

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

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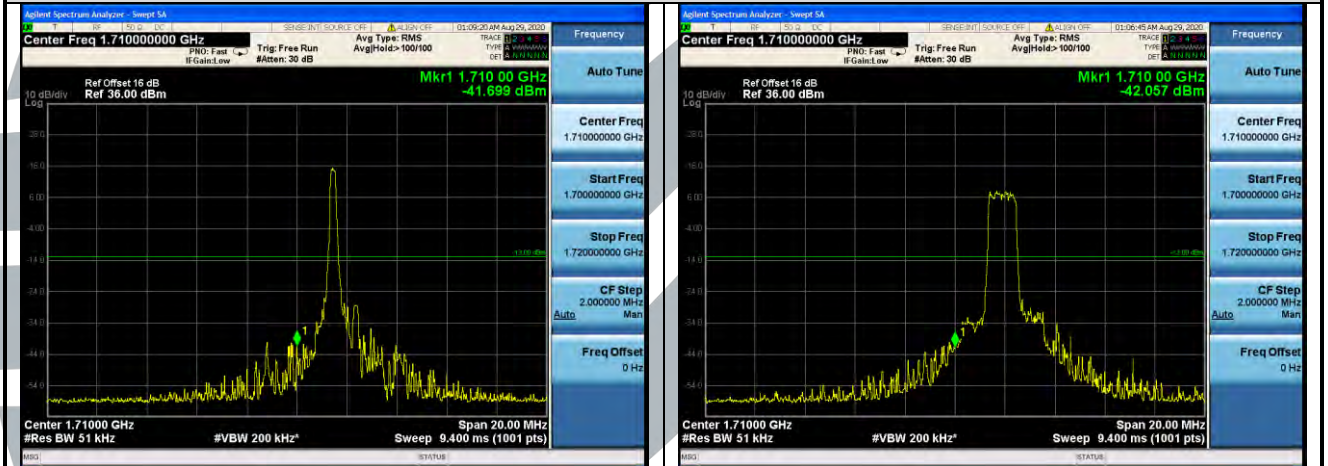
UTTR-RF-RSS4G-V1.1



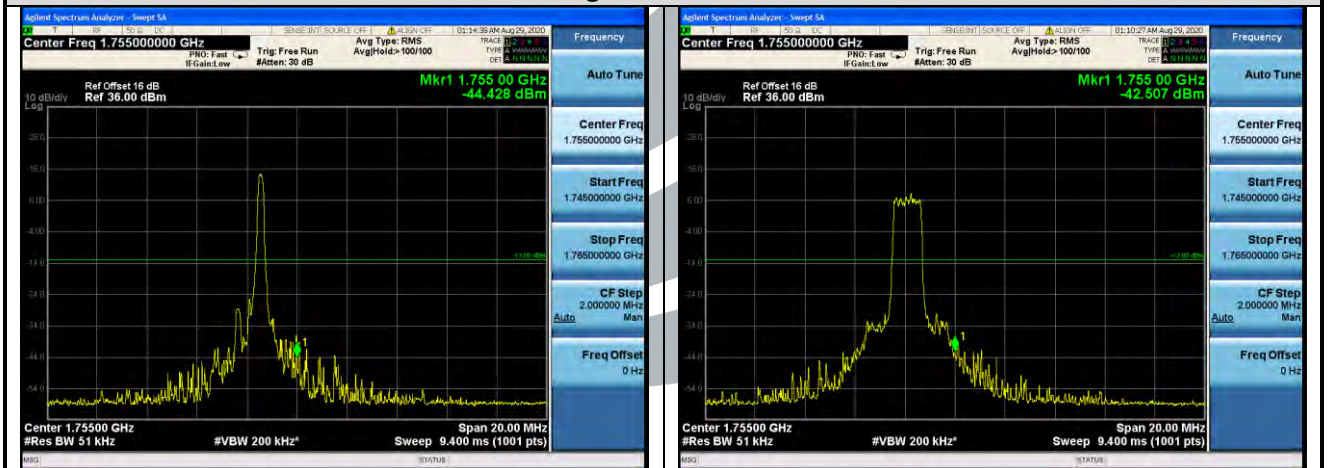
LTE Band 4 / 20 MHz / QPSK

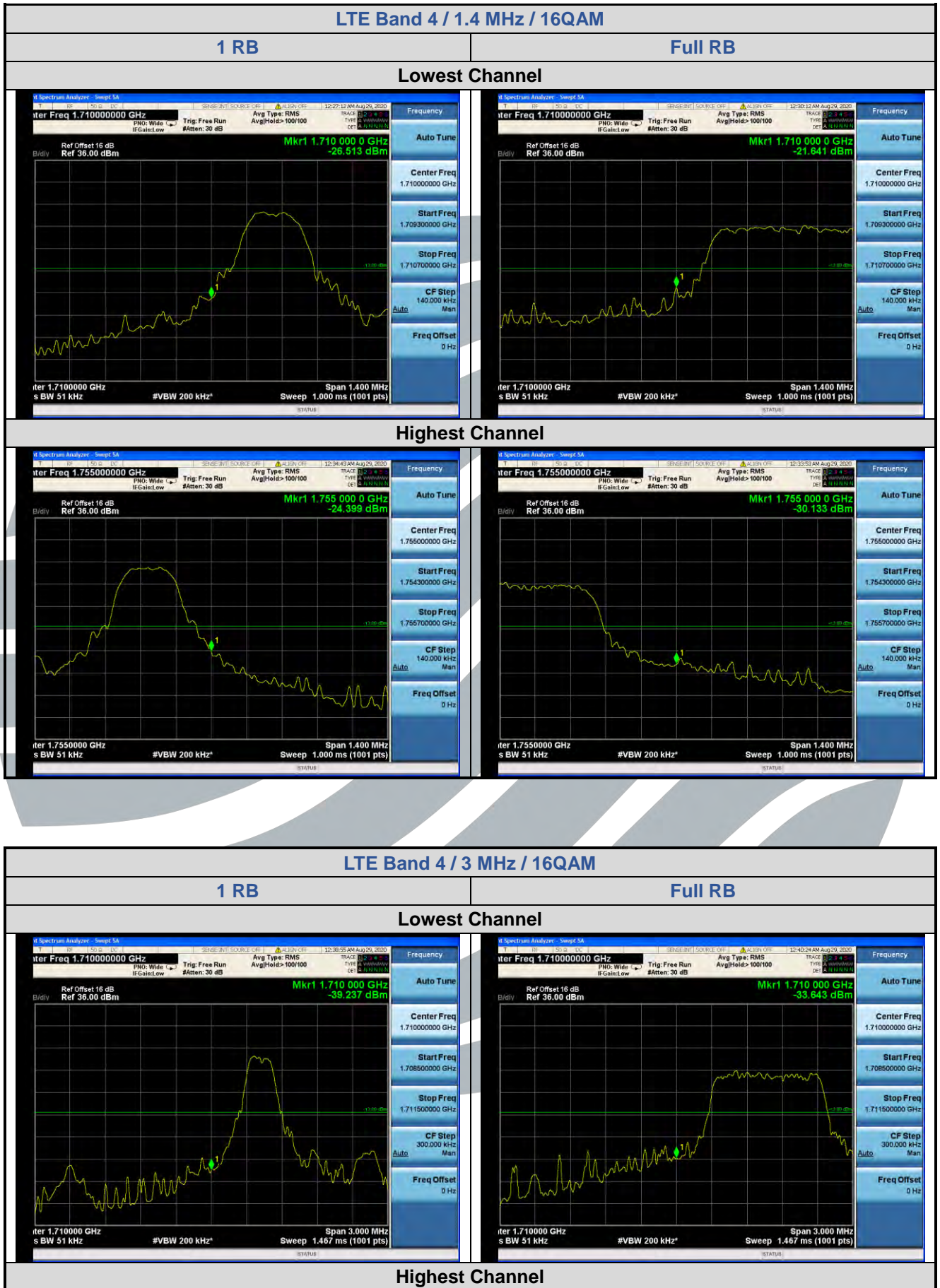
1 RB Full RB

Lowest Channel



Highest Channel





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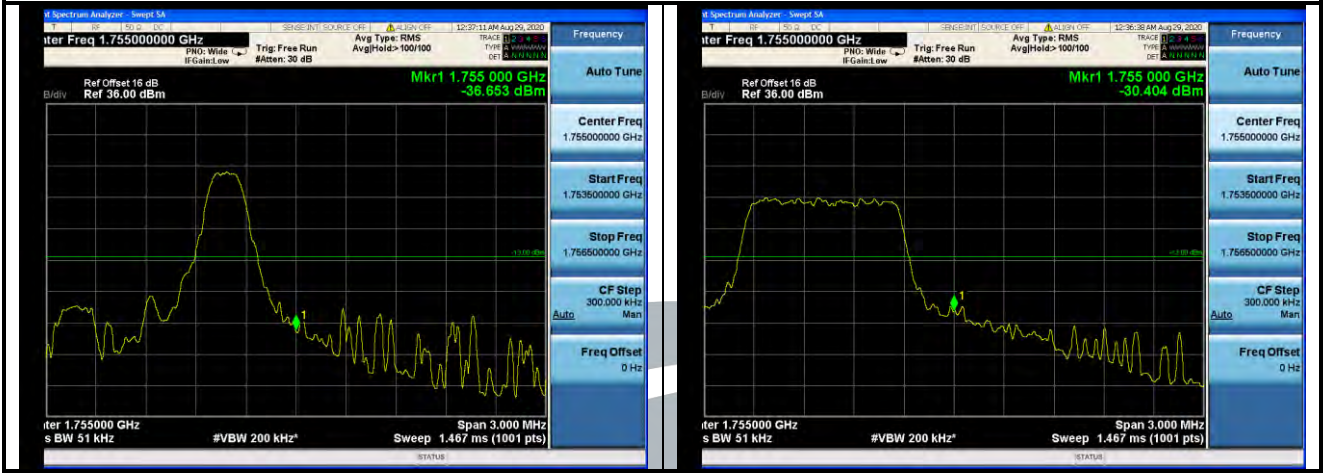
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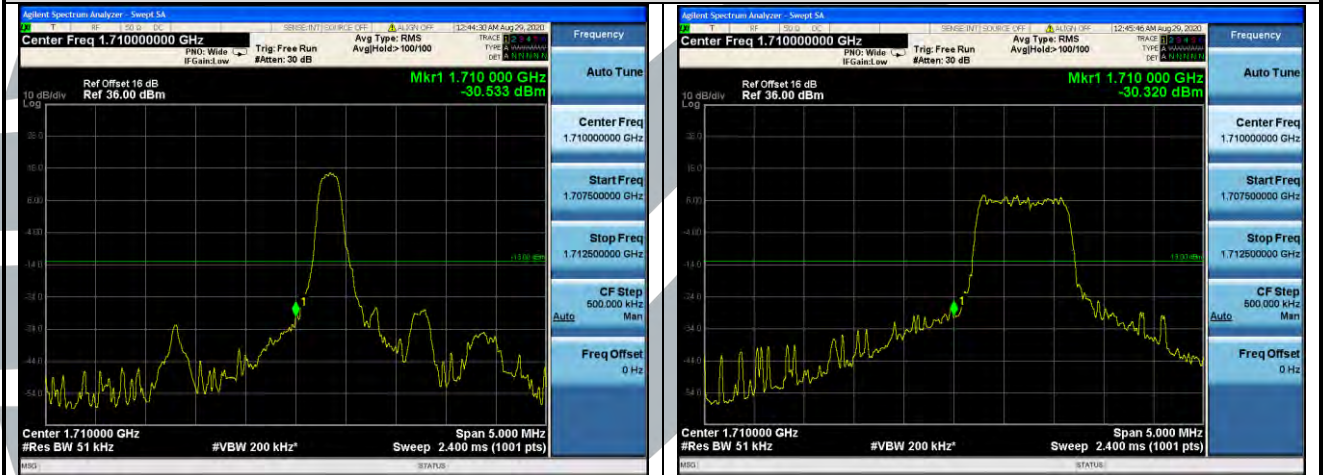
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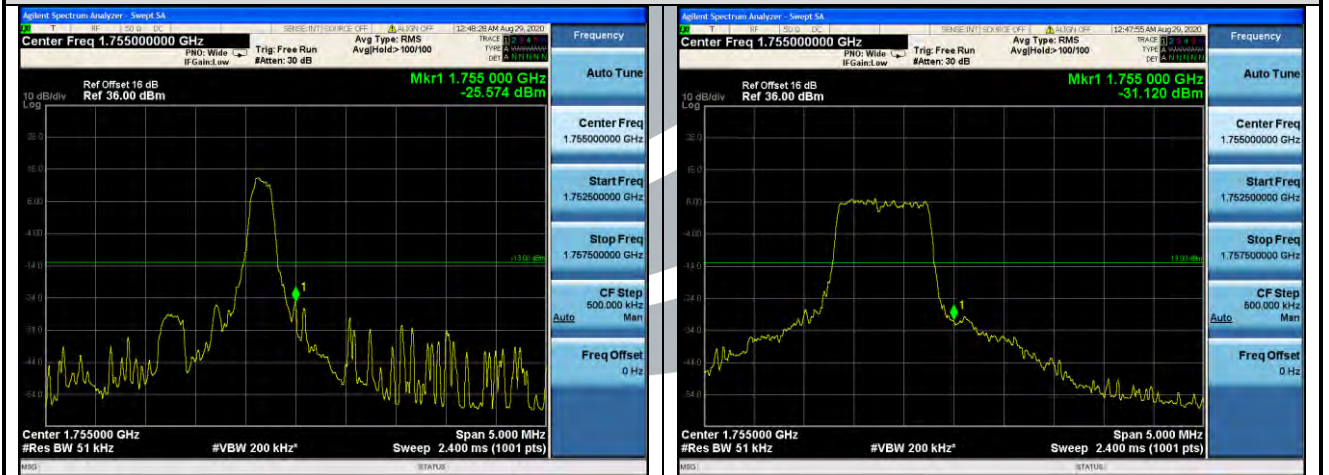
LTE Band 4 / 5 MHz / 16QAM

