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Appendix B

LTE-NB1 BAND4



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1 Effective (Isotropic) Radiated Power Output Data

Effective Isotropic Radiated Power of Transmitter (EIRP) for LTE-NB1 BAND4

Effective isotropic Radiated Fower of Transmitter (EIRF) for ETE-NBT BAND4										
Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict		
			LCH	1T0	22.26	23.86	30	PASS		
			LCH	1T47	22.37	23.97	30	PASS		
	TN44	2.75	MOLL	1T0	22.65	24.25	30	PASS		
	TM1	3.75	3.75 N	3.75 MCH	1T47	22.78	24.38	30	PASS	
			НСН	1T0	22.55	24.15	30	PASS		
DANDA	DAND4			1T47	22.61	24.21	30	PASS		
BAND4		LCH	1.00	1T0	22.36	23.96	30	PASS		
			1T47	22.45	24.05	30	PASS			
	TMO	2.75	MCH	1T0	22.53	24.13	30	PASS		
	I IVIZ	TM2 3.75	MCH	1T47	22.69	24.29	30	PASS		
			ПСП	1T0	22.72	24.32	30	PASS		
			HCH	1T47	22.63	24.23	30	PASS		

Test Band	Test Mode	Sub-carrier Spacin (kHz)	Test channel	Number of T	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
			LCH	1T0	22.88	24.48	30	PASS
			LCH	1T11	22.84	24.44	30	PASS
	TM1	15	MCH	1T0	22.88	24.48	30	PASS
	1 101 1	15	IVICIT	1T11	22.89	24.49	30	PASS
			НСН	1T0	22.88	24.48	30	PASS
				1T11	22.81	24.41	30	PASS
				1T0	22.72	24.32	30	PASS
BAND4			LCH	1T11	22.87	24.47	30	PASS
				12T0	20.97	22.57	30	PASS
		15		1T0	22.78	24.38	30	PASS
	TM2		MCH	1T11	22.91	24.51	30	PASS
				12T0	20.96	22.56	30	PASS
		F	НСН	1T0	22.64	24.24	30	PASS
				1T11	22.73	24.33	30	PASS
				12T0	20.87	22.47	30	PASS

Note:

EIRP [dBm] = SGP [dBm] - Cable Loss [dB] + Gain [dBi]

b: SGP=Signal Generator Level

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



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2 Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
		LCH	5.22	13	PASS
	TM1/1T	MCH	4.90	13	PASS
		HCH	1.59	13	PASS
	TM2/1T	LCH	4.14	13	PASS
BAND4		MCH	6.43	13	PASS
		HCH	1.68	13	PASS
		LCH	3.91	13	PASS
	TM2/Full T	MCH	2.29	13	PASS
		HCH	3.68	13	PASS

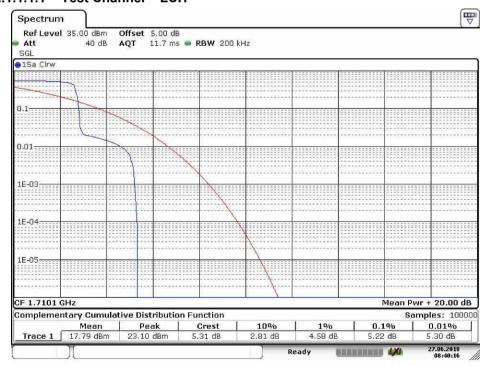
Part II - Test Plots

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 BAND4

2.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

2.1.1.1.1 Test Channel = LCH



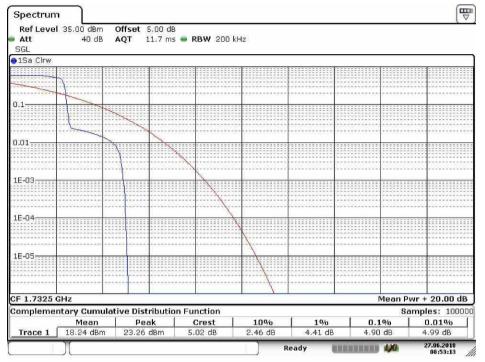
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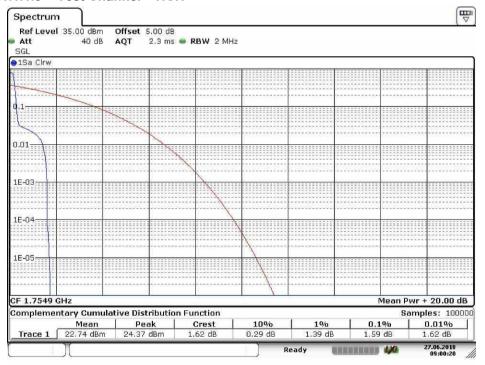
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2.1.1.1.2 Test Channel = MCH



Date: 27.JUN.2018 08:53:13

2.1.1.1.3 Test Channel = HCH



Date: 27.JUN.2018 09:00:20

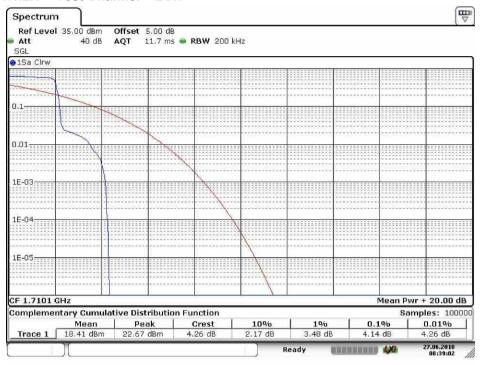


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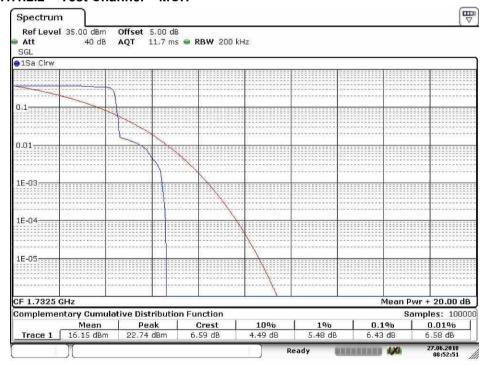
2.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=1T0

2.1.1.2.1 Test Channel = LCH



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2.1.1.2.2 Test Channel = MCH



