Appendix B

GSM850&1900

CONTENT

Page

1 Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	ERP[dB]	Limit[dBm]	Verdict
GSM 850	GSM/TM1	LCH	31.28	30.28	38.45	PASS
		MCH	31.35	30.35	38.45	PASS
		HCH	31.23	30.23	38.45	PASS
	GSM/TM2	LCH	26.74	25.74	38.45	PASS
		MCH	26.82	25.82	38.45	PASS
		HCH	26.87	25.87	38.45	PASS

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

ERP [dBm] = SGP [dBm] – Cable Loss [dB] + Gain [dBd]

b: SGP=Signal Generator Level
c: RBW > emission bandwidth, VBW > 3 x RBW.
Detector: RMS

Test Band	Test Mode	Test Channel	Measured[dB]	EIRP[dB]	Limit[dBm]	Verdict
GSM 1900	GSM/TM1	LCH	30.76	29.96	33	PASS
		MCH	30.72	29.72	33	PASS
		HCH	30.67	29.87	33	PASS
	GSM/TM2	LCH	25.30	24.50	33	PASS
		MCH	25.22	24.32	33	PASS
		HCH	24.96	24.16	33	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
c: RBW > emission bandwidth, VBW > 3 x RBW.
Detector: RMS

2 Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM 850	GSM/TM1	LCH	6.81	13	PASS
		MCH	6.81	13	PASS
		HCH	6.90	13	PASS
	GSM/TM2	LCH	8.26	13	PASS
		MCH	8.35	13	PASS
		HCH	8.38	13	PASS
GSM 1900	GSM/TM1	LCH	6.64	13	PASS
		MCH	6.72	13	PASS
		HCH	6.84	13	PASS
	GSM/TM2	LCH	8.29	13	PASS
		MCH	8.75	13	PASS
		HCH	8.20	13	PASS

