



# Appendix B

## LTE-NB1 Band 26 (814-824)



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# 1 Effective Radiated Power Output Data

## 1.1 Test Result for LTE NB1 Band 26

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 26	BPSK	3.75	26692	1T0	20.25	17.10	50.00	PASS
NB1 Band 26	BPSK	3.75	26740	1T0	20.48	17.33	50.00	PASS
NB1 Band 26	BPSK	3.75	26788	1T0	20.49	17.34	50.00	PASS
NB1 Band 26	QPSK	3.75	26692	1T0	20.23	17.08	50.00	PASS
NB1 Band 26	QPSK	3.75	26740	1T0	20.40	17.25	50.00	PASS
NB1 Band 26	QPSK	3.75	26788	1T0	20.39	17.24	50.00	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	ERP (dBm)	limit (dBm)	Verdict
NB1 Band 26	BPSK	15	26692	1T0	20.55	17.40	50.00	PASS
NB1 Band 26	BPSK	15	26740	1T0	20.44	17.29	50.00	PASS
NB1 Band 26	BPSK	15	26788	1T0	20.57	17.42	50.00	PASS
NB1 Band 26	QPSK	15	26692	1T0	20.73	17.58	50.00	PASS
NB1 Band 26	QPSK	15	26692	12T0	20.59	17.44	50.00	PASS
NB1 Band 26	QPSK	15	26740	1T0	20.51	17.36	50.00	PASS
NB1 Band 26	QPSK	15	26740	12T0	20.06	16.91	50.00	PASS
NB1 Band 26	QPSK	15	26788	1T0	20.44	17.29	50.00	PASS
NB1 Band 26	QPSK	15	26788	12T0	20.10	16.95	50.00	PASS

Note:

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

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

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



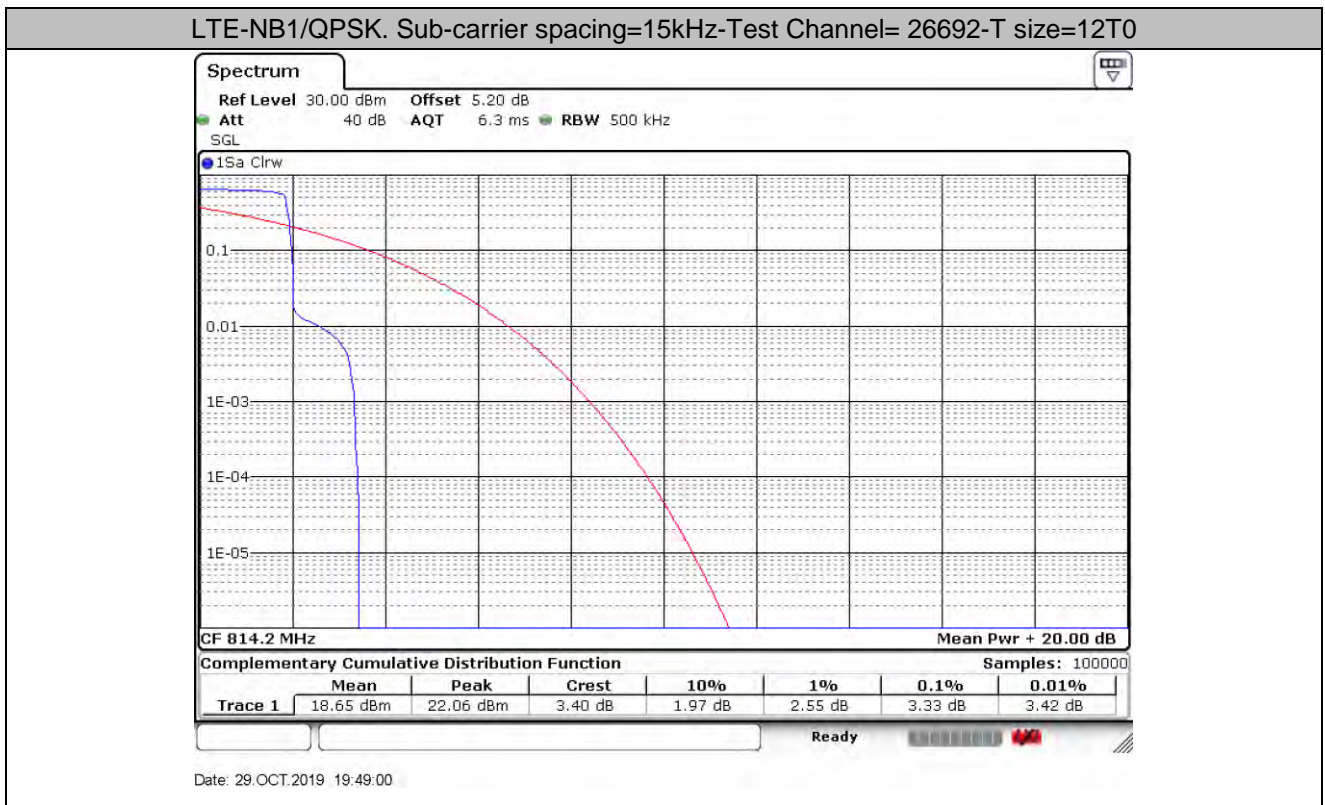


## 2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 26	QPSK/12T0	26692	3.33	13	PASS
NB1 Band 26	QPSK/12T0	26740	3.16	13	PASS
NB1 Band 26	QPSK/12T0	26788	4.64	13	PASS

