

IBTP Koschuch e.U.

G-162020

**g-Force Schock Sensor
3 Axis +/- 16 g**

Data Sheet, Rev.1.1

**www.ibtp-koschuch.com
www.avalancheradar.com**

G-312725 Shock Sensor System



Acceleration Sensor

The sensor has three axes of measurements, X Y Z. It is possible to set the sensitivity level to either $\pm 2g$, $\pm 4g$, $\pm 8g$ or $\pm 16g$. The lower range gives more resolution for slow acceleration, the higher range is good for high acceleration tracking.

The power source is a LiPo accumulator loaded by a 6W solar panel, therefore, once installed the sensor will work a lifetime (~10 years)

Communication

The communication is realized over LoRa® connectivity with a gateway (Outdoor Gateway - 868 Mhz to Mobile Cell). It is based on an Atmel low power processor, a LoRa® module, and the MKR family characteristic crypto chip. The crypto chip adds security by storing credentials and certificates in the embedded secure element.

Webinterface

The Data where visu

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Utilities

A wide set of additional Utilities like spectrum analyzer, EMI analyzer, oscilloscope or RF Voltmeter, further extend the instruments capabilities.

Powerful software.

An unlimited number of rectangular- and smith-diagrams and over 50 built in measurement functions like time domain measurements allow a detailed DUT analysis.

Utility Overview

- Signal generator DC - 1 GHz with 1 Hz resolution.
- Two channel 60 MHz digital oscilloscope with 125 Ms/s and 12 bit resolution.
- DC - 1 GHz spectrum analyzer, with an unambiguous frequency range of DC - 60 MHz and an active sideband suppression for spurious-free signal measurements up to 1 GHz (under certain conditions).
- EMI analyzer with quasi-peak and average measurements.
- Power sweep measurements.
- Wideband Power/Voltage measurements.
- THD analyzer.
- Phase noise analyzer.
- General noise and bode measurements.

Specifications

Specifications describe the instrument's warranted performance over the temperature range of 0 °C to 55 °C. Supplemental characteristics are intended to provide information useful in applying the instrument by giving supplemental, but not warranted performance parameters. These are denoted as "typical."

VNA specifications:

Measured Parameters	$S_{11}, S_{12}, S_{21}, S_{22}$
Measurement Channels	Four parallel receiver chains
Data Traces	Arbitrary number of traces and diagrams
Memory traces	4 full S-parameter memory slots
Data display formats	Rectangular and smith diagram, over 50 trace functions, including time domain and group delay.
Sweep type	Linear and Logarithmic
Measured points per sweep	2 - 2048
Power Settings	-15 dBm to -80 dBm in 0.1 dB steps
Sweep Trigger	Continuous, Single, Hold
Trace Math	Normalization, Magnitude, Phase, log, Real, Imag, Complex, Delay
De-Embedding	Port Extension with loss, delay and Z_0 adjustment, full de-embedding.
Calibration	SOLT (short, open, load, through), normalization
Calibration Types	1-port or 2-port
Measurement bandwidth	1 Hz - 200 kHz adjustable
Frequency range	1 Hz - 1000 MHz
Frequency resolution	1 Hz
Setups	Arbitrary number of pre-defined setups
Output signal amplitude accuracy (typ.)	+/- 2 dB @ -15 dBm to -25 dBm +/-2.5 dB @ -25 dBm to -40 dBm +/-3 dB @ -40 dBm to -80 dBm
Trace noise (typ.)	+/- 3 mdB
Measurement speed (typ.)	1.5 ms / frequency point
Frequency accuracy	+/- 25 ppm
Operating temperature	0°C - 55°C ambient
Operating humidity	0% to 80% rel. humidity
Power consumption	15 Watt max.
Power requirements	+12V / 2A
Connection	USB 2.0, Full-Speed

