

2.4. Frequency Stability

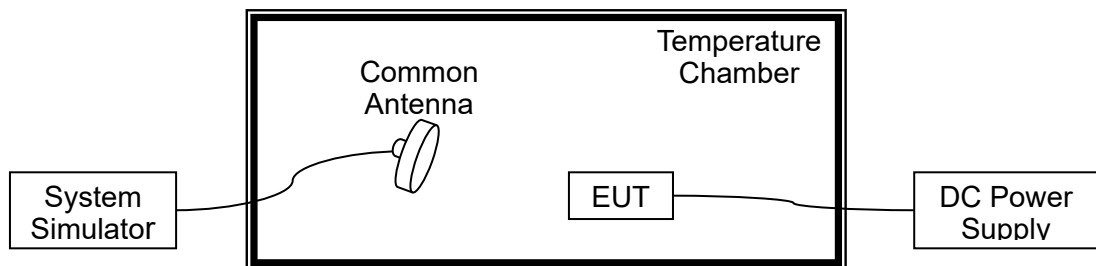
2.4.1. Requirement

According to FCC section 22.355, 24.235 and 27.54 the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

- (a) The temperature is varied from 0°C to +35°C at intervals of not more than 10°C.
- (b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.4.2. Test Description

Test Setup:



The EUT, which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS via a Common Antenna.



2.4.3. Test Result

The nominal, highest and lowest extreme voltages are separately 3.85VDC, 4.40VDC and 3.70VDC, which are specified by the applicant; the normal temperature here used is 20°C.

A. Test Verdict:

GSM 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	22	0.026	PASS
100		-30	28	0.033	
100		-20	-36	-0.043	
100		-10	44	0.053	
100		0	27	0.032	
100		+10	15	0.018	
100		+20	22	0.026	
100		+30	74	0.088	
100		+40	62	0.074	
100		+50	52	0.062	
115	4.40	+20	-7	-0.008	
85	3.70	+20	-70	-0.084	

GSM 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	97	0.052	PASS
c		-30	38	0.020	
100		-20	21	0.011	
100		-10	-37	-0.020	
100		0	-29	-0.015	
100		+10	-52	-0.028	
100		+20	41	0.022	
100		+30	-73	-0.039	
100		+40	29	0.015	
100		+50	30	0.016	
115	4.40	+20	18	0.010	
85	3.70	+20	-57	-0.030	



EDGE 850MHz, Channel 190, Frequency 836.6MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	25	0.030	PASS
100		-30	20	0.024	
100		-20	-18	-0.022	
100		-10	28	0.033	
100		0	-26	-0.031	
100		+10	55	0.066	
100		+20	15	0.018	
100		+30	28	0.033	
100		+40	25	0.030	
100		+50	34	0.041	
115	4.40	+20	-35	-0.042	
85	3.70	+20	-46	-0.055	

EDGE 1900MHz, Channel 661, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	42	0.022	PASS
100		-30	23	0.012	
100		-20	-15	-0.008	
100		-10	29	0.015	
100		0	-84	-0.045	
100		+10	-83	-0.044	
100		+20	27	0.014	
100		+30	82	0.044	
100		+40	16	0.009	
100		+50	30	0.016	
115	4.40	+20	18	0.010	
85	3.70	+20	-24	-0.013	



WCDMA Band V, Channel 4182, Frequency 836.4MHz					
Limit =±2.5ppm					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	31	0.037	PASS
100		-30	25	0.030	
100		-20	-17	-0.020	
100		-10	24	0.029	
100		0	25	0.030	
100		+10	32	0.038	
100		+20	16	0.019	
100		+30	25	0.030	
100		+40	43	0.051	
100		+50	29	0.035	
115	4.40	+20	-65	-0.078	
85	3.70	+20	-32	-0.038	

