

Appendix B

WCDMA Band II&V

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1 Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Part 1 – RF Conducted Power of Transmitter for WCDMA BAND 2

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel 9262(L)		Channel 9400 (M)		Channel 9538(H)	
	1852.4.4MHz	1880.0MHz	1907.6MHz			
Tnom/ Vnom	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)
RCM	23.51	33	23.06	33	23.05	33
HSDPA	22.41	33	22.09	33	22.03	33
HSUPA	22.33	33	22.03	33	22.01	33

Part 2– Effective Isotropic Radiated Power of Transmitter (ERP) for WCDMA BAND 2

Test Mode	Freq. (MHz)	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBi)	Cable Loss (dB)	Substitution Level(EIRP) / dBm	Limit (dBm)	Result
RCM	1850.2	21.65	Horn Ant.	25.13	4.5	1	21.63	33	Pass
RCM	1880.0	21.60	Horn Ant.	25.06	4.5	1	21.56	33	Pass
RCM	1909.8	21.21	Horn Ant.	24.65	4.5	1	21.15	33	Pass
HSDPA	1850.2	20.46	Horn Ant.	23.94	4.5	1	20.44	33	Pass
HSDPA	1880.0	20.09	Horn Ant.	23.56	4.5	1	20.06	33	Pass
HSDPA	1909.8	20.11	Horn Ant.	23.58	4.5	1	20.08	33	Pass
HSUPA	1850.2	20.35	Horn Ant.	23.83	4.5	1	20.33	33	Pass
HSUPA	1880.0	20.05	Horn Ant.	23.54	4.5	1	20.04	33	Pass
HSUPA	1909.8	20.04	Horn Ant.	23.52	4.5	1	20.02	33	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

c: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

Part 3 – RF Conducted Power of Transmitter for WCDMA BAND 5

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel 4132(L)		Channel 4182 (M)		Channel 4233(H)	
	826.4MHz	836.4MHz	836.4MHz	846.6MHz		
T _{nom} / V _{nom}	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)
RCM	24.32	38.5	24.38	38.5	24.02	38.5
HSDPA	23.41	38.5	23.09	38.5	23.03	38.5
HSUPA	23.33	38.5	23.03	38.5	23.01	38.5

Part 4– Effective Radiated Power of Transmitter (ERP) for WCDMA BAND 5

Test Mode	Freq. (MHz)	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBd)	Cable Loss (dB)	Substitution Level(ERP) / dBm	Limit (dBm)	Result
RCM	826.4	22.05	Dipole	27.53	-4.90	0.6	22.03	38.5	Pass
RCM	836.4	21.90	Dipole	27.68	-5.02	0.6	22.06	38.5	Pass
RCM	846.6	21.91	Dipole	27.45	-5.00	0.6	21.85	38.5	Pass
HSDPA	826.4	21.06	Dipole	26.51	-4.90	0.6	21.01	38.5	Pass
HSDPA	836.4	20.99	Dipole	26.58	-5.02	0.6	20.96	38.5	Pass
HSDPA	846.6	20.91	Dipole	26.48	-5.00	0.6	20.88	38.5	Pass
HSUPA	826.4	21.05	Dipole	26.53	-4.90	0.6	21.03	38.5	Pass
HSUPA	836.4	21.03	Dipole	26.59	-5.02	0.6	20.97	38.5	Pass
HSUPA	846.6	20.94	Dipole	26.45	-5.00	0.6	20.85	38.5	Pass

Note:

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

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

b: SGP=Signal Generator Level

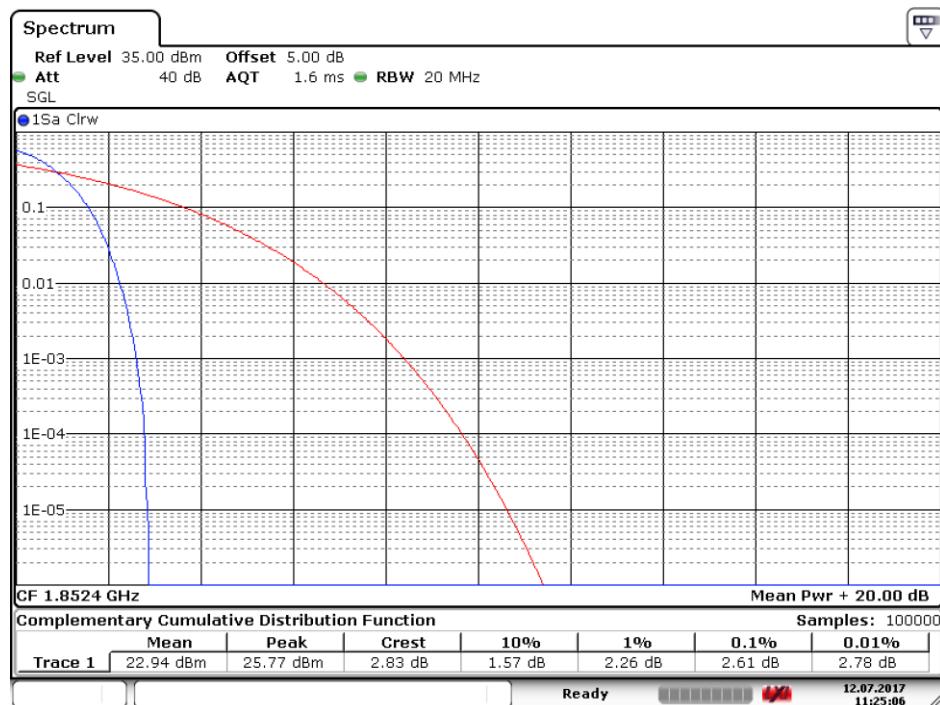
c: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

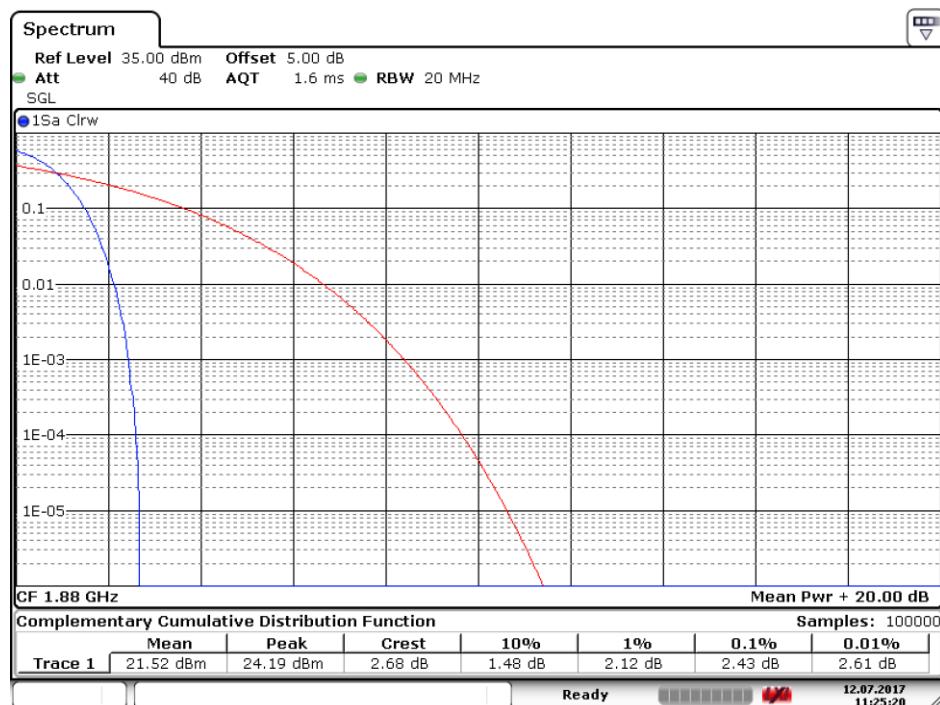
2 Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	2.61	13	PASS
		MCH	2.43	13	PASS
		HCH	2.81	13	PASS
WCDMA850	UMTS/TM1	LCH	3.16	13	PASS
		MCH	3.10	13	PASS
		HCH	3.13	13	PASS

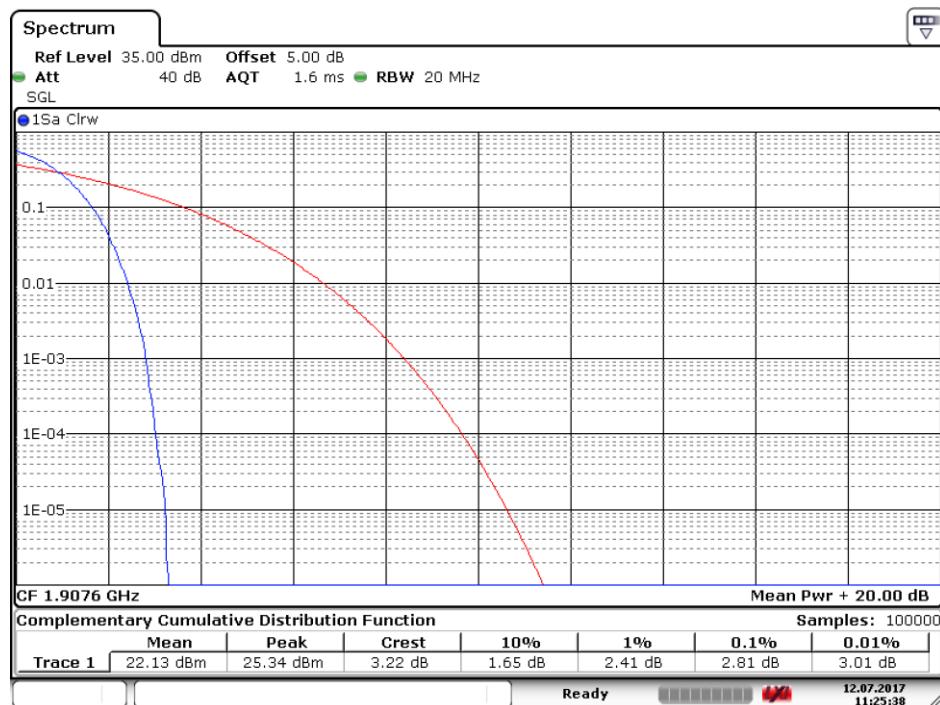
Part II - Test Plots
2.1 For WCDMA
2.1.1 Test Band = WCDMA 1900
2.1.1.1 Test Mode = UMTS/TM1
2.1.1.1.1 Test Channel = LCH


