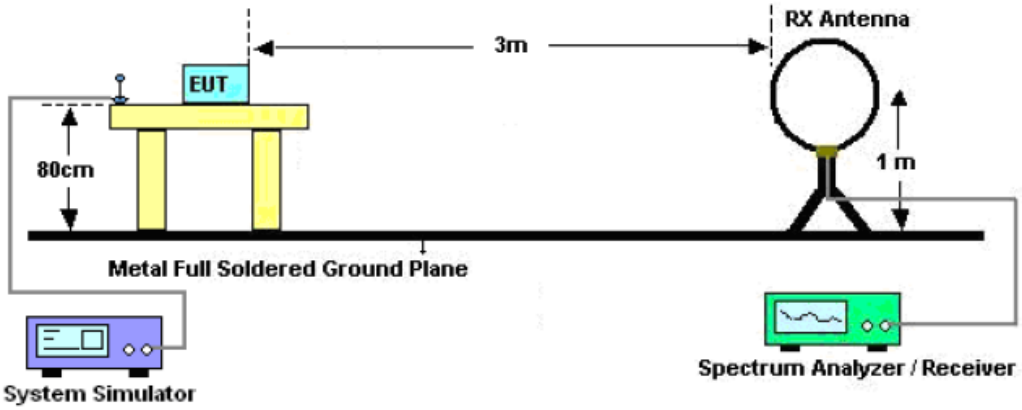
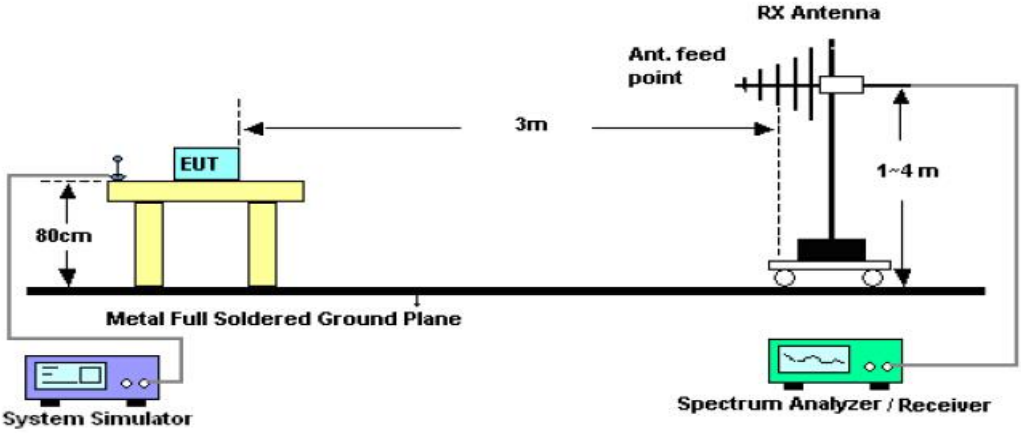
7.2.2. TEST SETUP

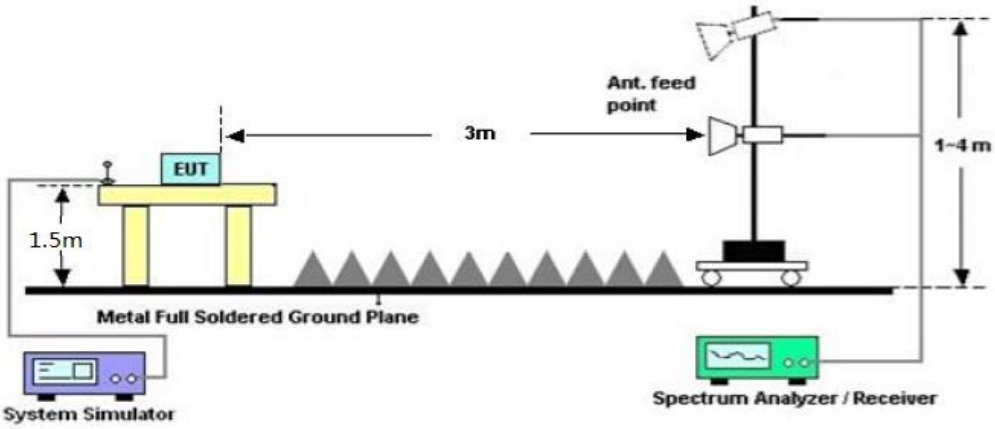
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



7.2.3 PROVISIONS APPLICABLE

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log(P) dB. The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Note: Only record the worst condition of each test mode:

7.2.4 MEASUREMENT RESULT

LTE Band 2
Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3720	V	-57.31	-13	-44.31
845.5	V	-61.77	-13	-48.77
497.4	V	-66.13	-13	-53.13
3720	H	-55.78	-13	-42.78
792.3	H	-60.77	-13	-47.77
512.6	H	-65.94	-13	-52.94

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3760	V	-56.34	-13	-43.34
514.5	V	-62.97	-13	-49.97
425.5	V	-62.17	-13	-49.17
3760	H	-57.97	-13	-44.97
533.3	H	-64.81	-13	-51.81
412.9	H	-64.75	-13	-51.75

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3800	V	-57.44	-13	-44.44
695.1	V	-63.15	-13	-50.15
543.5	V	-63.23	-13	-50.23
3800	H	-56.75	-13	-43.75
687.2	H	-62.46	-13	-49.46
564.3	H	-61.60	-13	-48.6

LTE Band 5

Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1658	V	-57.44	-13	-44.44
554.3	V	-64.84	-13	-51.84
315.1	V	-66.05	-13	-53.05
1658	H	-56.82	-13	-43.82
541.5	H	-63.70	-13	-50.7
349.2	H	-61.82	-13	-48.82

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1673	V	-56.53	-13	-43.53
565.1	V	-61.84	-13	-48.84
463.3	V	-64.20	-13	-51.2
1673	H	-56.64	-13	-43.64
686.3	H	-62.31	-13	-49.31
404.5	H	-60.92	-13	-47.92

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1688	V	-55.24	-13	-42.24
654.6	V	-63.09	-13	-50.09
557.1	V	-62.24	-13	-49.24
1688	H	-56.90	-13	-43.9
603.7	H	-62.37	-13	-49.37
435.4	H	-62.19	-13	-49.19

LTE Band 7

Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3440	V	-57.48	-25	-32.48
874.61	V	-42.33	-25	-17.33
759.13	V	-44.56	-25	-19.56
3440	H	-55.42	-25	-30.42
549.66	H	-42.19	-25	-17.19
447.03	H	-42.35	-25	-17.35

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3465	V	-56.31	-25	-31.31
561.33	V	-43.49	-25	-18.49
436.16	V	-42.73	-25	-17.73
3465	H	-56.44	-25	-31.44
343.66	H	-41.35	-25	-16.35
289.44	H	-42.43	-25	-17.43

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
3490	V	-56.84	-25	-31.84
536.33	V	-41.69	-25	-16.69
444.70	V	-43.43	-25	-18.43
3490	H	-56.47	-25	-31.47
318.59	H	-42.53	-25	-17.53
287.16	H	-43.66	-25	-18.66

LTE Band 12
Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1408	V	-56.60	-13	-43.6
596.7	V	-63.49	-13	-50.49
365.4	V	-64.61	-13	-51.61
1408	H	-57.49	-13	-44.49
563.1	H	-63.98	-13	-50.98
490.2	H	-62.52	-13	-49.52

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1415	V	-57.20	-13	-44.2
569.3	V	-63.39	-13	-50.39
431.0	V	-63.24	-13	-50.24
1415	H	-56.22	-13	-43.22
495.5	H	-62.94	-13	-49.94
312.1	H	-63.23	-13	-50.23

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1422	V	-58.10	-13	-45.1
742.3	V	-62.73	-13	-49.73
641.0	V	-64.03	-13	-51.03
1422	H	-55.95	-13	-42.95
684.3	H	-62.11	-13	-49.11
489.7	H	-62.76	-13	-49.76

LTE Band 17
Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1420	V	-55.52	-13	-42.52
584.5	V	-63.04	-13	-50.04
421.1	V	-63.34	-13	-50.34
1420	H	-55.39	-13	-42.39
525.3	H	-62.93	-13	-49.93
396.6	H	-61.48	-13	-48.48

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1435	V	-55.63	-13	-42.63
546.0	V	-62.59	-13	-49.59
433.3	V	-61.59	-13	-48.59
1466	H	-54.24	-13	-41.24
589.5	H	-60.37	-13	-47.37
394.1	H	-61.41	-13	-48.41

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1496	V	-59.28	-13	-46.28
554.3	V	-63.45	-13	-50.45
488.5	V	-62.87	-13	-49.87
1485	H	-57.54	-13	-44.54
569.8	H	-63.02	-13	-50.02
441.3	H	-63.05	-13	-50.05

LTE Band 40

Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
4620	V	-36.92	-13	-23.92
781.6	V	-43.36	-13	-30.36
533.7	V	-43.87	-13	-30.87
4620	H	-37.34	-13	-24.34
691.8	H	-43.30	-13	-30.3
594.1	H	-43.74	-13	-30.74

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
4700	V	-38.52	-13	-25.52
684.16	V	-43.90	-13	-30.9
544.73	V	-43.60	-13	-30.6
4700	H	-38.16	-13	-25.16
563.66	H	-42.31	-13	-29.31
486.42	H	-44.28	-13	-31.28

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
4780	V	-37.86	-13	-24.86
589.1	V	-42.49	-13	-29.49
436.2	V	-42.65	-13	-29.65
4780	H	-36.72	-13	-23.72
631.5	H	-43.34	-13	-30.34
435.4	H	-44.60	-13	-31.6

LTE Band 41

Low channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5012	V	-37.44	-13	-24.44
695.5	V	-41.82	-13	-28.82
421.1	V	-43.89	-13	-30.89
5012	H	-36.95	-13	-23.95
594.0	H	-43.85	-13	-30.85
389.3	H	-43.35	-13	-30.35

Middle channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5186	V	-36.94	-13	-23.94
698.2	V	-43.41	-13	-30.41
569.3	V	-44.15	-13	-31.15
5186	H	-37.79	-13	-24.79
658.4	H	-42.45	-13	-29.45
533.0	H	-44.10	-13	-31.1

High channel

Frequency (MHz)	Polarity (H/V)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
5360	V	-36.40	-13	-23.4
633.1	V	-42.41	-13	-29.41
506.4	V	-43.75	-13	-30.75
5360	H	-36.39	-13	-23.39
612.0	H	-42.57	-13	-29.57
513.5	H	-44.73	-13	-31.73

Note: 1. Margin = Emission Level -Limit

2. (30MHz-26GHz) Below 30MHZ no Spurious found and above is the worst mode data

8. FREQUENCY STABILITY

8.1 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 -10℃. 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℃ increments from -10℃ to +40℃. 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 +40℃.

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℃ increments from +40℃ to -10℃. 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℃ during the measurement procedure.

8.2 PROVISIONS APPLICABLE

8.2.1 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 -10°C to +40°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 ±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.

