

ANNEX A.4. OCCUPIED BANDWIDTH

Reference

FCC: CFR Part 2.1049(h) (i)

A.4.1 Occupied Bandwidth Results

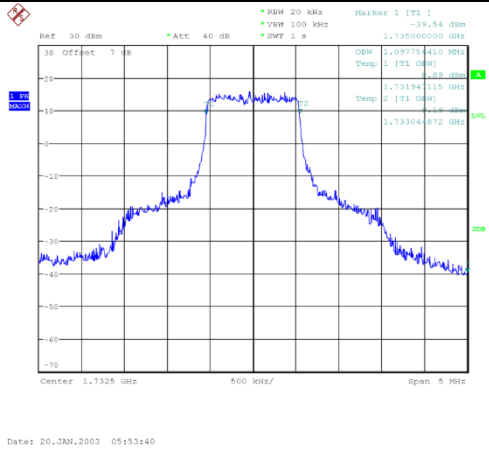
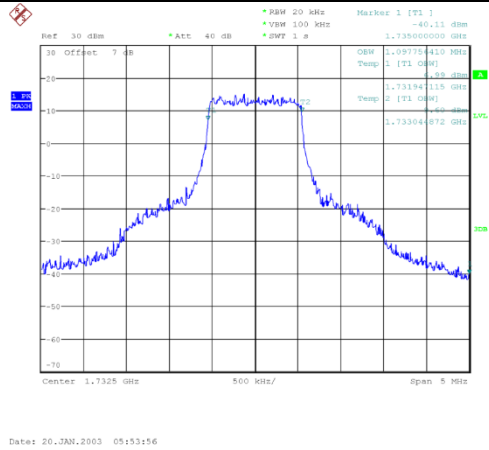
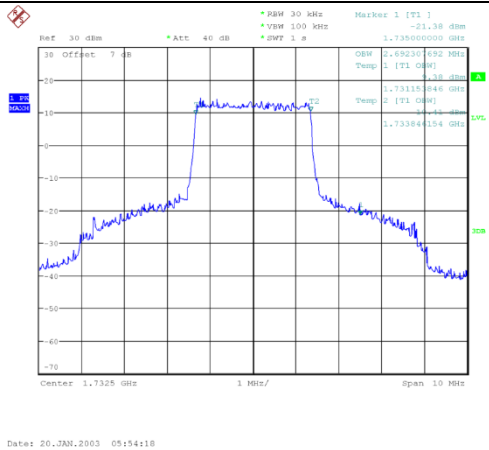
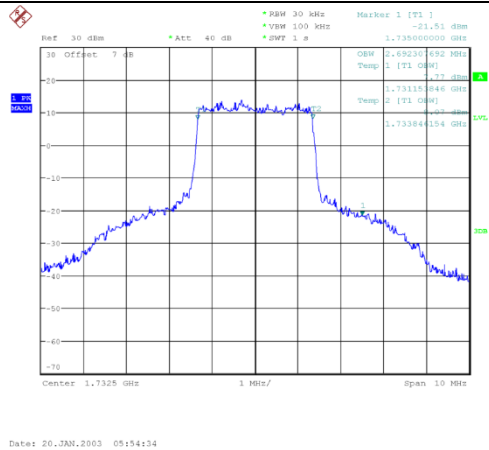
Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 971168 4:

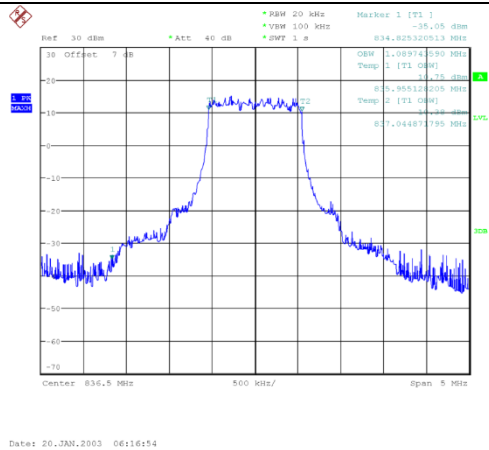
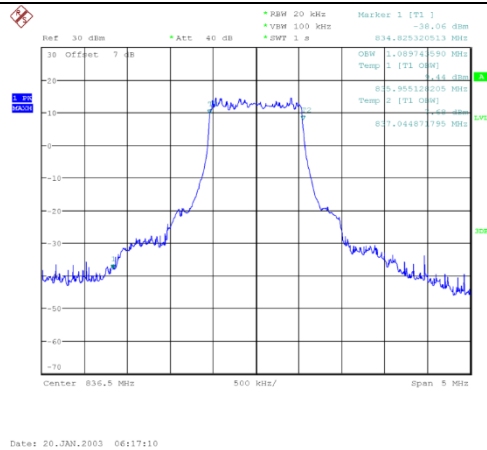
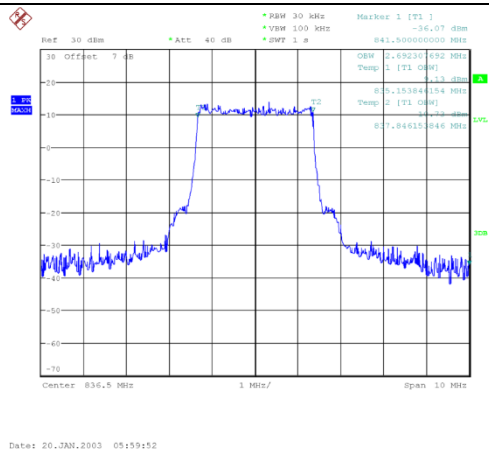
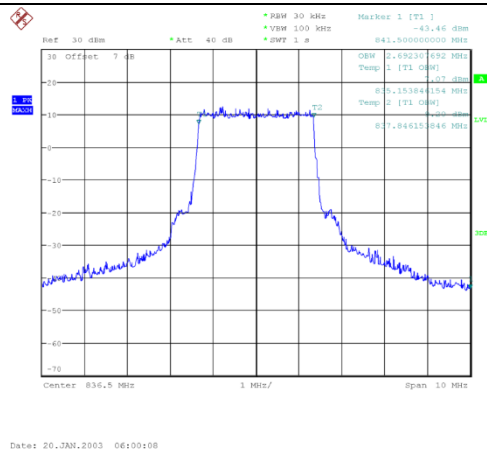
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

LTE band 2			
Frequency(MHz)		Occupied Bandwidth (99%)(MHz)	
1880.0		QPSK	16QAM
		1.09	1.09
LTE band 2, 1.4MHz Bandwidth, QPSK (99% BW)		LTE band 2, 1.4MHz Bandwidth, 16QAM (99% BW)	
Frequency(MHz) 1880.0		Occupied Bandwidth (99%)(MHz) QPSK 16QAM 2.69 2.69	
LTE band 2, 3MHz Bandwidth, QPSK (99% BW)		LTE band 2, 3MHz Bandwidth, 16QAM (99% BW)	

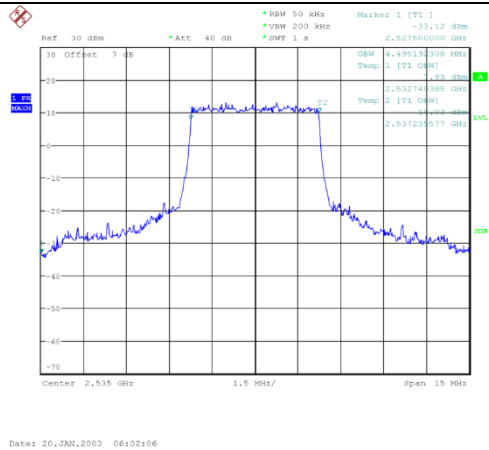
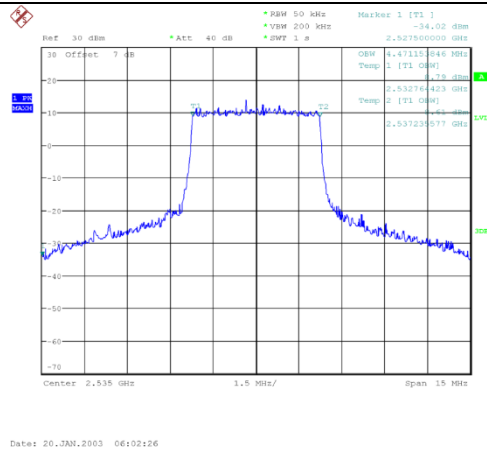
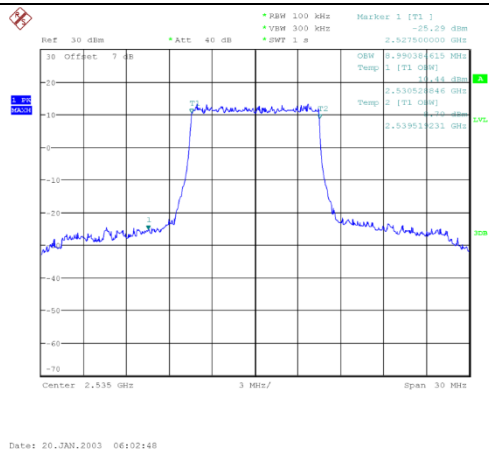
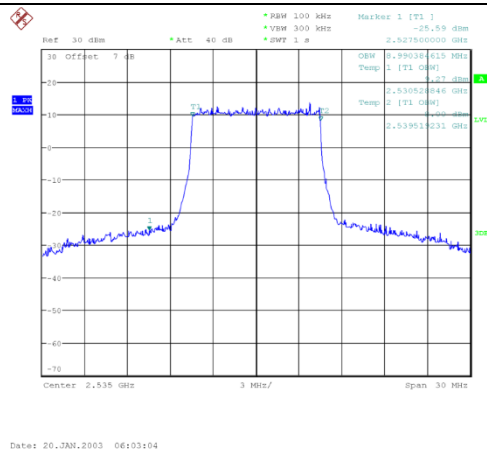
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	13.56	13.56
LTE band 2, 15MHz Bandwidth, QPSK (99% BW)	LTE band 2, 15MHz Bandwidth, 16QAM (99% BW)	
Ref: 30 dBm Att: 40 dB BW: 200 kHz YBW: 1 MHz ZBW: 1 # Marker 1 [T1] 14.48 dBm 1.881217549 GHz Temp 1 [T1] 0dB 1.68 dBm 1.87322154 GHz Temp 2 [T1] 0dB 1.886778846 GHz	Ref: 30 dBm Att: 40 dB BW: 200 kHz YBW: 1 MHz ZBW: 1 # Marker 1 [T1] 14.48 dBm 1.881217549 GHz Temp 1 [T1] 0dB 1.68 dBm 1.87322154 GHz Temp 2 [T1] 0dB 1.886778846 GHz	
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	17.89	17.98
LTE band 2, 20MHz Bandwidth, QPSK (99% BW)	LTE band 2, 20MHz Bandwidth, 16QAM (99% BW)	
Ref: 30 dBm Att: 40 dB BW: 200 kHz YBW: 1 MHz ZBW: 1 # Marker 1 [T1] 13.26 dBm 1.881217549 GHz Temp 1 [T1] 0dB 1.16 dBm 1.87105692 GHz Temp 2 [T1] 0dB 1.889038462 GHz	Ref: 30 dBm Att: 40 dB BW: 200 kHz YBW: 1 MHz ZBW: 1 # Marker 1 [T1] 13.64 dBm 1.881217549 GHz Temp 1 [T1] 0dB 1.16 dBm 1.87105692 GHz Temp 2 [T1] 0dB 1.889038462 GHz	