WCDMA Band II, Channel 9400, Frequency 1880.0MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	25	0.013	PASS
100		-30	21	0.011	
100		-20	-13	-0.007	
100		-10	29	0.015	
100		0	24	0.013	
100		+10	-26	-0.014	
100		+20	87	0.046	
100		+30	82	0.044	
100		+40	51	0.027	
100		+50	38	0.020	
115	4.40	+20	44	0.023	
85	3.70	+20	-84	-0.045	



WCDMA Band IV, Channel 1413, Frequency 1732.6MHz					
Limit =Within Authorized Band					
Voltage (%)	Power (VDC)	Temp (°C)	Fre. Dev. (Hz)	Deviation (ppm)	Result
100	3.85	+20(Ref)	25	0.014	PASS
100		-30	29	0.017	
100		-20	18	0.010	
100		-10	39	0.023	
100		0	-52	-0.030	
100		+10	-38	-0.022	
100		+20	-63	-0.036	
100		+30	-36	-0.021	
100		+40	66	0.038	
100		+50	37	0.021	
115		4.40	+20	13	
85	3.70	+20	-54	-0.031	

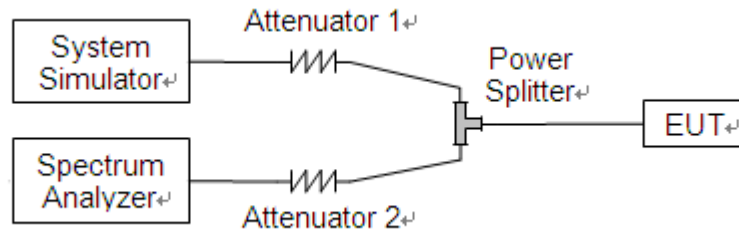
2.5. Conducted Out of Band Emissions

2.5.1. Requirement

According to FCC section 22.917(a), 24.238(a) and 27.53(h) the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10*\log(P)$ dB. This calculated to be -13dBm.

2.5.2. Test Description

Test Setup:



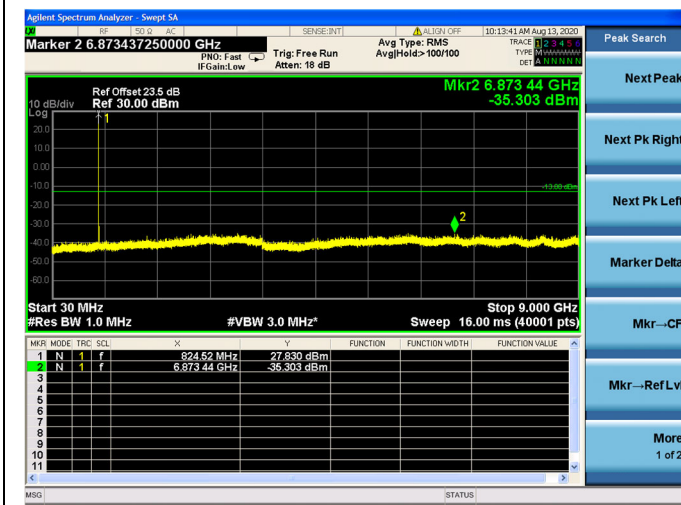
The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power i.e. Power Control Level (PCL) = 5 and Power Class = 4. A call is established between the EUT and the SS.

2.5.3. Test Result

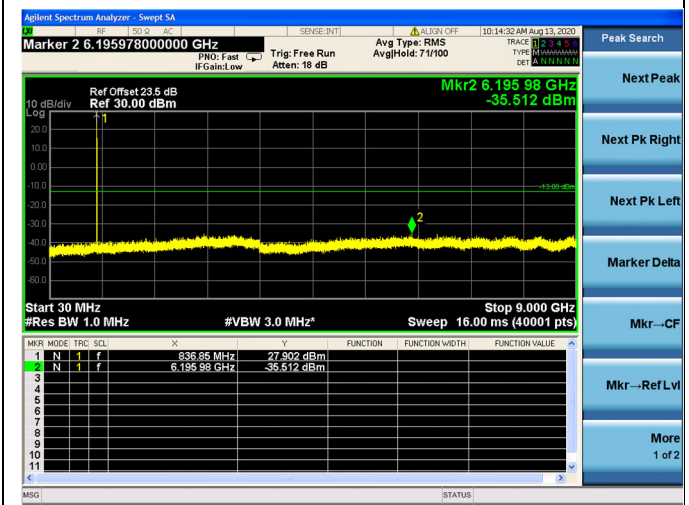
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the out of band emissions.



