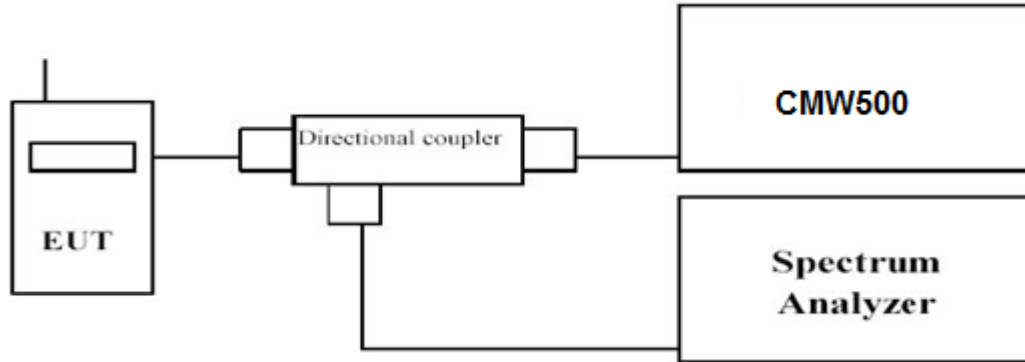## 4.4 Band Edge compliance

<u>LIMIT</u>

FCC § 2.1053, §22.917, § 24.238.

<u>TEST CONFIGURATION</u>

<u>TEST PROCEDURE</u>

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest and highest channels for each band and different modulation.
5. Measure Band edge using RMS (Average) detector by spectrum

<u>TEST RESULTS</u>

Temperature	24.5℃	Humidity	53.7%
Test Engineer	Jenny Zeng	Configurations	GSM

Remark:
We were tested all RB Configuration refer 3GPP TS151010 for each Channel Bandwidth of GSM850M,GSM1900M; recorded worst case for each Channel Bandwidth of GSM850, GSM1900M.
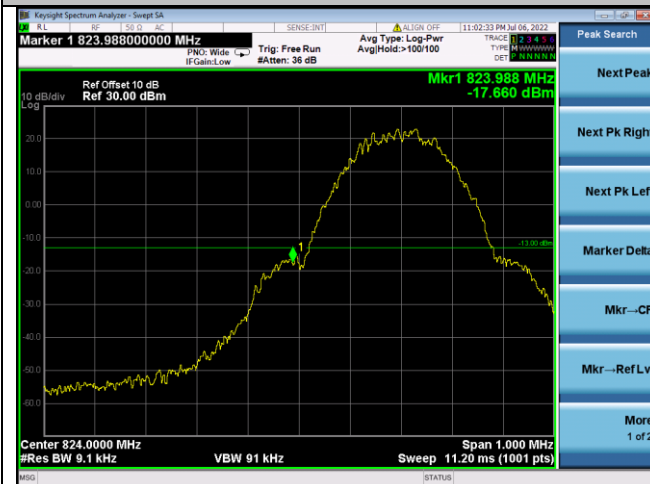
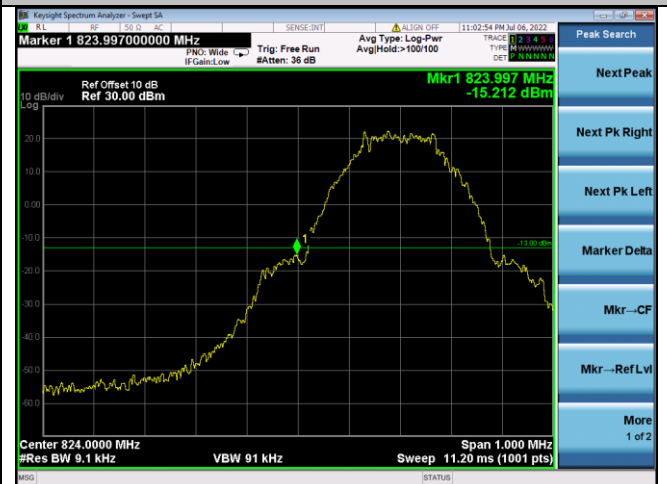| Test Mode	Channel	Frequency (MHz)	Band Edg Compliance (dBm)	Limits (dBm)	Verdict
GSM/TM1/GSM850	128	824.2	-17.660	-13dBm	PASS
	251	848.8	-17.689	-13dBm	
GSM/TM2/EDGE850	128	824.2	-15.212	-13dBm	PASS
	251	848.8	-15.265	-13dBm	
GSM/TM1/GSM1900	512	1850.2	-23.130	-13dBm	PASS
	810	1909.8	-23.802	-13dBm	
GSM/TM2/EDGE1900	512	1850.2	-22.029	-13dBm	PASS
	810	1909.8	-20.581	-13dBm	

Remark:
1. Test results including cable loss;
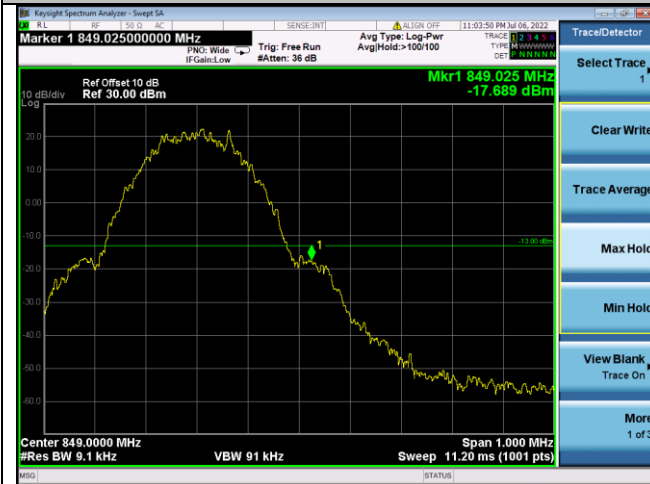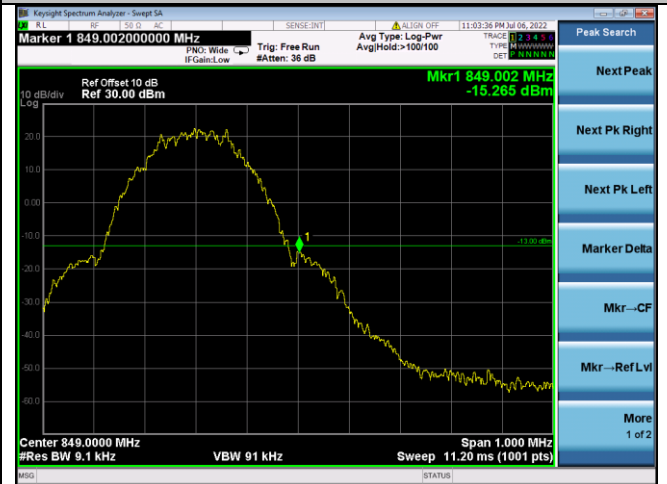2. Please refer to following plots;