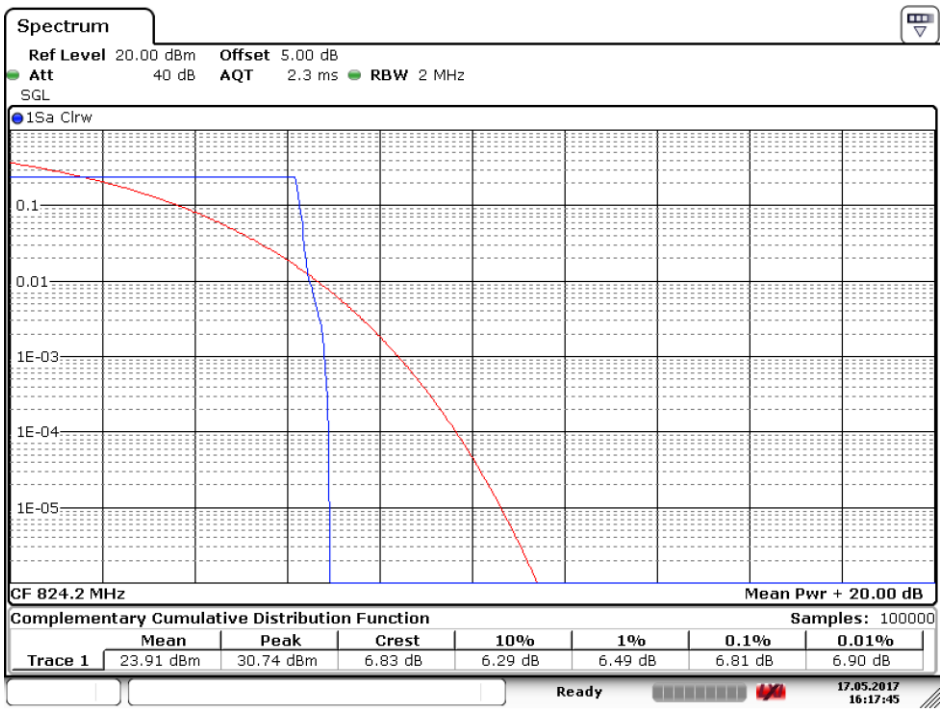
Part II - Test Plots

2.1 For GSM

2.1.1 Test Band = GSM 850

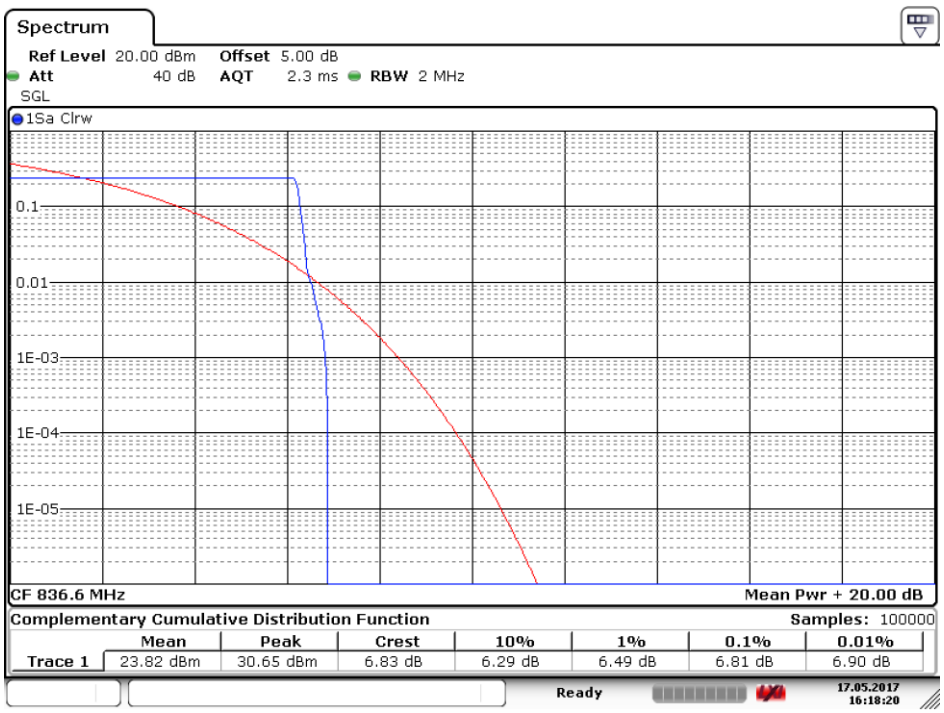
2.1.1.1 Test Mode = GSM/TM1

2.1.1.1.1 Test Channel = LCH



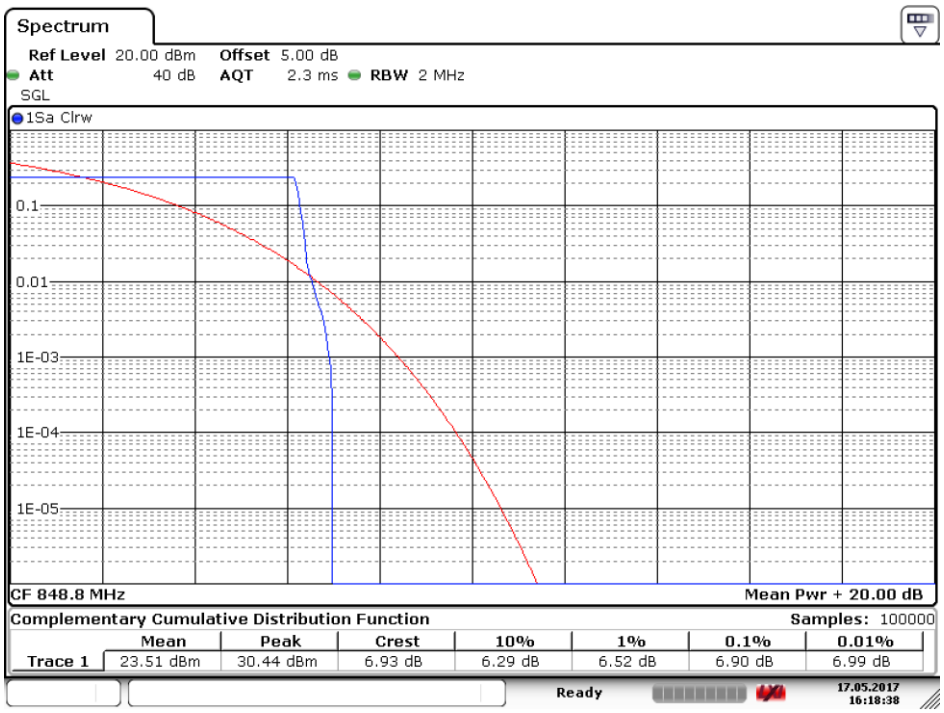
Date: 17.MAY.2017 16:17:45

2.1.1.1.2 Test Channel = MCH



Date: 17.MAY.2017 16:18:20

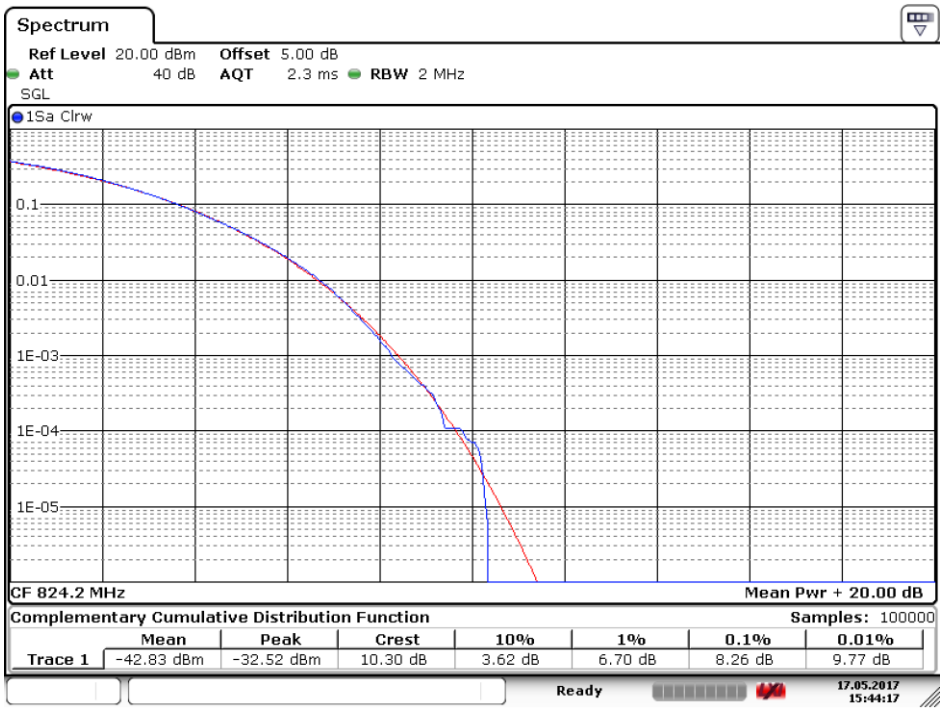
2.1.1.1.3 Test Channel = HCH



Date: 17.MAY.2017 16:18:38

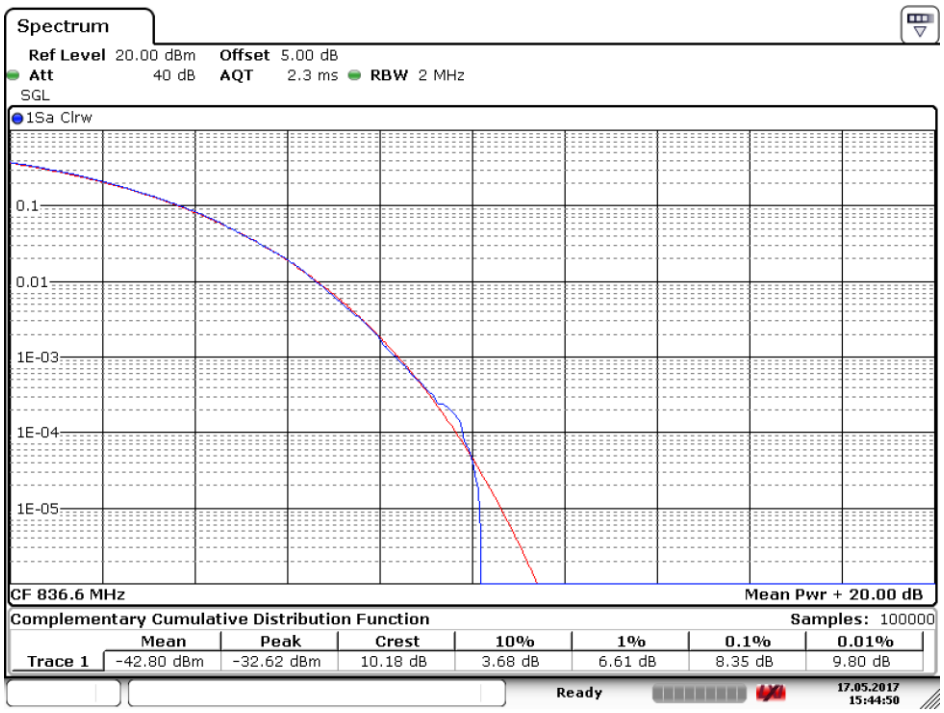
2.1.1.2 Test Mode = GSM/TM2

2.1.1.2.1 Test Channel = LCH



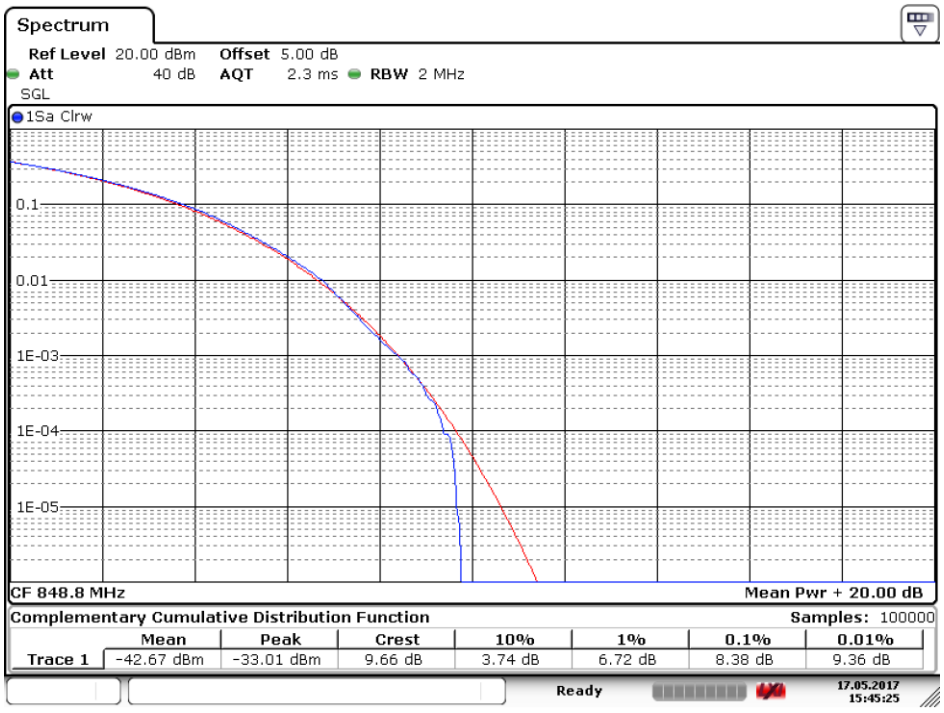
Date: 17.MAY.2017 15:44:17

2.1.1.2.2 Test Channel = MCH



Date: 17.MAY.2017 15:44:51

2.1.1.2.3 Test Channel = HCH

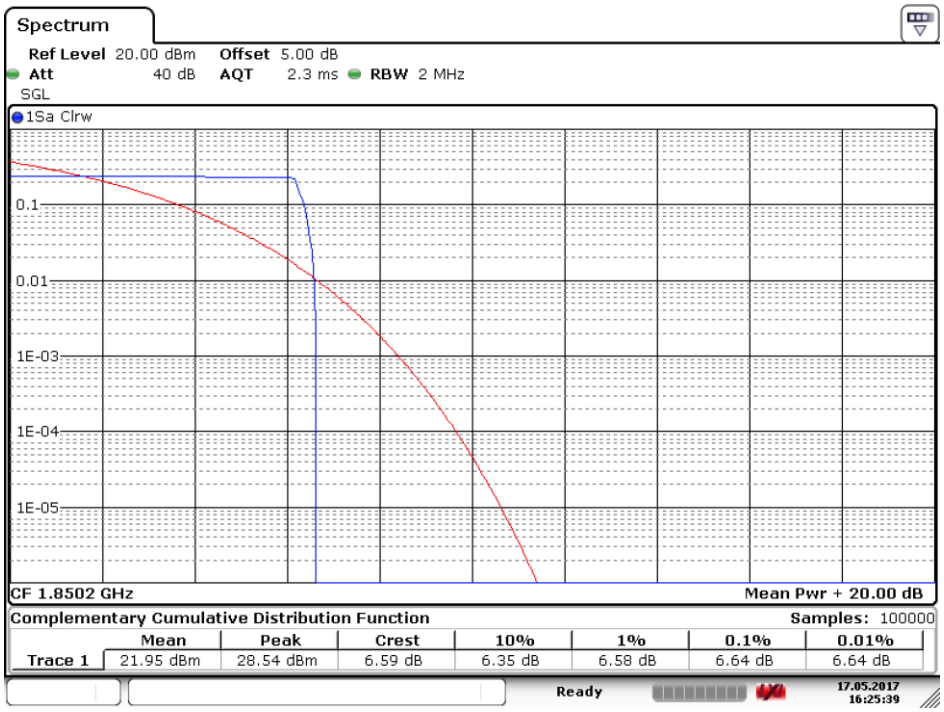


Date: 17.MAY.2017 15:45:25

2.1.2 Test Band = GSM 1900

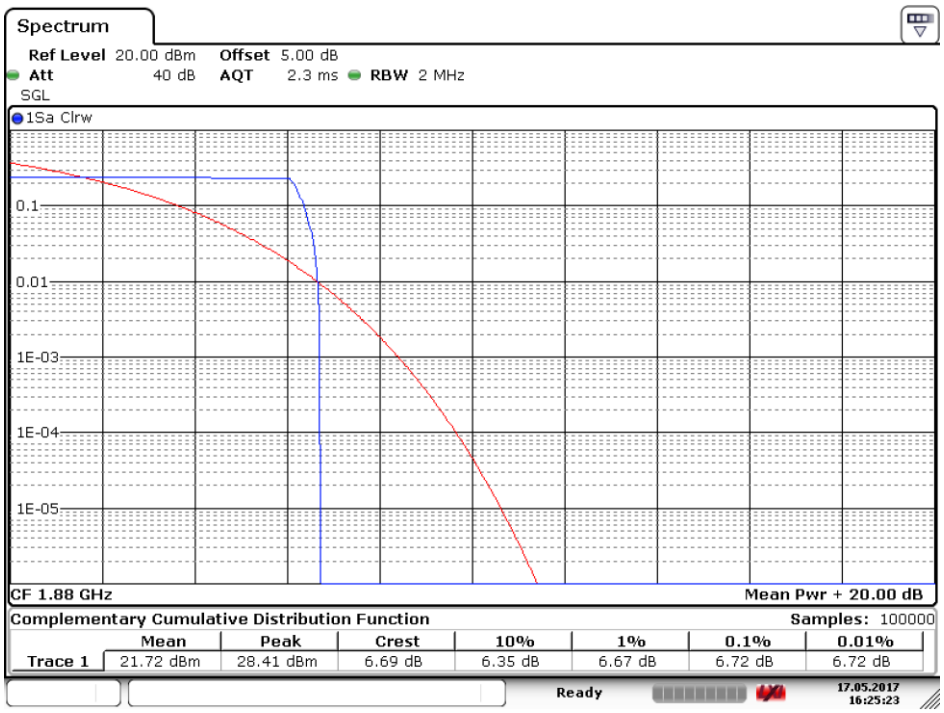
2.1.2.1 Test Mode = GSM/TM1

2.1.2.1.1 Test Channel = LCH



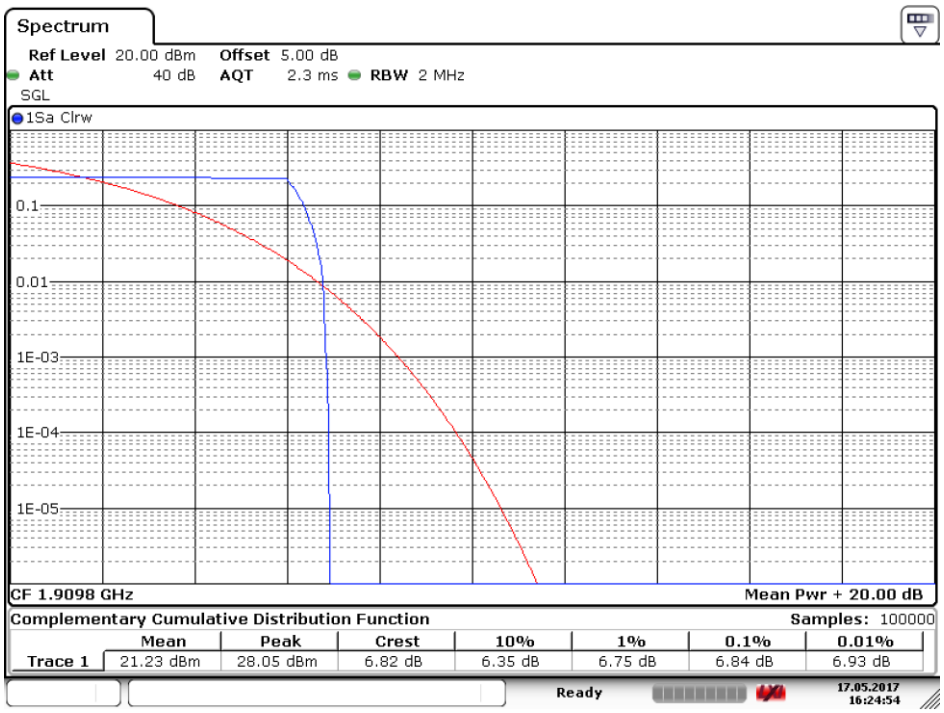
Date: 17.MAY.2017 16:25:39

2.1.2.1.2 Test Channel = MCH



Date: 17.MAY.2017 16:25:23

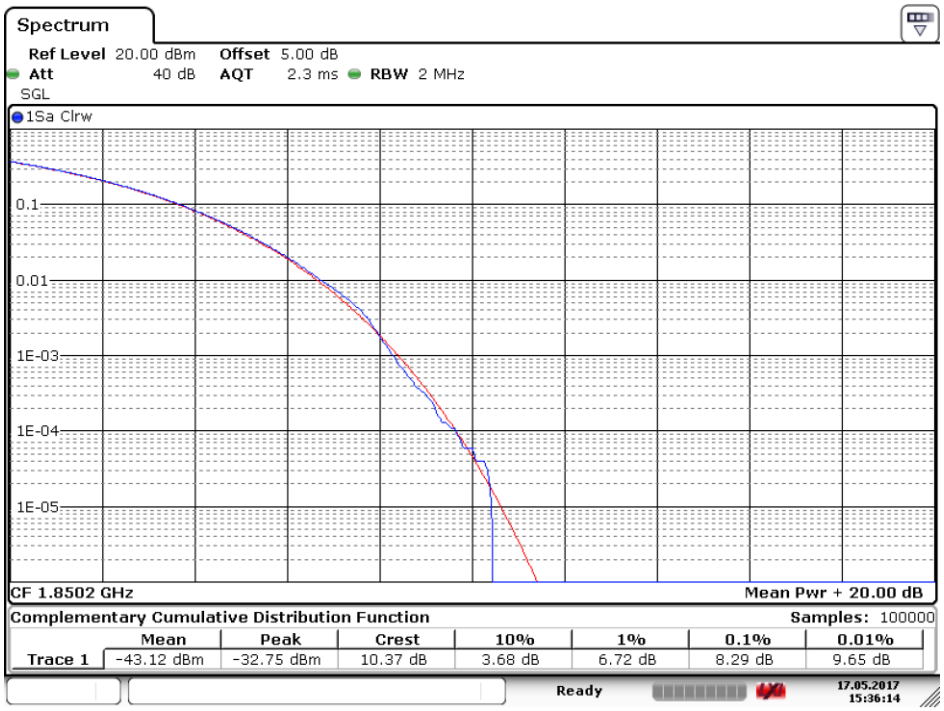
2.1.2.1.3 Test Channel = HCH



Date: 17.MAY.2017 16:24:55

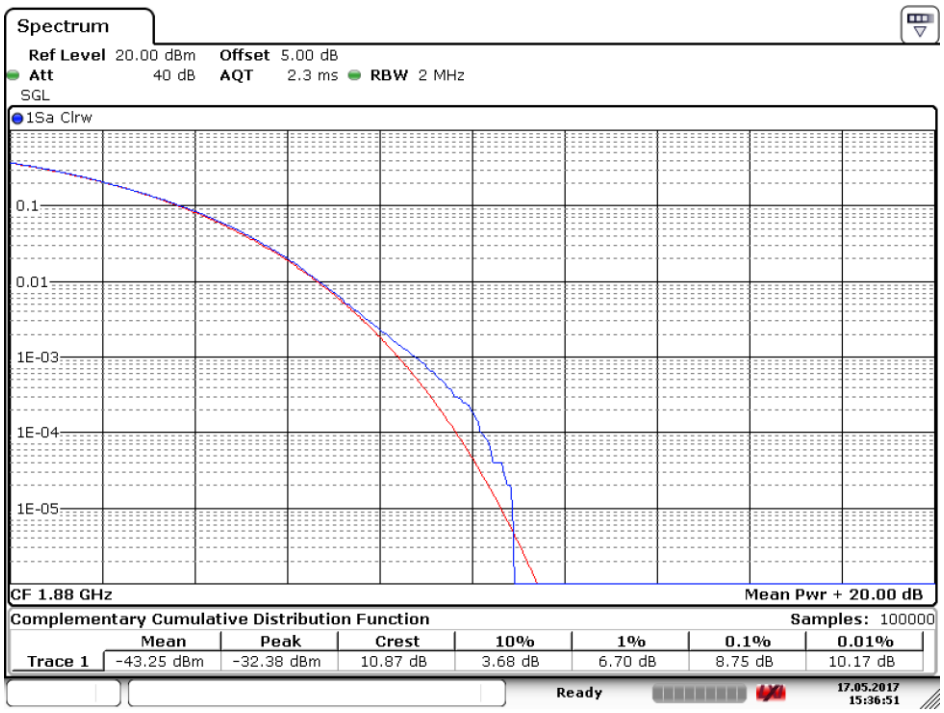
2.1.2.2 Test Mode = GSM/TM2

2.1.2.2.1 Test Channel = LCH



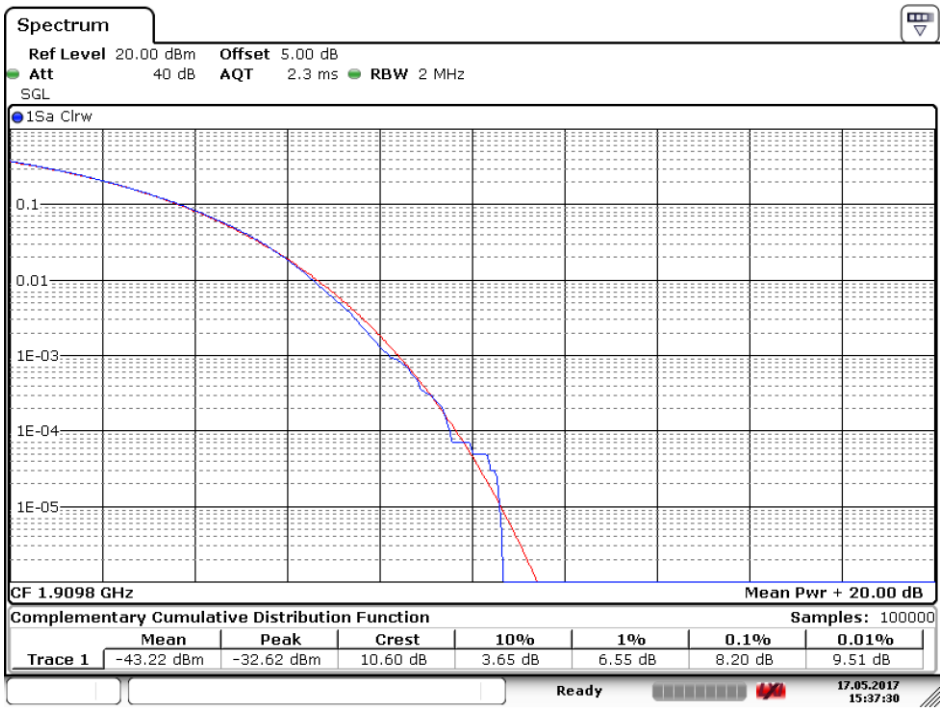
Date: 17.MAY.2017 15:36:14

2.1.2.2.2 Test Channel = MCH



Date: 17.MAY.2017 15:36:51

2.1.2.2.3 Test Channel = HCH



Date: 17.MAY.2017 15:37:30

3 Modulation Characteristics

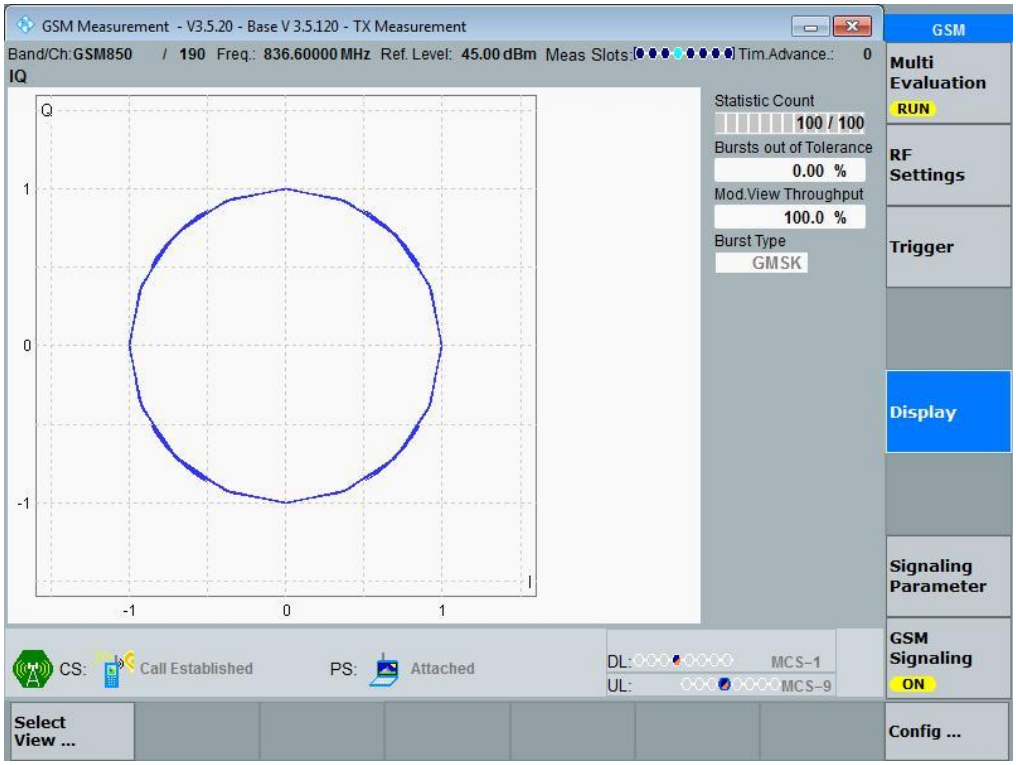
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM 850

