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WatchBP O3 2G

Presenter | Department / Title | Date

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In order to go direct to the subject click on the text
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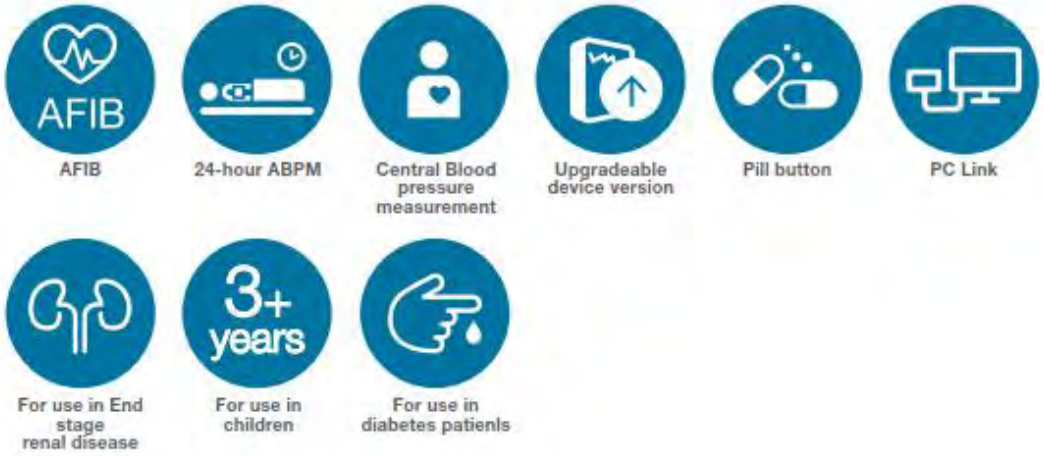
WatchBP O3

Professional 24-hour ambulatory blood pressure monitor



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WatchBP O3

- Medication button
- Solid & easier to clean
- USB & BT 4.2 connectivity
- Upgradable Device version
  - Standard: standard ABPM
  - Advanced: AFIB
  - Premier: AFIB and Central BP
- New WatchBP Analyzer

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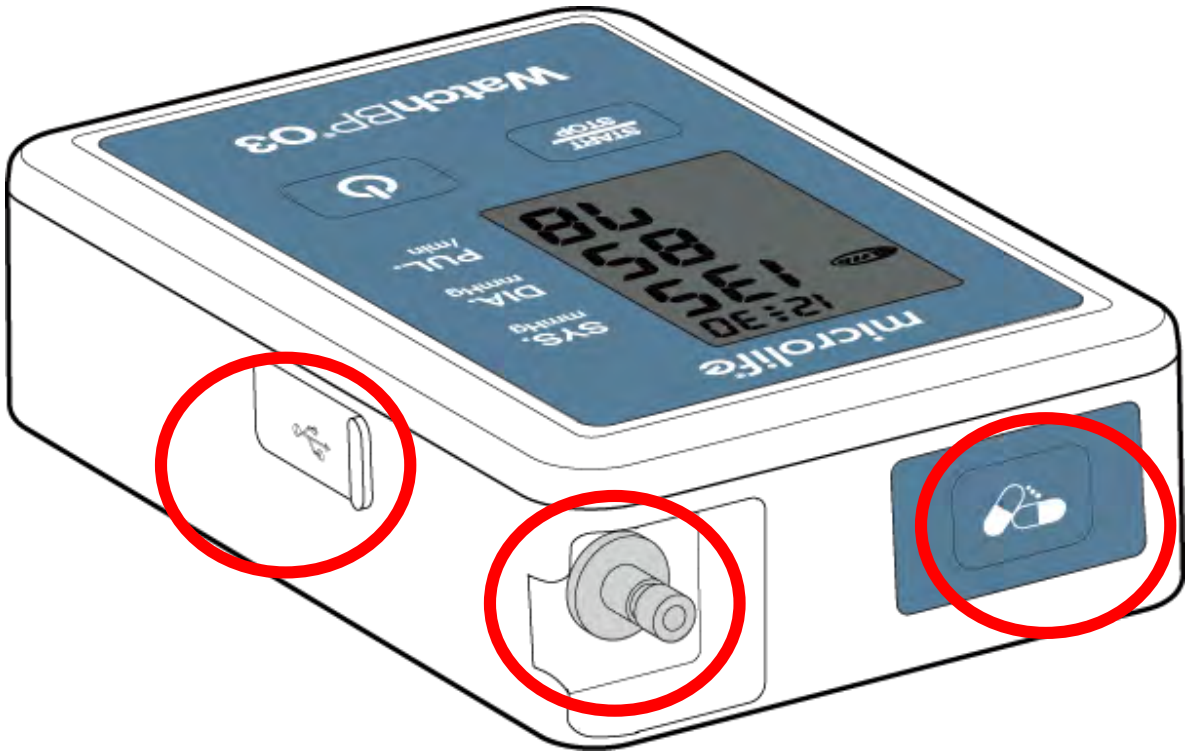
WatchBP O3

- Medication button on top of device
  - No need to remove device from pouch before pushing
- Solid tube connector
- Flat surface
  - Easier to clean



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WatchBP O3

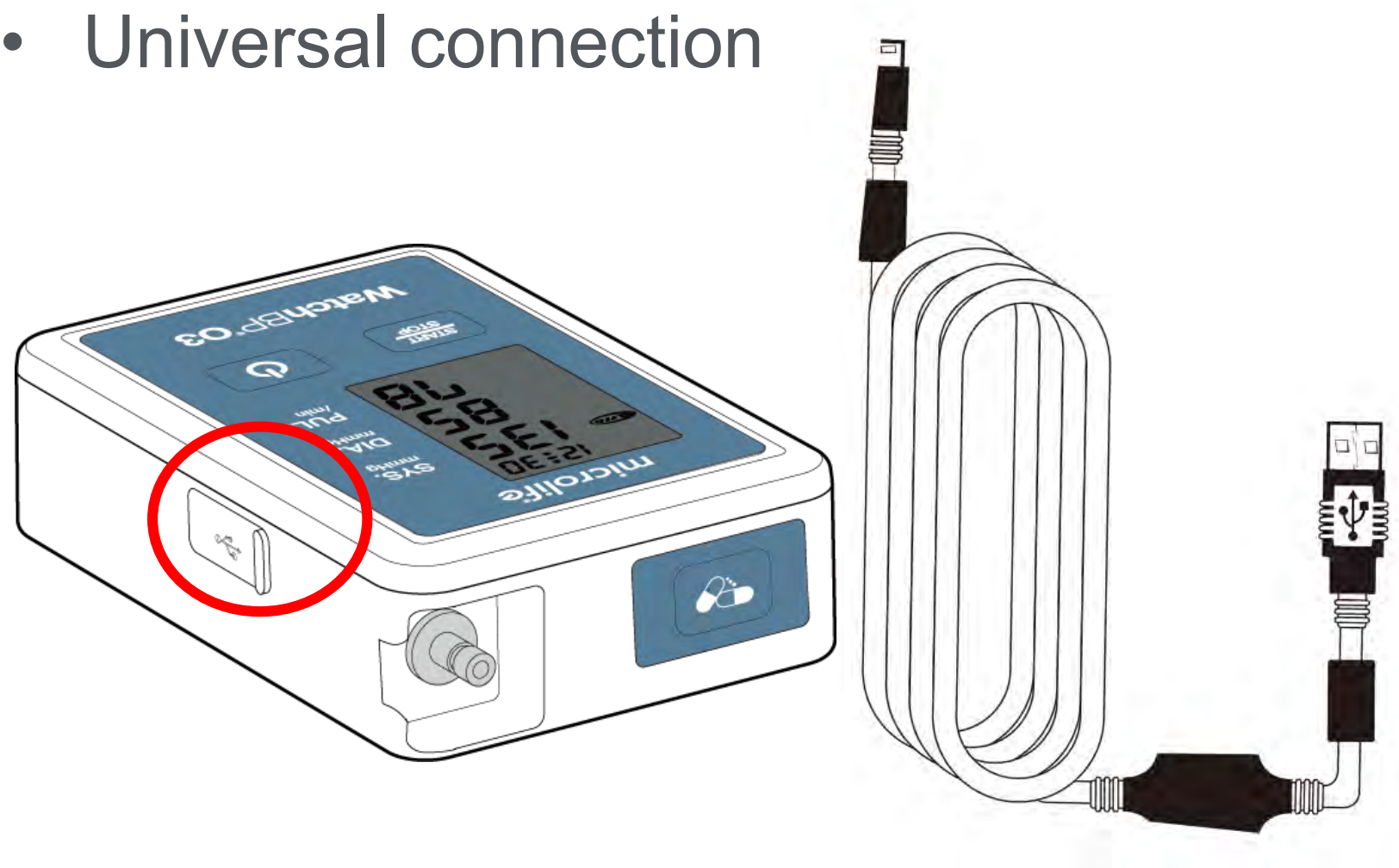
- Same delivery but without waste belt and shoulder strap

