

**LTE Band 5
Low channel**

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2487	V	-41.95	-13	-28.95
1658	V	-42.42	-13	-29.42
512.2	V	-46.56	-13	-33.56
365.5	V	-46.55	-13	-33.55
2487	H	-40.45	-13	-27.45
1658	H	-40.14	-13	-27.14
521.1	H	-44.92	-13	-31.92
336.5	H	-44.74	-13	-31.74

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2509.5	V	-42.47	-13	-29.47
1673	V	-42.49	-13	-29.49
725.8	V	-47.13	-13	-34.13
616.6	V	-46.79	-13	-33.79
2509.5	H	-40.93	-13	-27.93
1673	H	-42.17	-13	-29.17
705.5	H	-45.88	-13	-32.88
558.9	H	-45.88	-13	-32.88

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2532	V	-40.66	-13	-27.66
1688	V	-39.53	-13	-26.53
648.3	V	-46.76	-13	-33.76
482.7	V	-46.29	-13	-33.29
2532	H	-40.33	-13	-27.33
1688	H	-40.42	-13	-27.42
785.6	H	-45.72	-13	-32.72
615.7	H	-48.58	-13	-35.58

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LTE Band 12 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2112.0	V	-43.04	-13	-30.04
1408	V	-41.87	-13	-28.87
658.1	V	-50.52	-13	-37.52
516.9	V	-50.10	-13	-37.10
2112	H	-42.37	-13	-29.37
1408	H	-41.38	-13	-28.38
714.4	H	-49.28	-13	-36.28
669.5	H	-48.86	-13	-35.86

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2122.5	V	-44.86	-13	-31.86
1415	V	-43.56	-13	-30.56
651.5	V	-48.29	-13	-35.29
512.7	V	-50.68	-13	-37.68
2122.5	H	-42.94	-13	-29.94
1415	H	-43.19	-13	-30.19
525.4	H	-48.62	-13	-35.62
498.7	H	-50.60	-13	-37.60

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2133	V	-44.33	-13	-31.33
1422	V	-43.80	-13	-30.80
653.3	V	-47.83	-13	-34.83
592.7	V	-48.55	-13	-35.55
2133	H	-44.62	-13	-31.62
1422	H	-44.62	-13	-31.62
641.5	H	-51.94	-13	-38.94
558.3	H	-48.98	-13	-35.98

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LTE Band 13 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2338.5	V	-47.40	-13	-34.40
1559	V	-45.25	-13	-32.25
678.2	V	-48.33	-13	-35.33
423.6	V	-51.88	-13	-38.88
2338.5	H	-45.30	-13	-32.30
1559	H	-44.65	-13	-31.65
577.3	H	-52.83	-13	-39.83
345.9	H	-49.02	-13	-36.02

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2346	V	-46.08	-13	-33.08
1564	V	-45.62	-13	-32.62
611.7	V	-51.69	-13	-38.69
444,8	V	-52.16	-13	-39.16
2346	H	-43.83	-13	-30.83
1564	H	-45.50	-13	-32.50
692.8	H	-48.27	-13	-35.27
439.4	H	-51.83	-13	-38.83

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2353.5	V	-45.52	-13	-32.52
1569	V	-44.99	-13	-31.99
572.8	V	-49.38	-13	-36.38
309.9	V	-51.81	-13	-38.81
2353.5	H	-44.05	-13	-31.05
1569	H	-43.18	-13	-30.18
602.7	H	-49.80	-13	-36.80
413.6	H	-49.55	-13	-36.55

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LTE Band 14 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2371.5	V	-45.13	-13	-32.13
1581	V	-46.69	-13	-33.69
577.9	V	-48.13	-13	-35.13
415.6.6	V	-50.24	-13	-37.24
2371.5	H	-44.36	-13	-31.36
1581	H	-44.58	-13	-31.58
699.2	H	-51.83	-13	-38.83
514.7	H	-48.48	-13	-35.48

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2379	V	-45.97	-13	-32.97
1586	V	-45.31	-13	-32.31
611.7	V	-50.02	-13	-37.02
444,8	V	-51.49	-13	-38.49
2379	H	-44.46	-13	-31.46
1586	H	-44.18	-13	-31.18
692.8	H	-47.73	-13	-34.73
439.4	H	-52.30	-13	-39.30

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2386.5	V	-46.80	-13	-33.80
1591	V	-45.32	-13	-32.32
572.8	V	-49.36	-13	-36.36
309.9	V	-50.87	-13	-37.87
2386.6	H	-42.66	-13	-29.66
1591	H	-43.99	-13	-30.99
602.7	H	-51.71	-13	-38.71
413.6	H	-49.45	-13	-36.45

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LTE Band 13 (1559 MHz ~ 1610 MHz Wideband Band)

