Mtron™
Innovative RF Solutions

XO5503-166MHz
e-Vibe® Compensated OCXO

Features	Applications
Frequency: 166MHz Vibration Compensated Low Phase Noise Low Aging	Radar Satcom Electronic Warfare Munitions

Electrical Specifications at 166MHz

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Nominal Frequency	F_0		166		MHz	

Frequency Stabilities

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Frequency Stability	ΔF/F	-500		+500	ppb	Over the operating temperature range
vs. Supply Voltage variation		-15		+15	ppb	±5% change in V
vs. Load Change		-100		+100	ppb	
Aging (After 30-days power on)		-250 -200		+250 +200	ppb ppb	1st year Per year after 1st year

RF Output

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Output Type			Sinewave			
Output Level		+5	+7	+10	dBm	Into a nominal 50Ω load
Output Load			50		Ω	±5%
Harmonics				-30	dBc	

Frequency Adjustment

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Adjustment Method		External Voltage				
Adjustment Voltage	V_{TUNE}	0		+5	V	
Adjustment Range			±2.5		ppm	
Input Impedance		25		kΩ		
Adjustment Slope		Positive				

Phase Noise

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
SSB Phase Noise (Under Static Conditions)				-84	dBc/Hz	10 Hz Offset
				-120	dBc/Hz	100 Hz Offset
				-146	dBc/Hz	1 kHz Offset
				-162	dBc/Hz	10 kHz Offset
				-166	dBc/Hz	100 kHz Offset
SSB Phase Noise – With Random Vibration (operational, any axis)				-80	dBc/Hz	10 Hz Offset
				-119	dBc/Hz	100 Hz Offset
				-148	dBc/Hz	1 kHz Offset
				-161	dBc/Hz	10 kHz Offset
				-164	dBc/Hz	100 kHz Offset

Random Vibration (operational)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Power Spectral Density			0.010		g^2/Hz	10 Hz
			0.220			25 Hz
			0220			35 Hz
			0.005			73 Hz
			0.020			78 Hz
			0.020			86 Hz
			0.0025			90 Hz
			15.0E-6			300 Hz
			10.0E-6			510 Hz
			0.005			720 Hz
			0.005			860 Hz
			30.0E-6			1100 Hz
			15.0E-6			2000 Hz

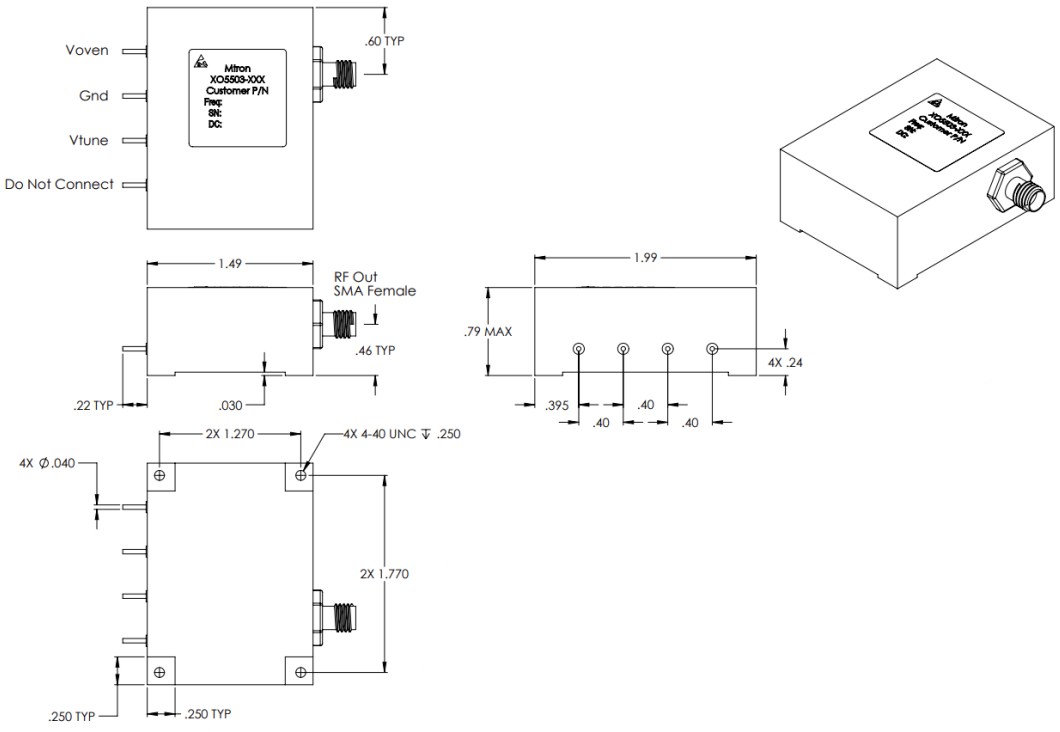
Temperature, Supply Voltage & Power Consumption

