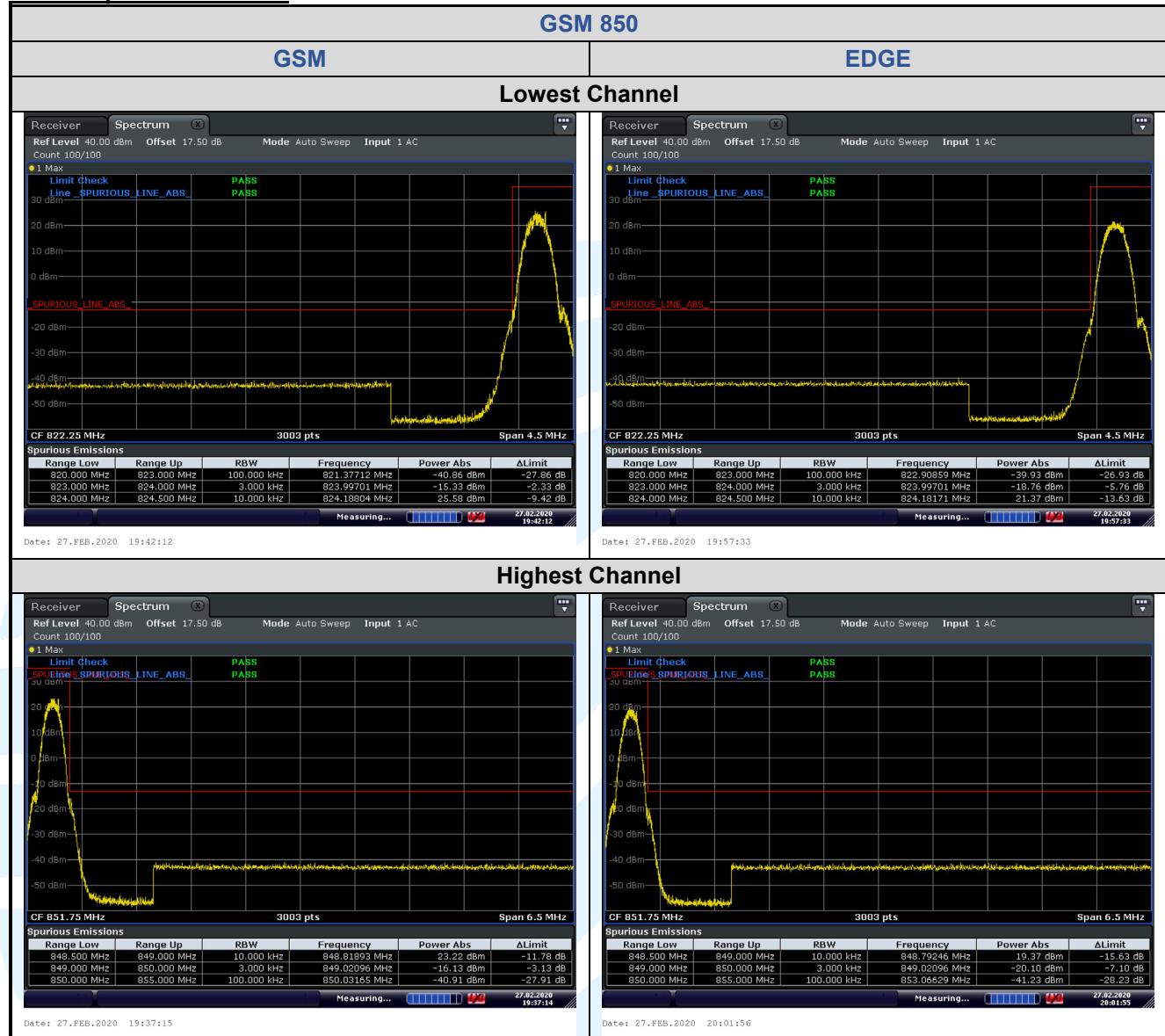
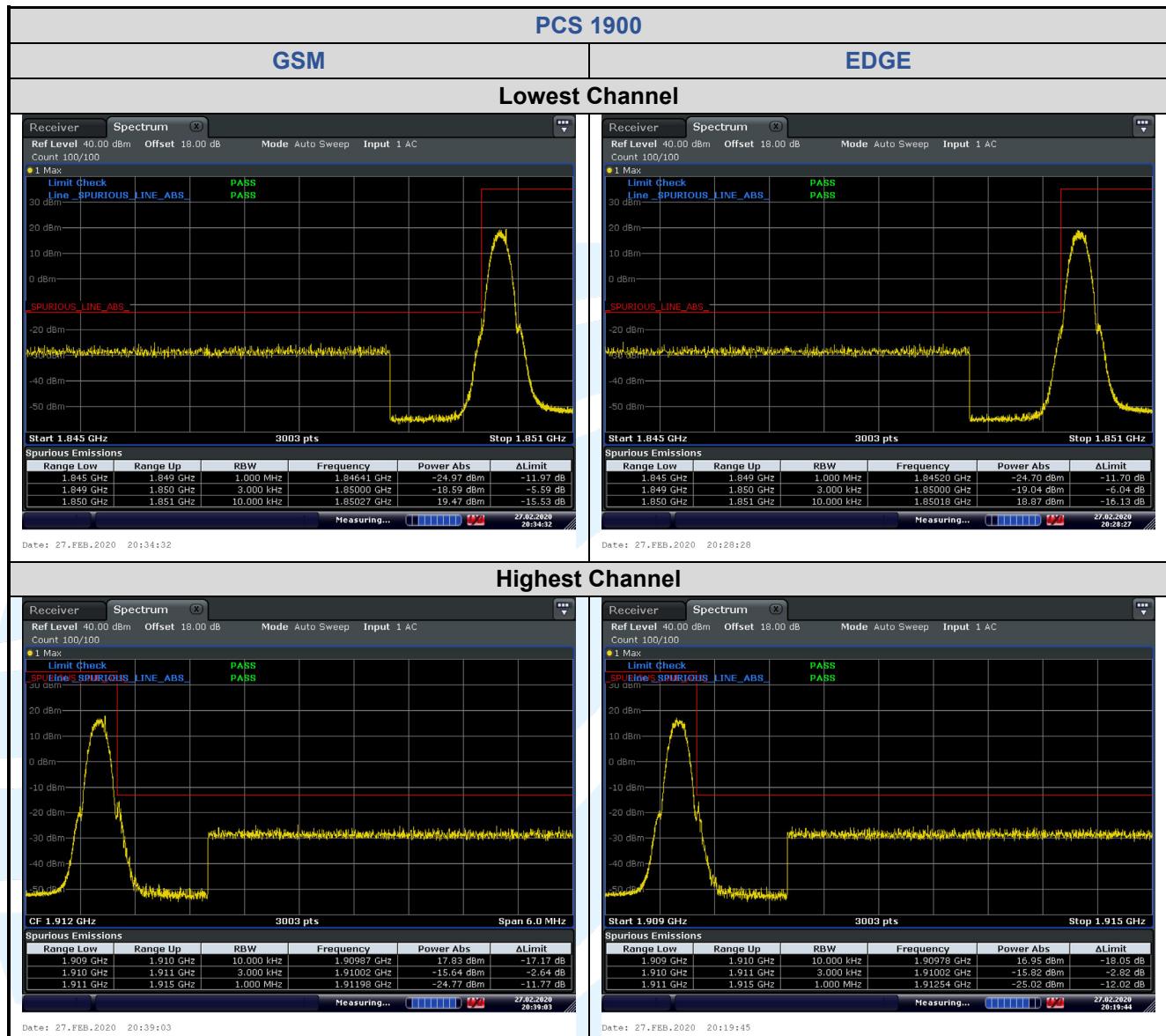