Operating Frequency (MHz)	Measured Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
779.5	1559	V	-43.53	-40	-3.53
782.0	1564	V	-44.94	-40	-4.94
784.5	1569	V	-42.38	-40	-2.38
779.5	1559	H	-44.14	-40	-4.14
782.0	1564	H	-45.09	-40	-5.09
784.5	1569	H	-43.55	-40	-3.55

LTE Band 14 (1559 MHz ~ 1610 MHz Wideband Band)

Operating Frequency (MHz)	Measured Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
790.5	1581	V	-44.31	-40	-4.31
793.0	1586	V	-44.29	-40	-4.29
795.5	1591	V	-42.22	-40	-2.22
790.5	1581	H	-43.60	-40	-3.60
793.0	1586	H	-42.96	-40	-2.96
795.5	1591	H	-43.22	-40	-3.22

Note: The spurious emissions found in the frequency band 1559-1610MHz meet the stricter Wideband limits.

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**LTE Band 66
Low channel**

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5132.1	V	-44.52	-13	-31.52
3421.4	V	-42.08	-13	-29.08
698.3	V	-47.56	-13	-34.56
417.5	V	-49.17	-13	-36.17
5132.1	H	-43.07	-13	-30.07
3421.4	H	-43.78	-13	-30.78
504.9	H	-51.05	-13	-38.05
431.9	H	-47.80	-13	-34.80

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5235	V	-42.86	-13	-29.86
3490	V	-43.31	-13	-30.31
578.2	V	-48.77	-13	-35.77
345.7	V	-50.13	-13	-37.13
5235	H	-43.25	-13	-30.25
3490	H	-42.20	-13	-29.20
634.8	H	-46.74	-13	-33.74
412.9	H	-51.59	-13	-38.59

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5337.9	V	-41.93	-13	-28.93
3558.6	V	-41.31	-13	-28.31
752.6	V	-47.02	-13	-34.02
546.1	V	-49.03	-13	-36.03
5337.9	H	-43.00	-13	-30.00
3558.6	H	-41.25	-13	-28.25
687.3	H	-48.40	-13	-35.40
436.6	H	-47.28	-13	-34.28

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LTE Band 71 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1996.5	V	-42.09	-13	-29.09
1331	V	-42.93	-13	-29.93
511.2	V	-45.35	-13	-32.35
375.4	V	-48.59	-13	-35.59
1996.5	H	-42.58	-13	-29.58
1331	H	-43.07	-13	-30.07
577.1	H	-51.83	-13	-38.83
309.6	H	-48.26	-13	-35.26

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2041.5	V	-43.35	-13	-30.35
1361	V	-43.62	-13	-30.62
515.1	V	-49.43	-13	-36.43
345.7	V	-51.10	-13	-38.10
2041.5	H	-43.65	-13	-30.65
1361	H	-43.22	-13	-30.22
564.5	H	-46.92	-13	-33.92
315.9	H	-52.32	-13	-39.32

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2086.5	V	-41.29	-13	-28.29
1391	V	-41.21	-13	-28.21
546.6	V	-47.35	-13	-34.35
345.1	V	-50.07	-13	-37.07
2086.5	H	-42.41	-13	-29.41
1391	H	-41.71	-13	-28.71
534.2	H	-49.33	-13	-36.33
322.9	H	-48.08	-13	-35.08

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Note: 1. Margin (dB) = Emission Level(dBm) -Limit(dBm)

Emission Level(dBm)= Measurement Reading(dBm)+Factor(dB)

Factor(dB) = ANT Gain -Cable Loss + Power Splitter

2. The test refers to the value of Factor, please refer to the results listed in the test method in this section of the report.
3. Radiated Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0.
4. Below 30MHz, no spurious emission was found, and only the worst mode data above 30MHz is recorded in the report.

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12. FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

12.1 PROVISIONS APPLICABLE

12.1.1 For Hand carried battery powered equipment

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) Temperature: The temperature is varied from -20°C to +50°C in 10°C increments using an environmental chamber.
- b.) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

For Part 22, the frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency. For Part 24 and Part 27, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

12.1.2 For equipment powered by primary supply voltage

1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -20°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

12.2 MEASUREMENT METHOD

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

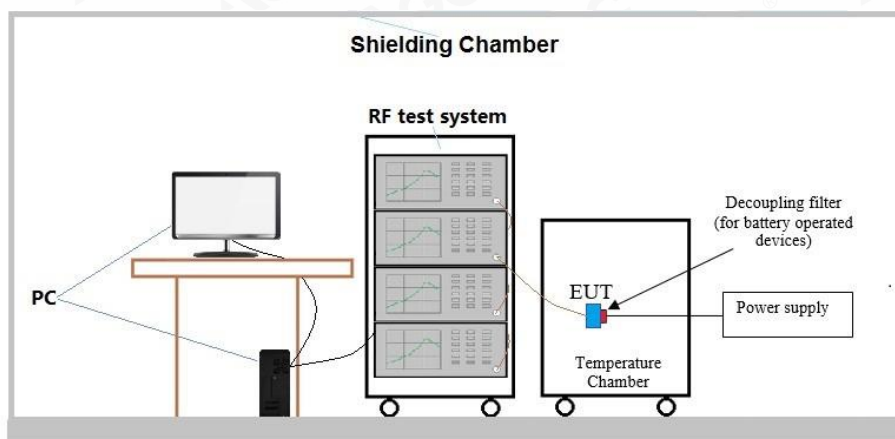
- 1 Measure the carrier frequency at room temperature.
- 2 Subject the EUT to overnight soak at -20°C. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on channel 20175 for LTE band 4 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- 3 Repeat the above measurements at 10°C increments from -20°C to +50°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
- 4 Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.

