



Appendix B

For
Test Report No.: SZEM1501000357HR

Authorized Signature:



Jack Zhang
EMC Laboratory Manager

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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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3 Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Part I – RF Conducted Power of Transmitter for GSM850

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel128(L)		Channel190(M)		Channel251(H)	
	824.2MHz		836.6 MHz		848.8 MHz	
Tnom/ Vnom	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)
GSM/TM1 (GSM ONLY)	32.62	38.5	32.82	38.5	32.56	38.5
GSM/TM1(GPRS)	32.61	38.5	32.79	38.5	32.55	38.5

Part 2– Effective Radiated Power of Transmitter (ERP) for GSM850

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
GSM/TM1 (GSM ONLY)	824.2	28.61	Dipole Ant.	34.05	-4.90	0.6	28.55	38.5	Pass
GSM/TM1 (GSM ONLY)	836.6	28.81	Dipole Ant.	34.40	-5.02	0.6	28.78	38.5	Pass
GSM/TM1 (GSM ONLY)	848.8	28.55	Dipole Ant.	34.12	-5.00	0.6	28.52	38.5	Pass
GSM/TM1 (GPRS)	824.2	28.60	Dipole	34.04	-4.90	0.6	28.54	38.5	Pass
GSM/TM1 (GPRS)	836.6	28.78	Dipole	34.35	-5.02	0.6	28.73	38.5	Pass
GSM/TM1 (GPRS)	848.8	28.54	Dipole	34.11	-5.00	0.6	28.51	38.5	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





Part I – RF Conducted Power of Transmitter for GSM1900

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel128(L)		Channel190(M)		Channel251(H)	
	1850.2MHz		1880.0 MHz		1909.8 MHz	
Tnom/ Vnom	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)
GSM/TM1 (GSM ONLY)	27.58	33	26.48	33	27.07	33
GSM/TM1 (GPRS)	27.55	33	26.41	33	27.02	33

Part 2– Effective Isotropic Radiated Power of Transmitter (EIRP) for GSM1900

Test Mode	Freq. (MHz)	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBi)	Cable Loss (dB)	Substitution Level(ERP) / dBm	Limit (dBm)	Result
GSM/TM1 (GSM ONLY)	1850.2	30.26	Horn Ant.	26.63	4.5	1	30.13	33	Pass
GSM/TM1 (GSM ONLY)	1880.0	29.16	Horn Ant.	25.63	4.5	1	29.13	33	Pass
GSM/TM1 (GSM ONLY)	1909.8	29.75	Horn Ant.	26.08	4.5	1	29.58	33	Pass
GSM/TM1 (GPRS)	1850.2	30.21	Horn Ant.	26.62	4.5	1	30.12	33	Pass
GSM/TM1 (GPRS)	1880.0	29.12	Horn Ant.	25.58	4.5	1	29.08	33	Pass
GSM/TM1 (GPRS)	1909.8	29.70	Horn Ant.	26.12	4.5	1	29.62	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

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4 Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM850	GSM/TM1	LCH	0.15	13	PASS
		MCH	0.21	13	PASS
		HCH	0.07	13	PASS
GSM1900	GSM/TM1	LCH	0.11	13	PASS
		MCH	0.09	13	PASS
		HCH	0.14	13	PASS

5 Appendix_C: Modulation Characteristics

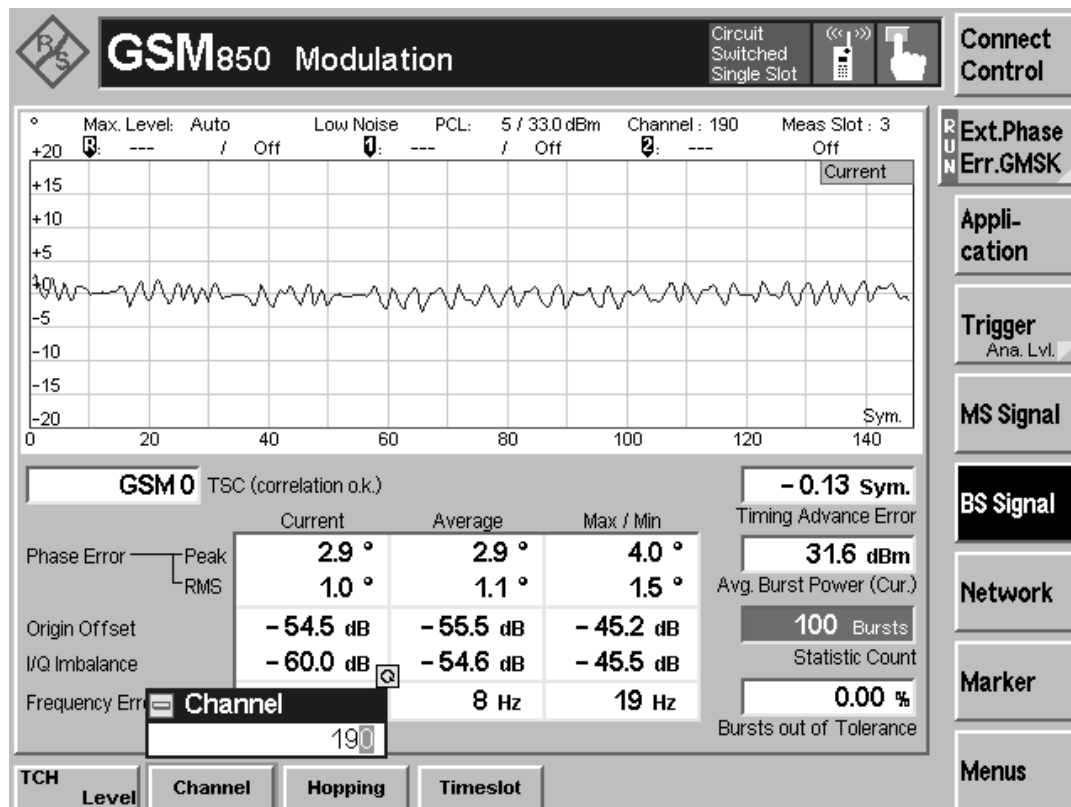
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = MCH

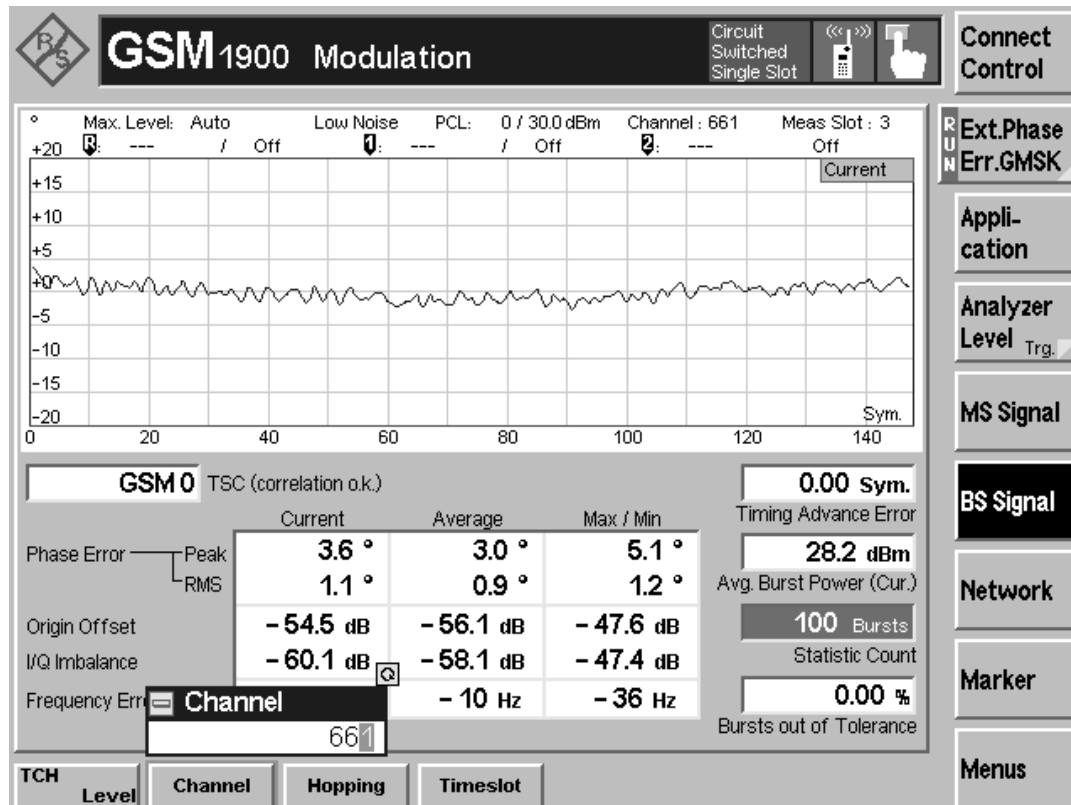




5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = MCH



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6 Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	245.75	316.90	PASS
		MCH	243.71	323.10	PASS
		HCH	244.30	320.10	PASS
GSM1900	GSM/TM1	LCH	243.11	315.50	PASS
		MCH	245.58	317.70	PASS
		HCH	244.58	321.30	PASS

