

ESMAPBD BDFE2
Data Report WINDCUBEv2 S/N WLS7-598
at the site Feni,
Chittagong District, Bangladesh
for the period from
2018-12-01 to 2018-12-31

2019-01-18


Summary report: SG17010KB23

ESMAPBD BDFE2

Data Report WINDCUBEv2 S/N WLS7-598

at the site Feni, Chittagong District, Bangladesh

Summary report: SG17010KB23

Location or measuring site:	E 91.358190, N 22.800290, Feni, Chittagong District / Bangladesh		
Client:	Suntrace GmbH	Große Elbstraße 145c D-22767 Hamburg	
	On behalf of Worldbank Group	1818 H Street, NW Washington, DC 20433	
Contractor:	windtest grevenbroich gmbh Frimmersdorfer Str. 73a D-41517 Grevenbroich		
Date of order:	2017-09-12	Contract number:	17 0091 09
Auditor:	Editor:		

Dipl.-Ing. Frank Albers
Division manager energy assessment

Dipl.-Ing. Florian Schmidt
Project manager site assessment

Grevenbroich, 2019-01-18

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It comprises 12 pages in total, incl. appendices.



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1 Introduction

windtest grevenbroich gmbh (wtg) was instructed by Suntrace GmbH to evaluate the data of the LiDAR wind measurement system at the location Feni. This report only contains the data measured by the LiDAR device ranging from 2018-12-01 until 2018-12-31 at the present site. In parallel an environmental measurement including a small meteorological mast (10 m) is being performed by the customer. The results of these measurements can be taken from a separate report provided by the customer.

2 Measurement statistics

Table 1: Mean measurement values during the evaluation period

Mean Values	Wind speed [m/s]	Wind speed max [m/s]	Wind speed min [m/s]	Wind direction [°]	Weibull A [m/s]	Weibull k []	Availability [%]
40 m	3.79	7.71	0.59	358.1	4.22	3.390	99.8
60 m	4.52	10.57	0.61	0.1	4.97	2.737	99.5
80 m	4.95	12.46	0.47	2.1	5.47	2.537	98.8
100 m	5.20	12.48	0.92	3.5	5.72	2.382	97.8
110 m	5.30	13.11	0.97	3.9	5.80	2.312	97.7
120 m	5.40	13.40	0.96	4.3	5.89	2.273	97.4
130 m	5.47	13.65	1.01	4.4	5.97	2.236	97.0
140 m	5.53	13.65	1.06	4.4	6.02	2.189	96.9
150 m	5.58	13.55	1.05	4.4	6.07	2.171	96.7
160 m	5.61	13.76	0.81	4.4	6.08	2.139	96.6
180 m	5.64	13.91	0.54	4.3	6.10	2.112	96.2
200 m	5.63	14.14	0.64	4.2	6.11	2.115	95.8

Table 2: Availability during the evaluation period

Availability per day [%]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
40 m	100	100	94	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
60 m	100	100	94	100	100	100	100	100	100	93	100	100	100	100	100	100	100	100	100	97	100	100	100	100	100	100	100	100	100	100	100
80 m	100	97	94	99	100	99	100	100	99	91	100	99	99	100	100	99	100	100	100	90	97	100	100	100	100	100	100	100	100	100	100
100 m	100	94	94	97	100	97	100	100	99	90	100	99	96	100	99	98	100	100	99	83	89	100	100	100	100	100	100	100	100	100	100
110 m	100	94	94	97	100	94	100	100	99	90	100	99	95	100	99	98	100	100	98	83	89	100	100	100	100	100	100	100	100	100	100
120 m	100	93	94	96	100	93	100	99	99	90	100	99	95	100	99	97	99	100	96	83	88	100	100	100	100	100	100	100	100	100	100
130 m	100	93	94	96	100	93	100	97	99	90	100	99	95	100	98	95	97	100	90	83	88	100	100	100	100	100	100	100	100	100	100
140 m	100	93	94	96	100	92	100	97	99	90	100	99	95	100	98	95	96	100	89	83	88	100	100	100	100	100	100	100	100	100	100
150 m	100	93	94	96	100	92	100	97	99	90	100	98	95	100	98	94	96	100	88	83	87	100	100	100	100	100	100	100	100	100	100
160 m	100	93	94	96	100	92	100	97	99	90	100	98	95	100	98	93	95	100	85	82	87	100	100	100	100	100	100	100	100	100	100
180 m	100	93	94	96	100	92	100	97	99	90	100	98	95	100	98	89	94	100	81	81	87	100	99	100	100	100	100	100	100	100	100
200 m	100	92	94	95	100	92	99	97	99	90	100	98	95	100	98	88	93	100	78	77	87	100	97	100	100	100	100	100	100	100	100