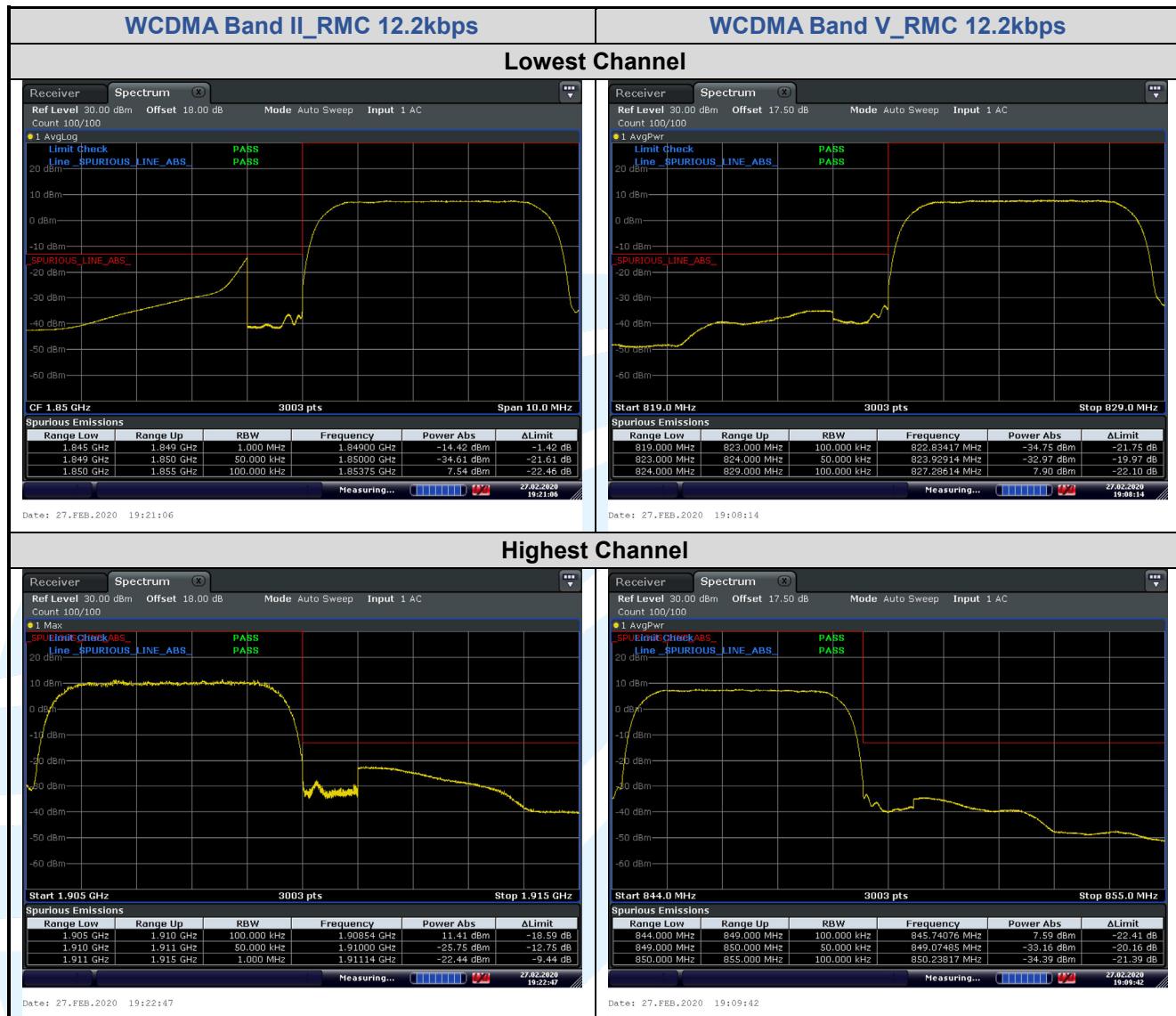