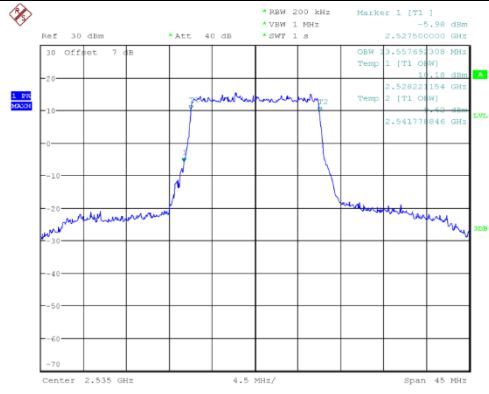
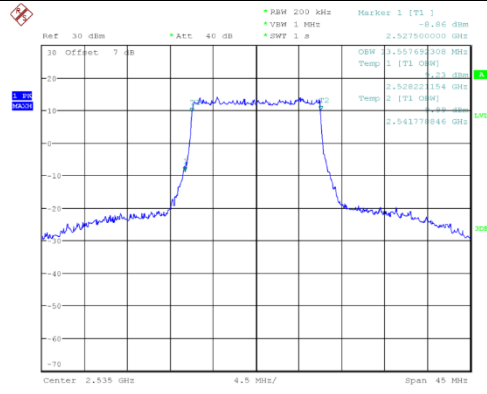
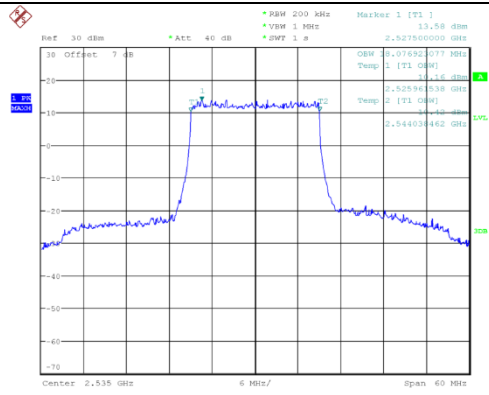
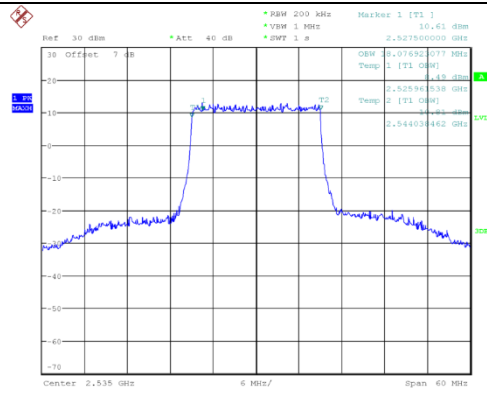
LTE band 4		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	1.09	1.09
LTE band 4, 1.4MHz Bandwidth, QPSK (99% BW)		LTE band 4, 1.4MHz Bandwidth, 16QAM (99% BW)
		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	2.69	2.69
LTE band 4, 3MHz Bandwidth, QPSK (99% BW)		LTE band 4, 3MHz Bandwidth, 16QAM (99% BW)
		

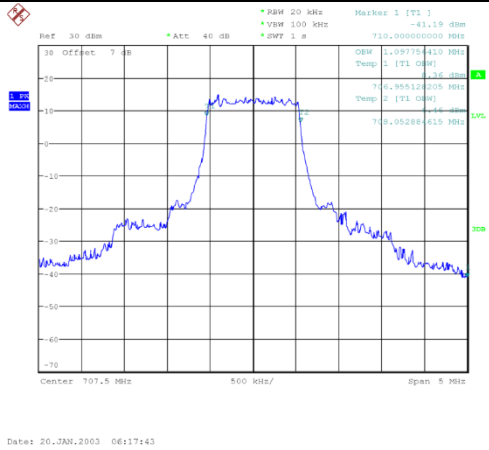
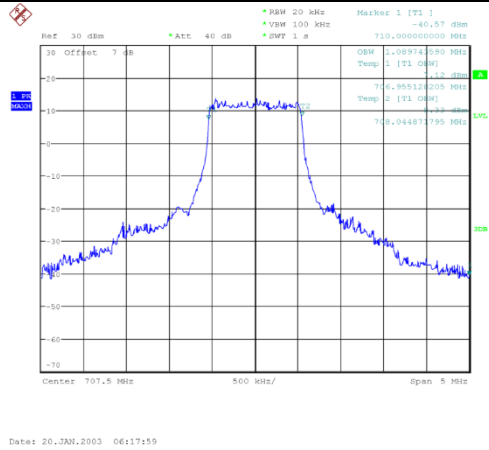
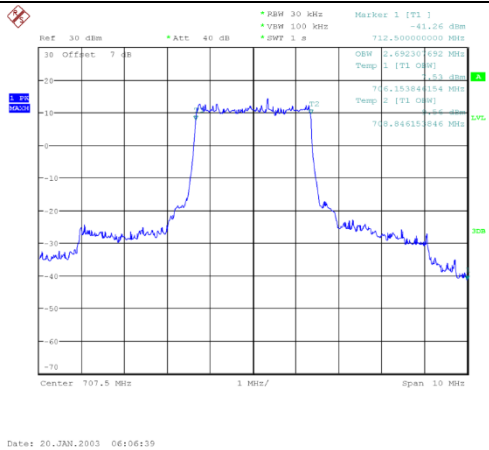
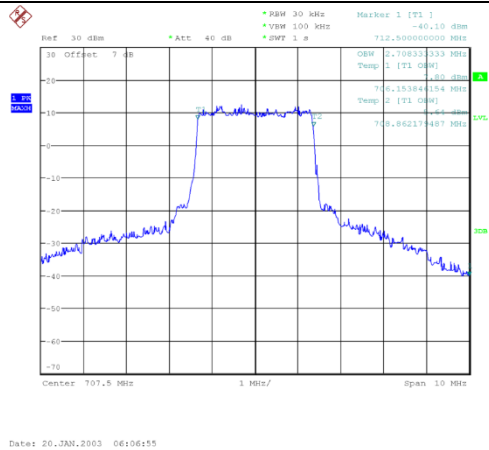
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	4.50	4.50
LTE band 4, 5MHz Bandwidth, QPSK (99% BW)	LTE band 4, 5MHz Bandwidth, 16QAM (99% BW)	
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	8.94	8.94
LTE band 4, 10MHz Bandwidth, QPSK (99% BW)	LTE band 4, 10MHz Bandwidth, 16QAM (99% BW)	

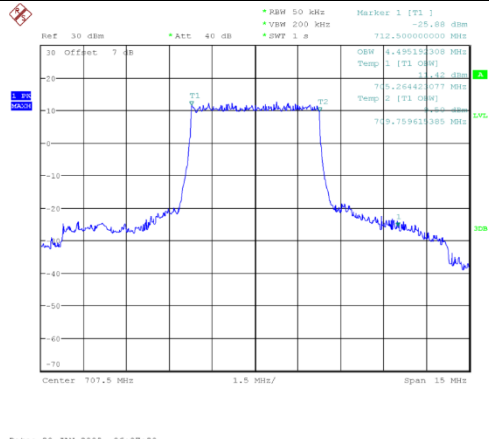
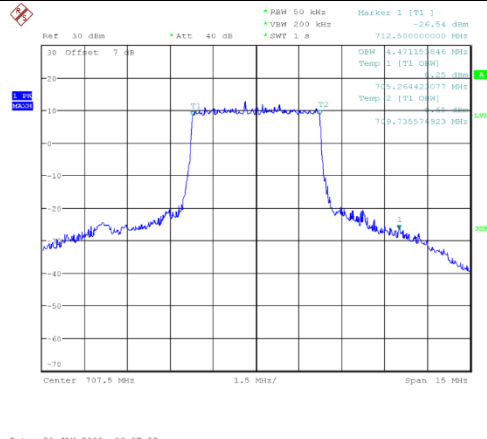
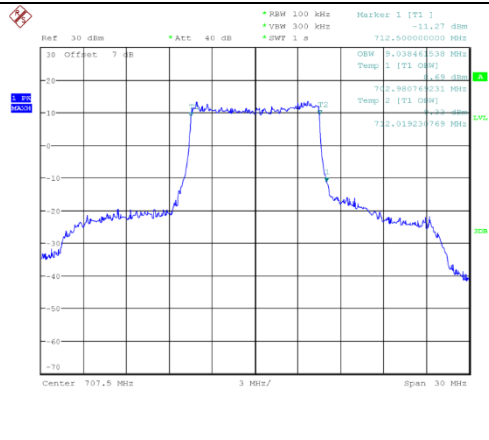
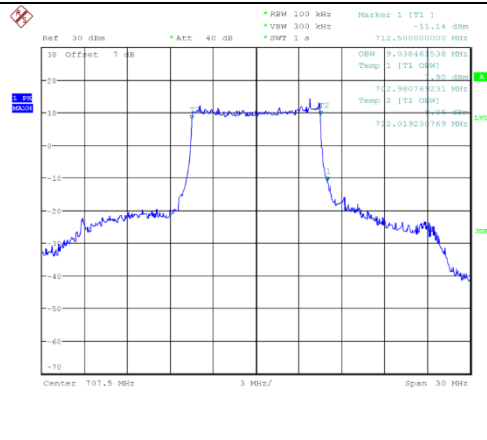
LTE band 5		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	1.09	1.10
LTE band 5, 1.4MHz Bandwidth, QPSK (99% BW)	LTE band 5, 1.4MHz Bandwidth, 16QAM (99% BW)	
		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	2.69	2.69
LTE band 5, 3MHz Bandwidth, QPSK (99% BW)	LTE band 5, 3MHz Bandwidth, 16QAM (99% BW)	
		

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Report Issued Date: Aug.07.2020

LTE band 7		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535.0	QPSK	16QAM
	4.49	4.47
LTE band 7, 5MHz Bandwidth, QPSK (99% BW)	LTE band 7, 5MHz Bandwidth, 16QAM (99% BW)	
		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535.0	QPSK	16QAM
	8.99	8.99
LTE band 7, 10MHz Bandwidth, QPSK (99% BW)	LTE band 7, 10MHz Bandwidth, 16QAM (99% BW)	
		

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535.0	QPSK	16QAM
	13.36	13.36
LTE band 7, 15MHz Bandwidth, QPSK (99% BW)	LTE band 7, 15MHz Bandwidth, 16QAM (99% BW)	
 Ref: 30 dBm *Att: 40 dB *RBW: 200 kHz *VBW: 1 MHz *Span: 45 MHz Marker 1 [T1] 1 2.535000000 GHz -5.98 dBm Temp 1 [T1] 0.000 dBm 2.535000000 GHz Temp 2 [T1] 0.000 dBm 2.541770846 GHz Center 2.535 GHz 4.5 MHz/ Span 45 MHz Date: 20.JAN.2003 06:03:25	 Ref: 30 dBm *Att: 40 dB *RBW: 200 kHz *VBW: 1 MHz *Span: 45 MHz Marker 1 [T1] 1 2.535000000 GHz -5.98 dBm Temp 1 [T1] 0.000 dBm 2.535000000 GHz Temp 2 [T1] 0.000 dBm 2.541770846 GHz Center 2.535 GHz 4.5 MHz/ Span 45 MHz Date: 20.JAN.2003 06:03:41	
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
2535.0	QPSK	16QAM
	18.07	18.07
LTE band 7, 20MHz Bandwidth, QPSK (99% BW)	LTE band 7, 20MHz Bandwidth, 16QAM (99% BW)	
 Ref: 30 dBm *Att: 40 dB *RBW: 200 kHz *VBW: 1 MHz *Span: 60 MHz Marker 1 [T1] 1 2.535000000 GHz -5.98 dBm Temp 1 [T1] 0.000 dBm 2.535000000 GHz Temp 2 [T1] 0.000 dBm 2.544030462 GHz Center 2.535 GHz 6 MHz/ Span 60 MHz Date: 20.JAN.2003 06:04:02	 Ref: 30 dBm *Att: 40 dB *RBW: 200 kHz *VBW: 1 MHz *Span: 60 MHz Marker 1 [T1] 1 2.535000000 GHz -5.98 dBm Temp 1 [T1] 0.000 dBm 2.535000000 GHz Temp 2 [T1] 0.000 dBm 2.544030462 GHz Center 2.535 GHz 6 MHz/ Span 60 MHz Date: 20.JAN.2003 06:04:18	

LTE band 12		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	1.09	1.09
LTE band 12, 1.4MHz Bandwidth, QPSK (99% BW)		LTE band 12, 1.4MHz Bandwidth, 16QAM (99% BW)
		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	2.69	2.68
LTE band 12, 3MHz Bandwidth, QPSK (99% BW)		LTE band 12, 3MHz Bandwidth, 16QAM (99% BW)
		

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	4.49	4.47
LTE band 12, 5MHz Bandwidth, QPSK (99% BW)	LTE band 12, 5MHz Bandwidth, 16QAM (99% BW)	
		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	9.04	9.04
LTE band 12, 10MHz Bandwidth, QPSK (99% BW)	LTE band 12, 10MHz Bandwidth, 16QAM (99% BW)	
		

