



# Appendix B

## LTE-NB1 Band 25



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# 1 Effective (Isotropic) Radiated Power Output Data

## 1.1 Test Result for LTE NB1 Band 25

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	EIRP (dBm)	limit (dBm)	Verdict
NB1 Band 25	BPSK	3.75	26041	1T0	20.54	21.44	33.00	PASS
NB1 Band 25	BPSK	3.75	26365	1T0	20.43	21.33	33.00	PASS
NB1 Band 25	BPSK	3.75	26689	1T0	20.5	21.40	33.00	PASS
NB1 Band 25	QPSK	3.75	26041	1T0	20.56	21.46	33.00	PASS
NB1 Band 25	QPSK	3.75	26365	1T0	20.42	21.32	33.00	PASS
NB1 Band 25	QPSK	3.75	26689	1T0	20.49	21.39	33.00	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	EIRP (dBm)	limit (dBm)	Verdict
NB1 Band 25	BPSK	15	26041	1T0	20.85	21.75	33.00	PASS
NB1 Band 25	BPSK	15	26365	1T0	20.71	21.61	33.00	PASS
NB1 Band 25	BPSK	15	26689	1T0	20.52	21.42	33.00	PASS
NB1 Band 25	QPSK	15	26041	1T0	20.92	21.82	33.00	PASS
NB1 Band 25	QPSK	15	26041	12T0	20.87	21.77	33.00	PASS
NB1 Band 25	QPSK	15	26365	1T0	20.72	21.62	33.00	PASS
NB1 Band 25	QPSK	15	26365	12T0	20.78	21.68	33.00	PASS
NB1 Band 25	QPSK	15	26689	1T0	20.62	21.52	33.00	PASS
NB1 Band 25	QPSK	15	26689	12T0	20.57	21.47	33.00	PASS

Note:

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

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

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



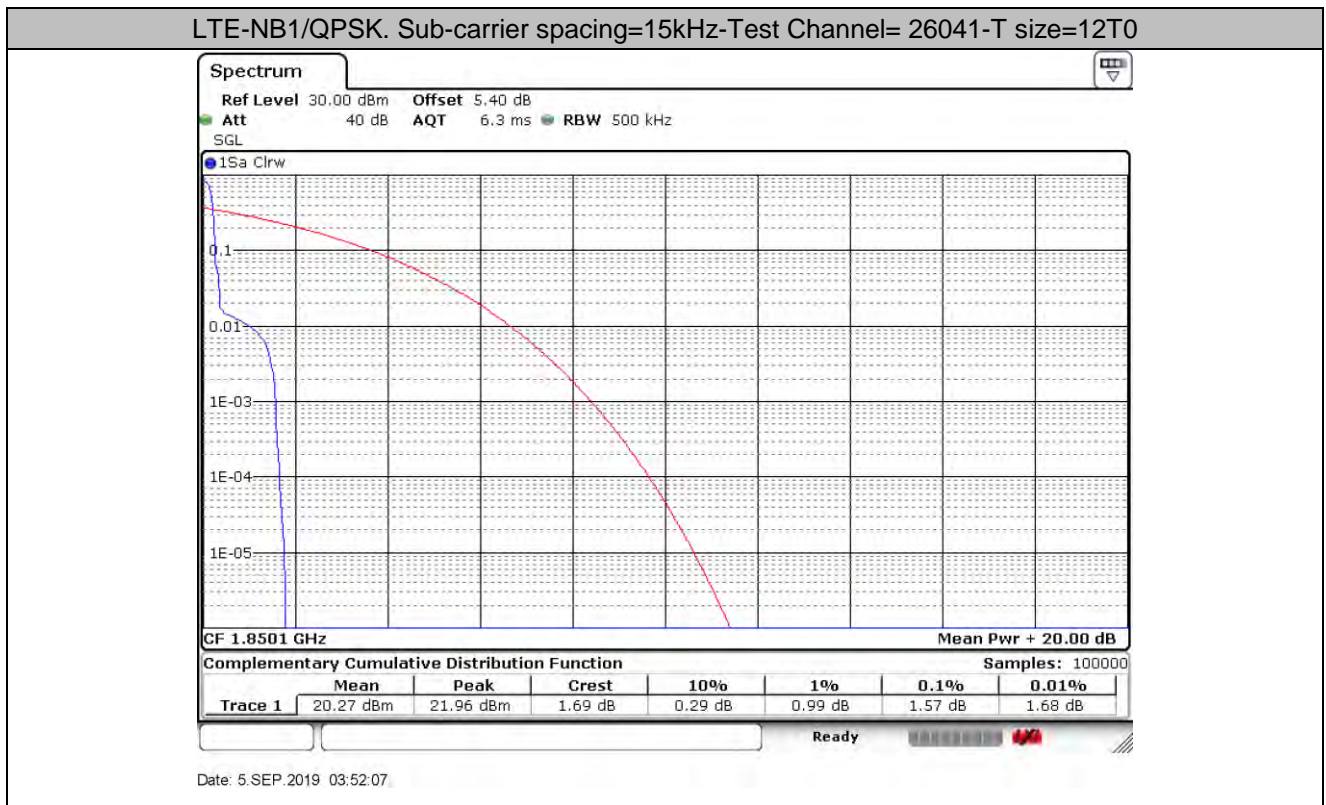


## 2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 25	QPSK/12T0	26041	1.57	13	PASS
NB1 Band 25	QPSK/12T0	26365	2.12	13	PASS
NB1 Band 25	QPSK/12T0	26689	1.59	13	PASS

### 2.1 For LTE-NB1

#### 2.1.1 Test Band = LTE-NB1 Band 25



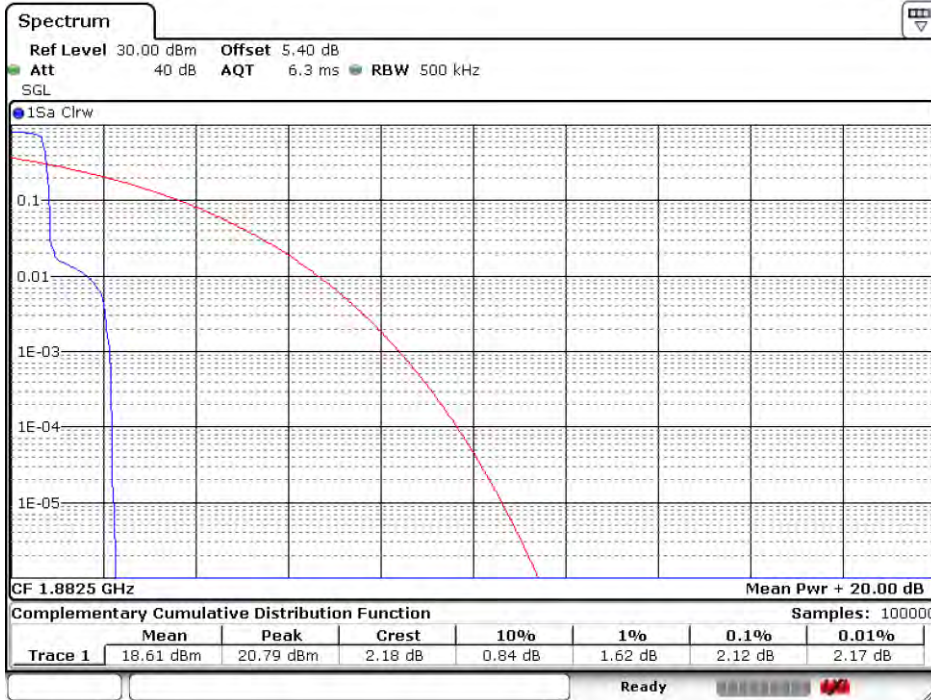
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26365-T size=12T0



