



Appendix B

LTE-M1 BAND 2



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1 Effective (Isotropic) Radiated Power Output Data

Effective Isotropic Radiated Power of Transmitter (EIRP) for LTE-M1 BAND 2

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM1	1.4M	LCH	RB1#0	22.92	24.02	33.00	PASS
				RB1#5	22.81	23.91	33.00	PASS
				RB6#0	21.04	22.14	33.00	PASS
			MCH	RB1#0	23.02	24.12	33.00	PASS
				RB1#5	22.97	24.07	33.00	PASS
				RB6#0	21.17	22.27	33.00	PASS
			HCH	RB1#0	23.24	24.34	33.00	PASS
				RB1#5	23.34	24.44	33.00	PASS
				RB6#0	21.18	22.28	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM2	1.4M	LCH	RB1#0	22.21	23.31	33.00	PASS
				RB1#5	22.26	23.36	33.00	PASS
				RB6#0	21.03	22.13	33.00	PASS
			MCH	RB1#0	22.44	23.54	33.00	PASS
				RB1#5	22.55	23.65	33.00	PASS
				RB6#0	21.1	22.2	33.00	PASS
			HCH	RB1#0	22.45	23.55	33.00	PASS
				RB1#5	22.59	23.69	33.00	PASS
				RB6#0	21.07	22.17	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM1	3M	LCH	RB1#0	23.07	24.17	33.00	PASS
				RB1#5	23.1	24.2	33.00	PASS
				RB6#0	21.11	22.21	33.00	PASS
			MCH	RB1#0	23.21	24.31	33.00	PASS
				RB1#5	23.23	24.33	33.00	PASS
				RB6#0	21.24	22.34	33.00	PASS
			HCH	RB1#0	23.24	24.34	33.00	PASS
				RB1#5	23.25	24.35	33.00	PASS
				RB6#0	21.17	22.27	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM2	3M	LCH	RB1#0	22.3	23.4	33.00	PASS
				RB1#5	22.19	23.29	33.00	PASS
				RB6#0	21.12	22.22	33.00	PASS
			MCH	RB1#0	22.45	23.55	33.00	PASS
				RB1#5	22.5	23.6	33.00	PASS

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				RB6#0	21.08	22.18	33.00	PASS
			HCH	RB1#0	22.49	23.59	33.00	PASS
				RB1#5	22.53	23.63	33.00	PASS
				RB6#0	21.16	22.26	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM1	5M	LCH	RB1#0	22.99	24.09	33.00	PASS
				RB1#5	22.91	24.01	33.00	PASS
				RB6#0	22.05	23.15	33.00	PASS
			MCH	RB1#0	23.23	24.33	33.00	PASS
				RB1#5	23.26	24.36	33.00	PASS
				RB6#0	22.36	23.46	33.00	PASS
			HCH	RB1#0	23.18	24.28	33.00	PASS
				RB1#5	23.22	24.32	33.00	PASS
				RB6#0	22.2	23.3	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM2	5M	LCH	RB1#0	22.44	23.54	33.00	PASS
				RB1#5	22.51	23.61	33.00	PASS
				RB6#0	21.01	22.11	33.00	PASS
			MCH	RB1#0	22.64	23.74	33.00	PASS
				RB1#5	22.67	23.77	33.00	PASS
				RB6#0	21.16	22.26	33.00	PASS
			HCH	RB1#0	22.71	23.81	33.00	PASS
				RB1#5	22.6	23.7	33.00	PASS
				RB6#0	21.35	22.45	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM1	10M	LCH	RB1#0	22.99	24.09	33.00	PASS
				RB1#5	22.99	24.09	33.00	PASS
				RB6#0	22.03	23.13	33.00	PASS
			MCH	RB1#0	23.23	24.33	33.00	PASS
				RB1#5	23.23	24.33	33.00	PASS
				RB6#0	22.28	23.38	33.00	PASS
			HCH	RB1#0	23.13	24.23	33.00	PASS
				RB1#5	23.12	24.22	33.00	PASS
				RB6#0	22.19	23.29	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM2	10M	LCH	RB1#0	22.46	23.56	33.00	PASS
				RB1#5	22.48	23.58	33.00	PASS
				RB6#0	21.21	22.31	33.00	PASS
			MCH	RB1#0	22.63	23.73	33.00	PASS
				RB1#5	22.64	23.74	33.00	PASS
				RB6#0	21.18	22.28	33.00	PASS

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			HCH	RB1#0	22.53	23.63	33.00	PASS
				RB1#5	22.54	23.64	33.00	PASS
				RB6#0	21.14	22.24	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM1	15M	LCH	RB1#0	23.17	24.27	33.00	PASS
				RB1#5	23.08	24.18	33.00	PASS
				RB6#0	23.08	24.18	33.00	PASS
			MCH	RB1#0	23.21	24.31	33.00	PASS
				RB1#5	23.12	24.22	33.00	PASS
				RB6#0	23.15	24.25	33.00	PASS
			HCH	RB1#0	23.09	24.19	33.00	PASS
				RB1#5	23.03	24.13	33.00	PASS
				RB6#0	23.07	24.17	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM2	15M	LCH	RB1#0	22.39	23.49	33.00	PASS
				RB1#5	22.35	23.45	33.00	PASS
				RB6#0	22.98	24.08	33.00	PASS
			MCH	RB1#0	22.61	23.71	33.00	PASS
				RB1#5	22.62	23.72	33.00	PASS
				RB6#0	23.14	24.24	33.00	PASS
			HCH	RB1#0	22.46	23.56	33.00	PASS
				RB1#5	22.51	23.61	33.00	PASS
				RB6#0	23.02	24.12	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM1	20M	LCH	RB1#0	22.96	24.06	33.00	PASS
				RB1#5	23.02	24.12	33.00	PASS
				RB6#0	23	24.1	33.00	PASS
			MCH	RB1#0	22.97	24.07	33.00	PASS
				RB1#5	22.91	24.01	33.00	PASS
				RB6#0	22.97	24.07	33.00	PASS
			HCH	RB1#0	22.99	24.09	33.00	PASS
				RB1#5	23.03	24.13	33.00	PASS
				RB6#0	23.11	24.21	33.00	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND2	LTE-M1/TM2	20M	LCH	RB1#0	22.46	23.56	33.00	PASS
				RB1#5	22.53	23.63	33.00	PASS
				RB6#0	23.07	24.17	33.00	PASS
			MCH	RB1#0	22.43	23.53	33.00	PASS
				RB1#5	22.38	23.48	33.00	PASS
				RB6#0	23.02	24.12	33.00	PASS
			HCH	RB1#0	22.56	23.66	33.00	PASS

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				RB1#5	22.51	23.61	33.00	PASS
				RB6#0	23.15	24.25	33.00	PASS

Note:

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

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

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
Band 2	TM1/5M Full RB	LCH	4.93	13	PASS
		MCH	5.04	13	PASS
		HCH	4.23	13	PASS
	TM1/5M 1 RB	LCH	4.32	13	PASS
		MCH	4.55	13	PASS
		HCH	4.32	13	PASS
	TM2/5M Full RB	LCH	4.96	13	PASS
		MCH	6.38	13	PASS
		HCH	6.20	13	PASS
	TM2/5M 1 RB	LCH	5.30	13	PASS
		MCH	4.84	13	PASS
		HCH	4.84	13	PASS

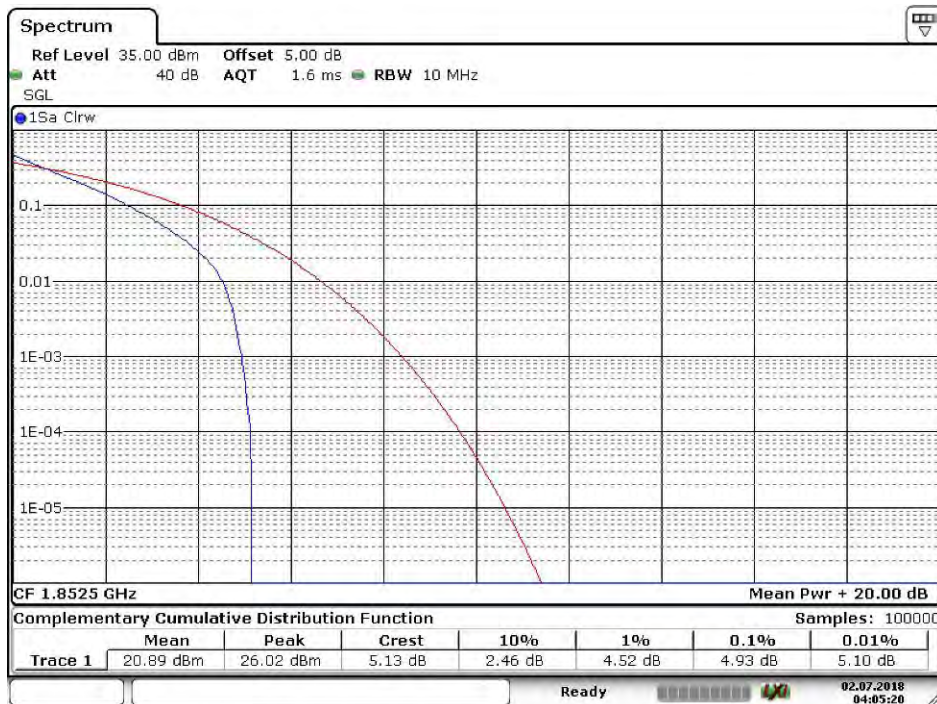
Part II - Test Plots

2.1 For LTE-M1

2.1.1 Test Band = LTE-M1 BAND2

2.1.1.1 Test Mode = LTE-M1/TM1.Bandwidth=5MHz Full RB

2.1.1.1.1 Test Channel = LCH



Date: 2.JUL.2018 04:05:20

2.1.1.1.2 Test Channel = MCH



Date: 2.JUL.2018 04:06:48

2.1.1.1.3 Test Channel = HCH



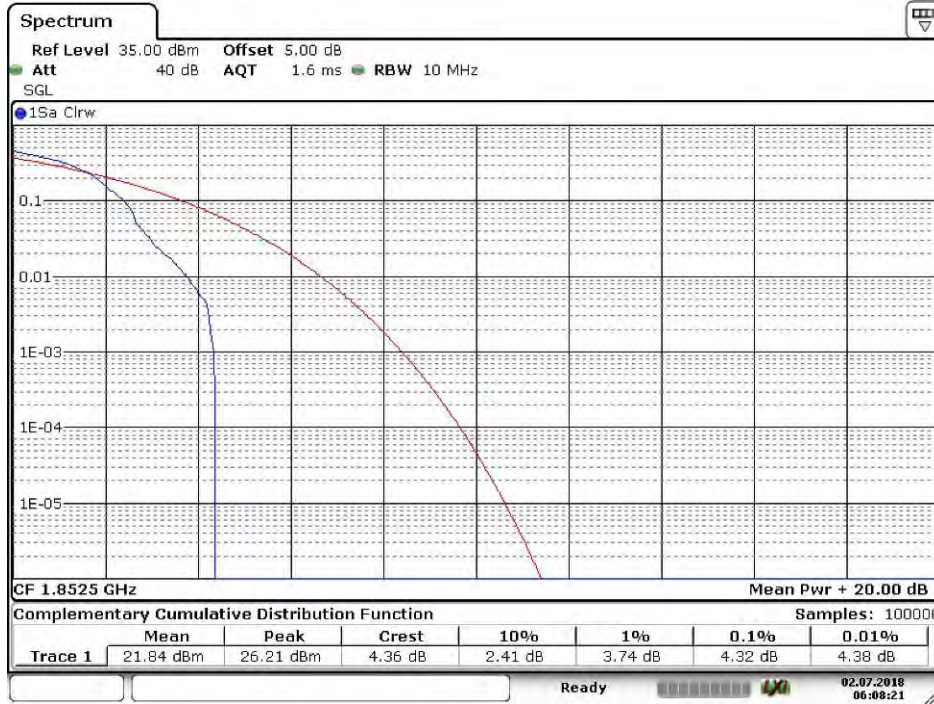
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2.1.1.2 Test Mode = LTE-M1/TM1.Bandwidth=5MHz 1 RB