### 2.1 For LTE-NB1

#### 2.1.1 Test Band = LTE-NB1 Band 26

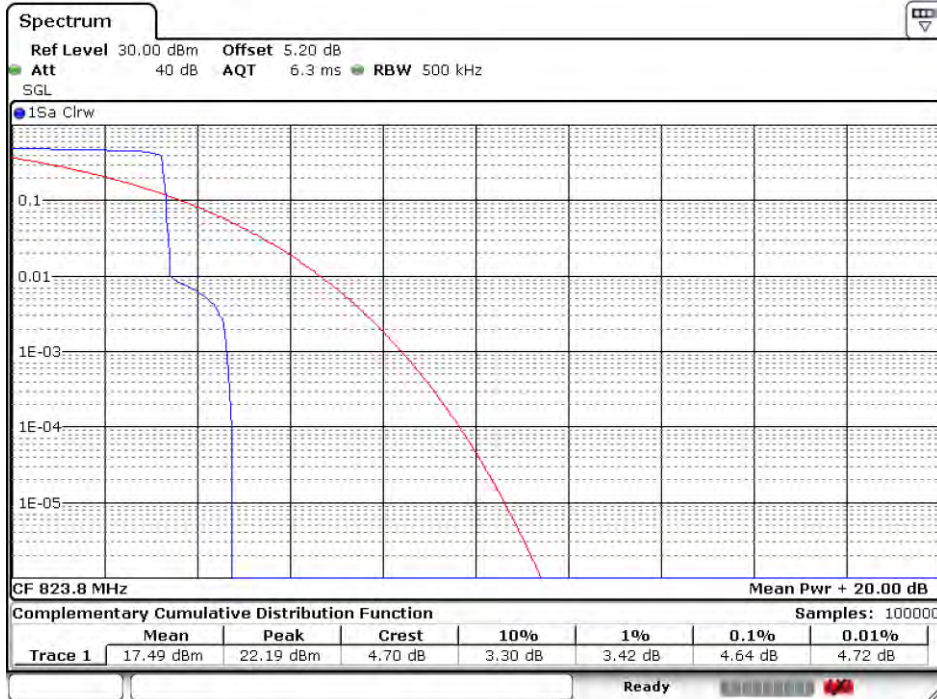


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26740-T size=12T0



Date: 5.SEP.2019 05:24:17

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26788-T size=12T0



Date: 29.OCT.2019 19:49:23





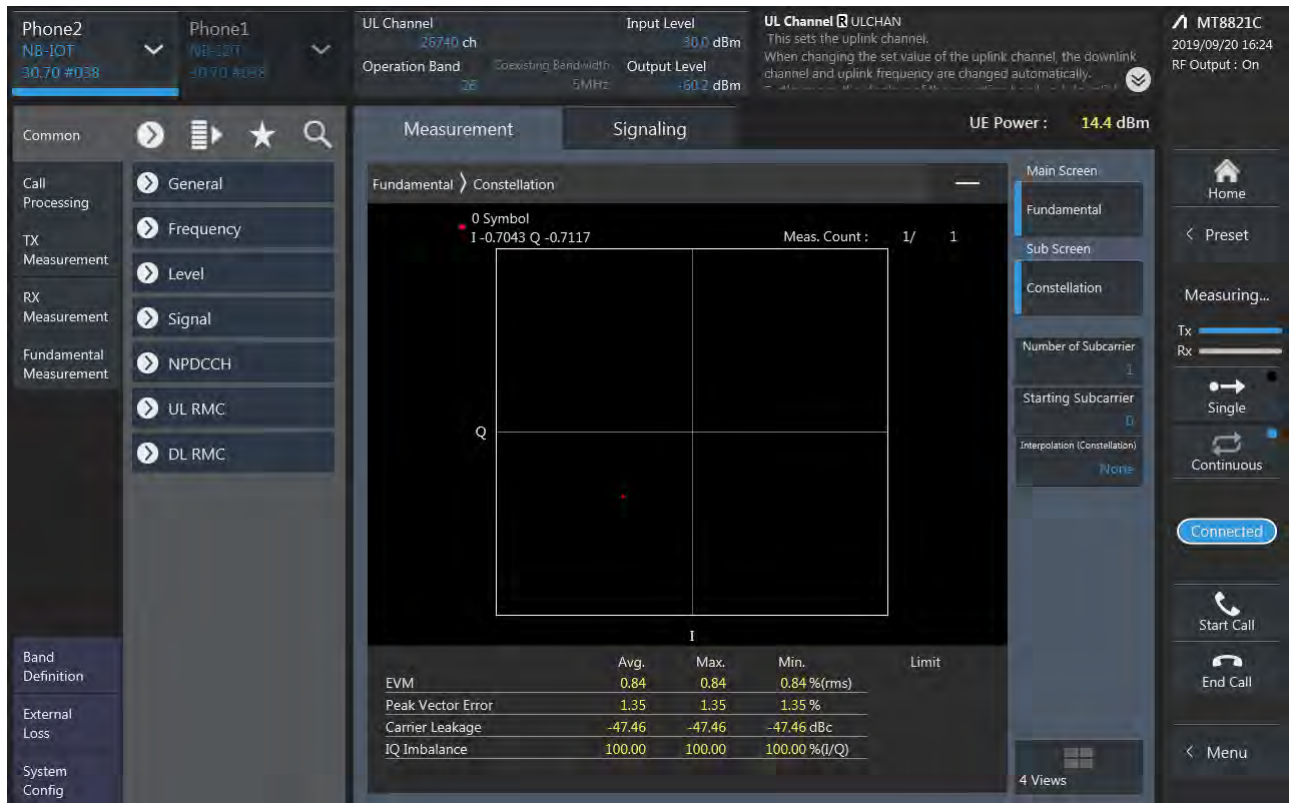
### 3 Modulation Characteristics

#### 3.1 For LTE-NB1

##### 3.1.1 Test Band = LTE-NB1 Band 26

##### 3.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=15kHz.T size=1T0

##### 3.1.1.1.1 Test Channel = 26740



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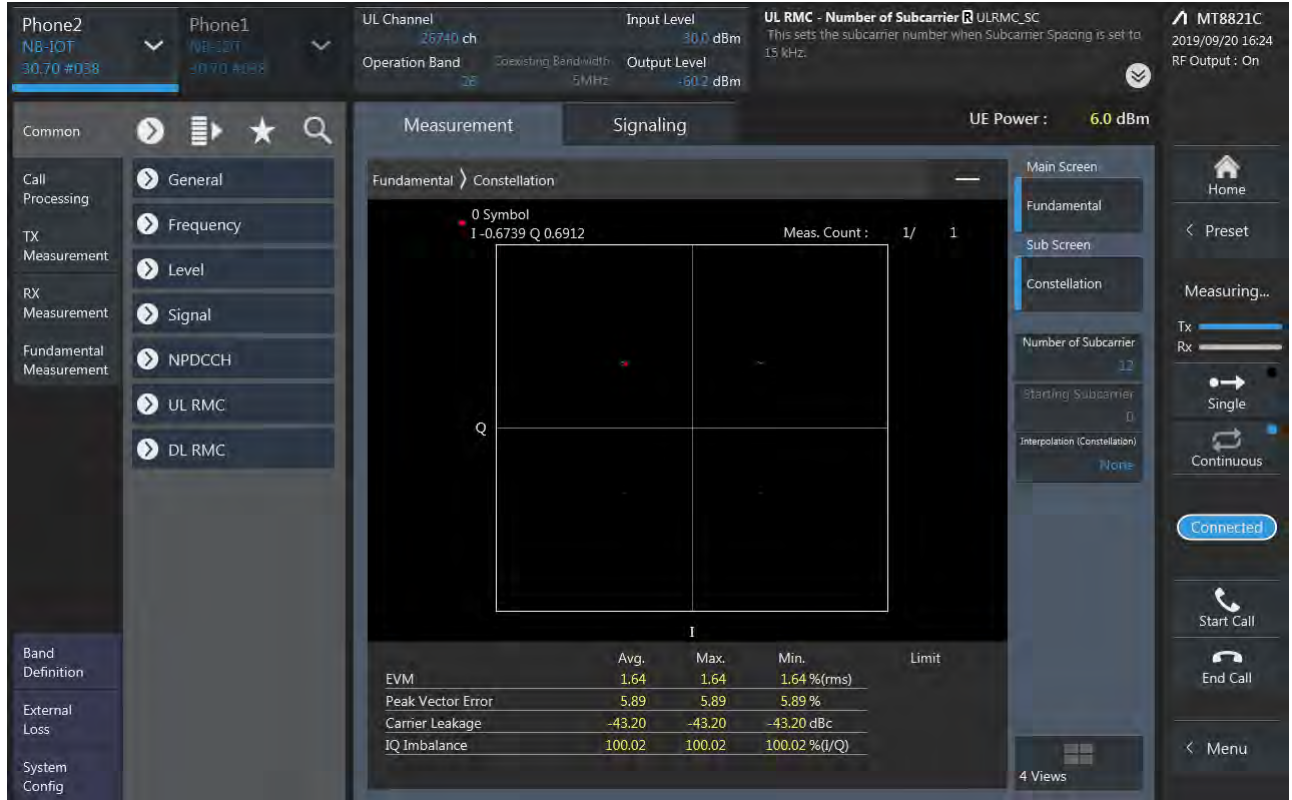
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**3.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0**

**3.1.1.2.1 Test Channel = 26740**



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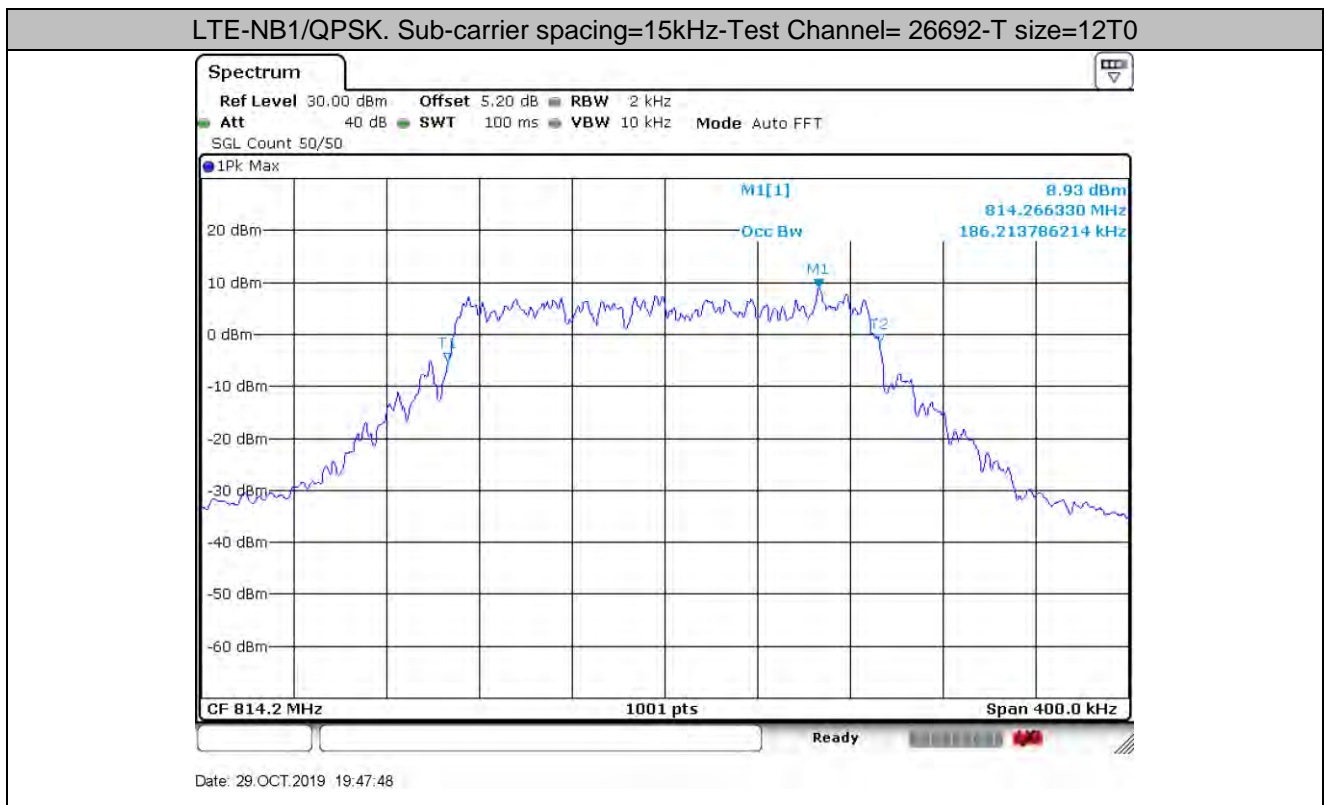


## 4 26dB Bandwidth and Occupied Bandwidth

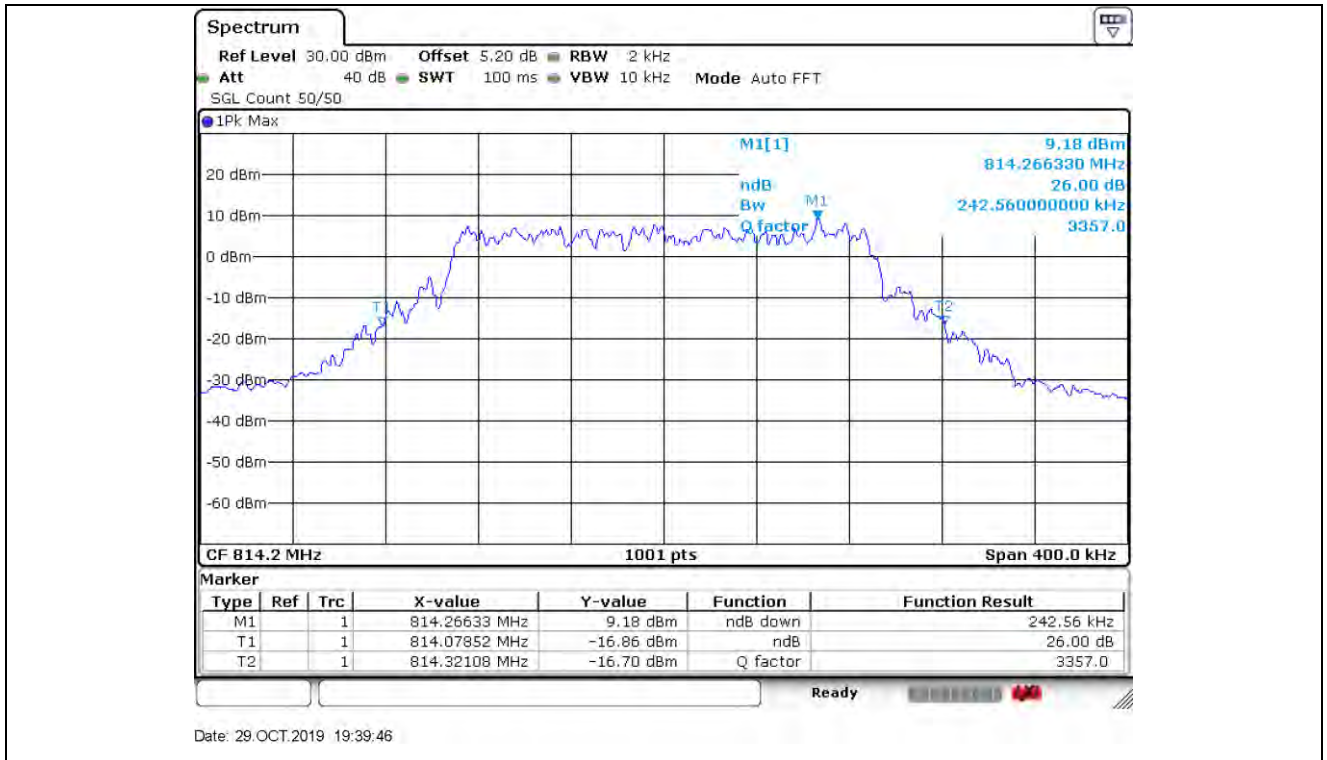
Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 26	QPSK/15kHz	12T0	26692	186.21	242.56	PASS
NB1 Band 26	QPSK/15kHz	12T0	26740	186.36	244.26	PASS
NB1 Band 26	QPSK/15kHz	12T0	26788	186.21	242.56	PASS

