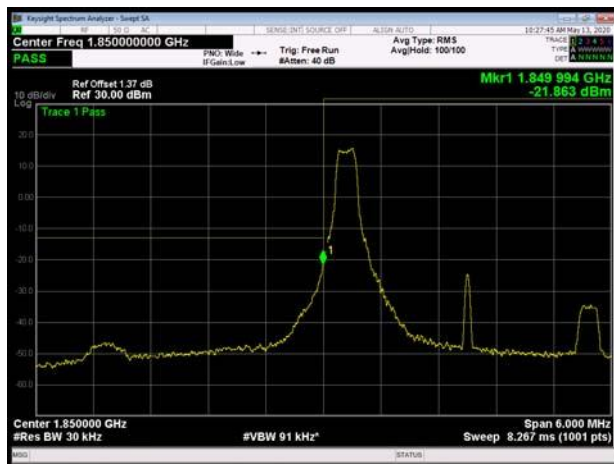
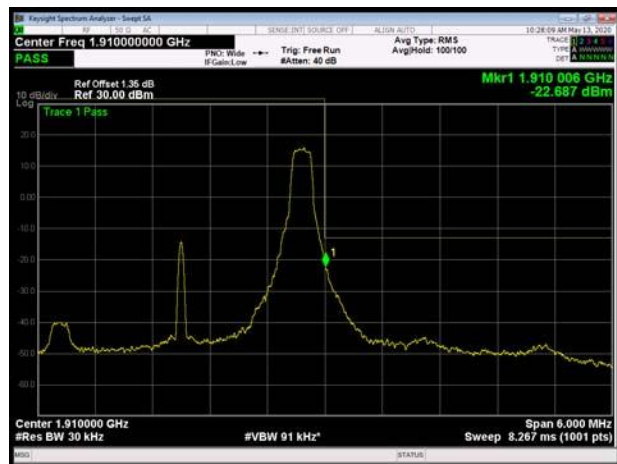




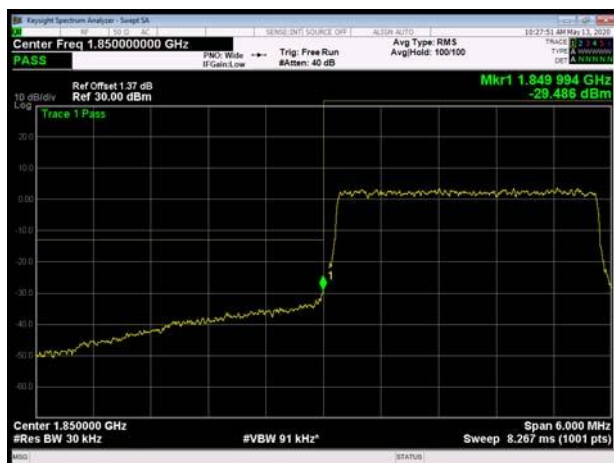
LTE Band 2 3MHz 16QAM 1RB CH-Low



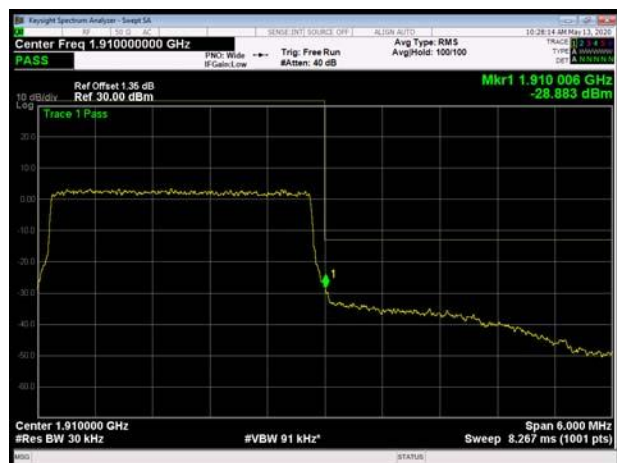
LTE Band 2 3MHz 16QAM 1RB CH-High



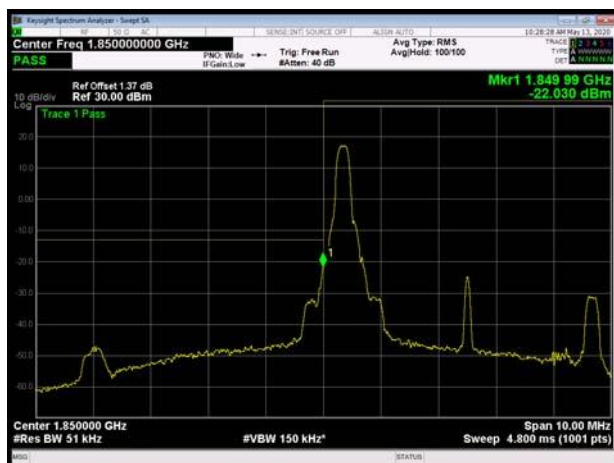
LTE Band 2 3MHz 16QAM 100%RB CH-Low



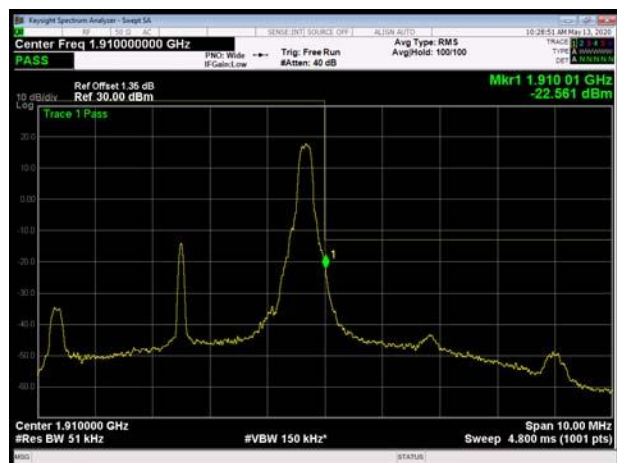
LTE Band 2 3MHz 16QAM 100%RB CH-High



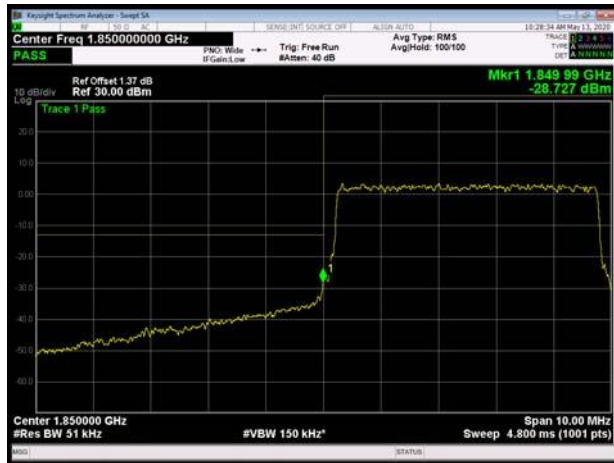
LTE Band 2 5MHz 16QAM 1RB CH-Low



LTE Band 2 5MHz 16QAM 1RB CH-High



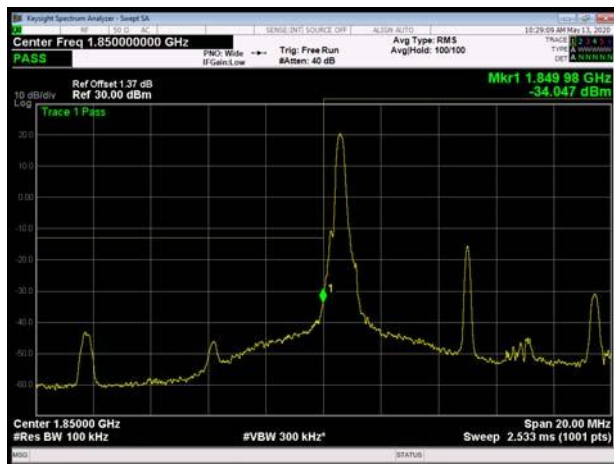
LTE Band 2 5MHz 16QAM 100%RB CH-Low



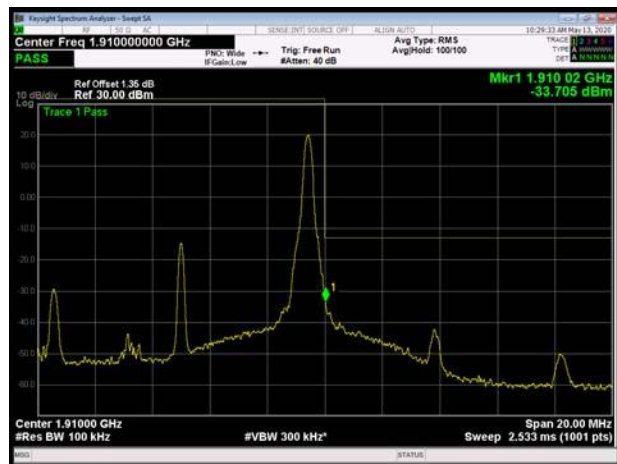
LTE Band 2 5MHz 16QAM 100%RB CH-High



LTE Band 2 10MHz 16QAM 1RB CH-Low



LTE Band 2 10MHz 16QAM 1RB CH-High



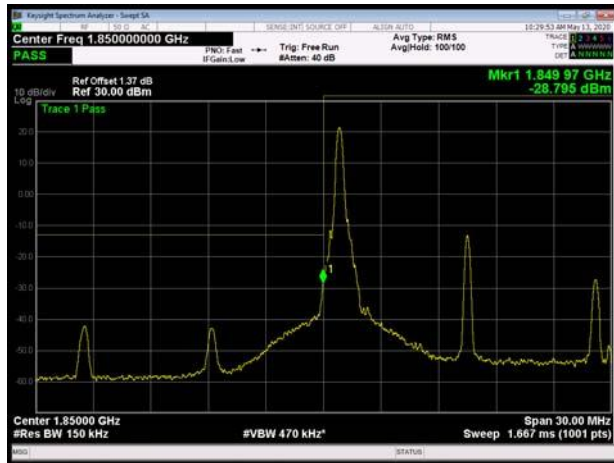
LTE Band 2 10MHz 16QAM 100%RB CH-Low



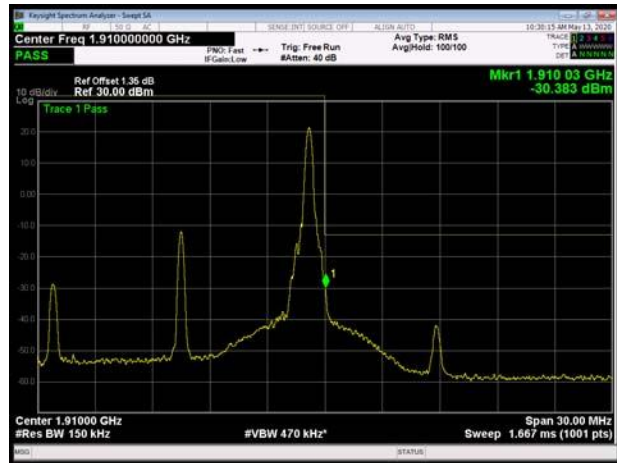
LTE Band 2 10MHz 16QAM 100%RB CH-High



LTE Band 2 15MHz 16QAM 1RB CH-Low



LTE Band 2 15MHz 16QAM 1RB CH-High



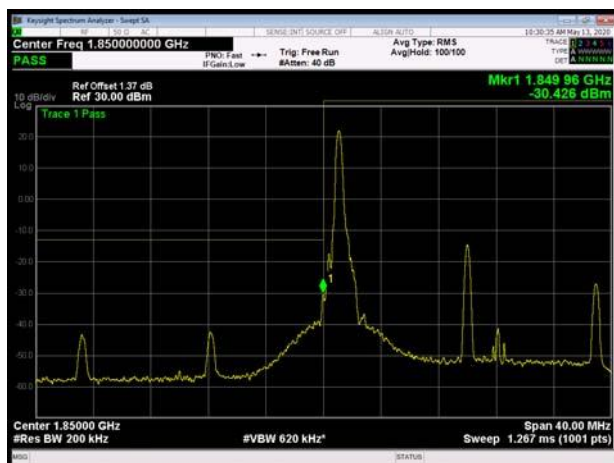
LTE Band 2 15MHz 16QAM 100%RB CH-Low



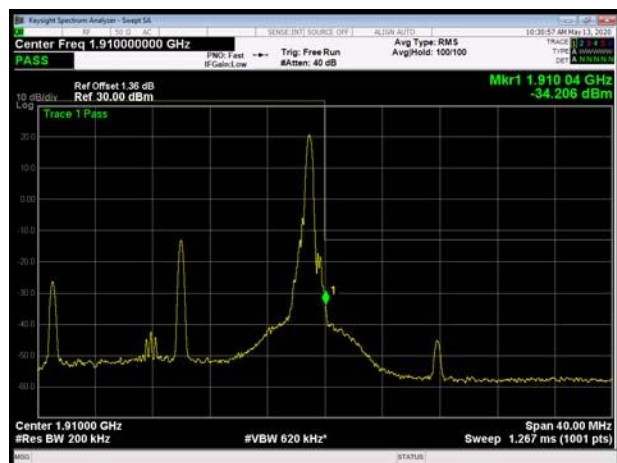
LTE Band 2 15MHz 16QAM 100%RB CH-High



LTE Band 2 20MHz 16QAM 1RB CH-Low



LTE Band 2 20MHz 16QAM 1RB CH-High





LTE Band 2 20MHz 16QAM 100%RB CH-Low



LTE Band 2 20MHz 16QAM 100%RB CH-High



5.4. Peak-to-Average Power Ratio (PAPR)

Ambient condition

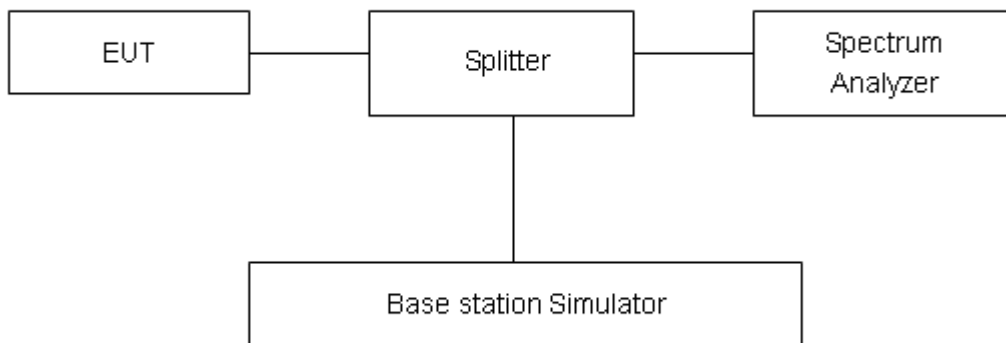
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = \text{PPk (dBm)} - \text{PAvg (dBm)}.$$

Test Setup



Limits

In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB in 24.232(d).

