



Appendix B

LTE-M1 BAND 4



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1 Effective (Isotropic) Radiated Power Output Data

Effective Isotropic Radiated Power of Transmitter (EIRP) for LTE-M1 BAND 4

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM1	1.4M	LCH	RB1#0	22.84	24.44	30	PASS
				RB1#5	22.89	24.49	30	PASS
				RB6#0	21.99	23.59	30	PASS
			MCH	RB1#0	22.97	24.57	30	PASS
				RB1#5	23.02	24.62	30	PASS
				RB6#0	22.02	23.62	30	PASS
			HCH	RB1#0	22.98	24.58	30	PASS
				RB1#5	23	24.6	30	PASS
				RB6#0	21.89	23.49	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM2	1.4M	LCH	RB1#0	22.24	23.84	30	PASS
				RB1#5	22.31	23.91	30	PASS
				RB6#0	21.23	22.83	30	PASS
			MCH	RB1#0	22.26	23.86	30	PASS
				RB1#5	22.11	23.71	30	PASS
				RB6#0	21.21	22.81	30	PASS
			HCH	RB1#0	22.25	23.85	30	PASS
				RB1#5	22.31	23.91	30	PASS
				RB6#0	21.23	22.83	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM1	3M	LCH	RB1#0	22.82	24.42	30	PASS
				RB1#5	22.77	24.37	30	PASS
				RB6#0	21.88	23.48	30	PASS
			MCH	RB1#0	22.83	24.43	30	PASS
				RB1#5	22.87	24.47	30	PASS
				RB6#0	21.85	23.45	30	PASS
			HCH	RB1#0	22.81	24.41	30	PASS
				RB1#5	22.72	24.32	30	PASS
				RB6#0	21.83	23.43	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM2	3M	LCH	RB1#0	21.84	23.44	30	PASS
				RB1#5	21.92	23.52	30	PASS
				RB6#0	20.74	22.34	30	PASS
			MCH	RB1#0	21.95	23.55	30	PASS
				RB1#5	22.01	23.61	30	PASS
				RB6#0	20.75	22.35	30	PASS

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			HCH	RB1#0	21.97	23.57	30	PASS
				RB1#5	22.11	23.71	30	PASS
				RB6#0	20.72	22.32	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM1	5M	LCH	RB1#0	22.81	24.41	30	PASS
				RB1#5	22.74	24.34	30	PASS
				RB6#0	21.92	23.52	30	PASS
			MCH	RB1#0	22.75	24.35	30	PASS
				RB1#5	22.78	24.38	30	PASS
				RB6#0	21.88	23.48	30	PASS
			HCH	RB1#0	22.81	24.41	30	PASS
				RB1#5	22.87	24.47	30	PASS
				RB6#0	21.93	23.53	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM2	5M	LCH	RB1#0	22.22	23.82	30	PASS
				RB1#5	22.28	23.88	30	PASS
				RB6#0	20.92	22.52	30	PASS
			MCH	RB1#0	22.26	23.86	30	PASS
				RB1#5	22.28	23.88	30	PASS
				RB6#0	20.88	22.48	30	PASS
			HCH	RB1#0	22.15	23.75	30	PASS
				RB1#5	22.25	23.85	30	PASS
				RB6#0	20.95	22.55	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM1	10M	LCH	RB1#0	22.74	24.34	30	PASS
				RB1#5	22.63	24.23	30	PASS
				RB6#0	21.87	23.47	30	PASS
			MCH	RB1#0	22.85	24.45	30	PASS
				RB1#5	22.66	24.26	30	PASS
				RB6#0	21.81	23.41	30	PASS
			HCH	RB1#0	22.75	24.35	30	PASS
				RB1#5	22.77	24.37	30	PASS
				RB6#0	21.82	23.42	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM2	10M	LCH	RB1#0	22.14	23.74	30	PASS
				RB1#5	22.06	23.66	30	PASS
				RB6#0	20.78	22.38	30	PASS
			MCH	RB1#0	22.22	23.82	30	PASS
				RB1#5	22.26	23.86	30	PASS
				RB6#0	20.8	22.4	30	PASS

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			HCH	RB1#0	22.14	23.74	30	PASS
				RB1#5	22.16	23.76	30	PASS
				RB6#0	20.91	22.51	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM1	15M	LCH	RB1#0	22.72	24.32	30	PASS
				RB1#5	22.57	24.17	30	PASS
				RB6#0	22.63	24.23	30	PASS
			MCH	RB1#0	22.76	24.36	30	PASS
				RB1#5	22.73	24.33	30	PASS
				RB6#0	22.79	24.39	30	PASS
			HCH	RB1#0	22.67	24.27	30	PASS
				RB1#5	22.55	24.15	30	PASS
				RB6#0	22.67	24.27	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM2	15M	LCH	RB1#0	22.12	23.72	30	PASS
				RB1#5	22.11	23.71	30	PASS
				RB6#0	22.81	24.41	30	PASS
			MCH	RB1#0	22.29	23.89	30	PASS
				RB1#5	22.27	23.87	30	PASS
				RB6#0	22.76	24.36	30	PASS
			HCH	RB1#0	22.4	24	30	PASS
				RB1#5	22.38	23.98	30	PASS
				RB6#0	22.67	24.27	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM1	20M	LCH	RB1#0	22.78	24.38	30	PASS
				RB1#5	22.74	24.34	30	PASS
				RB6#0	22.83	24.43	30	PASS
			MCH	RB1#0	22.89	24.49	30	PASS
				RB1#5	22.82	24.42	30	PASS
				RB6#0	22.93	24.53	30	PASS
			HCH	RB1#0	22.94	24.54	30	PASS
				RB1#5	22.83	24.43	30	PASS
				RB6#0	22.92	24.52	30	PASS

Test Band(LTE)	Test Mode	Test Bandwidth	Test channel	Test RB	Measured (dBm)	EIRP (dBm)	limit (dBm)	Verdict
BAND4	LTE-M1/TM2	20M	LCH	RB1#0	22.27	23.87	30	PASS
				RB1#5	22.14	23.74	30	PASS
				RB6#0	22.08	23.68	30	PASS
			MCH	RB1#0	22.61	24.21	30	PASS
				RB1#5	22.67	24.27	30	PASS
				RB6#0	23.02	24.62	30	PASS

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			HCH	RB1#0	22.52	24.12	30	PASS
				RB1#5	22.58	24.18	30	PASS
				RB6#0	23.02	24.62	30	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 4	TM1/5M Full RB	LCH	4.26	13	PASS
		MCH	4.29	13	PASS
		HCH	5.65	13	PASS
	TM1/5M 1 RB	LCH	4.38	13	PASS
		MCH	4.32	13	PASS
		HCH	4.03	13	PASS
	TM2/5M Full RB	LCH	5.77	13	PASS
		MCH	4.26	13	PASS
		HCH	5.88	13	PASS
	TM2/5M 1 RB	LCH	5.01	13	PASS
		MCH	5.04	13	PASS
		HCH	4.17	13	PASS

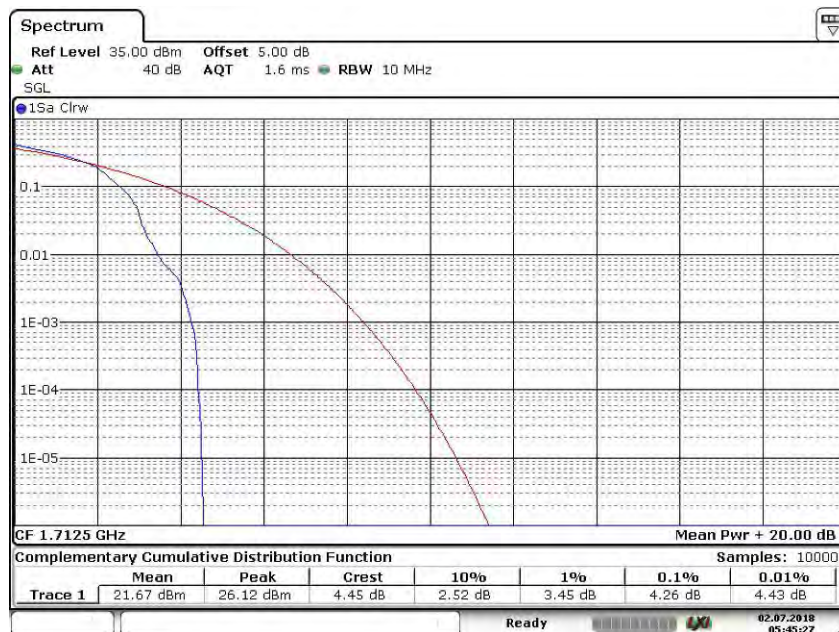
Part II - Test Plots

2.1 For LTE-M1

2.1.1 Test Band = LTE-M1 BAND4

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

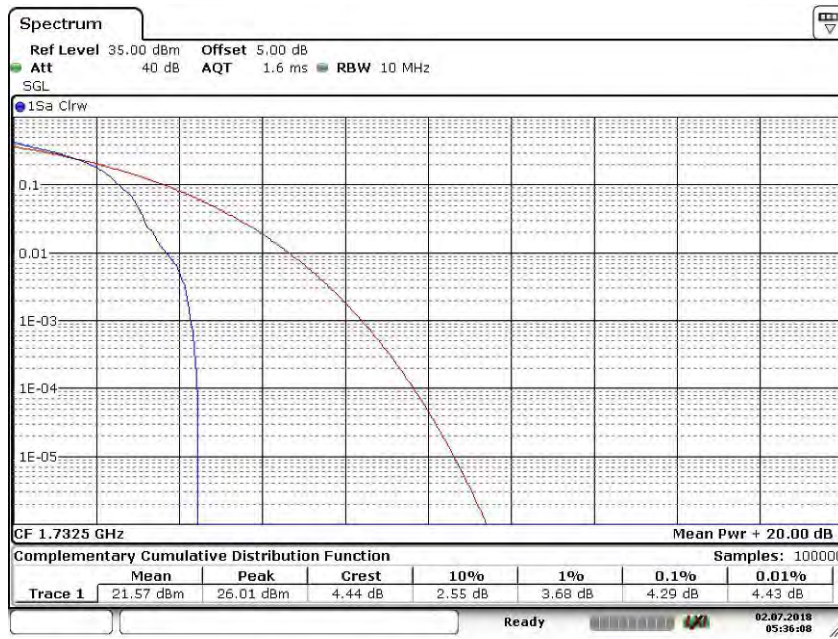
2.1.1.1.1 Test Channel = LCH



Date: 2 JUL 2018 05:45:27

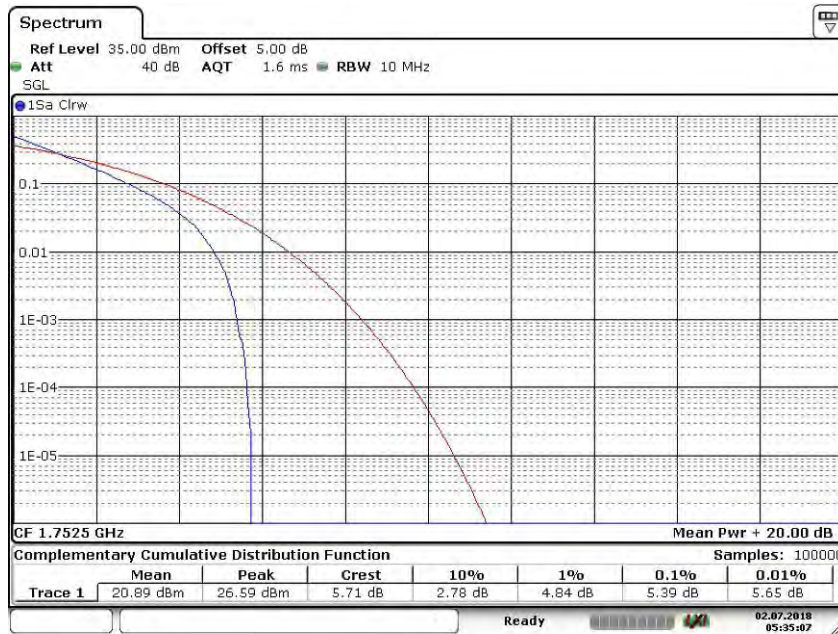
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2.1.1.1.2 Test Channel = MCH



