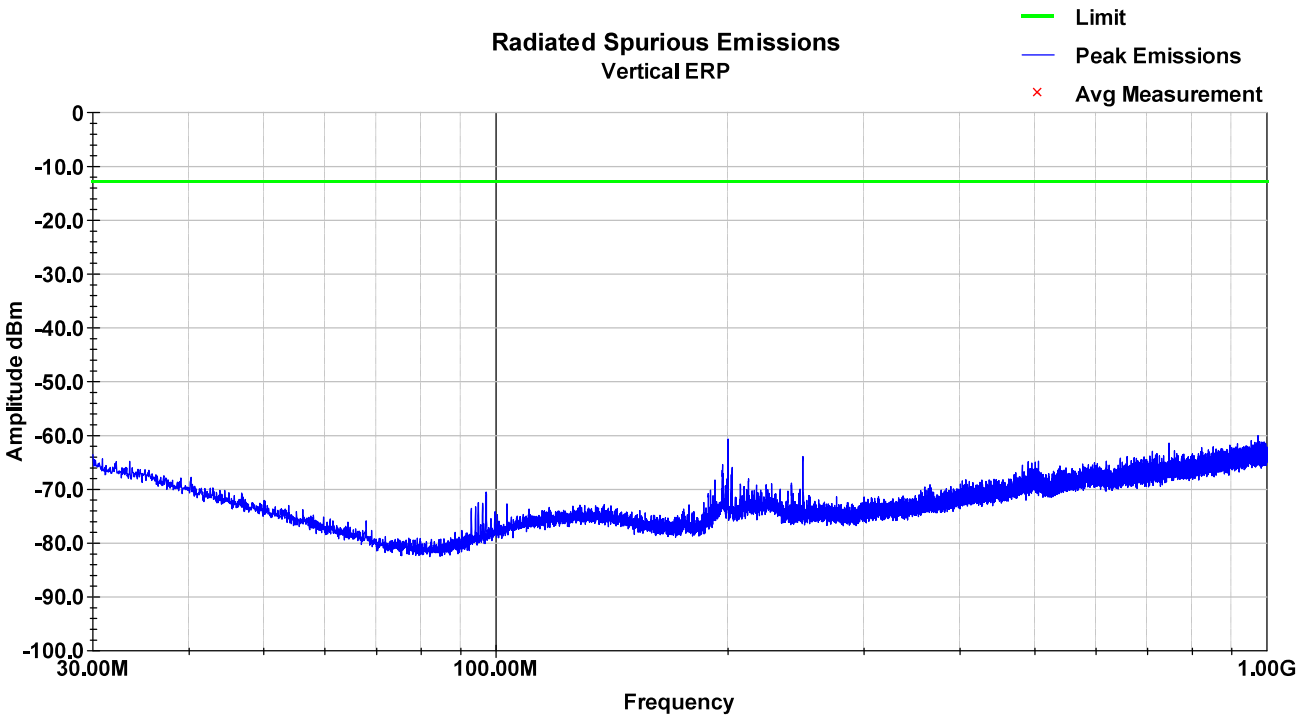
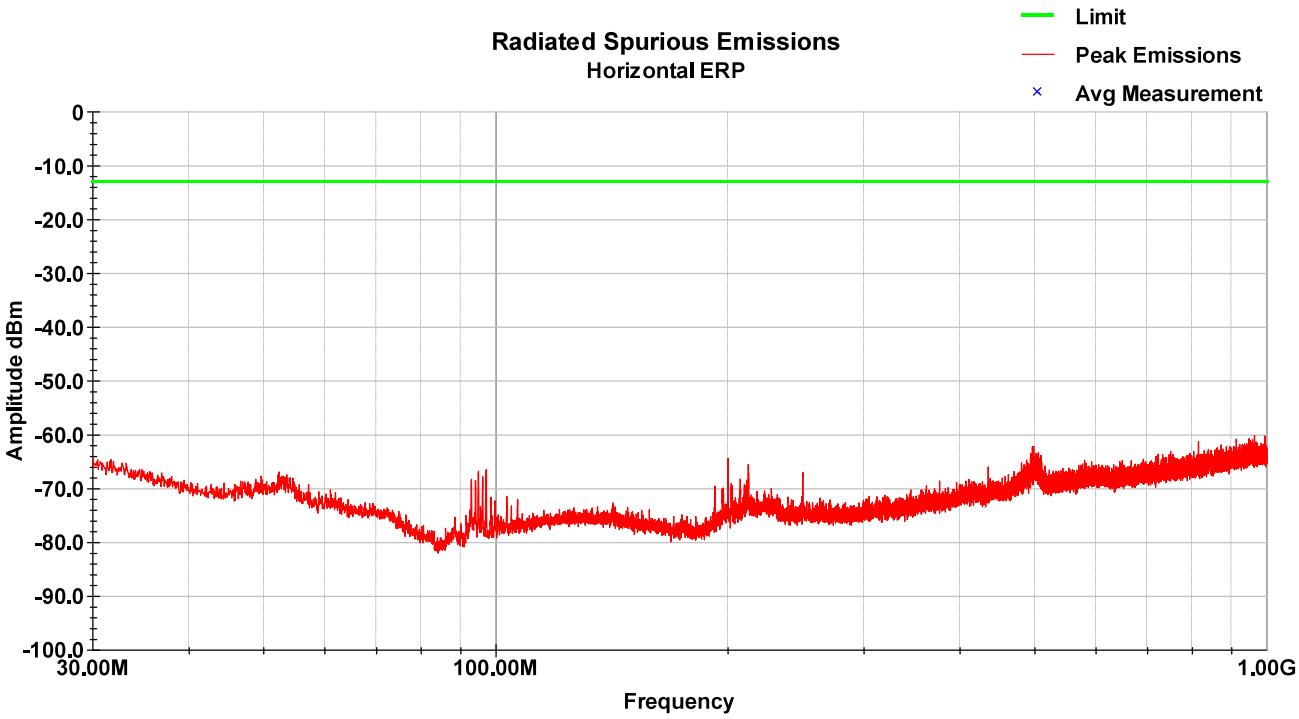
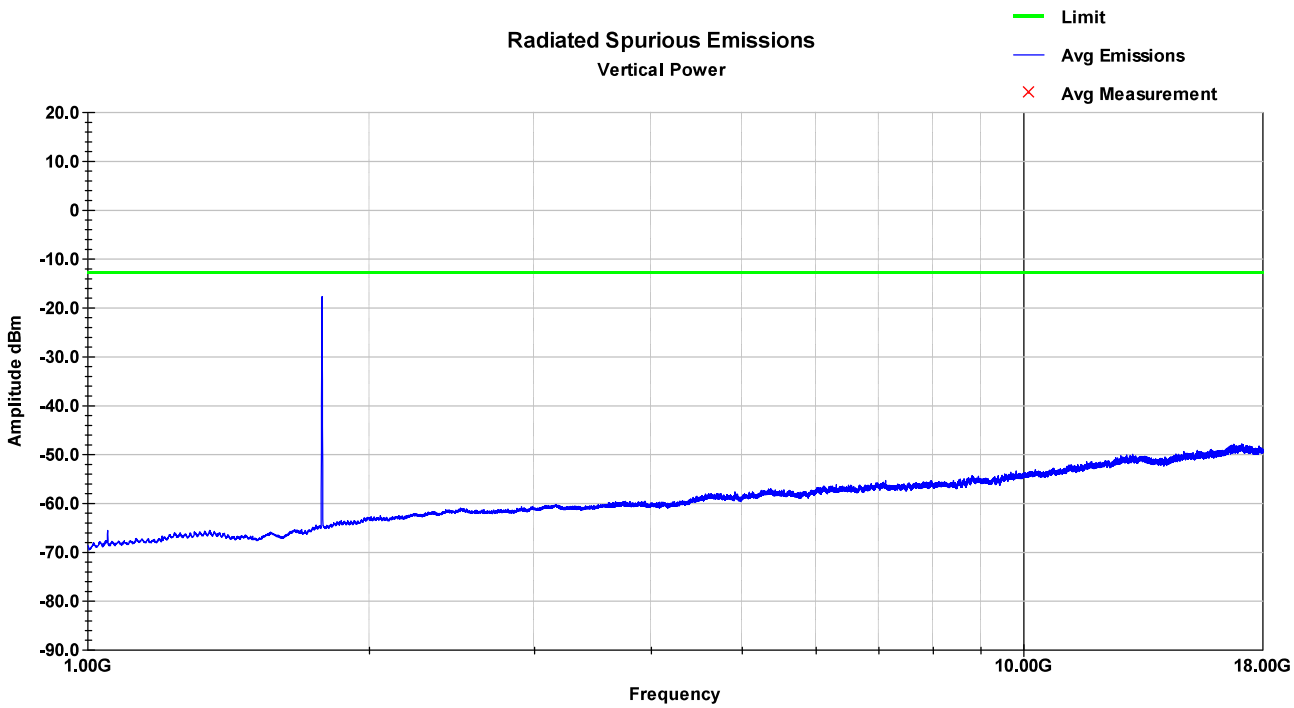
LTE Band 66 – HCH – 30-1000MHz – Vertical



