

# CALIBRATION PROTOCOL

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## Communication Test Instrument

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**4405**

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**Serial No : 1111275**

FW-Version : 15.31.009

The instruments used for these measurements are calibrated on a schedule  
 The calibration is traceable to national and international standards

**Environmental Conditions:**  
 Relative humidity 30% to 65%  
 Ambient temperature 23 +-3°C

**Warm - up time:**  
 Unit Under Test: 1.5h  
 Test equipment : 1.5h

Page	Titel	Testsoftware Version	Test equipment
1....4	Generator Mode .....	3.72	ATE-4400C-04
5....6	Analyzer Mode .....	3.72	ATE-4400C-04
7...13	Power Meas Analyzer Mode	3.72	ATE-4400C-04
14	TCXO/OCXO calibration	3.72	ATE-4400C-04
15	Generator Mod.Spectrum	3.72	ATE-4400C-04

**Authorized technician**

Name:

**----- test passed -----**

Signature:.....

tested 25 Sep 2018 10:25:21  
by: digimes

## G 1.1 Output Level versus Frequency

Conditions: Nominal Output Level = - 10.0 dBm  
MU( CW unmodulated ) = 0.15 dB , Tolerance = 0.40 dB

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Frequency/MHz	Actual level/dBm CW-Signal
430.98765	-9.95
461.23456	-10.01
495.67890	-9.97
801.12345	-10.02
840.23654	-10.02
905.11120	-10.00
945.54321	-9.97
999.90123	-9.96
1705.56854	-9.95
1740.68971	-9.95
1810.66558	-9.96
1860.98765	-9.96
1902.85236	-9.95
1945.98541	-9.99
1999.99990	-9.98
2000.00000	-9.95
2035.98541	-9.96
2068.56854	-9.97
2070.68971	-10.00
2110.66558	-9.98
2160.98765	-10.03
2202.85236	-9.93
2260.98765	-9.94
2299.99990	-9.92

## G 1.2 Linearity of Continuous Level Variation

Conditions: CW unmodulated (f= 1850 MHz) , Tolerance = 0.40 dB  
MU = 0.16 dB

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setting/dBm	Actual level/dBm
-10.0	-9.92
-10.5	-10.47
-11.0	-10.94
-11.5	-11.46
-12.0	-11.93
-12.5	-12.43
-13.0	-12.94
-13.5	-13.44
-14.0	-13.95
-14.5	-14.45
-15.0	-14.96
-15.5	-15.46
-16.0	-15.94
-16.5	-16.44
-17.0	-16.96
-17.5	-17.39
-18.0	-17.92

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-18.5	-18.41
-19.0	-18.95
-19.5	-19.45
-20.0	-19.95
-20.5	-20.46
-21.0	-20.98
-21.5	-21.49

### G 1.3 Linearity of Output Level versus Frequency

Conditions: CW unmodulated , Tolerance = 0.40 dB (0.50 dB for < -100 dBm)

setting dBm	Actual level/dBm					MU
	485.6 MHz	905.4 MHz	1845.2 MHz	1970.8 MHz	2170.0 MHz	
-1.0	-1.05	-1.07	-1.03	-1.04	-1.02	0.20
-4.0	-3.97	-4.01	-4.00	-3.98	-4.05	0.20
-7.0	-6.97	-6.99	-7.03	-7.02	-7.07	0.20
-10.0	-10.02	-10.06	-10.06	-10.02	-10.06	0.20
-13.0	-12.95	-12.99	-13.03	-13.00	-13.02	0.20
-16.0	-16.01	-16.05	-16.03	-16.00	-16.06	0.20
-19.0	-19.02	-19.03	-19.01	-19.04	-19.00	0.20
-22.0	-22.04	-22.06	-22.03	-22.01	-22.04	0.20
-25.0	-24.99	-25.04	-25.01	-25.01	-25.05	0.20
-28.0	-27.99	-28.03	-28.00	-27.99	-28.03	0.20
-31.0	-31.09	-31.10	-31.06	-31.04	-31.09	0.20
-34.0	-33.98	-33.97	-33.94	-33.95	-33.97	0.20
-37.0	-36.98	-36.95	-36.93	-36.96	-36.98	0.20
-40.0	-40.05	-40.05	-39.97	-39.97	-40.01	0.22
-43.0	-42.97	-42.94	-42.93	-42.93	-42.95	0.22
-46.0	-45.96	-46.00	-45.94	-45.97	-46.00	0.22
-49.0	-49.03	-49.00	-48.94	-48.98	-48.99	0.22
-52.0	-52.06	-52.06	-51.99	-52.01	-52.05	0.22
-55.0	-55.05	-55.04	-55.01	-55.04	-55.09	0.22
-58.0	-58.06	-58.03	-57.97	-58.02	-58.07	0.22
-61.0	-61.14	-61.11	-61.06	-61.10	-61.13	0.22
-64.0	-64.10	-64.09	-64.10	-64.15	-64.11	0.22
-67.0	-67.09	-67.09	-67.11	-67.15	-67.13	0.22
-70.0	-70.16	-70.14	-70.12	-70.17	-70.17	0.23
-73.0	-73.04	-72.97	-73.00	-73.06	-73.03	0.23
-76.0	-76.05	-76.02	-76.02	-76.06	-76.05	0.23
-79.0	-79.13	-79.04	-79.01	-79.09	-79.03	0.23
-82.0	-82.03	-82.01	-81.95	-82.00	-81.99	0.24
-85.0	-85.00	-84.99	-84.97	-84.99	-84.96	0.24
-88.0	-88.03	-87.99	-87.93	-87.98	-87.94	0.24
-91.0	-91.11	-91.07	-90.97	-91.05	-91.03	0.24
-94.0	-94.01	-93.89	-94.12	-94.18	-94.08	0.24
-97.0	-97.02	-96.89	-97.13	-97.20	-97.10	0.24
-100.0	-100.08	-99.96	-100.15	-100.21	-100.10	0.25
-103.0	-102.95	-102.93	-103.07	-103.08	-102.84	0.25
-106.0	-105.95	-105.98	-106.11	-106.09	-105.90	0.25
-109.0	-109.03	-108.98	-109.05	-109.10	-108.91	0.25
-112.0	-112.04	-112.08	-112.08	-112.10	-111.98	0.25