Date: 2 JUL 2018 05:36:09

2.1.1.1.3 Test Channel = HCH

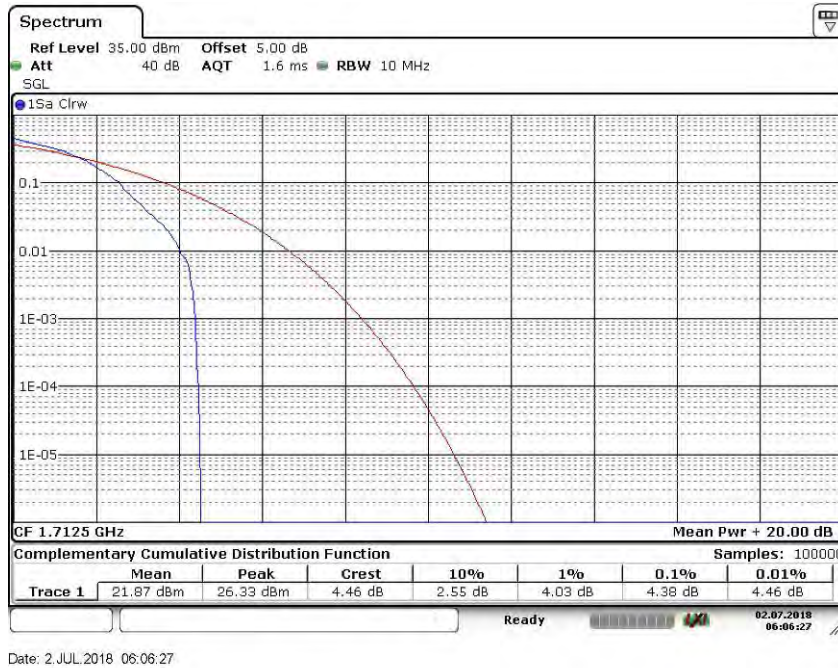


Date: 2 JUL 2018 05:35:08

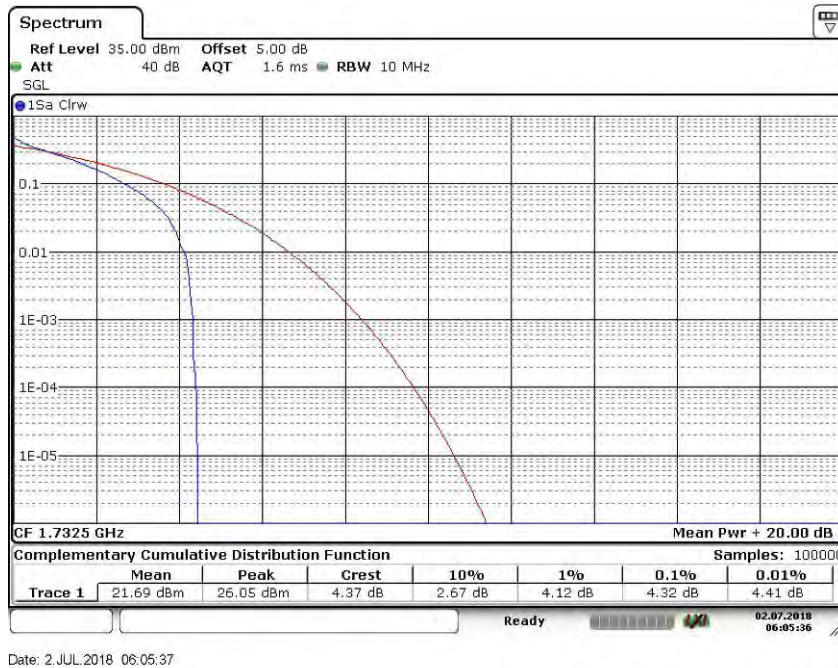
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2.1.1.2 Test Mode = LTE-M1/TM1.Bandwidth=5MHz 1 RB
2.1.1.2.1 Test Channel = LCH

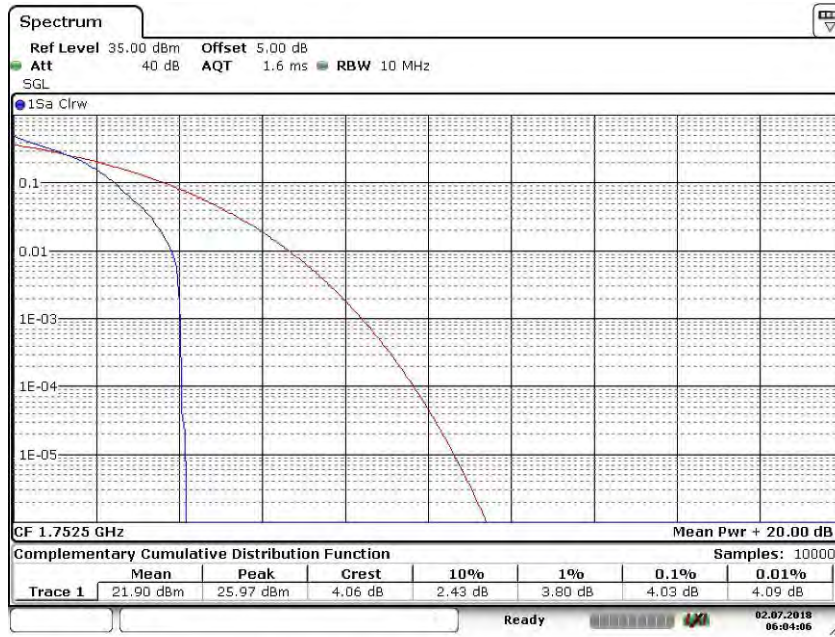


2.1.1.2.2 Test Channel = MCH



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2.1.1.2.3 Test Channel = HCH



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

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

2.1.1.3.1 Test Channel = LCH



Date: 2.JUL.2018 05:45:09

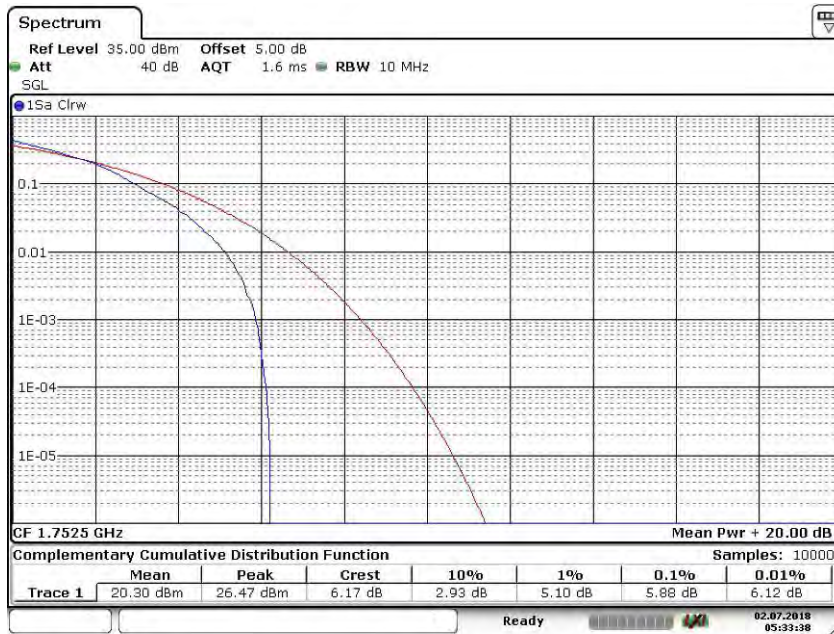
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2.1.1.3.2 Test Channel = MCH



Date: 2.JUL.2018 05:36:26

2.1.1.3.3 Test Channel = HCH



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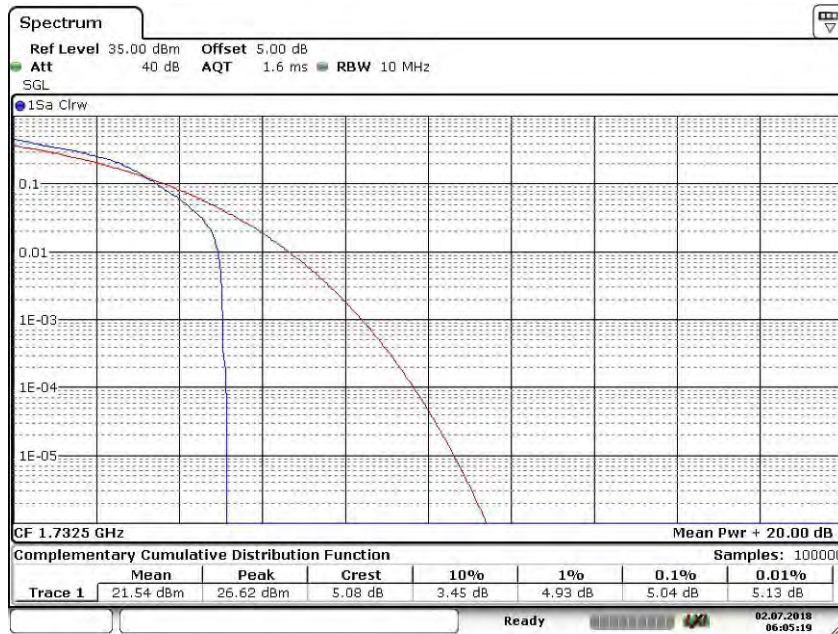
2.1.1.4 Test Mode = LTE-M1/TM2.Bandwidth=5MHz 1 RB