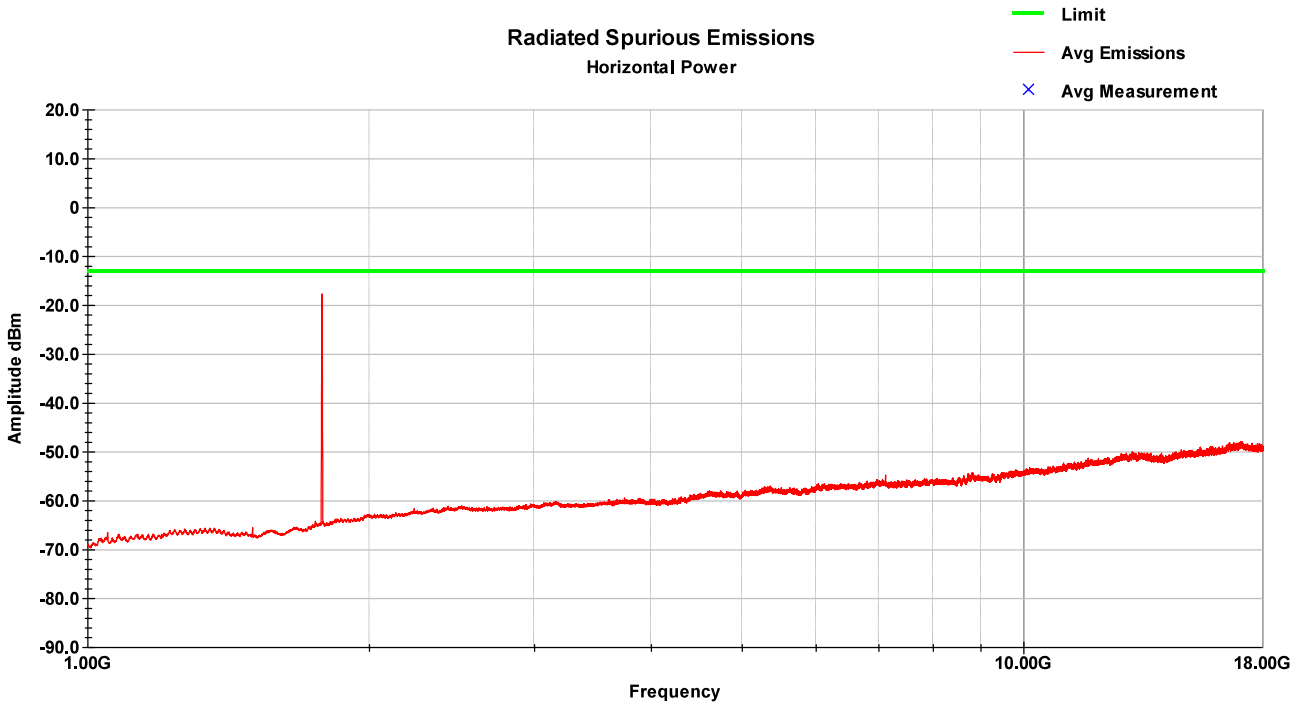
LTE Band 66 – HCH – 30-1000MHz – Horizontal



LTE Band 66 – HCH – 1-18GHz – Vertical



LTE Band 66 – HCH – 1-18G Hz – Horizontal



9 Frequency Stability

9.1 *Test Result*

Test Description	Specification		Test Result
	FCC	ISED	
Frequency Stability	2.1055 22.355 24.235 27.54 90.213	RSS-GEN (6.11) RSS-130 (4.5) RSS-132 (5.3) RSS-133 (6.3) RSS-139 (6.4) RSS-199 (4.3)	Compliant

9.2 *Test Method*

The EUT was placed inside the Environmental Chamber and was left inside chamber to stabilize to set temperature for minimum of thirty minutes before any measurements were made. The EUT was tested at the middle channels of LTE Bands 2, 4, 5, 7, 12, 13, 26, 38, 41, and 66..