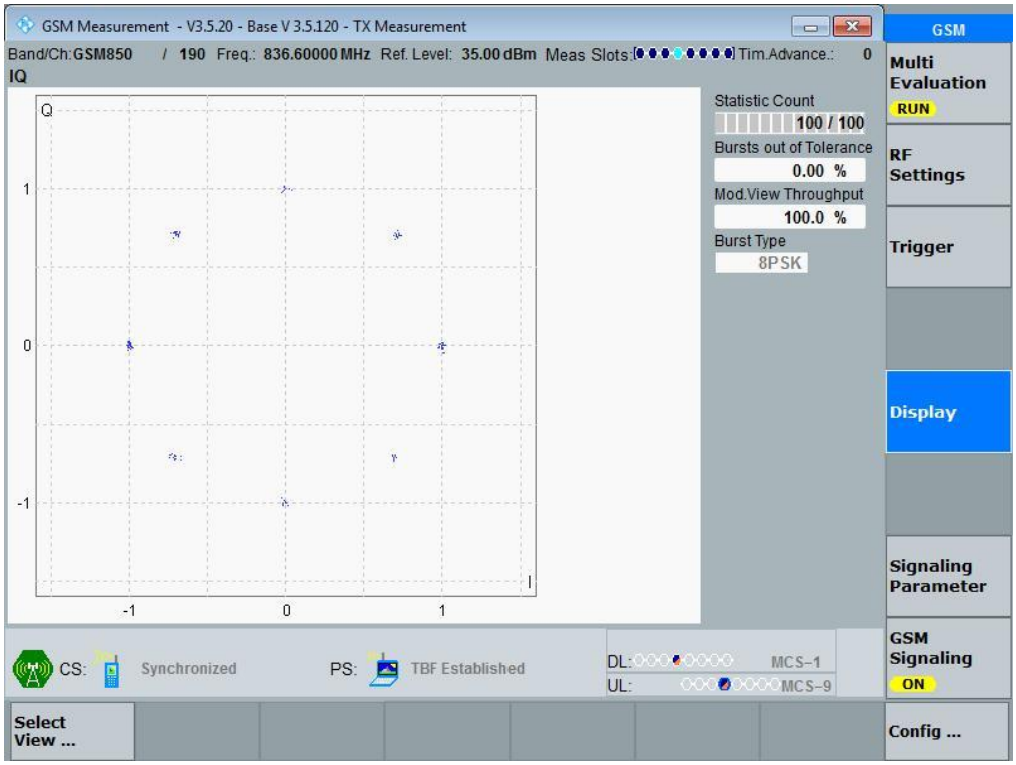
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

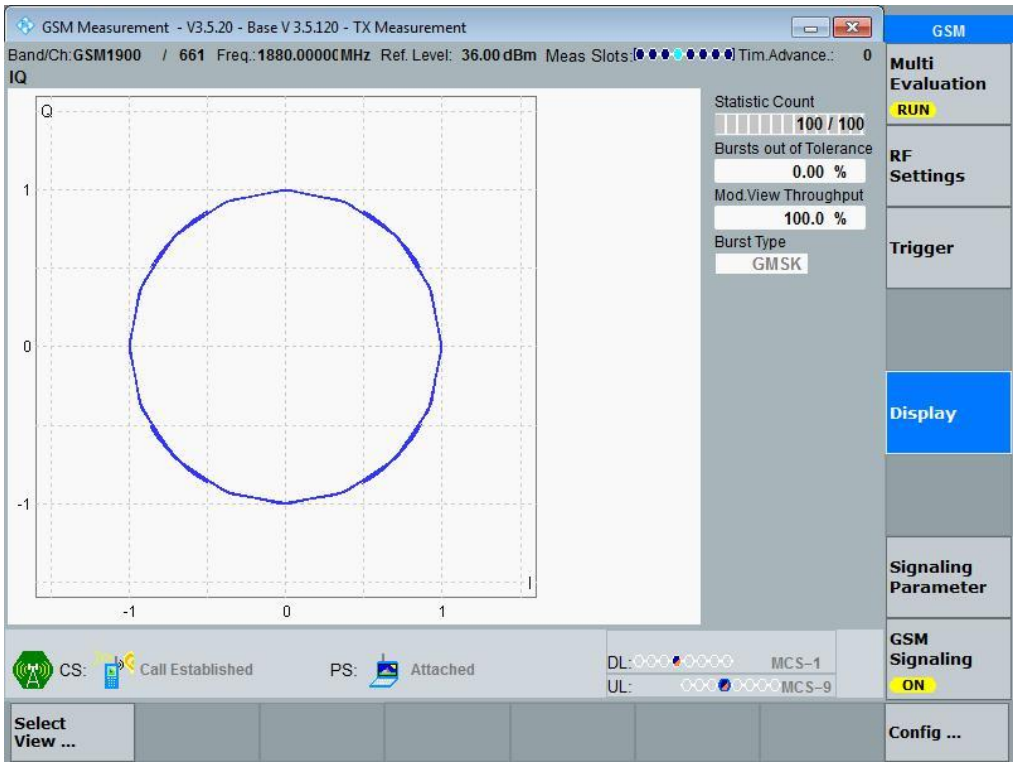
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM 1900

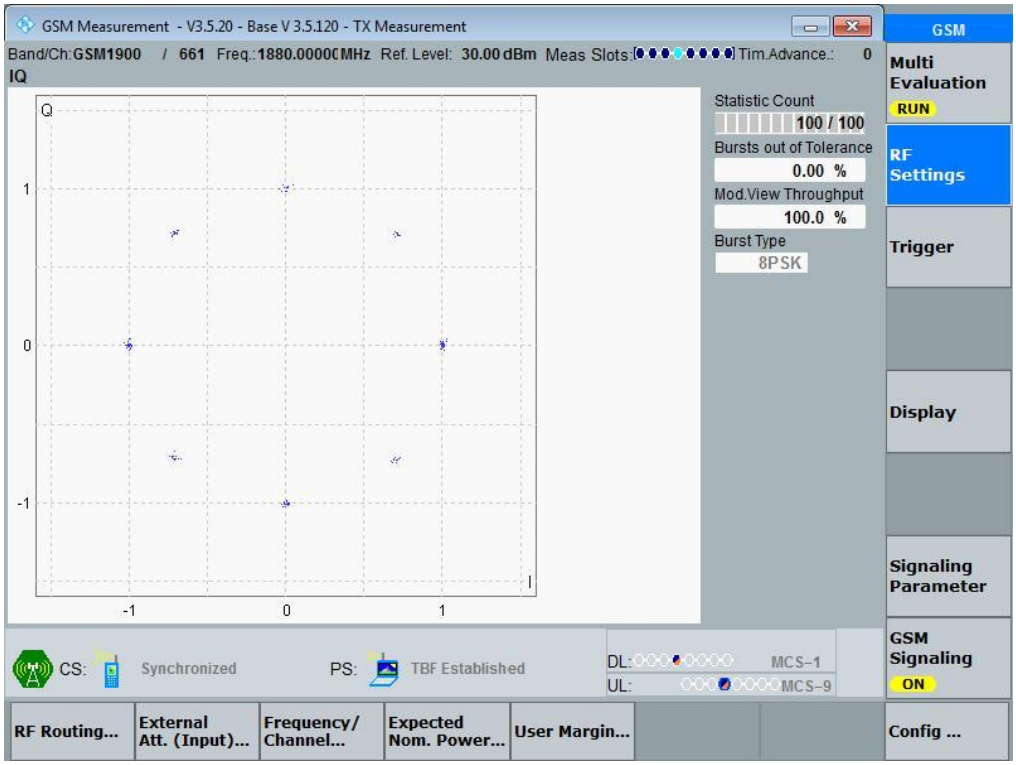
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH



4 Bandwidth

Part I - Test Results

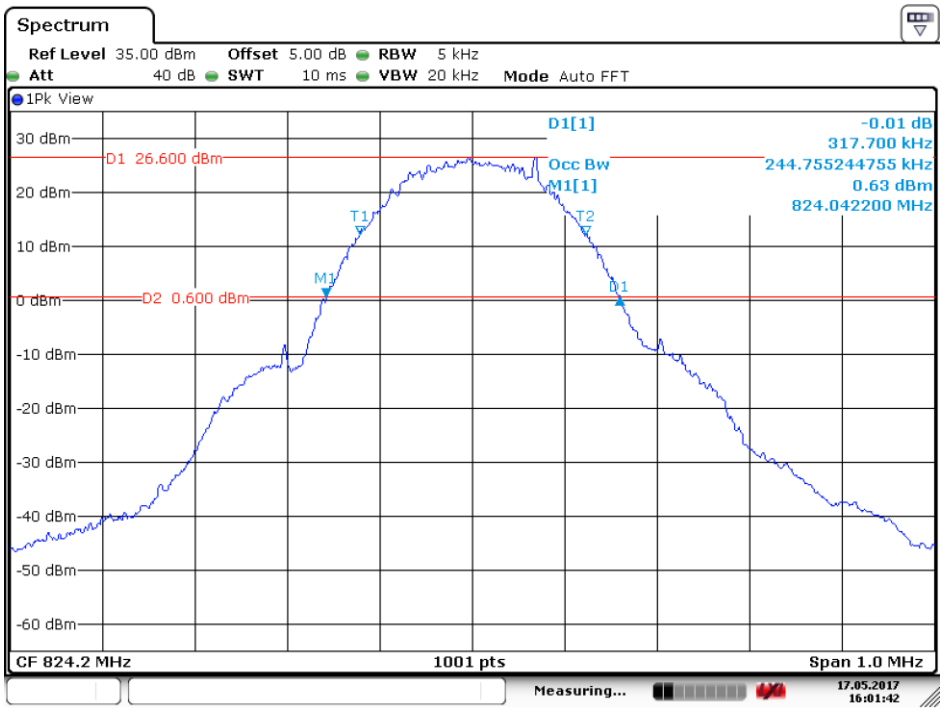
Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM 850	GSM/TM1	LCH	244.8	317.7	PASS
		MCH	244.8	318.7	PASS
		HCH	241.8	316.7	PASS
	GSM/TM2	LCH	237.8	314.7	PASS
		MCH	238.8	314.7	PASS
		HCH	241.8	312.7	PASS
GSM 1900	GSM/TM1	LCH	241.8	314.7	PASS
		MCH	243.8	317.7	PASS
		HCH	242.8	317.7	PASS
	GSM/TM2	LCH	242.8	314.7	PASS
		MCH	235.8	314.7	PASS
		HCH	237.8	314.7	PASS

4.1 For GSM

4.1.1 Test Band = GSM 850

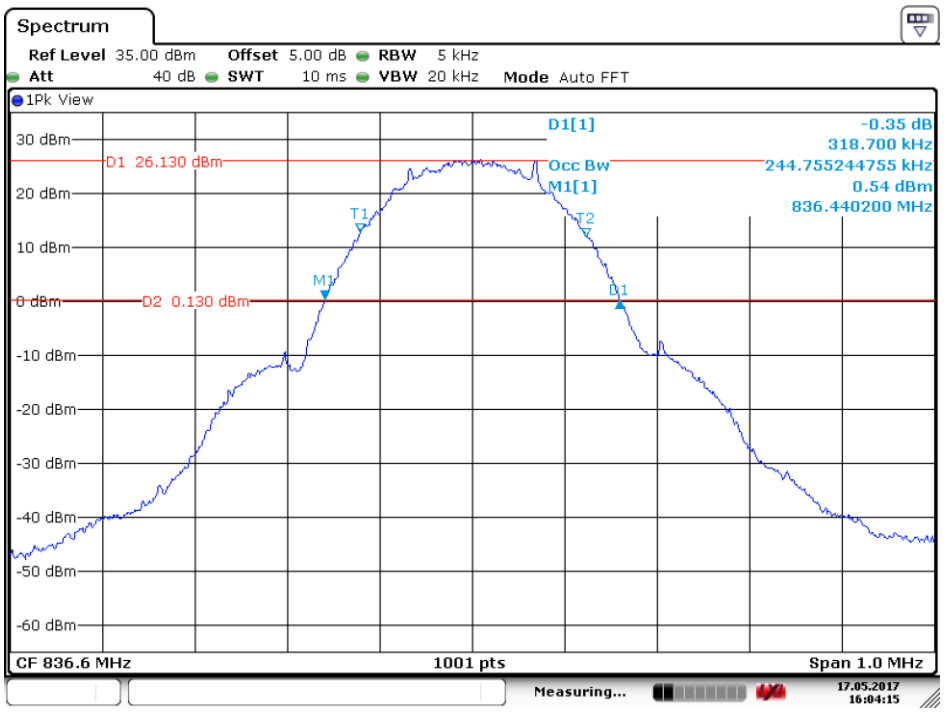
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



