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).

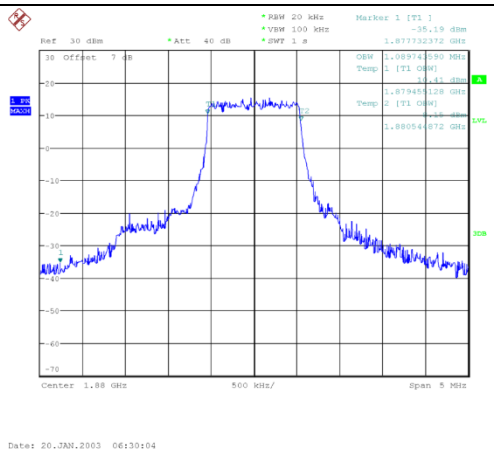
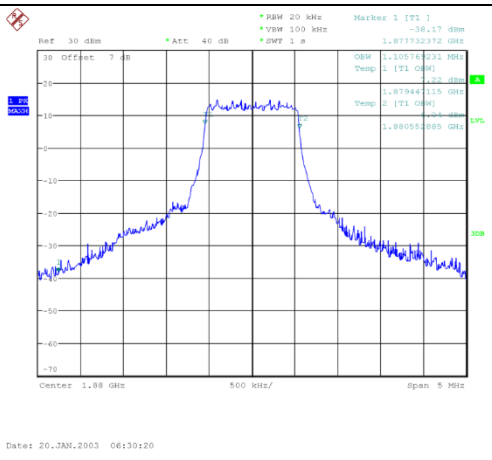
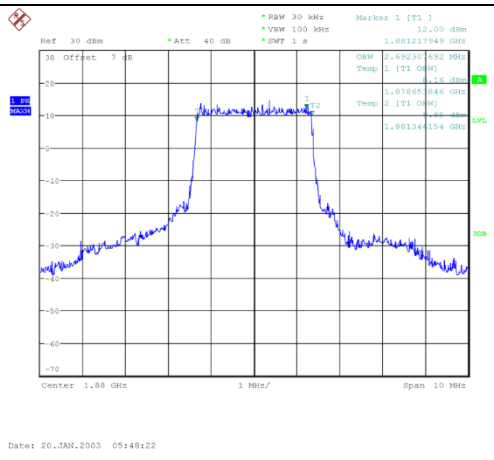
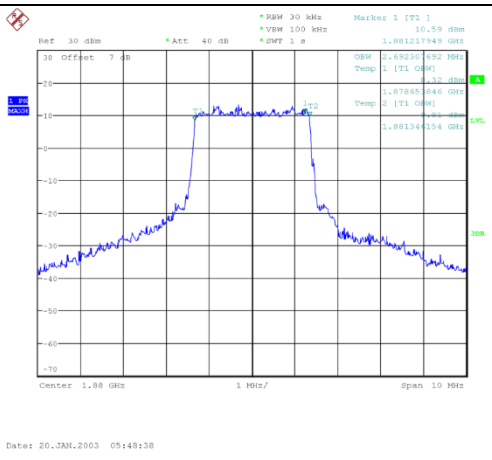
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

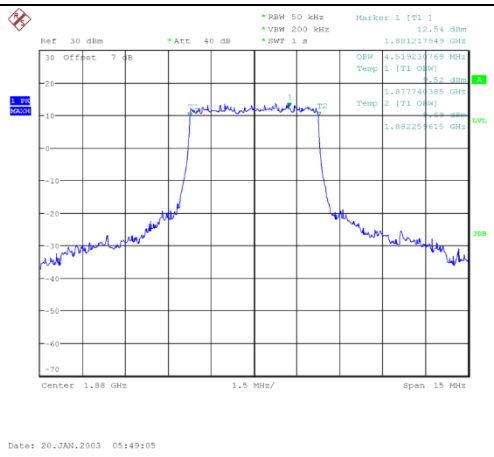
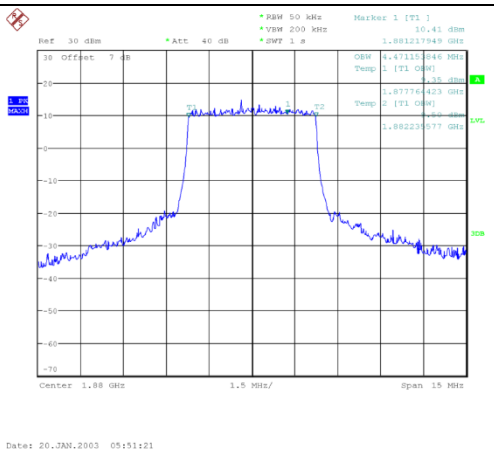
c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least 10log (OBW / RBW) below the reference level.

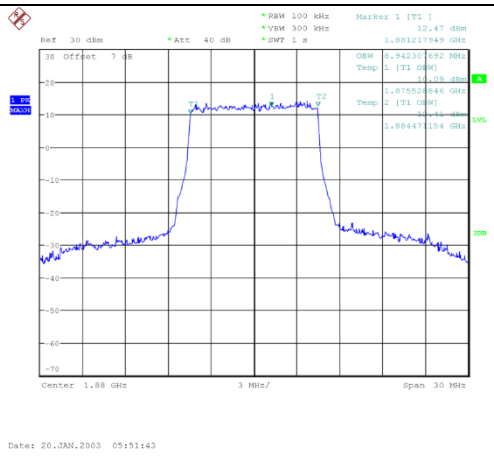
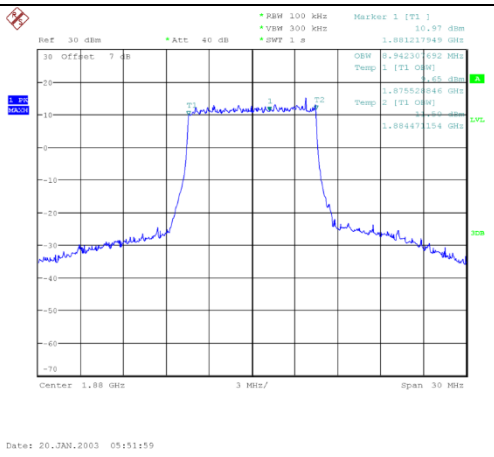
d) Set the detection mode to peak, and the trace mode to max hold.

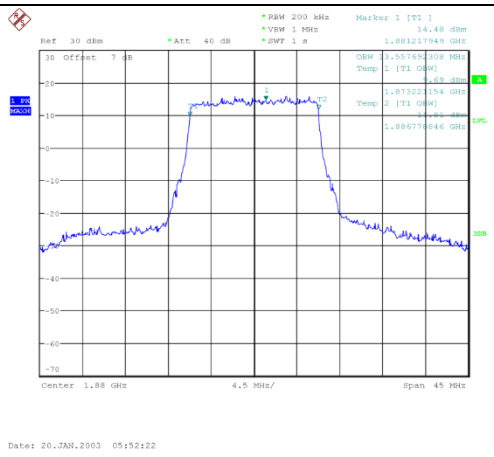
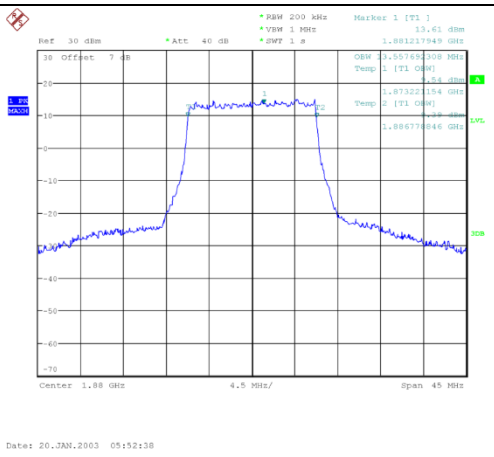
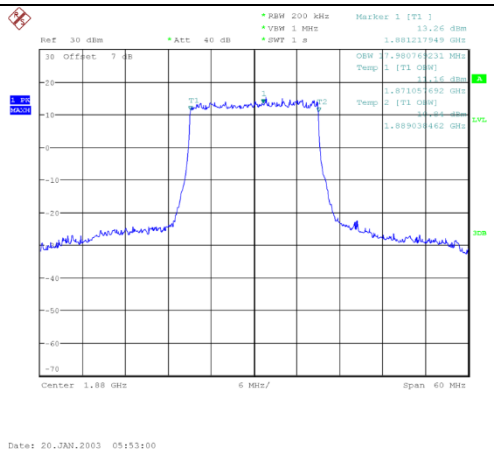
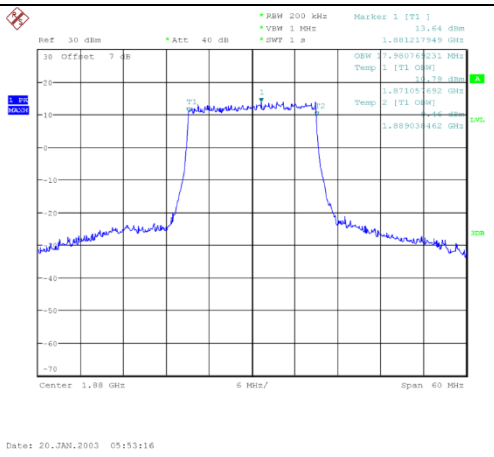
e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

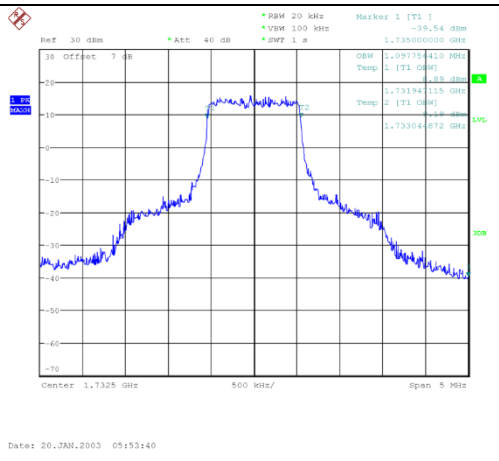
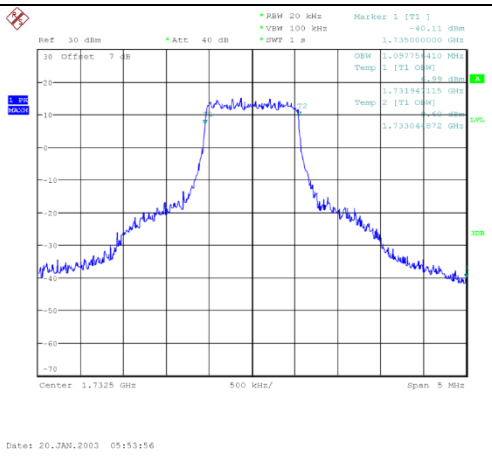
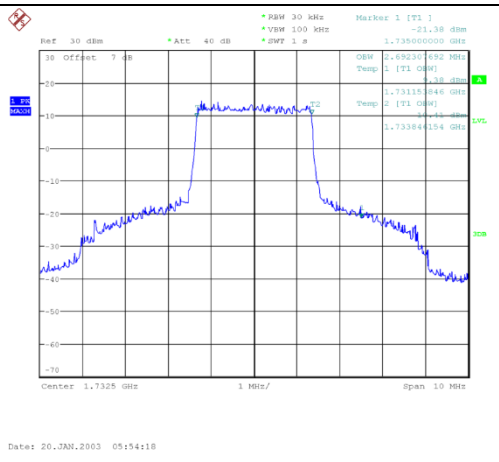
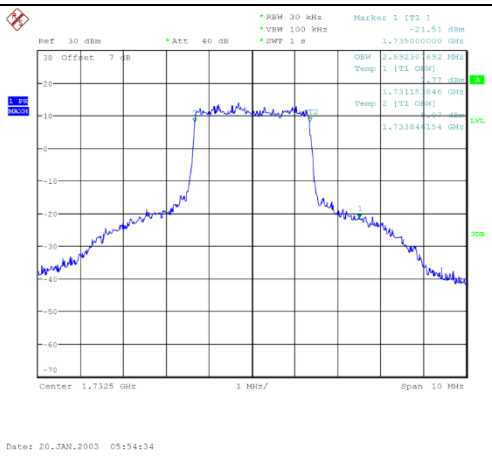
Occupied Bandwidth Measurement Results:

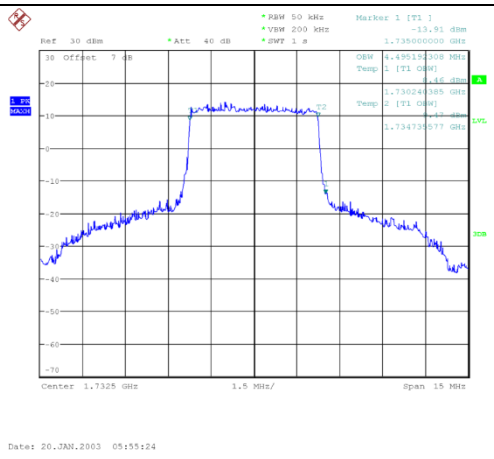
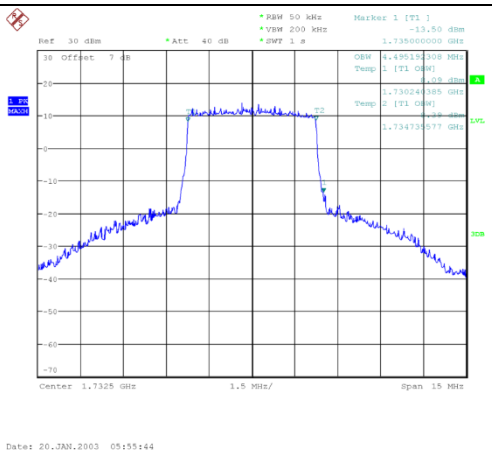
<table>
<tr><th colspan="3">LTE band 2</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">1880.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.09</td><td>1.09</td></tr>
<tr><td>LTE band 2, 1.4MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 2, 1.4MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">1880.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.69</td><td>2.69</td></tr>
<tr><td>LTE band 2, 3MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 2, 3MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
</table>