### 4.1 For LTE-NB1

#### 4.1.1 Test Band = LTE-NB1 Band 26





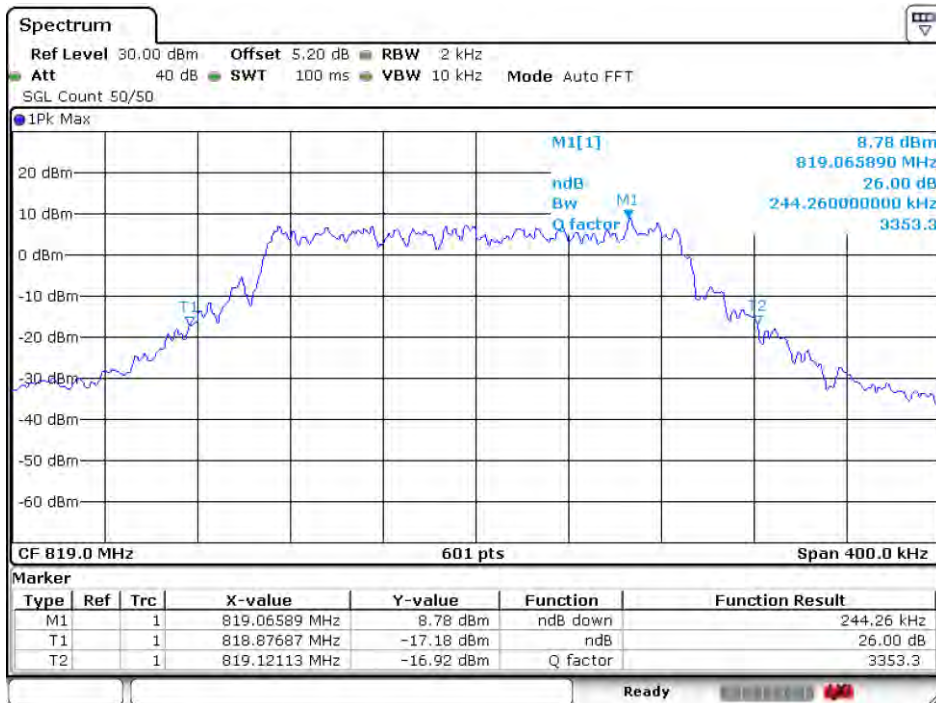




LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26740-T size=12T0



Date: 5.SEP.2019 05:51:49



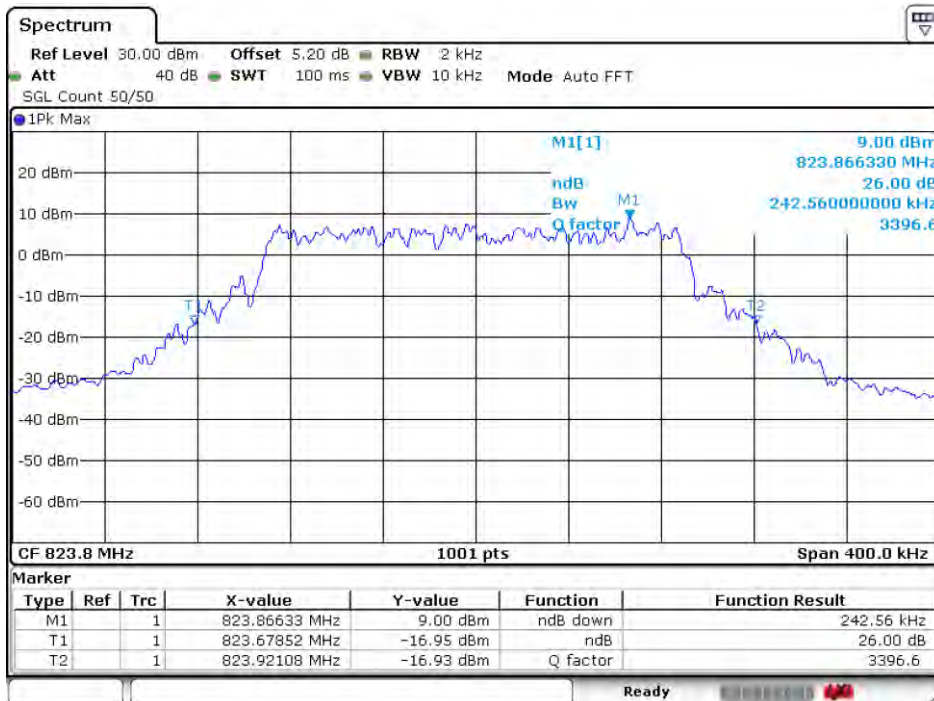
Date: 5.SEP.2019 06:03:40



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26788-T size=12T0



Date: 29.OCT.2019 19:32:12



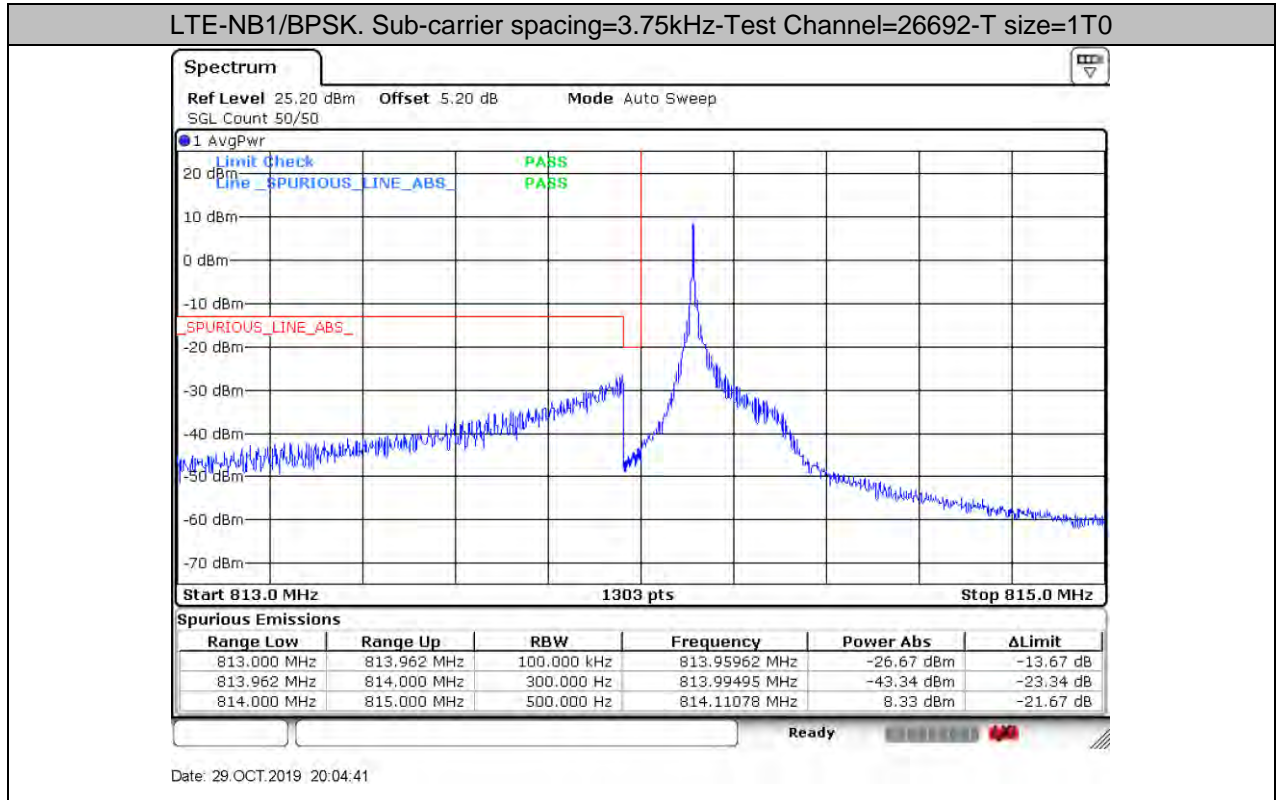
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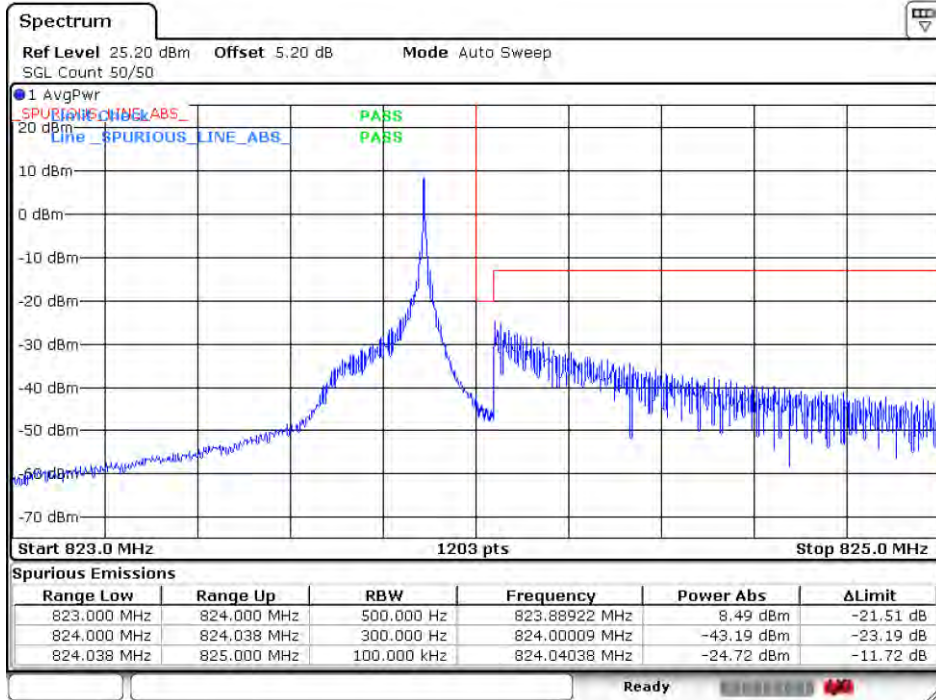
## 5 Band Edges Compliance