8.2.2 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 -10°C to +40°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

8.3 MEASUREMENT RESULT (WORST)

LTE Band 2

Middle Channel, f_O = 1880 MHz			
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-10	3.8	-6.07	-0.003277
0		-8.34	-0.004506
10		-12.63	-0.006719
20		-3.98	-0.002115
30		-3.89	-0.002038
40		-6.67	-0.003491
25	4.35	-6.90	-0.003726
	3.23	-8.87	-0.004718

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

LTE Band 5

Middle Channel, f_O = 836.5 MHz				
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.8	-2.96	-0.003591	±2.5
0		-2.23	-0.002706	±2.5
10		-2.95	-0.003523	±2.5
20		-4.02	-0.004805	±2.5
30		-8.21	-0.009680	±2.5
40		-7.57	-0.008921	±2.5
25	4.35	-3.16	-0.003833	±2.5
	3.23	-7.17	-0.008568	±2.5

LTE Band 7

Middle Channel, f_O = 2535 MHz			
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-10	3.8	-11.54	-0.004613
0		-1.52	-0.000606
10		-9.07	-0.003578
20		-17.57	-0.006930
30		-10.81	-0.004212
40		-7.50	-0.002920
25	4.35	-14.00	-0.005596
	3.23	5.16	0.002037

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

LTE Band 12

Middle Channel, f_O = 1882.5 MHz			
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-10	3.8	-3.02	-0.004314
0		-3.69	-0.005275
10		-3.60	-0.005095
20		-10.37	-0.014659
30		-3.12	-0.004360
40		-6.64	-0.009279
25	4.35	-11.87	-0.016969
	3.23	-8.88	-0.012419

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

LTE Band 17

Middle Channel, f_O = 1882.5 MHz			
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-10	3.8	-2.17	-0.003078
0		-1.24	-0.001762
10		-4.63	-0.006528
20		-2.36	-0.003324
30		-4.91	-0.006877
40		-5.58	-0.007819
-25	4.35	-8.03	-0.011359
	3.23	-3.36	-0.004735

LTE Band 40

Middle Channel, f_O = 2350MHz			
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-10	3.8	-1.96	-0.000851
0		-1.00	-0.000435
10		-8.31	-0.003537
20		-6.15	-0.002618
30		-5.16	-0.002154
40		-6.34	-0.002643
25	4.35	-7.37	-0.003200
	3.23	-14.52	-0.006179

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

LTE Band 41

Middle Channel, f_O = 2593 MHz			
Temperature (℃)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)
-10	3.8	-10.39	-0.004093
0		-8.44	-0.003326
10		-2.06	-0.000794
20		-11.07	-0.004270
30		-3.22	-0.001213
40		-6.95	-0.002621
25	4.35	-14.15	-0.005575
	3.23	-8.87	-0.003420

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

The EUT doesn't work below -10℃

9. OCCUPIED BANDWIDTH

9.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

9.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

9.3 MEASUREMENT RESULT

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 2

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.078	PASS
	MCH	6	0	1.074	PASS
	HCH	6	0	1.074	PASS
16QAM	LCH	6	0	1.074	PASS
	MCH	6	0	1.070	PASS
	HCH	6	0	1.074	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.674	PASS
	MCH	15	0	2.683	PASS
	HCH	15	0	2.674	PASS
16QAM	LCH	15	0	2.674	PASS
	MCH	15	0	2.674	PASS
	HCH	15	0	2.683	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.457	PASS
	MCH	25	0	4.472	PASS
	HCH	25	0	4.486	PASS
16QAM	LCH	25	0	4.472	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.472	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.915	PASS
	MCH	50	0	8.944	PASS
	HCH	50	0	8.944	PASS
16QAM	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	13.415	PASS
	MCH	75	0	13.372	13.372
	HCH	75	0	13.415	PASS
16QAM	LCH	75	0	13.372	PASS
	MCH	75	0	13.372	PASS
	HCH	75	0	13.415	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.771	PASS
16QAM	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.829	PASS

LTE Band 5

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.074	PASS
	MCH	6	0	1.078	PASS
	HCH	6	0	1.070	PASS
16QAM	LCH	6	0	1.070	PASS
	MCH	6	0	1.070	PASS
	HCH	6	0	1.074	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.674	PASS
	MCH	15	0	2.692	PASS
	HCH	15	0	2.674	PASS
16QAM	LCH	15	0	2.674	PASS
	MCH	15	0	2.674	PASS
	HCH	15	0	2.674	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.472	PASS
	MCH	25	0	4.472	PASS
	HCH	25	0	4.457	PASS
16QAM	LCH	25	0	4.486	PASS
	MCH	25	0	4.472	PASS
	HCH	25	0	4.472	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.915	PASS
	MCH	50	0	8.944	PASS
	HCH	50	0	8.915	PASS
16QAM	LCH	50	0	8.915	PASS
	MCH	50	0	8.944	PASS
	HCH	50	0	8.915	PASS

LTE Band 7

Channel Bandwidth: 5MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.472	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.457	PASS
16QAM	LCH	25	0	4.457	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.472	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.944	PASS
16QAM	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	13.415	PASS
	MCH	75	0	13.415	PASS
	HCH	75	0	13.372	PASS
16QAM	LCH	75	0	13.372	PASS
	MCH	75	0	13.372	PASS
	HCH	75	0	13.372	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.829	PASS
16QAM	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.829	PASS

LTE Band 12

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.074	PASS
	MCH	6	0	1.074	PASS
	HCH	6	0	1.074	PASS
16QAM	LCH	6	0	1.074	PASS
	MCH	6	0	1.074	PASS
	HCH	6	0	1.074	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth:3 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.683	PASS
	MCH	15	0	2.683	PASS
	HCH	15	0	2.683	PASS
16QAM	LCH	15	0	2.674	PASS
	MCH	15	0	2.683	PASS
	HCH	15	0	2.692	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.472	PASS
	MCH	25	0	4.472	PASS
	HCH	25	0	4.472	PASS
16QAM	LCH	25	0	4.486	PASS
	MCH	25	0	4.472	PASS
	HCH	25	0	4.486	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.944	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS
16QAM	LCH	50	0	8.944	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS

LTE Band 17

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.472	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.472	PASS
16QAM	LCH	25	0	4.472	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.486	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS
16QAM	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS

LTE Band 40

Channel Bandwidth: 5MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.457	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.472	PASS
16QAM	LCH	25	0	4.472	PASS
	MCH	25	0	4.486	PASS
	HCH	25	0	4.457	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.915	PASS
	MCH	50	0	8.944	PASS
	HCH	50	0	8.944	PASS
16QAM	LCH	50	0	8.944	PASS
	MCH	50	0	8.973	PASS
	HCH	50	0	8.915	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	13.415	PASS
	MCH	75	0	13.459	PASS
	HCH	75	0	13.372	PASS
16QAM	LCH	75	0	13.415	PASS
	MCH	75	0	13.415	PASS
	HCH	75	0	13.415	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.887	PASS
16QAM	LCH	100	0	17.771	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.829	PASS

LTE Band 41

Channel Bandwidth: 5MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth(MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.472	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.472	PASS
16QAM	LCH	25	0	4.472	PASS
	MCH	25	0	4.457	PASS
	HCH	25	0	4.472	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.944	PASS
16QAM	LCH	50	0	8.915	PASS
	MCH	50	0	8.915	PASS
	HCH	50	0	8.915	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	13.459	PASS
	MCH	75	0	13.372	PASS
	HCH	75	0	13.415	PASS
16QAM	LCH	75	0	13.415	PASS
	MCH	75	0	13.372	PASS
	HCH	75	0	13.415	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		Occupied Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.829	PASS
16QAM	LCH	100	0	17.829	PASS
	MCH	100	0	17.829	PASS
	HCH	100	0	17.829	PASS

Note: Please refers to Appendix B for compliance test plots for Occupied Bandwidth (99%)

10. EMISSION BANDWIDTH

10.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

10.2 PROVISIONS APPLICABLE

The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power.

10.3 MEASUREMENT RESULT

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

LTE Band 2

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.205	PASS
	MCH	6	0	1.205	PASS
	HCH	6	0	1.230	PASS
16QAM	LCH	6	0	1.213	PASS
	MCH	6	0	1.189	PASS
	HCH	6	0	1.173	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.791	PASS
	MCH	15	0	2.817	PASS
	HCH	15	0	2.817	PASS
16QAM	LCH	15	0	2.817	PASS
	MCH	15	0	2.800	PASS
	HCH	15	0	2.800	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.725	PASS
	MCH	25	0	4.696	PASS
	HCH	25	0	4.696	PASS
16QAM	LCH	25	0	4.710	PASS
	MCH	25	0	4.754	PASS
	HCH	25	0	4.696	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.304	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.333	PASS
16QAM	LCH	50	0	9.333	PASS
	MCH	50	0	9.333	PASS
	HCH	50	0	9.275	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	14.087	PASS
	MCH	75	0	14.087	PASS
	HCH	75	0	14.087	PASS
16QAM	LCH	75	0	14.087	PASS
	MCH	75	0	14.087	PASS
	HCH	75	0	14.043	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS
16QAM	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS

LTE Band 5

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.177	PASS
	MCH	6	0	1.205	PASS
	HCH	6	0	1.201	PASS
16QAM	LCH	6	0	1.201	PASS
	MCH	6	0	1.205	PASS
	HCH	6	0	1.221	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3 MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.809	PASS
	MCH	15	0	2.809	PASS
	HCH	15	0	2.809	PASS
16QAM	LCH	15	0	2.800	PASS
	MCH	15	0	2.809	PASS
	HCH	15	0	2.817	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.710	PASS
	MCH	25	0	4.667	PASS
	HCH	25	0	4.725	PASS
16QAM	LCH	25	0	4.696	PASS
	MCH	25	0	4.710	PASS
	HCH	25	0	4.667	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.275	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.275	PASS
16QAM	LCH	50	0	9.275	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.275	PASS

LTE Band 7

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.696	PASS
	MCH	25	0	4.696	PASS
	HCH	25	0	4.710	PASS
16QAM	LCH	25	0	4.681	PASS
	MCH	25	0	4.725	PASS
	HCH	25	0	4.710	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.275	PASS
	MCH	50	0	9.333	PASS
	HCH	50	0	9.333	PASS
16QAM	LCH	50	0	9.304	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.275	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	14.087	PASS
	MCH	75	0	14.087	PASS
	HCH	75	0	14.043	PASS
16QAM	LCH	75	0	14.087	PASS
	MCH	75	0	14.087	PASS
	HCH	75	0	14.087	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS
16QAM	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS

LTE Band 12

Channel Bandwidth: 1.4 MHz

Channel Bandwidth: 1.4MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	6	0	1.201	PASS
	MCH	6	0	1.185	PASS
	HCH	6	0	1.213	PASS
16QAM	LCH	6	0	1.177	PASS
	MCH	6	0	1.209	PASS
	HCH	6	0	1.230	PASS

Channel Bandwidth: 3 MHz

Channel Bandwidth: 3MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	15	0	2.791	PASS
	MCH	15	0	2.817	PASS
	HCH	15	0	2.826	PASS
16QAM	LCH	15	0	2.800	PASS
	MCH	15	0	2.809	PASS
	HCH	15	0	2.826	PASS

