



Appendix B

LTE-NB1 Band 5



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1 Effective Radiated Power Output Data

1.1 Test Result for LTE NB1 Band 5

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 5	BPSK	3.75	20401	1T0	20.17	17.02	38.45	PASS
NB1 Band 5	BPSK	3.75	20525	1T0	20.36	17.21	38.45	PASS
NB1 Band 5	BPSK	3.75	20649	1T0	20.20	17.05	38.45	PASS
NB1 Band 5	QPSK	3.75	20401	1T0	20.19	17.04	38.45	PASS
NB1 Band 5	QPSK	3.75	20525	1T0	20.32	17.17	38.45	PASS
NB1 Band 5	QPSK	3.75	20649	1T0	20.21	17.06	38.45	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 5	BPSK	15	20401	1T0	20.38	17.23	38.45	PASS
NB1 Band 5	BPSK	15	20525	1T0	20.41	17.26	38.45	PASS
NB1 Band 5	BPSK	15	20649	1T0	20.36	17.21	38.45	PASS
NB1 Band 5	QPSK	15	20401	1T0	20.43	17.28	38.45	PASS
NB1 Band 5	QPSK	15	20401	12T0	20.11	16.96	38.45	PASS
NB1 Band 5	QPSK	15	20525	1T0	20.38	17.23	38.45	PASS
NB1 Band 5	QPSK	15	20525	12T0	20.12	16.97	38.45	PASS
NB1 Band 5	QPSK	15	20649	1T0	20.41	17.26	38.45	PASS
NB1 Band 5	QPSK	15	20649	12T0	20.15	17.00	38.45	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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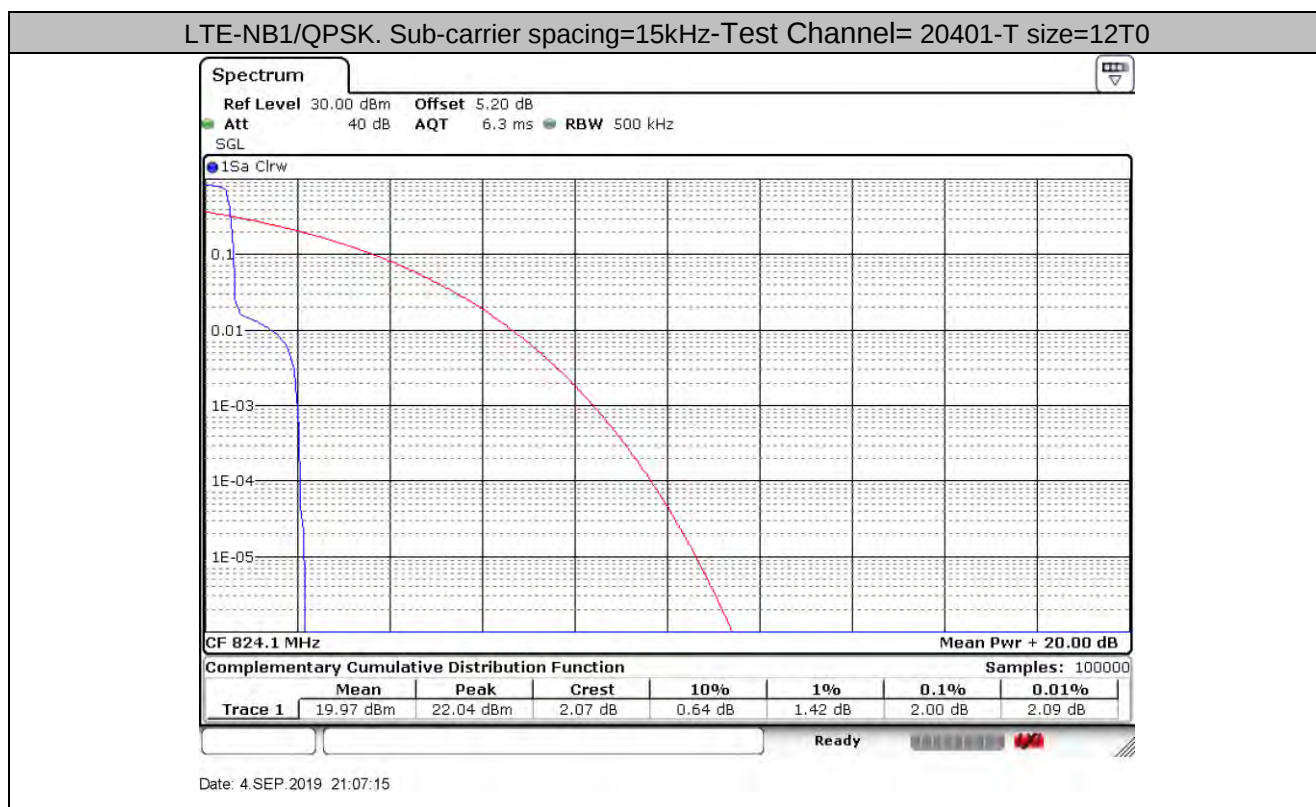


2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 5	QPSK/12T0	20401	2.00	13	PASS
NB1 Band 5	QPSK/12T0	20525	2.75	13	PASS
NB1 Band 5	QPSK/12T0	20649	3.07	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 5



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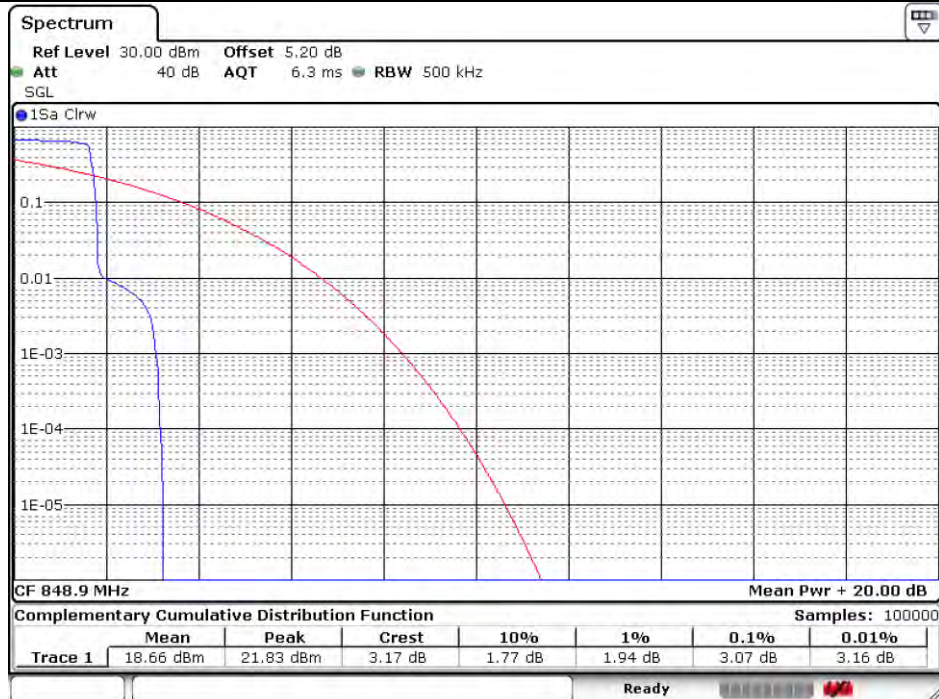


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20525-T size=12T0



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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20649-T size=12T0



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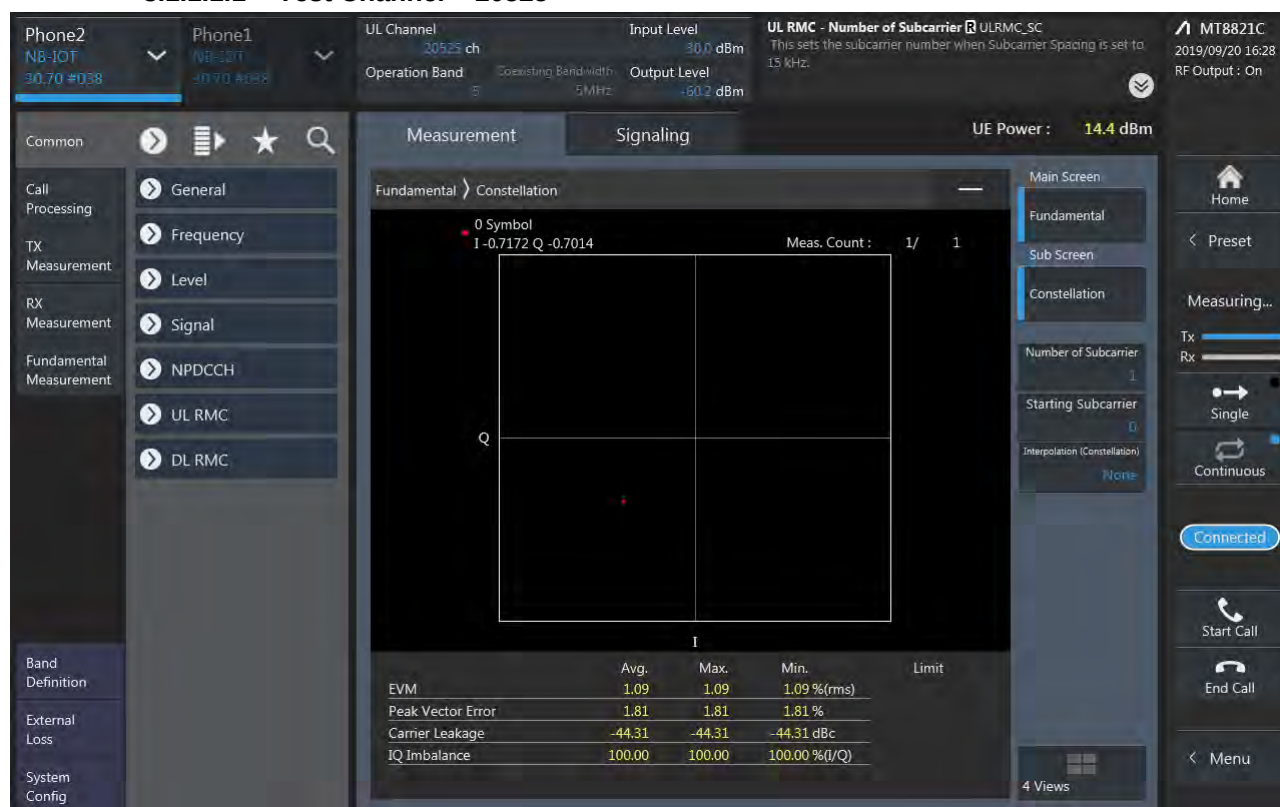
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 5

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

3.1.1.1.1 Test Channel = 20525



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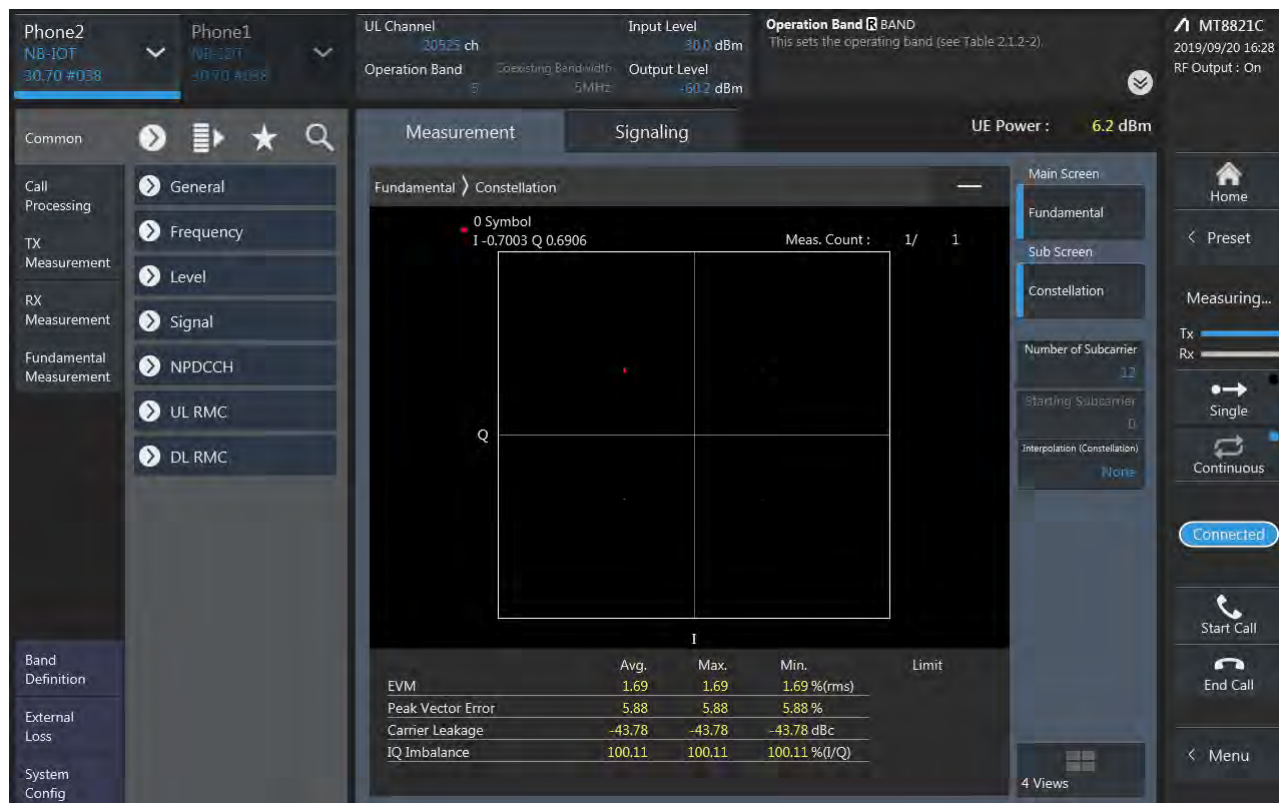
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3.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.2.1 Test Channel = 20525



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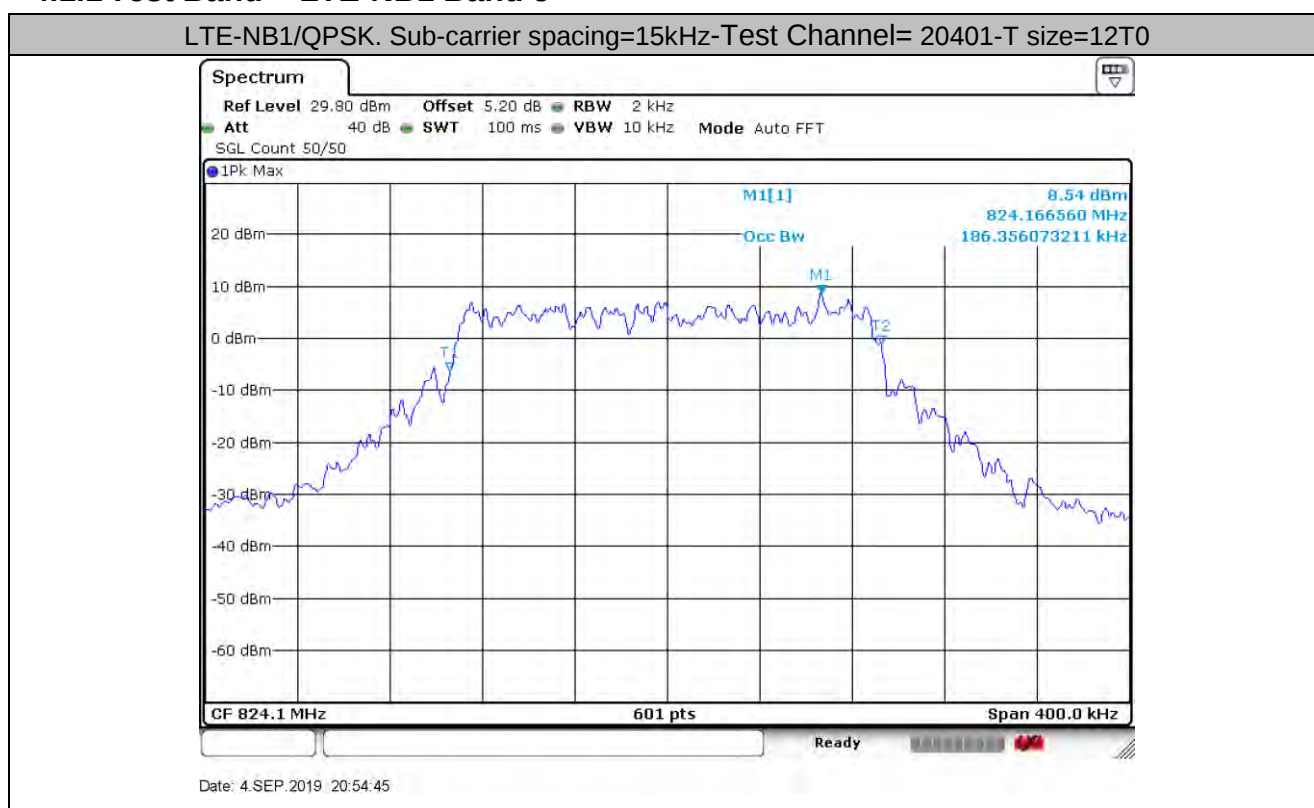


4 26dB Bandwidth and Occupied Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 5	QPSK/15kHz	12T0	20401	186.36	244.26	PASS
NB1 Band 5	QPSK/15kHz	12T0	20525	186.36	243.59	PASS
NB1 Band 5	QPSK/15kHz	12T0	20649	186.36	242.93	PASS

4.1 For LTE-NB1

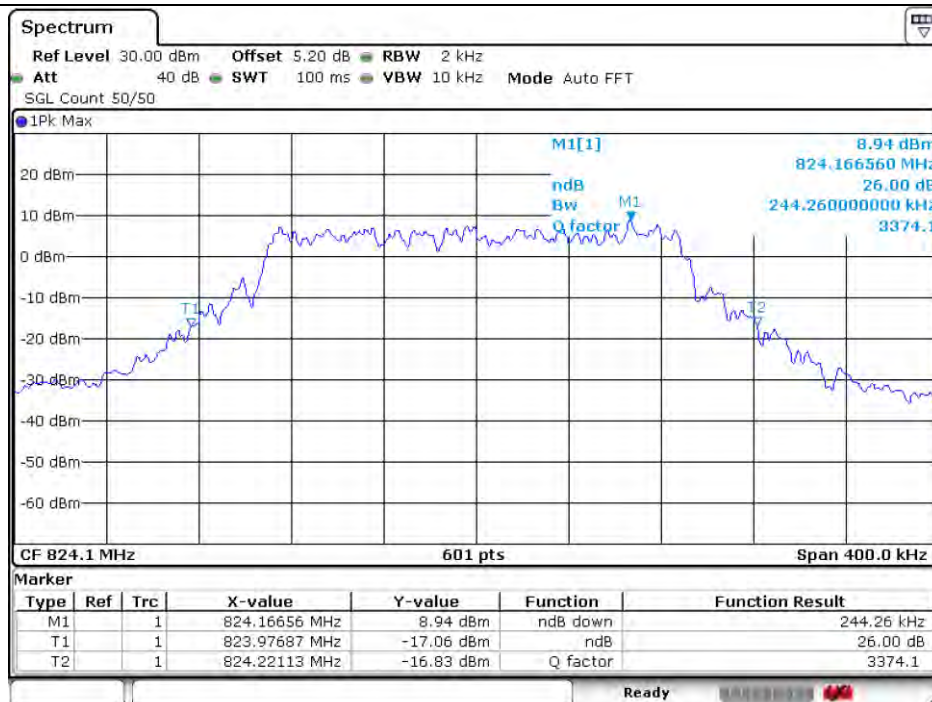
4.1.1 Test Band = LTE-NB1 Band 5



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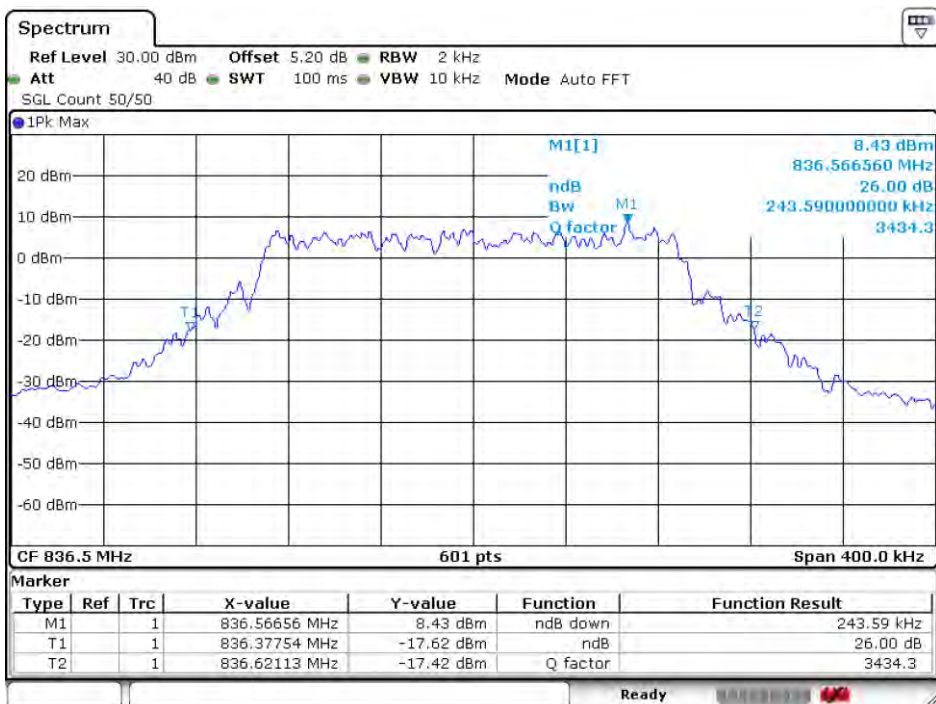
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20525-T size=12T0



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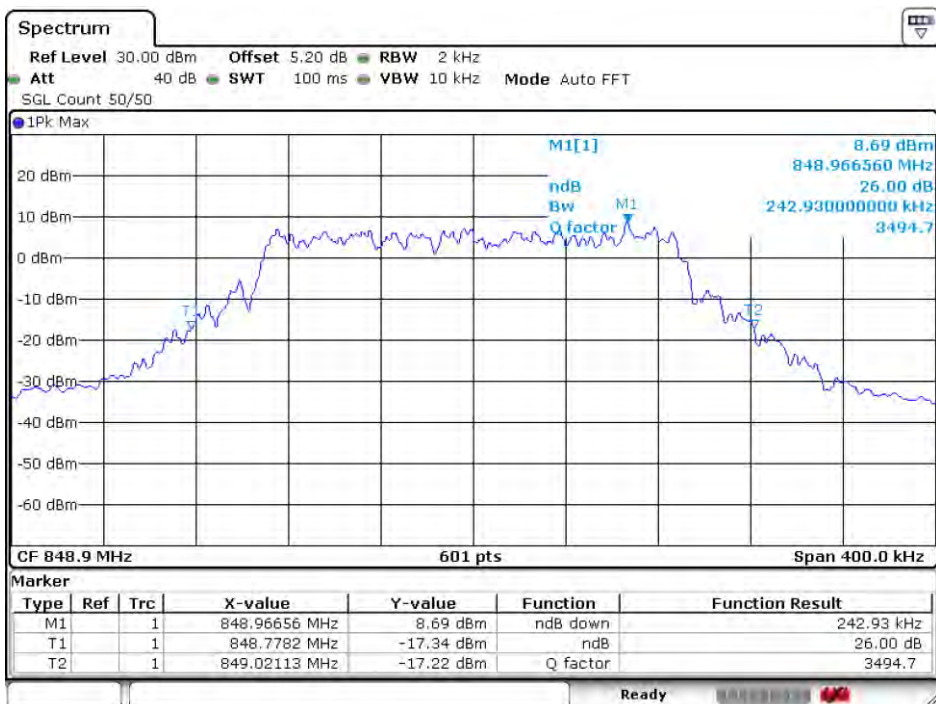
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20649-T size=12T0



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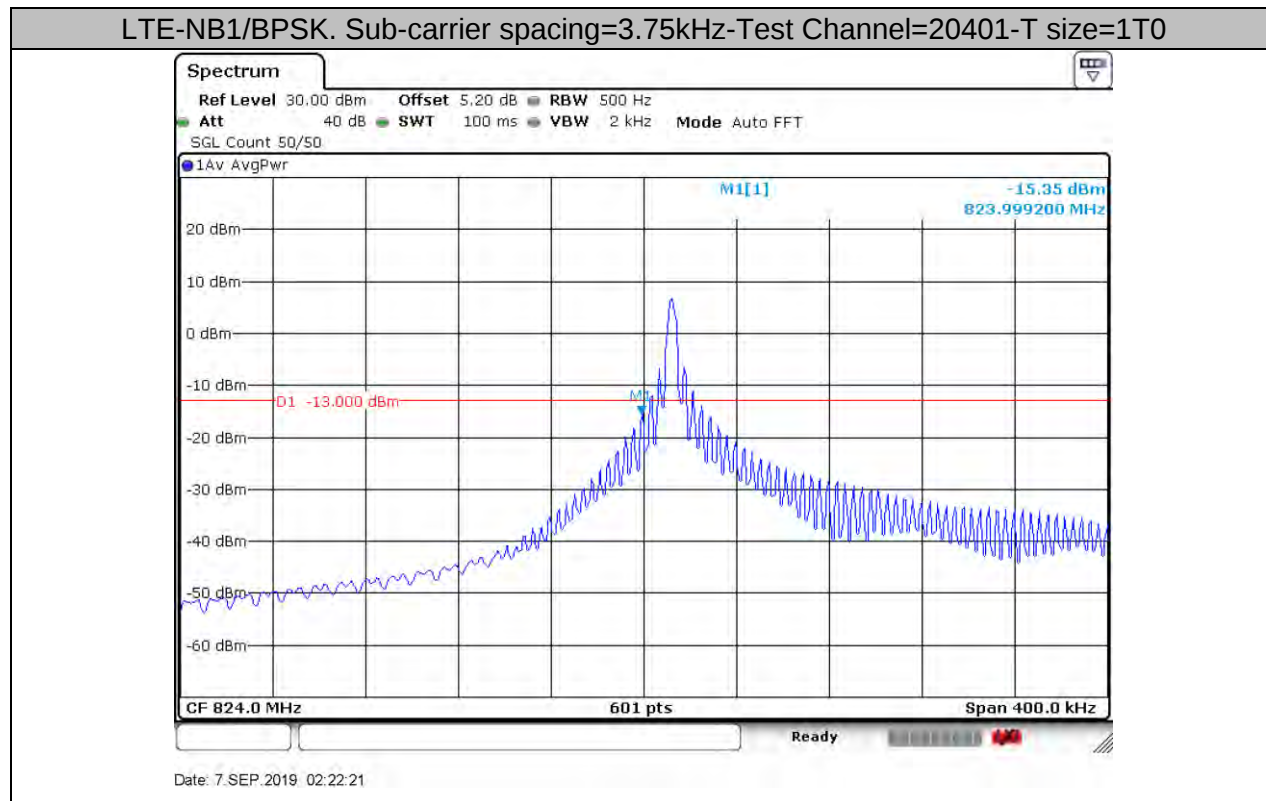
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5 Band Edges Compliance