### 5.1 For LTE-NB1

#### 5.1.1 Test Band = LTE-NB1 Band 26

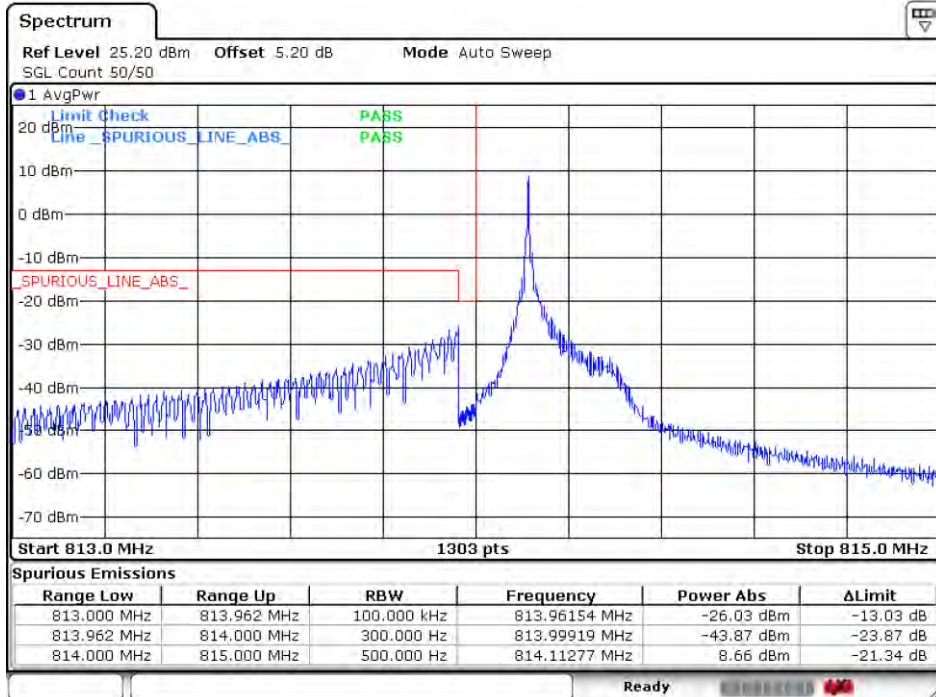


**LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=26788-T size=1T47**



Date: 29.OCT.2019 19:58:24

**LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26692-T size=1T0**

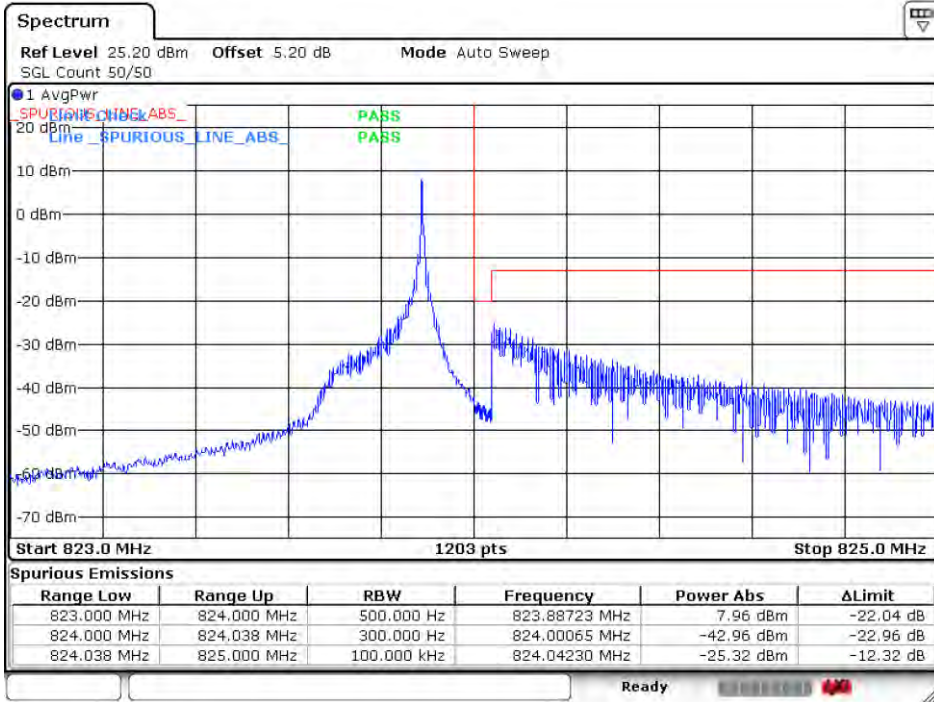


Date: 29.OCT.2019 20:06:33



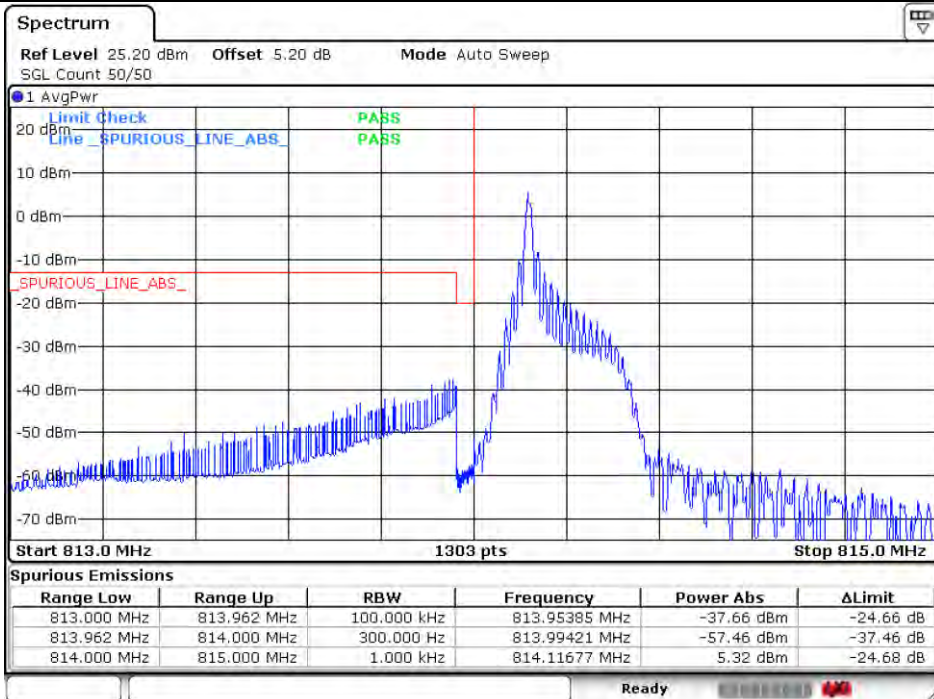


**LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26788-T size=1T47**



Date: 29.OCT.2019 19:56:52

**LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26692-T size=1T0**

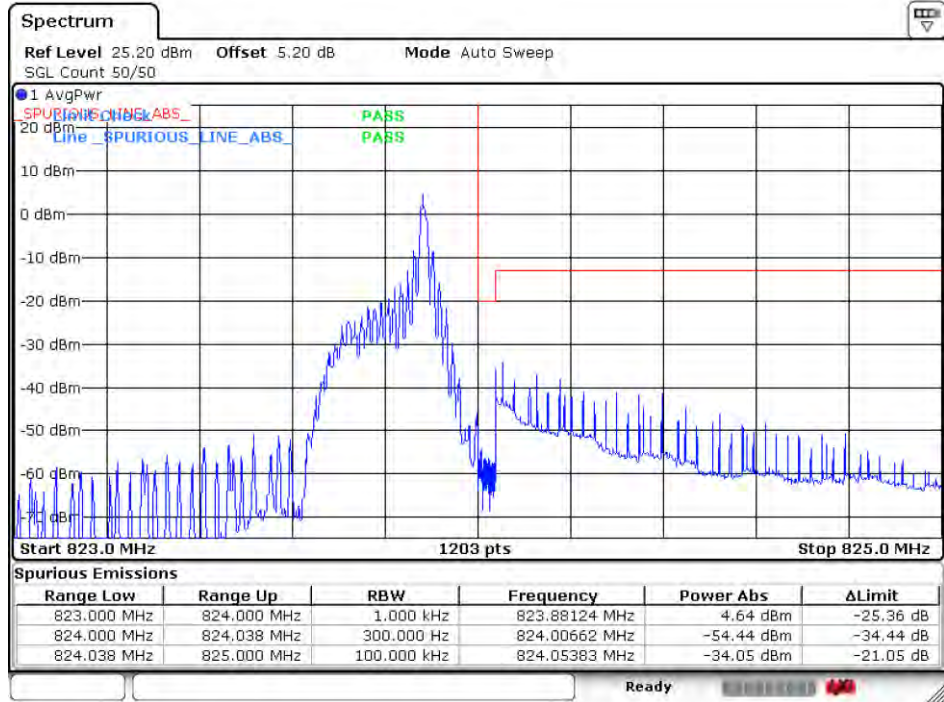


Date: 29.OCT.2019 20:08:56



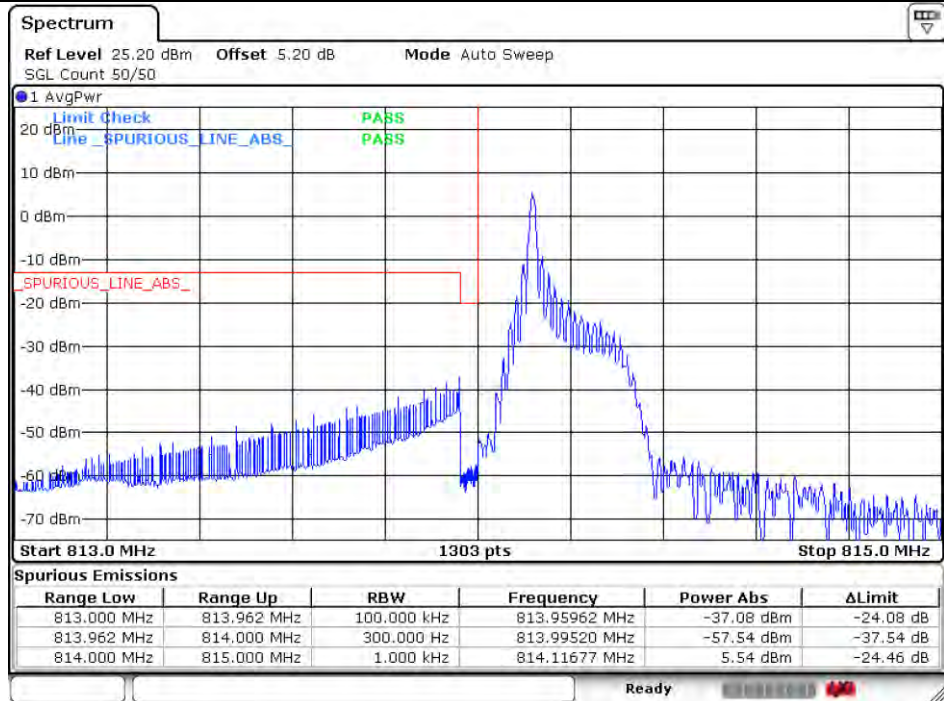


**LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26788-T size=1T11**



Date: 29.OCT.2019 19:54:37