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Operating Temperature	OTR	-40		+85	°C	Full Specification Compliance
Operating Voltage	V_{CC}	+11.4	+12.0	+12.6	V	
Power Consumption				3	W	Steady state @ 25°C, In Still Air
				6	W	@ Start-up

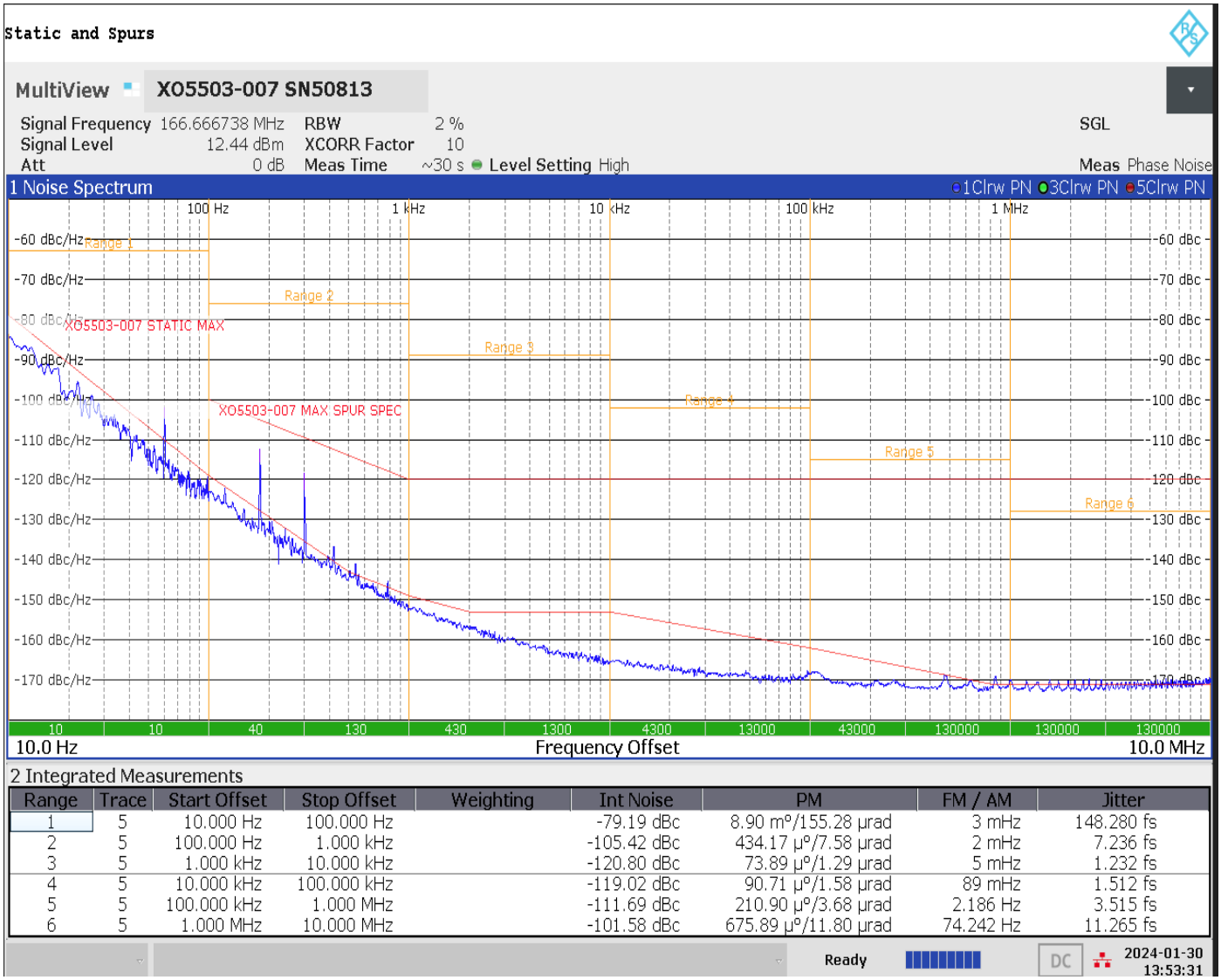
Marking information

Part Marking
Mtron
XO5503
166.000MHz