Bluetooth WatchBP O3 Connectivity

- BT 4.2 connectivity

USB WatchBP O3 Connectivity

- Universal connection



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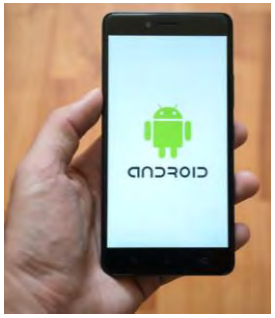
SDK's available

SDK / sample code for integration for:

- **Windows 10** (USB and BT)
  - dll library file and sample code is available

- **IOS** (iPhone/iPad) & **Android** (BT only)
  - sample code and communication protocol available



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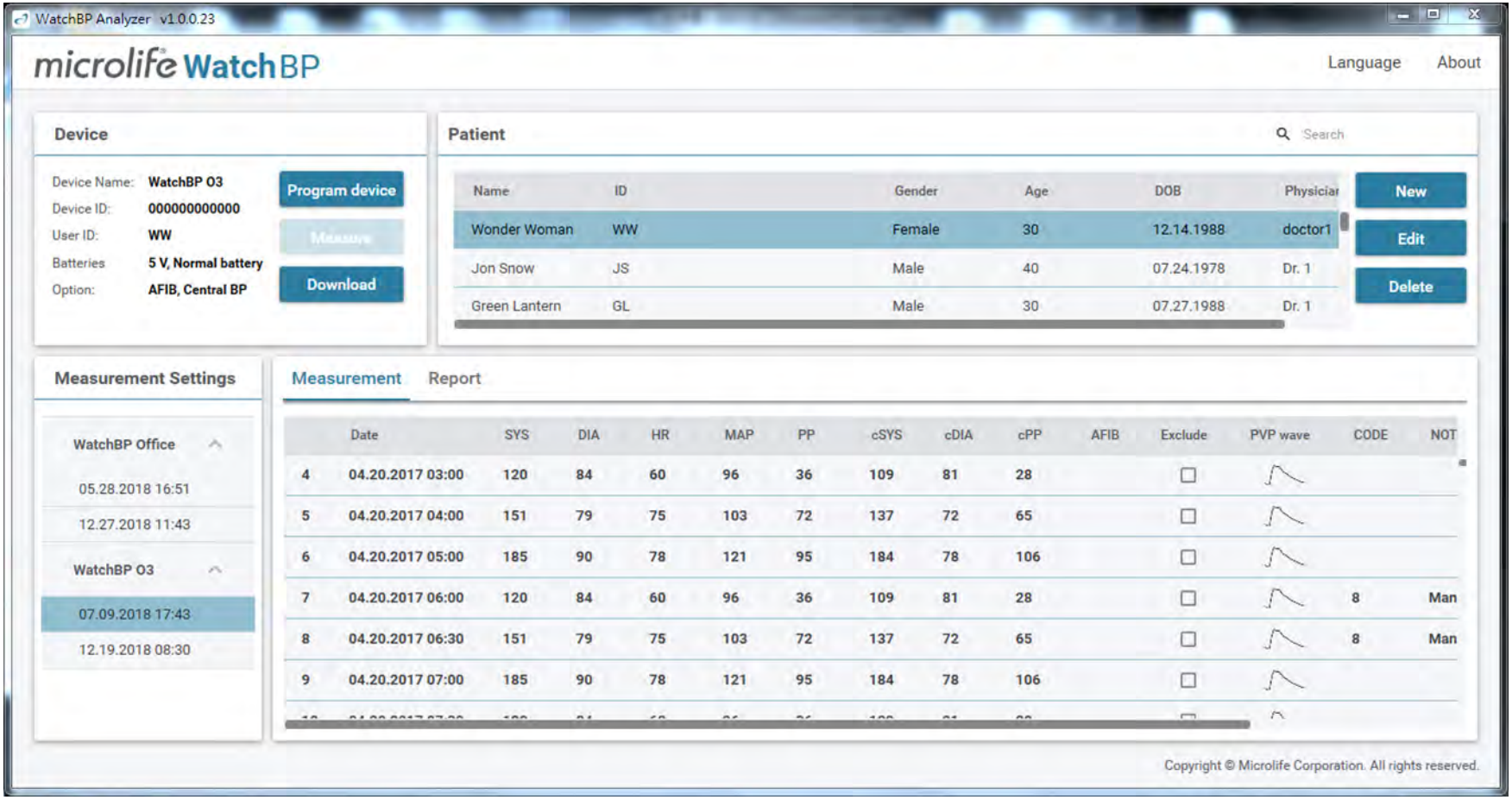
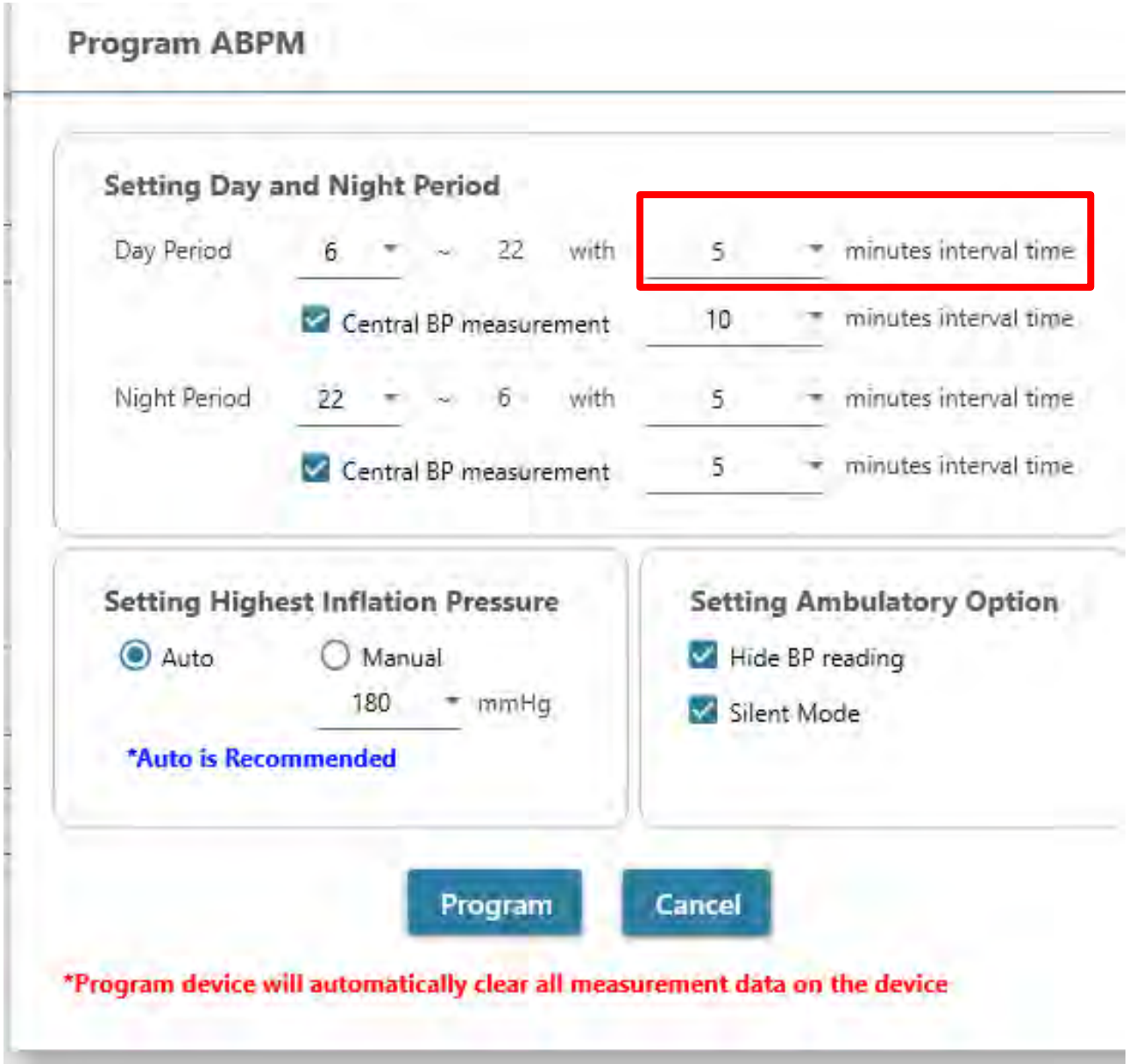
WatchBP Analyzer Software