Date: 5.SEP.2019 04:10:23

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26689-T size=12T0



Date: 5.SEP.2019 04:12:15





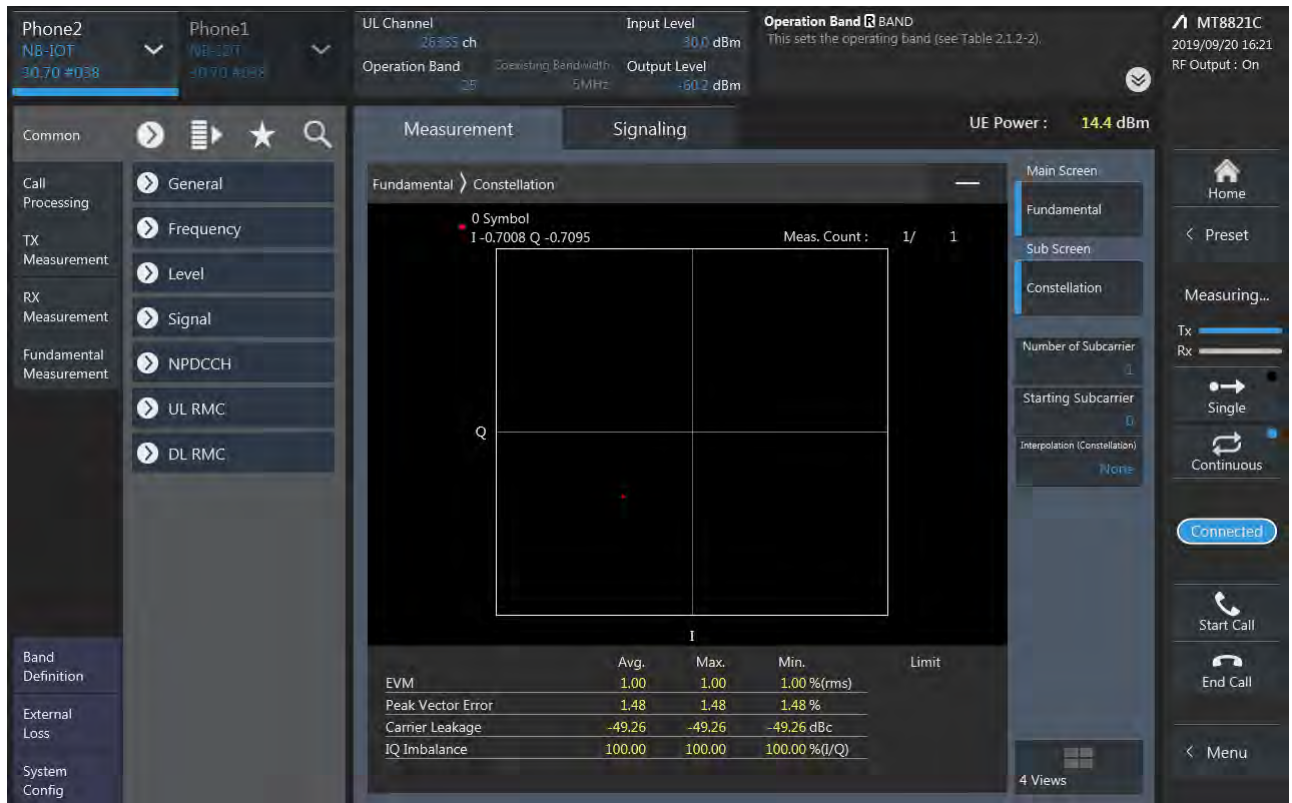
### 3 Modulation Characteristics

#### 3.1 For LTE-NB1

##### 3.1.1 Test Band = LTE-NB1 Band 25

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

##### 3.1.1.1.1 Test Channel = 26365

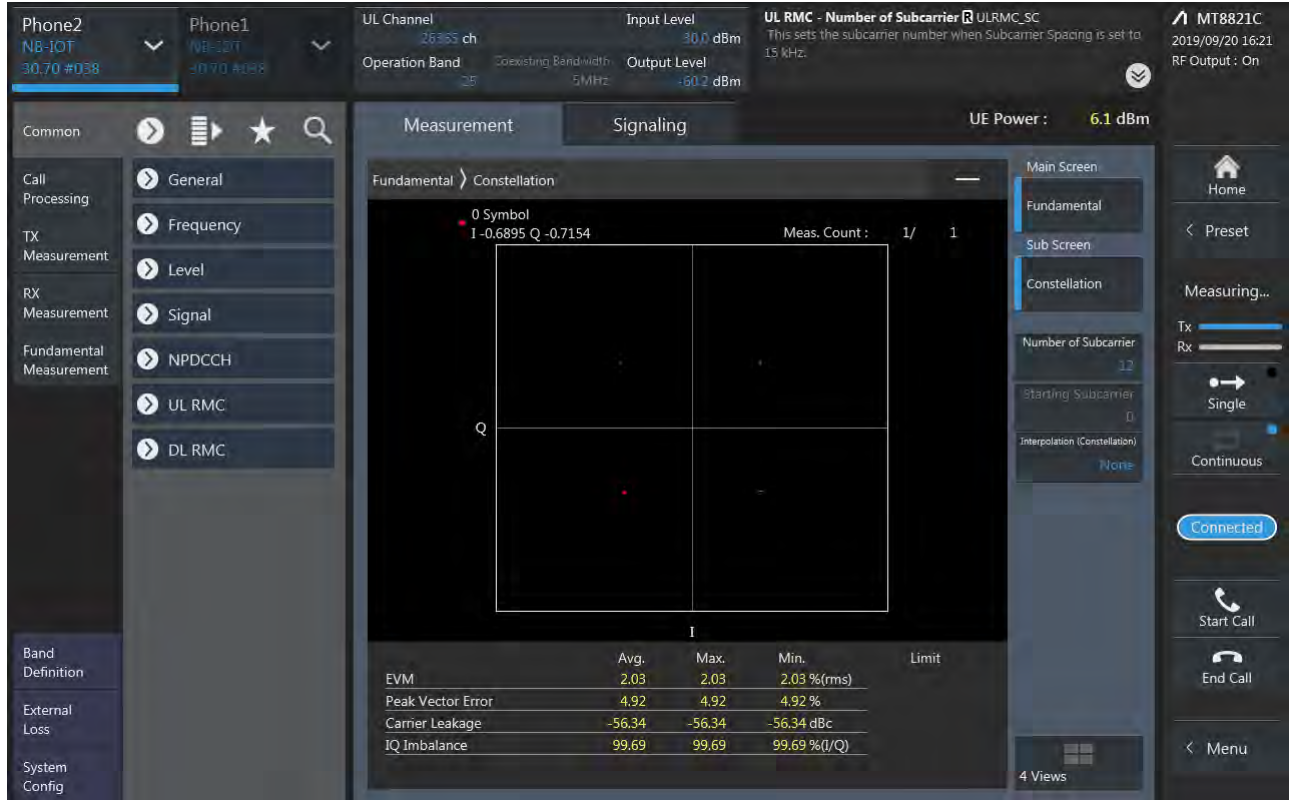






**3.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0**

**3.1.1.2.1 Test Channel = 26365**



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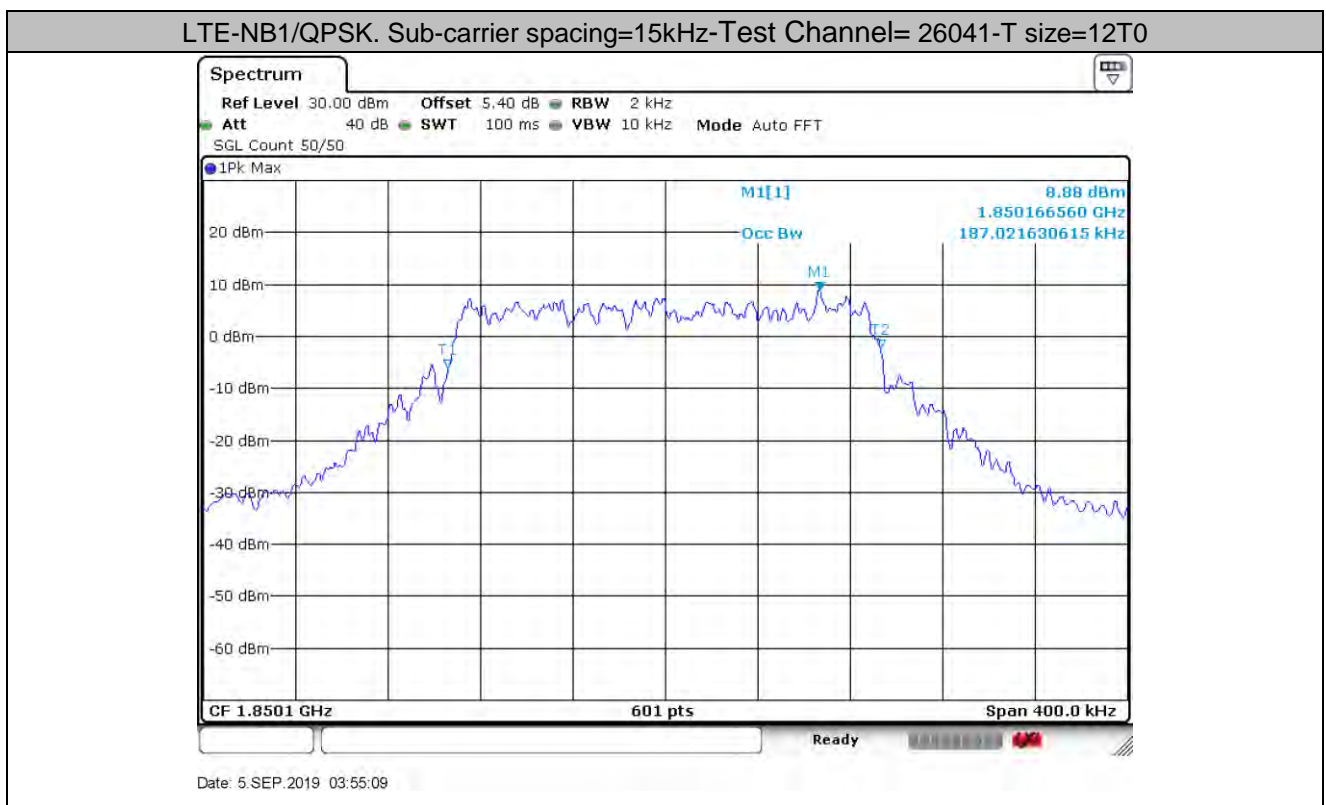


## 4 26dB Bandwidth and Occupied Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 25	QPSK/15kHz	12T0	26041	187.02	244.93	PASS
NB1 Band 25	QPSK/15kHz	12T0	26365	187.02	243.59	PASS
NB1 Band 25	QPSK/15kHz	12T0	26689	187.02	244.26	PASS