3 Time series

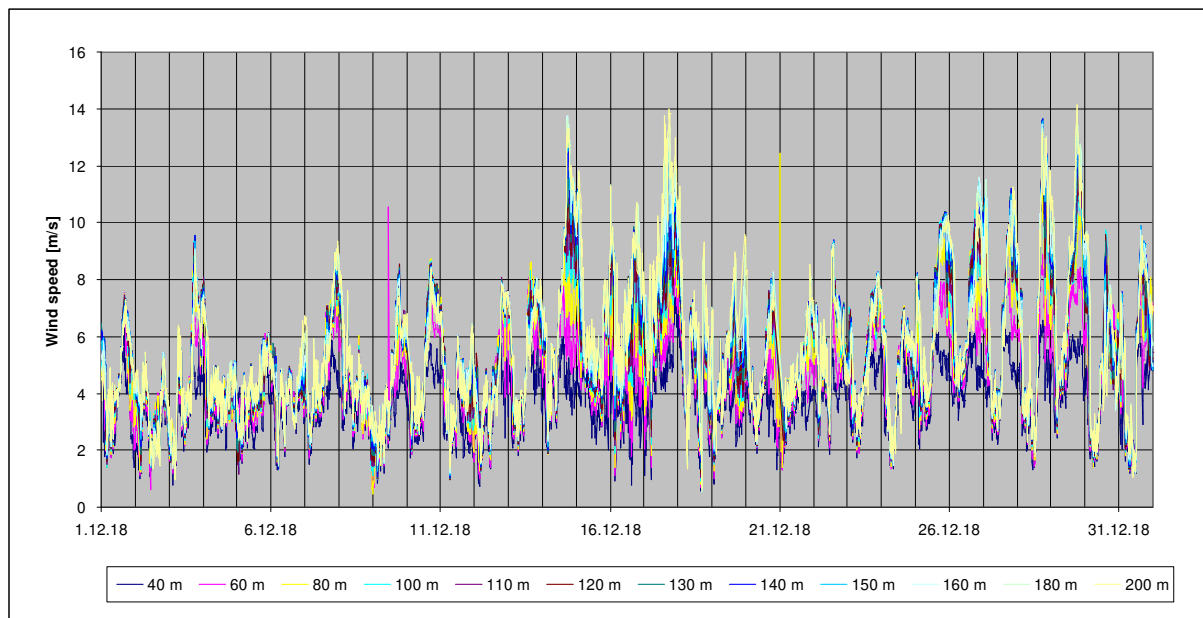


Figure 1: Time series of wind speed during the evaluation period

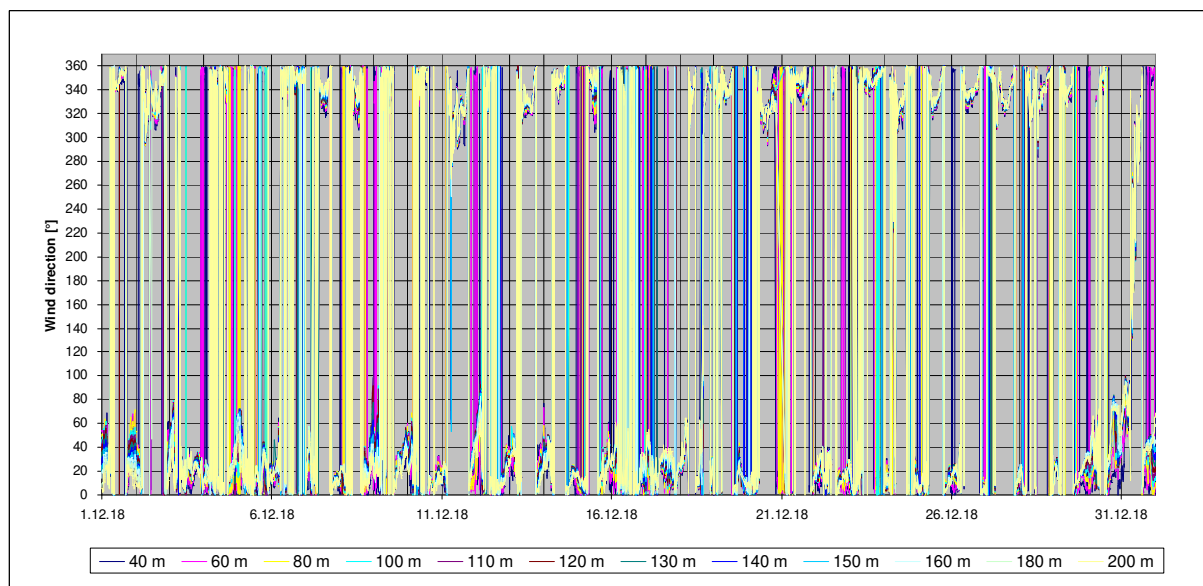


Figure 2: Time series of wind direction during the evaluation period



4 Daily profile

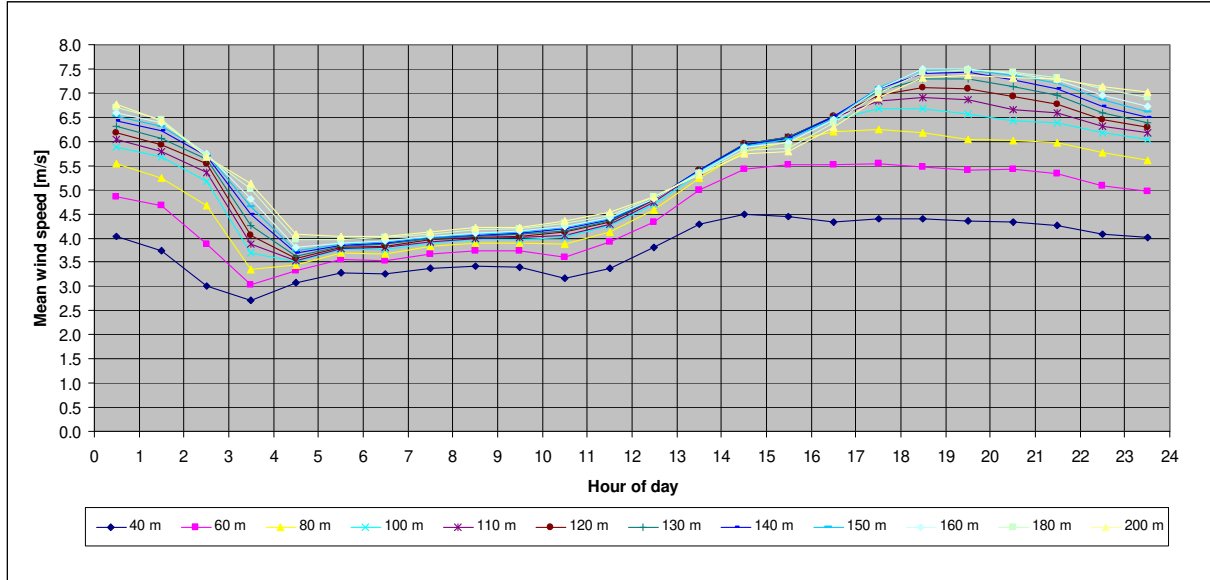


Figure 3: Daily profile of wind speed during the evaluation period

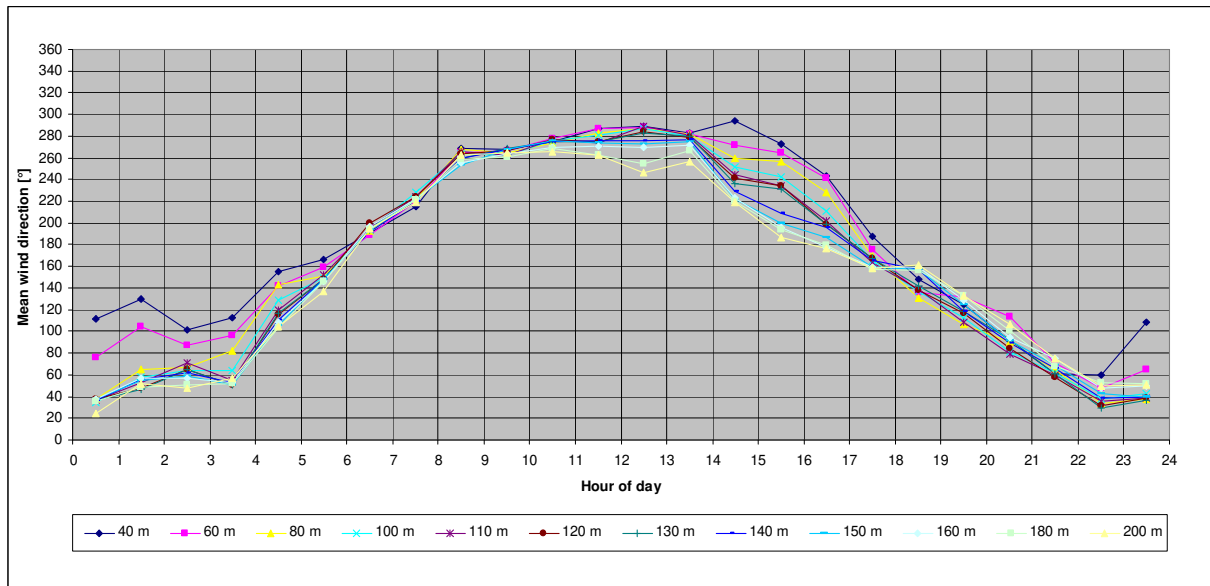


Figure 4: Daily profile of wind direction during the evaluation period



5 Wind direction distribution

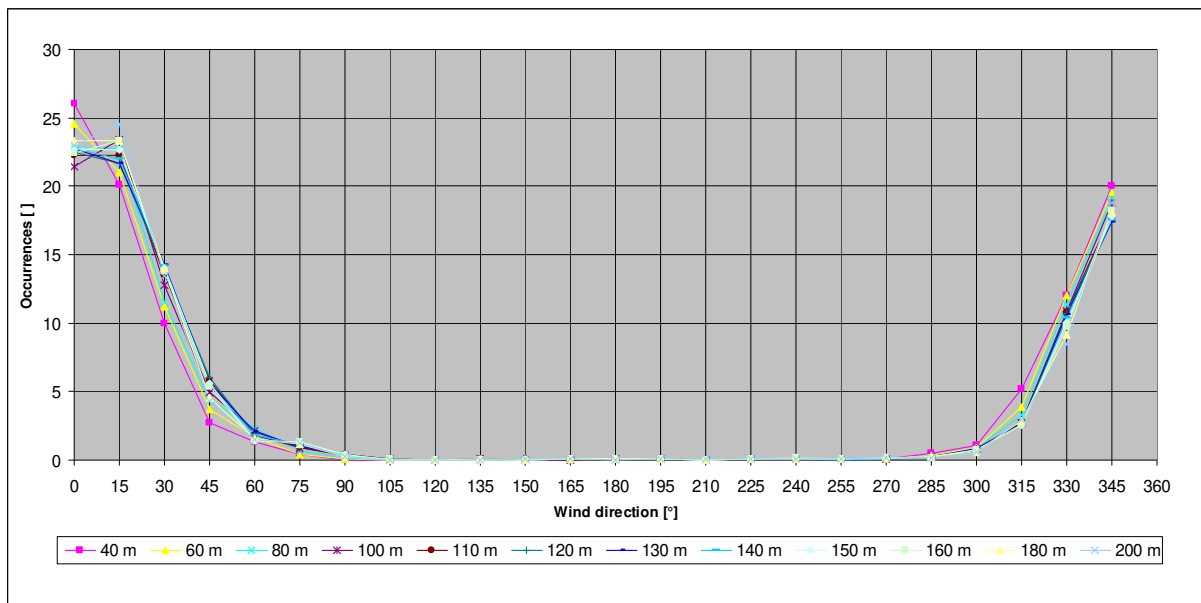


