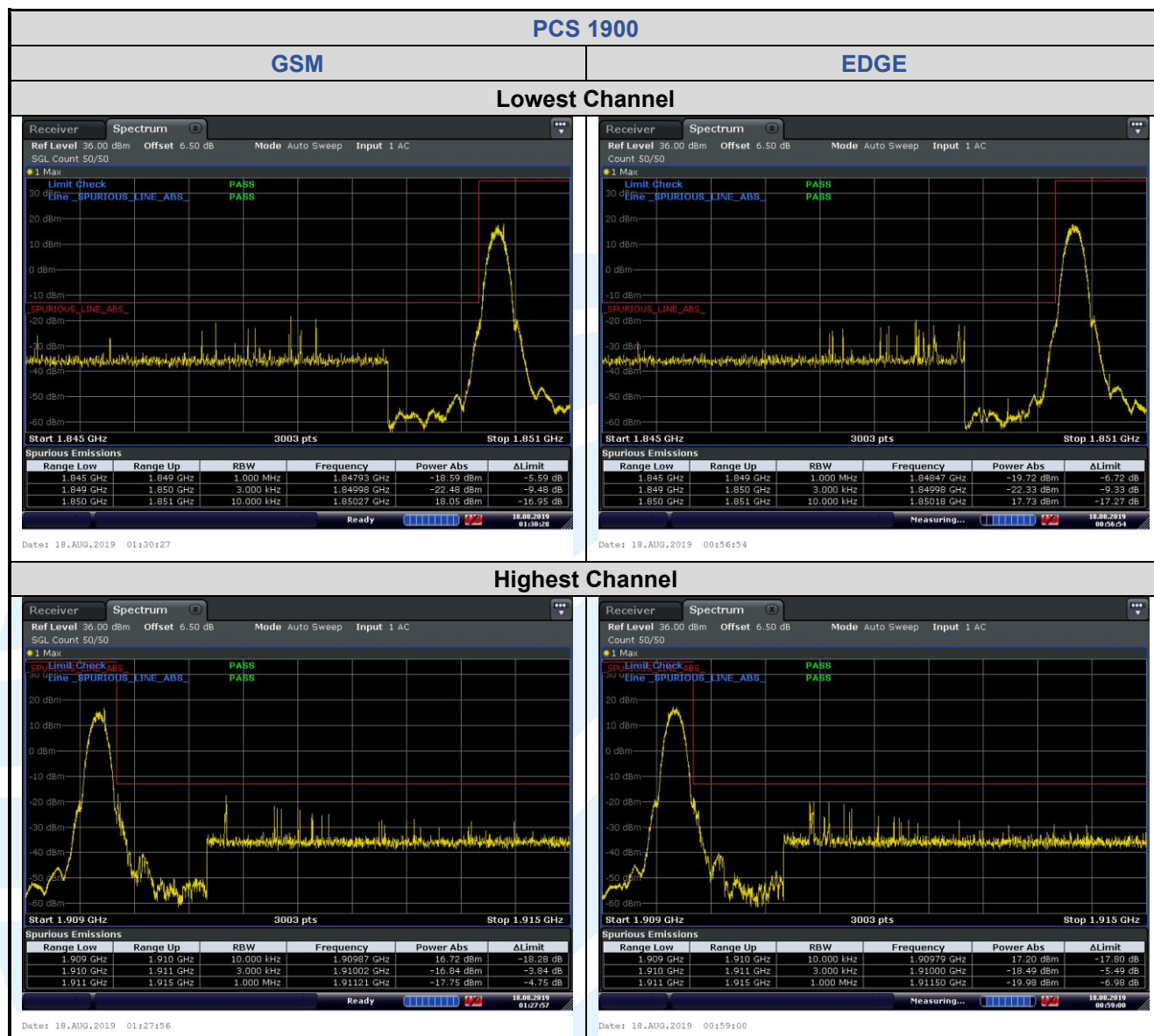