Serial Number
Date Code

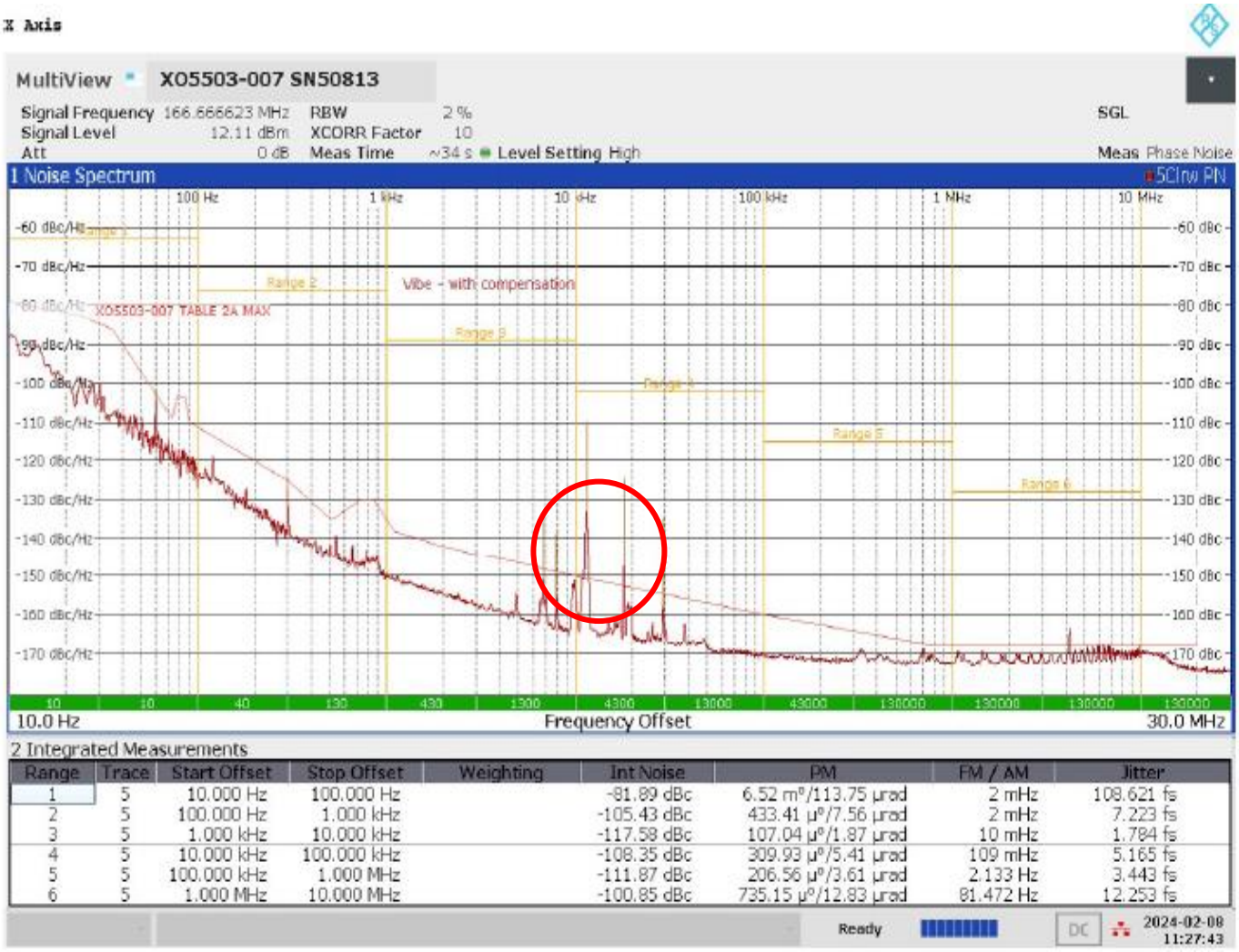
Mechanical Outline



Phase Noise Performance



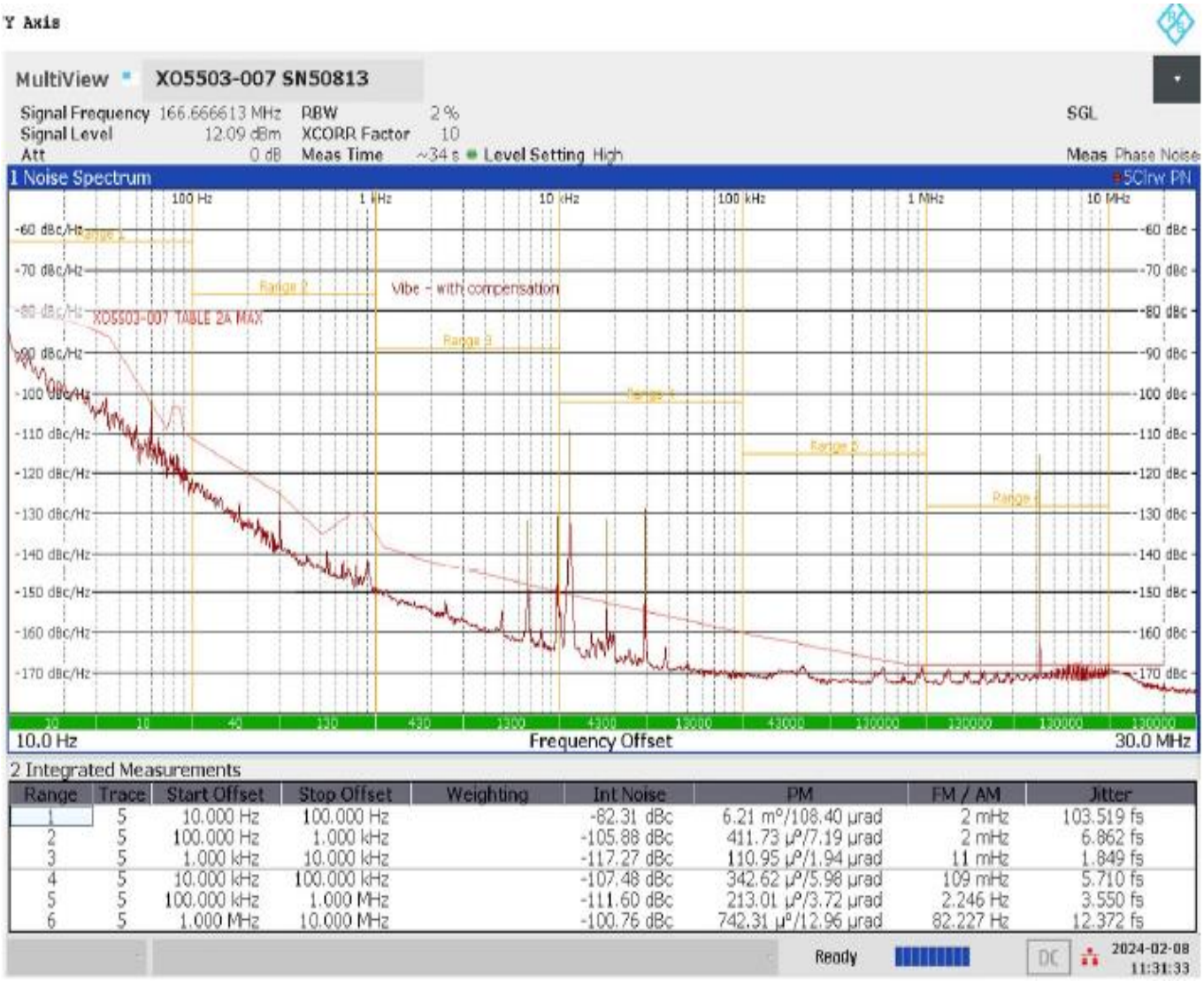
Range	Trace	Start Offset	Stop Offset	Weighting	Int Noise	PM	FM / AM	Jitter
1	5	10.000 Hz	100.000 Hz		-79.19 dBc	8.90 m°/155.28 µrad	3 mHz	148.280 fs
2	5	100.000 Hz	1.000 kHz		-105.42 dBc	434.17 µ°/7.58 µrad	2 mHz	7.236 fs
3	5	1.000 kHz	10.000 kHz		-120.80 dBc	73.89 µ°/1.29 µrad	5 mHz	1.232 fs
4	5	10.000 kHz	100.000 kHz		-119.02 dBc	90.71 µ°/1.58 µrad	89 mHz	1.512 fs
5	5	100.000 kHz	1.000 MHz		-111.69 dBc	210.90 µ°/3.68 µrad	2.186 Hz	3.515 fs
6	5	1.000 MHz	10.000 MHz		-101.58 dBc	675.89 µ°/11.80 µrad	74.242 Hz	11.265 fs



