Appendix B

LTE-NB1 BAND2

CONTENT

Page

1 Effective (Isotropic) Radiated Power Output Data

Effective Isotropic Radiated Power of Transmitter (EIRP) for LTE-NB1 BAND2

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	TM1	3.75	LCH	1T0	22.13	23.23	33.00	PASS
				1T47	22.87	22.97	33.00	PASS
			MCH	1T0	22.45	23.55	33.00	PASS
				1T47	22.72	23.82	33.00	PASS
			HCH	1T0	22.41	23.51	33.00	PASS
				1T47	22.36	23.46	33.00	PASS
	TM2	3.75	LCH	1T0	22.63	23.73	33.00	PASS
				1T47	22.85	23.95	33.00	PASS
			MCH	1T0	22.38	23.48	33.00	PASS
				1T47	22.43	23.53	33.00	PASS
			HCH	1T0	22.59	23.69	33.00	PASS
				1T47	22.31	23.41	33.00	PASS

Test Band	Test Mode	Sub-carrier Spacin (kHz)	Test channel	Number of T	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	TM1	15	LCH	1T0	22.56	23.66	33.00	PASS
				1T11	22.45	23.55	33.00	PASS
			MCH	1T0	22.77	23.87	33.00	PASS
				1T11	22.76	23.86	33.00	PASS
			HCH	1T0	22.63	23.73	33.00	PASS
				1T11	22.75	23.85	33.00	PASS
	TM2	15	LCH	1T0	21.61	22.71	33.00	PASS
				1T11	21.63	22.63	33.00	PASS
				12T0	20.34	21.44	33.00	PASS
			MCH	1T0	22.72	23.82	33.00	PASS
				1T11	22.79	23.89	33.00	PASS
				12T0	20.93	22.03	33.00	PASS
			HCH	1T0	22.61	23.71	33.00	PASS
				1T11	22.56	23.66	33.00	PASS
				12T0	20.75	21.85	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] = 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
BAND2	TM1/1T	LCH	4.12	13	PASS
		MCH	4.58	13	PASS
		HCH	4.55	13	PASS
	TM2/1T	LCH	4.55	13	PASS
		MCH	4.09	13	PASS
		HCH	4.67	13	PASS
	TM2/Full T	LCH	2.61	13	PASS
		MCH	2.35	13	PASS
		HCH	2.55	13	PASS

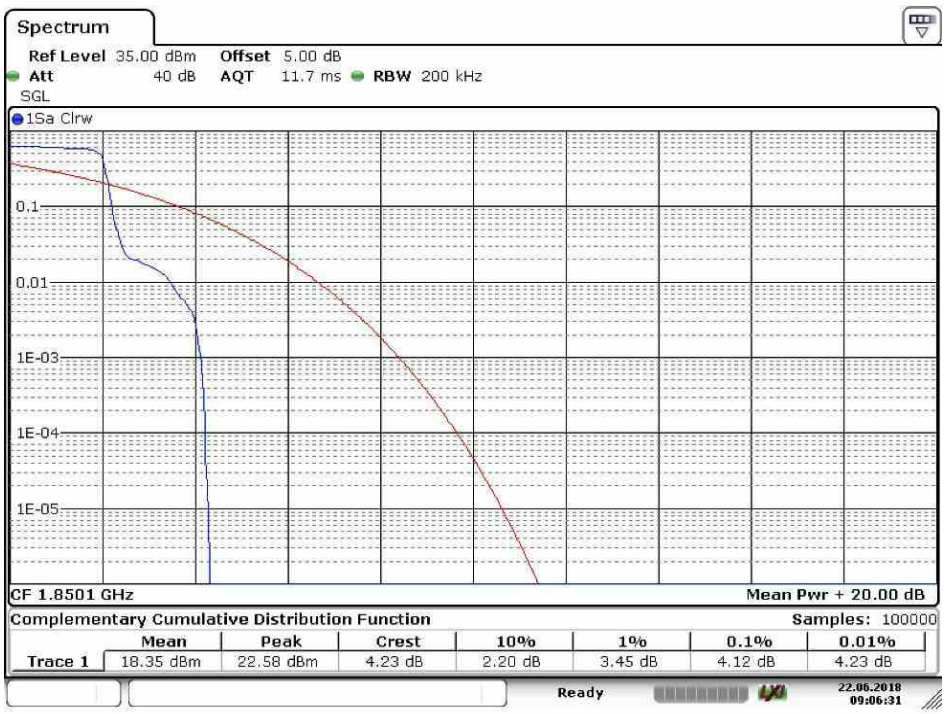
Part II - Test Plots

2.1 For LTE-NB1

2.1.1 Test Band = LTE-NB1 BAND2

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: 22.JUN.2018 09:06:31

2.1.1.1.2 Test Channel = MCH

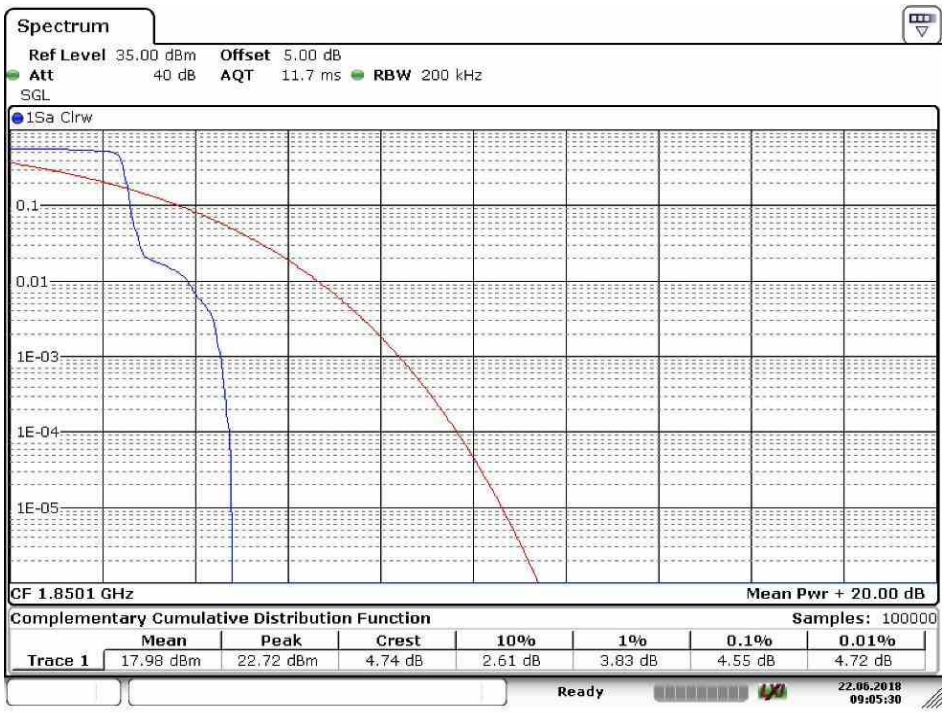
Date: 27.JUN.2018 10:09:51

2.1.1.1.3 Test Channel = HCH

Date: 27.JUN.2018 10:07:37

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: 22.JUN.2018 09:05:30

2.1.1.2.2 Test Channel = MCH

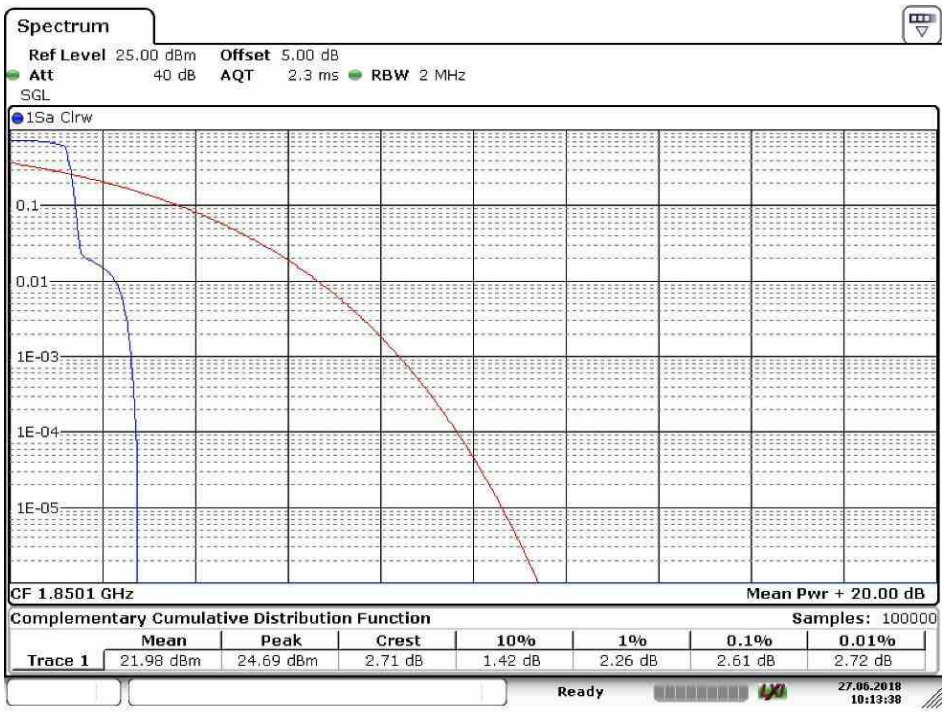
Date: 27.JUN.2018 10:10:15

2.1.1.2.3 Test Channel = HCH

Date: 27.JUN.2018 10:06:41

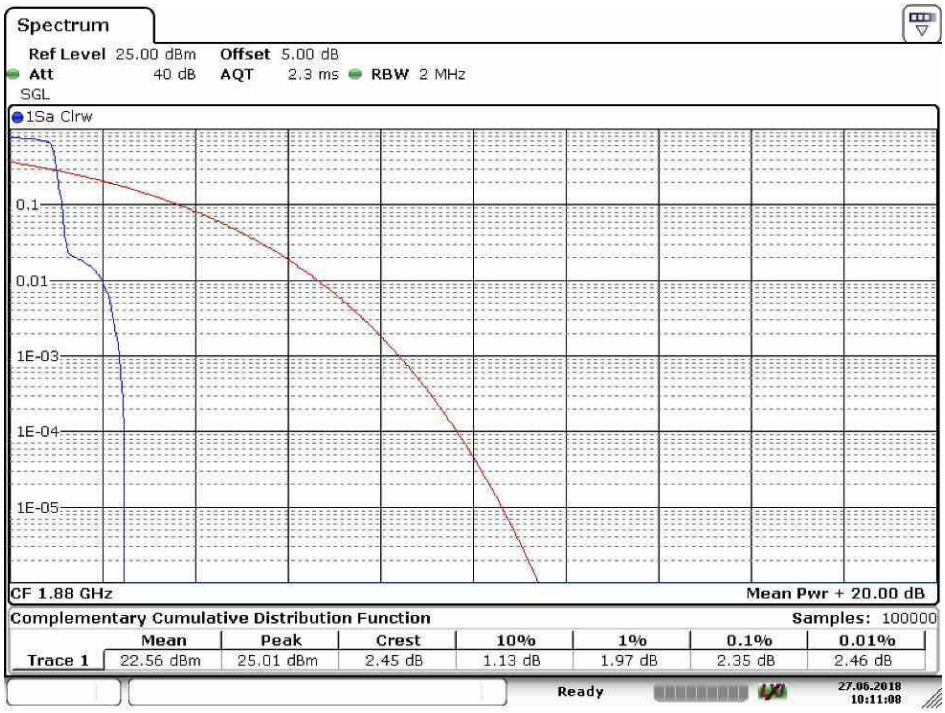
2.1.1.3 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0