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.710	PASS
	MCH	25	0	4.681	PASS
	HCH	25	0	4.754	PASS
16QAM	LCH	25	0	4.710	PASS
	MCH	25	0	4.696	PASS
	HCH	25	0	4.696	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.333	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.333	PASS
16QAM	LCH	50	0	9.304	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.304	PASS

LTE BAND 17

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.710	PASS
	MCH	25	0	4.681	PASS
	HCH	25	0	4.681	PASS
16QAM	LCH	25	0	4.696	PASS
	MCH	25	0	4.710	PASS
	HCH	25	0	4.696	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.304	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.304	PASS
16QAM	LCH	50	0	9.275	PASS
	MCH	50	0	9.304	PASS
	HCH	50	0	9.275	PASS

LTE Band 40

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.696	PASS
	MCH	25	0	4.652	PASS
	HCH	25	0	4.681	PASS
16QAM	LCH	25	0	4.710	PASS
	MCH	25	0	4.681	PASS
	HCH	25	0	4.681	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.304	PASS
	MCH	50	0	9.275	PASS
	HCH	50	0	9.333	PASS
16QAM	LCH	50	0	9.304	PASS
	MCH	50	0	9.333	PASS
	HCH	50	0	9.304	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	14.043	PASS
	MCH	75	0	14.087	PASS
	HCH	75	0	14.087	PASS
16QAM	LCH	75	0	14.087	PASS
	MCH	75	0	14.043	PASS
	HCH	75	0	14.087	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	18.609	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.609	PASS
16QAM	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS

LTE Band 41

Channel Bandwidth: 5 MHz

Channel Bandwidth: 5MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	25	0	4.667	PASS
	MCH	25	0	4.652	PASS
	HCH	25	0	4.725	PASS
16QAM	LCH	25	0	4.681	PASS
	MCH	25	0	4.667	PASS
	HCH	25	0	4.725	PASS

Channel Bandwidth: 10 MHz

Channel Bandwidth: 10MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	50	0	9.304	PASS
	MCH	50	0	9.275	PASS
	HCH	50	0	9.304	PASS
16QAM	LCH	50	0	9.304	PASS
	MCH	50	0	9.333	PASS
	HCH	50	0	9.333	PASS

Channel Bandwidth: 15 MHz

Channel Bandwidth: 15MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	75	0	14.087	PASS
	MCH	75	0	14.043	PASS
	HCH	75	0	14.087	PASS
16QAM	LCH	75	0	14.087	PASS
	MCH	75	0	14.087	PASS
	HCH	75	0	14.043	PASS

Channel Bandwidth: 20 MHz

Channel Bandwidth: 20MHz					
Modulation	Channel	RB Configuration		26dB Bandwidth (MHz)	Verdict
		Size	Offset		
QPSK	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS
16QAM	LCH	100	0	18.551	PASS
	MCH	100	0	18.551	PASS
	HCH	100	0	18.551	PASS

Note: Please refers to Appendix B for compliance test plots for emission bandwidth (-26dBc)

11. BAND EDGE

11.1 MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

11.2 PROVISIONS APPLICABLE

As Specified in FCC rules of §2.1051 §24.238(a) §27.53(g) §27.53(h) §27.53(m)
KDB 971168 D01v03 – Section 6.0

11.3 MEASUREMENT RESULT

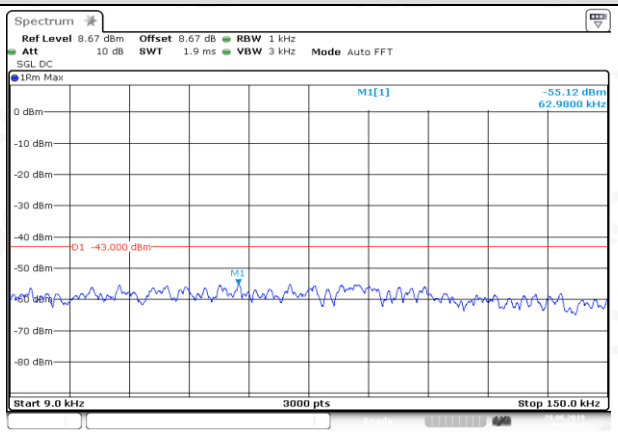
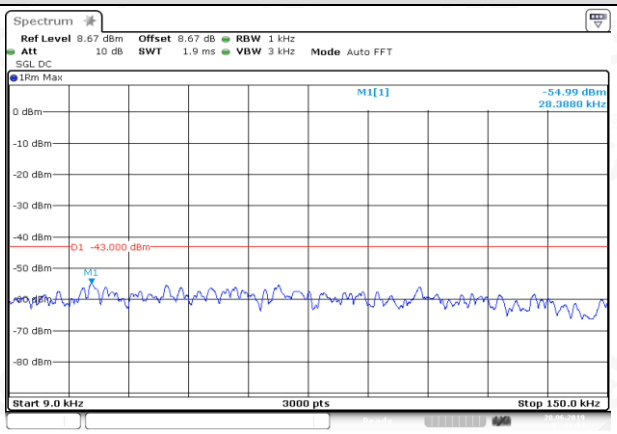
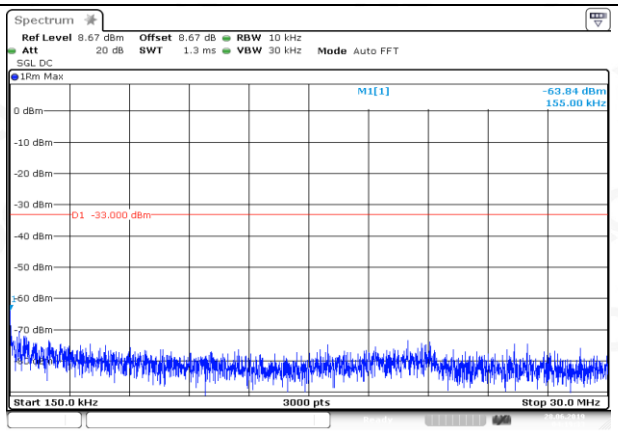
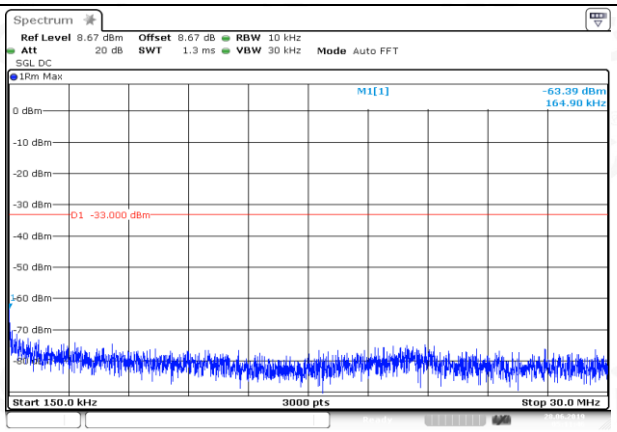
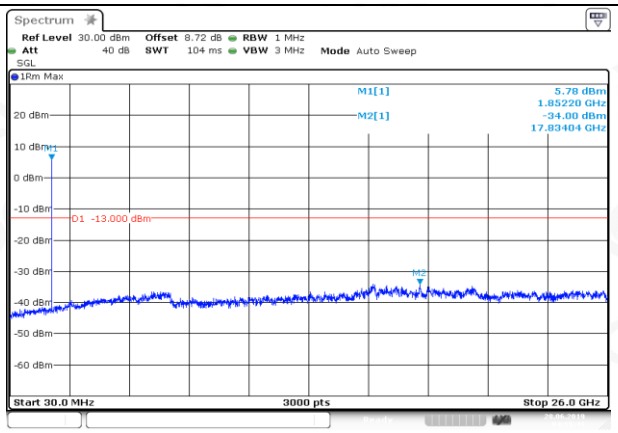
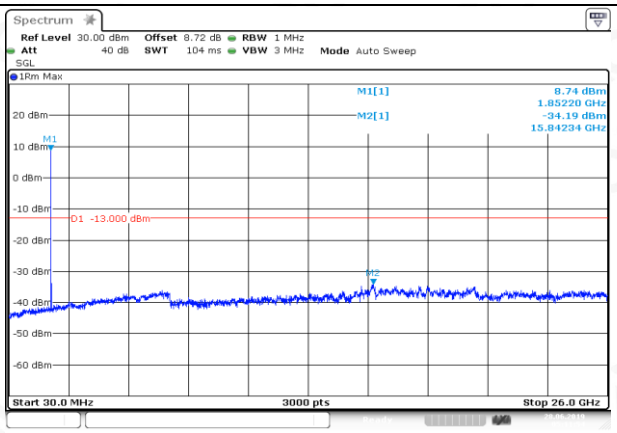
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequency. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.
The minimum permissible attenuation level of any spurious emission is 43 + log10(P[Watts]), where P is the transmitter power in Watts.