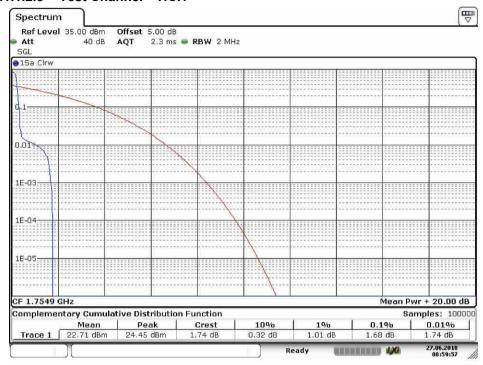
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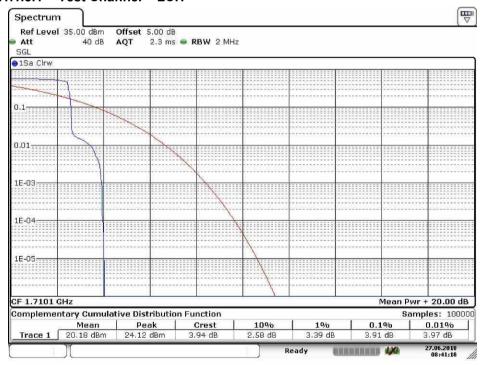
2.1.1.2.3 Test Channel = HCH



Date: 27.JUN.2018 08:59:57

2.1.1.3 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0

2.1.1.3.1 Test Channel = LCH



Date: 27.JUN.2018 08:41:19

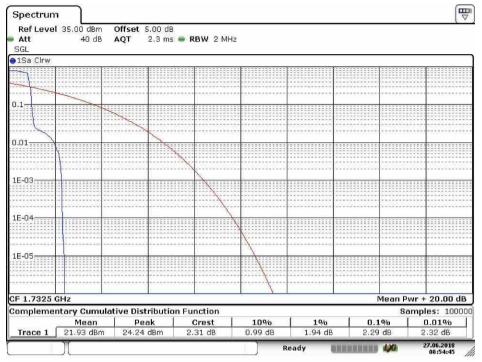
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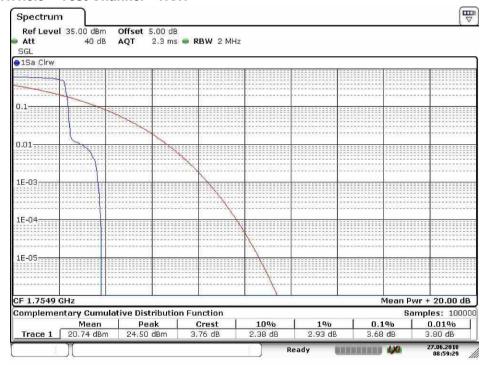
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2.1.1.3.2 Test Channel = MCH



Date: 27.JUN.2018 08:54:46

2.1.1.3.3 Test Channel = HCH



Date: 27.JUN.2018 08:59:30



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3 Modulation Characteristics

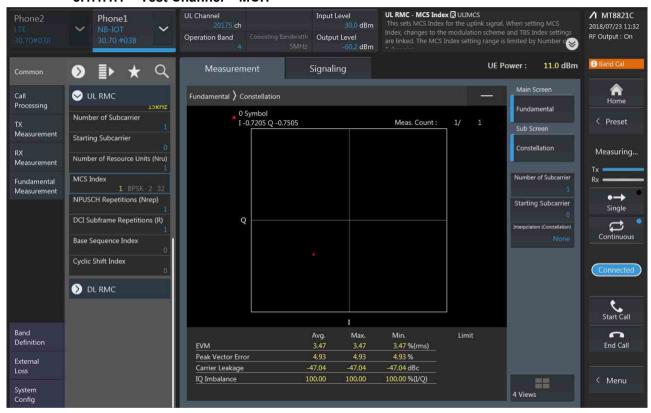
Part I - Test Plots

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 BAND4

3.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

3.1.1.1.1 Test Channel = MCH

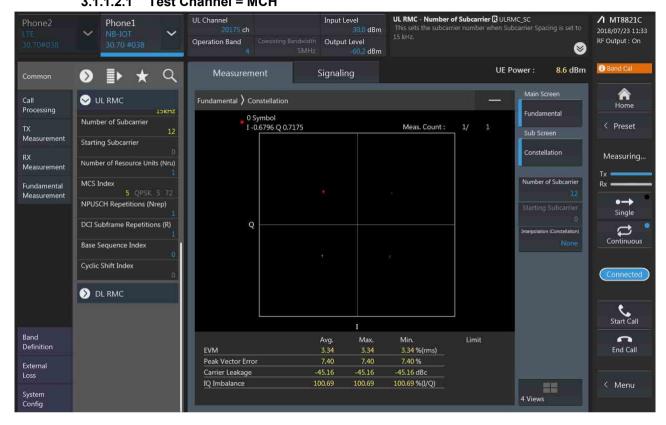




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3.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0 3.1.1.2.1 Test Channel = MCH





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4 Bandwidth

Part I - Test Results

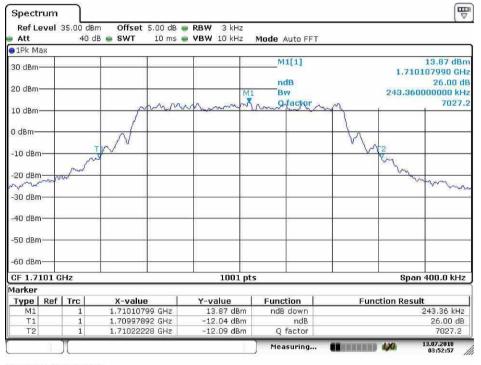
Test Band	Test Mode Test Occupied Bandwidth [kHz]		Emission Bandwidth [kHz]	Verdict	
BAND4	TM2/15kHz	LCH	185.41	243.36	PASS
		MCH	185.41	243.36	PASS
		HCH	185.41	243.36	PASS

4.1 For LTE-NB1

4.1.1 Test Band = LTE-NB1 BAND4

4.1.1.1 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0

4.1.1.1.1 Test Channel = LCH

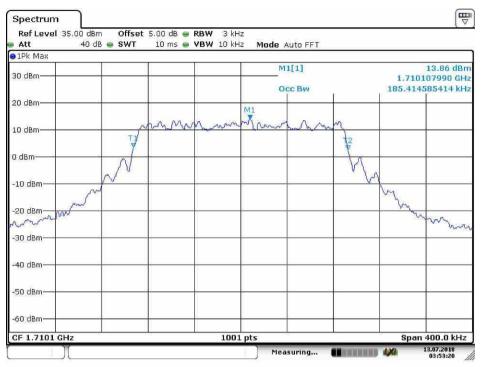


Date: 13.JUL.2018 03:52:57



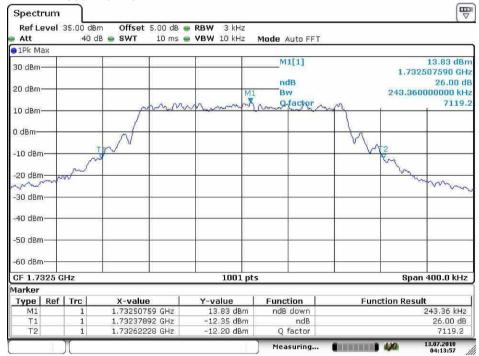
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Date: 13.JUL.2018 03:53:21