Date: 12.JUL.2017 11:25:06

2.1.1.1.2 Test Channel = MCH


Date: 12.JUL.2017 11:25:21

2.1.1.1.3 Test Channel = HCH

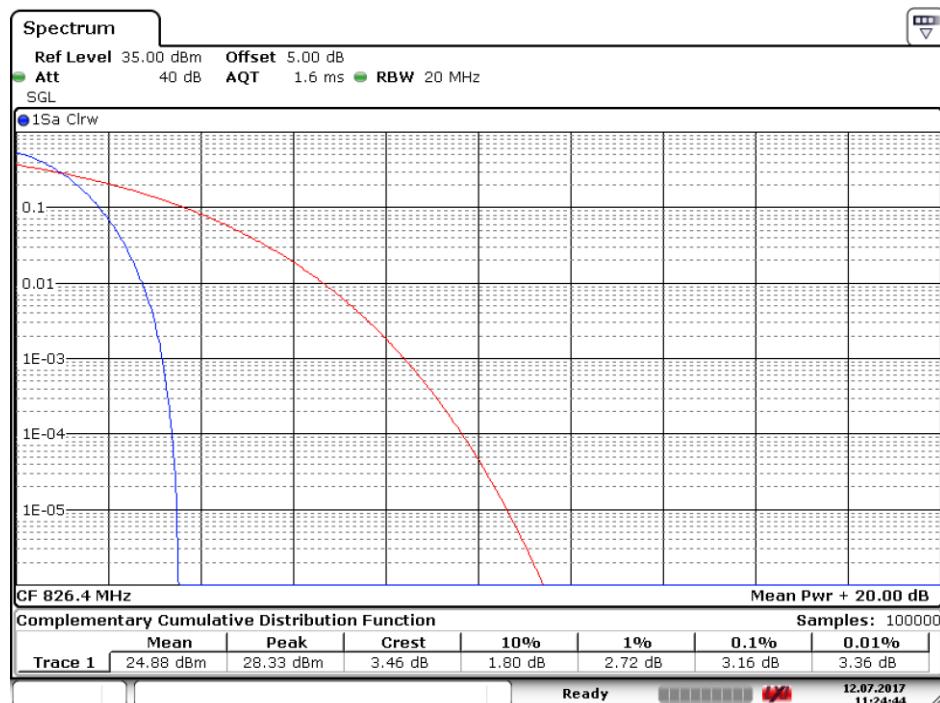


Date: 12.JUL.2017 11:25:38

2.1.2 Test Band = WCDMA 850

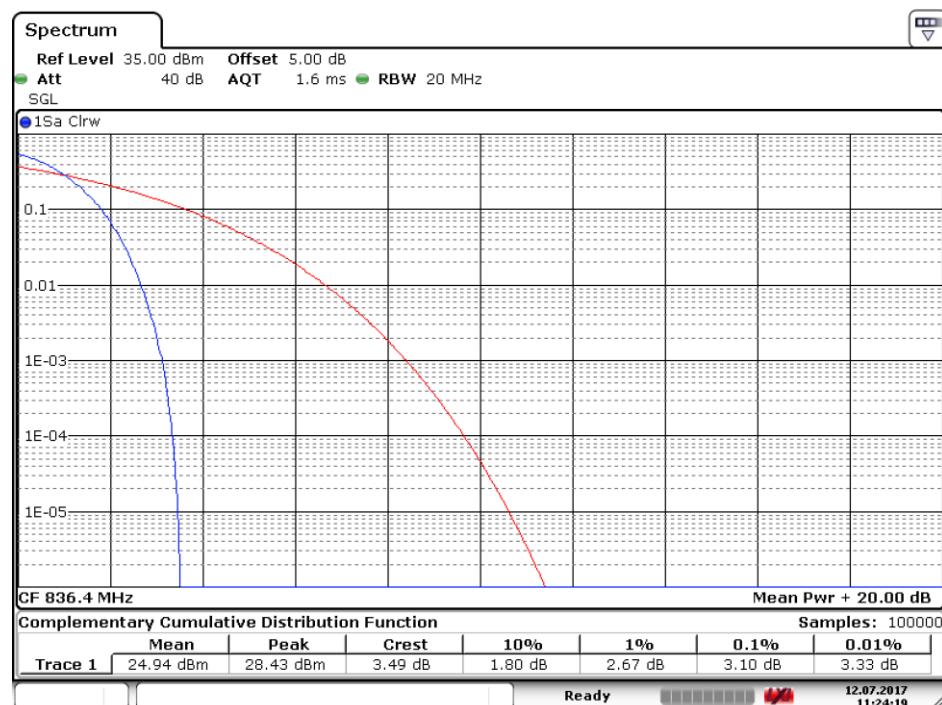
2.1.2.1 Test Mode = UMTS/TM1

2.1.2.1.1 Test Channel = LCH



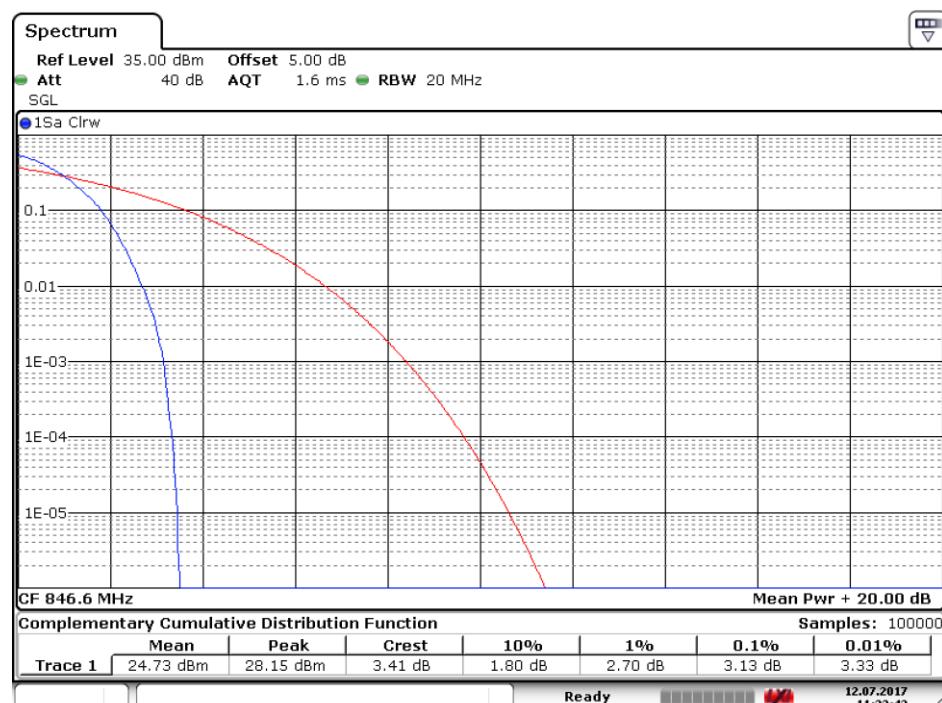
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2.1.2.1.2 Test Channel = MCH



