Appendix B

LTE-NB1 BAND4

CONTENT

Page

1 Effective (Isotropic) Radiated Power Output Data

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

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	TM1	3.75	LCH	1T0	22.26	23.86	30	PASS
				1T47	22.37	23.97	30	PASS
			MCH	1T0	22.65	24.25	30	PASS
				1T47	22.78	24.38	30	PASS
			HCH	1T0	22.55	24.15	30	PASS
				1T47	22.61	24.21	30	PASS
	TM2	3.75	LCH	1T0	22.36	23.96	30	PASS
				1T47	22.45	24.05	30	PASS
			MCH	1T0	22.53	24.13	30	PASS
				1T47	22.69	24.29	30	PASS
			HCH	1T0	22.72	24.32	30	PASS
				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
BAND4	TM1	15	LCH	1T0	22.88	24.48	30	PASS
				1T11	22.84	24.44	30	PASS
			MCH	1T0	22.88	24.48	30	PASS
				1T11	22.89	24.49	30	PASS
			HCH	1T0	22.88	24.48	30	PASS
				1T11	22.81	24.41	30	PASS
	TM2	15	LCH	1T0	22.72	24.32	30	PASS
				1T11	22.87	24.47	30	PASS
				12T0	20.97	22.57	30	PASS
			MCH	1T0	22.78	24.38	30	PASS
				1T11	22.91	24.51	30	PASS
				12T0	20.96	22.56	30	PASS
			HCH	1T0	22.64	24.24	30	PASS
				1T11	22.73	24.33	30	PASS
				12T0	20.87	22.47	30	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] = SGP [dBm] – Cable Loss [dB] + Gain [dBi]

b: SGP=Signal Generator Level

2 Peak-to-Average Ratio

Part I - Test Results

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

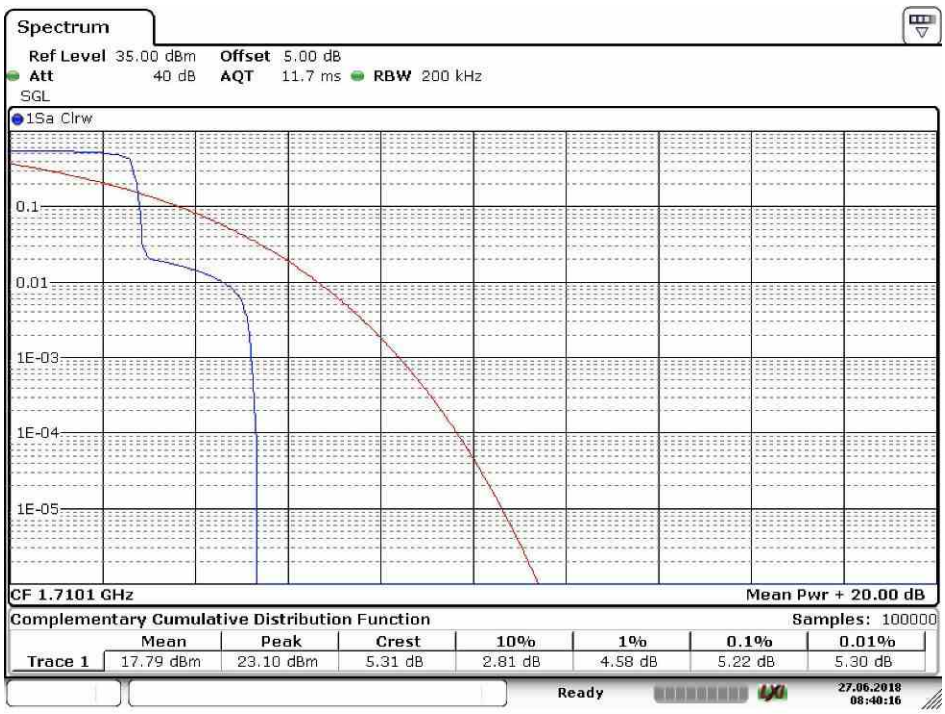
Part II - Test Plots

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 BAND4

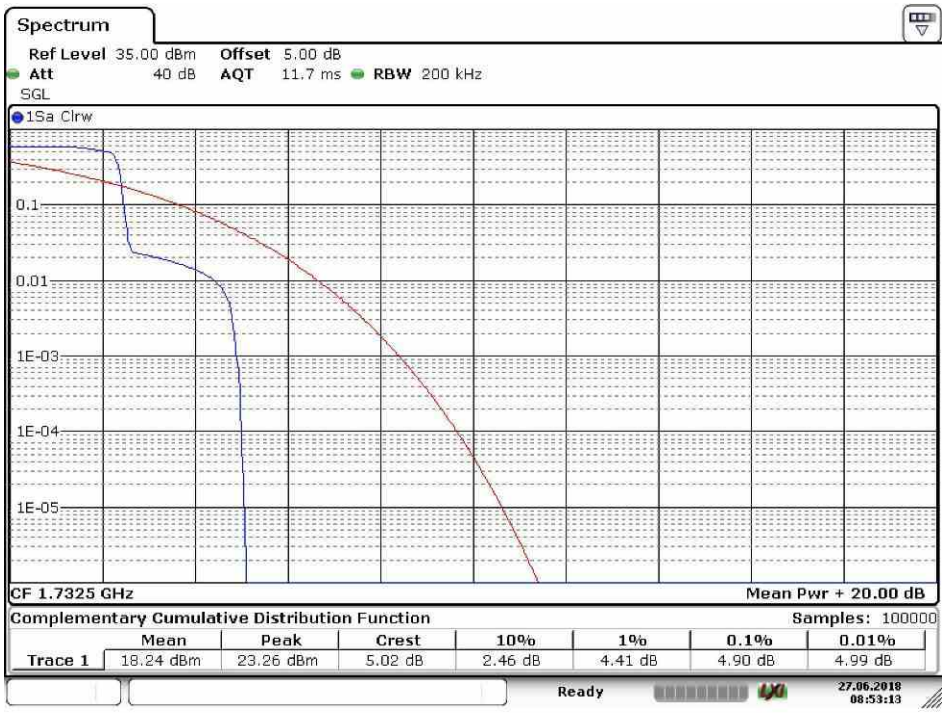
2.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