The test plots as follows:







## 5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

FCC 47 CFR Part 2.1051,

**Test Requirement:** FCC 47 CFR Part 22.917(a)(b),

FCC 47 CFR Part 24.238(a)(b),

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limit:**

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. The emission limit equal to -13 dBm.

**Test Procedure:**

The EUT makes a phone call to the communication simulator. All measurements were done at low, middle and high operational frequency range. b. Measuring frequency range is from 30 MHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.2.2 for details.

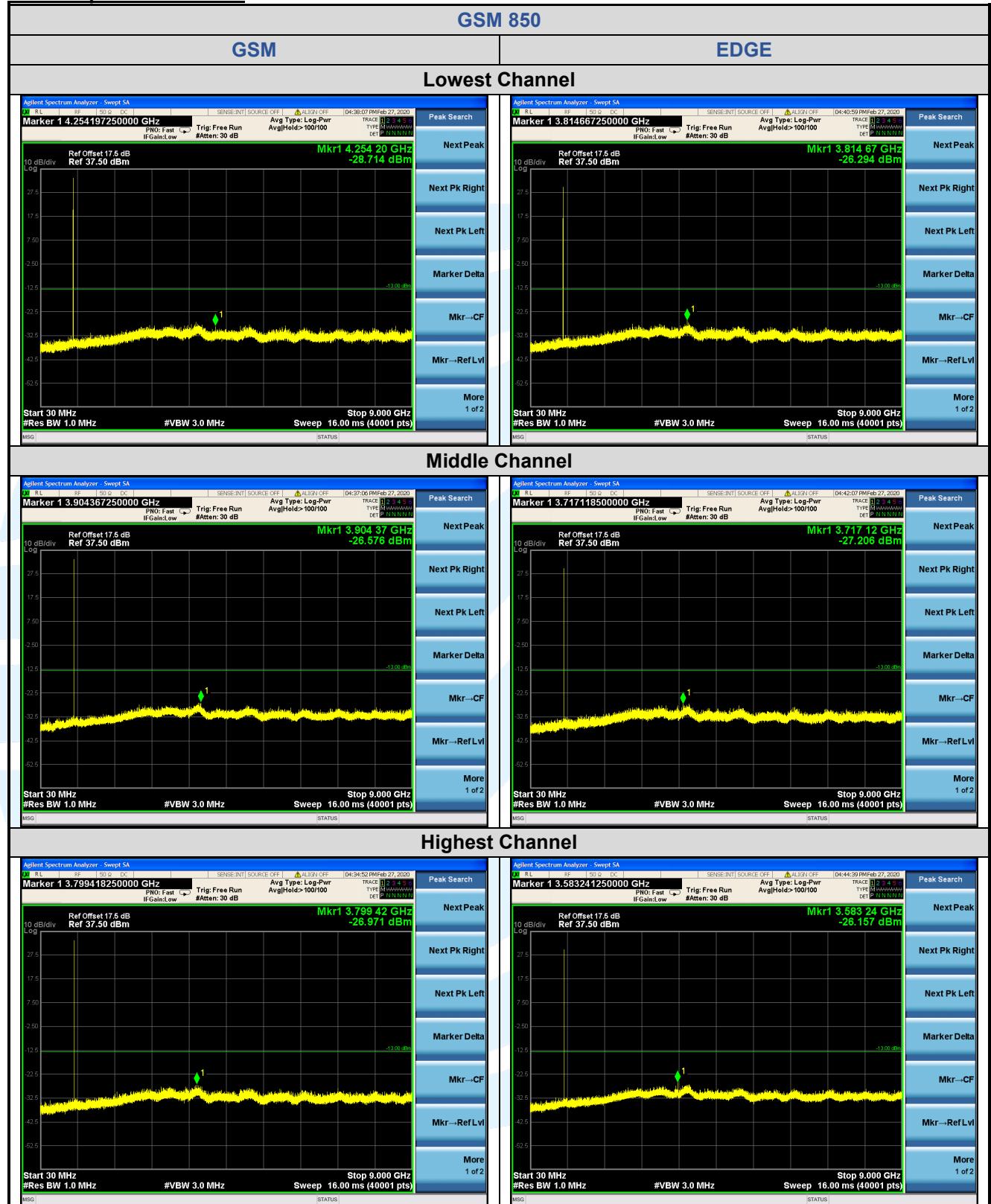
**Instruments Used:** Refer to section 3 for details