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- 5 Subject the EUT to overnight soak at +50°C.
- 6 With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
- 7 Repeat the above measurements at 10°C increments from +50°C to -20°C. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
- 8 At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

12.3 MEASUREMENT SETUP



12.4 MEASUREMENT RESULT

LTE Band 2

Middle Channel, $f_0 = 1880$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-20	3.70	-7.28	-0.003934
-10		-5.78	-0.003123
0		-8.96	-0.004841
10		-7.81	-0.004154
20		-8.97	-0.004771
30		-7.42	-0.003947
40		3.28	0.001718
50		-3.22	-0.001686
25	4.20	5.66	0.002964
	3.15	-5.19	-0.002804

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the

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device is determined to remain operating in band over the temperature and voltage range as tested.

LTE Band 4

Middle Channel, $f_0 = 1732.5$ MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Temperature (°C)
-20	3.70	-2.73	-0.001596	±2.5
-10		6.02	0.003519	±2.5
0		3.30	0.001929	±2.5
10		-3.78	-0.002182	±2.5
20		-3.25	-0.001876	±2.5
30		5.42	0.003128	±2.5
40		-5.85	-0.003335	±2.5
50		-5.52	-0.003147	±2.5
25	4.20	-5.06	-0.002884	±2.5
	3.15	-3.28	-0.001917	±2.5

LTE Band 5

Middle Channel, $f_0 = 836.5$ MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Temperature (°C)
-20	3.70	-3.22	-0.003904	±2.5
-10		-4.59	-0.005566	±2.5
0		-2.46	-0.002983	±2.5
10		-4.09	-0.004889	±2.5
20		-3.19	-0.003814	±2.5
30		-4.56	-0.005451	±2.5
40		-1.85	-0.002181	±2.5
50		2.33	0.002747	±2.5
25	4.20	-1.87	-0.002204	±2.5
	3.15	-3.22	-0.003904	±2.5

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LTE Band 12

Middle Channel, $f_0 = 707.5$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-20	3.70	-2.15	-0.003073
-10		-3.10	-0.004430
0		-2.83	-0.004045
10		-3.48	-0.004919
20		-2.75	-0.003887
30		-2.76	-0.003901
40		-4.29	-0.005997
50		-3.36	-0.004697
25	4.20	-3.38	-0.004725
	3.15	-2.98	-0.004259

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

LTE Band 13

Middle Channel, $f_0 = 782.0$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-20	3.70	-3.82	-0.004901
-10		-3.65	-0.004682
0		-2.55	-0.003271
10		-3.52	-0.004501
20		-2.90	-0.003708
30		-3.16	-0.004041
40		-2.36	-0.003008
50		1.79	0.002282
25	4.20	1.80	0.002294
	3.15	-3.28	-0.004208

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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LTE Band 14

Middle Channel, $f_0 = 793.0\text{MHz}$			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-20	3.70	-4.19	-0.005300
-10		-4.71	-0.005958
0		-3.68	-0.004655
10		-3.00	-0.003783
20		-1.73	-0.002182
30		2.12	0.002673
40		-2.26	-0.002841
50		-2.36	-0.002967
25	4.20	1.47	0.001848
	3.15	-5.26	-0.006654

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

LTE Band 66

Middle Channel, $f_0 = 1745.0\text{MHz}$			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-20	3.70	4.39	0.002566
-10		6.25	0.003653
0		5.04	0.002946
10		-7.54	-0.004321
20		-4.75	-0.002722
30		-9.51	-0.005450
40		-3.91	-0.002197
50		4.31	0.002422
25	4.20	6.29	0.003535
	3.15	4.02	0.002350

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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LTE Band 71

Middle Channel, $f_0 = 680.5\text{MHz}$			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-20	3.70	1.93	0.002900
-10		-1.86	-0.002795
0		-2.60	-0.003907
10		2.29	0.003365
20		-3.35	-0.004923
30		-2.12	-0.003115
40		-2.07	-0.002976
50		-5.41	-0.007779
25	4.20	-2.80	-0.004026
	3.15	-2.88	-0.004328

Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

- Note:**1. The device under test maintains the minimum and maximum operating temperature and the required limit voltage according to the manufacturer's requirements.
2. Only the worst working mode data is recorded in the report.