Date: 12.JUL.2017 11:24:19

2.1.2.1.3 Test Channel = HCH



Date: 12.JUL.2017 11:23:43

3 Modulation Characteristics

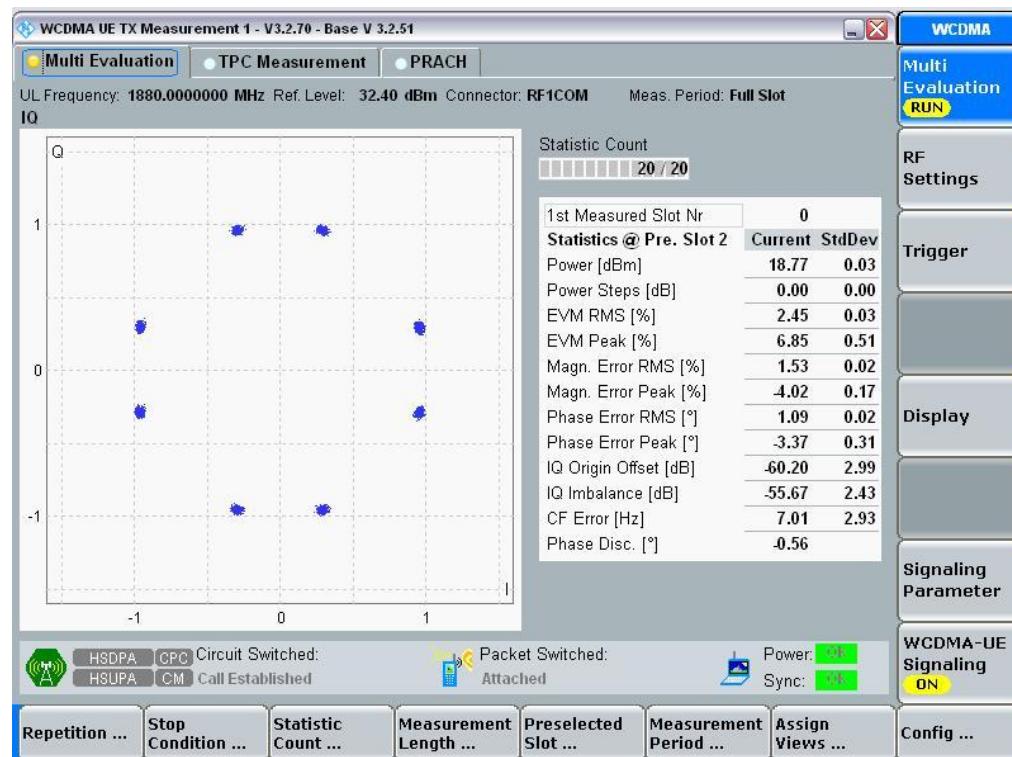
Part I - Test Plots

3.1 For WCDMA

3.1.1 Test Band = WCDMA 1900

3.1.1.1 Test Mode = UMTS/TM1

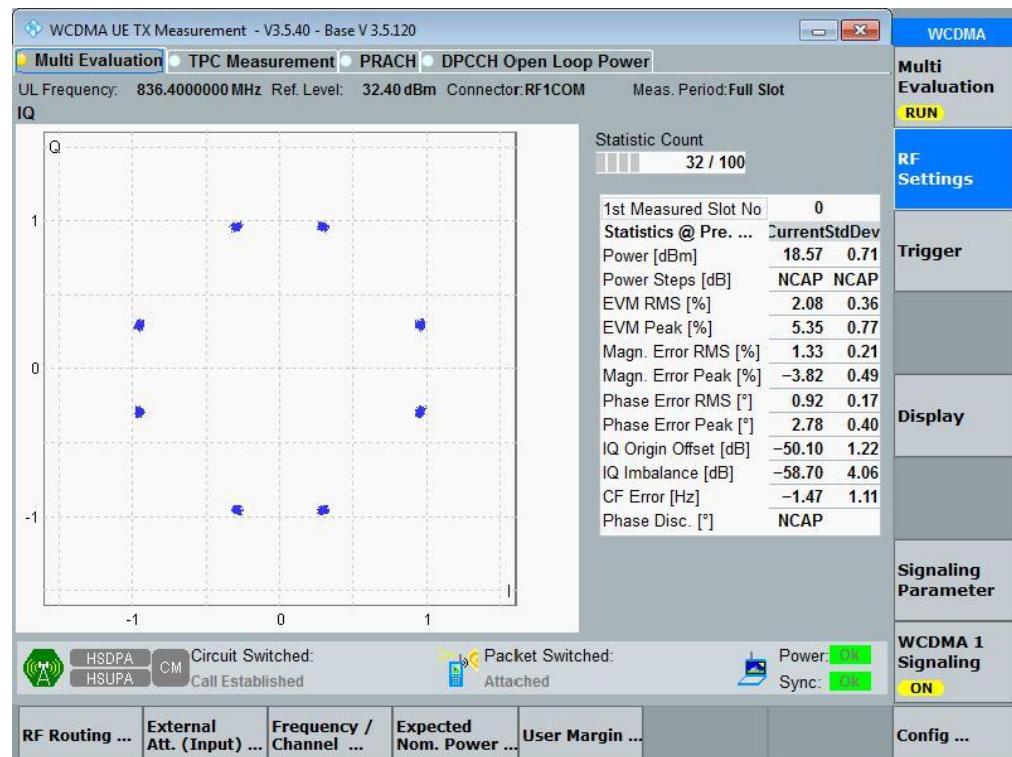
3.1.1.1.1 Test Channel = MCH



3.1.2 Test Band = WCDMA 850

3.1.2.1 Test Mode = UMTS /TM1

3.1.2.1.1 Test Channel = MCH



4 Bandwidth

Part I - Test Results

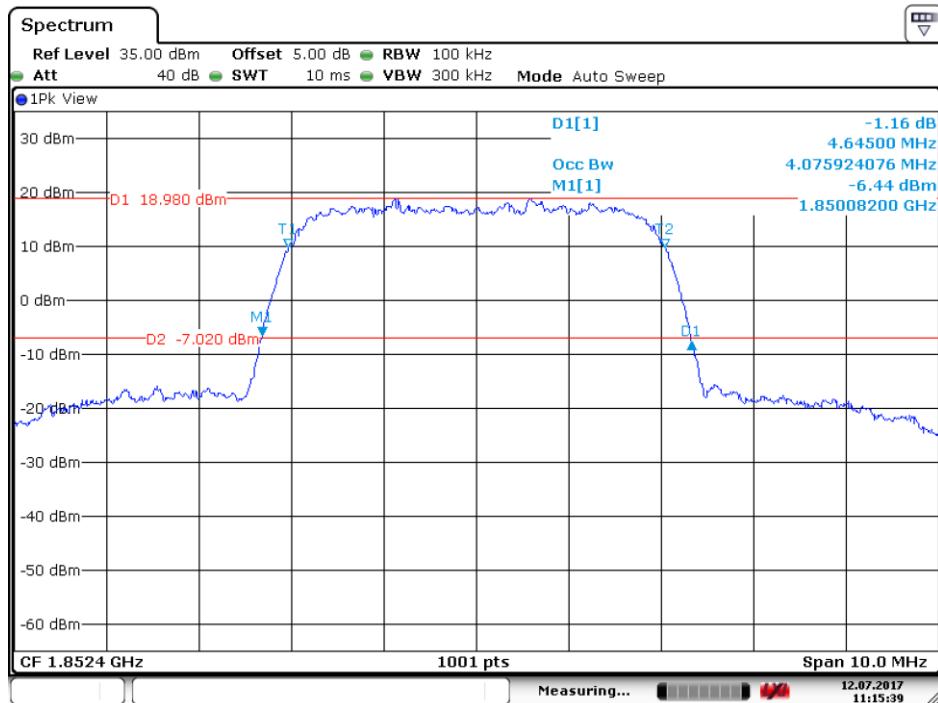
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA1900	UMTS/TM1	LCH	4.08	4.65	PASS
		MCH	4.09	4.66	PASS
		HCH	4.05	4.62	PASS
WCDMA850	UMTS/TM1	LCH	4.05	4.62	PASS
		MCH	4.06	4.58	PASS
		HCH	4.06	4.61	PASS

4.1 For WCDMA

4.1.1 Test Band = WCDMA 1900

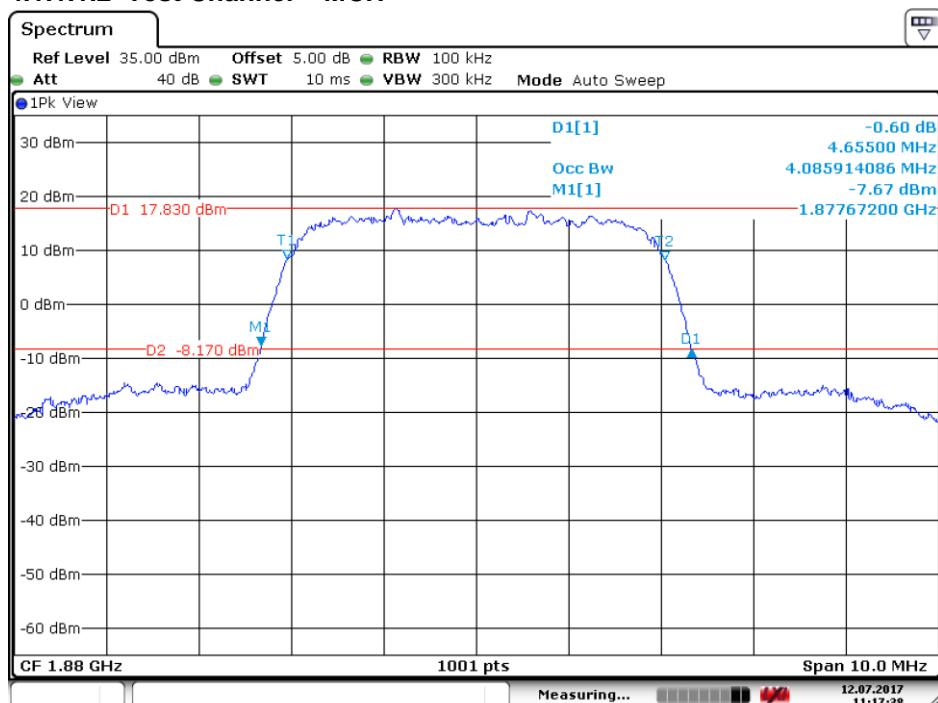
4.1.1.1 Test Mode = UMTS/TM1

4.1.1.1.1 Test Channel = LCH

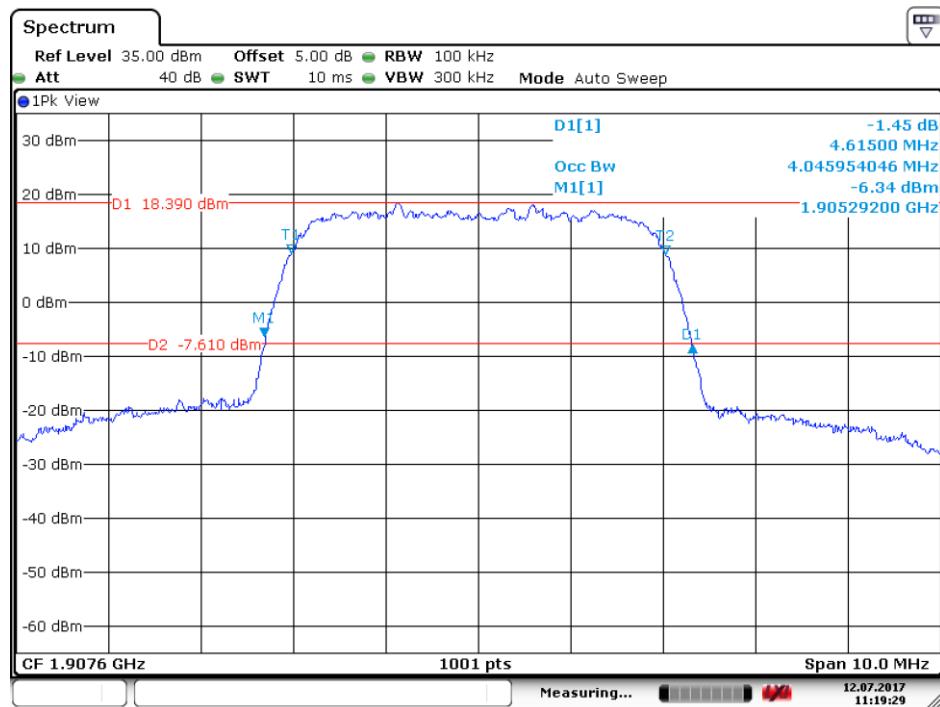


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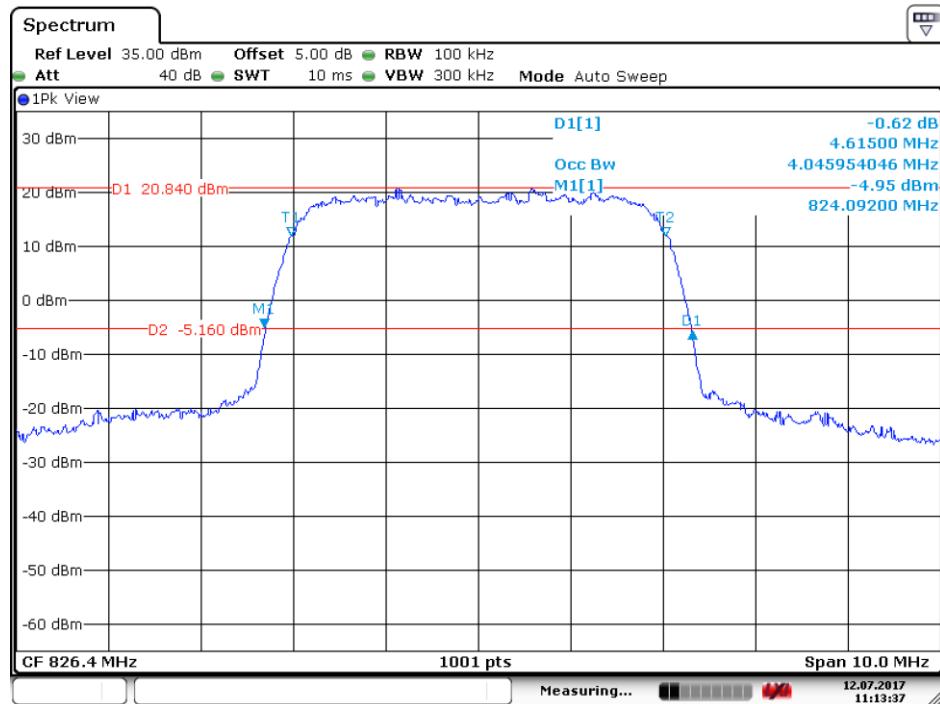
4.1.1.1.2 Test Channel = MCH