Figure 5: Frequency distribution of wind direction during the evaluation period

6 Natural turbulence

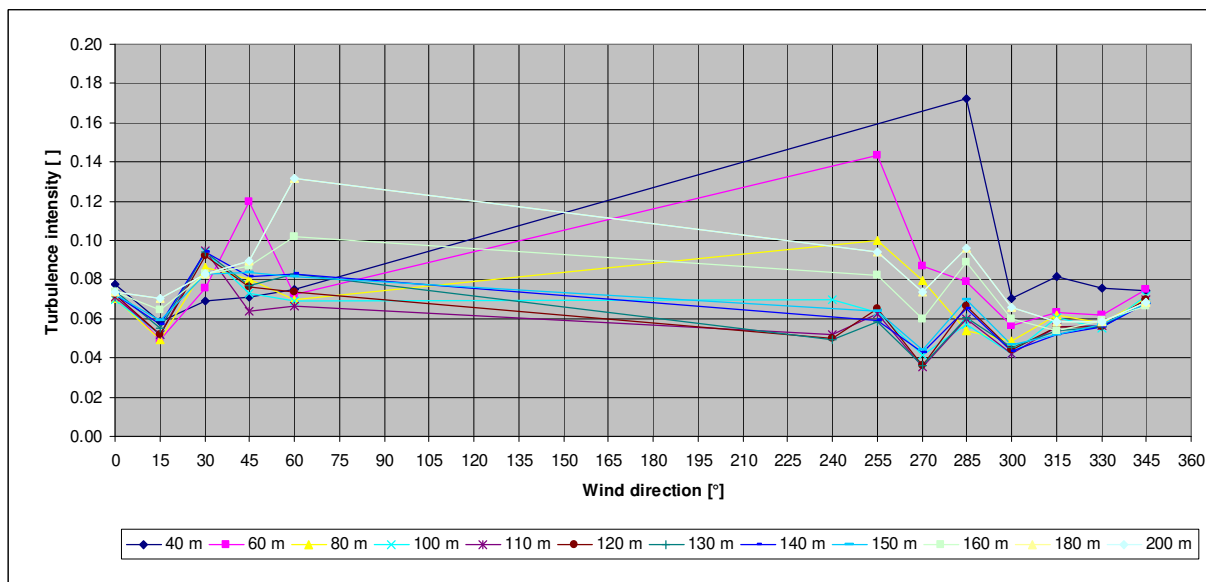


Figure 6: Directional mean turbulence during the evaluation period



7 Wind profile

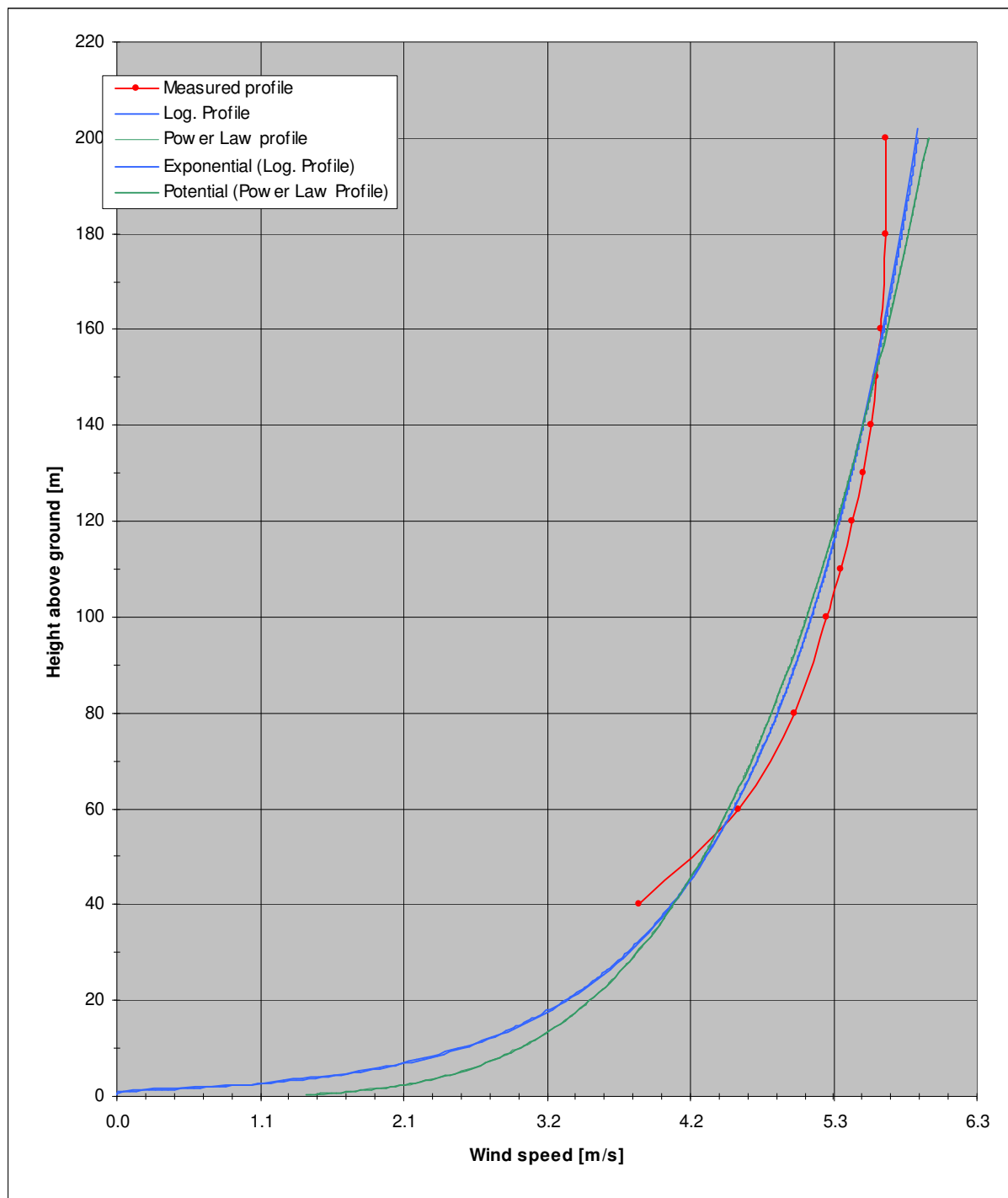


Figure 7: Wind profile during the evaluation period



8 Station Log

Date	Note	Issues
2017-06-04	Installation of LiDAR (Florian Schmidt, wtg) Connection to utility grid due to charger problems with 24 V	frequent restarts
2017-06-15	Manufacturer recommends to turn off LiDAR due to frequent restarts	frequent restarts
