



Appendix B

GSM 850 & 1900



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1. Effective (Isotropic) Radiated Power Output Data

1.1. Test Result

Band	Channel	Slot	Conducted Power (dBm)	ERP (dBm)	Limit(dBm)	Verdict
GSM850	128	---	32.34	29.19	38.45	PASS
GSM850	190	---	32.38	29.23	38.45	PASS
GSM850	251	---	32.39	29.24	38.45	PASS
EGPRS850	128	1	26.59	23.44	38.45	PASS
EGPRS850	128	2	26.32	23.17	38.45	PASS
EGPRS850	128	3	25.22	22.07	38.45	PASS
EGPRS850	128	4	23.94	20.79	38.45	PASS
EGPRS850	190	1	26.65	23.50	38.45	PASS
EGPRS850	190	2	26.17	23.02	38.45	PASS
EGPRS850	190	3	25.06	21.91	38.45	PASS
EGPRS850	190	4	24.16	21.01	38.45	PASS
EGPRS850	251	1	26.60	23.45	38.45	PASS
EGPRS850	251	2	26.28	23.13	38.45	PASS
EGPRS850	251	3	25.24	22.09	38.45	PASS
EGPRS850	251	4	24.22	21.07	38.45	PASS

Band	Channel	Slot	Conducted Power (dBm)	EIRP (dBm)	Limit(dBm)	Verdict
GSM1900	512	---	29.54	30.44	33.00	PASS
GSM1900	661	---	29.67	30.57	33.00	PASS
GSM1900	810	---	29.23	30.13	33.00	PASS
EGPRS1900	512	1	24.88	25.78	33.00	PASS
EGPRS1900	512	2	24.76	25.66	33.00	PASS
EGPRS1900	512	3	23.56	24.46	33.00	PASS
EGPRS1900	512	4	22.63	23.53	33.00	PASS
EGPRS1900	661	1	24.88	25.78	33.00	PASS
EGPRS1900	661	2	24.70	25.60	33.00	PASS
EGPRS1900	661	3	23.52	24.42	33.00	PASS
EGPRS1900	661	4	22.58	23.48	33.00	PASS
EGPRS1900	810	1	24.67	25.57	33.00	PASS
EGPRS1900	810	2	24.69	25.59	33.00	PASS
EGPRS1900	810	3	23.66	24.56	33.00	PASS
EGPRS1900	810	4	22.65	23.55	33.00	PASS



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Remark:

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

ERP [dBm] = Conducted Power [dBm] + Gain [dBd]

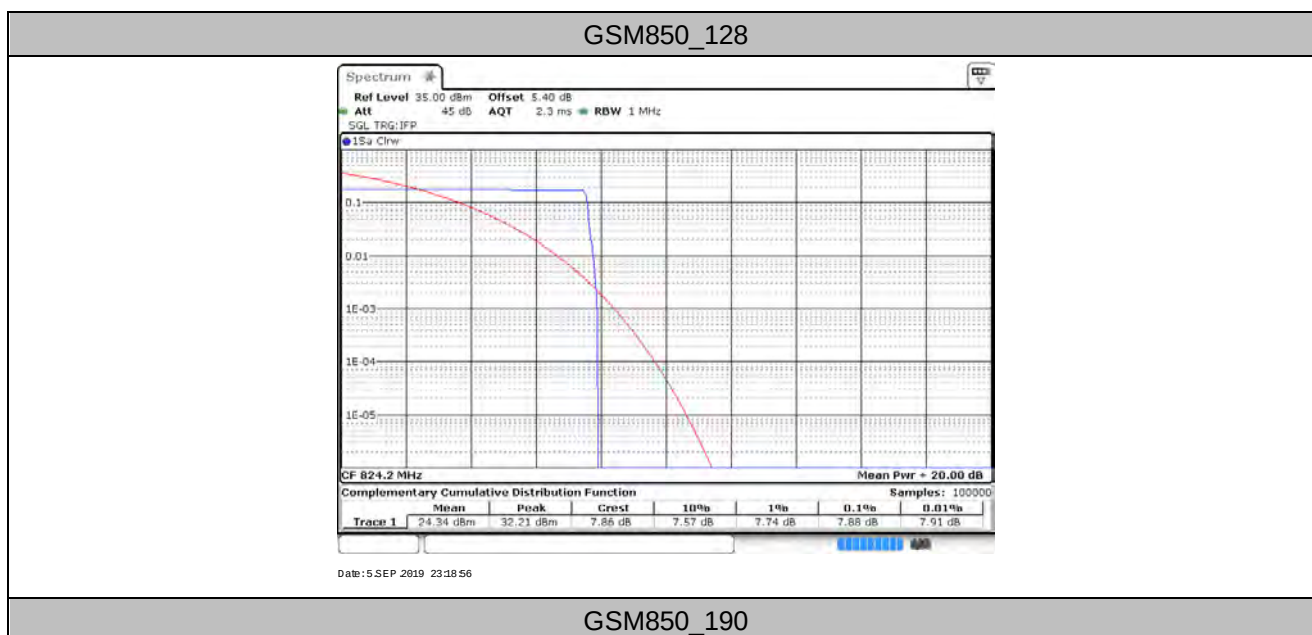
EIRP [dBm] = Conducted Power [dBm] + Gain [dBi]

2. Peak-to-Average Ratio

2.1. Test Result

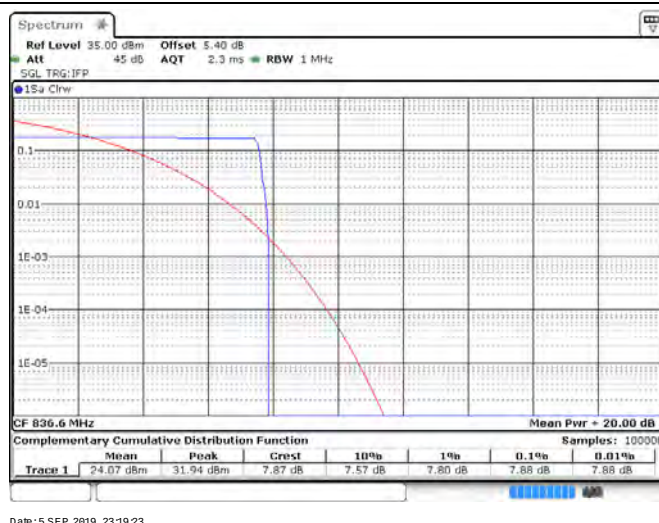
Band	Channel	Peak-to-Average Ratio(dB)	Limit(dB)	Verdict
GSM850	128	7.88	13	PASS
GSM850	190	7.88	13	PASS
GSM850	251	8.03	13	PASS
EGPRS850	128	10.52	13	PASS
EGPRS850	190	10.90	13	PASS
EGPRS850	251	10.43	13	PASS
GSM1900	512	7.86	13	PASS
GSM1900	661	7.88	13	PASS
GSM1900	810	7.88	13	PASS
EGPRS1900	512	10.93	13	PASS
EGPRS1900	661	11.25	13	PASS
EGPRS1900	810	10.58	13	PASS

2.2. Part II - Test Plots



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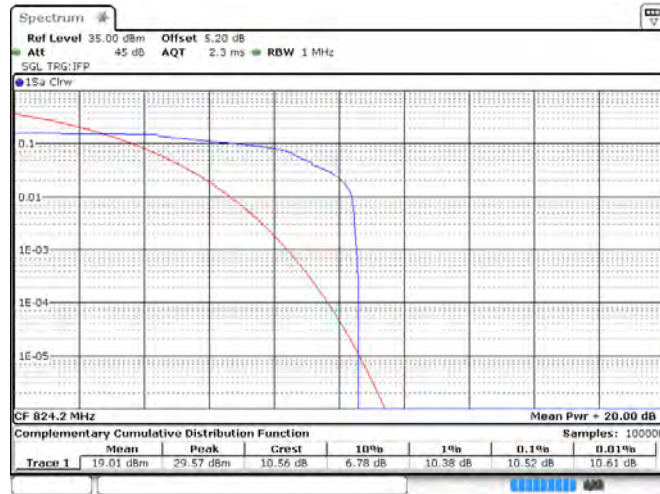
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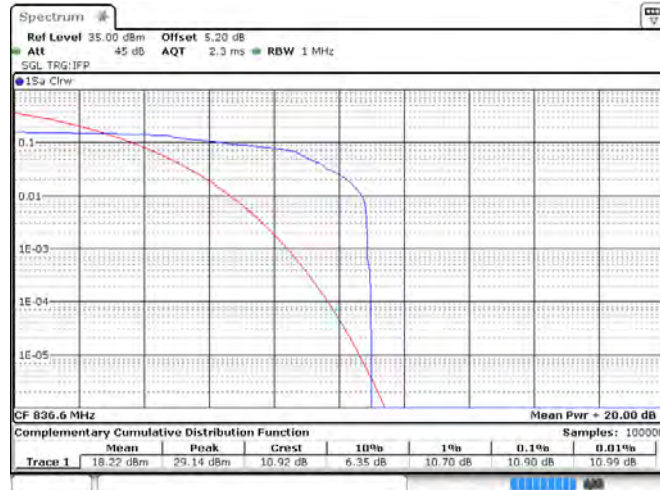
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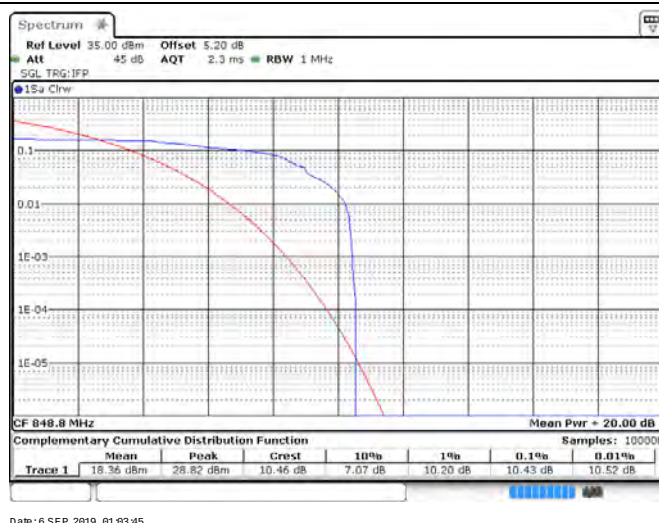
EGPRS850_190



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EGPRS850_251





Date: 6 SEP 2019 01:03:45

GSM1900_512



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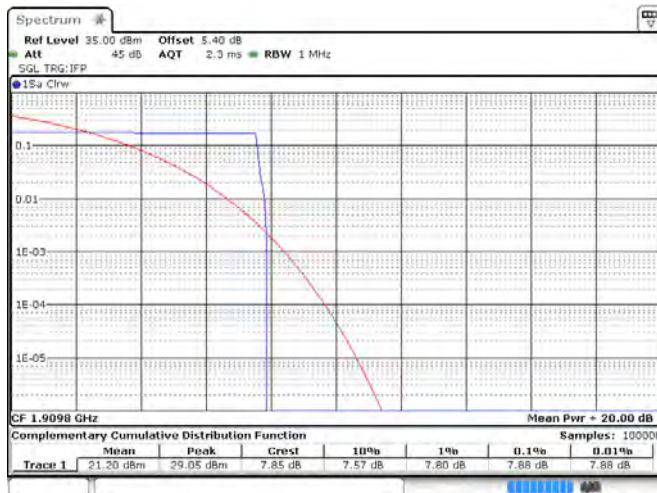
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GSM1900_810



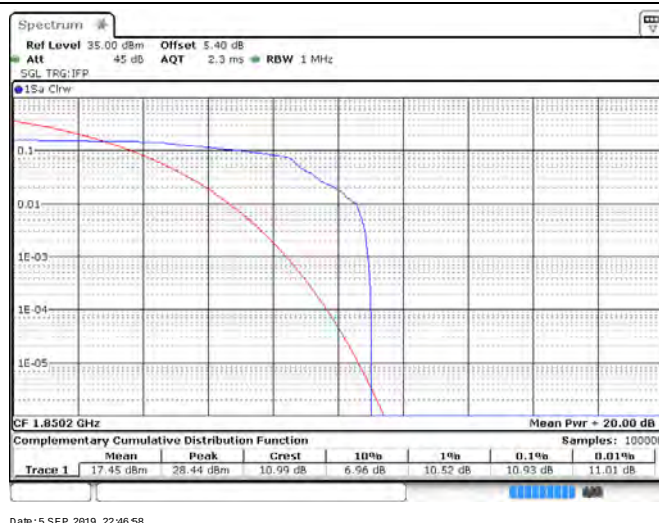
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EGPRS1900_512



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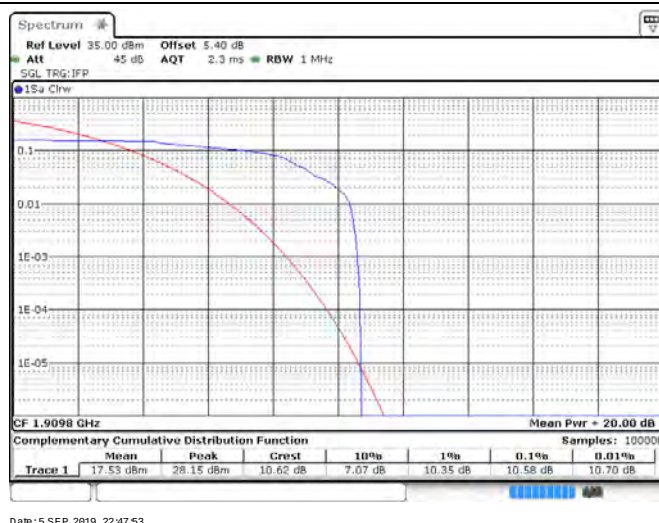


EGPRS1900_661



EGPRS1900_810





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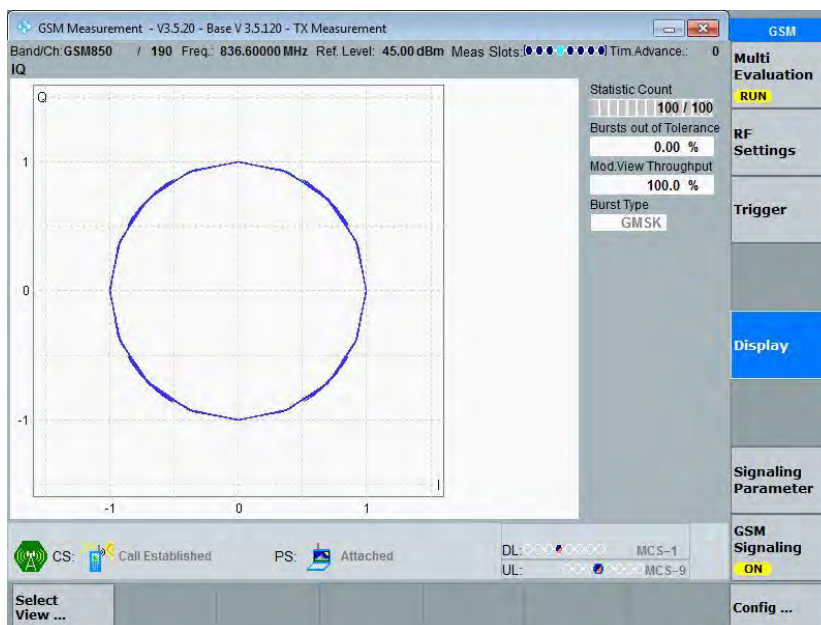
3. Modulation Characteristics

3.1. For GSM

3.1.1. Test Band = GSM 850

3.1.1.1. Test Mode = GSM/TM1

3.1.1.1.1. Test Channel = MCH



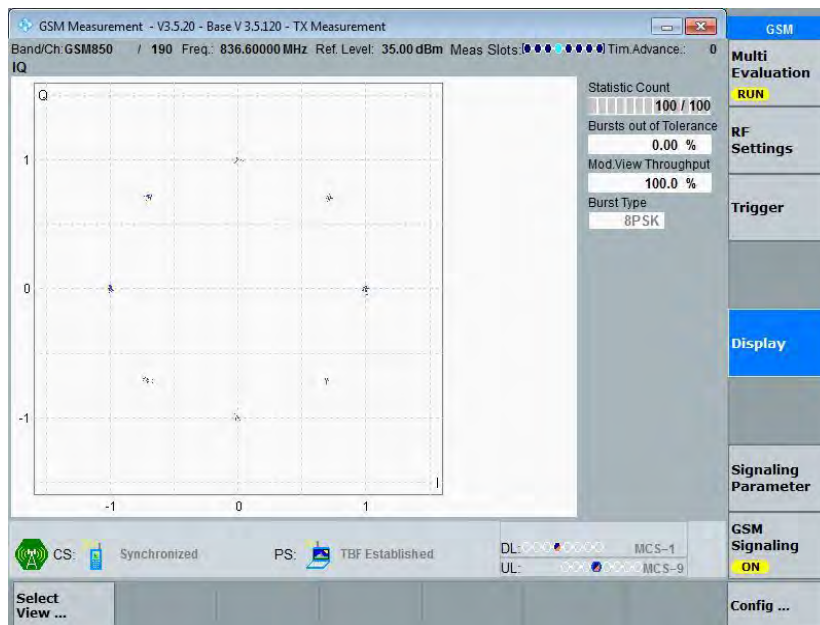
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3.1.1.2. Test Mode = GSM/TM2

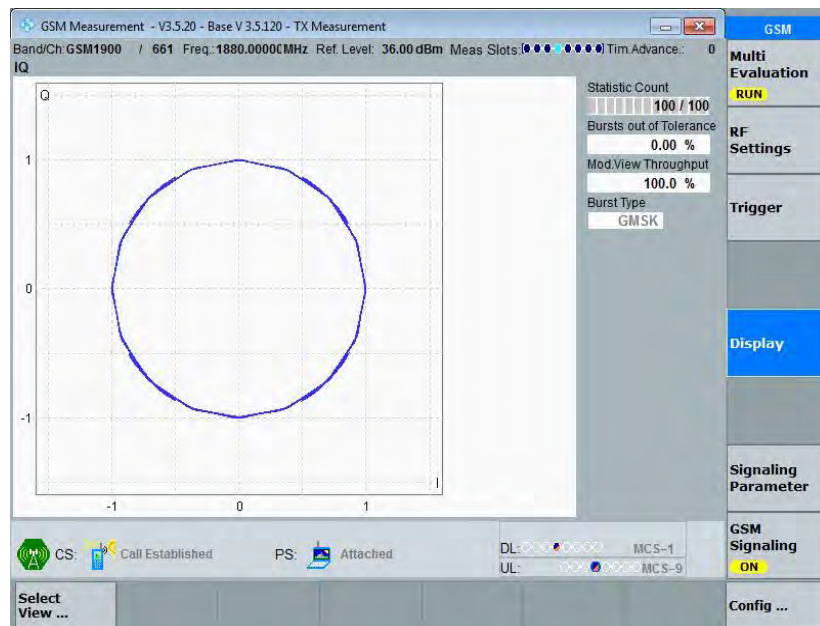
3.1.1.2.1. Test Channel = MCH



3.1.2. Test Band = GSM 1900

3.1.2.1. Test Mode = GSM/TM1

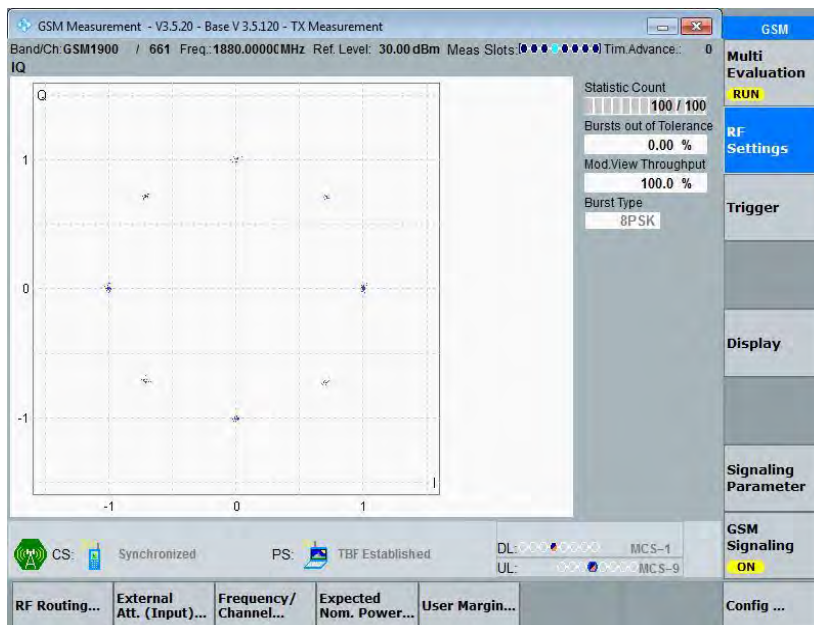
3.1.2.1.1. Test Channel = MCH





3.1.2.2. Test Mode = GSM/TM2

3.1.2.2.1. Test Channel = MCH



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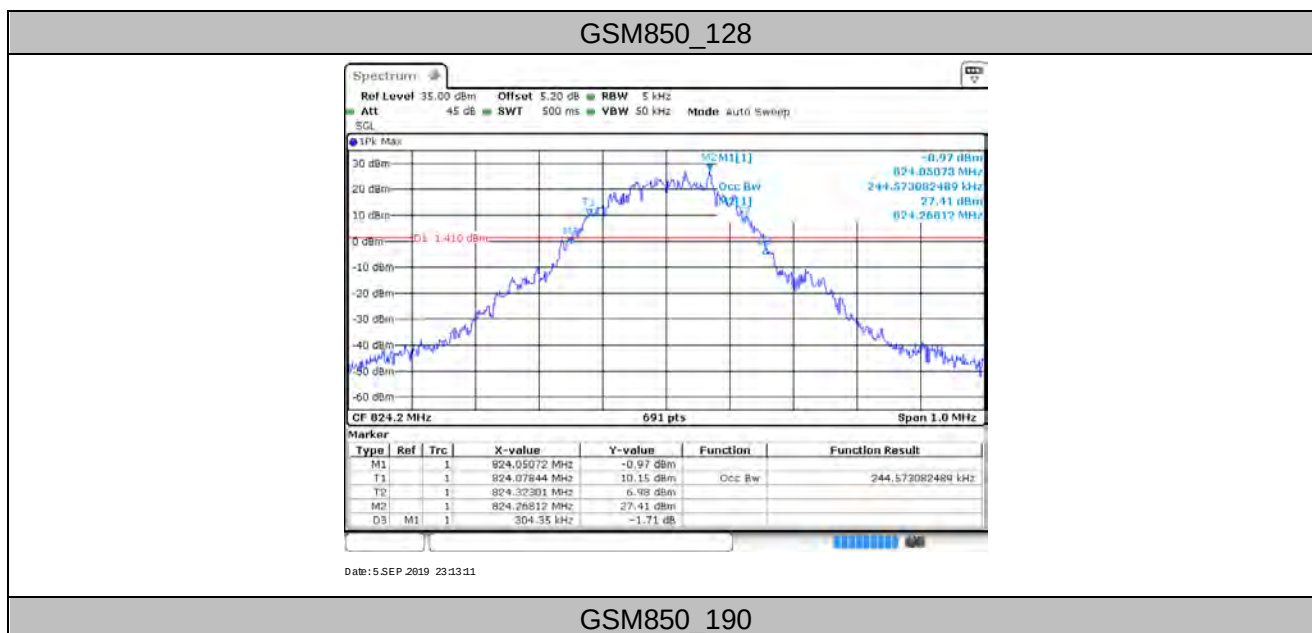


4. 26dB Bandwidth and Occupied Bandwidth

4.1. Test Result

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	244.57	304.35	---	PASS
GSM850	190	244.57	286.96	---	PASS
GSM850	251	243.13	300.00	---	PASS
EGPRS850	128	244.57	305.80	---	PASS
EGPRS850	190	243.13	288.41	---	PASS
EGPRS850	251	247.47	291.30	---	PASS
GSM1900	512	241.68	300.00	---	PASS
GSM1900	661	243.13	291.30	---	PASS
GSM1900	810	243.13	286.96	---	PASS
EGPRS1900	512	247.47	308.70	---	PASS
EGPRS1900	661	247.47	297.10	---	PASS
EGPRS1900	810	244.57	297.10	---	PASS

4.2. Test Plots



GSM850_190



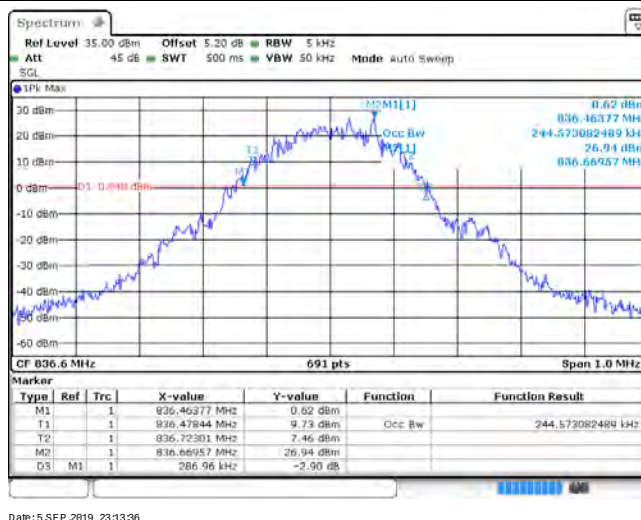
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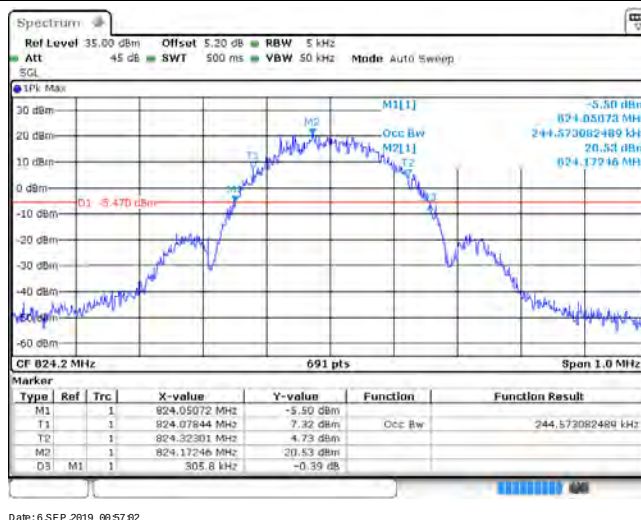
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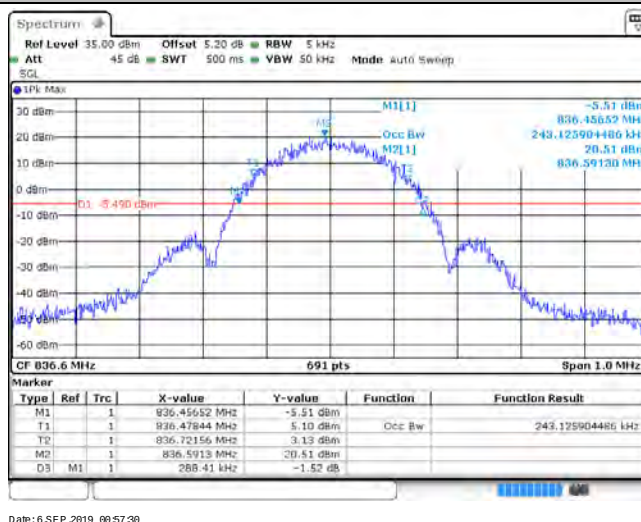
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EGPRS850_128





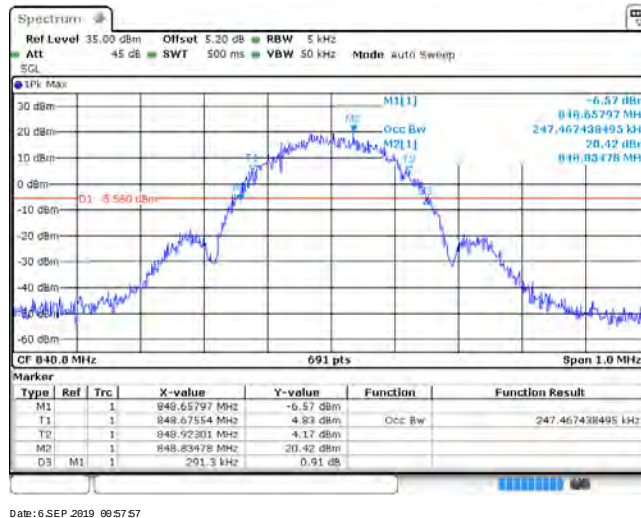
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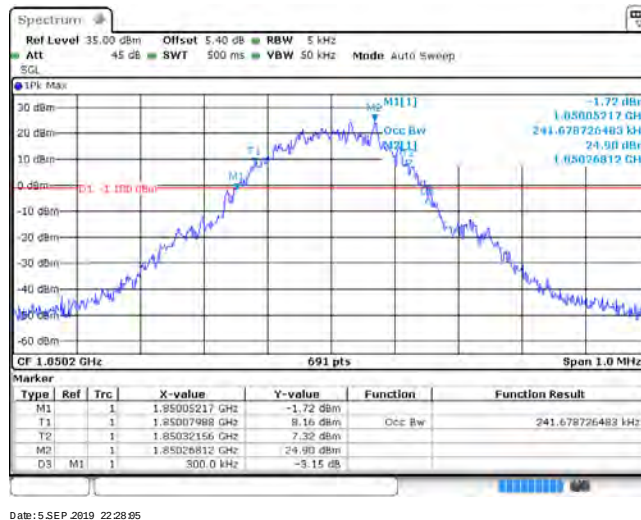
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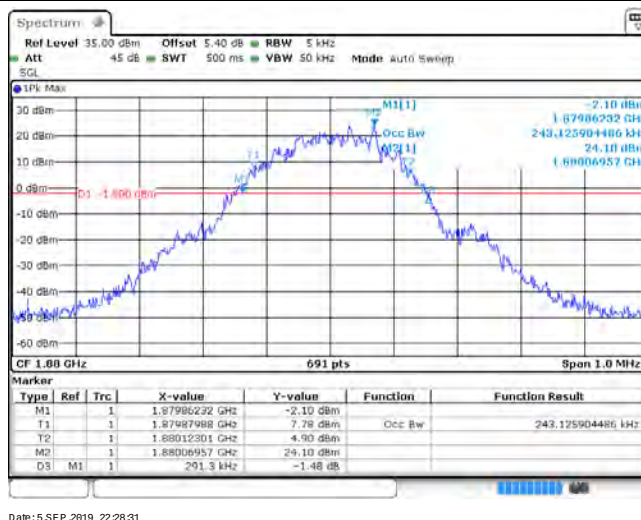
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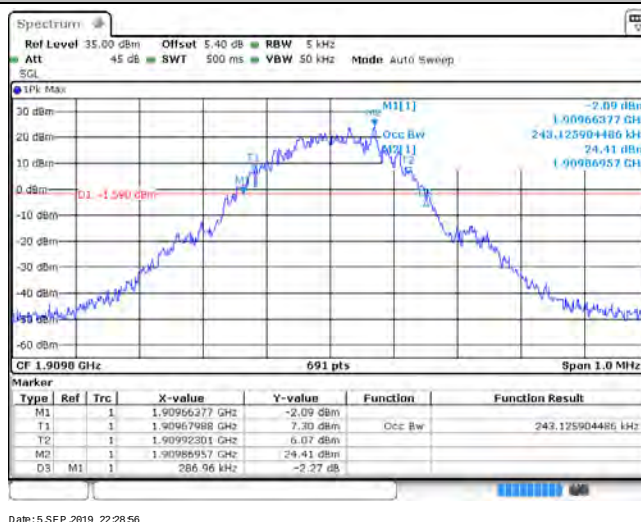