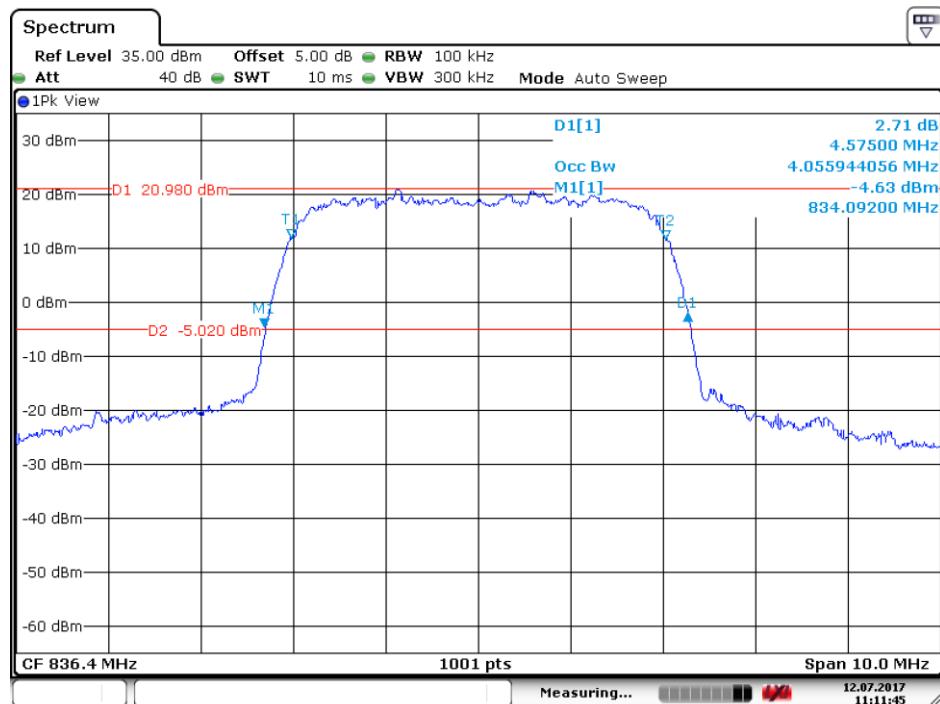
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4.1.1.1.3 Test Channel = HCH


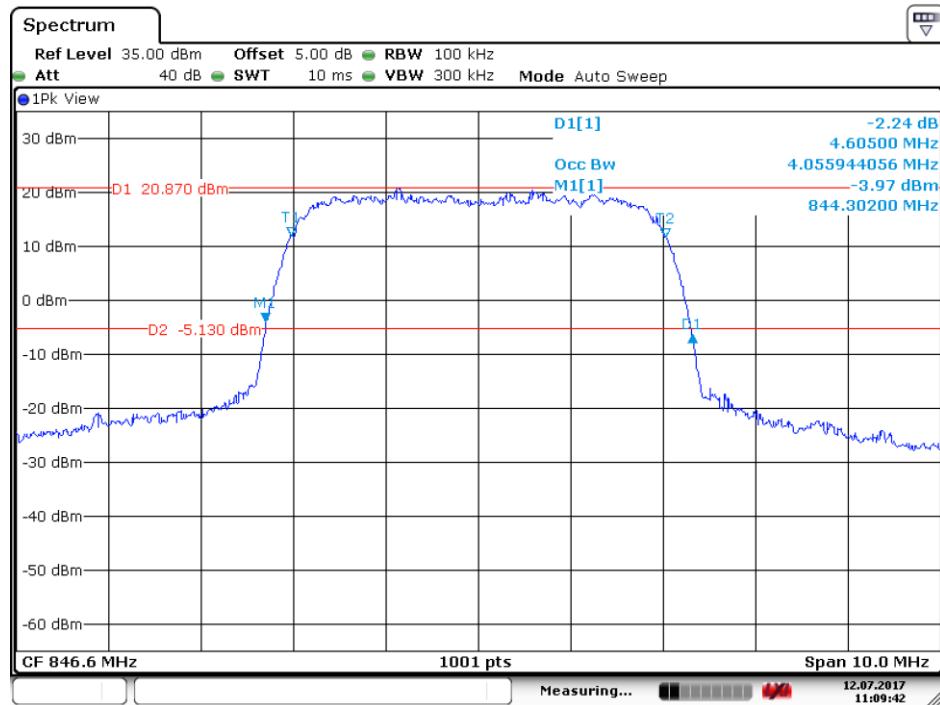
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4.1.2 Test Band = WCDMA 850
4.1.2.1 Test Mode = UMTS/TM1
4.1.2.1.1 Test Channel = LCH