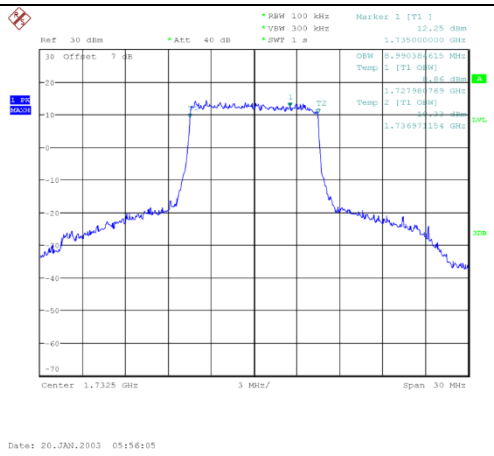
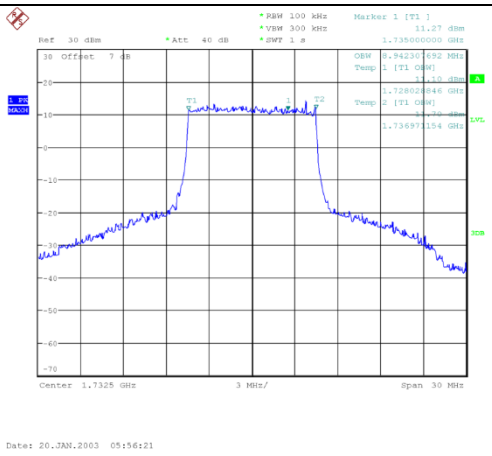
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	4.52	4.47
LTE band 2, 5MHz Bandwidth, QPSK (99% BW)	LTE band 2, 5MHz Bandwidth, 16QAM (99% BW)	
		

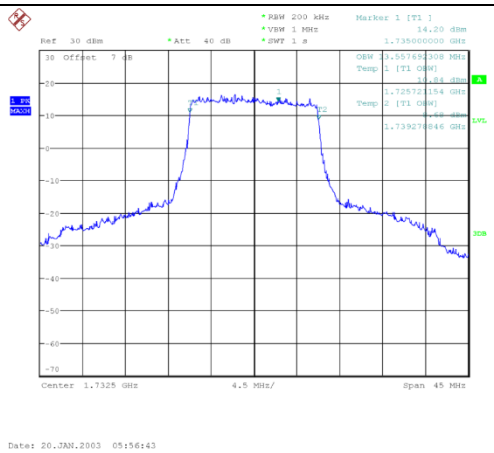
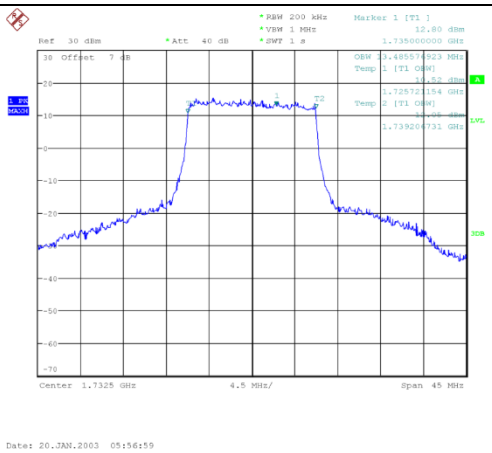
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	8.94	8.94
LTE band 2, 10MHz Bandwidth, QPSK (99% BW)	LTE band 2, 10MHz Bandwidth, 16QAM (99% BW)	
		

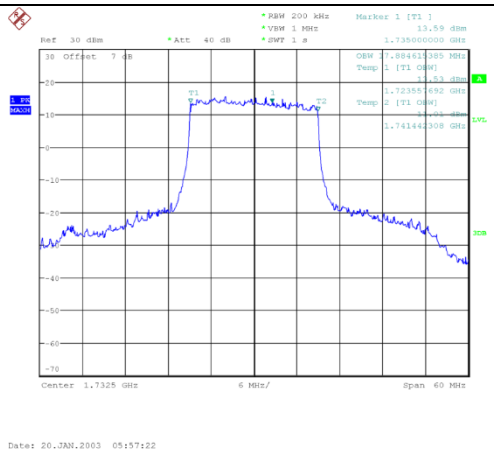
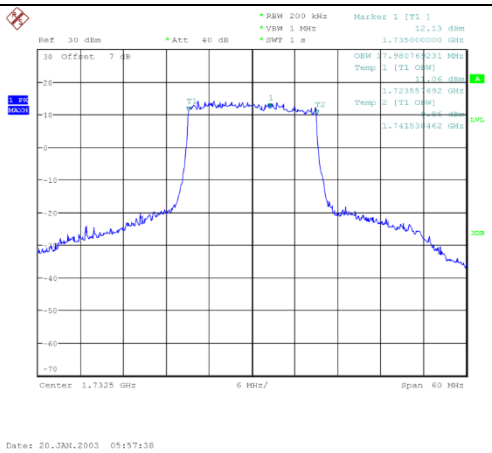
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	13.56	13.56
LTE band 2, 15MHz Bandwidth, QPSK (99% BW)	LTE band 2, 15MHz Bandwidth, 16QAM (99% BW)	
		
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1880.0	QPSK	16QAM
	17.89	17.98
LTE band 2, 20MHz Bandwidth, QPSK (99% BW)	LTE band 2, 20MHz Bandwidth, 16QAM (99% BW)	
		

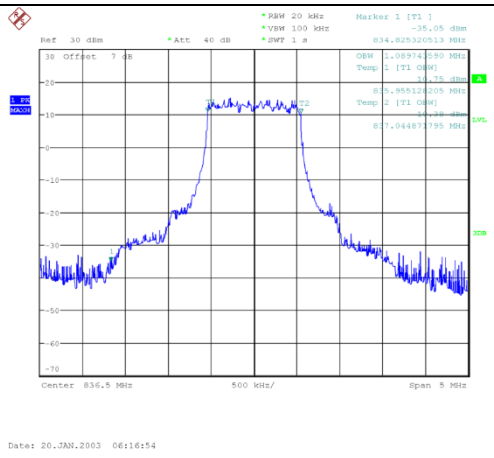
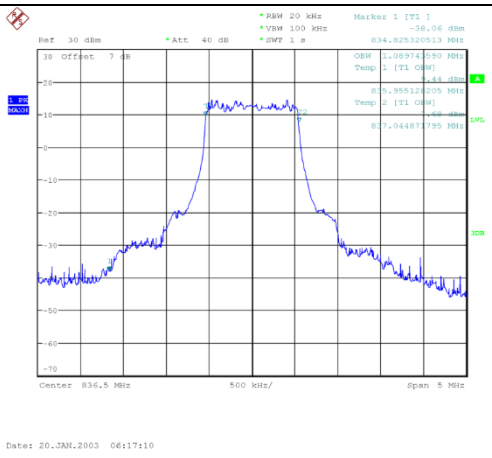
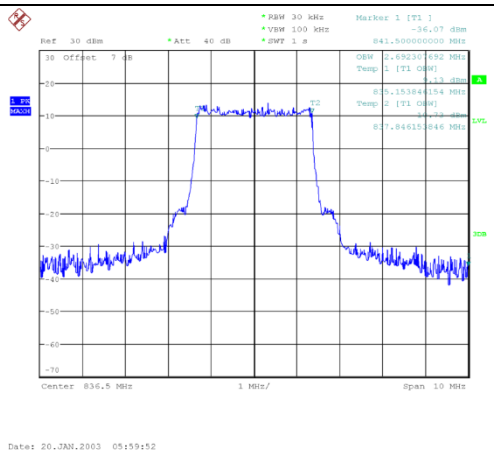
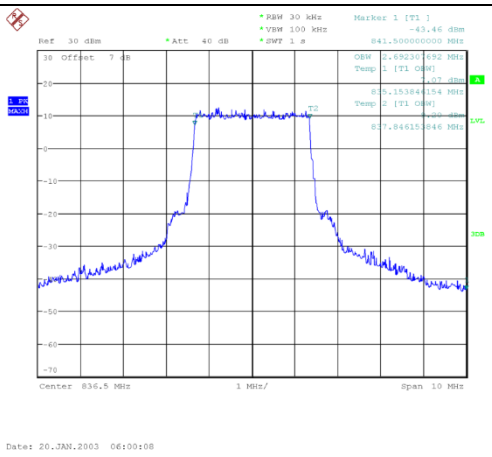
<table>
<tr><th colspan="3">LTE band 4</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">1732.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.09</td><td>1.09</td></tr>
<tr><td>LTE band 4, 1.4MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 4, 1.4MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">1732.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.69</td><td>2.69</td></tr>
<tr><td>LTE band 4, 3MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 4, 3MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
</table>

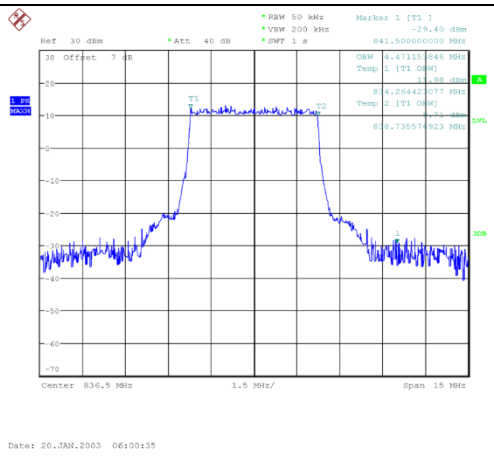
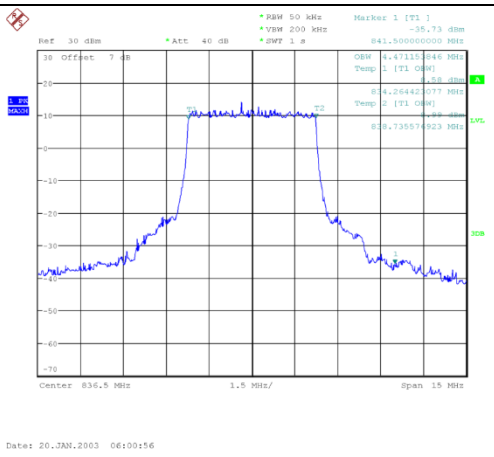
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	4.50	4.50
LTE band 4, 5MHz Bandwidth, QPSK (99% BW)	LTE band 4, 5MHz Bandwidth, 16QAM (99% BW)	
		

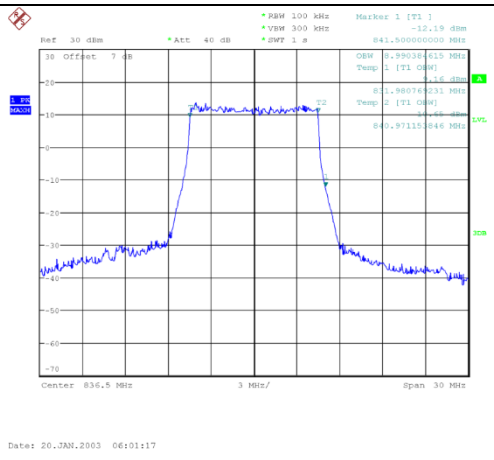
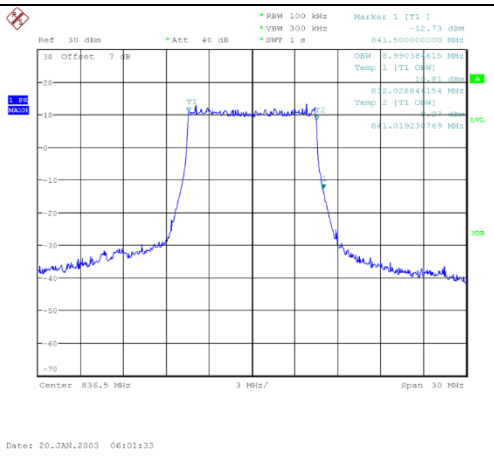
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	8.94	8.94
LTE band 4, 10MHz Bandwidth, QPSK (99% BW)	LTE band 4, 10MHz Bandwidth, 16QAM (99% BW)	
		

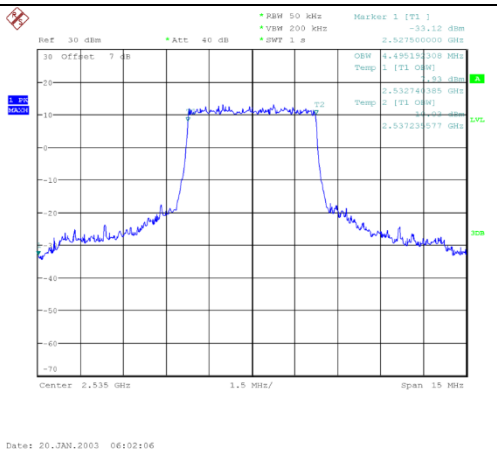
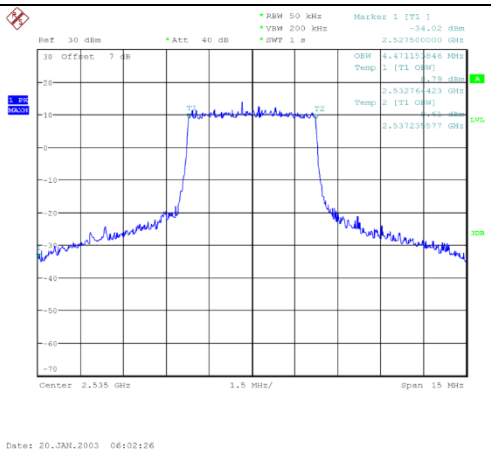
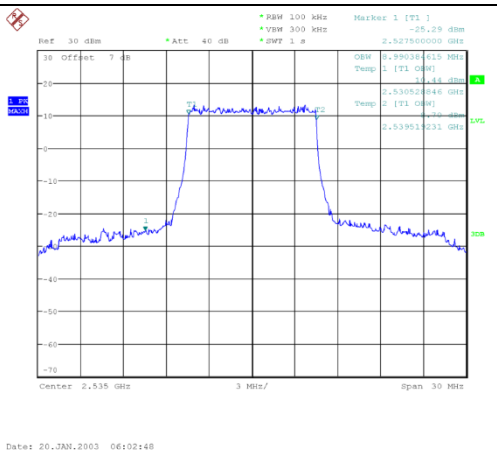
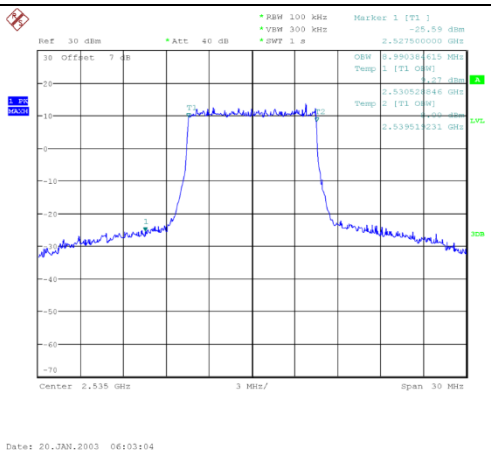
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	13.56	13.49
LTE band 4, 15MHz Bandwidth, QPSK (99% BW)	LTE band 4, 15MHz Bandwidth, 16QAM (99% BW)	
		