5.1 For LTE-NB1

5.1.1 Test Band = LTE-NB1 Band 5



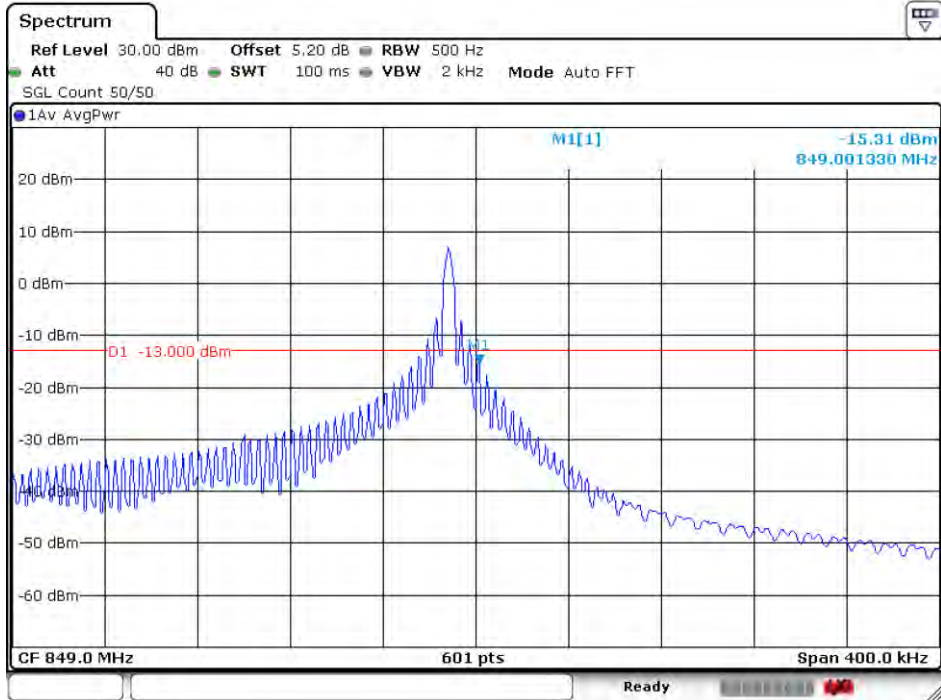
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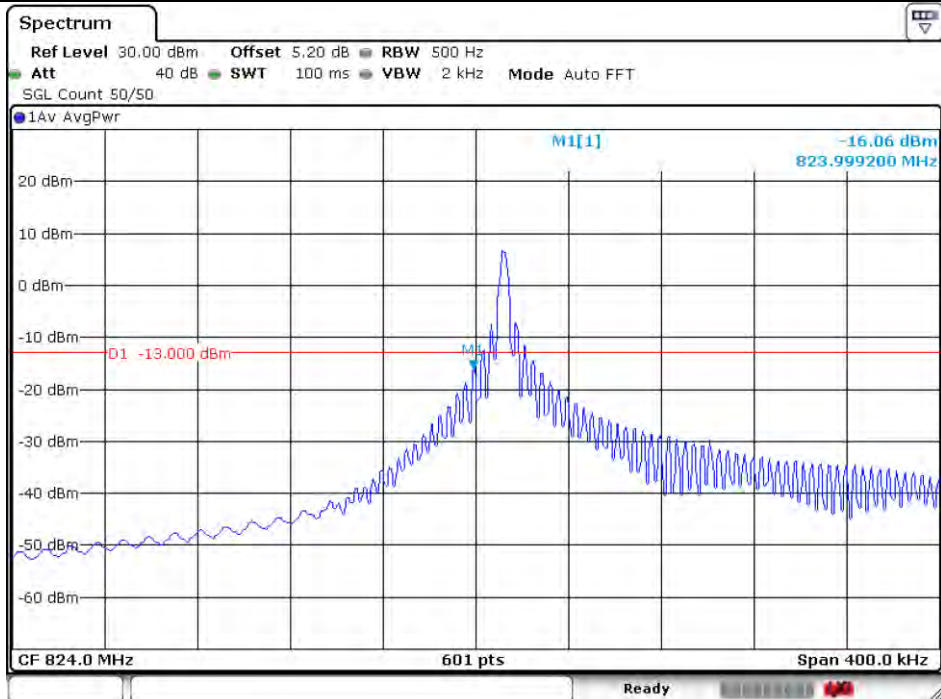
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T47



Date: 7.SEP.2019 02:24:06

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20401-T size=1T0



Date: 7.SEP.2019 02:22:02



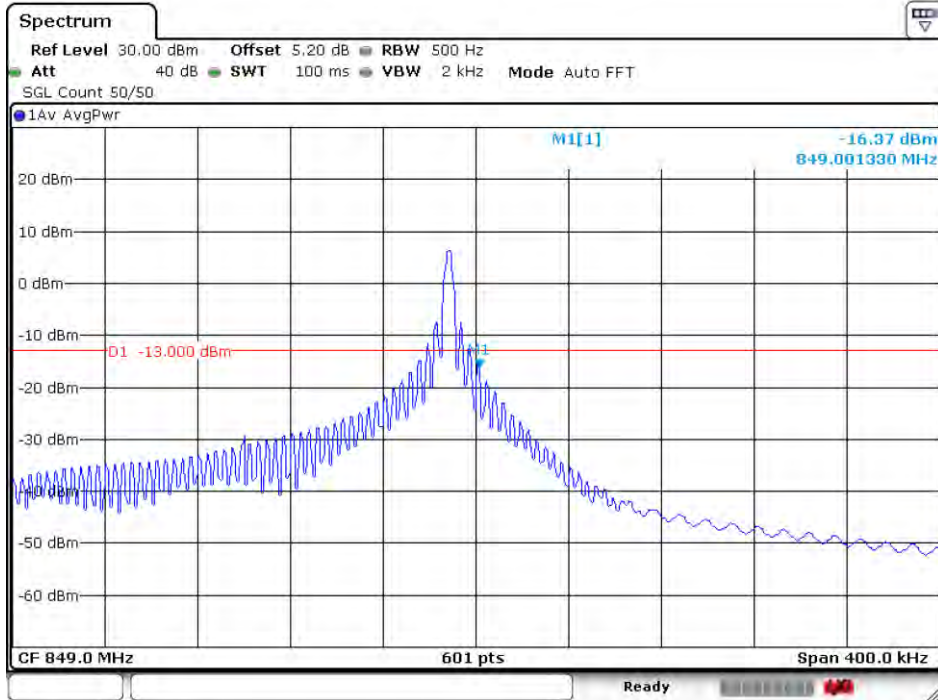
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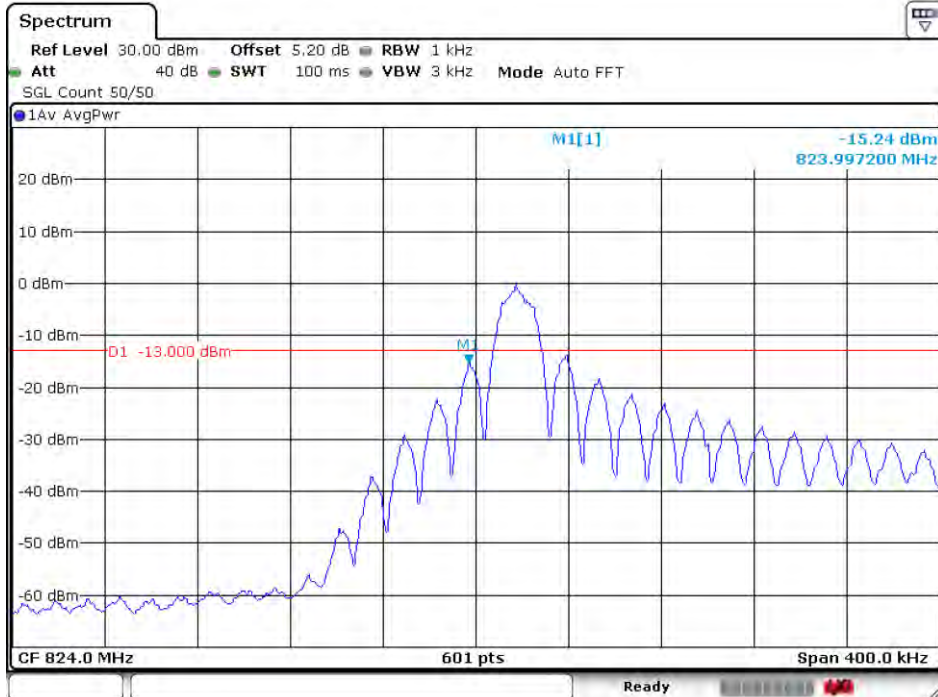
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T47



Date: 7.SEP.2019 02:24:24

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=1T0



Date: 7.SEP.2019 02:19:42



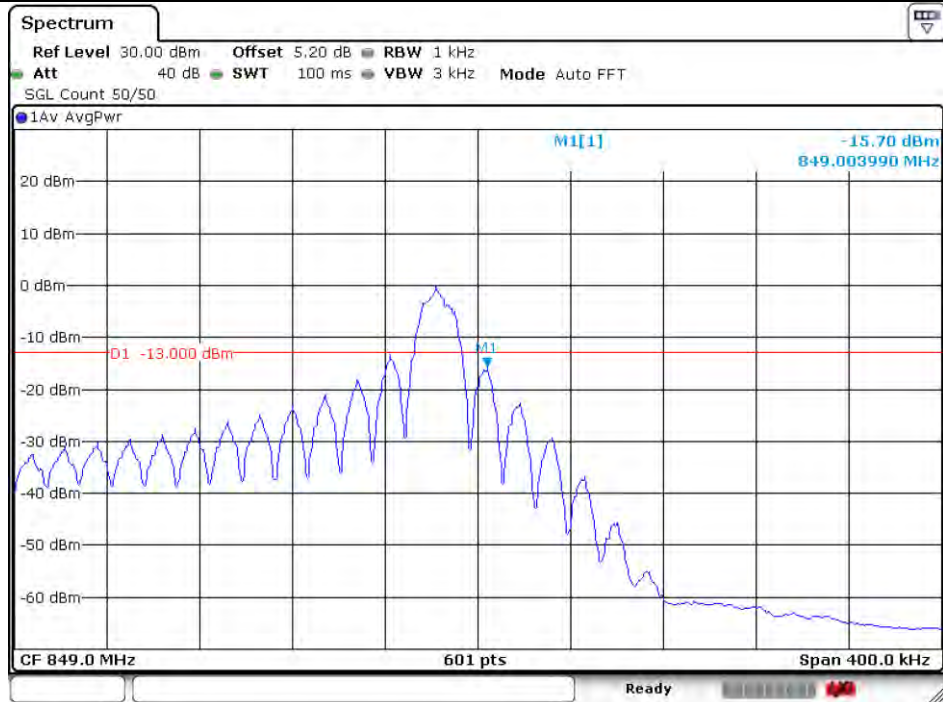
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LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=1T11



Date: 7.SEP.2019 02:25:26

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=1T0



Date: 7.SEP.2019 02:21:05



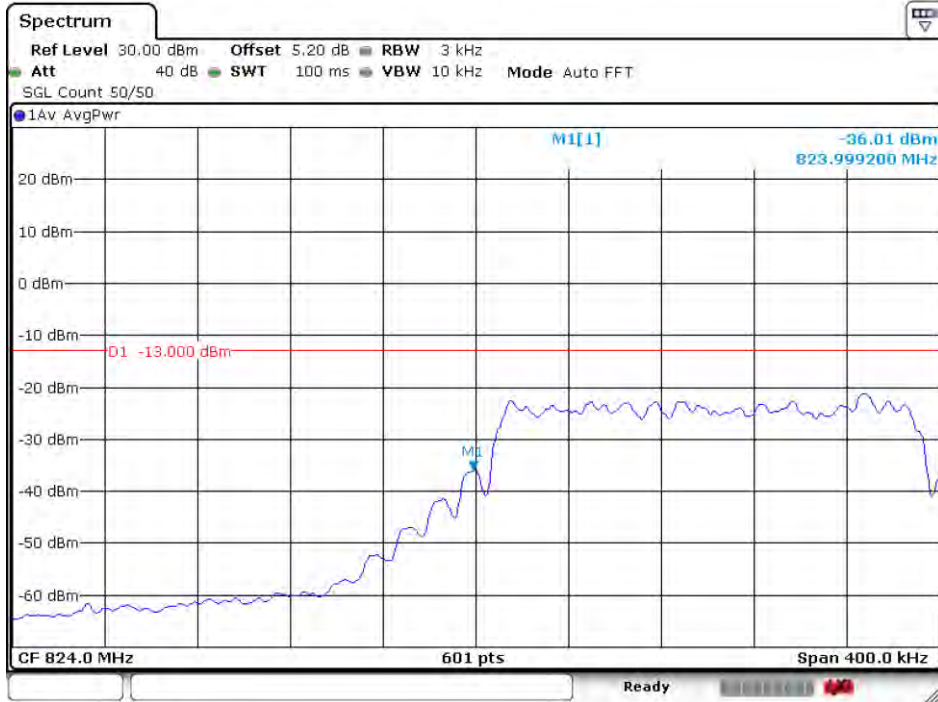
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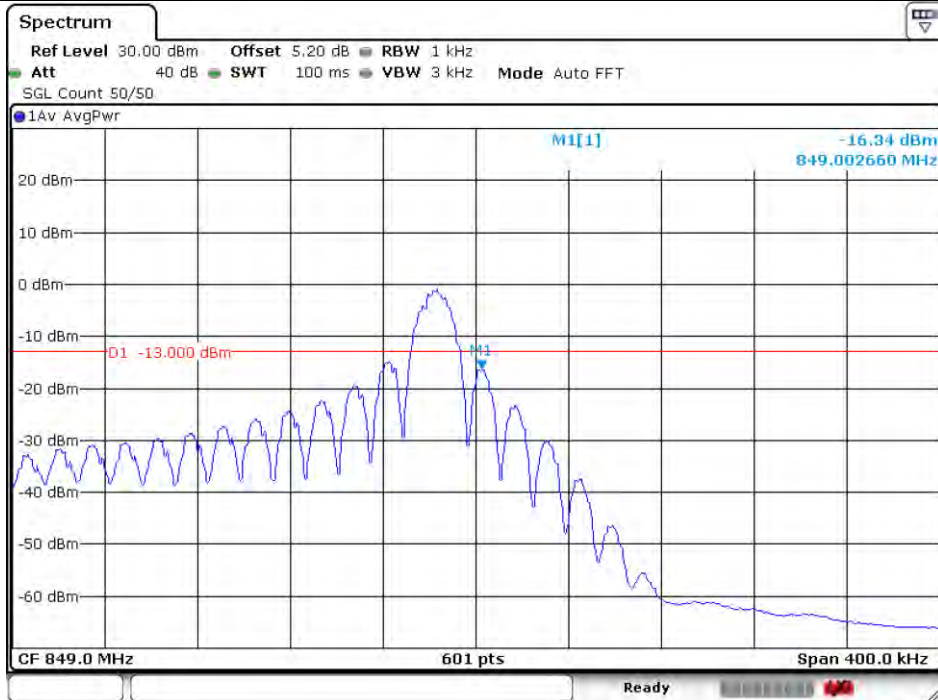
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20401-T size=12T0



Date: 7.SEP.2019 02:21:26

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=1T11



Date: 7.SEP.2019 02:25:02



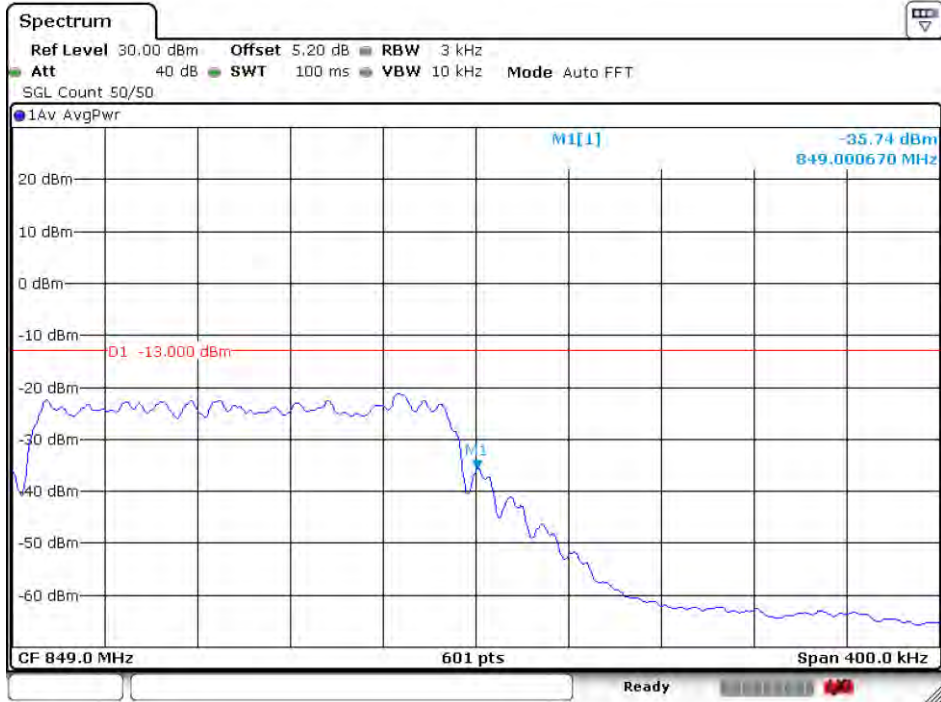
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=12T0



Date: 7.SEP.2019 02:25:48



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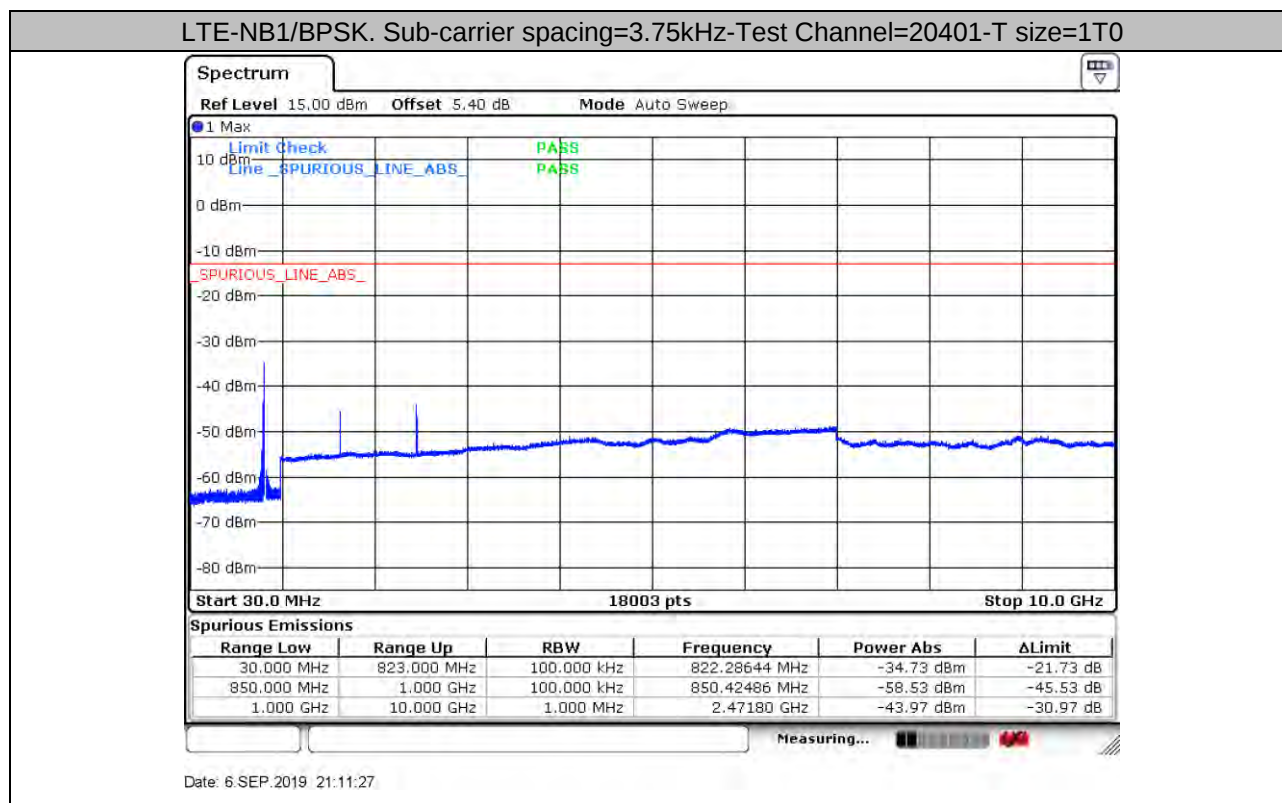
6 Spurious Emission at Antenna Terminal

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 = $k * (Span / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Part I - Test Plots

6.1 For LTE-NB1

6.1.1 Test Band = LTE-NB1 Band 5



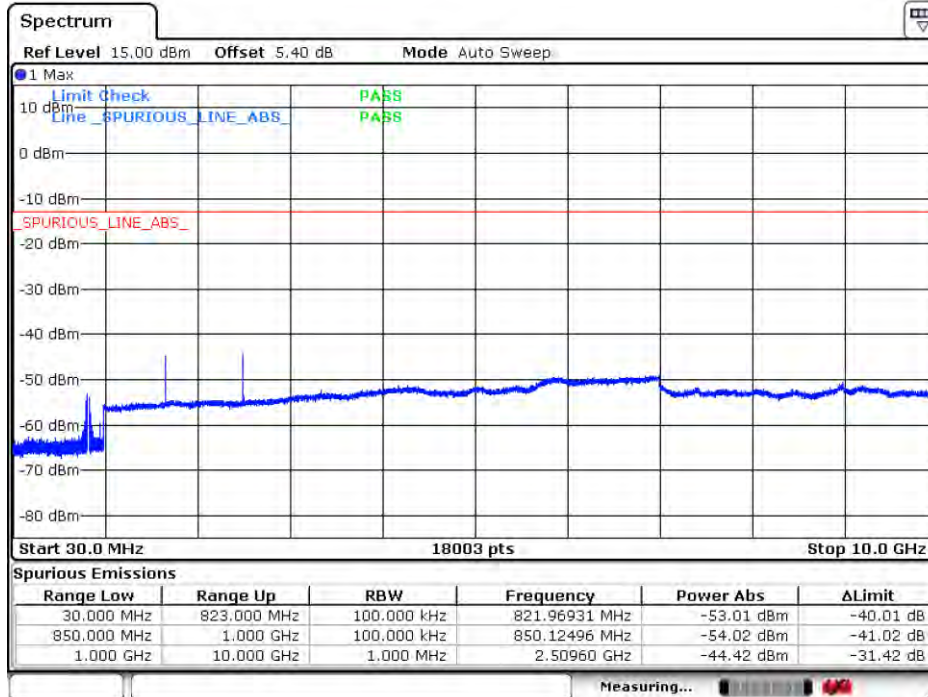
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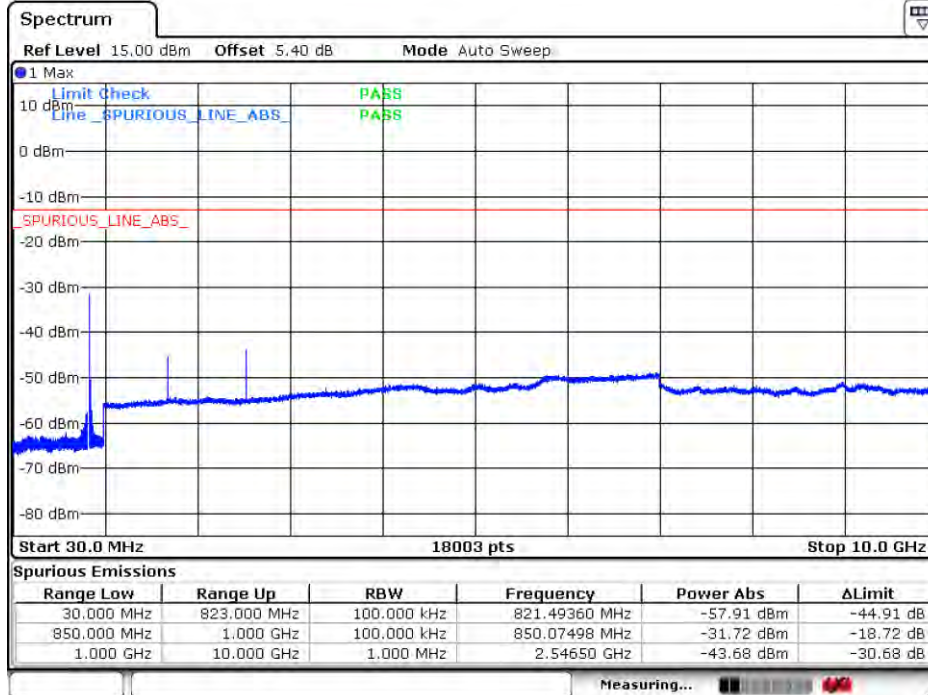
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20525-T size=1T0



Date: 6 SEP. 2019 21:31:42

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20649-T size=1T0



Date: 6 SEP. 2019 21:37:14



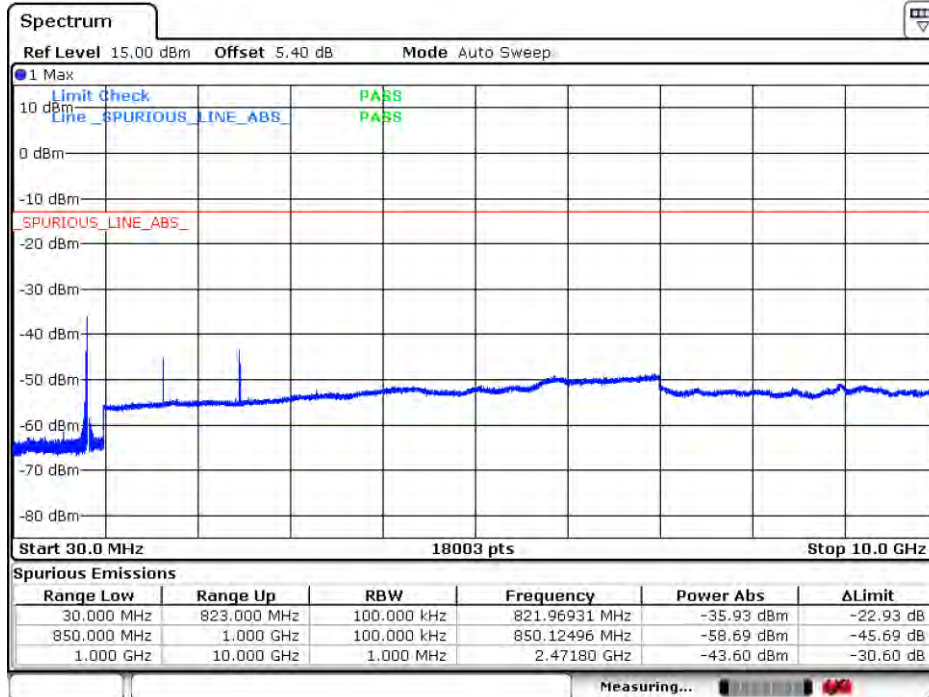
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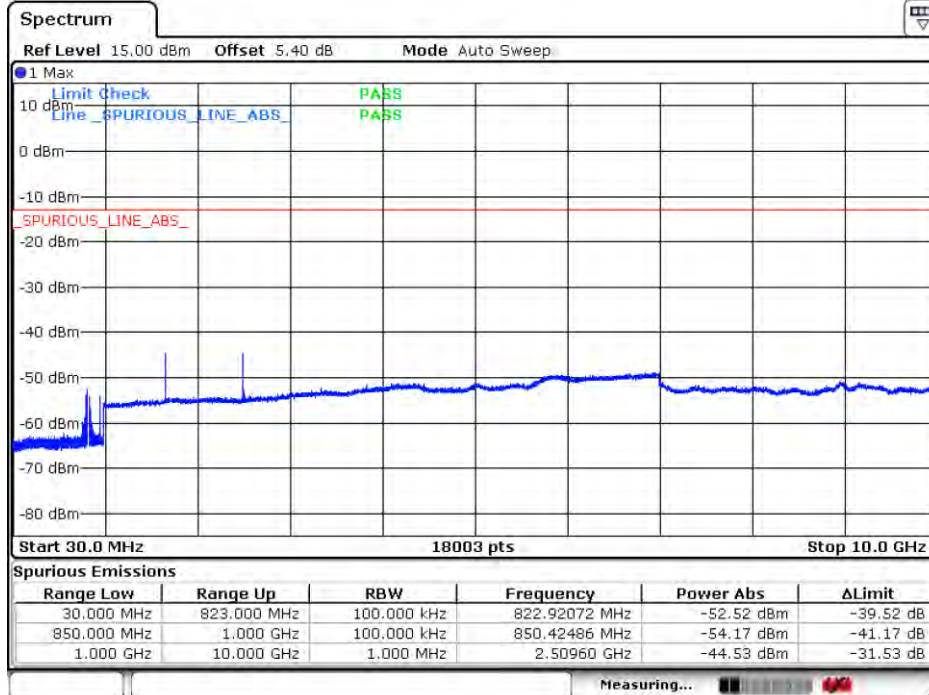
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20401-T size=1T0



