

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),
 FCC 47 CFR Part 27.53(h)(1)

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.

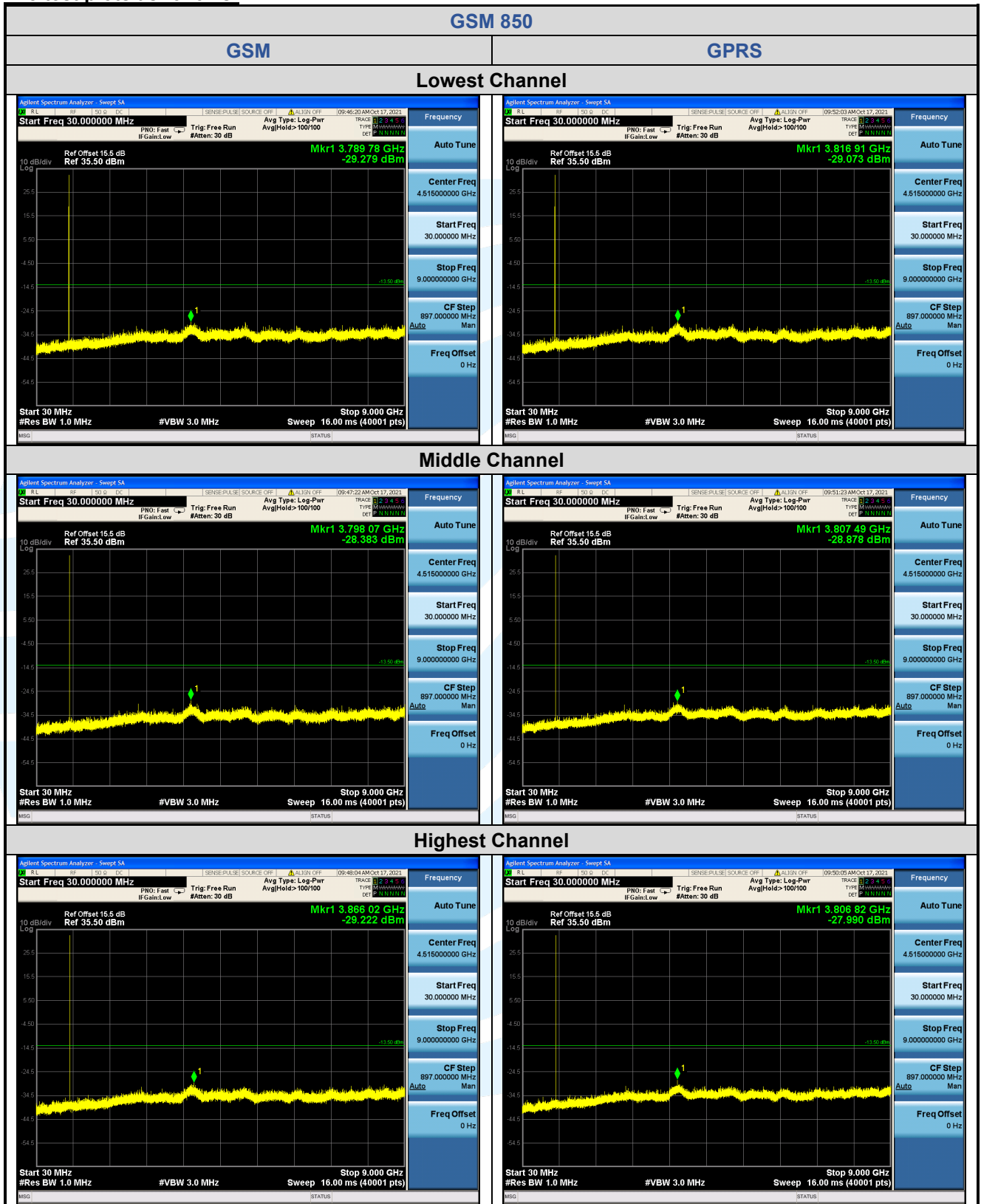
Test Setup: Refer to section 4.2.2 for details.