Measurement interval times

- from 5 min to 1 hour



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Central blood pressure measurement (Optional)

Validated against invasive blood pressure measurement

ORIGINAL ARTICLE

Measurement Accuracy of a Stand-Alone Oscillometric Central Blood Pressure Monitor: A Validation Report for Microlife WatchBP Office Central

Hao-Min Cheng[1,2,4,5], Shih-Hsien Sung[3,4,6], Yuan-Ta Shih[7], Shao-Yuan Chuang[8], Wen-Chung Yu[3,4,5], Chen-Huan Chen[2,4,5,6]

BACKGROUND
The superiority of prognostic value of blood pressure (BP) measured at central aorta (CBP) over conventional brachial BP measured by cuff-based BP monitors has reignited the development of new noninvasive techniques for estimating CBP. The present study validated the accuracy of CBP measured by a newly developed stand-alone CBP monitor.

METHODS
The CBP monitor provided readings of brachial systolic BP (SBP), brachial diastolic BP (DBP), central SBP, and central pulse pressure (PP). Brachial PP and central DBP were calculated from the relevant readings. The accuracy of the brachial and central SBP, PP, and DBP was validated against the simultaneously recorded invasively measured central aortic SBP, PP, and DBP, according to the invasive standard requirements for the noninvasive brachial BP monitors from the Association for the Advancement of Medical Instrumentation (AAMI) in 85 subjects (255 measurements; age range, 30–93 years).

RESULTS
The mean differences of cuff BP with reference to the invasively measured central SBP, PP, and DBP were −2.6 ± 9.0, −8.6 ± 11.2, and 6.1 ± 7.0 mm Hg, respectively, with the former two being obviously underestimated at high CBP and overestimated at low CBP. In contrast, the corresponding differences for the central SBP, PP, and DBP measured by the CBP monitor were −0.6 ± 5.5, −0.4 ± 7.0, and −0.2 ± 6.5 mm Hg, respectively, without obvious systematic bias. The distribution of measurement errors for central SBP, PP, and DBP surpassed the AAMI criteria.

CONCLUSION
Central SBP, PP, and DBP can be measured accurately by a stand-alone automatic BP monitor.

Keywords: blood pressure; central pulse pressure; hypertension; oscillometric signals; pressure wave reflection; pulse volume plethysmography; pulse wave analysis.

doi:10.1093/ajh/hps021

The blood pressure (BP) amplification from central aorta to peripheral arteries, which varies substantially between subjects, causes conceivable discrepancy between central BP (CBP) and BP recorded at a person's upper arm.[1–4] Although mean BP and diastolic BP (DBP) are relatively constant in the conduit arteries, systolic BP (SBP) and pulse pressure (PP) measured from peripheral arteries are usually higher than those measured at the origin of the arterial tree, namely, the aortic root.[5,7] CBP can be estimated noninvasively, mainly by using the technique of applanation tonometry.[5,8,9] Thereafter, it has been shown that the noninvasively measured CBP and the conventional brachial BP respond to antihypertensive medications differently.[10,11] Furthermore, the superior prognostic value of CBP over conventional brachial BP demonstrated in previous studies[12–14] has reignited the development of more convenient noninvasive methods for CBP measurements, including tonometry-based[15] and brachial cuff-based techniques.[16,17]

We have developed and validated a novel oscillometric method to estimate central SBP and PP.[16,18,19] Noninvasively

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Initially submitted March 20, 2012; date of first revision 04 June, 2012; accepted for publication July 19, 2012.

