China

FCC - TEST REPORT

Report Number	: **708881801426-00**	Date of Issue:	March 14, 2018
Model	: 22967		
Product Type	: Fahrradcomputer(IB-2018-1003)		
Applicant	: MONZ Handelsgesellschaft International mbH & Co. KG		
Address	: Schöndorfer Str. 60-62, 54292 Trier, GERMANY		
Manufacture	: MONZ Handelsgesellschaft International mbH & Co. KG		
Address	: Schöndorfer Str. 60-62, 54292 Trier, GERMANY		
Test Result	: ■ **Positive** ☐ **Negative**		
Total pages including Appendices	: 22		

TÜV SÜD CHINA

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2 Details about the Test Laboratory

Details about the Test Laboratory
Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch No.16 Lane, 1951 Du Hui Road, Shanghai 201108, P.R. China
FCC Registration Number	820234
Telephone:	+86 21 6141 0123
Fax:	+86 21 6140 8600

3 Description of the Equipment Under Test

Product:	Fahrradcomputer(IB-2018-1003)
Model no.:	22967
Rating:	DC 3V by battery
Description of the EUT:	EUT is bike computer set, which consist of a bike speed sensor (transmitter) and a computer with display (receiver).
Test Setup Configration:	Test mode 1: bike speed sensor (transmitter) continuous manually triggered to transmit to the bike computer with display (receiver).

4 Summary of Test Standards

Test Standards	
CFR 47 Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

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5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
§15.207 Conducted emission AC power port	NA	NA	☐	☐	☒
§15.205, §15.209 Field strength of emissions and Restricted bands	10~15	1	☒	☐	☐
§15.215(c) 20dB bandwidth	17	1	☒	☐	☐

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6 General Remarks

Remarks

Test software: EMC 32

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	Sep 12, 2017
Testing Start Date:	Sep 12, 2017
Testing End Date:	Jan 17, 2018

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shanghai Branch -

Reviewed by: Prepared by:

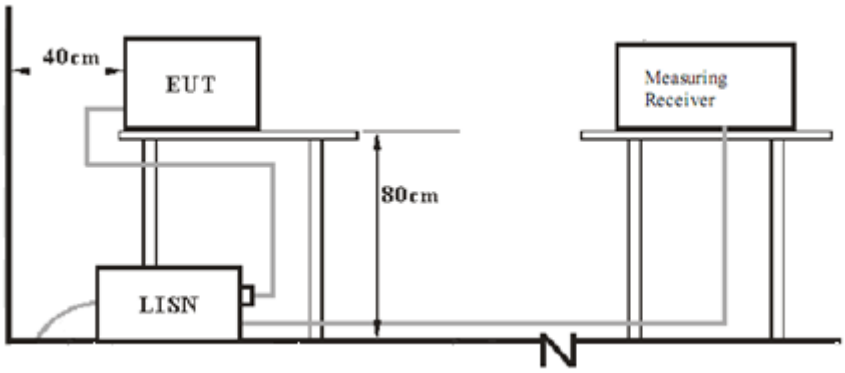
3.14.2018 3.14.2018

Hui TONG
Review Engineer

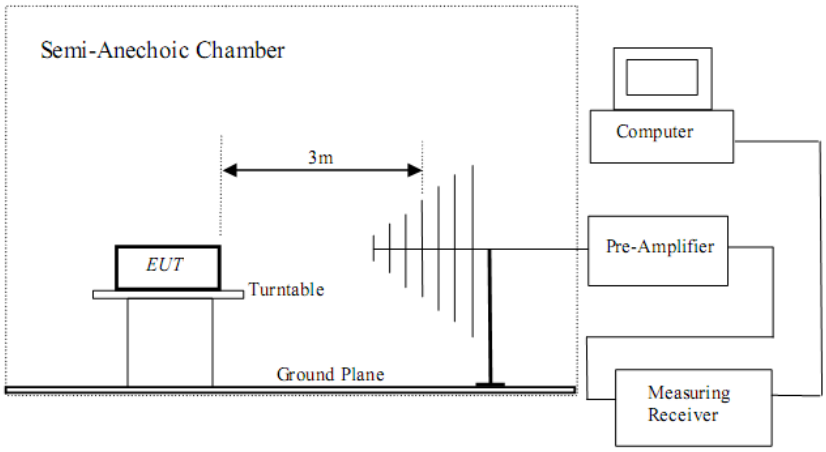
Zhining ZHANG
Project Engineer

7 Test setups

7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups



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8 Technical Requirement

8.1 Field strength of emissions and Restricted bands

Test Method

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
3. Use the following spectrum analyzer settings:
   Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for f ≥ 1GHz, 100 kHz for 30MHz< f< 1 GHz, 9kHz for 150kHz<f< 30MHz, 200Hz for 9kHz<f<150kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Follow the guidelines in ANSI C63.4 and ANSI C63.10 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc.
   The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limits