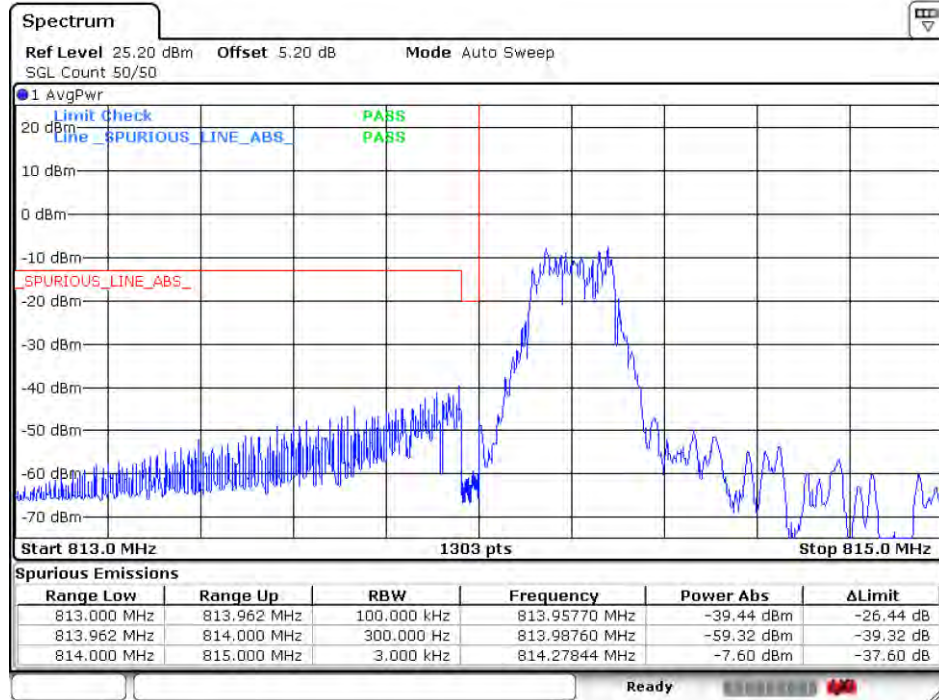
**LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26692-T size=1T0**



Date: 29.OCT.2019 20:08:13

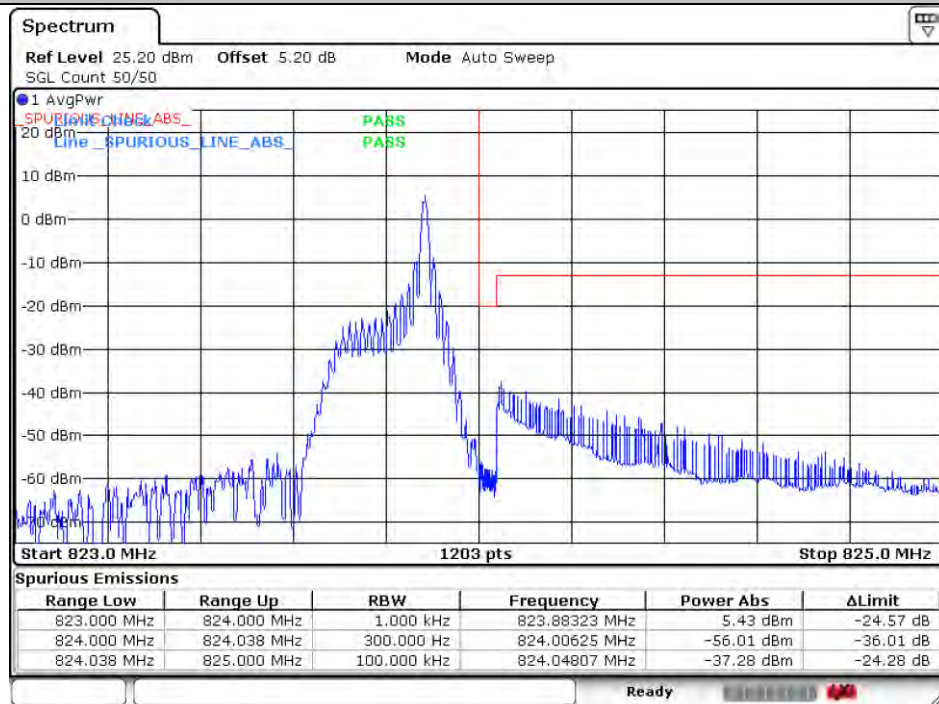


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26692-T size=12T0



Date: 29.OCT.2019 20:10:00

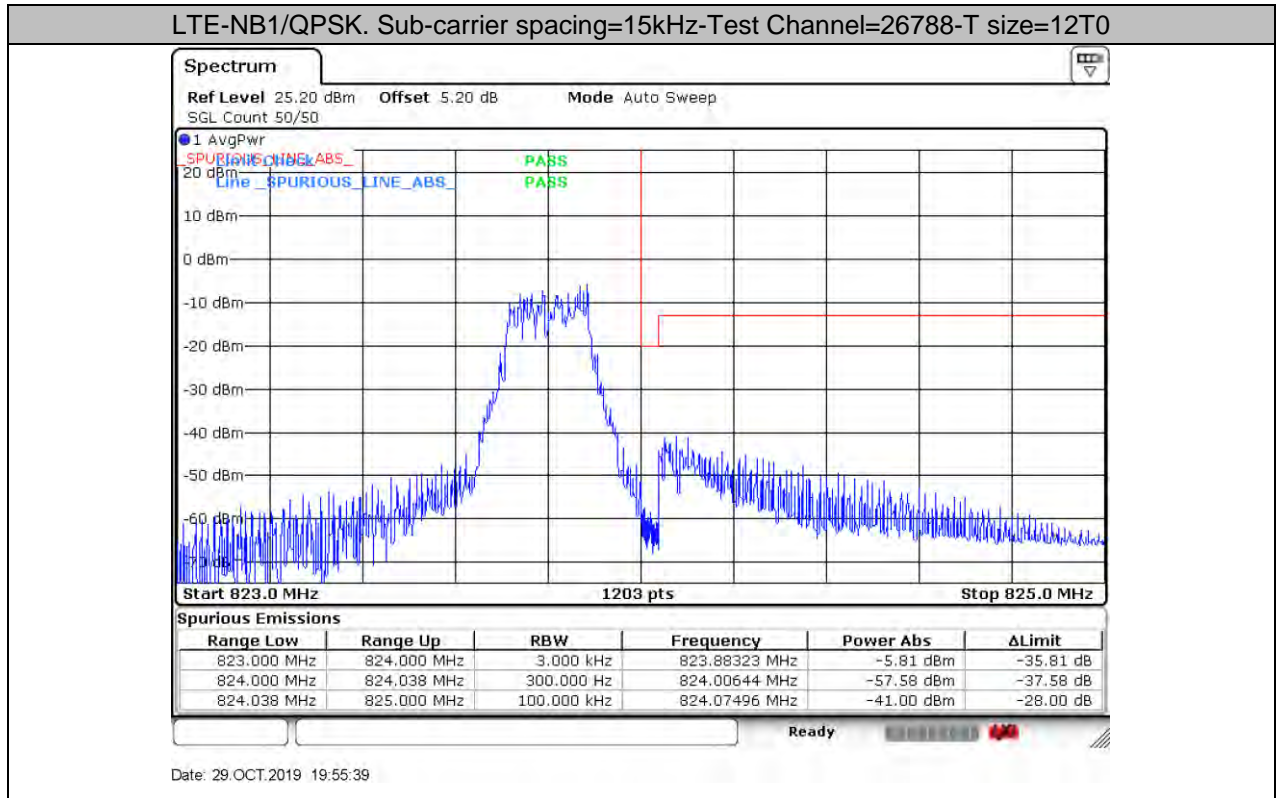
LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26788-T size=1T11



Date: 29.OCT.2019 19:53:19







## 6 Spurious Emission at Antenna Terminal

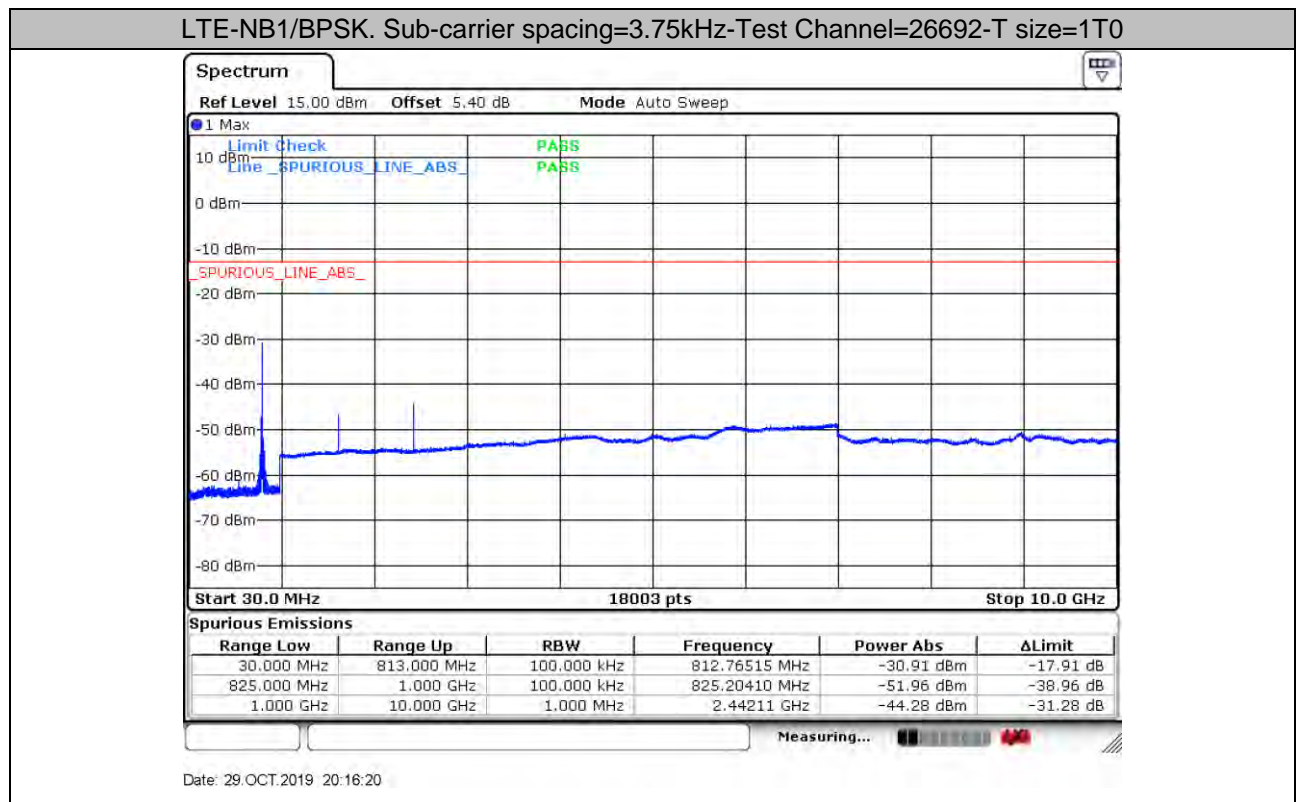
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of  $< RBW/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (Span / RBW)$ " 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 26