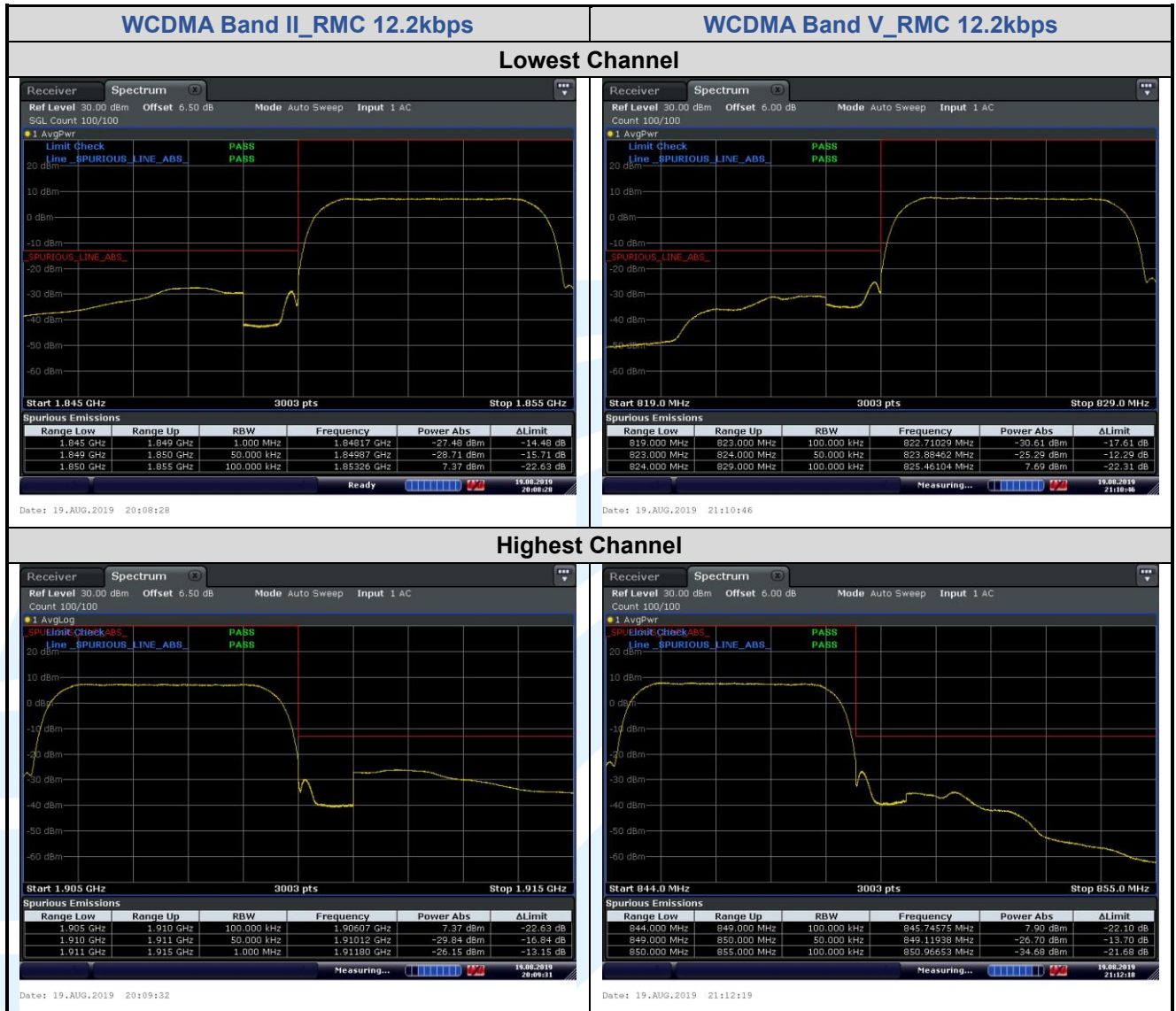