2.1.1.3.1 Test Channel = LCH



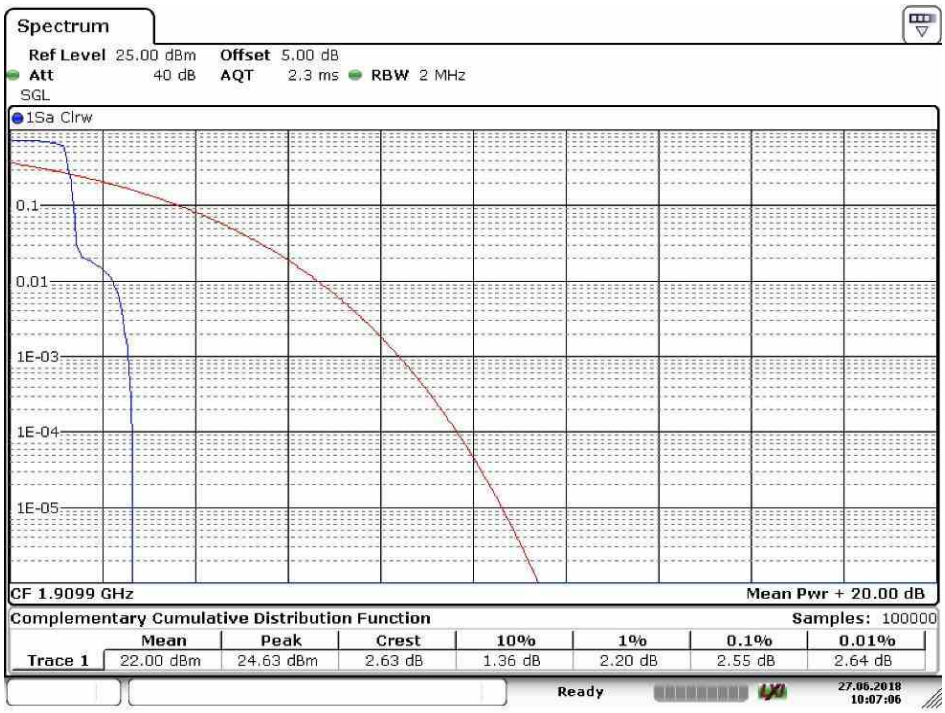
Date: 27.JUN.2018 10:13:38

2.1.1.3.2 Test Channel = MCH



Date: 27.JUN.2018 10:11:08

2.1.1.3.3 Test Channel = HCH



Date: 27.JUN.2018 10:07:06

3 Modulation Characteristics

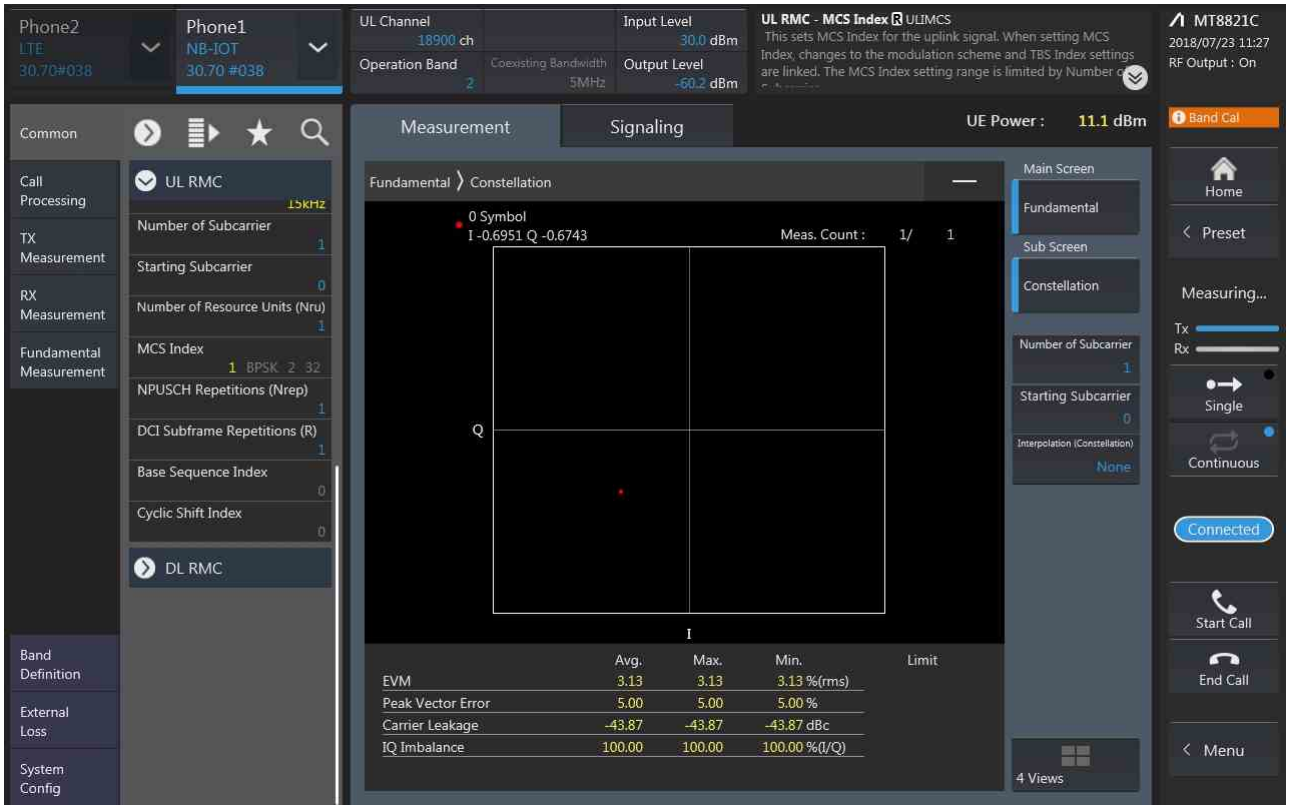
Part I - Test Plots

3.1 For LTE-NB1

3.1.1 Test Band = LTE-NB1 BAND2

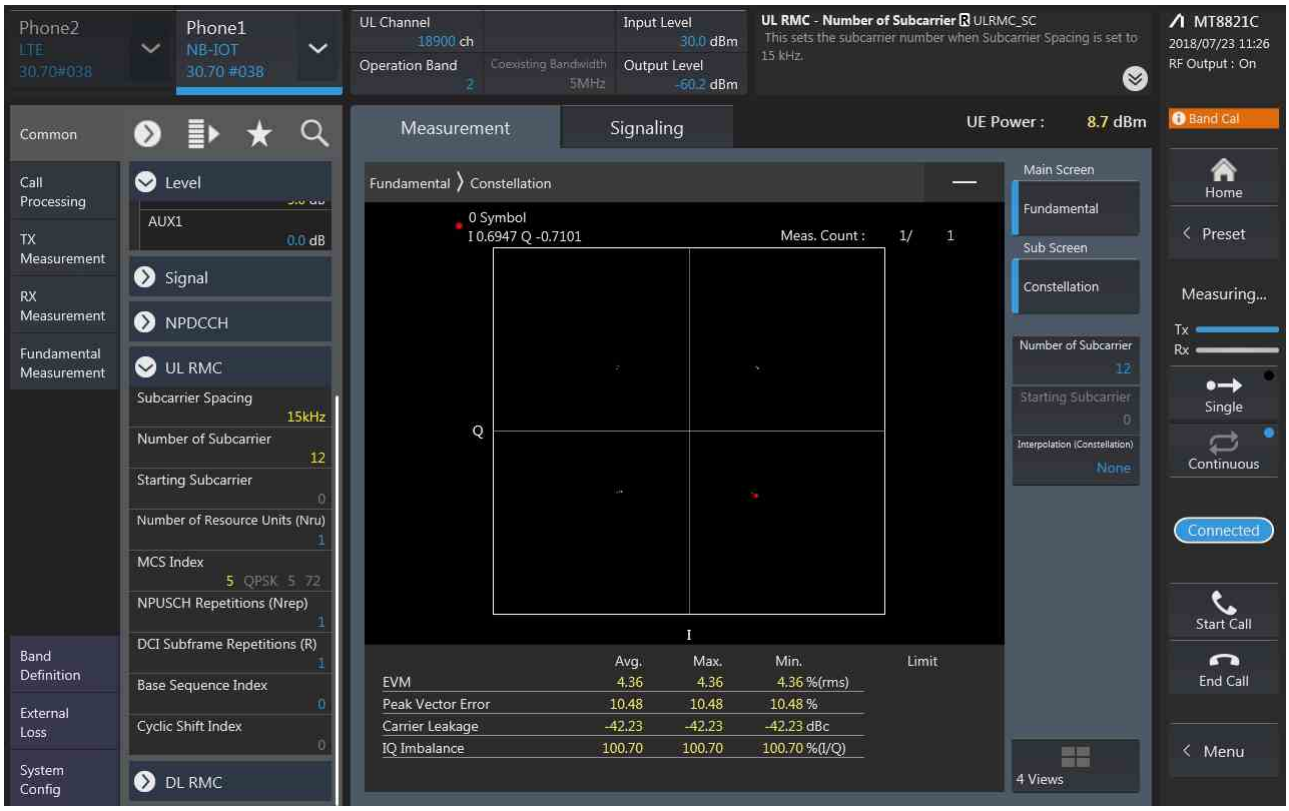
3.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

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

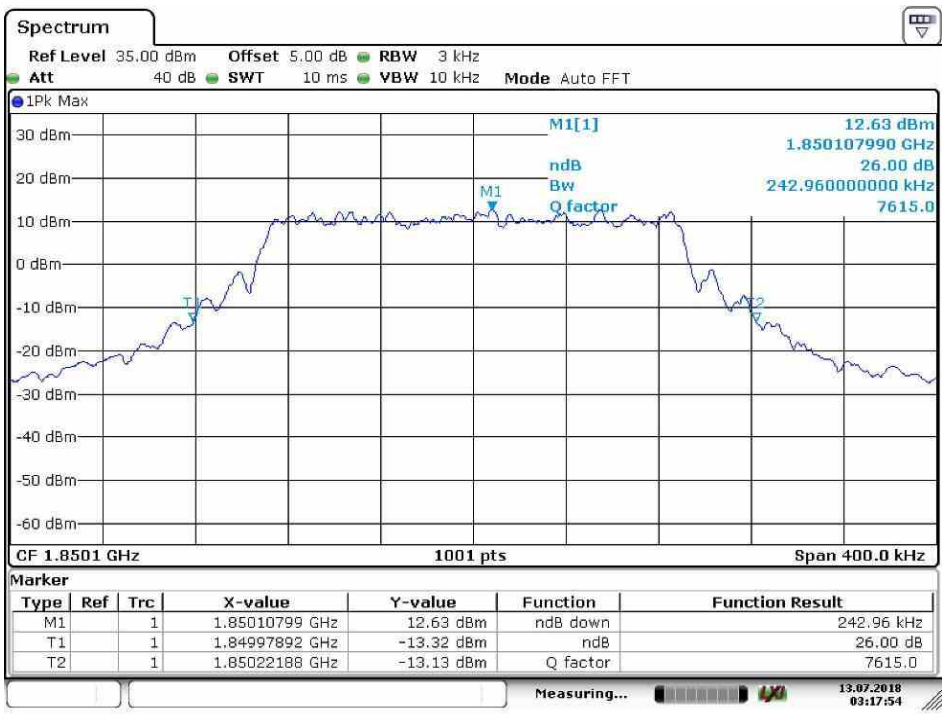
Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
BAND2	TM2/15kHz	LCH	184.61	242.96	PASS
		MCH	186.61	242.16	PASS
		HCH	186.61	242.16	PASS