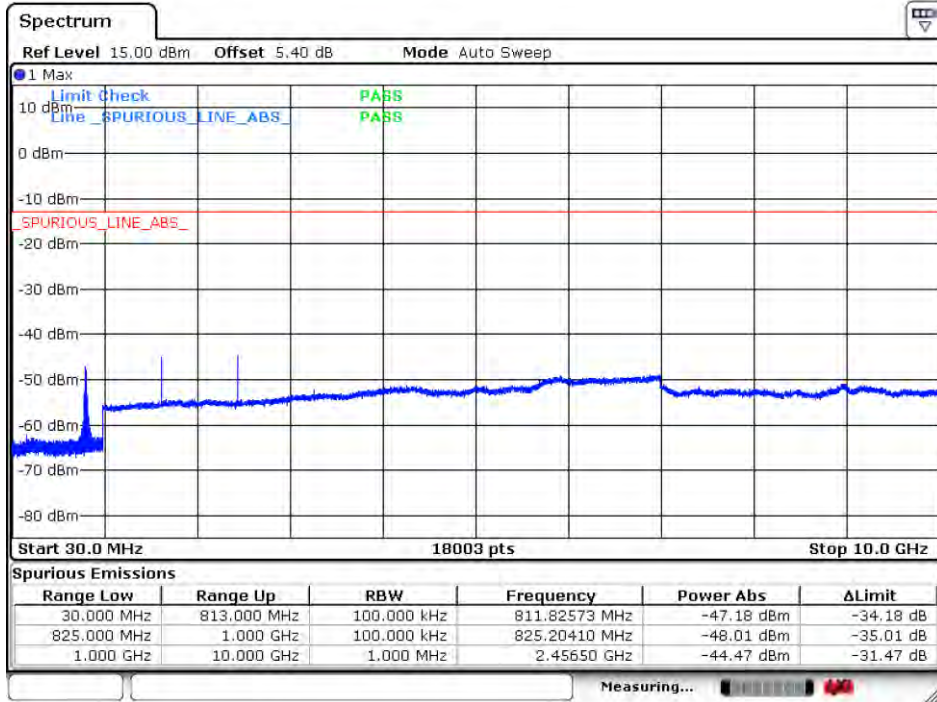


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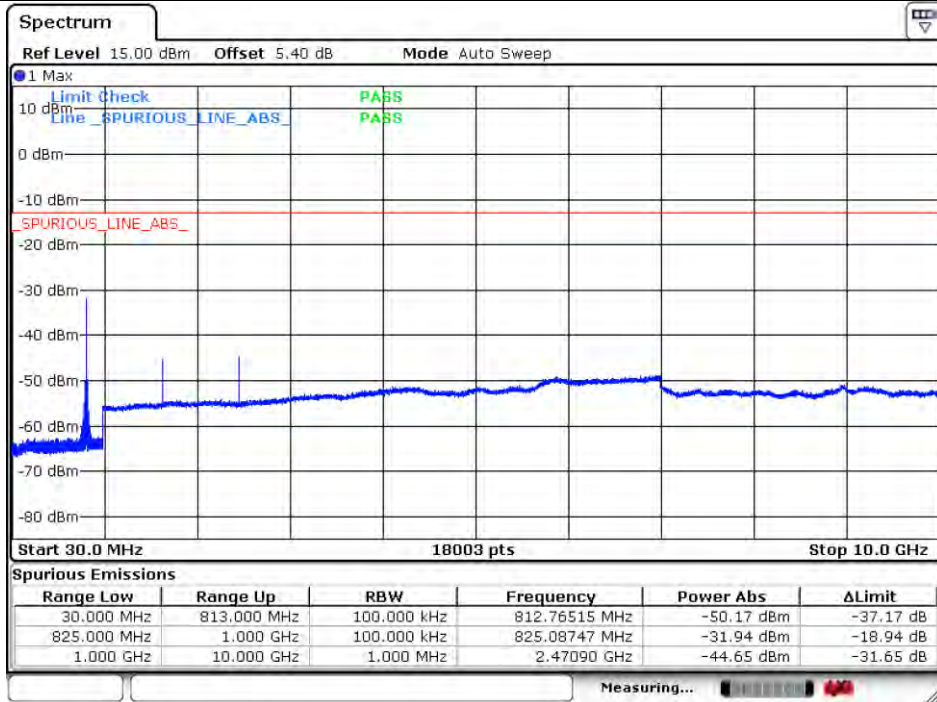
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=26740-T size=1T0



Date: 6 SEP.2019 06:59:09

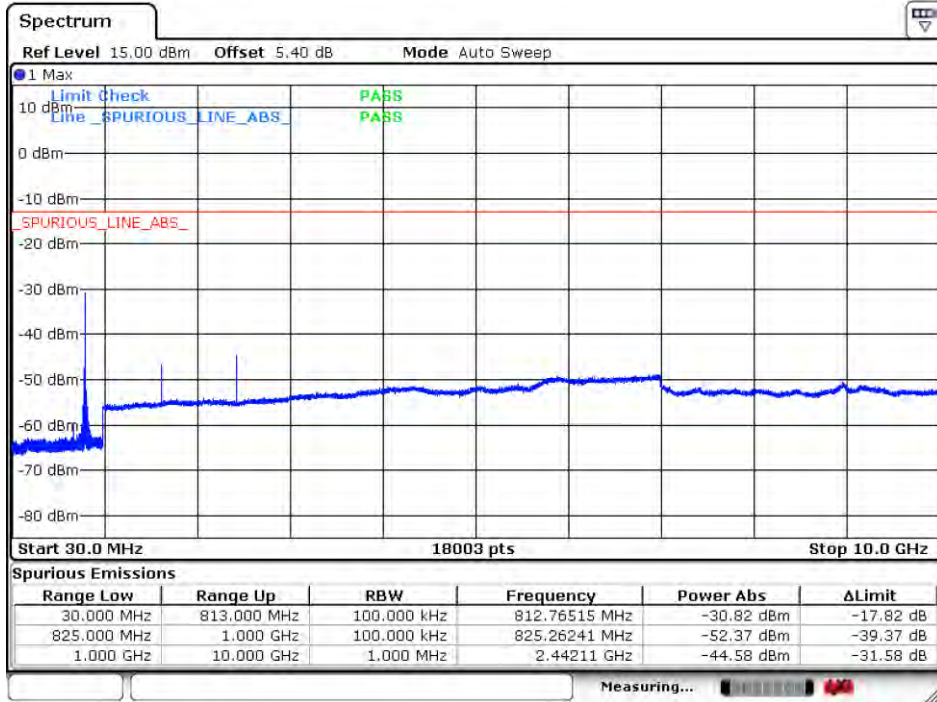
LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=26788-T size=1T0



