



Appendix B

LTE-NB1 Band 85





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1 Effective (Isotropic) Radiated Power Output Data

1.1 Test Result for LTE NB1 Band 85

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 85	BPSK	3.75	134003	1T0	23.16	22.21	34.77	PASS
NB1 Band 85	BPSK	3.75	134003	1T47	23.10	22.15	34.77	PASS
NB1 Band 85	BPSK	3.75	134092	1T0	23.02	22.07	34.77	PASS
NB1 Band 85	BPSK	3.75	134092	1T47	23.12	22.17	34.77	PASS
NB1 Band 85	BPSK	3.75	134181	1T0	22.96	22.01	34.77	PASS
NB1 Band 85	BPSK	3.75	134181	1T47	22.96	22.01	34.77	PASS
NB1 Band 85	QPSK	3.75	134003	1T0	22.87	21.92	34.77	PASS
NB1 Band 85	QPSK	3.75	134003	1T47	22.89	21.94	34.77	PASS
NB1 Band 85	QPSK	3.75	134092	1T0	23.14	22.19	34.77	PASS
NB1 Band 85	QPSK	3.75	134092	1T47	23.06	22.11	34.77	PASS
NB1 Band 85	QPSK	3.75	134181	1T0	23.18	22.23	34.77	PASS
NB1 Band 85	QPSK	3.75	134181	1T47	22.96	22.01	34.77	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 85	BPSK	15	134003	1T0	22.99	22.04	34.77	PASS
NB1 Band 85	BPSK	15	134003	1T11	22.82	21.87	34.77	PASS
NB1 Band 85	BPSK	15	134092	1T0	23.11	22.16	34.77	PASS
NB1 Band 85	BPSK	15	134092	1T11	22.97	22.02	34.77	PASS
NB1 Band 85	BPSK	15	134181	1T0	22.94	21.99	34.77	PASS
NB1 Band 85	BPSK	15	134181	1T11	23.12	22.17	34.77	PASS
NB1 Band 85	QPSK	15	134003	1T0	22.93	21.98	34.77	PASS
NB1 Band 85	QPSK	15	134003	1T11	22.94	21.99	34.77	PASS
NB1 Band 85	QPSK	15	134003	12T0	21.56	20.61	34.77	PASS
NB1 Band 85	QPSK	15	134092	1T0	22.88	21.93	34.77	PASS
NB1 Band 85	QPSK	15	134092	1T11	23.07	22.12	34.77	PASS
NB1 Band 85	QPSK	15	134092	12T0	21.65	20.70	34.77	PASS
NB1 Band 85	QPSK	15	134181	1T0	22.84	21.89	34.77	PASS
NB1 Band 85	QPSK	15	134181	1T11	23.02	22.07	34.77	PASS
NB1 Band 85	QPSK	15	134181	12T0	21.43	20.48	34.77	PASS

Note:

a: For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$EIRP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi]$

$ERP [dBm] = \text{Conducted Power} [dBm] + \text{Gain} [dBi] - 2.15$



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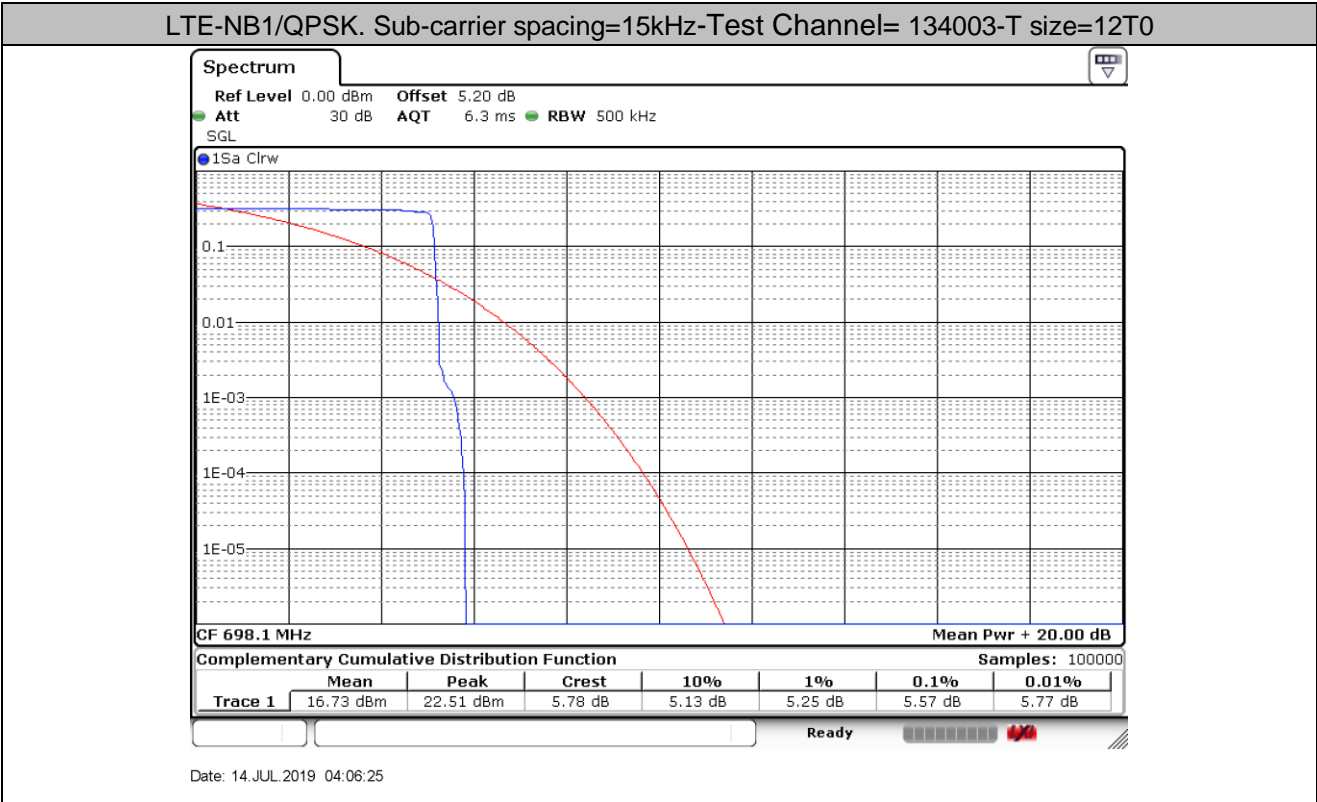
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2 Peak-to-Average Ratio

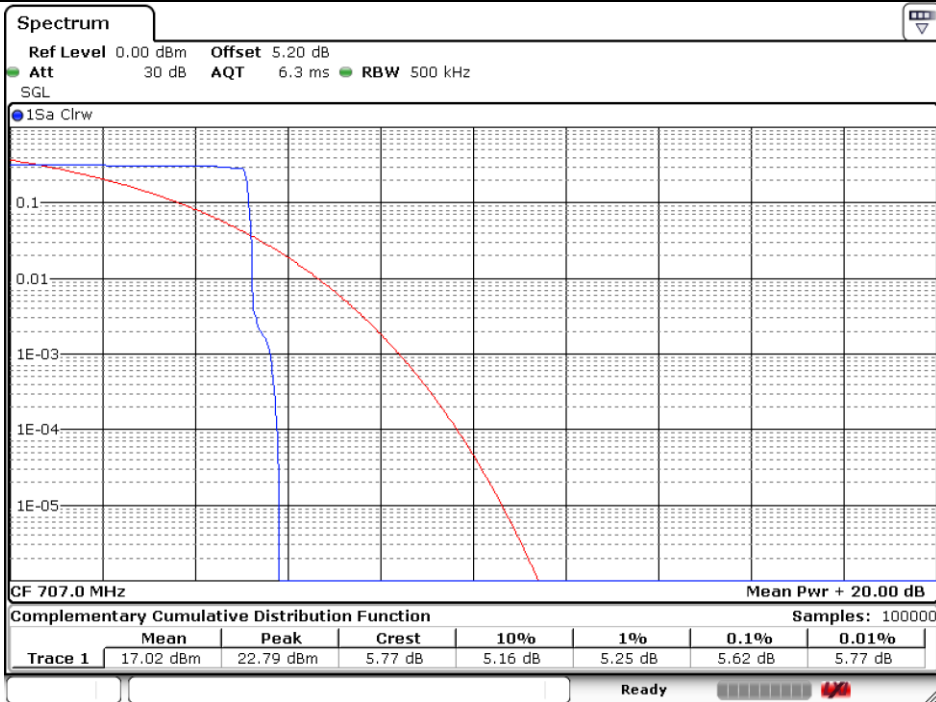
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 85	QPSK/12T0	134003	5.57	13	PASS
NB1 Band 85	QPSK/12T0	134092	5.62	13	PASS
NB1 Band 85	QPSK/12T0	134181	5.51	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 85