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13. OCCUPIED BANDWIDTH

13.1 PROVISIONS APPLICABLE

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission. The EUT makes a call to the communication simulator.

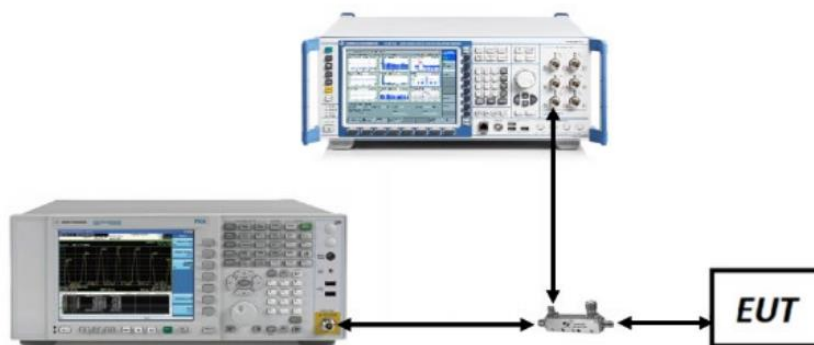
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

13.2 MEASUREMENT METHOD

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

13.3 MEASUREMENT SETUP



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13.4 MEASUREMENT RESULT

LTE Band 2

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0911	1.266	PASS
	MCH	6	0	1.0922	1.268	PASS
	HCH	6	0	1.0908	1.275	PASS
16QAM	LCH	6	0	1.0911	1.268	PASS
	MCH	6	0	1.0875	1.276	PASS
	HCH	6	0	1.0898	1.254	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6889	2.890	PASS
	MCH	15	0	2.6977	2.921	PASS
	HCH	15	0	2.6955	2.900	PASS
16QAM	LCH	15	0	2.6884	2.918	PASS
	MCH	15	0	2.6917	2.926	PASS
	HCH	15	0	2.6938	2.907	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.5035	4.904	PASS
	MCH	25	0	4.4986	4.875	PASS
	HCH	25	0	4.5034	4.867	PASS
16QAM	LCH	25	0	4.5069	4.854	PASS
	MCH	25	0	4.4977	4.907	PASS
	HCH	25	0	4.5103	4.863	PASS

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Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9636	9.563	PASS
	MCH	50	0	8.9699	9.533	PASS
	HCH	50	0	8.9355	9.530	PASS
16QAM	LCH	50	0	8.9585	9.568	PASS
	MCH	50	0	8.9591	9.530	PASS
	HCH	50	0	8.9322	9.488	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	13.442	14.26	PASS
	MCH	75	0	13.421	14.26	PASS
	HCH	75	0	13.376	14.19	PASS
16QAM	LCH	75	0	13.452	14.26	PASS
	MCH	75	0	13.419	14.23	PASS
	HCH	75	0	13.369	14.23	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	100	0	17.913	18.97	PASS
	MCH	100	0	17.871	18.95	PASS
	HCH	100	0	17.824	18.90	PASS
16QAM	LCH	100	0	17.912	18.95	PASS
	MCH	100	0	17.880	18.92	PASS
	HCH	100	0	17.821	18.91	PASS

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LTE Band 4

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0900	1.258	PASS
	MCH	6	0	1.0929	1.259	PASS
	HCH	6	0	1.0927	1.252	PASS
16QAM	LCH	6	0	1.0898	1.268	PASS
	MCH	6	0	1.0886	1.264	PASS
	HCH	6	0	1.0927	1.261	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6937	2.902	PASS
	MCH	15	0	2.6937	2.921	PASS
	HCH	15	0	2.6985	2.913	PASS
16QAM	LCH	15	0	2.6956	2.910	PASS
	MCH	15	0	2.6888	2.918	PASS
	HCH	15	0	2.6931	2.934	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.5016	4.896	PASS
	MCH	25	0	4.5014	4.918	PASS
	HCH	25	0	4.4995	4.878	PASS
16QAM	LCH	25	0	4.5056	4.869	PASS
	MCH	25	0	4.5034	4.868	PASS
	HCH	25	0	4.5014	4.892	PASS

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Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9844	9.550	PASS
	MCH	50	0	8.9674	9.560	PASS
	HCH	50	0	8.9517	9.528	PASS
16QAM	LCH	50	0	8.9675	9.538	PASS
	MCH	50	0	8.9484	9.540	PASS
	HCH	50	0	8.9622	9.535	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	13.469	14.27	PASS
	MCH	75	0	13.421	14.26	PASS
	HCH	75	0	13.442	14.25	PASS
16QAM	LCH	75	0	13.455	14.27	PASS
	MCH	75	0	13.419	14.27	PASS
	HCH	75	0	13.434	14.28	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	100	0	17.905	18.94	PASS
	MCH	100	0	17.890	18.96	PASS
	HCH	100	0	17.917	18.99	PASS
16QAM	LCH	100	0	17.903	18.94	PASS
	MCH	100	0	17.876	18.93	PASS
	HCH	100	0	17.919	18.96	PASS