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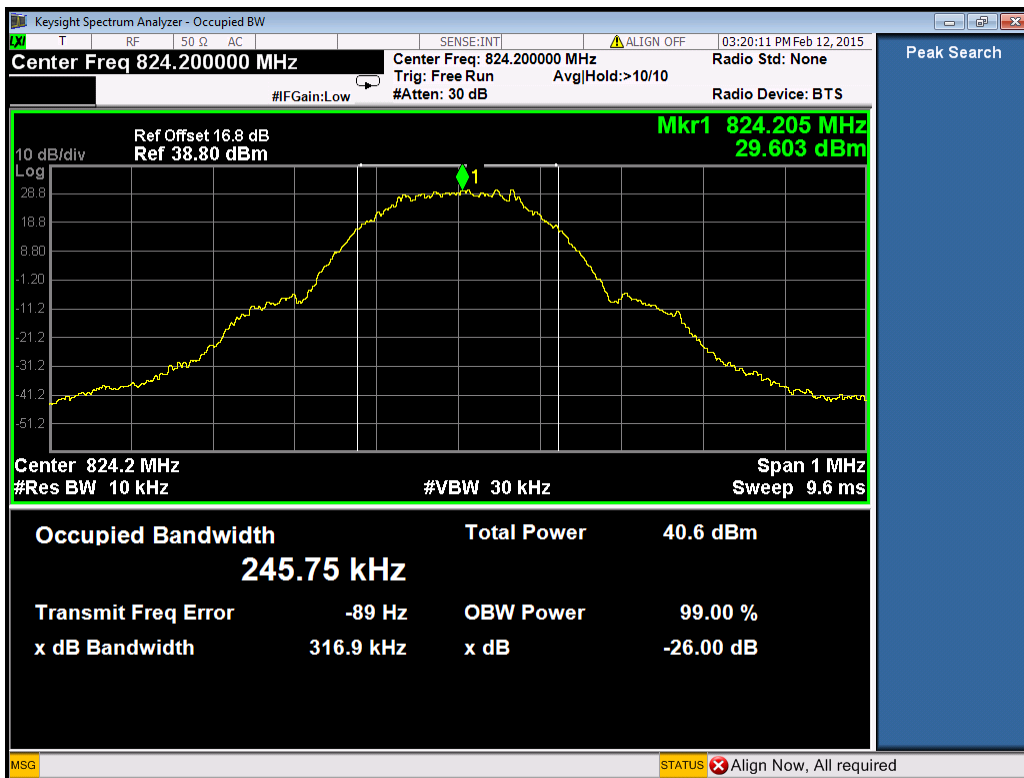
Part II - Test Plots

6.1 For GSM

6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



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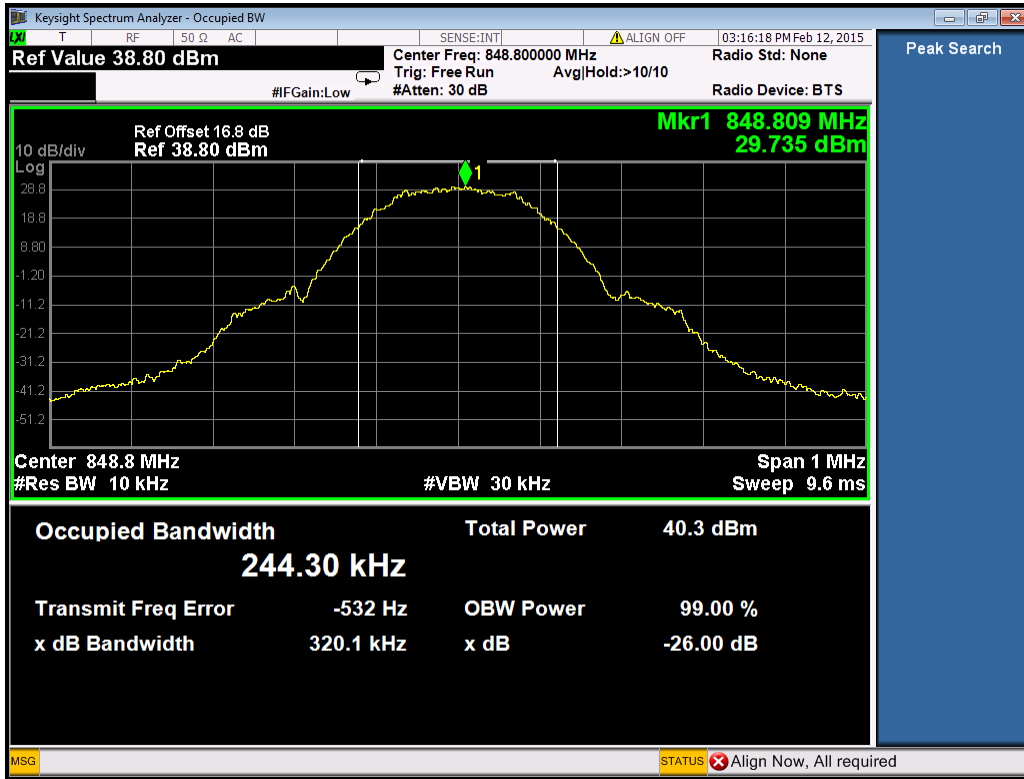
6.1.1.1.2 Test Channel = MCH



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6.1.1.1.3 Test Channel = HCH



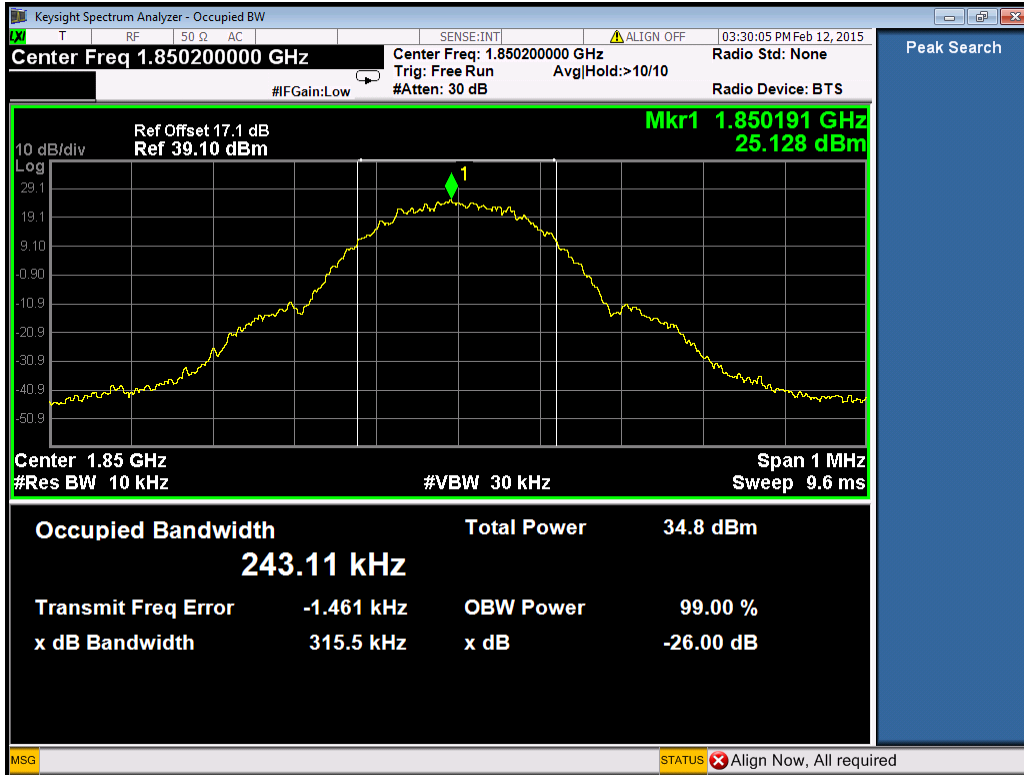
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6.2 Test Band = GSM1900