2.1.1.4.1 Test Channel = LCH



Date: 2 JUL 2018 06:06:44

2.1.1.4.2 Test Channel = MCH

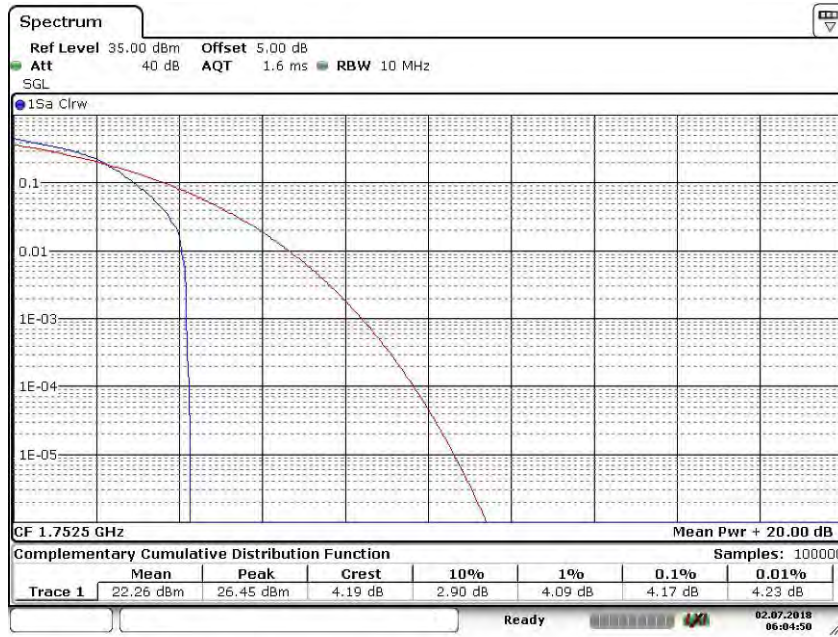


Date: 2 JUL 2018 06:05:19

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2.1.1.4.3 Test Channel = HCH



Date: 2 JUL 2018 06:04:50

3 Modulation Characteristics

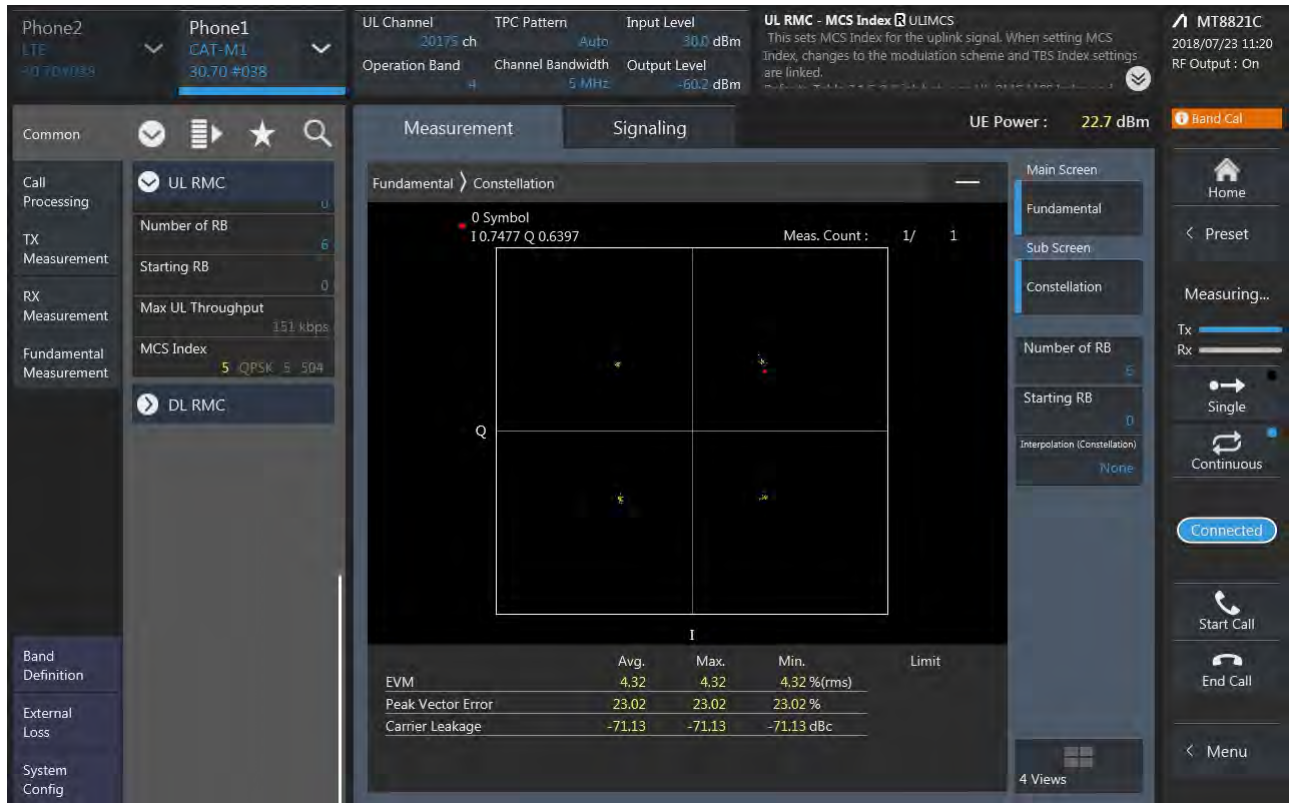
Part I - Test Plots

3.1 For LTE-M1

3.1.1 Test Band = LTE-M1 BAND4

3.1.1.1 Test Mode = LTE-M1 /TM1 5MHz

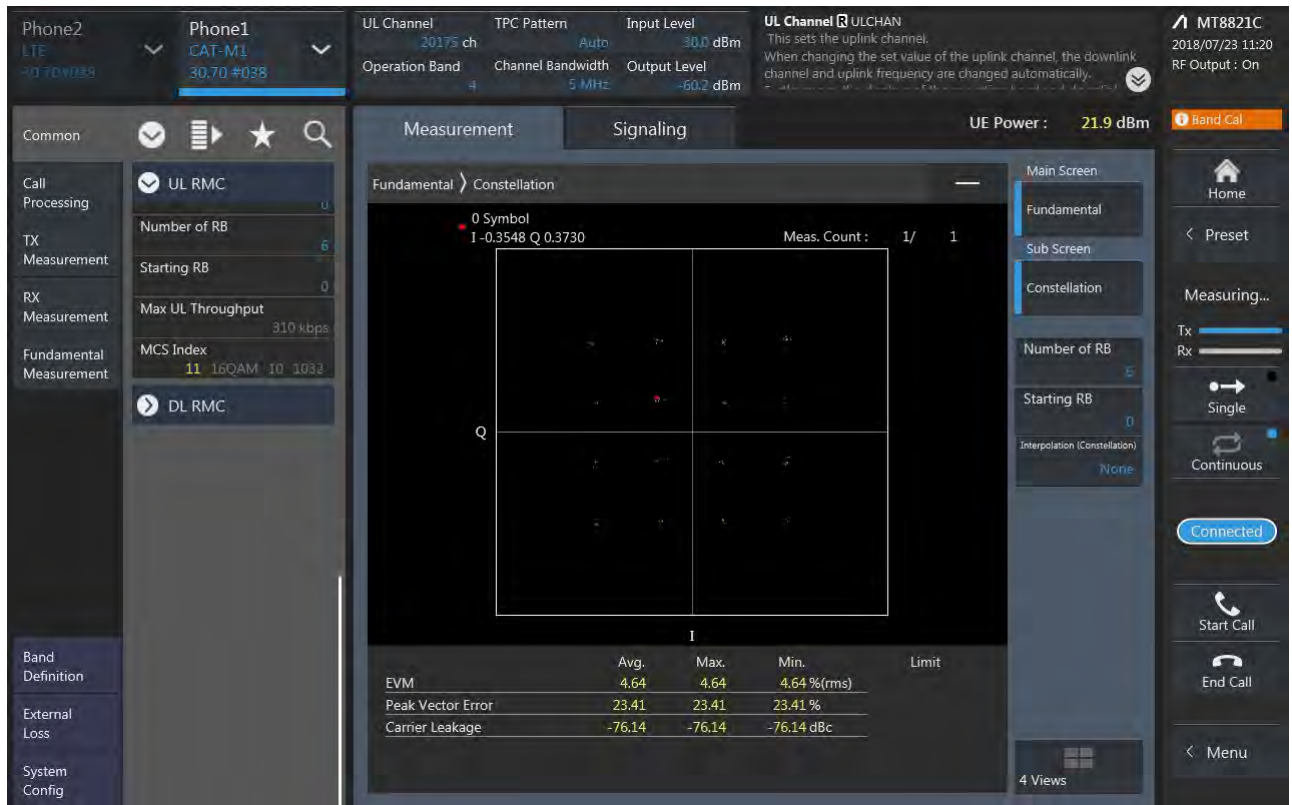
3.1.1.1.1 Test Channel = MCH



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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

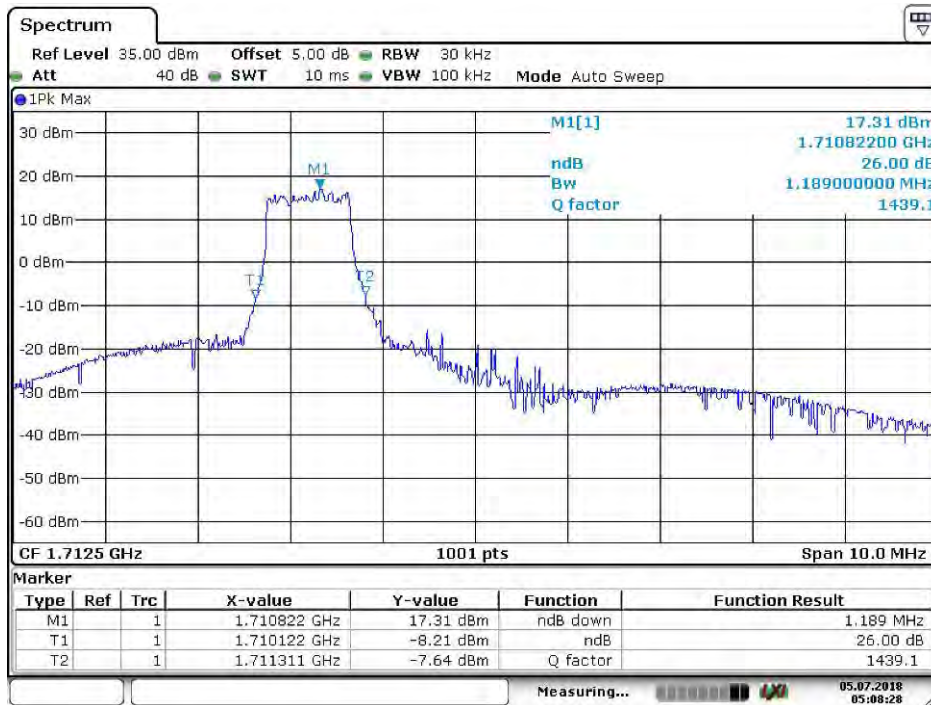
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
BAND4	TM1/ 5MHz	LCH	0.92	1.18	PASS
		MCH	1.11	1.18	PASS
		HCH	1.10	1.16	PASS
	TM2/ 5MHz	LCH	0.95	1.23	PASS
		MCH	1.12	1.22	PASS
		HCH	1.12	1.23	PASS

