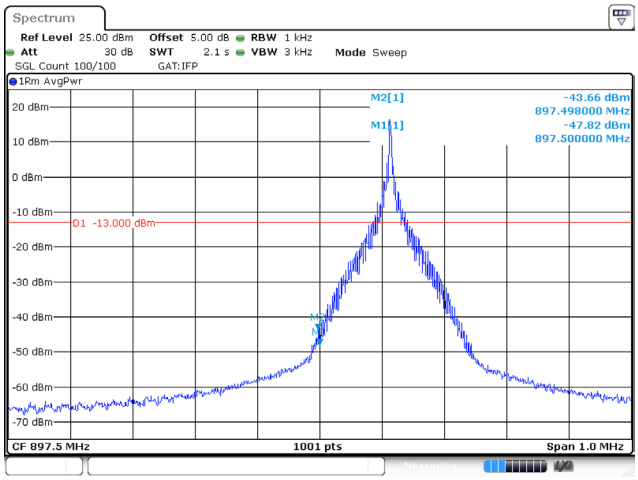
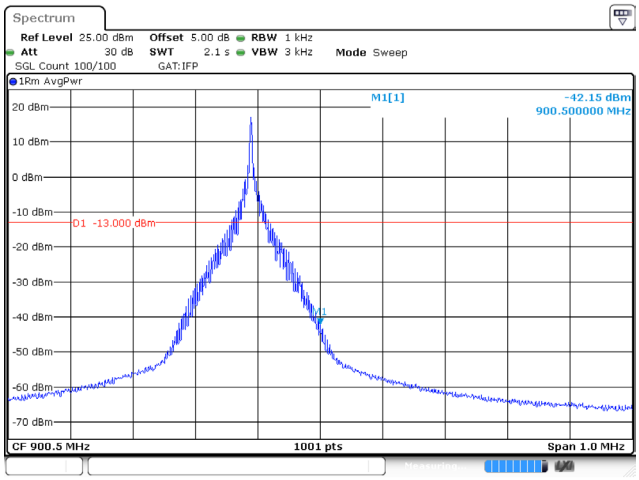
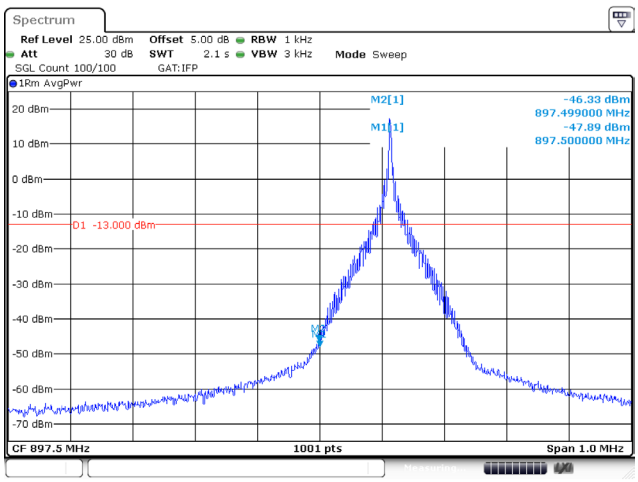
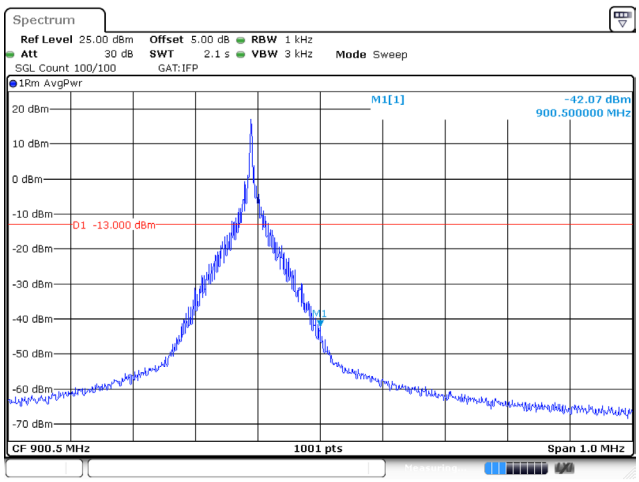