4.1 For LTE-NB1

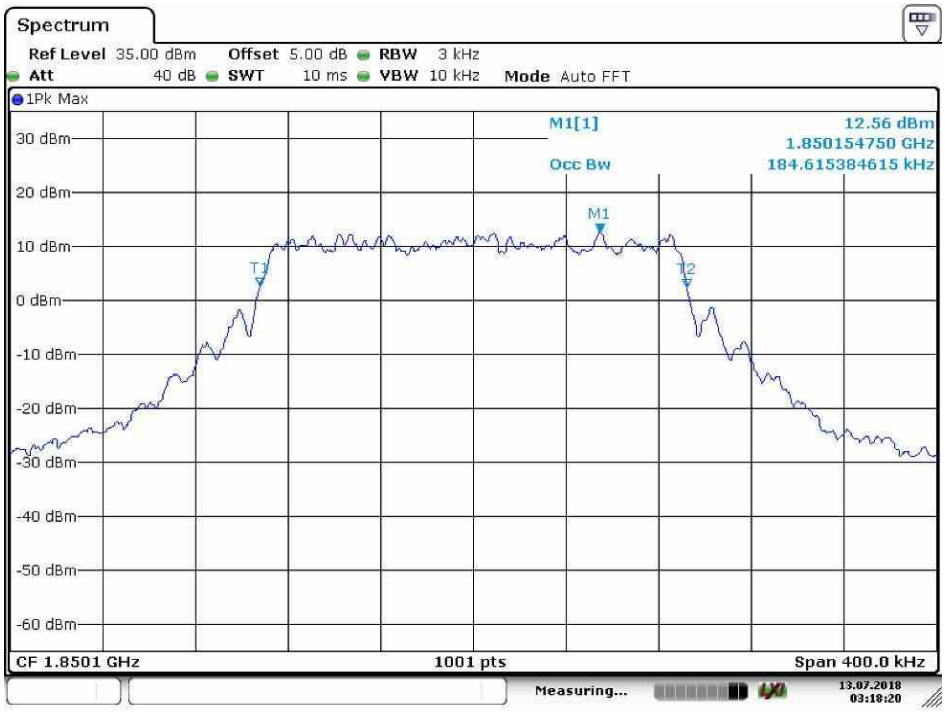
4.1.1 Test Band = LTE-NB1 BAND2

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

4.1.1.1.1 Test Channel = LCH

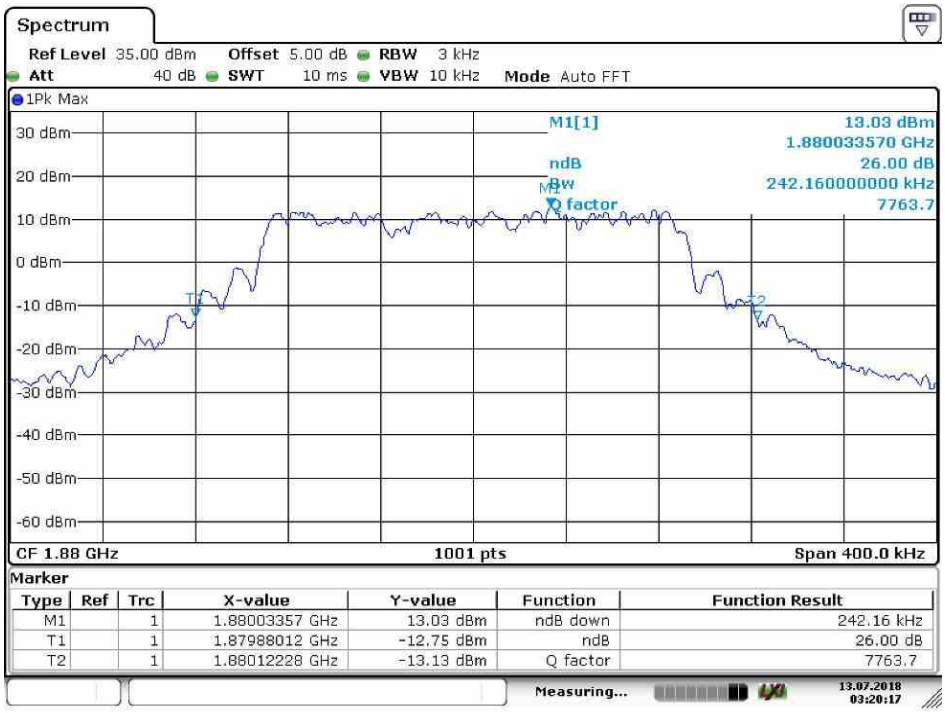


Date: 13.JUL.2018 03:17:54

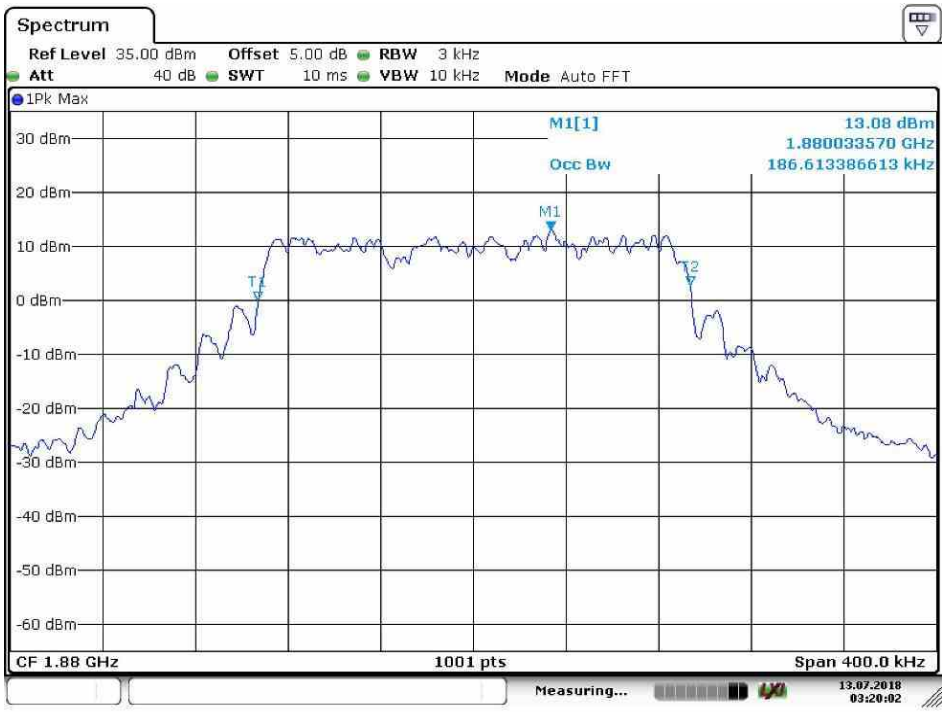


Date: 13.JUL.2018 03:18:20

4.1.1.1.2 Test Channel = MCH



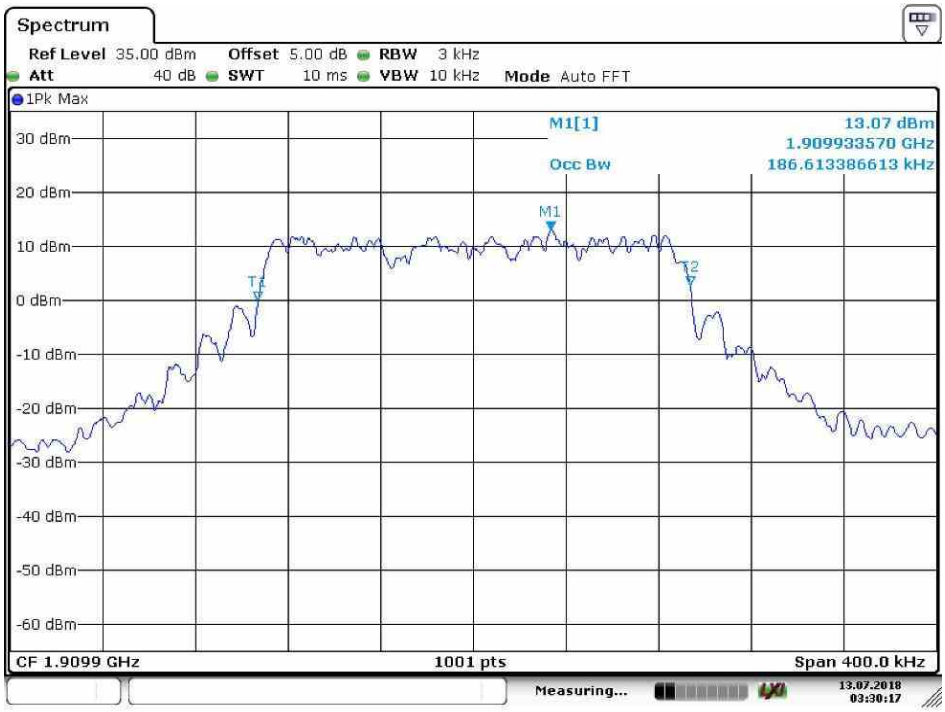
Date: 13.JUL.2018 03:20:17



Date: 13.JUL.2018 03:20:02

4.1.1.1.3 Test Channel = HCH

Date: 13.JUL.2018 03:29:37



Date: 13.JUL.2018 03:30:18

5 Band Edges Compliance

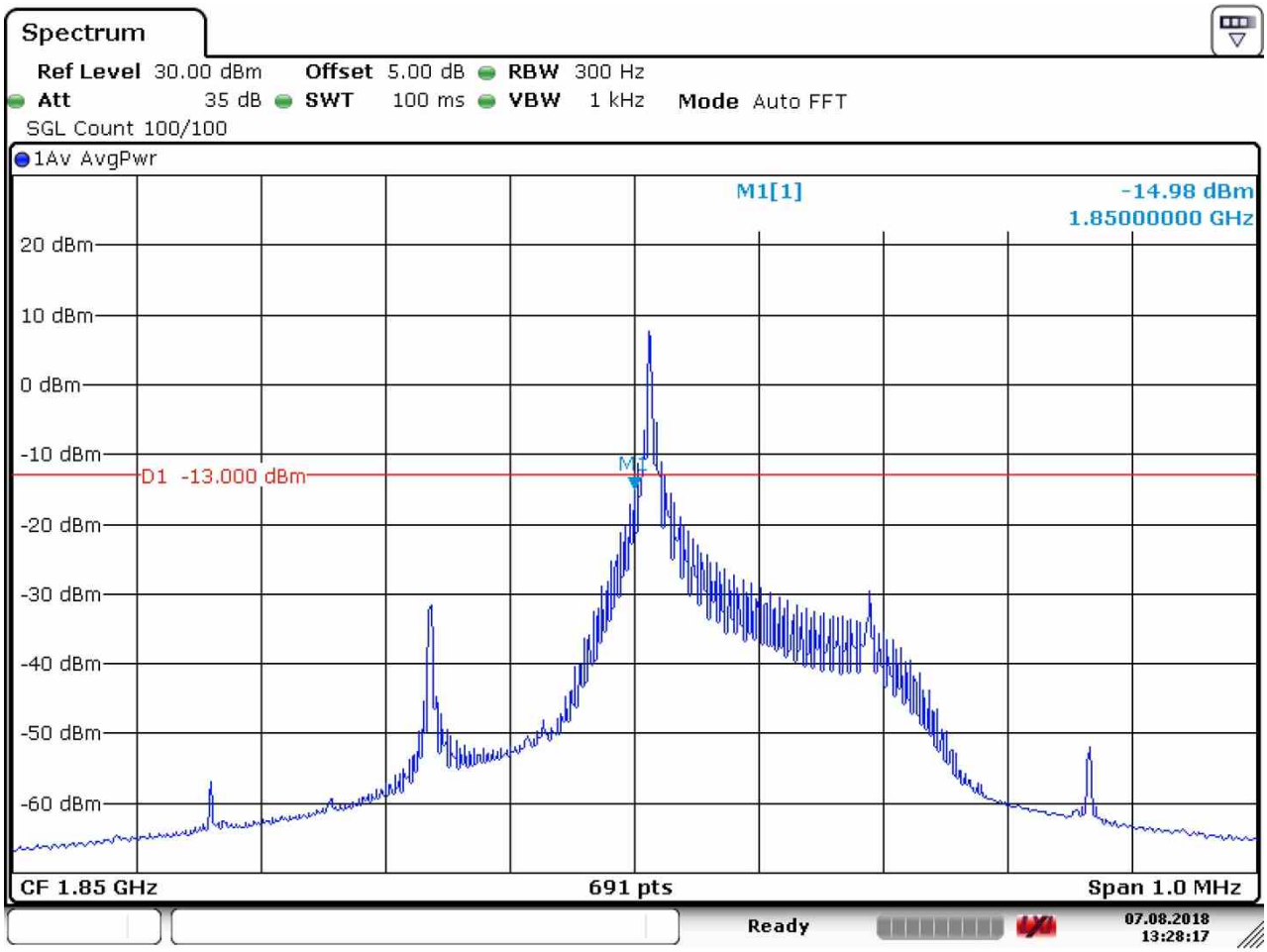
5.1 For LTE-NB1

5.1.1 Test Band = LTE-NB1 BAND2

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

5.1.1.1.1 Test Channel = LCH

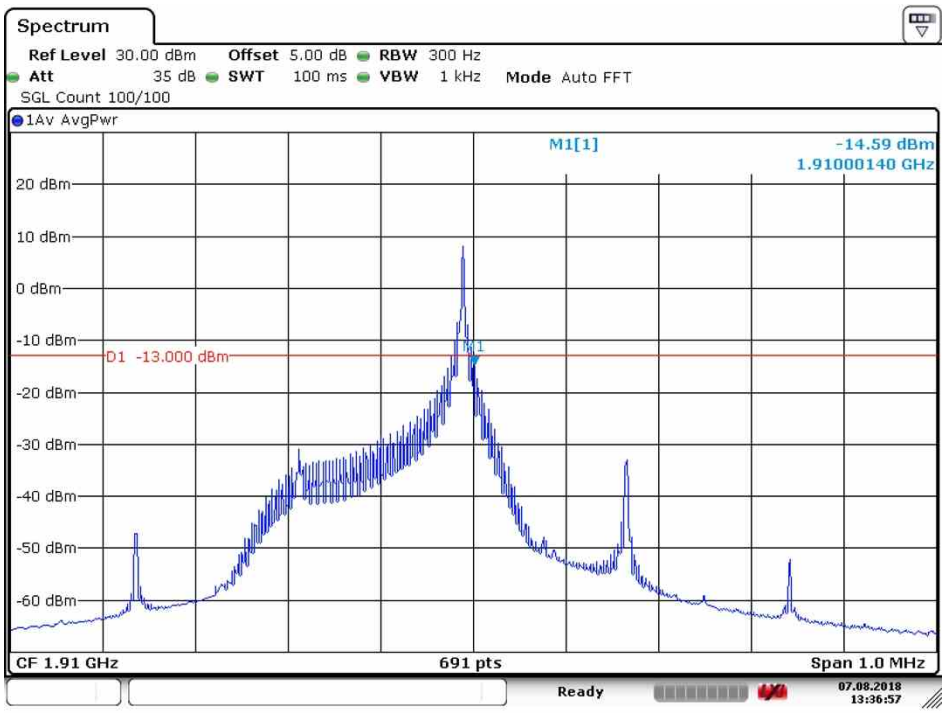
5.1.1.1.1.1 Test T size=1T



Date: 7.AUG.2018 13:28:17

5.1.1.1.2 Test Channel = HCH

5.1.1.1.2.1 Test T size=1T

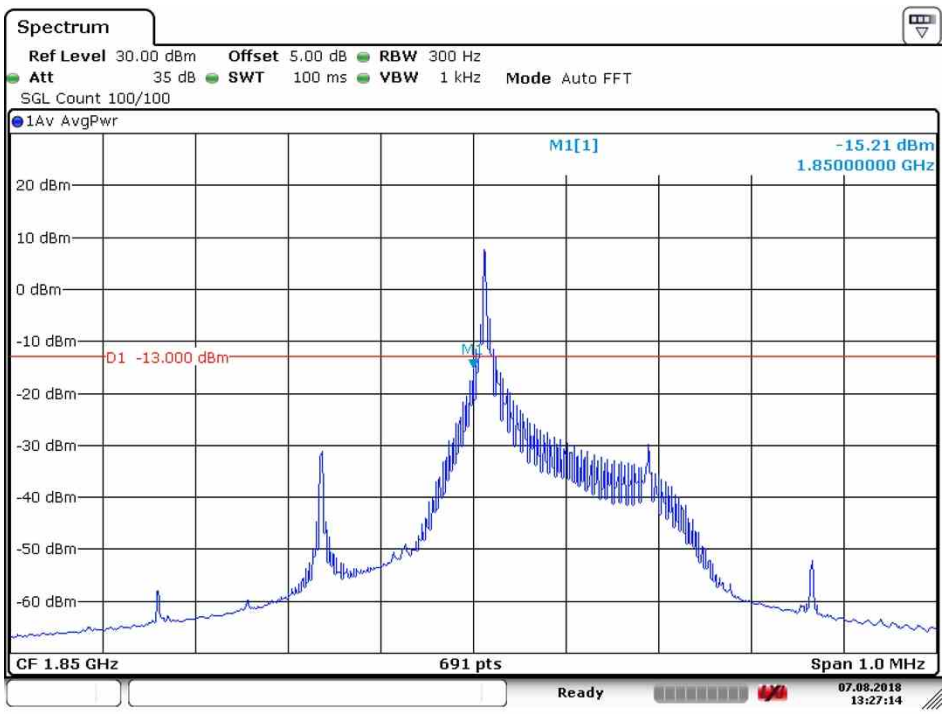


Date: 7.AUG.2018 13:36:57

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

5.1.1.2.1 Test Channel = LCH

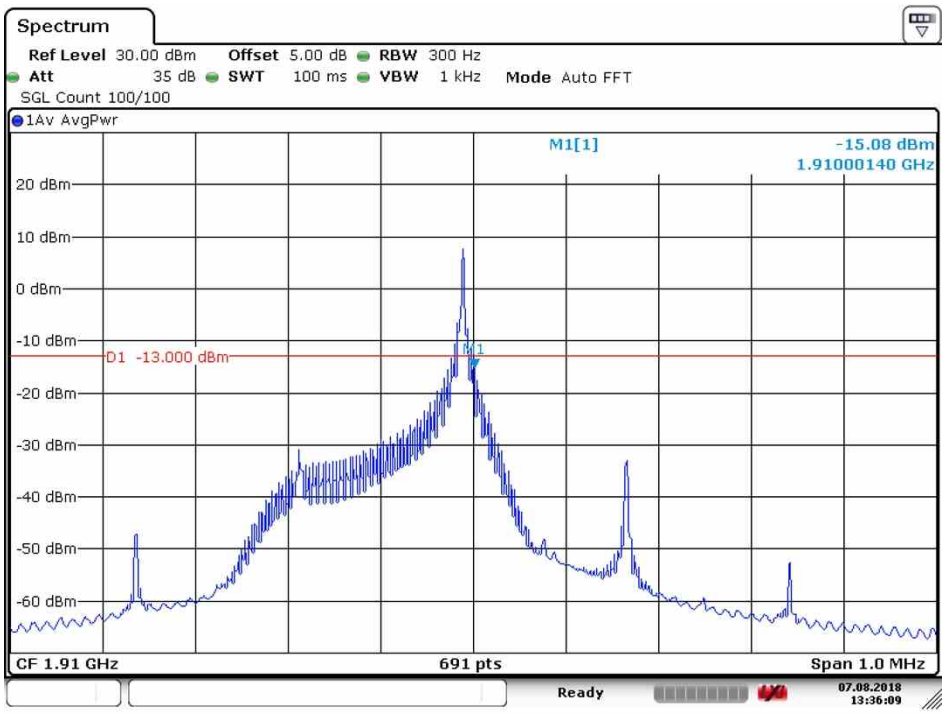
5.1.1.2.1.1 Test T size=1T



Date: 7.AUG.2018 13:27:14

5.1.1.2.2 Test Channel = HCH

5.1.1.2.2.1 Test T size=1T

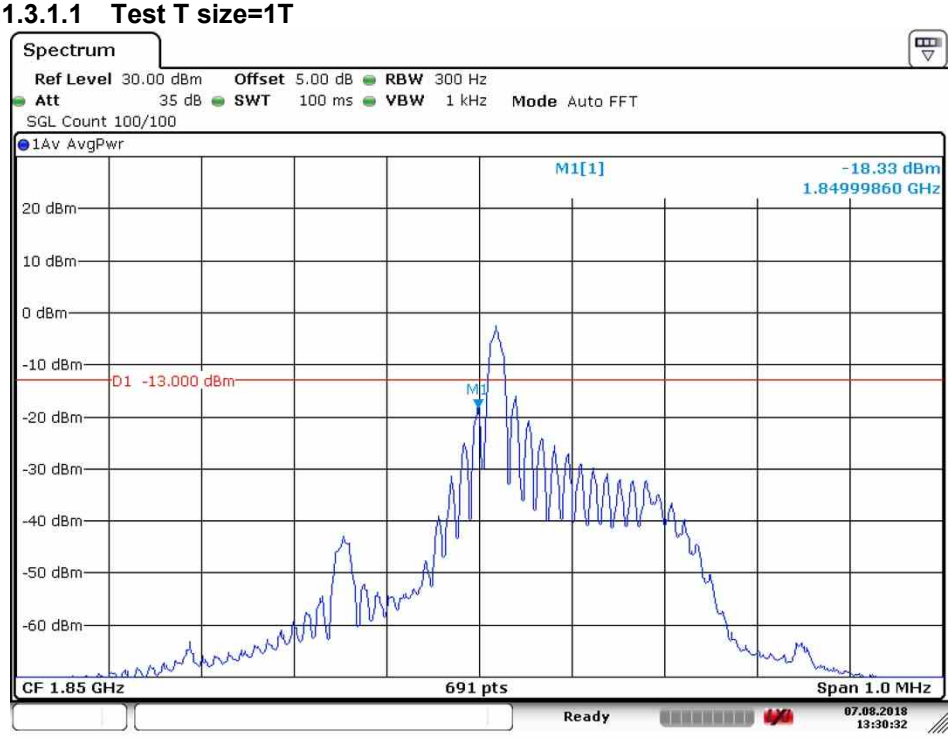


Date: 7.AUG.2018 13:36:09

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

5.1.1.3.1 Test Channel = LCH