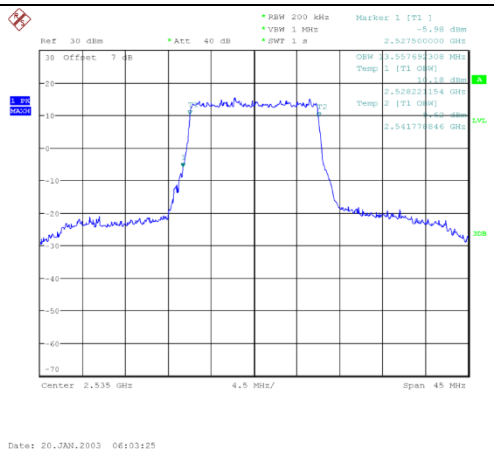
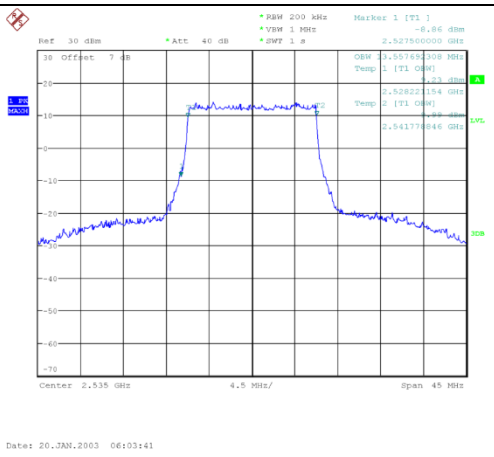
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
1732.5	QPSK	16QAM
	17.89	17.89
LTE band 4, 20MHz Bandwidth, QPSK (99% BW)	LTE band 4, 20MHz Bandwidth, 16QAM (99% BW)	
		

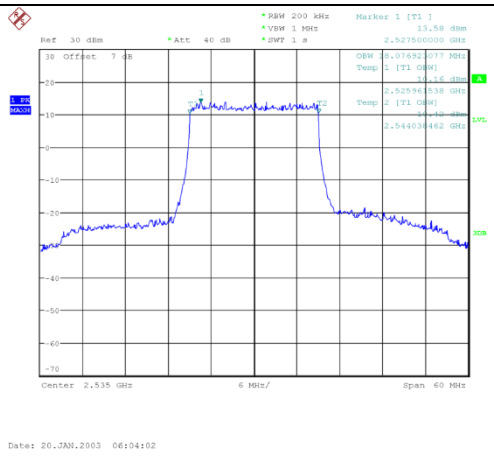
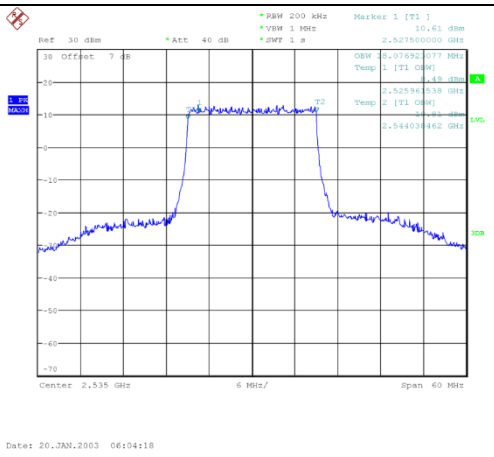
<table>
<tr><th colspan="3">LTE band 5</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">836.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.09</td><td>1.10</td></tr>
<tr><td>LTE band 5, 1.4MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 5, 1.4MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">836.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.69</td><td>2.69</td></tr>
<tr><td>LTE band 5, 3MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 5, 3MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
</table>

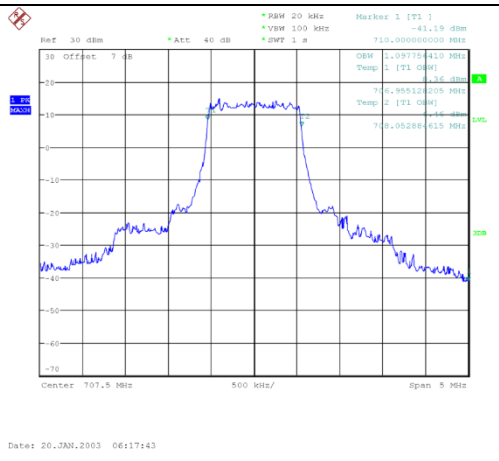
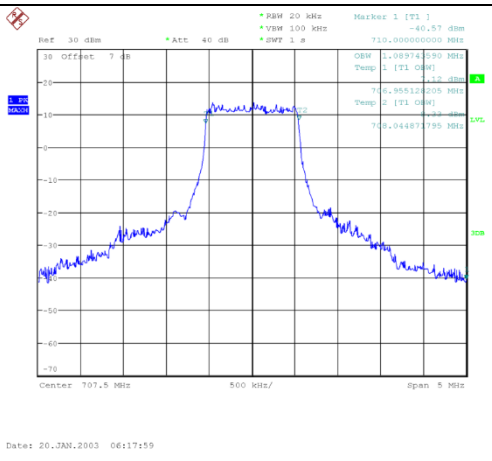
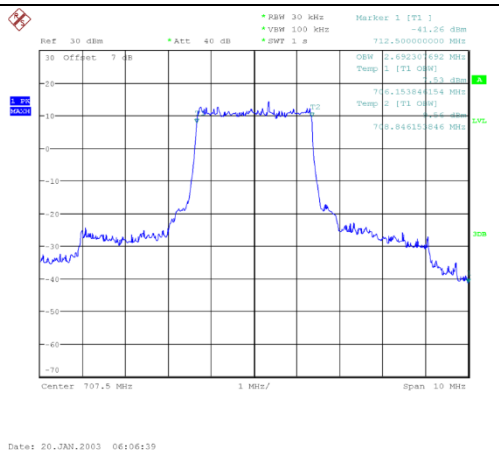
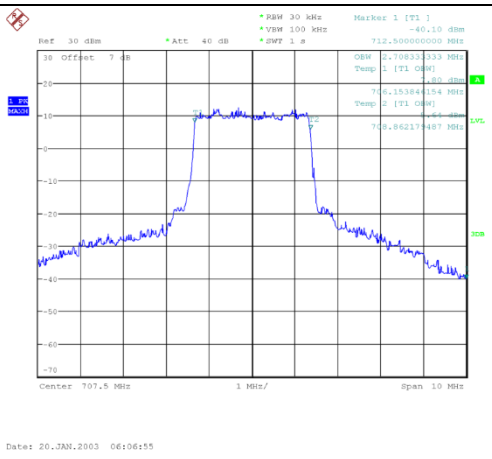
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	4.47	4.47
LTE band 5, 5MHz Bandwidth, QPSK (99% BW)	LTE band 5, 5MHz Bandwidth, 16QAM (99% BW)	
		

Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
836.5	QPSK	16QAM
	9.03	8.94
LTE band 5, 10MHz Bandwidth, QPSK (99% BW)	LTE band 5, 10MHz Bandwidth, 16QAM (99% BW)	
		

<table>
<tr><th colspan="3">LTE band 7</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">2535.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>4.49</td><td>4.47</td></tr>
<tr><td>LTE band 7, 5MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 7, 5MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">2535.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>8.99</td><td>8.99</td></tr>
<tr><td>LTE band 7, 10MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 7, 10MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
</table>

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)	
		

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)	
		

<table>
<tr><th colspan="3">LTE band 12</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">707.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.09</td><td>1.09</td></tr>
<tr><td>LTE band 12, 1.4MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 12, 1.4MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (99%)(MHz)</td></tr>
<tr><td rowspan="2">707.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.69</td><td>2.68</td></tr>
<tr><td>LTE band 12, 3MHz Bandwidth,
QPSK (99% BW)</td><td colspan="2">LTE band 12, 3MHz Bandwidth,
16QAM (99% BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
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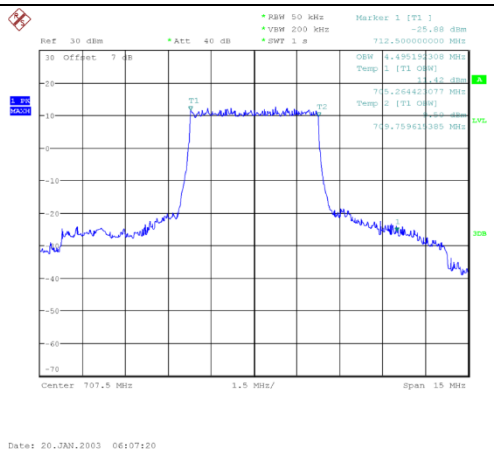
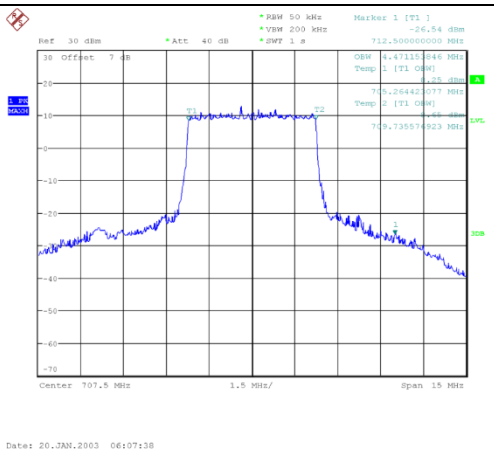
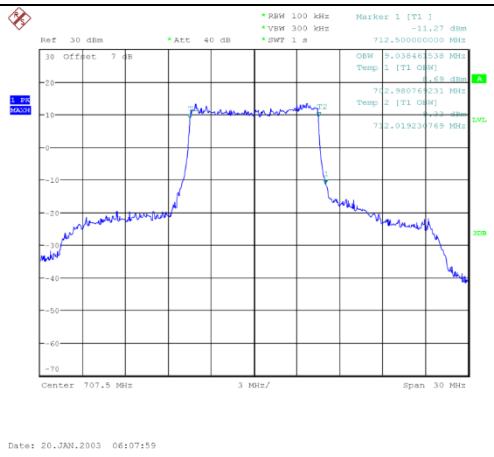
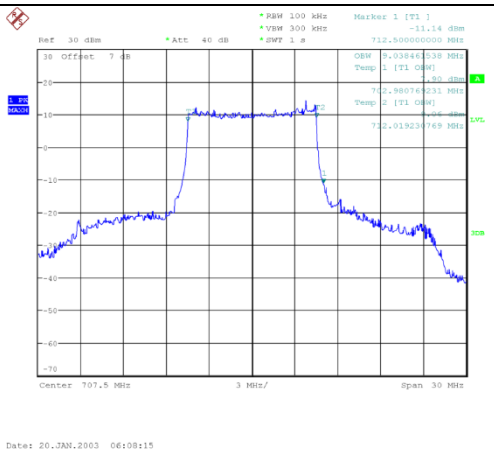
Frequency(MHz)	Occupied Bandwidth (99%)(MHz)	
707.5	QPSK	16QAM
	4.49	4.47
LTE band 12, 5MHz Bandwidth, QPSK (99% BW)	LTE band 12, 5MHz Bandwidth, 16QAM (99% BW)	
		

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

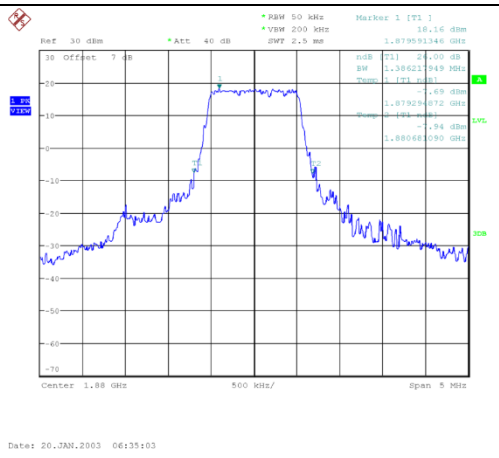
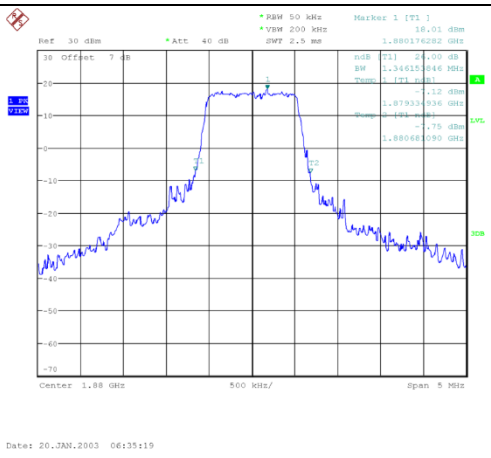
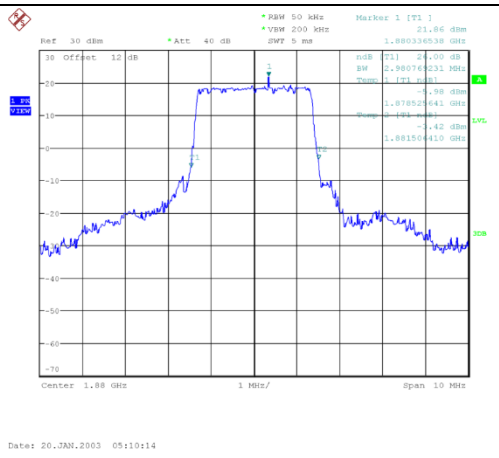
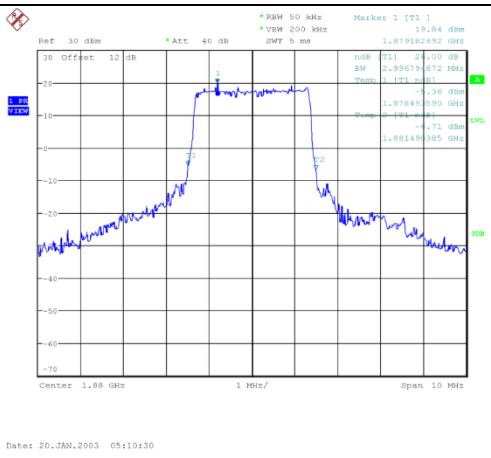
Reference