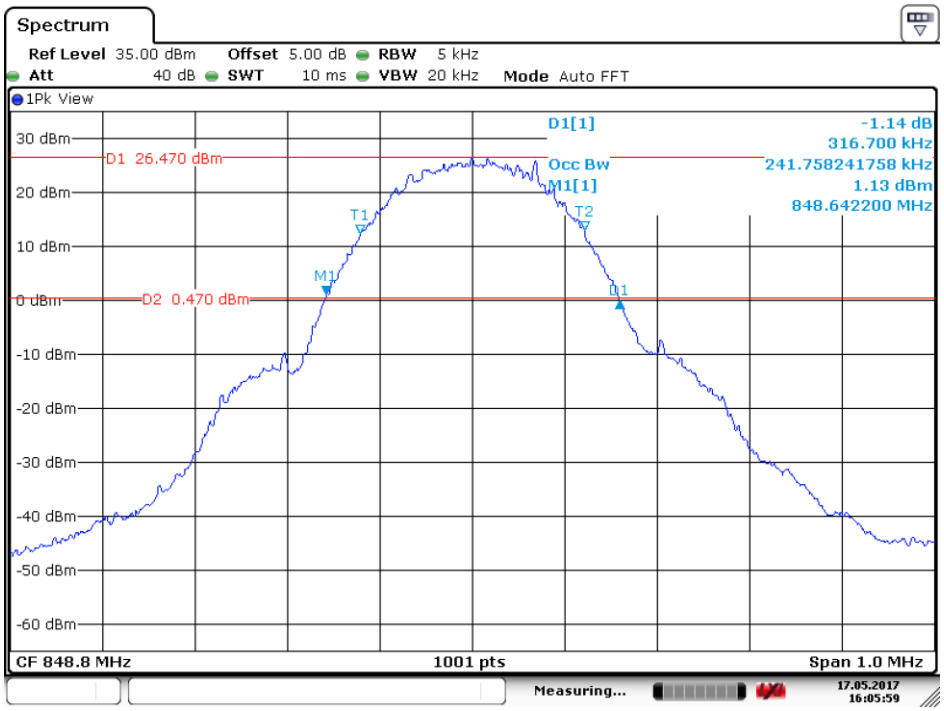
Date: 17.MAY.2017 16:01:42

4.1.1.1.2 Test Channel = MCH



Date: 17.MAY.2017 16:04:16

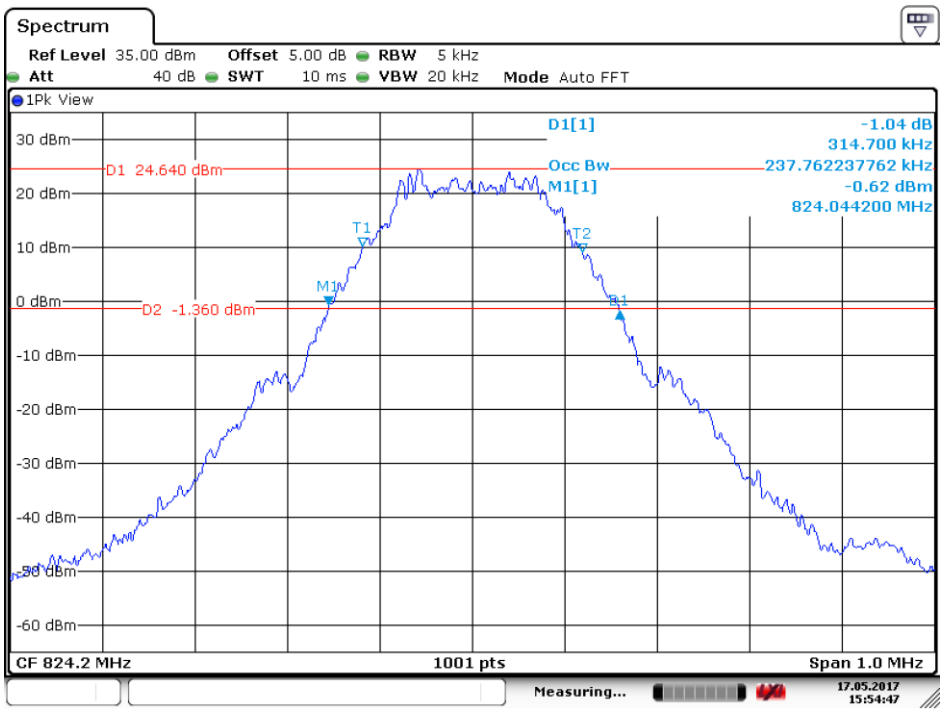
4.1.1.1.3 Test Channel = HCH



Date: 17.MAY.2017 16:05:59

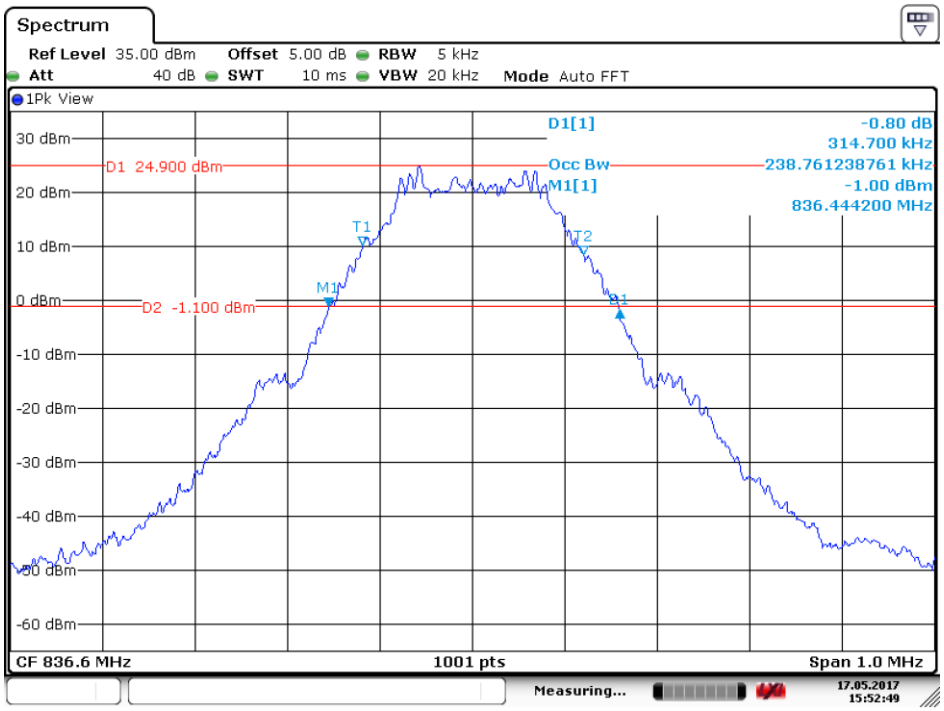
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



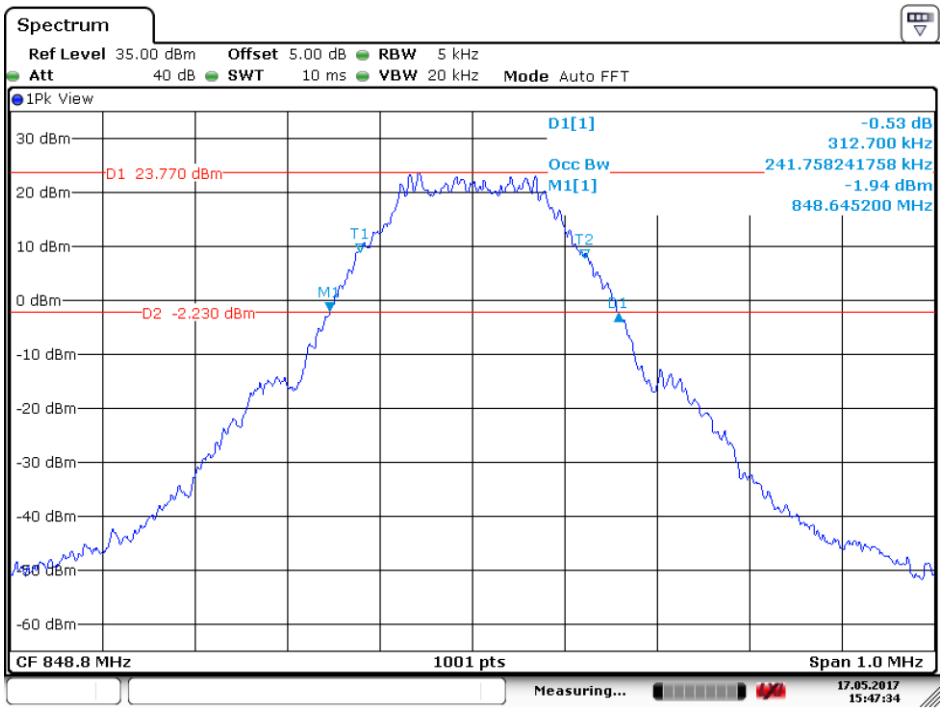
Date: 17.MAY.2017 15:54:47

4.1.1.2.2 Test Channel = MCH



Date: 17.MAY.2017 15:52:49

4.1.1.2.3 Test Channel = HCH

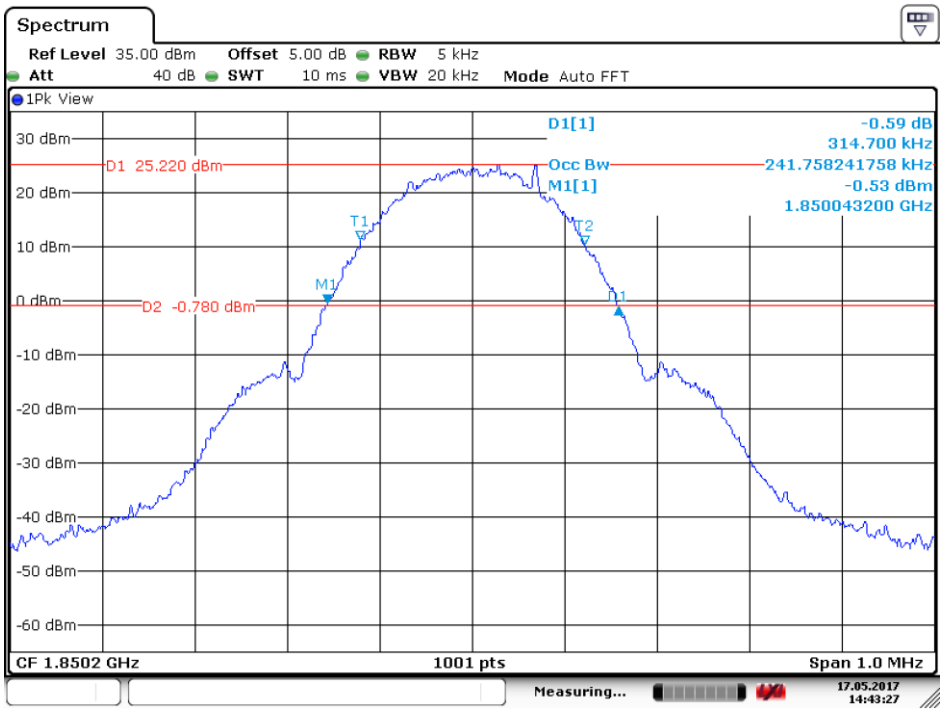


Date: 17.MAY.2017 15:47:34

4.1.2 Test Band = GSM 1900

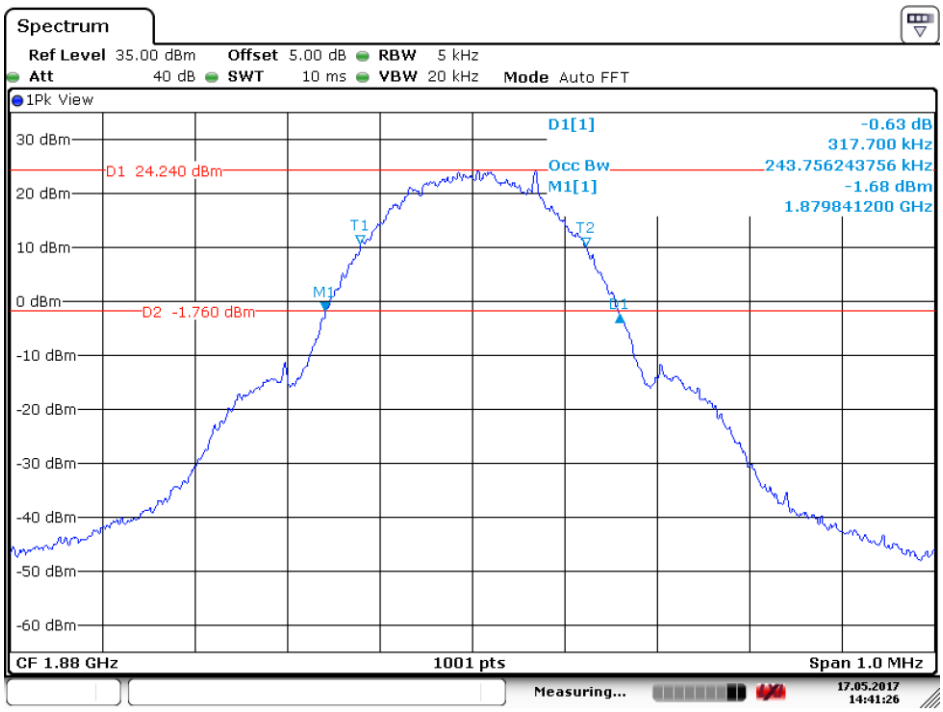
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



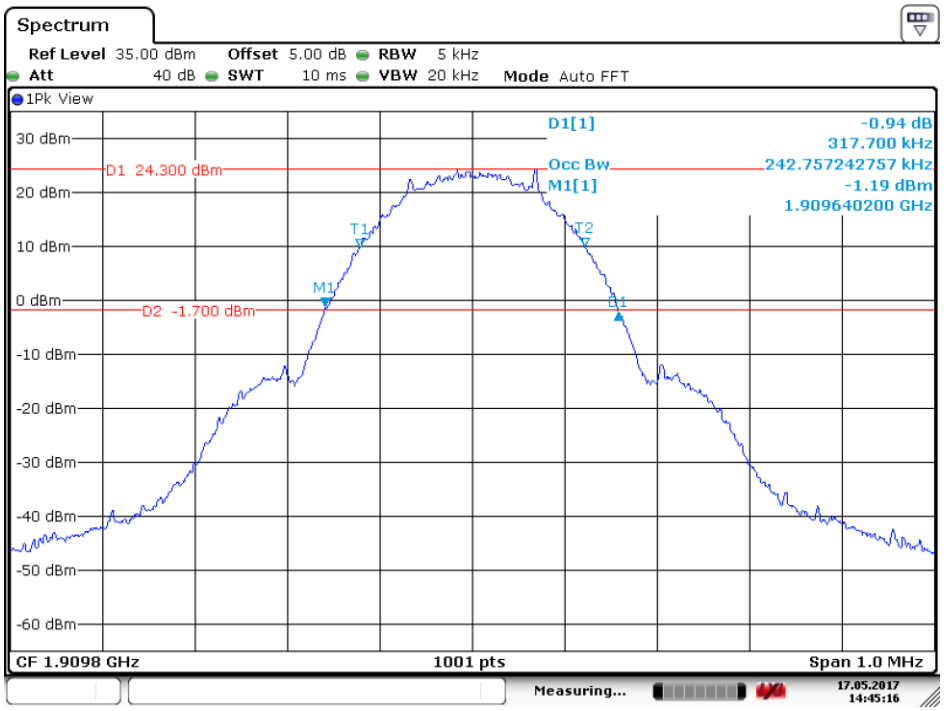
Date: 17.MAY.2017 14:43:28

4.1.2.1.2 Test Channel = MCH



Date: 17.MAY.2017 14:41:26

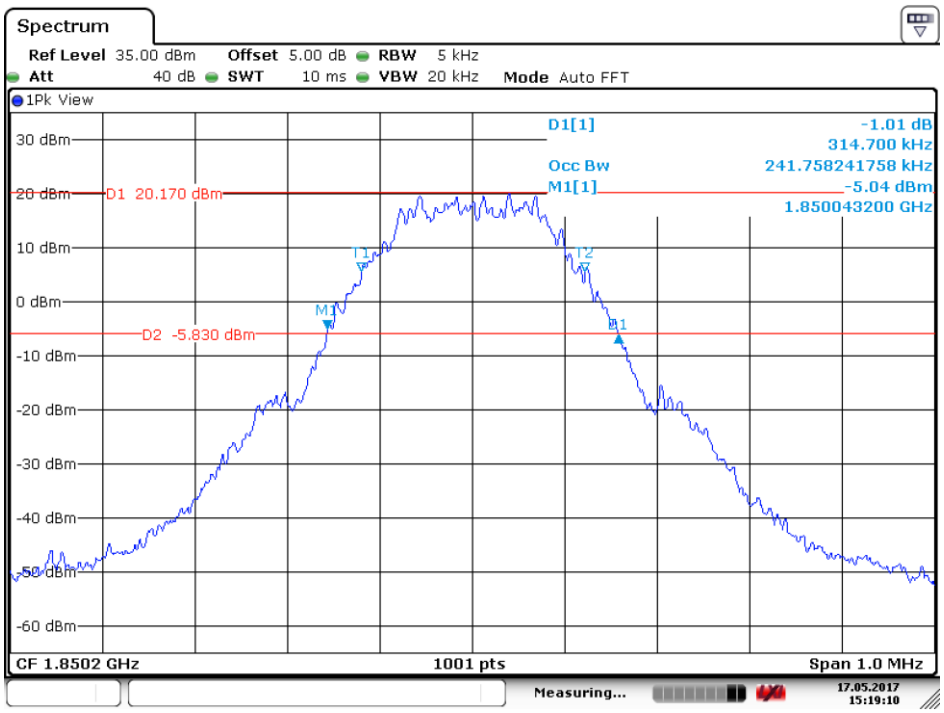
4.1.2.1.3 Test Channel = HCH



Date: 17.MAY.2017 14:45:16

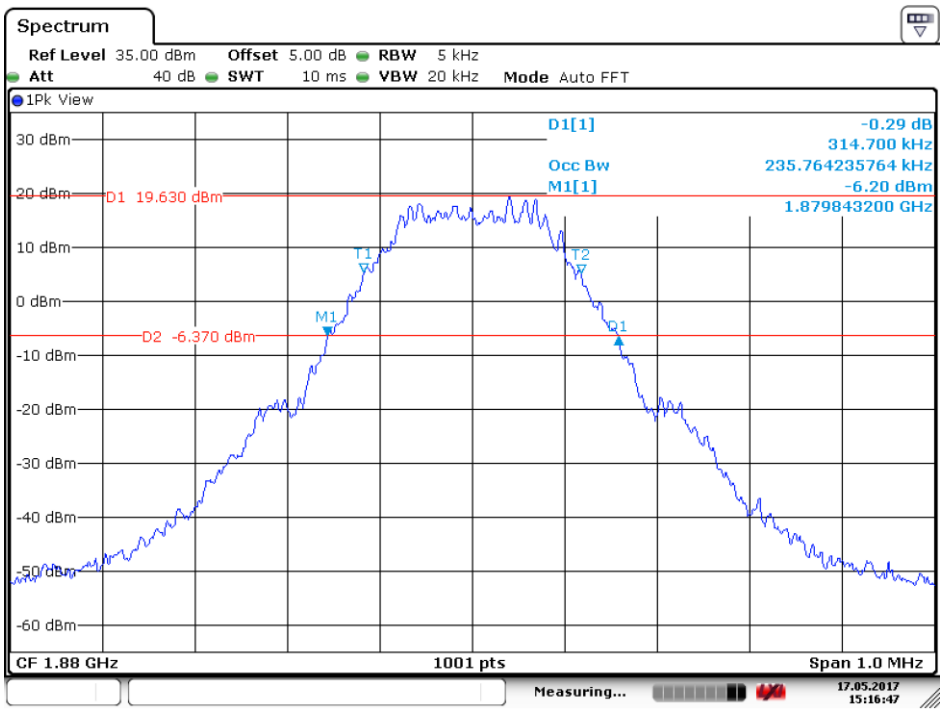
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