4.1 For LTE

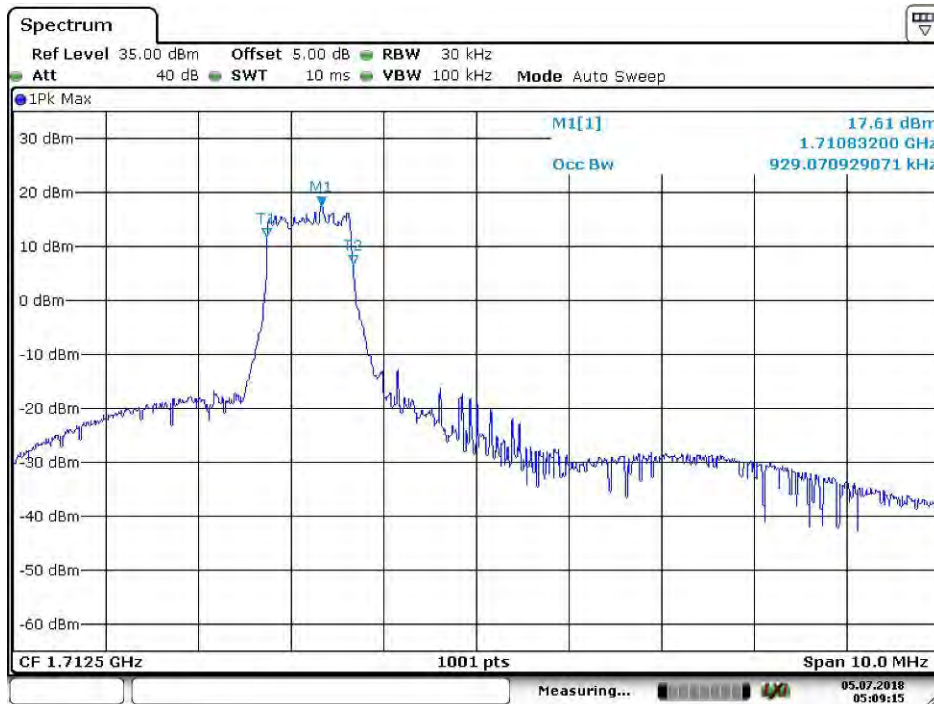
4.1.1 Test Band = LTE-M1 BAND4

4.1.1.1 Test Mode = LTE-M1/TM1 5MHz

4.1.1.1.1 Test Channel = LCH

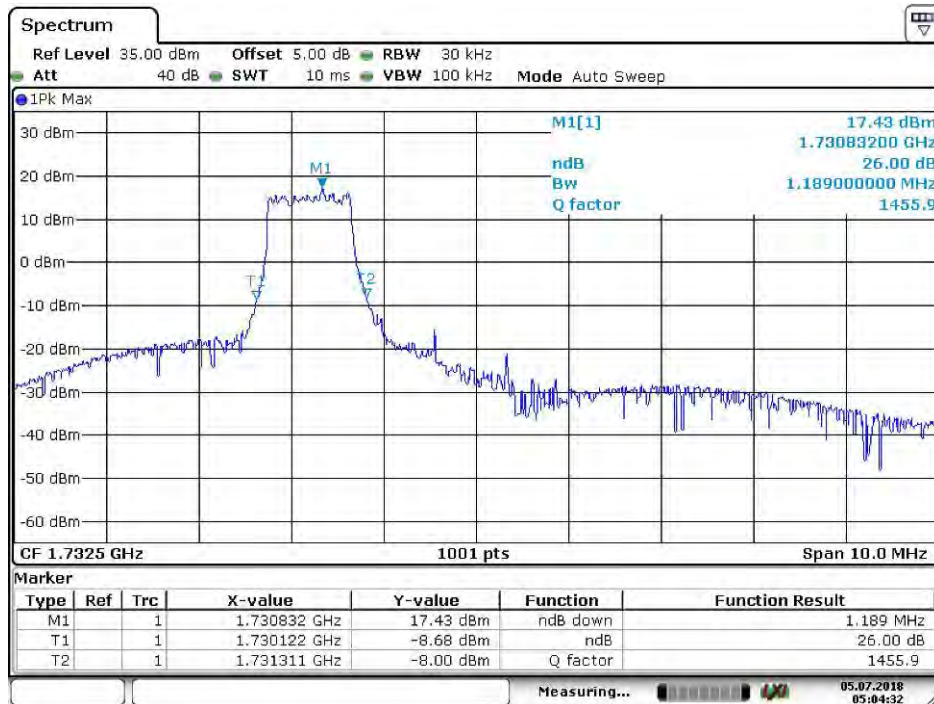


Date: 5.JUL.2018 05:08:28



Date: 5.JUL.2018 05:09:15

4.1.1.1.2 Test Channel = MCH



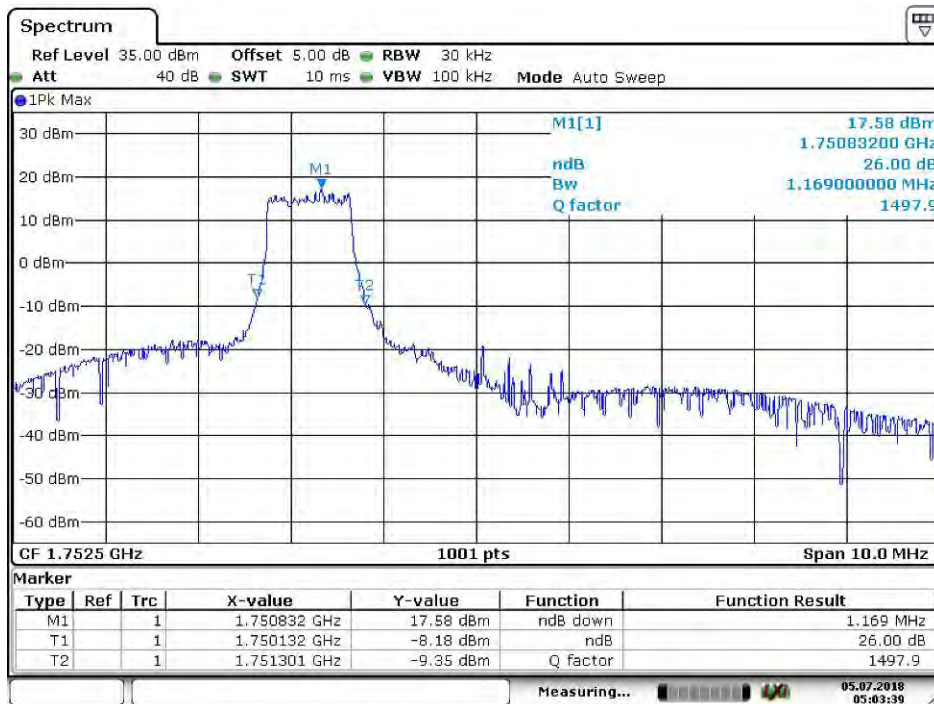
Date: 5.JUL.2018 05:04:32

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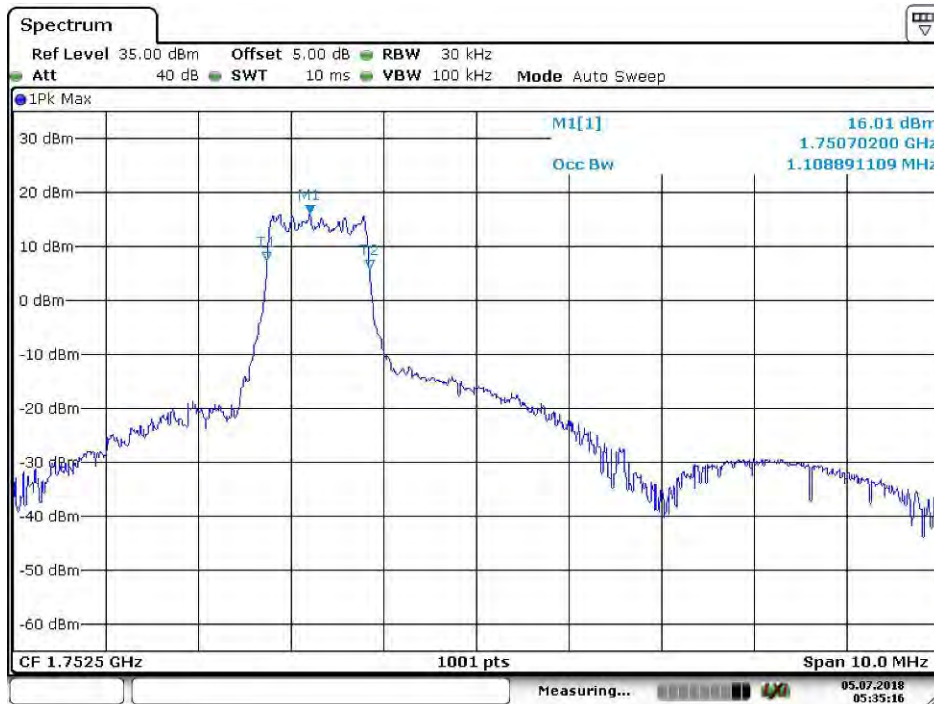