5.7 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Requirement: FCC 47 CFR Part 2.1051,
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.

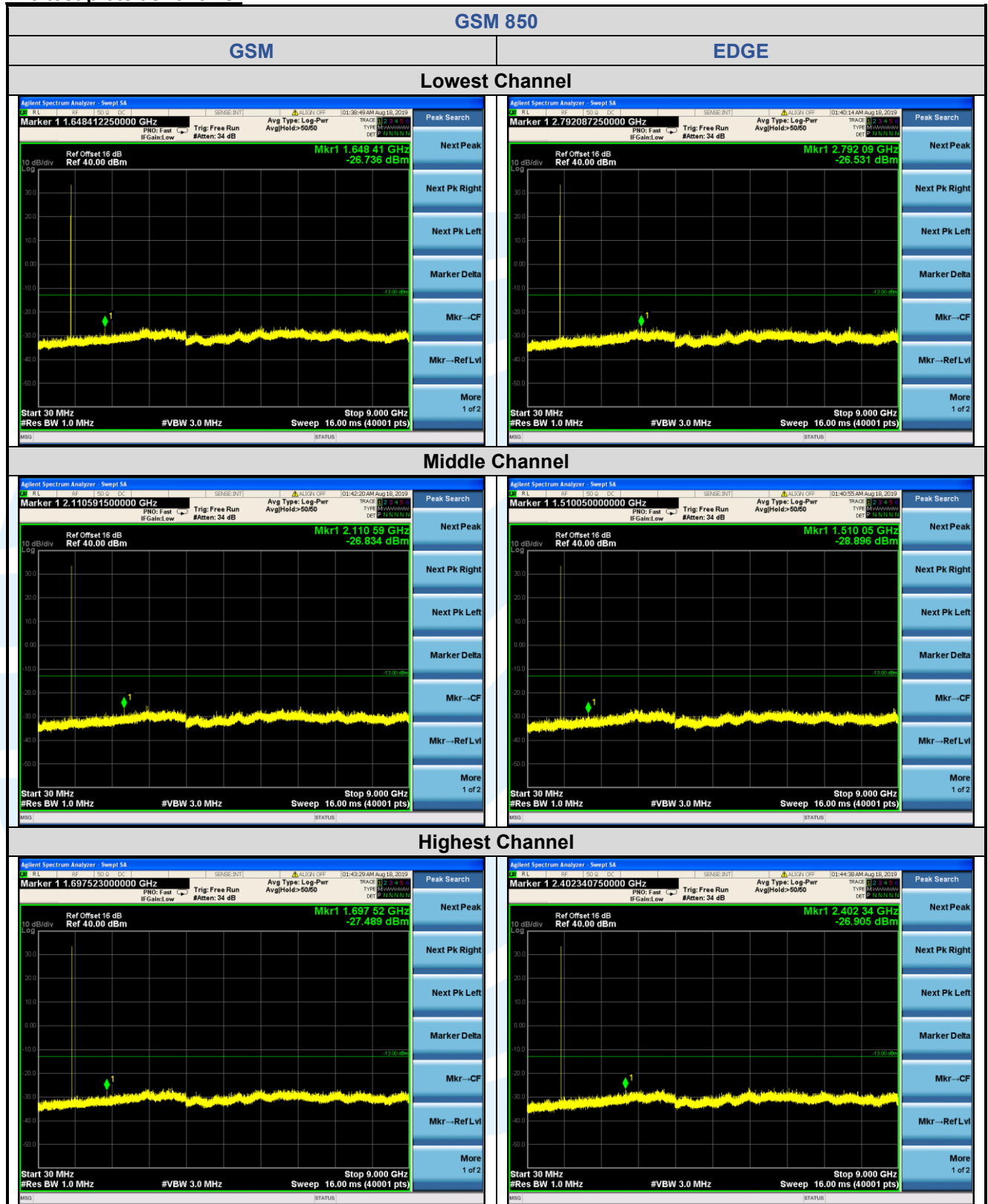
Test Setup: Refer to section 4.2.2 for details.