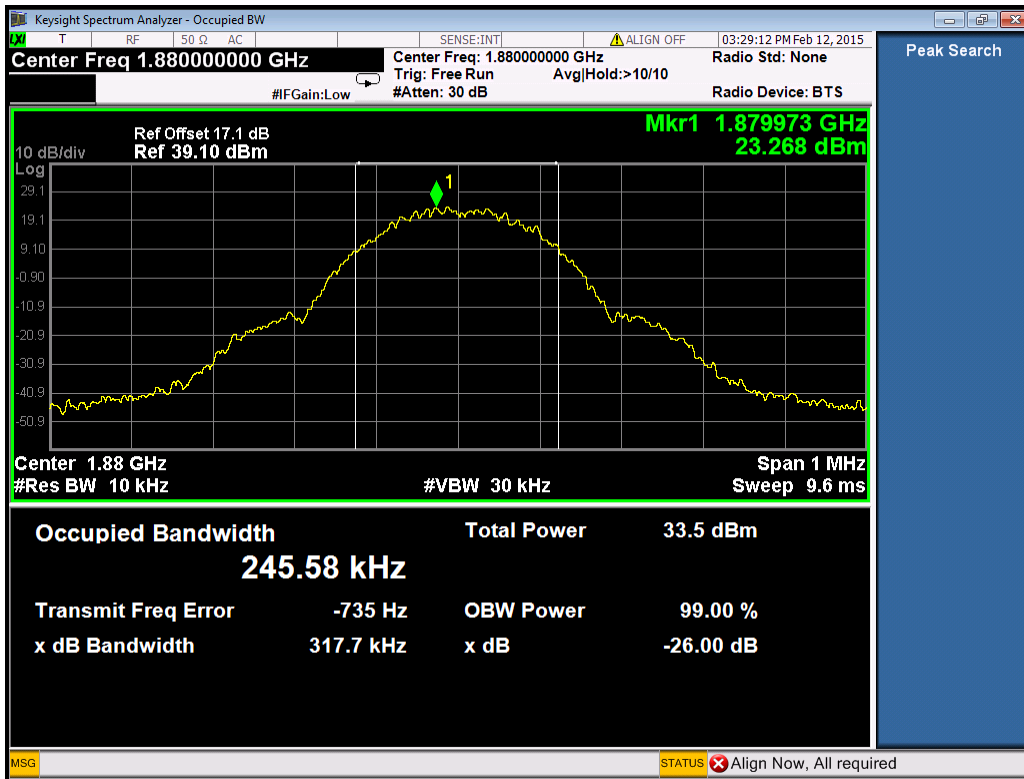
6.2.1.1 Test Mode = GSM/TM1

6.2.1.1.1 Test Channel = LCH





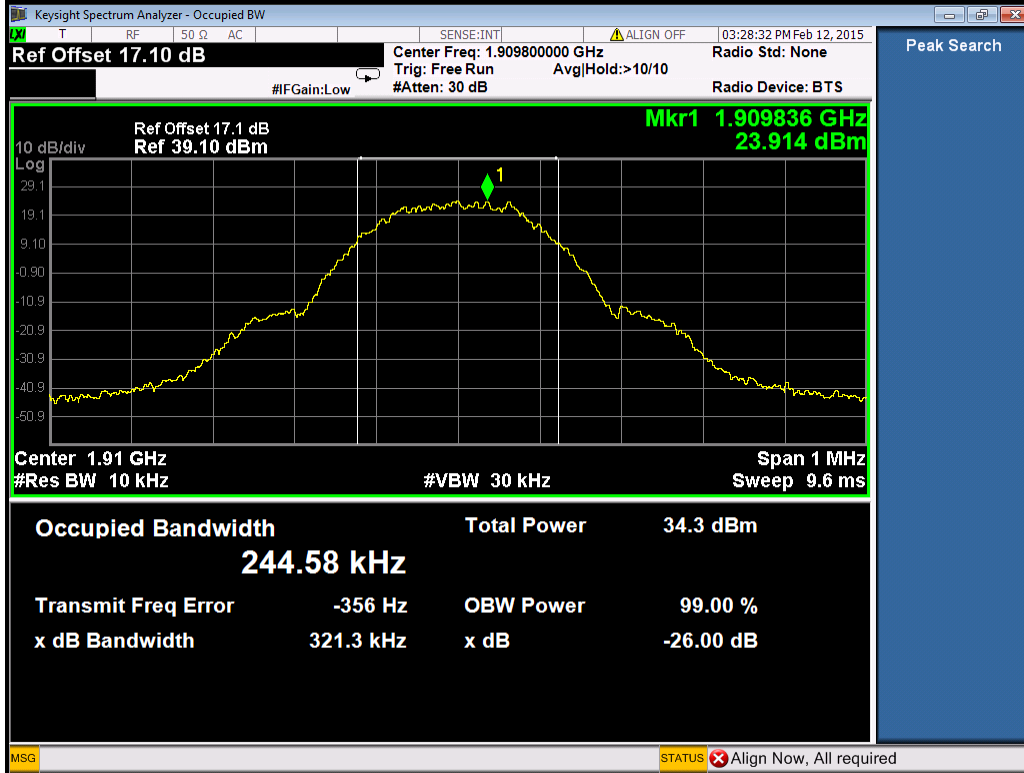
6.2.1.1.2 Test Channel = MCH



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6.2.1.1.3 Test Channel = HCH



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7 Appendix_E: Band Edges Compliance

