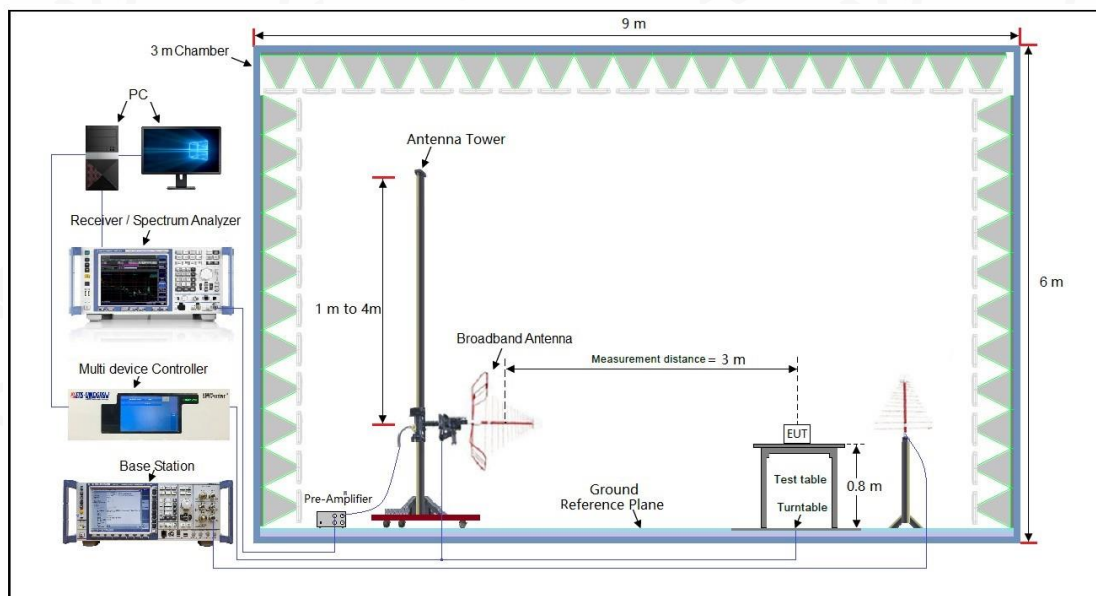
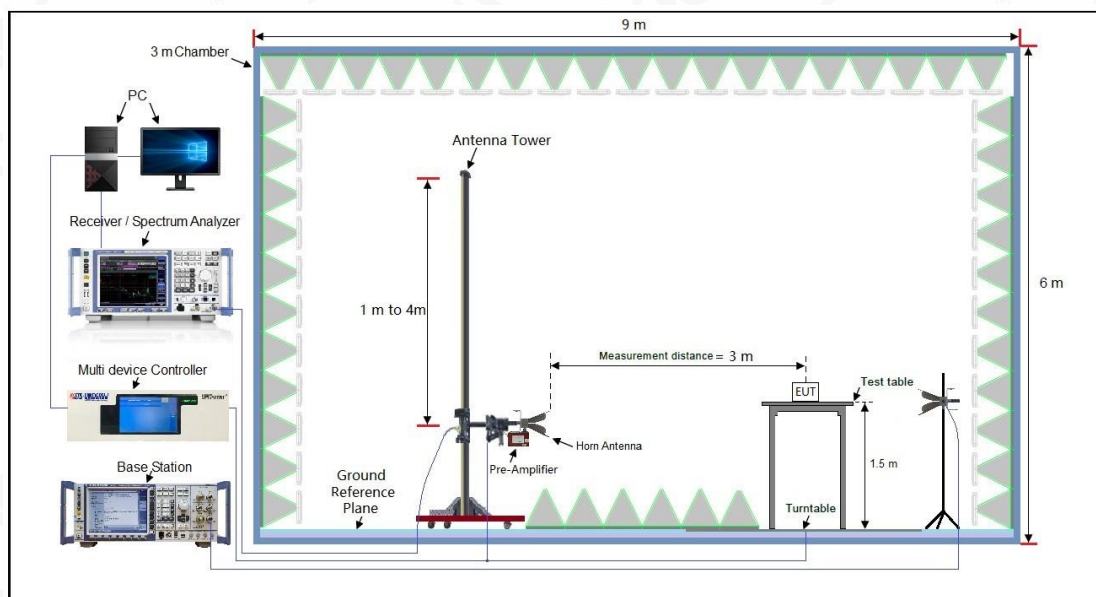


### 11.3 MEASUREMENT SETUP

#### Radiated Emissions 30MHz to 1GHz Test setup



#### Radiated Emissions Above 1GHz Test setup



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## 11.4 MEASUREMENT RESULT

### LTE Band 2 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5552.1	V	-41.13	-13	-28.13
3701.4	V	-40.32	-13	-27.32
695.5	V	-46.83	-13	-33.83
412.1	V	-51.11	-13	-38.11
5552.1	H	-39.27	-13	-26.27
3701.4	H	-41.11	-13	-28.11
678.3	H	-49.68	-13	-36.68
452.1	H	-49.33	-13	-36.33

### Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5640	V	-41.60	-13	-28.60
3760	V	-38.84	-13	-25.84
885.1	V	-48.84	-13	-35.84
618.7	V	-49.11	-13	-36.11
5640	H	-48.71	-13	-35.71
3760	H	-42.17	-13	-29.17
851.3	H	-46.18	-13	-33.18
732.5	H	-47.75	-13	-34.75