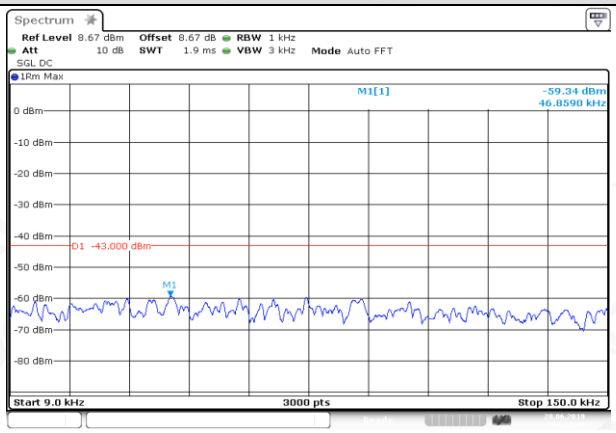
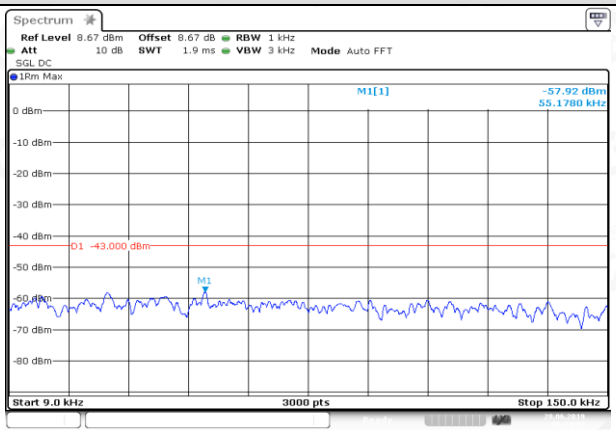
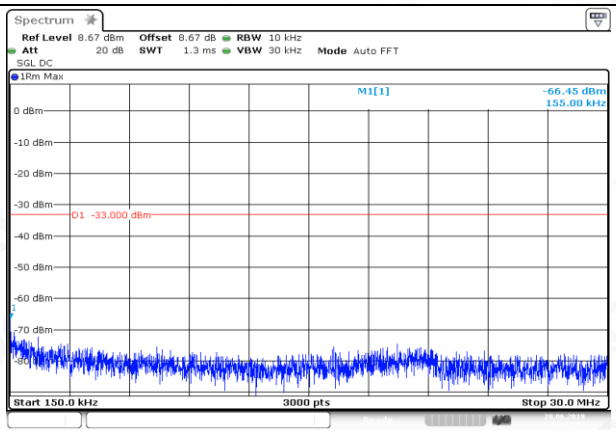
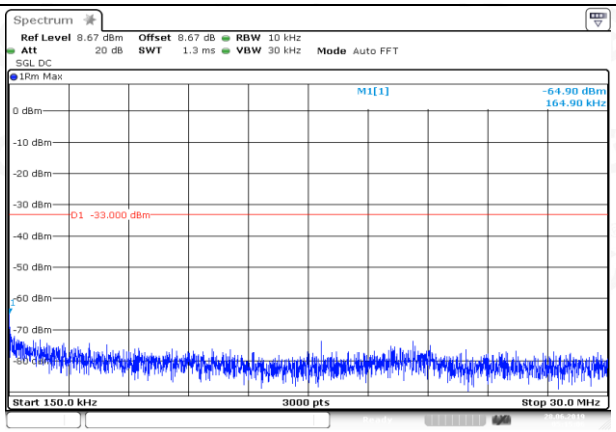
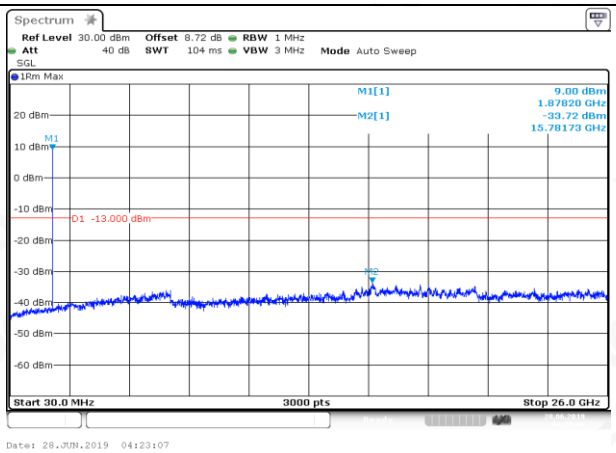
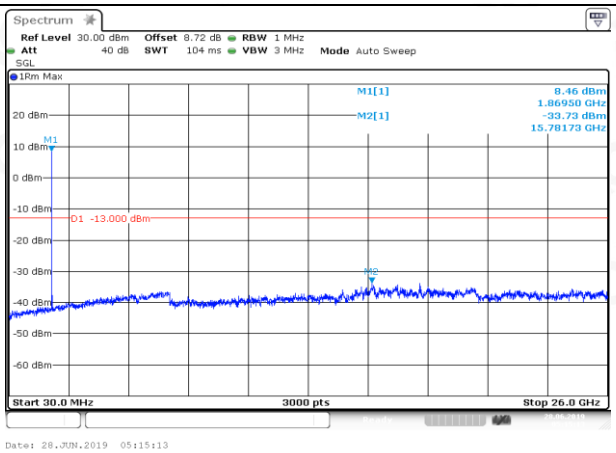
For Band 7:
(i) 40 + 10 log10 p from the channel edges to 5 MHz away
(ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and
(iii) 55 + 10 log10 p at X MHz and beyond from the channel edges

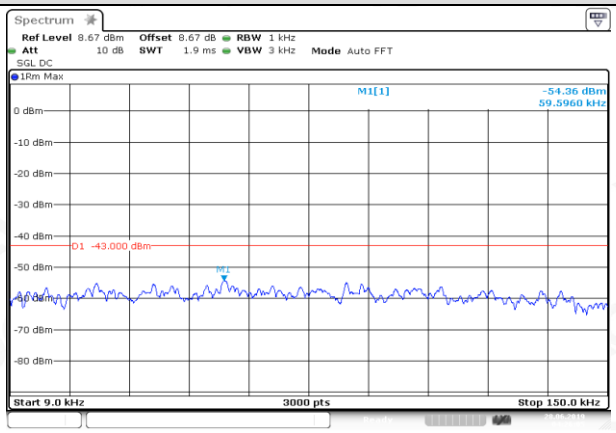
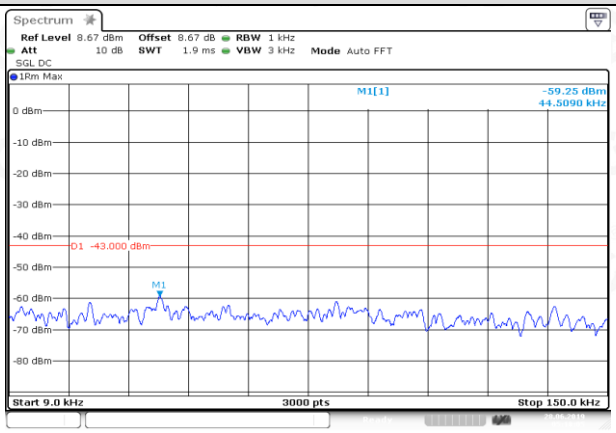
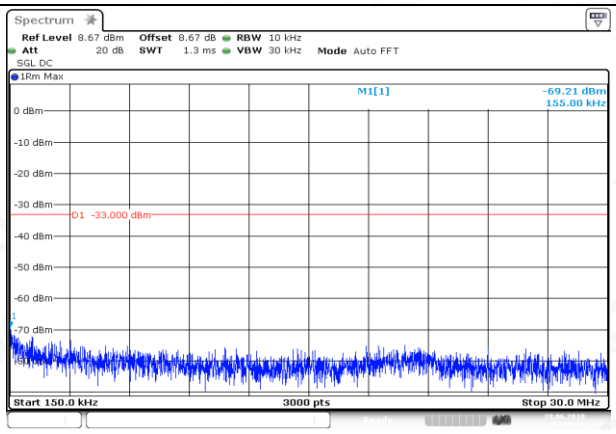
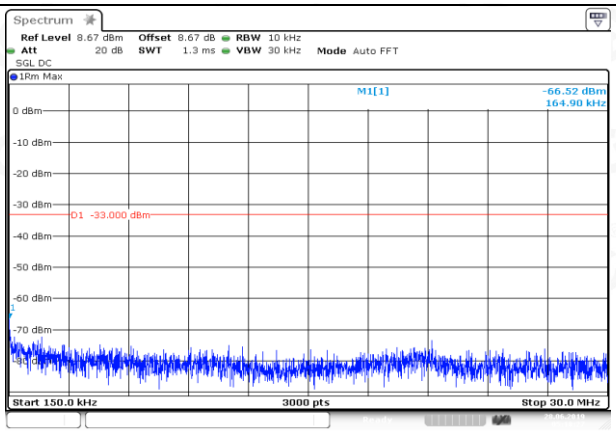
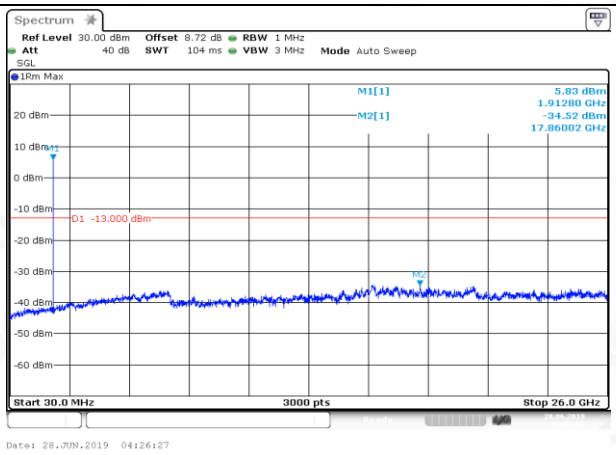
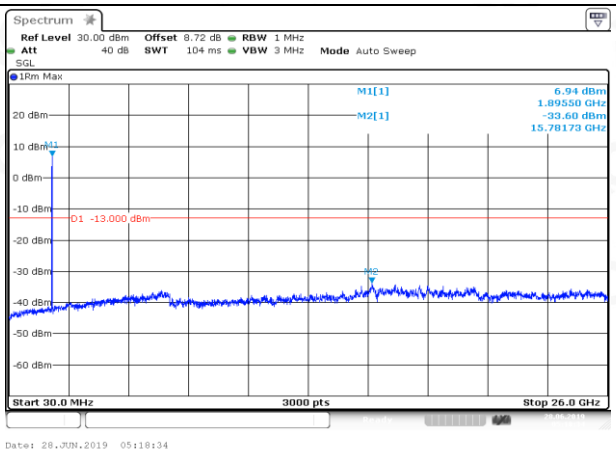
Please refers to Appendix C for compliance test plots for band edge