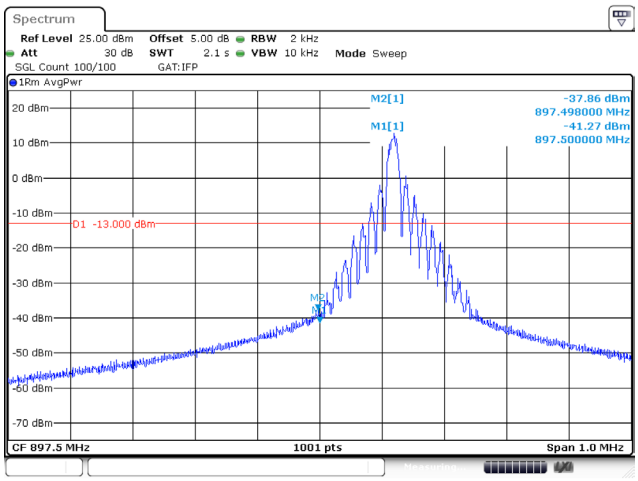
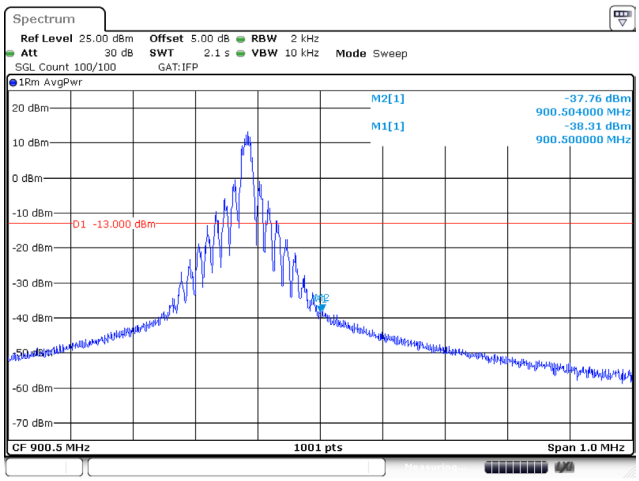
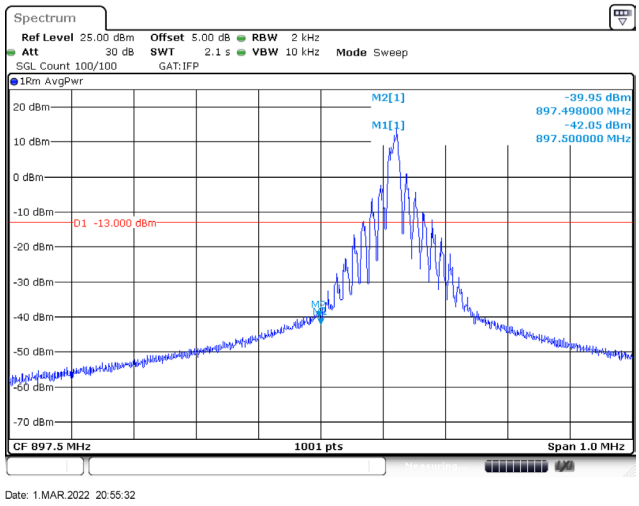
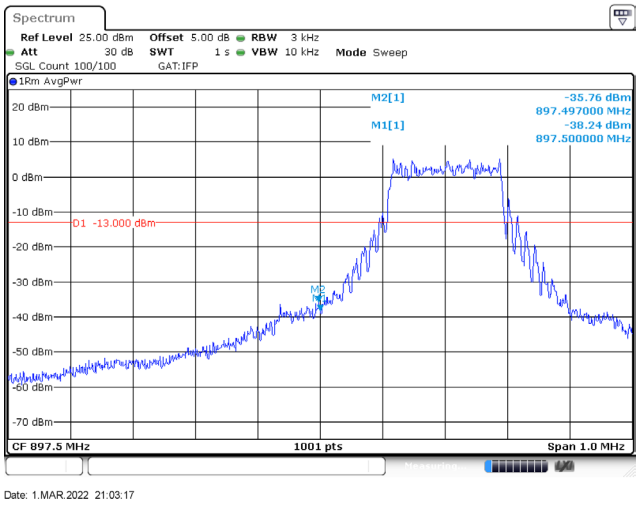