Frequency	Limit at 3m (dBuV/m)
0.009 MHz – 0.490 MHz	128.5 to 93.8[1]
0.490 MHz – 1.705 MHz	73.8 to 63[1]
1.705 MHz – 30 MHz	69.5[1]
30 MHz – 88 MHz	40.0[1]
88 MHz – 216 MHz	43.5[1]
216 MHz – 960 MHz	46.0[1]
Above 960 MHz	54.0[1]
Above 1000 MHz	54.0[2]
Above 1000 MHz	74.0[3]

[1]Limit is with detector with bandwidths as defined in CISPR-16-1-1 except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz where an Average detector is used.
[2]Limit is with 1 MHz measurement bandwidth and using an Average detector
[3]Limit is with 1 MHz measurement bandwidth and using a Peak detector

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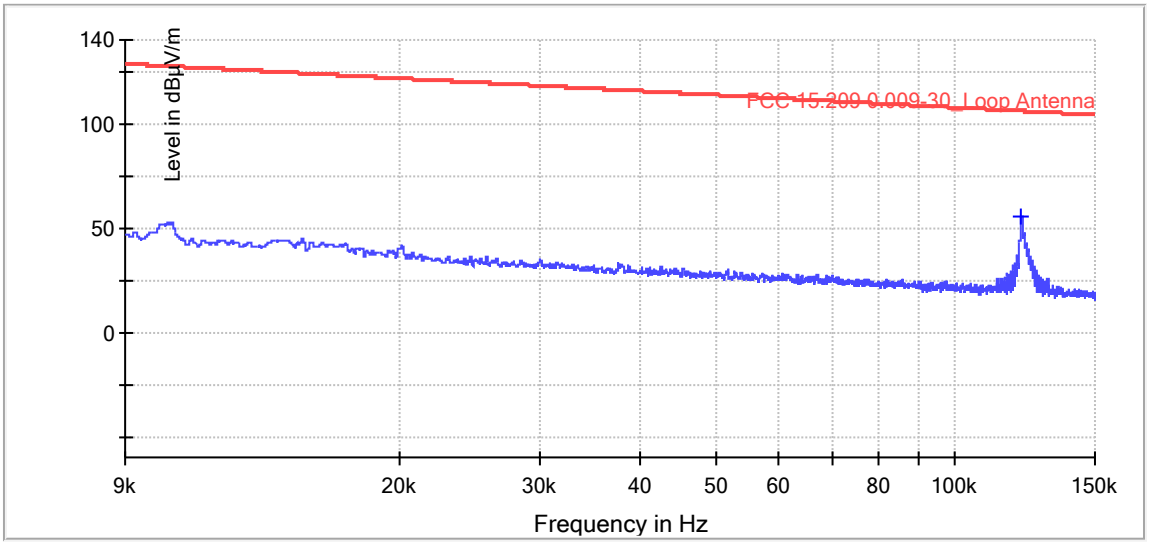
Field strength of emissions and Restricted bands

9k-150kHz Radiated Emission

EUT Information

EUT Name:	Fahrradcomputer (IB-2018-1003)
Model:	22967
Manufacturer:	MONZ Handelsgesellschaft International mbH & Co. KG
Op Cond:	Test mode 1, Power on and continue communication, DC3V,T22.3, H52.4%, P103.2kPa
Operator:	Zhining ZHANG
Test Spec:	FCC Part 15.209
Comment:	H(Antenna 0 deg)
Sample No:	SHA-314458-1



Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Limit (dBµV/m)	Margin dB
0.121080	55.4	1000.0	0.200	100.0	H	1.3	19.5	105.7	50.3