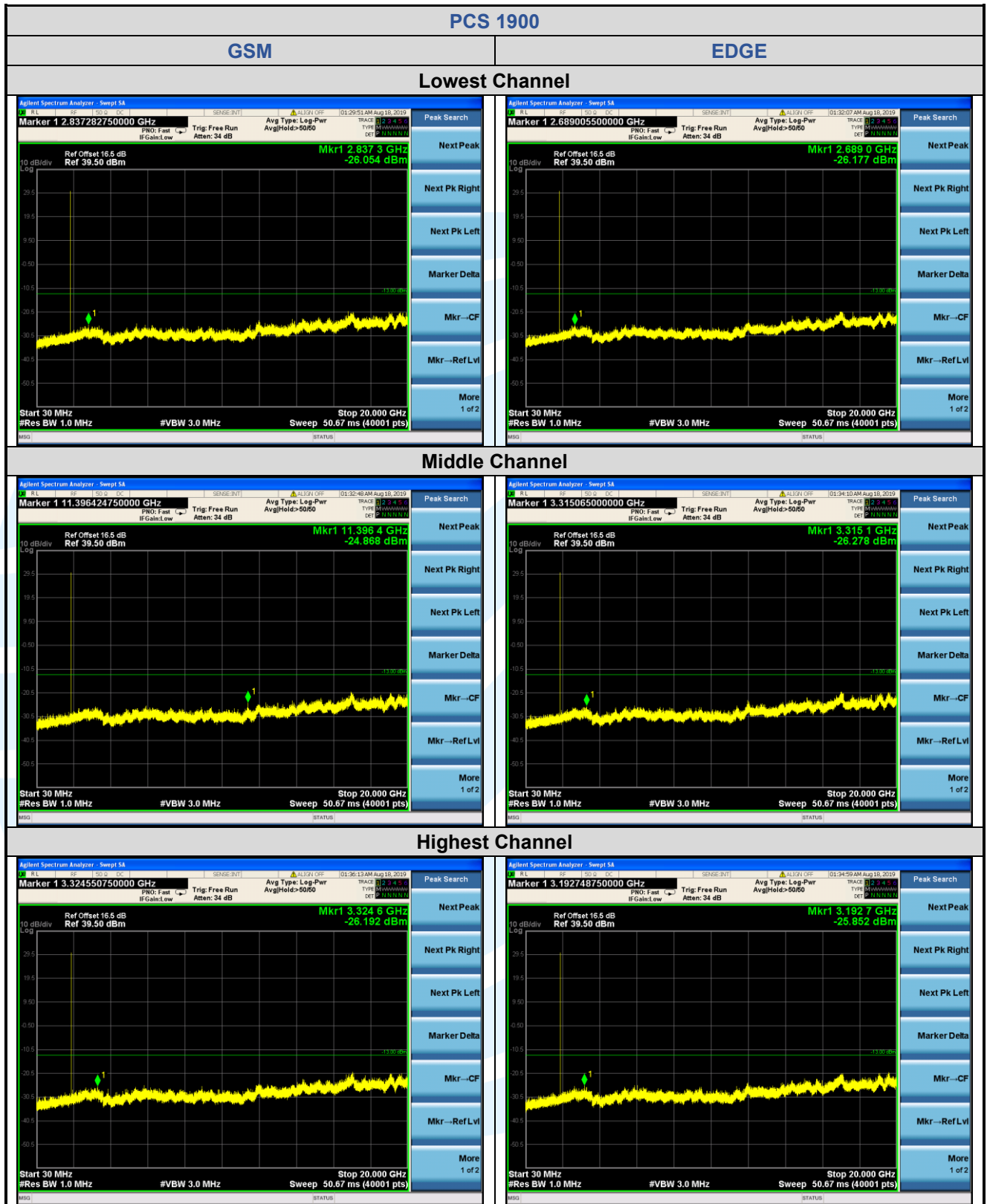
Instruments Used: Refer to section 3 for details