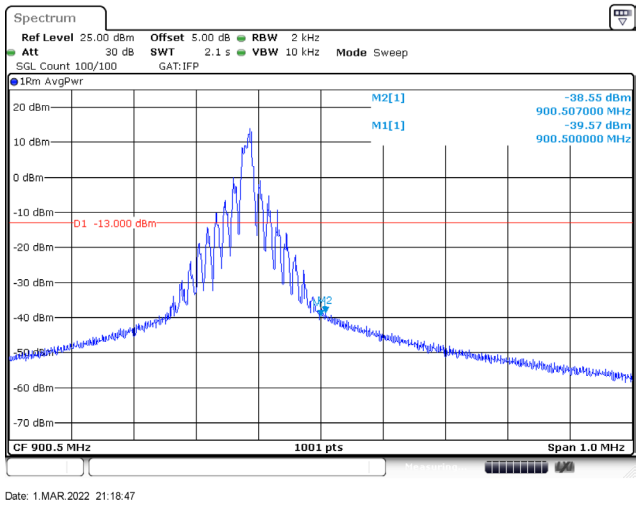
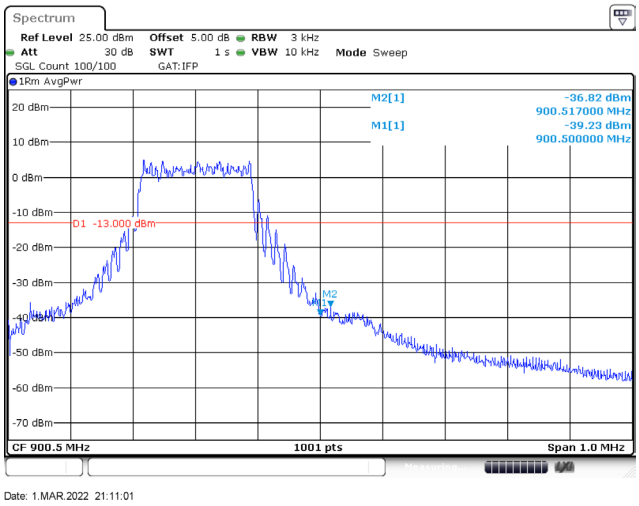
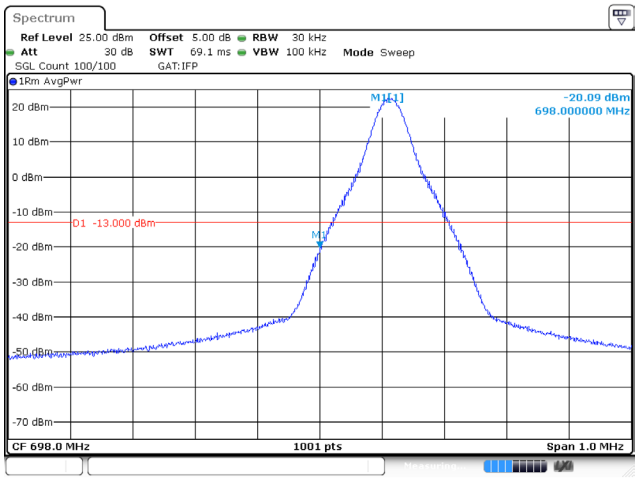
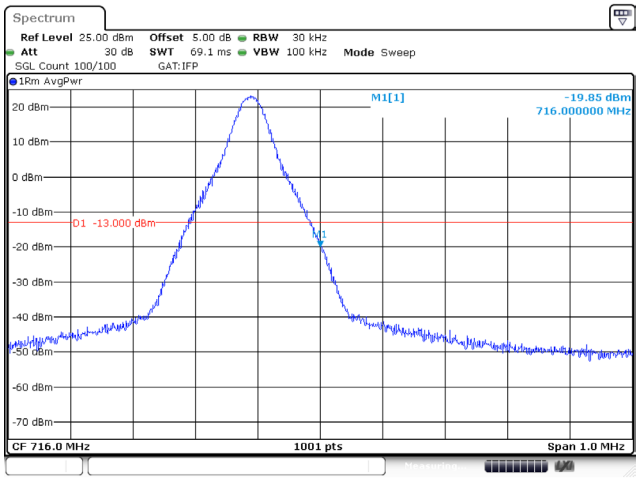