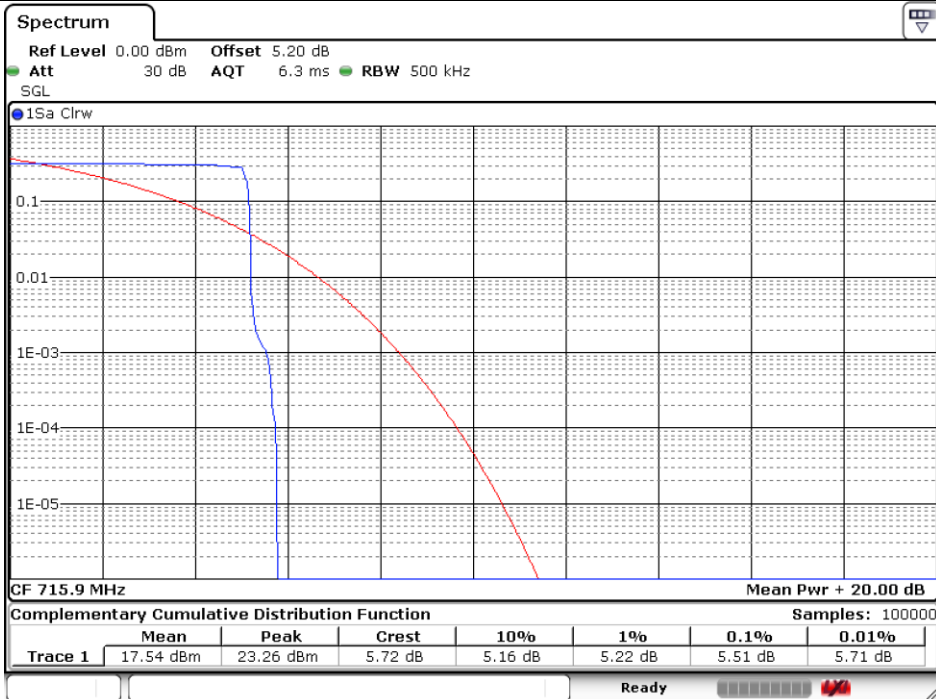


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 134092-T size=12T0



Date: 14.JUL.2019 04:02:49

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 134181-T size=12T0



Date: 14.JUL.2019 03:38:10



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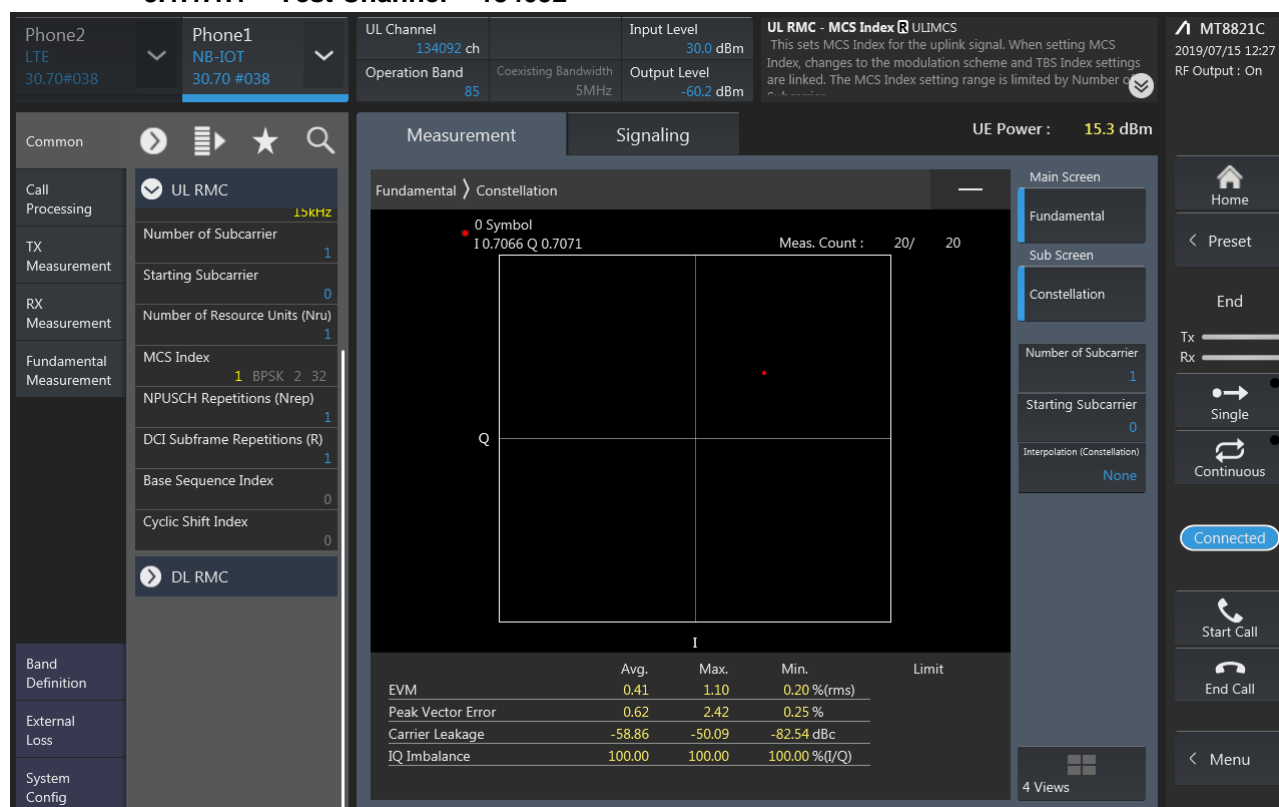
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 85

3.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.1.1 Test Channel = 134092

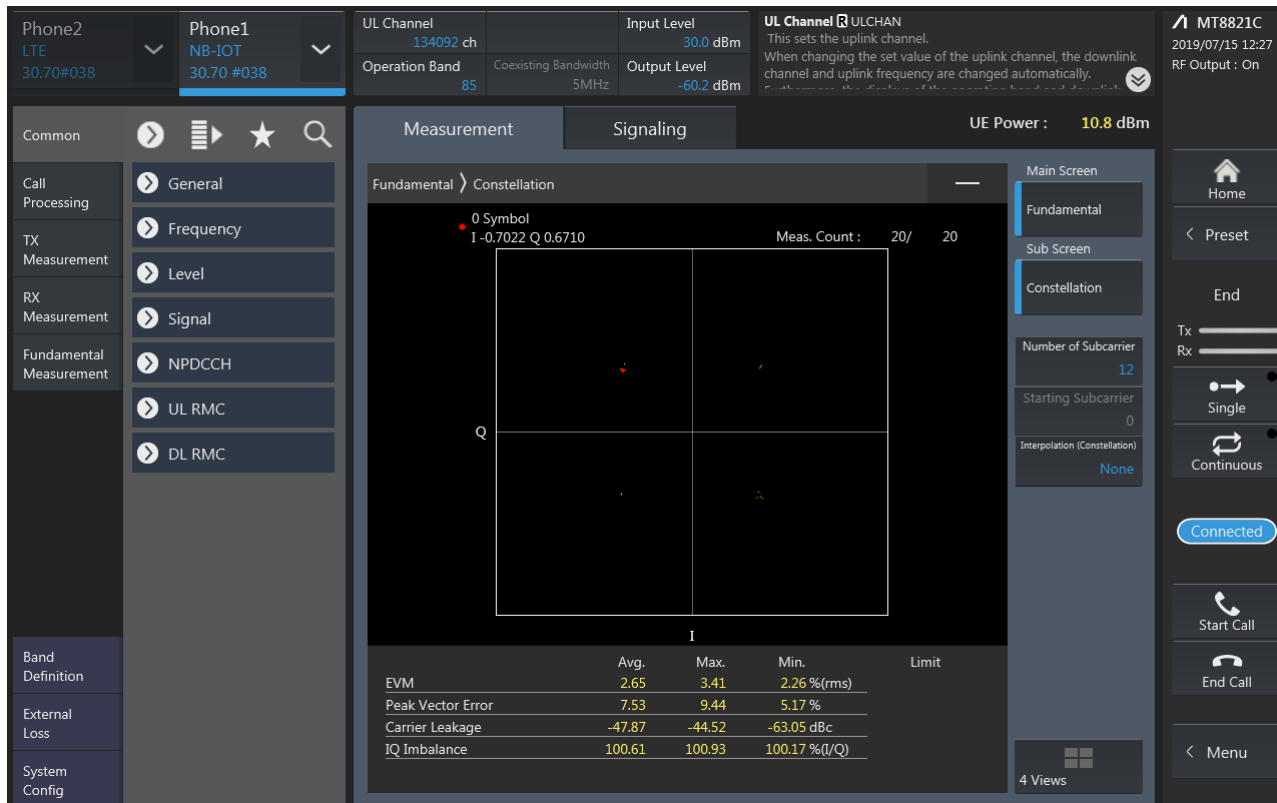


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3.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.2.1 Test Channel = 134092