Date: 6 SEP. 2019 21:10:46

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20525-T size=1T0



Date: 6 SEP. 2019 21:32:19



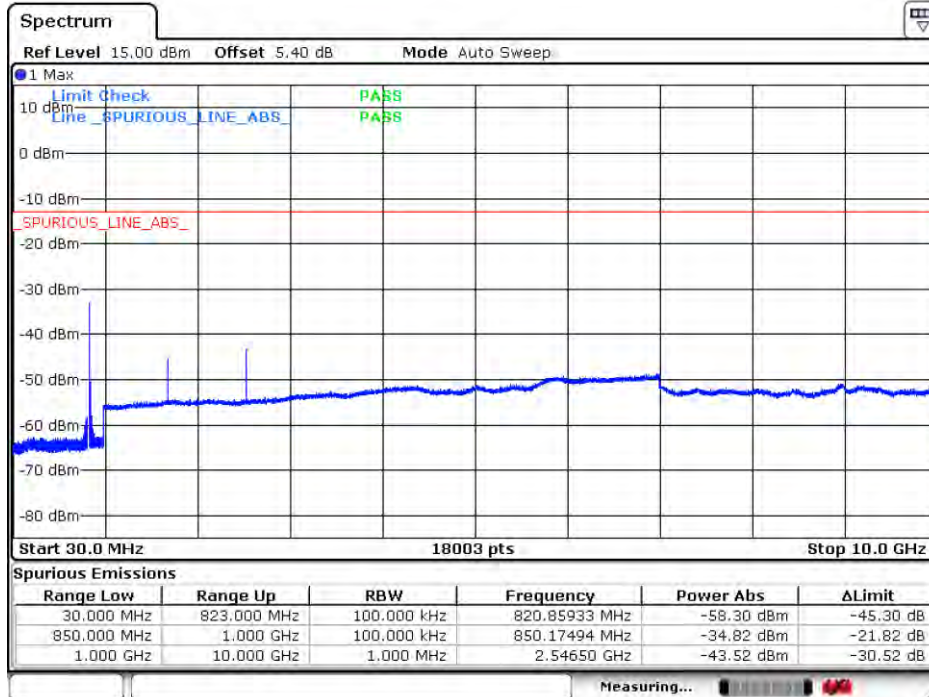
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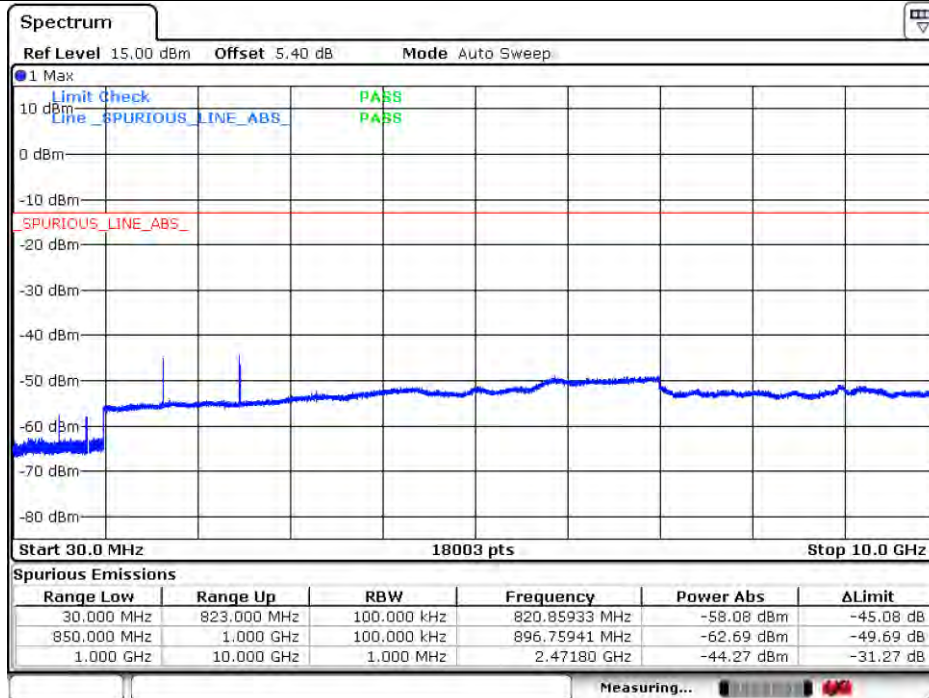
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Date: 6 SEP. 2019 21:36:37

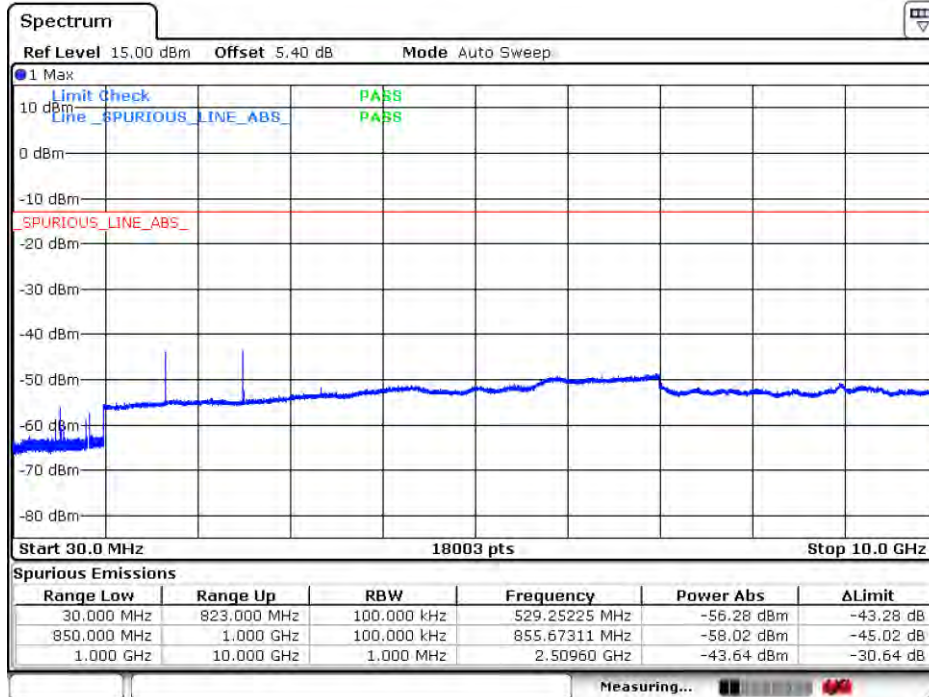
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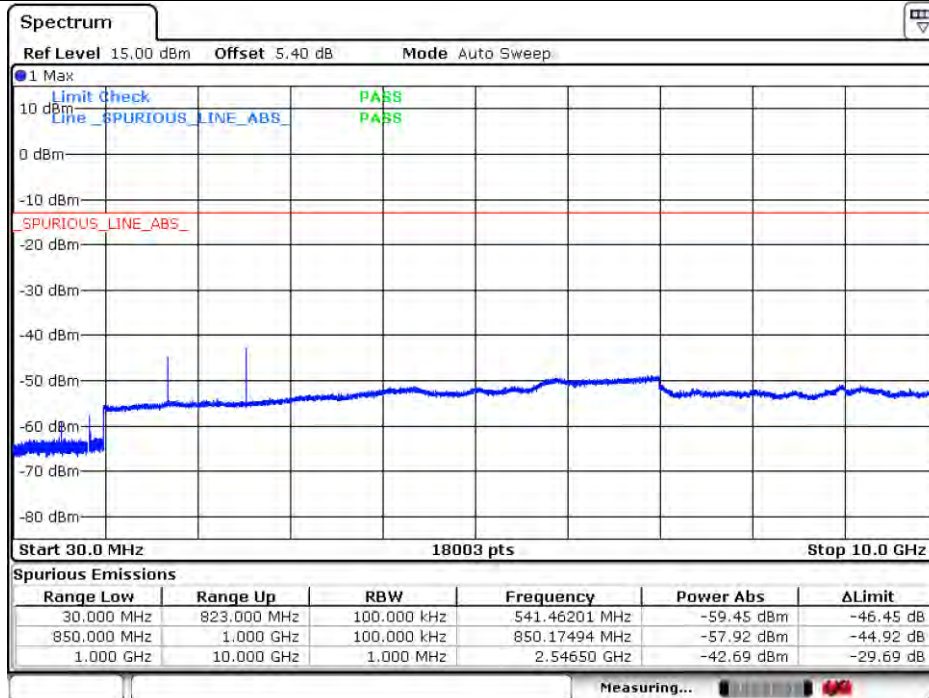


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Date: 6 SEP. 2019 21:33:39

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Date: 6 SEP. 2019 21:34:51



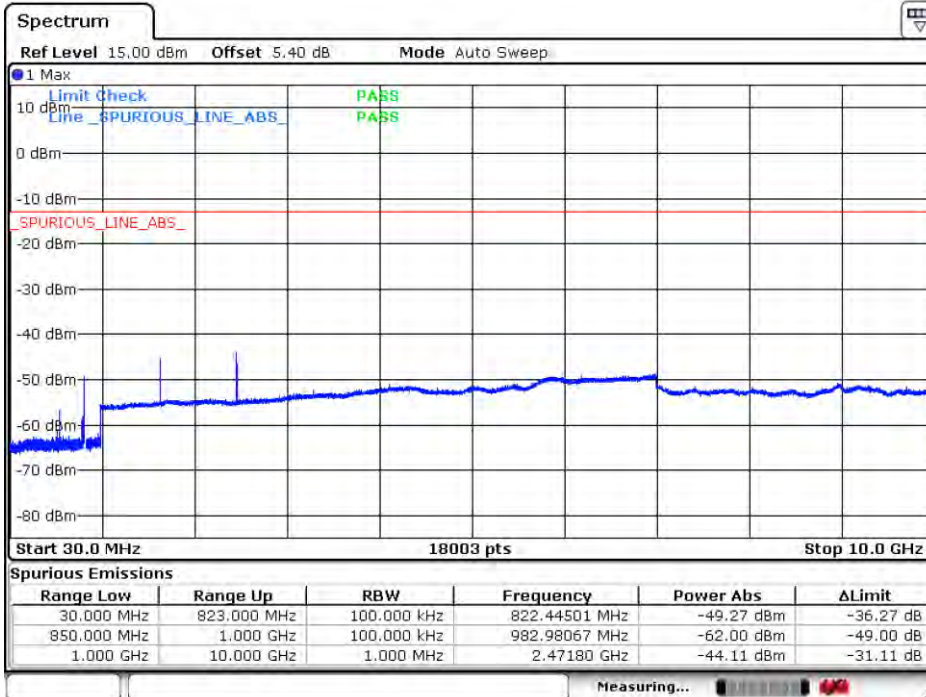
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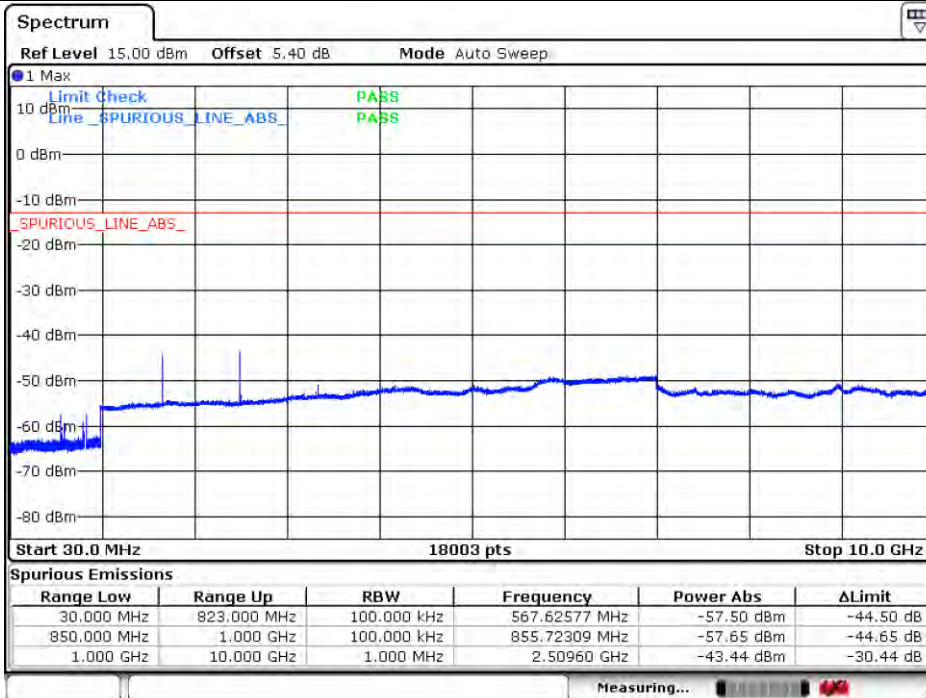
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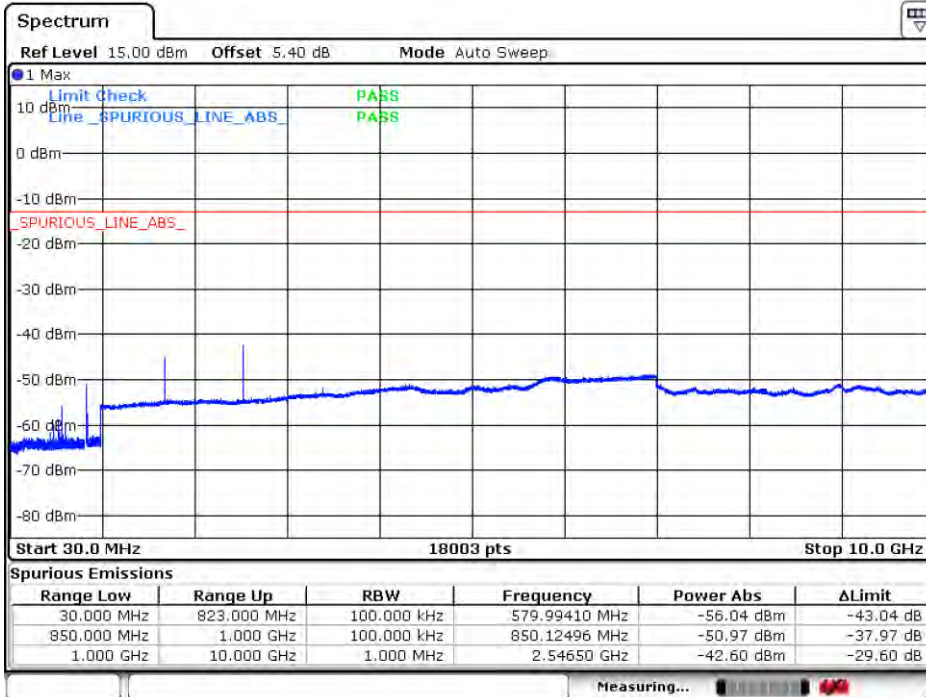
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Date: 6 SEP. 2019 21:33:08



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20649-T size=1T0



Date: 6 SEP. 2019 21:35:37



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7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 5

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

7.1.1.1.1 Test Channel = 20401

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
112.5026	-62.76	-13.00	49.76	Vertical
608.5854	-60.28	-13.00	47.28	Vertical
1166.4333	-64.19	-13.00	51.19	Vertical
2409.0818	-27.20	-13.00	14.20	Vertical
5566.8856	-56.37	-13.00	43.37	Vertical
8722.1907	-50.27	-13.00	37.27	Vertical
44.3567	-61.64	-13.00	48.64	Horizontal
234.5347	-65.56	-13.00	52.56	Horizontal
1166.4333	-64.15	-13.00	51.15	Horizontal
1648.1296	-59.23	-13.00	46.23	Horizontal
2411.4823	-25.31	-13.00	12.31	Horizontal
8728.9910	-50.86	-13.00	37.86	Horizontal

7.1.1.1.2 Test Channel = 20525

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
110.1260	-62.80	-13.00	49.80	Vertical
654.3717	-61.09	-13.00	48.09	Vertical
1672.9346	-59.60	-13.00	46.60	Vertical
2464.2929	-40.08	-13.00	27.08	Vertical
7056.3352	-55.18	-13.00	42.18	Vertical
8918.3973	-52.01	-13.00	39.01	Vertical
43.4352	-62.73	-13.00	49.73	Horizontal
240.0155	-65.35	-13.00	52.35	Horizontal
1672.9346	-50.31	-13.00	37.31	Horizontal
1941.3883	-32.67	-13.00	19.67	Horizontal
2464.2929	-37.91	-13.00	24.91	Horizontal
8817.7939	-51.66	-13.00	38.66	Horizontal



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7.1.1.1.3 Test Channel = 20649

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
114.5397	-63.25	-13.00	50.25	Vertical
601.9406	-61.48	-13.00	48.48	Vertical
1166.4333	-64.37	-13.00	51.37	Vertical
2465.4931	-58.32	-13.00	45.32	Vertical
5895.4965	-55.37	-13.00	42.37	Vertical
8774.5925	-50.61	-13.00	37.61	Vertical
40.9615	-61.61	-13.00	48.61	Horizontal
233.9042	-65.66	-13.00	52.66	Horizontal
1166.4333	-64.49	-13.00	51.49	Horizontal
1697.3395	-61.73	-13.00	48.73	Horizontal
2418.6837	-36.38	-13.00	23.38	Horizontal
8747.3916	-50.78	-13.00	37.78	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.



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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 5	180KHz	BPSK/15KHz	20401	12T0	VL	TN	-3.81	-0.004622	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	VN	TN	14.45	0.017539	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	VH	TN	14.96	0.018148	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	VL	TN	-6.36	-0.007604	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	VN	TN	1.70	0.002030	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	VH	TN	-3.54	-0.004234	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	VL	TN	11.26	0.013269	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	VN	TN	-14.16	-0.016678	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	VH	TN	7.21	0.008498	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	VL	TN	8.45	0.010248	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	VN	TN	-3.95	-0.004795	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	VH	TN	-2.83	-0.003432	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	VL	TN	-9.50	-0.011357	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	VN	TN	14.42	0.017240	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	VH	TN	-4.21	-0.005028	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	VL	TN	-1.49	-0.001753	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	VN	TN	8.31	0.009794	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	VH	TN	11.22	0.013218	±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 5	180KHz	BPSK/15KHz	20401	12T0	NV	-30	5.88	0.007132	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	-20	-10.52	-0.012765	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	0	4.74	0.005746	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	10	3.74	0.004537	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	20	2.56	0.003112	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	30	-2.31	-0.002803	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	40	-7.54	-0.009148	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20401	12T0	NV	50	-10.34	-0.012544	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	-30	-8.32	-0.009944	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	-20	-5.58	-0.006676	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	0	-14.16	-0.016929	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	10	1.94	0.002324	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	20	12.13	0.014507	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	30	-11.45	-0.013693	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	40	-0.44	-0.000526	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20525	12T0	NV	50	2.34	0.002791	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	-30	-10.82	-0.012744	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	-20	-7.34	-0.008646	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	0	-5.54	-0.006526	±2.5	PASS



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NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	10	1.87	0.002199	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	20	0.06	0.000067	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	30	1.69	0.001985	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	40	6.45	0.007600	±2.5	PASS
NB1 Band 5	180KHz	BPSK/15KHz	20649	12T0	NV	50	3.71	0.004372	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	-30	-6.11	-0.007417	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	-20	3.59	0.004358	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	0	13.31	0.016153	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	10	-0.32	-0.000387	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	20	8.04	0.009751	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	30	-14.11	-0.017125	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	40	-7.77	-0.009428	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20401	12T0	NV	50	6.32	0.007664	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	-30	3.73	0.004458	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	-20	1.90	0.002273	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	0	11.42	0.013651	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	10	-7.47	-0.008933	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	20	-12.11	-0.014476	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	30	-3.73	-0.004464	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	40	4.92	0.005877	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20525	12T0	NV	50	12.98	0.015520	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	-30	5.55	0.006539	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	-20	-3.41	-0.004022	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	0	-4.69	-0.005530	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	10	-2.08	-0.002447	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	20	6.70	0.007891	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	30	-3.27	-0.003849	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	40	6.21	0.007316	±2.5	PASS
NB1 Band 5	180KHz	QPSK/15KHz	20649	12T0	NV	50	-7.48	-0.008808	±2.5	PASS

The End



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Appendix B

LTE-NB1 Band 12



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1 Effective Radiated Power Output Data

1.1 Test Result for LTE NB1 Band 12

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 12	BPSK	3.75	23011	1T0	20.75	17.20	34.77	PASS
NB1 Band 12	BPSK	3.75	23095	1T0	20.62	17.07	34.77	PASS
NB1 Band 12	BPSK	3.75	23179	1T0	20.62	17.07	34.77	PASS
NB1 Band 12	QPSK	3.75	23011	1T0	20.74	17.19	34.77	PASS
NB1 Band 12	QPSK	3.75	23095	1T0	20.65	17.10	34.77	PASS
NB1 Band 12	QPSK	3.75	23179	1T0	20.63	17.08	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 12	BPSK	15	23011	1T0	20.54	16.99	34.77	PASS
NB1 Band 12	BPSK	15	23095	1T0	20.91	17.36	34.77	PASS
NB1 Band 12	BPSK	15	23179	1T0	20.26	16.71	34.77	PASS
NB1 Band 12	QPSK	15	23011	1T0	20.55	17.00	34.77	PASS
NB1 Band 12	QPSK	15	23011	12T0	20.49	16.94	34.77	PASS
NB1 Band 12	QPSK	15	23095	1T0	20.88	17.33	34.77	PASS
NB1 Band 12	QPSK	15	23095	12T0	20.81	17.26	34.77	PASS
NB1 Band 12	QPSK	15	23179	1T0	20.25	16.70	34.77	PASS
NB1 Band 12	QPSK	15	23179	12T0	20.36	16.81	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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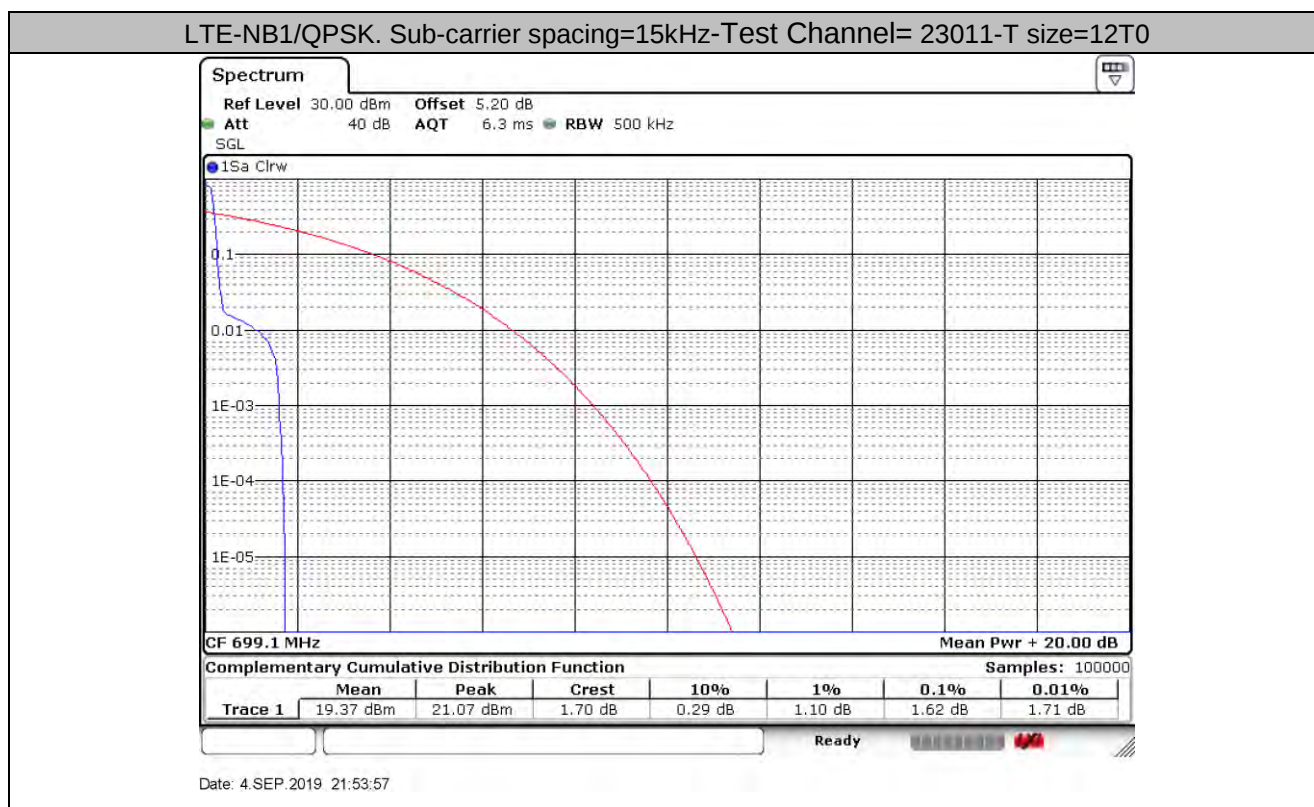


2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 12	QPSK/12T0	23011	1.62	13	PASS
NB1 Band 12	QPSK/12T0	23095	2.99	13	PASS
NB1 Band 12	QPSK/12T0	23179	1.65	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 12



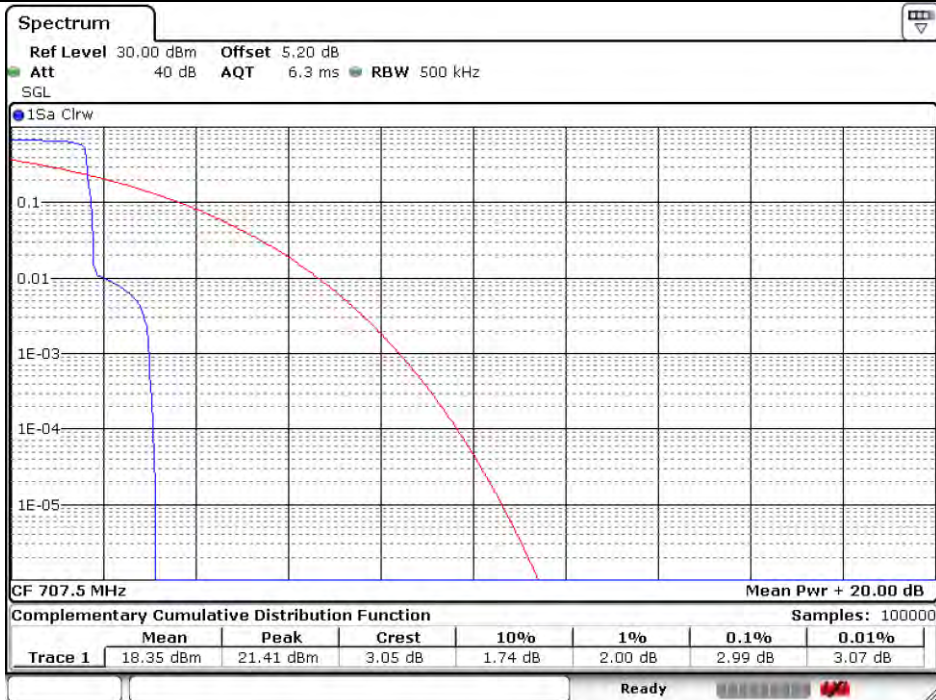
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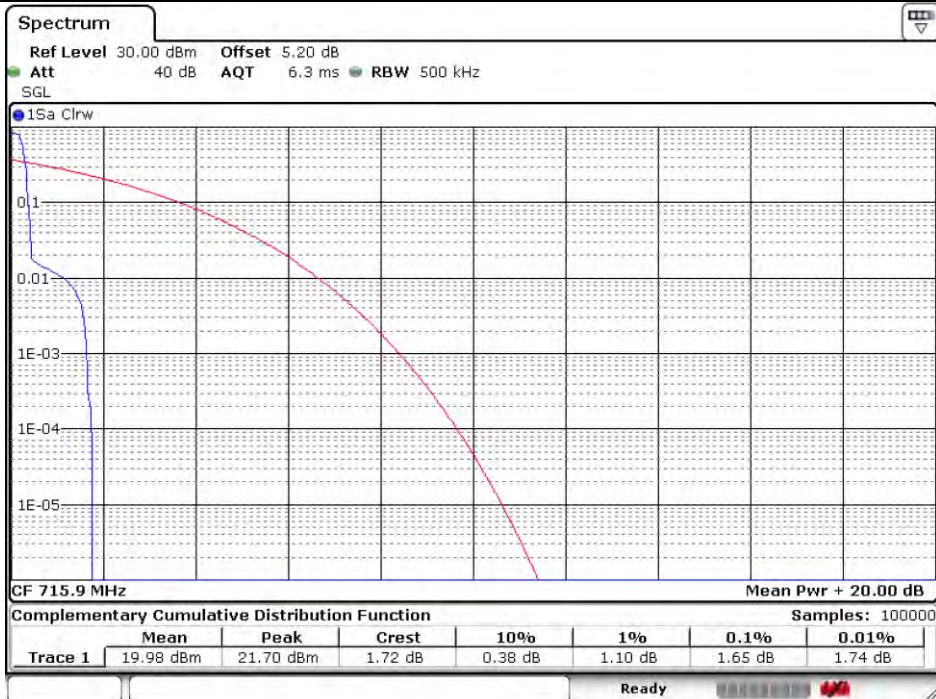


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23095-T size=12T0



Date: 4.SEP.2019 22:25:14

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23179-T size=12T0



Date: 4.SEP.2019 22:25:59



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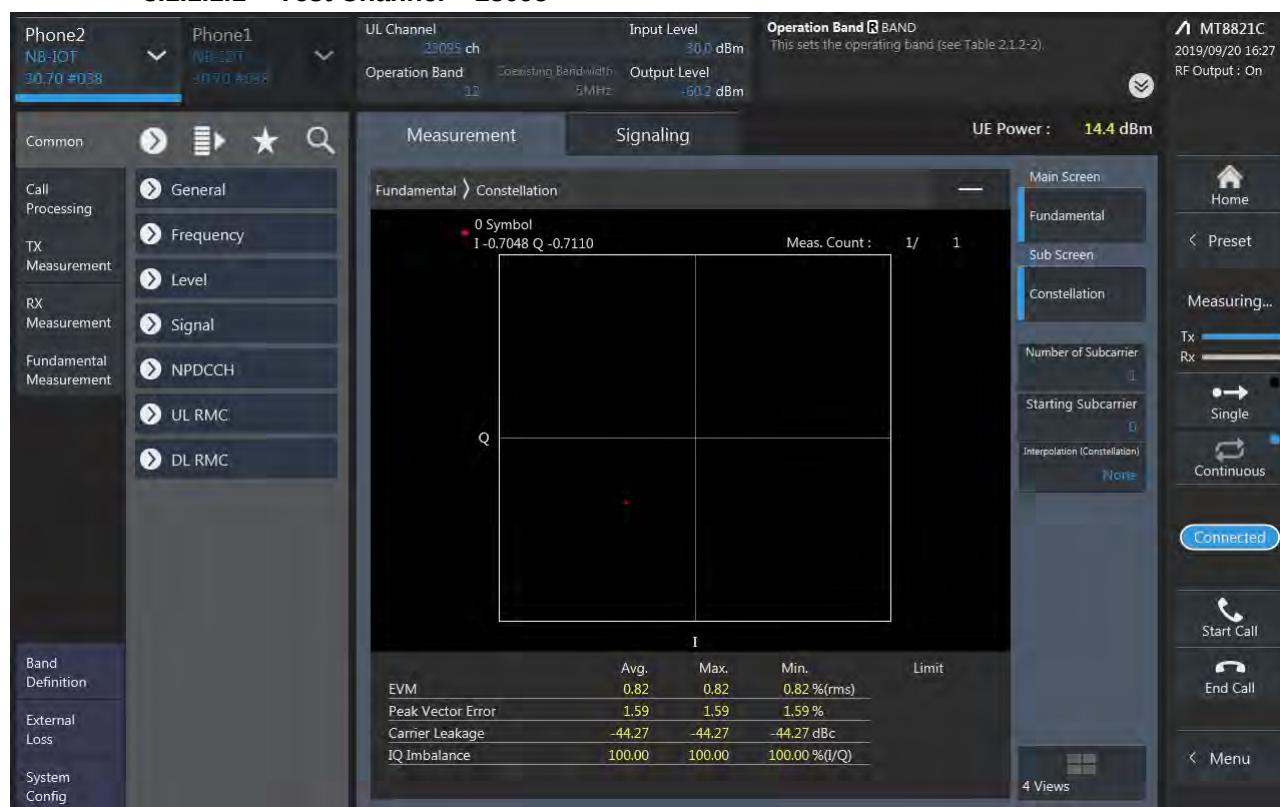
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 12