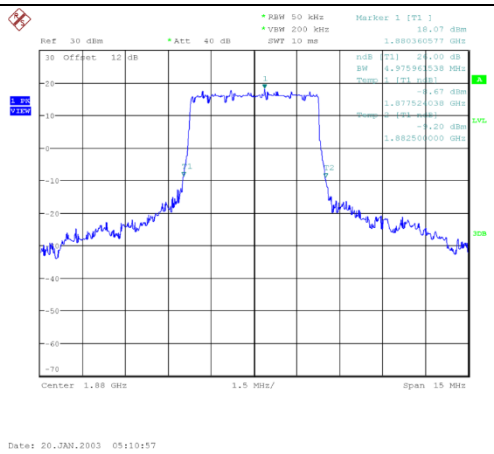
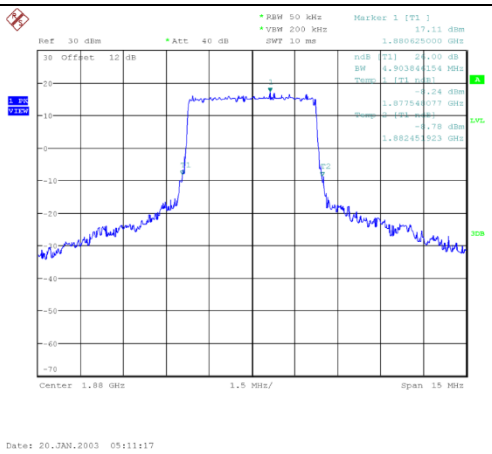
FCC: CFR Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m)

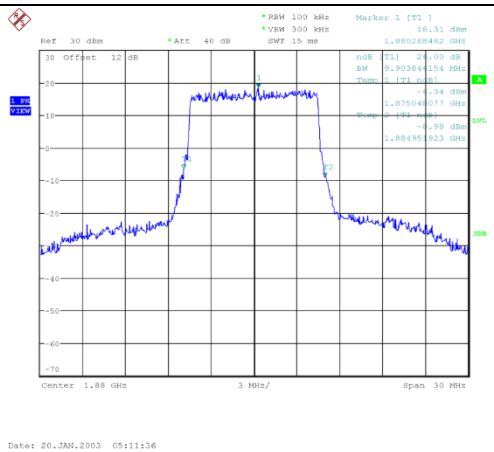
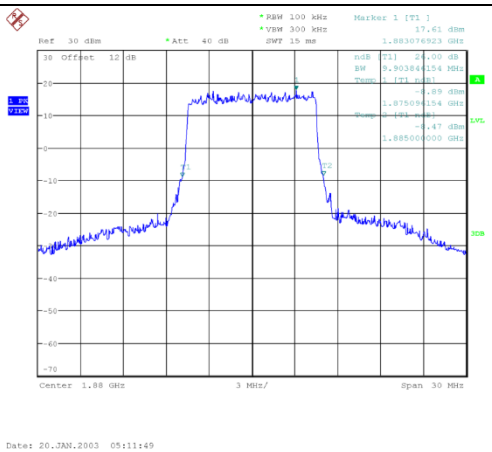
A.5.1Emission Bandwidth Results

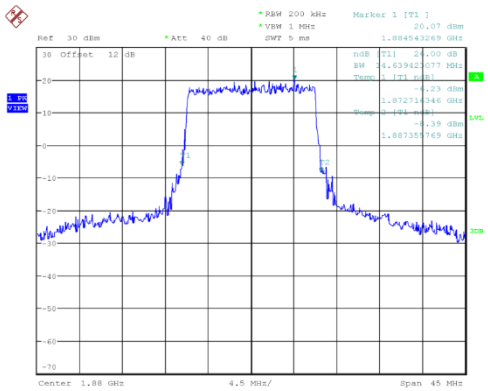
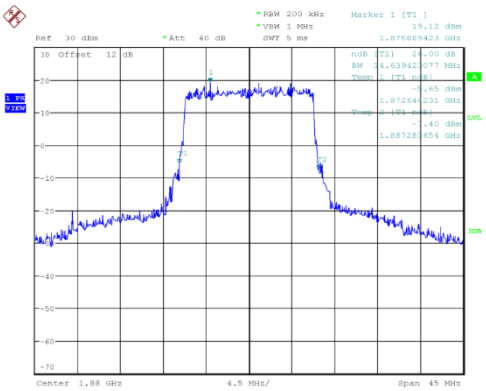
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum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

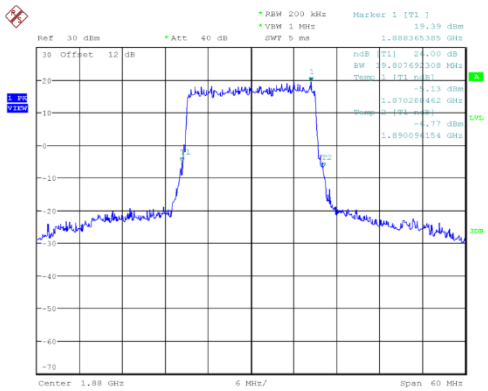
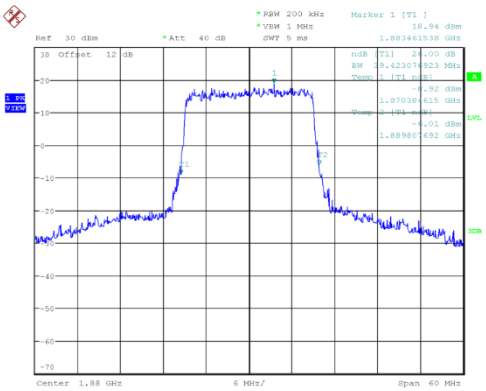
Emission Bandwidth Measurement Results:

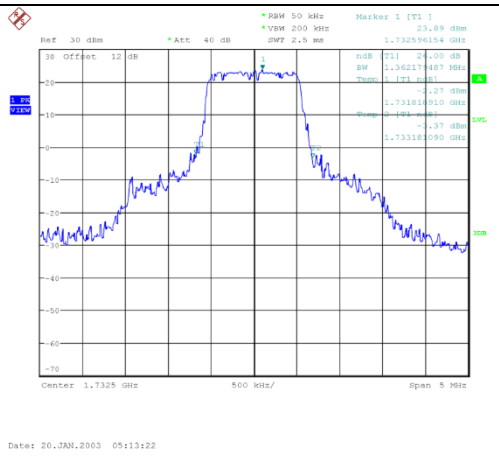
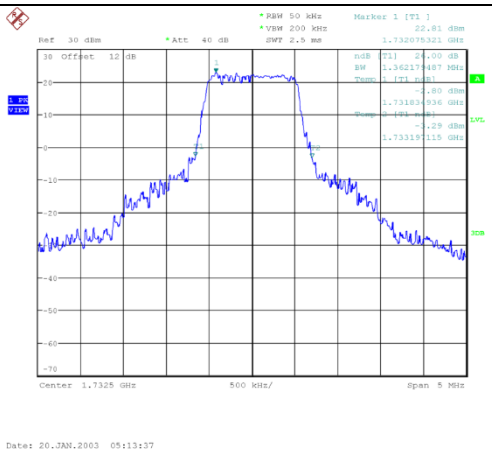
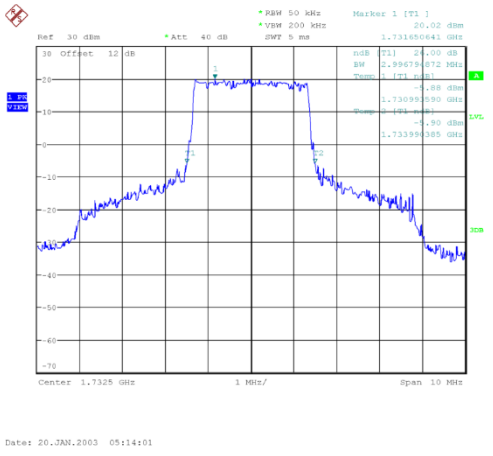
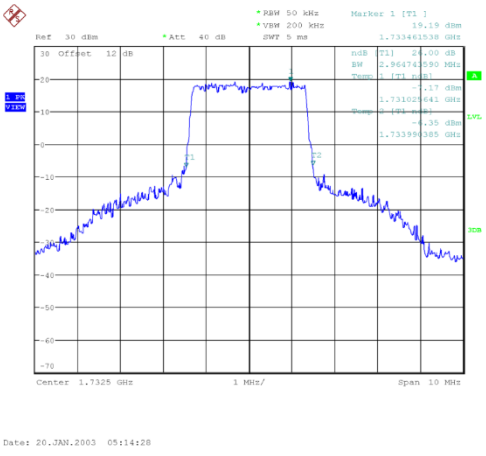
<table>
<tr><th colspan="3">LTE band 2</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">1880.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.39</td><td>1.35</td></tr>
<tr><td>LTE band 2, 1.4MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 2, 1.4MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">1880.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.98</td><td>2.99</td></tr>
<tr><td>LTE band 2, 3MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 2, 3MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
</table>

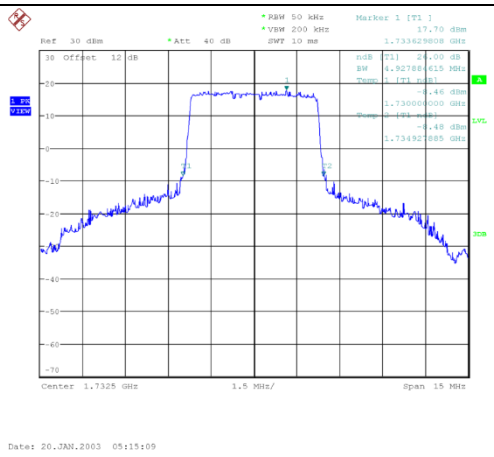
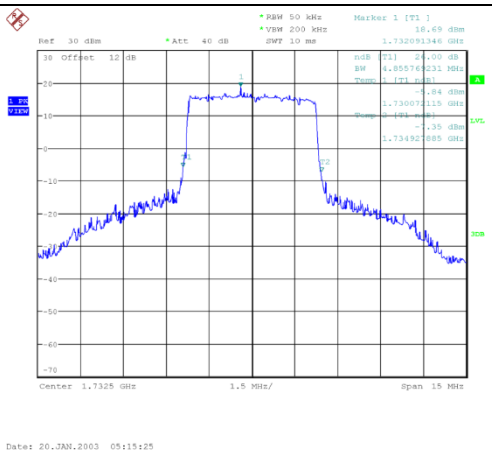
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	4.97	4.90
LTE band 2, 5MHz Bandwidth, QPSK (-26dBc BW)	LTE band 2, 5MHz Bandwidth, 16QAM (-26dBc BW)	
		

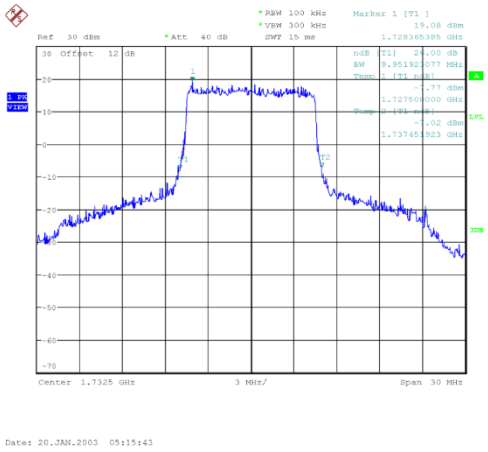
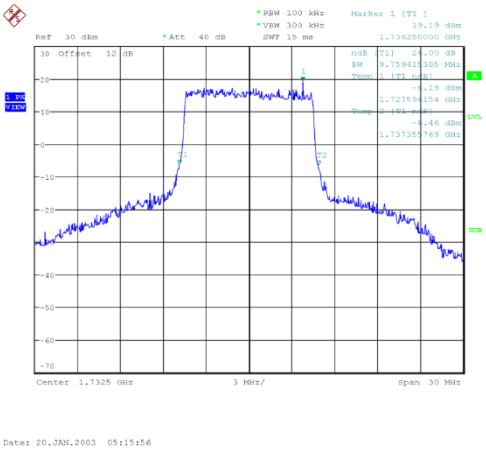
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	9.90	9.90
LTE band 2, 10MHz Bandwidth, QPSK (-26dBc BW)	LTE band 2, 10MHz Bandwidth, 16QAM (-26dBc BW)	
		

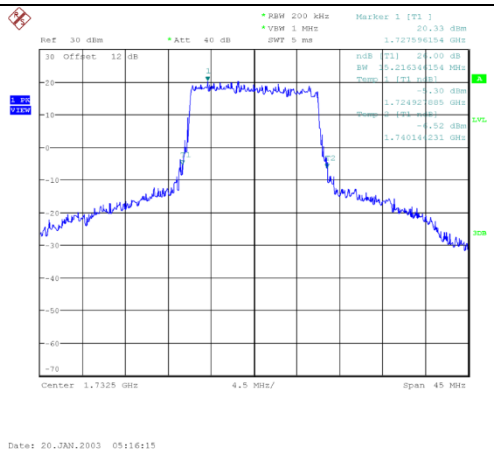
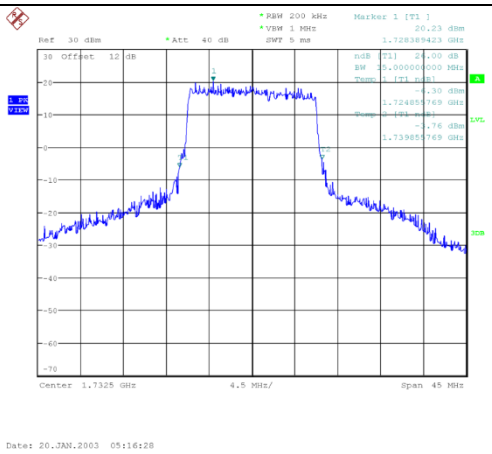
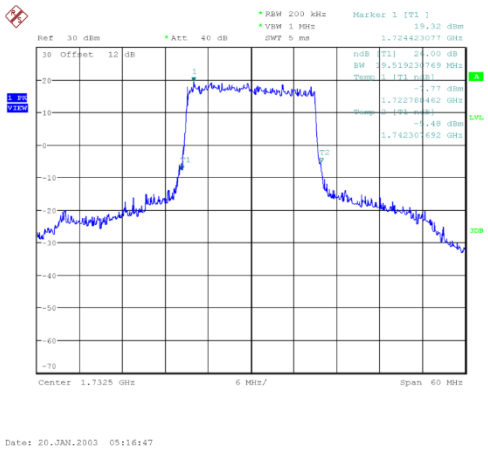
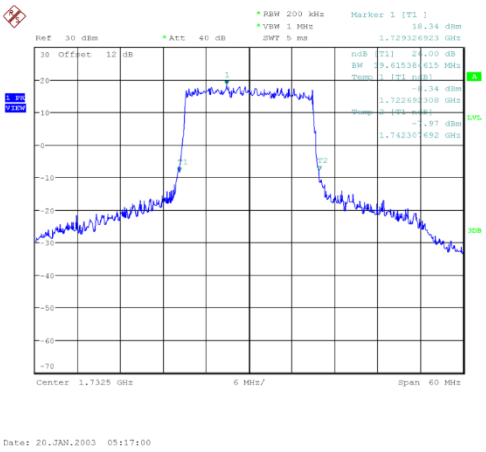
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
1880.0	QPSK	16QAM
	14.64	14.64
LTE band 2, 15MHz Bandwidth, QPSK (-26dBc BW)	LTE band 2, 15MHz Bandwidth, 16QAM (-26dBc BW)	
		