### High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5727.9	V	-41.13	-13	-28.13
3818.6	V	-41.52	-13	-28.52
664.5	V	-47.71	-13	-34.71
525.8	V	-47.93	-13	-34.93
5727.9	H	-38.81	-13	-25.81
3818.6	H	-40.14	-13	-27.14
669.8	H	-48.17	-13	-35.17
574.4	H	-47.69	-13	-34.69

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### LTE Band 4 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5132.1	V	-39.90	-13	-26.90
3421.4	V	-40.74	-13	-27.74
745.5	V	-44.30	-13	-31.30
528.1	V	-48.66	-13	-35.66
5132.1	H	-39.01	-13	-26.01
3421.4	H	-40.56	-13	-27.56
520.5	H	-48.40	-13	-35.40
395.8	H	-43.79	-13	-30.79

### Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5197.5	V	-38.96	-13	-25.96
3465	V	-39.40	-13	-26.40
669.4	V	-45.82	-13	-32.82
512.5	V	-48.52	-13	-35.52
5197.5	H	-38.68	-13	-25.68
3465	H	-40.99	-13	-27.99
569.4	H	-47.81	-13	-34.81
469.3	H	-46.61	-13	-33.61

### High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5262.9	V	-39.05	-13	-26.05
3508.6	V	-39.15	-13	-26.15
711.1	V	-47.53	-13	-34.53
528.7	V	-47.69	-13	-34.69
5262.9	H	-37.35	-13	-24.35
3508.6	H	-38.71	-13	-25.71
612.5	H	-45.52	-13	-32.52
553.9	H	-46.59	-13	-33.59

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### LTE Band 5 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2474.1	V	-41.05	-13	-28.05
1649.4	V	-42.24	-13	-29.24
512.2	V	-46.43	-13	-33.43
365.5	V	-47.36	-13	-34.36
2474.1	H	-39.46	-13	-26.46
1649.4	H	-40.75	-13	-27.75
521.1	H	-45.08	-13	-32.08
336.5	H	-45.31	-13	-32.31

### Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2509.5	V	-42.93	-13	-29.93
1673	V	-42.43	-13	-29.43
725.8	V	-46.49	-13	-33.49
616.6	V	-47.07	-13	-34.07
2509.5	H	-39.96	-13	-26.96
1673	H	-42.77	-13	-29.77
705.5	H	-45.78	-13	-32.78
558.9	H	-45.99	-13	-32.99

### High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2544.9	V	-42.35	-13	-29.35
1696.6	V	-41.00	-13	-28.00
648.3	V	-46.82	-13	-33.82
482.7	V	-48.75	-13	-35.75
2544.9	H	-40.04	-13	-27.04
1696.6	H	-41.86	-13	-28.86
785.6	H	-47.28	-13	-34.28
615.7	H	-48.33	-13	-35.33

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### LTE Band 7 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
7507.5	V	-31.63	-25	-18.63
5005	V	-31.00	-25	-18.00
925.7	V	-37.21	-25	-24.21
678.9	V	-40.39	-25	-27.39
7507.5	H	-30.02	-25	-17.02
5005	H	-29.85	-25	-16.85
873.6	H	-38.26	-25	-25.26
662.7	H	-39.55	-25	-26.55

### Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBc)	Margin (dB)
7605	V	-31.39	-25	-18.39
5070	V	-29.45	-25	-16.45
833.7	V	-37.58	-25	-24.58
521.2	V	-39.45	-25	-26.45
7605	H	-28.43	-25	-15.43
5070	H	-30.72	-25	-17.72
819.6	H	-38.67	-25	-25.67
520.5	H	-36.92	-25	-23.92

### High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
7702.5	V	-31.12	-25	-18.12
5135	V	-32.38	-25	-19.38
752.6	V	-40.28	-25	-27.28
511.4	V	-40.09	-25	-27.09
7702.5	H	-28.76	-25	-15.76
5135	H	-31.02	-25	-18.02
701.1	H	-38.07	-25	-25.07
507.1	H	-37.00	-25	-24.00

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### LTE Band 12 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2099.1	V	-43.87	-13	-30.87
1399.4	V	-42.13	-13	-29.13
658.1	V	-51.00	-13	-38.00
516.9	V	-50.57	-13	-37.57
2099.1	H	-41.92	-13	-28.92
1399.4	H	-42.06	-13	-29.06
714.4	H	-49.34	-13	-36.34
669.5	H	-49.10	-13	-36.10

### Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2122.5	V	-44.81	-13	-31.81
1415	V	-43.98	-13	-30.98
651.5	V	-47.48	-13	-34.48
512.7	V	-50.54	-13	-37.54
2122.5	H	-42.30	-13	-29.30
1415	H	-44.71	-13	-31.71
525.4	H	-49.49	-13	-36.49
498.7	H	-49.40	-13	-36.40

### High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2145.9	V	-44.33	-13	-31.33
1430.6	V	-43.41	-13	-30.41
653.3	V	-46.45	-13	-33.45
592.7	V	-49.44	-13	-36.44
2145.9	H	-44.81	-13	-31.81
1430.6	H	-44.83	-13	-31.83
641.5	H	-51.67	-13	-38.67
558.3	H	-50.41	-13	-37.41

