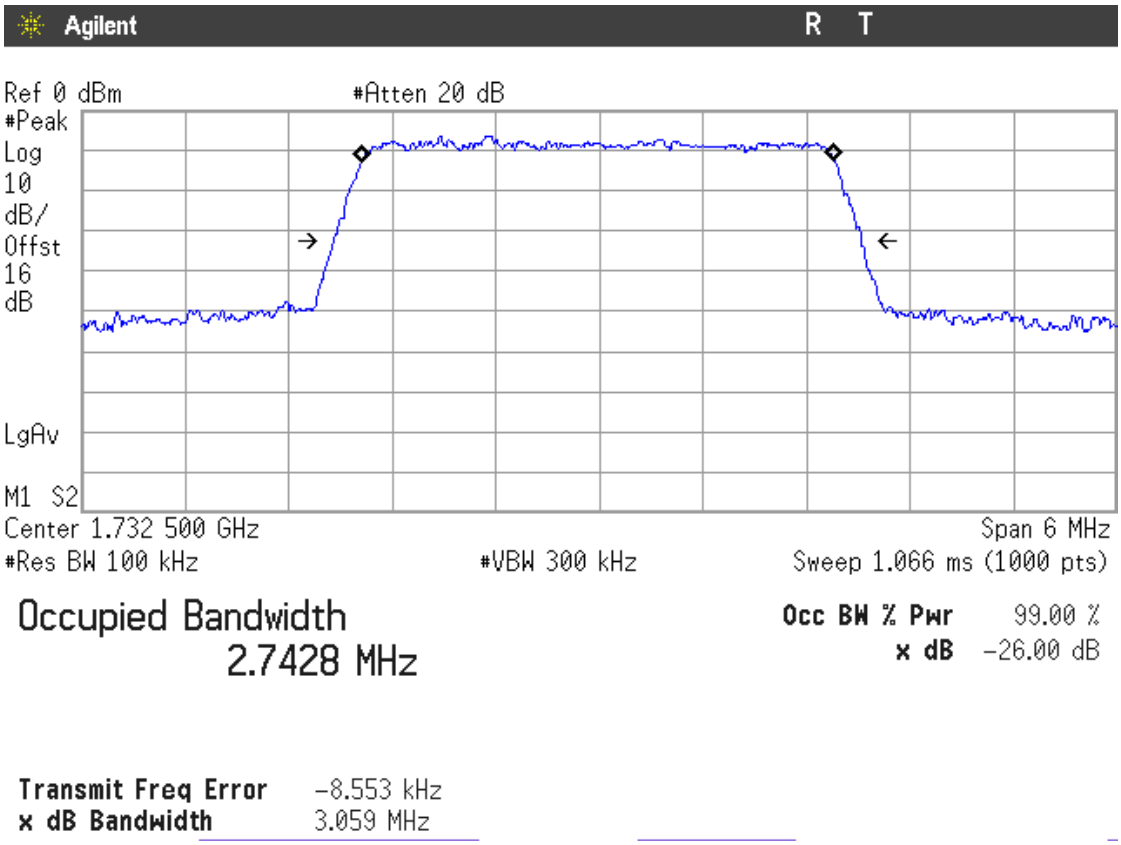


LTE 16QAM MODULATION. BW = 3 MHz (Band IV)

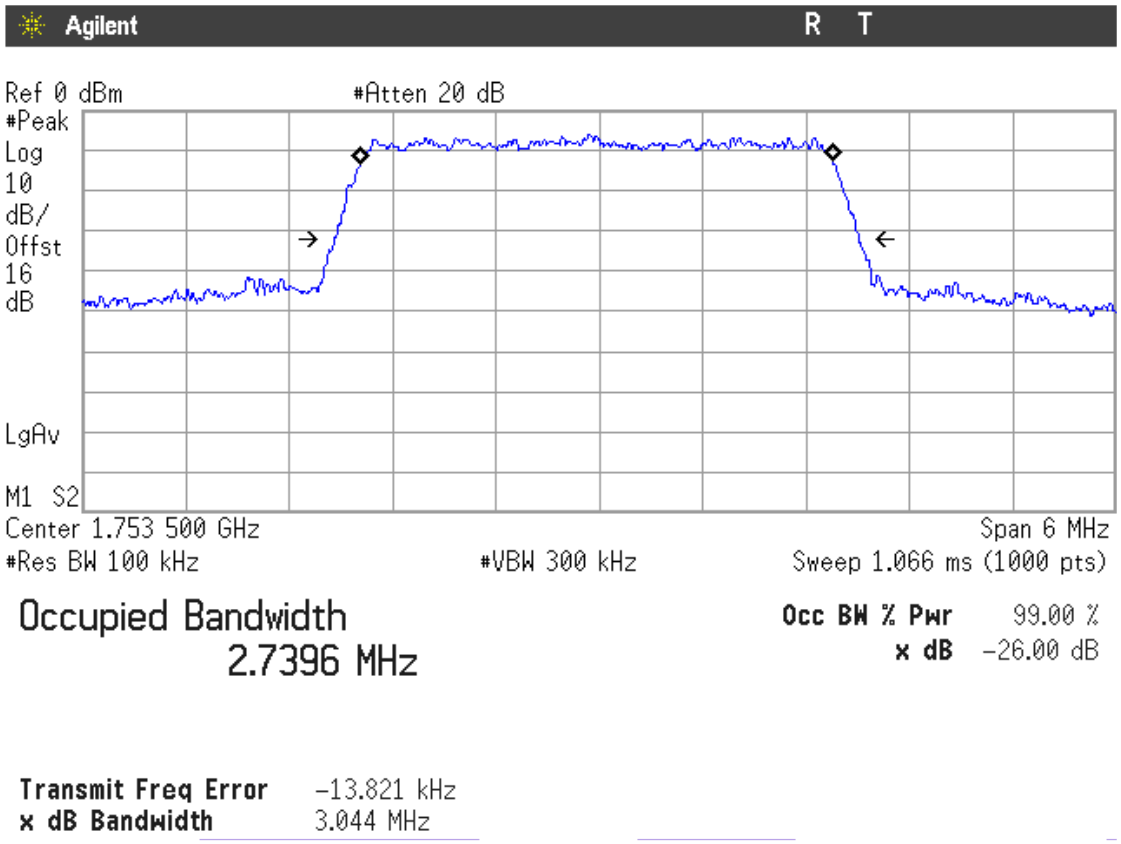
Lowest Channel



Middle Channel

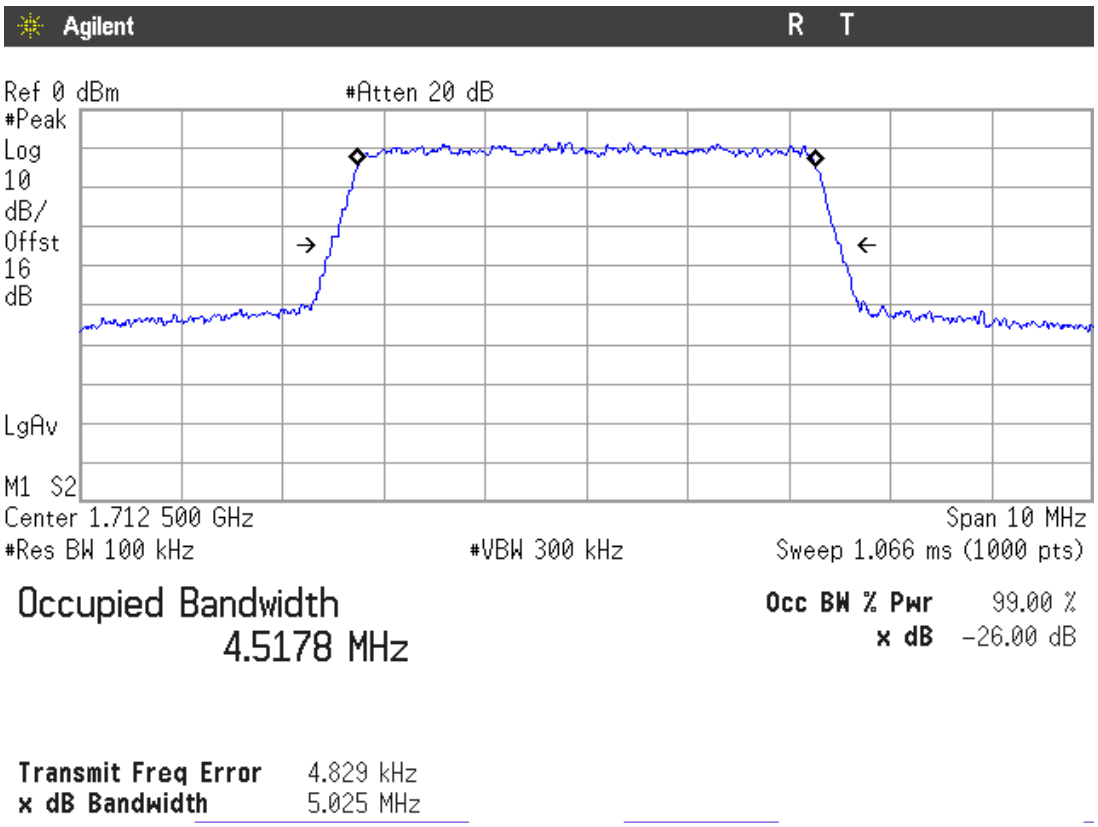


Highest Channel

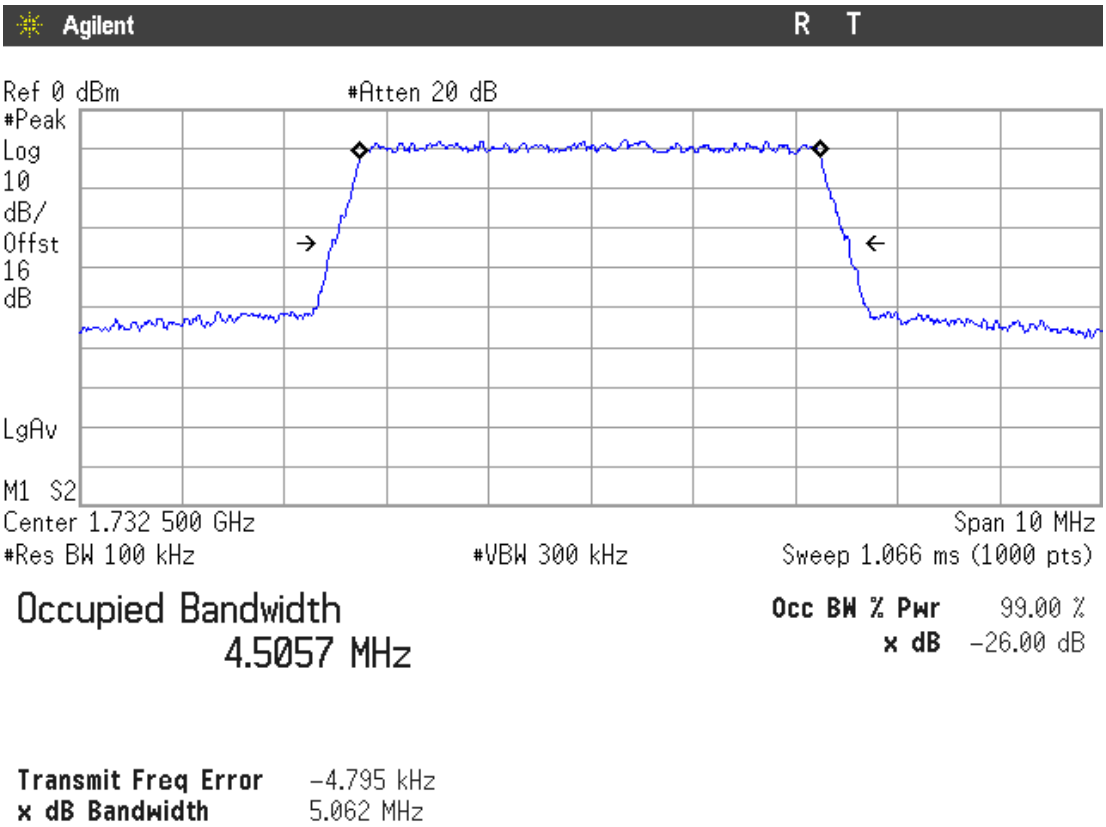


LTE QPSK MODULATION. BW = 5 MHz (Band IV)

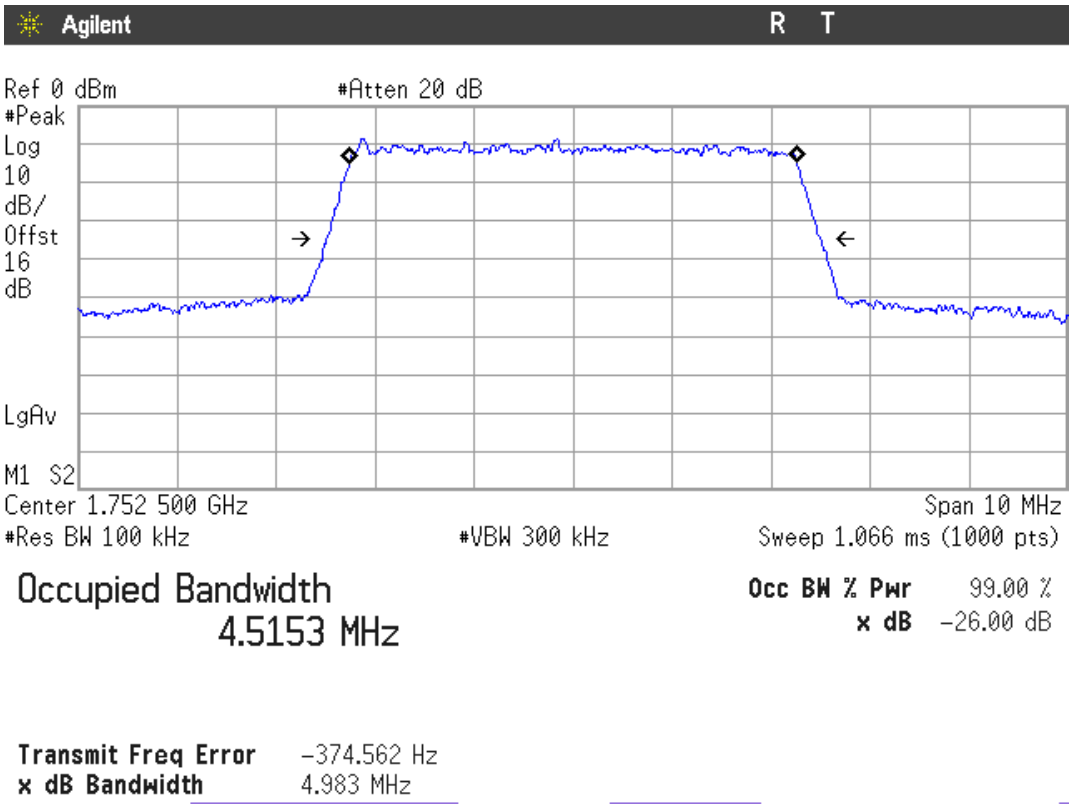
Lowest Channel



Middle Channel

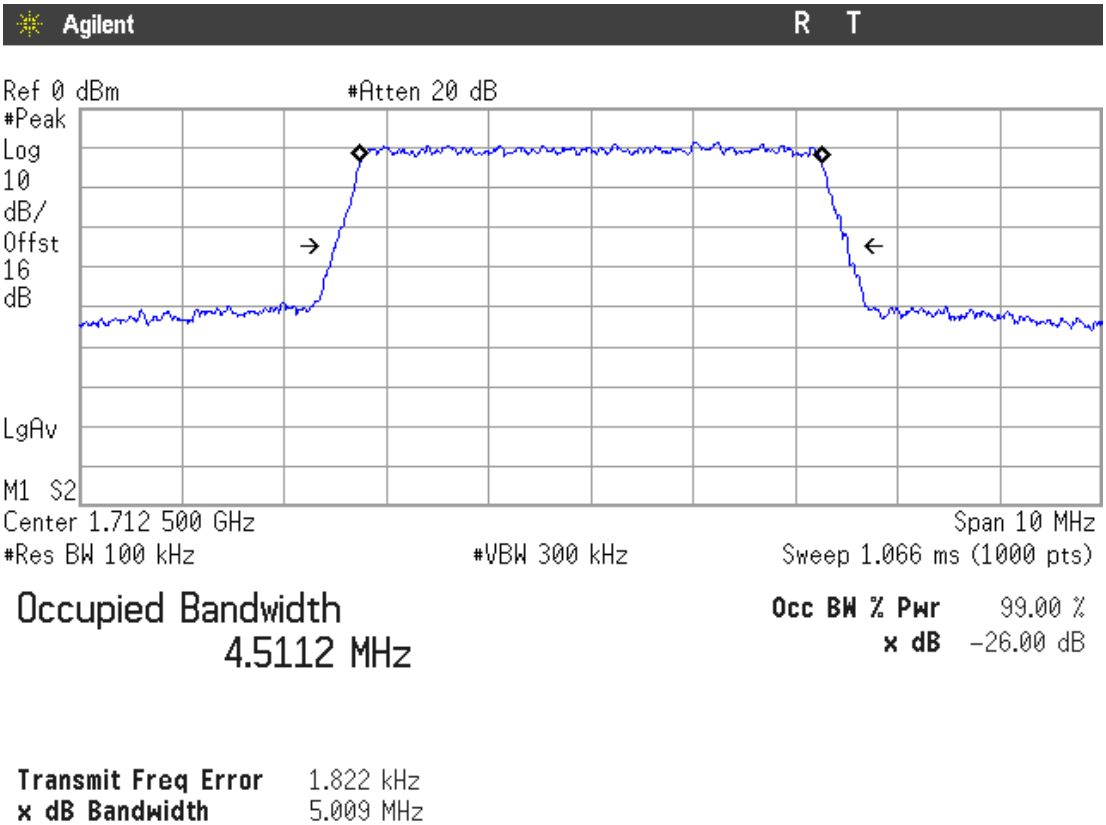


Highest Channel

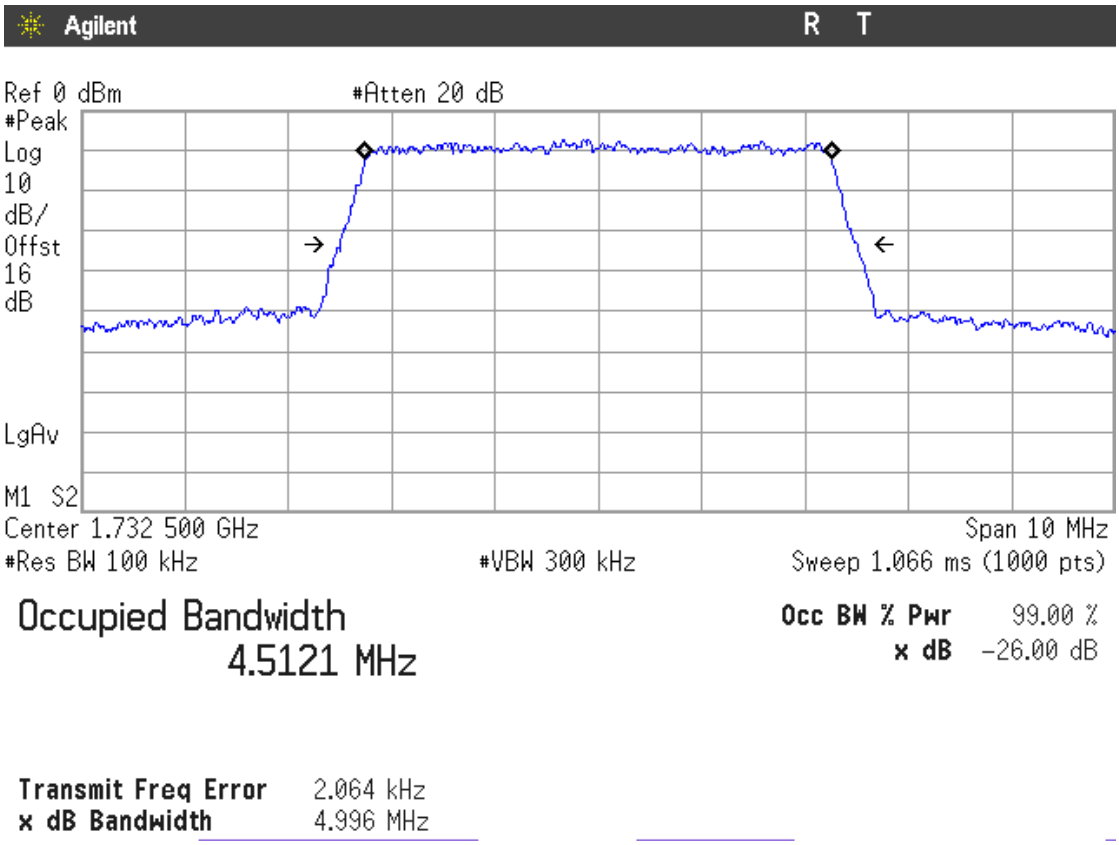


LTE 16QAM MODULATION. BW = 5 MHz (Band IV)

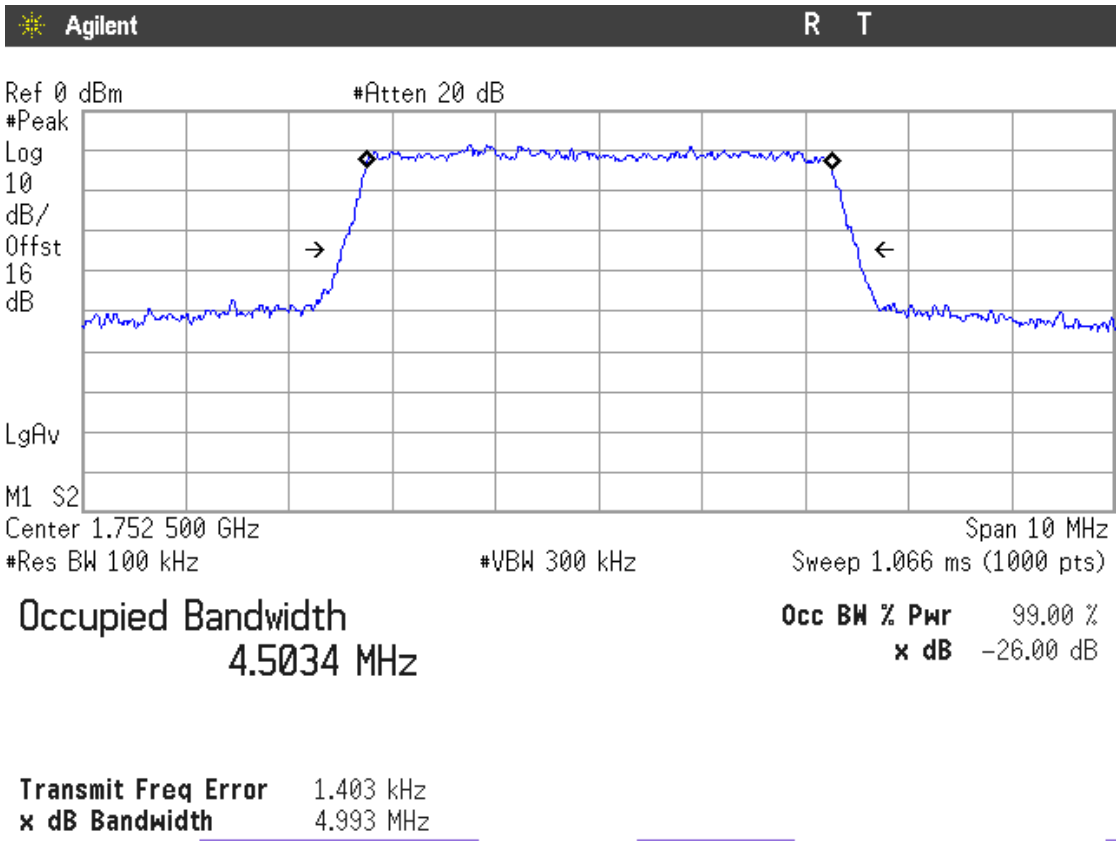
Lowest Channel



Middle Channel

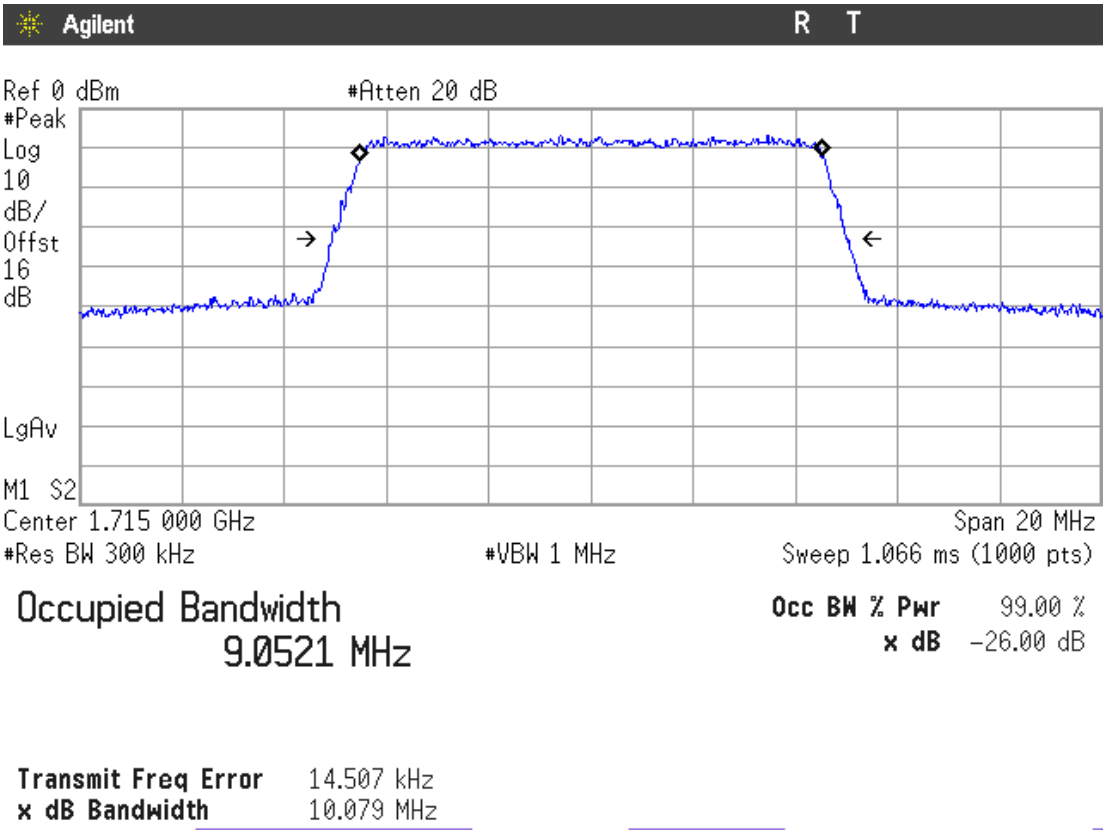


Highest Channel

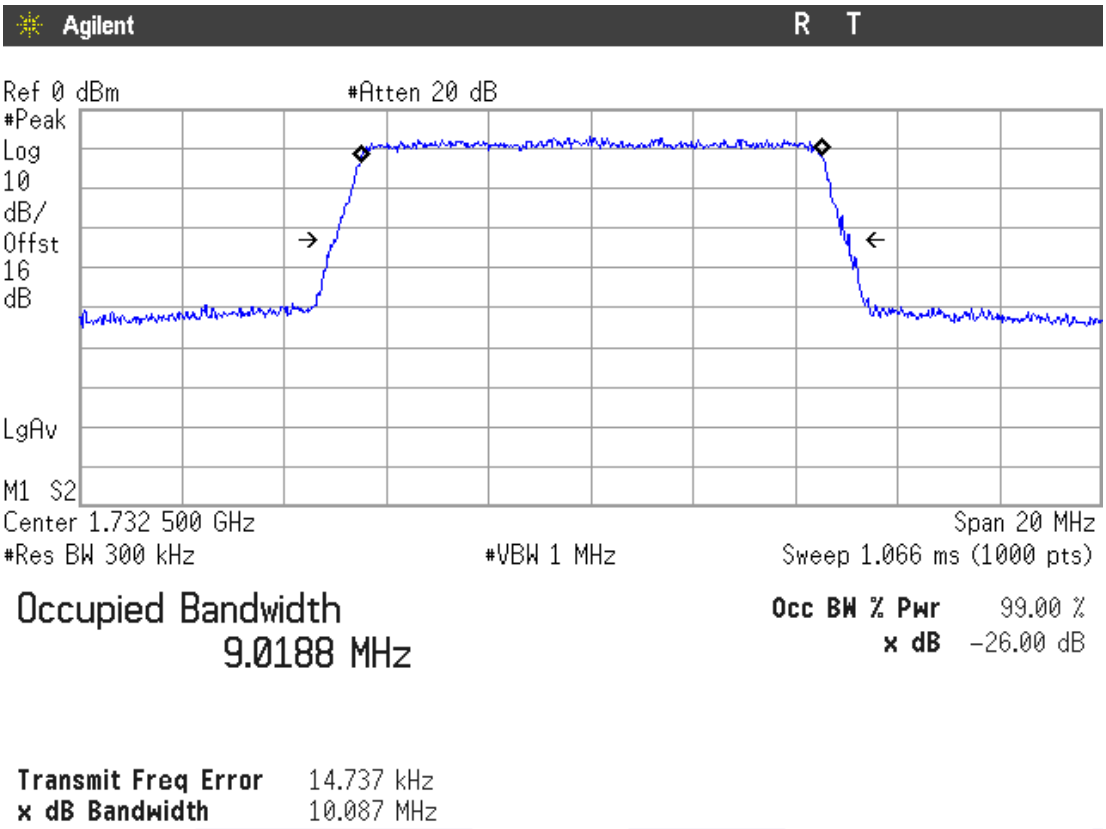


LTE QPSK MODULATION. BW = 10 MHz (Band IV)

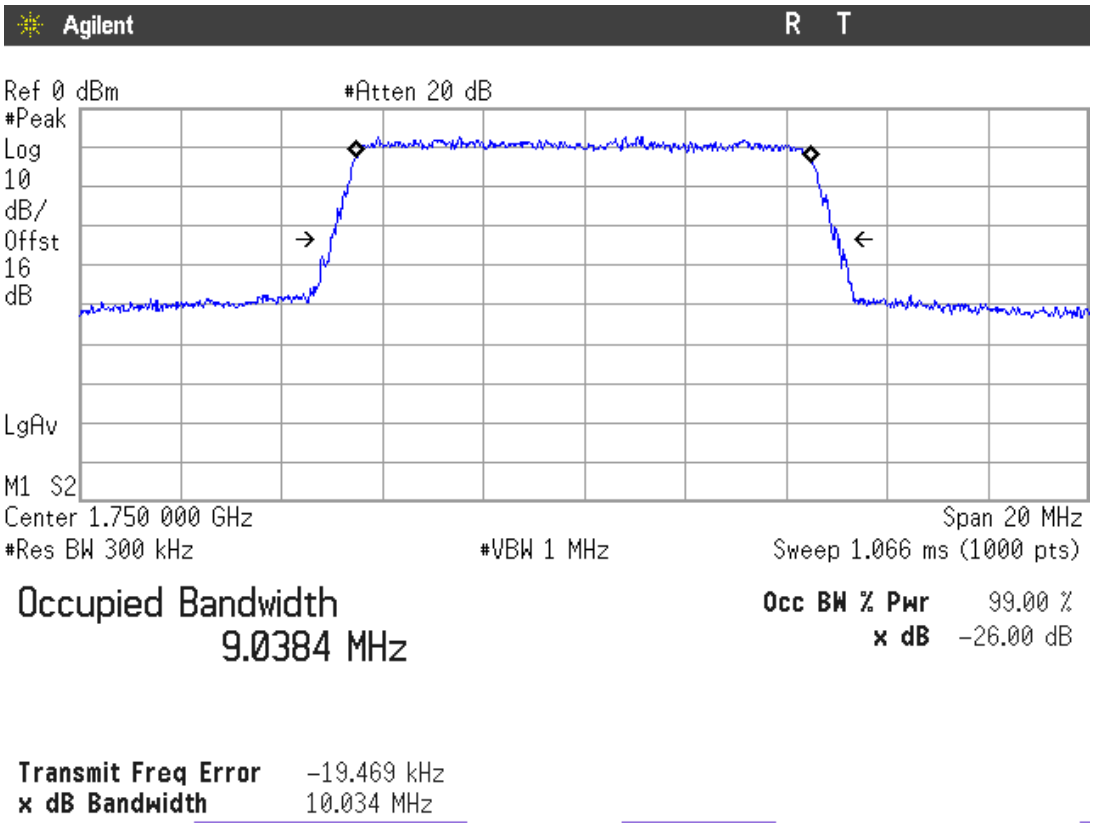
Lowest Channel



Middle Channel

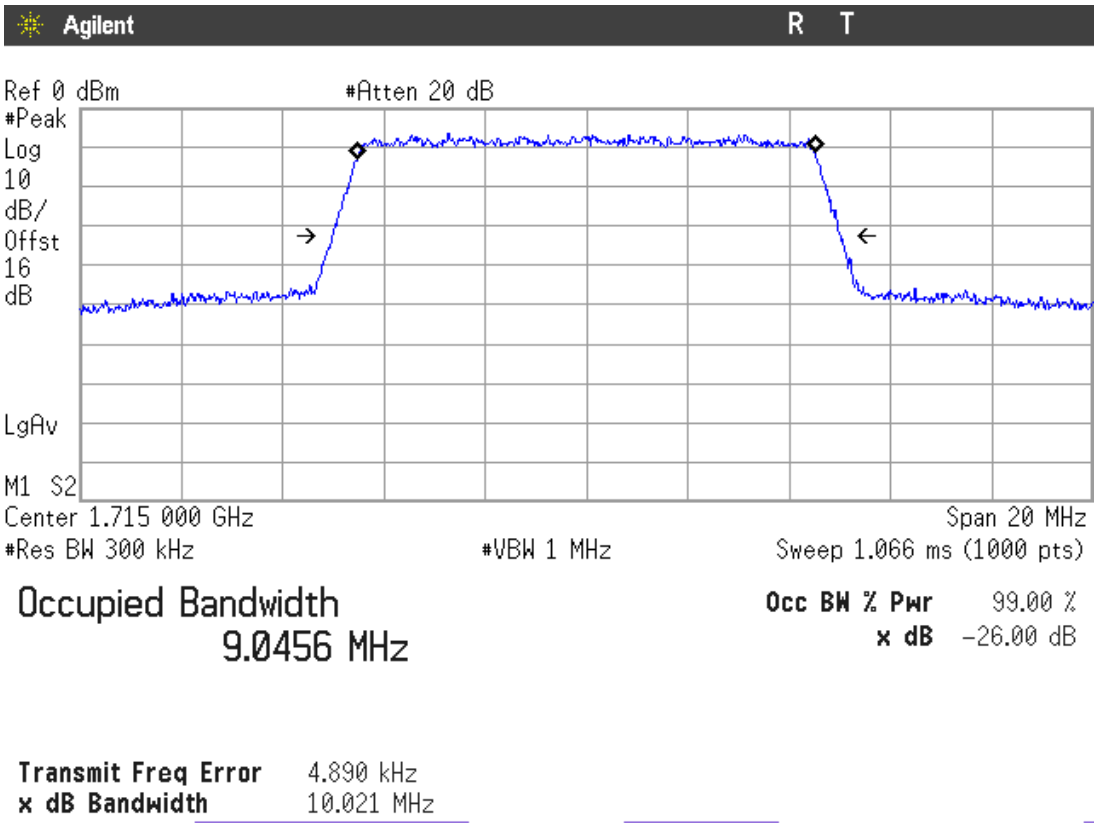


Highest Channel

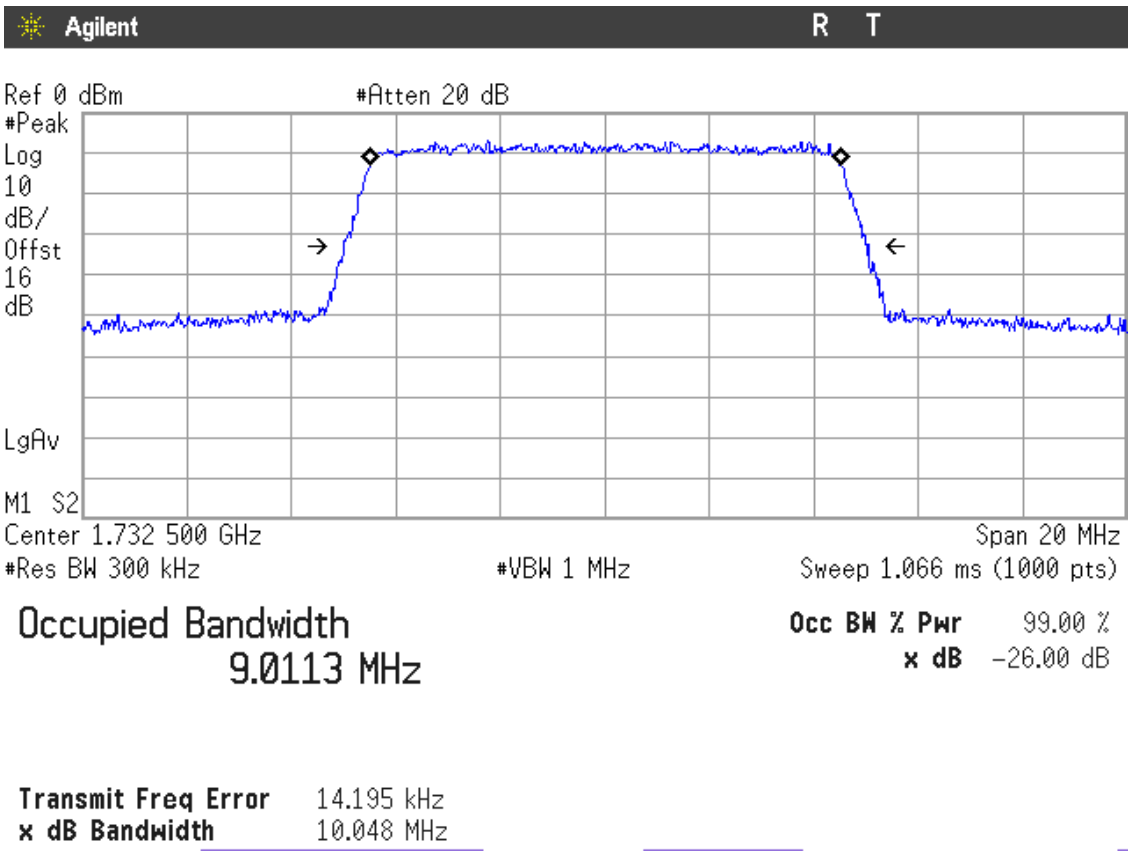


LTE 16QAM MODULATION. BW = 10 MHz (Band IV)

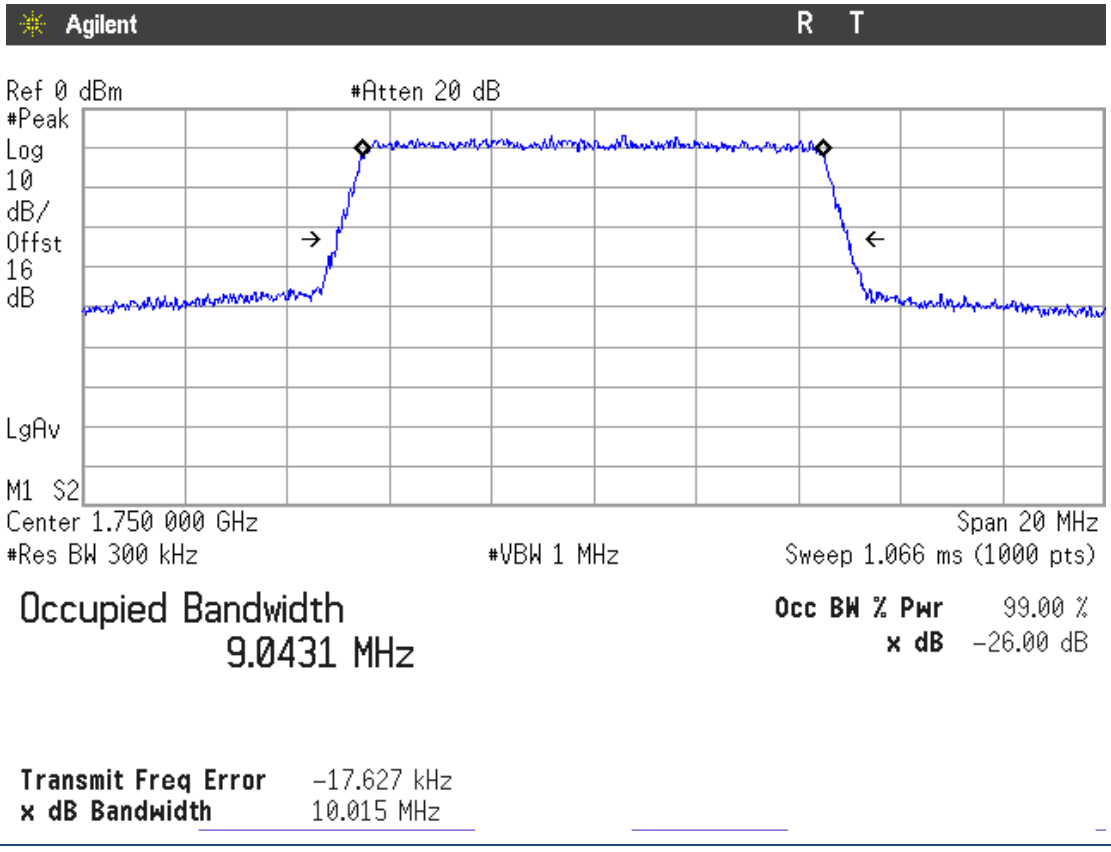
Lowest Channel



Middle Channel

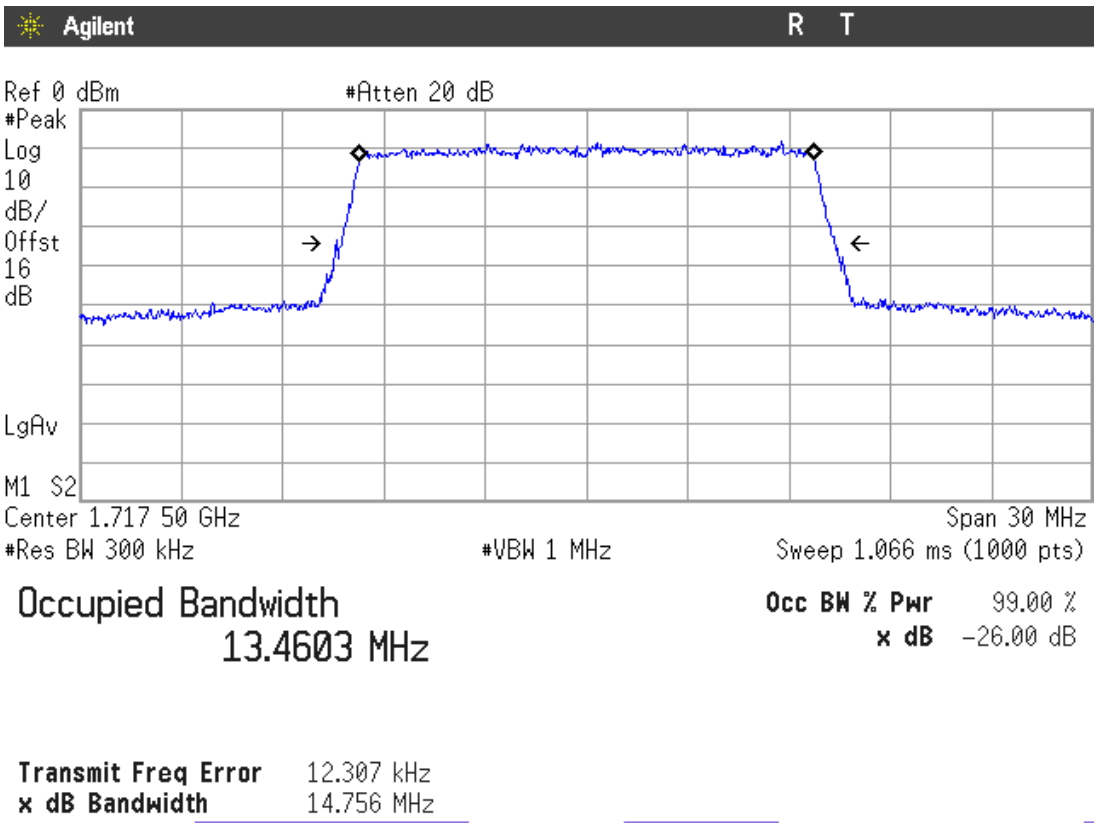


Highest Channel

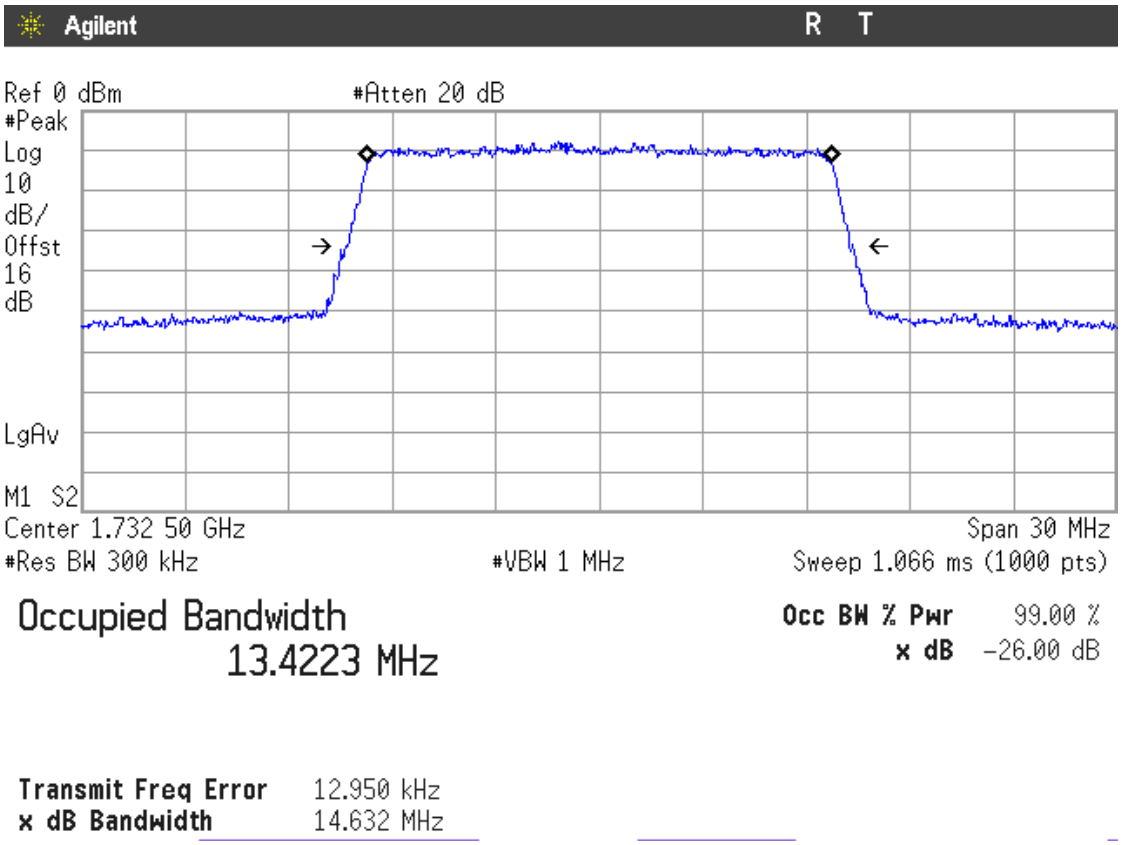


LTE QPSK MODULATION. BW = 15 MHz (Band IV)

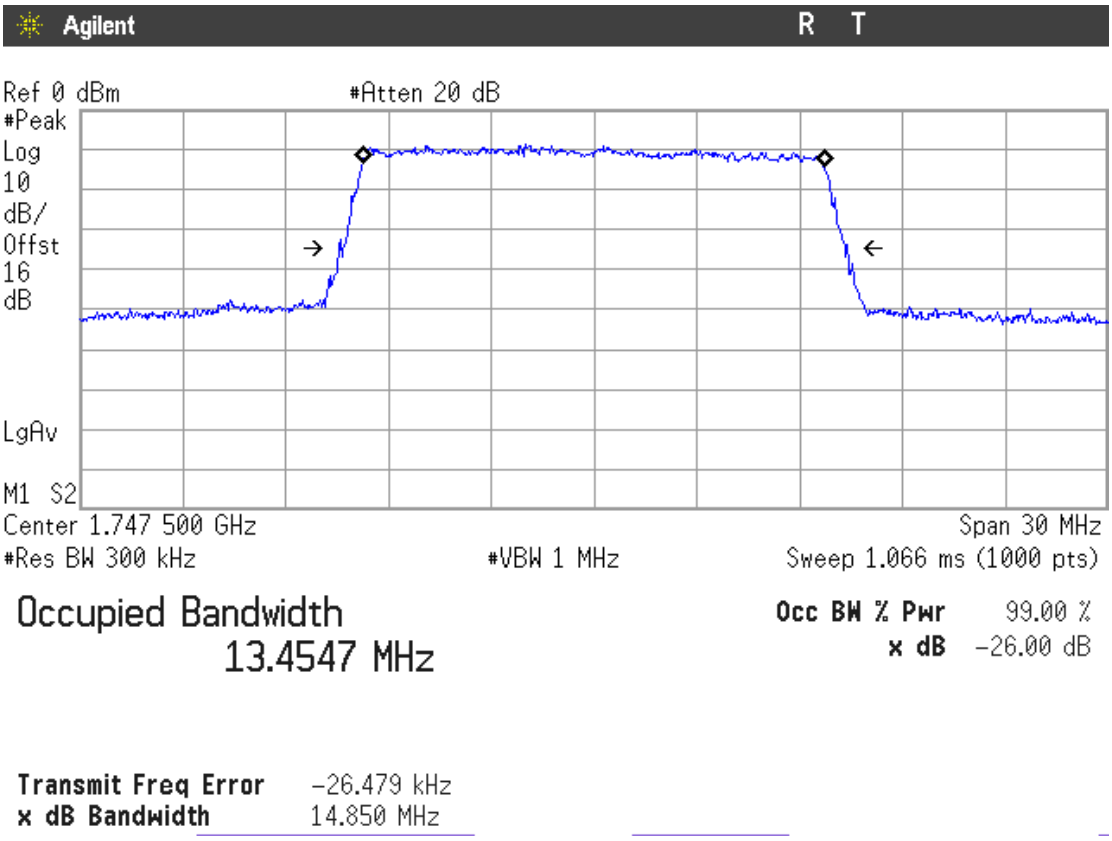
Lowest Channel



Middle Channel

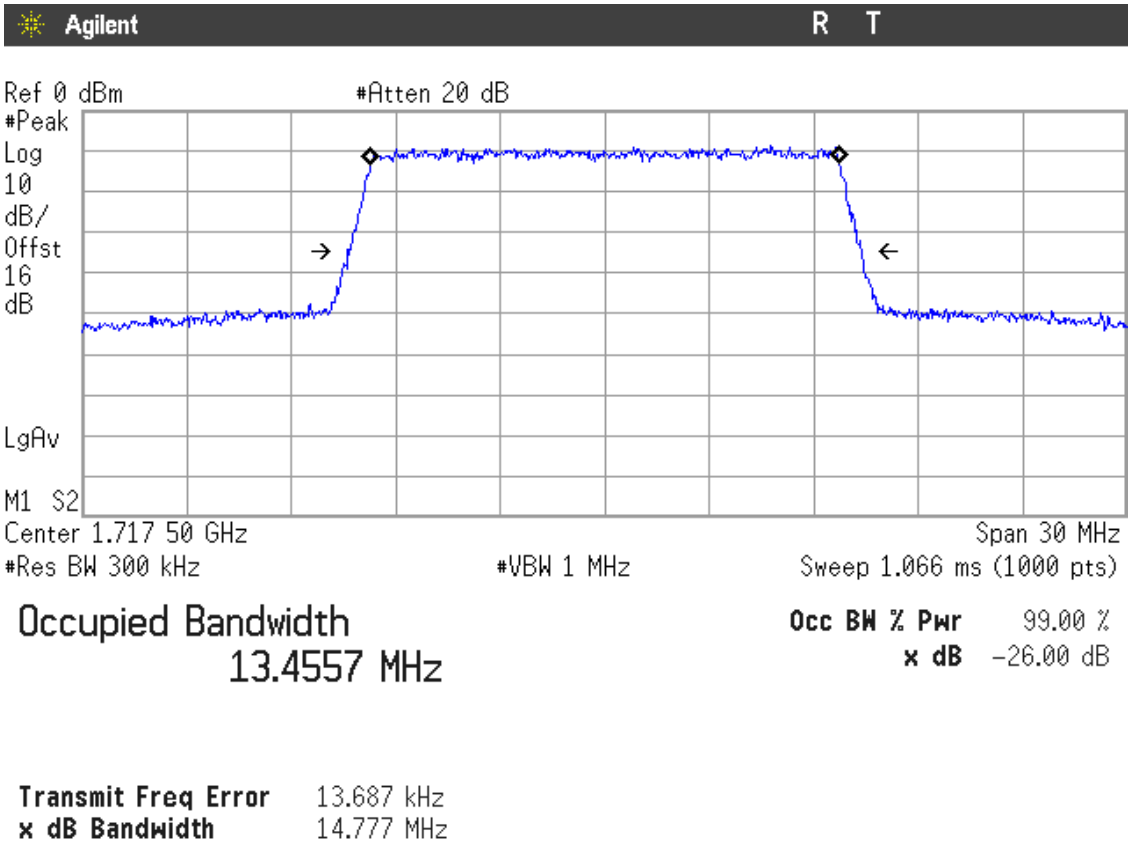


Highest Channel

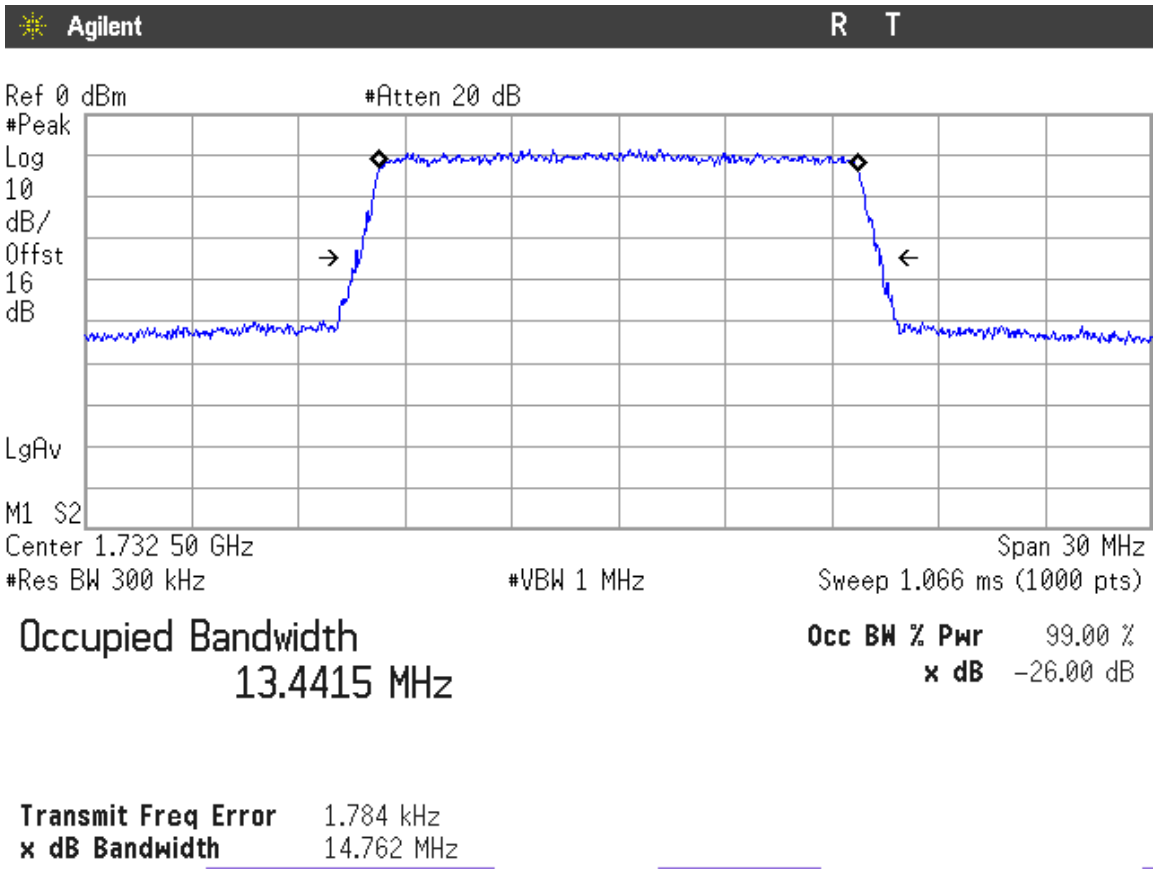


LTE 16QAM MODULATION. BW = 15 MHz (Band IV)

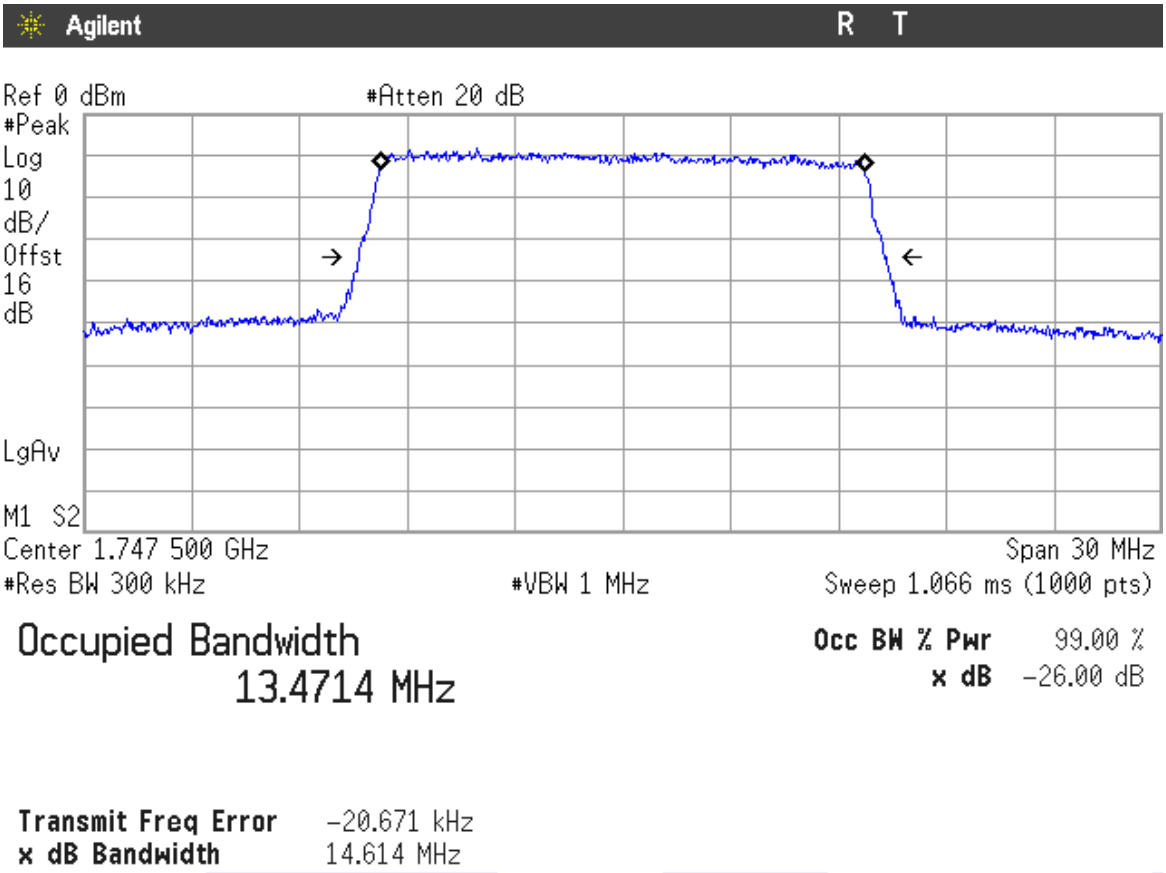
Lowest Channel



Middle Channel

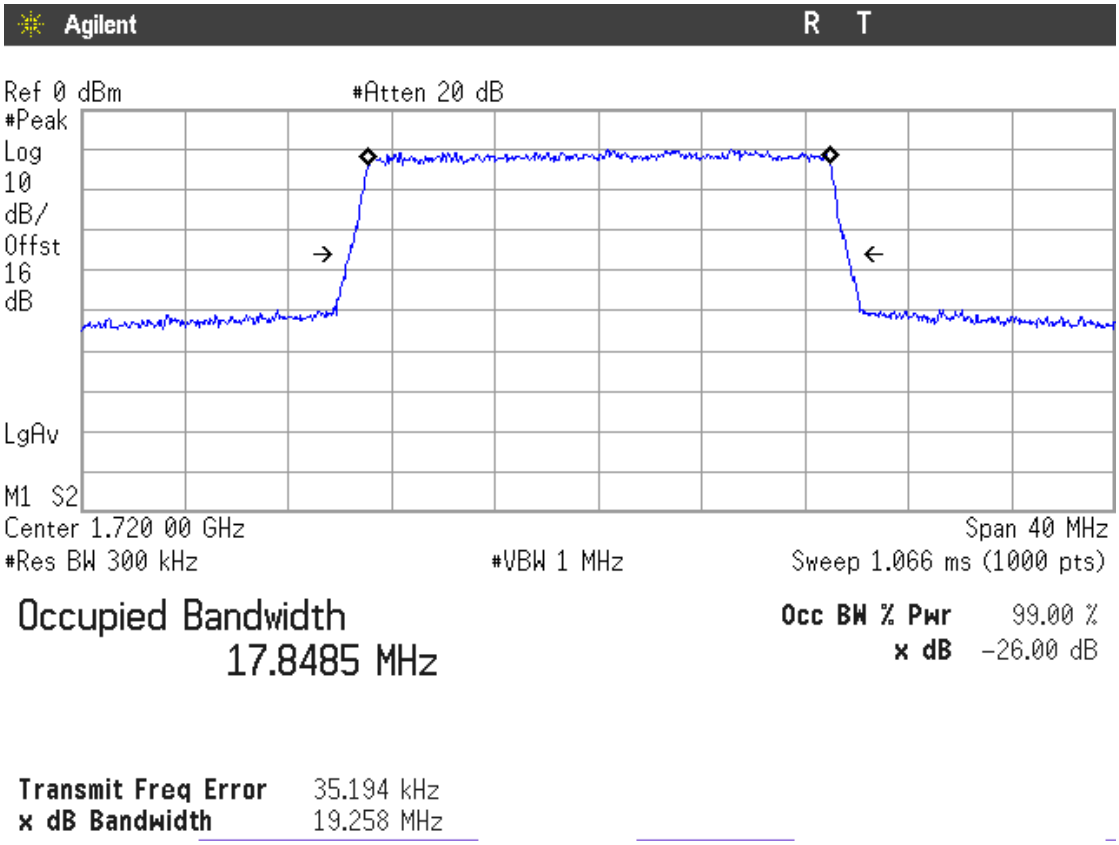


Highest Channel

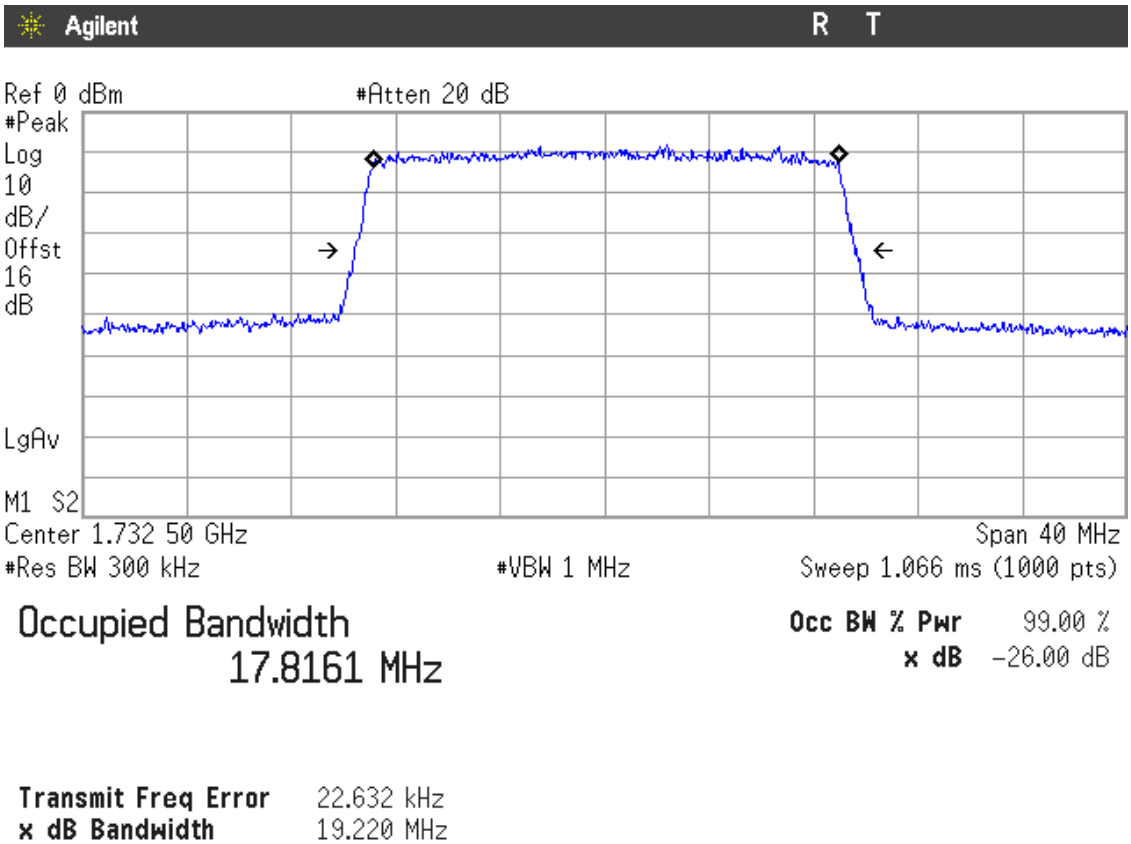


LTE QPSK MODULATION. BW = 20 MHz (Band IV)

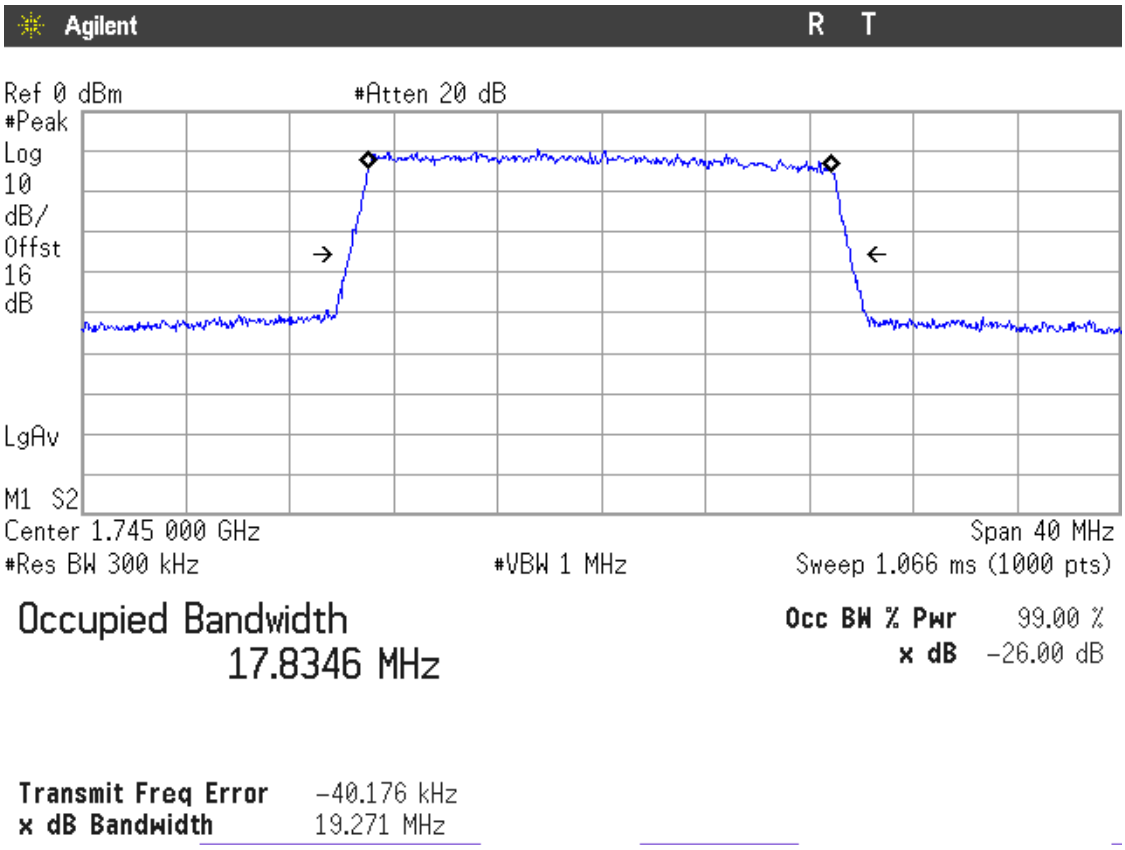
Lowest Channel



Middle Channel

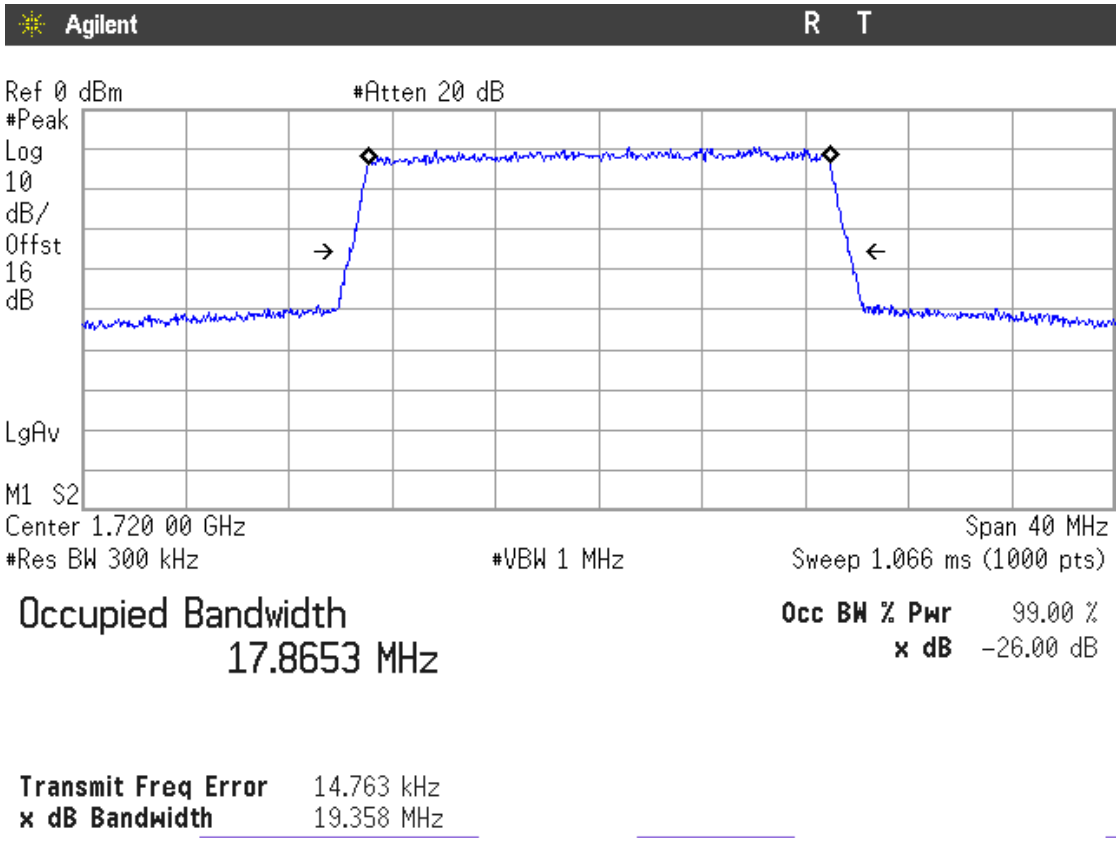


Highest Channel

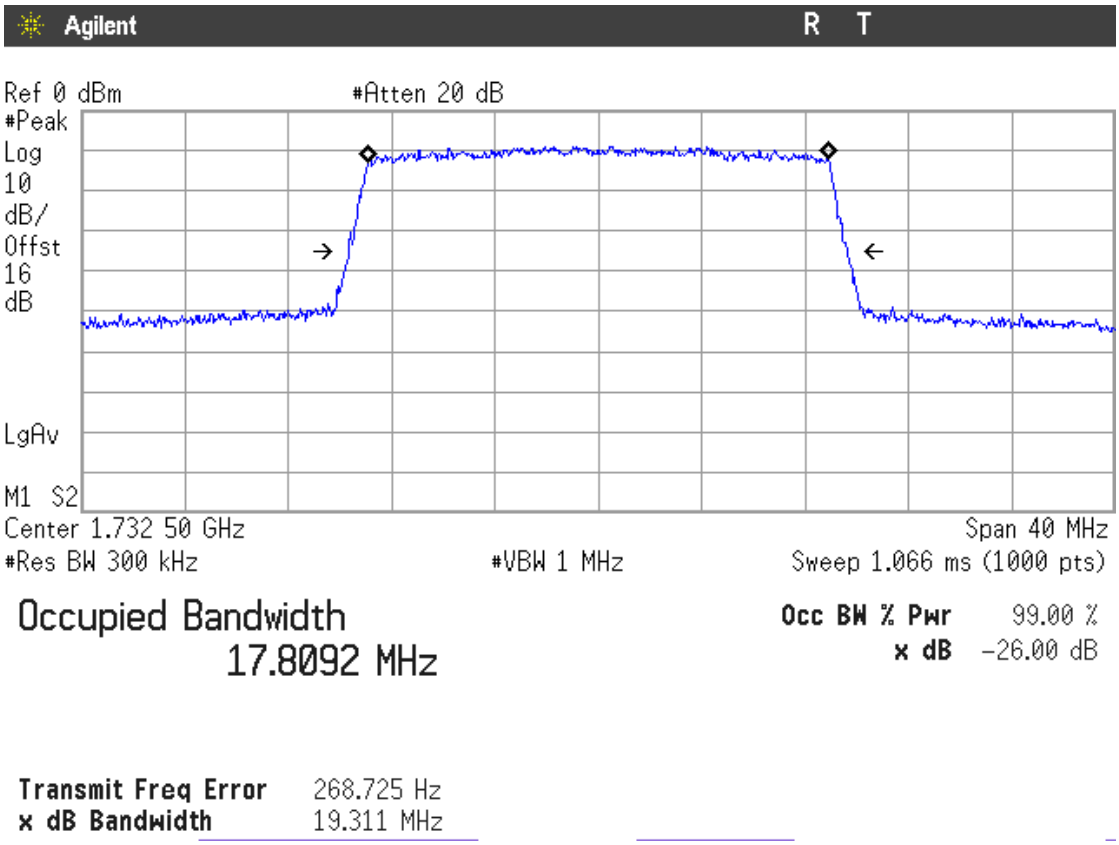


LTE 16QAM MODULATION. BW = 20 MHz (Band IV)

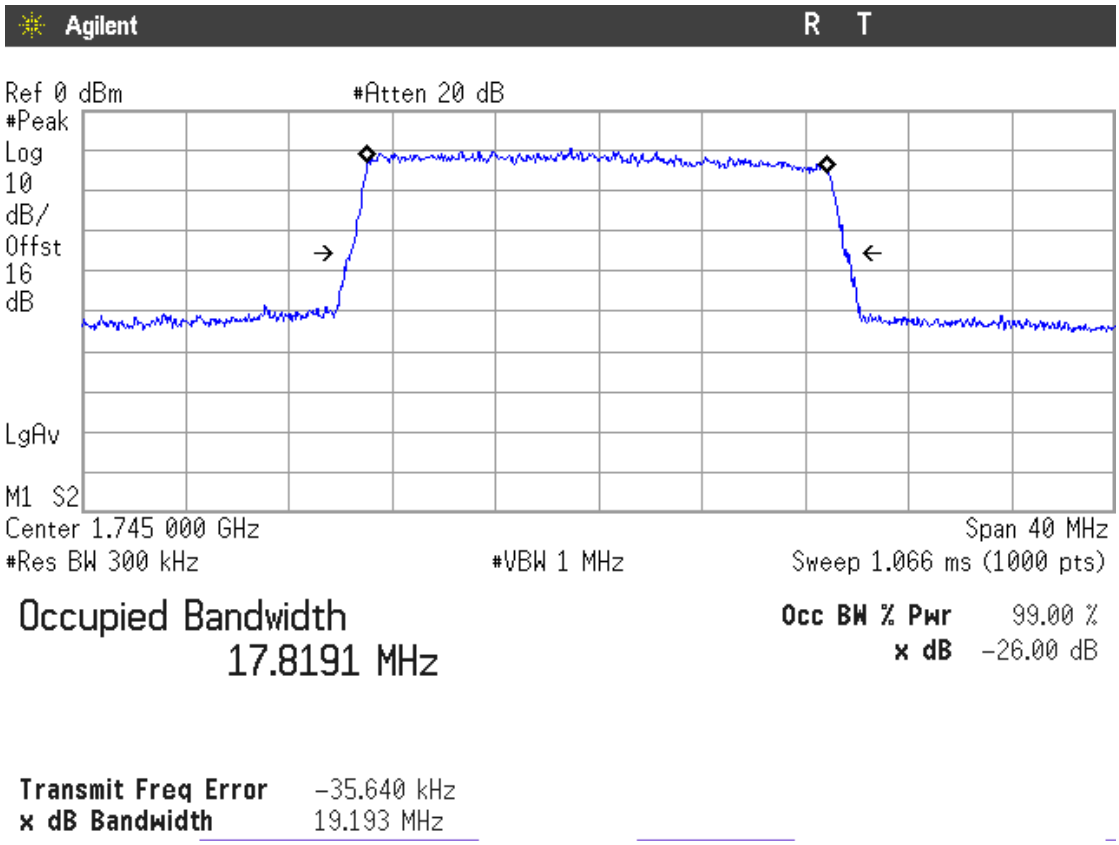
Lowest Channel



Middle Channel

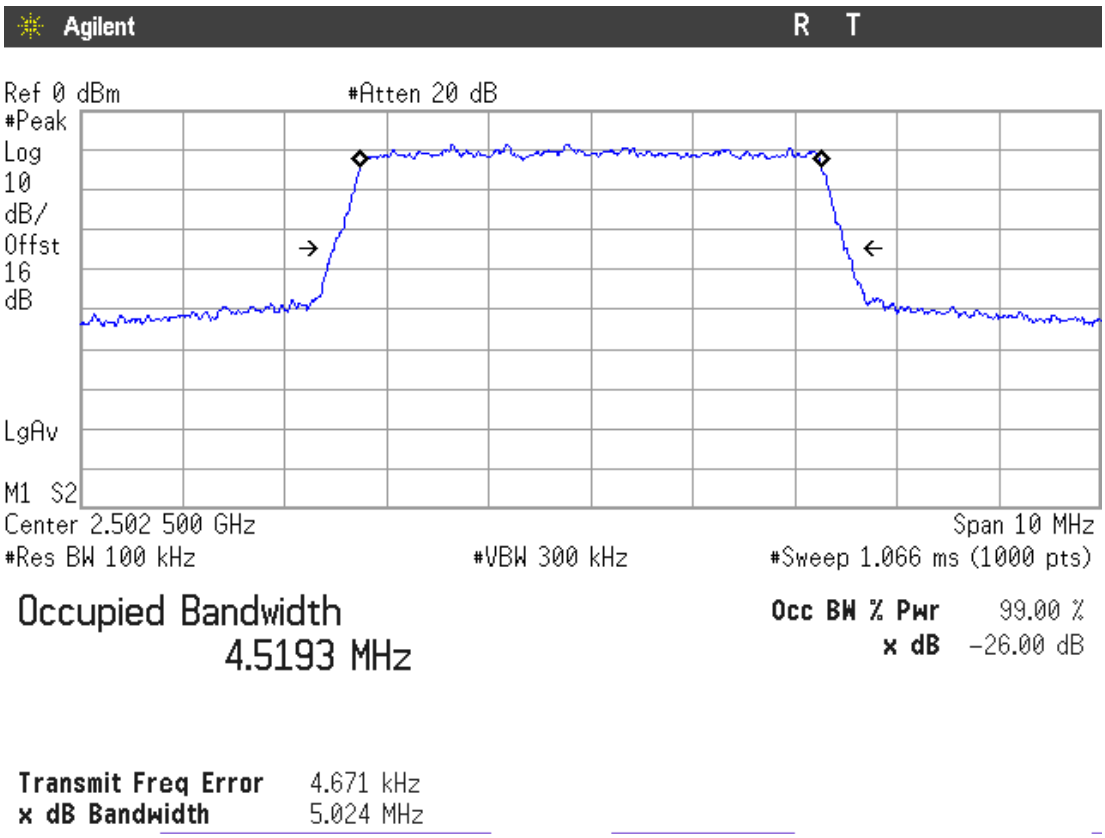


Highest Channel

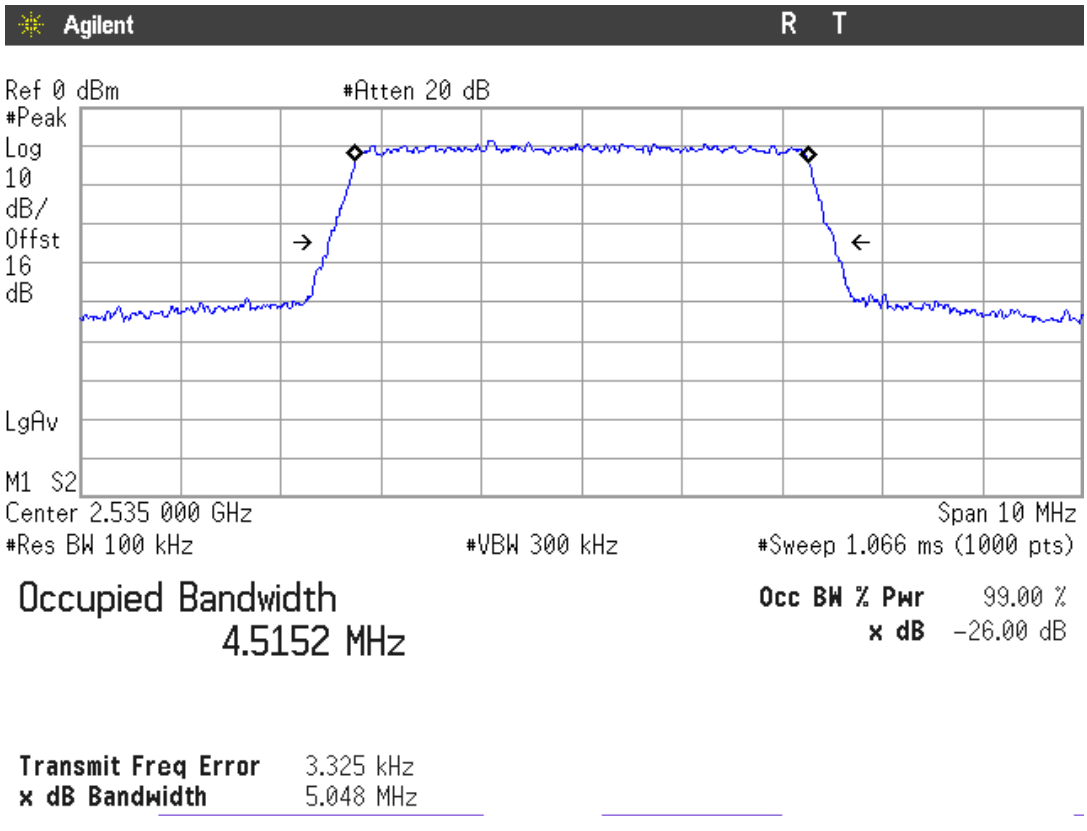


LTE QPSK MODULATION. BW = 5 MHz (Band VII)