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Date: 5 SEP 2019 22:28:31

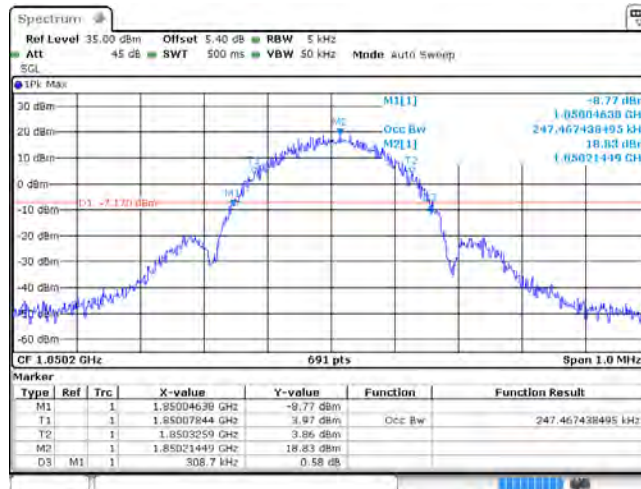
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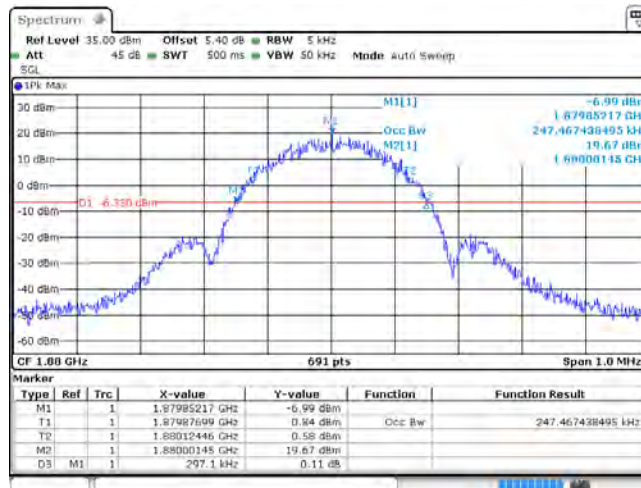
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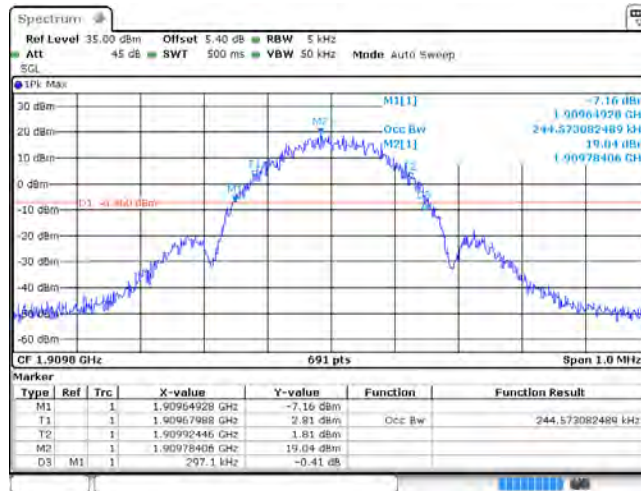
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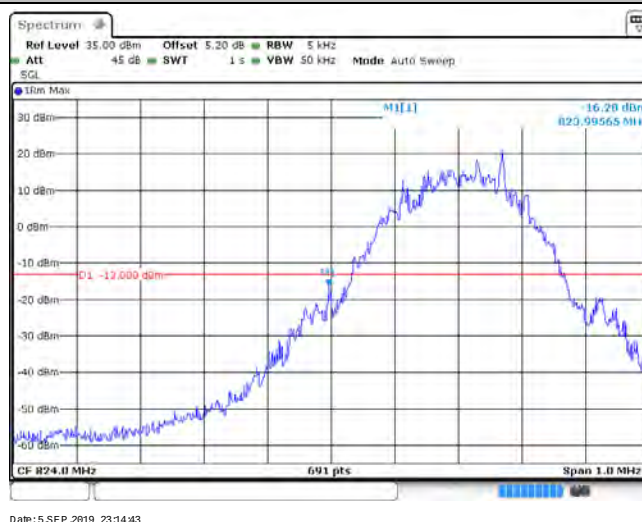
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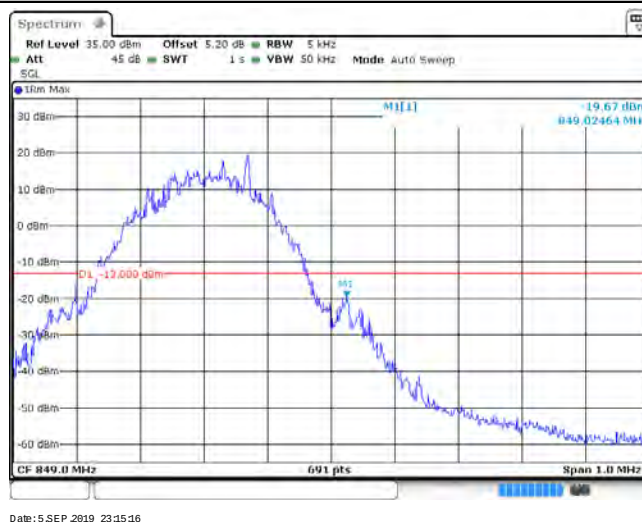
5. Band Edge Compliance

5.1. Test Plots

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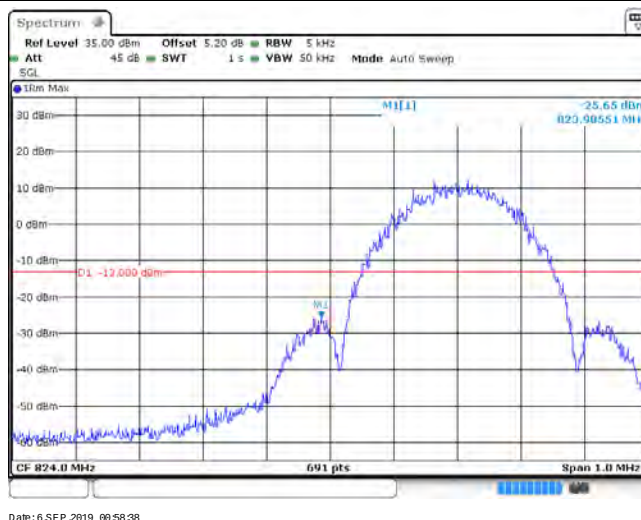


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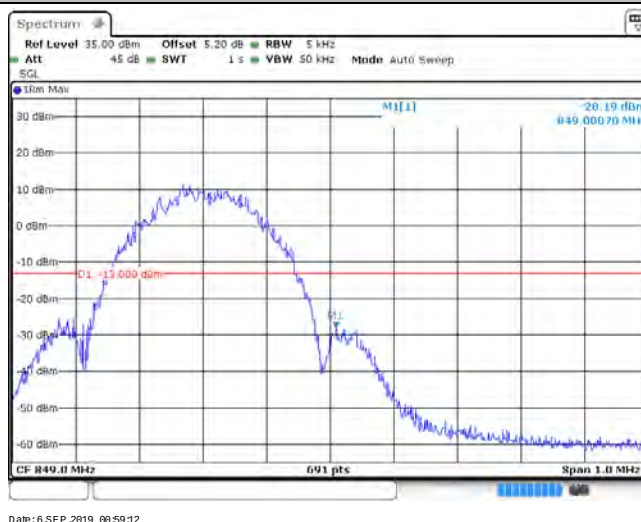


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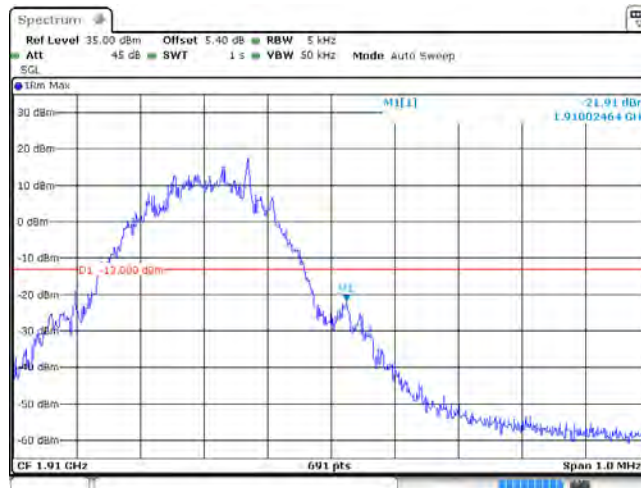
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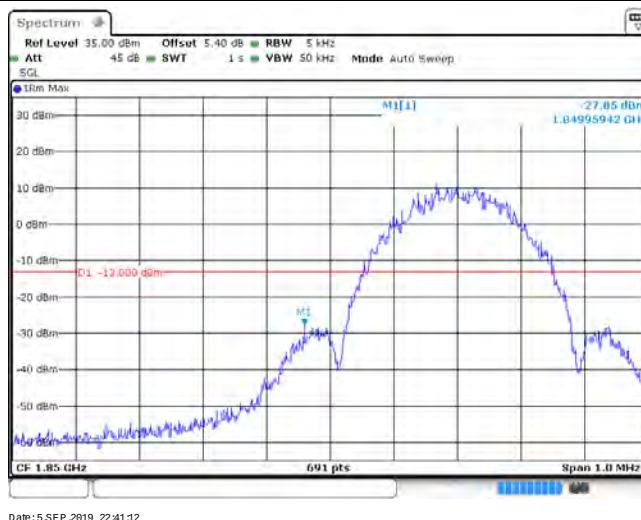
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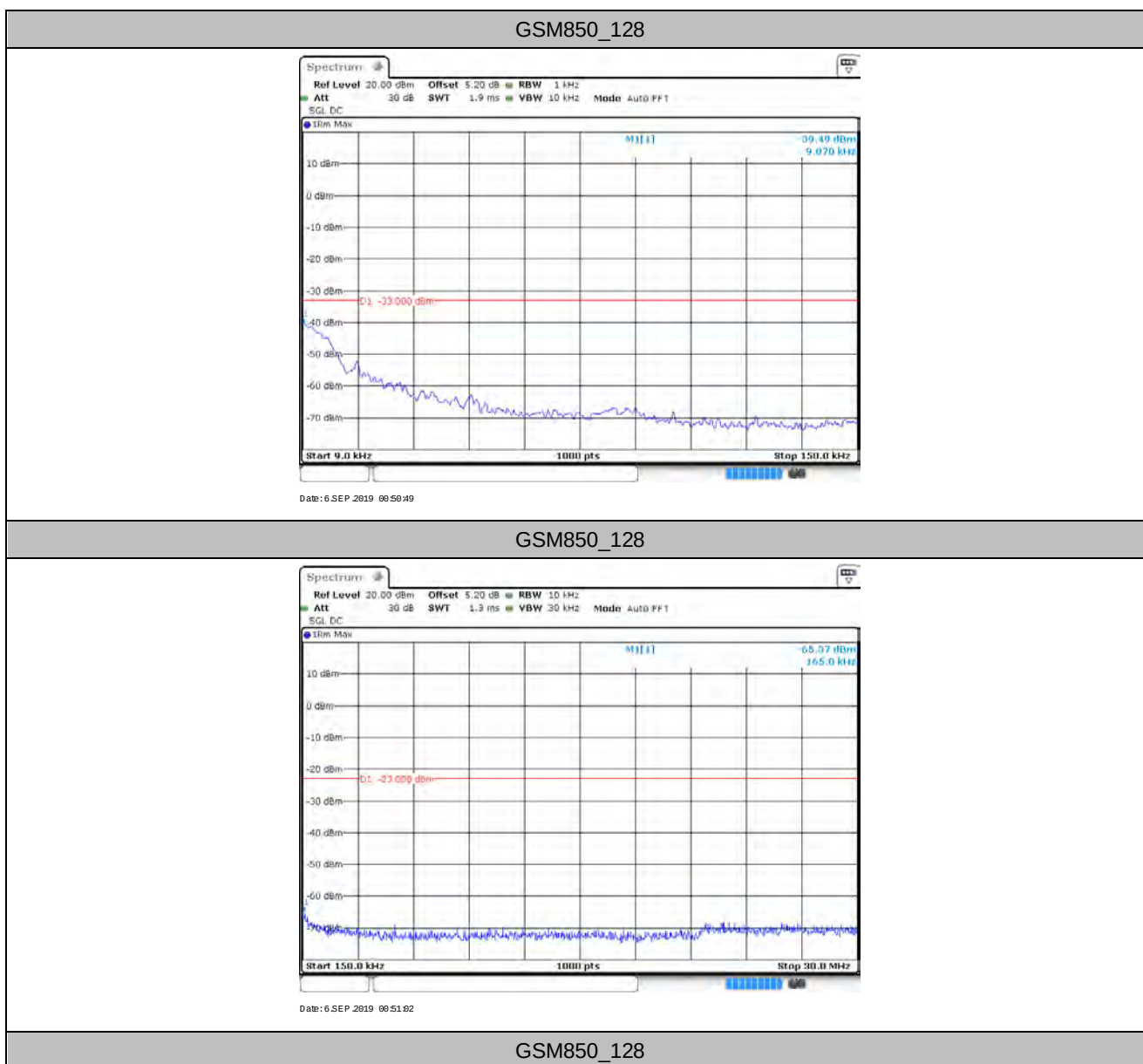


6. Spurious Emission at Antenna Terminal

Remark1: 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 = $k * (\text{Span} / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Remark2: only the worst case data displayed in this report.

6.1. Test Plots

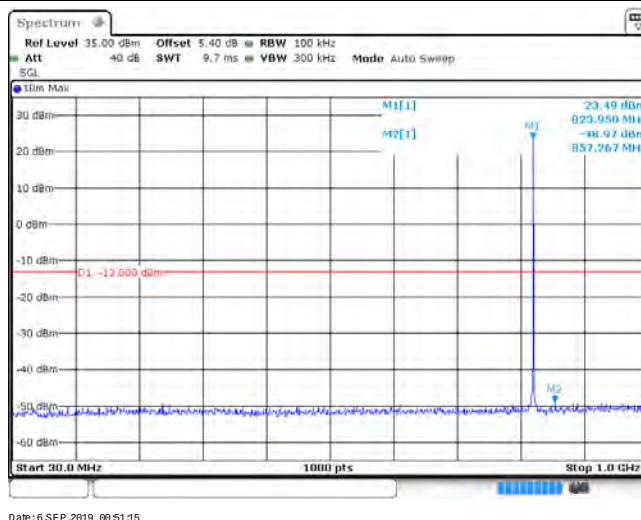


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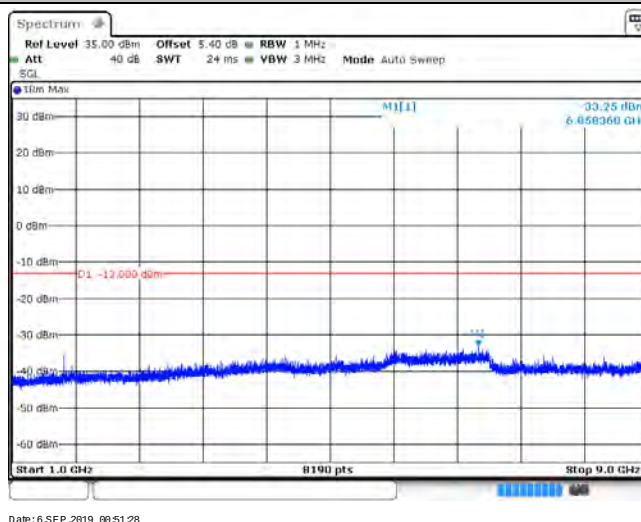
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Date: 6 SEP 2019 08:51:15

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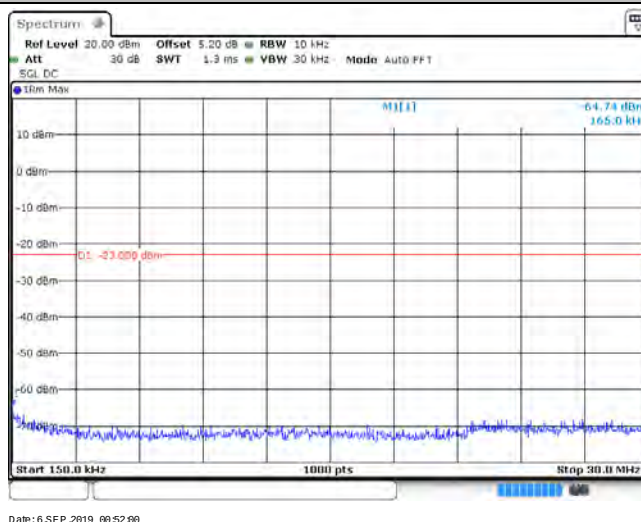
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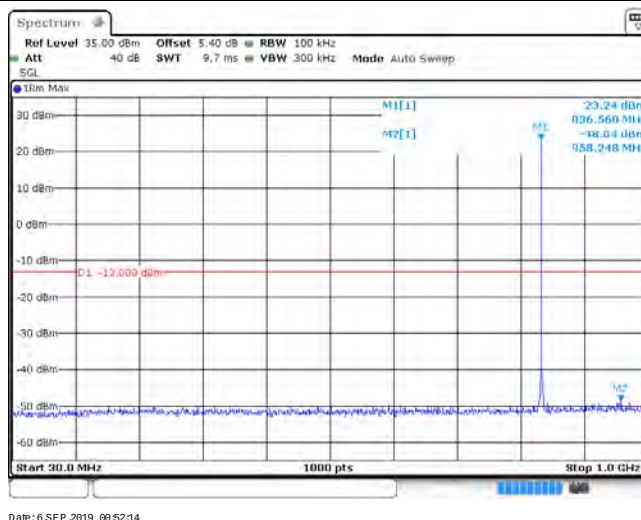


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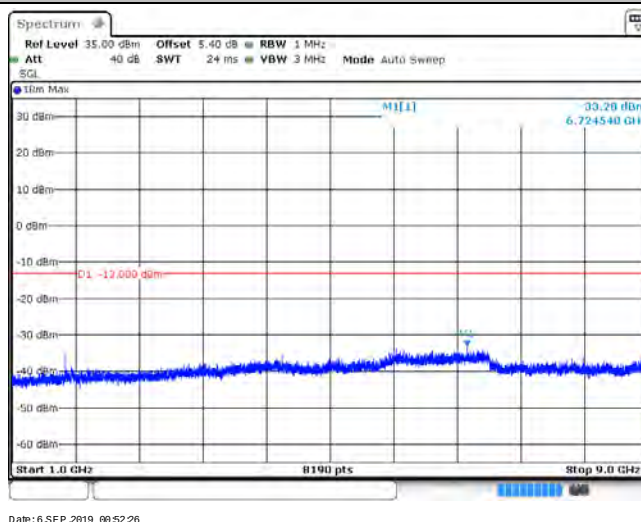


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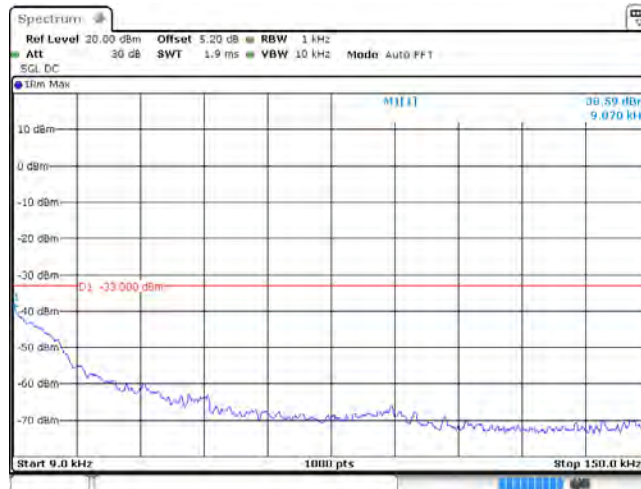


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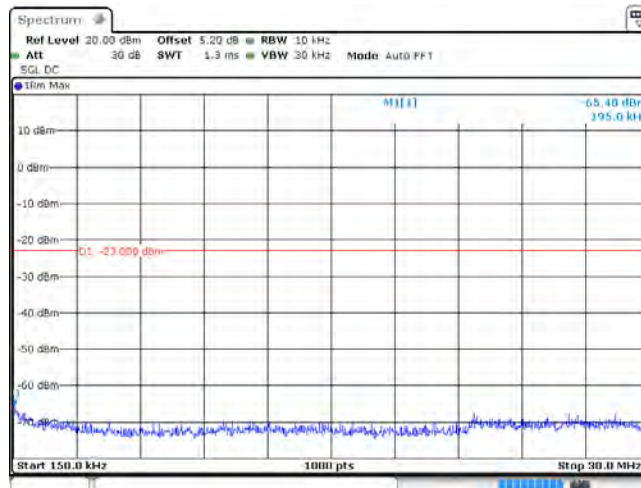
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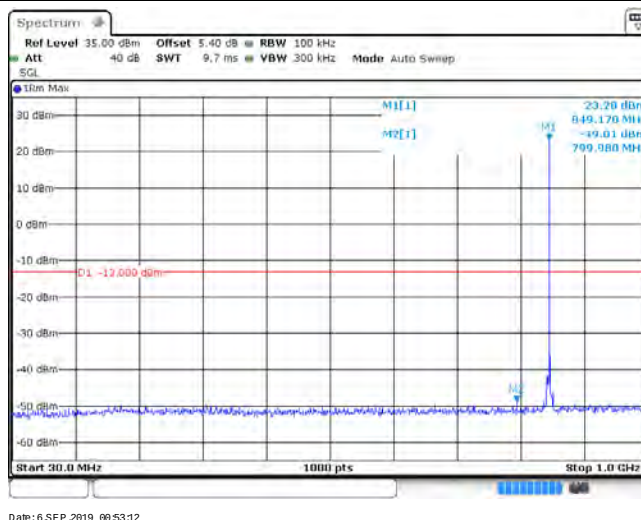
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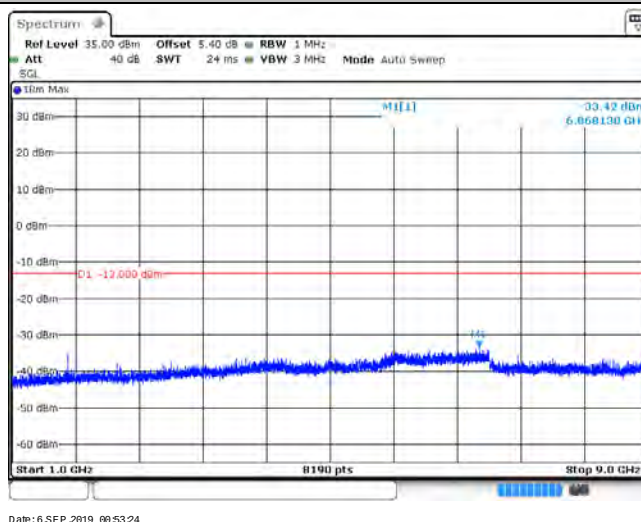


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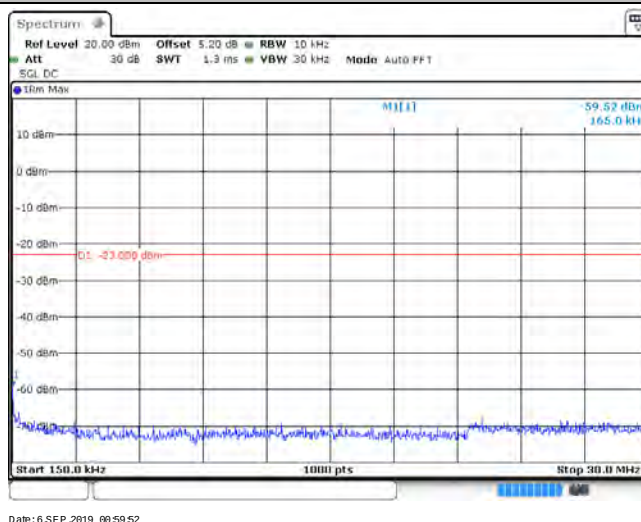


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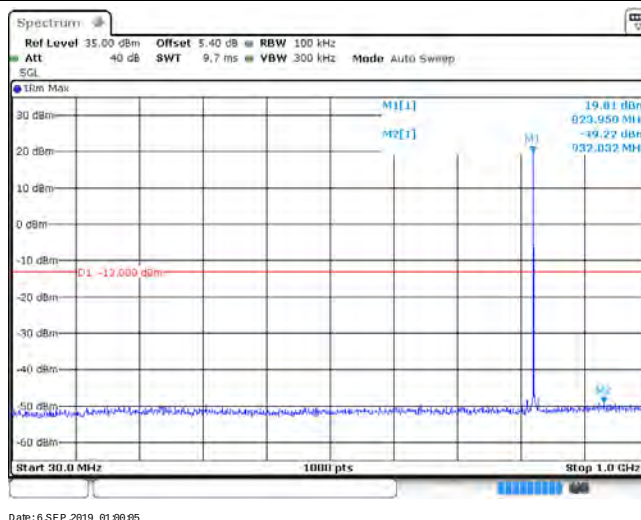


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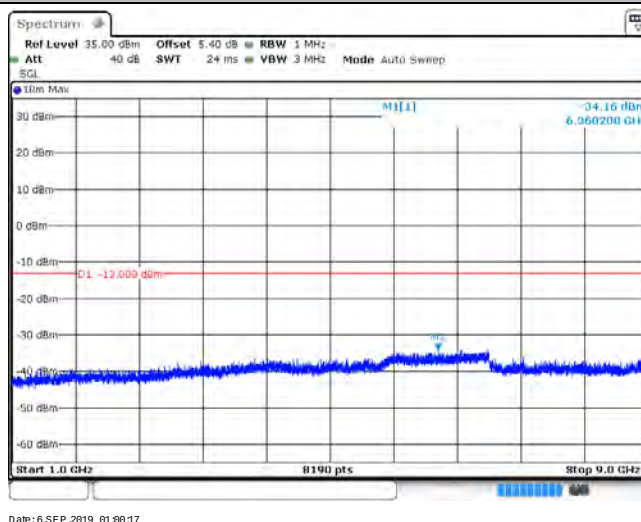


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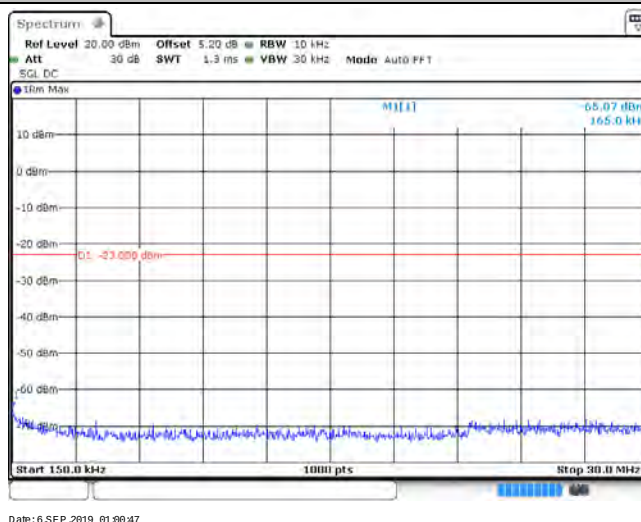


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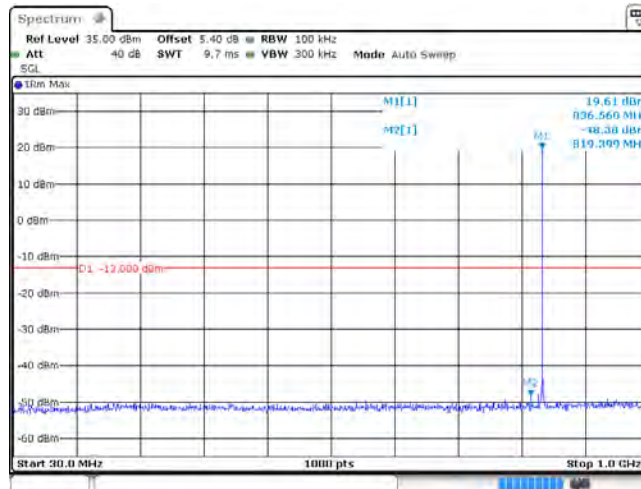