Band-edge Compliance	
GSM/TM1/GSM850	GSM/TM2/EDGE850
Channel 128 / 824.2 MHz	Channel 128 / 824.2 MHz
Channel 251 / 848.8 MHz	Channel 251 / 848.8 MHz
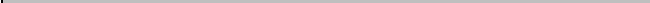
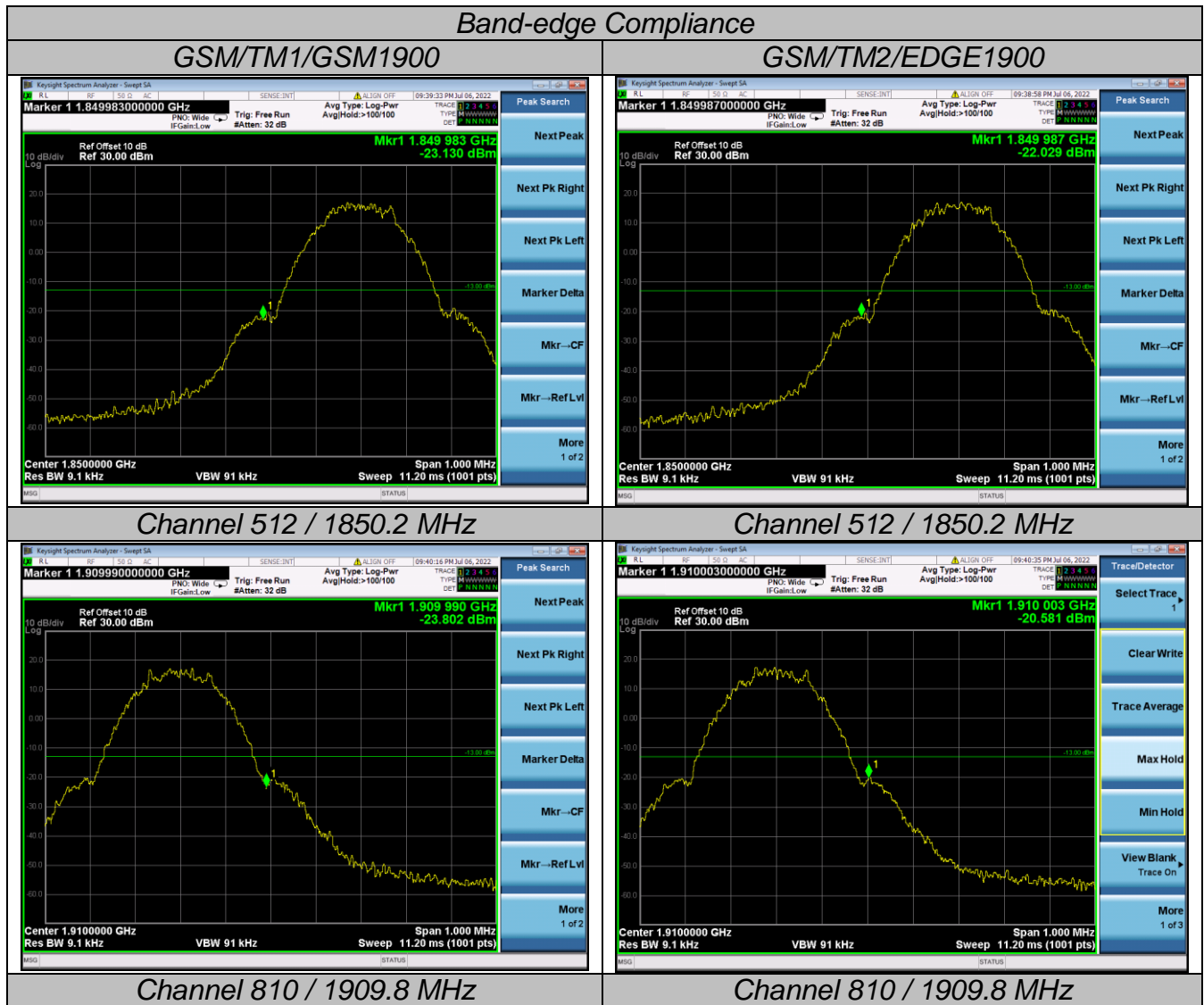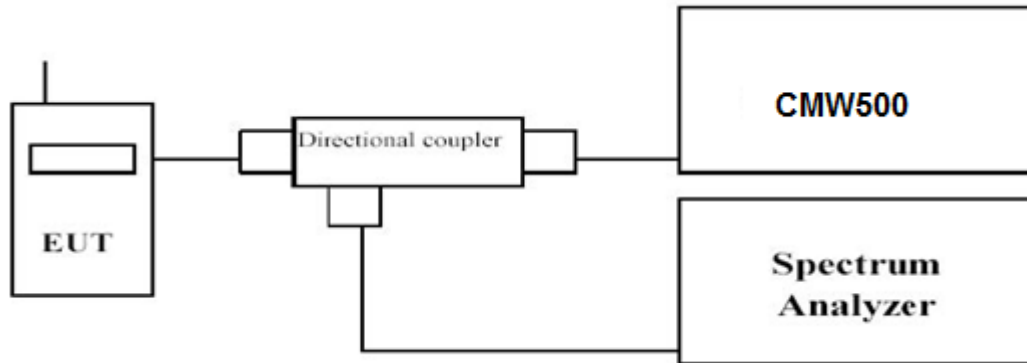| Band-edge Compliance	
GSM/TM1/GSM1900	*GSM/TM2/EDGE1900*
Channel 512 / 1850.2 MHz	*Channel 512 / 1850.2 MHz*
Channel 810 / 1909.8 MHz	*Channel 810 / 1909.8 MHz*
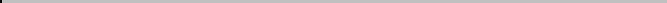
NOTE:We measured all modes and only recorded the worst case.

4.5   Spurious Emission

 FCC § 2.1053, §22.917, § 24.238.

TEST CONFIGURATION

Conducted Spurious Measurement:

Radiated Spurious Measurement:
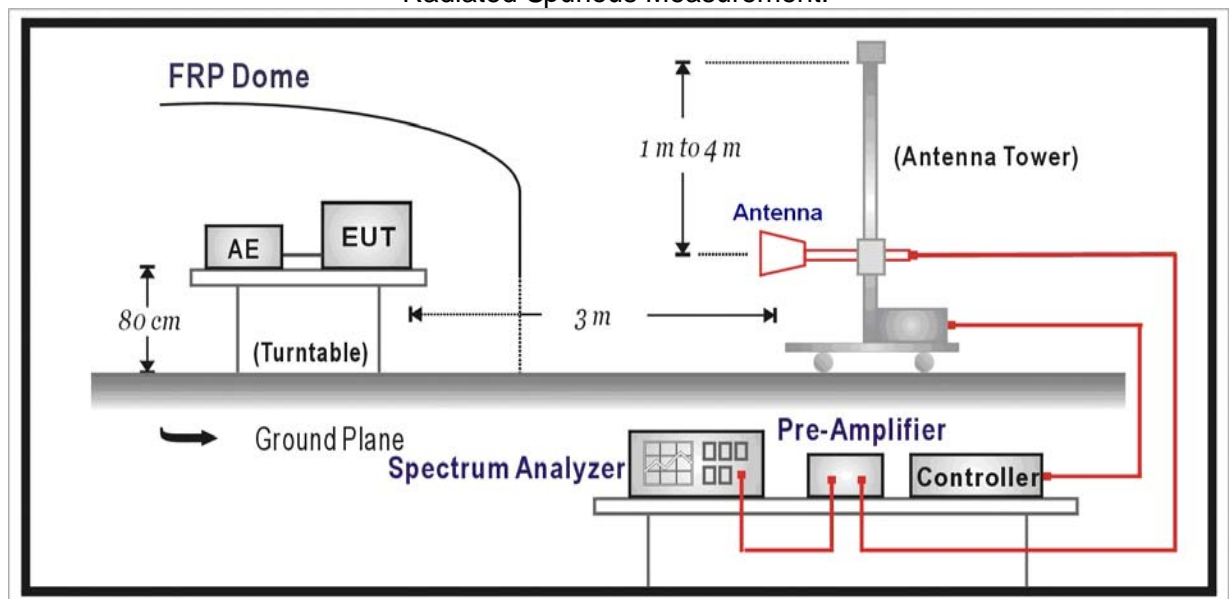
TEST PROCEDURE

The EUT was setup according to EIA/TIA 603-E

Conducted Spurious Measurement:
a.   Place the EUT on a bench and set it in transmitting mode.
b.   Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMW500 by a Directional Couple.
c.   EUT Communicate with CMW500, then select a channel for testing.
d.   Add a correction factor to the display of spectrum, and then test.
e.   The resolution bandwidth of the spectrum analyzer was set sufficient scans were taken to show the out of band Emission if any up to10th harmonic.
f.   Please refer to following tables for test antenna conducted emissions.