4.1.1.1.2 Test Channel = MCH



Date: 13.JUL.2018 04:13:58



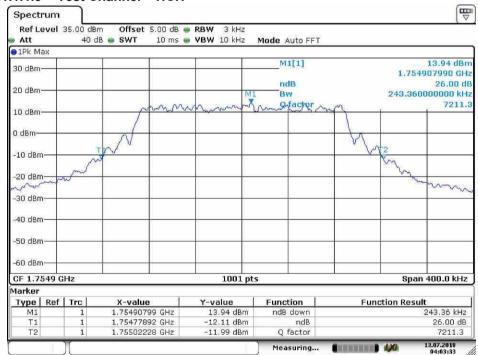
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Date: 13.JUL.2018 04:14:08

4.1.1.1.3 Test Channel = HCH

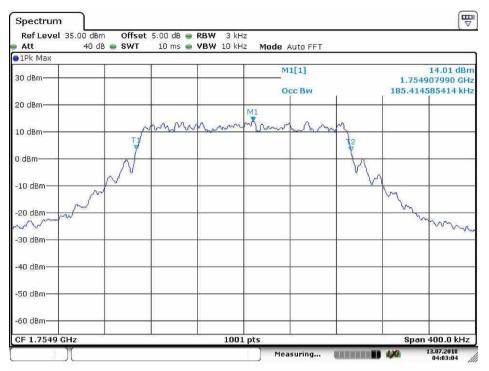


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Date: 13.JUL.2018 04:03:05



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5 Band Edges Compliance

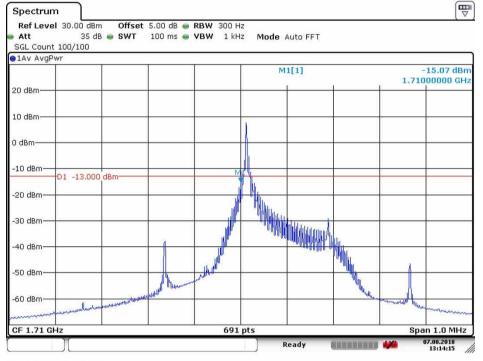
5.1 For LTE-NB1

5.1.1 Test Band = LTE-NB1 BAND4

5.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=3.75kHz

5.1.1.1.1 Test Channel = LCH

5.1.1.1.1 Test T size=1T



Date: 7.AUG.2018 13:14:15

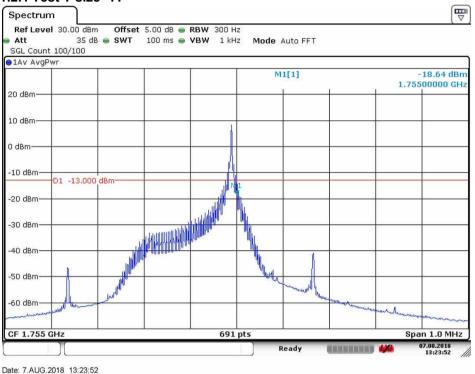


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5.1.1.1.2 Test Channel = HCH

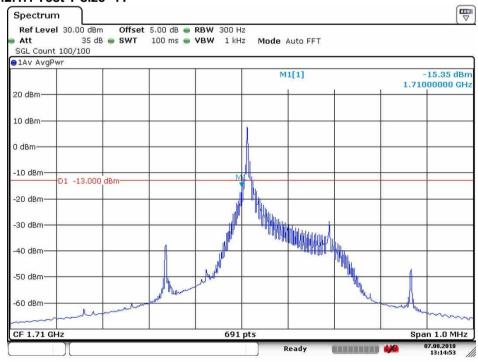
5.1.1.1.2.1 Test T size=1T



5.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=3.75kHz

5.1.1.2.1 Test Channel = LCH

5.1.1.2.1.1 Test T size=1T



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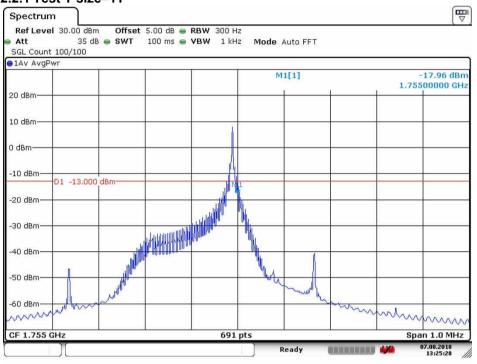


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5.1.1.2.2 Test Channel = HCH

5.1.1.2.2.1 Test T size=1T

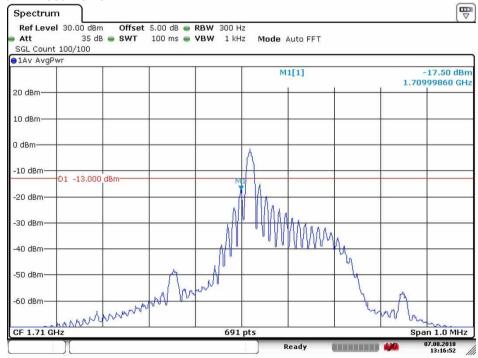


Date: 7.AUG.2018 13:25:29

5.1.1.3 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz

5.1.1.3.1 Test Channel = LCH

5.1.1.3.1.1 Test T size=1T



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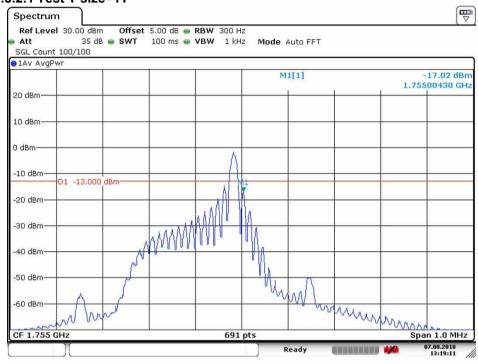


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5.1.1.3.2 Test Channel = HCH