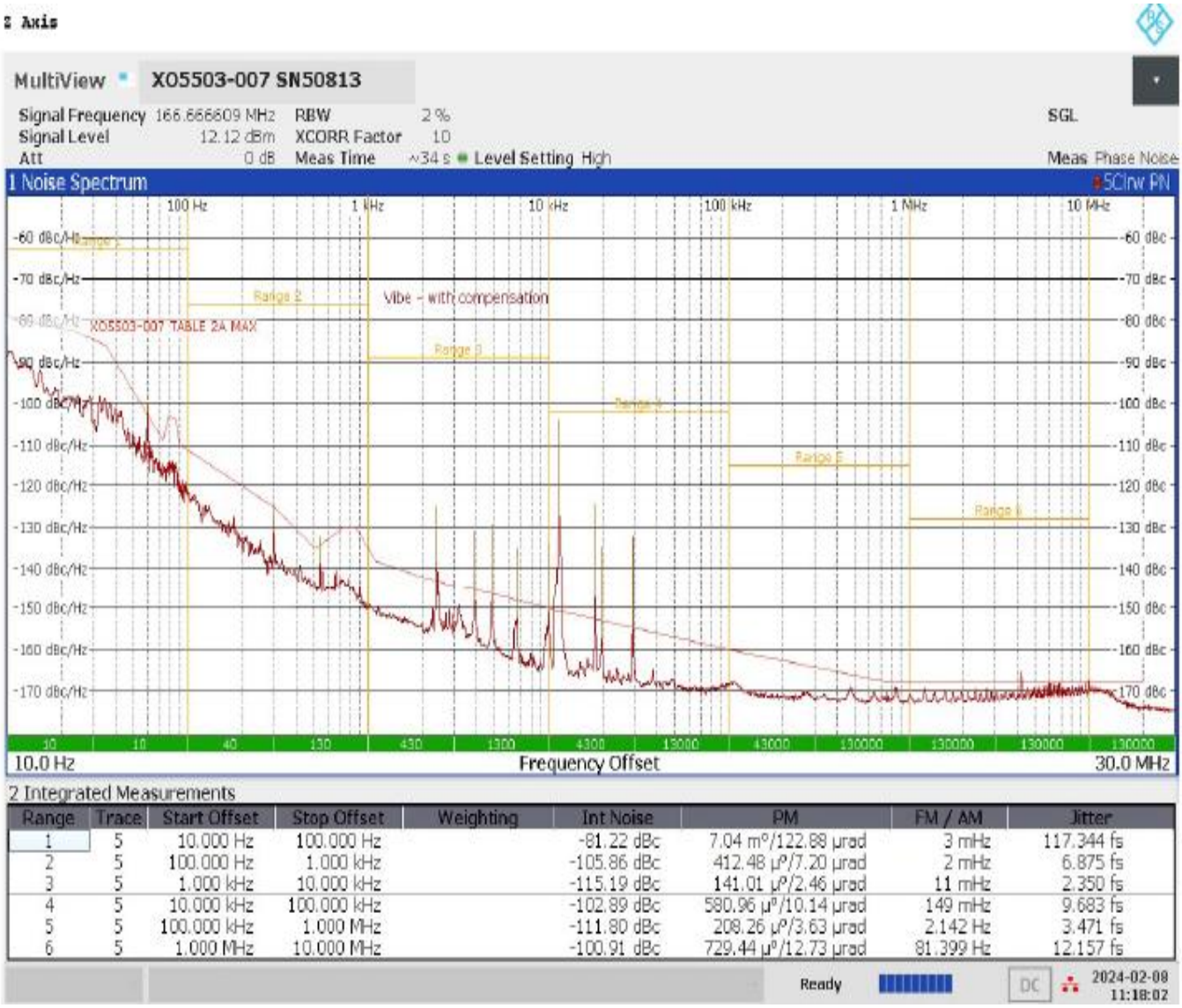
Range	Trace	Start Offset	Stop Offset	Weighting	Int Noise	PM	FM / AM	Jitter
1	5	10.000 Hz	100.000 Hz		-81.89 dBc	6.52 m°/113.75 µrad	2 mHz	108.621 fs
2	5	100.000 Hz	1.000 kHz		-105.43 dBc	433.41 µ°/7.56 µrad	2 mHz	7.223 fs
3	5	1.000 kHz	10.000 kHz		-117.58 dBc	107.04 µ°/1.87 µrad	10 mHz	1.784 fs
4	5	10.000 kHz	100.000 kHz		-108.35 dBc	309.93 µ°/5.41 µrad	109 mHz	5.165 fs
5	5	100.000 kHz	1.000 MHz		-111.87 dBc	206.56 µ°/3.61 µrad	2.133 Hz	3.443 fs
6	5	1.000 MHz	10.000 MHz		-100.85 dBc	735.15 µ°/12.83 µrad	81.472 Hz	12.253 fs

