



Appendix

For

Test Report No.: SZEM1511006808CR

FCC ID:2ADTD-19ABNG

Authorized Signature:



Jack Zhang
EMC Laboratory Manager

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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)		Channel192(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(GPRS) 1TX Slot	33.04	38.5	33.15	38.5	33.12	38.5
GSM/TM1(GPRS) 2TX Slots	31.85	38.5	31.88	38.5	31.86	38.5
GSM/TM1(GPRS) 3TX Slots	28.53	38.5	28.57	38.5	28.56	38.5
GSM/TM1(GPRS) 4TX Slots	27.41	38.5	27.43	38.5	27.46	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 (GPRS)	824.2	32.89	Dipole	38.35	-4.90	0.6	32.85	38.5	Pass
GSM/TM1 (GPRS)	836.6	33.00	Dipole	38.55	-5.02	0.6	32.93	38.5	Pass
GSM/TM1 (GPRS)	848.8	32.97	Dipole	38.48	-5.00	0.6	32.88	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



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Part I – RF Conducted Power of Transmitter for GSM1900

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel512(L)		Channel661(M)		Channel810(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(GPRS) 1TX Slot	30.07	33	30.01	33	29.89	33
GSM/TM1(GPRS) 2TX Slots	28.33	33	28.30	33	28.27	33
GSM/TM1(GPRS) 3TX Slots	26.89	33	26.86	33	26.81	33
GSM/TM1(GPRS) 4TX Slots	25.10	33	25.01	33	24.92	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(EIRP) / dBm	Limit (dBm)	Result
GSM/TM 1 (GPRS)	1850.2	32.07	Horn Ant.	28.53	4.5	1	32.03	33	Pass
GSM/TM 1 (GPRS)	1880.0	32.01	Horn Ant.	28.45	4.5	1	31.95	33	Pass
GSM/TM 1 (GPRS)	1909.8	31.89	Horn Ant.	28.35	4.5	1	31.85	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: RM

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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
GPRS850	GSM/TM1	LCH	0.2	13	PASS
		MCH	0.3	13	PASS
		HCH	0.3	13	PASS
GPRS1900	GSM/TM1	LCH	0.2	13	PASS
		MCH	0.1	13	PASS
		HCH	0.2	13	PASS



5 Appendix_C: Modulation Characteristics

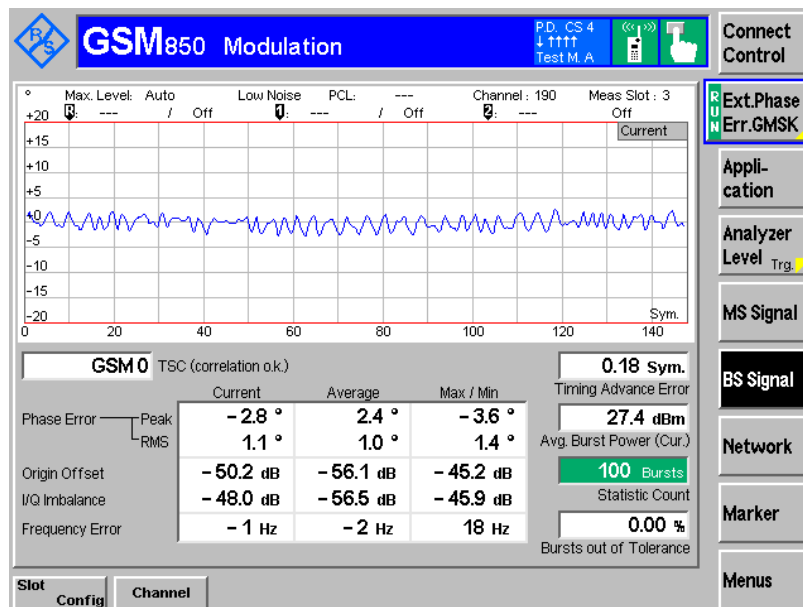
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GPRS850

5.1.1.1 Test Mode = GPRS/TM1

5.1.1.1.1 Test Channel = MCH

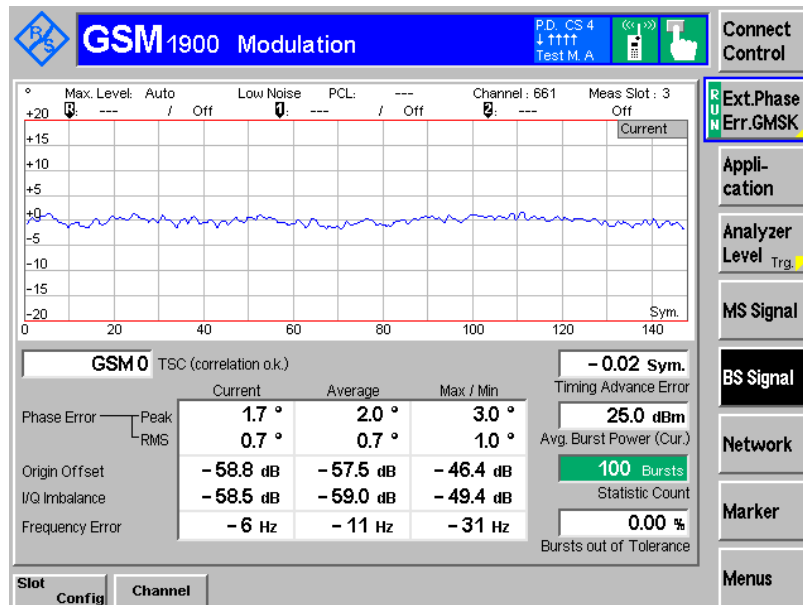




5.1.2 Test Band = GPRS1900

5.1.2.1 Test Mode = GPRS/TM1

5.1.2.1.1 Test Channel = MCH





6 Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GPRS850	GPRS/TM1	LCH	233.83	314.1	PASS
		MCH	236.10	311.1	PASS
		HCH	234.52	309.6	PASS
GPRS1900	GPRS/TM1	LCH	244.31	315.2	PASS
		MCH	242.88	318.6	PASS
		HCH	242.28	315.3	PASS