2.1.1.2.1 Test Channel = LCH



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2.1.1.2.2 Test Channel = MCH



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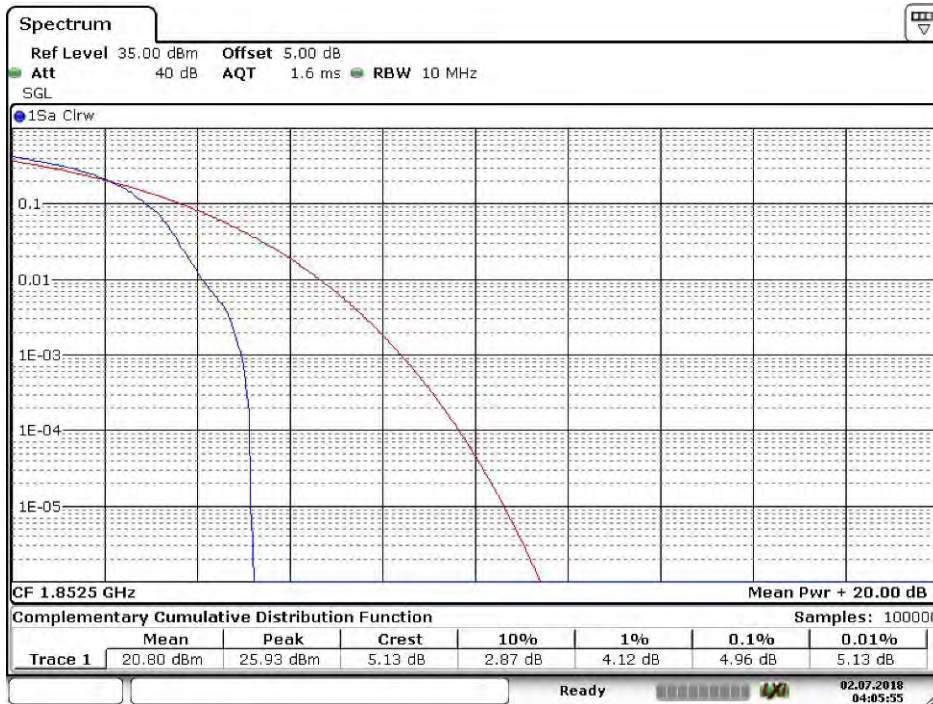
2.1.1.2.3 Test Channel = HCH



Date: 2.JUL.2018 06:09:49

2.1.1.3 Test Mode = LTE-M1/TM2.Bandwidth=5MHz Full RB

2.1.1.3.1 Test Channel = LCH



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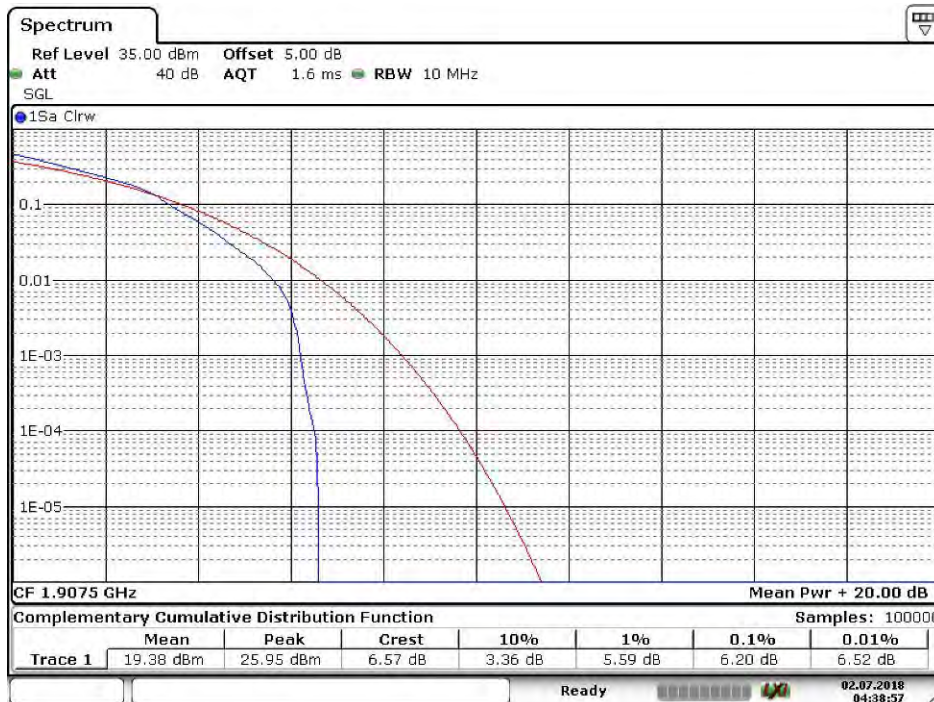


2.1.1.3.2 Test Channel = MCH



Date: 2.JUL.2018 04:06:35

2.1.1.3.3 Test Channel = HCH



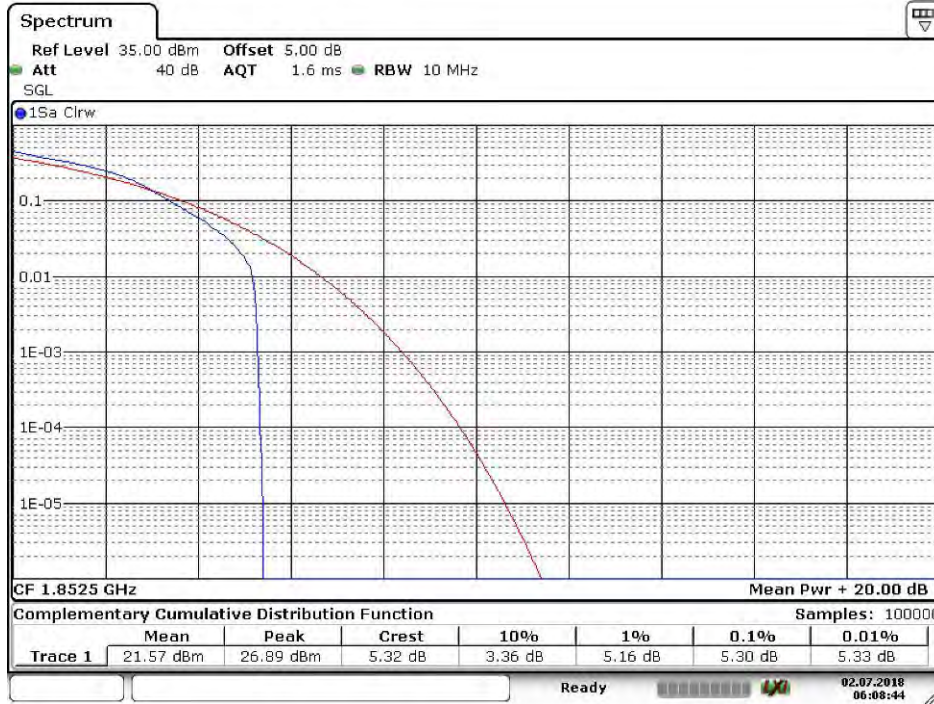
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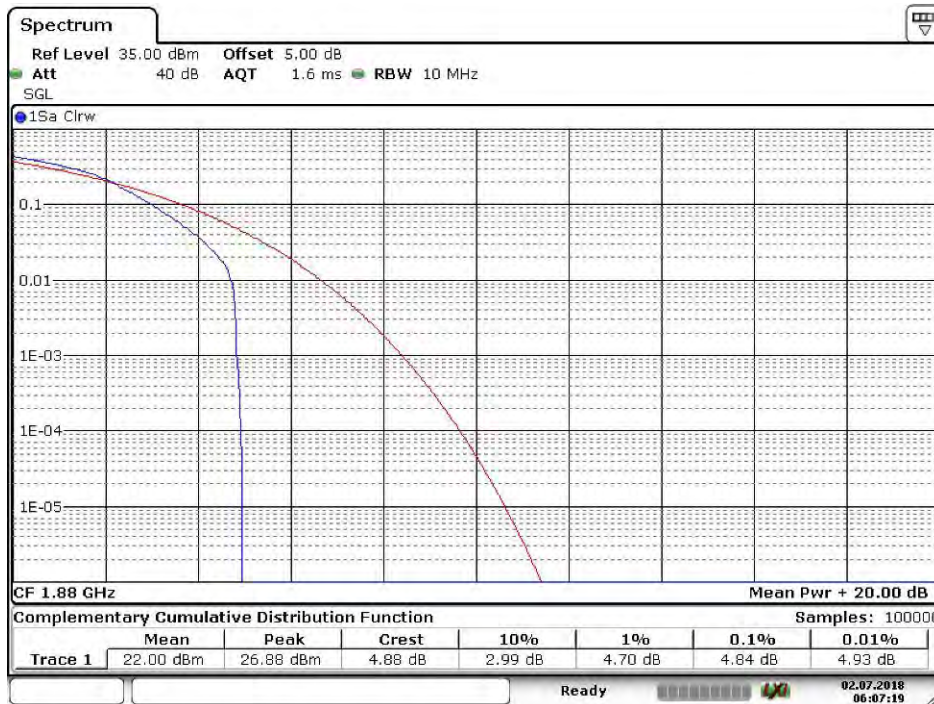
2.1.1.4 Test Mode = LTE-M1/TM2.Bandwidth=5MHz 1 RB

2.1.1.4.1 Test Channel = LCH



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2.1.1.4.2 Test Channel = MCH



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2.1.1.4.3 Test Channel = HCH



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3 Modulation Characteristics