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### LTE Band 17 Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2119.5	V	-41.32	-13	-28.32
1413	V	-45.96	-13	-32.96
652.8	V	-49.50	-13	-36.50
431.2	V	-46.64	-13	-33.64
2119.5	H	-41.13	-13	-28.13
1413	H	-51.41	-13	-38.41
547.1	H	-47.58	-13	-34.58
425.3	H	-45.08	-13	-32.08

### Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2130	V	-42.13	-13	-29.13
1420	V	-42.00	-13	-29.00
625.5	V	-47.33	-13	-34.33
498.3	V	-49.47	-13	-36.47
2130	H	-42.03	-13	-29.03
1420	H	-45.53	-13	-32.53
515.3	H	-49.51	-13	-36.51
412.5	H	-48.18	-13	-35.18

### High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
2140.5	V	-40.09	-13	-27.09
1427	V	-46.56	-13	-33.56
577.8	V	-47.84	-13	-34.84
412.3	V	-44.45	-13	-31.45
2140.5	H	-39.44	-13	-26.44
1427	H	-46.75	-13	-33.75
505.6	H	-47.79	-13	-34.79
401.4	H	-48.35	-13	-35.35

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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 -30°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  $\pm 0.00025\%$  ( $\pm 2.5$  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 -30°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

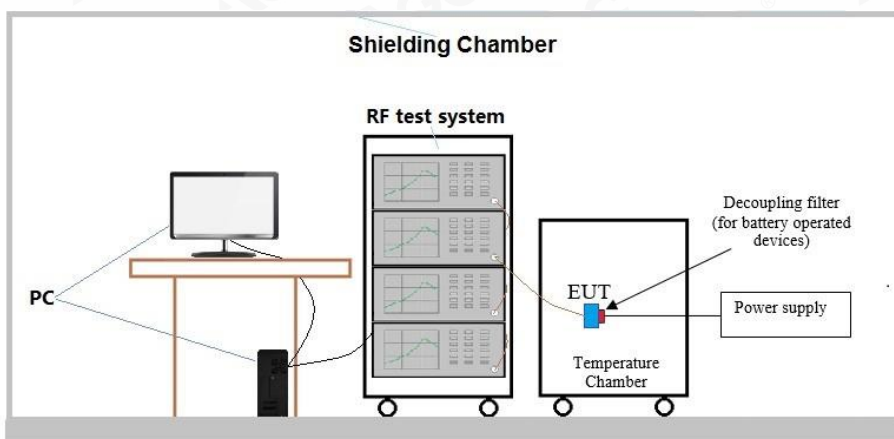
In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

- 1 Measure the carrier frequency at room temperature.
- 2 Subject the EUT to overnight soak at -30°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 -30°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.



- 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 -30°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

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### LTE Band 2

Middle Channel, $f_0 = 1880$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-30	3.85	6.11	0.003301
-20		3.79	0.002048
-10		2.86	0.001545
0		-3.73	-0.001984
10		3.81	0.002027
20		3.38	0.001798
30		2.07	0.001084
40		-2.55	-0.001336
50		-4.13	-0.002163
25	4.40	5.71	0.003085
	3.27	5.14	0.002777

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 4

Middle Channel, $f_0 = 1732.5$ MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Temperature (°C)
-30	3.85	5.06	0.002958	±2.5
-20		4.02	0.002350	±2.5
-10		6.21	0.003630	±2.5
0		4.35	0.002511	±2.5
10		5.62	0.003244	±2.5
20		-2.35	-0.001356	±2.5
30		-4.89	-0.002787	±2.5
40		-4.81	-0.002742	±2.5
50		-6.05	-0.003449	±2.5
25	4.40	5.14	0.003005	±2.5
	3.27	6.28	0.003671	±2.5

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### LTE Band 5

Middle Channel, $f_0 = 836.5$ MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Temperature (°C)
-30	3.85	-7.02	-0.008512	±2.5
-20		-7.84	-0.009506	±2.5
-10		-1.67	-0.002025	±2.5
0		-9.13	-0.010915	±2.5
10		-10.44	-0.012481	±2.5
20		-9.91	-0.011847	±2.5
30		-9.24	-0.010892	±2.5
40		-10.21	-0.012036	±2.5
50		-7.75	-0.009136	±2.5
25	4.40	-10.74	-0.013023	±2.5
	3.27	-9.13	-0.011071	±2.5

### LTE Band 7

Middle Channel, $f_0 = 2535$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-30	3.85	3.40	0.001359
-20		5.28	0.002110
-10		4.33	0.001730
0		-5.12	-0.002020
10		-4.52	-0.001783
20		-7.22	-0.002848
30		6.09	0.002372
40		6.57	0.002559
50		5.12	0.001994
25	4.40	5.49	0.002194
	3.27	6.98	0.002789

Note: 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 12

Middle Channel, $f_0 = 707.5$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-30	3.85	-2.13	-0.003044
-20		2.39	0.003416
-10		1.87	0.002673
0		-1.85	-0.002615
10		3.08	0.004353
20		3.06	0.004325
30		-1.87	-0.002614
40		-2.53	-0.003537
50		-2.15	-0.003006
25	4.40	1.19	0.001701
	3.27	2.53	0.003616

Note: 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 17

Middle Channel, $f_0 = 710$ MHz			
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-30	3.85	1.14	0.001614
-20		1.13	0.001599
-10		-2.03	-0.002873
0		-1.13	-0.001592
10		-1.42	-0.002000
20		-2.32	-0.003268
30		-1.23	-0.001724
40		1.44	0.002018
50		-1.27	-0.001780
25	4.40	-2.37	-0.003355
	3.27	-2.86	-0.004048

Note: 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

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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.