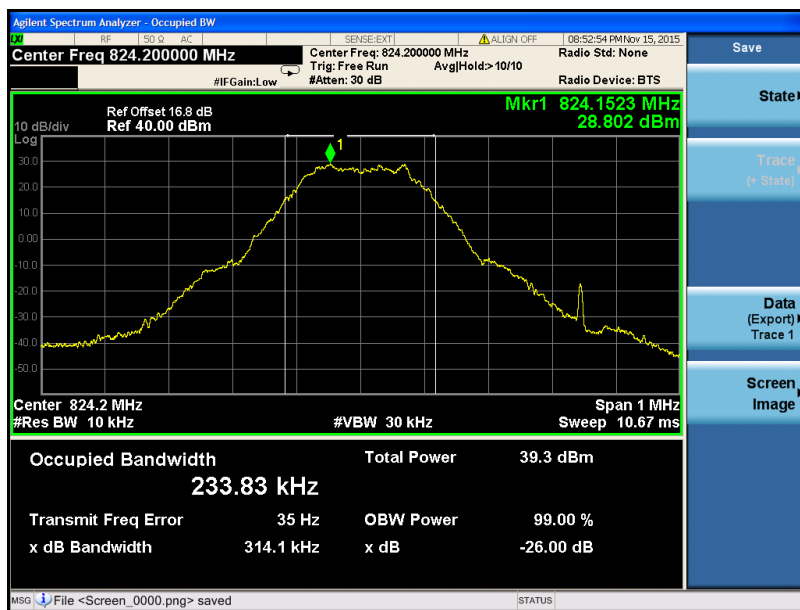
Part II - Test Plots

6.1 For GPRS

6.1.1 Test Band = GPRS850

6.1.1.1 Test Mode = GPRS/TM1

6.1.1.1.1 Test Channel = LCH

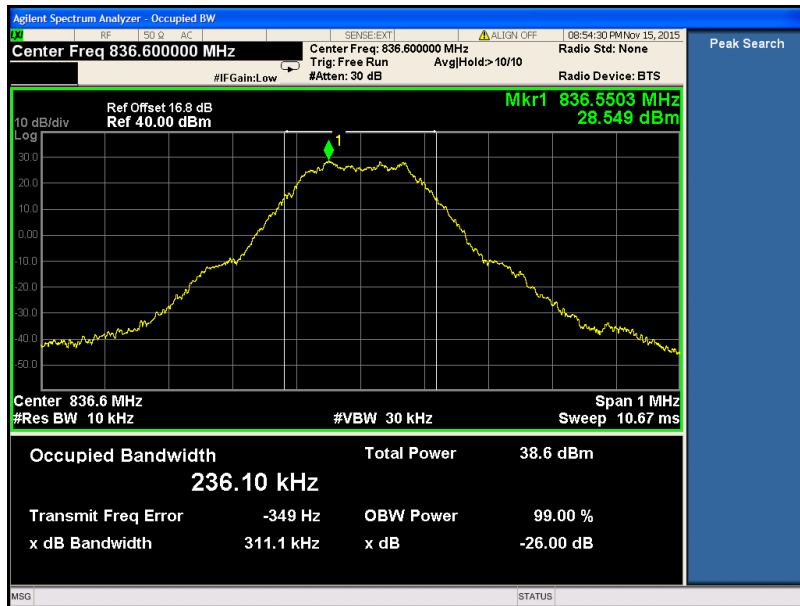




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6.1.1.1.2 Test Channel = MCH



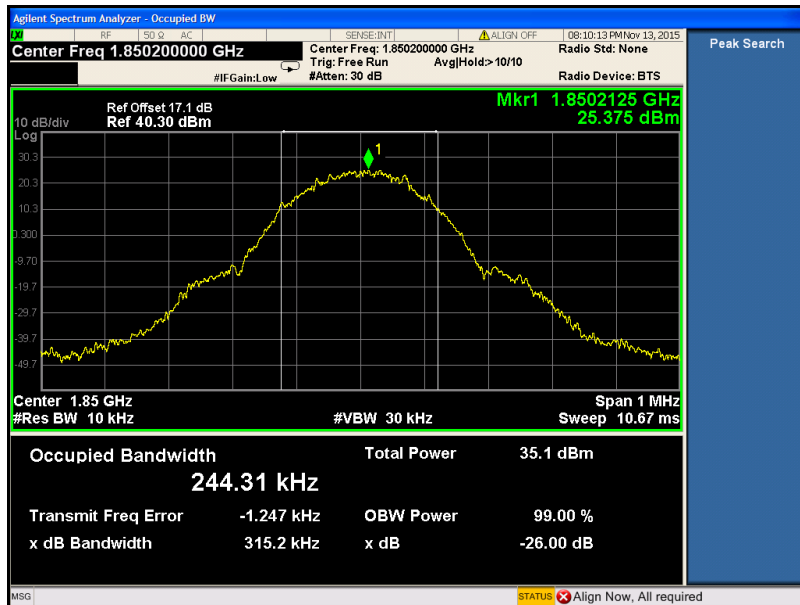
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6.2 Test Band = GPRS1900