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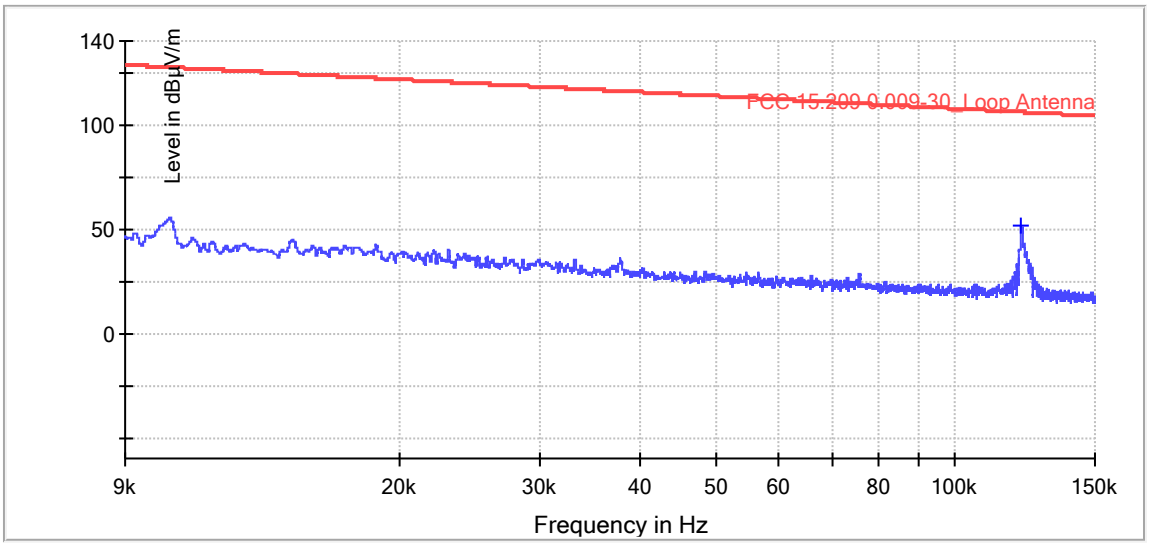
9k-150kHz Radiated Emission

EUT Information

EUT Name:	Fahrradcomputer (IB-2018-1003)
Model:	22967
Manufacturer:	MONZ Handelsgesellschaft International mbH & Co. KG
Op Cond:	Test mode 1: Power on and continue communication, DC3V,T22.3, H52.4%, P103.2kPa
Operator:	Zhining ZHANG
Test Spec:	FCC Part 15.209
Comment:	V(Antenna 90 deg)
Sample No:	SHA-314458-1



Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Limit (dBµV/m)	Margin dB
0.121160	51.1	1000.0	0.200	100.0	V	208.0	19.5	105.7	54.6

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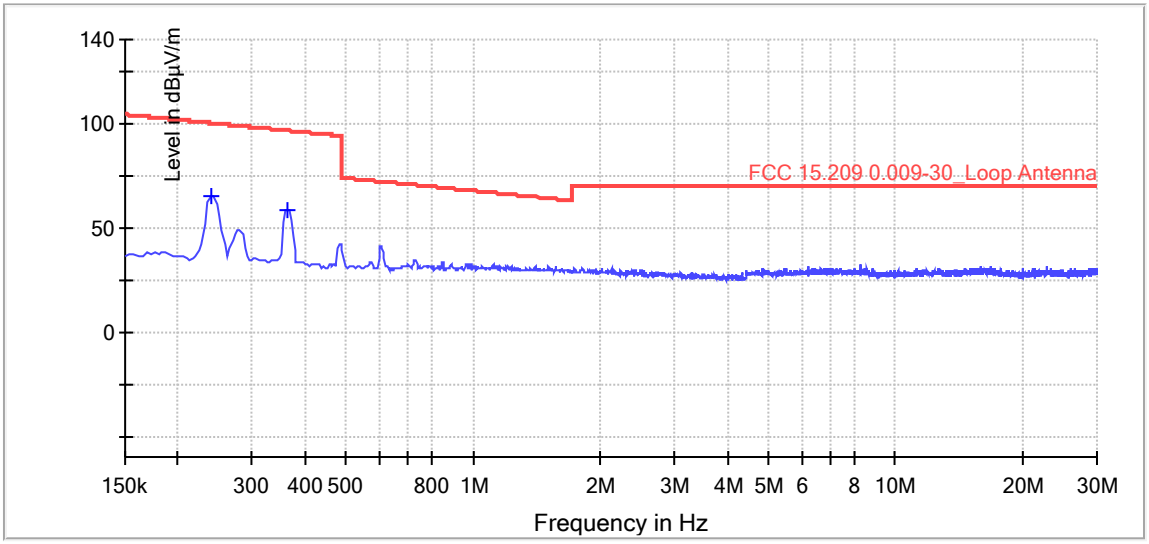
150k-30MHz Radiated Emission