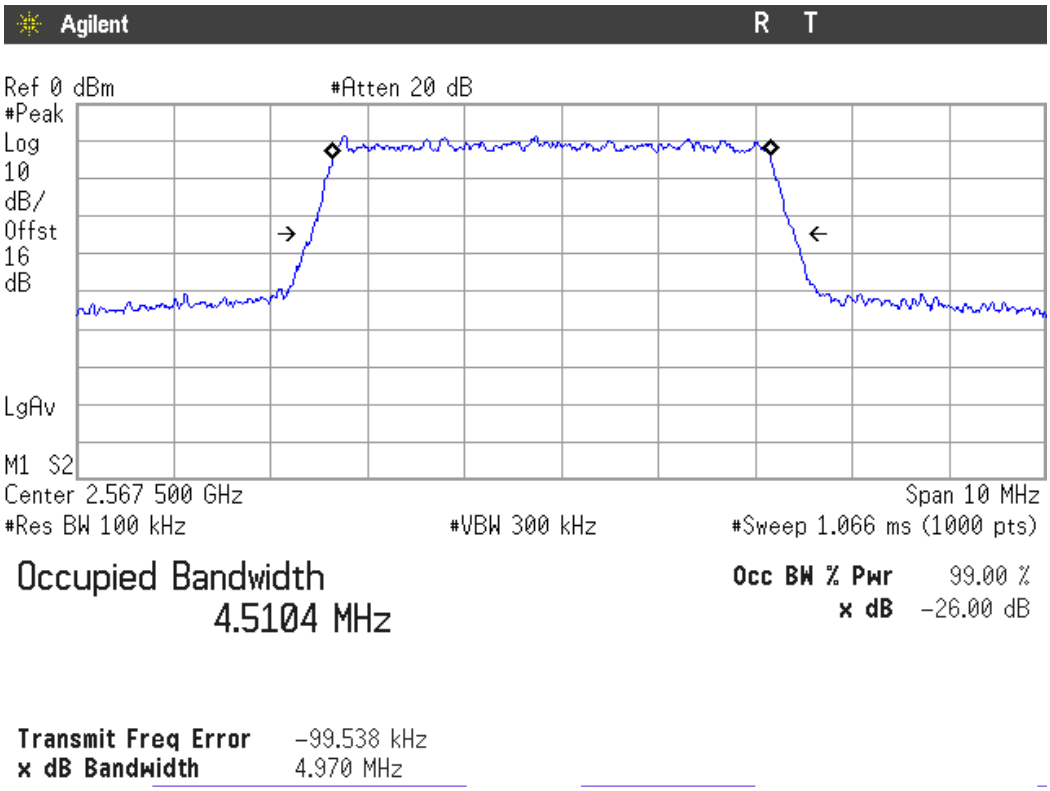
Lowest Channel



Middle Channel

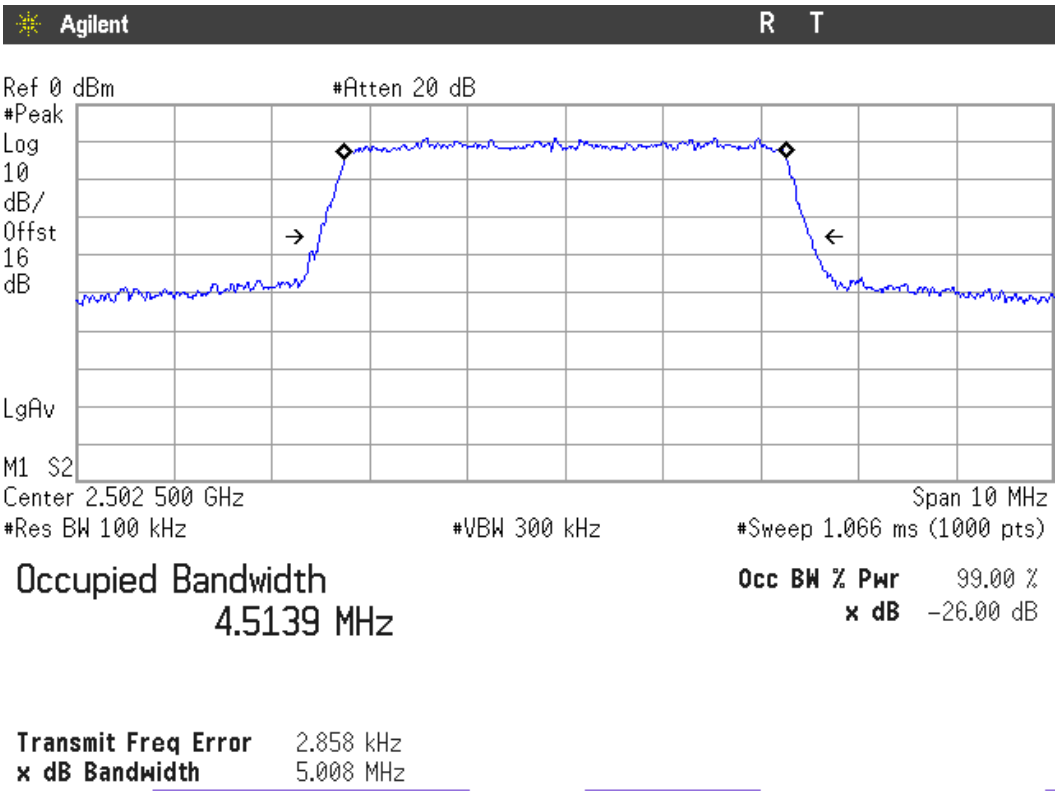


Highest Channel

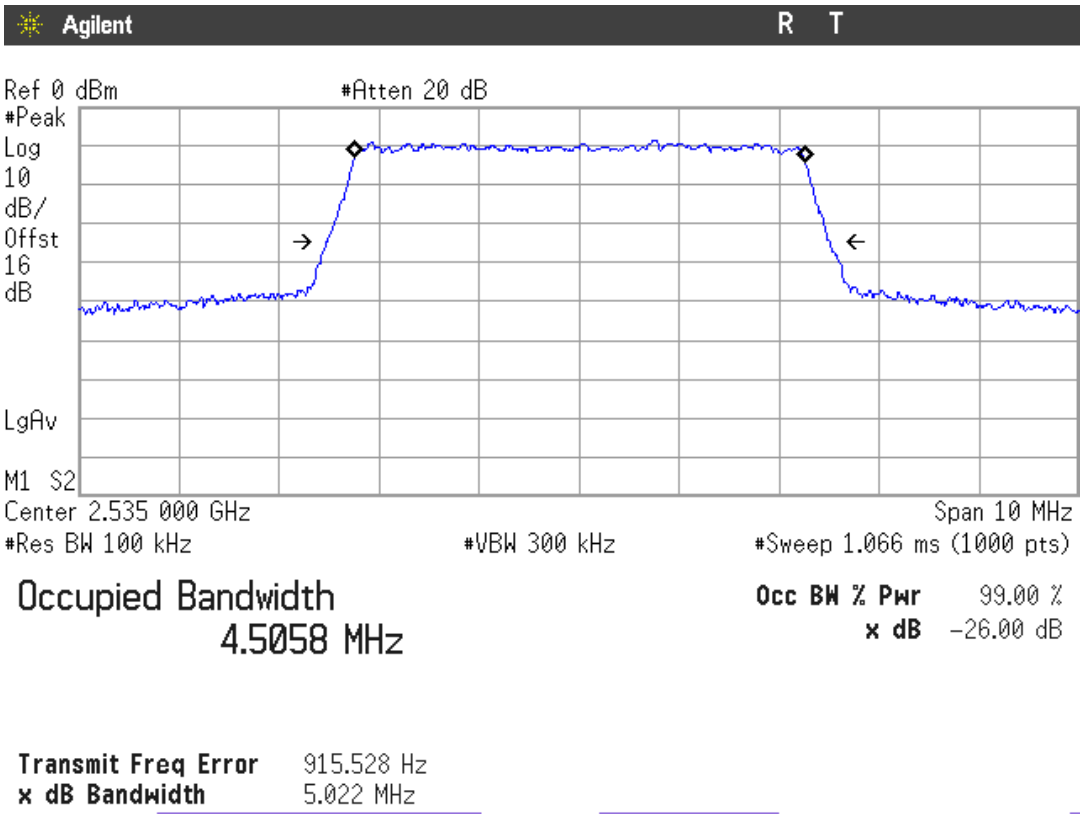


LTE 16QAM MODULATION. BW = 5 MHz (Band VII)

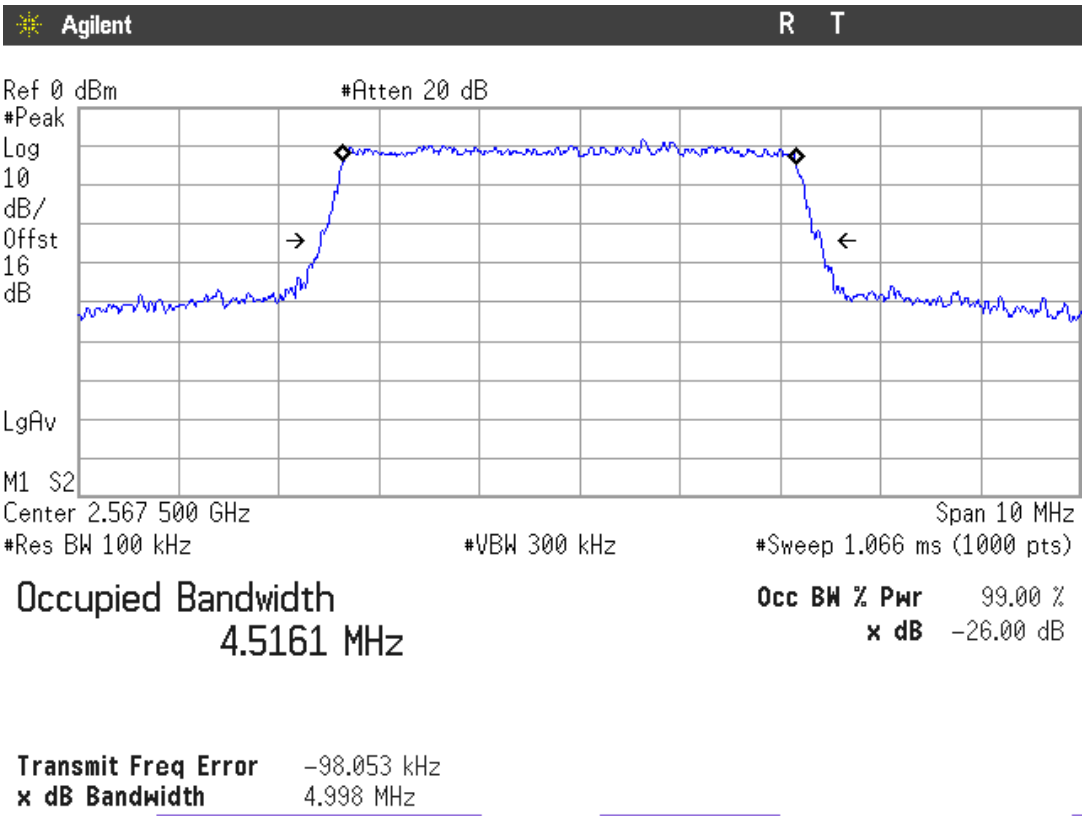
Lowest Channel



Middle Channel

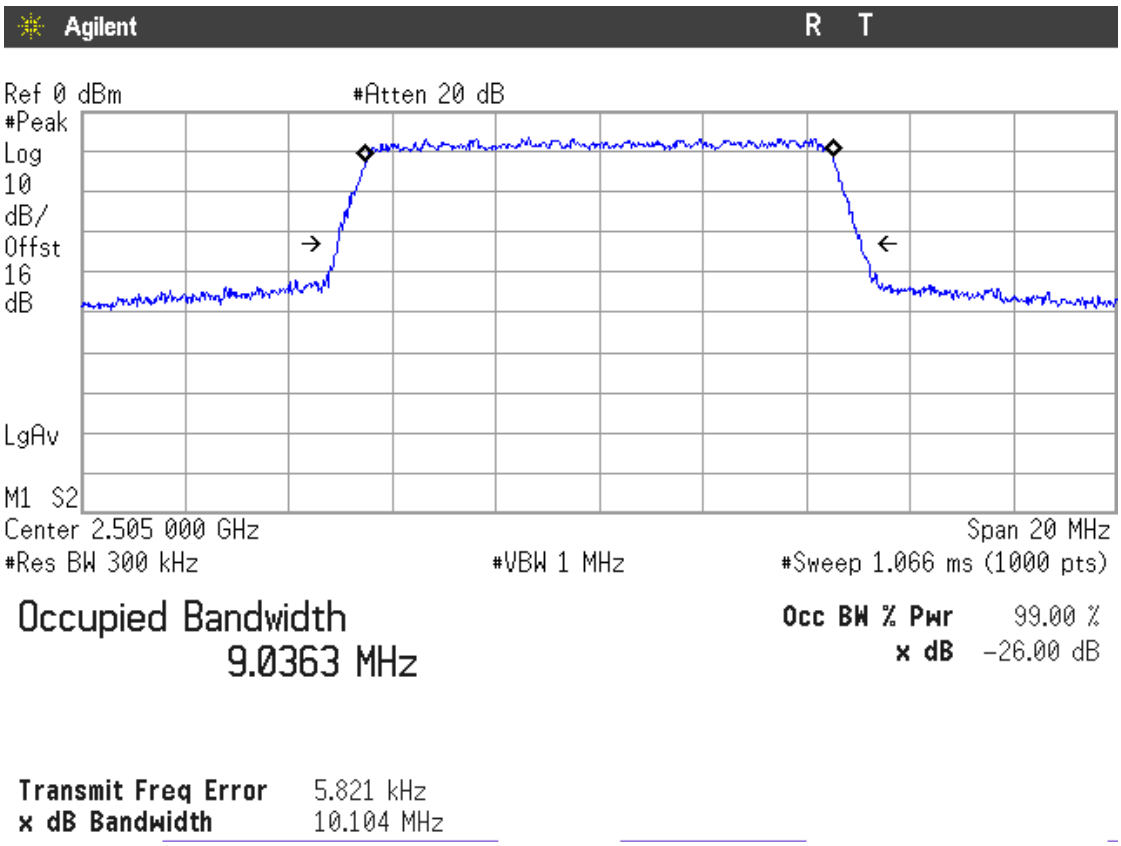


Highest Channel

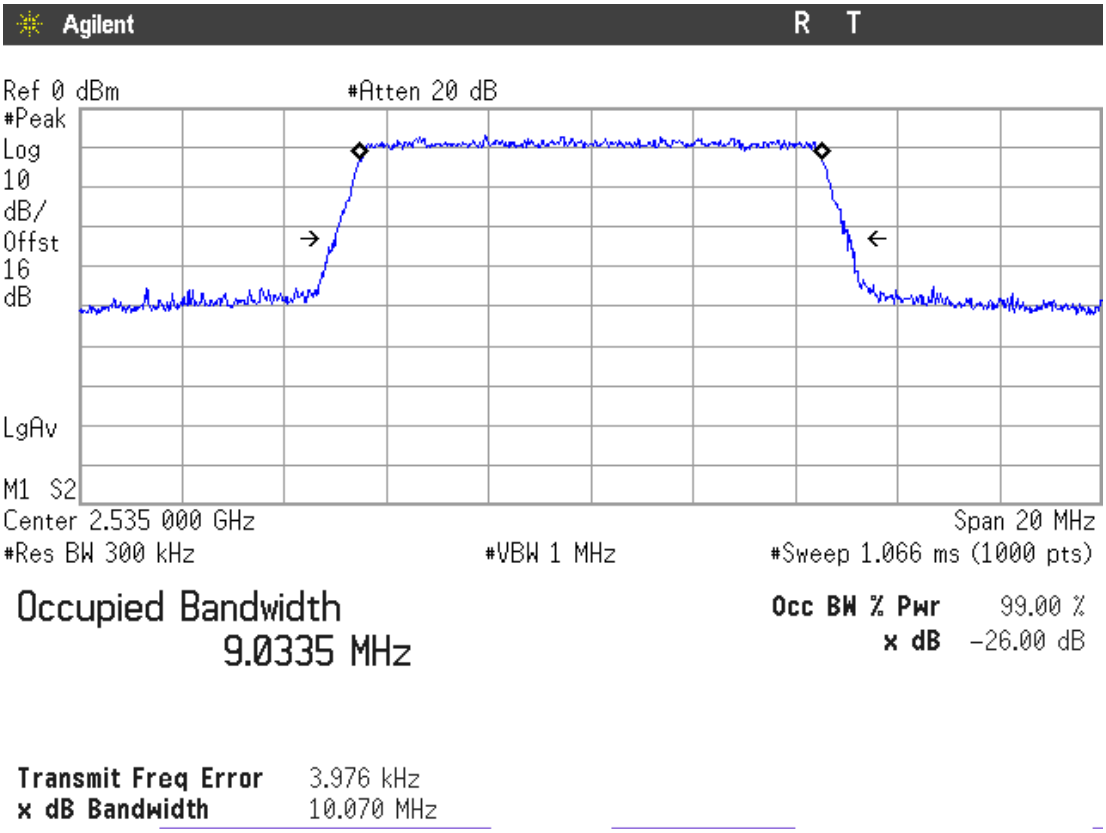


LTE QPSK MODULATION. BW = 10 MHz (Band VII)

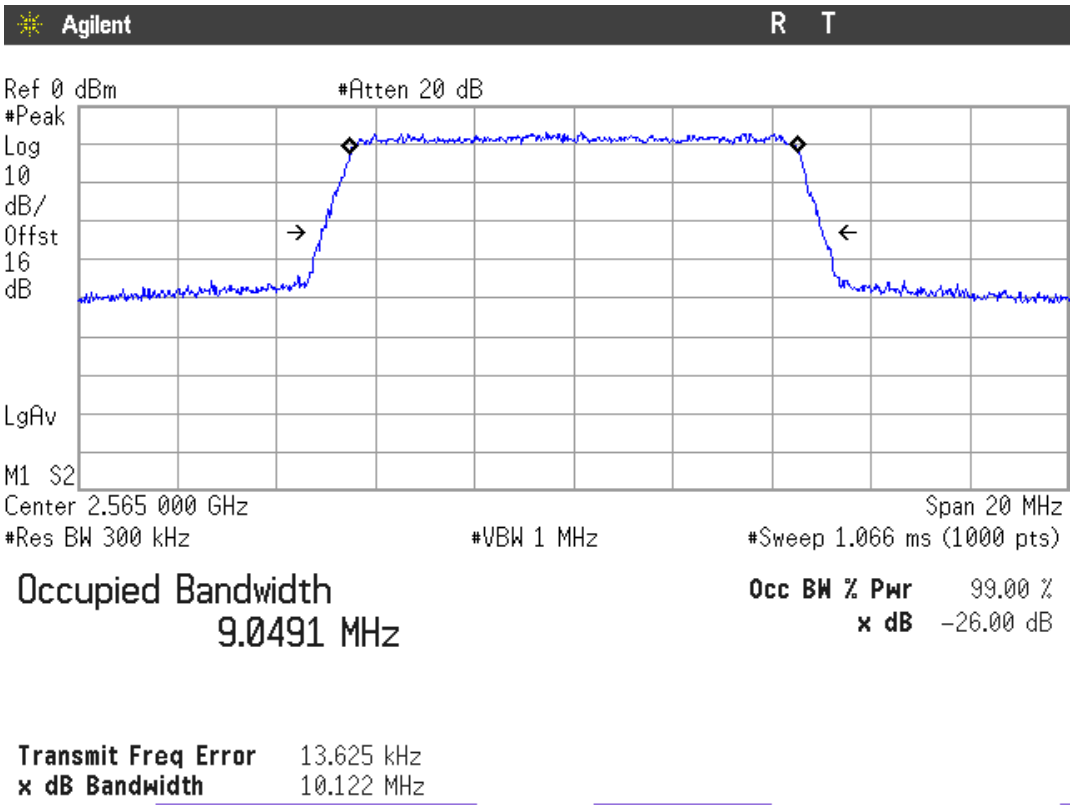
Lowest Channel



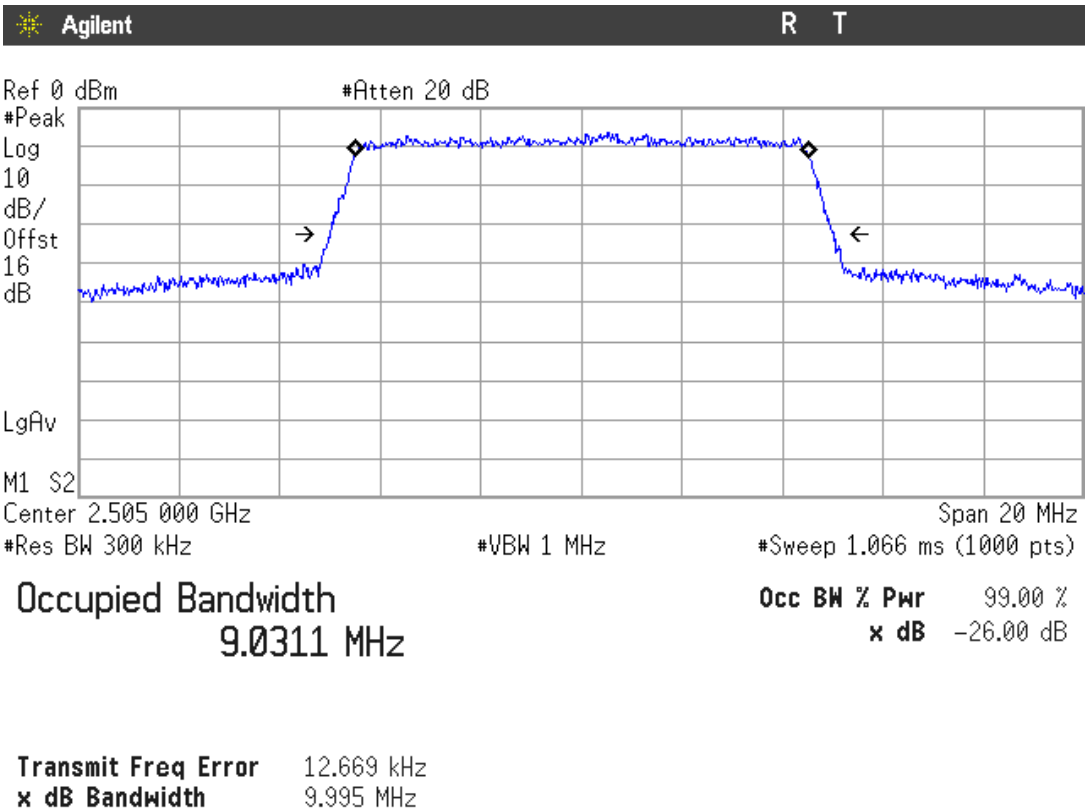
Middle Channel



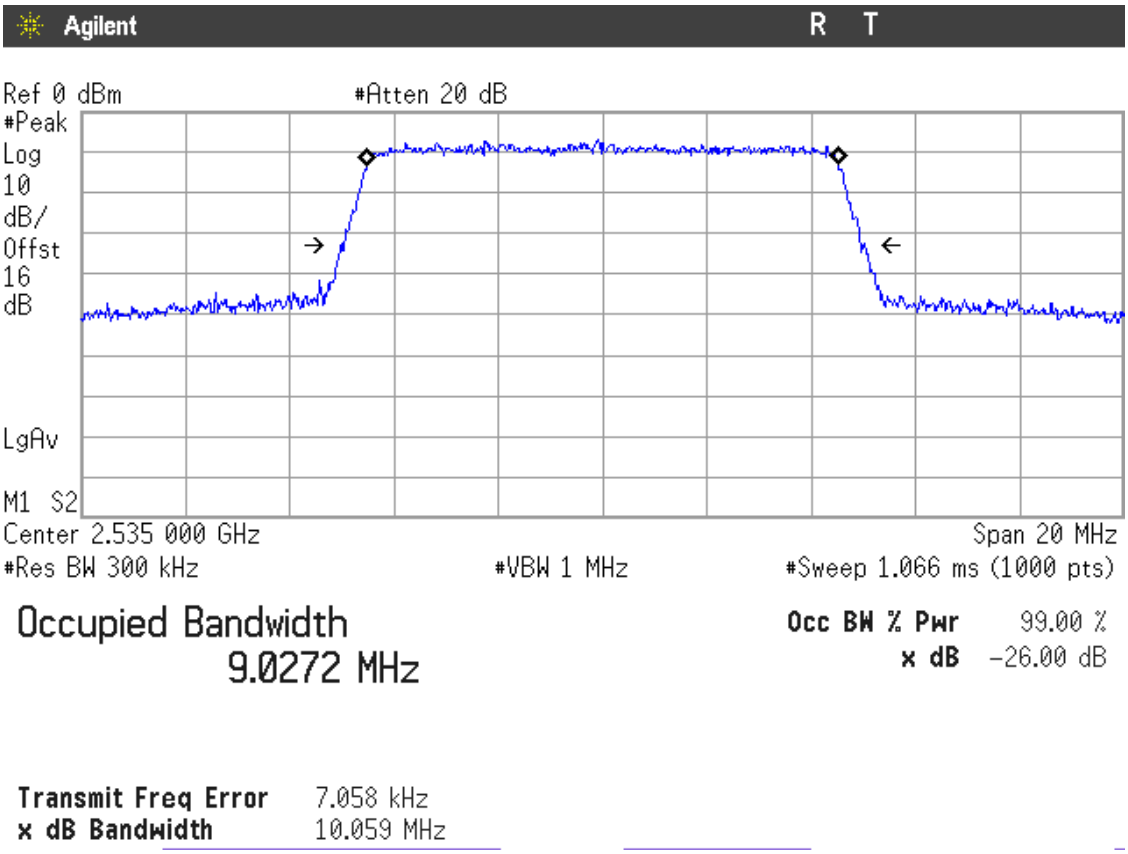
Highest Channel



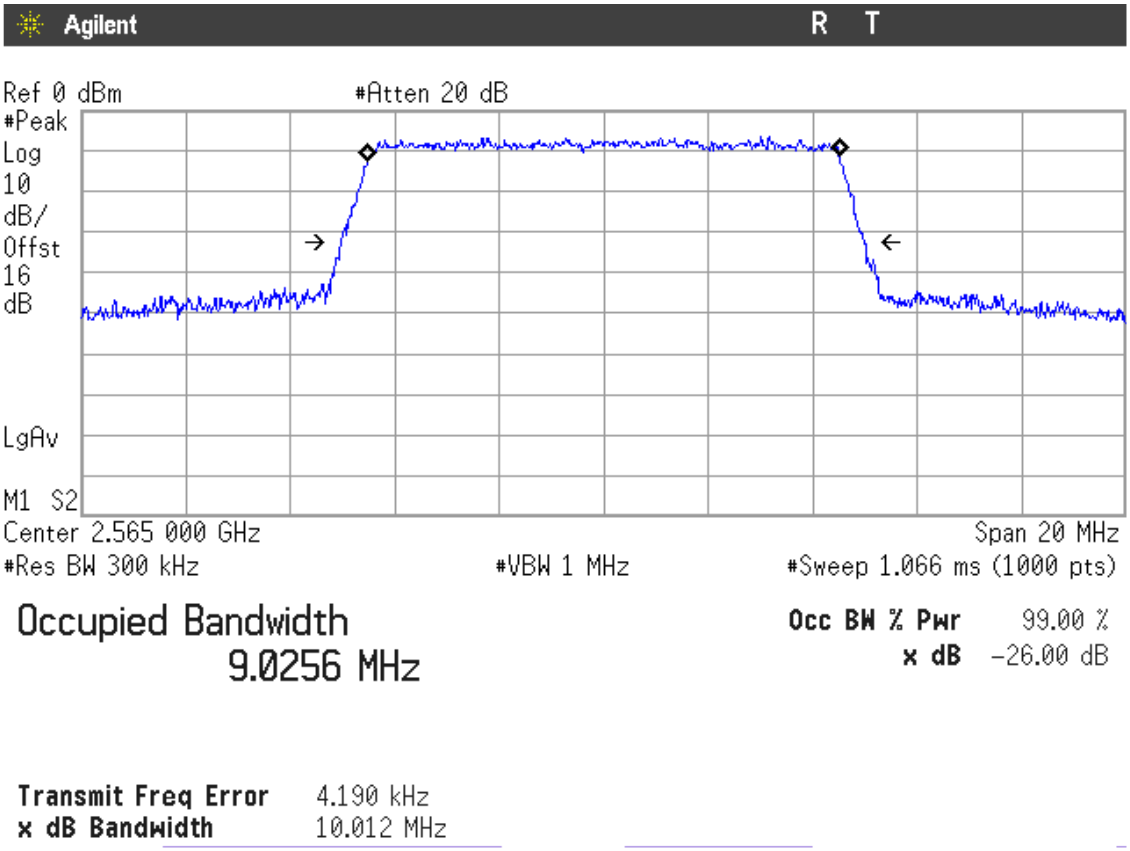
LTE 16QAM MODULATION. BW = 10 MHz (Band VII)
Lowest Channel



Middle Channel

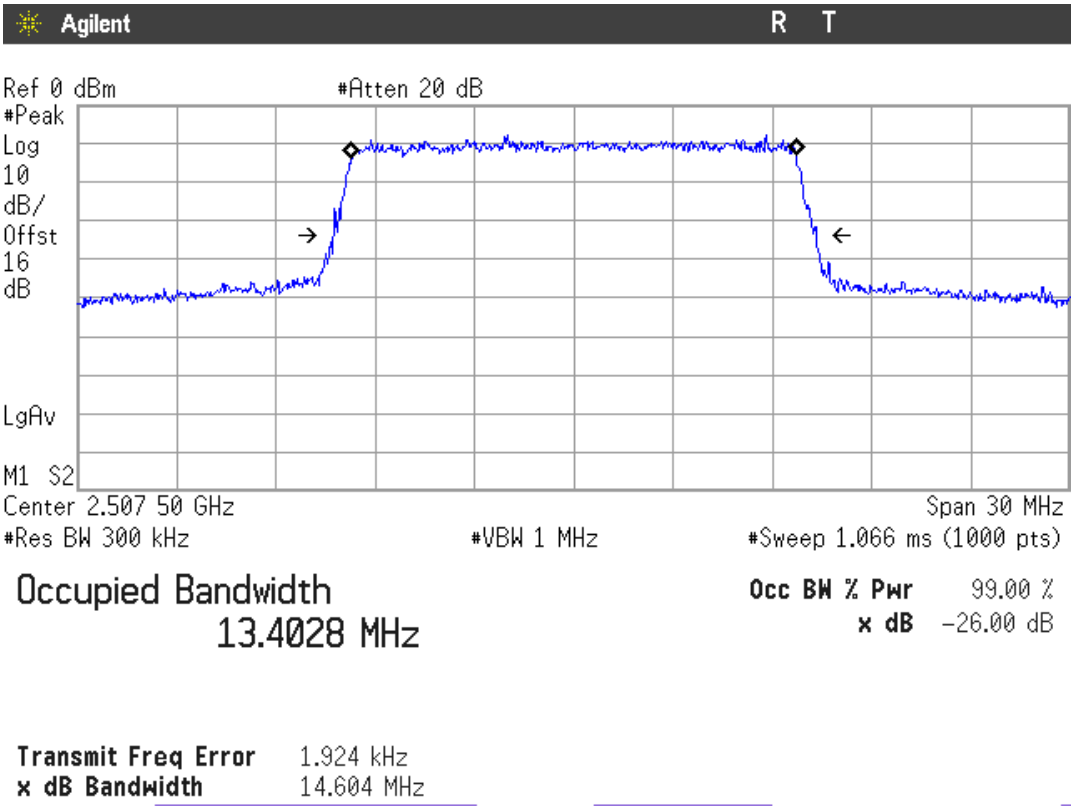


Highest Channel

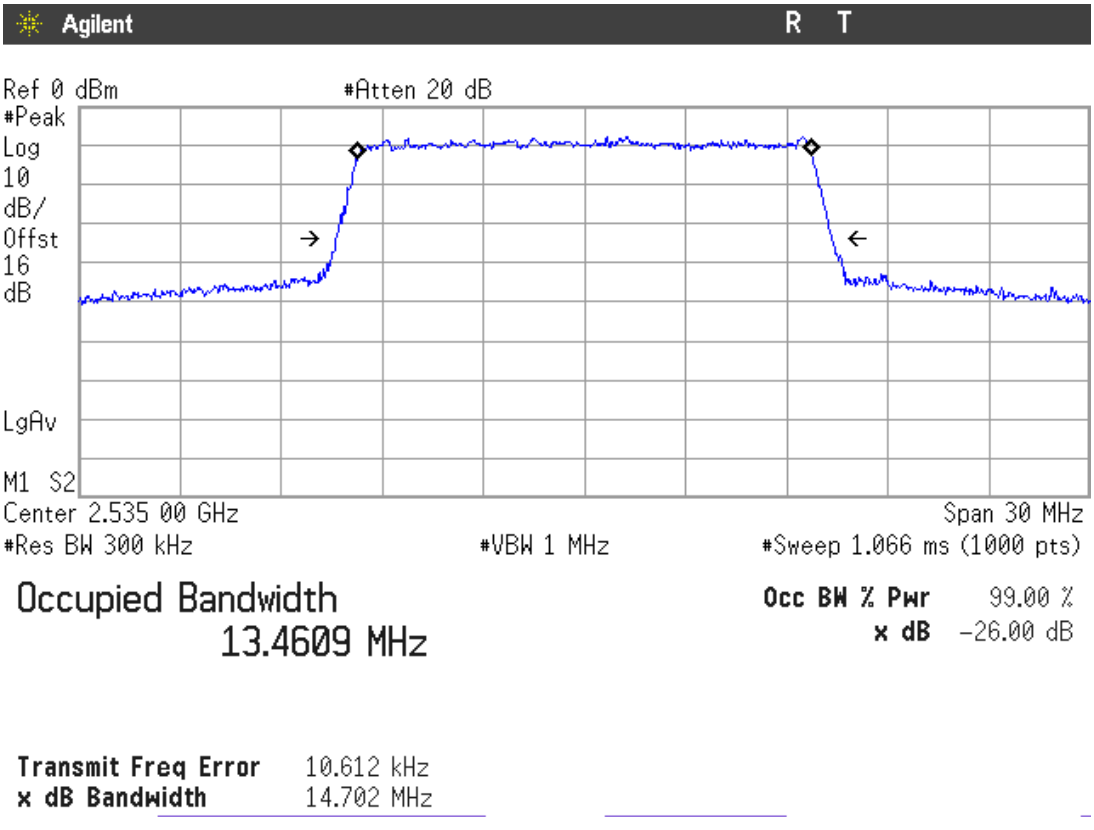


LTE QPSK MODULATION. BW = 15 MHz (Band VII)

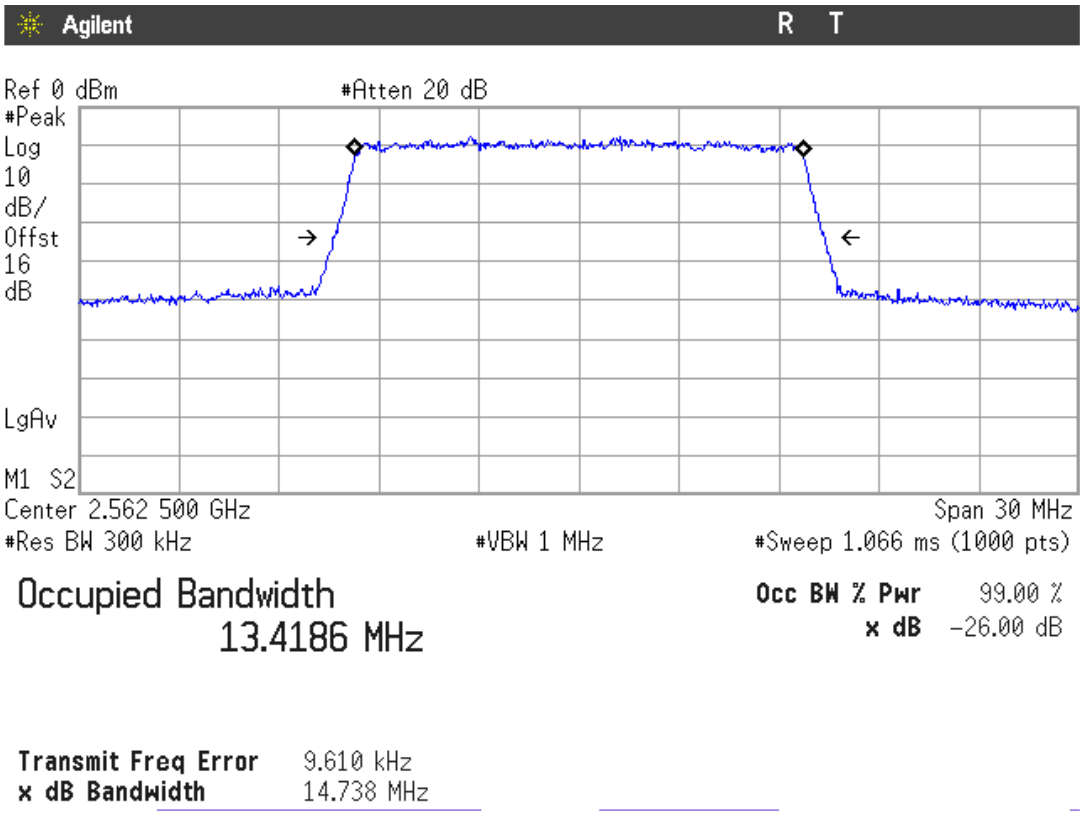
Lowest Channel



Middle Channel

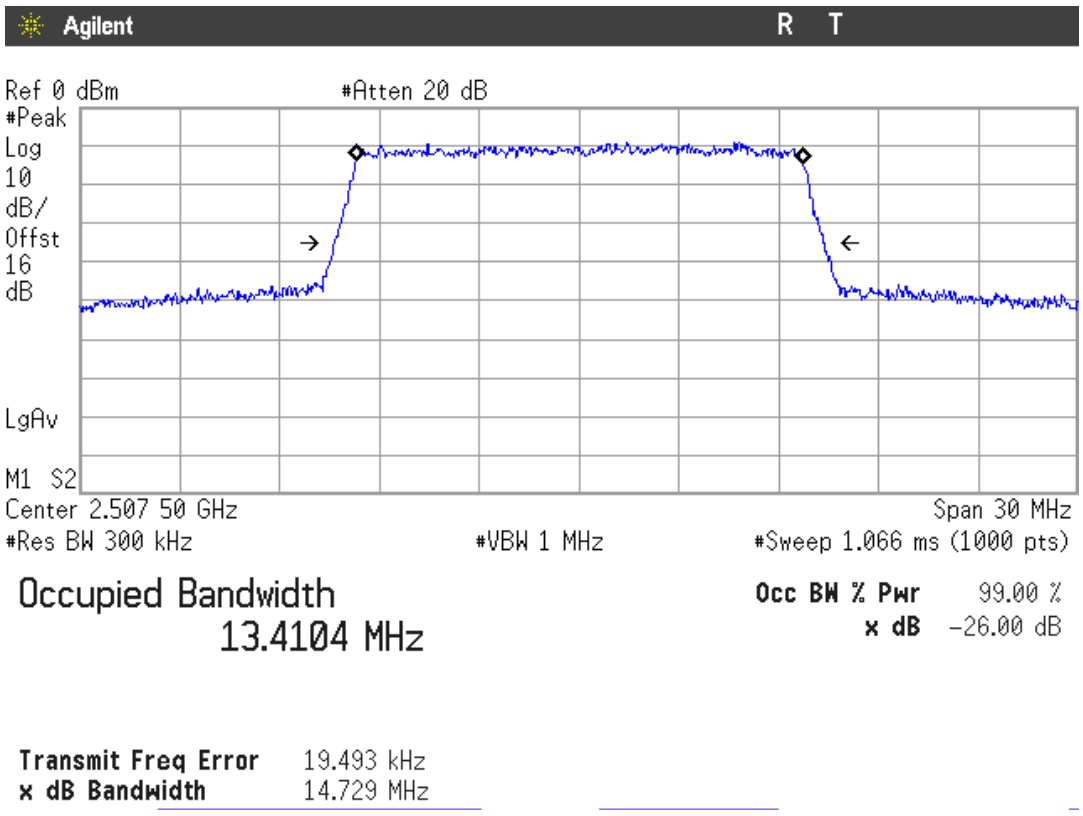


Highest Channel

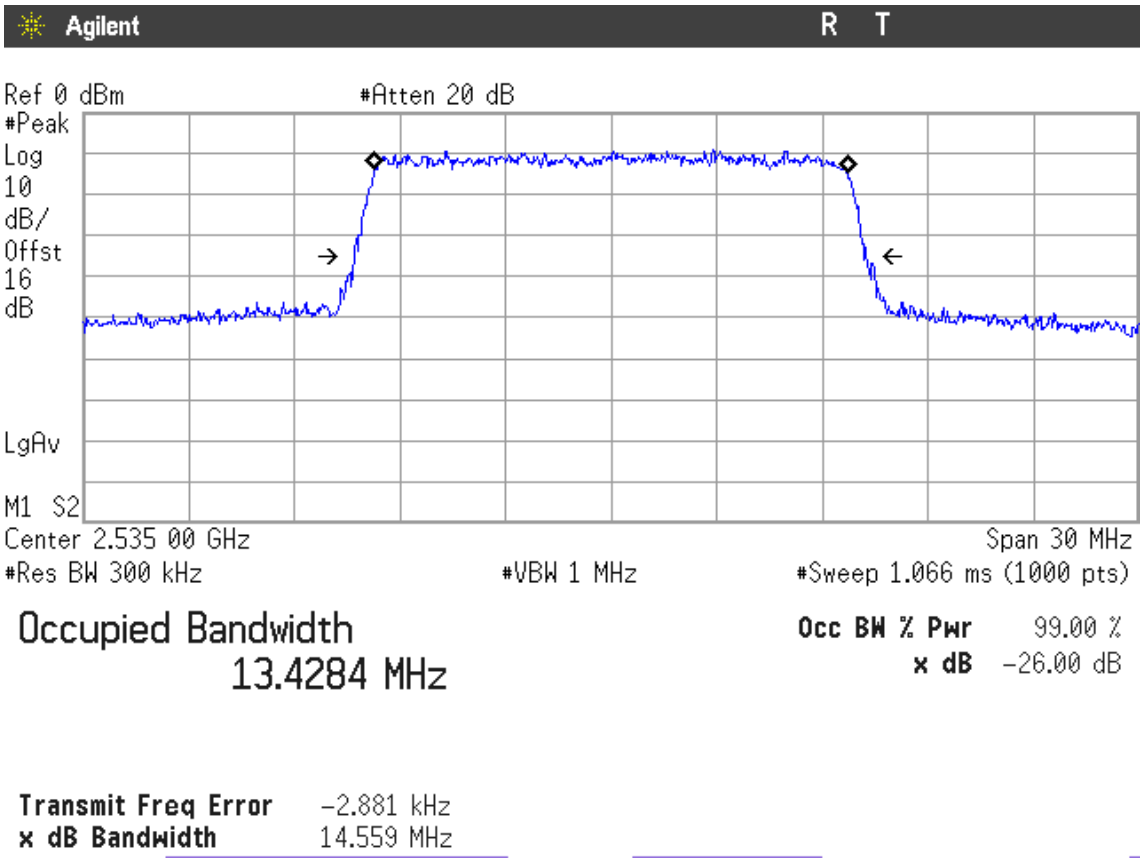


LTE 16QAM MODULATION. BW = 15 MHz (Band VII)

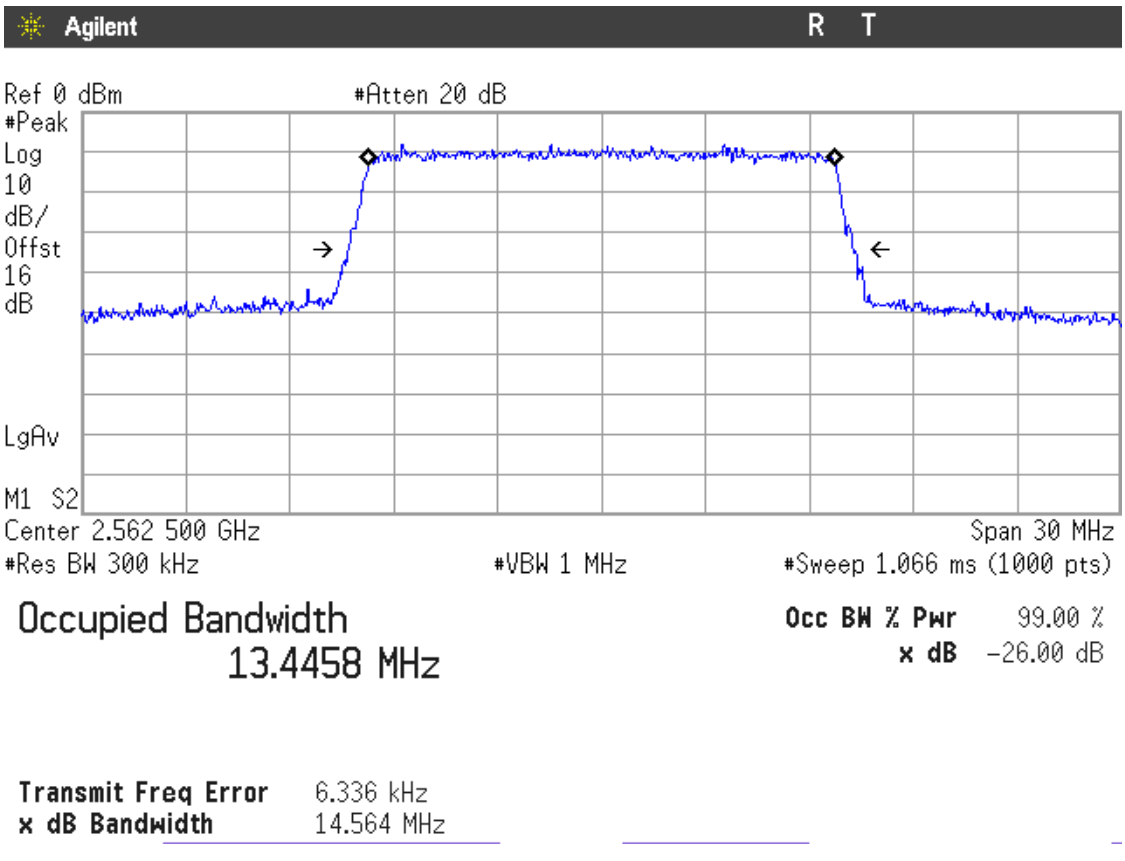
Lowest Channel



Middle Channel

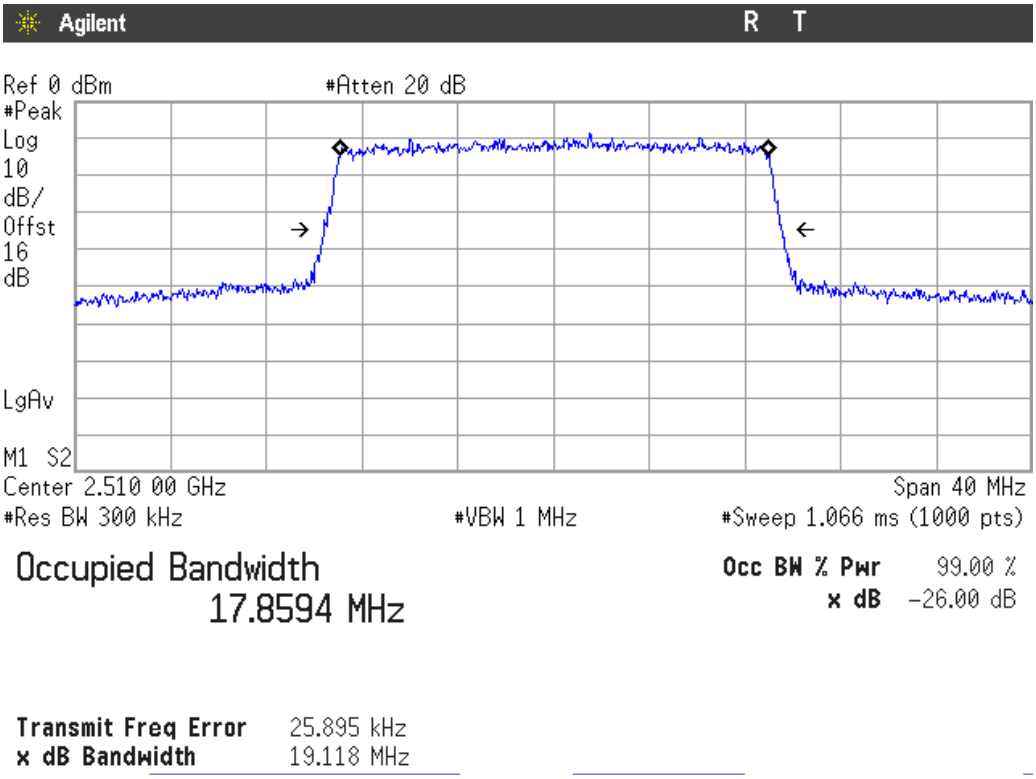


Highest Channel

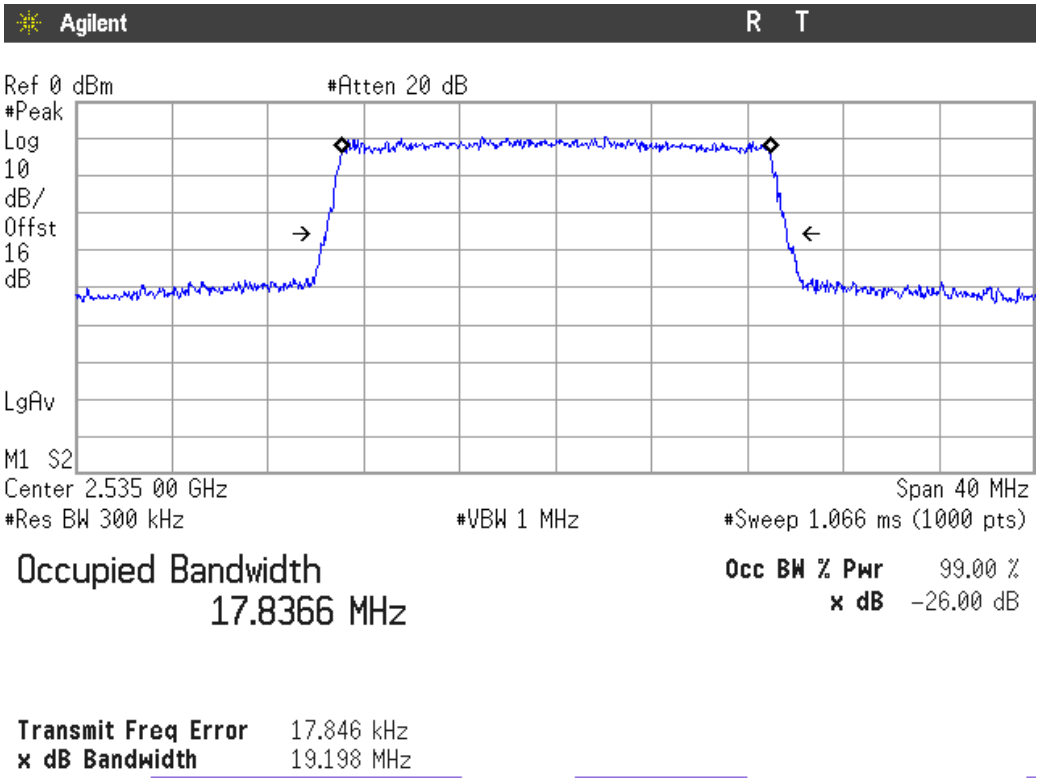


LTE QPSK MODULATION. BW = 20 MHz (Band VII)

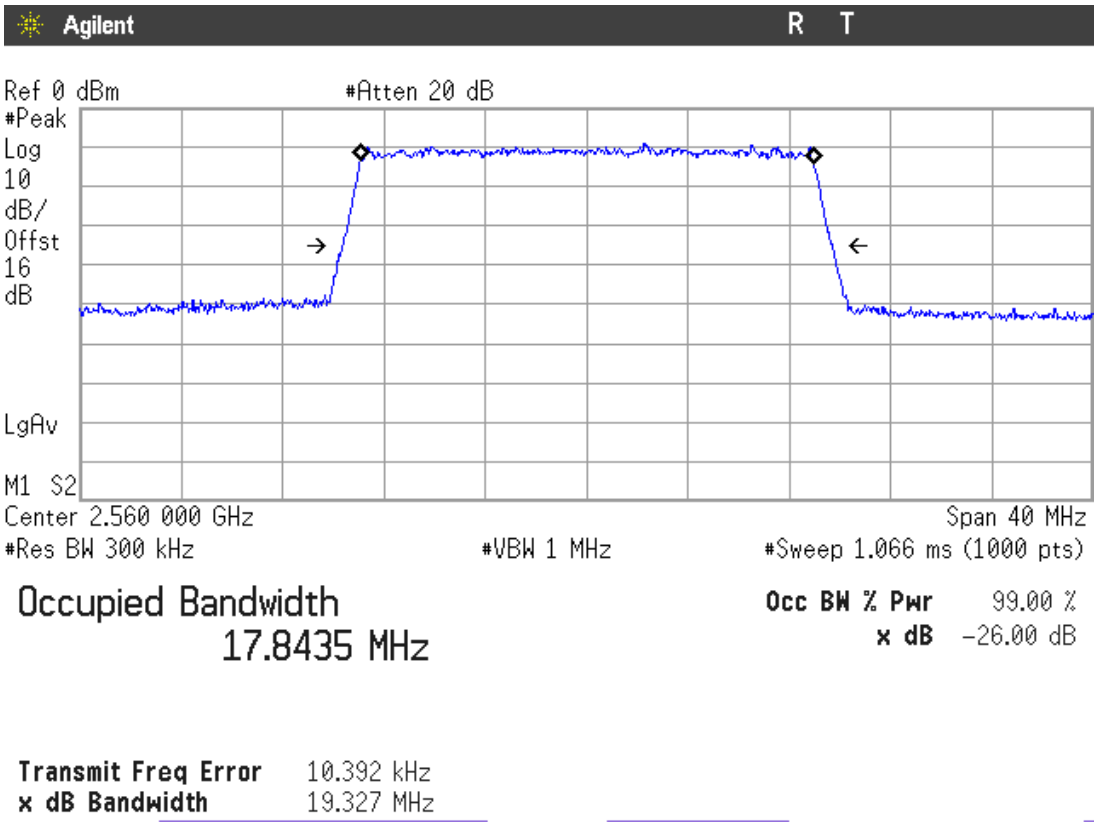
Lowest Channel



Middle Channel

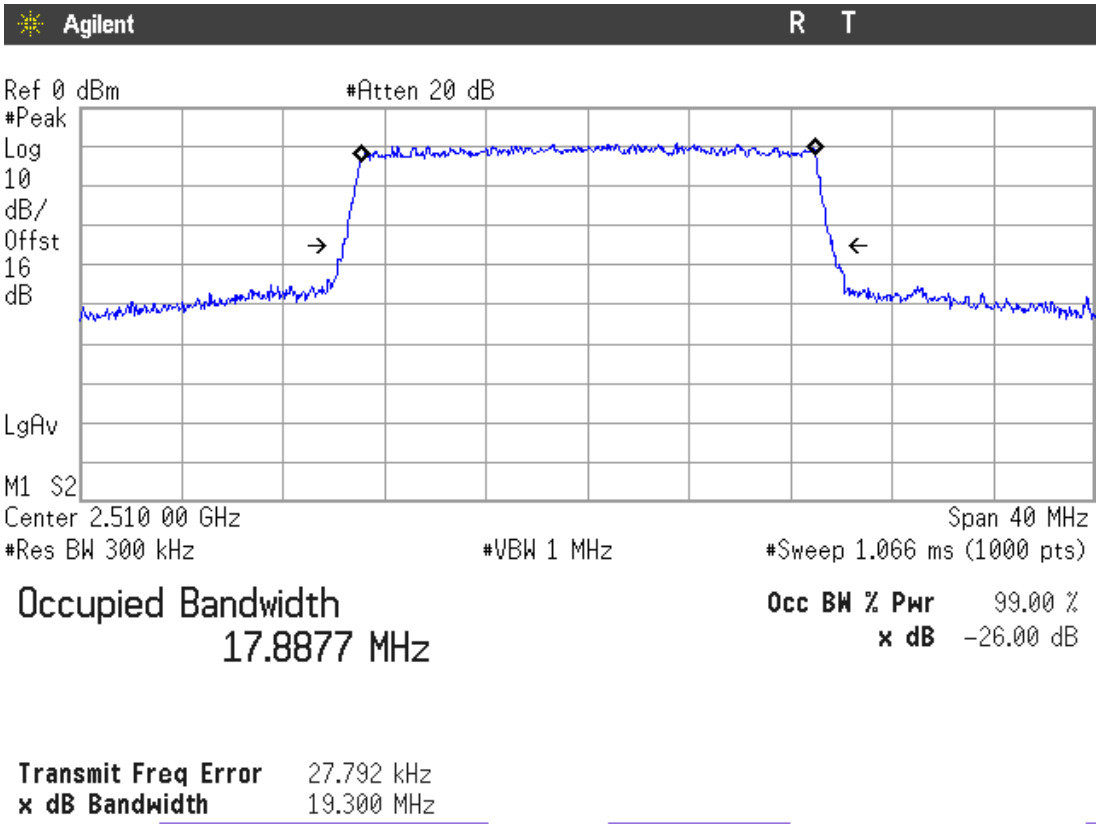


Highest Channel

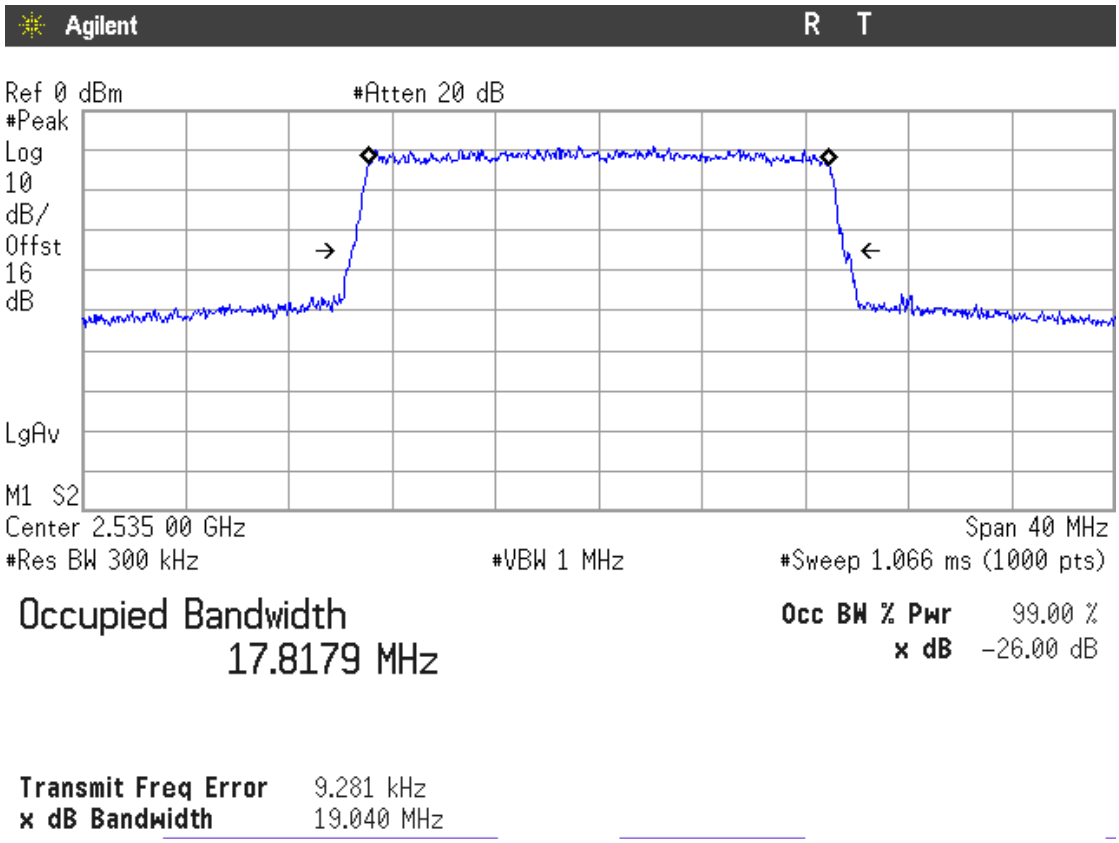


LTE 16QAM MODULATION. BW = 20 MHz (Band VII)

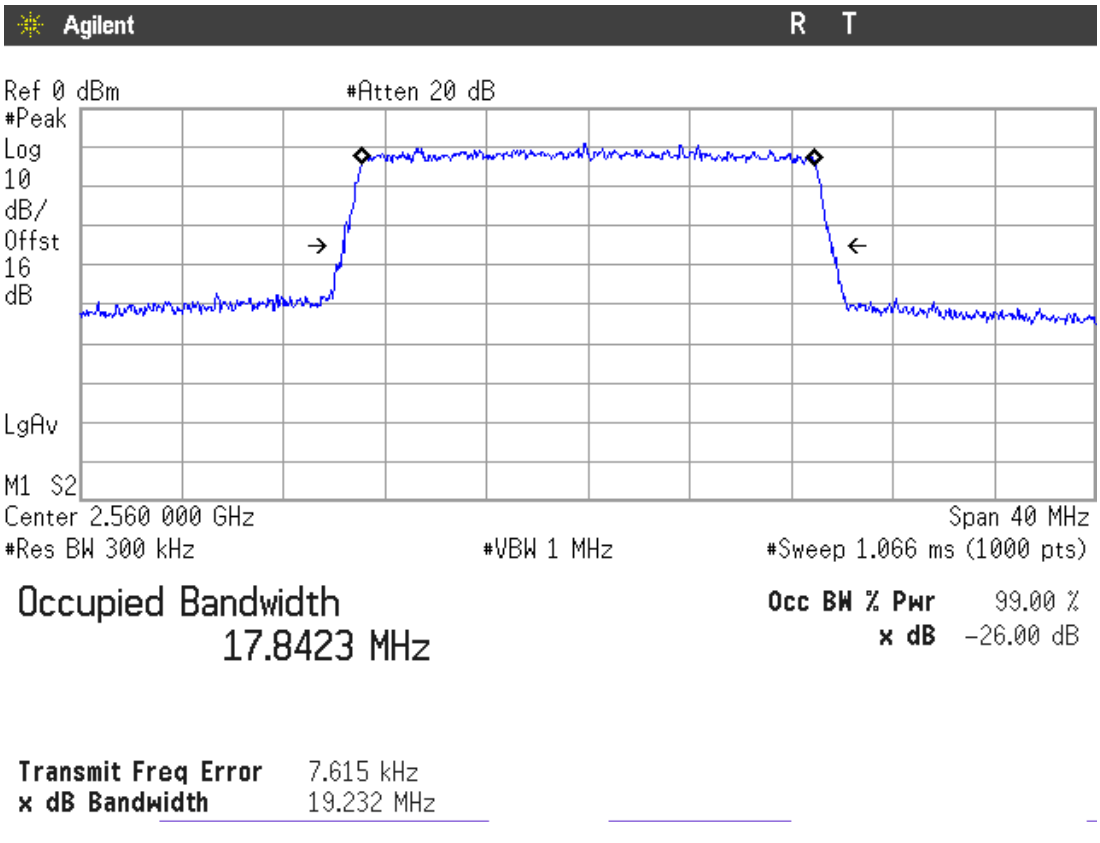
Lowest Channel



Middle Channel

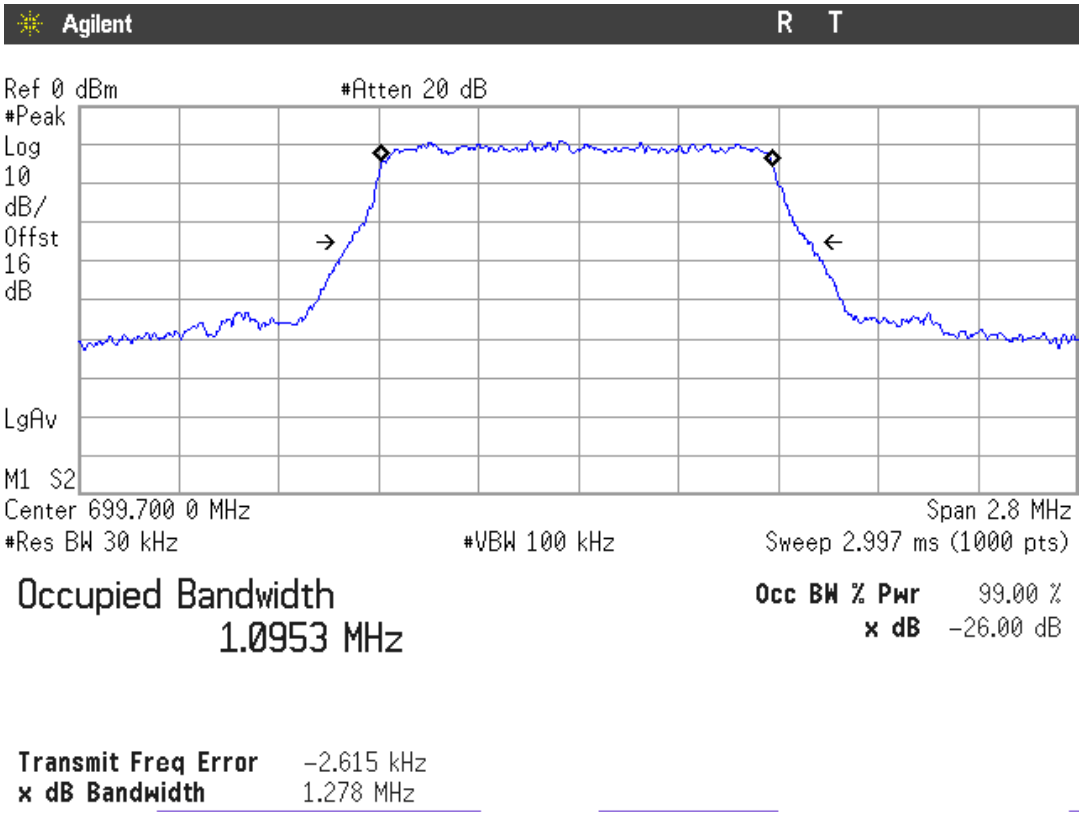


Highest Channel

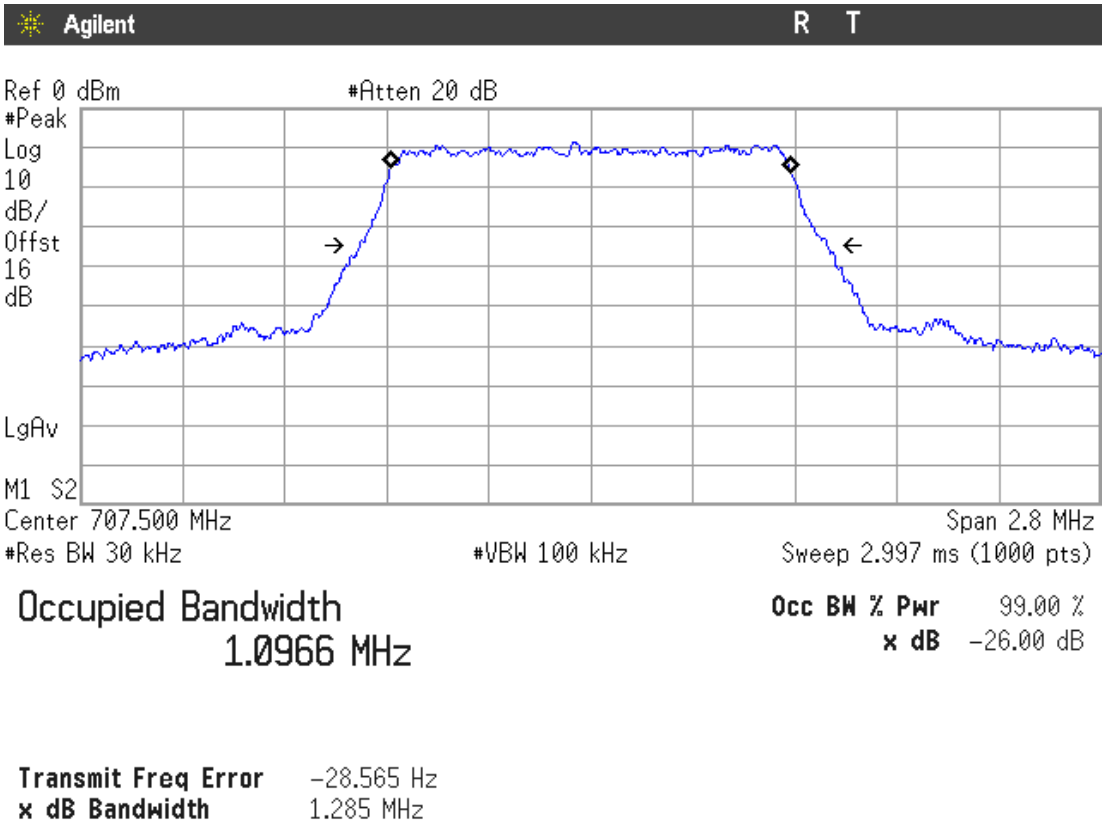


LTE QPSK MODULATION. BW = 1.4 MHz (Band XII)

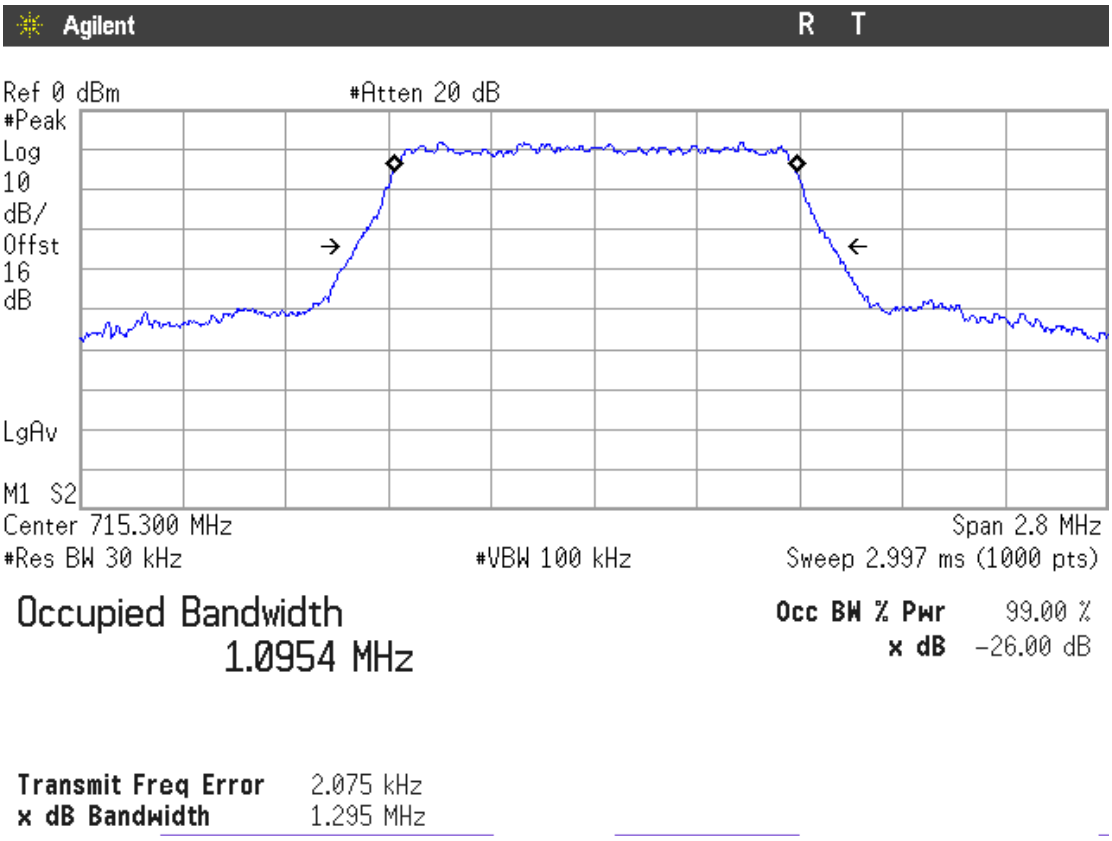
Lowest Channel



Middle Channel

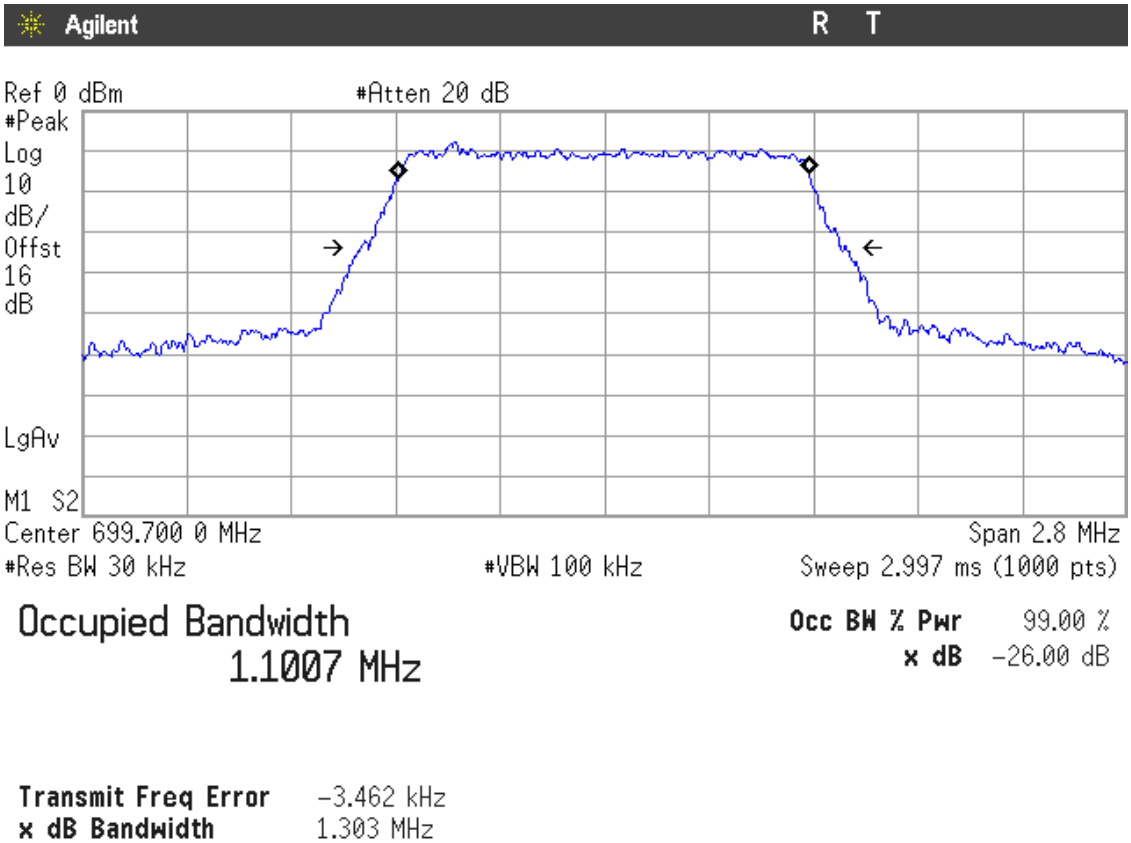


Highest Channel

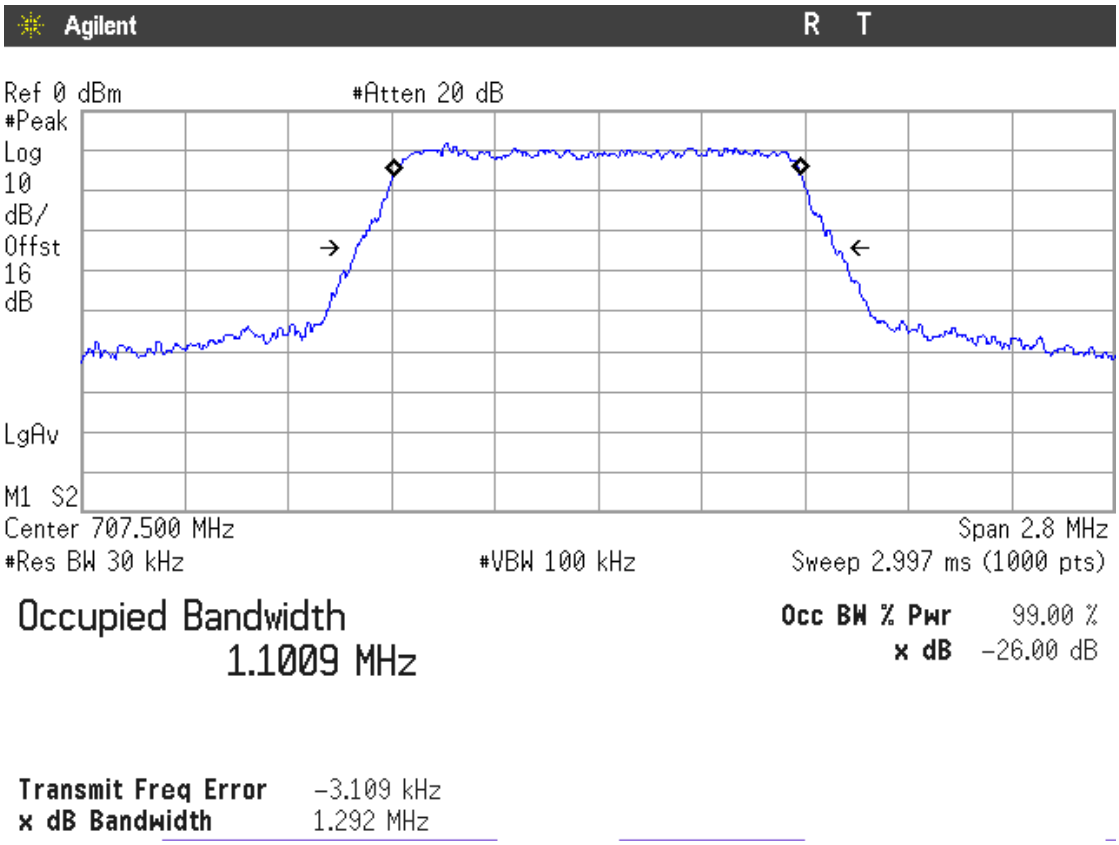


LTE 16QAM MODULATION. BW = 1.4 MHz (Band XII)