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.4$ dB.

**Test Results**

Mode	Channel	Frequency (MHz)	Peak(dBm)	Avg(dBm)	PAPR(dB)	Limit(dB)	Conclusion
GSM 1900 (GSM)	512	1850.2	30.68	29.80	0.88	≤13	PASS
	661	1880	30.75	29.86	0.89	≤13	PASS
	810	1909.8	30.75	29.91	0.84	≤13	PASS
GPRS 1900 (GMSK)	512	1850.2	30.51	29.57	0.94	≤13	PASS
	661	1880	30.58	29.61	0.97	≤13	PASS
	810	1909.8	30.62	29.71	0.91	≤13	PASS
EGPRS 1900 (8-PSK)	512	1850.2	30.54	29.51	1.03	≤13	PASS
	661	1880	30.73	29.64	1.09	≤13	PASS
	810	1909.8	30.83	29.68	1.15	≤13	PASS
WCDMA Band II (RMC)	9262	1852.4	26.82	23.78	3.04	≤13	PASS
	9400	1880	26.84	23.78	3.06	≤13	PASS
	9538	1907.6	26.68	23.57	3.11	≤13	PASS



LTE Band 2								
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
QPSK	1.4	18607	1850.7	27.40	22.41	4.99	≤13	PASS
		18900	1880.0	27.48	22.65	4.83	≤13	PASS
		19193	1909.3	27.11	22.27	4.84	≤13	PASS
	3	18615	1851.5	27.57	22.44	5.13	≤13	PASS
		18900	1880	27.56	22.62	4.94	≤13	PASS
		19185	1908.5	27.33	22.30	5.03	≤13	PASS
	5	18625	1852.5	27.50	22.42	5.08	≤13	PASS
		18900	1880	27.52	22.61	4.91	≤13	PASS
		19175	1907.5	27.30	22.28	5.02	≤13	PASS
	10	18650	1855	27.61	22.50	5.11	≤13	PASS
		18900	1880	27.58	22.63	4.95	≤13	PASS
		19150	1905	27.44	22.32	5.12	≤13	PASS
	15	18675	1857.5	27.71	22.48	5.23	≤13	PASS
		18900	1880	27.54	22.59	4.95	≤13	PASS
		19125	1902.5	27.53	22.27	5.26	≤13	PASS
	20	18700	1860	27.66	22.45	5.21	≤13	PASS
		18900	1880	27.55	22.54	5.01	≤13	PASS
		19100	1900	27.47	22.23	5.24	≤13	PASS
16QAM	1.4	18607	1850.7	27.19	21.39	5.80	≤13	PASS
		18900	1880.0	27.19	21.57	5.62	≤13	PASS
		19193	1909.3	27.21	21.59	5.62	≤13	PASS
	3	18615	1851.5	27.33	21.42	5.91	≤13	PASS
		18900	1880	27.24	21.50	5.74	≤13	PASS
		19185	1908.5	27.47	21.62	5.85	≤13	PASS
	5	18625	1852.5	27.24	21.40	5.84	≤13	PASS
		18900	1880	27.12	21.46	5.66	≤13	PASS
		19175	1907.5	27.35	21.57	5.78	≤13	PASS
	10	18650	1855	27.28	21.43	5.85	≤13	PASS
		18900	1880	27.21	21.51	5.70	≤13	PASS
		19150	1905	27.55	21.61	5.94	≤13	PASS
	15	18675	1857.5	27.33	21.40	5.93	≤13	PASS
		18900	1880	27.13	21.46	5.67	≤13	PASS
		19125	1902.5	27.58	21.57	6.01	≤13	PASS
	20	18700	1860	27.34	21.38	5.96	≤13	PASS
		18900	1880	27.17	21.42	5.75	≤13	PASS
		19100	1900	27.59	21.54	6.05	≤13	PASS

5.5.Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -40°C to +85°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -40°C to +85°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

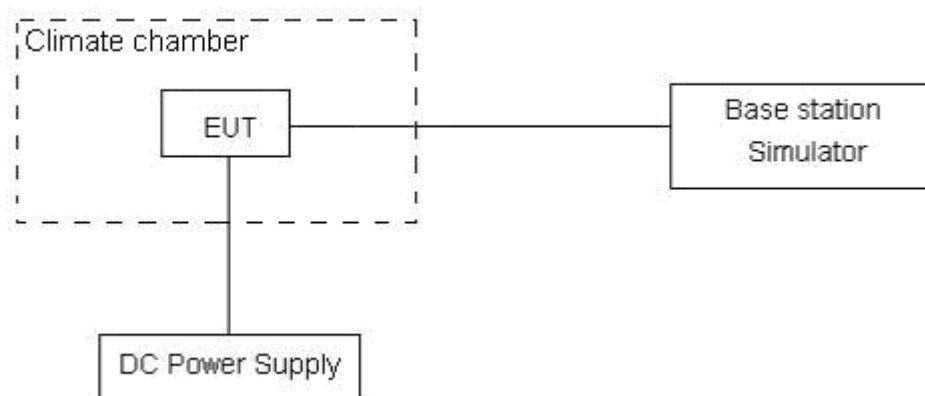
The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.3 V and 4.3 V, with a nominal voltage of 3.8V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 3$, $U = 0.01\text{ppm}$.

Test Result

GSM1900						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	GMSK	8PSK	GMSK	8PSK	
Normal (25℃)	Normal	2.14	6.56	0.00114	0.00349	PASS
Extreme (85℃)		7.91	16.38	0.00421	0.00871	PASS
Extreme (80℃)		16.72	3.49	0.00890	0.00186	PASS
Extreme (70℃)		14.12	9.88	0.00751	0.00525	PASS
Extreme (60℃)		16.54	3.55	0.00880	0.00189	PASS
Extreme (50℃)		9.53	7.64	0.00507	0.00407	PASS
Extreme (40℃)		16.77	7.62	0.00892	0.00406	PASS
Extreme (30℃)		16.01	12.86	0.00851	0.00684	PASS
Extreme (20℃)		4.27	3.09	0.00227	0.00164	PASS
Extreme (10℃)		17.72	8.65	0.00942	0.00460	PASS
Extreme (0℃)		11.98	14.42	0.00637	0.00767	PASS
Extreme (-10℃)		4.55	4.99	0.00242	0.00265	PASS
Extreme (-20℃)		8.16	7.22	0.00434	0.00384	PASS
Extreme (-30℃)		9.81	9.15	0.00522	0.00487	PASS
Extreme (-40℃)		2.63	15.20	0.00140	0.00809	PASS
25℃	LV	5.55	3.84	0.00295	0.00204	PASS
	HV	7.17	3.26	0.00382	0.00174	PASS

WCDMA Band II						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
Temperature	Voltage	BPSK	QPSK	BPSK	QPSK	
Normal (25℃)	Normal	15.38	11.91	0.00818	0.00634	PASS
Extreme (85℃)		12.67	3.59	0.00674	0.00191	PASS
Extreme (80℃)		9.31	3.52	0.00495	0.00187	PASS
Extreme (70℃)		9.65	2.28	0.00513	0.00121	PASS
Extreme (60℃)		6.94	3.90	0.00369	0.00208	PASS
Extreme (50℃)		15.01	10.37	0.00798	0.00551	PASS
Extreme (40℃)		11.95	13.77	0.00635	0.00732	PASS
Extreme (30℃)		7.62	6.65	0.00405	0.00354	PASS
Extreme (20℃)		16.53	11.24	0.00879	0.00598	PASS
Extreme (10℃)		8.89	1.95	0.00473	0.00104	PASS
Extreme (0℃)		6.85	14.37	0.00364	0.00764	PASS
Extreme (-10℃)		4.75	17.34	0.00253	0.00923	PASS



Extreme (-20℃)		7.16	1.28	0.00381	0.00068	PASS
Extreme (-30℃)		7.92	4.53	0.00421	0.00241	PASS
Extreme (-40℃)		6.53	4.12	0.00348	0.00219	PASS
25℃	LV	1.37	3.63	0.00073	0.00193	PASS
	HV	10.64	12.00	0.00566	0.00638	PASS

LTE Band 2						
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	1.4MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	16.29	10.21	0.00867	0.00543	PASS
Extreme (85℃)		12.52	5.78	0.00666	0.00308	PASS
Extreme (80℃)		14.49	5.46	0.00771	0.00291	PASS
Extreme (70℃)		6.71	11.17	0.00357	0.00594	PASS
Extreme (60℃)		1.20	5.78	0.00064	0.00307	PASS
Extreme (50℃)		13.84	5.45	0.00736	0.00290	PASS
Extreme (40℃)		14.81	11.46	0.00788	0.00609	PASS
Extreme (30℃)		9.68	2.27	0.00515	0.00121	PASS
Extreme (20℃)		15.59	6.64	0.00829	0.00353	PASS
Extreme (10℃)		11.57	8.95	0.00616	0.00476	PASS
Extreme (0℃)		15.14	9.00	0.00805	0.00478	PASS
Extreme (-10℃)		2.84	5.73	0.00151	0.00305	PASS
Extreme (-20℃)		2.30	9.32	0.00123	0.00496	PASS
Extreme (-30℃)		16.46	10.12	0.00876	0.00538	PASS
Extreme (-40℃)		14.36	16.83	0.00764	0.00895	PASS
25℃	LV	11.10	1.69	0.00590	0.00090	PASS
	HV	15.86	16.25	0.00844	0.00865	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	3MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	10.37	14.40	0.00551	0.00766	PASS
Extreme (85℃)		3.76	5.65	0.00200	0.00300	PASS
Extreme (80℃)		13.59	9.69	0.00723	0.00516	PASS
Extreme (70℃)		1.06	3.50	0.00057	0.00186	PASS
Extreme (60℃)		14.75	4.23	0.00785	0.00225	PASS
Extreme (50℃)		11.98	1.47	0.00637	0.00078	PASS
Extreme (40℃)		1.26	12.41	0.00067	0.00660	PASS
Extreme (30℃)		11.55	15.15	0.00614	0.00806	PASS
Extreme (20℃)		13.92	5.98	0.00740	0.00318	PASS



Extreme (10℃)		8.59	12.76	0.00457	0.00679	PASS
Extreme (0℃)		14.36	1.83	0.00764	0.00097	PASS
Extreme (-10℃)		6.85	15.33	0.00364	0.00816	PASS
Extreme (-20℃)		8.24	4.02	0.00438	0.00214	PASS
Extreme (-30℃)		15.62	2.35	0.00831	0.00125	PASS
Extreme (-40℃)		2.18	7.41	0.00116	0.00394	PASS
25℃	LV	13.55	2.74	0.00721	0.00146	PASS
	HV	10.42	7.33	0.00555	0.00390	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	5MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	13.47	2.50	0.00716	0.00133	PASS
Extreme (85℃)		9.77	12.88	0.00520	0.00685	PASS
Extreme (80℃)		7.53	6.30	0.00400	0.00335	PASS
Extreme (70℃)		16.47	15.23	0.00876	0.00810	PASS
Extreme (60℃)		16.56	14.73	0.00881	0.00784	PASS
Extreme (50℃)		2.95	1.68	0.00157	0.00089	PASS
Extreme (40℃)		11.61	14.33	0.00617	0.00762	PASS
Extreme (30℃)		9.01	12.98	0.00479	0.00690	PASS
Extreme (20℃)		9.26	9.32	0.00493	0.00496	PASS
Extreme (10℃)		5.59	9.80	0.00297	0.00521	PASS
Extreme (0℃)		4.88	9.86	0.00260	0.00525	PASS
Extreme (-10℃)		14.42	14.97	0.00767	0.00796	PASS
Extreme (-20℃)		10.39	15.74	0.00553	0.00837	PASS
Extreme (-30℃)		3.61	6.60	0.00192	0.00351	PASS
Extreme (-40℃)		9.32	5.85	0.00496	0.00311	PASS
25℃	LV	3.06	5.42	0.00163	0.00288	PASS
	HV	14.84	1.69	0.00789	0.00090	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	10MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	17.55	15.17	0.00934	0.00807	PASS
Extreme (85℃)		16.73	13.95	0.00890	0.00742	PASS
Extreme (80℃)		11.08	10.22	0.00590	0.00543	PASS
Extreme (70℃)		15.81	8.29	0.00841	0.00441	PASS
Extreme (60℃)		3.45	2.33	0.00183	0.00124	PASS
Extreme (50℃)		14.46	13.70	0.00769	0.00729	PASS
Extreme (40℃)		14.95	14.78	0.00795	0.00786	PASS
Extreme (30℃)		16.77	7.63	0.00892	0.00406	PASS
Extreme (20℃)		9.78	13.72	0.00520	0.00730	PASS