EUT Information

EUT Name:	Fahrradcomputer (IB-2018-1003)
Model:	22967
Manufacturer:	MONZ Handelsgesellschaft International mbH & Co. KG
Op Cond:	Test mode 1: Power on and continue communication, DC3V,T22.3, H52.4%, P103.2kPa
Operator:	Zhining ZHANG
Test Spec:	FCC Part 15.209
Comment:	H(Antenna 0 deg)
Sample No:	SHA-314458-1



Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Limit (dBµV/m)	Margin dB
0.241000	65.0	1000.0	9.000	100.0	H	2.7	19.5	99.96	34.96
0.362000	58.7	1000.0	9.000	100.0	H	3.6	19.5	96.43	37.73

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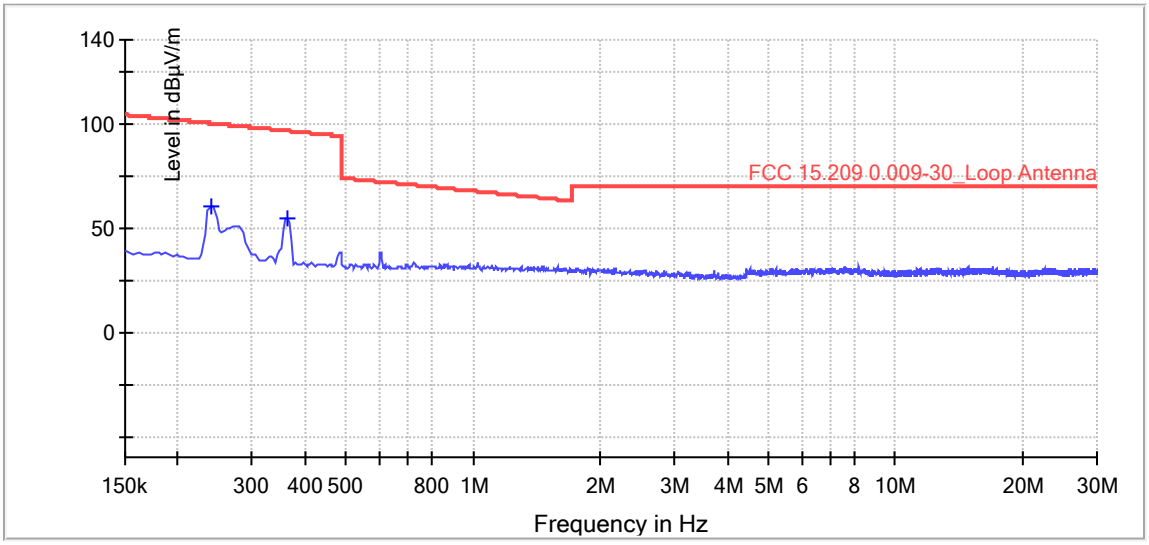
150k-30MHz Radiated Emission

EUT Information

EUT Name:	Fahrradcomputer (IB-2018-1003)
Model:	22967
Manufacturer:	MONZ Handelsgesellschaft International mbH & Co. KG
Op Cond:	Test mode 1: Power on and continue communication, DC3V,T22.3, H52.4%, P103.2kPa
Operator:	Zhining ZHANG
Test Spec:	FCC Part 15.209
Comment:	V(Antenna 90 deg)
Sample No:	SHA-314458-1



Result Table_Single

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Limit (dBµV/m)	Margin dB
0.239500	60.2	1000.0	9.000	100.0	V	349.0	19.5	100.02	39.82
0.363000	54.5	1000.0	9.000	100.0	V	327.0	19.4	96.41	41.91