5.1.1.3.2.1 Test T size=1T

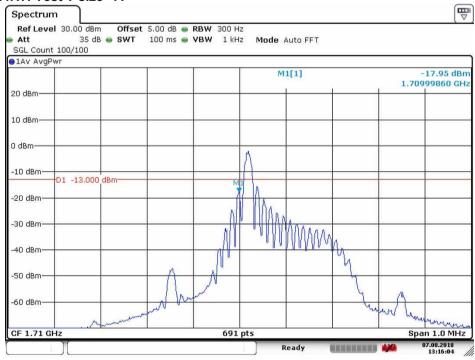


Date: 7.AUG.2018 13:19:11

5.1.1.4 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz

5.1.1.4.1 Test Channel = LCH

5.1.1.4.1.1 Test T size=1T



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5.1.1.4.1.2 Test T size=Full T



Date: 13.JUL.2018 03:50:23

5.1.1.4.2 Test Channel = HCH

5.1.1.4.2.1 Test T size=1T



Date: 7.AUG.2018 13:20:23

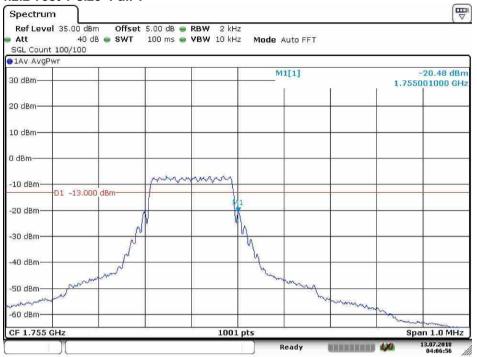
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5.1.1.4.2.2 Test T size=Full T



Date: 13.JUL.2018 04:06:56



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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 = 4 * (Span / RBW) with k = 4 * (Span / RBW).

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

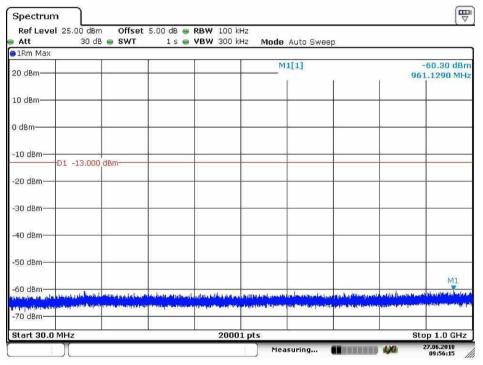
Part I - Test Plots

6.1 For LTE-NB1

6.1.1 Test Band = LTE-NB1 BAND4

6.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=3.75kHz

6.1.1.1.1 Test Channel = LCH

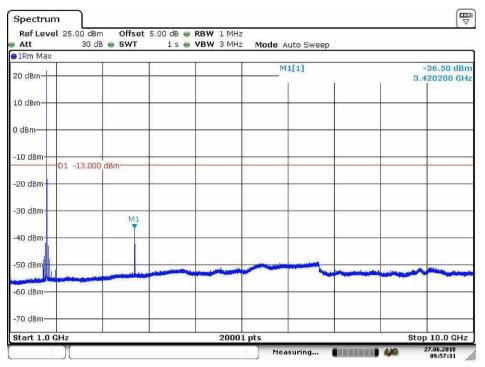


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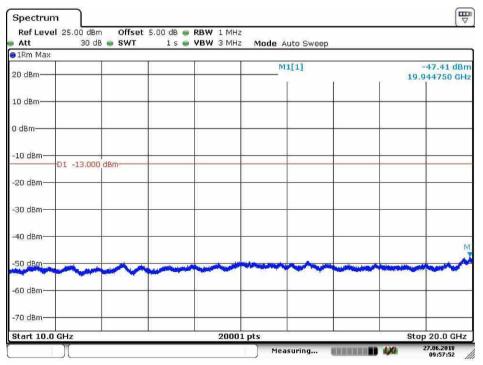


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Date: 27.JUN.2018 09:57:32



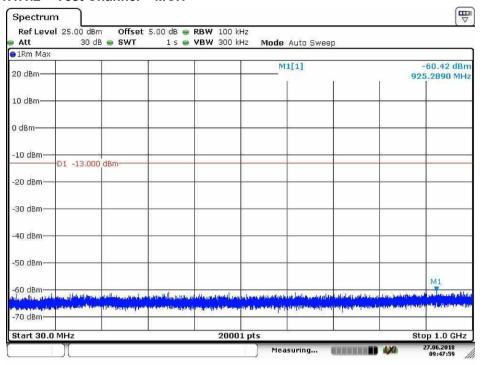
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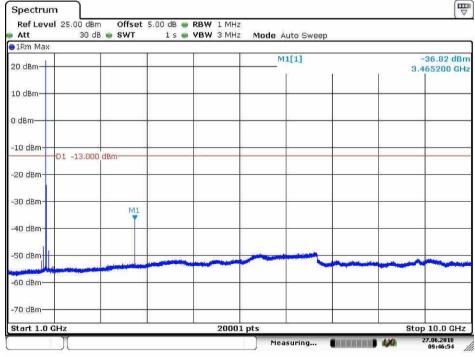
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6.1.1.1.2 Test Channel = MCH



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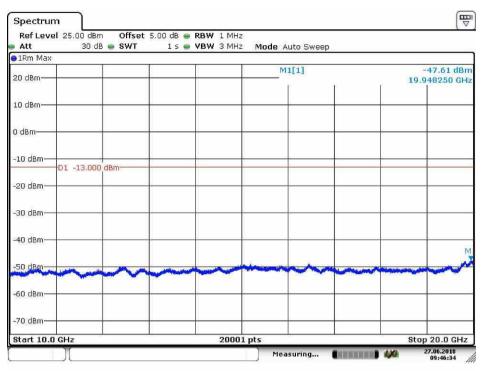
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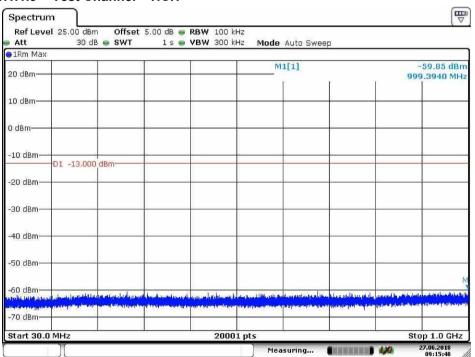
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6.1.1.1.3 Test Channel = HCH