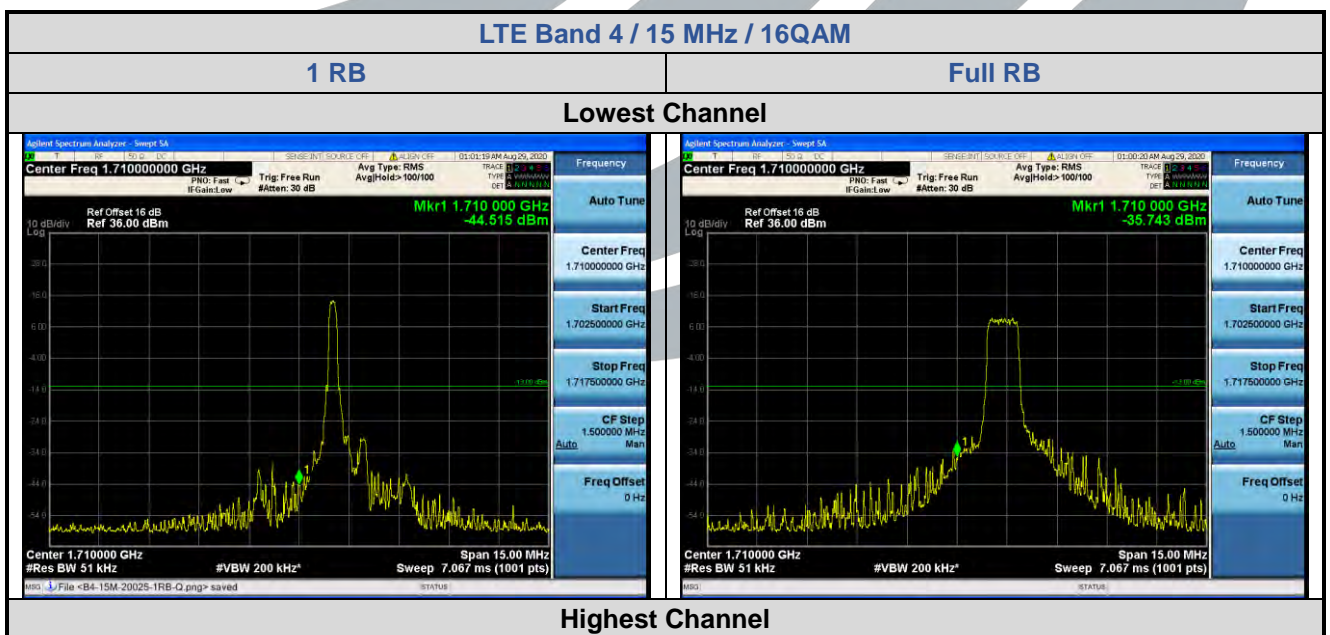
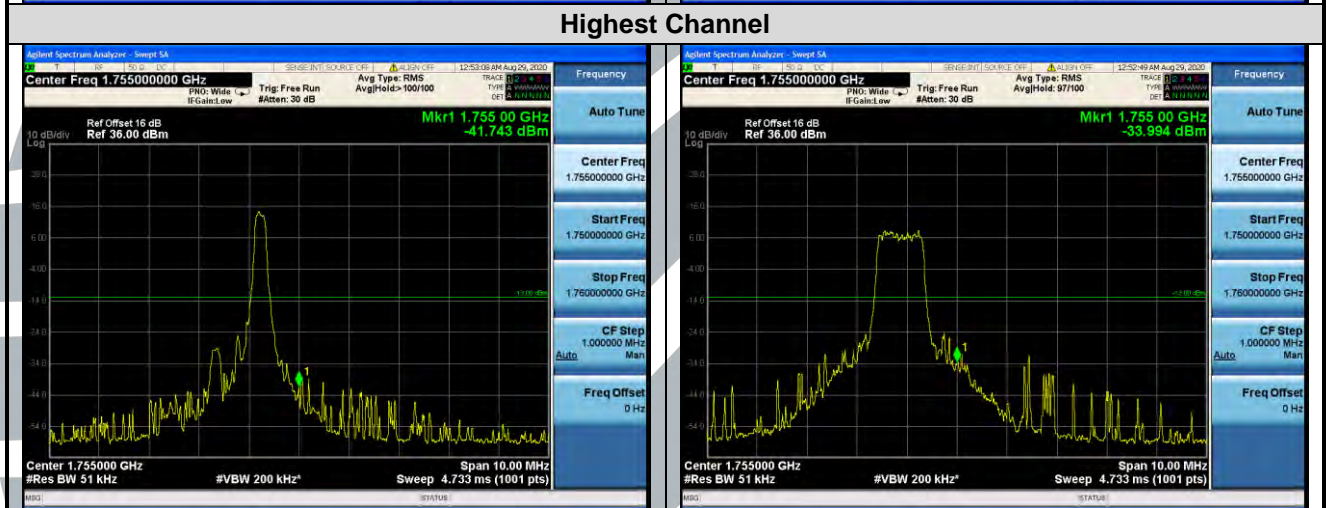
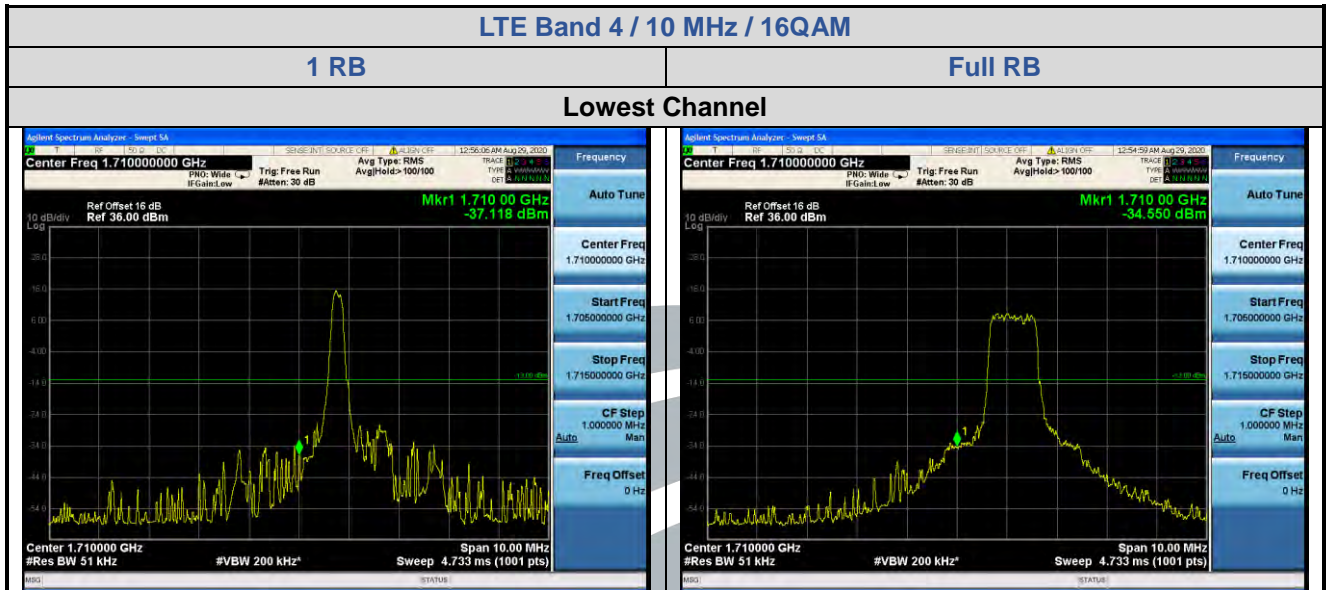
1 RB	Full RB
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Lowest Channel



Highest Channel





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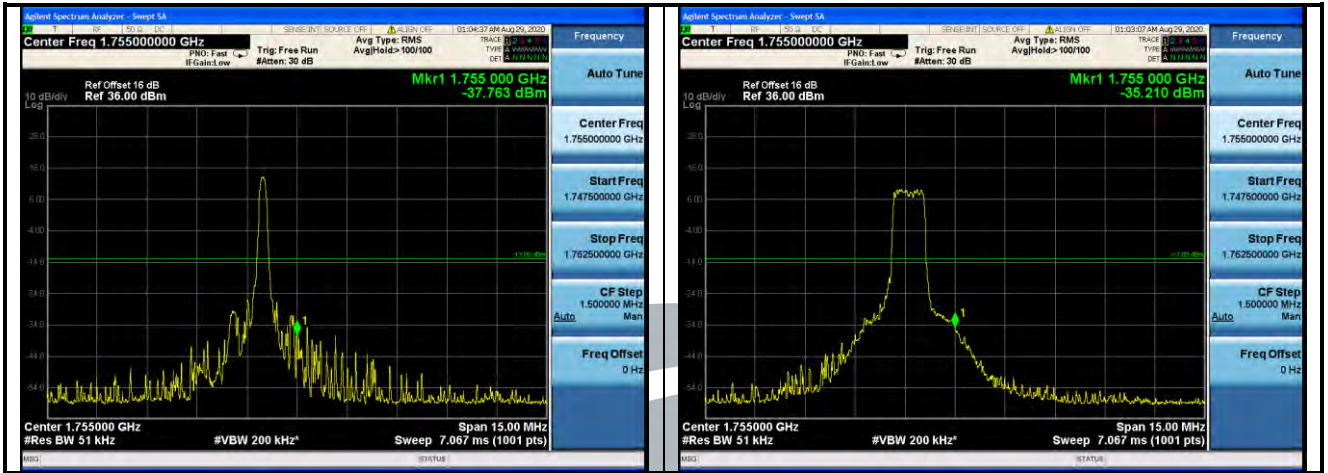
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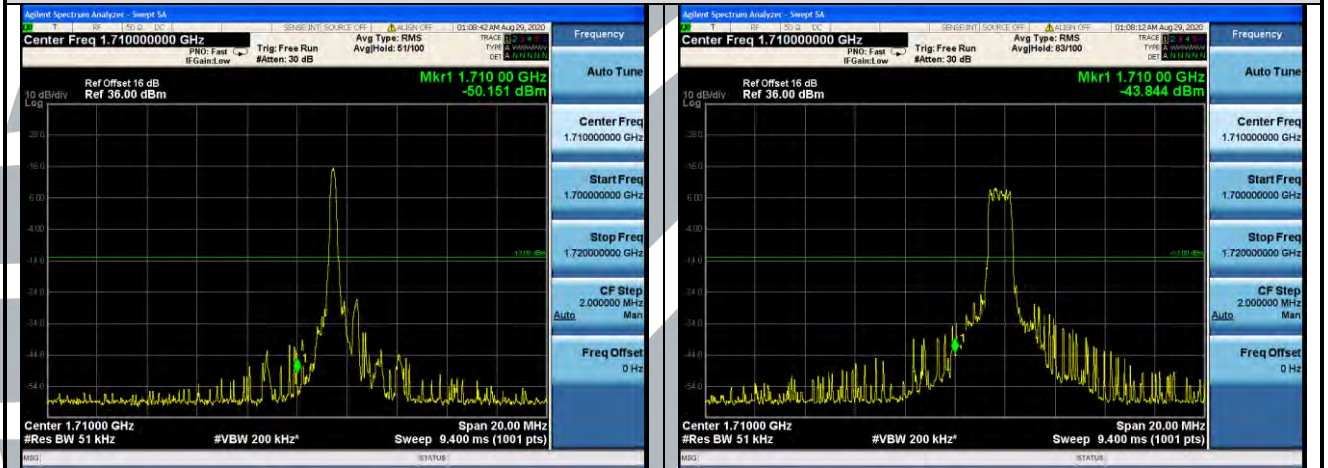