Radiated Spurious Measurement:
a. The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
b. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
c. The output of the test antenna shall be connected to the measuring receiver.
d. The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
e. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
f. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
g. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
h. The maximum signal level detected by the measuring receiver shall be noted.
i. The transmitter shall be replaced by a substitution antenna.
j. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
k. The substitution antenna shall be connected to a calibrated signal generator.
l. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
m. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
n. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
o. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
p. The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
q. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.
r. Test site anechoic chamber refer to ANSI C63.4:2014.

TEST RESULTS

Temperature	24.5℃	Humidity	53.7%
Test Engineer	Jenny Zeng	Configurations	GSM

Conducted Measurement:
Remark:
We were tested all RB Configuration refer 3GPP TS151010 for each Channel Bandwidth of GSM850M,GSM1900M; recorded worst case for each Channel Bandwidth of GSM850, GSM1900M.

Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBm)	Limits (dBm)	Verdict
GSM/TM1/GSM850	128	824.2	-34.515	-13dBm	
	190	836.6	-34.575	-13dBm	PASS
	251	848.8	-34.258	-13dBm	
GSM/TM2/EDGE850	128	824.2	-33.552	-13dBm	
	190	836.6	-33.482	-13dBm	PASS
	251	848.8	-34.264	-13dBm	
GSM/TM1/GSM1900	512	1850.2	-31.969	-13dBm	
	661	1880.0	-31.652	-13dBm	PASS
	810	1909.8	-32.720	-13dBm	
GSM/TM2/EDGE1900	512	1850.2	-32.600	-13dBm	
	661	1880.0	-31.277	-13dBm	PASS
	810	1909.8	-32.277	-13dBm	

Remark:
1. Test results including cable loss;
2. Please refer to following plots;
3. We measured all modes and only recorded the worst case.