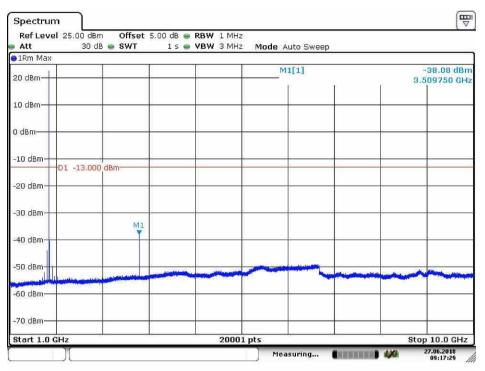


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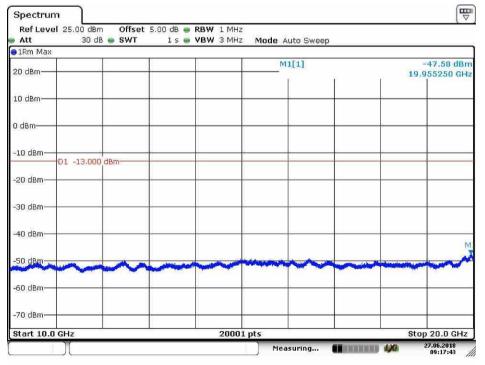


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Date: 27.JUN.2018 09:17:30



Date: 27.JUN.2018 09:17:44

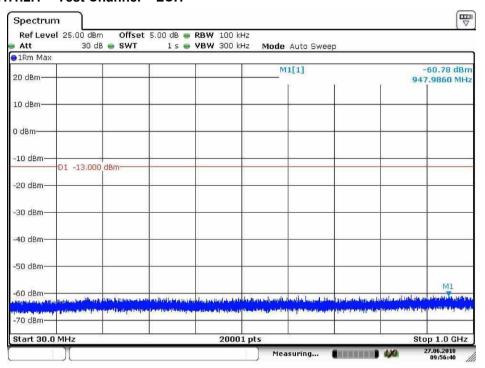


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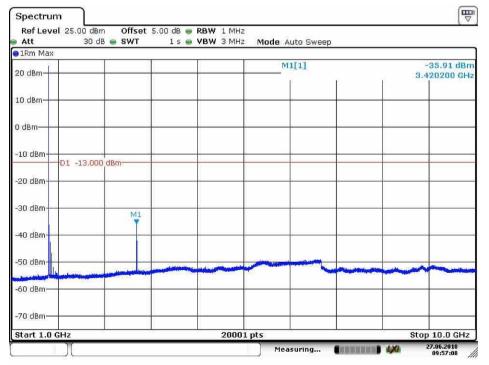
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6.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=3.75kHz

6.1.1.2.1 Test Channel = LCH



Date: 27.JUN.2018 09:56:40

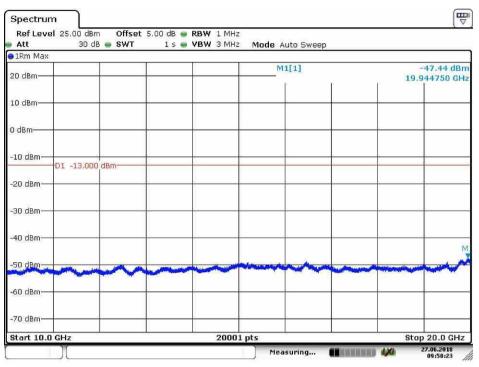


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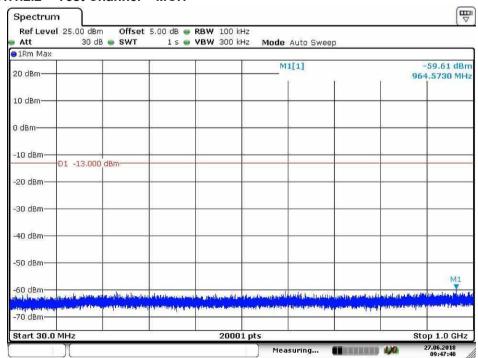
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Date: 27.JUN.2018 09:58:23

6.1.1.2.2 Test Channel = MCH



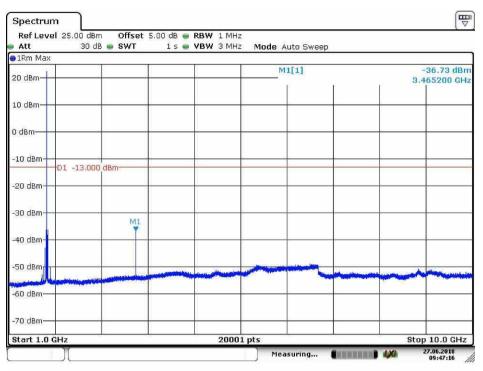
Date: 27.JUN.2018 09:47:41

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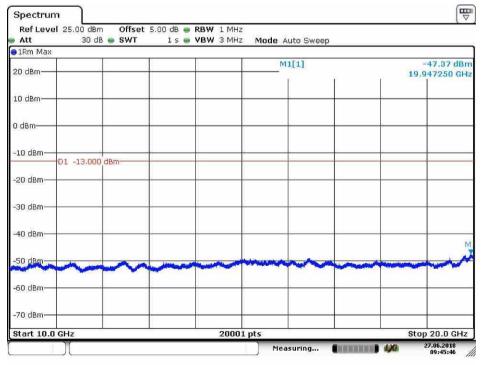


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Date: 27.JUN.2018 09:47:17



Date: 27.JUN.2018 09:45:46

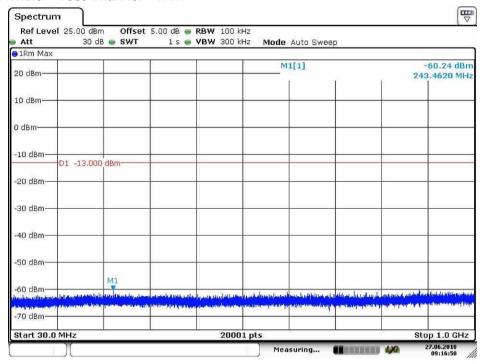
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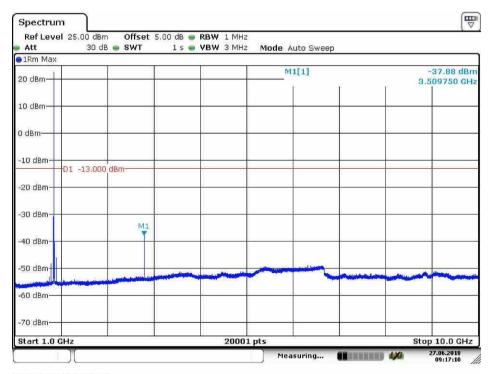
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6.1.1.2.3 Test Channel = HCH