2.1.1.1.1 Test Channel = LCH



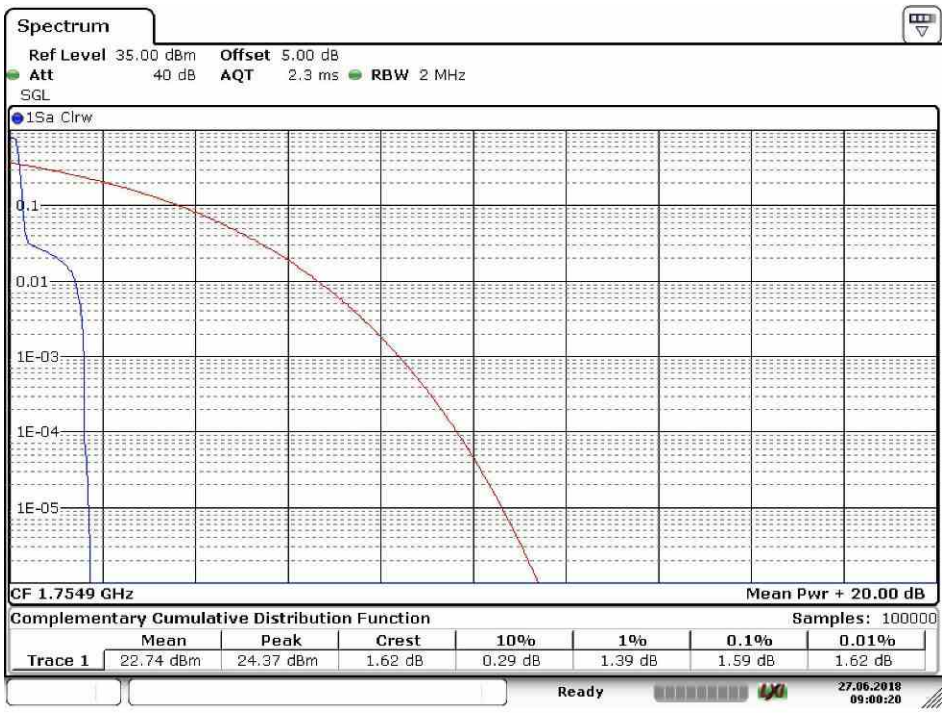
Date: 27.JUN.2018 08:40:17

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

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

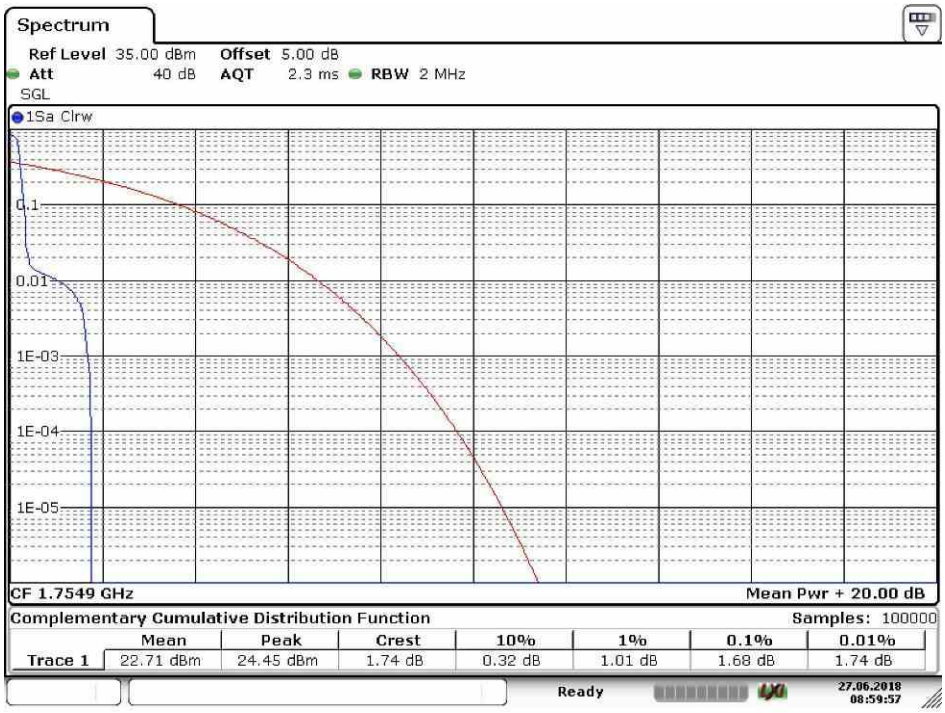
2.1.1.2.1 Test Channel = LCH

Date: 27.JUN.2018 08:39:02

2.1.1.2.2 Test Channel = MCH

Date: 27.JUN.2018 08:52:51

2.1.1.2.3 Test Channel = HCH



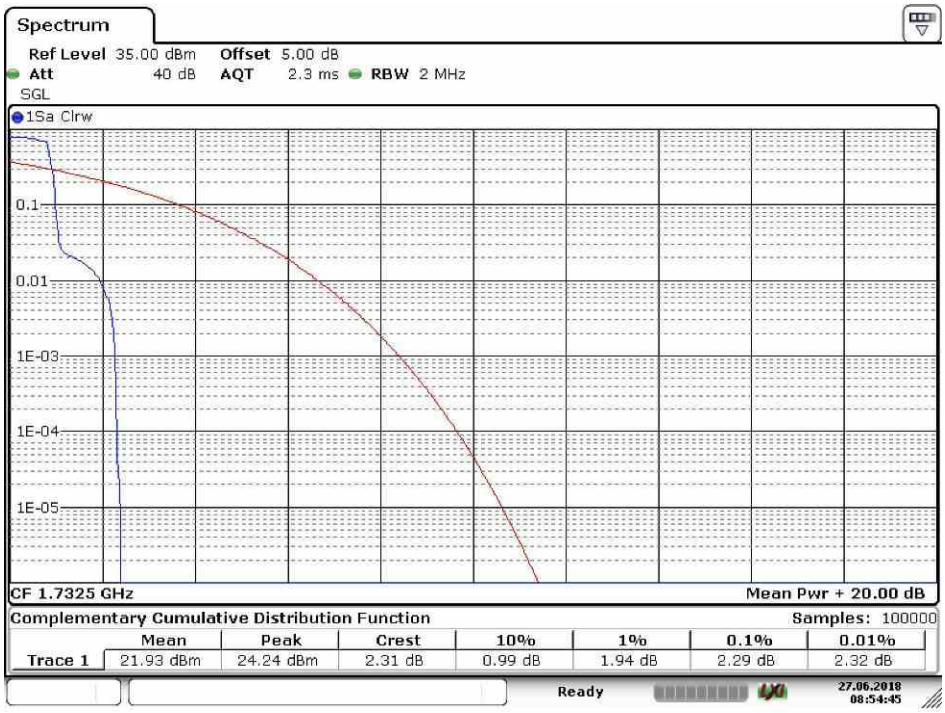
Date: 27.JUN.2018 08:59:57

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

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

3 Modulation Characteristics

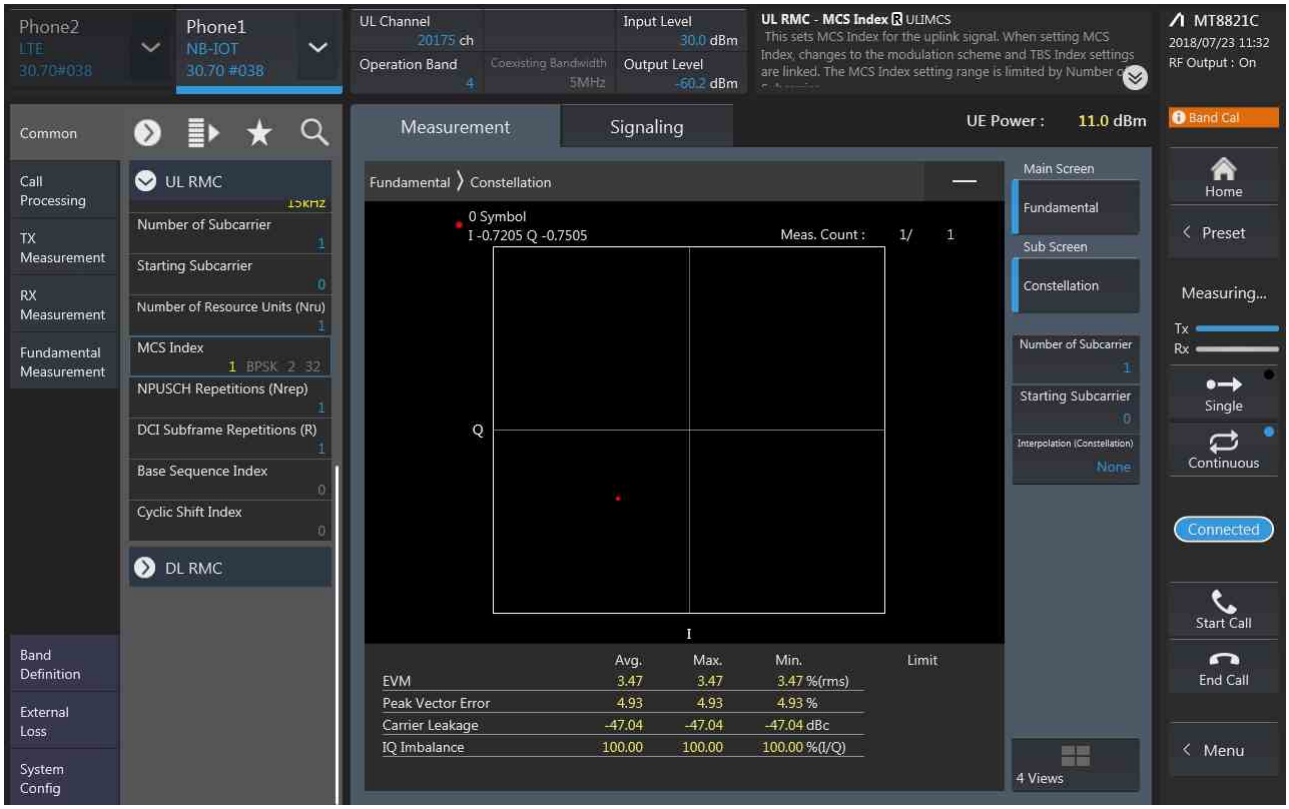
Part I - Test Plots

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 BAND4

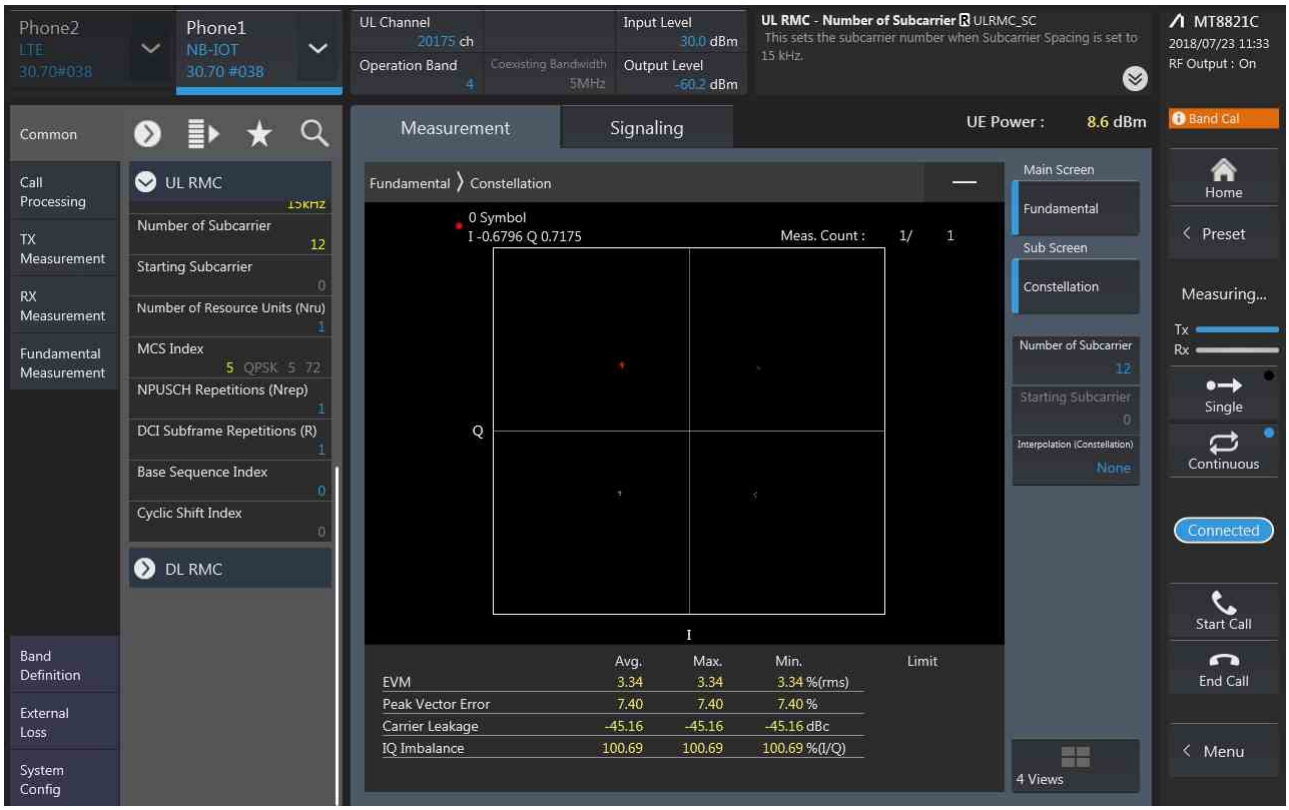
3.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

3.1.1.1.1 Test Channel = MCH



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

3.1.1.2.1 Test Channel = MCH



4 Bandwidth

Part I - Test Results

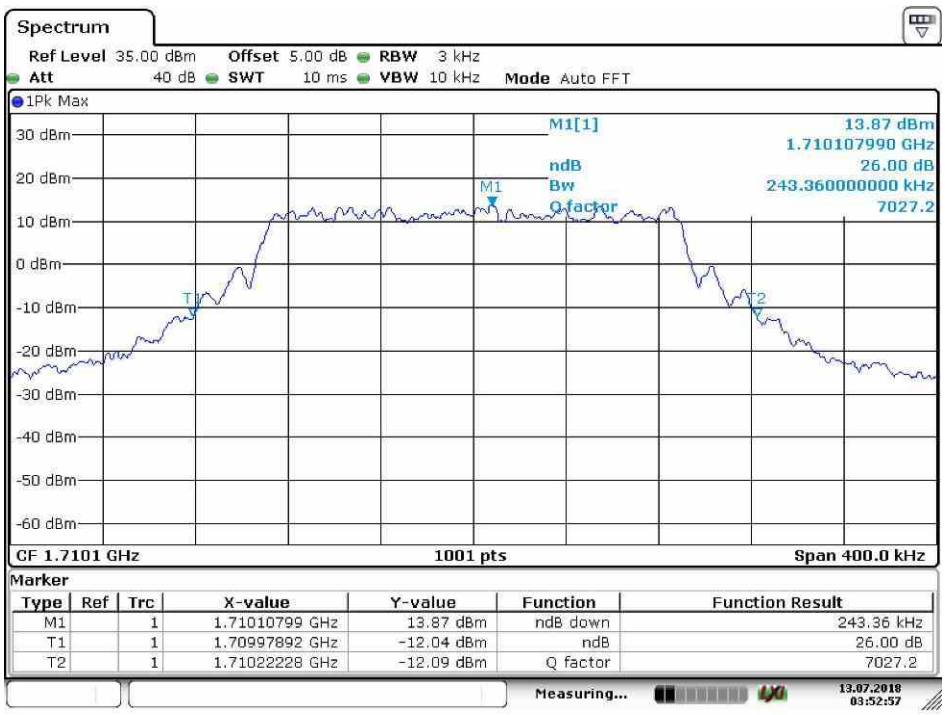
Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
BAND4	TM2/15kHz	LCH	185.41	243.36	PASS
		MCH	185.41	243.36	PASS
		HCH	185.41	243.36	PASS

