FCC&IC TEST REPORT

FCC ID: 2BHAR-3-348-3472

IC: 32831-YQ3472

On Behalf of

Guiyang YongQing Intelligent Control Technology Co., Ltd

4.3-inch integrated T-BOX instrument

Model No.: YQ3.348.3472

Prepared for	:	Guiyang YongQing Intelligent Control Technology Co., Ltd
Address	:	NO.249 North Baiyun Road, Baiyun District, Guiyang City, Guizhou P.R. China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

Report Number	:	A2405185-C01-R02
Date of Receipt	:	May 21, 2024
Date of Test	:	May 21, 2024 – October 24, 2024
Date of Report	:	October 24, 2024
Version Number	:	V0
Test Result	**:**	**Pass**

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TEST REPORT DECLARATION

Applicant	:	Guiyang YongQing Intelligent Control Technology Co., Ltd
Address	:	NO.249 North Baiyun Road, Baiyun District, Guiyang City, Guizhou P.R. China
Manufacturer	:	Guiyang YongQing Intelligent Control Technology Co., Ltd
Address	:	NO.249 North Baiyun Road, Baiyun District, Guiyang City, Guizhou P.R. China
EUT Description	:	4.3-inch integrated T-BOX instrument
		(A) Model No. : YQ3.348.3472
		(B) Trademark : N/A

Measurement Standard Used:

FCC CFR Title 47 Part 2	**RSS-130 issue 2**
FCC CFR Title 47 Part 22 Subpart H	**RSS-132 issue 4**
FCC CFR Title 47 Part 24 Subpart E	**RSS-133 issue 6**
FCC CFR Title 47 Part 27	**RSS-139 Issue 4**
FCC CFR Title 47 Part 90	**RSS-140 issue 1**
	RSS-Gen Issue 5

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. To determine the maximum emission levels emanating from the device. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. Is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature)….....:	Yannis Wen Project Engineer	Yannis Wen
Approved by (name + signature)…….:	Jack Xu Project Manager	Jack Xu
Date of issue……..:	October 24, 2024	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	October 24, 2024	Initial released Issue	Yannis Wen

1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093 RSS-102	Pass*(Please refer to SAR Report)
RF Output Power	Part 2.1046 Part 22.913(a) (5) Part 24.232 © Part 27.50 (d)(4) Part 27.50 (h) Part 90.542 (d)(4) RSS-130 (4.6) RSS-132 (5.4) RSS-133 (6.4) RSS-139(6.5) RSS-140(4.3)	Pass
Peak-To-Average Ratio	Part 2.1046 Part 22.913(d) Part 24.232 (d) Part 27.50(d) RSS-130 (4.6) RSS-132 (5.4) RSS-133 (6.4) RSS-139(6.5) RSS-140(4.3)	Pass
Modulation Characteristics	Part 2.1047 RSS-130 (4.2) RSS-132 (5.2) RSS-133 (6.2) RSS-139(6.2) RSS-140	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 22.917 Part 24.238 Part 27.53(a) RSS-130 (4.1) RSS-132 (3.1) RSS-133 (3.1) RSS-139(3.1)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m) Part 90.543 (c)/(f) RSS-130 (4.7) RSS-132 (5.5) RSS-133 (6.5) RSS-139(6.6) RSS-140(4.4)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 22.917 (a) Part 24.238 (a) Part 27.53 (h)/(m) RSS-130 (4.7) RSS-132 (5.5) RSS-133 (6.5) RSS-139(6.6) RSS-140(4.4)	Pass
Emission Mask	Part 2.1051, Part 90.210(b)	Pass

Out of band emission, Band Edge	Part 22.917 (a) Part 24.238 (a) Part 27.53(h)/(m) Part 90.543(e)(2)(3) RSS-130 (4.7) RSS-132 (5.5) RSS-133 (6.5) RSS-139(6.6) RSS-140(4.4)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 90.213 RSS-130 (4.5) RSS-132 (5.3) RSS-133 (6.3) RSS-139(6.4) RSS-140(4.2)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 90.213 RSS-130 (4.5) RSS-132 (5.3) RSS-133 (6.3) RSS-139(6.4) RSS-140(4.2)	Pass

Note: 1. Pass: The EUT complies with the essential requirements in the standard.

2. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

2 General Information

2.1 General Description of EUT

Description of Device (EUT)

Description/PMN	:	4.3-inch integrated T-BOX instrument
Model Number/HVIN(s)	:	YQ3.348.3472
Diff	:	N/A
Test Voltage	:	DC 12V/24V from battery
Support Bands	:	LTE Band 2/4/5/12/13/14/66/71
Channel Bandwidth	:	LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 12: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 14: 5MHz, 10MHz LTE Band 66: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 71: 5MHz, 10MHz, 15MHz, 20MHz
TX Frequency	:	LTE Band 2: 1850 ~ 1910 MHz LTE Band 4: 1710 ~ 1755 MHz LTE Band 5: 824 ~ 849 MHz LTE Band 12: 699MHz ~ 716MHz LTE Band 13: 777MHz ~ 787MHz LTE Band 14: 788MHz ~ 798MHz LTE Band 66: 1710MHz ~ 1779.9MHz LTE Band 71: 663MHz ~ 697.9MHz
Modulation type	:	QPSK, 16QAM
Antenna Type	:	FPC antenna, LTE Band 2: Maximum Gain is 1.18dBi. LTE Band 4: Maximum Gain is 1.18dBi. LTE Band 5: Maximum Gain is 1.28dBi. LTE Band 12: Maximum Gain is 1.28dBi. LTE Band 13: Maximum Gain is 1.28dBi. LTE Band 14: Maximum Gain is 1.28dBi. LTE Band 66: Maximum Gain is 1.18dBi. LTE Band 71: Maximum Gain is 1.28dBi. (Antenna information is provided by applicant.) There is WWAN diversity antenna inside the product, which is only for receiving function.
Modulation Characteristics	:	Digital Modulation
Software version	:	V1.0
Hardware version	:	V1.0

Remark: The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 4G function, and there is no other transmitter involved.

2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules, Part 27 of the FCC CFR 47 Rules of the FCC CFR 47 Rules and RSS-130, RSS-132, RSS-133, RSS-139 and RSS-140 Rules.

2.3 Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 15, 2019 Certificated by IC
Registration Number: 12135A

CAB identifier: CN0085

2.4 Accessories of Device (EUT)

Accessories : /

Manufacturer : /

Model : /

Ratings : /

2.5 Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
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2.6 Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	98kPa

2.7 Measurement Uncertainty

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	1.63dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.74dB(Polarize: V)
	3.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31 dB(Polarize: V)
	4.30 dB(Polarize: H)
Uncertainty for radio frequency	5.06×10^{-8}GHz
Uncertainty for conducted RF Power	0.40dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

3 Test Instruments list

Equipment	Manufacture	Model No.	Firmware version	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	/	N/A	2022.05.18	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	2.3	102137	2024.08.08	1Year
Spectrum analyzer	Agilent	N9020A	A.14.16	MY499100060	2024.08.08	1Year
Receiver	ROHDE&SCHWARZ	ESR	2.28 SP1	1316.3003K03-102082-Wa	2024.08.08	1Year
Receiver	R&S	ESCI	4.42 SP1	101165	2024.08.08	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	/	VULB 9168#627	2023.08.28	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	/	2106	2023.08.19	2Year
Loop Antenna	SCHWARZBECK	FMZB 1519B	/	00128	2023.08.19	2Year
RF Cable	Resenberger	Cable 1	/	RE1	2024.08.08	1Year
RF Cable	Resenberger	Cable 2	/	RE2	2024.08.08	1Year
RF Cable	Resenberger	Cable 3	/	CE1	2024.08.08	1Year
Pre-amplifier	HP	HP8347A	/	2834A00455	2024.08.08	1Year
Pre-amplifier	Agilent	8449B	/	3008A02664	2024.08.08	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	/	8126-466	2024.08.08	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	101043	2024.08.08	1Year
Horn Antenna	SCHWARZBECK	BBHA 9170	/	00946	2023.08.19	2Year
Preamplifier	SKET	LNPA_1840-50	/	SK2018101801	2024.08.08	1 Year
Power Meter	Agilent	E9300A	/	MY41496628	2024.08.08	1 Year
Power Sensor	DARE	RPR3006W	/	15100041SNO91	2024.08.08	1 Year
Electronic Thermo-Hygrometer	S.H.Qixiang	HTC-1	/	N/A	2024.08.11	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	/	20140927-6	2024.08.08	1 Year
Adjustable attenuator	MWRFtest	N/A	/	N/A	N/A	N/A
10dB Attenuator	Mini-Circuits	DC-6G	/	N/A	N/A	N/A

Software Information			
Test Item	Software Name	Manufacturer	Version
RE	EZ-EMC	EZ	Alpha-3A1
CE	EZ-EMC	EZ	Alpha-3A1
RF-CE	MTS 8310	MW	V2.0.0.0

4 System test configuration

4.1 Test mode

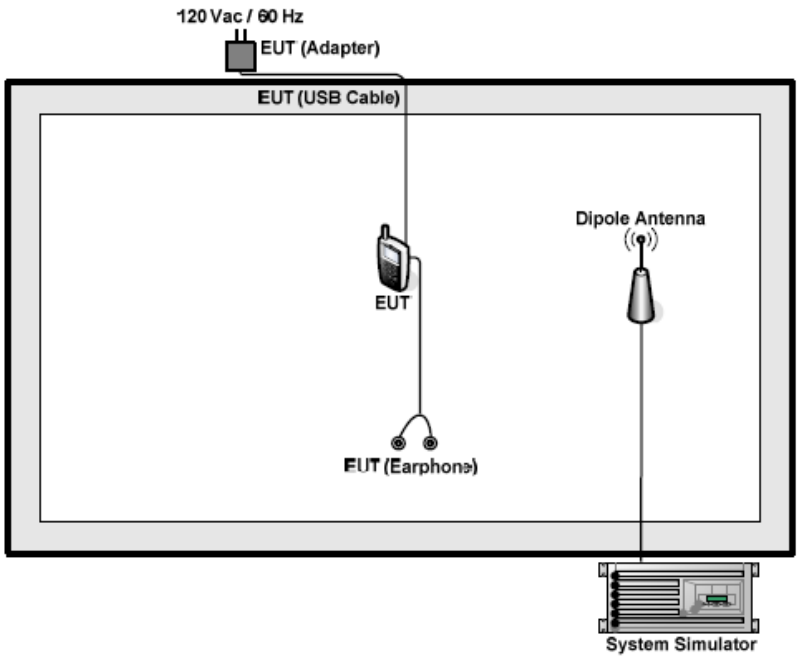
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
LTE Band 2	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 4	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 5	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 12	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 13	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 14	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 66	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 71	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link

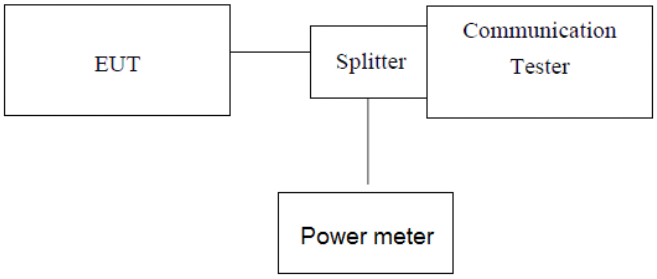
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

4.2 Configuration of Tested System



4.3 Conducted Output Power

Test Requirement:	FCC part22.913(a) (5), FCC part24.232(b) and FCC Part 27.50 (d)(4)/(h) RSS-130 (4.6), RSS-133 (6.4), RSS-139(6.5) and RSS-140(4.3)
Test Method:	ANSI C63.26:2015
Limit:	LTE Band 2: 2W LTE Band 4: 1W LTE Band 5: 7W LTE Band 12: 3W LTE Band 13: 3W LTE Band 14: 3W LTE Band 66: 1W LTE Band 71: 3W
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

LTE Band2

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				18607/1850.7	18900/1880	19193/1909.3
1.4MHz	QPSK	1	0	23.23	23.46	23.44
			2	23.53	23.62	23.48
			5	23.60	23.69	23.40
		3	0	23.44	23.38	23.65
			2	23.43	23.34	23.63
			3	23.56	23.21	23.45
		6	0	23.68	23.38	23.35
	QAM16	1	0	23.12	22.90	22.95
			2	23.39	22.92	22.91
			5	23.16	23.14	22.96
		3	0	23.38	23.27	23.31
			2	22.97	23.07	23.26
			3	23.20	23.24	23.03
		6	0	23.38	22.96	22.93

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				18615/1851.5	18900/1880	19185/1908.5
3MHz	QPSK	1	0	24.04	24.26	24.41
			7	24.51	24.55	24.52
			14	24.44	24.53	23.97
		8	0	24.32	24.17	24.12
			4	24.49	24.36	23.94
			7	24.06	24.12	24.32
		15	0	24.25	24.43	24.31
	QAM16	1	0	23.94	23.82	23.47
			7	23.99	23.76	23.48
			14	23.68	23.99	23.88
		8	0	23.72	23.45	23.84
			4	23.69	23.46	23.64
			7	23.64	23.58	23.74
		15	0	23.52	23.38	23.90

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				18625/1852.5	18900/1880	19175/1907.5
5MHz	QPSK	1	0	24.49	24.77	24.57
			13	24.78	24.50	24.82
			24	24.87	24.71	25.18
		12	0	24.26	24.85	24.80
			6	24.28	24.70	24.60
			13	24.71	24.85	24.57
		25	0	24.73	24.47	24.69
	QAM16	1	0	23.25	23.37	23.40
			13	23.34	23.27	23.52
			24	23.23	23.78	23.69
		12	0	23.38	23.48	23.75
			6	23.44	23.77	23.42
			13	23.60	23.48	23.77
		25	0	23.23	23.67	23.19

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				18650/1855	18900/1880	19150/1905
10MHz	QPSK	1	0	23.91	23.42	23.44
			25	23.83	24.00	24.00
			49	23.66	23.50	23.76
		25	0	24.14	23.89	23.76
			13	23.95	23.78	23.55
			25	24.29	24.00	23.81
		50	0	24.03	23.99	23.94
	QAM16	1	0	23.28	23.84	23.13
			25	23.12	23.16	23.79
			49	23.18	23.12	23.31
		25	0	23.89	23.70	23.62
			13	23.43	23.66	23.17
			25	23.43	23.84	23.15
		50	0	23.60	23.20	23.26

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				18675/1857.5	18900/1880	19125/1902.5
15MHz	QPSK	1	0	23.98	23.34	24.08
			38	23.81	23.68	23.47
			74	23.30	23.43	23.56
		36	0	23.44	23.86	23.55
			18	23.39	23.37	23.39
			39	24.05	23.64	23.59
		75	0	23.78	23.84	23.30
	QAM16	1	0	22.89	22.31	22.36
			38	22.32	22.31	22.70
			74	22.43	23.02	22.47
		36	0	22.28	22.94	22.61
			18	23.07	22.78	22.76
			39	22.62	22.33	23.01
		75	0	22.64	22.55	22.41

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				18700/1860	18900/1880	19100/1900
20MHz	QPSK	1	0	22.42	22.31	22.08
			50	21.84	22.28	22.48
			99	22.23	21.85	21.90
		50	0	22.49	22.03	22.04
			25	22.02	22.32	22.05
			50	21.72	21.77	22.05
		100	0	21.88	22.13	21.72
	QAM16	1	0	22.41	22.18	22.30
			50	22.10	22.21	22.14
			99	22.45	22.10	22.21
		50	0	22.04	22.50	22.66
			25	22.79	22.22	22.59
			50	22.53	22.68	22.27
		100	0	22.54	22.70	22.79

LTE Band4

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				19957/1710.7	20175/1732.5	20393/1754.3
1.4MHz	QPSK	1	0	22.35	21.84	21.80
			2	22.56	21.56	22.09
			5	22.08	22.03	22.06
		3	0	22.98	21.86	21.75
			2	22.92	22.26	22.24
			3	22.40	22.43	22.11
		6	0	21.48	20.70	21.58
	QAM16	1	0	21.54	21.67	20.74
			2	21.88	21.19	21.23
			5	21.60	21.16	21.19
		3	0	22.52	22.02	22.06
			2	22.76	21.62	22.16
			3	22.66	22.15	22.36
		6	0	21.83	21.81	21.63

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				19965/1711.5	20175/1732.5	20385/1753.5
3MHz	QPSK	1	0	22.87	22.13	22.24
			7	22.59	21.90	22.12
			14	22.66	22.16	22.11
		8	0	22.66	21.82	21.84
			4	22.53	21.99	22.18
			7	22.80	22.24	22.21
		15	0	21.56	20.85	21.33
	QAM16	1	0	22.39	21.80	21.80
			7	22.26	21.54	21.67
			14	22.39	21.84	21.70
		8	0	22.29	21.88	22.01
			4	22.17	21.81	21.98
			7	22.46	21.51	21.88
		15	0	21.10	21.44	22.18

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				19975/1712.5	20175/1732.5	20375/1752.5
5MHz	QPSK	1	0	22.81	22.21	22.26
			13	22.94	22.11	22.12
			24	22.53	22.39	22.26
		12	0	22.14	21.00	21.28
			6	21.44	21.00	21.87
			13	21.93	21.03	21.00
		25	0	21.81	22.08	21.40
	QAM16	1	0	21.48	21.09	21.58
			13	21.66	20.81	21.37
			24	21.75	21.12	21.40
		12	0	22.00	21.22	21.30
			6	21.89	21.14	21.49
			13	21.75	21.43	21.08
		25	0	22.07	21.10	21.55

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20000/1715	20175/1732.5	20350/1750
10MHz	QPSK	1	0	22.57	21.43	21.80
			25	22.32	21.71	22.24
			49	22.33	22.03	21.76
		25	0	21.85	21.25	21.84
			13	21.12	21.27	20.76
			25	21.47	22.50	21.09
		50	0	21.72	21.05	21.35
	QAM16	1	0	22.45	21.14	22.02
			25	22.60	21.83	21.57
			49	22.07	21.39	21.48
		25	0	21.22	21.90	21.51
			13	21.63	22.01	21.15
			25	21.95	21.80	21.31
		50	0	21.74	21.08	21.39

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20025/1717.5	20175/1732.5	20325/1747.5
15MHz	QPSK	1	0	22.52	21.89	21.74
			38	22.60	21.55	21.84
			74	22.14	22.12	21.35
		36	0	21.81	21.31	21.52
			18	21.81	21.04	21.58
			39	21.72	21.29	21.01
		75	0	21.60	22.48	21.22
	QAM16	1	0	22.14	21.73	21.63
			38	22.08	21.39	22.25
			74	22.25	21.51	21.81
		36	0	21.13	21.12	21.99
			18	21.69	21.16	22.18
			39	21.65	21.72	21.73
		75	0	21.59	22.08	21.77

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20050/1720	20175/1732.5	20300/1745
20MHz	QPSK	1	0	22.68	21.89	22.15
			50	22.65	22.10	22.59
			99	22.67	22.23	21.87
		50	0	21.78	21.53	21.47
			25	21.99	21.40	21.82
			50	21.80	21.99	21.55
		100	0	21.98	20.79	21.35
	QAM16	1	0	21.63	21.73	21.66
			50	22.06	21.87	21.85
			99	21.40	21.24	21.15
		50	0	21.19	21.30	21.76
			25	21.72	21.45	21.29
			50	21.65	21.99	21.52
		100	0	21.80	21.12	21.28

LTE Band5

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20417/824.7	20530/837	20643/848.3
1.4MHz	QPSK	1	0	22.33	21.92	22.32
			2	22.20	22.29	22.00
			5	22.12	22.17	22.26
		3	0	22.30	22.06	22.06
			2	22.21	22.22	21.93
			3	22.17	22.24	22.08
		6	0	22.37	22.30	22.04
	QAM16	1	0	22.09	22.08	22.06
			2	22.31	22.18	22.21
			5	22.33	22.06	22.19
		3	0	22.10	22.19	22.30
			2	22.44	22.42	22.15
			3	22.10	22.21	22.18
		6	0	22.00	22.02	22.31

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20425/826.5	20530/837	20635/847.5
3MHz	QPSK	1	0	21.78	21.66	21.39
			7	21.13	21.42	21.17
			14	21.53	21.74	21.34
		8	0	21.57	21.49	21.65
			4	21.68	21.30	21.35
			7	21.66	21.38	21.45
		15	0	21.73	21.14	21.69
	QAM16	1	0	21.05	21.08	21.00
			7	21.48	20.91	21.06
			14	21.49	21.01	21.03
		8	0	21.05	21.88	21.08
			4	22.51	21.09	21.09
			7	21.88	21.08	21.40
		15	0	21.09	21.26	21.89

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20435/827.5	20530/837	20625/846.5
5MHz	QPSK	1	0	22.29	22.44	22.42
			13	22.31	22.55	22.28
			24	22.79	22.62	22.23
		12	0	22.87	22.41	22.59
			6	22.48	22.61	22.67
			13	22.22	22.35	22.48
		25	0	22.43	22.76	22.56
	QAM16	1	0	21.71	21.07	21.52
			13	21.96	22.08	21.35
			24	21.04	21.09	21.42
		12	0	21.72	21.19	21.13
			6	21.09	21.28	21.31
			13	21.88	22.07	21.73
		25	0	21.11	21.16	21.31

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				20460/830	20530/837	20600/844
10MHz	QPSK	1	0	22.51	22.22	22.09
			25	22.25	22.27	22.22
			49	22.09	22.22	22.33
		25	0	21.99	22.17	22.27
			13	22.07	22.25	22.55
			25	21.98	22.47	22.43
		50	0	22.28	22.79	22.19
	QAM16	1	0	21.88	22.02	22.27
			25	21.83	21.80	21.82
			49	22.21	21.60	22.27
		25	0	22.25	22.03	21.76
			13	21.82	22.27	21.72
			25	22.18	22.24	21.94
		50	0	22.13	22.11	22.30

LTE Band12

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23017/699.7	23095/707.5	23173/715.3
1.4MHz	QPSK	1	0	23.77	23.91	23.10
			2	23.48	23.39	23.04
			5	23.45	23.96	23.43
		3	0	24.00	23.55	23.74
			2	23.85	23.99	23.25
			3	23.87	23.49	23.33
		6	0	22.91	22.29	22.48
	QAM16	1	0	22.92	23.15	22.73
			2	22.39	22.74	22.82
			5	22.35	23.16	22.73
		3	0	23.53	23.95	23.60
			2	23.82	23.49	23.21
			3	23.58	23.89	23.38
		6	0	22.85	22.65	22.40

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23025/700.5	23095/707.5	23165/714.5
3MHz	QPSK	1	0	23.31	23.57	23.43
			7	23.85	23.59	23.33
			14	23.19	23.57	23.80
		8	0	23.72	23.71	23.37
			4	23.35	23.55	23.65
			7	23.39	24.00	23.42
		15	0	22.60	22.48	22.61
	QAM16	1	0	23.52	23.49	23.22
			7	23.38	22.96	23.32
			14	22.96	23.01	23.38
		8	0	23.33	23.37	23.35
			4	23.26	22.99	22.74
			7	22.88	23.44	22.93
		15	0	22.41	23.09	22.72

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23035/701.5	23095/707.5	23155/713.5
5MHz	QPSK	1	0	23.75	23.98	23.12
			13	23.49	23.54	23.35
			24	23.38	23.52	23.10
		12	0	23.05	22.83	22.43
			6	22.81	23.00	22.55
			13	22.63	23.23	22.76
		25	0	22.57	22.75	22.35
	QAM16	1	0	22.89	22.66	22.58
			13	22.95	22.72	22.62
			24	23.00	23.15	22.46
		12	0	22.68	22.67	22.69
			6	22.80	23.12	22.56
			13	22.57	22.69	22.48
		25	0	22.66	23.00	22.73

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23035/701.5	23095/707.5	23155/713.5
10MHz	QPSK	1	0	23.90	23.80	23.28
			25	23.71	23.89	23.83
			49	23.54	24.01	23.31
		25	0	22.57	22.61	22.75
			13	22.47	22.85	22.44
			25	22.56	22.87	22.73
		50	0	22.71	22.96	22.81
	QAM16	1	0	23.52	23.34	23.33
			25	23.18	23.61	23.18
			49	23.15	23.32	23.27
		25	0	22.54	23.04	22.97
			13	22.83	22.69	22.78
			25	22.65	22.91	22.61
		50	0	22.55	22.89	22.56

LTE Band13

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23205/779.5	23230/782	23255/784.5
5MHz	QPSK	1	0	22.26	22.44	22.39
			13	22.28	22.46	22.06
			24	22.15	22.04	22.34
		12	0	21.21	21.24	21.49
			6	21.36	21.22	21.44
			13	21.17	21.32	21.63
		25	0	21.37	21.31	21.62
	QAM16	1	0	21.57	21.38	21.63
			13	21.42	21.36	21.67
			24	21.44	21.26	21.52
		12	0	21.11	21.18	21.49
			6	21.10	21.38	21.53
			13	21.17	21.45	21.27
		25	0	21.28	21.15	21.48

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23230/782	23230/782	23230/782
10MHz	QPSK	1	0	22.44	22.45	22.27
			25	22.70	22.73	22.32
			49	22.71	22.52	22.82
		25	0	21.11	21.77	21.26
			13	21.36	21.67	21.27
			25	21.60	21.76	21.50
		50	0	21.13	21.21	21.76
	QAM16	1	0	21.82	21.90	22.19
			25	21.91	22.27	21.96
			49	22.08	22.35	22.33
		25	0	21.17	21.54	21.41
			13	21.73	21.71	21.67
			25	21.46	21.69	21.63
		50	0	21.09	21.93	21.37

LTE Band14

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23305/790.5	23330/793	23355/795.5
5MHz	QPSK	1	0	22.23	22.33	22.34
			13	22.33	22.56	22.70
			24	22.54	22.14	22.25
		12	0	21.16	21.69	21.37
			6	21.49	21.58	21.74
			13	21.30	21.55	21.52
		25	0	21.51	21.41	21.96
	QAM16	1	0	21.17	21.50	21.96
			13	21.09	21.48	21.74
			24	21.28	21.64	21.79
		12	0	21.55	21.73	21.96
			6	21.18	21.40	21.62
			13	21.22	21.26	21.44
		25	0	21.24	21.72	21.43

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				23330/793	23330/793	23330/793
10MHz	QPSK	1	0	22.20	22.28	22.36
			25	22.38	22.72	22.65
			49	22.69	22.88	22.46
		25	0	21.72	21.37	22.11
			13	21.64	21.95	22.01
			25	21.42	21.67	21.66
		50	0	21.59	21.61	21.76
	QAM16	1	0	22.09	21.86	22.49
			25	22.24	22.38	22.11
			49	22.38	22.38	22.61
		25	0	21.47	21.56	21.56
			13	21.45	21.53	22.01
			25	21.64	21.41	21.72
		50	0	21.30	21.83	21.74

LTE Band66

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				131979/1710.7	132322/1745	132665/1779.3
1.4MHz	QPSK	1	0	22.14	22.03	22.21
			2	22.18	22.72	22.79
			5	22.54	23.04	22.23
		3	0	21.56	21.56	21.97
			2	21.71	21.75	21.80
			3	21.33	21.62	21.79
		6	0	21.73	21.79	21.56
	QAM16	1	0	21.97	21.88	22.23
			2	22.22	22.28	21.83
			5	22.35	22.48	22.75
		3	0	21.64	21.27	21.61
			2	21.59	21.69	21.83
			3	21.67	21.12	21.74
		6	0	21.30	21.65	21.92

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				131987/1711.5	132322/1745	132657/1778.5
3MHz	QPSK	1	0	21.96	22.51	22.39
			7	22.74	22.44	22.36
			14	22.53	22.84	22.69
		8	0	21.99	21.42	22.02
			4	21.72	21.67	21.95
			7	21.41	21.58	21.53
		15	0	21.80	21.36	21.91
	QAM16	1	0	21.80	22.15	22.72
			7	22.11	22.45	22.23
			14	22.43	22.35	23.01
		8	0	21.20	21.33	21.35
			4	21.80	21.56	21.95
			7	21.51	21.25	21.84
		15	0	21.21	22.11	22.09

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				131997/1712.5	132322/1745	132647/1777.5
5MHz	QPSK	1	0	21.68	22.53	22.00
			13	21.73	22.61	22.09
			24	21.99	22.06	21.98
		12	0	20.67	21.23	21.11
			6	21.27	21.70	21.17
			13	21.13	21.46	21.22
		25	0	21.31	21.34	21.52
	QAM16	1	0	21.11	21.20	21.16
			13	21.05	21.43	21.35
			24	21.26	21.39	21.47
		12	0	21.54	22.18	21.47
			6	22.16	21.86	21.35
			13	22.19	21.58	21.27
		25	0	21.20	21.77	21.34

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				132022/1715	132322/1745	132622/1775
10MHz	QPSK	1	0	22.48	22.50	22.28
			25	22.02	22.81	22.03
			49	22.39	22.59	22.27
		25	0	21.99	21.11	21.30
			13	21.25	21.54	20.83
			25	21.40	21.36	21.03
		50	0	22.05	21.75	21.69
	QAM16	1	0	21.49	21.88	22.37
			25	21.55	22.18	21.97
			49	21.54	21.88	22.22
		25	0	21.92	21.02	22.08
			13	21.58	21.03	21.00
			25	21.77	21.69	21.17
		50	0	22.07	21.82	22.81