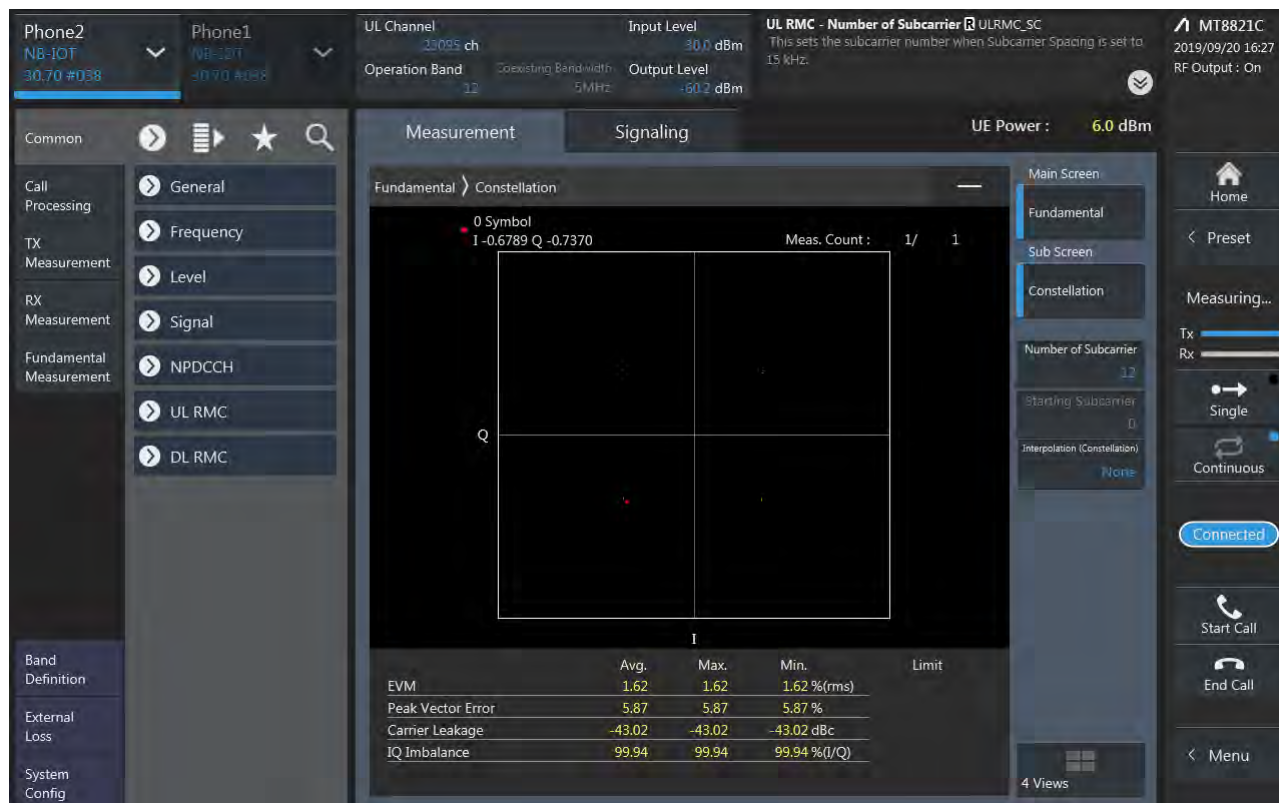
3.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.1.1 Test Channel = 23095



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

3.1.1.2.1 Test Channel = 23095



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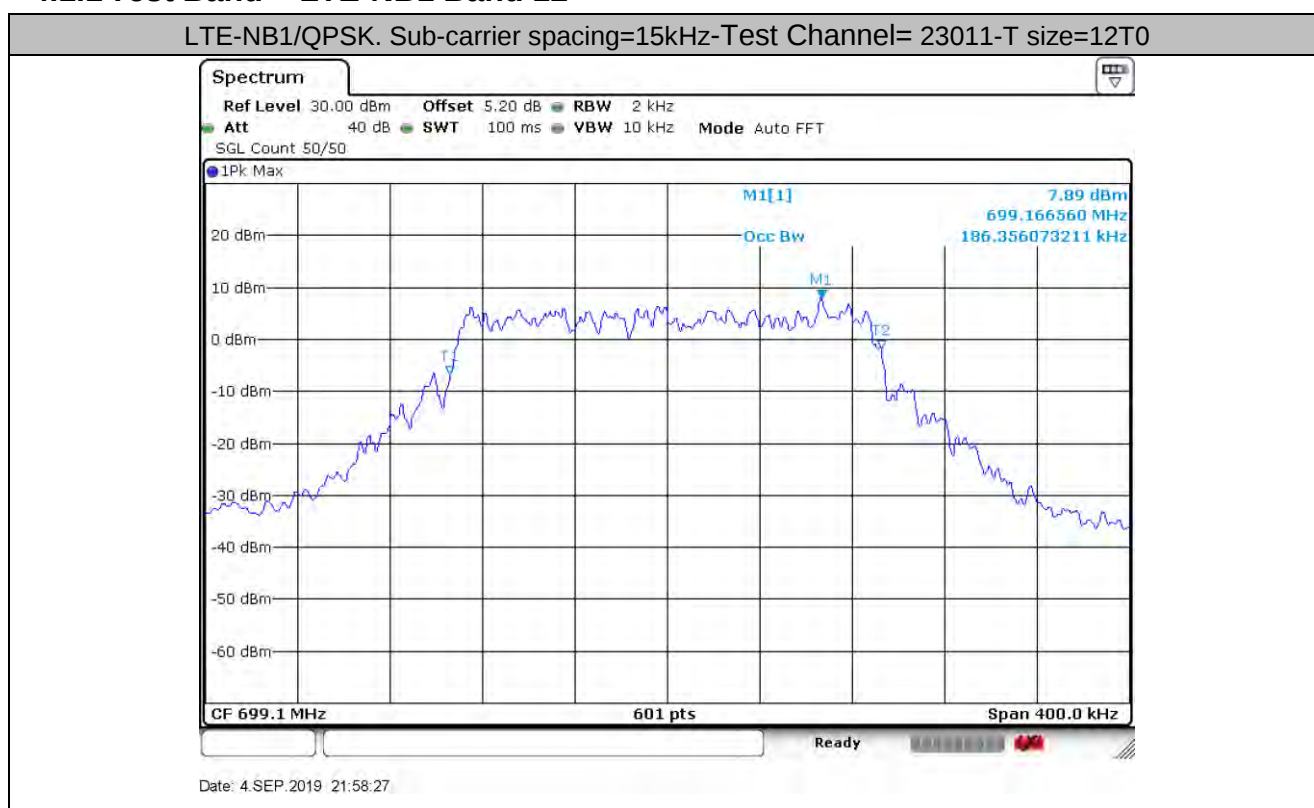
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4 26dB Bandwidth and Occupied Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 12	QPSK/15kHz	12T0	23011	186.36	245.59	PASS
NB1 Band 12	QPSK/15kHz	12T0	23095	186.36	242.93	PASS
NB1 Band 12	QPSK/15kHz	12T0	23179	186.36	242.26	PASS

4.1 For LTE-NB1

4.1.1 Test Band = LTE-NB1 Band 12



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Date: 4.SEP.2019 22:09:20

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23095-T size=12T0



Date: 4.SEP.2019 22:24:19



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Date: 4.SEP.2019 22:11:23

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23179-T size=12T0



Date: 4.SEP.2019 22:28:07

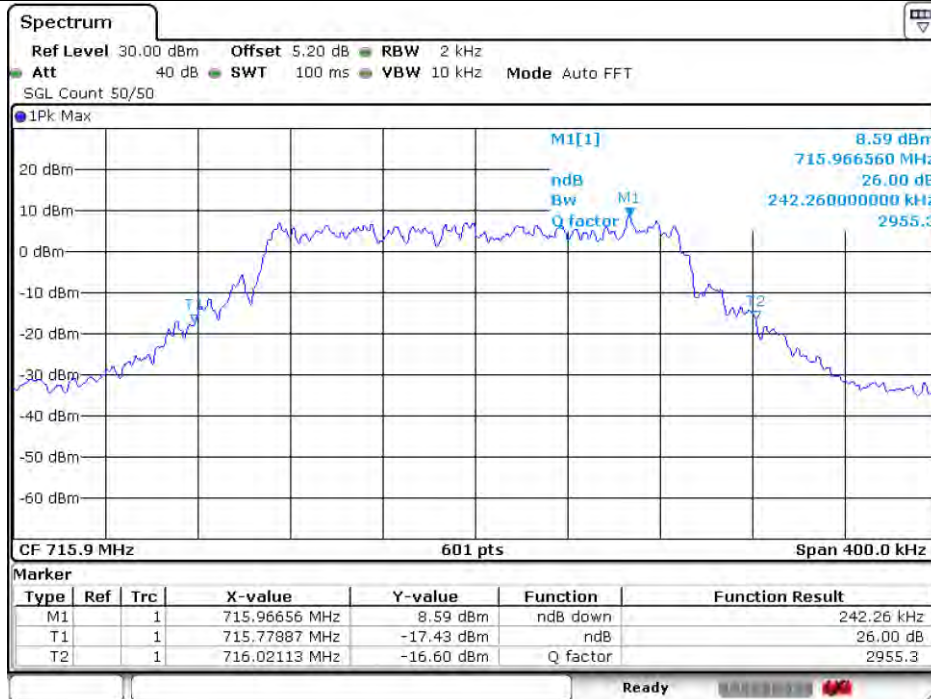


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Date: 4.SEP.2019 22:35:40



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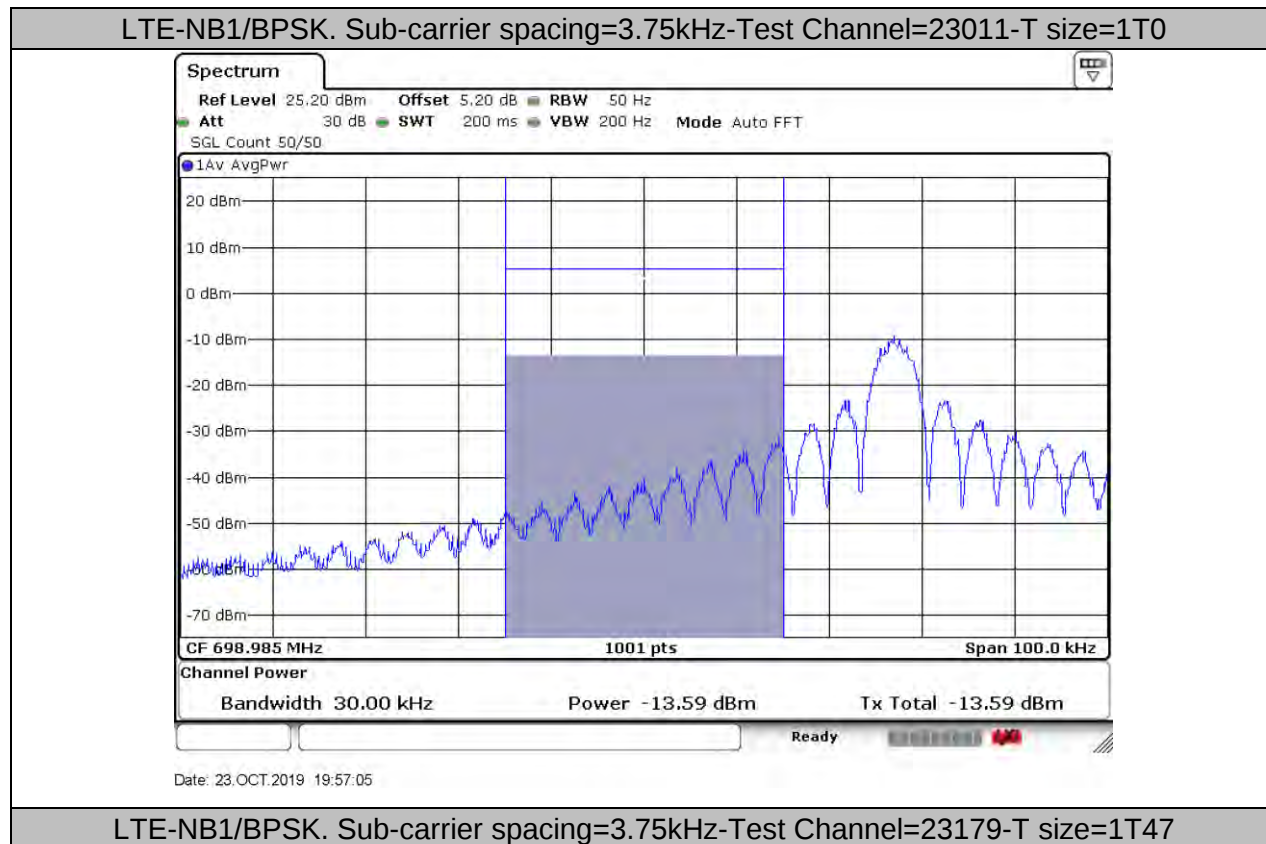
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5 Band Edges Compliance

5.1 For LTE-NB1

5.1.1 Test Band = LTE-NB1 Band 12

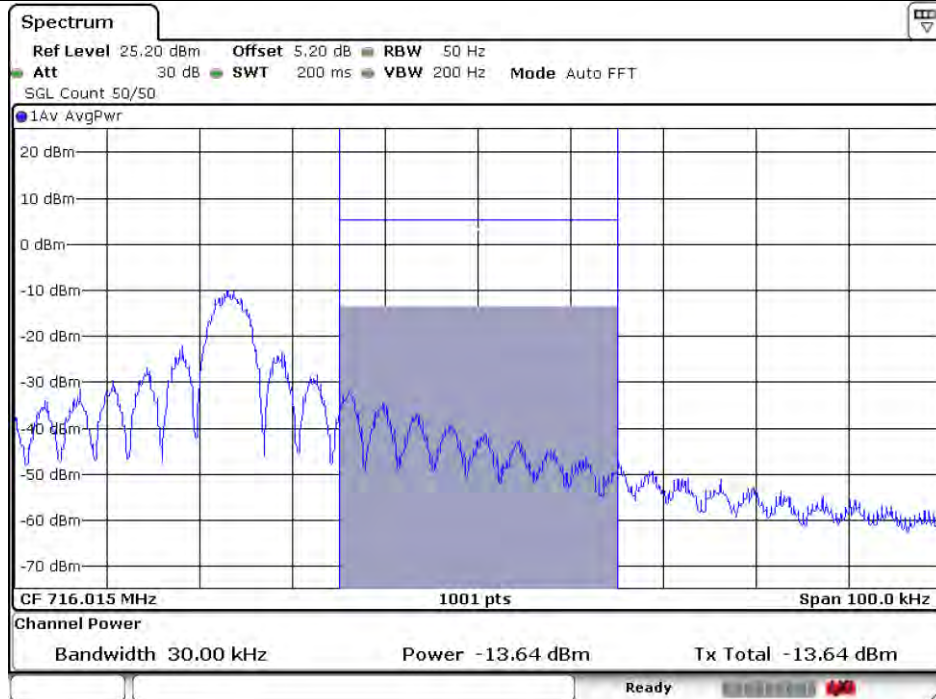


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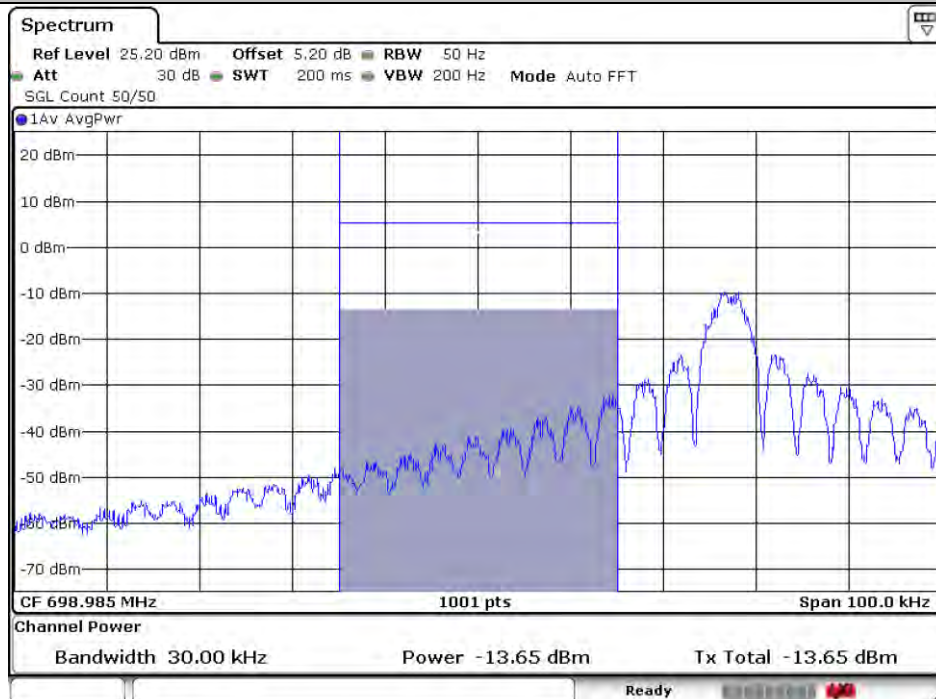
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Date: 23.OCT.2019 20:10:03

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23011-T size=1T0



Date: 23.OCT.2019 19:55:54

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23179-T size=1T47

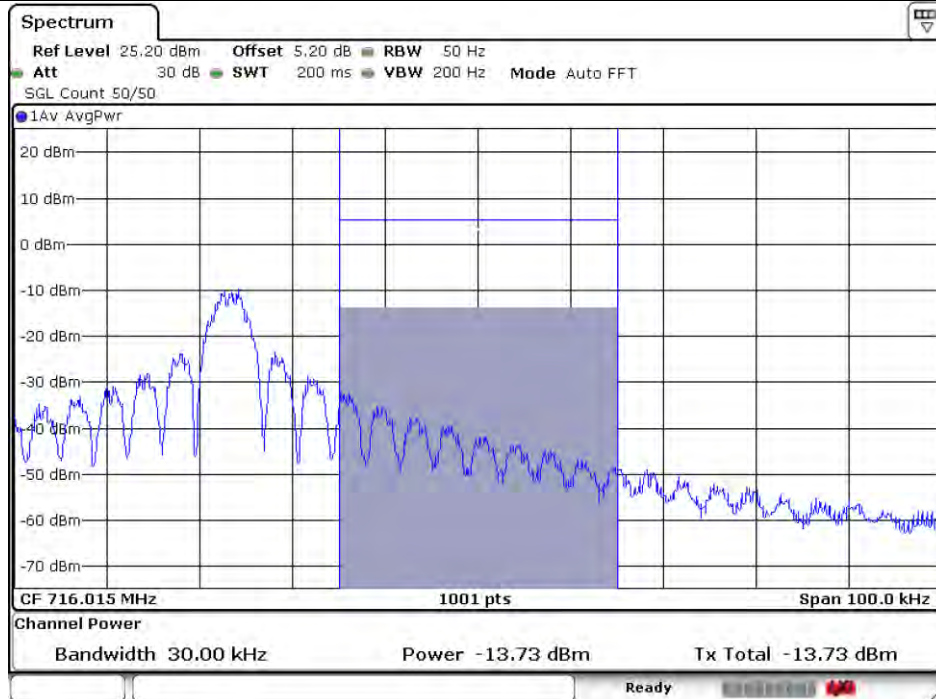


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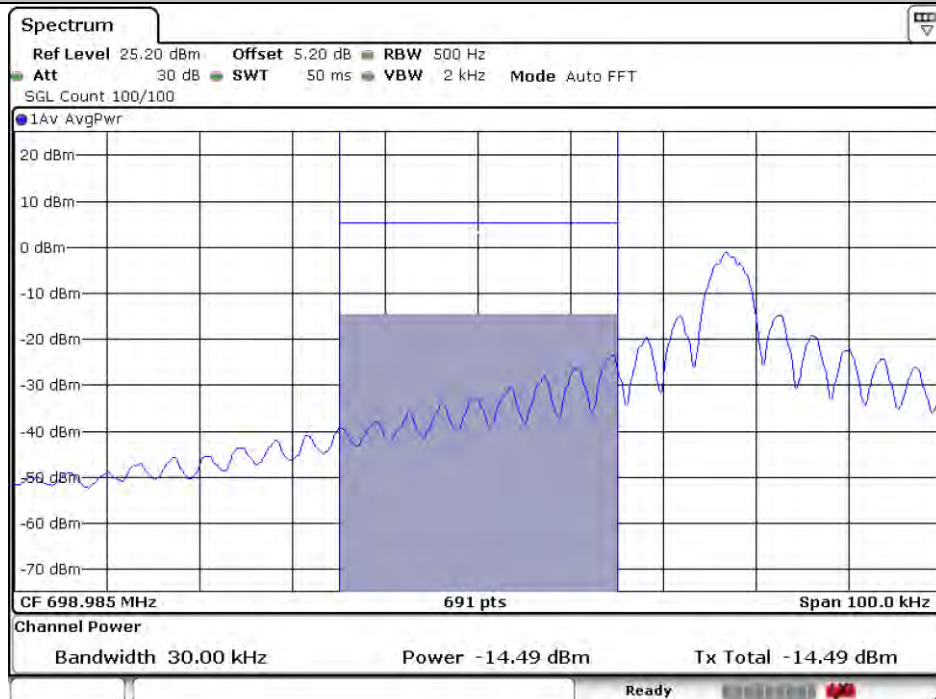
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Date: 23.OCT.2019 20:09:37

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23011-T size=1T0



Date: 24.OCT.2019 22:41:53

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23179-T size=1T11

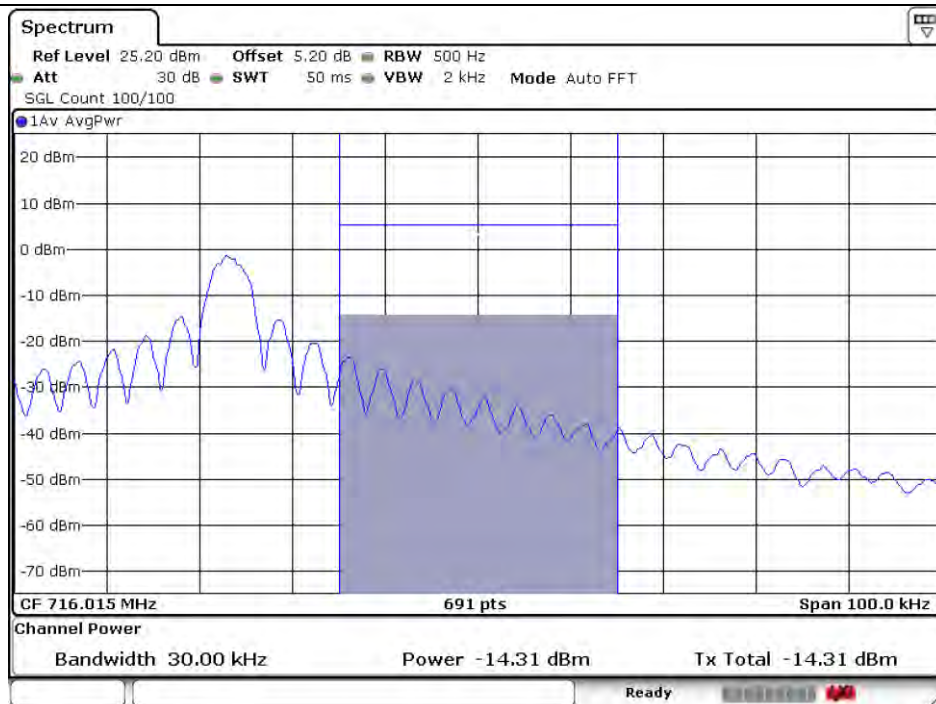


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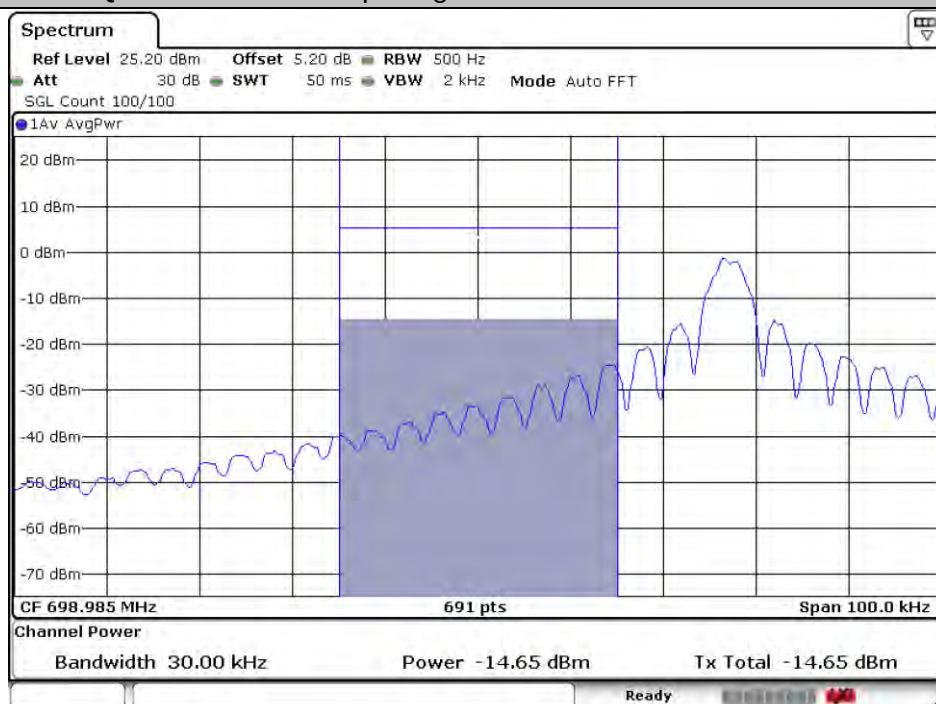
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Date: 24.OCT.2019 22:42:34