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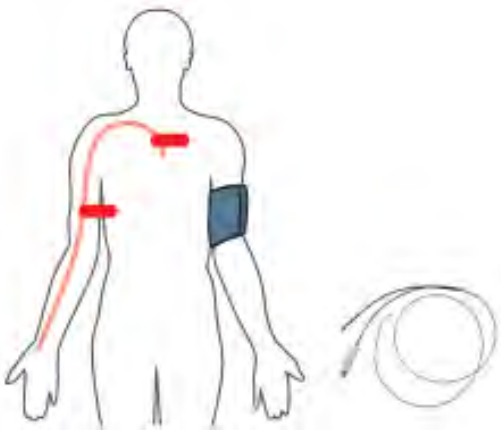
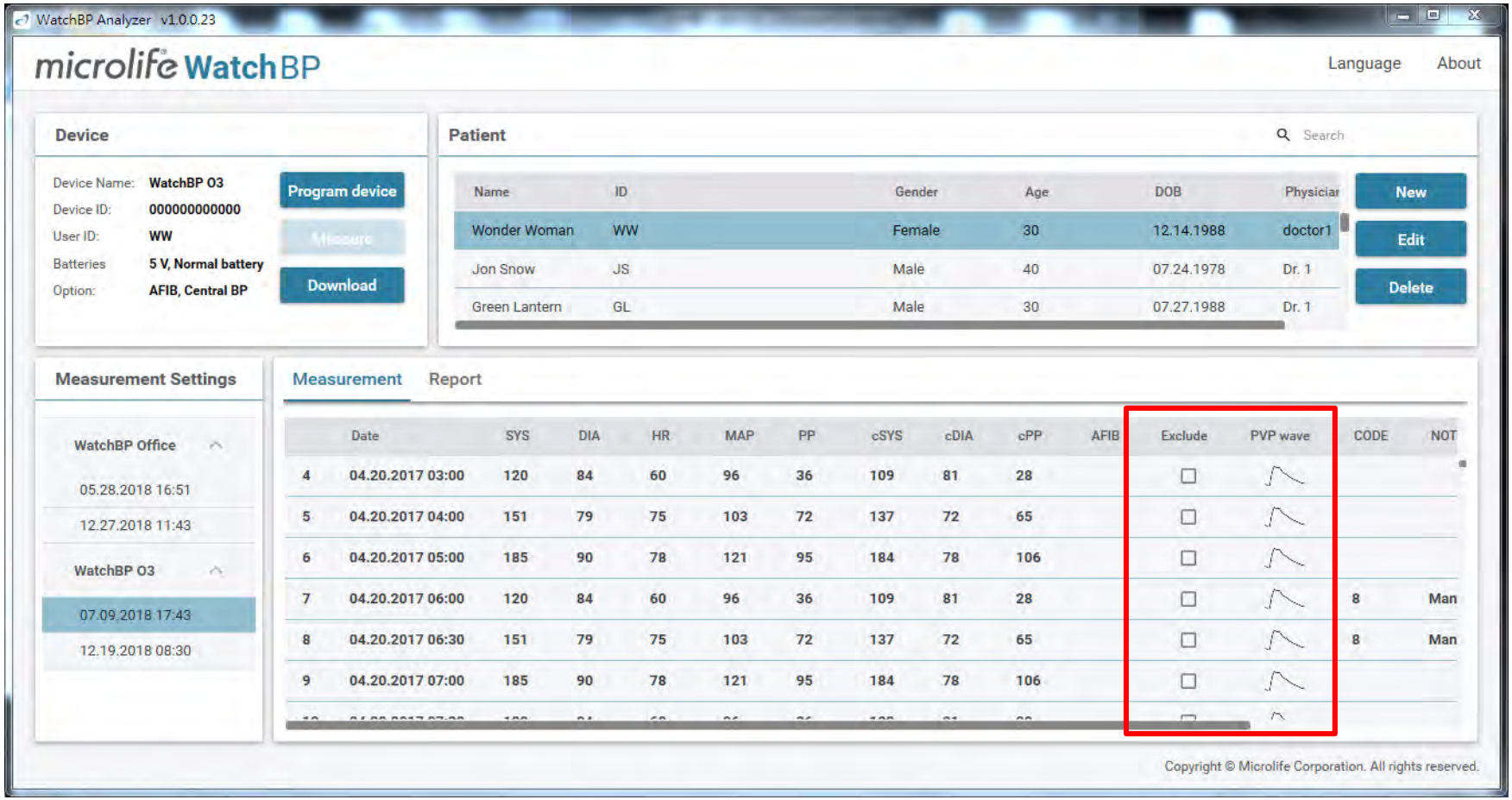
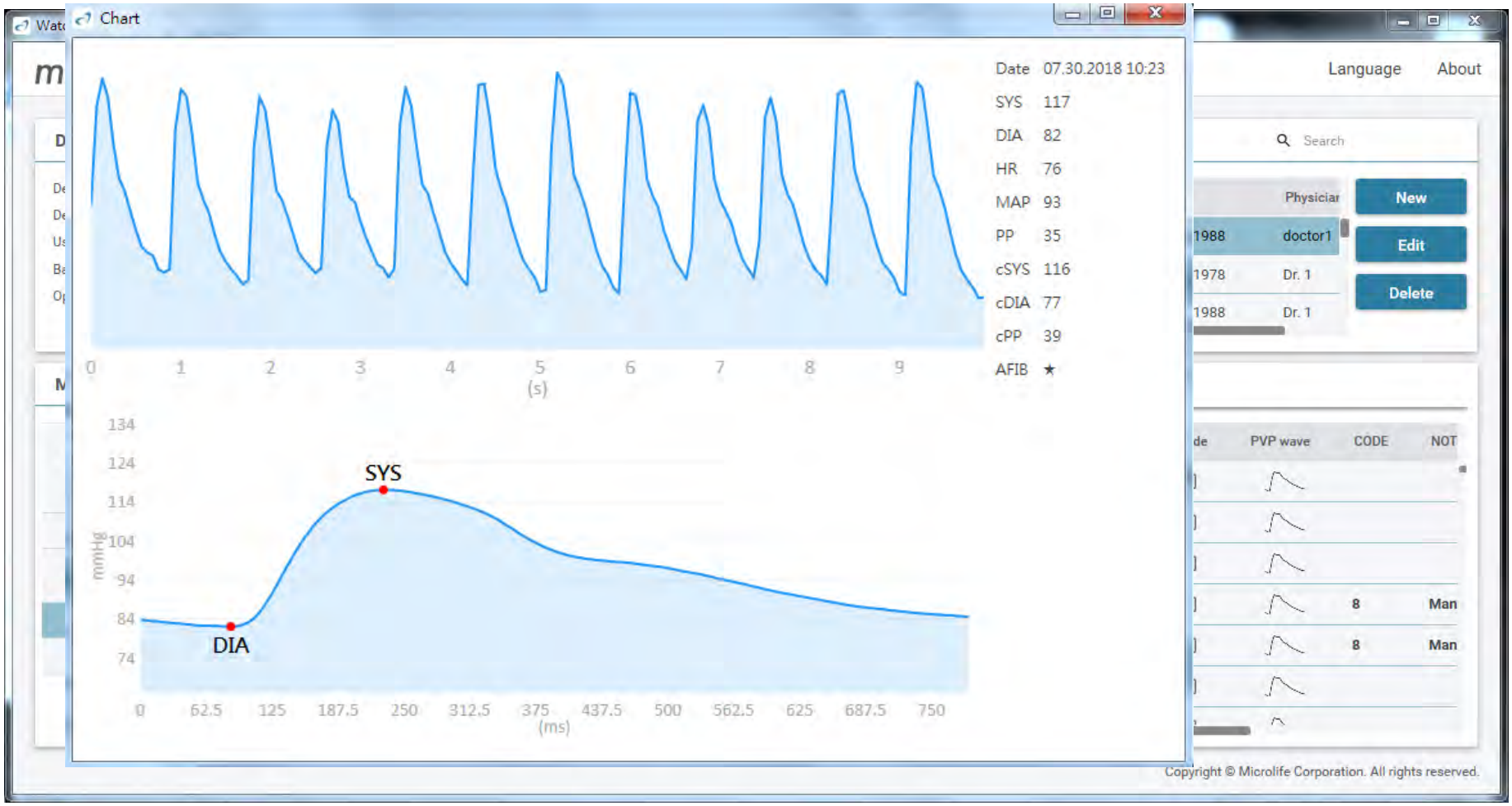