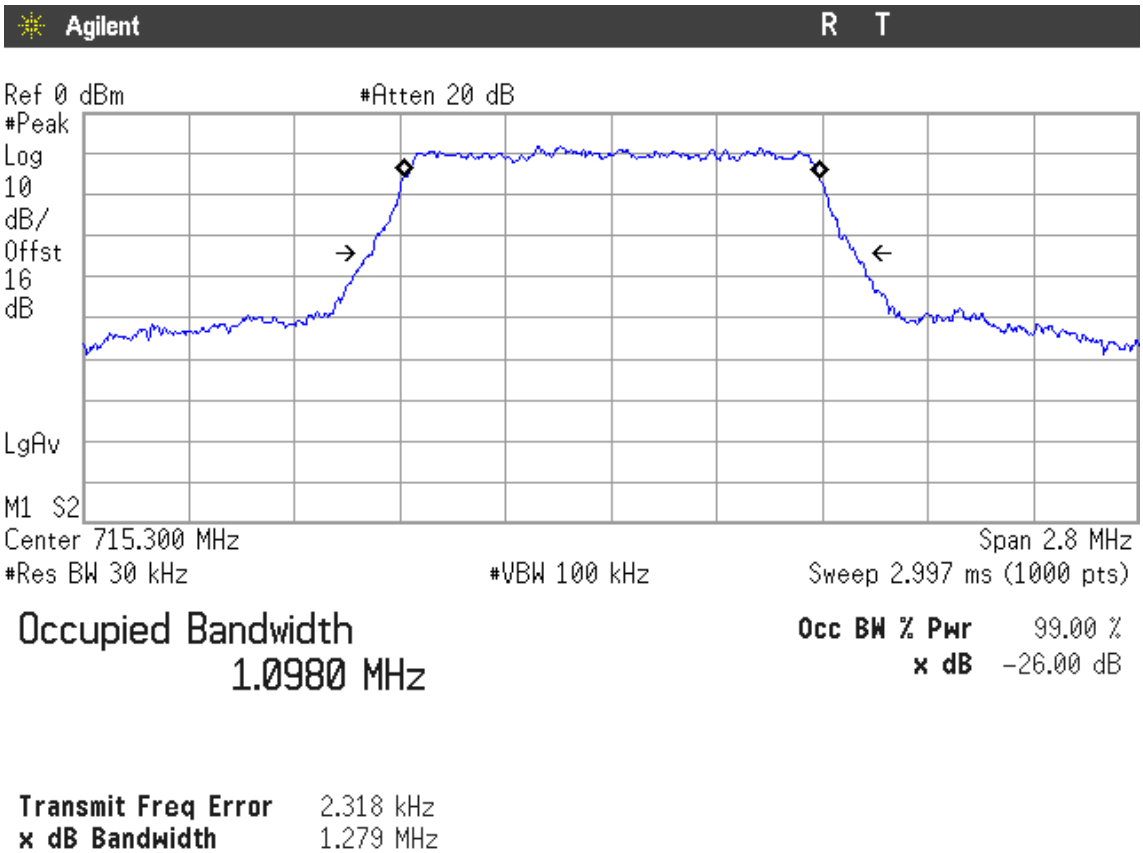
Lowest Channel



Middle Channel

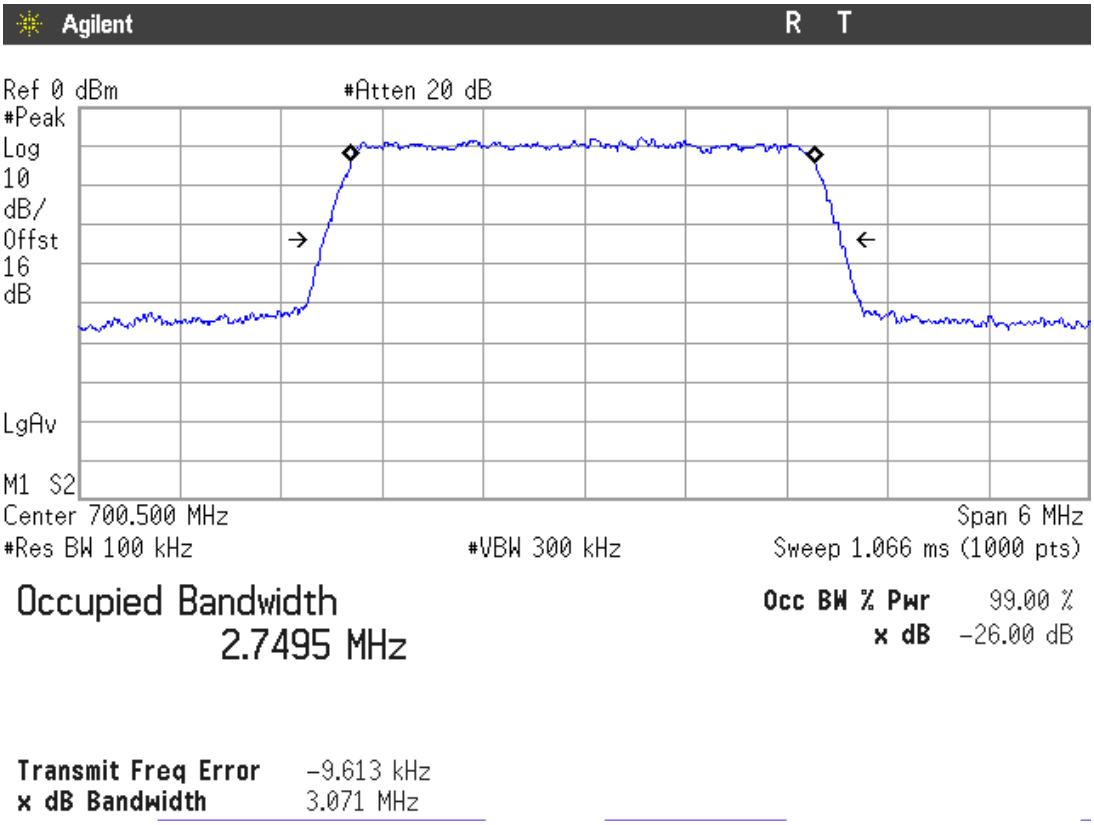


Highest Channel

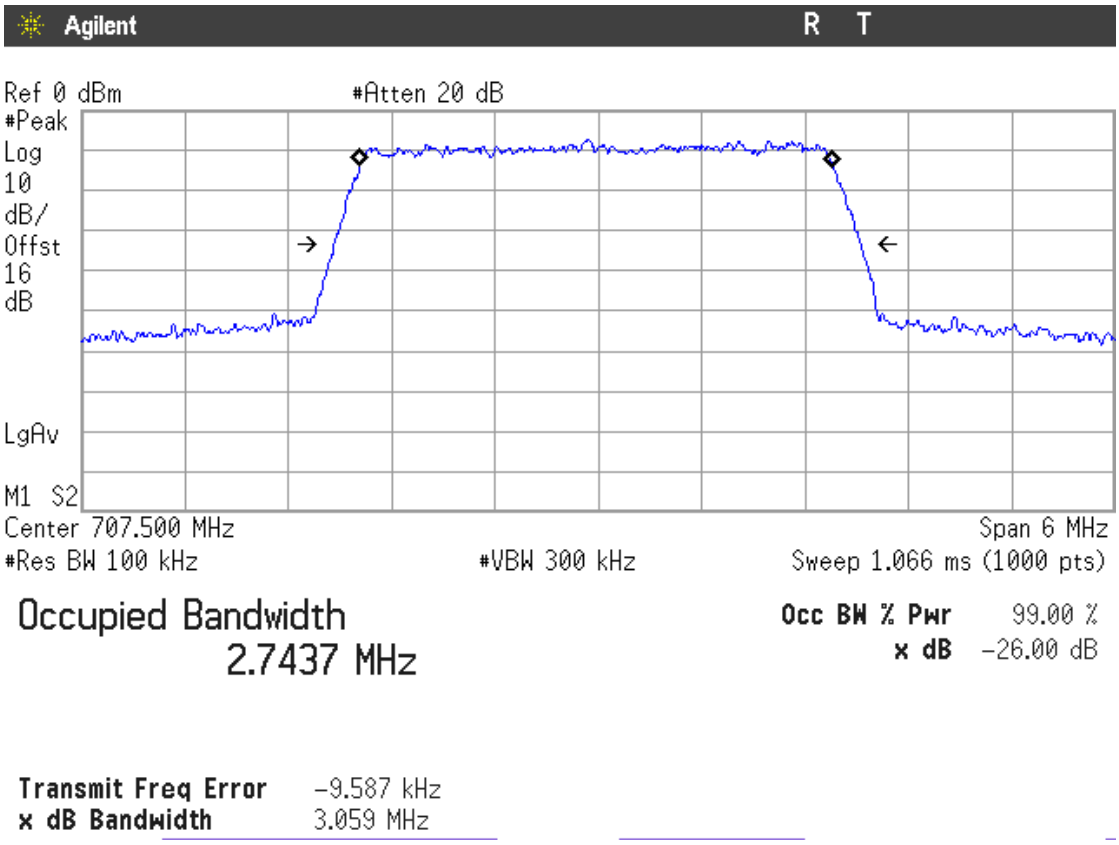


LTE QPSK MODULATION. BW = 3 MHz (Band XII)

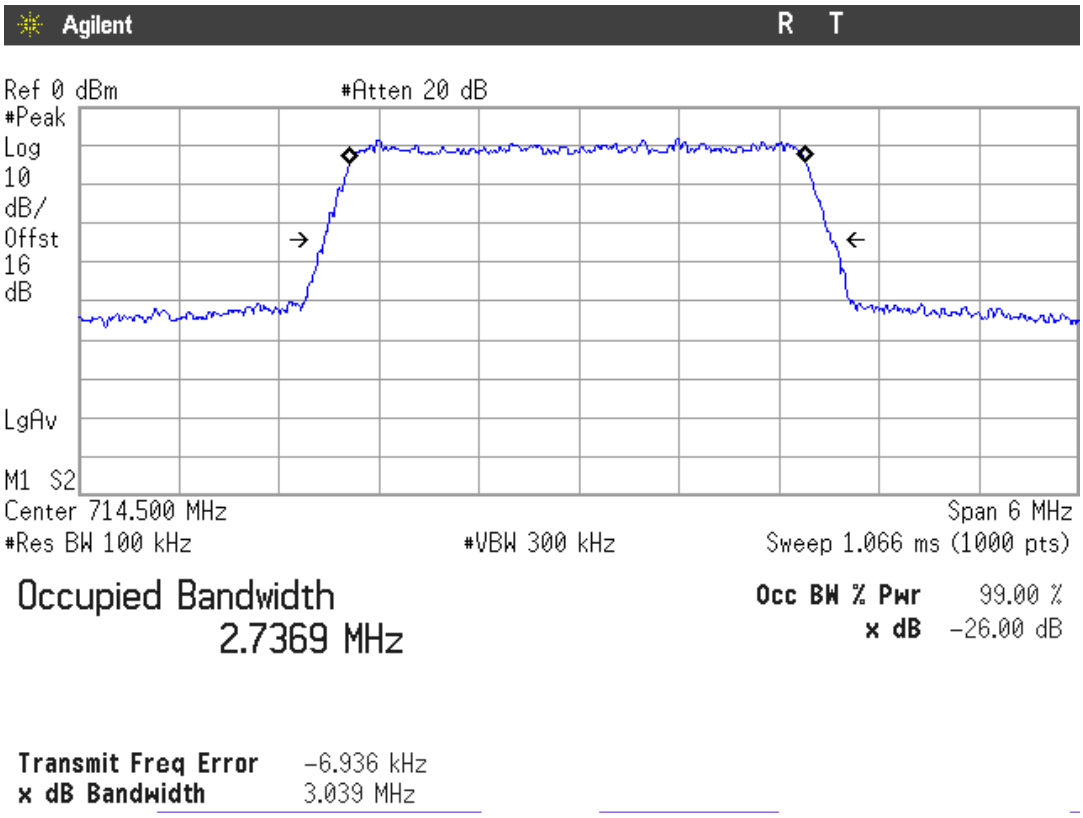
Lowest Channel



Middle Channel

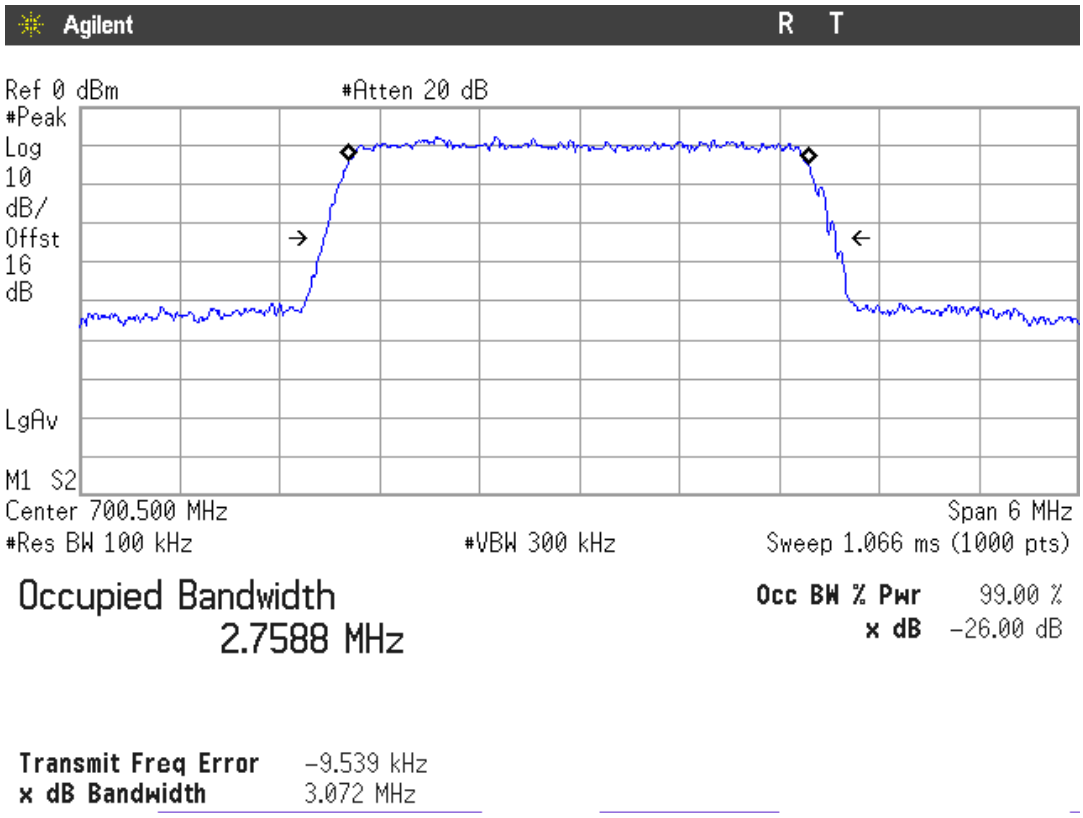


Highest Channel

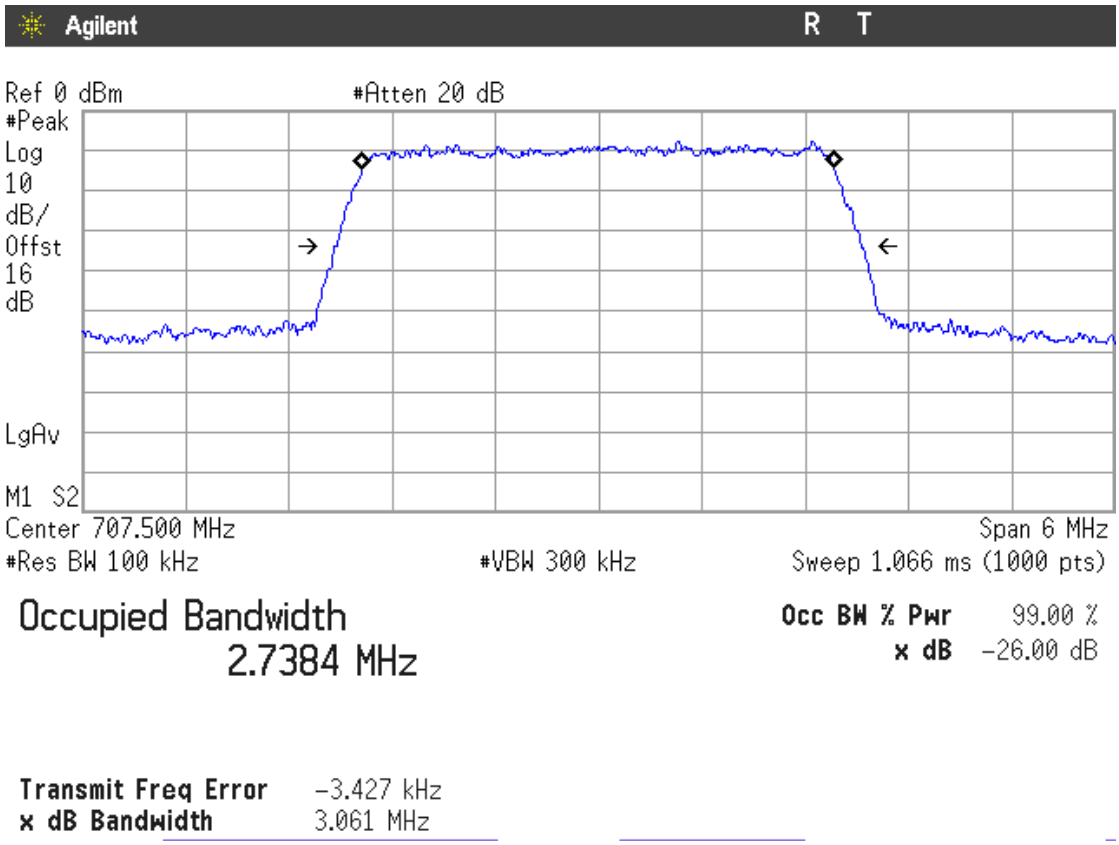


LTE 16QAM MODULATION. BW = 3 MHz (Band XII)

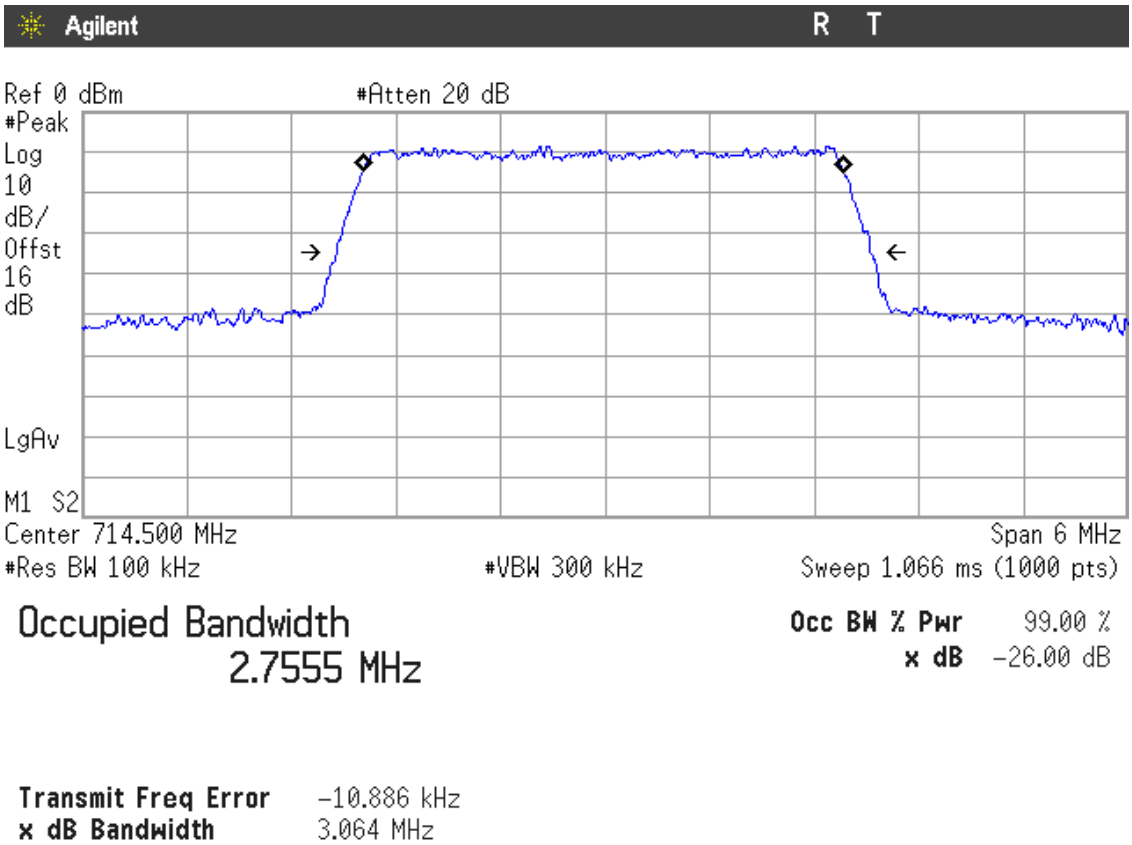
Lowest Channel



Middle Channel

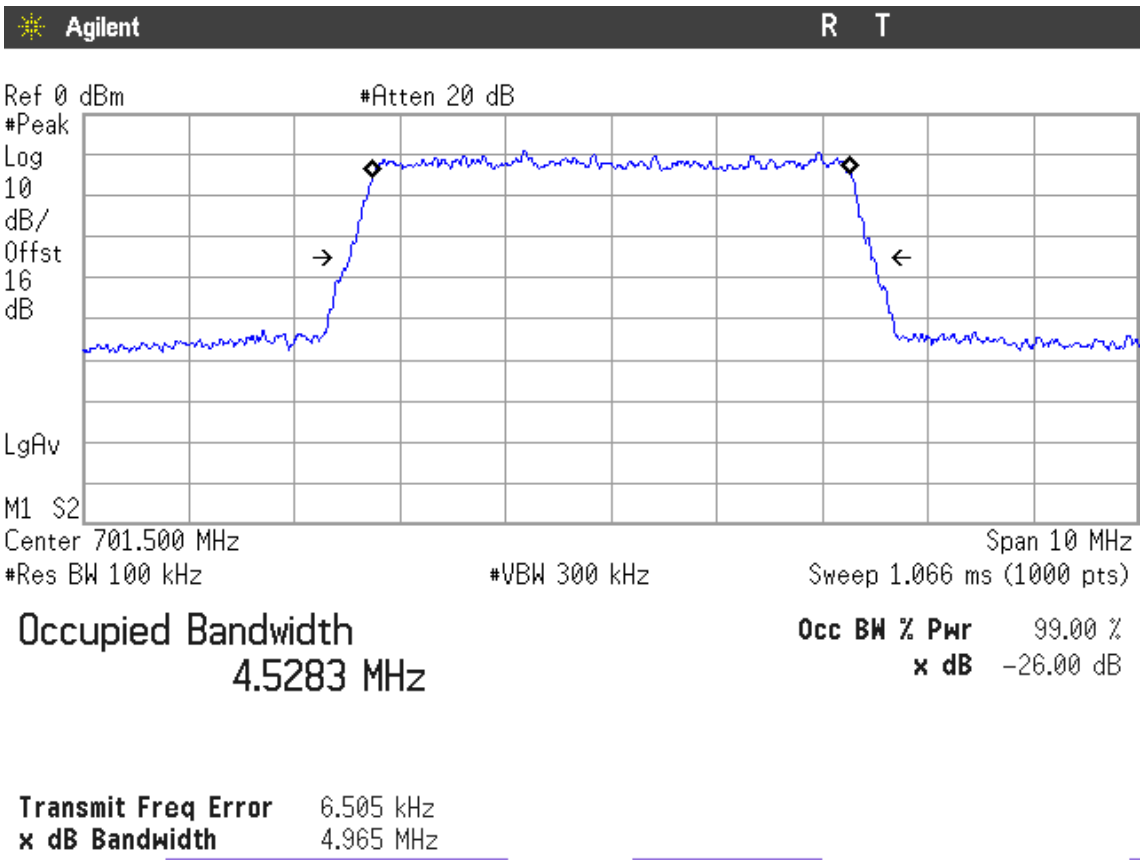


Highest Channel

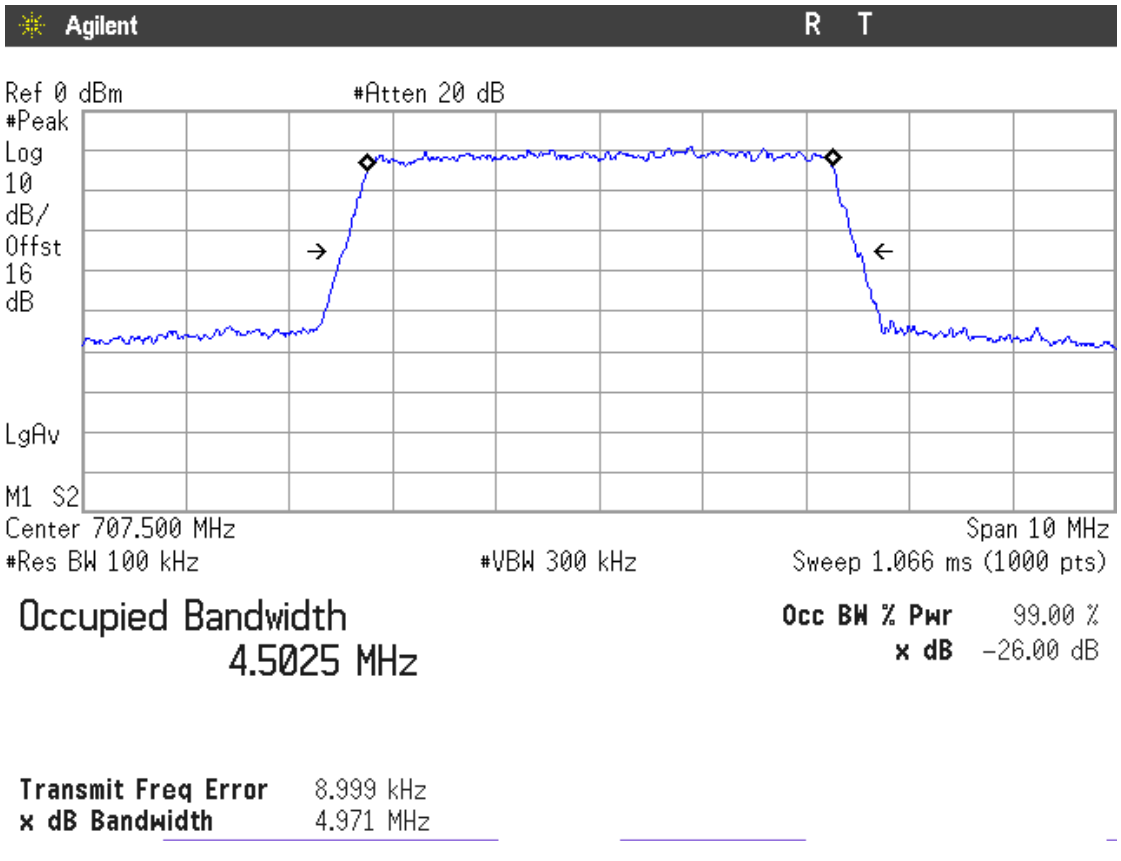


LTE QPSK MODULATION. BW = 5 MHz (Band XII)

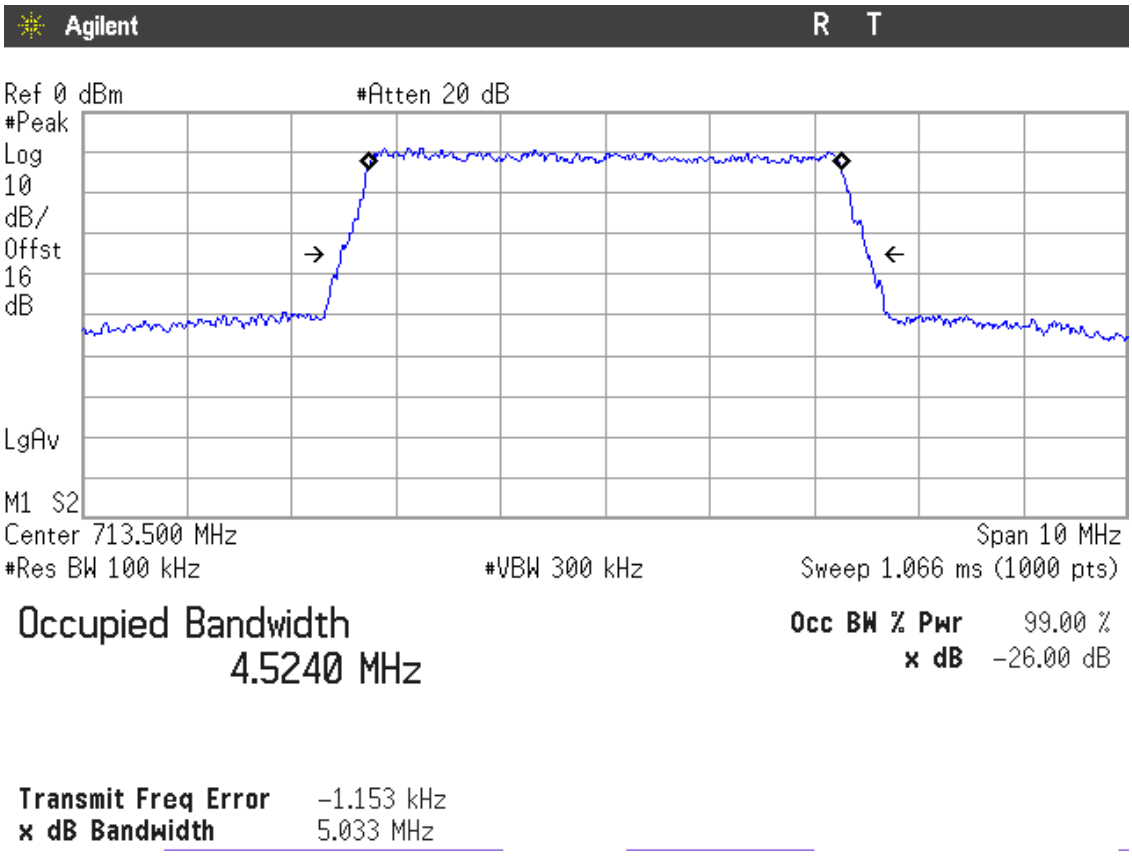
Lowest Channel



Middle Channel

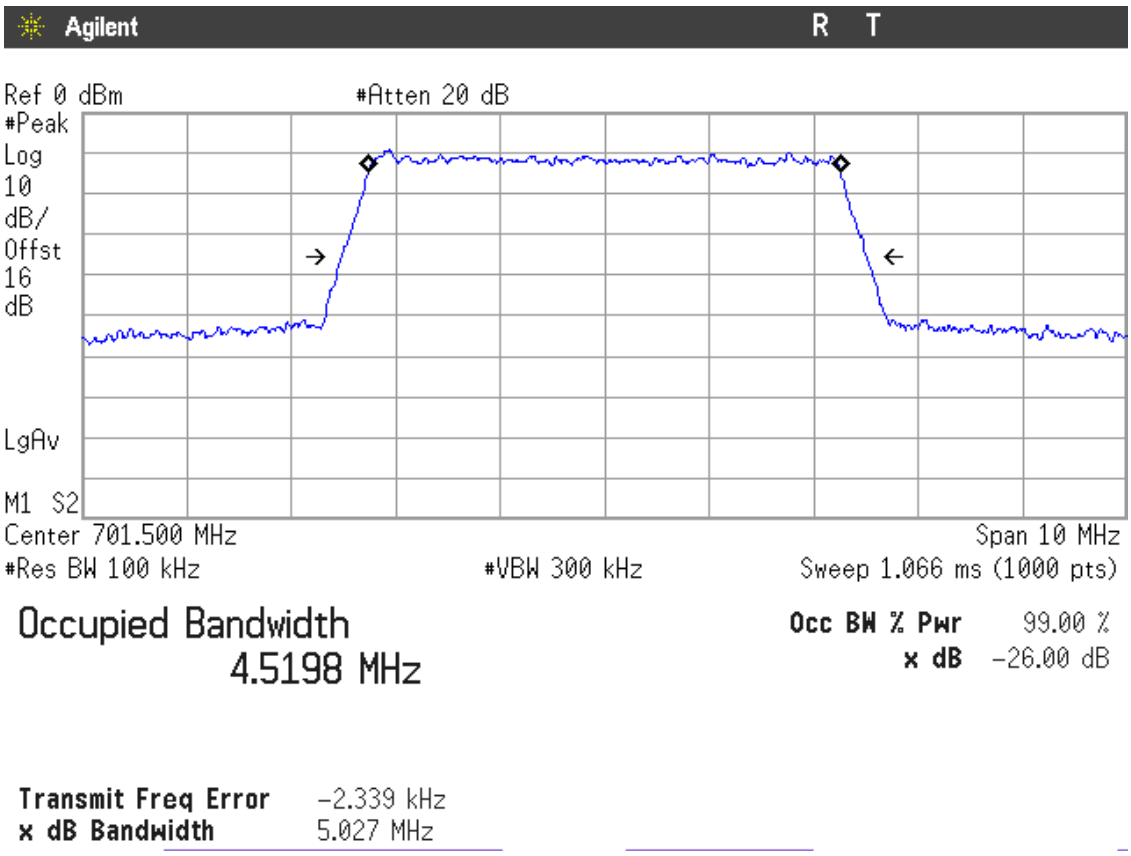


Highest Channel

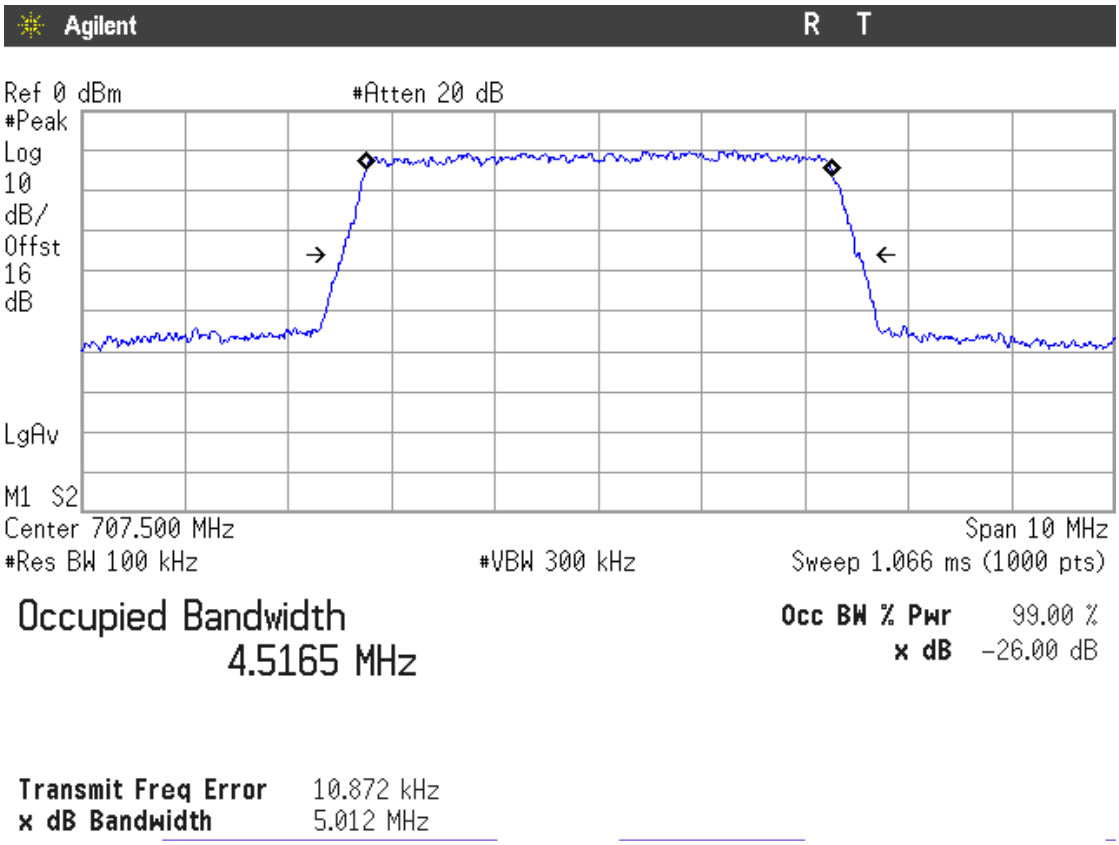


LTE 16QAM MODULATION. BW = 5 MHz (Band XII)

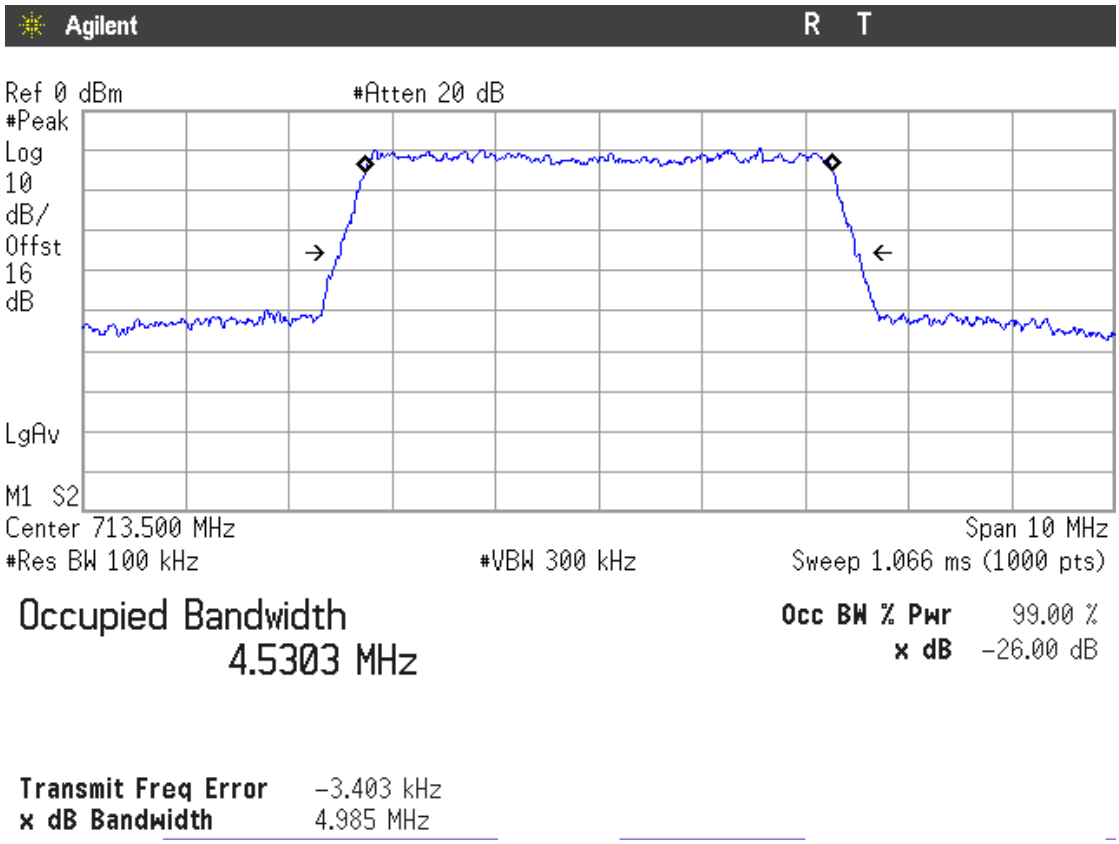
Lowest Channel



Middle Channel

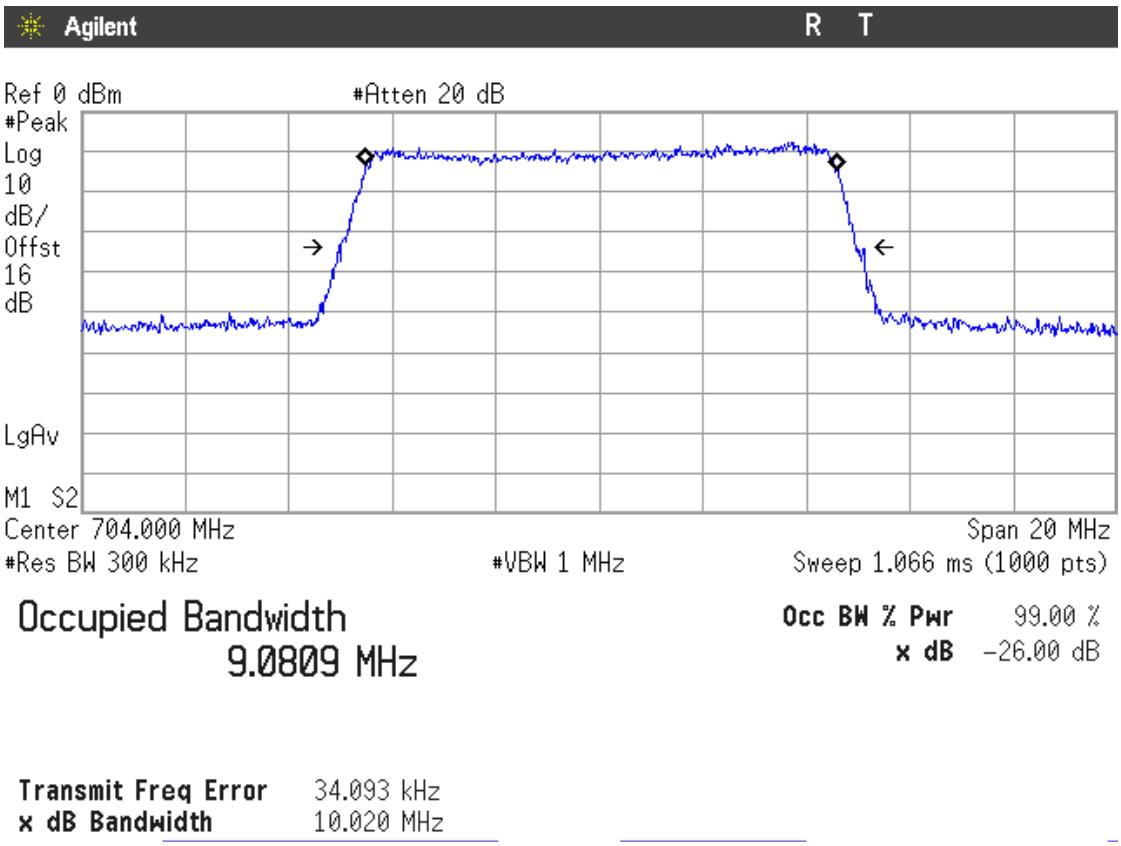


Highest Channel

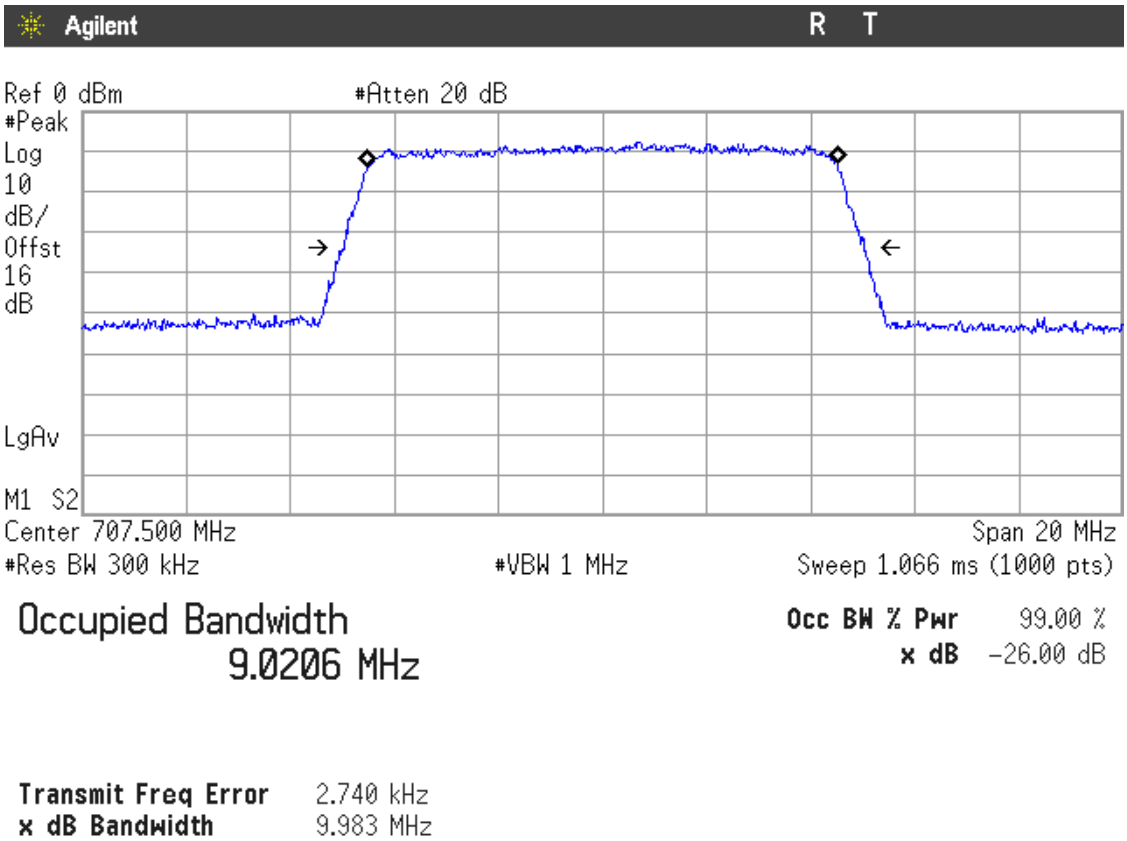


LTE QPSK MODULATION. BW = 10 MHz (Band XII)

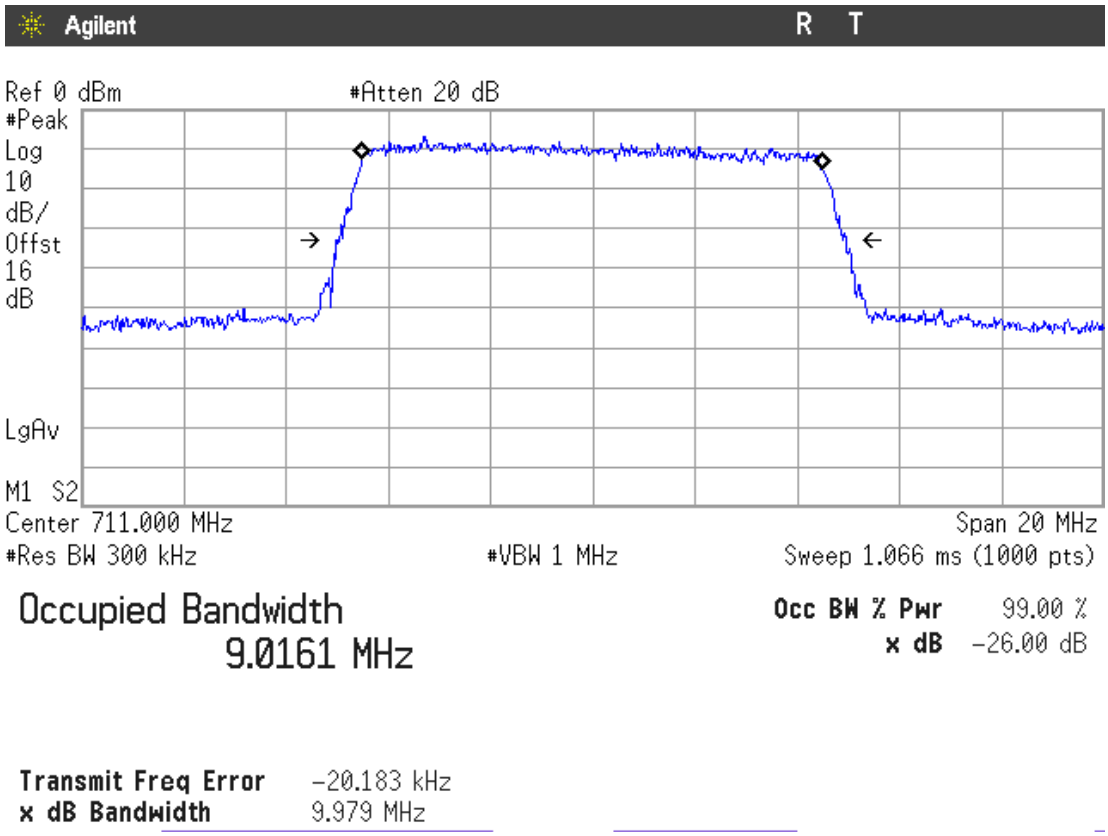
Lowest Channel



Middle Channel

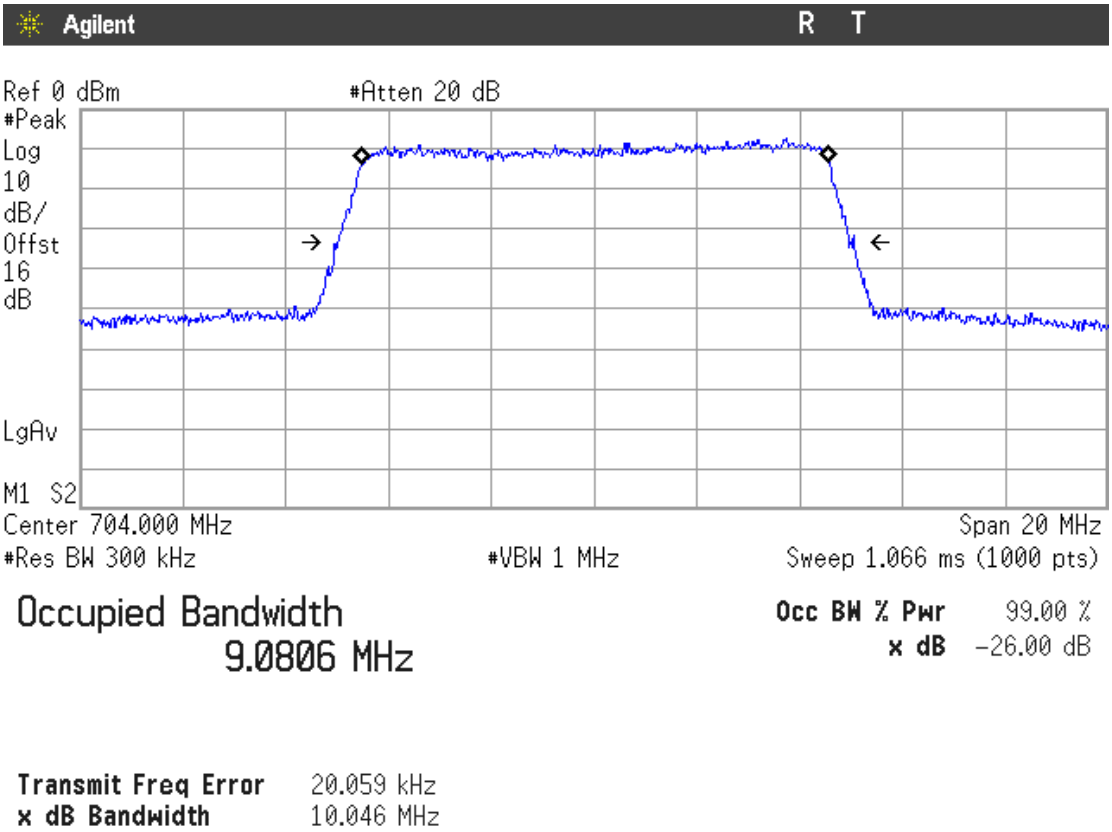


Highest Channel

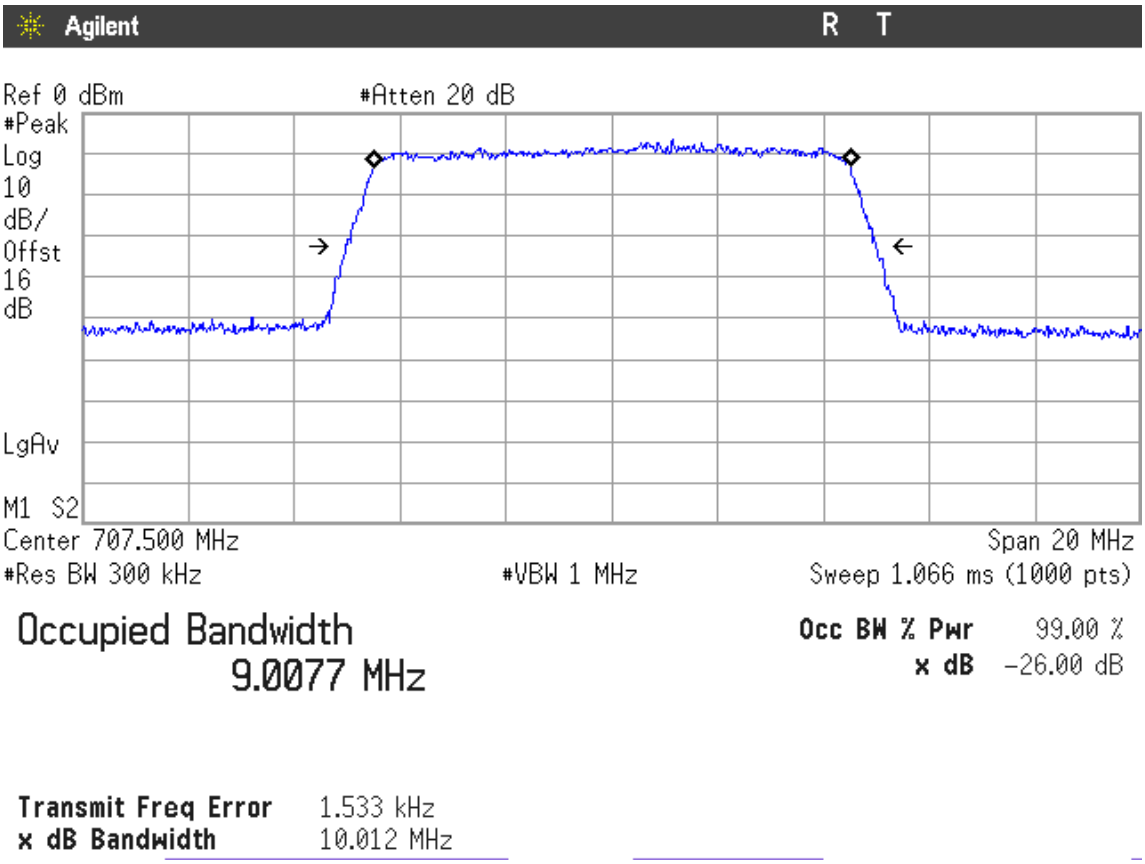


LTE 16QAM MODULATION. BW = 10 MHz (Band XII)

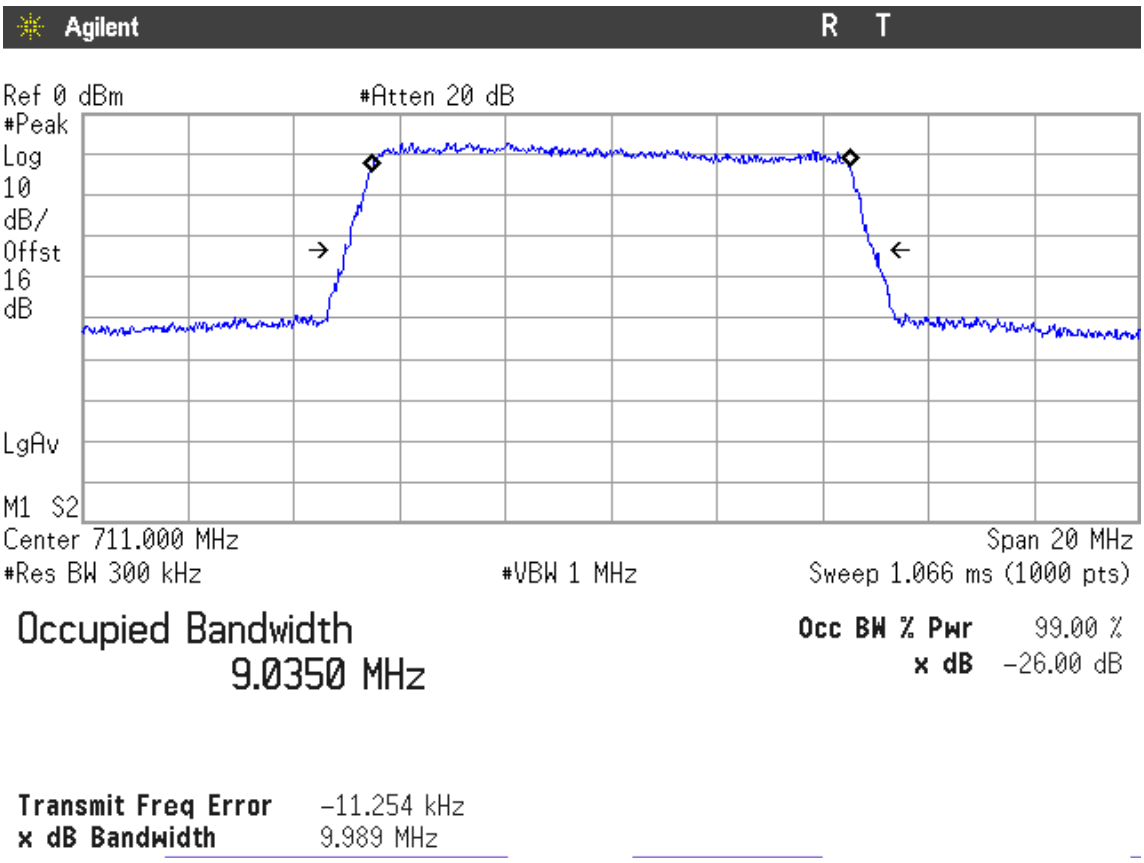
Lowest Channel



Middle Channel



Highest Channel



Spurious emissions at antenna terminals

SPECIFICATION

FCC §2.1051 and §27.53 (g) (h) (m). RSS-139 Clause 6.5. RSS-130 Clause 4.6.

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

RSS-199 Clause 4.6.

For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

i) 40 + 10 log p from the channel edges to 5 MHz away,
ii) 43 + 10 log p between 5 MHz and X MHz from the channel edges, and
iii) 55 + 10 log p at X MHz and beyond from the channel edges.
iv) in addition, the attenuation shall be not be less than 43 + 10 log p on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log p at or below 2490.5 MHz.

At Po transmitting power. the specified minimum attenuation becomes 40+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [40 + 10 log (Po in mwatts) - 30] = -10 dBm

At Po transmitting power. the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm

At Po transmitting power. the specified minimum attenuation becomes 55+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [55 + 10 log (Po in mwatts) - 30] = -25 dBm

METHOD

The EUT RF output connector was connected to a spectrum analyser and to the Universal Radio Communication tester R&S CMU200 and CMW500 (selecting maximum transmission power of the EUT and different modes of modulation) using a 50 ohm attenuator and a power splitter.

The spectrum was investigated from 9 kHz to 18 GHz for 3G Band IV and LTE Band IV.

The spectrum was investigated from 9 kHz to 26 GHz for LTE Band VII.

The spectrum was investigated from 9 kHz to 8 GHz for LTE Band XII.

The reading of the spectrum analyser is corrected with the attenuation loss of connection between output terminal of EUT and input of the spectrum analyser.

For LTE mode the configuration of Resource Blocks and modulation which is the worst case for conducted power was used.

RESULTS (see plots in next pages)

WCDMA MODULATION

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

HSUPA MODULATION

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 1.4 MHz. Band IV

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 3 MHz. Band IV

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 5 MHz. Band IV

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 10 MHz. Band IV

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 15 MHz. Band IV

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 20 MHz. Band IV

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE
No spurious signals were found at less than 20dB respect to the limit in all the range.

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 5 MHz. Band VII

1. CHANNEL: LOWEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.006	-33.16	-25.00

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.069	-40.21	-25.00

3. CHANNEL: HIGHEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.136	-39.13	-25.00

LTE QPSK MODULATION. BW = 10 MHz. Band VII

1. CHANNEL: LOWEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.009	-32.76	-25.00

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.069	-40.53	-25.00

3. CHANNEL: HIGHEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.130	-40.29	-25.00

LTE QPSK MODULATION. BW = 15 MHz. Band VII

1. CHANNEL: LOWEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.015	-32.67	-25.00

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.069	-41.52	-25.00

3. CHANNEL: HIGHEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.126	-40.34	-25.00

LTE QPSK MODULATION. BW = 20 MHz. Band VII

1. CHANNEL: LOWEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.022	-33.46	-25.00

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.069	-40.97	-25.00

3. CHANNEL: HIGHEST

Frequency (GHz)	Level (dBm)	Limit (dBm)
5.120	-40.56	-25.00

LTE QPSK MODULATION. BW = 1.4 MHz. Band XII

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
3.5356	-32.49	-13.00

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 3 MHz. Band XII

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
3.5385	-32.29	-13.00

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 5 MHz. Band XII

1. CHANNEL: LOWEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

2. CHANNEL: MIDDLE

Frequency (GHz)	Level (dBm)	Limit (dBm)
3.5385	-32.91	-13.00

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

LTE QPSK MODULATION. BW = 10 MHz. Band XII

1. CHANNEL: LOWEST
No spurious signals were found in all the range.

2. CHANNEL: MIDDLE

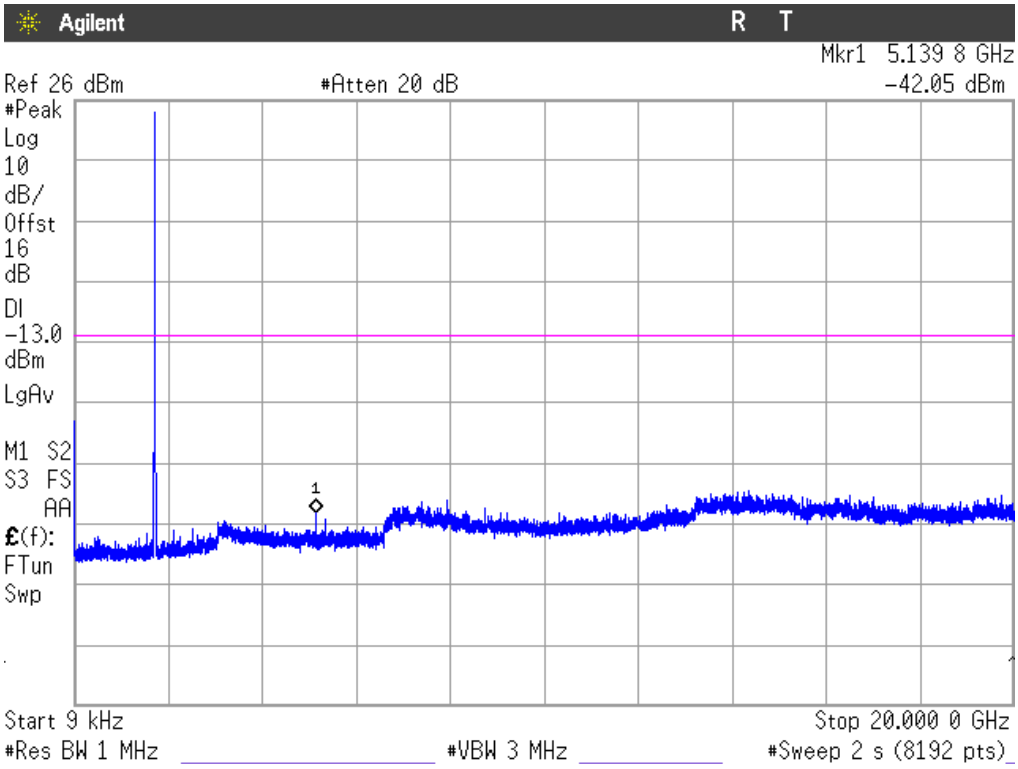
Frequency (GHz)	Level (dBm)	Limit (dBm)
3.5375	-32.36	-13.00

3. CHANNEL: HIGHEST
No spurious signals were found at less than 20dB respect to the limit in all the range.

Verdict: PASS

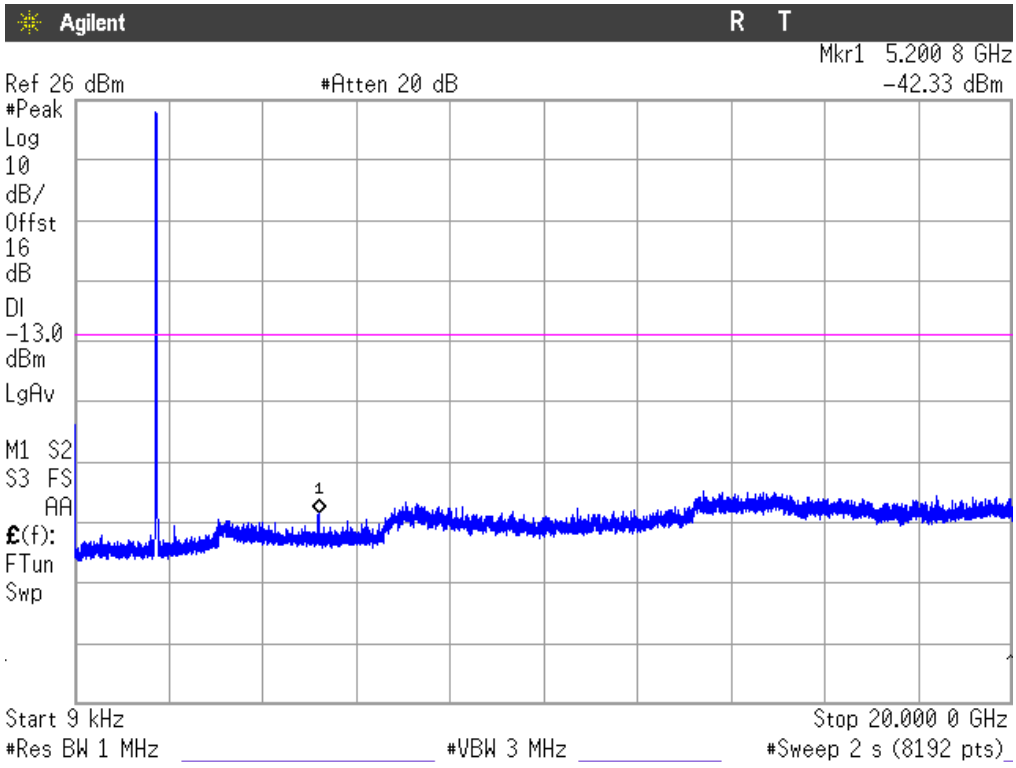
WCDMA MODULATION

1. CHANNEL: LOWEST



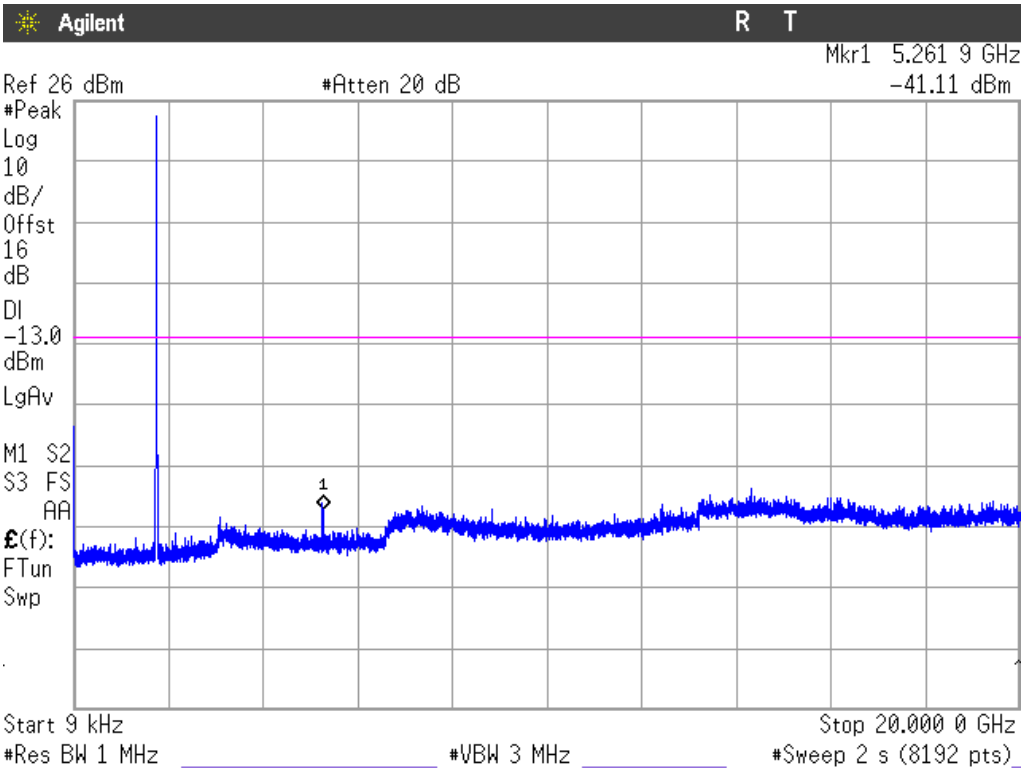
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

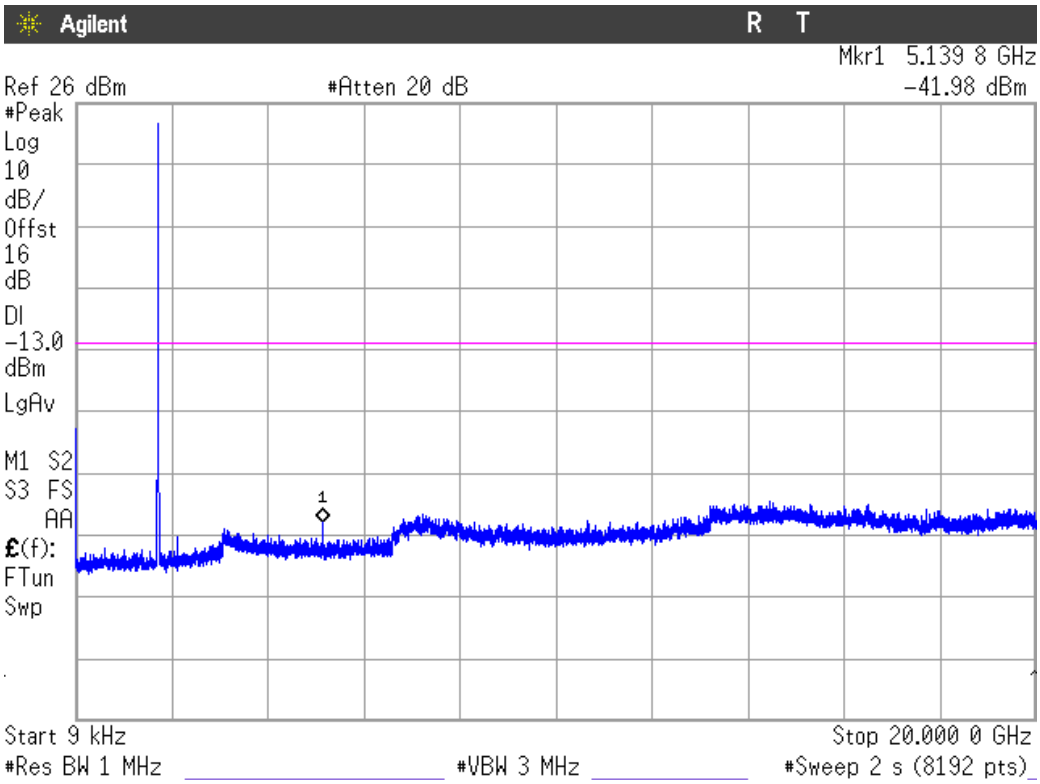
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

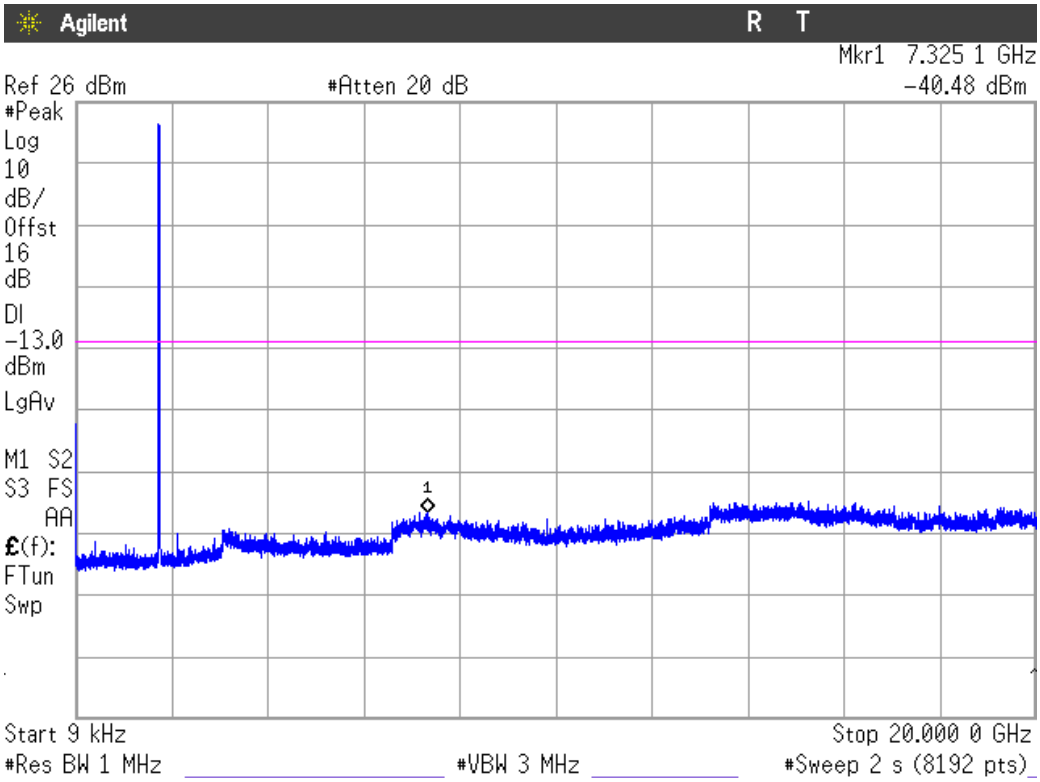
HSUPA MODULATION

1. CHANNEL: LOWEST



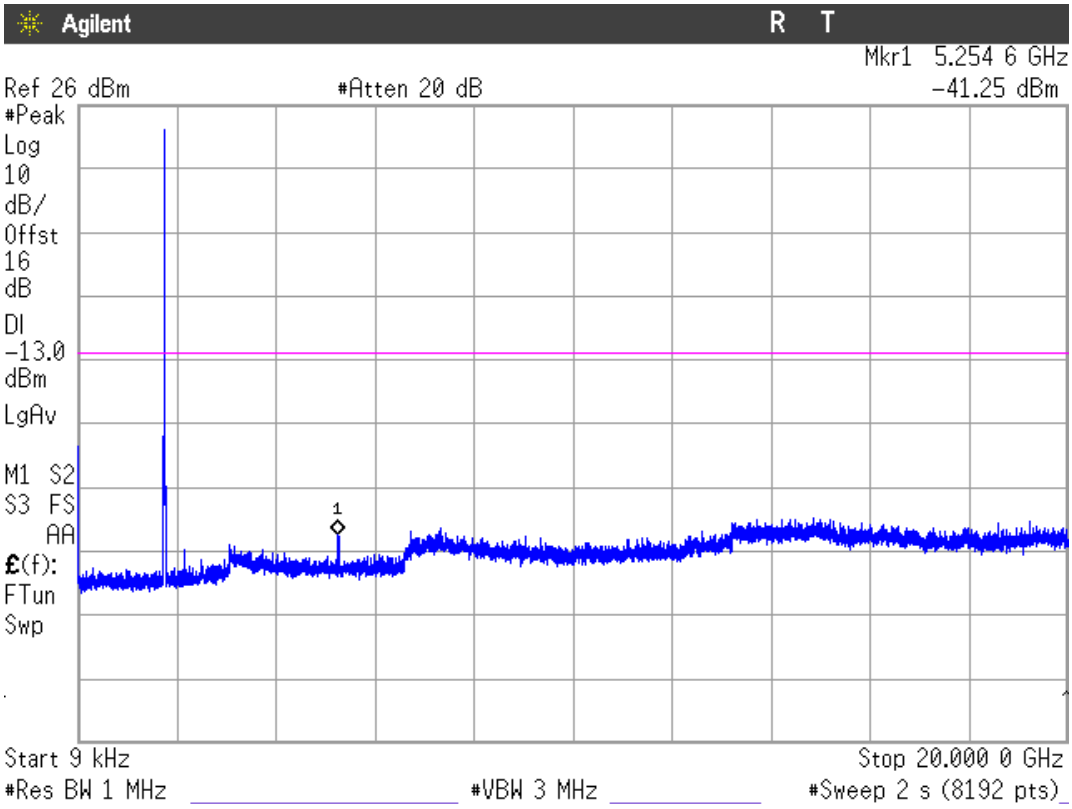
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