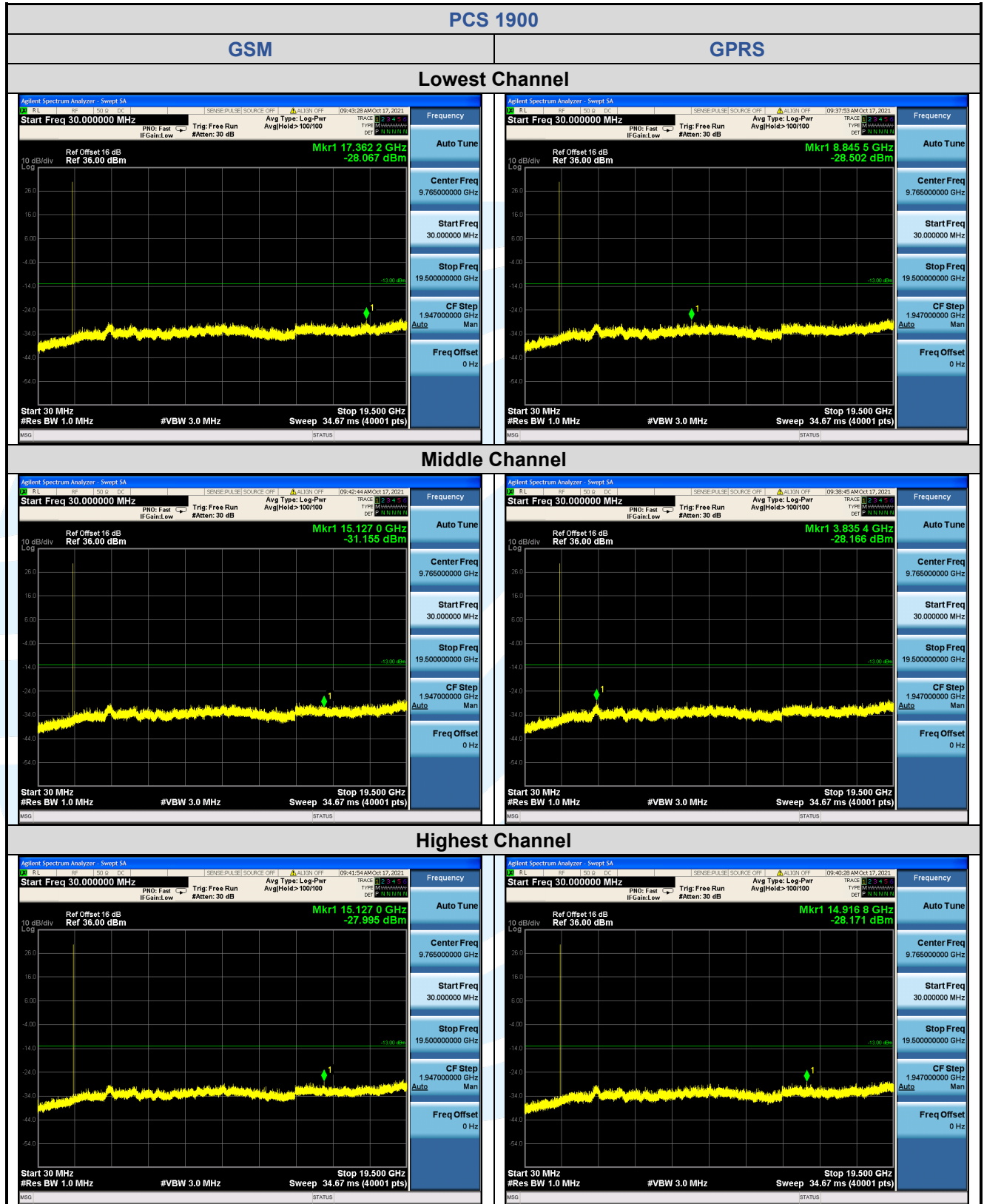
Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

The test plots as follows:





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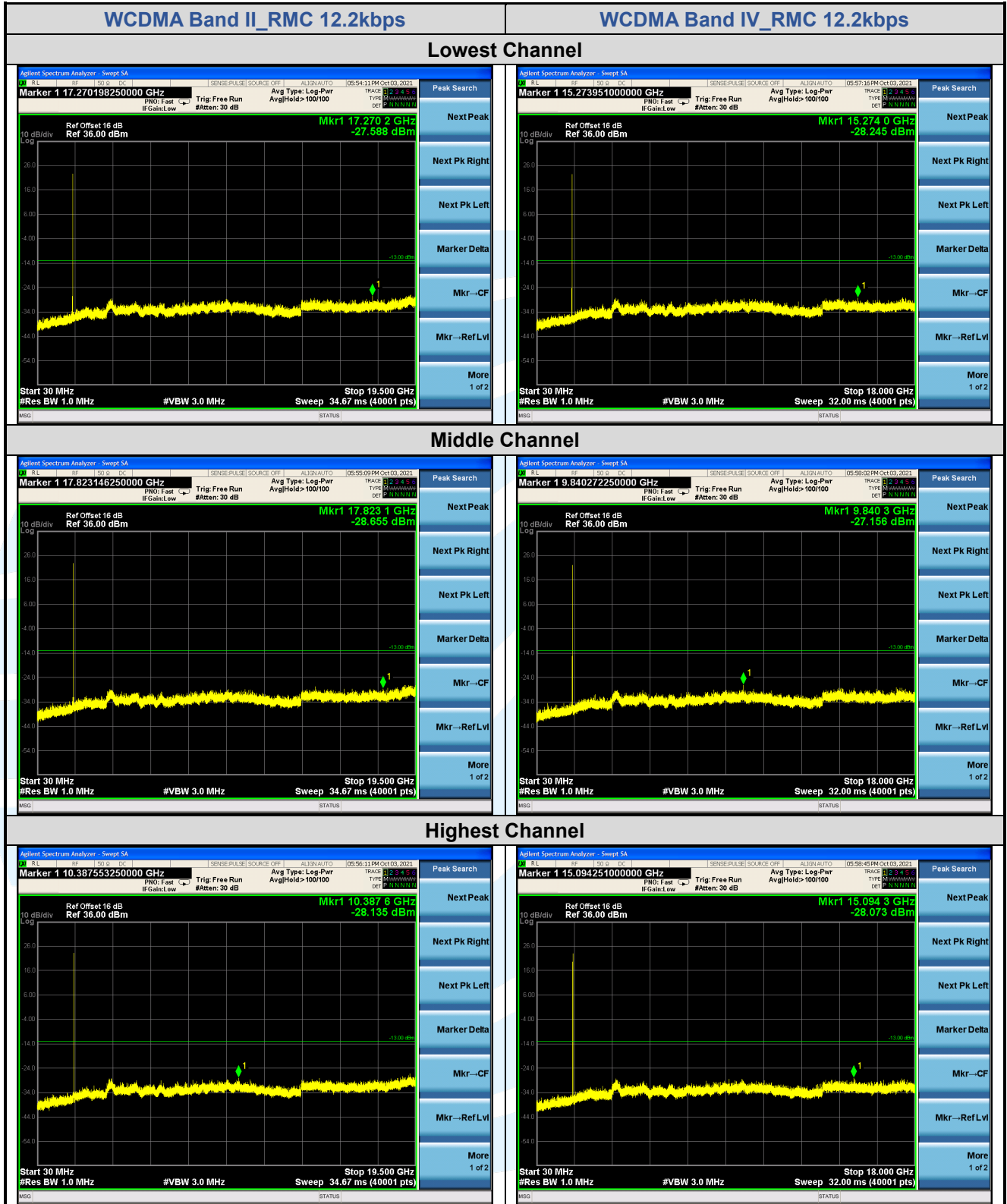
Tel: +86-755-28230888