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)	
		

<table>
<tr><th colspan="3">LTE band 4</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">1732.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.36</td><td>1.36</td></tr>
<tr><td>LTE band 4, 1.4MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 4, 1.4MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">1732.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.99</td><td>2.96</td></tr>
<tr><td>LTE band 4, 3MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 4, 3MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
</table>

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)	
		

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)	
		

<table>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">1732.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>15.22</td><td>15.00</td></tr>
<tr><td>LTE band 4, 15MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 4, 15MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">1732.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>19.52</td><td>19.61</td></tr>
<tr><td>LTE band 4, 20MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 4, 20MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
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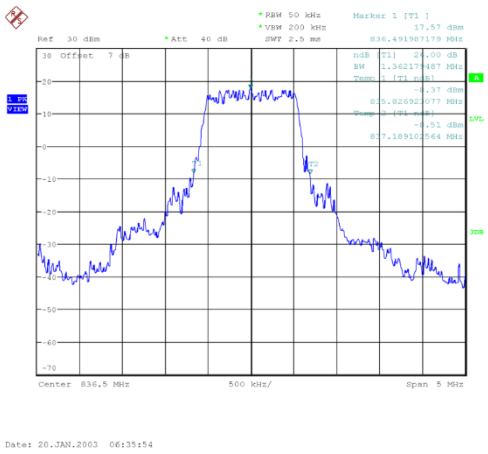
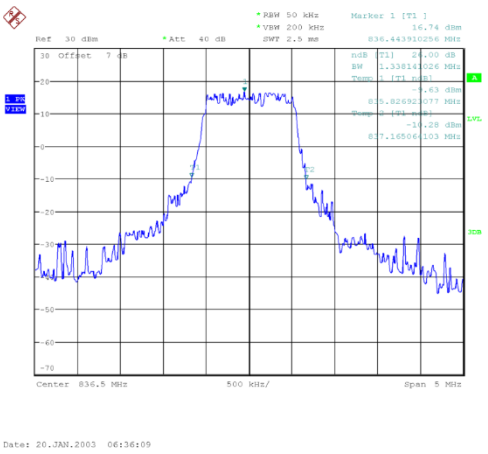
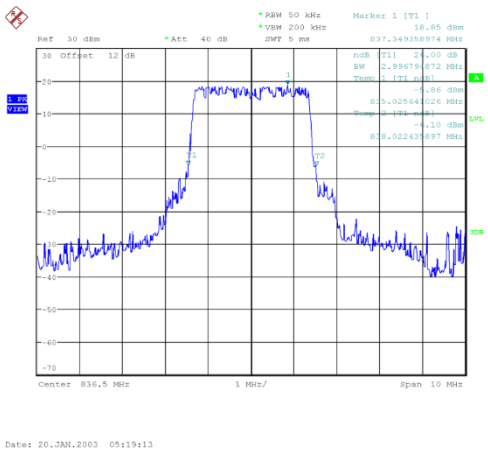
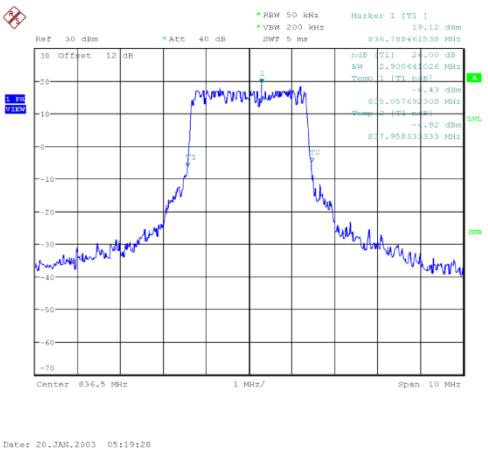
<table>
<tr><th colspan="3">LTE band 5</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">836.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.36</td><td>1.34</td></tr>
<tr><td>LTE band 5, 1.4MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 5, 1.4MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">836.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.99</td><td>2.90</td></tr>
<tr><td>LTE band 5, 3MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 5, 3MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
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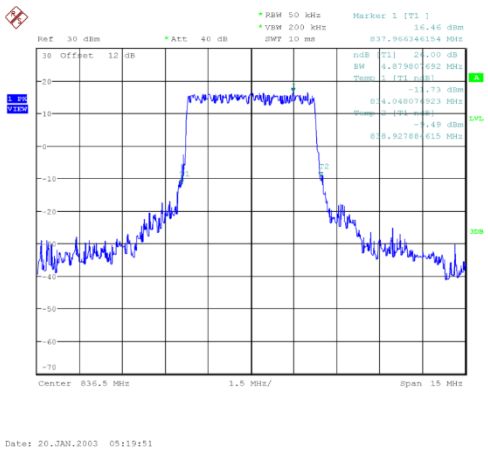
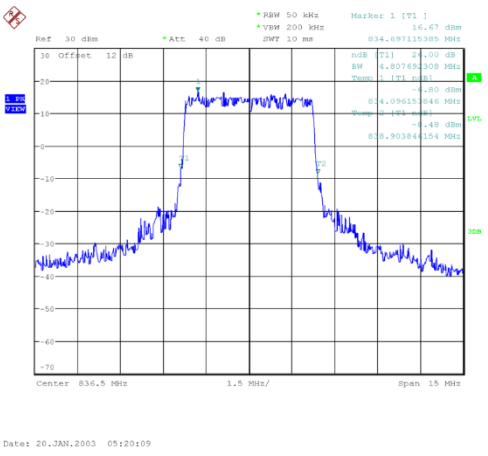
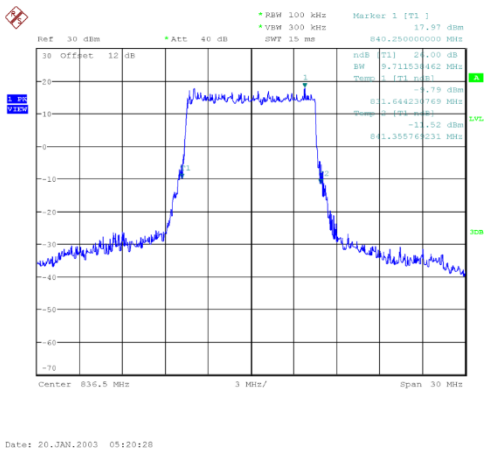
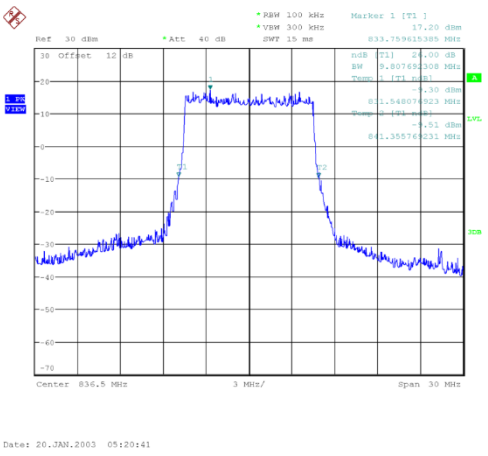
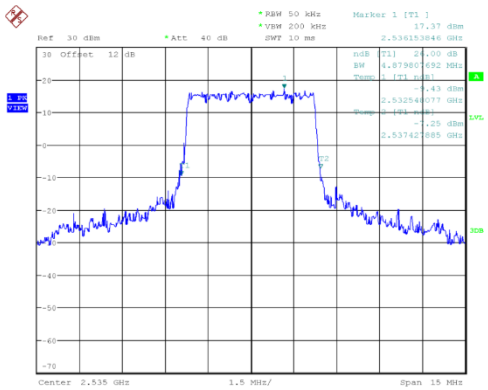
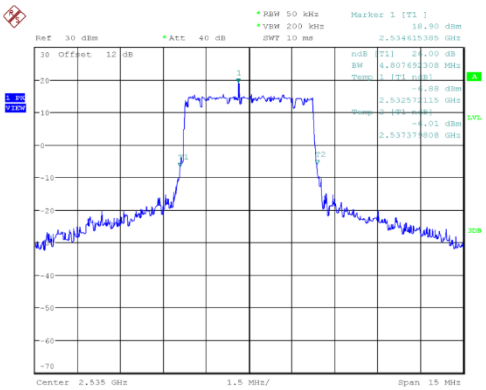
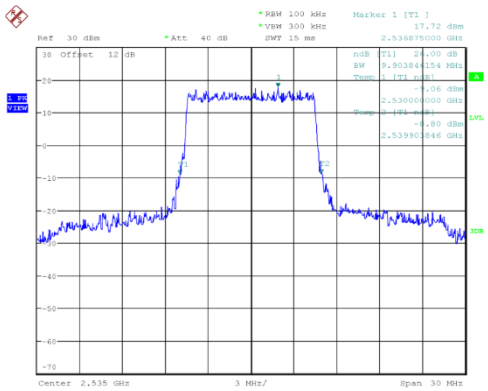
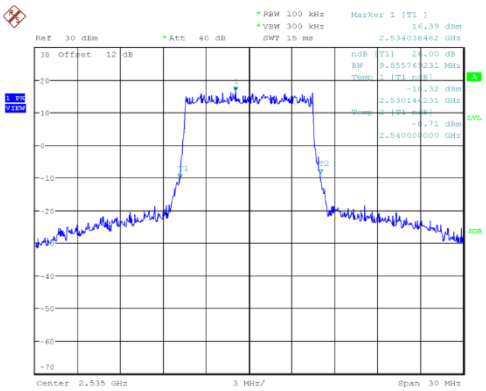
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
836.5	QPSK	16QAM
	4.88	4.81
LTE band 5, 5MHz Bandwidth, QPSK (-26dBc BW)	LTE band 5, 5MHz Bandwidth, 16QAM (-26dBc BW)	
		

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)	
		

<table>
<tr><th colspan="3">LTE band 7</th></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">2535.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>4.88</td><td>4.81</td></tr>
<tr><td>LTE band 7, 5MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 7, 5MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">2535.0</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>9.91</td><td>9.86</td></tr>
<tr><td>LTE band 7, 10MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 7, 10MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
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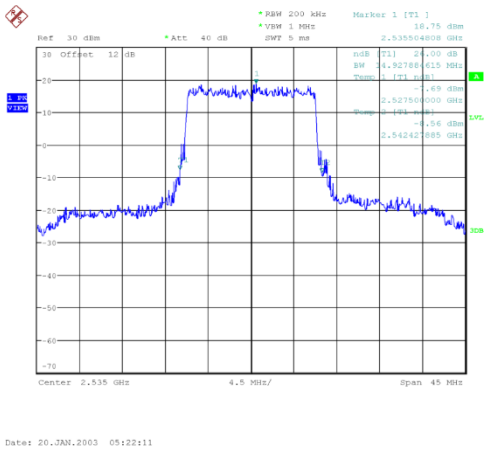
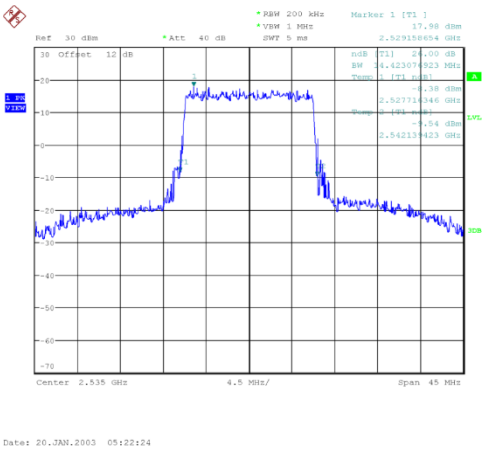
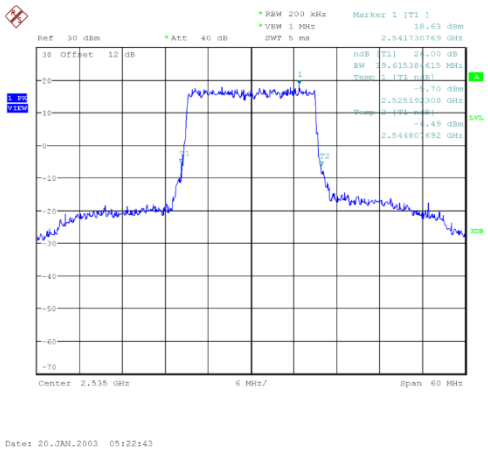
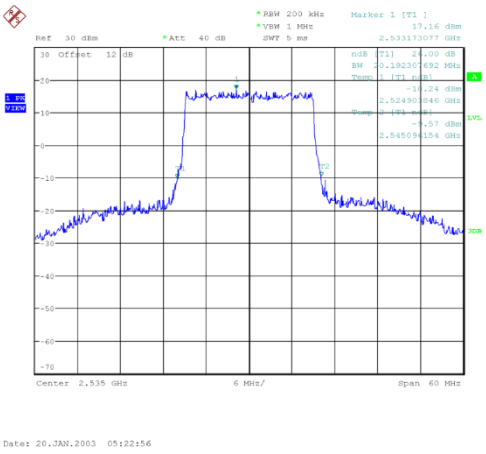
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
2535.0	QPSK	16QAM
	14.93	14.42
LTE band 7, 15MHz Bandwidth, QPSK (-26dBc BW)	LTE band 7, 15MHz Bandwidth, 16QAM (-26dBc BW)	
		

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)	
		