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23011-T size=1T0



Date: 24.OCT.2019 22:41:30

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23011-T size=12T0

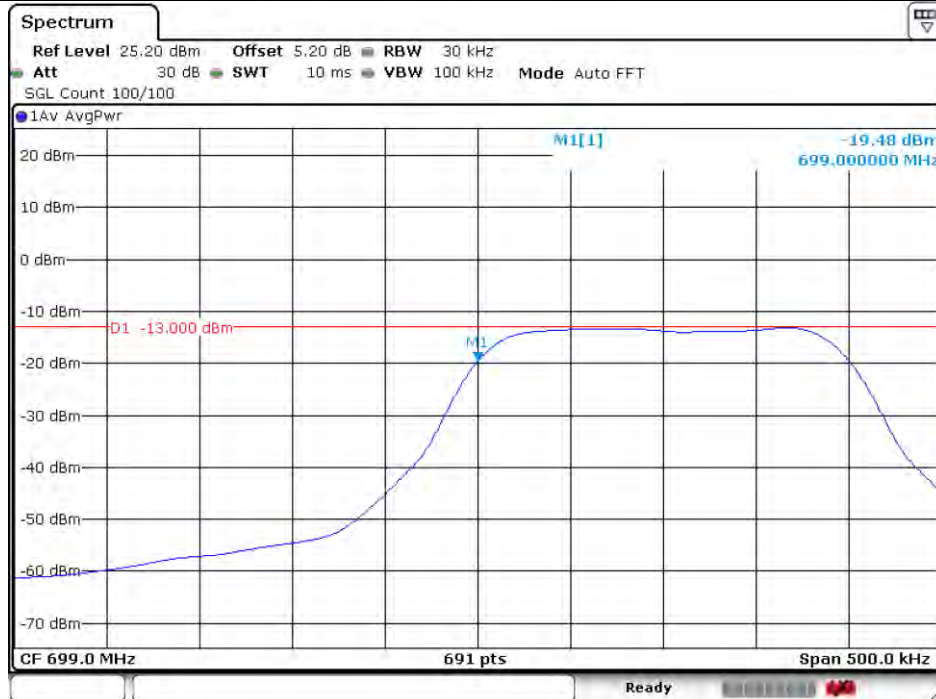


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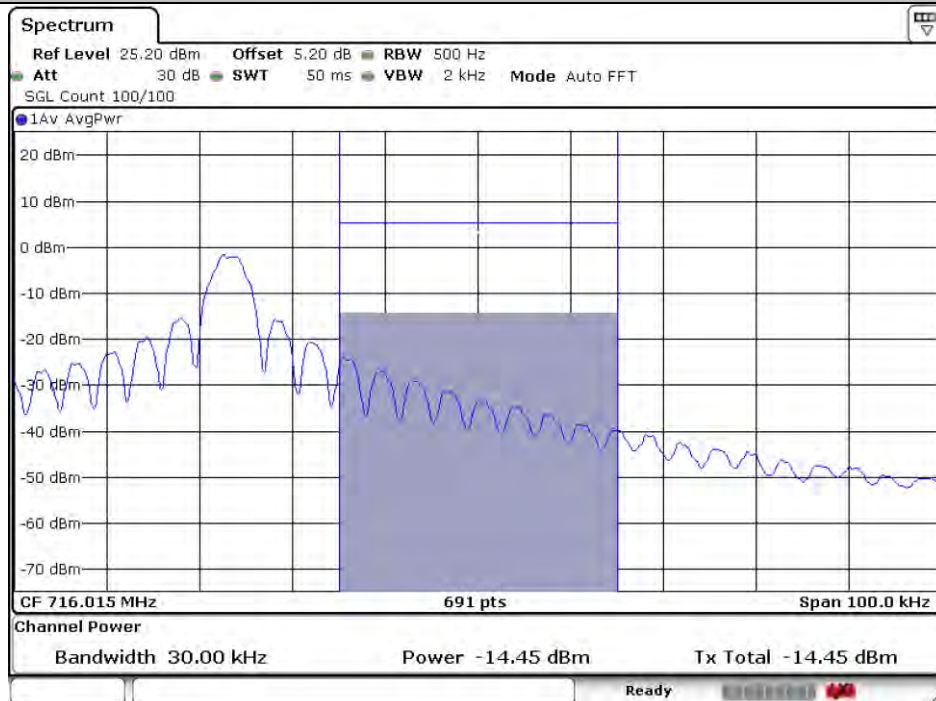
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Date: 24.OCT.2019 22:45:15

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23179-T size=1T11



Date: 24.OCT.2019 22:42:51

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23179-T size=12T0

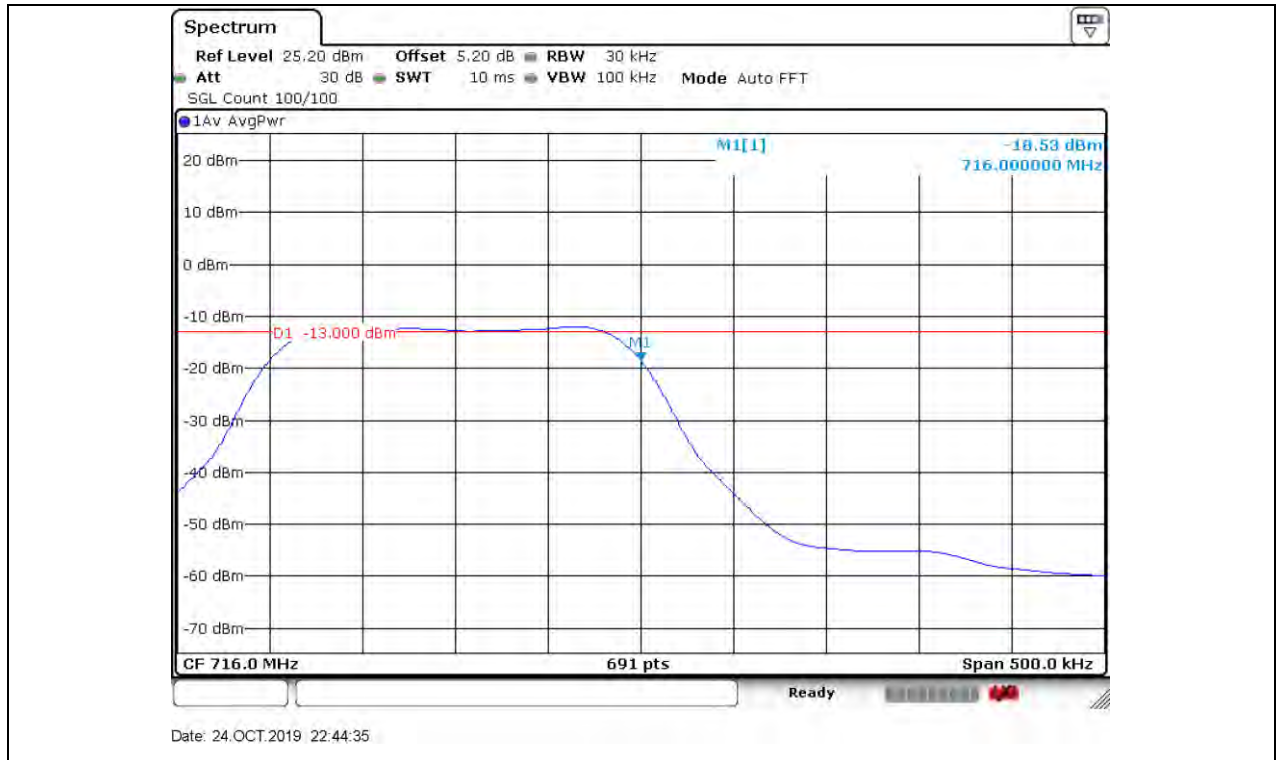


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6 Spurious Emission at Antenna Terminal

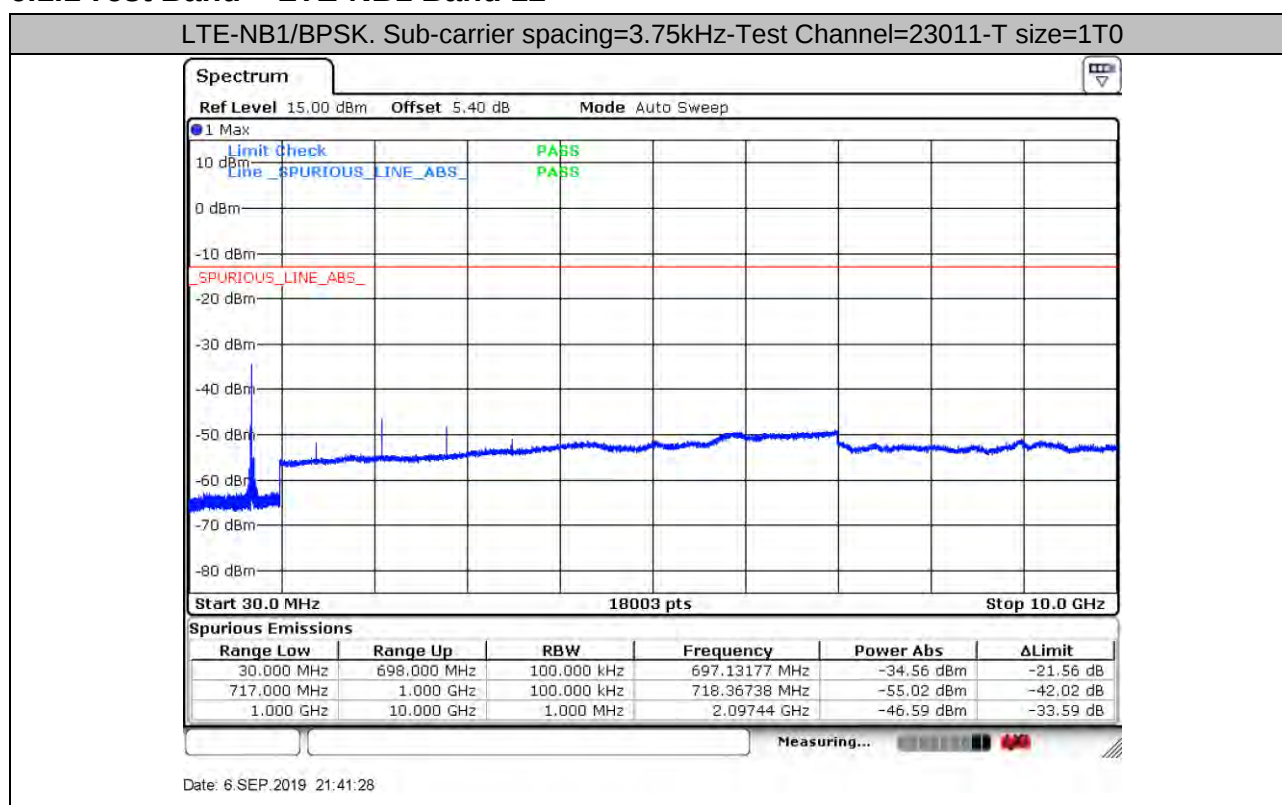
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k \cdot (\text{Span} / \text{RBW})$ " 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 12



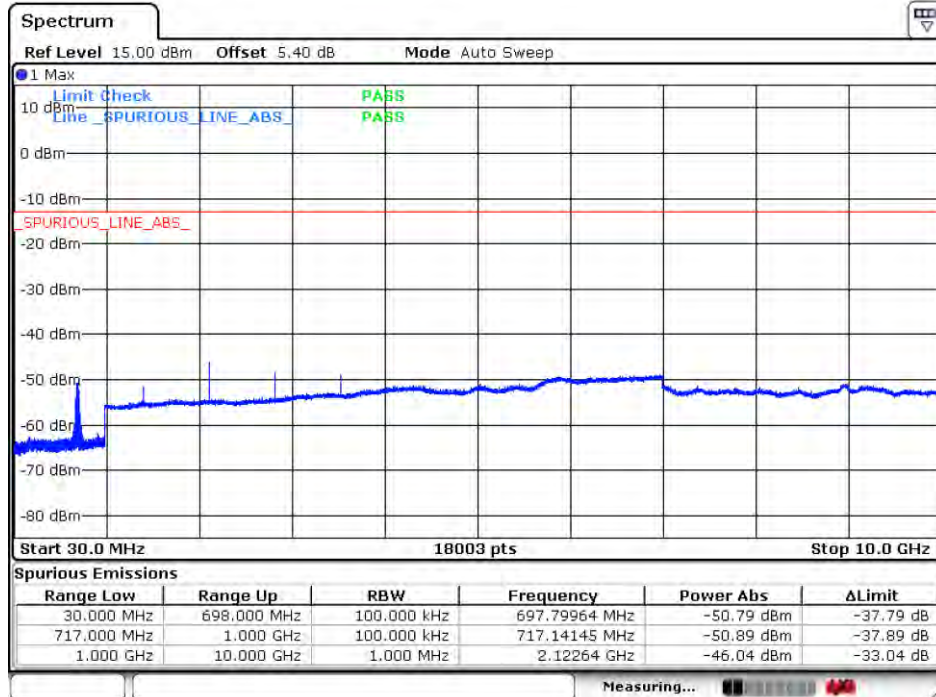
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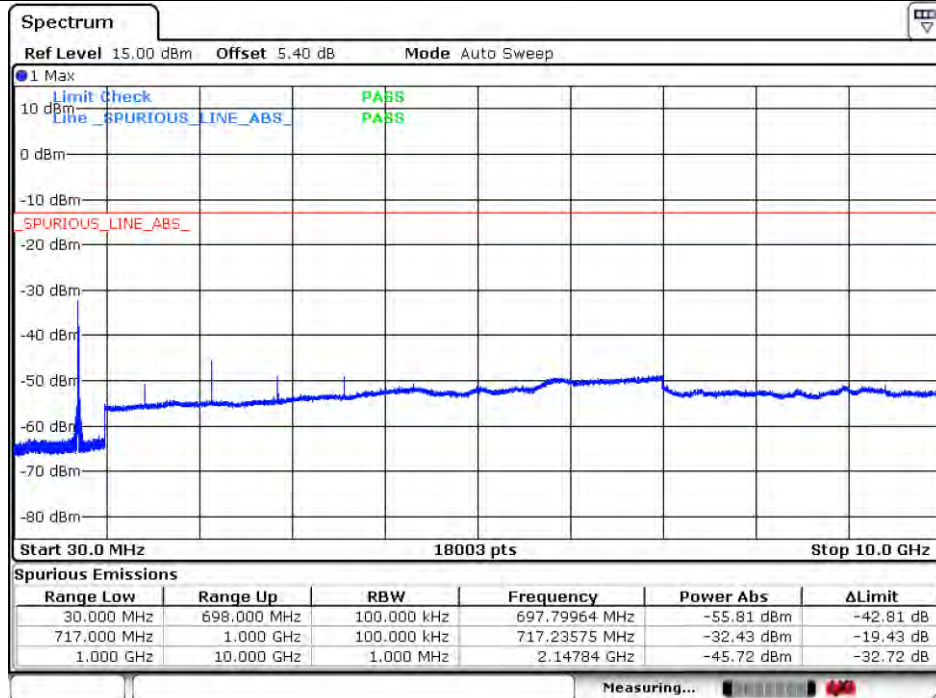
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=23095-T size=1T0



Date: 6 SEP. 2019 21:51:16

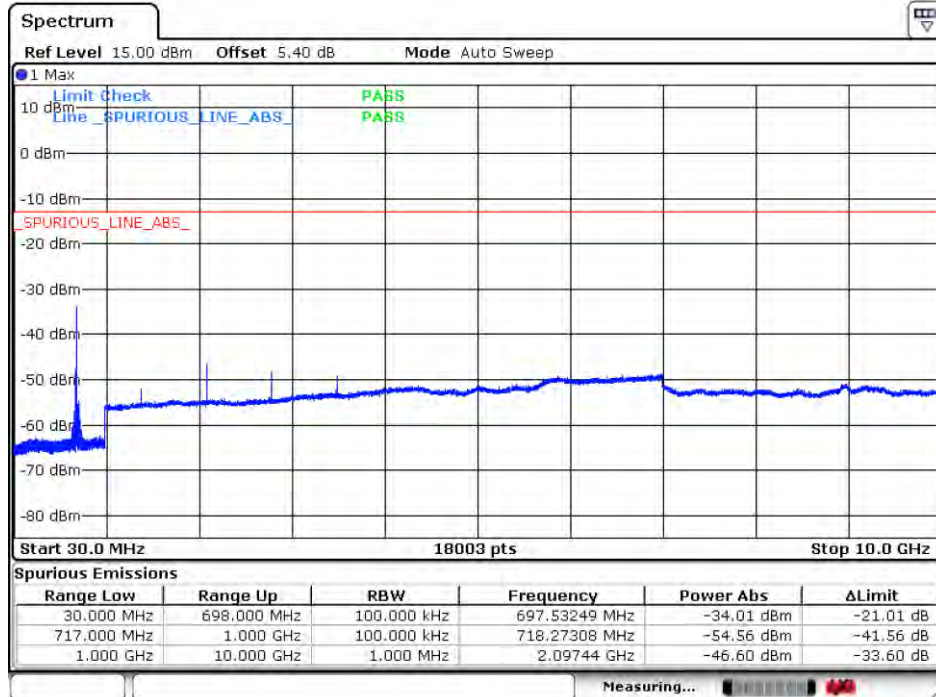
LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=23179-T size=1T0



Date: 6 SEP. 2019 21:52:51

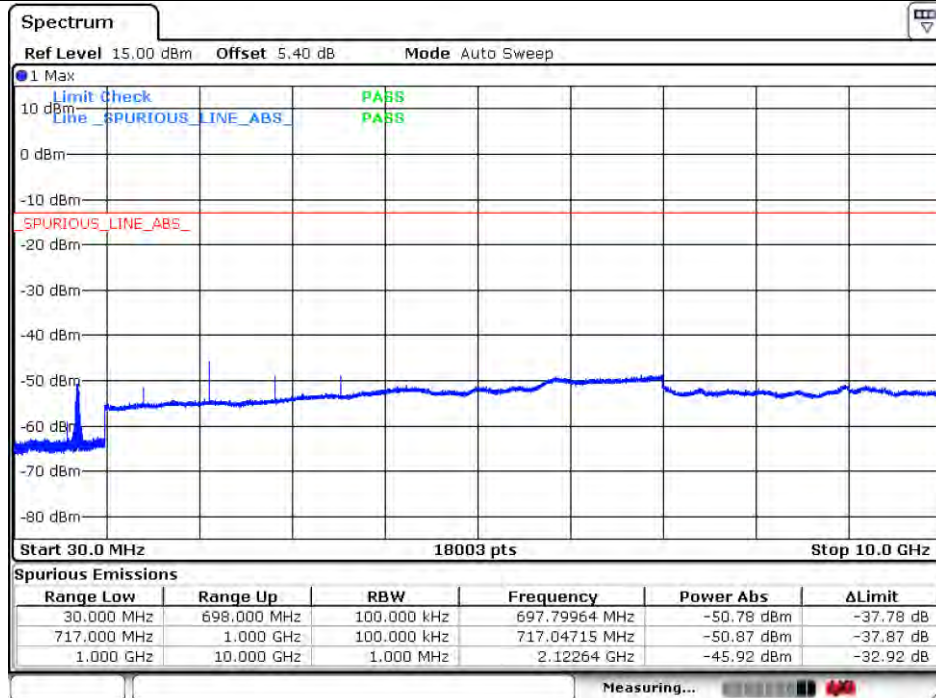


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23011-T size=1T0



Date: 6 SEP. 2019 21:45:36

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23095-T size=1T0



Date: 6 SEP. 2019 21:50:18



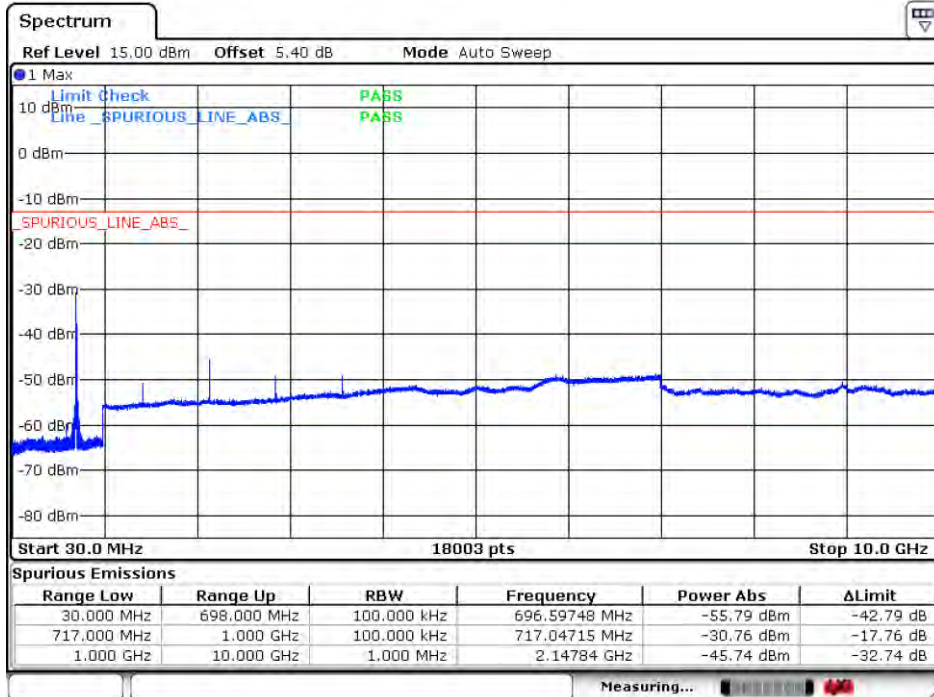
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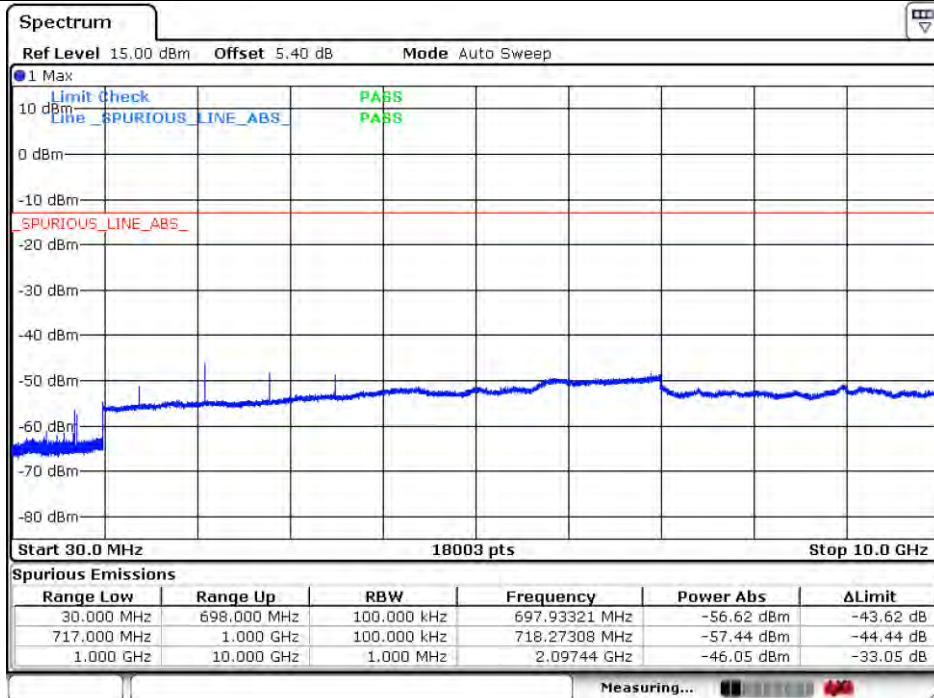
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23179-T size=1T0



Date: 6 SEP. 2019 21:53:31

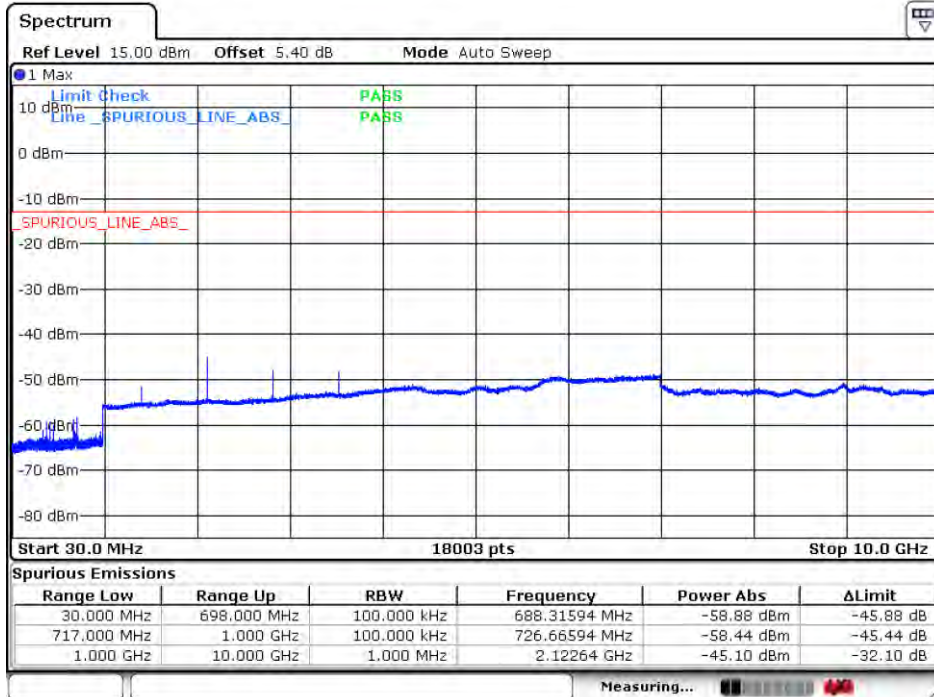
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23011-T size=1T0



Date: 6 SEP. 2019 21:46:39

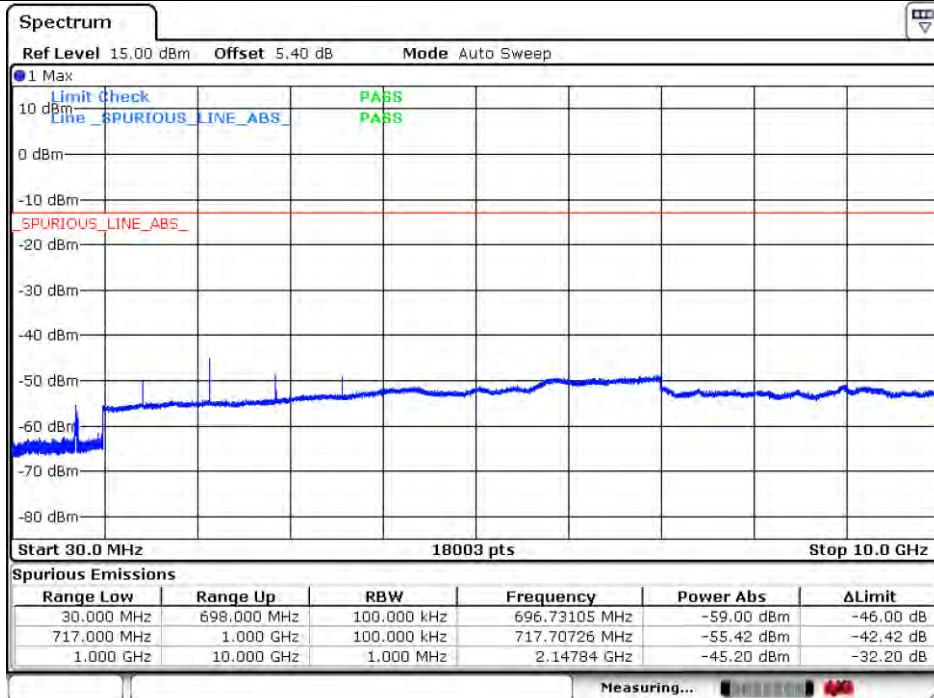


LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23095-T size=1T0



Date: 6 SEP. 2019 21:48:14

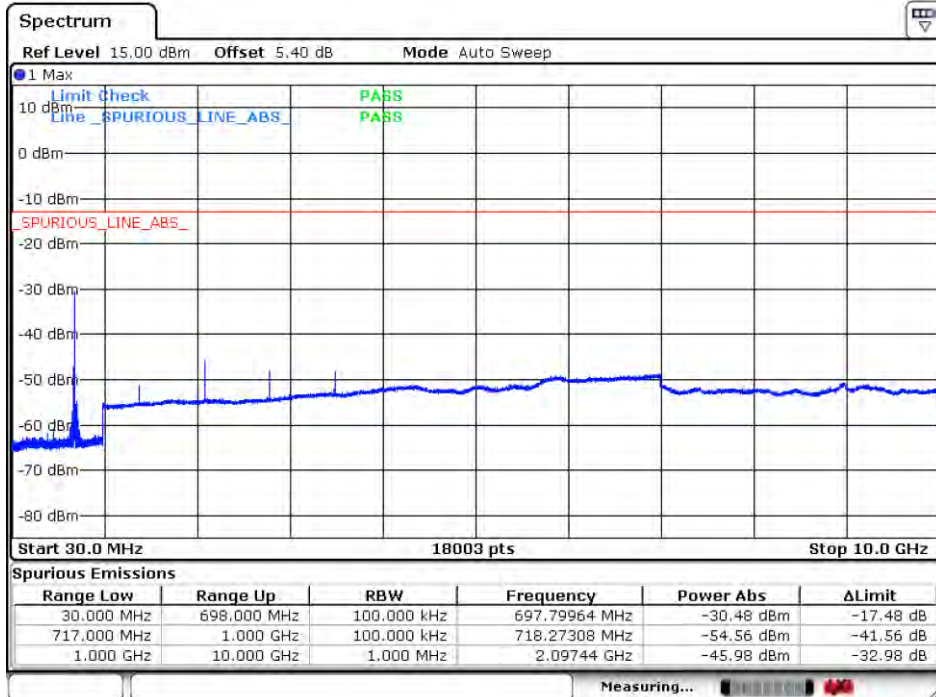
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23179-T size=1T0