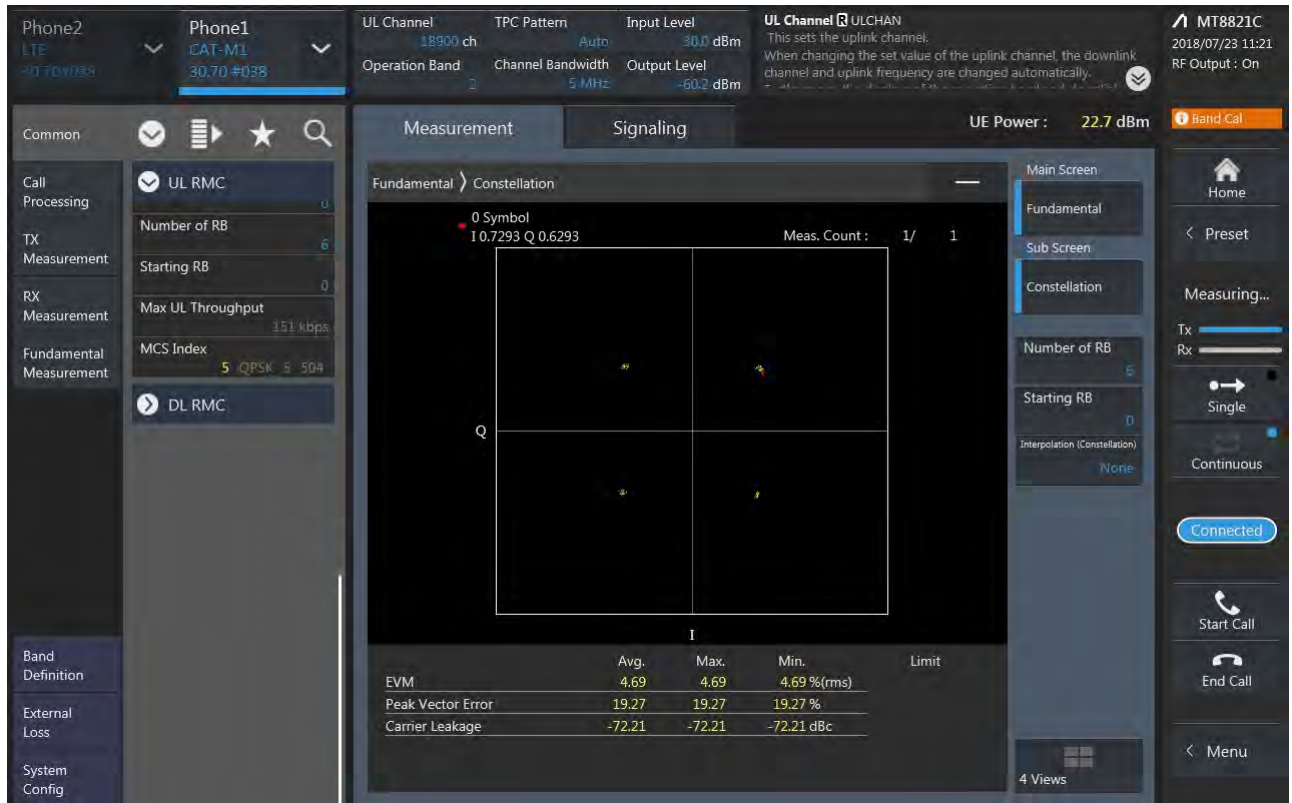
Part I - Test Plots

3.1 For LTE-M1

3.1.1 Test Band = LTE-M1 BAND2

3.1.1.1 Test Mode = LTE-M1 /TM1 5MHz

3.1.1.1.1 Test Channel = MCH

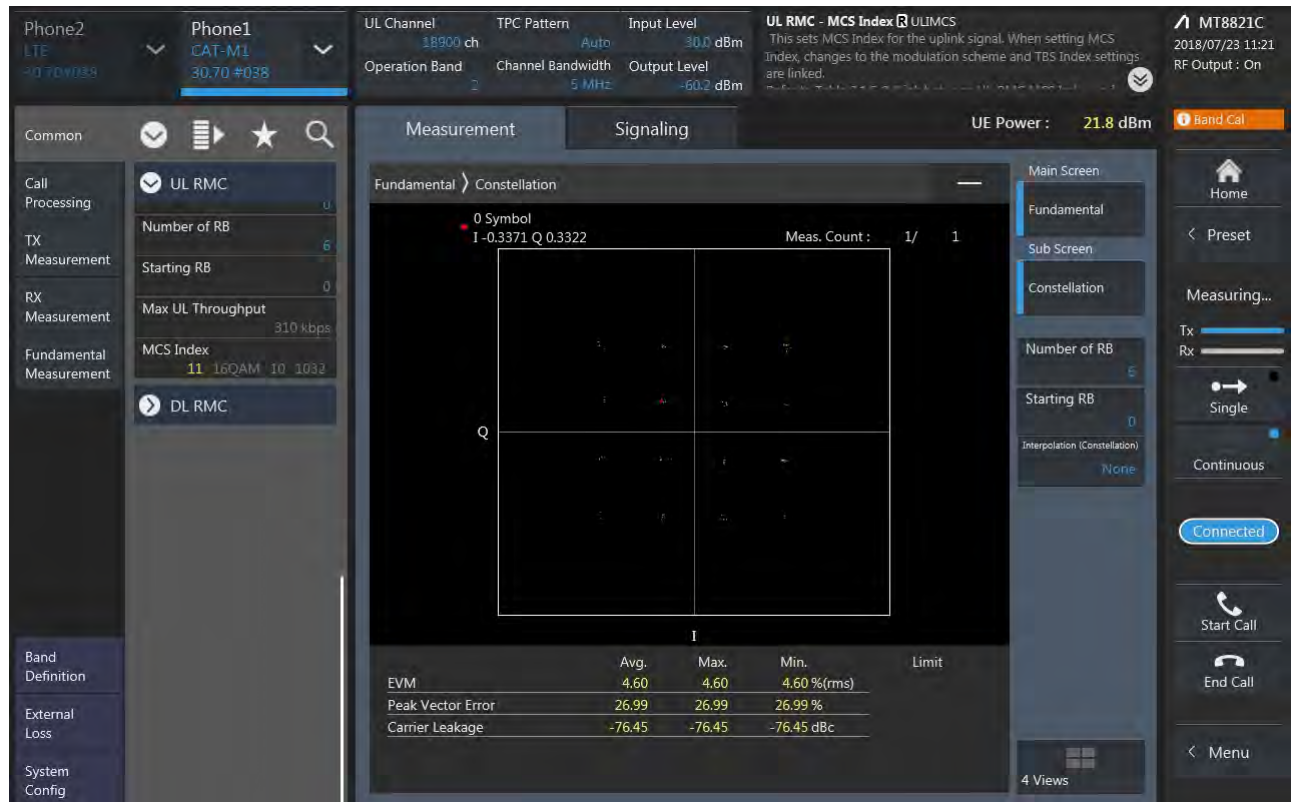


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3.1.1.2 Test Mode = LTE-M1 /TM2 5MHz

3.1.1.2.1 Test Channel = MCH



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4 Bandwidth

Part I - Test Results

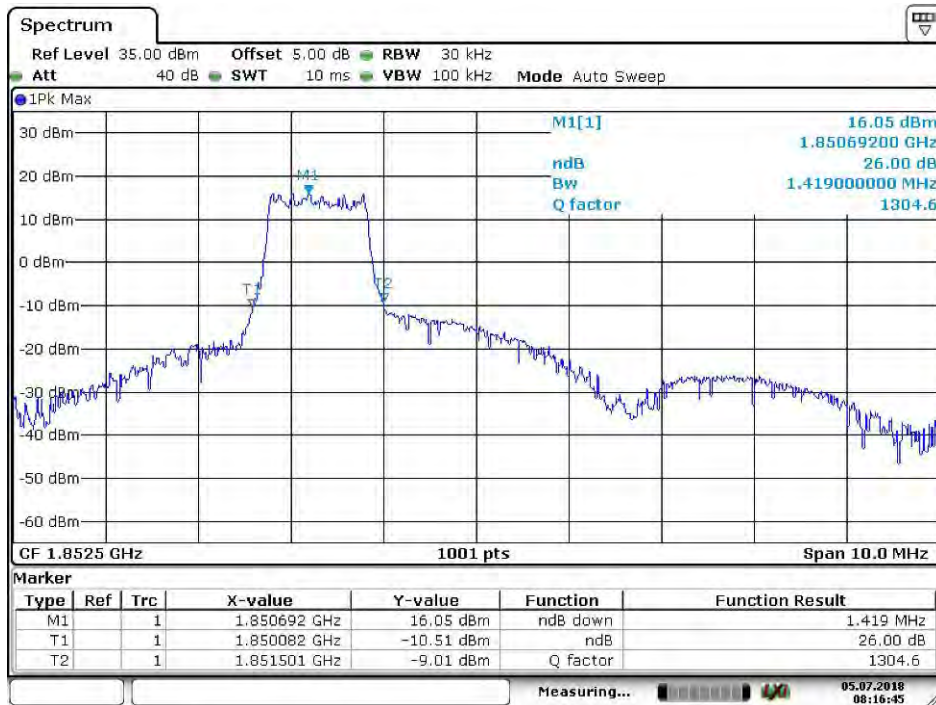
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
BAND2	TM1/ 5MHz	LCH	1.10	1.41	PASS
		MCH	1.10	1.39	PASS
		HCH	1.11	1.38	PASS
	TM2/ 5MHz	LCH	1.13	1.48	PASS
		MCH	1.13	1.46	PASS
		HCH	1.13	1.40	PASS