4.1 For LTE-NB1

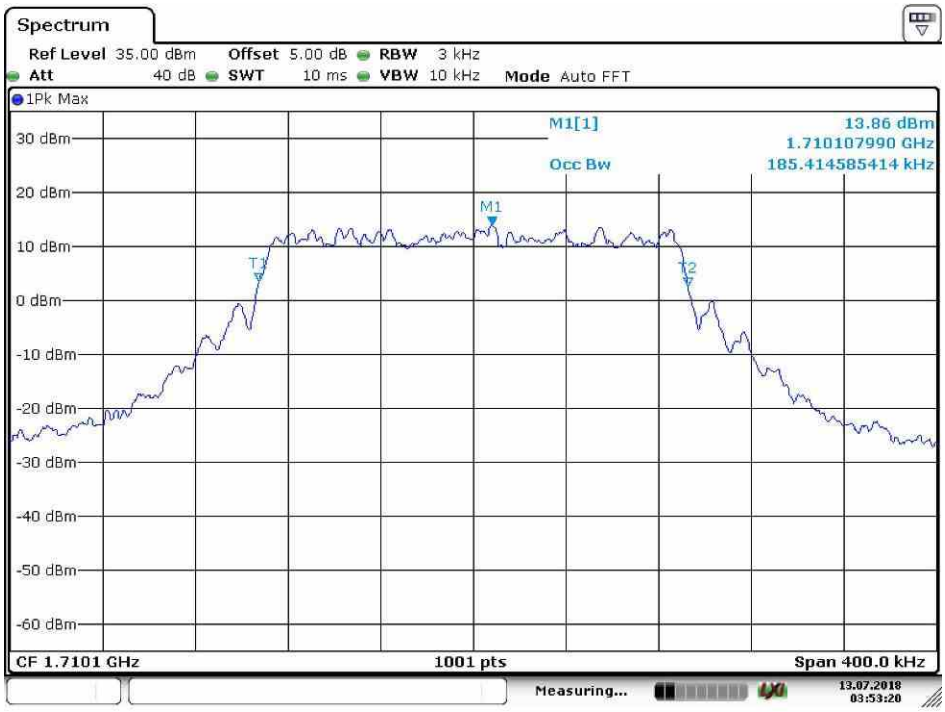
4.1.1 Test Band = LTE-NB1 BAND4

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

4.1.1.1.1 Test Channel = LCH

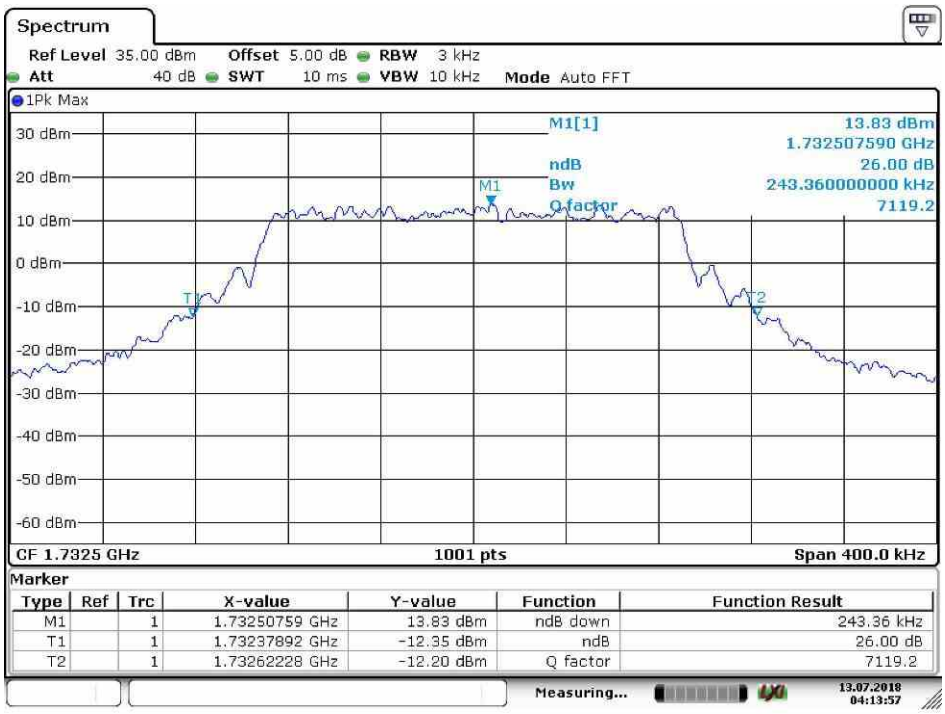


Date: 13.JUL.2018 03:52:57

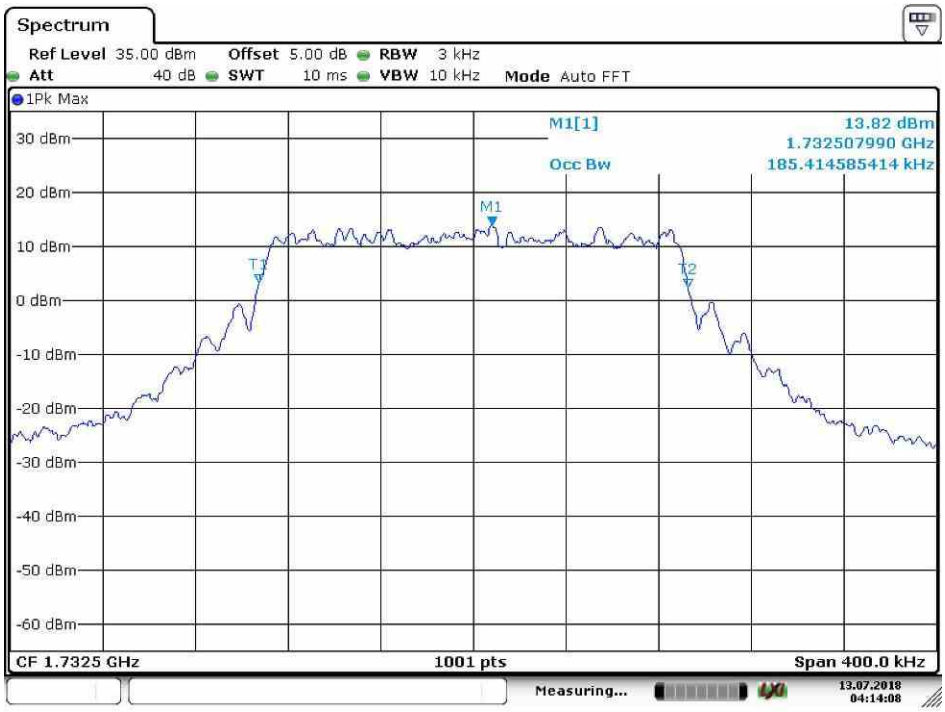


Date: 13.JUL.2018 03:53:21

4.1.1.1.2 Test Channel = MCH

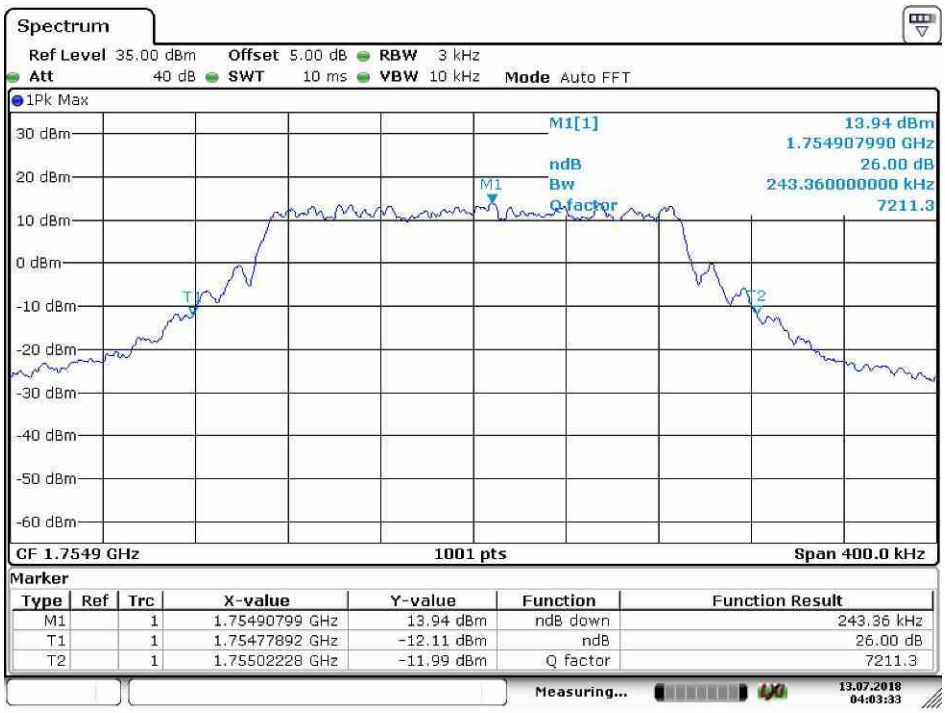


Date: 13.JUL.2018 04:13:58

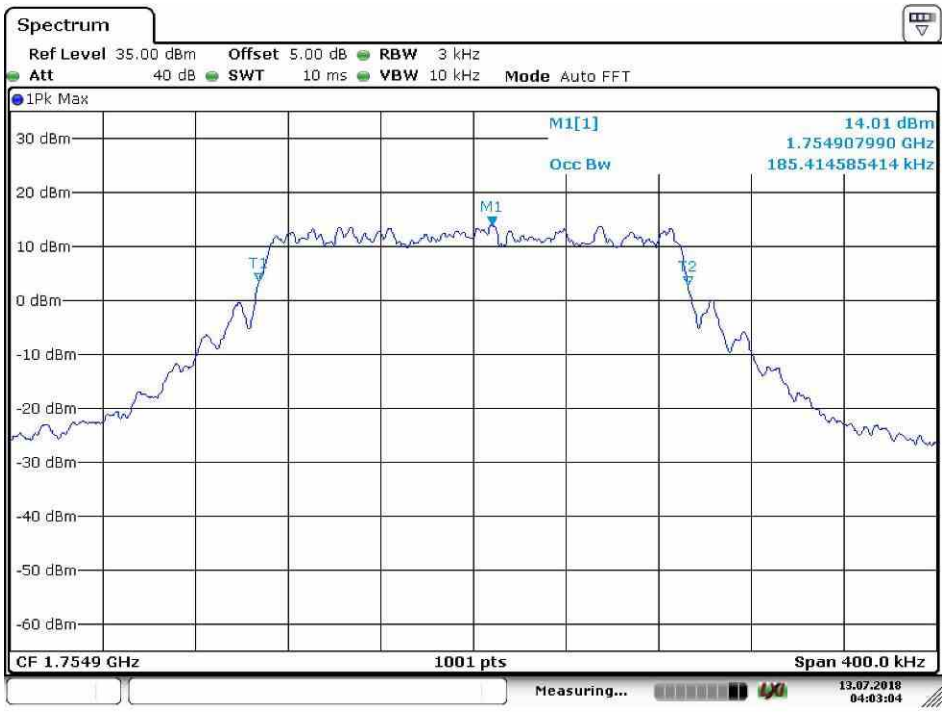


Date: 13.JUL.2018 04:14:08

4.1.1.1.3 Test Channel = HCH



Date: 13.JUL.2018 04:03:33



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

5 Band Edges Compliance

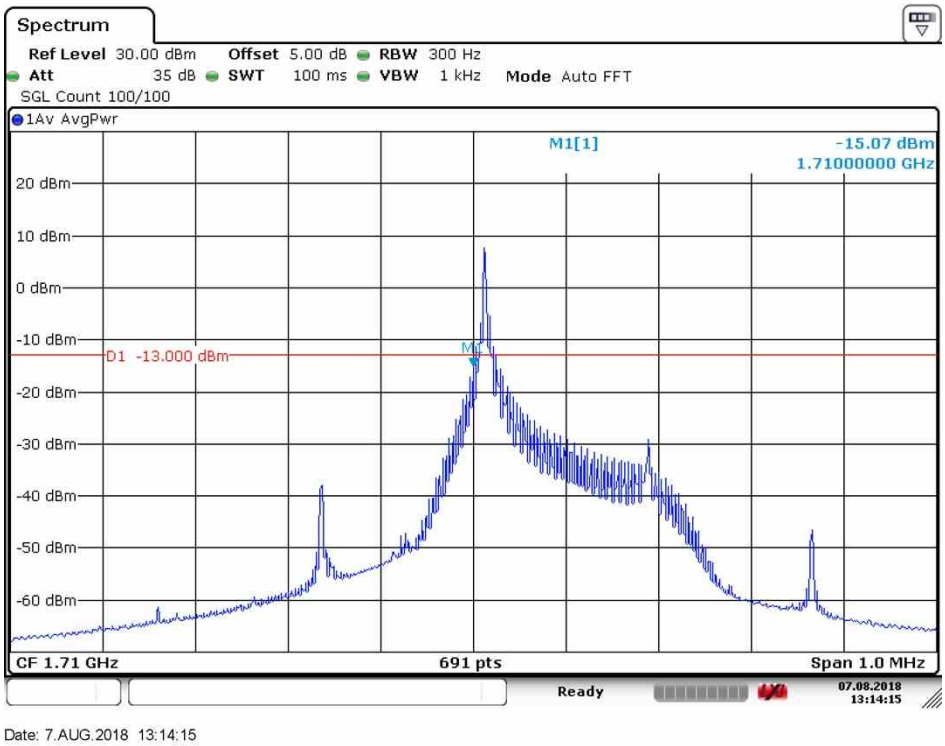
5.1 For LTE-NB1

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

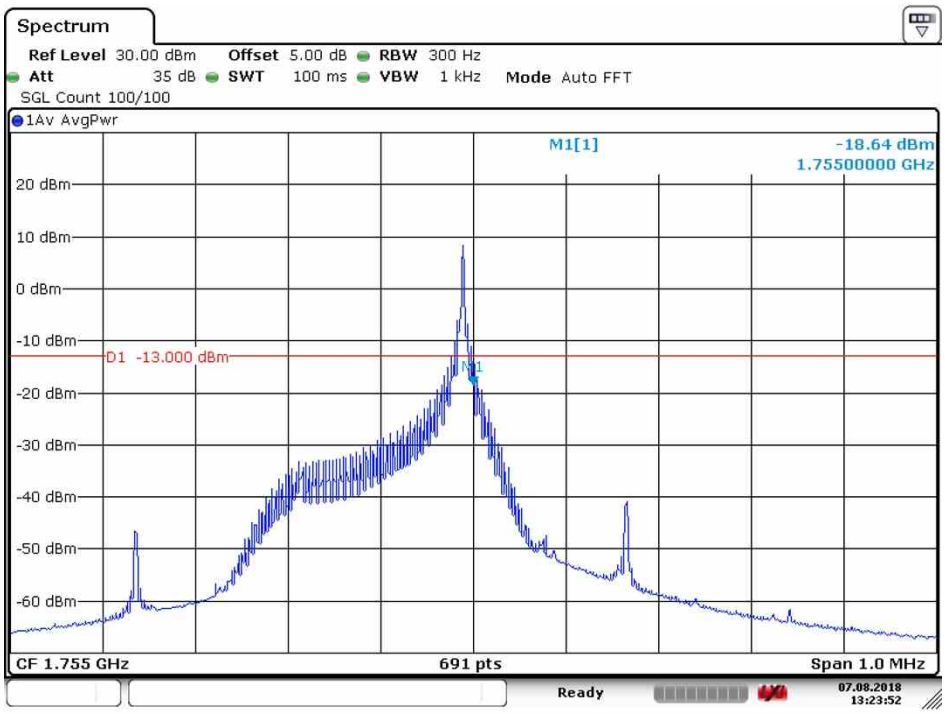
5.1.1.1.1.1 Test T size=1T



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

5.1.1.1.2 Test Channel = HCH

5.1.1.1.2.1 Test T size=1T

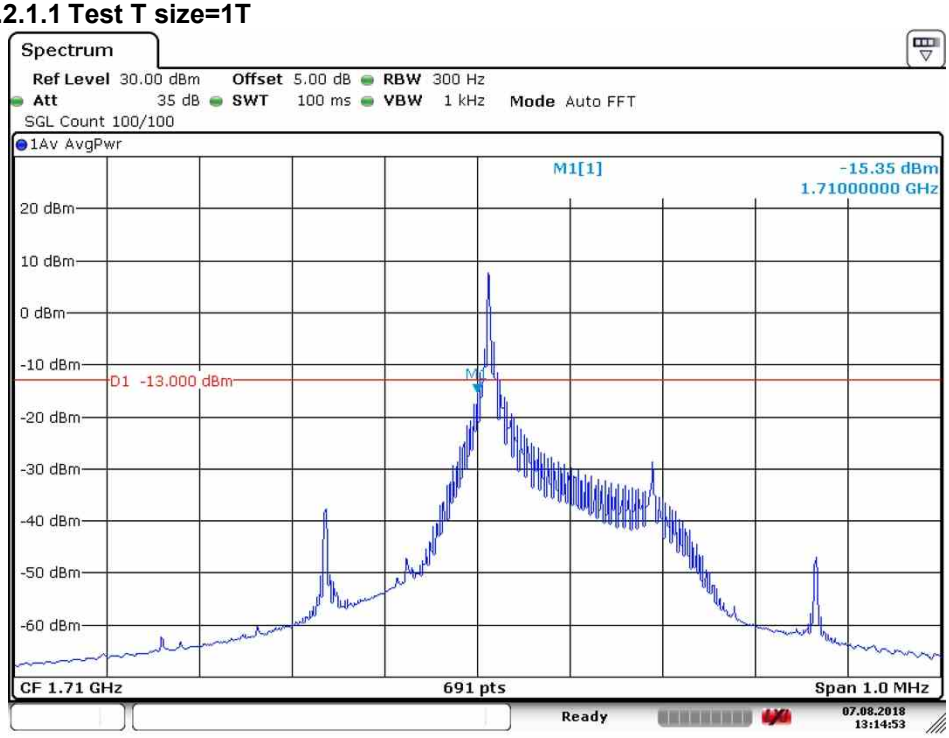


Date: 7.AUG.2018 13:23:52

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

5.1.1.2.1 Test Channel = LCH

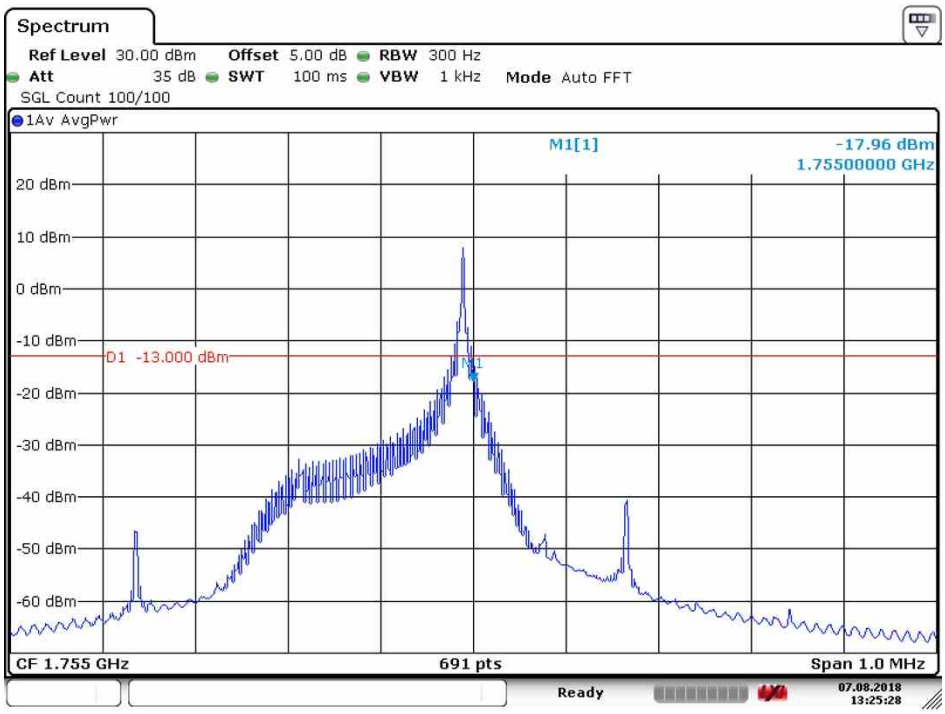
5.1.1.2.1.1 Test T size=1T



Date: 7.AUG.2018 13:14:53

5.1.1.2.2 Test Channel = HCH

5.1.1.2.2.1 Test T size=1T

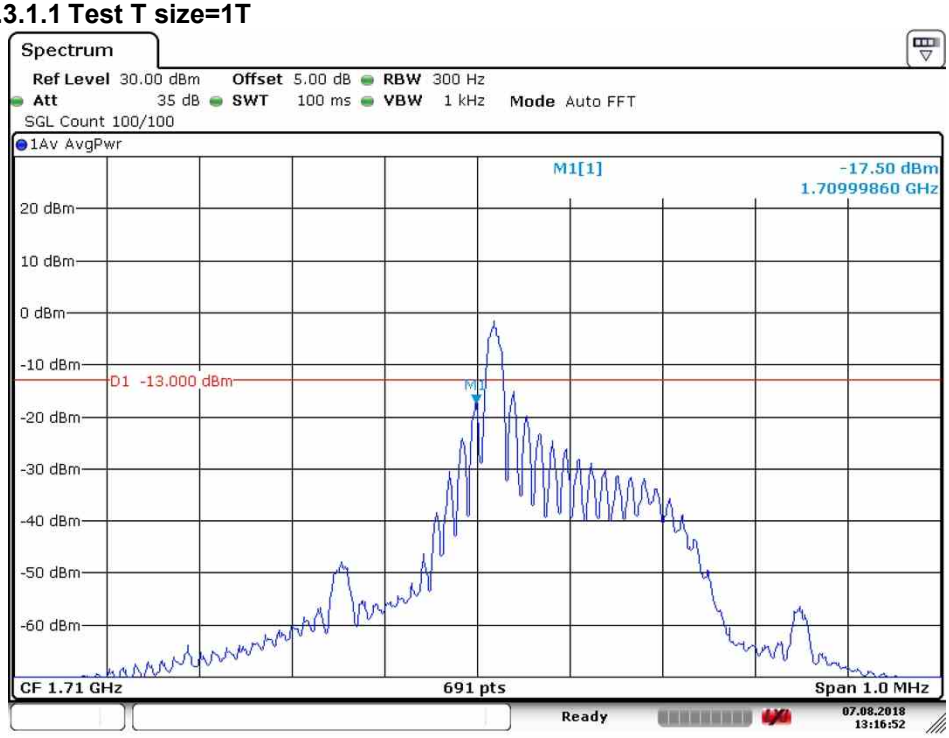


Date: 7.AUG.2018 13:25:29