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				132047/1717.5	132322/1745	132597/1772.5
15MHz	QPSK	1	0	22.25	22.12	22.39
			38	22.38	22.42	22.68
			74	22.48	22.63	22.45
		36	0	21.67	21.14	21.82
			18	21.47	21.97	22.16
			39	21.43	21.51	21.49
		75	0	21.69	21.40	21.48
	QAM16	1	0	21.81	21.86	22.67
			38	22.09	22.17	21.89
			74	22.58	22.46	22.41
		36	0	21.20	21.54	21.73
			18	21.21	21.26	21.94
			39	21.39	21.26	21.55
		75	0	21.20	21.81	21.68

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				132072/1720	132322/1745	132572/1770
20MHz	QPSK	1	0	22.18	22.23	22.68
			50	22.69	22.90	22.38
			99	22.39	22.70	22.64
		50	0	22.02	21.26	22.33
			25	21.87	21.87	22.30
			50	21.31	21.52	21.39
		100	0	21.33	21.81	21.85
	QAM16	1	0	22.44	21.75	22.42
			50	22.30	22.22	22.43
			99	22.73	22.28	22.87
		50	0	21.18	21.85	21.37
			25	21.21	21.71	21.90
			50	21.82	21.28	21.70
		100	0	21.05	22.15	21.48

LTE Band71

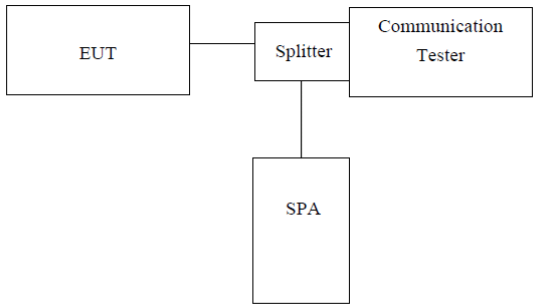
Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				133122/665.5	133297/680.5	133447/695.5
5MHz	QPSK	1	0	21.97	22.12	22.27
			13	22.05	21.91	22.14
			24	22.22	22.16	22.35
		12	0	21.11	20.68	21.43
			6	21.36	20.94	21.52
			13	21.33	21.11	21.23
		25	0	21.17	21.41	21.46
	QAM16	1	0	21.97	21.01	21.03
			13	21.20	21.32	21.41
			24	21.57	21.34	21.22
		12	0	22.01	21.24	21.46
			6	21.55	21.54	21.63
			13	21.32	21.60	21.19
		25	0	21.19	21.07	21.43

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				133172/668	133297/680.5	133422/693
10MHz	QPSK	1	0	22.22	22.22	21.94
			25	22.87	22.80	22.34
			49	22.21	22.64	22.62
		25	0	21.12	21.87	20.87
			13	21.14	21.55	20.98
			25	21.58	21.82	21.21
		50	0	21.18	21.06	21.13
	QAM16	1	0	21.55	21.66	21.68
			25	21.50	21.73	22.14
			49	21.52	21.86	22.49
		25	0	21.32	21.37	21.30
			13	21.61	21.71	21.64
			25	21.53	21.72	21.45
		50	0	21.06	21.74	21.13

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				133197/670.5	133297/680.5	133397/690.5
15MHz	QPSK	1	0	21.92	22.05	22.56
			38	22.36	22.73	22.59
			74	22.61	22.59	22.49
		36	0	21.75	21.41	22.07
			18	21.69	21.92	21.91
			39	21.18	21.41	21.70
		75	0	21.67	21.52	21.86
	QAM16	1	0	21.94	21.93	22.58
			38	22.26	22.23	22.14
			74	22.43	22.45	22.61
		36	0	21.37	21.40	21.70
			18	21.21	21.28	21.73
			39	21.45	21.49	21.67
		75	0	21.00	21.73	21.45

Bandwidth	Modulation	RB size	RB offset	Output Power (dBm) for low/mid/high channel		
				133222/673	133297/680.5	133372/688
20MHz	QPSK	1	0	22.33	22.48	22.47
			50	22.27	22.86	22.90
			99	22.84	23.24	22.81
		50	0	21.88	21.61	22.30
			25	22.00	21.99	22.27
			50	21.72	21.71	21.94
		100	0	21.82	21.96	21.74
	QAM16	1	0	22.48	22.09	22.56
			50	22.03	22.10	22.08
			99	22.48	22.73	22.69
		50	0	21.76	21.41	21.61
			25	21.50	21.55	21.73
			50	21.89	21.35	21.92
		100	0	21.10	21.87	21.55

4.4 Peak-to-Average Ratio

Test Requirement:	Part 22.913(d), FCC part24.232(d) and FCC part27.50(d)(5) RSS-130 (4.6), RSS-133 (6.4), RSS-139(6.5) and RSS-140(4.3)
Test Method:	ANSI C63.26:2015
Test Limit:	Used complementary cumulative distribution function (CCDF) of analyzer to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7 2. The EUT was connected to spectrum and system simulator via a power divider 3. Using the CCDF measurement of spectrum analyzer; 4. Set RBW≥OBW or specified reference bandwidth; 5. Set the number of counts to a value that stabilizes the measured CCDF curve; 6. Set the measurement interval as 1ms 7. Record the maximum PAPR level associated with a probability of 0.1%.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

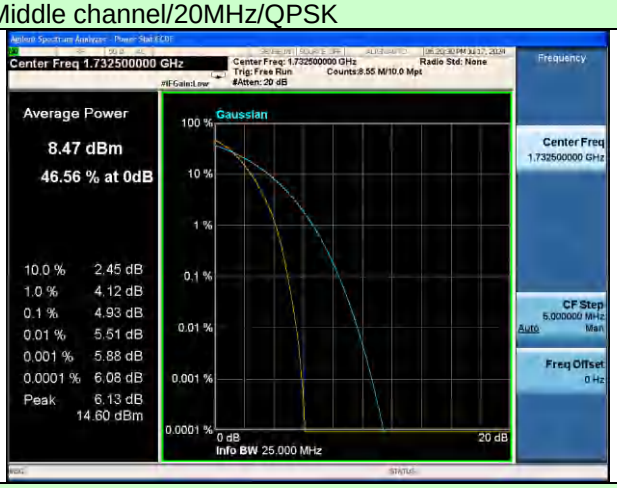
Test plots are listed as below:

Test mode	Peak to Average Ratio (dB)	Limit (dB)	Result
LTE Band 2 Middle channel/20MHz/QPSK	5.31	13	Pass
LTE Band 2 Middle channel/20MHz/16-QAM	5.28	13	Pass
LTE Band 4 Middle channel/20MHz/QPSK	4.93	13	Pass
LTE Band 4 Middle channel/20MHz/16-QAM	5.74	13	Pass
LTE Band 5 Middle channel/10MHz/QPSK	4.44	13	Pass
LTE Band 5 Middle channel/10MHz/16-QAM	5.38	13	Pass
LTE Band 12 Middle channel/10MHz/QPSK	4.81	13	Pass
LTE Band 12 Middle channel/10MHz/16-QAM	5.79	13	Pass
LTE Band 13 Middle channel/10MHz/QPSK	4.47	13	Pass
LTE Band 13 Middle channel/10MHz/16-QAM	5.34	13	Pass
LTE Band 14 Middle channel/10MHz/QPSK	4.70	13	Pass
LTE Band 14 Middle channel/10MHz/16-QAM	5.68	13	Pass
LTE Band 66 Middle channel/20MHz/QPSK	5.6	13	Pass
LTE Band 66 Middle channel/20MHz/16-QAM	5.61	13	Pass
LTE Band 71 Middle channel/20MHz/QPSK	5.59	13	Pass
LTE Band 71 Middle channel/20MHz/16-QAM	5.61	13	Pass

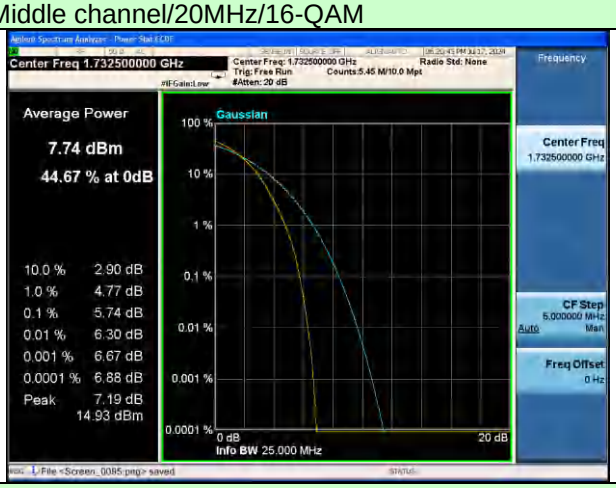
Test Mode: LTE Band 2
Middle channel/20MHz/QPSK

Test Mode: LTE Band 2
Middle channel/20MHz/16-QAM

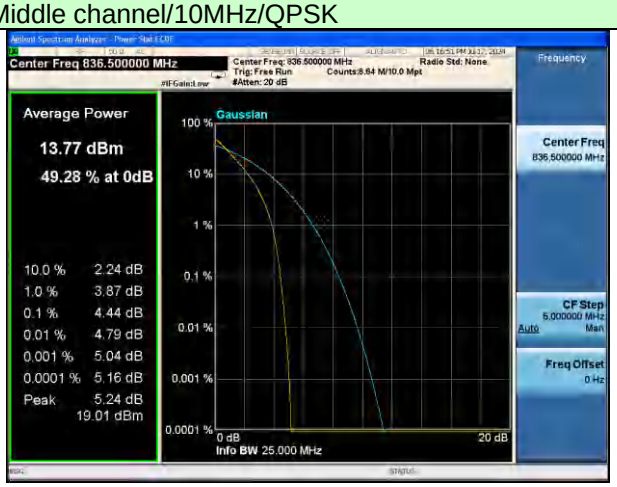
Test Mode: LTE Band 4
Middle channel/20MHz/QPSK



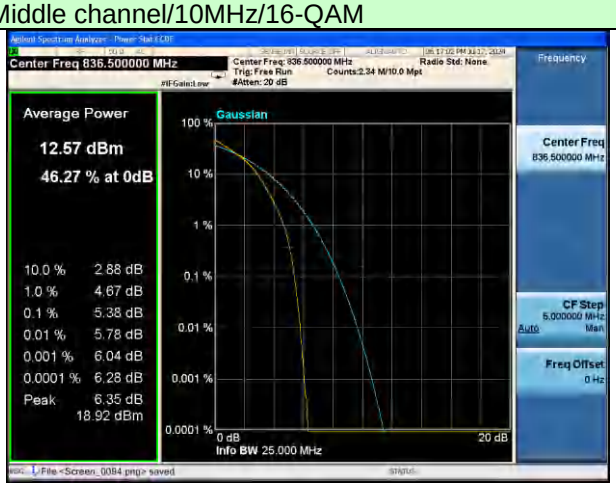
Test Mode: LTE Band 4
Middle channel/20MHz/16-QAM



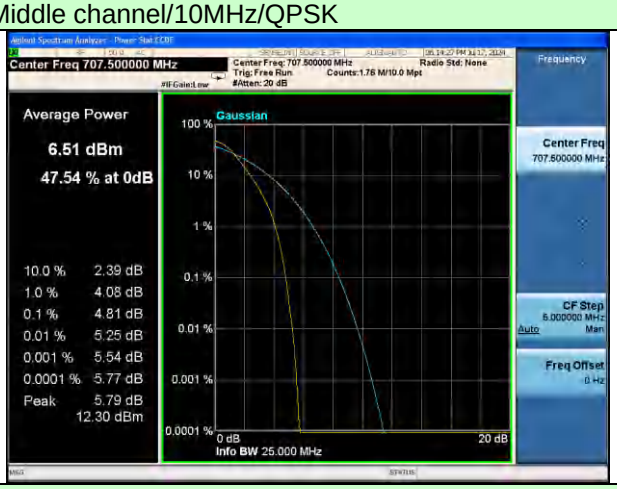
Test Mode: LTE Band 5
Middle channel/10MHz/QPSK



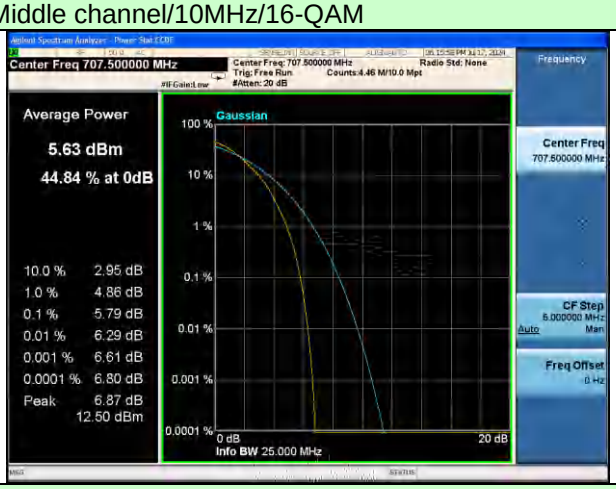
Test Mode: LTE Band 5
Middle channel/10MHz/16-QAM



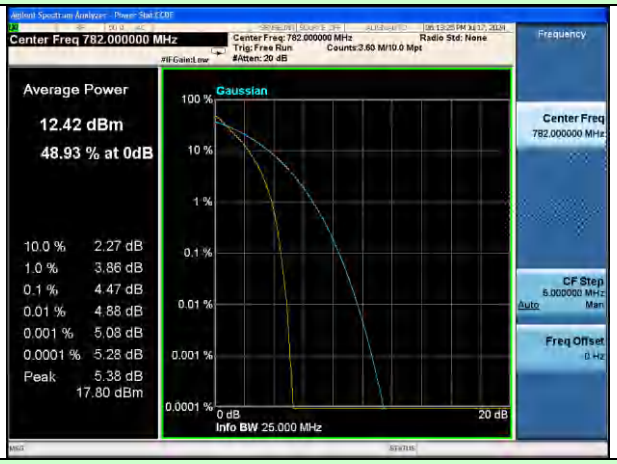
Test Mode: LTE Band 12
Middle channel/10MHz/QPSK



Test Mode: LTE Band 12
Middle channel/10MHz/16-QAM



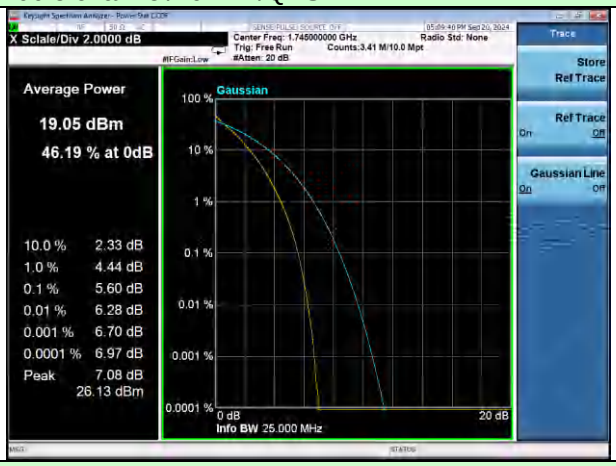
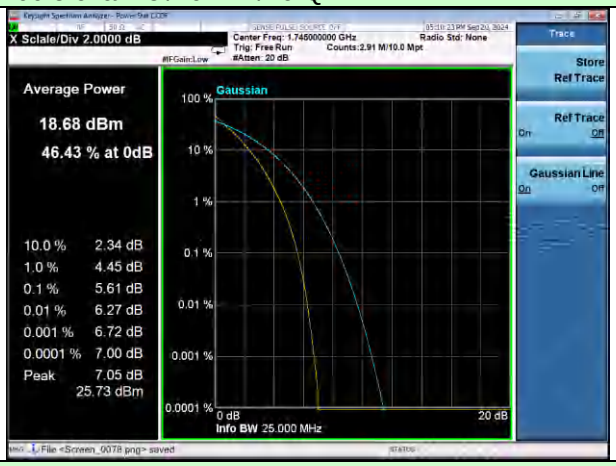
Test Mode: LTE Band 13
Middle channel/10MHz/QPSK



Test Mode: LTE Band 13
Middle channel/10MHz/16-QAM

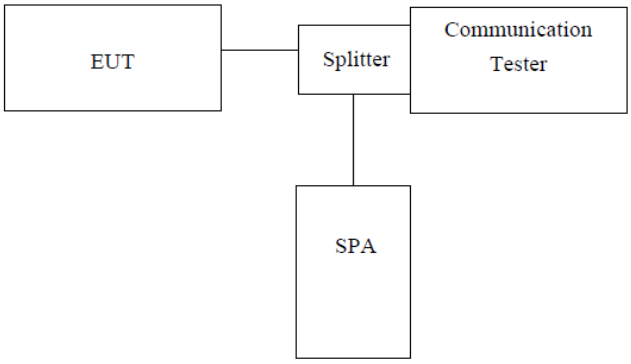
Test Mode: LTE Band 14
Middle channel/10MHz/QPSK

Test Mode: LTE Band 14
Middle channel/10MHz/16-QAM

Test Mode: LTE Band 66 Middle channel/10MHz/QPSK	Test Mode: LTE Band 66 Middle channel/10MHz/16-QAM
	
Test Mode: LTE Band 71 Middle channel/10MHz/QPSK	Test Mode: LTE Band 71 Middle channel/10MHz/16-QAM

Note: All bandwidth and modulation are tested, only the worst results are reported.

4.5 Occupy Bandwidth

Test Requirement:	FCC part22.913(a), FCC part24.232(b) and FCC part27.53(a), FCC part 90.209, RSS-130 (4.1), RSS-132 (3.1), RSS-133 (3.1), RSS-139(3.1)
Test Method:	ANSI C63.26:2015
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer, set center frequency to channel center frequency. 2. RBW was set to about 1%-5% of emission OBW, VBW≥ 3 X RBW. 3. Set spectrum analyzer detection mode to peak, and the trace mode to max hold. 4. Use the 99% OBW function, The 99% power OBW can be found on the plot, determine the "-26dB amplitude" as equal to reference value -26dB.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

Band2						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	18900	1880	1.1010	1.309
		3	18900	1880	2.7396	3.060
		5	18900	1880	4.5242	5.028
		10	18900	1880	8.9308	9.671
		15	18900	1880	13.604	15.13
		20	18900	1880	17.997	19.46
	QAM16	1.4	18900	1880	1.0969	1.303
		3	18900	1880	2.7434	3.033
		5	18900	1880	4.5126	5.009
		10	18900	1880	8.9294	9.683
		15	18900	1880	13.594	15.12
		20	18900	1880	17.991	19.44

Band4						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20175	1732.5	1.0959	1.294
		3	20175	1732.5	2.7576	3.081
		5	20175	1732.5	4.5004	5.004
		10	20175	1732.5	8.9252	9.660
		15	20175	1732.5	13.534	14.94
		20	20175	1732.5	17.951	19.50
	QAM16	1.4	20175	1732.5	1.0945	1.277
		3	20175	1732.5	2.7381	3.083
		5	20175	1732.5	4.4981	5.005
		10	20175	1732.5	8.9287	9.613
		15	20175	1732.5	13.541	14.88
		20	20175	1732.5	17.957	19.44

Band5						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	20530	837	1.1003	1.308
		3	20530	837	2.7295	3.048
		5	20530	837	4.4999	5.018
		10	20530	837	8.9123	9.612
	QAM16	1.4	20530	837	1.1007	1.311
		3	20530	837	2.7304	3.025
		5	20530	837	4.4976	4.972
		10	20530	837	8.9162	9.659

Band12						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	23095	707.5	1.0965	1.294
		3	23095	707.5	2.7535	3.058
		5	23095	707.5	4.4832	4.906
		10	23095	707.5	8.8761	9.578
	QAM16	1.4	23095	707.5	1.0954	1.290
		3	23095	707.5	2.7275	3.039
		5	23095	707.5	4.4890	4.934
		10	23095	707.5	8.8862	9.533

Band13						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23230	782	4.4984	4.989
		10	23230	782	8.9210	9.499
	QAM16	5	23230	782	4.5040	4.951
		10	23230	782	8.9057	9.526

Band14						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	5	23790	793	4.4949	4.980
		10	23790	793	8.9369	9.607
	QAM16	5	23790	793	4.4904	4.928
		10	23790	793	8.9237	9.653

Band66						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
100%	QPSK	1.4	132322	1745	1.1024	1.308
		3	132322	1745	2.7258	3.121
		5	132322	1745	4.4870	4.916
		10	132322	1745	8.9357	9.544
		15	132322	1745	13.539	14.84
		20	132322	1745	17.968	19.38
	QAM16	1.4	132322	1745	1.1026	1.308
		3	132322	1745	2.7217	2.993
		5	132322	1745	4.4861	4.912
		10	132322	1745	8.9370	9.521
		15	132322	1745	13.537	15.16
		20	132322	1745	17.935	19.44

Band71						
RB	Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	99% Power Bandwidth(MHz)	-26dBc Bandwidth(MHz)
	QPSK	5	133297	680.5	4.5434	5.224
		10	133297	680.5	8.9741	9.870
		15	133297	680.5	13.689	15.45
		20	133297	680.5	18.071	19.90
	QAM16	5	133297	680.5	4.5506	5.236
		10	133297	680.5	8.9776	9.948
		15	133297	680.5	13.708	15.49
		20	133297	680.5	18.084	20.03

Test plot as follows:

Test Mode: LTE Band 2 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 2 Channel Bandwidth: 3MHz

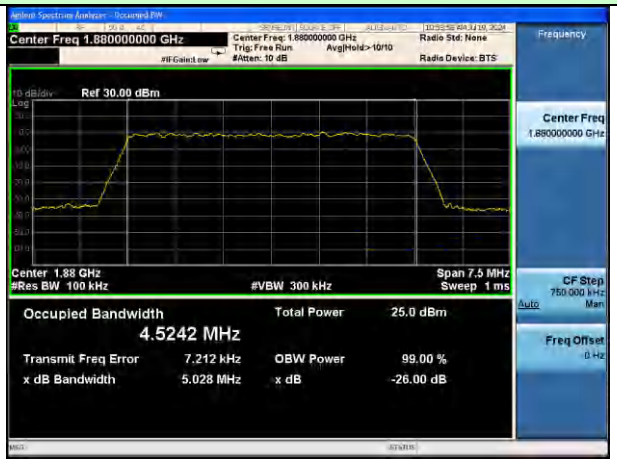
QPSK

16-QAM

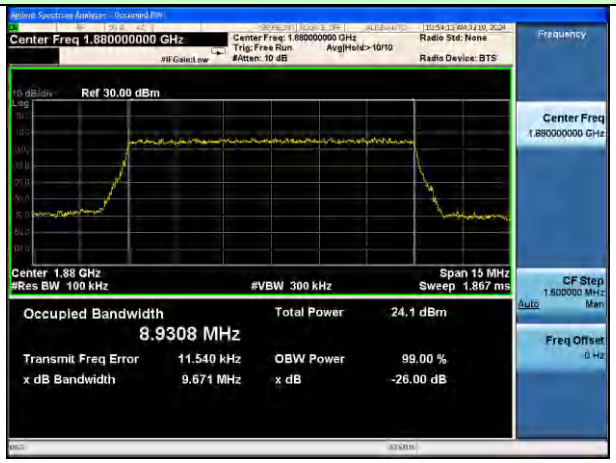
QPSK

16-QAM

Test Mode: LTE Band 2 Channel Bandwidth: 5MHz	Test Mode: LTE Band 2 Channel Bandwidth: 10MHz

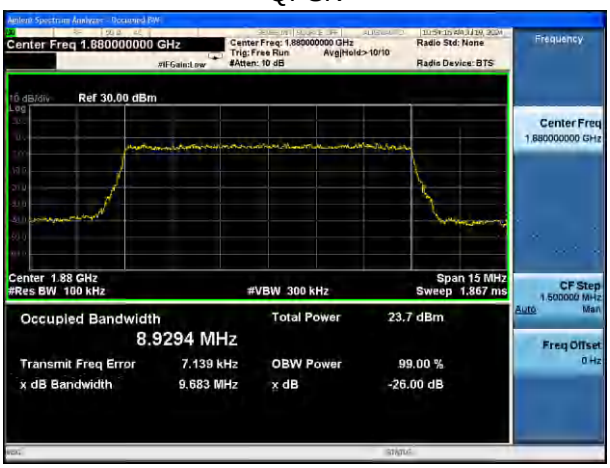


QPSK



QPSK

16-QAM



16-QAM

Test Mode: LTE Band 2 Channel Bandwidth: 15MHz	Test Mode: LTE Band 2 Channel Bandwidth: 20MHz

QPSK

QPSK

16-QAM

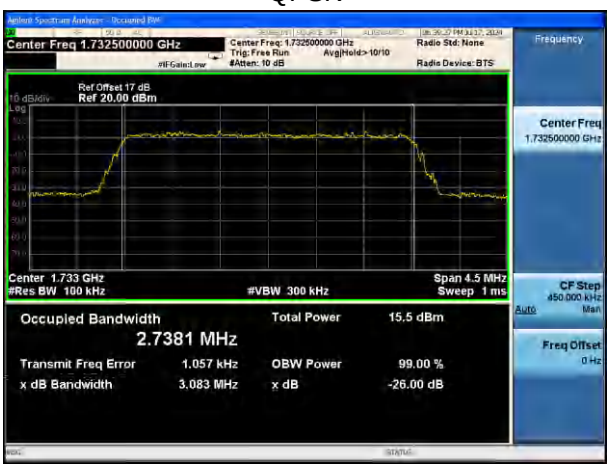
16-QAM

Test Mode: LTE Band 4 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 4 Channel Bandwidth: 3MHz

QPSK

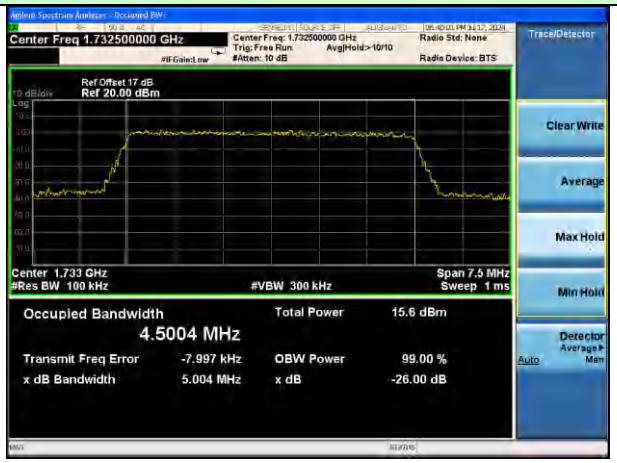
QPSK

16-QAM



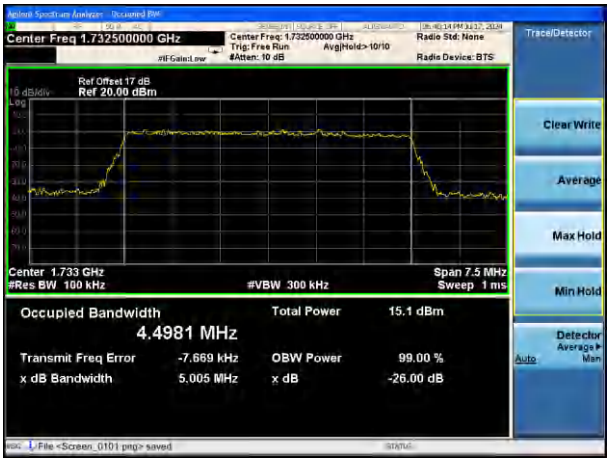
16-QAM

Test Mode: LTE Band 4 Channel Bandwidth: 5MHz	Test Mode: LTE Band 4 Channel Bandwidth: 10MHz

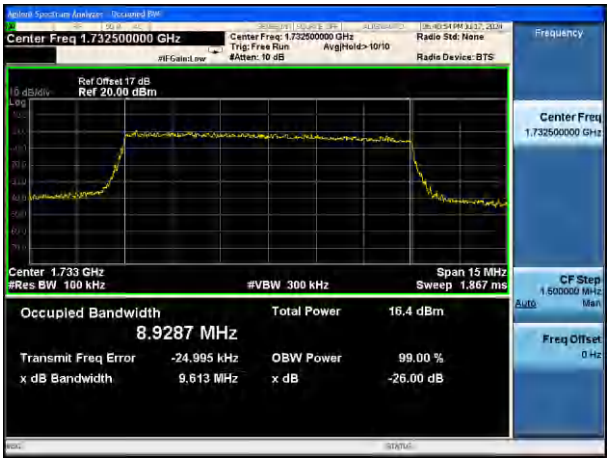


QPSK

QPSK

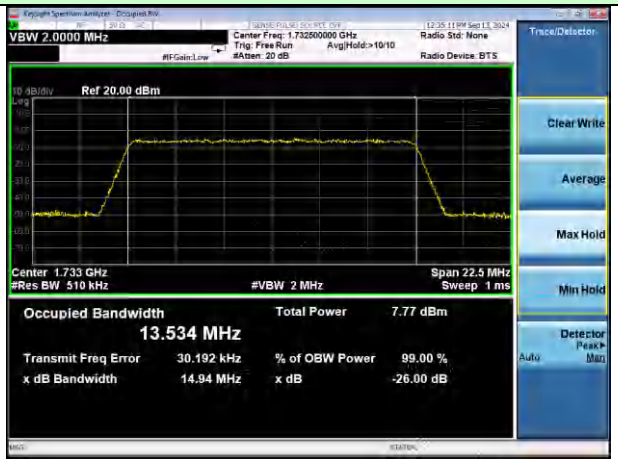


16-QAM



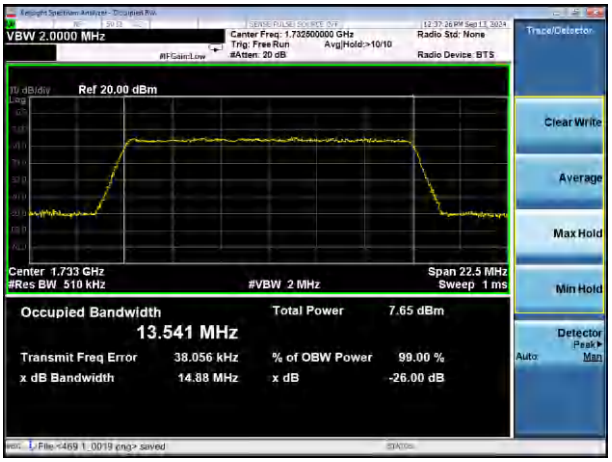
16-QAM

Test Mode: LTE Band 4 Channel Bandwidth: 15MHz	Test Mode: LTE Band 4 Channel Bandwidth: 20MHz