### 4.1 For LTE-NB1

#### 4.1.1 Test Band = LTE-NB1 Band 25



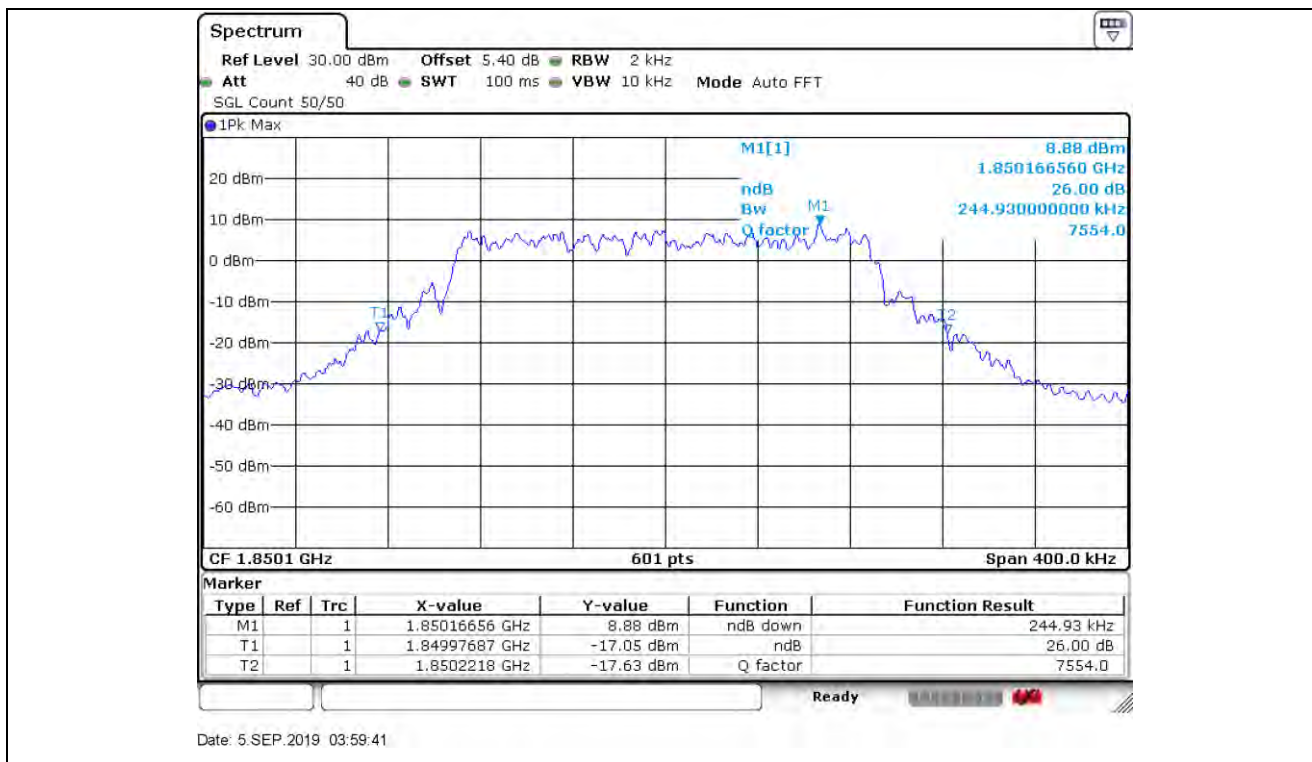
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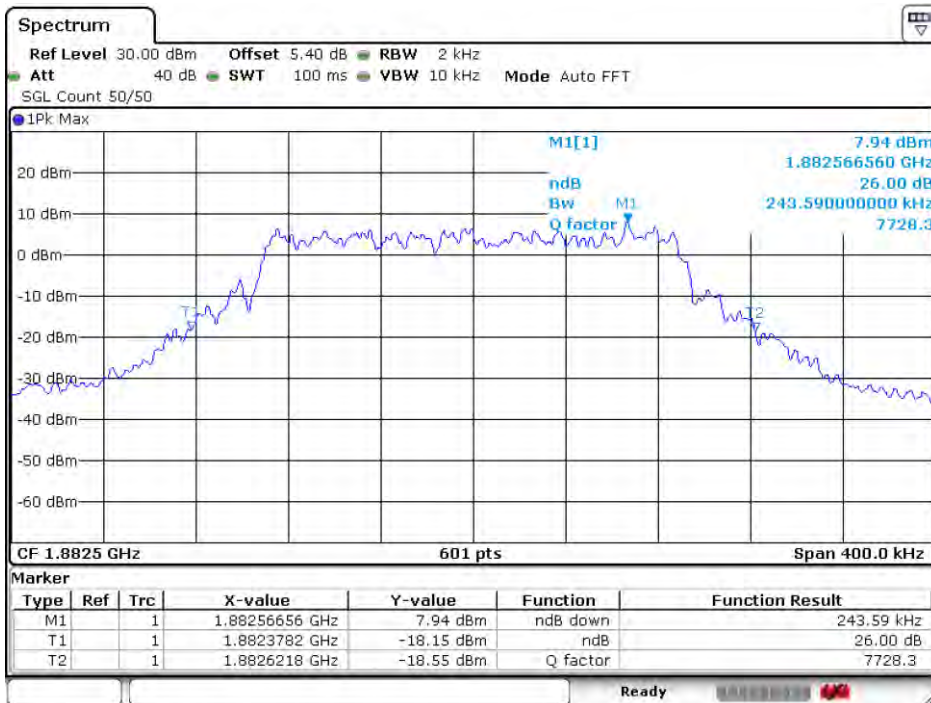
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26365-T size=12T0