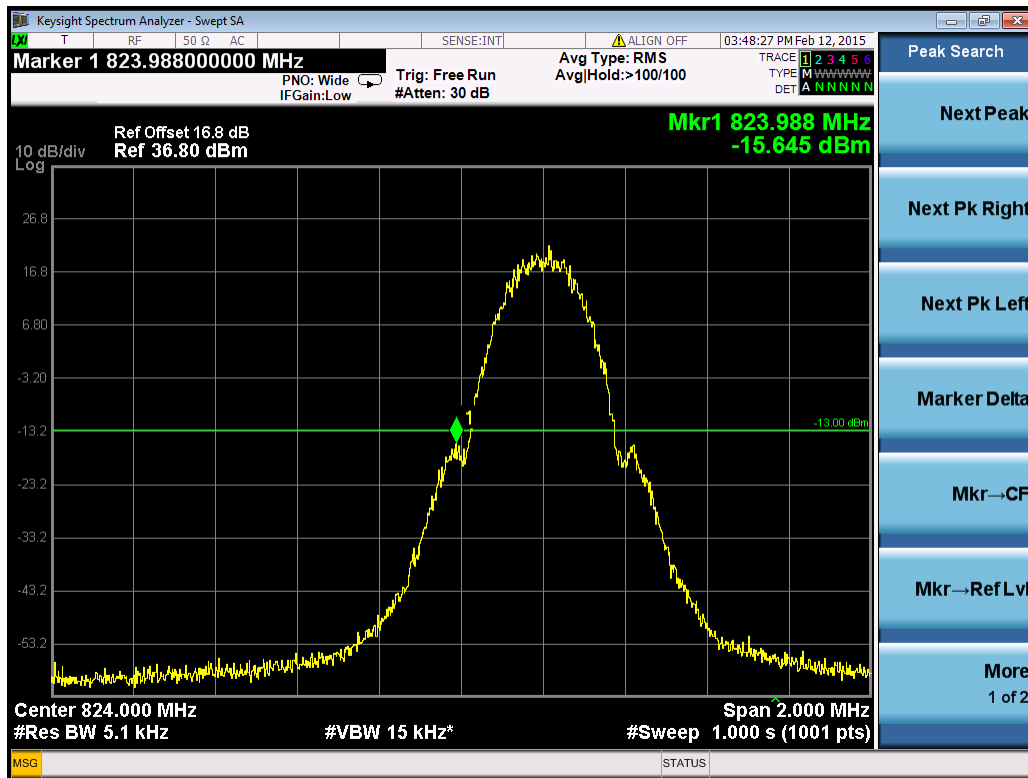
Part I - Test Plots

7.1 For GSM

7.1.1 Test Band = GSM850

7.1.1.1 Test Mode = GSM/TM1

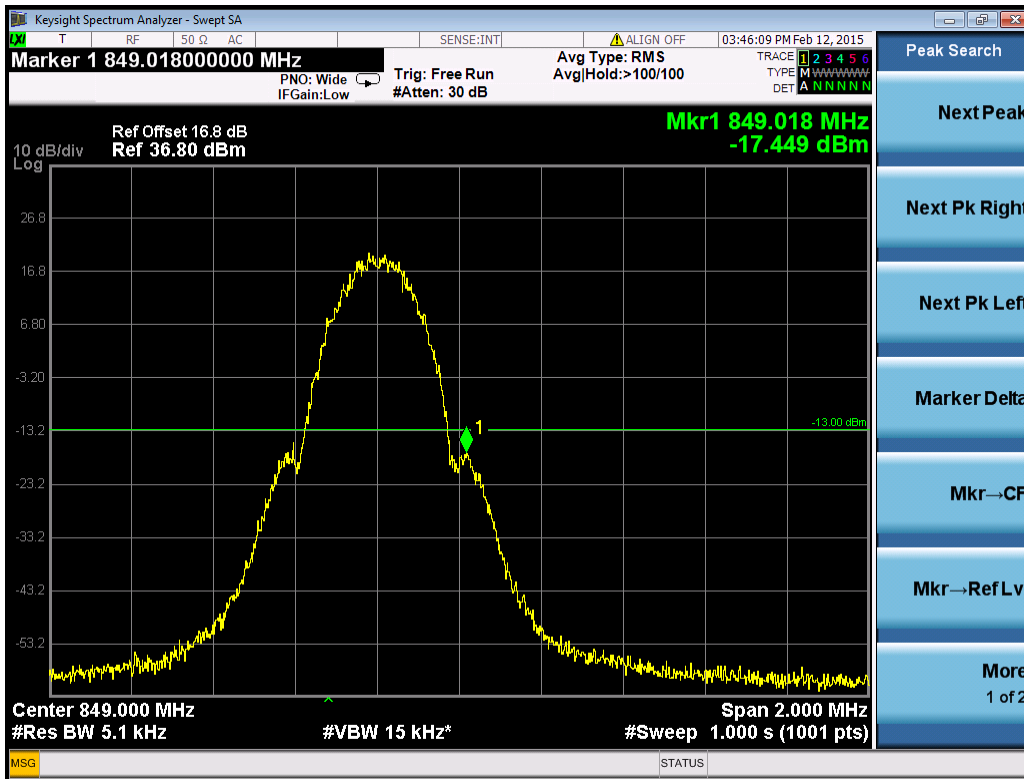
7.1.1.1.1 Test Channel = LCH



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7.1.1.1.2 Test Channel = HCH



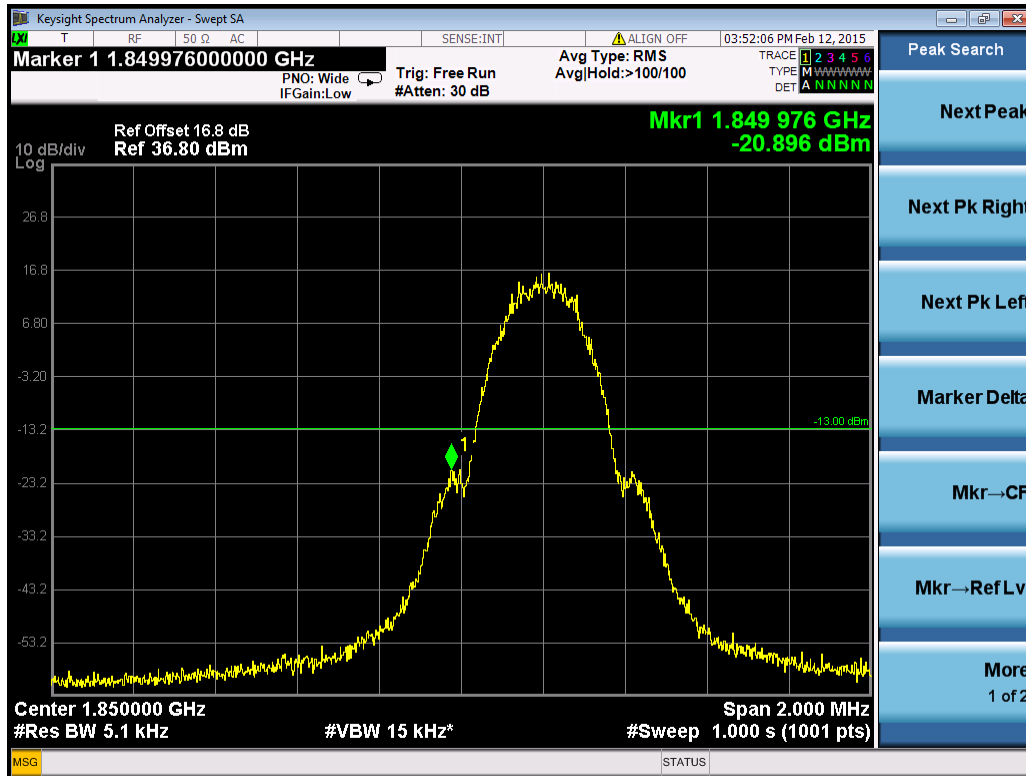
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7.1.2 Test Band = GSM1900

7.1.2.1 Test Mode = GSM/TM1

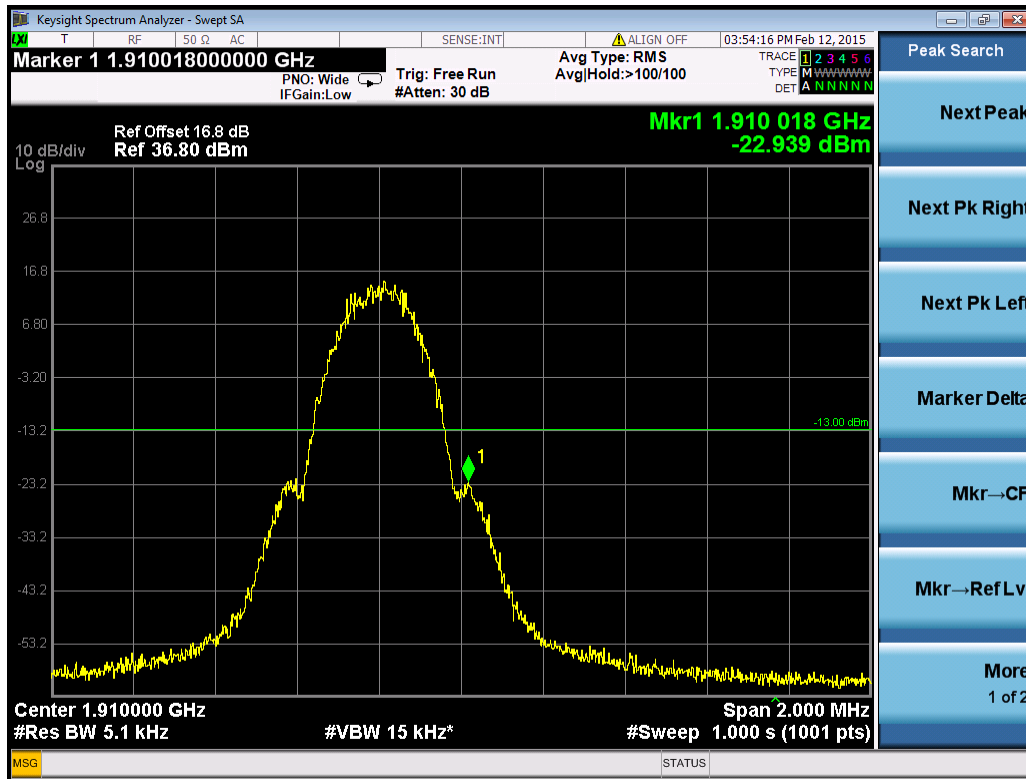
7.1.2.1.1 Test Channel = LCH



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7.1.2.1.2 Test Channel = HCH



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8 Appendix_F: 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.