9.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

9.4 *Test Equipment*

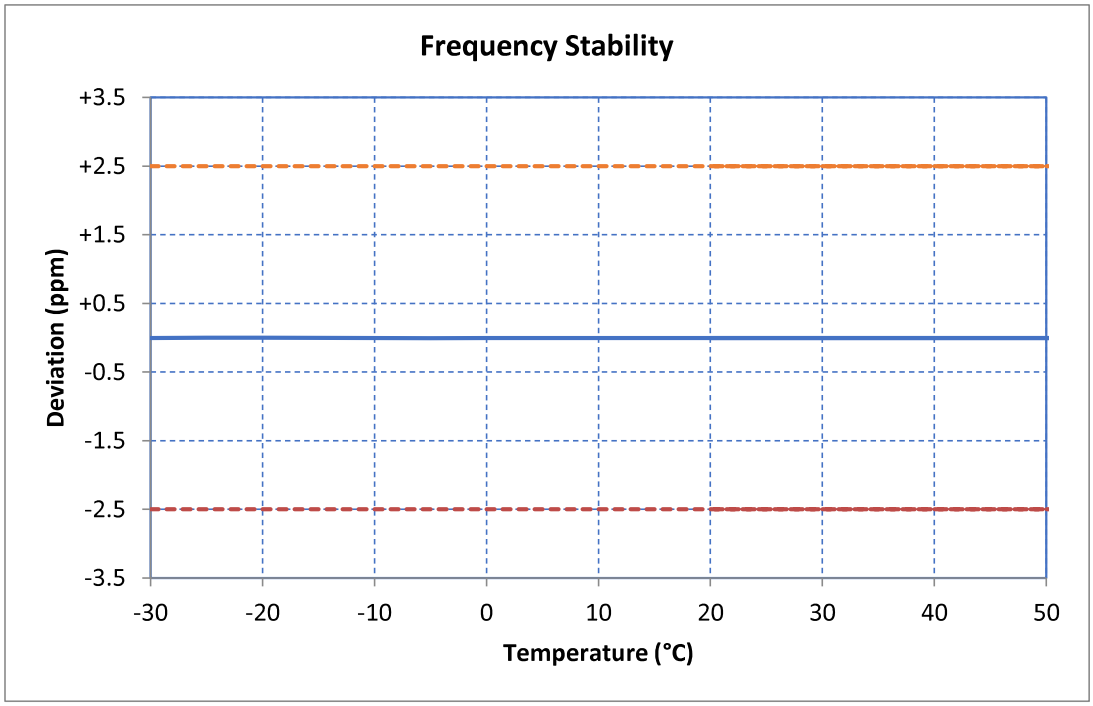
Test End Date: 1/31/2022 Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Date	Cal Due Date
RF CABLE SMA TO SMA, 0.01-40GHZ	084-0505-059	TELEDYNE STORM	20107	16-Mar-2022	16-Mar-2023
MULTIMETER	87V	FLUKE	B079677	18-Aug-2021	18-Aug-2022
WIDEBAND RADIO COMMUNICATION	CMW500	ROHDE & SCHWARZ	B094874	13-Jan-2021	13-Jan-2023
ENVIRONMENTAL TEST CHAMBER	T2RC	TENNEY	B094877	CNR	CNR

9.5 *Test Data*

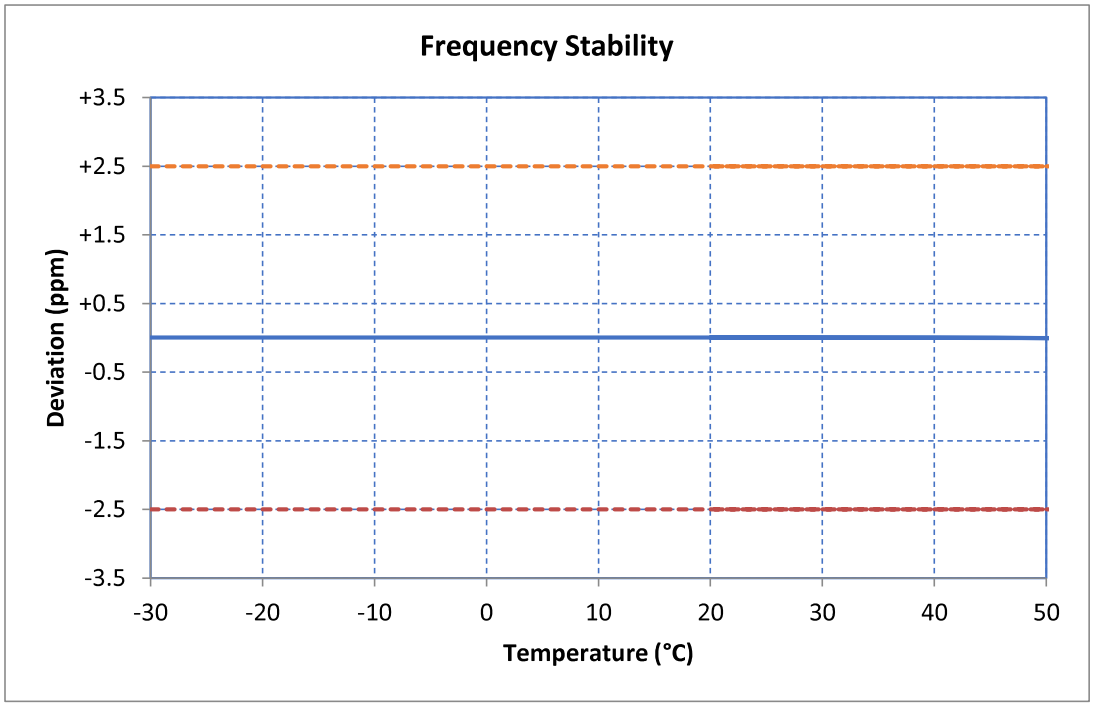
LTE Band 2, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	-30	1,879,999,994	-6	-0.00	-0.000000
100%	12.00	-20	1,880,000,004	+4	+0.00	+0.000000
100%	12.00	-10	1,879,999,990	-10	-0.01	-0.000001
100%	12.00	0	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	+10	1,879,999,994	-6	-0.00	-0.000000
100%	12.00	+20	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	+30	1,879,999,991	-9	-0.00	-0.000000
100%	12.00	+40	1,879,999,992	-8	-0.00	-0.000000
100%	12.00	+50	1,879,999,992	-8	-0.00	-0.000000
100%	12.00	+55	1,879,999,991	-9	-0.00	-0.000000
115%	13.80	+20	1,879,999,993	-7	-0.00	-0.000000
85%	10.20	+20	1,879,999,993	-7	-0.00	-0.000000