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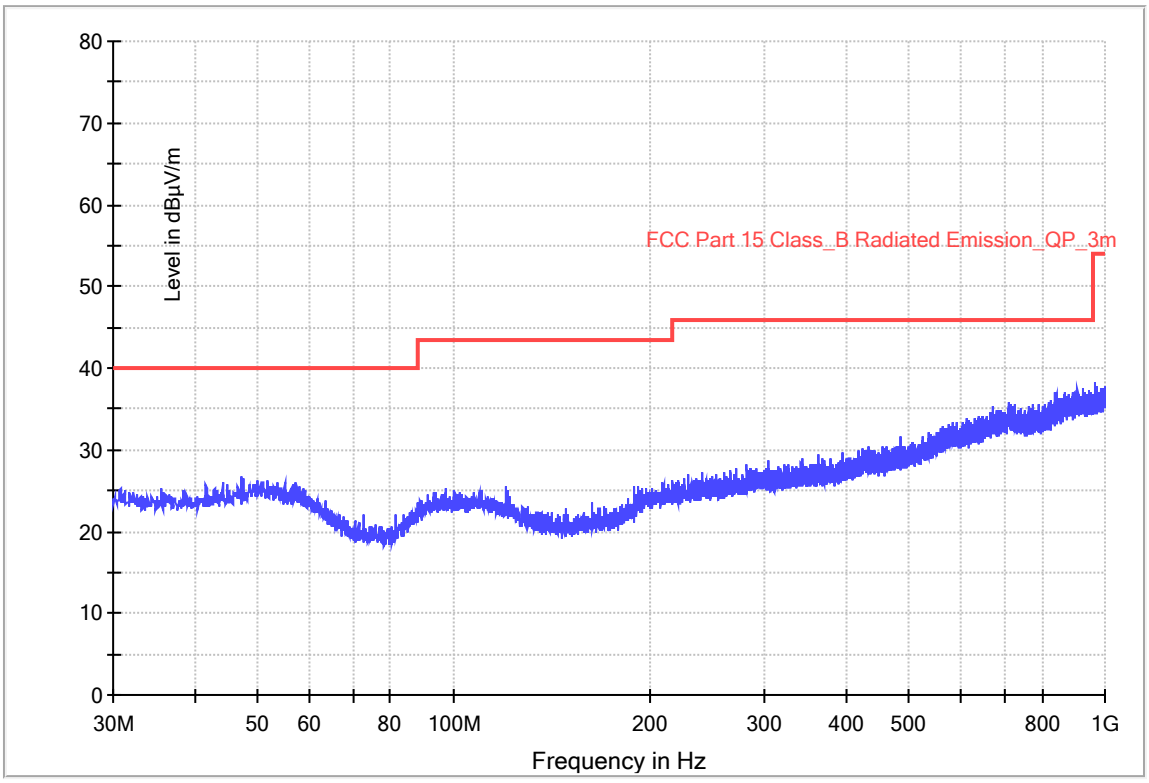
30-1000MHz Radiated Emission

EUT Information

EUT Name:	Fahrradcomputer (IB-2018-1003)
Model:	22967
Manufacturer:	MONZ Handelsgesellschaft International mbH & Co. KG
Op Cond:	Test mode 1: Power on and continue communication, DC3V,T21.9, H51.6%, P101.4kPa
Operator:	Zhang Zhining
Test Spec:	CFR 47 Part 15.209
Comment:	Horizontal
Sample No:	SHA-314458-1