Extreme (10℃)		5.16	9.21	0.00274	0.00490	PASS
Extreme (0℃)		5.70	9.00	0.00303	0.00479	PASS
Extreme (-10℃)		5.79	15.94	0.00308	0.00848	PASS
Extreme (-20℃)		2.15	6.82	0.00114	0.00363	PASS
Extreme (-30℃)		1.72	16.96	0.00091	0.00902	PASS
Extreme (-40℃)		12.08	11.38	0.00642	0.00605	PASS
25℃	LV	16.02	7.32	0.00852	0.00389	PASS
	HV	4.72	2.02	0.00251	0.00107	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	15MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	1.79	1.38	0.00095	0.00073	PASS
Extreme (85℃)		13.51	3.84	0.00719	0.00204	PASS
Extreme (80℃)		4.61	4.12	0.00245	0.00219	PASS
Extreme (70℃)		17.34	5.53	0.00922	0.00294	PASS
Extreme (60℃)		12.91	8.24	0.00687	0.00438	PASS
Extreme (50℃)		10.27	11.24	0.00547	0.00598	PASS
Extreme (40℃)		7.36	1.87	0.00392	0.00100	PASS
Extreme (30℃)		9.11	8.54	0.00485	0.00454	PASS
Extreme (20℃)		17.40	2.58	0.00925	0.00137	PASS
Extreme (10℃)		13.82	13.43	0.00735	0.00714	PASS
Extreme (0℃)		2.25	11.68	0.00120	0.00621	PASS
Extreme (-10℃)		1.55	11.39	0.00082	0.00606	PASS
Extreme (-20℃)		13.88	11.07	0.00738	0.00589	PASS
Extreme (-30℃)		9.50	6.23	0.00505	0.00331	PASS
Extreme (-40℃)		17.08	5.98	0.00909	0.00318	PASS
25℃	LV	13.04	6.79	0.00693	0.00361	PASS
	HV	17.22	4.45	0.00916	0.00237	PASS
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict
BANDWIDTH	20MHz					
Temperature	Voltage	16QAM	QPSK	16QAM	QPSK	
Normal (25℃)	Normal	1.19	1.67	0.00063	0.00089	PASS
Extreme (85℃)		17.27	13.44	0.00919	0.00715	PASS
Extreme (80℃)		6.45	3.54	0.00343	0.00188	PASS
Extreme (70℃)		6.28	7.23	0.00334	0.00384	PASS
Extreme (60℃)		6.31	7.16	0.00336	0.00381	PASS
Extreme (50℃)		8.44	5.61	0.00449	0.00298	PASS
Extreme (40℃)		12.44	10.81	0.00662	0.00575	PASS
Extreme (30℃)		4.68	6.62	0.00249	0.00352	PASS
Extreme (20℃)		12.41	5.88	0.00660	0.00313	PASS



Extreme (10℃)		2.03	6.63	0.00108	0.00353	PASS
Extreme (0℃)		2.09	4.53	0.00111	0.00241	PASS
Extreme (-10℃)		4.77	6.08	0.00253	0.00324	PASS
Extreme (-20℃)		16.24	3.71	0.00864	0.00197	PASS
Extreme (-30℃)		14.58	2.14	0.00776	0.00114	PASS
Extreme (-40℃)		14.01	16.23	0.00745	0.00863	PASS
25℃	LV	14.02	17.17	0.00746	0.00913	PASS
	HV	13.11	14.82	0.00698	0.00788	PASS

5.6. Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

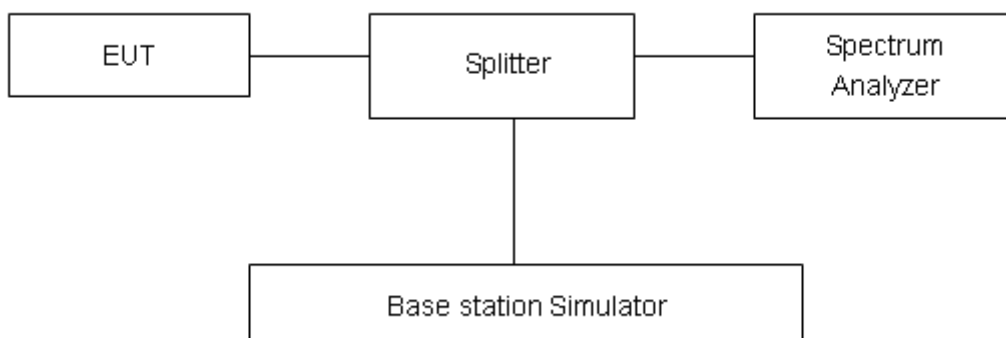
The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee’s frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
9kHz-1GHz	0.684 dB
1GHz-20GHz	1.407 dB

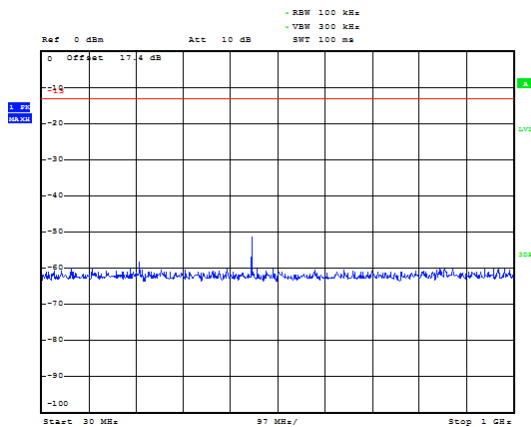


Test Result

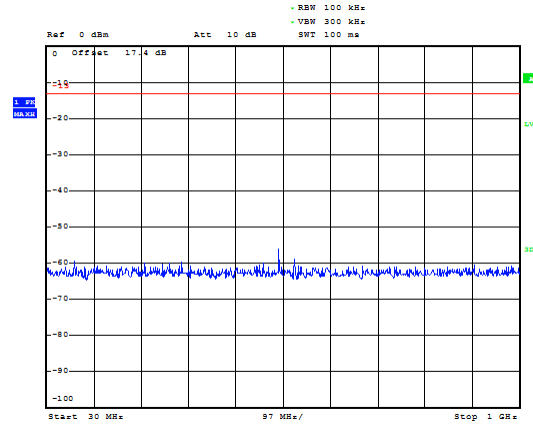
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

The signal beyond the limit is carrier.