Date: 27.JUN.2018 09:16:50

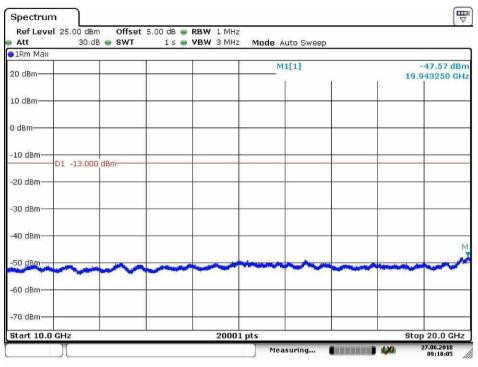


Date: 27.JUN.2018 09:17:10



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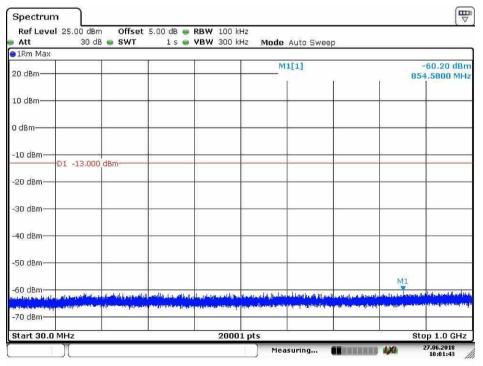
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Date: 27.JUN.2018 09:18:05

6.1.1.3 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz

6.1.1.3.1 Test Channel = LCH



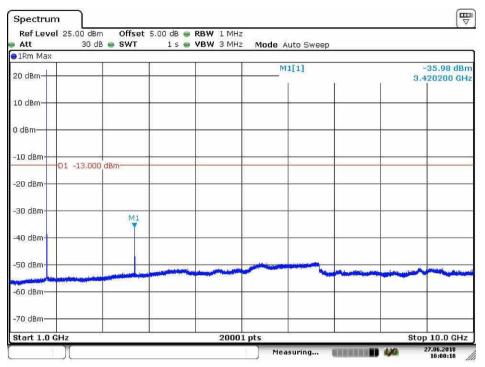
Date: 27.JUN.2018 10:01:43

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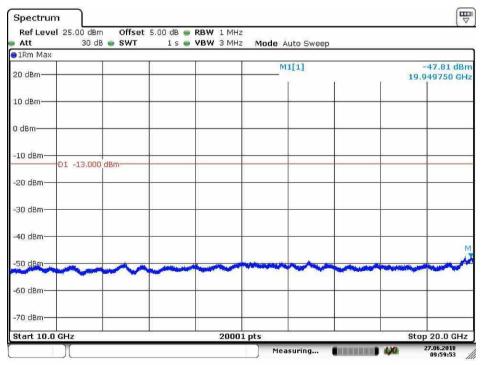


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Date: 27.JUN.2018 10:00:18



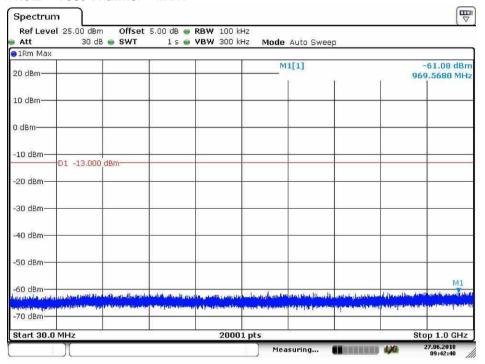
Date: 27.JUN.2018 09:59:53



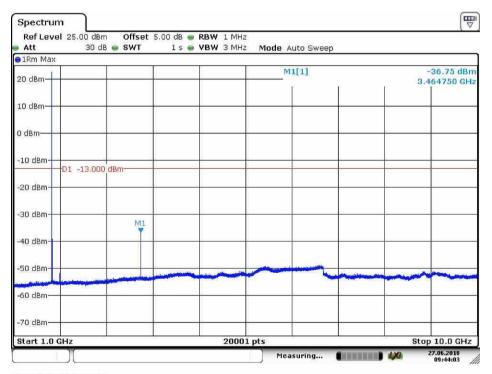
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6.1.1.3.2 Test Channel = MCH



Date: 27.JUN.2018 09:42:40

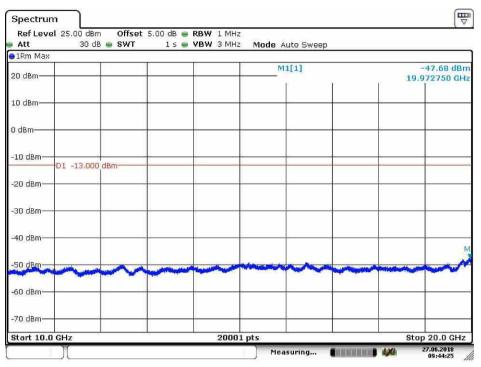


Date: 27.JUN.2018 09:44:04



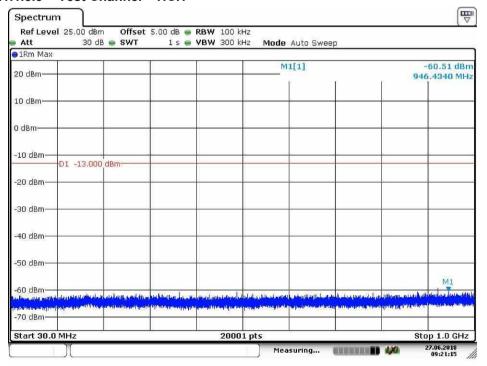
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Date: 27.JUN.2018 09:44:25