Date: 5.SEP.2019 04:09:20



Date: 5.SEP.2019 04:00:58



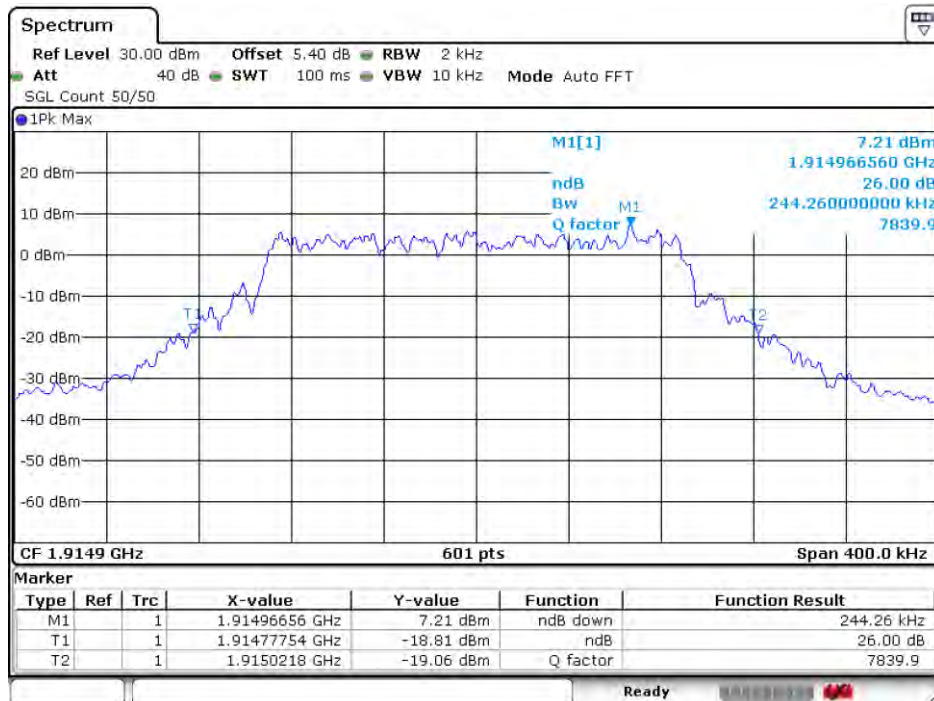




LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 26689-T size=12T0



Date: 5.SEP.2019 04:14:46



Date: 5.SEP.2019 04:23:12

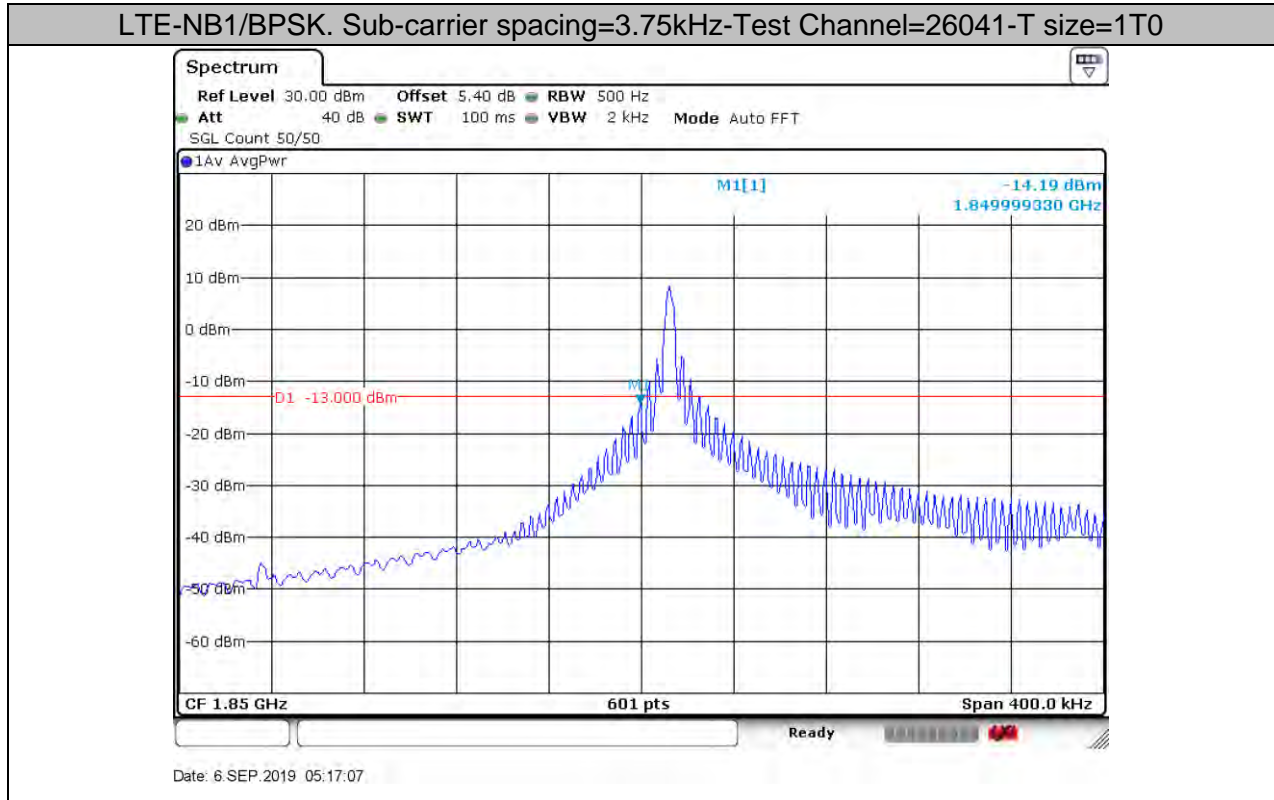




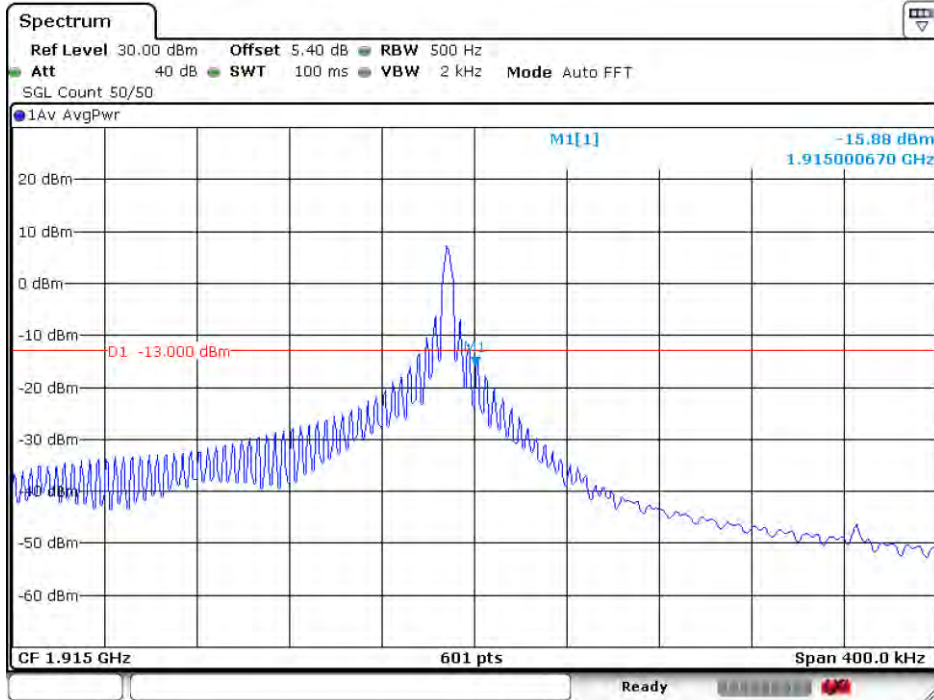
## 5 Band Edges Compliance

### 5.1 For LTE-NB1

#### 5.1.1 Test Band = LTE-NB1 Band 25

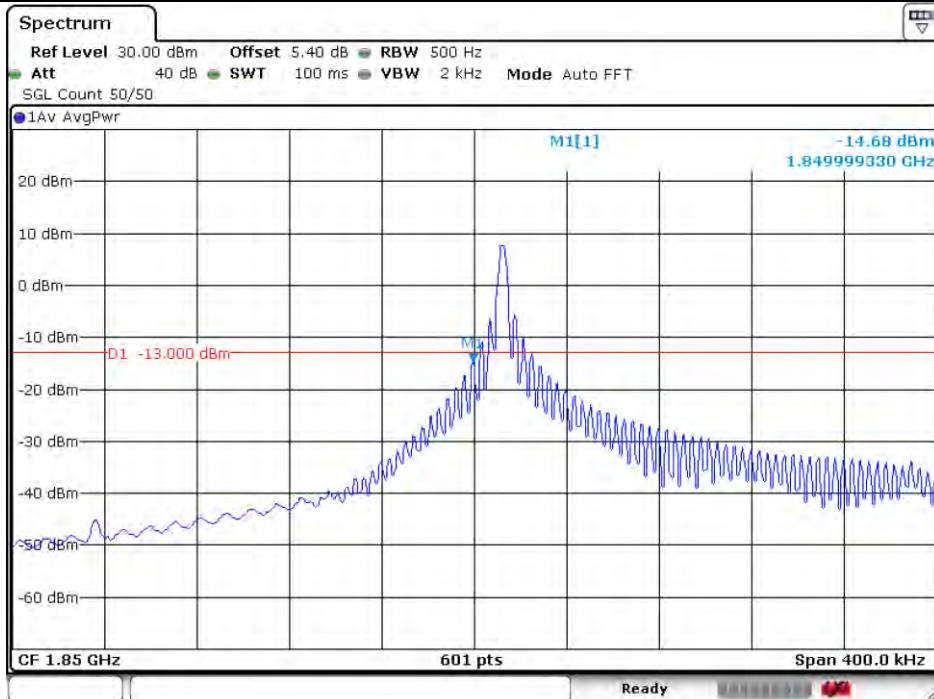


**LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=26689-T size=1T47**



Date: 6.SEP.2019 05:25:29

**LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26041-T size=1T0**

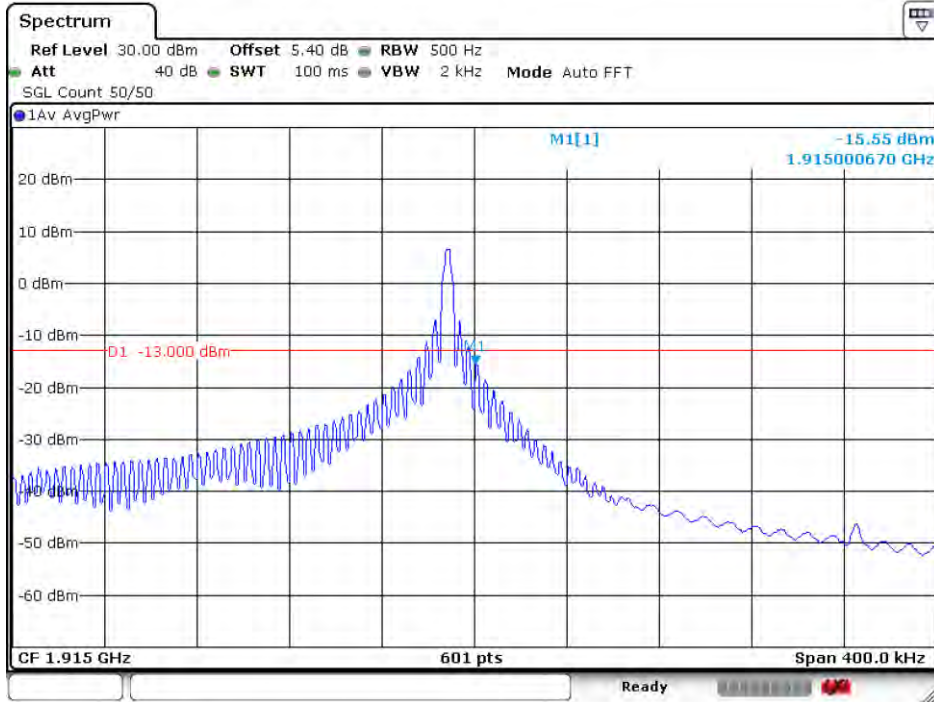


Date: 6.SEP.2019 05:18:09





**LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26689-T size=1T47**



Date: 6.SEP.2019 05:25:04

**LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26041-T size=1T0**



Date: 6.SEP.2019 05:20:35





**LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26689-T size=1T11**



Date: 6.SEP.2019 05:24:17

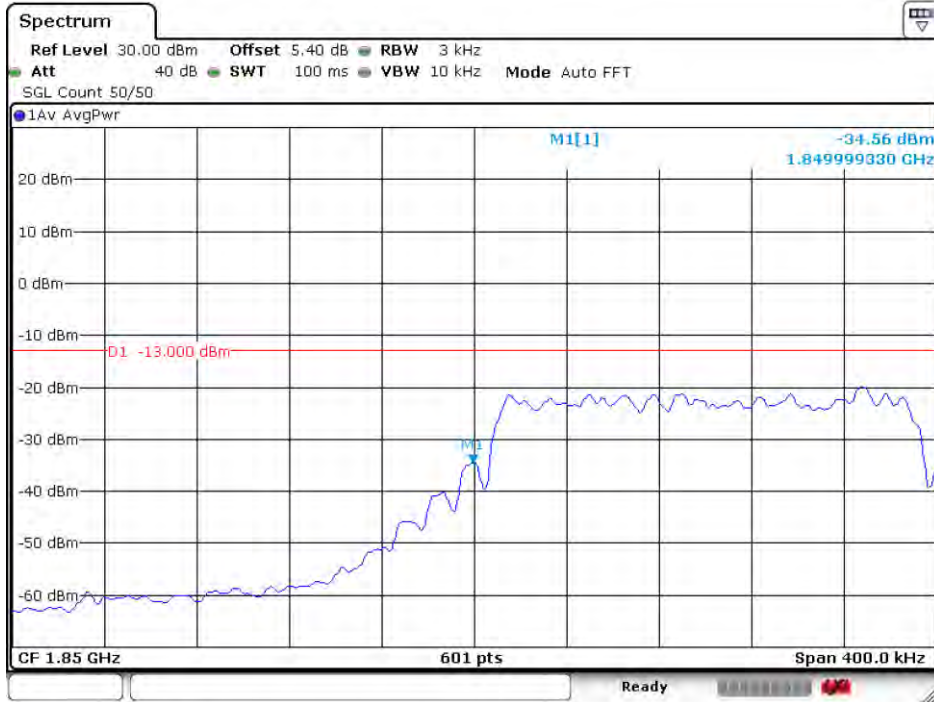
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Date: 6.SEP.2019 05:19:46



**LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26041-T size=12T0**



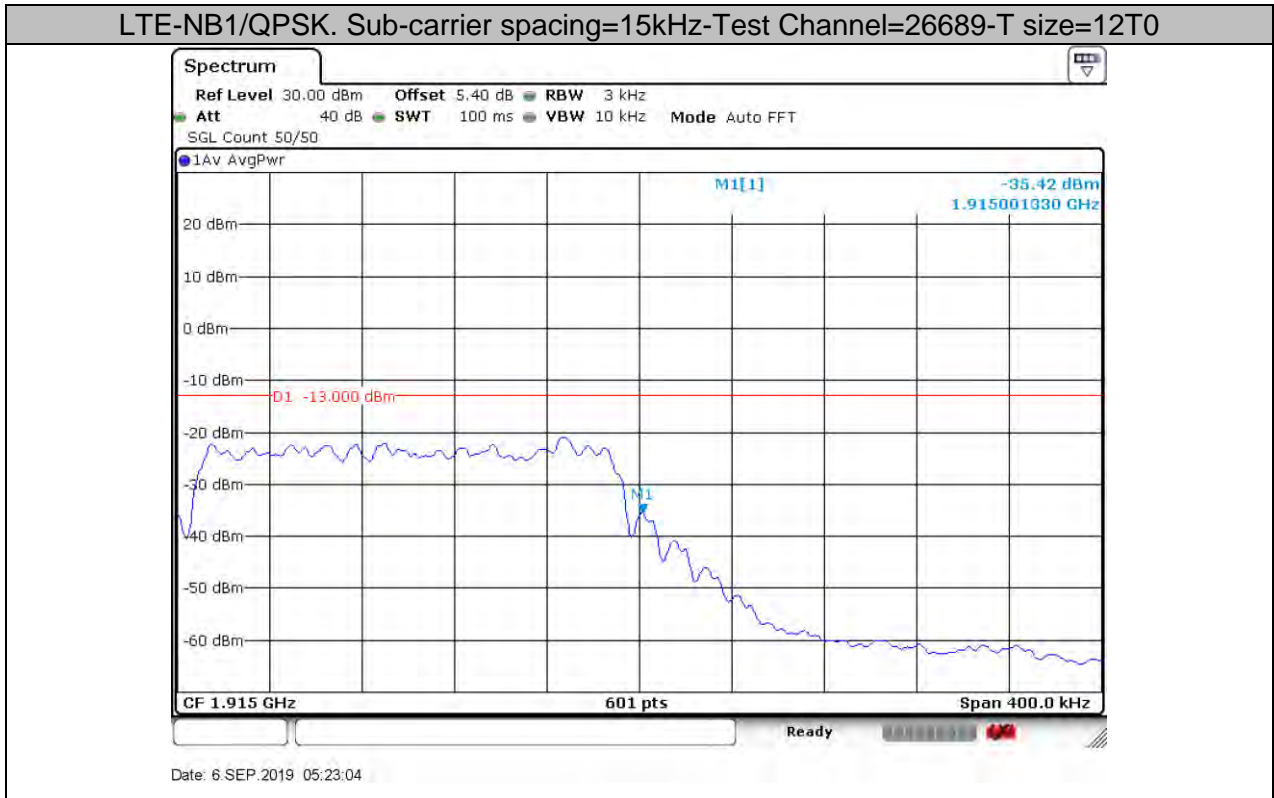
Date: 6.SEP.2019 05:21:04

**LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26689-T size=1T11**



Date: 6.SEP.2019 05:23:42







## 6 Spurious Emission at Antenna Terminal

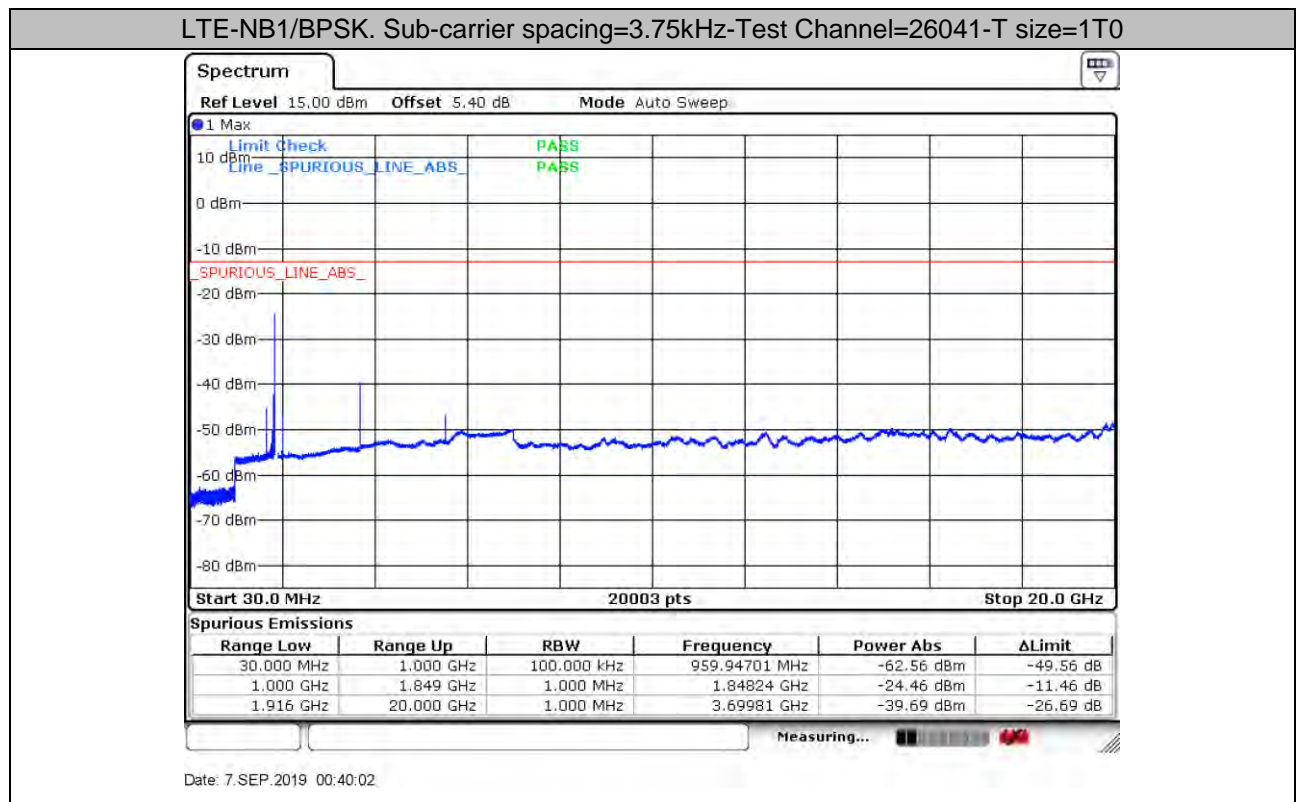
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of  $< RBW/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (Span / RBW)$ " 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 25