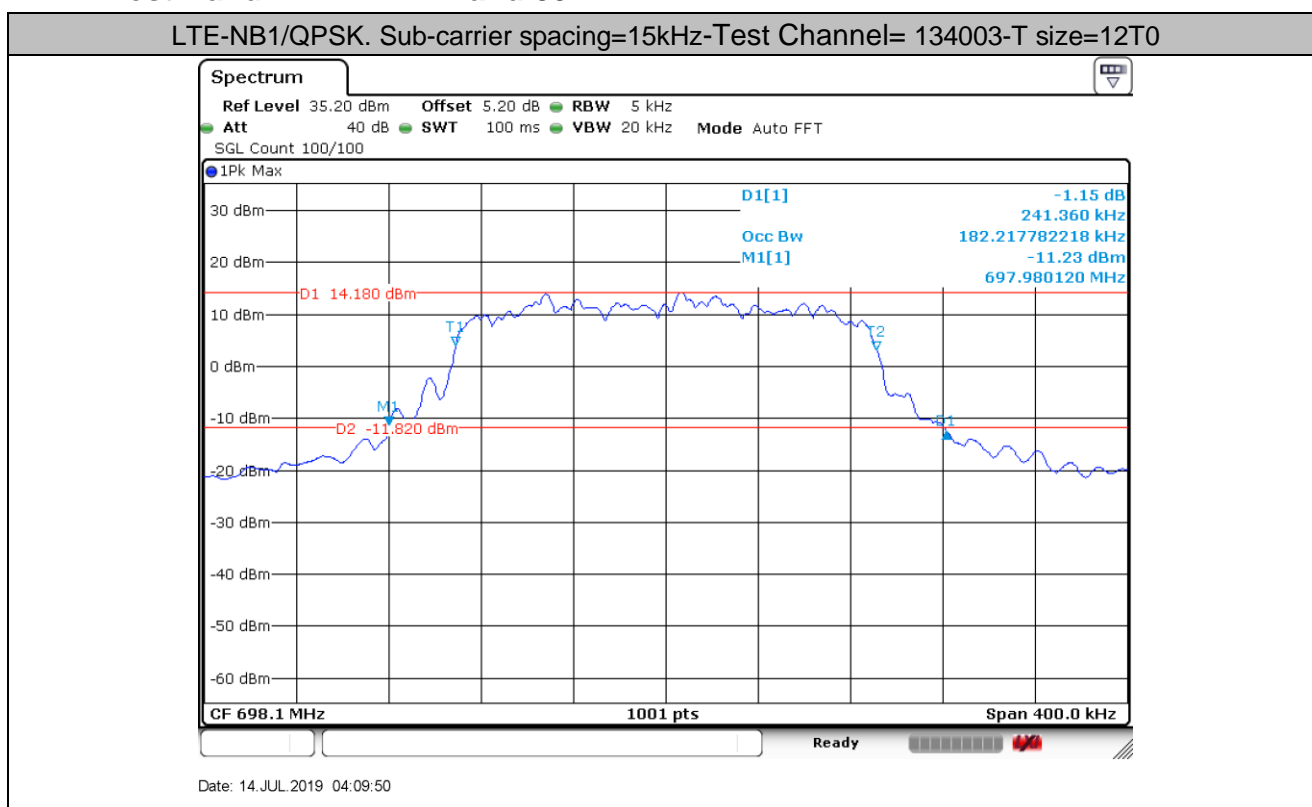


4 Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 85	QPSK/15kHz	12T0	134003	182.22	241.36	PASS
NB1 Band 85	QPSK/15kHz	12T0	134092	182.22	240.56	PASS
NB1 Band 85	QPSK/15kHz	12T0	134181	181.82	241.36	PASS

4.1 For LTE-NB1

4.1.1 Test Band = LTE-NB1 Band 85



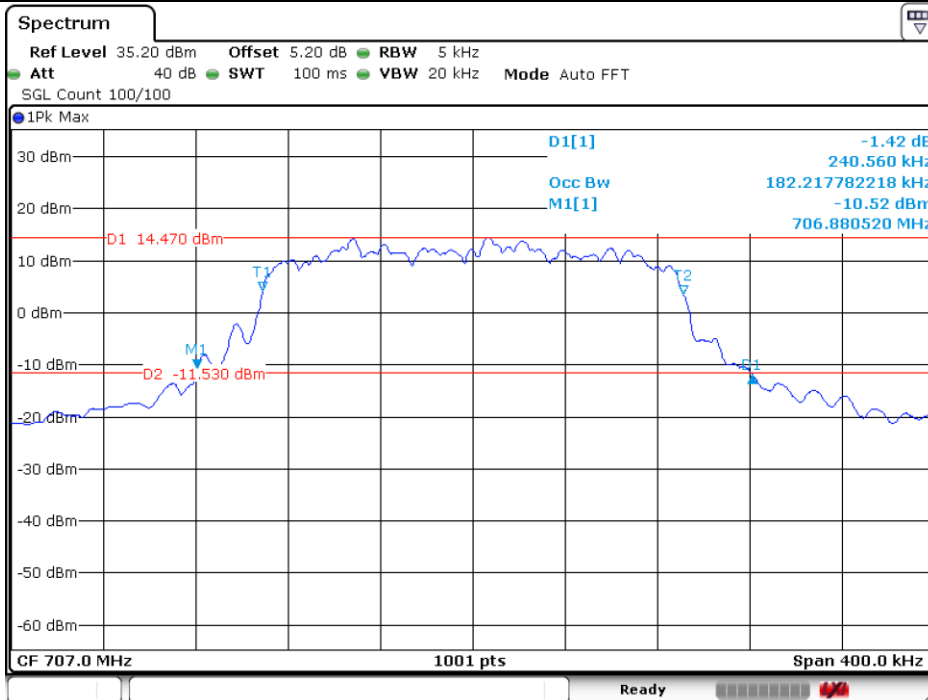
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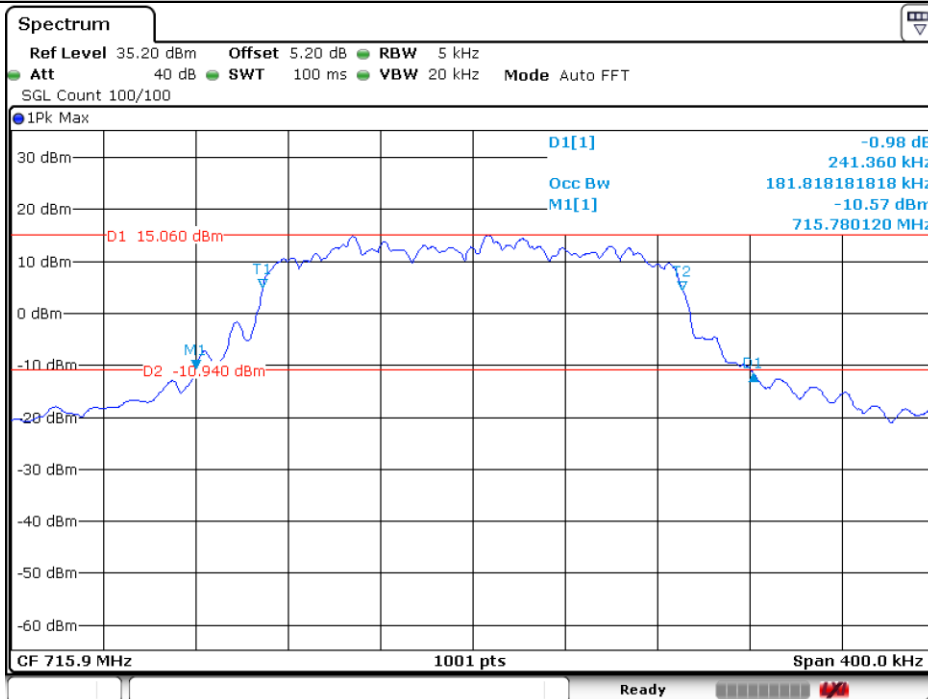
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 134092-T size=12T0



Date: 14.JUL.2019 03:54:42

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 134181-T size=12T0



Date: 14.JUL.2019 03:41:03



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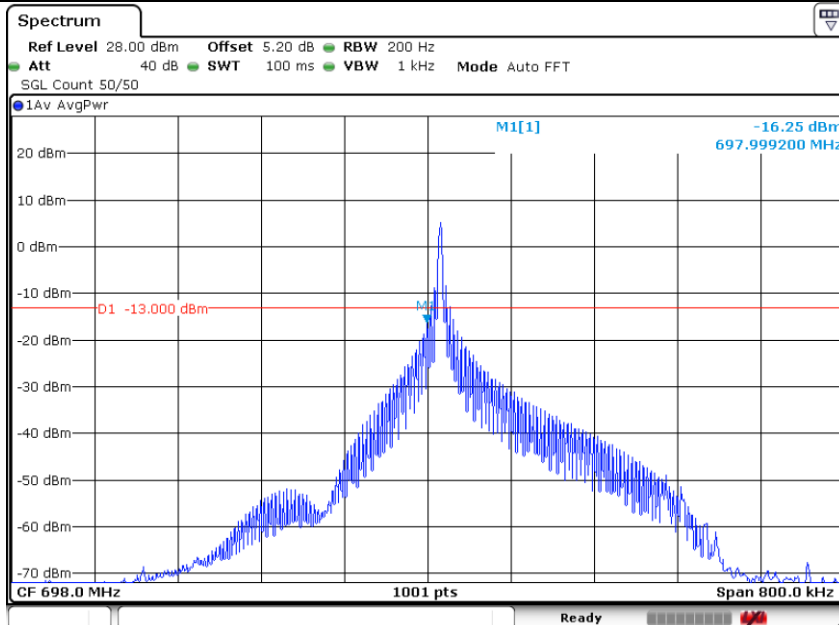
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5 Band Edges Compliance