Date: 5.JUL.2018 05:32:27

4.1.1.1.3 Test Channel = HCH



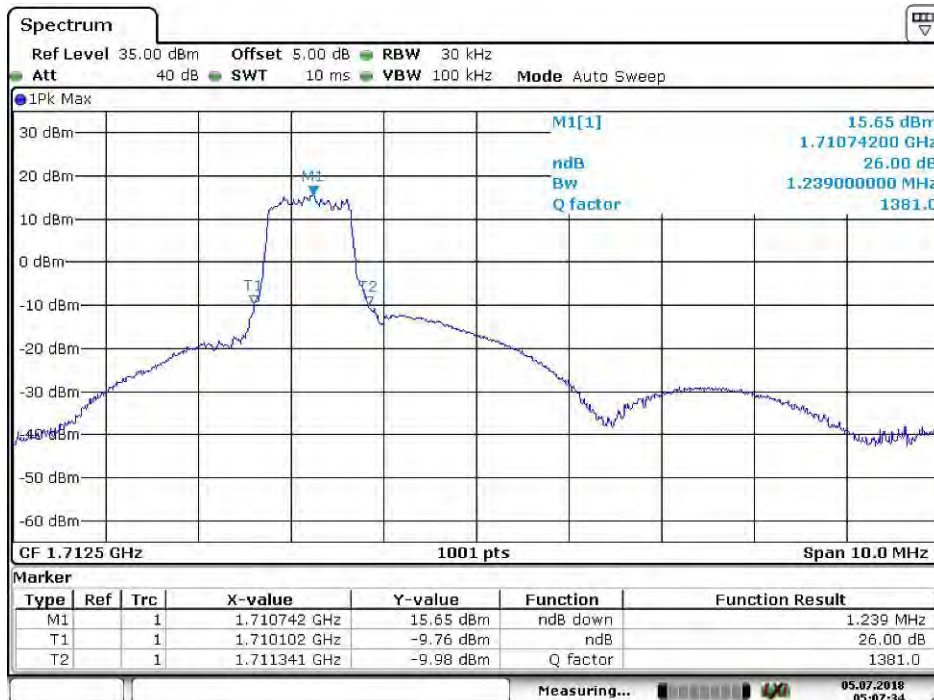
Date: 5.JUL.2018 05:03:39



Date: 5.JUL.2018 05:35:16

4.1.1.2 Test Mode = LTE-M1/TM2 5MHz

4.1.1.2.1 Test Channel = LCH



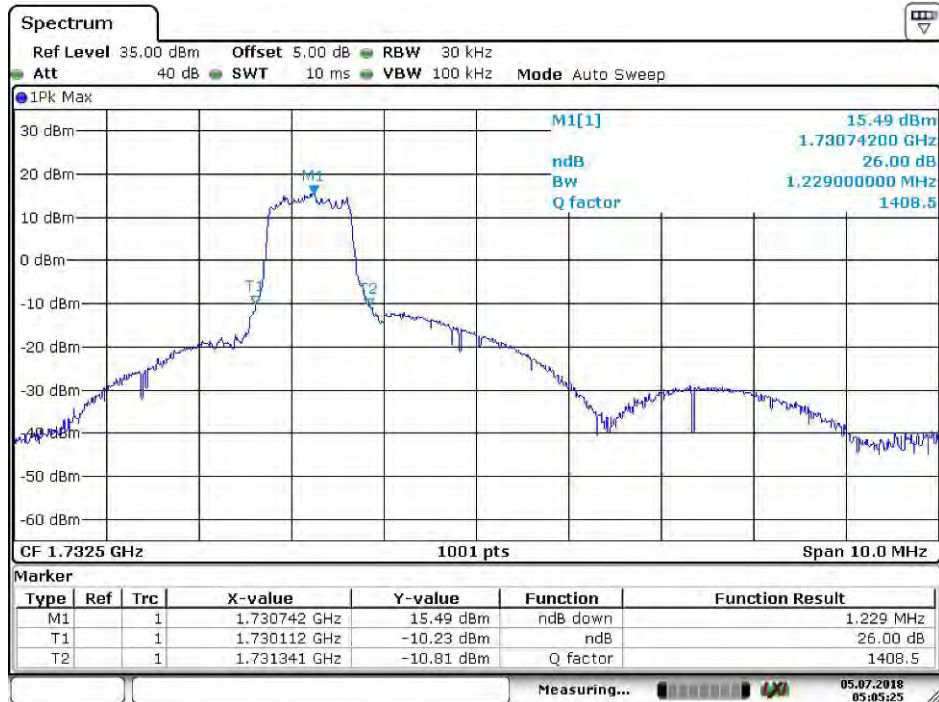
Date: 5.JUL.2018 05:07:34

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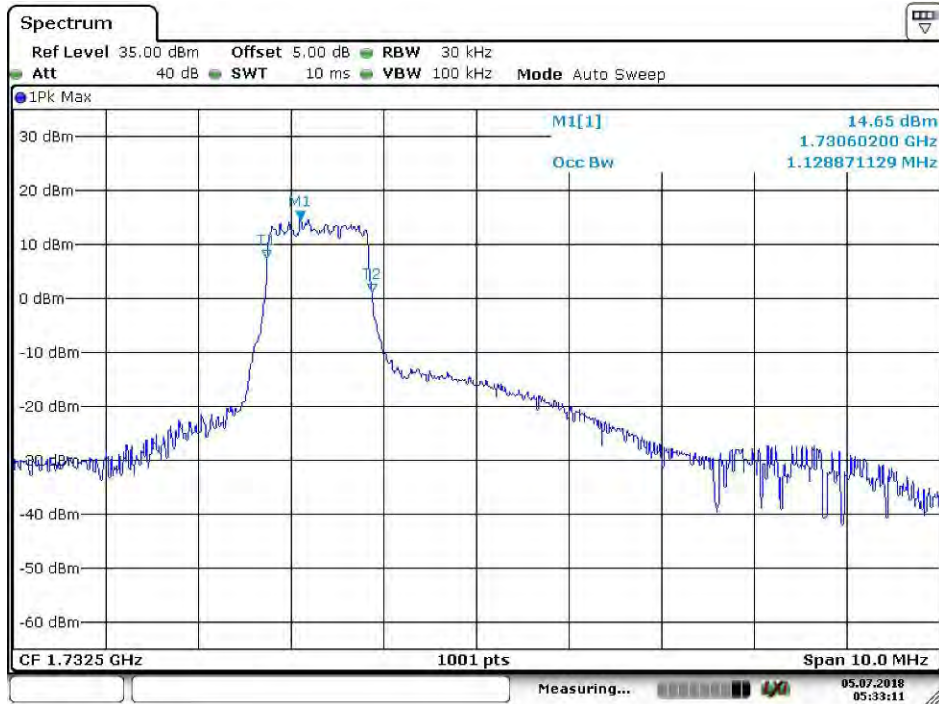
Date: 5.JUL.2018 05:10:40

4.1.1.2.2 Test Channel = MCH



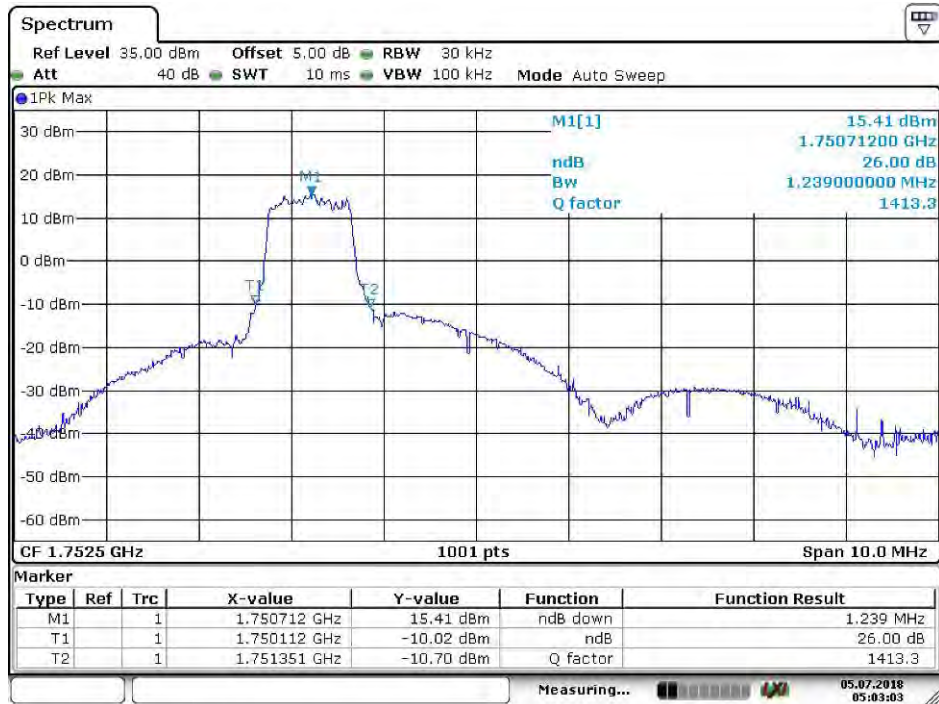
Date: 5.JUL.2018 05:05:25

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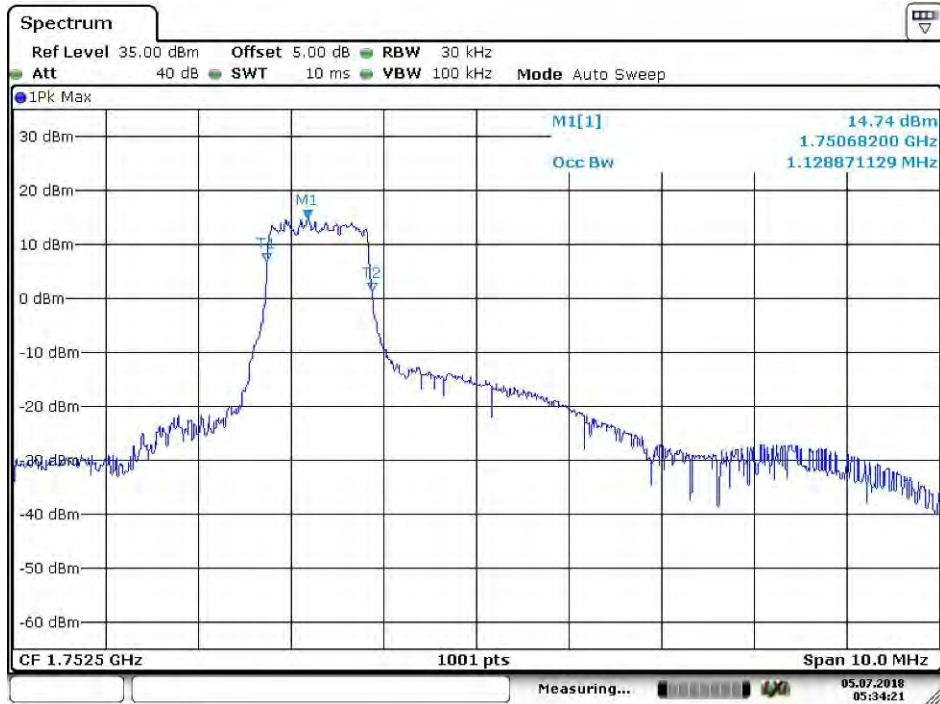
Date: 5.JUL.2018 05:33:11