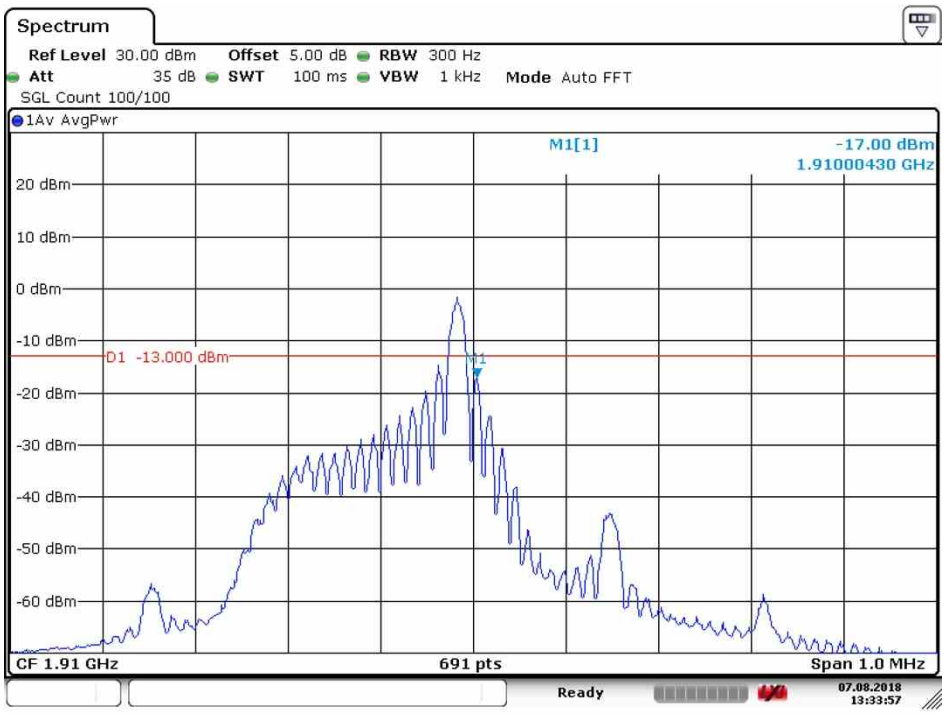
5.1.1.3.1.1 Test T size=1T



Date: 7.AUG.2018 13:30:32

5.1.1.3.2 Test Channel = HCH

5.1.1.3.2.1 Test T size=1T

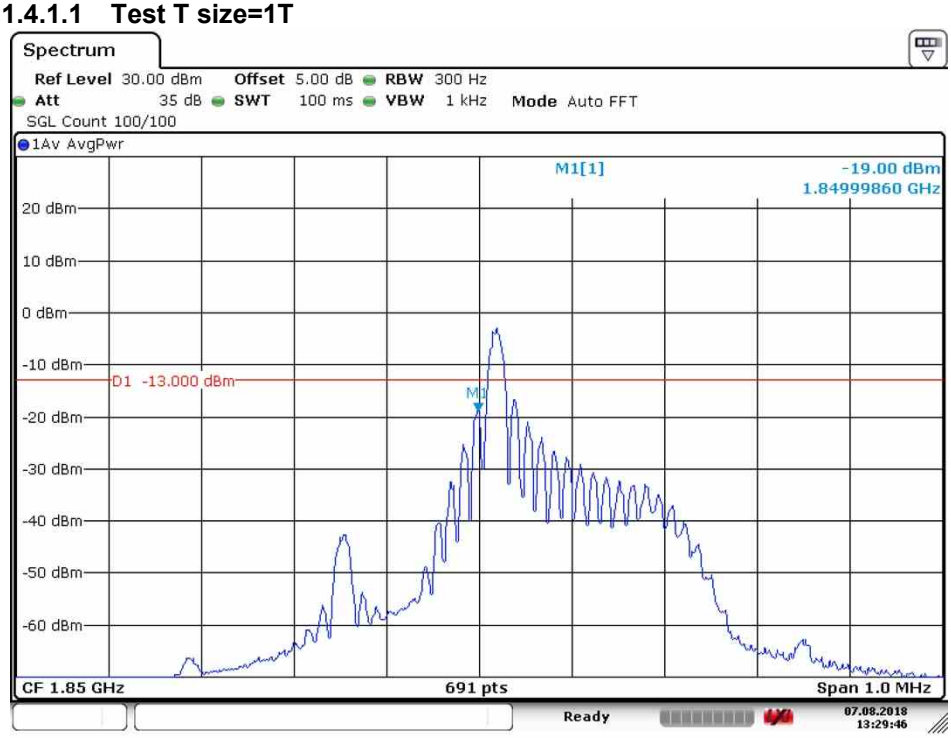


Date: 7.AUG.2018 13:33:58

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

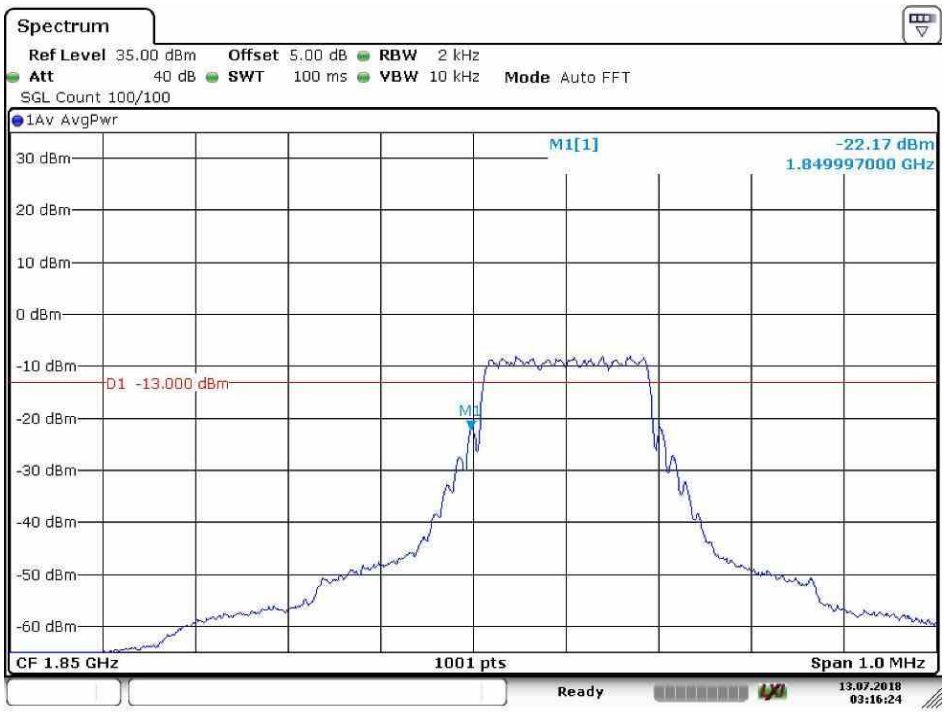
5.1.1.4.1 Test Channel = LCH

5.1.1.4.1.1 Test T size=1T



Date: 7.AUG.2018 13:29:46

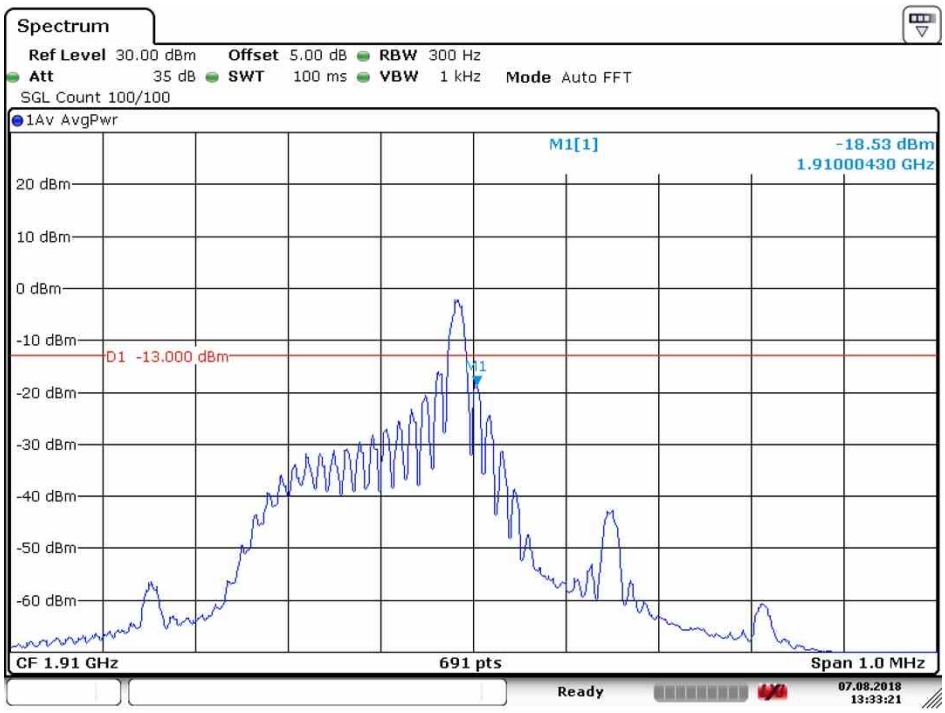
5.1.1.4.1.2 Test T size=Full T



Date: 13.JUL.2018 03:16:24

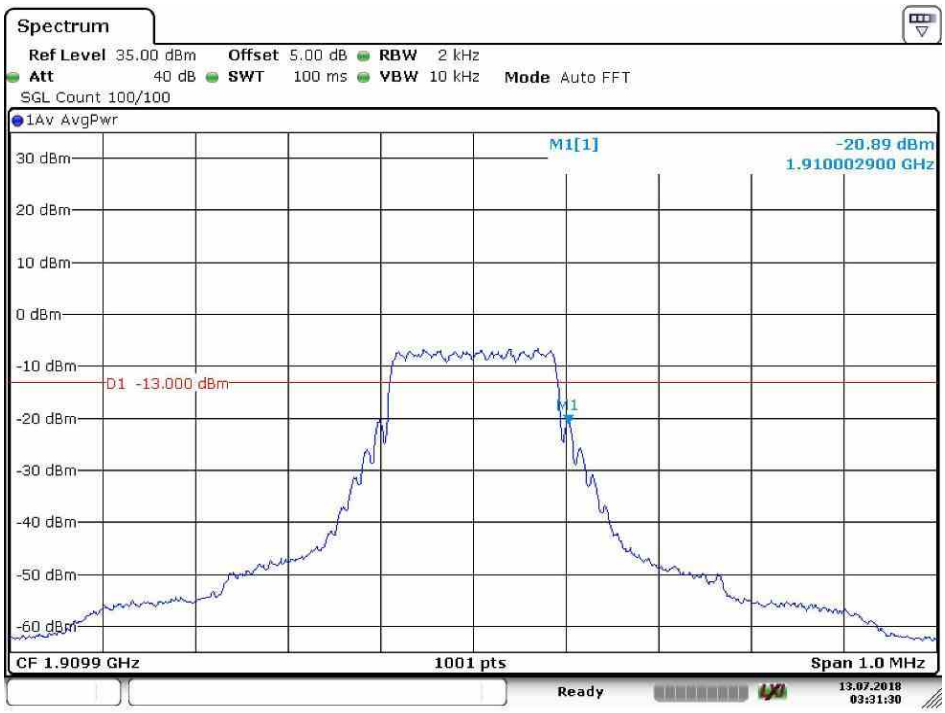
5.1.1.4.2 Test Channel = HCH

5.1.1.4.2.1 Test T size=1T



Date: 7.AUG.2018 13:33:21

5.1.1.4.2.2 Test T size=Full T



Date: 13.JUL.2018 03:31:31

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.

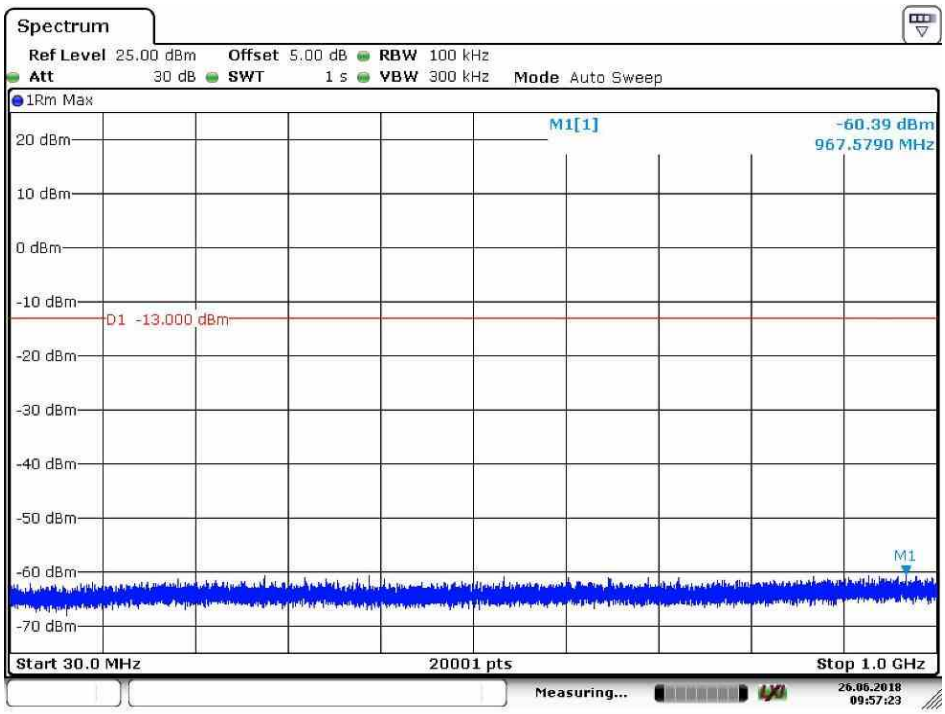
Part I - Test Plots

6.1 For LTE-NB1

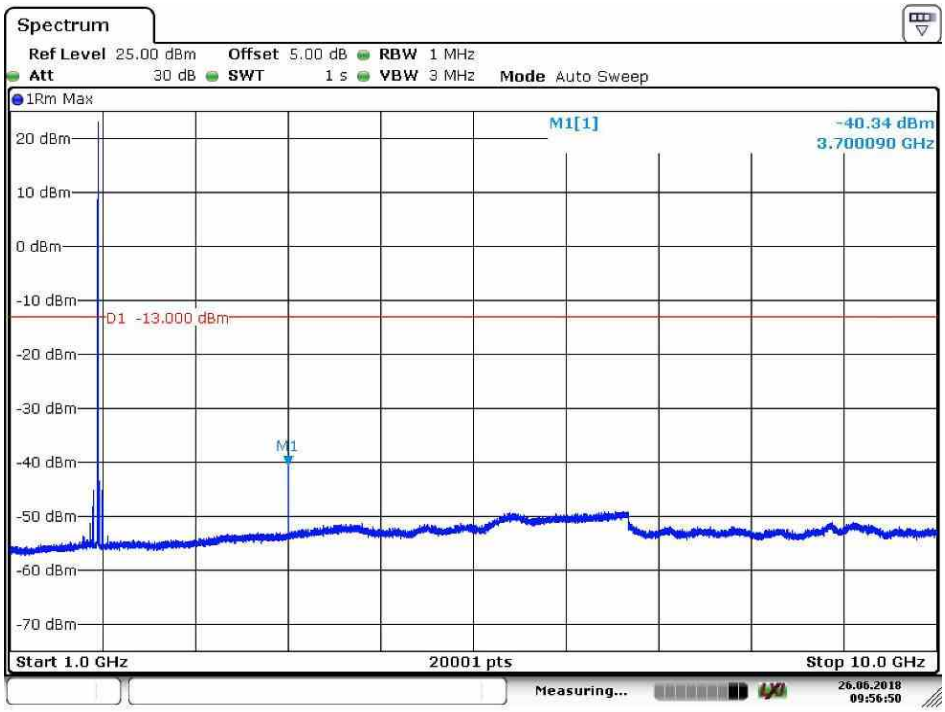
6.1.1 Test Band = LTE-NB1 BAND2

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

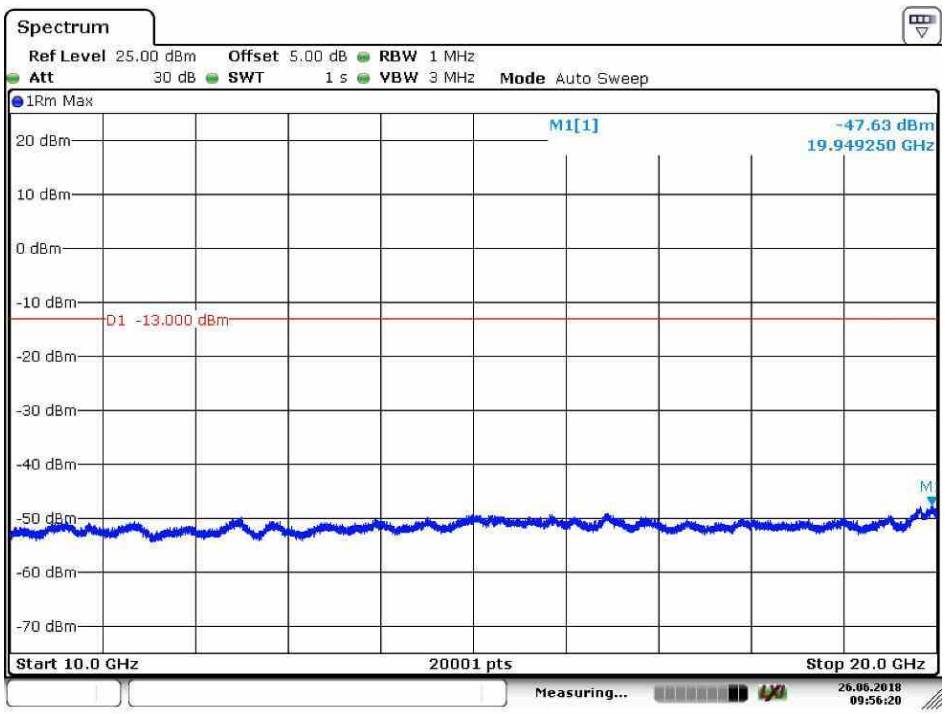
6.1.1.1.1 Test Channel = LCH



Date: 26.JUN.2018 09:57:24

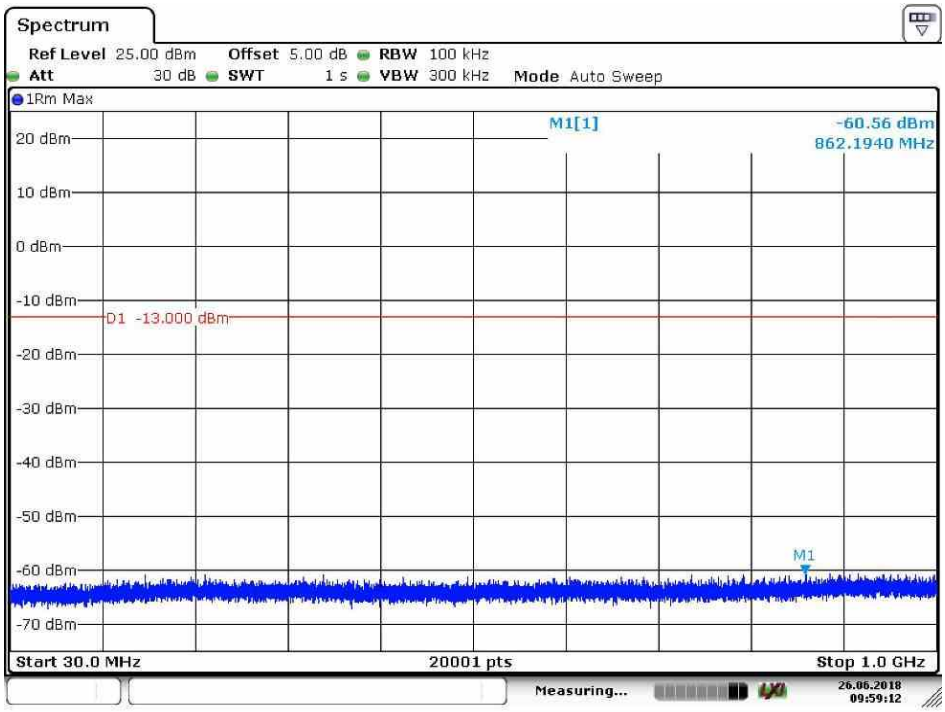


Date: 26.JUN.2018 09:56:51



Date: 26.JUN.2018 09:56:21

6.1.1.1.2 Test Channel = MCH



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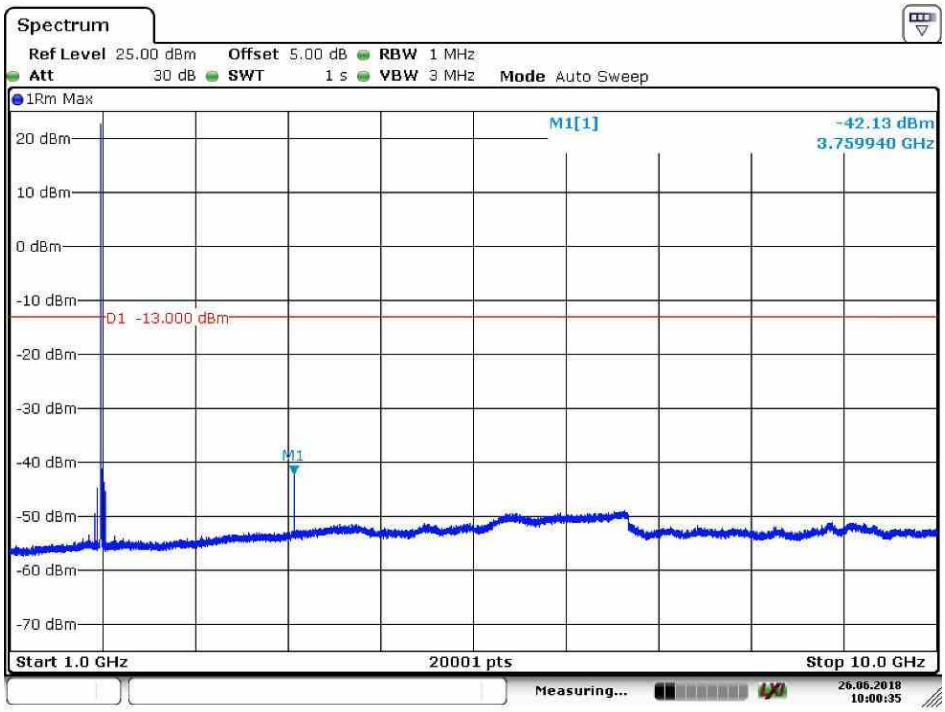
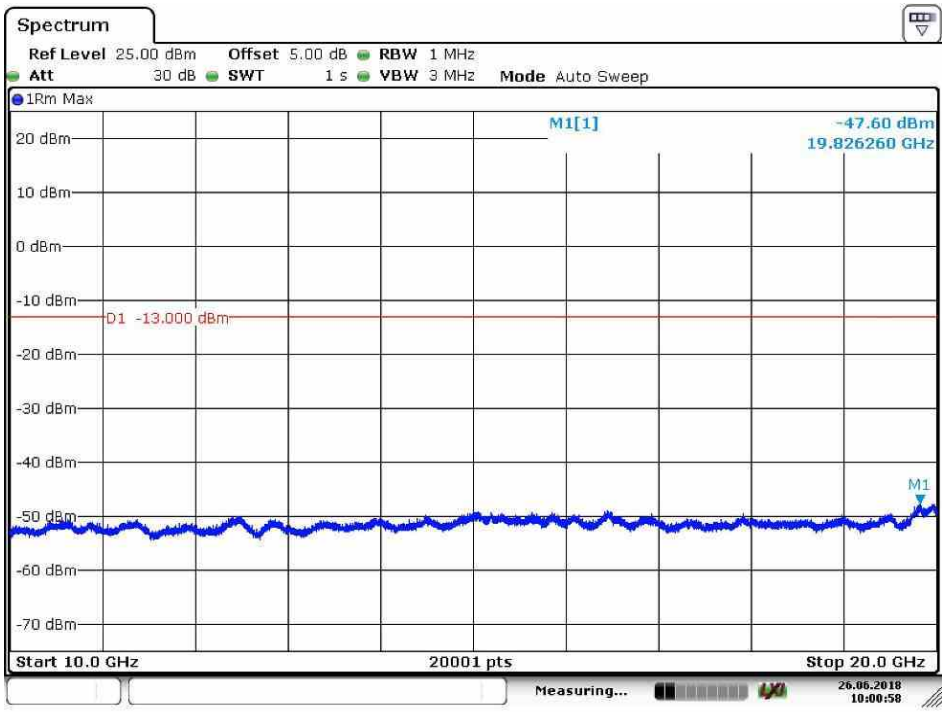
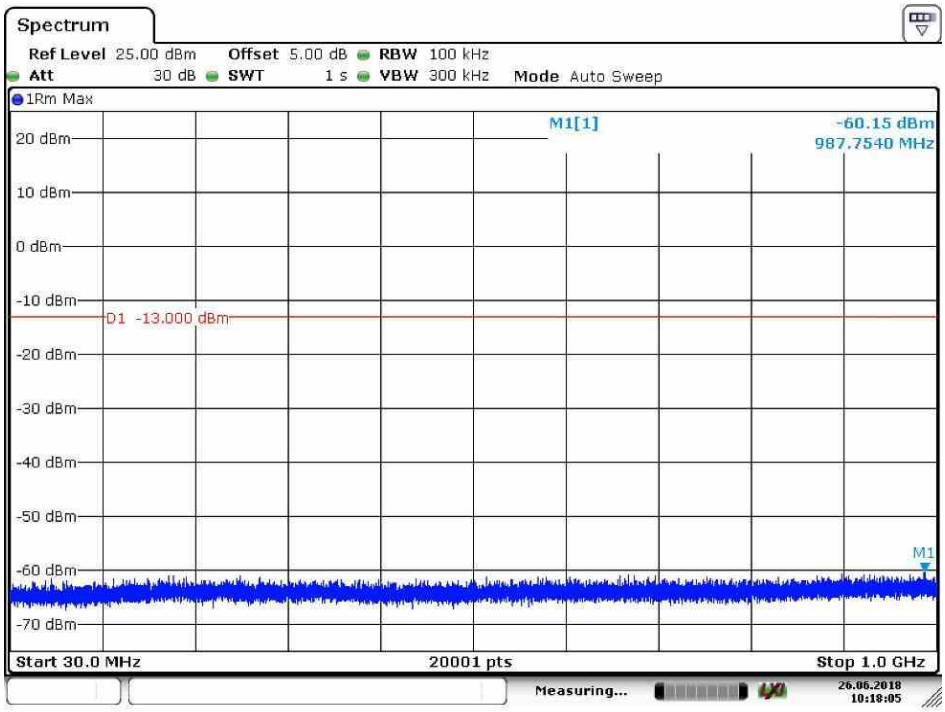