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

5.1.1.3.1 Test Channel = LCH

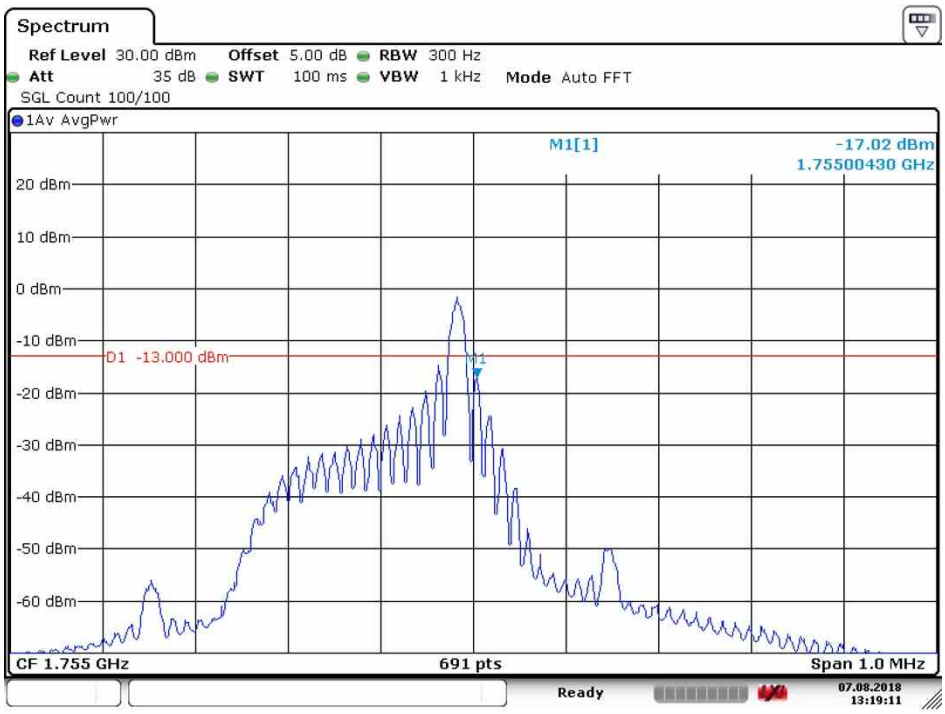
5.1.1.3.1.1 Test T size=1T



Date: 7.AUG.2018 13:16:53

5.1.1.3.2 Test Channel = HCH

5.1.1.3.2.1 Test T size=1T

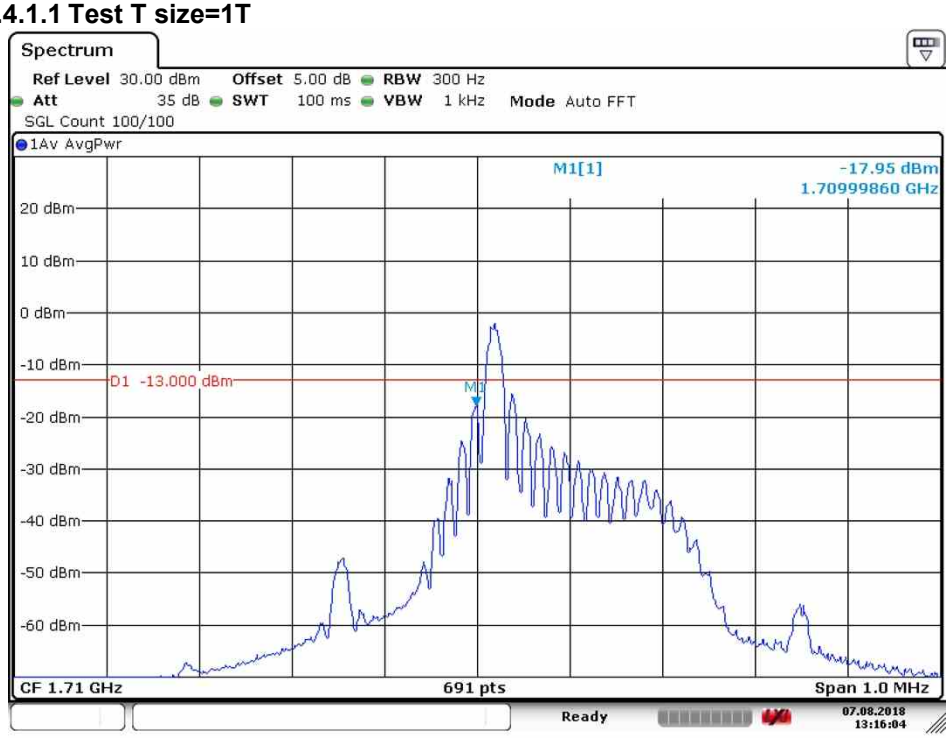


Date: 7.AUG.2018 13:19:11

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

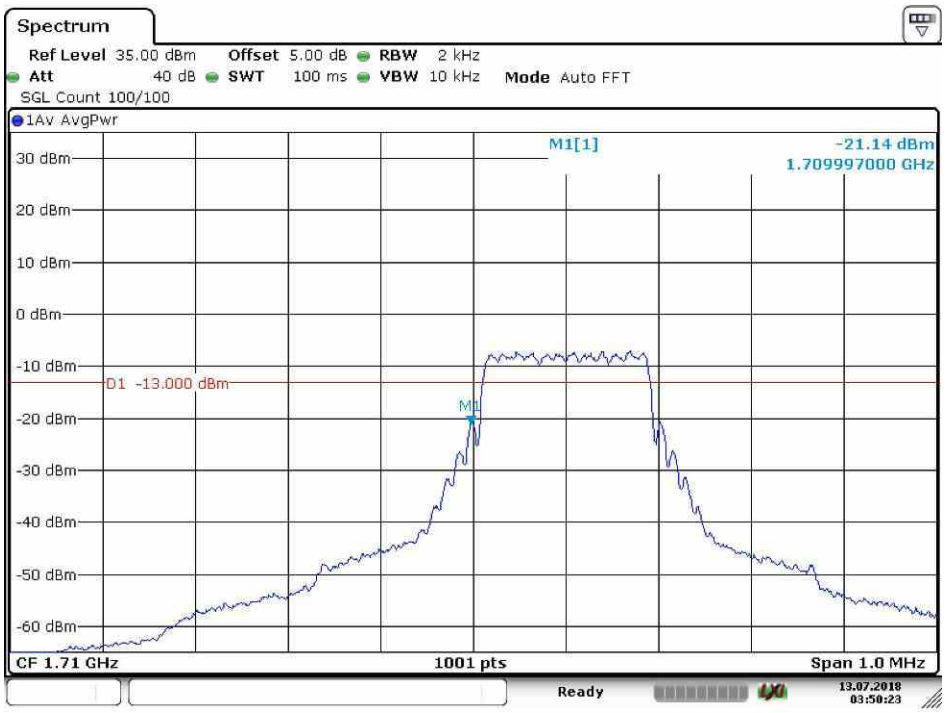
5.1.1.4.1 Test Channel = LCH

5.1.1.4.1.1 Test T size=1T



Date: 7.AUG.2018 13:16:03

5.1.1.4.1.2 Test T size=Full T



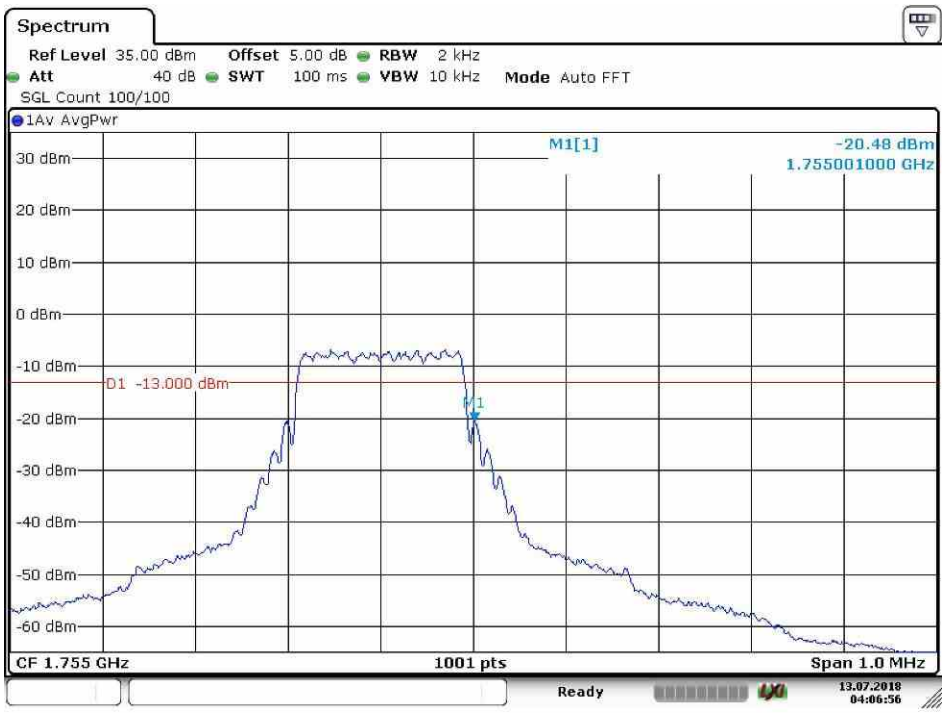
Date: 13.JUL.2018 03:50:23

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

5.1.1.4.2.2 Test T size=Full T



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

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.

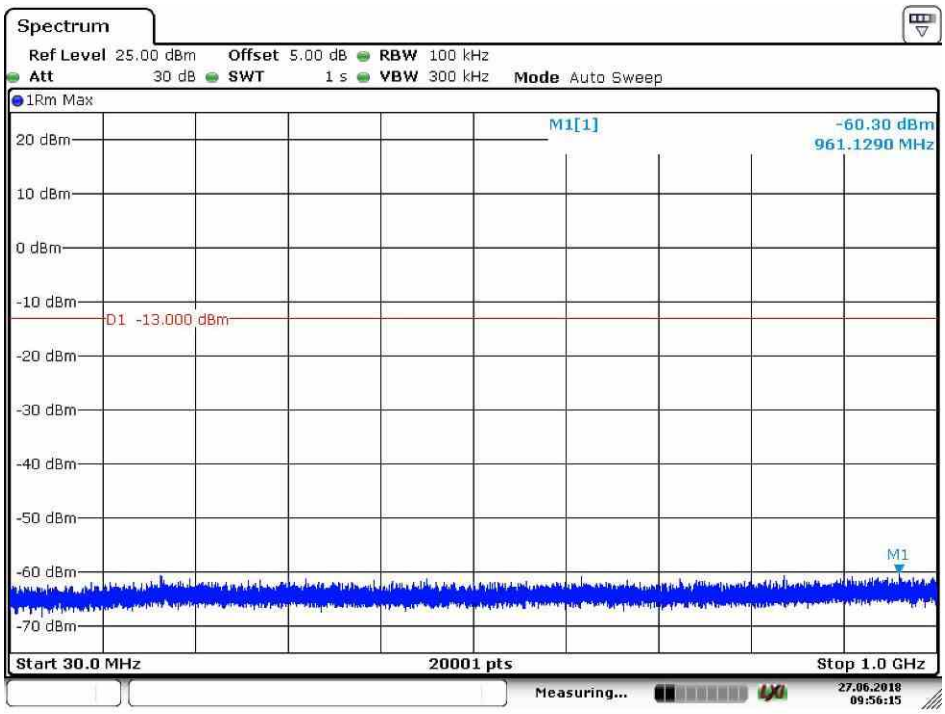
Part I - Test Plots

6.1 For LTE-NB1

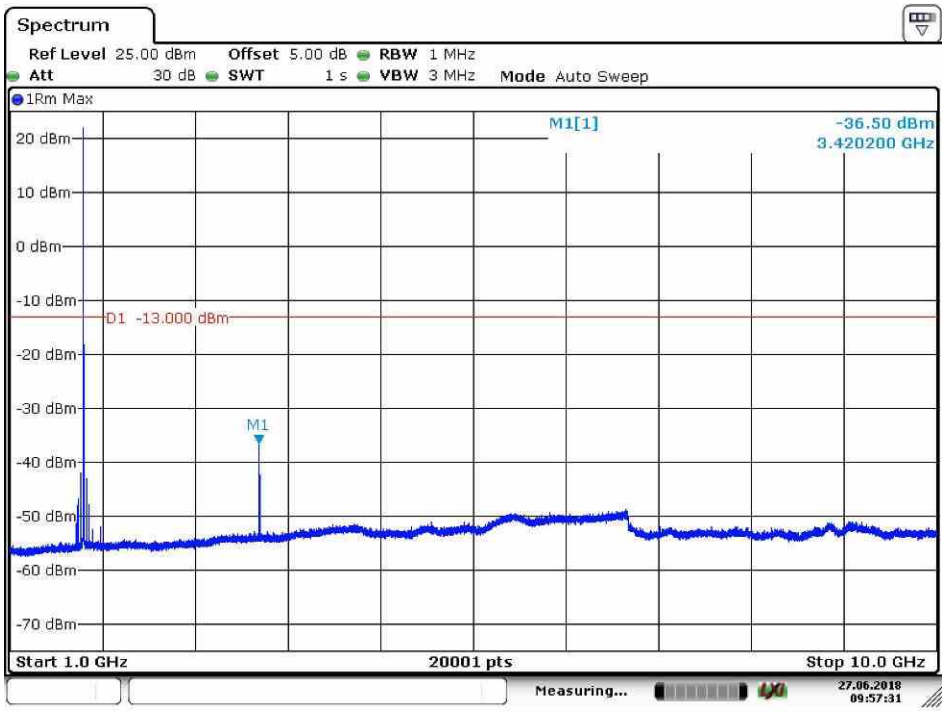
6.1.1 Test Band = LTE-NB1 BAND4

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

6.1.1.1.1 Test Channel = LCH



Date: 27.JUN.2018 09:56:15



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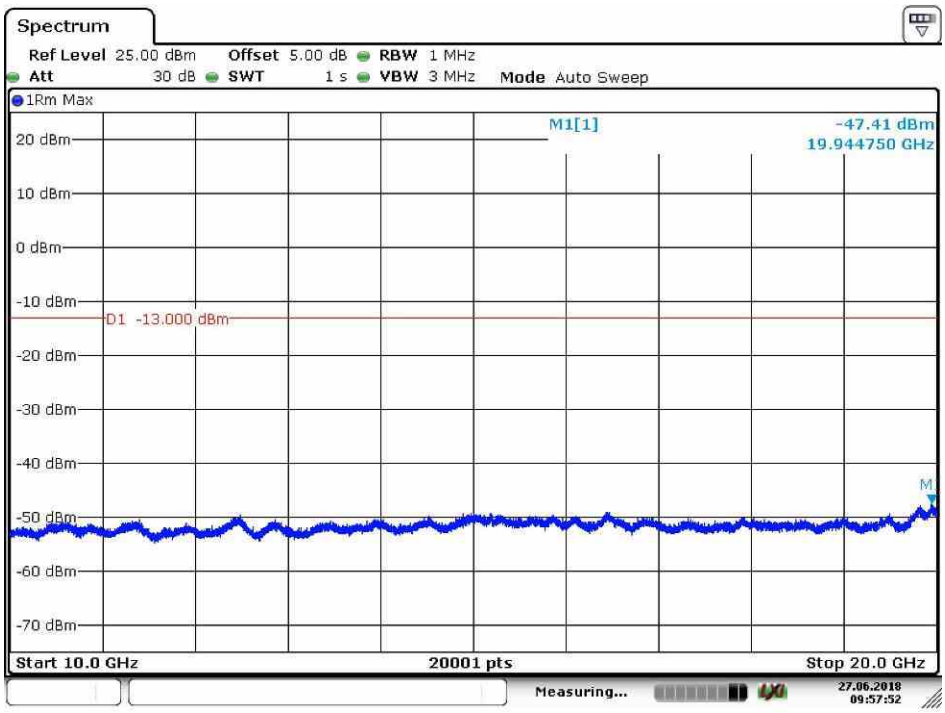
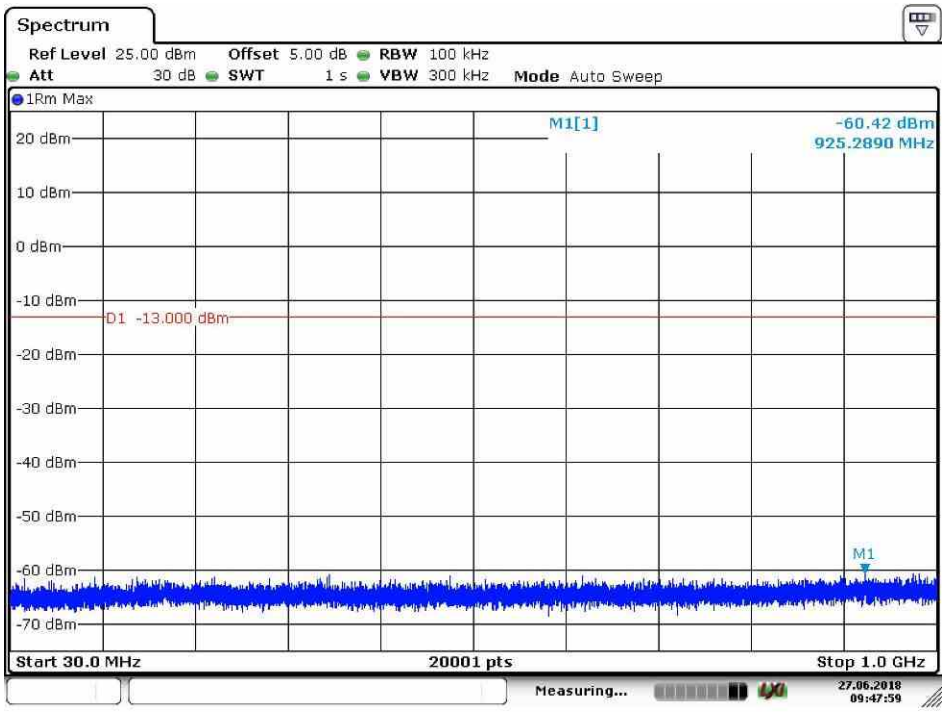


Date: 27.JUN.2018 09:57:51

6.1.1.1.2 Test Channel = MCH



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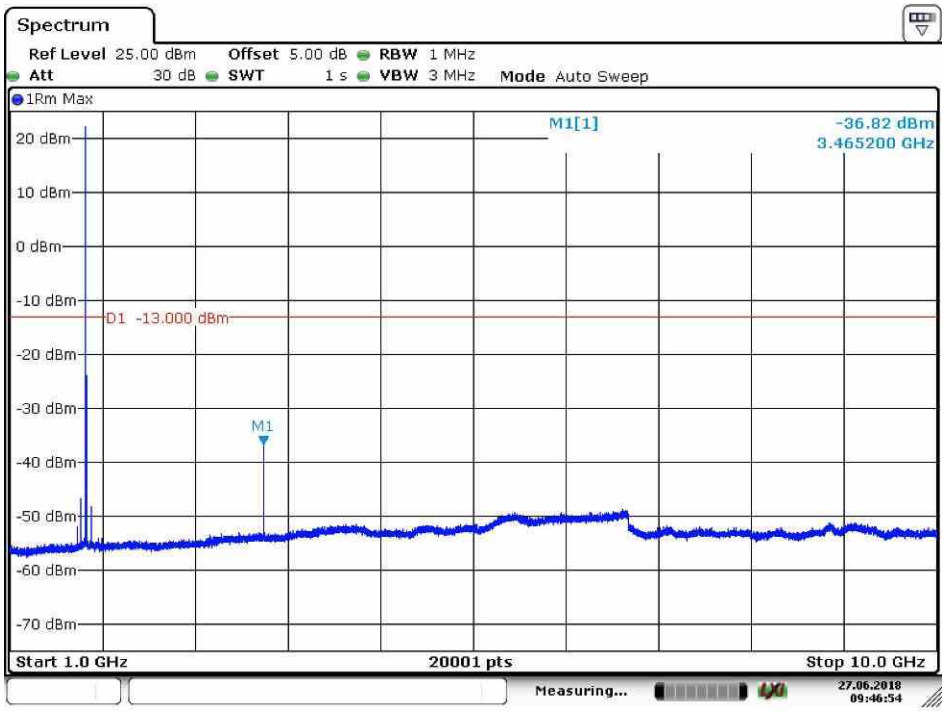