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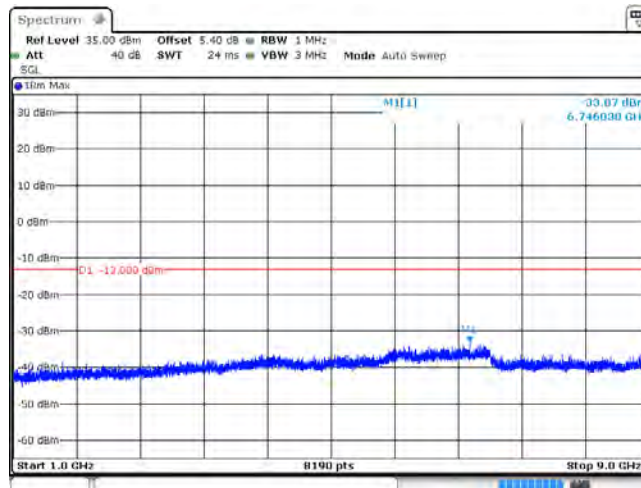
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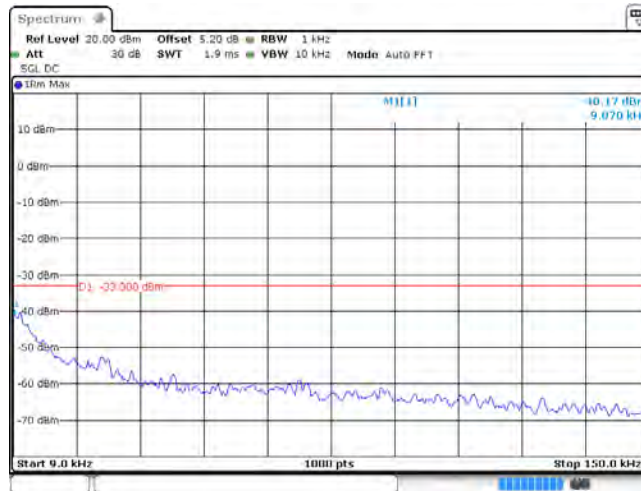
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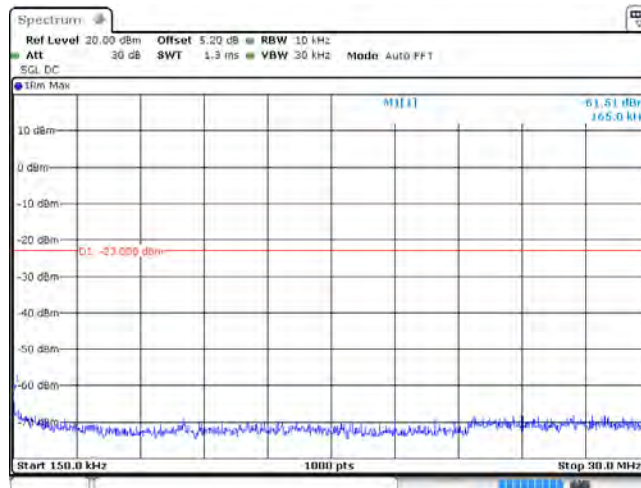
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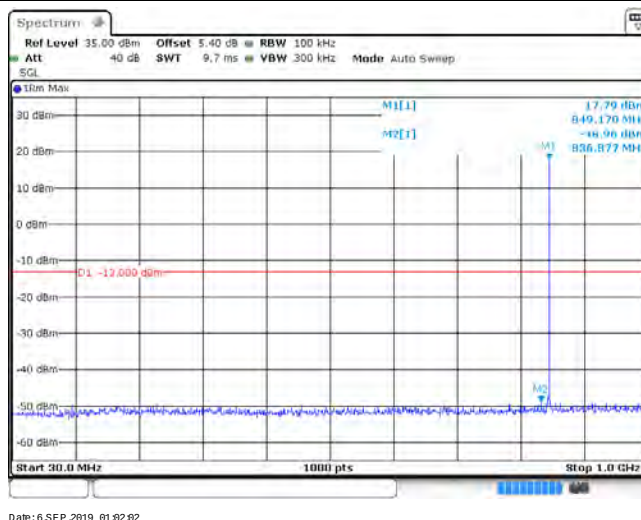
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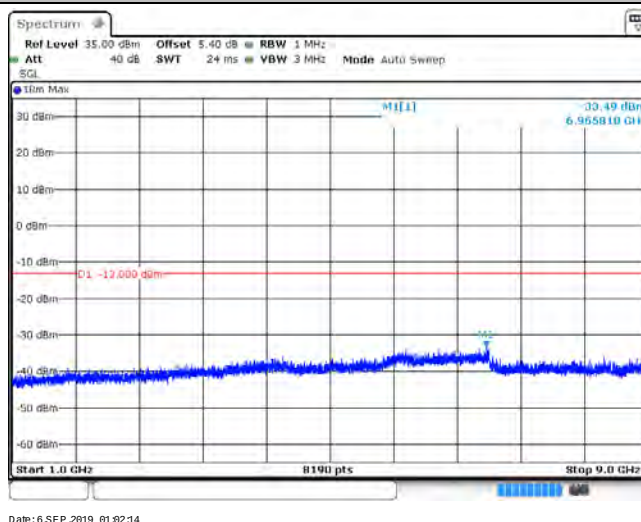


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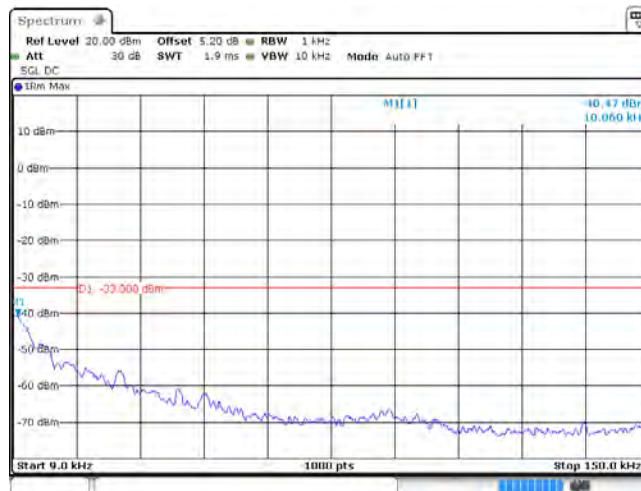
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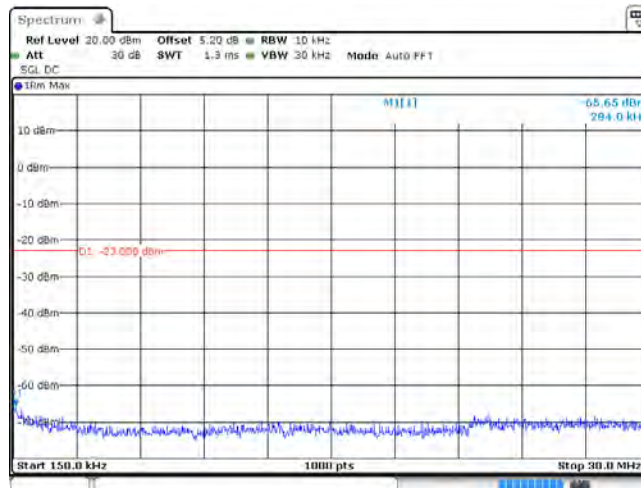


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Date: 6 SEP 2019 08:38:43

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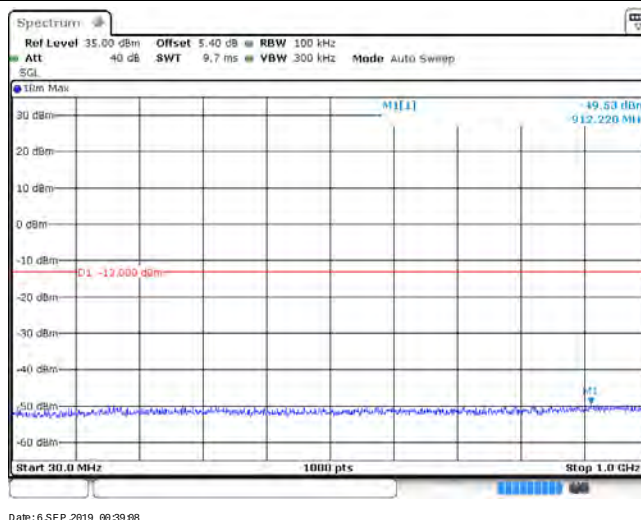
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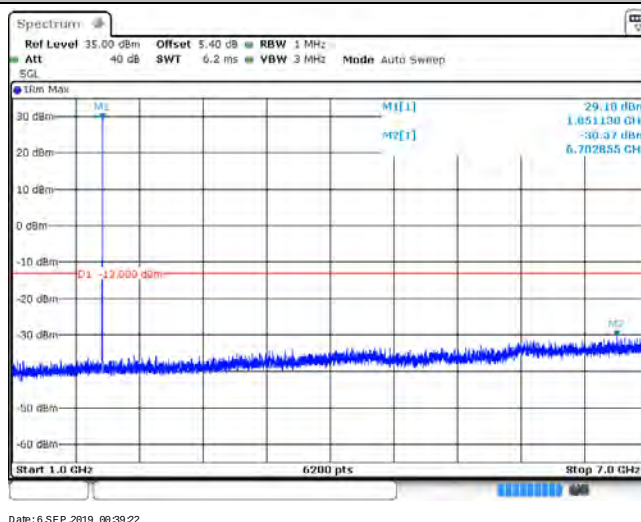
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Date: 6 SEP 2019 08:39:08

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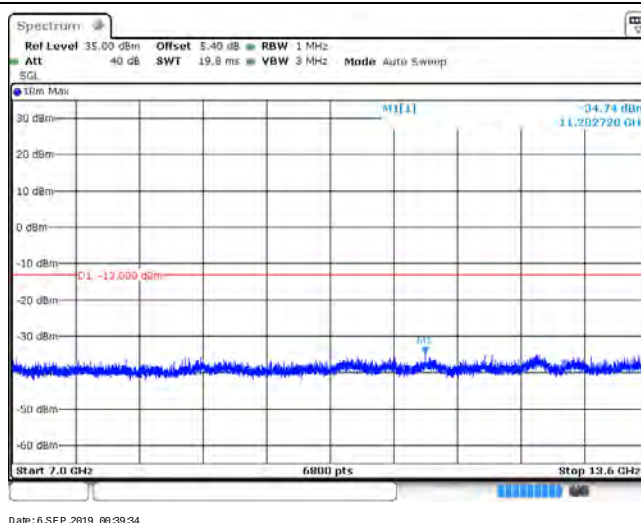
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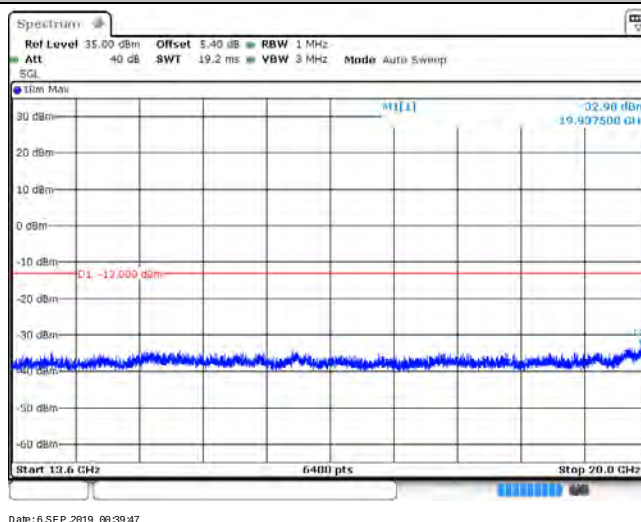
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Date: 6 SEP 2019 00:39:34

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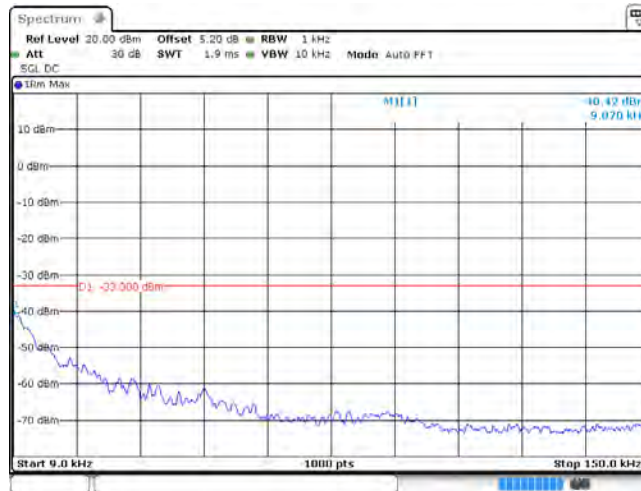
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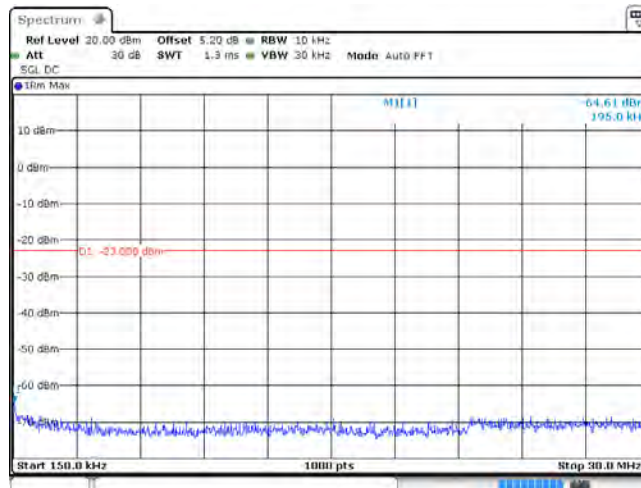
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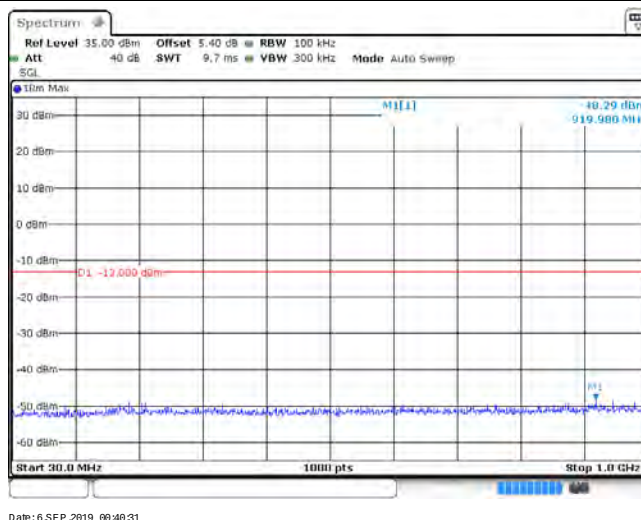
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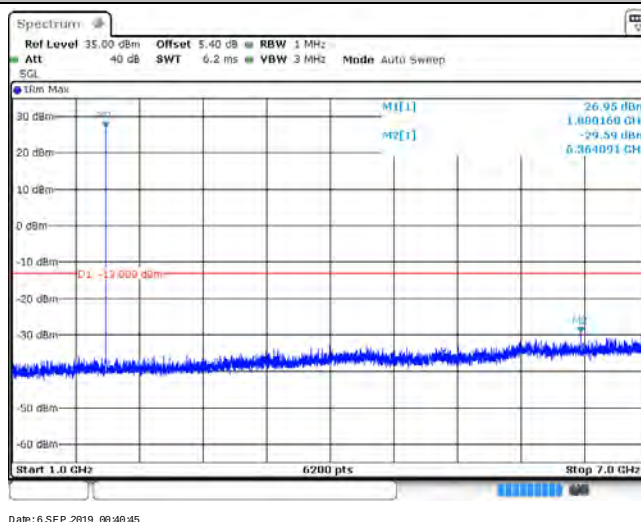


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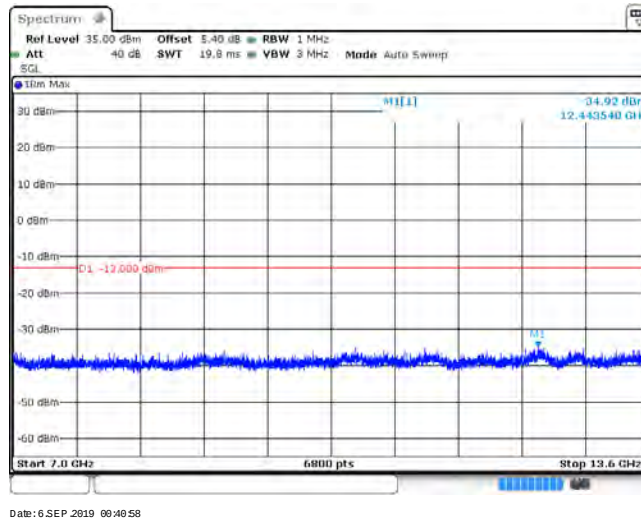


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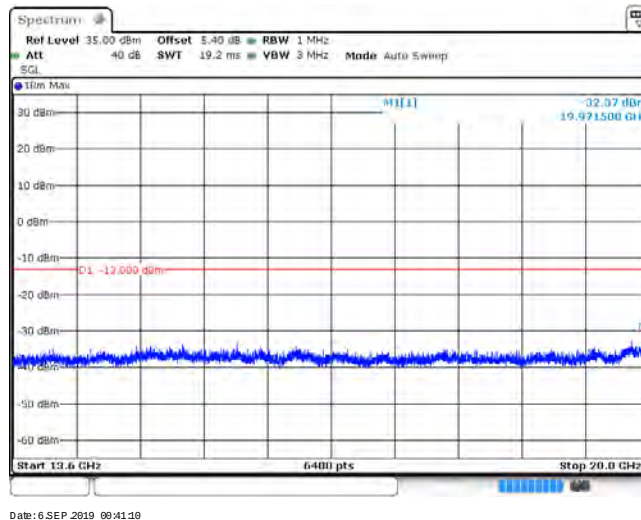


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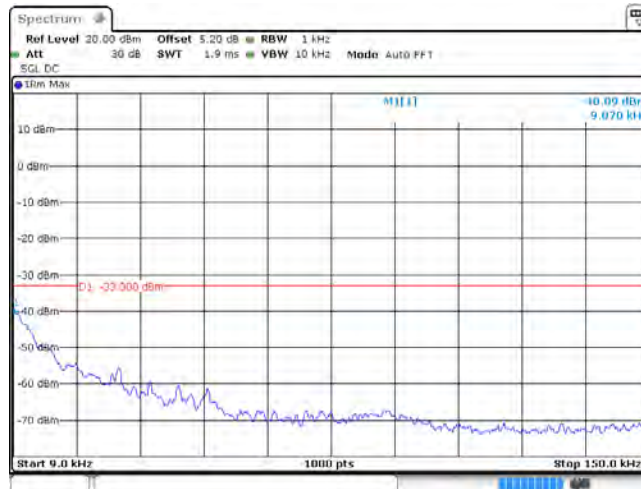


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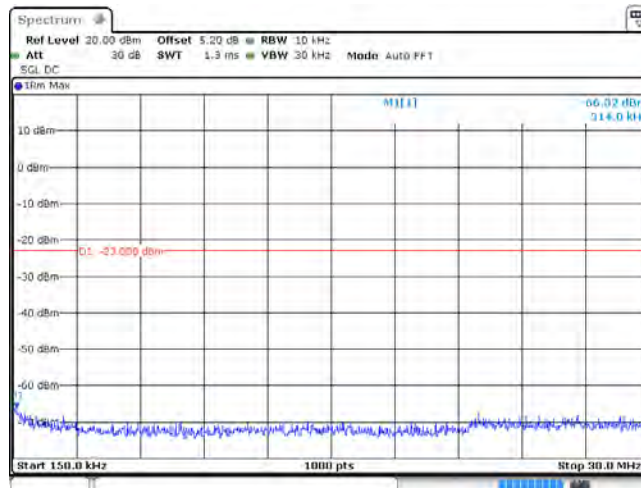
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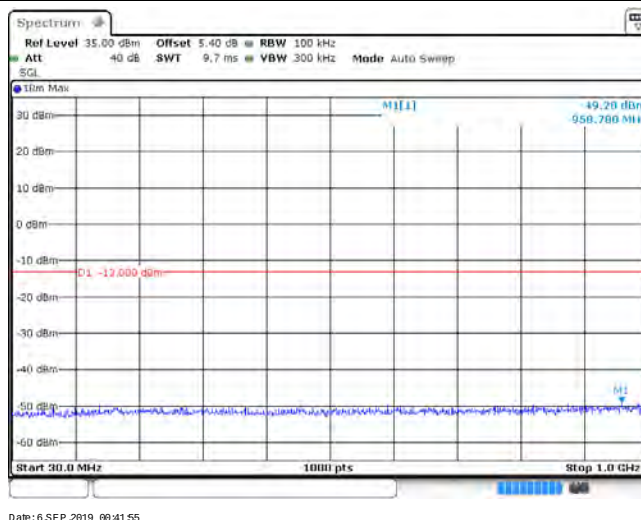
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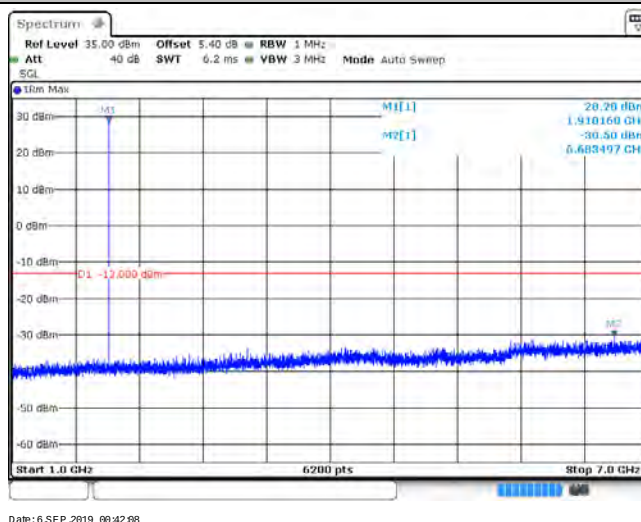


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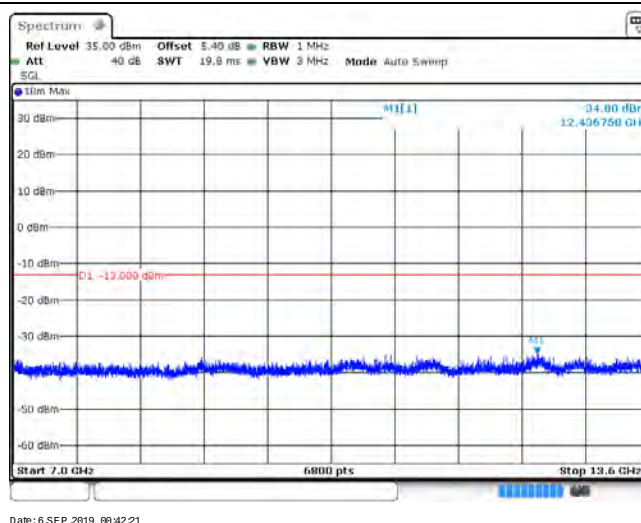


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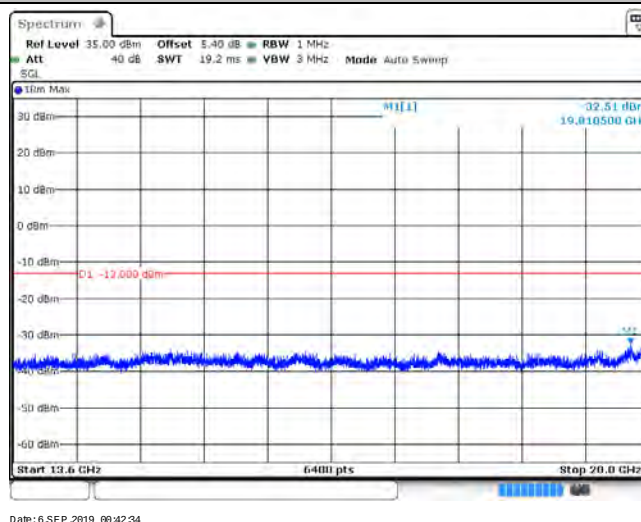


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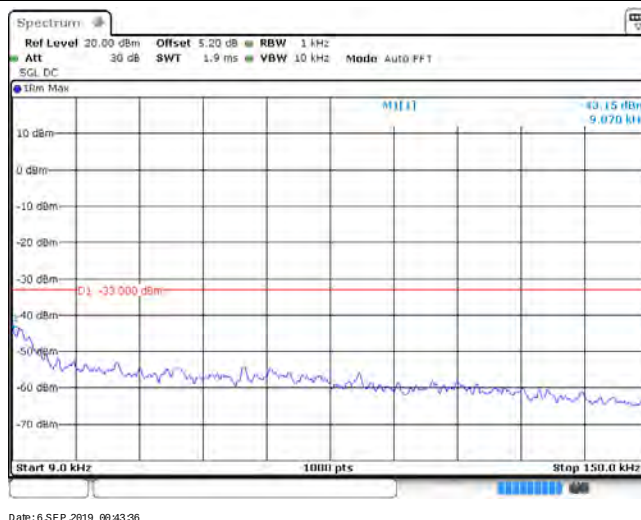
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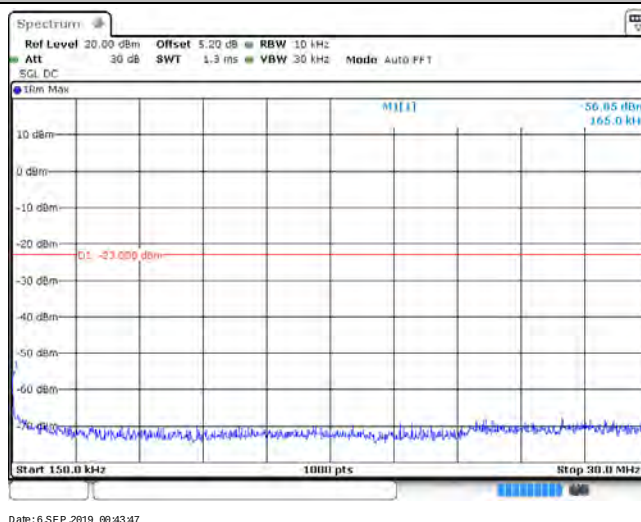
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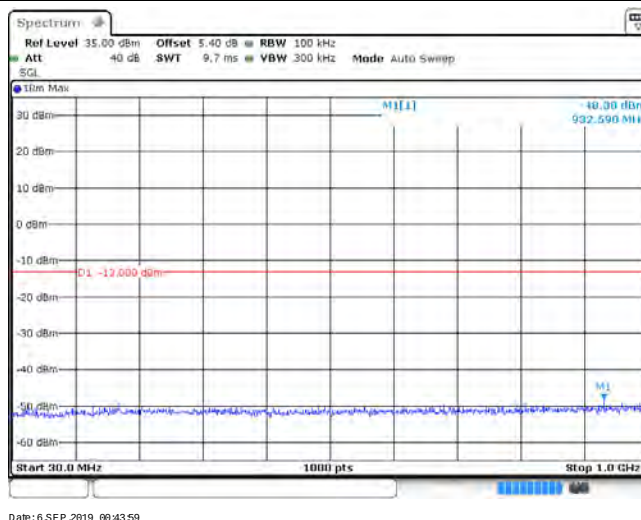


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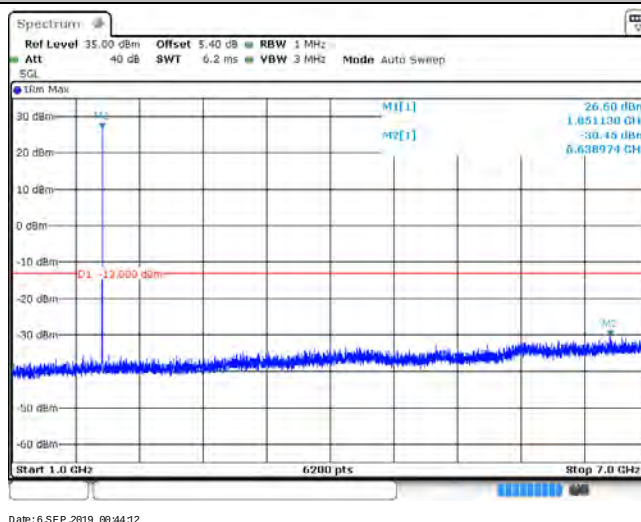


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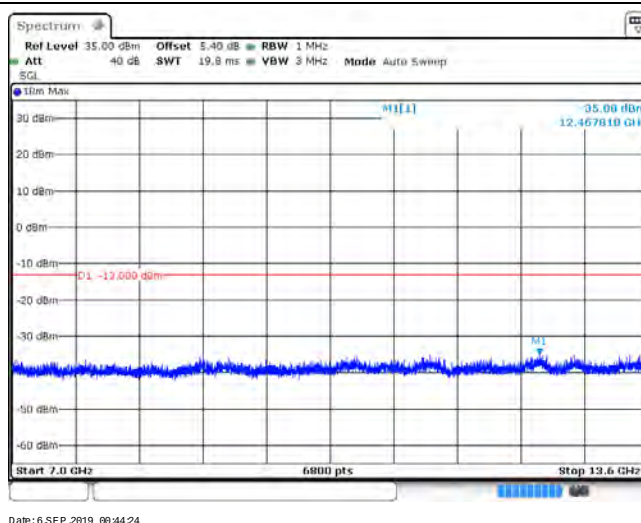


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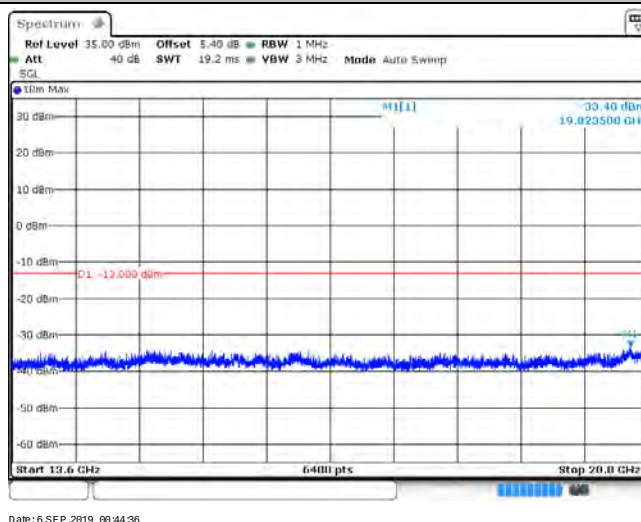
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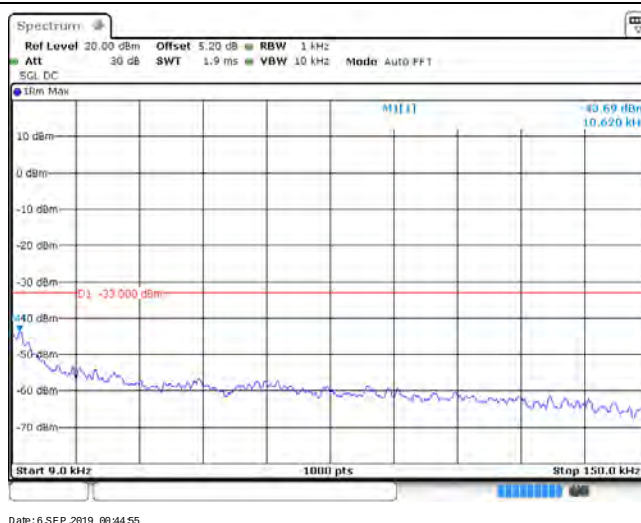
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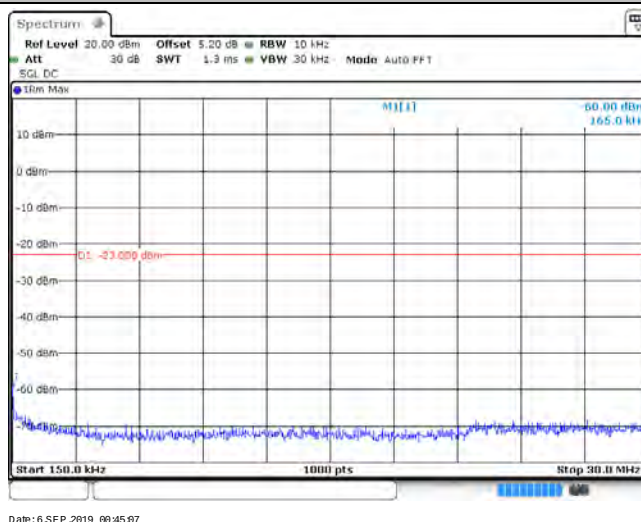
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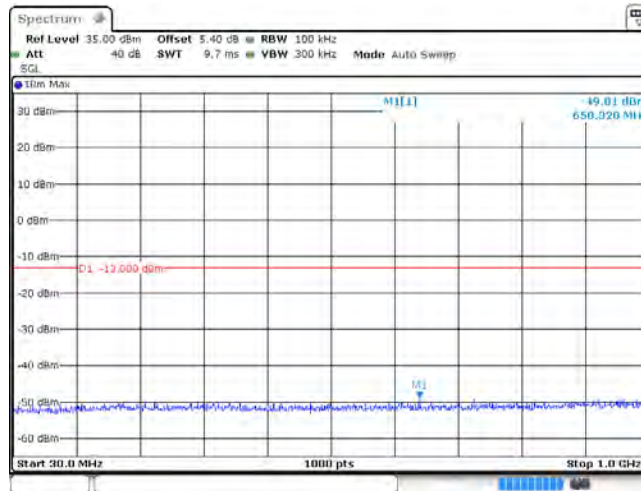