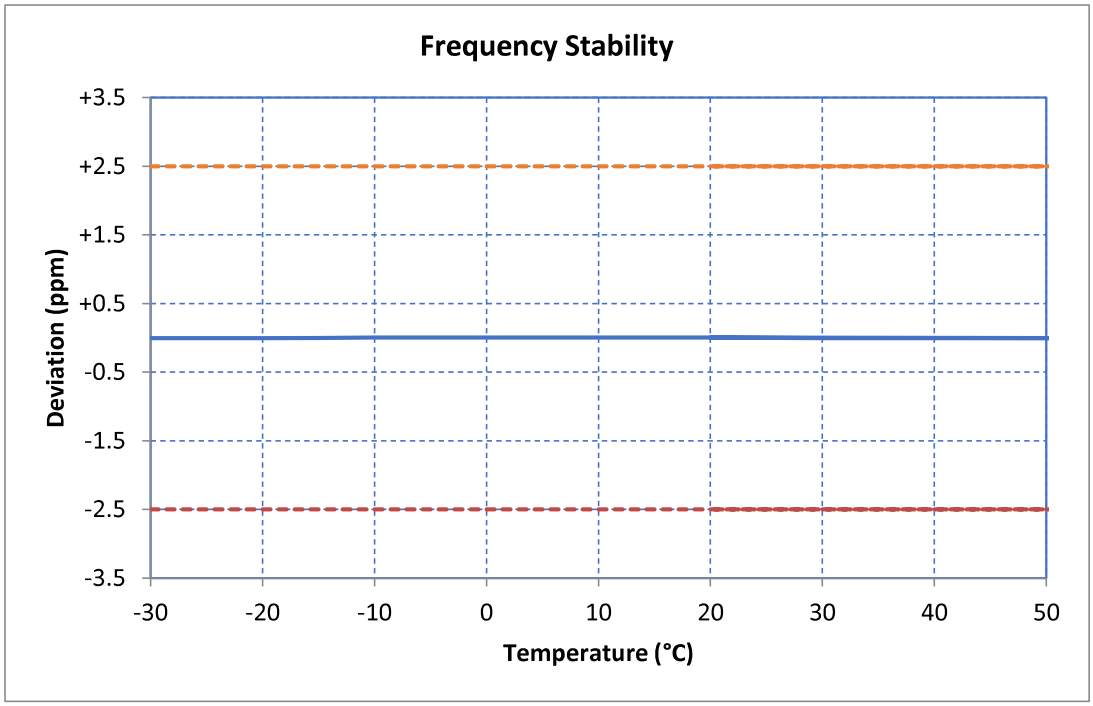
LTE Band 4, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,732,500,006	+6	+0.00	+0.000000
100%	12.00	-30	1,732,500,006	+6	+0.00	+0.000000
100%	12.00	-20	1,732,500,007	+7	+0.00	+0.000000
100%	12.00	-10	1,732,500,007	+7	+0.00	+0.000000
100%	12.00	0	1,732,500,006	+6	+0.00	+0.000000
100%	12.00	+10	1,732,500,008	+8	+0.00	+0.000000
100%	12.00	+20	1,732,500,006	+6	+0.00	+0.000000
100%	12.00	+30	1,732,500,005	+5	+0.00	+0.000000
100%	12.00	+40	1,732,500,006	+6	+0.00	+0.000000
100%	12.00	+50	1,732,499,995	-5	-0.00	-0.000000
100%	12.00	+55	1,732,499,995	-5	-0.00	-0.000000
115%	13.80	+20	1,732,500,005	+5	+0.00	+0.000000
85%	10.20	+20	1,732,500,006	+6	+0.00	+0.000000