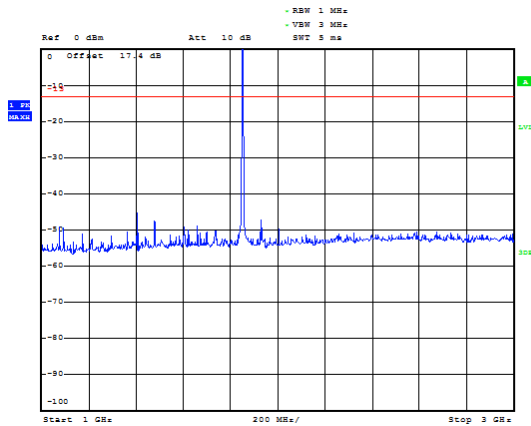
GSM 1900 CH-Low 30MHz~1GHz



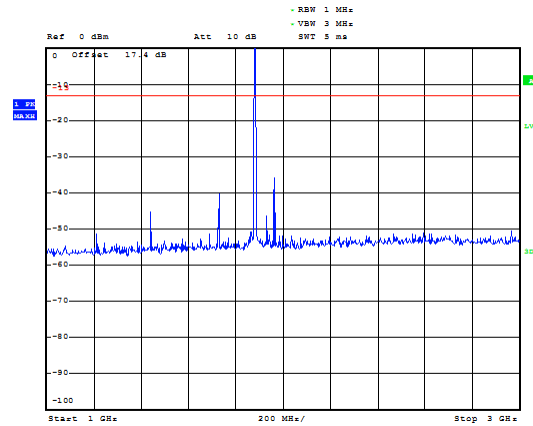
GSM 1900 CH-Middle 30MHz~1GHz



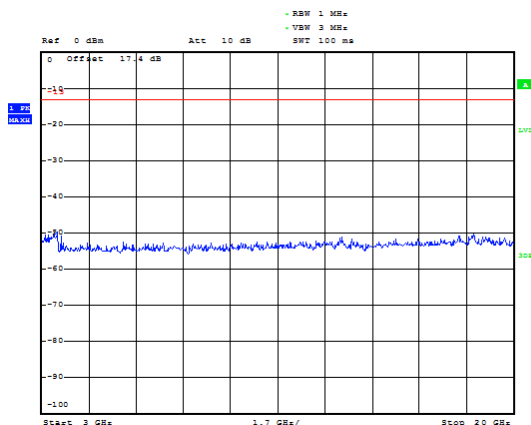
GSM 1900 CH-Low 1GHz~3GHz



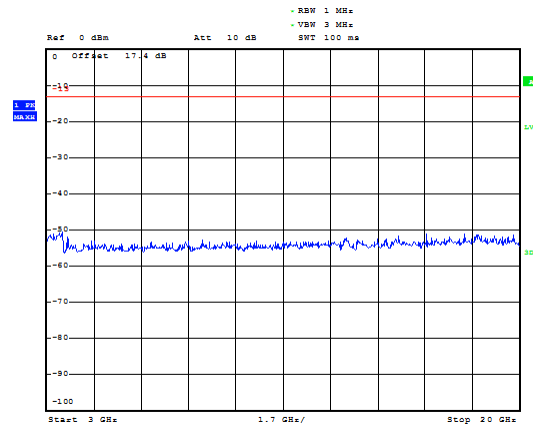
GSM 1900 CH-Middle 1GHz~3GHz



GSM 1900 CH-Low 3GHz~20GHz

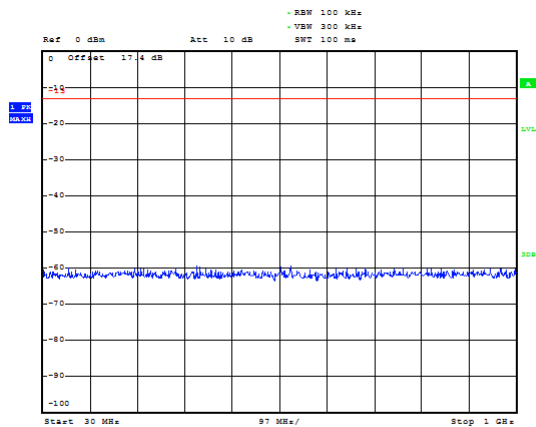


GSM 1900 CH-Middle 3GHz~20GHz

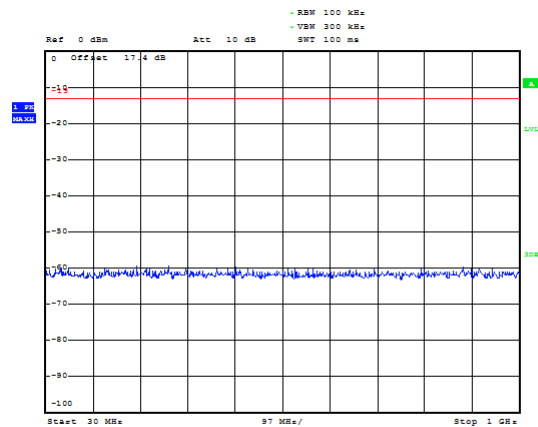




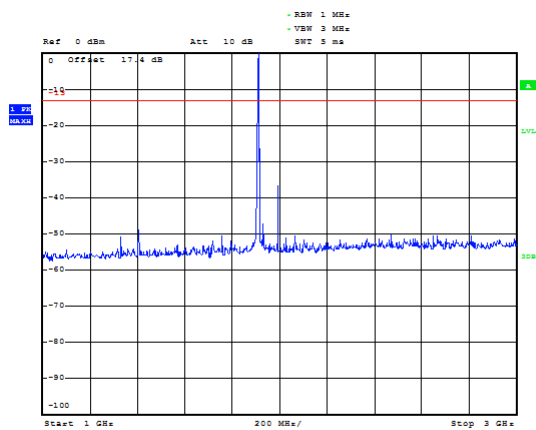
GSM 1900 CH-High 30MHz~1GHz



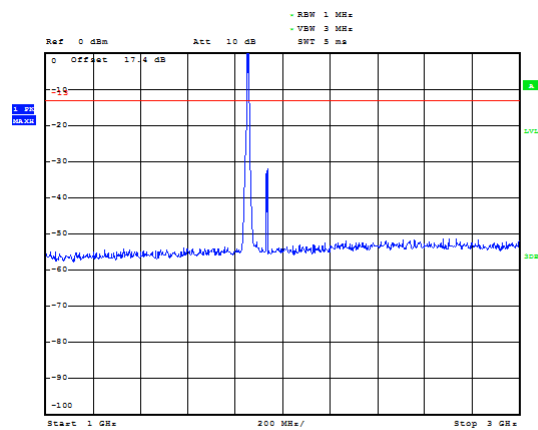
WCDMA Band II CH-Low 30MHz~1GHz



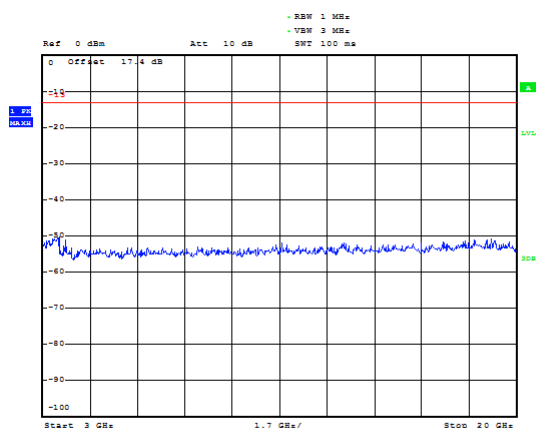
GSM 1900 CH-High 1GHz~3GHz



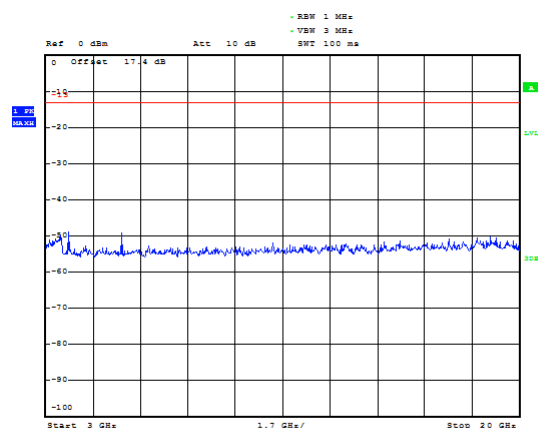
WCDMA BAND II CH-Low 1GHz~3GHz



GSM 1900 CH-High 3GHz~20GHz

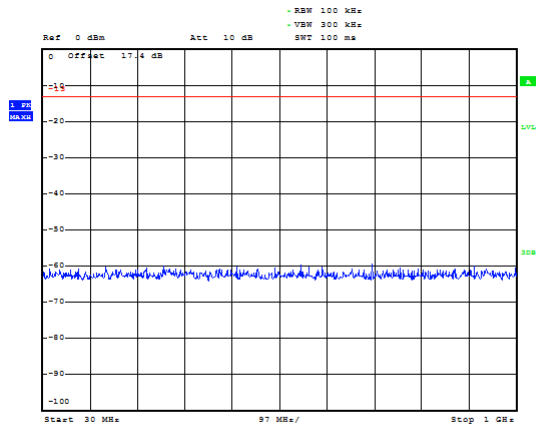


WCDMA BAND II CH-Low 3GHz~20GHz

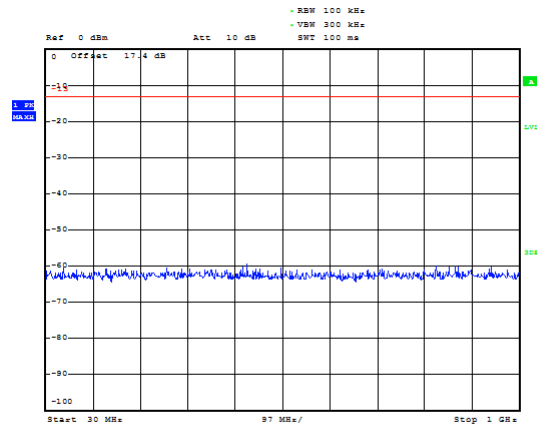




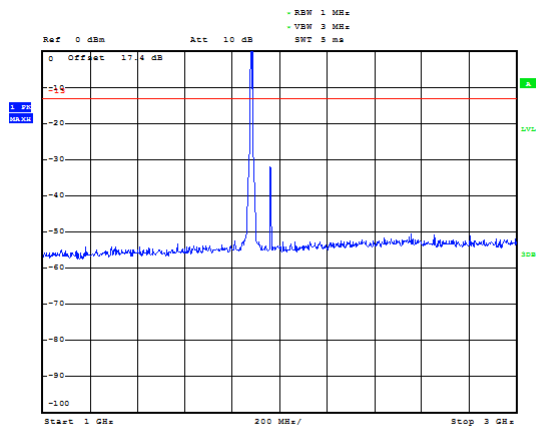
WCDMA Band II CH- Middle 30MHz~1GHz



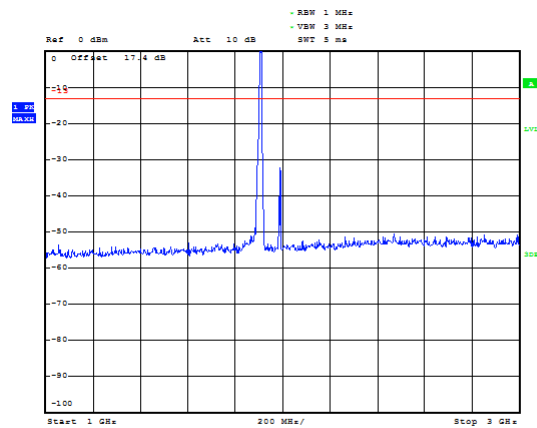
WCDMA Band II CH- High 30MHz~1GHz



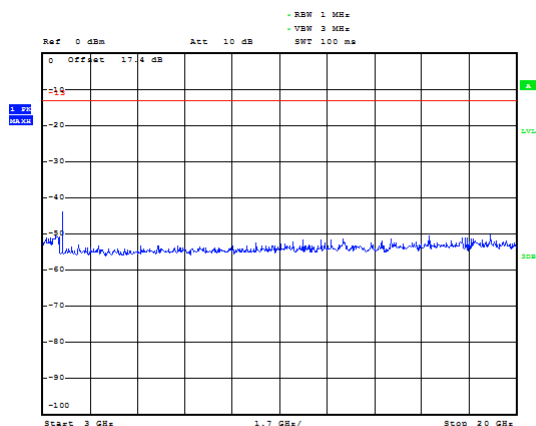
WCDMA BAND II CH-Middle 1GHz~3GHz



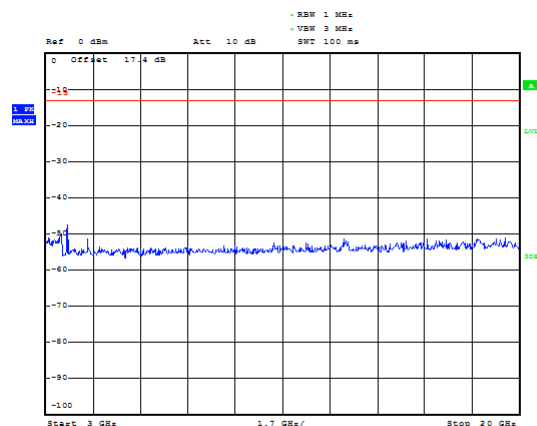
WCDMA BAND II CH-High 1GHz~3GHz



WCDMA BAND II CH-Middle 3GHz~20GHz

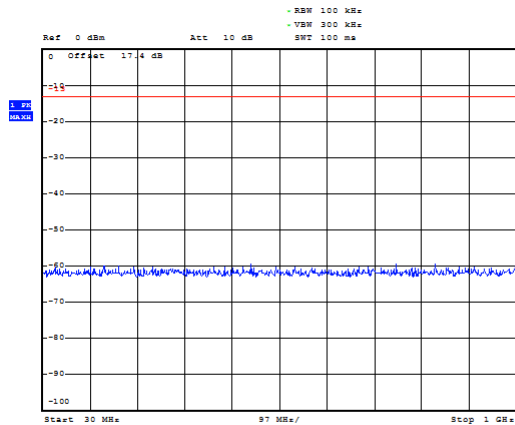


WCDMA BAND II CH-High 3GHz~20GHz

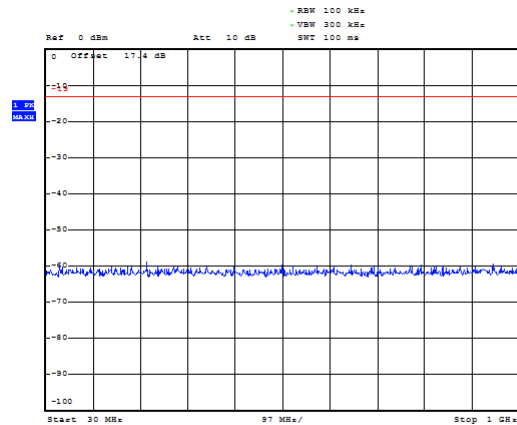




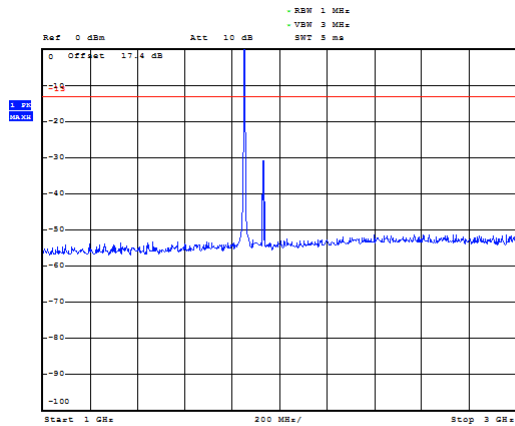
LTE Band 2 1.4MHz CH-Low 30MHz~1GHz



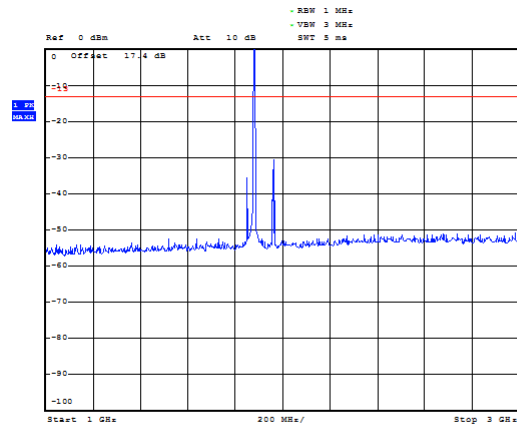
LTE Band 2 1.4MHz CH-Middle 30MHz~1GHz



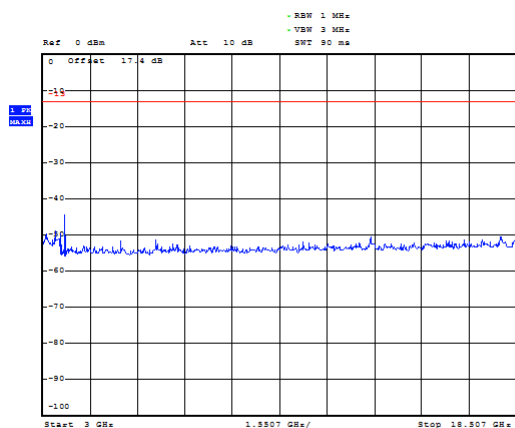
