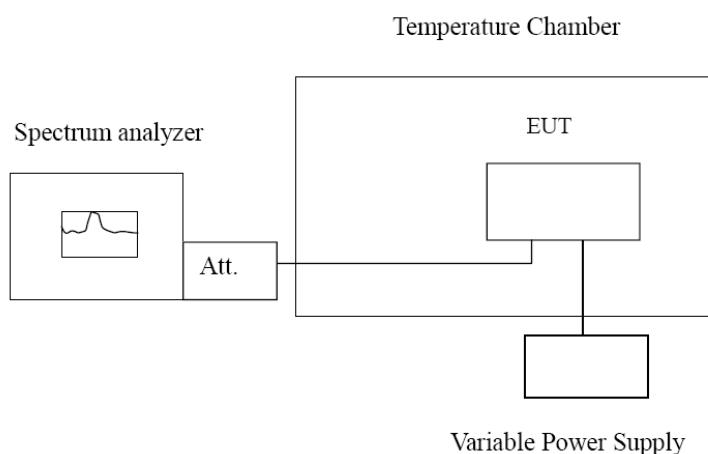


8. Frequency Stability

8.1. Test Setup



8.2. Test Procedure

Frequency Stability Under Temperature Variations:

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. 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 ($\pm 15\%$) and endpoint, record the maximum frequency change.

8.3. Test Method

KDB 971168 D01 Power Meas License Digital Systems v03 sub-clause 9

ANSI C63.26: 2015 Sub-clause 5.6

8.4. Test Result

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 1: LTE Band 2		
Date of Test	2018/08/08	Test Site	SR10-H

1860MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	2	-0.0030
3.8	-25	0.0371
3.4	8	-0.0119

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	1	-0.0015
-20	-4	0.0059
-10	-1	0.0015
0	18	-0.0267
+10	-32	0.0475
+20	16	-0.0238
+30	6	-0.0089
+40	-26	0.0386
+50	-42	0.0624

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 1: LTE Band 2		
Date of Test	2018/08/08	Test Site	SR10-H

1880MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	11	-0.0162
3.8	8	-0.0118
3.4	-21	0.0309

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-20	0.0294
-20	12	-0.0176
-10	25	-0.0367
0	21	-0.0309
+10	8	-0.0118
+20	-21	0.0309
+30	-23	0.0338
+40	15	-0.0220
+50	-26	0.0382

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 1: LTE Band 2		
Date of Test	2018/08/08	Test Site	SR10-H

1900MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	16	-0.0230
3.8	8	-0.0115
3.4	20	-0.0288

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	16	-0.0230
-20	18	-0.0259
-10	-37	0.0532
0	15	-0.0216
+10	-32	0.0460
+20	-2	0.0029
+30	25	-0.0359
+40	23	-0.0331
+50	-22	0.0316

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 2: LTE Band 4		
Date of Test	2018/08/08	Test Site	SR10-H

1720MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-4	0.0059
3.8	22	-0.0327
3.4	-42	0.0624

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-36	0.0535
-20	-26	0.0386
-10	13	-0.0193
0	7	-0.0104
+10	18	-0.0267
+20	-28	0.0416
+30	24	-0.0357
+40	-30	0.0446
+50	-29	0.0431

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 2: LTE Band 4		
Date of Test	2018/08/08	Test Site	SR10-H

1732.5MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	18	-0.0265
3.8	-30	0.0441
3.4	-2	0.0029

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	11	-0.0162
-20	-24	0.0353
-10	-3	0.0044
0	-26	0.0382
+10	3	-0.0044
+20	11	-0.0162
+30	11	-0.0162
+40	-42	0.0617
+50	5	-0.0073

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 2: LTE Band 4		
Date of Test	2018/08/08	Test Site	SR10-H

1745MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	14	-0.0201
3.8	-40	0.0575
3.4	24	-0.0345

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-31	0.0446
-20	-7	0.0101
-10	9	-0.0129
0	20	-0.0288
+10	-3	0.0043
+20	13	-0.0187
+30	-10	0.0144
+40	-40	0.0575
+50	15	-0.0216

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 3: LTE Band 5		
Date of Test	2018/08/08	Test Site	SR10-H

829MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-18	0.0267
3.8	3	-0.0045
3.4	-6	0.0089

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	6	-0.0089
-20	12	-0.0178
-10	-18	0.0267
0	21	-0.0312
+10	-34	0.0505
+20	-1	0.0015
+30	18	-0.0267
+40	-10	0.0149
+50	-13	0.0193

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 3: LTE Band 5		
Date of Test	2018/08/08	Test Site	SR10-H

836.5MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-1	0.0015
3.8	-28	0.0411
3.4	11	-0.0162

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-15	0.0220
-20	-34	0.0500
-10	-34	0.0500
0	-40	0.0588
+10	-30	0.0441
+20	-6	0.0088
+30	20	-0.0294
+40	-11	0.0162
+50	14	-0.0206

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 3: LTE Band 5		
Date of Test	2018/08/08	Test Site	SR10-H

844MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	20	-0.0288
3.8	12	-0.0173
3.4	-37	0.0532