Date: 29.OCT.2019 20:17:33

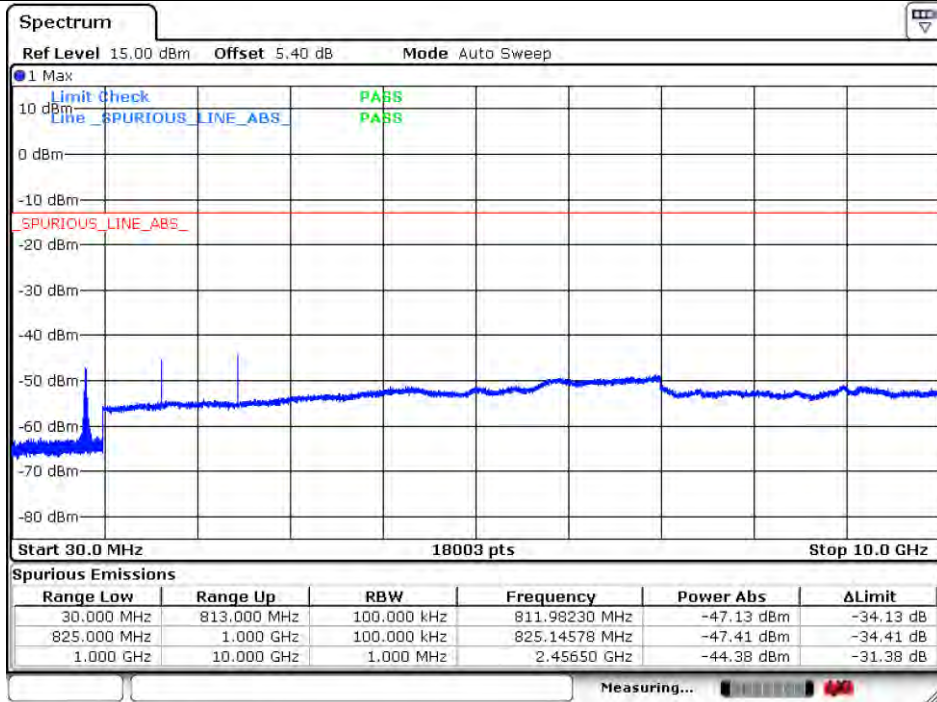


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26692-T size=1T0



Date: 29.OCT.2019 20:14:15

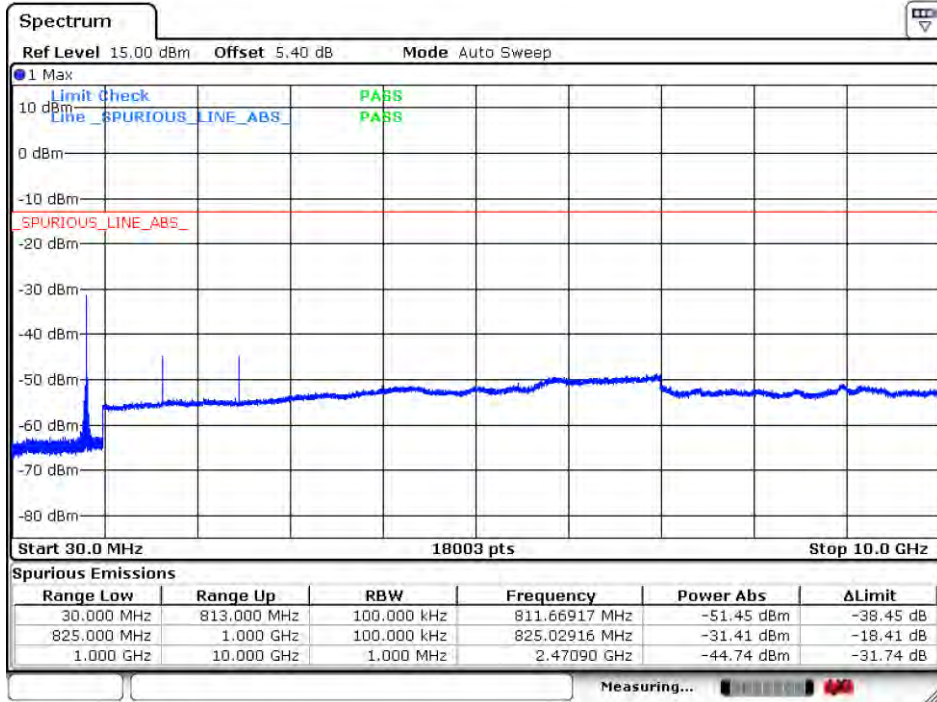
LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26740-T size=1T0



Date: 6 SEP.2019 06:58:49

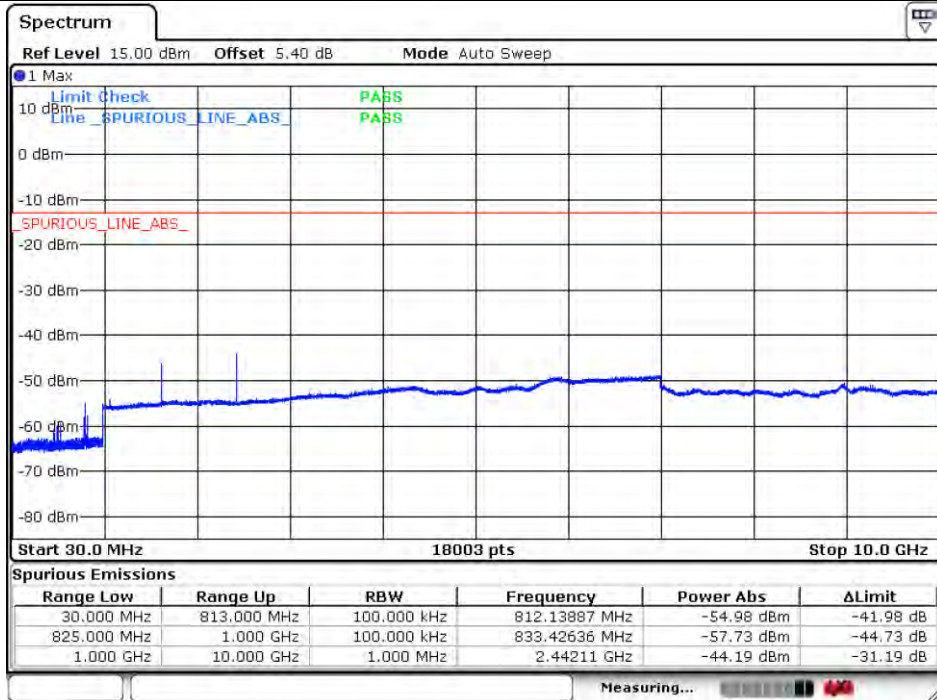


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26788-T size=1T0



Date: 29.OCT.2019 20:17:58

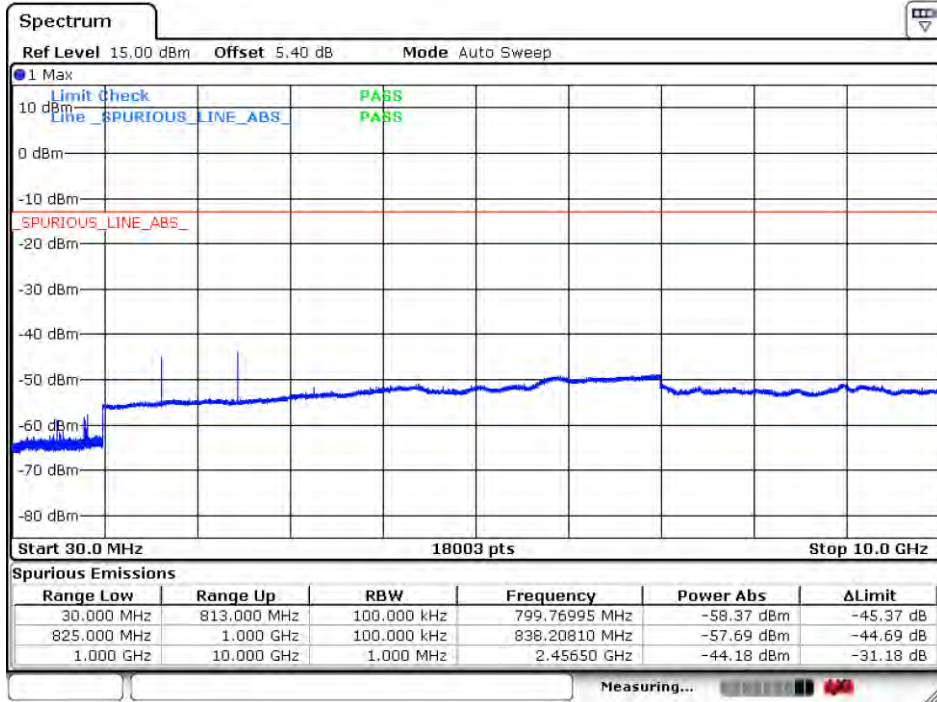
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26692-T size=1T0