Date: 12.JUL.2017 11:13:38

4.1.2.1.2 Test Channel = MCH


Date: 12.JUL.2017 11:11:45

4.1.2.1.3 Test Channel = HCH


Date: 12.JUL.2017 11:09:42

5 Band Edges Compliance

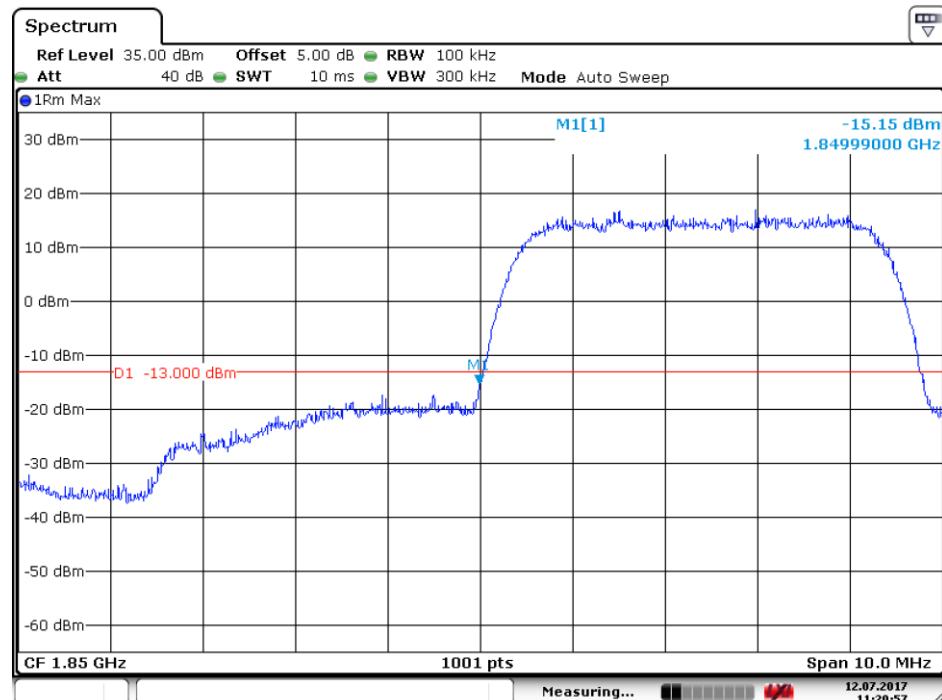
Part I - Test Plots

5.1 For WCDMA

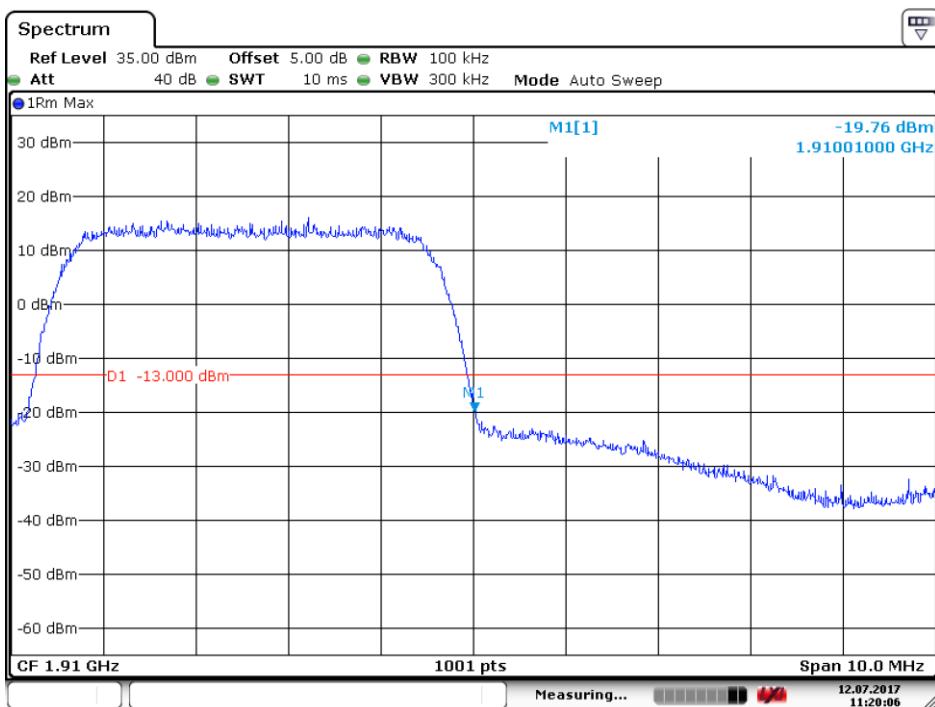
5.1.1 Test Band = WCDMA 1900

5.1.1.1 Test Mode = UMTS/TM1

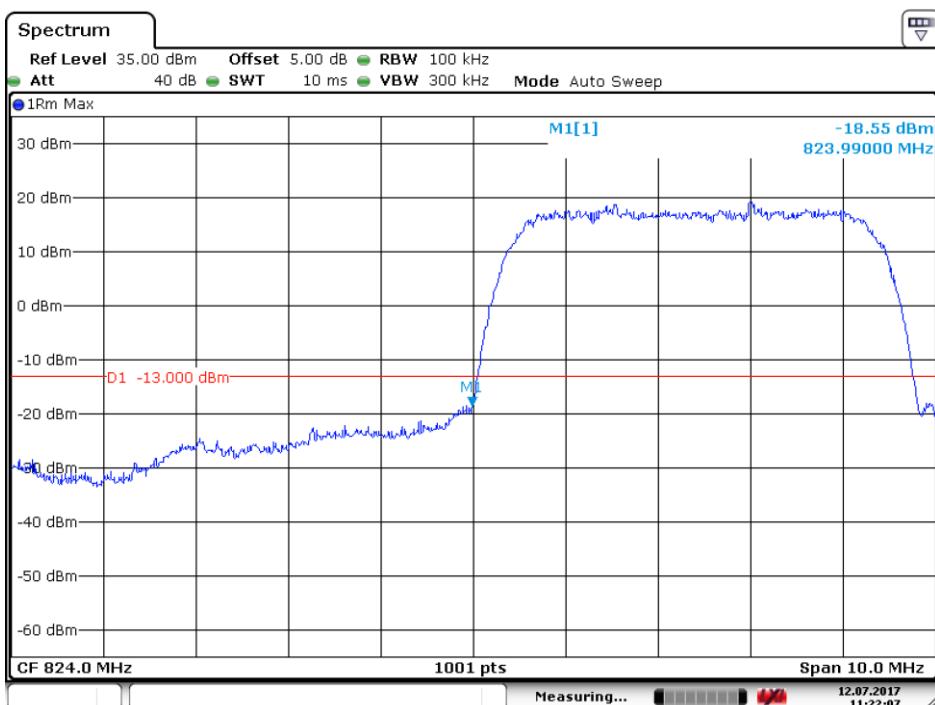
5.1.1.1.1 Test Channel = LCH



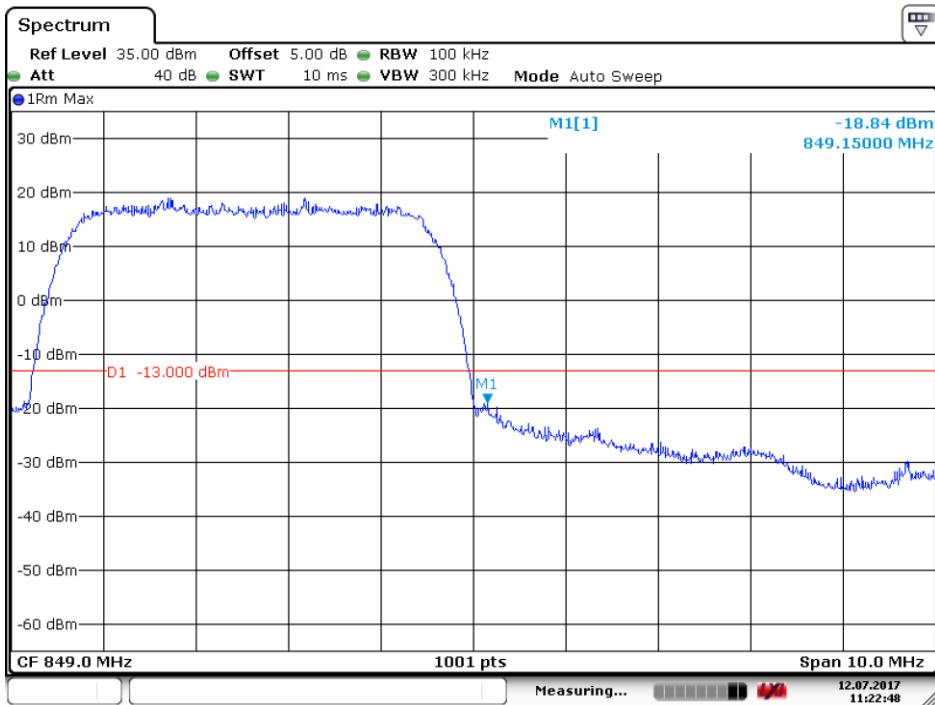
Date: 12.JUL.2017 11:20:57

5.1.1.1.2 Test Channel = HCH


Date: 12.JUL.2017 11:20:06

5.1.2 Test Band = WCDMA 850
5.1.2.1 Test Mode = UMTS/TM1
5.1.2.1.1 Test Channel = LCH


Date: 12.JUL.2017 11:22:07

5.1.2.1.2 Test Channel = HCH

Date: 12.JUL.2017 11:22:48

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 $< \text{RBW}/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (\text{Span} / \text{RBW})$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