Date: 26.JUN.2018 10:00:35

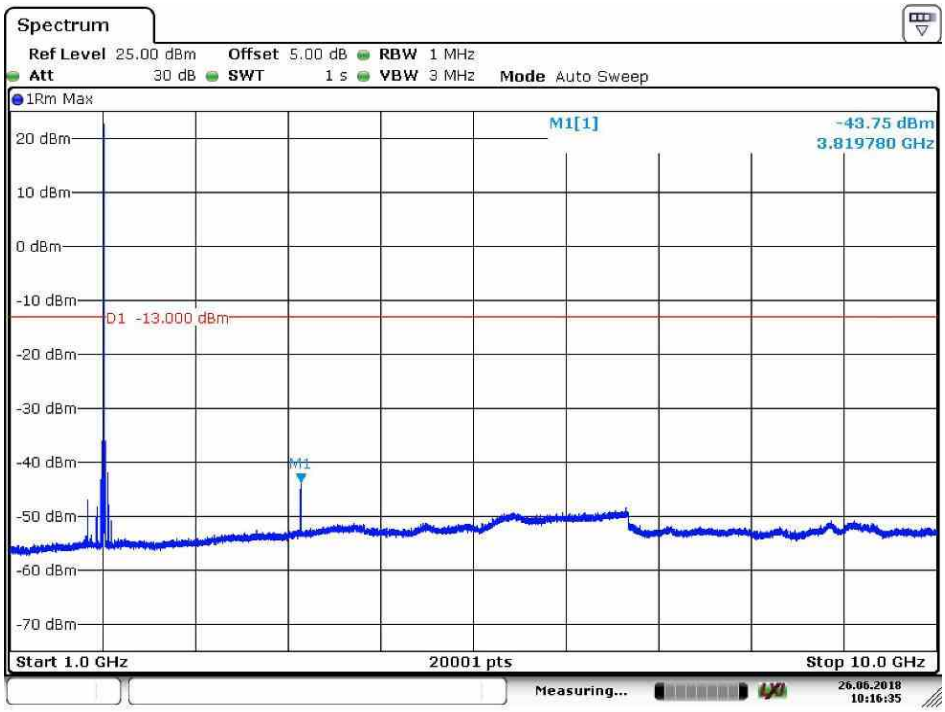


Date: 26.JUN.2018 10:00:58

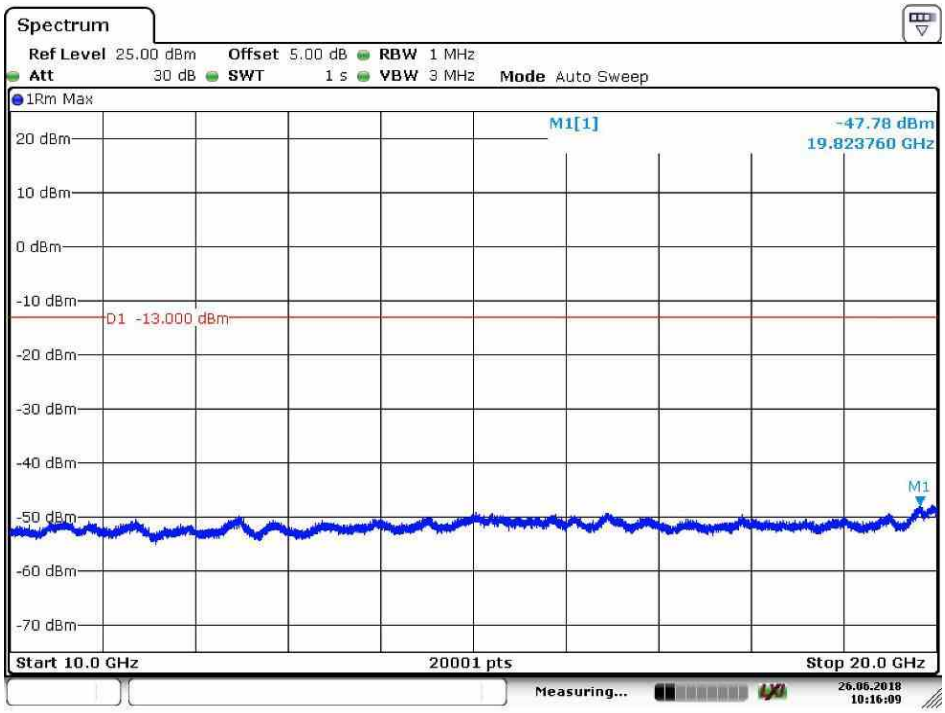
6.1.1.1.3 Test Channel = HCH



Date: 26.JUN.2018 10:18:05



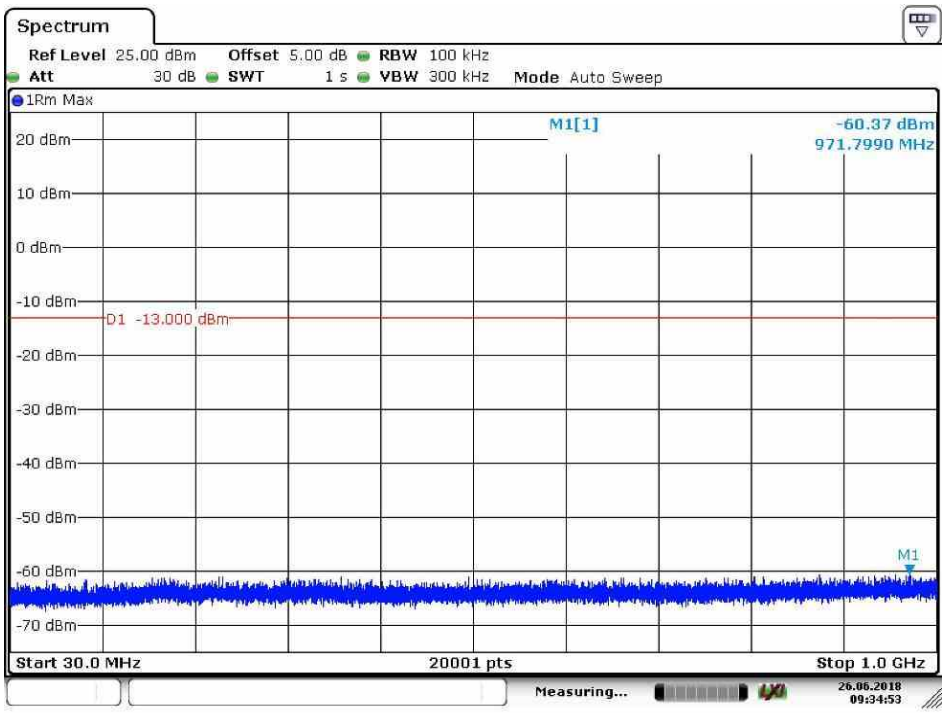
Date: 26.JUN.2018 10:16:35



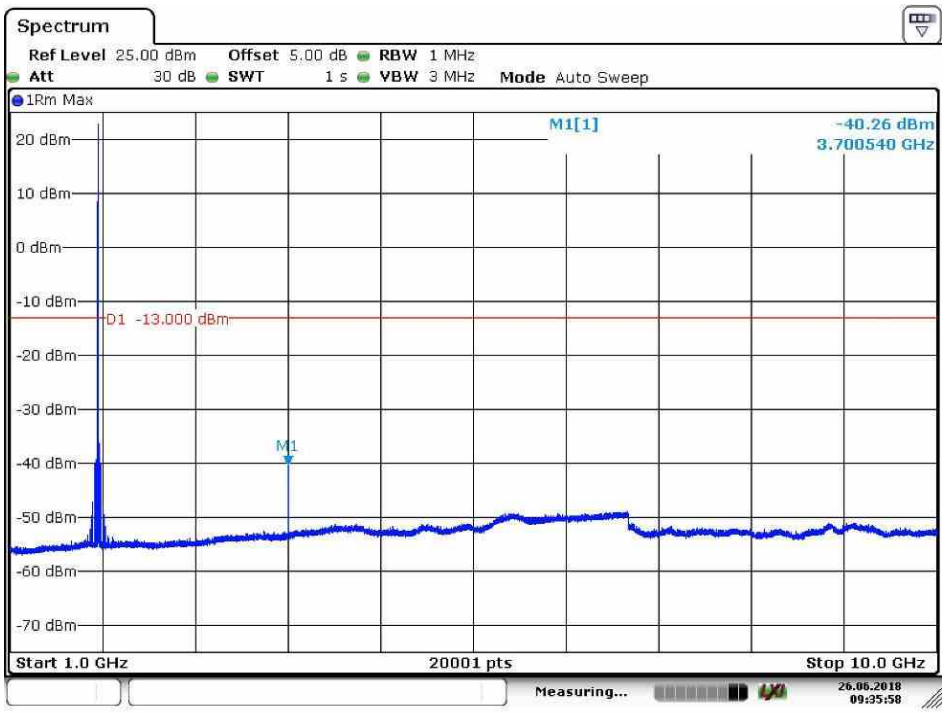
Date: 26.JUN.2018 10:16:09

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

6.1.1.2.1 Test Channel = LCH



Date: 26.JUN.2018 09:34:54



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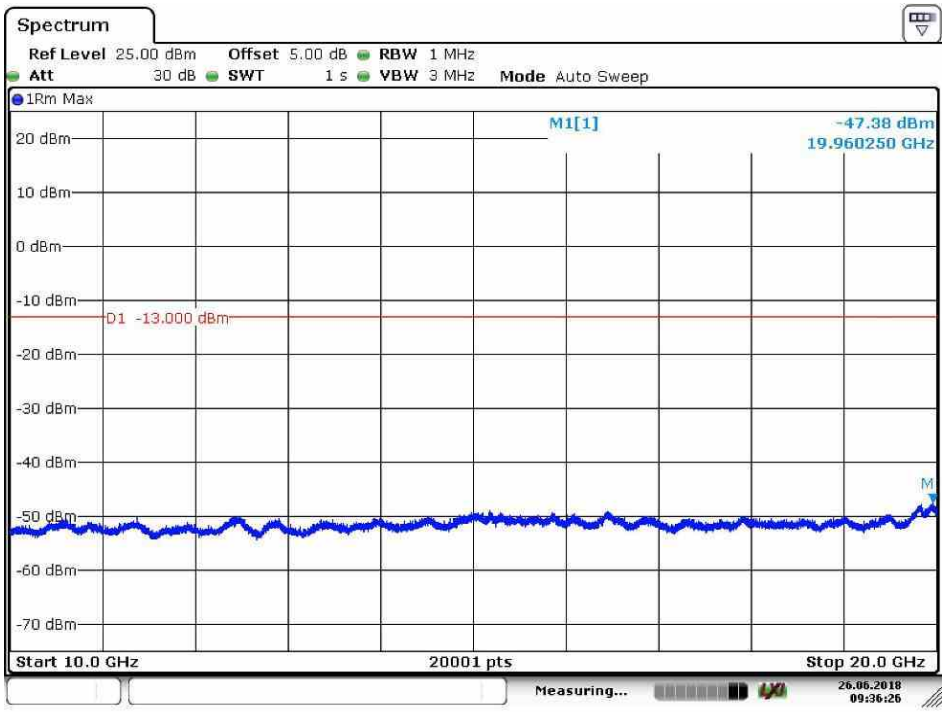
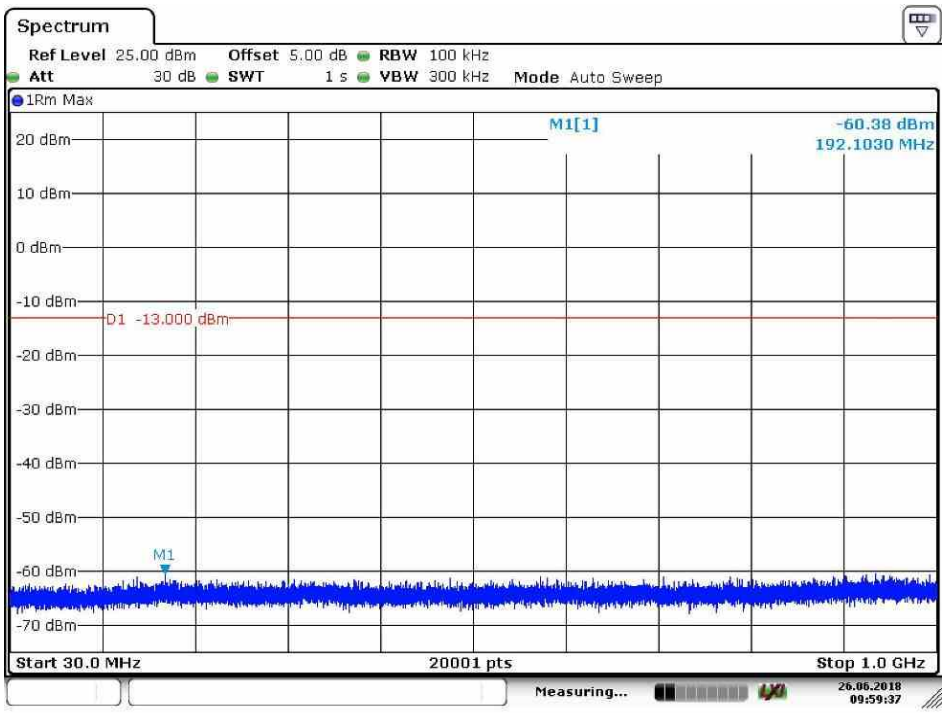
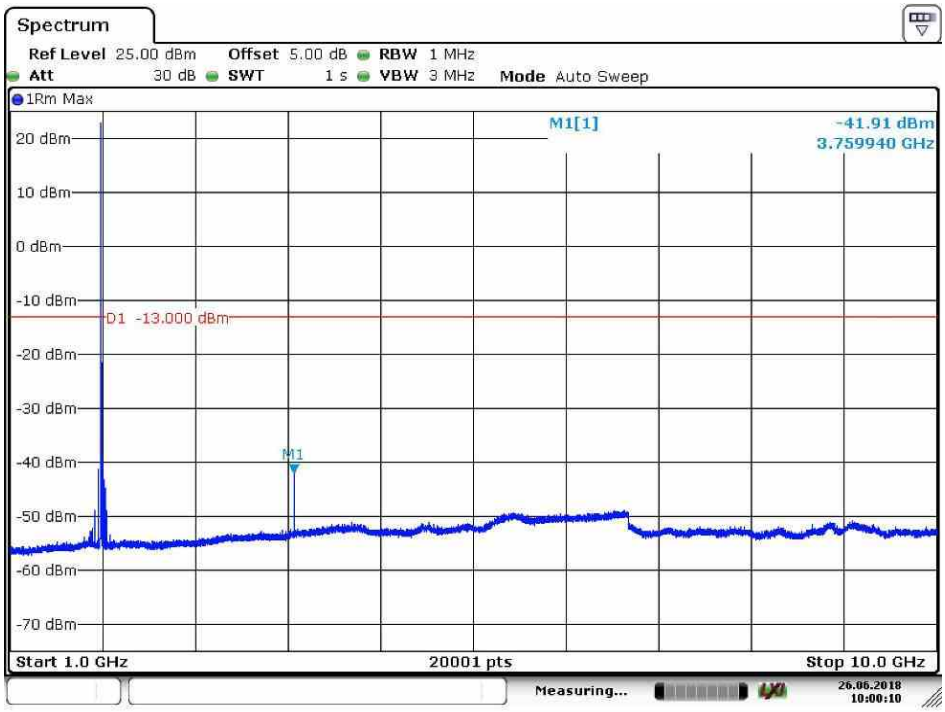