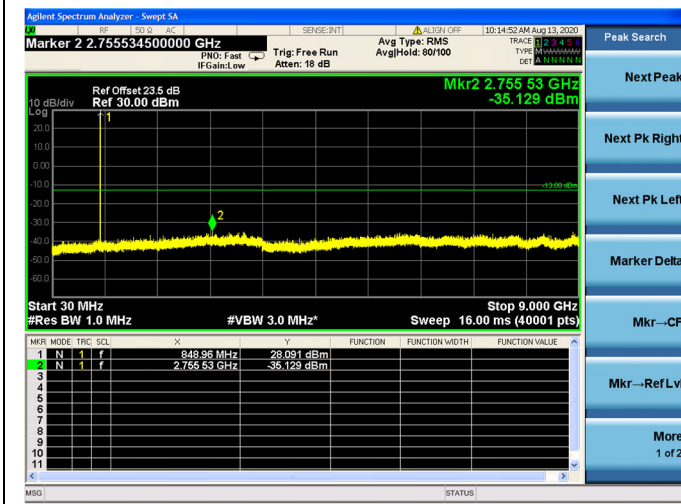
GSM 850MHz CH128 824.2MHz



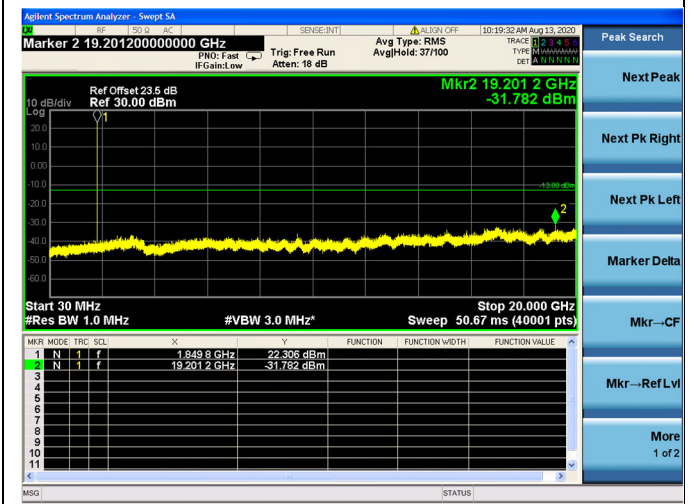
GSM 850MHz CH190 836.6MHz



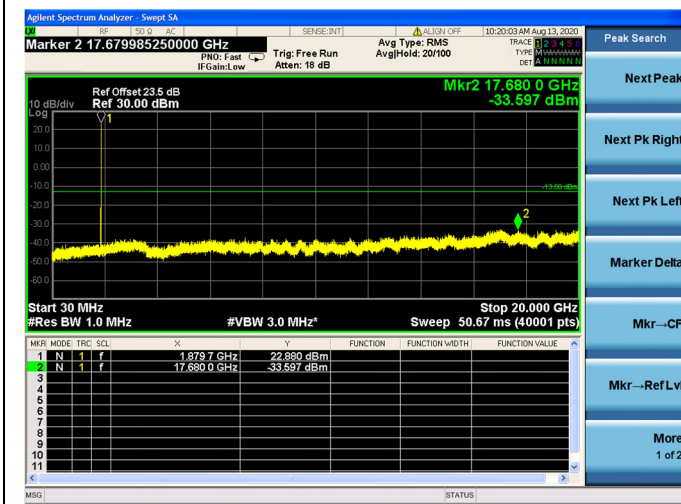
GSM 850MHz CH251 848.8MHz