5.1 For LTE-NB1

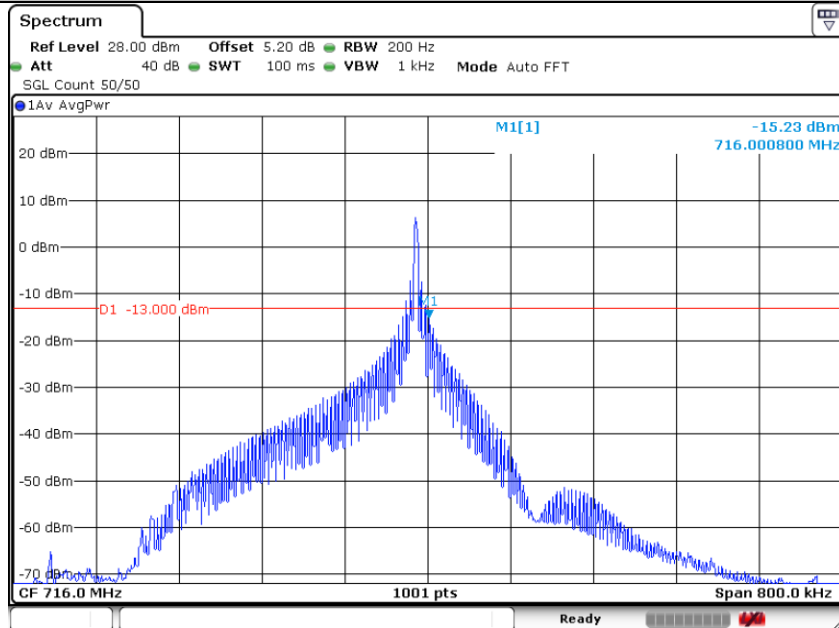
5.1.1 Test Band = LTE-NB1 Band 85

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=134003-T size=1T0



Date: 20.AUG.2019 20:10:58

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=134181-T size=1T47



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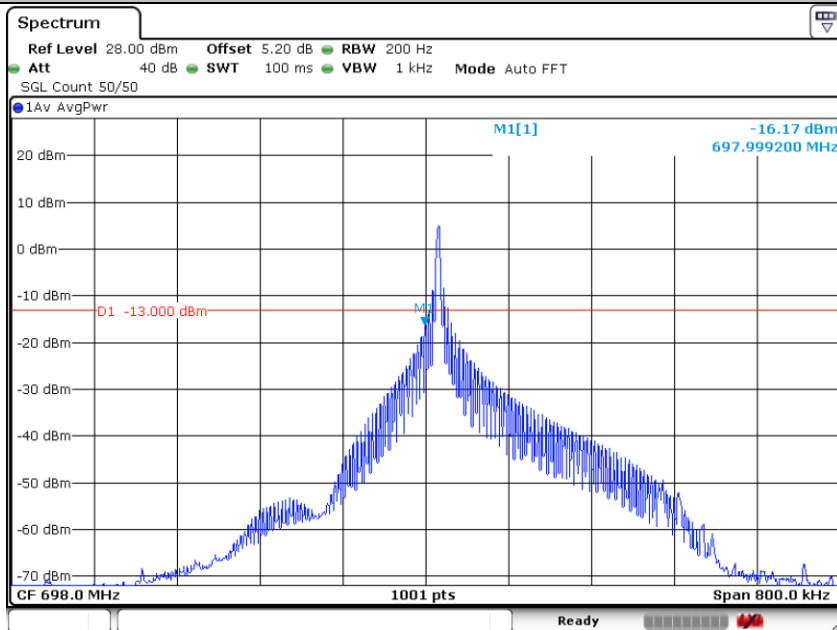
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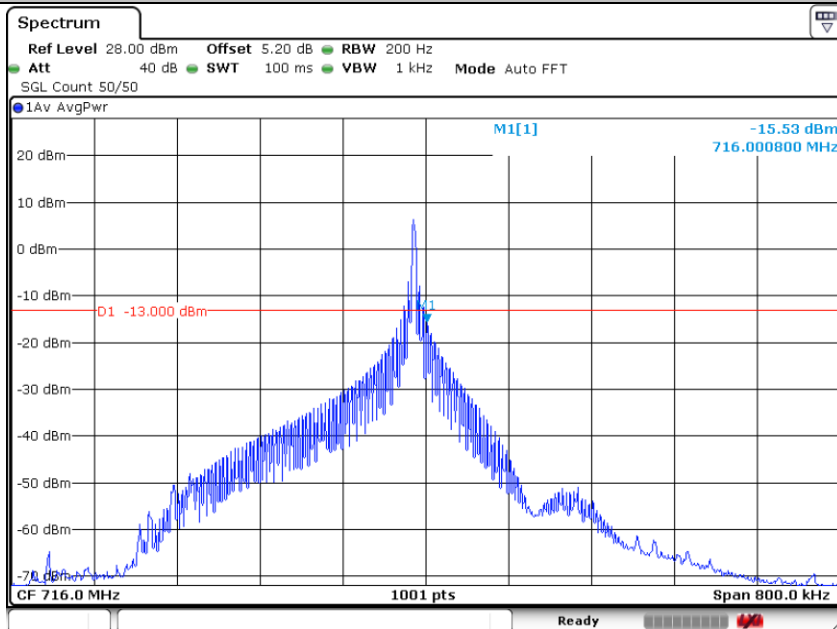
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=134003-T size=1T0



Date: 20.AUG.2019 20:11:24

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=134181-T size=1T47



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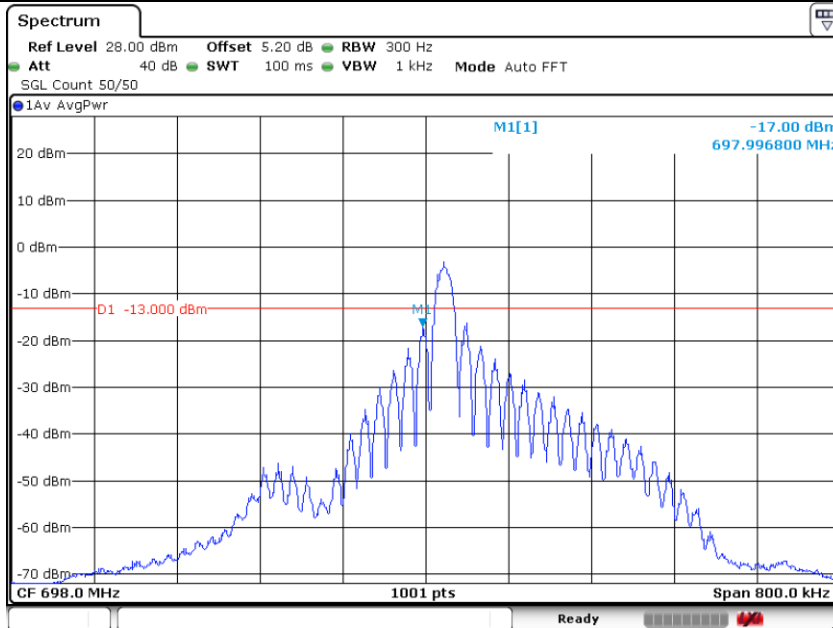


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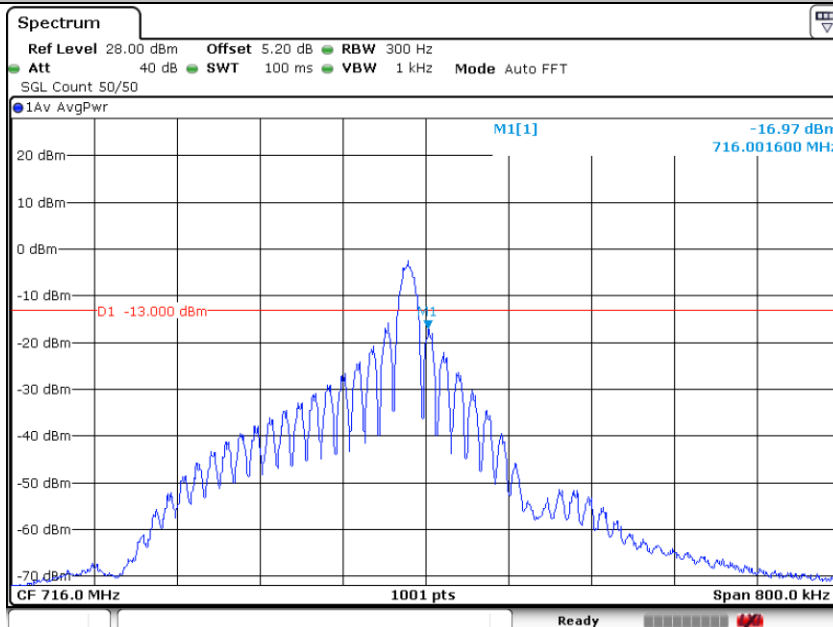
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LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=134003-T size=1T0



Date: 20.AUG.2019 20:13:15

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=134181-T size=1T11



Date: 20.AUG.2019 20:16:49



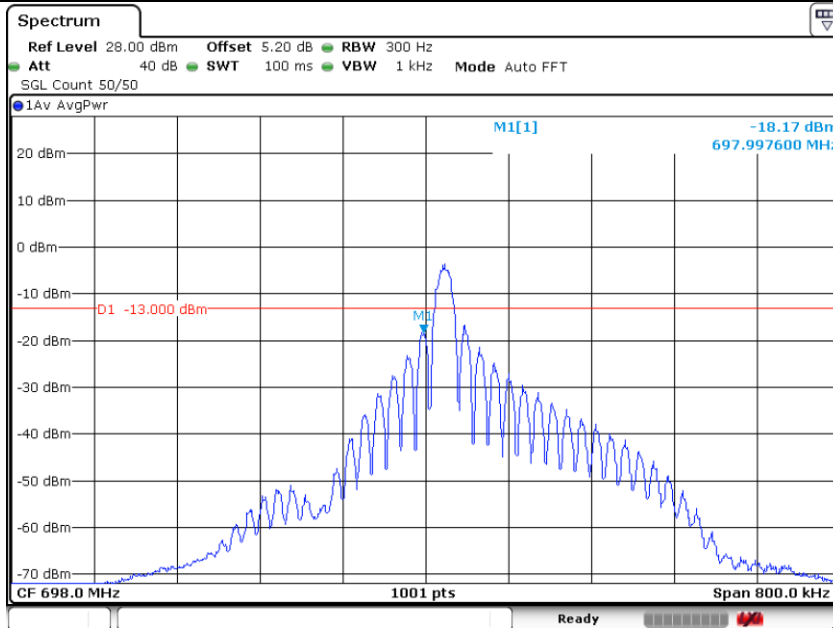
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134003-T size=1T0