## G 2.3 Phase Error RMS

Conditions: Output Level = - 10.0 dBm, Modulation = PRBS9  
 MU = 0.09 deg, Tolerance = 2.90 deg  
 20 Measurements per Channel

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Network	Channel	CW Mode RMS/deg			Burst Mode RMS/deg		
		min	avg	max	min	avg	max
GSM 900	975	0.70	1.02	1.66	0.70	0.98	1.43
	49	0.82	1.01	1.50	0.72	0.98	1.48
	124	0.72	0.95	1.53	0.73	0.99	1.51
GSM 1800	512	0.78	1.00	1.71	0.74	0.96	1.43
	740	0.77	1.01	1.48	0.67	0.98	1.56
	884	0.79	1.04	1.60	0.76	0.97	1.51
GSM 1900	512	0.82	1.04	1.61	0.76	0.99	1.58
	650	0.87	1.19	1.78	0.75	1.00	1.55
	809	0.87	1.10	1.64	0.75	1.04	1.56

## A 1.1 Level Reading versus Frequency

Conditions: Nominal Input Level = - 10.0 dBm

MU (CW PRBS 9 modulated) = 0.15 dB, Tolerance = 0.30 dB

MU (Burst PRBS 9) = 0.16 dB, Tolerance = 0.35 dB

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Frequency/MHz	Actual rdg CW/dBm	Actual rdg burst/dBm
815.20	-10.07	-10.07
917.40	-10.05	-10.03
990.60	-10.09	-10.11
1702.60	-10.05	-9.95
1847.20	-10.06	-10.00
1999.80	-10.06	-10.02

## A 2.1 Frequency Error Reading

Conditions: Input Level = -10.0 dBm, MU = 0.6 Hz  
 Tolerance (GSM 900)= 15 Hz | Tolerance (GSM 1800/1900) = 25 Hz  
 30 Measurements per Nominal Frequency Error / CW unmodulated

Nominal setting	Carr.F= 915 MHz delta/Hz			Carr.F= 1765 MHz delta/Hz			Carr.F= 1955 MHz delta/Hz		
	F-error/Hz	min	avg	max	min	avg	max	min	avg
-10000.0	+2.4	+0.2	-2.3	+5.3	-0.1	-2.9	+5.1	+0.5	-3.1
-5000.0	+2.6	+0.3	-2.0	+5.5	+0.6	-4.1	+4.6	-0.3	-4.1
-3000.0	+2.0	-0.0	-1.8	+4.2	-0.2	-5.4	+10.4	-0.4	-5.9
-1000.0	+2.1	-0.2	-2.6	+4.4	+0.7	-5.1	+4.6	-0.4	-5.1
-500.0	+4.0	-0.1	-4.5	+5.1	+0.5	-3.2	+5.2	+0.2	-4.4
-300.0	+3.5	-0.3	-5.3	+4.7	-0.4	-6.2	+4.7	-1.0	-6.1
-100.0	+2.9	-0.0	-3.6	+3.7	-0.1	-5.6	+7.4	+0.7	-6.0
+0.0	+3.6	+0.5	-2.8	+4.0	-0.2	-6.8	+4.8	+0.7	-5.2
+100.0	+3.4	+0.0	-2.9	+7.3	+0.2	-4.5	+5.7	+0.9	-5.0
+300.0	+3.9	+0.1	-4.2	+4.9	-0.3	-5.1	+5.7	-0.6	-5.5
+500.0	+3.9	-0.6	-6.0	+4.8	-0.3	-4.2	+6.3	+0.2	-7.4
+1000.0	+2.7	+0.3	-3.5	+4.7	+0.6	-3.0	+3.2	-0.2	-7.4
+3000.0	+2.2	-0.3	-2.9	+4.4	+0.2	-3.2	+5.2	-0.1	-4.4
+5000.0	+2.4	-0.3	-2.5	+3.4	-1.2	-5.3	+4.0	-0.4	-5.4
+10000.0	+1.6	-0.4	-2.9	+3.0	-0.3	-3.7	+4.6	-0.7	-5.8