4.1 For LTE

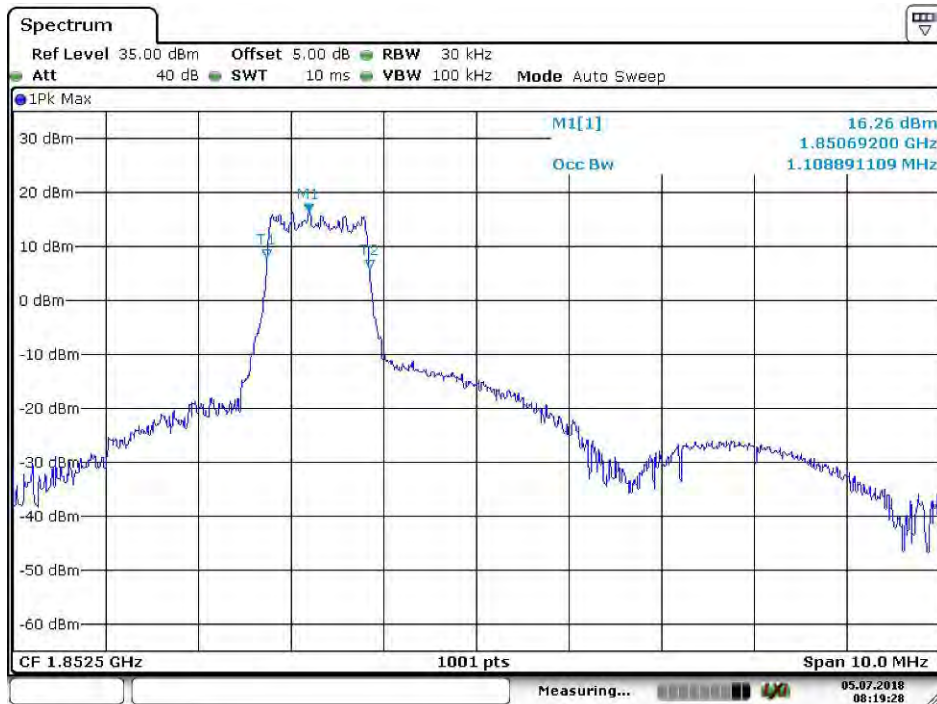
4.1.1 Test Band = LTE-M1 BAND2

4.1.1.1 Test Mode = LTE-M1/TM1 5MHz

4.1.1.1.1 Test Channel = LCH

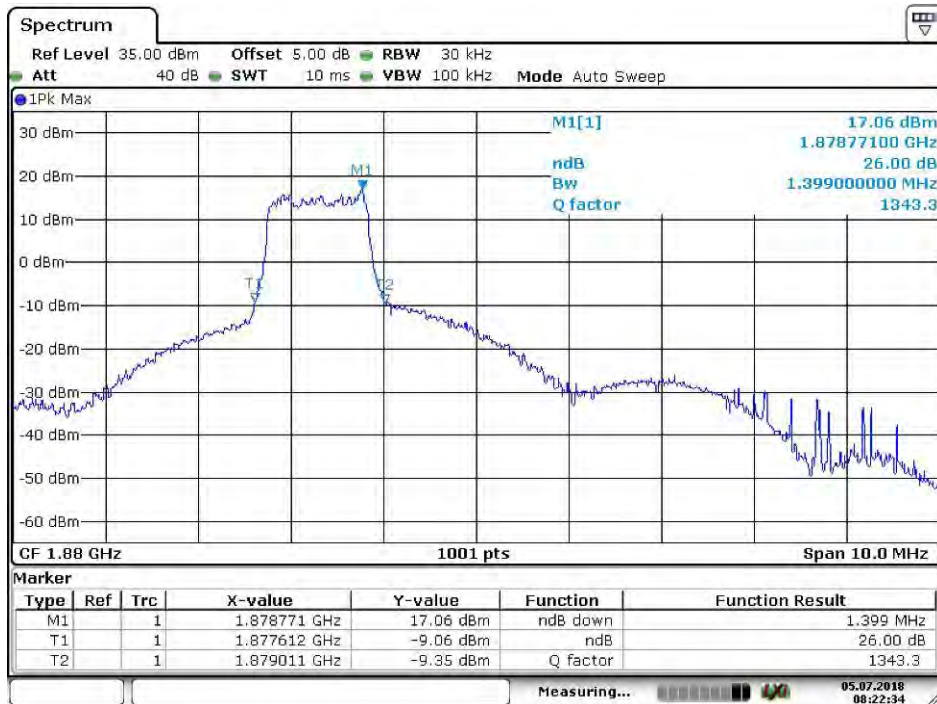


Date: 5.JUL 2018 08:16:45

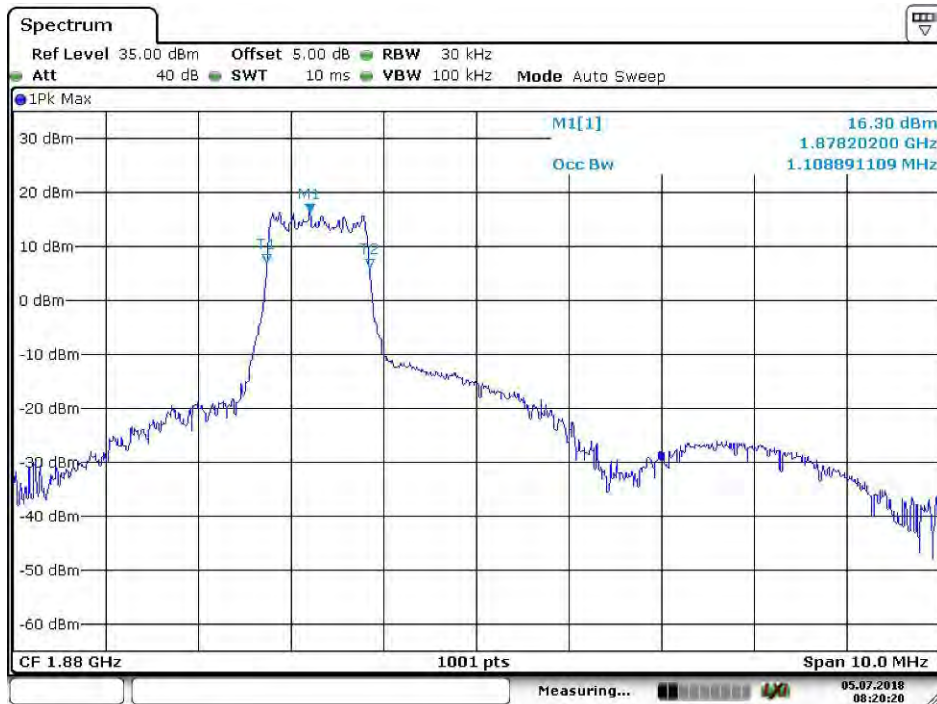


Date: 5.JUL.2018 08:19:29

4.1.1.1.2 Test Channel = MCH

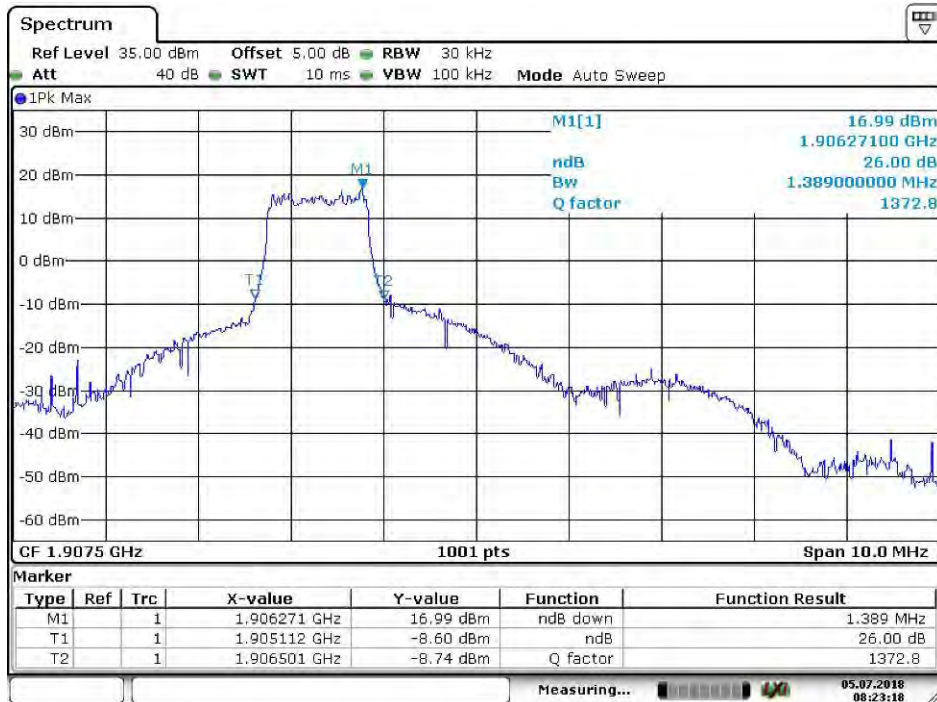


Date: 5.JUL.2018 08:22:35



Date: 5.JUL.2018 08:20:20

4.1.1.1.3 Test Channel = HCH



Date: 5.JUL.2018 08:23:18

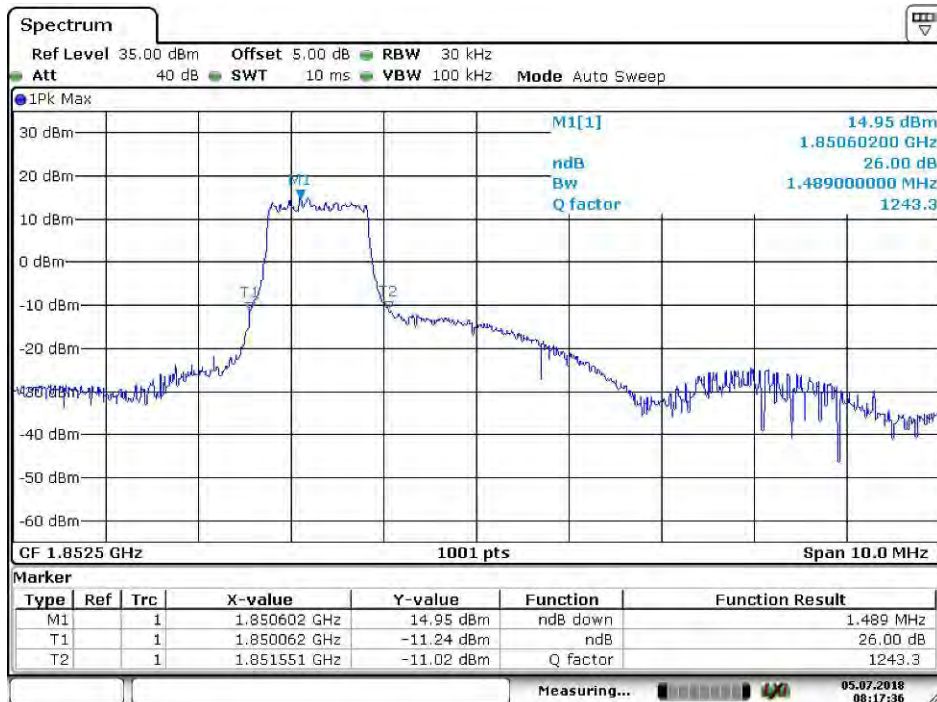
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Date: 5.JUL.2018 08:25:33