LTE Band 4 / 20 MHz / 16QAM

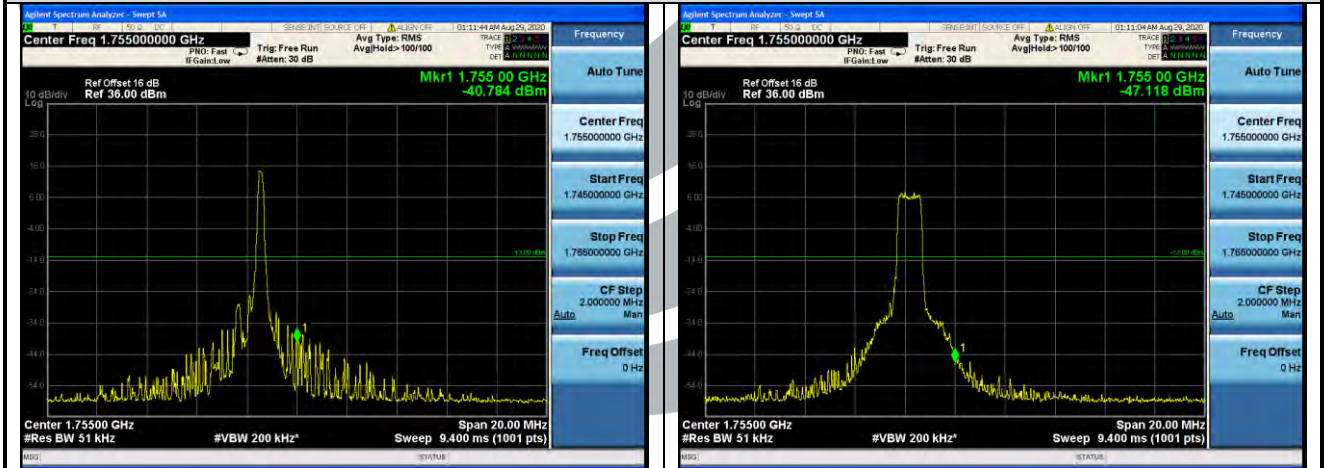
1 RB

Full RB

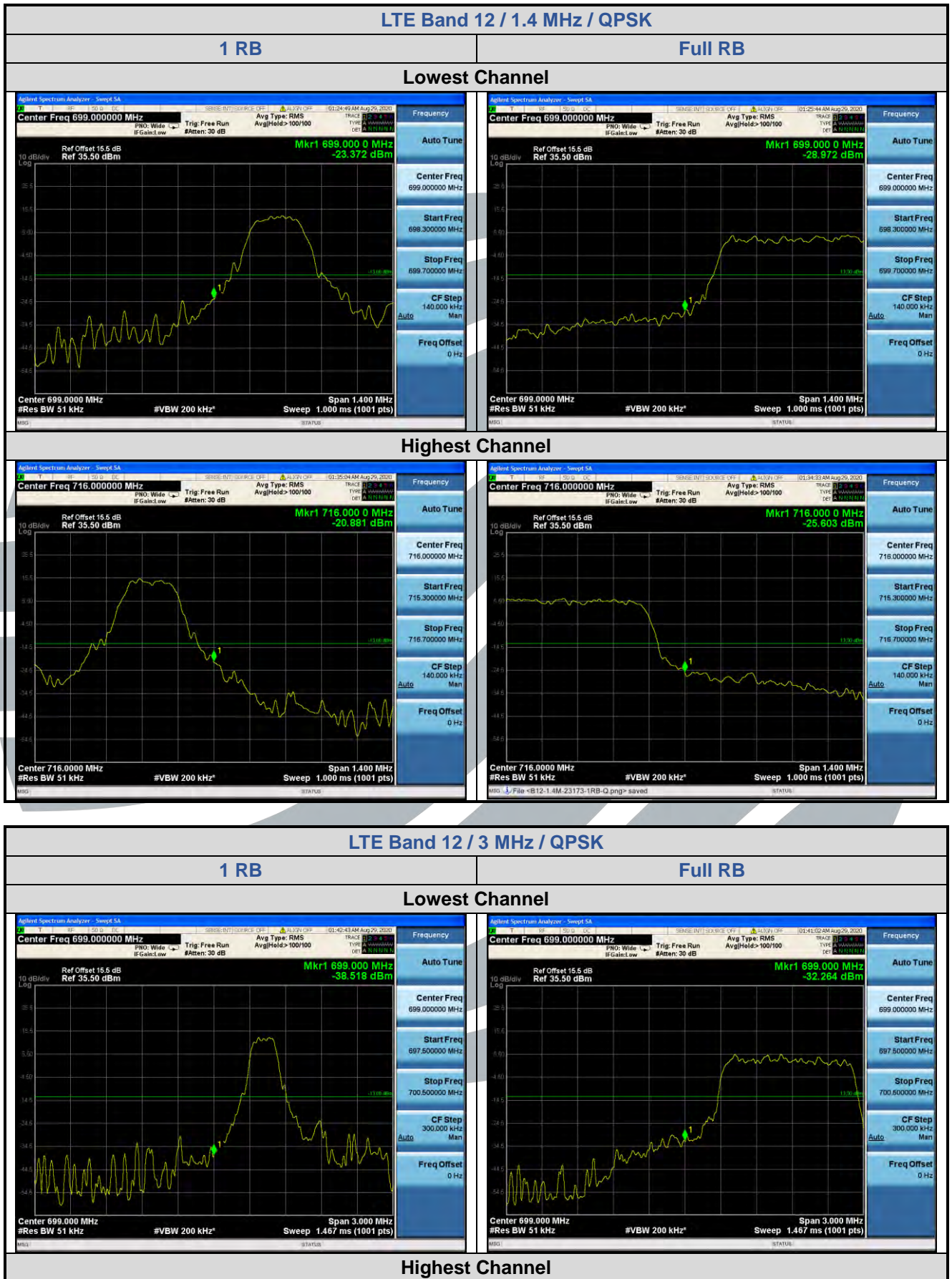
Lowest Channel

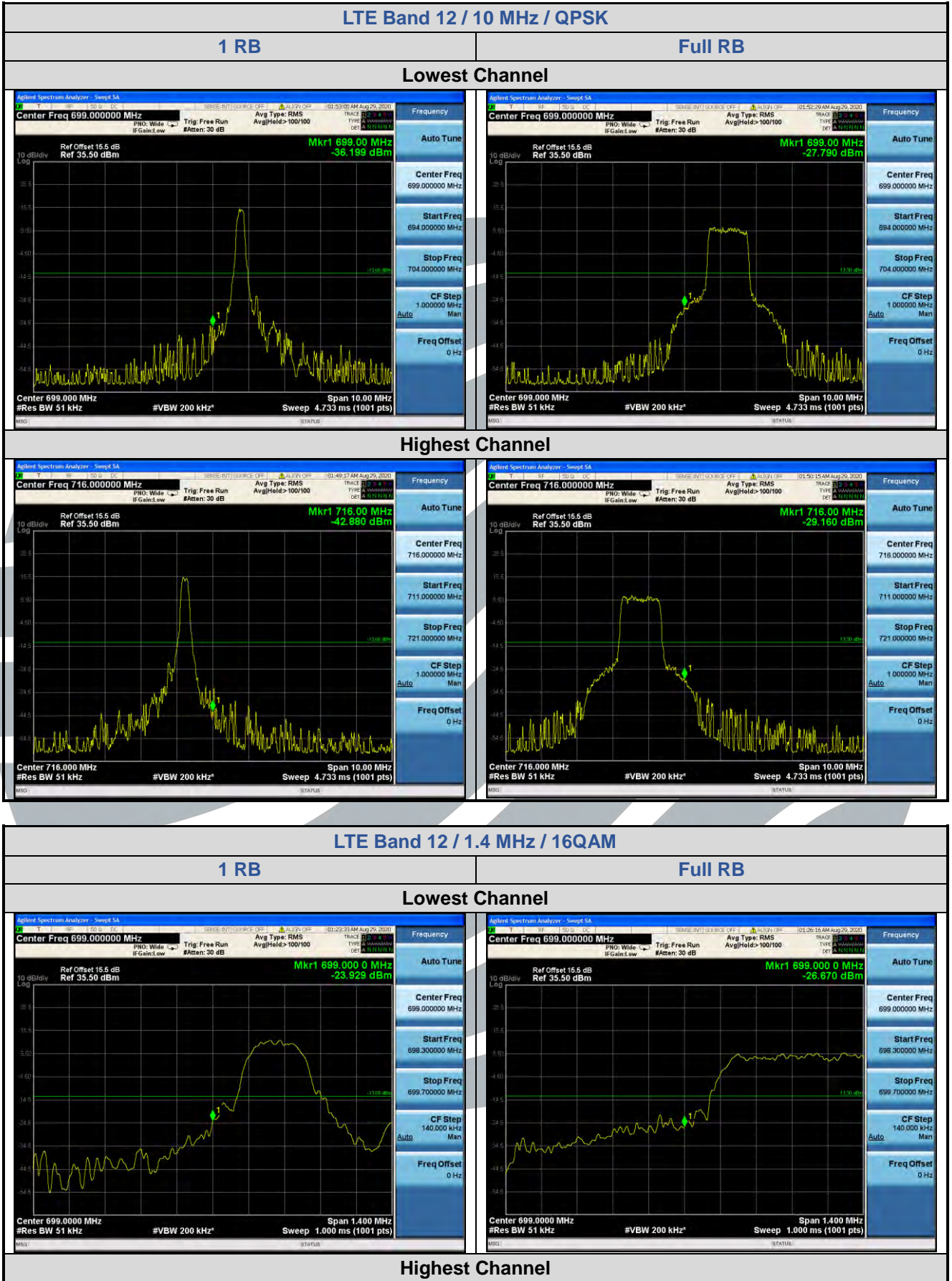


Highest Channel



5.6.3 LTE Band 12





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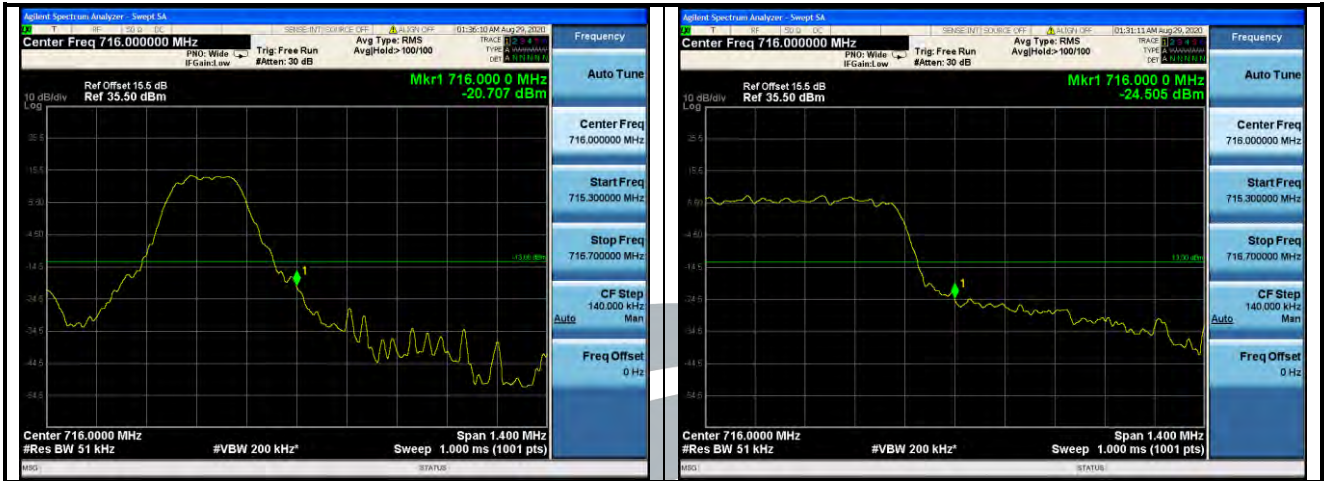
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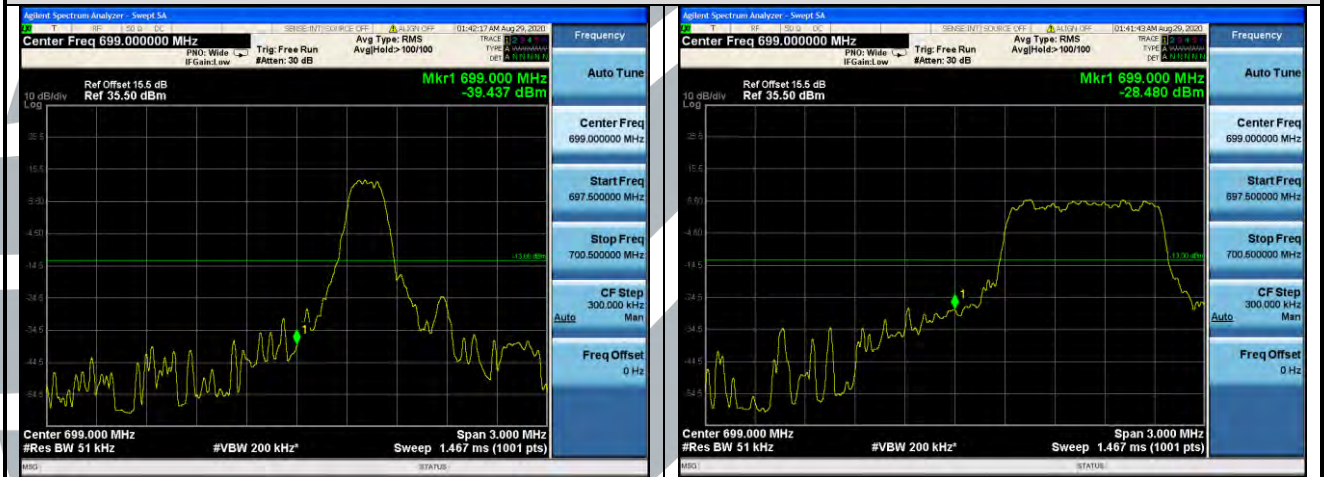
UTTR-RF-RSS4G-V1.1