QPSK

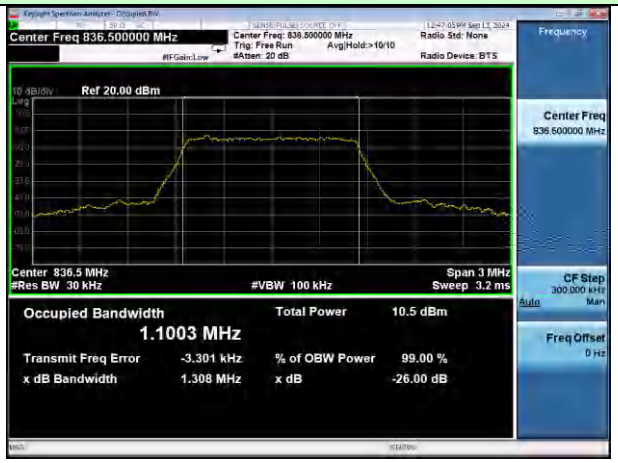
QPSK



16-QAM

16-QAM

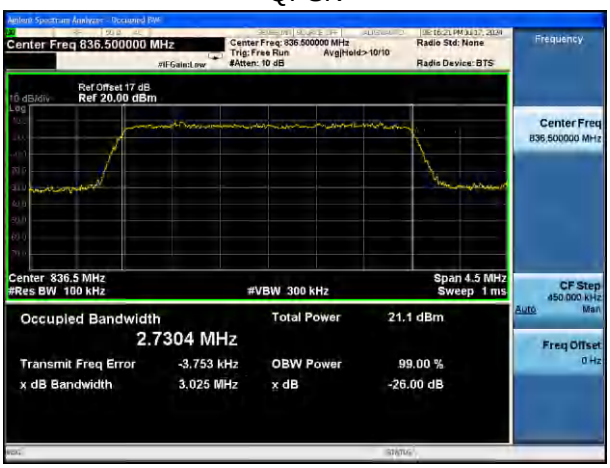
Test Mode: LTE Band 5 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 5 Channel Bandwidth: 3MHz



QPSK

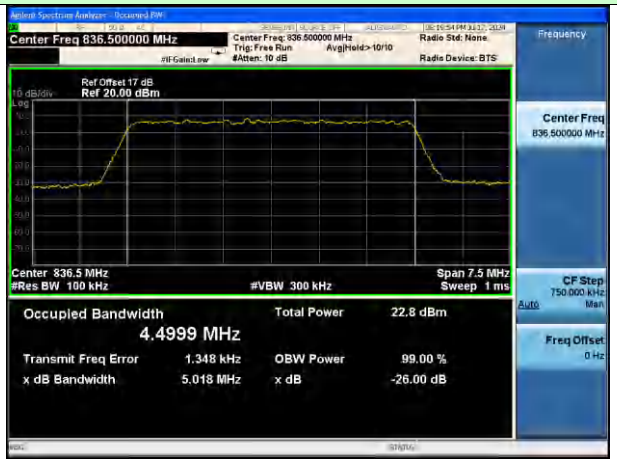
QPSK

16-QAM



16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 5MHz

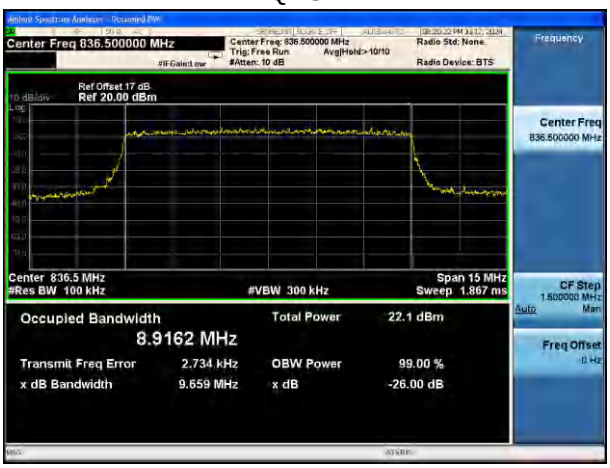


QPSK

16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 10MHz

QPSK



16-QAM

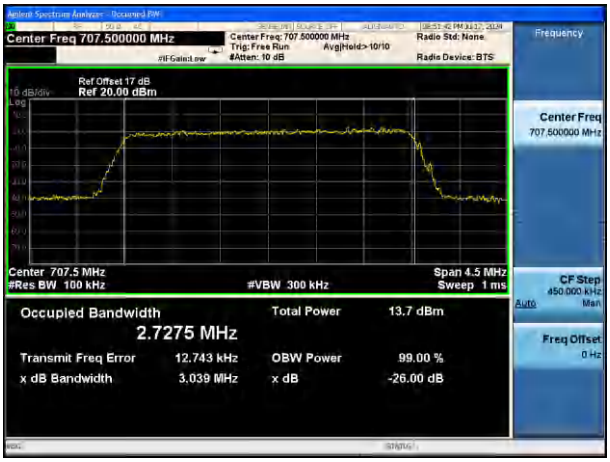
Test Mode: LTE Band 12
Channel Bandwidth: 1.4MHz

QPSK

16-QAM

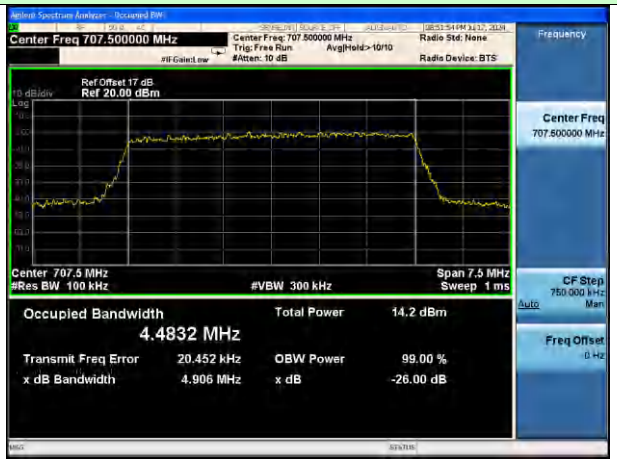
Test Mode: LTE Band 12
Channel Bandwidth: 3MHz

QPSK

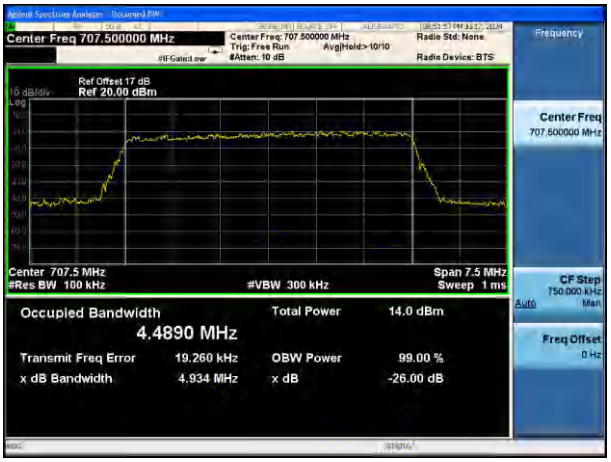


16-QAM

Test Mode: LTE Band 12
Channel Bandwidth: 5MHz



QPSK



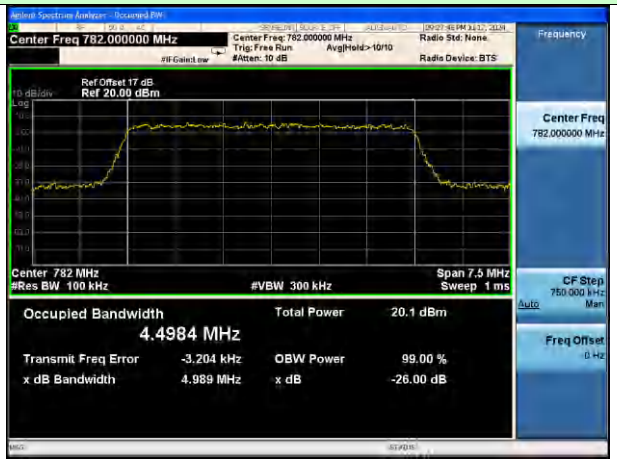
16-QAM

Test Mode: LTE Band 12
Channel Bandwidth: 10MHz

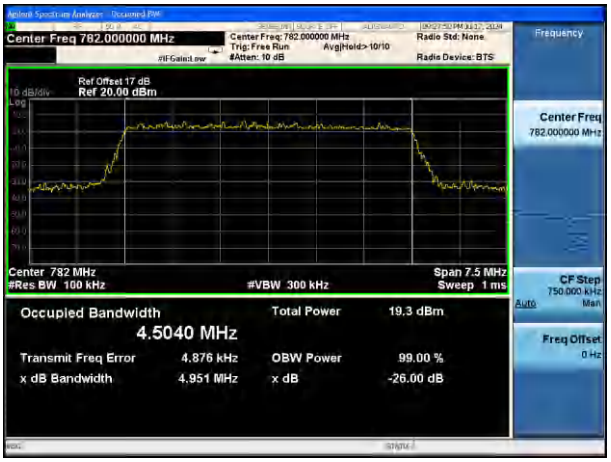
QPSK

16-QAM

Test Mode: LTE Band 13
Channel Bandwidth: 5MHz



QPSK



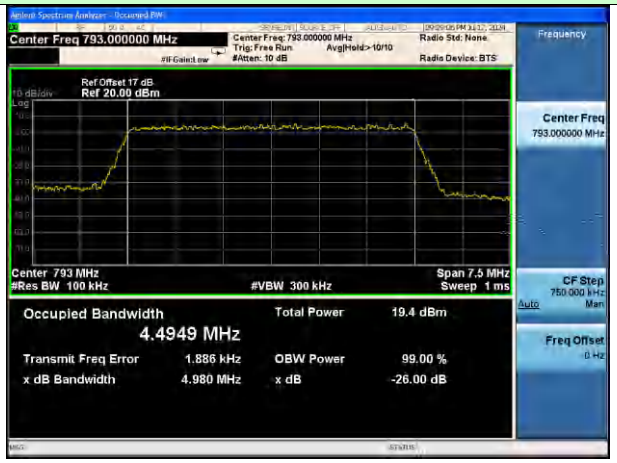
16-QAM

Test Mode: LTE Band 13
Channel Bandwidth: 10MHz

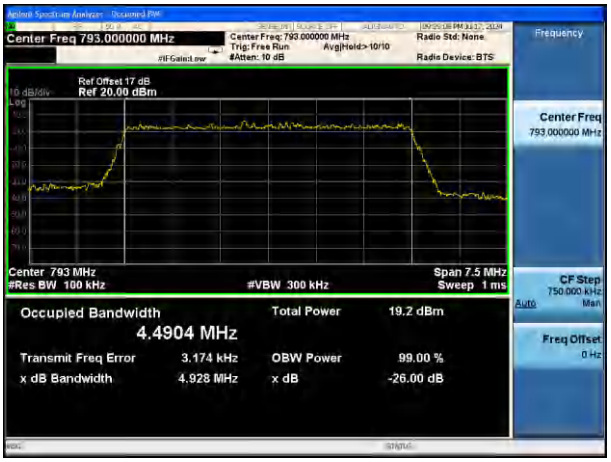
QPSK

16-QAM

Test Mode: LTE Band 14
Channel Bandwidth: 5MHz

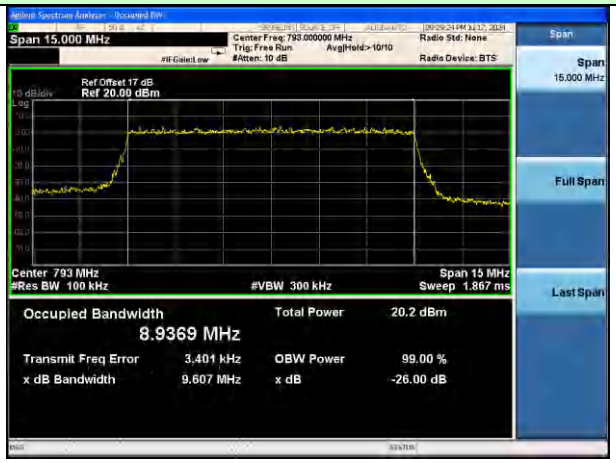


QPSK

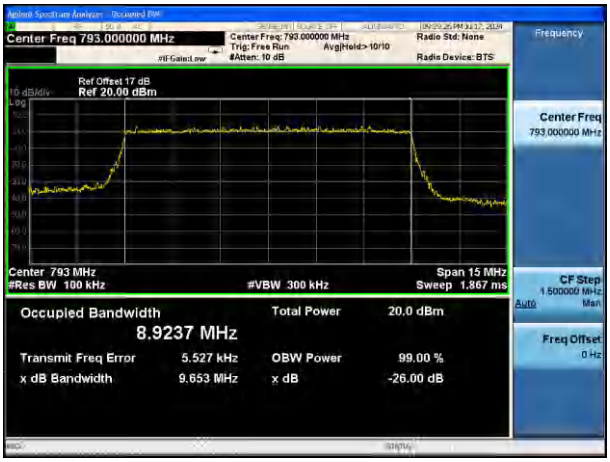


16-QAM

Test Mode: LTE Band 17
Channel Bandwidth: 10MHz

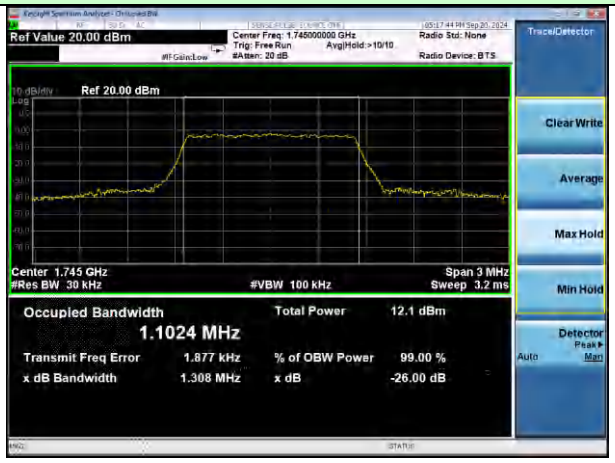


QPSK



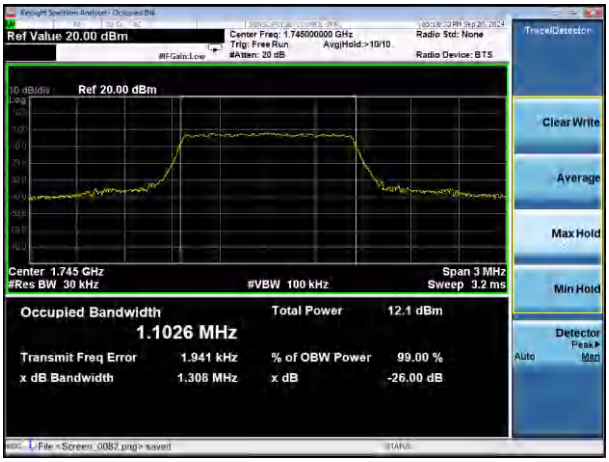
16-QAM

Test Mode: LTE Band 66 Channel Bandwidth: 1.4MHz	Test Mode: LTE Band 66 Channel Bandwidth: 3MHz



QPSK

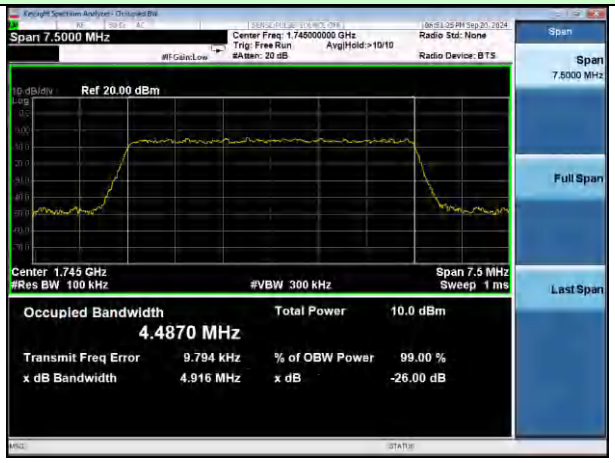
QPSK



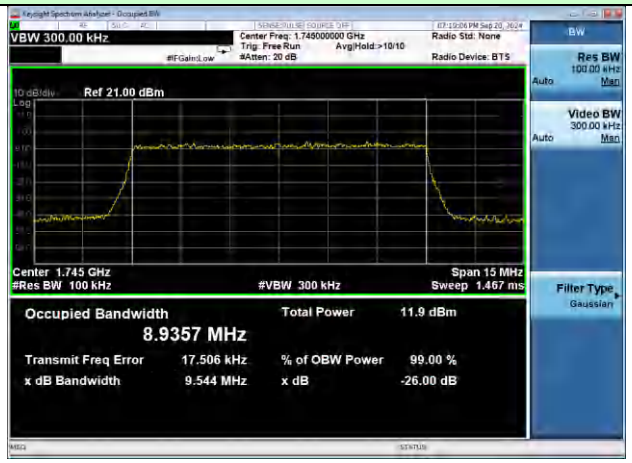
16-QAM

16-QAM

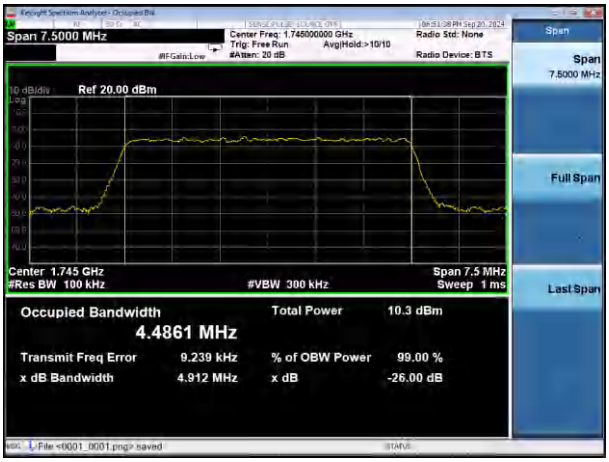
Test Mode: LTE Band 66 Channel Bandwidth: 5MHz	Test Mode: LTE Band 66 Channel Bandwidth: 10MHz



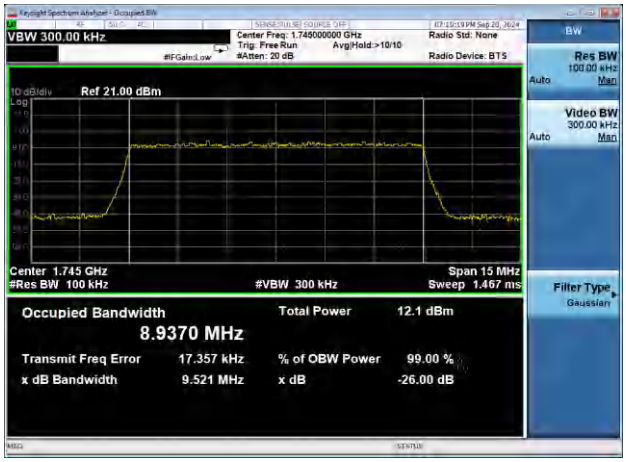
QPSK



QPSK

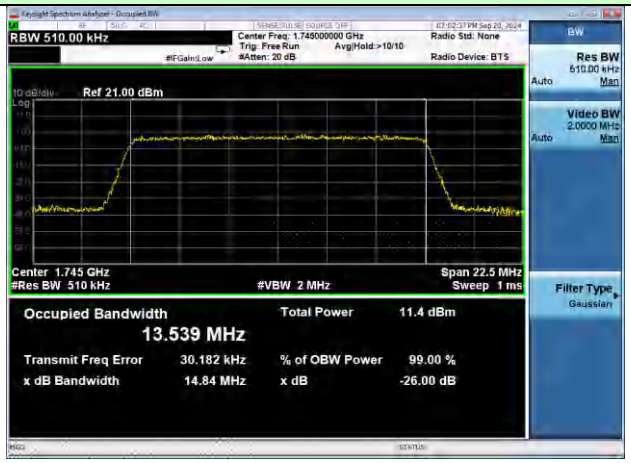


16-QAM

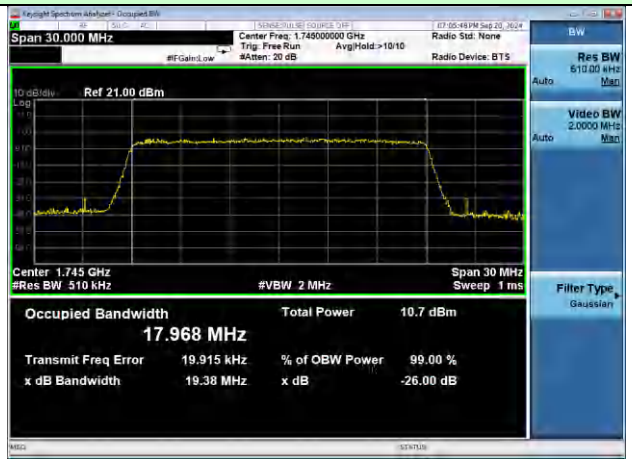


16-QAM

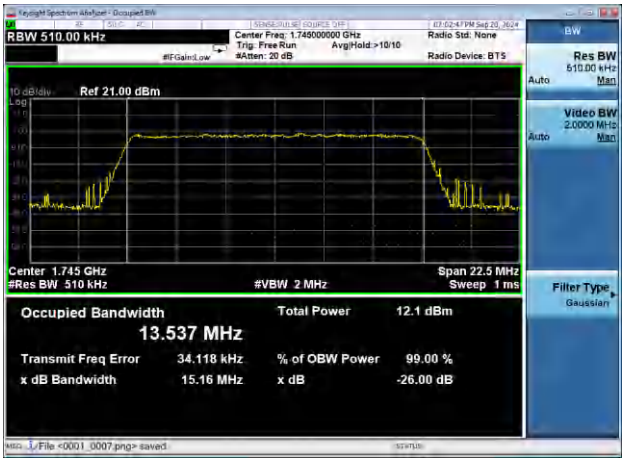
Test Mode: LTE Band 66 Channel Bandwidth: 15MHz	Test Mode: LTE Band 66 Channel Bandwidth: 20MHz



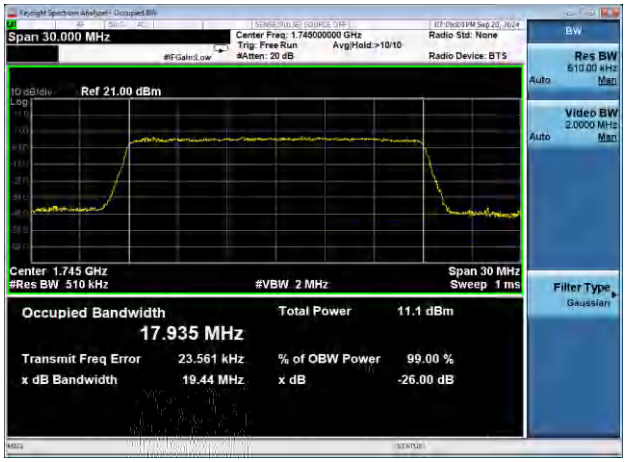
QPSK



QPSK

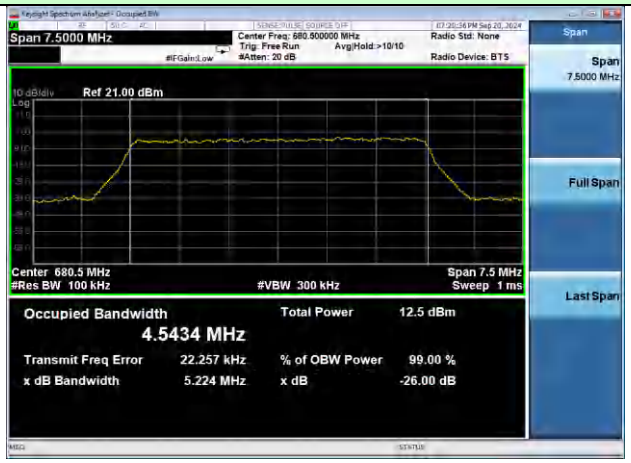


16-QAM



16-QAM

Test Mode: LTE Band 71 Channel Bandwidth: 5MHz	Test Mode: LTE Band 71 Channel Bandwidth: 10MHz



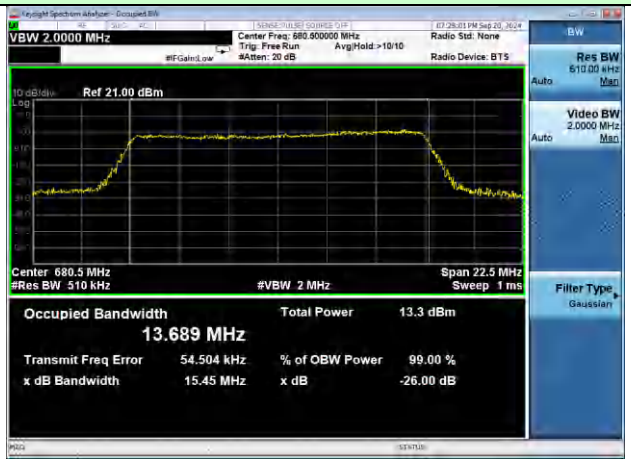
QPSK

QPSK

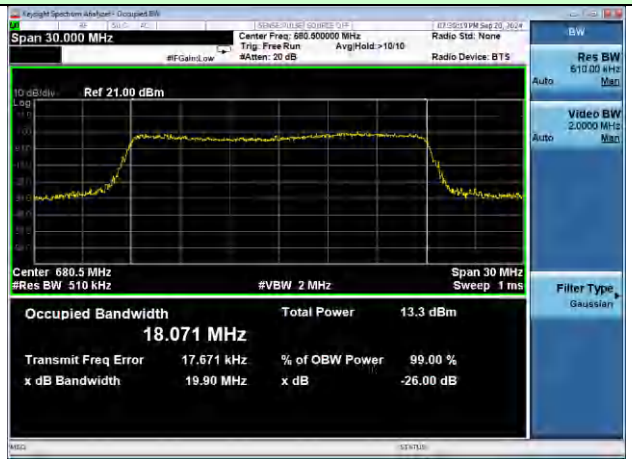
16-QAM

16-QAM

Test Mode: LTE Band 71 Channel Bandwidth: 15MHz	Test Mode: LTE Band 71 Channel Bandwidth: 20MHz



QPSK



QPSK

16-QAM

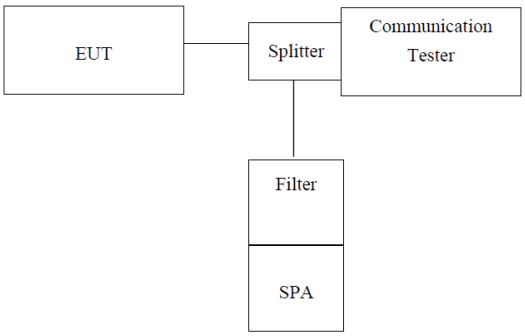
16-QAM

Note: All bandwidth and modulation are tested, only the worst results are reported.