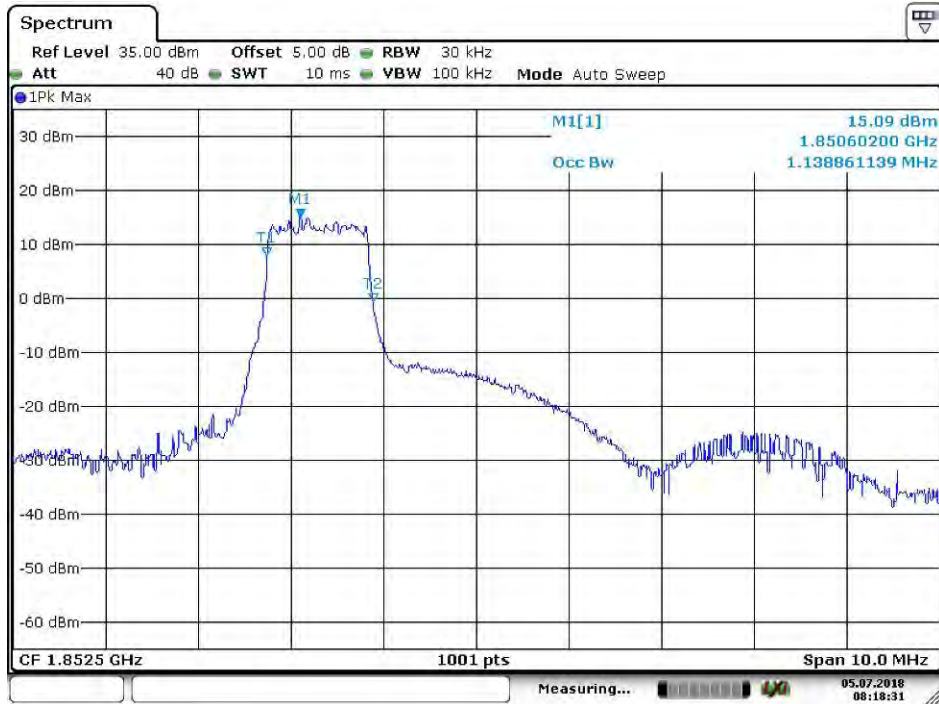
4.1.1.2 Test Mode = LTE-M1/TM2 5MHz

4.1.1.2.1 Test Channel = LCH

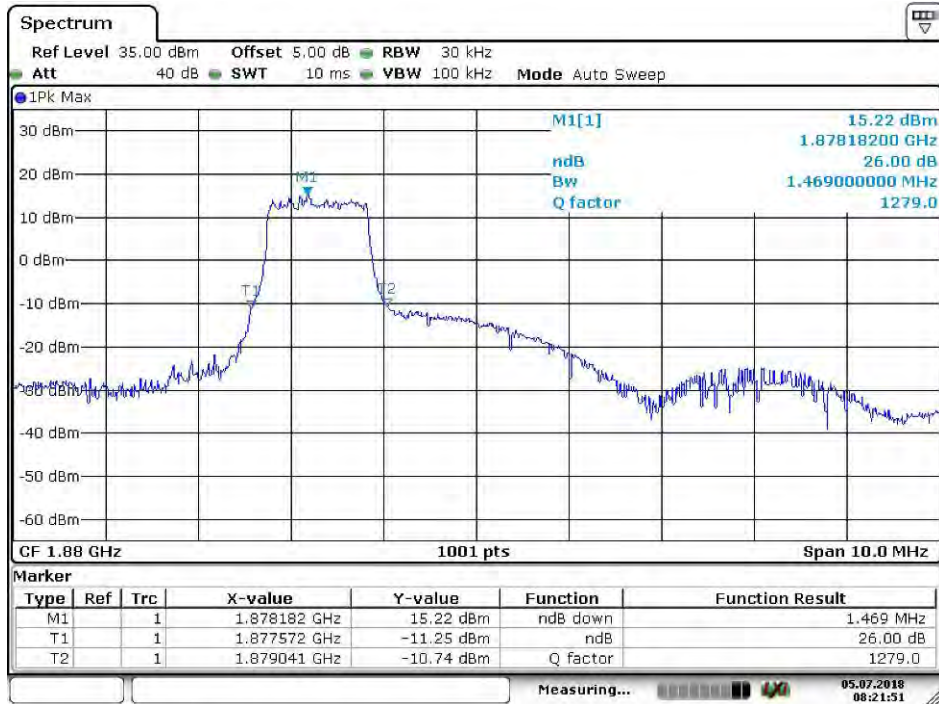


Date: 5.JUL.2018 08:17:36

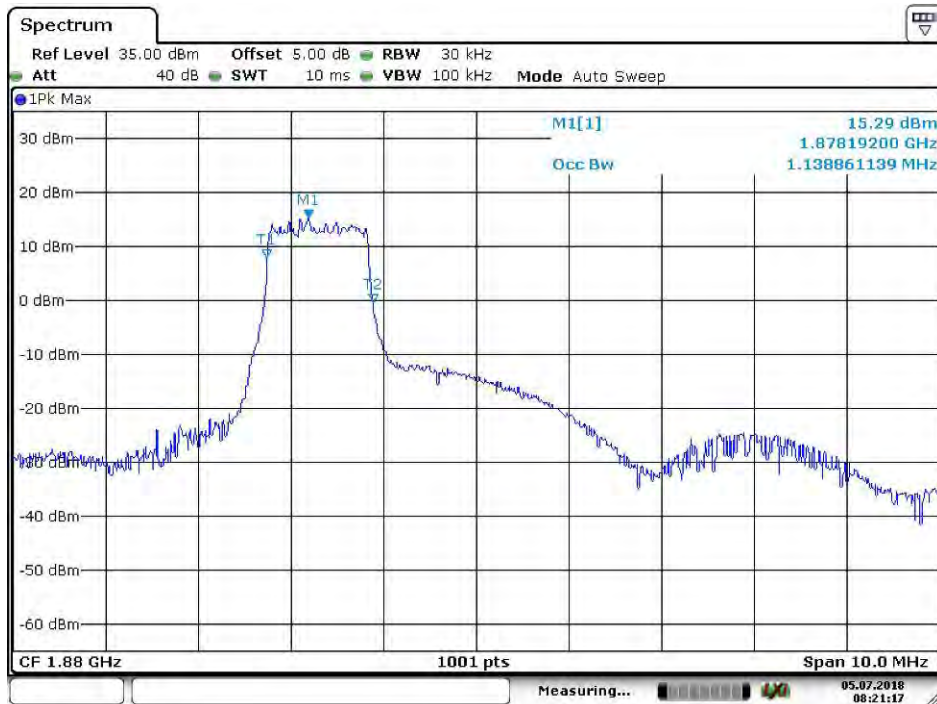
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4.1.1.2.2 Test Channel = MCH