## A 3.1 RMS Phase Error Reading

Conditions: Input Level = -10.0 dBm, Tolerance = 0.35 deg  
 30 Measurements per Nominal Phase Error

Nominal P-error/deg	act rdg at 915 MHz			act rdg at 1765 MHz			act rdg at 1955 MHz			MU deg
	min	avg	max	min	avg	max	min	avg	max	
2.5	2.41	2.48	2.52	2.44	2.50	2.56	2.45	2.50	2.55	0.05
5.0	4.94	4.98	5.01	4.96	5.00	5.05	4.98	5.01	5.07	0.07
10.0	9.91	9.96	10.06	9.99	10.04	10.09	9.97	10.01	10.11	0.12

## A 3.2 Peak Phase Error Reading

Conditions: Input Level = -10.0 dBm, MU = 1.20 deg  
 30 Measurements per Nominal Phase Error

Nominal P-error/deg	act rdg at 915 MHz			act rdg at 1765 MHz			act rdg at 1955 MHz			Tol deg
	min	avg	max	min	avg	max	min	avg	max	
3.54	3.10	3.64	4.34	3.06	3.55	4.29	2.98	3.52	4.04	2.00
7.07	6.83	7.31	8.04	6.61	7.04	7.76	6.66	7.27	7.93	2.00
14.14	13.82	14.22	14.94	13.41	14.09	14.81	13.71	14.23	15.15	2.00



## A 4.1 RF Level Reading versus Frequency

Conditions: Input Level = +10 and +34 dBm  
 CW unmodulated, 10 Measurements per Result

Freque. MHz	input dBm	reading dBm	error dB	MU dB	limit dB	input dBm	reading dBm	error dB	MU dB	limit dB
430	10.000	9.923	-0.077	0.08	0.20	34.000	33.912	-0.088	0.08	0.20
432	10.000	9.939	-0.061	0.08	0.20	34.000	33.930	-0.070	0.08	0.20
437	10.000	9.941	-0.059	0.08	0.20	34.000	33.933	-0.067	0.08	0.20
445	10.000	9.926	-0.074	0.08	0.20	34.000	33.935	-0.065	0.08	0.20
455	10.000	9.919	-0.081	0.08	0.20	34.000	33.935	-0.065	0.08	0.20
465	10.000	9.921	-0.079	0.08	0.20	34.000	33.934	-0.066	0.08	0.20
475	10.000	9.924	-0.076	0.08	0.20	34.000	33.939	-0.061	0.08	0.20
485	10.000	9.929	-0.071	0.08	0.20	34.000	33.937	-0.063	0.08	0.20
493	10.000	9.925	-0.075	0.08	0.20	34.000	33.937	-0.063	0.08	0.20
496	10.000	9.928	-0.072	0.08	0.20	34.000	33.941	-0.059	0.08	0.20
800	10.000	9.912	-0.088	0.08	0.20	34.000	33.903	-0.097	0.08	0.20
805	10.000	9.929	-0.071	0.08	0.20	34.000	33.930	-0.070	0.08	0.20
815	10.000	9.929	-0.071	0.08	0.20	34.000	33.937	-0.063	0.08	0.20
825	10.000	9.928	-0.072	0.08	0.20	34.000	33.935	-0.065	0.08	0.20
835	10.000	9.929	-0.071	0.08	0.20	34.000	33.938	-0.062	0.08	0.20
845	10.000	9.929	-0.071	0.08	0.20	34.000	33.936	-0.064	0.08	0.20
855	10.000	9.929	-0.071	0.08	0.20	34.000	33.933	-0.067	0.08	0.20
865	10.000	9.929	-0.071	0.08	0.20	34.000	33.934	-0.066	0.08	0.20
875	10.000	9.934	-0.066	0.08	0.20	34.000	33.926	-0.074	0.08	0.20
885	10.000	9.924	-0.076	0.08	0.20	34.000	33.935	-0.065	0.08	0.20
895	10.000	9.927	-0.073	0.08	0.20	34.000	33.937	-0.063	0.08	0.20
905	10.000	9.927	-0.073	0.08	0.20	34.000	33.936	-0.064	0.08	0.20
915	10.000	9.934	-0.066	0.08	0.20	34.000	33.938	-0.062	0.08	0.20
925	10.000	9.931	-0.069	0.08	0.20	34.000	33.939	-0.061	0.08	0.20
935	10.000	9.930	-0.070	0.08	0.20	34.000	33.939	-0.061	0.08	0.20
945	10.000	9.921	-0.079	0.08	0.20	34.000	33.927	-0.073	0.08	0.20
955	10.000	9.932	-0.068	0.08	0.20	34.000	33.936	-0.064	0.08	0.20
965	10.000	9.926	-0.074	0.08	0.20	34.000	33.934	-0.066	0.08	0.20
975	10.000	9.924	-0.076	0.08	0.20	34.000	33.922	-0.078	0.08	0.20
985	10.000	9.915	-0.085	0.08	0.20	34.000	33.920	-0.080	0.08	0.20
995	10.000	9.917	-0.083	0.08	0.20	34.000	33.911	-0.089	0.08	0.20
1000	10.000	9.924	-0.076	0.08	0.20	34.000	33.922	-0.078	0.08	0.20
1700	10.000	9.928	-0.072	0.08	0.20	34.000	33.922	-0.078	0.08	0.20
1705	10.000	9.944	-0.056	0.08	0.20	34.000	33.948	-0.052	0.08	0.20
1715	10.000	9.943	-0.057	0.08	0.20	34.000	33.948	-0.052	0.08	0.20
1725	10.000	9.941	-0.059	0.08	0.20	34.000	33.936	-0.064	0.08	0.20
1735	10.000	9.933	-0.067	0.08	0.20	34.000	33.932	-0.068	0.08	0.20
1745	10.000	9.936	-0.064	0.08	0.20	34.000	33.944	-0.056	0.08	0.20
1755	10.000	9.935	-0.065	0.08	0.20	34.000	33.945	-0.055	0.08	0.20
1765	10.000	9.938	-0.062	0.08	0.20	34.000	33.947	-0.053	0.08	0.20
1775	10.000	9.937	-0.063	0.08	0.20	34.000	33.944	-0.056	0.08	0.20
1785	10.000	9.938	-0.062	0.08	0.20	34.000	33.943	-0.057	0.08	0.20
1795	10.000	9.937	-0.063	0.08	0.20	34.000	33.945	-0.055	0.08	0.20
1805	10.000	9.936	-0.064	0.08	0.20	34.000	33.927	-0.073	0.08	0.20
1815	10.000	9.937	-0.063	0.08	0.20	34.000	33.937	-0.063	0.08	0.20
1825	10.000	9.929	-0.071	0.08	0.20	34.000	33.923	-0.077	0.08	0.20
1835	10.000	9.934	-0.066	0.08	0.20	34.000	33.944	-0.056	0.08	0.20
1845	10.000	9.930	-0.070	0.08	0.20	34.000	33.944	-0.056	0.08	0.20
1855	10.000	9.922	-0.078	0.08	0.20	34.000	33.925	-0.075	0.08	0.20
1865	10.000	9.928	-0.072	0.08	0.20	34.000	33.930	-0.070	0.08	0.20
1875	10.000	9.932	-0.068	0.08	0.20	34.000	33.922	-0.078	0.08	0.20