ANNEX A.5. EMISSION BANDWIDTH

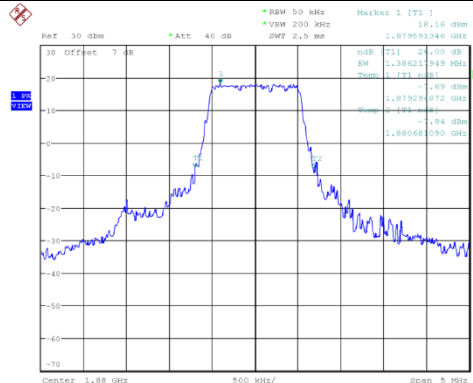
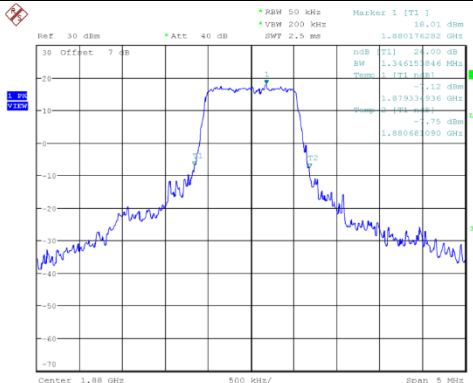
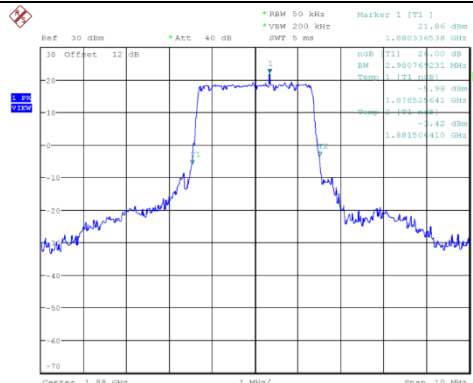
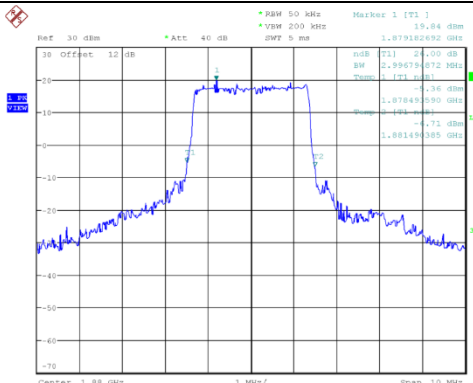
Reference

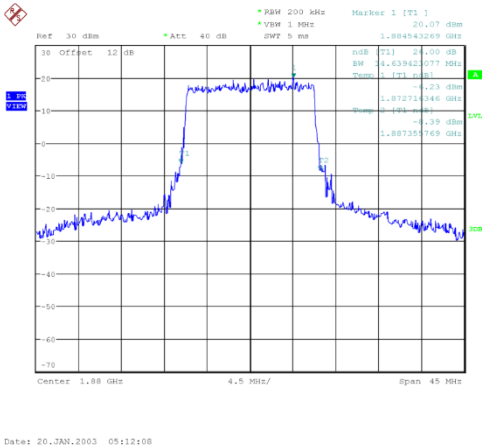
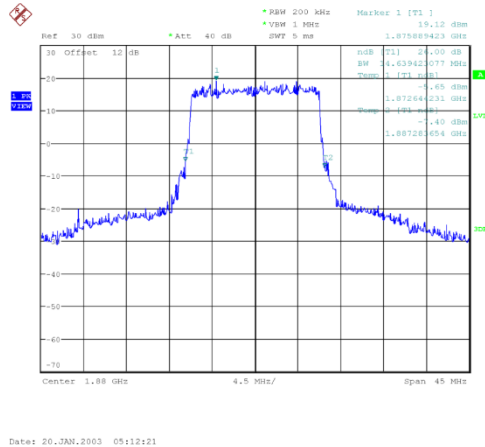
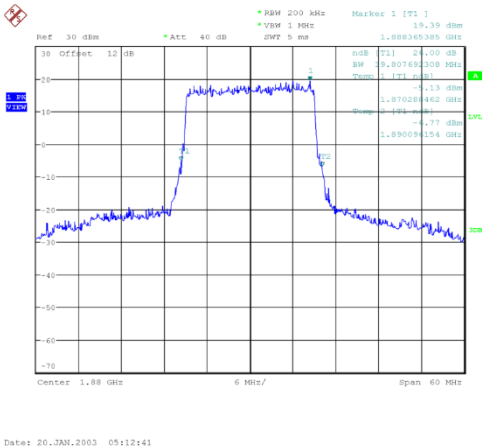
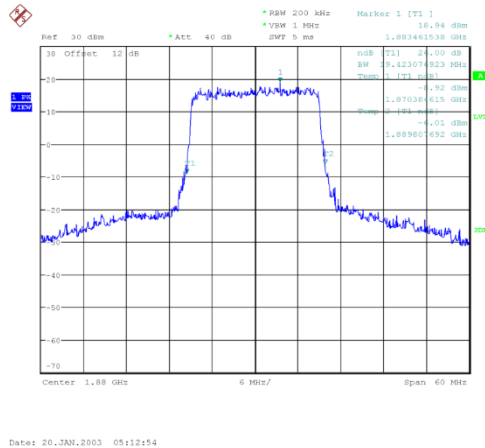
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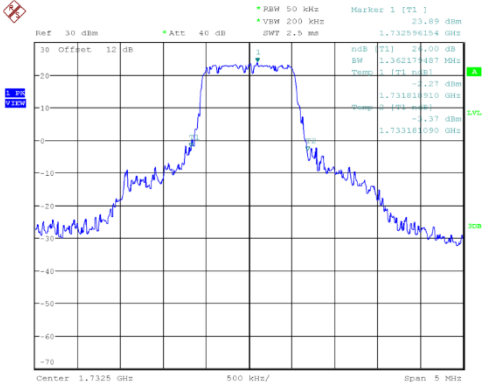
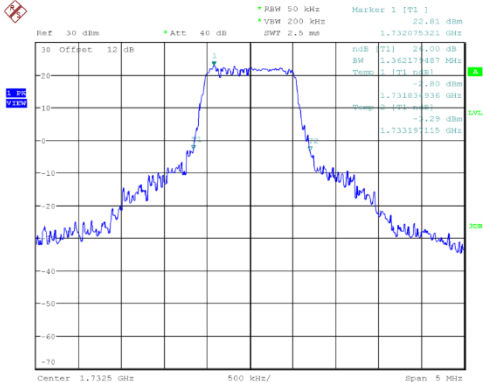
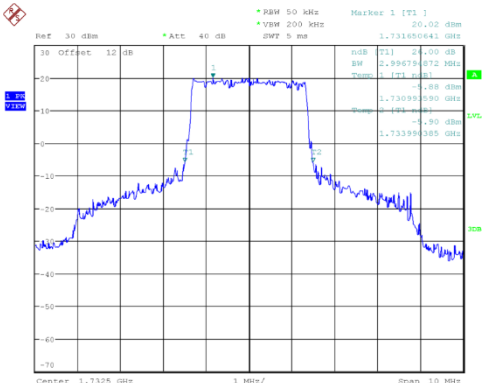
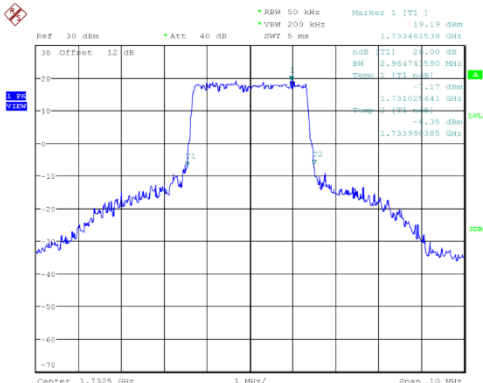
A.5.1Emission Bandwidth Results

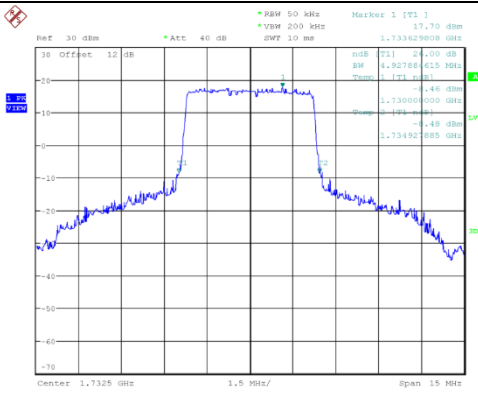
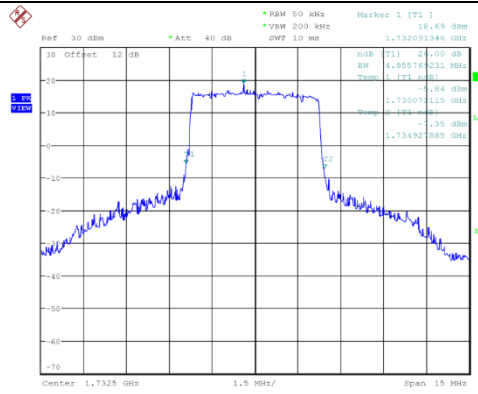
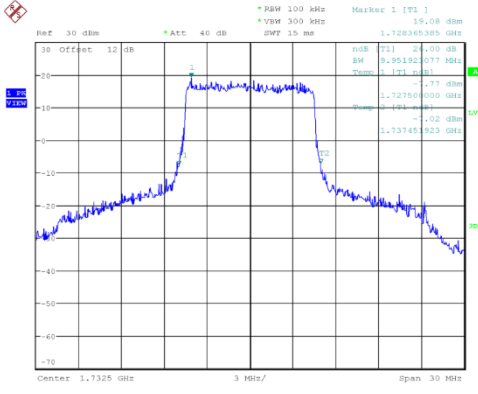
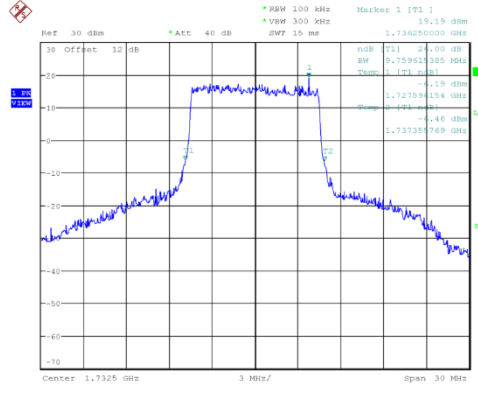
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

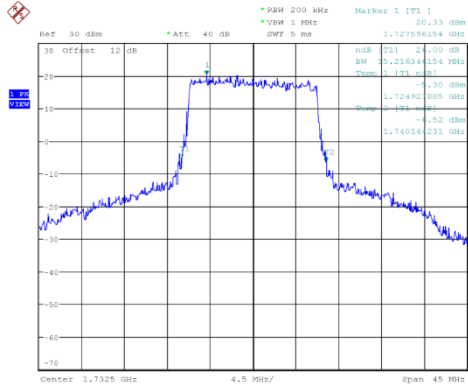
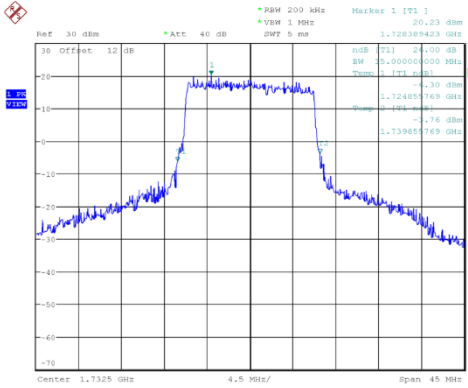
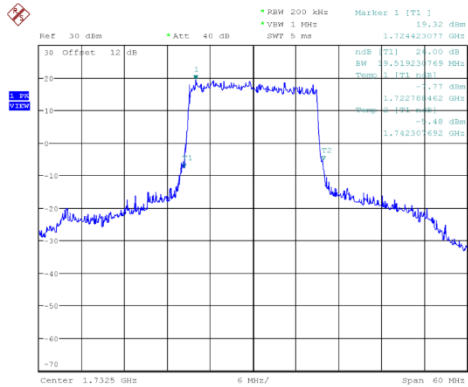
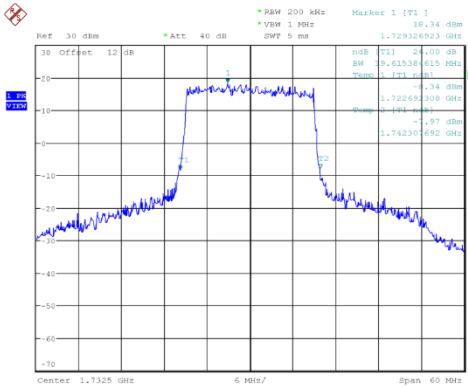
Emission Bandwidth Measurement Results:

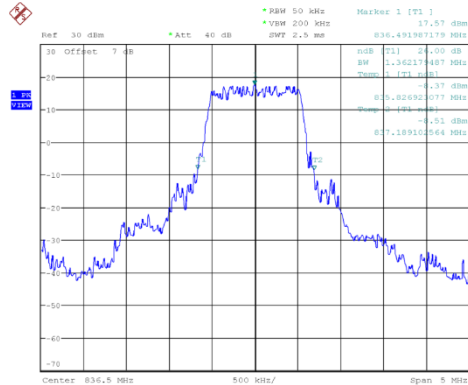
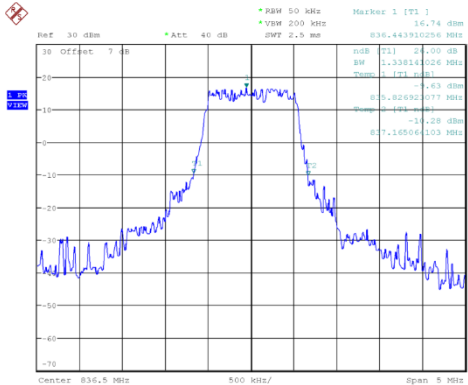
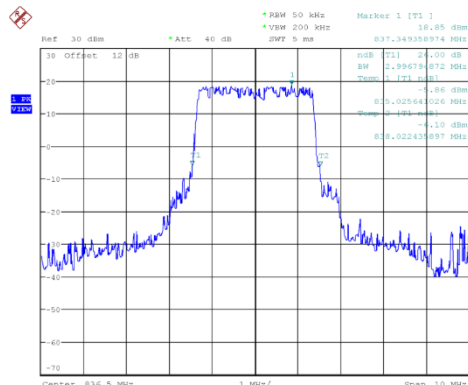
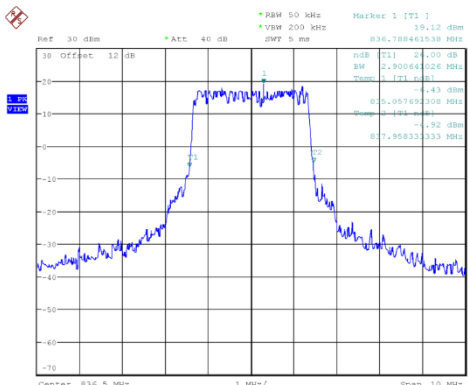
LTE band 2		
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	1.39	1.35
LTE band 2, 1.4MHz Bandwidth, QPSK (-26dBc BW)	LTE band 2, 1.4MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm, Att: 40 dB, BW: 200 kHz, Span: 5 MHz, Center: 1.88 GHz. Peak power: 24.00 dBm, BW: 1.39 MHz, Occupied Bandwidth: 1.39 MHz. Date: 20.JAN.2003 06:35:03	 Ref: 30 dBm, Att: 40 dB, BW: 200 kHz, Span: 5 MHz, Center: 1.88 GHz. Peak power: 24.00 dBm, BW: 1.35 MHz, Occupied Bandwidth: 1.35 MHz. Date: 20.JAN.2003 06:35:19	
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	2.98	2.99
LTE band 2, 3MHz Bandwidth, QPSK (-26dBc BW)	LTE band 2, 3MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm, Att: 40 dB, BW: 200 kHz, Span: 10 MHz, Center: 1.88 GHz. Peak power: 24.00 dBm, BW: 2.98 MHz, Occupied Bandwidth: 2.98 MHz. Date: 20.JAN.2003 05:10:14	 Ref: 30 dBm, Att: 40 dB, BW: 200 kHz, Span: 10 MHz, Center: 1.88 GHz. Peak power: 24.00 dBm, BW: 2.99 MHz, Occupied Bandwidth: 2.99 MHz. Date: 20.JAN.2003 05:10:30	

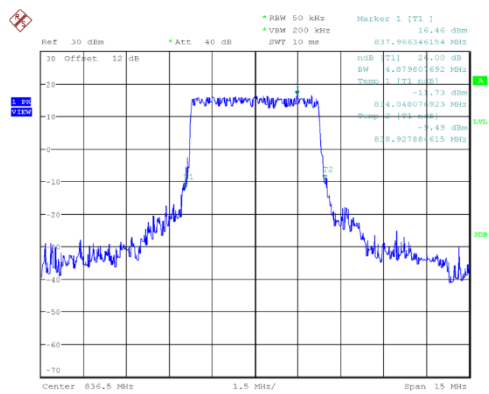
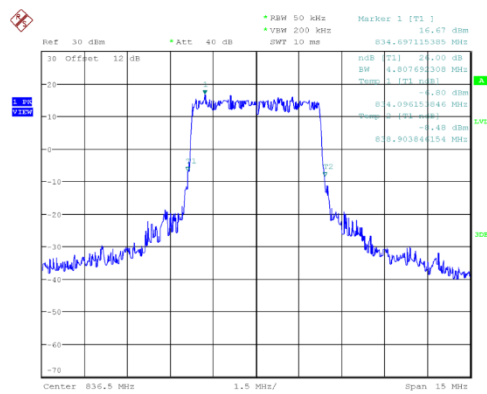
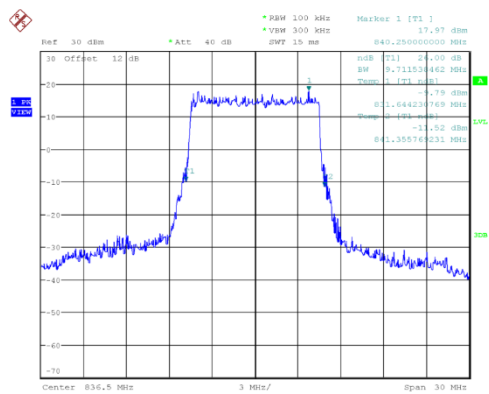
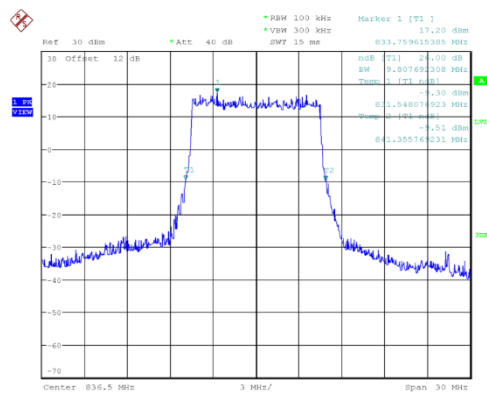
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM	
	14.64	14.64	
LTE band 2, 15MHz Bandwidth, QPSK (-26dBc BW)		LTE band 2, 15MHz Bandwidth, 16QAM (-26dBc BW)	
			
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM	
	19.81	19.42	
LTE band 2, 20MHz Bandwidth, QPSK (-26dBc BW)		LTE band 2, 20MHz Bandwidth, 16QAM (-26dBc BW)	
			

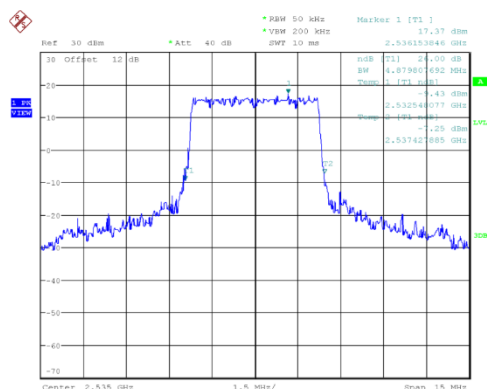
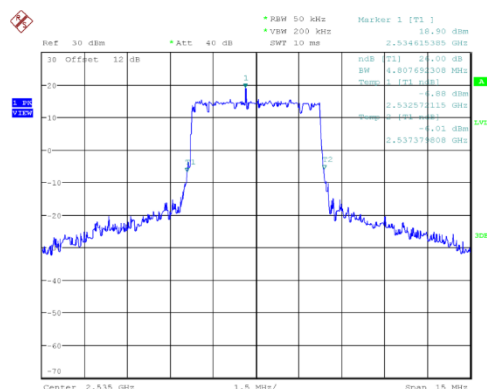
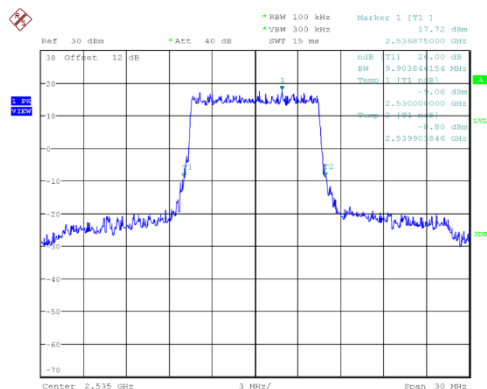
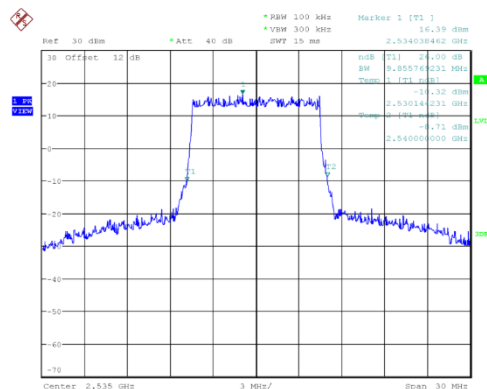
LTE band 4		
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	1.36	1.36
LTE band 4, 1.4MHz Bandwidth, QPSK (-26dBc BW)	LTE band 4, 1.4MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm *Att: 40 dB *RBW 50 kHz Marker 1 [T1] 1 *VSW 200 kHz 23.89 dBm SWF 2.5 ms 1.732596154 GHz dBm [T1] -23.89 dB BW 1.36217487 MHz Power 1.73 GHz dBm [T1] -23.89 dB BW 1.36217487 MHz Power 1.73 GHz Center 1.7325 GHz 500 kHz/ Span 5 MHz Date: 20. JAN. 2003 05:13:22	 Ref: 30 dBm *Att: 40 dB *RBW 50 kHz Marker 1 [T1] 1 *VSW 200 kHz 22.81 dBm SWF 2.5 ms 1.732079321 GHz dBm [T1] -22.81 dB BW 1.36217487 MHz Power 1.73 GHz dBm [T1] -22.81 dB BW 1.36217487 MHz Power 1.73 GHz Center 1.7325 GHz 500 kHz/ Span 5 MHz Date: 20. JAN. 2003 05:13:37	
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1732.5	QPSK	16QAM
	2.99	2.96
LTE band 4, 3MHz Bandwidth, QPSK (-26dBc BW)	LTE band 4, 3MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm *Att: 40 dB *RBW 50 kHz Marker 1 [T1] 1 *VSW 200 kHz 20.02 dBm SWF 5 ms 1.733506041 GHz dBm [T1] -20.02 dB BW 2.990764012 MHz Power 1.73 GHz dBm [T1] -20.02 dB BW 2.990764012 MHz Power 1.73 GHz Center 1.7325 GHz 1 MHz/ Span 10 MHz Date: 20. JAN. 2003 05:14:01	 Ref: 30 dBm *Att: 40 dB *RBW 50 kHz Marker 1 [T1] 1 *VSW 200 kHz 19.19 dBm SWF 5 ms 1.733441539 GHz dBm [T1] -19.19 dB BW 2.960764012 MHz Power 1.73 GHz dBm [T1] -19.19 dB BW 2.960764012 MHz Power 1.73 GHz Center 1.7325 GHz 1 MHz/ Span 10 MHz Date: 20. JAN. 2003 05:14:28	