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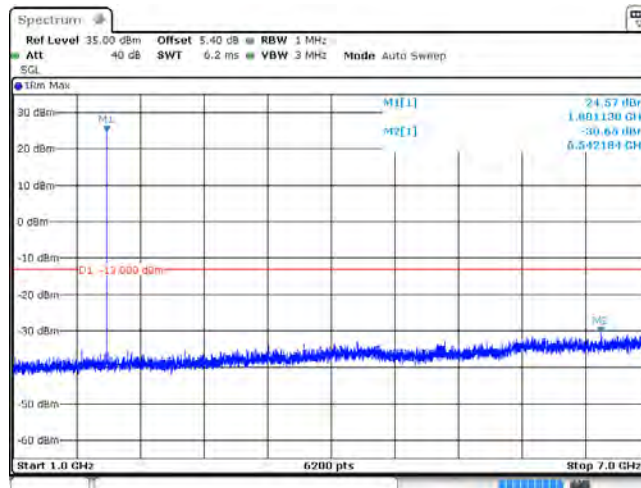
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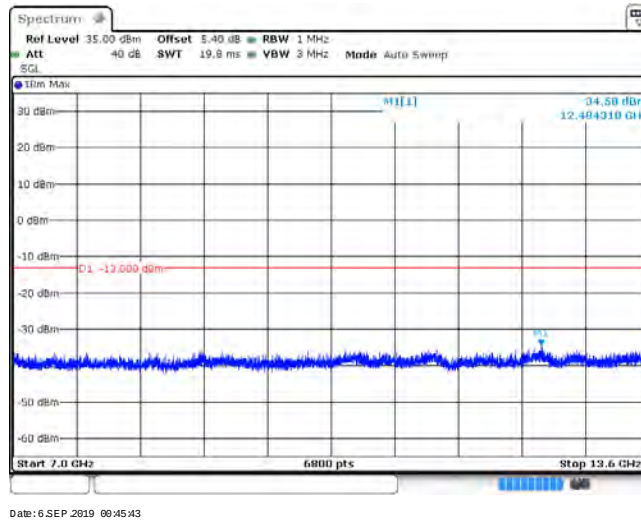
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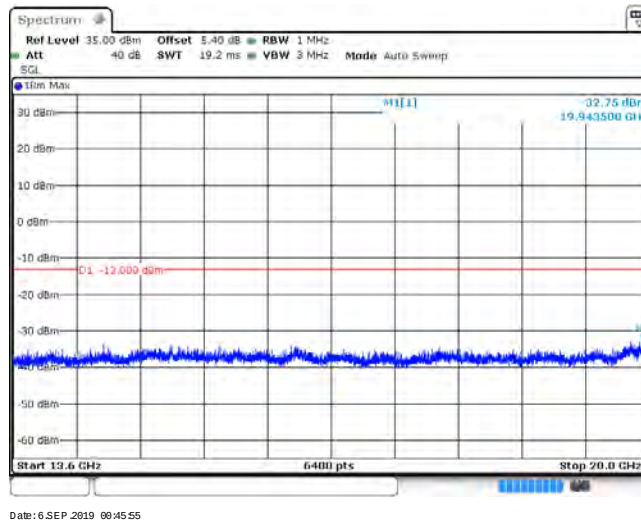


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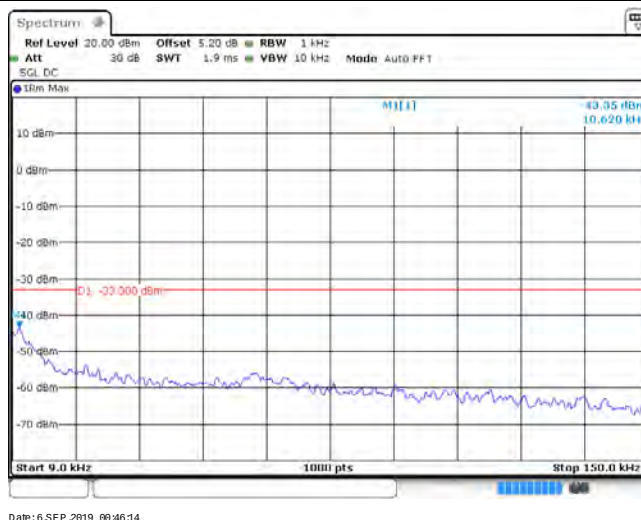


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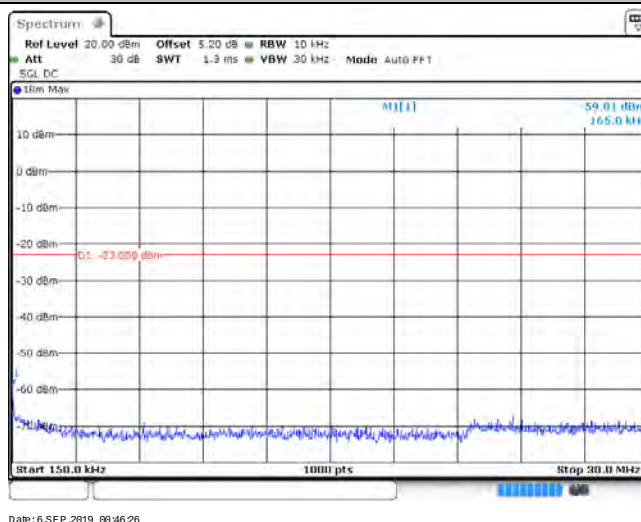


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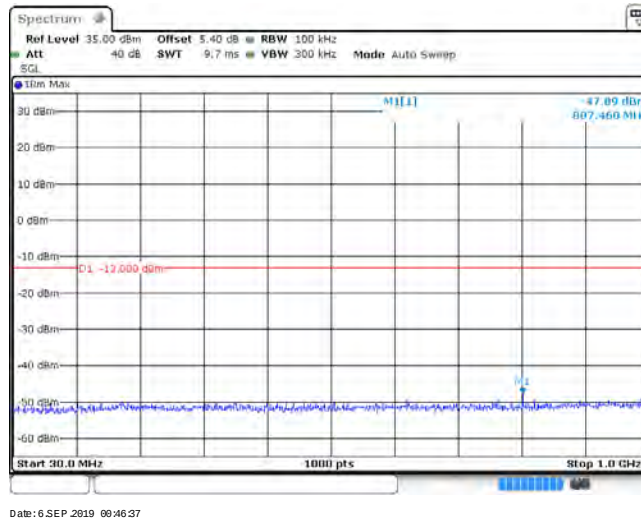
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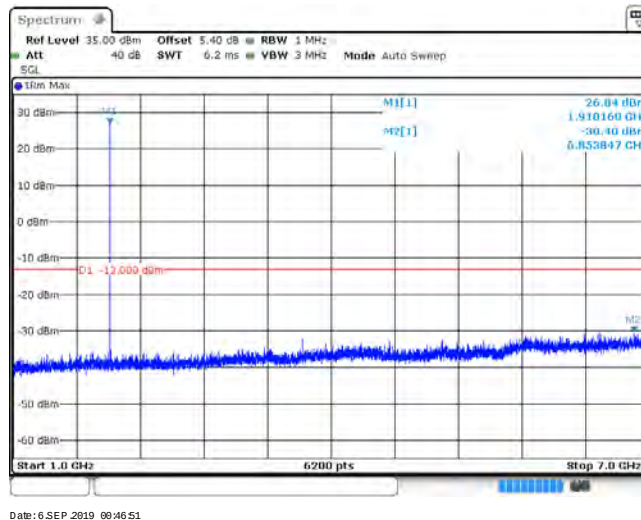
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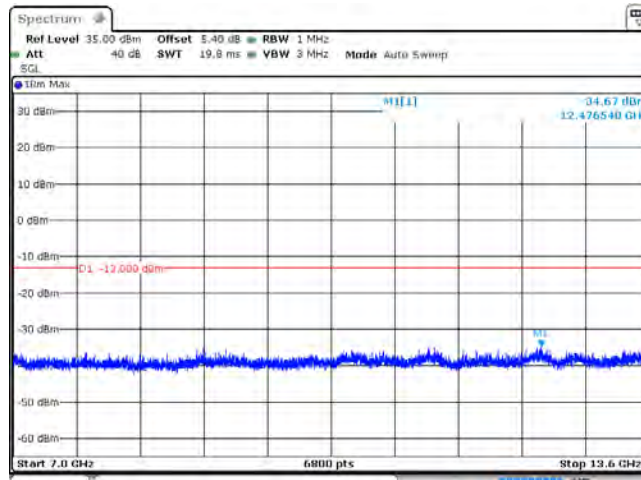


EGPRS1900_810



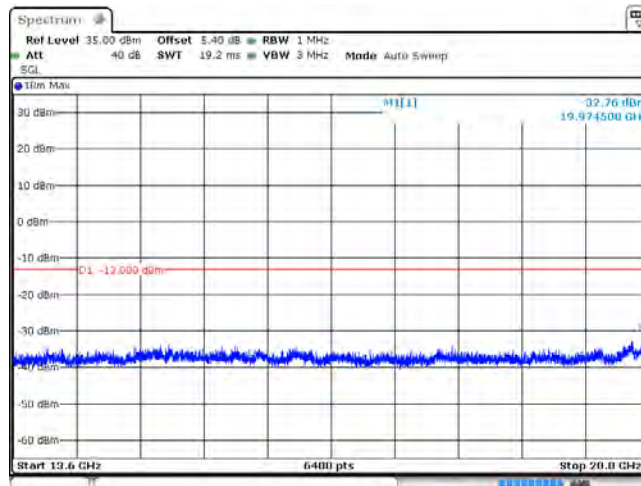
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Date: 6 SEP 2019 09:47:83

EGPRS1900_810



Date: 6 SEP 2019 09:47:15



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7. Field Strength of Spurious Radiation

7.1. Test Band = GSM 850

7.1.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
114.2487	-63.58	-13.00	50.58	Vertical
1648.5297	-40.89	-13.00	27.89	Vertical
2472.6945	-37.50	-13.00	24.50	Vertical
3297.0099	-56.49	-13.00	43.49	Vertical
4121.0374	-52.96	-13.00	39.96	Vertical
17984.9995	-32.91	-13.00	19.91	Vertical
41.3496	-62.78	-13.00	49.78	Horizontal
1648.5297	-36.21	-13.00	23.21	Horizontal
2472.6945	-33.21	-13.00	20.21	Horizontal
3297.0099	-53.65	-13.00	40.65	Horizontal
4121.0374	-46.84	-13.00	33.84	Horizontal
17993.4998	-37.52	-13.00	24.52	Horizontal

7.1.2. Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
110.3200	-63.97	-13.00	50.97	Vertical
1673.3347	-39.55	-13.00	26.55	Vertical
2465.4931	-49.65	-13.00	36.65	Vertical
3346.5116	-56.99	-13.00	43.99	Vertical
14698.8900	-42.64	-13.00	29.64	Vertical
17986.9996	-32.79	-13.00	19.79	Vertical
43.0957	-63.51	-13.00	50.51	Horizontal
1673.3347	-39.09	-13.00	26.09	Horizontal
2465.8932	-48.01	-13.00	35.01	Horizontal
3346.5116	-53.55	-13.00	40.55	Horizontal
4183.0394	-52.71	-13.00	39.71	Horizontal
17994.9998	-37.81	-13.00	24.81	Horizontal

7.1.3. Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
109.5440	-64.14	-13.00	51.14	Vertical
1697.7395	-44.49	-13.00	31.49	Vertical
2465.4931	-44.78	-13.00	31.78	Vertical
3395.5132	-56.31	-13.00	43.31	Vertical



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14690.8897	-42.45	-13.00	29.45	Vertical
17991.4997	-33.10	-13.00	20.10	Vertical
43.2897	-64.03	-13.00	51.03	Horizontal
1697.7395	-47.60	-13.00	34.60	Horizontal
2466.2933	-44.21	-13.00	31.21	Horizontal
3395.0132	-54.27	-13.00	41.27	Horizontal
16395.9465	-38.52	-13.00	25.52	Horizontal
17998.5000	-37.21	-13.00	24.21	Horizontal

7.2. Test Band = GSM 1900

7.2.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
111.0961	-64.28	-13.00	51.28	Vertical
2591.1182	-36.45	-13.00	23.45	Vertical
3700.5234	-56.03	-13.00	43.03	Vertical
5550.5850	-51.59	-13.00	38.59	Vertical
14708.8903	-42.80	-13.00	29.80	Vertical
17989.4997	-32.87	-13.00	19.87	Vertical
44.1627	-63.72	-13.00	50.72	Horizontal
768.0129	-61.12	-13.00	48.12	Horizontal
2703.5407	-36.27	-13.00	23.27	Horizontal
3700.5234	-50.81	-13.00	37.81	Horizontal
5550.5850	-51.99	-13.00	38.99	Horizontal
17991.9997	-37.64	-13.00	24.64	Horizontal

7.2.2. Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
110.4655	-65.13	-13.00	52.13	Vertical
2701.9404	-37.59	-13.00	24.59	Vertical
3760.0253	-52.88	-13.00	39.88	Vertical
5640.0880	-52.90	-13.00	39.90	Vertical
14682.8894	-42.70	-13.00	29.70	Vertical
17993.4998	-33.33	-13.00	20.33	Vertical
38.0029	-55.05	-13.00	42.05	Horizontal
819.2315	-59.54	-13.00	46.54	Horizontal
2707.9416	-36.40	-13.00	23.40	Horizontal
3760.0253	-51.58	-13.00	38.58	Horizontal
5640.0880	-51.78	-13.00	38.78	Horizontal
17999.0000	-37.97	-13.00	24.97	Horizontal



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7.2.3. Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
110.4655	-64.86	-13.00	51.86	Vertical
2697.9396	-37.60	-13.00	24.60	Vertical
3819.5273	-55.31	-13.00	42.31	Vertical
7958.6653	-50.30	-13.00	37.30	Vertical
14662.8888	-42.77	-13.00	29.77	Vertical
17997.9999	-33.38	-13.00	20.38	Vertical
42.1256	-63.45	-13.00	50.45	Horizontal
2698.7397	-36.45	-13.00	23.45	Horizontal
3820.0273	-53.69	-13.00	40.69	Horizontal
9304.2101	-50.03	-13.00	37.03	Horizontal
16391.4464	-38.40	-13.00	25.40	Horizontal
17997.4999	-37.94	-13.00	24.94	Horizontal

Remark:

- 1) According to 971168 D01 Power Meas License Digital Systems, The amplitudes of unwanted emissions that are attenuated more than 20 dB below the applicable limit are not required to be reported.
- 2) The disturbance above 12.75GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the worst case data had been displayed.



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8. Frequency Stability

8.1. Frequency Error Vs Voltage

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VL	TN	9.94	0.012065	±2.5	PASS
GSM850	128	VN	TN	4.13	0.005014	±2.5	PASS
GSM850	128	VH	TN	3.33	0.004035	±2.5	PASS
GSM850	190	VL	TN	7.36	0.008799	±2.5	PASS
GSM850	190	VN	TN	6.36	0.007603	±2.5	PASS
GSM850	190	VH	TN	9.94	0.011886	±2.5	PASS
GSM850	251	VL	TN	15.53	0.018296	±2.5	PASS
GSM850	251	VN	TN	11.20	0.013199	±2.5	PASS
GSM850	251	VH	TN	14.59	0.017193	±2.5	PASS
EGPRS850	128	VL	TN	13.79	0.016727	±2.5	PASS
EGPRS850	128	VN	TN	17.82	0.021623	±2.5	PASS
EGPRS850	128	VH	TN	18.05	0.021897	±2.5	PASS
EGPRS850	190	VL	TN	17.21	0.020569	±2.5	PASS
EGPRS850	190	VN	TN	14.46	0.017289	±2.5	PASS
EGPRS850	190	VH	TN	13.37	0.015977	±2.5	PASS
EGPRS850	251	VL	TN	19.05	0.022442	±2.5	PASS
EGPRS850	251	VN	TN	10.20	0.012020	±2.5	PASS
EGPRS850	251	VH	TN	17.89	0.021073	±2.5	PASS
GSM1900	512	VL	TN	-11.20	-0.006055	±2.5	PASS
GSM1900	512	VN	TN	7.26	0.003926	±2.5	PASS
GSM1900	512	VH	TN	4.81	0.002600	±2.5	PASS
GSM1900	661	VL	TN	-22.47	-0.011953	±2.5	PASS
GSM1900	661	VN	TN	-7.78	-0.004139	±2.5	PASS
GSM1900	661	VH	TN	-21.89	-0.011644	±2.5	PASS
GSM1900	810	VL	TN	-12.98	-0.006796	±2.5	PASS
GSM1900	810	VN	TN	-2.23	-0.001166	±2.5	PASS
GSM1900	810	VH	TN	-7.62	-0.003990	±2.5	PASS
EGPRS1900	512	VL	TN	9.01	0.004869	±2.5	PASS
EGPRS1900	512	VN	TN	37.97	0.020521	±2.5	PASS
EGPRS1900	512	VH	TN	13.69	0.007399	±2.5	PASS
EGPRS1900	661	VL	TN	17.66	0.009394	±2.5	PASS
EGPRS1900	661	VN	TN	5.26	0.002799	±2.5	PASS
EGPRS1900	661	VH	TN	6.62	0.003521	±2.5	PASS
EGPRS1900	810	VL	TN	-1.36	-0.000710	±2.5	PASS
EGPRS1900	810	VN	TN	16.01	0.008385	±2.5	PASS
EGPRS1900	810	VH	TN	3.10	0.001623	±2.5	PASS



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8.2.Frequency Error Vs Temperature

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VN	-30	6.33	0.007678	±2.5	PASS
GSM850	128	VN	-20	8.23	0.009989	±2.5	PASS
GSM850	128	VN	-10	7.78	0.009441	±2.5	PASS
GSM850	128	VN	0	12.75	0.015473	±2.5	PASS
GSM850	128	VN	10	9.75	0.011830	±2.5	PASS
GSM850	128	VN	20	13.24	0.016061	±2.5	PASS
GSM850	128	VN	30	13.79	0.016727	±2.5	PASS
GSM850	128	VN	40	17.14	0.020801	±2.5	PASS
GSM850	128	VN	50	9.49	0.011517	±2.5	PASS
GSM850	190	VN	-30	10.30	0.012311	±2.5	PASS
GSM850	190	VN	-20	11.62	0.013893	±2.5	PASS
GSM850	190	VN	-10	9.27	0.011076	±2.5	PASS
GSM850	190	VN	0	3.87	0.004631	±2.5	PASS
GSM850	190	VN	10	14.14	0.016903	±2.5	PASS
GSM850	190	VN	20	6.23	0.007448	±2.5	PASS
GSM850	190	VN	30	10.30	0.012311	±2.5	PASS
GSM850	190	VN	40	3.45	0.004129	±2.5	PASS
GSM850	190	VN	50	5.52	0.006599	±2.5	PASS
GSM850	251	VN	-30	12.72	0.014987	±2.5	PASS
GSM850	251	VN	-20	8.98	0.010574	±2.5	PASS
GSM850	251	VN	-10	15.59	0.018372	±2.5	PASS
GSM850	251	VN	0	10.20	0.012020	±2.5	PASS
GSM850	251	VN	10	7.81	0.009205	±2.5	PASS
GSM850	251	VN	20	15.50	0.018258	±2.5	PASS
GSM850	251	VN	30	13.04	0.015367	±2.5	PASS
GSM850	251	VN	40	10.94	0.012895	±2.5	PASS
GSM850	251	VN	50	9.17	0.010803	±2.5	PASS
EGPRS850	128	VN	-30	17.01	0.020644	±2.5	PASS
EGPRS850	128	VN	-20	16.43	0.019939	±2.5	PASS
EGPRS850	128	VN	-10	16.08	0.019508	±2.5	PASS
EGPRS850	128	VN	0	11.75	0.014259	±2.5	PASS
EGPRS850	128	VN	10	13.79	0.016727	±2.5	PASS
EGPRS850	128	VN	20	16.18	0.019625	±2.5	PASS
EGPRS850	128	VN	30	15.27	0.018529	±2.5	PASS
EGPRS850	128	VN	40	15.50	0.018803	±2.5	PASS
EGPRS850	128	VN	50	13.95	0.016922	±2.5	PASS
EGPRS850	190	VN	-30	13.66	0.016324	±2.5	PASS
EGPRS850	190	VN	-20	22.41	0.026783	±2.5	PASS
EGPRS850	190	VN	-10	14.33	0.017135	±2.5	PASS
EGPRS850	190	VN	0	11.17	0.013353	±2.5	PASS
EGPRS850	190	VN	10	20.15	0.024081	±2.5	PASS
EGPRS850	190	VN	20	16.53	0.019759	±2.5	PASS



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EGPRS850	190	VN	30	20.63	0.024660	±2.5	PASS
EGPRS850	190	VN	40	13.17	0.015745	±2.5	PASS
EGPRS850	190	VN	50	14.33	0.017135	±2.5	PASS
EGPRS850	251	VN	-30	13.24	0.015595	±2.5	PASS
EGPRS850	251	VN	-20	17.85	0.021034	±2.5	PASS
EGPRS850	251	VN	-10	9.20	0.010841	±2.5	PASS
EGPRS850	251	VN	0	9.85	0.011601	±2.5	PASS
EGPRS850	251	VN	10	10.78	0.012704	±2.5	PASS
EGPRS850	251	VN	20	13.08	0.015405	±2.5	PASS
EGPRS850	251	VN	30	15.98	0.018828	±2.5	PASS
EGPRS850	251	VN	40	15.85	0.018676	±2.5	PASS
EGPRS850	251	VN	50	17.72	0.020882	±2.5	PASS
GSM1900	512	VN	-30	-11.04	-0.005968	±2.5	PASS
GSM1900	512	VN	-20	-2.36	-0.001274	±2.5	PASS
GSM1900	512	VN	-10	5.13	0.002775	±2.5	PASS
GSM1900	512	VN	0	3.87	0.002094	±2.5	PASS
GSM1900	512	VN	10	2.26	0.001221	±2.5	PASS
GSM1900	512	VN	20	8.14	0.004397	±2.5	PASS
GSM1900	512	VN	30	-5.49	-0.002966	±2.5	PASS
GSM1900	512	VN	40	0.74	0.000401	±2.5	PASS
GSM1900	512	VN	50	5.13	0.002775	±2.5	PASS
GSM1900	661	VN	-30	-19.92	-0.010596	±2.5	PASS
GSM1900	661	VN	-20	-12.01	-0.006388	±2.5	PASS
GSM1900	661	VN	-10	-21.70	-0.011540	±2.5	PASS
GSM1900	661	VN	0	-19.02	-0.010115	±2.5	PASS
GSM1900	661	VN	10	-19.50	-0.010373	±2.5	PASS
GSM1900	661	VN	20	-22.37	-0.011901	±2.5	PASS
GSM1900	661	VN	30	-16.43	-0.008741	±2.5	PASS
GSM1900	661	VN	40	-20.82	-0.011077	±2.5	PASS
GSM1900	661	VN	50	-20.34	-0.010819	±2.5	PASS
GSM1900	810	VN	-30	-8.33	-0.004362	±2.5	PASS
GSM1900	810	VN	-20	-6.30	-0.003297	±2.5	PASS
GSM1900	810	VN	-10	-10.72	-0.005613	±2.5	PASS
GSM1900	810	VN	0	-12.62	-0.006610	±2.5	PASS
GSM1900	810	VN	10	-2.45	-0.001285	±2.5	PASS
GSM1900	810	VN	20	-19.44	-0.010177	±2.5	PASS
GSM1900	810	VN	30	-7.33	-0.003838	±2.5	PASS
GSM1900	810	VN	40	-9.81	-0.005139	±2.5	PASS
GSM1900	810	VN	50	-12.88	-0.006745	±2.5	PASS
EGPRS1900	512	VN	-30	19.50	0.010540	±2.5	PASS
EGPRS1900	512	VN	-20	21.66	0.011709	±2.5	PASS
EGPRS1900	512	VN	-10	4.23	0.002286	±2.5	PASS
EGPRS1900	512	VN	0	22.79	0.012320	±2.5	PASS
EGPRS1900	512	VN	10	10.88	0.005881	±2.5	PASS
EGPRS1900	512	VN	20	18.18	0.009824	±2.5	PASS
EGPRS1900	512	VN	30	8.27	0.004467	±2.5	PASS
EGPRS1900	512	VN	40	4.84	0.002617	±2.5	PASS



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EGPRS1900	512	VN	50	9.72	0.005252	±2.5	PASS
EGPRS1900	661	VN	-30	2.42	0.001288	±2.5	PASS
EGPRS1900	661	VN	-20	0.23	0.000120	±2.5	PASS
EGPRS1900	661	VN	-10	-10.30	-0.005478	±2.5	PASS
EGPRS1900	661	VN	0	-9.75	-0.005186	±2.5	PASS
EGPRS1900	661	VN	10	-8.59	-0.004568	±2.5	PASS
EGPRS1900	661	VN	20	6.81	0.003624	±2.5	PASS
EGPRS1900	661	VN	30	-9.94	-0.005289	±2.5	PASS
EGPRS1900	661	VN	40	-1.23	-0.000653	±2.5	PASS
EGPRS1900	661	VN	50	0.81	0.000429	±2.5	PASS
EGPRS1900	810	VN	-30	2.52	0.001319	±2.5	PASS
EGPRS1900	810	VN	-20	13.24	0.006931	±2.5	PASS
EGPRS1900	810	VN	-10	12.98	0.006796	±2.5	PASS
EGPRS1900	810	VN	0	13.50	0.007066	±2.5	PASS
EGPRS1900	810	VN	10	0.81	0.000423	±2.5	PASS
EGPRS1900	810	VN	20	-1.68	-0.000879	±2.5	PASS
EGPRS1900	810	VN	30	-0.84	-0.000440	±2.5	PASS
EGPRS1900	810	VN	40	7.30	0.003821	±2.5	PASS
EGPRS1900	810	VN	50	13.50	0.007066	±2.5	PASS

The End





Appendix B

LTE-NB1 Band 2



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1 Effective (Isotropic) Radiated Power Output Data

1.1 Test Result for LTE NB1 band 2

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	EIRP (dBm)	limit (dBm)	Verdict
NB1 Band 2	BPSK	3.75	18601	1T0	21.00	21.90	33.00	PASS
NB1 Band 2	BPSK	3.75	18900	1T0	20.84	21.74	33.00	PASS
NB1 Band 2	BPSK	3.75	19199	1T0	20.82	21.72	33.00	PASS
NB1 Band 2	QPSK	3.75	18601	1T0	21.00	21.90	33.00	PASS
NB1 Band 2	QPSK	3.75	18900	1T0	20.83	21.73	33.00	PASS
NB1 Band 2	QPSK	3.75	19199	1T0	20.78	21.68	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 2	BPSK	15	18601	1T0	20.24	21.14	33.00	PASS
NB1 Band 2	BPSK	15	18900	1T0	20.56	21.46	33.00	PASS
NB1 Band 2	BPSK	15	19199	1T0	21.00	21.90	33.00	PASS
NB1 Band 2	QPSK	15	18601	1T0	20.23	21.13	33.00	PASS
NB1 Band 2	QPSK	15	18601	12T0	20.11	21.01	33.00	PASS
NB1 Band 2	QPSK	15	18900	1T0	20.66	21.56	33.00	PASS
NB1 Band 2	QPSK	15	18900	12T0	20.82	21.72	33.00	PASS
NB1 Band 2	QPSK	15	19199	1T0	21.07	21.97	33.00	PASS
NB1 Band 2	QPSK	15	19199	12T0	20.22	21.12	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,

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

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



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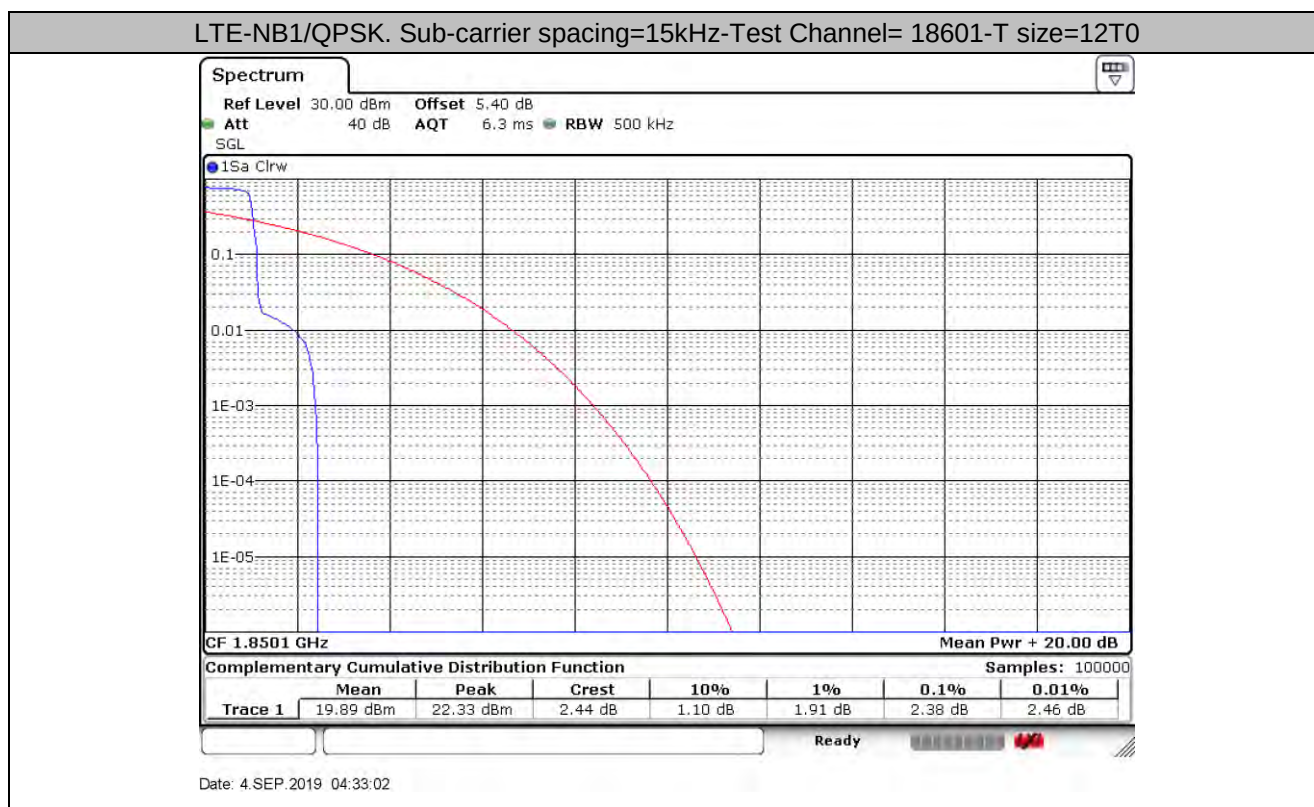