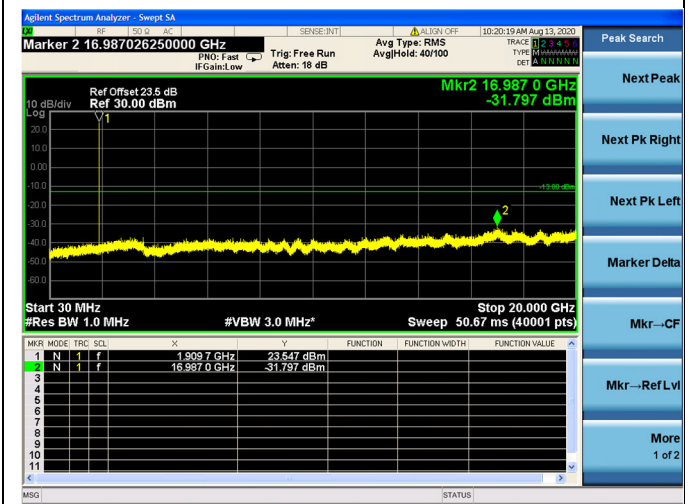
GSM 1900MHz CH512 1850.2MHz

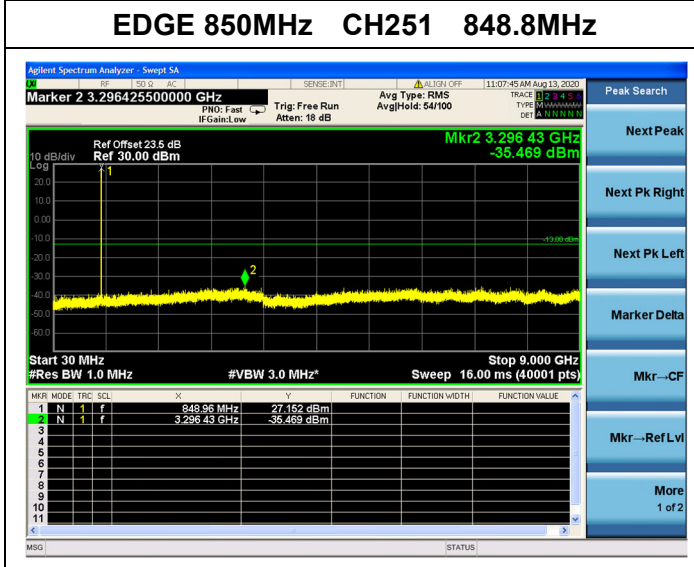
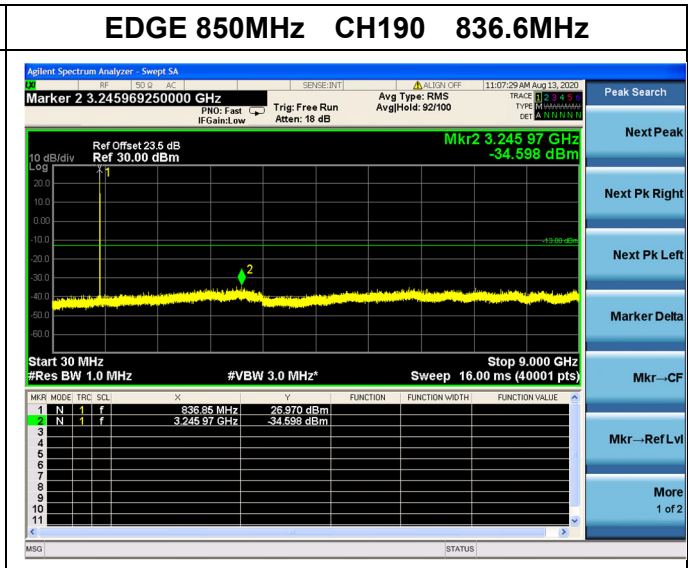
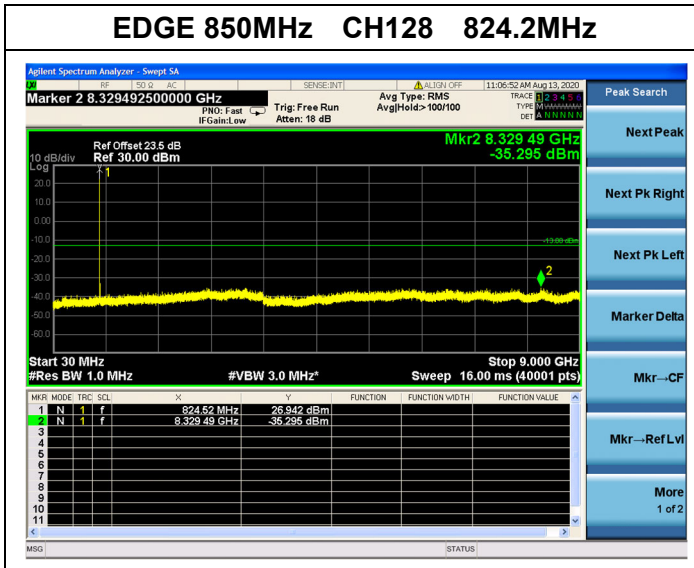