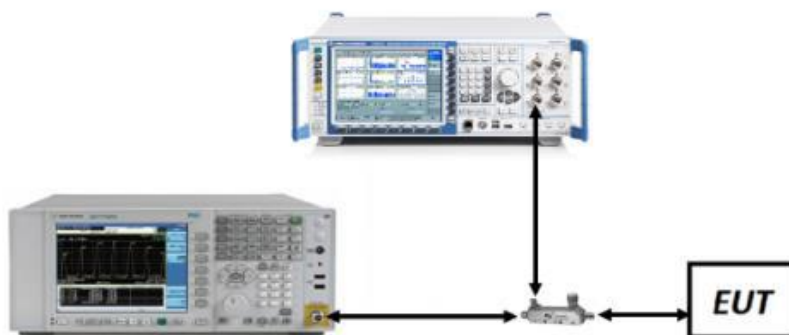
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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	1.0958	1.272	PASS
	MCH	6	0	1.0929	1.260	PASS
	HCH	6	0	1.0899	1.271	PASS
16QAM	LCH	6	0	1.0934	1.276	PASS
	MCH	6	0	1.0937	1.281	PASS
	HCH	6	0	1.0908	1.281	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6913	2.934	PASS
	MCH	15	0	2.6978	2.933	PASS
	HCH	15	0	2.7016	2.894	PASS
16QAM	LCH	15	0	2.6901	2.935	PASS
	MCH	15	0	2.6941	2.908	PASS
	HCH	15	0	2.7025	2.900	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.5009	4.894	PASS
	MCH	25	0	4.5007	4.880	PASS
	HCH	25	0	4.5053	4.896	PASS
16QAM	LCH	25	0	4.5012	4.865	PASS
	MCH	25	0	4.5031	4.922	PASS
	HCH	25	0	4.5174	4.896	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	8.9586	9.515	PASS
	MCH	50	0	8.9739	9.529	PASS
	HCH	50	0	8.9576	9.588	PASS
16QAM	LCH	50	0	8.9443	9.552	PASS
	MCH	50	0	8.9675	9.538	PASS
	HCH	50	0	8.9518	9.494	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	13.425	14.22	PASS
	MCH	75	0	13.485	14.24	PASS
	HCH	75	0	13.479	14.25	PASS
16QAM	LCH	75	0	13.428	14.21	PASS
	MCH	75	0	13.479	14.25	PASS
	HCH	75	0	13.478	14.25	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	100	0	17.827	18.89	PASS
	MCH	100	0	17.982	19.02	PASS
	HCH	100	0	17.957	18.98	PASS
16QAM	LCH	100	0	17.829	18.91	PASS
	MCH	100	0	17.997	18.96	PASS
	HCH	100	0	17.956	18.96	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	1.0938	1.269	PASS
	MCH	6	0	1.0919	1.262	PASS
	HCH	6	0	1.0934	1.274	PASS
16QAM	LCH	6	0	1.0895	1.266	PASS
	MCH	6	0	1.0930	1.264	PASS
	HCH	6	0	1.0910	1.244	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6904	2.893	PASS
	MCH	15	0	2.6909	2.896	PASS
	HCH	15	0	2.7018	2.918	PASS
16QAM	LCH	15	0	2.6933	2.919	PASS
	MCH	15	0	2.6961	2.933	PASS
	HCH	15	0	2.6945	2.927	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4942	4.873	PASS
	MCH	25	0	4.5004	4.911	PASS
	HCH	25	0	4.4977	4.871	PASS
16QAM	LCH	25	0	4.5051	4.852	PASS
	MCH	25	0	4.5020	4.893	PASS
	HCH	25	0	4.4966	4.909	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	8.9631	9.525	PASS
	MCH	50	0	8.9685	9.557	PASS
	HCH	50	0	8.9672	9.543	PASS
16QAM	LCH	50	0	8.9628	9.537	PASS
	MCH	50	0	8.9574	9.538	PASS
	HCH	50	0	8.9681	9.562	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	13.512	14.31	PASS
	MCH	75	0	13.456	14.33	PASS
	HCH	75	0	13.457	14.32	PASS
16QAM	LCH	75	0	13.485	14.28	PASS
	MCH	75	0	13.435	14.28	PASS
	HCH	75	0	13.454	14.29	PASS