6.1.1.3.3 Test Channel = HCH

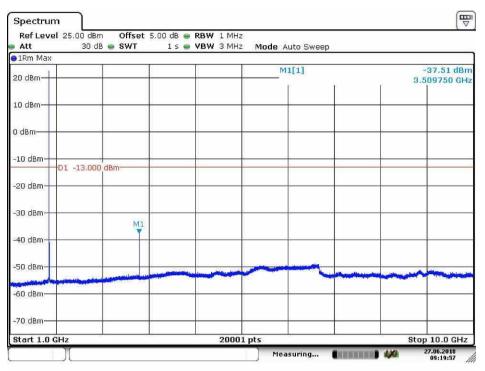


Date: 27.JUN.2018 09:21:15

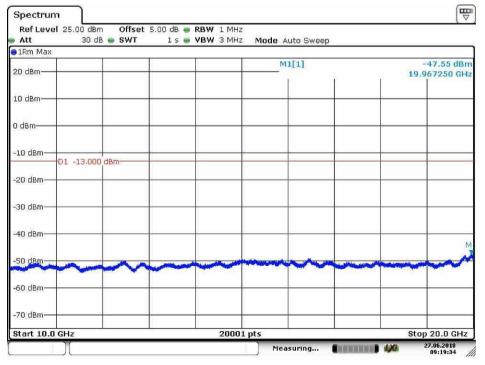


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Date: 27.JUN.2018 09:19:57



Date: 27.JUN.2018 09:19:34

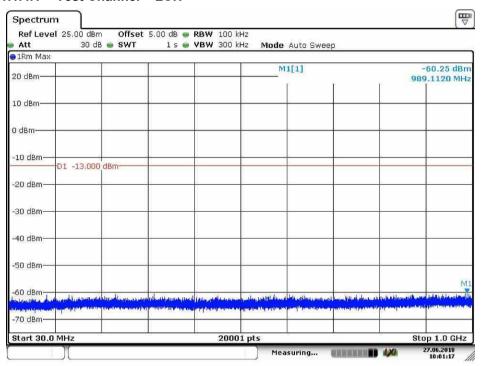


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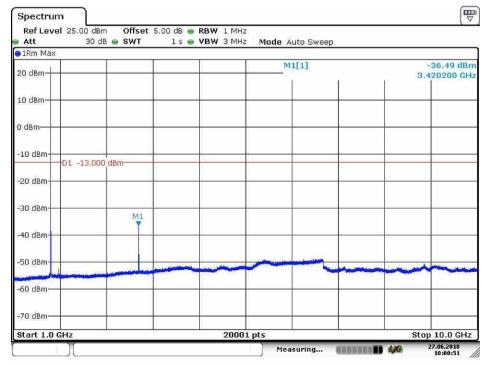
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6.1.1.4 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz

6.1.1.4.1 Test Channel = LCH



Date: 27.JUN.2018 10:01:18



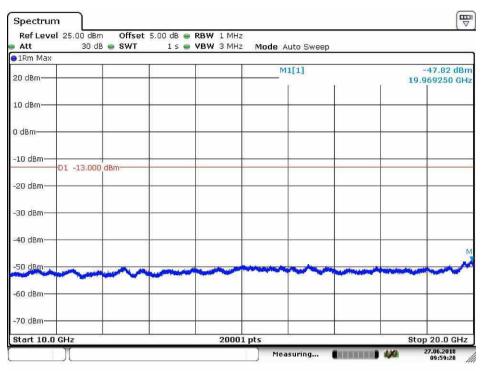
Date: 27.JUN.2018 10:00:51

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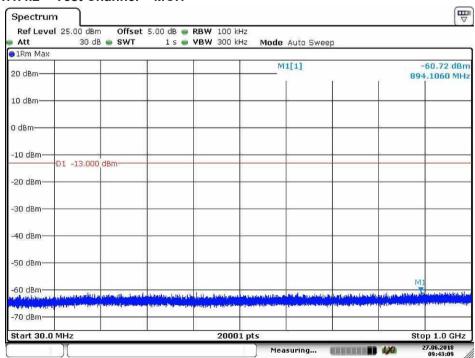
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Date: 27.JUN.2018 09:59:28

6.1.1.4.2 Test Channel = MCH



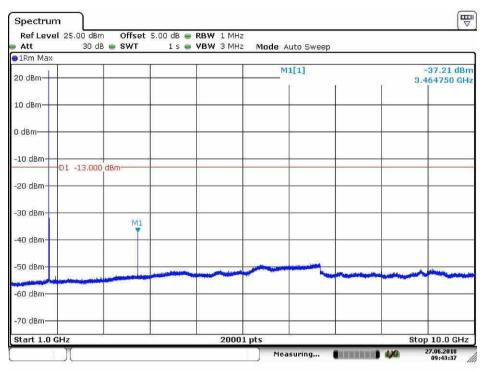
Date: 27.JUN.2018 09:43:09

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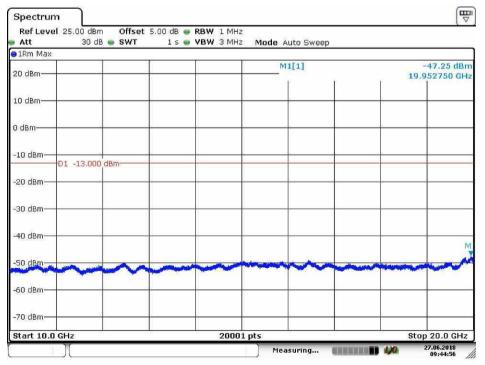


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Date: 27.JUN.2018 09:43:37



Date: 27.JUN.2018 09:44:56

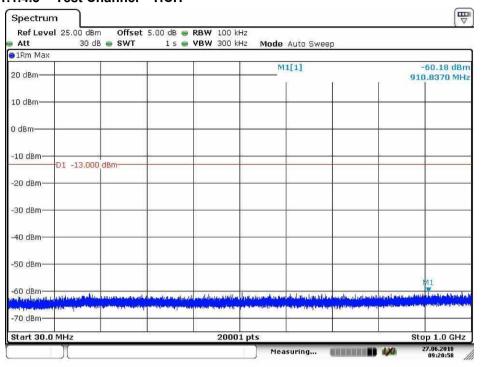
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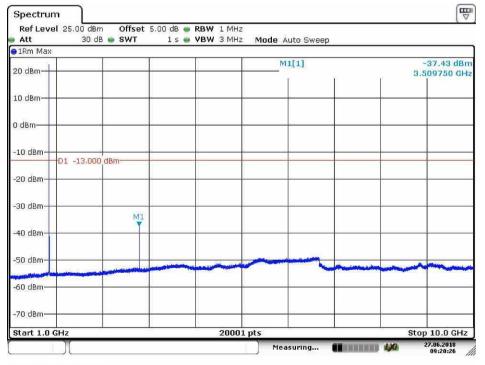
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6.1.1.4.3 Test Channel = HCH



Date: 27.JUN.2018 09:20:58

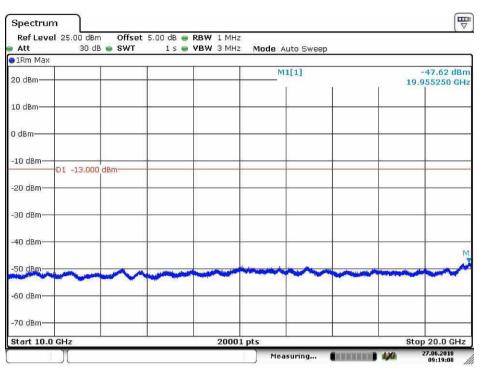


Date: 27.JUN.2018 09:20:26



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7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 BAND4