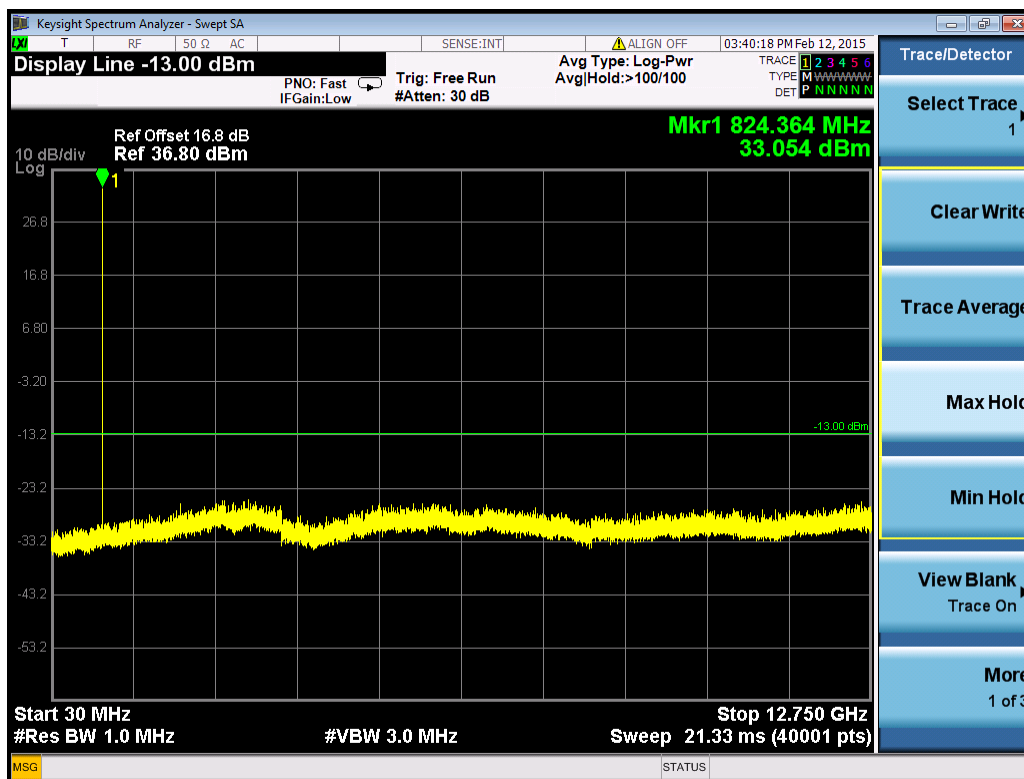
Part I - Test Plots

8.1 For GSM

8.1.1 Test Band = GSM850

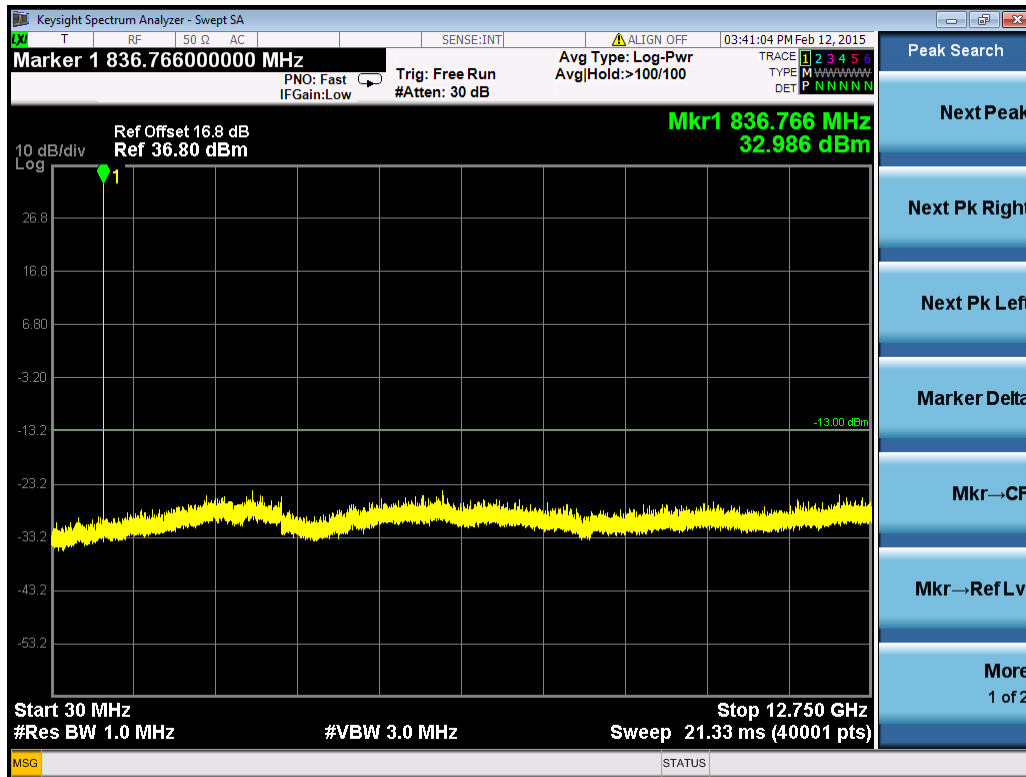
8.1.1.1 Test Mode = GSM/TM1

8.1.1.1.1 Test Channel = LCH





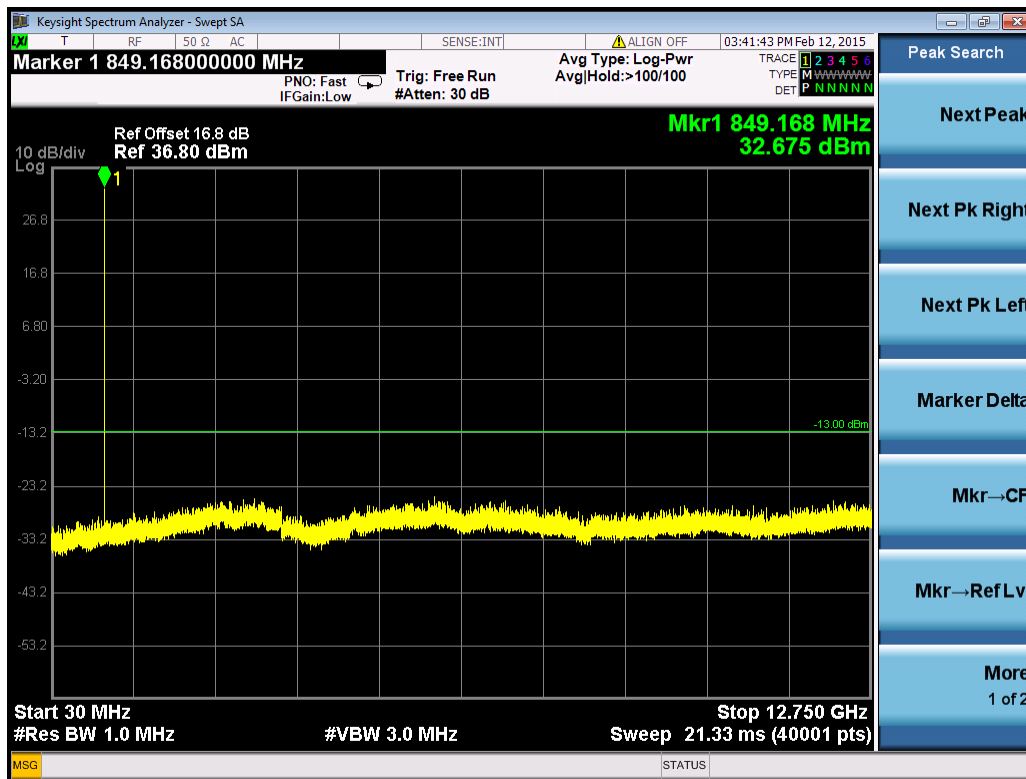
8.1.1.1.2 Test Channel = MCH



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8.1.1.1.3 Test Channel = HCH