4.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 24E & Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.
According to RSS-130, RSS-132, RSS-133, RSS-139, RSS-140 the equipment certified under these standards shall employ digital modulation, but there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

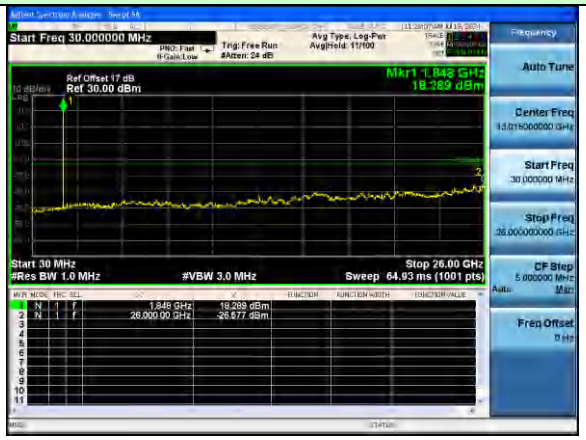
4.7 Out of band emission at antenna terminals

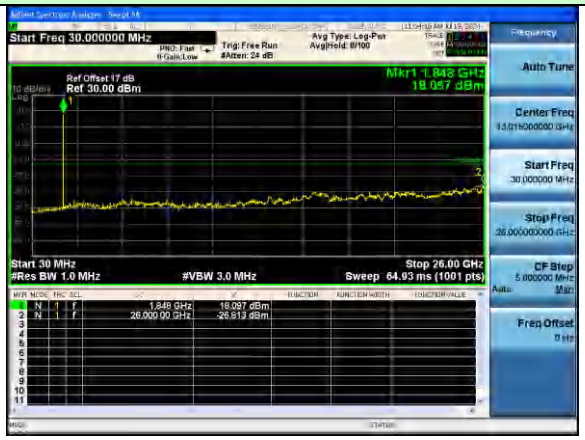
Test Requirement:	FCC part22.913(a), FCC part24.238(a), FCC part27.53(h) and FCC part27.53(m), RSS-130 (4.7), RSS-132 (5.5), RSS-133 (6.5), RSS-139(6.6) and RSS-140(4.4)
Test Method:	ANSI C63.26:2015
Limit:	-13dBm Band 7/41: -25dBm
Test setup:	 ***Note:*** *Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW=1MHz, VBW = 3MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Test plot as follows:

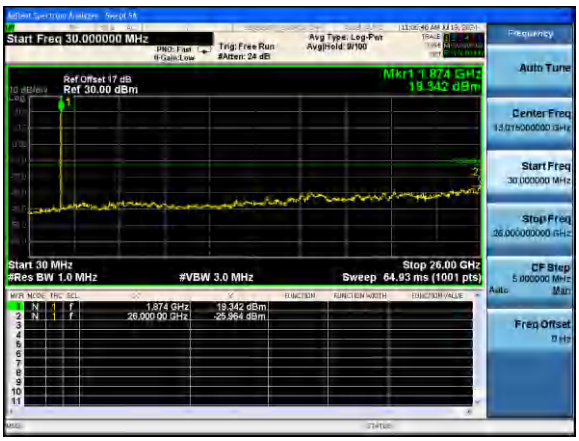
Conducted Spurious Emission:

Test Mode: LTE Band 2 / 1.4MHz /1RB	Test Mode: LTE Band 2 / 1.4MHz /FULL RB

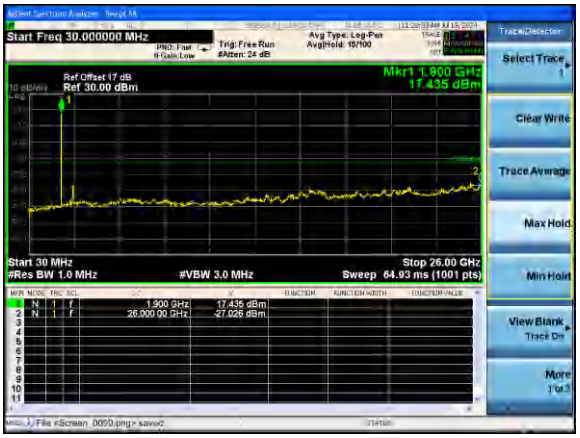


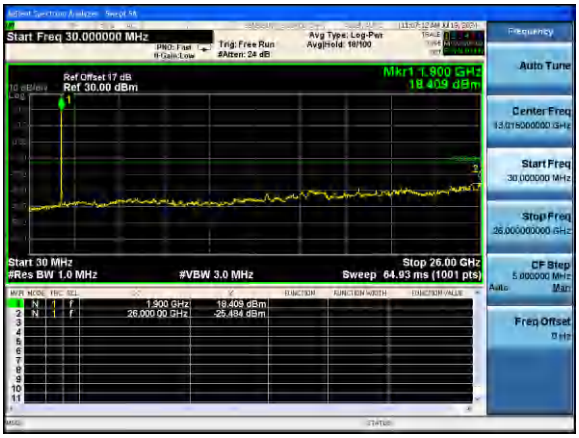


Lowest channel



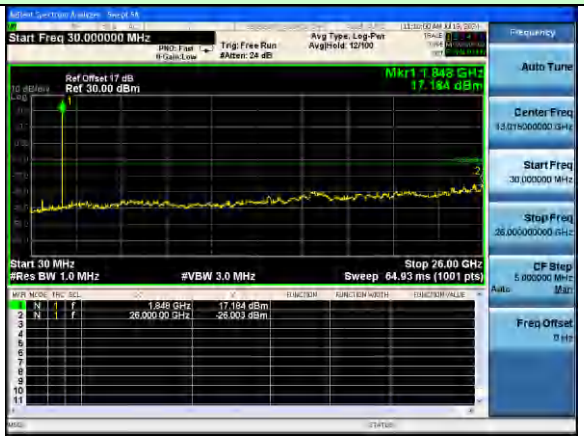
Middle channel



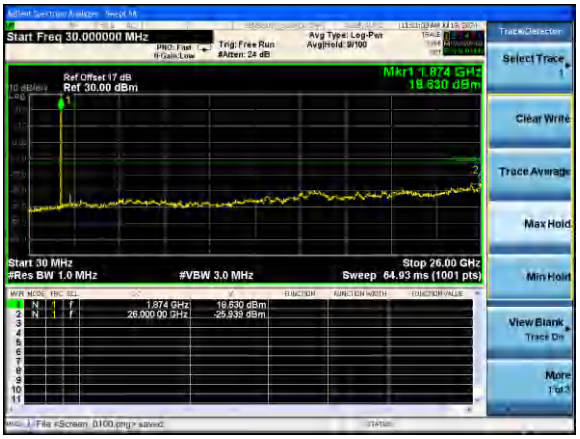


Highest channel

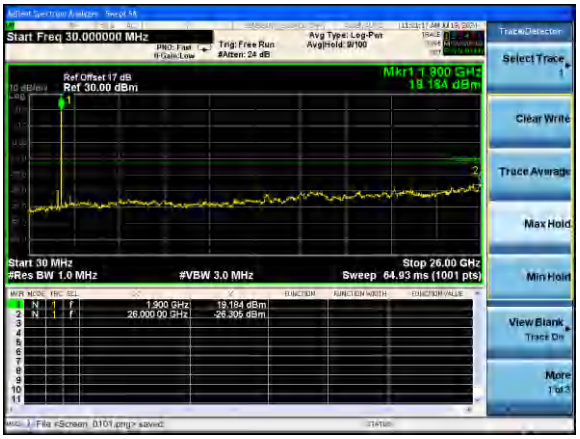
Test Mode: LTE Band 2 / 3MHz /1RB	Test Mode: LTE Band 2 / 3MHz /FULL RB



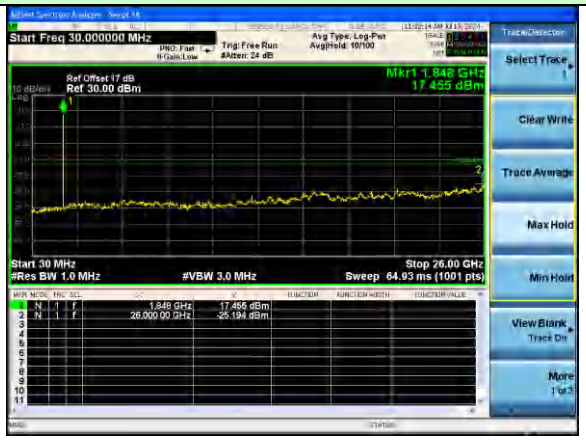
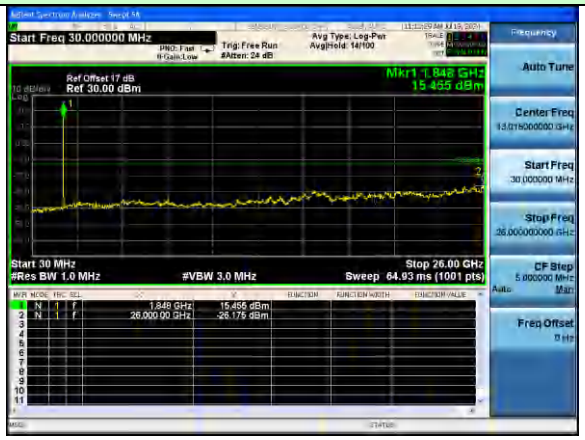
Lowest channel



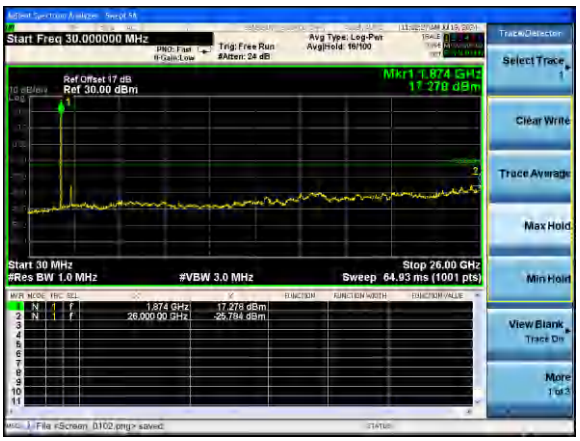
Middle channel



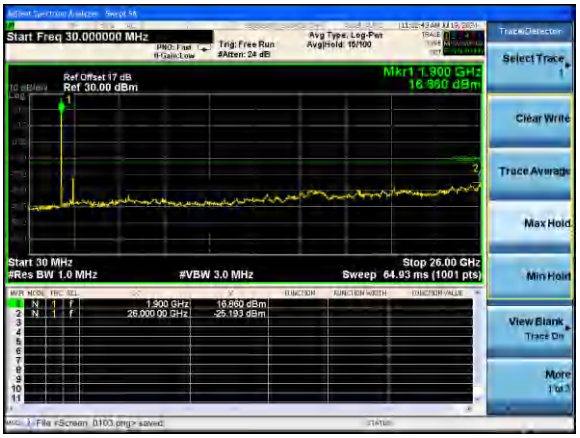
Highest channel

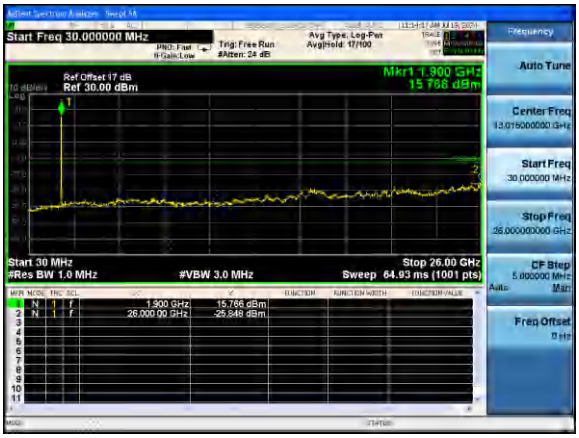
Test Mode: LTE Band 2 / 5MHz /1RB	Test Mode: LTE Band 2 / 5MHz /FULL RB
	

Lowest channel



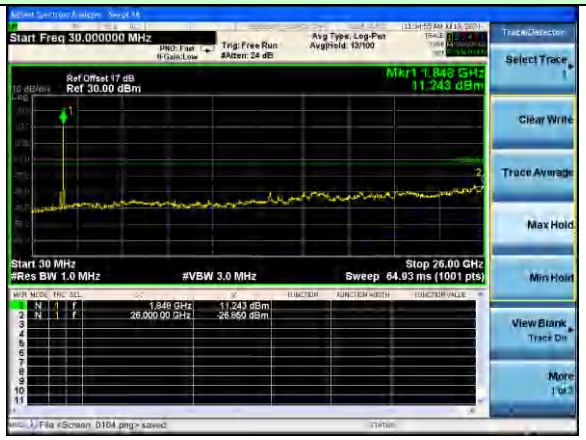
Middle channel

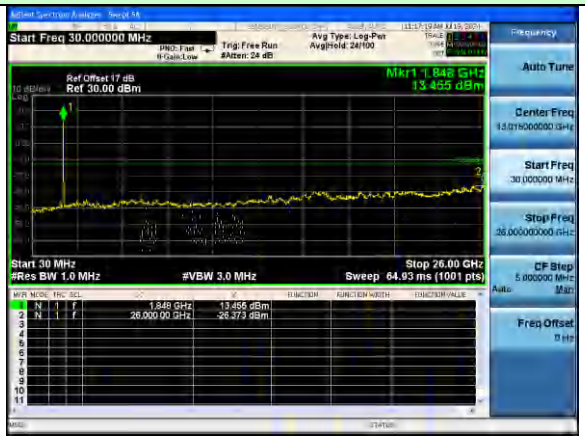




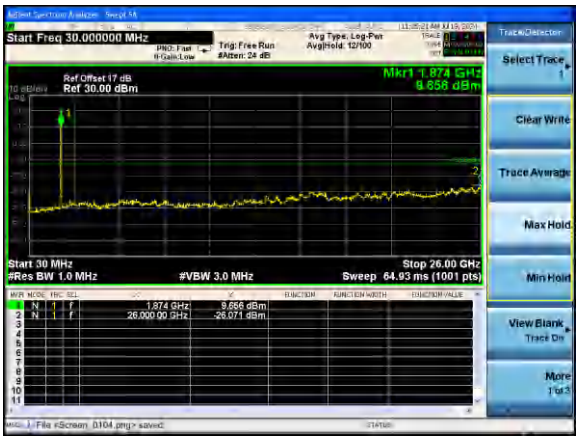
Highest channel

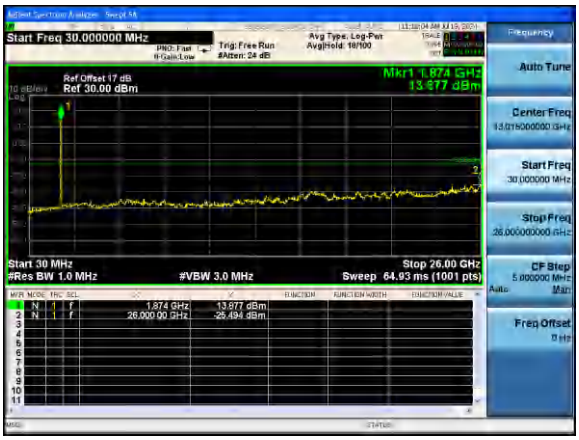
Test Mode: LTE Band 2 / 10MHz /1RB	Test Mode: LTE Band 2 / 10MHz /FULL RB



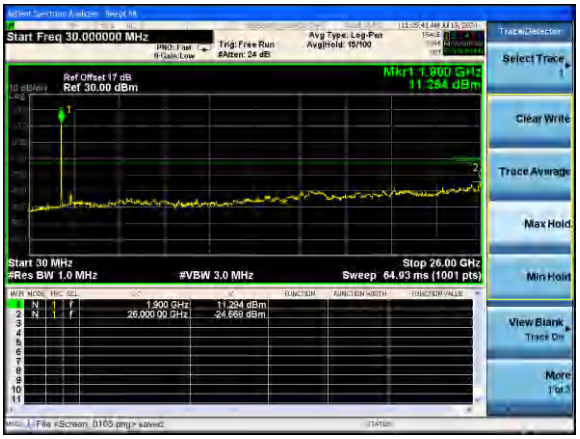


Lowest channel

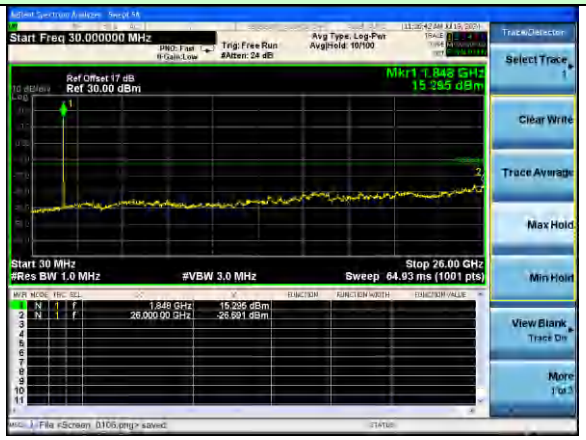
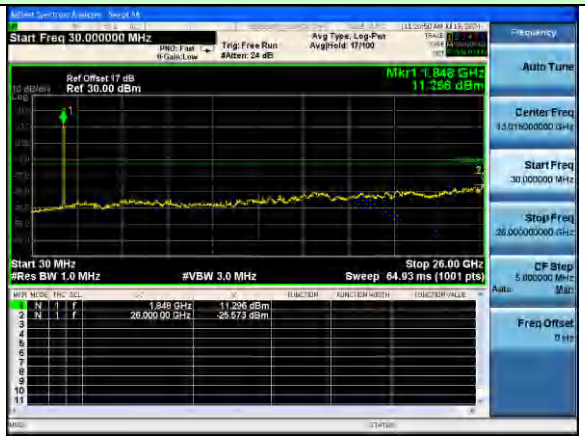




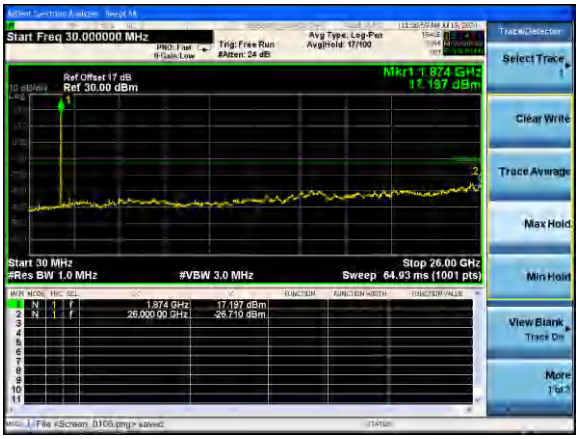
Middle channel

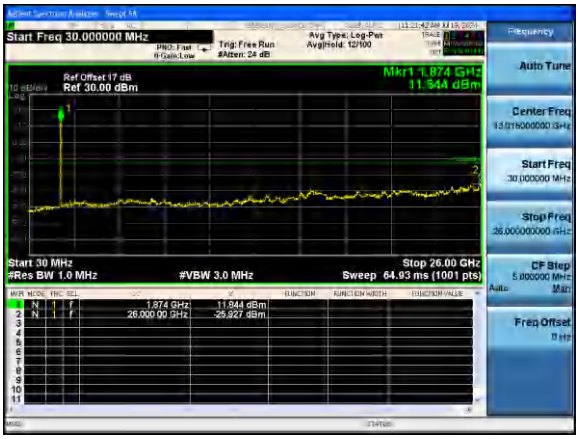


Highest channel

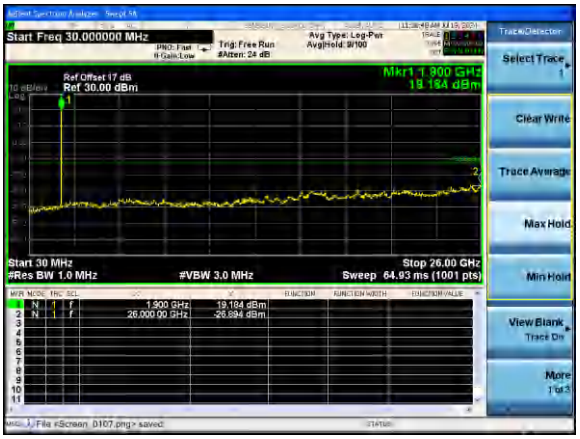
Test Mode: LTE Band 2 / 15MHz /1RB	Test Mode: LTE Band 2 / 15MHz /FULL RB
	

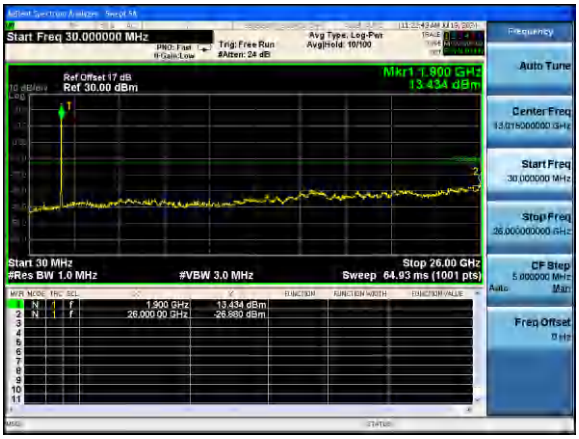
Lowest channel





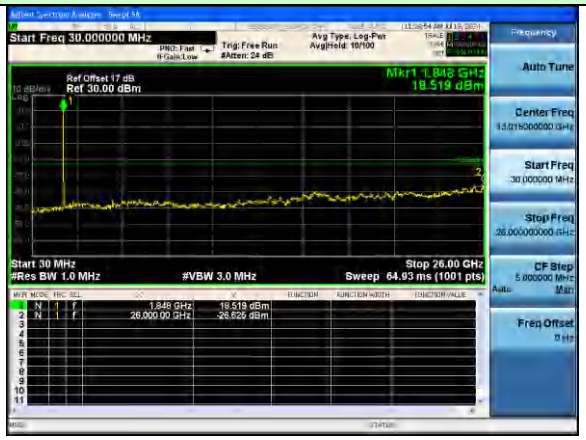
Middle channel

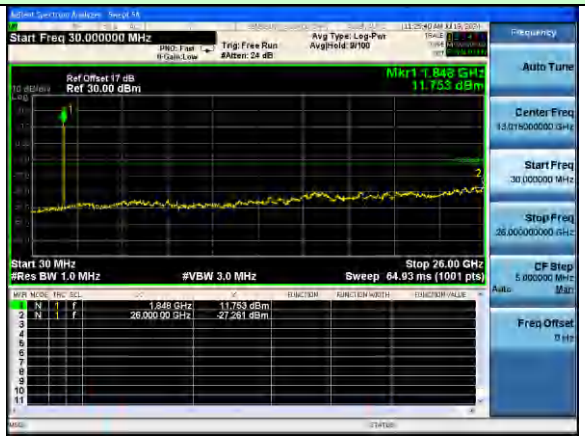




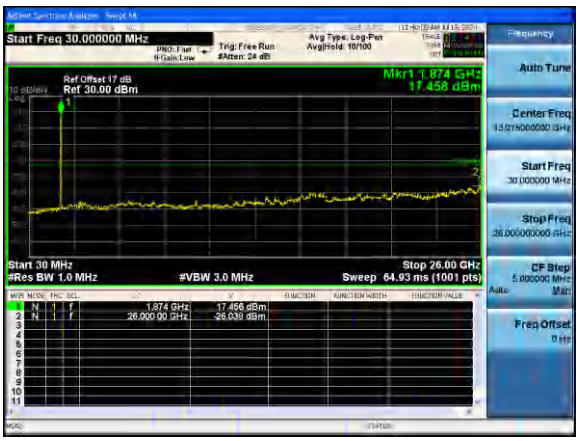
Highest channel

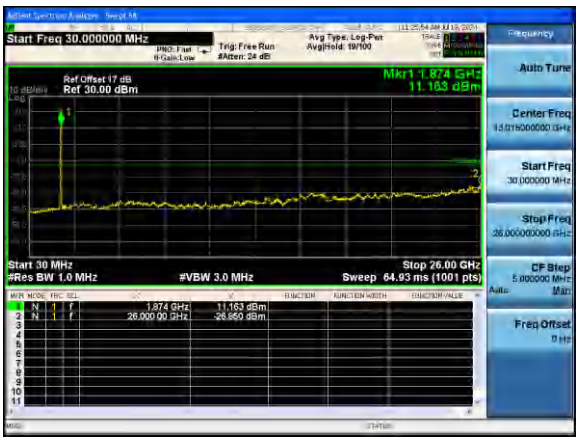
Test Mode: LTE Band 2 / 20MHz /1RB	Test Mode: LTE Band 2 / 20MHz /FULL RB



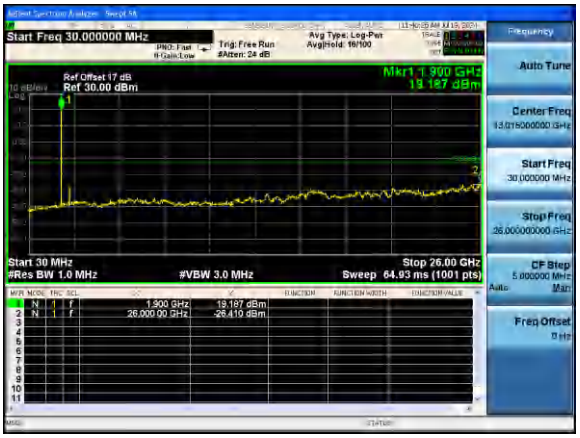


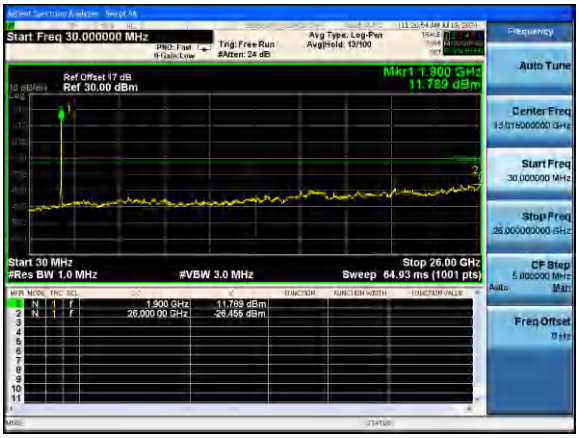
Lowest channel





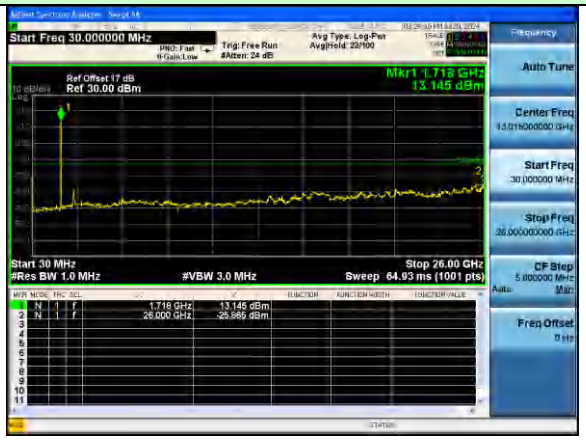
Middle channel

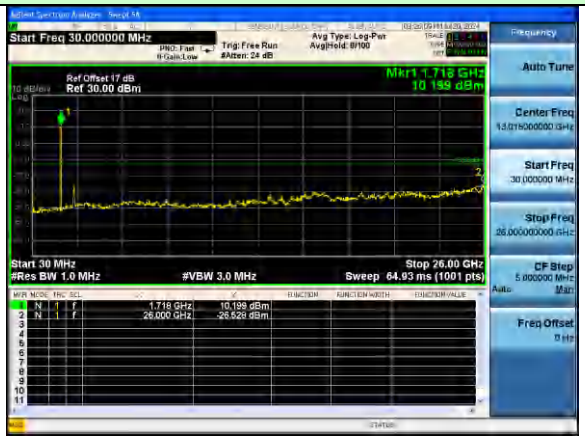




Highest channel

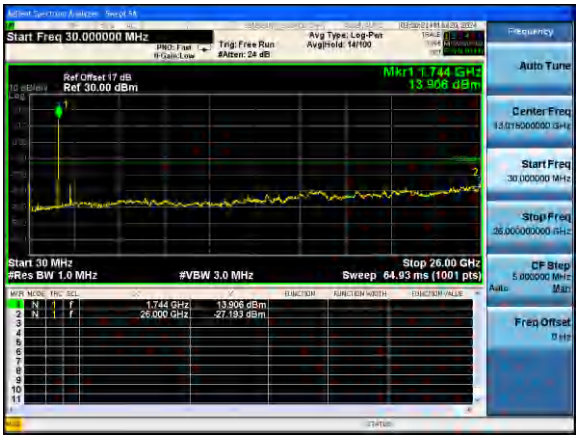
Test Mode: LTE Band 4 / 1.4MHz /1RB	Test Mode: LTE Band 4 / 1.4MHz /FULL RB



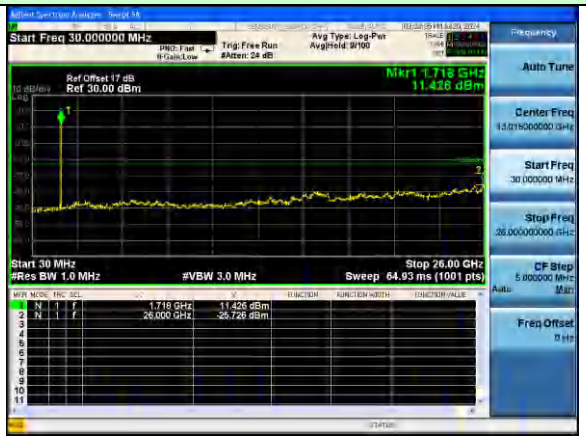
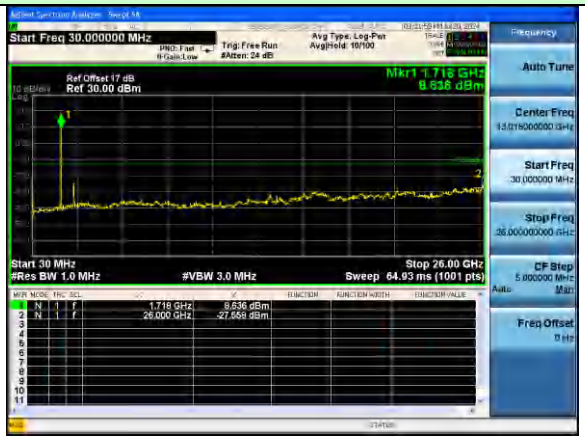