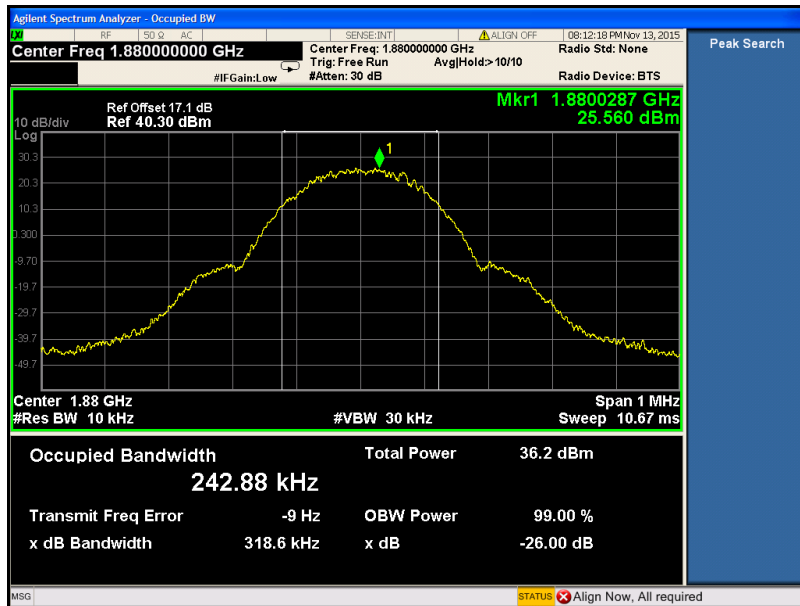
6.2.1.1 Test Mode = GPRS/TM1

6.2.1.1.1 Test Channel = LCH





6.2.1.1.2 Test Channel = MCH



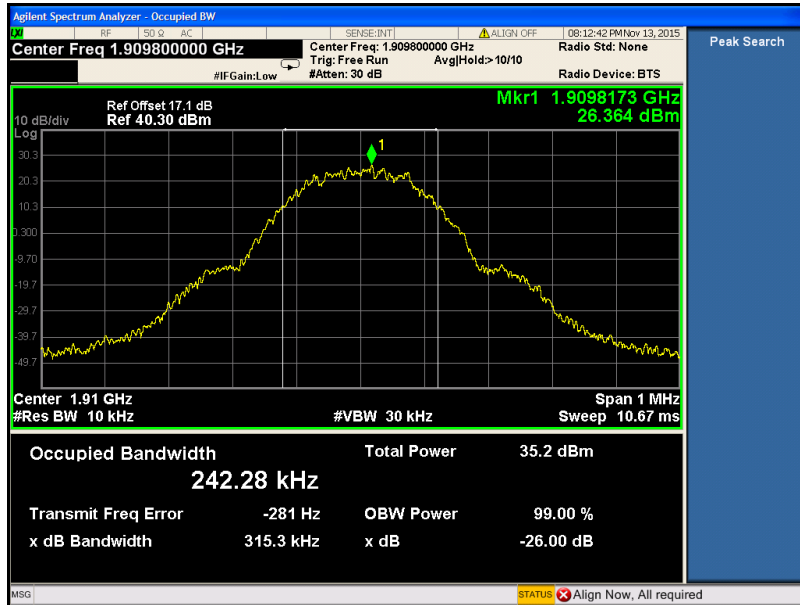


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6.2.1.1.3 Test Channel = HCH



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7 Appendix_E: Band Edges Compliance