4.1.1.2.3 Test Channel = HCH



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

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Date: 5.JUL.2018 05:34:21

5 Band Edges Compliance

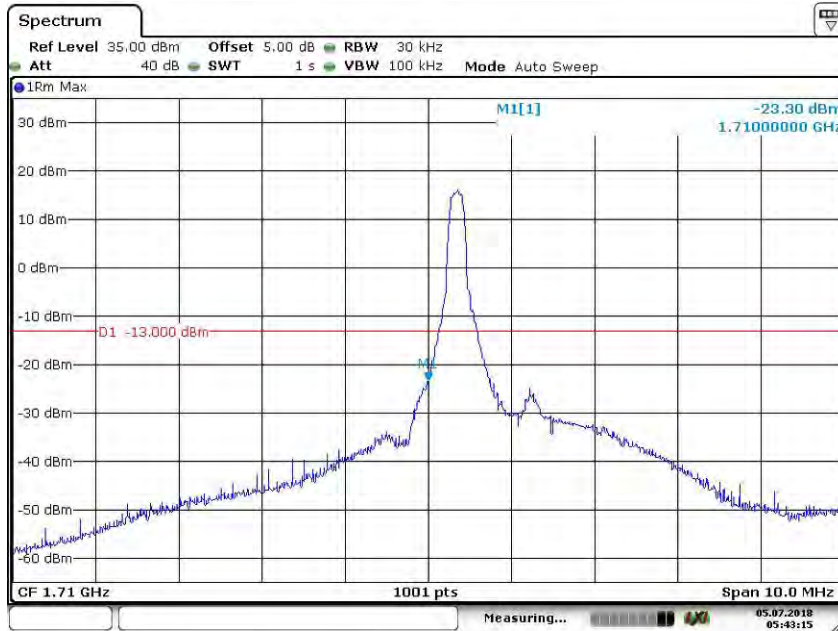
5.1 For LTE-M1

5.1.1 Test Band = LTE-M1 BAND4

5.1.1.1 Test Mode = LTE-M1/TM1 5MHz

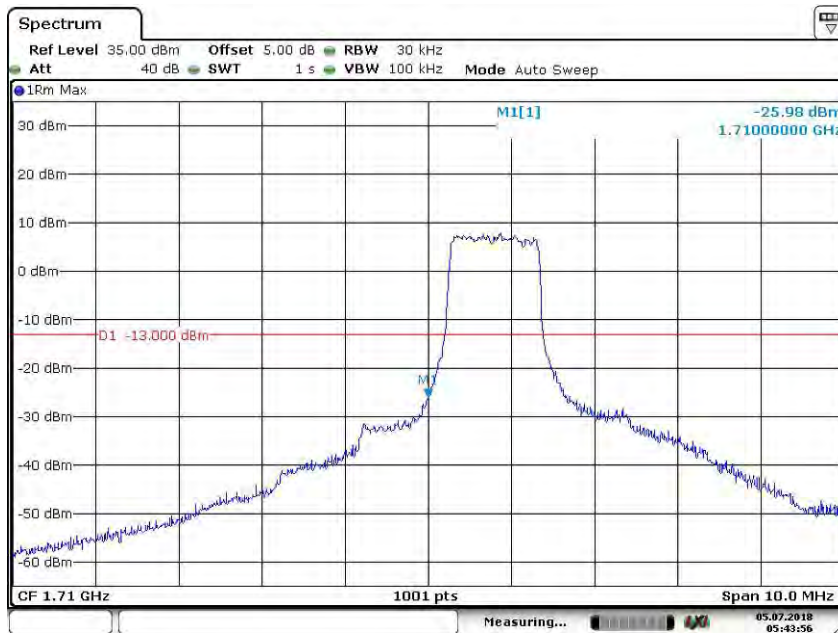
5.1.1.1.1 Test Channel = LCH

5.1.1.1.1.1 Test RB=1RB



Date: 5.JUL.2018 05:43:16

5.1.1.1.1.2 Test RB=6RB

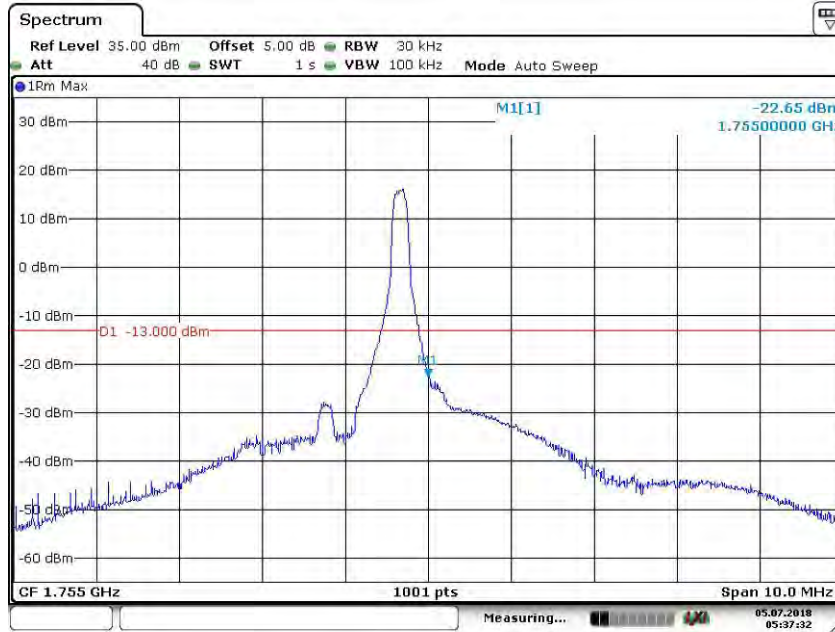


Date: 5.JUL.2018 05:43:57



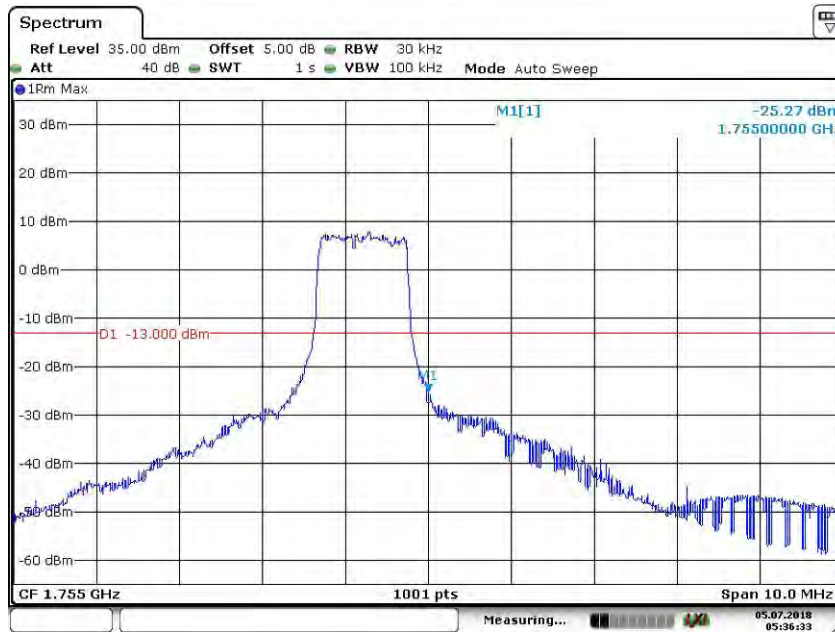
5.1.1.1.2 Test Channel = HCH

5.1.1.1.2.1 Test RB=1RB



Date: 5 JUL 2018 05:37:33

5.1.1.1.2.2 Test RB=6RB



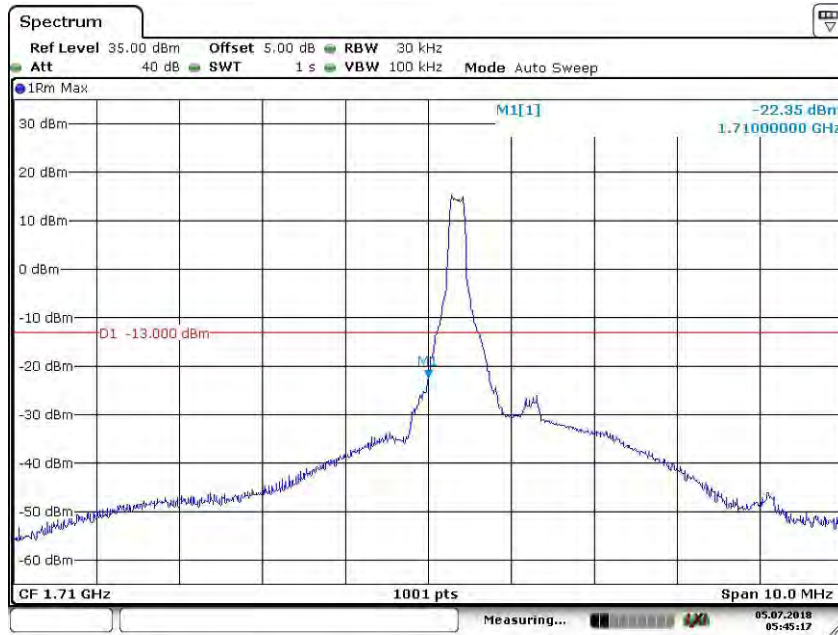
Date: 5 JUL 2018 05:36:34



5.1.1.2 Test Mode = LTE-M1/TM2 5MHz

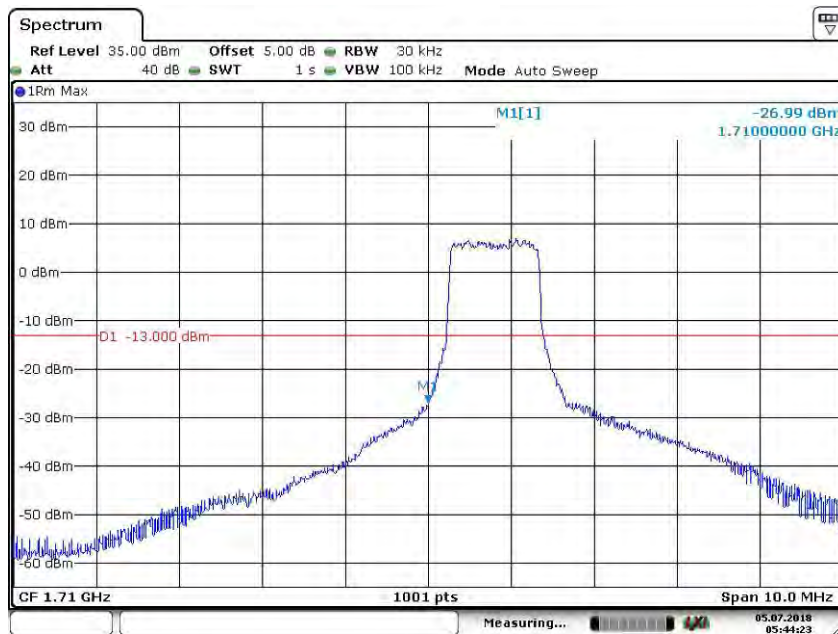
5.1.1.2.1 Test Channel = LCH

5.1.1.2.1.1 Test RB=1RB



Date: 5 JUL 2018 05:45:17

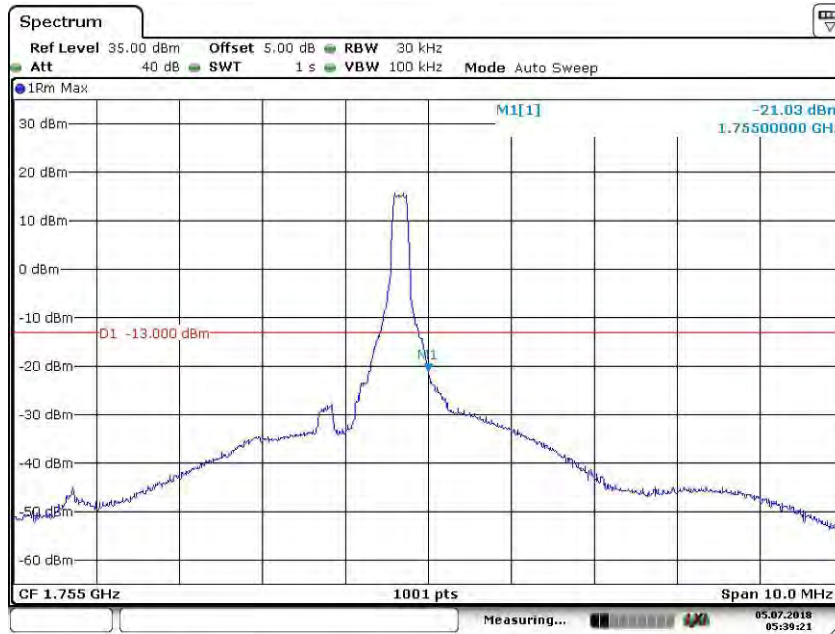
5.1.1.2.1.2 Test RB=6RB



Date: 5 JUL 2018 05:44:23

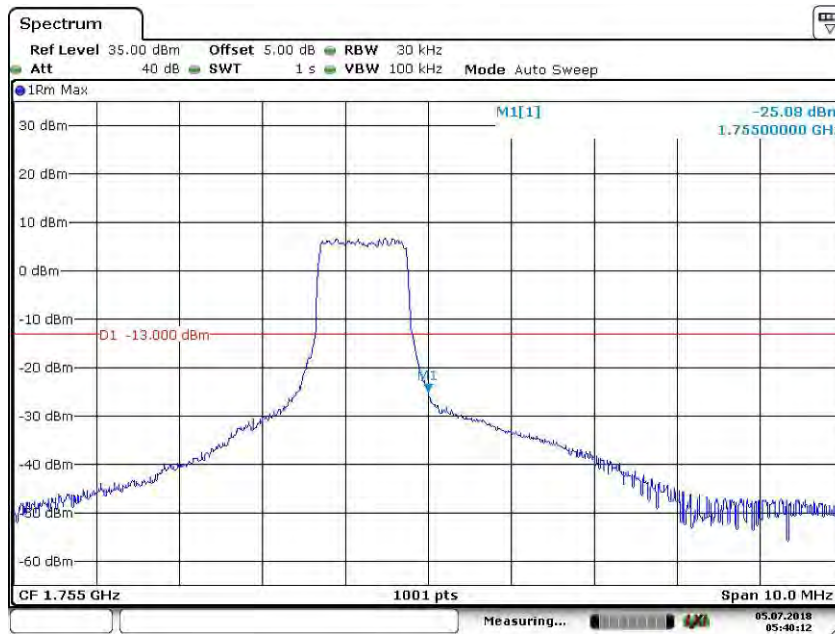
5.1.1.2.2 Test Channel = HCH

5.1.1.2.2.1 Test RB=1RB



Date: 5 JUL 2018 05:39:21

5.1.1.2.2.2 Test RB=6RB



Date: 5 JUL 2018 05:40:13



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.