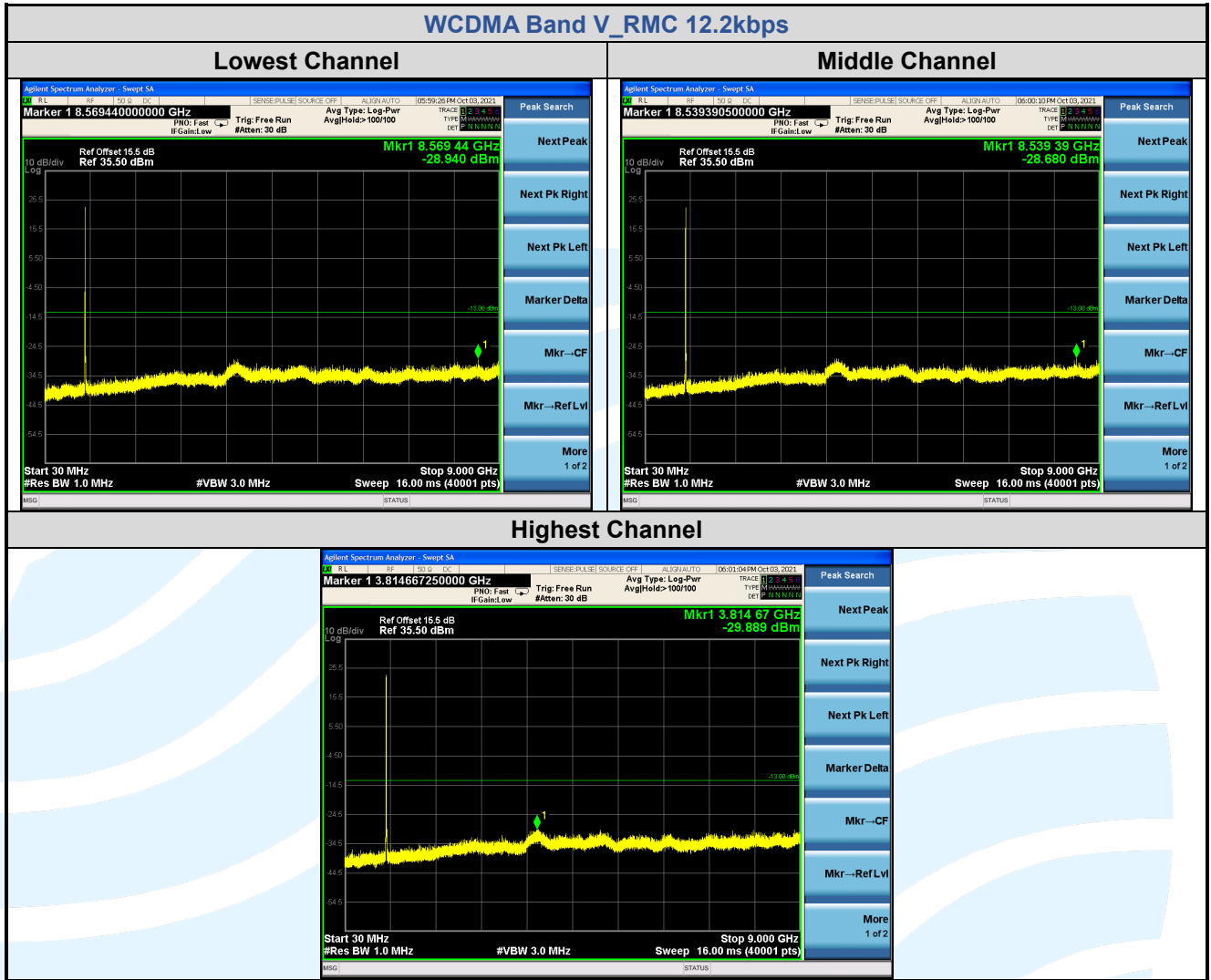
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UTTR-RF-FCC23G-V1.1





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),
FCC 47 CFR Part 27.53(h)(1)

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:

GSM 850							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
GPRS_ Lowest Channel							
1	455.189	-89.82	34.79	-55.03	-13.00	-42.03	Horizontal
2	590.351	-89.45	37.75	-51.70	-13.00	-38.70	Horizontal
3	689.051	-88.99	40.05	-48.94	-13.00	-35.94	Horizontal
4	1648.400	-49.52	0.20	-49.32	-13.00	-36.32	Horizontal
5	2472.600	-62.57	3.59	-58.98	-13.00	-45.98	Horizontal
6	542.610	-89.20	36.84	-52.36	-13.00	-39.36	Vertical
7	703.731	-88.98	40.30	-48.68	-13.00	-35.68	Vertical
8	793.028	-88.00	40.99	-47.01	-13.00	-34.01	Vertical
9	1648.400	-54.22	0.20	-54.02	-13.00	-41.02	Vertical
10	2472.600	-59.71	3.59	-56.12	-13.00	-43.12	Vertical
GSM_ Middle Channel							
1	531.291	-88.74	36.67	-52.07	-13.00	-39.07	Horizontal
2	620.117	-88.63	38.48	-50.15	-13.00	-37.15	Horizontal
3	771.047	-89.22	40.84	-48.38	-13.00	-35.38	Horizontal
4	1673.200	-48.58	0.36	-48.22	-13.00	-35.22	Horizontal
5	2509.800	-60.57	3.71	-56.86	-13.00	-43.86	Horizontal
6	651.383	-88.36	39.24	-49.12	-13.00	-36.12	Vertical
7	684.226	-88.45	40.01	-48.44	-13.00	-35.44	Vertical
8	793.028	-88.04	40.99	-47.05	-13.00	-34.05	Vertical
9	1673.200	-54.08	0.36	-53.72	-13.00	-53.72	Vertical
10	2509.800	-57.99	3.71	-54.28	-13.00	-54.28	Vertical
GPRS_ Middle Channel							
1	509.356	-89.15	36.34	-52.81	-13.00	-39.81	Horizontal
2	598.707	-89.39	38.11	-51.28	-13.00	-38.28	Horizontal
3	708.694	-87.86	40.21	-47.65	-13.00	-34.65	Horizontal
4	1697.600	-46.94	0.52	-46.42	-13.00	-33.42	Horizontal
5	2546.400	-62.73	3.80	-58.93	-13.00	-45.93	Horizontal
6	464.887	-89.34	34.99	-54.35	-13.00	-41.35	Vertical
7	573.988	-89.87	37.53	-52.34	-13.00	-39.34	Vertical
8	765.648	-88.44	40.80	-47.64	-13.00	-34.64	Vertical
9	1697.600	-50.12	0.52	-49.60	-13.00	-36.60	Vertical
10	2546.400	-63.56	3.80	-59.76	-13.00	-46.76	Vertical