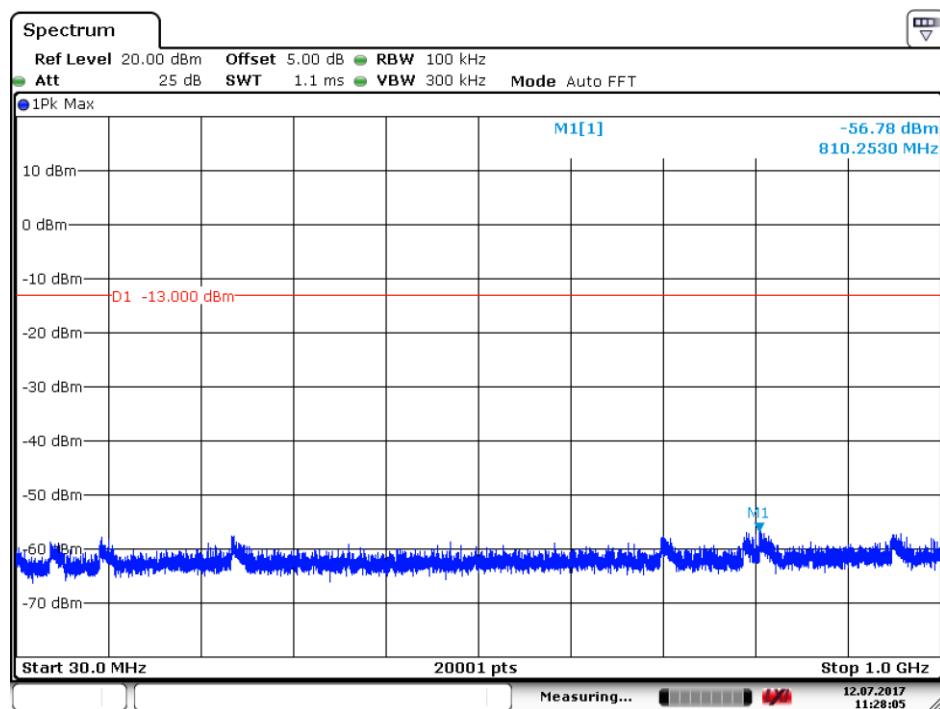
Part I - Test Plots

6.1 For WCDMA

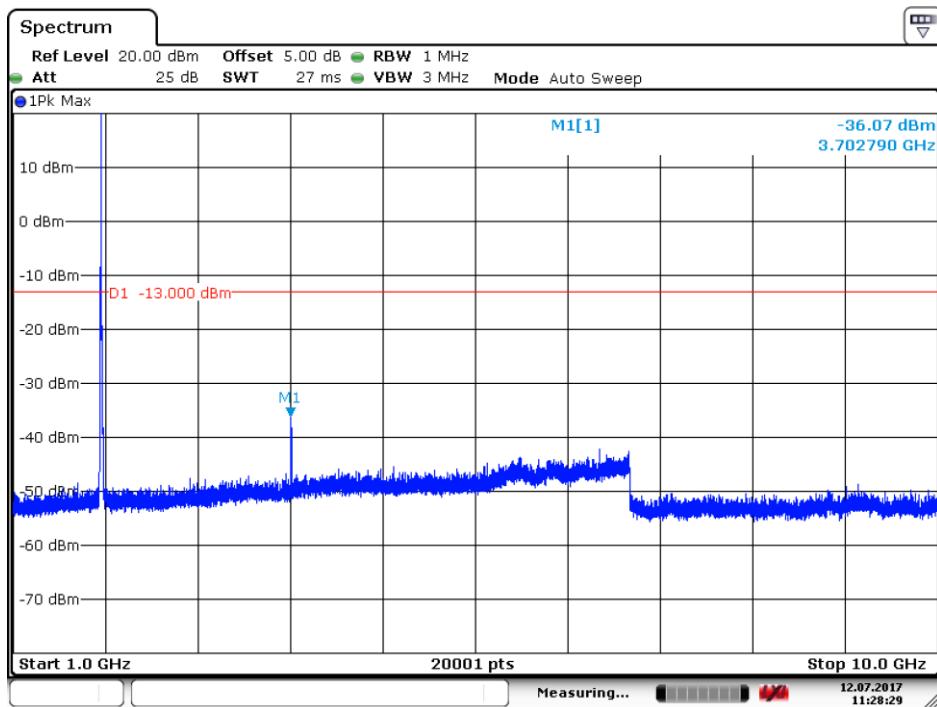
6.1.1 Test Band = WCDMA 1900

6.1.1.1 Test Mode = UMTS/TM1

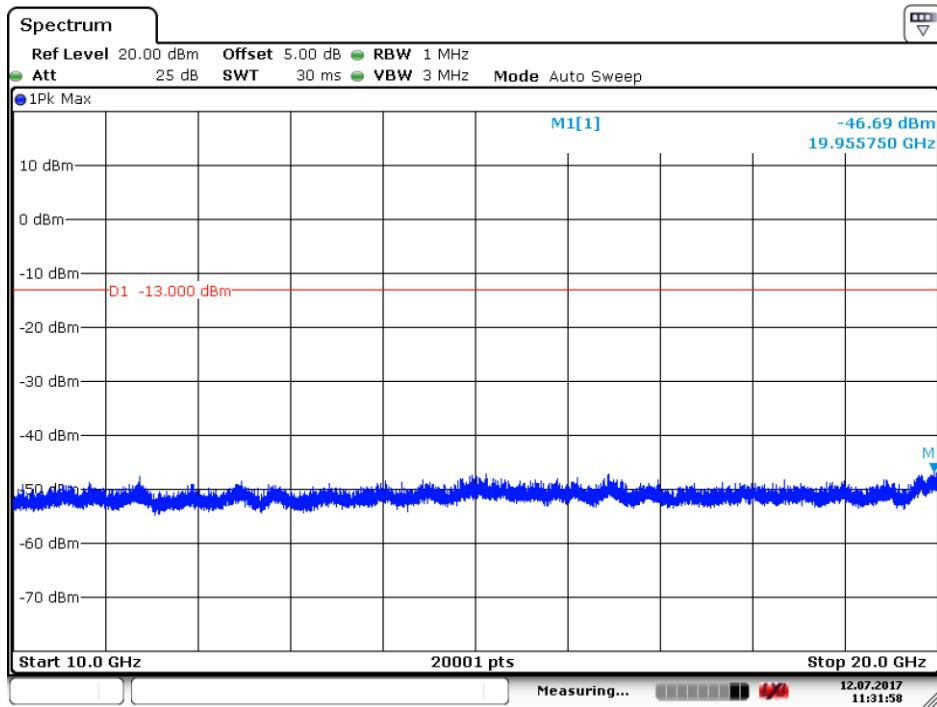
6.1.1.1.1 Test Channel = LCH



Date: 12.JUL.2017 11:28:05

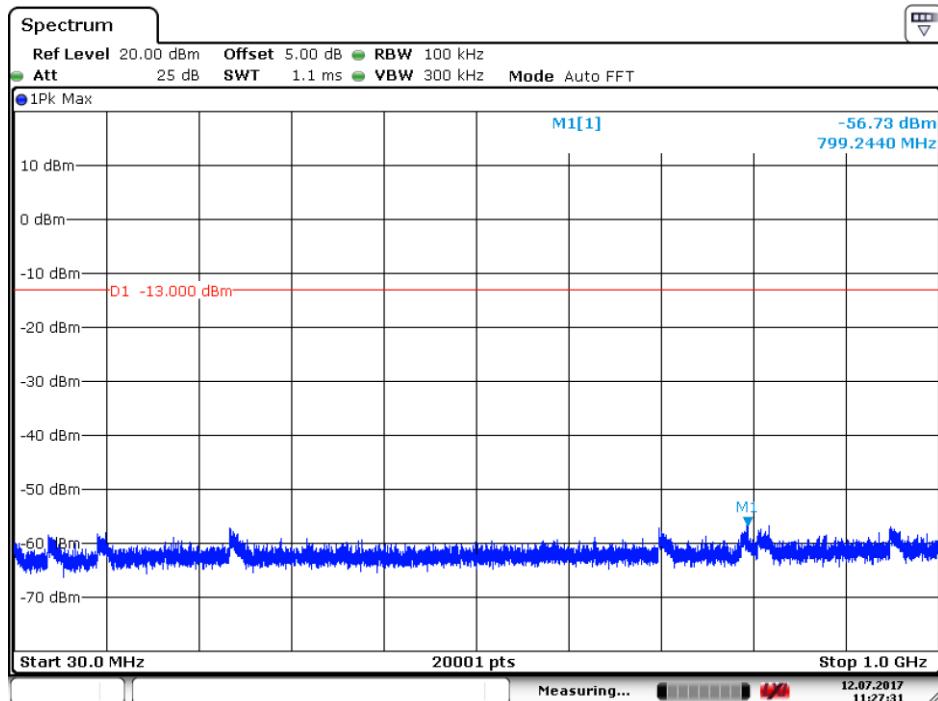


Date: 12.JUL.2017 11:28:29

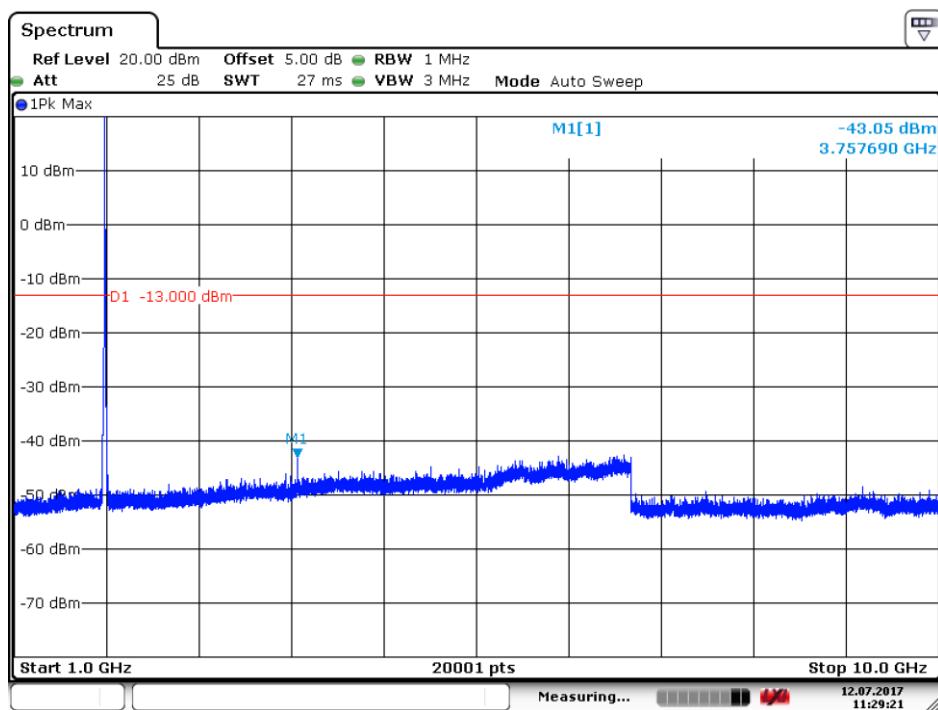


Date: 12.JUL.2017 11:31:59

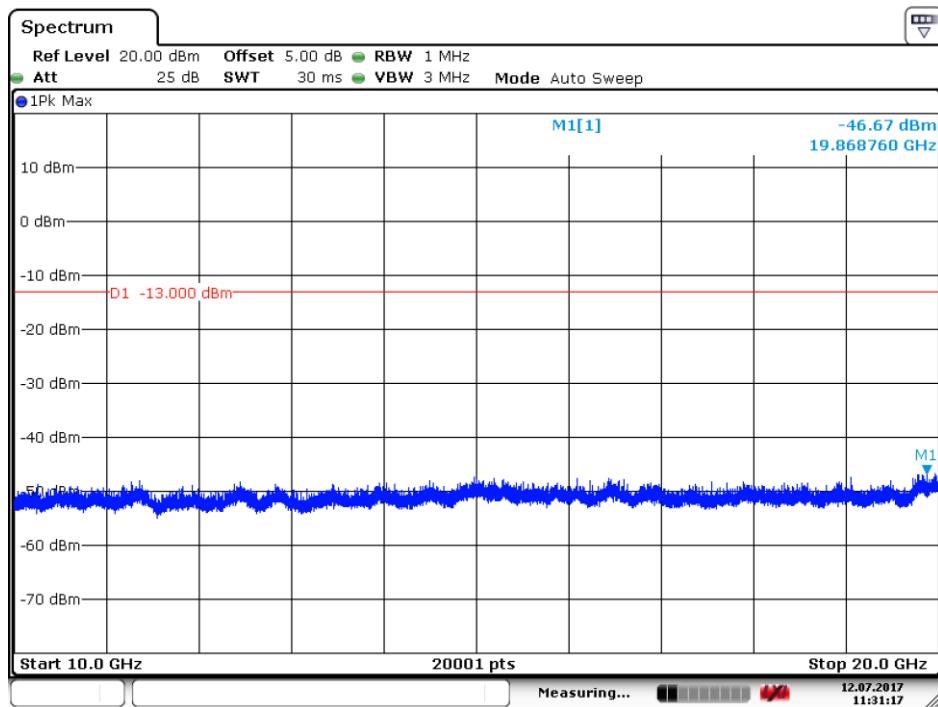
6.1.1.1.2 Test Channel = MCH



Date: 12.JUL.2017 11:27:31

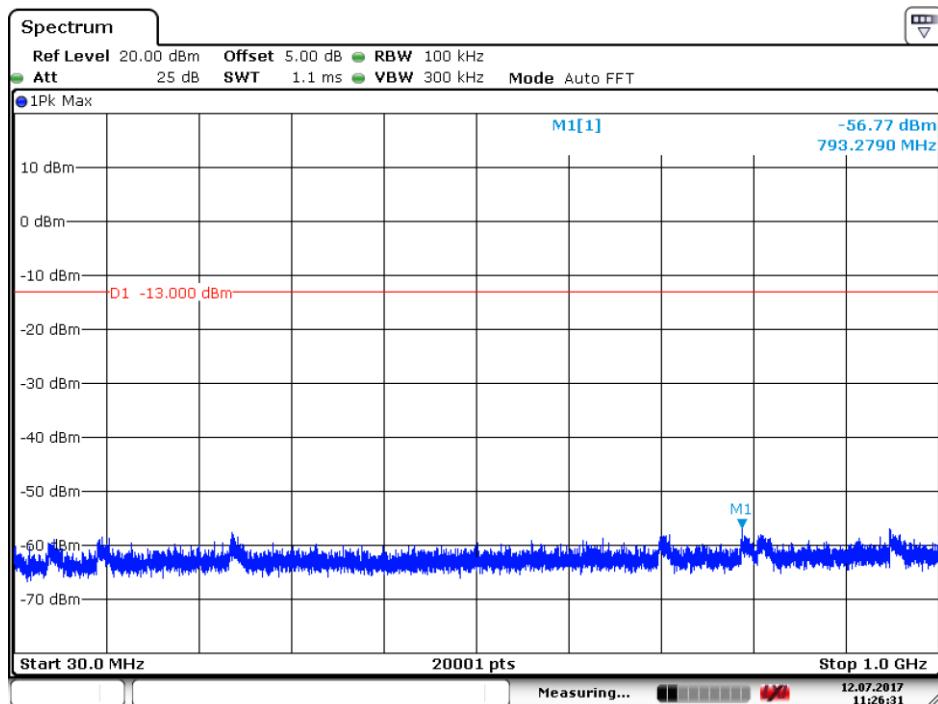


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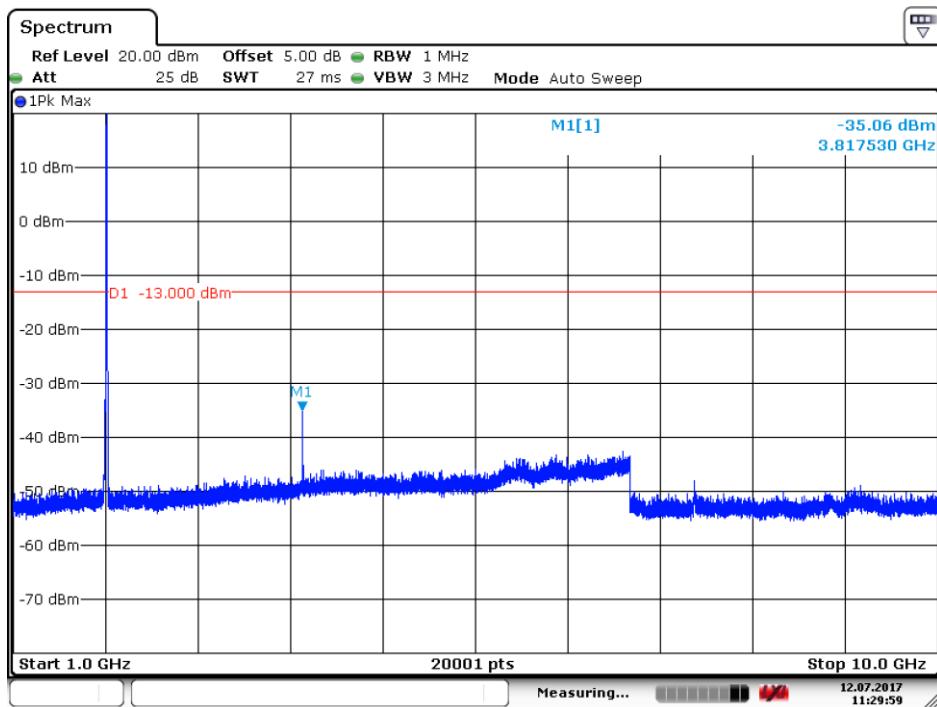