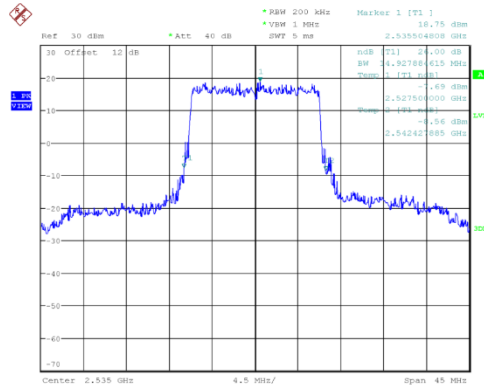
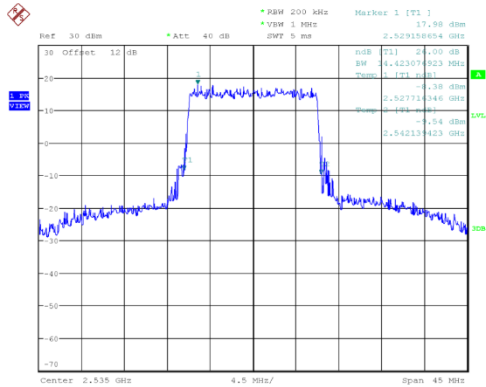
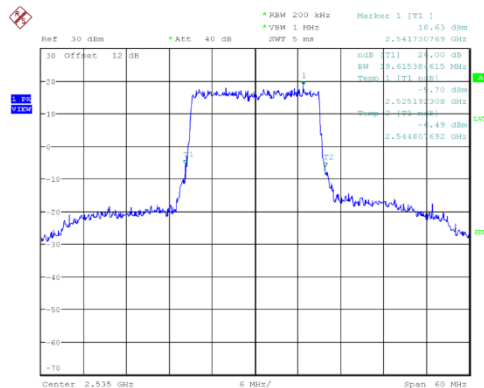
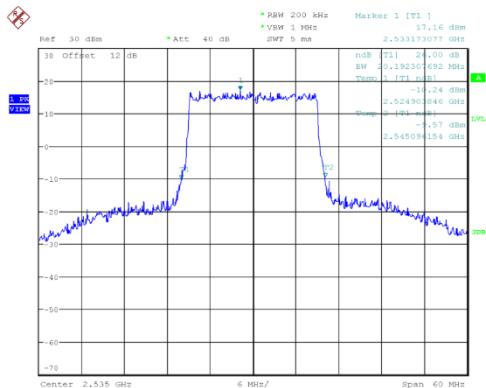
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
1732.5		QPSK	16QAM
		4.93	4.86
LTE band 4, 5MHz Bandwidth, QPSK (-26dBc BW)		LTE band 4, 5MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm, Att: 40 dB, RBW: 50 kHz, VBW: 200 kHz, Span: 15 MHz, Center: 1.7325 GHz. Marker 1 [T1]: 1.733429608 GHz, -4.48 dBm, BW: 4.93 MHz.		 Ref: 30 dBm, Att: 40 dB, RBW: 50 kHz, VBW: 200 kHz, Span: 15 MHz, Center: 1.7325 GHz. Marker 1 [T1]: 1.733429144 GHz, -4.44 dBm, BW: 4.86 MHz.	
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
1732.5		QPSK	16QAM
		9.95	9.76
LTE band 4, 10MHz Bandwidth, QPSK (-26dBc BW)		LTE band 4, 10MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm, Att: 40 dB, RBW: 100 kHz, VBW: 300 kHz, Span: 30 MHz, Center: 1.7325 GHz. Marker 1 [T1]: 1.7327594000 GHz, -4.77 dBm, BW: 9.95 MHz.		 Ref: 30 dBm, Att: 40 dB, RBW: 100 kHz, VBW: 300 kHz, Span: 30 MHz, Center: 1.7325 GHz. Marker 1 [T1]: 1.7327594154 GHz, -4.18 dBm, BW: 9.76 MHz.	

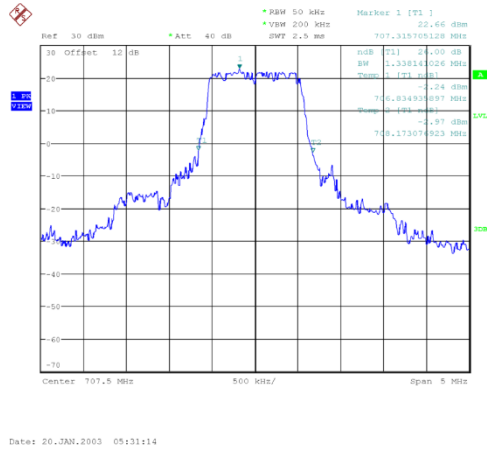
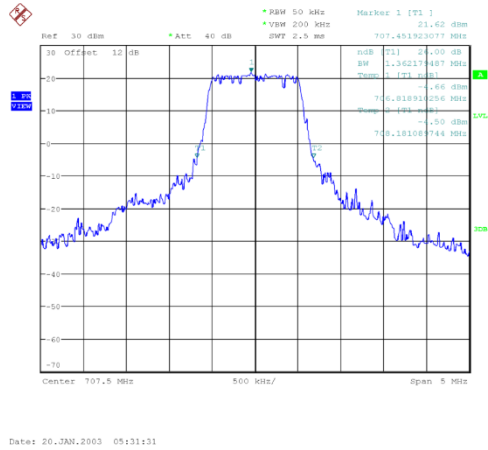
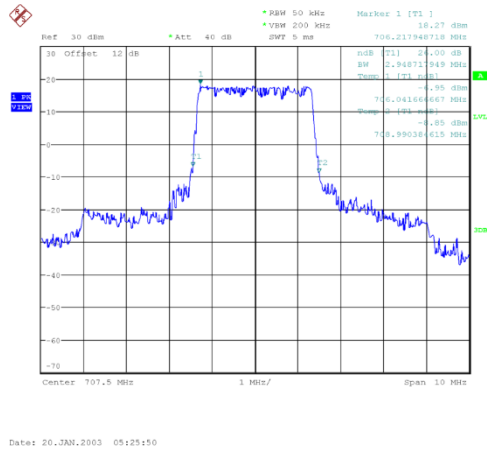
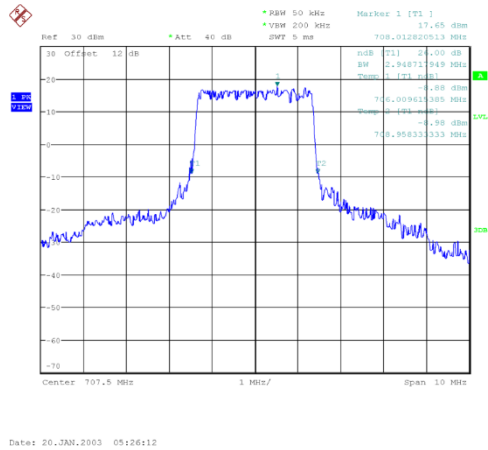
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
1732.5		QPSK	16QAM
		15.22	15.00
LTE band 4, 15MHz Bandwidth, QPSK (-26dBc BW)		LTE band 4, 15MHz Bandwidth, 16QAM (-26dBc BW)	
			
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
1732.5		QPSK	16QAM
		19.52	19.61
LTE band 4, 20MHz Bandwidth, QPSK (-26dBc BW)		LTE band 4, 20MHz Bandwidth, 16QAM (-26dBc BW)	
			

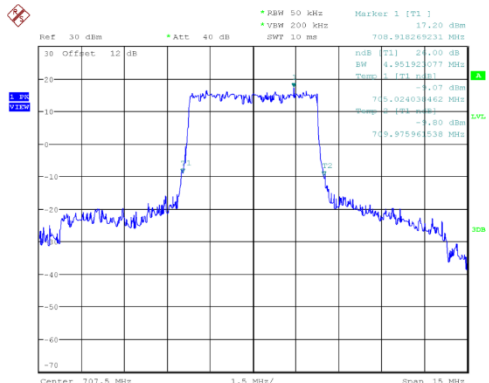
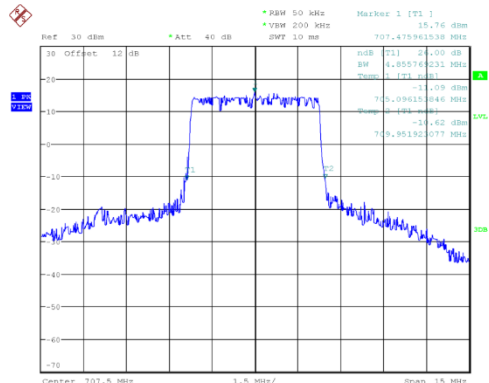
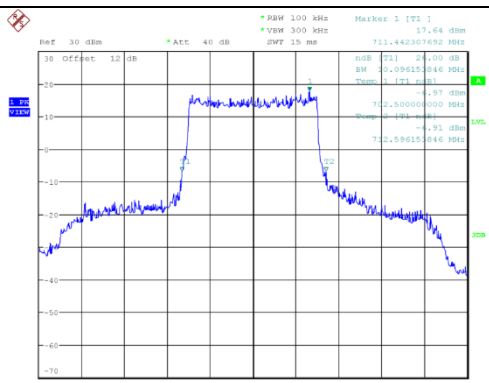
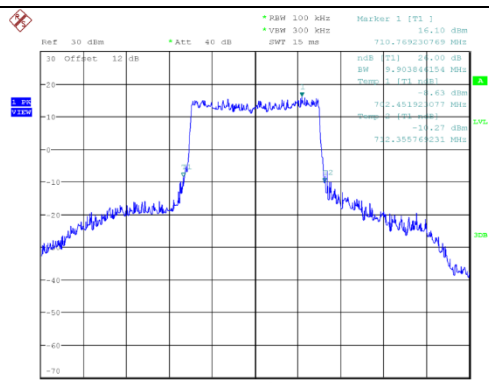
LTE band 5		
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	1.36	1.34
LTE band 5, 1.4MHz Bandwidth, QPSK (-26dBc BW)	LTE band 5, 1.4MHz Bandwidth, 16QAM (-26dBc BW)	
 Center: 836.5 MHz 500 kHz/ Span: 5 MHz Date: 20..JAN.2003 06:35:14	 Center: 836.5 MHz 500 kHz/ Span: 5 MHz Date: 20..JAN.2003 06:36:09	
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	2.99	2.90
LTE band 5, 3MHz Bandwidth, QPSK (-26dBc BW)	LTE band 5, 3MHz Bandwidth, 16QAM (-26dBc BW)	
 Center: 836.5 MHz 1 MHz/ Span: 10 MHz Date: 20..JAN.2003 05:19:13	 Center: 836.5 MHz 1 MHz/ Span: 10 MHz Date: 20..JAN.2003 05:19:28	

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	4.88	4.81
LTE band 5, 5MHz Bandwidth, QPSK (-26dBc BW)	LTE band 5, 5MHz Bandwidth, 16QAM (-26dBc BW)	
		
Date: 20.JAN.2003 05:19:51	Date: 20.JAN.2003 05:19:09	
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	9.71	9.81
LTE band 5, 10MHz Bandwidth, QPSK (-26dBc BW)	LTE band 5, 10MHz Bandwidth, 16QAM (-26dBc BW)	
		
Date: 20.JAN.2003 05:20:28	Date: 20.JAN.2003 05:20:41	

LTE band 7			
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
2535.0	QPSK	16QAM	
	4.88	4.81	
LTE band 7, 5MHz Bandwidth, QPSK (-26dBc BW)		LTE band 7, 5MHz Bandwidth, 16QAM (-26dBc BW)	
			
Date: 20.JAN.2003 05:21:04		Date: 20.JAN.2003 05:21:20	
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
2535.0	QPSK	16QAM	
	9.91	9.86	
LTE band 7, 10MHz Bandwidth, QPSK (-26dBc BW)		LTE band 7, 10MHz Bandwidth, 16QAM (-26dBc BW)	
			
Date: 20.JAN.2003 05:21:38		Date: 20.JAN.2003 05:21:51	

Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535.0	QPSK	16QAM
	14.93	14.42
LTE band 7, 15MHz Bandwidth, QPSK (-26dBc BW)	LTE band 7, 15MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm *Att: 40 dB *PSW: 200 kHz *VMW: 1 MHz *SWF: 5 ms Marker 1 [T1] 16.75 dBm 2.53554800 GHz Center: 2.535 GHz 4.5 MHz/ Span: 45 MHz Date: 20.JAN.2003 05:22:11	 Ref: 30 dBm *Att: 40 dB *PSW: 200 kHz *VMW: 1 MHz *SWF: 5 ms Marker 1 [T1] 17.38 dBm 2.52918454 GHz Center: 2.535 GHz 4.5 MHz/ Span: 45 MHz Date: 20.JAN.2003 05:22:24	
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535.0	QPSK	16QAM
	19.62	20.19
LTE band 7, 20MHz Bandwidth, QPSK (-26dBc BW)	LTE band 7, 20MHz Bandwidth, 16QAM (-26dBc BW)	
 Ref: 30 dBm *Att: 40 dB *PSW: 200 kHz *VMW: 1 MHz *SWF: 5 ms Marker 1 [T1] 16.63 dBm 2.541730769 GHz Center: 2.535 GHz 6 MHz/ Span: 60 MHz Date: 20.JAN.2003 05:22:43	 Ref: 30 dBm *Att: 40 dB *PSW: 200 kHz *VMW: 1 MHz *SWF: 5 ms Marker 1 [T1] 17.16 dBm 2.533173077 GHz Center: 2.535 GHz 6 MHz/ Span: 60 MHz Date: 20.JAN.2003 05:22:56	

LTE band 12		
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
707.5	QPSK	16QAM
	1.34	1.36
LTE band 12, 1.4MHz Bandwidth, QPSK (-26dBc BW)	LTE band 12, 1.4MHz Bandwidth, 16QAM (-26dBc BW)	
		
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
707.5	QPSK	16QAM
	2.95	2.95
LTE band 12, 3MHz Bandwidth, QPSK (-26dBc BW)	LTE band 12, 3MHz Bandwidth, 16QAM (-26dBc BW)	
		

Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
707.5		QPSK	16QAM
		4.95	4.86
LTE band 12, 5MHz Bandwidth, QPSK (-26dBc BW)		LTE band 12, 5MHz Bandwidth, 16QAM (-26dBc BW)	
			
Frequency(MHz)		Occupied Bandwidth (-26dBc)(MHz)	
707.5		QPSK	16QAM
		10.10	9.91
LTE band 12, 10MHz Bandwidth, QPSK (-26dBc BW)		LTE band 12, 10MHz Bandwidth, 16QAM (-26dBc BW)	
			