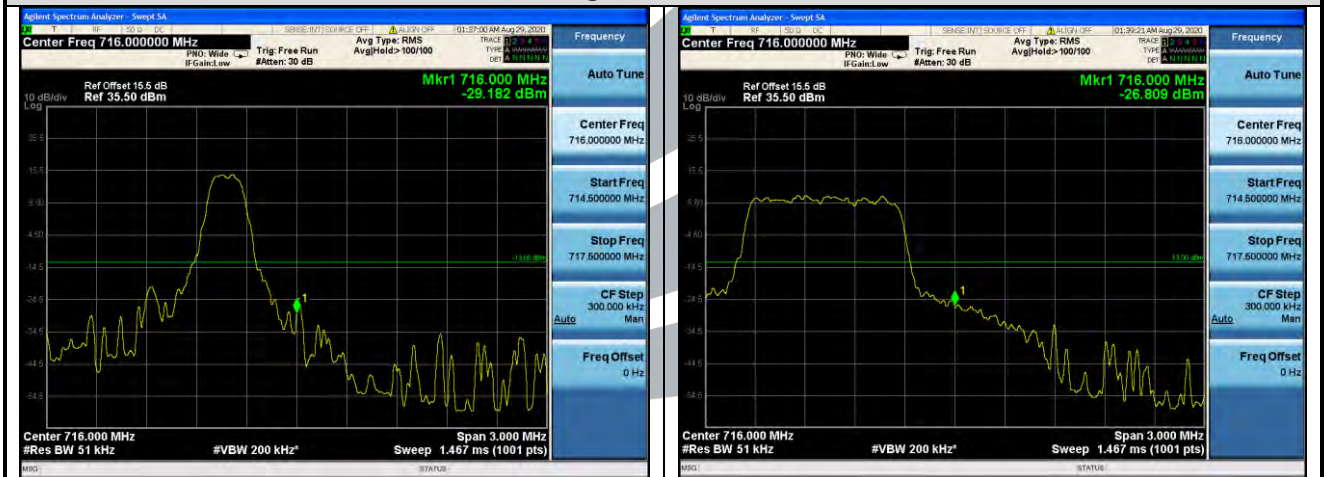
LTE Band 12 / 3 MHz / 16QAM

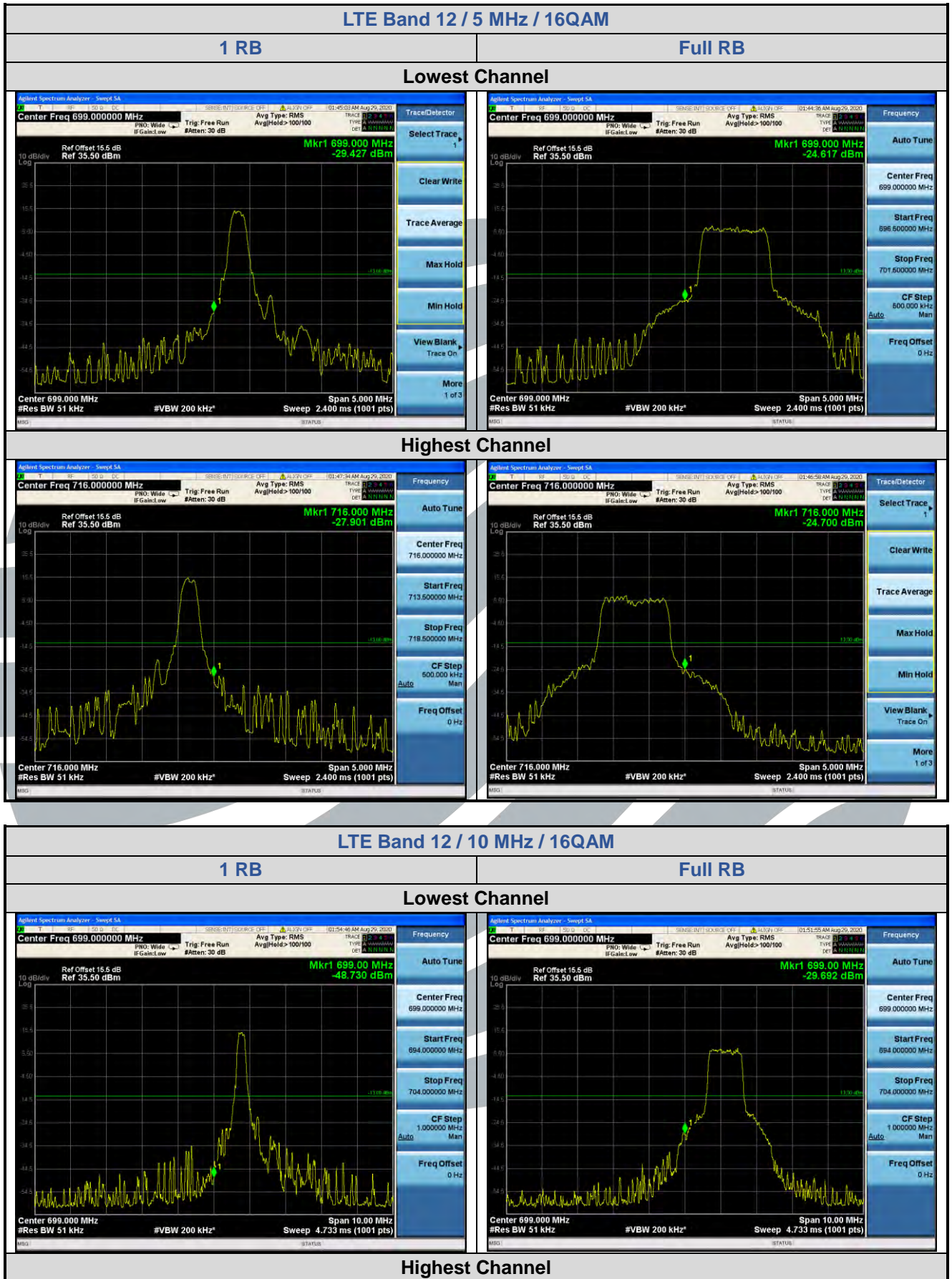
1 RB Full RB

Lowest Channel



Highest Channel





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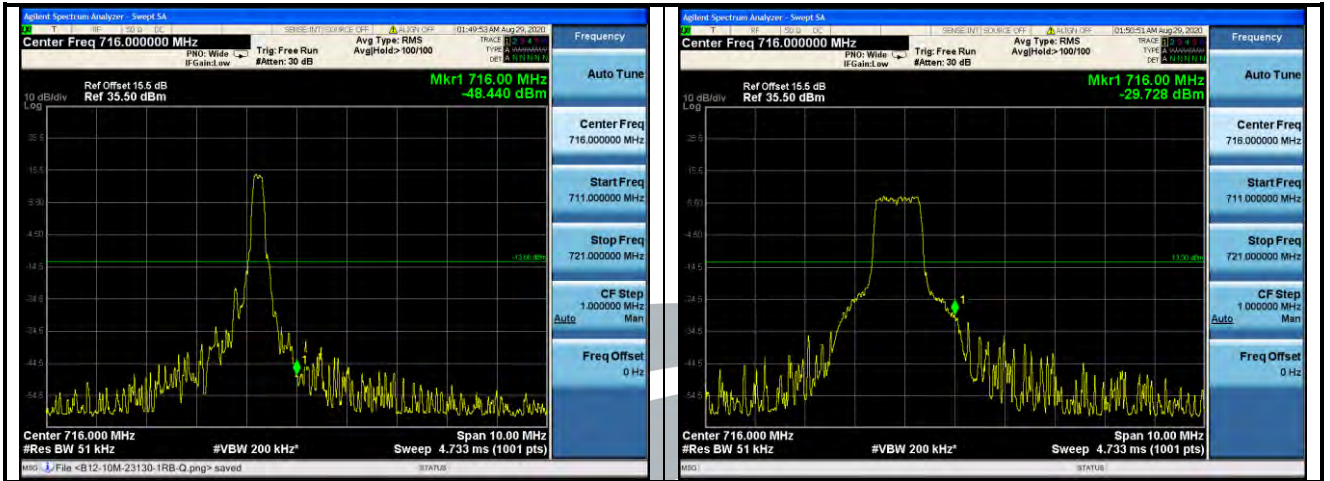
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5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: LTE Band 2: FCC 47 CFR Part 24.238(a)
LTE Band 4: FCC 47 CFR Part 27.53(h)
LTE Band 12: FCC 47 CFR Part 27.53(g)

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limit:

FCC 47 CFR Part 24.238(a), 27.53(h)(1), 27.53(g):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

Test Procedure:

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

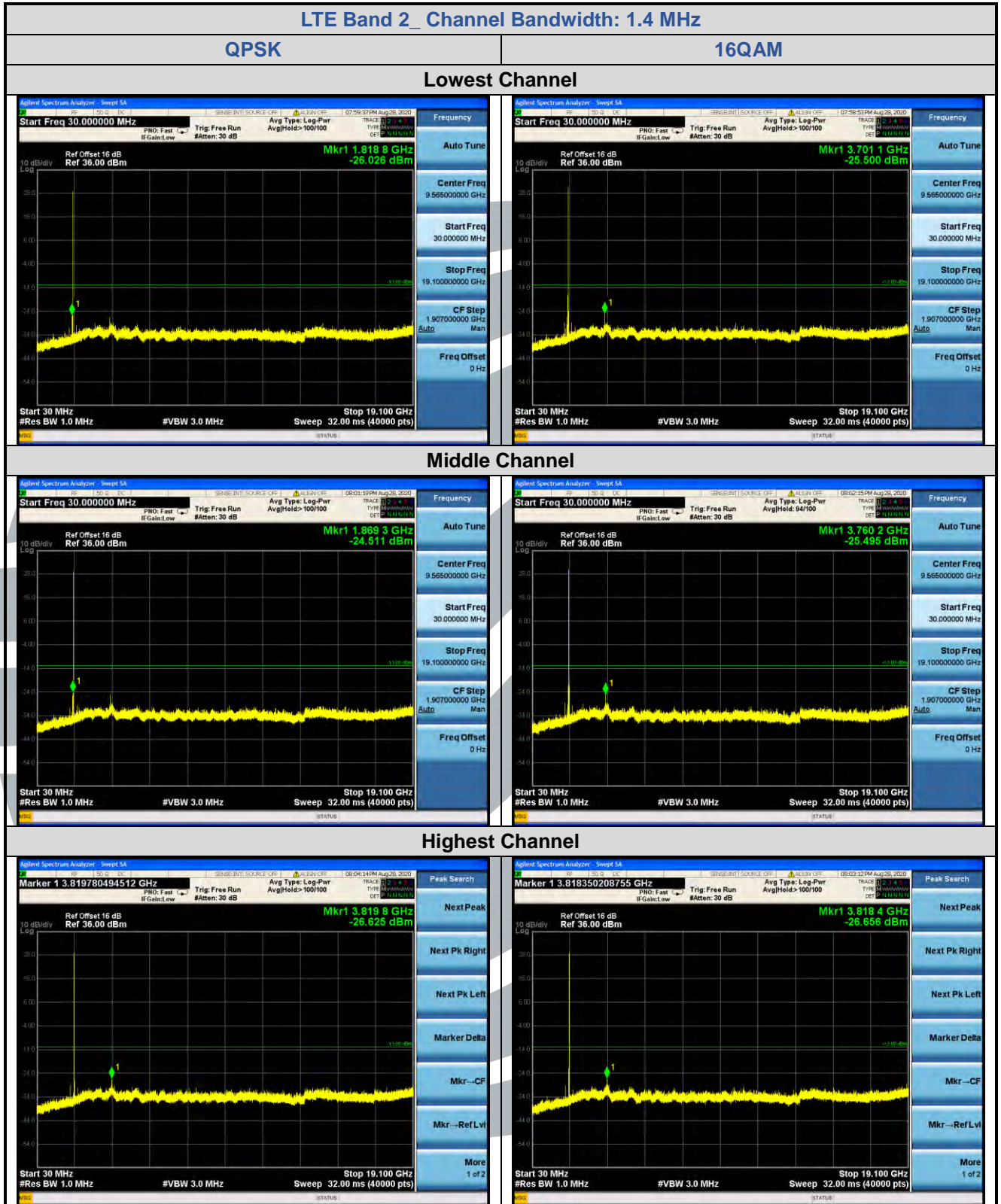
Test Setup: Refer to section 4.2.2 for details.

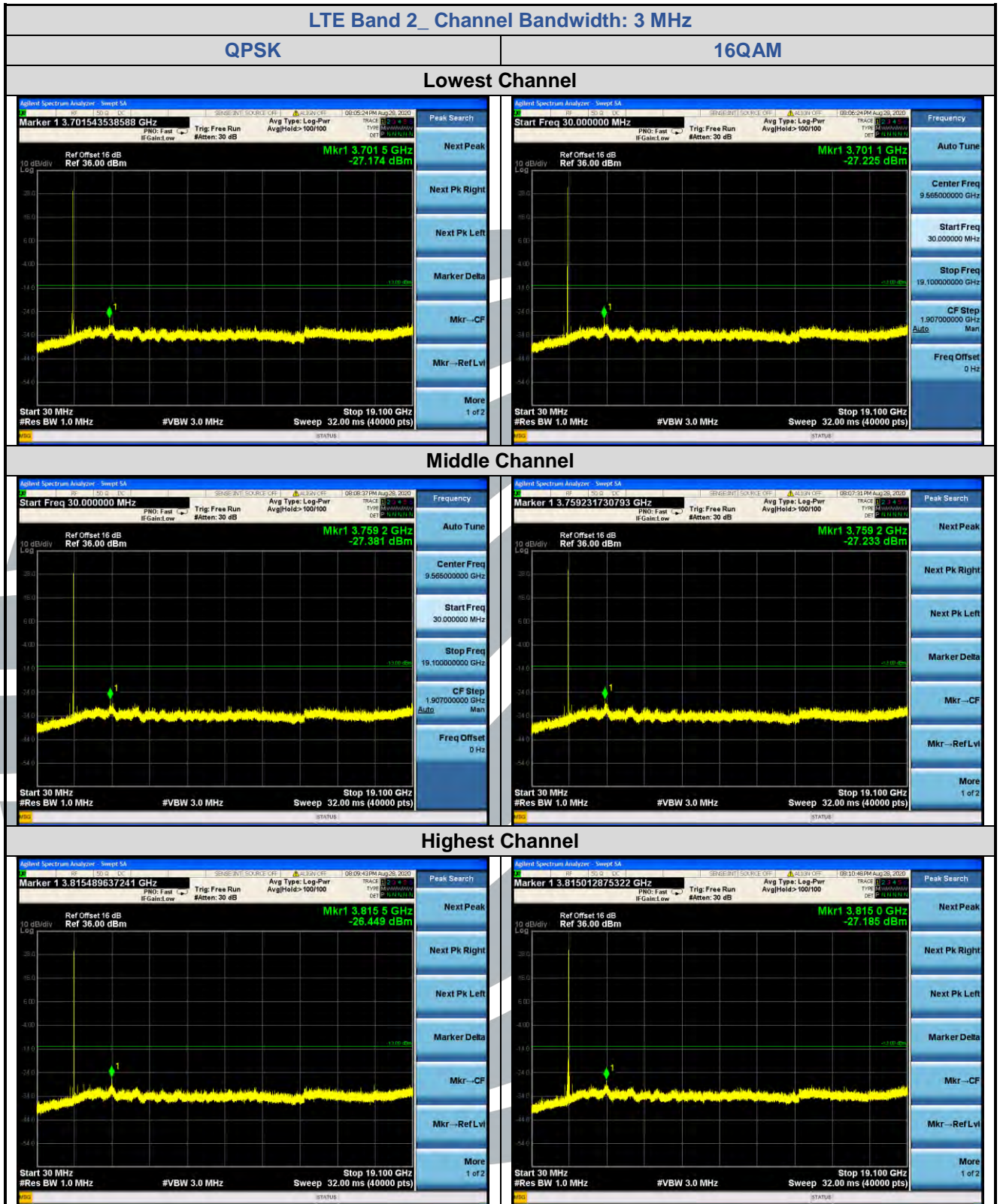
Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