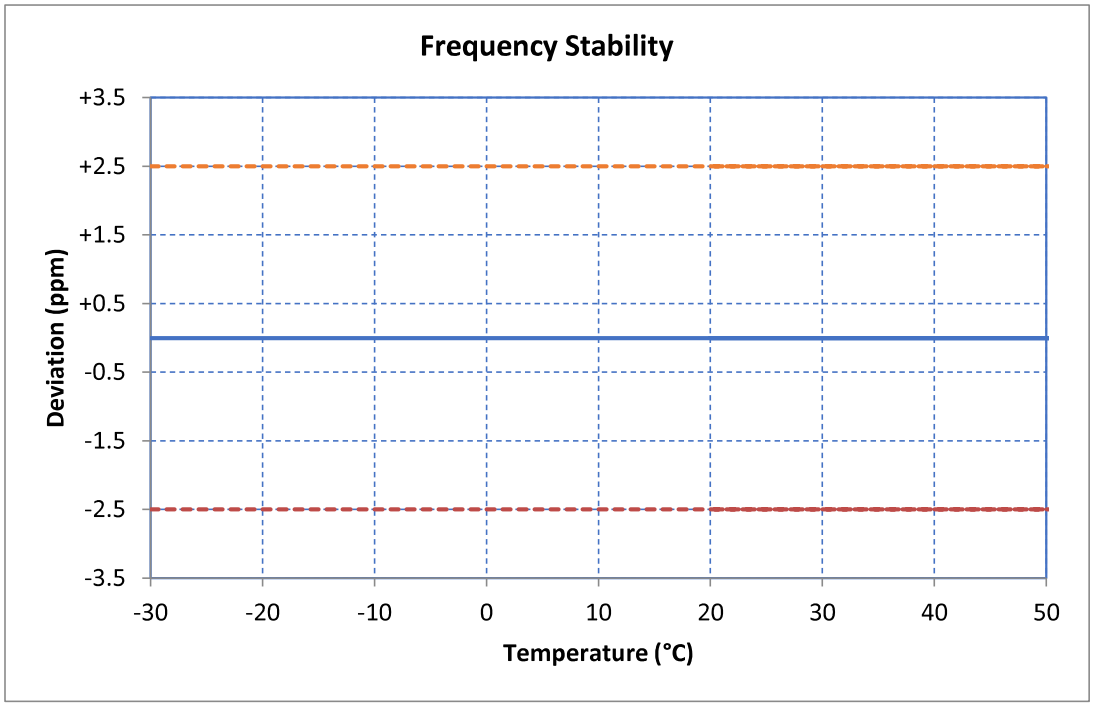
LTE Band 5, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	836,500,004	+4	+0.00	+0.000000
100%	12.00	-30	836,499,996	-4	-0.00	-0.000000
100%	12.00	-20	836,499,997	-3	-0.00	-0.000000
100%	12.00	-10	836,500,003	+3	+0.00	+0.000000
100%	12.00	0	836,500,004	+4	+0.01	+0.000001
100%	12.00	+10	836,500,004	+4	+0.01	+0.000001
100%	12.00	+20	836,500,004	+4	+0.00	+0.000000
100%	12.00	+30	836,499,996	-4	-0.00	-0.000000
100%	12.00	+40	836,499,995	-5	-0.01	-0.000001
100%	12.00	+50	836,499,996	-4	-0.00	-0.000000
100%	12.00	+55	836,499,996	-4	-0.00	-0.000000
115%	13.80	+20	836,500,004	+4	+0.00	+0.000000
85%	10.20	+20	836,500,004	+4	+0.00	+0.000000



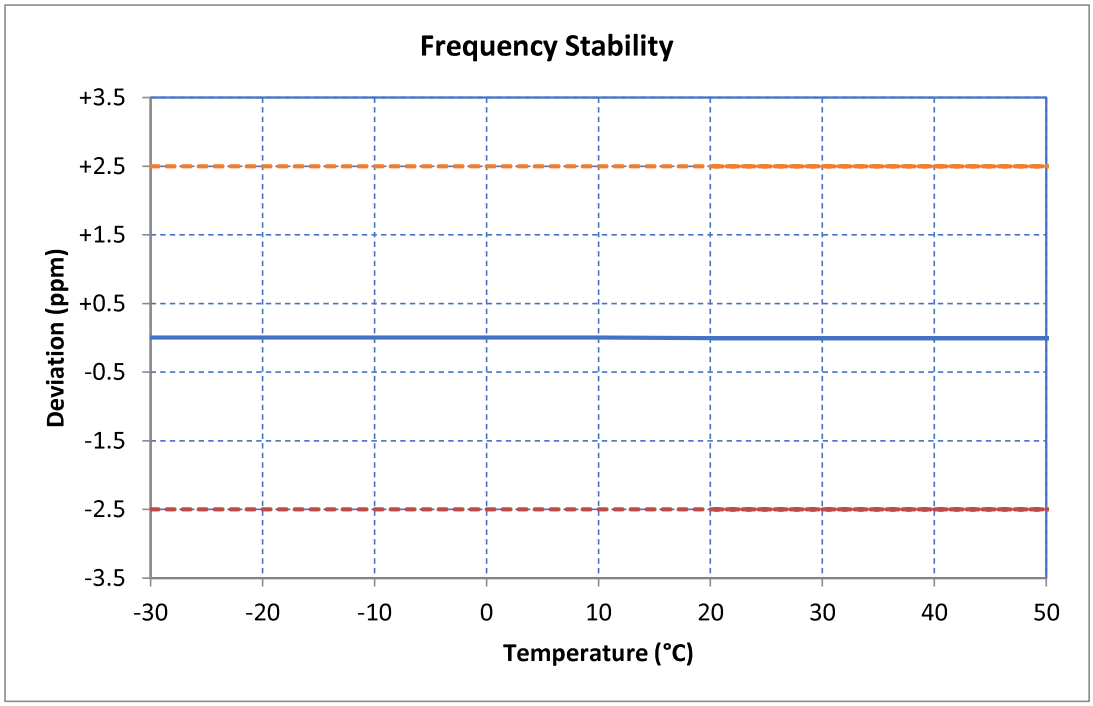
LTE Band 7, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	2,534,999,991	-9	-0.00	-0.000000
100%	12.00	-30	2,534,999,992	-8	-0.00	-0.000000
100%	12.00	-20	2,534,999,989	-11	-0.00	-0.000000
100%	12.00	-10	2,534,999,992	-8	-0.00	-0.000000
100%	12.00	0	2,534,999,993	-7	-0.00	-0.000000
100%	12.00	+10	2,534,999,991	-9	-0.00	-0.000000
100%	12.00	+20	2,534,999,991	-9	-0.00	-0.000000
100%	12.00	+30	2,534,999,990	-11	-0.00	-0.000000
100%	12.00	+40	2,534,999,987	-13	-0.01	-0.000001
100%	12.00	+50	2,534,999,992	-8	-0.00	-0.000000
100%	12.00	+55	2,534,999,991	-9	-0.00	-0.000000
115%	13.80	+20	2,534,999,992	-8	-0.00	-0.000000
85%	10.20	+20	2,534,999,991	-9	-0.00	-0.000000