LTE Band 2 1.4MHz CH-Low 1GHz~3GHz



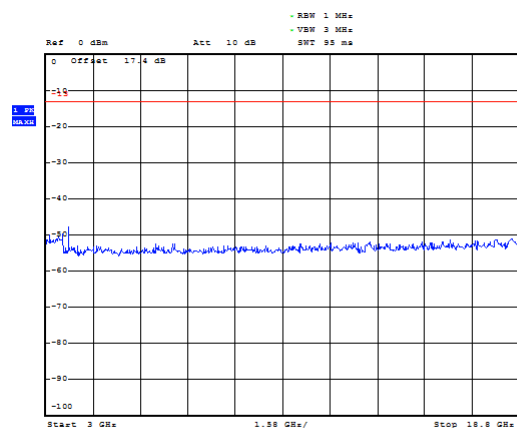
LTE Band 2 1.4MHz CH-Middle 1GHz~3GHz



LTE Band 2 1.4MHz CH-Low 3GHz~20GHz

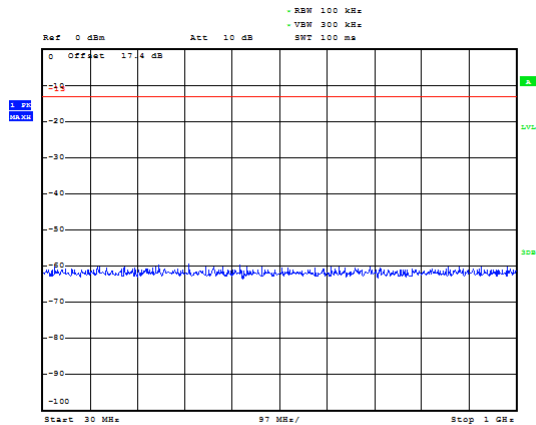


LTE Band 2 1.4MHz CH-Middle 3GHz~20GHz

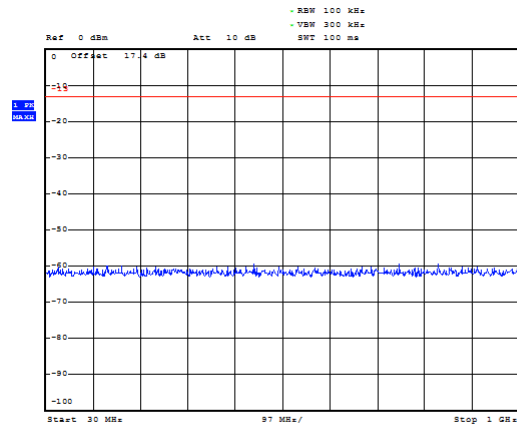




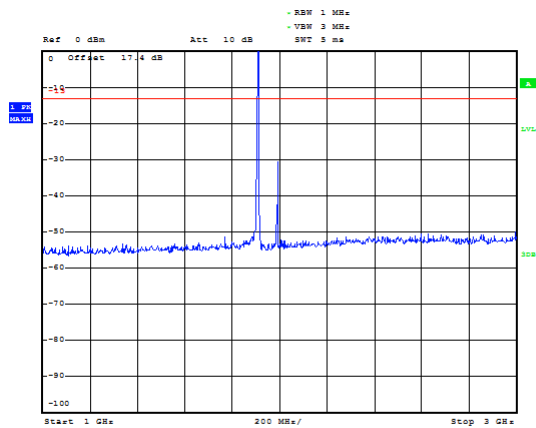
LTE Band 2 1.4MHz CH-High 30MHz~1GHz



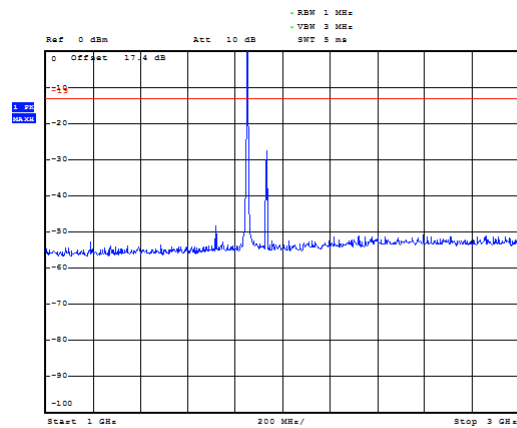
LTE Band 2 3MHz CH-Low 30MHz~1GHz



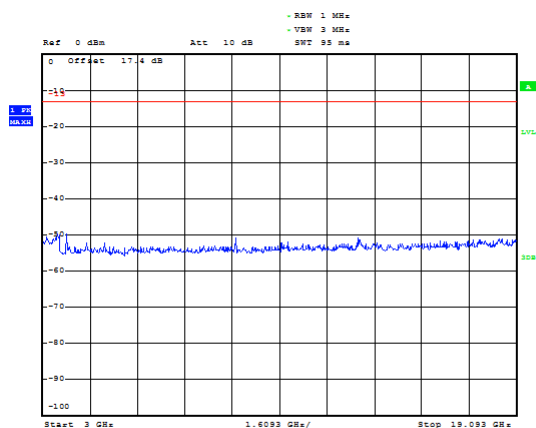
LTE Band 2 1.4MHz CH-High 1GHz~3GHz



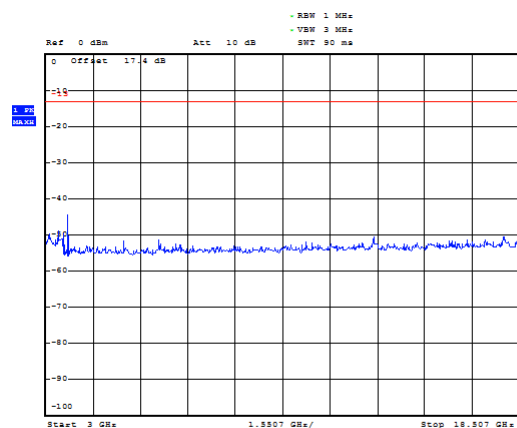
LTE Band 2 3MHz CH-Low 1GHz~3GHz



LTE Band 2 1.4MHz CH-High 3GHz~20GHz

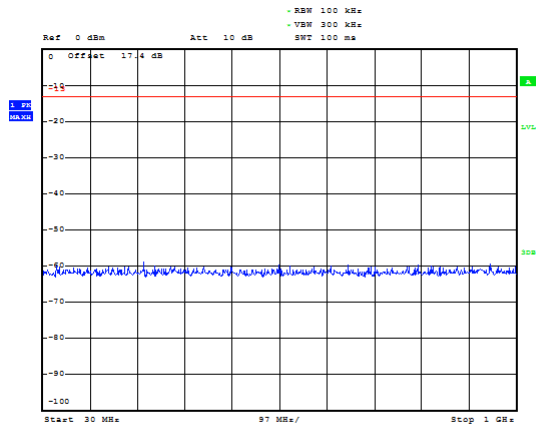


LTE Band 2 3MHz CH-Low 3GHz~20GHz

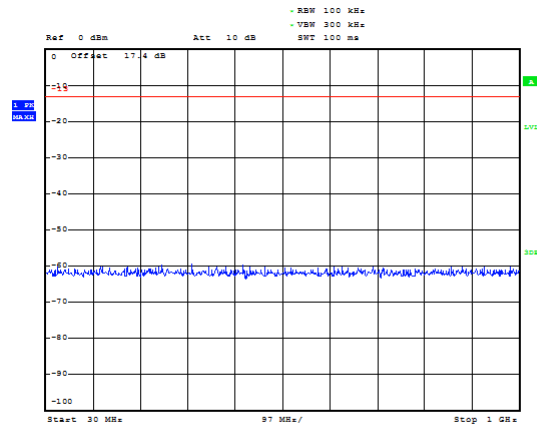




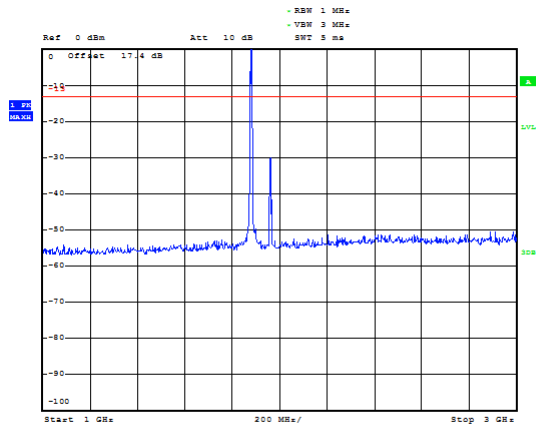
LTE Band 2 3MHz CH-Middle 30MHz~1GHz



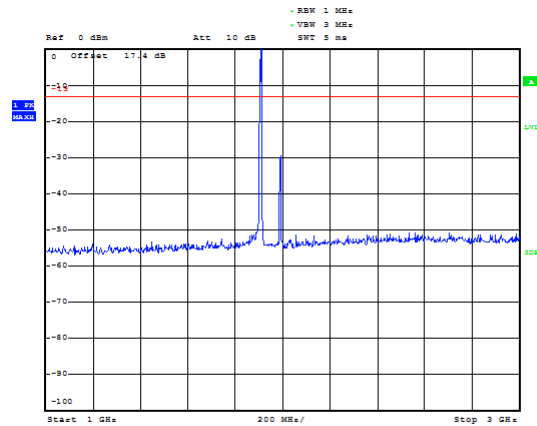
LTE Band 2 3MHz CH-High 30MHz~1GHz



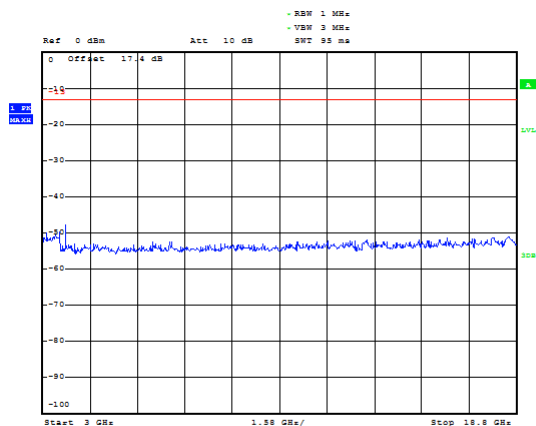
LTE Band 2 3MHz CH-Middle 1GHz~3GHz



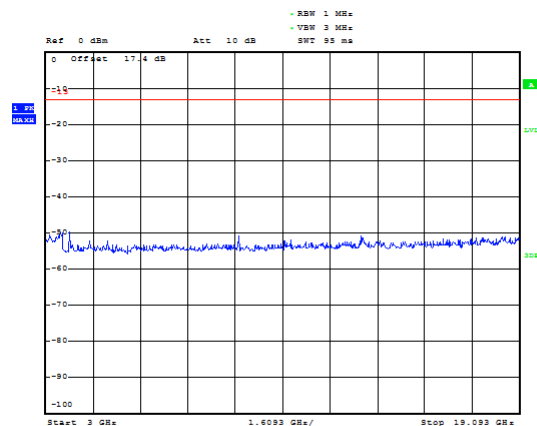
LTE Band 2 3MHz CH-High 1GHz~3GHz



LTE Band 2 3MHz CH-Middle 3GHz~20GHz

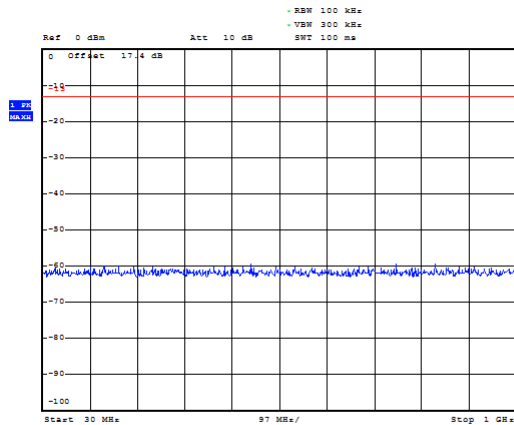


LTE Band 2 3MHz CH-High 3GHz~20GHz

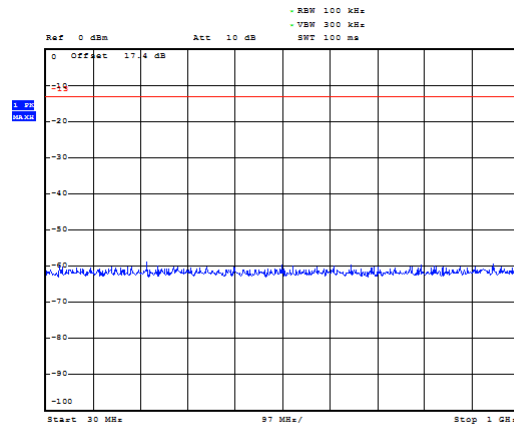




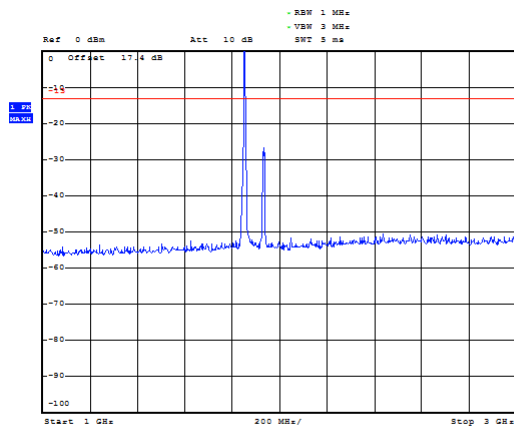
LTE Band 2 5MHz CH-Low 30MHz~1GHz



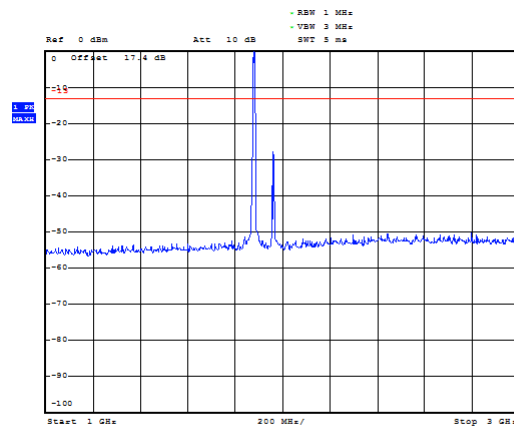
LTE Band 2 5MHz CH-Middle 30MHz~1GHz



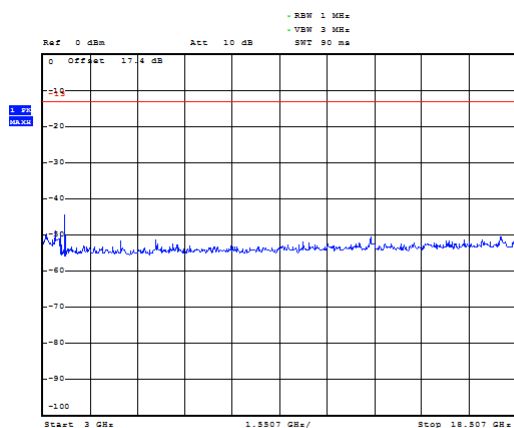
LTE Band 2 5MHz CH-Low 1GHz~3GHz



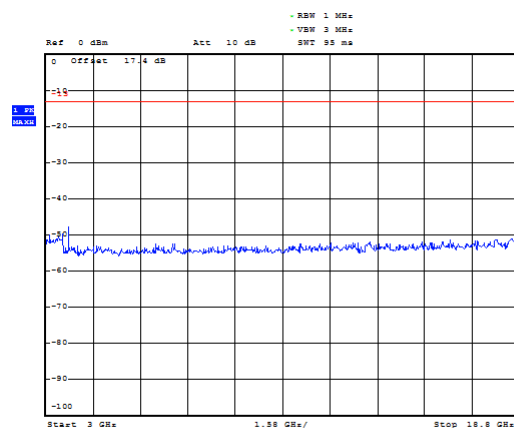