5.7.1 LTE Band 2





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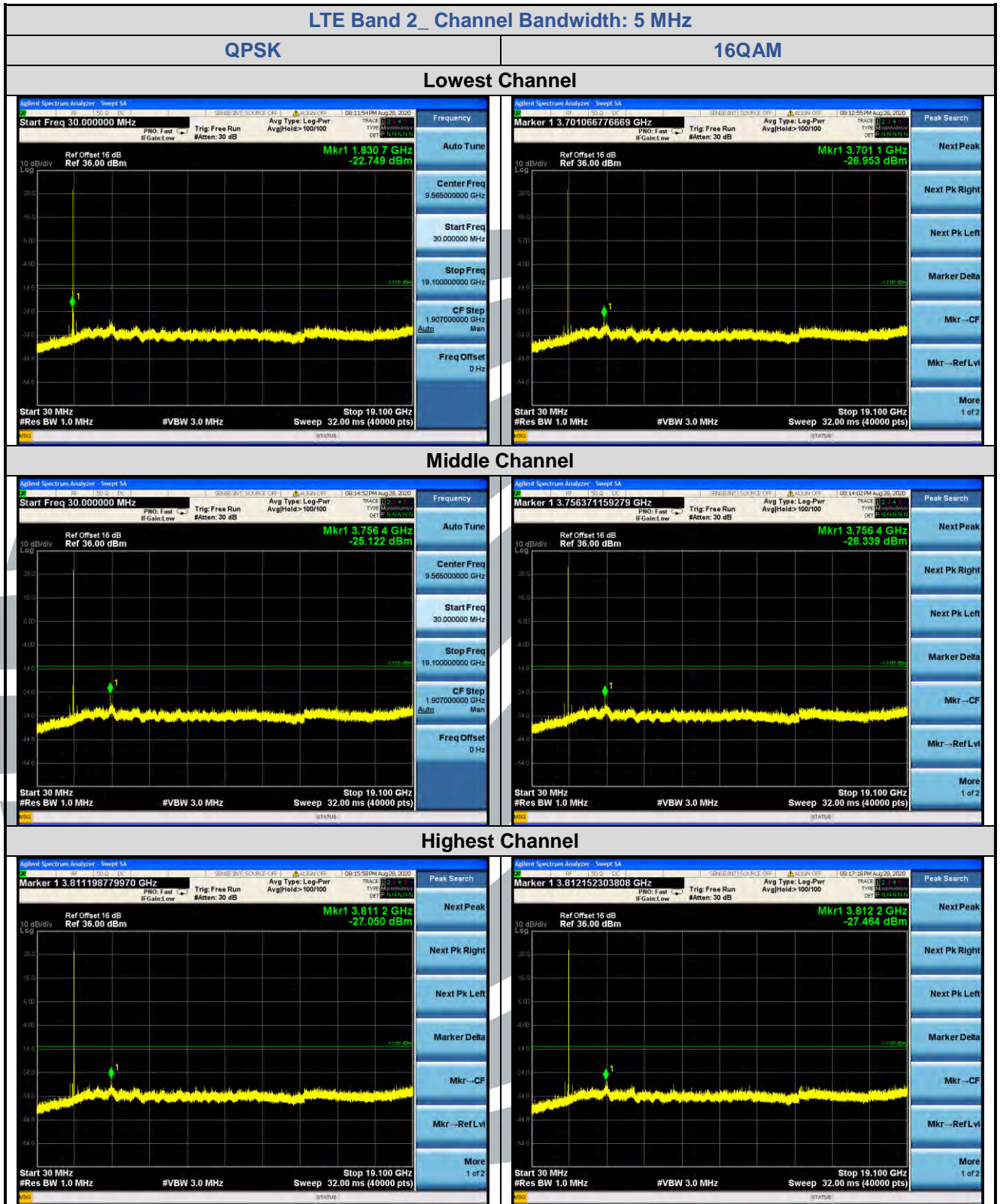
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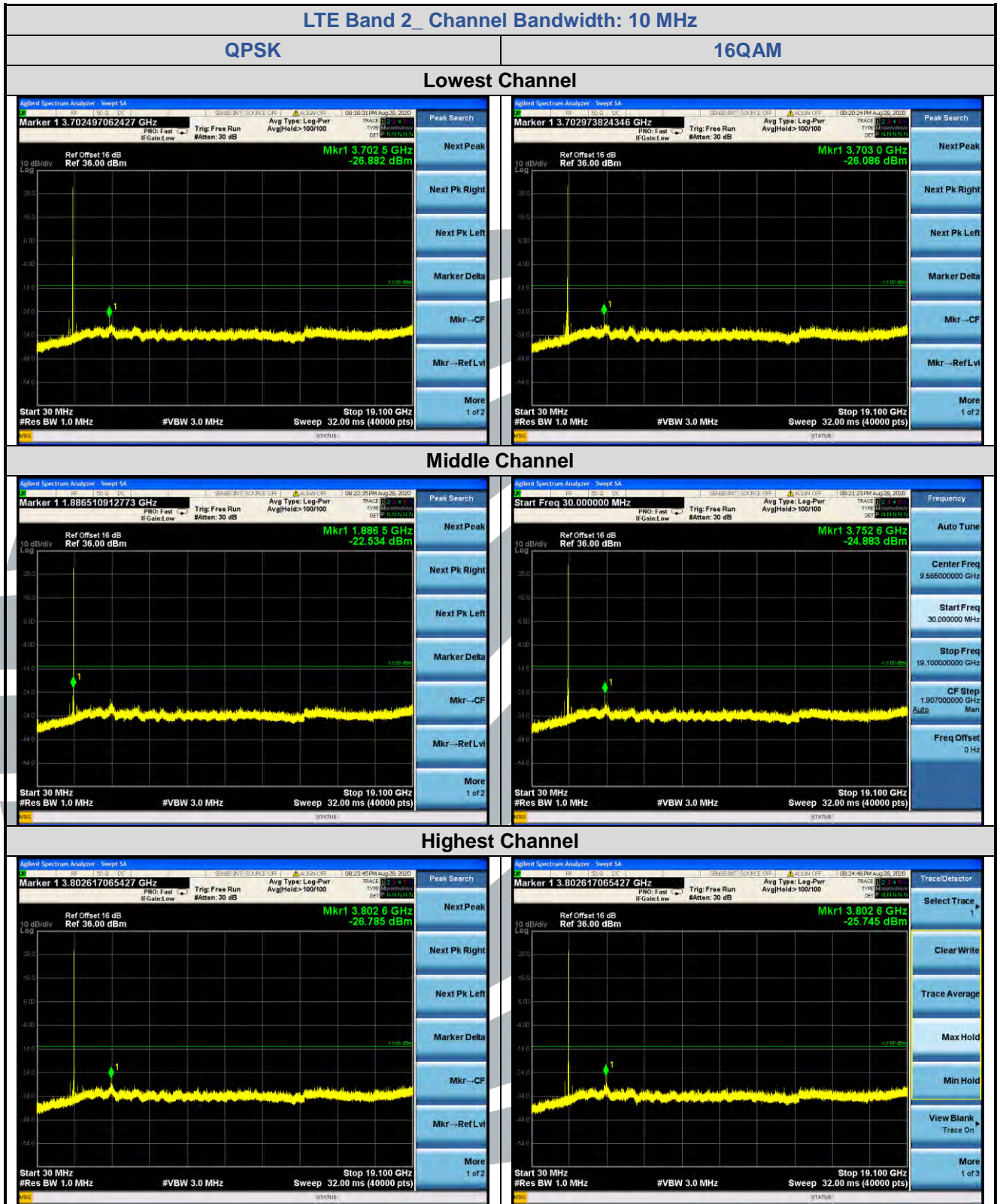
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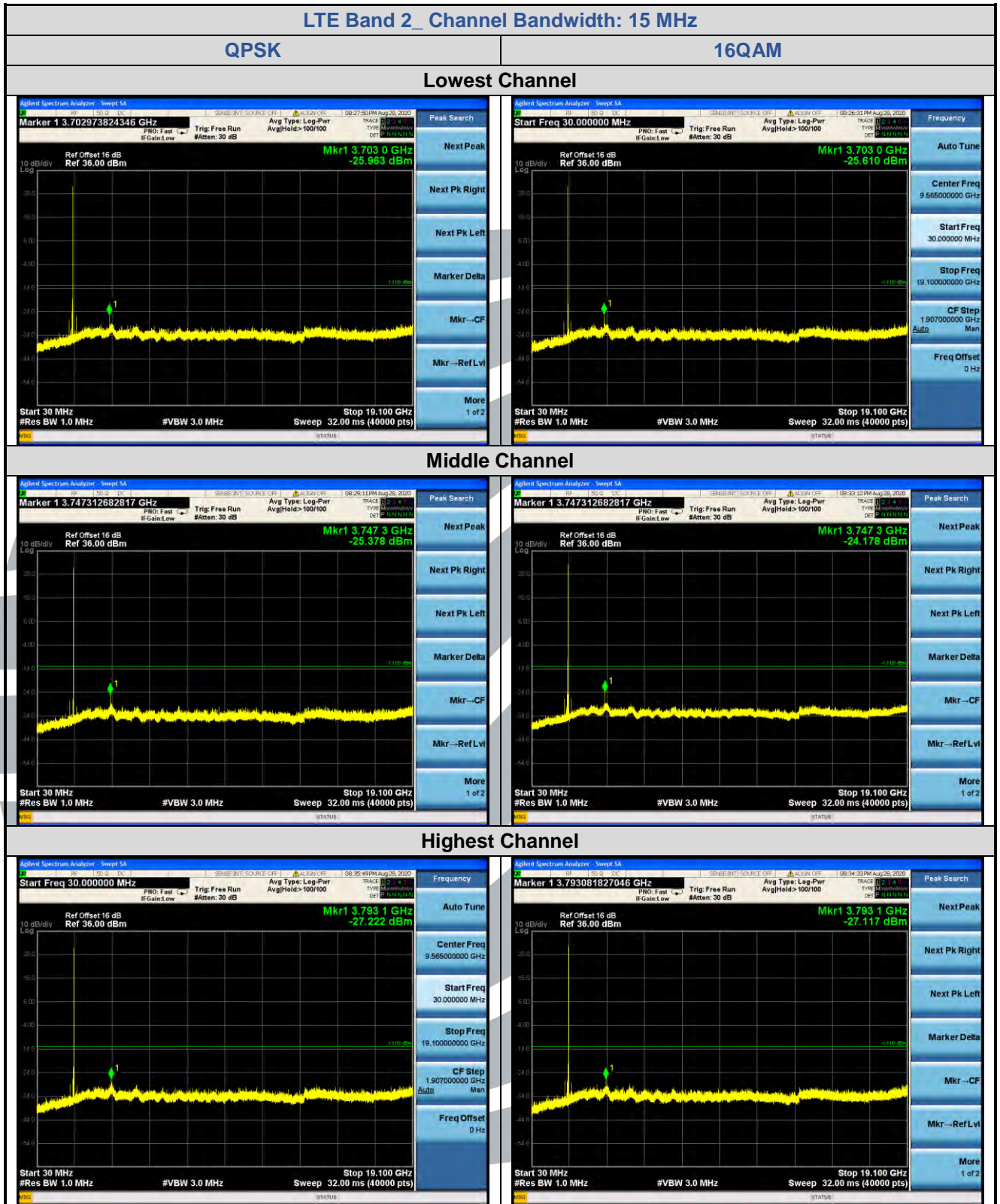
Tel: +86-755-28230888

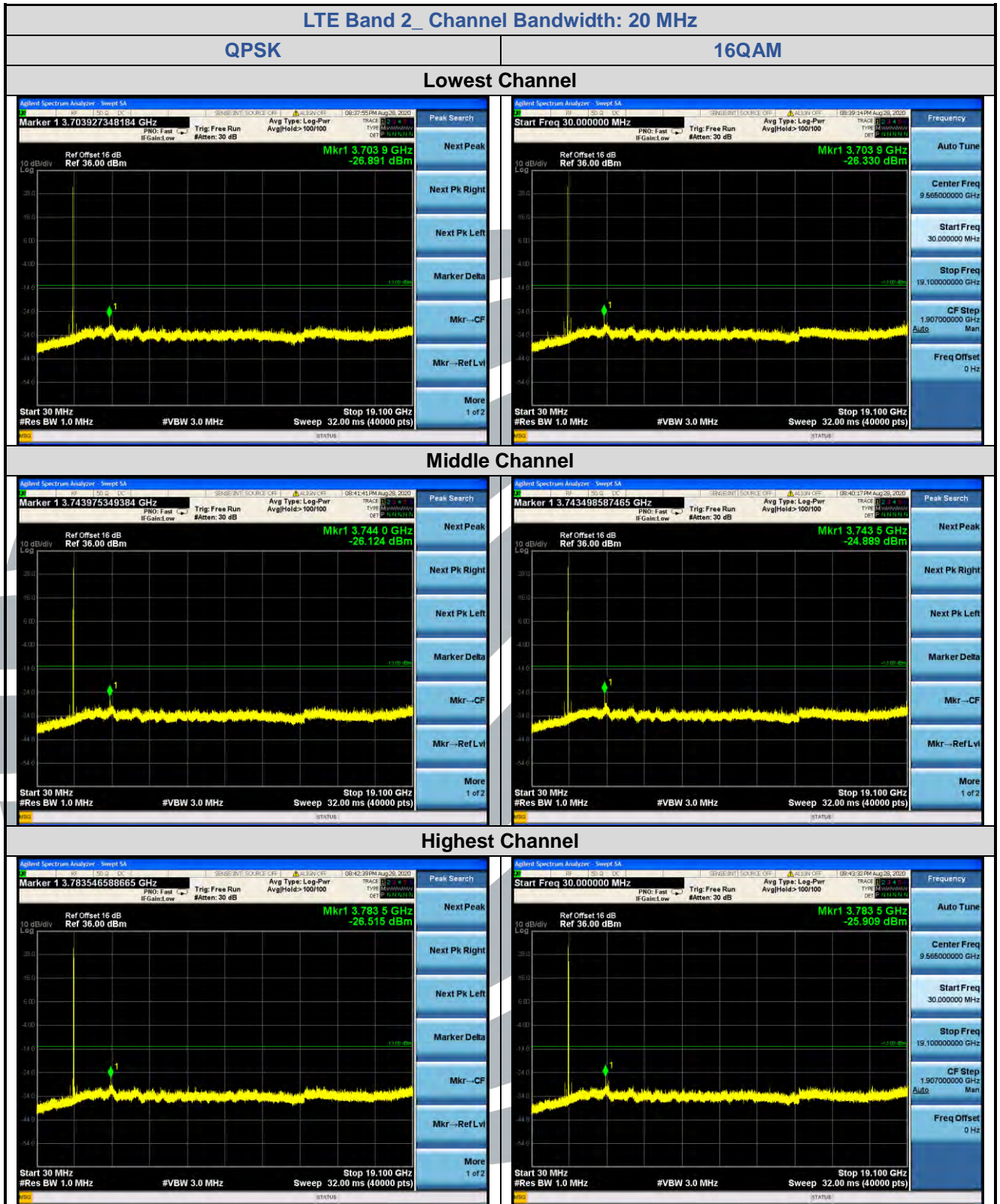
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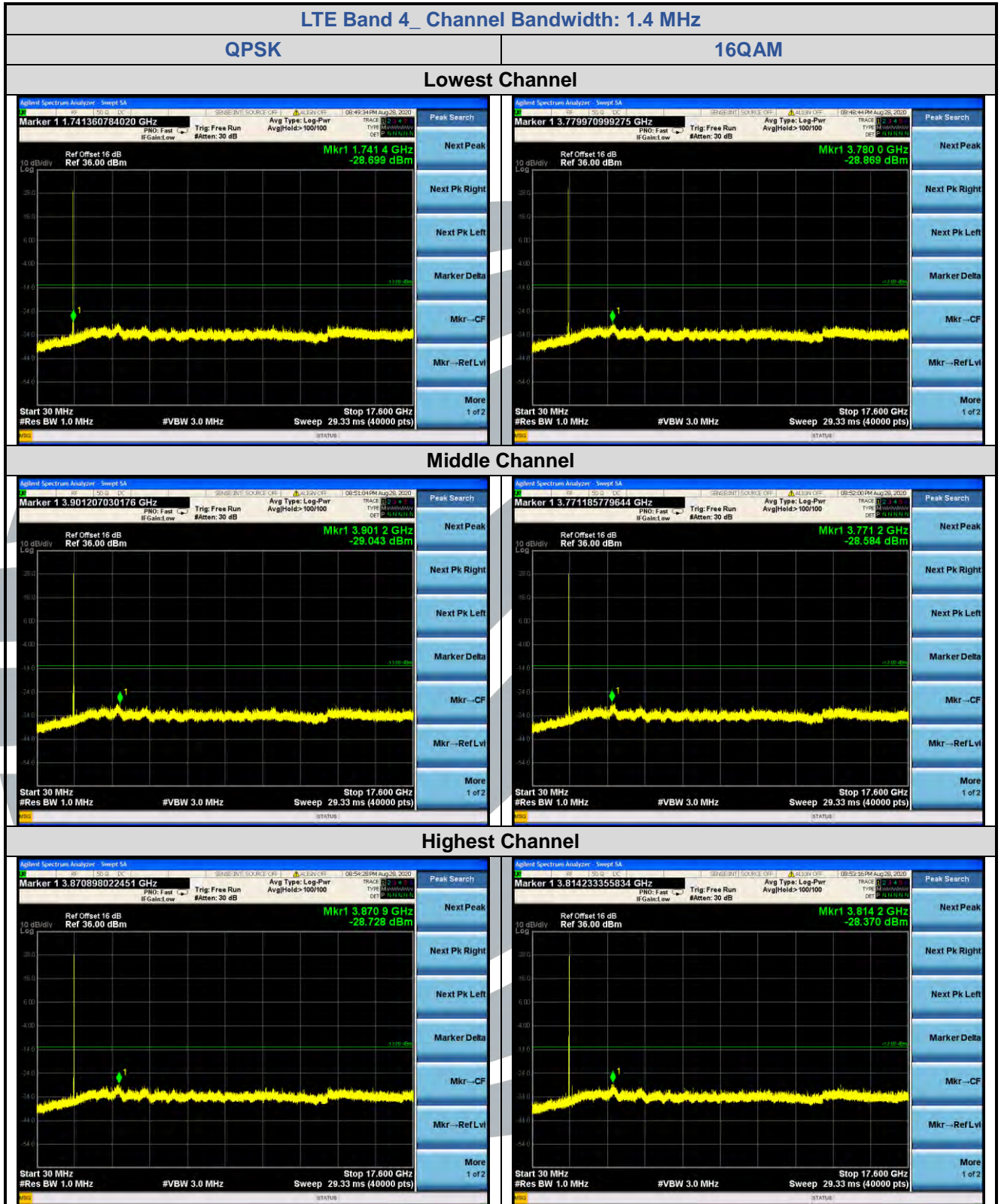
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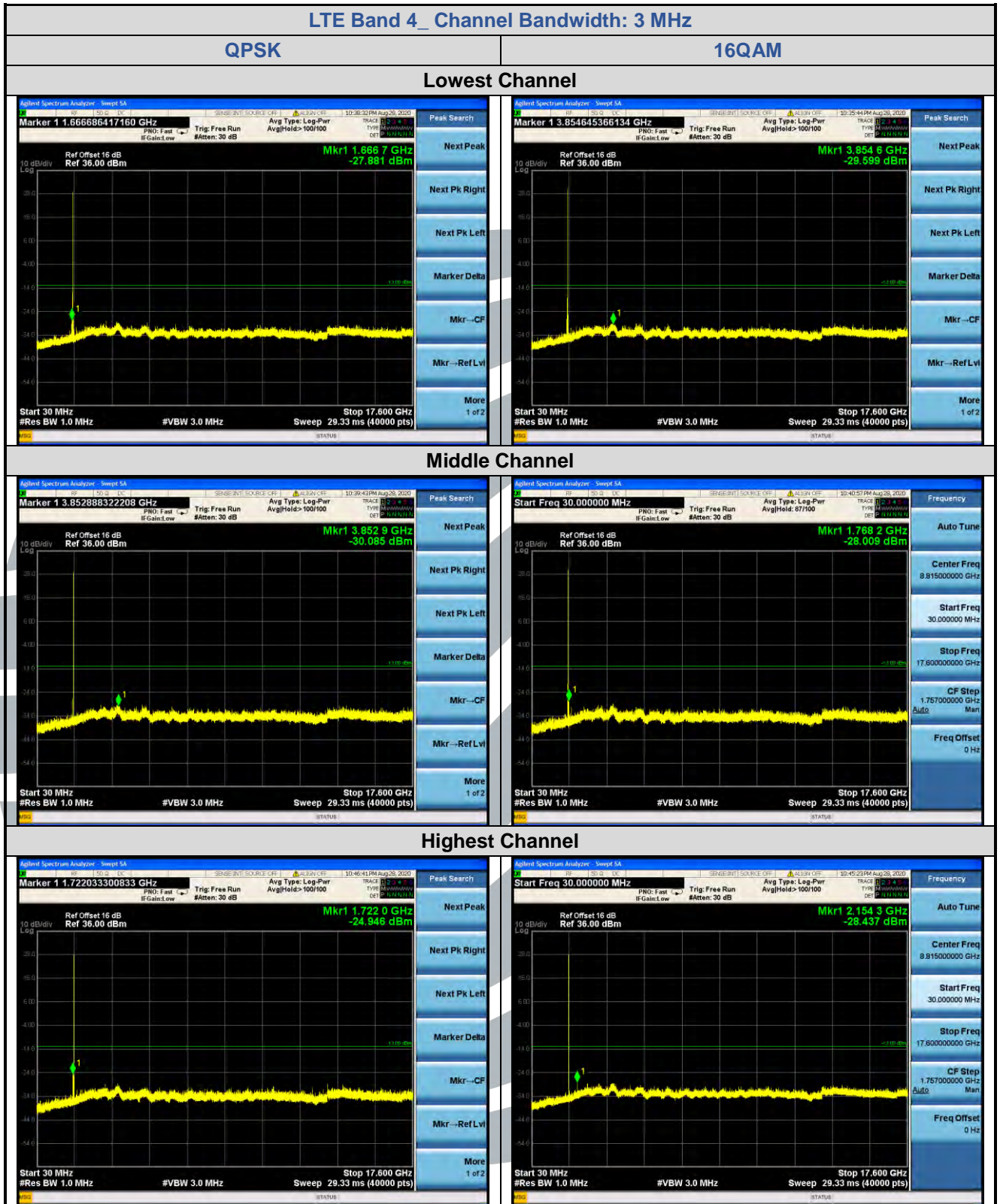
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5.7.2 LTE Band 4