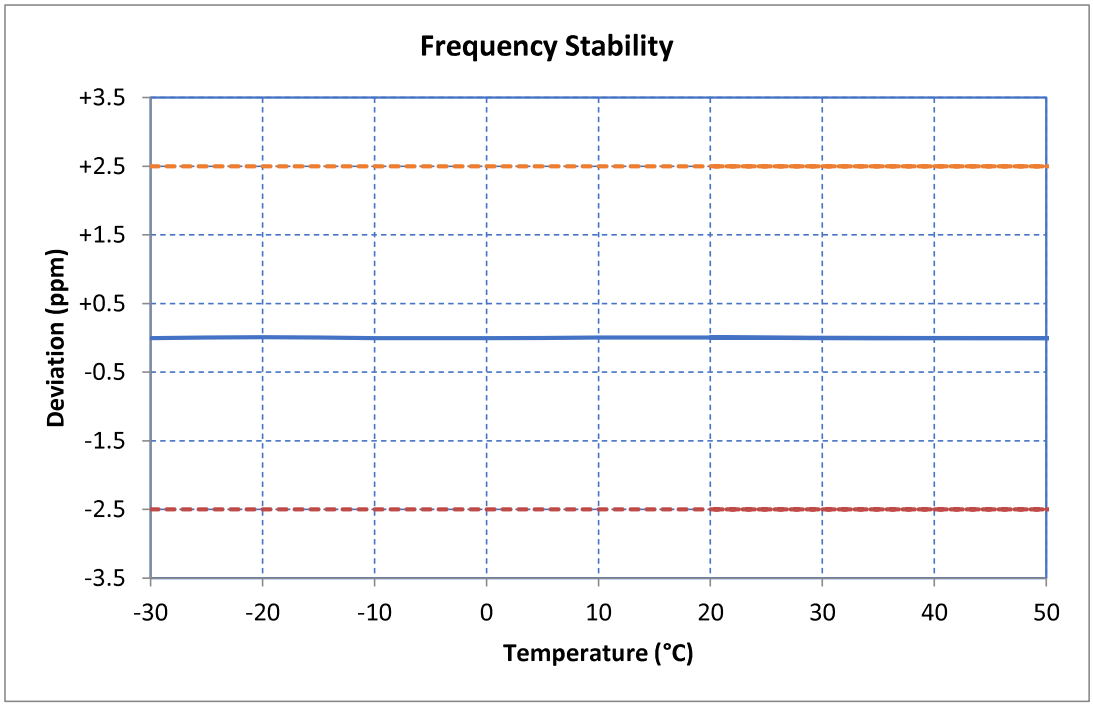
LTE Band 12, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	707,499,997	-3	-0.00	-0.000000
100%	12.00	-30	707,500,003	+3	+0.00	+0.000000
100%	12.00	-20	707,500,003	+3	+0.00	+0.000000
100%	12.00	-10	707,500,003	+3	+0.00	+0.000000
100%	12.00	0	707,500,002	+2	+0.00	+0.000000
100%	12.00	+10	707,500,003	+3	+0.00	+0.000000
100%	12.00	+20	707,499,997	-3	-0.00	-0.000000
100%	12.00	+30	707,499,997	-3	-0.00	-0.000000
100%	12.00	+40	707,499,996	-4	-0.01	-0.000001
100%	12.00	+50	707,499,996	-4	-0.01	-0.000001
100%	12.00	+55	707,499,996	-4	-0.01	-0.000001
115%	13.80	+20	707,499,997	-3	-0.00	-0.000000
85%	10.20	+20	707,499,997	-3	-0.00	-0.000000



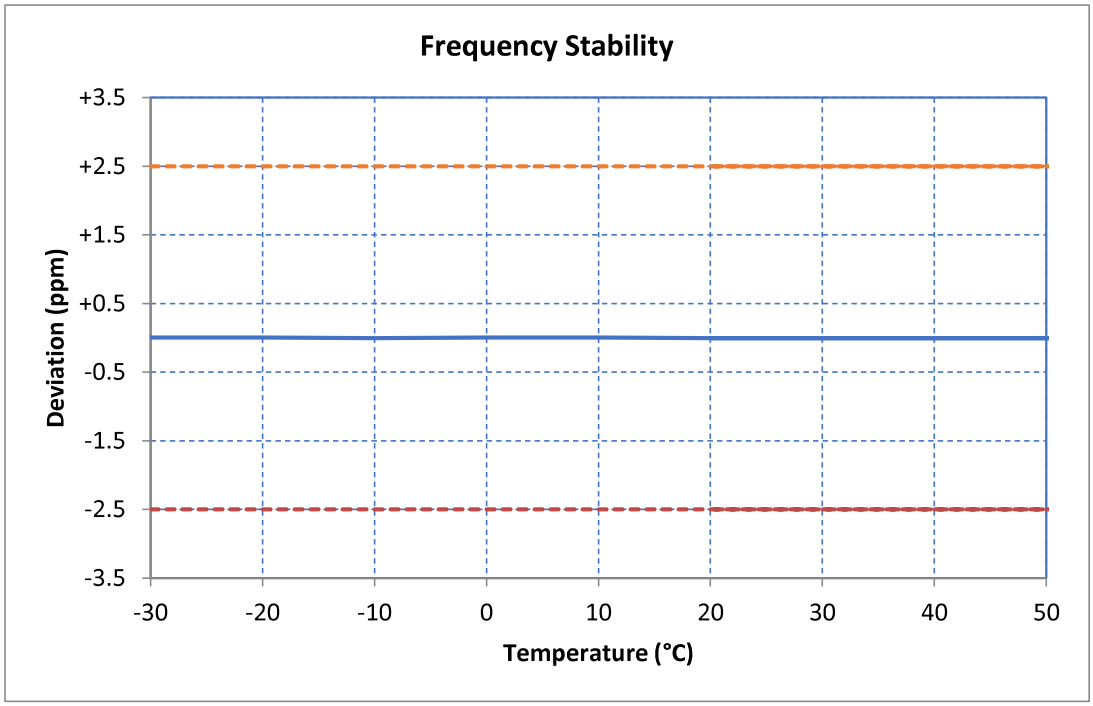
LTE Band 13, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	782,000,004	+4	+0.00	+0.000000
100%	12.00	-30	781,999,997	-3	-0.00	-0.000000
100%	12.00	-20	782,000,006	+6	+0.01	+0.000001
100%	12.00	-10	781,999,997	-3	-0.00	-0.000000
100%	12.00	0	781,999,996	-4	-0.00	-0.000000
100%	12.00	+10	782,000,003	+3	+0.00	+0.000000
100%	12.00	+20	782,000,004	+4	+0.00	+0.000000
100%	12.00	+30	781,999,996	-4	-0.01	-0.000001
100%	12.00	+40	781,999,996	-4	-0.01	-0.000001
100%	12.00	+50	781,999,996	-4	-0.00	-0.000000
100%	12.00	+55	781,999,996	-4	-0.01	-0.000001
115%	13.80	+20	782,000,003	+3	+0.00	+0.000000
85%	10.20	+20	782,000,004	+4	+0.00	+0.000000