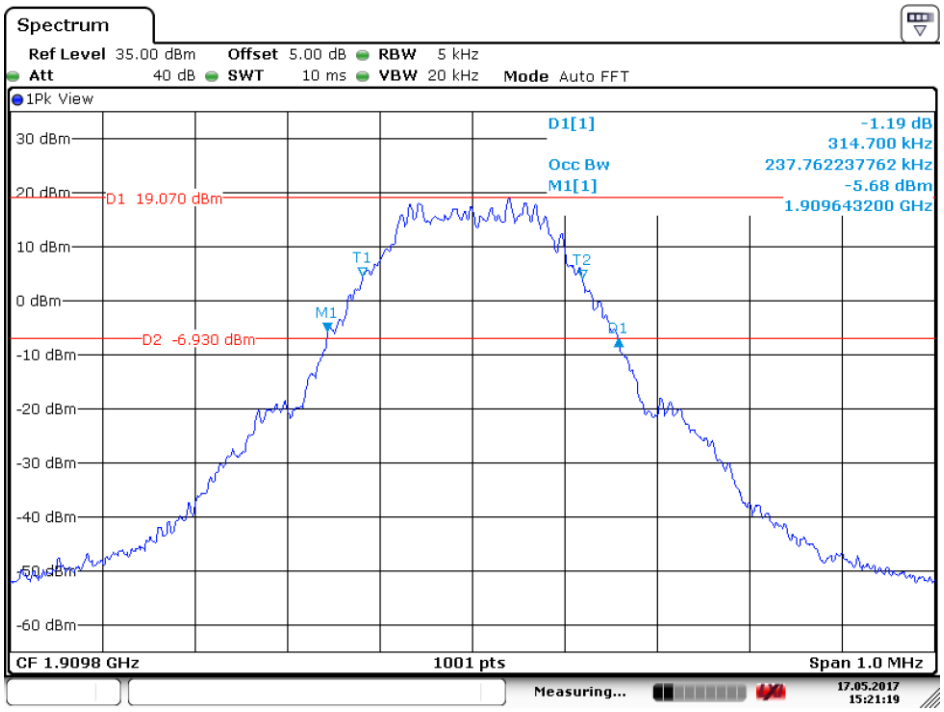
Date: 17.MAY.2017 15:19:11

4.1.2.2.2 Test Channel = MCH



Date: 17.MAY.2017 15:16:47

4.1.2.2.3 Test Channel = HCH



Date: 17.MAY.2017 15:21:20

5 Band Edges Compliance

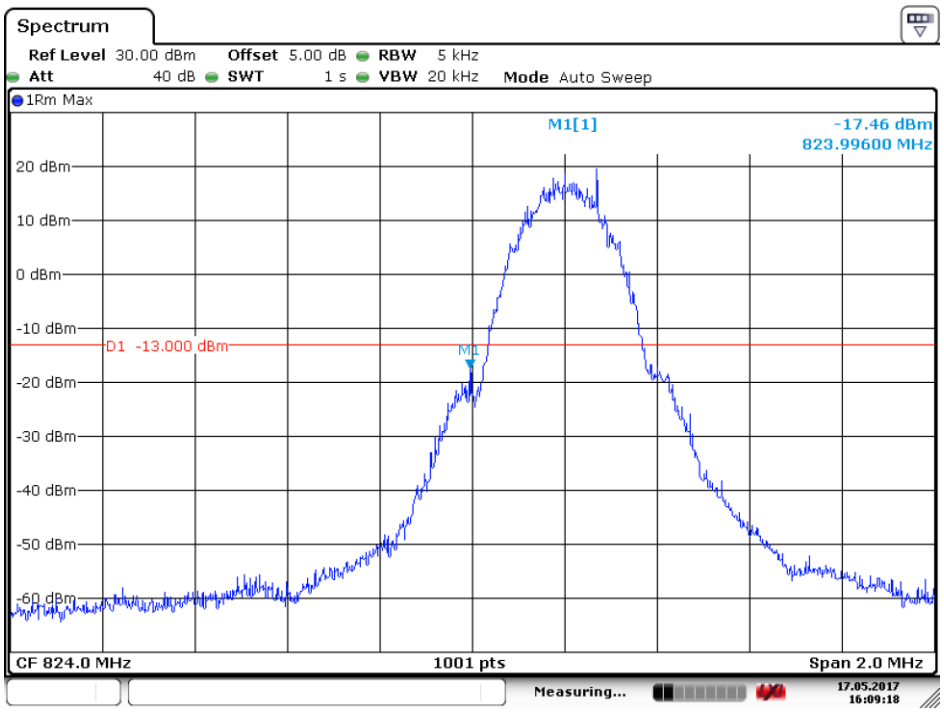
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM 850

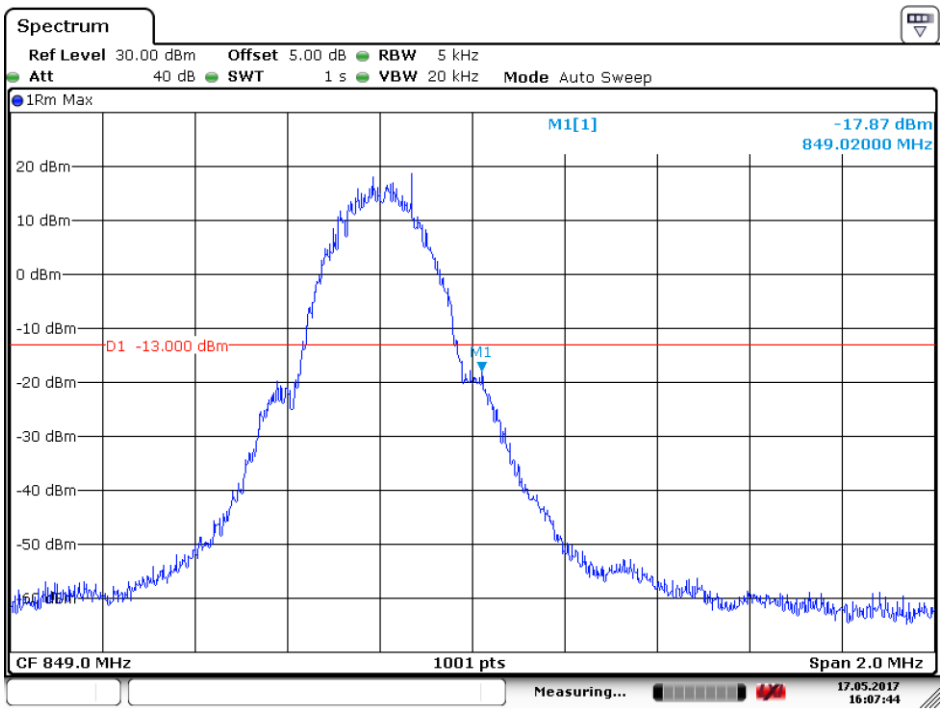
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



Date: 17.MAY.2017 16:09:17

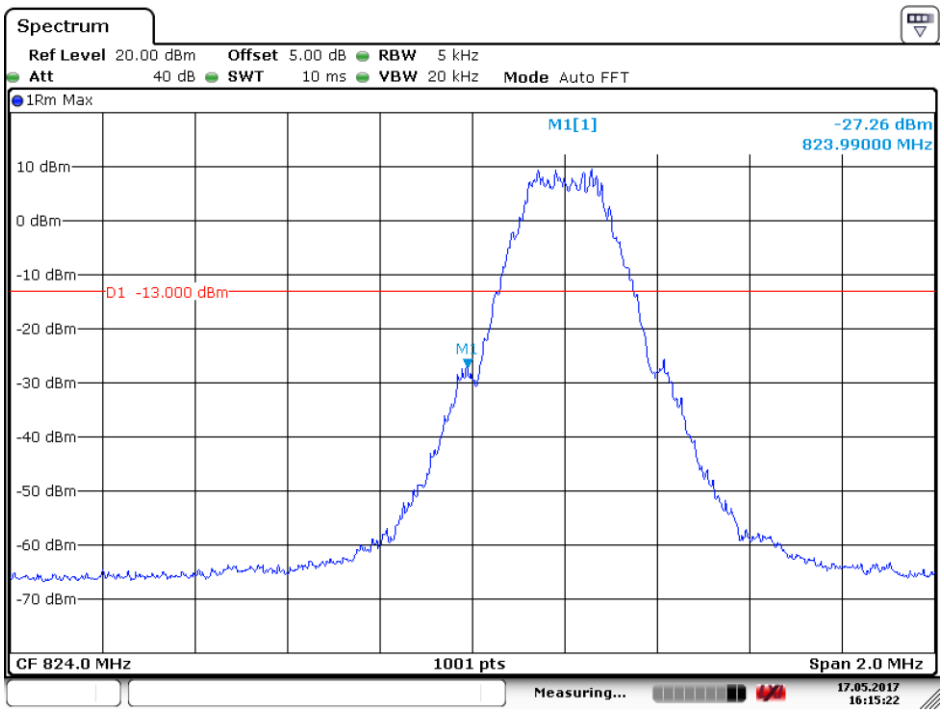
5.1.1.1.2 Test Channel = HCH



Date: 17.MAY.2017 16:07:45

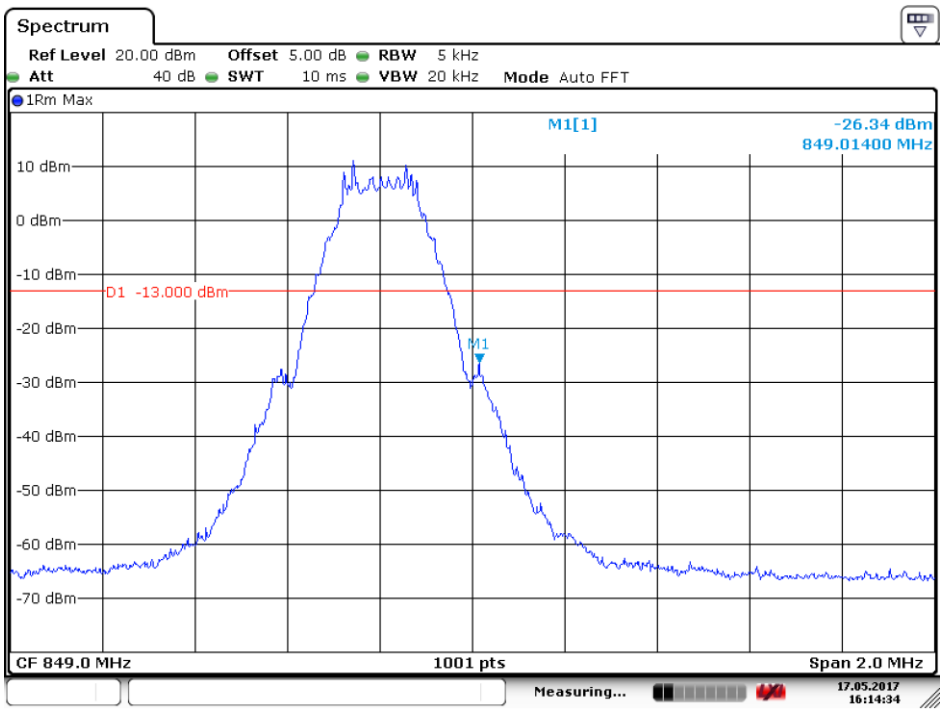
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



Date: 17.MAY.2017 16:15:22

5.1.1.2.2 Test Channel = HCH

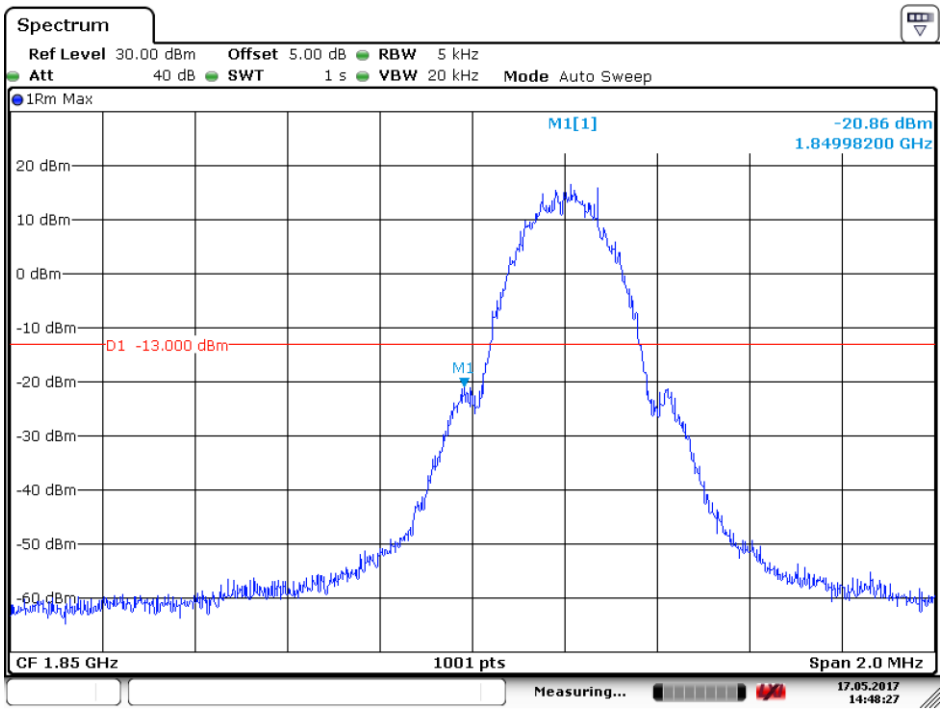


Date: 17.MAY.2017 16:14:34

5.1.2 Test Band = GSM 1900

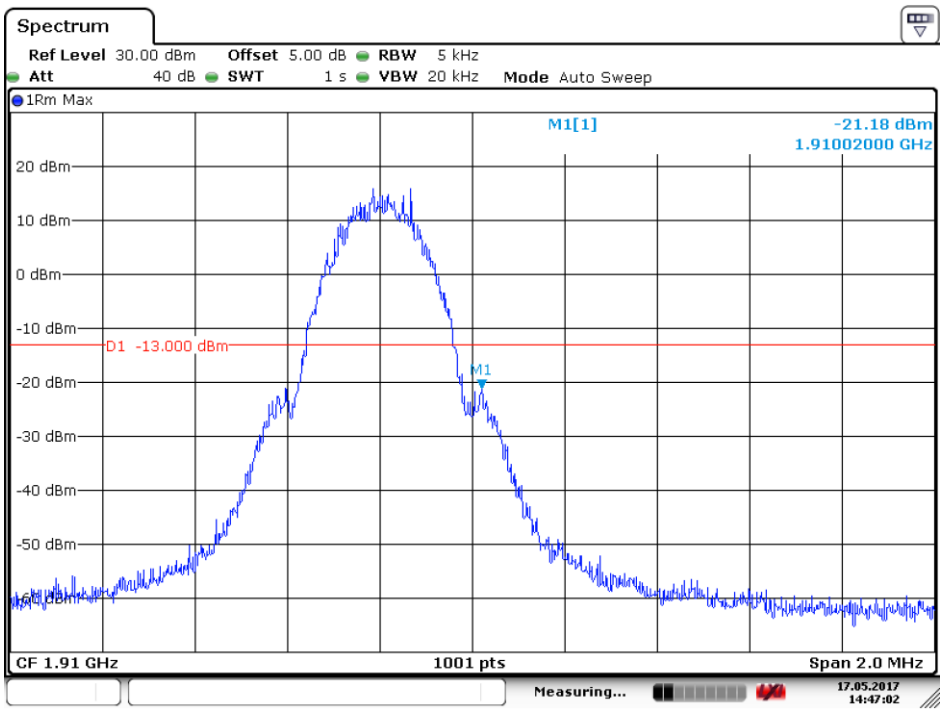
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