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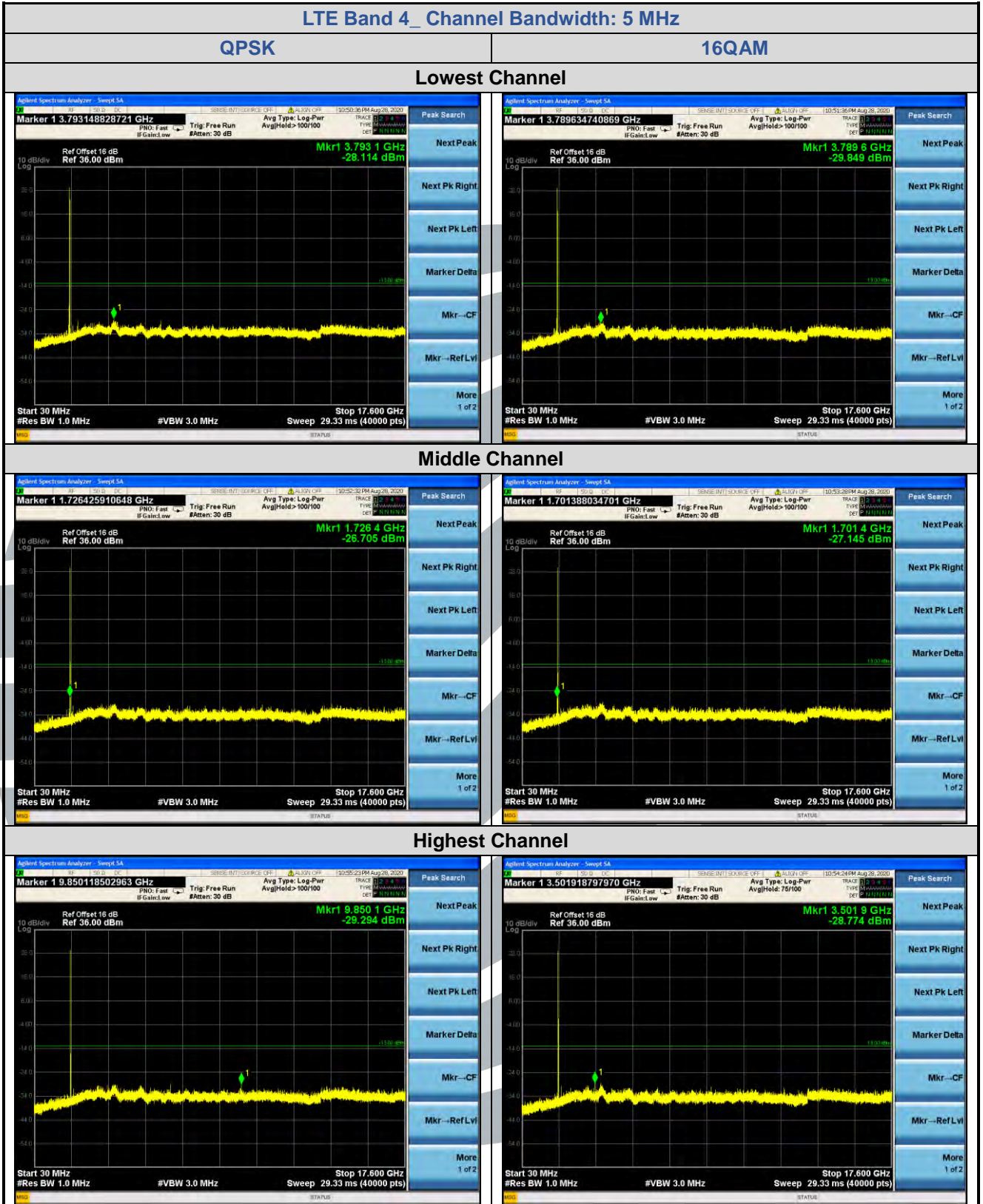
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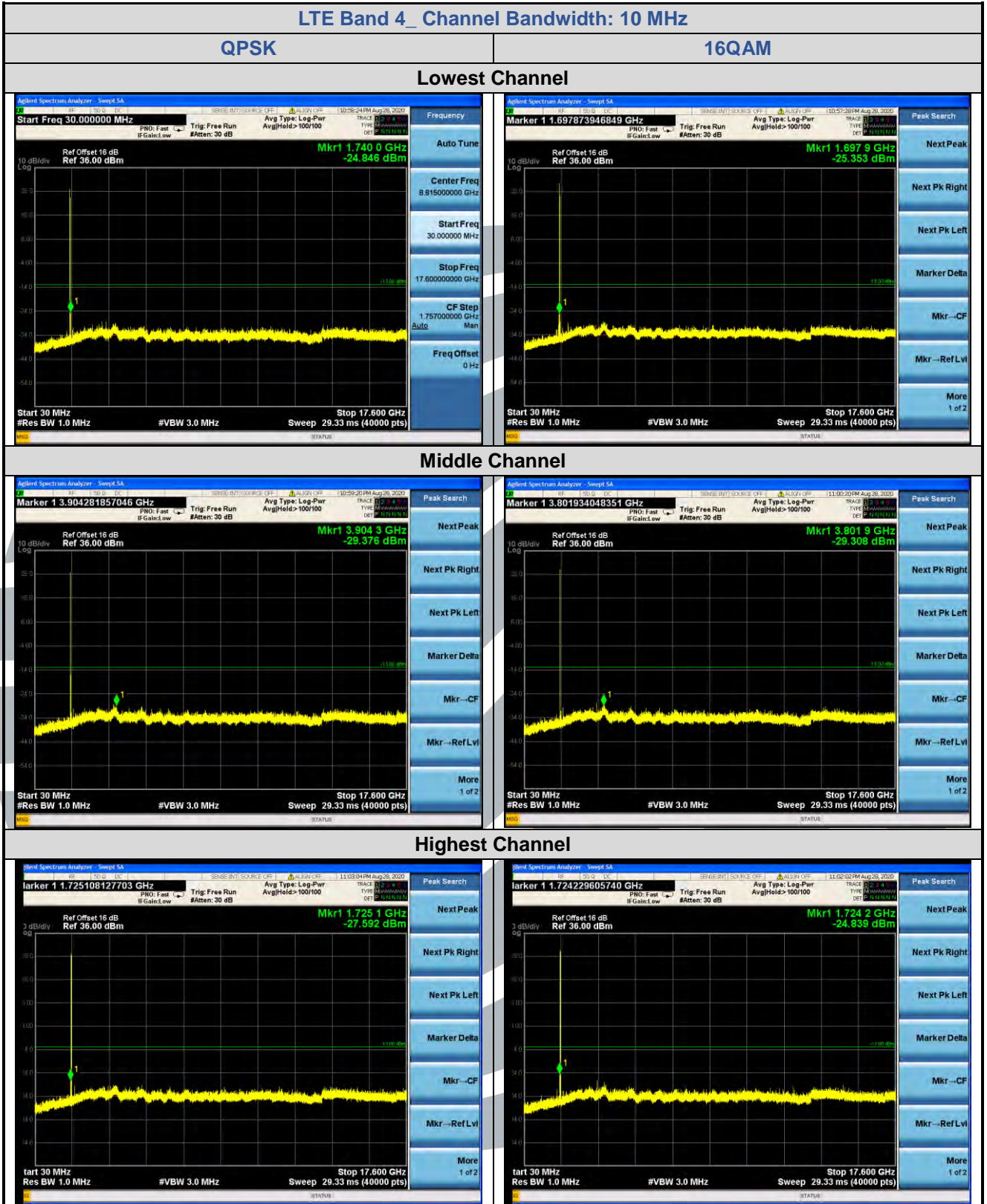
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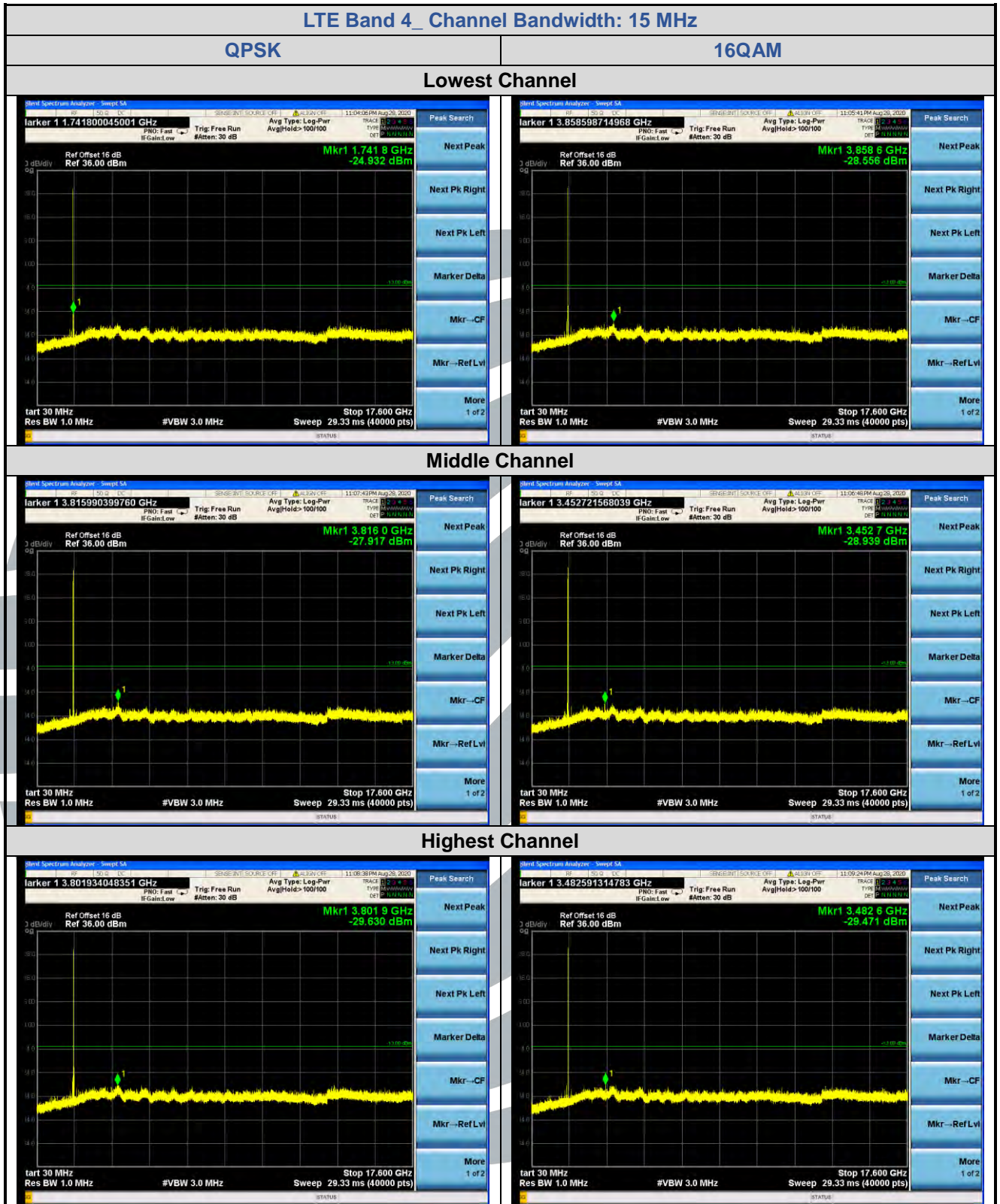
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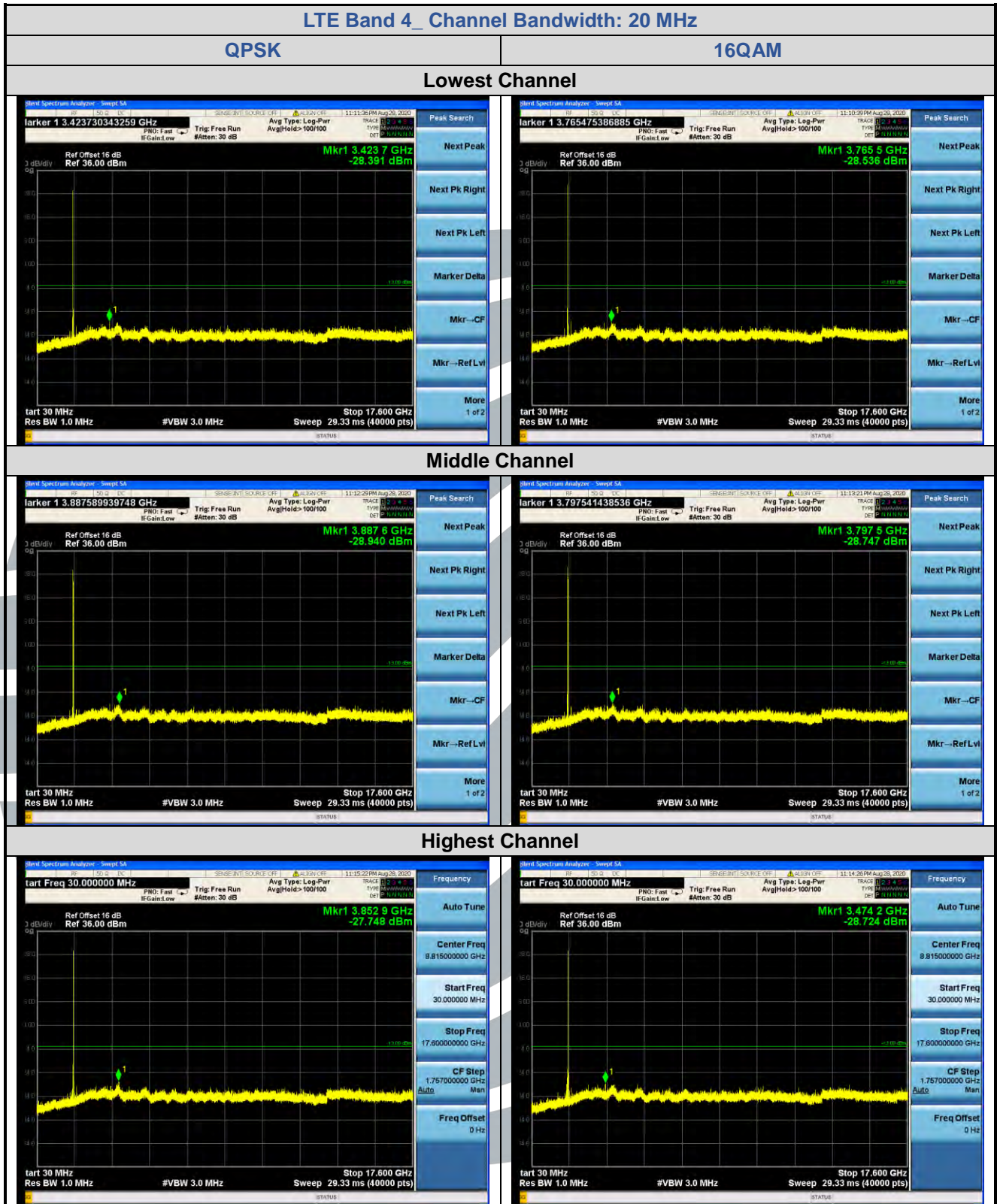
E-mail: info@uttlab.com