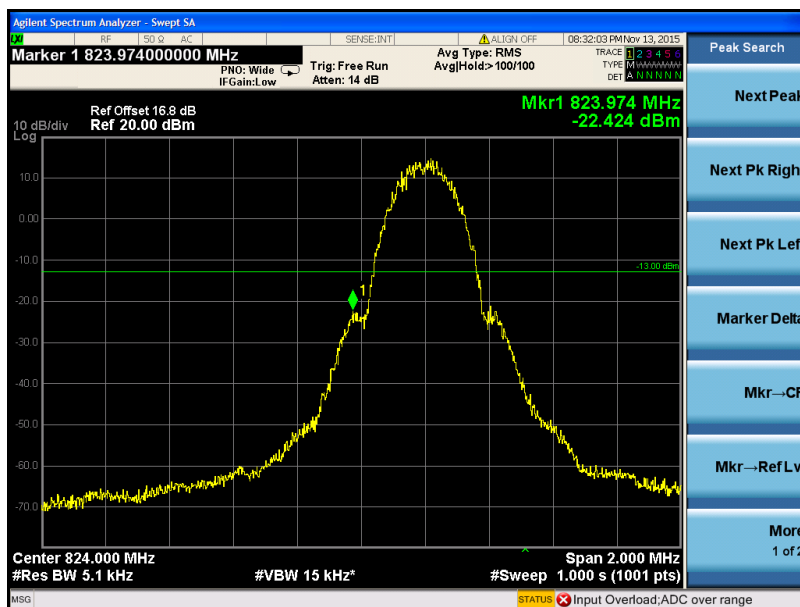
Part I - Test Plots

7.1 For GPRS

7.1.1 Test Band = GPRS850

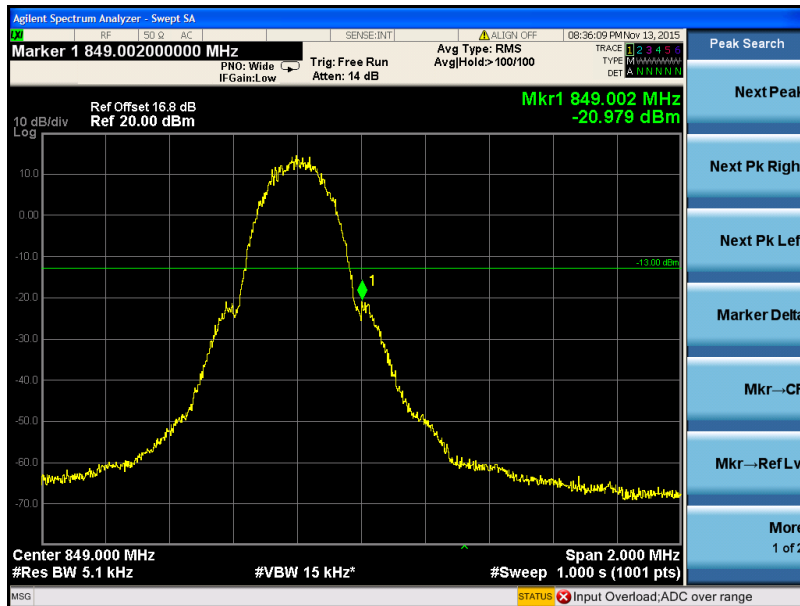
7.1.1.1 Test Mode = GPRS/TM1

7.1.1.1.1 Test Channel = LCH





7.1.1.1.2 Test Channel = HCH

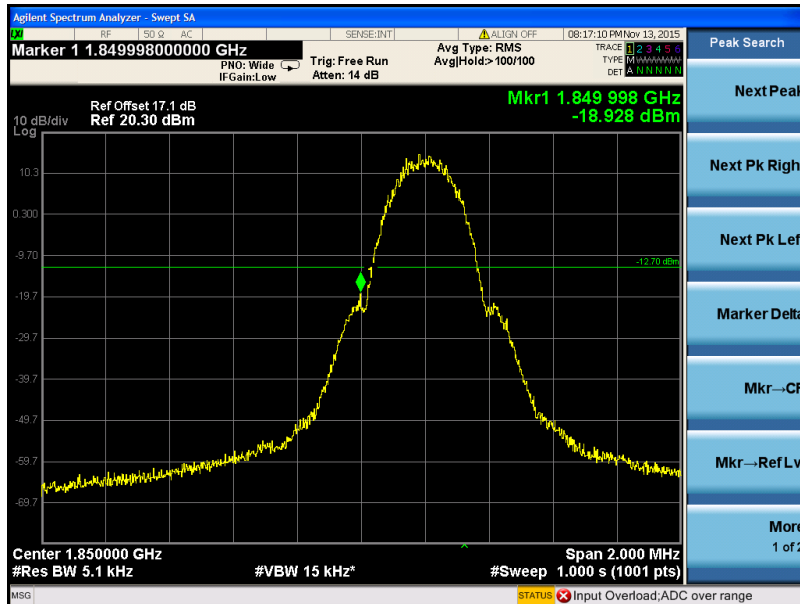




7.1.2 Test Band = GPRS1900

7.1.2.1 Test Mode = GPRS/TM1

7.1.2.1.1 Test Channel = LCH



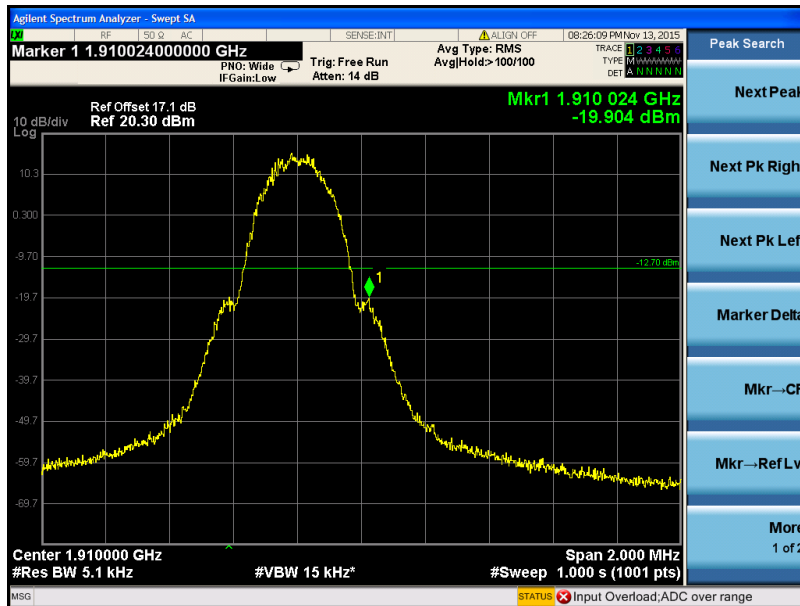


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7.1.2.1.2 Test Channel = HCH



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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.

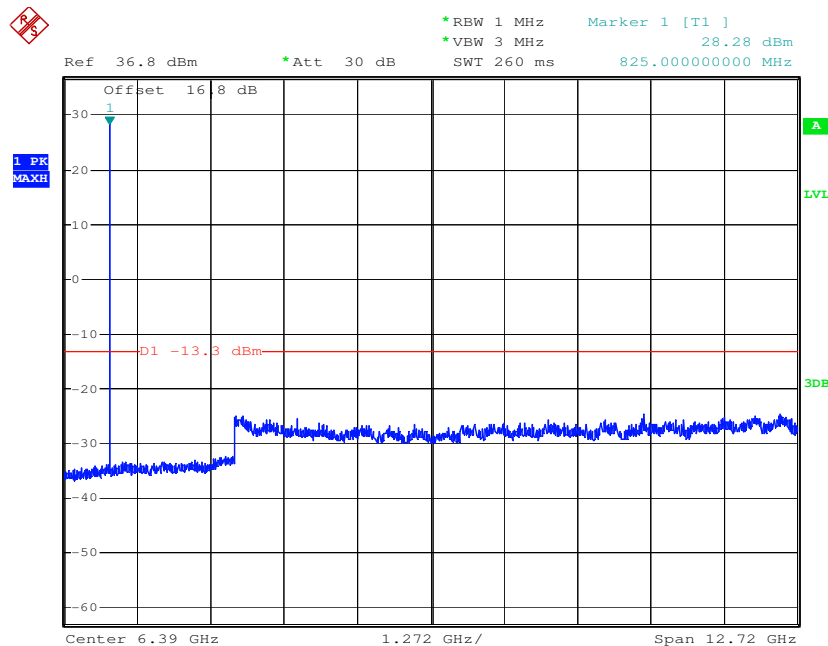
Part I - Test Plots

8.1 For GPRS

8.1.1 Test Band = GPRS850

8.1.1.1 Test Mode = GPRS/TM1

8.1.1.1.1 Test Channel = LCH



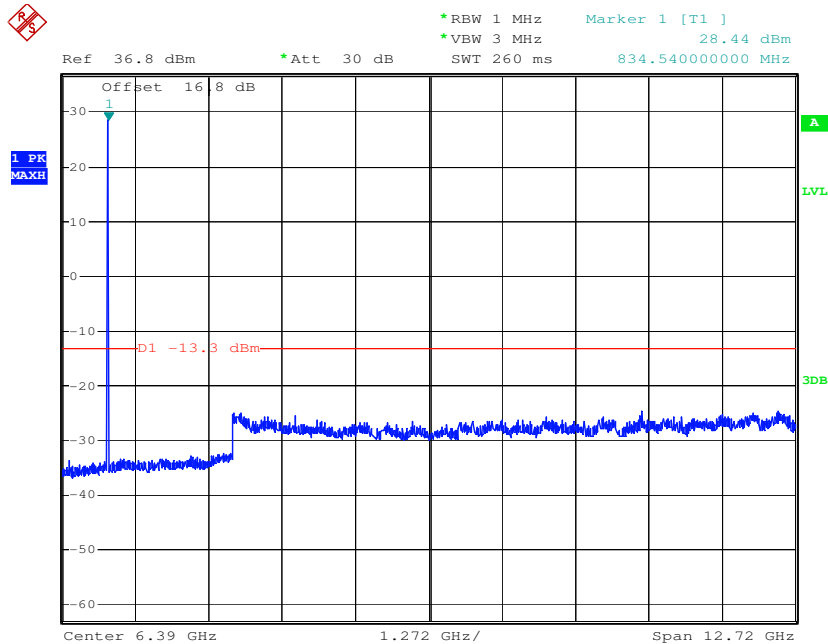


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8.1.1.1.2 Test Channel = MCH



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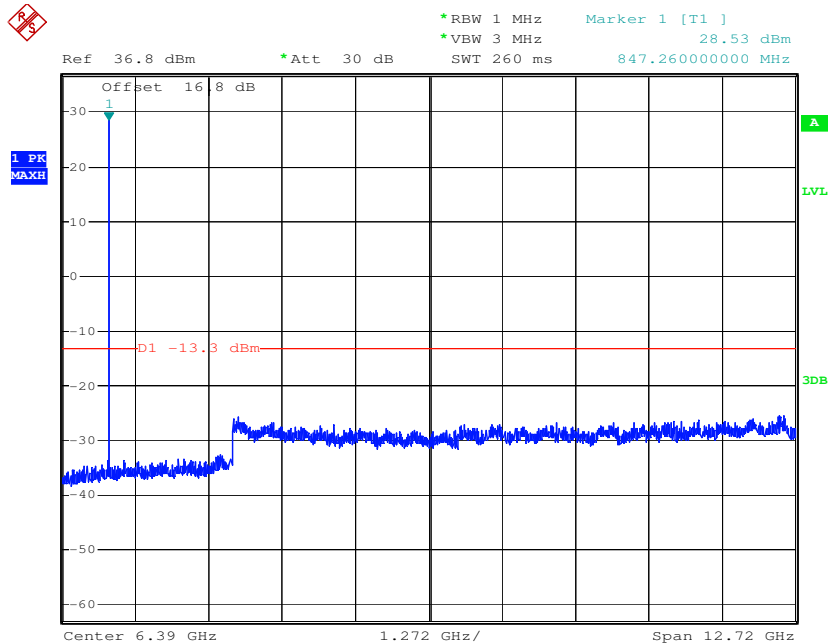