Table 1.1 VNA specifications

Spectrum analyzer, EMI analyzer and Phase Noise analyzer utility

Frequency range	10 Hz - 1000 MHz
Resolution bandwidth	10 Hz - 200 kHz
Frequency resolution	1 Hz
Frequency accuracy	+/-25 ppm
Amplitude accuracy	+/- 1.5 dB typ.
Unambiguous frequency range	10 Hz - 60 MHz
Low spurs technology (sideband suppression)	Multi frequency sampling
Frequency points	Arbitrary
Display functions	RMS, Minimum, Maximum and Average
Maximum linear input power	19 dBm
Phase noise (low noise mode) @ 300 MHz	< -90 dBc @ 100 Hz offset
	< -115 dBc @ 1kHz offset
	< -115 dBc @ 10kHz offset
	< -115 dBc @ 100kHz offset
	< -125 dBc @ 1MHz
Quasi Peak	Following CISPR 16-1-1 (9 kHz - 1 GHz)
Input noise voltage	< 30 nV/Sqrt(Hz) @ f > 10 kHz

Table 1.2 Spectrum Analyzer specifications

Signal Generator utility

Frequency range	1 Hz - 1GHz
Frequency resolution	1 Hz
Output power range	-15 dBm to -75 dBm (1Hz to 500 MHz)
	-15 dBm to < -90 dBm (500 MHz to 1GHz)
Output signal amplitude accuracy (typ.)	+/- 2 dB @ -15 dBm to -25 dBm
	+/-2.5 dB @ -25 dBm to -40 dBm
	+/-3 dB @ -40 dBm to <-80 dBm
Phase noise (low noise mode) @ 300 MHz	<-90 dBc @ 100 Hz offset
	< -115 dBc @ 1kHz offset
	< -115 dBc @ 10kHz offset
	< -115 dBc @ 100kHz offset
	< -125 dBc @ 1MHz

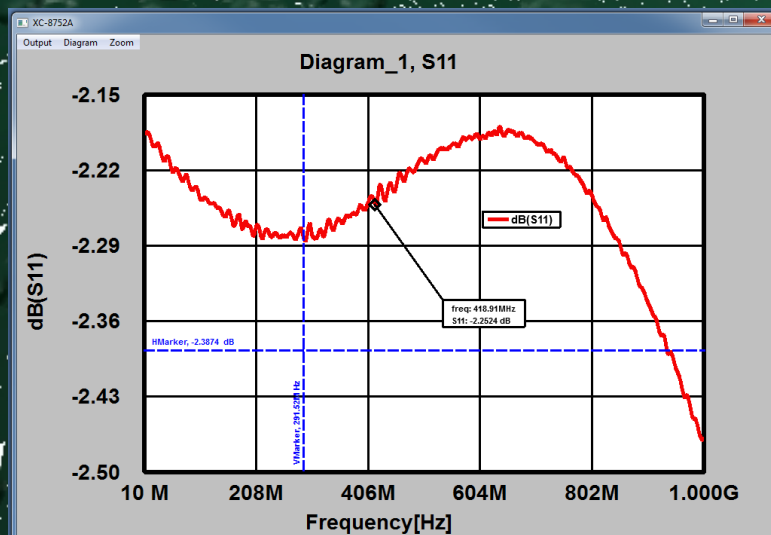
Table 1.3 Signal Generator specifications

Oscilloscope, Voltmeter

Resolution	12 Bit (up to 16Bits with CIC Filter)
Input range	Max. +/- 3V
Memory	Max. 2048 points
Lowpass Filter	CIC type, adjustable
Sampling range (real)	15 S/s - 125 MS/s
Sampling range (Sin(x)/x)	250 MS/s - 4 GS/s
Bandwidth	60 MHz (Nyquist), 500 MHz (real)
Protocol analyzer	SPI, I2C, RS232
Measurement functions	24 measurement functions like RMS, period..
Trigger Modes	Edge Trigger, Pulse Trigger, Manual, Auto, A->B
Trigger Delay	0 - 508 samples
Input	50 Ohms single ended, 100 Ohms differential
Special	Trigger aperture and HF Suppression filters

Table 1.4 Oscilloscope specifications

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Manufacturer:

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Product specifications and descriptions in this document,
Subject to change without notice.

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