ANNEX A.6. BAND EDGE COMPLIANCE

Reference

FCC: CFR Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m)

A.6.1 Measurement limit

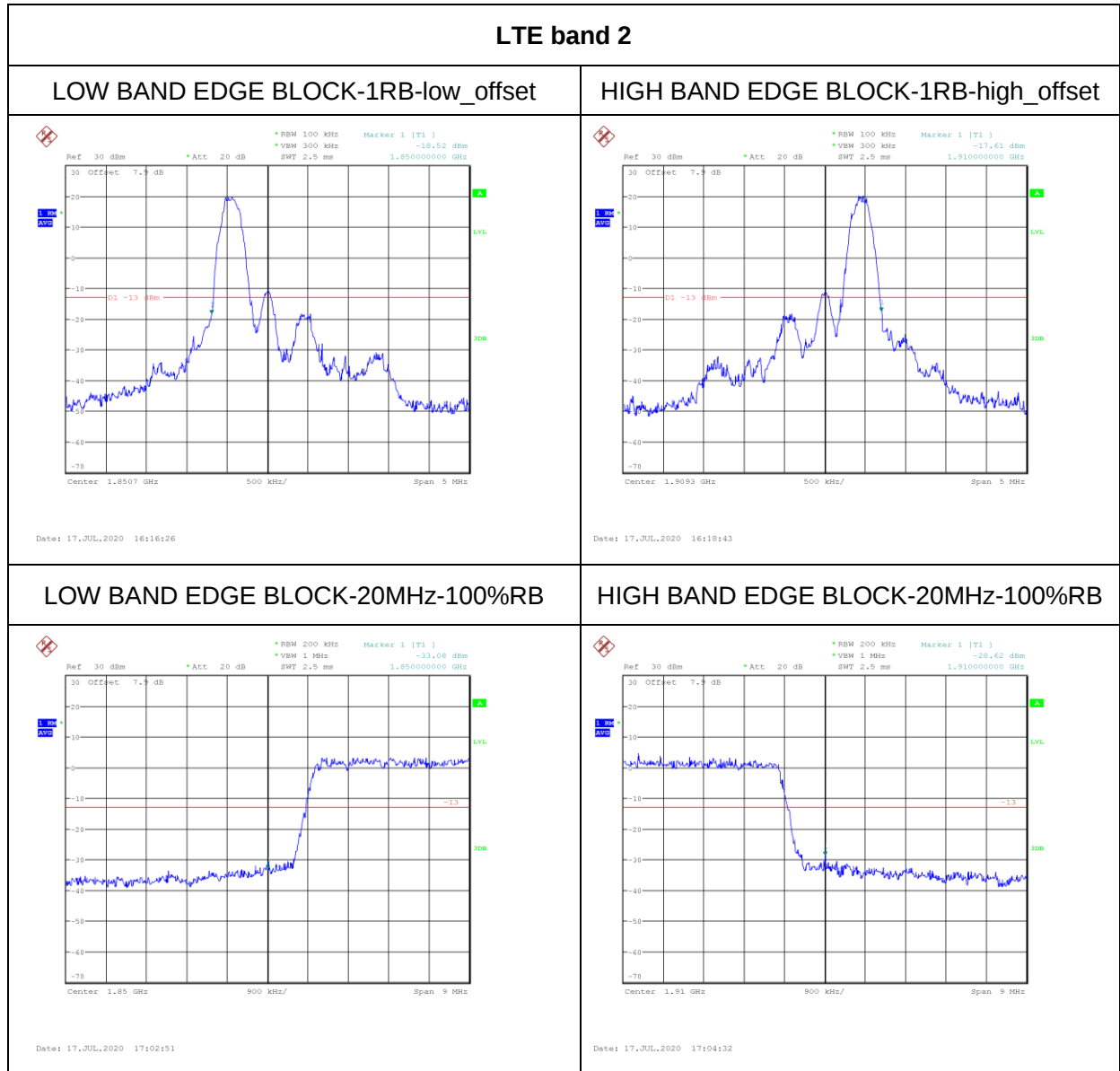
Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least $43+10\log(P)$ dB. For all power levels +30 dBm to 0 dBm, this becomes a constant specification limit of -13 dBm.

According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

Part 27.53(m) states that for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

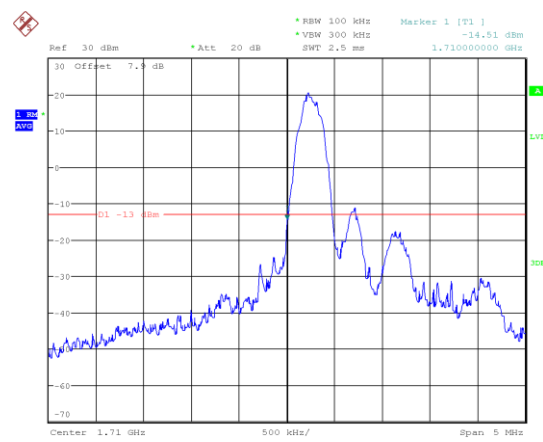
A.6.2 Measurement result

Only worst case result is given below



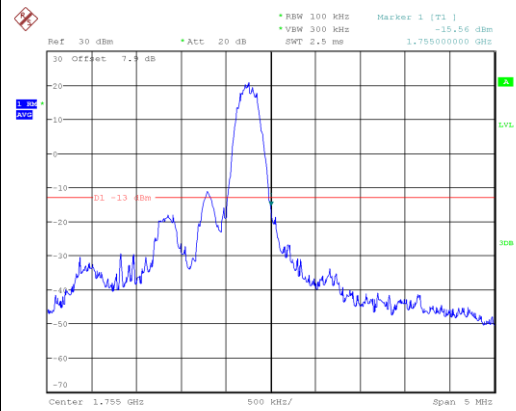
LTE band 4

LOW BAND EDGE BLOCK-1RB-low_offset



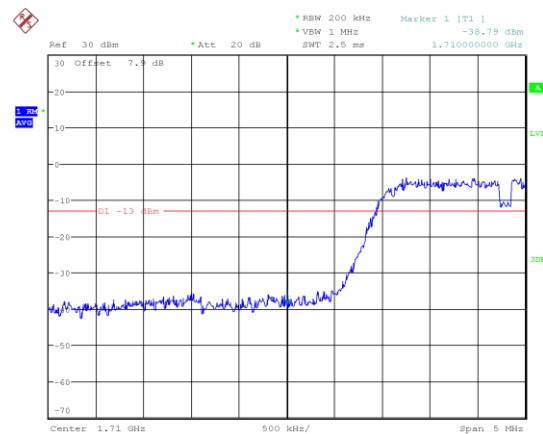
Date: 18.JUL.2020 10:48:32

HIGH BAND EDGE BLOCK-1RB-high_offset



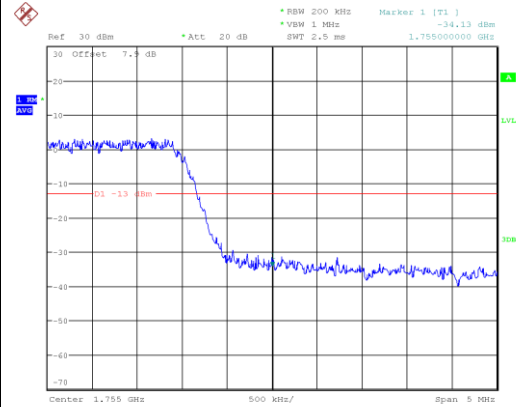
Date: 18.JUL.2020 11:23:23

LOW BAND EDGE BLOCK-20MHz-100%RB



Date: 18.JUL.2020 11:17:46

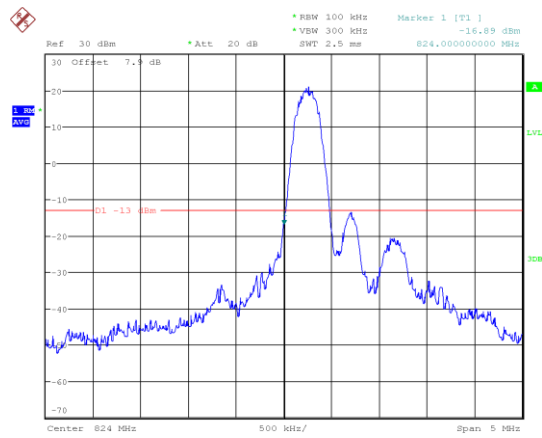
HIGH BAND EDGE BLOCK-20MHz-100%RB



Date: 18.JUL.2020 11:26:13

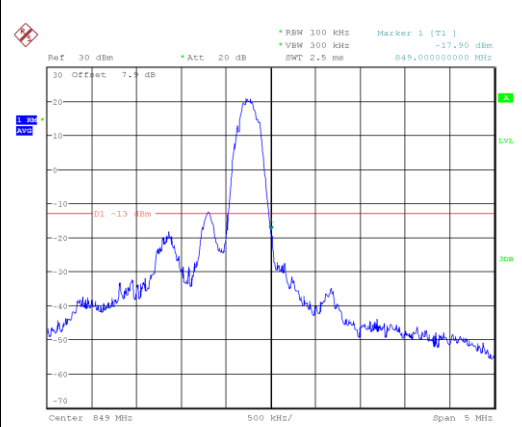
LTE band 5

LOW BAND EDGE BLOCK-1RB-low_offset



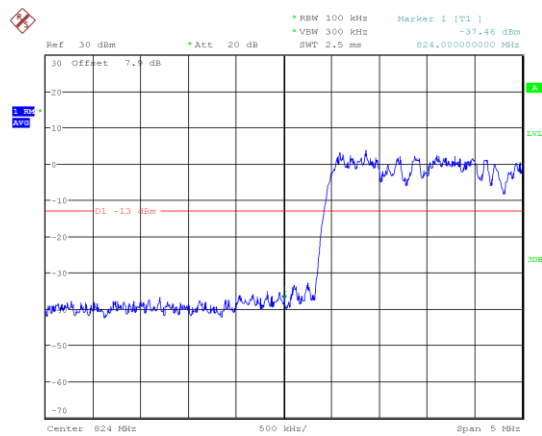
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HIGH BAND EDGE BLOCK-1RB-high_offset