Date: 17.MAY.2017 14:48:26

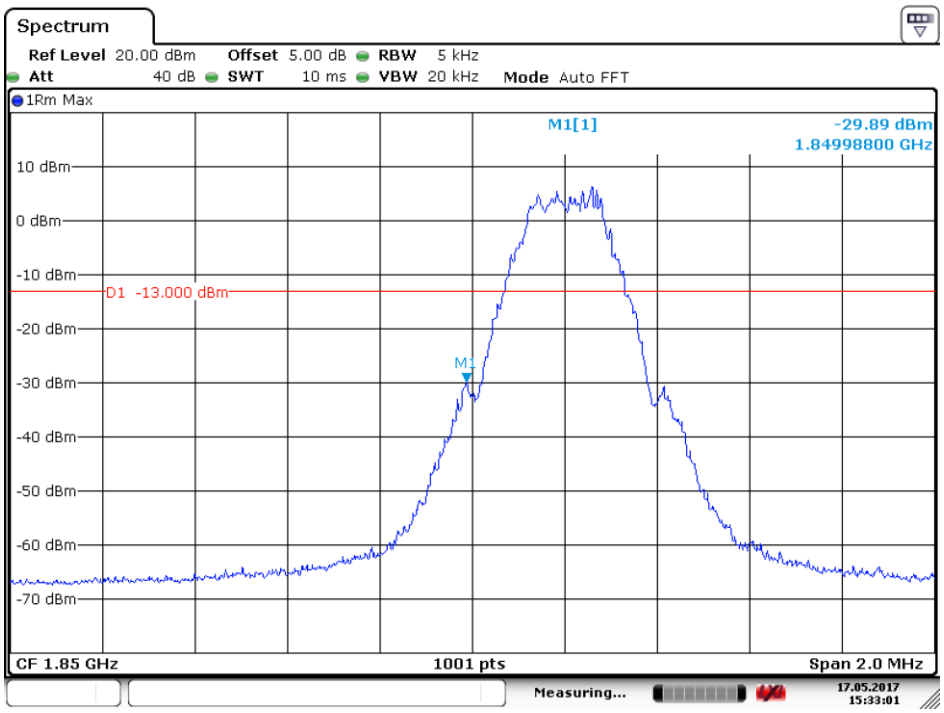
5.1.2.1.2 Test Channel = HCH



Date: 17.MAY.2017 14:47:02

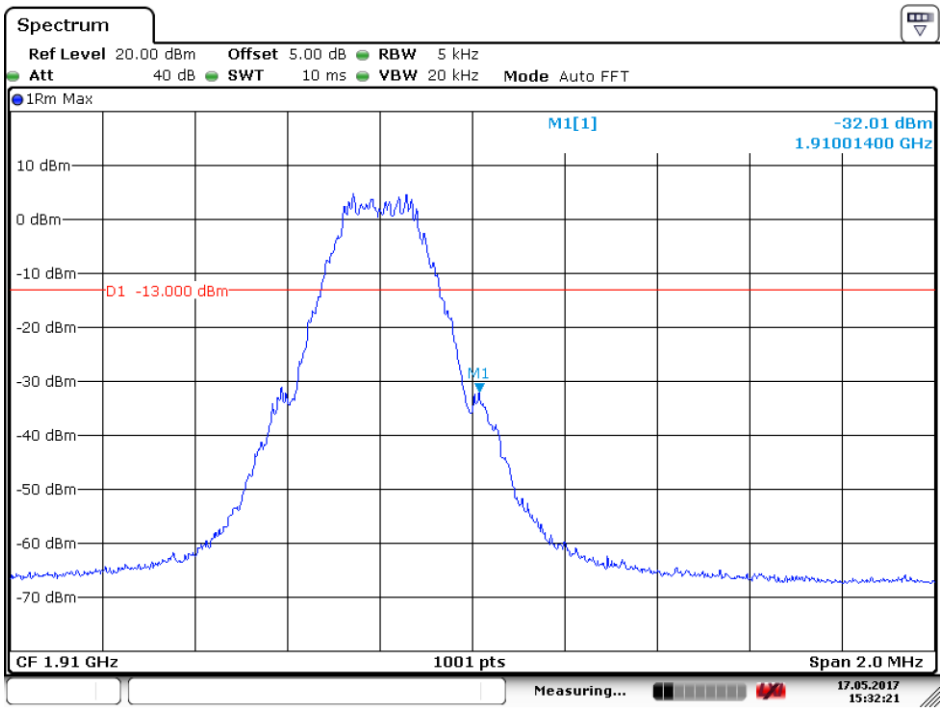
5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



Date: 17.MAY.2017 15:33:02

5.1.2.2.2 Test Channel = HCH



Date: 17.MAY.2017 15:32:21

6 Spurious Emission at Antenna Terminal

NOTE: 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.

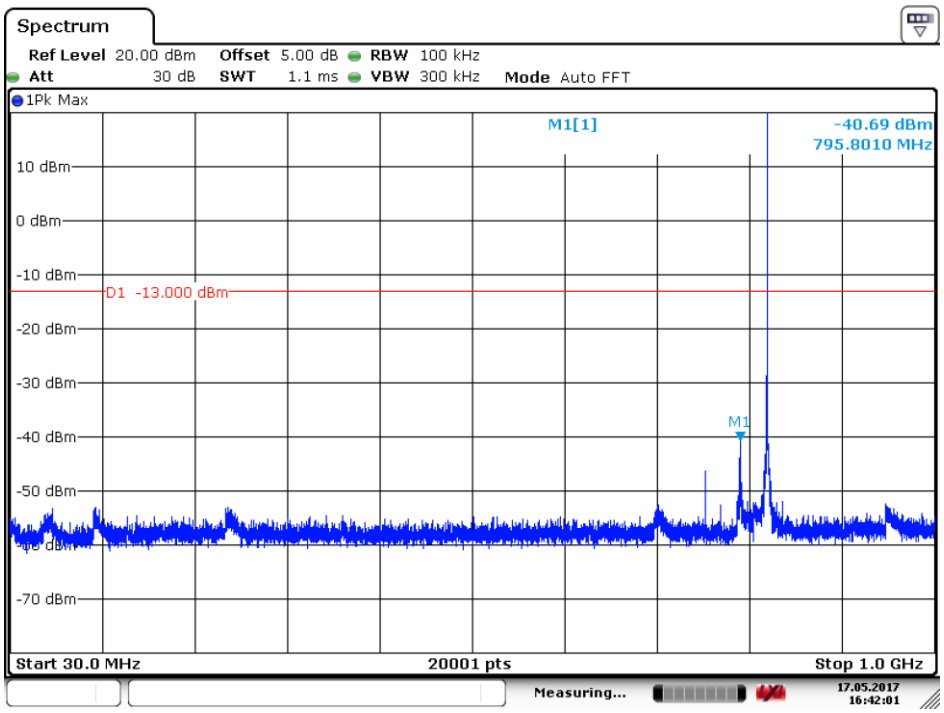
Part I - Test Plots

6.1 For GSM

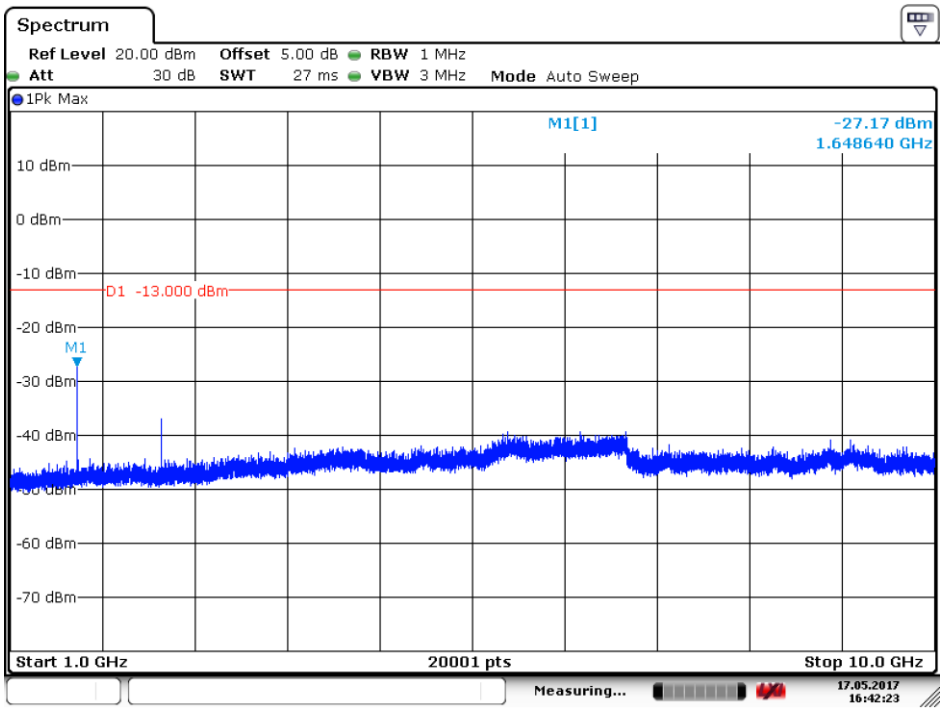
6.1.1 Test Band = GSM 850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