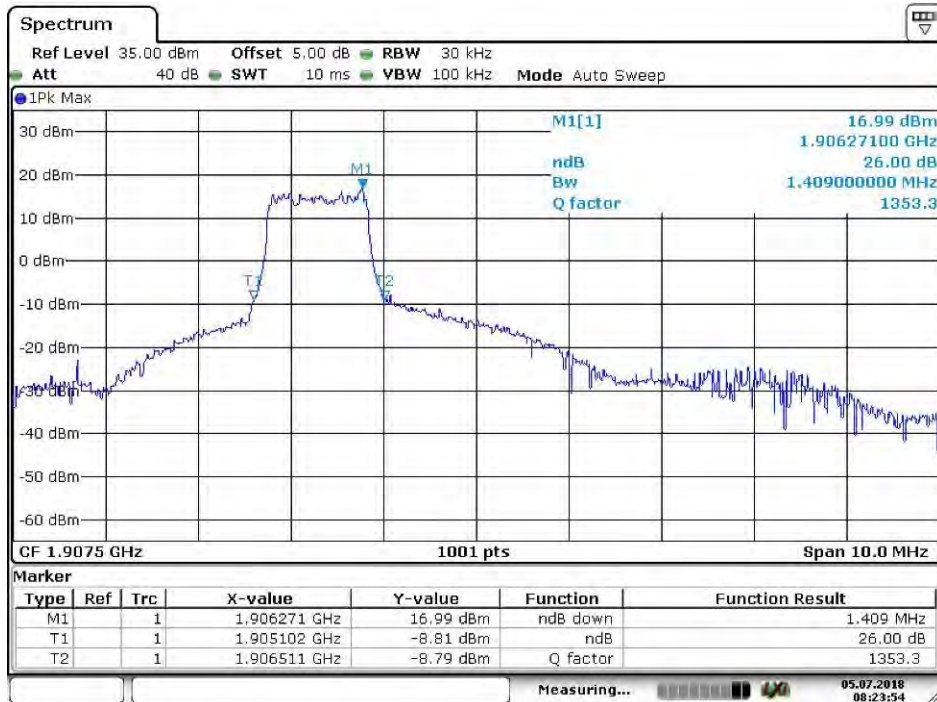


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Date: 5.JUL.2018 08:21:17

4.1.1.2.3 Test Channel = HCH



Date: 5.JUL.2018 08:23:54



Date: 5.JUL.2018 08:25:00

5 Band Edges Compliance

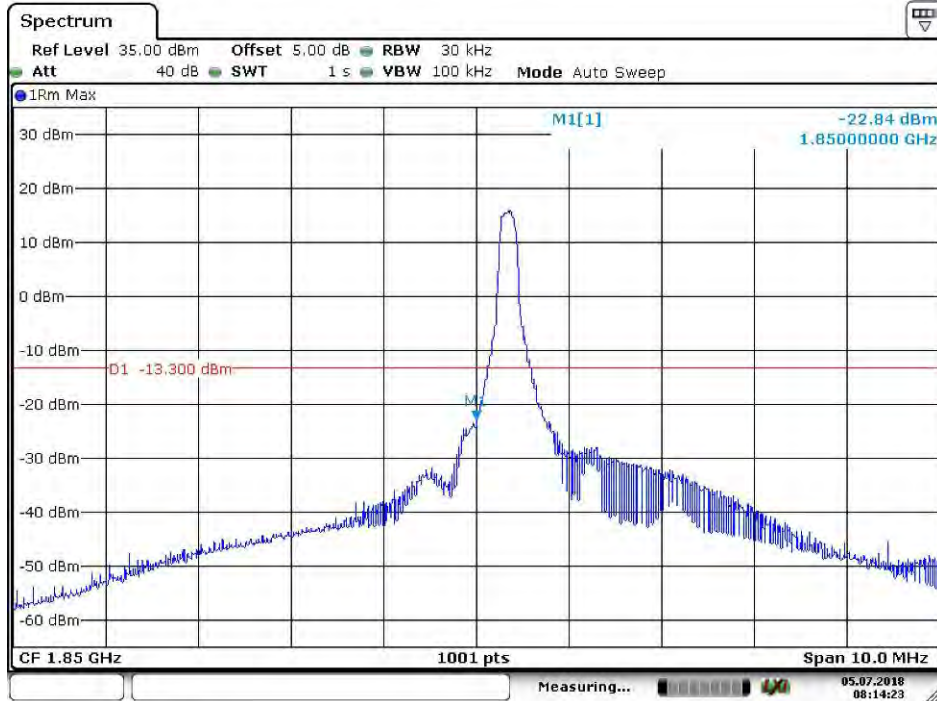
5.1 For LTE-M1

5.1.1 Test Band = LTE-M1 BAND2

5.1.1.1 Test Mode = LTE-M1/TM1 5MHz

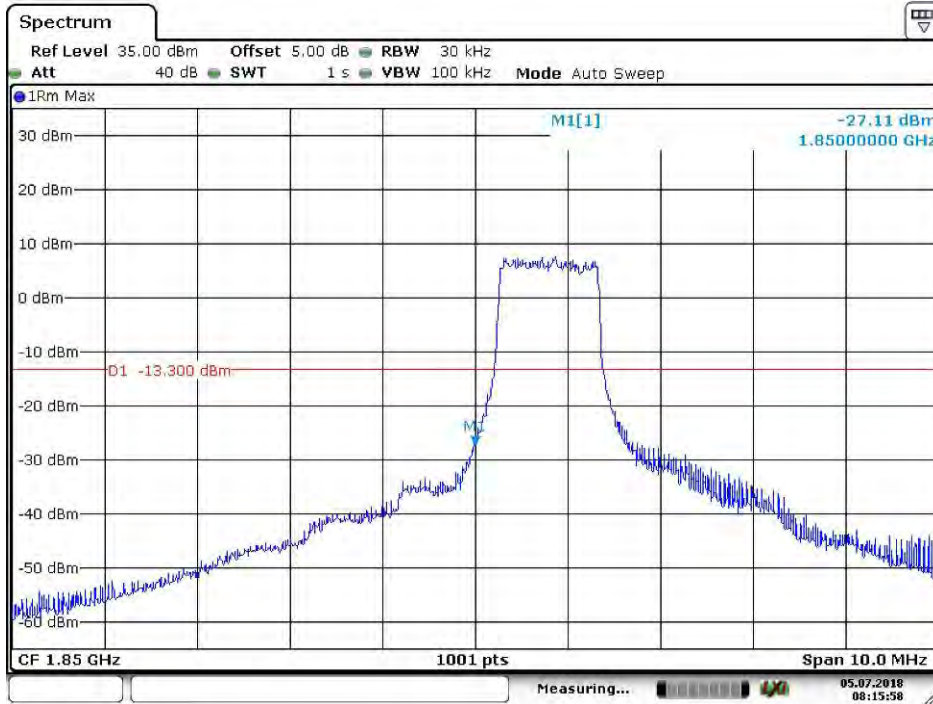
5.1.1.1.1 Test Channel = LCH

5.1.1.1.1.1 Test RB=1RB



Date: 5.JUL 2018 08:14:24

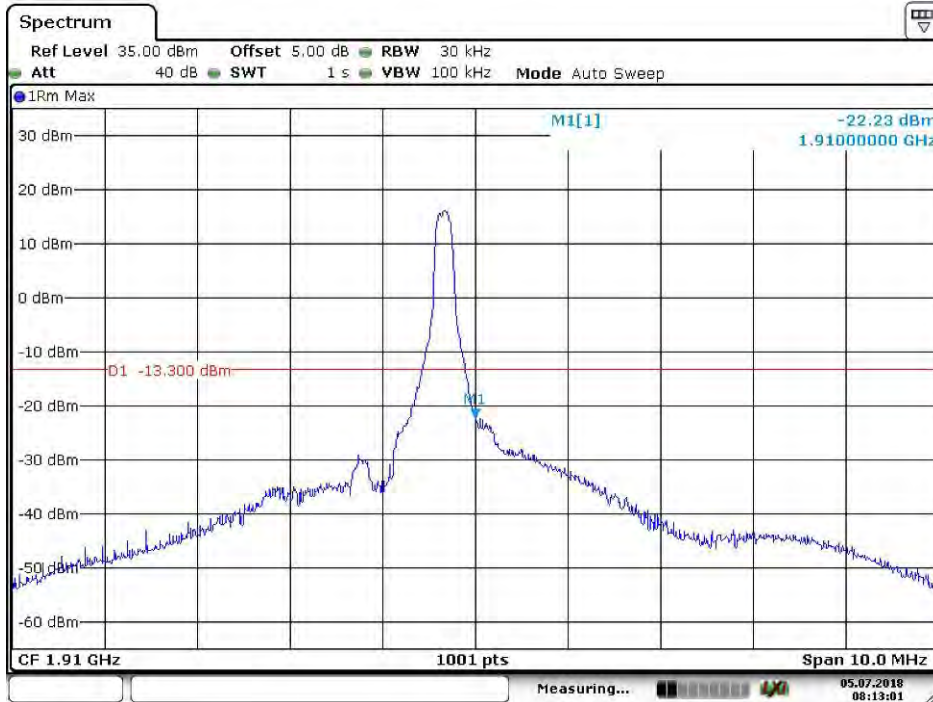
5.1.1.1.2 Test RB=6RB



Date: 5.JUL.2018 08:15:59

5.1.1.1.2 Test Channel = HCH

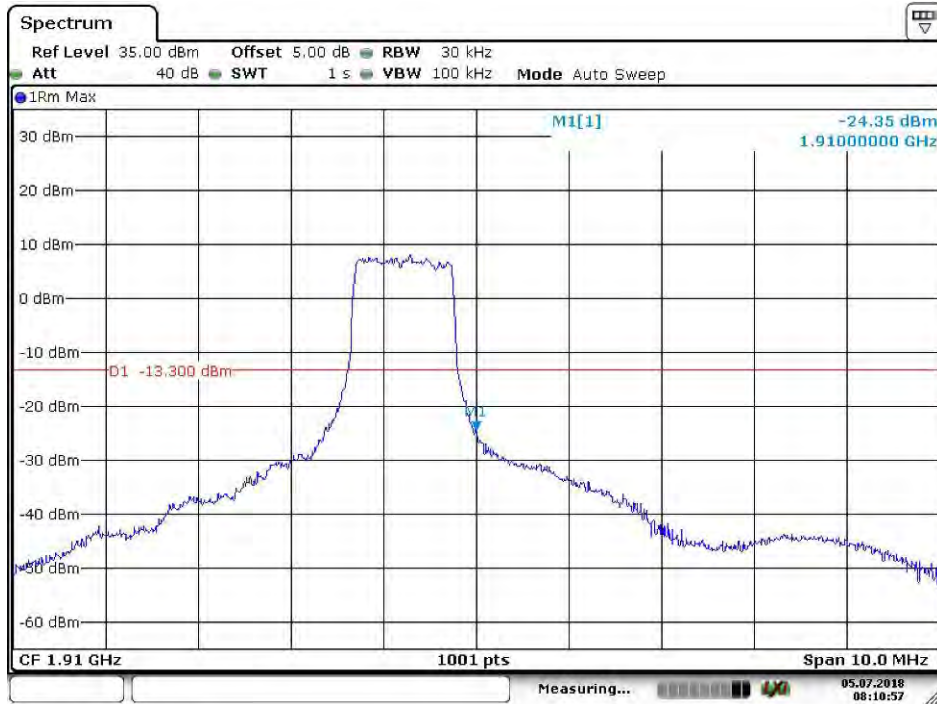
5.1.1.1.2.1 Test RB=1RB



Date: 5.JUL.2018 08:13:02

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5.1.1.1.2.2 Test RB=6RB