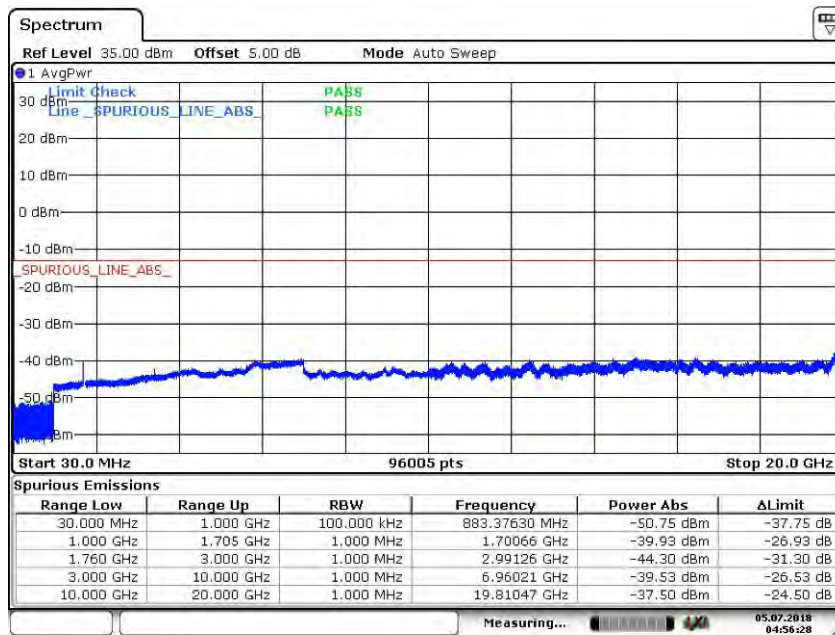
Part I - Test Plots

6.1 For LTE-M1

6.1.1 Test Band = LTE-M1 BAND4

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

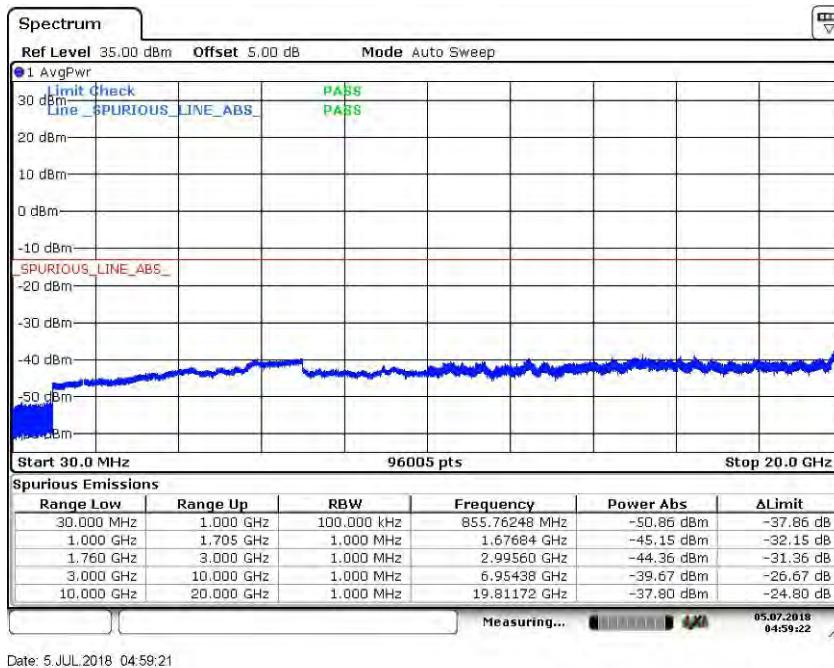
6.1.1.1.1 Test Channel = LCH



Date: 5 JUL 2018 04:56:28

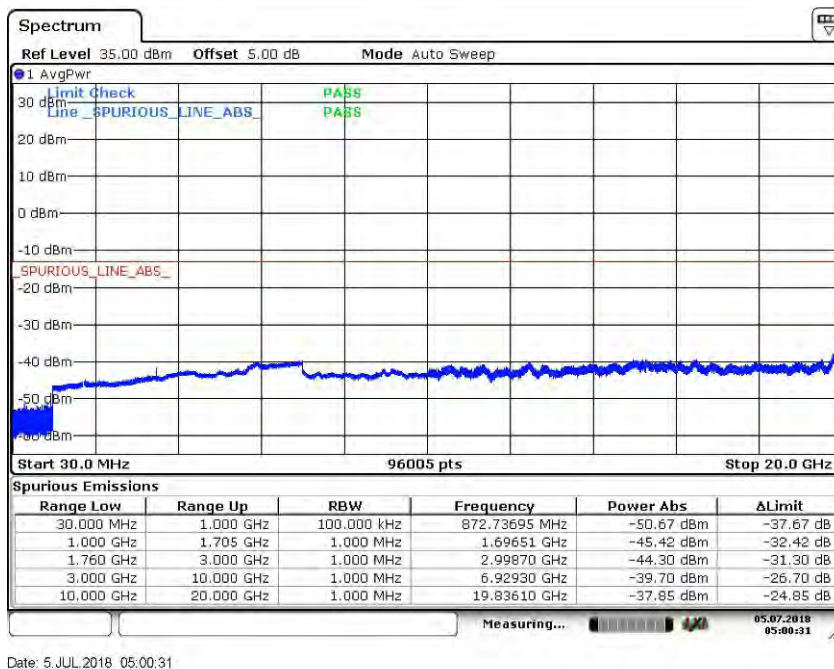


6.1.1.1.2 Test Channel = MCH



Date: 5 JUL 2018 04:59:21

6.1.1.1.3 Test Channel = HCH

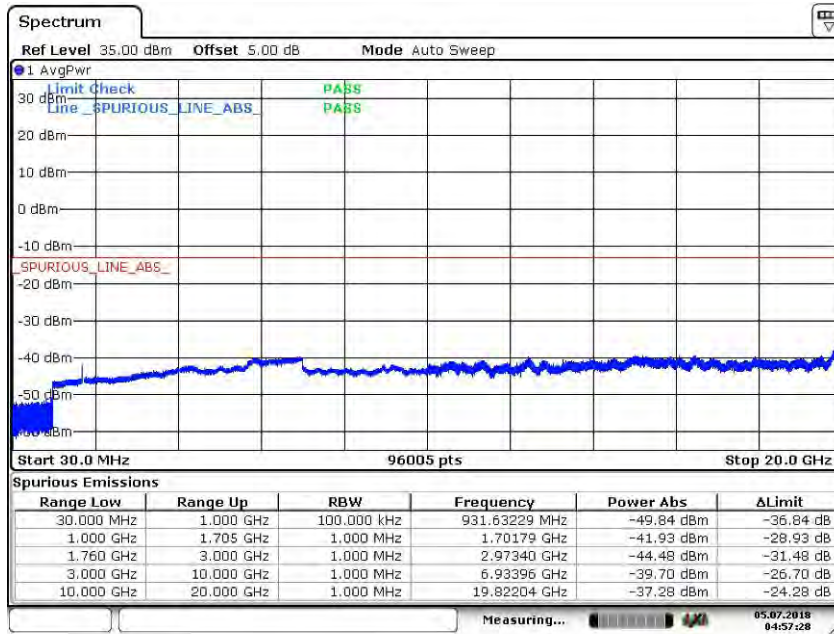


Date: 5 JUL 2018 05:00:31

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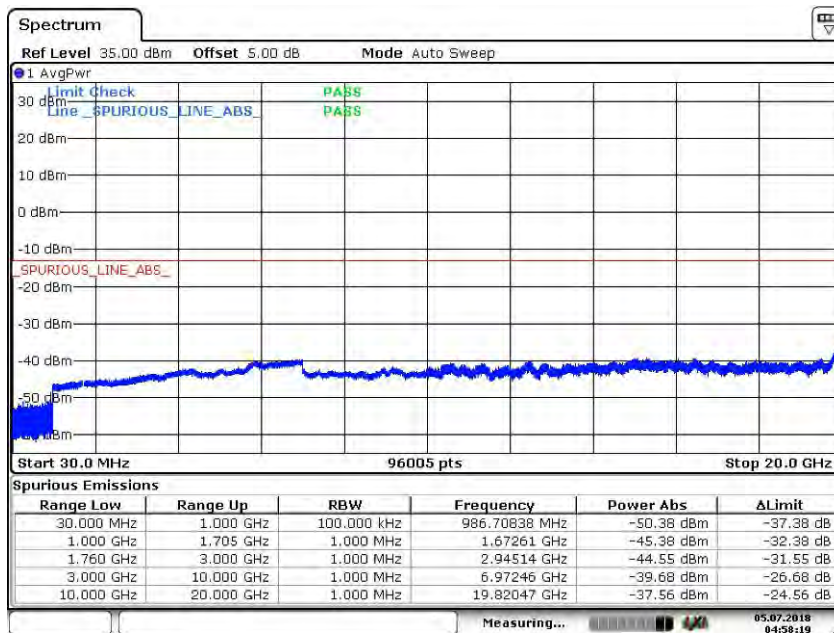


6.1.1.2 Test Mode = LTE-M1 / TM2 5MHz RB1#0
6.1.1.2.1 Test Channel = LCH



Date: 5 JUL 2018 04:57:28

6.1.1.2.2 Test Channel = MCH

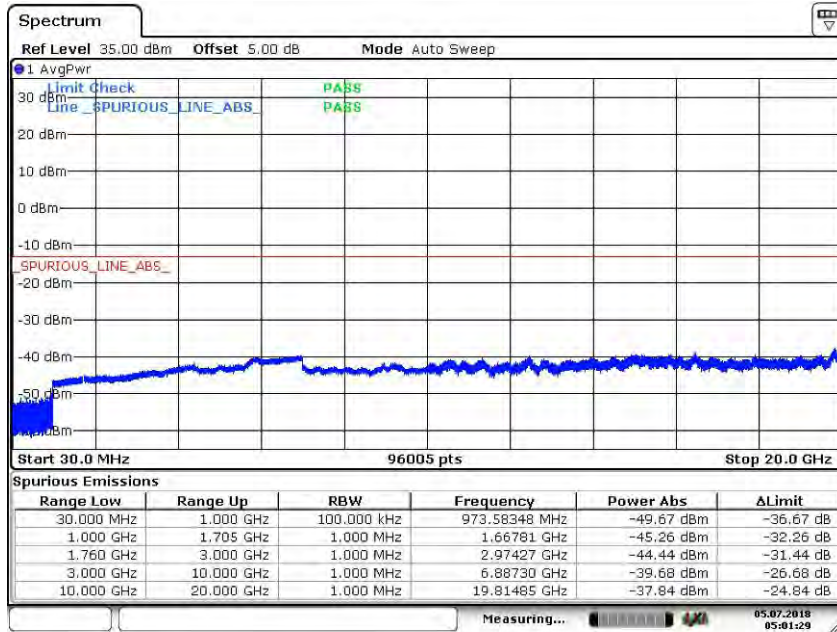


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6.1.1.2.3 Test Channel = HCH



Date: 5 JUL 2018 05:01:29



7 Field Strength of Spurious Radiation

7.1 For LTE-M1

7.1.1 Test Band = LTE-M1 BAND4

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
65.050000	-82.47	-13.00	-69.47	Vertical
124.950000	-87.58	-13.00	-74.58	Vertical
791.595833	-80.51	-13.00	-67.51	Vertical
3420.225000	-53.64	-13.00	-40.64	Vertical
5131.350000	-62.79	-13.00	-49.79	Vertical
6841.500000	-53.17	-13.00	-40.17	Vertical
62.650000	-77.74	-13.00	-64.74	Horizontal
110.750000	-93.38	-13.00	-80.38	Horizontal
268.750000	-87.06	-13.00	-74.06	Horizontal
3420.550000	-45.80	-13.00	-32.80	Horizontal
5131.025000	-61.05	-13.00	-48.05	Horizontal
6842.150000	-59.38	-13.00	-46.38	Horizontal

7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.450000	-82.12	-13.00	-69.12	Vertical
125.000000	-87.29	-13.00	-74.29	Vertical
307.900000	-87.02	-13.00	-74.02	Vertical
3460.525000	-50.50	-13.00	-37.50	Vertical
5190.825000	-61.64	-13.00	-48.64	Vertical
6921.775000	-54.89	-13.00	-41.89	Vertical
62.450000	-77.68	-13.00	-64.68	Horizontal
111.050000	-93.43	-13.00	-80.43	Horizontal
265.000000	-87.14	-13.00	-74.14	Horizontal
3460.200000	-45.08	-13.00	-32.08	Horizontal
5190.500000	-64.21	-13.00	-51.21	Horizontal
6921.775000	-56.73	-13.00	-43.73	Horizontal



7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
65.150000	-82.19	-13.00	-69.19	Vertical
125.000000	-87.64	-13.00	-74.64	Vertical
1103.000000	-61.93	-13.00	-48.93	Vertical
3501.150000	-52.13	-13.00	-39.13	Vertical
5250.950000	-65.26	-13.00	-52.26	Vertical
7001.400000	-54.74	-13.00	-41.74	Vertical
62.100000	-78.43	-13.00	-65.43	Horizontal
300.300000	-87.33	-13.00	-74.33	Horizontal