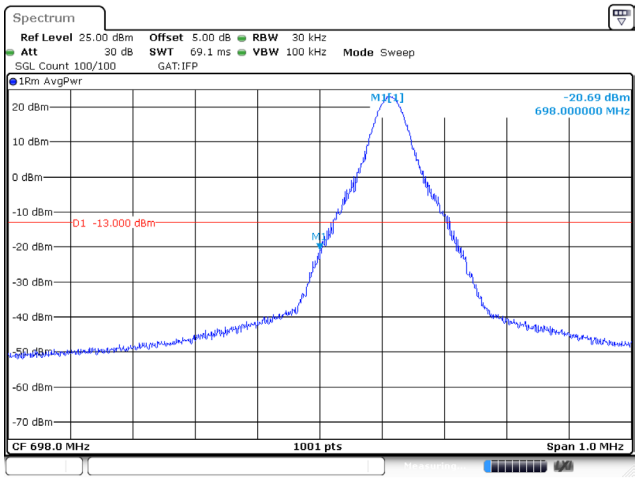
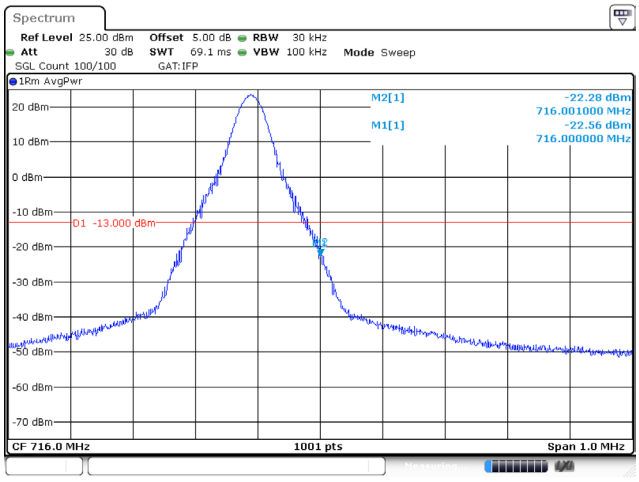
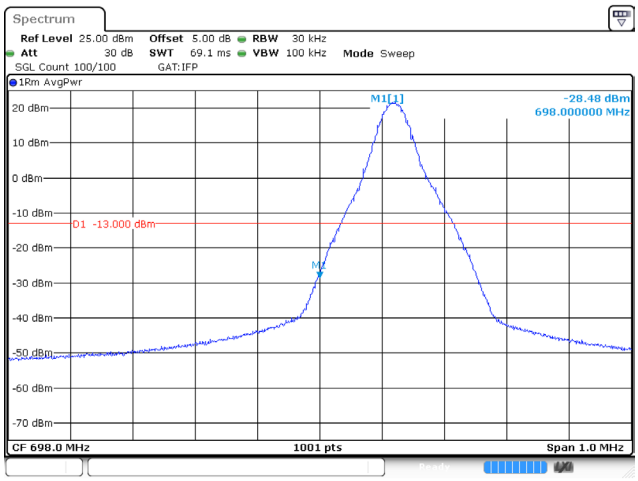
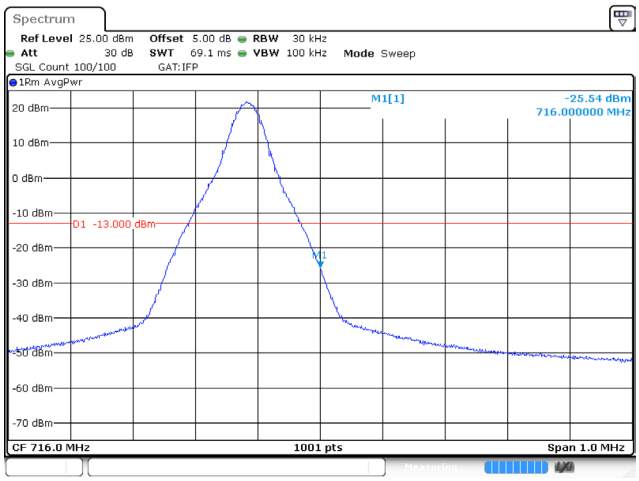
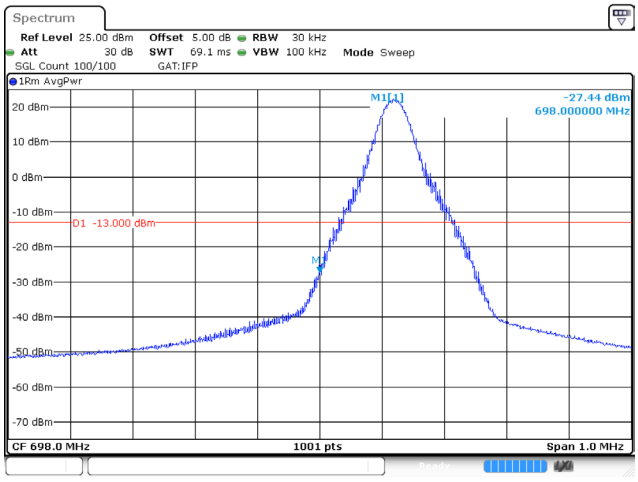