Spurious Emssion on Antenna Port	
GSM/TM1/GSM850	GSM/TM1/GSM850
Channel 128 / 824.2 MHz	Channel 190 / 836.6 MHz
30 MHz – 1000 MHz	30 MHz – 1000 MHz
1 GHz – 10 GHz	1 GHz – 10 GHz
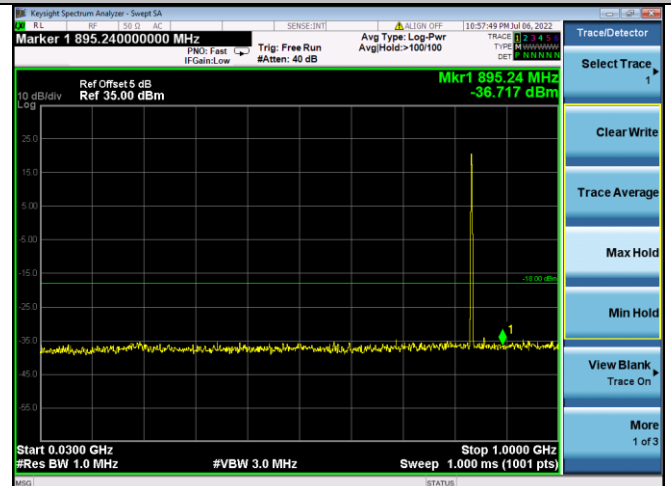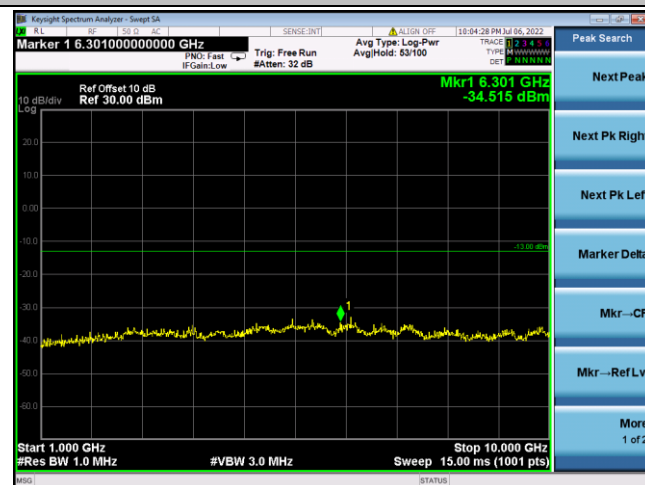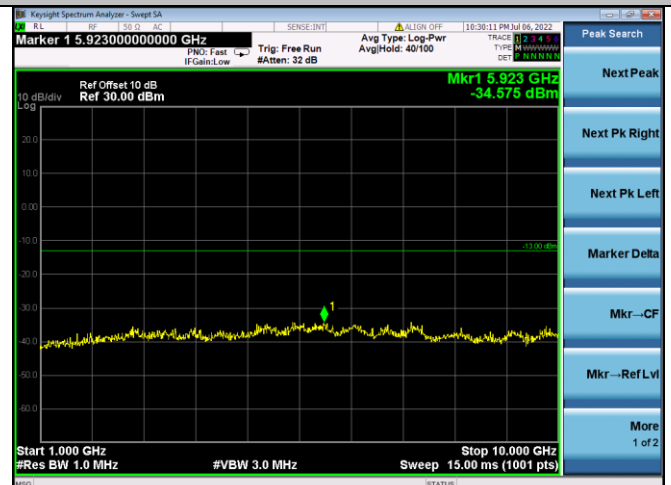
Spurious Emssion on Antenna Port	
GSM/TM1/GSM850	GSM/TM2/EDGE850
Channel 251 / 848.8 MHz	Channel 128 / 824.2 MHz
30 MHz – 1000 MHz	30 MHz – 1000 MHz
1 GHz – 10 GHz	1 GHz – 10 GHz
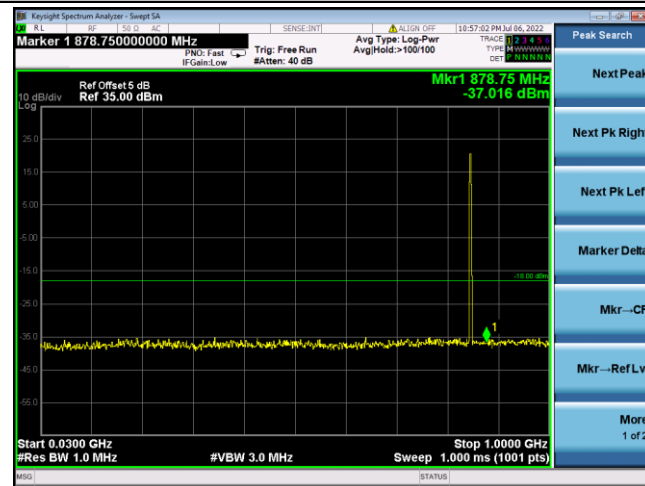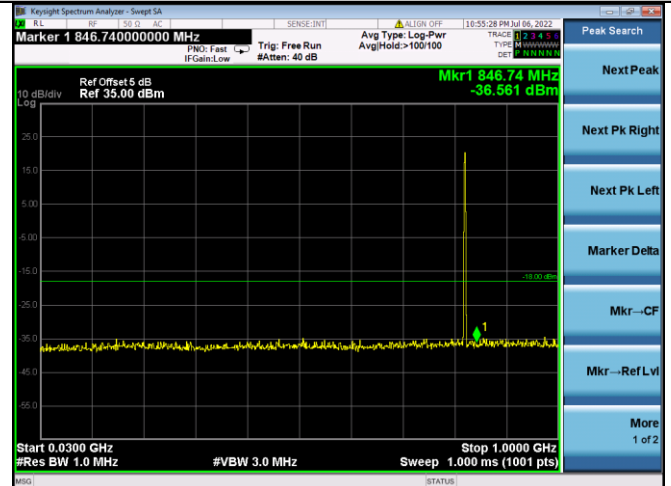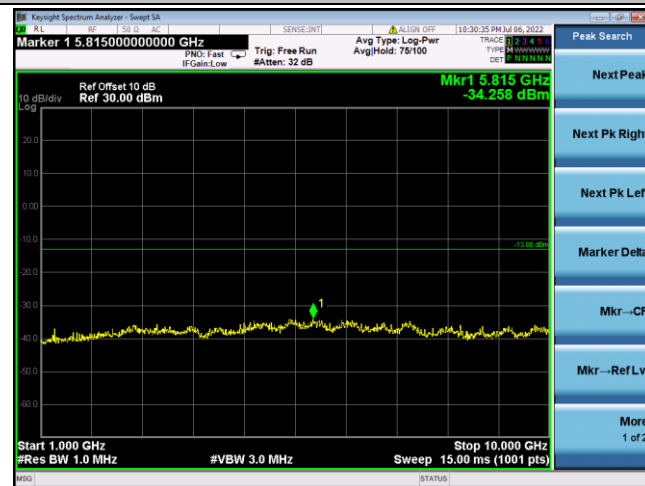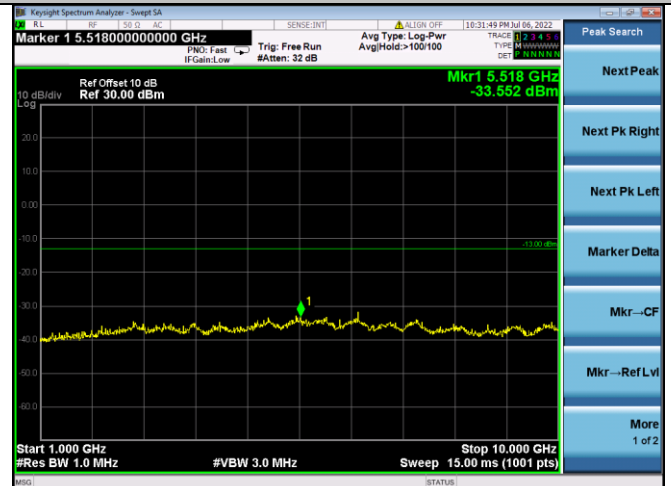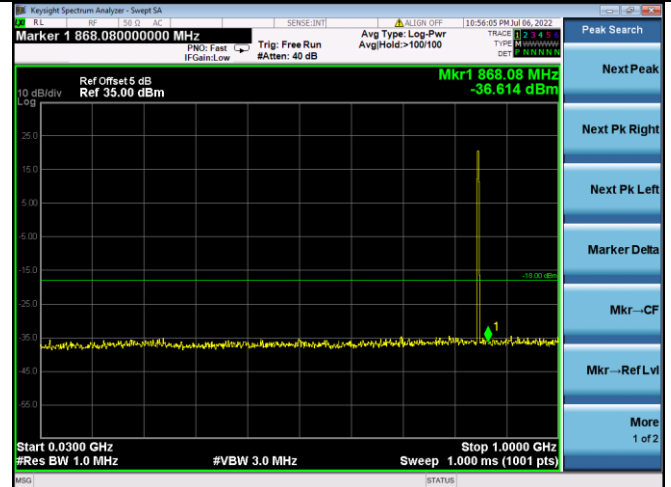
Spurious Emssion on Antenna Port	
GSM/TM2/EDGE850	GSM/TM2/EDGE850