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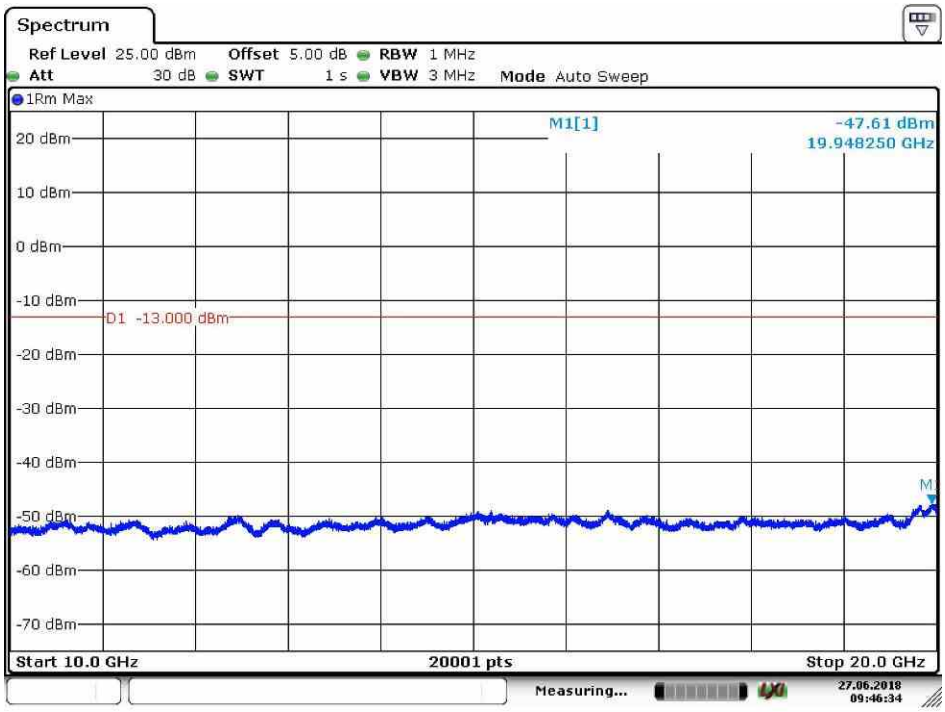
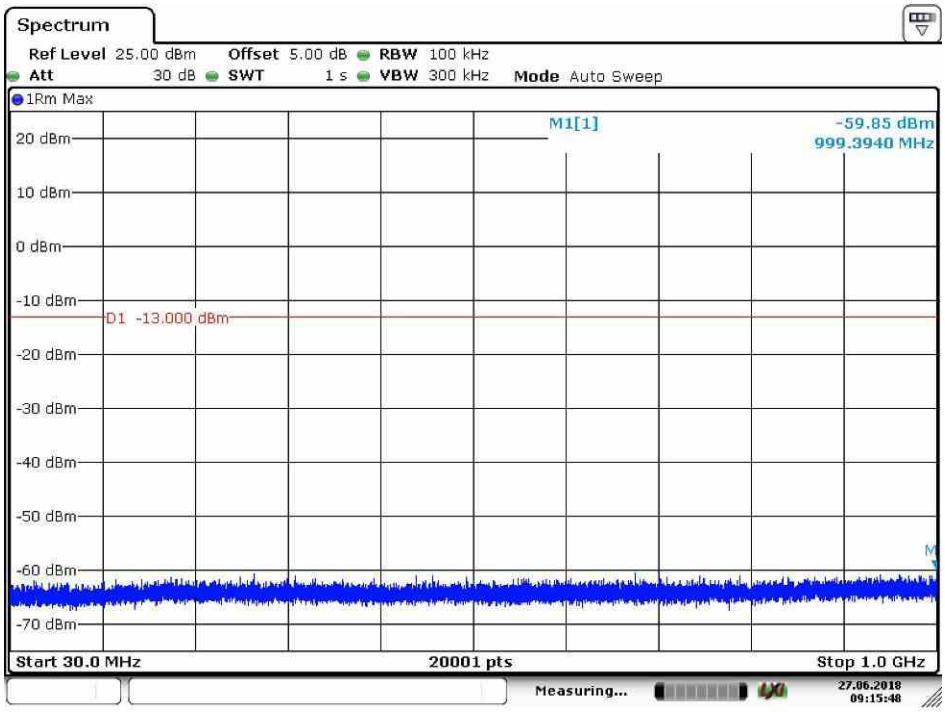
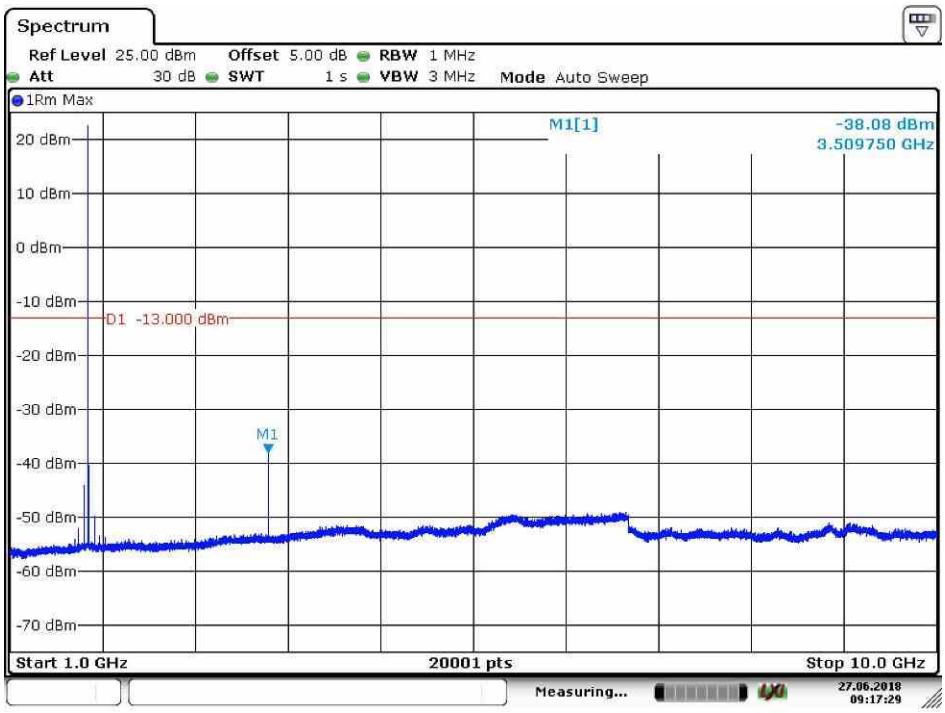


Date: 27.JUN.2018 09:46:34

6.1.1.1.3 Test Channel = HCH



Date: 27.JUN.2018 09:15:48



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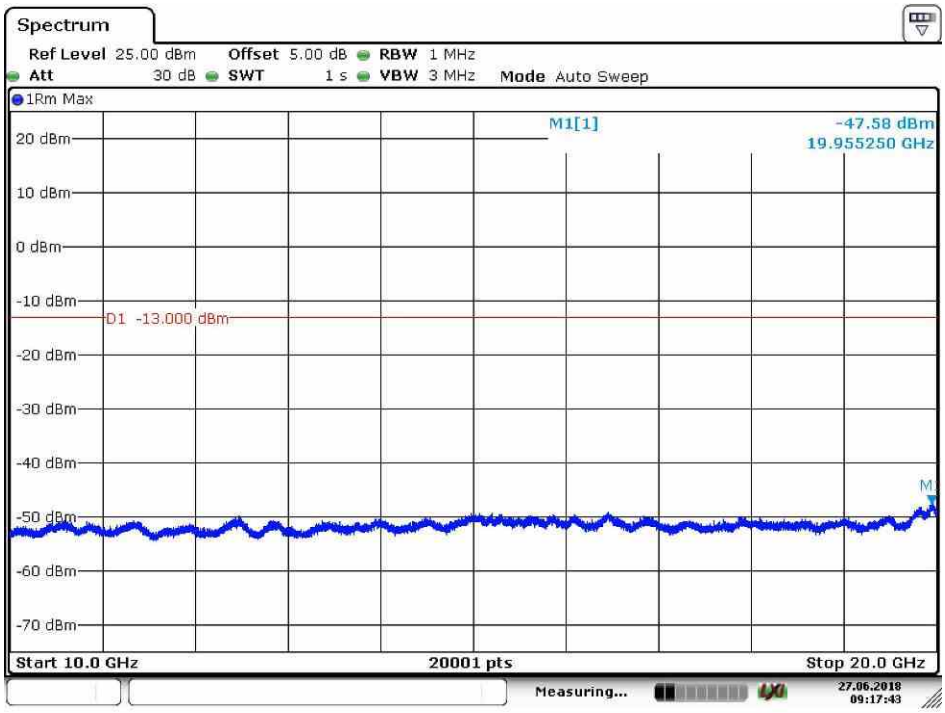
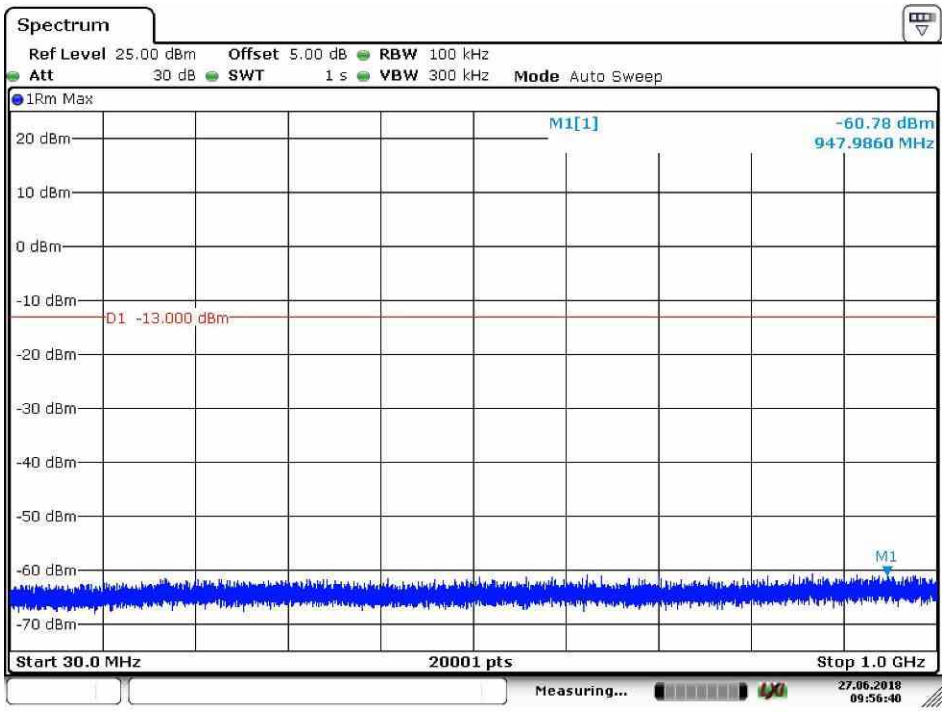


Date: 27.JUN.2018 09:17:44

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

6.1.1.2.1 Test Channel = LCH



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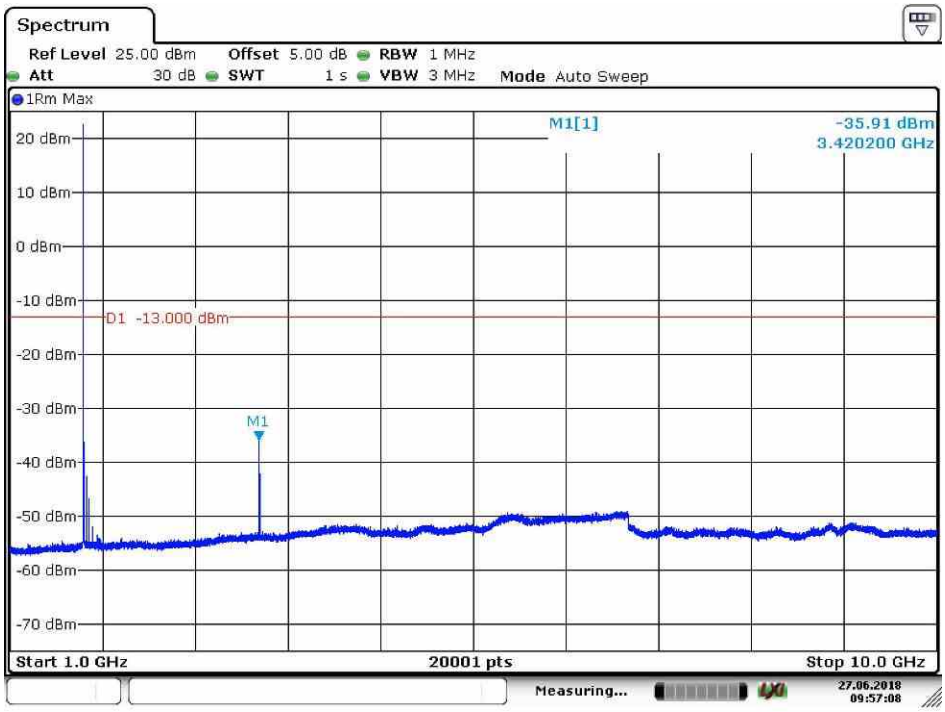

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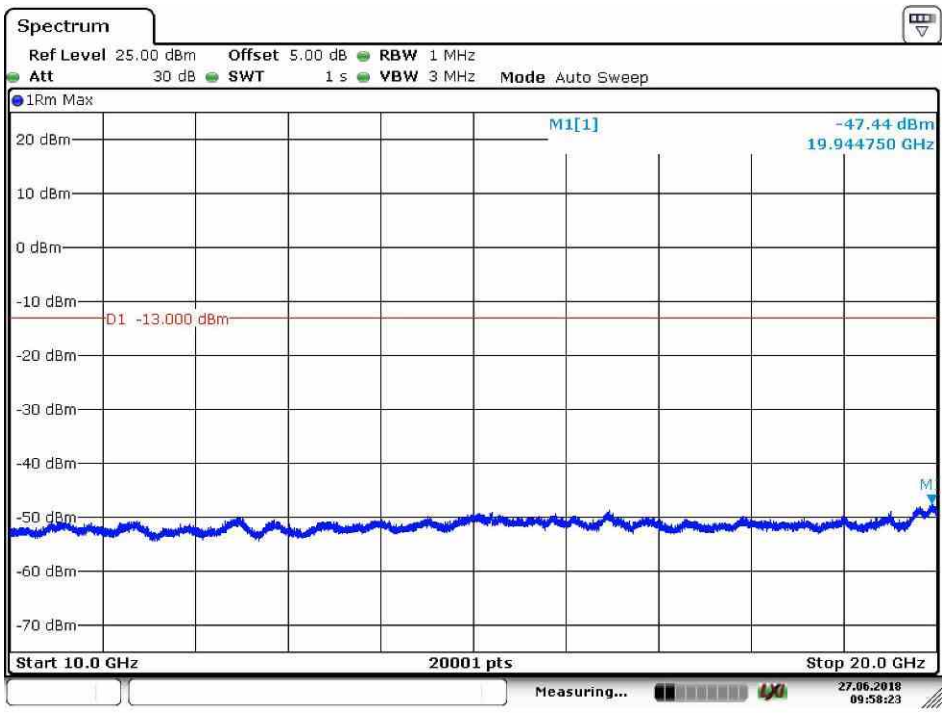
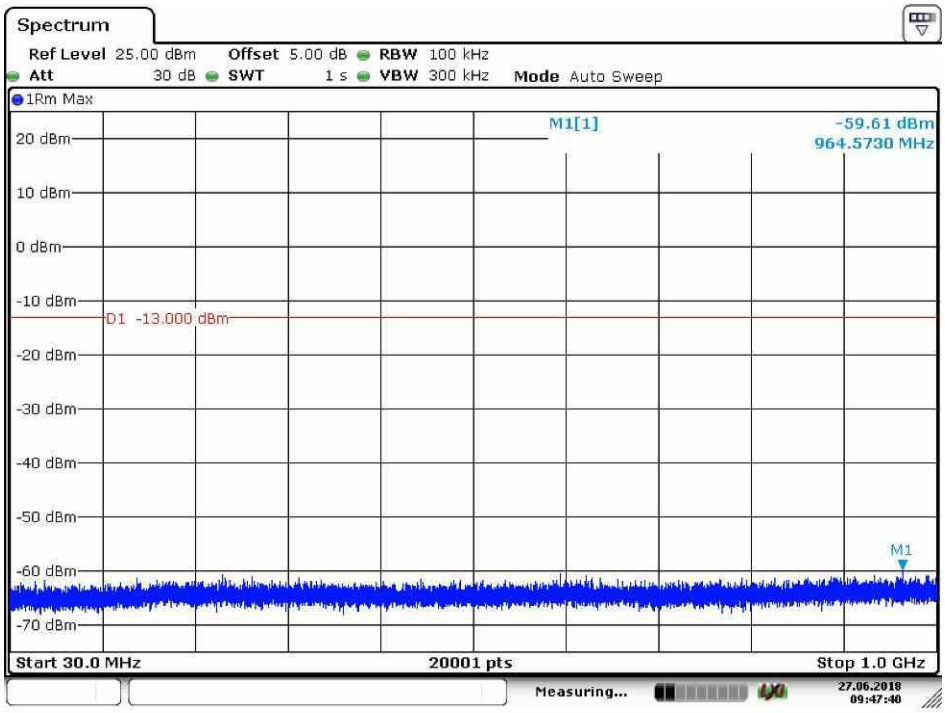


Date: 27.JUN.2018 09:58:23

6.1.1.2.2 Test Channel = MCH



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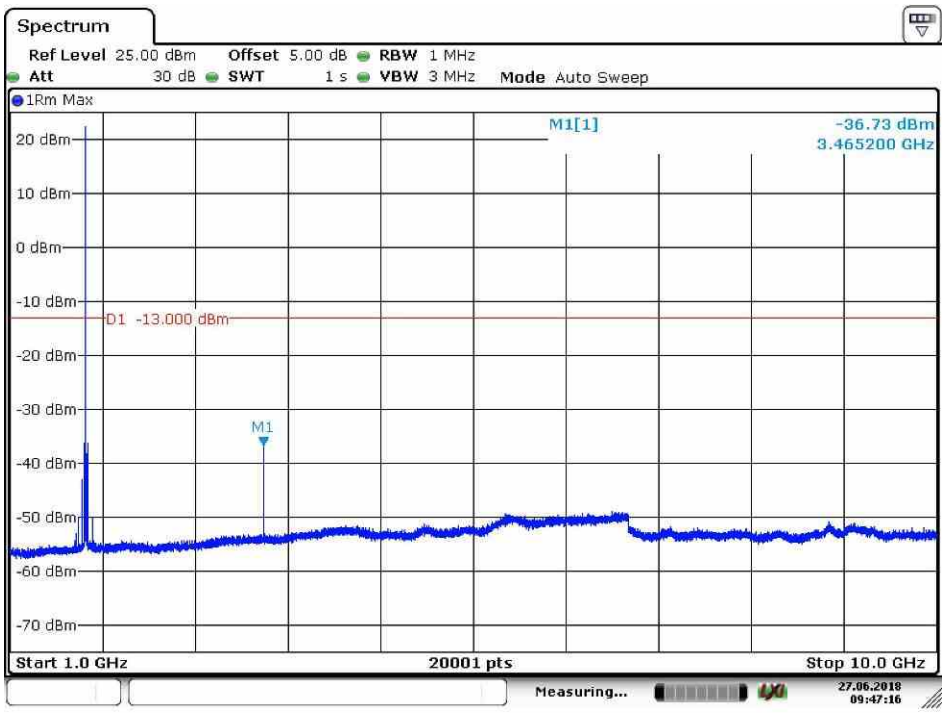

