

9. FREQUENCY STABILITY MEASUREMENT

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	Amplifier	HP	8449B	3008A00863	Apr.23,19	1 Year
3.	RF Cable	EMCI	EMC102-KM-K M 3500	170702	May.13,19	1 Year

9.2. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

9.3. Test Procedure

Use the test method described in ANSI C63.10 clause 6.8:

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
EUT have transmitted absence of modulation signal and fixed channelise. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f)/f \times 10^{-6}$ ppm. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
2. Extreme temperature rule is 0°C--40°C.

9.4. Test Result

EUT: COSMO		
M/N: COSMO COMMUNICATOR		
Test date: 2019-12-03	Pressure: 102.7±1.0 kpa	Humidity: 52.5±3.0%
Tested by: Garry	Test site: RF site	Temperature: 22.7±0.6 °C

Frequency Stability vs. Voltage:

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.27V	20°C	CH36	5179.995	5180	-0.97
		CH38	5189.992	5190	-1.54
		CH40	5199.996	5200	-0.77
		CH42	5209.997	5210	-0.58
		CH46	5229.964	5230	-6.88
		CH48	5239.995	5240	-0.95
		CH52	5259.934	5260	-12.55
		CH54	5269.935	5270	-12.33
		CH58	5289.935	5290	-12.29
		CH60	5299.968	5300	-6.04
		CH62	5309.968	5310	-6.03
		CH64	5319.968	5320	-6.02
		CH100	5499.964	5500	-6.55
		CH102	5509.964	5510	-6.53
		CH106	5529.964	5530	-6.51
		CH116	5579.964	5580	-6.45
		CH118	5589.972	5590	-5.01
		CH122	5609.972	5610	-4.99
		CH134	5669.972	5670	-4.94
		CH140	5699.997	5700	-0.53
		CH149	5744.992	5745	-1.39
		CH151	5754.994	5755	-1.04
		CH155	5774.993	5775	-1.21
		CH157	5784.994	5785	-1.04
		CH159	5794.997	5795	-0.52
		CH165	5824.999	5825	-0.17

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	20°C	CH36	5179.994	5180	-1.16
		CH38	5189.993	5190	-1.35
		CH40	5199.992	5200	-1.54
		CH42	5209.996	5210	-0.77
		CH46	5229.962	5230	-7.27
		CH48	5239.992	5240	-1.53
		CH52	5259.994	5260	-1.14
		CH54	5269.993	5270	-1.33
		CH58	5289.995	5290	-0.95
		CH60	5299.993	5300	-1.32
		CH62	5309.982	5310	-3.39
		CH64	5319.985	5320	-2.82
		CH100	5499.994	5500	-1.09
		CH102	5509.992	5510	-1.45
		CH106	5529.992	5530	-1.45
		CH116	5579.993	5580	-1.25
		CH118	5589.994	5590	-1.07
		CH122	5609.995	5610	-0.89
		CH134	5669.992	5670	-1.41
		CH140	5699.996	5700	-0.70
		CH149	5744.992	5745	-1.39
		CH151	5754.996	5755	-0.70
		CH155	5774.993	5775	-1.21
		CH157	5784.996	5785	-0.69
		CH159	5794.991	5795	-1.55
		CH165	5824.991	5825	-1.55

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 4.43V	20℃	CH36	5179.996	5180	-0.77
		CH38	5189.995	5190	-0.96
		CH40	5199.996	5200	-0.77
		CH42	5209.993	5210	-1.34
		CH46	5229.965	5230	-6.69
		CH48	5239.994	5240	-1.15
		CH52	5259.991	5260	-1.71
		CH54	5269.989	5270	-2.09
		CH58	5289.989	5290	-2.08
		CH60	5299.994	5300	-1.13
		CH62	5309.993	5310	-1.32
		CH64	5319.993	5320	-1.32
		CH100	5499.998	5500	-0.36
		CH102	5509.998	5510	-0.36
		CH106	5529.979	5530	-3.80
		CH116	5579.979	5580	-3.76
		CH118	5589.992	5590	-1.43
		CH122	5609.992	5610	-1.43
		CH134	5669.961	5670	-6.88
		CH140	5699.961	5700	-6.84
		CH149	5744.993	5745	-1.22
		CH151	5754.992	5755	-1.39
		CH155	5774.993	5775	-1.21
		CH157	5784.992	5785	-1.38
		CH159	5794.996	5795	-0.69
		CH165	5824.993	5825	-1.20

Frequency Stability vs. Temperature:

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	-20℃	CH36	5179.984	5180	-3.09
		CH38	5189.956	5190	-8.48
		CH40	5199.935	5200	-12.50
		CH42	5209.927	5210	-14.01
		CH46	5229.927	5230	-13.96
		CH48	5239.939	5240	-11.64
		CH52	5259.939	5260	-11.60
		CH54	5269.939	5270	-11.57
		CH58	5289.934	5290	-12.48
		CH60	5299.935	5300	-12.26
		CH62	5309.935	5310	-12.24
		CH64	5319.935	5320	-12.22
		CH100	5499.939	5500	-11.09
		CH102	5509.939	5510	-11.07
		CH106	5529.939	5530	-11.03
		CH116	5579.939	5580	-10.93
		CH118	5589.957	5590	-7.69
		CH122	5609.969	5610	-5.53
		CH134	5669.969	5670	-5.47
		CH140	5699.969	5700	-5.44
		CH149	5744.969	5745	-5.40
		CH151	5754.969	5755	-5.39
		CH155	5774.963	5775	-6.41
		CH157	5784.963	5785	-6.40
		CH159	5794.996	5795	-0.69
		CH165	5824.994	5825	-1.03

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	-10℃	CH36	5179.989	5180	-2.12
		CH38	5189.989	5190	-2.12
		CH40	5199.996	5200	-0.77
		CH42	5209.987	5210	-2.50
		CH46	5229.987	5230	-2.49
		CH48	5239.985	5240	-2.86
		CH52	5259.985	5260	-2.85
		CH54	5269.985	5270	-2.85
		CH58	5289.993	5290	-1.32
		CH60	5299.993	5300	-1.32
		CH62	5309.996	5310	-0.75
		CH64	5319.993	5320	-1.32
		CH100	5499.997	5500	-0.55
		CH102	5509.997	5510	-0.54
		CH106	5529.995	5530	-0.90
		CH116	5579.995	5580	-0.90
		CH118	5589.996	5590	-0.72
		CH122	5609.994	5610	-1.07
		CH134	5669.998	5670	-0.35
		CH140	5699.991	5700	-1.58
		CH149	5744.991	5745	-1.57
		CH151	5754.991	5755	-1.56
		CH155	5774.993	5775	-1.21
		CH157	5784.998	5785	-0.35
		CH159	5794.992	5795	-1.38
		CH165	5824.992	5825	-1.37

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	0℃	CH36	5179.993	5180	-1.35
		CH38	5189.992	5190	-1.54
		CH40	5199.992	5200	-1.54
		CH42	5209.993	5210	-1.34
		CH46	5229.961	5230	-7.46
		CH48	5239.998	5240	-0.38
		CH52	5259.999	5260	-0.19
		CH54	5269.999	5270	-0.19
		CH58	5289.999	5290	-0.19
		CH60	5299.993	5300	-1.32
		CH62	5309.991	5310	-1.69
		CH64	5319.9946	5320	-1.02
		CH100	5500	5500	0.00
		CH102	5509.993	5510	-1.27
		CH106	5529.998	5530	-0.36
		CH116	5579.992	5580	-1.43
		CH118	5589.994	5590	-1.07
		CH122	5609.998	5610	-0.36
		CH134	5669.998	5670	-0.35
		CH140	5699.995	5700	-0.88
		CH149	5744.995	5745	-0.87
		CH151	5754.996	5755	-0.70
		CH155	5774.991	5775	-1.56
		CH157	5784.996	5785	-0.69
		CH159	5794.994	5795	-1.04
		CH165	5824.994	5825	-1.03

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	10℃	CH36	5179.996	5180	-0.77
		CH38	5189.992	5190	-1.54
		CH40	5199.996	5200	-0.77
		CH42	5209.994	5210	-1.15
		CH46	5229.965	5230	-6.69
		CH48	5239.991	5240	-1.72
		CH52	5259.9935	5260	-1.24
		CH54	5269.9989	5270	-0.21
		CH58	5289.9988	5290	-0.23
		CH60	5299.9925	5300	-1.42
		CH62	5309.9905	5310	-1.79
		CH64	5319.9959	5320	-0.77
		CH100	5499.9998	5500	-0.04
		CH102	5509.9974	5510	-0.47
		CH106	5529.9975	5530	-0.45
		CH116	5579.9916	5580	-1.51
		CH118	5589.9952	5590	-0.86
		CH122	5609.9975	5610	-0.45
		CH134	5669.9955	5670	-0.79
		CH140	5699.9956	5700	-0.77
		CH149	5744.996	5745	-0.70
		CH151	5754.997	5755	-0.52
		CH155	5774.996	5775	-0.69
		CH157	5784.992	5785	-1.38
		CH159	5794.994	5795	-1.04
		CH165	5824.996	5825	-0.69