LTE Band 2 5MHz CH-Middle 1GHz~3GHz



LTE Band 2 5MHz CH-Low 3GHz~20GHz

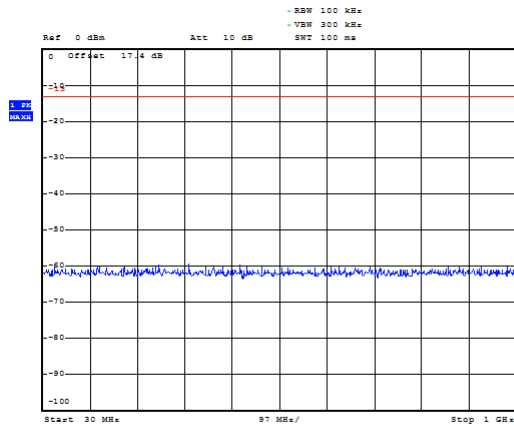


LTE Band 2 5MHz CH-Middle 3GHz~20GHz

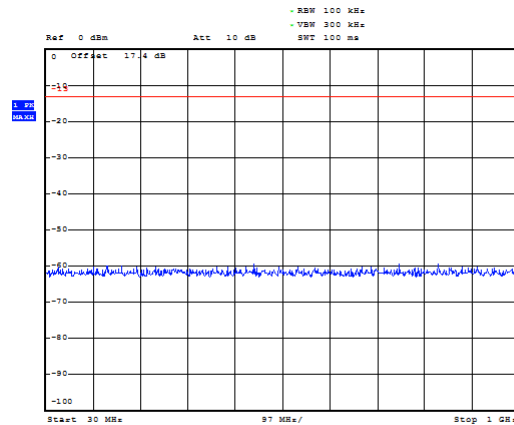




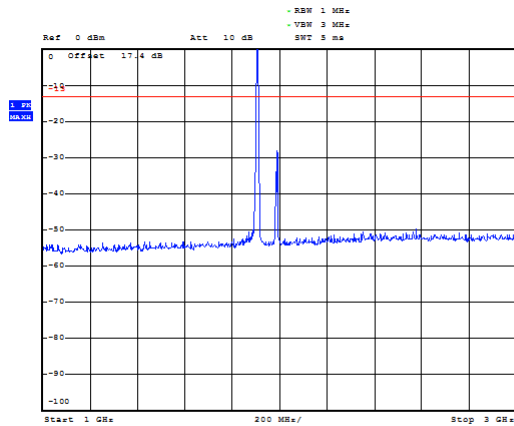
LTE Band 2 5MHz CH-High 30MHz~1GHz



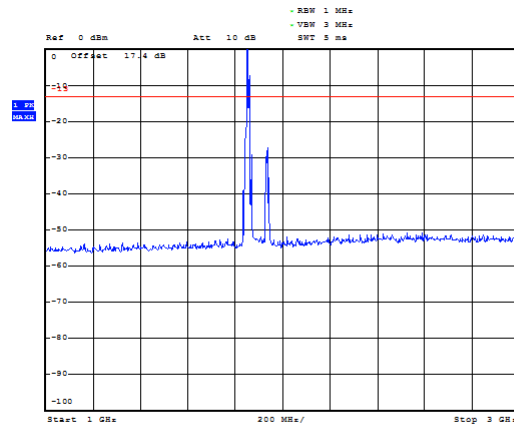
LTE Band 2 10MHz CH-Low 30MHz~1GHz



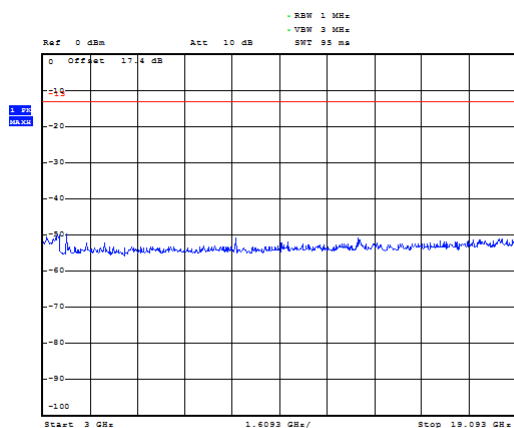
LTE Band 2 5MHz CH-High 1GHz~3GHz



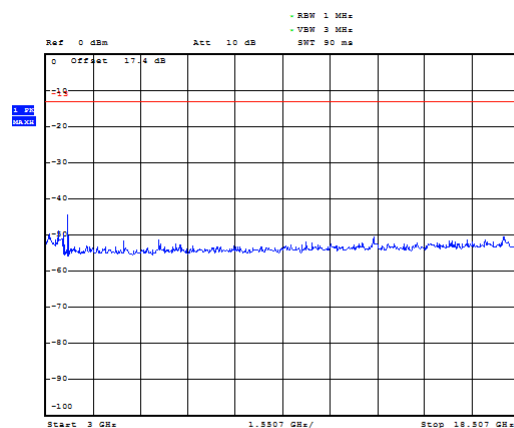
LTE Band 2 10MHz CH-Low 1GHz~3GHz



LTE Band 2 5MHz CH-High 3GHz~20GHz

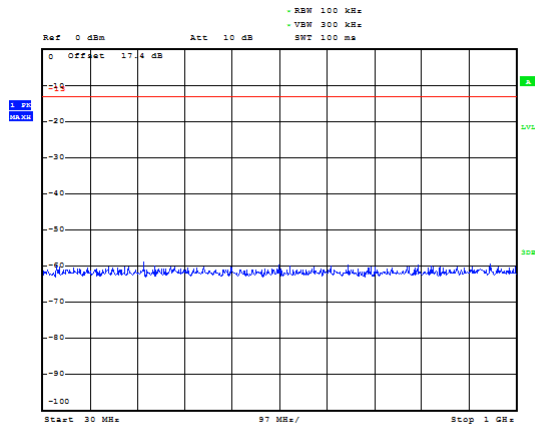


LTE Band 2 10MHz CH-Low 3GHz~20GHz

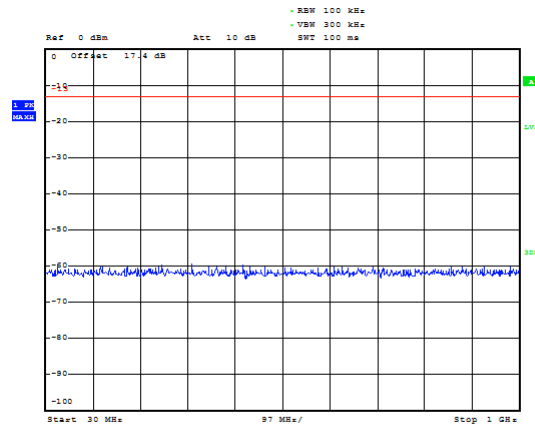




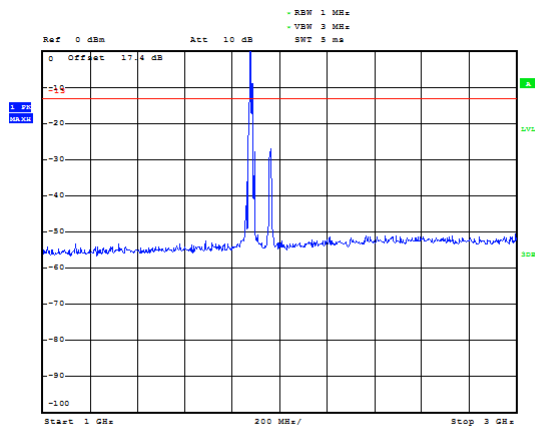
LTE Band 2 10MHz CH-Middle 30MHz~1GHz



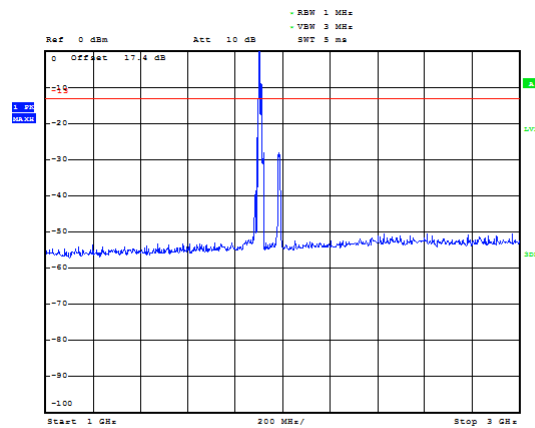
LTE Band 2 10MHz CH-High 30MHz~1GHz



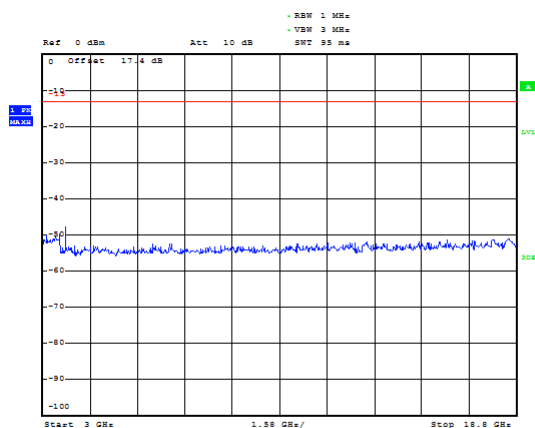
LTE Band 2 10MHz CH-Middle 1GHz~3GHz



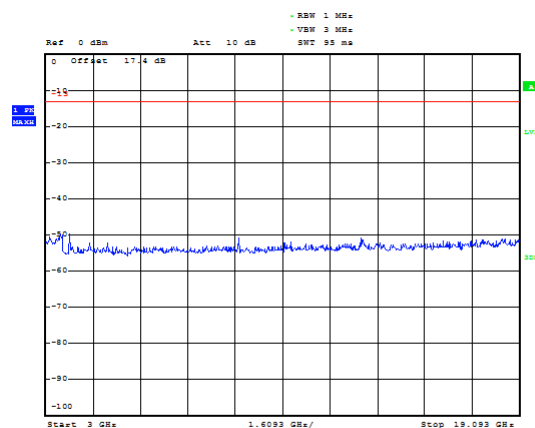
LTE Band 2 10MHz CH-High 1GHz~3GHz



LTE Band 2 10MHz CH-Middle 3GHz~20GHz

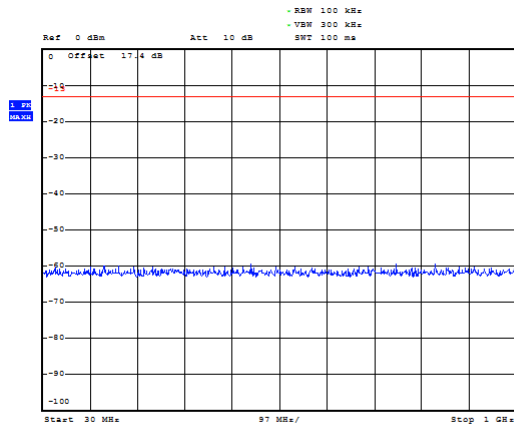


LTE Band 2 10MHz CH-High 3GHz~20GHz

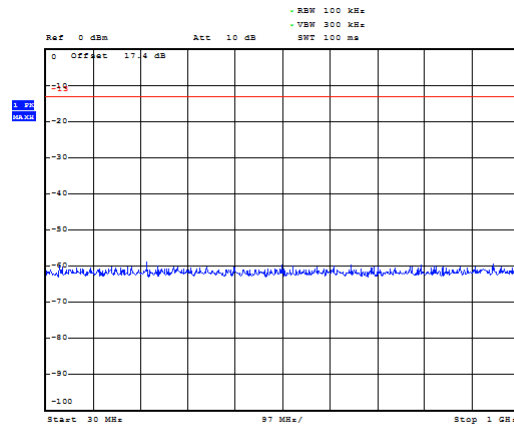




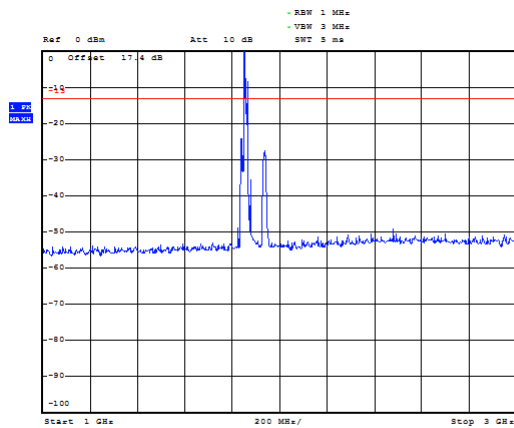
LTE Band 2 15MHz CH-Low 30MHz~1GHz



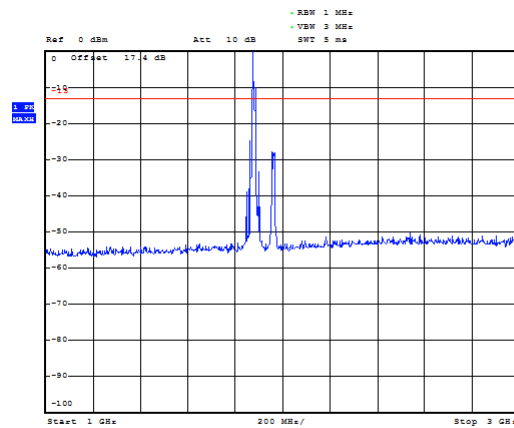
LTE Band 2 15MHz CH-Middle 30MHz~1GHz



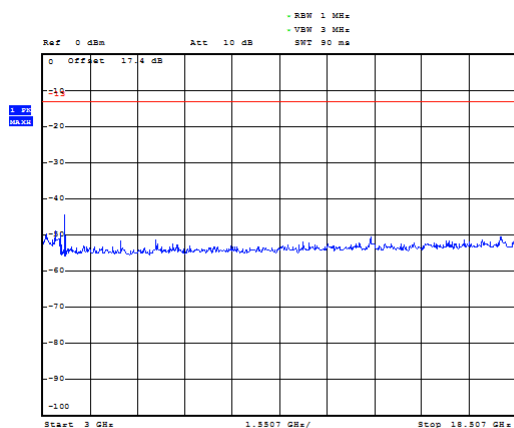
LTE Band 2 15MHz CH-Low 1GHz~3GHz



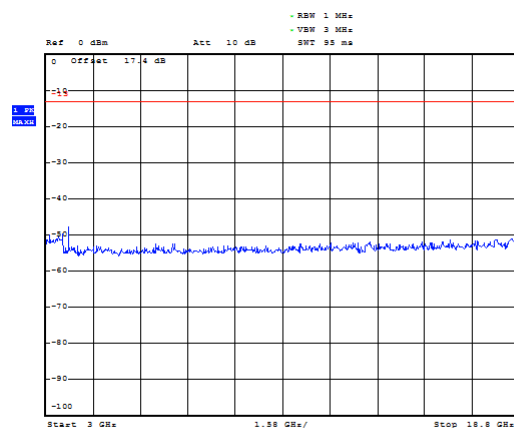
LTE Band 2 15MHz CH-Middle 1GHz~3GHz



LTE Band 2 15MHz CH-Low 3GHz~20GHz

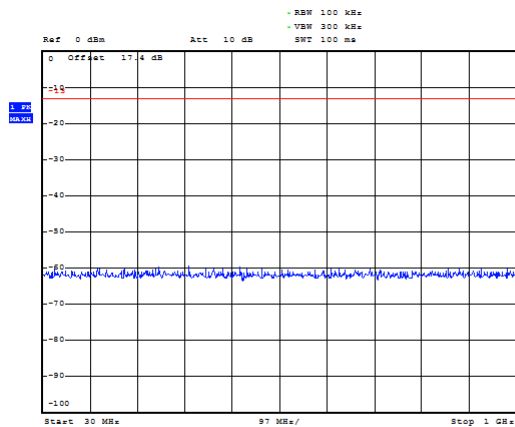