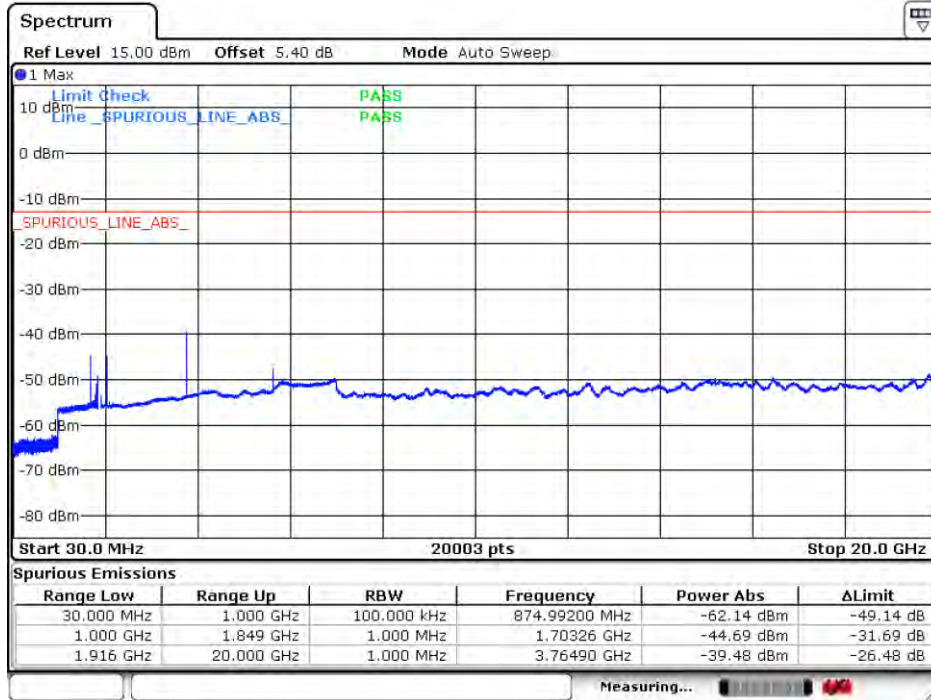


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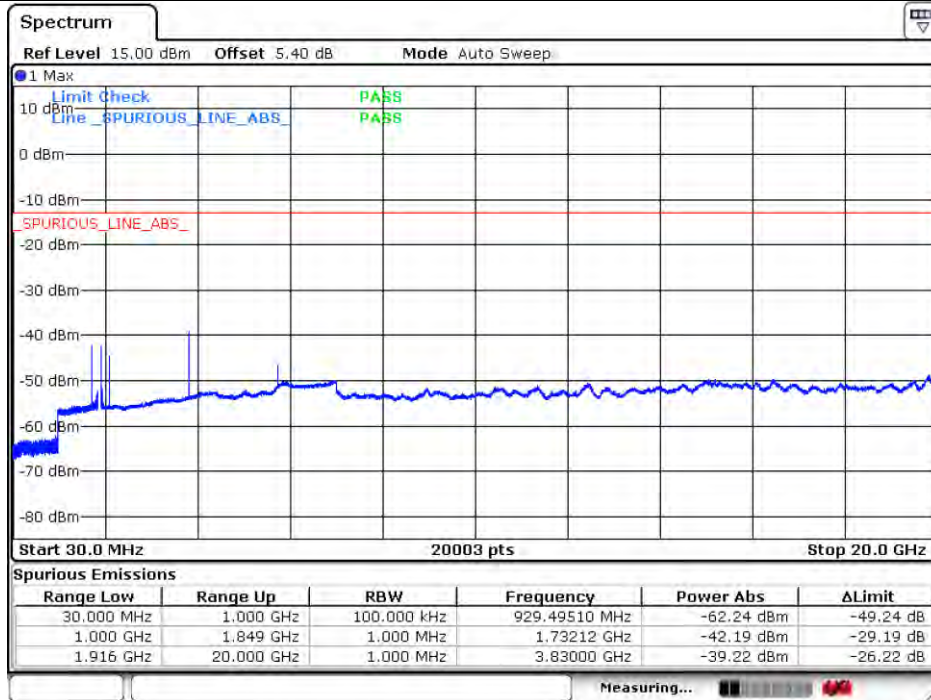
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=26365-T size=1T0



Date: 7.SEP.2019 00:49:43

LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=26689-T size=1T0

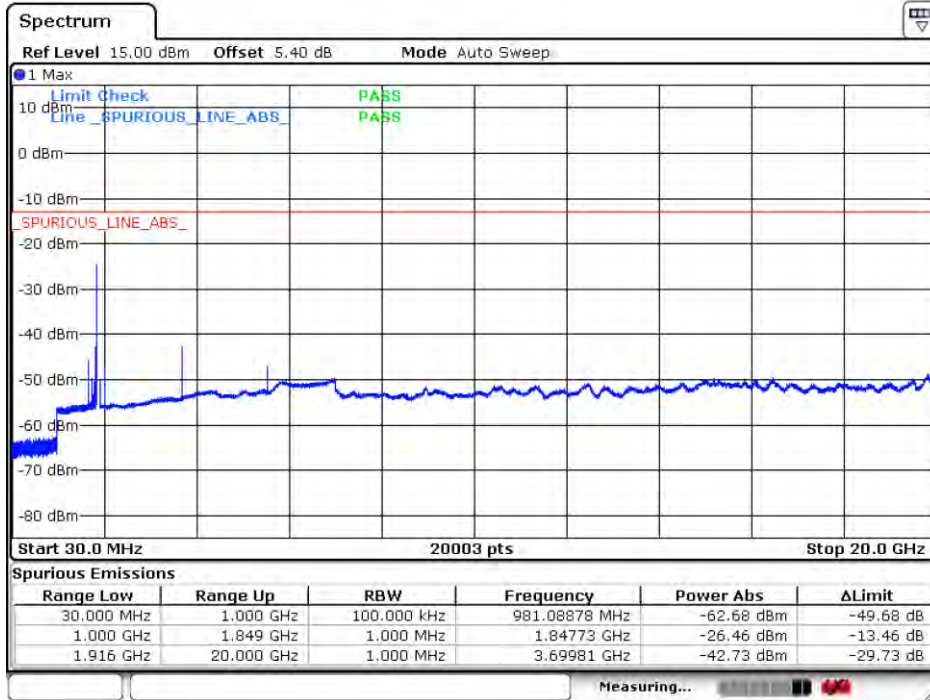


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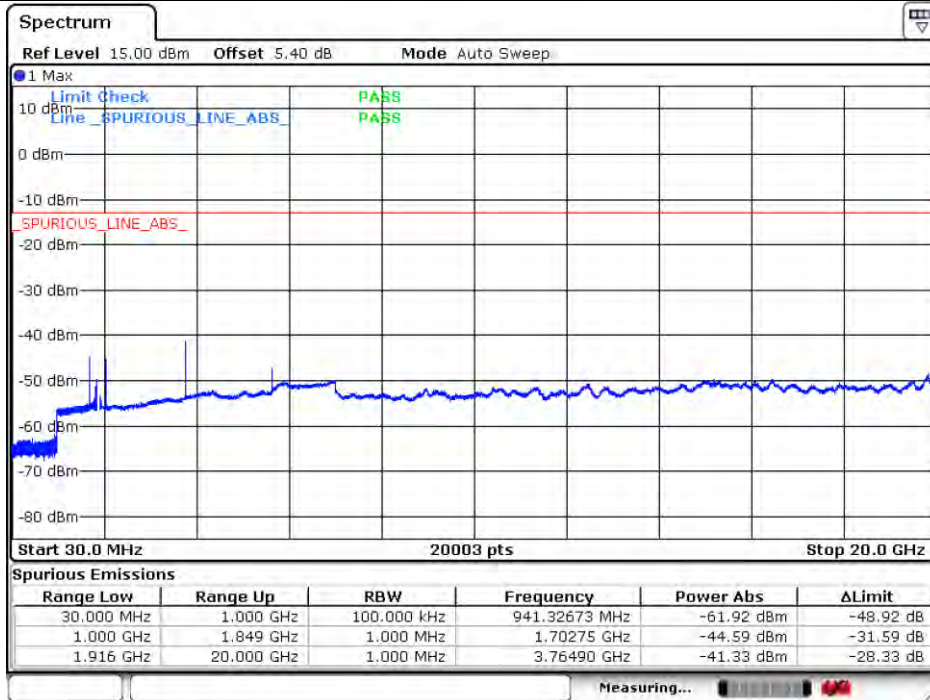