WatchBP Analyzer – Pulse wave analysis

- For central blood pressure measurement Pulse Waves can be displayed

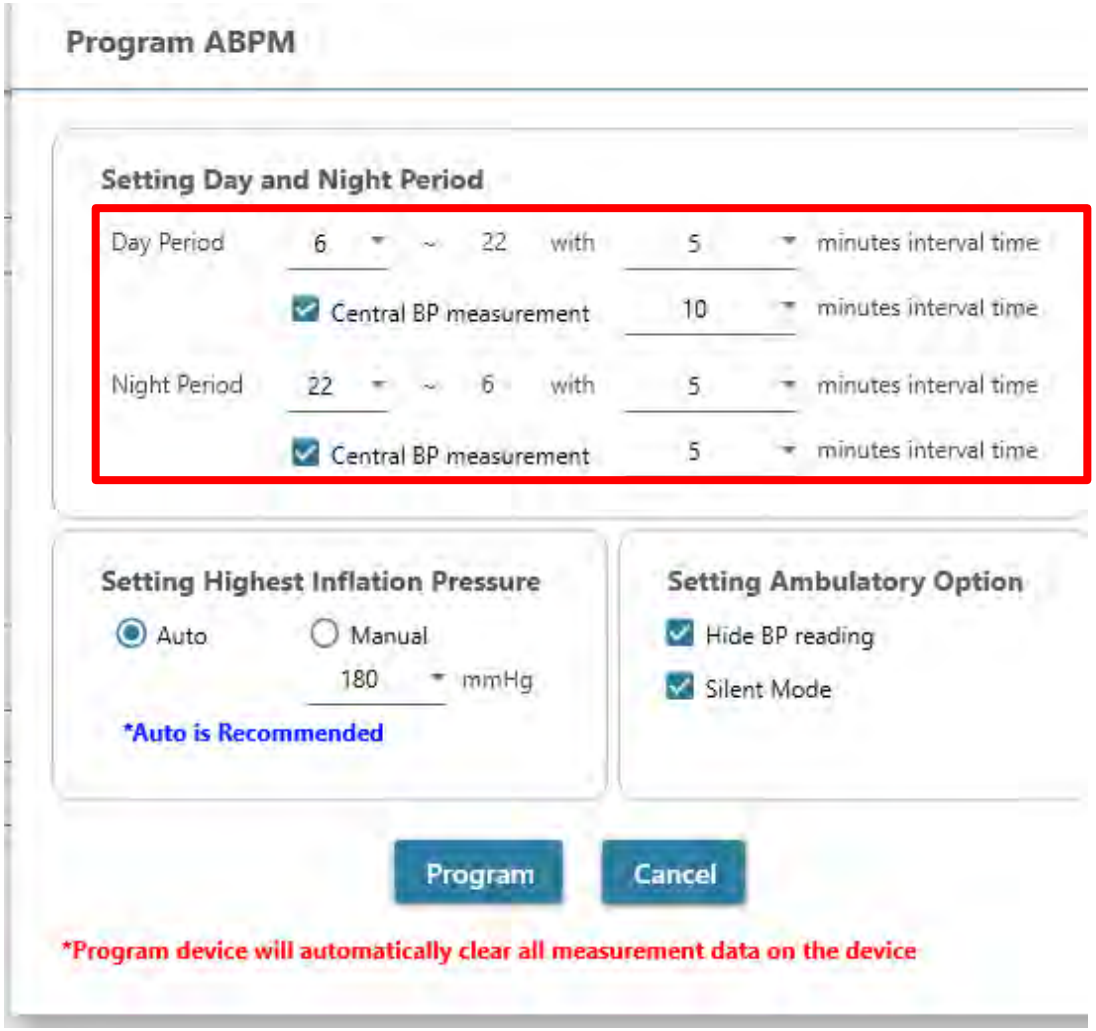


WatchBP Analyzer – Pulse wave analysis

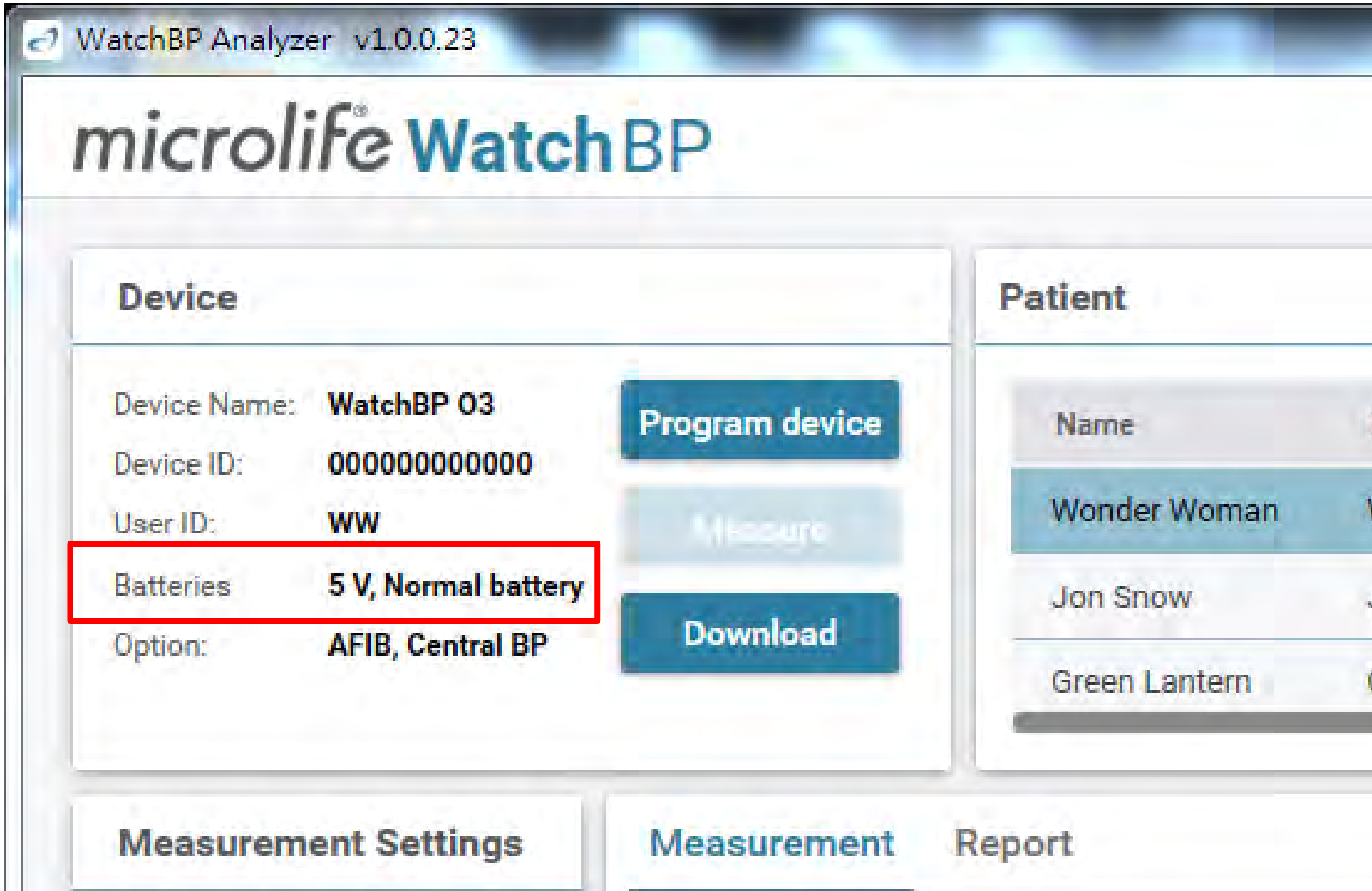


Central blood pressure measurement (CBPM)

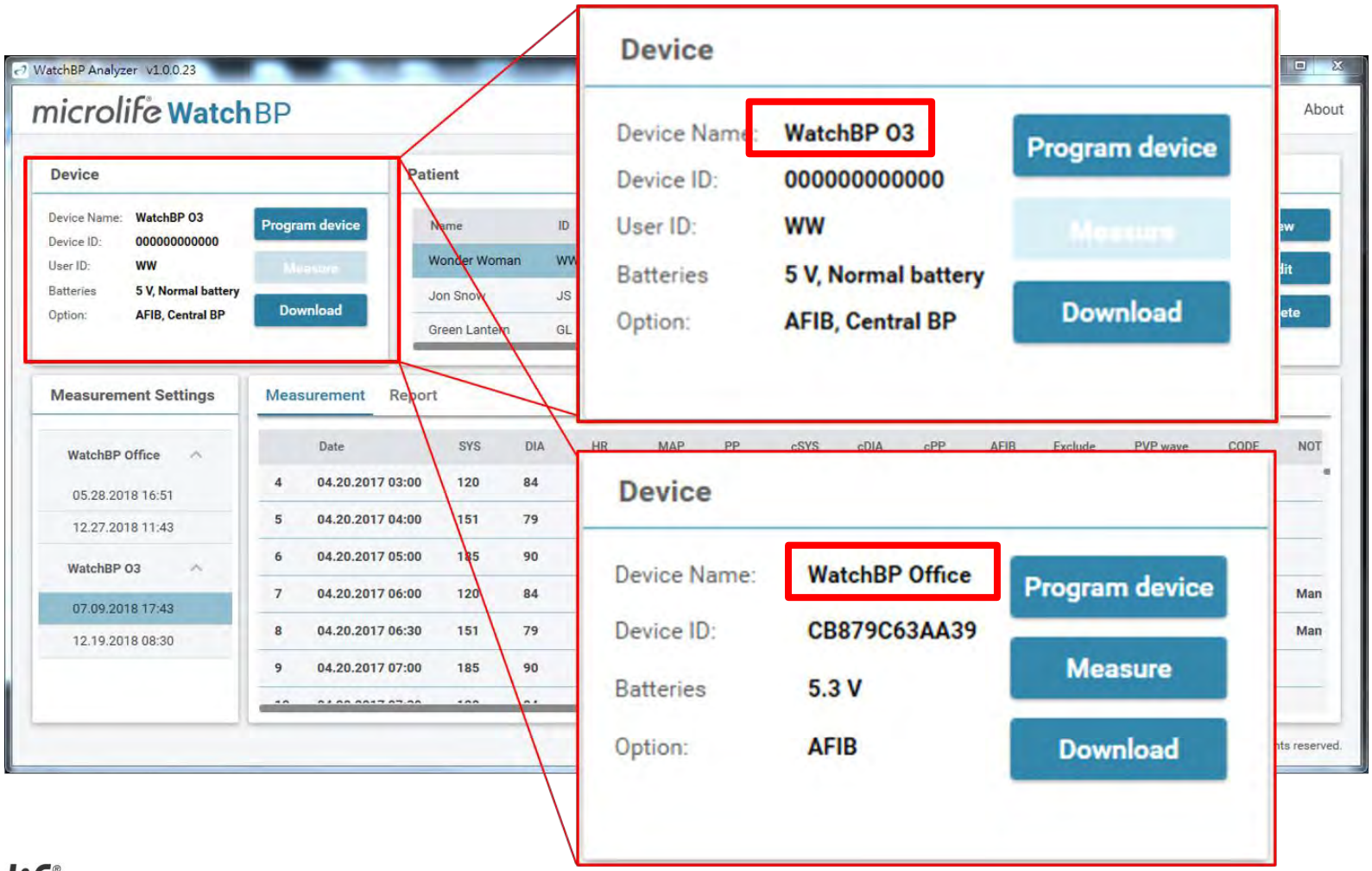
- The schedule for CBPM can be programmed separately from the regular measurement schedule