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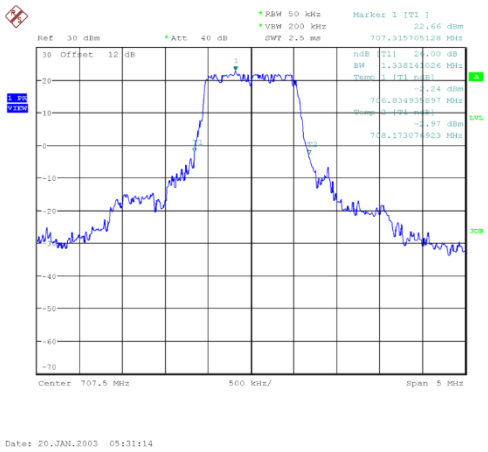
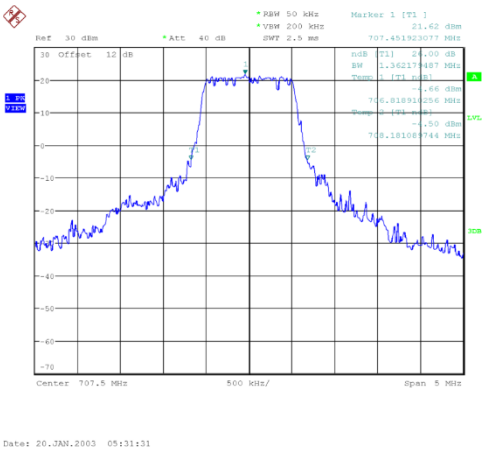
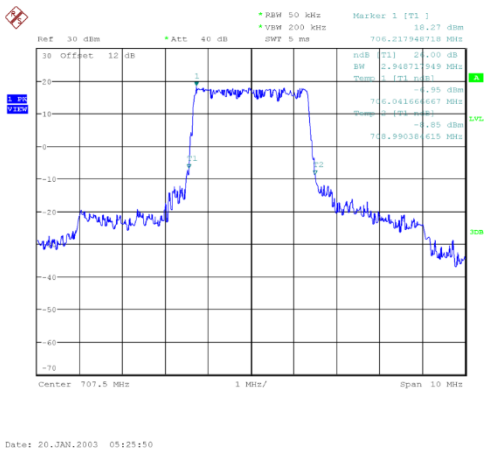
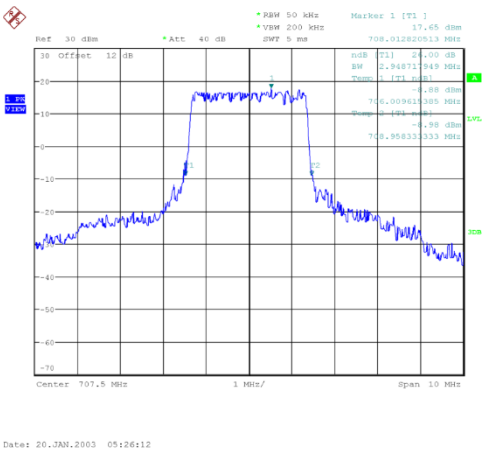
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">707.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>1.34</td><td>1.36</td></tr>
<tr><td>LTE band 12, 1.4MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 12, 1.4MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
<tr><td>Frequency(MHz)</td><td colspan="2">Occupied Bandwidth (-26dBc)(MHz)</td></tr>
<tr><td rowspan="2">707.5</td><td>QPSK</td><td>16QAM</td></tr>
<tr><td>2.95</td><td>2.95</td></tr>
<tr><td>LTE band 12, 3MHz Bandwidth,
QPSK (-26dBc BW)</td><td colspan="2">LTE band 12, 3MHz Bandwidth,
16QAM (-26dBc BW)</td></tr>
<tr><td>  </td><td colspan="2">  </td></tr>
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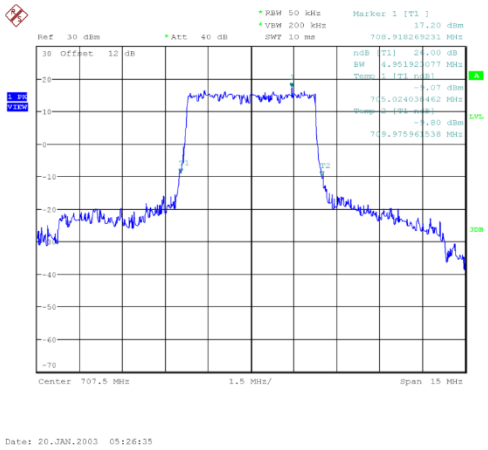
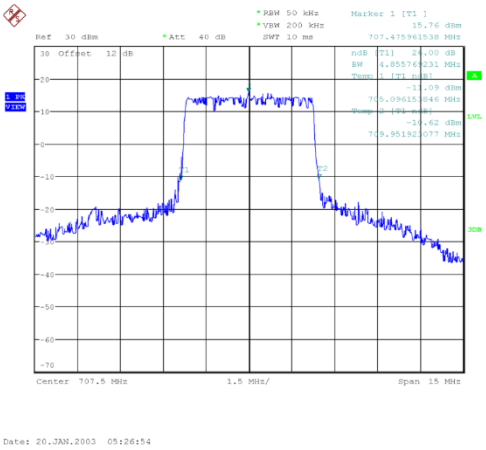
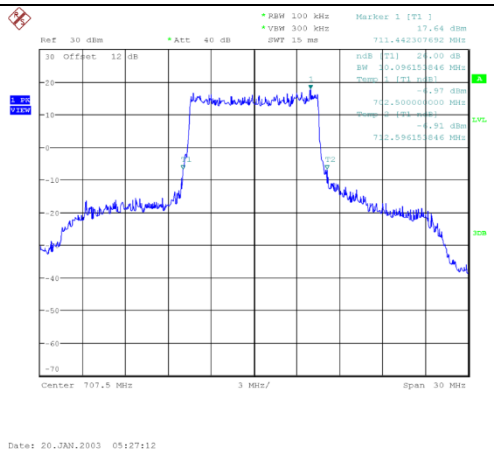
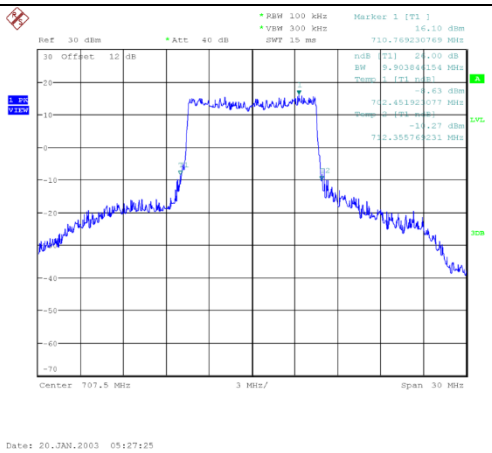
Frequency(MHz)	Occupied Bandwidth (-26dBc)(MHz)	
707.5	QPSK	16QAM
	4.95	4.86
LTE band 12, 5MHz Bandwidth, QPSK (-26dBc BW)	LTE band 12, 5MHz Bandwidth, 16QAM (-26dBc BW)	
		

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

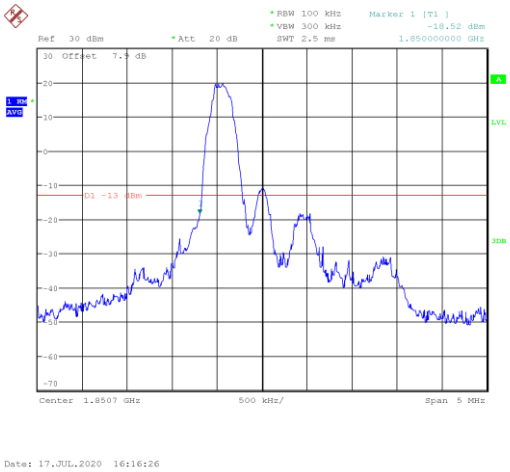
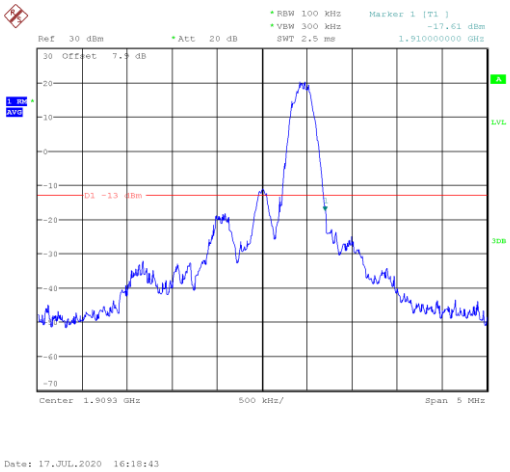
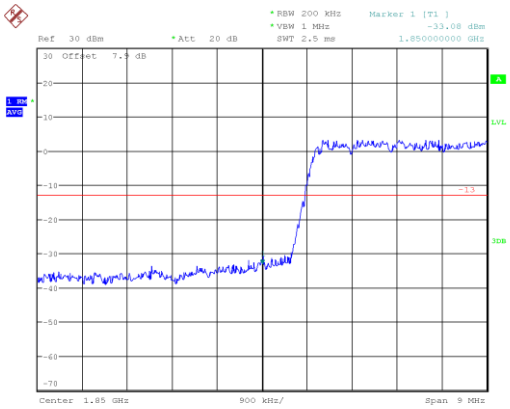
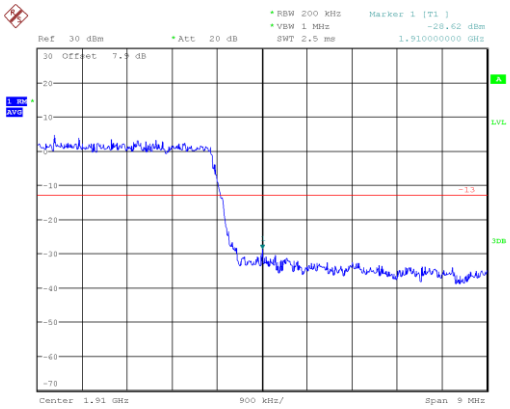
Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m) state that on any frequency outside frequency band of the US Cellular/PCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by at least 43+10Log (P) dB. For all power levels +30 dBm to 0 dBm, this becomes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

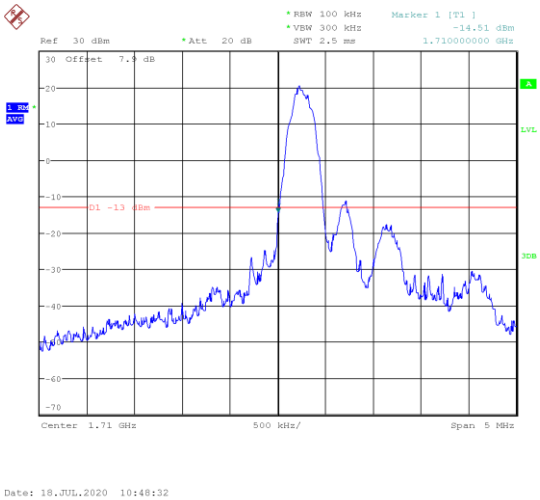
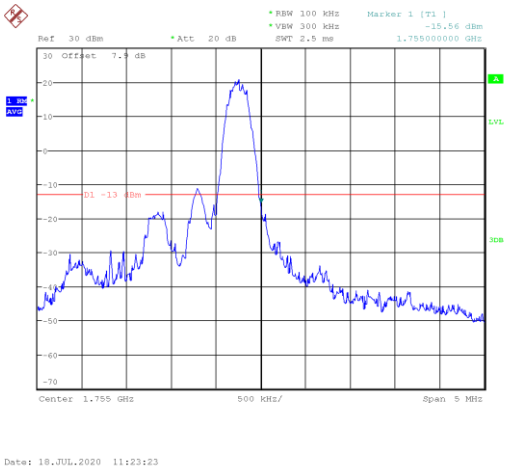
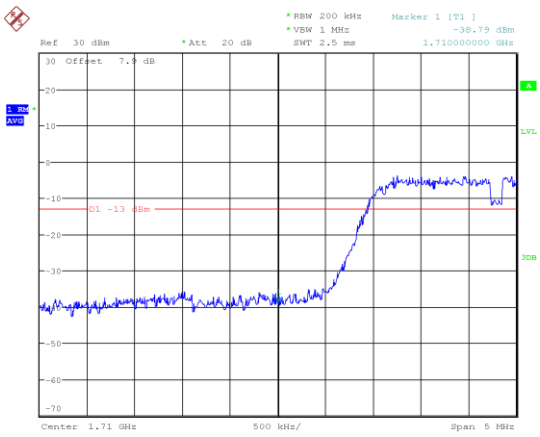
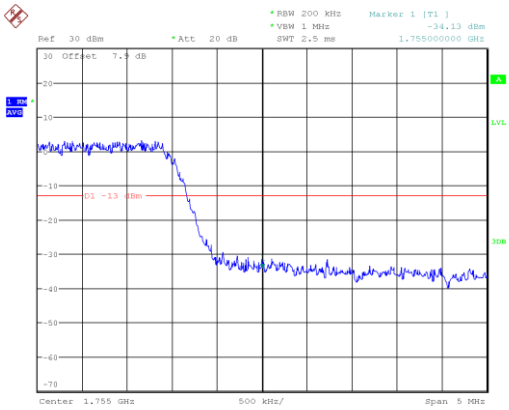
According to KDB 971168 6, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the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

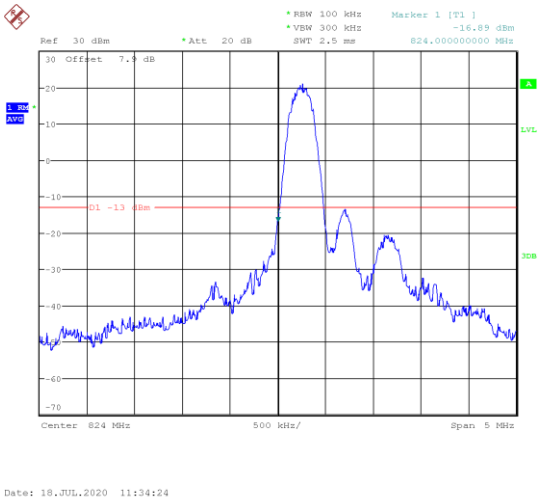
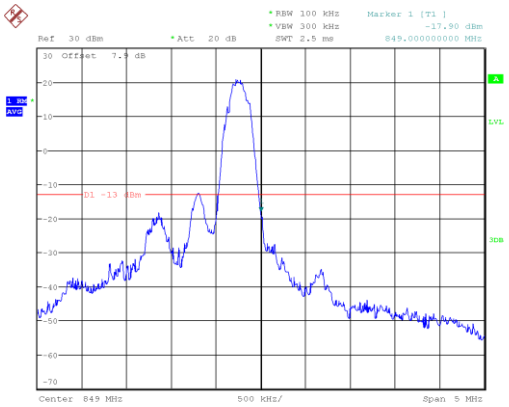
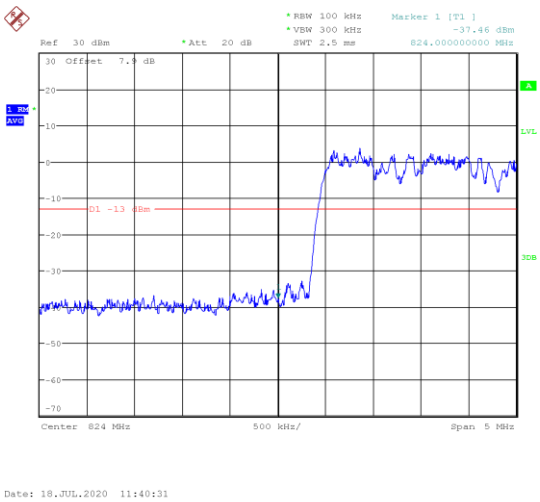
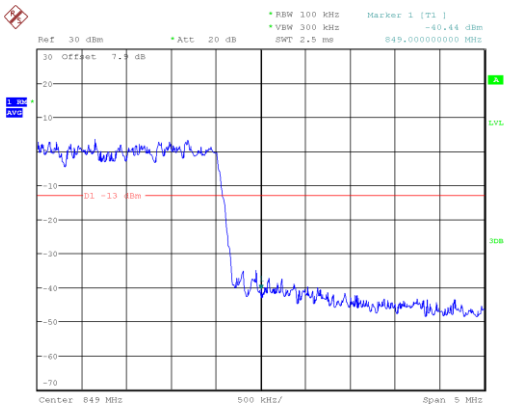
Part 27.53(m) states that for mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 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 that 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.