RE_VULB9163_pre_Cont_30-1000



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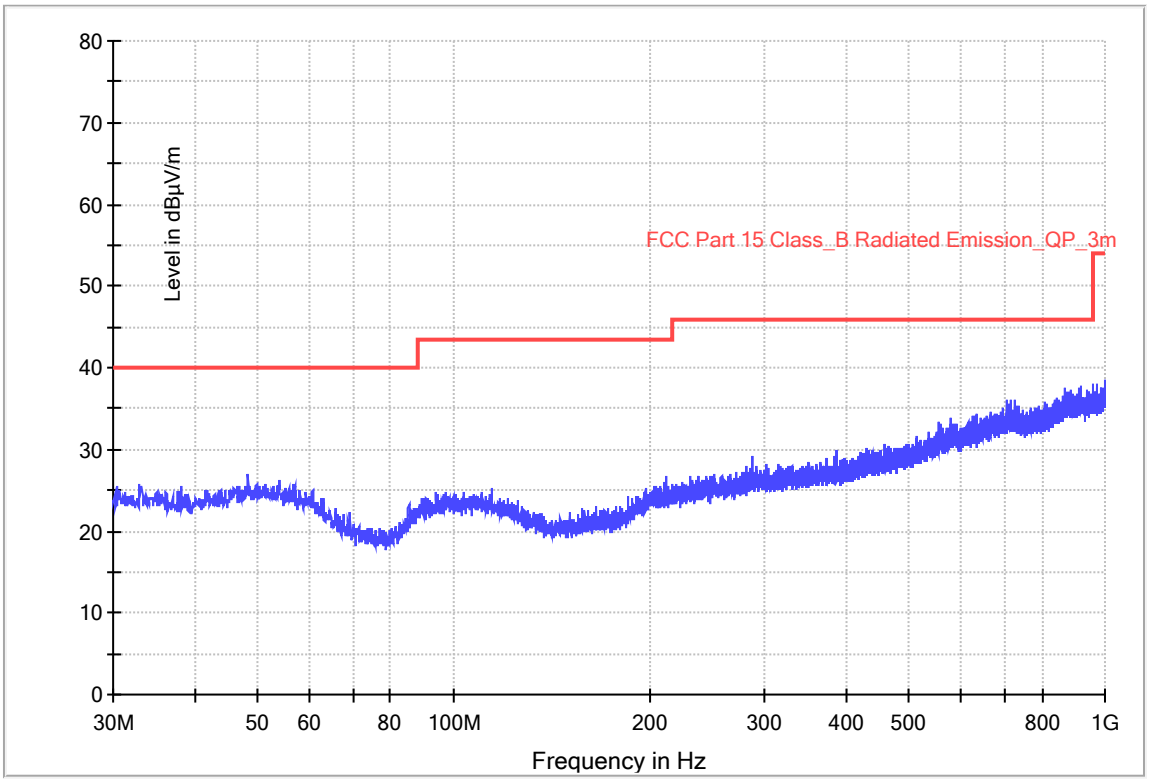
30-1000MHz Radiated Emission

EUT Information

EUT Name:	Fahrradcomputer (IB-2018-1003)
Model:	22967
Manufacturer:	MONZ Handelsgesellschaft International mbH & Co. KG
Op Cond:	Test mode 1: Power on and continue communication, DC3V,T21.9, H51.6%, P101.4kPa
Operator:	Zhang Zhining
Test Spec:	CFR 47 Part 15.209
Comment:	Vertical
Sample No:	SHA-314458-1

RE_VULB9163_pre_Cont_30-1000



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8.2 20dB Bandwidth

Test Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Limits:

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

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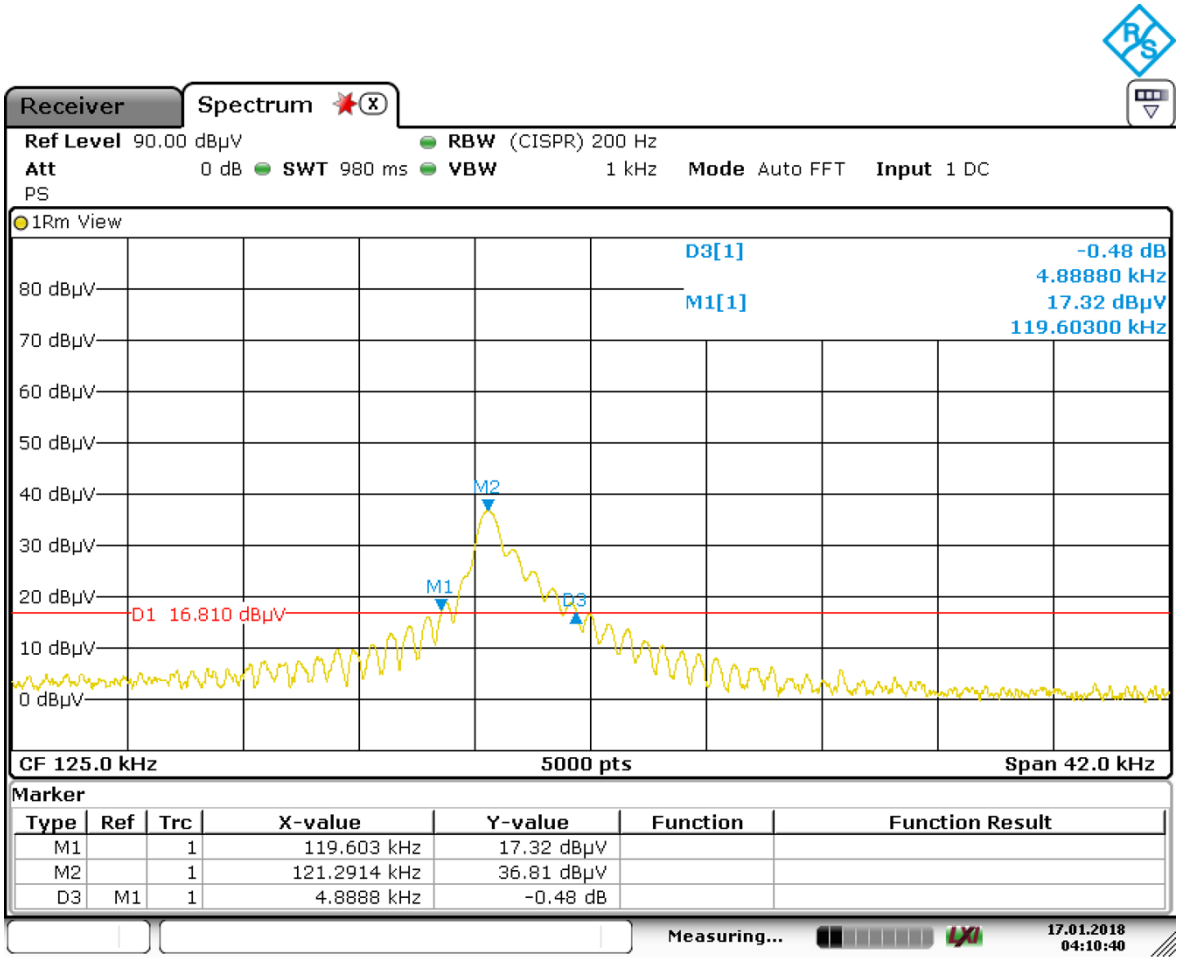
20dB Bandwidth

Frequency kHz	20dB Bandwidth kHz	Result
121.2914	4.888	Pass



Date: 17.JAN.2018 04:10:40

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9 Test equipment list

List of Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
RE	EMI Test Receiver	Rohde & Schwarz	ESR3	101906	2018-8-7
	Loop antenna	Rohde & Schwarz	HFH2-Z2	100443	2018-9-5
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	848	2018-9-17
	3m Semi-anechoic chamber	TDK	9X6X6	----	2018-5-20

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10 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

Items	Extended Uncertainty
Radiated Disturbance	30MHz to 1GHz, ±5.03dB (Horizontal) ±5.11dB (Vertical) 1GHz to 18GHz, ±5.15dB (Horizontal) ±5.12dB (Vertical)