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8.1.1.1.3 Test Channel = HCH



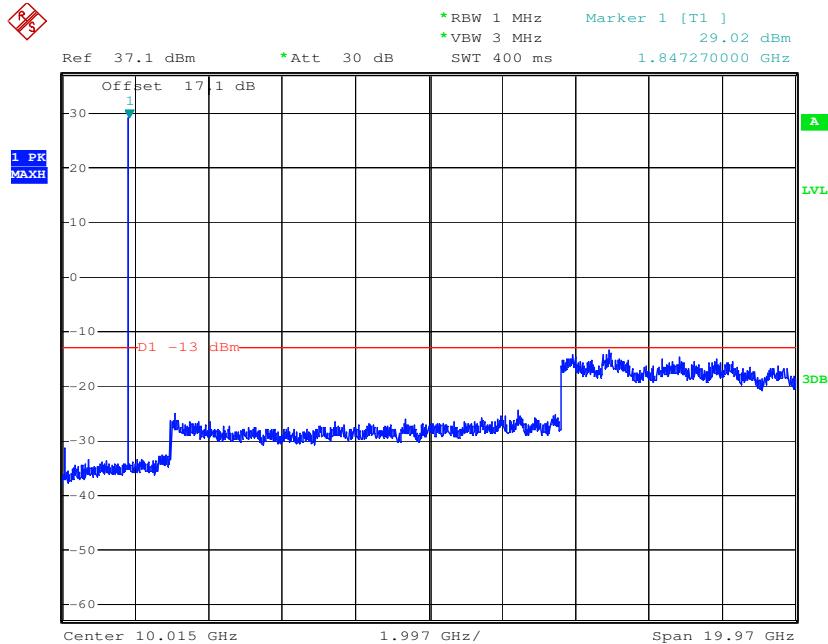
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8.1.2 Test Band = GPRS1900

8.1.2.1 Test Mode = GPRS/TM1

8.1.2.1.1 Test Channel = LCH



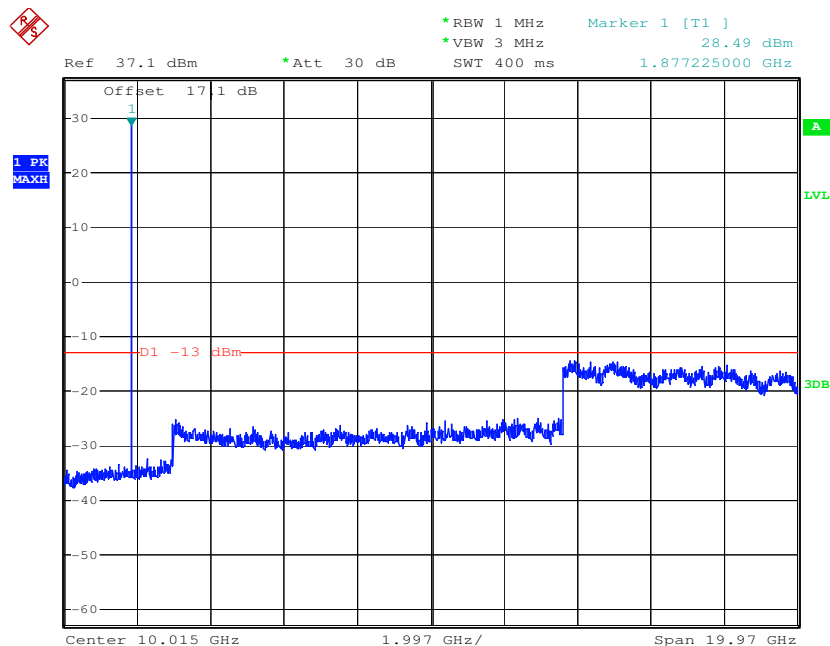


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8.1.2.1.2 Test Channel = MCH



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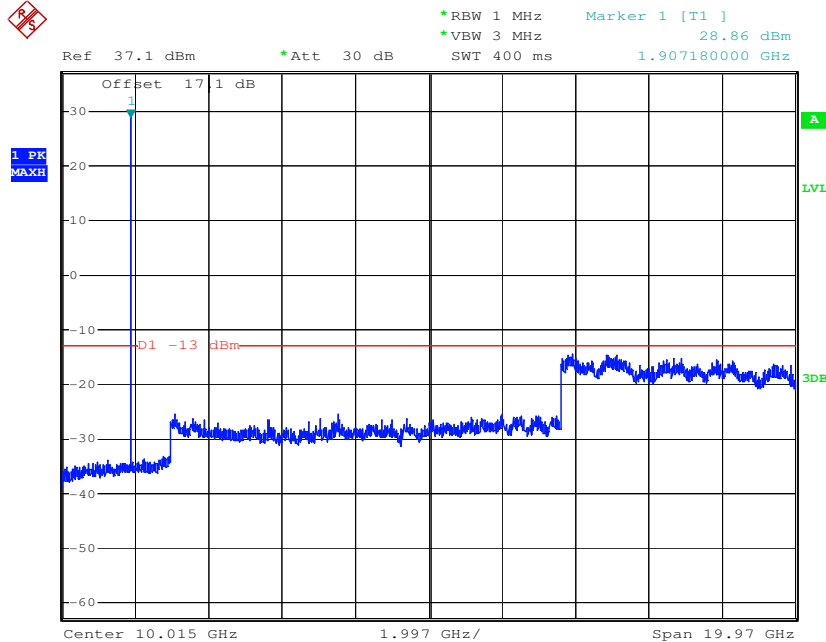


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8.1.2.1.3 Test Channel = HCH



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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