Channel Bandwidth: 20 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	100	0	18.008	18.99	PASS
	MCH	100	0	17.899	18.94	PASS
	HCH	100	0	17.963	18.98	PASS
16QAM	LCH	100	0	18.003	19.03	PASS
	MCH	100	0	17.910	18.95	PASS
	HCH	100	0	17.956	19.01	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	1.0938	1.254	PASS
	MCH	6	0	1.0904	1.256	PASS
	HCH	6	0	1.0909	1.256	PASS
16QAM	LCH	6	0	1.0894	1.252	PASS
	MCH	6	0	1.0911	1.252	PASS
	HCH	6	0	1.0862	1.260	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6983	2.905	PASS
	MCH	15	0	2.6971	2.894	PASS
	HCH	15	0	2.6979	2.917	PASS
16QAM	LCH	15	0	2.6903	2.917	PASS
	MCH	15	0	2.6906	2.888	PASS
	HCH	15	0	2.6939	2.915	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4994	4.892	PASS
	MCH	25	0	4.5024	4.902	PASS
	HCH	25	0	4.4927	4.903	PASS
16QAM	LCH	25	0	4.5057	4.862	PASS
	MCH	25	0	4.5034	4.869	PASS
	HCH	25	0	4.5024	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	8.9854	9.576	PASS
	MCH	50	0	8.9788	9.540	PASS
	HCH	50	0	8.9720	9.558	PASS
16QAM	LCH	50	0	8.9656	9.536	PASS
	MCH	50	0	8.9832	9.561	PASS
	HCH	50	0	8.9670	9.556	PASS

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### LTE Band 7

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.5045	4.905	PASS
	MCH	25	0	4.5021	4.892	PASS
	HCH	25	0	4.4974	4.891	PASS
16QAM	LCH	25	0	4.5081	4.877	PASS
	MCH	25	0	4.5068	4.910	PASS
	HCH	25	0	4.5018	4.841	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9775	9.553	PASS
	MCH	50	0	8.9781	9.553	PASS
	HCH	50	0	8.9510	9.536	PASS
16QAM	LCH	50	0	8.9647	9.528	PASS
	MCH	50	0	8.9717	9.526	PASS
	HCH	50	0	8.9431	9.531	PASS

Channel Bandwidth: 15 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	75	0	13.465	14.28	PASS
	MCH	75	0	13.455	14.28	PASS
	HCH	75	0	13.416	14.28	PASS
16QAM	LCH	75	0	13.452	14.26	PASS
	MCH	75	0	13.452	14.28	PASS
	HCH	75	0	13.398	14.25	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	17.921	18.95	PASS
	MCH	100	0	17.927	19.01	PASS
	HCH	100	0	17.864	18.92	PASS
16QAM	LCH	100	0	17.909	18.95	PASS
	MCH	100	0	17.945	18.98	PASS
	HCH	100	0	17.865	18.91	PASS

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

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### 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	1.0907	1.255	PASS
	MCH	6	0	1.0918	1.257	PASS
	HCH	6	0	1.0903	1.249	PASS
16QAM	LCH	6	0	1.0915	1.252	PASS
	MCH	6	0	1.0918	1.272	PASS
	HCH	6	0	1.0907	1.252	PASS

Channel Bandwidth: 3 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	15	0	2.6917	2.923	PASS
	MCH	15	0	2.6989	2.917	PASS
	HCH	15	0	2.6919	2.930	PASS
16QAM	LCH	15	0	2.6895	2.924	PASS
	MCH	15	0	2.6962	2.909	PASS
	HCH	15	0	2.6961	2.920	PASS

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4989	4.891	PASS
	MCH	25	0	4.4982	4.888	PASS
	HCH	25	0	4.5006	4.841	PASS
16QAM	LCH	25	0	4.5031	4.857	PASS
	MCH	25	0	4.5011	4.902	PASS
	HCH	25	0	4.5033	4.866	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	8.9722	9.562	PASS
	MCH	50	0	8.9719	9.589	PASS
	HCH	50	0	8.9580	9.534	PASS
16QAM	LCH	50	0	8.9615	9.538	PASS
	MCH	50	0	8.9701	9.555	PASS
	HCH	50	0	8.9513	9.527	PASS

### LTE Band 17

Channel Bandwidth: 5 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	25	0	4.4949	4.866	PASS
	MCH	25	0	4.5038	4.866	PASS
	HCH	25	0	4.4936	4.887	PASS
16QAM	LCH	25	0	4.4985	4.884	PASS
	MCH	25	0	4.5035	4.880	PASS
	HCH	25	0	4.4955	4.840	PASS

Channel Bandwidth: 10 MHz						
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Verdict
		Size	Offset			
QPSK	LCH	50	0	8.9705	9.586	PASS
	MCH	50	0	8.9705	9.546	PASS
	HCH	50	0	8.9547	9.533	PASS
16QAM	LCH	50	0	8.9588	9.555	PASS
	MCH	50	0	8.9627	9.530	PASS
	HCH	50	0	8.9626	9.542	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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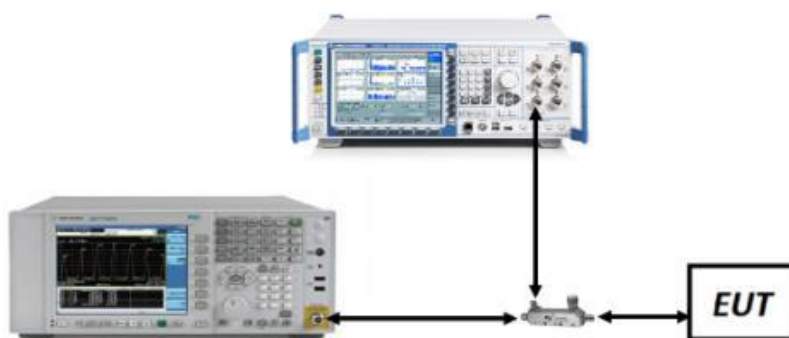
edges to 5 MHz away  $43 + 10 \log_{10} p$  between 5 MHz and X MHz from the channel edges, and  $55 + 10 \log_{10} p$  at X MHz and beyond from the channel edges. In addition, the attenuation shall not be less than  $43 + 10 \log_{10} p$  on all frequencies between 2490.5 MHz and 2496 MHz, and  $55 + 10 \log_{10} p$  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