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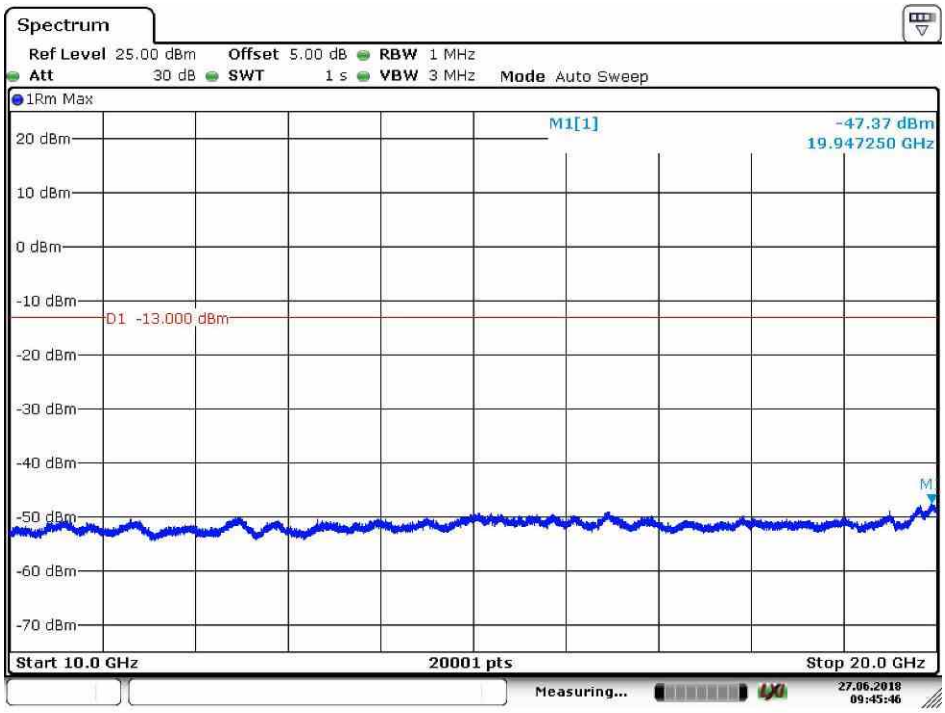
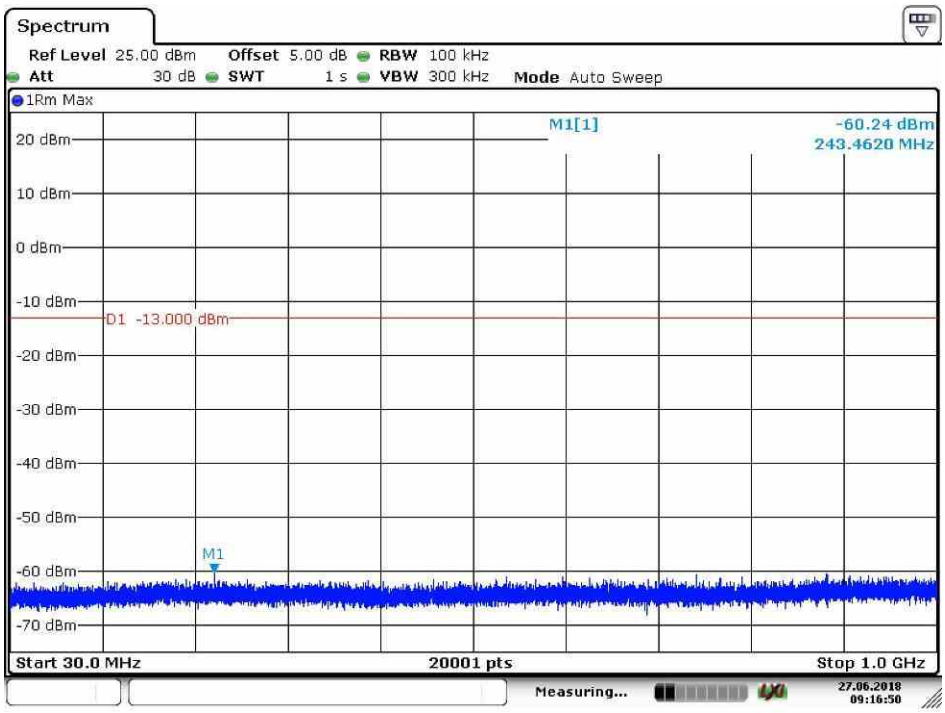
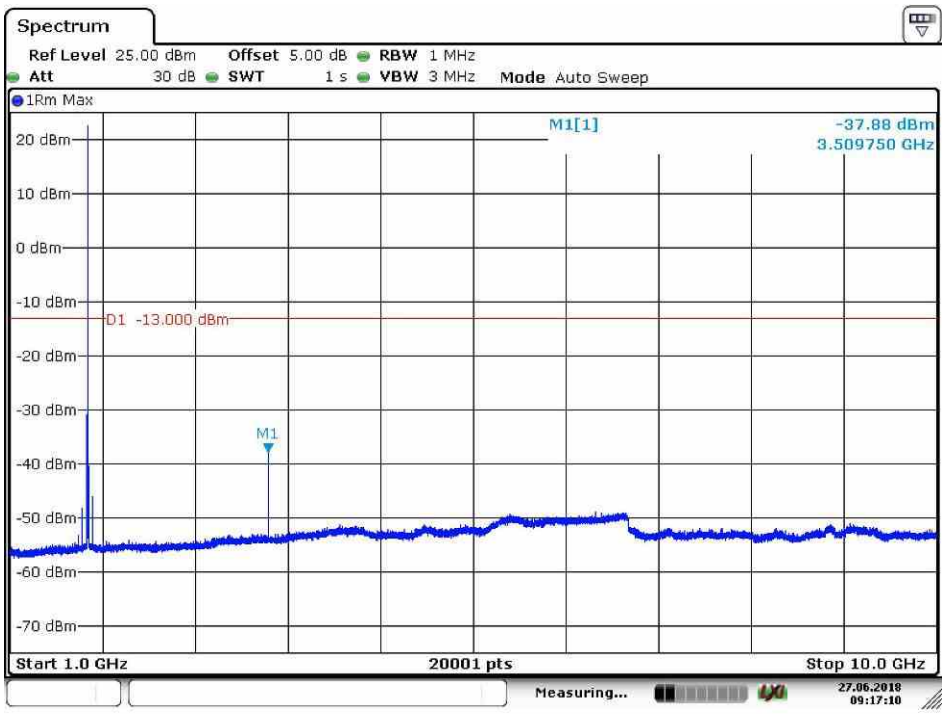