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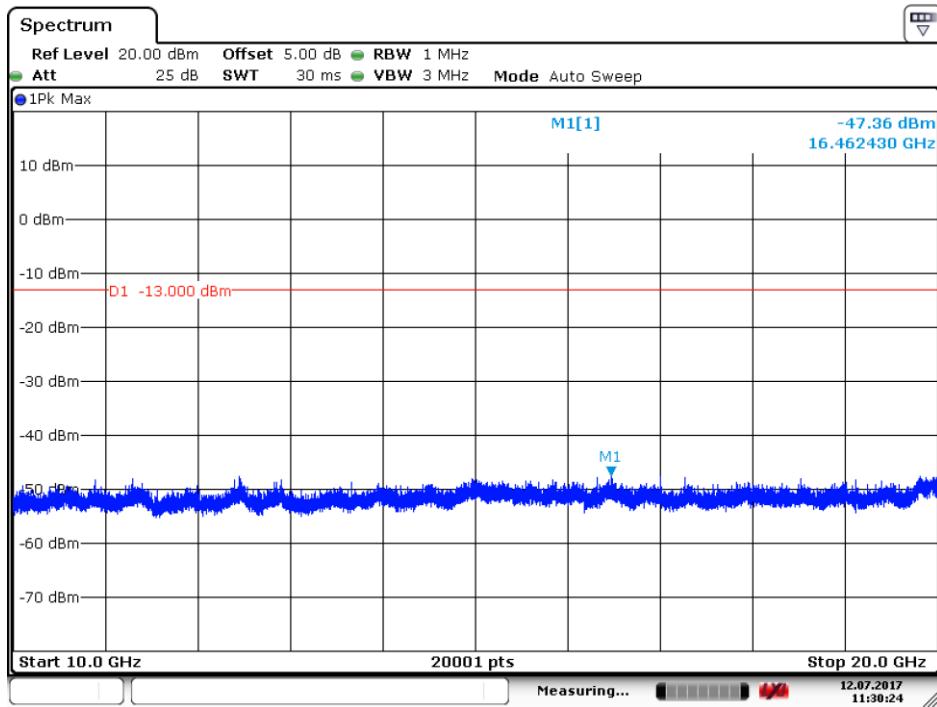
6.1.1.1.3 Test Channel = HCH



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Date: 12.JUL.2017 11:29:59

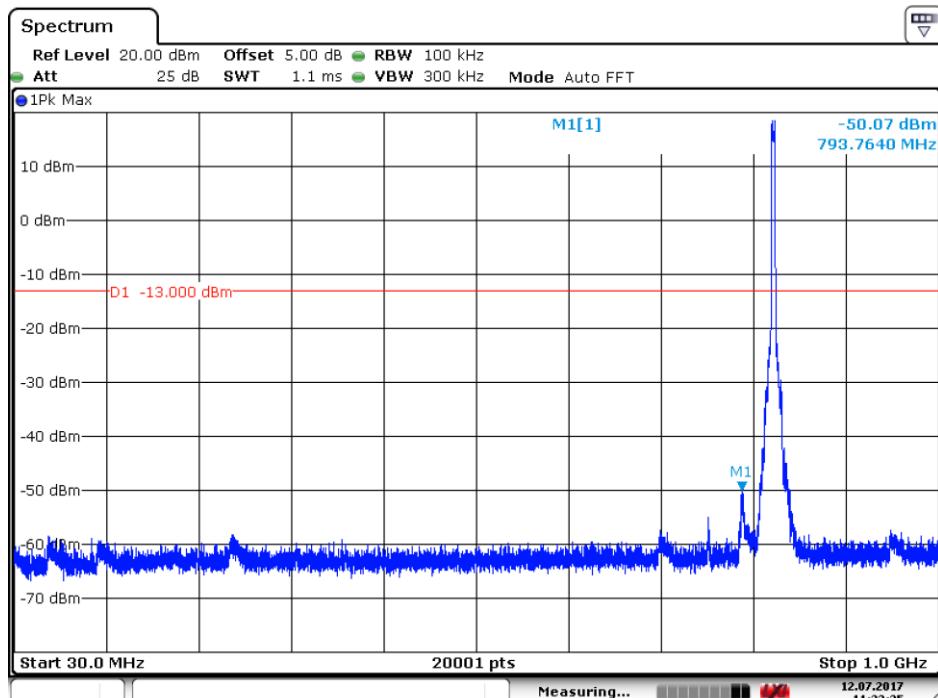


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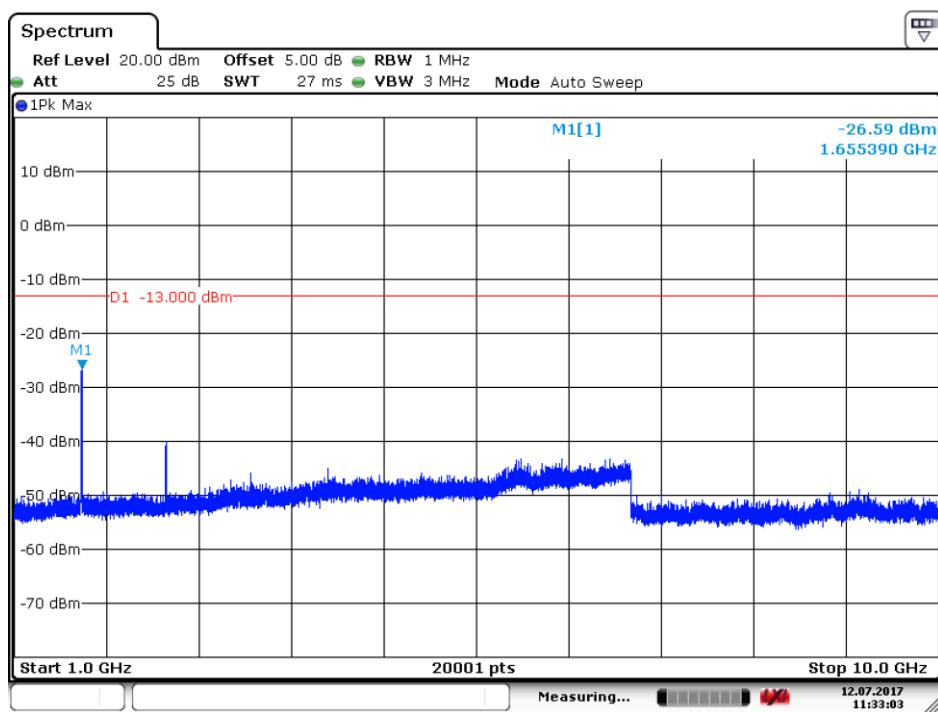
6.1.2 Test Band = WCDMA 850

6.1.2.1 Test Mode = UMTS/TM1

6.1.2.1.1 Test Channel = LCH

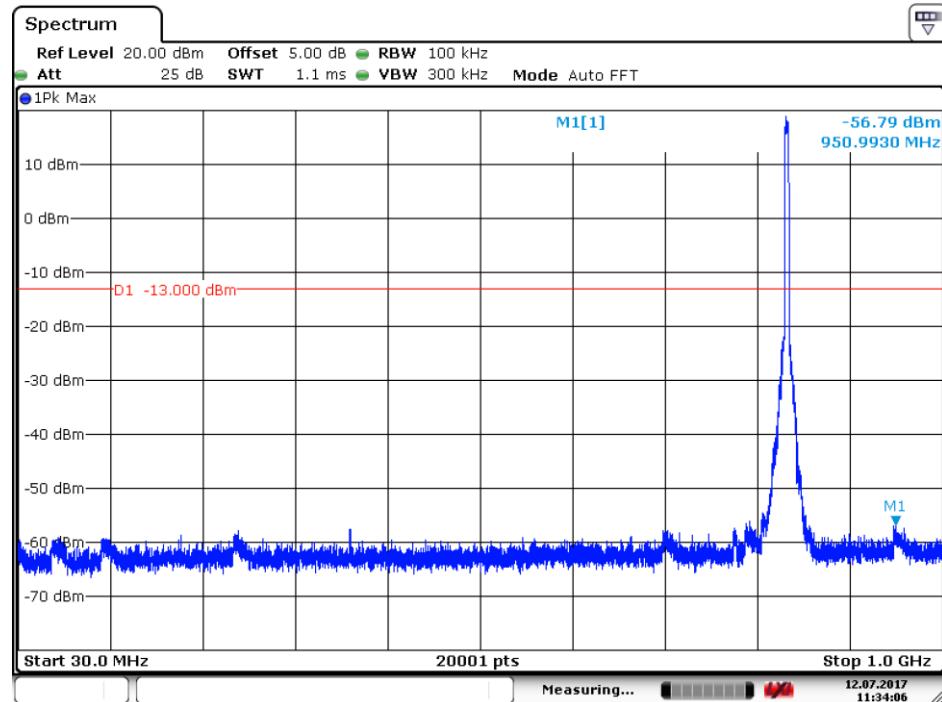


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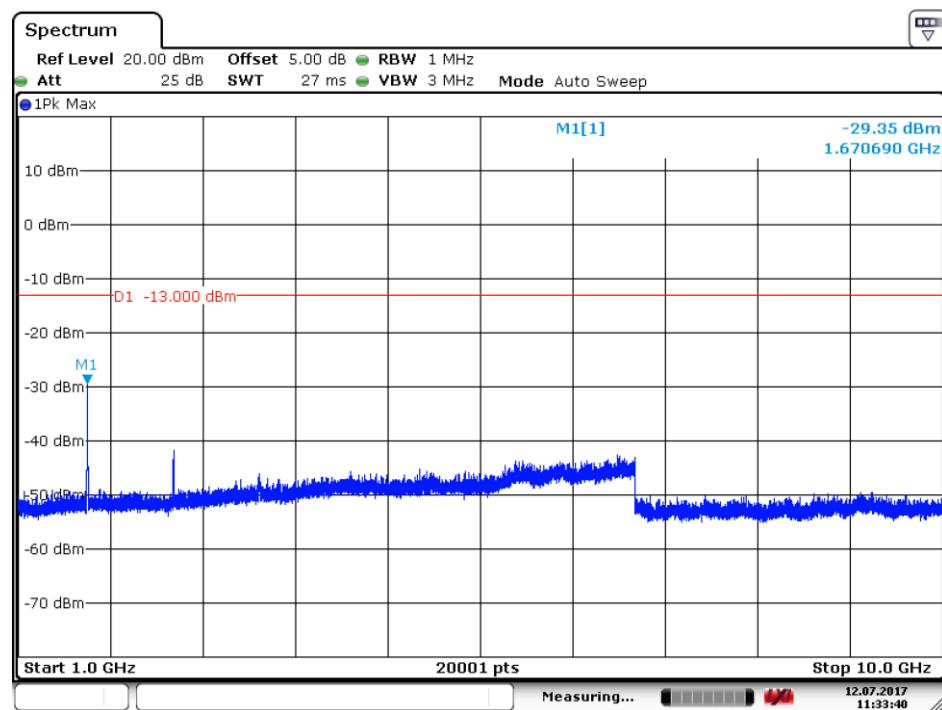