Lowest channel

Middle channel

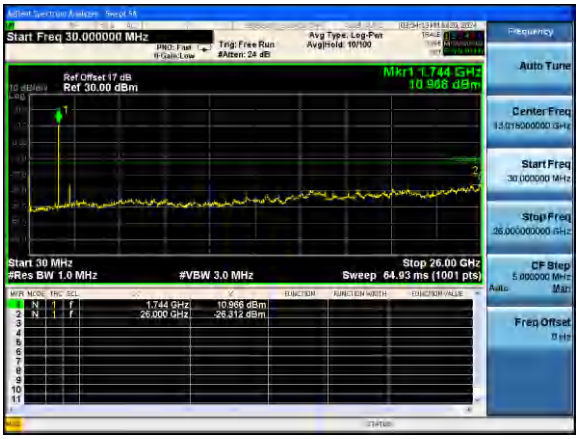


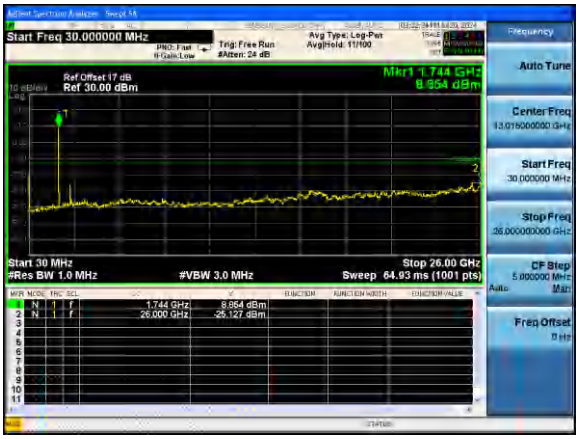
Highest channel

Test Mode: LTE Band 4 / 3MHz /1RB	Test Mode: LTE Band 4 / 3MHz /FULL RB
	

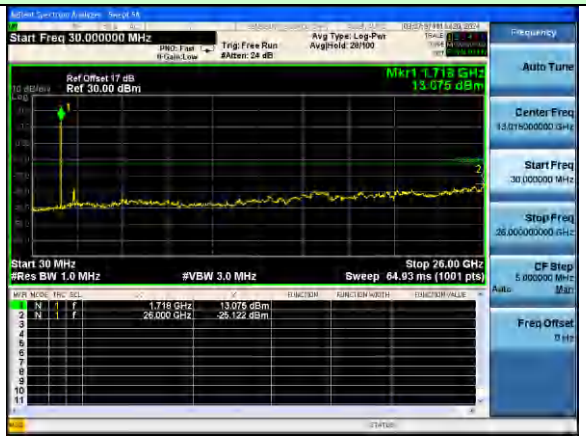
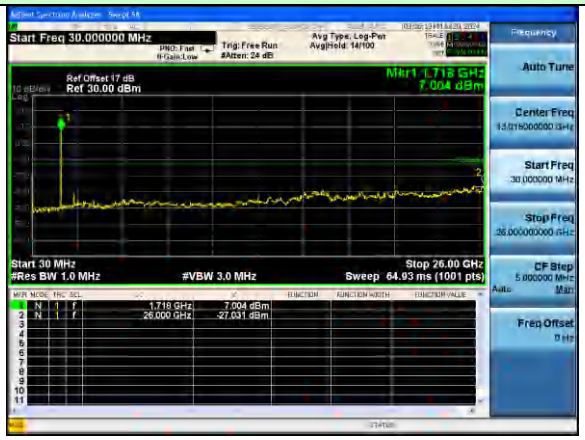
Lowest channel

Middle channel

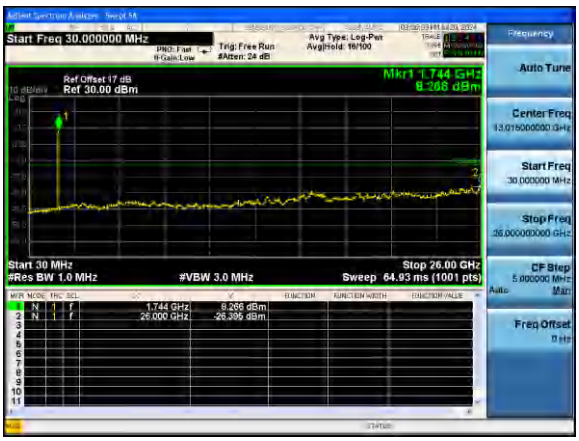




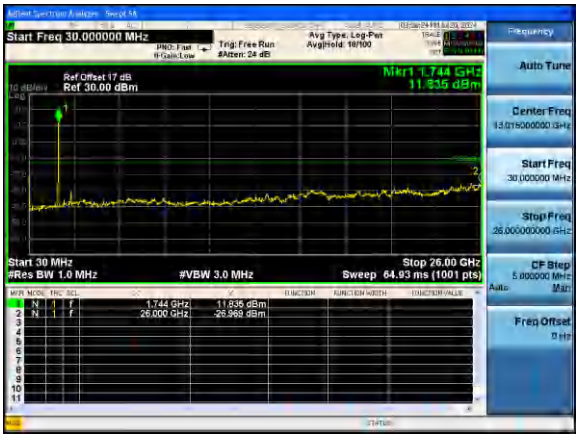
Highest channel

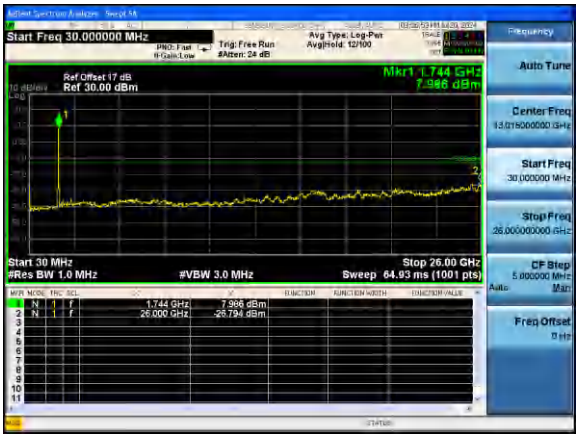
Test Mode: LTE Band 4 / 5MHz /1RB	Test Mode: LTE Band 4 / 5MHz /FULL RB
	

Lowest channel



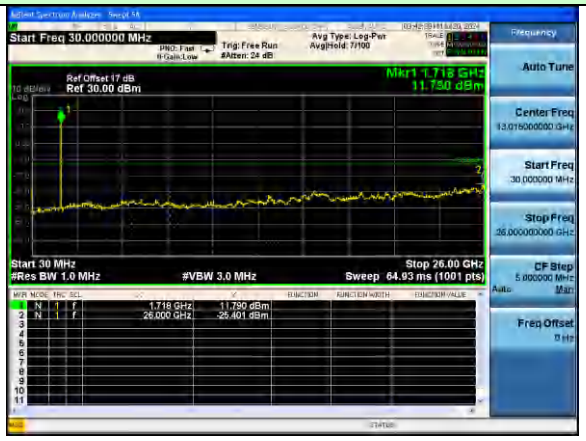
Middle channel

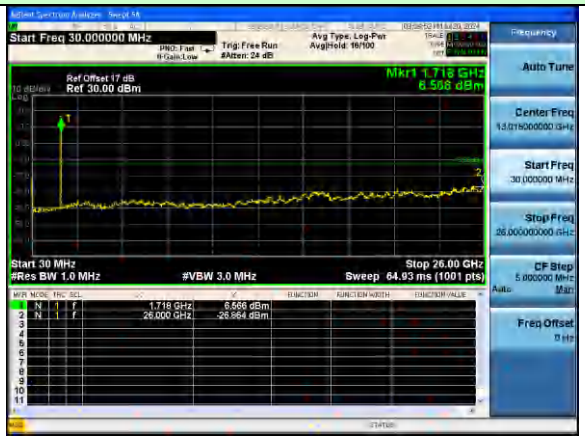




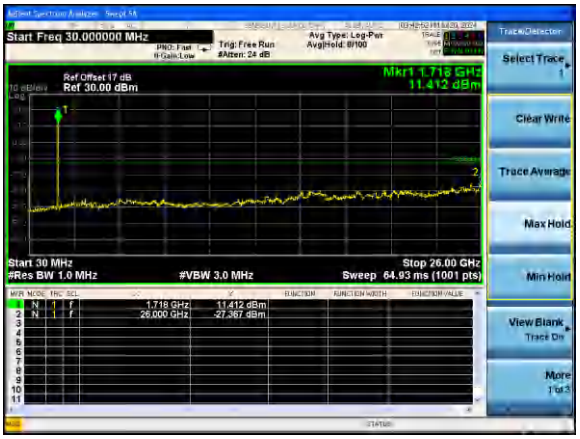
Highest channel

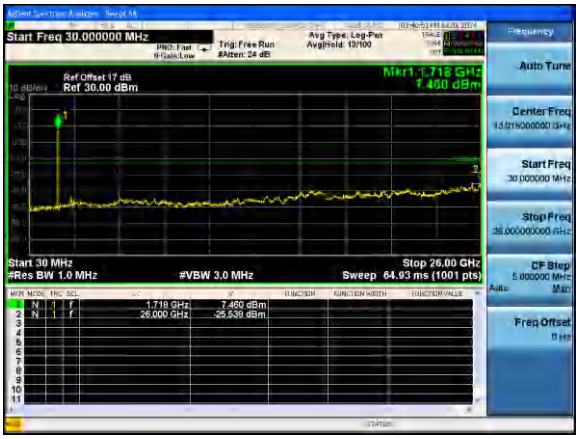
Test Mode: LTE Band 4 / 10MHz /1RB	Test Mode: LTE Band 4 / 10MHz /FULL RB



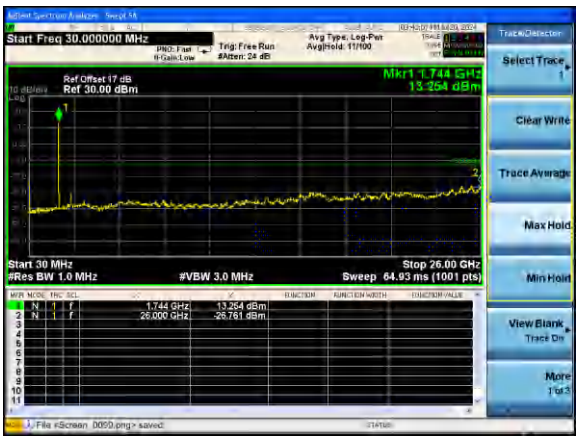


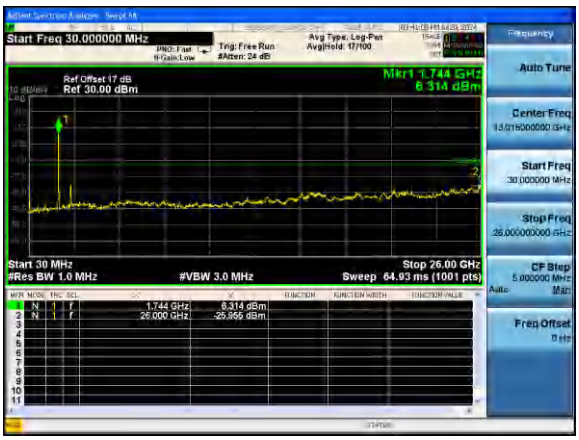
Lowest channel



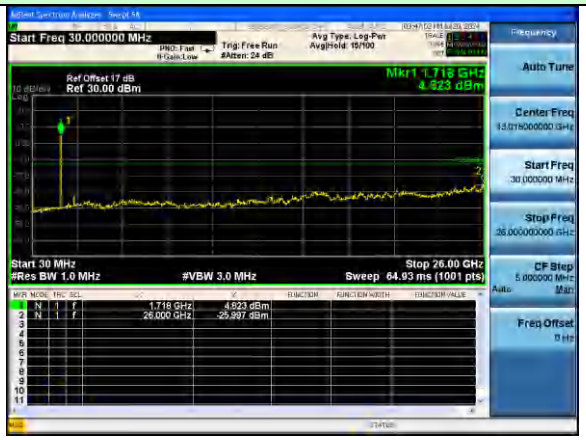


Middle channel

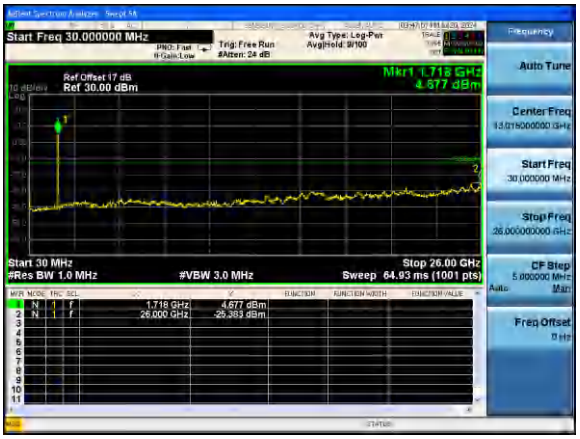


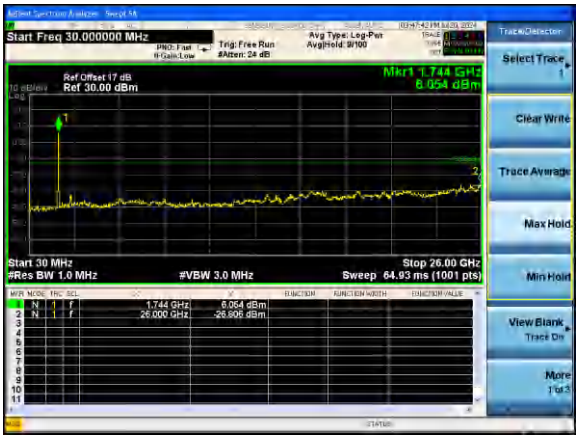


Highest channel

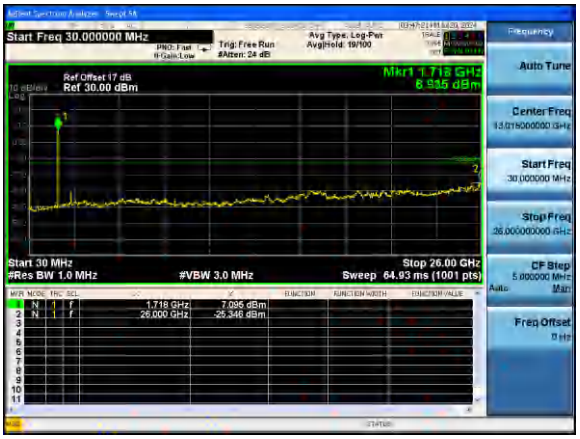
Test Mode: LTE Band 4 / 15MHz /1RB	Test Mode: LTE Band 4 / 15MHz /FULL RB
	

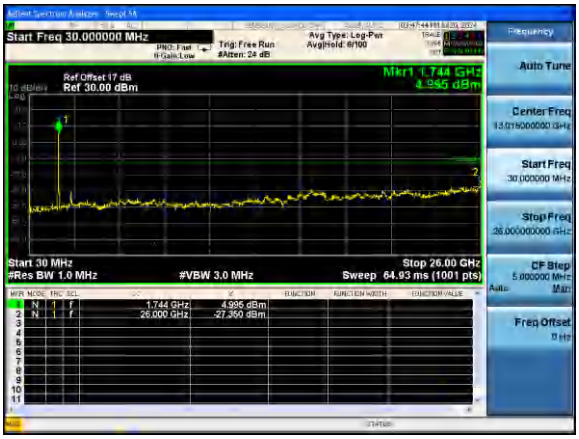
Lowest channel





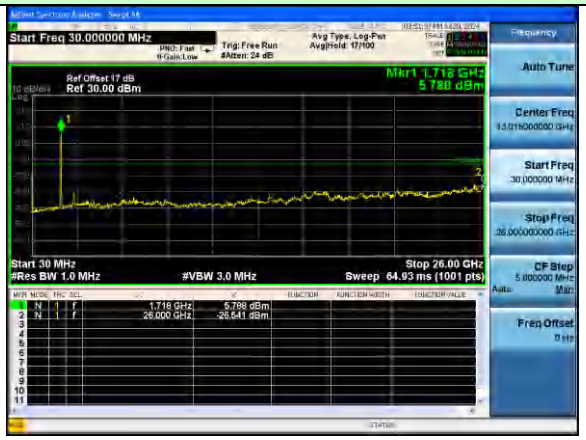
Middle channel

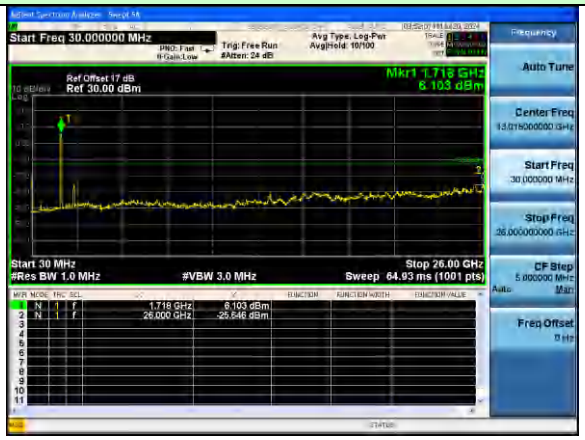




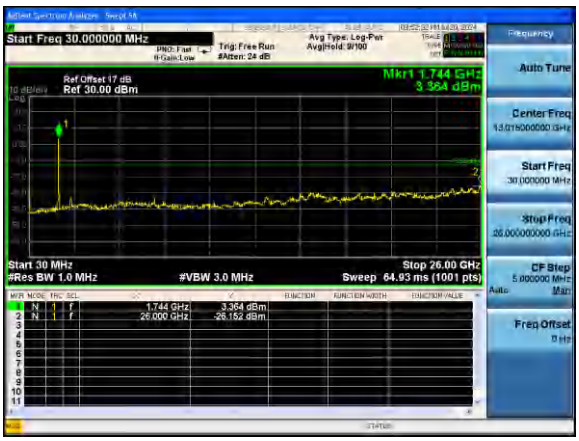
Highest channel

Test Mode: LTE Band 4 / 20MHz /1RB	Test Mode: LTE Band 4 / 20MHz /FULL RB

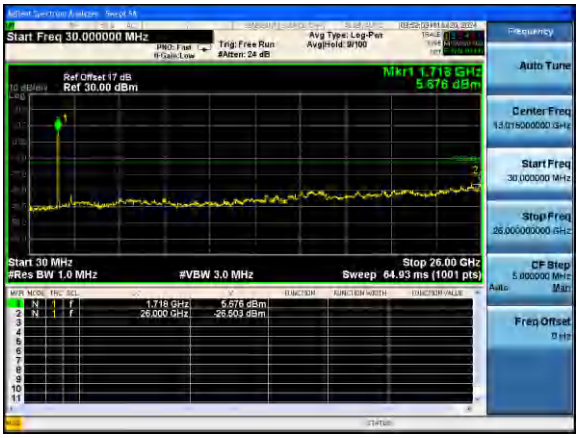




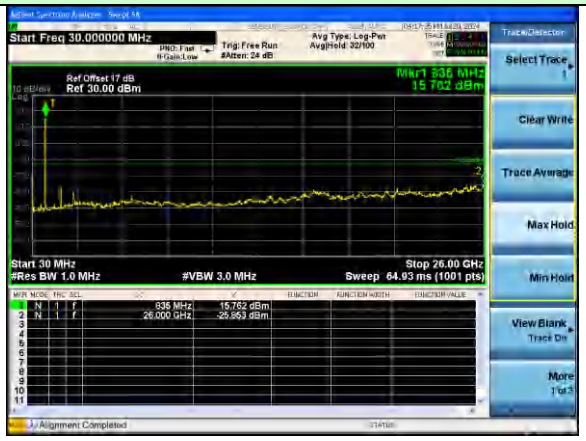
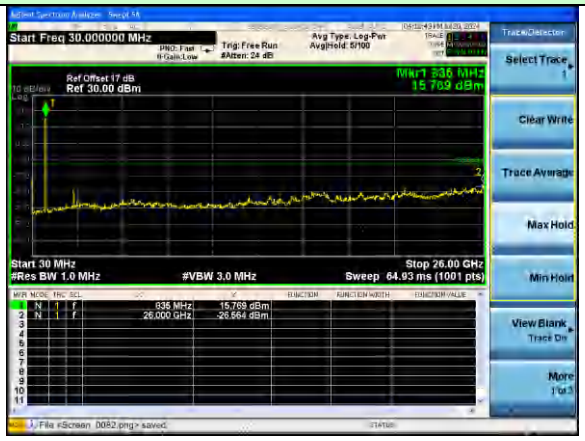
Lowest channel



Middle channel



Highest channel

Test Mode: LTE Band 5 / 1.4MHz /1RB	Test Mode: LTE Band 5 / 1.4MHz /FULL RB
	

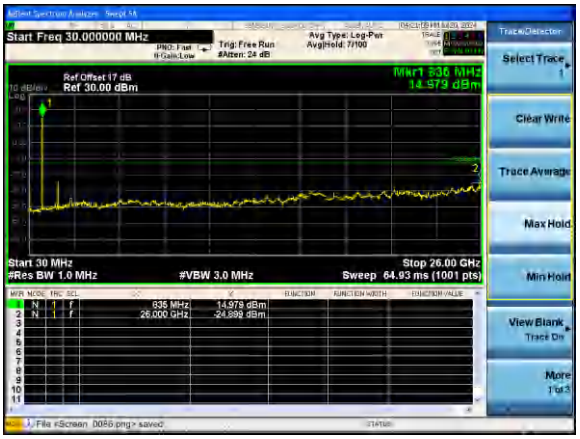
Lowest channel

Middle channel

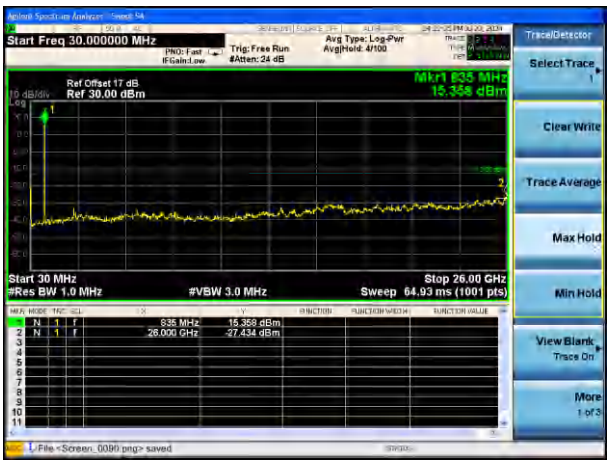
Highest channel

Test Mode: LTE Band 5 / 3MHz /1RB	Test Mode: LTE Band 5 / 3MHz /FULL RB

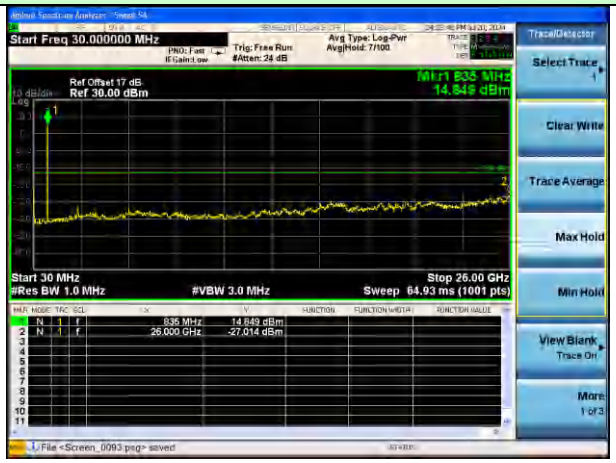
Lowest channel



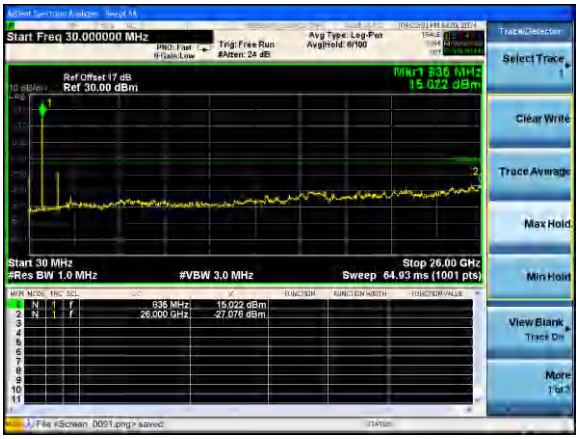
Middle channel

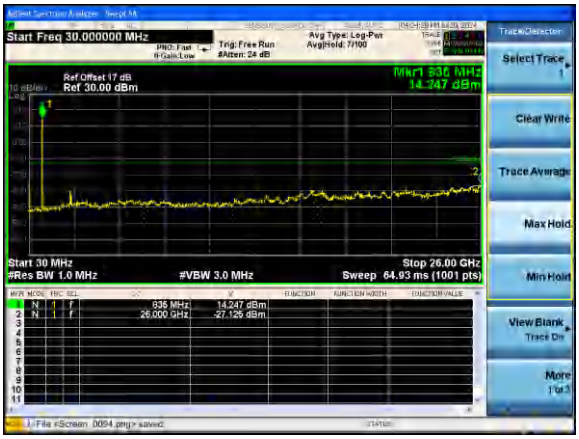


Highest channel

Test Mode: LTE Band 5/ 5MHz /1RB	Test Mode: LTE Band 5 / 5MHz /FULL RB
	

Lowest channel

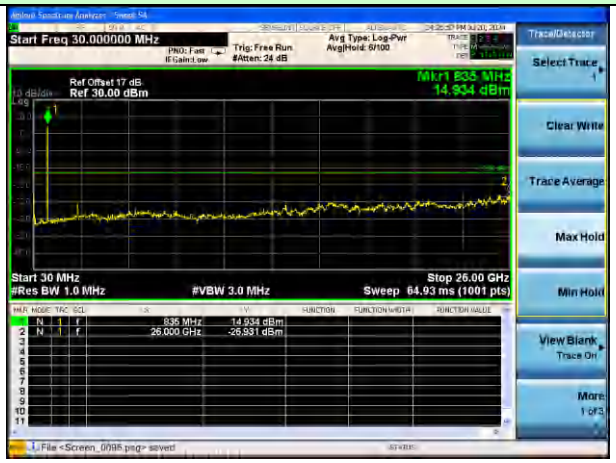




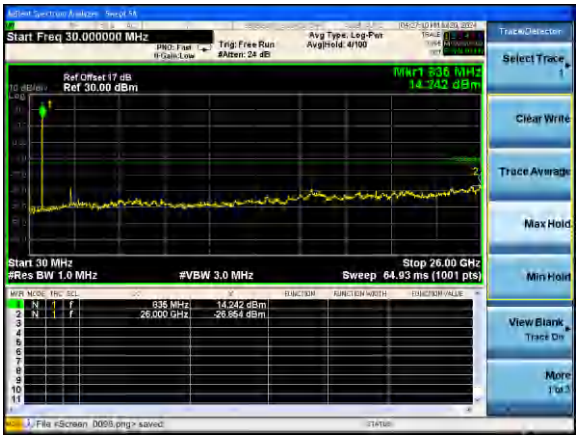
Middle channel

Highest channel

Test Mode: LTE Band 5/ 10MHz /1RB	Test Mode: LTE Band 5/ 10MHz /FULL RB

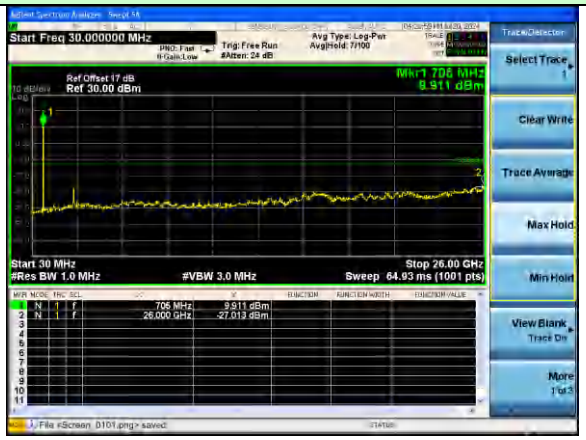
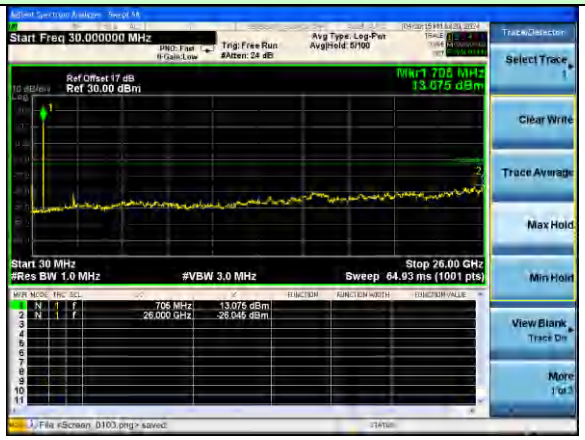