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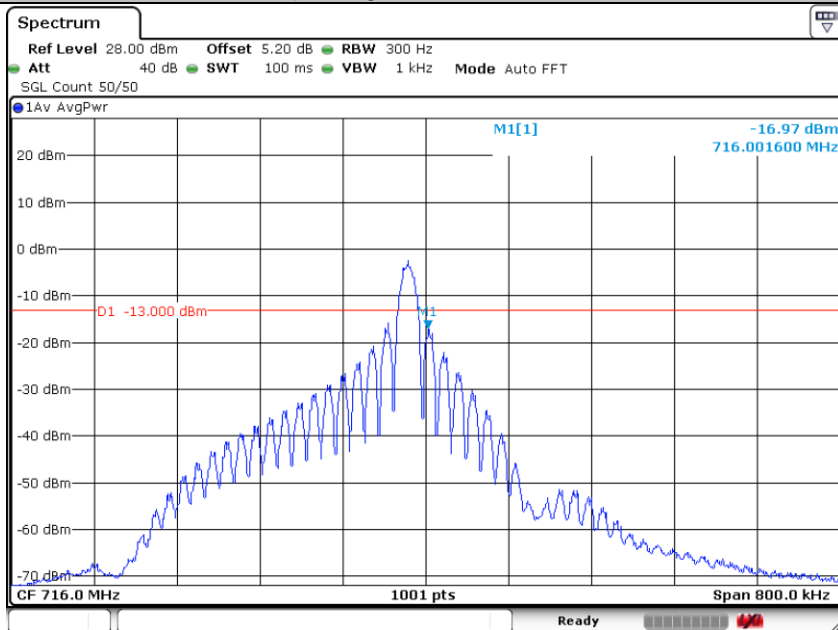
LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134003-T size=12T0



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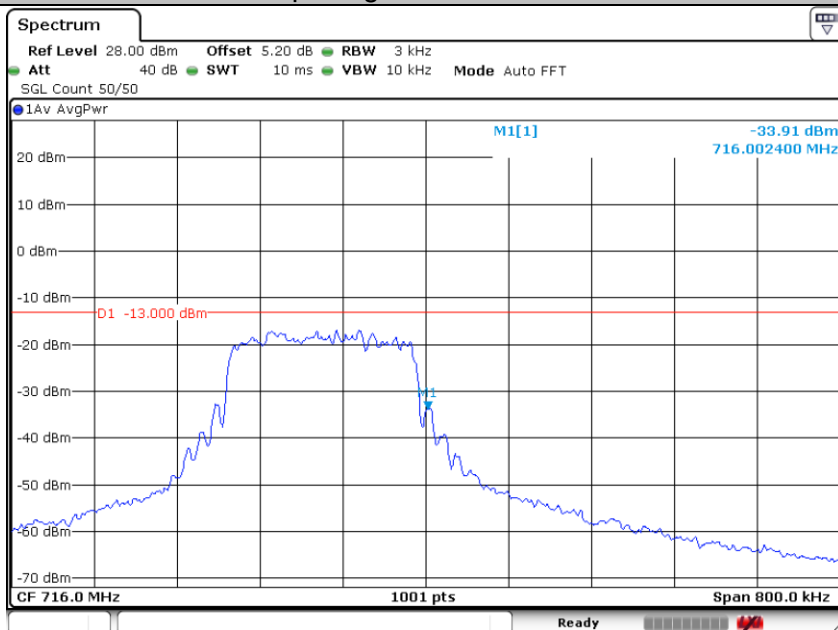


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134181-T size=1T11



Date: 20.AUG.2019 20:15:21

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134181-T size=12T0



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6 Spurious Emission at Antenna Terminal

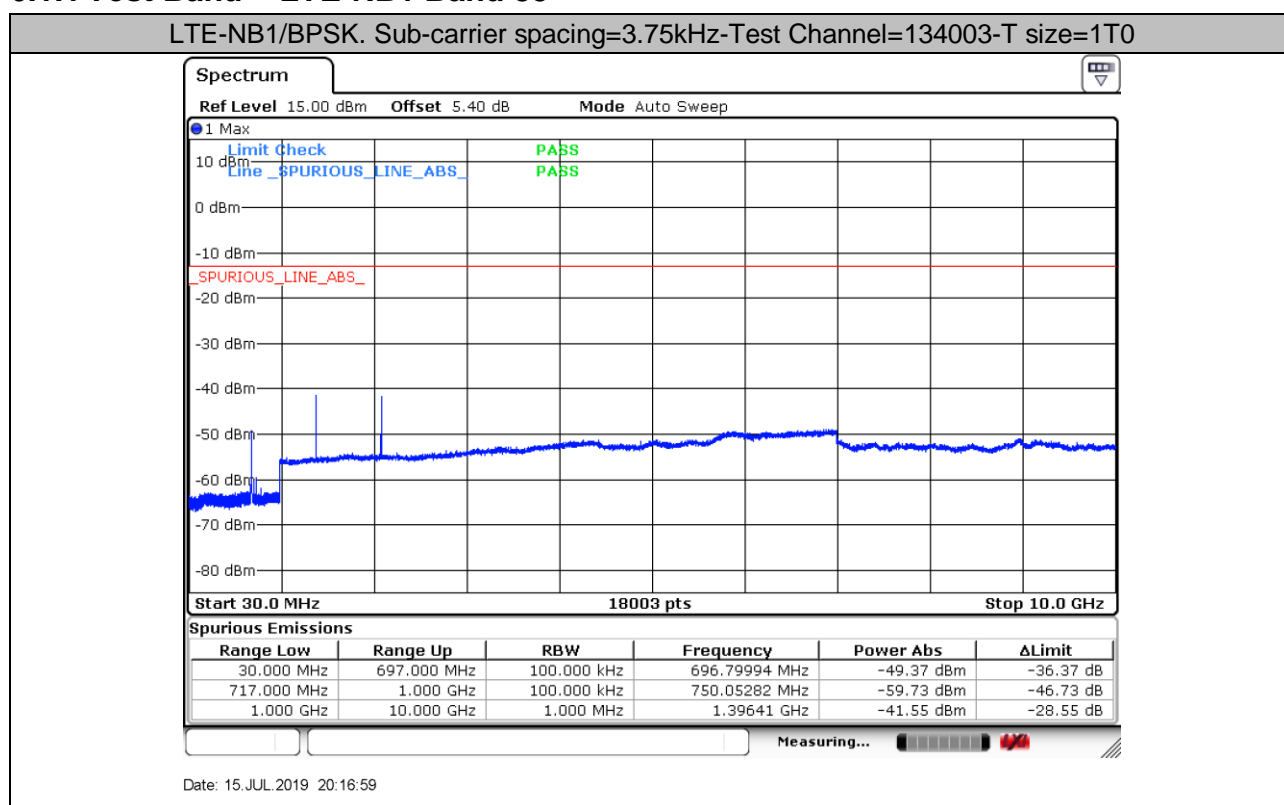
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k \cdot (\text{Span} / \text{RBW})$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

NOTE2: only the worst case data displayed in this report.