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LTE Band 5

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0900	1.257	PASS
	MCH	6	0	1.0901	1.259	PASS
	HCH	6	0	1.0932	1.255	PASS
16QAM	LCH	6	0	1.0904	1.259	PASS
	MCH	6	0	1.0919	1.264	PASS
	HCH	6	0	1.0883	1.267	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6945	2.906	PASS
	MCH	15	0	2.6937	2.890	PASS
	HCH	15	0	2.6965	2.905	PASS
16QAM	LCH	15	0	2.6916	2.903	PASS
	MCH	15	0	2.6910	2.928	PASS
	HCH	15	0	2.6954	2.905	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4972	4.865	PASS
	MCH	25	0	4.4996	4.900	PASS
	HCH	25	0	4.5036	4.873	PASS
16QAM	LCH	25	0	4.4992	4.853	PASS
	MCH	25	0	4.5016	4.849	PASS
	HCH	25	0	4.5044	4.897	PASS

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Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9885	9.548	PASS
	MCH	50	0	8.9593	9.534	PASS
	HCH	50	0	8.9618	9.529	PASS
16QAM	LCH	50	0	8.9649	9.517	PASS
	MCH	50	0	8.9588	9.517	PASS
	HCH	50	0	8.9595	9.551	PASS

LTE Band 12

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0890	1.258	PASS
	MCH	6	0	1.0913	1.255	PASS
	HCH	6	0	1.0916	1.242	PASS
16QAM	LCH	6	0	1.0897	1.275	PASS
	MCH	6	0	1.0924	1.269	PASS
	HCH	6	0	1.0927	1.269	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6925	2.926	PASS
	MCH	15	0	2.6957	2.913	PASS
	HCH	15	0	2.6987	2.904	PASS
16QAM	LCH	15	0	2.6870	2.914	PASS
	MCH	15	0	2.6931	2.925	PASS
	HCH	15	0	2.7011	2.909	PASS

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Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4936	4.886	PASS
	MCH	25	0	4.4974	4.868	PASS
	HCH	25	0	4.5078	4.858	PASS
16QAM	LCH	25	0	4.4982	4.862	PASS
	MCH	25	0	4.4922	4.879	PASS
	HCH	25	0	4.5087	4.890	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9399	9.522	PASS
	MCH	50	0	8.9435	9.510	PASS
	HCH	50	0	8.9329	9.518	PASS
16QAM	LCH	50	0	8.9317	9.496	PASS
	MCH	50	0	8.9338	9.527	PASS
	HCH	50	0	8.9349	9.506	PASS

LTE Band 13

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4981	4.880	PASS
	MCH	25	0	4.4954	4.856	PASS
	HCH	25	0	4.5010	4.881	PASS
16QAM	LCH	25	0	4.5013	4.862	PASS
	MCH	25	0	4.5015	4.874	PASS
	HCH	25	0	4.5084	4.877	PASS

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Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	MCH	50	0	8.9537	9.541	PASS
16QAM	MCH	50	0	8.9394	9.510	PASS

LTE Band 14

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4983	4.902	PASS
	MCH	25	0	4.4962	4.861	PASS
	HCH	25	0	4.5030	4.870	PASS
16QAM	LCH	25	0	4.5014	4.862	PASS
	MCH	25	0	4.4988	4.894	PASS
	HCH	25	0	4.5054	4.892	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	MCH	50	0	8.9389	9.539	PASS
16QAM	MCH	50	0	8.9311	9.509	PASS

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LTE Band 66

Channel Bandwidth: 1.4 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	6	0	1.0922	1.259	PASS
	MCH	6	0	1.0906	1.262	PASS
	HCH	6	0	1.0906	1.264	PASS
16QAM	LCH	6	0	1.0908	1.276	PASS
	MCH	6	0	1.0892	1.266	PASS
	HCH	6	0	1.0931	1.269	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6977	2.891	PASS
	MCH	15	0	2.6880	2.911	PASS
	HCH	15	0	2.6968	2.932	PASS
16QAM	LCH	15	0	2.6876	2.895	PASS
	MCH	15	0	2.6899	2.927	PASS
	HCH	15	0	2.6932	2.931	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.5032	4.928	PASS
	MCH	25	0	4.5038	4.901	PASS
	HCH	25	0	4.4974	4.884	PASS
16QAM	LCH	25	0	4.5061	4.864	PASS
	MCH	25	0	4.5066	4.880	PASS
	HCH	25	0	4.5063	4.883	PASS