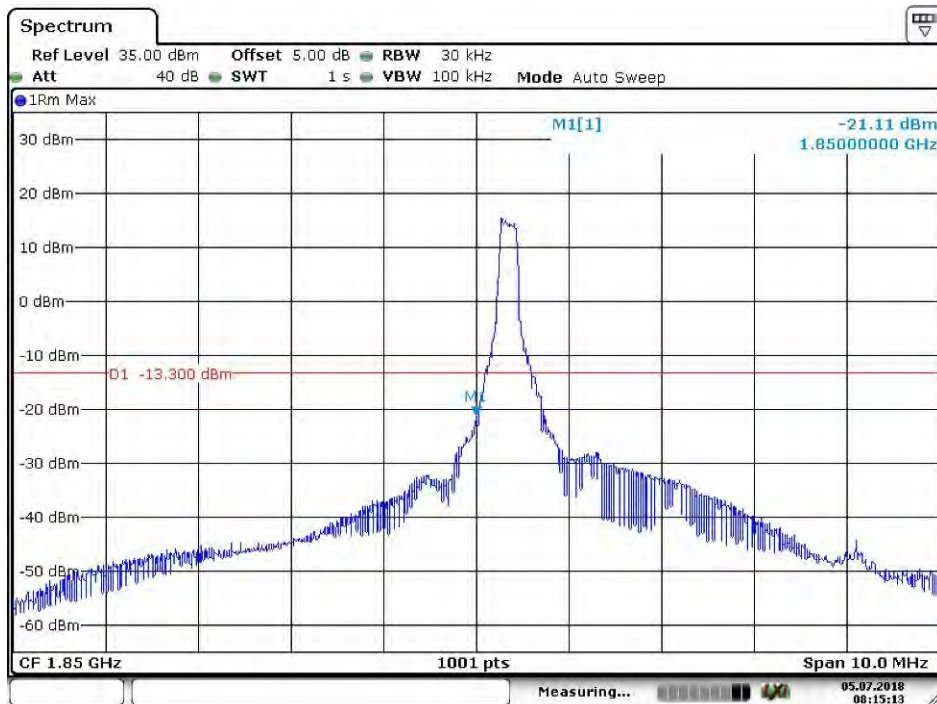


Date: 5.JUL.2018 08:10:58

5.1.1.2 Test Mode = LTE-M1/TM2 5MHz

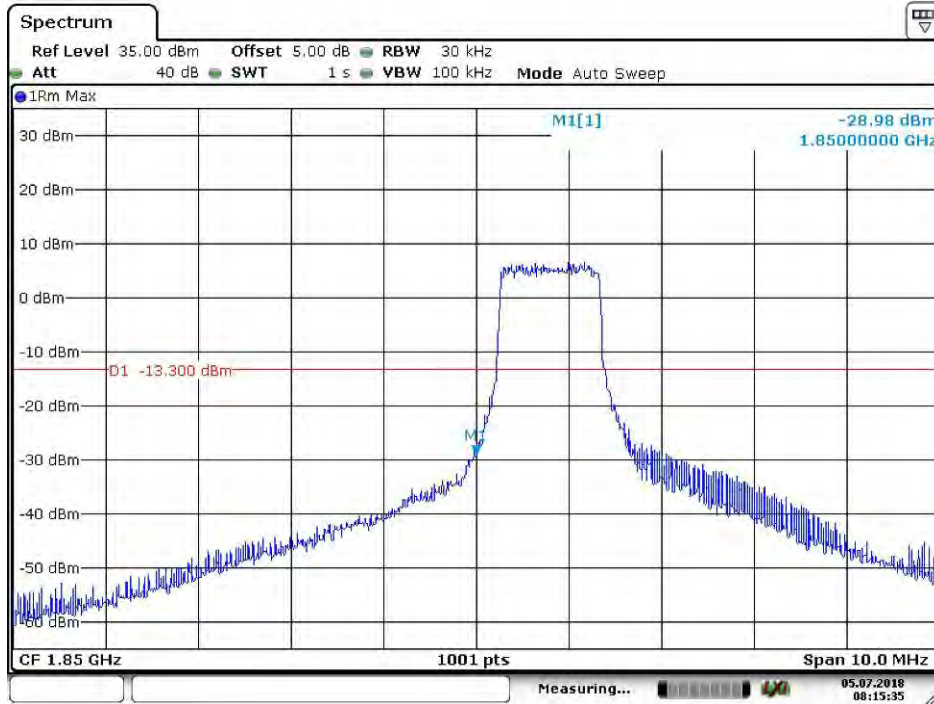
5.1.1.2.1 Test Channel = LCH

5.1.1.2.1.1 Test RB=1RB



Date: 5.JUL.2018 08:15:13

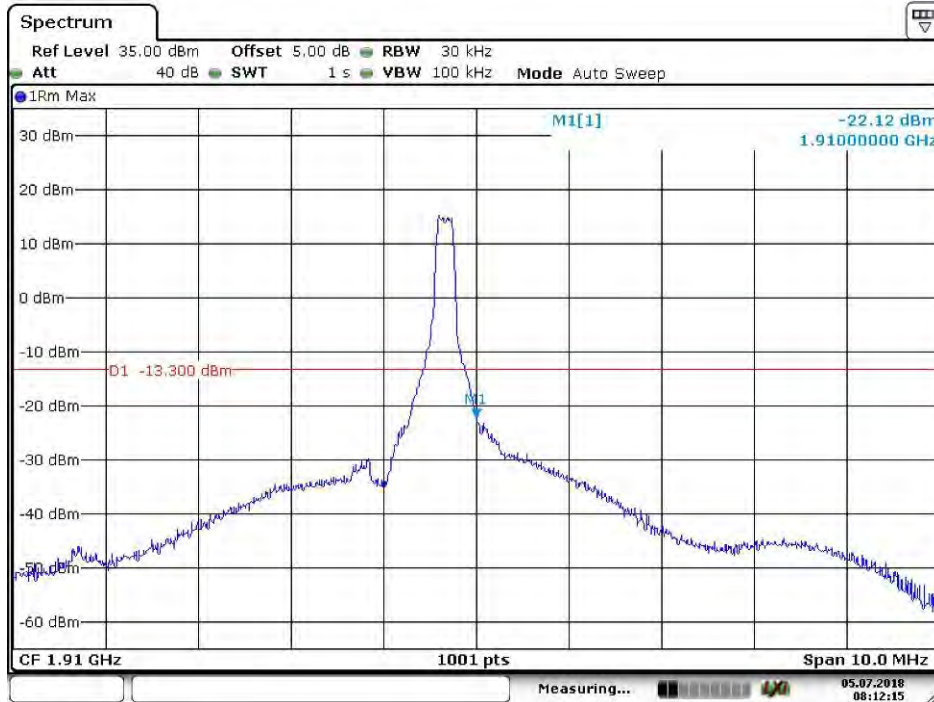
Test RB=6RB



Date: 5.JUL.2018 08:15:35

5.1.1.2.2 Test Channel = HCH

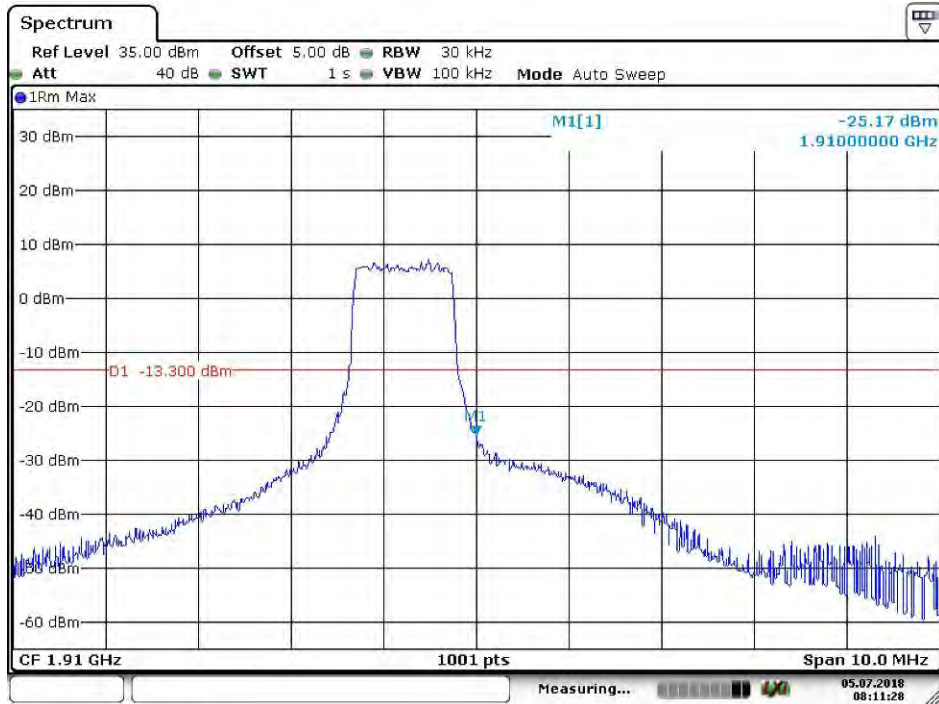
5.1.1.2.2.1 Test RB=1RB



Date: 5.JUL.2018 08:12:16

5.1.1.2.2.2 Test RB=6RB

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Date: 5.JUL.2018 08:11:28

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.

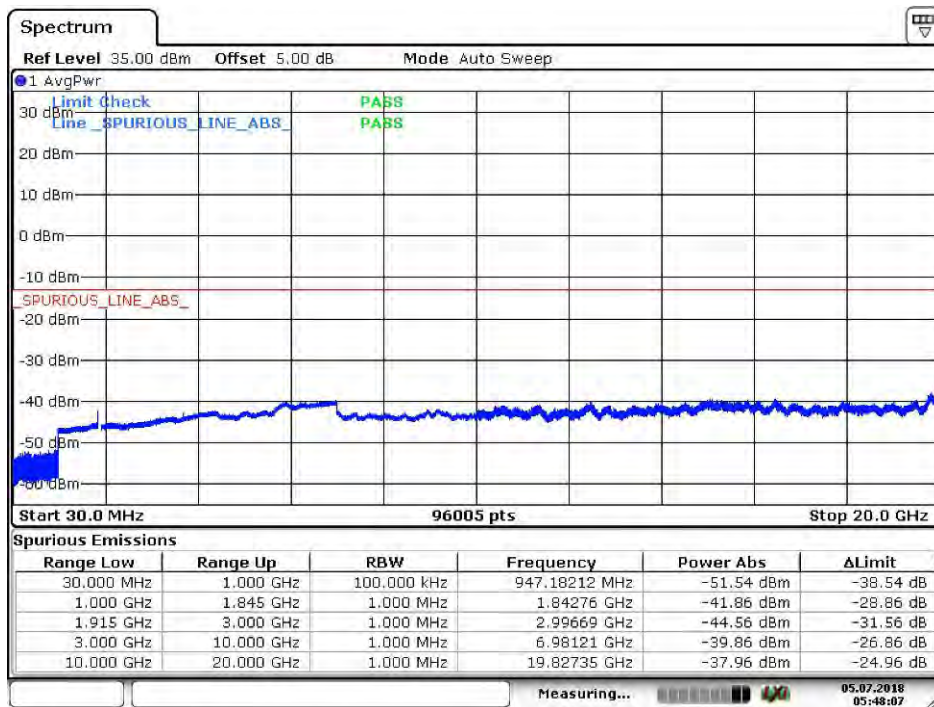
Part I - Test Plots

6.1 For LTE-M1

6.1.1 Test Band = LTE-M1 BAND2

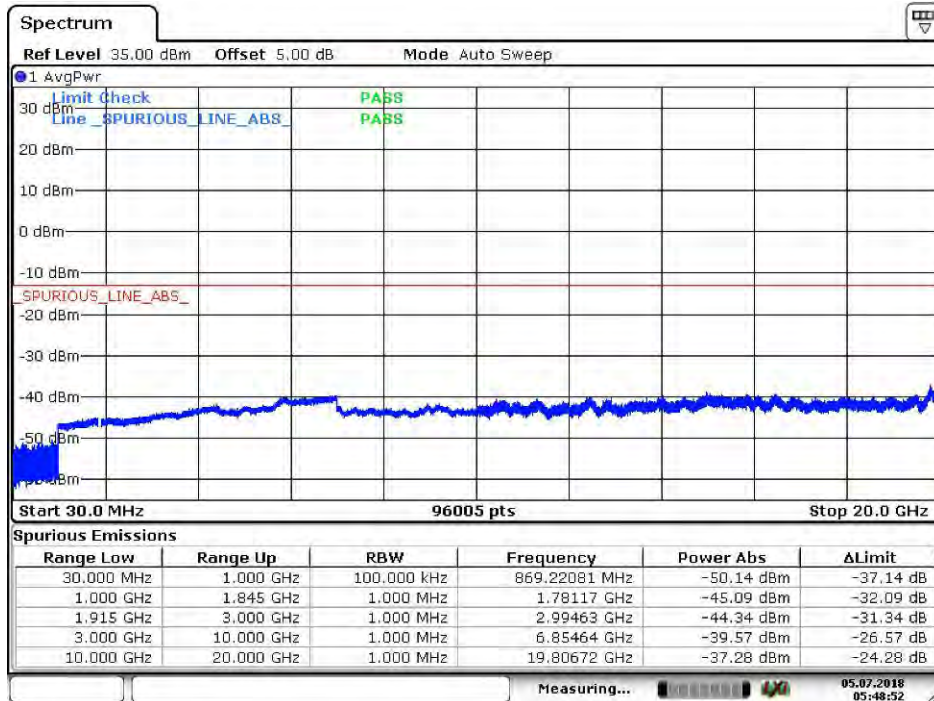
6.1.1.1 Test Mode = LTE-M1 / TM1 5MHz RB1#0