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26041-T size=1T0



Date: 7.SEP.2019 00:41:40

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26365-T size=1T0

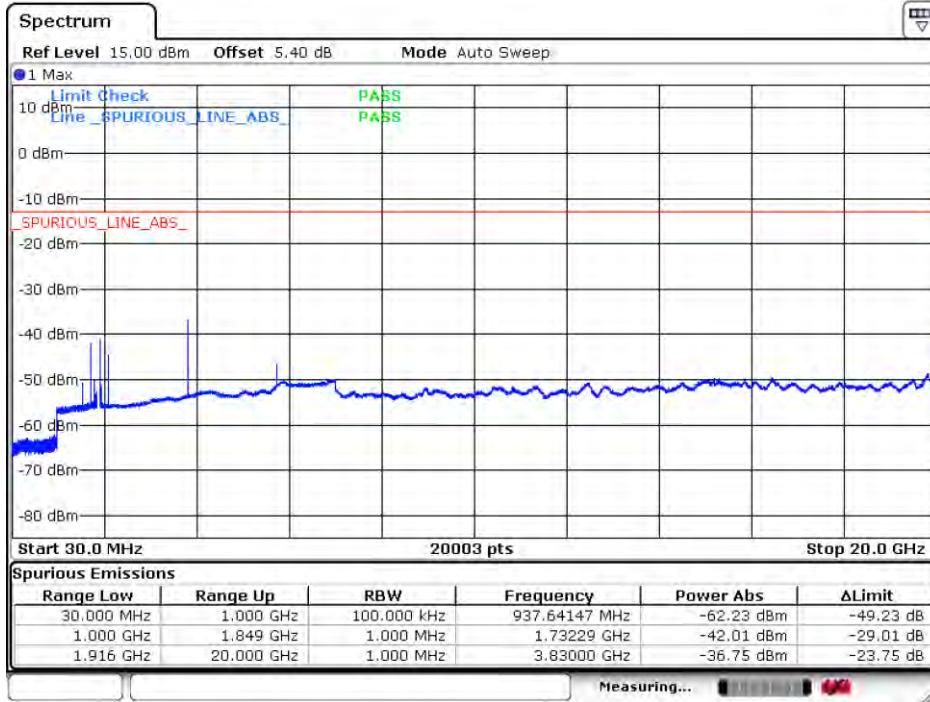


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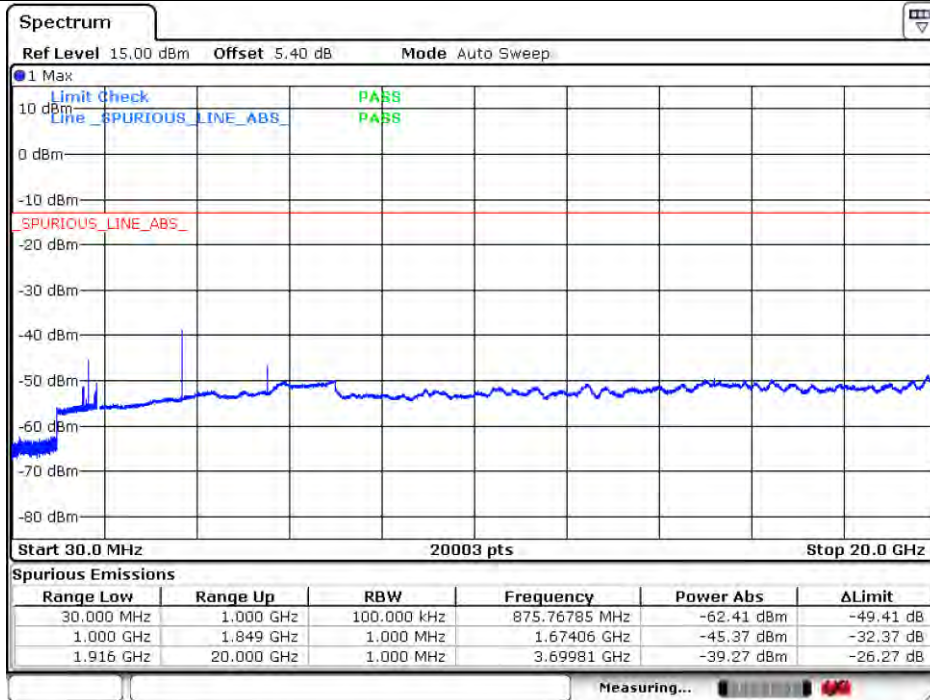


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=26689-T size=1T0



Date: 7.SEP.2019 00:53:08

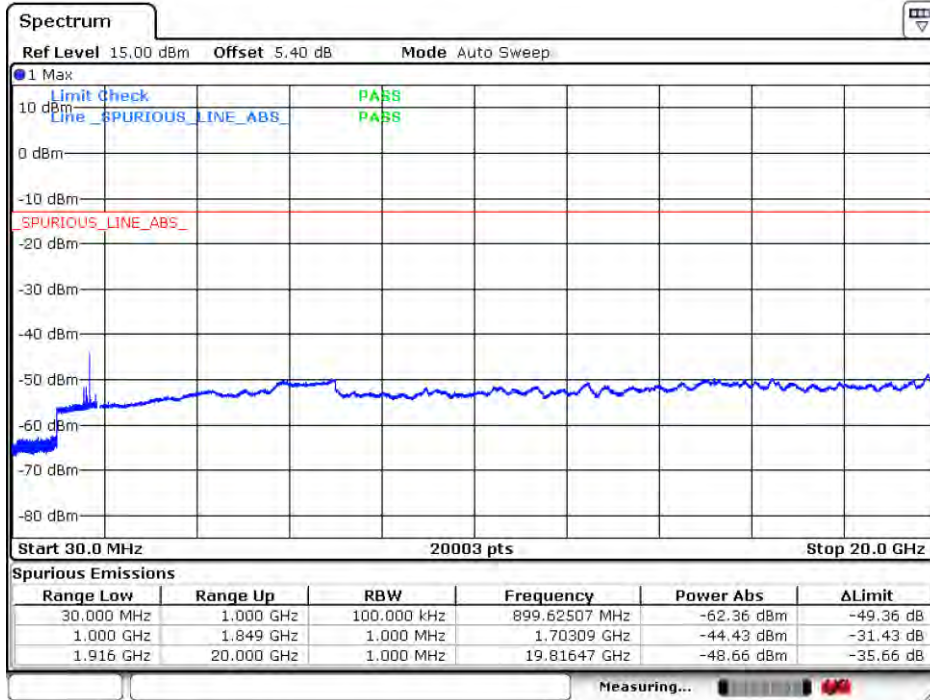
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26041-T size=1T0



Date: 7.SEP.2019 00:43:25

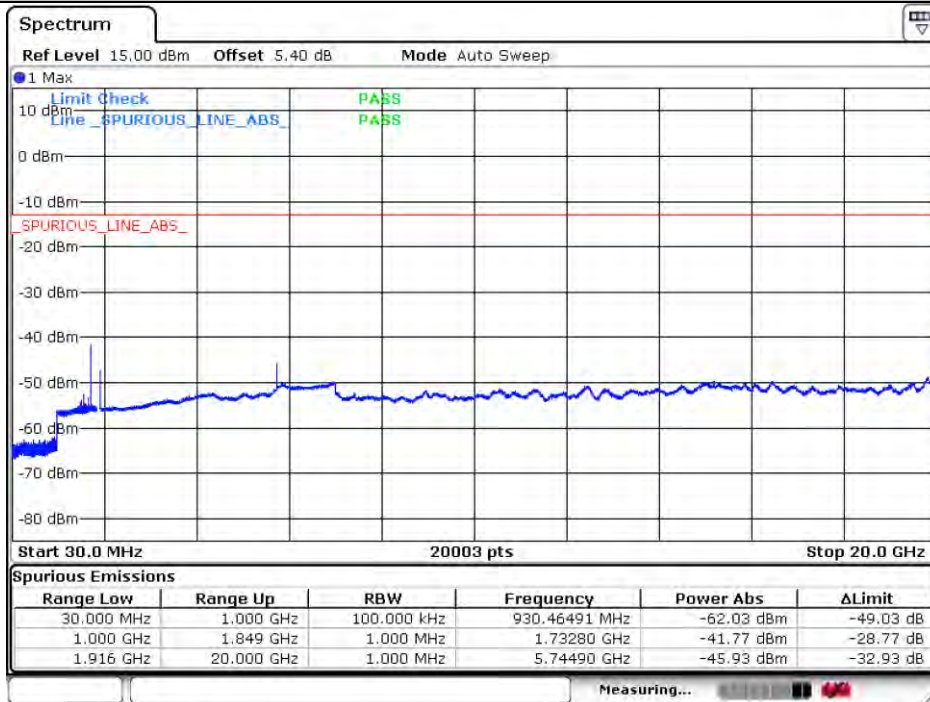


LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26365-T size=1T0



Date: 7.SEP.2019 00:45:23

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=26689-T size=1T0

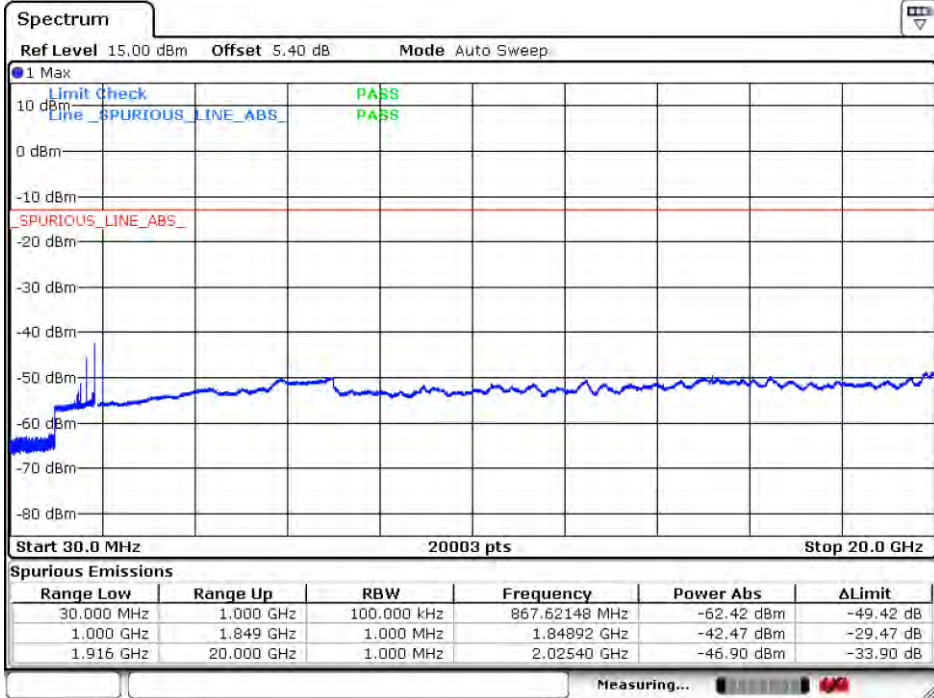


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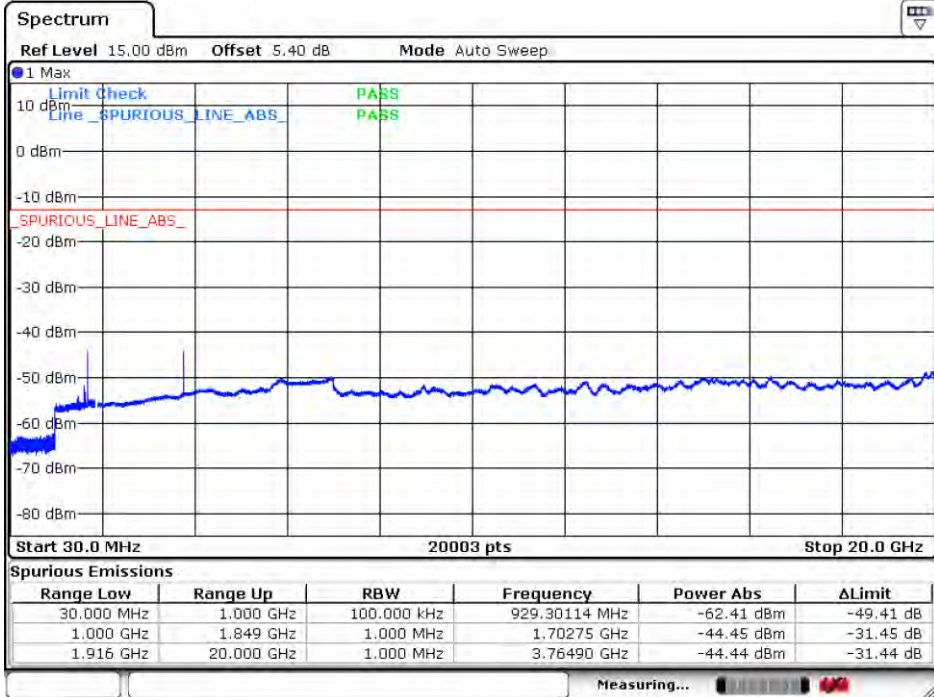