Lowest channel

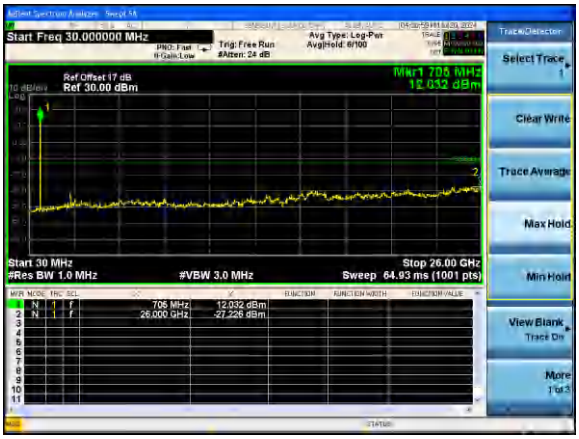


Middle channel

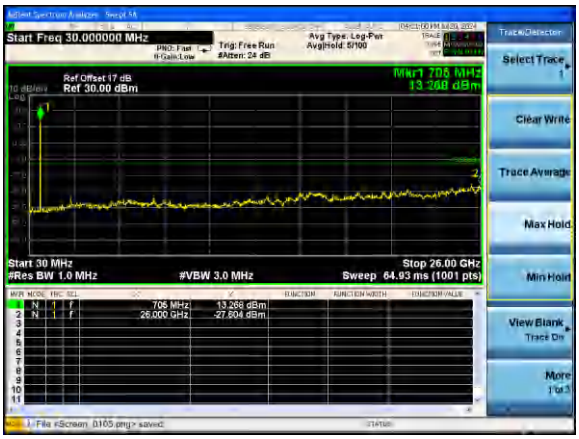
Highest channel

Test Mode: LTE Band 12 / 1.4MHz /1RB	Test Mode: LTE Band 12 / 1.4MHz /FULL RB
	

Lowest channel

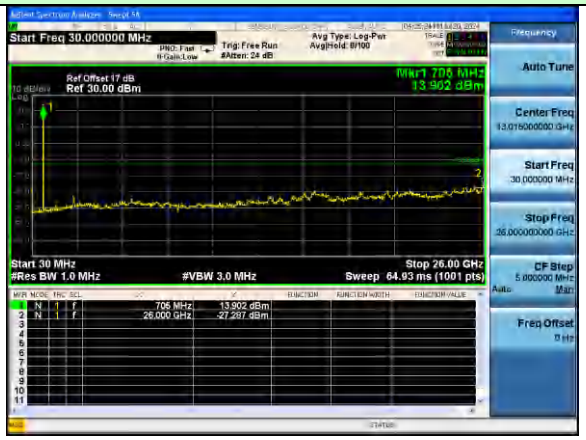


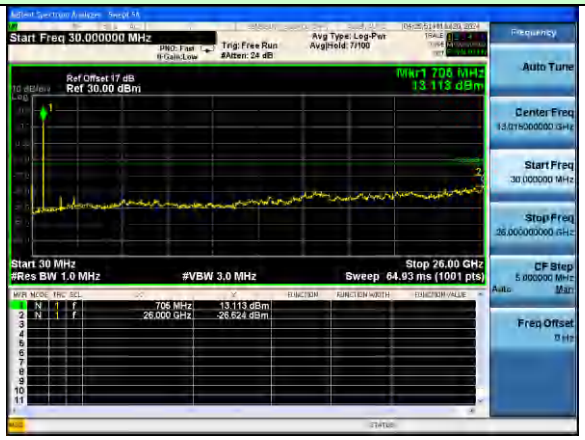
Middle channel



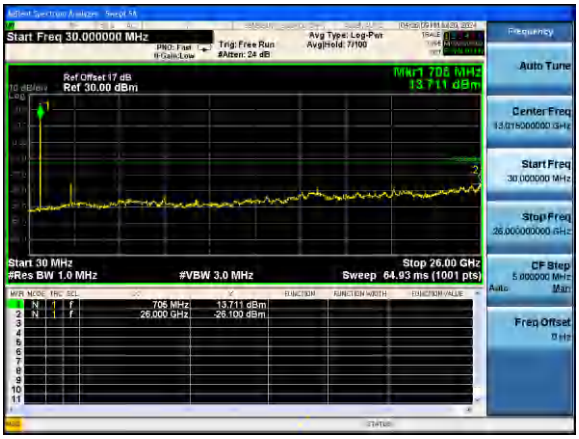
Highest channel

Test Mode: LTE Band 12 / 3MHz /1RB	Test Mode: LTE Band 12 / 3MHz /FULL RB

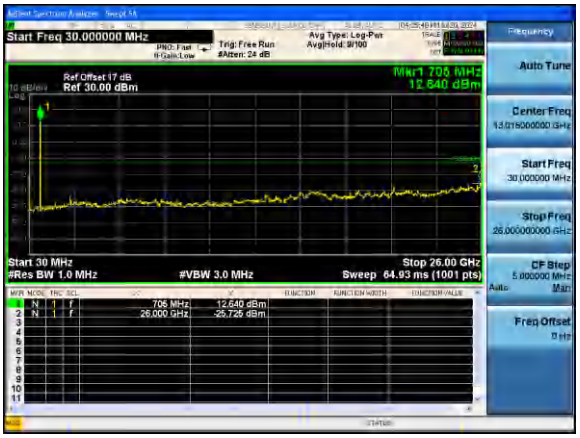


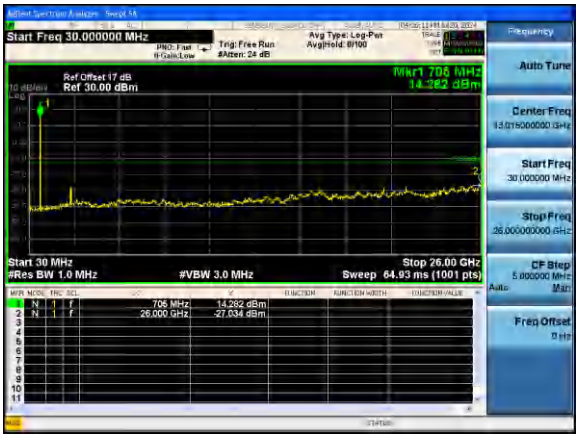


Lowest channel

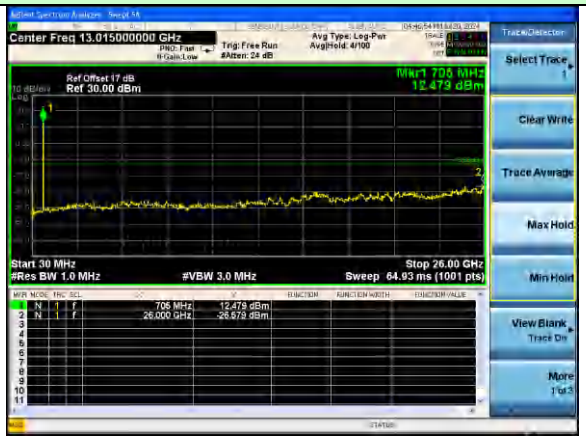


Middle channel

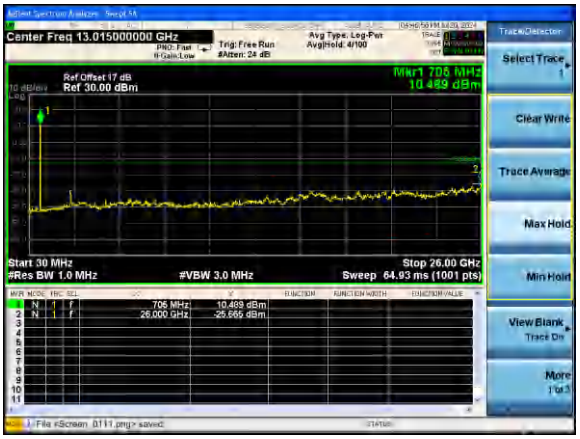


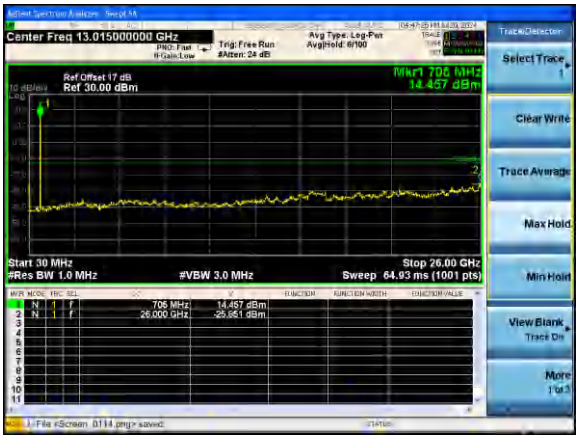


Highest channel

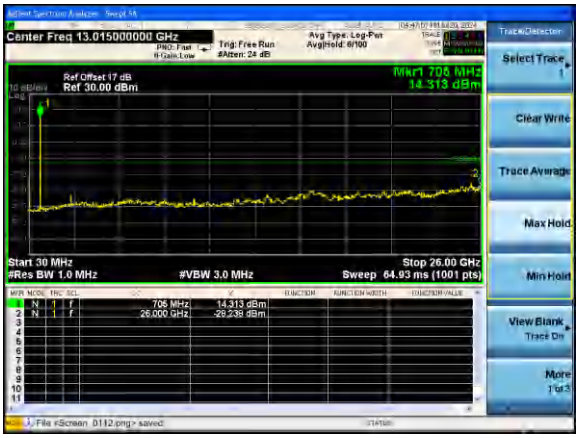
Test Mode: LTE Band 12 / 5MHz /1RB	Test Mode: LTE Band 12 / 5MHz /FULL RB
	

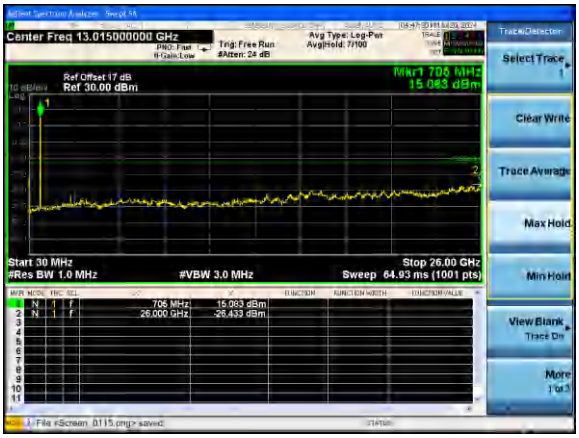
Lowest channel





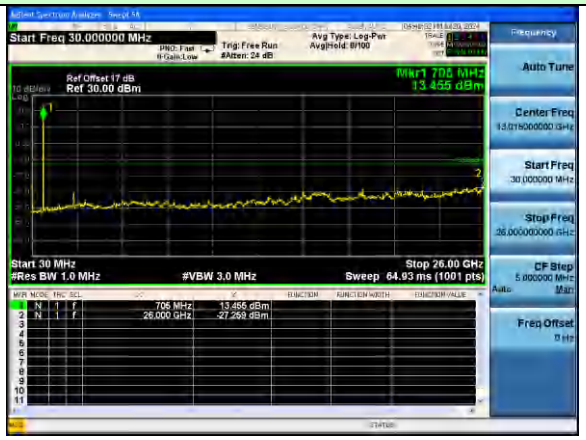
Middle channel

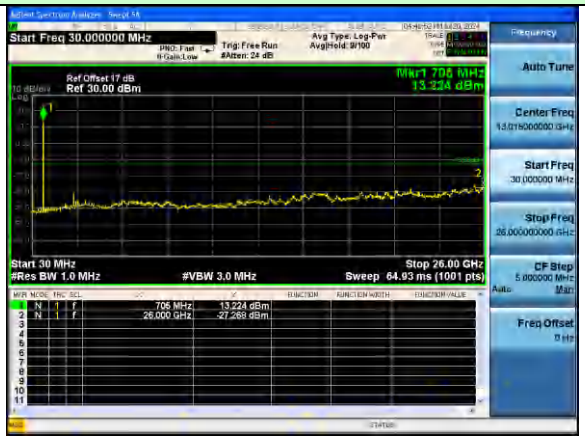




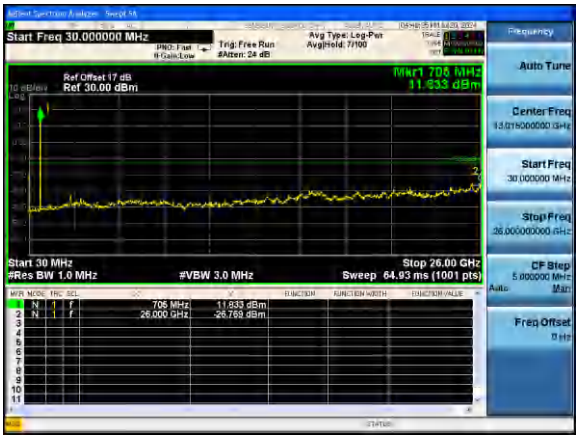
Highest channel

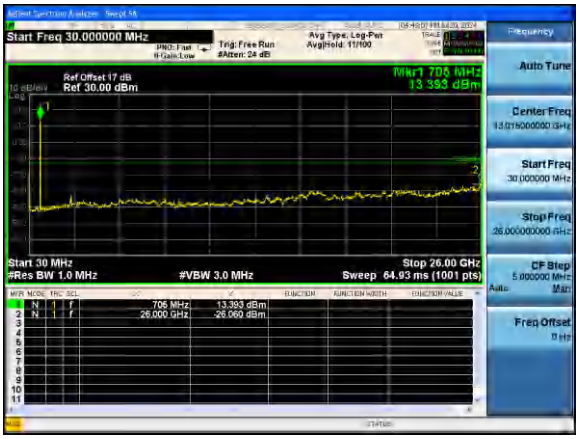
Test Mode: LTE Band 12 / 10MHz /1RB	Test Mode: LTE Band 12 / 10MHz /FULL RB



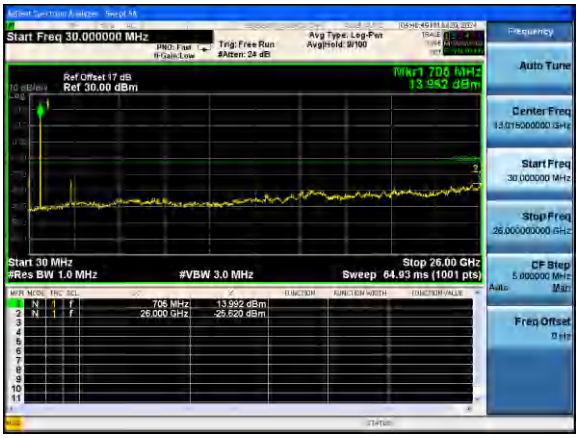


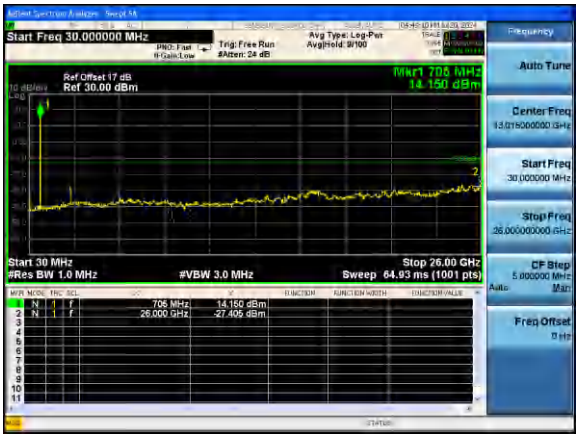
Lowest channel





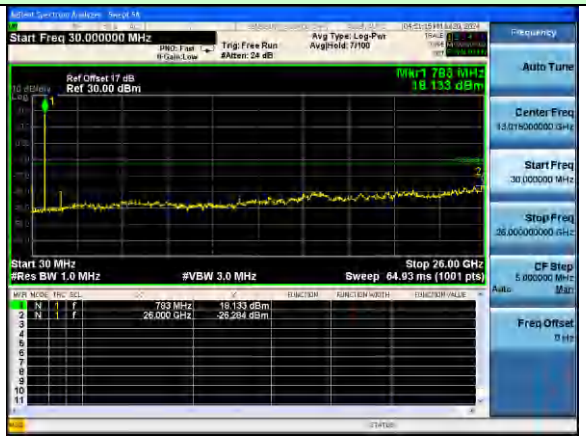
Middle channel

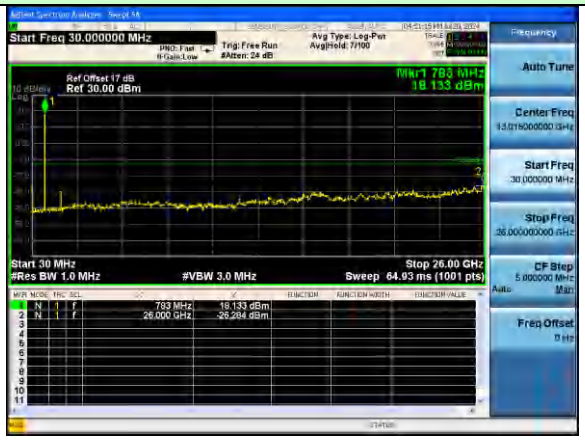




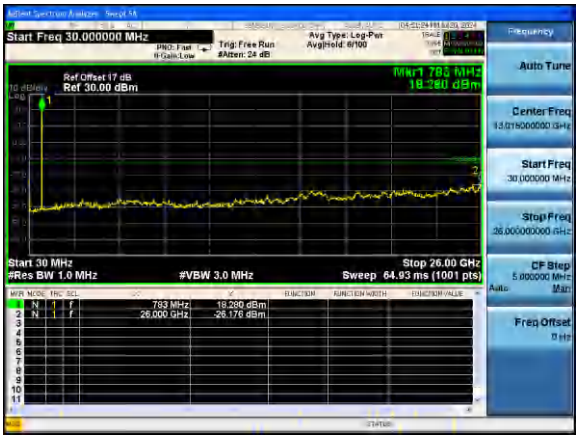
Highest channel

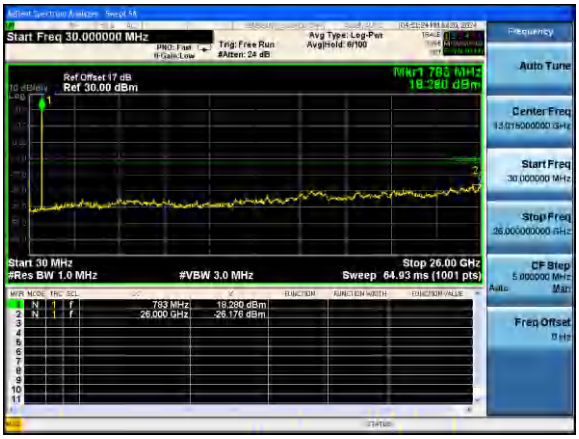
Test Mode: LTE Band 13 / 5MHz /1RB	Test Mode: LTE Band 13 / 5MHz /FULL RB



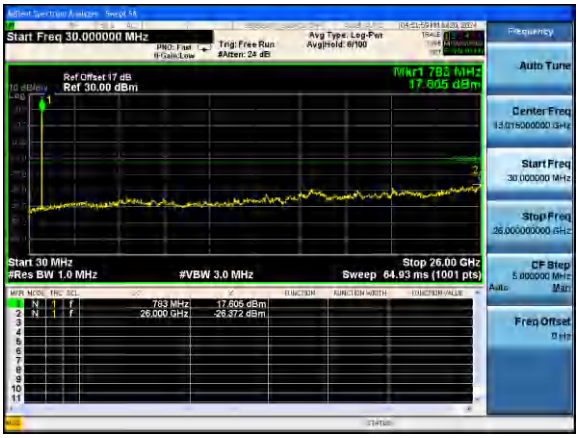


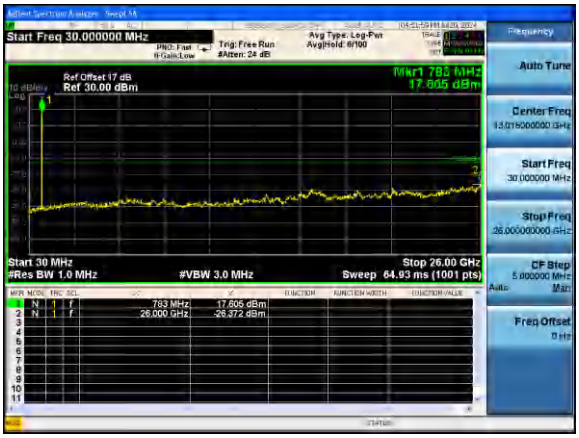
Lowest channel



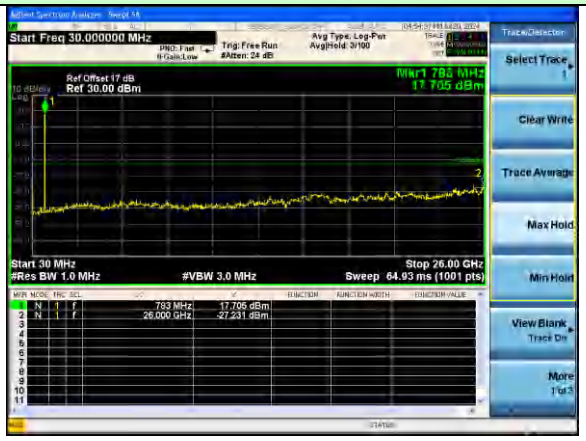
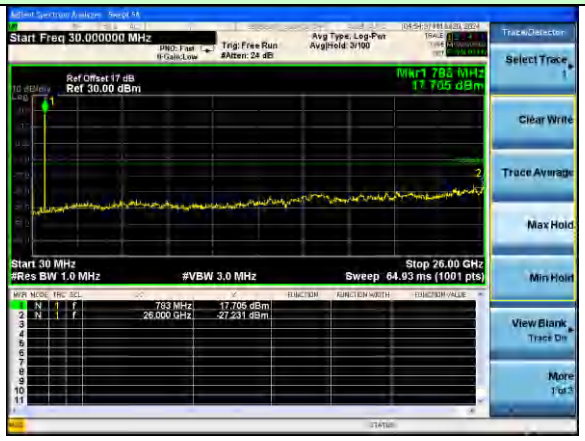


Middle channel

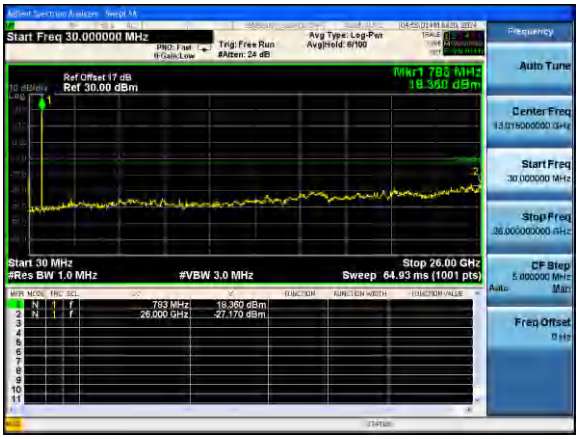


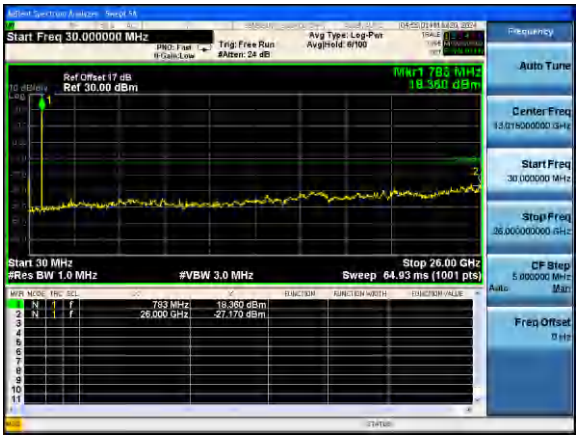


Highest channel

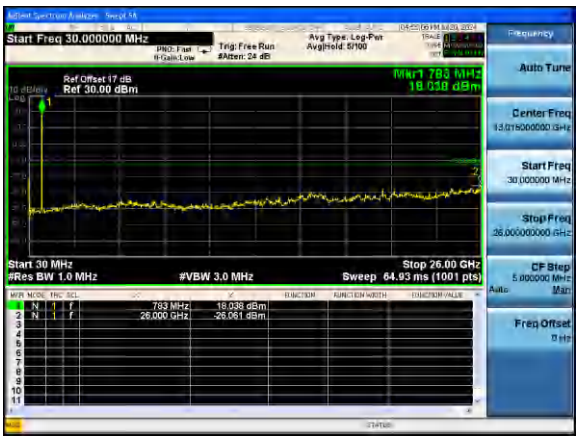
Test Mode: LTE Band 13 / 10MHz /1RB	Test Mode: LTE Band 13 / 10MHz /FULL RB
	

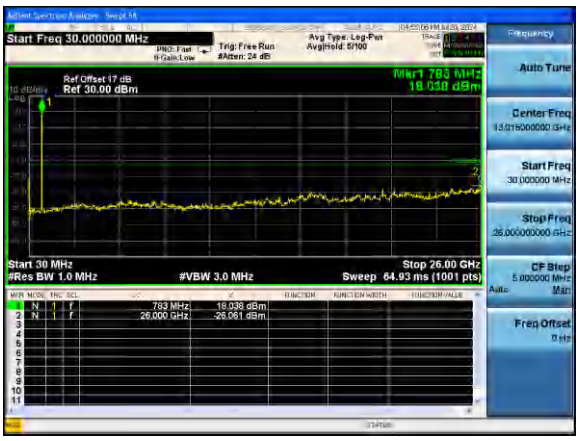
Lowest channel



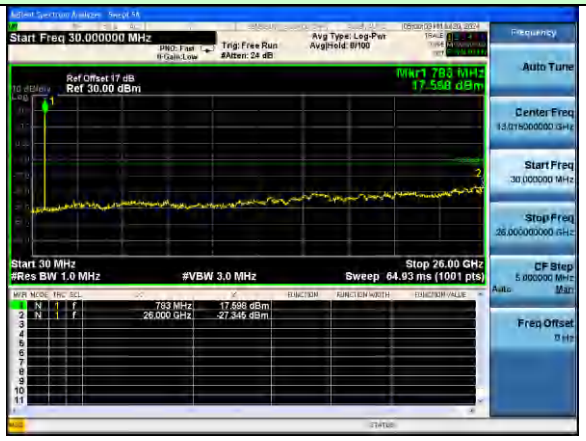
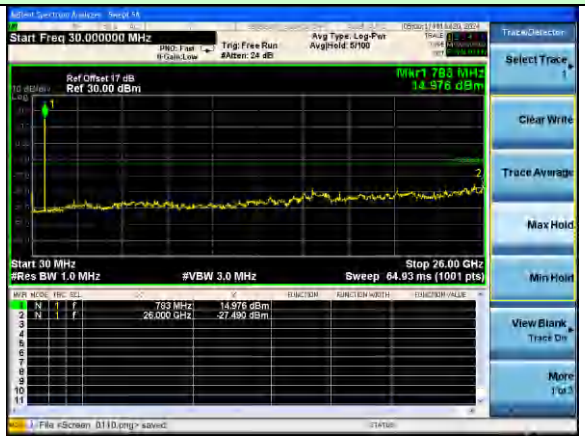


Middle channel

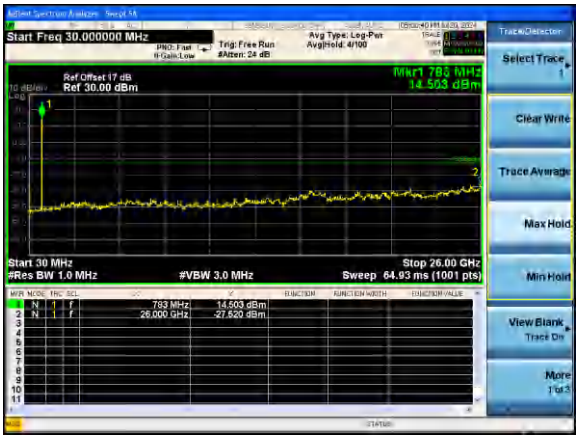




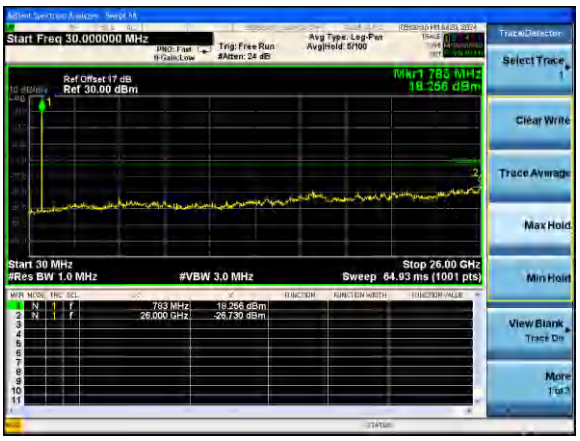
Highest channel

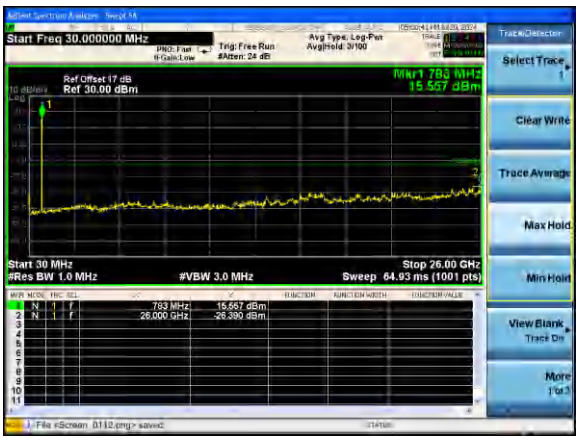
Test Mode: LTE Band 14 / 5MHz /1RB	Test Mode: LTE Band 14 / 5MHz /FULL RB
	