PCS 1900							
No.	Frequency	SA Reading	Correction factor	EIRP Result	Limit	Margin	Ant. Pol.
	(MHz)	(dBm)	(dB/m)	(dBm)	(dBm)	(dB)	
GPRS_ Lowest Channel							
1	550.290	-79.94	7.59	-72.35	-13.00	-59.35	Horizontal
2	739.214	-81.12	11.52	-69.60	-13.00	-56.60	Horizontal
3	906.304	-81.17	13.88	-67.29	-13.00	-54.29	Horizontal
4	3700.400	-63.53	7.58	-55.95	-13.00	-42.95	Horizontal
5	5550.600	-66.17	11.77	-54.40	-13.00	-41.40	Horizontal
6	546.437	-79.77	7.58	-72.19	-13.00	-59.19	Vertical
7	689.051	-80.55	10.66	-69.89	-13.00	-56.89	Vertical
8	899.958	-82.02	13.78	-68.24	-13.00	-55.24	Vertical
9	3700.400	-49.58	7.58	-42.00	-13.00	-29.00	Vertical
10	5550.600	-56.22	11.77	-44.45	-13.00	-31.45	Vertical
GPRS_ Middle Channel							
1	689.051	-80.95	10.66	-70.29	-13.00	-57.29	Horizontal
2	821.387	-79.89	12.21	-67.68	-13.00	-54.68	Horizontal
3	965.474	-80.54	13.86	-66.68	-13.00	-53.68	Horizontal
4	3760.000	-61.12	7.79	-53.33	-13.00	-40.33	Horizontal
5	5640.000	-63.12	11.56	-51.56	-13.00	-38.56	Horizontal
6	651.383	-80.88	9.83	-71.05	-13.00	-58.05	Vertical
7	771.047	-81.04	11.60	-69.44	-13.00	-56.44	Vertical
8	887.398	-81.11	13.66	-67.45	-13.00	-54.45	Vertical
9	3760.000	-63.16	7.79	-55.37	-13.00	-42.37	Vertical
10	5640.000	-64.47	11.56	-52.91	-13.00	-39.91	Vertical
GPRS_ Highest Channel							
1	787.475	-80.76	11.77	-68.99	-13.00	-55.99	Horizontal
2	919.132	-81.48	13.83	-67.65	-13.00	-54.65	Horizontal
3	992.997	-81.28	14.68	-66.60	-13.00	-53.60	Horizontal
4	3819.600	-62.92	8.01	-54.91	-13.00	-41.91	Horizontal
5	5729.400	-65.57	11.36	-54.21	-13.00	-41.21	Horizontal
6	674.677	-79.61	10.12	-69.49	-13.00	-56.49	Vertical
7	781.961	-80.14	11.58	-68.56	-13.00	-55.56	Vertical
8	868.886	-81.41	13.10	-68.31	-13.00	-55.31	Vertical
9	3819.600	-61.52	8.01	-53.51	-13.00	-40.51	Vertical
10	5729.400	-63.61	11.36	-52.25	-13.00	-39.25	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	558.079	-78.2	7.6	-70.6	-13.0	-57.6	Horizontal
2	718.725	-79.0	11.1	-67.9	-13.0	-54.9	Horizontal
3	899.958	-79.9	13.8	-66.1	-13.0	-53.1	Horizontal
4	3704.800	-54.10	7.59	-46.51	-13.00	-33.51	Horizontal
5	5557.200	-64.37	11.75	-52.62	-13.00	-39.62	Horizontal
6	461.631	-80.0	6.0	-74.0	-13.0	-61.0	Vertical
7	651.383	-80.3	9.8	-70.5	-13.0	-57.5	Vertical
8	893.656	-81.6	13.8	-67.8	-13.0	-54.8	Vertical
9	3704.800	-50.02	7.59	-42.43	-13.00	-29.43	Vertical
10	5557.200	-64.27	11.75	-52.52	-13.00	-39.52	Vertical
RMC 12.2kbps_ Middle Channel							
1	516.565	-80.6	7.0	-73.5	-13.0	-60.5	Horizontal
2	703.731	-81.3	10.9	-70.4	-13.0	-57.4	Horizontal
3	875.013	-80.9	13.3	-67.6	-13.0	-54.6	Horizontal
4	3760.000	-56.64	7.79	-48.85	-13.00	-35.85	Horizontal
5	5640.000	-62.99	11.56	-51.43	-13.00	-38.43	Horizontal
6	535.038	-80.8	7.5	-73.3	-13.0	-60.3	Vertical
7	615.774	-81.0	9.1	-71.8	-13.0	-58.8	Vertical
8	798.62	-80.5	11.9	-68.6	-13.0	-55.6	Vertical
9	3760.000	-55.87	7.79	-48.08	-13.00	-35.08	Vertical
10	5640.000	-63.28	11.56	-51.72	-13.00	-38.72	Vertical
RMC 12.2kbps_ Highest Channel							
1	582.112	-80.4	8.0	-72.4	-13.0	-59.4	Horizontal
2	754.963	-80.7	11.4	-69.3	-13.0	-56.3	Horizontal
3	945.334	-82.0	13.8	-68.2	-13.0	-55.2	Horizontal
4	3815.200	-60.93	7.99	-52.94	-13.00	-39.94	Horizontal
5	5722.800	-61.09	11.38	-49.71	-13.00	-36.71	Horizontal
6	582.112	-80.5	8.0	-72.5	-13.0	-59.5	Vertical
7	655.977	-80.8	9.9	-70.9	-13.0	-57.9	Vertical
8	868.886	-81.5	13.1	-68.4	-13.0	-55.4	Vertical
9	3815.200	-60.93	7.99	-52.94	-13.00	-39.94	Vertical
10	5722.800	-60.85	11.38	-49.47	-13.00	-36.47	Vertical