Battery indicator



WatchBP O3 and WatchBP Office 2G have the same software; WatchBP Analyzer



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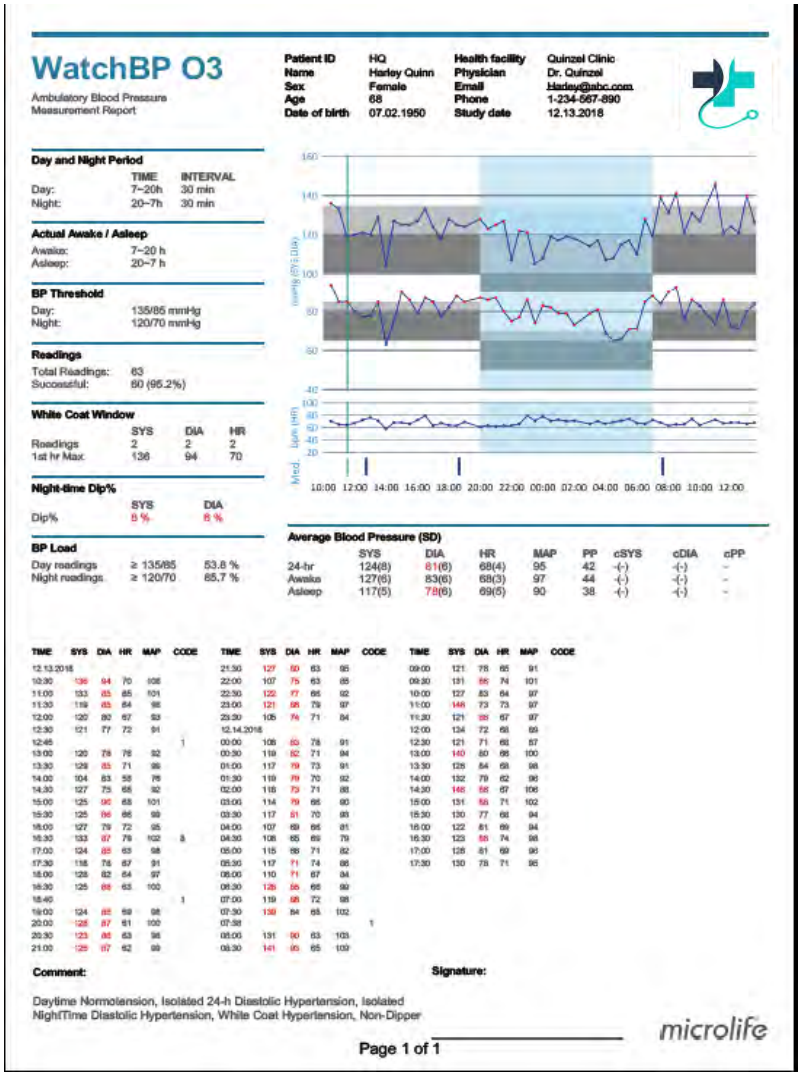
Reports



WatchBP O3

Ambulatory Blood Pressure Measurement Report

Patient ID	HQ	**Health facility**	Quinzel Clinic
Name	Harley Quinn	**Physician**	Dr. Quinzel
Sex	Female	**Email**	Harley@abc.com
Age	68	**Phone**	1-234-567-890
Date of birth	07.02.1950	**Study date**	12.13.2018

Day and Night Period

	TIME	INTERVAL
Day:	7–20h	30 min
Night:	20–7h	30 min

Actual Awake / Asleep

Awake:	7–20 h
Asleep:	20–7 h

BP Threshold

Day:	135/85 mmHg
Night:	120/70 mmHg

Readings

Total Readings:	63
Successful:	60 (95.2%)

White Coat Window

	SYS	DIA	HR
Readings	2	2	2
1st hr Max	136	94	70

Night-time Dip%

	SYS	DIA
Dip%	8 %	8 %

BP Load

Day readings	≥ 135/85	53.8 %
Night readings	≥ 120/70	85.7 %

Average Blood Pressure (SD)

	SYS	DIA	HR	MAP	PP	cSYS	cDIA	cPP
24-hr	124(8)	81(6)	68(4)	95	42	-(-)	-(-)	-
Awake	127(8)	83(6)	68(3)	97	44	-(-)	-(-)	-
Asleep	117(5)	78(6)	69(5)	90	38	-(-)	-(-)	-

TIME	SYS	DIA	HR	MAP	CODE	TIME	SYS	DIA	HR	MAP	CODE	TIME	SYS	DIA	HR	MAP	CODE
12.13.2018						21:30	127	80	83	95		09:00	121	78	85	91	
10:30	136	94	70	108		22:00	107	75	63	85		09:30	131	85	74	101	
11:00	133	85	85	101		22:30	122	77	86	92		10:00	127	83	84	97	
11:30	119	83	84	98		23:00	121	86	79	97		11:00	146	73	73	97	
12:00	120	80	67	93		23:30	105	76	71	84		11:30	121	88	67	97	
12:30	121	77	72	91		12.14.2018						12:00	134	72	68	89	
12:45					1	00:00	108	80	78	91		12:30	121	71	66	87	
13:00	120	78	78	92		00:30	119	82	71	94		13:00	140	80	86	100	
13:30	129	85	71	99		01:00	117	79	73	91		13:30	128	84	68	98	
14:00	104	83	58	78		01:30	119	79	70	92		14:00	132	79	62	96	
14:30	127	75	66	92		02:00	116	79	71	88		14:30	146	86	67	106	
15:00	125	90	63	101		03:00	114	79	66	80		15:00	131	86	71	102	
15:30	125	86	66	99		03:30	117	81	70	93		15:30	130	77	68	94	
16:00	127	79	72	95		04:00	107	69	66	81		16:00	122	81	69	94	
16:30	133	87	78	102	a	04:30	108	65	69	79		16:30	123	86	74	98	
17:00	124	85	63	98		05:00	115	88	71	82		17:00	128	81	69	90	
17:30	118	76	67	91		05:30	117	71	74	86		17:30	130	78	71	95	
18:00	128	82	64	97		06:00	110	71	67	84							
18:30	125	84	63	100		06:30	126	86	66	99							
18:45					1	07:00	119	68	72	98							
19:00	124	85	69	98		07:30	139	84	65	102							
20:00	128	87	61	100		07:58					1						
20:30	123	86	63	96		08:00	131	90	63	103							
21:00	129	87	62	99		08:30	141	95	65	109							

Comment:

Daytime Normotension, Isolated 24-h Diastolic Hypertension, Isolated NightTime Diastolic Hypertension, White Coat Hypertension, Non-Dipper

Signature:

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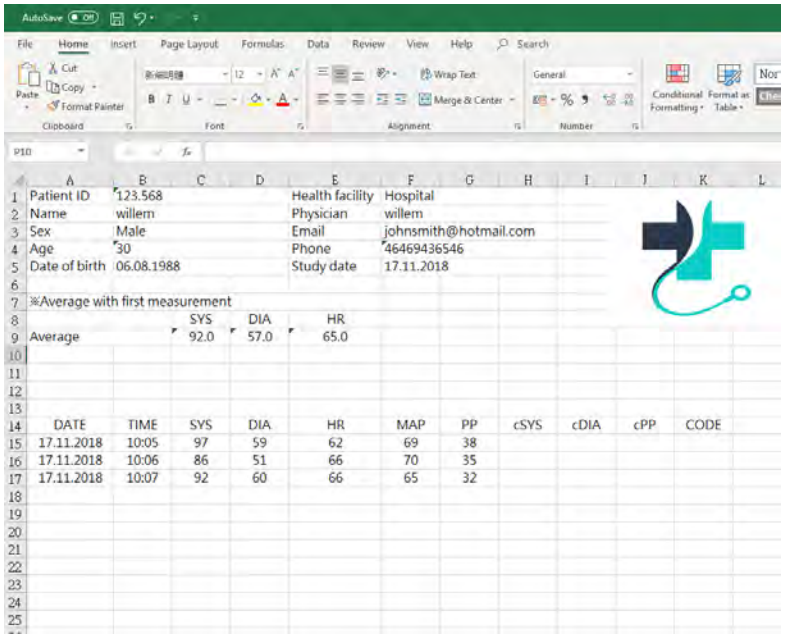

	A	B	C	D	E	F	G	H	I	J	K	L
1	Patient ID	123.568			Health facility	Hospital						
2	Name	willem			Physician	willem						
3	Sex	Male			Email	johnsmith@hotmail.com						
4	Age	30			Phone	46469436546						
5	Date of birth	06.08.1988			Study date	17.11.2018						
6												
7	※Average with first measurement											
8			SYS		DIA		HR					
9	Average		92.0		57.0		65.0					
10												
11												
12												
13												
14	DATE	TIME	SYS	DIA	HR	MAP	PP	cSYS	cDIA	cPP	CODE	
15	17.11.2018	10:05	97	59	62	69	38					
16	17.11.2018	10:06	86	51	66	70	35					
17	17.11.2018	10:07	92	60	66	65	32					
18												
19												
20												
21												
22												
23												
24												
25												

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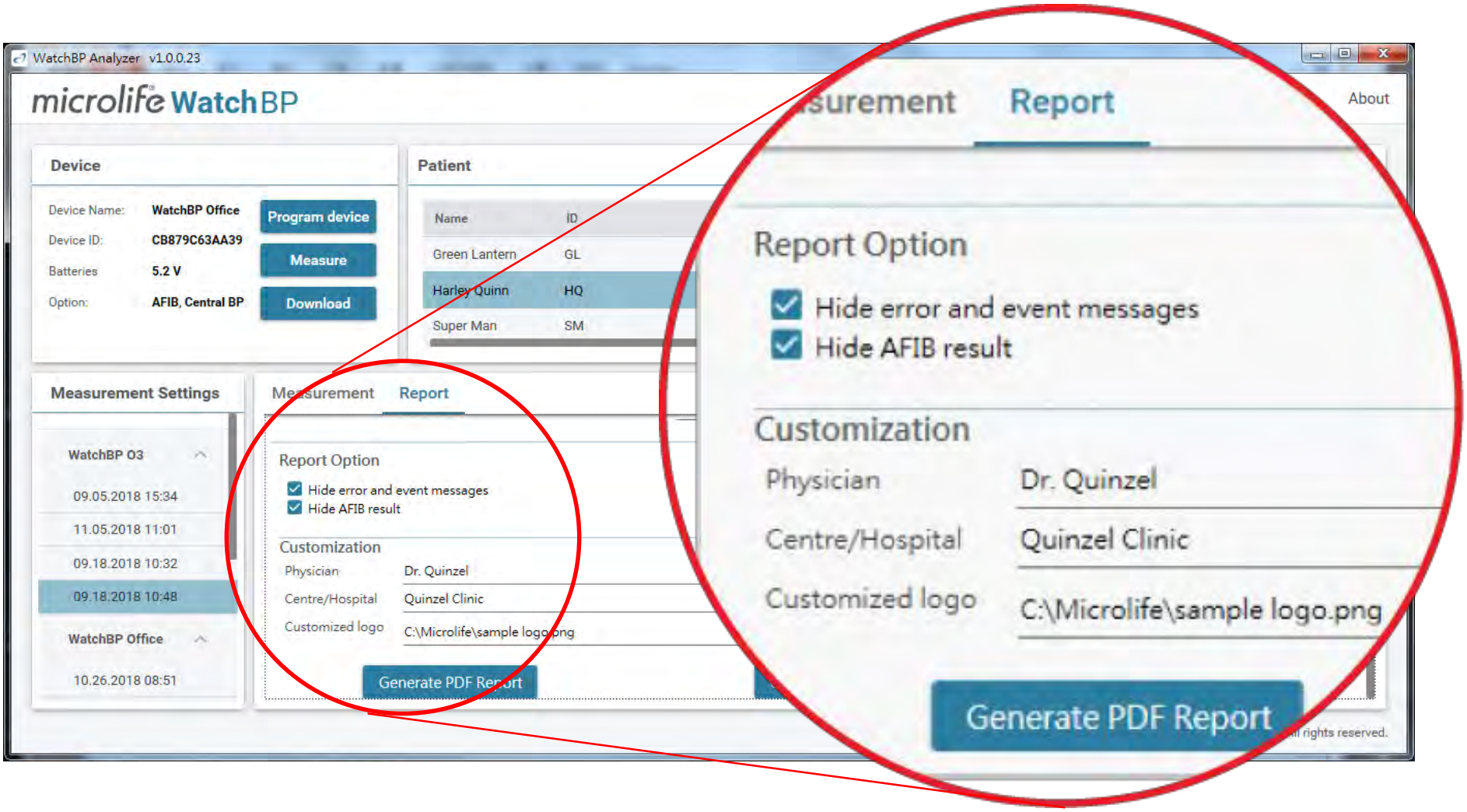
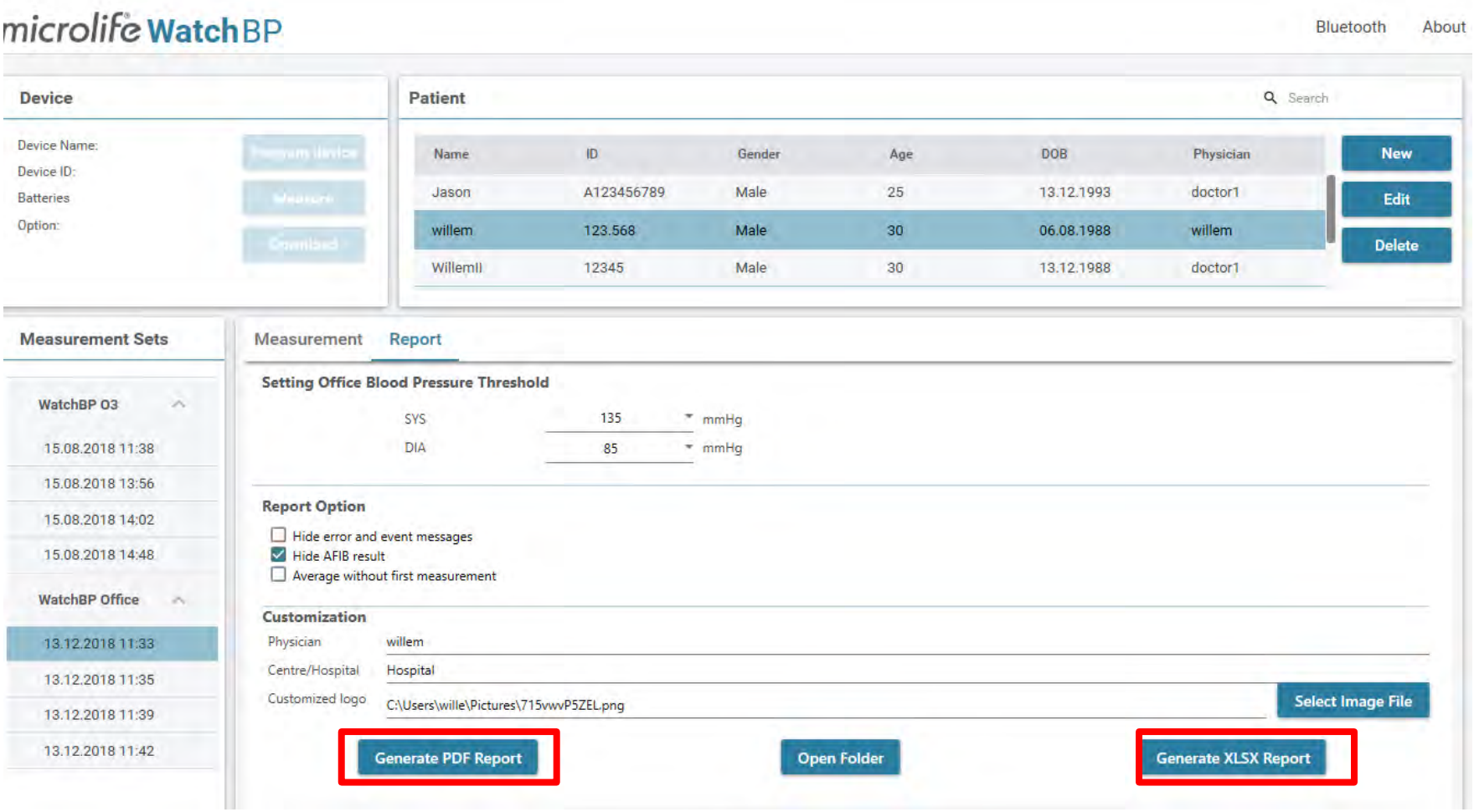
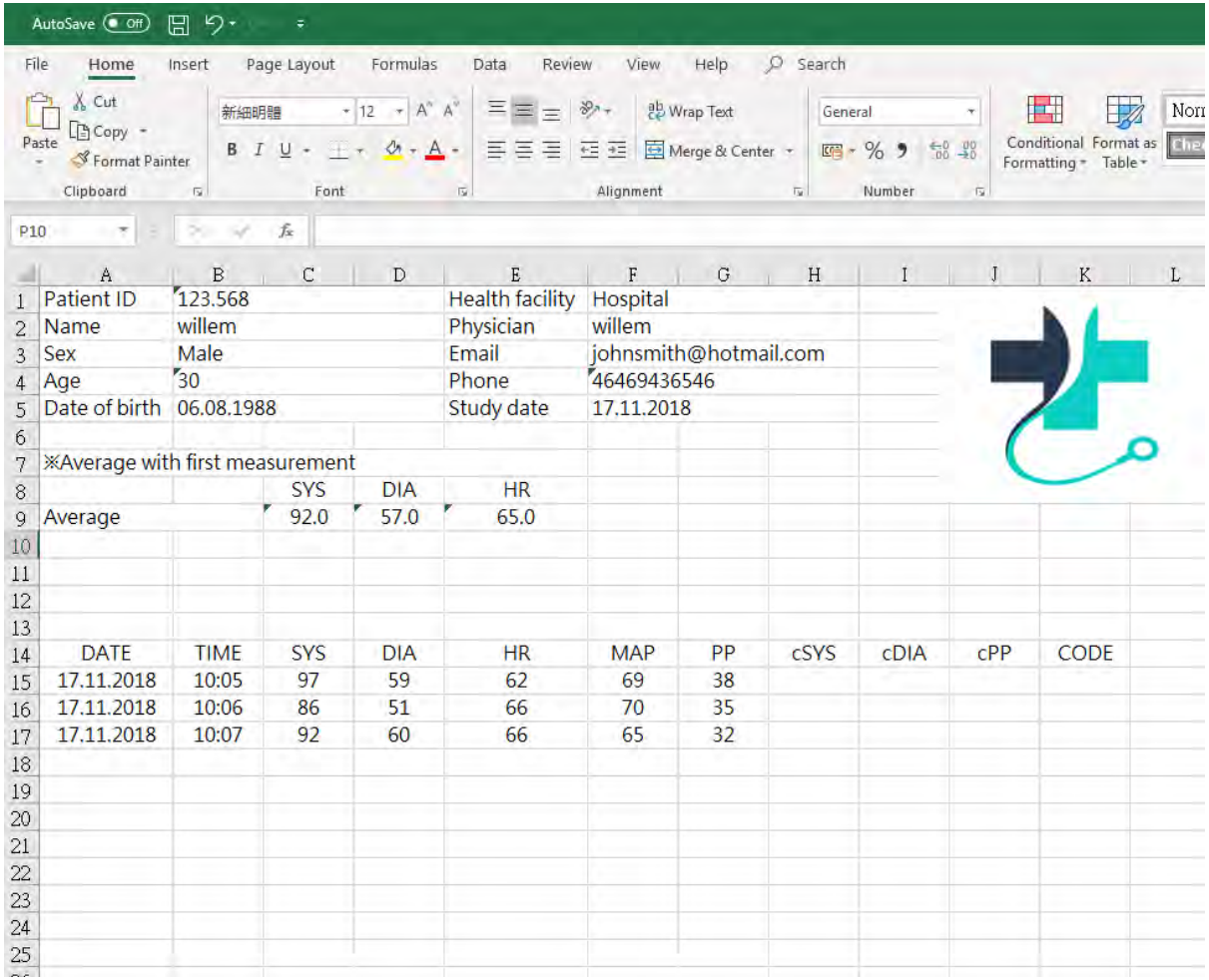
WatchBP Analyzer- Report Customization