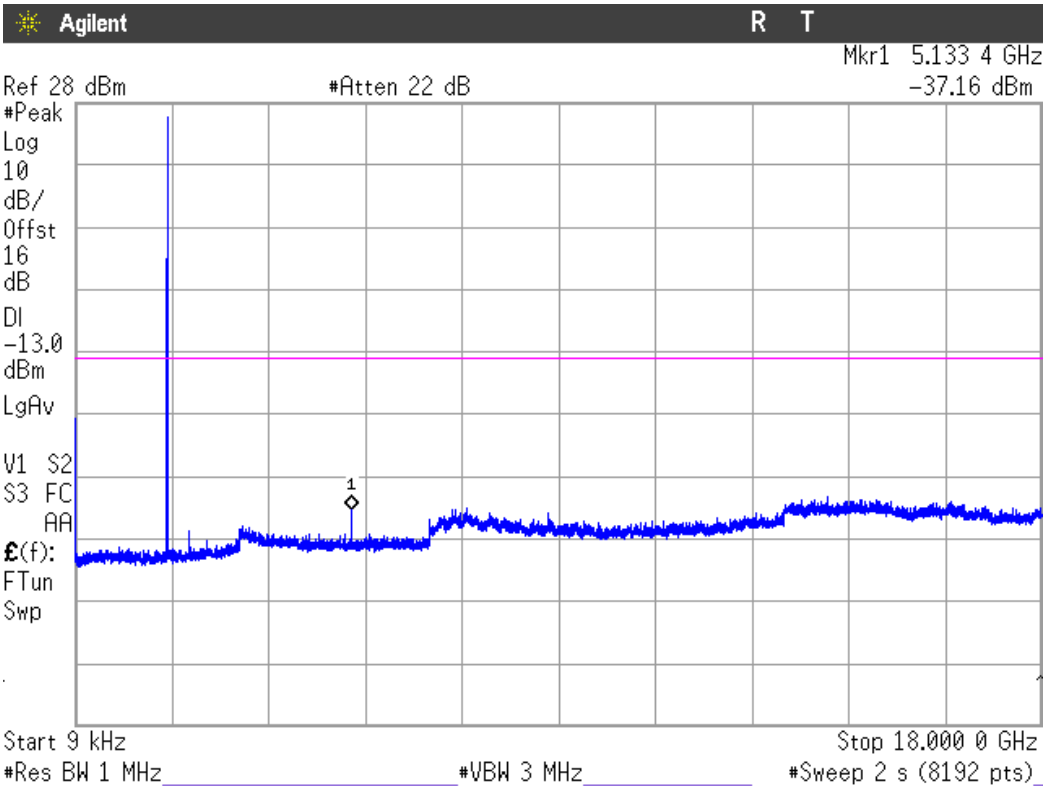
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

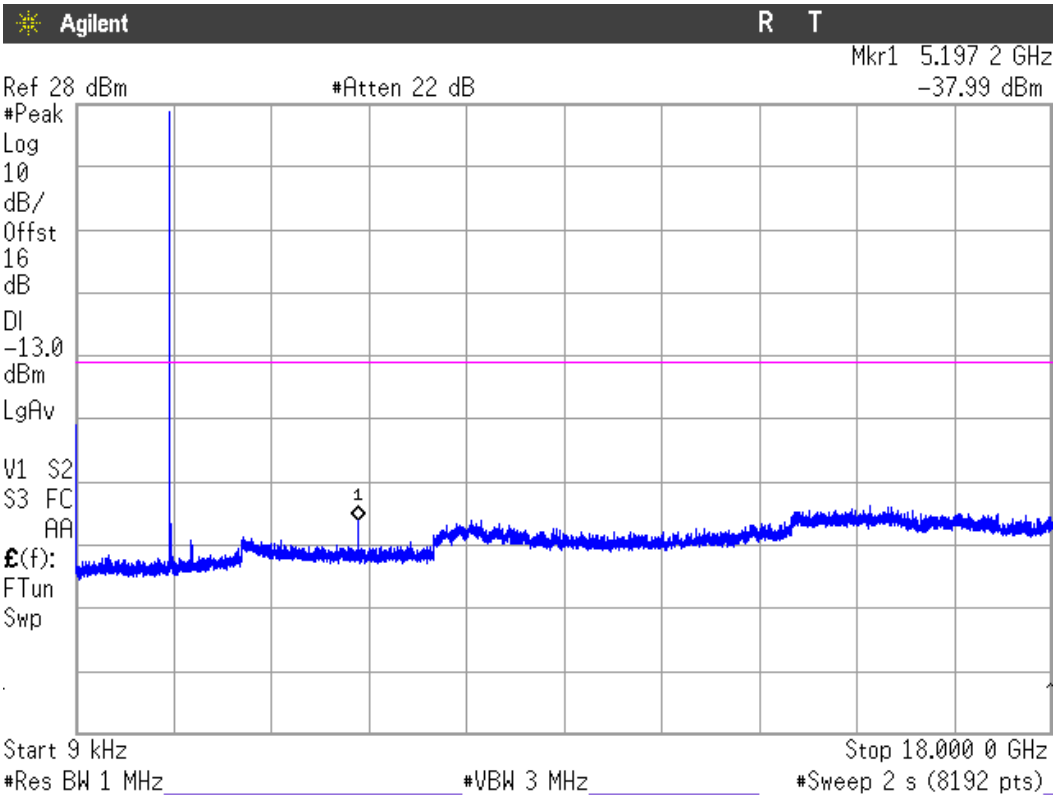
LTE QPSK MODULATION. BW = 1.4 MHz (Band IV)

1. CHANNEL: LOWEST



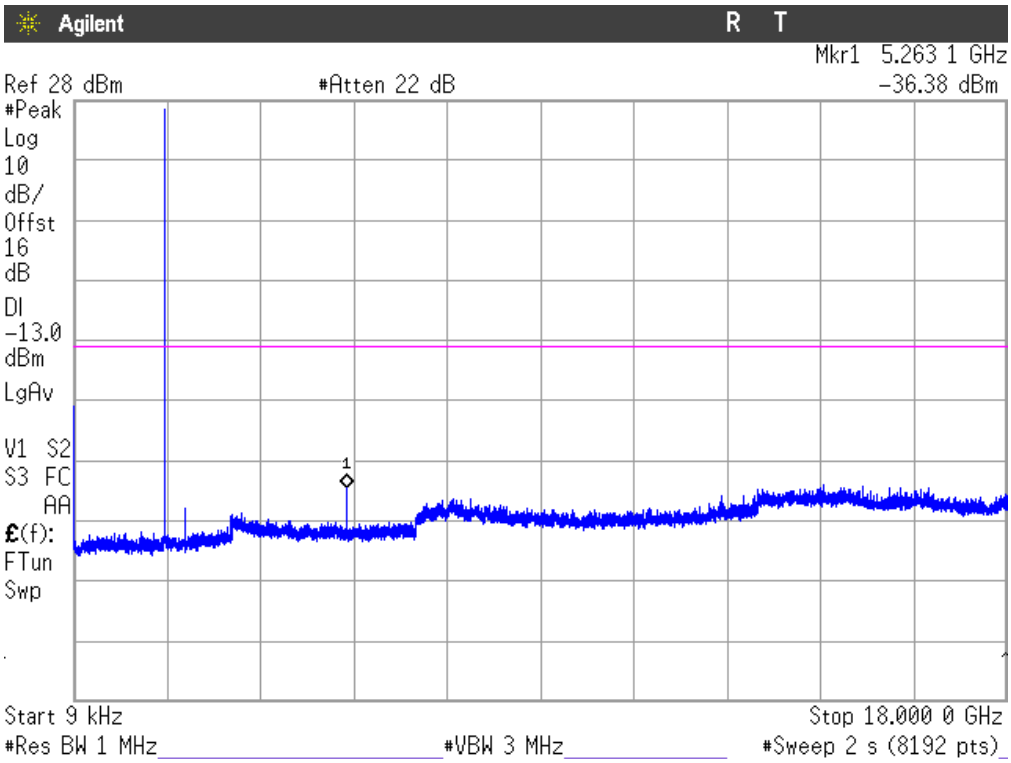
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

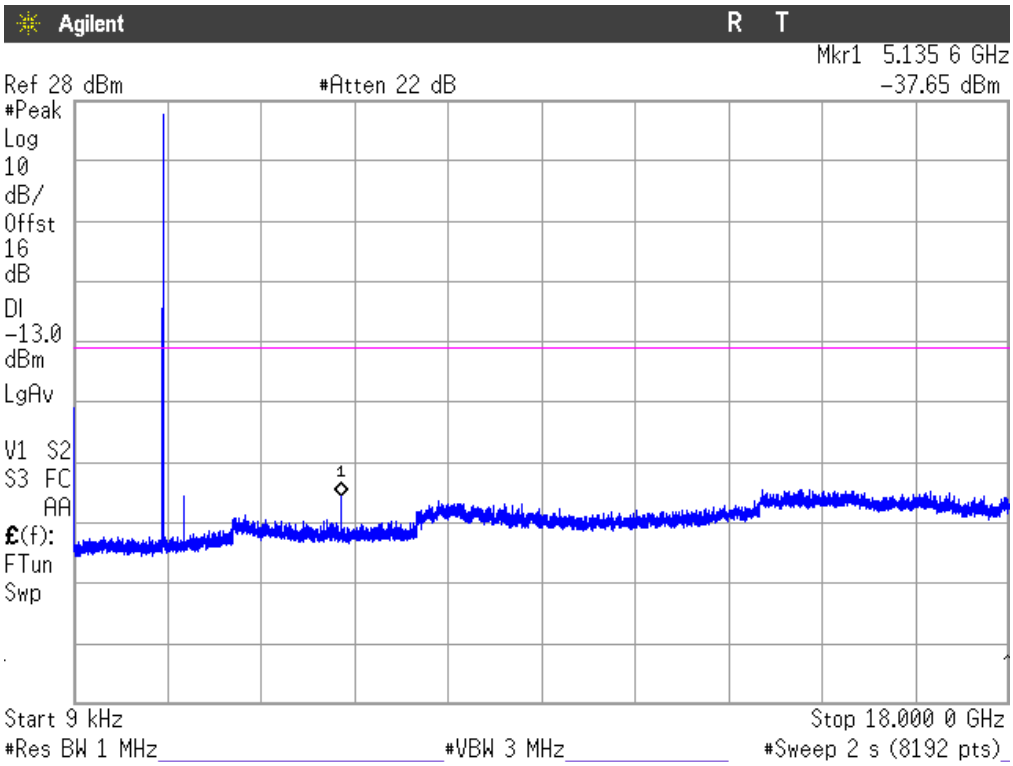
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

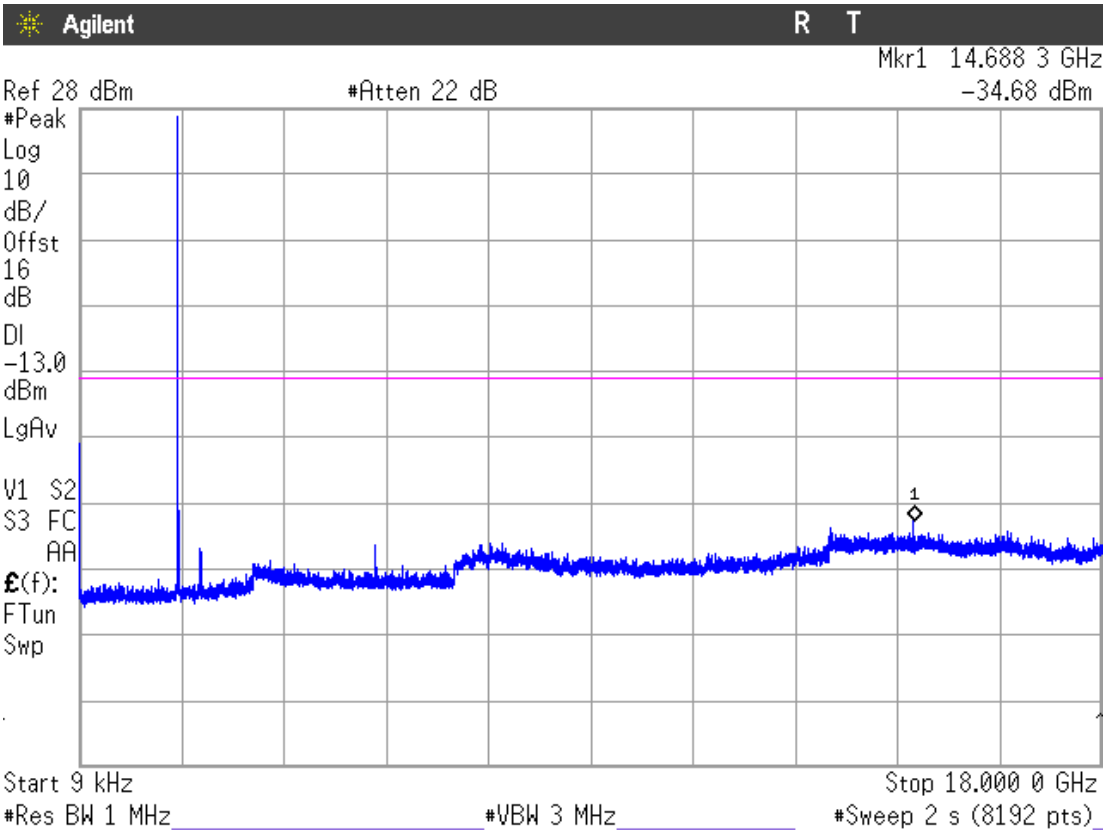
LTE QPSK MODULATION. BW = 3 MHz (Band IV)

1. CHANNEL: LOWEST



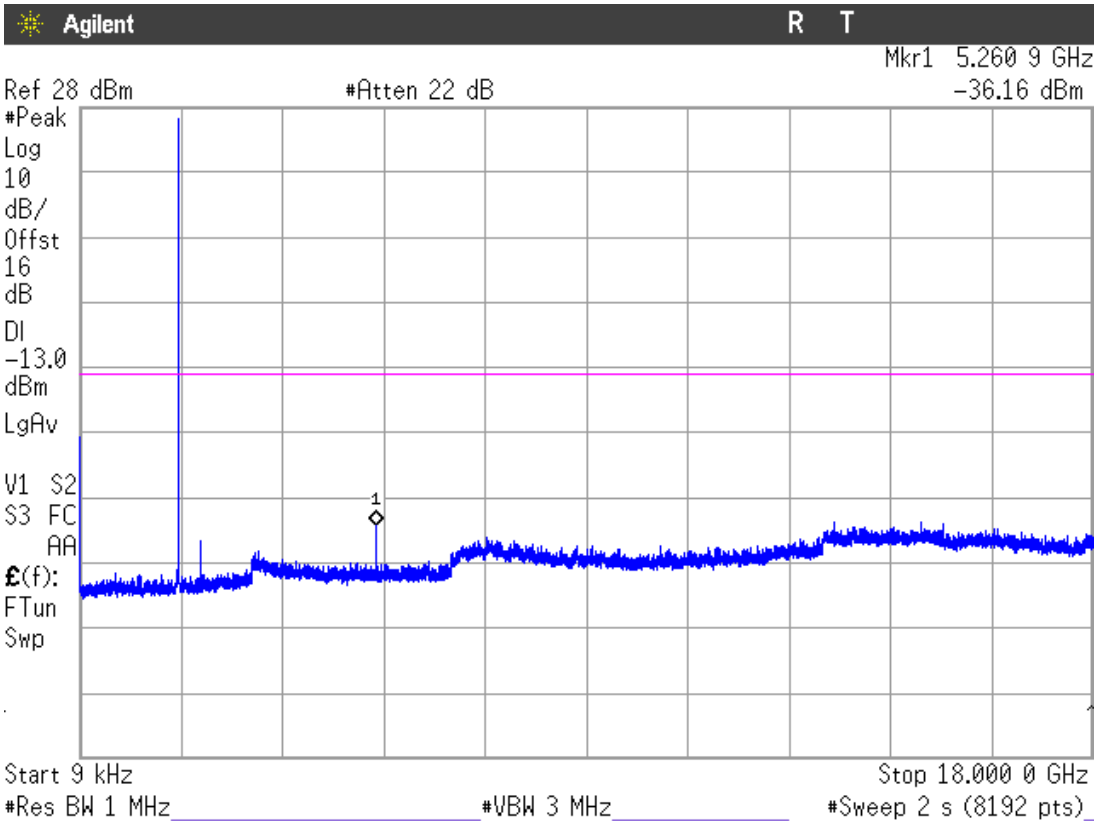
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

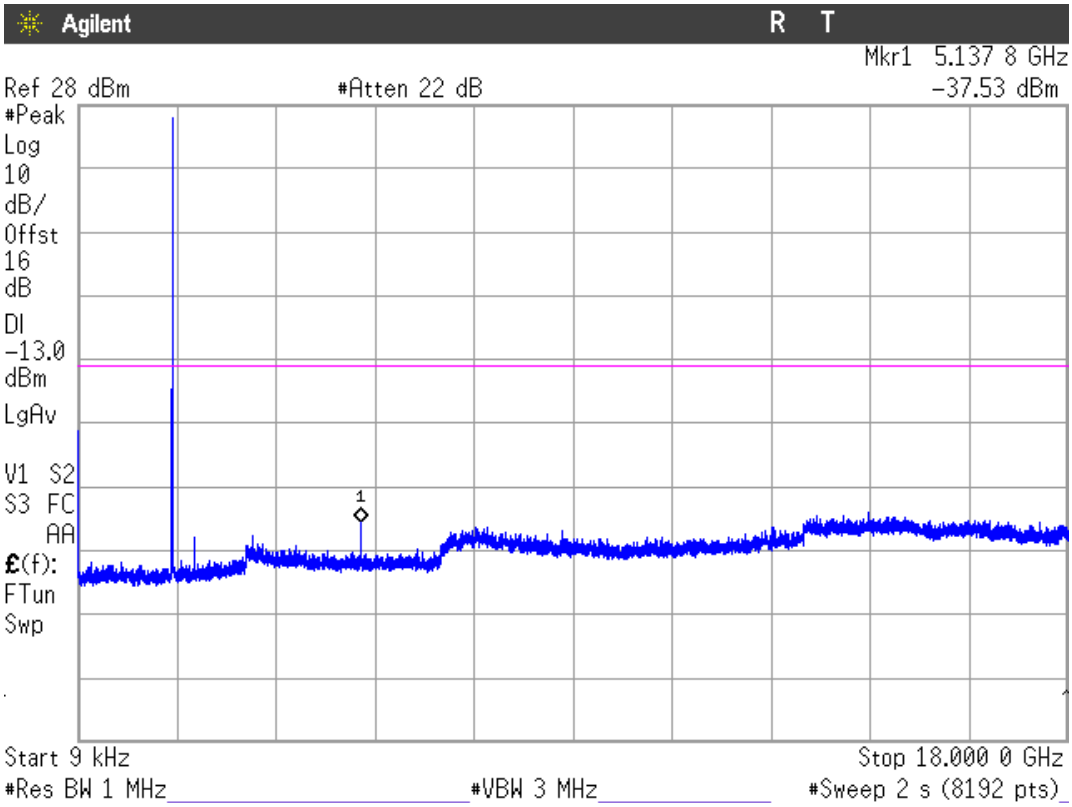
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

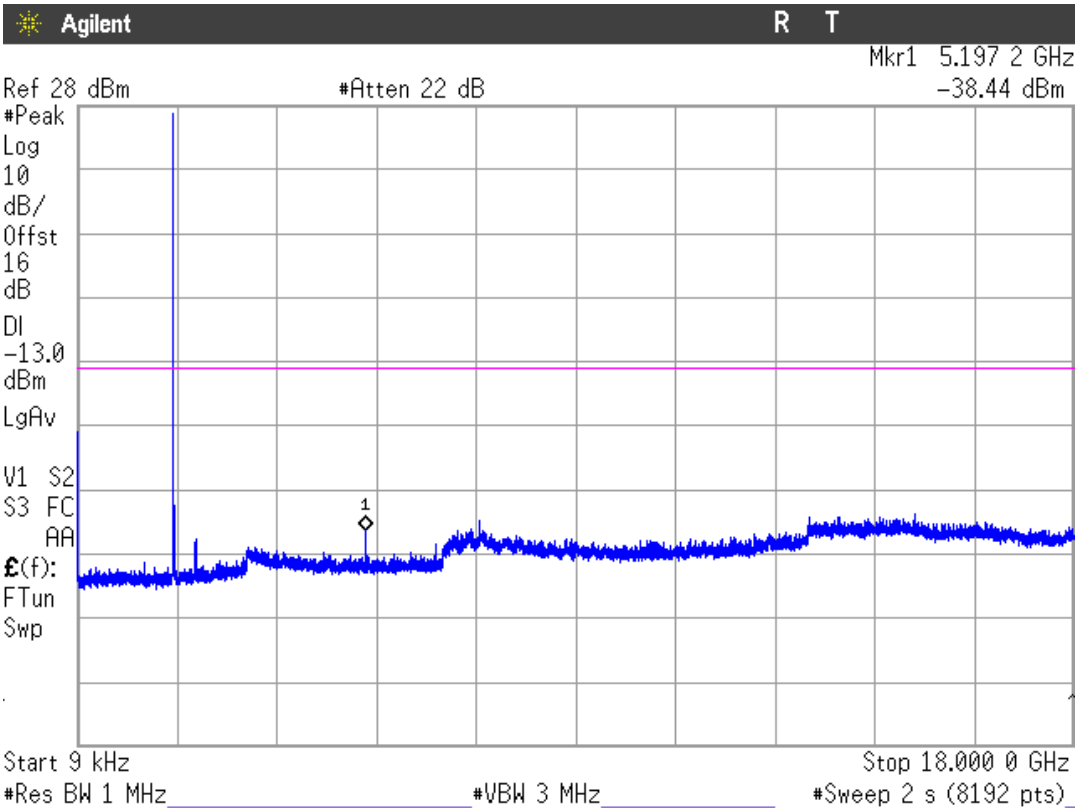
LTE QPSK MODULATION. BW = 5 MHz (Band IV)

1. CHANNEL: LOWEST



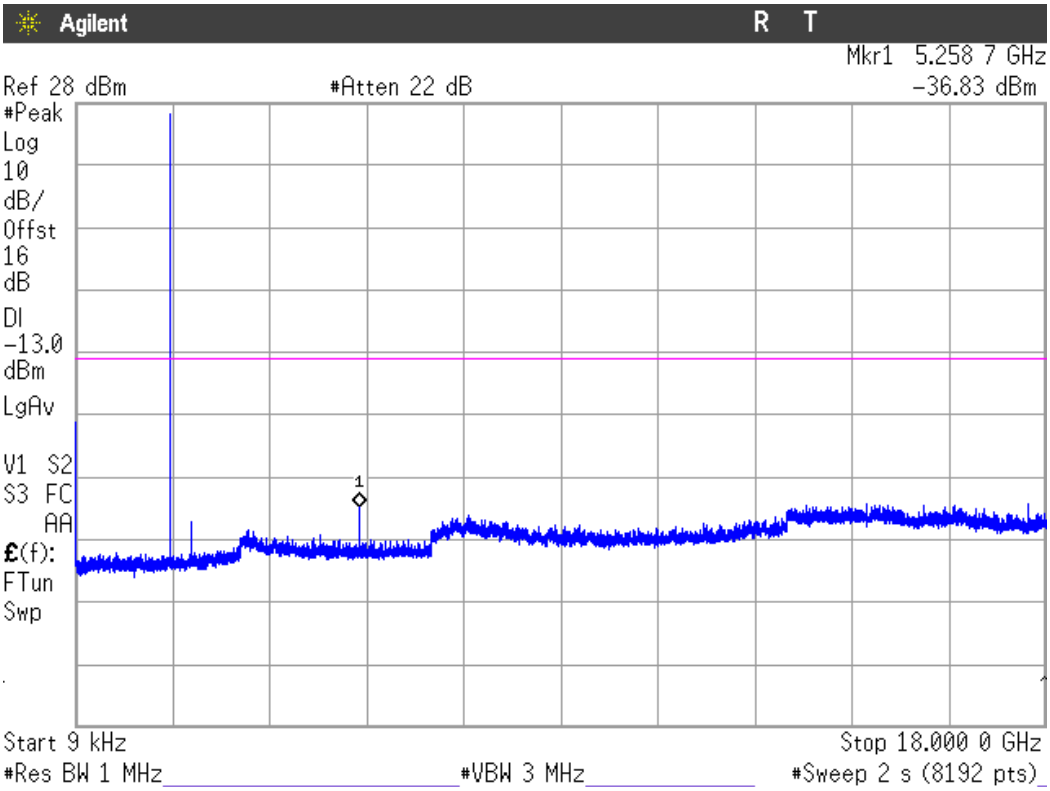
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

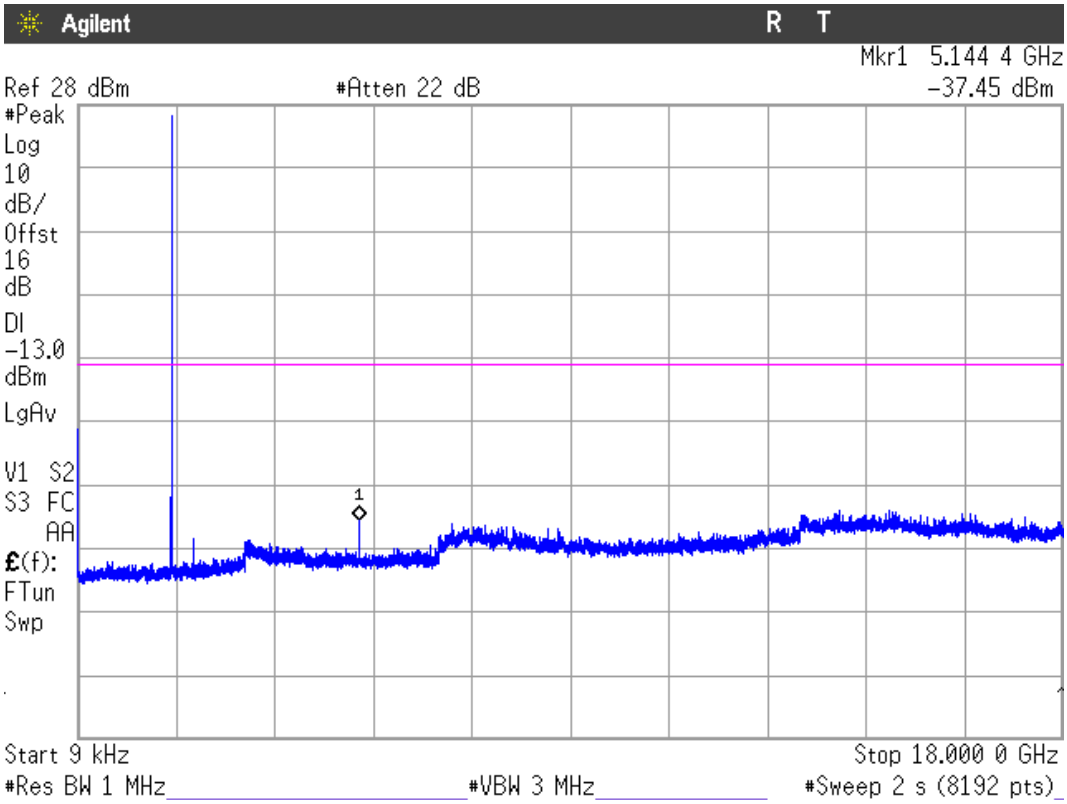
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

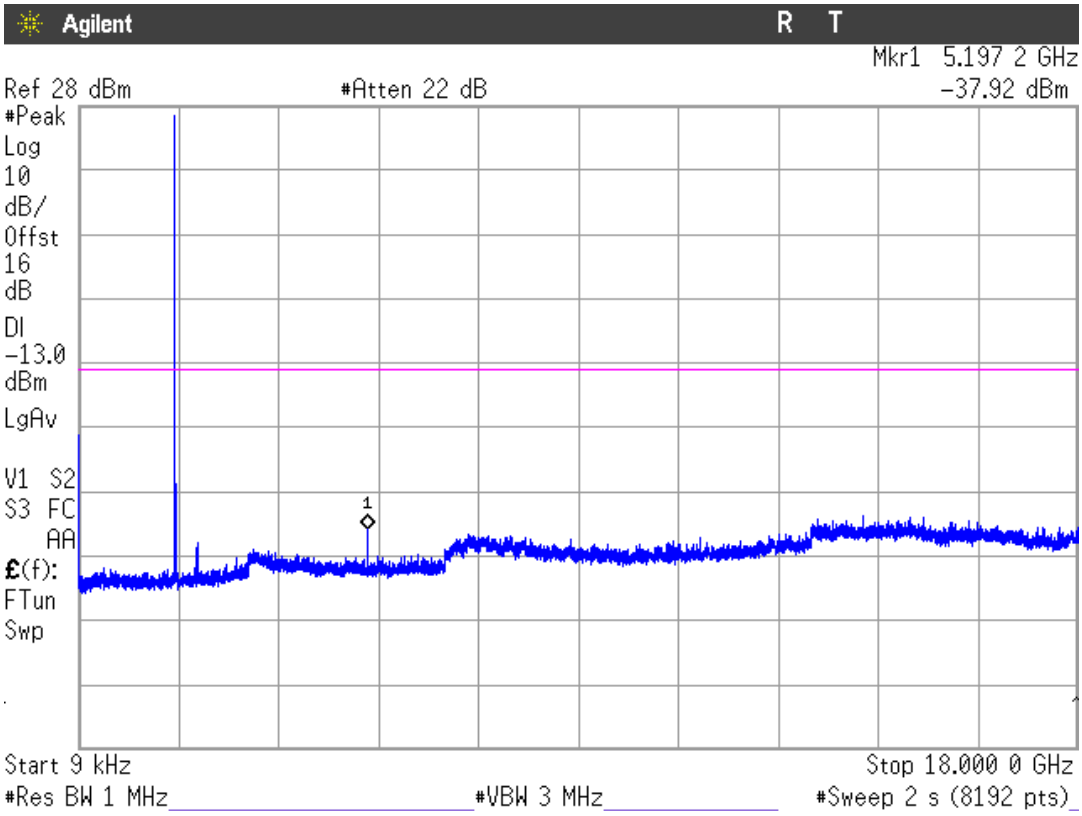
LTE QPSK MODULATION. BW = 10 MHz (Band IV)

1. CHANNEL: LOWEST



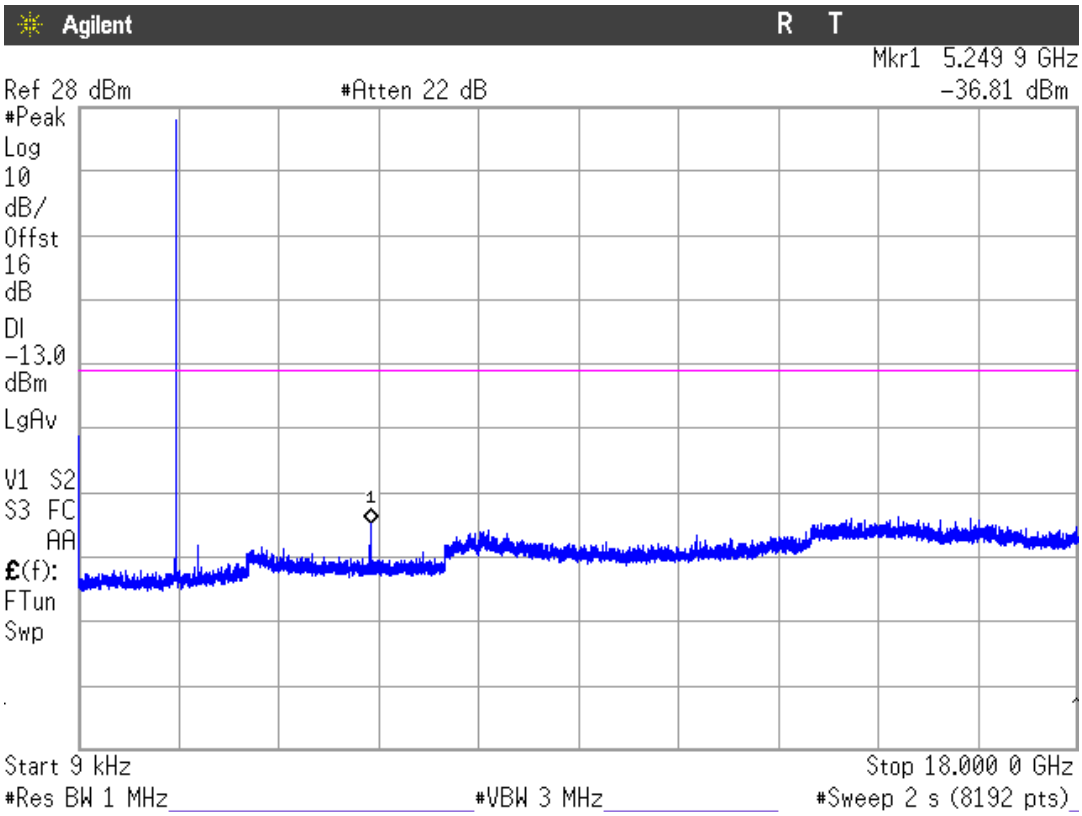
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

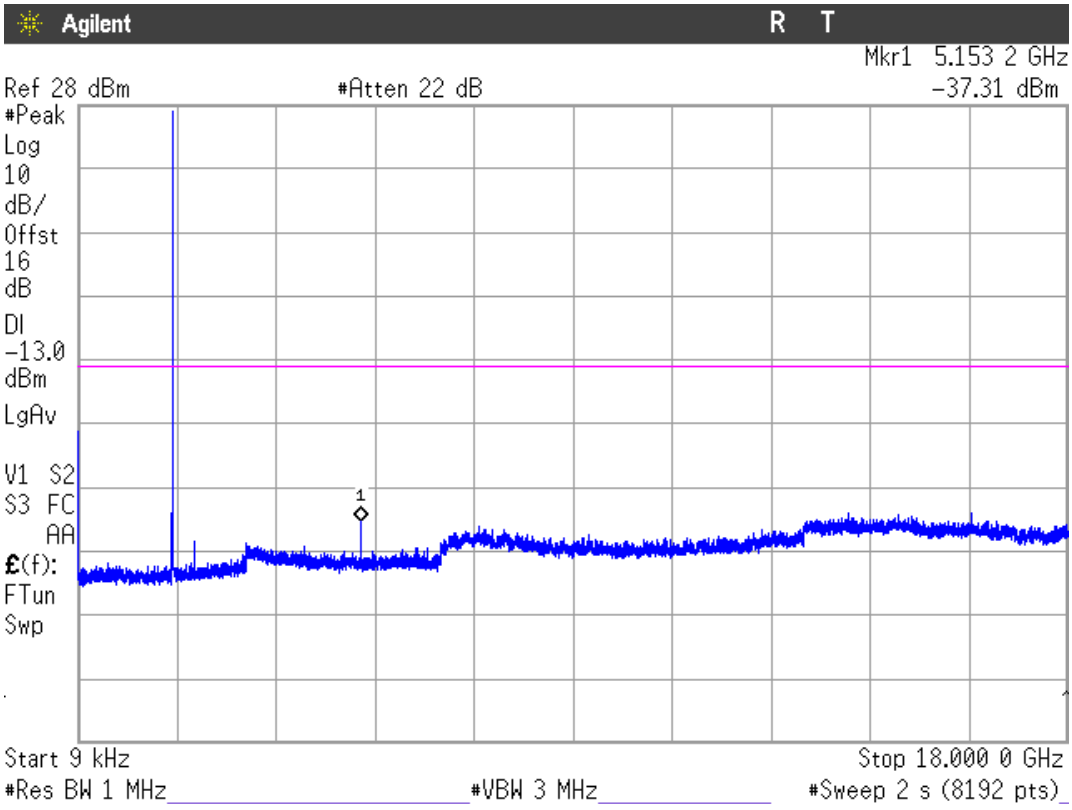
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

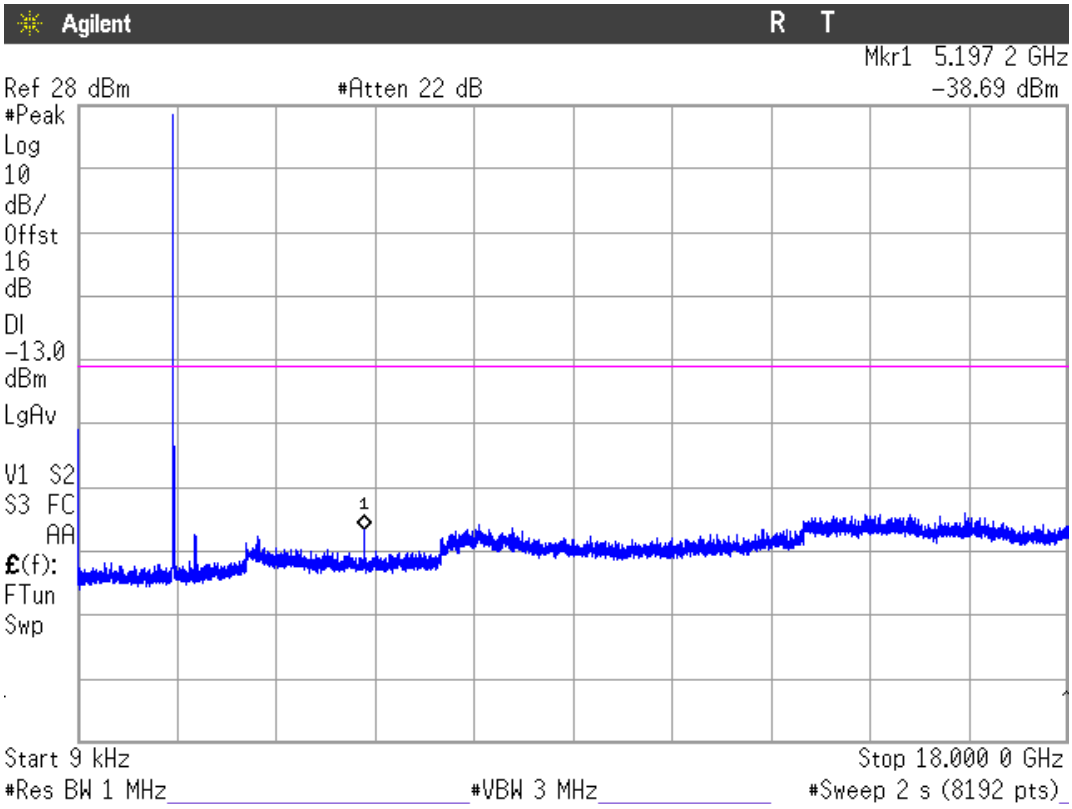
LTE QPSK MODULATION. BW = 15 MHz (Band IV)

1. CHANNEL: LOWEST



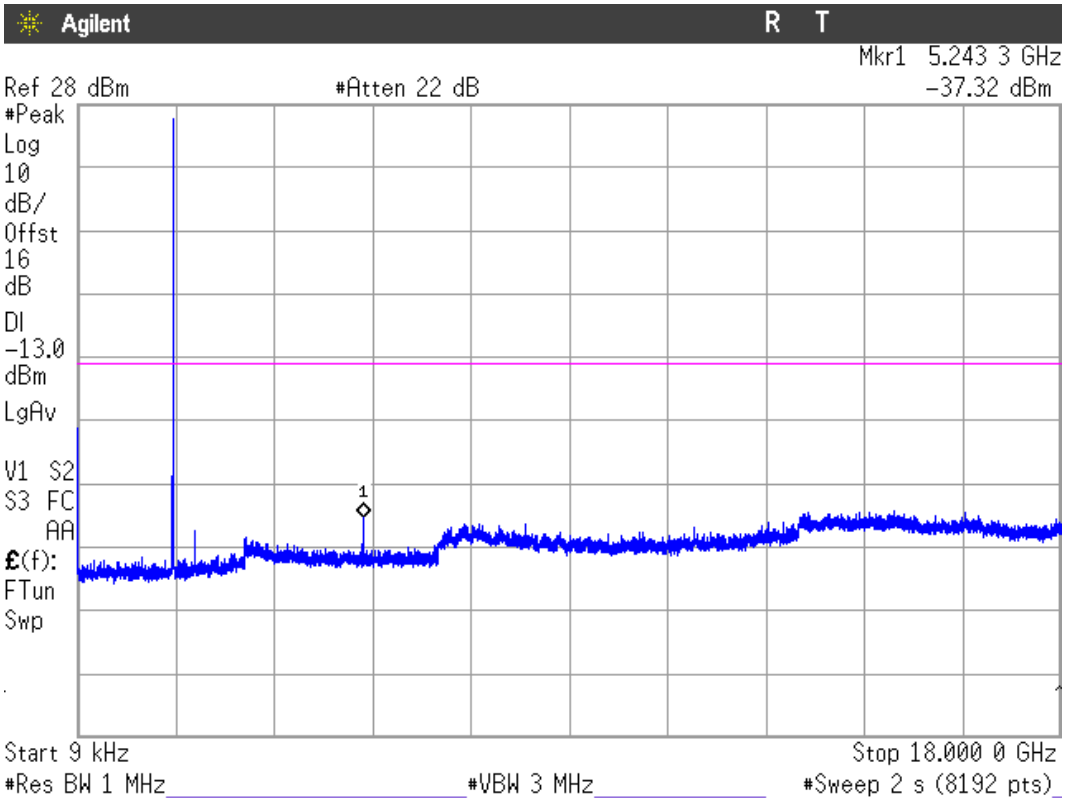
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

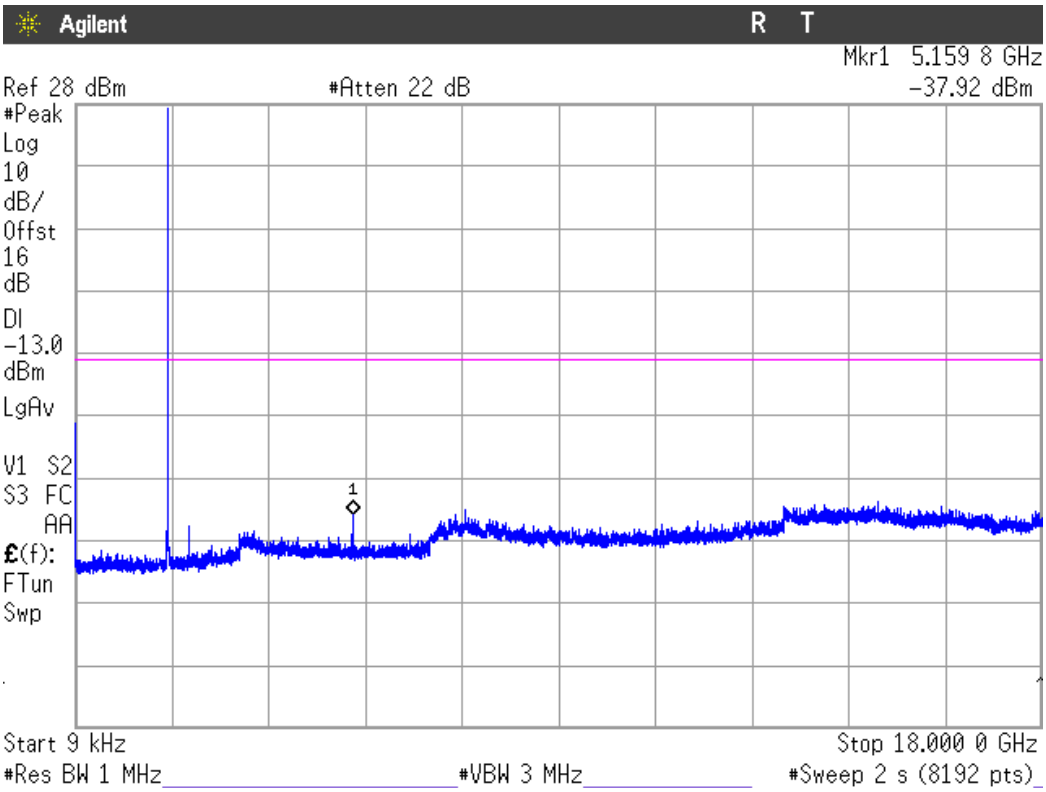
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

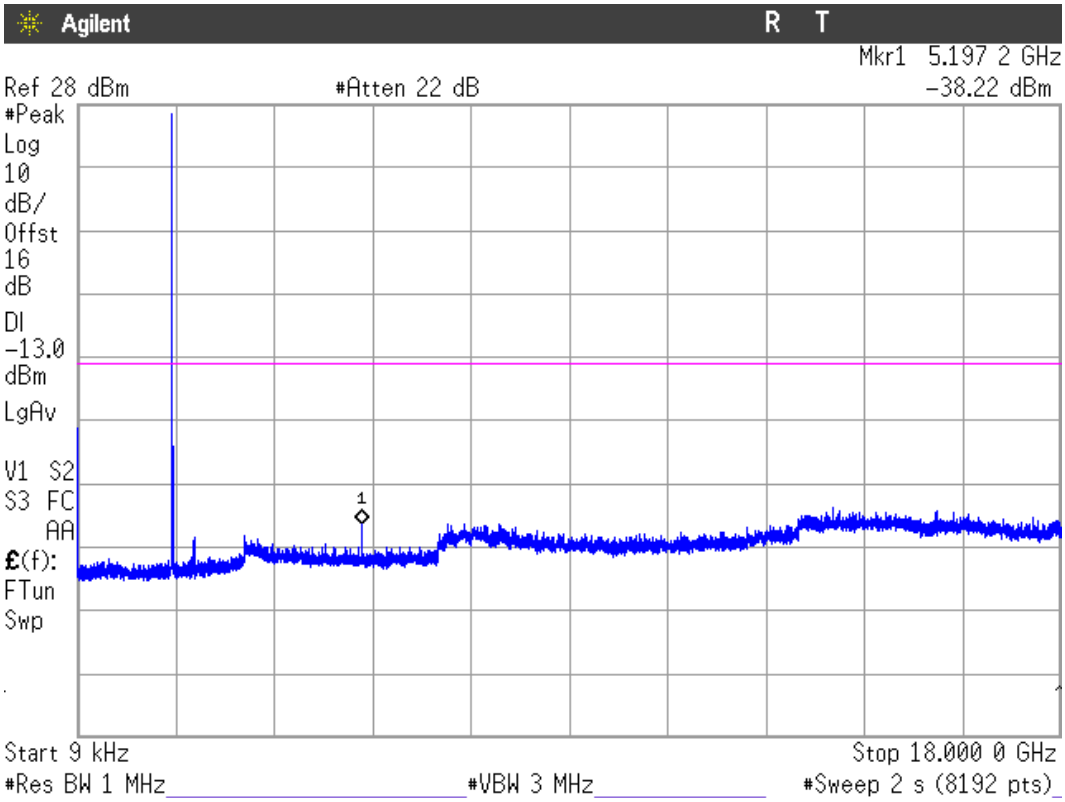
LTE QPSK MODULATION. BW = 20 MHz (Band IV)

1. CHANNEL: LOWEST



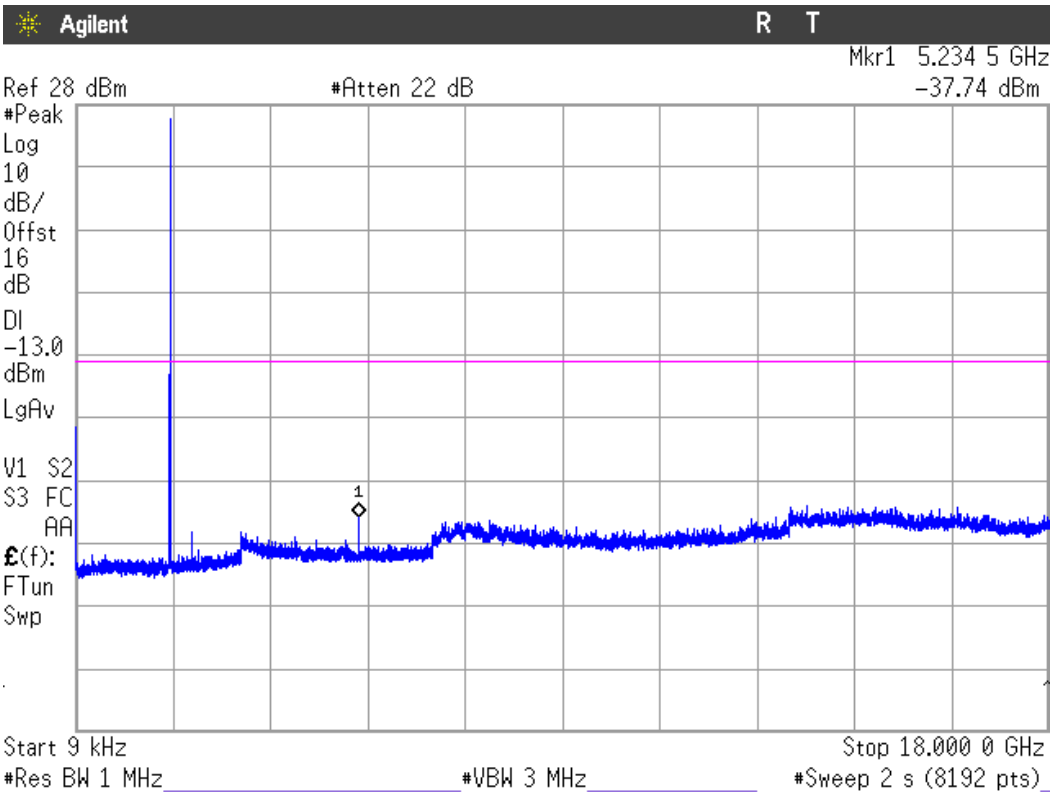
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

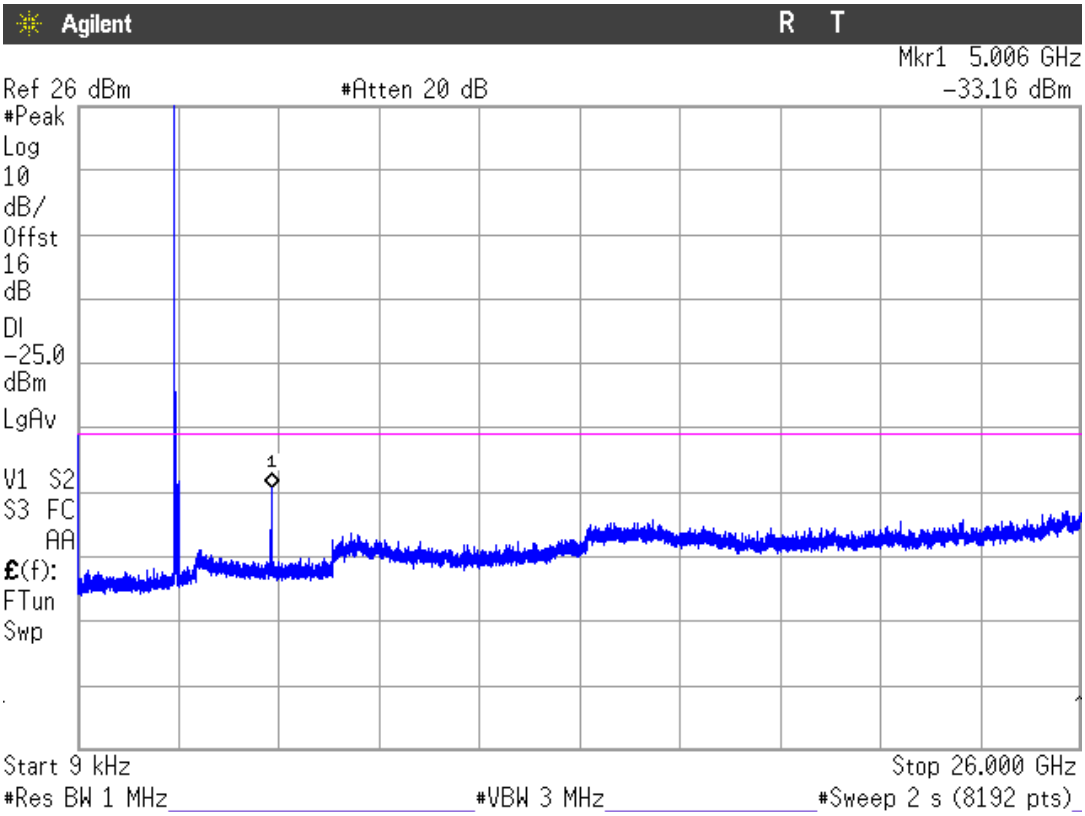
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

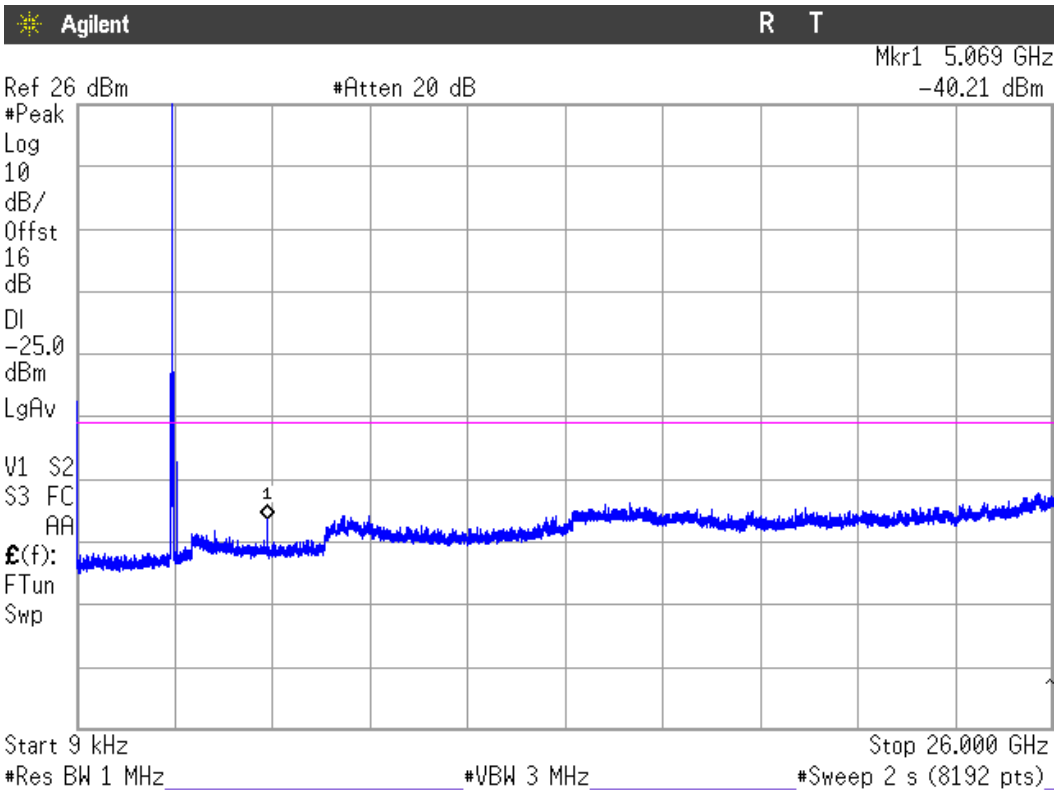
LTE QPSK MODULATION. BW = 5 MHz (Band VII)

1. CHANNEL: LOWEST



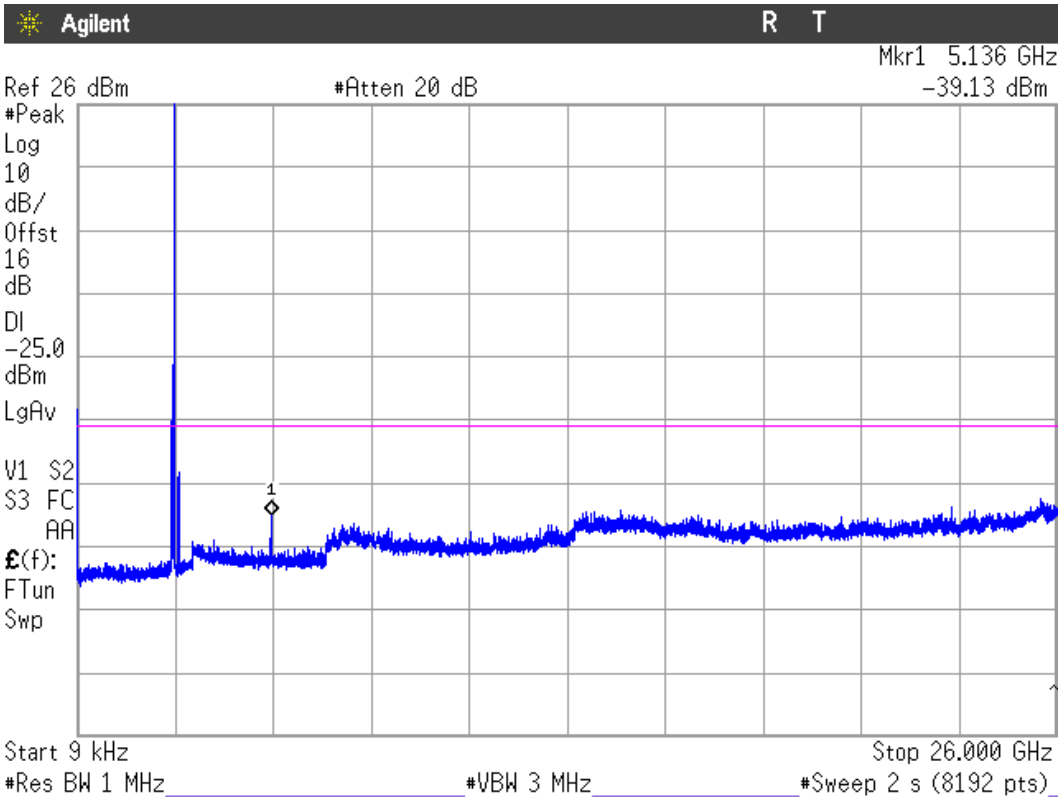
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

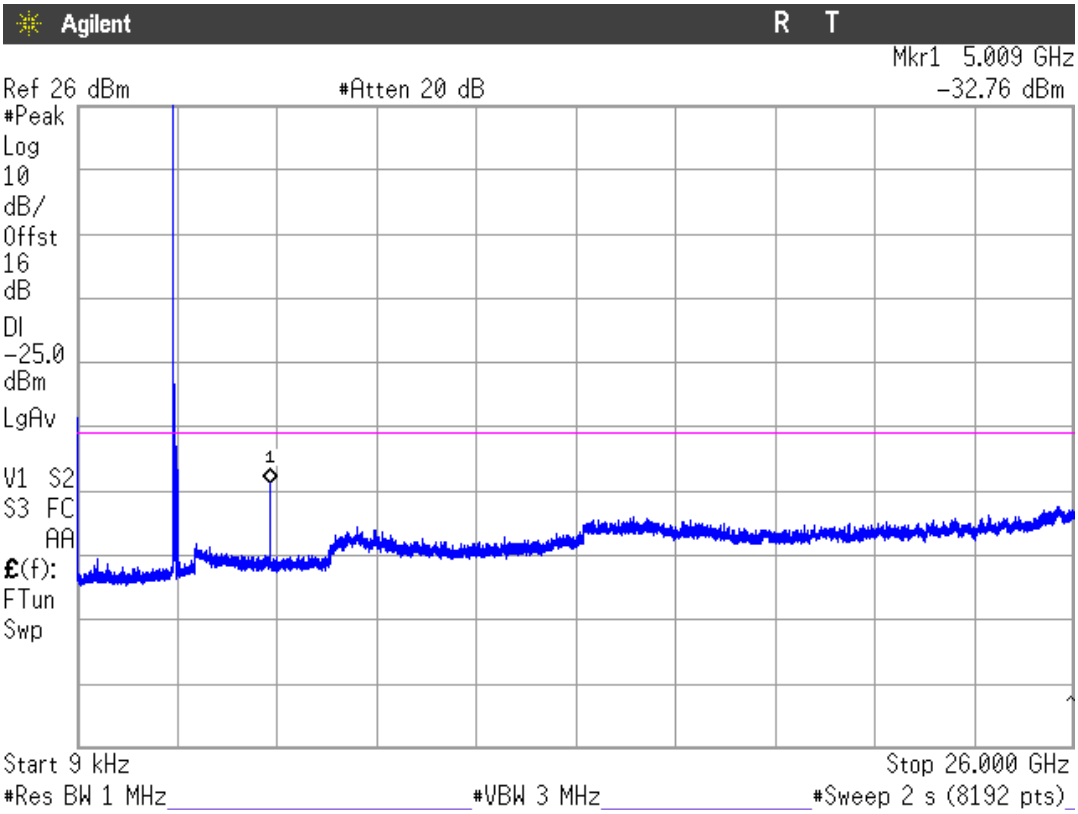
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

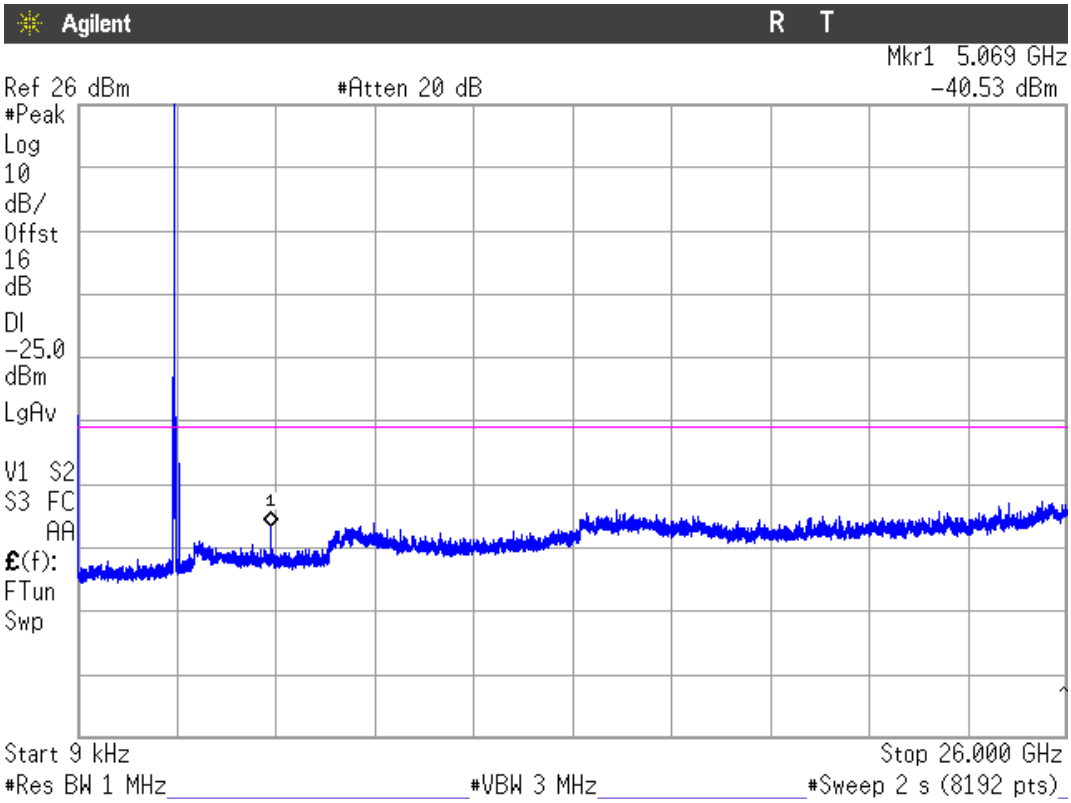
LTE QPSK MODULATION. BW = 10 MHz (Band VII)

1. CHANNEL: LOWEST



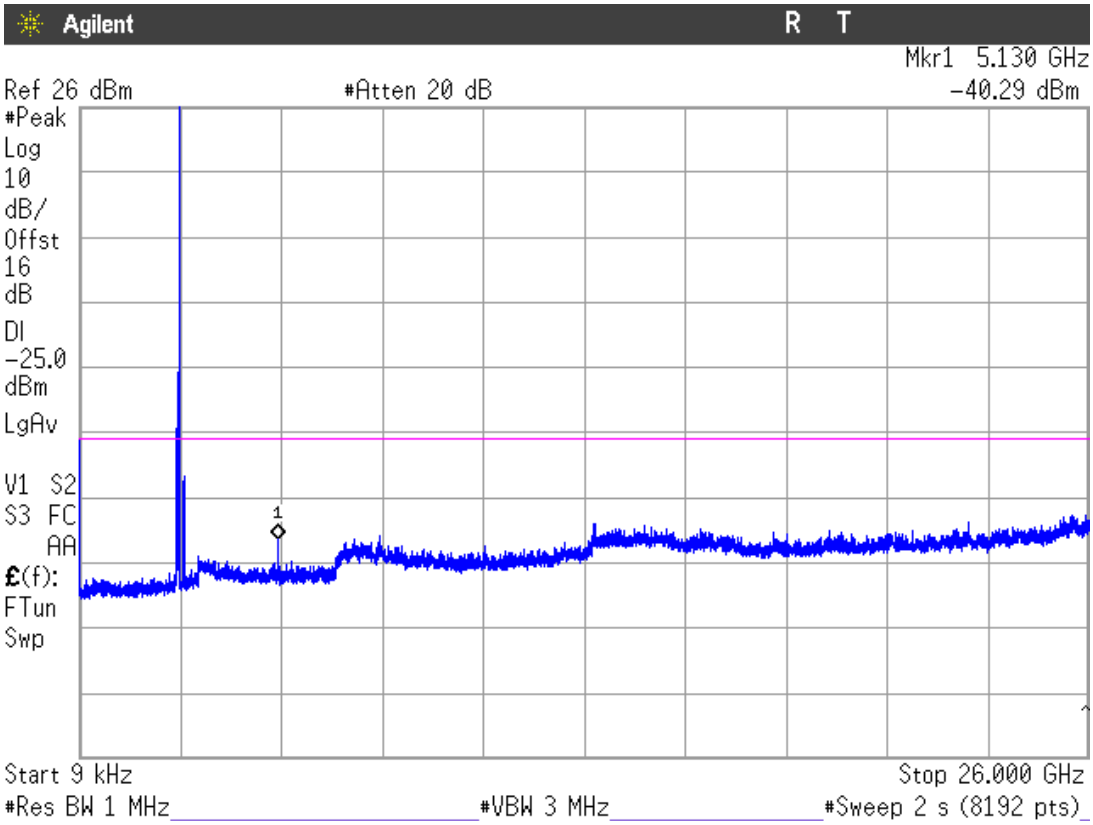
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

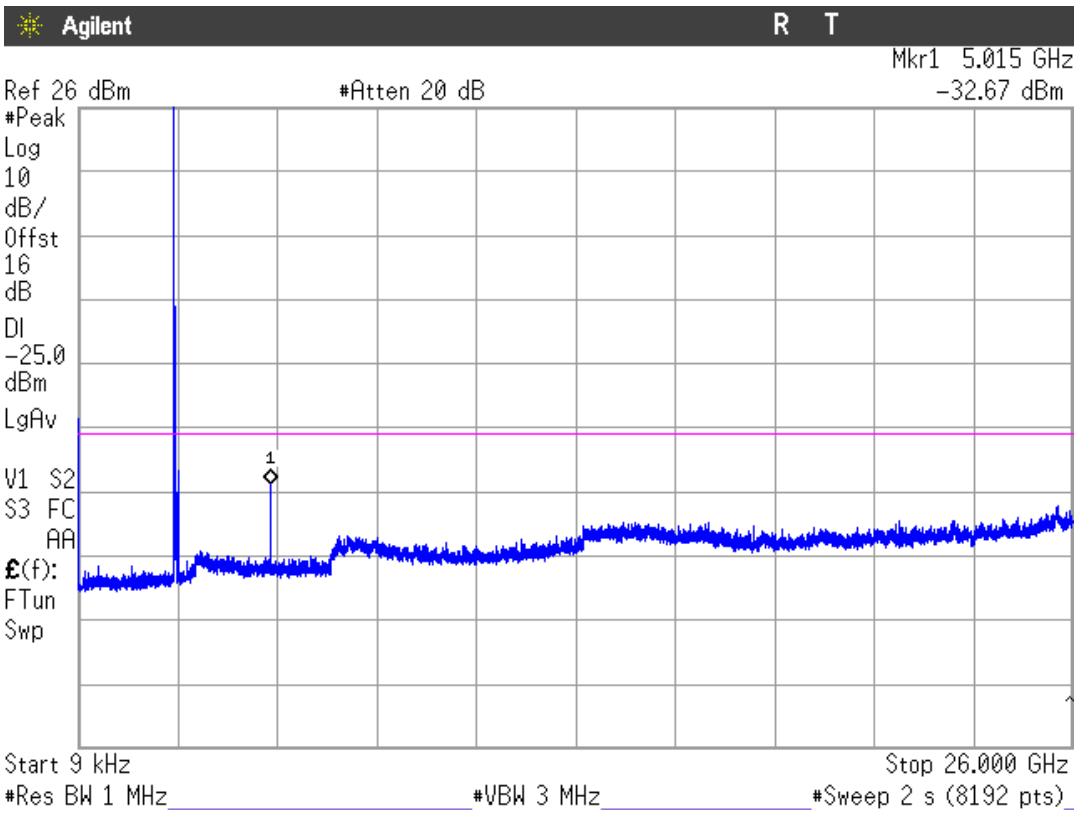
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

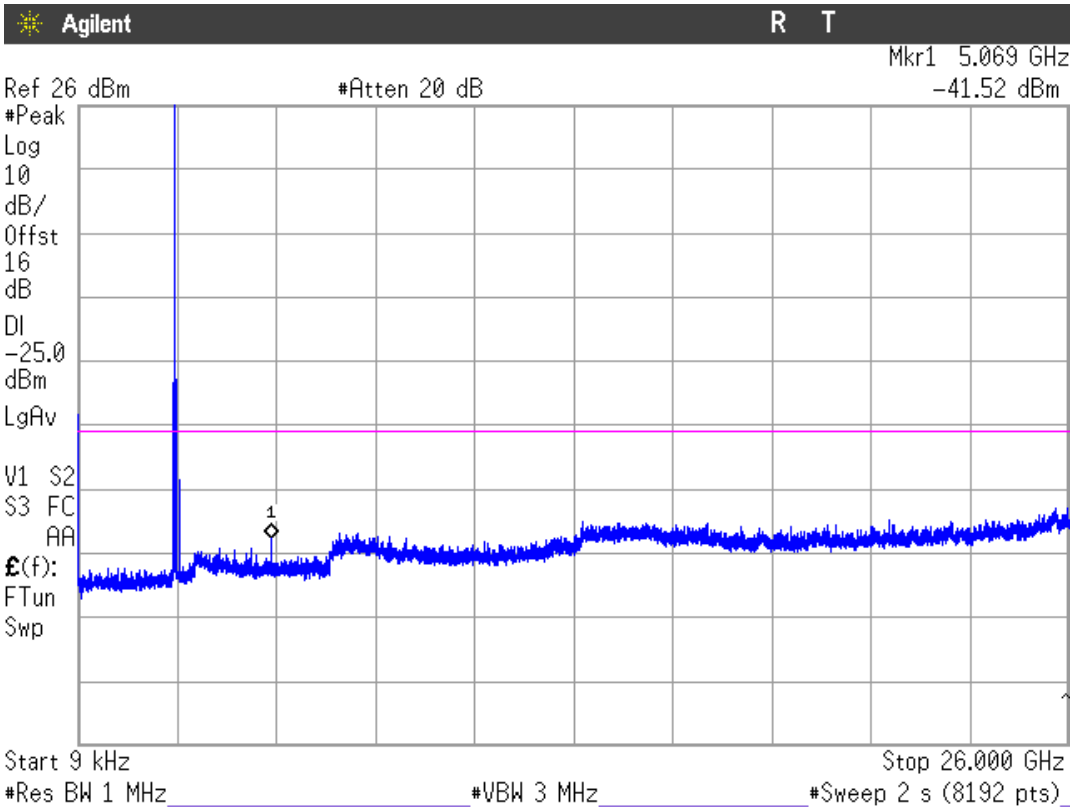
LTE QPSK MODULATION. BW = 15 MHz (Band VII)

1. CHANNEL: LOWEST



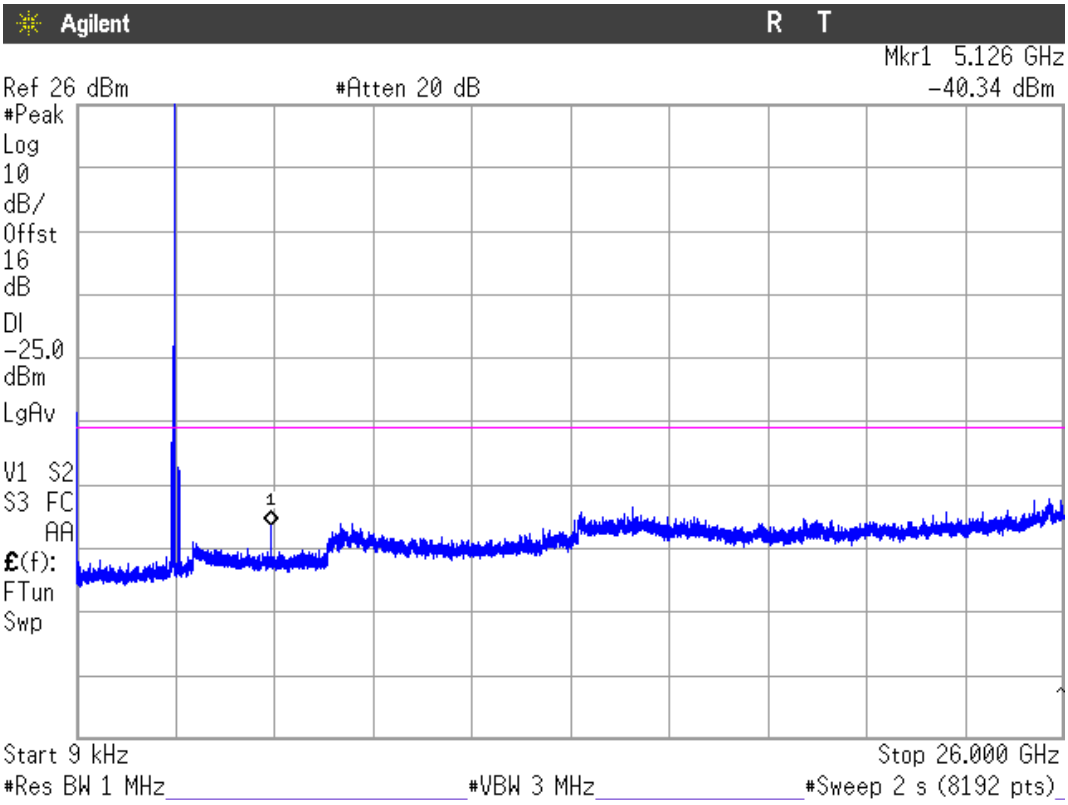
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

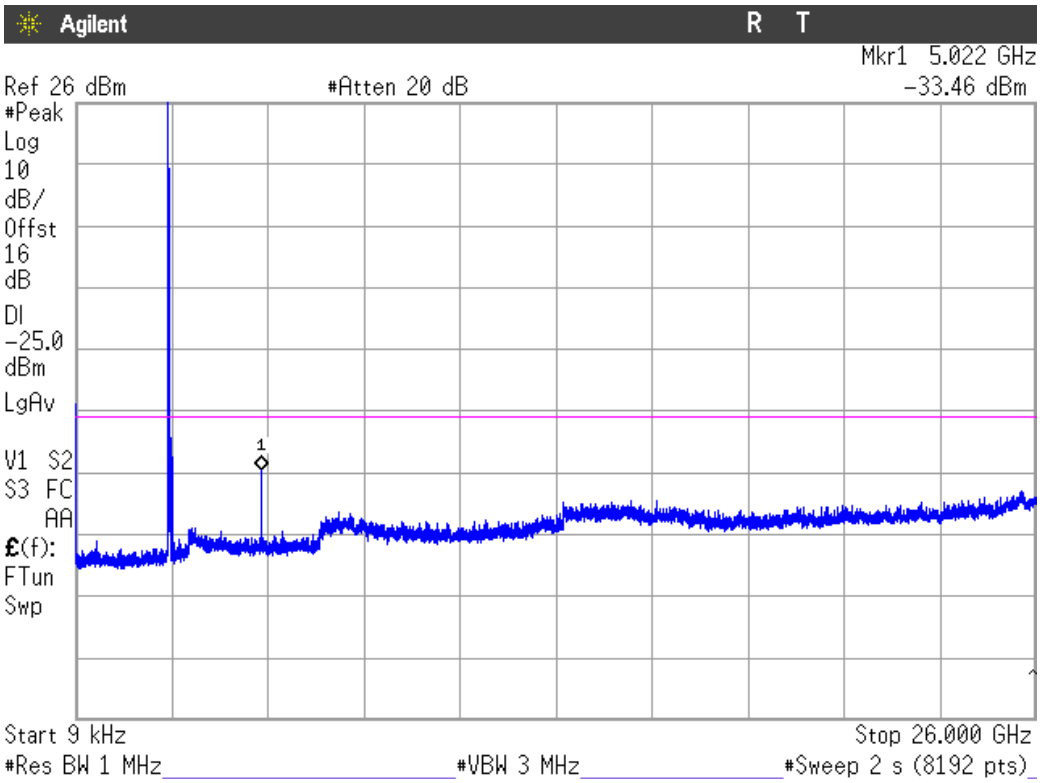
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

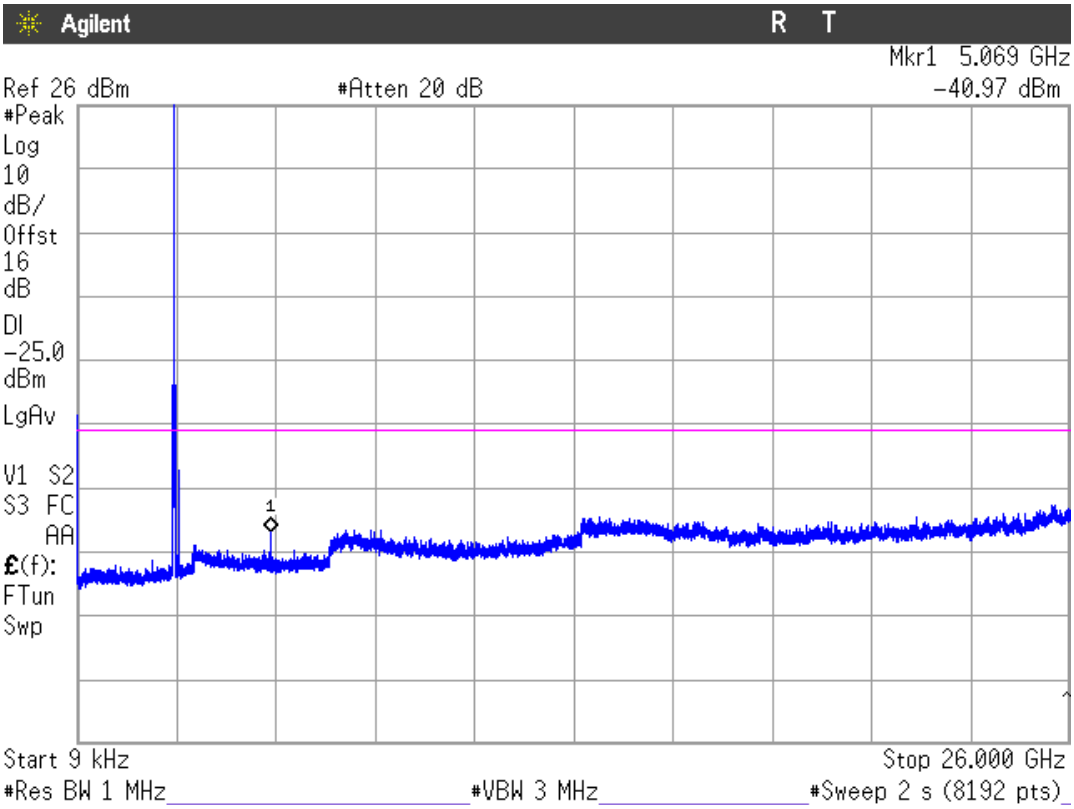
LTE QPSK MODULATION. BW = 20 MHz (Band VII)