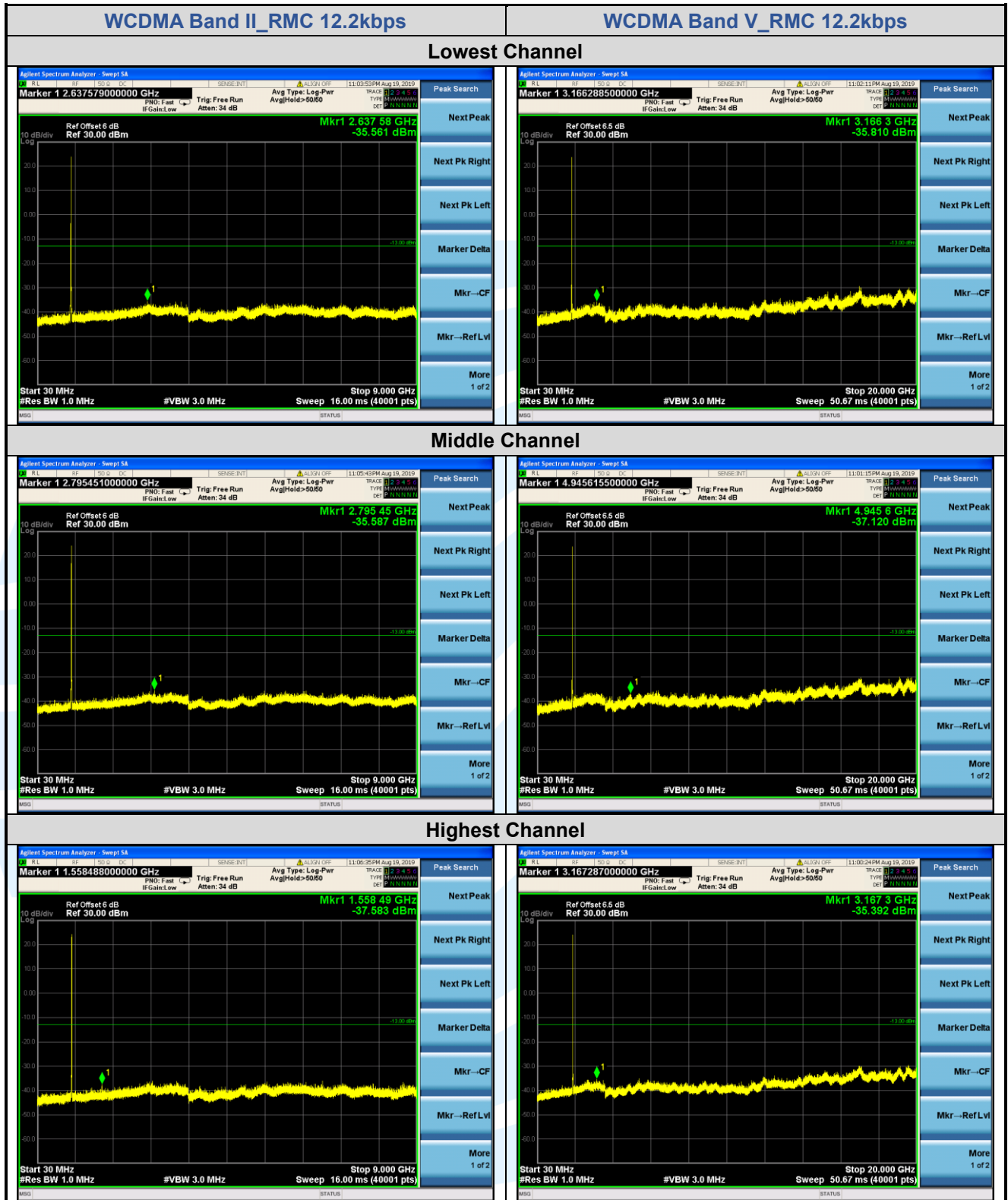
Test Mode: Link mode

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:

5.8.1 Radiated Emission Test Data (30 MHz to 1 GHz)

GSM 850							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
GSM _ Lowest Channel							
1	32.184	-85.86	32.91	-52.95	-13.00	-39.95	Horizontal
2	159.759	-87.28	27.62	-59.66	-13.00	-46.66	Horizontal
3	240.144	-84.98	29.27	-55.71	-13.00	-42.71	Horizontal
4	37.041	-89.62	29.51	-60.11	-13.00	-47.11	Vertical
5	194.499	-86.85	27.87	-58.98	-13.00	-45.98	Vertical
6	689.051	-86.02	38.81	-47.21	-13.00	-34.21	Vertical
GSM _ Middle Channel							
1	36.524	-89.24	29.76	-59.48	-13.00	-46.48	Horizontal
2	223.848	-87.23	28.17	-59.06	-13.00	-46.06	Horizontal
3	945.334	-85.84	43.46	-42.38	-13.00	-29.38	Horizontal
4	51.900	-88.19	25.08	-63.11	-13.00	-50.11	Vertical
5	159.759	-87.48	27.62	-59.86	-13.00	-46.86	Vertical
6	633.328	-86.95	38.04	-48.91	-13.00	-35.91	Vertical
GSM _ Middle Channel							
1	42.035	-89.32	27.55	-61.77	-13.00	-48.77	Horizontal
2	240.144	-86.79	29.27	-57.52	-13.00	-44.52	Horizontal
3	833.013	-86.05	40.42	-45.63	-13.00	-32.63	Horizontal
4	33.335	-89.32	31.89	-57.43	-13.00	-44.43	Vertical
5	240.144	-85.27	29.27	-56.00	-13.00	-43.00	Vertical
6	938.714	-85.56	43.40	-42.16	-13.00	-29.16	Vertical