6.1.1.1.1 Test Channel = LCH



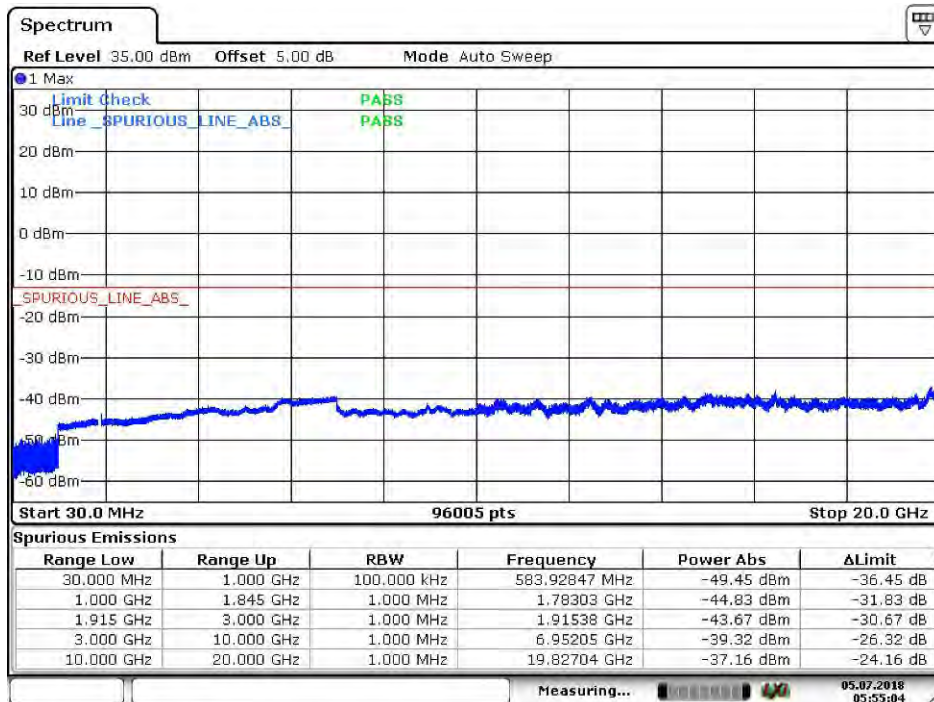
Date: 5.JUL.2018 05:48:07

6.1.1.1.2 Test Channel = MCH



Date: 5.JUL.2018 05:48:52

6.1.1.1.3 Test Channel = HCH

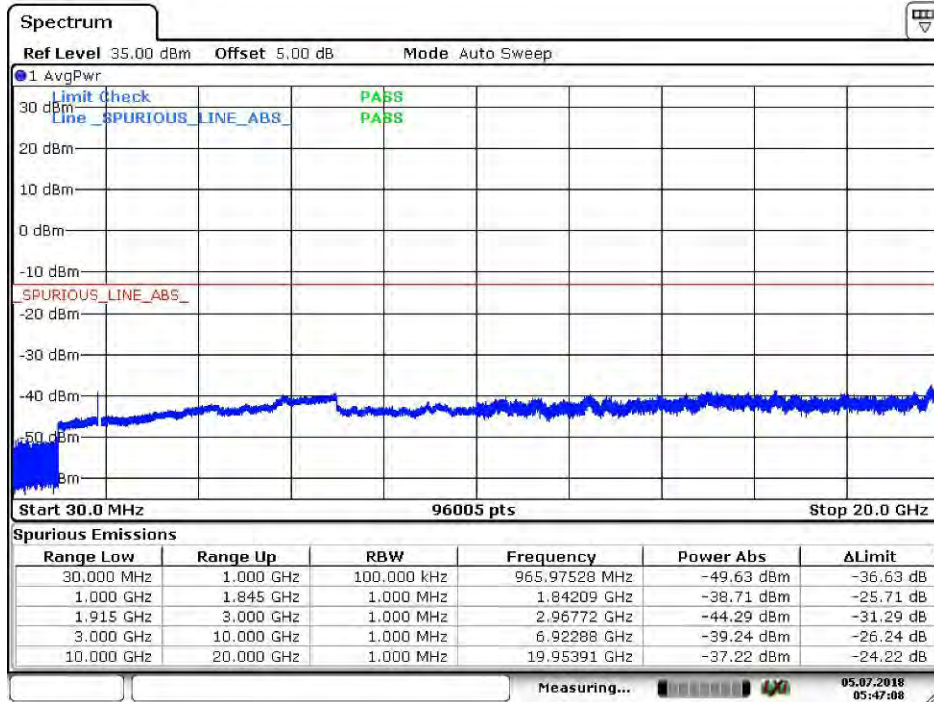


Date: 5.JUL.2018 05:55:03

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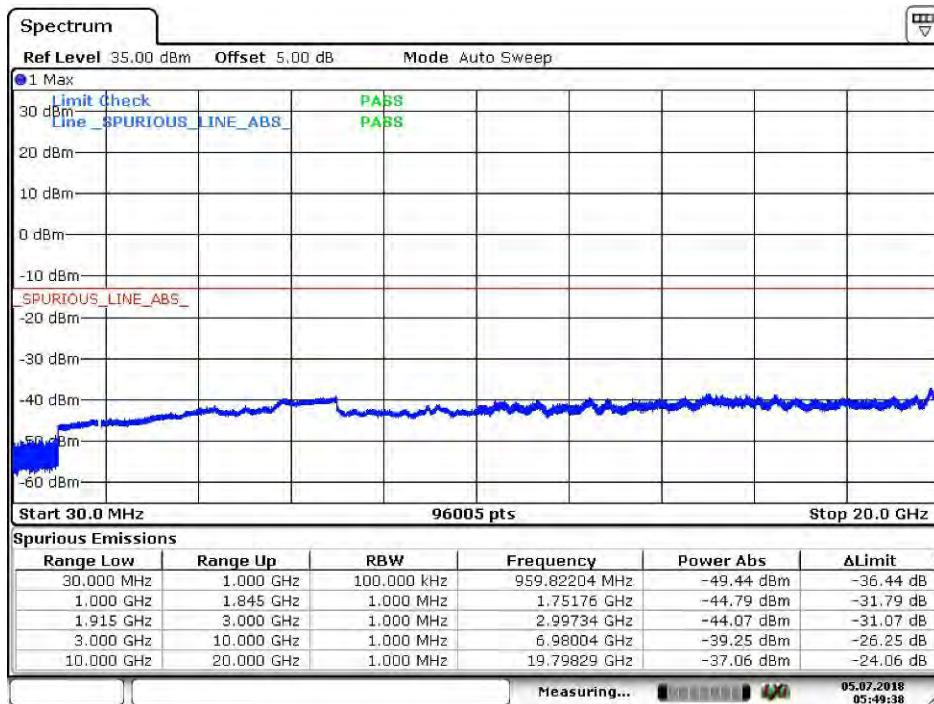
6.1.1.2 Test Mode = LTE-M1 / TM2 5MHz RB1#0

6.1.1.2.1 Test Channel = LCH



Date: 5.JUL.2018 05:47:08

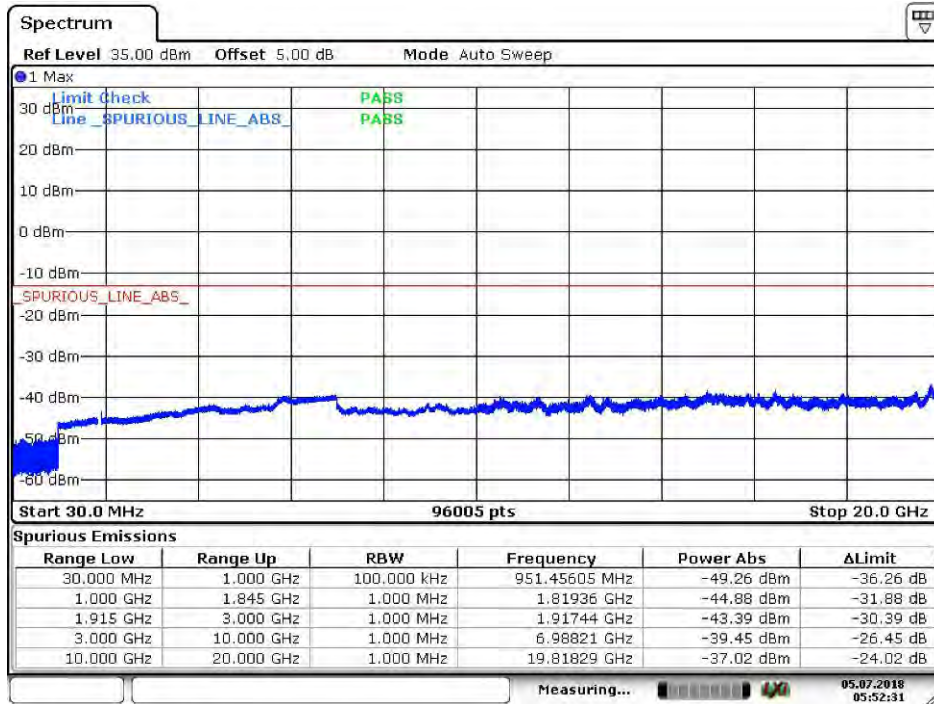
6.1.1.2.2 Test Channel = MCH



Date: 5.JUL.2018 05:49:39

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6.1.1.2.3 Test Channel = HCH



Date: 5.JUL.2018 05:52:31



7 Field Strength of Spurious Radiation

7.1 For LTE-M1

7.1.1 Test Band = LTE-M1 BAND2

7.1.1.1 Test Mode =LTE-M1/TM1 5MHz RB1#0

7.1.1.1.1 Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
64.100000	-82.39	-13.00	-69.39	Vertical
125.000000	-87.32	-13.00	-74.32	Vertical
306.050000	-87.52	-13.00	-74.52	Vertical
3701.025000	-53.80	-13.00	-40.80	Vertical
5704.650000	-67.09	-13.00	-54.09	Vertical
7401.150000	-58.62	-13.00	-45.62	Vertical
62.550000	-77.77	-13.00	-64.77	Horizontal
110.200000	-93.24	-13.00	-80.24	Horizontal
283.150000	-87.71	-13.00	-74.71	Horizontal
3700.375000	-43.21	-13.00	-30.21	Horizontal
5572.050000	-67.36	-13.00	-54.36	Horizontal
7401.150000	-63.51	-13.00	-50.51	Horizontal

7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.000000	-82.03	-13.00	-69.03	Vertical
124.950000	-87.36	-13.00	-74.36	Vertical
346.150000	-86.16	-13.00	-73.16	Vertical
3755.300000	-51.30	-13.00	-38.30	Vertical
5633.150000	-65.93	-13.00	-52.93	Vertical
7510.675000	-57.54	-13.00	-44.54	Vertical
62.700000	-78.31	-13.00	-65.31	Horizontal
110.350000	-93.64	-13.00	-80.64	Horizontal
300.300000	-87.25	-13.00	-74.25	Horizontal
3755.300000	-44.66	-13.00	-31.66	Horizontal
5731.625000	-67.04	-13.00	-54.04	Horizontal
7511.000000	-61.29	-13.00	-48.29	Horizontal



7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.000000	-82.48	-13.00	-69.48	Vertical
125.000000	-87.41	-13.00	-74.41	Vertical
313.100000	-86.53	-13.00	-73.53	Vertical
3809.900000	-53.51	-13.00	-40.51	Vertical
5716.025000	-61.22	-13.00	-48.22	Vertical
7621.175000	-54.66	-13.00	-41.66	Vertical
62.300000	-77.91	-13.00	-64.91	Horizontal
110.350000	-93.24	-13.00	-80.24	Horizontal
262.450000	-87.93	-13.00	-74.93	Horizontal
3810.550000	-48.28	-13.00	-35.28	Horizontal
5716.350000	-65.33	-13.00	-52.33	Horizontal
7621.500000	-63.56	-13.00	-50.56	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
LTE-M1 BAND2	LTE-M1/TM1 5MHz	LCH	TN	VL	-11.51	-0.006205	PASS
				VN	3.95	0.002132	PASS
				VH	-9.78	-0.005274	PASS
		MCH	TN	VL	9.55	0.005079	PASS
				VN	-8.67	-0.004614	PASS
				VH	1.37	0.000726	PASS
		HCH	TN	VL	8.75	0.004594	PASS
				VN	-3.10	-0.001629	PASS
				VH	-8.84	-0.004639	PASS
	LTE-M1/TM2 5MHz	LCH	TN	VL	6.36	0.003430	PASS
				VN	1.99	0.001074	PASS
				VH	9.48	0.005113	PASS
		MCH	TN	VL	2.75	0.001461	PASS
				VN	5.15	0.002740	PASS
				VH	-1.61	-0.000858	PASS
		HCH	TN	VL	3.91	0.002051	PASS
				VN	3.83	0.002009	PASS
				VH	-3.20	-0.001679	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
LTE-M1 BAND2	LTE-M1/TM1 5MHz	LCH	VN	-30	9.46	0.005102	PASS
				-20	-7.30	-0.003936	PASS
				-10	6.48	0.003494	PASS
				0	0.59	0.000319	PASS
				10	-0.30	-0.000164	PASS
				20	-2.96	-0.001595	PASS
				30	4.35	0.002345	PASS
				40	1.51	0.000815	PASS
				50	9.38	0.005059	PASS
		MCH	VN	-30	6.57	0.003496	PASS
				-20	6.10	0.003243	PASS
				-10	9.85	0.005241	PASS
				0	8.11	0.004314	PASS
				10	2.17	0.001152	PASS
				20	0.23	0.000122	PASS
				30	-2.38	-0.001268	PASS
				40	-6.13	-0.003259	PASS
				50	-5.25	-0.002790	PASS
		HCH	VN	-30	-1.95	-0.001023	PASS
				-20	3.22	0.001689	PASS
				-10	-6.30	-0.003308	PASS
				0	3.58	0.001882	PASS
				10	-9.25	-0.004856	PASS
				20	-7.34	-0.003851	PASS
30	-3.01			-0.001582	PASS		
40	-6.16			-0.003233	PASS		
50	-6.60			-0.003462	PASS		

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Shenzhen Branch

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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
LTE-M1 BAND2	LTE-M1/TM2 5MHz	LCH	VN	-30	-2.46	-0.001328	PASS
				-20	5.60	0.003018	PASS
				-10	2.20	0.001188	PASS
				0	4.22	0.002274	PASS
				10	5.75	0.003101	PASS
				20	-4.56	-0.002459	PASS
				30	3.19	0.001722	PASS
				40	-2.42	-0.001304	PASS
				50	7.90	0.004258	PASS
		MCH	VN	-30	-8.13	-0.004323	PASS
				-20	5.65	0.003003	PASS
				-10	-4.77	-0.002536	PASS
				0	9.80	0.005214	PASS
				10	5.26	0.002797	PASS
				20	-7.81	-0.004152	PASS
				30	9.19	0.004886	PASS
				40	0.28	0.000147	PASS
				50	-5.44	-0.002895	PASS
		HCH	VN	-30	7.07	0.003711	PASS
				-20	-4.49	-0.002359	PASS
				-10	2.15	0.001129	PASS
				0	7.08	0.003718	PASS
				10	5.37	0.002817	PASS
				20	8.84	0.004643	PASS
				30	2.75	0.001443	PASS
				40	-3.31	-0.001738	PASS
				50	-4.66	-0.002445	PASS

The End

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