LTE Band 2 15MHz CH-Middle 3GHz~20GHz

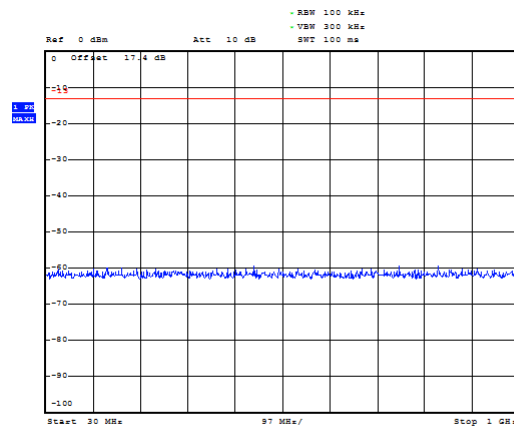




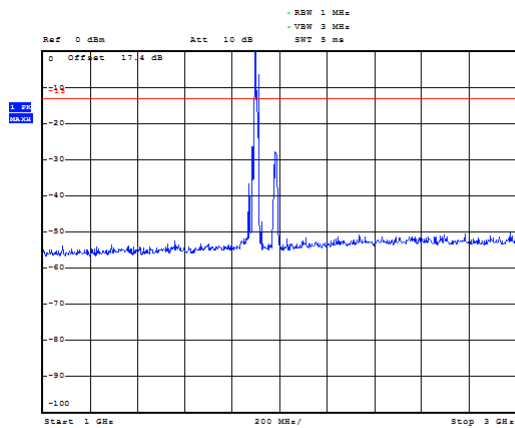
LTE Band 2 15MHz CH-High 30MHz~1GHz



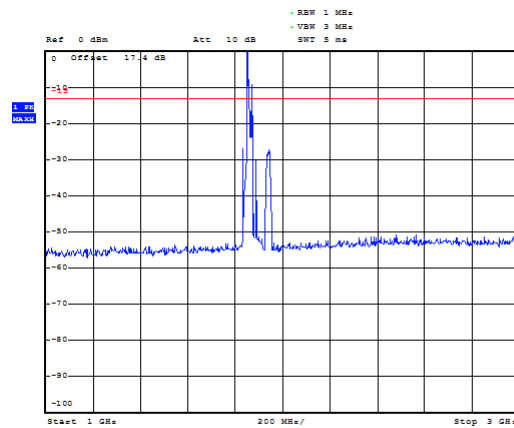
LTE Band 2 20MHz CH-Low 30MHz~1GHz



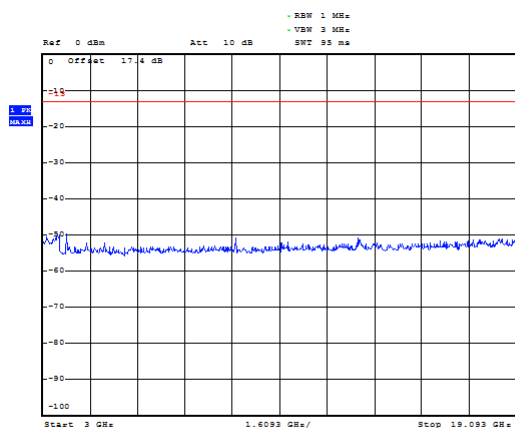
LTE Band 2 15MHz CH-High 1GHz~3GHz



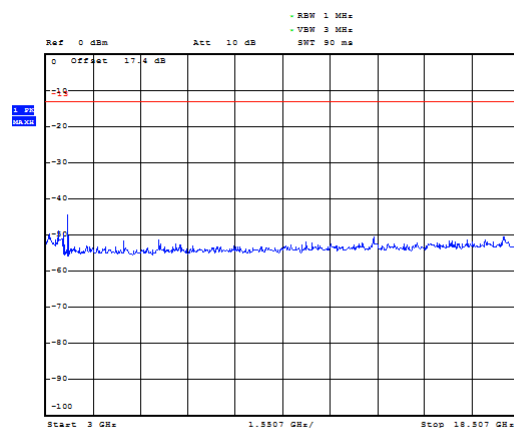
LTE Band 2 20MHz CH-Low 1GHz~3GHz



LTE Band 2 15MHz CH-High 3GHz~20GHz

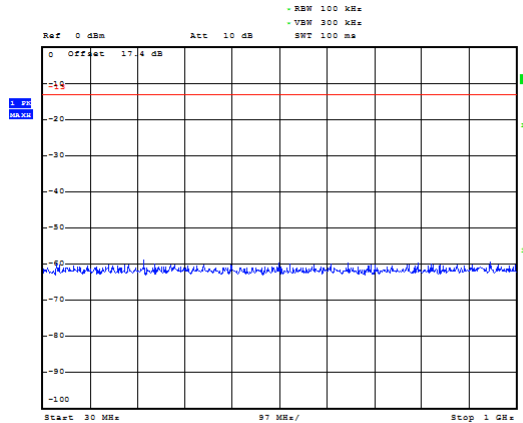


LTE Band 2 20MHz CH-Low 3GHz~20GHz

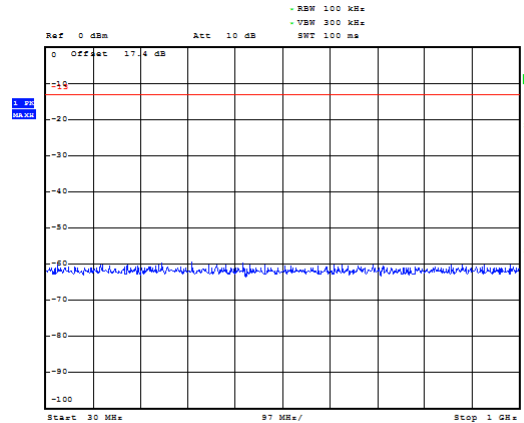




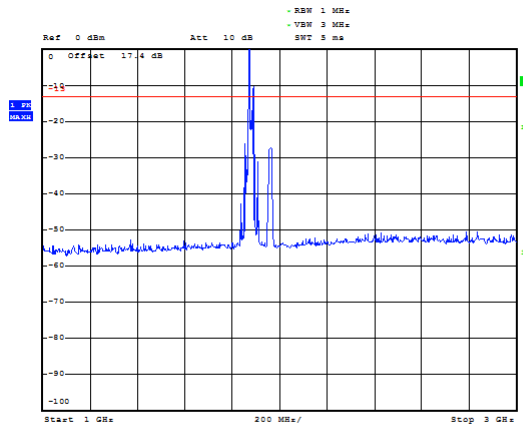
LTE Band 2 20MHz CH-Middle 30MHz~1GHz



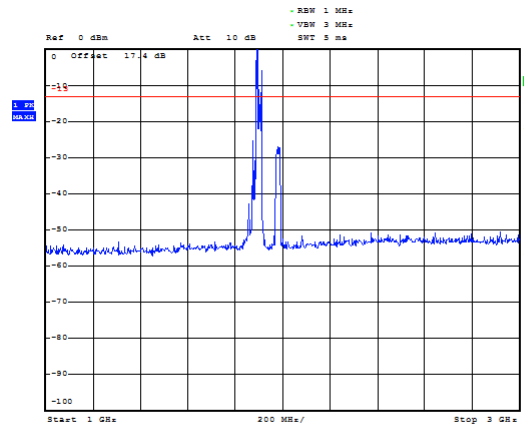
LTE Band 2 20MHz CH-High 30MHz~1GHz



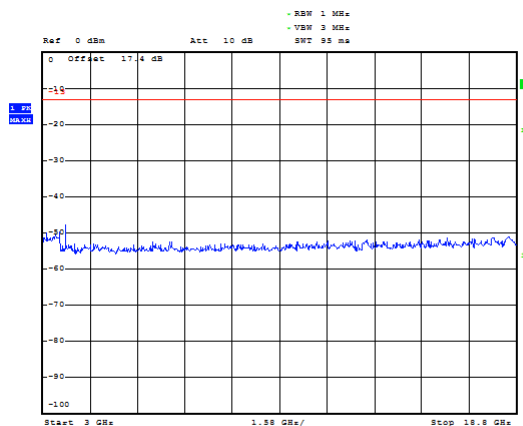
LTE Band 2 20MHz CH-Middle 1GHz~3GHz



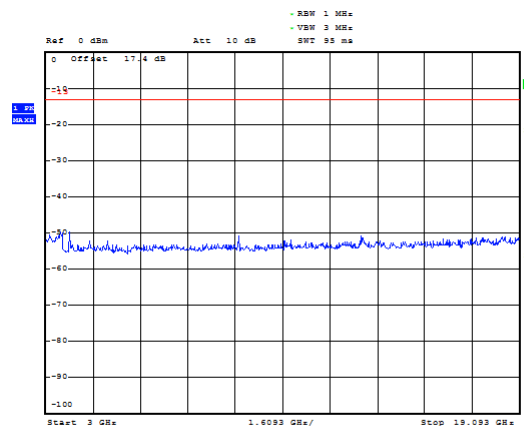
LTE Band 2 20MHz CH-High 1GHz~3GHz



LTE Band 2 20MHz CH-Middle 3GHz~20GHz



LTE Band 2 20MHz CH-High 3GHz~20GHz



5.7. Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. The testing follows FCC KDB 971168 v03r01 Section 5.8 and ANSI C63.26 (2015).
2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=1MHz, VBW=3MHz, and the maximum value of the receiver should be recorded as (Pr).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (Pcl) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
7. The measurement results are obtained as described below:

$$\text{Power(EIRP)} = \text{PMea} - \text{PAg} - \text{Pcl} + \text{Ga}$$
The measurement results are amend as described below:

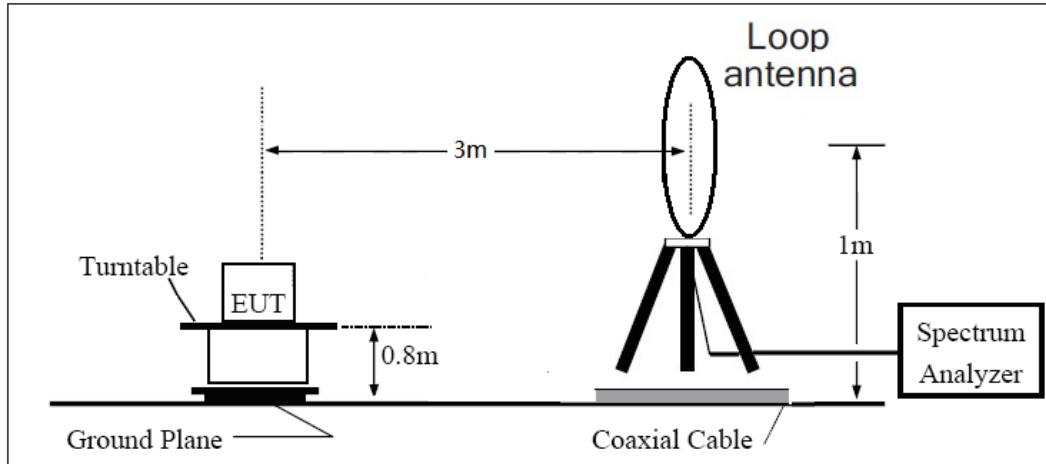
$$\text{Power(EIRP)} = \text{PMea} - \text{Pcl} + \text{Ga}$$
8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP

= EIRP-2.15dBi.

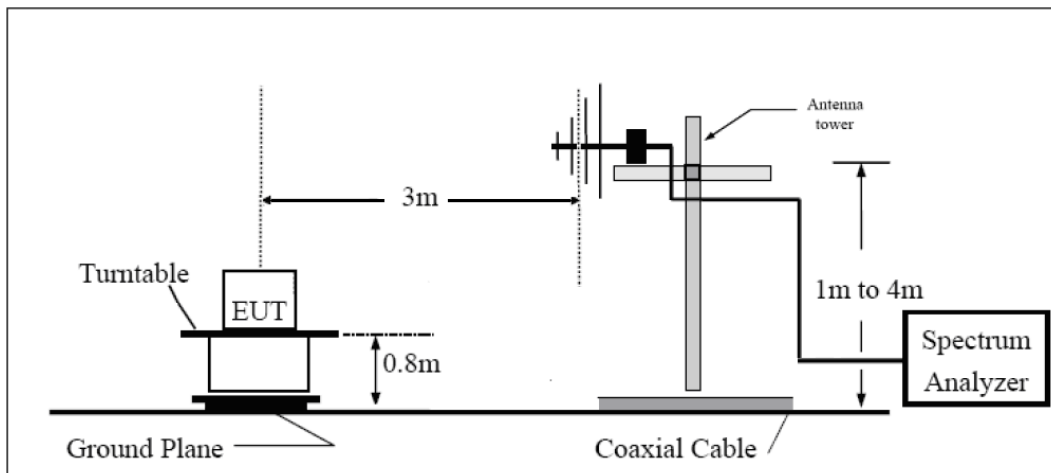
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

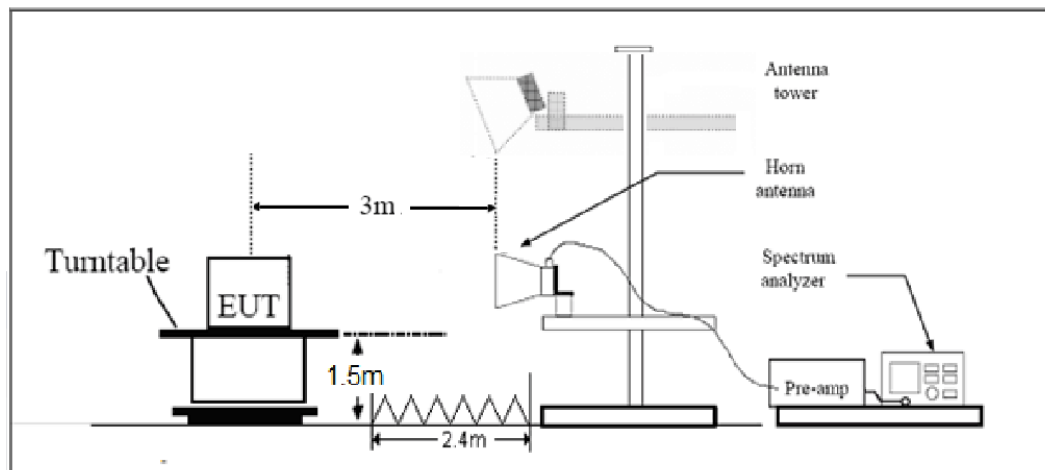
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m

Limits

Rule Part 24.238(a) specifies that “on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10} (P)$ dB.”

Limit	-13 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

Variant

GSM 1900 CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-57.41	5.10	11.05	Horizontal	-51.46	-13.00	38.46	90
3	5640.0	-53.66	5.42	12.65	Horizontal	-46.43	-13.00	33.43	315
4	7520.0	-55.56	6.70	13.85	Horizontal	-48.41	-13.00	35.41	45
5	9400.0	-53.81	7.01	14.75	Horizontal	-46.07	-13.00	33.07	225
6	11280.0	-52.35	7.48	15.95	Horizontal	-43.88	-13.00	30.88	270
7	13160.0	-51.04	7.51	16.55	Horizontal	-42.00	-13.00	29.00	180
8	15040.0	-48.51	8.24	15.35	Horizontal	-41.40	-13.00	28.40	315
9	16920.0	-45.67	8.41	14.95	Horizontal	-39.13	-13.00	26.13	135
10	18800.0	/	/	/	/	/	/	/	/
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

WCDMA Band II CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3760.0	-53.12	5.10	11.05	Horizontal	-47.17	-13.00	34.17	315
3	5640.0	-55.15	5.42	12.65	Horizontal	-47.92	-13.00	34.92	225
4	7520.0	-55.49	6.70	13.85	Horizontal	-48.34	-13.00	35.34	180
5	9400.0	-55.44	7.01	14.75	Horizontal	-47.70	-13.00	34.70	90
6	11280.0	-53.17	7.48	15.95	Horizontal	-44.70	-13.00	31.70	135
7	13160.0	-52.59	7.51	16.55	Horizontal	-43.55	-13.00	30.55	0
8	15040.0	-49.91	8.24	15.35	Horizontal	-42.80	-13.00	29.80	45
9	16920.0	-46.76	8.41	14.95	Horizontal	-40.22	-13.00	27.22	180
10	18800.0	/	/	/	/	/	/	/	/
Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor. 2. The worst emission was found in the antenna is Horizontal position.									

LTE Band 2 1.4MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3759.0	-48.46	5.10	11.05	Horizontal	-42.51	-13.00	29.51	315
3	5638.9	-54.63	5.42	12.65	Horizontal	-47.40	-13.00	34.40	270
4	7520.0	-52.59	6.70	13.85	Horizontal	-45.44	-13.00	32.44	180
5	9400.0	-50.65	7.01	14.75	Horizontal	-42.91	-13.00	29.91	315
6	11280.0	-53.17	7.48	15.95	Horizontal	-44.70	-13.00	31.70	0
7	13160.0	-51.26	7.51	16.55	Horizontal	-42.22	-13.00	29.22	45
8	15040.0	-49.43	8.24	15.35	Horizontal	-42.32	-13.00	29.32	90
9	16920.0	-45.96	8.41	14.95	Horizontal	-39.42	-13.00	26.42	225
10	18800.0	/	/	/	/	/	/	/	/

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 2 5MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3755.6	-48.73	5.10	11.05	Horizontal	-42.78	-13.00	29.78	270
3	5633.6	-55.14	5.42	12.65	Horizontal	-47.91	-13.00	34.91	180
4	7520.0	-53.92	6.70	13.85	Horizontal	-46.77	-13.00	33.77	45
5	9400.0	-50.88	7.01	14.75	Horizontal	-43.14	-13.00	30.14	135
6	11280.0	-53.28	7.48	15.95	Horizontal	-44.81	-13.00	31.81	90
7	13160.0	-50.02	7.51	16.55	Horizontal	-40.98	-13.00	27.98	225
8	15040.0	-50.73	8.24	15.35	Horizontal	-43.62	-13.00	30.62	315
9	16920.0	-46.51	8.41	14.95	Horizontal	-39.97	-13.00	26.97	0
10	18800.0	/	/	/	/	/	/	/	/

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



LTE Band 2 20MHz CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3742.1	-49.53	5.10	11.05	Horizontal	-43.58	-13.00	30.58	180
3	5613.4	-51.05	5.42	12.65	Horizontal	-43.82	-13.00	30.82	225
4	7484.6	-54.17	6.70	13.85	Horizontal	-47.02	-13.00	34.02	315
5	9355.9	-52.32	7.01	14.75	Horizontal	-44.58	-13.00	31.58	180
6	11227.1	-53.43	7.48	15.95	Horizontal	-44.96	-13.00	31.96	135
7	13098.4	-52.15	7.51	16.55	Horizontal	-43.11	-13.00	30.11	90
8	14969.6	-49.97	8.24	15.35	Horizontal	-42.86	-13.00	29.86	45
9	16840.9	-46.92	8.41	14.95	Horizontal	-40.38	-13.00	27.38	270
10	18800.0	/	/	/	/	/	/	/	/

Note: 1.The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMU200	118133	2017-05-21	2018-05-20
Base Station Simulator	R&S	CMU200	118133	2018-05-20	2019-05-19
Base Station Simulator	R&S	CMU200	118133	2019-05-19	2020-05-18
Base Station Simulator	R&S	CMW500	113824	2017-05-21	2018-05-20
Base Station Simulator	R&S	CMW500	113824	2018-05-20	2019-05-19
Base Station Simulator	R&S	CMW500	113824	2019-05-19	2020-05-18
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	/	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2017-05-21	2018-05-20
Spectrum Analyzer	Key sight	N9010A	MY50210259	2018-05-20	2019-05-19
Spectrum Analyzer	Key sight	N9010A	MY50210259	2019-05-19	2020-05-18
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2017-05-21	2018-05-20
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2018-05-20	2019-05-19
Universal Radio Communication Tester	Key sight	E5515C	MY48367192	2019-05-19	2020-05-18
Signal Analyzer	R&S	FSV30	100815	2017-12-17	2018-12-16
Signal Analyzer	R&S	FSV30	100815	2018-12-16	2019-12-15
Signal Analyzer	R&S	FSV30	100815	2019-12-15	2020-12-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2020-09-25
Trilog Antenna	SCHWARZBECK	VUBL 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2016-07-08	2018-07-07



Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Horn Antenna	ETS-Lindgren	3160-09	00102643	2016-06-21	2018-06-20
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Signal generator	R&S	SMB 100A	102594	2017-05-21	2018-05-20
Signal generator	R&S	SMB 100A	102594	2018-05-20	2019-05-19
Signal generator	R&S	SMB 100A	102594	2019-05-19	2020-05-18
Climatic Chamber	ESPEC	SU-242	93000506	2017-12-17	2020-12-16
Preamplifier	R&S	SCU18	102327	2017-05-21	2018-05-20
Preamplifier	R&S	SCU18	102327	2018-05-20	2019-05-19
Preamplifier	R&S	SCU18	102327	2019-05-19	2020-05-18
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2017-05-21	2018-05-20
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2018-05-20	2019-05-19
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2019-05-19	2020-05-18
RF Cable	Agilent	SMA 15cm	0001	2017-12-17	2018-06-16
RF Cable	Agilent	SMA 15cm	0001	2018-06-16	2018-12-15
RF Cable	Agilent	SMA 15cm	0001	2018-12-15	2019-06-14
RF Cable	Agilent	SMA 15cm	0001	2019-06-14	2019-12-13
RF Cable	Agilent	SMA 15cm	0001	2019-12-13	2020-06-12
Software	R&S	EMC32	9.26.0	/	/

*****END OF REPORT *****



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.



ANNEX C: Product Change Description

The Product Change Description are submitted separately.



ANNEX D: Verify data

The Verify data are submitted separately.