Date: 27.JUN.2018 09:45:46

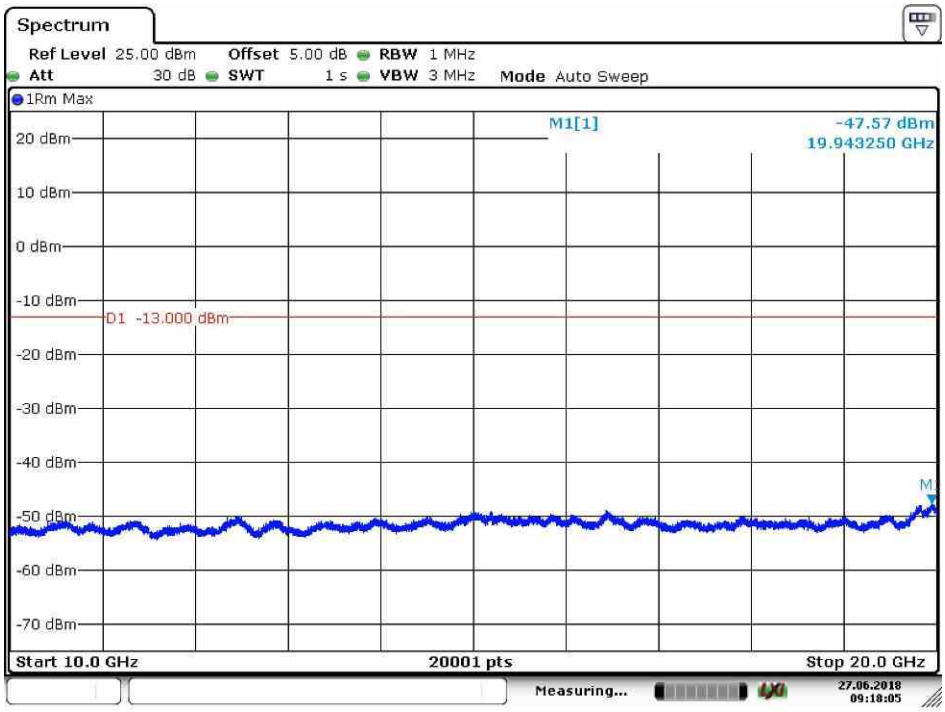
6.1.1.2.3 Test Channel = HCH



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



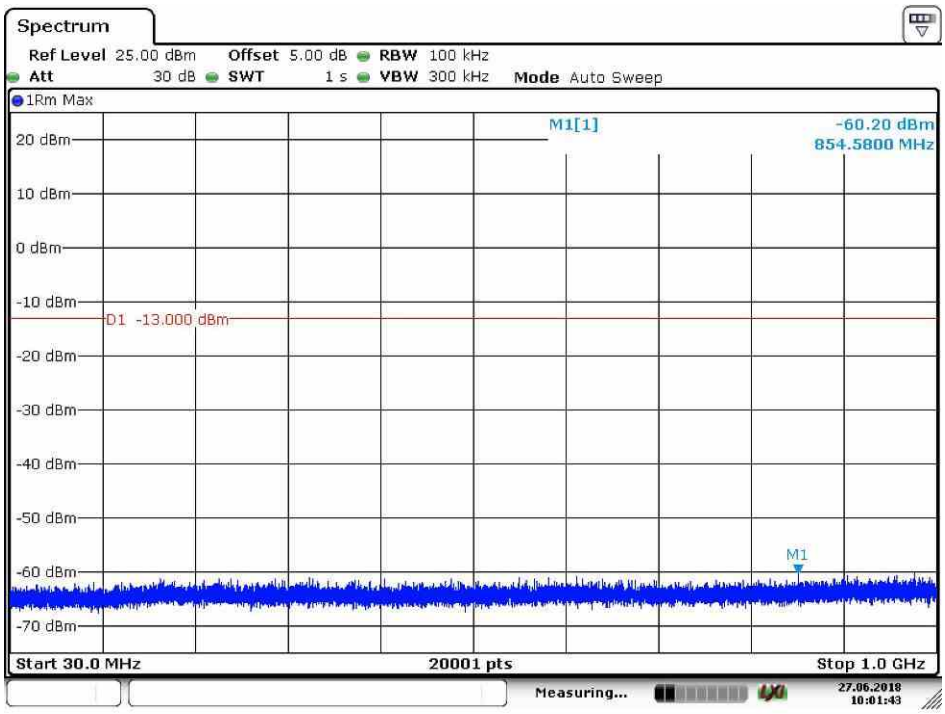
Date: 27.JUN.2018 09:17:10



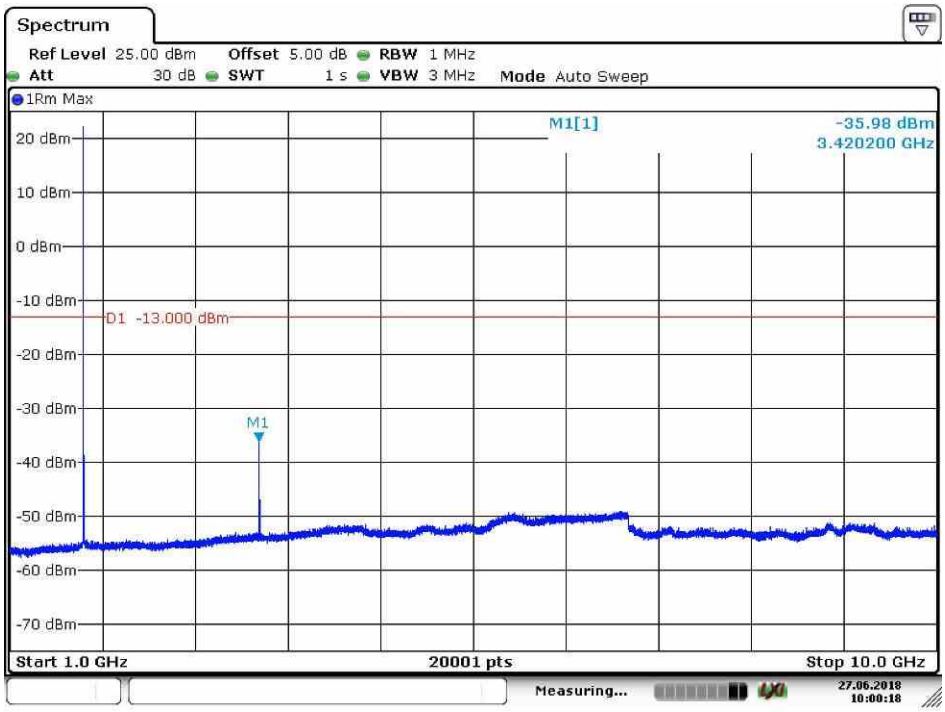
Date: 27.JUN.2018 09:18:05

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

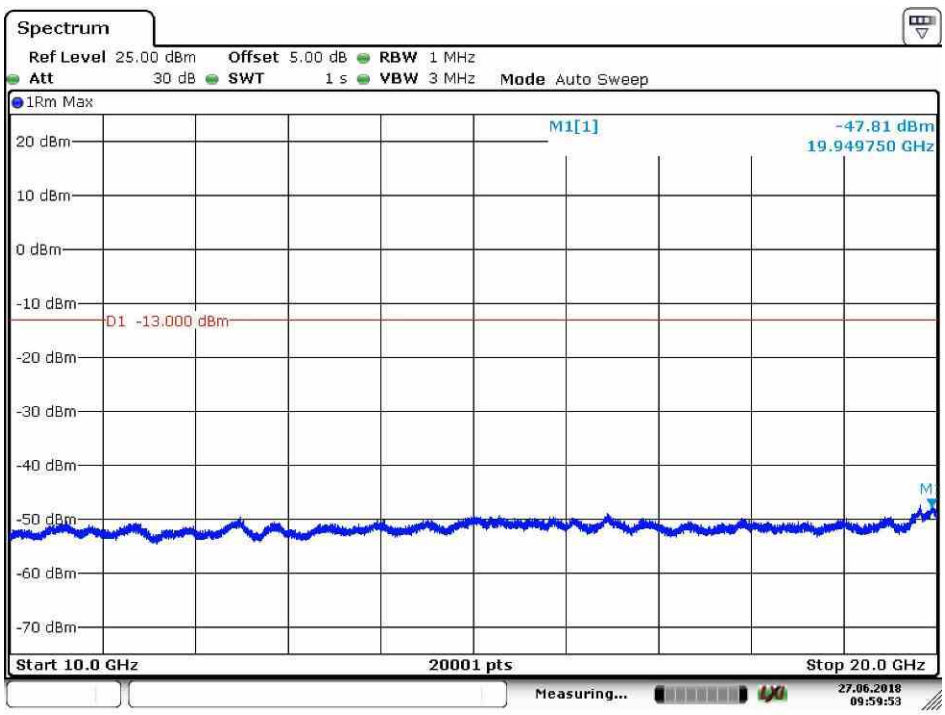
6.1.1.3.1 Test Channel = LCH



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

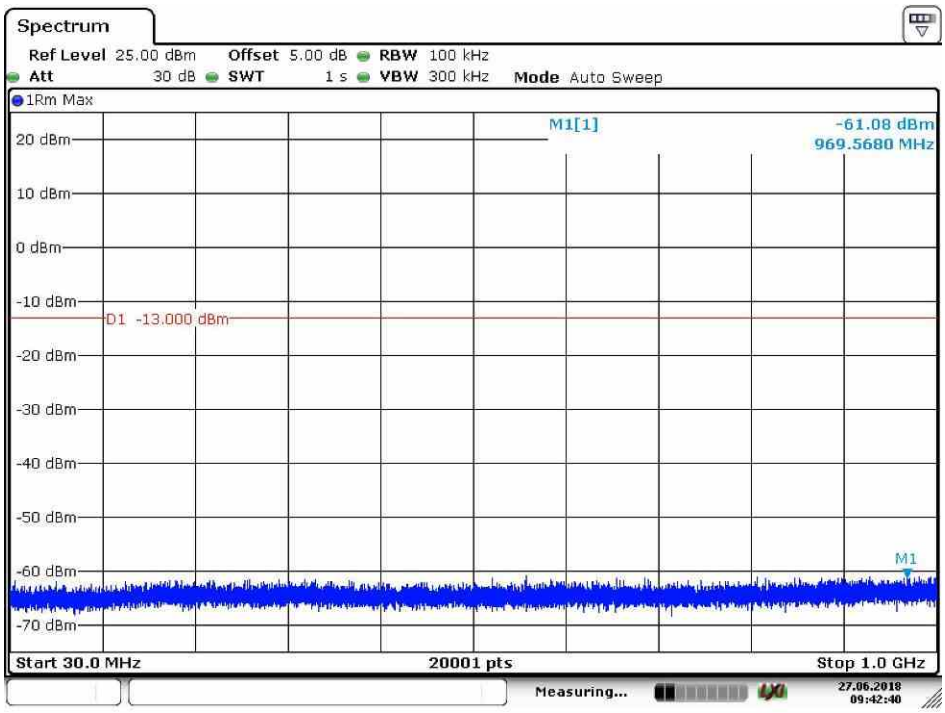


Date: 27.JUN.2018 10:00:18

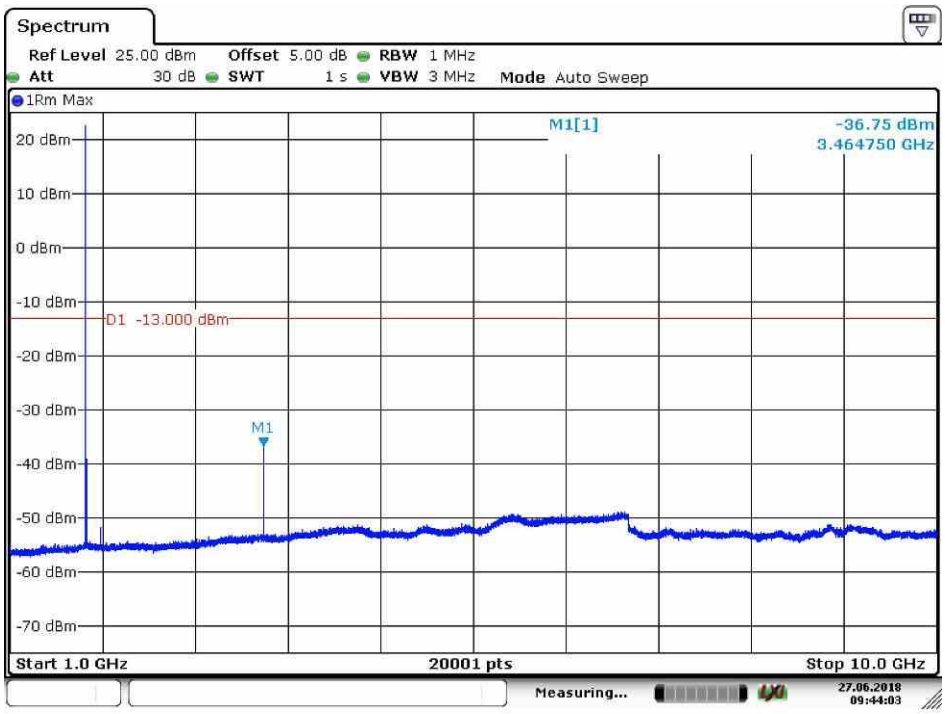


Date: 27.JUN.2018 09:59:53

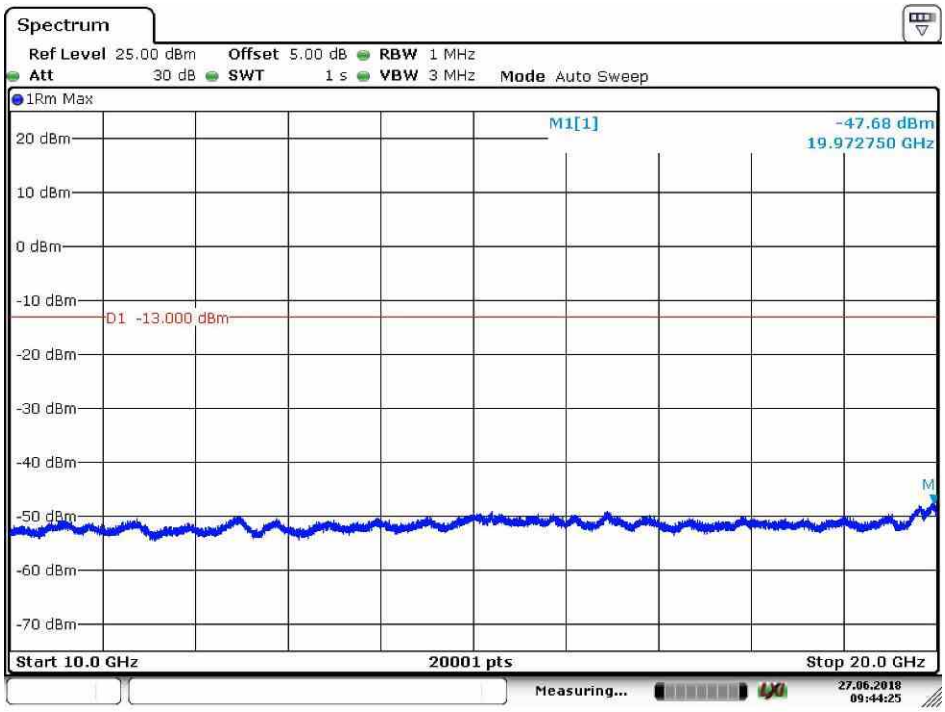
6.1.1.3.2 Test Channel = MCH



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

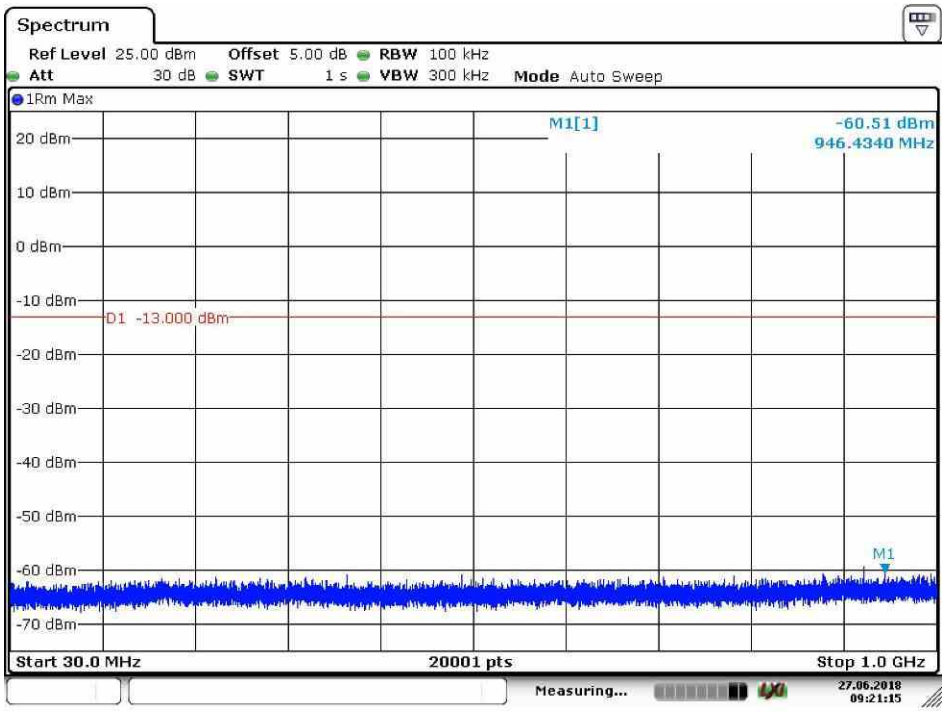


Date: 27.JUN.2018 09:44:04

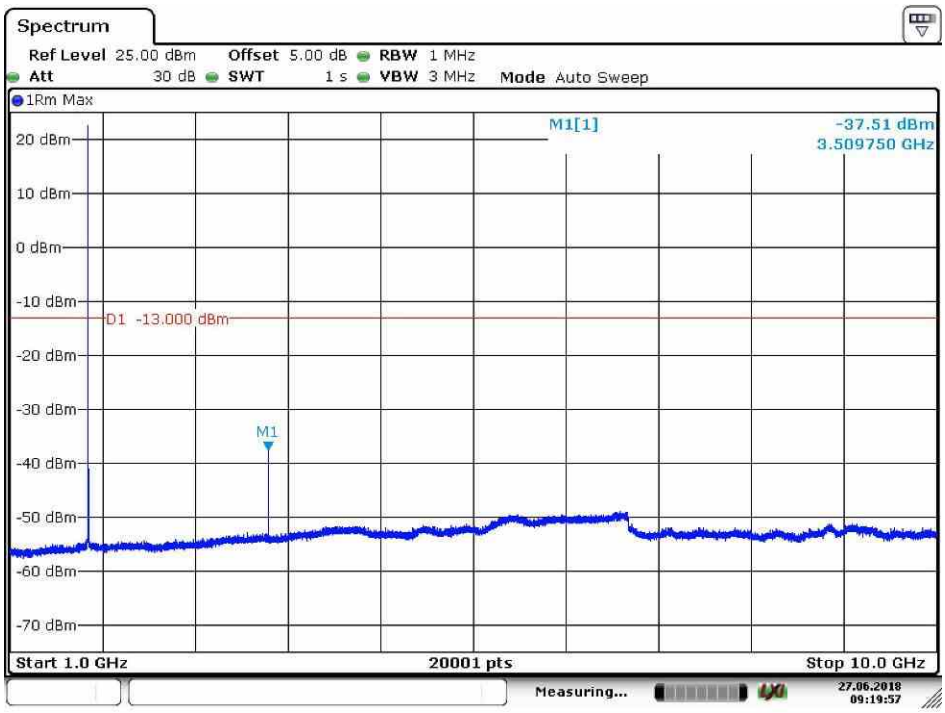


Date: 27.JUN.2018 09:44:25

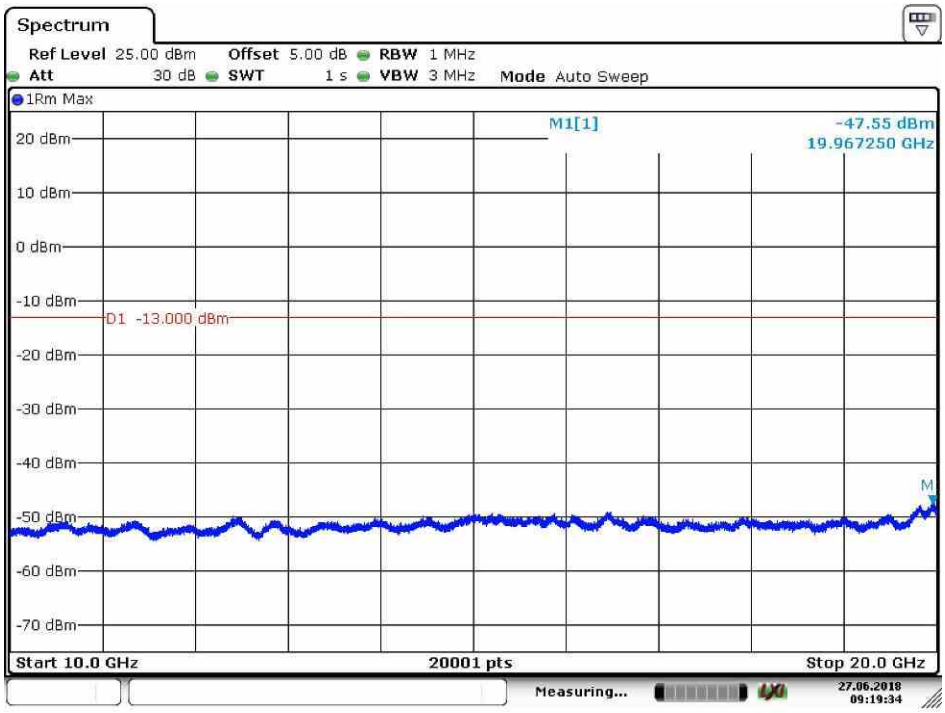
6.1.1.3.3 Test Channel = HCH



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



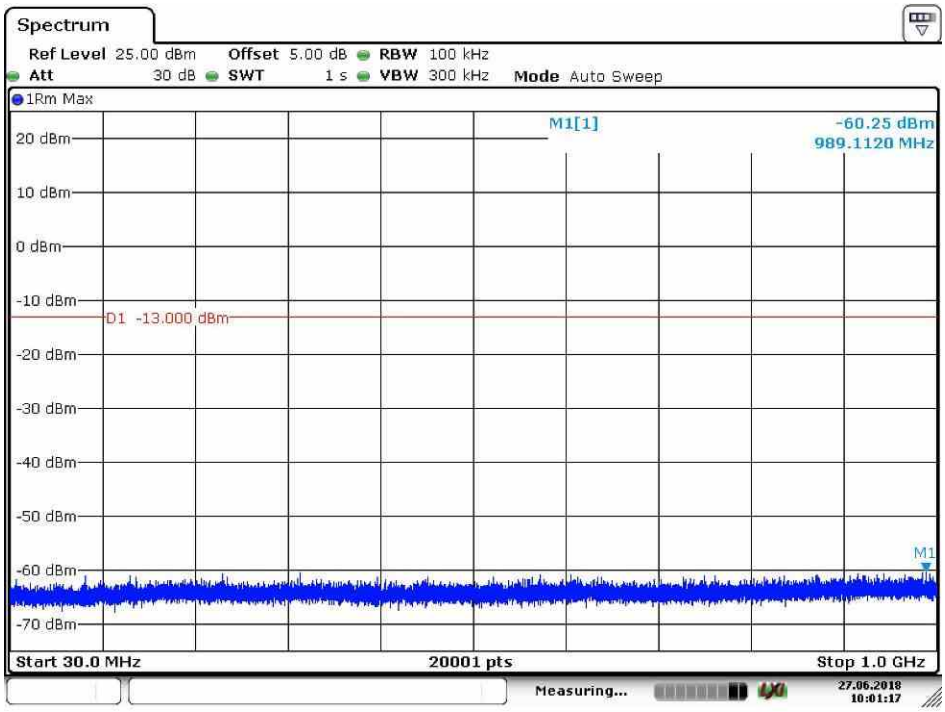
Date: 27.JUN.2018 09:19:57



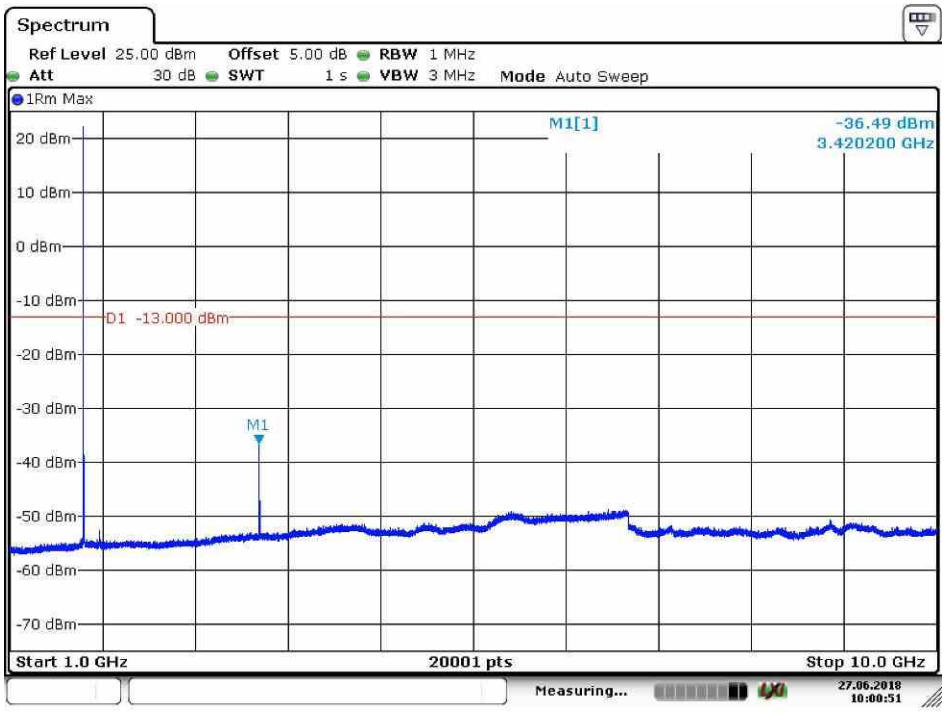
Date: 27.JUN.2018 09:19:34

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

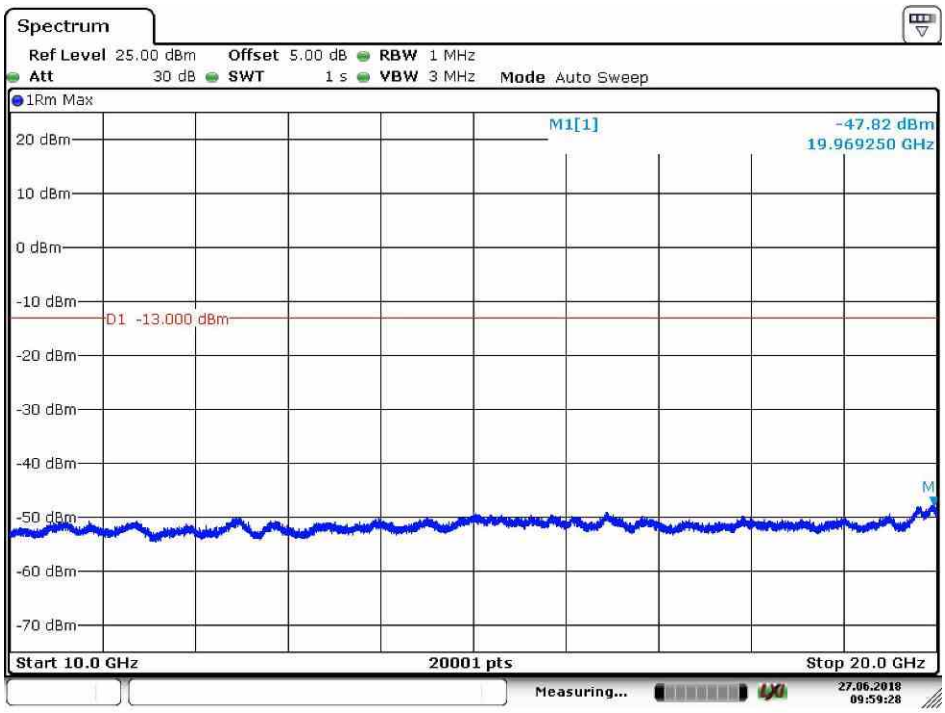
6.1.1.4.1 Test Channel = LCH



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

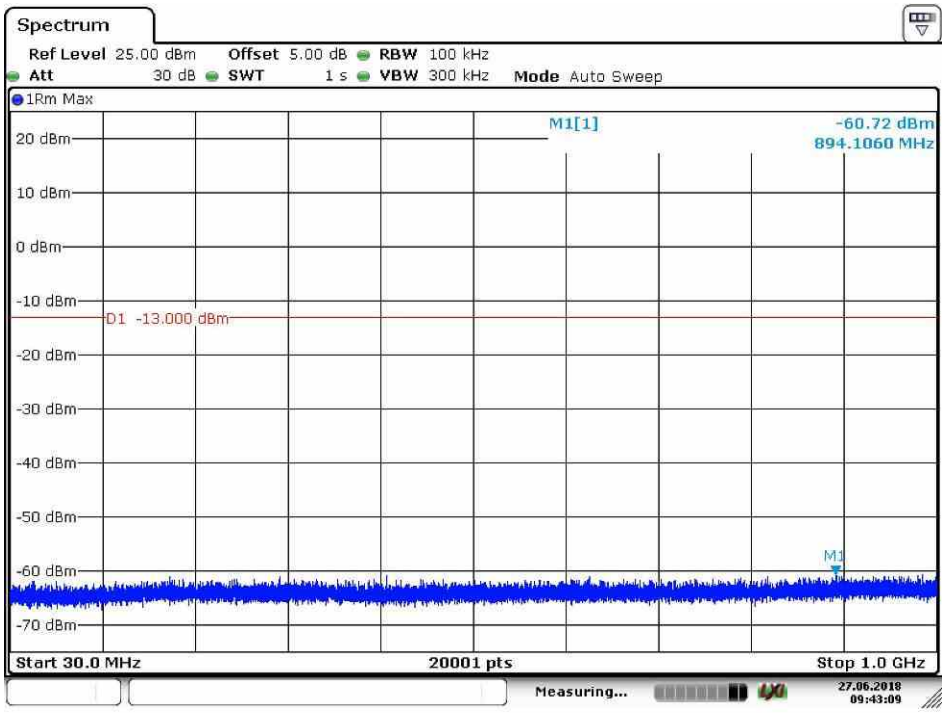


Date: 27.JUN.2018 10:00:51

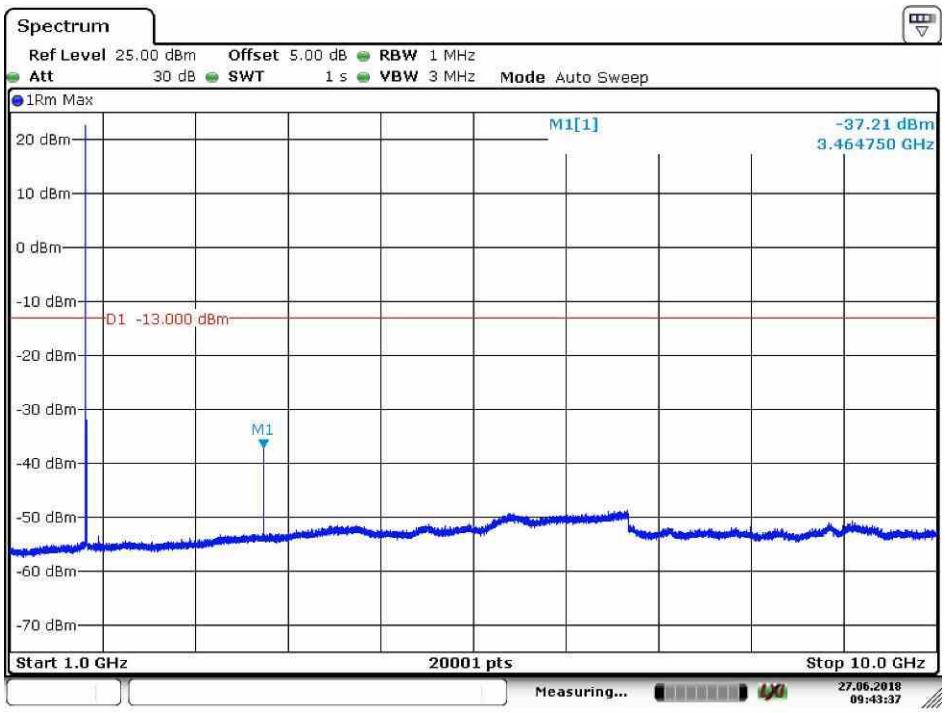


Date: 27.JUN.2018 09:59:28

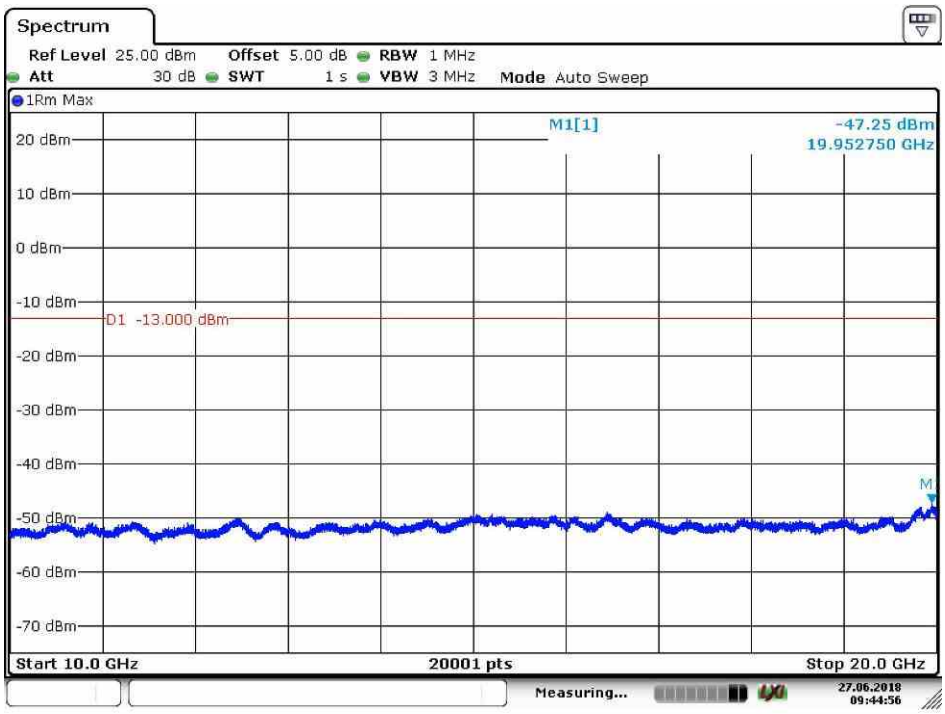
6.1.1.4.2 Test Channel = MCH



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

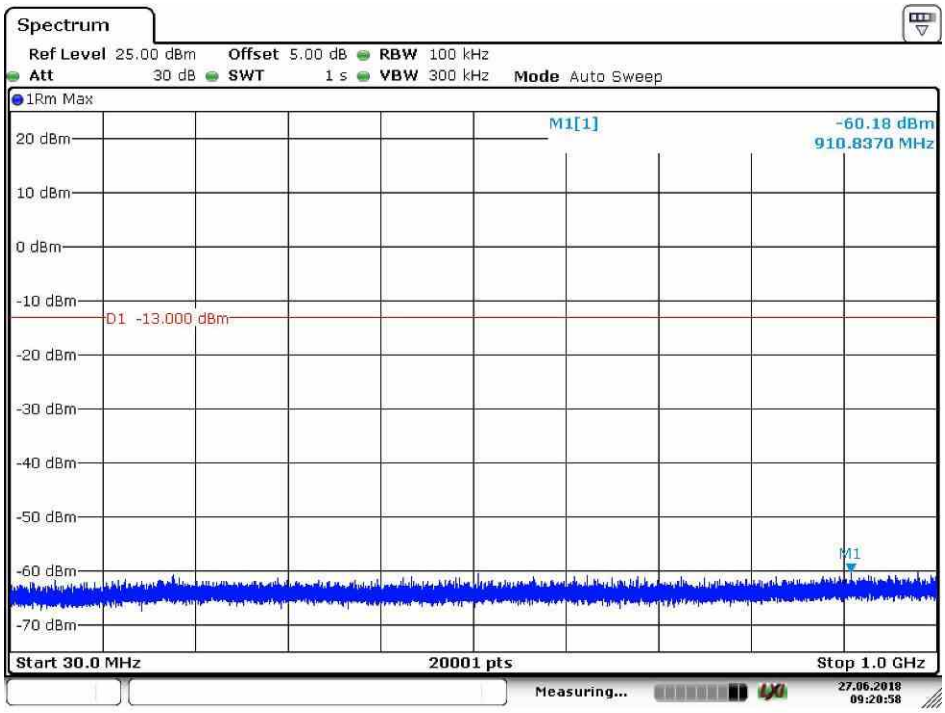


Date: 27.JUN.2018 09:43:37

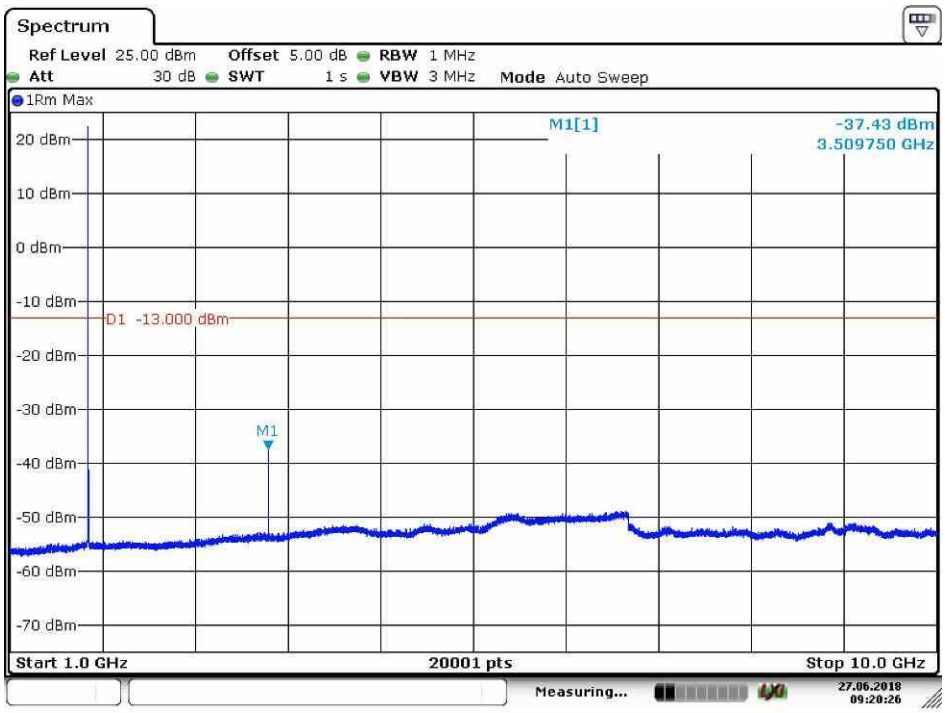


Date: 27.JUN.2018 09:44:56

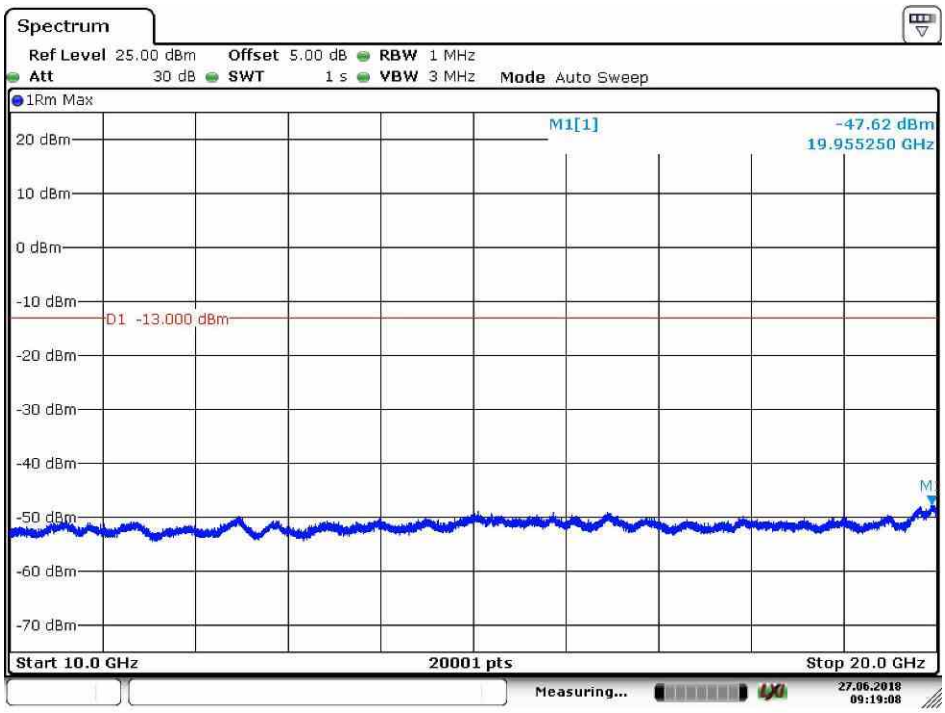
6.1.1.4.3 Test Channel = HCH



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



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



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