Channel 190 / 836.6 MHz	Channel 251 / 848.8 MHz
30 MHz – 1000 MHz	30 MHz – 1000 MHz
1 GHz – 10 GHz	1 GHz – 10 GHz
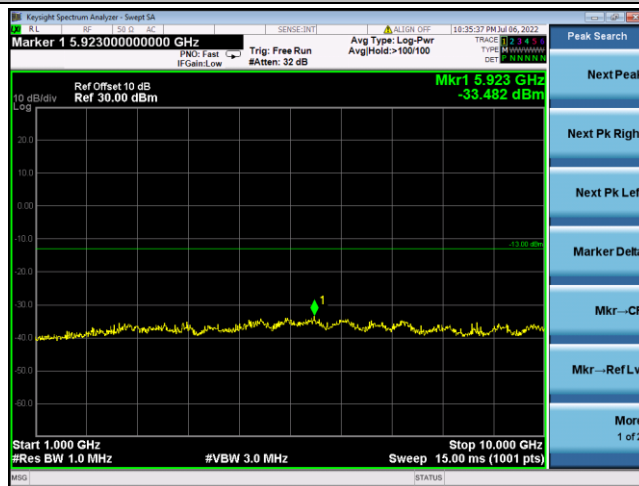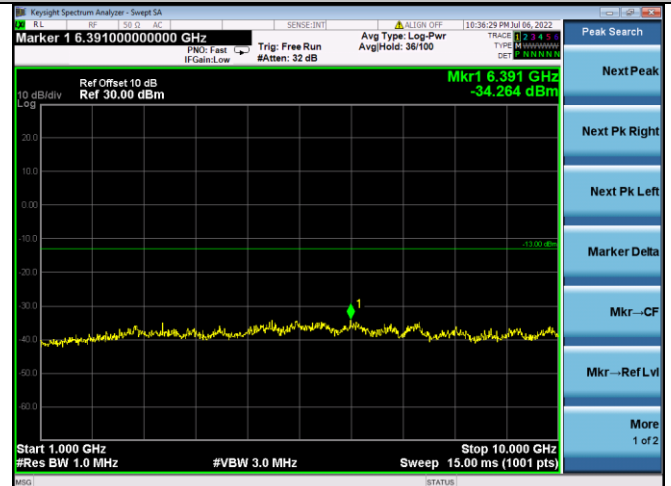
Spurious Emssion on Antenna Port	
GSM/TM1/GSM1900	GSM/TM1/GSM1900
Channel 512/ 1850.2 MHz	Channel 661 / 1880.0 MHz
30 MHz – 1000 MHz	30 MHz – 1000 MHz
1 GHz – 2 GHz	1 GHz – 2 GHz
2 GHz – 20 GHz	2 GHz – 20 GHz
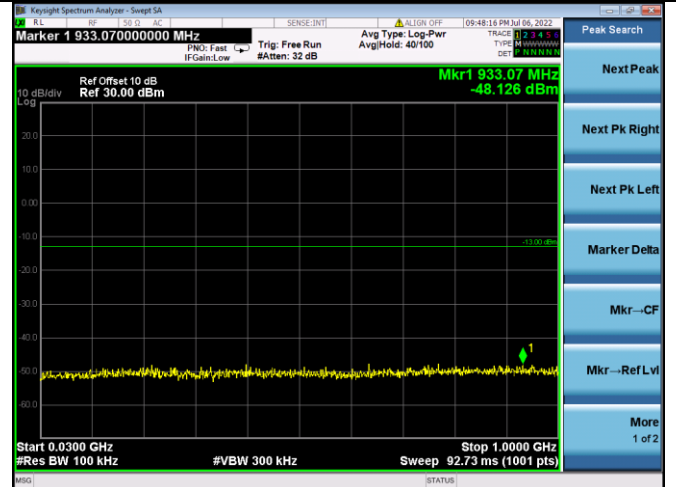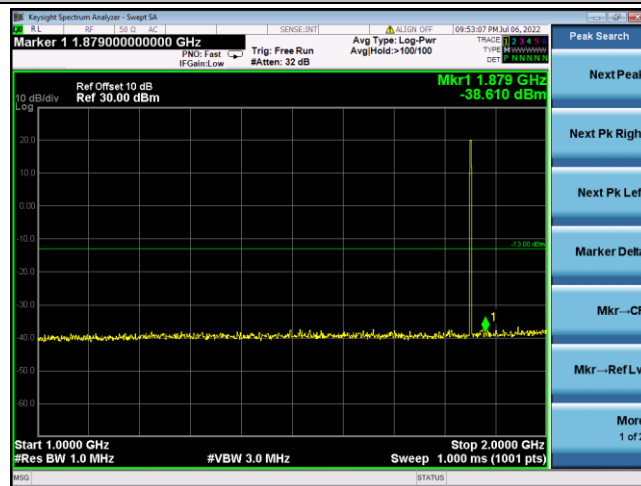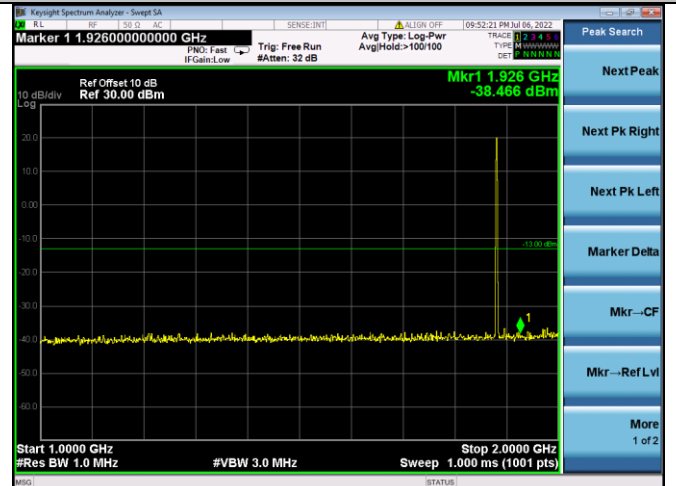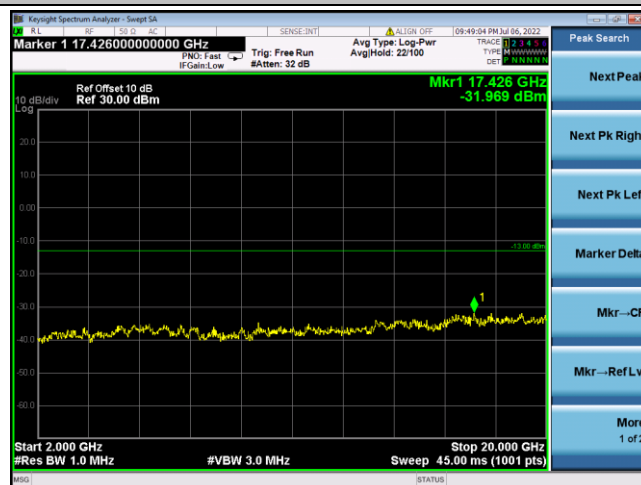
Spurious Emssion on Antenna Port	
GSM/TM1/GSM1900	GSM/TM2/EDGE1900
Channel 810/ 1909.8 MHz	Channel 512/ 1850.2 MHz
30 MHz – 1000 MHz	30 MHz – 1000 MHz
1 GHz – 2 GHz	1 GHz – 2 GHz