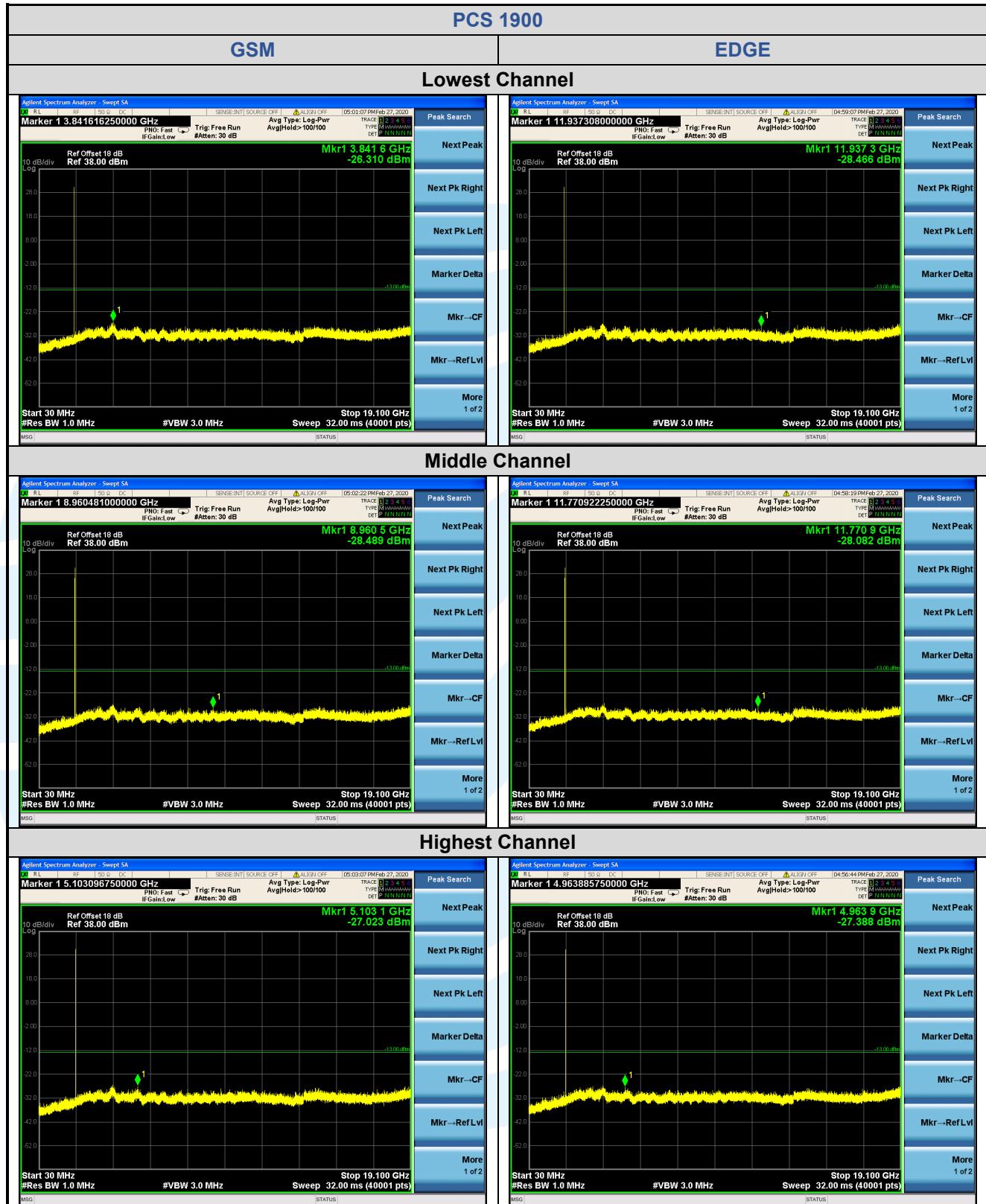
**Test Mode:** Link mode

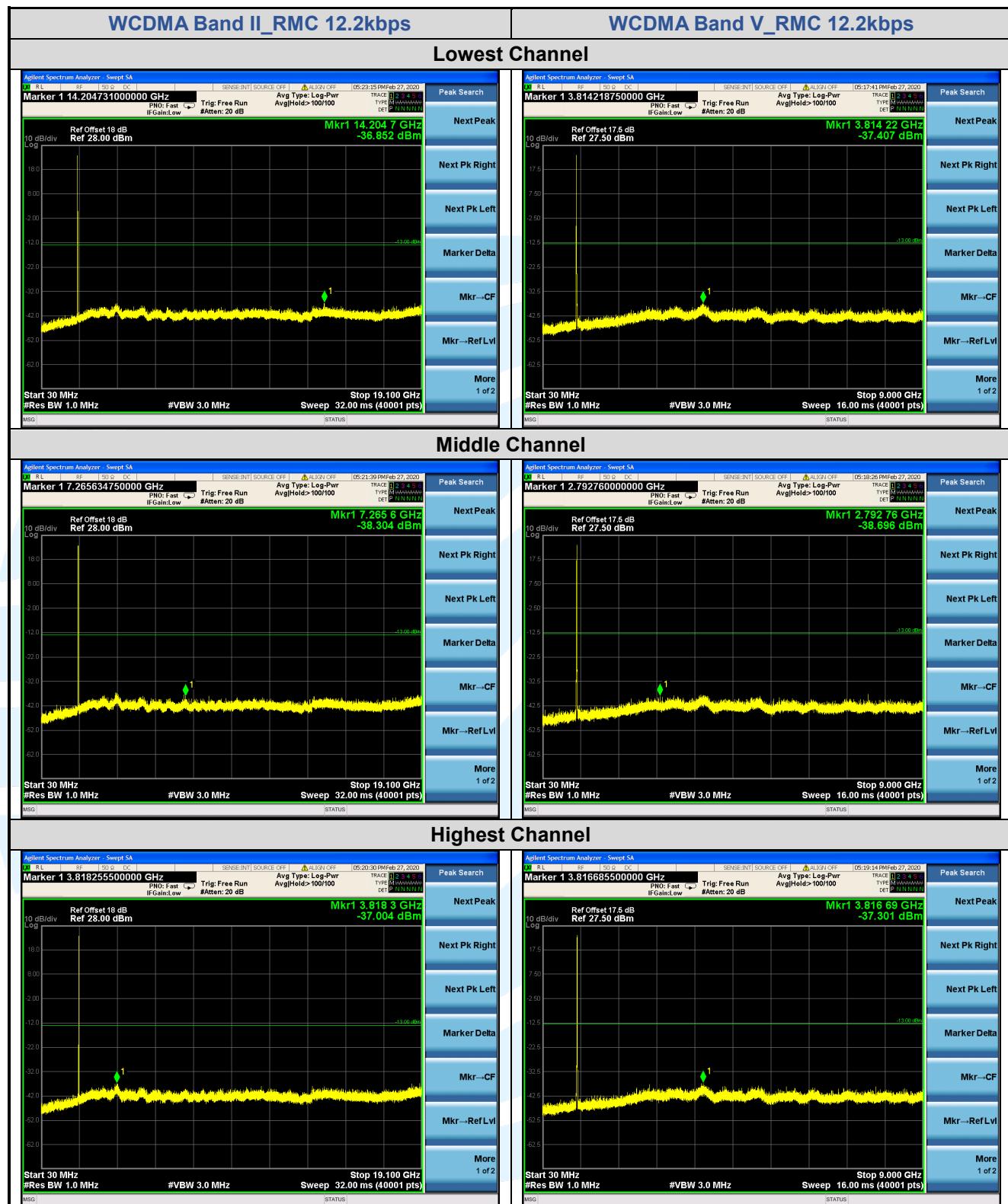
**Test Results:** Pass



The test plots as follows:







## 5.8 FIELD STRENGTH OF SPURIOUS RADIATION

**Test Requirement:** FCC 47 CFR Part 2.1053,  
 FCC 47 CFR Part 22.917(a)(b),  
 FCC 47 CFR Part 24.238(a)(b),

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 7

**Limits:**

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. The emission limit equal to -13 dBm.

**Test Setup:** Refer to section 4.2.1 for details.

**Test Procedures:** KDB 971168 D01v03r01 Section 7

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

**The measurement data as follows:**

<b>GSM 850_Below 1G</b>							
<b>No.</b>	<b>Frequency</b>	<b>SA Reading</b>	<b>Correction factor</b>	<b>EIRP Result</b>	<b>Limit</b>	<b>Margin</b>	<b>Ant. Pol.</b>
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>GSM_Lowest Channel</b>							
1	45.733	-75.06	25.75	-49.31	-13.00	-36.31	Horizontal