APPENDIX A TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

LTE BAND 2

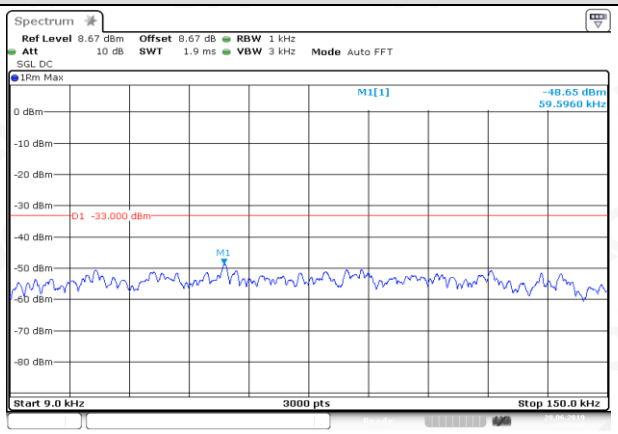
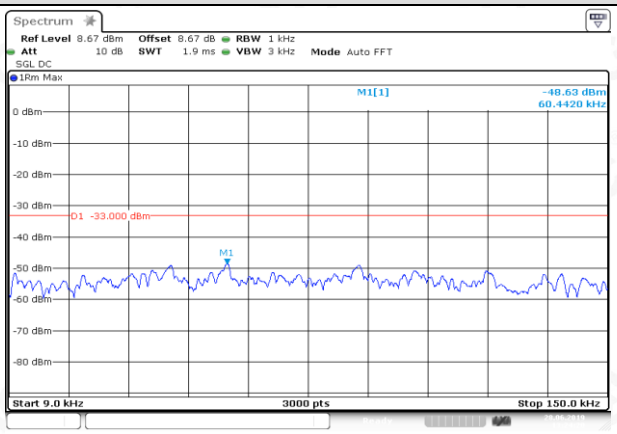
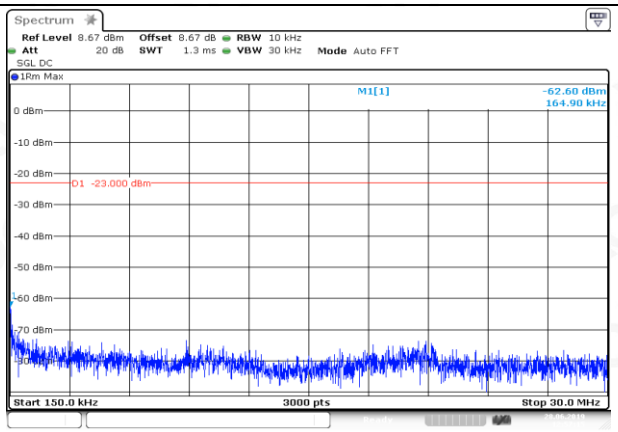
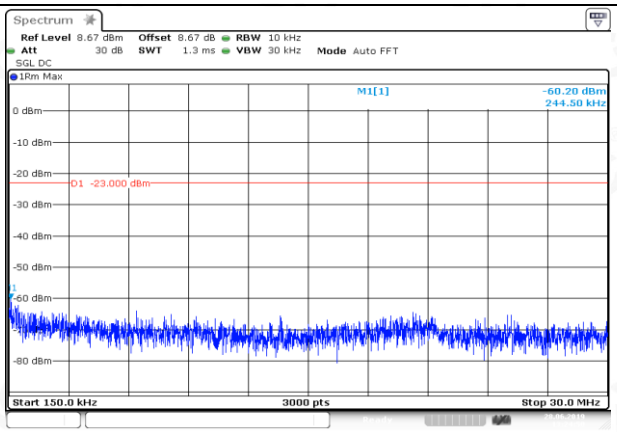
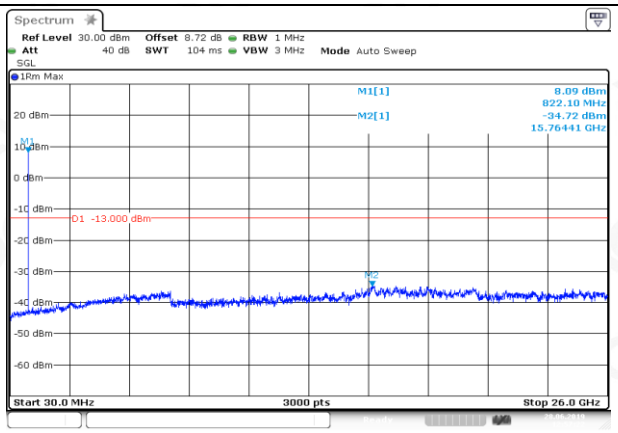
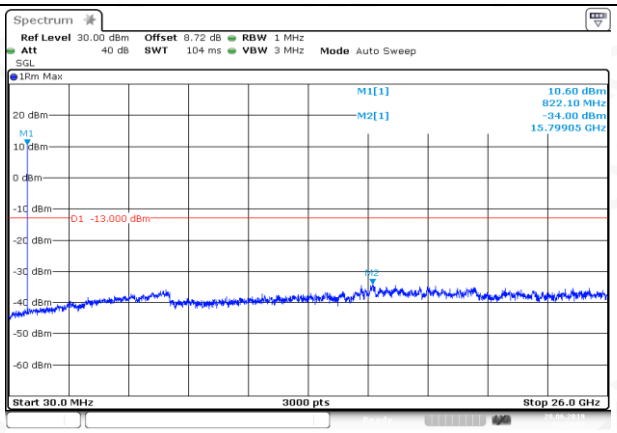
1.4MHz_LCH_QPSK_1RB#0	20MHz_LCH_QPSK_1RB#0
	
	
	

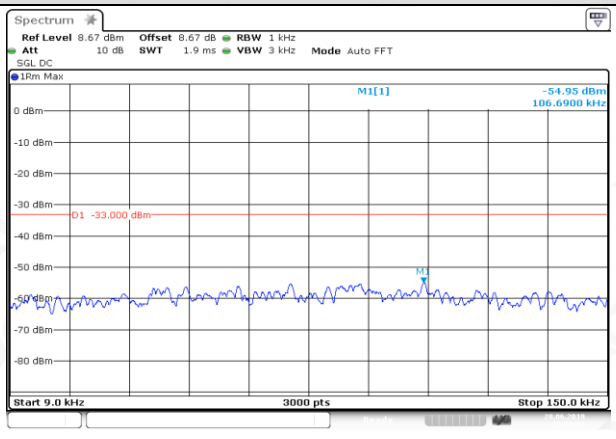
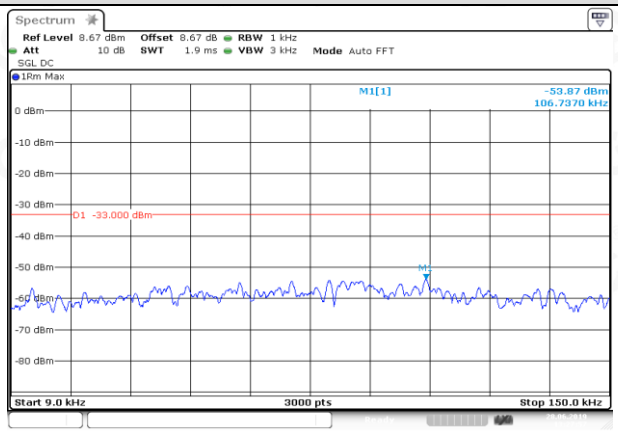
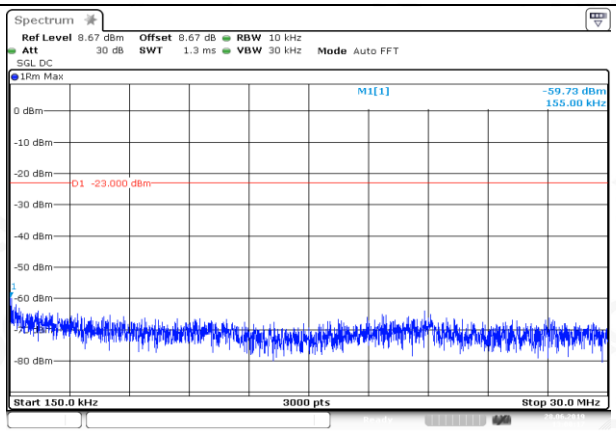
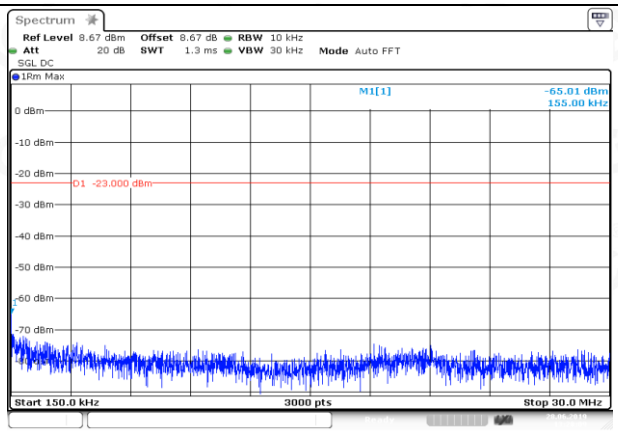
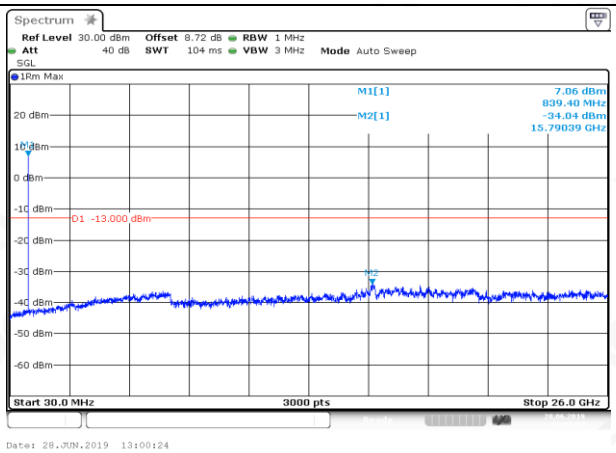
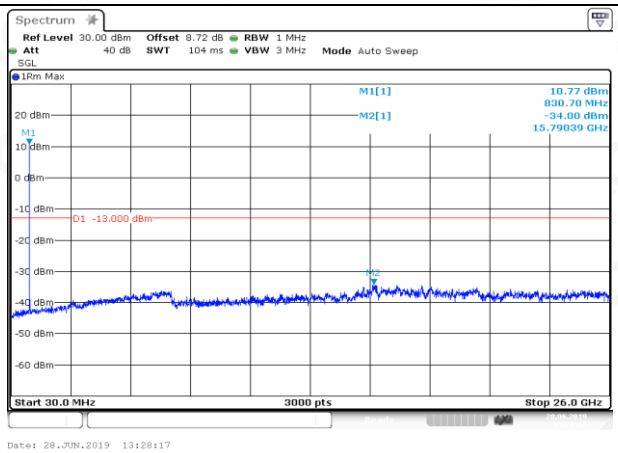
1.4MHz_MCH_QPSK_1RB#0	20MHz_MCH_QPSK_1RB#0
	
	
	

1.4MHz_HCH_QPSK_1RB#0	20MHz_HCH_QPSK_1RB#0
	
	
	

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

LTE BAND 5

1.4MHz_LCH_QPSK_1RB#0	10MHz_LCH_QPSK_1RB#0
	
	
	

1.4MHz_MCH_QPSK_1RB#0	10MHz_MCH_QPSK_1RB#0
	
	
	