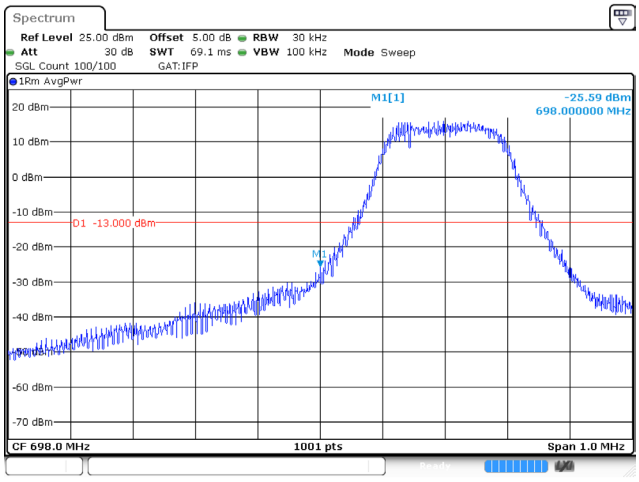
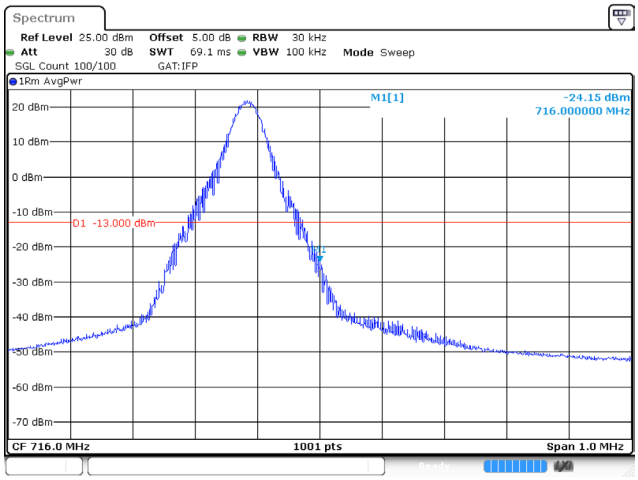
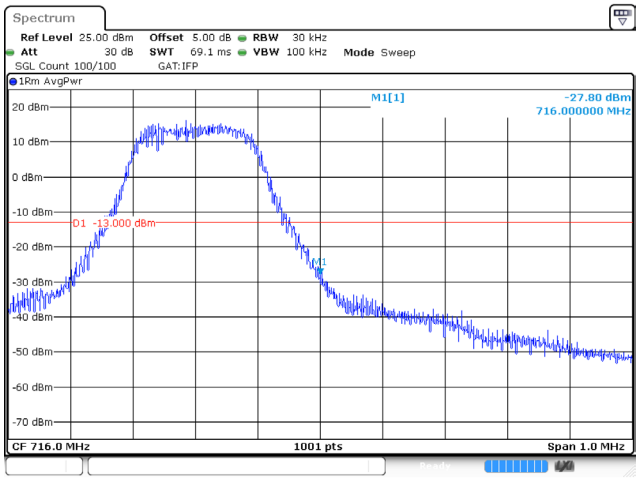
Mode 3: NB-IoT Band 8 (FCC only)