2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 2	QPSK/12T0	18601	2.38	13	PASS
NB1 Band 2	QPSK/12T0	18900	2.55	13	PASS
NB1 Band 2	QPSK/12T0	19199	1.62	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 2



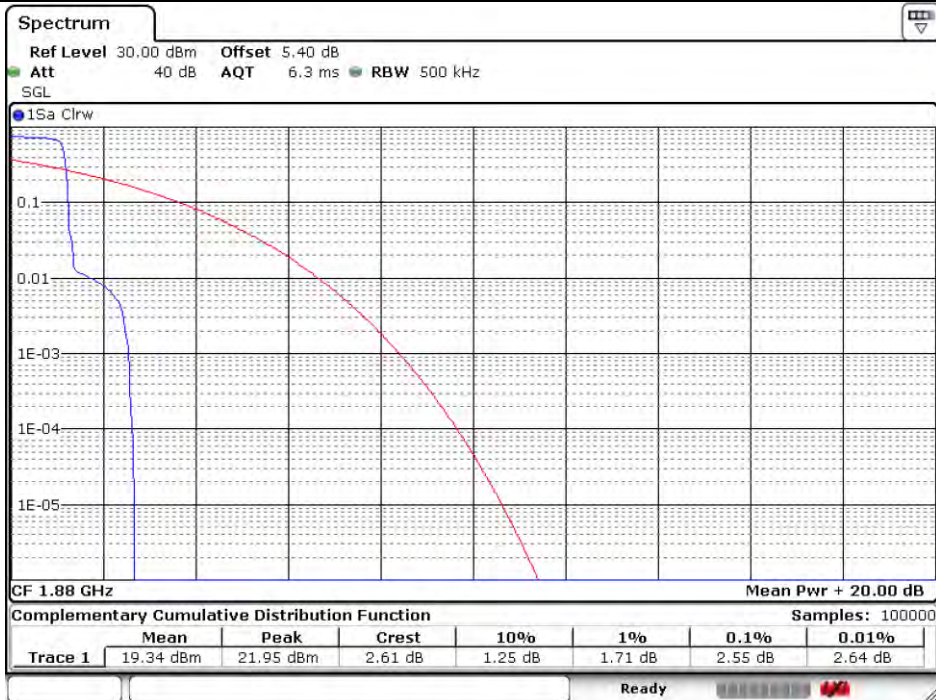
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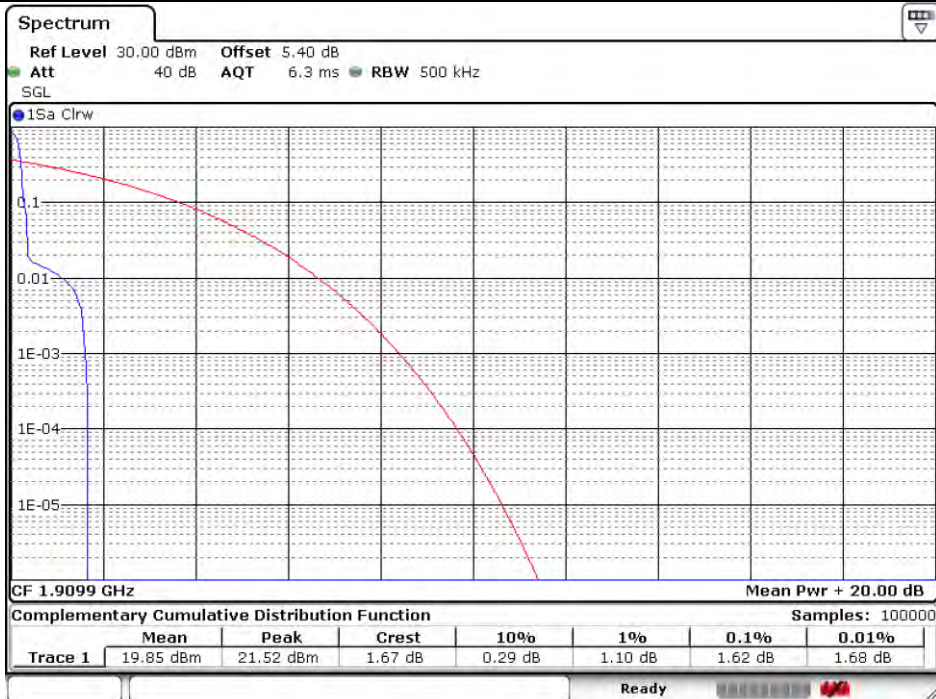


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 18900-T size=12T0



Date: 4.SEP.2019 04:29:44

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 19199-T size=12T0



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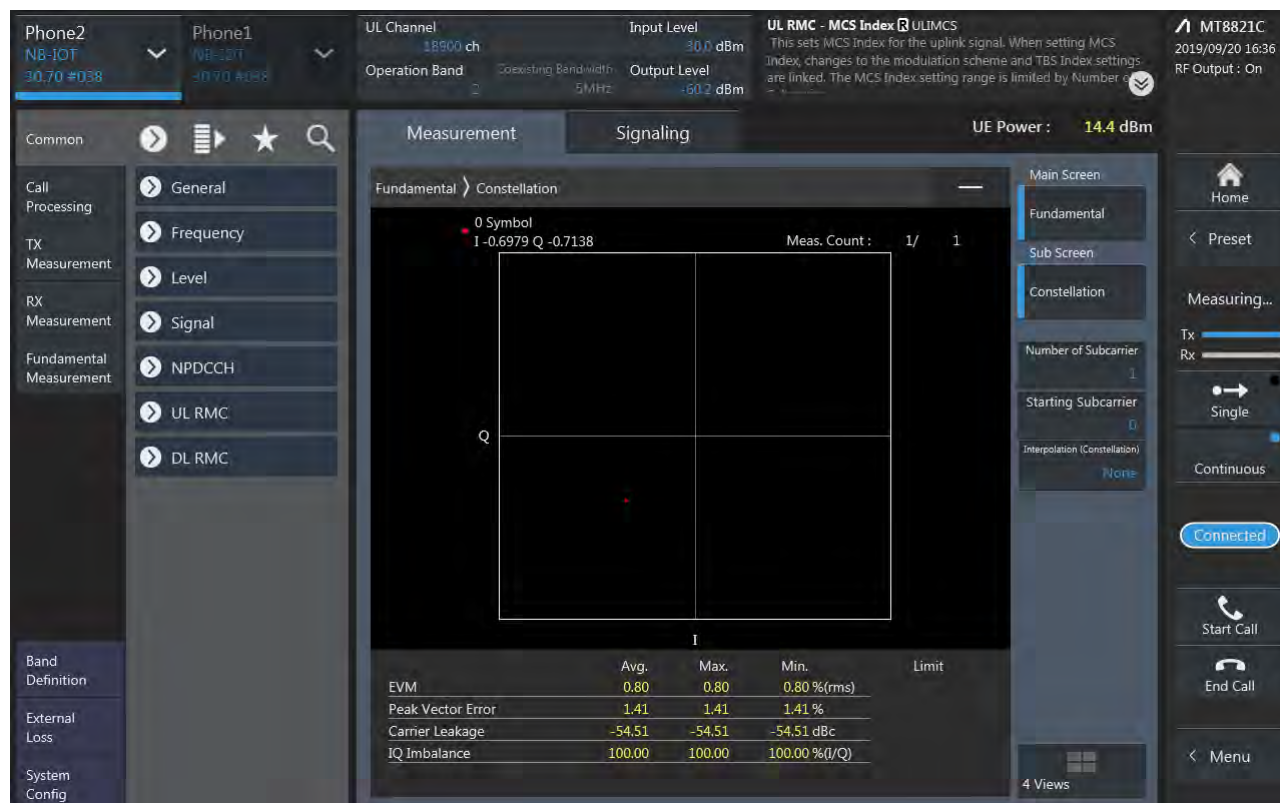
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 2

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

3.1.1.1.1 Test Channel = 18900



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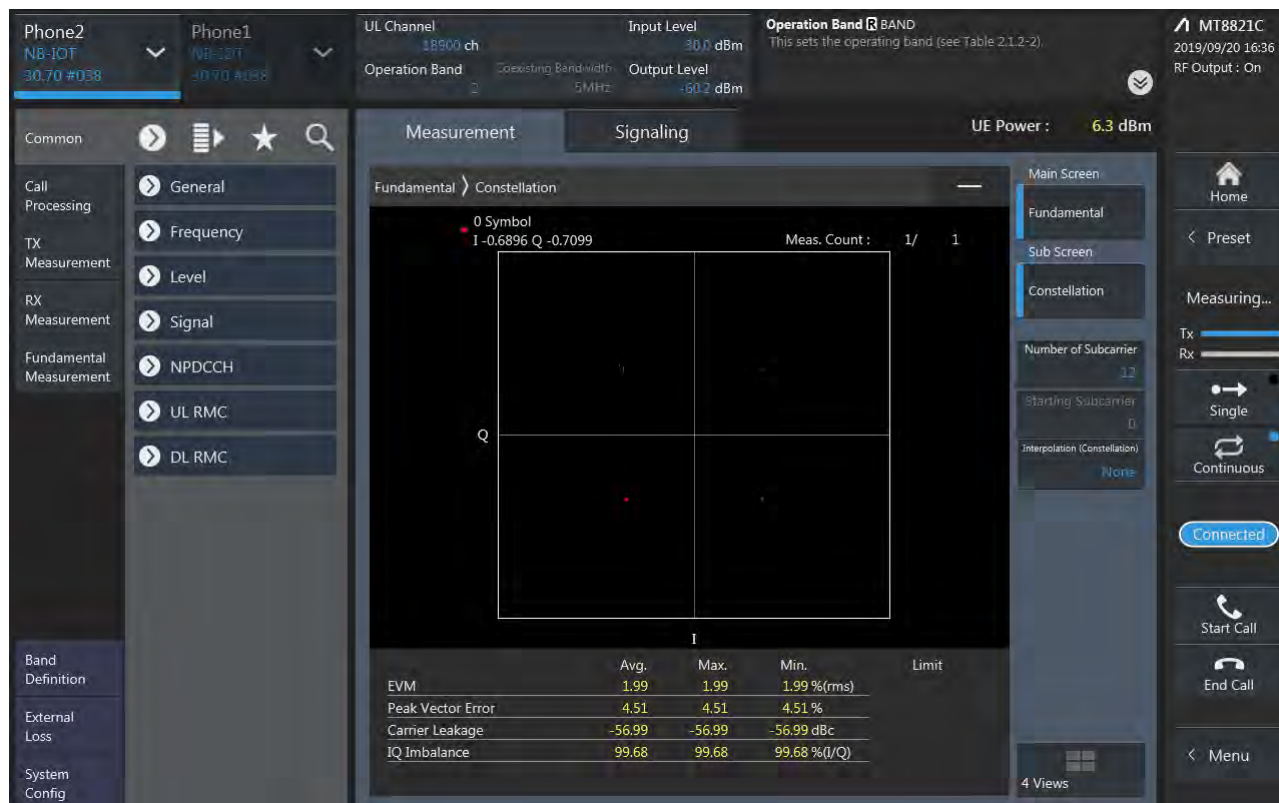
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3.1.1.1.2 Test Mode = LTE-NB1/QPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.2.1 Test Channel = 18900





4 26dB Bandwidth and Occupied Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 2	QPSK/15kHz	12T0	18601	187.02	245.59	PASS
NB1 Band 2	QPSK/15kHz	12T0	18900	187.02	242.93	PASS
NB1 Band 2	QPSK/15kHz	12T0	19199	187.02	244.93	PASS

4.1 For LTE-NB1

4.1.1 Test Band = LTE-NB1 Band 2

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 18601-T size=12T0



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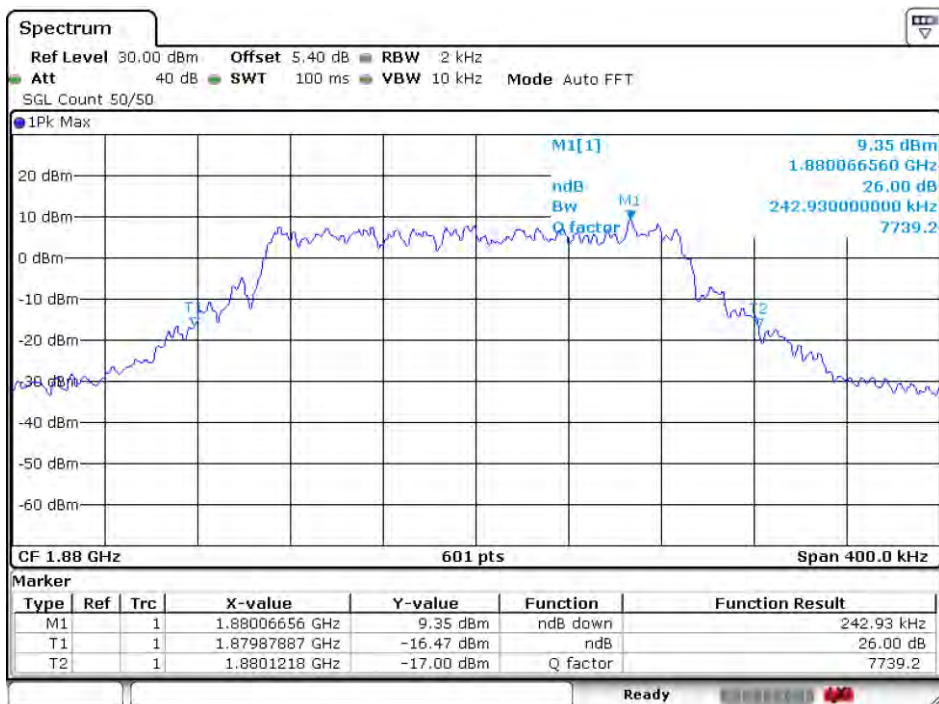
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 18900-T size=12T0



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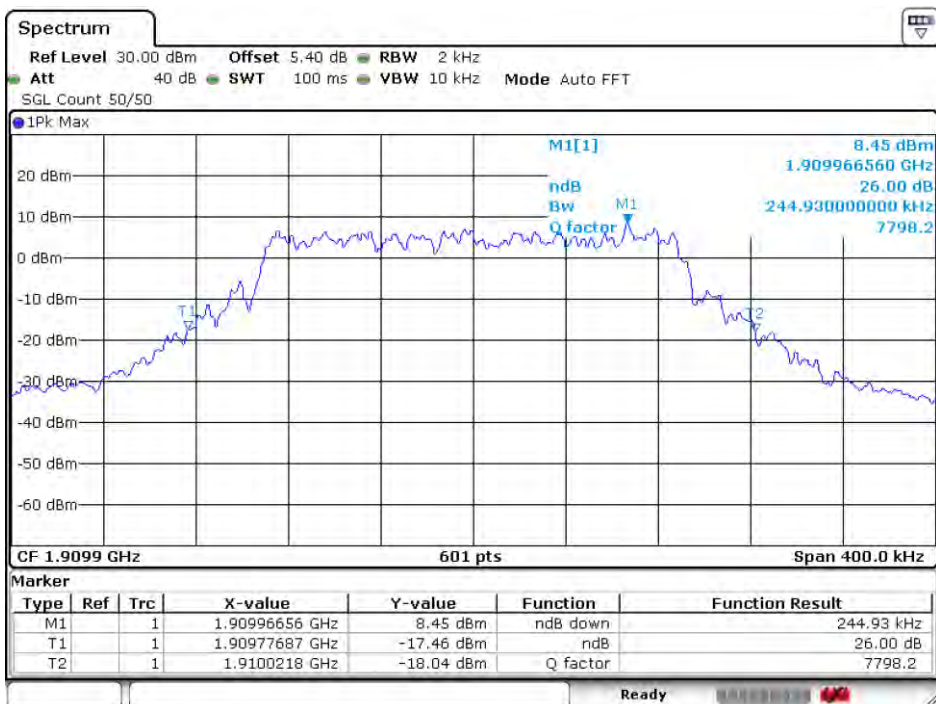
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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 19199-T size=12T0



Date: 4.SEP.2019 04:16:31



Date: 4.SEP.2019 04:17:37



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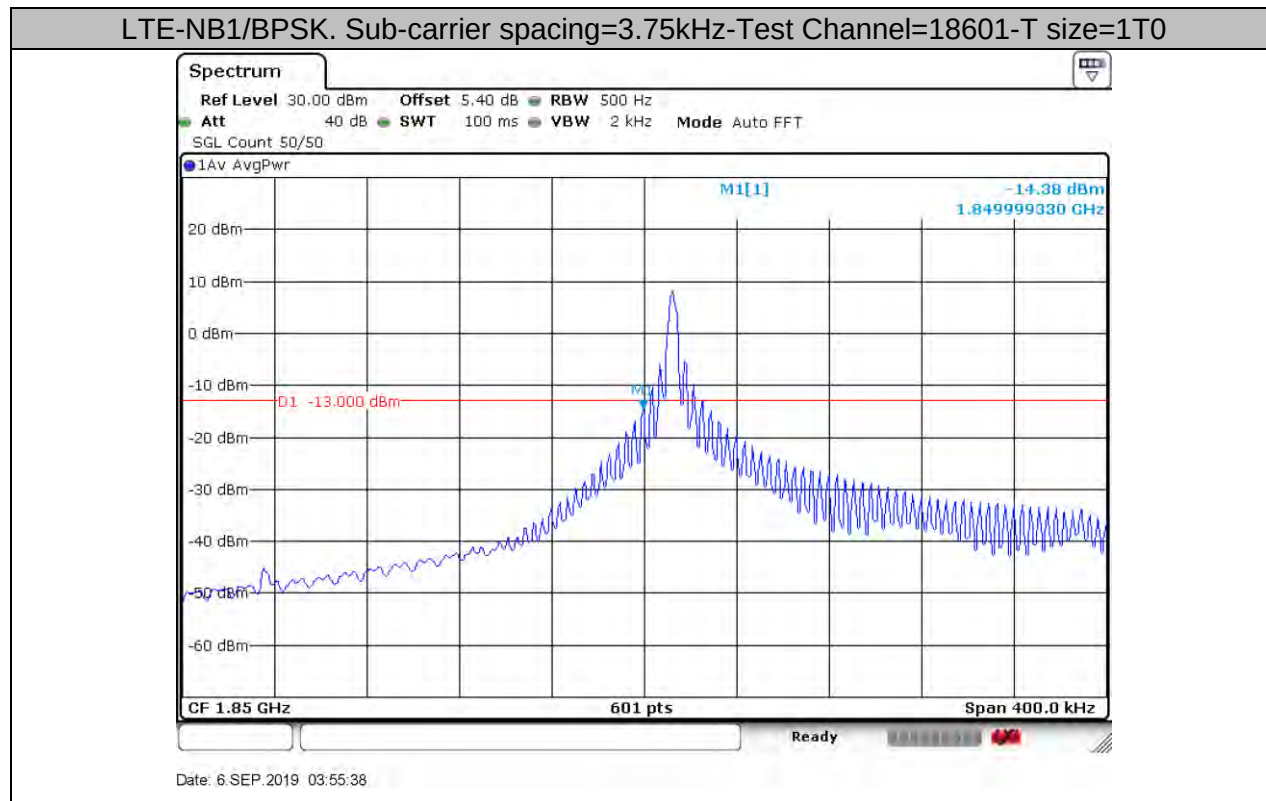
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5 Band Edges Compliance

5.1 For LTE-NB1

5.1.1 Test Band = LTE-NB1 Band 2



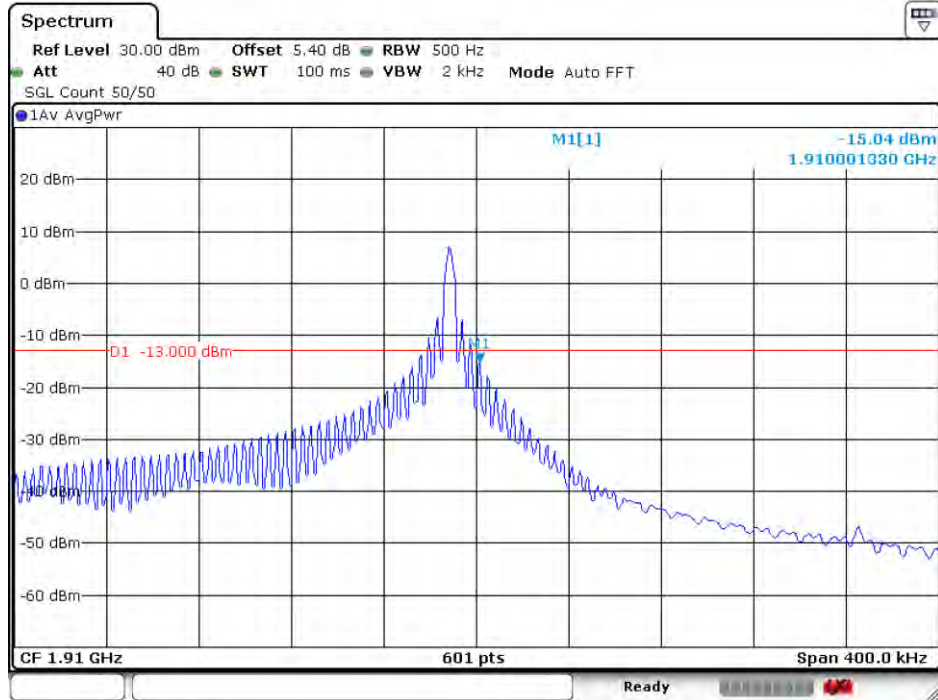
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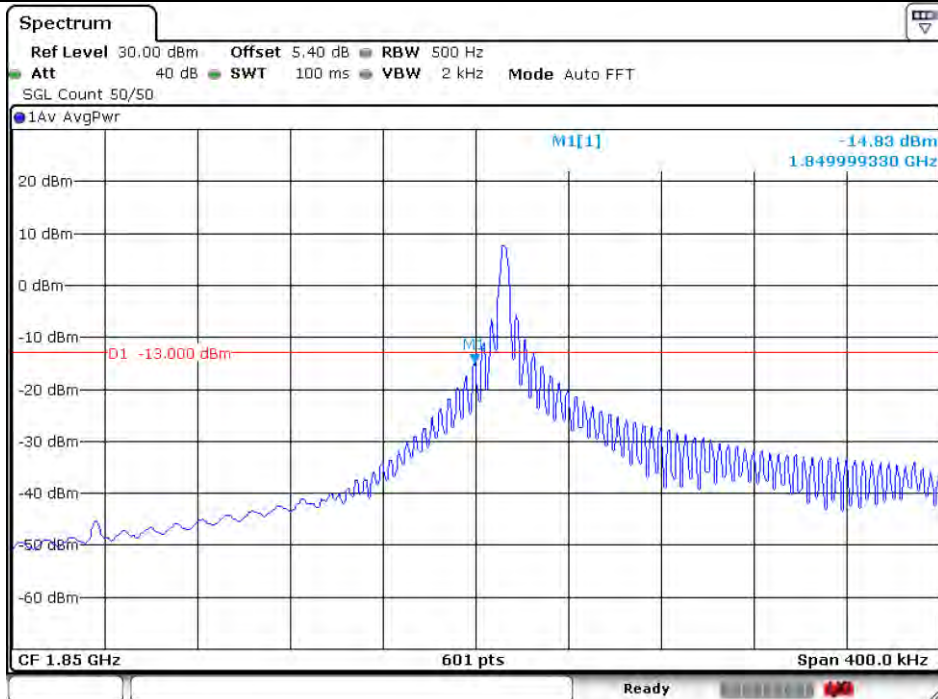
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=19199-T size=1T47



Date: 6.SEP.2019 04:04:13

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=18601-T size=1T0



Date: 6.SEP.2019 03:54:08



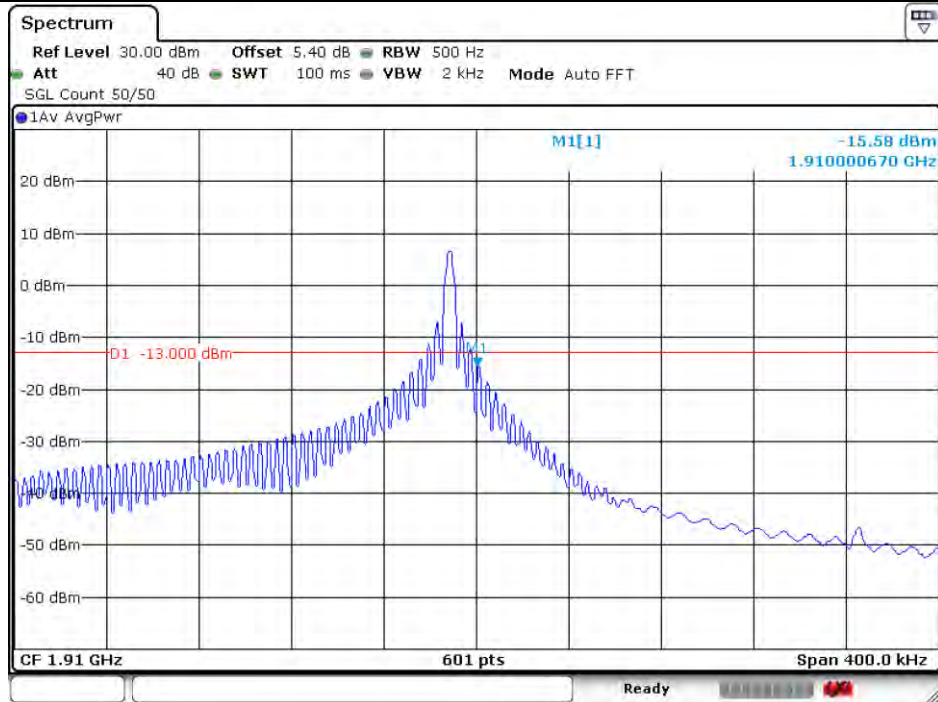
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=19199-T size=1T47



Date: 6.SEP.2019 04:03:47

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=18601-T size=1T0



Date: 6.SEP.2019 03:56:28



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LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=19199-T size=1T11



Date: 6.SEP.2019 04:02:19

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=18601-T size=1T0



Date: 6.SEP.2019 03:56:59



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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=18601-T size=12T0



Date: 6 SEP. 2019 03:57:38

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=19199-T size=1T11



Date: 6 SEP. 2019 04:00:21



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=19199-T size=12T0



Date: 6 SEP. 2019 03:59:19



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6 Spurious Emission at Antenna Terminal

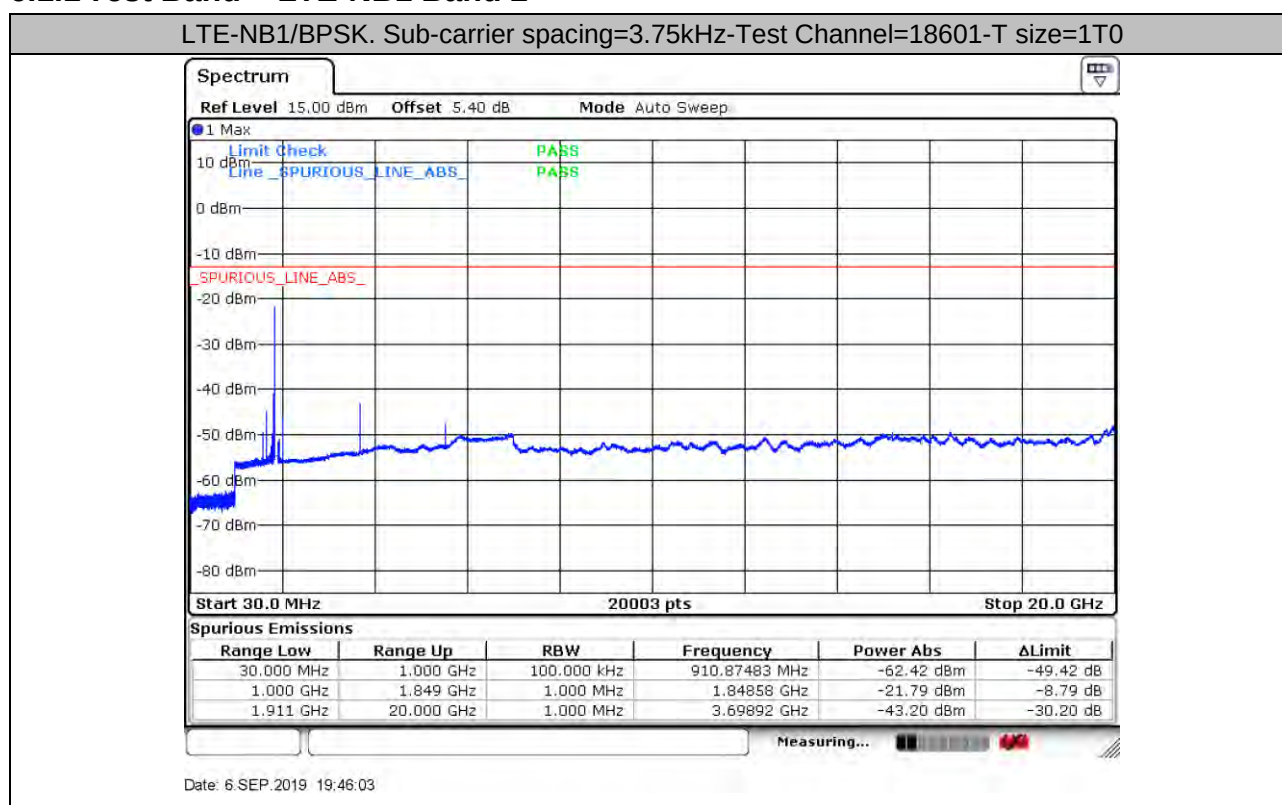
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k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