PCS 1900							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
GSM_ Lowest Channel							
1	120.612	-69.29	-2.14	-71.43	-13.00	-58.43	Horizontal
2	240.144	-61.35	1.06	-60.29	-13.00	-47.29	Horizontal
3	360.977	-65.64	3.68	-61.96	-13.00	-48.96	Horizontal
4	52.634	-65.61	-3.88	-69.49	-13.00	-56.49	Vertical
5	99.768	-72.69	-2.03	-74.72	-13.00	-61.72	Vertical
6	240.144	-67.04	1.06	-65.98	-13.00	-52.98	Vertical
GSM_ Middle Channel							
1	120.612	-68.58	-2.14	-70.72	-13.00	-57.72	Horizontal
2	240.144	-62.91	1.06	-61.85	-13.00	-48.85	Horizontal
3	360.977	-65.66	3.68	-61.98	-13.00	-48.98	Horizontal
4	52.634	-64.25	-3.88	-68.13	-13.00	-55.13	Vertical
5	230.230	-69.89	0.32	-69.57	-13.00	-56.57	Vertical
6	498.730	-69.58	6.07	-63.51	-13.00	-50.51	Vertical
GSM_ Highest Channel							
1	120.612	-68.01	-2.14	-70.15	-13.00	-57.15	Horizontal
2	240.144	-62.12	1.06	-61.06	-13.00	-48.06	Horizontal
3	368.668	-67.09	3.65	-63.44	-13.00	-50.44	Horizontal
4	52.634	-65.03	-3.88	-68.91	-13.00	-55.91	Vertical
5	230.230	-69.74	0.32	-69.42	-13.00	-56.42	Vertical
6	498.730	-70.03	6.07	-63.96	-13.00	-50.96	Vertical

WCDMA Band II							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	120.612	-68.59	-2.14	-70.73	-13.00	-57.73	Horizontal
2	240.144	-61.51	1.06	-60.45	-13.00	-47.45	Horizontal
3	360.977	-65.52	3.68	-61.84	-13.00	-48.84	Horizontal
4	52.266	-64.75	-3.79	-68.54	-13.00	-55.54	Vertical
5	240.144	-66.12	1.06	-65.06	-13.00	-52.06	Vertical
6	498.730	-69.66	6.07	-63.59	-13.00	-50.59	Vertical
RMC 12.2kbps_ Middle Channel							
1	120.612	-67.58	-2.14	-69.72	-13.00	-56.72	Horizontal
2	240.144	-60.76	1.06	-59.70	-13.00	-46.70	Horizontal
3	360.977	-66.45	3.68	-62.77	-13.00	-49.77	Horizontal
4	53.006	-66.46	-3.95	-70.41	-13.00	-57.41	Vertical
5	230.230	-70.34	0.32	-70.02	-13.00	-57.02	Vertical
6	498.730	-70.59	6.07	-64.52	-13.00	-51.52	Vertical
RMC 12.2kbps_ Highest Channel							
1	120.612	-68.05	-2.14	-70.19	-13.00	-57.19	Horizontal
2	240.144	-61.03	1.06	-59.97	-13.00	-46.97	Horizontal
3	360.977	-65.68	3.68	-62.00	-13.00	-49.00	Horizontal
4	51.900	-65.08	-3.73	-68.81	-13.00	-55.81	Vertical
5	240.144	-64.77	1.06	-63.71	-13.00	-50.71	Vertical
6	502.247	-69.85	6.06	-63.79	-13.00	-50.79	Vertical

WCDMA Band V							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	51.900	-88.77	25.08	-63.69	-13.00	-50.69	Horizontal
2	240.144	-85.91	29.27	-56.64	-13.00	-43.64	Horizontal
3	651.383	-87.48	38.06	-49.42	-13.00	-36.42	Horizontal
4	38.636	-88.68	28.73	-59.95	-13.00	-46.95	Vertical
5	240.144	-85.63	29.27	-56.36	-13.00	-43.36	Vertical
6	787.475	-86.81	40.15	-46.66	-13.00	-33.66	Vertical
RMC 12.2kbps_ Middle Channel							
1	31.959	-88.22	33.10	-55.12	-13.00	-42.12	Horizontal
2	186.468	-87.49	28.05	-59.44	-13.00	-46.44	Horizontal
3	804.252	-86.35	40.27	-46.08	-13.00	-33.08	Horizontal
4	31.959	-88.22	33.10	-55.12	-13.00	-42.12	Vertical
5	240.144	-86.86	29.27	-57.59	-13.00	-44.59	Vertical
6	798.620	-86.64	40.36	-46.28	-13.00	-33.28	Vertical
RMC 12.2kbps_ Highest Channel							
1	34.045	-89.91	31.27	-58.64	-13.00	-45.64	Horizontal
2	240.144	-86.21	29.27	-56.94	-13.00	-43.94	Horizontal
3	958.714	-86.78	44.08	-42.70	-13.00	-29.70	Horizontal
4	31.292	-89.05	33.57	-55.48	-13.00	-42.48	Vertical
5	186.468	-88.13	28.05	-60.08	-13.00	-47.08	Vertical
6	938.714	-85.22	43.40	-41.82	-13.00	-28.82	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.