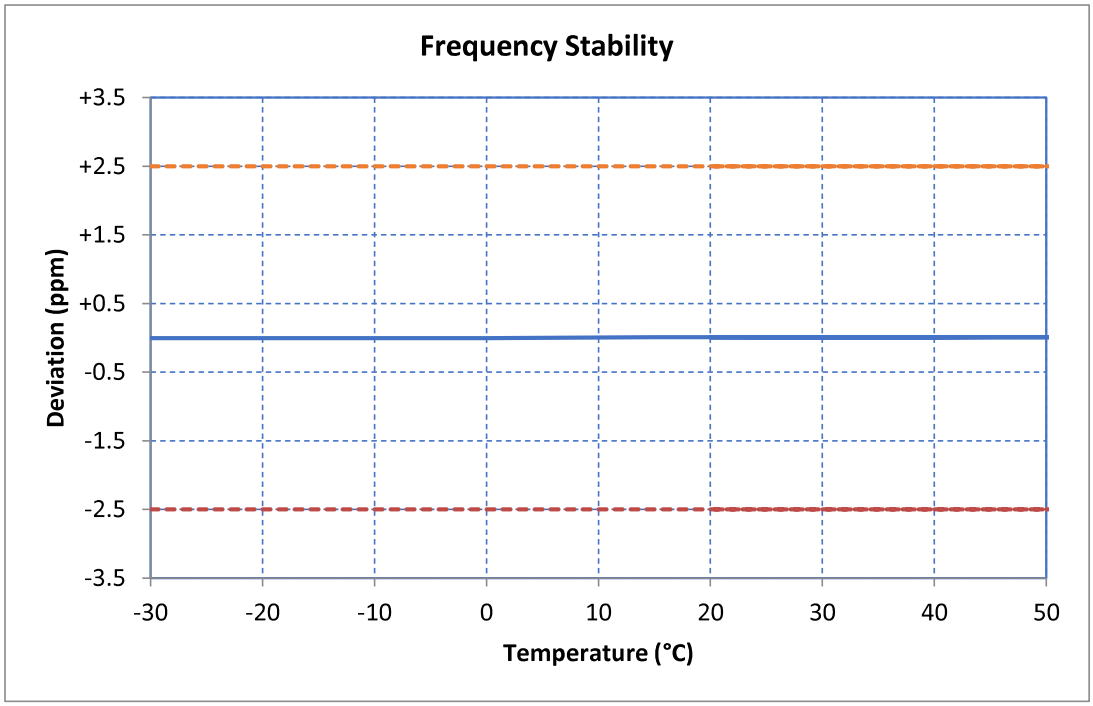
LTE Band 26, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	818,999,997	-3	-0.00	-0.000000
100%	12.00	-30	819,000,004	+4	+0.00	+0.000000
100%	12.00	-20	819,000,004	+4	+0.00	+0.000000
100%	12.00	-10	818,999,996	-4	-0.01	-0.000001
100%	12.00	0	819,000,004	+4	+0.00	+0.000000
100%	12.00	+10	819,000,003	+3	+0.00	+0.000000
100%	12.00	+20	818,999,997	-3	-0.00	-0.000000
100%	12.00	+30	818,999,996	-4	-0.01	-0.000001
100%	12.00	+40	818,999,995	-5	-0.01	-0.000001
100%	12.00	+50	818,999,995	-5	-0.01	-0.000001
100%	12.00	+55	818,999,995	-5	-0.01	-0.000001
115%	13.80	+20	818,999,996	-4	-0.01	-0.000001
85%	10.20	+20	818,999,997	-3	-0.00	-0.000000



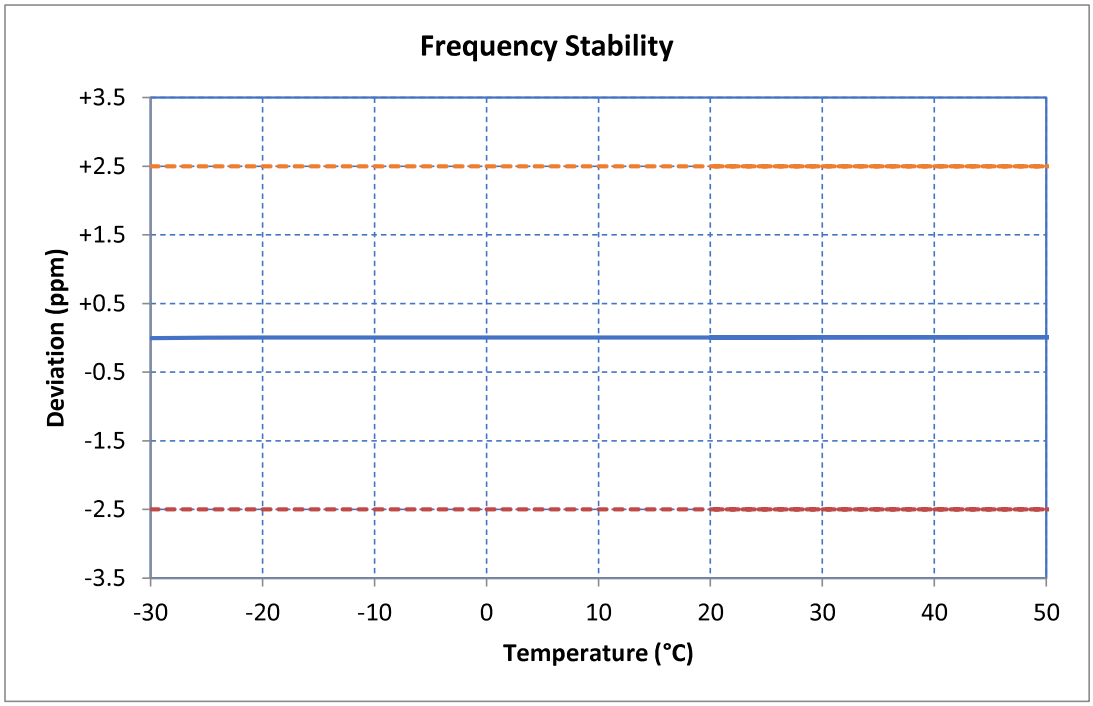
LTE Band 38, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	2,595,000,019	+19	+0.01	+0.000001
100%	12.00	-30	2,594,999,985	-15	-0.01	-0.000001
100%	12.00	-20	2,594,999,987	-13	-0.01	-0.000001
100%	12.00	-10	2,594,999,988	-12	-0.00	-0.000000
100%	12.00	0	2,594,999,987	-13	-0.00	-0.000000
100%	12.00	+10	2,595,000,014	+14	+0.01	+0.000001
100%	12.00	+20	2,595,000,019	+19	+0.01	+0.000001
100%	12.00	+30	2,595,000,016	+16	+0.01	+0.000001
100%	12.00	+40	2,595,000,017	+17	+0.01	+0.000001
100%	12.00	+50	2,595,000,024	+24	+0.01	+0.000001
100%	12.00	+55	2,595,000,024	+24	+0.01	+0.000001
115%	13.80	+20	2,595,000,015	+15	+0.01	+0.000001
85%	10.20	+20	2,595,000,016	+16	+0.01	+0.000001