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

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.

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
BAND4	TM1/15k	LCH	TN	VL	11.19	0.006542	PASS
				VN	-7.35	-0.004301	PASS
				VH	-9.26	-0.005414	PASS
		MCH	TN	VL	-7.84	-0.004526	PASS
				VN	5.17	0.002983	PASS
				VH	3.61	0.002085	PASS
		HCH	TN	VL	-0.49	-0.000279	PASS
				VN	1.50	0.000854	PASS
				VH	-0.84	-0.000476	PASS
	TM2/15k	LCH	TN	VL	8.88	0.005195	PASS
				VN	-2.13	-0.001248	PASS
				VH	-7.16	-0.004189	PASS
		MCH	TN	VL	5.60	0.003233	PASS
				VN	5.24	0.003026	PASS
				VH	0.81	0.000467	PASS
		HCH	TN	VL	0.63	0.000361	PASS
				VN	-9.24	-0.005265	PASS
				VH	3.85	0.002194	PASS

8.2 Frequency Error VS. Temperature

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BAND4	TM1 15kHz	LCH	VN	-30	-8.38	-0.004901	PASS
				-20	7.55	0.004413	PASS
				-10	-1.47	-0.000857	PASS
				0	1.70	0.000995	PASS
				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
		MCH	VN	-30	8.28	0.004780	PASS
				-20	-0.06	-0.000036	PASS
				-10	-5.16	-0.002976	PASS
				0	3.11	0.001796	PASS
				10	7.30	0.004213	PASS
				20	2.12	0.001225	PASS
				30	3.62	0.002089	PASS
				40	2.30	0.001327	PASS
				50	-0.58	-0.000335	PASS
		HCH	VN	-30	1.23	0.000702	PASS
				-20	2.93	0.001669	PASS
				-10	7.01	0.003994	PASS
				0	0.89	0.000506	PASS
				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

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BAND4	TM2 15kHz	LCH	VN	-30	-4.54	-0.002655	PASS
				-20	-8.65	-0.005060	PASS
				-10	-5.35	-0.003127	PASS
				0	-5.57	-0.003257	PASS
				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
		MCH	VN	-30	-7.00	-0.004040	PASS
				-20	2.32	0.001341	PASS
				-10	-0.79	-0.000455	PASS
				0	-9.99	-0.005768	PASS
				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
		HCH	VN	-30	7.79	0.004437	PASS
				-20	9.88	0.005629	PASS
				-10	-9.49	-0.005406	PASS
				0	-3.95	-0.002251	PASS
				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