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Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9814	9.555	PASS
	MCH	50	0	8.9570	9.570	PASS
	HCH	50	0	8.9726	9.533	PASS
16QAM	LCH	50	0	8.9720	9.541	PASS
	MCH	50	0	8.9586	9.522	PASS
	HCH	50	0	8.9684	9.539	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	8.9814	9.555	PASS
	MCH	75	0	8.9570	9.570	PASS
	HCH	75	0	8.9726	9.533	PASS
16QAM	LCH	75	0	8.9720	9.541	PASS
	MCH	75	0	8.9586	9.522	PASS
	HCH	75	0	8.9684	9.539	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	100	0	13.465	14.34	PASS
	MCH	100	0	13.456	14.32	PASS
	HCH	100	0	13.445	14.29	PASS
16QAM	LCH	100	0	13.459	14.27	PASS
	MCH	100	0	13.441	14.26	PASS
	HCH	100	0	13.442	14.27	PASS

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LTE Band 71

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4928	4.897	PASS
	MCH	25	0	4.4894	4.841	PASS
	HCH	25	0	4.4953	4.878	PASS
16QAM	LCH	25	0	4.4990	4.884	PASS
	MCH	25	0	4.4938	4.884	PASS
	HCH	25	0	4.4997	4.856	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9693	9.556	PASS
	MCH	50	0	8.9318	9.498	PASS
	HCH	50	0	8.9601	9.537	PASS
16QAM	LCH	50	0	8.9447	9.549	PASS
	MCH	50	0	8.9179	9.504	PASS
	HCH	50	0	8.9475	9.548	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	13.467	14.24	PASS
	MCH	75	0	13.366	14.23	PASS
	HCH	75	0	13.473	14.27	PASS
16QAM	LCH	75	0	13.447	14.23	PASS
	MCH	75	0	13.361	14.21	PASS
	HCH	75	0	13.464	14.26	PASS

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Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	100	0	17.861	18.91	PASS
	MCH	100	0	17.820	18.90	PASS
	HCH	100	0	17.916	18.96	PASS
16QAM	LCH	100	0	17.861	18.90	PASS
	MCH	100	0	17.808	18.87	PASS
	HCH	100	0	17.920	18.96	PASS

Note: Please refers to Appendix B for compliance test plots for Occupied Bandwidth &Emission Bandwidth.

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14. BAND EDGE

14.1 PROVISIONS APPLICABLE

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

14.2 MEASUREMENT METHOD

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1% of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

TEST NOTE

§90.543(e)

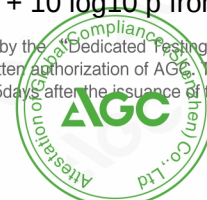
1. On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.
 2. On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.
 3. On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.
 4. Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
 5. Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.
- However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30kHz may be employed.

§27.53(m)

Equipment shall comply with the following unwanted emission limits:

- a) for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least $43 + 10 \log_{10} p$
- b) for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least: $40 + 10 \log_{10} p$ from the channel

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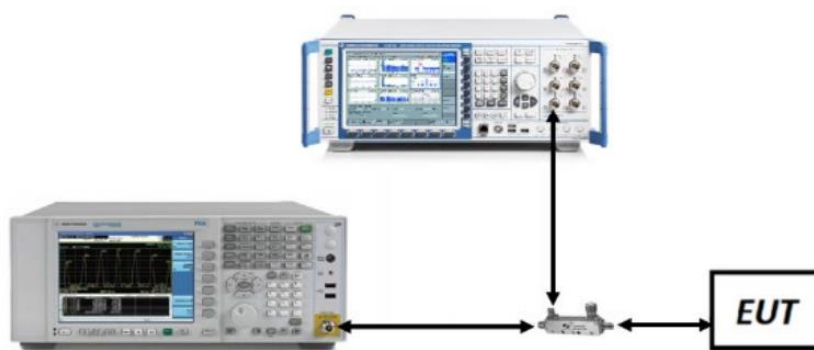
edges to 5 MHz away $43 + 10 \log_{10} p$ between 5 MHz and X MHz from the channel edges, and $55 + 10 \log_{10} p$ at X MHz and beyond from the channel edges. In addition, the attenuation shall not be less than $43 + 10 \log_{10} p$ on all frequencies between 2490.5 MHz and 2496 MHz, and $55 + 10 \log_{10} p$ at or below 2490.5 MHz.

In (a) and (b), p is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.

According to FCC 22.917, 24.238, 27.53 specified that 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. All measurements were done at 2 channels (low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