GPRS LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
111.900	-57.6	-13.0	-44.6	Vertical
163.380	-61.7	-13.0	-48.7	Vertical
237.090	-64.0	-13.0	-51.0	Vertical
335.370	-57.7	-13.0	-44.7	Vertical
473.430	-61.5	-13.0	-48.5	Vertical
657.120	-58.7	-13.0	-45.7	Vertical
1648.200	-41.1	-13.0	-28.1	Vertical
2638.200	-35.4	-13.0	-22.4	Vertical
3721.000	-50.1	-13.0	-37.1	Vertical
5618.000	-49.3	-13.0	-36.3	Vertical
7522.000	-48.7	-13.0	-35.7	Vertical
9188.000	-44.1	-13.0	-31.1	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-62.6	-13.0	-49.6	Horizontal
150.510	-58.9	-13.0	-45.9	Horizontal
214.860	-63.1	-13.0	-50.1	Horizontal
316.650	-63.3	-13.0	-50.3	Horizontal
447.690	-68.7	-13.0	-55.7	Horizontal
630.210	-66.9	-13.0	-53.9	Horizontal
1686.000	-43.3	-13.0	-30.3	Horizontal
2438.400	-35.0	-13.0	-22.0	Horizontal
3294.000	-50.9	-13.0	-37.9	Horizontal
4638.000	-48.5	-13.0	-35.5	Horizontal
6486.000	-44.0	-13.0	-31.0	Horizontal
8740.000	-44.5	-13.0	-31.5	Horizontal



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GPRS MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
107.220	-56.8	-13.0	-43.8	Vertical
149.837	-58.3	-13.0	-45.3	Vertical
248.790	-61.3	-13.0	-48.3	Vertical
344.730	-57.4	-13.0	-44.4	Vertical
472.260	-61.2	-13.0	-48.2	Vertical
647.760	-58.6	-13.0	-45.6	Vertical
1673.400	-42.5	-13.0	-29.5	Vertical
2661.600	-34.9	-13.0	-21.9	Vertical
3805.000	-49.9	-13.0	-36.9	Vertical
5247.000	-49.6	-13.0	-36.6	Vertical
6885.000	-47.5	-13.0	-34.5	Vertical
9251.000	-43.8	-13.0	-30.8	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
109.560	-66.0	-13.0	-53.0	Horizontal
150.510	-60.0	-13.0	-47.0	Horizontal
205.500	-71.1	-13.0	-58.1	Horizontal
276.870	-67.0	-13.0	-54.0	Horizontal
434.820	-70.7	-13.0	-57.7	Horizontal
647.760	-67.3	-13.0	-54.3	Horizontal
1745.400	-42.9	-13.0	-29.9	Horizontal
2614.800	-36.9	-13.0	-23.9	Horizontal
3679.000	-52.4	-13.0	-39.4	Horizontal
4666.000	-48.8	-13.0	-35.8	Horizontal
6451.000	-44.9	-13.0	-31.9	Horizontal
8740.000	-45.1	-13.0	-32.1	Horizontal

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GPRS HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-53.9	-13.0	-40.9	Vertical
149.340	-58.1	-13.0	-45.1	Vertical
249.960	-61.7	-13.0	-48.7	Vertical
359.940	-57.7	-13.0	-44.7	Vertical
475.770	-61.7	-13.0	-48.7	Vertical
673.500	-57.3	-13.0	-44.3	Vertical
1639.200	-44.8	-13.0	-31.8	Vertical
2622.000	-35.9	-13.0	-22.9	Vertical
3644.000	-51.7	-13.0	-38.7	Vertical
4729.000	-51.8	-13.0	-38.8	Vertical
6682.000	-47.8	-13.0	-34.8	Vertical
9258.000	-44.5	-13.0	-31.5	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-64.8	-13.0	-51.8	Horizontal
149.340	-57.4	-13.0	-44.4	Horizontal
217.200	-63.3	-13.0	-50.3	Horizontal
317.820	-62.4	-13.0	-49.4	Horizontal
452.370	-67.9	-13.0	-54.9	Horizontal
632.550	-66.3	-13.0	-53.3	Horizontal
1623.000	-45.2	-13.0	-32.2	Horizontal
2600.400	-36.8	-13.0	-23.8	Horizontal
3574.000	-51.8	-13.0	-38.8	Horizontal
5198.000	-49.9	-13.0	-36.9	Horizontal
7277.000	-45.2	-13.0	-32.2	Horizontal
9489.000	-44.4	-13.0	-31.4	Horizontal

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9.1.2 Test Band = GPRS1900

9.1.2.1 Test Mode = GPRS/TM1

GPRS LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-56.9	-13.0	-43.9	Vertical
150.510	-60.0	-13.0	-47.0	Vertical
256.980	-67.8	-13.0	-54.8	Vertical
451.200	-67.8	-13.0	-54.8	Vertical
624.360	-66.8	-13.0	-53.8	Vertical
853.680	-62.0	-13.0	-49.0	Vertical
3720.000	-48.4	-13.0	-35.4	Vertical
5550.000	-42.5	-13.0	-29.5	Vertical
7500.000	-48.0	-13.0	-35.0	Vertical
9300.000	-44.6	-13.0	-31.6	Vertical
12015.000	-40.3	-13.0	-27.3	Vertical
15915.000	-32.7	-13.0	-19.7	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
150.510	-58.9	-13.0	-45.9	Horizontal
218.370	-64.3	-13.0	-51.3	Horizontal
318.990	-63.4	-13.0	-50.4	Horizontal
443.010	-69.7	-13.0	-56.7	Horizontal
657.120	-66.2	-13.0	-53.2	Horizontal
919.200	-61.1	-13.0	-48.1	Horizontal
3690.000	-50.9	-13.0	-37.9	Horizontal
5550.000	-42.1	-13.0	-29.1	Horizontal
7410.000	-46.4	-13.0	-33.4	Horizontal
9285.000	-44.1	-13.0	-31.1	Horizontal
11685.000	-40.3	-13.0	-27.3	Horizontal
15270.000	-36.5	-13.0	-23.5	Horizontal