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1885	10.000	9.935	-0.065	0.08	0.20	34.000	33.927	-0.073	0.08	0.20	
1895	10.000	9.937	-0.063	0.08	0.20	34.000	33.933	-0.067	0.08	0.20	
1905	10.000	9.935	-0.065	0.08	0.20	34.000	33.924	-0.076	0.08	0.20	
1915	10.000	9.934	-0.066	0.08	0.20	34.000	33.925	-0.075	0.08	0.20	
1925	10.000	9.936	-0.064	0.08	0.20	34.000	33.926	-0.074	0.08	0.20	
1935	10.000	9.938	-0.062	0.08	0.20	34.000	33.928	-0.072	0.08	0.20	
1945	10.000	9.936	-0.064	0.08	0.20	34.000	33.927	-0.073	0.08	0.20	
1955	10.000	9.939	-0.061	0.08	0.20	34.000	33.928	-0.072	0.08	0.20	
1965	10.000	9.928	-0.072	0.08	0.20	34.000	33.926	-0.074	0.08	0.20	
1975	10.000	9.936	-0.064	0.08	0.20	34.000	33.930	-0.070	0.08	0.20	
1985	10.000	9.936	-0.064	0.08	0.20	34.000	33.928	-0.072	0.08	0.20	
1995	10.000	9.938	-0.062	0.08	0.20	34.000	33.927	-0.073	0.08	0.20	
2000	10.000	9.933	-0.067	0.08	0.20	34.000	33.925	-0.075	0.08	0.20	
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2005	10.000	9.934	-0.066	0.08	0.20	34.000	33.923	-0.077	0.08	0.20	
2015	10.000	9.936	-0.064	0.08	0.20	34.000	33.930	-0.070	0.08	0.20	
2025	10.000	9.936	-0.064	0.08	0.20	34.000	33.927	-0.073	0.08	0.20	
2035	10.000	9.936	-0.064	0.08	0.20	34.000	33.930	-0.070	0.08	0.20	
2045	10.000	9.939	-0.061	0.08	0.20	34.000	33.930	-0.070	0.08	0.20	
2055	10.000	9.935	-0.065	0.08	0.20	34.000	33.927	-0.073	0.08	0.20	
2065	10.000	9.936	-0.064	0.08	0.20	34.000	33.936	-0.064	0.08	0.20	
2075	10.000	9.927	-0.073	0.08	0.20	34.000	33.943	-0.057	0.08	0.20	
2085	10.000	9.930	-0.070	0.08	0.20	34.000	33.933	-0.067	0.08	0.20	
2095	10.000	9.930	-0.070	0.08	0.20	34.000	33.940	-0.060	0.08	0.20	
2105	10.000	9.929	-0.071	0.08	0.20	34.000	33.937	-0.063	0.08	0.20	
2115	10.000	9.932	-0.068	0.08	0.20	34.000	33.936	-0.064	0.08	0.20	
2125	10.000	9.930	-0.070	0.08	0.20	34.000	33.937	-0.063	0.08	0.20	
2135	10.000	9.932	-0.068	0.08	0.20	34.000	33.934	-0.066	0.08	0.20	
2145	10.000	9.942	-0.058	0.08	0.20	34.000	33.938	-0.062	0.08	0.20	
2155	10.000	9.946	-0.054	0.08	0.20	34.000	33.934	-0.066	0.08	0.20	
2165	10.000	9.946	-0.054	0.08	0.20	34.000	33.941	-0.059	0.08	0.20	
2175	10.000	9.937	-0.063	0.08	0.20	34.000	33.934	-0.066	0.08	0.20	
2185	10.000	9.937	-0.063	0.08	0.20	34.000	33.932	-0.068	0.08	0.20	
2195	10.000	9.940	-0.060	0.08	0.20	34.000	33.938	-0.062	0.08	0.20	
2205	10.000	9.947	-0.053	0.08	0.20	34.000	33.939	-0.061	0.08	0.20	
2215	10.000	9.941	-0.059	0.08	0.20	34.000	33.938	-0.062	0.08	0.20	
2225	10.000	9.949	-0.051	0.08	0.20	34.000	33.944	-0.056	0.08	0.20	
2235	10.000	9.942	-0.058	0.08	0.20	34.000	33.940	-0.060	0.08	0.20	
2245	10.000	9.938	-0.062	0.08	0.20	34.000	33.934	-0.066	0.08	0.20	
2255	10.000	9.939	-0.061	0.08	0.20	34.000	33.934	-0.066	0.08	0.20	
2265	10.000	9.933	-0.067	0.08	0.20	34.000	33.931	-0.069	0.08	0.20	
2275	10.000	9.944	-0.056	0.08	0.20	34.000	33.938	-0.062	0.08	0.20	
2285	10.000	9.928	-0.072	0.08	0.20	34.000	33.920	-0.080	0.08	0.20	
2295	10.000	9.968	-0.032	0.08	0.20	34.000	33.964	-0.036	0.08	0.20	
2300	10.000	9.942	-0.058	0.08	0.20	34.000	33.936	-0.064	0.08	0.20	
-----											