14.3 MEASUREMENT METHOD



14.4 MEASUREMENT RESULT

NOTE: Please refers to Appendix C for compliance test plots for band edge

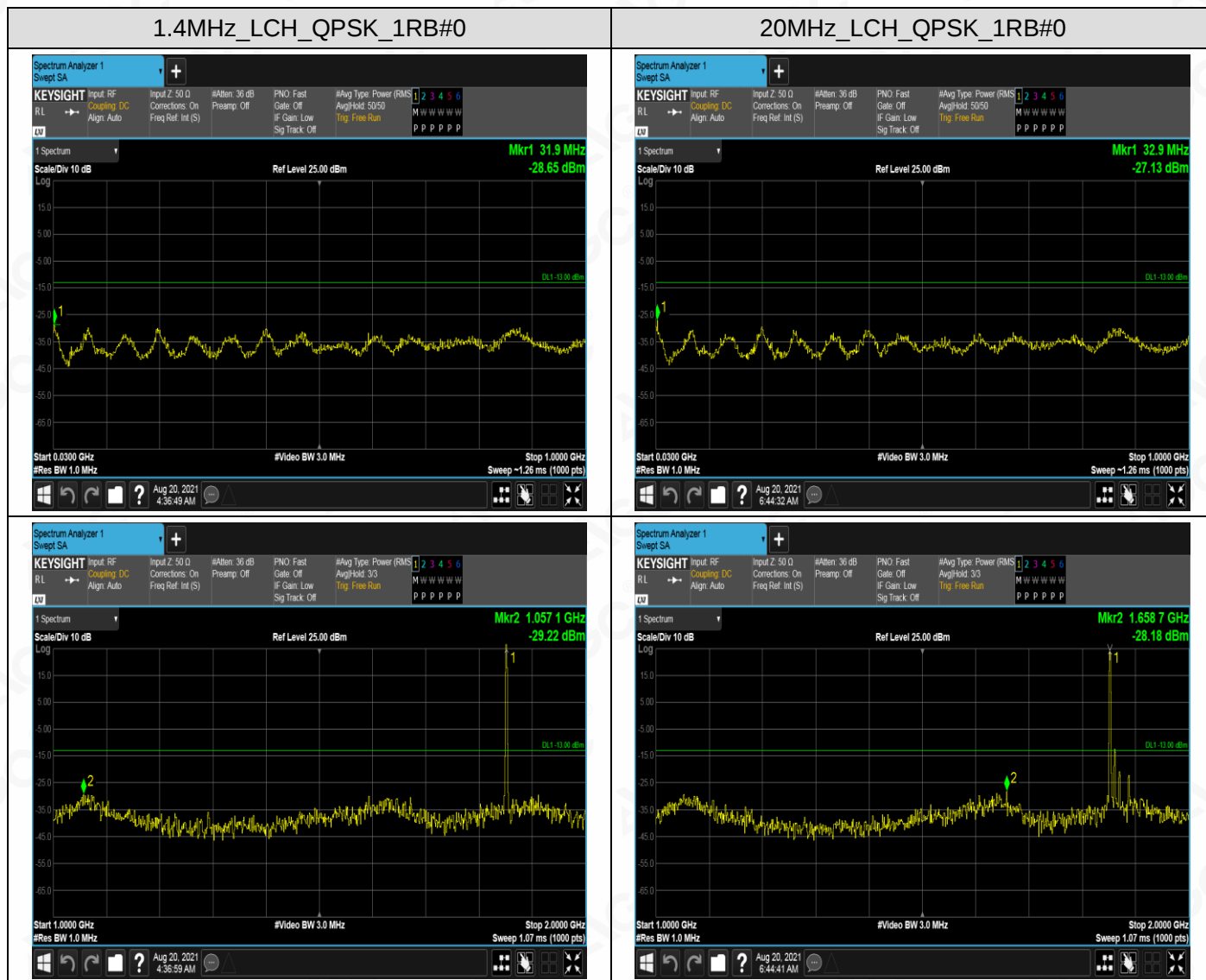
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APPENDIX A TEST PLOTS FOR SPURIOUS EMISSIONS AT ANTENNA TERMINALS