2	250.486	-79.42	30.50	-48.92	-13.00	-35.92	Horizontal
3	689.051	-80.65	41.68	-38.97	-13.00	-25.97	Horizontal
4	45.733	-77.00	25.10	-51.90	-13.00	-38.90	Vertical
5	64.532	-75.31	24.05	-51.26	-13.00	-38.26	Vertical
6	781.961	-80.34	40.88	-39.46	-13.00	-26.46	Vertical
<b>GSM_Middle Channel</b>							
1	64.987	-74.38	23.81	-50.57	-13.00	-37.57	Horizontal
2	102.612	-77.10	26.16	-50.94	-13.00	-37.94	Horizontal
3	698.804	-81.72	41.90	-39.82	-13.00	-26.82	Horizontal
4	55.678	-74.89	23.80	-51.09	-13.00	-38.09	Vertical
5	101.893	-77.78	26.17	-51.61	-13.00	-38.61	Vertical
6	708.694	-80.97	40.73	-40.24	-13.00	-27.24	Vertical
<b>GSM_Highest Channel</b>							
1	55.678	-73.95	23.69	-50.26	-13.00	-37.26	Horizontal
2	250.486	-78.35	30.50	-47.85	-13.00	-34.85	Horizontal
3	698.804	-80.43	41.90	-38.53	-13.00	-25.53	Horizontal
4	45.733	-75.98	25.10	-50.88	-13.00	-37.88	Vertical
5	69.230	-73.74	24.21	-49.53	-13.00	-36.53	Vertical
6	693.910	-81.07	40.49	-40.58	-13.00	-27.58	Vertical