1. CHANNEL: LOWEST



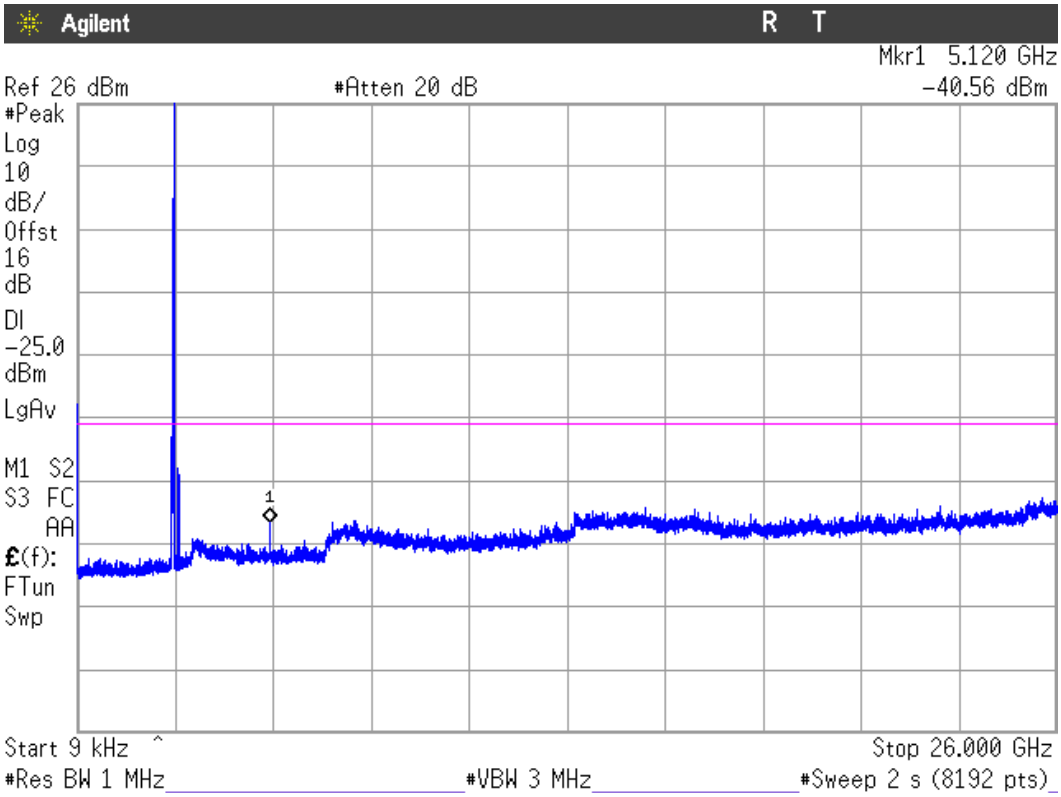
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

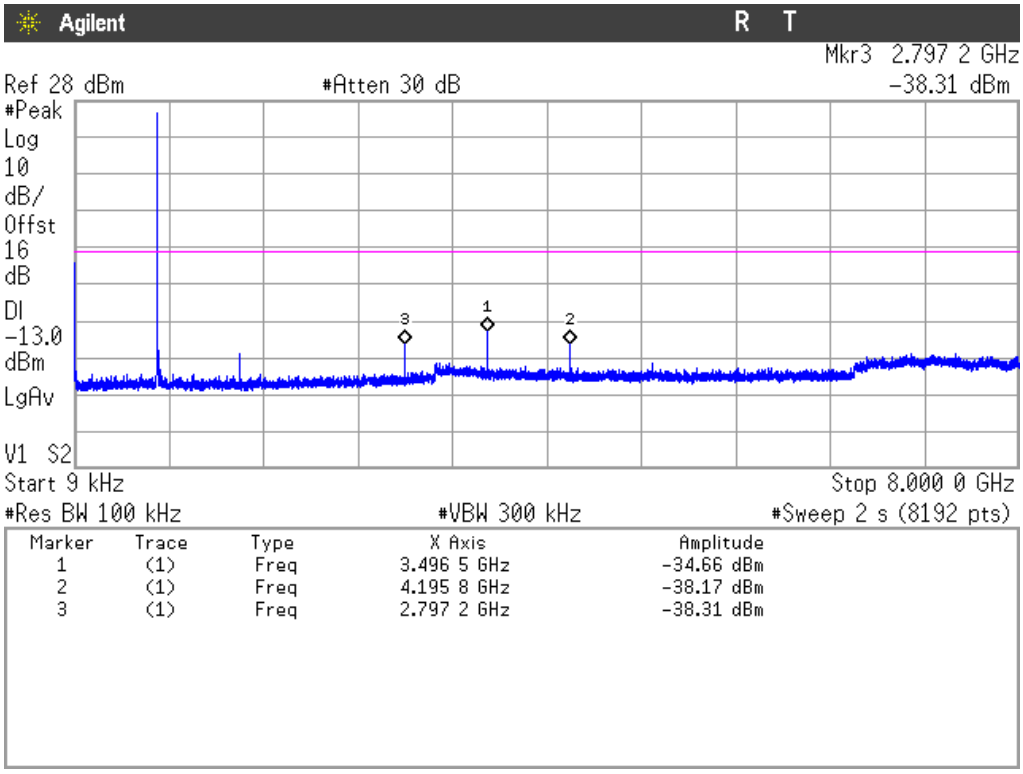
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

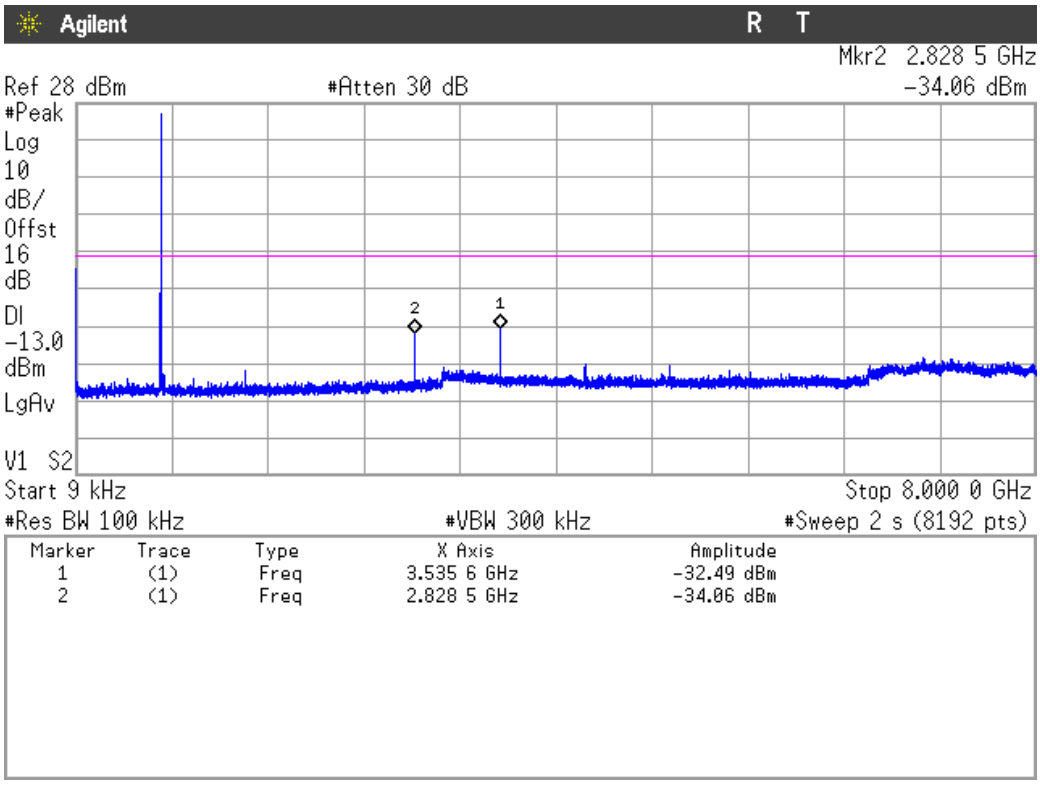
LTE QPSK MODULATION. BW = 1.4 MHz (Band XII)

1. CHANNEL: LOWEST



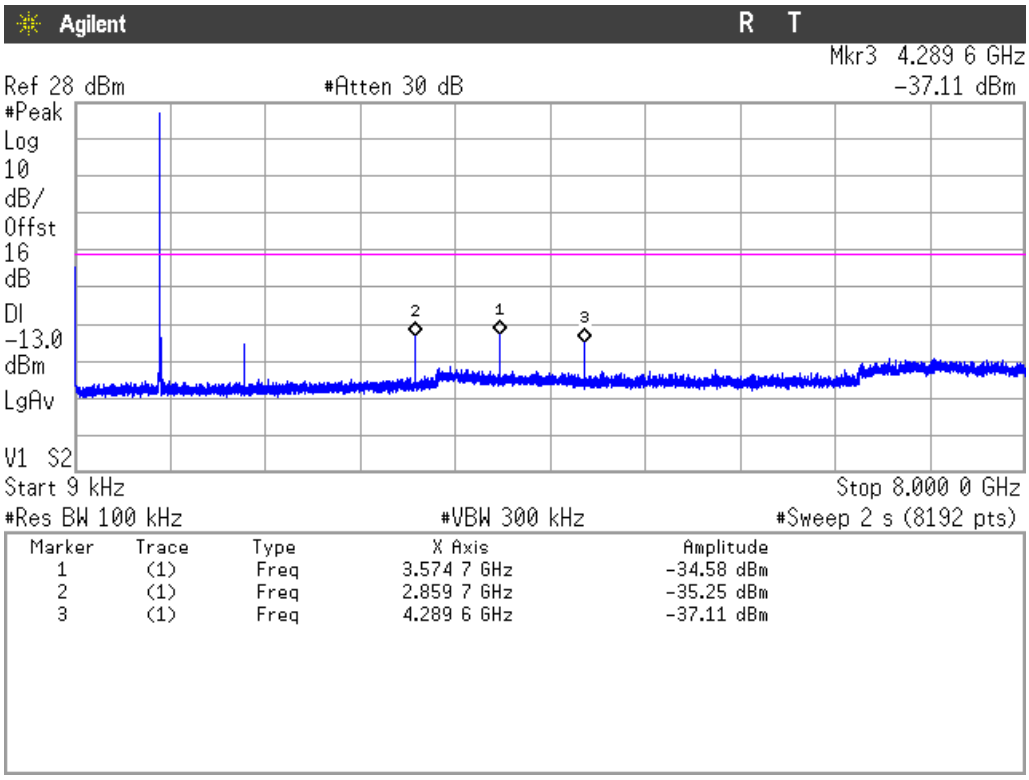
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

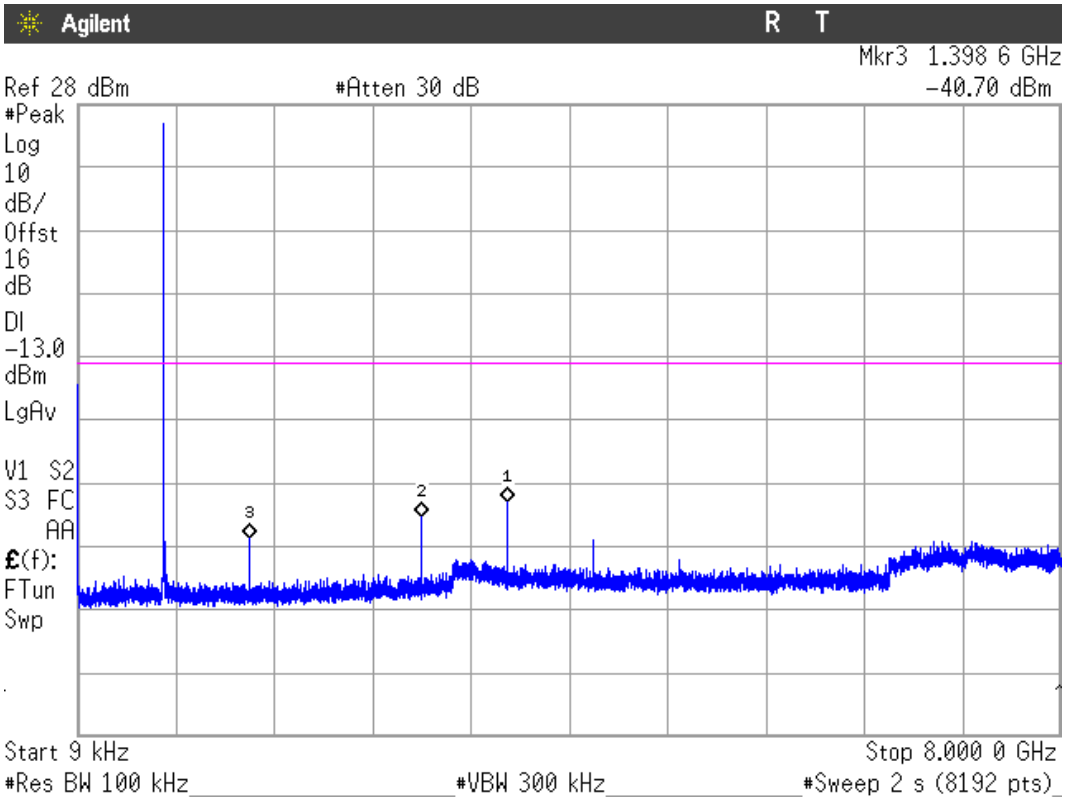
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

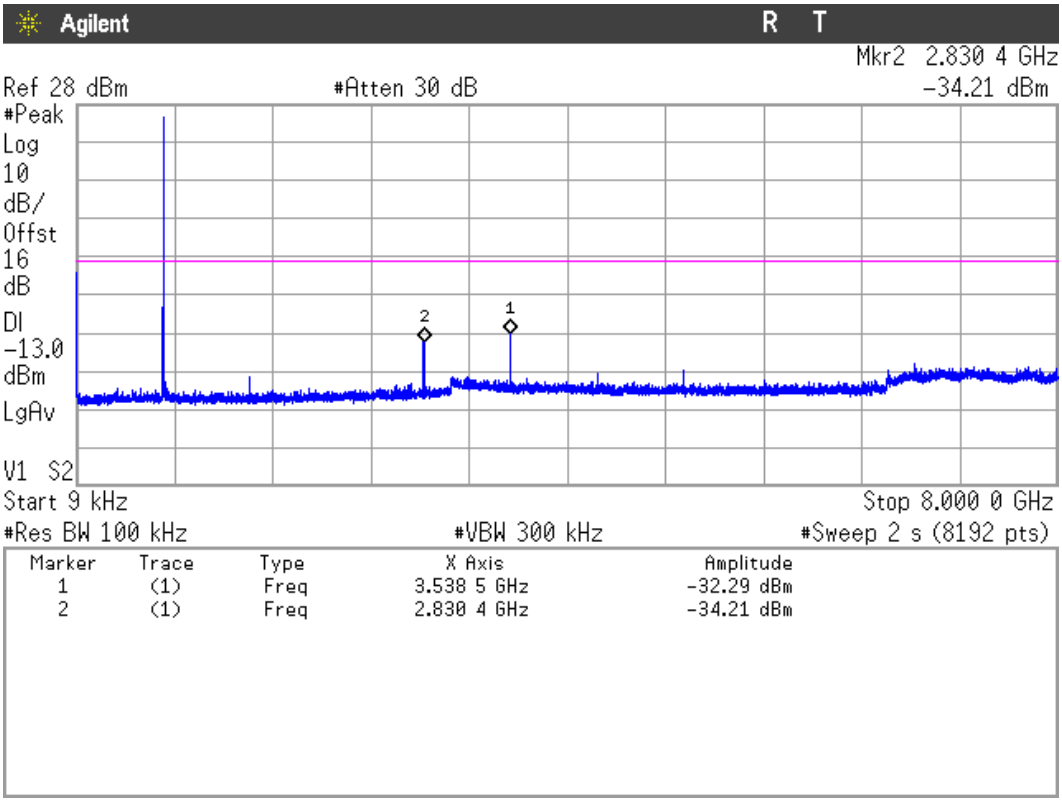
LTE QPSK MODULATION. BW = 3 MHz (Band XII)

1. CHANNEL: LOWEST



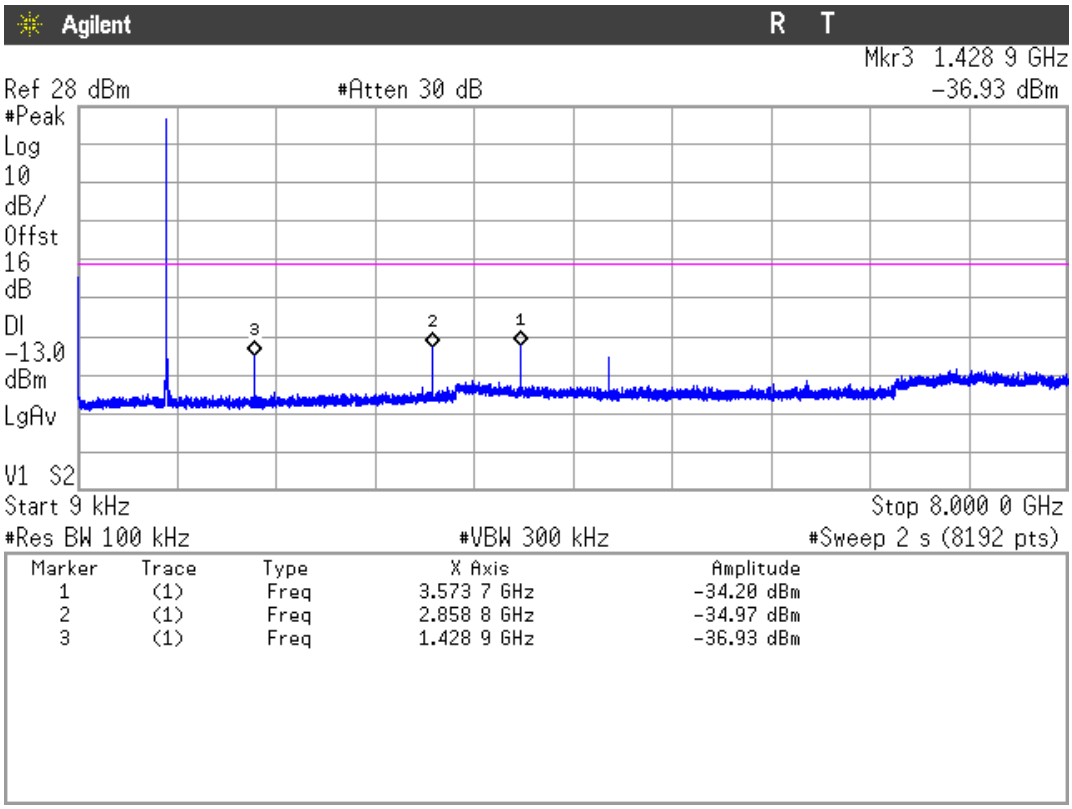
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

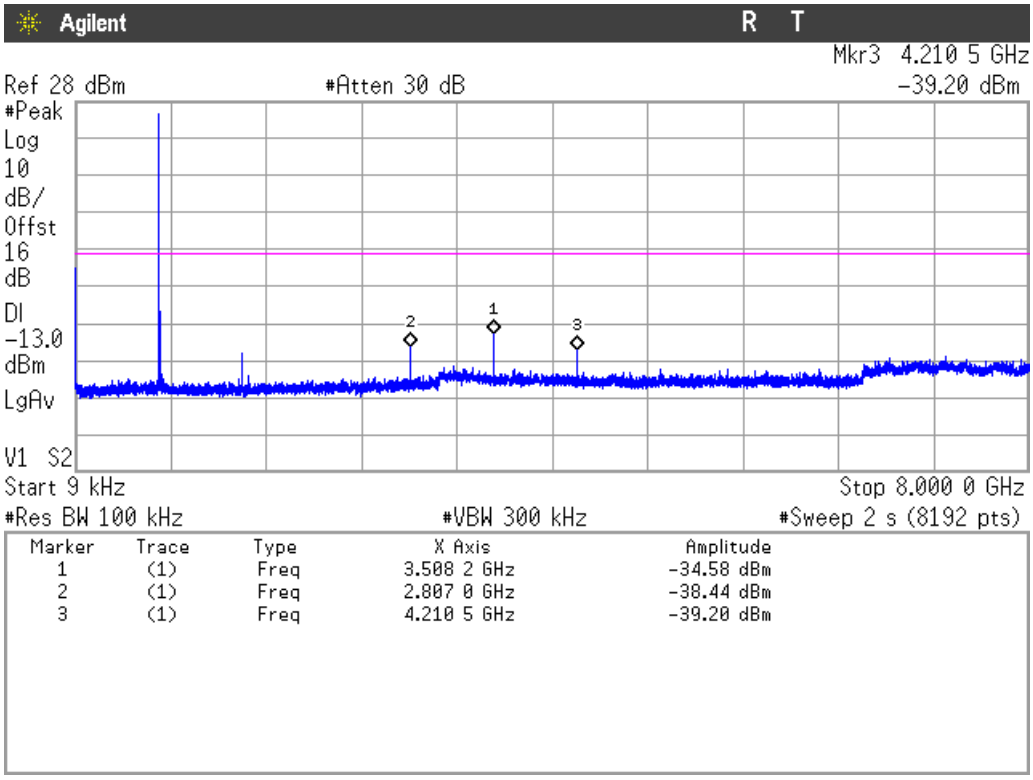
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

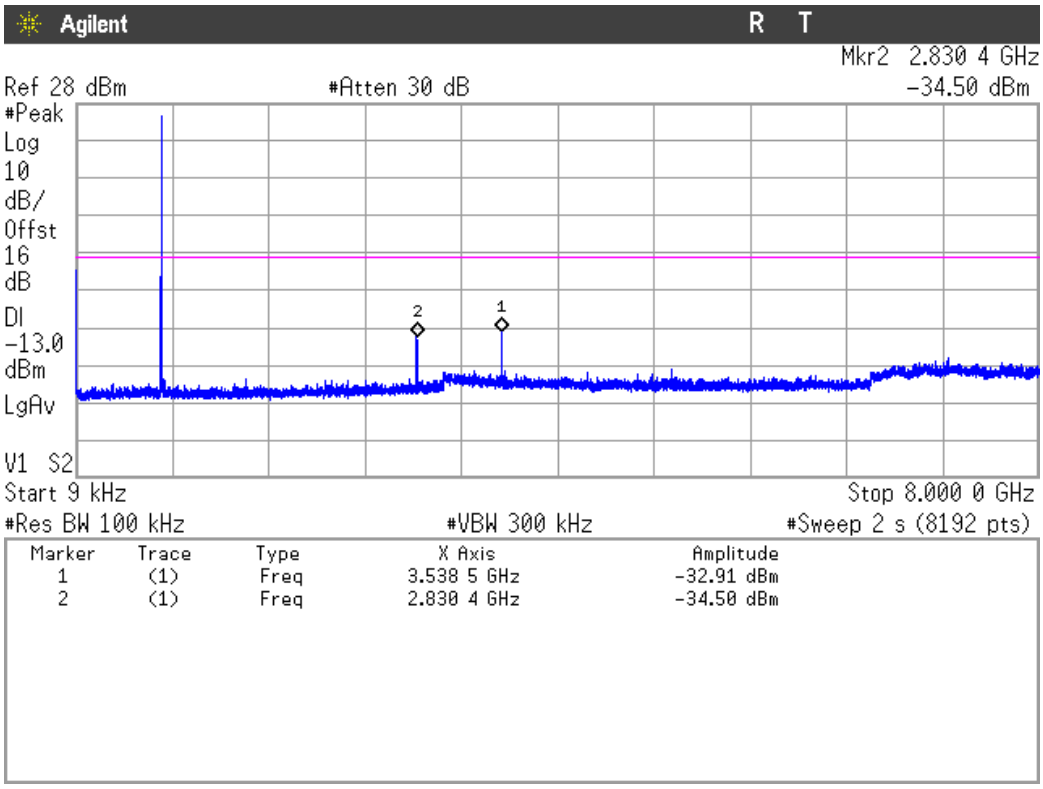
LTE QPSK MODULATION. BW = 5 MHz (Band XII)

1. CHANNEL: LOWEST



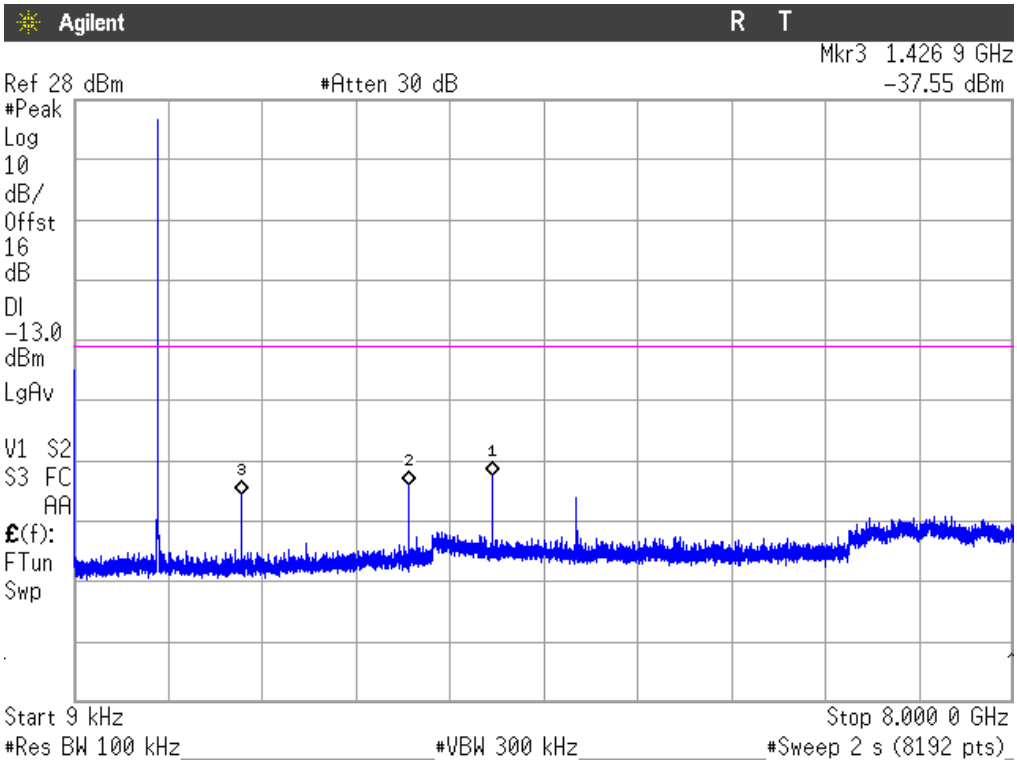
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

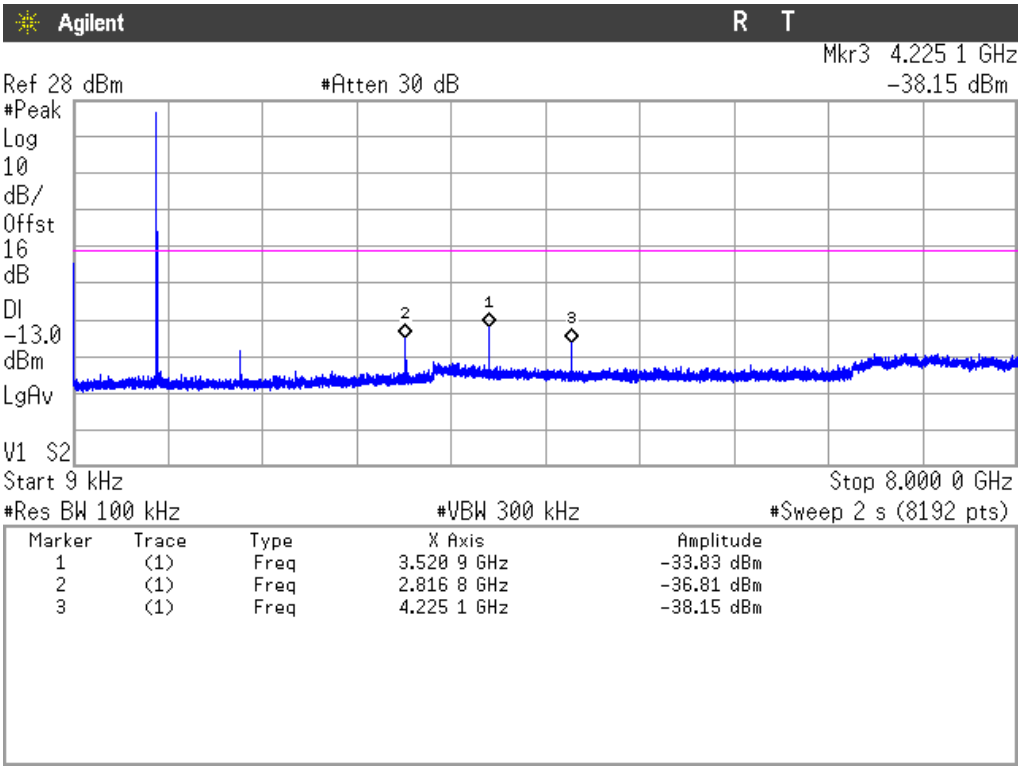
3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

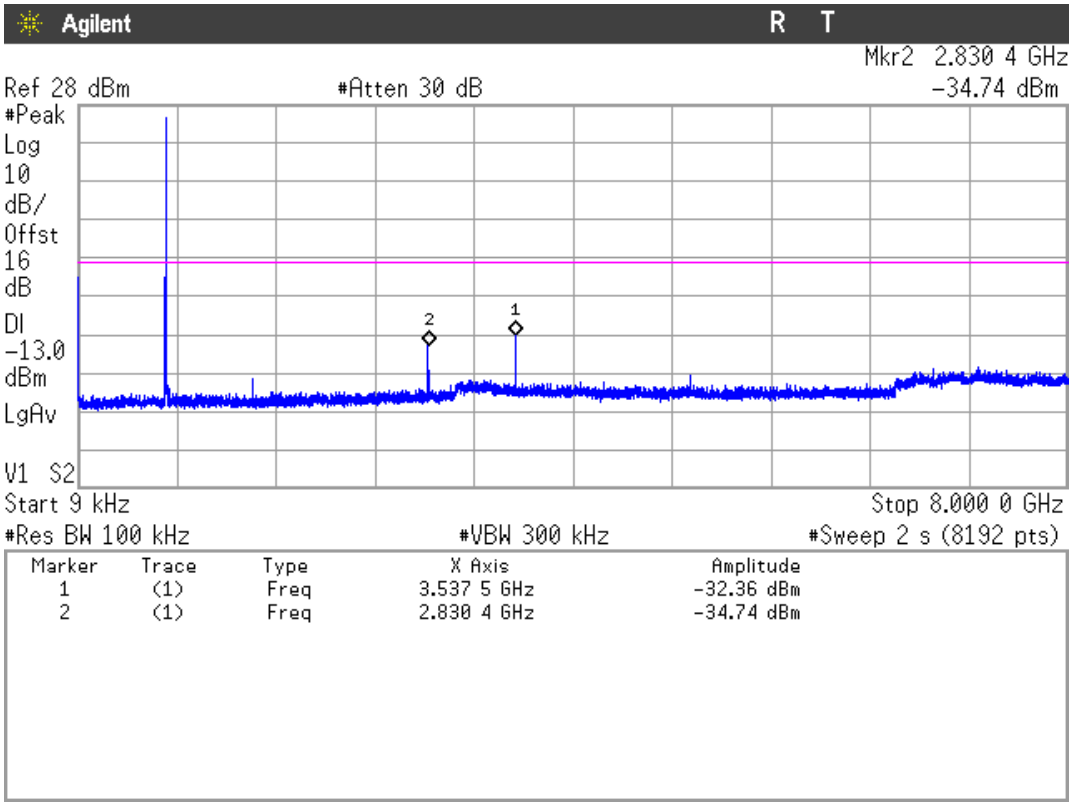
LTE QPSK MODULATION. BW = 10 MHz (Band XII)

1. CHANNEL: LOWEST



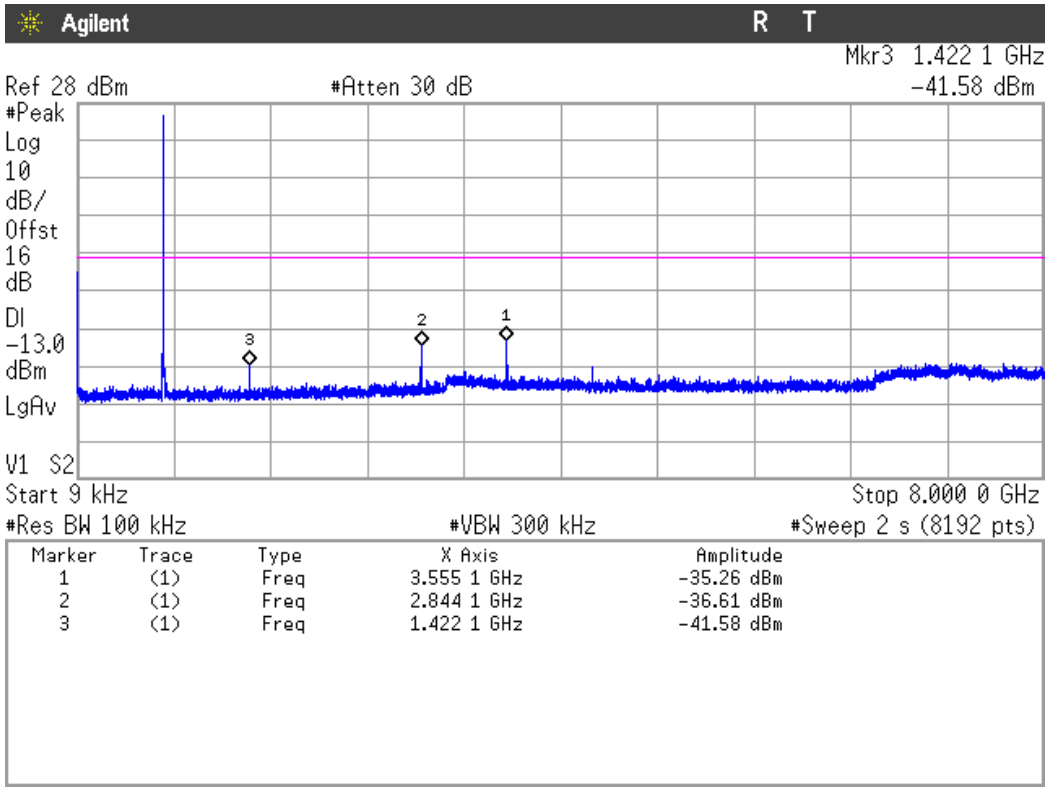
Note: The peak above the limit is the carrier frequency.

2. CHANNEL: MIDDLE



Note: The peak above the limit is the carrier frequency.

3. CHANNEL: HIGHEST



Note: The peak above the limit is the carrier frequency.

Spurious emissions at antenna terminals at Block Edges

SPECIFICATION

FCC §2.1051 and §27.53(g) (h) (m). RSS-139 Clause 6.5. RSS-130 Clause 4.6.

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

RSS-199 Clause 4.6.

For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

i) 40 + 10 log p from the channel edges to 5 MHz away,
ii) 43 + 10 log p between 5 MHz and X MHz from the channel edges, and
iii) 55 + 10 log p at X MHz and beyond from the channel edges.
iv) in addition, the attenuation shall be not be less than 43 + 10 log p on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log p at or below 2490.5 MHz.

At Po transmitting power. the specified minimum attenuation becomes 40+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [40 + 10 log (Po in mwatts) - 30] = -10 dBm

At Po transmitting power. the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm

At Po transmitting power. the specified minimum attenuation becomes 55+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [55 + 10 log (Po in mwatts) - 30] = -25 dBm

METHOD

For 3G Band IV and LTE Band IV, as indicated in FCC part 27.53 (h) (3)/RSS-139 Clause 6.5., in the 1 MHz bands immediately outside and adjacent to the licensee's frequency block or band, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

For LTE Band XII, as indicated in FCC part 27.53 (g)/RSS-130 Clause 4.6., in the 100 kHz bands immediately outside and adjacent to the licensee's frequency block or band, a resolution bandwidth of 30 kHz may be employed.

For LTE Band VII, as indicated in FCC part 27.53 (m) (6) /RSS-199 Clause 4.6., in the 1 MHz band immediately outside and adjacent to the band edge, the unwanted emission power shall be measured with a resolution bandwidth of at least 2% of the occupied bandwidth for mobile subscriber equipment.

RESULTS (see plots in next pages)

MODULATION:	WCDMA	HSUPA
Maximum measured level at lowest Block Edge at antenna port (dBm)	-31.52	-31.77

MODULATION:	WCDMA	HSUPA
Maximum measured level at highest Block Edge at antenna port (dBm)	-33.22	-33.00

LTE QPSK MODULATION (Channels in Band IV):	RB=1, Offset=0, BW=1.4 MHz	RB=1 , Offset =0, BW = 3 MHz	RB=1 , Offset =0, BW = 5 MHz	RB=1 , Offset =0, BW = 10 MHz	RB=1 , Offset =0, BW = 15 MHz	RB=1 , Offset =0, BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-23.40	-20.12	-22.27	-31.12	-28.20	-31.53

LTE QPSK MODULATION: (Channels in Band IV):	RB= All, Offset=0, BW=1.4 MHz	RB= All, Offset =0, BW = 3 MHz	RB= All, Offset =0, BW = 5 MHz	RB= All, Offset =0, BW = 10 MHz	RB= All, Offset =0, BW = 15 MHz	RB= All, Offset =0, BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-29.75	-27.93	-28.38	-30.50	-29.52	-28.43

LTE QPSK MODULATION: (Channels in Band IV):	RB= 1, Offset=Max, BW=1.4 MHz	RB= 1, Offset=Max, BW = 3 MHz	RB= 1, Offset=Max, BW = 5 MHz	RB= 1, Offset=Max, BW = 10 MHz	RB= 1, Offset=Max, BW = 15 MHz	RB= 1, Offset=Max, BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-33.71	-20.17	-22.58	-30.33	-28.66	-31.33

LTE QPSK MODULATION: (Channels in Band IV):	RB= All, Offset=0, BW=1.4 MHz	RB= All, Offset =0, BW = 3 MHz	RB= All, Offset =0, BW = 5 MHz	RB= All, Offset =0, BW = 10 MHz	RB= All, Offset =0, BW = 15 MHz	RB= All, Offset =0, BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-35.82	-30.48	-29.50	-30.70	-30.06	-29.99

LTE QPSK MODULATION (Channels in Band VII):	RB=1, Offset=0, BW = 5 MHz	RB=1 , Offset =0, BW = 10 MHz	RB=1 , Offset =0, BW = 15 MHz	RB=1 , Offset =0, BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-16.98 (up to 1 MHz) -27.40 (from 1 MHz outside Block Edge)	-23.04 (up to 1 MHz) -12.59 (from 1 MHz outside Block Edge)	-22.23 (up to 1 MHz) -27.85 (from 1 MHz outside Block Edge)	-24.60 (up to 1 MHz) -38.11 (from 1 MHz outside Block Edge)

LTE QPSK MODULATION: (Channels in Band VII):	RB= All, Offset=0, BW = 5 MHz	RB= All, Offset =0, BW = 10 MHz	RB= All, Offset =0, BW = 15 MHz	RB= All, Offset =0, BW = 20 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-24.74 (up to 1 MHz) -14.60 (from 1 MHz outside Block Edge)	-26.57 (up to 1 MHz) -24.06 (from 1 MHz outside Block Edge)	-25.94 (up to 1 MHz) -22.70 (from 1 MHz outside Block Edge)	-24.32 (up to 1 MHz) -21.76 (from 1 MHz outside Block Edge)

LTE QPSK MODULATION: (Channels in Band VII):	RB= 1, Offset=Max, BW = 5 MHz	RB= 1, Offset=Max, BW = 10 MHz	RB= 1, Offset=Max, BW = 15 MHz	RB= 1, Offset=Max, BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-16.37 (up to 1 MHz) -27.99 (from 1 MHz outside Block Edge)	-22.87 (up to 1 MHz) -12.91 (from 1 MHz outside Block Edge)	-23.02 (up to 1 MHz) -28.18 (from 1 MHz outside Block Edge)	-23.76 (up to 1 MHz) -36.68 (from 1 MHz outside Block Edge)

LTE QPSK MODULATION: (Channels in Band VII):	RB= All, Offset=0, BW = 5 MHz	RB= All, Offset =0, BW = 10 MHz	RB= All, Offset =0, BW = 15 MHz	RB= All, Offset =0, BW = 20 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-25.00 (up to 1 MHz) -13.92 (from 1 MHz outside Block Edge)	-25.64 (up to 1 MHz) -20.49 (from 1 MHz outside Block Edge)	-24.65 (up to 1 MHz) -20.03(from 1 MHz outside Block Edge)	-21.88 (up to 1 MHz) -19.43 (from 1 MHz outside Block Edge)

LTE QPSK MODULATION (Channels in Band XII):	RB=1, Offset=0, BW=1.4 MHz	RB=1 , Offset =0, BW = 3 MHz	RB=1 , Offset =0, BW = 5 MHz	RB=1 , Offset =0, BW = 10 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-41.62	-32.18	-33.12	-45.50

LTE QPSK MODULATION: (Channels in Band XII):	RB= All, Offset=0, BW=1.4 MHz	RB= All, Offset =0, BW = 3 MHz	RB= All, Offset =0, BW = 5 MHz	RB= All, Offset =0, BW = 10 MHz
Maximum measured level at lowest Block Edge at antenna port (dBm)	-32.85	-29.07	-32.07	-27.37

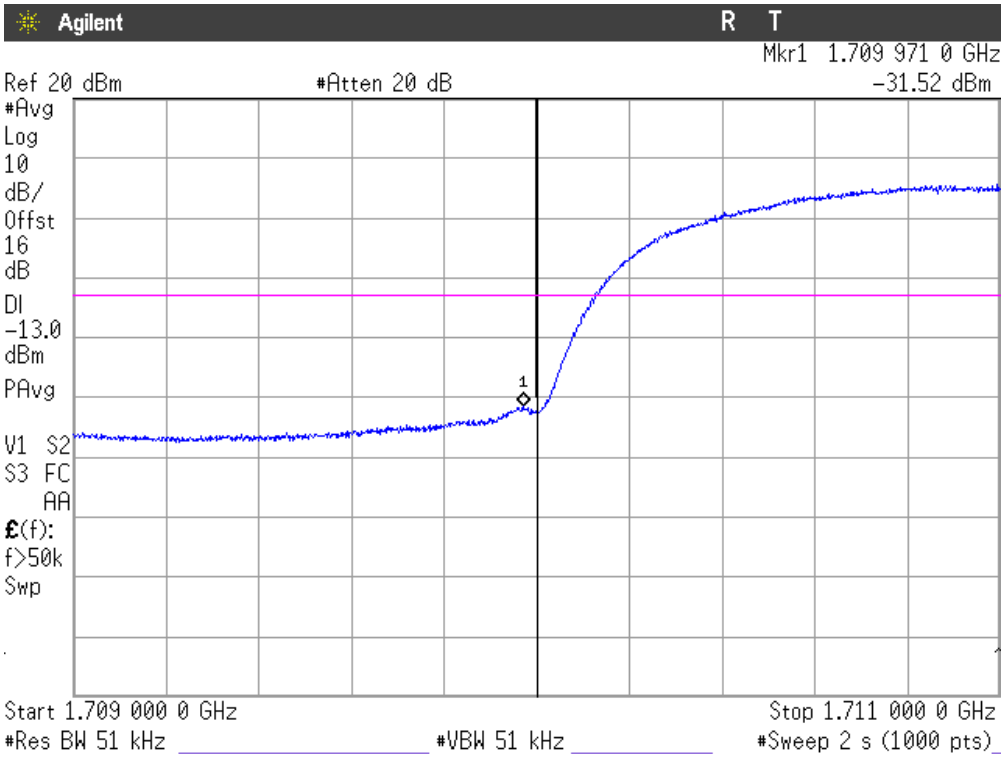
LTE QPSK MODULATION: (Channels in Band XII):	RB= 1, Offset=Max, BW=1.4 MHz	RB= 1, Offset=Max, BW = 3 MHz	RB= 1, Offset=Max, BW = 5 MHz	RB= 1, Offset=Max, BW = 10 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-22.51 (from 100 kHz up to 1 MHz outside Block Edge) -20.28 (up to 100 kHz from Block Edge)	-21.18 (from 100 kHz up to 1 MHz outside Block Edge) -18.44 (up to 100 kHz from Block Edge)	-15.89	-28.88

LTE QPSK MODULATION: (Channels in Band XII):	RB= All, Offset=0, BW=1.4 MHz	RB= All, Offset =0, BW = 3 MHz	RB= All, Offset =0, BW = 5 MHz	RB= All, Offset =0, BW = 10 MHz
Maximum measured level at highest Block Edge at antenna port (dBm)	-18.89	-19.22	-23.44	-24.67

Measurement uncertainty = ±1.57 dB.

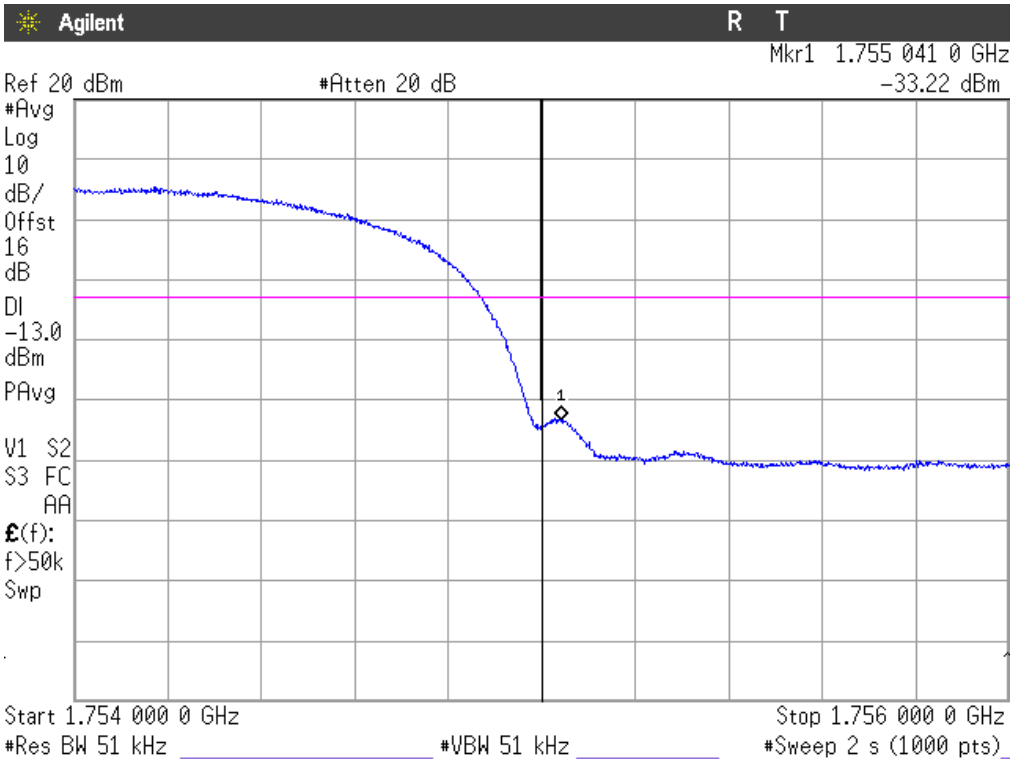
WCDMA MODULATION

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

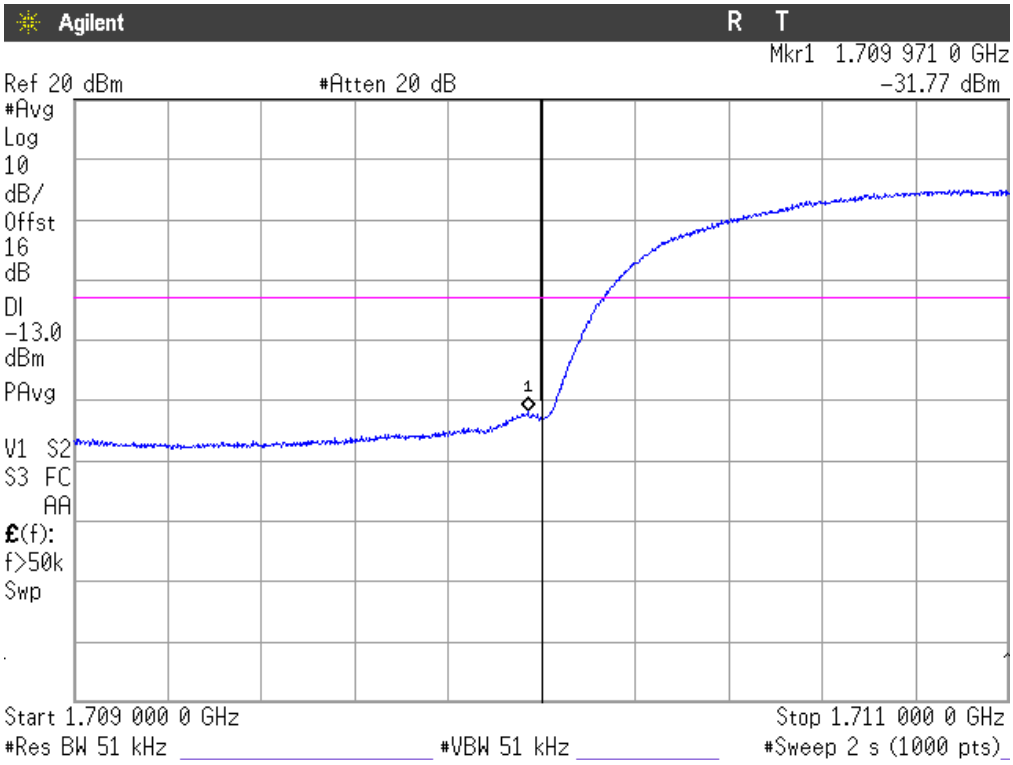


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

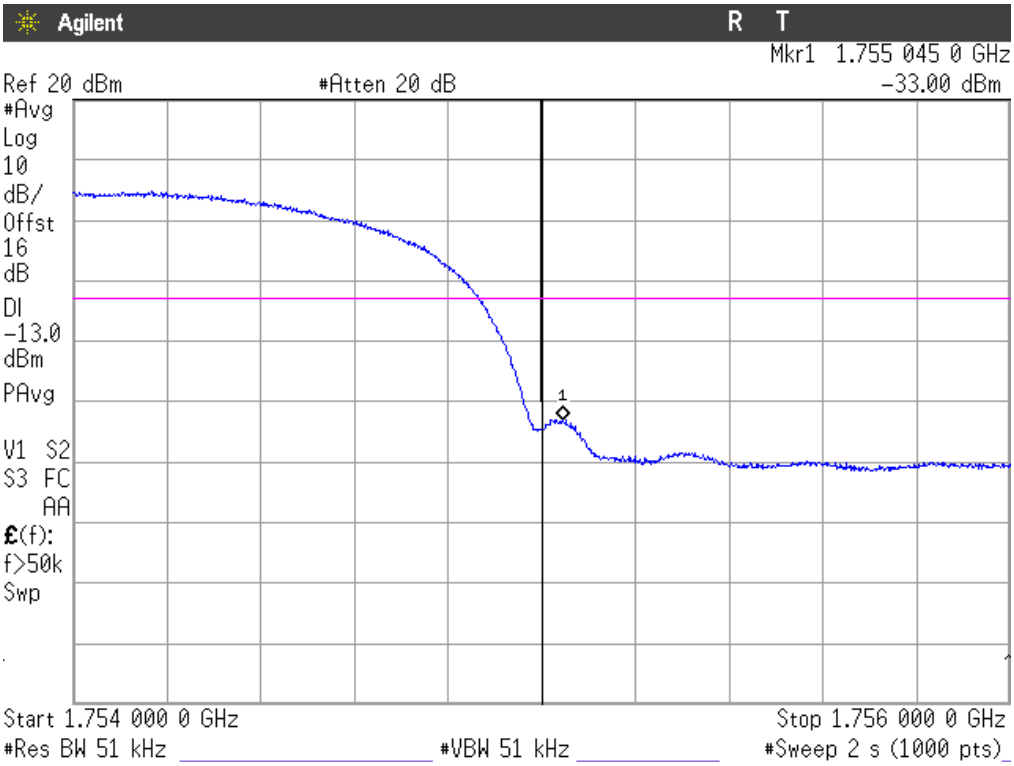
HSUPA MODULATION

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

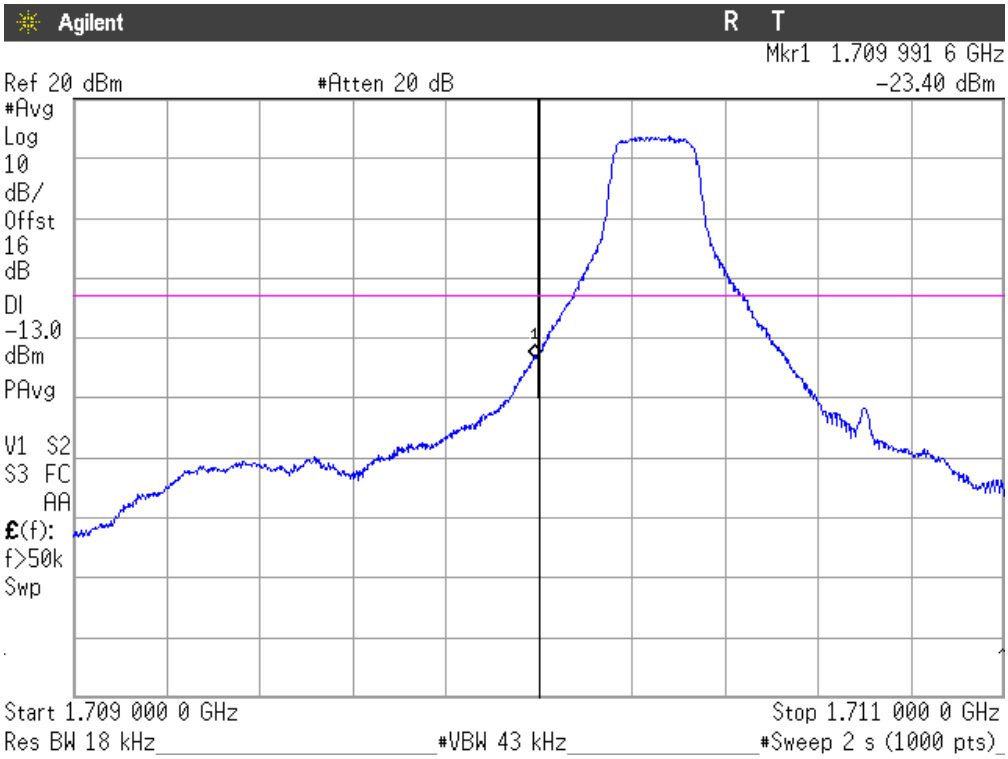


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 1.4 MHz (Band IV)

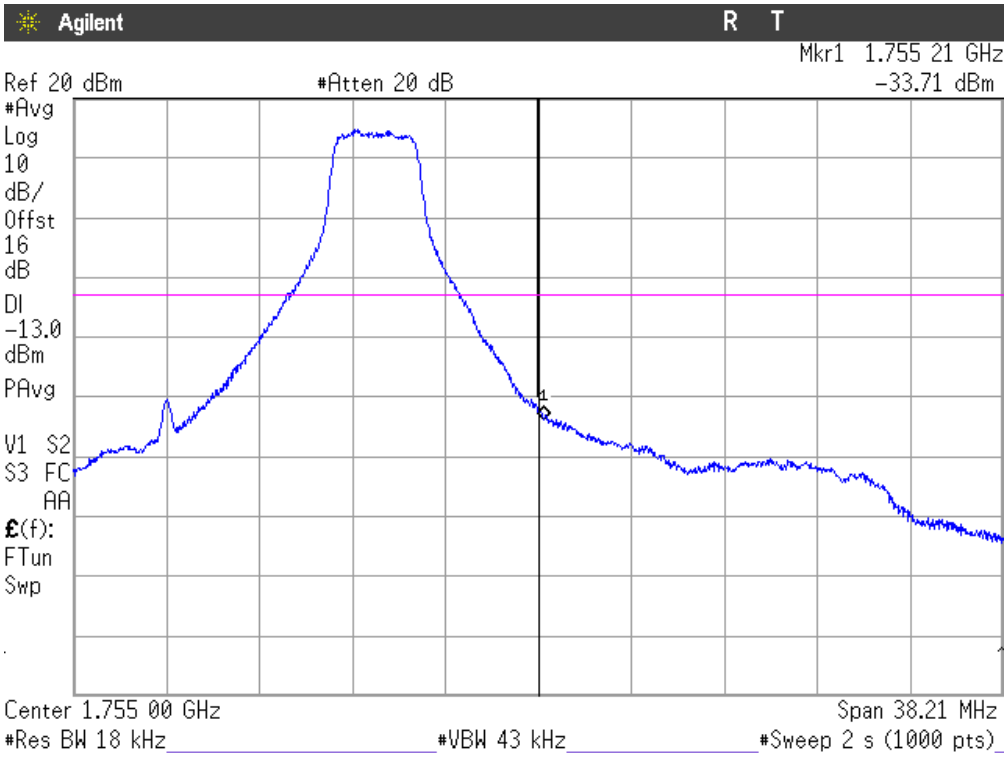
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 1.4 MHz (Band IV)

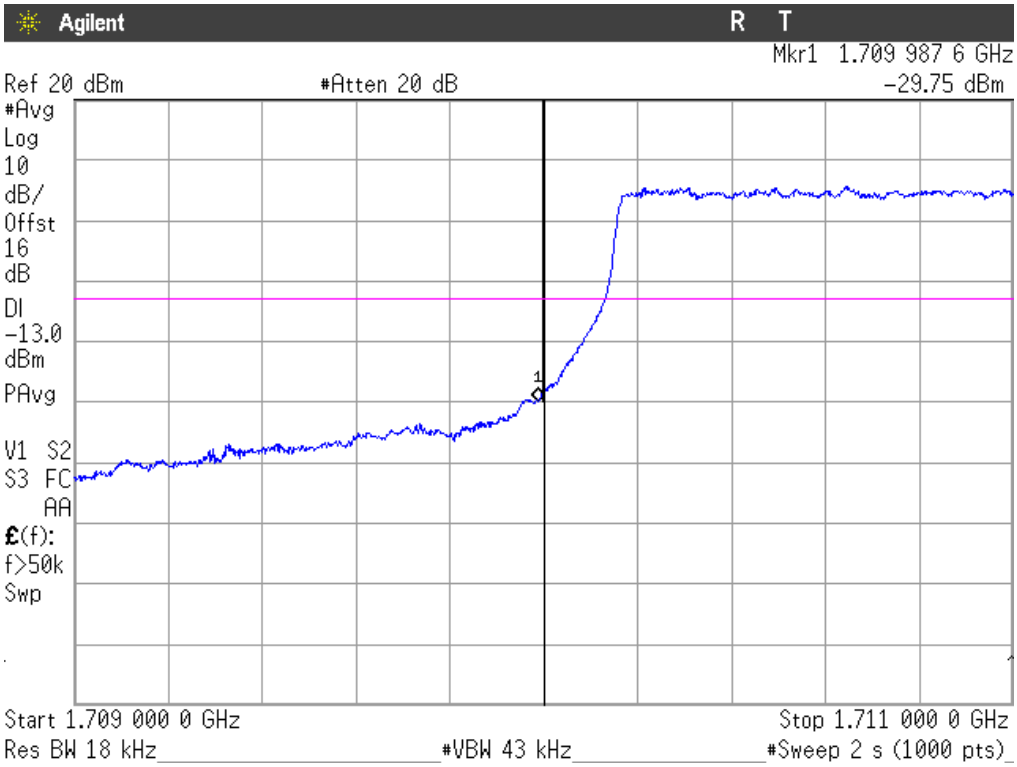
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

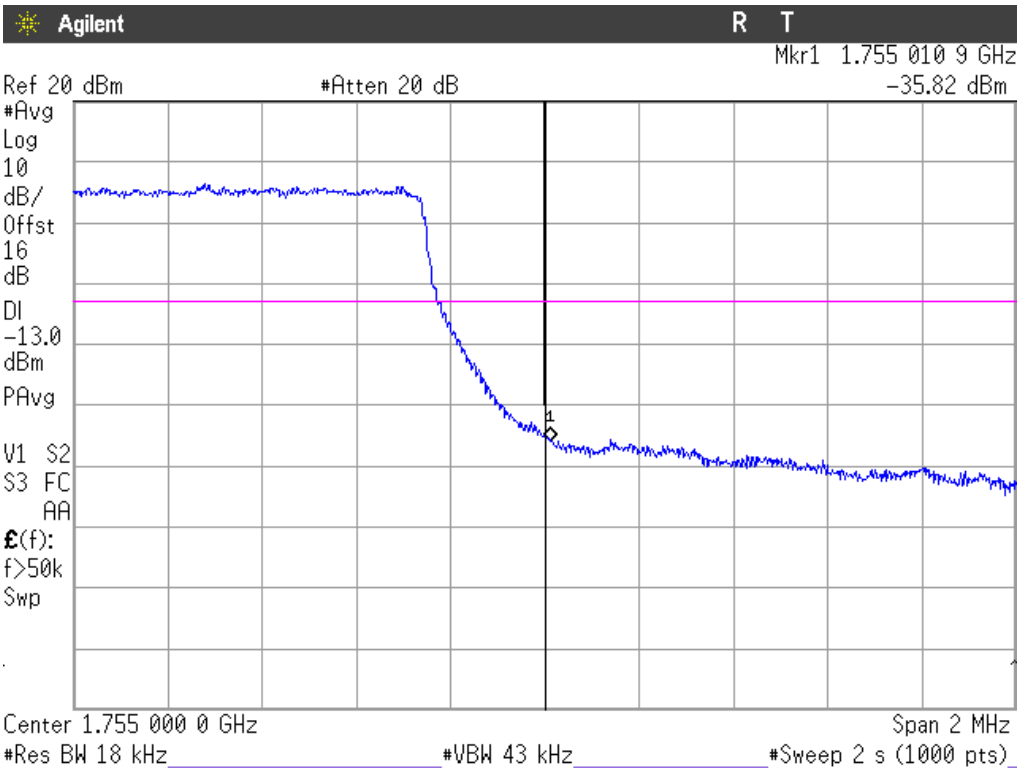
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 1.4 MHz (Band IV)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

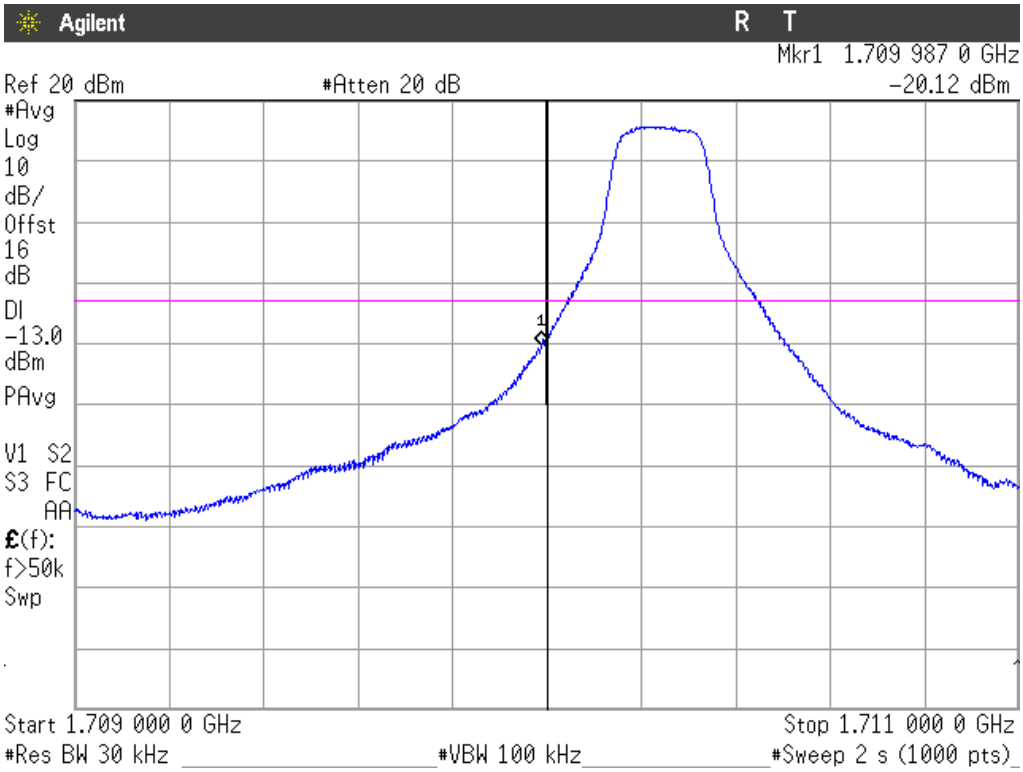


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 3 MHz (Band IV)

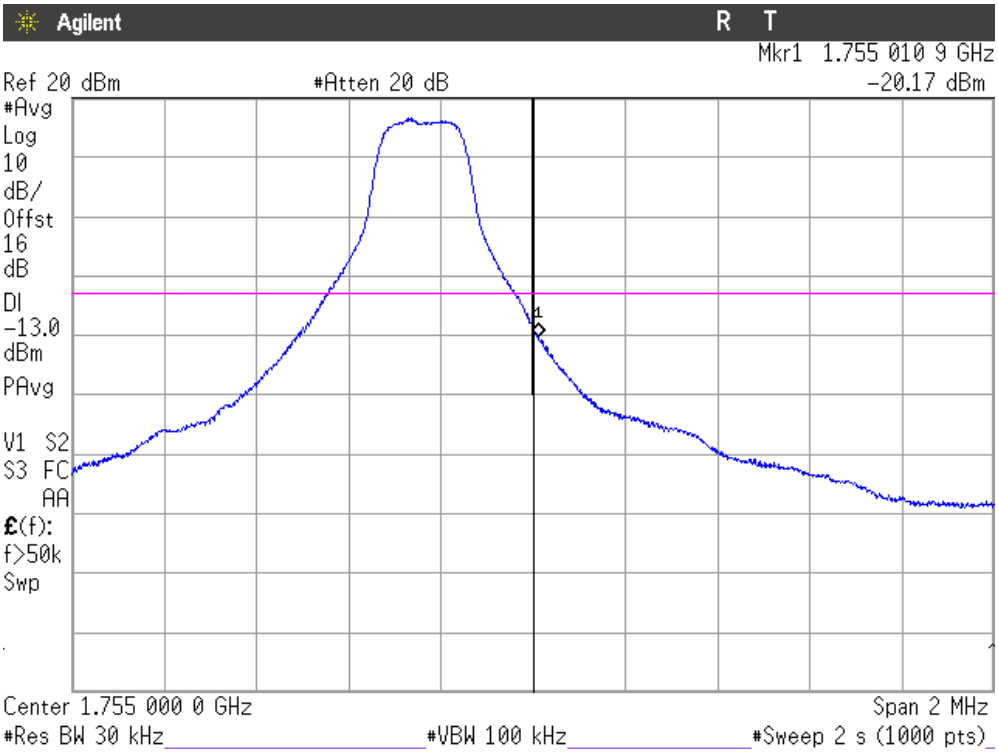
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 3 MHz (Band IV)

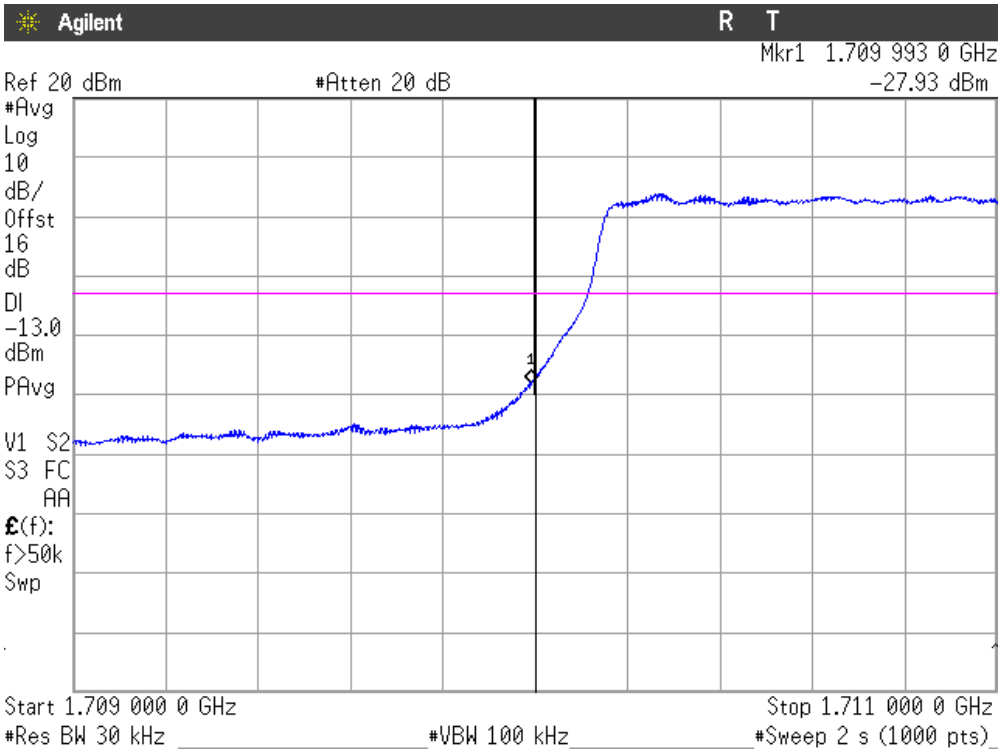
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

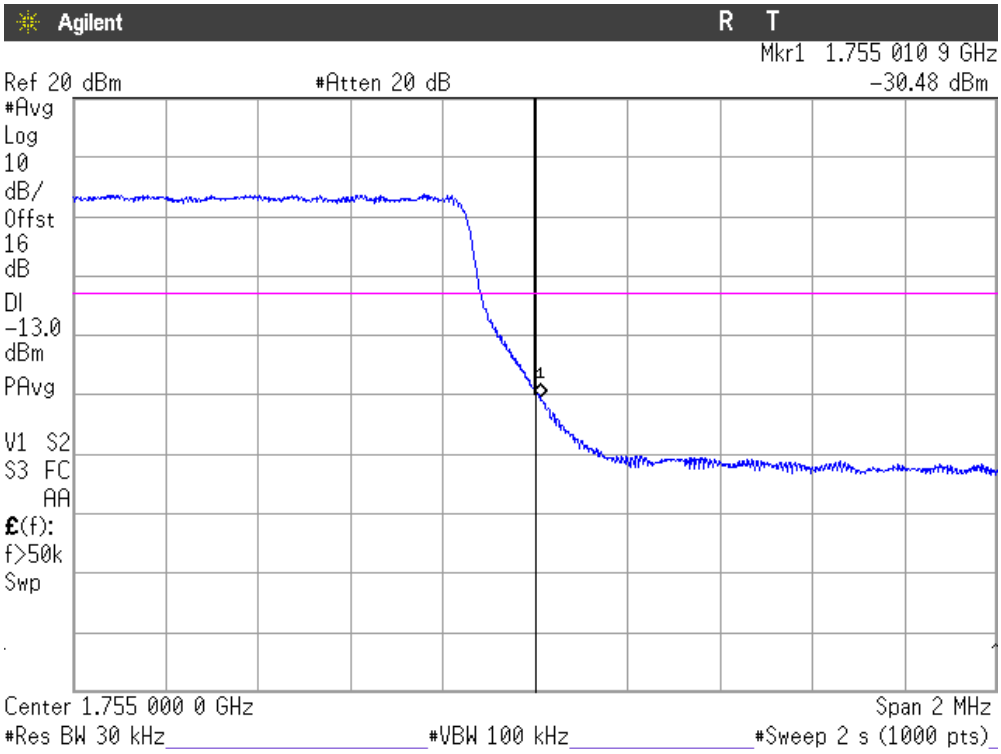
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 3 MHz (Band IV)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

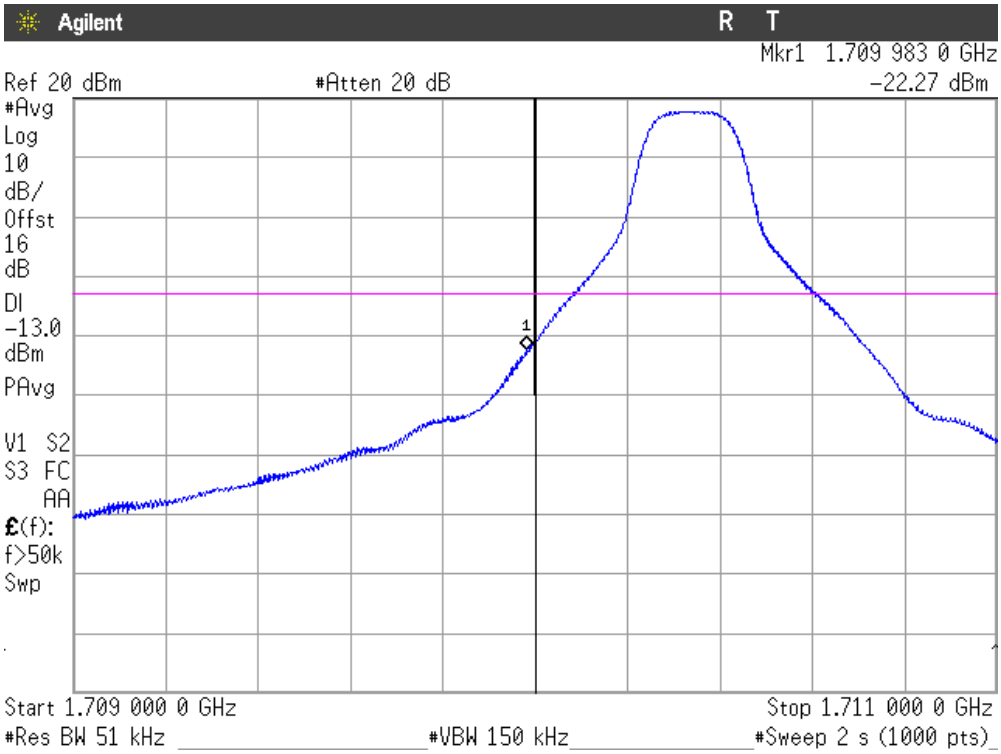


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 5 MHz (Band IV)

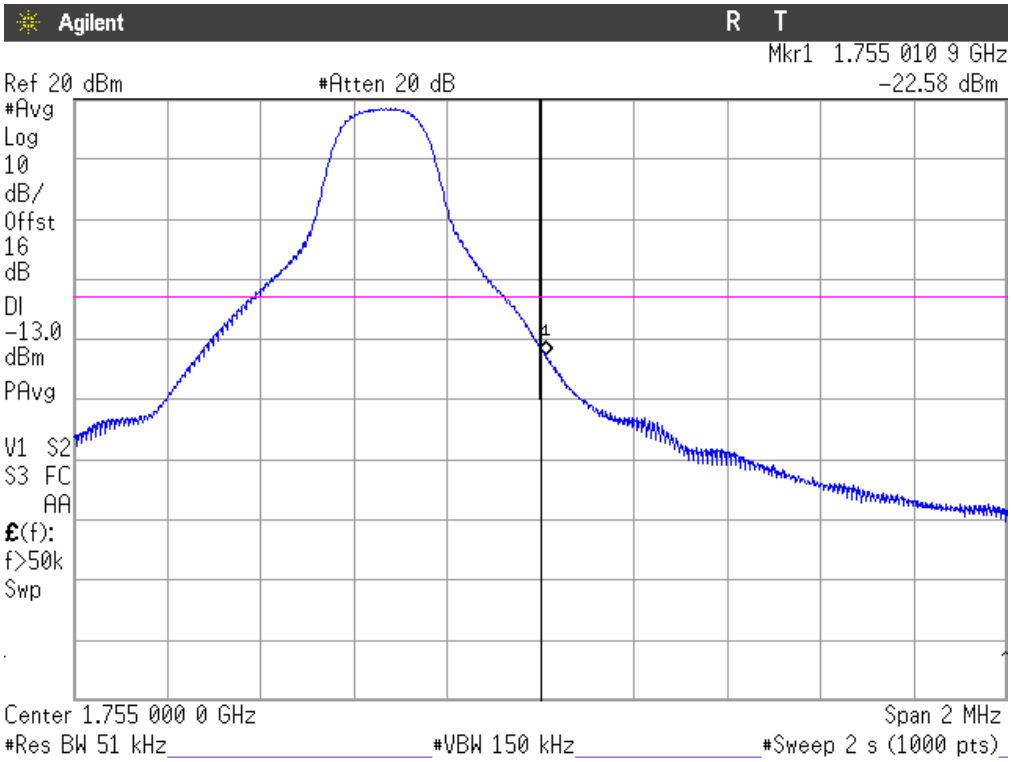
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 5 MHz (Band IV)

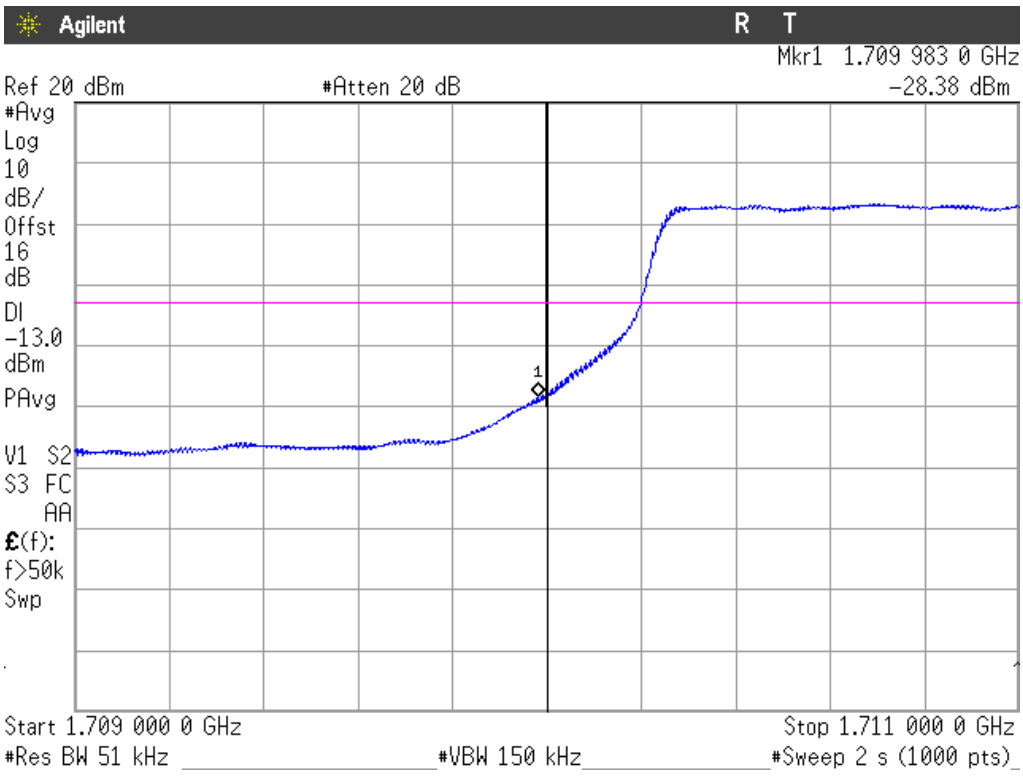
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

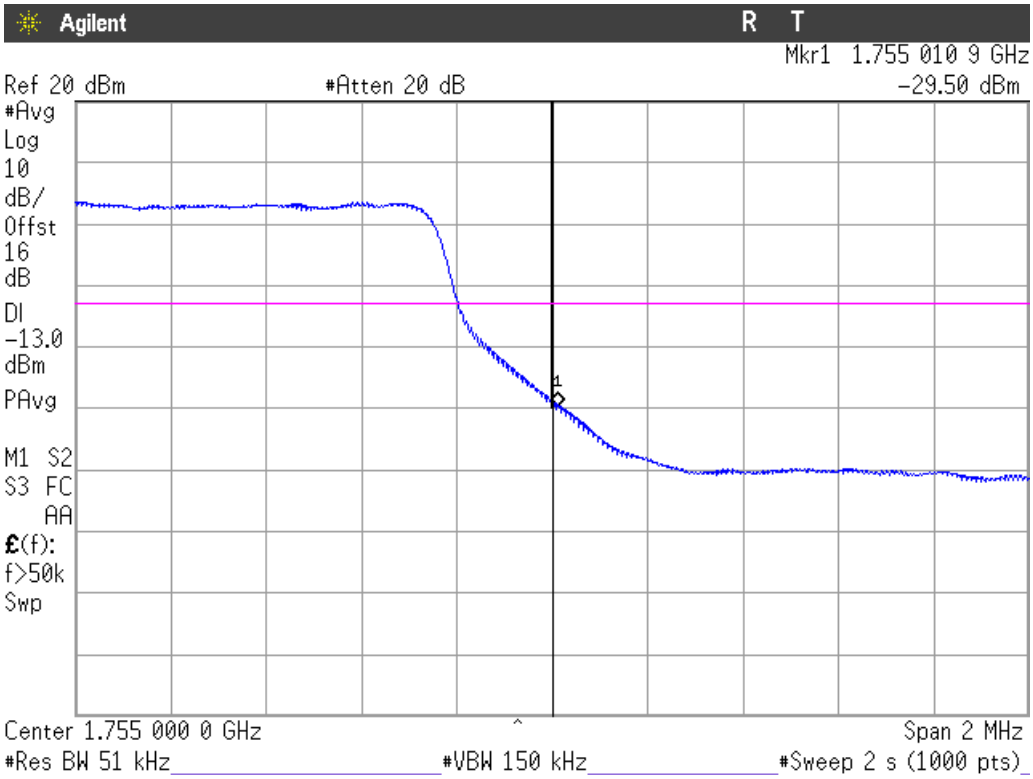
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 5 MHz (Band IV)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