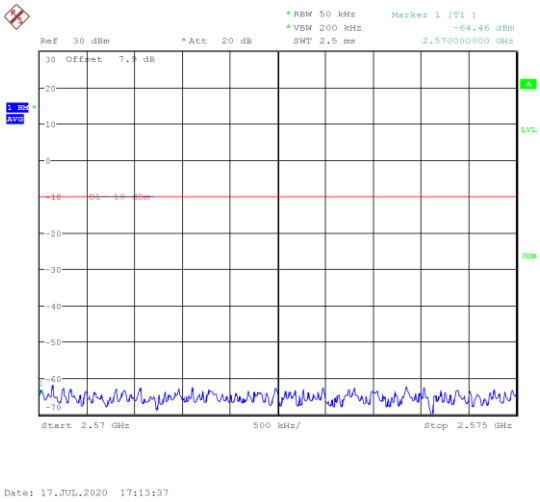
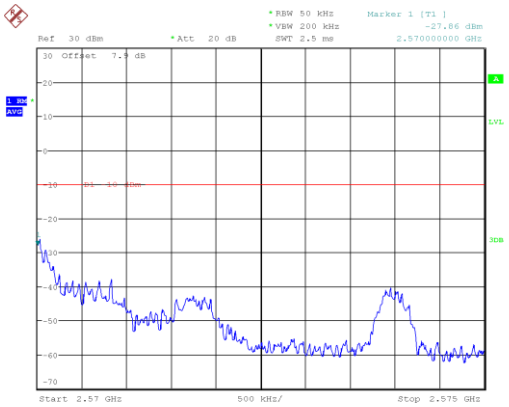
A.6.2 Measurement result

Only worst case result is given below

LTE band 2	
LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	
LOW BAND EDGE BLOCK-20MHz-100%RB	HIGH BAND EDGE BLOCK-20MHz-100%RB
	

LTE band 4	
LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	
LOW BAND EDGE BLOCK-20MHz-100%RB	HIGH BAND EDGE BLOCK-20MHz-100%RB
	

LTE band 5	
LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	
LOW BAND EDGE BLOCK-10MHz-100%RB	HIGH BAND EDGE BLOCK-10MHz-100%RB
	

LTE band 7	
LOW BAND EDGE BLOCK-1RB- high _offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	
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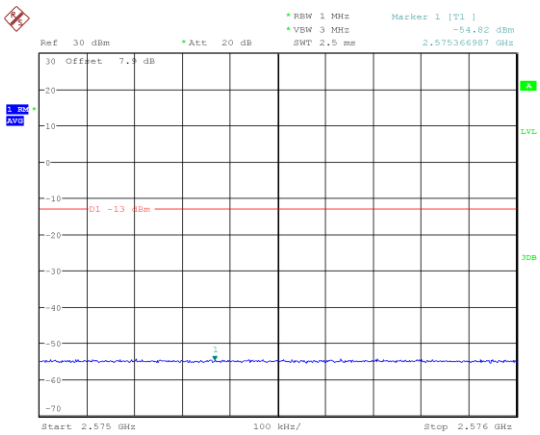
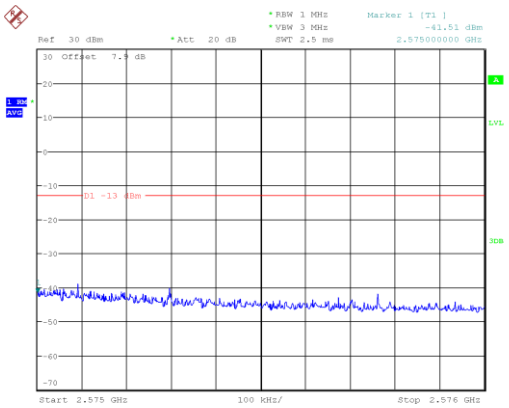
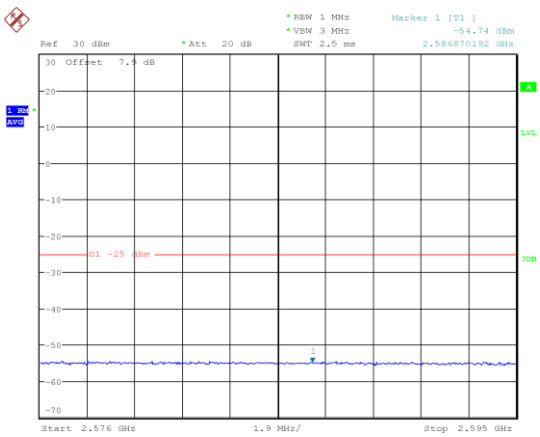
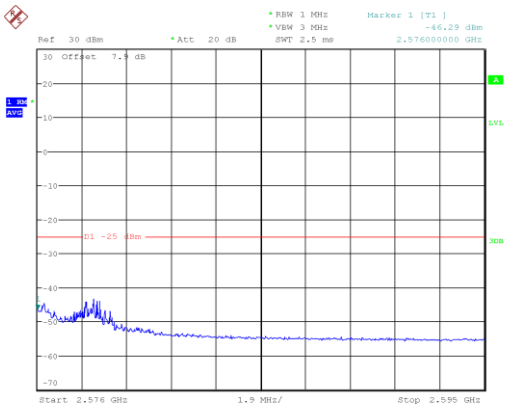
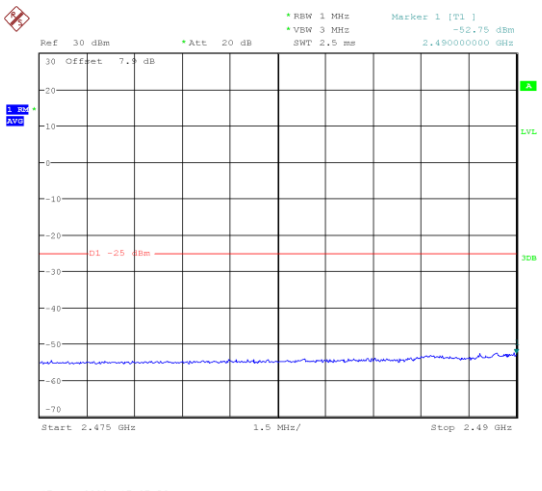
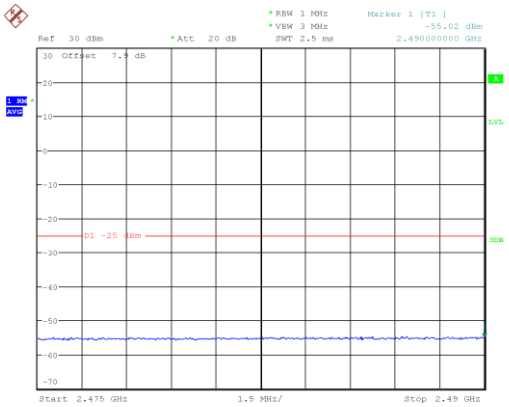
	
LOW BAND EDGE BLOCK-1RB- high _offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	

LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB- low _offset
	
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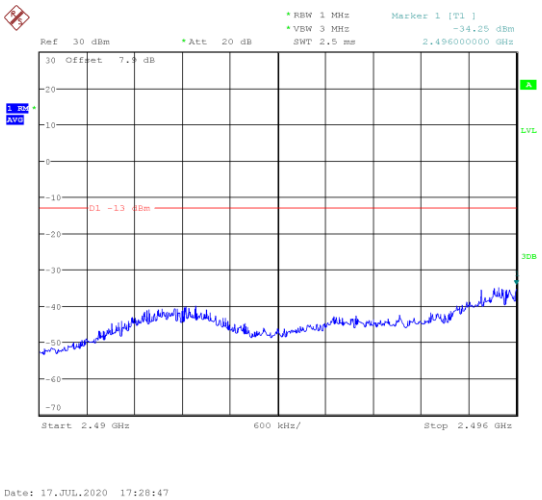
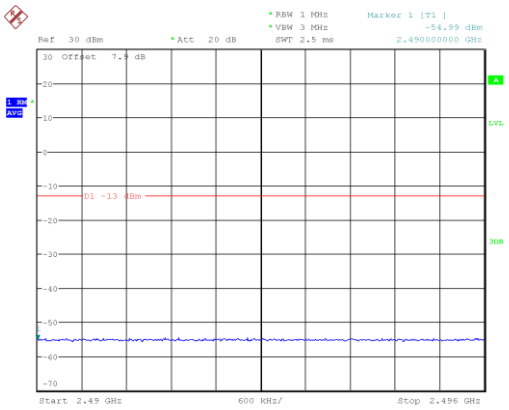
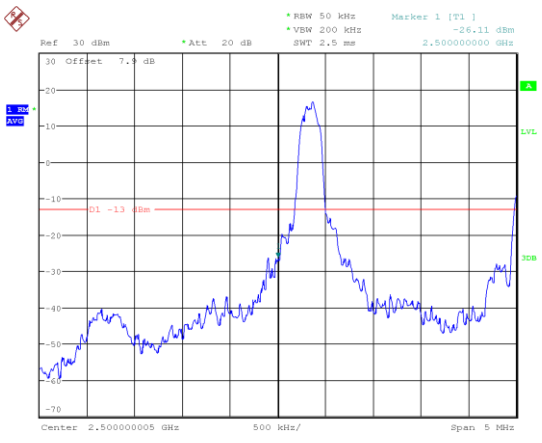
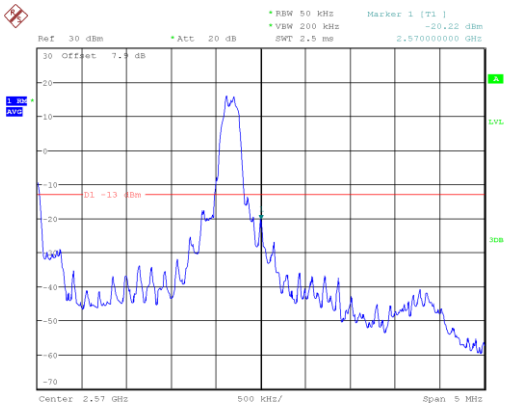
	
LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	

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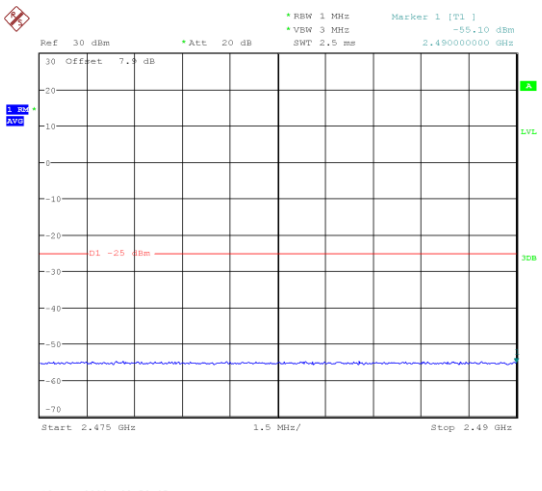	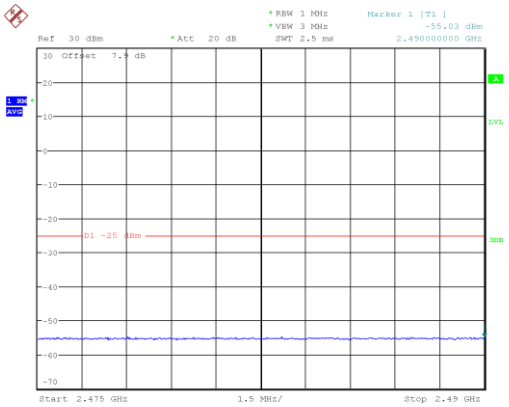
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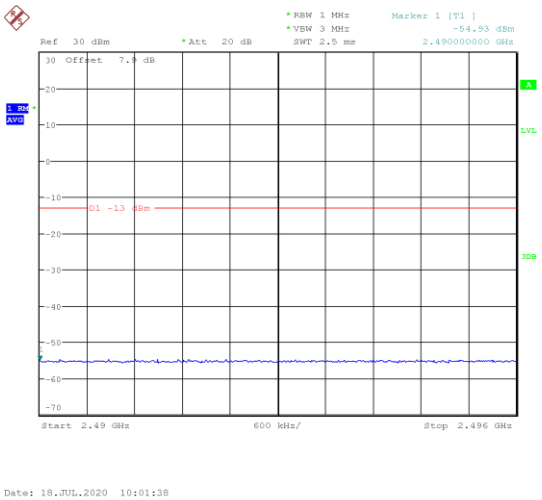	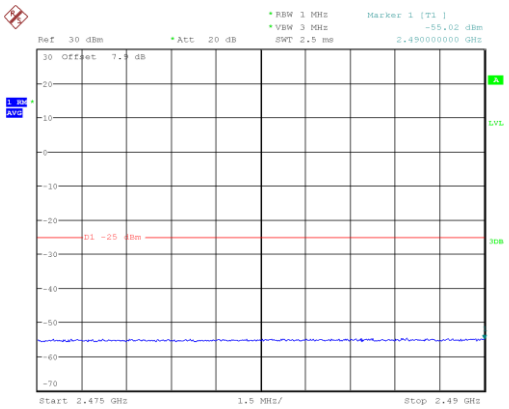
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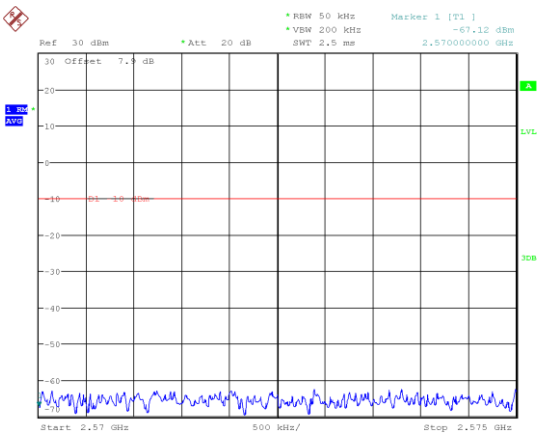	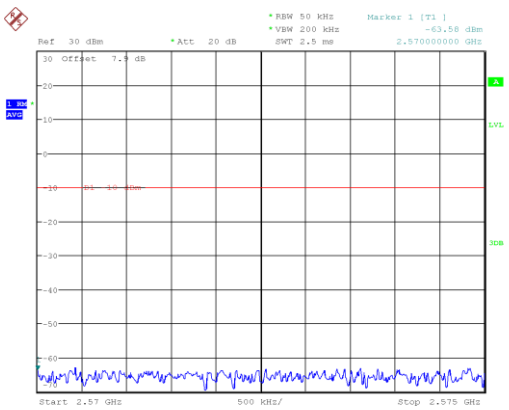