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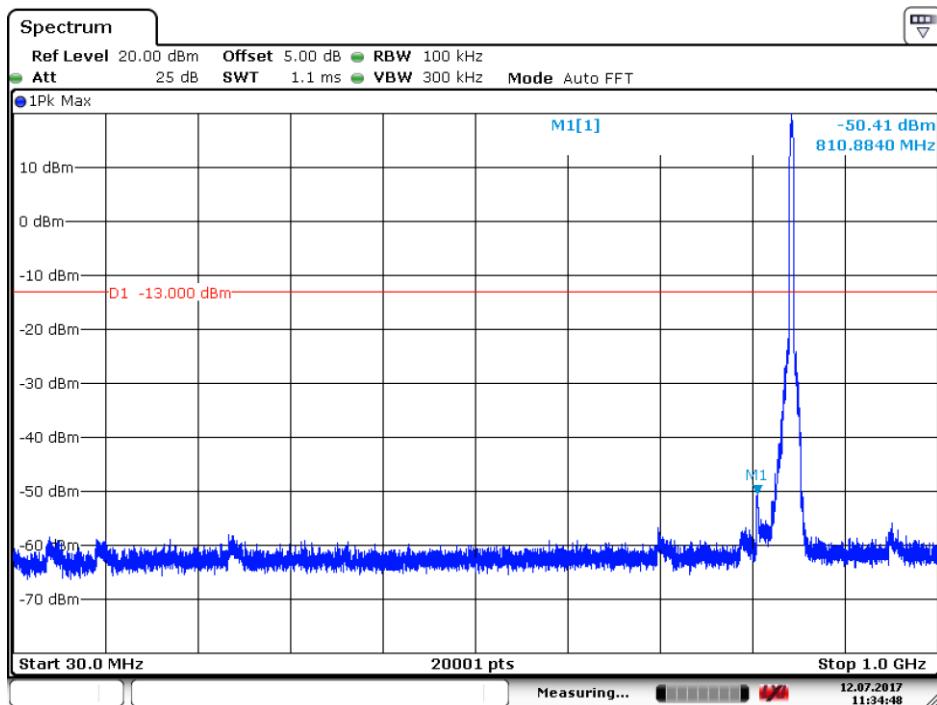
6.1.2.1.2 Test Channel = MCH



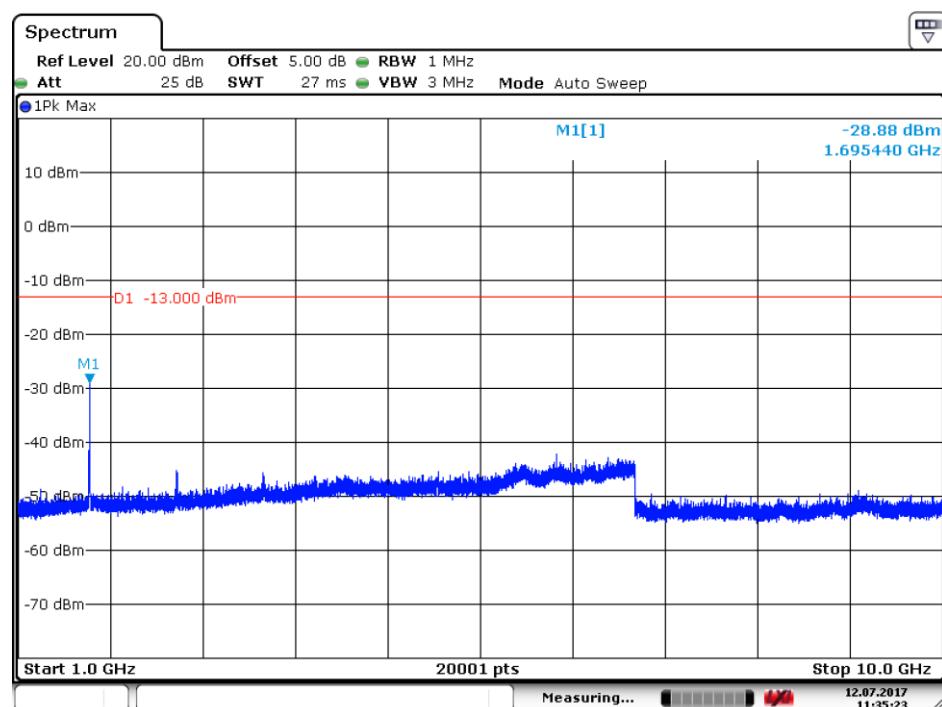
Date: 12.JUL.2017 11:34:07



Date: 12.JUL.2017 11:33:40

6.1.2.1.3 Test Channel = HCH


Date: 12.JUL.2017 11:34:48



Date: 12.JUL.2017 11:35:23

7 Field Strength of Spurious Radiation

Part I - Test Plots

7.1 For WCDMA

7.1.1 Test Band = WCDMA 1900

7.1.1.1 Test Mode = UMTS/TM1

7.1.1.1.1 Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1255.500	-61.21	-13.00	48.21	Vertical
3957.450	-68.33	-13.00	55.33	Vertical
5077.237	-67.42	-13.00	54.42	Vertical
1456.000	-60.77	-13.00	47.77	Horizontal
4338.187	-67.41	-13.00	54.41	Horizontal
6642.600	-66.11	-13.00	53.11	Horizontal

7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1291.000	-61.50	-13.00	48.50	Vertical
2583.500	-57.74	-13.00	44.74	Vertical
4401.562	-68.07	-13.00	55.07	Vertical
1398.500	-62.14	-13.00	49.14	Horizontal
2463.500	-58.41	-13.00	45.41	Horizontal
4462.987	-68.06	-13.00	55.06	Horizontal

7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1511.000	-61.43	-13.00	48.43	Vertical
2681.500	-56.99	-13.00	43.99	Vertical
5125.500	-67.39	-13.00	54.39	Vertical
1465.500	-60.56	-13.00	47.56	Horizontal
2682.000	-57.14	-13.00	44.14	Horizontal
3433.387	-69.62	-13.00	56.62	Horizontal

7.1.2 Test Band = WCDMA band 850**7.1.2.1 Test Mode = UMTS/TM1**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1235.500	-61.32	-13.00	48.32	Vertical
1641.500	-59.78	-13.00	46.78	Vertical
2701.500	-57.09	-13.00	44.09	Vertical
1365.500	-62.42	-13.00	49.42	Horizontal
2396.500	-58.40	-13.00	45.40	Horizontal
4675.537	-68.14	-13.00	55.14	Horizontal

7.1.2.1.1 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1706.500	-58.71	-13.00	45.71	Vertical
2651.500	-57.15	-13.00	44.15	Vertical
5911.350	-66.68	-13.00	53.68	Vertical
1454.500	-60.87	-13.00	47.87	Horizontal
2682.000	-57.16	-13.00	44.16	Horizontal
4724.775	-67.75	-13.00	54.75	Horizontal

7.1.2.1.2 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1525.000	-61.13	-13.00	48.13	Vertical
3992.550	-68.32	-13.00	55.32	Vertical
5124.525	-67.43	-13.00	54.43	Vertical
1645.500	-59.66	-13.00	46.66	Horizontal
2801.000	-56.54	-13.00	43.54	Horizontal
5031.412	-67.05	-13.00	54.05	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.

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
WCDMA 1900	UMTS/TM1	LCH	TN	VL	3.28	0.00177	PASS
				VN	-1.36	-0.00073	PASS
				VH	3.02	0.00163	PASS
		MCH	TN	VL	1.45	0.00077	PASS
				VN	2.75	0.00146	PASS
				VH	-1.37	-0.00073	PASS
		HCH	TN	VL	1.25	0.00066	PASS
				VN	-2.68	-0.00140	PASS
				VH	-4.30	-0.00225	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 850	UMTS/TM1	LCH	TN	VL	-3.38	-0.00409	PASS
				VN	-0.96	-0.00116	PASS
				VH	2.32	0.00281	PASS
		MCH	TN	VL	-3.82	-0.00457	PASS
				VN	1.34	0.00160	PASS
				VH	-2.45	-0.00293	PASS
		HCH	TN	VL	1.78	0.00210	PASS
				VN	-4.61	-0.00545	PASS
				VH	2.80	0.00331	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
WCDMA 1900	UMTS/TM1	LCH	VN	0	-2.62	-0.00141	PASS
				10	0.56	0.00030	PASS
				20	-4.80	-0.00259	PASS
				30	1.40	0.00076	PASS
				40	-2.04	-0.00110	PASS
		MCH	VN	0	-3.38	-0.00180	PASS
				10	1.31	0.00070	PASS
				20	2.72	0.00145	PASS
				30	1.61	0.00086	PASS
				40	3.13	0.00166	PASS
		HCH	VN	0	-5.32	-0.00279	PASS
				10	1.57	0.00082	PASS
				20	-2.78	-0.00146	PASS
				30	3.64	0.00191	PASS
				40	-1.73	-0.00091	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 850	UMTS/TM1	LCH	VN	0	-2.83	-0.00342	PASS
				10	5.37	0.00650	PASS
				20	1.74	0.00211	PASS
				30	-6.39	-0.00773	PASS
				40	1.45	0.00175	PASS
		MCH	VN	0	4.28	0.00512	PASS
				10	1.34	0.00160	PASS
				20	-2.37	-0.00283	PASS
				30	-4.45	-0.00532	PASS
				40	-2.43	-0.00291	PASS
		HCH	VN	0	-3.50	-0.00413	PASS
				10	2.54	0.00300	PASS
				20	5.17	0.00611	PASS
				30	-2.77	-0.00327	PASS
				40	-1.46	-0.00172	PASS

The End