3.75 kHz / BPSK / CH21627 / 1RB0	3.75 kHz / BPSK / CH21653 / 1RB47
 Date: 1.MAR.2022 21:34:59	 Date: 1.MAR.2022 21:26:22
3.75 kHz / QPSK / CH21627 / 1RB0	**3.75 kHz / QPSK / CH21653 / 1RB47**
 Date: 1.MAR.2022 21:32:41	 Date: 1.MAR.2022 21:29:14
15 kHz / BPSK / CH21627 / 1RB0	**15 kHz / BPSK / CH21653 / 1RB11**
 Date: 1.MAR.2022 20:50:58	 Date: 1.MAR.2022 21:14:19

15 kHz / QPSK / CH21627 / 1RB0	15 kHz / QPSK / CH21627 / 12RB0
	
15 kHz / QPSK / CH21653 / 1RB11	15 kHz / QPSK / CH21653 / 12RB0
	

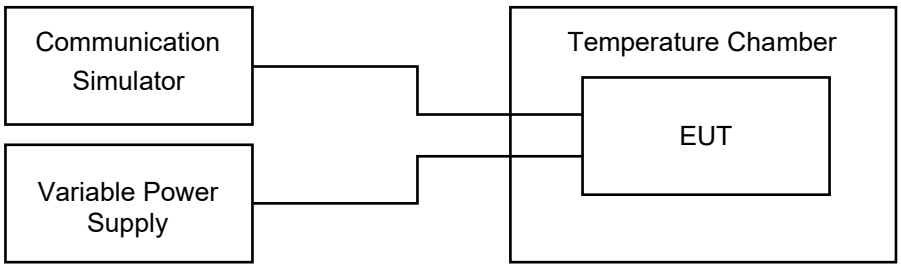
Mode 4: NB-IoT Band 85

3.75 kHz / BPSK / CH134004 / 1RB0	3.75 kHz / BPSK / CH134180 / 1RB47
 Date: 1.MAR.2022 19:15:22	 Date: 1.MAR.2022 19:25:06
3.75 kHz / QPSK / CH134004 / 1RB0	3.75 kHz / QPSK / CH134180 / 1RB47
 Date: 1.MAR.2022 19:21:12	 Date: 1.MAR.2022 19:29:53
15 kHz / BPSK / CH134004 / 1RB0	15 kHz / BPSK / CH134180 / 1RB11
 Date: 1.MAR.2022 18:45:45	 Date: 1.MAR.2022 18:36:53

15 kHz / QPSK / CH134004 / 1RB0	15 kHz / QPSK / CH134004 / 12RB0
	
15 kHz / QPSK / CH134180 / 1RB11	15 kHz / QPSK / CH134180 / 12RB0
	

8. Frequency Stability

8.1. Test Setup



8.2. Test Procedure

Frequency Stability under Temperature Variations:

The EUT under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a communication simulator. The EUT was placed inside the temperature chamber. Set the EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

Frequency Stability under Voltage Variations:

Set chamber temperature to 20℃. Use a variable AC or DC power supply to power the EUT and set the voltage to rated voltage. Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, record the maximum frequency change.

8.3. Test Methodology and Reference Procedures

KDB 971168 D01 Power Meas License Digital Systems v03r01

ANSI C63.26-2015

8.4. Test Result of Frequency Stability

Mode 1: Cat-M1 Band 8 (FCC only)

LTE Band 8 / 1.4 MHz / 898.2 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	2.80	0.0031
12	3.22	0.0036
13.8	2.50	0.0028

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	2.70	0.0030
-20	2.93	0.0033
-10	3.00	0.0033
0	2.95	0.0033
10	2.29	0.0025
20	2.50	0.0028
30	2.83	0.0032
40	3.90	0.0043
50	3.37	0.0038
55	3.42	0.0038

LTE Band 8 / 1.4 MHz / 899.8 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	-2.36	-0.0026
12	-3.11	-0.0035
13.8	-3.25	-0.0036

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	-4.62	-0.0051
-20	-2.84	-0.0032
-10	-3.44	-0.0038
0	-3.19	-0.0035
10	-3.88	-0.0043
20	-2.86	-0.0032
30	-2.50	-0.0028
40	-3.17	-0.0035
50	-3.27	-0.0036
55	-4.31	-0.0048