Date: 29.OCT.2019 20:12:35

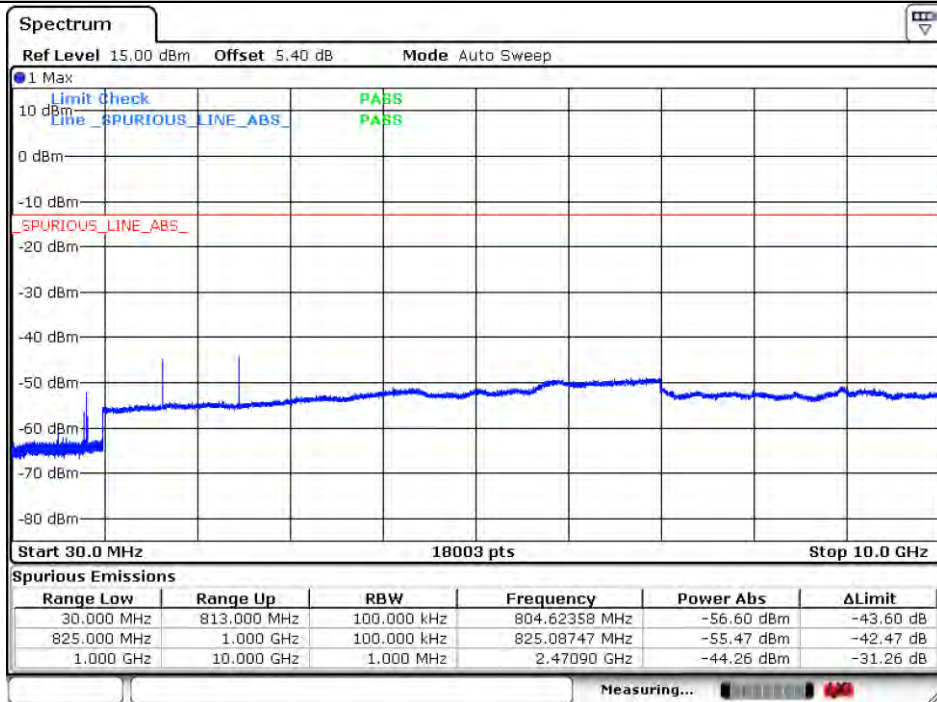


LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26740-T size=1T0



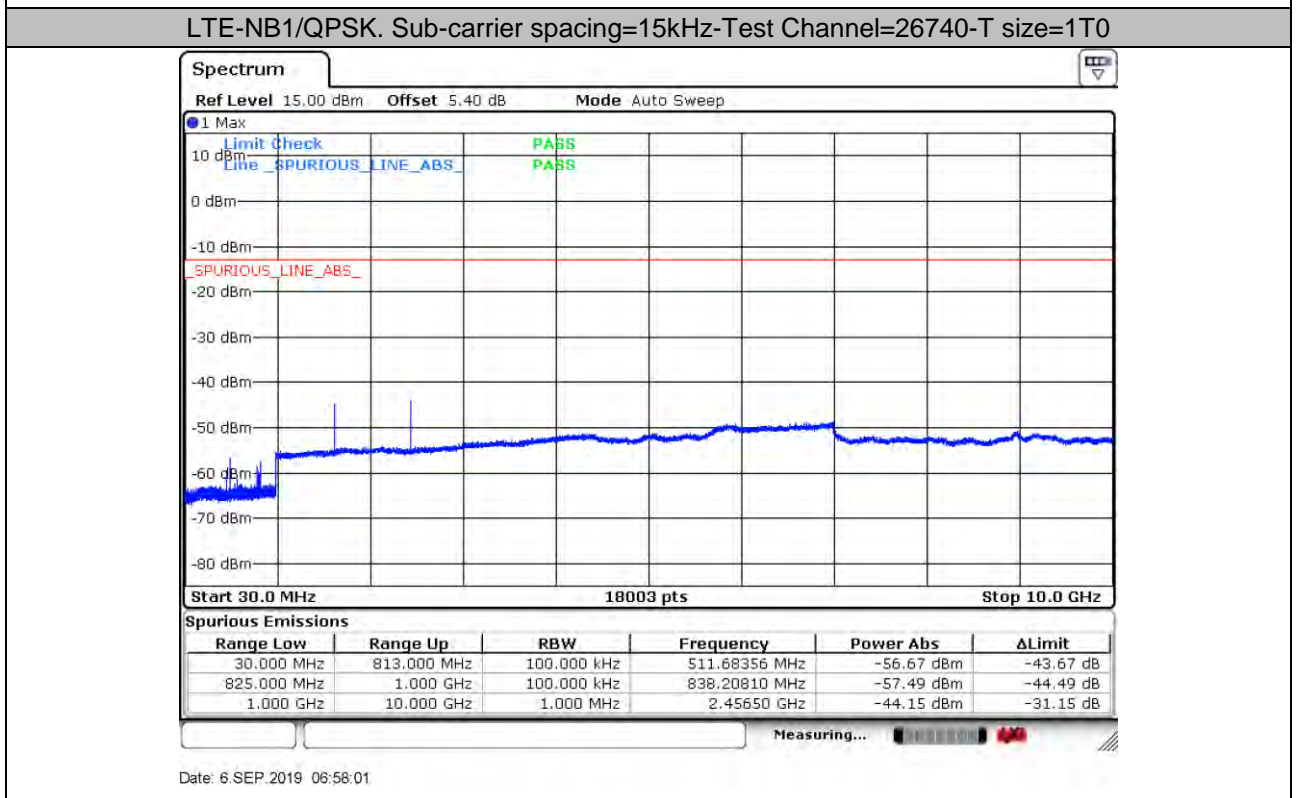
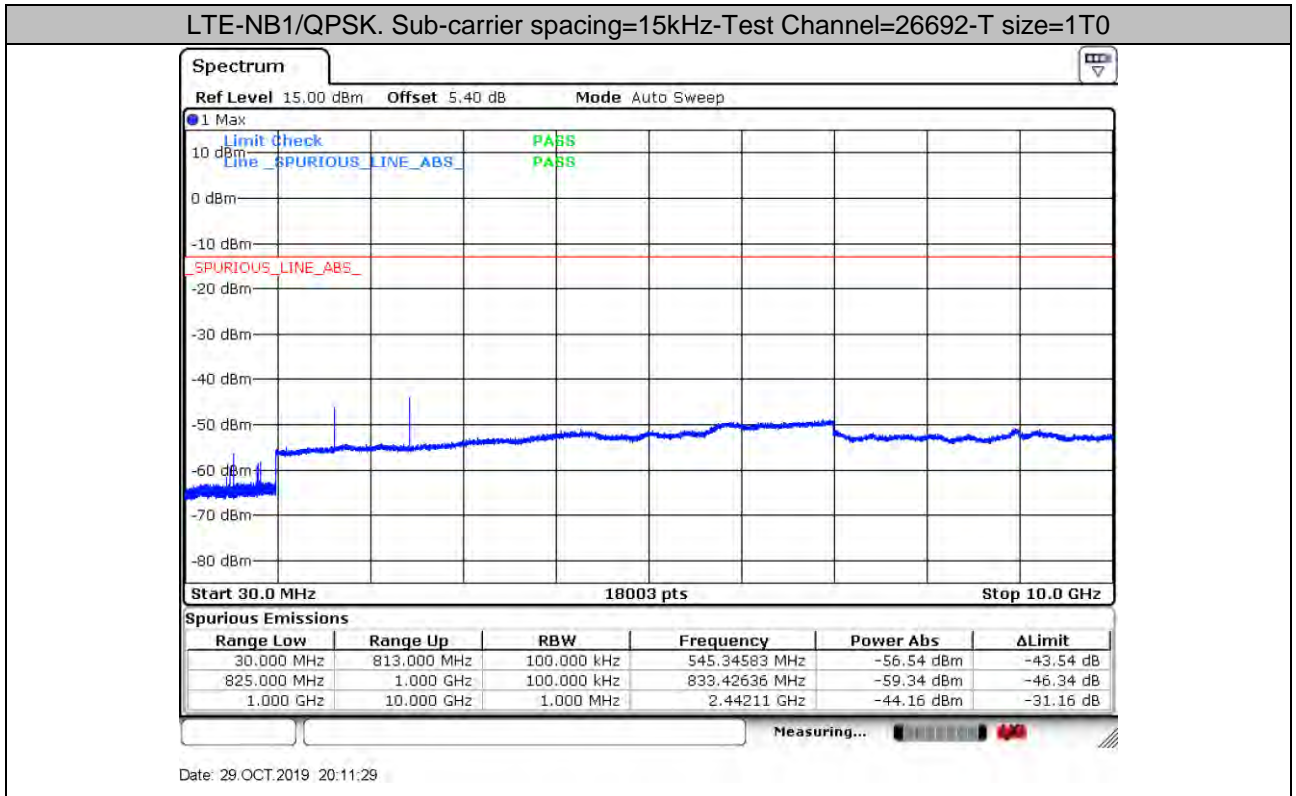
Date: 6 SEP.2019 06:57:09

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26788-T size=1T0



Date: 29.OCT.2019 20:19:44







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## 7 Field Strength of Spurious Radiation

### 7.1 For LTE-NB1

#### 7.1.1 Test Band = LTE-NB1 Band 26

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

##### 7.1.1.1.1 Test Channel = 26692

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
114.0062	-64.23	-13.00	51.23	Vertical
618.0434	-62.78	-13.00	49.78	Vertical
1166.4333	-64.24	-13.00	51.24	Vertical
2442.2885	-51.24	-13.00	38.24	Vertical
7393.7465	-51.93	-13.00	38.93	Vertical
8740.3913	-50.47	-13.00	37.47	Vertical
42.1256	-63.02	-13.00	50.02	Horizontal
573.5182	-63.83	-13.00	50.83	Horizontal
1628.1256	-59.46	-13.00	46.46	Horizontal
2442.2885	-45.85	-13.00	32.85	Horizontal
4070.0357	-54.04	-13.00	41.04	Horizontal
8822.3941	-51.05	-13.00	38.05	Horizontal

##### 7.1.1.1.2 Test Channel = 26740

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
117.0577	-67.64	-13.00	54.64	Vertical
616.8351	-58.95	-13.00	45.95	Vertical
1163.2622	-61.84	-13.00	48.84	Vertical
2446.1055	-51.24	-13.00	38.24	Vertical
7391.8353	-56.27	-13.00	43.27	Vertical
8743.6340	-53.78	-13.00	40.78	Vertical
38.9198	-58.29	-13.00	45.29	Horizontal
573.7200	-68.26	-13.00	55.26	Horizontal
1623.8130	-62.01	-13.00	49.01	Horizontal
2443.9780	-41.68	-13.00	28.68	Horizontal
4068.7849	-58.86	-13.00	45.86	Horizontal
8820.6204	-53.51	-13.00	40.51	Horizontal



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**7.1.1.1.3 Test Channel = 26788**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.7658	-68.42	-13.00	55.42	Vertical
616.4906	-61.72	-13.00	48.72	Vertical
1165.0222	-67.29	-13.00	54.29	Vertical
2444.7828	-50.14	-13.00	37.14	Vertical
7392.1554	-51.63	-13.00	38.63	Vertical
8741.7231	-51.34	-13.00	38.34	Vertical
41.0657	-63.42	-13.00	50.42	Horizontal
573.3639	-62.70	-13.00	49.70	Horizontal
1623.4384	-63.65	-13.00	50.65	Horizontal
2439.8532	-41.80	-13.00	28.80	Horizontal
4066.2175	-56.41	-13.00	43.41	Horizontal
8819.3488	-51.11	-13.00	38.11	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 26	180KHz	BPSK/15KHz	26692	12T0	VL	TN	4.35	0.00535	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	VN	TN	1.72	0.00211	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	VH	TN	-6.85	-0.00841	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	VL	TN	-4.08	-0.00498	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	VN	TN	9.43	0.01151	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	VH	TN	4.70	0.00574	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	VL	TN	-1.14	-0.00139	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	VN	TN	8.62	0.01046	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	VH	TN	-3.20	-0.00388	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	VL	TN	7.66	0.00940	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	VN	TN	-0.18	-0.00022	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	VH	TN	-2.07	-0.00255	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	VL	TN	0.76	0.00093	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	VN	TN	-7.47	-0.00912	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	VH	TN	0.08	0.00010	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	VL	TN	2.43	0.00295	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	VN	TN	6.62	0.00804	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	VH	TN	3.12	0.00379	±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 26	180KHz	BPSK/15KHz	26692	12T0	NV	-30	4.16	0.00511	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	-20	-4.05	-0.00497	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	0	-2.28	-0.00281	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	10	0.41	0.00051	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	20	-4.19	-0.00514	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	30	6.87	0.00844	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	40	4.89	0.00601	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26692	12T0	NV	50	9.25	0.01136	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	-30	0.36	0.00044	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	-20	1.77	0.00216	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	0	-4.46	-0.00545	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	10	0.51	0.00062	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	20	8.04	0.00982	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	30	2.53	0.00309	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	40	8.31	0.01014	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26740	12T0	NV	50	-7.85	-0.00959	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	-30	-6.95	-0.00848	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	-20	-1.50	-0.00183	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	0	-6.84	-0.00830	±2.5	PASS



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NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	10	9.00	0.01093	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	20	4.67	0.00566	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	30	9.78	0.01187	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	40	1.89	0.00230	±2.5	PASS
NB1 Band 26	180KHz	BPSK/15KHz	26788	12T0	NV	50	-3.29	-0.00399	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	-30	5.31	0.00644	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	-20	-7.78	-0.00944	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	0	-1.47	-0.00179	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	10	4.16	0.00511	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	20	-4.05	-0.00497	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	30	-2.28	-0.00281	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	40	0.41	0.00051	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26692	12T0	NV	50	-4.19	-0.00514	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	-30	6.87	0.00844	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	-20	4.89	0.00601	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	0	9.25	0.01136	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	10	0.36	0.00044	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	20	1.77	0.00216	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	30	-4.46	-0.00545	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	40	0.51	0.00062	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26740	12T0	NV	50	8.04	0.00982	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	-30	2.53	0.00309	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	-20	8.31	0.01014	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	0	-7.85	-0.00959	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	10	-6.95	-0.00848	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	20	-1.50	-0.00183	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	30	-6.84	-0.00830	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	40	9.00	0.01093	±2.5	PASS
NB1 Band 26	180KHz	QPSK/15KHz	26788	12T0	NV	50	4.67	0.00566	±2.5	PASS

The End



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