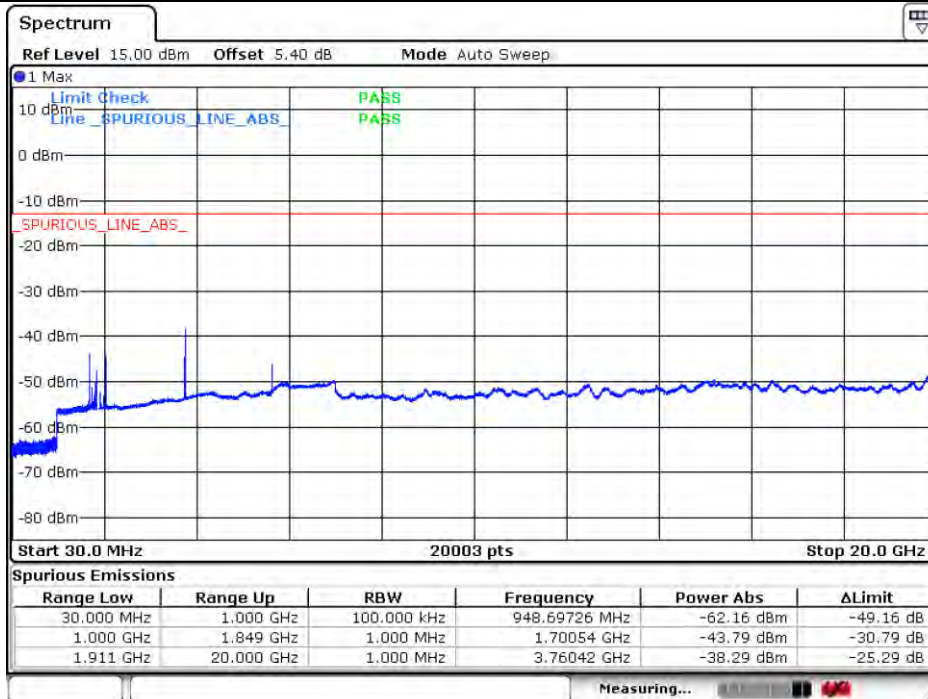
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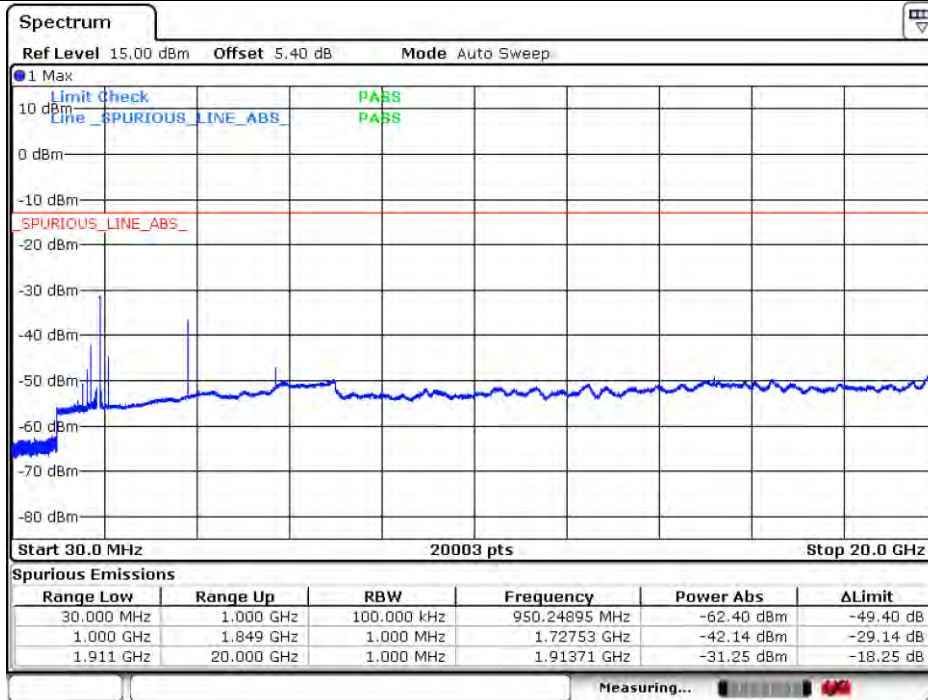
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=18900-T size=1T0



Date: 6 SEP. 2019 19:47:08

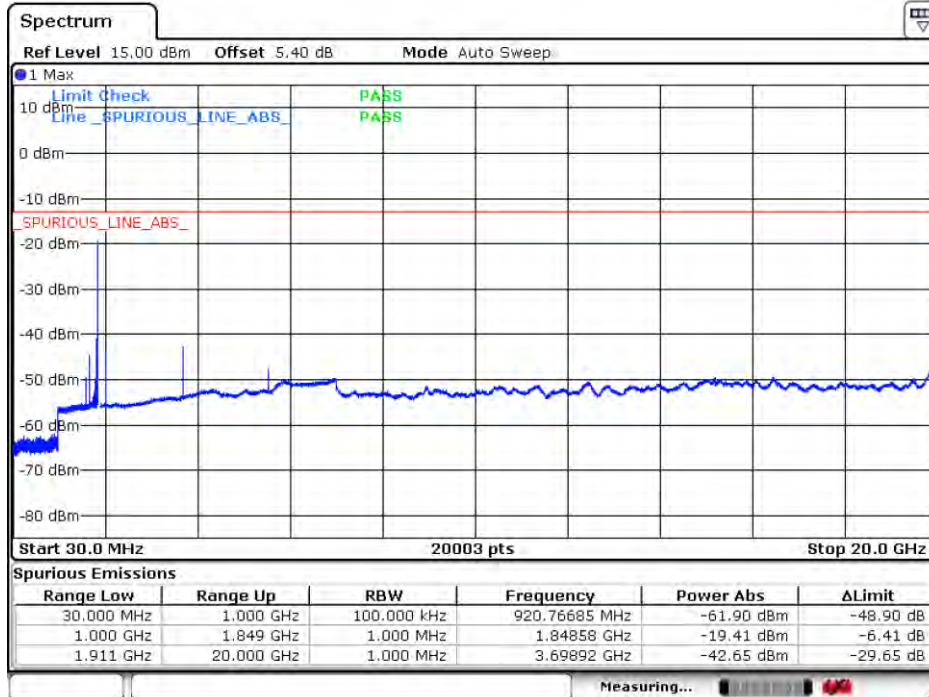
LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=19199-T size=1T0



Date: 6 SEP. 2019 19:53:06

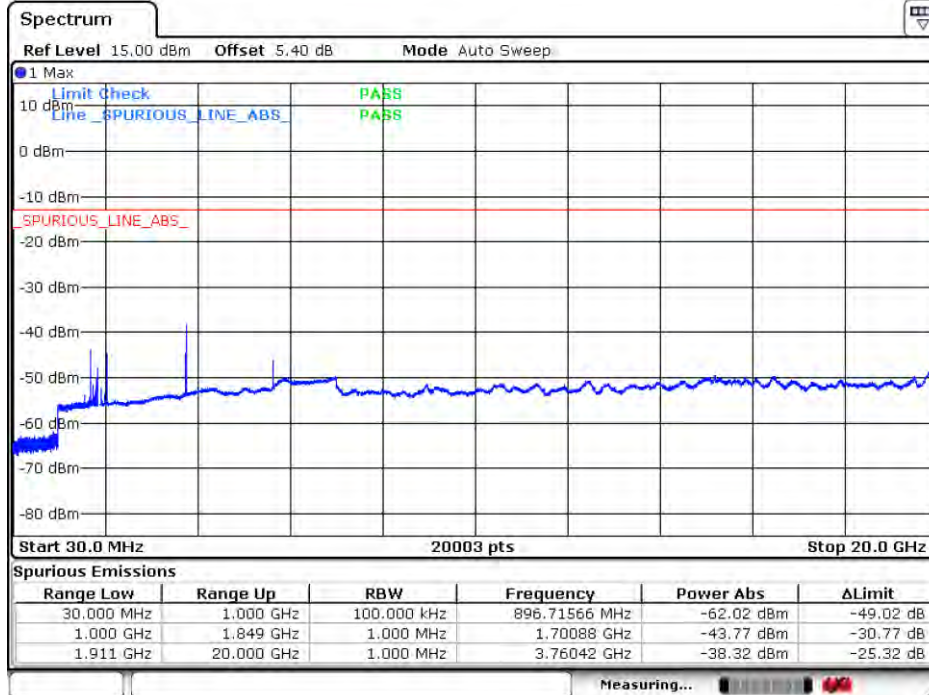


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=18601-T size=1T0



Date: 6 SEP. 2019 19:45:37

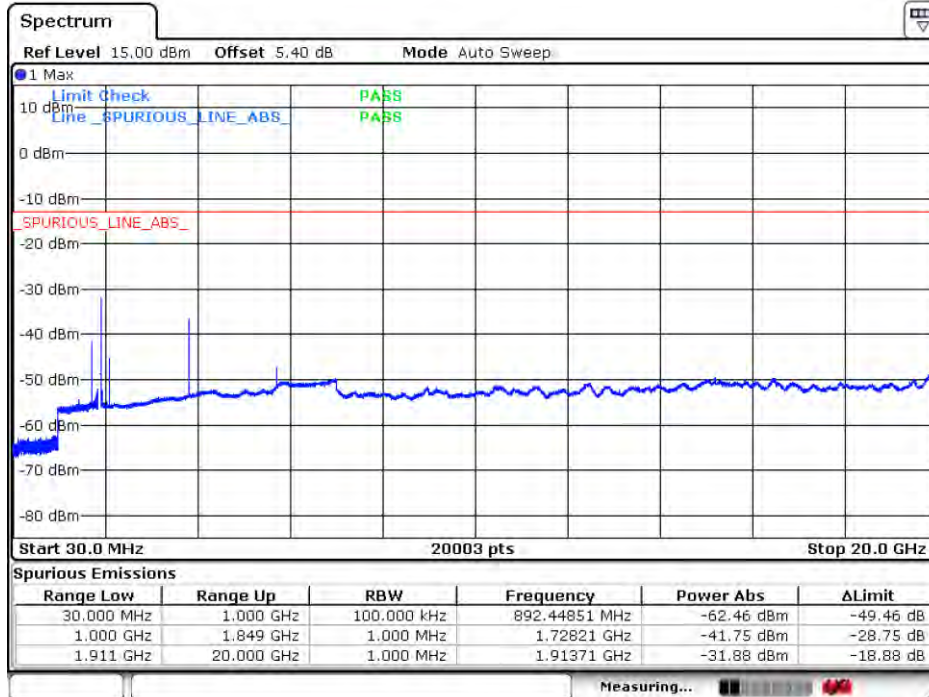
LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=18900-T size=1T0



Date: 6 SEP. 2019 19:47:37

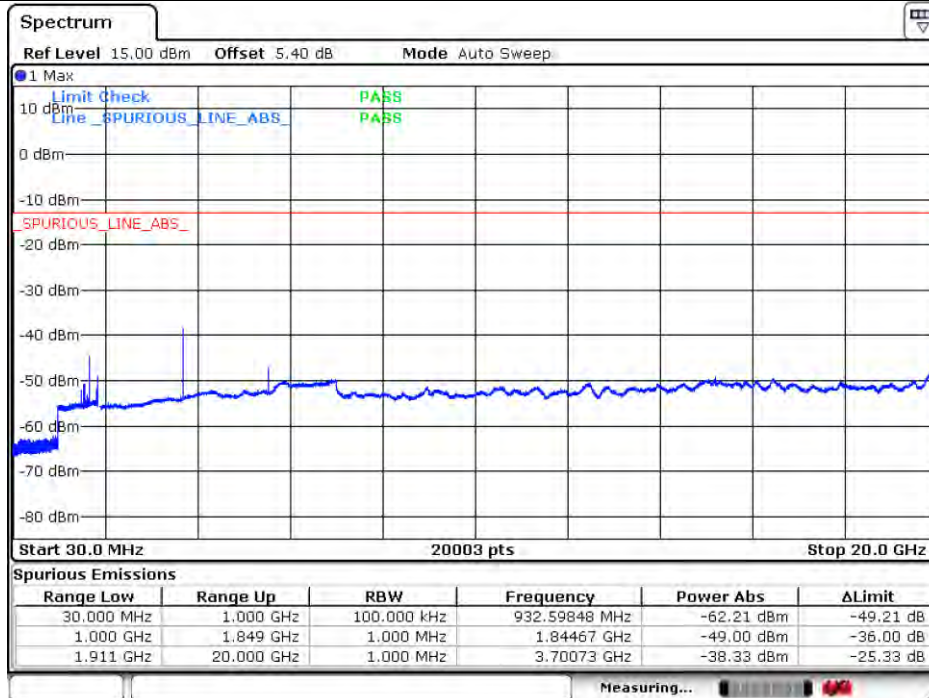


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=19199-T size=1T0



Date: 6 SEP. 2019 19:52:37

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=18601-T size=1T0



Date: 6 SEP. 2019 19:42:42



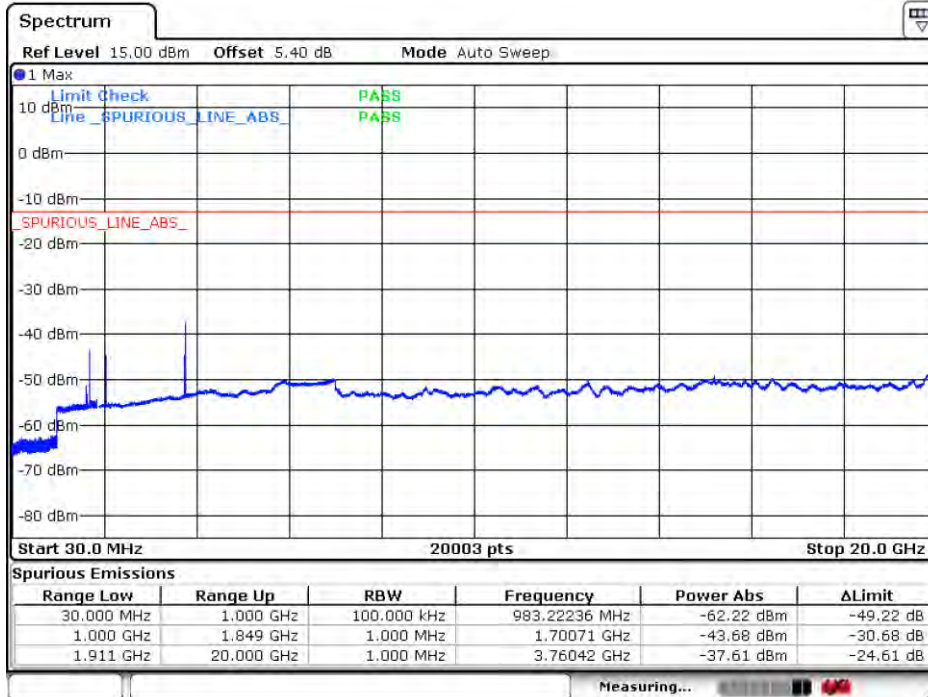
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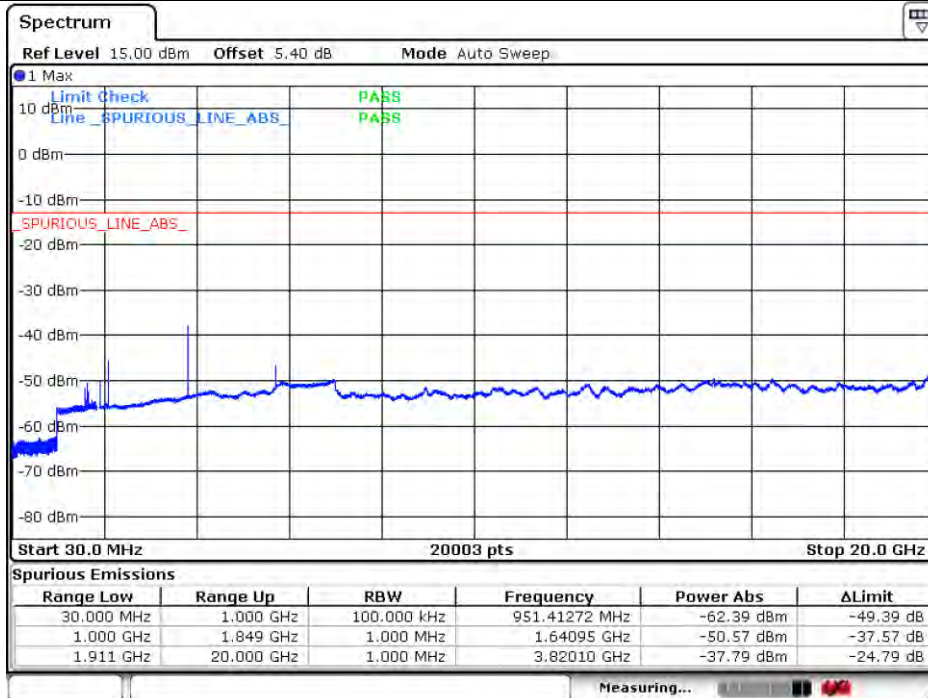
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LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=18900-T size=1T0



Date: 6 SEP. 2019 19:49:01

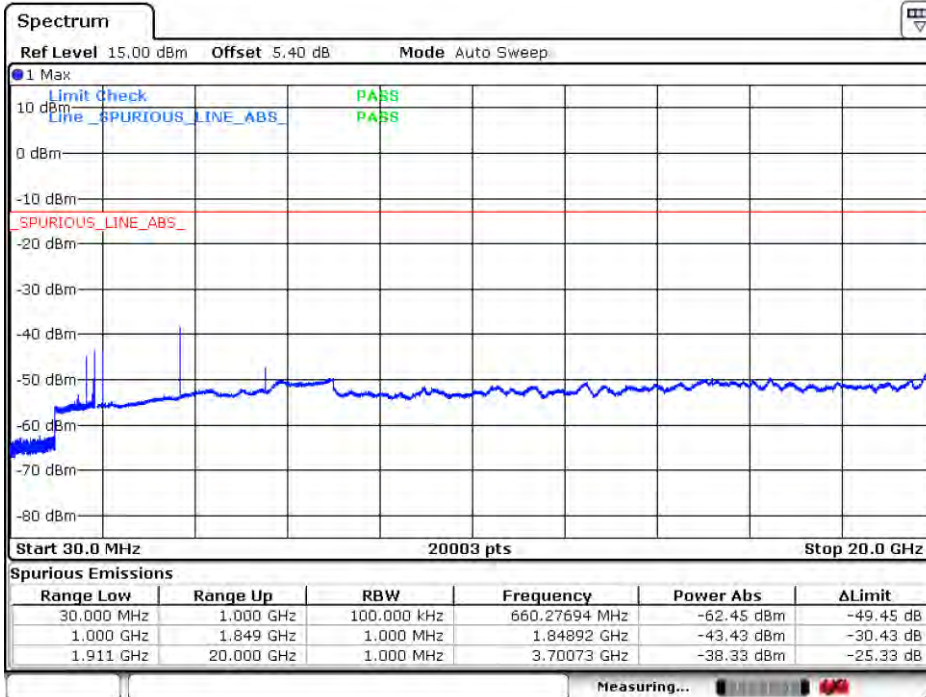
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Date: 6 SEP. 2019 19:50:55

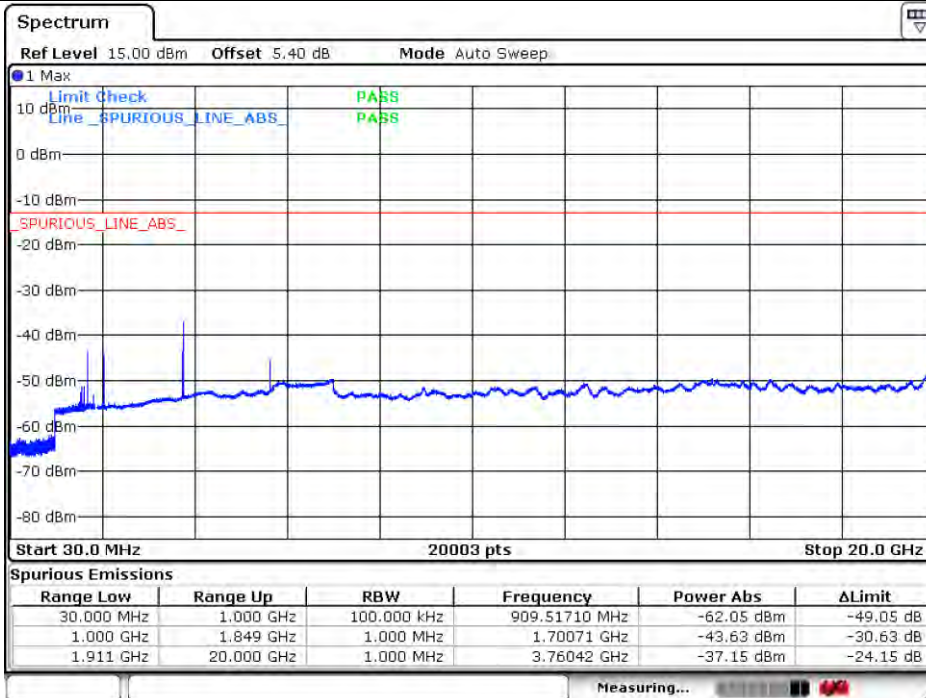


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=18601-T size=1T0



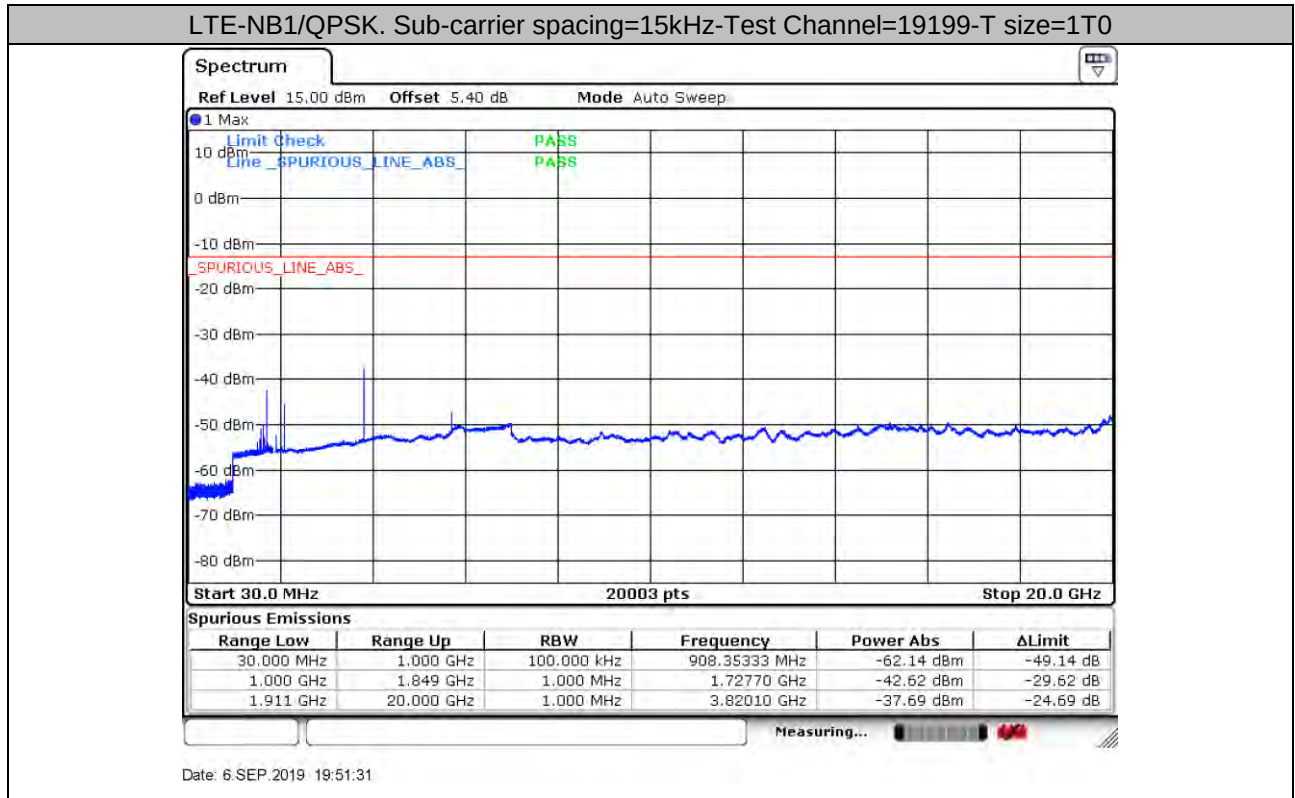
Date: 6 SEP. 2019 19:44:42

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=18900-T size=1T0



Date: 6 SEP. 2019 19:48:24







7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 2

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

7.1.1.1.1 Test Channel = 18601

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.0105	-65.55	-13.00	52.55	Vertical
755.7903	-61.76	-13.00	48.76	Vertical
2699.1398	-37.70	-13.00	24.70	Vertical
7365.6455	-53.52	-13.00	40.52	Vertical
14642.3881	-42.68	-13.00	29.68	Vertical
17985.9995	-32.93	-13.00	19.93	Vertical
40.1855	-64.38	-13.00	51.38	Horizontal
229.1510	-67.56	-13.00	54.56	Horizontal
2701.9404	-36.50	-13.00	23.50	Horizontal
3699.5233	-44.22	-13.00	31.22	Horizontal
16405.9469	-38.37	-13.00	25.37	Horizontal
17991.9997	-37.81	-13.00	24.81	Horizontal

7.1.1.1.2 Test Channel = 18900

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.5440	-65.51	-13.00	52.51	Vertical
865.2603	-61.17	-13.00	48.17	Vertical
2699.9400	-37.53	-13.00	24.53	Vertical
3760.0253	-54.69	-13.00	41.69	Vertical
14669.8890	-42.77	-13.00	29.77	Vertical
17999.5000	-33.29	-13.00	20.29	Vertical
42.3681	-62.83	-13.00	49.83	Horizontal
824.0332	-61.74	-13.00	48.74	Horizontal
2703.5407	-36.47	-13.00	23.47	Horizontal
3760.0253	-37.53	-13.00	24.53	Horizontal
5639.5880	-50.00	-13.00	37.00	Horizontal
17899.4967	-39.92	-13.00	26.92	Horizontal



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7.1.1.1.3 Test Channel = 19199

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.7865	-65.39	-13.00	52.39	Vertical
848.4784	-61.93	-13.00	48.93	Vertical
2700.3401	-37.73	-13.00	24.73	Vertical
3819.0273	-55.99	-13.00	42.99	Vertical
14696.3899	-43.34	-13.00	30.34	Vertical
17991.9997	-34.96	-13.00	21.96	Vertical
41.2526	-64.72	-13.00	51.72	Horizontal
228.6174	-67.93	-13.00	54.93	Horizontal
2699.9400	-36.45	-13.00	23.45	Horizontal
3819.0273	-39.12	-13.00	26.12	Horizontal
5729.0910	-48.39	-13.00	35.39	Horizontal
16361.4454	-40.50	-13.00	27.50	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.