LTE Band 8 / 3 MHz / 899 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	1.50	0.0017
12	1.98	0.0022
13.8	1.12	0.0012

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	2.40	0.0027
-20	0.62	0.0007
-10	1.59	0.0018
0	0.86	0.0010
10	1.22	0.0014
20	1.98	0.0022
30	1.09	0.0012
40	0.59	0.0007
50	1.87	0.0021
55	2.18	0.0024

Mode 2: Cat-M1 Band 85

LTE Band 85 / 5 MHz / 700.5 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	1.51	0.0022
12	2.37	0.0034
13.8	0.87	0.0012

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	2.33	0.0033
-20	1.91	0.0027
-10	1.26	0.0018
0	2.16	0.0031
10	2.05	0.0029
20	1.44	0.0021
30	2.27	0.0032
40	1.17	0.0017
50	1.67	0.0024
55	2.17	0.0031

LTE Band 85 / 5 MHz / 713.5 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	2.11	0.0030
12	2.11	0.0030
13.8	0.93	0.0013

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	1.69	0.0024
-20	1.88	0.0026
-10	1.69	0.0024
0	1.92	0.0027
10	0.65	0.0009
20	1.91	0.0027
30	0.92	0.0013
40	1.78	0.0025
50	0.95	0.0013
55	1.55	0.0022

LTE Band 85 / 10 MHz / 703 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	3.16	0.0045
12	3.01	0.0043
13.8	2.38	0.0034

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	1.68	0.0024
-20	2.93	0.0042
-10	2.82	0.0040
0	2.13	0.0030
10	3.10	0.0044
20	1.56	0.0022
30	3.08	0.0044
40	2.01	0.0029
50	3.29	0.0047
55	3.42	0.0049

LTE Band 85 / 10 MHz / 711 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	2.79	0.0039
12	3.40	0.0048
13.8	2.65	0.0037

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	2.64	0.0037
-20	2.41	0.0034
-10	3.20	0.0045
0	2.95	0.0041
10	2.11	0.0030
20	2.07	0.0029
30	2.38	0.0033
40	2.78	0.0039
50	2.93	0.0041
55	2.19	0.0031

Mode 3: NB-IoT Band 8 (FCC only)

LTE Band 8 / 3.75 kHz / 897.7 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	1.27	0.0014
12	2.03	0.0023
13.8	2.26	0.0025

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	1.37	0.0015
-20	1.84	0.0020
-10	1.50	0.0017
0	2.24	0.0025
10	1.00	0.0011
20	1.08	0.0012
30	1.46	0.0016
40	2.75	0.0031
50	1.04	0.0012
55	2.27	0.0025

LTE Band 8 / 3.75 kHz / 900.3 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	0.97	0.0011
12	1.60	0.0018
13.8	1.51	0.0017

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	1.82	0.0020
-20	0.99	0.0011
-10	1.83	0.0020
0	0.30	0.0003
10	1.72	0.0019
20	1.64	0.0018
30	0.28	0.0003
40	0.35	0.0004
50	0.39	0.0004
55	1.38	0.0015

Mode 4: NB-IoT Band 85

LTE Band 85 / 3.75 kHz / 698.2 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	2.99	0.0043
12	3.02	0.0043
13.8	1.99	0.0029

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	2.69	0.0039
-20	3.00	0.0043
-10	2.79	0.0040
0	2.54	0.0036
10	3.17	0.0045
20	1.28	0.0018
30	2.14	0.0031
40	3.82	0.0055
50	1.86	0.0027
55	2.57	0.0037

LTE Band 85 / 3.75 kHz / 715.8 MHz

Voltage (VDC)	Frequency Stability (Hz)	Frequency Stability (ppm)
10.2	2.11	0.0029
12	2.57	0.0036
13.8	1.37	0.0019

Temperature (°C)	Frequency Stability (Hz)	Frequency Stability (ppm)
-30	1.77	0.0025
-20	1.96	0.0027
-10	2.25	0.0031
0	3.19	0.0045
10	1.93	0.0027
20	2.25	0.0031
30	1.62	0.0023
40	2.05	0.0029
50	2.26	0.0032
55	2.45	0.0034