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-18	0.0259
-20	-39	0.0561
-10	-20	0.0288
0	-20	0.0288
+10	5	-0.0072
+20	12	-0.0173
+30	-31	0.0446
+40	22	-0.0316
+50	9	-0.0129

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 4: LTE Band 12		
Date of Test	2018/08/08	Test Site	SR10-H

704MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-23	0.0342
3.8	-4	0.0059
3.4	3	-0.0045

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-5	0.0074
-20	-28	0.0416
-10	-5	0.0074
0	-11	0.0163
+10	-27	0.0401
+20	-42	0.0624
+30	8	-0.0119
+40	-33	0.0490
+50	-10	0.0149

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 4: LTE Band 12		
Date of Test	2018/08/08	Test Site	SR10-H

707.5MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	12	-0.0176
3.8	-29	0.0426
3.4	-20	0.0294

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	15	-0.0220
-20	2	-0.0029
-10	-7	0.0103
0	16	-0.0235
+10	-26	0.0382
+20	-4	0.0059
+30	6	-0.0088
+40	3	-0.0044
+50	1	-0.0015

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 4: LTE Band 12		
Date of Test	2018/08/08	Test Site	SR10-H

711MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-42	0.0604
3.8	-1	0.0014
3.4	-31	0.0446

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-7	0.0101
-20	-5	0.0072
-10	-7	0.0101
0	2	-0.0029
+10	9	-0.0129
+20	-38	0.0546
+30	-35	0.0503
+40	4	-0.0058
+50	-15	0.0216

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 5: LTE Band 13		
Date of Test	2018/08/08	Test Site	SR10-H

782MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-26	0.0382
3.8	-29	0.0426
3.4	22	-0.0323

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-21	0.0309
-20	10	-0.0147
-10	-10	0.0147
0	-2	0.0029
+10	-15	0.0220
+20	-11	0.0162
+30	-15	0.0220
+40	9	-0.0132
+50	-30	0.0441

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 6: LTE Band 14		
Date of Test	2018/08/08	Test Site	SR10-H

793MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	20	-0.0297
3.8	5	-0.0074
3.4	-39	0.0579

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	2	-0.0030
-20	-1	0.0015
-10	24	-0.0357
0	-23	0.0342
+10	-27	0.0401
+20	-35	0.0520
+30	6	-0.0089
+40	5	-0.0074
+50	-2	0.0030

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 7: LTE Band 66		
Date of Test	2018/08/08	Test Site	SR10-H

1720MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	18	-0.0267
3.8	-3	0.0045
3.4	-39	0.0579

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-27	0.0401
-20	25	-0.0371
-10	-21	0.0312
0	-36	0.0535
+10	4	-0.0059
+20	16	-0.0238
+30	-21	0.0312
+40	8	-0.0119
+50	4	-0.0059

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 7: LTE Band 66		
Date of Test	2018/08/08	Test Site	SR10-H

1745MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-5	0.0073
3.8	14	-0.0206
3.4	22	-0.0323

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-3	0.0044
-20	11	-0.0162
-10	20	-0.0294
0	-21	0.0309
+10	-23	0.0338
+20	9	-0.0132
+30	-25	0.0367
+40	-10	0.0147
+50	-7	0.0103

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 7: LTE Band 66		
Date of Test	2018/08/08	Test Site	SR10-H

1770MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	22	-0.0316
3.8	-37	0.0532
3.4	-38	0.0546

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-24	0.0345
-20	-33	0.0474
-10	-32	0.0460
0	22	-0.0316
+10	-24	0.0345
+20	-27	0.0388
+30	-24	0.0345
+40	-15	0.0216
+50	20	-0.0288

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 8: LTE Band 71		
Date of Test	2018/08/08	Test Site	SR10-H

673MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	10	-0.0149
3.8	-26	0.0386
3.4	-10	0.0149

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	4	-0.0059
-20	-36	0.0535
-10	-1	0.0015
0	4	-0.0059
+10	19	-0.0282
+20	-42	0.0624
+30	-31	0.0461
+40	13	-0.0193
+50	-28	0.0416

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 8: LTE Band 71		
Date of Test	2018/08/08	Test Site	SR10-H

680.5MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	2	-0.0029
3.8	-11	0.0162
3.4	25	-0.0367

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	25	-0.0367
-20	-7	0.0103
-10	13	-0.0191
0	8	-0.0118
+10	20	-0.0294
+20	5	-0.0073
+30	-26	0.0382
+40	1	-0.0015
+50	17	-0.0250

Product	LE910C4-NF		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 8: LTE Band 71		
Date of Test	2018/08/08	Test Site	SR10-H

688MHz

Voltage (VDC)	Frequency Error(Hz)	Frequency Error(ppm)
4.2	-5	0.0072
3.8	-24	0.0345
3.4	-18	0.0259

Temperature	Frequency Error (Hz)	Frequency Error (ppm)
-30	-26	0.0374
-20	-40	0.0575
-10	16	-0.0230
0	-18	0.0259
+10	8	-0.0115
+20	-20	0.0288
+30	-41	0.0590
+40	-18	0.0259
+50	-42	0.0604