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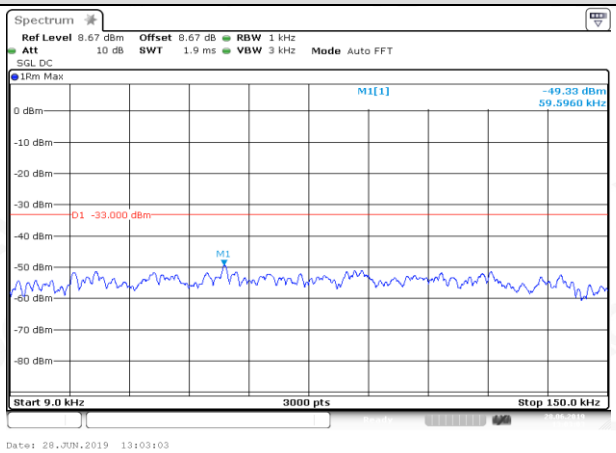
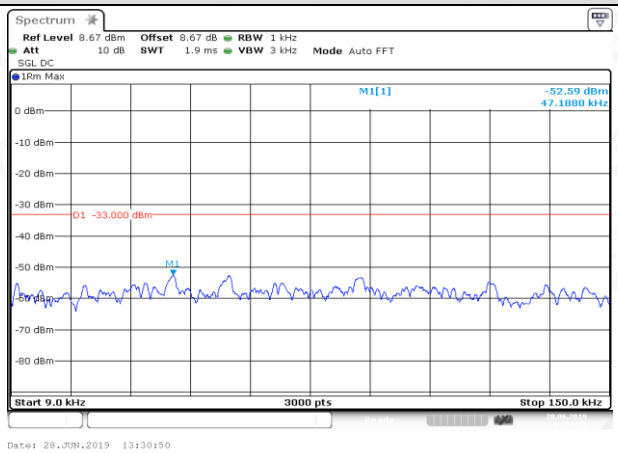
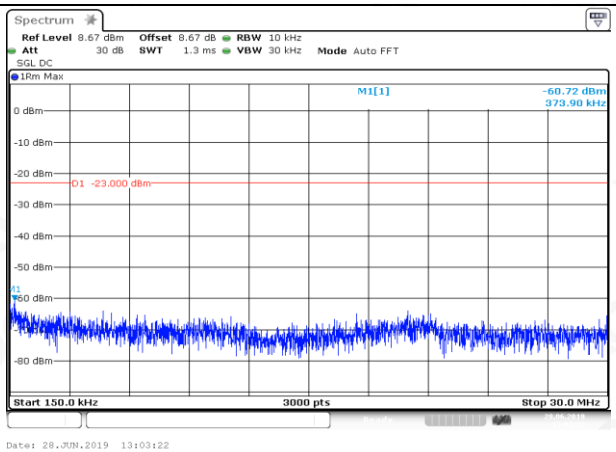
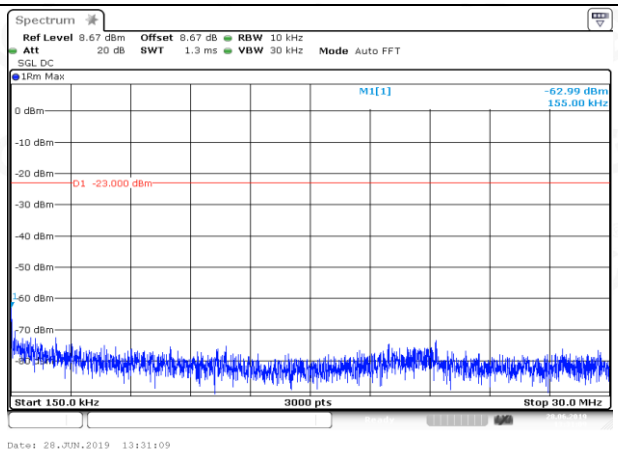
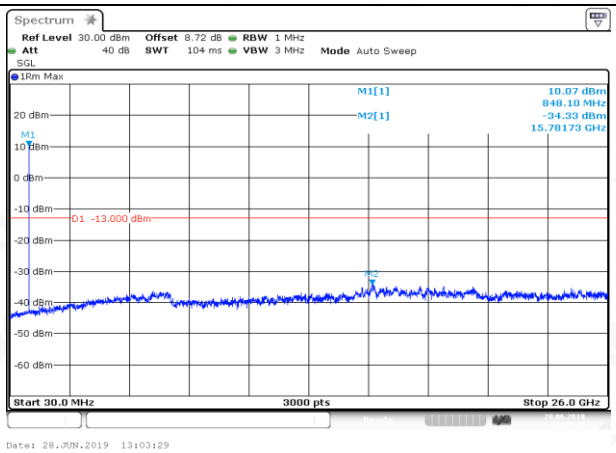
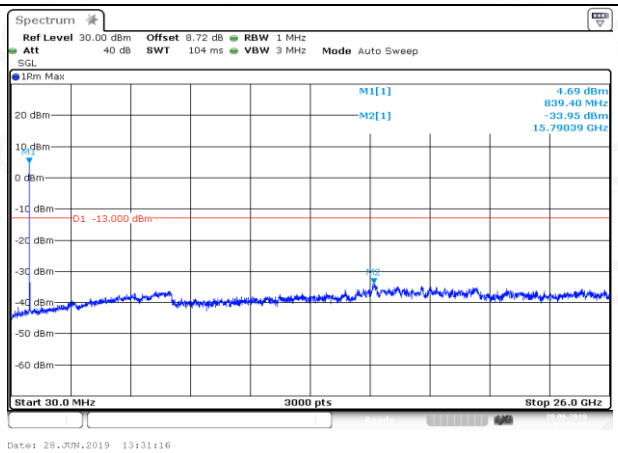
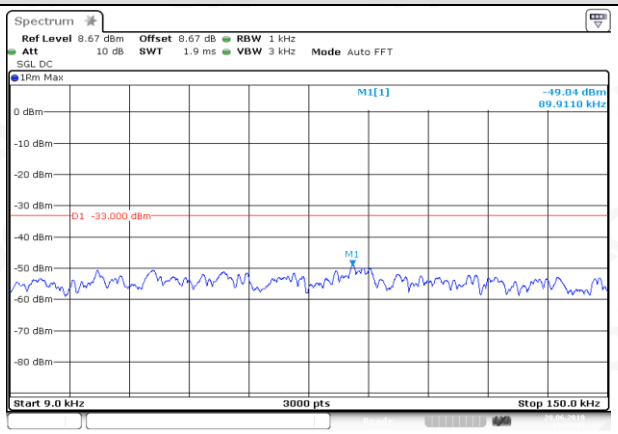
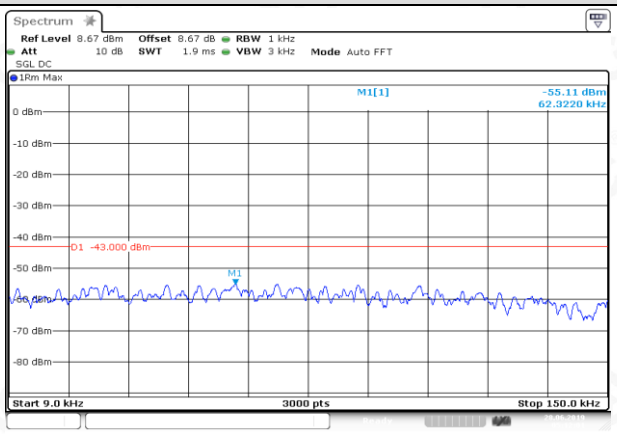
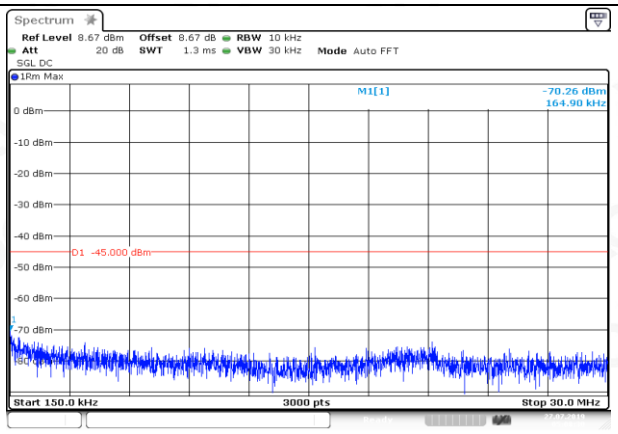
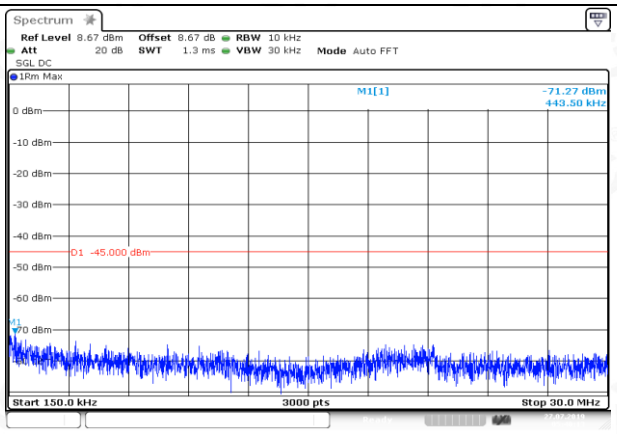
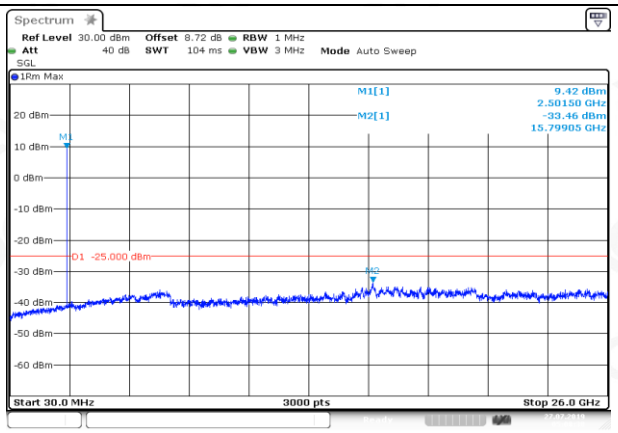