2 GHz – 20 GHz	2 GHz – 20 GHz
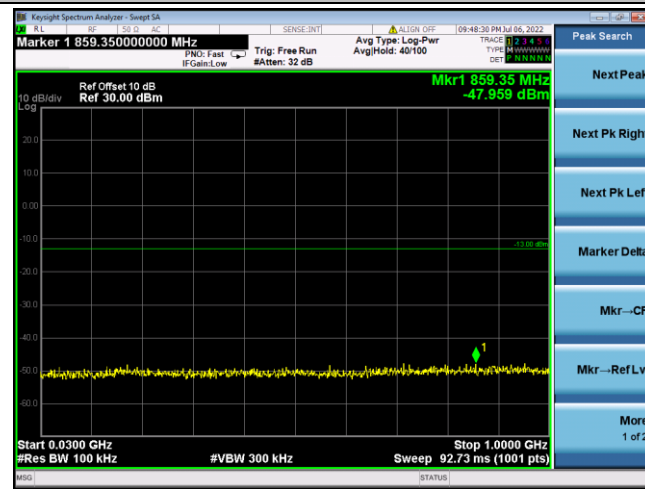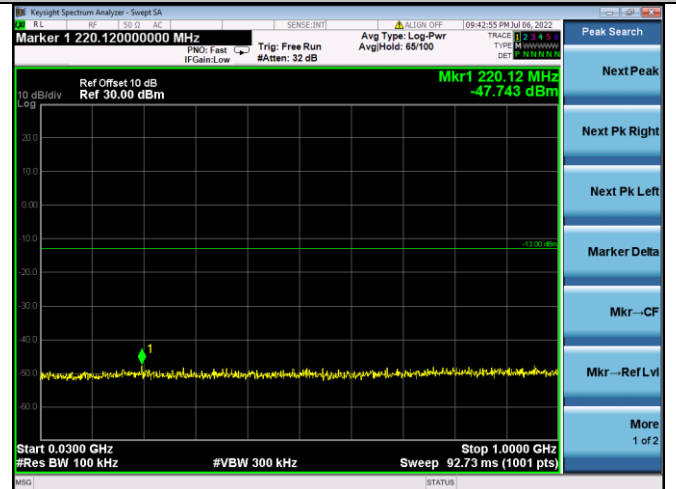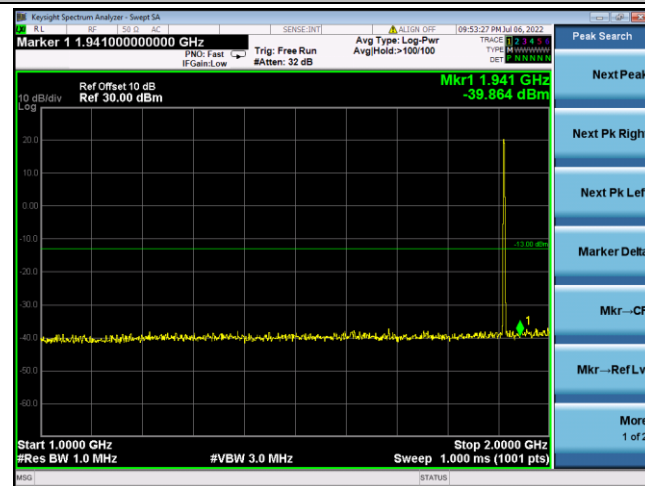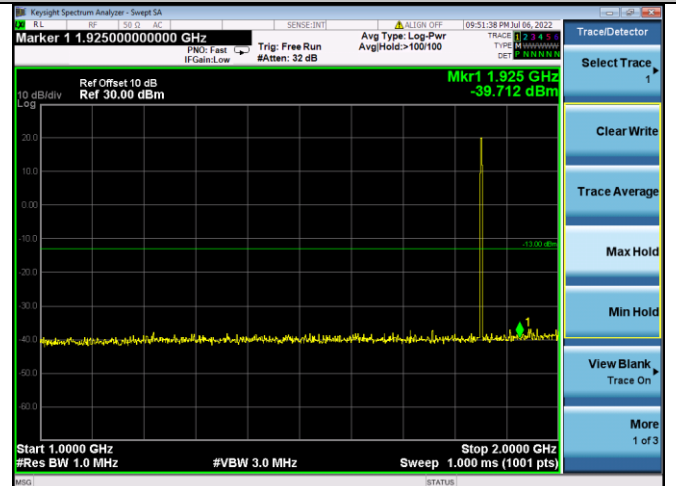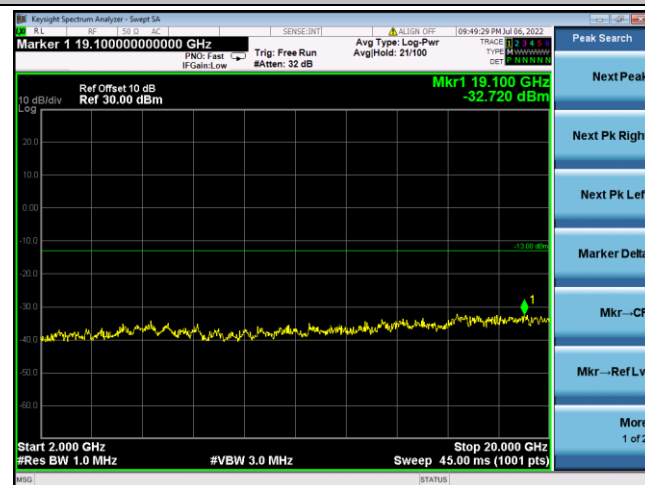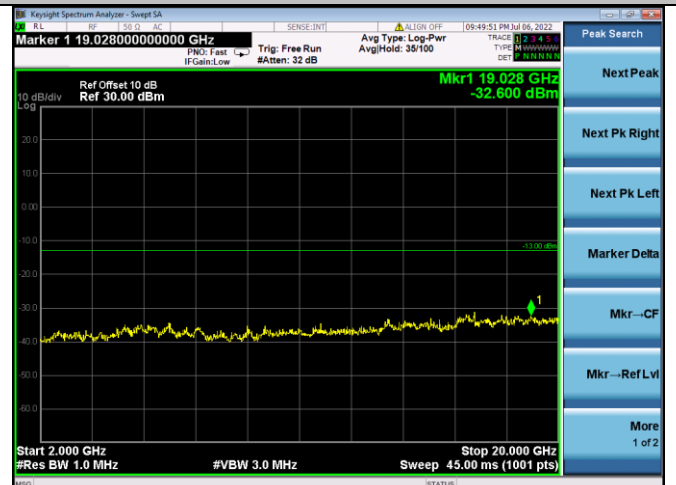
Spurious Emssion on Antenna Port	
GSM/TM1/GSM1900	GSM/TM2/EDGE1900
Channel 661 / 1880.0 MHz	Channel 810/ 1909.8 MHz
30 MHz – 1000 MHz	30 MHz – 1000 MHz
1 GHz – 2 GHz	1 GHz – 2 GHz
2 GHz – 20 GHz	2 GHz – 20 GHz
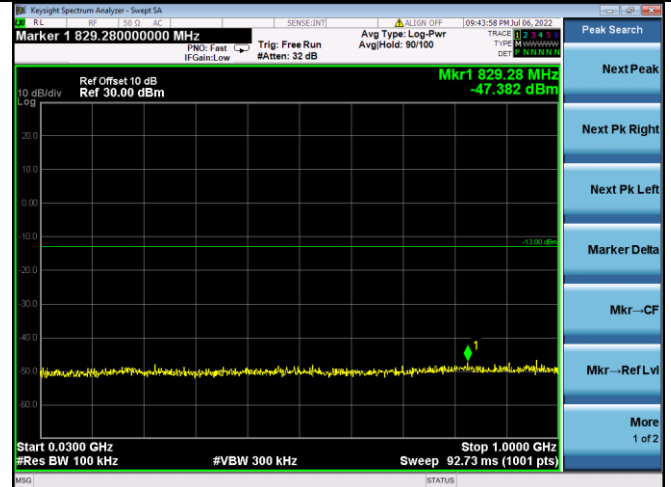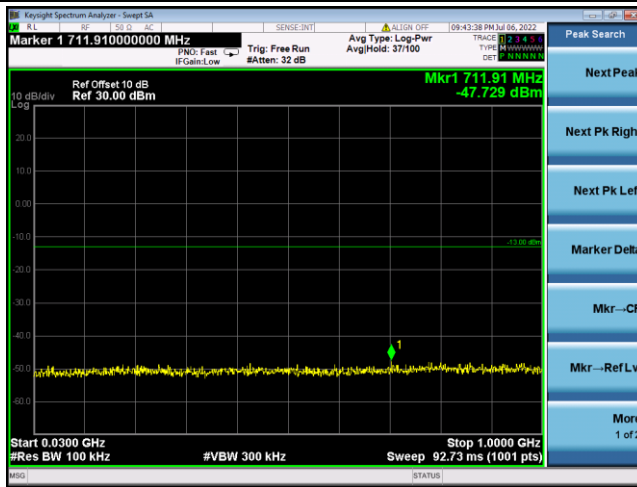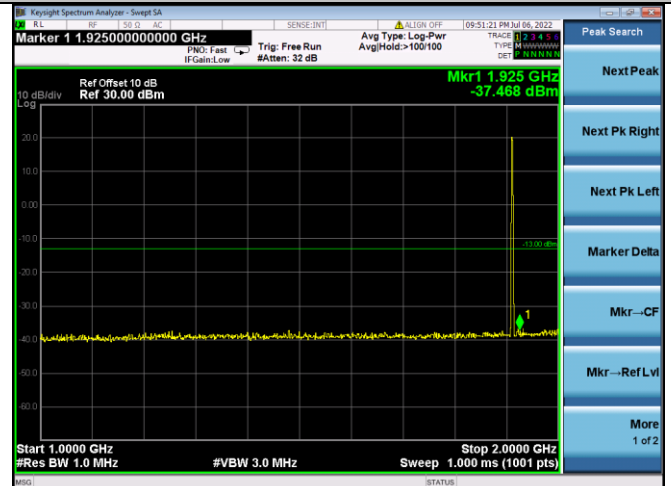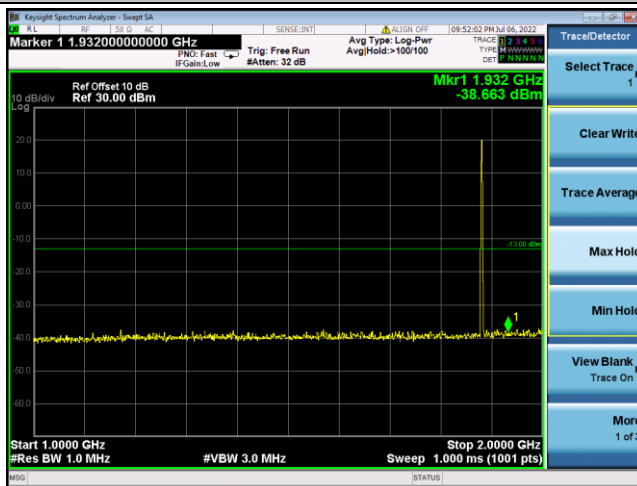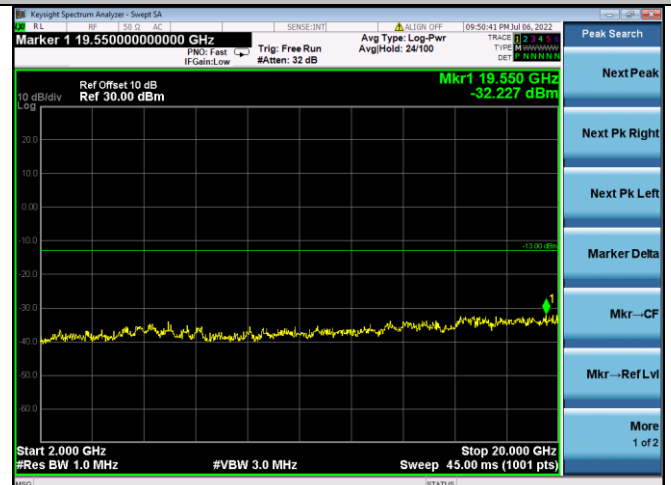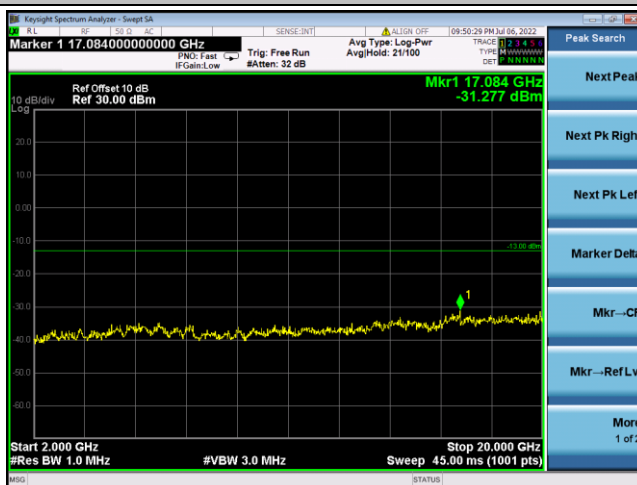
Radiated Measurement:

Remark:

We were tested all RB Configuration refer 3GPP TS151010 for each Channel Bandwidth of GSM850M,GSM1900M; recorded worst case for each Channel Bandwidth of GSM850M,GSM1900M.

Temperature	24.5℃	Humidity	53.7%
Test Engineer	Jenny Zeng	Configurations	GSM

For Less than 1 GHZ:

GSM/TM1/GSM850_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
148.26	-45.89	3.95	3.00	8.74	-41.11	-13.00	-28.11	H
237.51	-45.84	4.10	3.00	6.97	-42.98	-13.00	-29.98	H
558.06	-41.87	3.68	3.00	8.46	-37.09	-13.00	-24.09	V
906.71	-43.47	4.47	3.00	6.82	-41.12	-13.00	-28.12	V

GSM/TM1/GSM850_ Middle Channel

| Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
157.00	-46.03	4.05	3.00	8.56	-41.51	-13.00	-28.51	H
236.89	-46.76	4.21	3.00	6.85	-44.12	-13.00	-31.12	H
560.68	-42.74	3.68	3.00	8.59	-37.82	-13.00	-24.82	V
905.53	-44.72	4.33	3.00	6.85	-42.20	-13.00	-29.20	V

GSM/TM1/GSM850_ High Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
156.04	-47.64	4.03	3.00	8.72	-42.95	-13.00	-29.95	H
235.33	-45.88	4.45	3.00	6.85	-43.48	-13.00	-30.48	H
556.15	-44.31	3.83	3.00	8.61	-39.53	-13.00	-26.53	V
899.70	-45.05	4.39	3.00	7.18	-42.27	-13.00	-29.27	V

GSM/TM2/ EDGE850_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
151.47	-45.70	3.87	3.00	8.39	-41.18	-13.00	-28.18	H
234.76	-45.87	4.10	3.00	6.89	-43.08	-13.00	-30.08	H
560.13	-41.98	3.72	3.00	8.41	-37.30	-13.00	-24.30	V
906.88	-43.34	4.35	3.00	6.82	-40.87	-13.00	-27.87	V

GSM/TM2/ EDGE850_ Middle Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
152.19	-46.07	3.75	3.00	8.64	-41.18	-13.00	-28.18	H
236.77	-46.68	4.14	3.00	6.81	-44.01	-13.00	-31.01	H
559.43	-42.65	3.74	3.00	8.38	-38.02	-13.00	-25.02	V
902.54	-44.68	4.36	3.00	6.98	-42.06	-13.00	-29.06	V

GSM/TM2/ EDGE850_ High Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
155.74	-47.58	3.98	3.00	8.66	-42.90	-13.00	-29.90	H
242.93	-45.63	4.39	3.00	7.02	-43.00	-13.00	-30.00	H
555.78	-44.53	3.94	3.00	8.75	-39.72	-13.00	-26.72	V
897.47	-45.04	4.31	3.00	6.95	-42.40	-13.00	-29.40	V

GSM/TM1/GSM1900_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
150.15	-45.70	3.86	3.00	8.74	-40.82	-13.00	-27.82	H
233.50	-46.01	4.09	3.00	6.78	-43.32	-13.00	-30.32	H
554.92	-41.99	4.01	3.00	8.65	-37.35	-13.00	-24.35	V
899.93	-43.50	4.23	3.00	6.87	-40.86	-13.00	-27.86	V

GSM/TM1/GSM1900_ Middle Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
151.54	-45.95	3.84	3.00	8.56	-41.23	-13.00	-28.23	H
238.03	-46.65	4.32	3.00	6.96	-44.01	-13.00	-31.01	H
554.34	-42.74	3.79	3.00	8.59	-37.93	-13.00	-24.93	V
902.68	-44.49	4.23	3.00	7.08	-41.63	-13.00	-28.63	V

GSM/TM1/GSM1900_ High Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
156.84	-47.51	3.96	3.00	8.66	-42.81	-13.00	-29.81	H
236.14	-45.83	4.31	3.00	6.99	-43.15	-13.00	-30.15	H
552.71	-44.34	4.02	3.00	8.40	-39.95	-13.00	-26.95	V
898.74	-45.06	4.28	3.00	6.85	-42.49	-13.00	-29.49	V

GSM/TM2/ EDGE1900_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
154.43	-45.97	3.70	3.00	8.72	-40.95	-13.00	-27.95	H
240.18	-46.05	4.47	3.00	6.81	-43.71	-13.00	-30.71	H
561.36	-41.83	3.81	3.00	8.45	-37.19	-13.00	-24.19	V
906.95	-43.57	4.36	3.00	7.06	-40.87	-13.00	-27.87	V

GSM/TM2/ EDGE1900_ Middle Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
149.15	-46.01	4.03	3.00	8.52	-41.51	-13.00	-28.51	H
239.86	-46.63	4.14	3.00	7.07	-43.69	-13.00	-30.69	H
554.72	-42.90	3.74	3.00	8.54	-38.10	-13.00	-25.10	V
900.76	-44.74	4.24	3.00	7.05	-41.93	-13.00	-28.93	V

GSM/TM2/ EDGE1900_ High Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
152.66	-47.48	3.76	3.00	8.47	-42.77	-13.00	-29.77	H
241.92	-45.83	4.49	3.00	7.02	-43.29	-13.00	-30.29	H
553.60	-44.53	3.90	3.00	8.70	-39.73	-13.00	-26.73	V
905.06	-45.01	4.10	3.00	6.99	-42.12	-13.00	-29.12	V

For More than 1 GHZ:

GSM/TM1/GSM850_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1648.40	-45.88	3.86	3.00	8.56	-41.18	-13.00	-28.18	H
2472.60	-45.76	4.29	3.00	6.98	-43.07	-13.00	-30.07	H
1648.40	-41.99	3.86	3.00	8.56	-37.29	-13.00	-24.29	V
2472.60	-43.54	4.29	3.00	6.98	-40.85	-13.00	-27.85	V

GSM/TM1/GSM850_ Middle Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.20	-46.09	3.90	3.00	8.58	-41.41	-13.00	-28.41	H
2509.80	-46.81	4.32	3.00	6.80	-44.33	-13.00	-31.33	H
1673.20	-42.69	3.90	3.00	8.58	-38.01	-13.00	-25.01	V
2509.80	-44.54	4.32	3.00	6.80	-42.06	-13.00	-29.06	V

GSM/TM1/GSM850_ High Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.60	-47.40	3.91	3.00	9.06	-42.25	-13.00	-29.25	H
2546.40	-45.87	4.32	3.00	6.65	-43.54	-13.00	-30.54	H
1697.60	-44.38	3.91	3.00	9.06	-39.23	-13.00	-26.23	V
2546.40	-45.31	4.32	3.00	6.65	-42.98	-13.00	-29.98	V

GSM/TM2/ EDGE850_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1648.40	-45.67	3.86	3.00	8.56	-40.97	-13.00	-27.97	H
2472.60	-45.72	4.29	3.00	6.98	-43.03	-13.00	-30.03	H
1648.40	-41.93	3.86	3.00	8.56	-37.23	-13.00	-24.23	V
2472.60	-43.72	4.29	3.00	6.98	-41.03	-13.00	-28.03	V

GSM/TM2/ EDGE850_ Middle Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1673.20	-46.01	3.90	3.00	8.58	-41.33	-13.00	-28.33	H
2509.80	-46.54	4.32	3.00	6.80	-44.06	-13.00	-31.06	H
1673.20	-42.77	3.90	3.00	8.58	-38.09	-13.00	-25.09	V
2509.80	-44.75	4.32	3.00	6.80	-42.27	-13.00	-29.27	V

GSM/TM2/ EDGE850_ High Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1697.60	-47.71	3.91	3.00	9.06	-42.56	-13.00	-29.56	H
2546.40	-45.81	4.32	3.00	6.65	-43.48	-13.00	-30.48	H
1697.60	-44.45	3.91	3.00	9.06	-39.30	-13.00	-26.30	V
2546.40	-45.29	4.32	3.00	6.65	-42.96	-13.00	-29.96	V

GSM/TM1/GSM1900_ Low Channel

Frequency (MHz)	P_Mea (dBm)	P_cl (dB)	Diatance	G_a Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3700.40	-42.89	5.26	3.00	9.88	-38.27	-13.00	-25.27	H
5550.60	-48.52	6.11	3.00	11.36	-43.27	-13.00	-30.27	H
3700.40	-44.88	5.26	3.00	9.88	-40.26	-13.00	-27.26	V
5550.60	-50.28	6.11	3.00	11.36	-45.03	-13.00	-32.03	V