WCDMA Band IV							
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	665.261	-80.4	10.3	-70.1	-13.0	-57.1	Horizontal
2	744.427	-80.7	11.3	-69.4	-13.0	-56.4	Horizontal
3	919.132	-81.9	13.8	-68.1	-13.0	-55.1	Horizontal
4	3424.800	-63.94	6.47	-57.47	-13.00	-44.47	Horizontal
5	5137.200	-67.30	10.02	-57.28	-13.00	-44.28	Horizontal
6	565.978	-80.3	7.9	-72.4	-13.0	-59.4	Vertical
7	703.731	-80.4	10.9	-69.4	-13.0	-56.4	Vertical
8	881.184	-81.6	13.5	-68.1	-13.0	-55.1	Vertical
9	3424.800	-63.69	6.47	-57.22	-13.00	-44.22	Vertical
10	5137.200	-66.52	10.02	-56.50	-13.00	-43.50	Vertical
RMC 12.2kbps_ Middle Channel							
1	749.676	-80.7	11.4	-69.3	-13.0	-56.3	Horizontal
2	798.62	-81.1	11.9	-69.3	-13.0	-56.3	Horizontal
3	932.141	-81.7	13.9	-67.9	-13.0	-54.9	Horizontal
4	3464.800	-61.83	6.62	-55.21	-13.00	-42.21	Horizontal
5	5197.200	-66.42	10.24	-56.18	-13.00	-43.18	Horizontal
6	582.112	-80.2	8.0	-72.2	-13.0	-59.2	Vertical
7	739.214	-79.4	11.5	-67.9	-13.0	-54.9	Vertical
8	912.695	-81.6	14.0	-67.6	-13.0	-54.6	Vertical
9	3464.800	-64.24	6.62	-57.62	-13.00	-44.62	Vertical
10	5197.200	-66.63	10.24	-56.39	-13.00	-43.39	Vertical
RMC 12.2kbps_ Highest Channel							
1	523.876	-80.0	7.0	-73.0	-13.0	-60.0	Horizontal
2	708.694	-80.8	10.9	-69.9	-13.0	-56.9	Horizontal
3	821.387	-80.7	12.2	-68.5	-13.0	-55.5	Horizontal
4	3505.200	-62.24	6.77	-55.47	-13.00	-42.47	Horizontal
5	5257.800	-64.69	10.56	-54.13	-13.00	-41.13	Horizontal
6	689.051	-80.7	10.7	-70.0	-13.0	-57.0	Vertical
7	815.635	-80.9	12.1	-68.9	-13.0	-55.9	Vertical
8	986.044	-82.1	14.5	-67.7	-13.0	-54.7	Vertical
9	3505.200	-61.47	6.77	-54.70	-13.00	-41.70	Vertical
10	5257.800	-66.71	10.56	-56.15	-13.00	-43.15	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	538.811	-89.3	36.8	-52.5	-13.0	-39.5	Horizontal
2	669.952	-88.9	39.4	-49.5	-13.0	-36.5	Horizontal
3	765.648	-88.1	40.8	-47.3	-13.0	-34.3	Horizontal
4	1652.800	-51.90	0.23	-51.67	-13.00	-38.67	Horizontal
5	2479.200	-62.09	3.61	-58.48	-13.00	-45.48	Horizontal
6	296.502	-88.9	30.9	-58.1	-13.0	-45.1	Vertical
7	478.139	-88.7	35.1	-53.6	-13.0	-40.6	Vertical
8	660.602	-88.7	39.5	-49.3	-13.0	-36.3	Vertical
9	1652.800	-53.75	0.23	-53.52	-13.00	-40.52	Vertical
10	2479.200	-60.15	3.61	-56.54	-13.00	-43.54	Vertical
RMC 12.2kbps_ Middle Channel							
1	442.572	-89.6	34.2	-55.4	-13.0	-42.4	Horizontal
2	660.602	-88.9	39.5	-49.4	-13.0	-36.4	Horizontal
3	771.047	-89.2	40.8	-48.3	-13.0	-35.3	Horizontal
4	1672.800	-56.99	0.36	-56.63	-13.00	-43.63	Horizontal
5	2509.200	-64.14	3.71	-60.43	-13.00	-47.43	Horizontal
6	324.864	-89.2	31.9	-57.3	-13.0	-44.3	Vertical
7	505.789	-89.8	36.2	-53.6	-13.0	-40.6	Vertical
8	651.383	-88.9	39.2	-49.6	-13.0	-36.6	Vertical
9	1672.800	-59.90	0.36	-59.54	-13.00	-46.54	Vertical
10	2509.200	-57.79	3.71	-54.08	-13.00	-41.08	Vertical
RMC 12.2kbps_ Highest Channel							
1	418.378	-89.5	33.9	-55.6	-13.0	-42.6	Horizontal
2	498.73	-89.1	35.9	-53.2	-13.0	-40.2	Horizontal
3	679.435	-88.9	39.8	-49.1	-13.0	-36.1	Horizontal
4	1693.200	-54.93	0.50	-54.43	-13.00	-41.43	Horizontal
5	2539.800	-65.20	3.78	-61.42	-13.00	-48.42	Horizontal
6	516.565	-90.0	36.4	-53.7	-13.0	-40.7	Vertical
7	665.261	-89.3	39.7	-49.6	-13.0	-36.6	Vertical
8	749.676	-89.1	40.7	-48.4	-13.0	-35.4	Vertical
9	1693.200	-56.21	0.50	-55.71	-13.00	-42.71	Vertical
10	2539.800	-59.54	3.78	-55.76	-13.00	-42.76	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