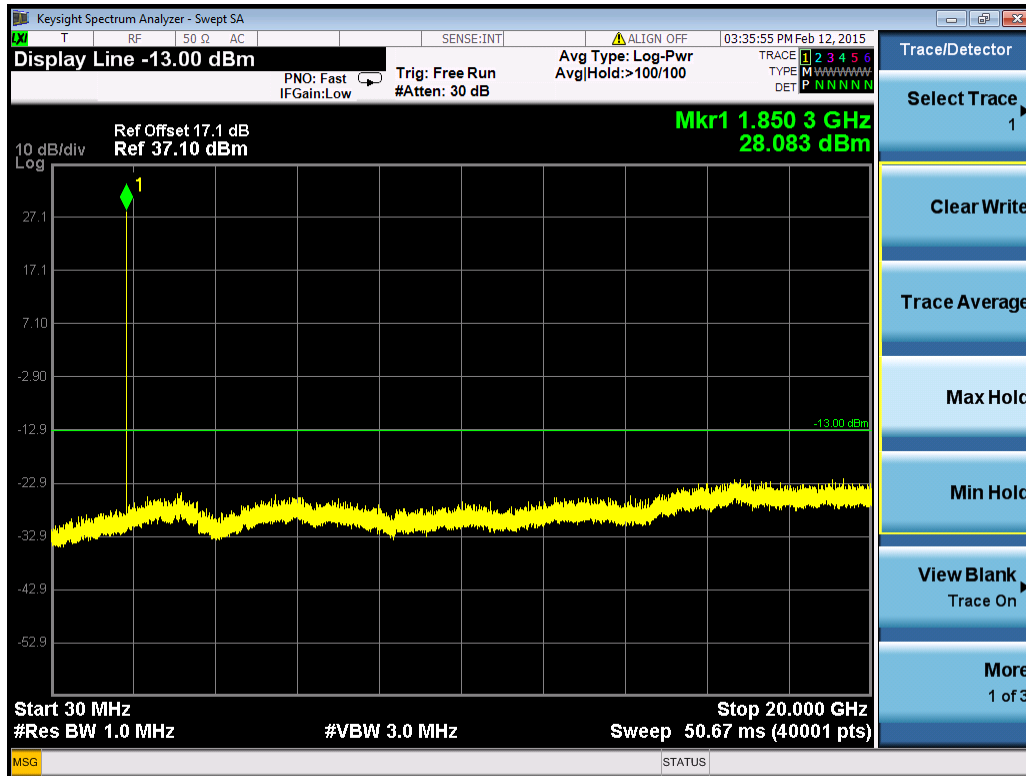
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8.1.2 Test Band = GSM1900

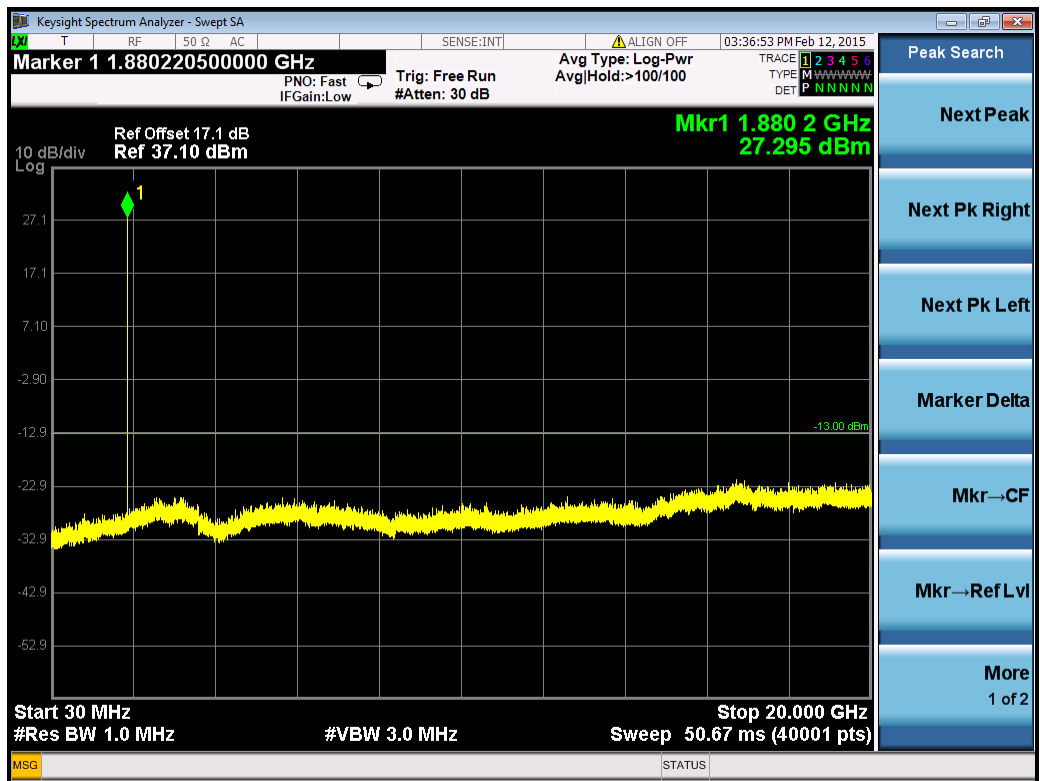
8.1.2.1 Test Mode = GSM/TM1

8.1.2.1.1 Test Channel = LCH



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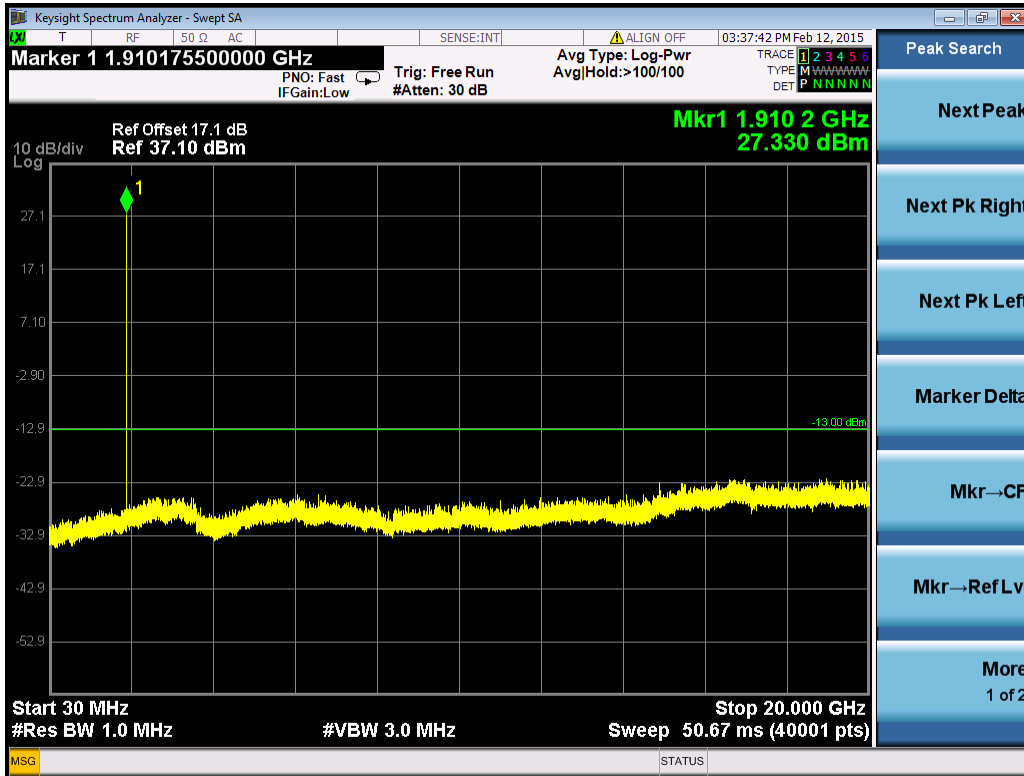
8.1.2.1.2 Test Channel = MCH



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8.1.2.1.3 Test Channel = HCH



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9 Appendix_G: Field Strength of Spurious Radiation