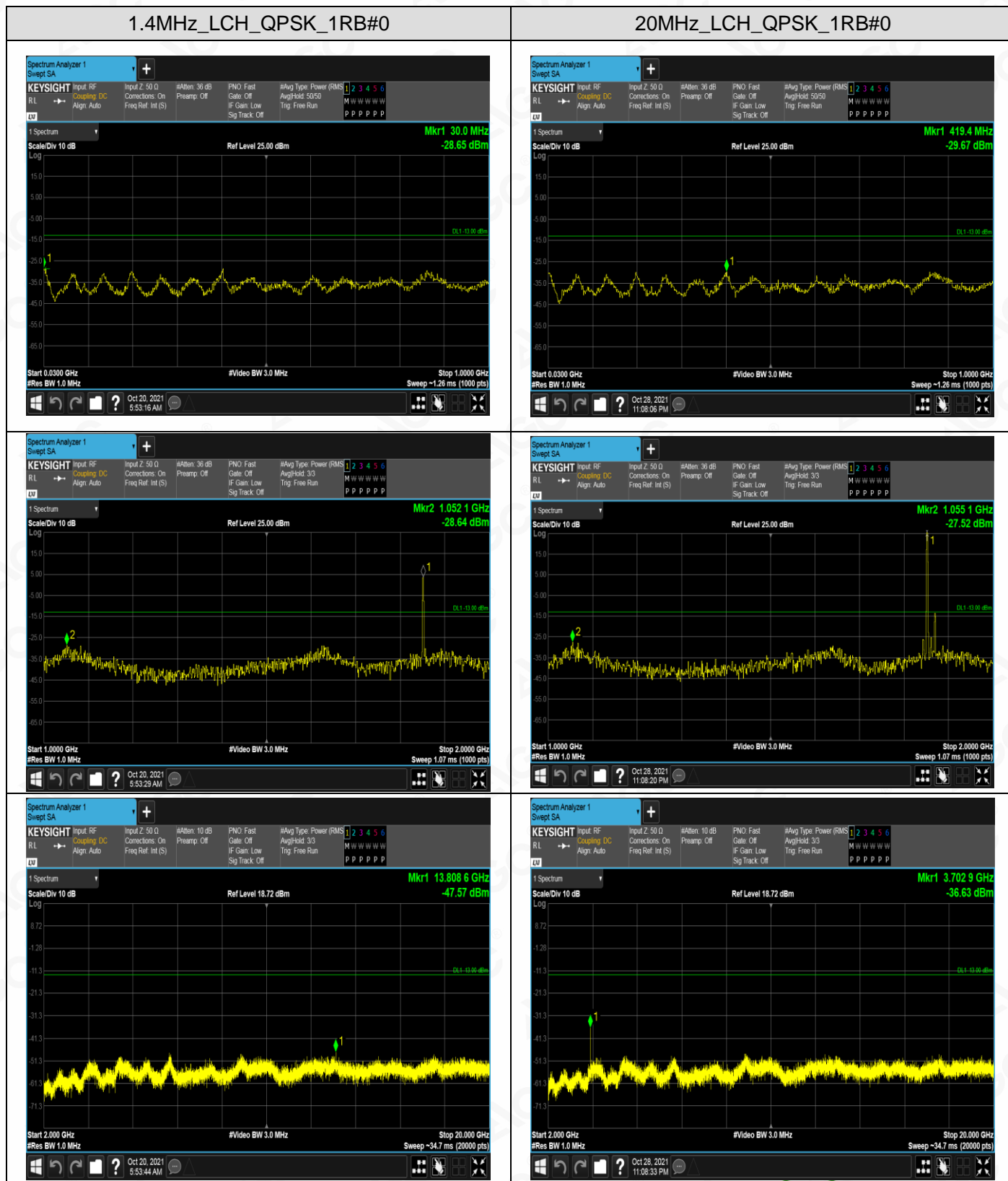
NOTE: Please refers to Appendix C for compliance test plots for band edge

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## APPENDIX A TEST PLOTS FOR SPURIOUS EMISSIONS AT ANTENNA TERMINALS LTE BAND 2