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UTTR-RF-FCC23G-V1.1

5.9 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 2.1055 &
 FCC 47 CFR Part 22.355 &
 FCC 47 CFR Part 24.235 &
 FCC 47 CFR Part 27.54

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, FCC 47 CFR Part 27.54

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, 3.8 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	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	($^{\circ}\text{C}$)	(Hz)	(ppm)	(ppm)	
GSM 850 1Tx-slot							
GMSK	190 / 836.6	VL	TN	36	0.0430	± 2.5	Pass
		VN		35	0.0418	± 2.5	Pass
		VH		34	0.0406	± 2.5	Pass
		VN	50	37	0.0442	± 2.5	Pass
			40	39	0.0466	± 2.5	Pass
			30	35	0.0418	± 2.5	Pass
			20	37	0.0442	± 2.5	Pass
			10	38	0.0454	± 2.5	Pass
			0	33	0.0394	± 2.5	Pass
			-10	40	0.0478	± 2.5	Pass
			-20	36	0.0430	± 2.5	Pass
			-30	36	0.0430	± 2.5	Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
PCS 1900 1Tx-slot							
GMSK	661 / 1880.0	VL	TN	23	0.0122	N/A	Pass
		VN		30	0.0160		Pass
		VH		27	0.0144		Pass
		VN	50	26	0.0138		Pass
			40	21	0.0112		Pass
			30	28	0.0149		Pass
			20	22	0.0117		Pass
			10	30	0.0160		Pass
			0	21	0.0112		Pass
			-10	27	0.0144		Pass
			-20	25	0.0133		Pass
			-30	23	0.0122		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
WCDMA Band V RMC 12.2Kbps							
BPSK	4182 / 836.4	VL	TN	51	0.0610	± 2.5	Pass
		VN		56	0.0670	± 2.5	Pass
		VH		53	0.0634	± 2.5	Pass
		VN	50	56	0.0670	± 2.5	Pass
			40	58	0.0693	± 2.5	Pass
			30	51	0.0610	± 2.5	Pass
			20	49	0.0586	± 2.5	Pass
			10	54	0.0646	± 2.5	Pass
			0	57	0.0681	± 2.5	Pass
			-10	58	0.0693	± 2.5	Pass
			-20	50	0.0598	± 2.5	Pass
			-30	57	0.0681	± 2.5	Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
WCDMA Band II RMC 12.2Kbps							
BPSK	9400 / 1880.0	VL	TN	-17	-0.0090	N/A	Pass
		VN		-21	-0.0112		Pass
		VH		-25	-0.0133		Pass
		VN	50	-23	-0.0122		Pass
			40	-16	-0.0085		Pass
			30	-18	-0.0096		Pass
			20	-16	-0.0085		Pass
			10	-18	-0.0096		Pass
			0	-20	-0.0106		Pass
			-10	-21	-0.0112		Pass
			-20	-19	-0.0101		Pass
			-30	-21	-0.0112		Pass

Modulation	Channel/ Frequency	Voltage	Temperature	Deviation	Deviation	Limit	Result
	(MHz)	(Vdc)	(°C)	(Hz)	(ppm)	(ppm)	
WCDMA Band IV RMC 12.2Kbps							
BPSK	1412 / 1732.4	VL	TN	-36	-0.0208	N/A	Pass
		VN		-32	-0.0185		Pass
		VH		-33	-0.0190		Pass
		VN	50	-39	-0.0225		Pass
			40	-34	-0.0196		Pass
			30	-39	-0.0225		Pass
			20	-35	-0.0202		Pass
			10	-34	-0.0196		Pass
			0	-37	-0.0214		Pass
			-10	-30	-0.0173		Pass
			-20	-36	-0.0208		Pass
			-30	-30	-0.0173		Pass

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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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