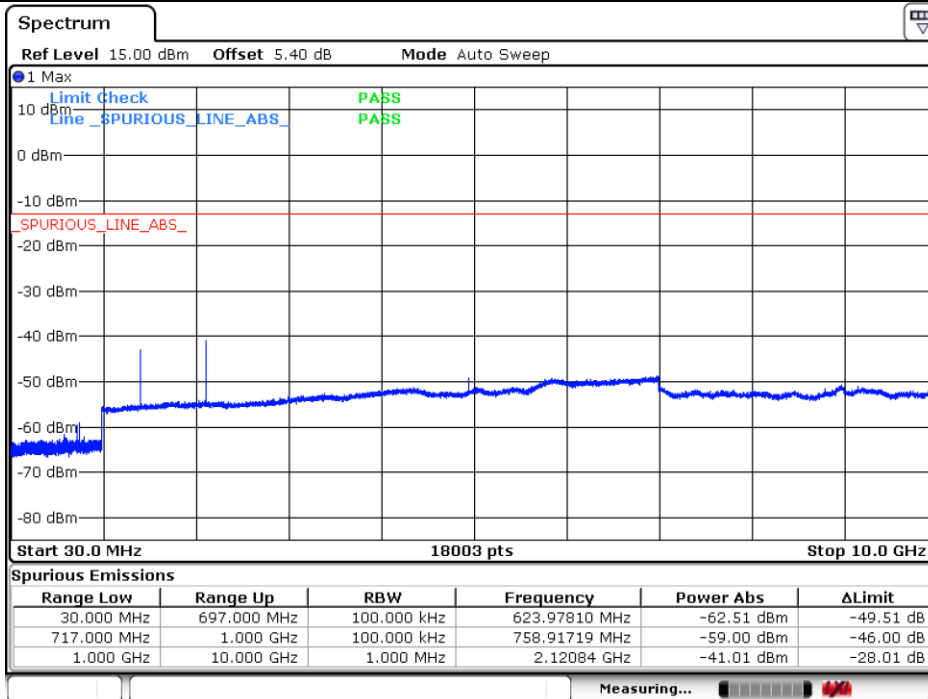
Part I - Test Plots

6.1 For LTE-NB1

6.1.1 Test Band = LTE-NB1 Band 85

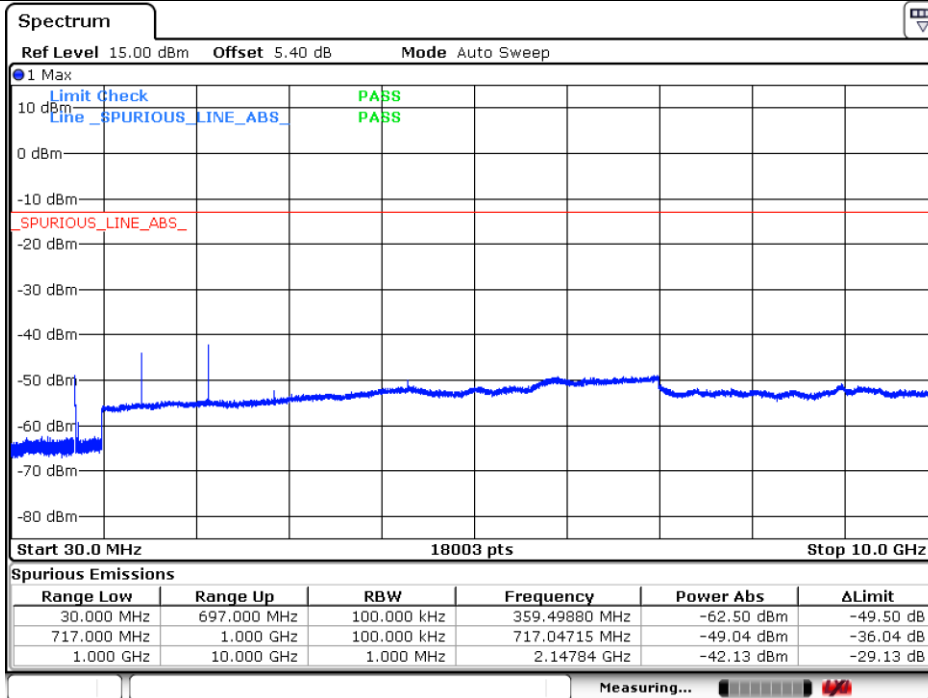


LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=134092-T size=1T0



Date: 15.JUL.2019 20:02:25

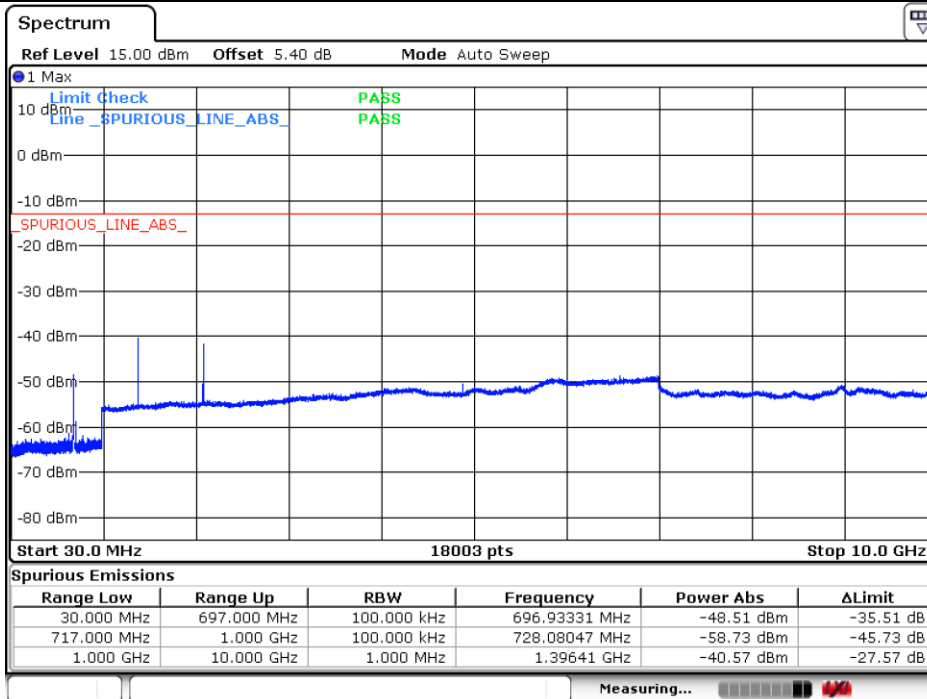
LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=134181-T size=1T0