Date: 6 SEP. 2019 21:56:36

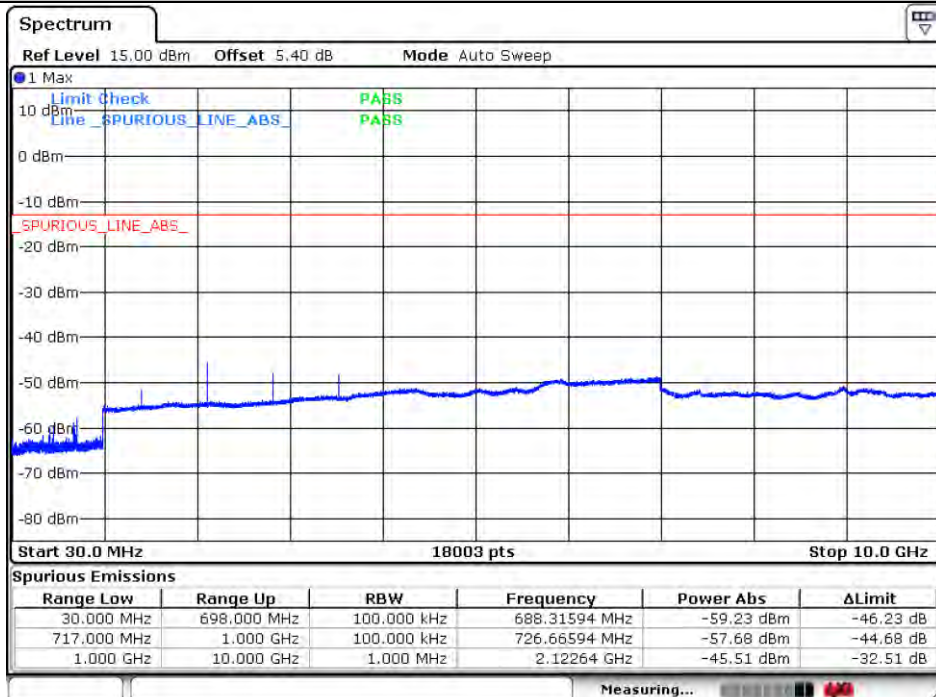


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23011-T size=1T0



Date: 6 SEP. 2019 21:46:16

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23095-T size=1T0



Date: 6 SEP. 2019 21:49:12



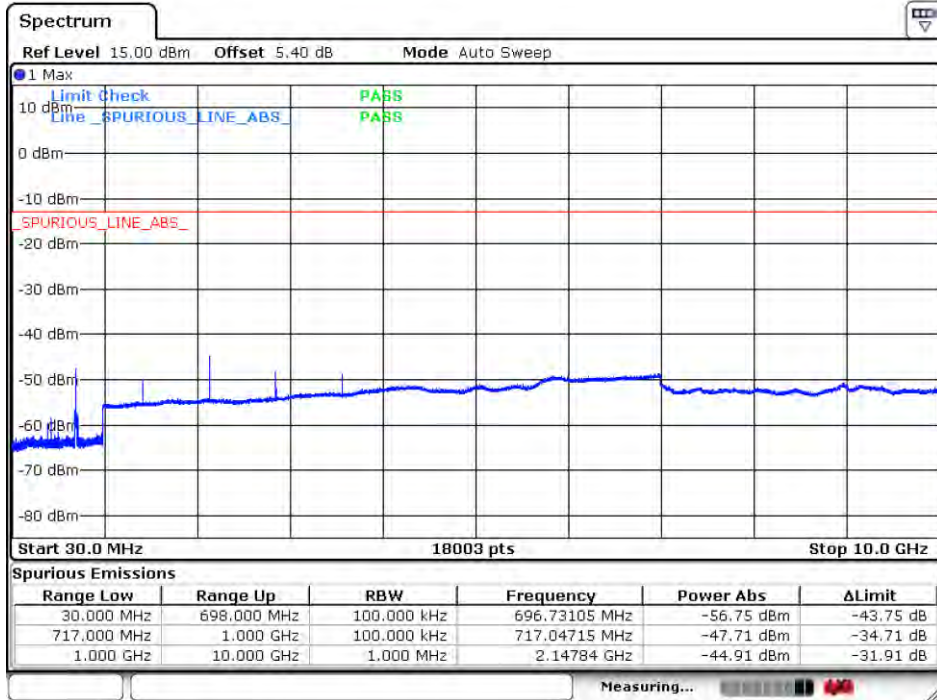
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23179-T size=1T0



Date: 6 SEP. 2019 21:56:12



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7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 12

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

7.1.1.1.1 Test Channel = 23011

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.2045	-65.11	-13.00	52.11	Vertical
561.5381	-65.68	-13.00	52.68	Vertical
1398.0796	-62.37	-13.00	49.37	Vertical
2465.0930	-53.50	-13.00	40.50	Vertical
14663.2665	-43.05	-13.00	30.05	Vertical
17992.1997	-34.49	-13.00	21.49	Vertical
38.7789	-63.61	-13.00	50.61	Horizontal
242.7801	-68.61	-13.00	55.61	Horizontal
1398.0796	-59.16	-13.00	46.16	Horizontal
2097.0194	-47.71	-13.00	34.71	Horizontal
3495.0198	-52.57	-13.00	39.57	Horizontal
16990.1596	-39.39	-13.00	26.39	Horizontal

7.1.1.1.2 Test Channel = 23095

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
110.4655	-65.48	-13.00	52.48	Vertical
1414.4829	-61.44	-13.00	48.44	Vertical
2122.2244	-53.88	-13.00	40.88	Vertical
2463.4927	-41.56	-13.00	28.56	Vertical
14618.2647	-43.54	-13.00	30.54	Vertical
17902.1961	-35.82	-13.00	22.82	Vertical
49.9830	-57.13	-13.00	44.13	Horizontal
238.0269	-68.41	-13.00	55.41	Horizontal
1414.4829	-51.11	-13.00	38.11	Horizontal
2122.2244	-43.29	-13.00	30.29	Horizontal
2462.6925	-41.34	-13.00	28.34	Horizontal
17984.3994	-38.33	-13.00	25.33	Horizontal



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7.1.1.1.3 Test Channel = 23179

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.9805	-65.64	-13.00	52.64	Vertical
611.2531	-63.31	-13.00	50.31	Vertical
1166.4333	-64.34	-13.00	51.34	Vertical
2460.2921	-42.40	-13.00	29.40	Vertical
14573.8630	-42.71	-13.00	29.71	Vertical
17912.9965	-36.38	-13.00	23.38	Vertical
41.7861	-64.03	-13.00	51.03	Horizontal
576.6708	-65.14	-13.00	52.14	Horizontal
1431.2863	-58.25	-13.00	45.25	Horizontal
2147.0294	-47.38	-13.00	34.38	Horizontal
3578.4231	-53.53	-13.00	40.53	Horizontal
16997.3599	-39.45	-13.00	26.45	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.



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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 12	180KHz	BPSK/15KHz	23011	12T0	VL	TN	-11.42	-0.016342	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	VN	TN	4.41	0.006307	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	VH	TN	-1.00	-0.001435	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	VL	TN	-0.37	-0.000523	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	VN	TN	-5.60	-0.007914	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	VH	TN	4.15	0.005873	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	VL	TN	7.31	0.010218	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	VN	TN	4.28	0.005975	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	VH	TN	-7.11	-0.009932	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	VL	TN	0.22	0.000317	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	VN	TN	12.40	0.017738	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	VH	TN	8.46	0.012101	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	VL	TN	1.94	0.002745	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	VN	TN	-14.15	-0.020005	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	VH	TN	7.49	0.010589	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	VL	TN	-1.27	-0.001774	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	VN	TN	7.77	0.010853	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	VH	TN	-3.03	-0.004232	±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 12	180KHz	BPSK/15KHz	23011	12T0	NV	-30	5.94	0.008499	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	-20	-11.27	-0.016123	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	0	-2.83	-0.004047	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	10	1.78	0.002542	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	20	12.96	0.018532	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	30	10.93	0.015629	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	40	11.25	0.016090	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23011	12T0	NV	50	-3.60	-0.005143	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	-30	0.23	0.000329	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	-20	4.28	0.006045	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	0	14.09	0.019919	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	10	-14.47	-0.020456	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	20	0.87	0.001229	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	30	-1.40	-0.001986	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	40	-0.48	-0.000684	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23095	12T0	NV	50	2.62	0.003702	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	-30	9.54	0.013322	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	-20	-6.48	-0.009053	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	0	-6.99	-0.009761	±2.5	PASS



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NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	10	-9.87	-0.013792	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	20	-6.37	-0.008892	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	30	0.69	0.000967	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	40	-4.13	-0.005767	±2.5	PASS
NB1 Band 12	180KHz	BPSK/15KHz	23179	12T0	NV	50	-3.26	-0.004547	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	-30	6.43	0.009200	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	-20	-3.81	-0.005453	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	0	2.75	0.003931	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	10	8.64	0.012356	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	20	11.06	0.015814	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	30	8.73	0.012492	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	40	-14.97	-0.021408	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23011	12T0	NV	50	3.52	0.005040	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	-30	-11.43	-0.016153	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	-20	13.16	0.018606	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	0	-11.07	-0.015644	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	10	8.31	0.011744	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	20	9.48	0.013393	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	30	-13.74	-0.019419	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	40	1.08	0.001521	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23095	12T0	NV	50	7.22	0.010202	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	-30	-13.37	-0.018674	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	-20	-4.70	-0.006562	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	0	-9.04	-0.012632	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	10	-3.30	-0.004603	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	20	-0.72	-0.001000	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	30	12.14	0.016951	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	40	-11.72	-0.016372	±2.5	PASS
NB1 Band 12	180KHz	QPSK/15KHz	23179	12T0	NV	50	-0.80	-0.001118	±2.5	PASS

The End



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Appendix B

LTE-NB1 Band 13



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1 Effective Radiated Power Output Data

1.1 Test Result for LTE NB1 Band 13

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 13	BPSK	3.75	23181	1T0	20.36	17.51	34.77	PASS
NB1 Band 13	BPSK	3.75	23230	1T0	20.25	17.40	34.77	PASS
NB1 Band 13	BPSK	3.75	23279	1T0	20.12	17.27	34.77	PASS
NB1 Band 13	QPSK	3.75	23181	1T0	20.35	17.50	34.77	PASS
NB1 Band 13	QPSK	3.75	23230	1T0	20.27	17.42	34.77	PASS
NB1 Band 13	QPSK	3.75	23279	1T0	20.13	17.28	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 13	BPSK	15	23181	1T0	20.57	17.72	34.77	PASS
NB1 Band 13	BPSK	15	23230	1T0	20.27	17.42	34.77	PASS
NB1 Band 13	BPSK	15	23279	1T0	20.3	17.45	34.77	PASS
NB1 Band 13	QPSK	15	23181	1T0	20.55	17.70	34.77	PASS
NB1 Band 13	QPSK	15	23181	12T0	20.41	17.56	34.77	PASS
NB1 Band 13	QPSK	15	23230	1T0	20.34	17.49	34.77	PASS
NB1 Band 13	QPSK	15	23230	12T0	20.44	17.59	34.77	PASS
NB1 Band 13	QPSK	15	23279	1T0	20.32	17.47	34.77	PASS
NB1 Band 13	QPSK	15	23279	12T0	20.43	17.58	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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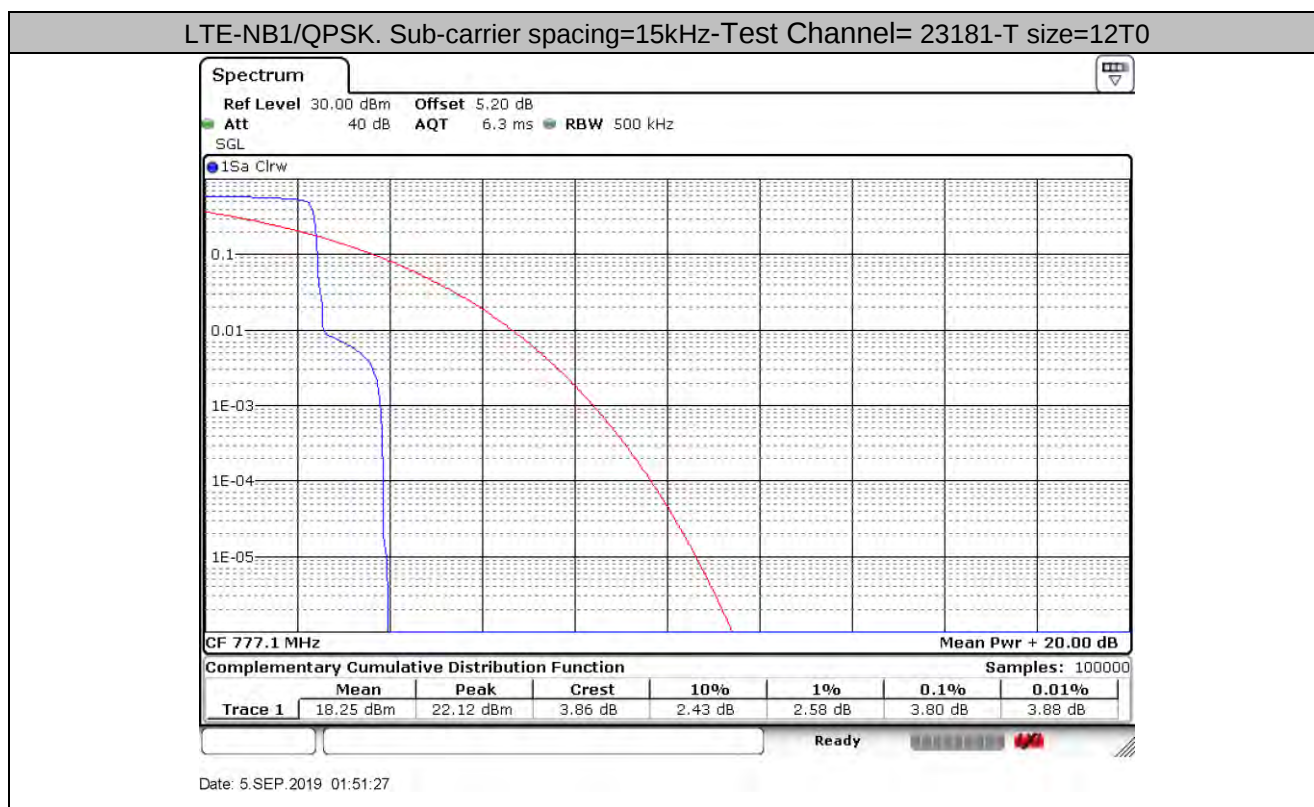


2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 13	QPSK/12T0	23181	3.80	13	PASS
NB1 Band 13	QPSK/12T0	23230	2.67	13	PASS
NB1 Band 13	QPSK/12T0	23279	2.23	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 13



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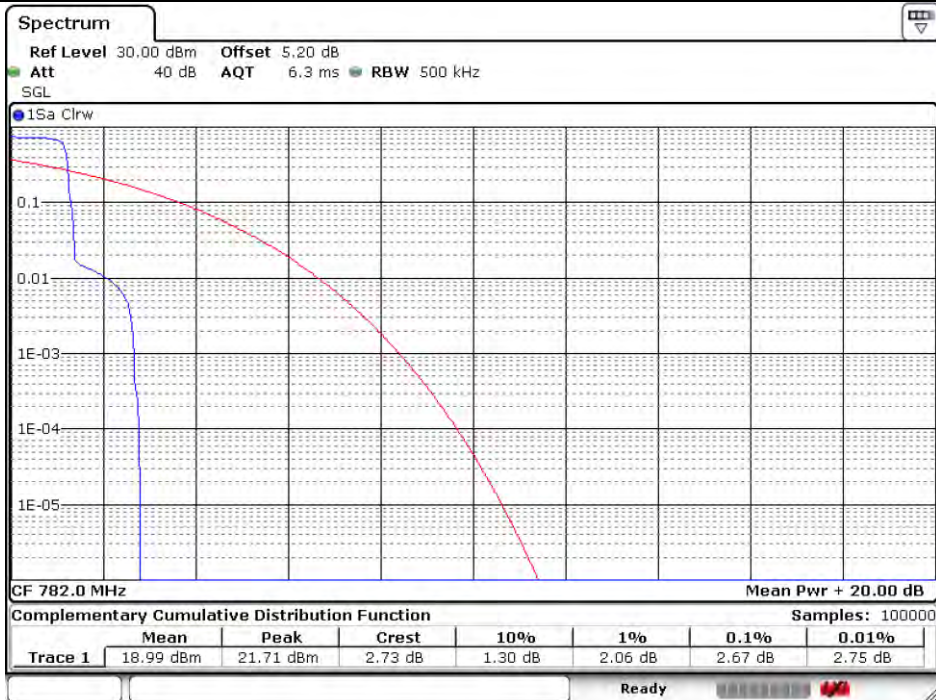
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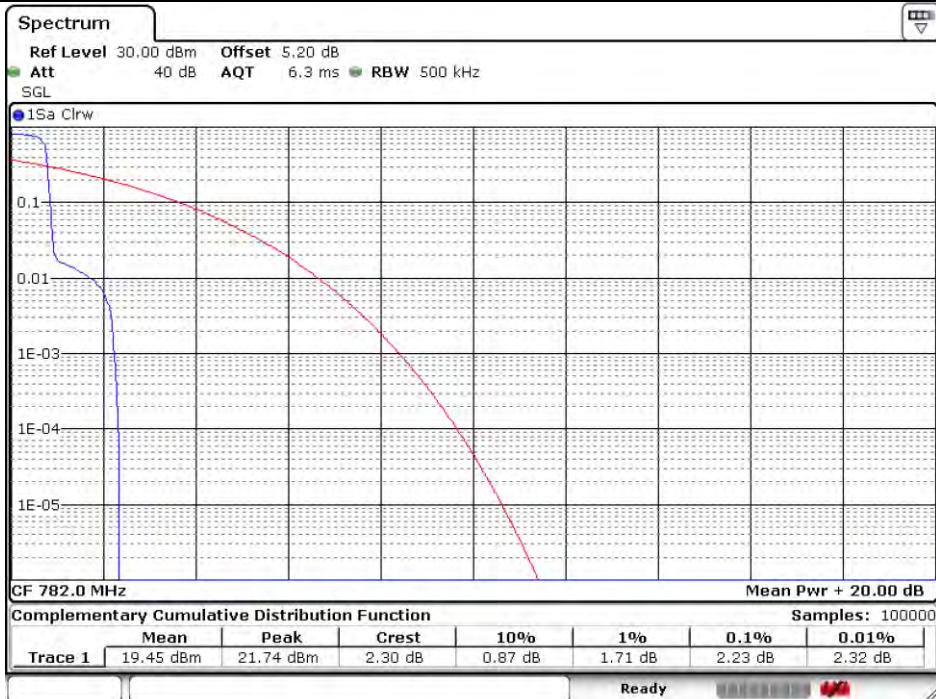


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23230-T size=12T0



Date: 5.SEP.2019 03:48:59

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23279-T size=12T0



Date: 5.SEP.2019 01:53:20



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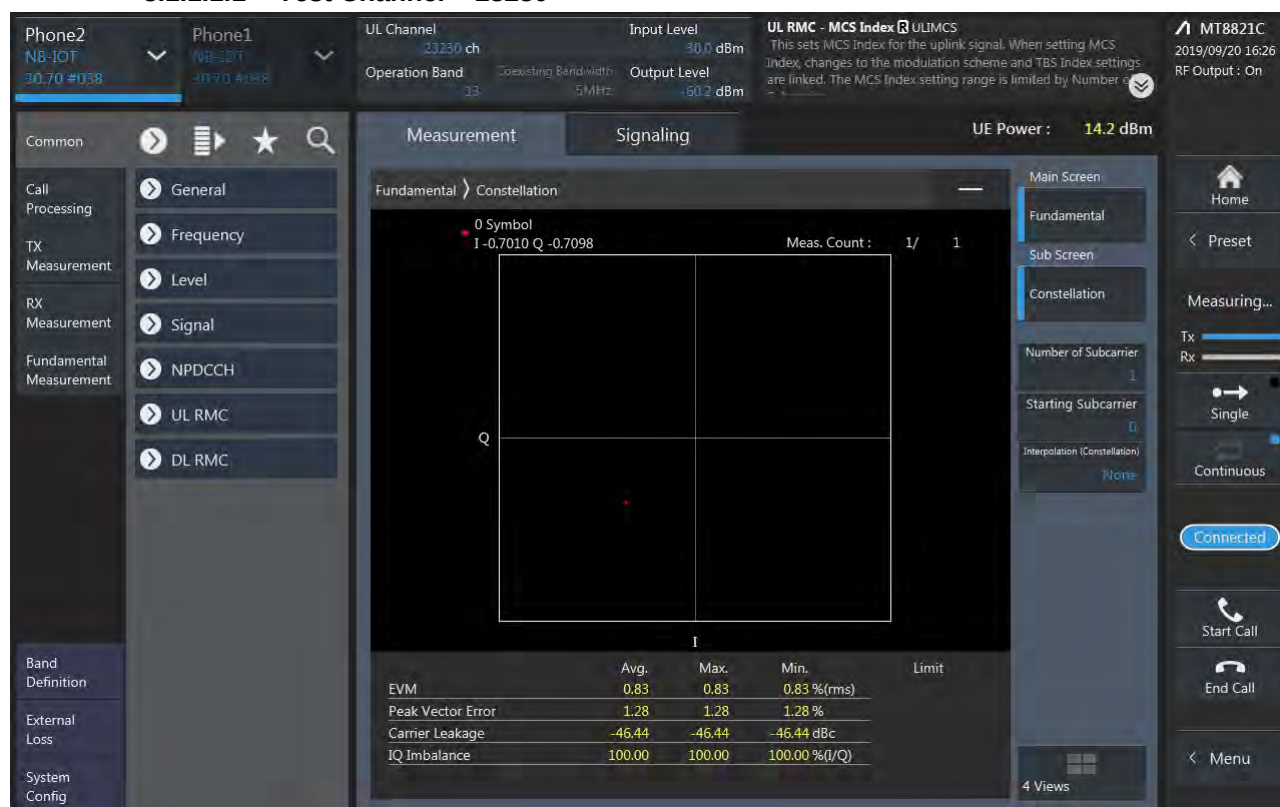
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 13

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

3.1.1.1.1 Test Channel = 23230



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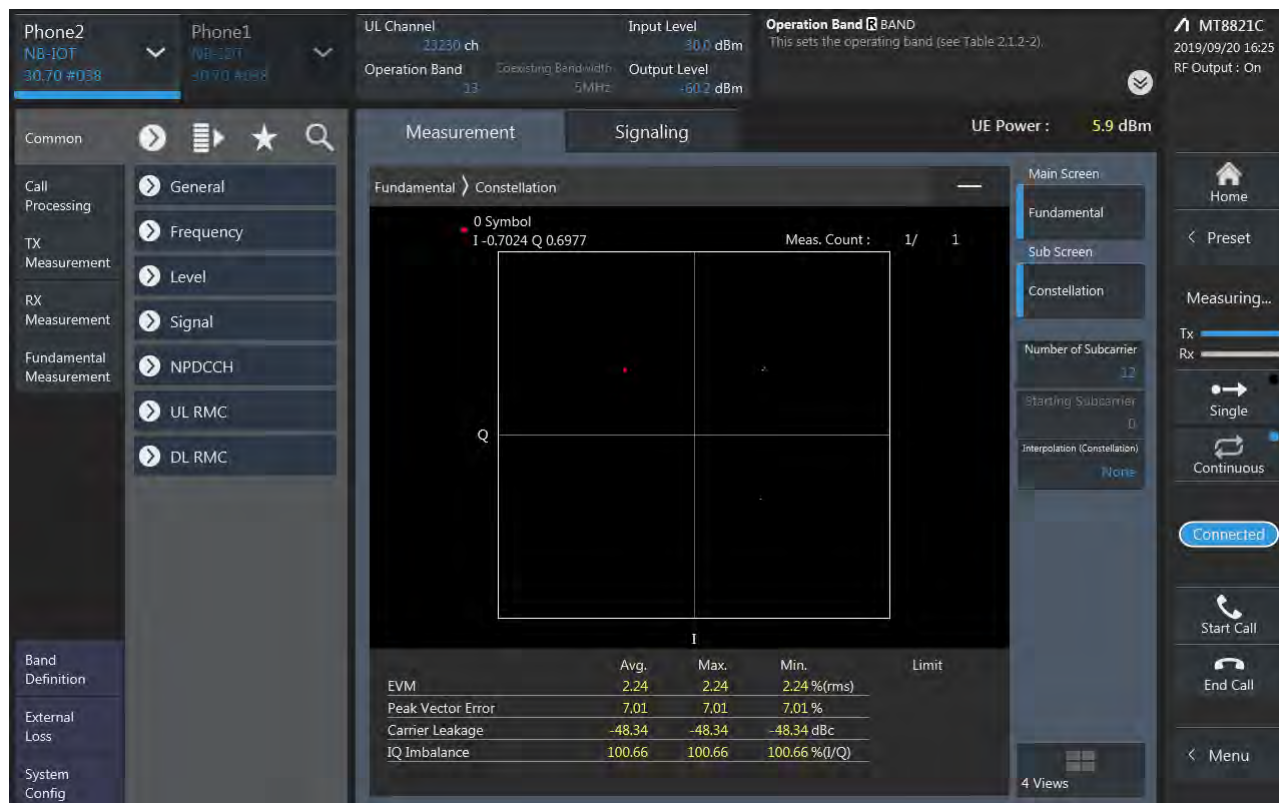
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3.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.2.1 Test Channel = 23230



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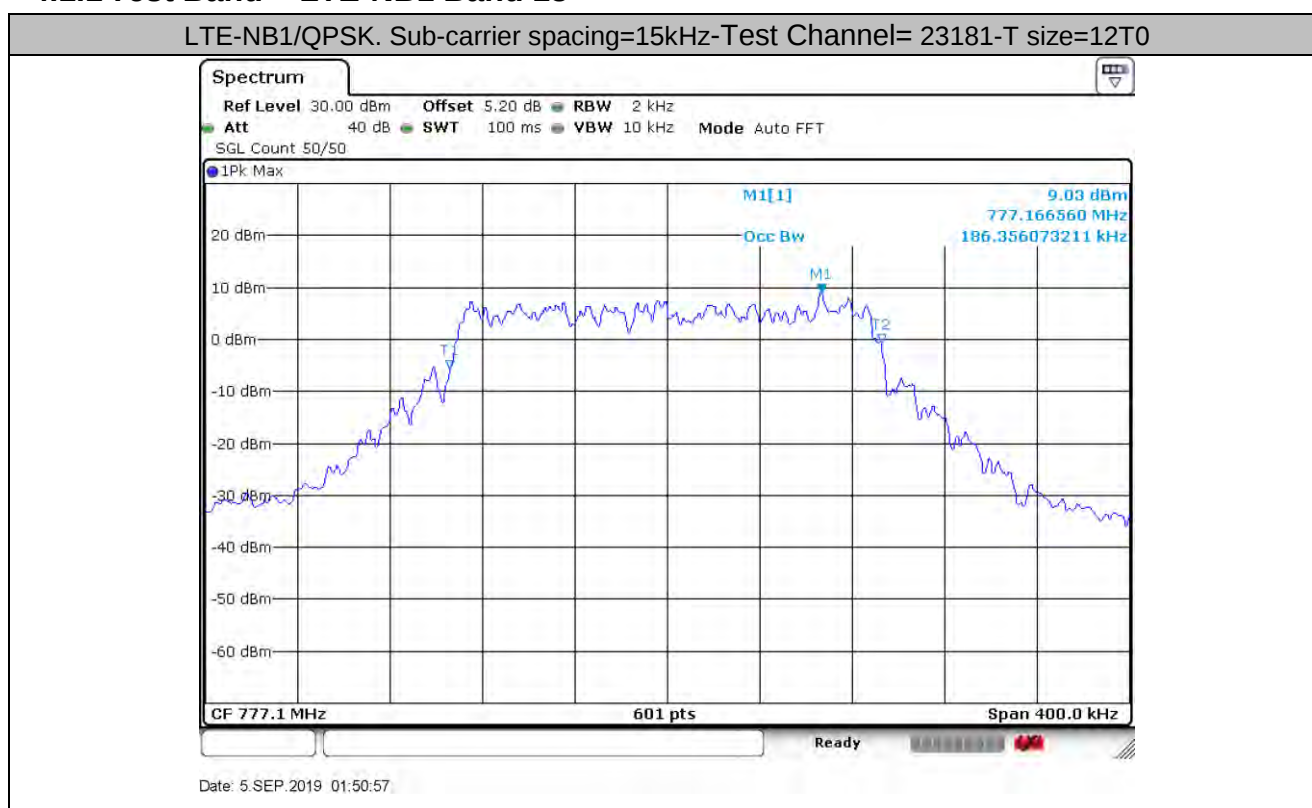


4 26dB Bandwidth and Occupied Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 13	QPSK/15kHz	12T0	23181	186.36	243.59	PASS
NB1 Band 13	QPSK/15kHz	12T0	23230	186.36	244.26	PASS
NB1 Band 13	QPSK/15kHz	12T0	23279	186.36	244.26	PASS