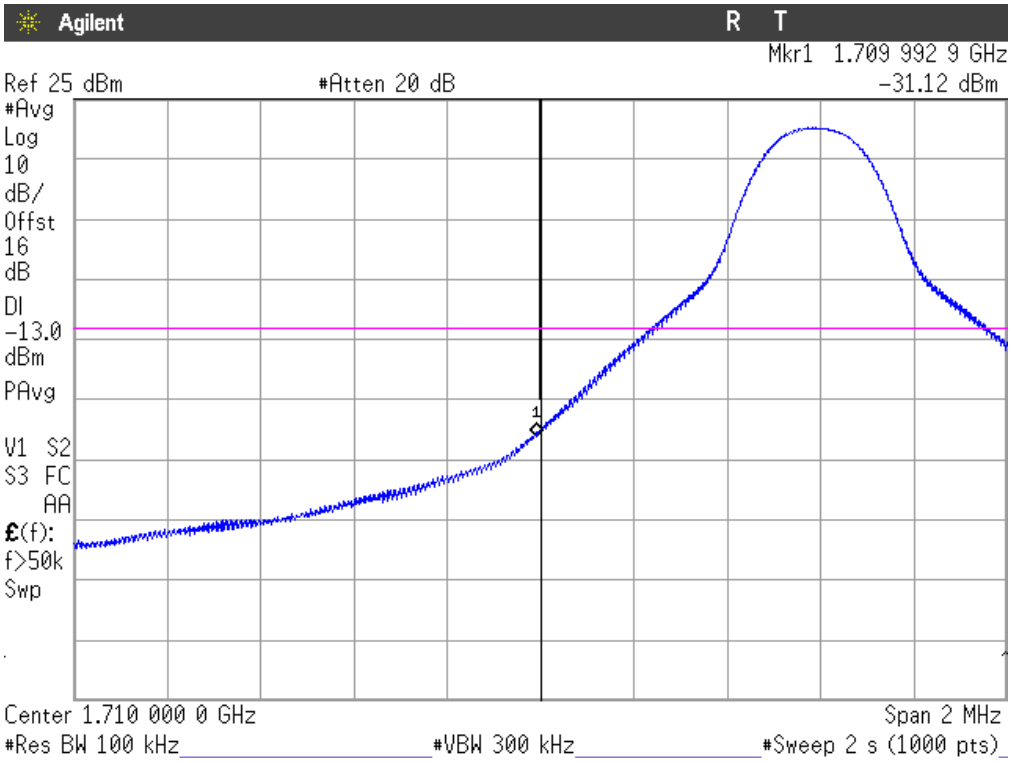


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 10 MHz (Band IV)

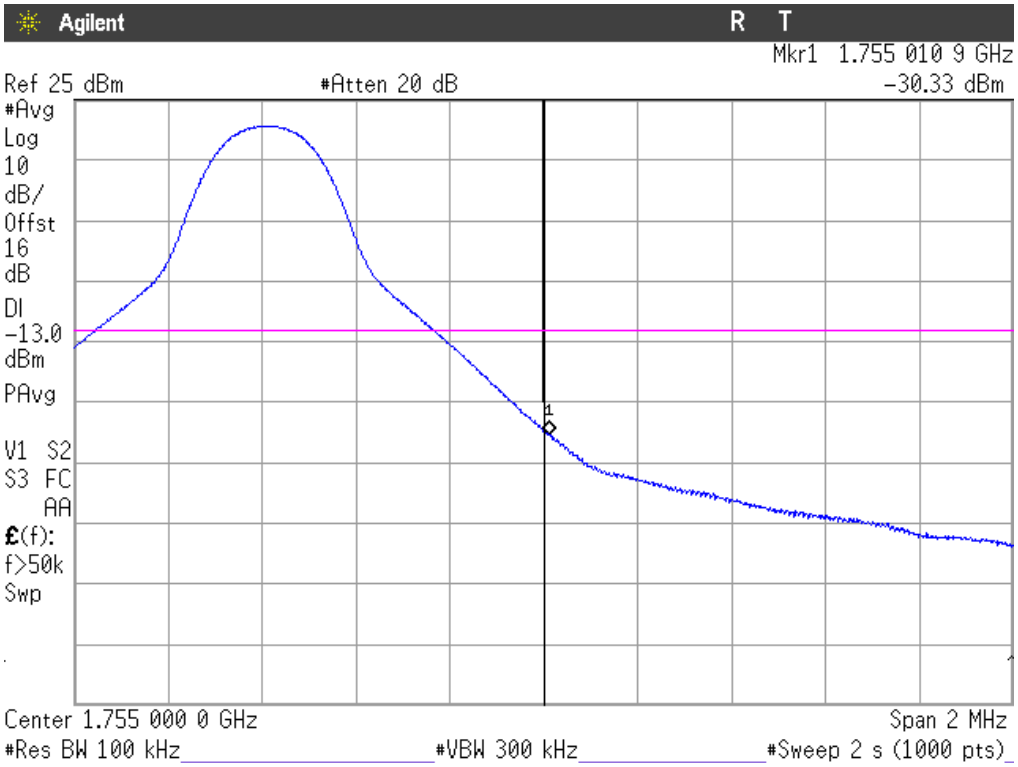
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 10 MHz (Band IV)

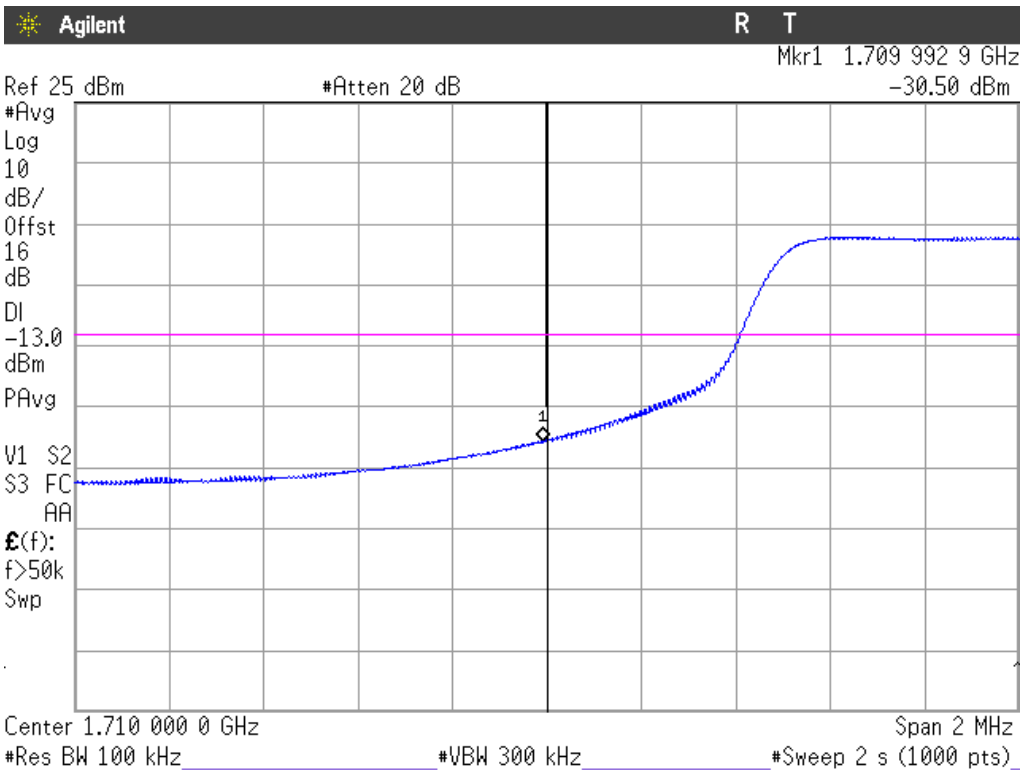
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

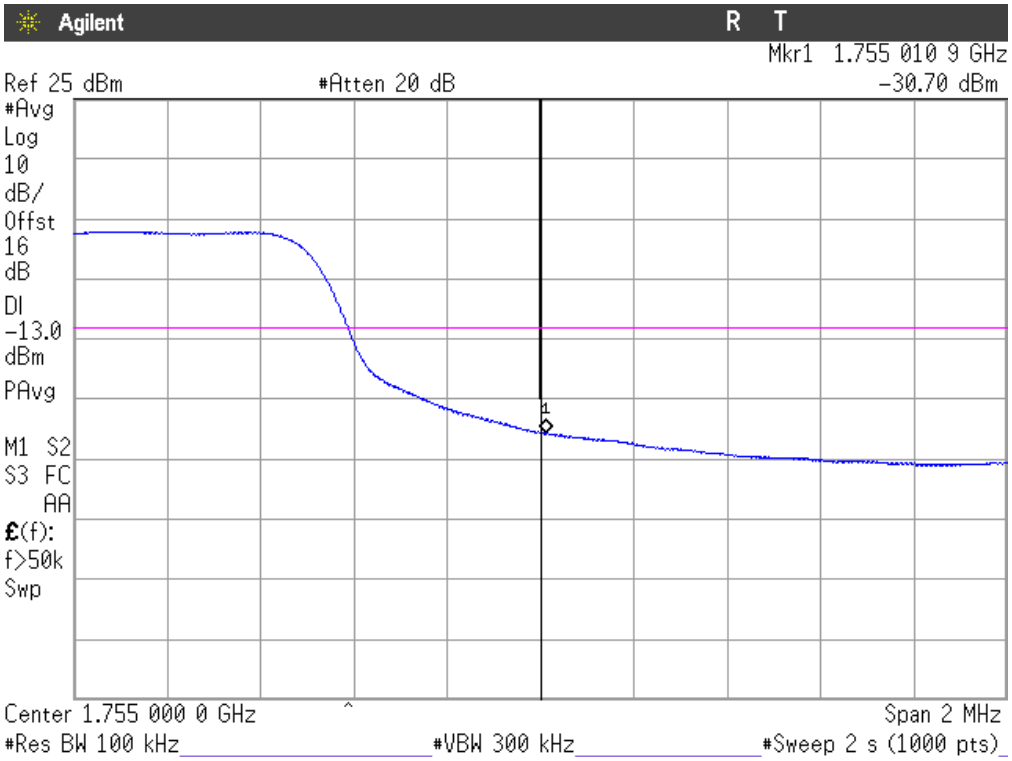
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 10 MHz (Band IV)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

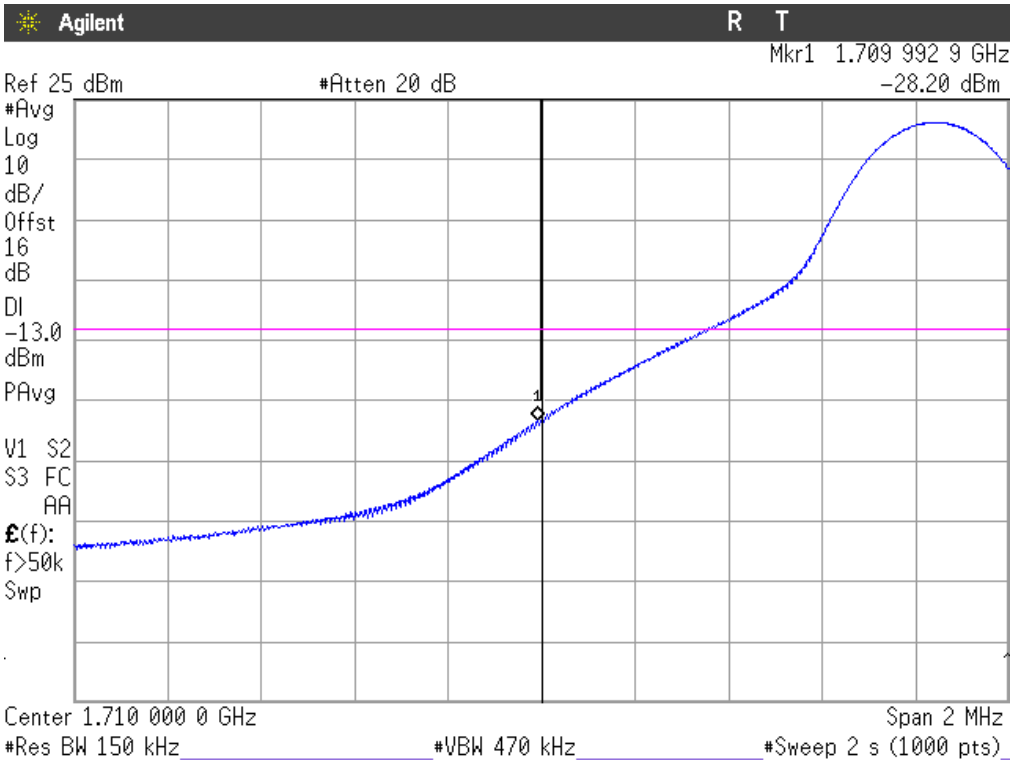


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 15 MHz (Band IV)

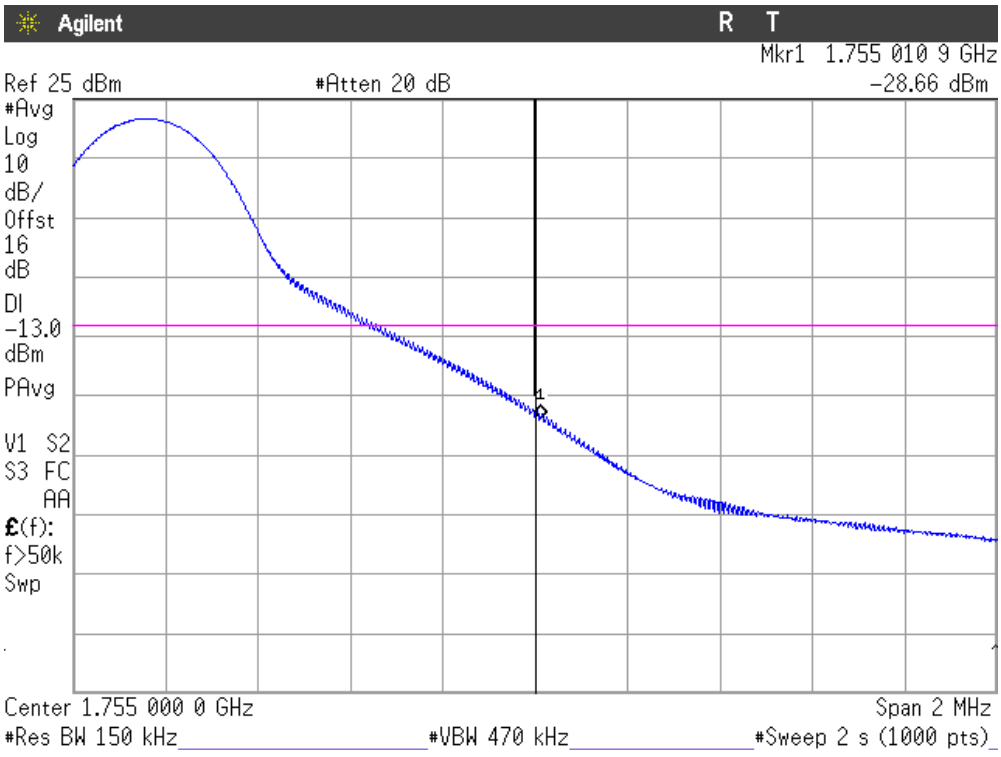
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 15 MHz (Band IV)

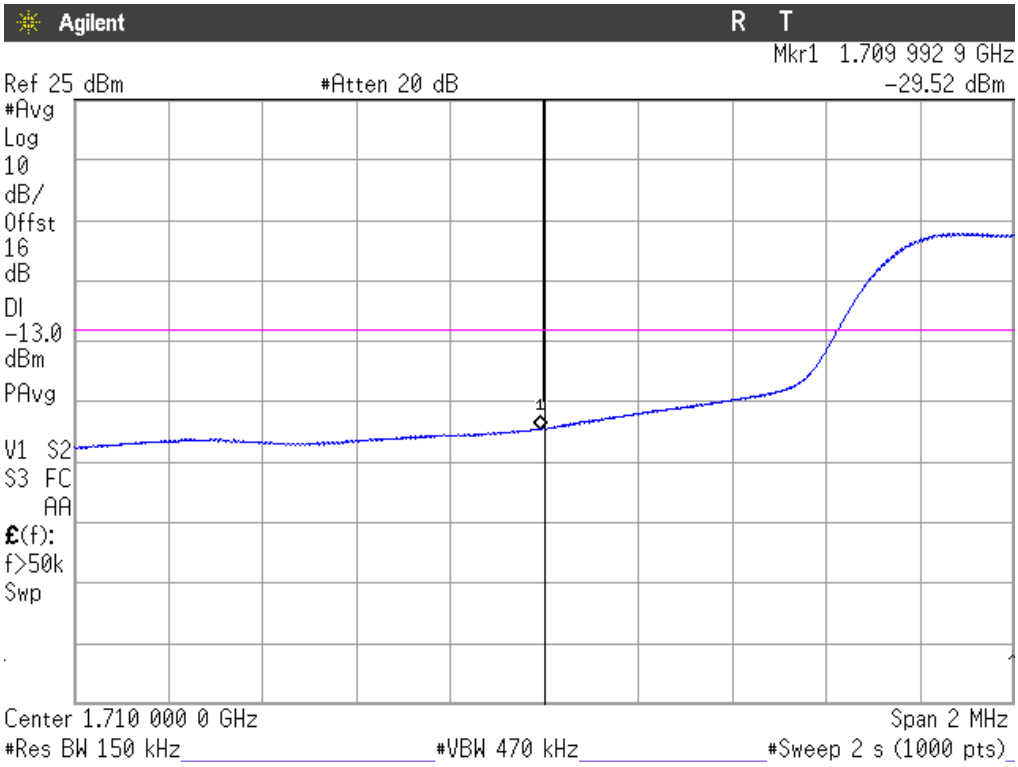
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

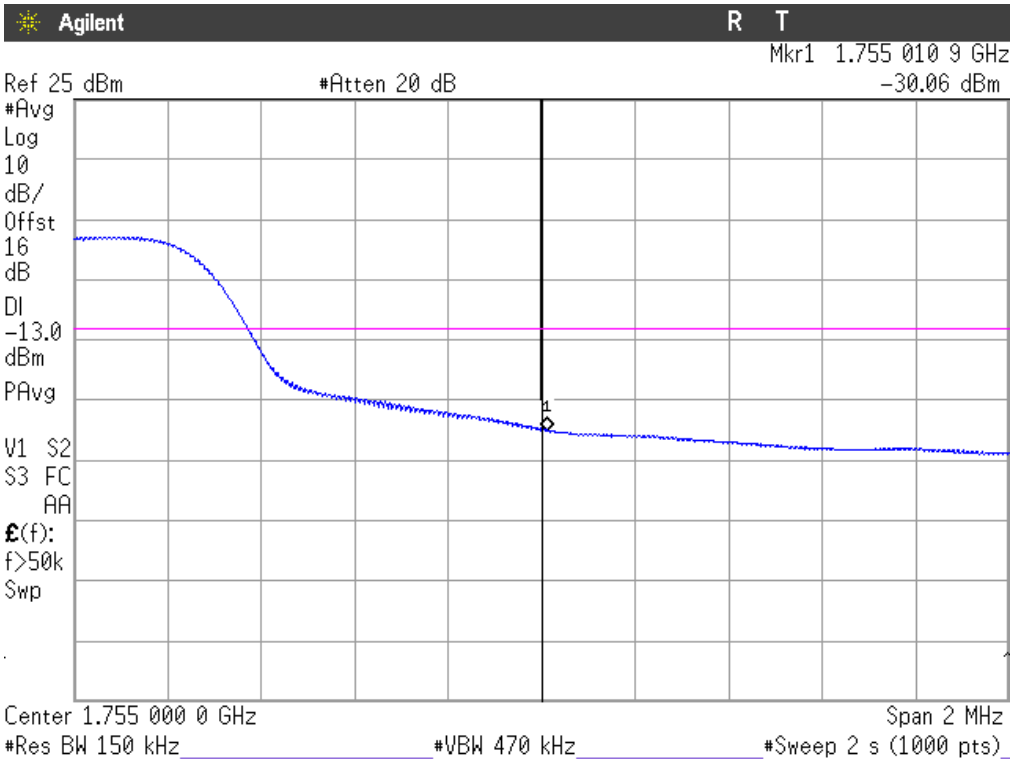
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 15 MHz (Band IV)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

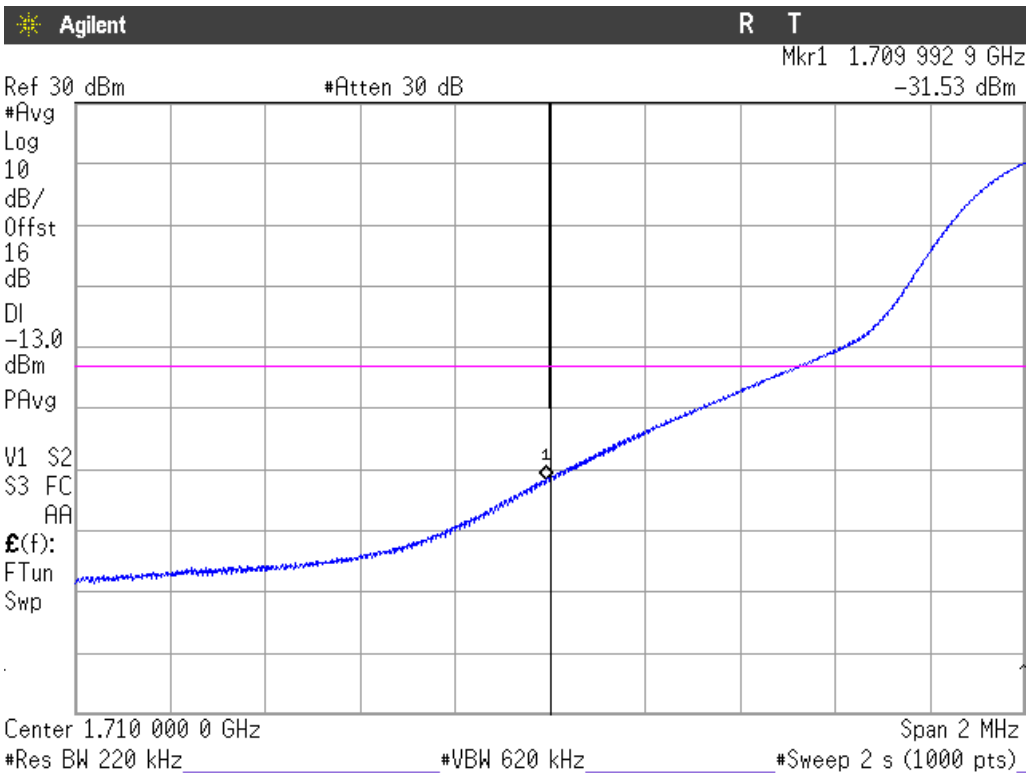


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 20 MHz (Band IV)

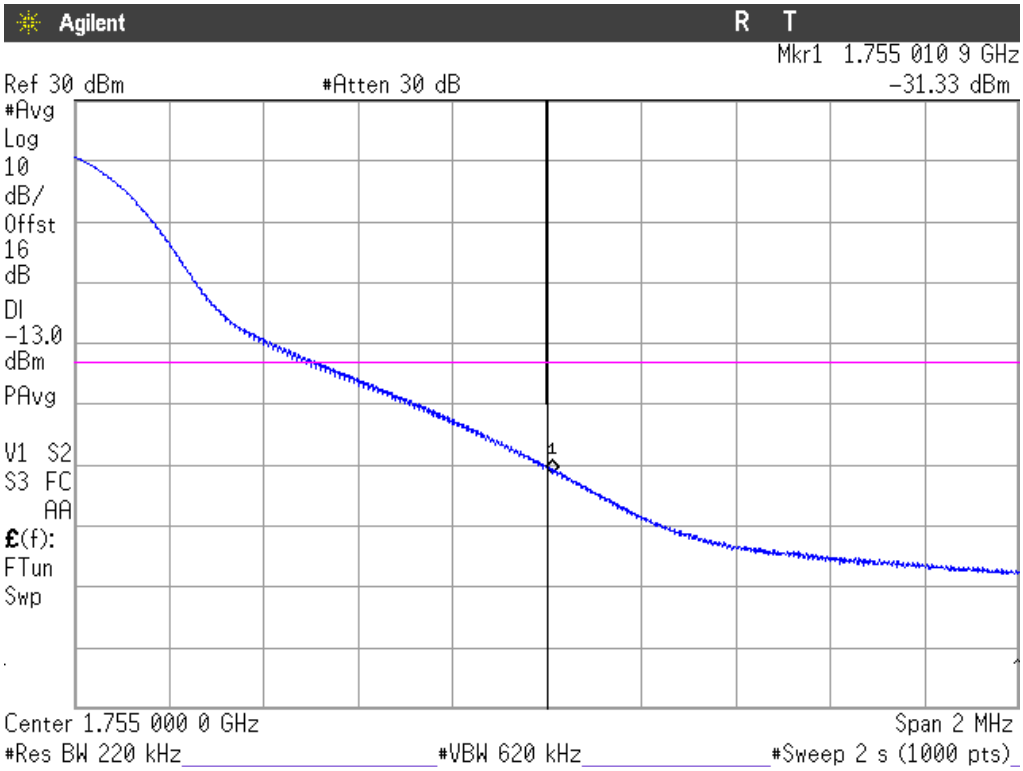
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 20 MHz (Band IV)

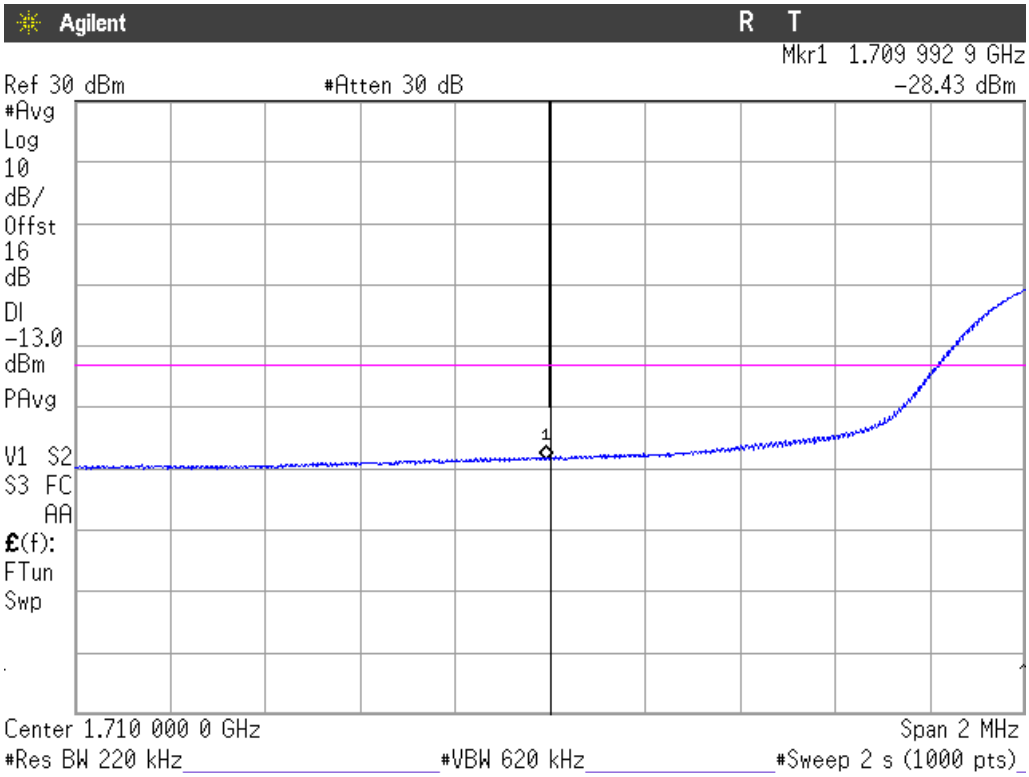
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

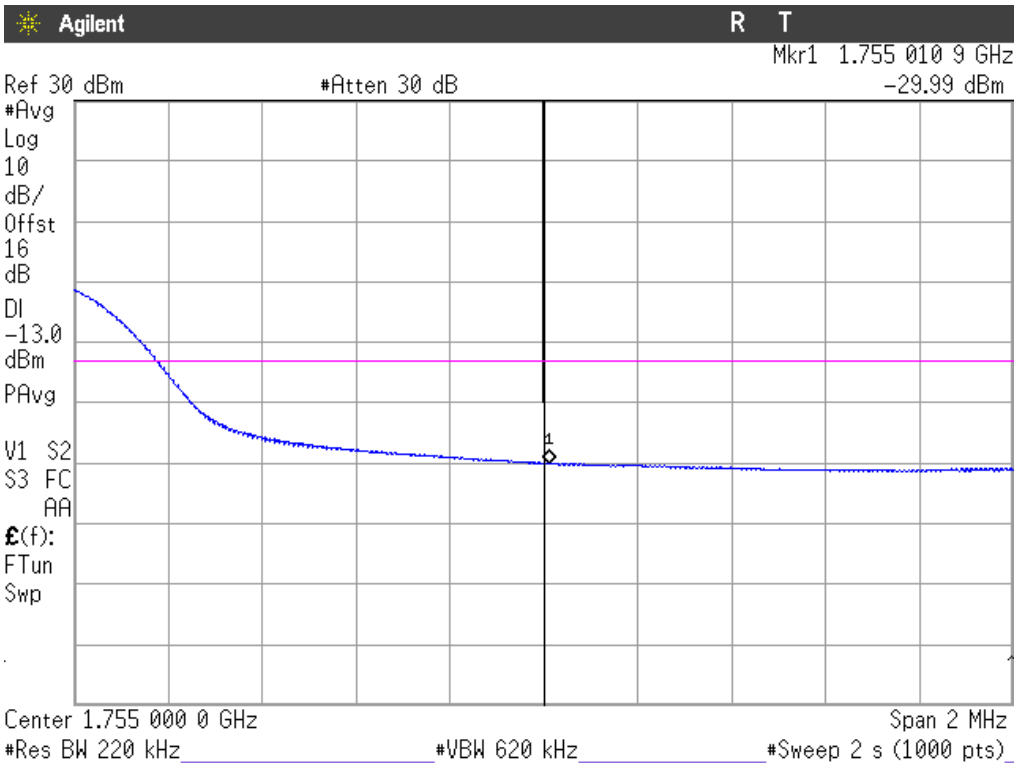
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 20 MHz (Band IV)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

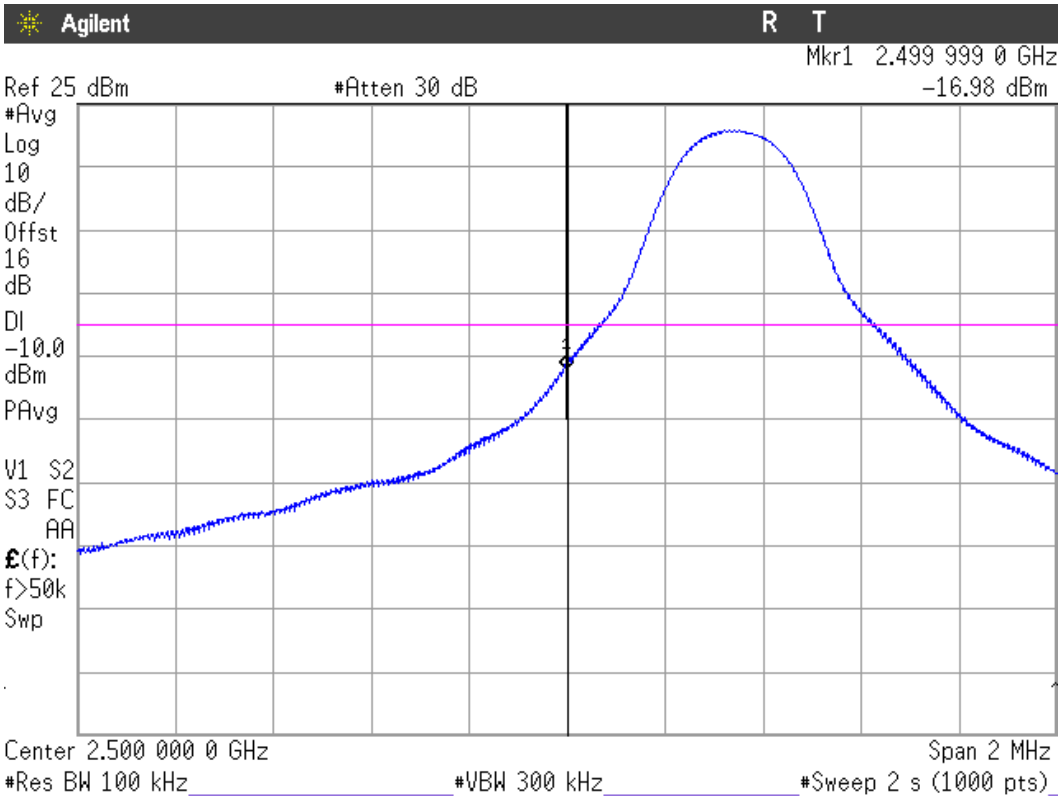


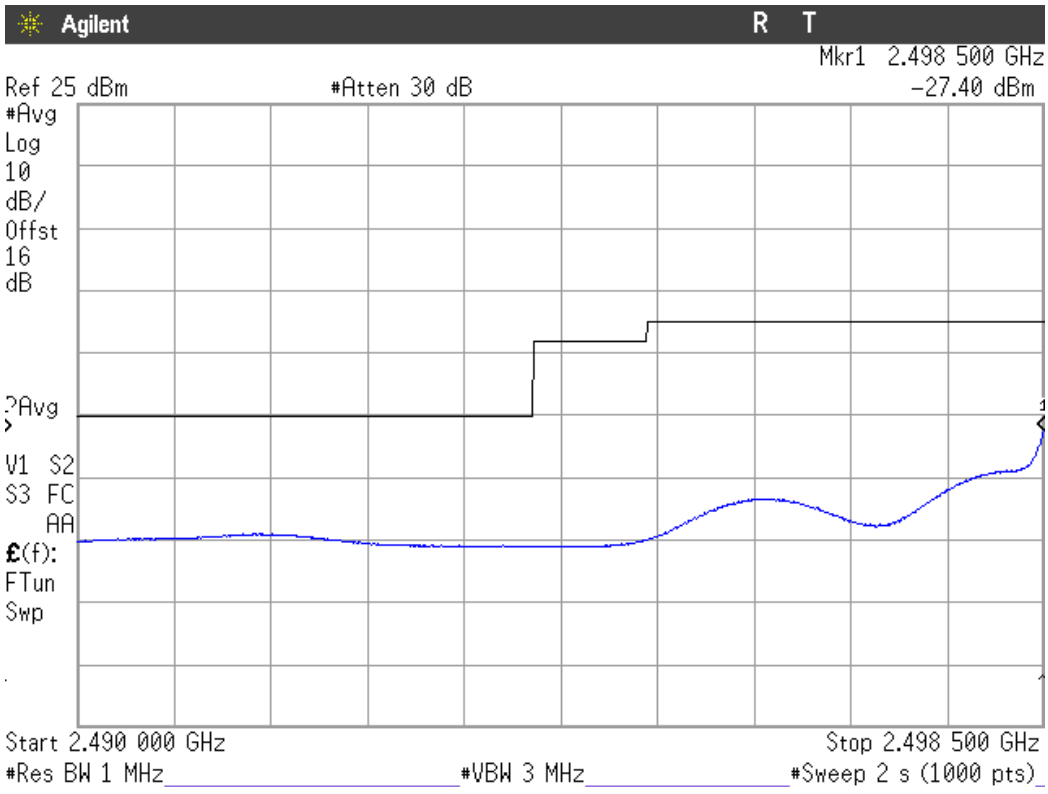
NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 5 MHz (Band VII)

CHANNEL LOWEST.

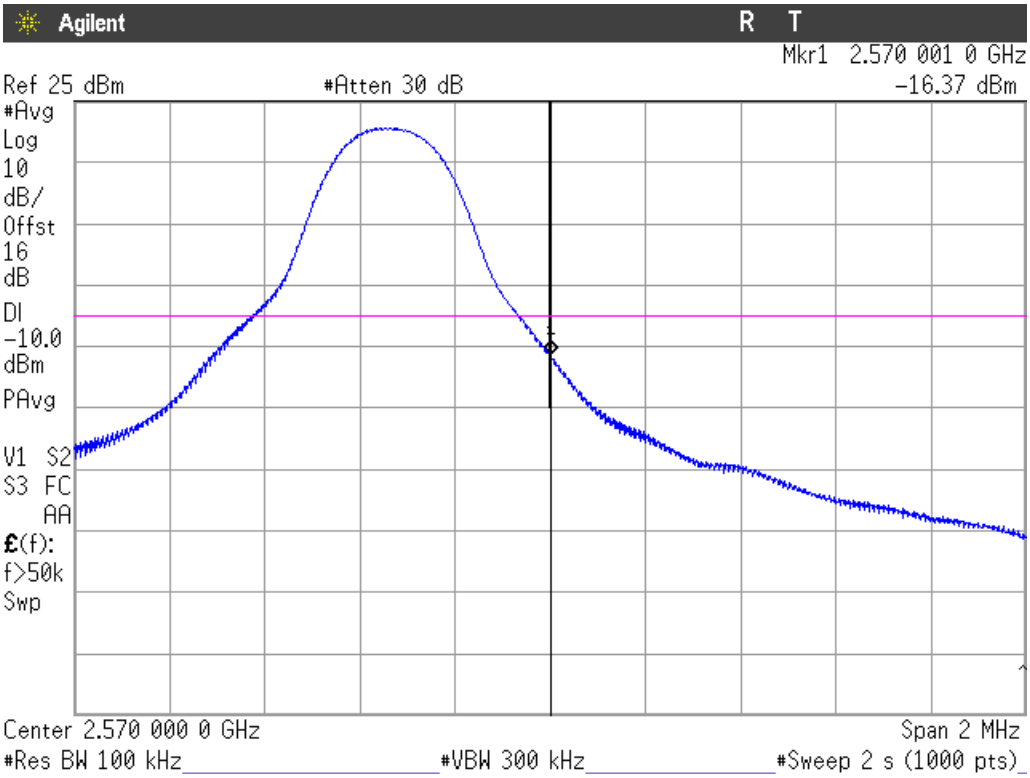


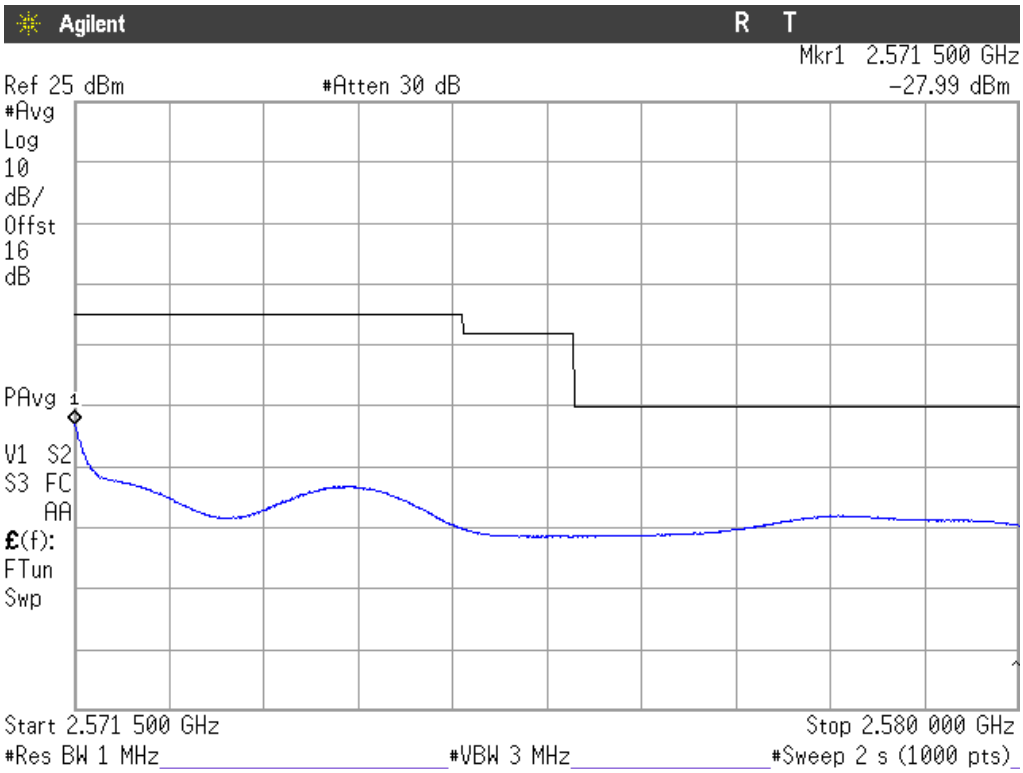


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 5 MHz (Band VII)

CHANNEL HIGHEST

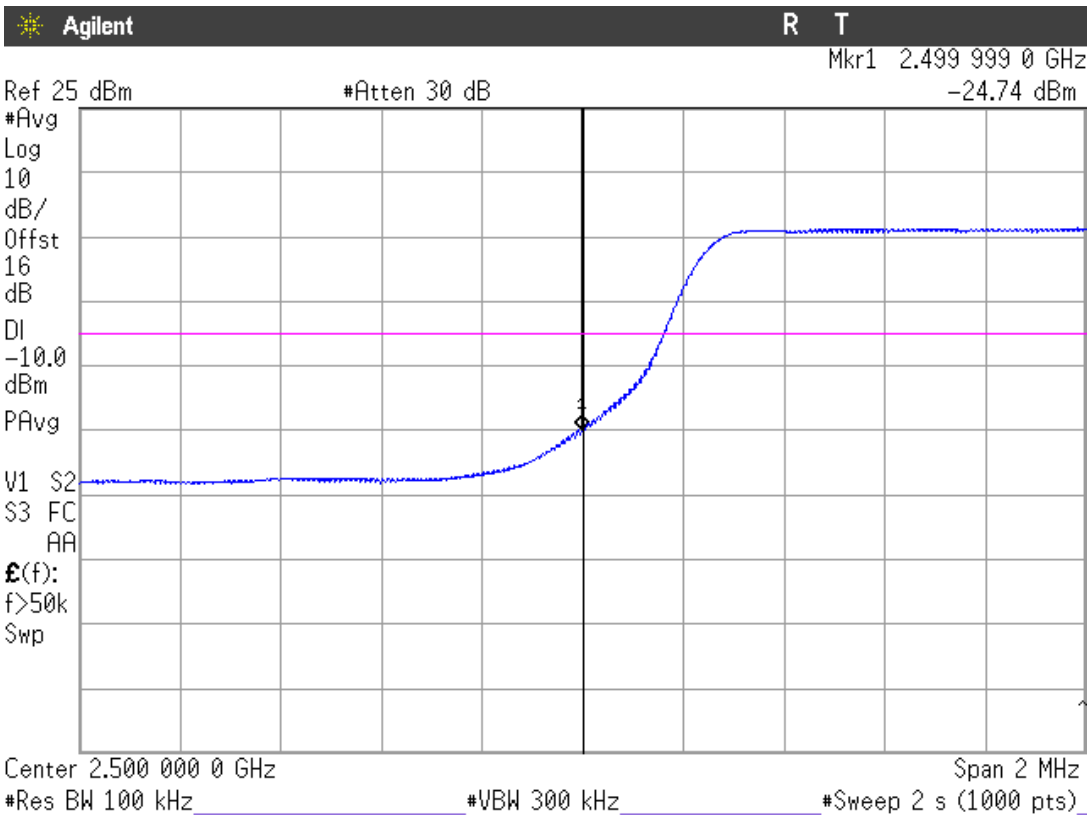


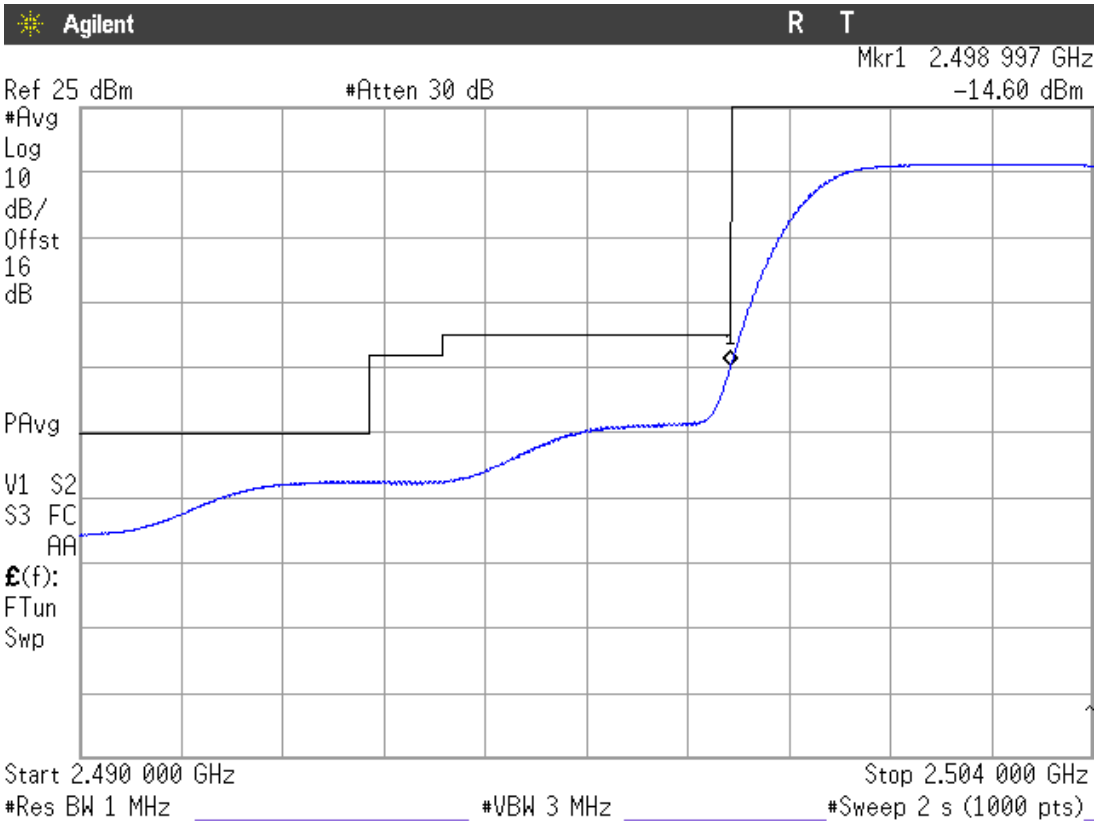


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = All, Offset = 0, BW = 5 MHz (Band VII)

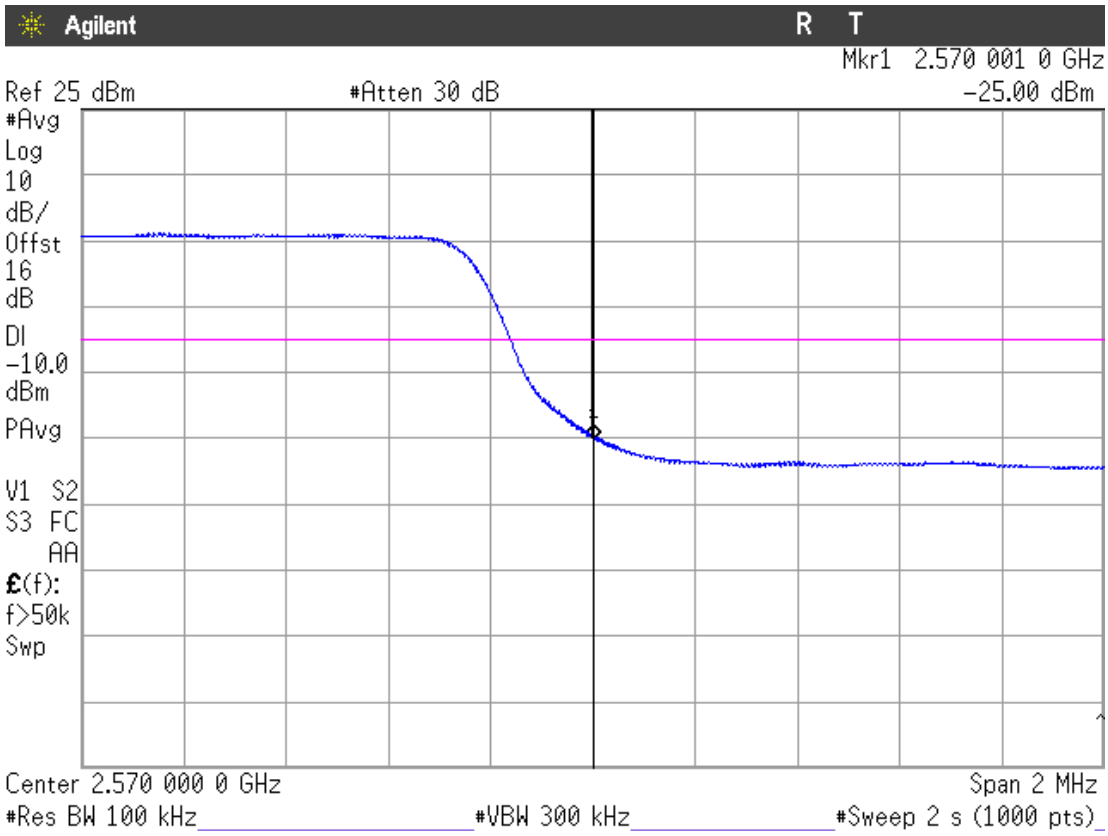
CHANNEL LOWEST

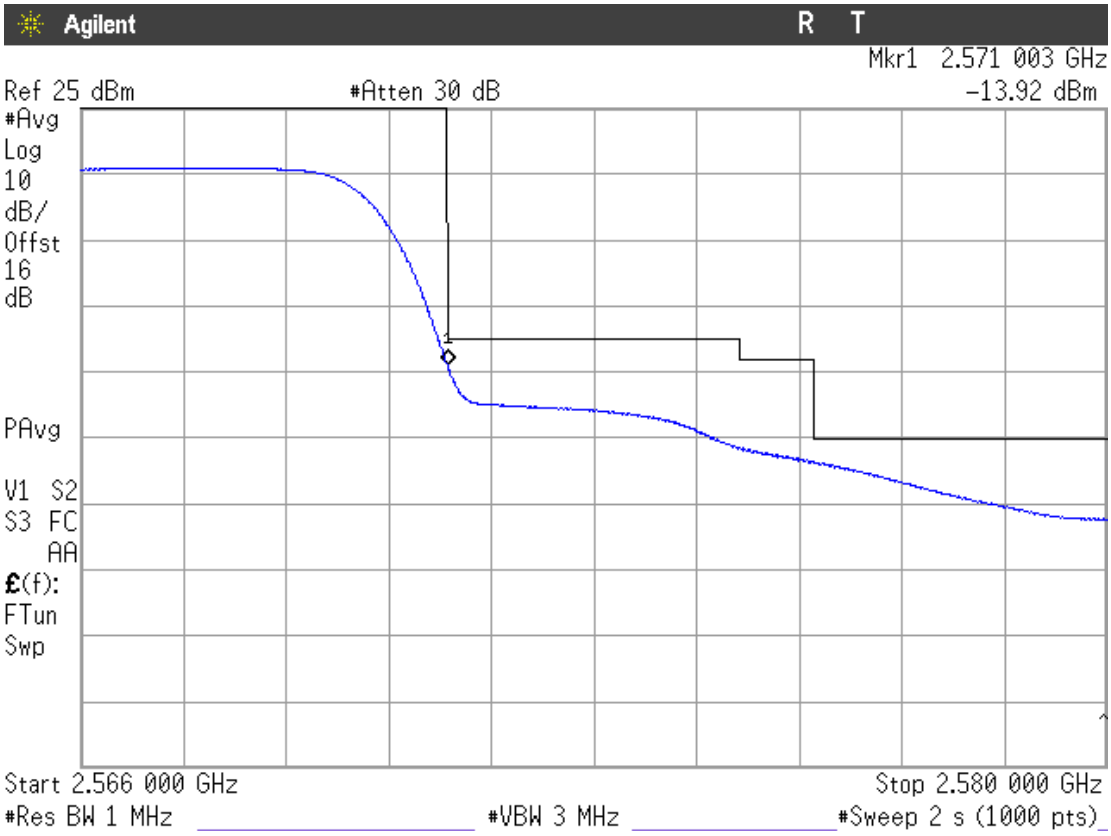




NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST



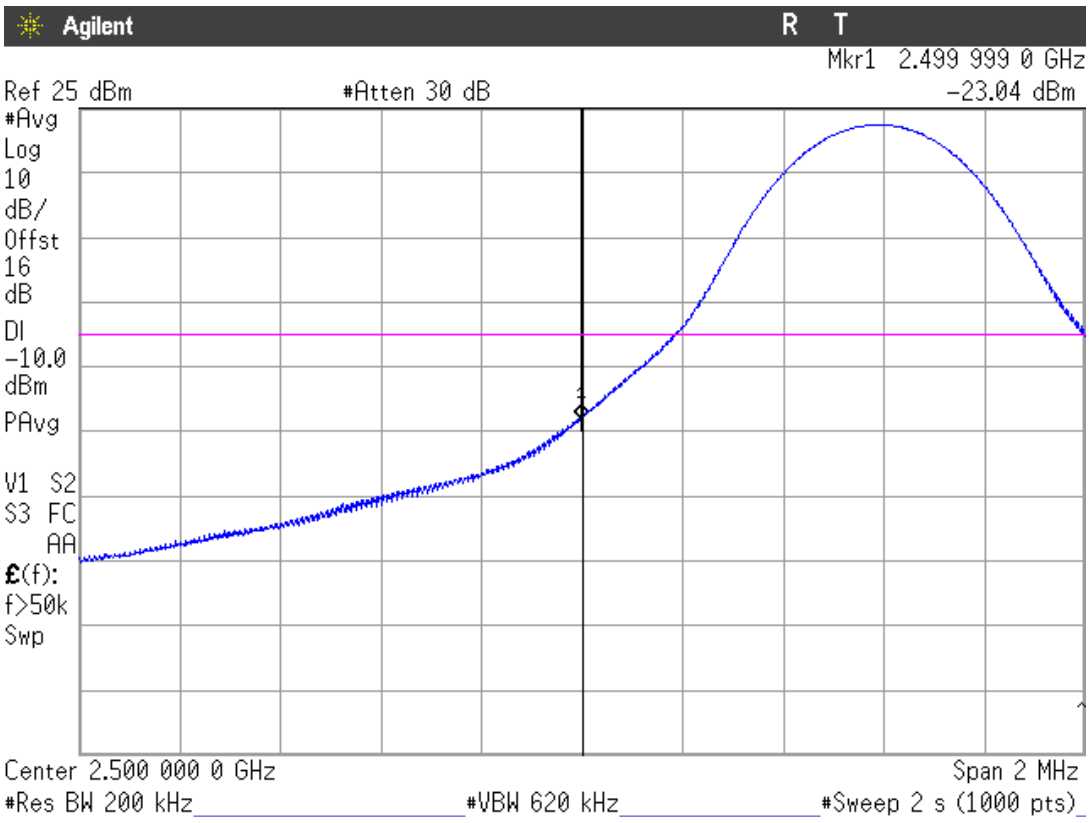


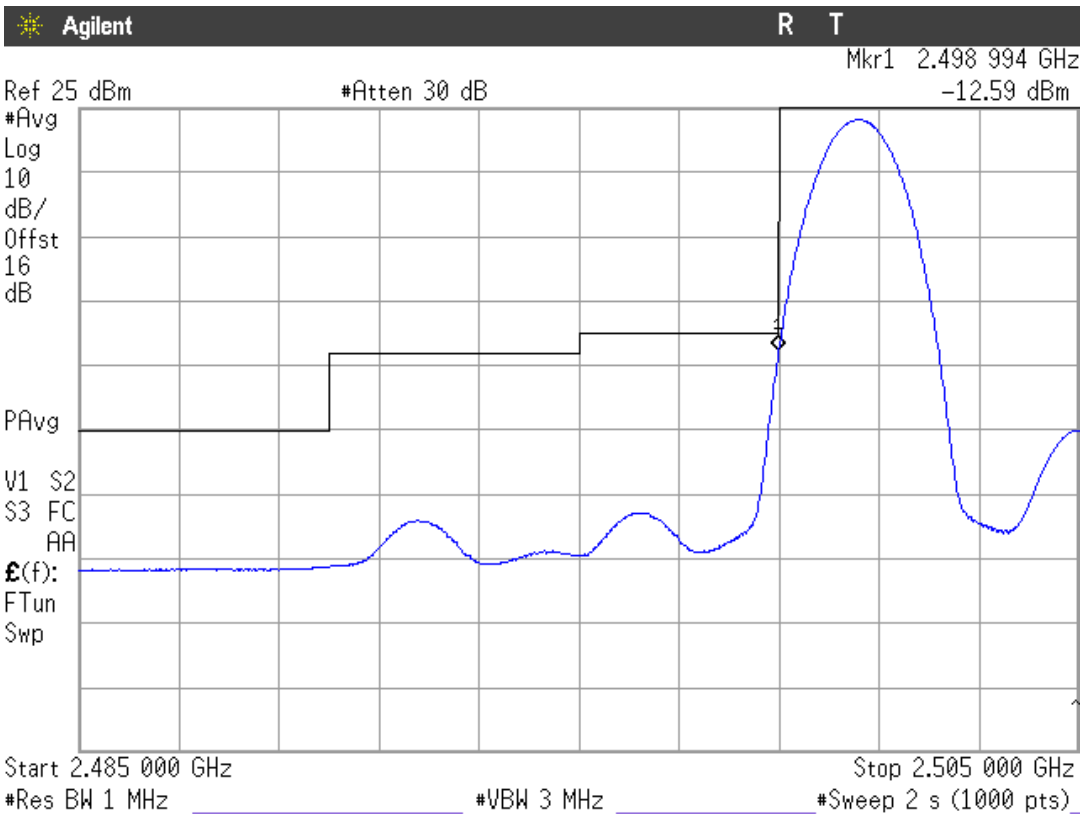
NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 10 MHz (Band VII)

CHANNEL LOWEST

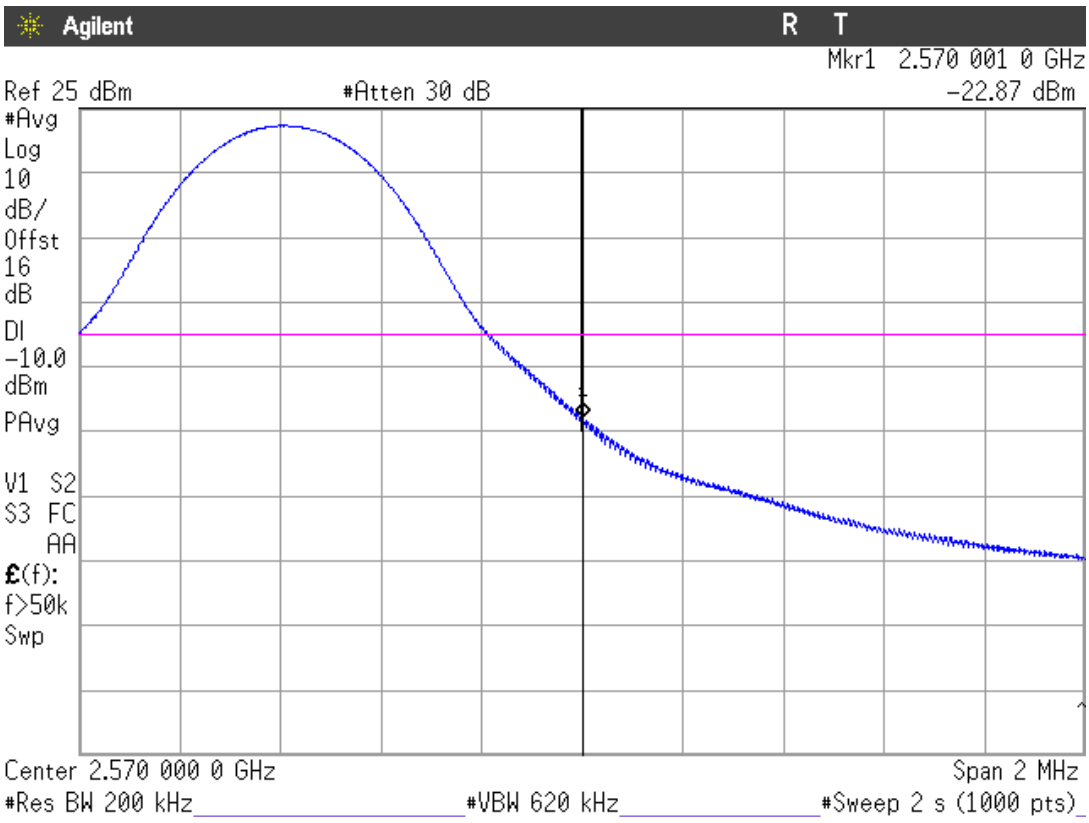


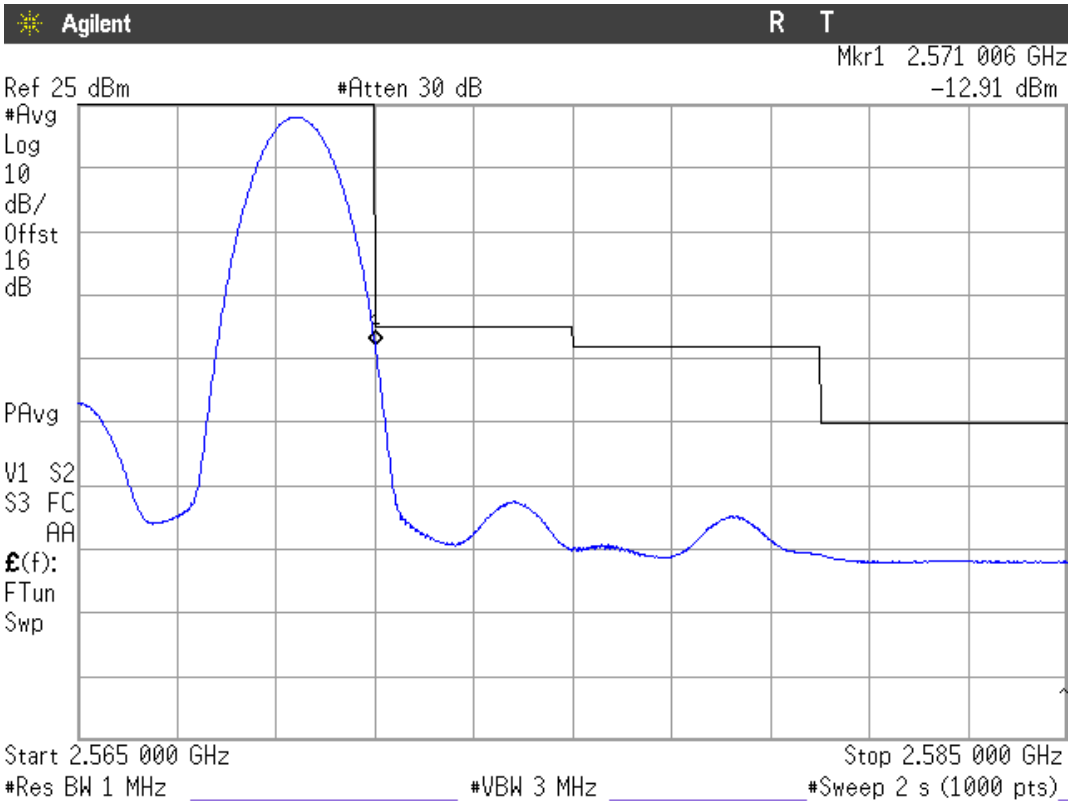


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 10 MHz (Band VII)

CHANNEL HIGHEST

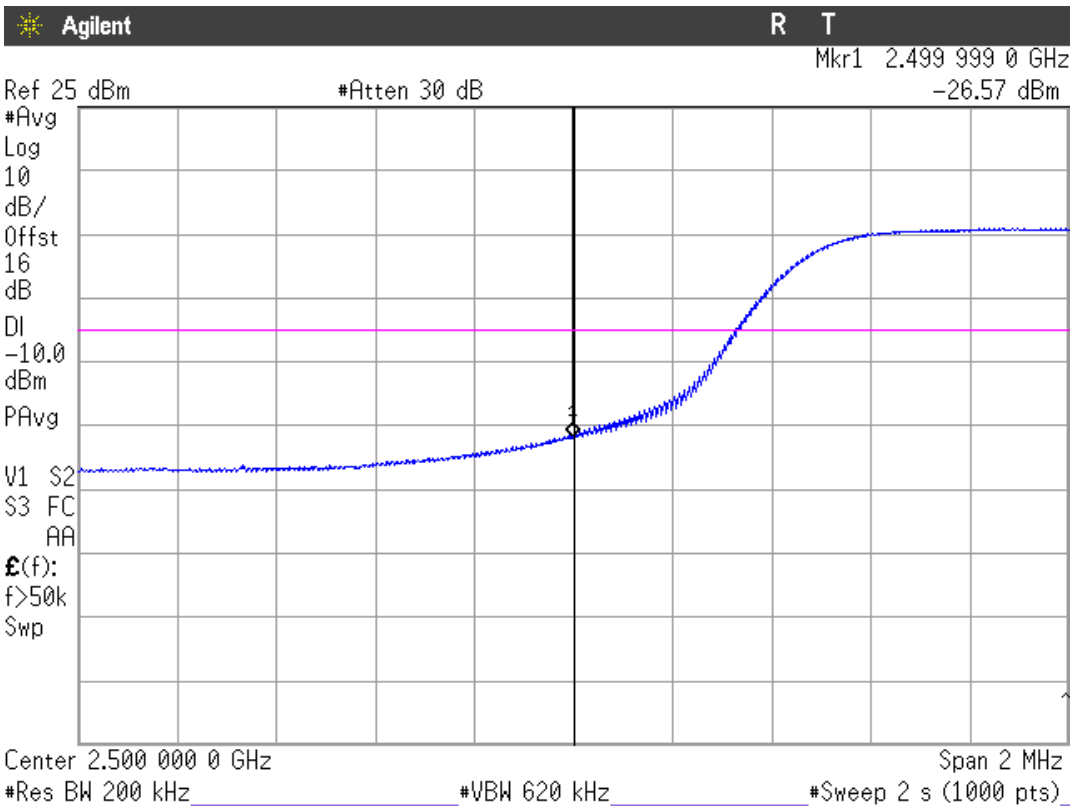


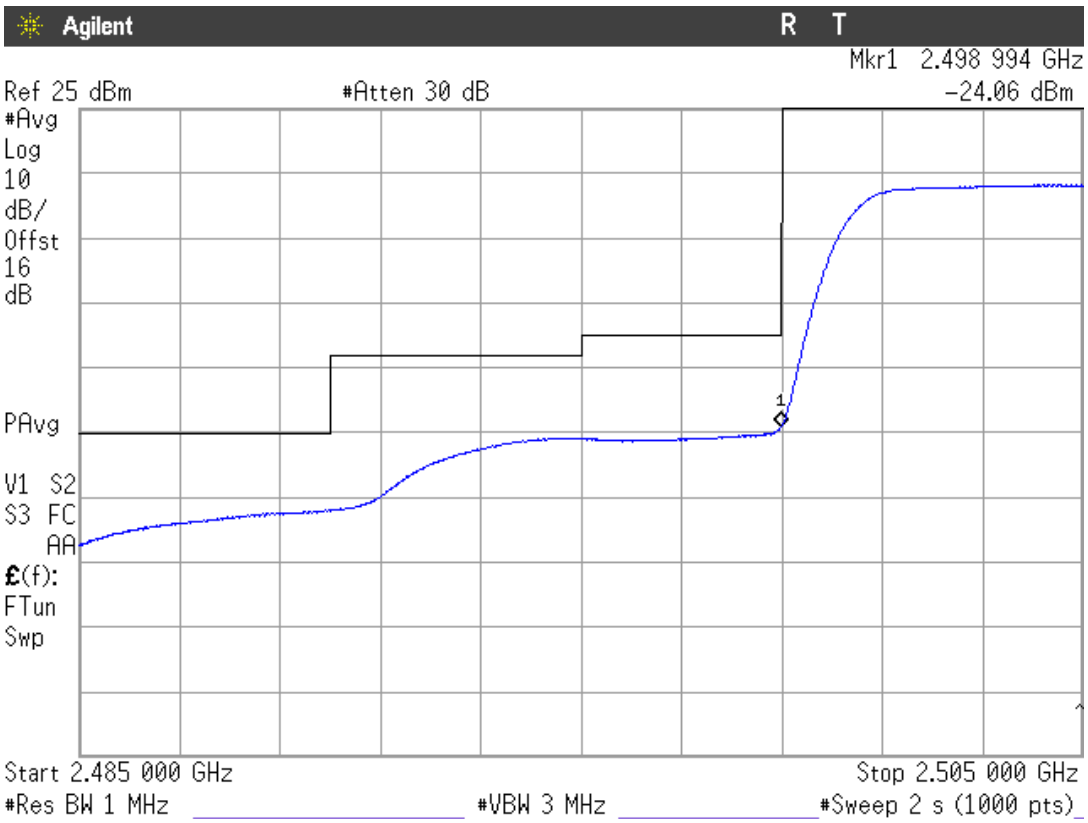


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = All, Offset = 0, BW = 10 MHz (Band VII)

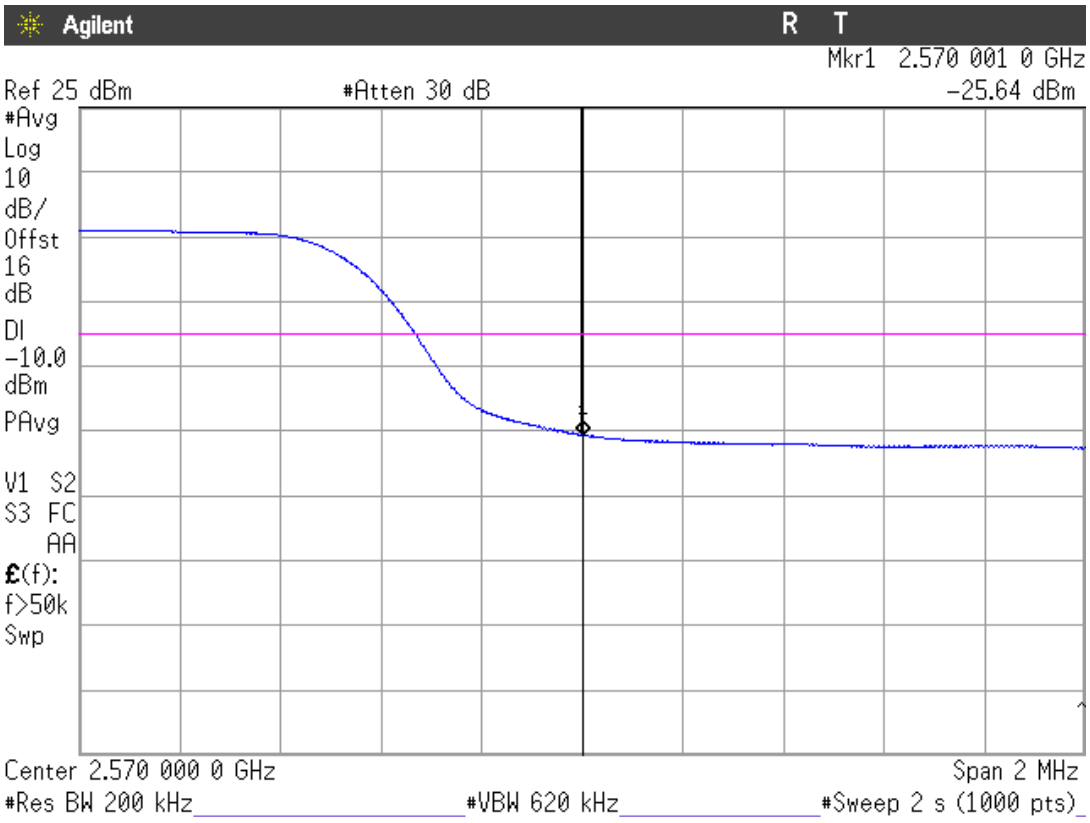
CHANNEL LOWEST

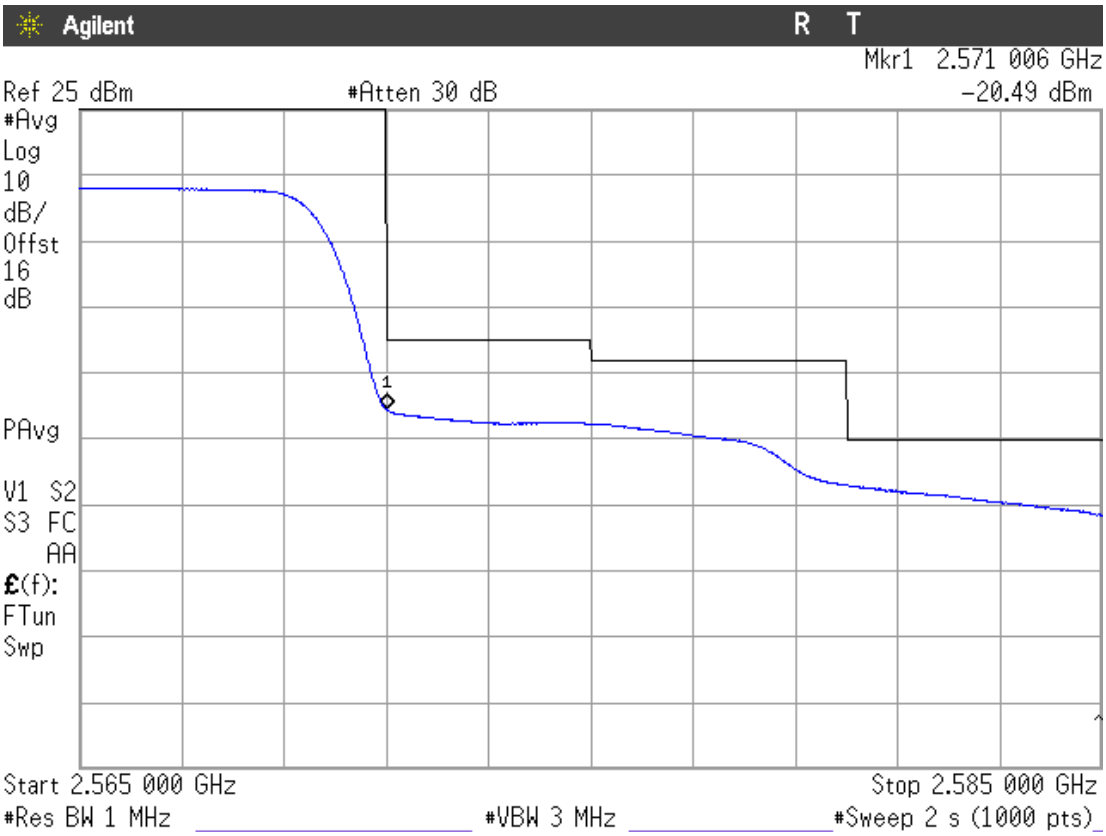




NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST



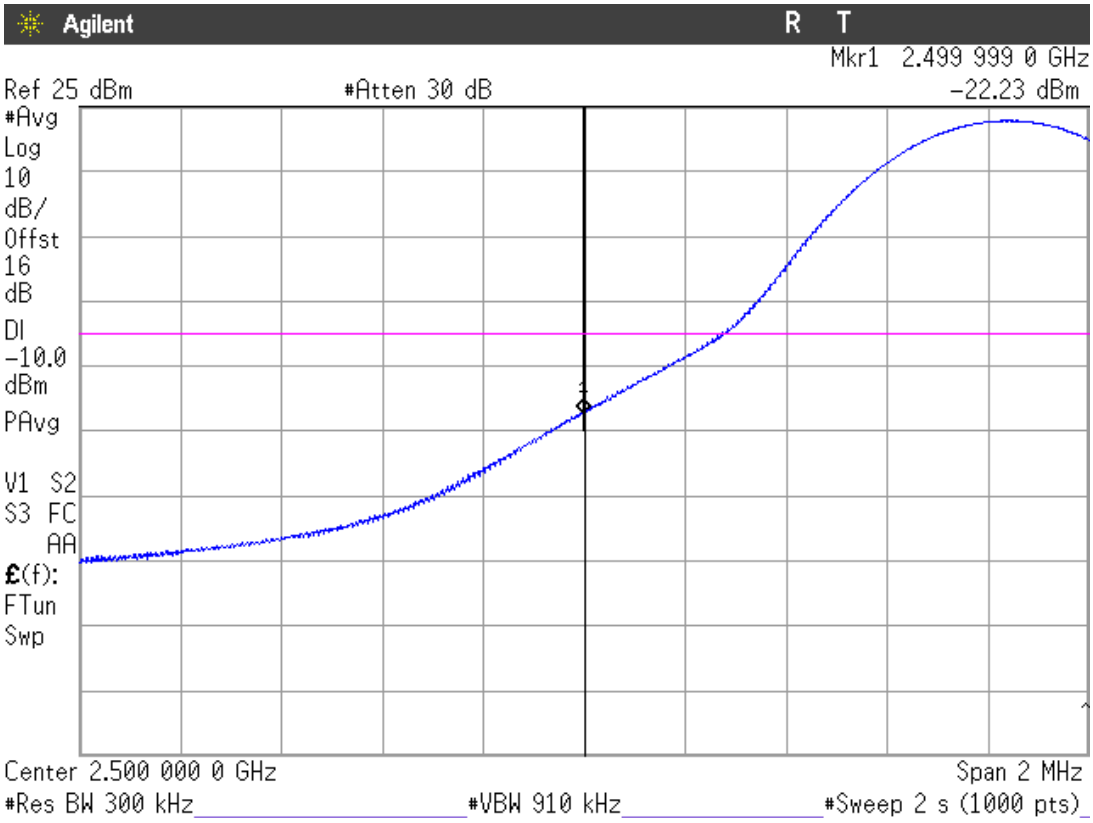


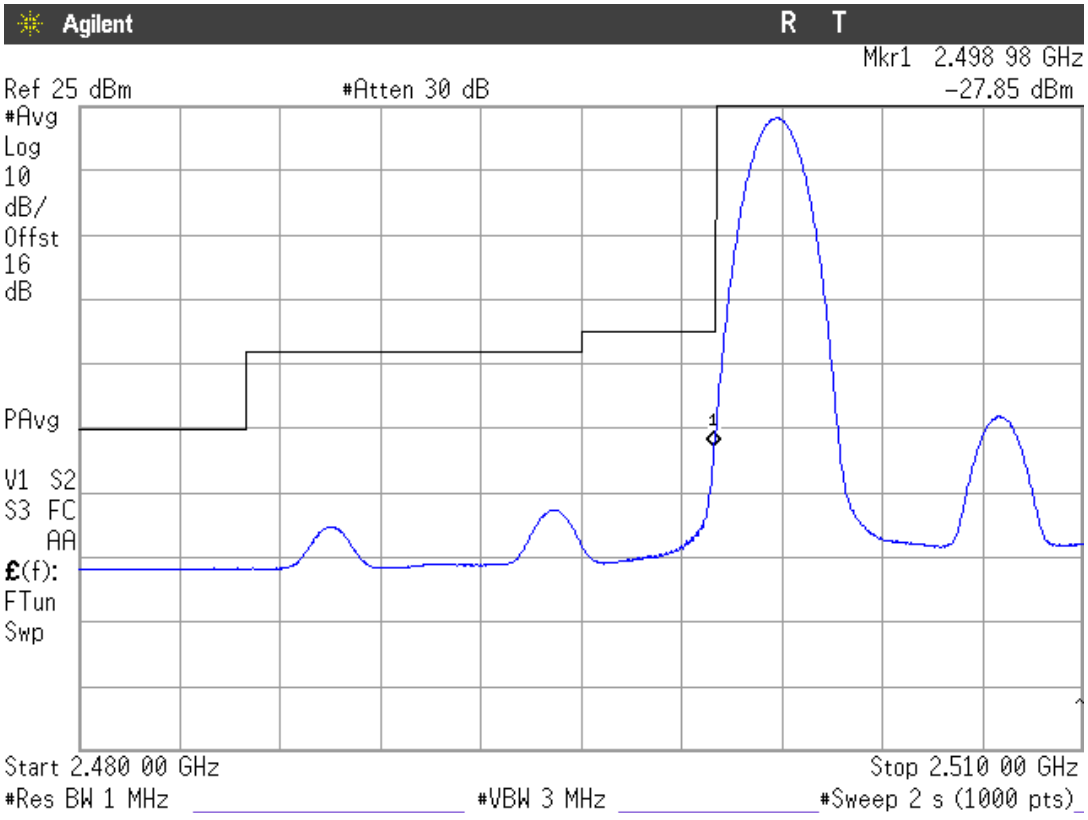
NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 15 MHz (Band VII)