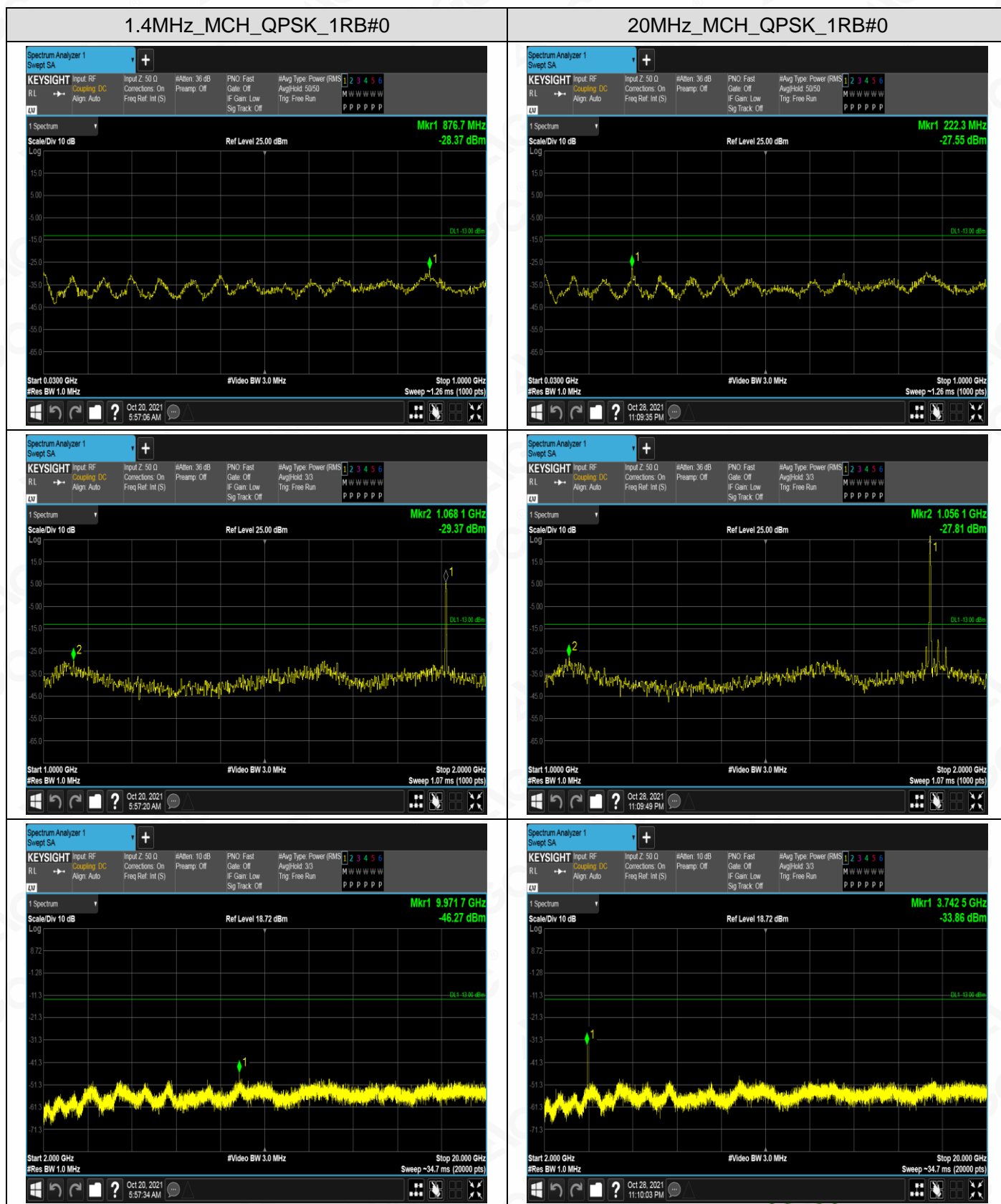


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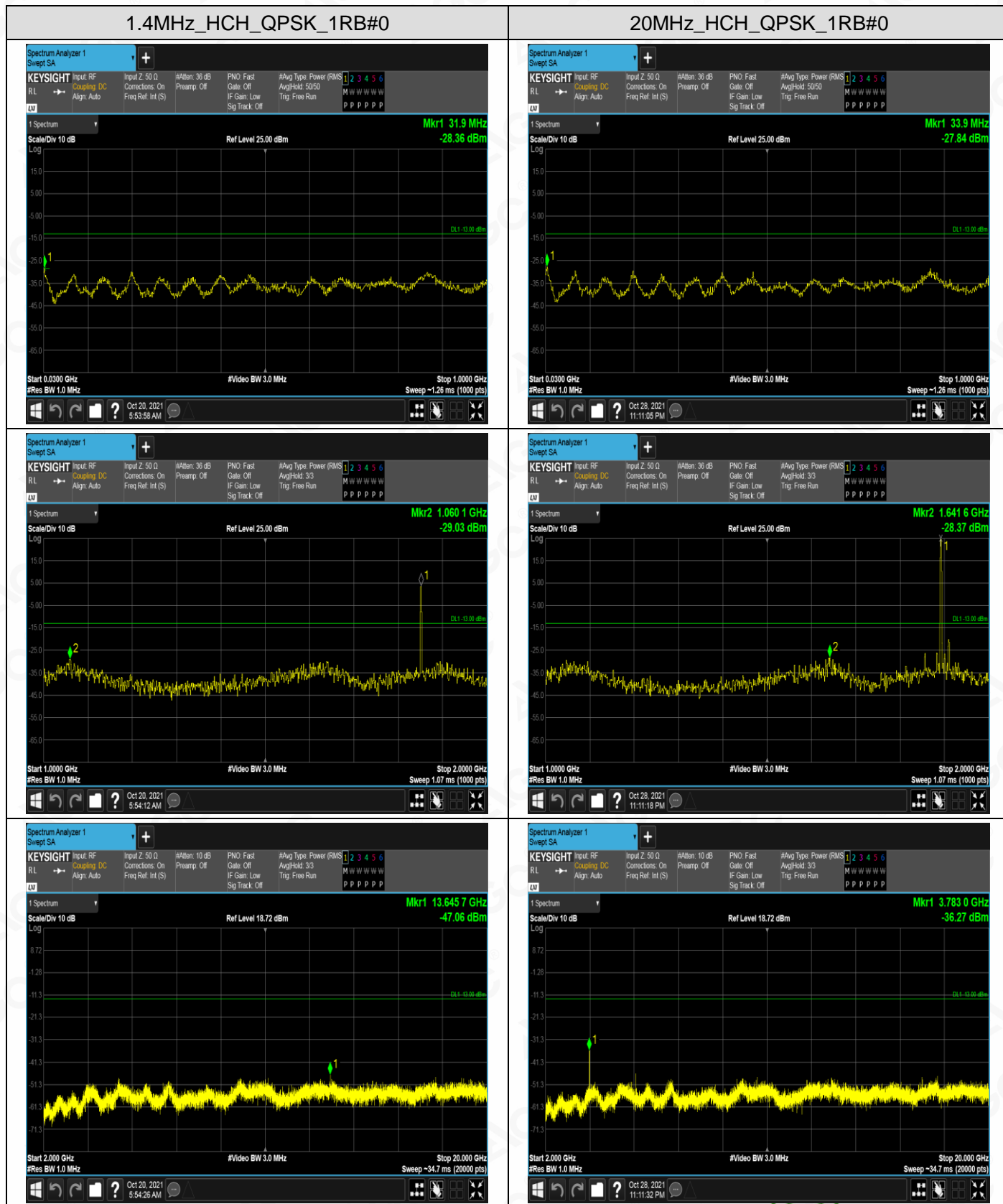