<http://www.uttlab.com>

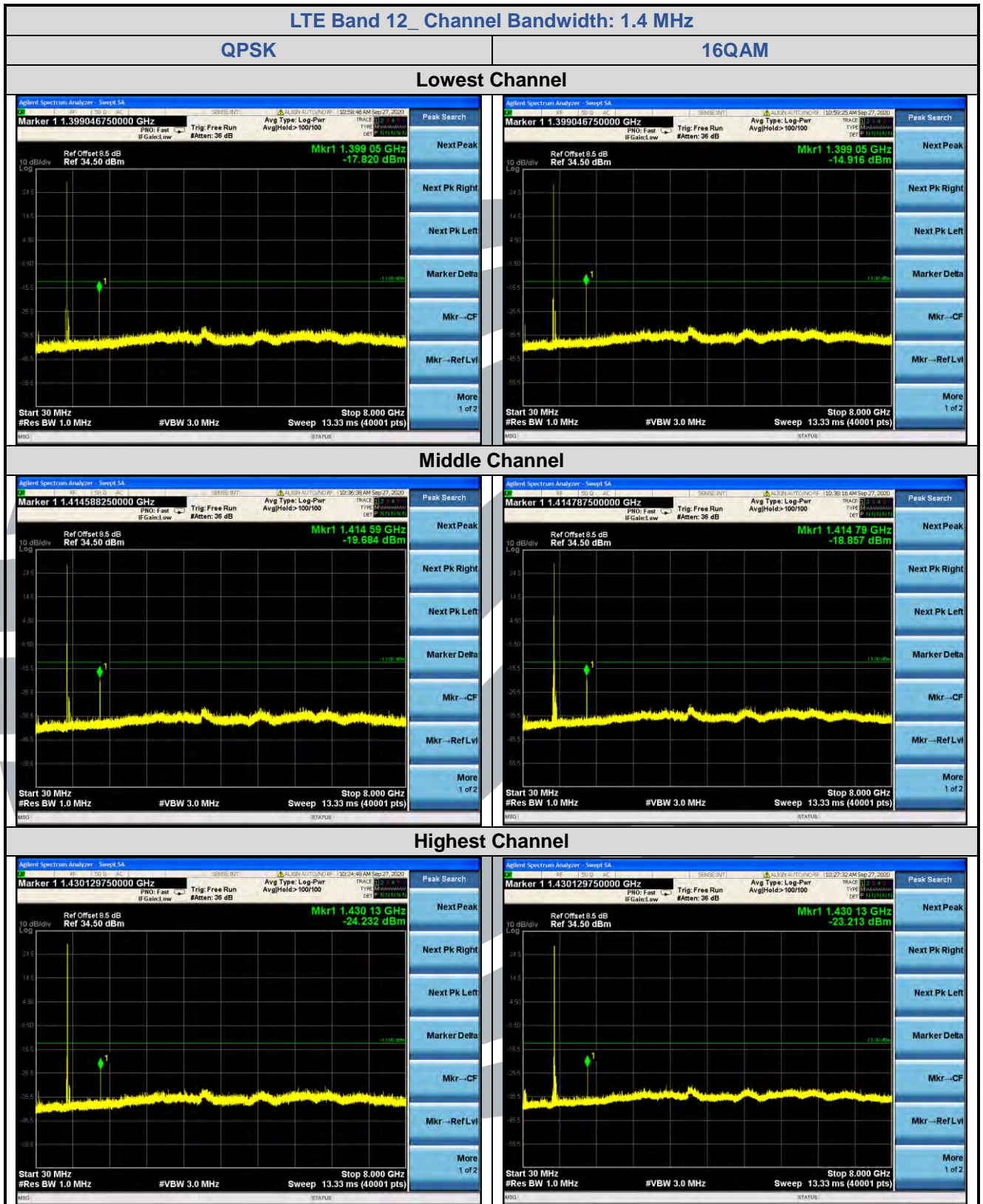
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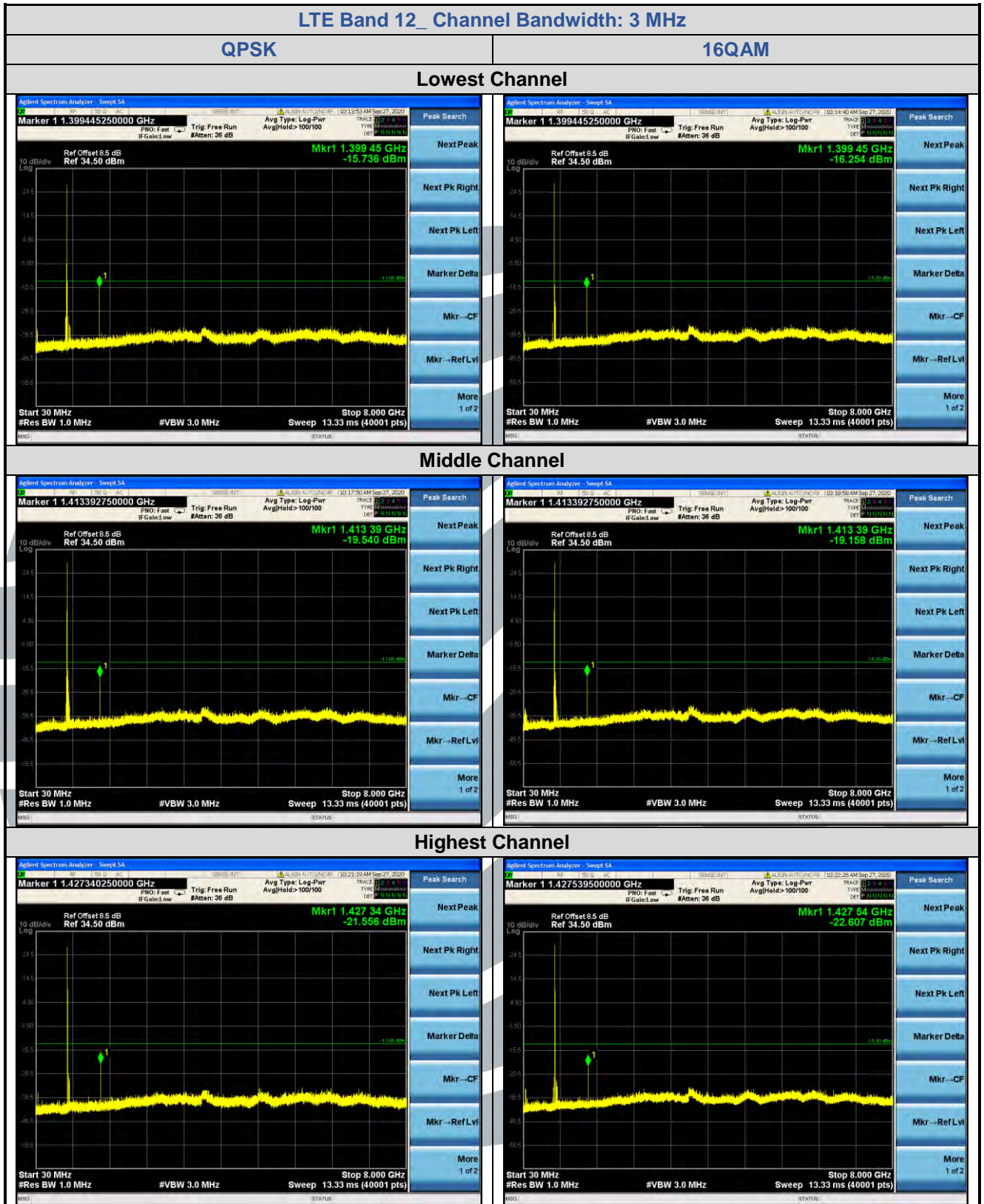






5.7.3 LTE Band 12





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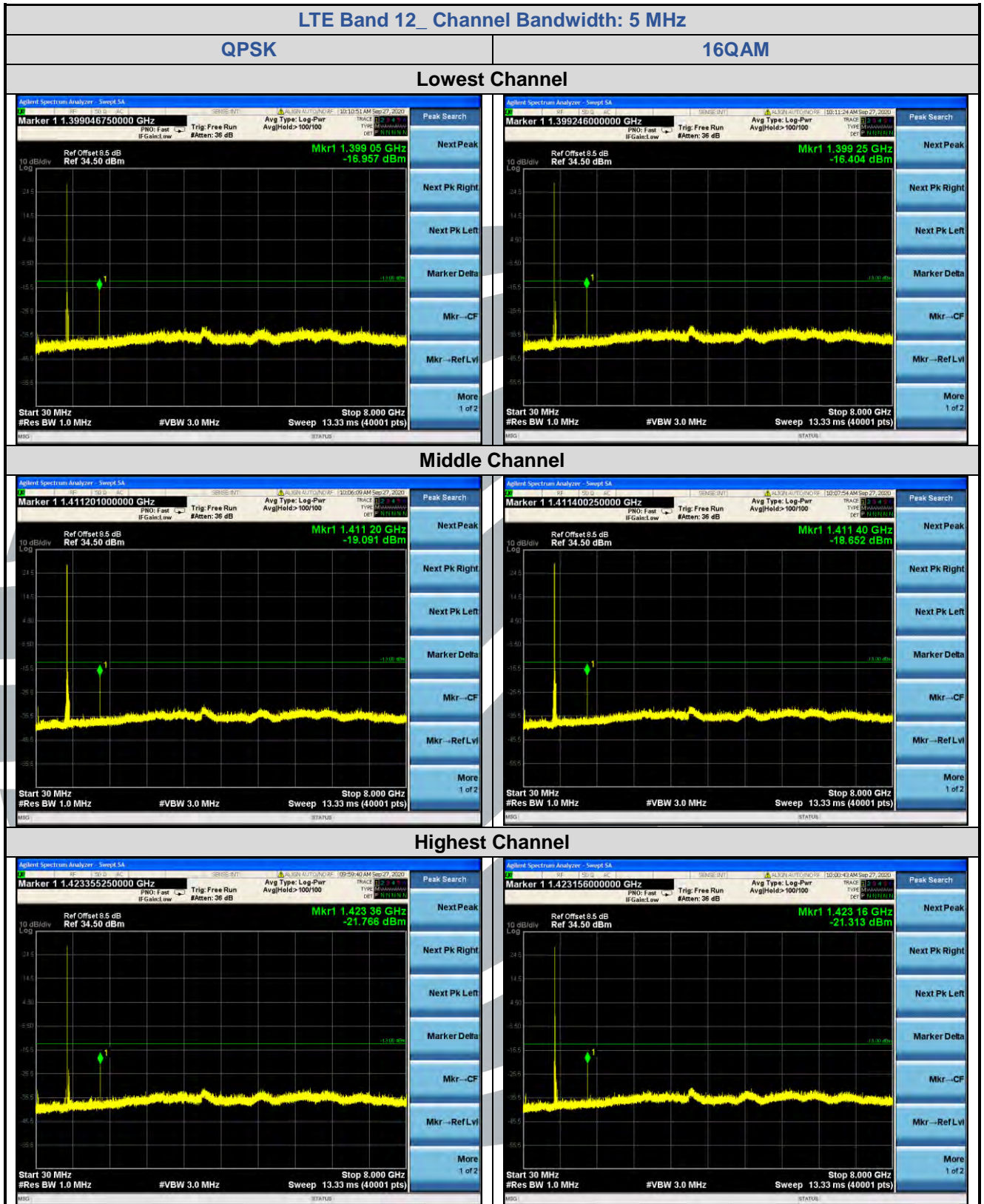
Tel: +86-755-28230888