Margin = Result – Limit

5.8.1 Radiated Emission Test Data (Above 1GHz)

GSM 850							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
GSM _ Lowest Channel							
1	1648.400	-66.62	2.39	-64.23	-13.00	-51.23	Horizontal
2	2472.600	-68.94	9.16	-59.78	-13.00	-46.78	Horizontal
3	1648.400	-71.12	4.03	-67.09	-13.00	-54.09	Vertical
4	2472.600	-64.54	11.49	-53.05	-13.00	-40.05	Vertical
GSM _ Middle Channel							
1	1673.200	-71.54	2.59	-68.95	-13.00	-55.95	Horizontal
2	2509.800	-67.85	9.17	-58.68	-13.00	-45.68	Horizontal
3	1673.200	-71.60	4.31	-67.29	-13.00	-54.29	Vertical
4	2509.800	-62.39	11.46	-50.93	-13.00	-37.93	Vertical
GSM _ Highest Channel							
1	1697.600	-69.58	2.78	-66.80	-13.00	-53.80	Horizontal
2	2546.400	-70.64	9.22	-61.42	-13.00	-48.42	Horizontal
3	1697.600	-69.55	4.59	-64.96	-13.00	-51.96	Vertical
4	2546.400	-70.40	11.45	-58.95	-13.00	-45.95	Vertical
PCS 1900							
No.	Frequency (MHz)	SA Reading (dBm)	Correction factor (dB/m)	EIRP Result (dBm)	Limit (dBm)	Margin (dB)	Ant. Pol.
GSM _ Lowest Channel							
1	3700.400	-68.14	13.77	-54.37	-13.00	-41.37	Horizontal
2	5550.600	-70.33	16.02	-54.31	-13.00	-41.31	Horizontal
3	3700.400	-68.66	15.13	-53.53	-13.00	-40.53	Vertical
4	5550.600	-68.56	16.91	-51.65	-13.00	-38.65	Vertical
GSM _ Middle Channel							
1	3760.000	-69.78	13.87	-55.91	-13.00	-42.91	Horizontal
2	5640.000	-70.03	16.10	-53.93	-13.00	-40.93	Horizontal
3	3760.000	-63.81	15.28	-48.53	-13.00	-35.53	Vertical
4	5640.000	-63.03	16.97	-46.06	-13.00	-33.06	Vertical
GSM _ Highest Channel							
1	3819.600	-68.75	13.98	-54.77	-13.00	-41.77	Horizontal
2	5729.400	-68.83	16.37	-52.46	-13.00	-39.46	Horizontal
3	3819.600	-64.86	15.44	-49.42	-13.00	-36.42	Vertical
4	5729.400	-62.79	17.23	-45.56	-13.00	-32.56	Vertical

WCDMA Band II							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	3704.800	-68.44	13.78	-54.66	-13.00	-41.66	Horizontal
2	5557.200	-63.17	16.01	-47.16	-13.00	-34.16	Horizontal
3	3704.800	-63.63	15.14	-48.49	-13.00	-35.49	Vertical
4	5557.200	-64.88	16.90	-47.98	-13.00	-34.98	Vertical
RMC 12.2kbps_ Middle Channel							
1	3760.000	-60.39	13.87	-46.52	-13.00	-33.52	Horizontal
2	5640.000	-58.24	16.10	-42.14	-13.00	-29.14	Horizontal
3	3760.000	-60.76	15.28	-45.48	-13.00	-32.48	Vertical
4	5640.000	-57.86	16.97	-40.89	-13.00	-27.89	Vertical
RMC 12.2kbps_ Highest Channel							
1	3815.200	-62.17	13.97	-48.20	-13.00	-35.20	Horizontal
2	5722.800	-63.50	16.35	-47.15	-13.00	-34.15	Horizontal
3	3815.200	-67.49	15.43	-52.06	-13.00	-39.06	Vertical
4	5722.800	-63.71	17.21	-46.50	-13.00	-33.50	Vertical