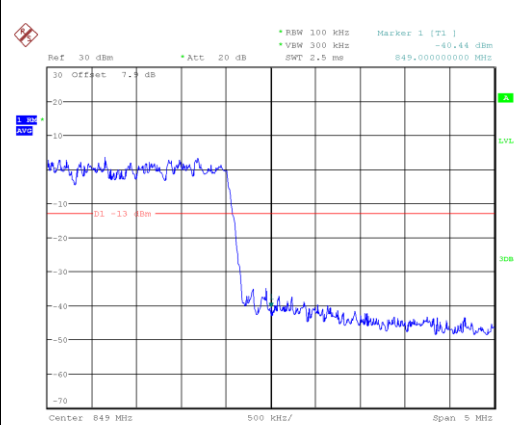
Date: 18.JUL.2020 11:36:15

LOW BAND EDGE BLOCK-10MHz-100%RB



Date: 18.JUL.2020 11:40:31

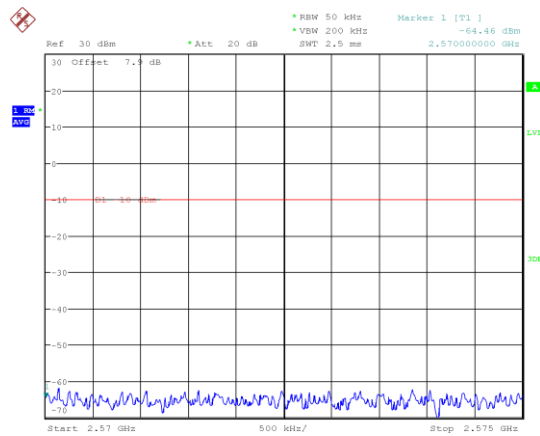
HIGH BAND EDGE BLOCK-10MHz-100%RB



Date: 18.JUL.2020 11:41:57

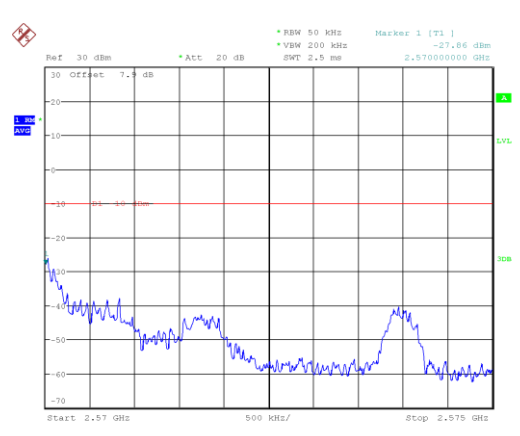
LTE band 7

LOW BAND EDGE BLOCK-1RB- high_offset



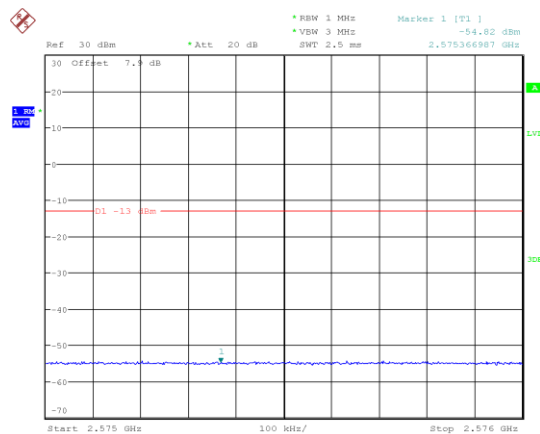
Date: 17.JUL.2020 17:13:37

HIGH BAND EDGE BLOCK-1RB-high_offset



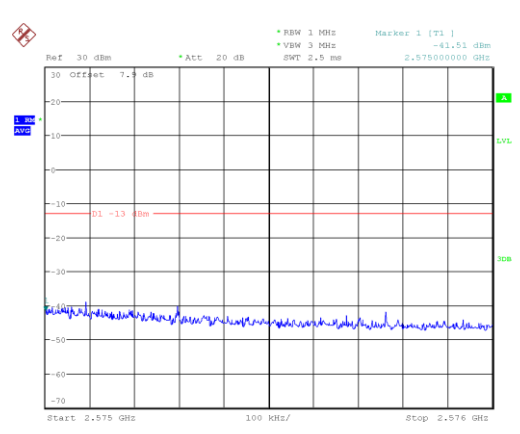
Date: 18.JUL.2020 09:39:22

LOW BAND EDGE BLOCK-1RB- high_offset



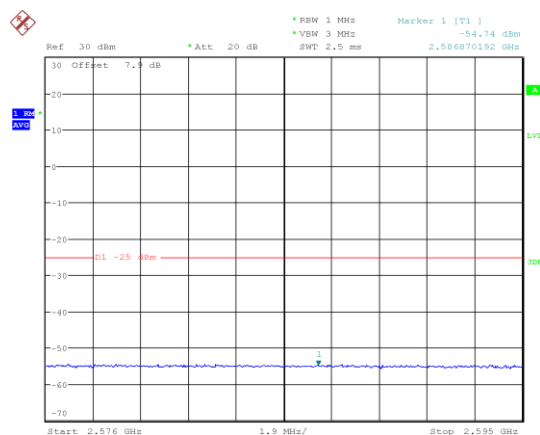
Date: 17.JUL.2020 17:15:46

HIGH BAND EDGE BLOCK-1RB-high_offset



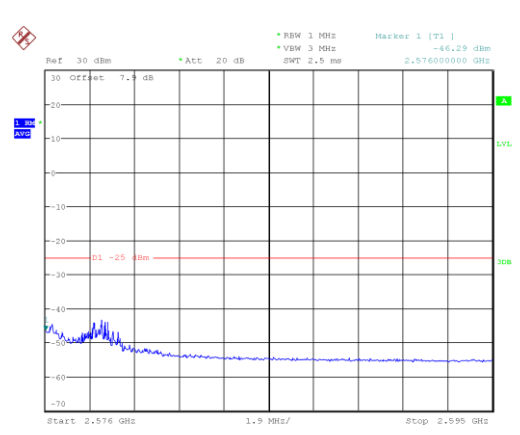
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LOW BAND EDGE BLOCK-1RB- high_offset

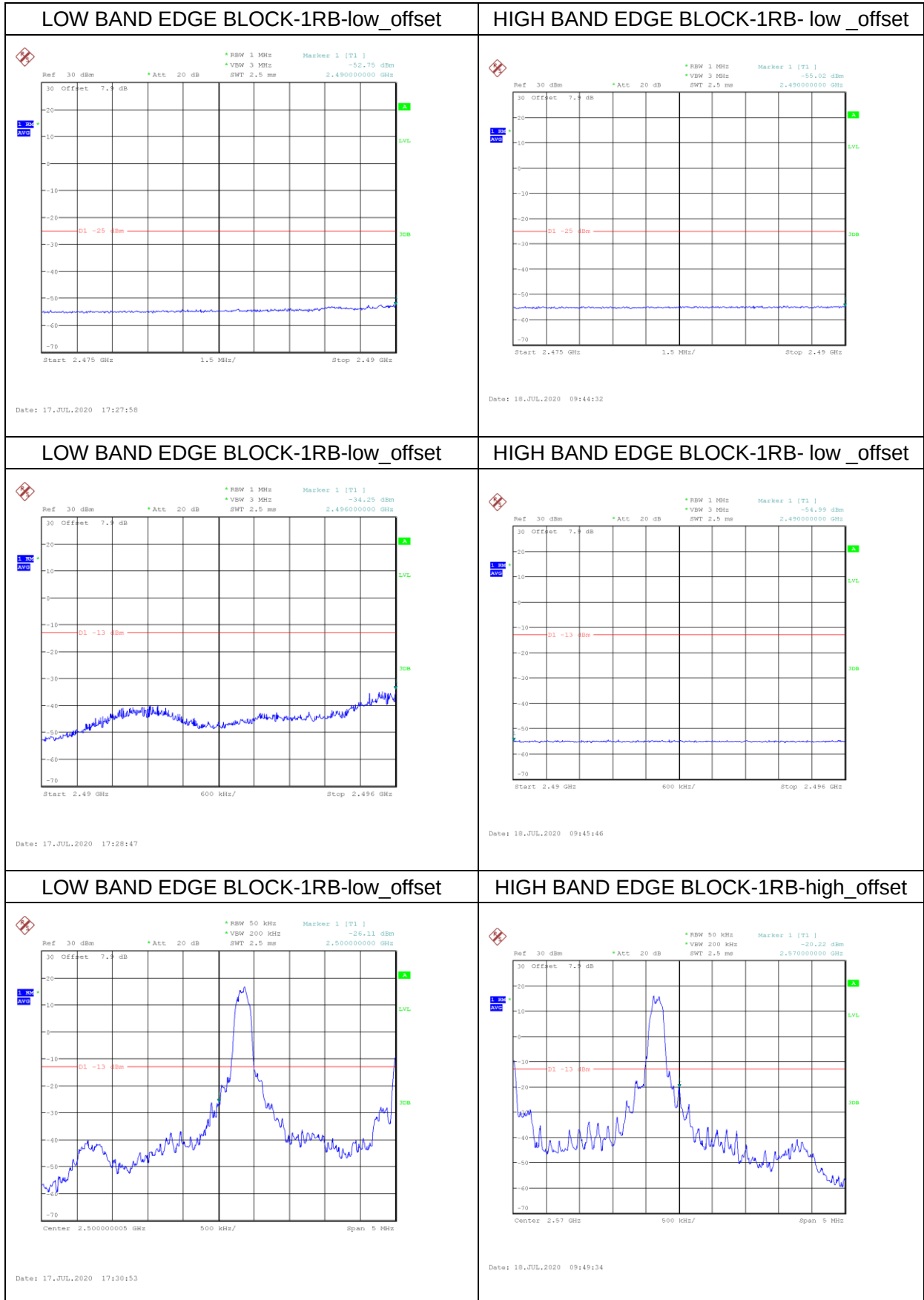


Date: 17.JUL.2020 17:16:33

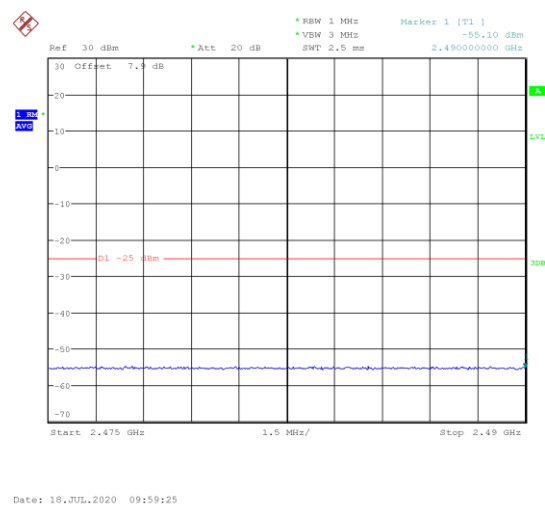
HIGH BAND EDGE BLOCK-1RB-high_offset



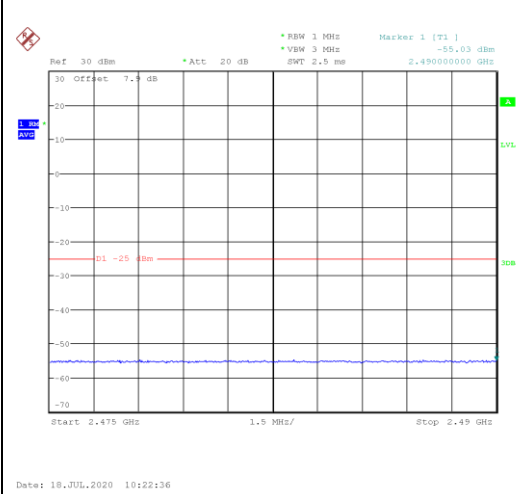
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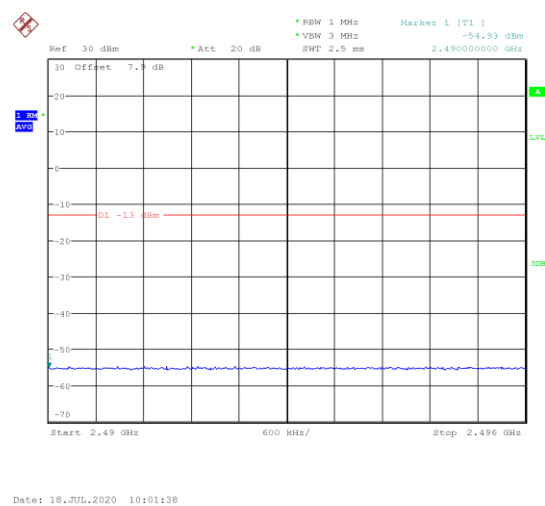
LOW BAND EDGE BLOCK-20MHz-100%RB