GSM 1900MHz CH661 1880.0MHz



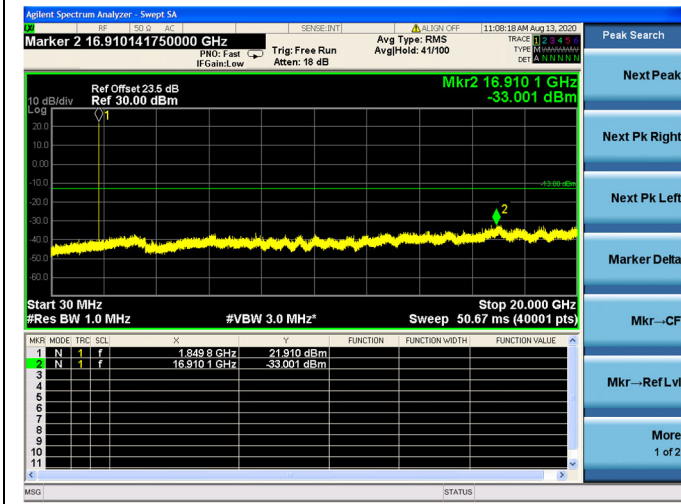
GSM 1900MHz CH810 1909.8MHz



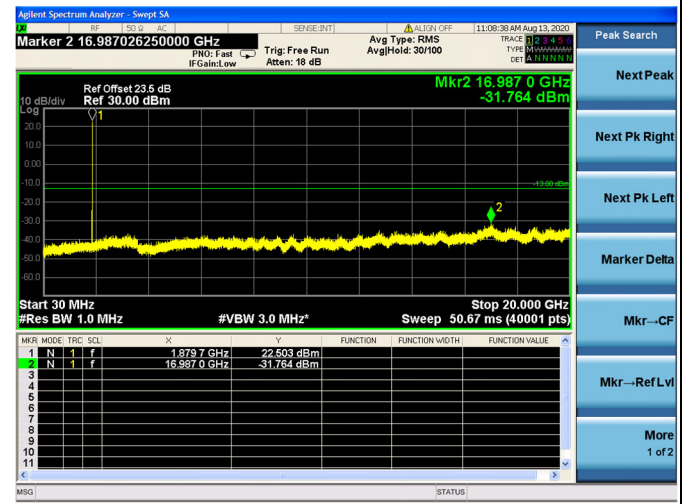




EDGE 1900MHz CH512 1850.2MHz



EDGE 1900MHz CH661 1880.0MHz



EDGE 1900MHz CH810 1909.8MHz