Part I - Test Plots

9.1 For GSM

9.1.1 Test Band = GSM850

9.1.1.1 Test Mode = GSM/TM1

GSM Below 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
53.468	-66.4	-13.0	-53.4	Vertical
80.866	-62.2	-13.0	-49.2	Vertical
139.011	-62.5	-13.0	-49.5	Vertical
170.396	-59.4	-13.0	-46.4	Vertical
326.438	-63.3	-13.0	-50.3	Vertical
656.949	-57.2	-13.0	-44.2	Vertical
43.334	-66.6	-13.0	-53.6	Horizontal
94.050	-64.2	-13.0	-51.2	Horizontal
130.176	-59.8	-13.0	-46.8	Horizontal
174.931	-57.7	-13.0	-44.7	Horizontal
322.179	-51.5	-13.0	-38.5	Horizontal
607.168	-58.6	-13.0	-45.6	Horizontal

Above 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1645.823	-46.0	-13.0	-33.0	Vertical
2472.751	-46.5	-13.0	-33.5	Vertical
3202.730	-45.0	-13.0	-32.0	Vertical
4534.554	-43.1	-13.0	-30.1	Vertical
6298.854	-39.5	-13.0	-26.5	Vertical
8880.433	-36.3	-13.0	-23.3	Vertical
1645.823	-43.3	-13.0	-30.3	Horizontal
2472.751	-46.1	-13.0	-33.1	Horizontal
3122.270	-45.6	-13.0	-32.6	Horizontal
5009.716	-41.9	-13.0	-28.9	Horizontal
6516.203	-38.8	-13.0	-25.8	Horizontal
8749.604	-36.1	-13.0	-23.1	Horizontal



GPRS Below 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
38.126	-71.7	-13.0	-58.7	Vertical
90.120	-68.8	-13.0	-55.8	Vertical
226.735	-68.7	-13.0	-55.7	Vertical
338.444	-65.6	-13.0	-52.6	Vertical
468.443	-61.4	-13.0	-48.4	Vertical
701.538	-58.2	-13.0	-45.2	Vertical
35.938	-72.5	-13.0	-59.5	Horizontal
58.233	-69.1	-13.0	-56.1	Horizontal
105.504	-67.7	-13.0	-54.7	Horizontal
223.043	-68.1	-13.0	-55.1	Horizontal
406.762	-63.6	-13.0	-50.6	Horizontal
690.115	-59.3	-13.0	-46.3	Horizontal

Above 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1645.823	-47.5	-13.0	-34.5	Vertical
2472.751	-44.2	-13.0	-31.2	Vertical
4061.178	-44.9	-13.0	-31.9	Vertical
5605.527	-42.3	-13.0	-29.3	Vertical
7062.943	-38.8	-13.0	-25.8	Vertical
8880.433	-36.3	-13.0	-23.3	Vertical
1645.823	-43.6	-13.0	-30.6	Horizontal
2472.751	-45.8	-13.0	-32.8	Horizontal
3606.502	-46.2	-13.0	-33.2	Horizontal
4515.366	-44.0	-13.0	-31.0	Horizontal
6153.646	-40.0	-13.0	-27.0	Horizontal
8749.604	-36.1	-13.0	-23.1	Horizontal

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9.1.2 Test Band = GSM1900

9.1.2.1 Test Mode = GSM/TM1

GSM Below 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
39.528	-67.8	-13.0	-54.8	Vertical
79.028	-65.7	-13.0	-52.7	Vertical
138.555	-63.8	-13.0	-50.8	Vertical
172.082	-60.1	-13.0	-47.1	Vertical
544.818	-62.4	-13.0	-49.4	Vertical
813.865	-58.0	-13.0	-45.0	Vertical
38.001	-67.0	-13.0	-54.0	Horizontal
87.496	-61.7	-13.0	-48.7	Horizontal
131.896	-64.8	-13.0	-51.8	Horizontal
176.662	-58.4	-13.0	-45.4	Horizontal
338.444	-65.6	-13.0	-52.6	Horizontal
603.194	-61.6	-13.0	-48.6	Horizontal

Above 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
3699.687	-41.4	-13.0	-28.4	Vertical
5107.780	-41.9	-13.0	-28.9	Vertical
7322.183	-37.3	-13.0	-24.3	Vertical
8774.732	-36.3	-13.0	-23.3	Vertical
10515.432	-31.6	-13.0	-18.6	Vertical
12399.868	-29.3	-13.0	-16.3	Vertical
3699.687	-43.7	-13.0	-30.7	Horizontal
5035.087	-42.1	-13.0	-29.1	Horizontal
6528.883	-39.2	-13.0	-26.2	Horizontal
7824.060	-37.3	-13.0	-24.3	Horizontal
10036.798	-33.1	-13.0	-20.1	Horizontal
12466.700	-29.5	-13.0	-16.5	Horizontal

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GPRS Below 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
36.413	-70.2	-13.0	-57.2	Vertical
82.746	-71.9	-13.0	-58.9	Vertical
116.808	-67.7	-13.0	-54.7	Vertical
224.512	-68.6	-13.0	-55.6	Vertical
389.765	-67.4	-13.0	-54.4	Vertical
659.110	-62.0	-13.0	-49.0	Vertical
38.126	-70.2	-13.0	-57.2	Horizontal
95.607	-69.4	-13.0	-56.4	Horizontal
217.975	-67.3	-13.0	-54.3	Horizontal
325.368	-67.0	-13.0	-54.0	Horizontal
535.947	-64.1	-13.0	-51.1	Horizontal
764.058	-61.2	-13.0	-48.2	Horizontal

Above 1GHz

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
3996.000	-46.5	-13.0	-33.5	Vertical
5389.850	-44.6	-13.0	-31.6	Vertical
6623.143	-40.3	-13.0	-27.3	Vertical
8542.040	-37.8	-13.0	-24.8	Vertical
10236.579	-34.0	-13.0	-21.0	Vertical
12267.276	-30.4	-13.0	-17.4	Vertical
3897.008	-45.0	-13.0	-32.0	Horizontal
5497.135	-43.4	-13.0	-30.4	Horizontal
6670.781	-40.0	-13.0	-27.0	Horizontal
8315.518	-38.1	-13.0	-25.1	Horizontal
9840.916	-35.2	-13.0	-22.2	Horizontal
12114.377	-30.6	-13.0	-17.6	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) Pretest was performed at the EUT in low, middle, high channel, but only the worst test channel(Channel 192 for GSM850 and Channel 661 for GSM1900)and only the data of the worst case show in the test report.

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10 Appendix_H: Frequency Stability

10.1 For GSM

10.1.1 Frequency Error VS. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	-3.10	-0.00376	PASS
				VN	-8.00	-0.00971	PASS
				VH	0.52	0.00063	PASS
		MCH	TN	VL	-7.74	-0.00925	PASS
				VN	-6.52	-0.00779	PASS
				VH	-5.16	-0.00617	PASS
		HCH	TN	VL	-0.80	-0.00094	PASS
				VN	-5.52	-0.00650	PASS
				VH	-8.94	-0.01053	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-10.09	-0.00545	PASS
				VN	-8.54	-0.00462	PASS
				VH	-2.40	-0.00128	PASS
		MCH	TN	VL	-1.69	-0.00090	PASS
				VN	-7.38	-0.00393	PASS
				VH	-1.05	-0.00055	PASS
		HCH	TN	VL	-8.28	-0.00434	PASS
				VN	-18.93	-0.00991	PASS
				VH	3.80	0.00205	PASS

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10.1.2 Frequency Error VS. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	-1.98	-0.00240	±2.5	PASS
				-20	-1.27	-0.00154	±2.5	PASS
				-10	-1.59	-0.00193	±2.5	PASS
				0	-3.53	-0.00428	±2.5	PASS
				10	1.25	0.00152	±2.5	PASS
				20	2.48	0.00301	±2.5	PASS
				30	2.57	0.00312	±2.5	PASS
				40	1.09	0.00132	±2.5	PASS
				50	6.19	0.00751	±2.5	PASS
		MCH	VN	-30	0.25	0.00030	±2.5	PASS
				-20	2.96	0.00354	±2.5	PASS
				-10	-0.61	-0.00073	±2.5	PASS
				0	-1.96	-0.00234	±2.5	PASS
				10	0.43	0.00051	±2.5	PASS
				20	-1.12	-0.00134	±2.5	PASS
				30	0.94	0.00112	±2.5	PASS
				40	1.52	0.00182	±2.5	PASS
				50	2.36	0.00282	±2.5	PASS
		HCH	VN	-30	0.32	0.00038	±2.5	PASS
				-20	4.97	0.00586	±2.5	PASS
				-10	-0.65	-0.00077	±2.5	PASS
				0	-1.10	-0.00130	±2.5	PASS
				10	-0.84	-0.00099	±2.5	PASS
				20	-1.10	-0.00130	±2.5	PASS
				30	-1.30	-0.00153	±2.5	PASS
				40	-2.20	-0.00259	±2.5	PASS
				50	-0.13	-0.00015	±2.5	PASS