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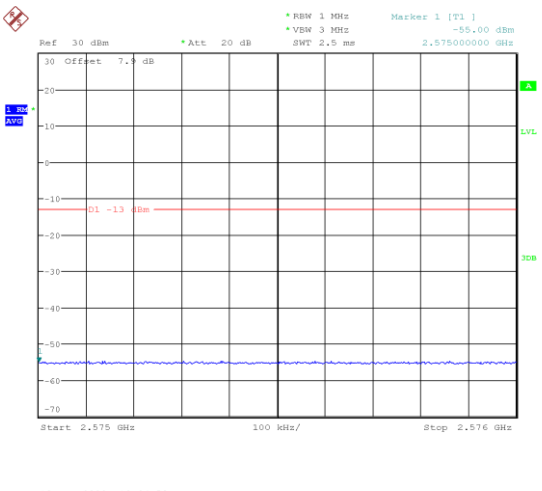	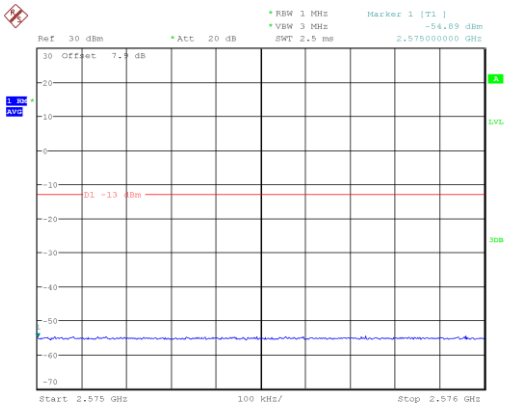
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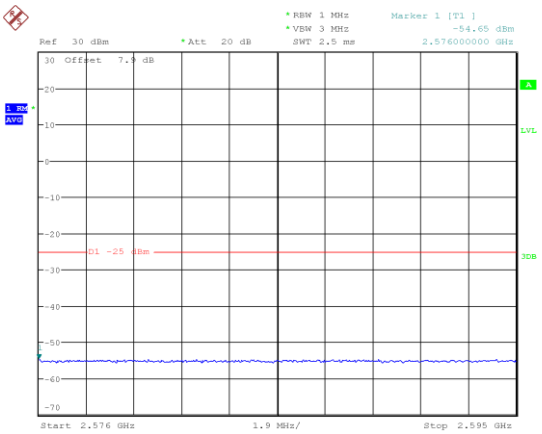	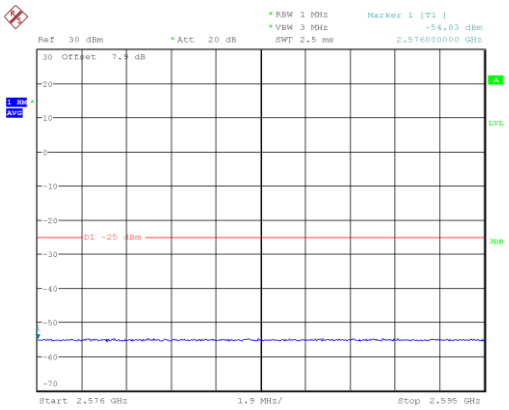
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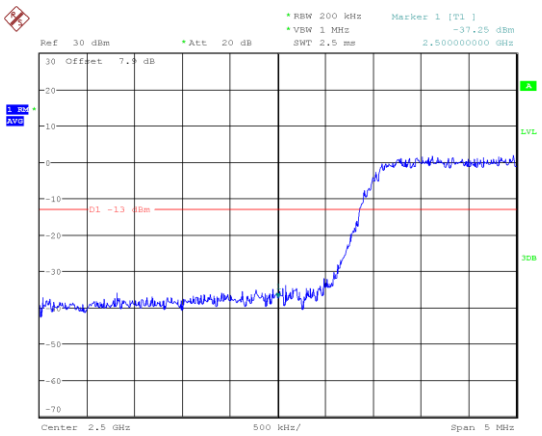
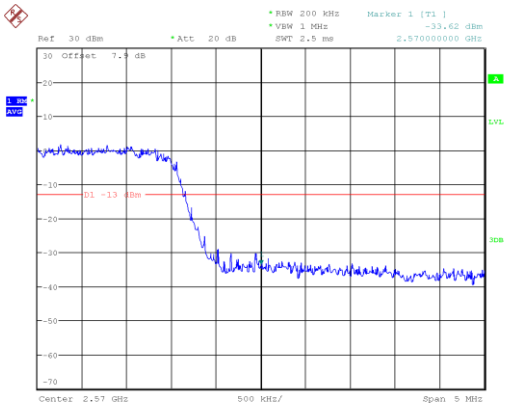
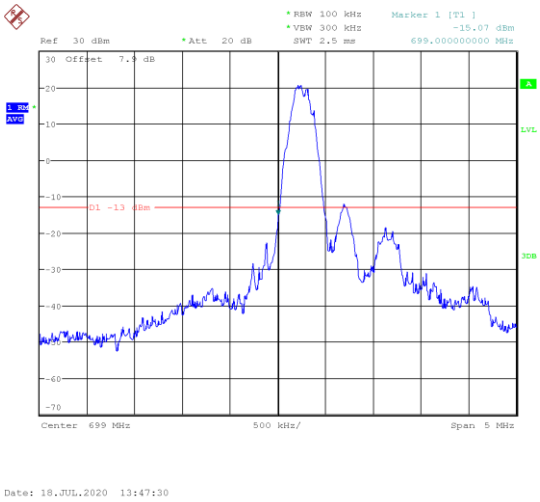
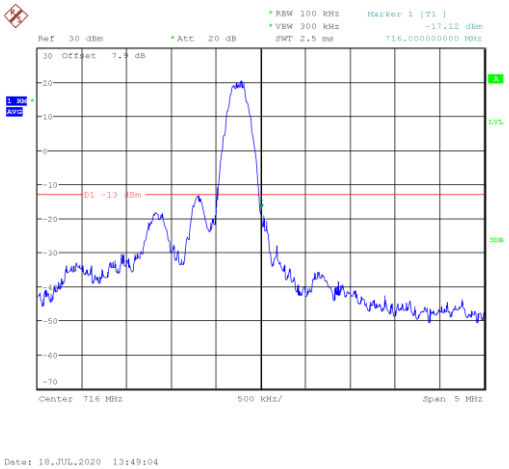
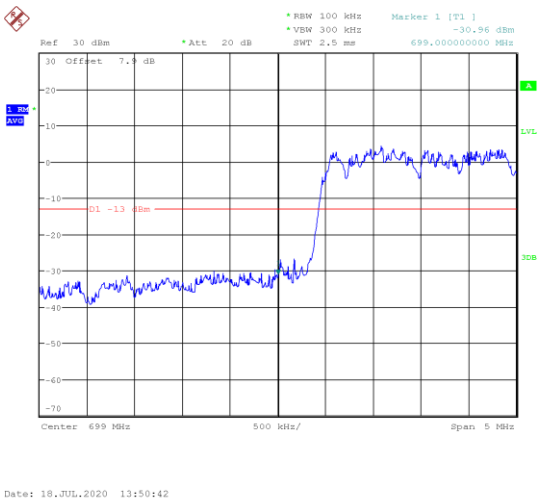
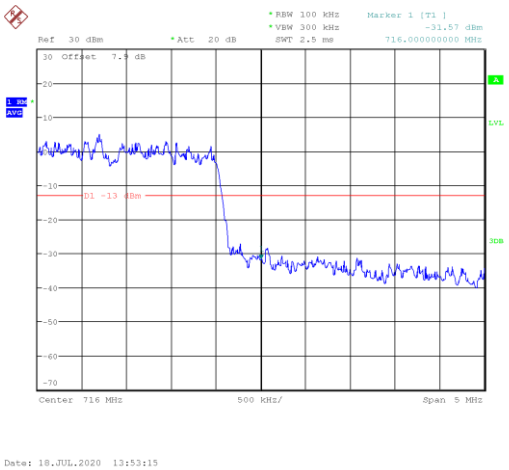
	

LTE band 12	
LOW BAND EDGE BLOCK-1RB-low_offset	HIGH BAND EDGE BLOCK-1RB-high_offset
	
LOW BAND EDGE BLOCK-10MHz-100%RB	HIGH BAND EDGE BLOCK-10MHz-100%RB
	

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

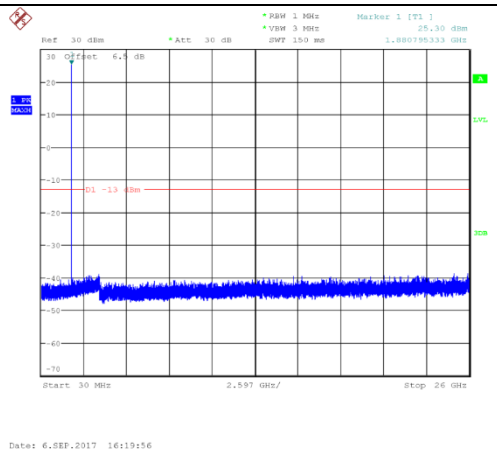
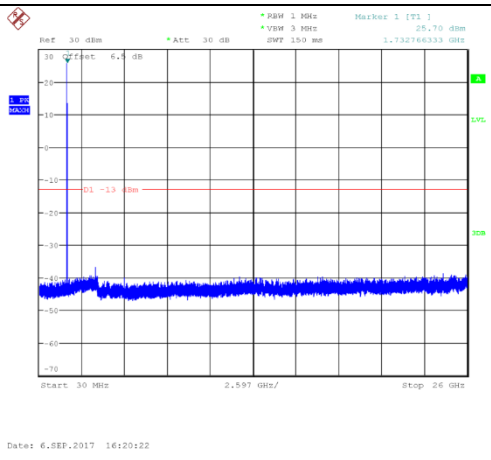
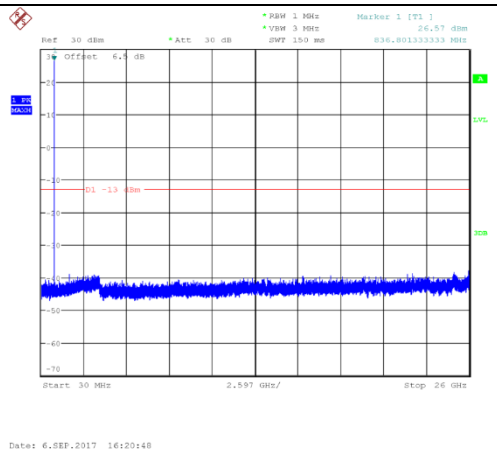
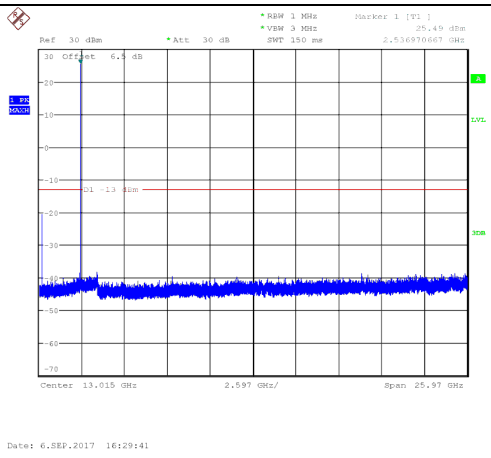
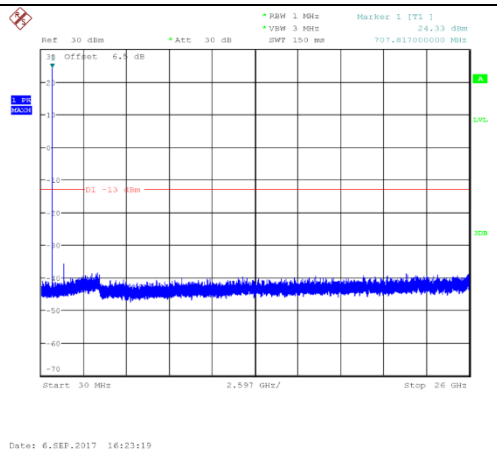
Part 22.917(b),24.238(a), 27.53(g),27.53(h), 27.53(m) specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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 that 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

LTE band 2: 30MHz – 26GHz	LTE band 4: 30MHz – 26GHz
	
LTE band 5: 30MHz – 26GHz	LTE band 7: 30MHz – 26GHz
	
LTE band 12: 30MHz – 26GHz	/
	/

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:

a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;

b) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;

c) Set the number of counts to a value that stabilizes the measured CCDF curve;

d) Set the measurement interval to 1 ms

e) 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

Accredited Laboratory

A2LA has accredited

EAST CHINA INSTITUTE OF TELECOMMUNICATIONS

Shanghai, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 6th day of May 2019.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2021

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

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