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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 2	180KHz	BPSK/15KHz	18601	12T0	VL	TN	6.39	0.00345	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	VN	TN	5.90	0.00319	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	VH	TN	-3.97	-0.00215	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	VL	TN	2.42	0.00129	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	VN	TN	6.95	0.00370	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	VH	TN	-7.43	-0.00395	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	VL	TN	-8.80	-0.00461	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	VN	TN	8.32	0.00436	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	VH	TN	6.55	0.00343	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	VL	TN	8.71	0.00471	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	VN	TN	-1.74	-0.00094	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	VH	TN	2.99	0.00161	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	VL	TN	2.75	0.00146	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	VN	TN	8.83	0.00470	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	VH	TN	-0.22	-0.00012	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	VL	TN	5.46	0.00286	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	VN	TN	5.14	0.00269	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	VH	TN	-2.65	-0.00139	±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 2	180KHz	BPSK/15KHz	18601	12T0	NV	-30	-3.93	-0.00213	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	-20	5.17	0.00279	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	0	8.46	0.00457	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	10	-6.67	-0.00361	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	20	-3.96	-0.00214	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	30	7.40	0.00400	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	40	-9.48	-0.00512	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18601	12T0	NV	50	-3.53	-0.00191	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	-30	-9.05	-0.00489	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	-20	-2.18	-0.00116	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	0	8.20	0.00436	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	10	-5.67	-0.00301	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	20	-6.25	-0.00332	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	30	-2.95	-0.00157	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	40	7.69	0.00409	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	18900	12T0	NV	50	-6.59	-0.00351	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	-30	5.31	0.00283	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	-20	8.70	0.00463	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	0	1.51	0.00079	±2.5	PASS



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NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	10	7.12	0.00373	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	20	5.97	0.00313	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	30	6.98	0.00366	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	40	3.71	0.00194	±2.5	PASS
NB1 Band 2	180KHz	BPSK/15KHz	19199	12T0	NV	50	5.83	0.00305	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	-30	6.97	0.00365	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	-20	-4.23	-0.00221	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	0	5.86	0.00307	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	10	-3.93	-0.00213	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	20	5.17	0.00279	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	30	8.46	0.00457	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	40	-6.67	-0.00361	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18601	12T0	NV	50	-3.96	-0.00214	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	-30	7.40	0.00400	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	-20	-9.48	-0.00512	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	0	-3.53	-0.00191	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	10	-9.05	-0.00489	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	20	-2.18	-0.00116	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	30	8.20	0.00436	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	40	-5.67	-0.00301	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	18900	12T0	NV	50	-6.25	-0.00332	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	-30	-2.95	-0.00157	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	-20	7.69	0.00409	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	0	-6.59	-0.00351	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	10	5.31	0.00283	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	20	8.70	0.00463	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	30	1.51	0.00079	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	40	7.12	0.00373	±2.5	PASS
NB1 Band 2	180KHz	QPSK/15KHz	19199	12T0	NV	50	5.97	0.00313	±2.5	PASS

The End



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Appendix B

LTE-NB1 Band 4



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1 Effective (Isotropic) Radiated Power Output Data

1.1 Test Result for LTE NB1 Band 4

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	EIRP (dBm)	limit (dBm)	Verdict
NB1 Band 4	BPSK	3.75	19951	1T0	20.48	22.08	30.00	PASS
NB1 Band 4	BPSK	3.75	20175	1T0	20.46	22.06	30.00	PASS
NB1 Band 4	BPSK	3.75	20399	1T0	20.61	22.21	30.00	PASS
NB1 Band 4	QPSK	3.75	19951	1T0	20.51	22.11	30.00	PASS
NB1 Band 4	QPSK	3.75	20175	1T0	20.52	22.12	30.00	PASS
NB1 Band 4	QPSK	3.75	20399	1T0	20.55	22.15	30.00	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Conducted Power (dBm)	EIRP (dBm)	limit (dBm)	Verdict
NB1 Band 4	BPSK	15	19951	1T0	20.21	21.81	30.00	PASS
NB1 Band 4	BPSK	15	20175	1T0	20.87	22.47	30.00	PASS
NB1 Band 4	BPSK	15	20399	1T0	20.47	22.07	30.00	PASS
NB1 Band 4	QPSK	15	19951	1T0	20.19	21.79	30.00	PASS
NB1 Band 4	QPSK	15	19951	12T0	20.28	21.88	30.00	PASS
NB1 Band 4	QPSK	15	20175	1T0	20.80	22.40	30.00	PASS
NB1 Band 4	QPSK	15	20175	12T0	20.28	21.88	30.00	PASS
NB1 Band 4	QPSK	15	20399	1T0	20.48	22.08	30.00	PASS
NB1 Band 4	QPSK	15	20399	12T0	20.26	21.88	30.00	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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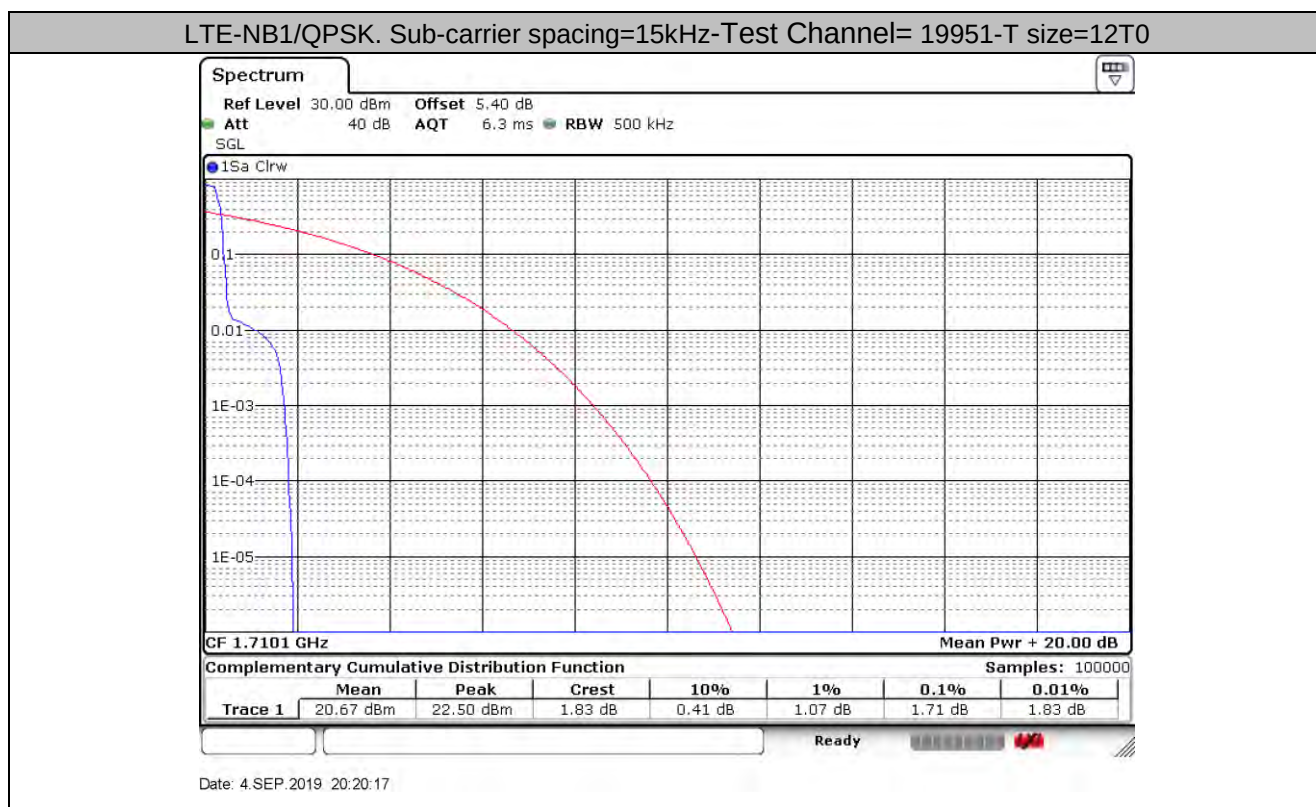


2 Peak-to-Average Ratio

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
NB1 Band 4	QPSK/12T0	19951	1.71	13	PASS
NB1 Band 4	QPSK/12T0	20175	1.62	13	PASS
NB1 Band 4	QPSK/12T0	20399	2.55	13	PASS

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 Band 4



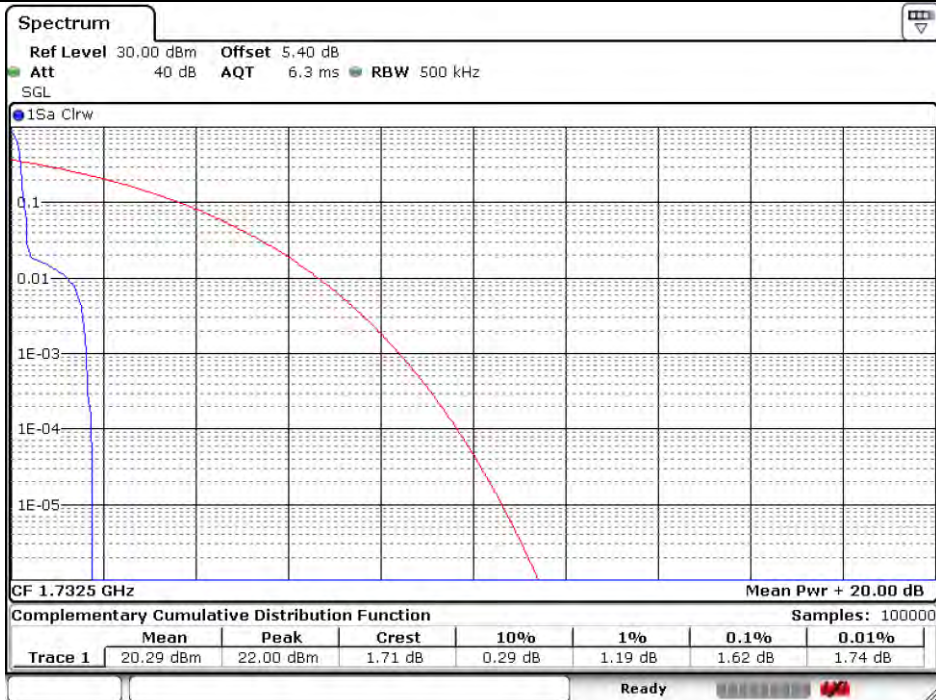
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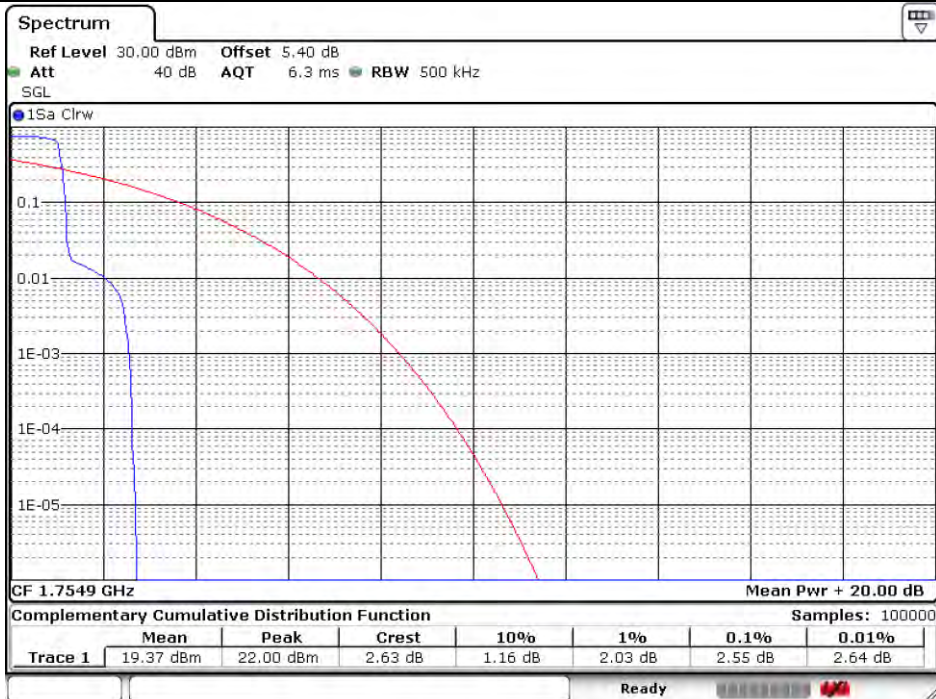


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20175-T size=12T0



Date: 4.SEP.2019 05:20:26

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20399-T size=12T0



Date: 4.SEP.2019 20:17:31



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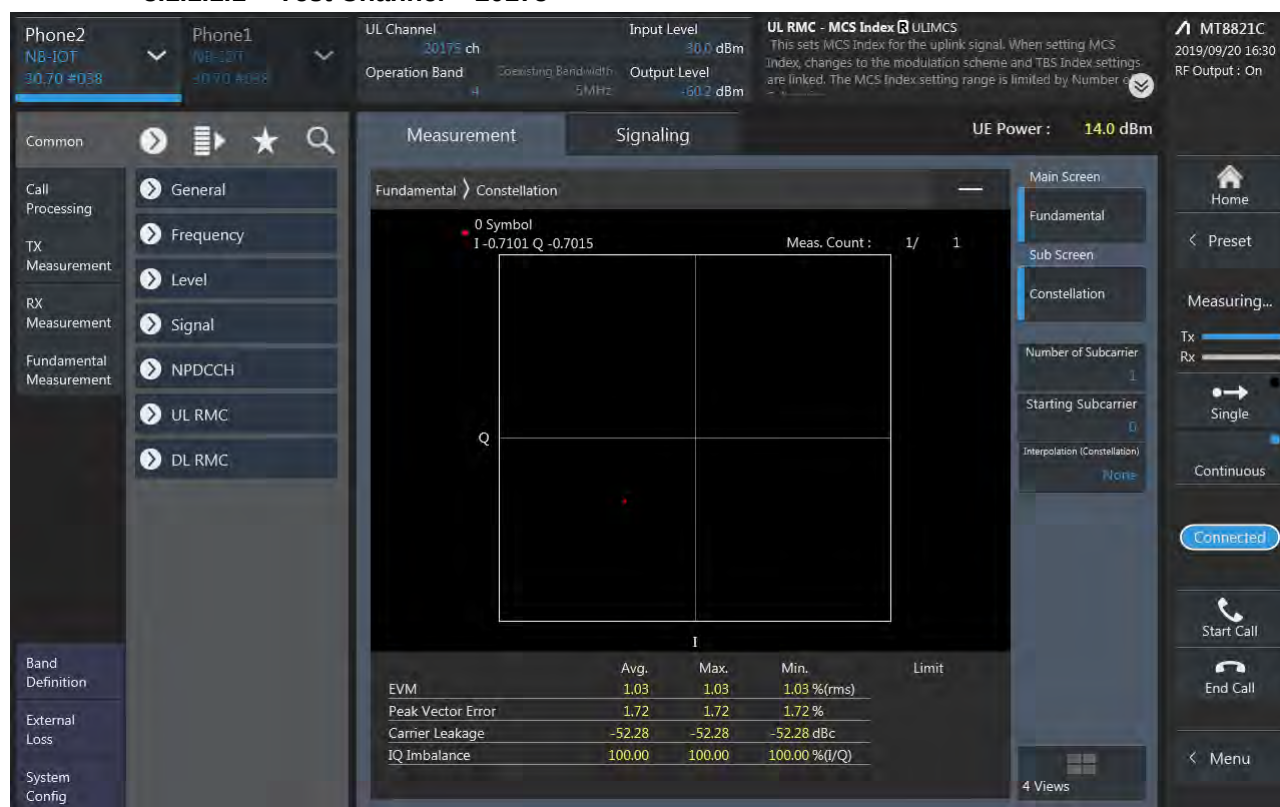
3 Modulation Characteristics

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 Band 4

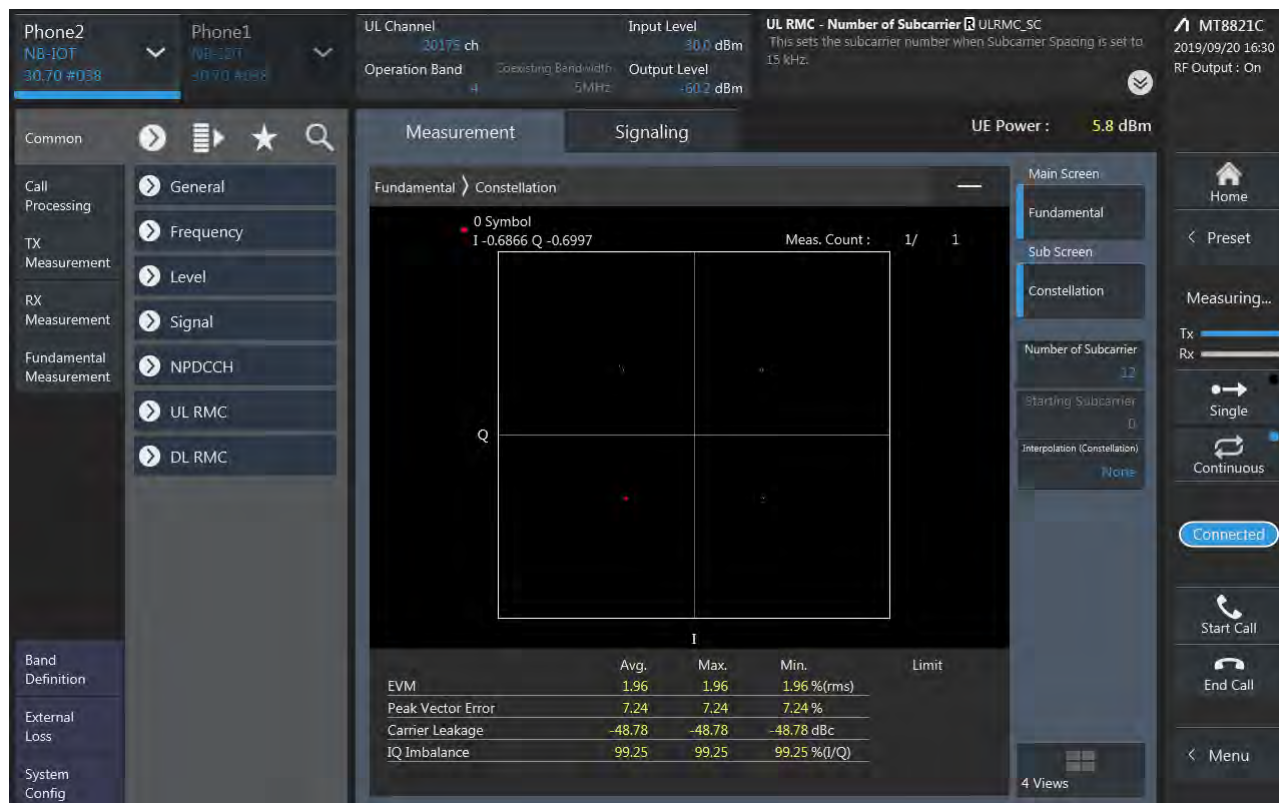
3.1.1.1 Test Mode = LTE-NB1/BPSK. Sub-carrier spacing=15kHz.T size=12T0

3.1.1.1.1 Test Channel = 20175



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

3.1.1.2.1 Test Channel = 20175



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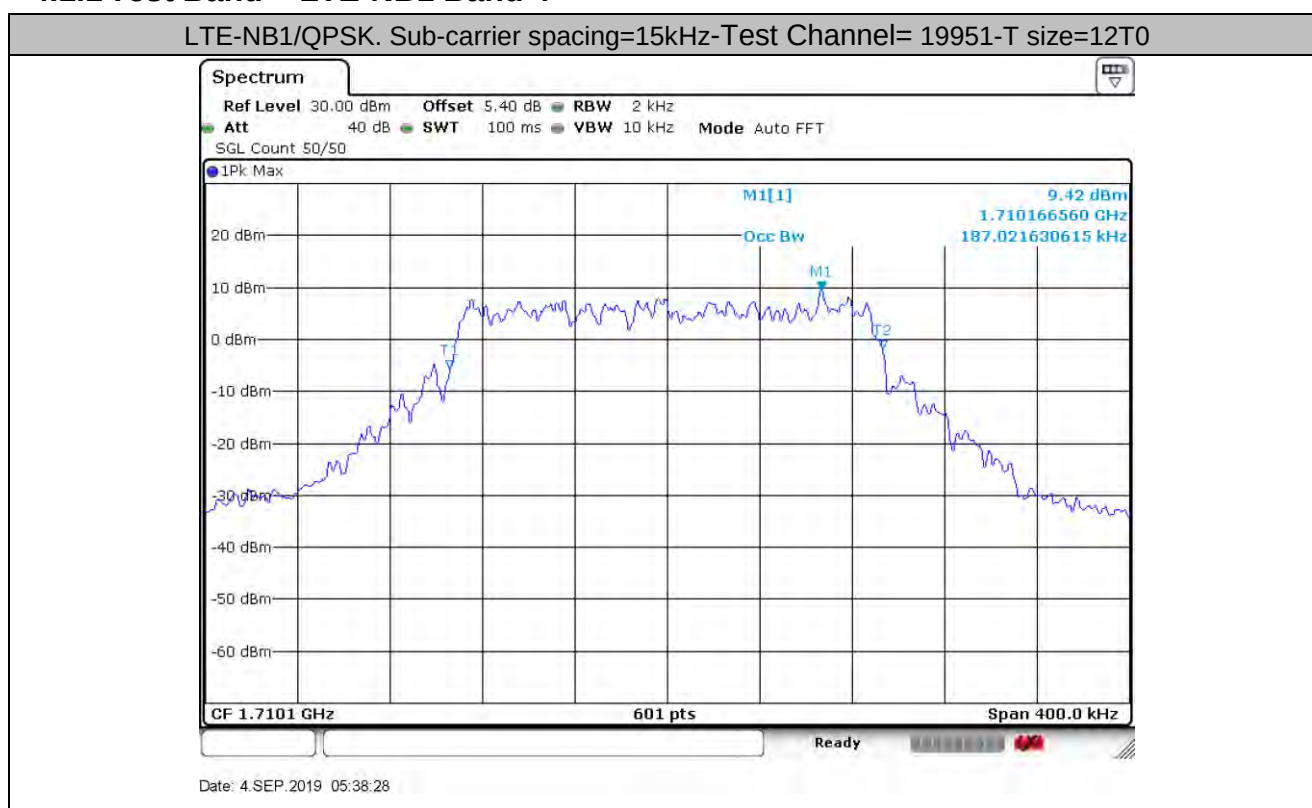


4 26dB Bandwidth and Occupied Bandwidth

Test Band	Test Mode	T size	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
NB1 Band 4	QPSK/15kHz	12T0	19951	187.02	242.93	PASS
NB1 Band 4	QPSK/15kHz	12T0	20175	187.02	242.93	PASS
NB1 Band 4	QPSK/15kHz	12T0	20399	187.02	243.76	PASS

4.1 For LTE-NB1

4.1.1 Test Band = LTE-NB1 Band 4



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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20175-T size=12T0



Date: 4.SEP.2019 05:22:30



Date: 4.SEP.2019 05:28:44



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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel= 20399-T size=12T0



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Date: 4.SEP.2019 20:16:47



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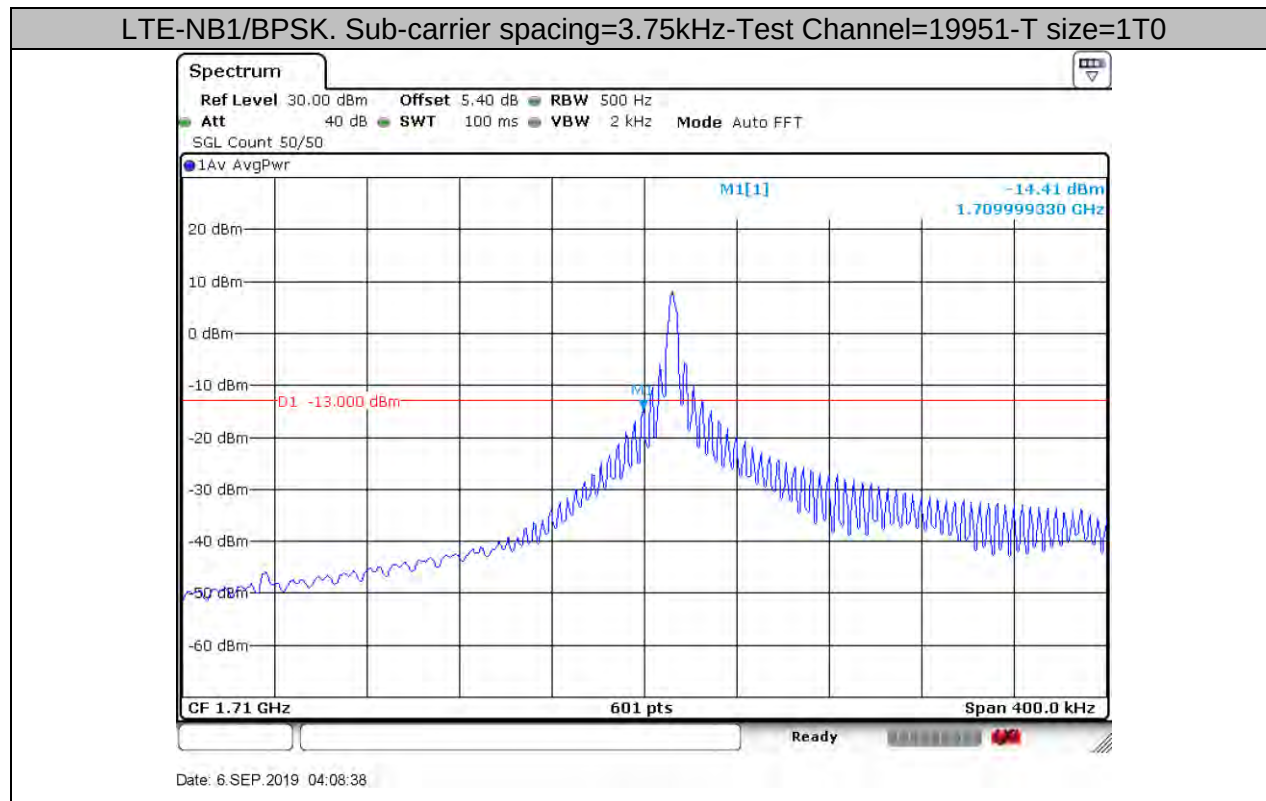
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5 Band Edges Compliance

5.1 For LTE-NB1

5.1.1 Test Band = LTE-NB1 Band 4



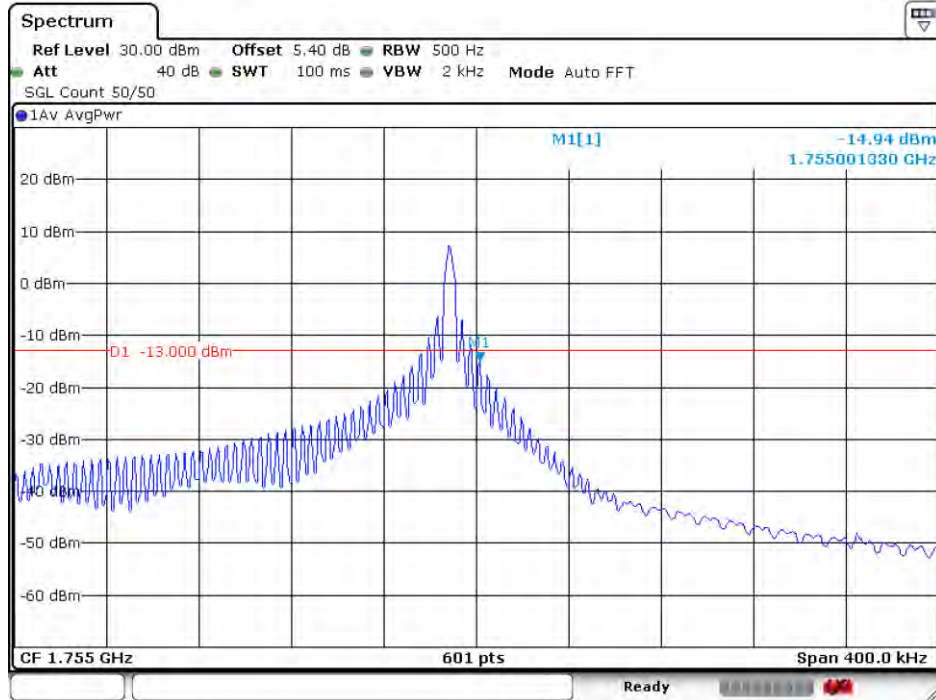
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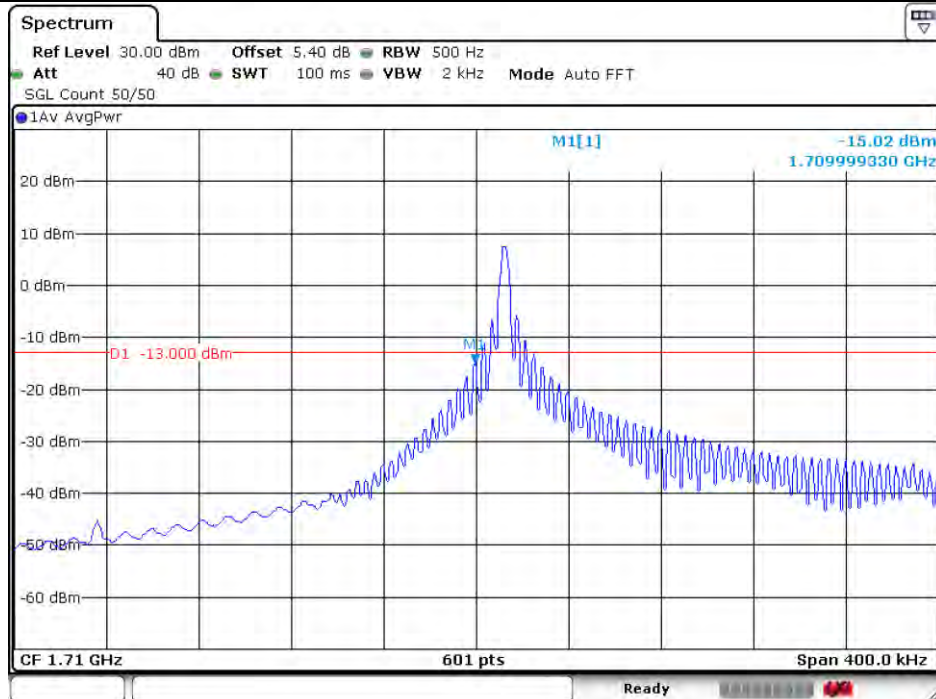
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20399-T size=1T47



Date: 6.SEP.2019 04:16:35

LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=19951-T size=1T0



Date: 6.SEP.2019 04:09:14



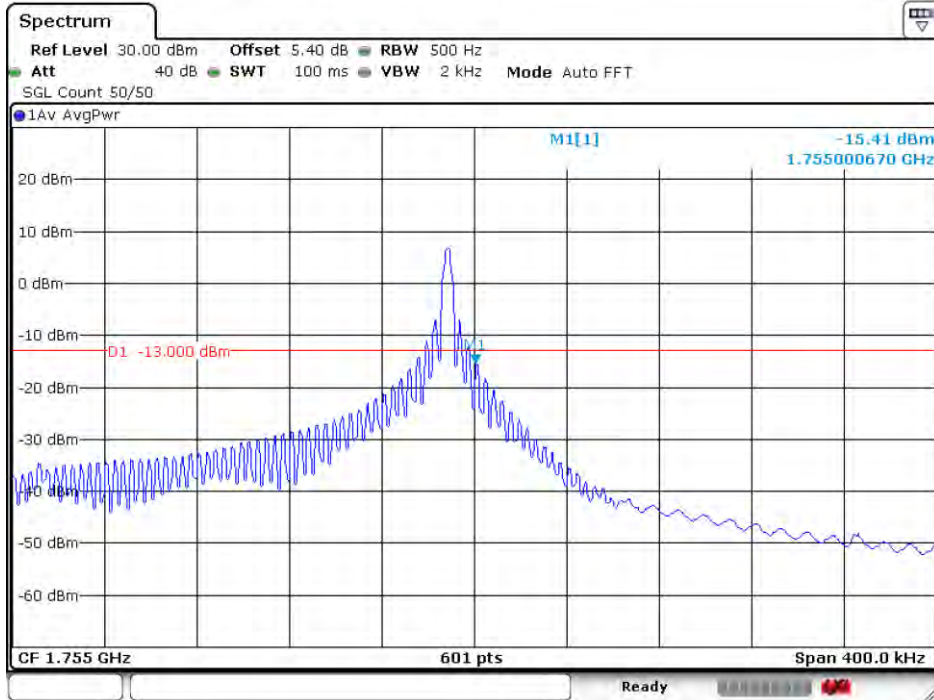
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LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20399-T size=1T47



Date: 6.SEP.2019 04:15:50

LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=19951-T size=1T0



Date: 6.SEP.2019 04:10:27



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Date: 6.SEP.2019 04:14:40

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=19951-T size=1T0



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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=19951-T size=12T0



Date: 6 SEP. 2019 04:11:27

LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20399-T size=1T11



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LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20399-T size=12T0



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6 Spurious Emission at Antenna Terminal