2017-06-16	LiDAR disconnected from Grid (Najmul Hossain, EQMS)	LiDAR disconnected
2017-07-27	Installation of DC-AC converter to supply LiDAR (Najmul Hossain, EQMS) LiDAR connected to power supply Performance check via remote connection (Florian Schmidt, wtg)	-
2017-07-28	Performance check via remote connection (Florian Schmidt, wtg)	-
2017-07-31	Data and performance check (Florian Schmidt, wtg) No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2017-08-08	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2017-09-05	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2017-09-09	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2017-12-04	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2017-12-05	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2018-01-02	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2018-01-03	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2018-01-30	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2018-02-06	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2018-05-01	LiDAR shut down (02:20 - 02:30) LiDAR shut down (04:30 - 06:10)	No power supply / Low solar radiation due to heavy rain
2018-05-04	LiDAR shut down (10:50 - 12:10)	No power supply / Low solar radiation due to heavy rain
2018-05-07	LiDAR shut down (02:10 - 03:20) LiDAR shut down (11:20 - 12:30)	No power supply / Low solar radiation due to heavy rain
2018-05-15	LiDAR shut down (10:30 - 12:40)	No power supply / Low solar radiation due to heavy rain
2018-06-05	LiDAR shut down (10:50 - 12:10)	No power supply / Low solar radiation due to heavy rain
2018-07-11	LiDAR shut down (10:10 - 13:20)	No power supply / Low solar radiation due to cloudy conditions
2018-07-13	LiDAR shut down (09:50 - 13:00)	No power supply / Low solar radiation due to cloudy conditions