## A 5.0 Linearity of RF Level Reading at 437 MHz

Conditions: Frequency = 437 MHz

CW unmodulated, 10 Measurements per Result

---

input	reading	error	MU	limit
dBm	dBm	dB	dB	dB
-10.000	-10.094	-0.094	0.08	0.20
-8.090	-8.182	-0.092	0.08	0.20
-6.180	-6.259	-0.079	0.08	0.20
-4.270	-4.356	-0.086	0.08	0.20
-2.360	-2.437	-0.077	0.08	0.20
0.270	0.195	-0.075	0.08	0.20
2.180	2.121	-0.059	0.08	0.20
4.090	4.028	-0.062	0.08	0.20
6.000	5.939	-0.061	0.08	0.20
8.090	8.018	-0.072	0.08	0.20
9.180	9.118	-0.062	0.08	0.20
10.000	9.934	-0.066	0.08	0.20
12.090	12.014	-0.076	0.08	0.20
14.180	14.111	-0.069	0.08	0.20
16.270	16.194	-0.076	0.08	0.20
18.360	18.279	-0.081	0.08	0.20
20.480	20.403	-0.077	0.08	0.20
22.480	22.401	-0.079	0.08	0.20
24.360	24.283	-0.077	0.08	0.20
26.270	26.197	-0.073	0.08	0.20
28.180	28.107	-0.073	0.08	0.20
30.090	30.020	-0.070	0.08	0.20
32.180	32.102	-0.078	0.08	0.20
34.270	34.190	-0.080	0.08	0.20
36.000	35.926	-0.074	0.08	0.20