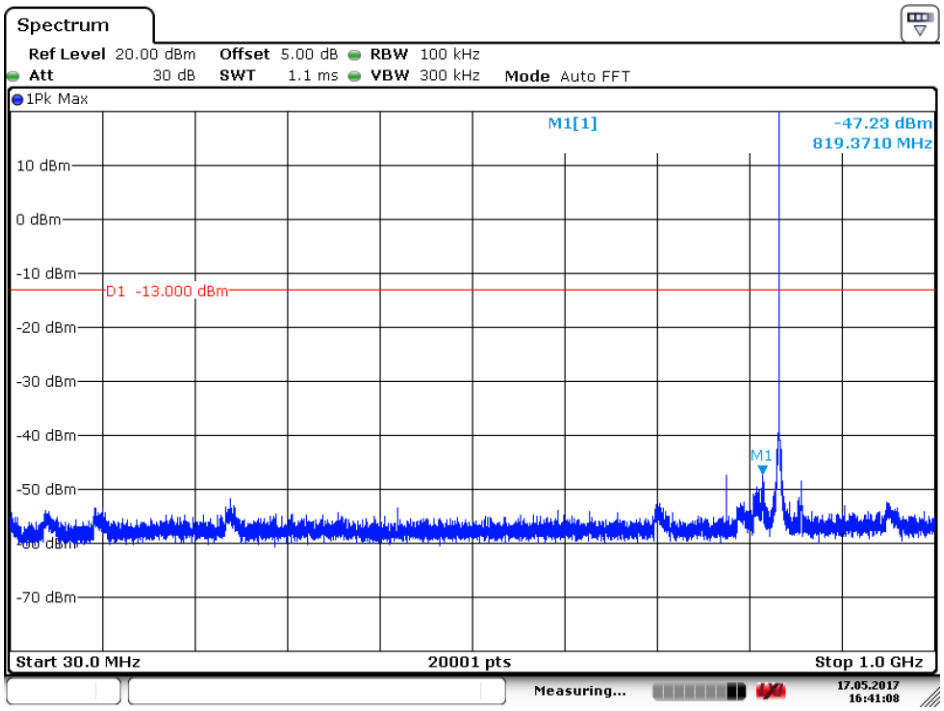


Date: 17.MAY.2017 16:42:01

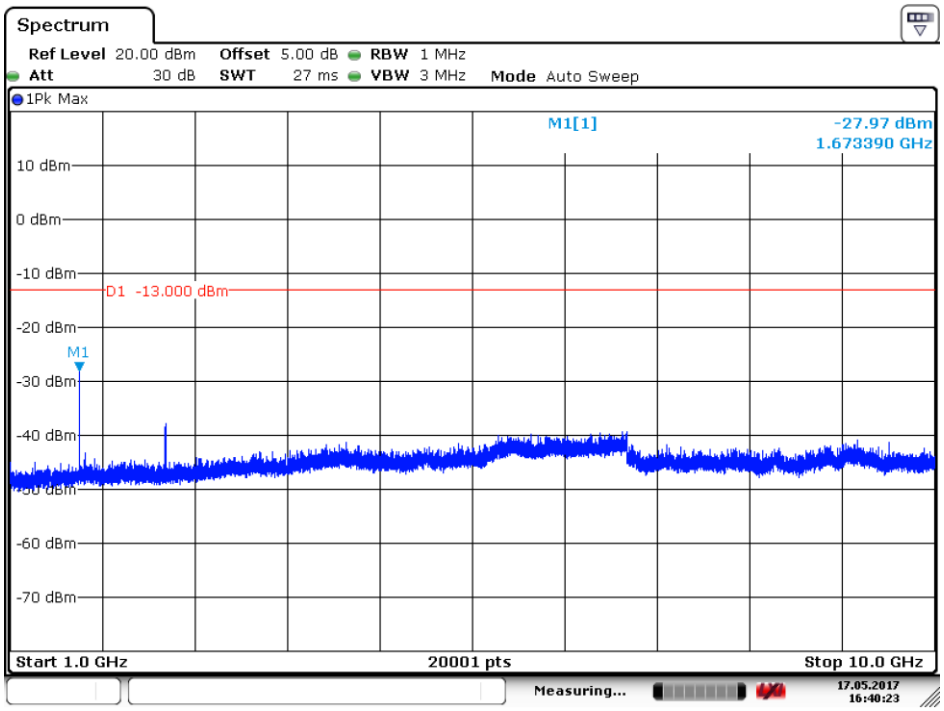


Date: 17.MAY.2017 16:42:23

6.1.1.1.2 Test Channel = MCH

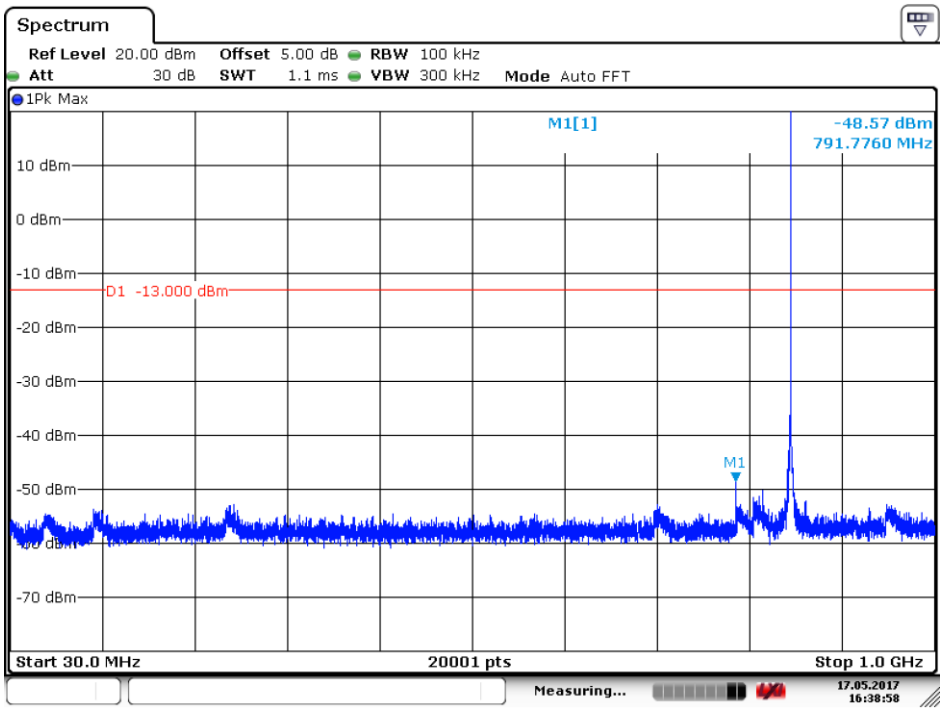


Date: 17.MAY.2017 16:41:08

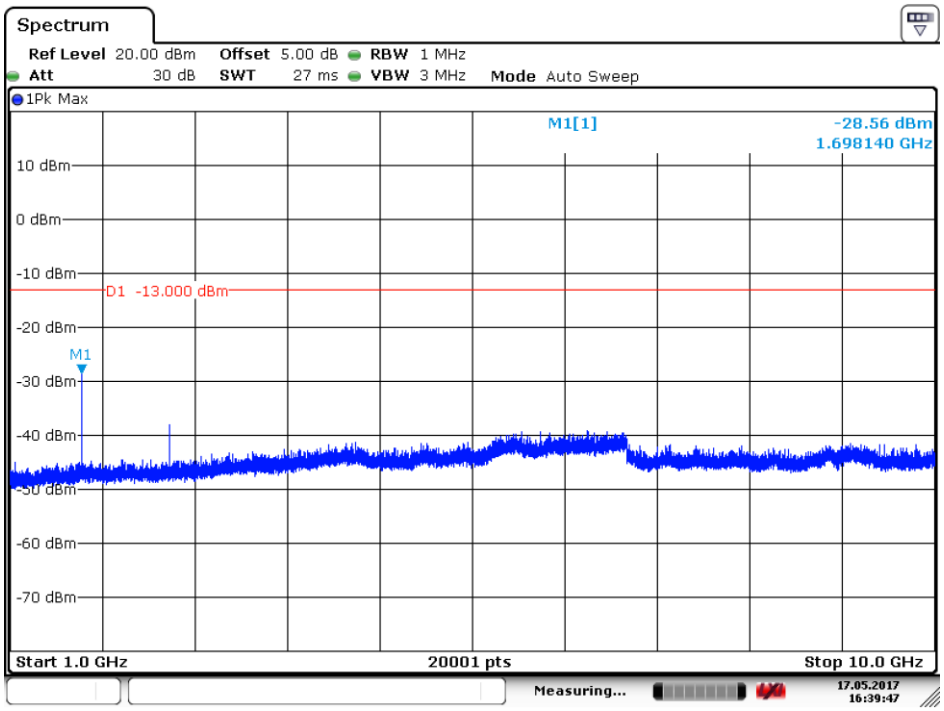


Date: 17.MAY.2017 16:40:24

6.1.1.1.3 Test Channel = HCH



Date: 17.MAY.2017 16:38:58

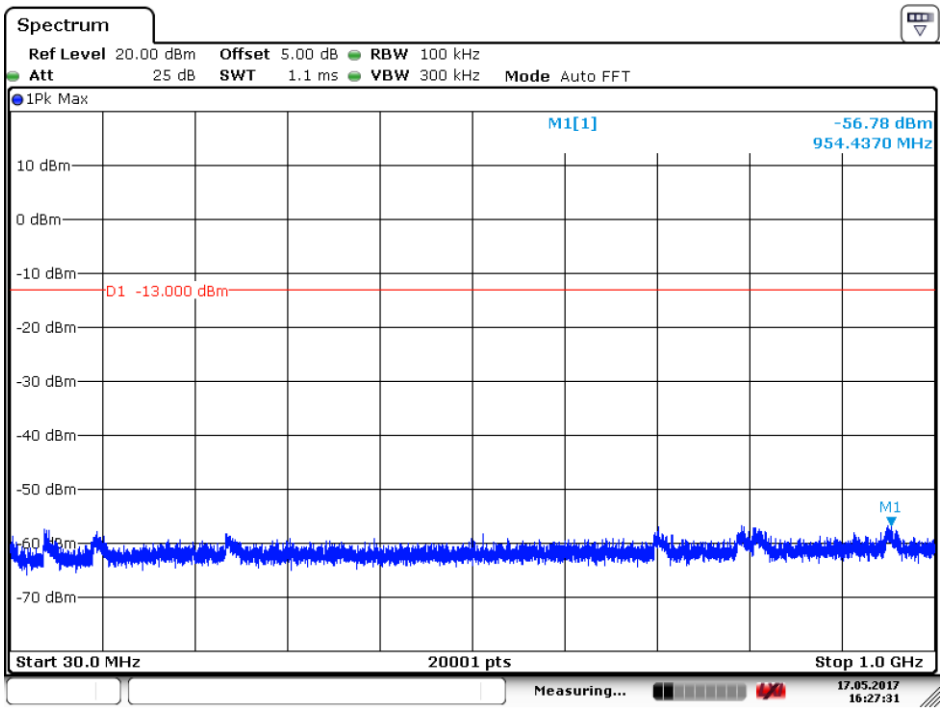


Date: 17.MAY.2017 16:39:47

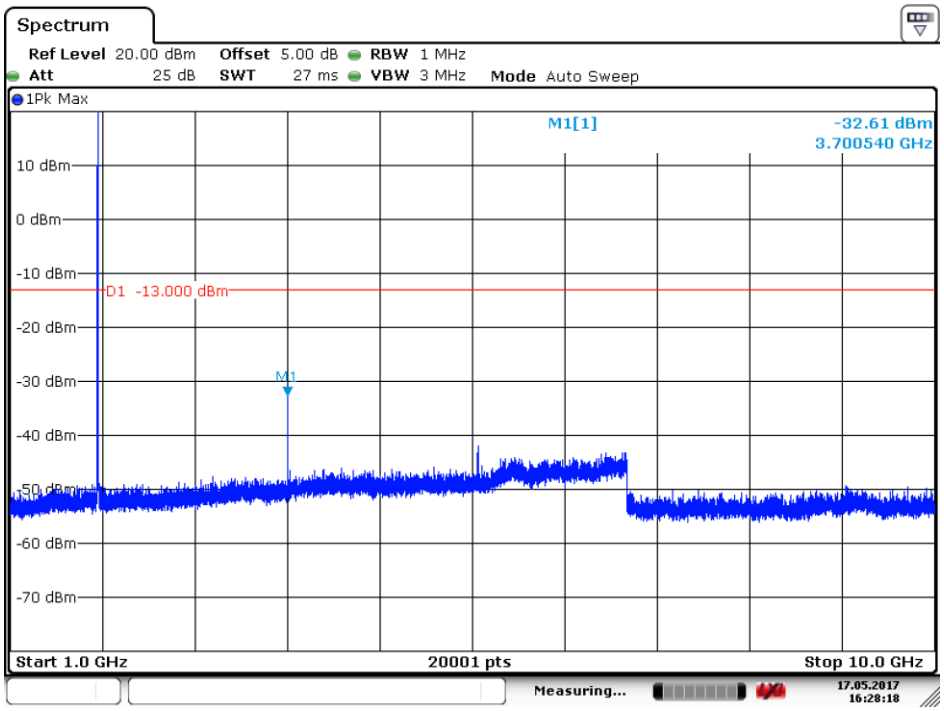
6.1.2 Test Band = GSM 1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH



Date: 17.MAY.2017 16:27:31



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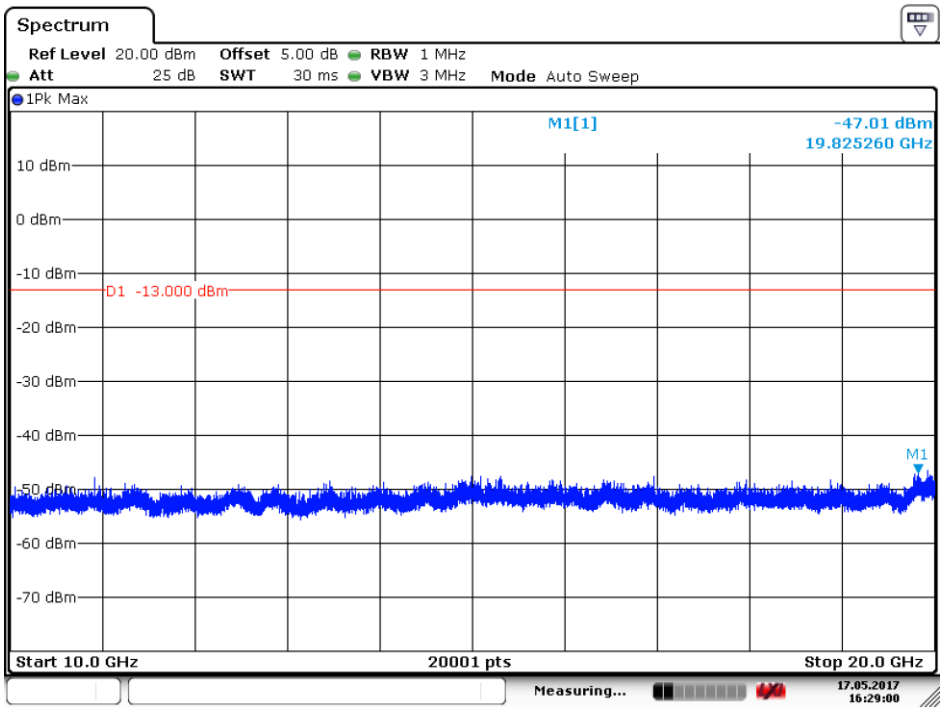
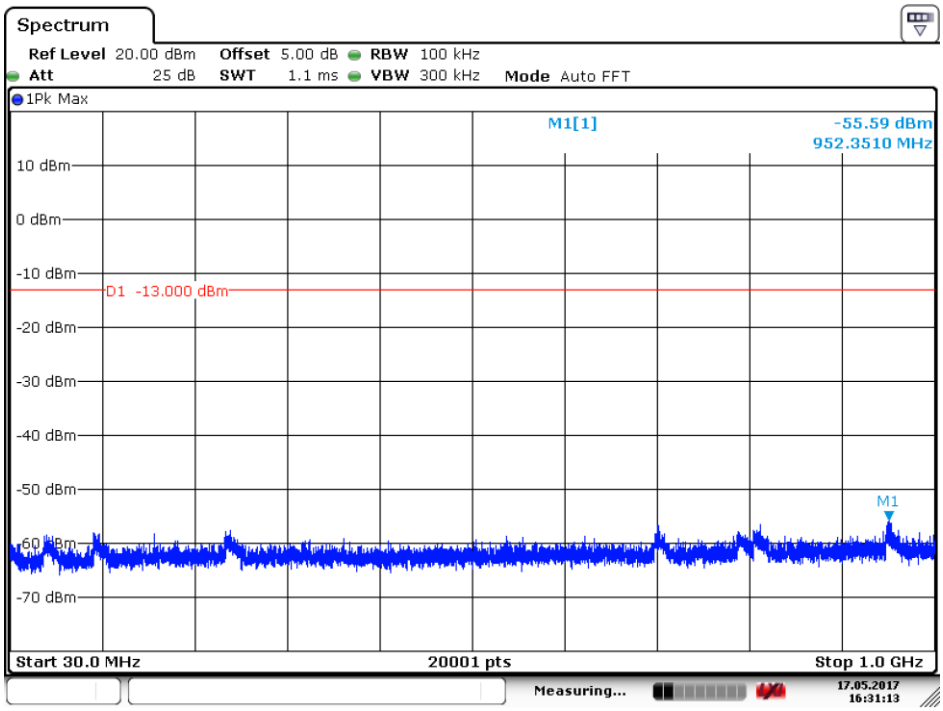
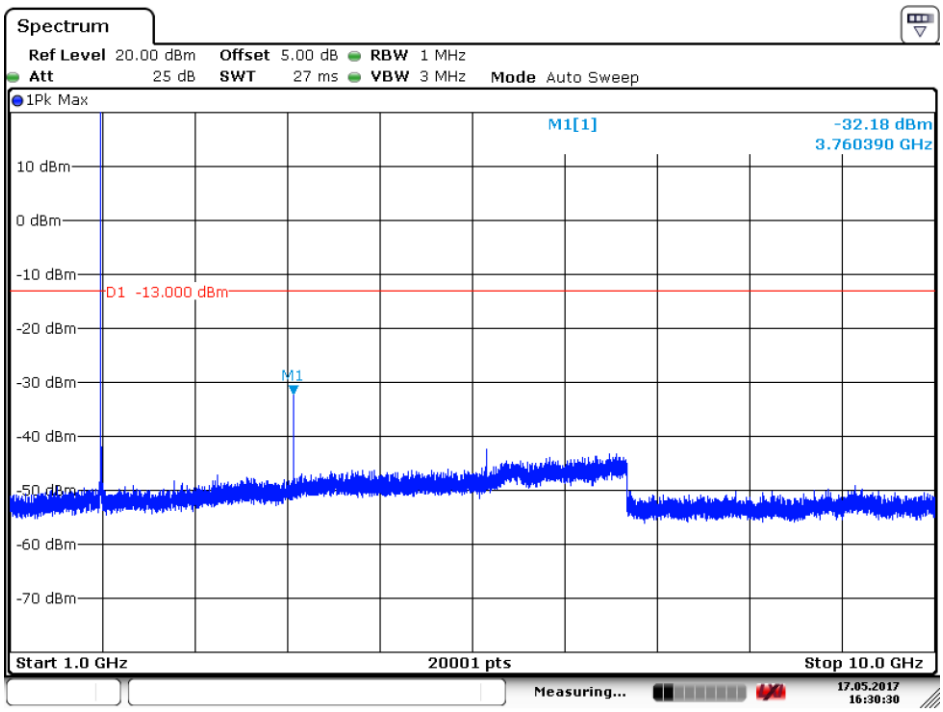