CHANNEL LOWEST

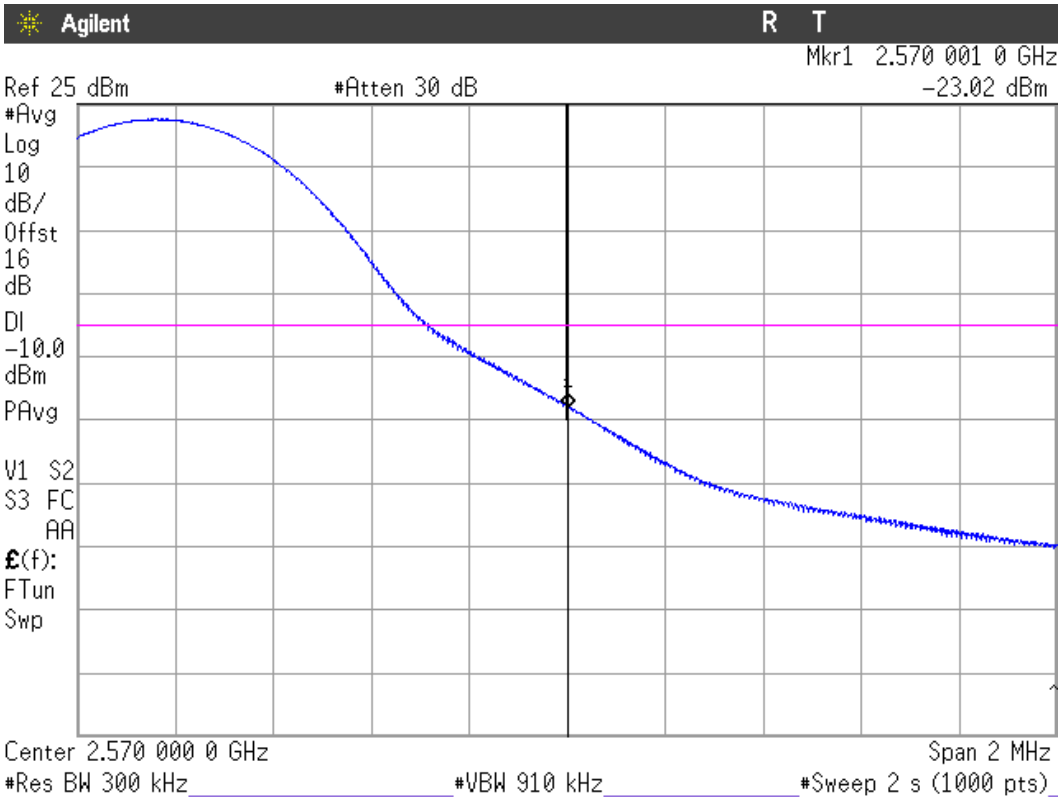


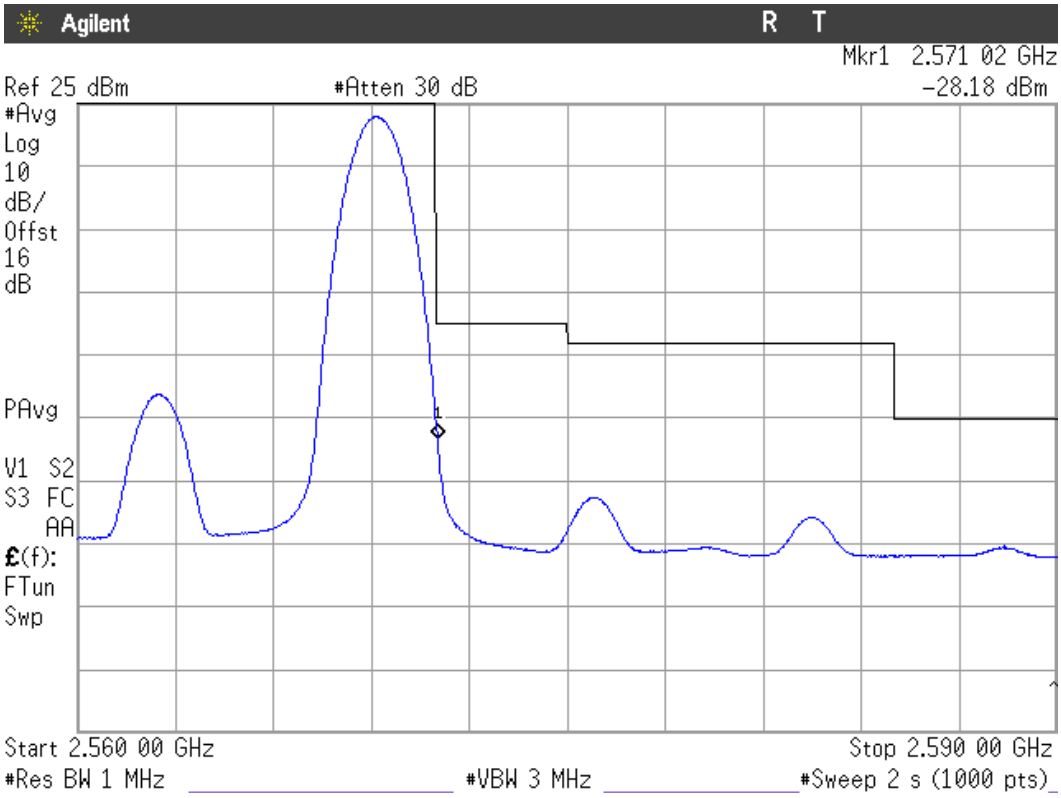


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 15 MHz (Band VII)

CHANNEL HIGHEST

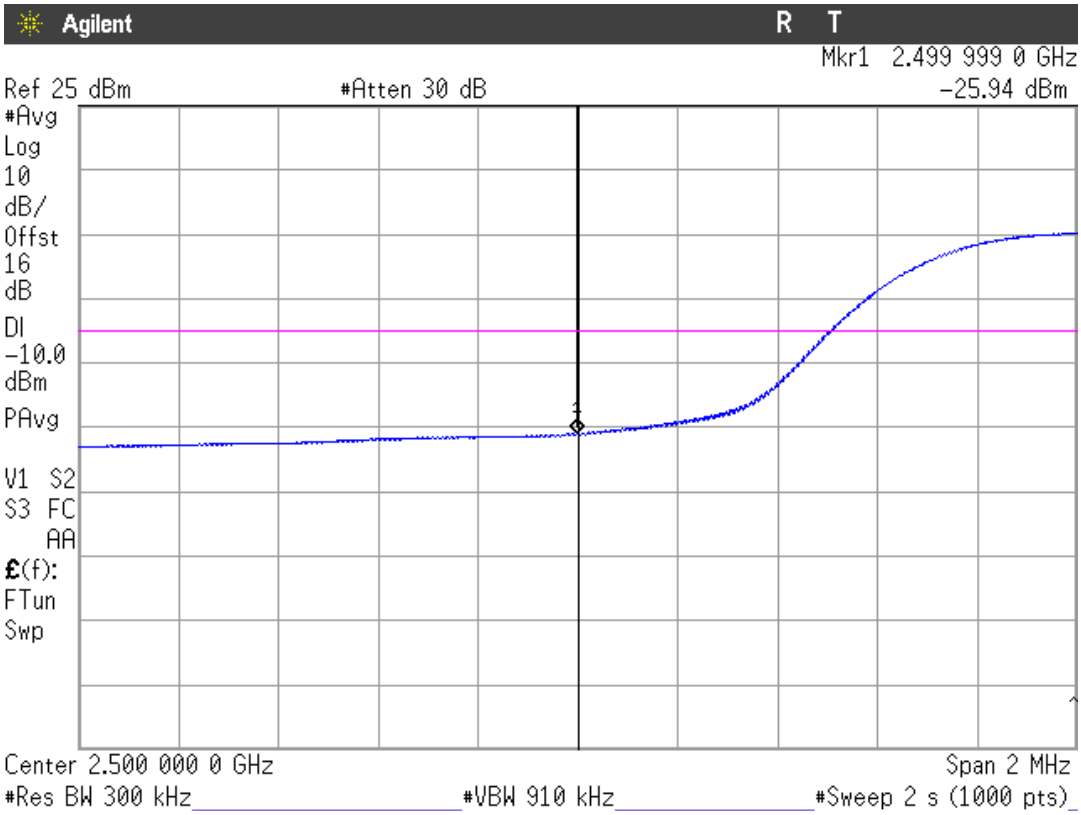


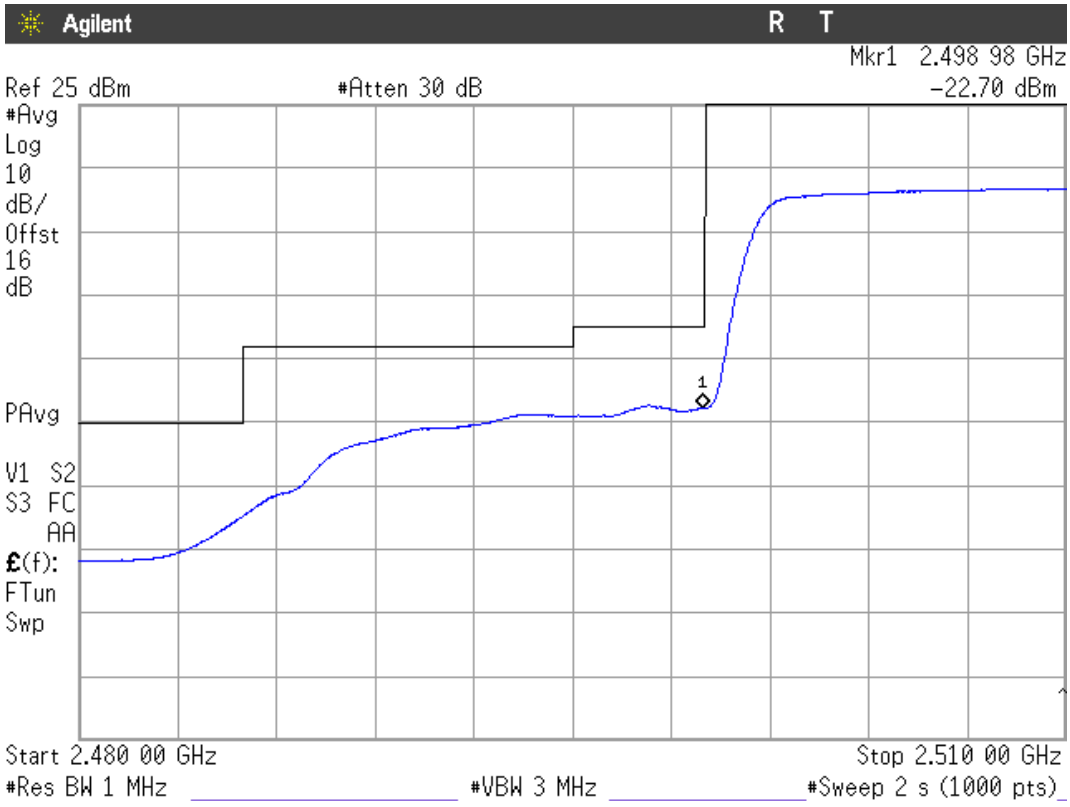


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = All, Offset = 0, BW = 15 MHz (Channels in Band VII)

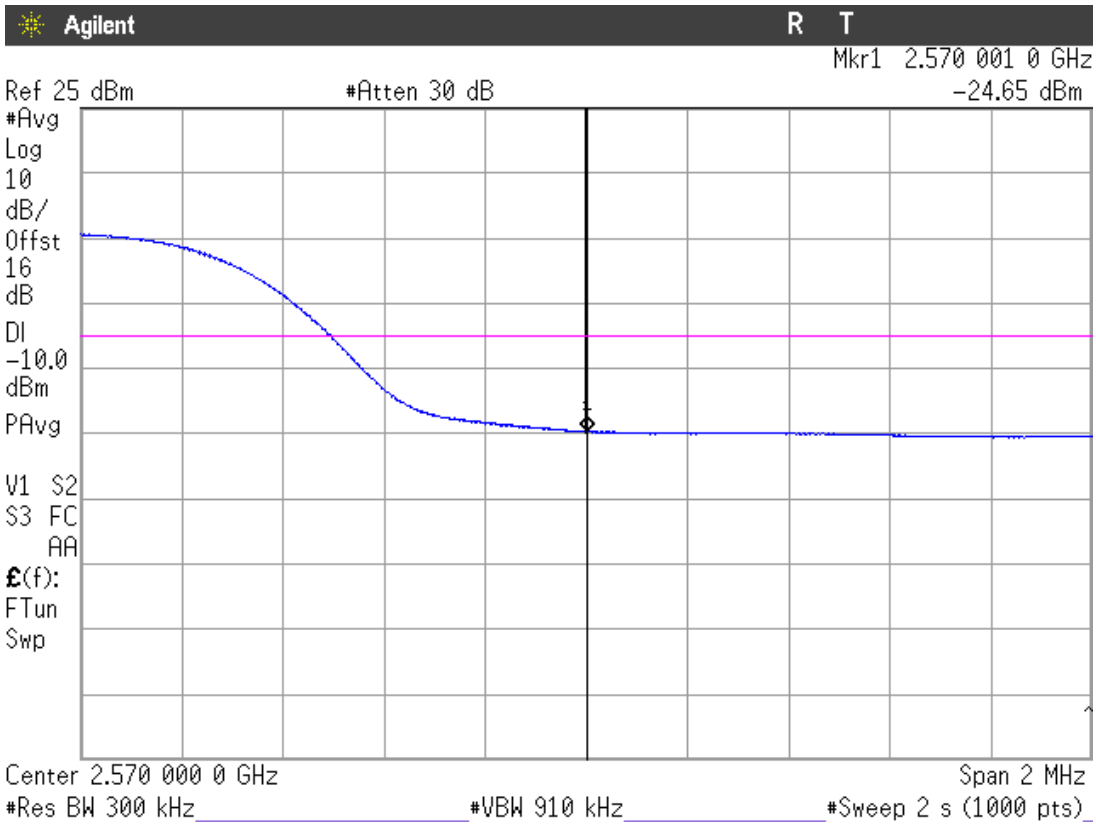
CHANNEL LOWEST

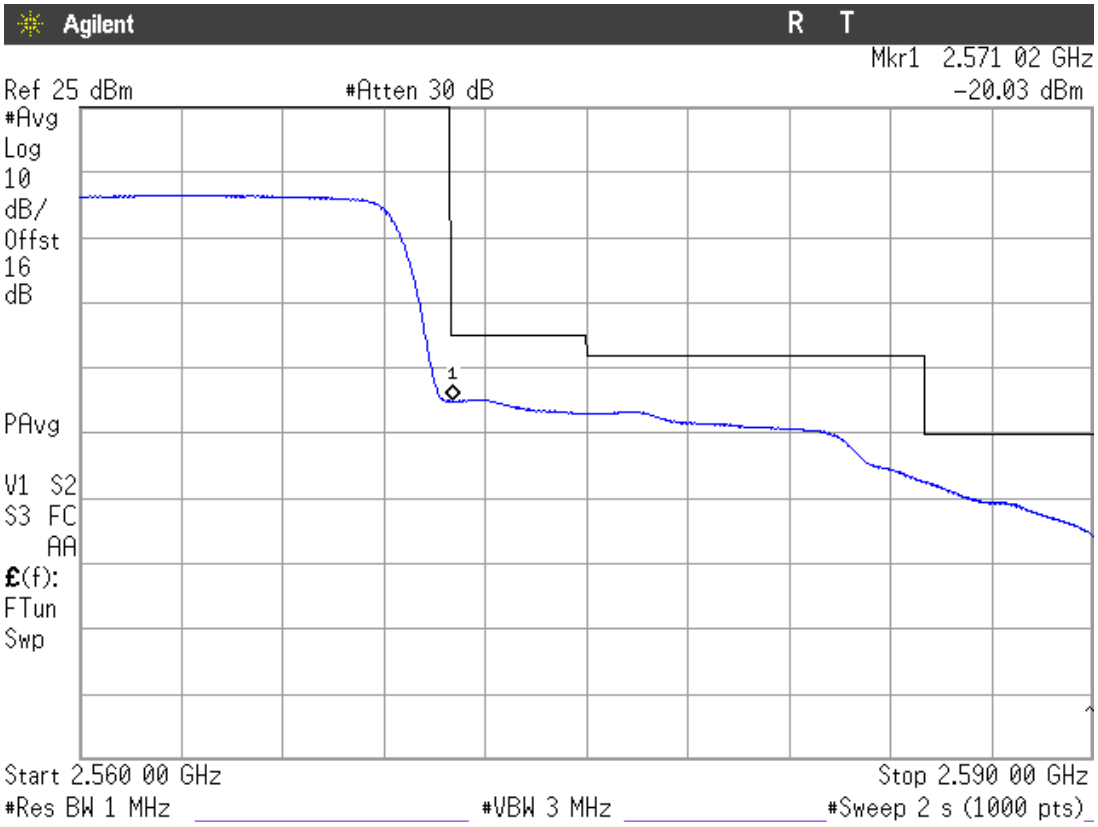




NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST



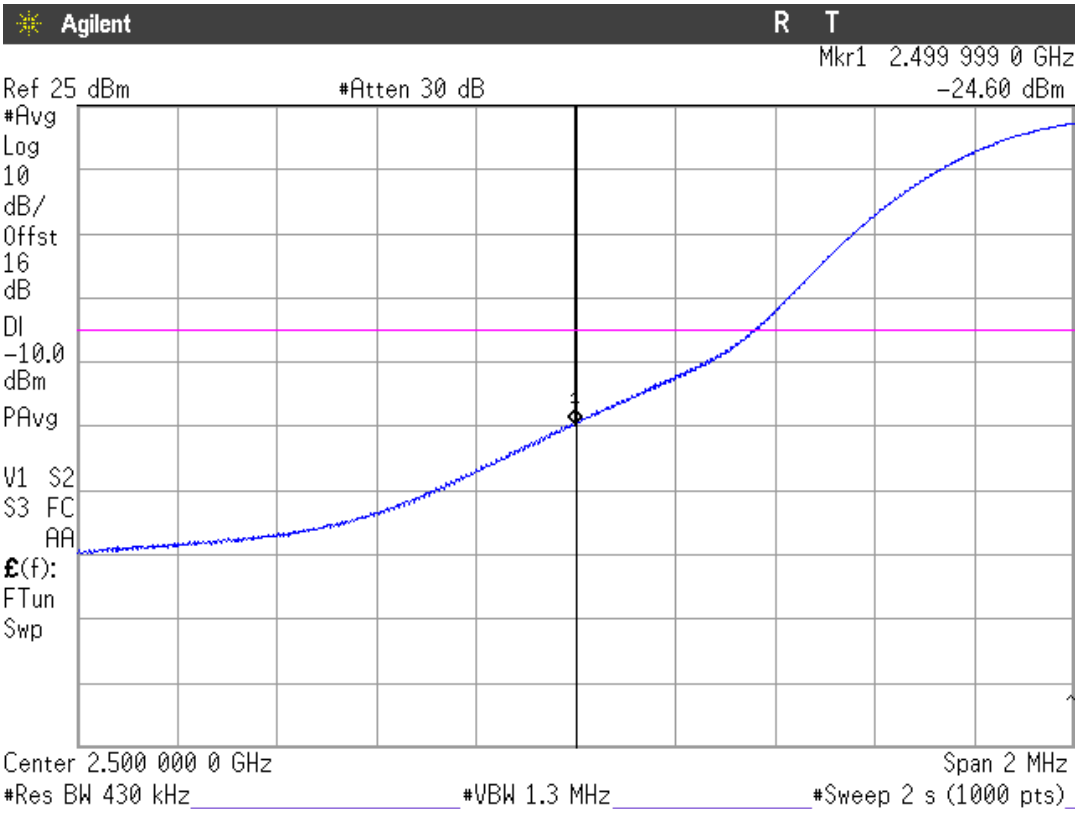


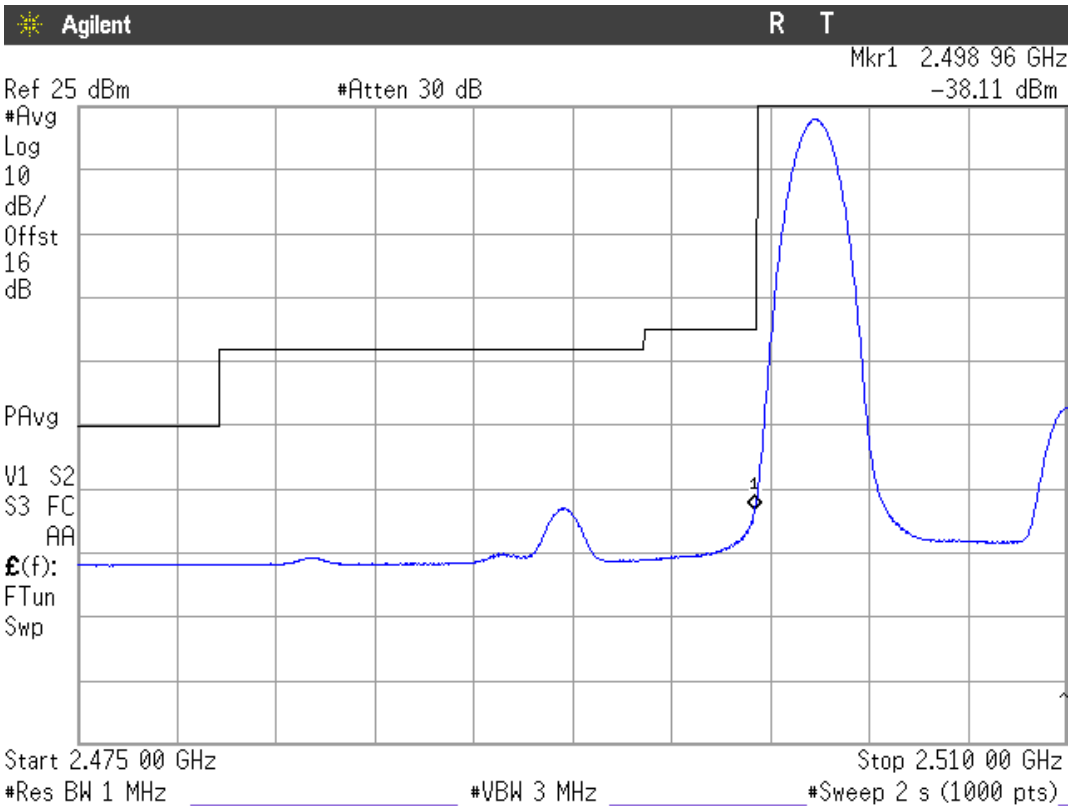
NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 20 MHz (Band VII)

CHANNEL LOWEST

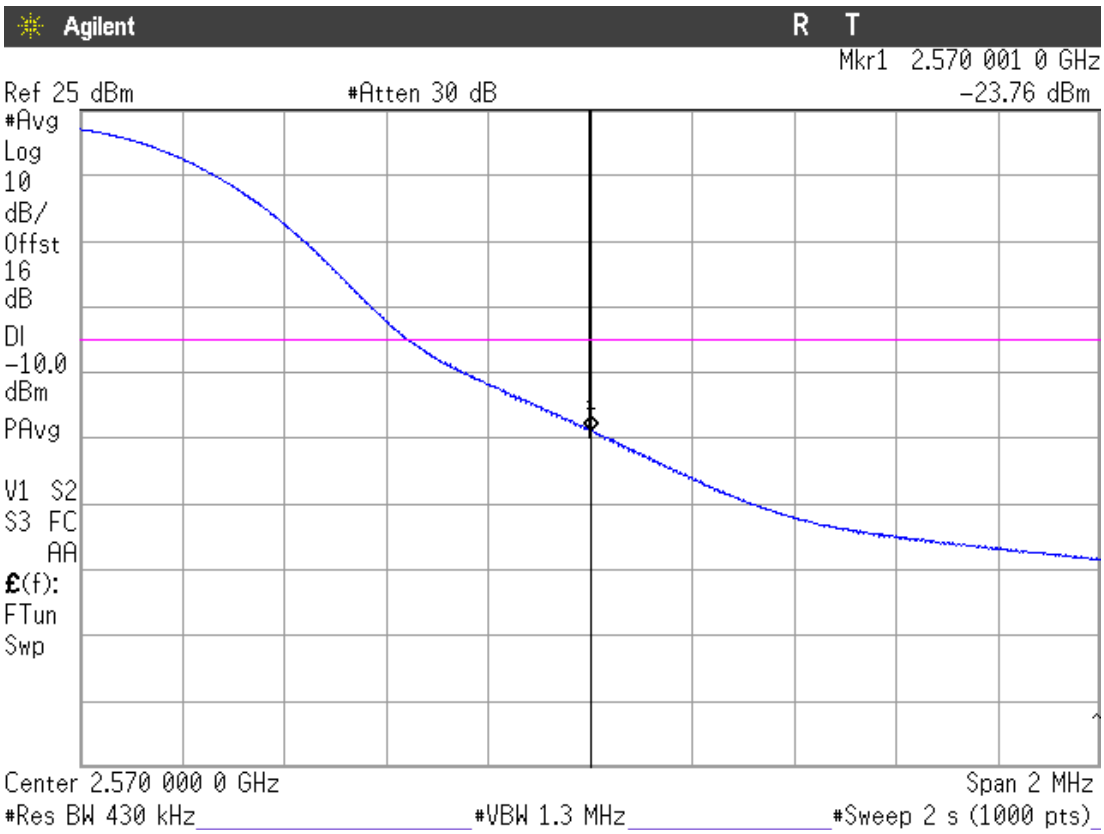


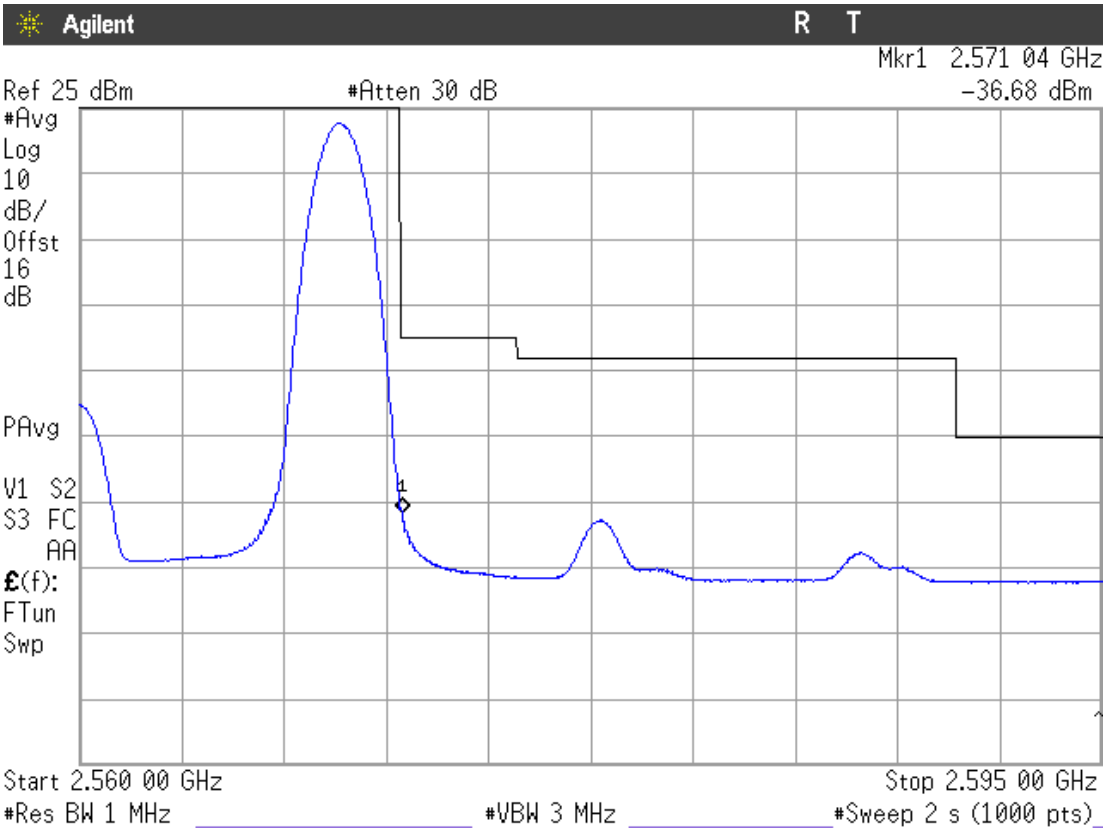


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 20 MHz (Band VII)

CHANNEL HIGHEST

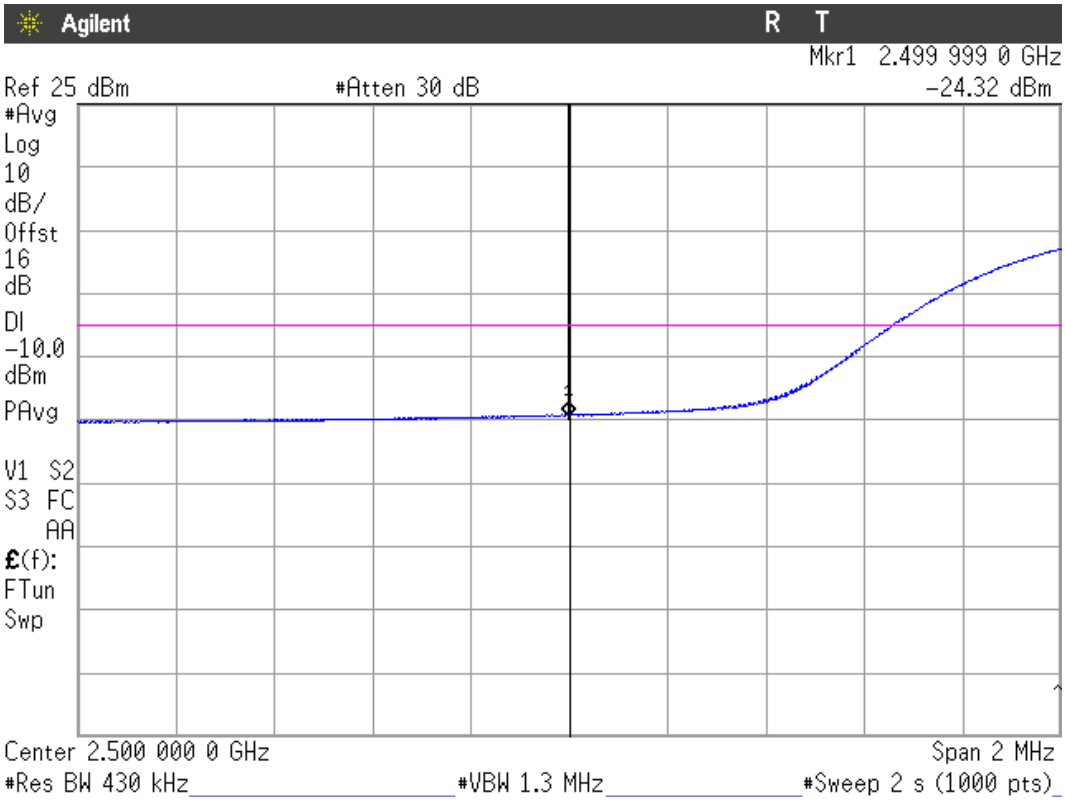


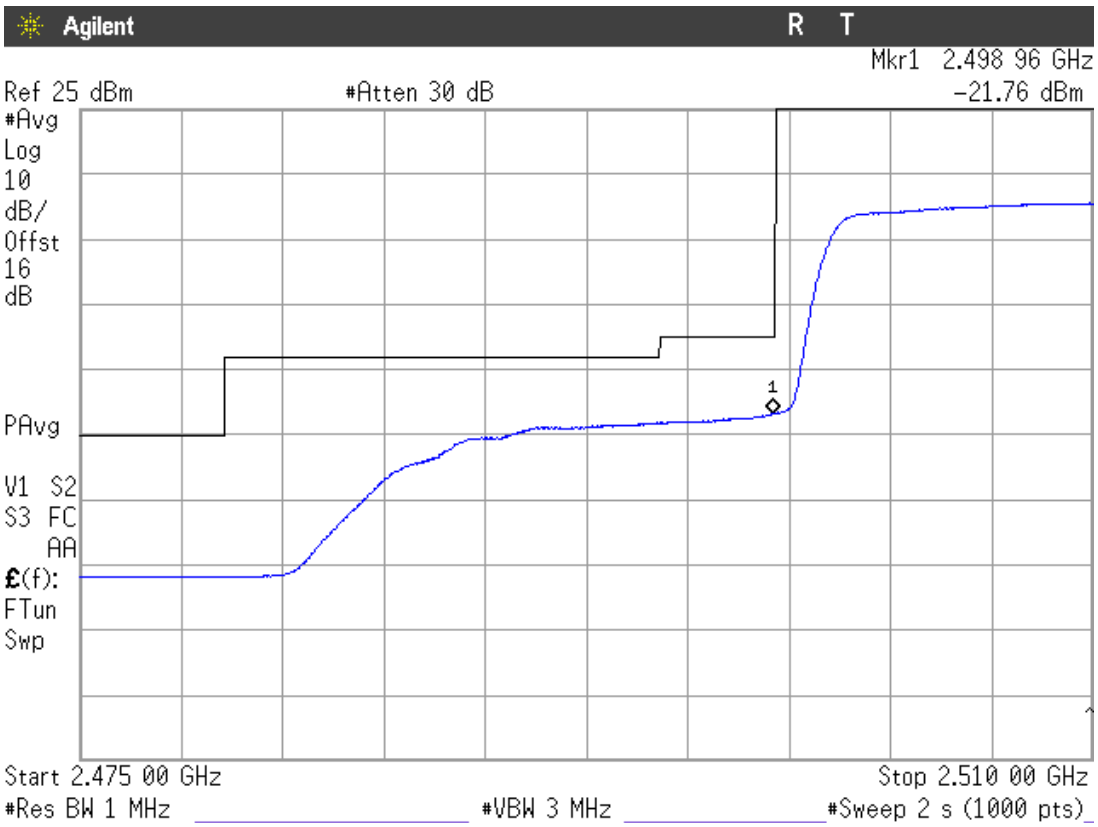


NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = All, Offset = 0, BW = 20 MHz (Band VII)

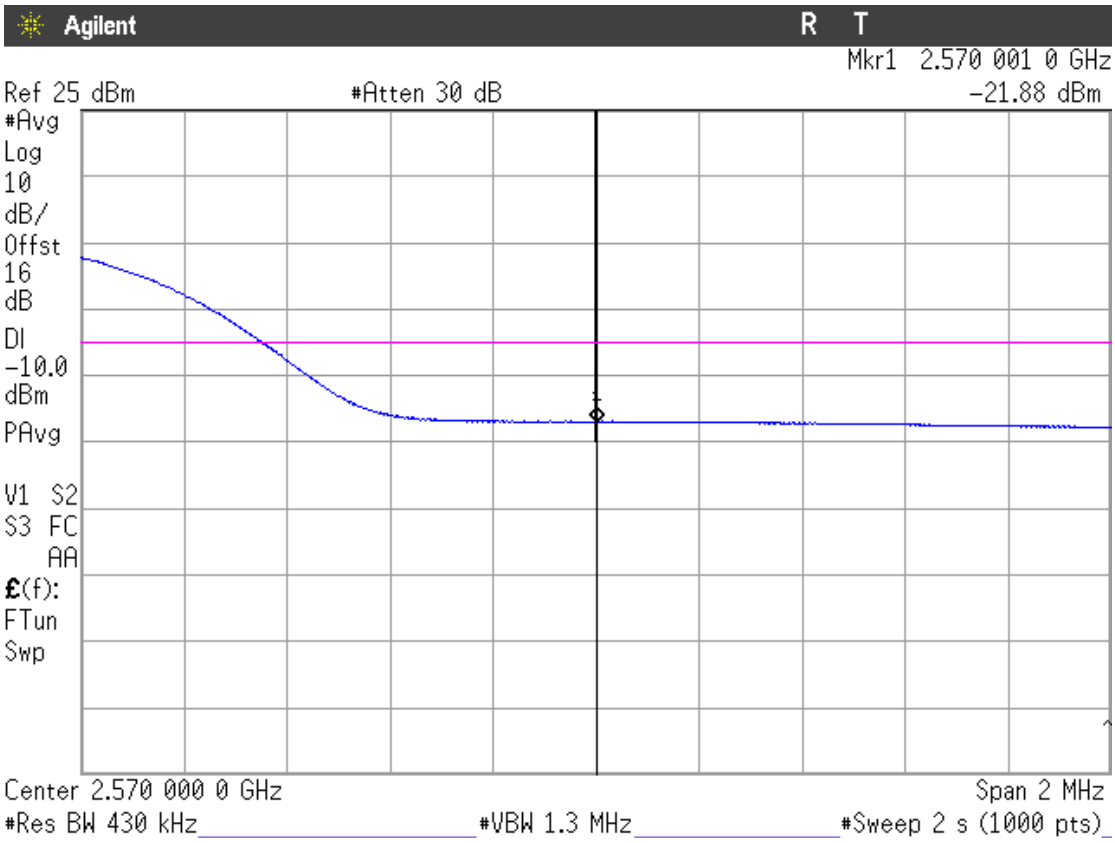
CHANNEL LOWEST

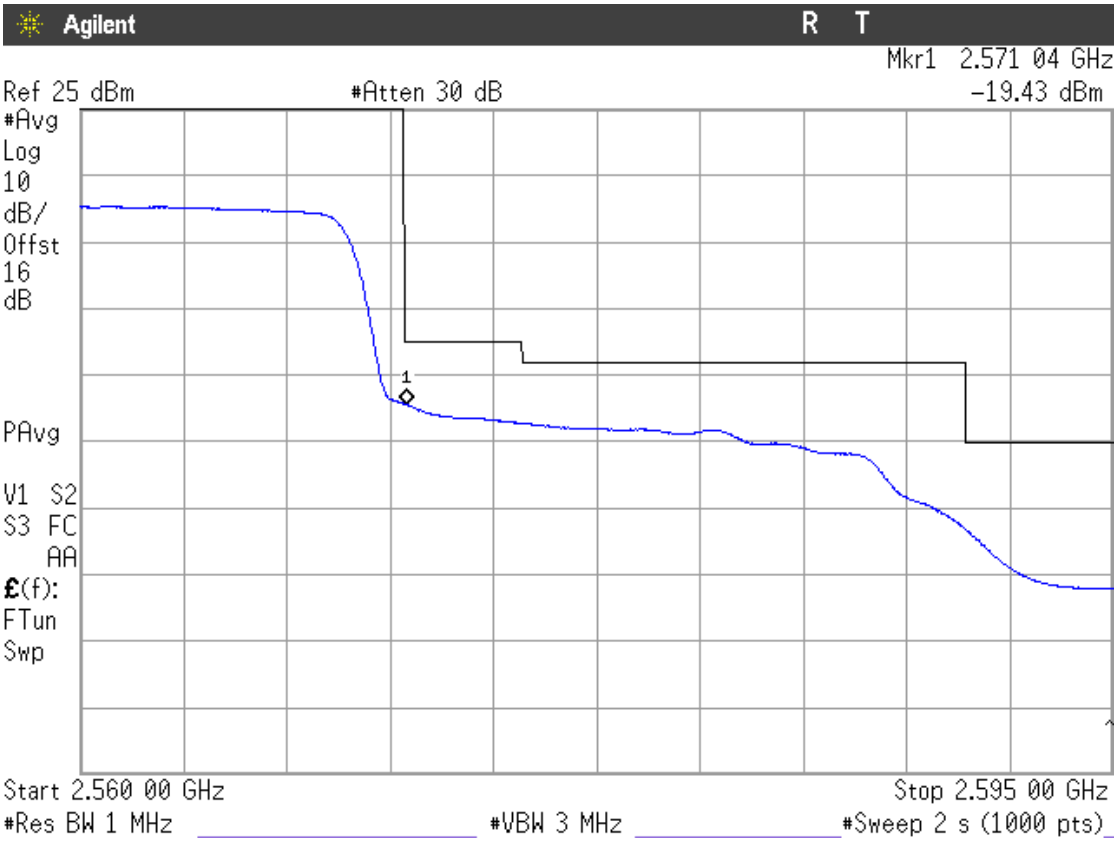




NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST



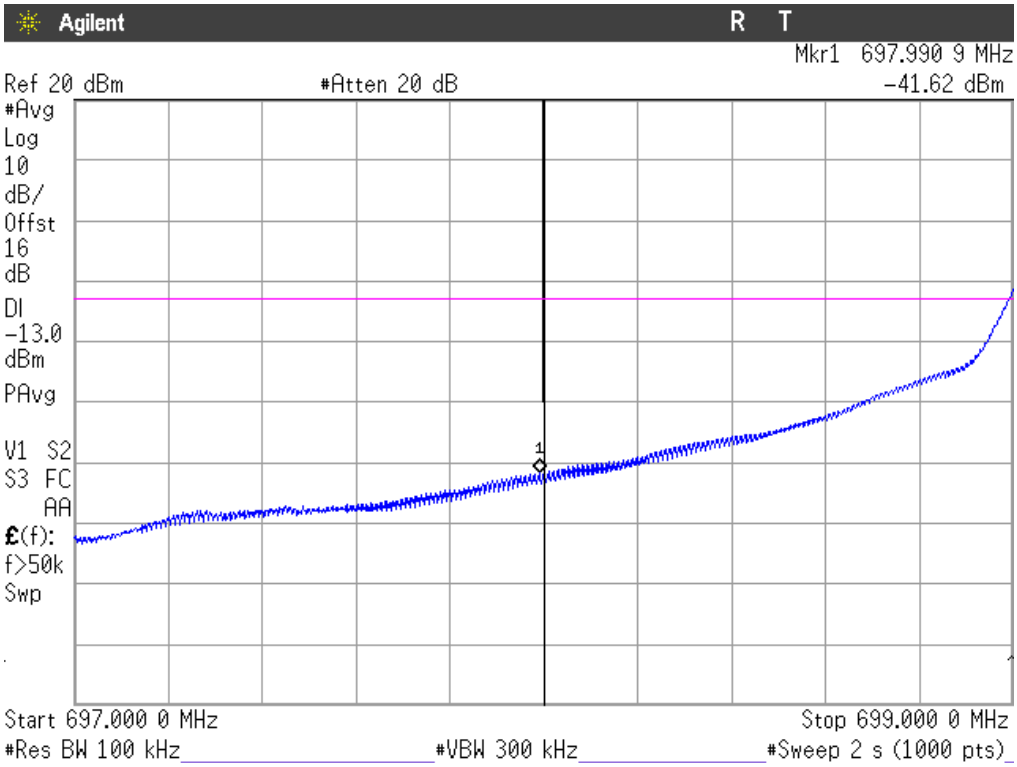


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 1.4 MHz (Band XII)

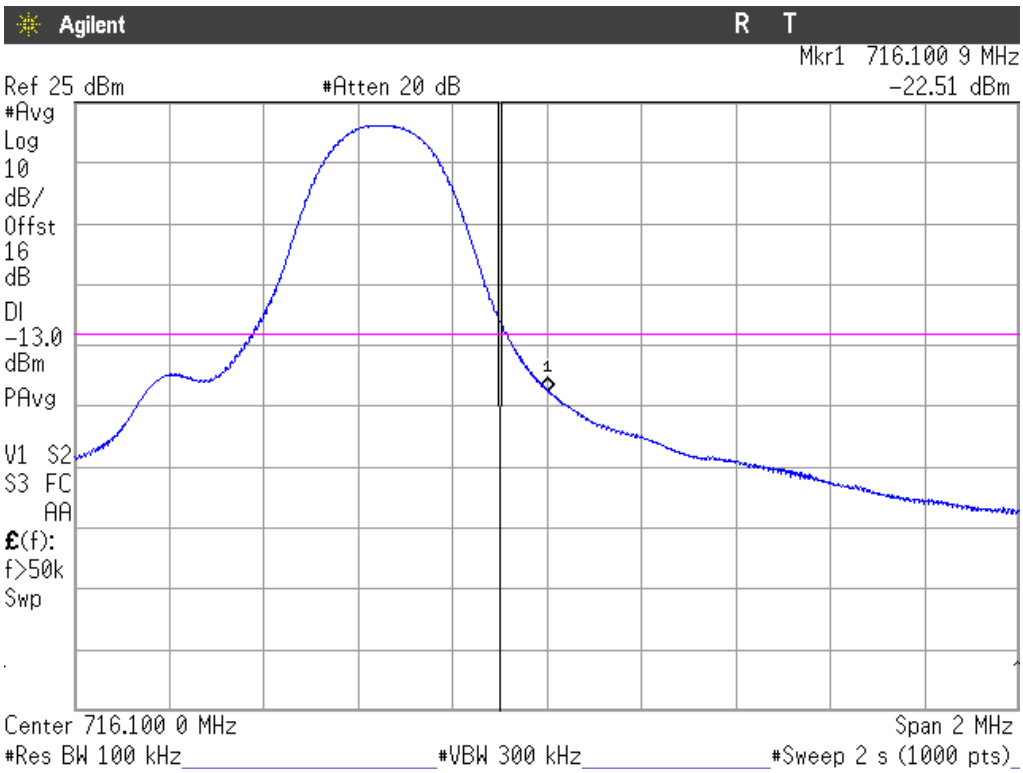
CHANNEL LOWEST



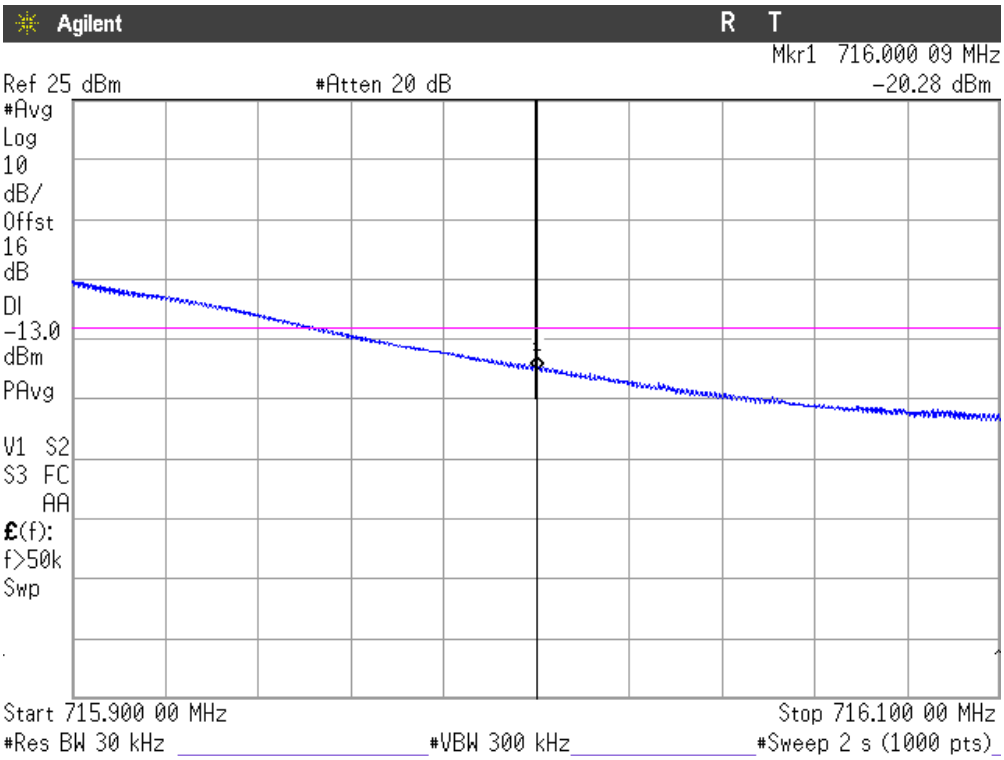
NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 1.4 MHz (Band XII)

CHANNEL HIGHEST. From 100 kHz up to 1 MHz outside the band edge, with Resolution BW = 100 kHz.



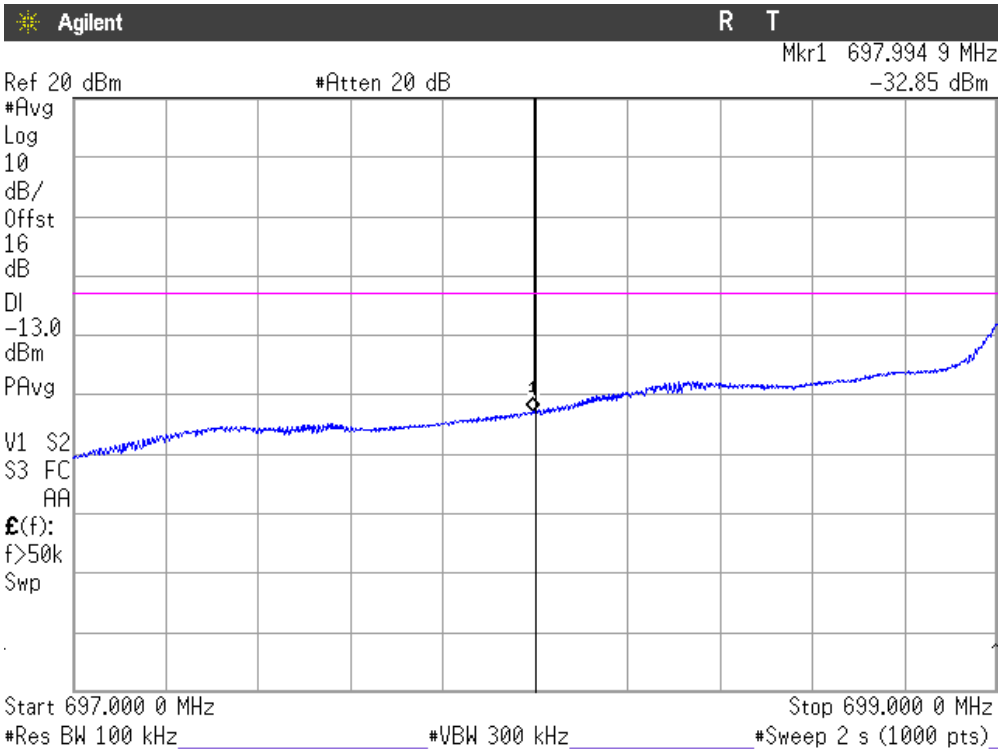
CHANNEL HIGHEST. Up to 100 kHz from the band edge, with Resolution BW = 30 kHz.



NOTE: The equipment transmits at the maximum output power

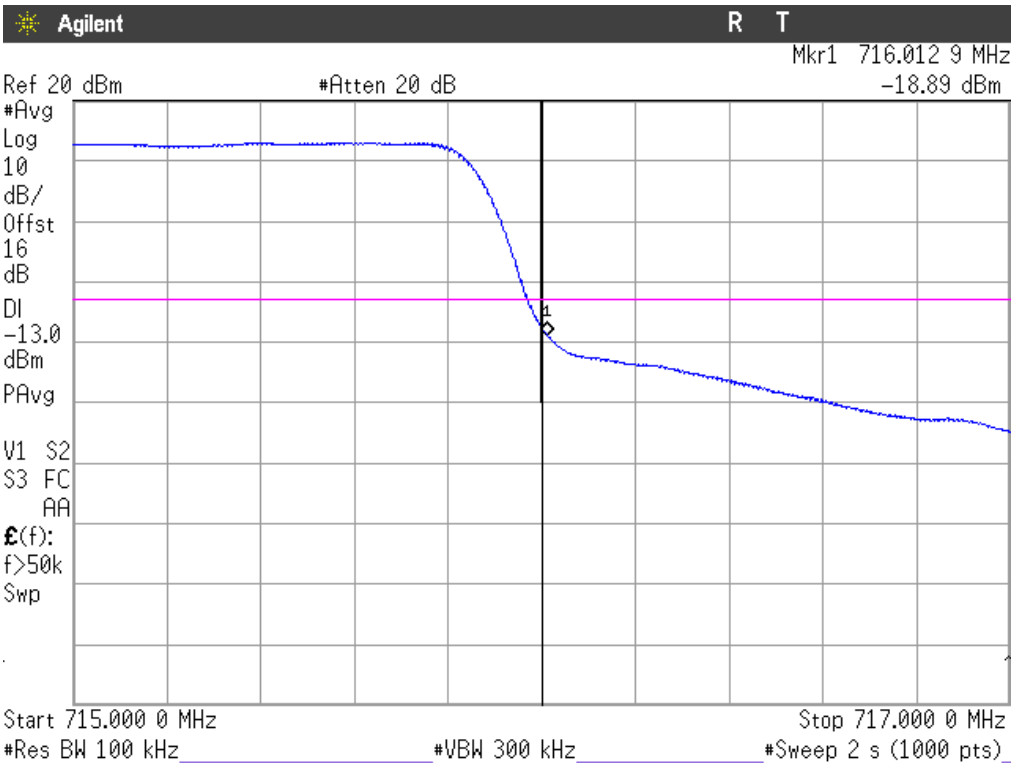
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 1.4 MHz (Band XII)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

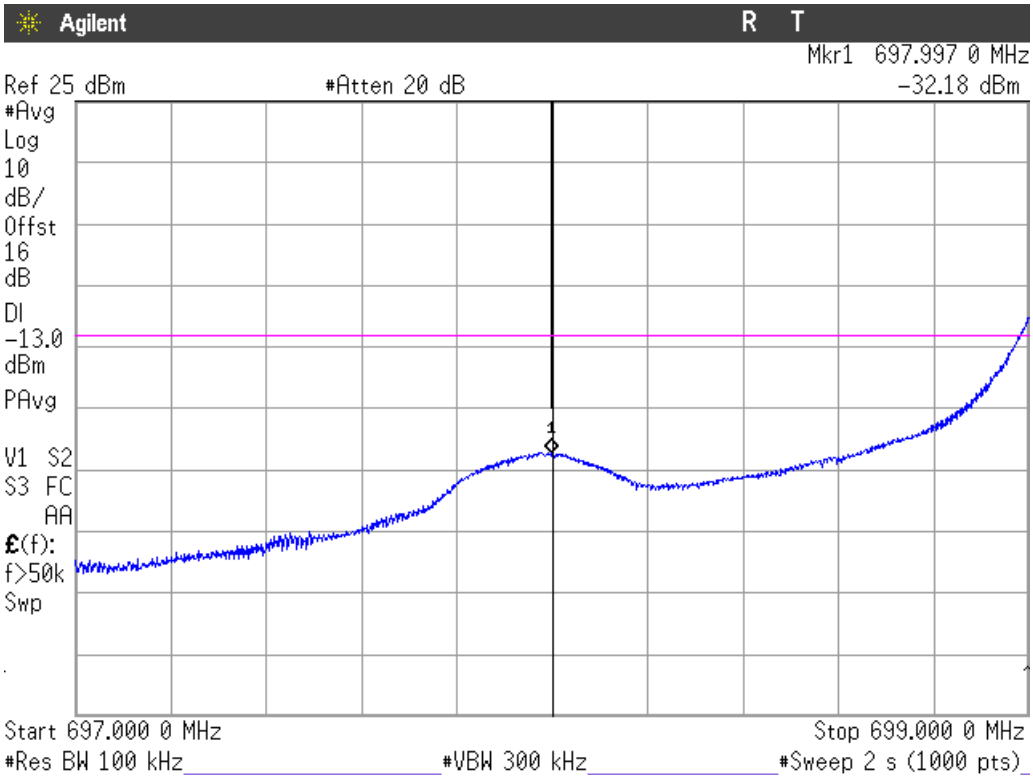


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 3 MHz (Band XII)

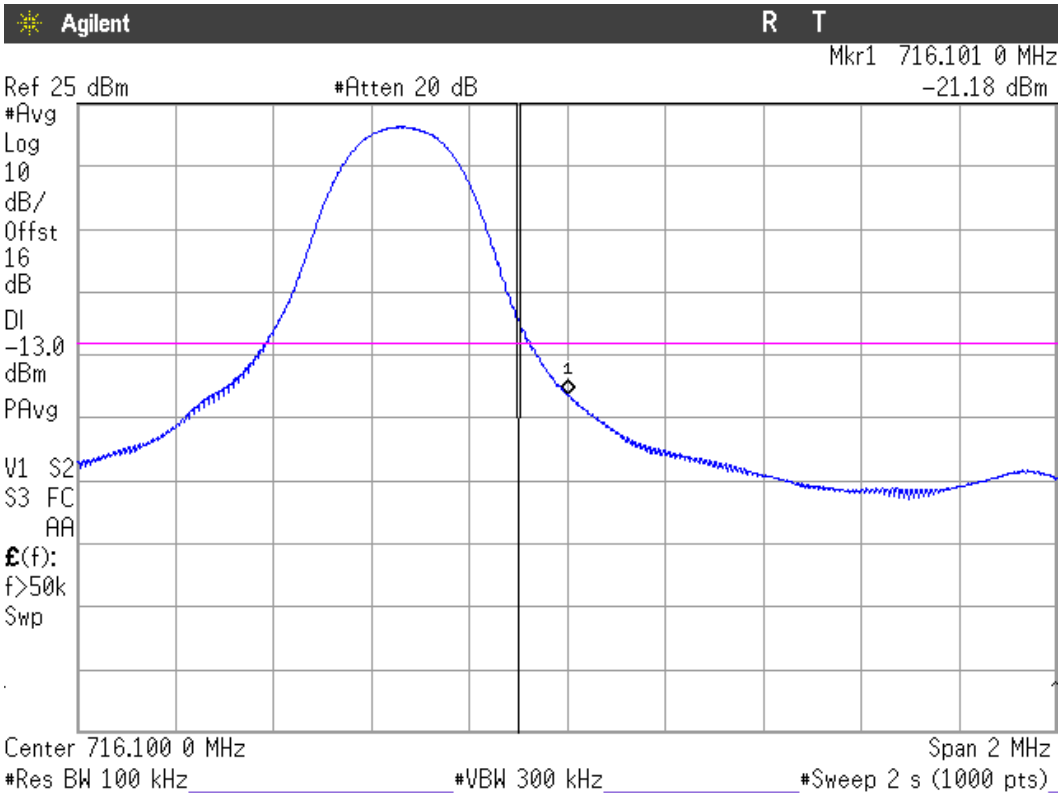
CHANNEL LOWEST



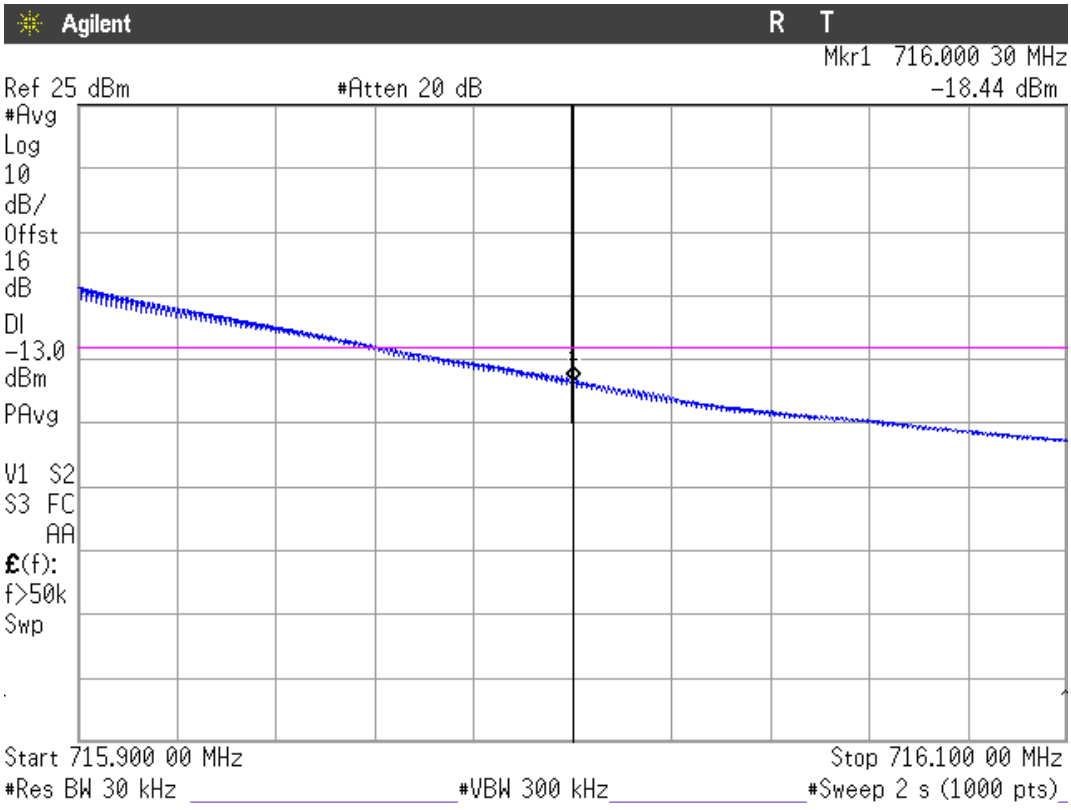
NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 3 MHz (Band XII)

CHANNEL HIGHEST. From 100 kHz up to 1 MHz outside the band edge, with Resolution BW = 100 kHz.



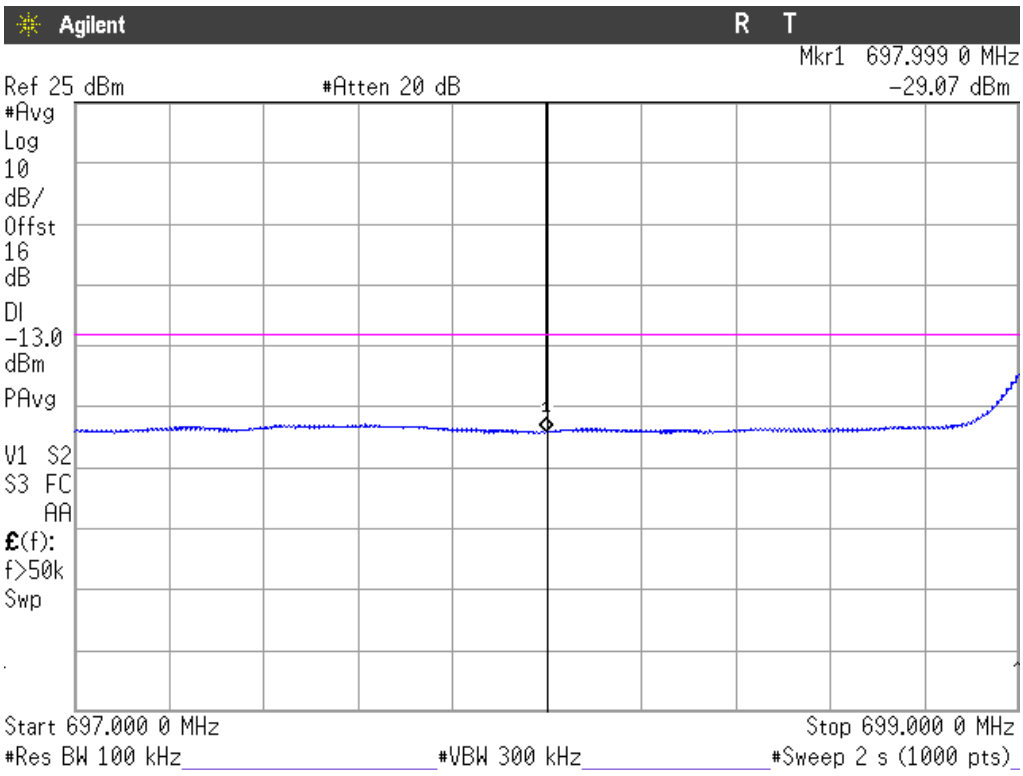
CHANNEL HIGHEST. Up to 100 kHz from the band edge, with Resolution BW = 30 kHz.



NOTE: The equipment transmits at the maximum output power

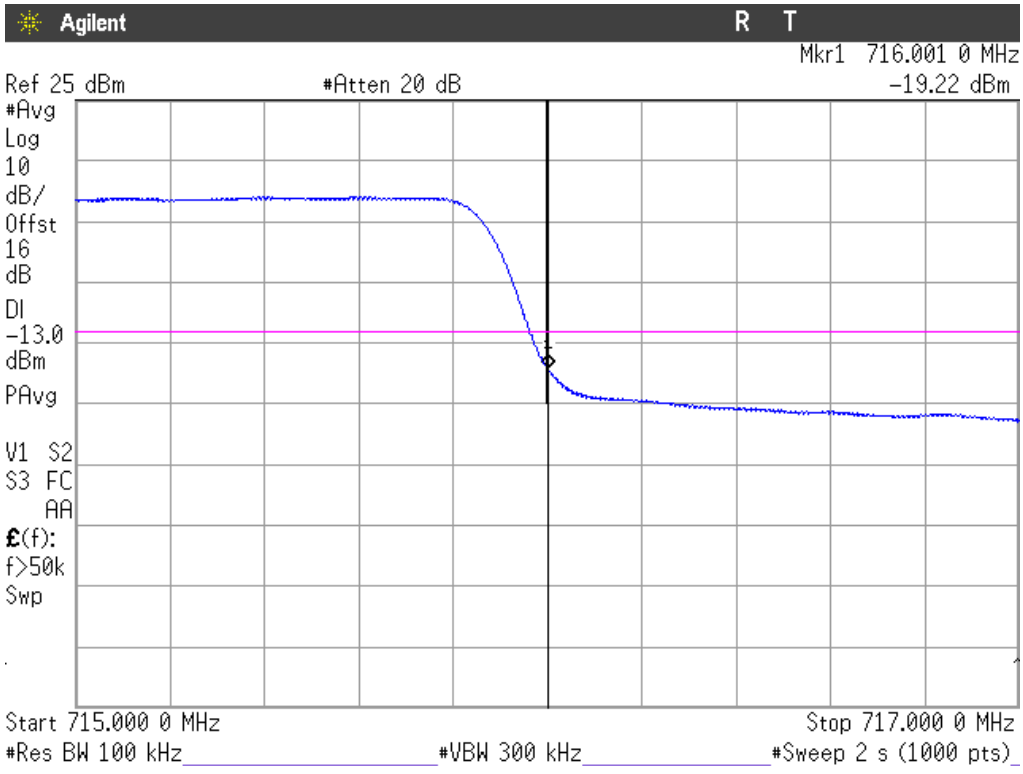
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 3 MHz (Band XII)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

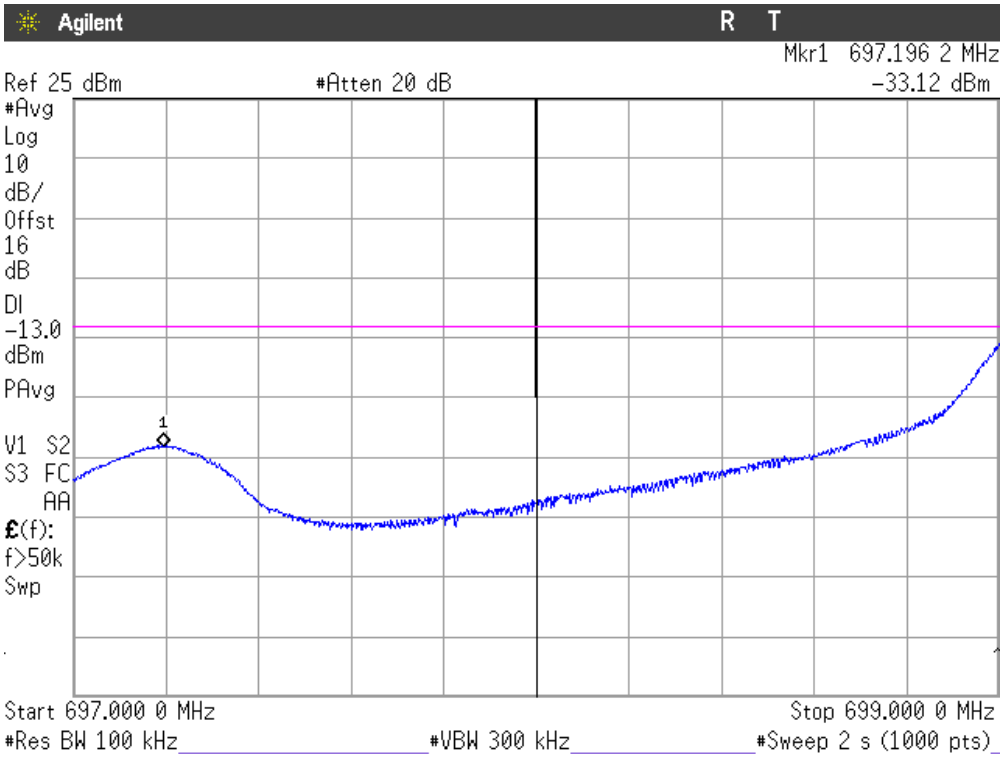


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 5 MHz (Band XII)

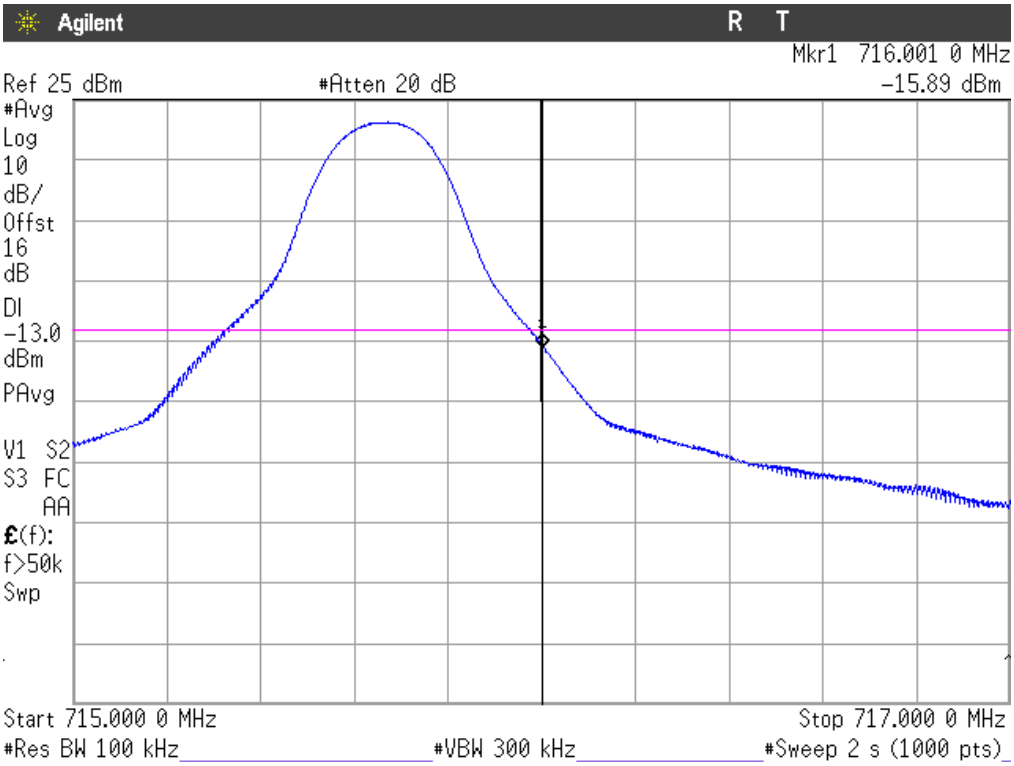
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 5 MHz (Band XII)

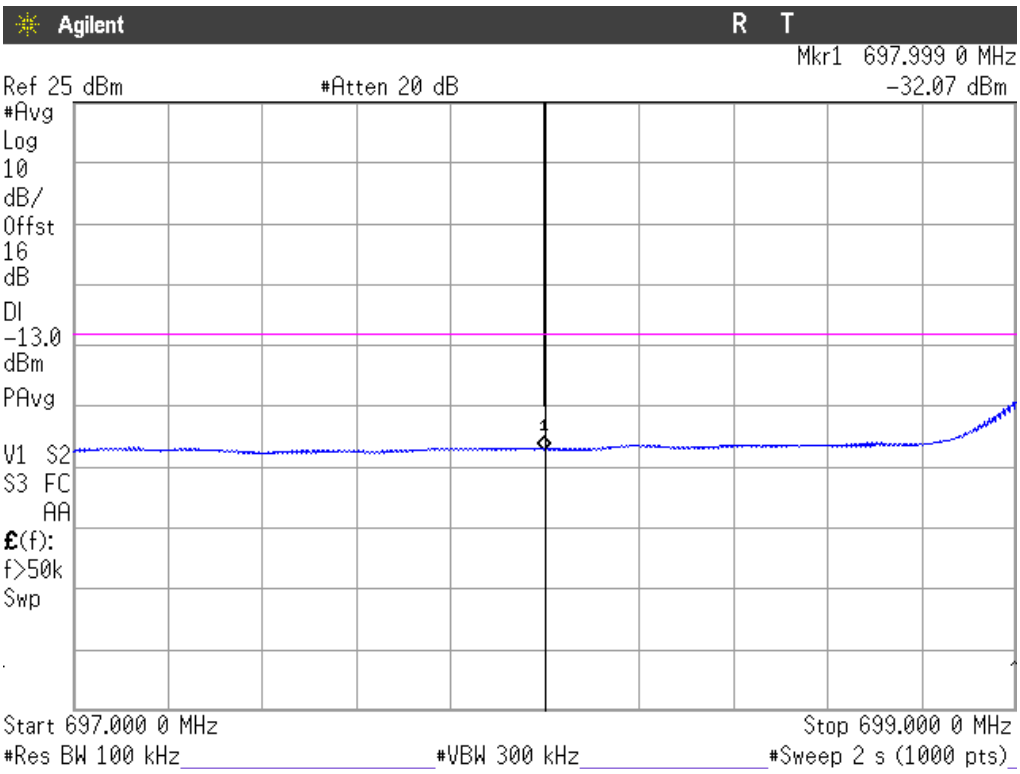
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

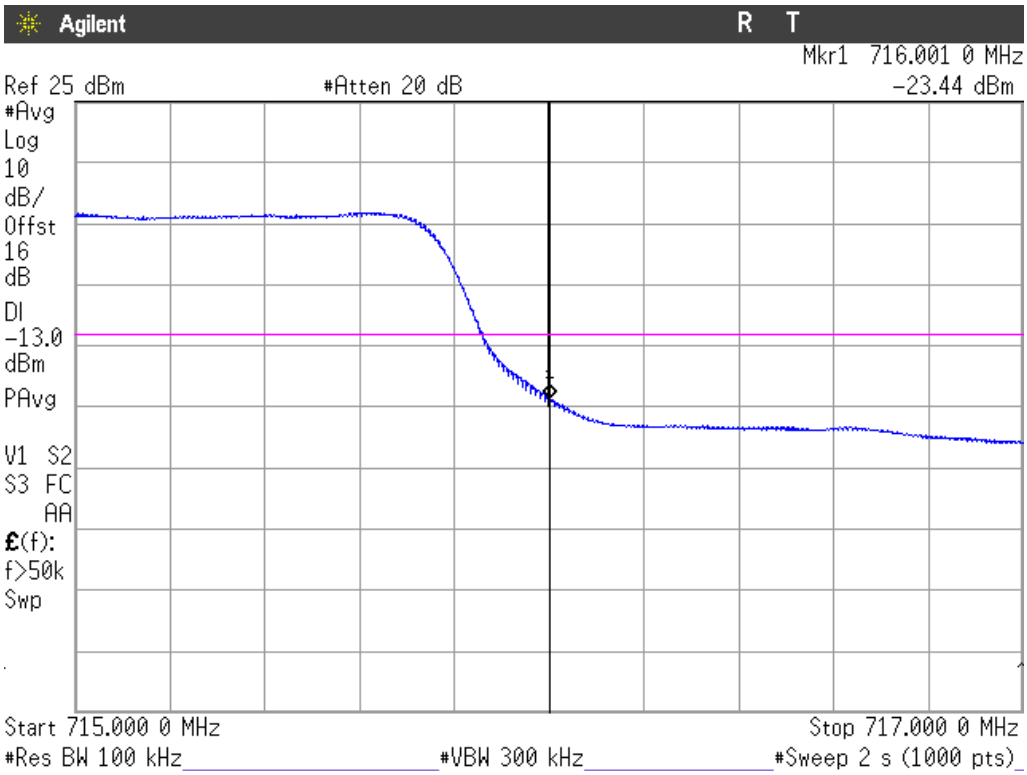
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 5 MHz (Band XII)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST

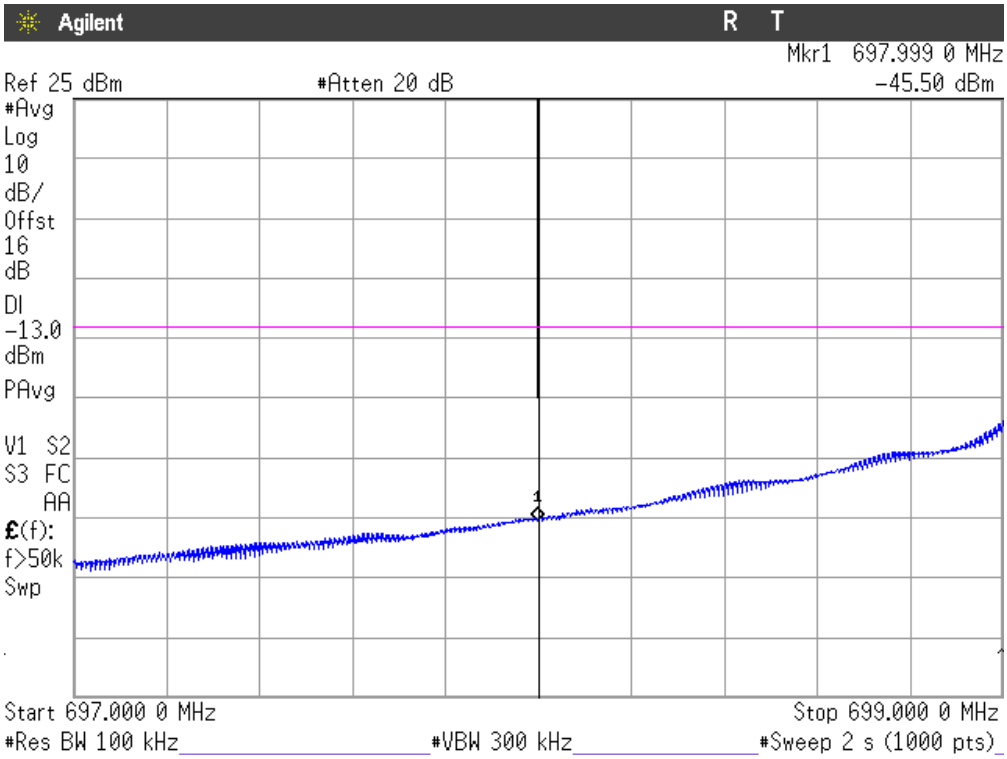


NOTE: The equipment transmits at the maximum output power

Verdict: PASS

LTE QPSK MODULATION. RB = 1, Offset = 0, BW = 10 MHz (Band XII)

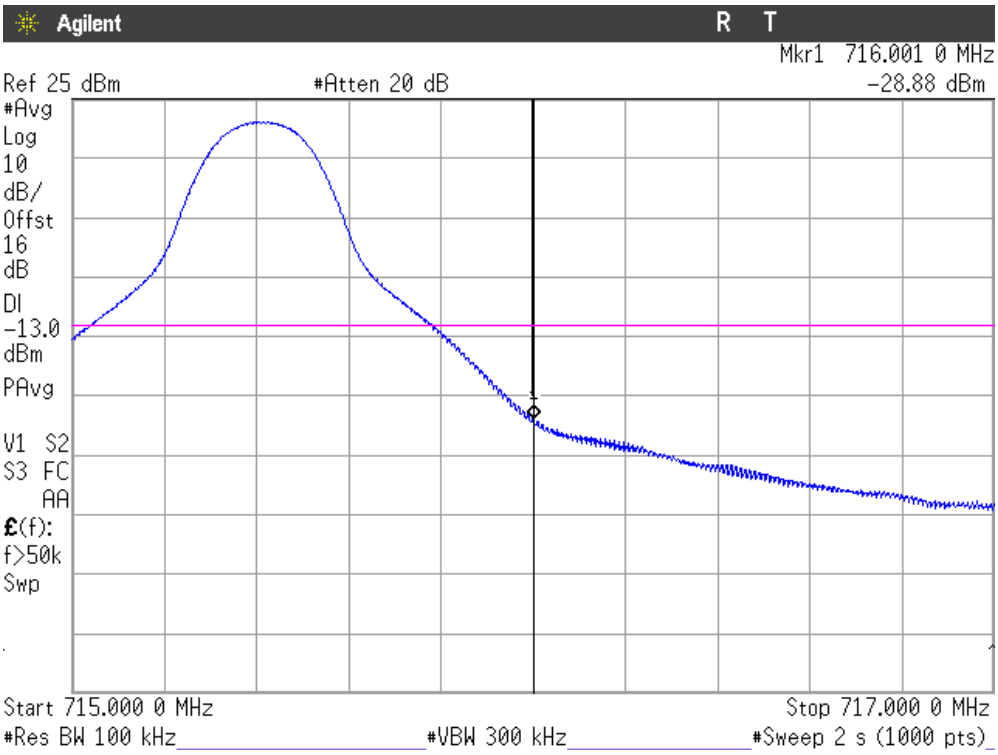
CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

LTE QPSK MODULATION. RB = 1, Offset = Max, BW = 10 MHz (Band XII)

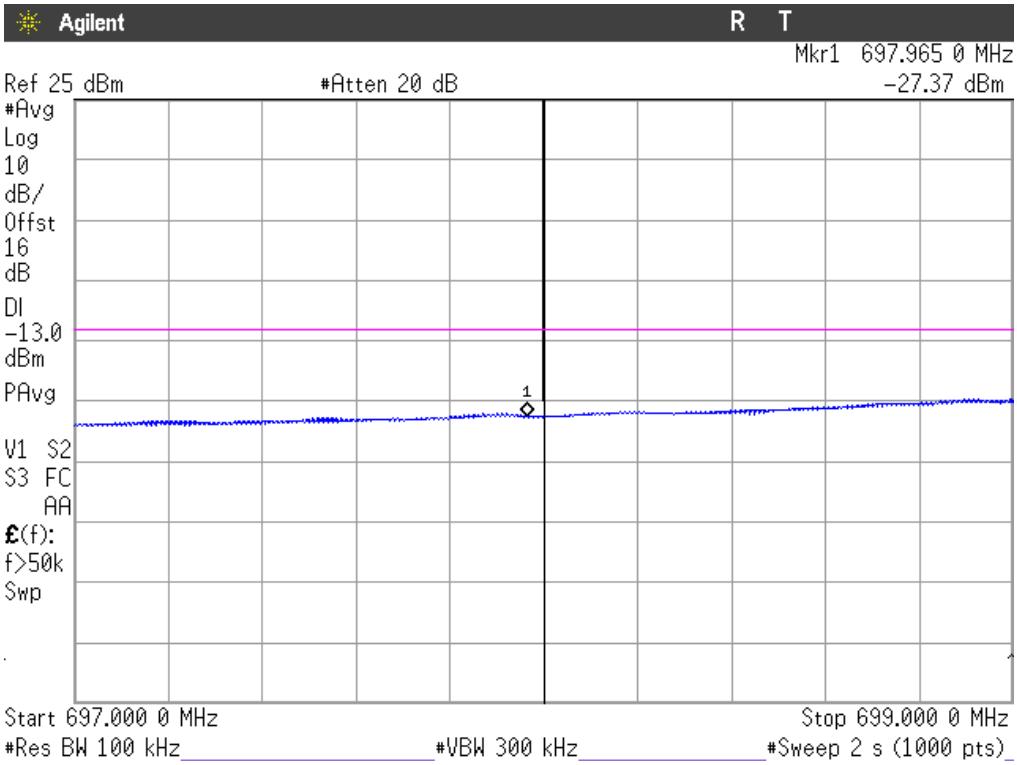
CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

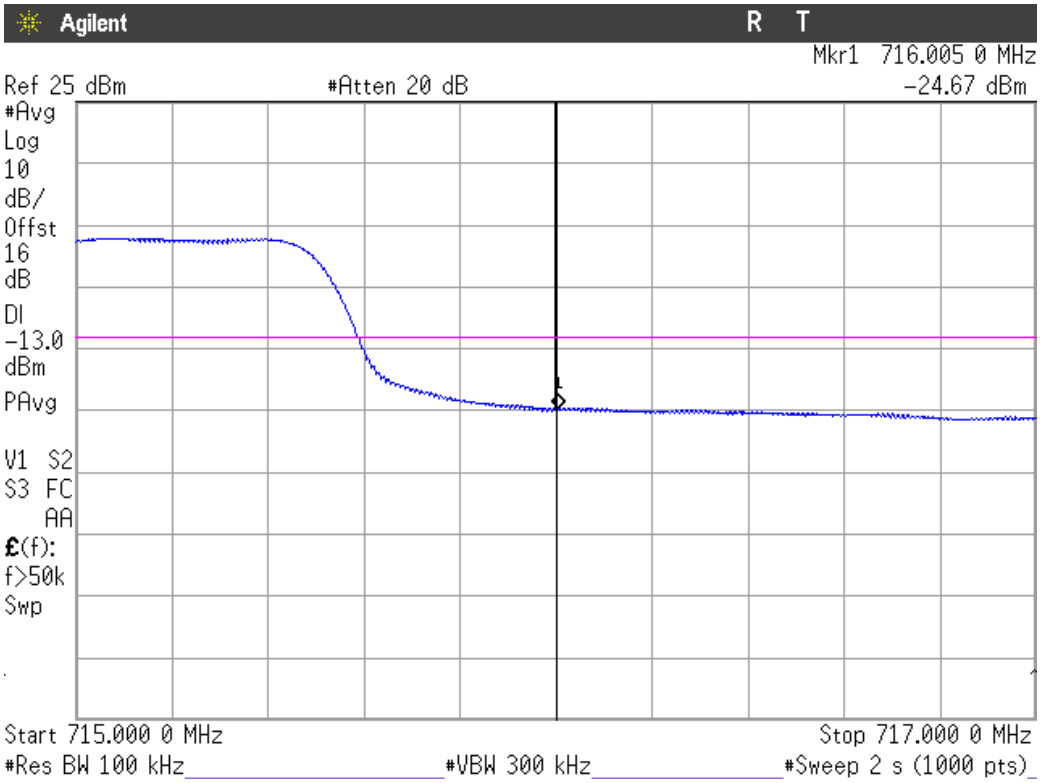
LTE QPSK MODULATION. RB = All, Offset = 0, BW = 10 MHz (Band XII)

CHANNEL LOWEST



NOTE: The equipment transmits at the maximum output power

CHANNEL HIGHEST



NOTE: The equipment transmits at the maximum output power

Verdict: PASS

Radiated emissions

SPECIFICATION

FCC §2.1051 and §27.53(g) (h) (m). RSS-139 Clause 6.5. RSS-130 Clause 4.6.