---

## A 5.1 Linearity of RF Level Reading at 895 MHz

Conditions: Frequency = 895 MHz

CW unmodulated, 10 Measurements per Result

---

input	reading	error	MU	limit
dBm	dBm	dB	dB	dB
-10.000	-10.112	-0.112	0.08	0.20
-8.090	-8.209	-0.119	0.08	0.20
-6.180	-6.296	-0.116	0.08	0.20
-4.270	-4.392	-0.122	0.08	0.20
-2.360	-2.427	-0.067	0.08	0.20
0.270	0.205	-0.065	0.08	0.20
2.180	2.124	-0.056	0.08	0.20
4.090	4.024	-0.066	0.08	0.20
6.000	5.933	-0.067	0.08	0.20
8.090	8.019	-0.071	0.08	0.20
9.180	9.107	-0.073	0.08	0.20
10.000	9.923	-0.077	0.08	0.20
12.090	12.013	-0.077	0.08	0.20
14.180	14.111	-0.069	0.08	0.20
16.270	16.195	-0.075	0.08	0.20
18.360	18.293	-0.067	0.08	0.20
20.480	20.403	-0.077	0.08	0.20
22.480	22.405	-0.075	0.08	0.20
24.360	24.276	-0.084	0.08	0.20
26.270	26.189	-0.081	0.08	0.20
28.180	28.097	-0.083	0.08	0.20
30.090	30.010	-0.080	0.08	0.20
32.180	32.096	-0.084	0.08	0.20
34.270	34.196	-0.074	0.08	0.20
36.000	35.915	-0.085	0.08	0.20

---

## A 5.2 Linearity of RF Level Reading at 1735 MHz

Conditions: Frequency = 1735 MHz

CW unmodulated, 10 Measurements per Result

---

input	reading	error	MU	limit
dBm	dBm	dB	dB	dB
-10.000	-10.073	-0.073	0.08	0.20
-9.080	-9.155	-0.075	0.08	0.20
-7.160	-7.232	-0.072	0.08	0.20
-5.240	-5.311	-0.071	0.08	0.20
-3.320	-3.388	-0.068	0.08	0.20
-1.700	-1.773	-0.073	0.08	0.20
1.160	1.110	-0.050	0.08	0.20
3.320	3.261	-0.059	0.08	0.20
5.240	5.191	-0.049	0.08	0.20
7.160	7.089	-0.071	0.08	0.20
9.080	9.018	-0.062	0.08	0.20
10.000	9.937	-0.063	0.08	0.20
11.080	11.022	-0.058	0.08	0.20
13.160	13.100	-0.060	0.08	0.20
15.240	15.178	-0.062	0.08	0.20
17.320	17.257	-0.063	0.08	0.20
19.400	19.337	-0.063	0.08	0.20
21.320	21.256	-0.064	0.08	0.20
23.240	23.174	-0.066	0.08	0.20
25.160	25.096	-0.064	0.08	0.20
27.080	27.008	-0.072	0.08	0.20
29.000	28.928	-0.072	0.08	0.20
31.080	31.009	-0.071	0.08	0.20
33.160	33.088	-0.072	0.08	0.20
35.240	35.175	-0.065	0.08	0.20
36.000	35.929	-0.071	0.08	0.20

---

## A 5.3 Linearity of RF Level Reading at 1885 MHz

Conditions: Frequency = 1885 MHz

CW unmodulated, 10 Measurements per Result

---

input	reading	error	MU	limit
dBm	dBm	dB	dB	dB
-10.000	-10.095	-0.095	0.08	0.20
-8.070	-8.168	-0.098	0.08	0.20
-6.140	-6.234	-0.094	0.08	0.20
-4.210	-4.300	-0.090	0.08	0.20
-2.280	-2.374	-0.094	0.08	0.20
0.350	0.301	-0.049	0.08	0.20
2.280	2.231	-0.049	0.08	0.20
4.210	4.151	-0.059	0.08	0.20
6.140	6.088	-0.052	0.08	0.20
8.070	7.999	-0.071	0.08	0.20
10.000	9.935	-0.065	0.08	0.20
12.070	12.008	-0.062	0.08	0.20
14.140	14.071	-0.069	0.08	0.20
16.210	16.141	-0.069	0.08	0.20
18.280	18.209	-0.071	0.08	0.20
20.350	20.287	-0.063	0.08	0.20
22.280	22.212	-0.068	0.08	0.20
24.210	24.141	-0.069	0.08	0.20
26.140	26.072	-0.068	0.08	0.20
28.070	27.999	-0.071	0.08	0.20
30.140	30.069	-0.071	0.08	0.20
32.210	32.137	-0.073	0.08	0.20
34.280	34.200	-0.080	0.08	0.20
36.000	35.929	-0.071	0.08	0.20