Date: 17.MAY.2017 16:29:00

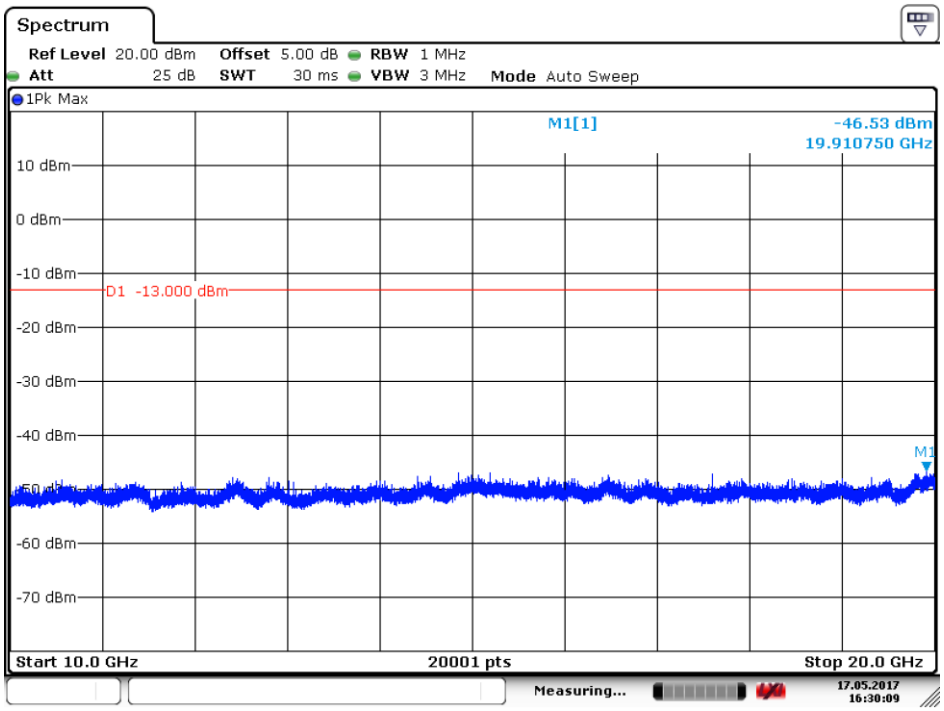
6.1.2.1.2 Test Channel = MCH



Date: 17.MAY.2017 16:31:13

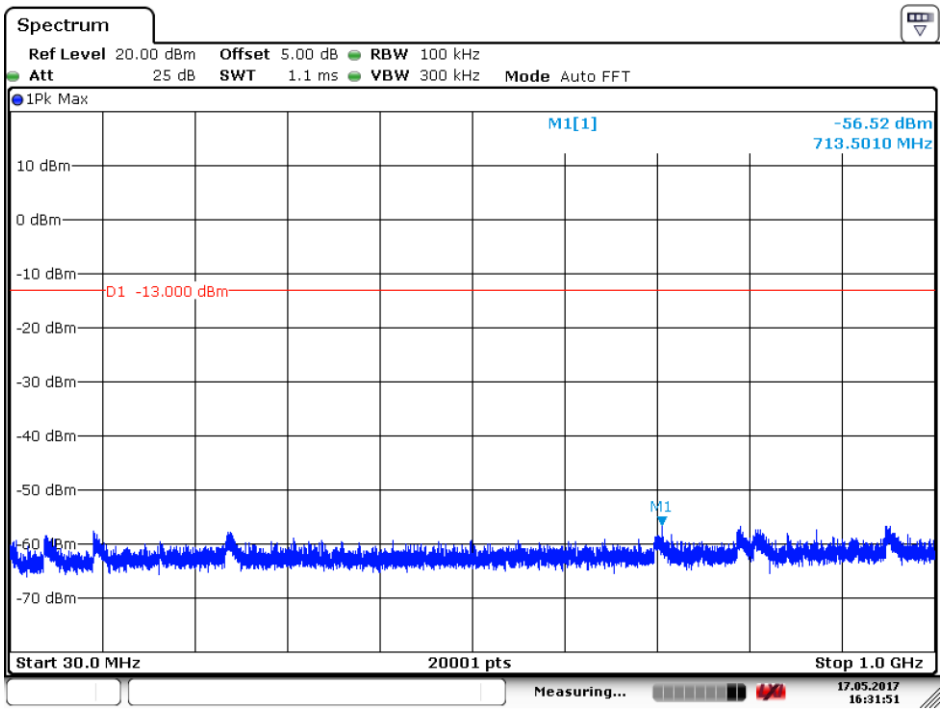


Date: 17.MAY.2017 16:30:30

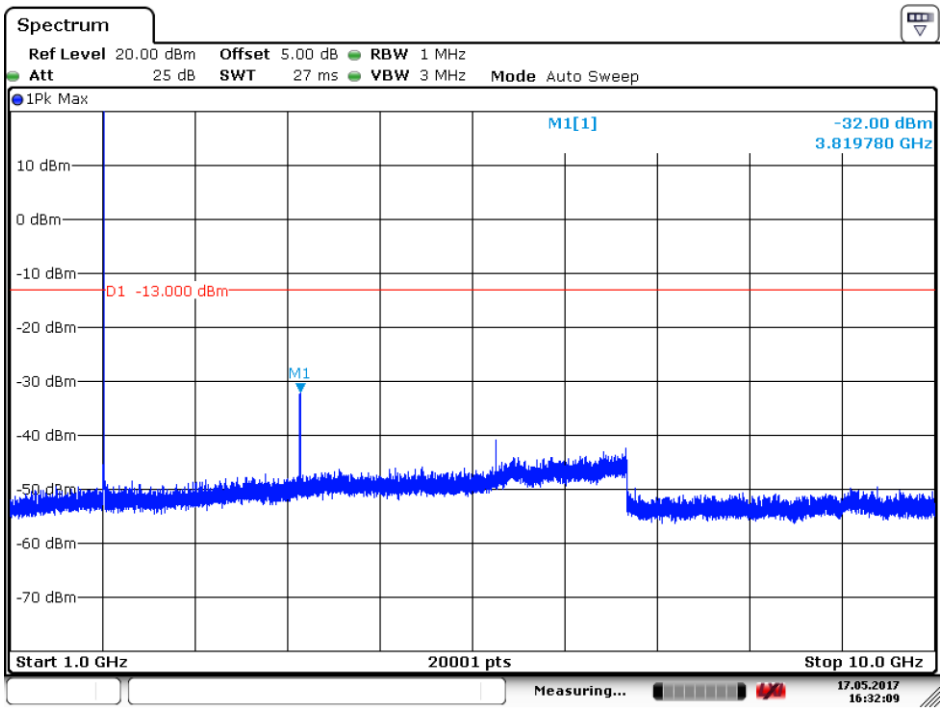


Date: 17.MAY.2017 16:30:09

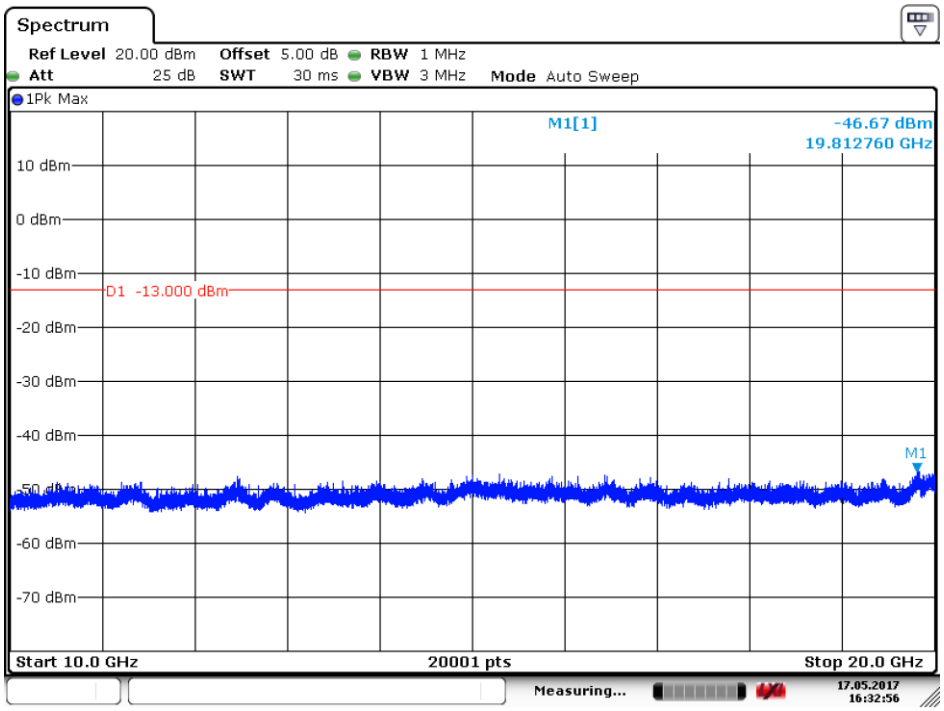
6.1.2.1.3 Test Channel = HCH



Date: 17.MAY.2017 16:31:52



Date: 17.MAY.2017 16:32:10



Date: 17.MAY.2017 16:32:57

7 Field Strength of Spurious Radiation

7.1 For GSM

7.1.1 Test Band = GSM 850

7.1.1.1.1 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
72.550000	-59.04	-13.00	46.04	Vertical
126.850000	-63.03	-13.00	50.03	Vertical
541.160000	-52.41	-13.00	39.41	Vertical
1698.000000	-40.85	-13.00	27.85	Vertical
2406.750000	-39.36	-13.00	26.36	Vertical
6053.500000	-48.66	-13.00	35.66	Vertical
65.700000	-63.86	-13.00	50.86	Horizontal
171.100000	-64.16	-13.00	51.16	Horizontal
638.915000	-56.51	-13.00	43.51	Horizontal
1696.875000	-39.54	-13.00	26.54	Horizontal
4803.375000	-49.99	-13.00	36.99	Horizontal
7187.000000	-47.77	-13.00	34.77	Horizontal

7.1.2 Test Band = GSM 1900

7.1.2.1.1 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
72.550000	-58.05	-13.00	45.05	Vertical
130.700000	-57.88	-13.00	44.88	Vertical
774.166667	-45.15	-13.00	32.15	Vertical
2714.860000	-41.77	-13.00	28.77	Vertical
3759.750000	-45.65	-13.00	32.65	Vertical
5640.000000	-42.70	-13.00	29.70	Vertical
72.300000	-62.35	-13.00	49.35	Horizontal
166.200000	-59.87	-13.00	46.87	Horizontal
799.166667	-46.81	-13.00	33.81	Horizontal
3759.750000	-41.54	-13.00	28.54	Horizontal
5639.250000	-45.75	-13.00	32.75	Horizontal
7851.000000	-47.14	-13.00	34.14	Horizontal

NOTE:

1) All modes are tested,but the data presented above is the worst case.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.

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
GSM 850	GSM/TM1	LCH	TN	VL	4.60	0.00558	PASS
				VN	1.41	0.00171	PASS
				VH	-3.38	-0.00410	PASS
		MCH	TN	VL	-2.73	-0.00326	PASS
				VN	-1.62	-0.00194	PASS
				VH	-4.45	-0.00532	PASS
		HCH	TN	VL	3.30	0.00389	PASS
				VN	-1.92	-0.00226	PASS
				VH	-2.98	-0.00351	PASS
	GSM/TM2	LCH	TN	VL	-3.27	-0.00397	PASS
				VN	1.55	0.00188	PASS
				VH	-2.15	-0.00261	PASS
		MCH	TN	VL	3.42	0.00409	PASS
				VN	2.54	0.00304	PASS
				VH	-4.30	-0.00514	PASS
		HCH	TN	VL	0.46	0.00054	PASS
				VN	-3.32	-0.00391	PASS
				VH	2.73	0.00322	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 1900	GSM/TM1	LCH	TN	VL	-4.32	-0.00233	PASS
				VN	2.14	0.00116	PASS
				VH	3.45	0.00186	PASS
		MCH	TN	VL	1.39	0.00074	PASS
				VN	-2.50	-0.00133	PASS
				VH	5.33	0.00284	PASS
		HCH	TN	VL	-2.58	-0.00135	PASS
				VN	2.47	0.00129	PASS
				VH	-4.43	-0.00232	PASS
	GSM/TM2	LCH	TN	VL	1.20	0.00065	PASS
				VN	-3.36	-0.00182	PASS
				VH	2.90	0.00157	PASS
		MCH	TN	VL	-4.23	-0.00225	PASS
				VN	1.67	0.00089	PASS
				VH	0.74	0.00039	PASS
		HCH	TN	VL	-2.43	-0.00127	PASS
				VN	3.50	0.00183	PASS
				VH	-4.76	-0.00249	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
GSM 850	GSM/TM1	LCH	VN	-30	-4.72	-0.00573	PASS
				-20	3.80	0.00461	PASS
				-10	1.02	0.00124	PASS
				0	-2.65	-0.00322	PASS
				10	0.49	0.00059	PASS
				20	-4.33	-0.00525	PASS
				30	5.79	0.00702	PASS
				40	-2.05	-0.00249	PASS
				50	-6.23	-0.00756	PASS
		MCH	VN	-30	-2.28	-0.00273	PASS
				-20	-5.03	-0.00601	PASS
				-10	-2.40	-0.00287	PASS
				0	-3.53	-0.00422	PASS
				10	1.32	0.00158	PASS
				20	2.70	0.00323	PASS
				30	1.88	0.00225	PASS
				40	3.67	0.00439	PASS
				50	-4.32	-0.00516	PASS
		HCH	VN	-30	-1.54	-0.00181	PASS
				-20	3.77	0.00444	PASS
				-10	4.19	0.00494	PASS
				0	-5.54	-0.00653	PASS
				10	1.57	0.00185	PASS
				20	-2.84	-0.00335	PASS
				30	3.78	0.00445	PASS
				40	-2.66	-0.00313	PASS
				50	-4.50	-0.00530	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 850	GSM/TM2	LCH	VN	-30	-4.62	-0.00561	PASS
				-20	2.25	0.00273	PASS
				-10	-5.10	-0.00619	PASS
				0	1.32	0.00160	PASS
				10	-5.34	-0.00648	PASS
				20	-4.50	-0.00546	PASS
				30	-4.22	-0.00512	PASS
				40	-6.63	-0.00804	PASS
				50	-2.55	-0.00309	PASS
		MCH	VN	-30	-2.91	-0.00348	PASS
				-20	3.27	0.00391	PASS
				-10	-4.23	-0.00506	PASS
				0	1.95	0.00233	PASS
				10	-5.11	-0.00611	PASS
				20	-3.57	-0.00427	PASS
				30	-1.09	-0.00130	PASS
				40	-3.12	-0.00373	PASS
				50	-5.29	-0.00632	PASS
		HCH	VN	-30	-3.65	-0.00430	PASS
				-20	-5.75	-0.00677	PASS
				-10	-2.66	-0.00313	PASS
				0	-5.32	-0.00627	PASS
				10	1.15	0.00135	PASS
				20	-4.32	-0.00509	PASS
				30	-3.47	-0.00409	PASS
				40	-2.83	-0.00333	PASS
				50	-5.08	-0.00598	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 1900	GSM/TM1	LCH	VN	-30	-5.42	-0.00293	PASS
				-20	-4.82	-0.00261	PASS
				-10	2.40	0.00130	PASS
				0	-3.55	-0.00192	PASS
				10	-0.59	-0.00032	PASS
				20	1.35	0.00073	PASS
				30	-3.90	-0.00211	PASS
				40	-5.21	-0.00282	PASS
				50	-3.44	-0.00186	PASS
		MCH	VN	-30	-4.93	-0.00262	PASS
				-20	1.29	0.00069	PASS
				-10	-5.42	-0.00288	PASS
				0	4.55	0.00242	PASS
				10	-3.27	-0.00174	PASS
				20	-6.30	-0.00335	PASS
				30	-3.23	-0.00172	PASS
				40	-8.10	-0.00431	PASS
				50	-5.23	-0.00278	PASS
		HCH	VN	-30	-3.99	-0.00209	PASS
				-20	3.64	0.00191	PASS
				-10	1.89	0.00099	PASS
				0	-4.30	-0.00225	PASS
				10	-3.24	-0.00170	PASS
				20	-5.19	-0.00272	PASS
				30	1.35	0.00071	PASS
				40	-3.44	-0.00180	PASS
				50	-2.20	-0.00115	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM 1900	GSM/TM2	LCH	VN	-30	-2.73	-0.00148	PASS
				-20	-4.32	-0.00233	PASS
				-10	1.50	0.00081	PASS
				0	-2.65	-0.00143	PASS
				10	-2.91	-0.00157	PASS
				20	-4.56	-0.00246	PASS
				30	1.50	0.00081	PASS
				40	-3.23	-0.00175	PASS
				50	-6.16	-0.00333	PASS
		MCH	VN	-30	-5.55	-0.00295	PASS
				-20	-2.46	-0.00131	PASS
				-10	-4.23	-0.00225	PASS
				0	1.70	0.00090	PASS
				10	-5.37	-0.00286	PASS
				20	-2.74	-0.00146	PASS
				30	-1.55	-0.00082	PASS
				40	2.57	0.00137	PASS
				50	-5.65	-0.00301	PASS
		HCH	VN	-30	-3.08	-0.00161	PASS
				-20	2.74	0.00143	PASS
				-10	1.34	0.00070	PASS
				0	-5.09	-0.00267	PASS
				10	-6.23	-0.00326	PASS
				20	-3.55	-0.00186	PASS
				30	3.40	0.00178	PASS
				40	-2.24	-0.00117	PASS
				50	-5.79	-0.00303	PASS

The End