GSM 850_Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>GSM_Lowest Channel</b>							
1	1648.400	-52.07	3.17	-48.90	-13.00	-35.90	Horizontal
2	2472.600	-63.82	11.44	-52.38	-13.00	-39.38	Horizontal
3	1648.400	-54.38	3.25	-51.13	-13.00	-38.13	Vertical
4	2472.600	-62.20	11.24	-50.96	-13.00	-37.96	Vertical
<b>GSM_Middle Channel</b>							
1	1673.200	-51.43	3.44	-47.99	-13.00	-34.99	Horizontal
2	2509.800	-63.93	11.46	-52.47	-13.00	-39.47	Horizontal
3	1673.200	-51.31	3.50	-47.81	-13.00	-34.81	Vertical I
4	2509.800	-64.56	11.26	-53.30	-13.00	-40.30	Vertical
<b>GSM_Highest Channel</b>							
1	1697.600	-54.74	3.71	-51.03	-13.00	-38.03	Horizontal
2	2546.400	-66.86	11.46	-55.40	-13.00	-42.40	Horizontal
3	1697.600	-49.93	3.75	-46.18	-13.00	-33.18	Vertical
4	2546.400	-57.66	11.25	-46.41	-13.00	-33.41	Vertical

PCS 1900_Below 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>GSM_Lowest Channel</b>							
1	55.288	-73.35	0.74	-72.61	-13.00	-59.61	Horizontal
2	101.893	-77.59	3.29	-74.30	-13.00	-61.30	Horizontal
3	958.714	-81.98	23.01	-58.97	-13.00	-45.97	Horizontal
4	52.634	-74.31	0.76	-73.55	-13.00	-60.55	Vertical
5	101.893	-77.81	3.29	-74.52	-13.00	-61.52	Vertical
6	815.635	-81.15	18.56	-62.59	-13.00	-49.59	Vertical
<b>GSM_Middle Channel</b>							
1	53.756	-74.23	0.84	-73.39	-13.00	-60.39	Horizontal
2	104.064	-78.57	3.26	-75.31	-13.00	-62.31	Horizontal
3	938.714	-81.75	22.26	-59.49	-13.00	-46.49	Horizontal
4	54.135	-73.98	0.79	-73.19	-13.00	-60.19	Vertical
5	418.378	-80.69	12.79	-67.90	-13.00	-54.90	Vertical
6	952.000	-82.09	21.52	-60.57	-13.00	-47.57	Vertical
<b>GSM_Highest Channel</b>							
1	55.288	-74.74	0.74	-74.00	-13.00	-61.00	Horizontal
2	104.798	-77.58	3.25	-74.33	-13.00	-61.33	Horizontal
3	760.287	-80.41	18.15	-62.26	-13.00	-49.26	Horizontal
4	53.379	-74.57	0.77	-73.80	-13.00	-60.80	Vertical
5	104.064	-78.36	3.26	-75.10	-13.00	-62.10	Vertical
6	952.000	-82.64	21.52	-61.12	-13.00	-48.12	Vertical

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PCS 1900_Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>GSM_Lowest Channel</b>							
1	3700.400	-72.73	15.35	-57.38	-13.00	-44.38	Horizontal
2	5550.600	-70.12	17.05	-53.07	-13.00	-40.07	Horizontal
3	3700.400	-74.73	15.09	-59.64	-13.00	-46.64	Vertical
4	5550.600	-70.12	16.85	-53.27	-13.00	-40.27	Vertical
<b>GSM_Middle Channel</b>							
1	3760.000	-71.77	15.54	-56.23	-13.00	-43.23	Horizontal
2	5640.000	-71.15	17.18	-53.97	-13.00	-40.97	Horizontal
3	3760.000	-67.05	15.29	-51.76	-13.00	-38.76	Vertical
4	5640.000	-69.86	16.98	-52.88	-13.00	-39.88	Vertical
<b>GSM_Highest Channel</b>							
1	3819.600	-69.26	15.73	-53.53	-13.00	-40.53	Horizontal
2	5729.400	-68.74	17.51	-51.23	-13.00	-38.23	Horizontal
3	3819.600	-71.75	15.49	-56.26	-13.00	-43.26	Vertical
4	5729.400	-70.70	17.31	-53.39	-13.00	-40.39	Vertical

WCDMA Band II_Below 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>RMC 12.2kbps_Lowest Channel</b>							
1	54.135	-72.00	0.82	-71.18	-13.00	-58.18	Horizontal
2	348.514	-80.99	11.12	-69.87	-13.00	-56.87	Horizontal
3	815.635	-81.55	18.92	-62.63	-13.00	-49.63	Horizontal
4	55.288	-74.08	0.81	-73.27	-13.00	-60.27	Vertical
5	104.798	-77.35	3.25	-74.10	-13.00	-61.10	Vertical
6	972.283	-82.19	22.13	-60.06	-13.00	-47.06	Vertical
<b>RMC 12.2kbps_Middle Channel</b>							
1	54.135	-73.29	0.82	-72.47	-13.00	-59.47	Horizontal
2	105.537	-77.60	3.24	-74.36	-13.00	-61.36	Horizontal
3	952.000	-81.62	22.97	-58.65	-13.00	-45.65	Horizontal
4	56.071	-75.42	0.83	-74.59	-13.00	-61.59	Vertical
5	103.335	-76.63	3.26	-73.37	-13.00	-60.37	Vertical
6	965.474	-82.09	21.91	-60.18	-13.00	-47.18	Vertical
<b>RMC 12.2kbps_Highest Channel</b>							
1	54.135	-73.63	0.82	-72.81	-13.00	-59.81	Horizontal
2	103.335	-77.87	3.26	-74.61	-13.00	-61.61	Horizontal
3	945.334	-81.74	22.67	-59.07	-13.00	-46.07	Horizontal
4	54.135	-71.73	0.79	-70.94	-13.00	-57.94	Vertical
5	248.732	-79.93	8.03	-71.90	-13.00	-58.90	Vertical
6	952.000	-81.82	21.52	-60.30	-13.00	-47.30	Vertical