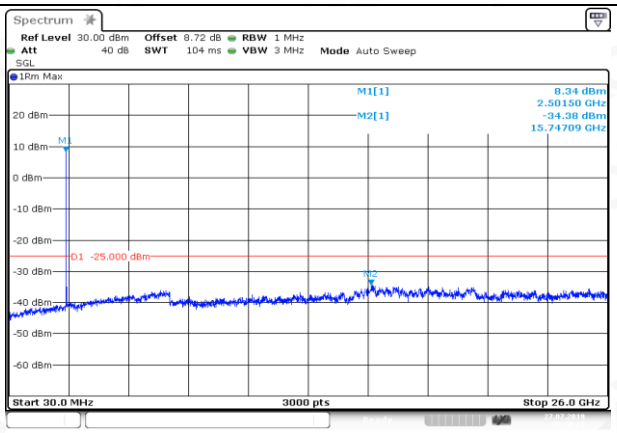
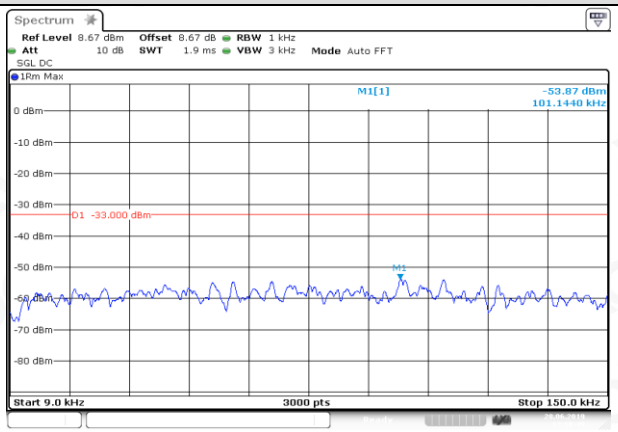
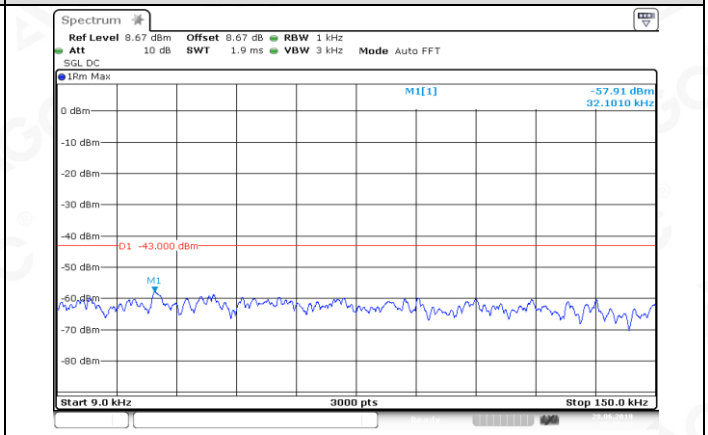
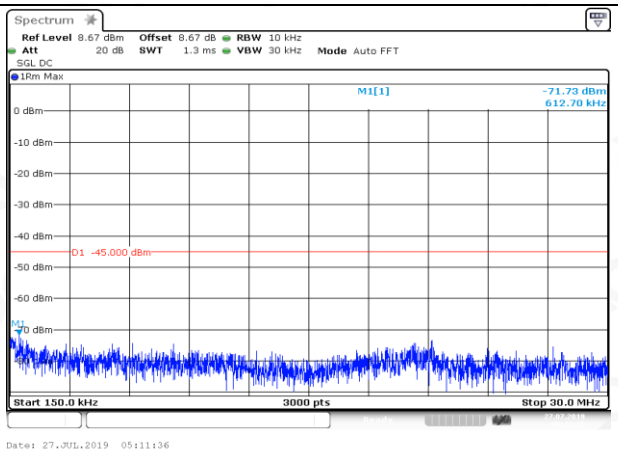
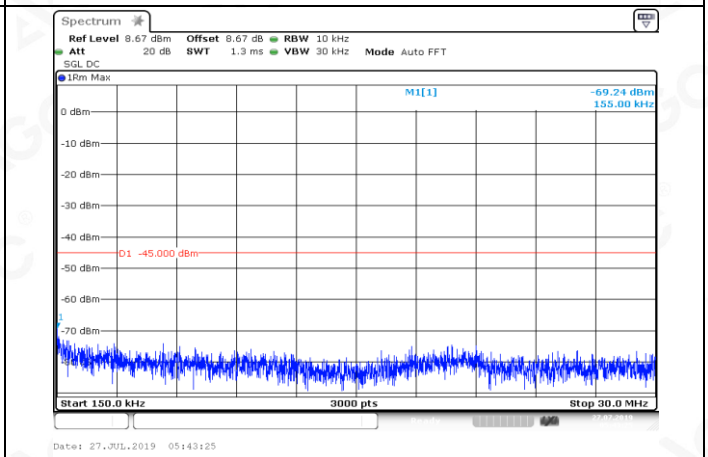
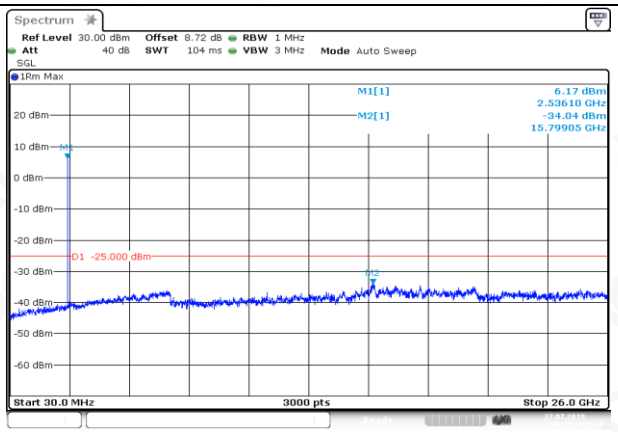
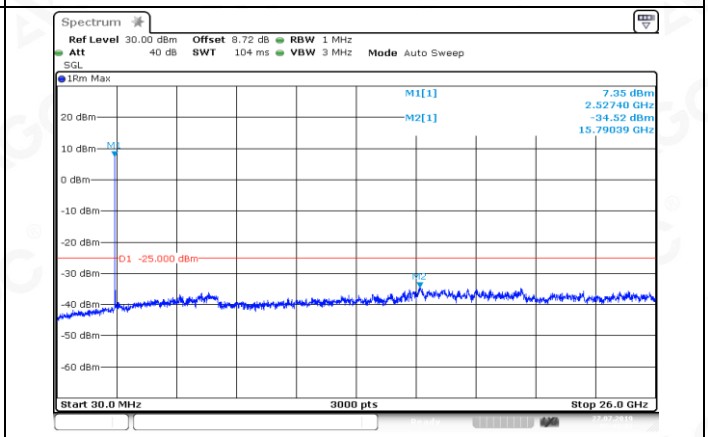
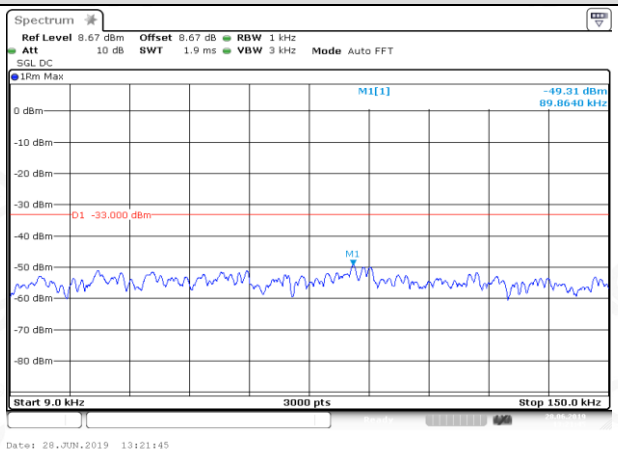
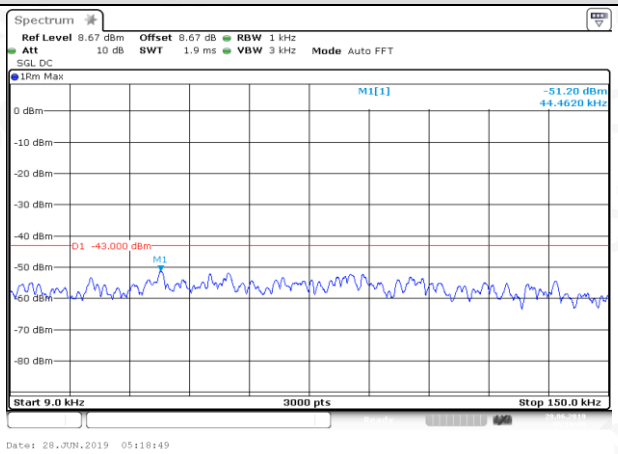
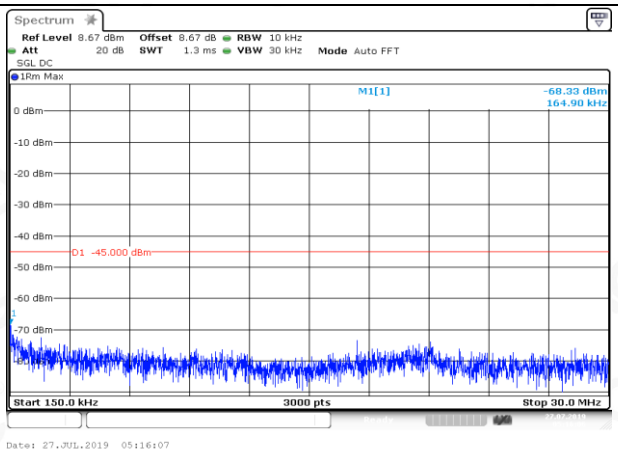
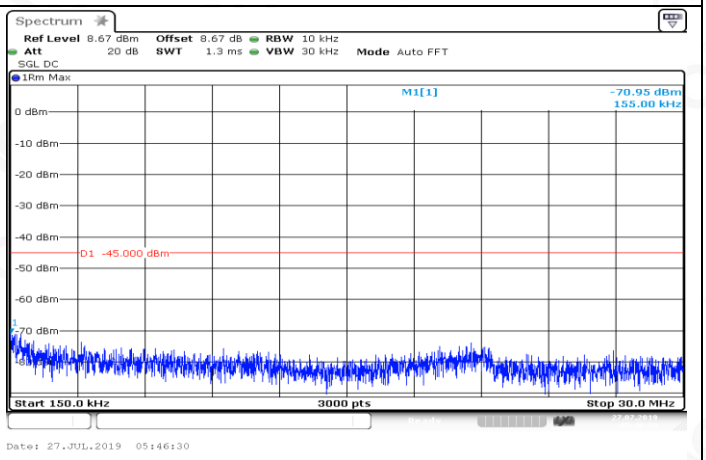
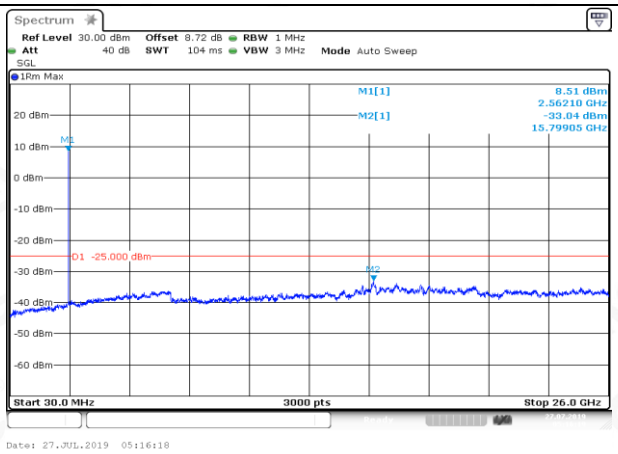
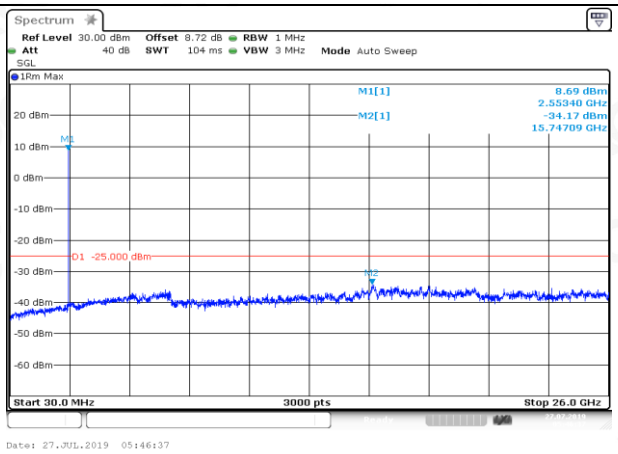
	