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GPRS MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
148.188	-64.7	-13.0	-51.7	Vertical
219.540	-69.8	-13.0	-56.8	Vertical
329.520	-65.3	-13.0	-52.3	Vertical
451.200	-68.1	-13.0	-55.1	Vertical
634.890	-67.1	-13.0	-54.1	Vertical
927.390	-61.5	-13.0	-48.5	Vertical
3750.000	-49.0	-13.0	-36.0	Vertical
5640.000	-42.9	-13.0	-29.9	Vertical
7605.000	-47.5	-13.0	-34.5	Vertical
9525.000	-44.9	-13.0	-31.9	Vertical
12645.000	-40.9	-13.0	-27.9	Vertical
15885.000	-33.4	-13.0	-20.4	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-62.9	-13.0	-49.9	Horizontal
150.510	-58.6	-13.0	-45.6	Horizontal
217.200	-66.0	-13.0	-53.0	Horizontal
365.790	-62.2	-13.0	-49.2	Horizontal
568.200	-68.0	-13.0	-55.0	Horizontal
844.320	-63.4	-13.0	-50.4	Horizontal
3615.000	-53.5	-13.0	-40.5	Horizontal
5640.000	-44.5	-13.0	-31.5	Horizontal
7410.000	-46.0	-13.0	-33.0	Horizontal
9270.000	-45.1	-13.0	-32.1	Horizontal
12345.000	-39.5	-13.0	-26.5	Horizontal
15975.000	-33.0	-13.0	-20.0	Horizontal

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GPRS HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-57.0	-13.0	-44.0	Vertical
149.340	-60.1	-13.0	-47.1	Vertical
285.060	-67.8	-13.0	-54.8	Vertical
451.200	-67.6	-13.0	-54.6	Vertical
632.550	-66.8	-13.0	-53.8	Vertical
933.240	-61.2	-13.0	-48.2	Vertical
3810.000	-44.1	-13.0	-31.1	Vertical
5730.000	-44.0	-13.0	-31.0	Vertical
7665.000	-47.5	-13.0	-34.5	Vertical
9540.000	-45.0	-13.0	-32.0	Vertical
12570.000	-40.1	-13.0	-27.1	Vertical
15990.000	-33.1	-13.0	-20.1	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.710	-64.5	-13.0	-51.5	Horizontal
150.510	-58.4	-13.0	-45.4	Horizontal
289.740	-67.5	-13.0	-54.5	Horizontal
454.710	-68.9	-13.0	-55.9	Horizontal
666.480	-66.2	-13.0	-53.2	Horizontal
947.280	-62.3	-13.0	-49.3	Horizontal
3810.000	-45.9	-13.0	-32.9	Horizontal
5730.000	-46.8	-13.0	-33.8	Horizontal
7395.000	-46.3	-13.0	-33.3	Horizontal
9390.000	-45.3	-13.0	-32.3	Horizontal
12045.000	-40.5	-13.0	-27.5	Horizontal
15825.000	-32.9	-13.0	-19.9	Horizontal

NOTE:

- 1) The disturbance above 16GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



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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
GPRS850	GPRS/TM ₁	LCH	TN	VL	5.00	0.00607	PASS
				VN	12.00	0.01456	PASS
				VH	-1.00	-0.00121	PASS
		MCH	TN	VL	4.00	0.00478	PASS
				VN	0.00	0.00000	PASS
				VH	2.10	0.00251	PASS
		HCH	TN	VL	8.00	0.00943	PASS
				VN	6.00	0.00707	PASS
				VH	3.30	0.00389	PASS
GPRS1900	GPRS/TM ₁	LCH	TN	VL	-4.00	-0.00216	PASS
				VN	-11.00	-0.00595	PASS
				VH	2.00	0.00108	PASS
		MCH	TN	VL	5.00	0.00266	PASS
				VN	-8.00	-0.00426	PASS
				VH	4.00	0.00213	PASS
		HCH	TN	VL	9.00	0.00471	PASS
				VN	-3.00	-0.00157	PASS
				VH	-3.00	-0.00157	PASS



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
GPRS850	GPRS/TM1	LCH	VN	-30	-1.81	-0.00220	±2.5	PASS
				-20	-1.10	-0.00133	±2.5	PASS
				-10	-1.42	-0.00172	±2.5	PASS
				0	-3.36	-0.00408	±2.5	PASS
				10	1.42	0.00172	±2.5	PASS
				20	2.65	0.00322	±2.5	PASS
				30	2.32	0.00281	±2.5	PASS
				40	0.84	0.00102	±2.5	PASS
				50	5.94	0.00721	±2.5	PASS
		MCH	VN	-30	0.00	0.00000	±2.5	PASS
				-20	2.71	0.00324	±2.5	PASS
				-10	-0.52	-0.00062	±2.5	PASS
				0	-1.87	-0.00224	±2.5	PASS
				10	0.52	0.00062	±2.5	PASS
				20	-1.03	-0.00123	±2.5	PASS
				30	1.03	0.00123	±2.5	PASS
				40	1.61	0.00192	±2.5	PASS
				50	2.45	0.00293	±2.5	PASS
		HCH	VN	-30	0.26	0.00031	±2.5	PASS
				-20	4.91	0.00578	±2.5	PASS
				-10	-0.71	-0.00084	±2.5	PASS
				0	-1.16	-0.00137	±2.5	PASS
				10	-0.90	-0.00106	±2.5	PASS
				20	-1.16	-0.00137	±2.5	PASS
				30	-1.36	-0.00160	±2.5	PASS
				40	-2.26	-0.00266	±2.5	PASS
				50	-0.19	-0.00022	±2.5	PASS



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GPRS1900	GPRS/TM1	LCH	VN	-30	2.70	0.00327	±2.5	PASS
				-20	1.47	0.00178	±2.5	PASS
				-10	0.61	0.00074	±2.5	PASS
				0	-2.70	-0.00327	±2.5	PASS
				10	0.55	0.00067	±2.5	PASS
				20	-1.86	-0.00225	±2.5	PASS
				30	1.62	0.00196	±2.5	PASS
				40	-0.07	-0.00008	±2.5	PASS
				50	-1.20	-0.00145	±2.5	PASS
		MCH	VN	-30	-1.95	-0.00233	±2.5	PASS
				-20	-1.22	-0.00146	±2.5	PASS
				-10	-0.48	-0.00057	±2.5	PASS
				0	-1.49	-0.00178	±2.5	PASS
				10	2.19	0.00262	±2.5	PASS
				20	1.61	0.00192	±2.5	PASS
				30	1.50	0.00179	±2.5	PASS
				40	-0.04	-0.00005	±2.5	PASS
				50	-0.50	-0.00060	±2.5	PASS
		HCH	VN	-30	-0.30	-0.00035	±2.5	PASS
				-20	0.52	0.00061	±2.5	PASS
				-10	0.72	0.00085	±2.5	PASS
				0	-1.38	-0.00163	±2.5	PASS
				10	1.71	0.00202	±2.5	PASS
				20	-2.67	-0.00315	±2.5	PASS
				30	2.81	0.00332	±2.5	PASS
				40	-0.42	-0.00050	±2.5	PASS
				50	-2.45	-0.00289	±2.5	PASS