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WCDMA Band II _ Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>RMC 12.2kbps_ Lowest Channel</b>							
1	3704.800	-71.26	15.37	-55.89	-13.00	-42.89	Horizontal
2	5557.200	-68.13	17.05	-51.08	-13.00	-38.08	Horizontal
3	3704.800	-75.23	15.11	-60.12	-13.00	-47.12	Vertical
4	5557.200	-71.92	16.85	-55.07	-13.00	-42.07	Vertical
<b>RMC 12.2kbps_ Middle Channel</b>							
1	3760.000	-71.22	15.54	-55.68	-13.00	-42.68	Horizontal
2	5640.000	-71.15	17.18	-53.97	-13.00	-40.97	Horizontal
3	3760.000	-72.04	15.29	-56.75	-13.00	-43.75	Vertical
4	5640.000	-70.38	16.98	-53.40	-13.00	-40.40	Vertical
<b>RMC 12.2kbps_ Highest Channel</b>							
1	3815.200	-68.95	15.72	-53.23	-13.00	-40.23	Horizontal
2	5722.800	-70.66	17.48	-53.18	-13.00	-40.18	Horizontal
3	3815.200	-69.94	15.48	-54.46	-13.00	-41.46	Vertical
4	5722.800	-69.04	17.28	-51.76	-13.00	-38.76	Vertical

WCDMA Band V _ Below 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>RMC 12.2kbps_ Lowest Channel</b>							
1	55.678	-74.10	23.69	-50.41	-13.00	-37.41	Horizontal
2	101.893	-76.14	26.17	-49.97	-13.00	-36.97	Horizontal
3	250.486	-78.23	30.50	-47.73	-13.00	-34.73	Horizontal
4	62.304	-73.61	23.96	-49.65	-13.00	-36.65	Vertical
5	101.893	-76.46	26.17	-50.29	-13.00	-37.29	Vertical
6	562.014	-80.87	39.04	-41.83	-13.00	-28.83	Vertical
<b>RMC 12.2kbps_ Middle Channel</b>							
1	32.870	-80.59	31.66	-48.93	-13.00	-35.93	Horizontal
2	102.612	-78.81	26.16	-52.65	-13.00	-39.65	Horizontal
3	651.383	-80.99	40.46	-40.53	-13.00	-27.53	Horizontal
4	31.292	-80.83	32.62	-48.21	-13.00	-35.21	Vertical
5	103.335	-76.63	26.14	-50.49	-13.00	-37.49	Vertical
6	455.189	-81.47	36.00	-45.47	-13.00	-32.47	Vertical
<b>RMC 12.2kbps_ Highest Channel</b>							
1	55.678	-72.88	23.69	-49.19	-13.00	-36.19	Horizontal
2	105.537	-78.27	26.11	-52.16	-13.00	-39.16	Horizontal
3	787.475	-81.32	42.22	-39.10	-13.00	-26.10	Horizontal
4	55.678	-72.88	23.80	-49.08	-13.00	-36.08	Vertical
5	107.031	-77.77	26.09	-51.68	-13.00	-38.68	Vertical
6	821.387	-80.95	42.16	-38.79	-13.00	-25.79	Vertical

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WCDMA Band V _Above 1G							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
<b>RMC 12.2kbps_ Lowest Channel</b>							
1	1652.800	-67.69	3.22	-64.47	-13.00	-51.47	Horizontal
2	2479.200	-73.71	11.45	-62.26	-13.00	-49.26	Horizontal
3	1652.800	-70.27	3.30	-66.97	-13.00	-53.97	Vertical
4	2479.200	-75.49	11.25	-64.24	-13.00	-51.24	Vertical
<b>RMC 12.2kbps_ Middle Channel</b>							
1	1672.800	-70.34	3.44	-66.90	-13.00	-53.90	Horizontal
2	2509.200	-71.62	11.46	-60.16	-13.00	-47.16	Horizontal
3	1672.800	-70.34	3.44	-66.90	-13.00	-53.90	Vertical
4	2509.200	-71.62	11.46	-60.16	-13.00	-47.16	Vertical
<b>RMC 12.2kbps_ Highest Channel</b>							
1	1693.200	-70.00	3.66	-66.34	-13.00	-53.34	Horizontal
2	2539.800	-74.51	11.46	-63.05	-13.00	-50.05	Horizontal
3	1693.200	-70.01	3.71	-66.30	-13.00	-53.30	Vertical
4	2539.800	-74.51	11.25	-63.26	-13.00	-50.26	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

## 5.9 FREQUENCY STABILITY

**Test Requirement:** FCC 47 CFR Part 2.1055 &  
 FCC 47 CFR Part 22.355 &  
 FCC 47 CFR Part 24.235 &

**Test Method:** ANSI C63.26-2015 & KDB 971168 D01v03r01

**Limits:**

**FCC 47 CFR Part 22.355,**

The carrier frequency shall not depart from the reference frequency in excess of  $\pm 2.5$  ppm for mobile stations.