4.1 For LTE-NB1

4.1.1 Test Band = LTE-NB1 Band 13

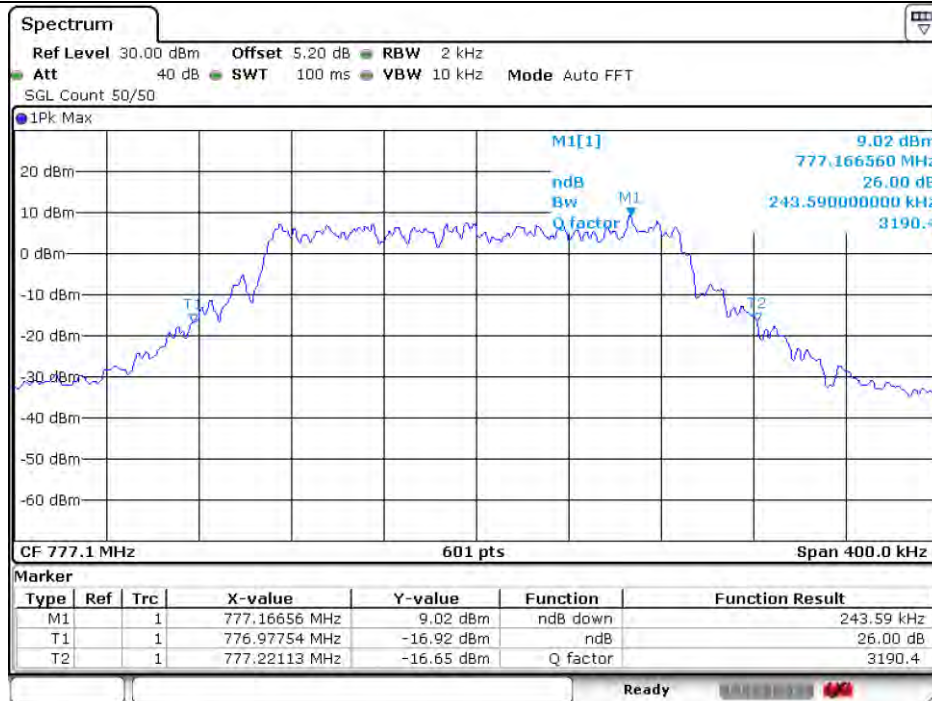


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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23230-T size=12T0



Date: 5.SEP.2019 02:01:26



Date: 5.SEP.2019 02:06:17

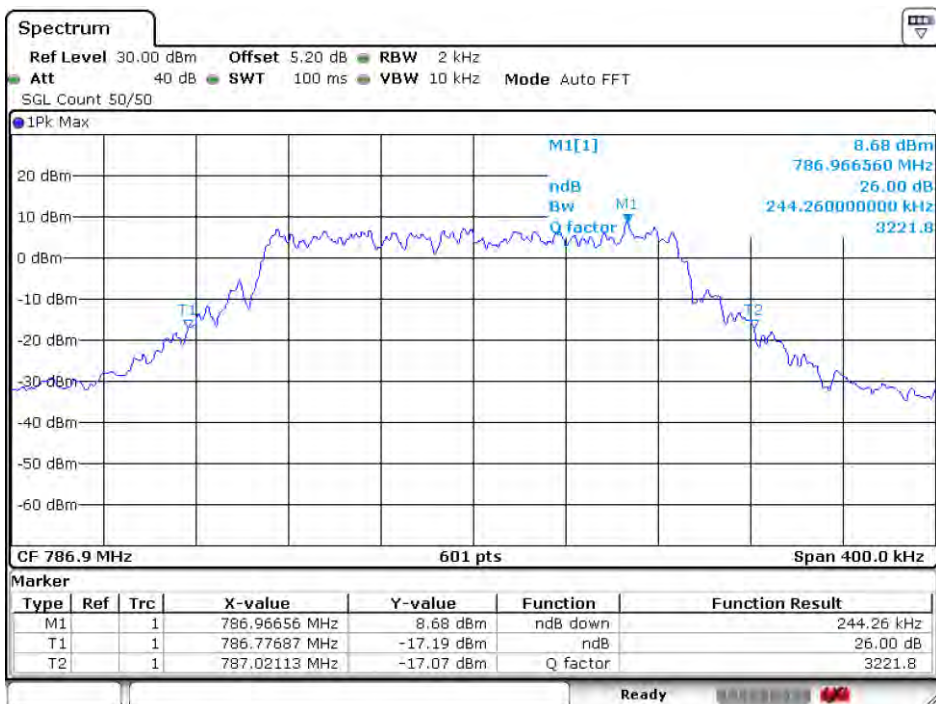




LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 23279-T size=12T0



Date: 5.SEP.2019 03:46:58



Date: 5.SEP.2019 02:19:10



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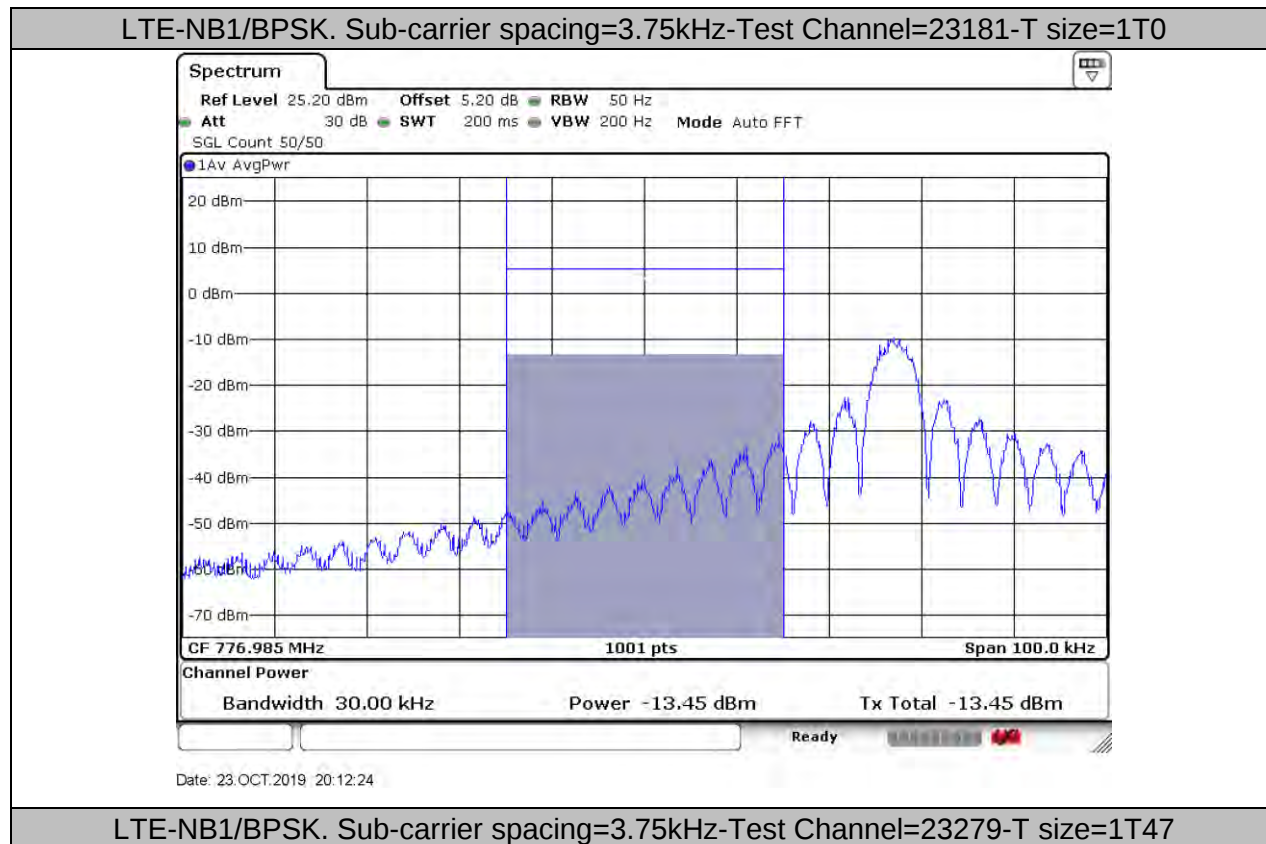
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5 Band Edges Compliance

5.1 For LTE-NB1

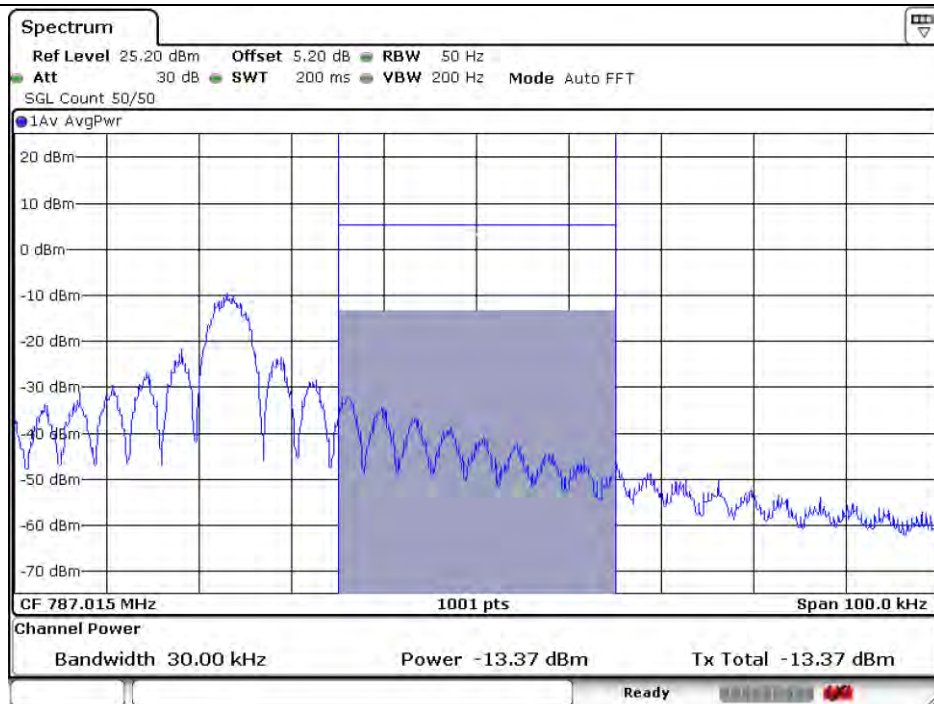
5.1.1 Test Band = LTE-NB1 Band 13



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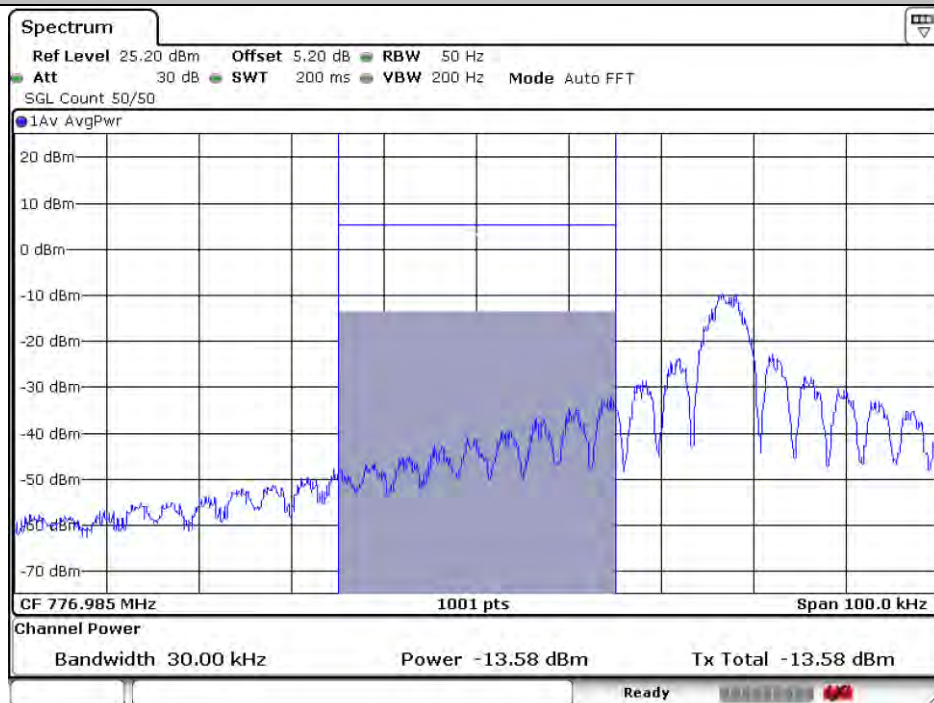
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Date: 23.OCT.2019 20:14:24

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23181-T size=1T0



Date: 23.OCT.2019 20:12:59

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23279-T size=1T47

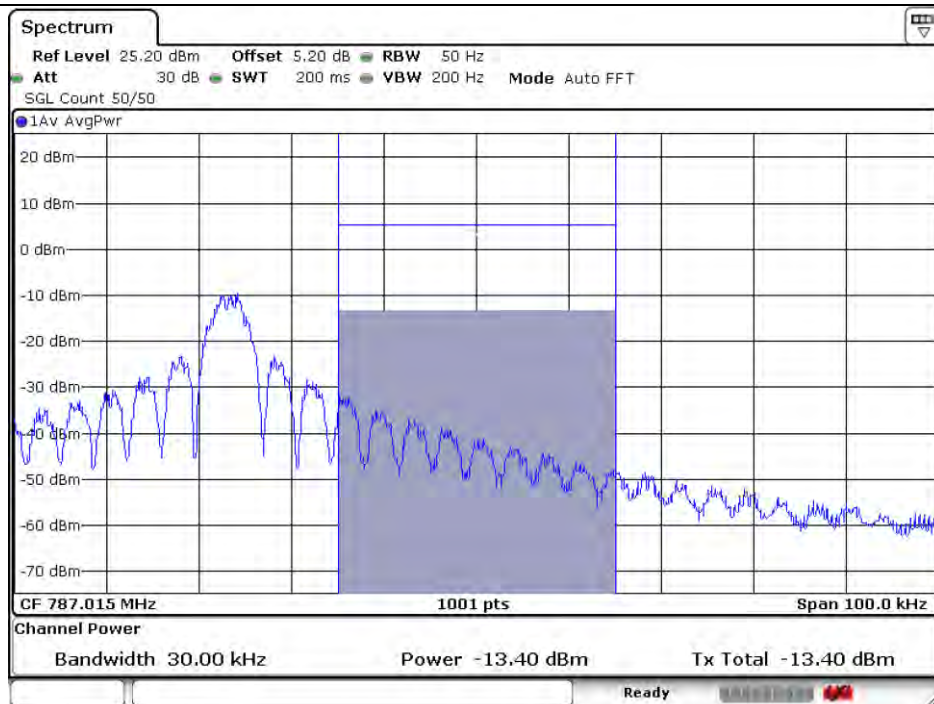


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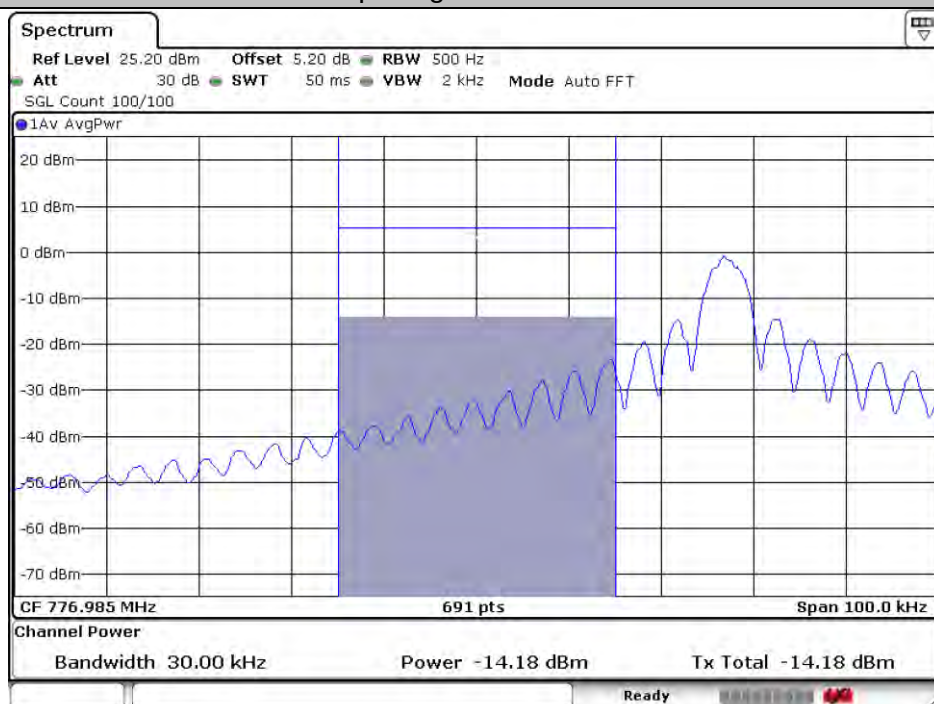
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Date: 23.OCT.2019 20:13:50

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23181-T size=1T0



Date: 24.OCT.2019 22:29:37

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23279-T size=1T11

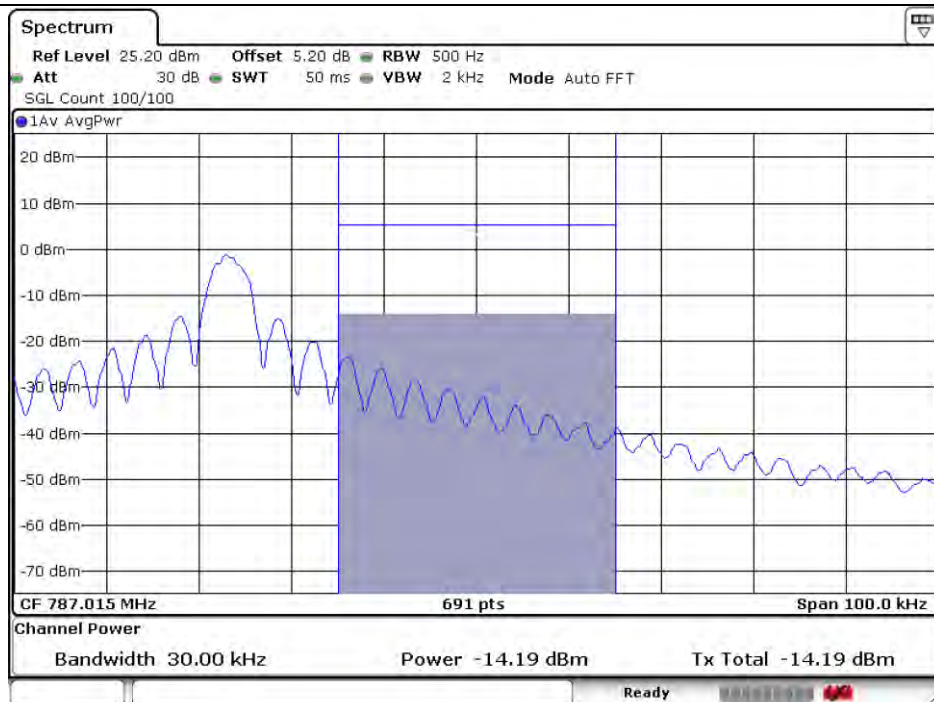


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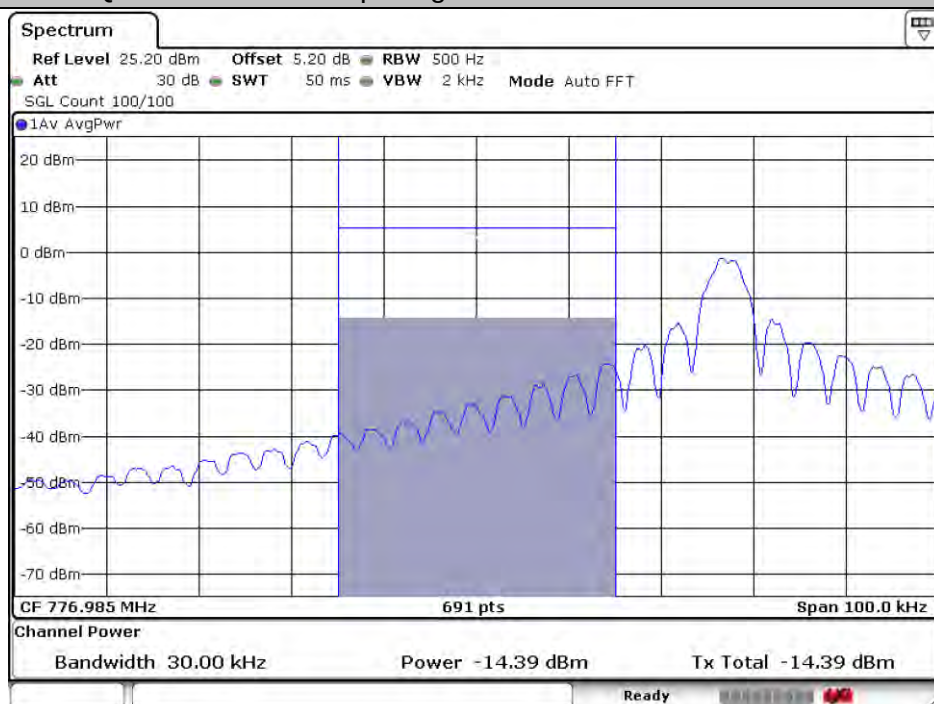
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Date: 24.OCT.2019 22:28:10

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23181-T size=1T0



Date: 24.OCT.2019 22:30:03

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23181-T size=12T0

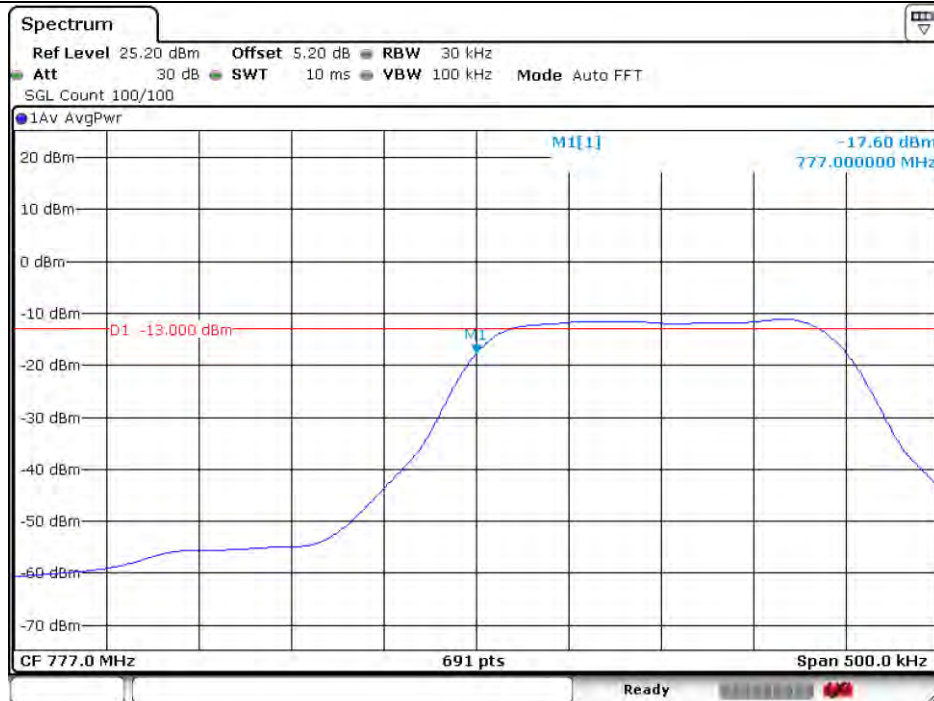


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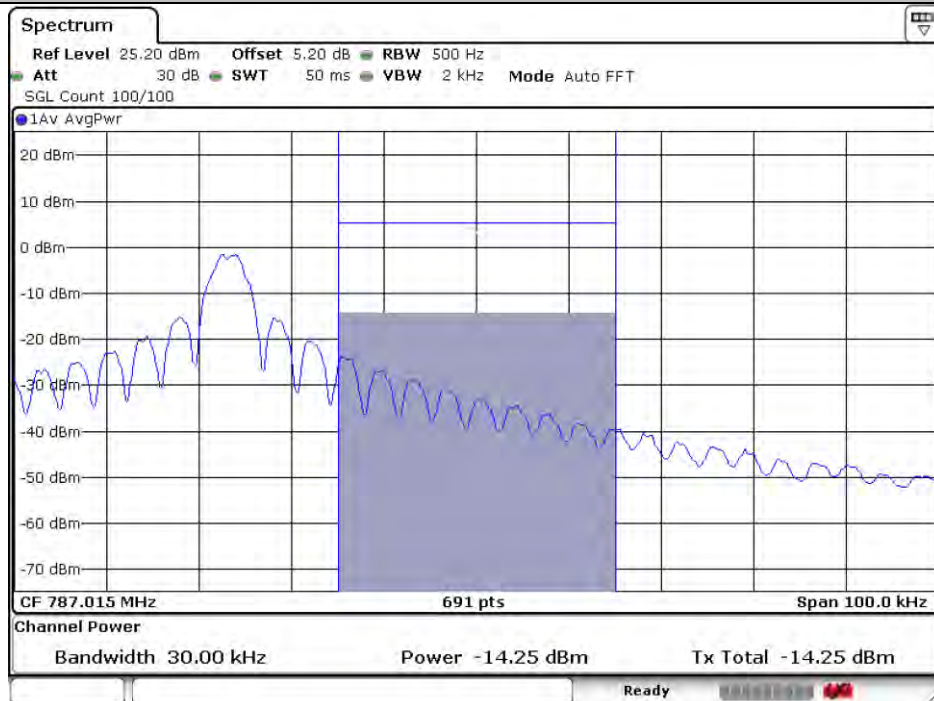
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Date: 24.OCT.2019 22:13:52

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23279-T size=1T11



Date: 24.OCT.2019 22:27:39

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23279-T size=12T0

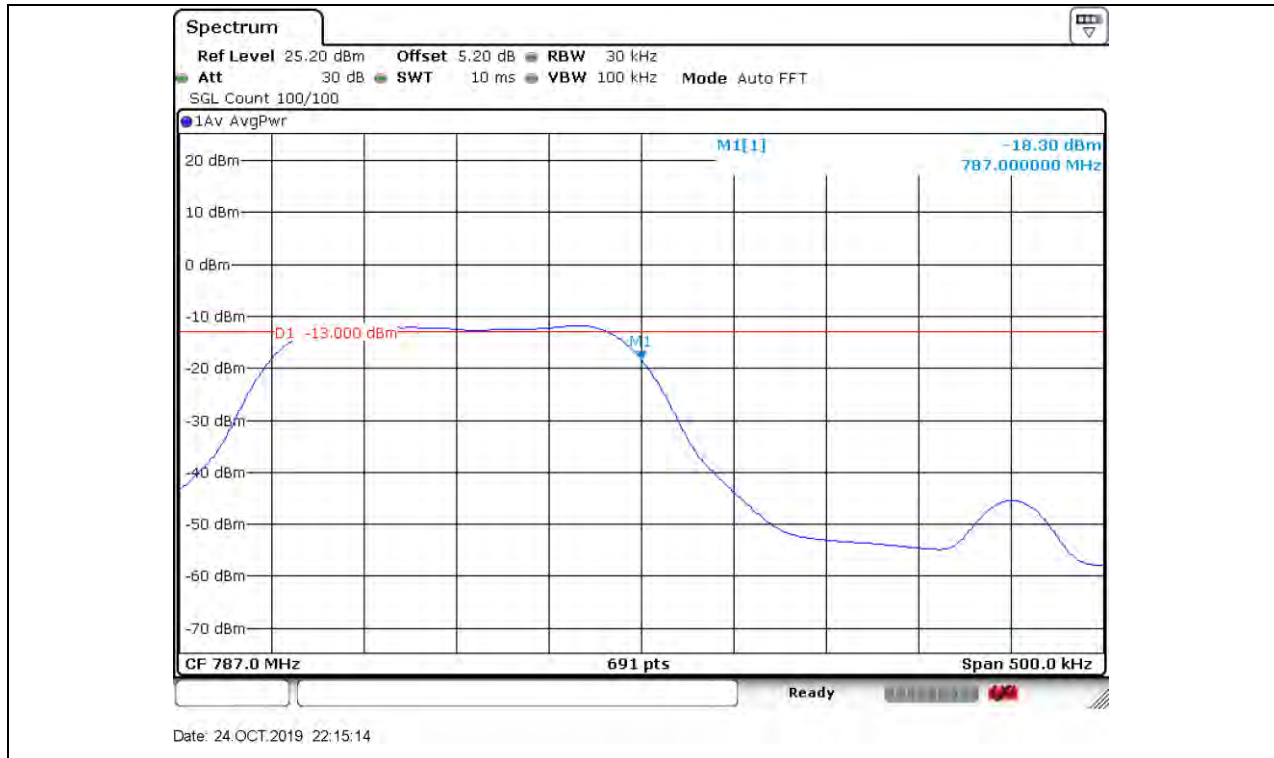


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6 Spurious Emission at Antenna Terminal