Lowest channel



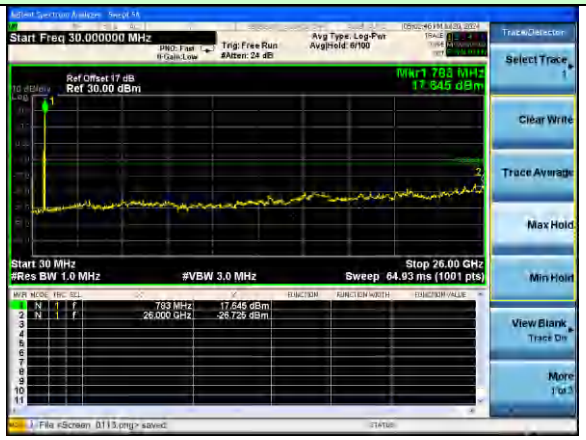
Middle channel

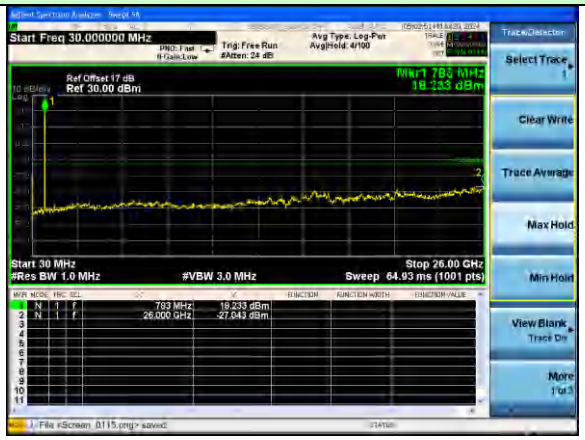




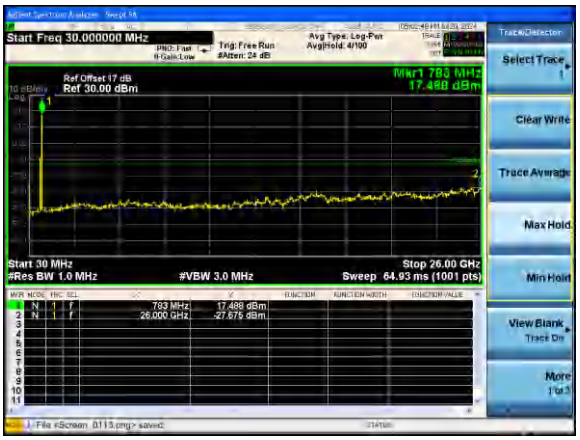
Highest channel

Test Mode: LTE Band 14 / 10MHz /1RB	Test Mode: LTE Band 14 / 10MHz /FULL RB

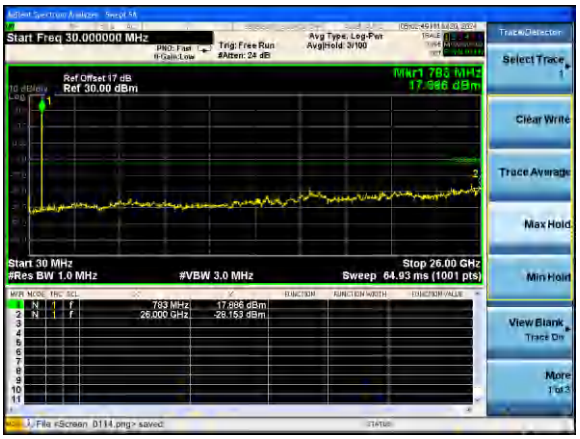


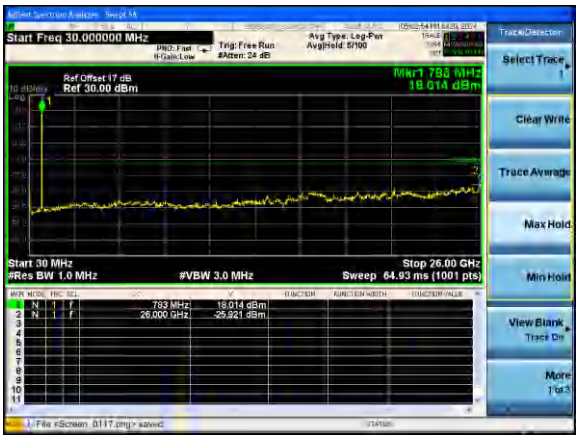


Lowest channel



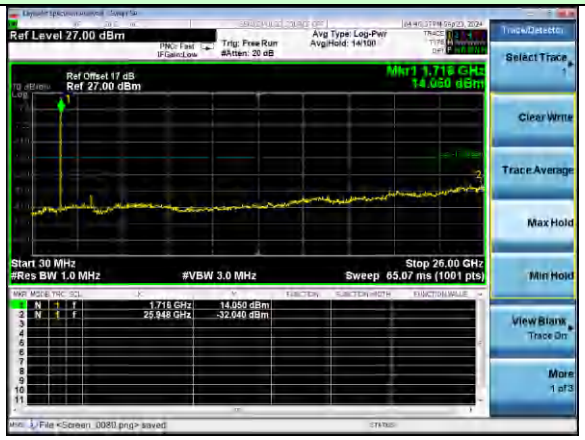
Middle channel



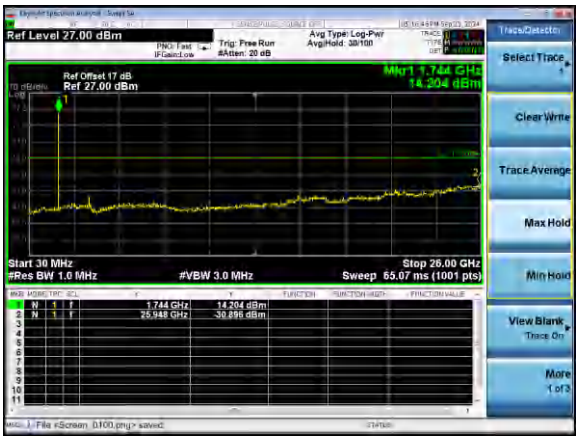


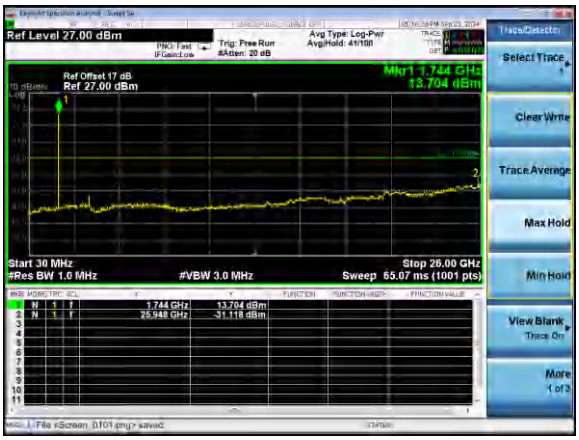
Highest channel

Test Mode: LTE Band 66 / 1.4MHz /1RB	Test Mode: LTE Band 66/ 1.4MHz /FULL RB

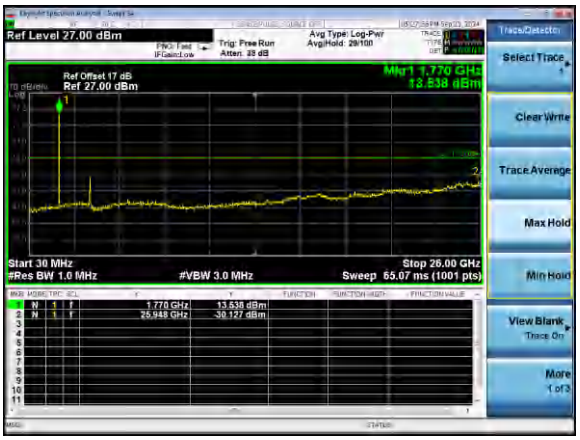


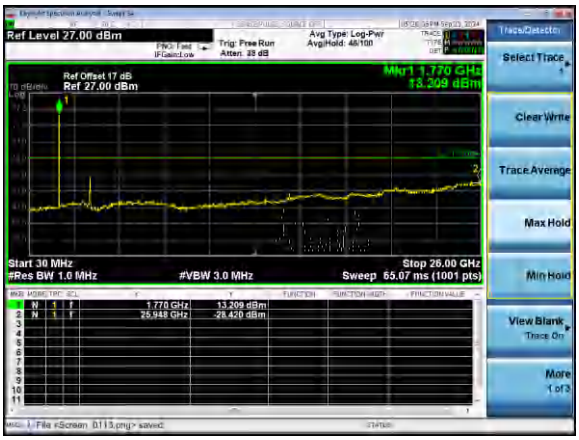
Lowest channel



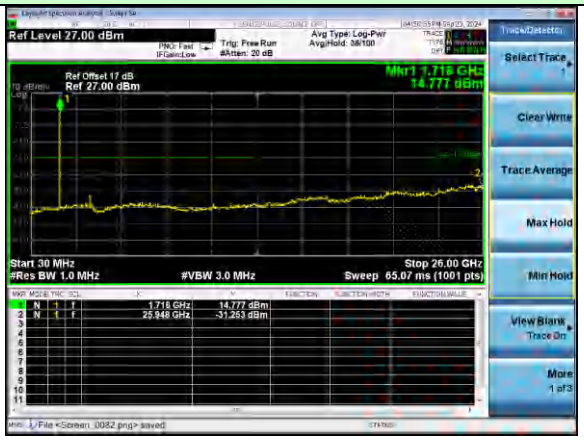


Middle channel

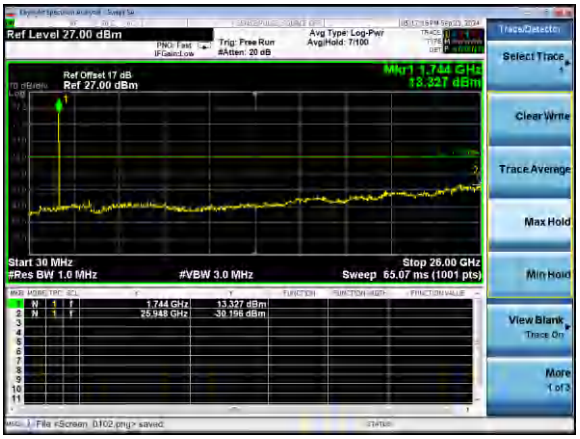


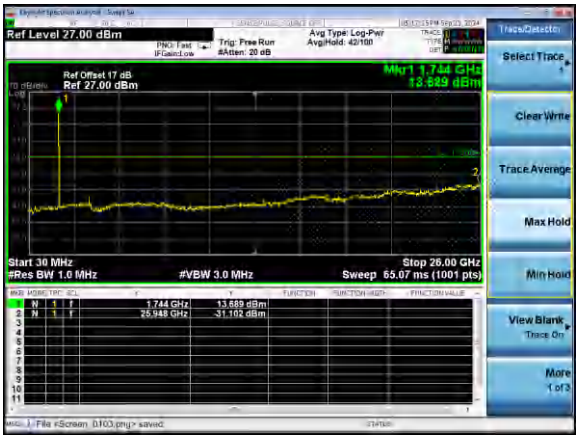


Highest channel

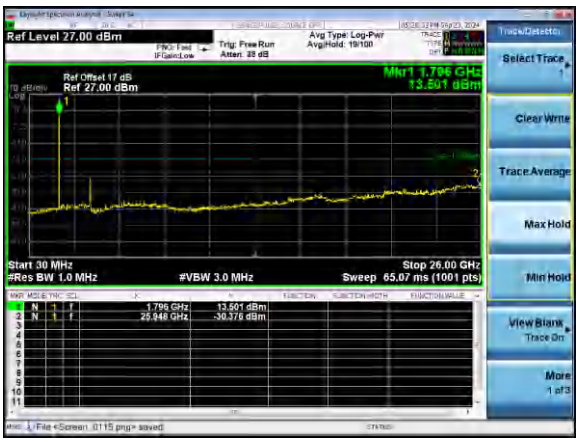
Test Mode: LTE Band 66 / 3MHz /1RB	Test Mode: LTE Band 66 / 3MHz /FULL RB
	

Lowest channel

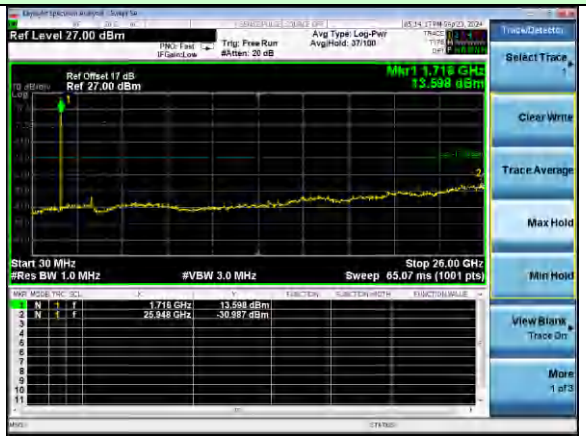




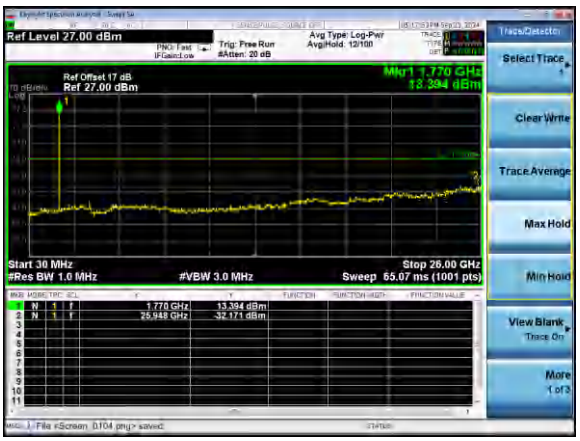
Middle channel

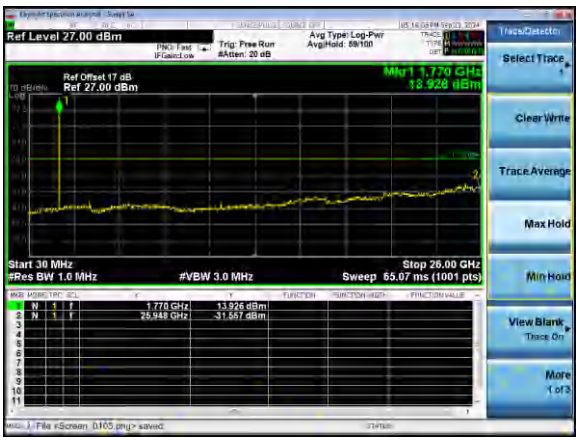


Highest channel

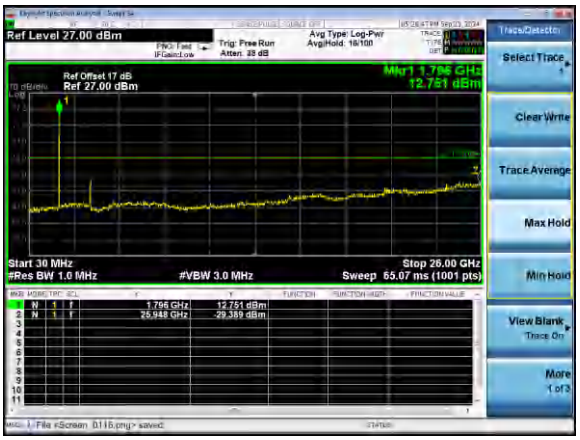
Test Mode: LTE Band 66 / 5MHz /1RB	Test Mode: LTE Band 66 / 5MHz /FULL RB
	

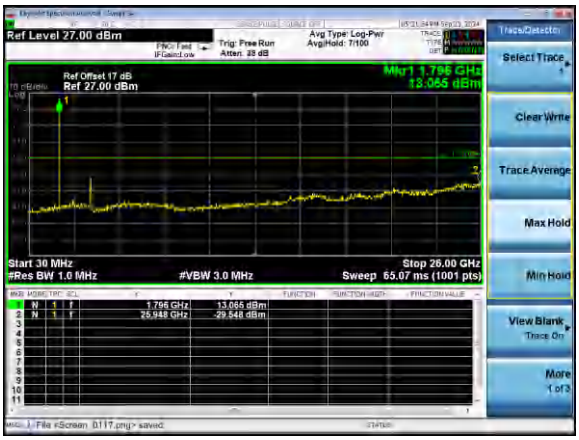
Lowest channel





Middle channel

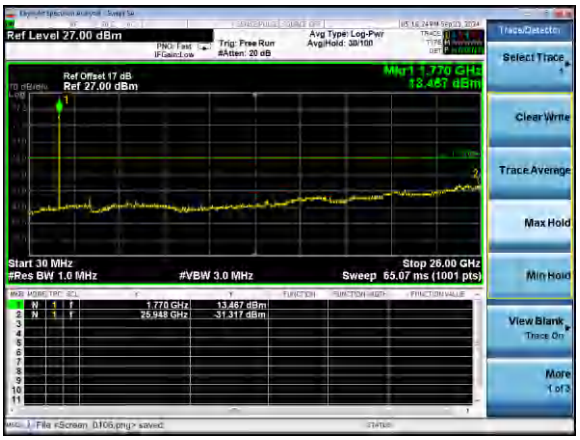


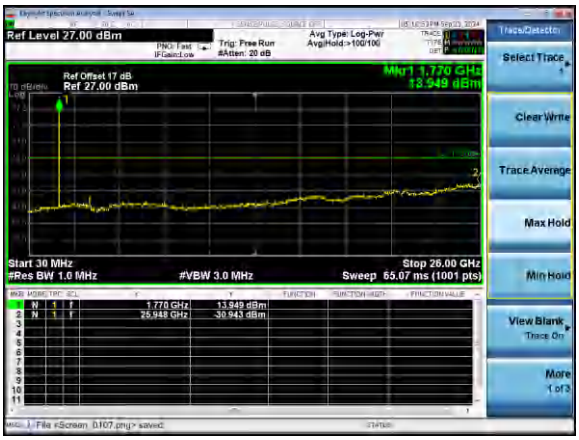


Highest channel

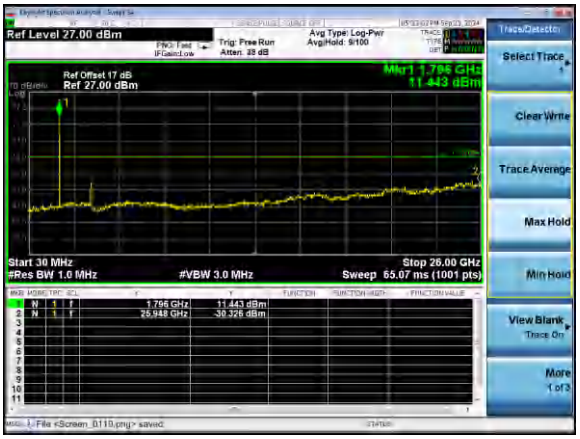
Test Mode: LTE Band 66 / 10MHz /1RB	Test Mode: LTE Band 66 / 10MHz /FULL RB

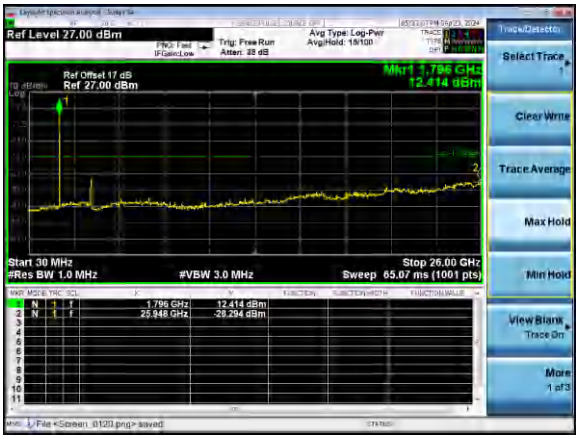
Lowest channel





Middle channel

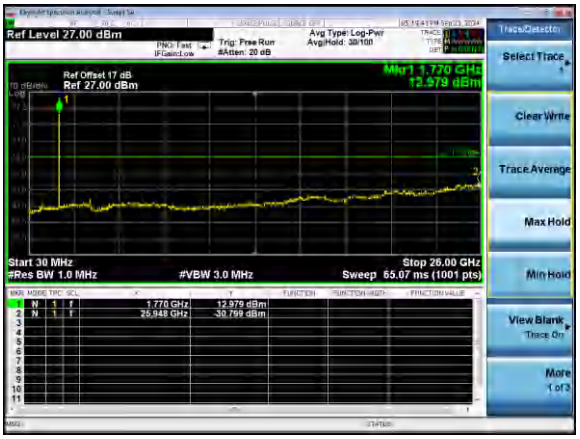


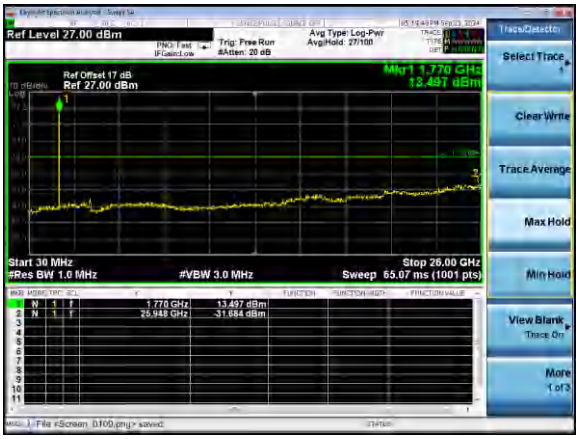


Highest channel

Test Mode: LTE Band 66 / 15MHz /1RB	Test Mode: LTE Band 66 / 15MHz /FULL RB

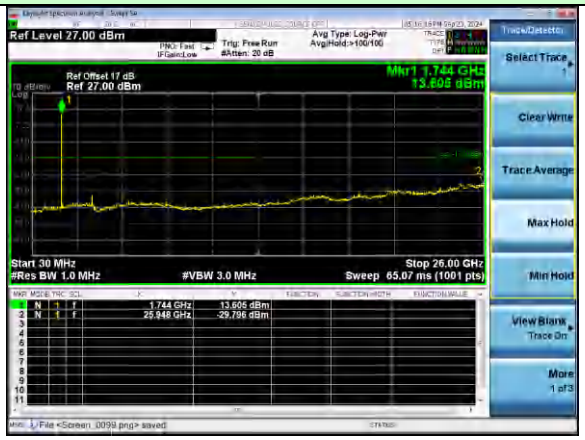
Lowest channel



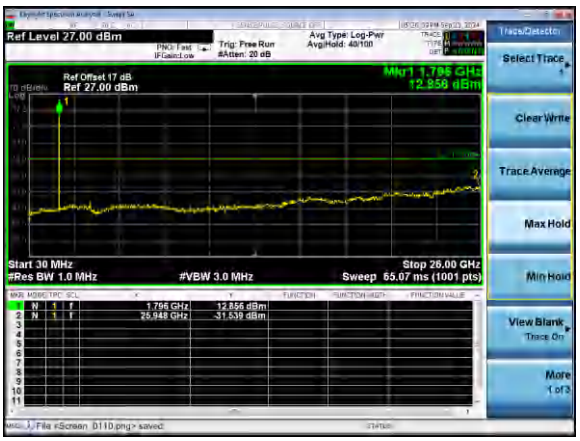


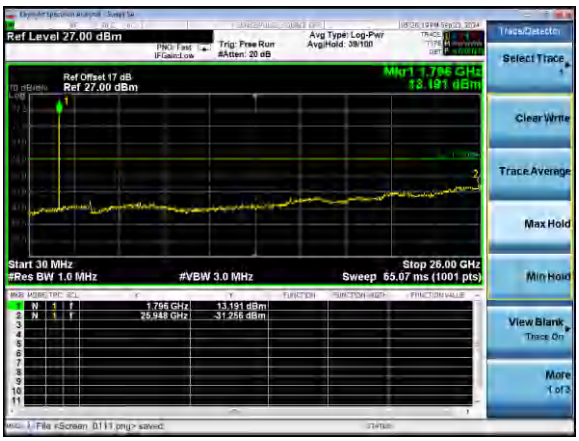
Middle channel

Highest channel

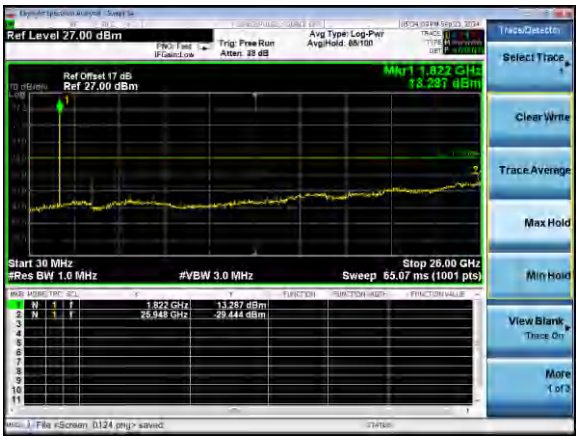
Test Mode: LTE Band 66 / 20MHz /1RB	Test Mode: LTE Band 66 / 20MHz /FULL RB
	

Lowest channel



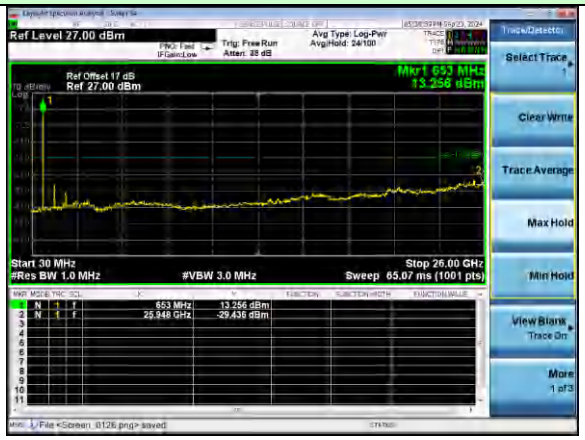


Middle channel

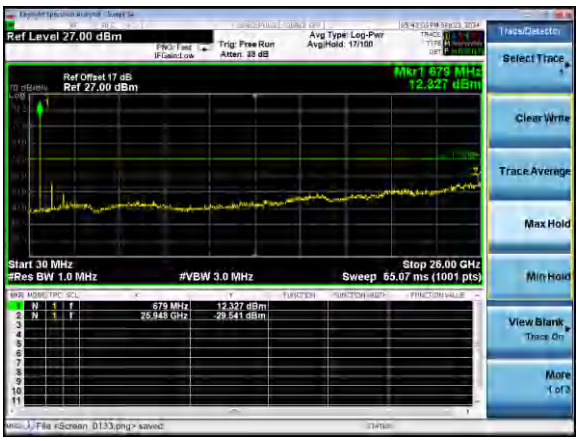


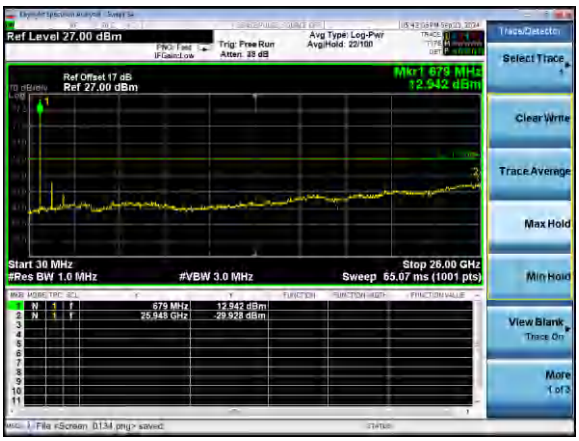
Highest channel

Test Mode: LTE Band 71 / 5MHz /1RB	Test Mode: LTE Band 71 / 5MHz /FULL RB

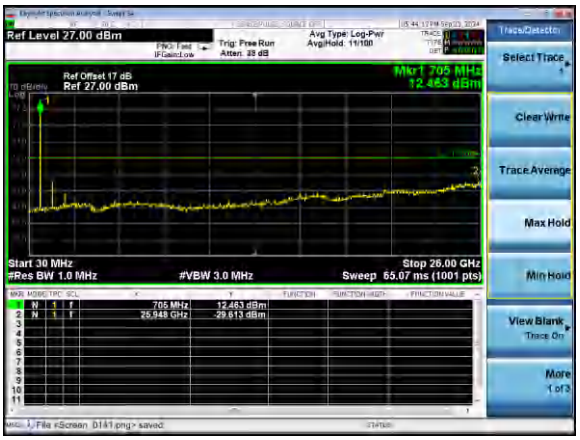


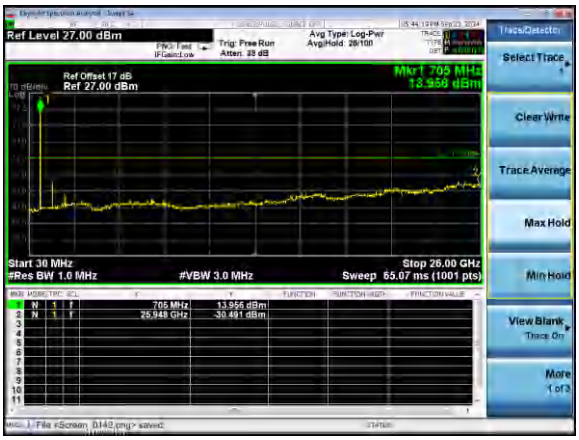
Lowest channel





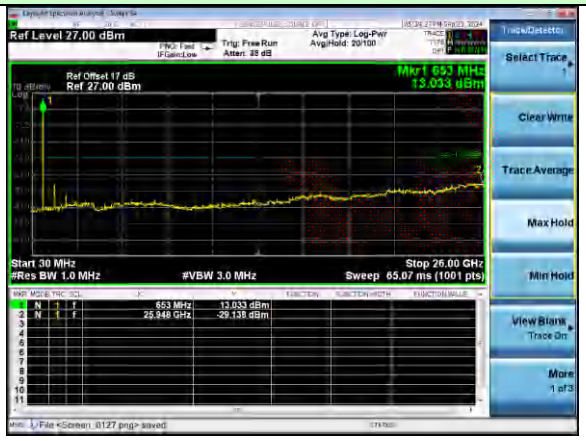
Middle channel

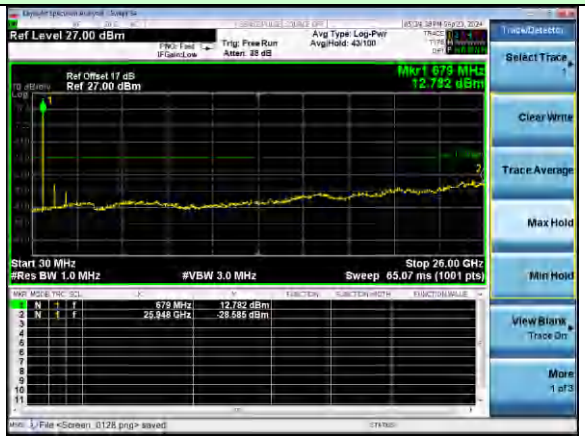




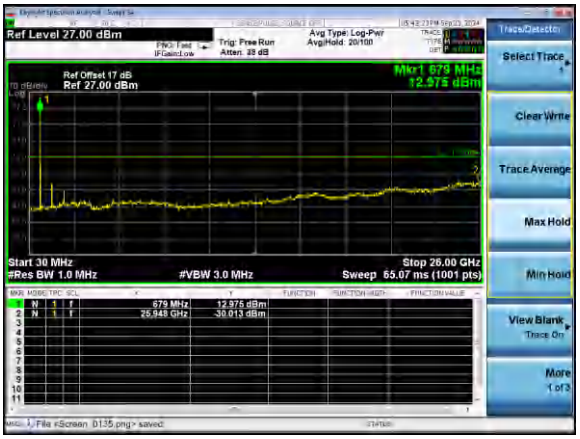
Highest channel

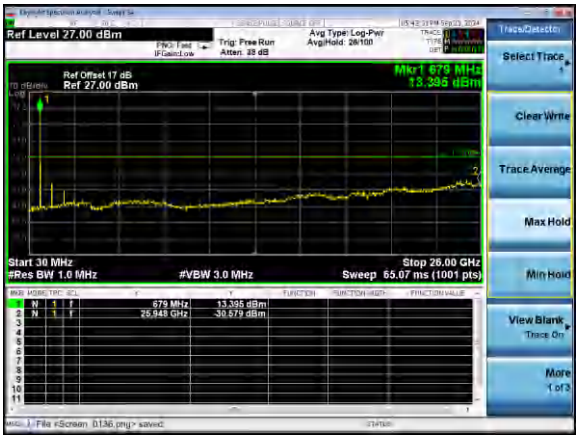
Test Mode: LTE Band 71 / 10MHz /1RB	Test Mode: LTE Band 71 / 10MHz /FULL RB