**FCC 47 CFR Part 24.235,**

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

**Test Setup:** Refer to section 4.2.2 for details.

**Test Procedures:**

1) Use CMW 500 with Frequency Error measurement capability.

a) Temp. =  $-30^{\circ}$  to  $+50^{\circ}\text{C}$

b) Voltage = low voltage, 3.4 Vdc, Normal, 3.8Vdc and High voltage, 4.35 Vdc.

2) Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to  $20^{\circ}\text{C}$  and allowed to stabilize.

After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until  $+50^{\circ}\text{C}$  is reached.

3) Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

Modulation	Channel/ Frequency (MHz)	Voltage	Temperature	Deviation	Deviation	Limit	Result
		(Vdc)	( $^{\circ}\text{C}$ )	(Hz)	(ppm)	(ppm)	
<b>GSM 850</b>							
GPRS	190 / 836.6	VL	TN	34	0.0406	$\pm 2.5$	Pass
		VN		44	0.0526	$\pm 2.5$	Pass
		VH		31	0.0371	$\pm 2.5$	Pass
		50	VN	35	0.0418	$\pm 2.5$	Pass
		40		40	0.0478	$\pm 2.5$	Pass
		30		37	0.0442	$\pm 2.5$	Pass
		20		37	0.0442	$\pm 2.5$	Pass
		10		39	0.0466	$\pm 2.5$	Pass
		0		43	0.0514	$\pm 2.5$	Pass
		-10		38	0.0454	$\pm 2.5$	Pass
		-20		37	0.0442	$\pm 2.5$	Pass
		-30		35	0.0418	$\pm 2.5$	Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>GSM 850</b>							
EDGE	190 / 836.6	VL	TN	39	0.0466	± 2.5	Pass
				33	0.0394	± 2.5	Pass
				39	0.0466	± 2.5	Pass
		VN	50	38	0.0454	± 2.5	Pass
			40	41	0.0490	± 2.5	Pass
			30	42	0.0502	± 2.5	Pass
			20	44	0.0526	± 2.5	Pass
			10	36	0.0430	± 2.5	Pass
			0	37	0.0442	± 2.5	Pass
			-10	36	0.0430	± 2.5	Pass
			-20	35	0.0418	± 2.5	Pass
			-30	34	0.0406	± 2.5	Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>PCS 1900</b>							
GPRS	661 / 1880.0	VL	TN	28	0.0149	N/A	Pass
				28	0.0149		Pass
				35	0.0186		Pass
		VN	50	31	0.0165		Pass
			40	39	0.0207		Pass
			30	27	0.0144		Pass
			20	28	0.0149		Pass
			10	25	0.0133		Pass
			0	26	0.0138		Pass
			-10	31	0.0165		Pass
			-20	31	0.0165		Pass
			-30	33	0.0176		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Pass/ Fail
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>PCS 1900</b>							
EDGE	661 / 1880.0	VL	TN	33	0.0176	N/A	Pass
				34	0.0181		Pass
				29	0.0154		Pass
		VN	50	30	0.0160		Pass
			40	31	0.0165		Pass
			30	30	0.0160		Pass
			20	29	0.0154		Pass
			10	34	0.0181		Pass
			0	31	0.0165		Pass
			-10	33	0.0176		Pass
			-20	27	0.0144		Pass
			-30	29	0.0154		Pass

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 UTTR-RF-FCC23G-V1.0

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>WCDMA Band II</b>							
RMC 12.2kbps	9400 / 1880.0	VL	TN	-36	-0.0191	N/A	Pass
		VN		-33	-0.0176		Pass
		VH		-29	-0.0154		Pass
		50	50	-32	-0.0170		Pass
		40	40	-29	-0.0154		Pass
		30	30	-36	-0.0191		Pass
		20	20	-36	-0.0191		Pass
		10	10	-33	-0.0176		Pass
		0	0	-34	-0.0181		Pass
		-10	-10	-33	-0.0176		Pass
		-20	-20	-33	-0.0176		Pass
		-30	-30	-30	-0.0160		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
<b>WCDMA Band V</b>							
RMC 12.2kbps	4182 / 836.4	VL	TN	-29	-0.0347	± 2.5	Pass
		VN		-31	-0.0371	± 2.5	Pass
		VH		-27	-0.0323	± 2.5	Pass
		50	50	-23	-0.0275	± 2.5	Pass
		40	40	-33	-0.0395	± 2.5	Pass
		30	30	-29	-0.0347	± 2.5	Pass
		20	20	-31	-0.0371	± 2.5	Pass
		10	10	-27	-0.0323	± 2.5	Pass
		0	0	-26	-0.0311	± 2.5	Pass
		-10	-10	-31	-0.0371	± 2.5	Pass
		-20	-20	-29	-0.0347	± 2.5	Pass
		-30	-30	-29	-0.0347	± 2.5	Pass

## APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

\*\*\* End of Report \*\*\*

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The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.

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