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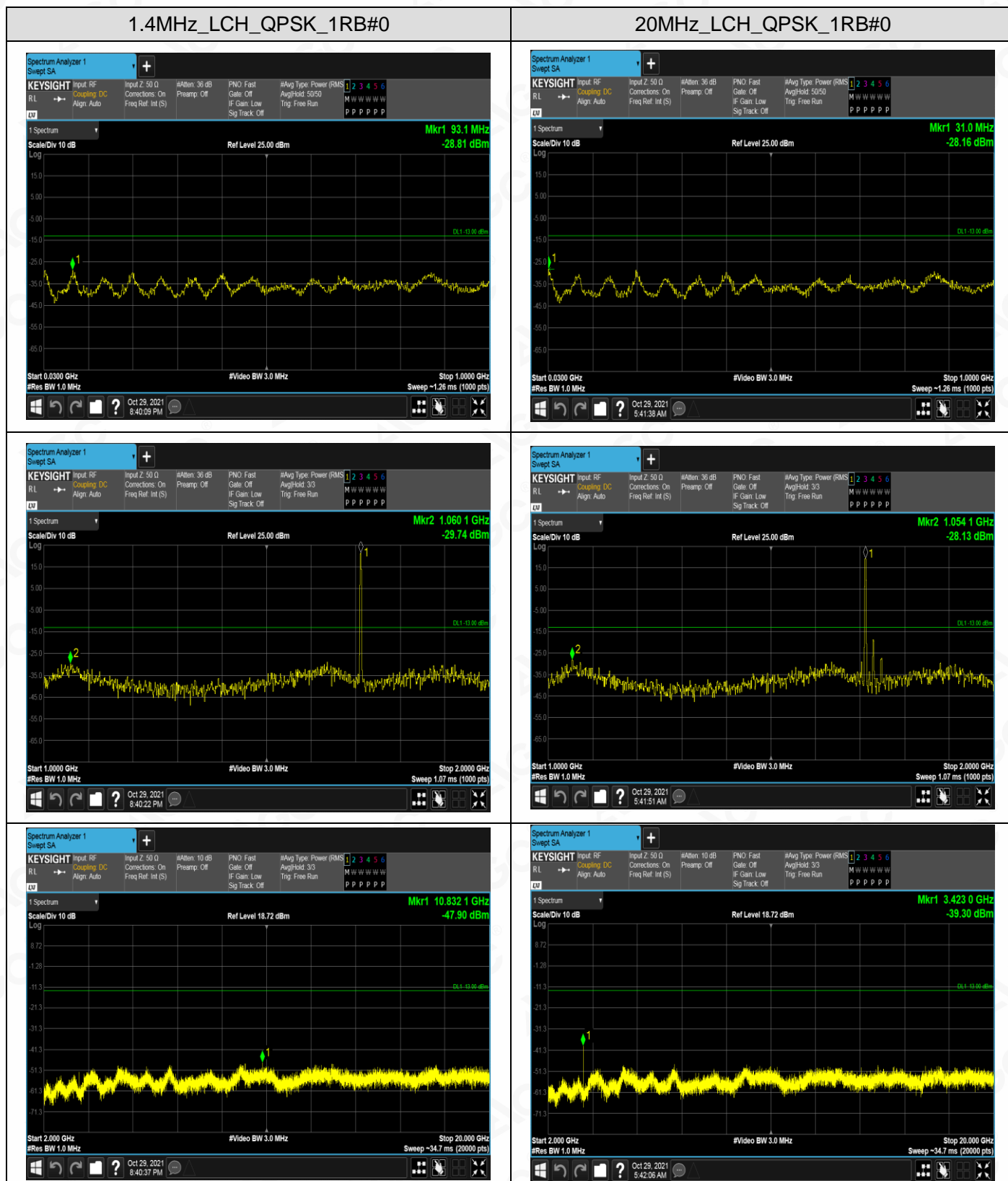


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## LTE BAND 4



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