WCDMA Band V							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
RMC 12.2kbps_ Lowest Channel							
1	1652.800	-60.36	2.43	-57.93	-13.00	-44.93	Horizontal
2	2479.200	-64.83	9.16	-55.67	-13.00	-42.67	Horizontal
3	1652.800	-63.00	4.08	-58.92	-13.00	-45.92	Vertical
4	2479.200	-65.83	11.48	-54.35	-13.00	-41.35	Vertical
RMC 12.2kbps_ Middle Channel							
1	1673.200	-63.88	4.31	-59.57	-13.00	-46.57	Horizontal
2	2509.800	-64.99	11.46	-53.53	-13.00	-40.53	Horizontal
3	1673.200	-63.53	4.31	-59.22	-13.00	-46.22	Vertical
4	2509.800	-64.21	11.46	-52.75	-13.00	-39.75	Vertical
5	3346.400	-66.79	13.37	-53.42	-13.00	-40.42	Vertical
RMC 12.2kbps_ Highest Channel							
1	1693.200	-63.96	2.75	-61.21	-13.00	-48.21	Horizontal
2	2539.800	-65.65	9.22	-56.43	-13.00	-43.43	Horizontal
3	1693.200	-65.95	4.54	-61.41	-13.00	-48.41	Vertical
4	2539.800	-64.87	11.45	-53.42	-13.00	-40.42	Vertical

Remark:

- Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
- Result = Reading + Correct Factor.
- 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 ± 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° to $+50^{\circ}\text{C}$

b) Voltage = low voltage, 3.5 Vdc, Normal, 3.85 Vdc and High voltage, 4.35 Vdc.

2) Frequency Stability vs Temperature:

The EUT is placed inside a temperature chamber. The temperature is set to 20°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 (Vdc)	Temperature ($^{\circ}\text{C}$)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850							
GPRS	190 / 836.6	VL	TN	-7.54	-0.0090	± 2.5	Pass
		VN		-4.53	-0.0054	± 2.5	Pass
		VH		-3.44	-0.0041	± 2.5	Pass
		VN	50	2.11	0.0025	± 2.5	Pass
			40	-1.14	-0.0014	± 2.5	Pass
			30	-4.32	-0.0052	± 2.5	Pass
			20	-4.65	-0.0056	± 2.5	Pass
			10	-5.32	-0.0064	± 2.5	Pass
			0	-5.66	-0.0068	± 2.5	Pass
			-10	-6.03	-0.0072	± 2.5	Pass
			-20	-6.24	-0.0075	± 2.5	Pass
			-30	-9.67	-0.0116	± 2.5	Pass

Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
PCS 1900							
GPRS	661 / 1880.0	VL	TN	-12.21	-0.0065	N/A	Pass
		VN		-7.45	-0.0040		Pass
		VH		-6.78	-0.0036		Pass
		VN	50	-5.66	-0.0030		Pass
			40	-6.21	-0.0033		Pass
			30	-6.56	-0.0035		Pass
			20	-6.87	-0.0037		Pass
			10	-7.12	-0.0038		Pass
			0	-8.32	-0.0044		Pass
			-10	-9.44	-0.0050		Pass
			-20	-10.21	-0.0054		Pass
			-30	-13.57	-0.0072		Pass
Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band II							
RMC 12.2kbps	9400 / 1880.0	VL	TN	-8.32	-0.0044	N/A	Pass
		VN		-7.34	-0.0039		Pass
		VH		-7.14	-0.0038		Pass
		VN	50	-10.32	-0.0055		Pass
			40	-8.67	-0.0046		Pass
			30	-8.97	-0.0048		Pass
			20	-9.12	-0.0049		Pass
			10	-10.32	-0.0055		Pass
			0	-10.55	-0.0056		Pass
			-10	-11.33	-0.0060		Pass
			-20	-12.76	-0.0068		Pass
			-30	-14.67	-0.0078		Pass
Modulation	Channel/ Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
WCDMA Band V							
RMC 12.2kbps	4182 / 836.4	VL	TN	-6.43	-0.0037	N/A	Pass
		VN		-5.44	-0.0031		Pass
		VH		-5.78	-0.0033		Pass
		VN	50	-8.54	-0.0049		Pass
			40	-9.78	-0.0056		Pass
			30	-6.32	-0.0036		Pass
			20	-5.66	-0.0033		Pass
			10	-7.43	-0.0043		Pass
			0	-7.88	-0.0045		Pass
			-10	-8.67	-0.0050		Pass
			-20	-9.43	-0.0054		Pass
			-30	-11.22	-0.0065		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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