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26041-T size=1T0



Date: 7.SEP.2019 00:42:33

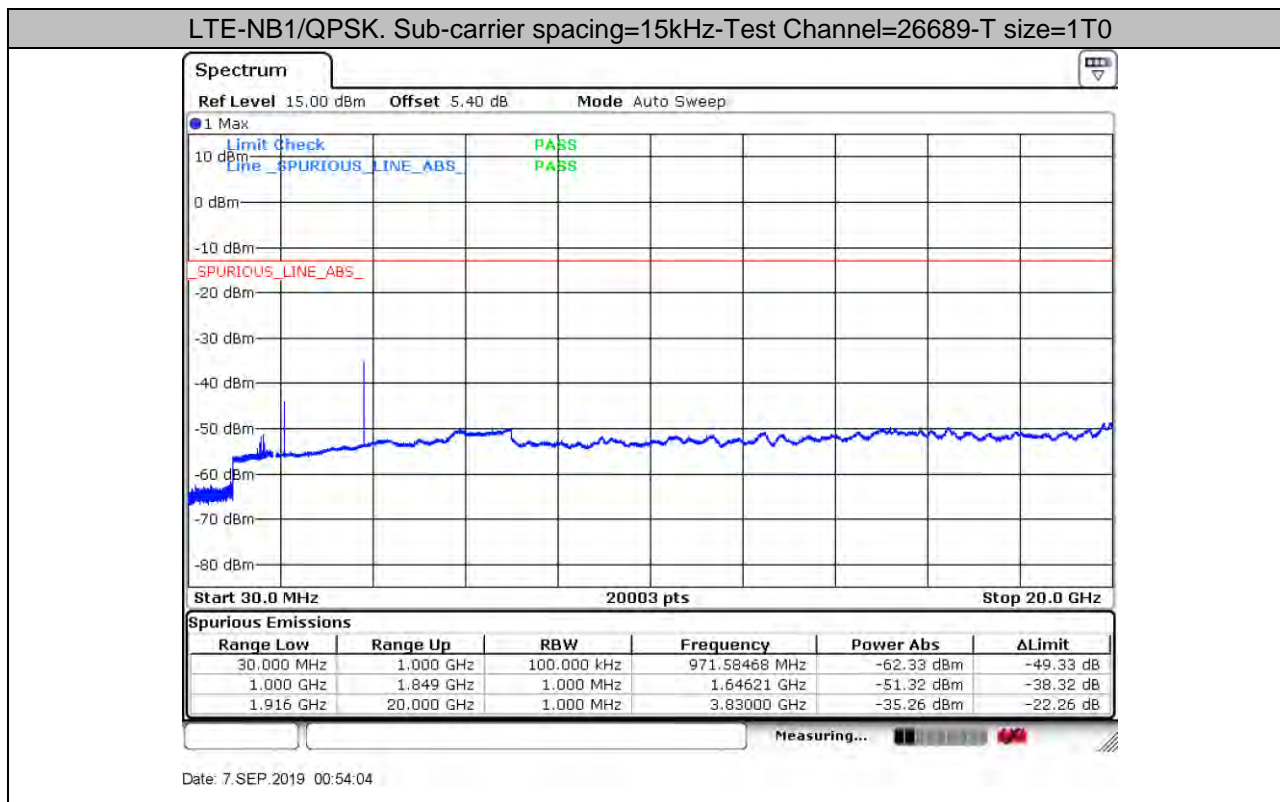
LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=26365-T size=1T0



Date: 7.SEP.2019 00:45:52







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## 7 Field Strength of Spurious Radiation

### 7.1 For LTE-NB1

#### 7.1.1 Test Band = LTE-NB1 Band 25

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

##### 7.1.1.1.1 Test Channel = 26041

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
113.8607	-65.57	-13.00	52.57	Vertical
750.1640	-62.60	-13.00	49.60	Vertical
2708.3417	-37.63	-13.00	24.63	Vertical
14592.3864	-43.04	-13.00	30.04	Vertical
42.3681	-64.64	-13.00	51.64	Horizontal
231.9156	-68.27	-13.00	55.27	Horizontal
2701.5403	-36.33	-13.00	23.33	Horizontal
3700.0233	-39.56	-13.00	26.56	Horizontal
5549.5850	-46.37	-13.00	33.37	Horizontal
16974.4658	-39.39	-13.00	26.39	Horizontal

##### 7.1.1.1.2 Test Channel = 26365

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
44.3567	-62.59	-13.00	49.59	Vertical
113.3272	-64.73	-13.00	51.73	Vertical
2677.9356	-38.24	-13.00	25.24	Vertical
7329.1443	-53.32	-13.00	40.32	Vertical
14691.8897	-42.80	-13.00	29.80	Vertical
17995.4999	-33.14	-13.00	20.14	Vertical
40.3310	-64.48	-13.00	51.48	Horizontal
247.9214	-67.44	-13.00	54.44	Horizontal
2701.1402	-36.64	-13.00	23.64	Horizontal
3765.0255	-40.61	-13.00	27.61	Horizontal
16380.4460	-38.65	-13.00	25.65	Horizontal
17999.5000	-37.79	-13.00	24.79	Horizontal



**7.1.1.1.3 Test Channel = 26689**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.5925	-65.12	-13.00	52.12	Vertical
854.4442	-61.34	-13.00	48.34	Vertical
2693.1386	-37.54	-13.00	24.54	Vertical
7395.6465	-52.30	-13.00	39.30	Vertical
14547.8849	-42.36	-13.00	29.36	Vertical
17969.4990	-34.98	-13.00	21.98	Vertical
40.0400	-64.78	-13.00	51.78	Horizontal
245.5448	-67.92	-13.00	54.92	Horizontal
2694.3389	-36.36	-13.00	23.36	Horizontal
3829.0276	-39.54	-13.00	26.54	Horizontal
5744.0915	-47.86	-13.00	34.86	Horizontal
16981.4660	-39.48	-13.00	26.48	Horizontal

**NOTE:**

- 1) The disturbance above 13GHz and 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 25	180KHz	BPSK/15KHz	26041	12T0	VL	TN	-1.69	-0.000916	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	VN	TN	0.07	0.000040	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	VH	TN	-12.02	-0.006498	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	VL	TN	-4.70	-0.002496	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	VN	TN	-13.79	-0.007325	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	VH	TN	10.36	0.005506	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	VL	TN	5.00	0.002609	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	VN	TN	-5.78	-0.003020	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	VH	TN	-7.38	-0.003856	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	VL	TN	-7.00	-0.003785	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	VN	TN	9.57	0.005174	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	VH	TN	12.68	0.006854	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	VL	TN	10.10	0.005365	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	VN	TN	-0.28	-0.000151	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	VH	TN	0.44	0.000232	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	VL	TN	7.96	0.004159	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	VN	TN	-0.95	-0.000495	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	VH	TN	-7.18	-0.003748	±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 25	180KHz	BPSK/15KHz	26041	12T0	NV	-30	-14.32	-0.007741	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	-20	9.88	0.005339	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	0	-7.04	-0.003807	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	10	8.56	0.004625	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	20	1.32	0.000712	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	30	9.79	0.005294	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	40	-12.82	-0.006928	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26041	12T0	NV	50	6.10	0.003298	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	-30	-9.54	-0.005065	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	-20	-14.11	-0.007495	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	0	4.47	0.002375	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	10	4.30	0.002287	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	20	-7.52	-0.003992	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	30	-7.28	-0.003867	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	40	9.89	0.005255	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26365	12T0	NV	50	-7.48	-0.003975	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	-30	12.15	0.006344	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	-20	-7.08	-0.003696	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	0	-1.79	-0.000937	±2.5	PASS



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NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	10	4.77	0.002490	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	20	11.81	0.006165	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	30	-1.26	-0.000657	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	40	2.11	0.001100	±2.5	PASS
NB1 Band 25	180KHz	BPSK/15KHz	26689	12T0	NV	50	13.58	0.007090	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	-30	3.83	0.002069	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	-20	-9.70	-0.005244	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	0	-5.74	-0.003100	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	10	-10.59	-0.005726	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	20	1.60	0.000864	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	30	13.37	0.007227	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	40	-8.20	-0.004433	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26041	12T0	NV	50	2.35	0.001269	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	-30	7.50	0.003982	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	-20	9.54	0.005070	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	0	9.42	0.005006	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	10	-12.20	-0.006482	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	20	-5.41	-0.002876	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	30	-8.66	-0.004601	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	40	-7.78	-0.004134	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26365	12T0	NV	50	-8.42	-0.004474	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	-30	1.15	0.000599	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	-20	7.56	0.003946	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	0	-6.43	-0.003356	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	10	14.25	0.007441	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	20	14.69	0.007673	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	30	-9.95	-0.005197	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	40	-13.97	-0.007296	±2.5	PASS
NB1 Band 25	180KHz	QPSK/15KHz	26689	12T0	NV	50	6.35	0.003314	±2.5	PASS

The End