---

## A 5.4 Linearity of RF Level Reading at 2095 MHz

Conditions: Frequency = 2095 MHz

CW unmodulated, 10 Measurements per Result

---

input	reading	error	MU	limit
dBm	dBm	dB	dB	dB
-10.000	-10.127	-0.127	0.08	0.20
-8.090	-8.212	-0.122	0.08	0.20
-6.180	-6.297	-0.117	0.08	0.20
-4.270	-4.389	-0.119	0.08	0.20
-2.360	-2.472	-0.112	0.08	0.20
0.270	0.226	-0.044	0.08	0.20
2.180	2.143	-0.037	0.08	0.20
4.090	4.043	-0.047	0.08	0.20
6.000	5.954	-0.046	0.08	0.20
8.090	8.025	-0.065	0.08	0.20
9.180	9.130	-0.050	0.08	0.20
10.000	9.933	-0.067	0.08	0.20
12.090	12.024	-0.066	0.08	0.20
14.180	14.115	-0.065	0.08	0.20
16.270	16.203	-0.067	0.08	0.20
18.360	18.303	-0.057	0.08	0.20
20.480	20.418	-0.062	0.08	0.20
22.480	22.427	-0.053	0.08	0.20
24.360	24.300	-0.060	0.08	0.20
26.270	26.220	-0.050	0.08	0.20
28.180	28.114	-0.066	0.08	0.20
30.090	30.031	-0.059	0.08	0.20
32.180	32.114	-0.066	0.08	0.20
34.270	34.210	-0.060	0.08	0.20
36.000	35.940	-0.060	0.08	0.20

---

### G 3.1 TCXO/OCXO accuracy at 900 MHz (ext.sync disabled)

Conditions: Nominal Output Level = - 10.0 dBm  
MU( CW unmodulated ) = 3.00 Hz , Tolerance TCXO = 1.00e-06  
Tolerance OCXO = 1.00e-07

-----  
current stored OCXO Ref Dac value = 2269  
relating FrequencyOffset @ 900MHz = +154.04 Hz (+1.71e-07)\*

mean slope of the OCXO is 2.31 Hz / DAC point  
best DAC setting could be 2205.30 (2205)

analyzing the near range +/- 2 dac points

DAC	freq.error Hz	accuracy	stdDev
2203	-4.29	-4.77e-09	1.2919
2204	-0.60	-6.66e-10	1.2026
2205	+0.92	+1.02e-09	1.2158
2206	+2.71	+3.02e-09	1.4321
2207	+5.15	+5.73e-09	1.3617

new OCXO Ref Dac value = 2205  
remaining FrequencyOffset @ 900MHz = +0.87 Hz (+9.69e-10)

### G 3.2 I/Q carrier suppression at 900 MHz

Conditions: Nominal Output Level = - 10.0 dBm  
MU( CW unmodulated ) = 2.00 dB , Tolerance Carrier = -40 dB  
Tolerance Sideband = -30 dB

-----  
old stored I/Q Ref Dac values = 77 / 75  
relating suppression of carrier = -57.62 dBc  
sideband = -43.44 dBc

good I/Q values could be 77 / 75  
analyzing the near range +/- 3 dac points

optimize for good suppression				new
I / Q	sideband dBc	carrier dBc	carrier	carrier dBc
77 / 72	-45.04	-49.44		-0.02
77 / 73	-46.88	-51.91		-0.03
77 / 74	-44.38	-54.65		+0.01
77 / 75	-43.69	-57.80		-0.03
77 / 76	-44.80	-57.42		-0.02
77 / 77	-46.42	-54.14		+0.04
77 / 78	-44.38	-51.72		-0.02

best found Q value is 75

74 / 75	-46.23	-48.89	+0.01
75 / 75	-43.91	-52.14	-0.03
76 / 75	-43.29	-54.94	-0.06
77 / 75	-48.05	-57.19	-0.02
78 / 75	-44.05	-57.91	-0.06
79 / 75	-48.18	-54.56	-0.02
80 / 75	-43.57	-52.01	-0.03

best found I value is 78



UUT: "AEROFLEX, 4400, 1111275, 15.31.009" / 4405  
Certification ID = B004A3270  
tested 25 Sep 2018 10:25:21, digimes

# Aeroflex

new stored I/Q Ref Dac values = 78 / 75  
relating suppression of carrier = -58.01 dBc  
sideband = -45.37 dBc

### G 3.3 Generator Modulation Spectrum

Conditions: Nominal Output Level = - 13.0 dBm  
              @ Frequency = 905.4 MHz  
              MU( CW unmodulated ) = 0.5 dB

-----  
unmodulated carrier = -13.15 dBm

GMSK-PRBS spectrum was measured 1 time

one spectr.point = 4.573 kHz

peakPower = -11.56 dBc

spectr.range	maxLimit	maxLimit.range
[kHz]	[error]	[dBc]
-800 ... -400	0	-56.6 ... -56.6
-400 ... -350	0	-56.6 ... -44.6
-350 ... -260	0	-44.6 ... -44.6
-260 ... -200	0	-44.6 ... -29.6
-200 ... -170	0	-29.6 ... -21.6
-170 ... -100	0	-21.6 ... -11.1
-100 ... +100	0	-11.1 ... -11.1
+100 ... +170	0	-11.1 ... -21.6
+170 ... +200	0	-21.6 ... -29.6
+200 ... +260	0	-29.6 ... -44.6
+260 ... +350	0	-44.6 ... -44.6
+350 ... +400	0	-44.6 ... -56.6
+400 ... +800	0	-56.6 ... -56.6