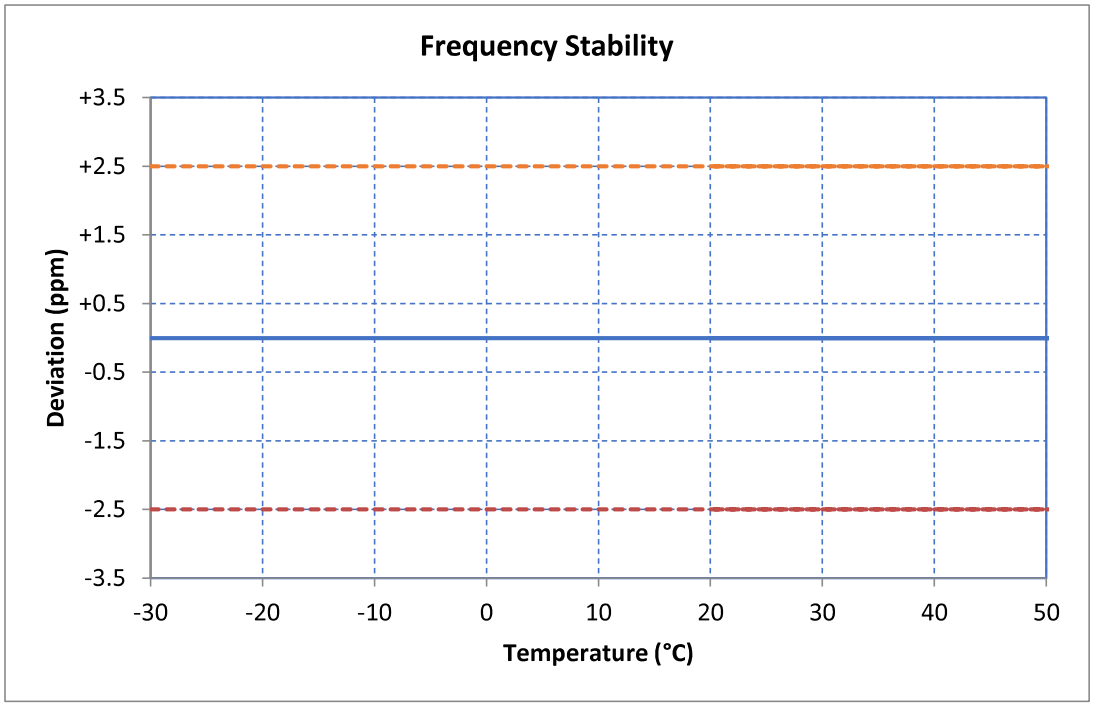
LTE Band 41, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	2,593,000,015	+15	+0.01	+0.000001
100%	12.00	-30	2,592,999,987	-13	-0.01	-0.000001
100%	12.00	-20	2,593,000,012	+12	+0.00	+0.000000
100%	12.00	-10	2,593,000,013	+13	+0.00	+0.000000
100%	12.00	0	2,593,000,015	+15	+0.01	+0.000001
100%	12.00	+10	2,593,000,013	+13	+0.01	+0.000001
100%	12.00	+20	2,593,000,015	+15	+0.01	+0.000001
100%	12.00	+30	2,593,000,018	+18	+0.01	+0.000001
100%	12.00	+40	2,593,000,023	+23	+0.01	+0.000001
100%	12.00	+50	2,593,000,024	+24	+0.01	+0.000001
100%	12.00	+55	2,593,000,027	+27	+0.01	+0.000001
115%	13.80	+20	2,593,000,014	+14	+0.01	+0.000001
85%	10.20	+20	2,593,000,012	+12	+0.00	+0.000000



LTE Band 66, Middle Channel

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,744,999,994	-6	-0.00	-0.000000
100%	12.00	-30	1,744,999,991	-9	-0.00	-0.000000
100%	12.00	-20	1,744,999,993	-7	-0.00	-0.000000
100%	12.00	-10	1,744,999,994	-6	-0.00	-0.000000
100%	12.00	0	1,744,999,993	-7	-0.00	-0.000000
100%	12.00	+10	1,744,999,991	-9	-0.01	-0.000001
100%	12.00	+20	1,744,999,994	-6	-0.00	-0.000000
100%	12.00	+30	1,744,999,993	-7	-0.00	-0.000000
100%	12.00	+40	1,744,999,991	-9	-0.01	-0.000001
100%	12.00	+50	1,744,999,990	-10	-0.01	-0.000001
100%	12.00	+55	1,744,999,992	-8	-0.00	-0.000000
115%	13.80	+20	1,744,999,993	-7	-0.00	-0.000000
85%	10.20	+20	1,744,999,994	-6	-0.00	-0.000000



10 Measurement Uncertainty

The measurement uncertainty figures are be calculated in accordance with TR 100 028-1 [2] and correspond to an expansion factor (coverage factor) k = 2 (which provide confidence levels of 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

	Expanded Uncertainty for Normal k factor equal to 2	
Parameter	Required	Laboratory Actual
Radio Frequency	±1 x 10-5	±9.8 x 10-8
total RF power, conducted	±1.5 dB	±1.2 dB
RF power density, conducted	±3 dB	±0.7 dB
spurious emissions, conducted	±3 dB	±2.1 dB
all emissions, radiated	±6 dB	±4.8 dB
temperature	±1°C	±0.5°C
humidity	±5 %	±3.5%
DC and low frequency voltages	±3 %	±0.4%

11 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	20 April 2022
	-	