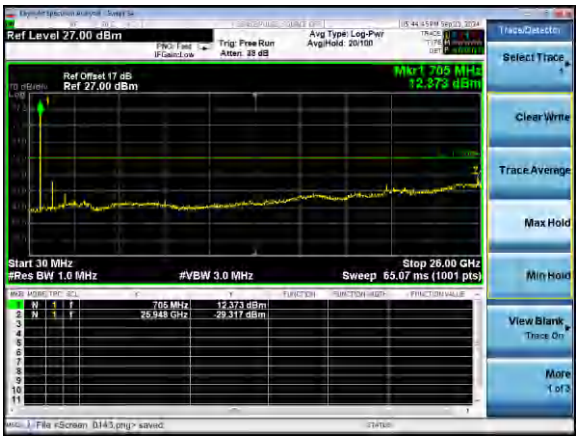


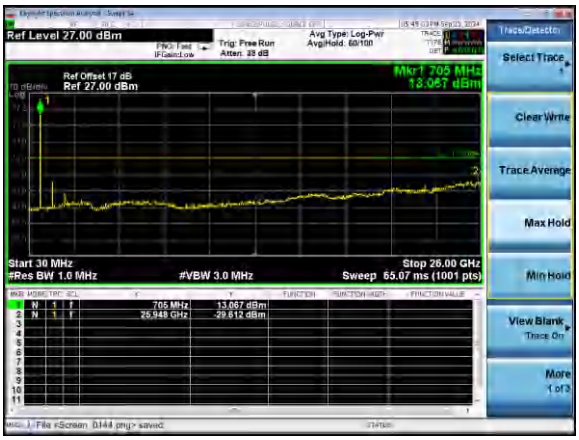
Lowest channel



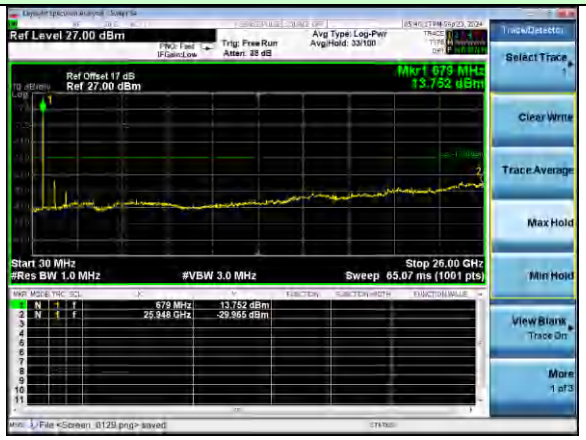
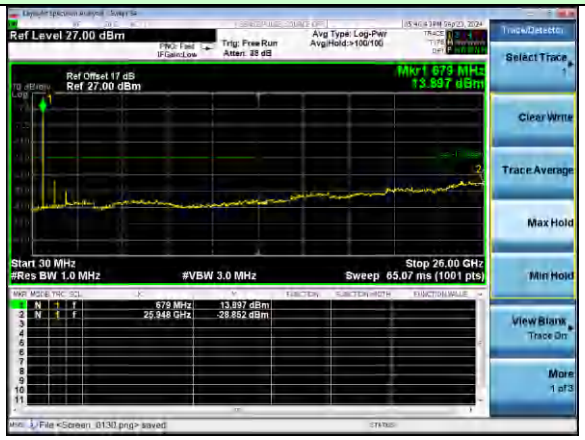


Middle channel

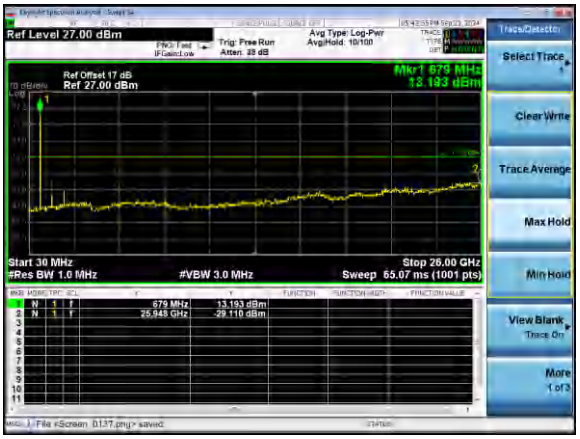


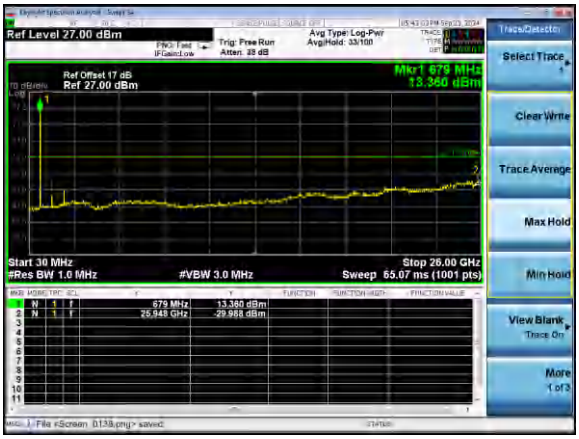


Highest channel

Test Mode: LTE Band 71 / 15MHz /1RB	Test Mode: LTE Band 71 / 15MHz /FULL RB
	

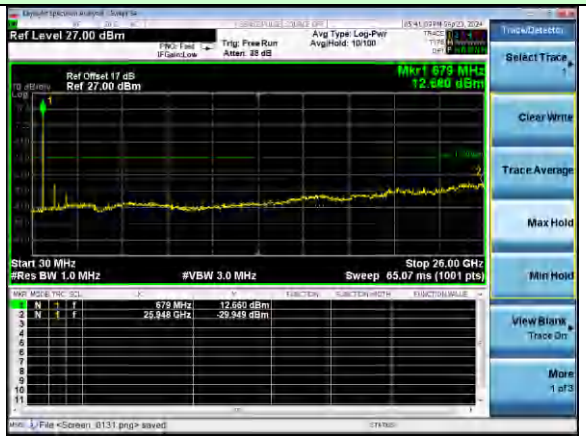
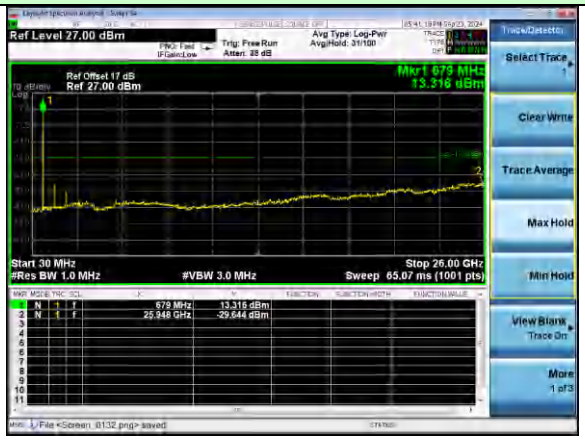
Lowest channel



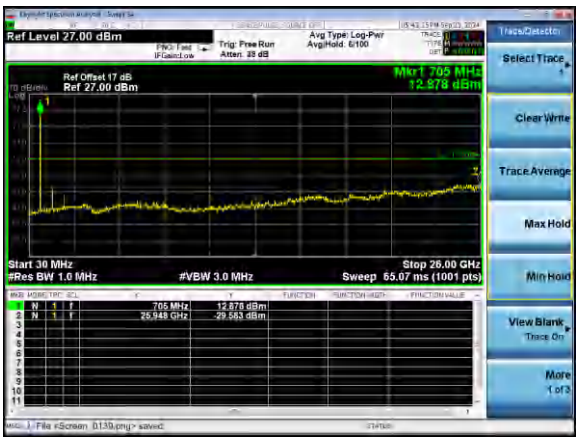


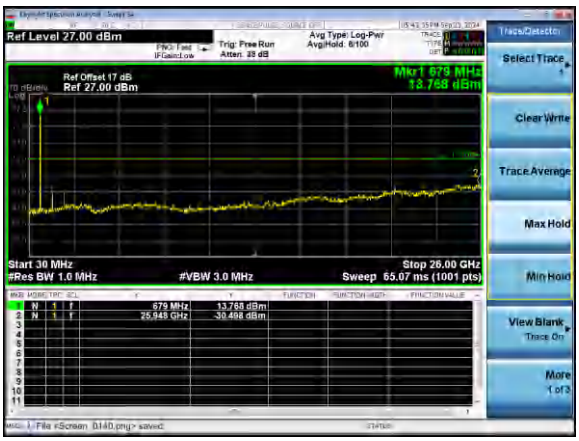
Middle channel

Highest channel

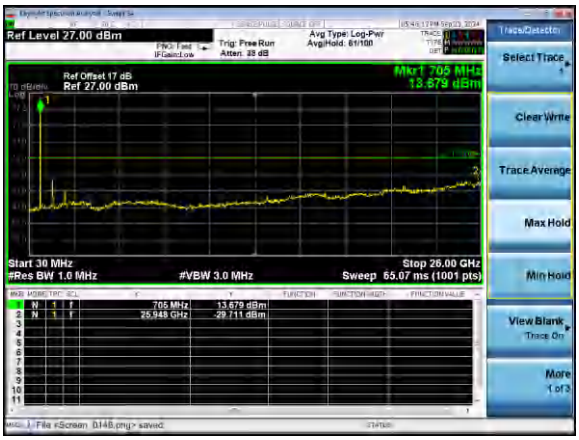
Test Mode: LTE Band 71 / 20MHz /1RB	Test Mode: LTE Band 71 / 20MHz /FULL RB
	

Lowest channel





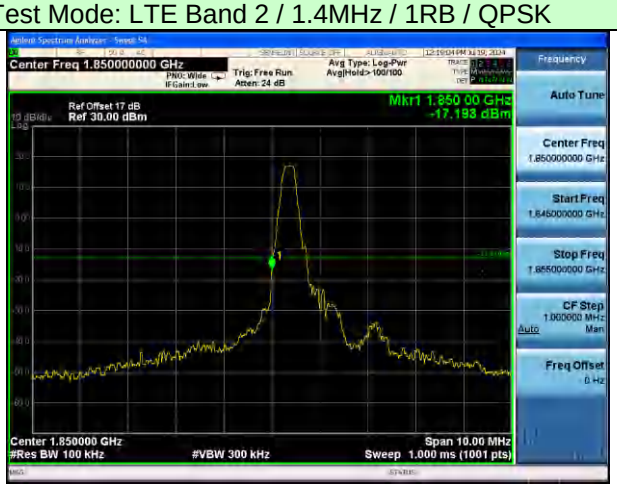
Middle channel



Highest channel

Band Edge

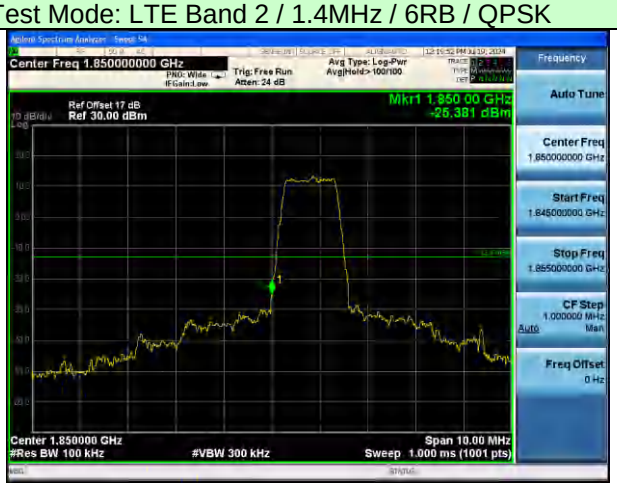
Test Mode: LTE Band 2 / 1.4MHz / 1RB / QPSK



Lowest channel

Highest channel

Test Mode: LTE Band 2 / 1.4MHz / 6RB / QPSK



Lowest channel

Highest channel

Test Mode: LTE Band 2 / 3MHz / 1RB / QPSK

Lowest channel

Highest channel

Test Mode: LTE Band 2 / 3MHz / 15RB / QPSK

Lowest channel

Highest channel

Test Mode: LTE Band 2 / 5MHz / 1RB / QPSK

Lowest channel

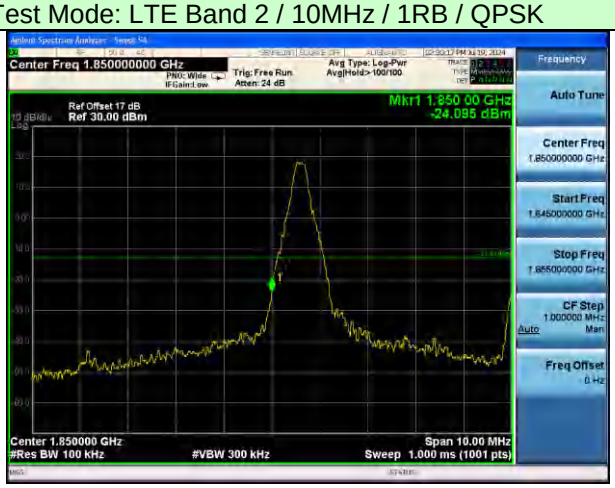
Highest channel

Test Mode: LTE Band 2 / 5MHz / 25RB / QPSK

Lowest channel

Highest channel

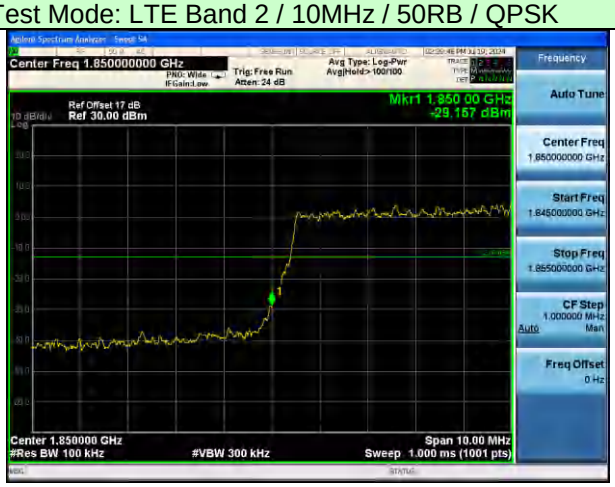
Test Mode: LTE Band 2 / 10MHz / 1RB / QPSK



Lowest channel

Highest channel

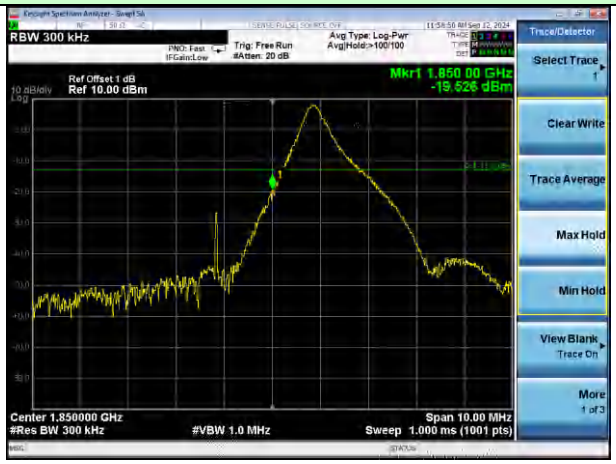
Test Mode: LTE Band 2 / 10MHz / 50RB / QPSK



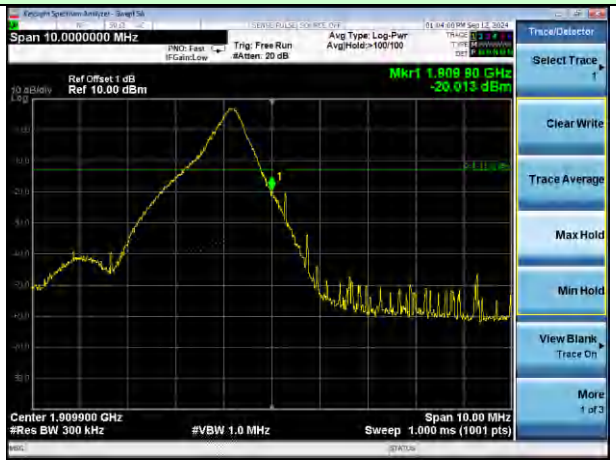
Lowest channel

Highest channel

Test Mode: LTE Band 2 / 15MHz / 1RB / QPSK

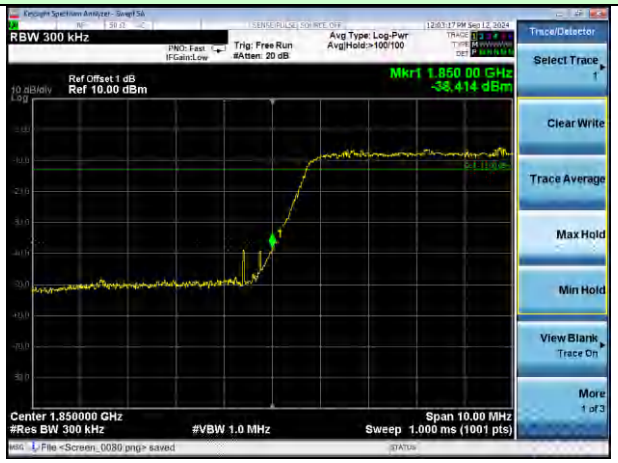


Lowest channel



Highest channel

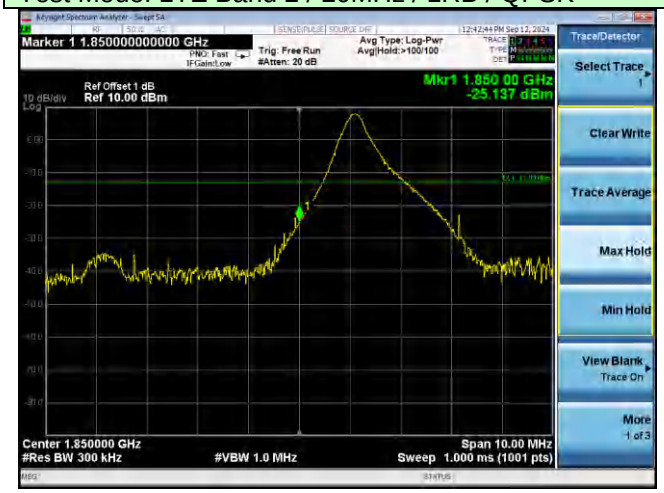
Test Mode: LTE Band 2 / 15MHz / 75RB / QPSK



Lowest channel

Highest channel

Test Mode: LTE Band 2 / 20MHz / 1RB / QPSK



Lowest channel

Highest channel

Test Mode: LTE Band 2 / 20MHz / 100RB / QPSK

Lowest channel

Highest channel

Test Mode: LTE Band 2 / 1.4MHz / 1RB / 16-QAM

Lowest channel

Highest channel

Test Mode: LTE Band 2 / 1.4MHz / 6RB / 16-QAM

Lowest channel

Highest channel

Test Mode: LTE Band 2 / 3MHz / 1RB / 16-QAM

Lowest channel

Highest channel

Test Mode: LTE Band 2 / 3MHz / 15RB / 16-QAM

Lowest channel

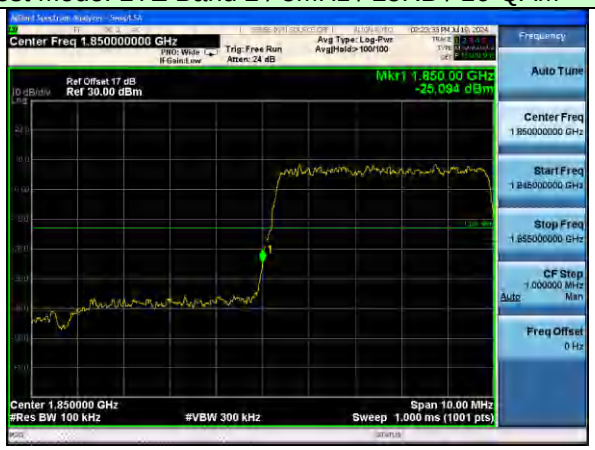
Highest channel

Test Mode: LTE Band 2 / 5MHz / 1RB / 16-QAM

Lowest channel

Highest channel

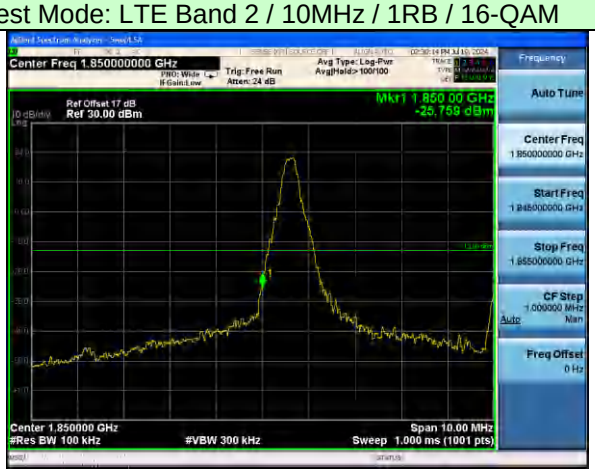
Test Mode: LTE Band 2 / 5MHz / 25RB / 16-QAM



Lowest channel

Highest channel

Test Mode: LTE Band 2 / 10MHz / 1RB / 16-QAM



Lowest channel

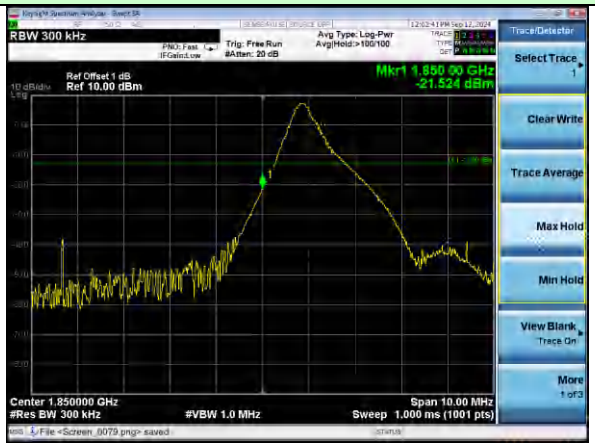
Highest channel

Test Mode: LTE Band 2 / 10MHz / 50RB / 16-QAM

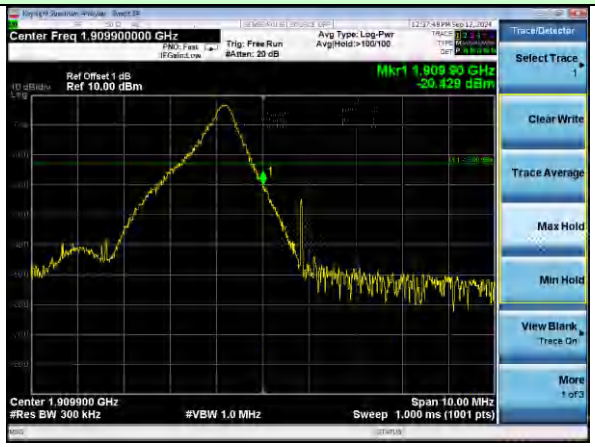
Lowest channel

Highest channel

Test Mode: LTE Band 2 / 15MHz / 1RB / 16-QAM



Lowest channel



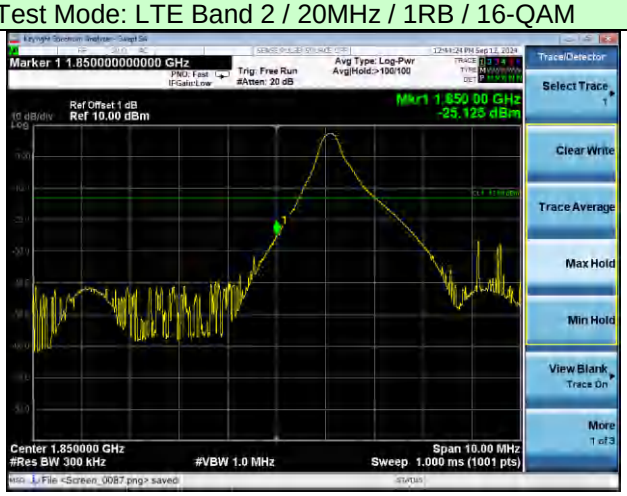
Highest channel

Test Mode: LTE Band 2 / 15MHz / 75RB / 16-QAM

Lowest channel

Highest channel

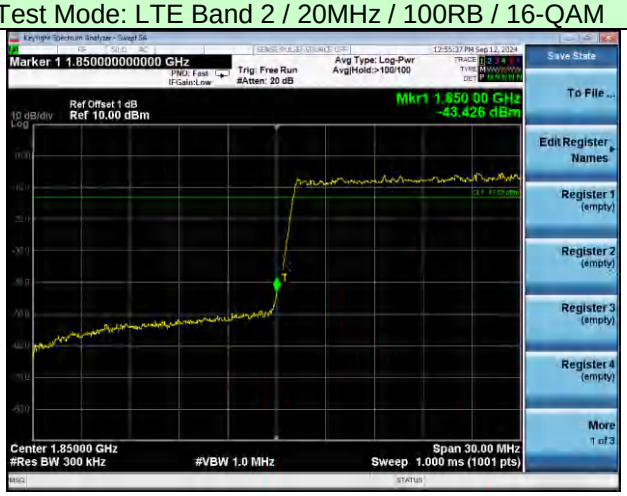
Test Mode: LTE Band 2 / 20MHz / 1RB / 16-QAM



Lowest channel

Highest channel

Test Mode: LTE Band 2 / 20MHz / 100RB / 16-QAM



Lowest channel

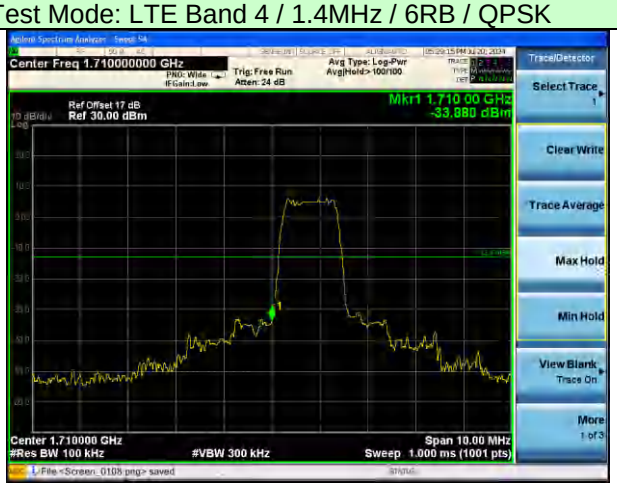
Highest channel

Test Mode: LTE Band 4 / 1.4MHz / 1RB / QPSK

Lowest channel

Highest channel

Test Mode: LTE Band 4 / 1.4MHz / 6RB / QPSK



Lowest channel

Highest channel

Test Mode: LTE Band 4 / 3MHz / 1RB / QPSK

Lowest channel

Highest channel