Date: 26.JUN.2018 09:36:26

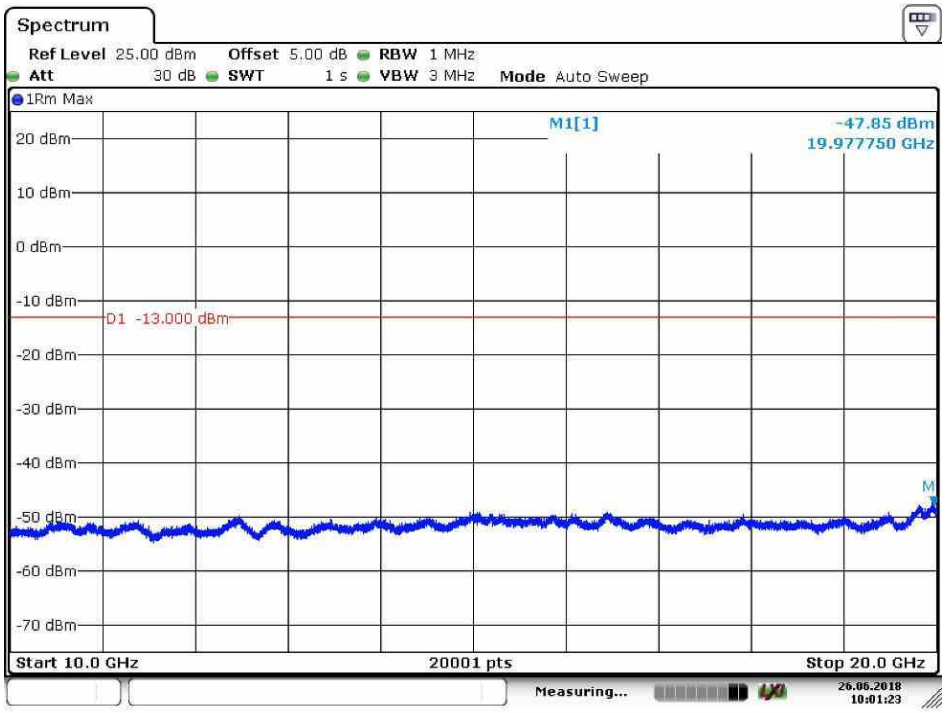
6.1.1.2.2 Test Channel = MCH



Date: 26.JUN.2018 09:59:38

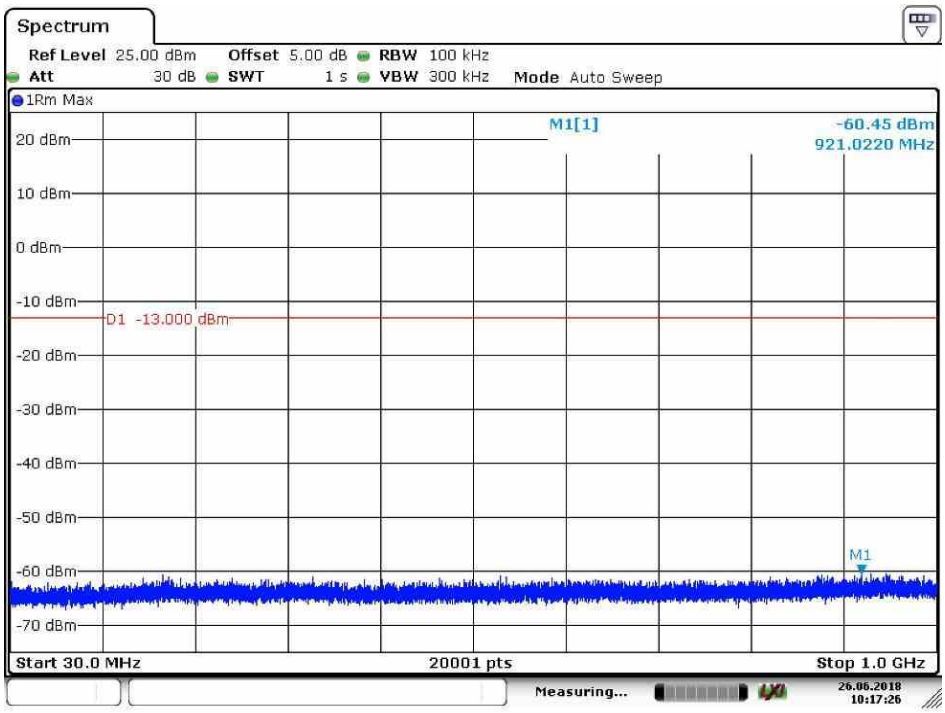


Date: 26.JUN.2018 10:00:10

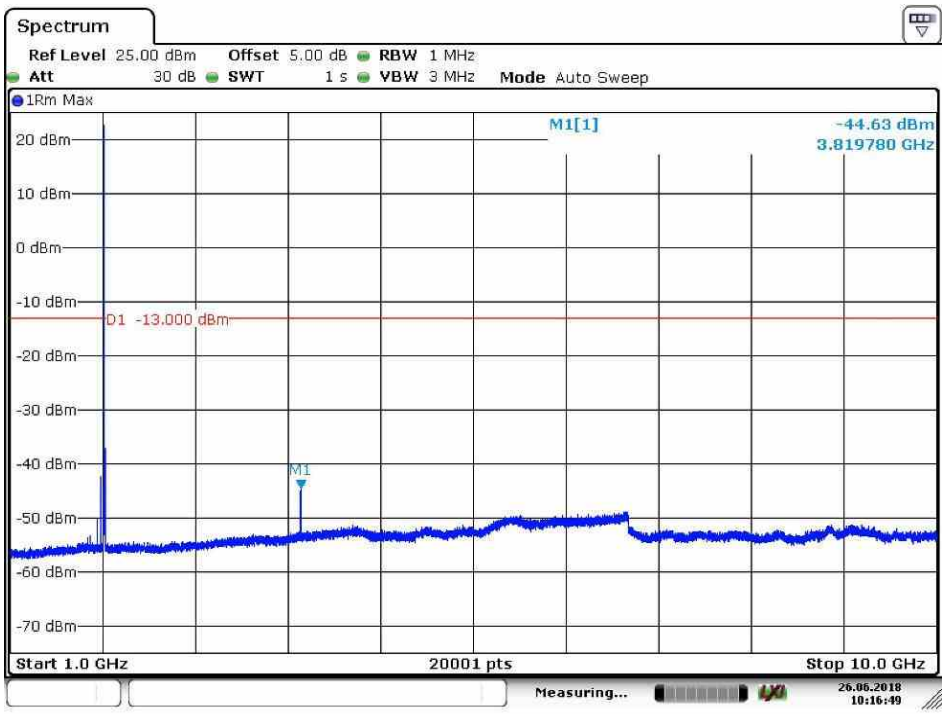


Date: 26.JUN.2018 10:01:23

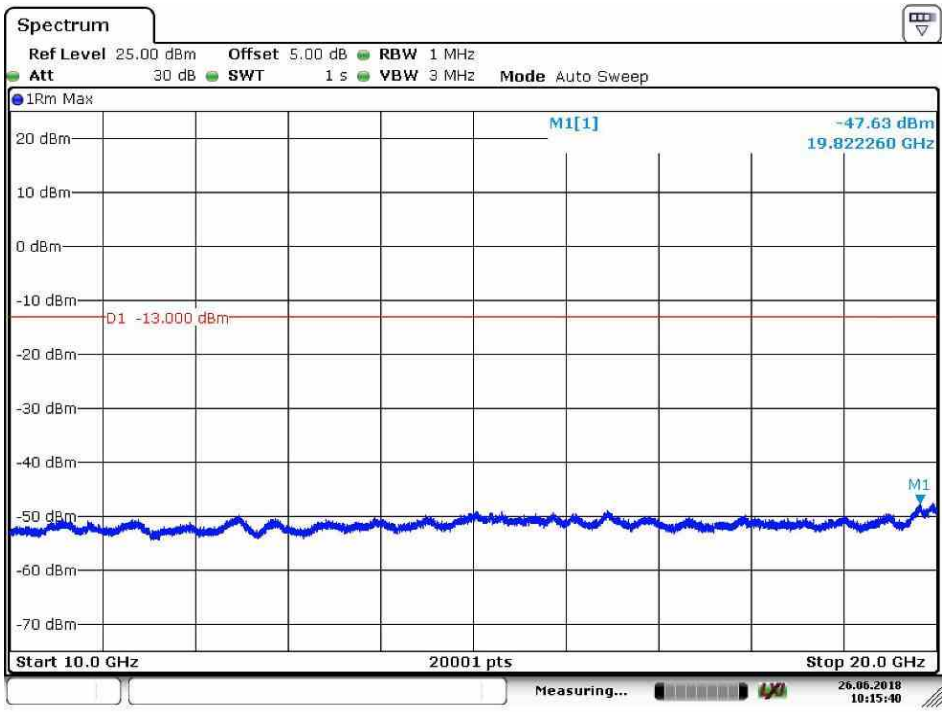
6.1.1.2.3 Test Channel = HCH



Date: 26.JUN.2018 10:17:25



Date: 26.JUN.2018 10:16:49



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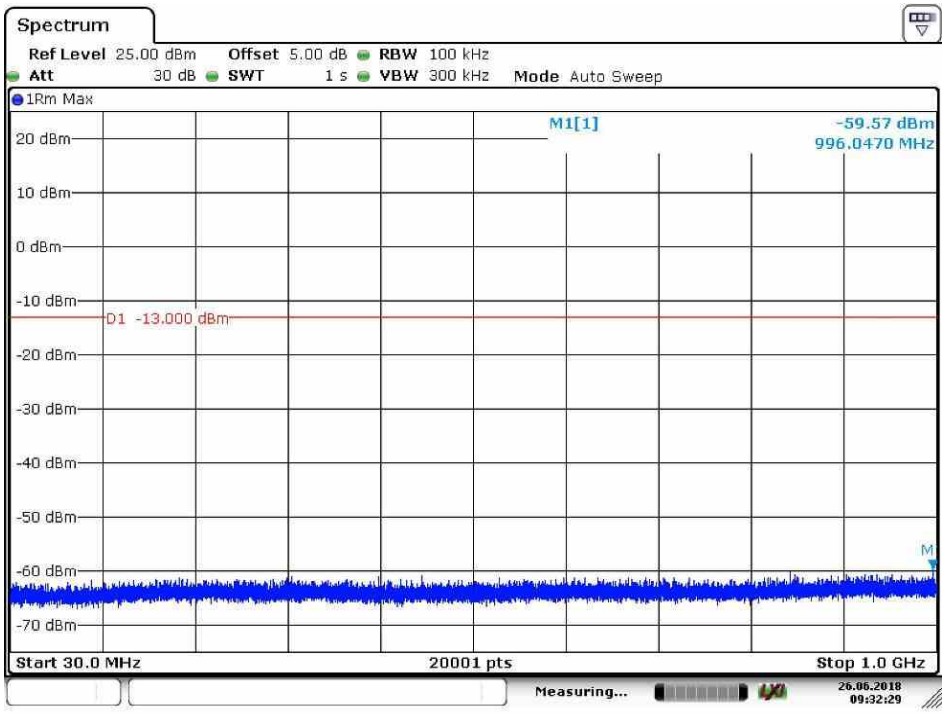
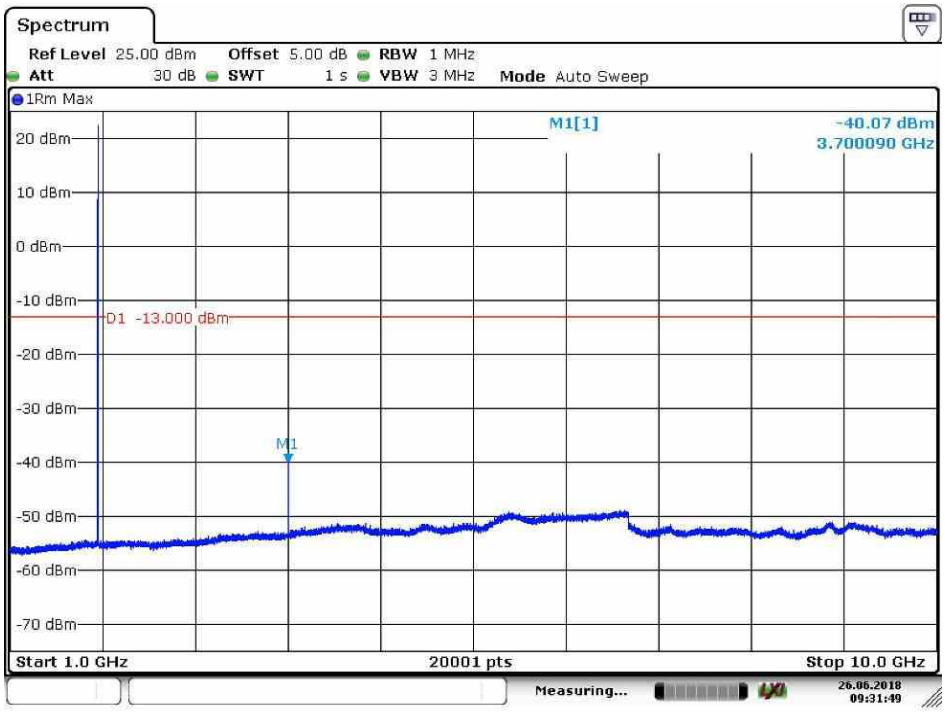
6.1.1.3 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz

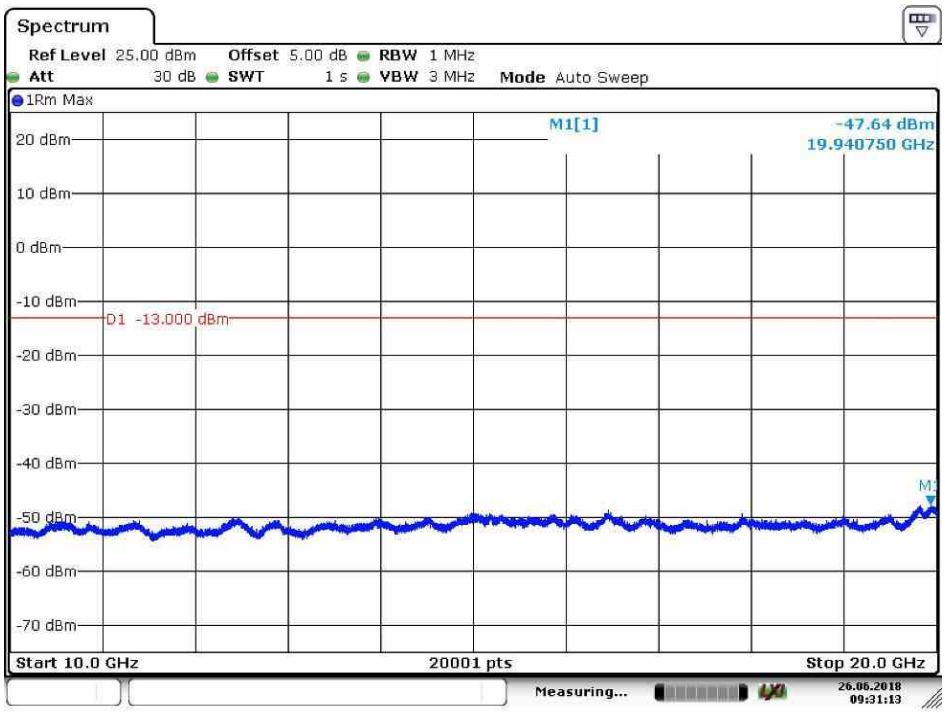
6.1.1.3.1 Test Channel = LCH



Date: 26.JUN.2018 09:32:30

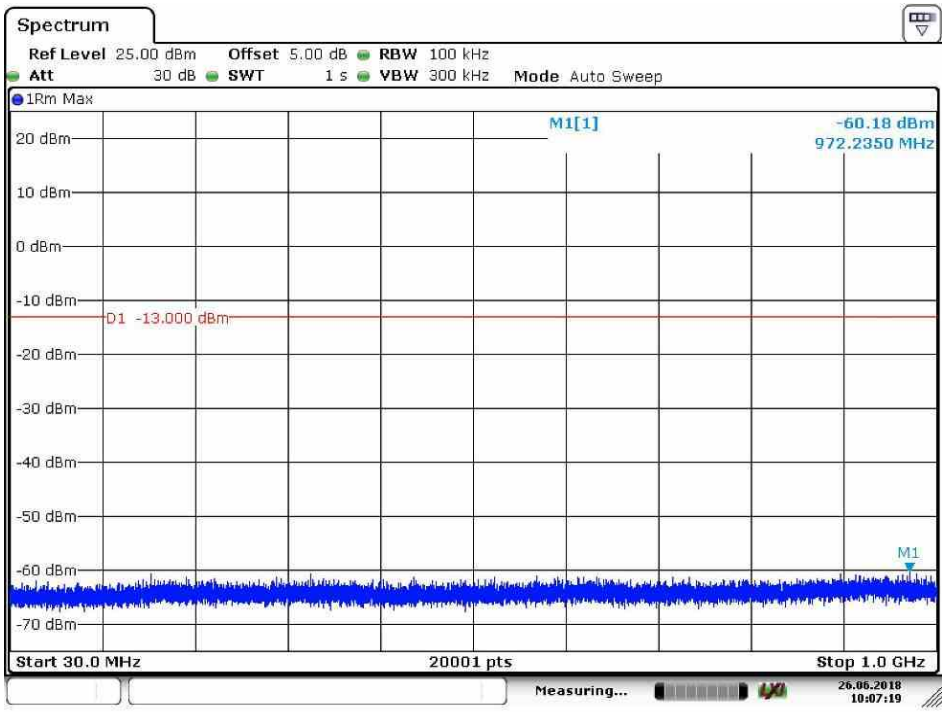


Date: 26.JUN.2018 09:31:49

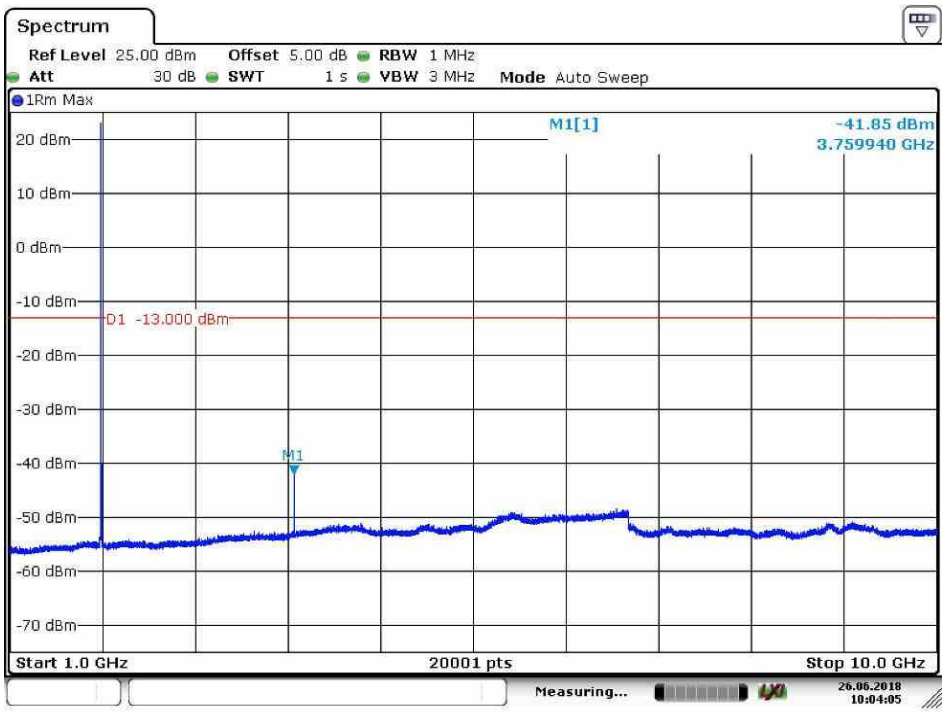


Date: 26.JUN.2018 09:31:14

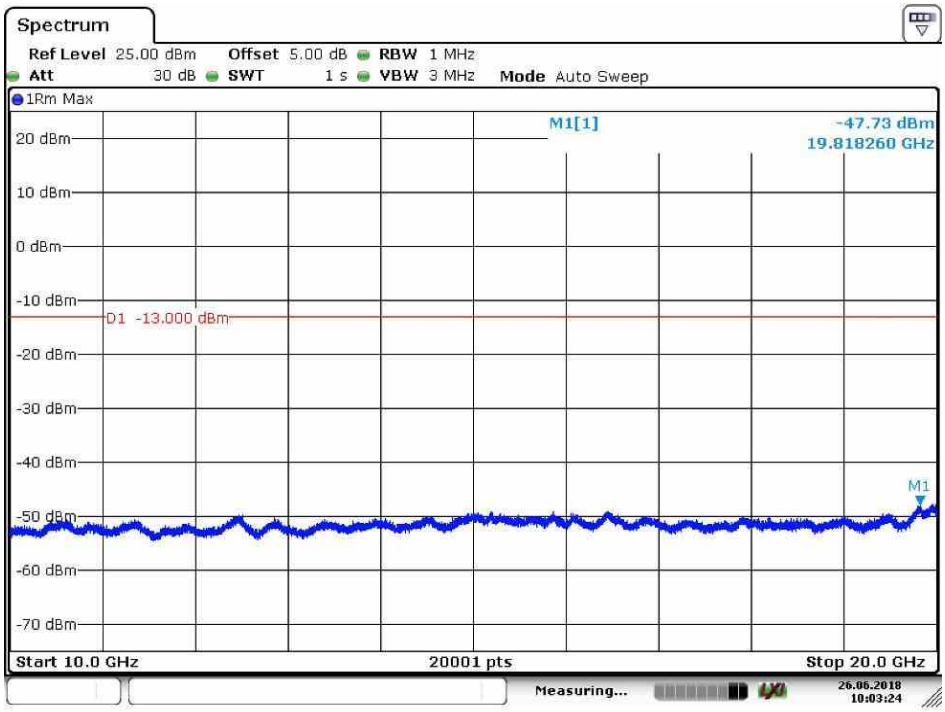
6.1.1.3.2 Test Channel = MCH



Date: 26.JUN.2018 10:07:20

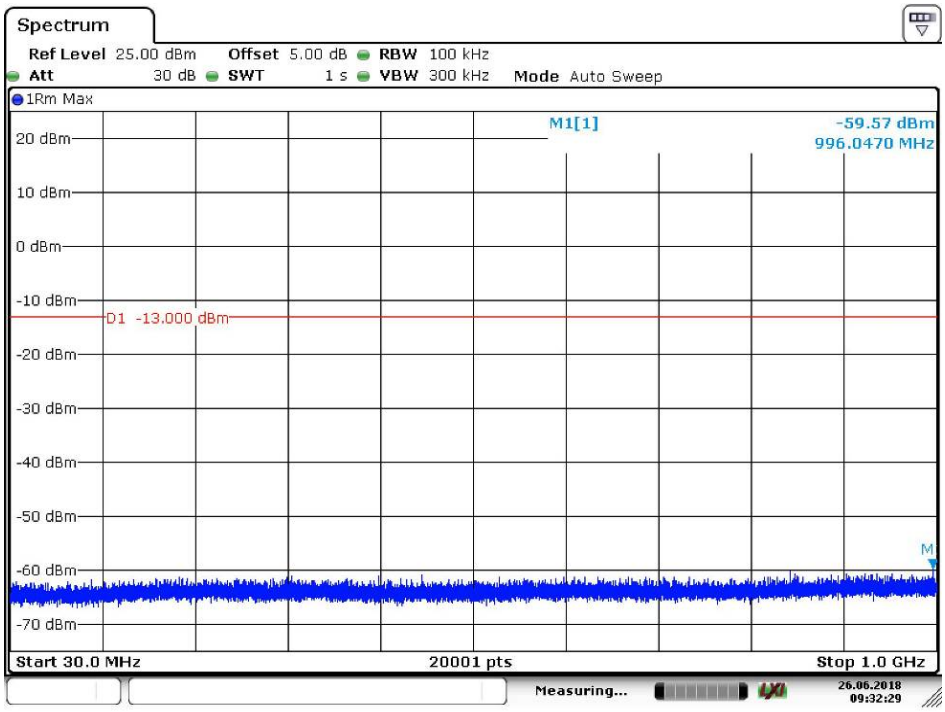


Date: 26.JUN.2018 10:04:05

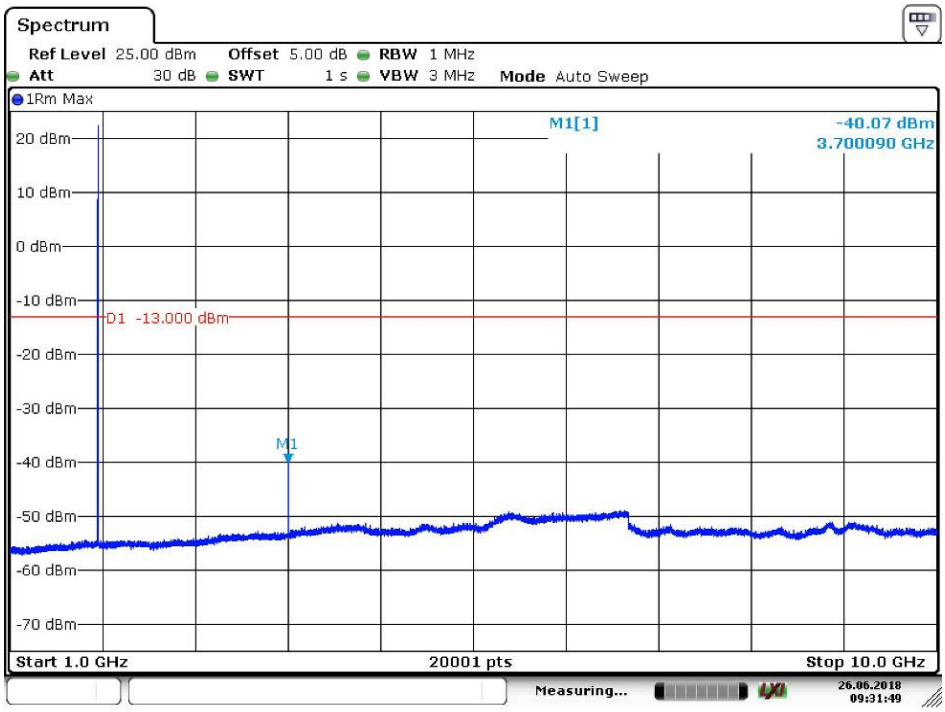


Date: 26.JUN.2018 10:03:25

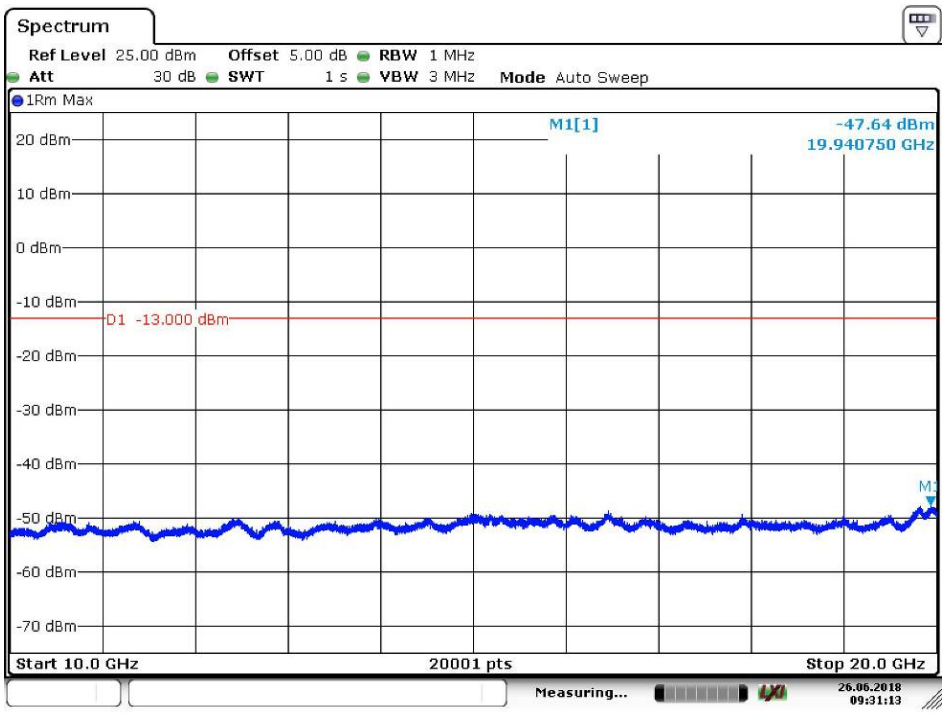
6.1.1.3.3 Test Channel = HCH



Date: 26.JUN.2018 09:32:30



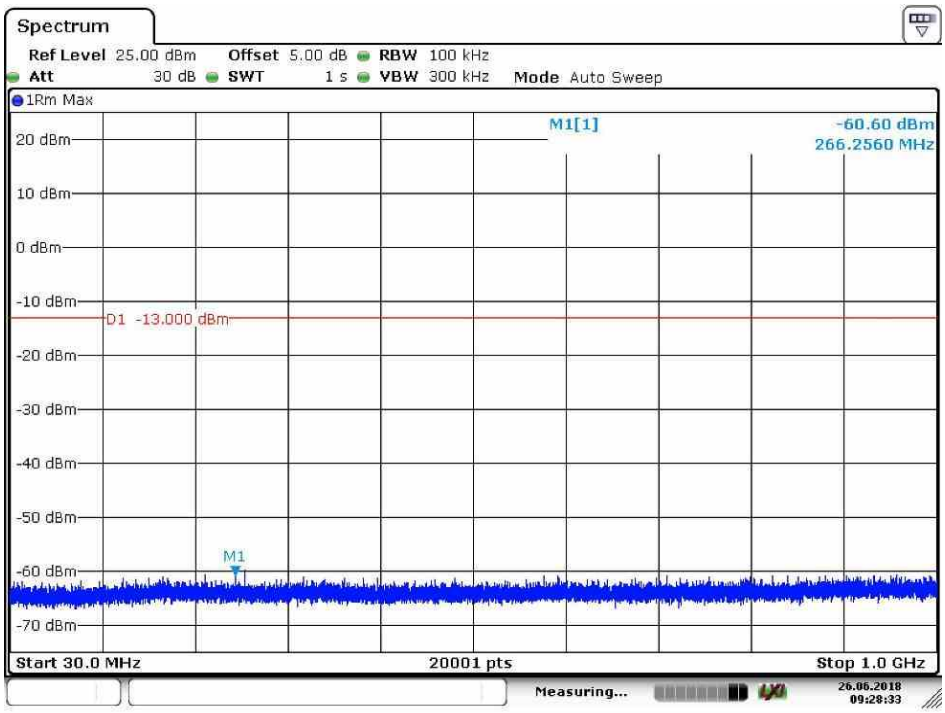
Date: 26.JUN.2018 09:31:49



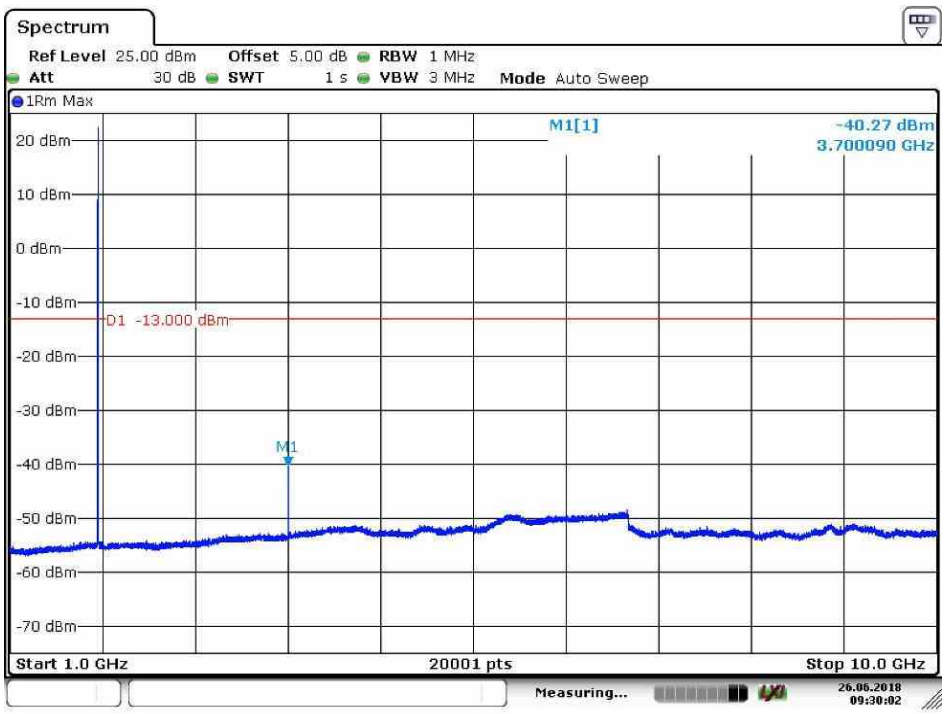
Date: 26.JUN.2018 09:31:14

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

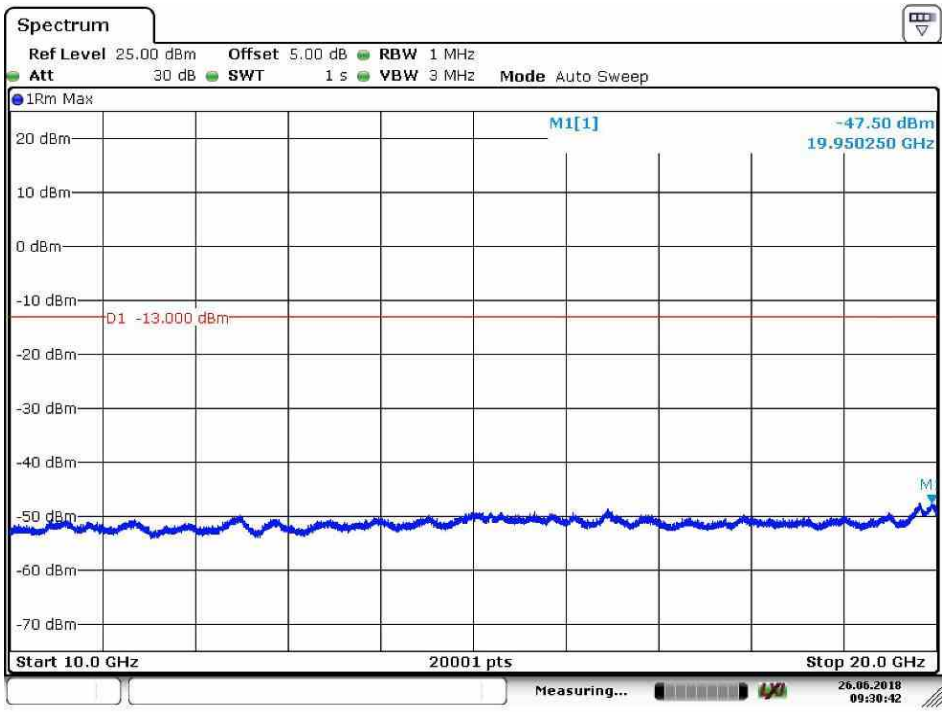
6.1.1.4.1 Test Channel = LCH



Date: 26.JUN.2018 09:28:34

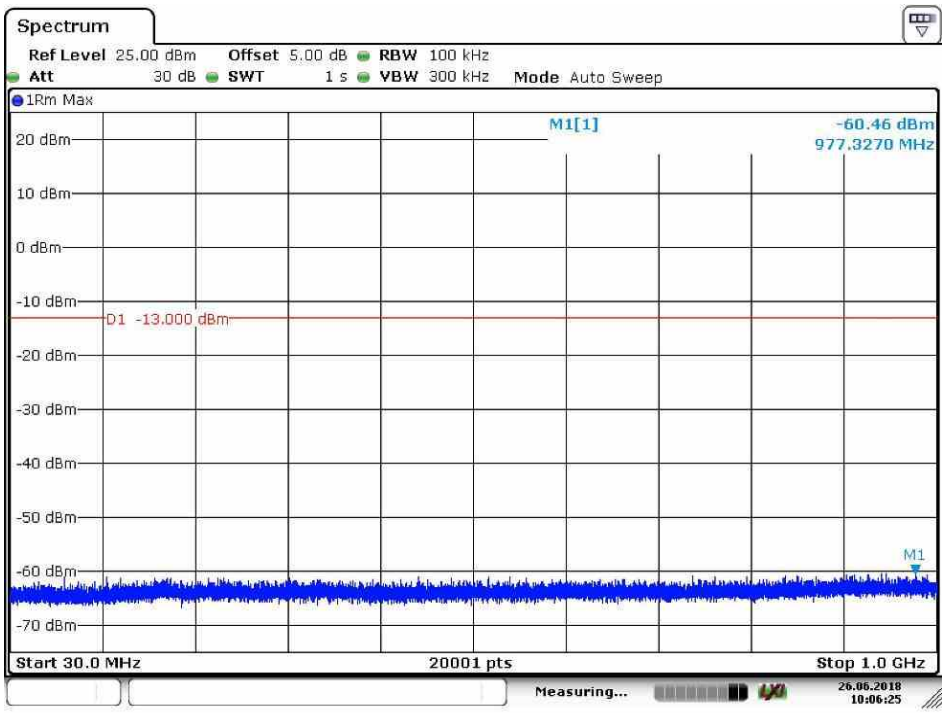


Date: 26.JUN.2018 09:30:03

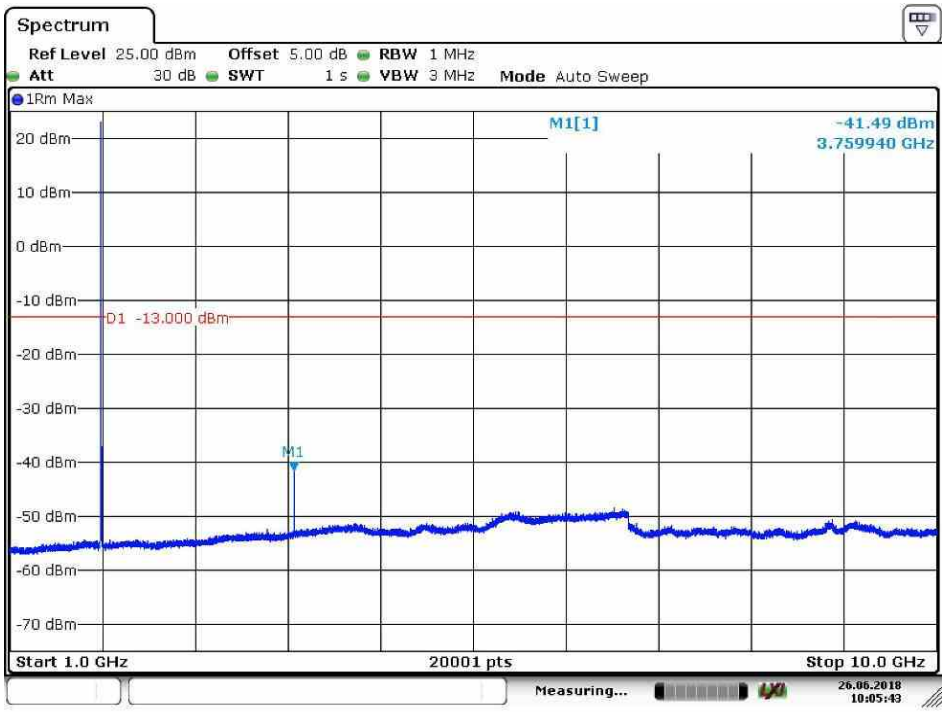


Date: 26.JUN.2018 09:30:42

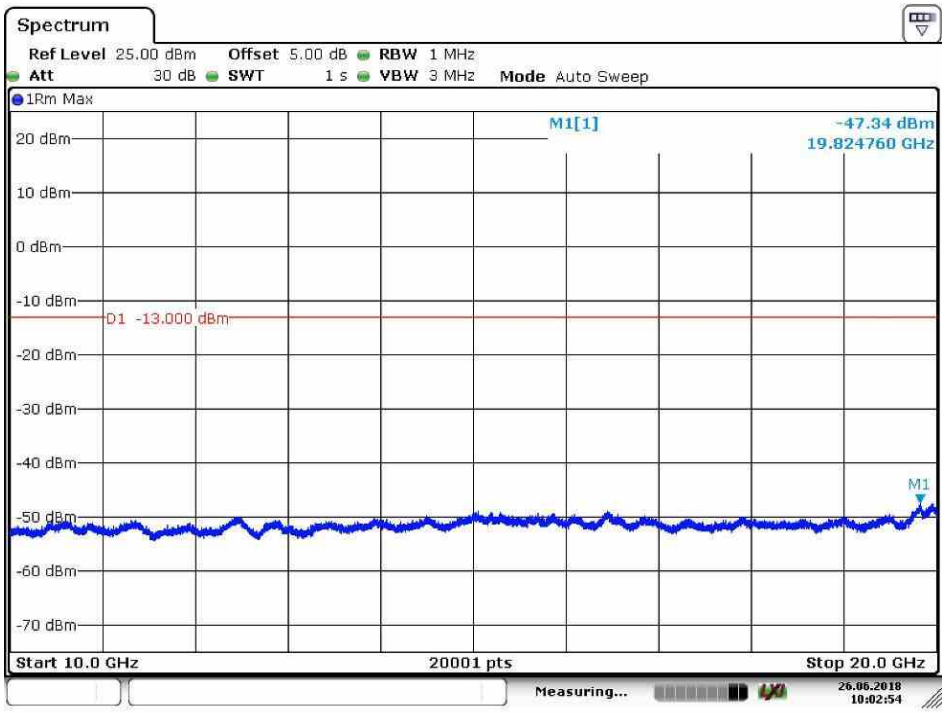
6.1.1.4.2 Test Channel = MCH



Date: 26.JUN.2018 10:06:26

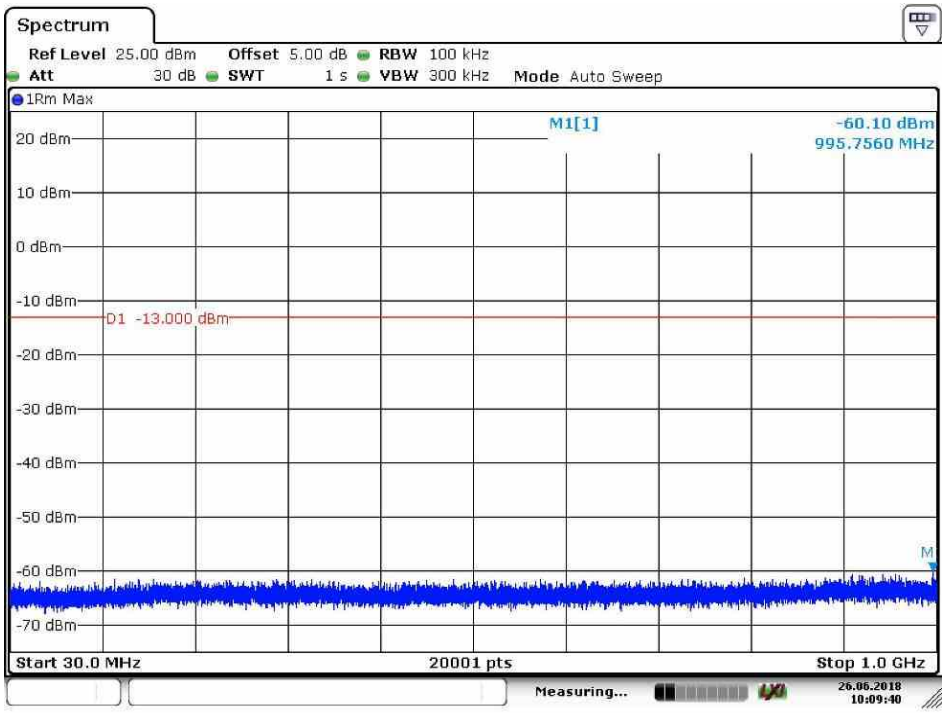


Date: 26.JUN.2018 10:05:44

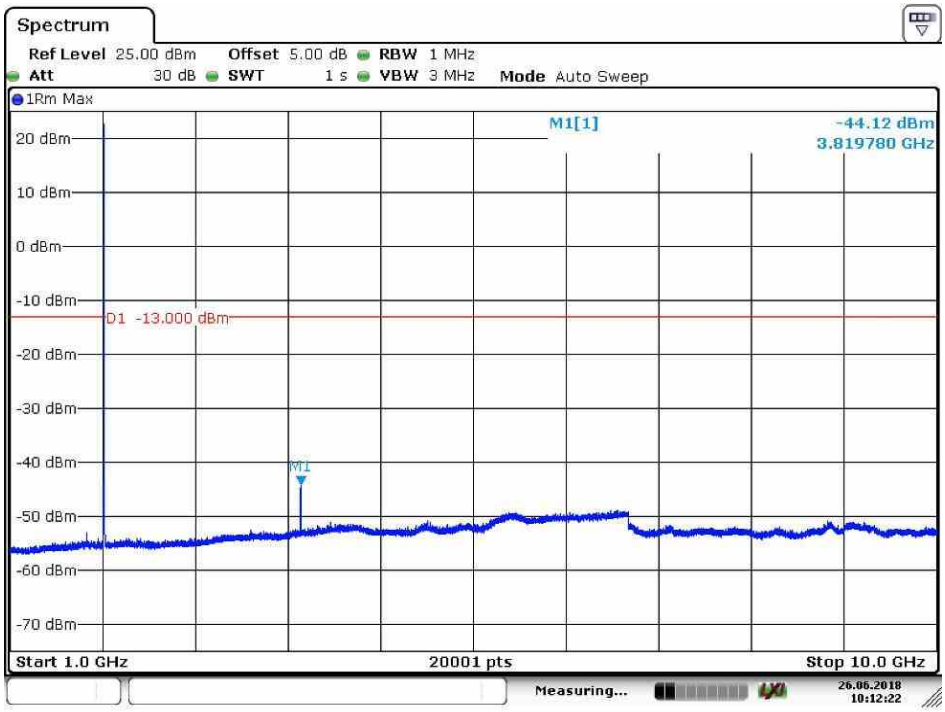


Date: 26.JUN.2018 10:02:55

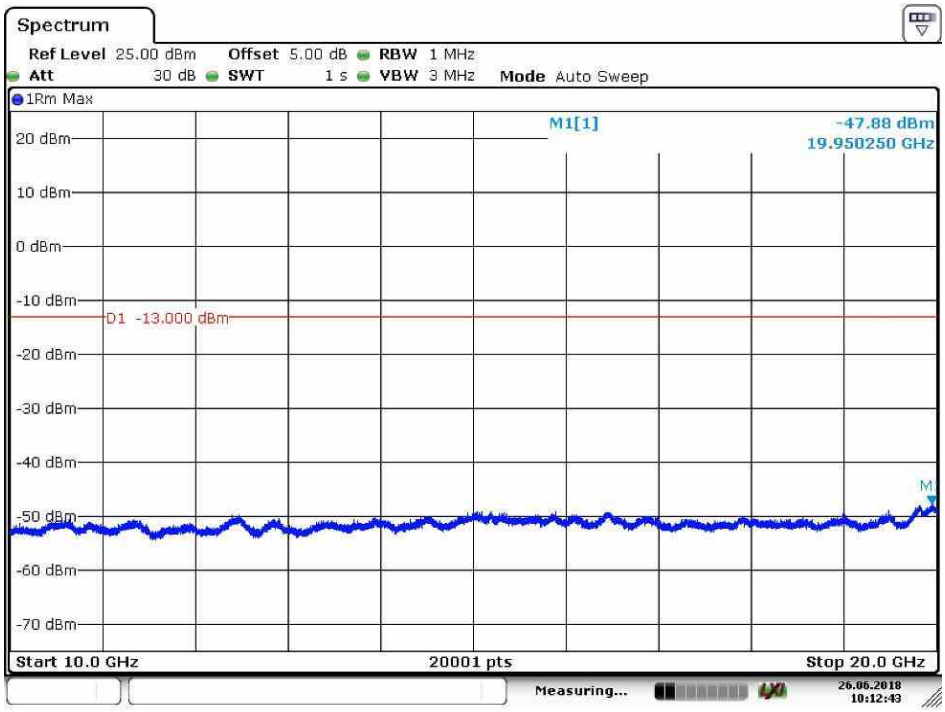
6.1.1.4.3 Test Channel = HCH



Date: 26.JUN.2018 10:09:41



Date: 26.JUN.2018 10:12:23



Date: 26.JUN.2018 10:12:43

7 Field Strength of Spurious Radiation

7.1 For LTE-NB1

7.1.1 Test Band = LTE-NB1 BAND2

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
64.950000	-81.79	-13.00	-68.79	Vertical
104.250000	-85.64	-13.00	-72.64	Vertical
780.595833	-80.81	-13.00	-67.81	Vertical
1236.000000	-66.66	-13.00	-53.66	Vertical
3704.600000	-44.85	-13.00	-31.85	Vertical
8632.250000	-63.90	-13.00	-50.90	Vertical
62.350000	-77.67	-13.00	-64.67	Horizontal
104.300000	-85.10	-13.00	-72.10	Horizontal
798.929167	-80.55	-13.00	-67.55	Horizontal
1213.000000	-67.23	-13.00	-54.23	Horizontal
3705.575000	-52.19	-13.00	-39.19	Horizontal
7843.150000	-64.25	-13.00	-51.25	Horizontal

7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
55.100000	-83.13	-13.00	-70.13	Vertical
104.250000	-84.18	-13.00	-71.18	Vertical
1271.000000	-66.53	-13.00	-53.53	Vertical
3759.525000	-53.10	-13.00	-40.10	Vertical
5639.650000	-52.76	-13.00	-39.76	Vertical
7520.100000	-53.09	-13.00	-40.09	Vertical
63.150000	-77.86	-13.00	-64.86	Horizontal
104.300000	-85.02	-13.00	-72.02	Horizontal
1234.000000	-62.55	-13.00	-49.55	Horizontal
3759.200000	-44.70	-13.00	-31.70	Horizontal
5639.975000	-53.18	-13.00	-40.18	Horizontal
9242.275000	-63.95	-13.00	-50.95	Horizontal

7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