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

7.1.1.1.1 Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
64.400000	-81.82	-13.00	-68.82	Vertical
104.250000	-76.93	-13.00	-63.93	Vertical
1271.000000	-66.61	-13.00	-53.61	Vertical
3424.775000	-45.78	-13.00	-32.78	Vertical
5137.200000	-57.82	-13.00	-44.82	Vertical
6849.625000	-44.89	-13.00	-31.89	Vertical
63.400000	-78.26	-13.00	-65.26	Horizontal
104.300000	-83.62	-13.00	-70.62	Horizontal
1259.500000	-62.57	-13.00	-49.57	Horizontal
3424.450000	-41.25	-13.00	-28.25	Horizontal
5136.875000	-65.01	-13.00	-52.01	Horizontal
6849.625000	-47.25	-13.00	-34.25	Horizontal

7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.200000	-82.22	-13.00	-69.22	Vertical
104.250000	-76.95	-13.00	-63.95	Vertical
1128.500000	-67.06	-13.00	-54.06	Vertical
3465.725000	-52.09	-13.00	-39.09	Vertical
5197.000000	-62.04	-13.00	-49.04	Vertical
6929.575000	-46.16	-13.00	-33.16	Vertical
62.500000	-77.65	-13.00	-64.65	Horizontal
104.300000	-83.11	-13.00	-70.11	Horizontal
1225.000000	-62.54	-13.00	-49.54	Horizontal
3464.750000	-36.96	-13.00	-23.96	Horizontal
5197.650000	-63.83	-13.00	-50.83	Horizontal
6929.575000	-47.35	-13.00	-34.35	Horizontal



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7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
64.300000	-82.01	-13.00	-69.01	Vertical
148.200000	-65.81	-13.00	-52.81	Vertical
1224.500000	-66.63	-13.00	-53.63	Vertical
3504.725000	-55.99	-13.00	-42.99	Vertical
5257.125000	-61.62	-13.00	-48.62	Vertical
7009.525000	-48.56	-13.00	-35.56	Vertical
62.700000	-77.80	-13.00	-64.80	Horizontal
104.300000	-83.69	-13.00	-70.69	Horizontal
1257.000000	-62.59	-13.00	-49.59	Horizontal
3505.375000	-38.44	-13.00	-25.44	Horizontal
5257.125000	-66.31	-13.00	-53.31	Horizontal
7009.525000	-49.44	-13.00	-36.44	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) We have tested all modulation and all bandwidth, but only the worst case data presented in this report.



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8 Frequency Stability

8.1 Frequency Error VS. Voltage

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VL	11.19	0.006542	PASS
		LCH	TN	VN	-7.35	-0.004301	PASS
				VH	-9.26	-0.005414	PASS
				VL	-7.84	-0.004526	PASS
	TM1/15k	MCH	TN	VN	5.17	0.002983	PASS
				VH	3.61	0.002085	PASS
		НСН	TN	VL	-0.49	-0.000279	PASS
				VN	1.50	0.000854	PASS
BAND4				VH	-0.84	-0.000476	PASS
DAND4				VL	8.88	0.005195	PASS
		LCH	TN	VN	-2.13	-0.001248	PASS
				VH	-7.16	-0.004189	PASS
				VL	5.60	0.003233	PASS
	TM2/15k	MCH	TN	VN	5.24	0.003026	PASS
				VH	0.81	0.000467	PASS
		НСН		VL	0.63	0.000361	PASS
			TN	VN	-9.24	-0.005265	PASS
				VH	3.85	0.002194	PASS



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8.2 Frequency Error VS. Temperature

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				-30	-8.38	-0.004901	PASS		
				-20	7.55	0.004413	PASS		
				-10	-1.47	-0.000857	PASS		
			0	1.70	0.000995	PASS			
		LCH	VN	10	8.77	0.005127	PASS		
				20	-0.97	-0.000570	PASS		
				30	1.45	0.000847	PASS		
				40	-8.37	-0.004893	PASS		
				50	8.61	0.005038	PASS		
	TM1 15kHz			-30	8.28	0.004780	PASS		
				-20	-0.06	-0.000036	PASS		
				MCH VN	-10	-5.16	-0.002976	PASS	
					0	3.11	0.001796	PASS	
BAND4		TM1 15kHz	MCH		10	7.30	0.004213	PASS	
						20	2.12	0.001225	PASS
									30
			40 2.30 0.00	0.001327	PASS				
				50	-0.58	-0.000335	PASS		
				-30	1.23	0.000702	PASS		
				-20	2.93	0.001669	PASS		
				-10	7.01	0.003994	PASS		
				0	0.89	0.000506	PASS		
		HCH	VN	10	7.16	0.004077	PASS		
				20	2.02	0.001150	PASS		
				30	8.03	0.004575	PASS		
				40	3.36	0.001914	PASS		
				50	8.54	0.004869	PASS		



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict												
				-30	-4.54	-0.002655	PASS												
				-20	-8.65	-0.005060	PASS												
					-10	-5.35	-0.003127	PASS											
				0	-5.57	-0.003257	PASS												
		LCH	VN	10	7.05	0.004123	PASS												
				20	0.81	0.000475	PASS												
				30	8.31	0.004859	PASS												
				40	4.35	0.002546	PASS												
				50	-5.81	-0.003399	PASS												
	TM2 15kHz			-30	-7.00	-0.004040	PASS												
				-20	2.32	0.001341	PASS												
				-10	-0.79	-0.000455	PASS												
					0	-9.99	-0.005768	PASS											
BAND4		TM2 15kHz	TM2 15kHz	TM2 15kHz	MCH	MCH	ikHz MCH	H VN	VN	MCH VN	10	-2.82	-0.001629	PASS					
																20	9.69	0.005593	PASS
														30	-1.94	-0.001122	PASS		
					40	5.39	0.003113	PASS											
				50	2.43	0.001403	PASS												
				-30	7.79	0.004437	PASS												
				-20	9.88	0.005629	PASS												
				-10	-9.49	-0.005406	PASS												
				0	-3.95	-0.002251	PASS												
		HCH	VN	10	-3.14	-0.001790	PASS												
				20	6.09	0.003469	PASS												
				30	6.58	0.003749	PASS												
				40	8.25	0.004699	PASS												
				50	9.38	0.005346	PASS												

The End