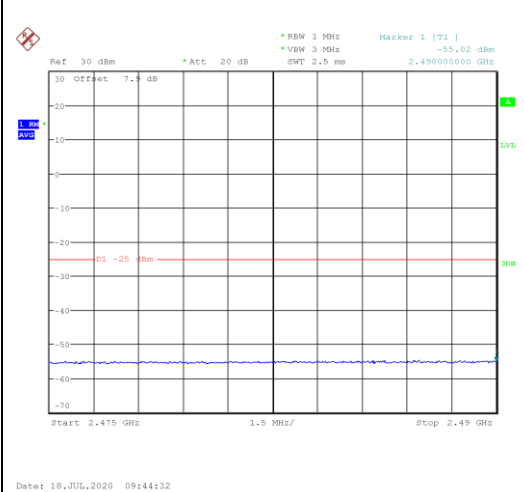
HIGH BAND EDGE BLOCK-20MHz-100%RB



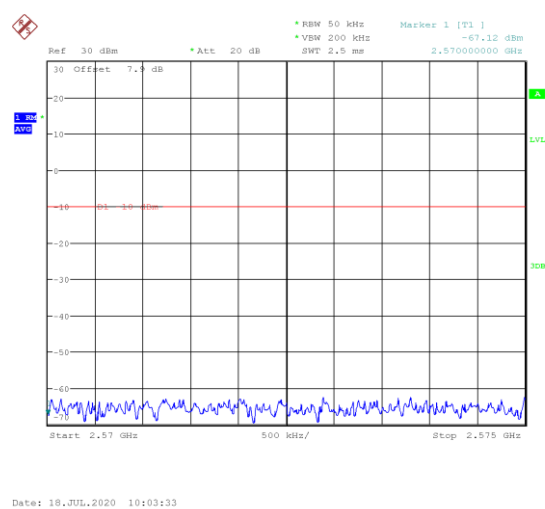
LOW BAND EDGE BLOCK-20MHz-100%RB



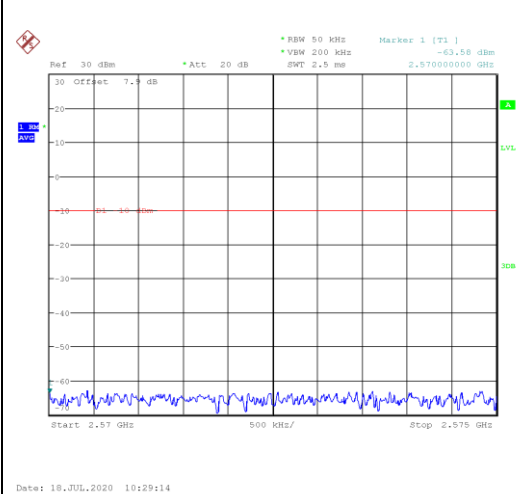
HIGH BAND EDGE BLOCK-20MHz-100%RB



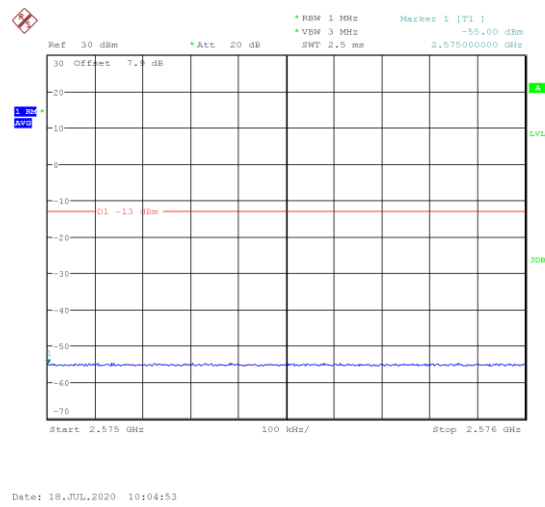
LOW BAND EDGE BLOCK-20MHz-100%RB



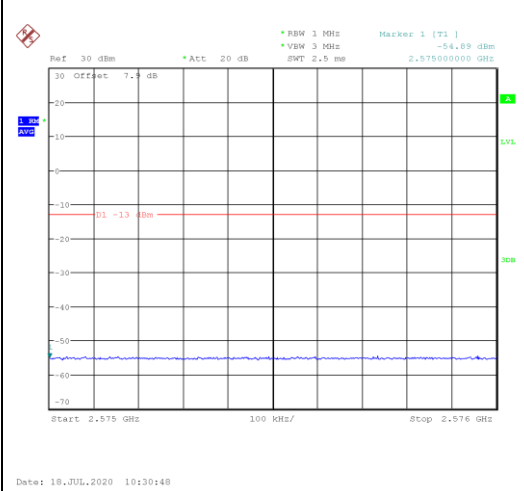
HIGH BAND EDGE BLOCK-20MHz-100%RB



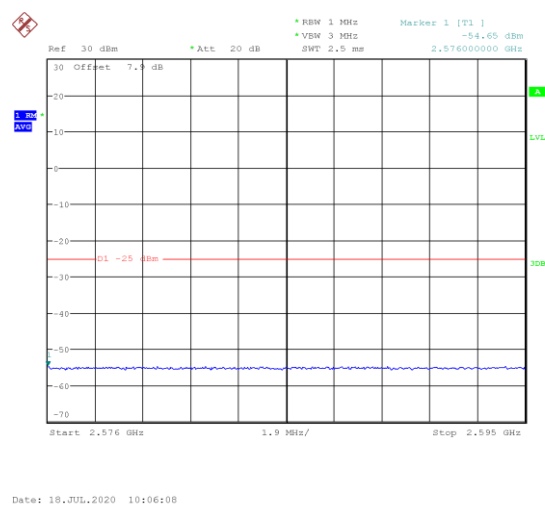
LOW BAND EDGE BLOCK-20MHz-100%RB



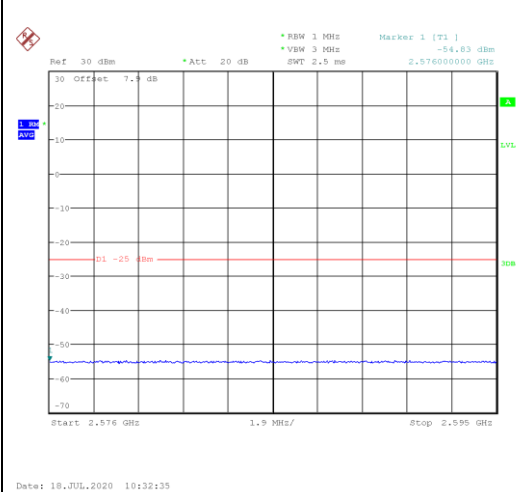
HIGH BAND EDGE BLOCK-20MHz-100%RB



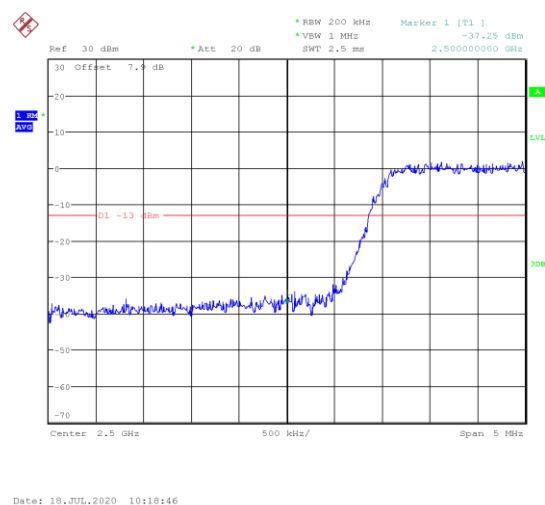
LOW BAND EDGE BLOCK-20MHz-100%RB



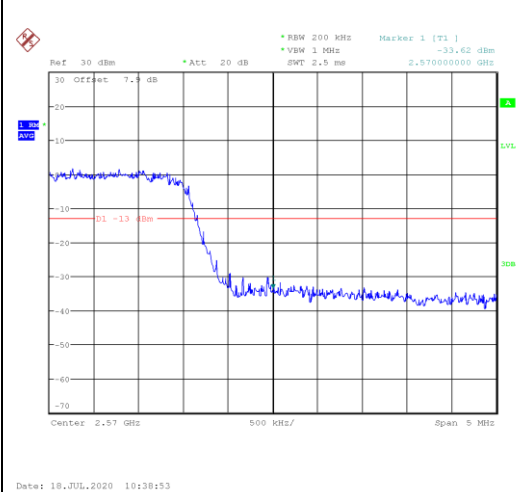
HIGH BAND EDGE BLOCK-20MHz-100%RB



LOW BAND EDGE BLOCK-20MHz-100%RB



HIGH BAND EDGE BLOCK-20MHz-100%RB



LOW BAND EDGE BLOCK-1RB-low offset



Date: 18.JUL.2020 13:49:04

HIGH BAND EDGE BLOCK-10MHz-100%RB



ANNEX A.7. CONDUCTED SPURIOUS EMISSION

Reference

FCC: CFR Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m)

A.7.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested, this equates to a frequency range of 13 MHz to 9 GHz, data taken from 10 MHz to 25 GHz.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

A. 7.2 Measurement Limit

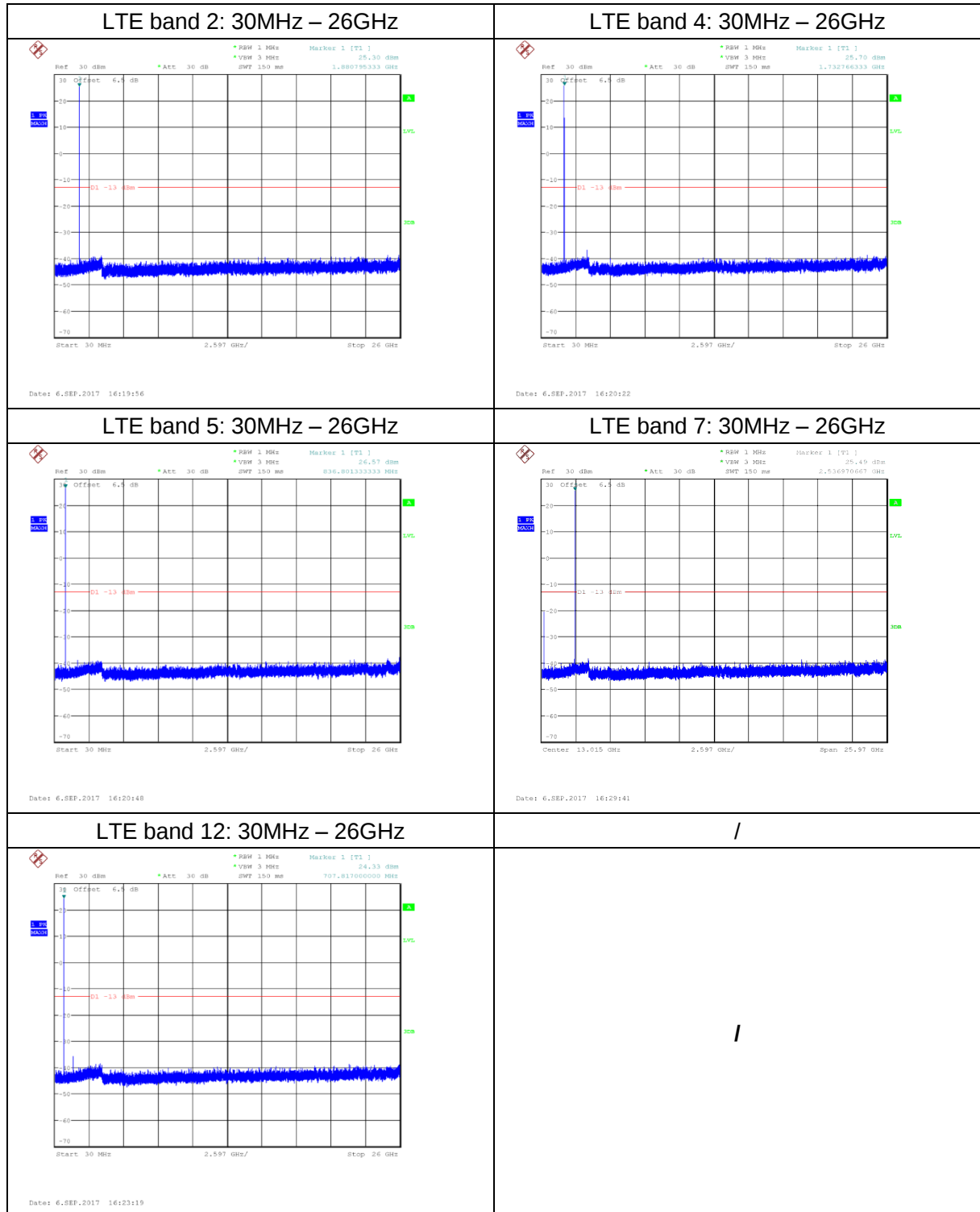
Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

The 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.

Part 27.53(m)(4) specifies for mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

A. 7.3 Measurement result

Only worst case result is given below



ANNEX A.8. PEAK-TO-AVERAGE POWER RATIO

Reference

FCC: CFR Part 24.232 (d), 27.50(a)

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

According to KDB 971168 5.7:

- Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- Set the number of counts to a value that stabilizes the measured CCDF curve;
- Set the measurement interval to 1 ms
- Record the maximum PAPR level associated with a probability of 0.1%

A.8.1 Measurement limit

Not exceed 13 dB

A.8.2 Measurement results

LTE band 2, 20MHz

Frequency(MHz)	PAPR(dB)	
1880.0	QPSK	16QAM
	5.90	6.98

LTE band 4, 20MHz

Frequency(MHz)	PAPR(dB)	
1732.5	QPSK	16QAM
	4.98	6.66

LTE band 5, 10MHz

Frequency(MHz)	PAPR(dB)	
836.5	QPSK	16QAM
	4.98	6.66

LTE band 7, 20MHz

Frequency(MHz)	PAPR(dB)	
2535.0	QPSK	16QAM
	6.79	7.31

LTE band 12, 10MHz

Frequency(MHz)	PAPR(dB)	
707.5	QPSK	16QAM
	4.99	6.05

ANNEX B. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

ANNEX C. Detailed Test Results**ANNEX C.1. Main Terms**

Verdict	Verdict of each test cases.
Test cases	Test cases identification number and description in ETSI EN 300 328 test specification and ETSI specification.

ANNEX C.2. Terms used in Condition column

Tnom	Normal temperature
Tmin	Low temperature
Tmax	High temperature
Vnom	Normal voltage

ANNEX C.3. Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NM	Not measure, the test was not measured by ECIT.
NA	Not applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

ANNEX C.4. Terms used in Note column

EUT ID	EUT ID (e.g N01, N02.....) is used to identify the EUT tested used for each test cases as specified in section 3 of this test report.
Lab Code	Lab code is used to identify the subcontracted lab if this test cases is performed in the subcontracted lab.

Subcontracted test lab code: N/A

ANNEX D. Accreditation Certificate



*****END OF REPORT*****