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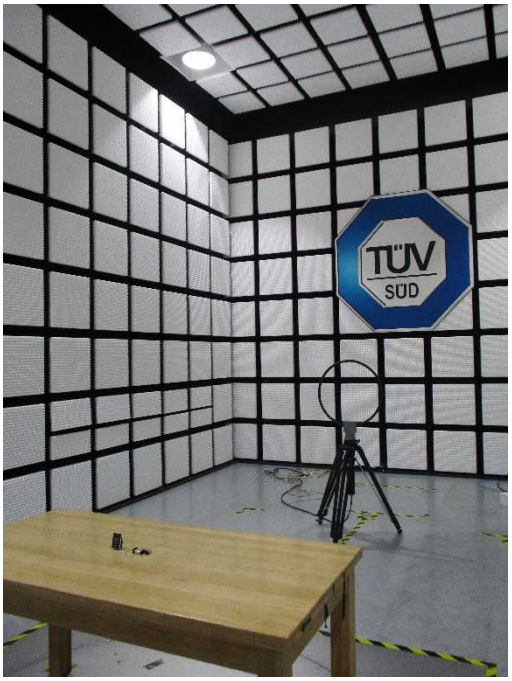
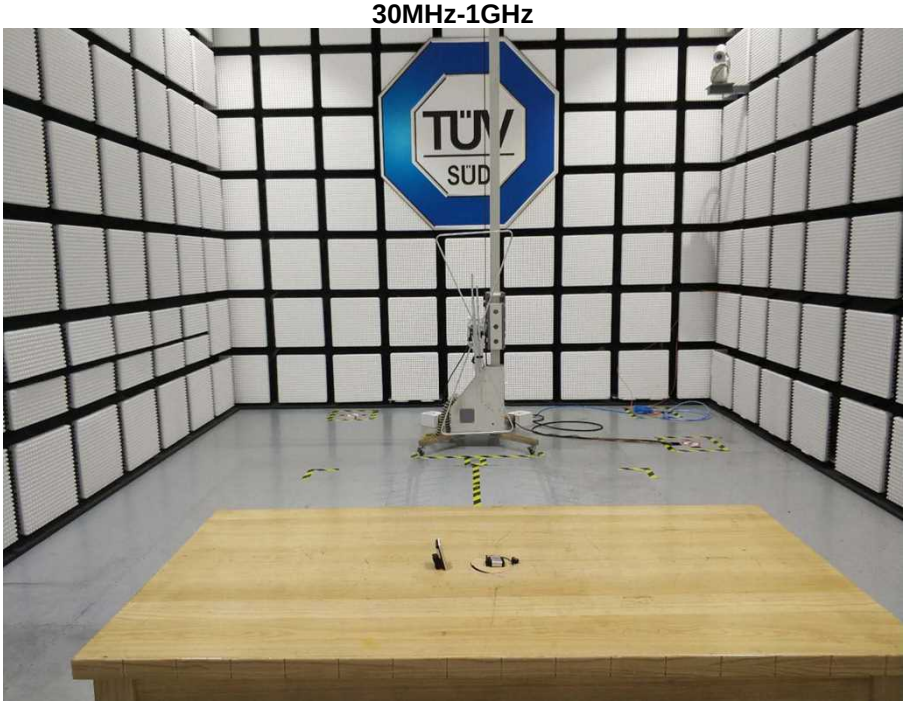
11 Photographs of Test Set-ups

9k-30MHz



30MHz-1GHz

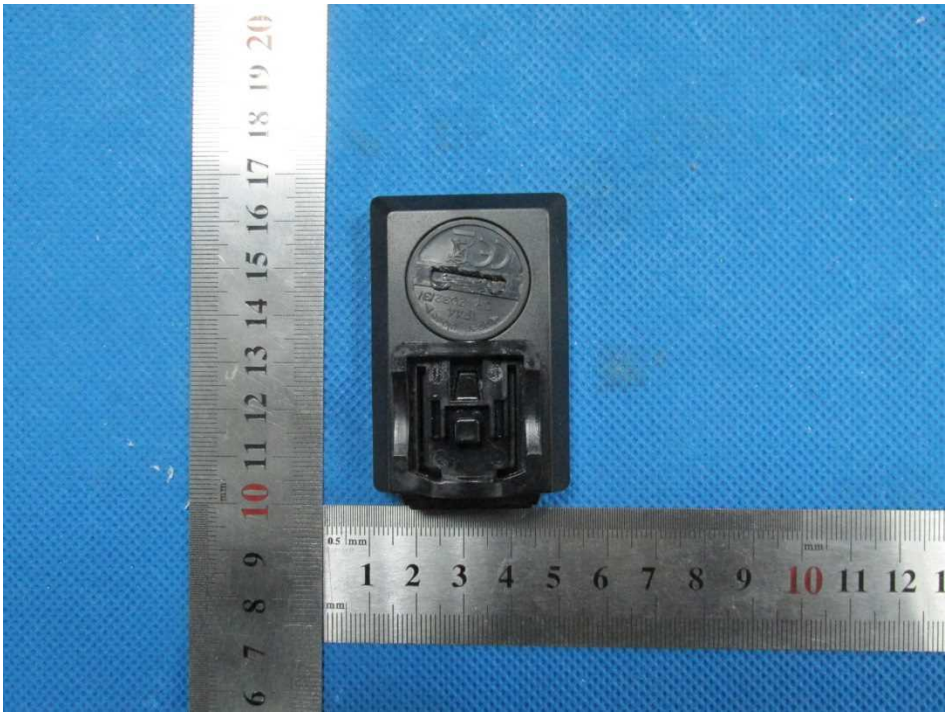


12 Photographs of EUT

EUT PHOTOS

Bike speed sensor (transmitter)

Auxiliary equipment
Bike computer with display (receiver)



----------The End----------

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