Date	Note	Issues
2018-07-15	LiDAR shut down (10:40 - 13:20)	No power supply / Low solar radiation due to cloudy conditions
2018-08-02	LiDAR shut down (10:40 - 10:50)	No power supply / Low solar radiation due to cloudy conditions
2018-08-06	LiDAR shut down (12:50 - 14:10)	No power supply / Low solar radiation due to cloudy conditions
2018-09-11	LiDAR shut down (11:20 - 12:40)	No power supply / Low solar radiation due to cloudy conditions
2018-09-16	LiDAR shut down (10:10 - 12:20)	No power supply / Low solar radiation due to cloudy conditions
2018-09-29	LiDAR shut down (9:50 - 10:20)	No power supply / Low solar radiation due to cloudy conditions
2018-10-25	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2018-10-26	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2018-11-01	Wiper nozzle is blocked Station keeper is manually cleaning the window with a special cleaning cloth until repair	Low data availability
2018-11-21	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2018-11-26	Data connection restored Data and performance check (Florian Schmidt, wtg)	-
2018-12-21	No connection to LiDAR	According to sent data, most likely no present LiDAR issues
2018-12-22	Data connection restored Data and performance check (Florian Schmidt, wtg)	-

Note: Weekly and other frequently performed checks as well as data backup will not be listed in the station log.

We hereby affirm that the evaluation was performed in accordance with the latest state of the art, impartially and to the best of our knowledge and belief.

Grevenbroich. 2019-01-18

Dipl.-Ing. Florian Schmidt
Project Manager



9 Appendix

9.1 Processing

Version	Date	Content
SG17010B1	2017-04-25	Verification of the remote sensing device type Leosphere WINDCUBE v2 S/N WLS7-598 performed at the verification station Grevenbroich
SG17010B2	2017-06-22	Installation of the Remote Sensing Device Type Leosphere WINDCUBE v2 S/N WLS7-598 at the site Feni
SG17010KB1	2017-08-31	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB2	2017-09-11	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB3	2017-10-06	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB4	2017-11-08	ESMAPBD BDFE2 Cumulative Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni
SG17010KB5	2017-12-18	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-11-01 to 2017-11-30
SG17010KB6	2018-01-17	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-12-01 to 2017-12-31
SG17010KB7	2018-03-02	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-01-01 to 2018-01-31
SG17010KB8	2018-03-02	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-02-01 to 2018-02-30
SG17010KB9	2018-04-13	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-06-01 to 2017-06-30
SG17010KB10	2018-04-13	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-07-01 to 2017-07-31
SG17010KB11	2018-04-13	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-03-01 to 2018-03-31
SG17010KB12	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-08-01 to 2017-08-31
SG17010KB13	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-09-01 to 2017-09-30
SG17010KB14	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2017-10-01 to 2017-09-31
SG17010KB15	2018-05-24	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-04-01 to 2018-04-30
SG17010KB16	2018-06-06	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-05-01 to 2018-05-31
SG17010KB17	2018-07-03	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-06-01 to 2018-06-30
SG17010KB18	2018-08-10	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-07-01 to 2018-07-30
SG17010KB19	2018-09-03	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-08-01 to 2018-08-31



Version	Date	Content
SG17010KB20	2018-10-01	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-09-01 to 2018-09-30
SG17010KB21	2018-11-02	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-10-01 to 2018-10-31
SG17010KB22	2018-12-03	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-11-01 to 2018-11-30
SG17010KB23	2019-01-08	ESMAPBD BDFE2 Data Report WINDCUBEv2 S/N WLS7-598 at the site Feni for the period 2018-12-01 to 2018-12-31

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