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	20°C	CH36	5179.993	5180	-1.35
		CH38	5189.992	5190	-1.54
		CH40	5199.996	5200	-0.77
		CH42	5209.992	5210	-1.54
		CH46	5229.995	5230	-0.96
		CH48	5239.996	5240	-0.76
		CH52	5259.997	5260	-0.57
		CH54	5269.998	5270	-0.38
		CH58	5289.991	5290	-1.70
		CH60	5299.992	5300	-1.51
		CH62	5309.996	5310	-0.75
		CH64	5319.993	5320	-1.32
		CH100	5499.994	5500	-1.09
		CH102	5509.992	5510	-1.45
		CH106	5529.993	5530	-1.27
		CH116	5579.996	5580	-0.72
		CH118	5589.997	5590	-0.54
		CH122	5609.995	5610	-0.89
		CH134	5669.992	5670	-1.41
		CH140	5699.996	5700	-0.70
		CH149	5744.995	5745	-0.87
		CH151	5754.997	5755	-0.52
		CH155	5774.996	5775	-0.69
		CH157	5784.994	5785	-1.04
		CH159	5794.996	5795	-0.69
		CH165	5824.994	5825	-1.03

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	30℃	CH36	5179.997	5180	-0.58
		CH38	5189.996	5190	-0.77
		CH40	5199.994	5200	-1.15
		CH42	5209.992	5210	-1.54
		CH46	5229.995	5230	-0.96
		CH48	5239.992	5240	-1.53
		CH52	5259.996	5260	-0.76
		CH54	5269.996	5270	-0.76
		CH58	5289.999	5290	-0.19
		CH60	5299.997	5300	-0.57
		CH62	5309.993	5310	-1.32
		CH64	5319.997	5320	-0.56
		CH100	5499.991	5500	-1.64
		CH102	5510	5510	0.00
		CH106	5529.998	5530	-0.36
		CH116	5579.999	5580	-0.18
		CH118	5589.995	5590	-0.89
		CH122	5609.998	5610	-0.36
		CH134	5669.996	5670	-0.71
		CH140	5699.996	5700	-0.70
		CH149	5744.999	5745	-0.17
		CH151	5754.993	5755	-1.22
		CH155	5774.994	5775	-1.04
		CH157	5784.992	5785	-1.38
		CH159	5794.993	5795	-1.21
		CH165	5824.994	5825	-1.03

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	40℃	CH36	5179.998	5180	-0.39
		CH38	5189.994	5190	-1.16
		CH40	5199.996	5200	-0.77
		CH42	5209.993	5210	-1.34
		CH46	5229.994	5230	-1.15
		CH48	5239.994	5240	-1.15
		CH52	5259.998	5260	-0.38
		CH54	5269.999	5270	-0.19
		CH58	5289.999	5290	-0.19
		CH60	5299.996	5300	-0.75
		CH62	5309.993	5310	-1.32
		CH64	5320	5320	0.00
		CH100	5499.991	5500	-1.64
		CH102	5509.997	5510	-0.54
		CH106	5529.999	5530	-0.18
		CH116	5579.991	5580	-1.61
		CH118	5589.995	5590	-0.89
		CH122	5609.998	5610	-0.36
		CH134	5669.997	5670	-0.53
		CH140	5700	5700	0.00
		CH149	5744.995	5745	-0.87
		CH151	5754.995	5755	-0.87
		CH155	5774.993	5775	-1.21
		CH157	5784.992	5785	-1.38
		CH159	5794.994	5795	-1.04
		CH165	5824.995	5825	-0.86

Test Voltage	Temperature	CH	Max. Reading (MHz)	Target Frequency (MHz)	Result (ppm)
DC 3.85V	50℃	CH36	5179.984	5180	-3.09
		CH38	5189.987	5190	-2.50
		CH40	5199.983	5200	-3.27
		CH42	5209.982	5210	-3.45
		CH46	5229.982	5230	-3.44
		CH48	5239.986	5240	-2.67
		CH52	5259.986	5260	-2.66
		CH54	5269.984	5270	-3.04
		CH58	5289.984	5290	-3.02
		CH60	5299.982	5300	-3.40
		CH62	5309.982	5310	-3.39
		CH64	5319.984	5320	-3.01
		CH100	5499.984	5500	-2.91
		CH102	5509.984	5510	-2.90
		CH106	5529.986	5530	-2.53
		CH116	5579.983	5580	-3.05
		CH118	5589.983	5590	-3.04
		CH122	5609.985	5610	-2.67
		CH134	5669.984	5670	-2.82
		CH140	5699.982	5700	-3.16
		CH149	5744.982	5745	-3.13
		CH151	5754.982	5755	-3.13
		CH155	5774.983	5775	-2.94
		CH157	5784.987	5785	-2.25
		CH159	5794.987	5795	-2.24
		CH165	5824.989	5825	-1.89

10. ANTENNA REQUIREMENT

10.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2. Antenna Connected Construction

The antennas used for this product are MONOPOLE antenna that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 0.6dBi.

11. DEVIATION TO TEST SPECIFICATIONS

[NONE]

..... End of Report