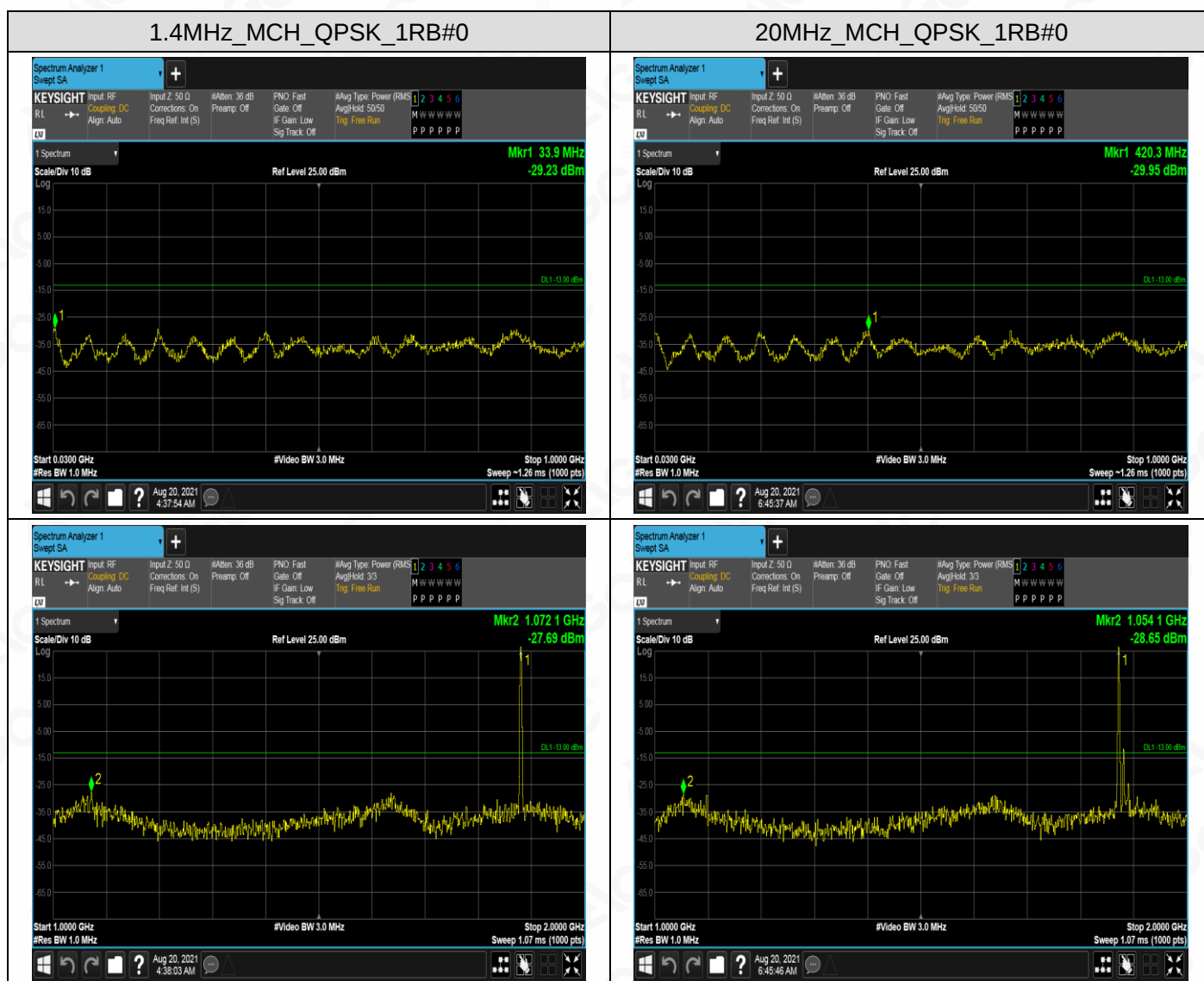
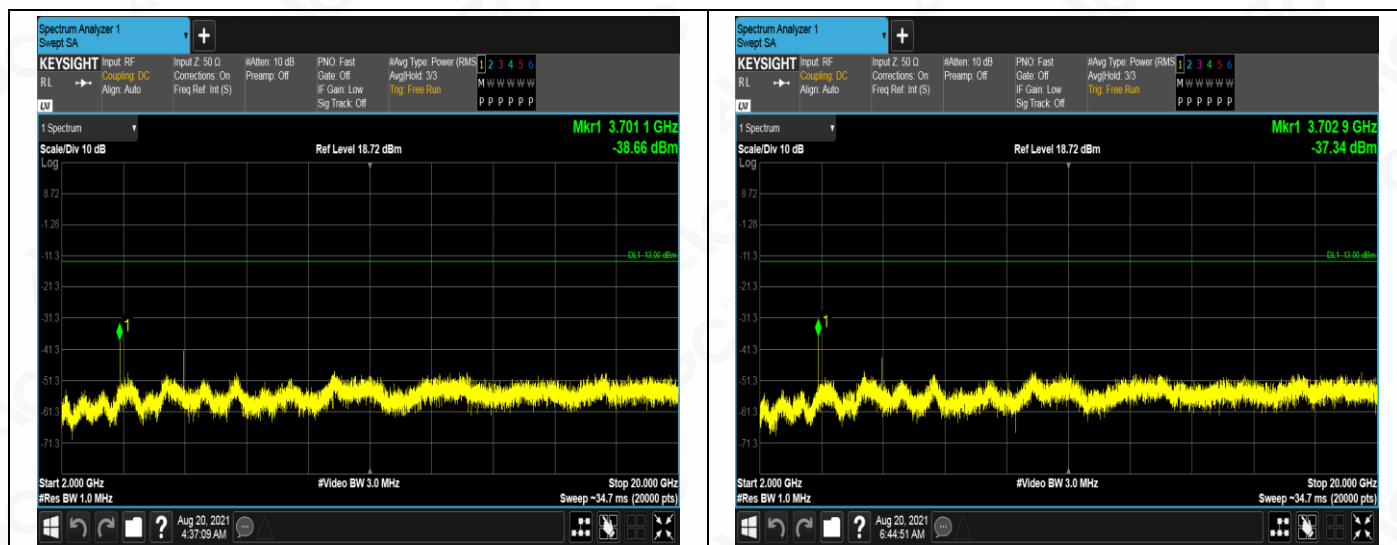
LTE BAND 2



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