According to specification. the power of emissions shall be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. P in watts.

RSS-199 Clause 4.6.

For mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:

i) 40 + 10 log p from the channel edges to 5 MHz away,
ii) 43 + 10 log p between 5 MHz and X MHz from the channel edges, and
iii) 55 + 10 log p at X MHz and beyond from the channel edges.
iv) in addition, the attenuation shall be not be less than 43 + 10 log p on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log p at or below 2490.5 MHz.

At Po transmitting power. the specified minimum attenuation becomes 40+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [40 + 10 log (Po in mwatts) - 30] = -10 dBm

At Po transmitting power. the specified minimum attenuation becomes 43+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [43 + 10 log (Po in mwatts) - 30] = -13 dBm

At Po transmitting power. the specified minimum attenuation becomes 55+10log (Po). and the level in dBm relative Po becomes:
Po (dBm) – [55 + 10 log (Po in mwatts) - 30] = -25 dBm

METHOD

The measurement was performed with the EUT inside an anechoic chamber. The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency generated within the equipment.
The EUT was placed on a 1 meter high non-conductive stand at a 3 meter distance from the measuring antenna for measurements below 1 GHz and at 1 m distance for measurements above 1 GHz.
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded. The radiated emissions were measured with peak detector and 1 MHz bandwidth.
Each detected emission is substituted by the Substitution method, in accordance with the ANSI/TIA/EIA-603-C: 2004.

RESULTS

WCDMA AND HSUPA MODULATION

A preliminary scan determined the WCDMA modulation as the worst case. The following tables and plots show the results for WCDMA modulation.

1. CHANNEL: LOWEST

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

3. CHANNEL: HIGHEST

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

LTE QPSK AND 16QAM MODULATION. Band IV. BW = 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz and 20 MHz.

A preliminary scan determined the QPSK 1.4 MHz bandwidth as the worst case. The configuration of Resource Blocks which is the worst case for conducted power was used.

The following tables and plots show the results for this configuration.

1. CHANNEL: LOWEST

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

3. CHANNEL: HIGHEST

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

LTE QPSK AND 16QAM MODULATION. Band VII. BW = 5 MHz, 10 MHz, 15 MHz and 20 MHz.

A preliminary scan determined the QPSK 5 MHz bandwidth as the worst case. The configuration of Resource Blocks which is the worst case for conducted power was used.

The following tables and plots show the results for this configuration.

1. CHANNEL: LOWEST

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-26 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain Gi (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
2521.868943	-31.50	Vertical	-43.15	2.00	9.95	-35.20
2541.020954	-24.40	Vertical	-35.85	2.20	9.95	-28.10

2. CHANNEL: MIDDLE

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-26 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain Gi (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
2496.861999	-21.50	Vertical	-35.30	1.80	9.90	-27.20
2515.973089	-24.70	Vertical	-36.45	1.90	9.95	-28.40
2554.337418	-29.00	Vertical	-38.75	2.20	9.95	-31.00
2573.540420	-21.70	Vertical	-33.05	2.30	9.95	-25.40

3. CHANNEL: HIGHEST

Frequency range 30 MHz-1000 MHz.
No spurious signals were found in all the range.

Frequency range 1 GHz-26 GHz.

Substitution method data

Frequency (MHz)	Instrument reading (dBm)	Polarization	(1) Generator output (dBm)	(2) Cable loss (dB)	(3) Substitution antenna gain Gi (respect to isotropic radiator) (dB)	E.I.R.P. (dBm) = (1) – (2) + (3)
2491.048208	-25.70	Vertical	-39.50	1.80	9.90	-31.40
2510.208621	-30.10	Vertical	-41.85	1.90	9.95	-33.80
2528.941949	-22.10	Vertical	-33.65	2.10	9.95	-25.80
2548.452063	-25.00	Vertical	-34.75	2.20	9.95	-27.00
2586.772039	-31.30	Vertical	-37.85	2.40	9.95	-30.30

LTE QPSK AND 16QAM MODULATION. Band XII. BW = 1.4 MHz, 3 MHz, 5 MHz and 10 MHz.

A preliminary scan determined the QPSK 3 MHz bandwidth as the worst case. The configuration of Resource Blocks which is the worst case for conducted power was used.

The following tables and plots show the results for this configuration.

1. CHANNEL: LOWEST

Frequency range 30 MHz-1000 MHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

2. CHANNEL: MIDDLE

Frequency range 30 MHz-1000 MHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

3. CHANNEL: HIGHEST

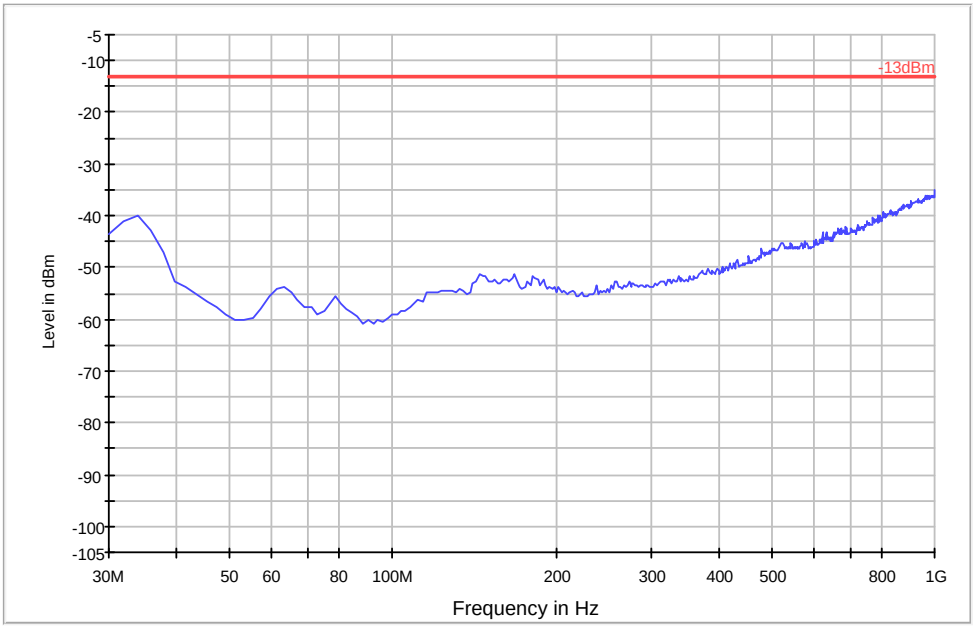
Frequency range 30 MHz-1000 MHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

Frequency range 1 GHz-18 GHz.
No radiated spurious signals were detected at less than 20 dB respect to the limit.

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

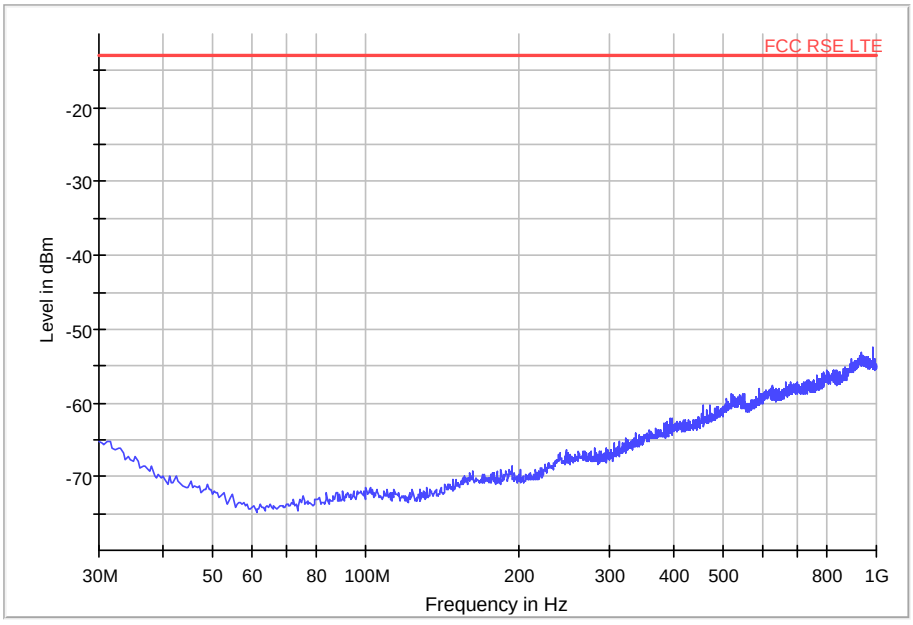
WCDMA MODULATION



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	-5dBm	0dB	0dB	Peak

(This plot is valid for all three channels)

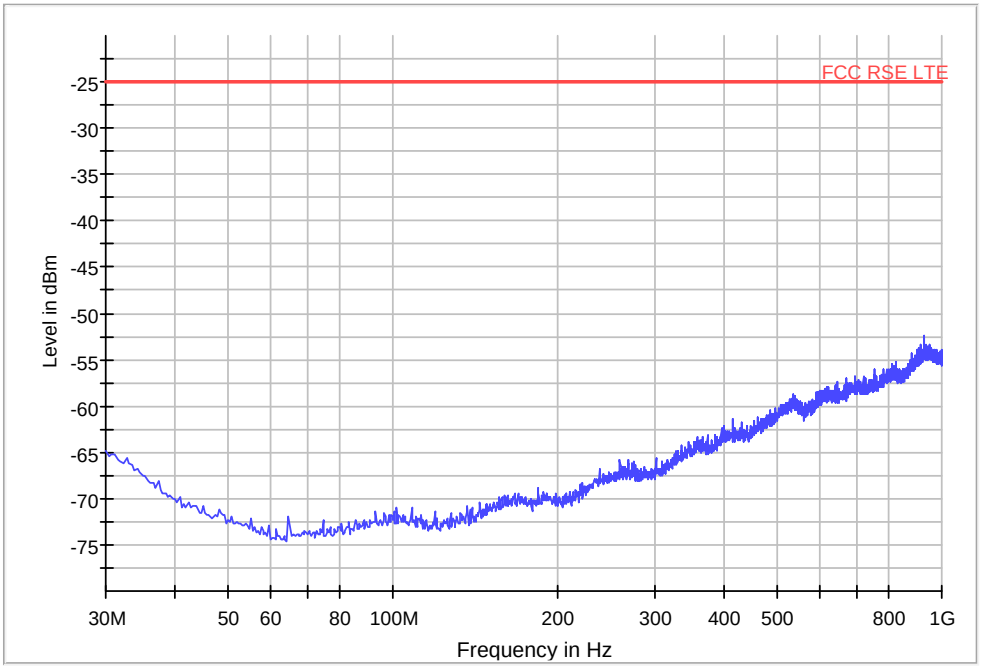
LTE 16QAM MODULATION. BW=1.4 MHz. Band IV



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	-10dBm	28dB	0dB	Peak

(This plot is valid for all three channels)

LTE QPSK MODULATION. BW=5 MHz. Band VII

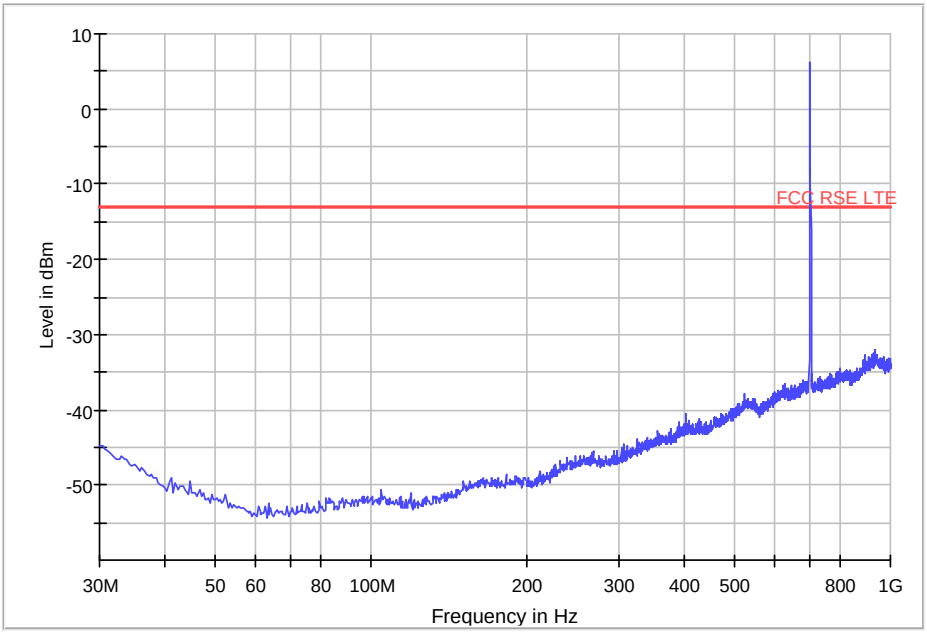


VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	-20dBm	28dB	0dB	Peak

(This plot is valid for all three channels)

LTE QPSK MODULATION. BW=3 MHz. Band XII

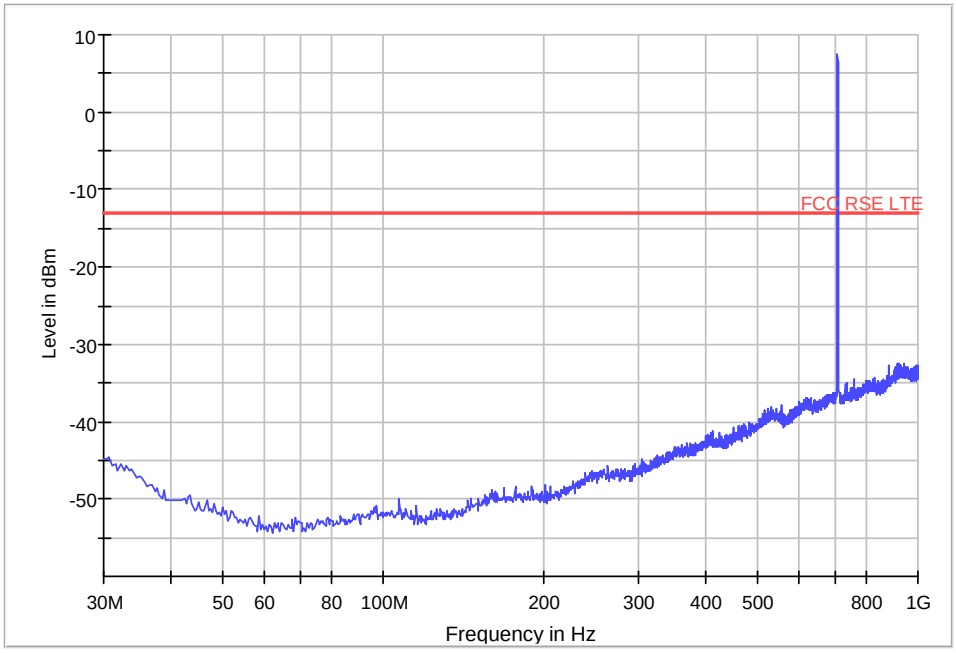
CHANNEL: LOWEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	10dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

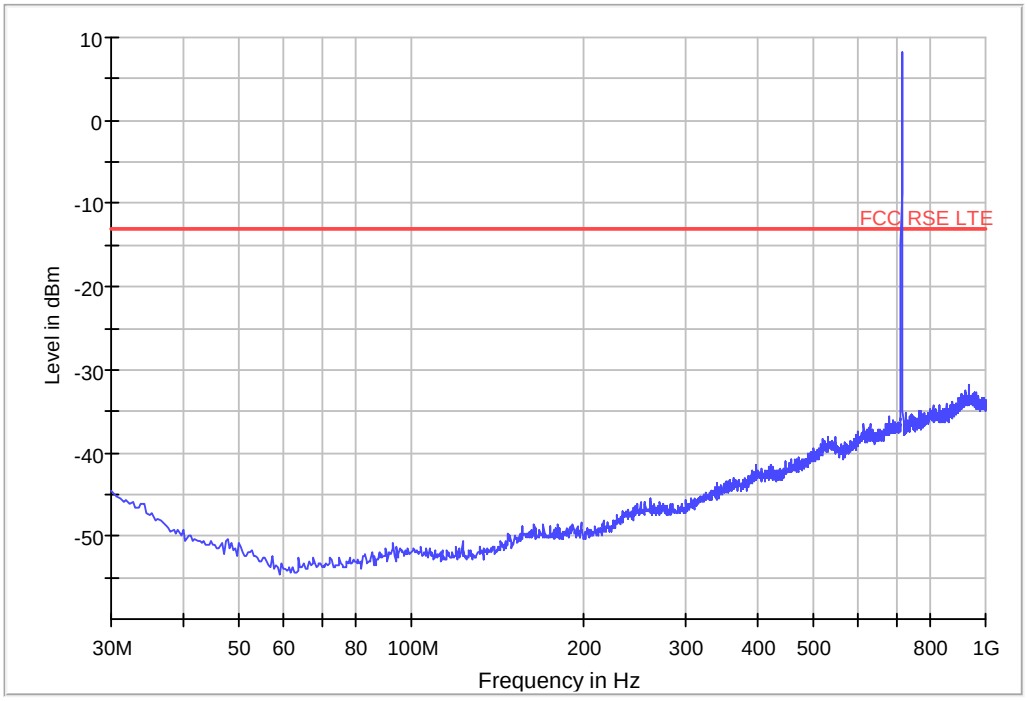
CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	10dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

CHANNEL: HIGHEST



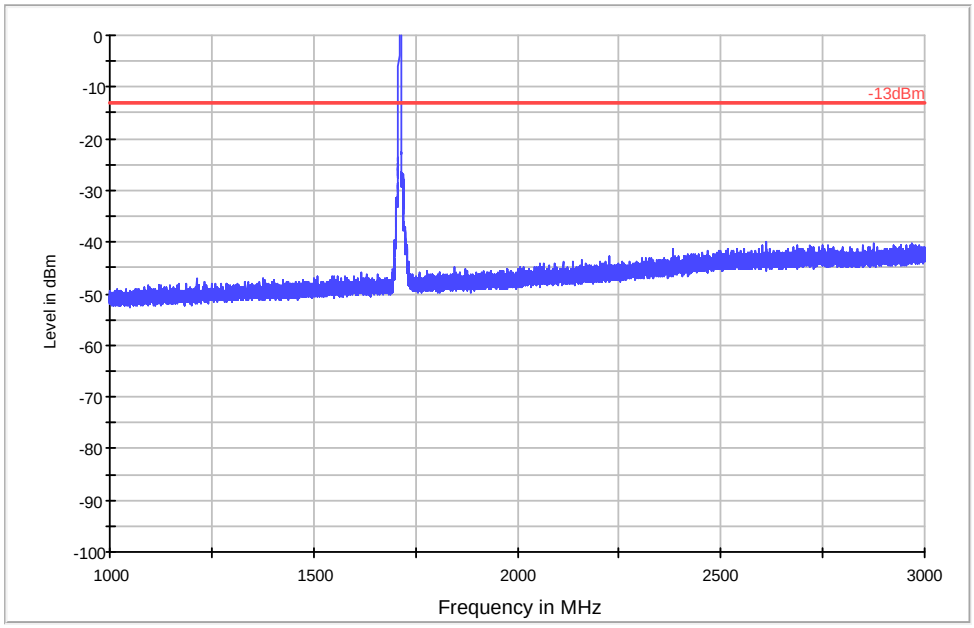
VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	10dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

FREQUENCY RANGE 1 GHz to 3 GHz.

WCDMA MODULATION

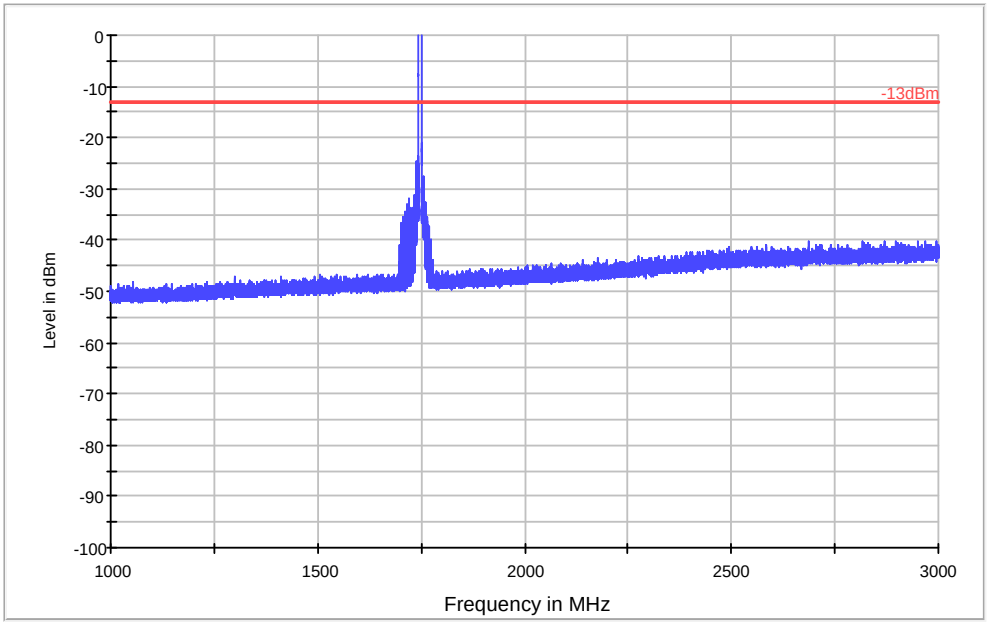
CHANNEL: LOWEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

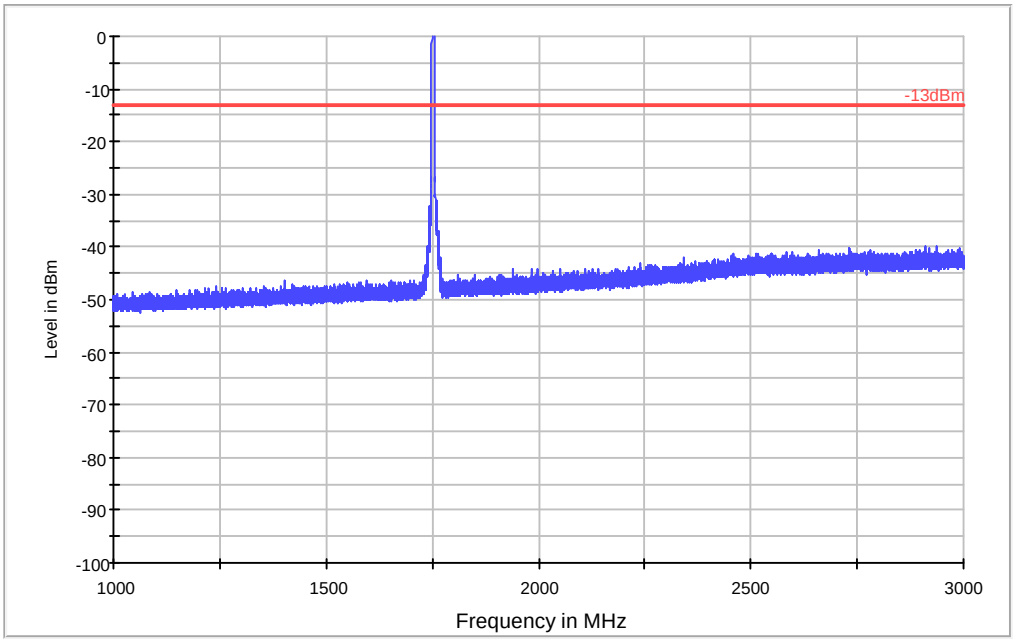
CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

CHANNEL: HIGHEST

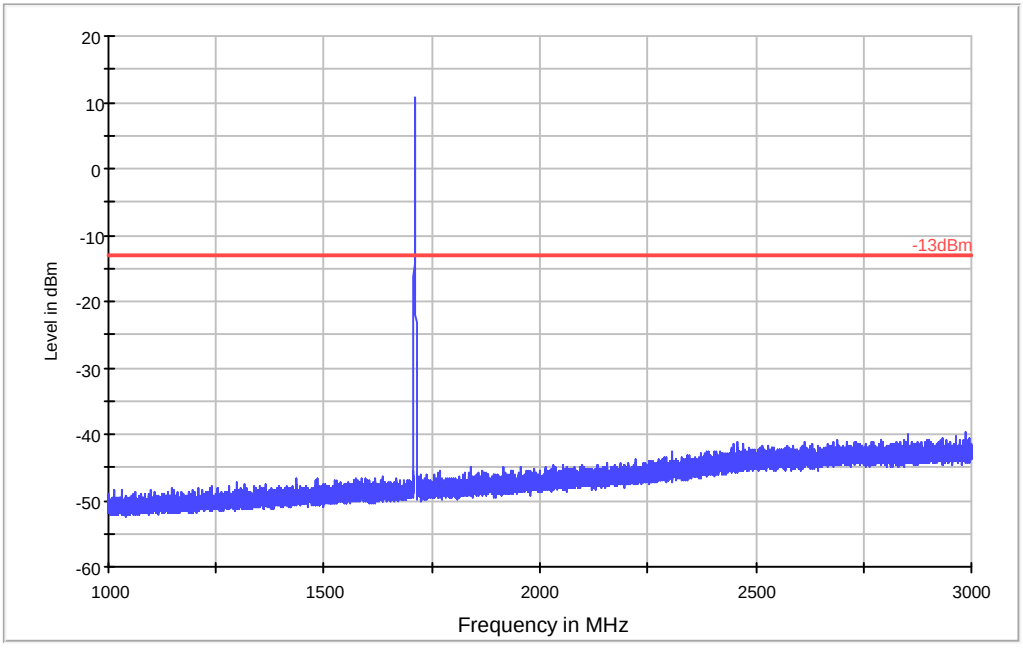


VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

LTE QPSK MODULATION. BW=1.4 MHz. Band IV

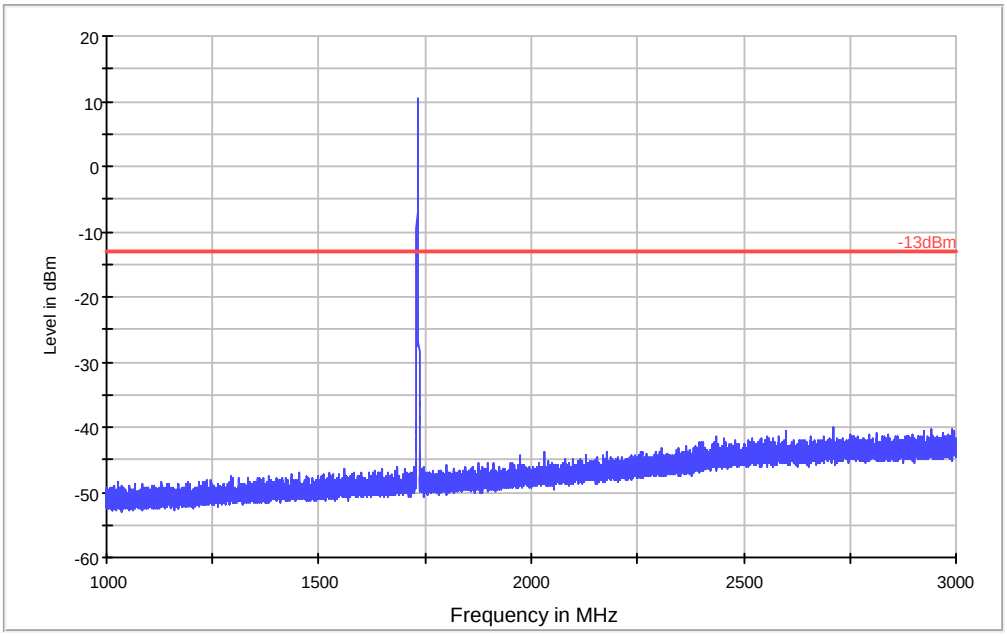
CHANNEL: LOWEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	20dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

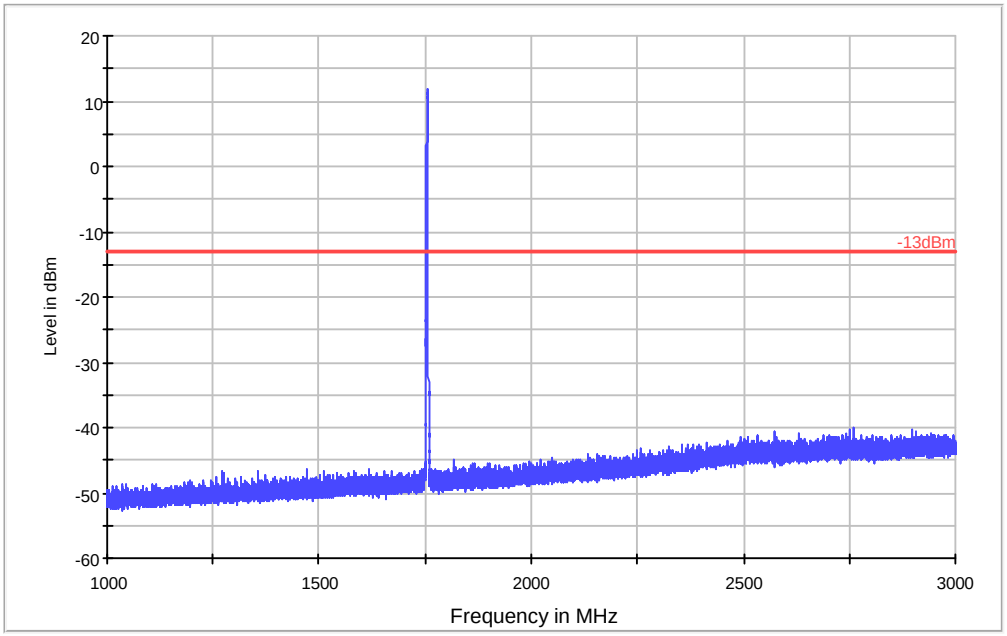
CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	20dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

CHANNEL: HIGHEST

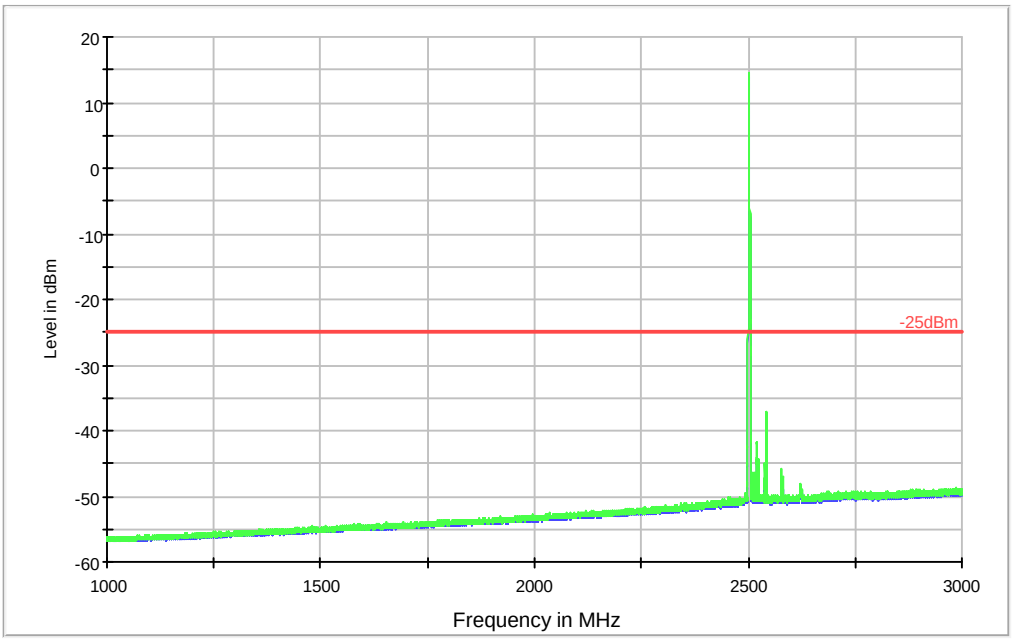


VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	20dBm	0dB	0dB	Peak

Note: The peak above the limit is the carrier frequency.

LTE QPSK MODULATION. BW=5 MHz. Band VII

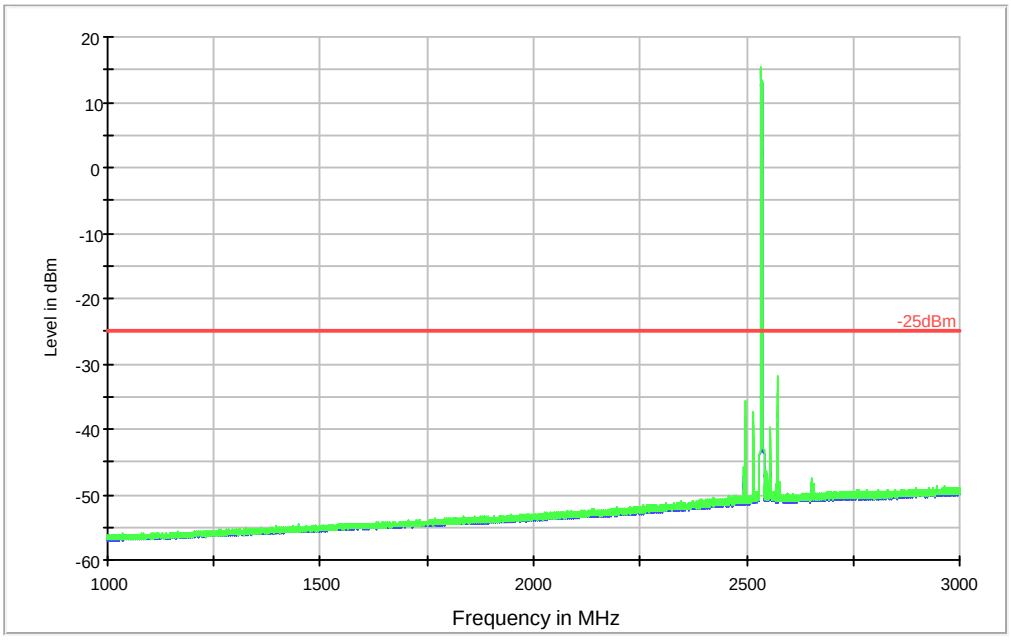
CHANNEL: LOWEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	20dBm	0dB	0dB	RMS

Note: The peak above the limit is the carrier frequency.

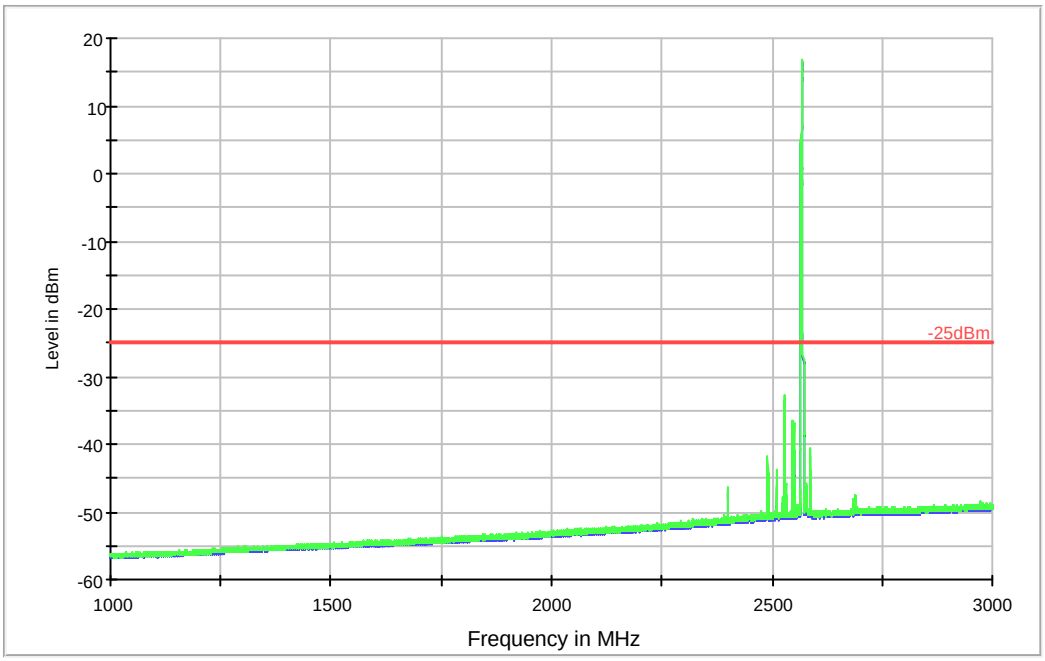
CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	20dBm	0dB	0dB	RMS

Note: The peak above the limit is the carrier frequency.

CHANNEL: HIGHEST

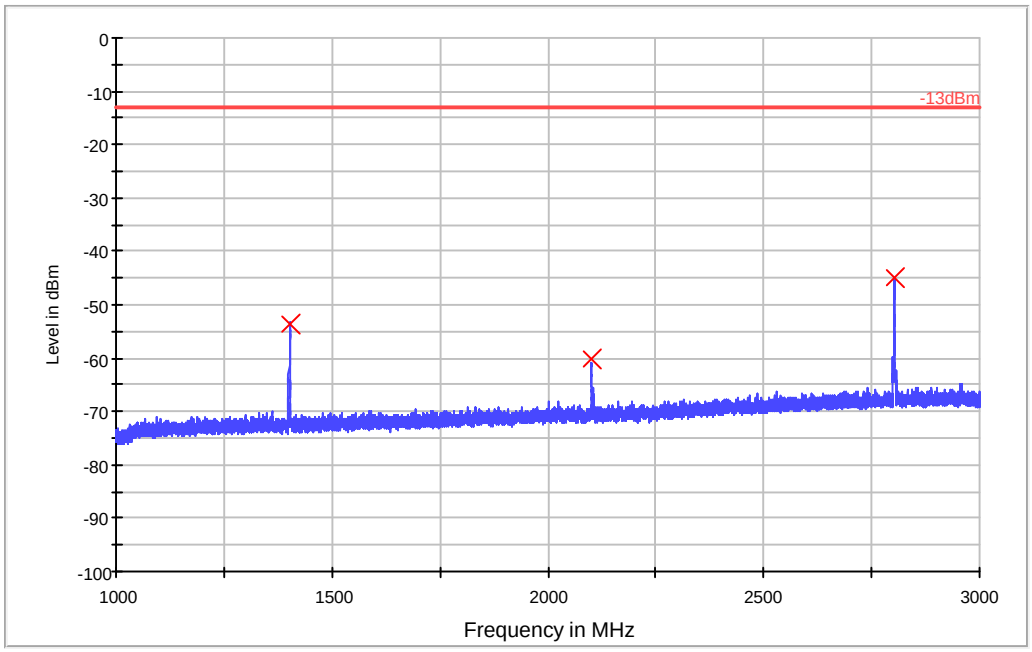


VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	20dBm	0dB	0dB	RMS

Note: The peak above the limit is the carrier frequency.

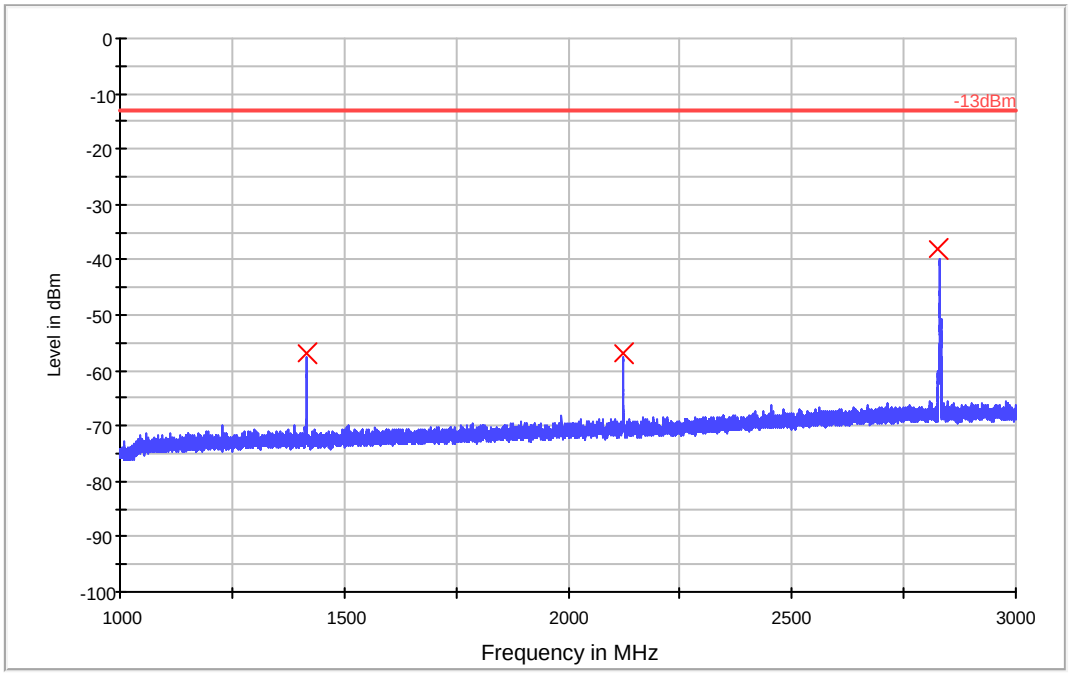
LTE QPSK MODULATION. BW=3 MHz. Band XII

CHANNEL: LOWEST



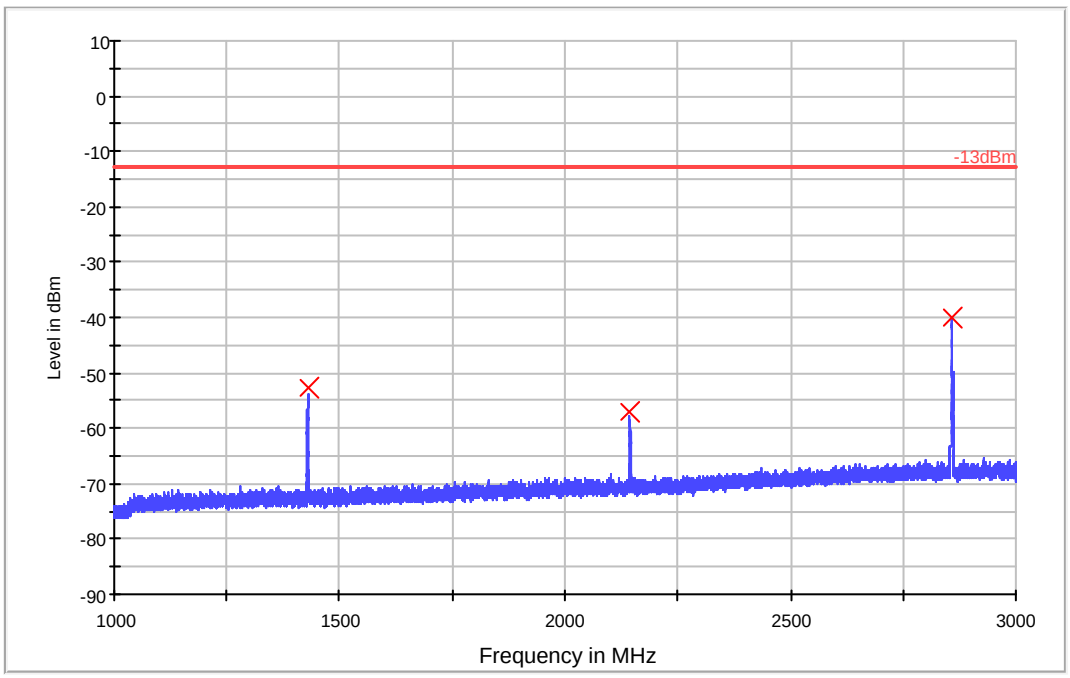
VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

CHANNEL: HIGHEST

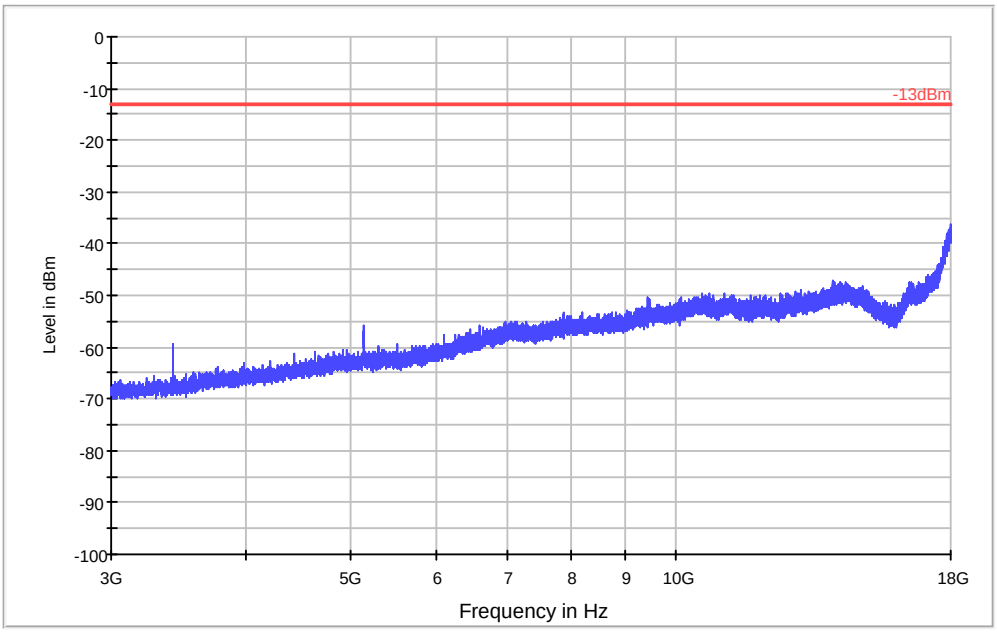


VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

FREQUENCY RANGE 3 GHz to 18 GHz.

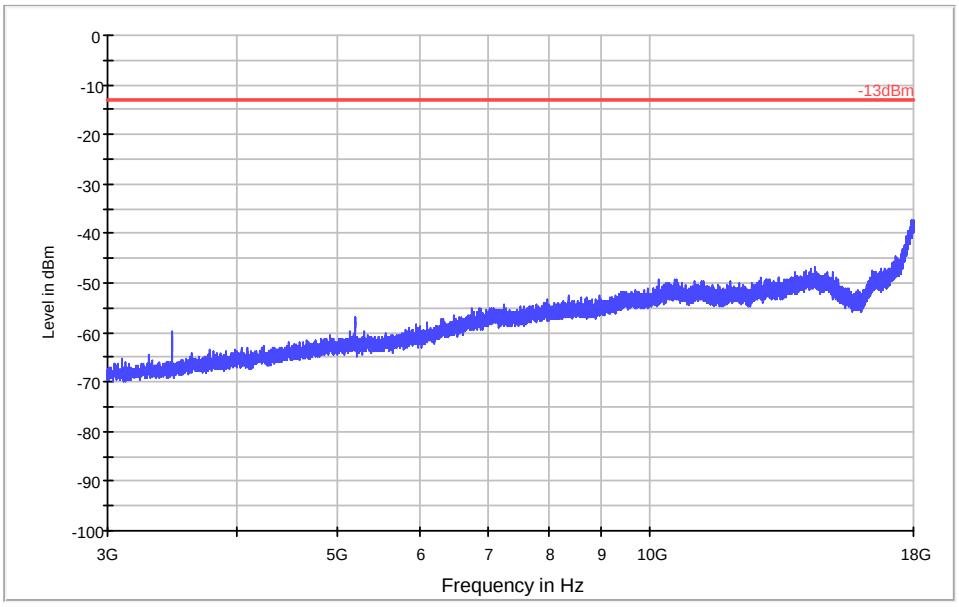
WCDMA MODULATION

CHANNEL: LOWEST



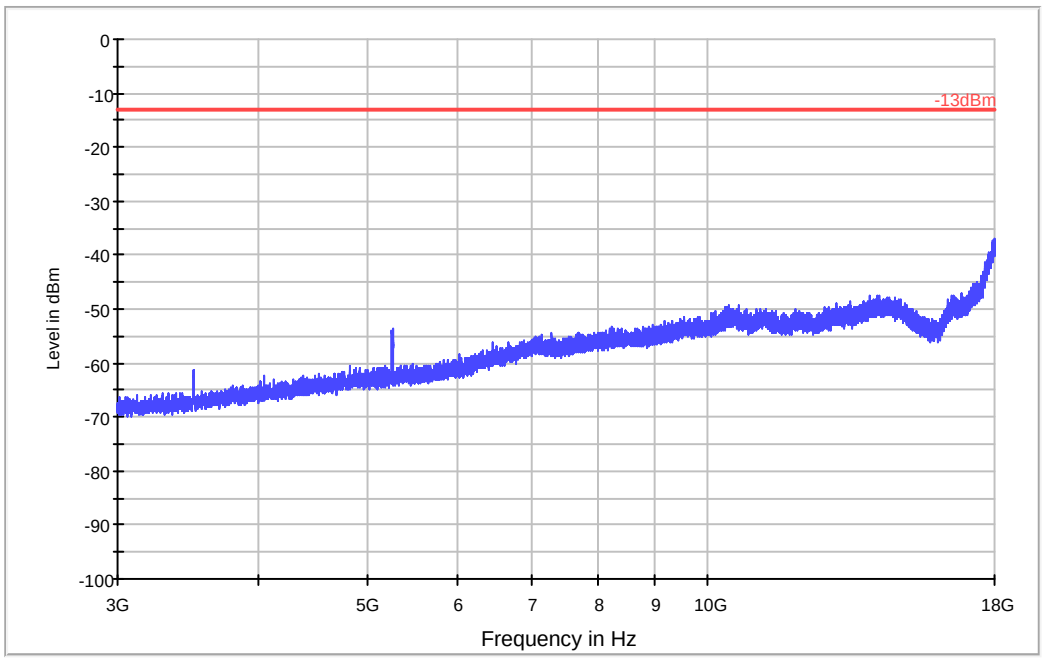
VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

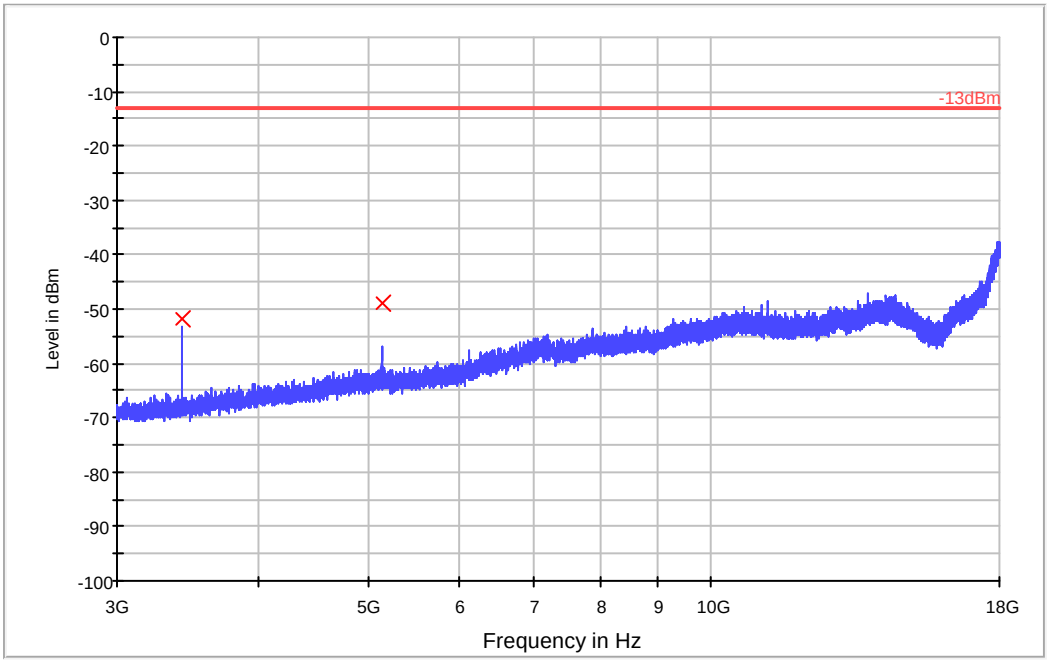
CHANNEL: HIGHEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

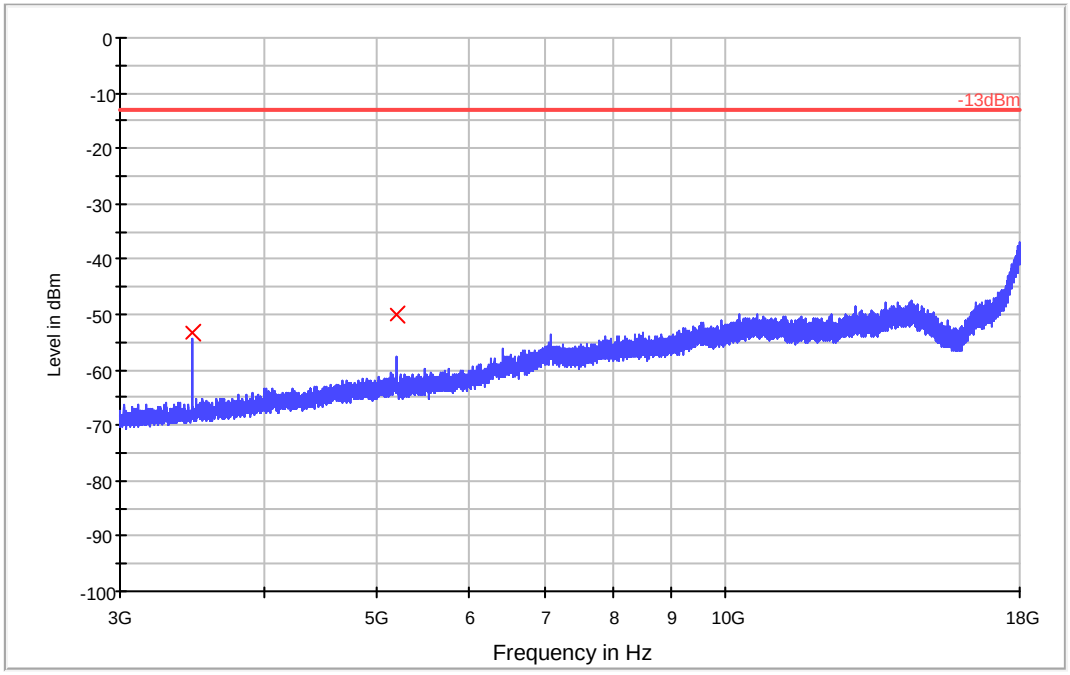
LTE QPSK MODULATION. BW=1.4 MHz. Band IV

CHANNEL: LOWEST



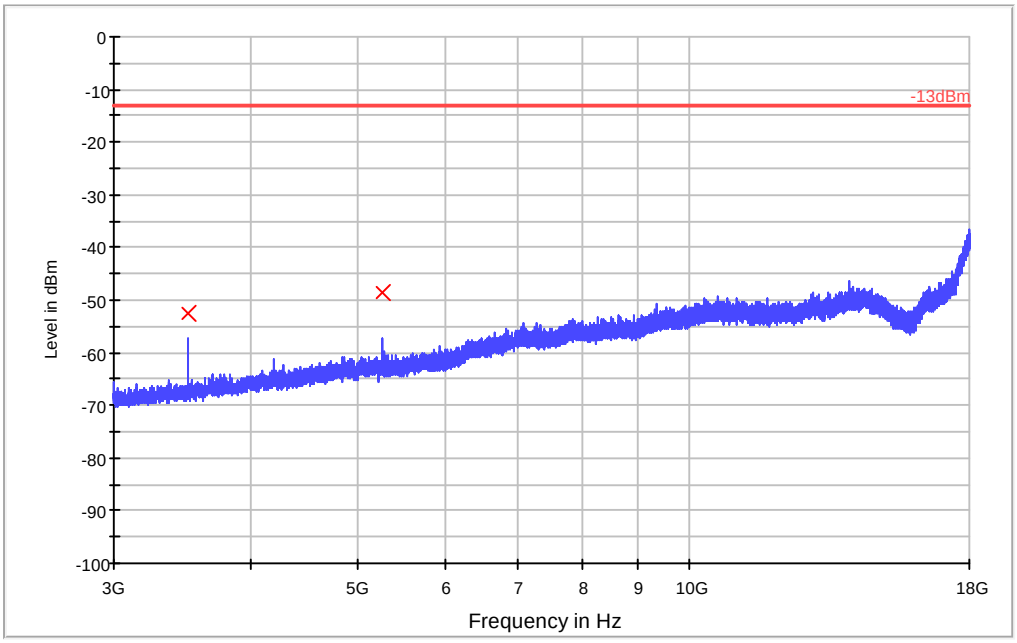
VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

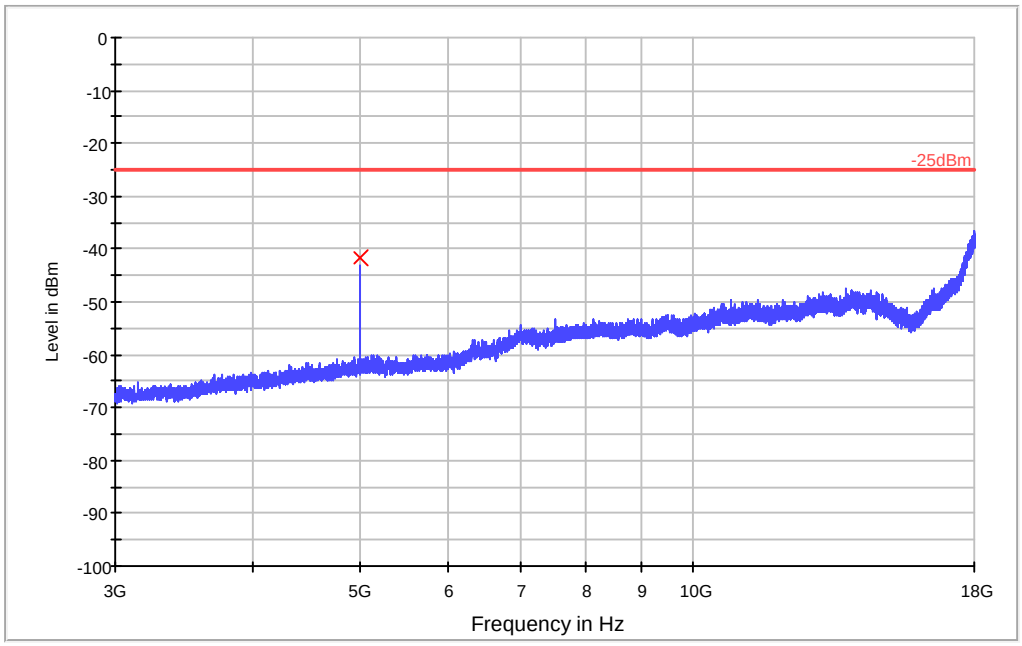
CHANNEL: HIGHEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

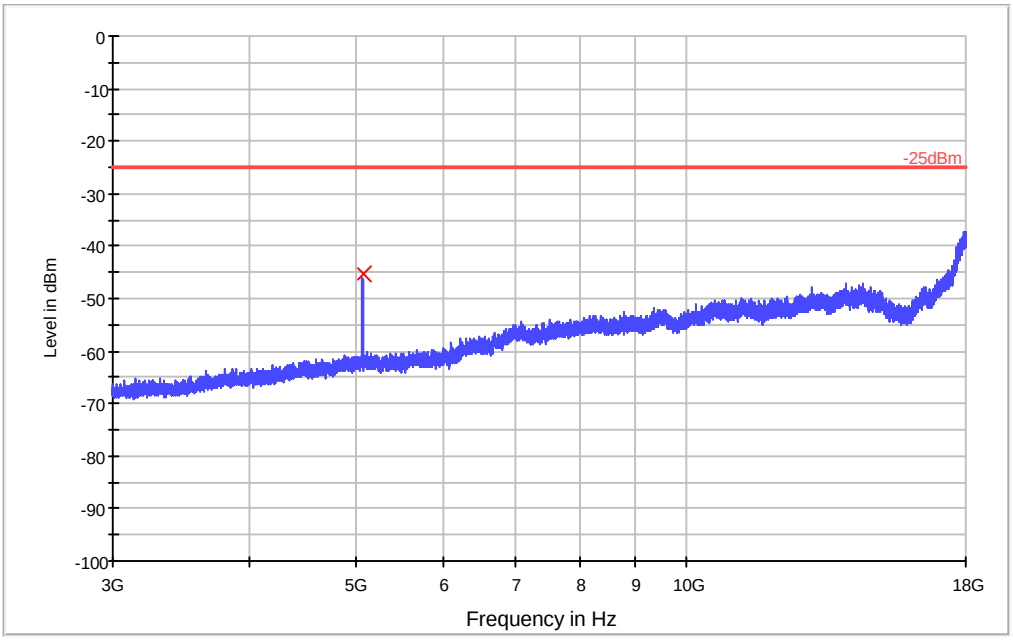
LTE QPSK MODULATION. BW=5 MHz. Band VII

CHANNEL: LOWEST



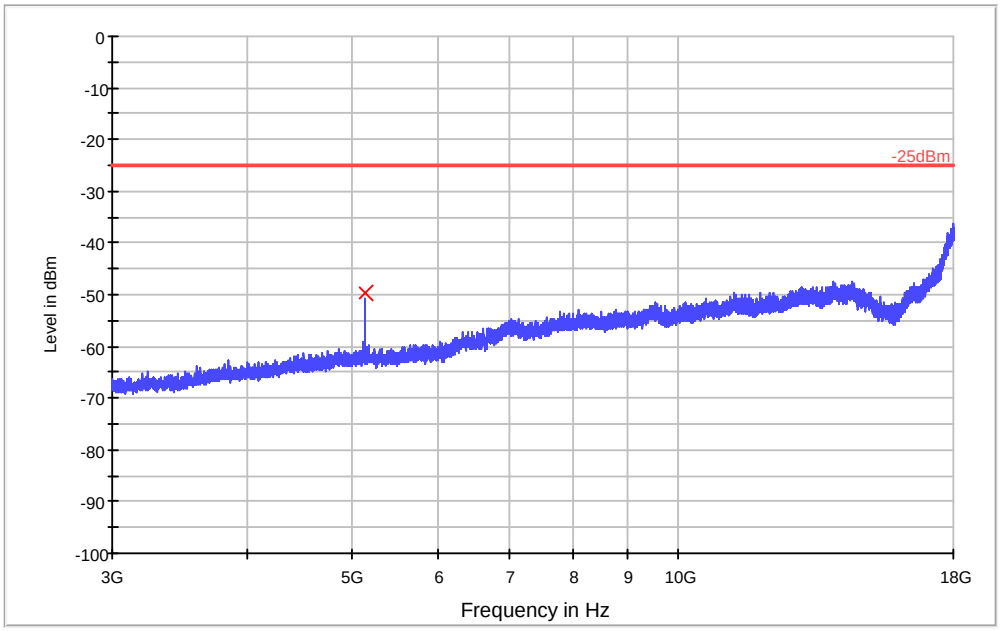
VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

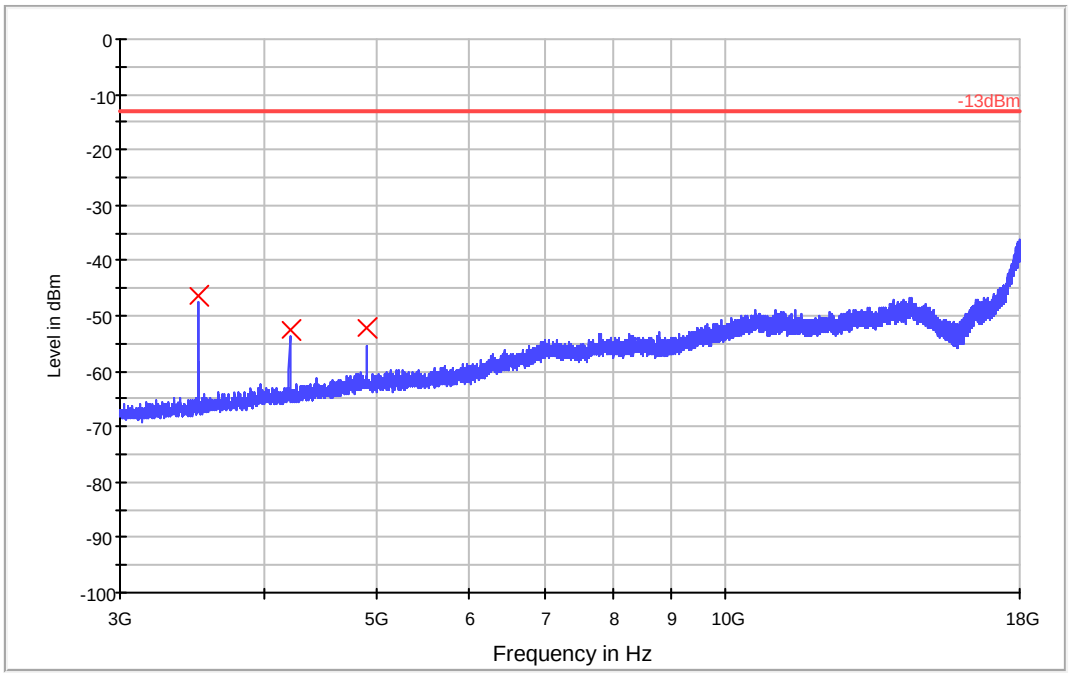
CHANNEL: HIGHEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

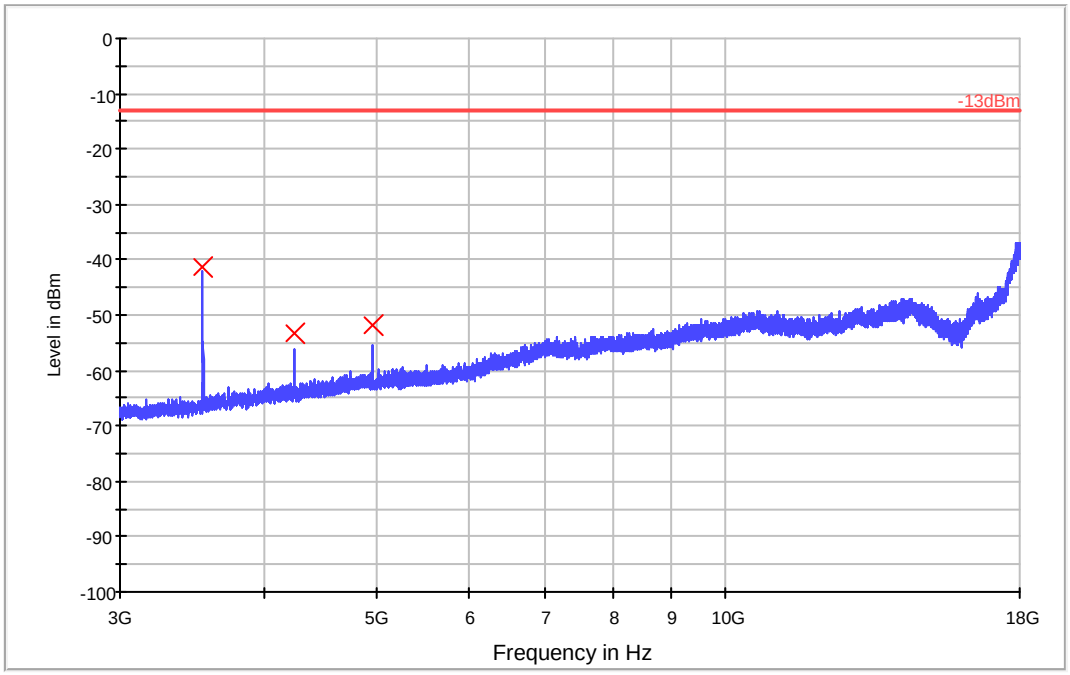
LTE QPSK MODULATION. BW=3 MHz. Band XII

CHANNEL: LOWEST



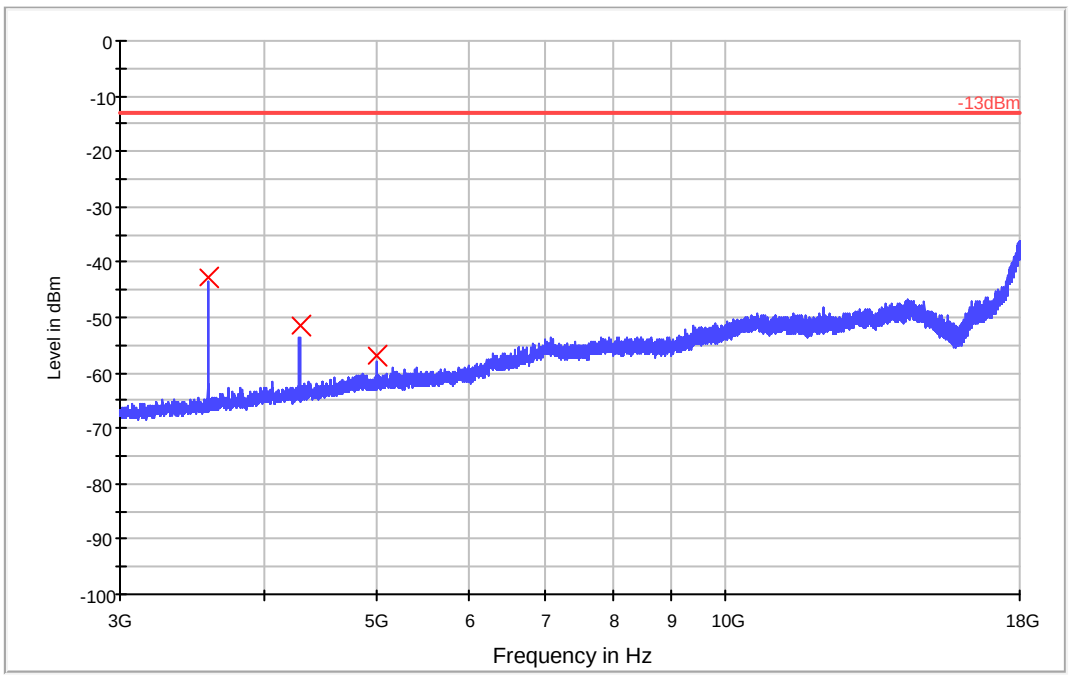
VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

CHANNEL: MIDDLE



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

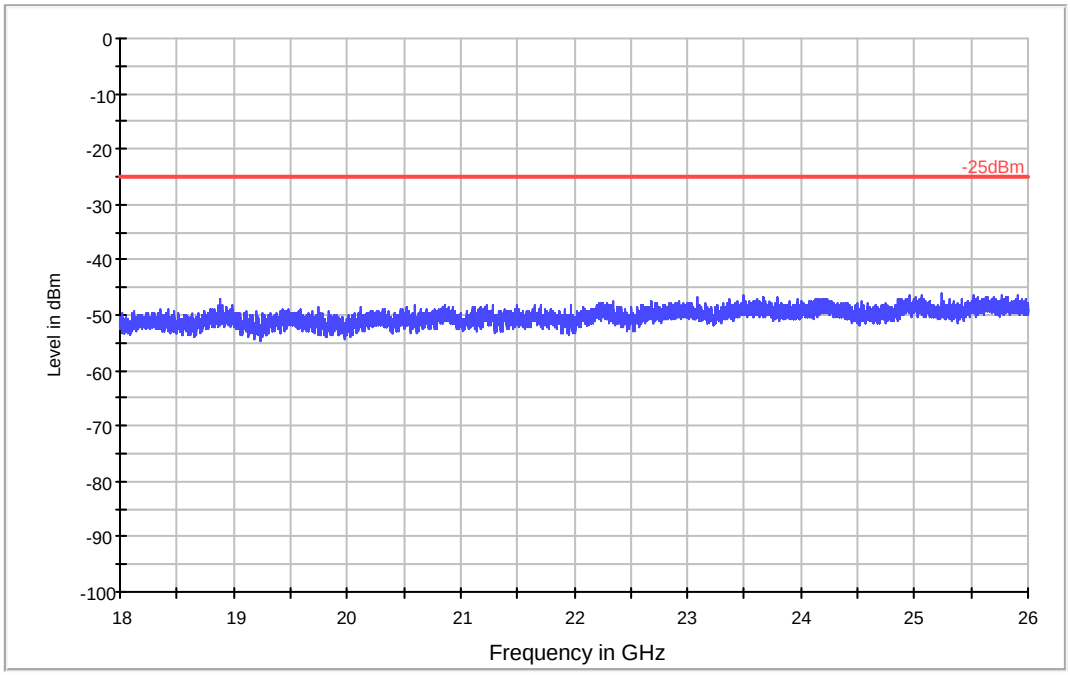
CHANNEL: HIGHEST



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

FREQUENCY RANGE 18 GHz to 26 GHz.

LTE QPSK MODULATION. BW=5 MHz. Band VII



VBW	RBW	SWT	Ref. Level	Preamp	Att.	Det.
1MHz	1MHz	1s	0dBm	35dB	0dB	Peak

(This plot is valid for all three channels)