GSM/TM1/GSM1900_ Middle Channel

Frequency (MHz)	P$_{Mea}$ (dBm)	P$_{cl}$ (dB)	Diatance	G$_a$ Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-44.50	5.32	3.00	10.03	-39.79	-13.00	-26.79	H
5640.00	-49.72	6.19	3.00	11.41	-44.50	-13.00	-31.50	H
3760.00	-45.12	5.32	3.00	10.03	-40.41	-13.00	-27.41	V
5640.00	-50.64	6.19	3.00	11.41	-45.42	-13.00	-32.42	V

GSM/TM1/GSM1900_ High Channel

Frequency (MHz)	P$_{Mea}$ (dBm)	P$_{cl}$ (dB)	Diatance	G$_a$ Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.60	-45.57	5.36	3.00	9.62	-41.31	-13.00	-28.31	H
5729.40	-50.63	6.24	3.00	11.46	-45.41	-13.00	-32.41	H
3819.60	-46.33	5.36	3.00	9.62	-42.07	-13.00	-29.07	V
5729.40	-51.25	6.24	3.00	11.46	-46.03	-13.00	-33.03	V

GSM/TM2/ EDGE1900_ Low Channel

Frequency (MHz)	P$_{Mea}$ (dBm)	P$_{cl}$ (dB)	Diatance	G$_a$ Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3700.40	-42.73	5.26	3.00	9.88	-38.11	-13.00	-25.11	H
5550.60	-48.20	6.11	3.00	11.36	-42.95	-13.00	-29.95	H
3700.40	-44.83	5.26	3.00	9.88	-40.21	-13.00	-27.21	V
5550.60	-50.12	6.11	3.00	11.36	-44.87	-13.00	-31.87	V

GSM/TM2/ EDGE1900_ Middle Channel

Frequency (MHz)	P$_{Mea}$ (dBm)	P$_{cl}$ (dB)	Diatance	G$_a$ Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3760.00	-44.27	5.32	3.00	10.03	-39.56	-13.00	-26.56	H
5640.00	-50.05	6.19	3.00	11.41	-44.83	-13.00	-31.83	H
3760.00	-45.30	5.32	3.00	10.03	-40.59	-13.00	-27.59	V
5640.00	-50.91	6.19	3.00	11.41	-45.69	-13.00	-32.69	V

GSM/TM2/ EDGE1900_ High Channel

Frequency (MHz)	P$_{Mea}$ (dBm)	P$_{cl}$ (dB)	Diatance	G$_a$ Antenna Gain(dB)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3819.60	-45.39	5.36	3.00	9.62	-41.13	-13.00	-28.13	H
5729.40	-50.79	6.24	3.00	11.46	-45.57	-13.00	-32.57	H
3819.60	-46.44	5.36	3.00	9.62	-42.18	-13.00	-29.18	V
5729.40	-51.65	6.24	3.00	11.46	-46.43	-13.00	-33.43	V

Notes:
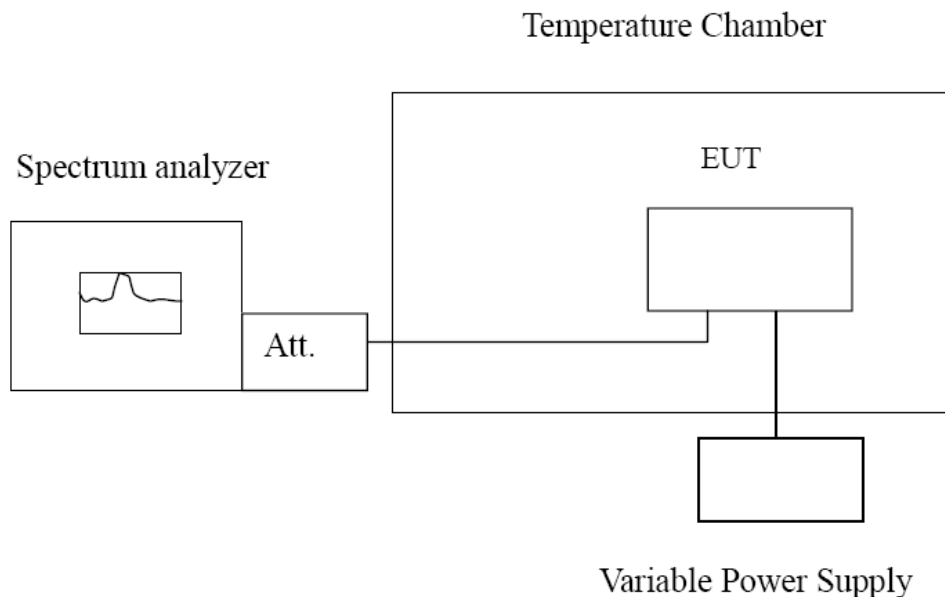1.All channel bandwidth were tested,the report recorded the worst data.
2. EIRP=PMea(dBm)-Pcl(dB)+PAg(dB)+Ga(dBi)
3. ERP = EIRP – 2.15dBi as EIRP by subtracting the gain of the dipole.
4. Margin = EIRP – Limit
5. We measured all modes and only recorded the worst case.

4.6   Frequency Stability under Temperature & Voltage Variations

LIMIT

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235 .

TEST CONFIGURATION

TEST PROCEDURE

The EUT was setup according to EIA/TIA 603D

Frequency Stability Under Temperature Variations:
In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.
1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel for LTE band 5, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 ℃ increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.
Frequency Stability Under Voltage Variations:
Set chamber temperature to 20℃. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.
Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

TEST RESULTS

Remark:

We were tested all RB Configuration refer 3GPP TS151010 for each Channel Bandwidth of GSM850M,GSM1900M; recorded worst case for each Channel Bandwidth of GSM850M,GSM1900M.

Temperature	24.5℃	Humidity	53.7%
Test Engineer	Jenny Zeng	Configurations	GSM

GSM/TM1/GSM850					
DC Power	Temperature (℃)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
DC 8.3V	25	1	0.001	±2.50	PASS
DC 6.9V	25	-21	-0.025	±2.50	PASS
DC 7.6V	25	14	0.017	±2.50	PASS
DC 7.6V	-30	16	0.019	±2.50	PASS
DC 7.6V	-20	10	0.012	±2.50	PASS
DC 7.6V	-10	5	0.006	±2.50	PASS
DC 7.6V	0	17	0.021	±2.50	PASS
DC 7.6V	10	38	0.046	±2.50	PASS
DC 7.6V	20	-49	-0.059	±2.50	PASS
DC 7.6V	30	6	0.007	±2.50	PASS
DC 7.6V	40	-15	-0.018	±2.50	PASS
DC 7.6V	50	-9	-0.011	±2.50	PASS

GSM/TM1/GSM1900					
DC Power	Temperature (℃)	Frequency error(Hz)	Frequency error(ppm)	Limit (ppm)	Verdict
DC 8.3V	25	9	0.005	±2.50	PASS
DC 6.9V	25	-10	-0.005	±2.50	PASS
DC 7.6V	25	-16	-0.009	±2.50	PASS
DC 7.6V	-30	-24	-0.013	±2.50	PASS
DC 7.6V	-20	-46	-0.024	±2.50	PASS
DC 7.6V	-10	46	0.024	±2.50	PASS
DC 7.6V	0	-31	-0.016	±2.50	PASS
DC 7.6V	10	-35	-0.019	±2.50	PASS
DC 7.6V	20	22	0.012	±2.50	PASS
DC 7.6V	30	5	0.003	±2.50	PASS
DC 7.6V	40	-15	-0.008	±2.50	PASS
DC 7.6V	50	14	0.007	±2.50	PASS

NOTE:We measured all modes and only recorded the worst case.

5 TEST SETUP PHOTOS OF THE EUT

6 E X T E R N A L A N D I N T E R N A L P H O T O S O F T H E E U T

Reference to the Test Report: **GTS20211218008-1-14.**

.......................End of Report........................