Note* The spurs seen under vibration (circled above) are test system related and not from the DUT

The spurs are seen when DUT is installed on the shaker and the amplifier is turned on, even if the unit is not being shaken. Spurs are due to shaker EMI



Range	Trace	Start Offset	Stop Offset	Weighting	Int Noise	PM	FM / AM	Jitter
1	5	10.000 Hz	100.000 Hz		-82.31 dBc	6.21 m°/108.40 µrad	2 mHz	103.519 fs
2	5	100.000 Hz	1.000 kHz		-105.88 dBc	411.73 µ°/7.19 µrad	2 mHz	6.862 fs
3	5	1.000 kHz	10.000 kHz		-117.27 dBc	110.95 µ°/1.94 µrad	11 mHz	1.849 fs
4	5	10.000 kHz	100.000 kHz		-107.48 dBc	342.62 µ°/5.98 µrad	109 mHz	5.710 fs
5	5	100.000 kHz	1.000 MHz		-111.60 dBc	213.01 µ°/3.72 µrad	2.246 Hz	3.550 fs
6	5	1.000 MHz	10.000 MHz		-100.76 dBc	742.31 µ°/12.96 µrad	82.227 Hz	12.372 fs


Z Axis
MultiView
XO5503-007 SN50813
Signal Frequency 166.666609 MHz
Signal Level 12.12 dBm
Att 0 dB
RBW 2 %
XCORR Factor 10
Meas Time ~34 s
Level Setting High
SGL
Meas Phase Noise
1 Noise Spectrum
SCInv PN
100 Hz
1 kHz
10 kHz
100 kHz
1 MHz
10 MHz
-60 dBc/Hz
-70 dBc/Hz
-80 dBc/Hz
-90 dBc/Hz
-100 dBc/Hz
-110 dBc/Hz
-120 dBc/Hz
-130 dBc/Hz
-140 dBc/Hz
-150 dBc/Hz
-160 dBc/Hz
-170 dBc/Hz
Range 2
Vibe - with compensation
XO5503-007 TABLE 2A MAX
Range 3
Range 4
Range 5
Range 6
10.0 Hz
Frequency Offset
30.0 MHz
2 Integrated Measurements
Range | Trace | Start Offset | Stop Offset | Weighting | Int Noise | PM | FM / AM | Jitter
1 | 5 | 10.000 Hz | 100.000 Hz | | -81.22 dBc | 7.04 m°/122.88 µrad | 3 mHz | 117.344 fs
2 | 5 | 100.000 Hz | 1.000 kHz | | -105.86 dBc | 412.48 µ°/7.20 µrad | 2 mHz | 6.875 fs
3 | 5 | 1.000 kHz | 10.000 kHz | | -115.19 dBc | 141.01 µ°/2.46 µrad | 11 mHz | 2.350 fs
4 | 5 | 10.000 kHz | 100.000 kHz | | -102.89 dBc | 580.96 µ°/10.14 µrad | 149 mHz | 9.683 fs
5 | 5 | 100.000 kHz | 1.000 MHz | | -111.80 dBc | 208.26 µ°/3.63 µrad | 2.142 Hz | 3.471 fs
6 | 5 | 1.000 MHz | 10.000 MHz | | -100.91 dBc | 729.44 µ°/12.73 µrad | 81.399 Hz | 12.157 fs
Ready
DC
2024-02-08
11:18:02