Date: 15.JUL.2019 20:09:26

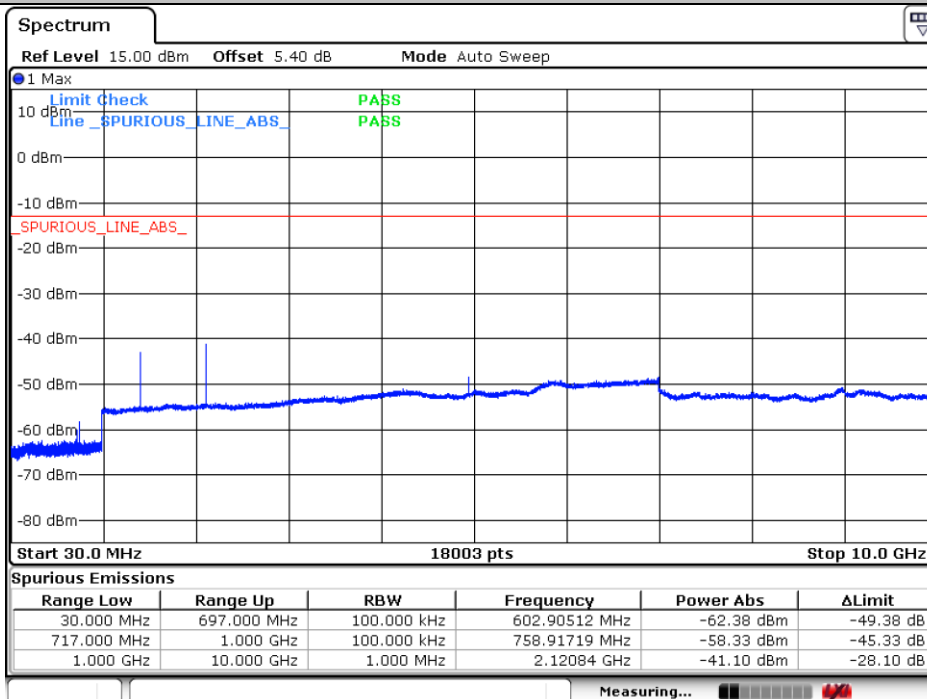


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=134003-T size=1T0



Date: 15.JUL.2019 20:16:18

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=134092-T size=1T0



Date: 15.JUL.2019 20:01:58



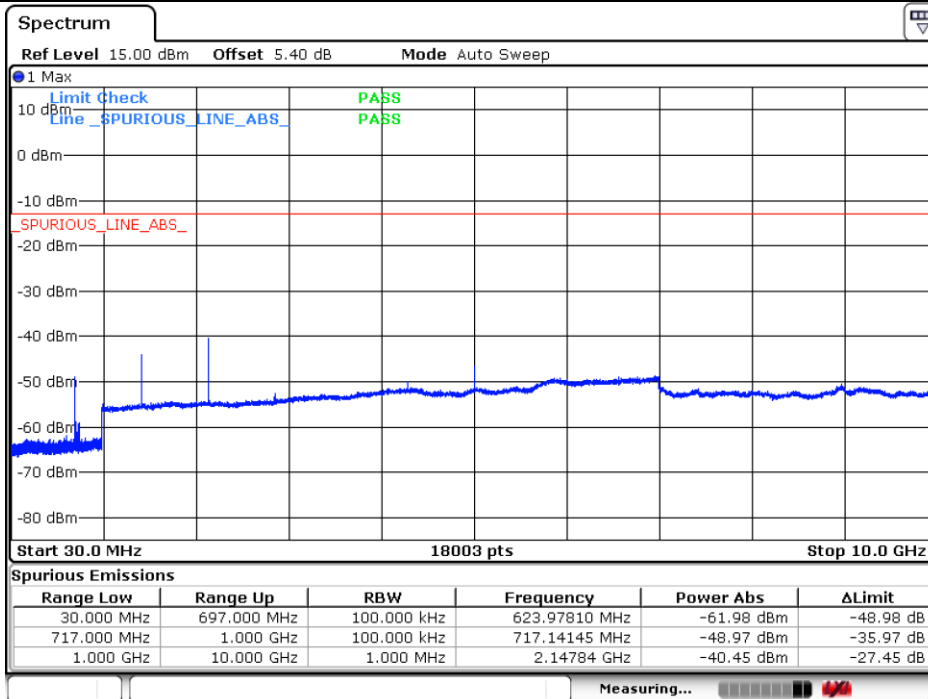
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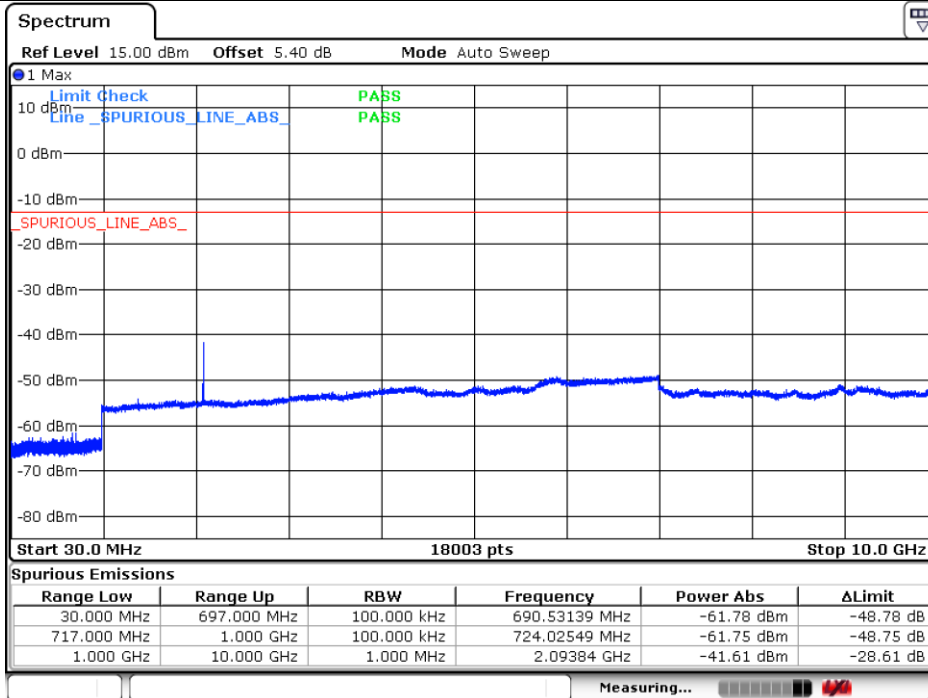
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=134181-T size=1T0



Date: 15.JUL.2019 20:10:16

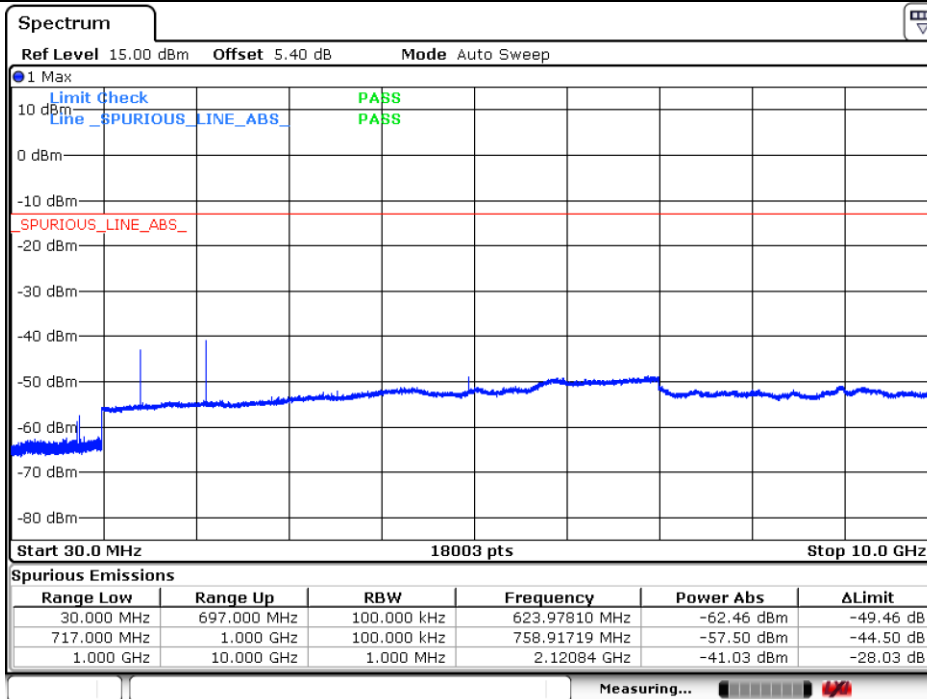
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=134003-T size=1T0