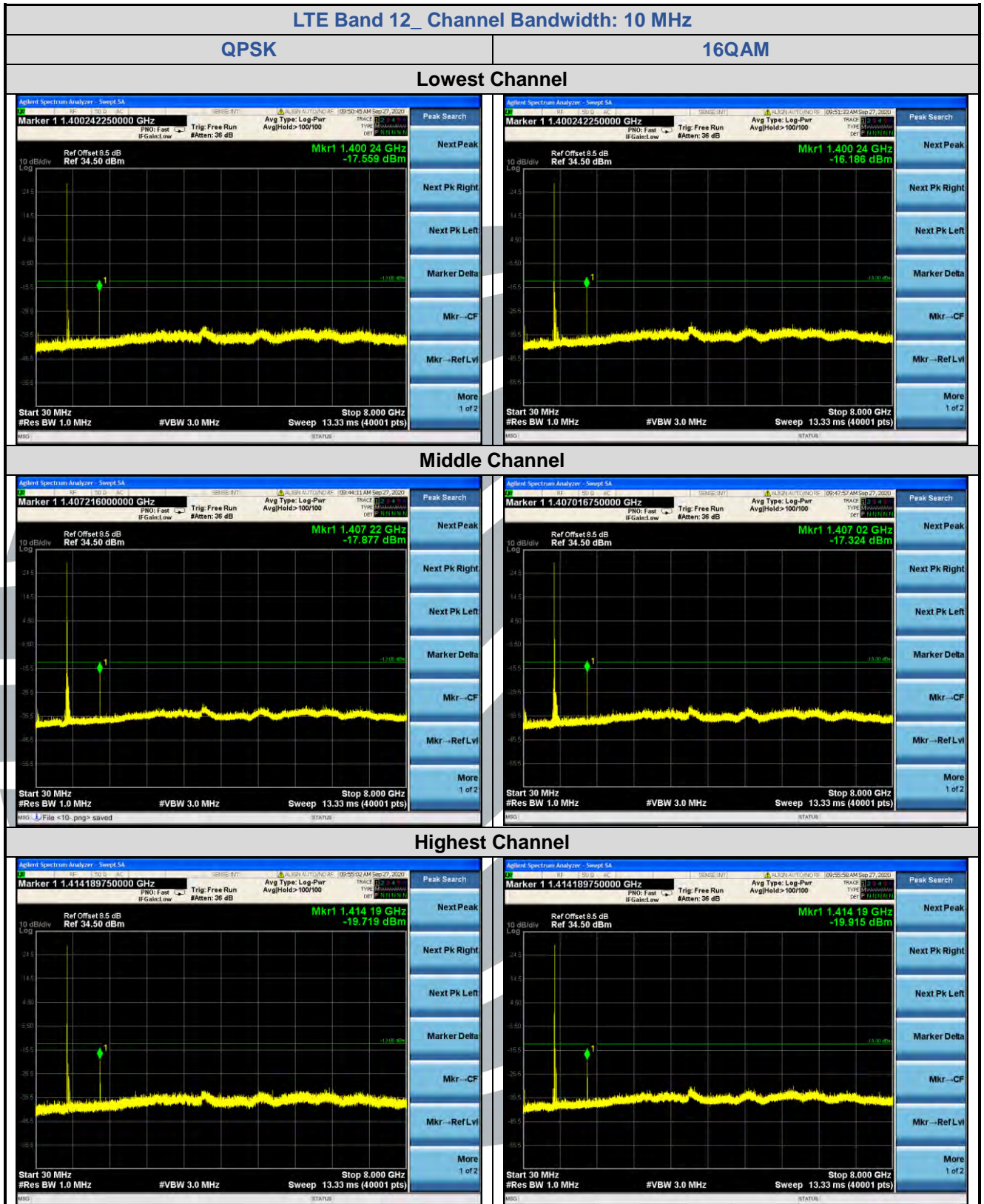
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Remark:

1) All the above radiation data, the fundamental frequency is not marked, it may exceed the limit, please ignore it.

5.8 FIELD STRENGTH OF SPURIOUS RADIATION

Test Requirement: LTE Band 2: FCC 47 CFR Part 24.238(a)
 LTE Band 4: FCC 47 CFR Part 27.53(h)
 LTE Band 12 : FCC 47 CFR Part 27.53(g)

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009 MHz-30 MHz	Peak	10 kHz	30 KHz	Peak
30 MHz-1 GHz	Quasi-peak	100 kHz	300 KHz	Peak
Above 1 GHz	Peak	1 MHz	3 MHz	Peak

Limits:

FCC 47 CFR Part 24.238(a), 27.53(h)(1), 27.53(g):

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. The emission limit equal to -13 dBm.

Test Setup: Refer to section 4.2.1 for details.

Test Procedures: KDB 971168 D01v03r01 Section 7

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

All bands emission had tested and emission margin more than 20dB

5.8.1 LTE Band 2

LTE Band 2_ QPSK							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
Lowest Channel							
1	31.455	-92.93	26.29	-66.64	-13.00	-53.64	Horizontal
2	144.374	-83.08	20.39	-62.69	-13.00	-49.69	Horizontal
3	889.506	-87.50	39.42	-48.08	-13.00	-35.08	Horizontal
4	3701.400	-68.74	15.20	-53.54	-13.00	-40.54	Horizontal
5	5552.100	-69.27	17.47	-51.80	-13.00	-38.80	Horizontal
6	32.813	-92.55	25.54	-67.01	-13.00	-54.01	Vertical
7	144.374	-85.54	20.39	-65.15	-13.00	-52.15	Vertical
8	922.004	-90.05	39.65	-50.40	-13.00	-37.40	Vertical
9	3701.400	-64.50	14.94	-49.56	-13.00	-36.56	Vertical
10	5552.100	-69.76	17.27	-52.49	-13.00	-39.49	Vertical
Middle Channel							
1	35.821	-91.74	24.08	-67.66	-13.00	-54.66	Horizontal
2	144.374	-82.44	20.39	-62.05	-13.00	-49.05	Horizontal
3	977.688	-88.50	40.85	-47.65	-13.00	-34.65	Horizontal
4	3760.000	-64.39	15.35	-49.04	-13.00	-36.04	Horizontal
5	5640.000	-67.87	17.75	-50.12	-13.00	-37.12	Horizontal
6	32.134	-92.30	25.97	-66.33	-13.00	-53.33	Vertical
7	144.374	-86.17	20.39	-65.78	-13.00	-52.78	Vertical
8	935.295	-88.34	39.65	-48.69	-13.00	-35.69	Vertical
9	3760.000	-63.90	15.10	-48.80	-13.00	-35.80	Vertical
10	5640.000	-67.90	17.55	-50.35	-13.00	-37.35	Vertical
Highest Channel							
1	39.022	-89.76	22.46	-67.30	-13.00	-54.30	Horizontal
2	144.374	-82.60	20.39	-62.21	-13.00	-49.21	Horizontal
3	951.398	-88.38	41.08	-47.30	-13.00	-34.30	Horizontal
4	3818.600	-62.68	15.50	-47.18	-13.00	-34.18	Horizontal
5	5727.900	-68.58	18.04	-50.54	-13.00	-37.54	Horizontal
6	30.388	-92.31	27.08	-65.23	-13.00	-52.23	Vertical
7	144.374	-85.51	20.39	-65.12	-13.00	-52.12	Vertical
8	937.429	-89.36	39.64	-49.72	-13.00	-36.72	Vertical
9	3818.600	-65.16	15.27	-49.89	-13.00	-36.89	Vertical
10	5727.900	-68.61	17.84	-50.77	-13.00	-37.77	Vertical

5.8.2 LTE Band 4

LTE Band 4_ QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
Lowest Channel							
1	30.582	-92.18	26.73	-65.45	-13.00	-52.45	Horizontal
2	144.374	-82.61	20.39	-62.22	-13.00	-49.22	Horizontal
3	954.988	-89.67	41.04	-48.63	-13.00	-35.63	Horizontal
4	3421.400	-64.48	14.67	-49.81	-13.00	-36.81	Horizontal
5	5132.100	-67.17	16.75	-50.42	-13.00	-37.42	Horizontal
6	32.619	-91.60	25.66	-65.94	-13.00	-52.94	Vertical
7	144.374	-85.97	20.39	-65.58	-13.00	-52.58	Vertical
8	971.091	-88.23	39.87	-48.36	-13.00	-35.36	Vertical
9	3421.400	-62.62	14.37	-48.25	-13.00	-35.25	Vertical
10	5132.100	-68.44	16.41	-52.03	-13.00	-39.03	Vertical
Middle Channel							
1	32.522	-91.64	25.75	-65.89	-13.00	-52.89	Horizontal
2	144.374	-82.56	20.39	-62.17	-13.00	-49.17	Horizontal
3	939.757	-88.26	40.76	-47.50	-13.00	-34.50	Horizontal
4	3465.000	-62.99	14.69	-48.30	-13.00	-35.30	Horizontal
5	5197.500	-67.51	16.86	-50.65	-13.00	-37.65	Horizontal
6	144.374	-86.39	20.39	-66.00	-13.00	-53.00	Vertical
7	578.881	-88.84	34.50	-54.34	-13.00	-41.34	Vertical
8	885.626	-88.12	39.05	-49.07	-13.00	-36.07	Vertical
9	3465.000	-63.18	14.39	-48.79	-13.00	-35.79	Vertical
10	5197.500	-67.00	16.54	-50.46	-13.00	-37.46	Vertical
Highest Channel							
1	144.374	-83.09	20.39	-62.70	-13.00	-49.70	Horizontal
2	572.187	-89.17	33.63	-55.54	-13.00	-42.54	Horizontal
3	939.951	-89.79	40.77	-49.02	-13.00	-36.02	Horizontal
4	3508.600	-63.62	14.73	-48.89	-13.00	-35.89	Horizontal
5	5262.900	-69.76	16.96	-52.80	-13.00	-39.80	Horizontal
6	144.374	-86.30	20.39	-65.91	-13.00	-52.91	Vertical
7	708.874	-89.80	36.41	-53.39	-13.00	-40.39	Vertical
8	880.290	-88.64	38.90	-49.74	-13.00	-36.74	Vertical
9	3508.600	-63.64	14.43	-49.21	-13.00	-36.21	Vertical
10	5262.900	-69.26	16.66	-52.60	-13.00	-39.60	Vertical

5.8.3 LTE Band 12

LTE Band 12_QPSK							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
Lowest Channel							
1	144.277	-72.04	20.38	-51.66	-13.00	-38.66	Horizontal
2	543.084	-83.09	33.64	-49.45	-13.00	-36.45	Horizontal
3	958.674	-81.68	41.00	-40.68	-13.00	-27.68	Horizontal
4	1399.400	-67.57	8.64	-58.93	-13.00	-45.93	Horizontal
5	2099.100	-67.56	13.10	-54.46	-13.00	-41.46	Horizontal
6	32.328	-85.58	25.85	-59.73	-13.00	-46.73	Vertical
7	305.023	-84.60	26.44	-58.16	-13.00	-45.16	Vertical
8	933.548	-81.84	39.65	-42.19	-13.00	-29.19	Vertical
9	1399.400	-66.83	8.82	-58.01	-13.00	-45.01	Vertical
10	2099.100	-68.87	12.90	-55.97	-13.00	-42.97	Vertical
Middle Channel							
1	96.161	-78.50	19.74	-58.76	-13.00	-45.76	Horizontal
2	144.277	-73.61	20.38	-53.23	-13.00	-40.23	Horizontal
3	943.928	-82.06	40.90	-41.16	-13.00	-28.16	Horizontal
4	1415.000	-64.97	8.65	-56.32	-13.00	-43.32	Horizontal
5	2122.500	-67.83	13.16	-54.67	-13.00	-41.67	Horizontal
6	30.485	-85.94	27.02	-58.92	-13.00	-45.92	Vertical
7	589.746	-82.64	34.18	-48.46	-13.00	-35.46	Vertical
8	900.662	-83.28	39.47	-43.81	-13.00	-30.81	Vertical
9	1415.000	-66.52	8.83	-57.69	-13.00	-44.69	Vertical
10	2122.500	-67.75	12.96	-54.79	-13.00	-41.79	Vertical
Highest Channel							
1	96.161	-77.51	19.74	-57.77	-13.00	-44.77	Horizontal
2	144.277	-72.73	20.38	-52.35	-13.00	-39.35	Horizontal
3	936.362	-81.22	40.65	-40.57	-13.00	-27.57	Horizontal
4	1430.600	-67.08	8.65	-58.43	-13.00	-45.43	Horizontal
5	2145.900	-69.01	13.22	-55.79	-13.00	-42.79	Horizontal
6	31.164	-83.86	26.59	-57.27	-13.00	-44.27	Vertical
7	593.820	-81.55	34.06	-47.49	-13.00	-34.49	Vertical
8	981.568	-80.54	40.02	-40.52	-13.00	-27.52	Vertical
9	1430.600	-65.24	8.65	-56.59	-13.00	-43.59	Vertical
10	2145.900	-68.13	13.22	-54.91	-13.00	-41.91	Vertical

5.9 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 2.1055 &
FCC 47 CFR Part 24.235 &
FCC 47 CFR Part 27.54,
Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01

Limits:

FCC 47 CFR Part 24.235, FCC 47 CFR Part 27.54

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

Test Setup: Refer to section 4.2.2 for details.

Test Procedures:

- 1) Use CMW 500 or CMU 200 with Frequency Error measurement capability.
 - a) Temp. = -30° to $+50^{\circ}\text{C}$
 - b) Voltage =low voltage, 3.3 Vdc, Normal, 3.8 Vdc and High voltage, 4.3Vdc.
- 2) Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until $+50^{\circ}\text{C}$ is reached.

- 3) Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

Equipment Used: Refer to section 3 for details.

Test Result: Pass

5.9.1 LTE Band 2

Modulation	Channel/ Frequency (MHz)	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
		(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
LTE Band 2 / 20MHz / Full RB							
QPSK	18900 / 1880.0	VL	TN	4.37	0.0023	N/A	Pass
		VN		-3.53	-0.0019		Pass
		VH		5.46	0.0029		Pass
		VN	50	5.28	0.0028		Pass
			40	6.21	0.0033		Pass
			30	5.64	0.0030		Pass
			20	5.20	0.0028		Pass
			10	4.22	0.0022		Pass
			0	4.16	0.0022		Pass
			-10	5.78	0.0031		Pass
			-20	6.54	0.0035		Pass
			-30	-6.22	-0.0033		Pass

5.9.2 LTE Band 4

Modulation	Channel/ Frequency (MHz)	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
		(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
LTE Band 4 / 20MHz / Full RB							
QPSK	20175 / 1732.5	VL	TN	-6.31	-0.0036	N/A	Pass
		VN		-6.22	-0.0036		Pass
		VH		-6.43	-0.0037		Pass
		VN	50	-7.86	-0.0045		Pass
			40	-6.43	-0.0037		Pass
			30	-5.29	-0.0031		Pass
			20	-6.33	-0.0037		Pass
			10	-6.36	-0.0037		Pass
			0	-7.21	-0.0042		Pass
			-10	-5.11	-0.0029		Pass
			-20	-5.34	-0.0031		Pass
			-30	-7.49	-0.0043		Pass

5.9.3 LTE Band 12

Modulation	Channel/ Frequency (MHz)	Voltage	Temperature	Deviation	Deviation	Limit	Result
		(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
LTE Band 12 / 10MHz / Full RB							
QPSK	23095 / 707.5	VL	TN	4.54	0.0064	N/A	Pass
		VN		6.44	0.0091		Pass
		VH		5.69	0.0080		Pass
		VN	50	3.88	0.0055		Pass
			40	-3.68	-0.0052		Pass
			30	-4.65	-0.0066		Pass
			20	-6.19	-0.0087		Pass
			10	-4.98	-0.0070		Pass
			0	-4.49	-0.0063		Pass
			-10	-5.68	-0.0080		Pass
			-20	-5.37	-0.0076		Pass
			-30	-5.82	-0.0082		Pass

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