spectr.range	minLimit	minLimit.range
[kHz]	[error]	[dBc]
-800 ... -750	0	-121.6 ... -121.6
-750 ... -500	0	-121.6 ... -91.6
-500 ... -320	0	-91.6 ... -76.6
-320 ... -240	0	-76.6 ... -56.6
-240 ... -180	0	-56.6 ... -56.6
-180 ... -100	0	-56.6 ... -31.6
-100 ... -30	0	-31.6 ... -16.6
-30 ... +30	0	-16.6 ... -16.6
+30 ... +100	0	-16.6 ... -31.6
+100 ... +180	0	-31.6 ... -56.6
+180 ... +240	0	-56.6 ... -56.6
+240 ... +320	0	-56.6 ... -76.6
+320 ... +500	0	-76.6 ... -91.6
+500 ... +750	0	-91.6 ... -121.6
+750 ... +800	0	-121.6 ... -121.6

spectrum PASSED

### G 3.3 CDMA2000 Generator Modulation Spectrum

Conditions: Nominal Output Level = - 13.0 dBm  
          @ Frequency = 905.4 MHz  
          MU( CW unmodulated ) = 0.5 dB

-----  
unmodulated carrier = -13.15 dBm  
QPSK-PRBS spectrum was measured 1 time  
one spectr.point = 4.573 kHz  
meanPower (-615 kHz ... 615 kHz) = -21.44 dBc

spectr.range [kHz]	maxLimit [error]	maxLimit.range [dBc]
-1600 ... -1350	0	-63.4 ... -61.4
-1350 ... -1270	0	-61.4 ... -56.4
-1270 ... -820	0	-56.4 ... -56.4
-820 ... -810	0	-56.4 ... -51.4
-810 ... -750	0	-51.4 ... -31.4
-750 ... -700	0	-31.4 ... -21.4
-700 ... -650	0	-21.4 ... -16.4
-650 ... +650	0	-16.4 ... -16.4
+650 ... +700	0	-16.4 ... -21.4
+700 ... +750	0	-21.4 ... -31.4
+750 ... +810	0	-31.4 ... -51.4
+810 ... +820	0	-51.4 ... -56.4
+820 ... +1270	0	-61.4 ... -56.4
+1270 ... +1350	0	-56.4 ... -61.4
+1350 ... +1600	0	-61.4 ... -63.4

spectr.range [kHz]	minLimit [error]	minLimit.range [dBc]
-1600 ... -750	0	-113.8 ... -76.4
-750 ... -700	0	-76.4 ... -41.4
-700 ... -600	0	-41.4 ... -26.4
-600 ... +600	0	-26.4 ... -26.4
+600 ... +700	0	-26.4 ... -41.4
+700 ... +750	0	-41.4 ... -76.4
+750 ... +1600	0	-76.4 ... -113.8

spectrum PASSED

### G 3.3 WCDMA Generator Modulation Spectrum

Conditions: Nominal Output Level = - 22.0 dBm  
                  @ Frequency = 905.4 MHz  
                  MU( CW unmodulated ) = 0.5 dB

-----  
unmodulated carrier = -22.35 dBm  
QPSK-PRBS spectrum was measured 1 time  
one spectr.point = 4.573 kHz  
meanPower (-1515 kHz ... 1515 kHz) = -27.47 dBc

spectr.range [kHz]	maxLimit [error]	maxLimit.range [dBc]
-3500 ... -2900	0	-62.5 ... -62.5
-2900 ... -2850	0	-62.5 ... -57.5
-2850 ... -2800	0	-57.5 ... -47.5
-2800 ... -2700	0	-47.5 ... -37.5
-2700 ... -2600	0	-37.5 ... -32.5
-2600 ... -2400	0	-32.5 ... -25.5
-2400 ... -2000	0	-25.5 ... -22.5
-2000 ... +2000	0	-22.5 ... -22.5
+2000 ... +2400	0	-22.5 ... -25.5
+2400 ... +2600	0	-25.5 ... -32.5
+2600 ... +2700	0	-32.5 ... -37.5
+2700 ... +2800	0	-37.5 ... -47.5
+2800 ... +2850	0	-47.5 ... -57.5
+2850 ... +2900	0	-57.5 ... -62.5
+2900 ... +3500	0	-62.5 ... -62.5

spectr.range [kHz]	minLimit [error]	minLimit.range [dBc]
-3500 ... -2650	0	-143.2 ... -82.5
-2650 ... -2600	0	-82.5 ... -57.5
-2600 ... -2500	0	-57.5 ... -42.5
-2500 ... -2350	0	-42.5 ... -36.5
-2350 ... -2150	0	-36.5 ... -33.5
-2150 ... +2150	0	-33.5 ... -33.5
+2150 ... +2350	0	-33.5 ... -36.5
+2350 ... +2500	0	-36.5 ... -42.5
+2500 ... +2600	0	-42.5 ... -57.5
+2600 ... +2650	0	-57.5 ... -82.5
+2650 ... +3500	0	-82.5 ... -143.2

spectrum PASSED