	
	

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

LTE BAND 7

5MHz_LCH_QPSK_1RB#0	20MHz_LCH_QPSK_1RB#0
	
	
	

5MHz_MCH_QPSK_1RB#0	20MHz_MCH_QPSK_1RB#0
	
	
	

5MHz_HCH_QPSK_1RB#0	20MHz_HCH_QPSK_1RB#0
	
	
	

TEST PLOTS FOR CONDUCTED SPURIOUS EMISSION

LTE BAND 12

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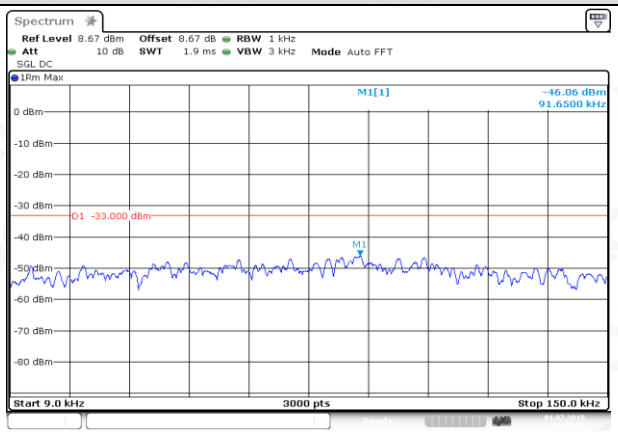	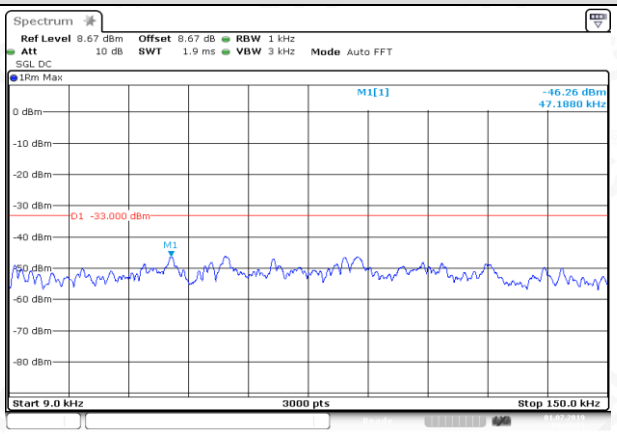
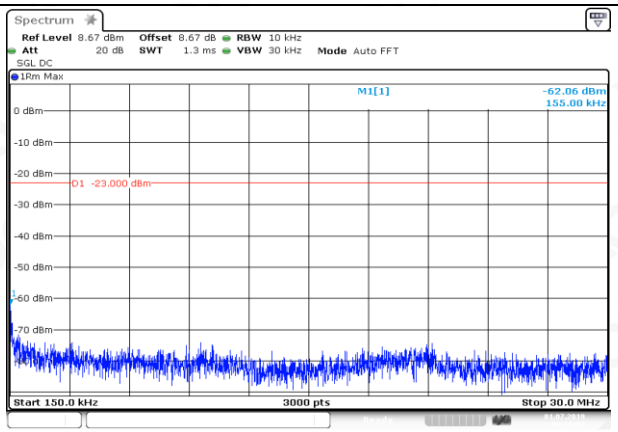	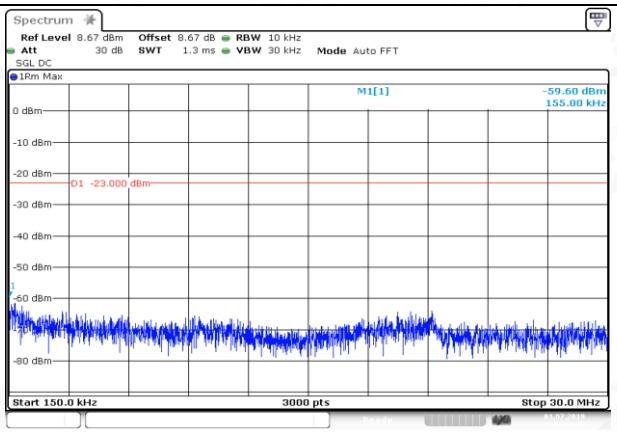
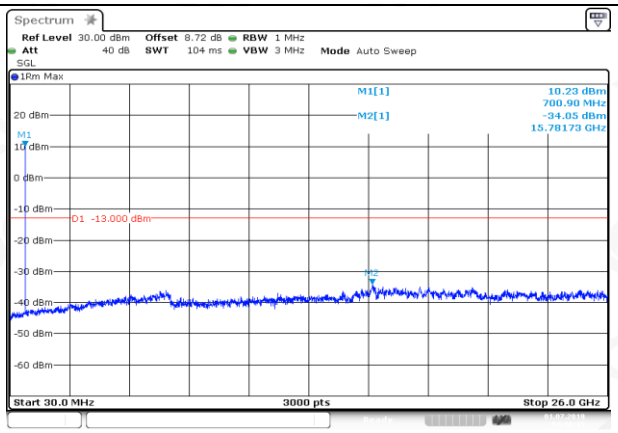	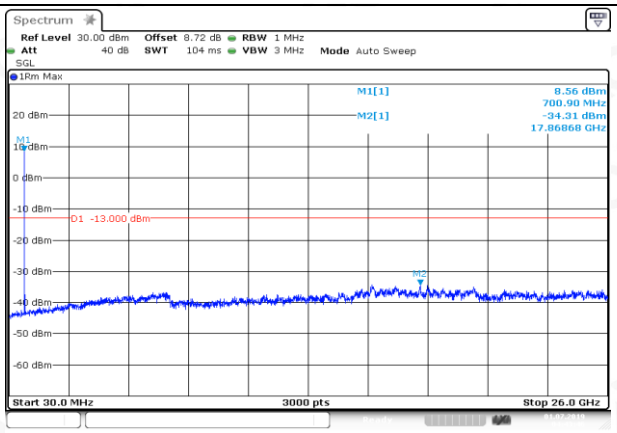
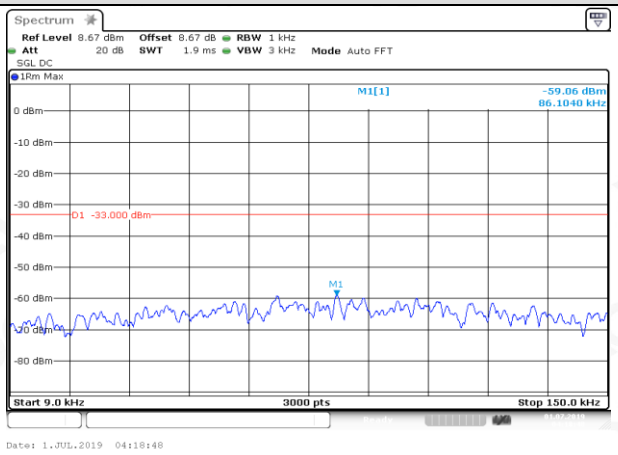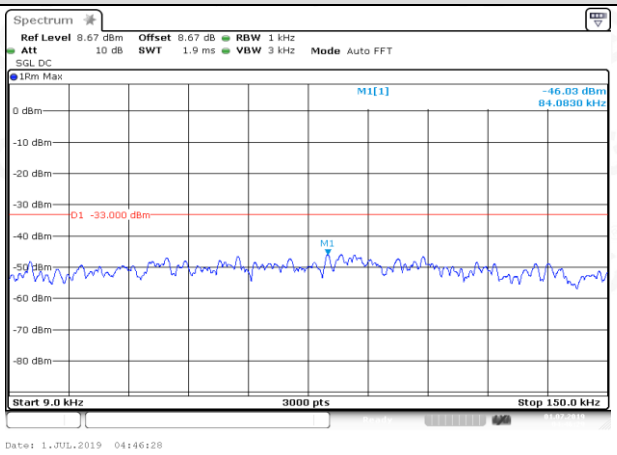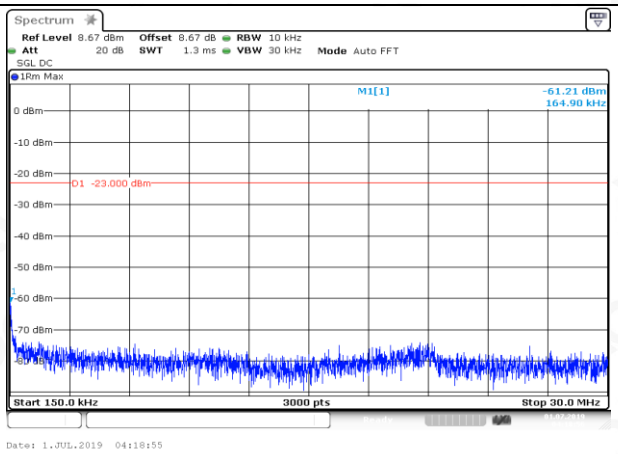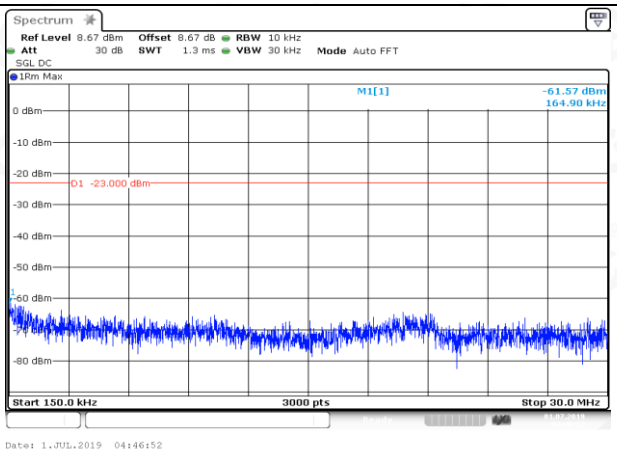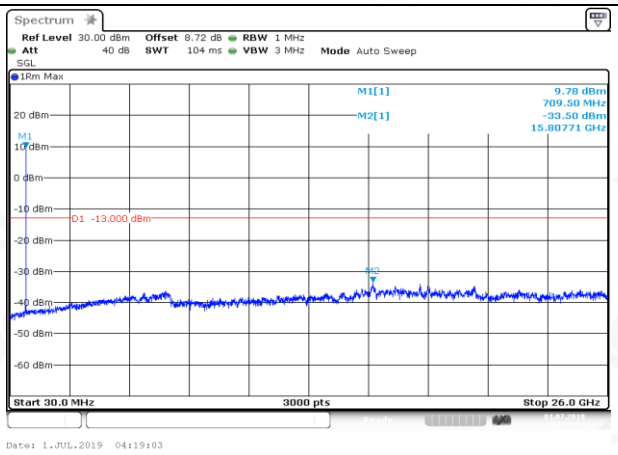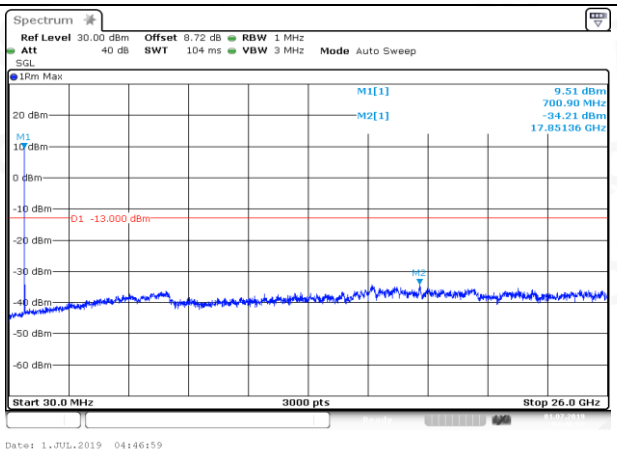
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