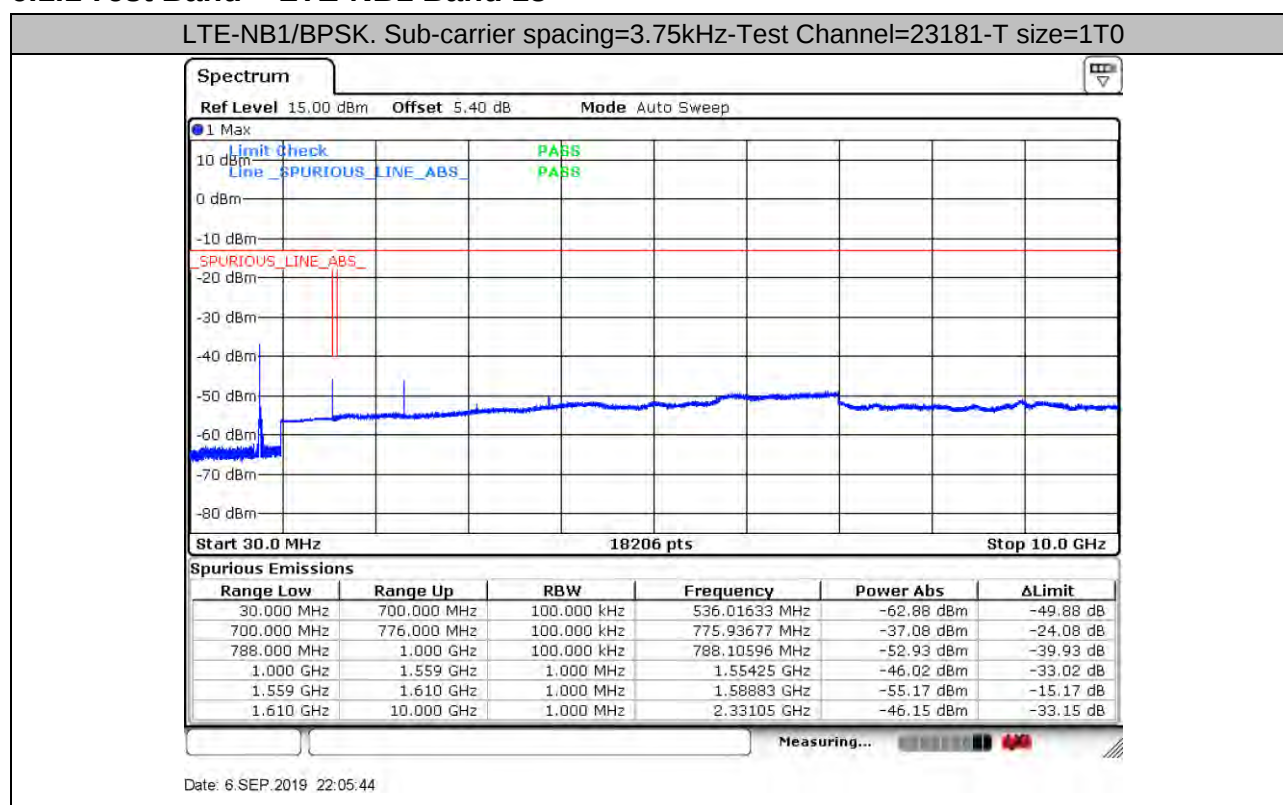
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " 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 13



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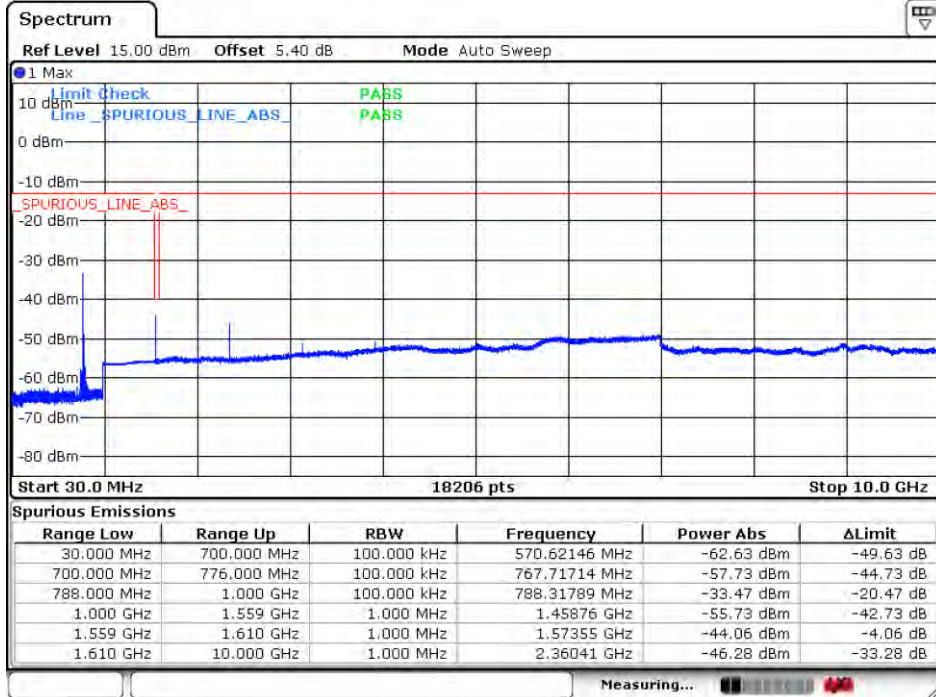
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=23230-T size=1T0



Date: 6 SEP. 2019 22:08:51

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=23279-T size=1T0



Date: 6 SEP. 2019 22:39:48



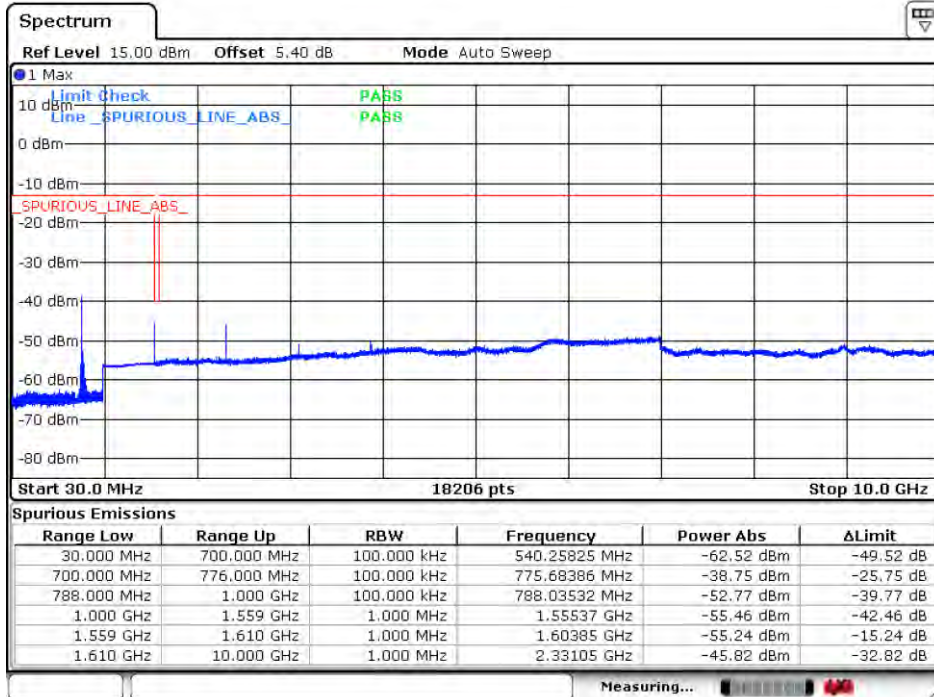
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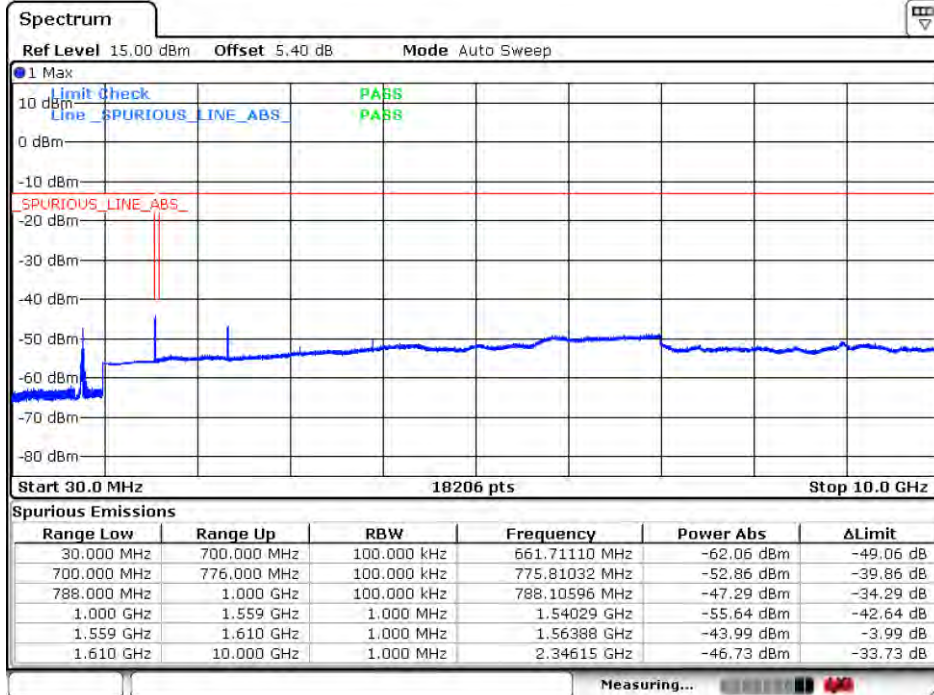
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23181-T size=1T0



Date: 6 SEP. 2019 22:04:10

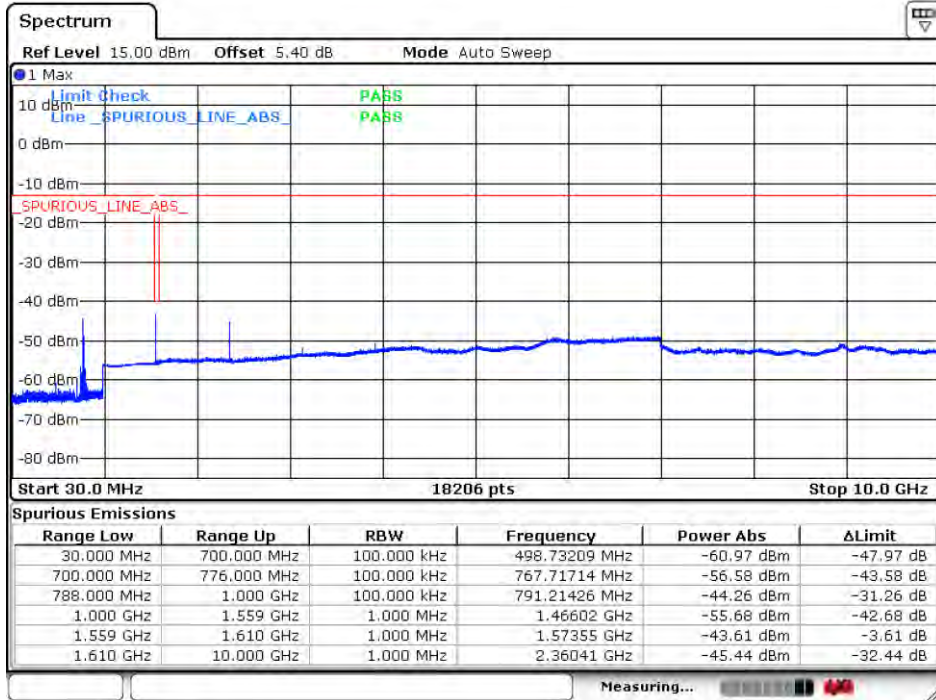
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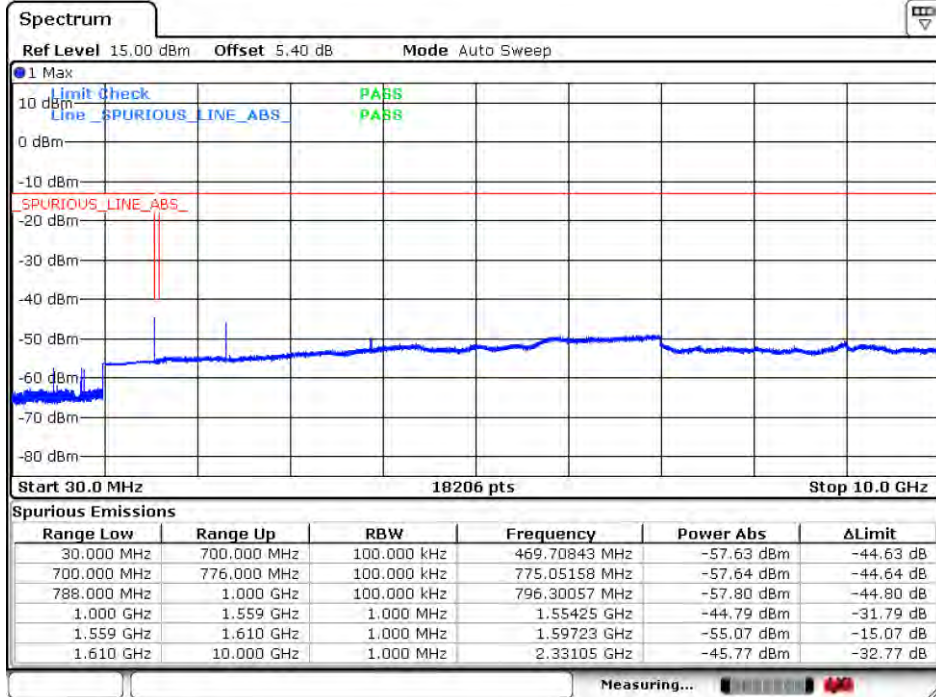


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=23279-T size=1T0



Date: 6 SEP. 2019 22:39:19

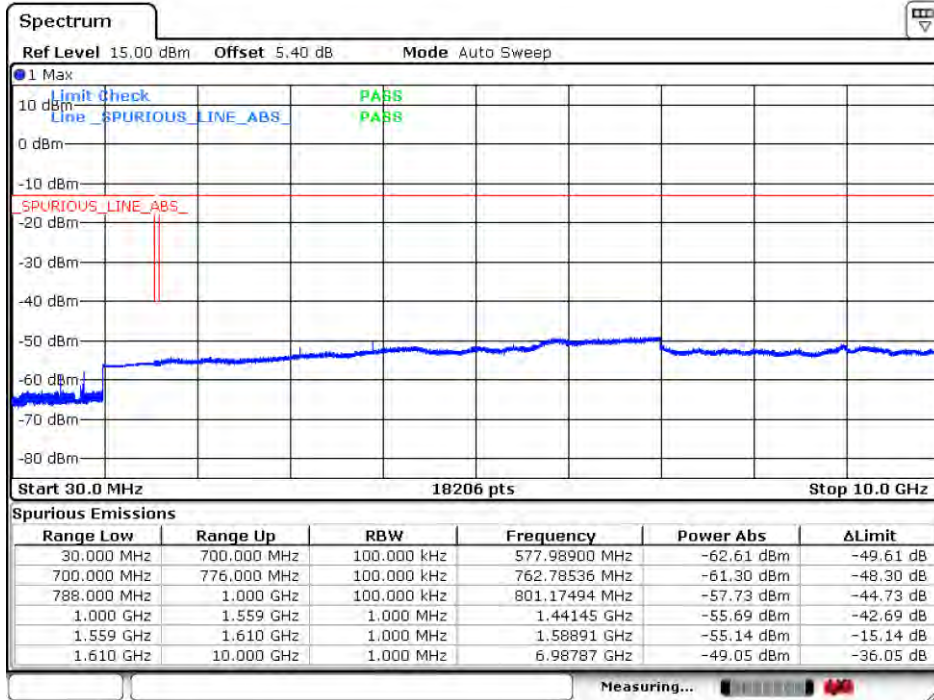
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Date: 6 SEP. 2019 22:01:07

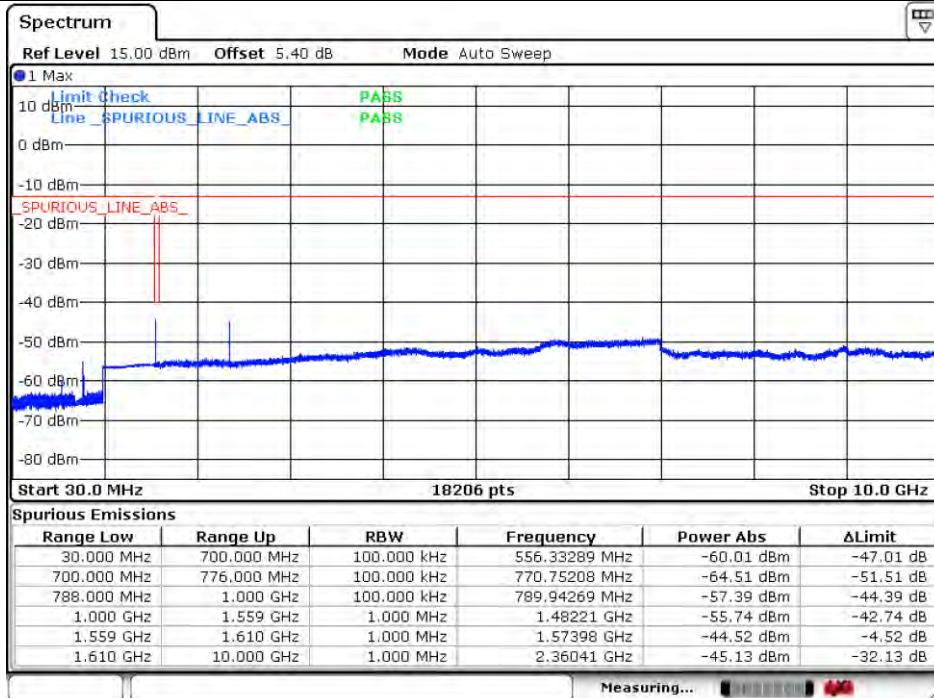


LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23230-T size=1T0



Date: 6 SEP. 2019 22:14:49

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=23279-T size=1T0



Date: 6 SEP. 2019 22:37:03



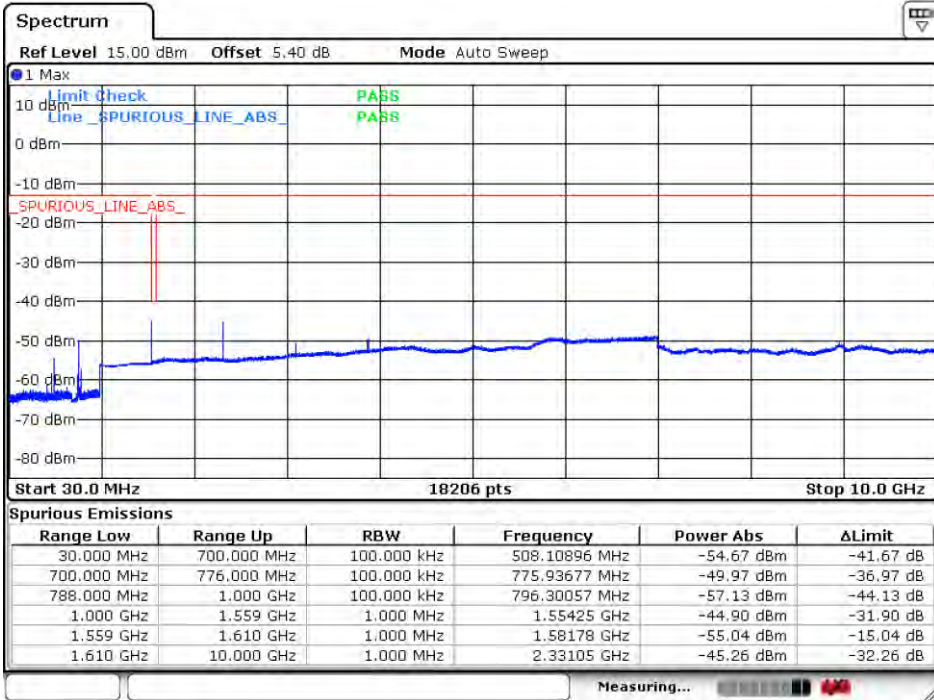
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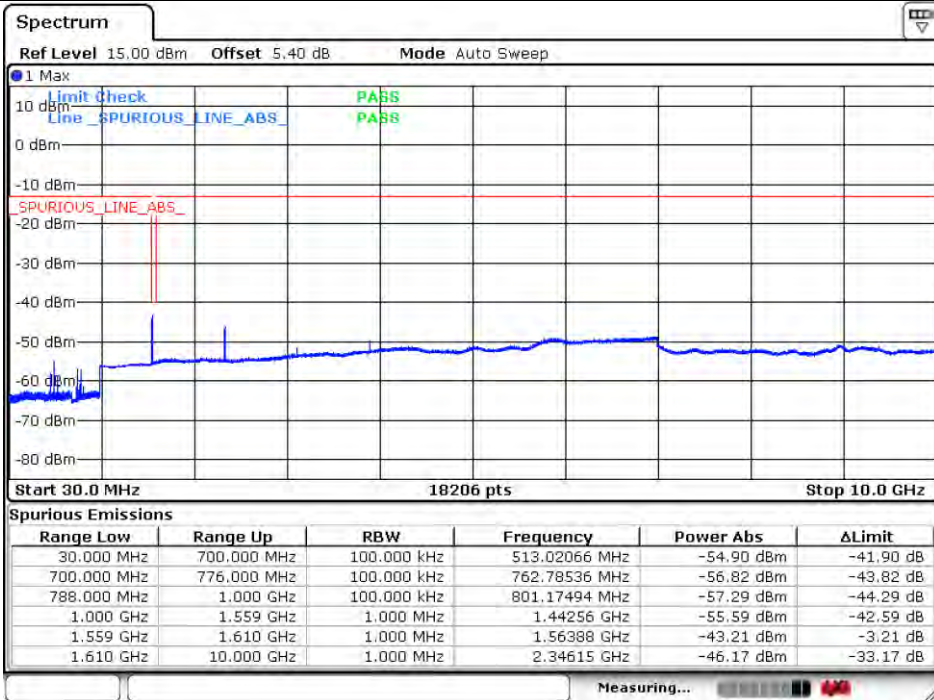
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23181-T size=1T0



Date: 6 SEP. 2019 22:03:28

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23230-T size=1T0



Date: 6 SEP. 2019 22:12:38



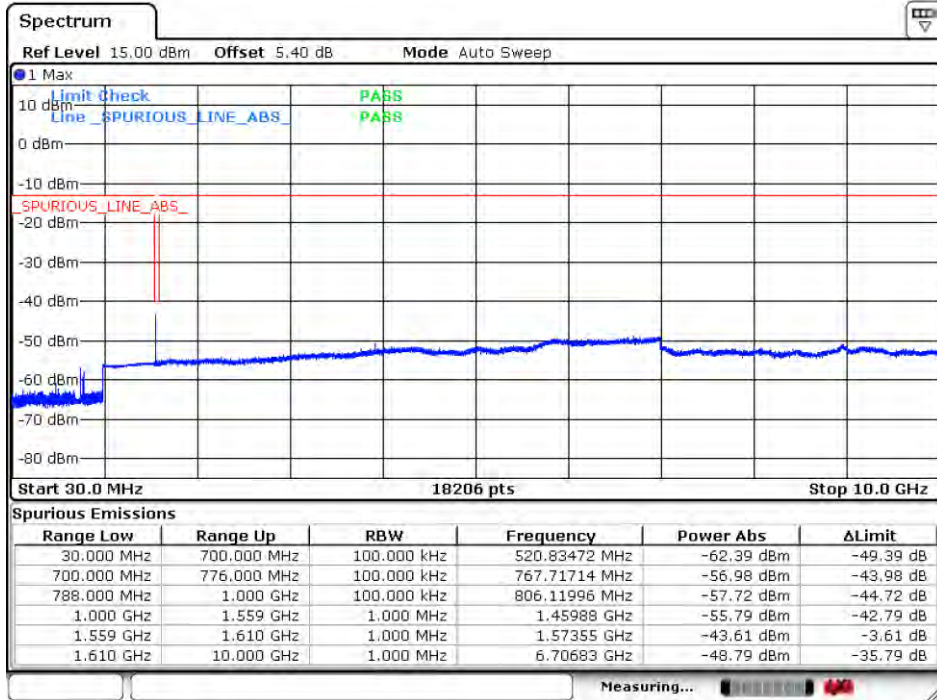
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=23279-T size=1T0



Date: 6 SEP. 2019 22:38:44



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7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 13

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

7.1.1.1.1 Test Channel = 23181

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
111.8236	-64.70	-13.00	51.70	Vertical
602.4256	-64.85	-13.00	51.85	Vertical
1559.1108	-58.76	-40.00	18.76	Vertical
2331.0662	-51.97	-13.00	38.97	Vertical
14547.4619	-42.84	-13.00	29.84	Vertical
17995.7998	-34.81	-13.00	21.81	Vertical
42.0771	-63.42	-13.00	50.42	Horizontal
241.1796	-69.09	-13.00	56.09	Horizontal
1559.1108	-54.15	-40.00	14.15	Horizontal
2331.0662	-48.16	-13.00	35.16	Horizontal
9304.4522	-48.92	-13.00	35.92	Horizontal
16960.7584	-39.52	-13.00	26.52	Horizontal

7.1.1.1.2 Test Channel = 23230

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
106.3913	-65.68	-13.00	52.68	Vertical
597.5269	-64.64	-13.00	51.64	Vertical
1605.8692	-50.34	-40.00	10.34	Vertical
2463.8928	-41.22	-13.00	28.22	Vertical
14497.6599	-42.63	-13.00	29.63	Vertical
17994.5998	-33.35	-13.00	20.35	Vertical
43.3382	-64.80	-13.00	51.80	Horizontal
245.1083	-69.11	-13.00	56.11	Horizontal
1605.8692	-50.58	-40.00	10.58	Horizontal
2463.4927	-42.46	-13.00	29.46	Horizontal
16397.9359	-38.11	-13.00	25.11	Horizontal
17998.1999	-37.92	-13.00	24.92	Horizontal



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7.1.1.1.3 Test Channel = 23279

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
108.4284	-65.43	-13.00	52.43	Vertical
614.0662	-63.79	-13.00	50.79	Vertical
1573.3147	-57.22	-40.00	17.22	Vertical
2360.2721	-54.42	-13.00	41.42	Vertical
14617.6647	-42.85	-13.00	29.85	Vertical
17989.1996	-35.19	-13.00	22.19	Vertical
42.9501	-64.93	-13.00	51.93	Horizontal
247.0969	-67.90	-13.00	54.90	Horizontal
1573.3147	-54.40	-40.00	14.40	Horizontal
2360.2721	-49.42	-13.00	36.42	Horizontal
3146.4059	-51.43	-13.00	38.43	Horizontal
16976.3591	-39.50	-13.00	26.50	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.



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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 13	180KHz	BPSK/15KHz	23181	12T0	VL	TN	9.30	0.011967	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	VN	TN	-10.63	-0.013676	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	VH	TN	4.68	0.006027	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	VL	TN	2.23	0.002848	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	VN	TN	3.15	0.004032	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	VH	TN	-1.96	-0.002506	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	VL	TN	11.14	0.014158	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	VN	TN	-12.78	-0.016242	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	VH	TN	13.43	0.017072	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	VL	TN	2.94	0.003787	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	VN	TN	-11.04	-0.014206	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	VH	TN	-0.79	-0.001015	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	VL	TN	8.16	0.010440	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	VN	TN	14.52	0.018572	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	VH	TN	-1.59	-0.002035	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	VL	TN	3.85	0.004897	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	VN	TN	-4.04	-0.005136	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	VH	TN	-2.26	-0.002874	±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 13	180KHz	BPSK/15KHz	23181	12T0	NV	-30	5.48	0.007056	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	-20	-8.55	-0.010996	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	0	12.41	0.015965	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	10	-5.77	-0.007423	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	20	-0.97	-0.001244	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	30	-1.90	-0.002451	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	40	-14.77	-0.019002	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23181	12T0	NV	50	7.18	0.009233	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	-30	8.63	0.011039	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	-20	11.97	0.015306	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	0	-1.61	-0.002054	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	10	11.85	0.015154	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	20	11.35	0.014516	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	30	-1.27	-0.001622	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	40	-3.25	-0.004156	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23230	12T0	NV	50	-1.78	-0.002274	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	-30	0.40	0.000505	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	-20	-7.65	-0.009716	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	0	-6.90	-0.008763	±2.5	PASS



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NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	10	-3.10	-0.003938	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	20	-3.12	-0.003968	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	30	5.72	0.007268	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	40	1.73	0.002203	±2.5	PASS
NB1 Band 13	180KHz	BPSK/15KHz	23279	12T0	NV	50	6.06	0.007696	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	-30	7.15	0.009205	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	-20	6.12	0.007878	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	0	-2.31	-0.002979	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	10	5.77	0.007426	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	20	-1.22	-0.001572	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	30	-4.54	-0.005844	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	40	12.12	0.015590	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23181	12T0	NV	50	11.92	0.015335	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	-30	-10.20	-0.013043	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	-20	-1.83	-0.002342	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	0	-6.21	-0.007935	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	10	-0.94	-0.001207	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	20	-6.63	-0.008482	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	30	0.83	0.001062	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	40	12.78	0.016343	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23230	12T0	NV	50	-10.87	-0.013898	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	-30	1.42	0.001802	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	-20	10.39	0.013202	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	0	-10.39	-0.013209	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	10	-5.98	-0.007605	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	20	9.10	0.011569	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	30	-10.05	-0.012777	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	40	14.89	0.018921	±2.5	PASS
NB1 Band 13	180KHz	QPSK/15KHz	23279	12T0	NV	50	6.52	0.008282	±2.5	PASS

The End



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