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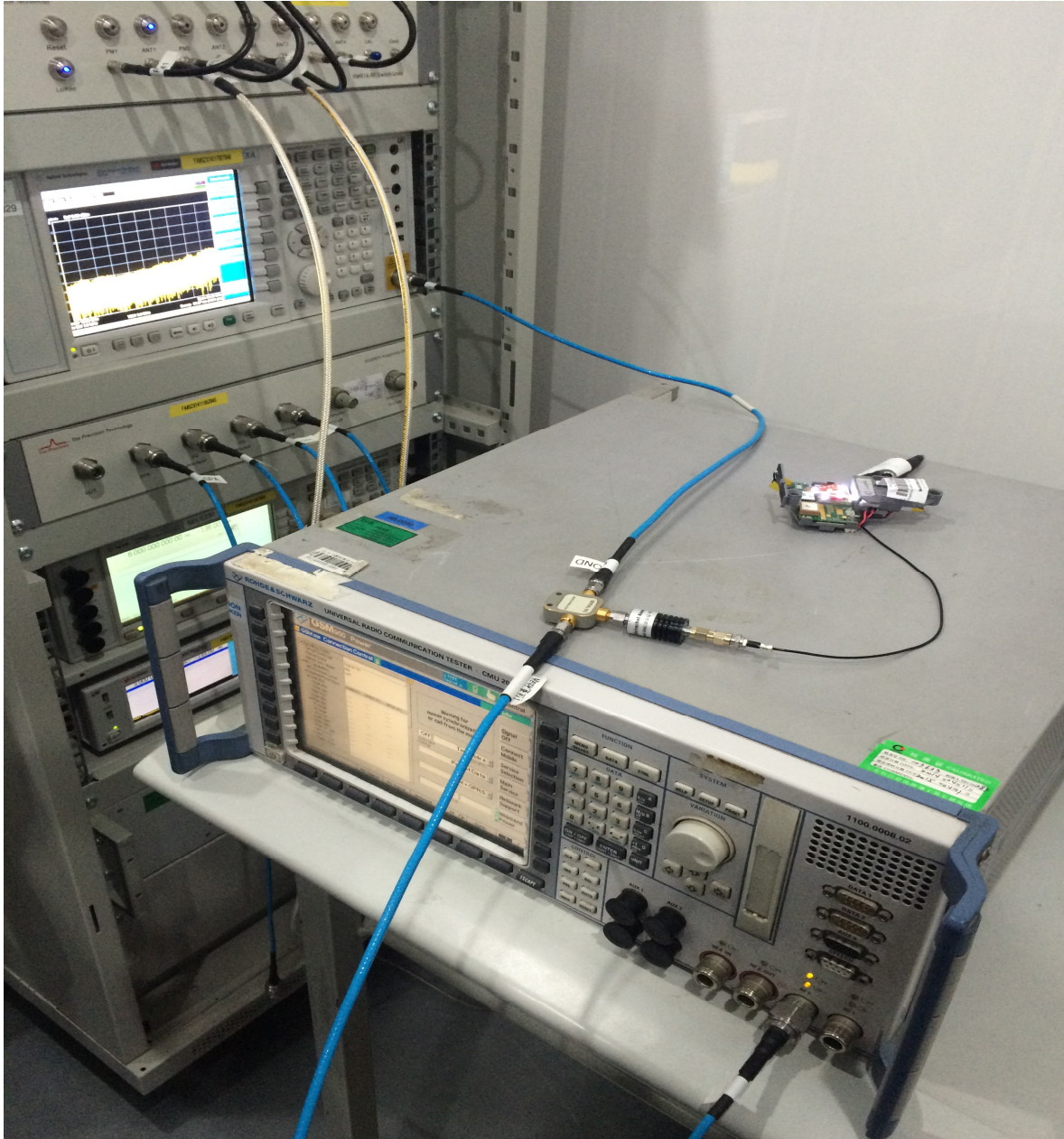
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GSM1900	GSM/TM1	LCH	VN	-30	-14.93	-0.00807	±2.5	PASS
				-20	-8.87	-0.00479	±2.5	PASS
				-10	-14.04	-0.00759	±2.5	PASS
				0	-2.22	-0.00120	±2.5	PASS
				10	1.65	0.00089	±2.5	PASS
				20	-5.06	-0.00273	±2.5	PASS
				30	-13.84	-0.00748	±2.5	PASS
				40	-10.42	-0.00563	±2.5	PASS
				50	1.33	0.00072	±2.5	PASS
		MCH	VN	-30	-5.77	-0.00307	±2.5	PASS
				-20	-7.39	-0.00393	±2.5	PASS
				-10	-13.13	-0.00698	±2.5	PASS
				0	-0.67	-0.00036	±2.5	PASS
				10	-15.33	-0.00815	±2.5	PASS
				20	-7.64	-0.00406	±2.5	PASS
	30			2.43	0.00129	±2.5	PASS	
	40			-8.87	-0.00472	±2.5	PASS	
	50			-11.96	-0.00636	±2.5	PASS	
	HCH	VN	-30	-14.73	-0.00771	±2.5	PASS	
			-20	-5.24	-0.00274	±2.5	PASS	
			-10	-6.79	-0.00356	±2.5	PASS	
			0	-11.76	-0.00616	±2.5	PASS	
			10	1.02	0.00053	±2.5	PASS	
			20	2.57	0.00135	±2.5	PASS	
			30	-6.34	-0.00332	±2.5	PASS	
			40	-13.64	-0.00714	±2.5	PASS	
			50	-2.21	-0.00116	±2.5	PASS	

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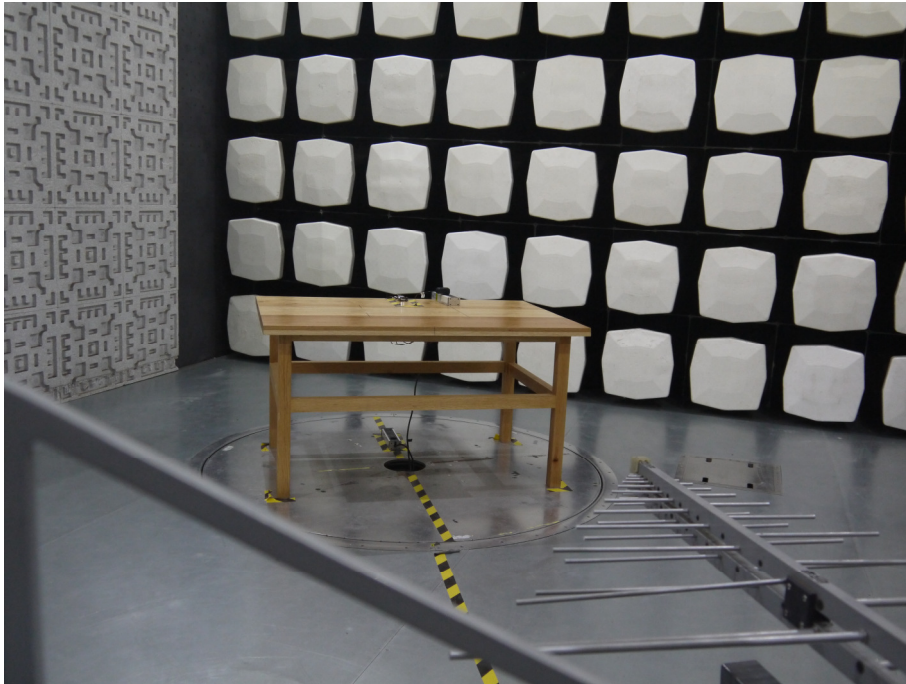
11 Appendix I: Test Setup

RF Conducted Test:



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Tx below 1GHz



Tx above 1GHz



The End