1046.000000	-61.12	-13.00	-48.12	Horizontal
3501.150000	-55.85	-13.00	-42.85	Horizontal
5250.300000	-65.82	-13.00	-52.82	Horizontal
7002.050000	-61.34	-13.00	-48.34	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 BAND4	LTE-M1/TM1 5MHz	LCH	TN	VL	-5.13	-0.002991	PASS
				VN	-8.66	-0.005047	PASS
				VH	-9.96	-0.005809	PASS
		MCH	TN	VL	6.69	0.003859	PASS
				VN	-6.87	-0.003967	PASS
				VH	5.30	0.003058	PASS
		HCH	TN	VL	9.17	0.005238	PASS
				VN	-0.30	-0.000174	PASS
				VH	-0.76	-0.000434	PASS
	LTE-M1/TM2 5MHz	LCH	TN	VL	4.49	0.002616	PASS
				VN	-2.37	-0.001382	PASS
				VH	8.11	0.004727	PASS
		MCH	TN	VL	-6.02	-0.003476	PASS
				VN	3.88	0.002239	PASS
				VH	7.45	0.004301	PASS
		HCH	TN	VL	8.26	0.004720	PASS
				VN	3.05	0.001744	PASS
				VH	2.02	0.001154	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 BAND4	LTE-M1/TM1 5MHz	LCH	VN	-30	-3.59	-0.002094	PASS
				-20	2.09	0.001218	PASS
				-10	2.54	0.001484	PASS
				0	-9.41	-0.005488	PASS
				10	-8.64	-0.005038	PASS
				20	-9.60	-0.005599	PASS
				30	-8.42	-0.004909	PASS
				40	7.08	0.004128	PASS
				50	-9.72	-0.005669	PASS
		MCH	VN	-30	8.01	0.004623	PASS
				-20	-8.20	-0.004734	PASS
				-10	2.04	0.001179	PASS
				0	6.94	0.004006	PASS
				10	2.40	0.001386	PASS
				20	-7.48	-0.004320	PASS
				30	-2.12	-0.001222	PASS
				40	8.58	0.004952	PASS
				50	3.21	0.001853	PASS
		HCH	VN	-30	3.43	0.001961	PASS
				-20	8.51	0.004864	PASS
				-10	9.61	0.005493	PASS
				0	-1.67	-0.000954	PASS
				10	6.52	0.003728	PASS
				20	2.55	0.001458	PASS
				30	9.93	0.005672	PASS
				40	0.29	0.000166	PASS
				50	6.28	0.003590	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 BAND4	LTE-M1/TM2 5MHz	LCH	VN	-30	2.73	0.001591	PASS
				-20	4.57	0.002663	PASS
				-10	9.05	0.005277	PASS
				0	-5.05	-0.002943	PASS
				10	-1.95	-0.001137	PASS
				20	1.14	0.000665	PASS
				30	-3.56	-0.002079	PASS
				40	-6.61	-0.003854	PASS
				50	-9.44	-0.005503	PASS
		MCH	VN	-30	3.67	0.002120	PASS
				-20	0.90	0.000522	PASS
				-10	8.16	0.004711	PASS
				0	-6.83	-0.003944	PASS
				10	2.53	0.001461	PASS
				20	-0.48	-0.000277	PASS
				30	7.86	0.004539	PASS
				40	9.37	0.005407	PASS
		HCH	VN	-30	-2.33	-0.001333	PASS
				-20	6.10	0.003484	PASS
				-10	9.47	0.005413	PASS
				0	-8.26	-0.004718	PASS
				10	-7.86	-0.004493	PASS
				20	2.69	0.001536	PASS
				30	0.87	0.000495	PASS
40	1.62			0.000924	PASS		
50	-5.29	-0.003022	PASS				

The End

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