64.150000	-81.81	-13.00	-68.81	Vertical
104.250000	-77.76	-13.00	-64.76	Vertical
1194.000000	-66.69	-13.00	-53.69	Vertical
3814.775000	-50.55	-13.00	-37.55	Vertical
5722.525000	-64.88	-13.00	-51.88	Vertical
9235.775000	-64.30	-13.00	-51.30	Vertical
62.350000	-77.89	-13.00	-64.89	Horizontal
104.300000	-83.83	-13.00	-70.83	Horizontal
1258.500000	-62.56	-13.00	-49.56	Horizontal
3814.450000	-44.53	-13.00	-31.53	Horizontal
5722.200000	-64.94	-13.00	-51.94	Horizontal
7629.950000	-60.20	-13.00	-47.20	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
BAND2	TM1/15k	LCH	TN	VL	5.44	0.002941	PASS
				VN	6.92	0.003741	PASS
				VH	1.02	0.000550	PASS
		MCH	TN	VL	-0.60	-0.000319	PASS
				VN	-2.46	-0.001310	PASS
				VH	-2.61	-0.001388	PASS
		HCH	TN	VL	-1.39	-0.000730	PASS
				VN	-4.62	-0.002418	PASS
				VH	-5.36	-0.002809	PASS
	TM2/15k	LCH	TN	VL	7.41	0.004006	PASS
				VN	7.01	0.003790	PASS
				VH	-9.63	-0.005206	PASS
		MCH	TN	VL	-5.24	-0.002787	PASS
				VN	-7.01	-0.003730	PASS
				VH	-0.46	-0.000246	PASS
		HCH	TN	VL	-6.77	-0.003548	PASS
				VN	-3.29	-0.001724	PASS
				VH	8.84	0.004630	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
BAND2	TM1 15kHz	LCH	VN	-30	-6.60	-0.003566	PASS
				-20	-7.12	-0.003850	PASS
				-10	-0.43	-0.000232	PASS
				0	-8.41	-0.004545	PASS
				10	4.12	0.002228	PASS
				20	-1.39	-0.000751	PASS
				30	-8.78	-0.004748	PASS
				40	1.80	0.000971	PASS
				50	-5.79	-0.003131	PASS
		MCH	VN	-30	-8.85	-0.004707	PASS
				-20	-5.37	-0.002857	PASS
				-10	-3.42	-0.001818	PASS
				0	0.06	0.000034	PASS
				10	-9.04	-0.004808	PASS
				20	-6.17	-0.003281	PASS
				30	-9.81	-0.005217	PASS
				40	-5.61	-0.002986	PASS
				50	6.98	0.003711	PASS
		HCH	VN	-30	-4.20	-0.002201	PASS
				-20	-8.66	-0.004539	PASS
				-10	-9.94	-0.005207	PASS
				0	5.11	0.002678	PASS
				10	-4.47	-0.002341	PASS
				20	5.16	0.002703	PASS
				30	5.73	0.003001	PASS
				40	3.77	0.001974	PASS
				50	-9.63	-0.005044	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BAND2	TM2 15kHz	LCH	VN	-30	-6.13	-0.003313	PASS
				-20	1.21	0.000653	PASS
				-10	7.86	0.004248	PASS
				0	-1.28	-0.000693	PASS
				10	2.02	0.001093	PASS
				20	-4.42	-0.002391	PASS
				30	-0.46	-0.000248	PASS
				40	-9.72	-0.005255	PASS
				50	-2.52	-0.001362	PASS
		MCH	VN	-30	9.34	0.004970	PASS
				-20	-4.10	-0.002181	PASS
				-10	-2.15	-0.001143	PASS
				0	3.32	0.001766	PASS
				10	-5.85	-0.003112	PASS
				20	3.37	0.001794	PASS
				30	4.87	0.002589	PASS
				40	9.31	0.004950	PASS
				50	-7.32	-0.003894	PASS
		HCH	VN	-30	-2.32	-0.001216	PASS
				-20	-6.07	-0.003182	PASS
				-10	5.19	0.002721	PASS
				0	2.69	0.001410	PASS
				10	-5.15	-0.002699	PASS
				20	6.54	0.003428	PASS
				30	3.09	0.001621	PASS
				40	-1.70	-0.000889	PASS
				50	-5.86	-0.003068	PASS

The End