Date: 15.JUL.2019 20:13:16

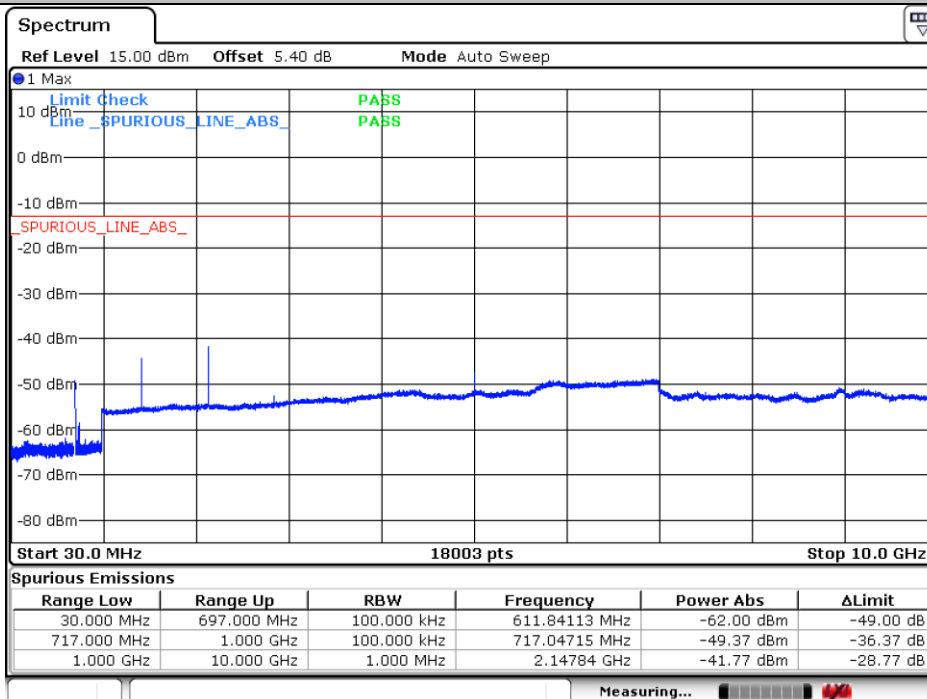


LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=134092-T size=1T0



Date: 15.JUL.2019 20:00:33

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=134181-T size=1T0



Date: 15.JUL.2019 20:11:37

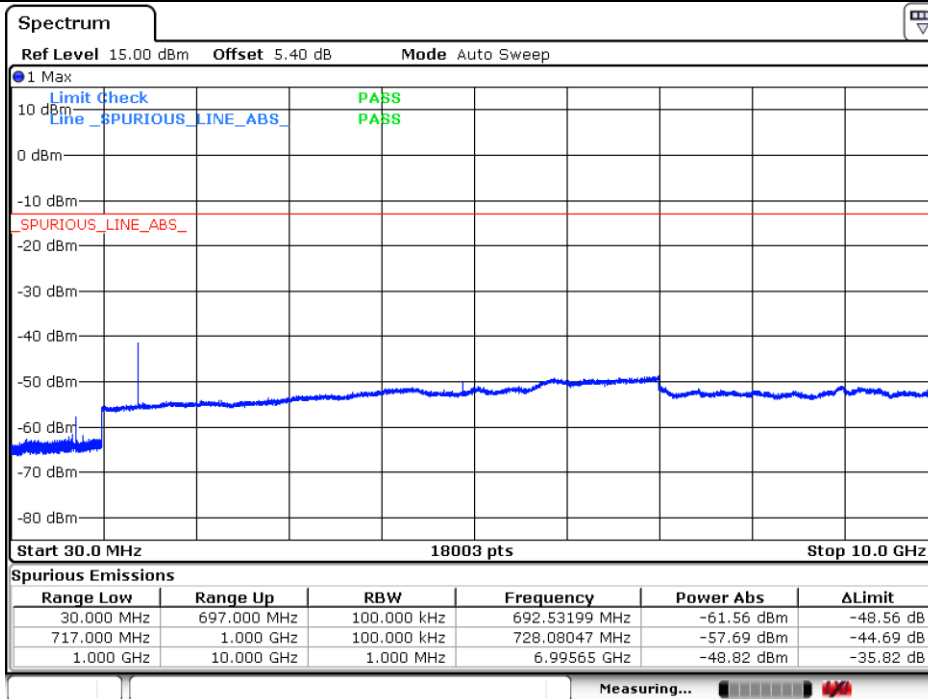


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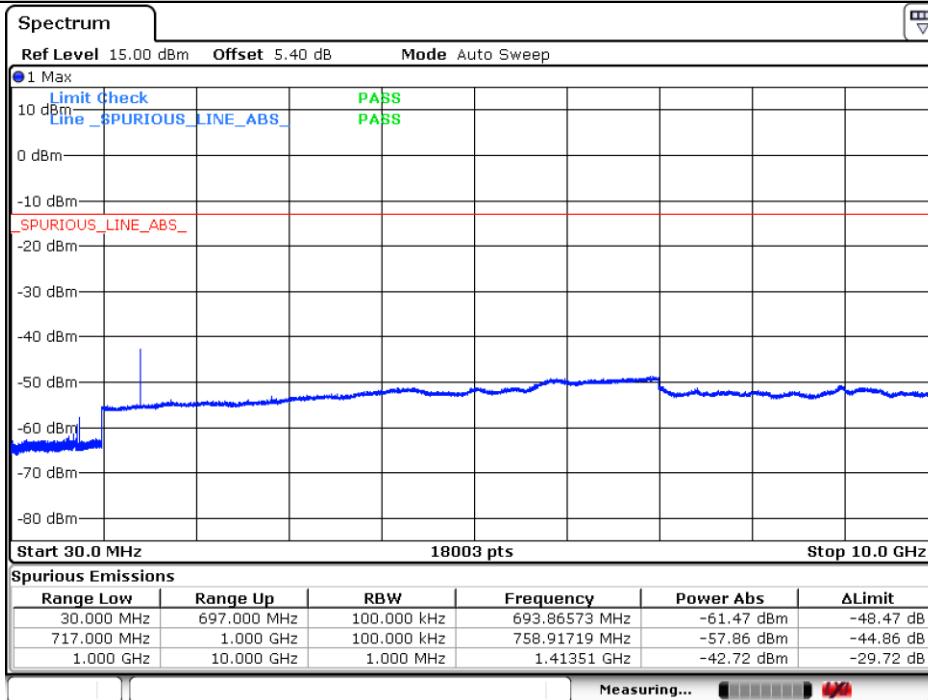
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134003-T size=1T0



Date: 15 JUL 2019 20:13:53

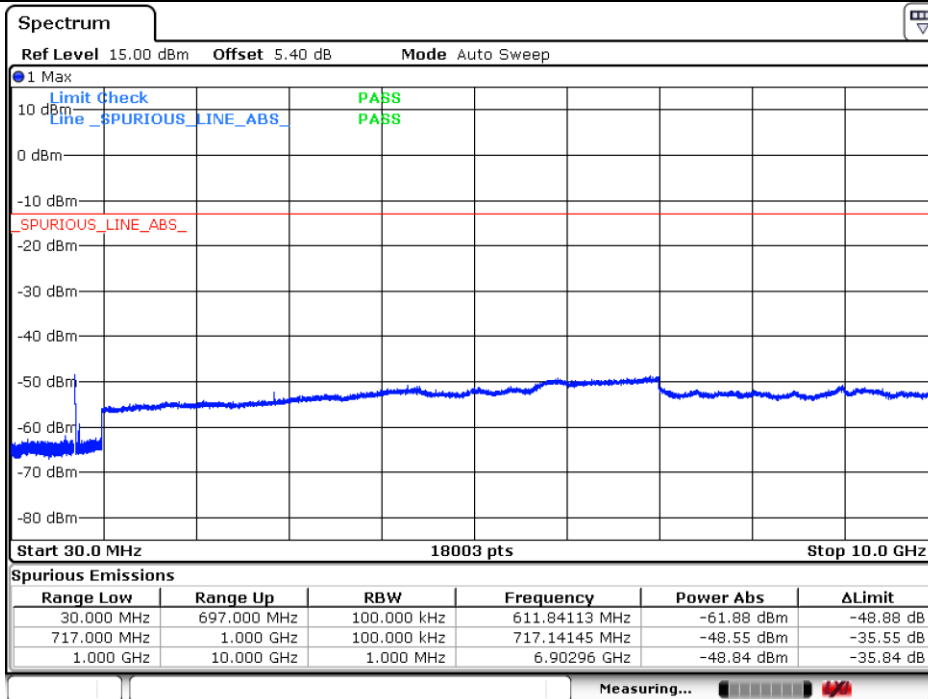
LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134092-T size=1T0



Date: 15 JUL 2019 19:59:58



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=134181-T size=1T0



Date: 15 JUL 2019 20:10:56



7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 85

7.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz

7.1.1.1.1 Test Channel = 134003

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
62.620000	-81.10	-13.00	68.10	Vertical
311.773333	-85.19	-13.00	72.19	Vertical
1387.500000	-67.48	-13.00	54.48	Vertical
2142.500000	-61.12	-13.00	48.12	Vertical
2892.000000	-57.35	-13.00	44.35	Vertical
6047.850000	-63.85	-13.00	50.85	Vertical
63.460000	-76.24	-13.00	63.24	Horizontal
273.693333	-86.18	-13.00	73.18	Horizontal
1395.500000	-63.38	-13.00	50.38	Horizontal
2105.500000	-62.32	-13.00	49.32	Horizontal
2880.500000	-56.97	-13.00	43.97	Horizontal
6061.987500	-63.89	-13.00	50.89	Horizontal

7.1.1.1.2 Test Channel = 134092

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.420000	-80.55	-13.00	67.55	Vertical
124.966667	-85.87	-13.00	72.87	Vertical
347.706667	-84.07	-13.00	71.07	Vertical
1413.500000	-61.96	-13.00	48.96	Vertical
2200.000000	-59.21	-13.00	46.21	Vertical
2872.000000	-57.34	-13.00	44.34	Vertical
62.386667	-75.88	-13.00	62.88	Horizontal
268.560000	-85.96	-13.00	72.96	Horizontal
1413.500000	-53.76	-13.00	40.76	Horizontal
2121.000000	-60.81	-13.00	47.81	Horizontal
2813.000000	-56.95	-13.00	43.95	Horizontal
7246.612500	-63.14	-13.00	50.14	Horizontal



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7.1.1.1.3 Test Channel = 134181

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.046667	-80.78	-13.00	67.78	Vertical
300.340000	-86.52	-13.00	73.52	Vertical
1456.000000	-66.69	-13.00	53.69	Vertical
2158.500000	-61.25	-13.00	48.25	Vertical
2811.500000	-57.72	-13.00	44.72	Vertical
7823.325000	-62.96	-13.00	49.96	Vertical
64.160000	-77.01	-13.00	64.01	Horizontal
272.200000	-86.13	-13.00	73.13	Horizontal
1432.000000	-61.90	-13.00	48.90	Horizontal
2137.500000	-62.00	-13.00	49.00	Horizontal
2843.500000	-57.33	-13.00	44.33	Horizontal
6060.525000	-64.08	-13.00	51.08	Horizontal

NOTE:

- 1) The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.
- 2) only the worst case data presented in this report.



8 Frequency Stability

8.1 Frequency Error VS. Voltage

BAND	Band width	Modulation	Channel	Number of T	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	VL	TN	9.63	0.013800	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	VN	TN	3.25	0.004654	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	VH	TN	13.86	0.019856	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	VL	TN	7.22	0.010214	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	VN	TN	0.53	0.000747	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	VH	TN	7.66	0.010837	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	VL	TN	-2.78	-0.003880	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	VN	TN	5.14	0.007177	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	VH	TN	-1.67	-0.002332	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	VL	TN	-10.62	-0.015216	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	VN	TN	-11.58	-0.016584	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	VH	TN	-1.96	-0.002812	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	VL	TN	-7.46	-0.010546	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	VN	TN	3.42	0.004838	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	VH	TN	-2.07	-0.002925	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	VL	TN	-3.55	-0.004954	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	VN	TN	12.47	0.017416	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	VH	TN	10.12	0.014135	±2.5	PASS

8.2 Frequency Error VS. Temperature

BAND	Band width	Modulation	Channel	Number of T	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	-30	-10.24	-0.014668	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	-20	-0.53	-0.000760	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	0	8.75	0.012530	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	10	3.80	0.005436	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	20	-6.78	-0.009712	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	30	-13.83	-0.019806	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	40	-14.78	-0.021167	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134003	12T0	NV	50	-6.32	-0.009053	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	-30	0.02	0.000031	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	-20	-12.73	-0.018002	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	0	-10.02	-0.014173	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	10	14.21	0.020094	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	20	9.23	0.013059	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	30	8.53	0.012061	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	40	2.55	0.003610	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134092	12T0	NV	50	-11.81	-0.016701	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	-30	0.59	0.000824	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	-20	0.17	0.000232	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	0	9.40	0.013124	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	10	11.50	0.016068	±2.5	PASS



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NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	20	-10.77	-0.015049	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	30	-5.99	-0.008366	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	40	-3.23	-0.004517	±2.5	PASS
NB1 Band 85	180KHz	BPSK/15KHz	134181	12T0	NV	50	-0.37	-0.000510	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	-30	-8.73	-0.012505	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	-20	-10.84	-0.015529	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	0	6.45	0.009237	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	10	13.61	0.019489	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	20	-7.90	-0.011323	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	30	10.00	0.014322	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	40	-14.69	-0.021041	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134003	12T0	NV	50	-13.94	-0.019970	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	-30	10.20	0.014423	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	-20	7.94	0.011232	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	0	4.56	0.006452	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	10	3.71	0.005253	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	20	-13.99	-0.019784	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	30	6.94	0.009823	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	40	6.26	0.008856	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134092	12T0	NV	50	1.67	0.002364	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	-30	3.17	0.004432	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	-20	-4.15	-0.005793	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	0	-7.61	-0.010632	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	10	10.67	0.014900	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	20	3.45	0.004819	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	30	-14.73	-0.020573	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	40	4.80	0.006698	±2.5	PASS
NB1 Band 85	180KHz	QPSK/15KHz	134181	12T0	NV	50	-14.54	-0.020312	±2.5	PASS

The End



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