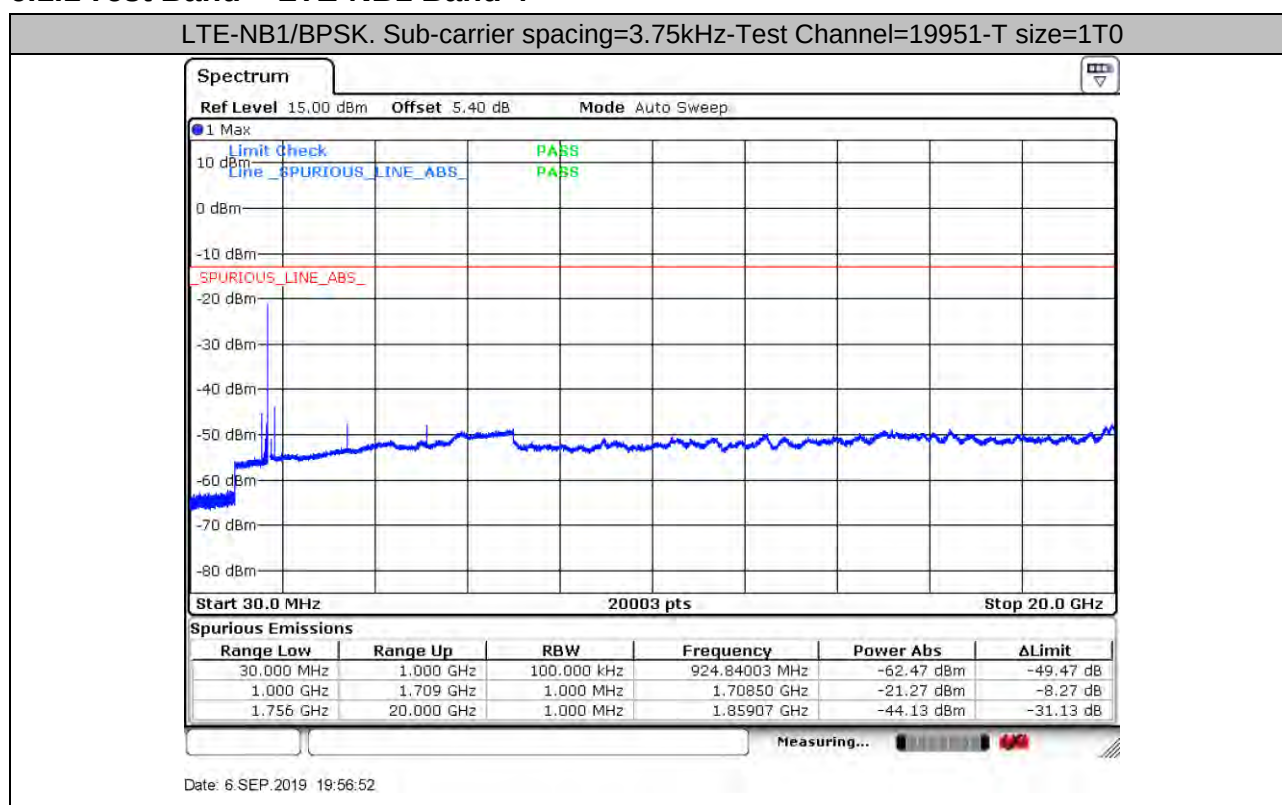
NOTE1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " 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 4



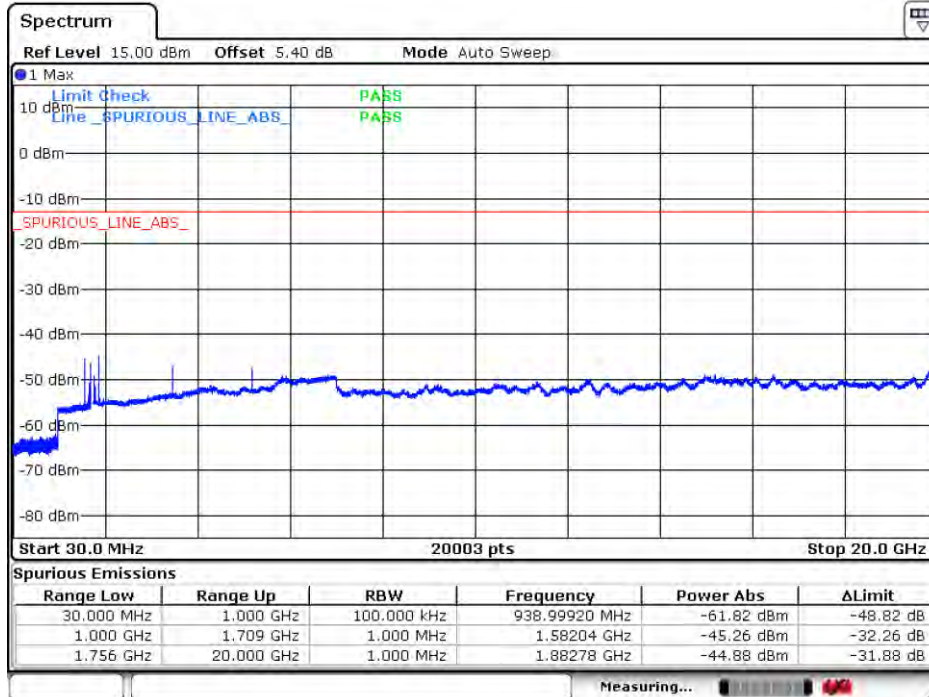
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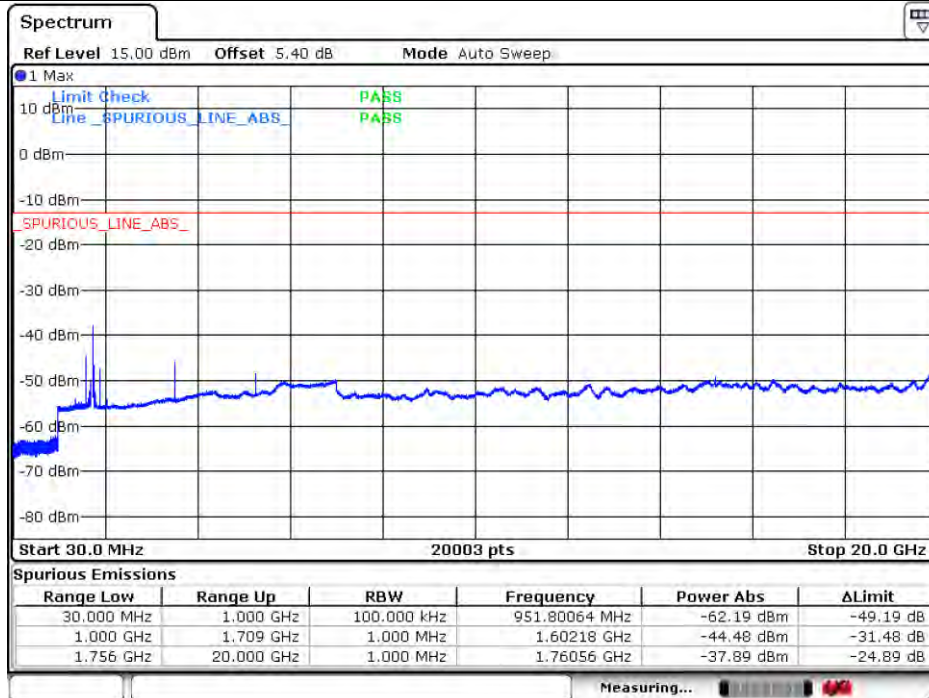
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LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20175-T size=1T0



Date: 6 SEP. 2019 20:10:10

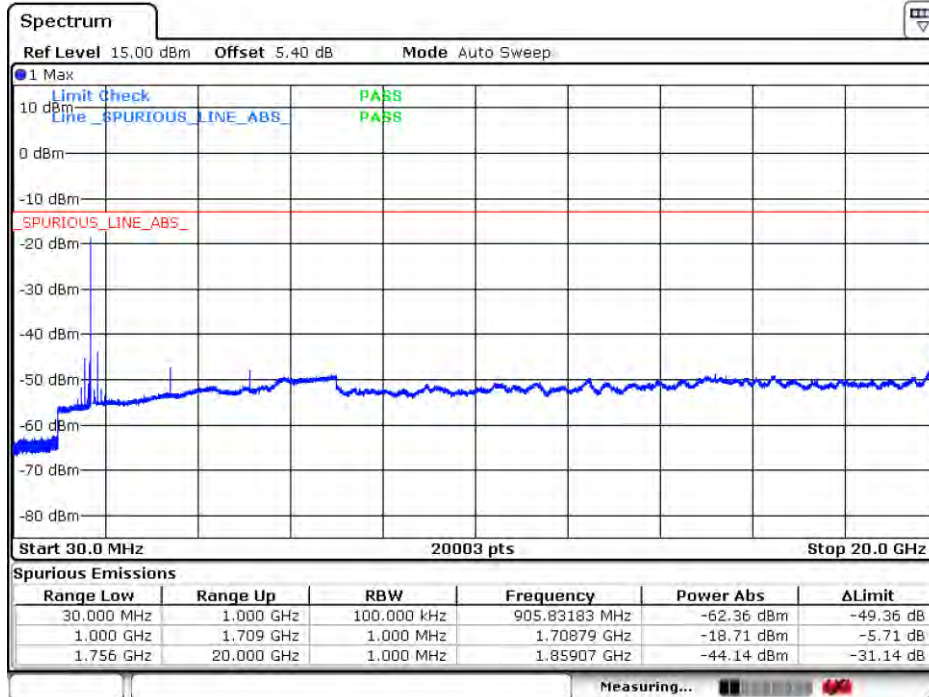
LTE-NB1/BPSK. Sub-carrier spacing=3.75kHz-Test Channel=20399-T size=1T0



Date: 6 SEP. 2019 20:11:44

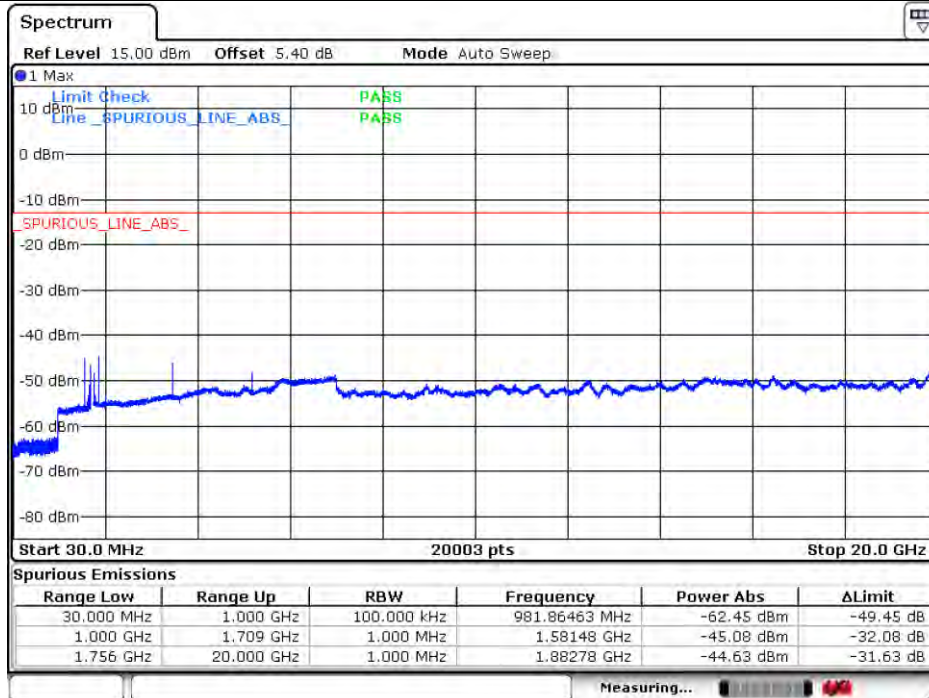


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=19951-T size=1T0



Date: 6 SEP. 2019 19:59:57

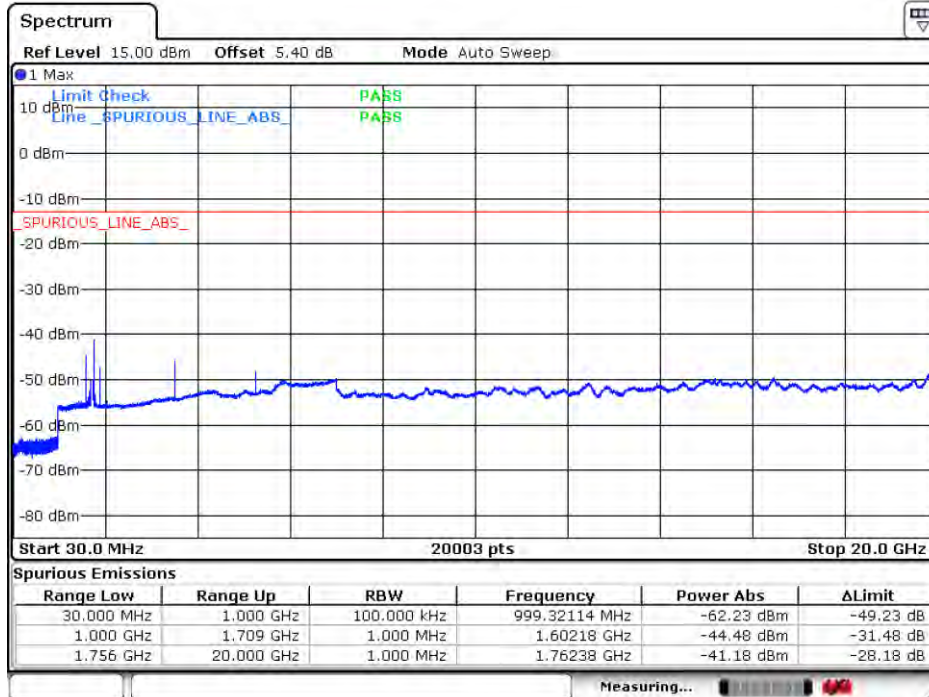
LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20175-T size=1T0



Date: 6 SEP. 2019 20:09:39

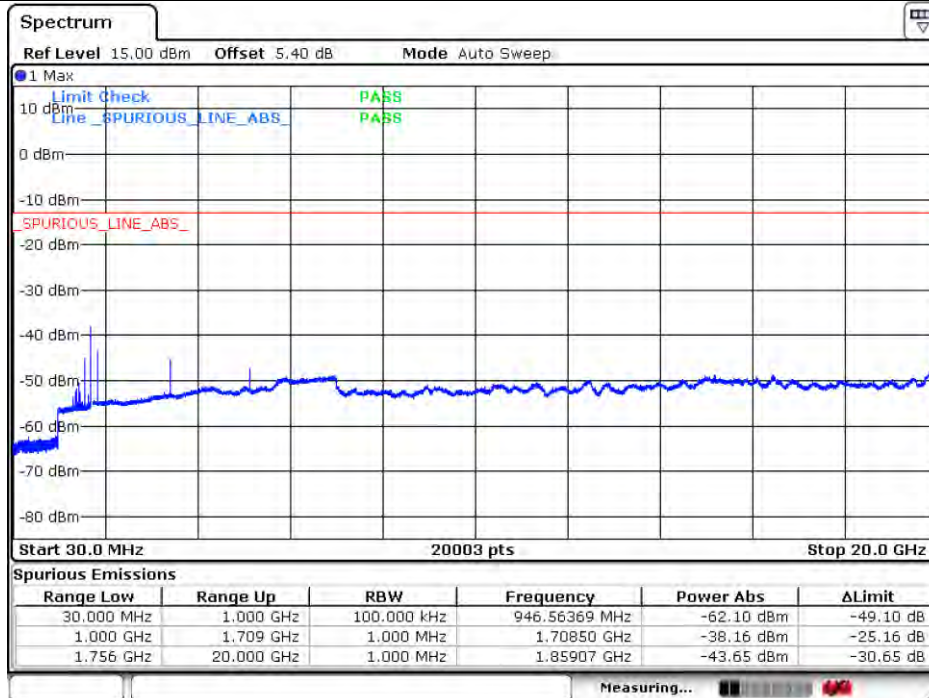


LTE-NB1/QPSK. Sub-carrier spacing=3.75kHz-Test Channel=20399-T size=1T0



Date: 6 SEP. 2019 20:12:33

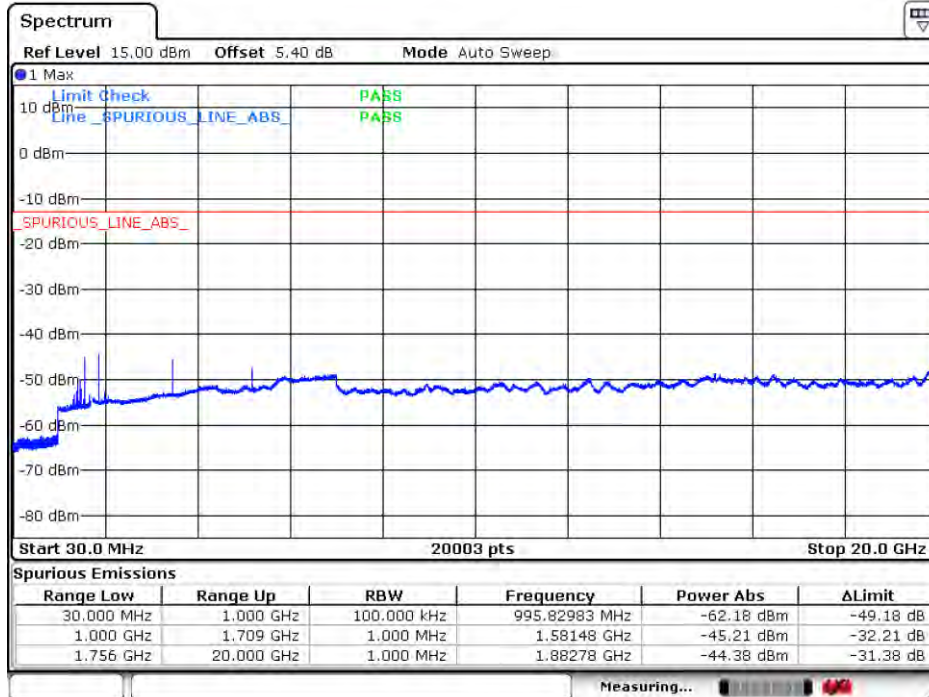
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=19951-T size=1T0



Date: 6 SEP. 2019 20:02:06

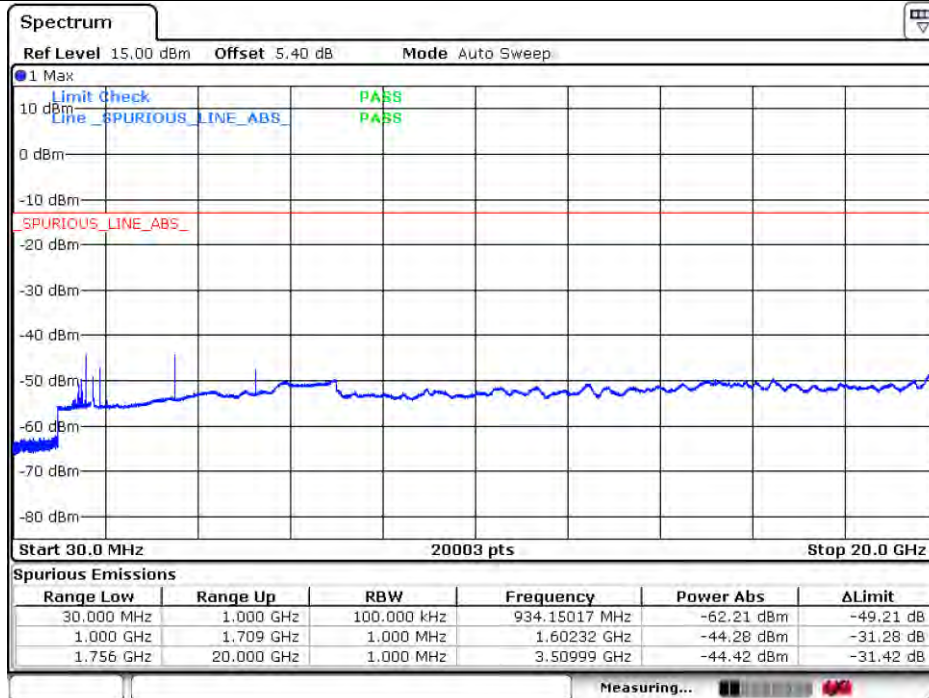


LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20175-T size=1T0



Date: 6 SEP. 2019 20:08:26

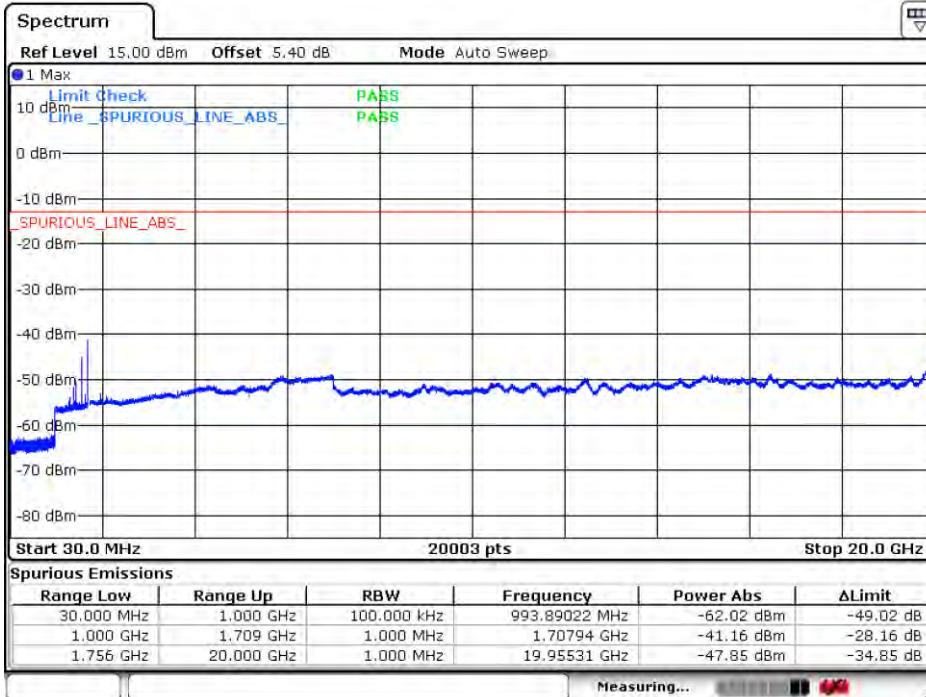
LTE-NB1/BPSK. Sub-carrier spacing=15kHz-Test Channel=20399-T size=1T0



Date: 6 SEP. 2019 21:04:30

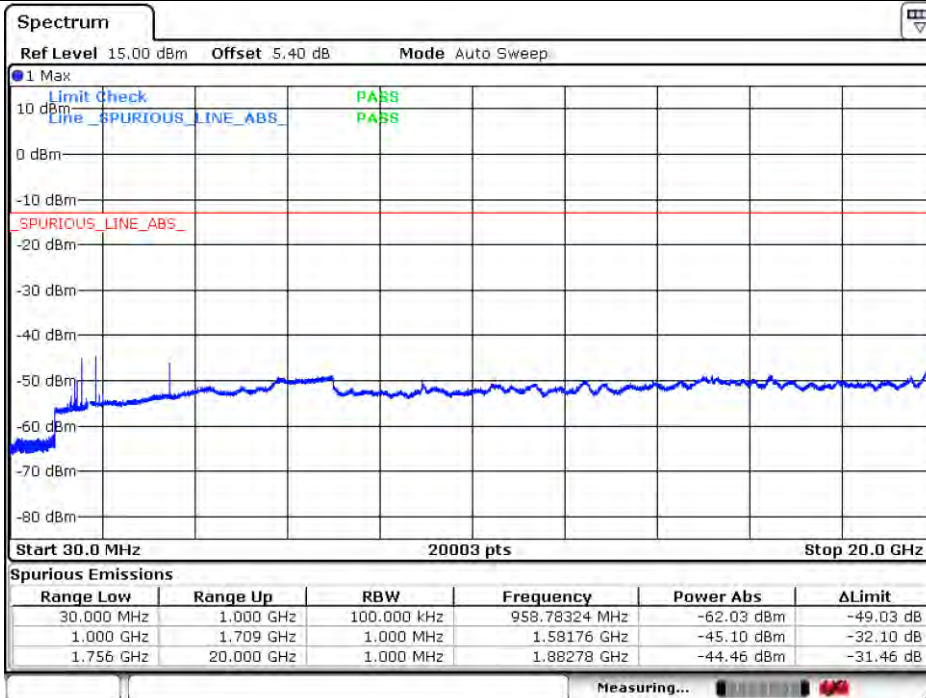


LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=19951-T size=1T0



Date: 6 SEP. 2019 20:01:18

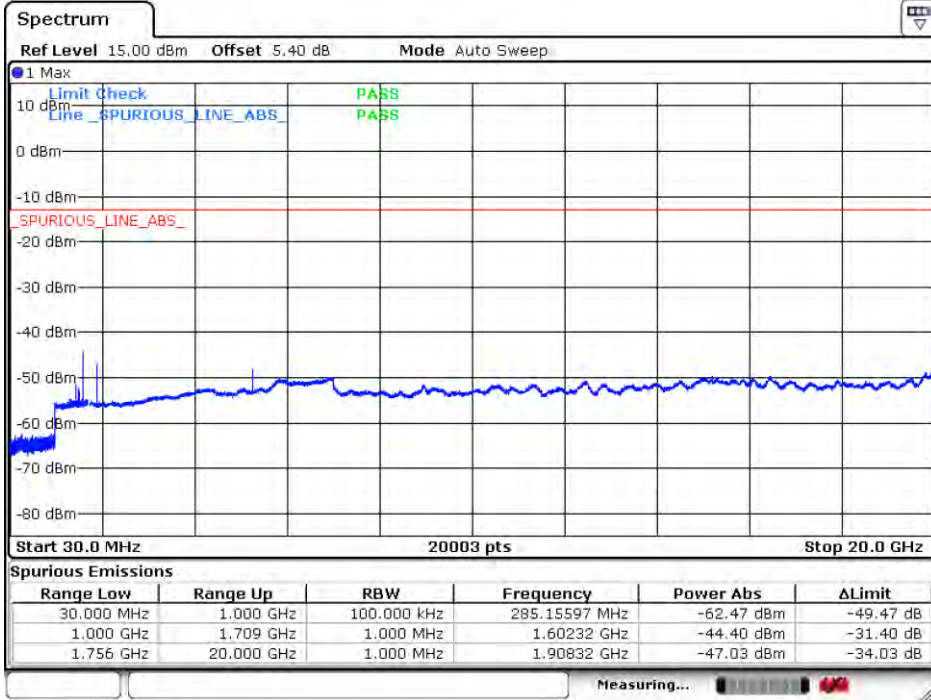
LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20175-T size=1T0



Date: 6 SEP. 2019 20:09:02



LTE-NB1/QPSK. Sub-carrier spacing=15kHz-Test Channel=20399-T size=1T0



Date: 6 SEP. 2019 21:03:29



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7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 Band 4

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

7.1.1.1.1 Test Channel = 19951

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.3015	-65.78	-13.00	52.78	Vertical
723.9242	-63.07	-13.00	50.07	Vertical
2699.5399	-37.69	-13.00	24.69	Vertical
7283.1428	-53.29	-13.00	40.29	Vertical
14551.3850	-42.94	-13.00	29.94	Vertical
17988.4996	-34.86	-13.00	21.86	Vertical
44.7447	-64.50	-13.00	51.50	Horizontal
233.2252	-68.42	-13.00	55.42	Horizontal
2695.5391	-36.59	-13.00	23.59	Horizontal
3420.0140	-43.22	-13.00	30.22	Horizontal
5130.0710	-49.03	-13.00	36.03	Horizontal
16988.9663	-39.35	-13.00	26.35	Horizontal

7.1.1.1.2 Test Channel = 20175

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
110.6110	-65.72	-13.00	52.72	Vertical
679.8840	-62.93	-13.00	49.93	Vertical
2132.6265	-33.61	-13.00	20.61	Vertical
7385.1462	-53.37	-13.00	40.37	Vertical
14502.8834	-43.51	-13.00	30.51	Vertical
17996.9999	-33.06	-13.00	20.06	Vertical
42.8046	-65.15	-13.00	52.15	Horizontal
801.2371	-62.37	-13.00	49.37	Horizontal
2704.3409	-36.27	-13.00	23.27	Horizontal
3465.0155	-52.96	-13.00	39.96	Horizontal
5197.0732	-48.10	-13.00	35.10	Horizontal
16392.9464	-38.01	-13.00	25.01	Horizontal



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7.1.1.1.3 Test Channel = 20399

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
108.2829	-65.42	-13.00	52.42	Vertical
824.9062	-61.99	-13.00	48.99	Vertical
2621.9244	-39.29	-13.00	26.29	Vertical
8049.1683	-51.33	-13.00	38.33	Vertical
16960.4653	-40.26	-13.00	27.26	Vertical
17996.4999	-35.13	-13.00	22.13	Vertical
41.8346	-65.10	-13.00	52.10	Horizontal
742.0641	-60.72	-13.00	47.72	Horizontal
2702.3405	-36.36	-13.00	23.36	Horizontal
3509.0170	-45.31	-13.00	32.31	Horizontal
5264.0755	-46.40	-13.00	33.40	Horizontal
16993.9665	-39.06	-13.00	26.06	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.



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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 4	180KHz	BPSK/15KHz	19951	12T0	VL	TN	-0.19	-0.000112	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	VN	TN	-0.92	-0.000541	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	VH	TN	-13.79	-0.008065	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	VL	TN	-8.61	-0.004969	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	VN	TN	-0.64	-0.000372	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	VH	TN	13.52	0.007803	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	VL	TN	4.08	0.002325	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	VN	TN	-0.67	-0.000383	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	VH	TN	-4.49	-0.002557	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	VL	TN	3.19	0.001864	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	VN	TN	9.25	0.005407	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	VH	TN	-12.62	-0.007379	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	VL	TN	5.11	0.002951	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	VN	TN	-6.22	-0.003590	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	VH	TN	-13.16	-0.007594	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	VL	TN	-0.62	-0.000351	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	VN	TN	-0.53	-0.000304	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	VH	TN	3.01	0.001713	±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 4	180KHz	BPSK/15KHz	19951	12T0	NV	-30	12.42	0.007262	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	-20	-0.95	-0.000558	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	0	-3.48	-0.002036	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	10	-2.46	-0.001439	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	20	-9.37	-0.005482	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	30	-6.31	-0.003688	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	40	8.41	0.004917	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	19951	12T0	NV	50	-4.25	-0.002487	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	-30	-5.90	-0.003405	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	-20	0.14	0.000078	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	0	-3.04	-0.001755	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	10	7.68	0.004431	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	20	4.34	0.002506	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	30	-11.37	-0.006562	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	40	10.22	0.005900	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20175	12T0	NV	50	2.26	0.001302	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	-30	5.80	0.003305	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	-20	4.49	0.002558	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	0	-7.64	-0.004352	±2.5	PASS



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NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	10	5.89	0.003355	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	20	3.90	0.002221	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	30	8.67	0.004940	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	40	-3.60	-0.002049	±2.5	PASS
NB1 Band 4	180KHz	BPSK/15KHz	20399	12T0	NV	50	4.24	0.002413	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	-30	7.49	0.004382	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	-20	-12.54	-0.007333	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	0	11.26	0.006583	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	10	2.63	0.001538	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	20	1.51	0.000885	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	30	-2.79	-0.001630	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	40	4.87	0.002846	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	19951	12T0	NV	50	10.89	0.006371	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	-30	8.93	0.005155	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	-20	-8.53	-0.004926	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	0	-2.27	-0.001308	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	10	12.44	0.007181	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	20	-9.80	-0.005658	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	30	-13.51	-0.007796	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	40	8.75	0.005050	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20175	12T0	NV	50	10.23	0.005907	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	-30	-10.67	-0.006080	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	-20	-1.37	-0.000782	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	0	4.59	0.002613	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	10	-4.35	-0.002478	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	20	8.75	0.004987	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	30	-1.96	-0.001114	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	40	-2.92	-0.001661	±2.5	PASS
NB1 Band 4	180KHz	QPSK/15KHz	20399	12T0	NV	50	5.89	0.003355	±2.5	PASS

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