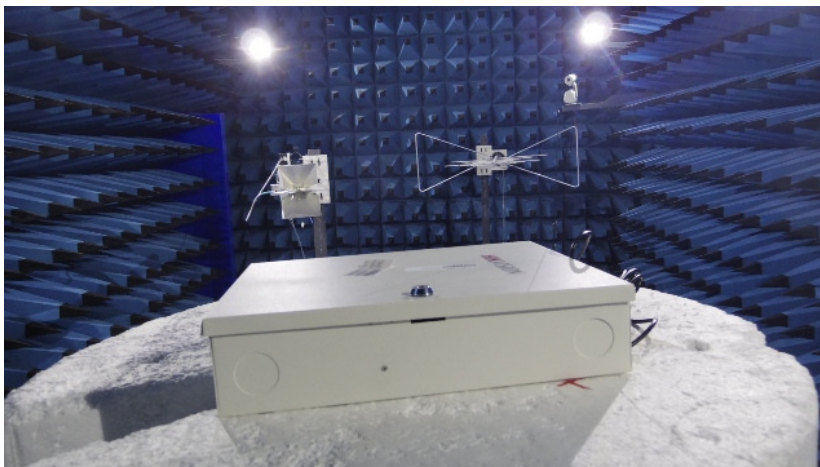
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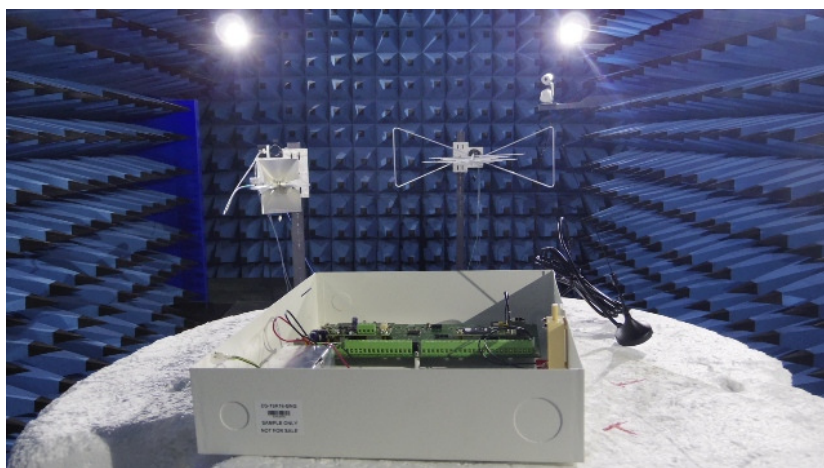
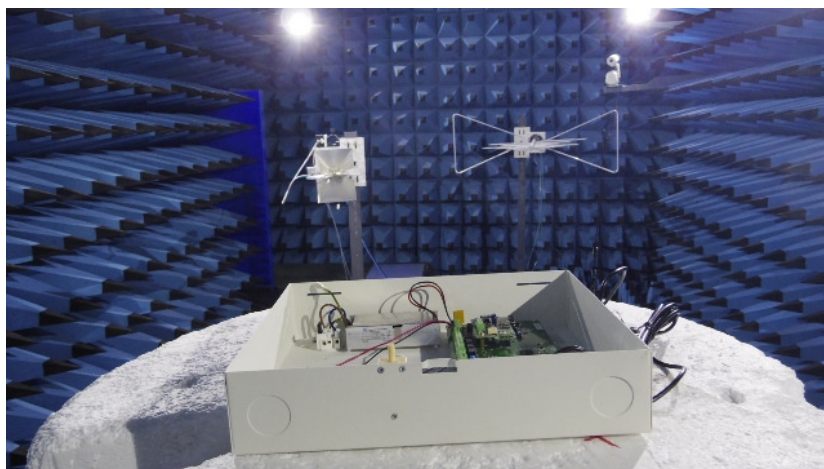
11 Appendix I: Test Setup

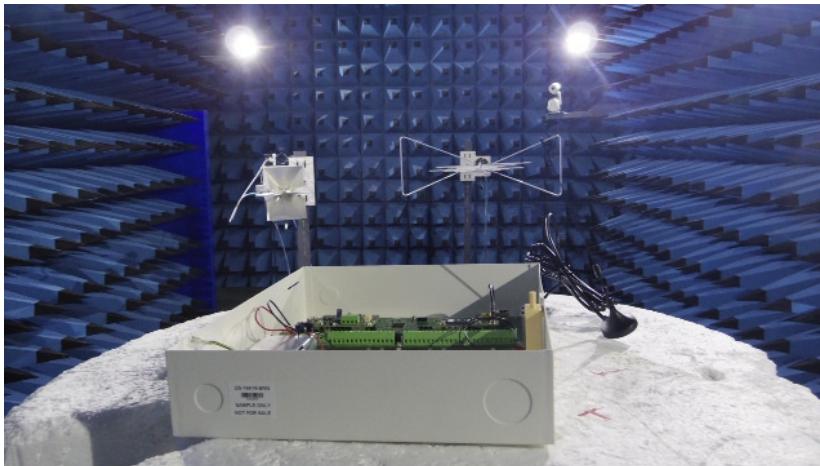
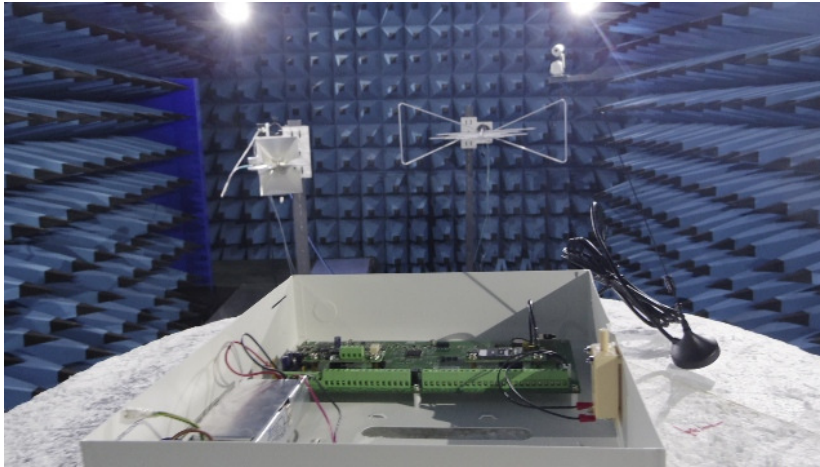
RF Conducted Test:



RSE







The End