Report in PDF or in XLSX



XLSX report Hospital logo can be implemented



	A	B	C	D	E	F
1	Patient ID	123.568			Health facility	Hospital
2	Name	willem			Physician	willem
3	Sex	Male			Email	johnsmith@hotmail.com
4	Age	30			Phone	46469436546
5	Date of birth	06.08.1988			Study date	17.11.2018
6						
7	※Average with first measurement					
8			SYS	DIA	HR	
9	Average		92.0	57.0	65.0	

	DATE	TIME	SYS	DIA	HR	MAP	PP	cSYS	cDIA	cPP	CODE
15	17.11.2018	10:05	97	59	62	69	38				
16	17.11.2018	10:06	86	51	66	70	35				
17	17.11.2018	10:07	92	60	66	65	32				

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PDF report

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WatchBP O3

Ambulatory Blood Pressure Measurement Report

Patient ID	HQ	**Health facility**	Quinzel Clinic
Name	Harley Quinn	**Physician**	Dr. Quinzel
Sex	Female	**Email**	Hadey@abc.com
Age	68	**Phone**	1-234-567-890
Date of birth	07.02.1950	**Study date**	12.13.2018

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	TIME	INTERVAL
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White Coat Window

	SYS	DIA	HR
Readings	2	2	2
1st hr Max	136	94	70

Night-time Dip%

	SYS	DIA
Dip%	8 %	8 %

BP Load

Day readings	≥ 135/85	53.8 %
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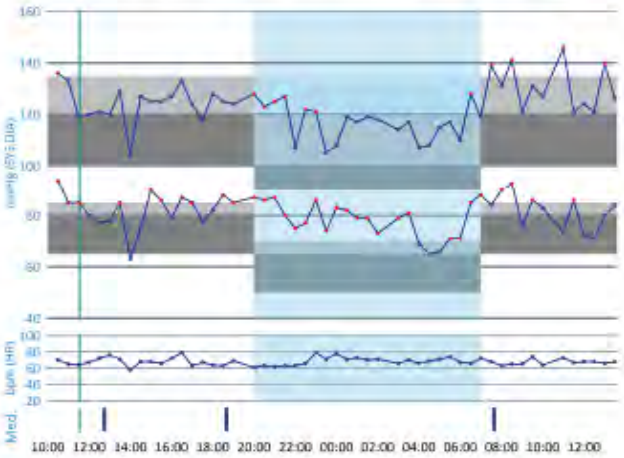

Average Blood Pressure (SD)

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24-hr	124(8)	81(6)	68(4)	95	42	-(-)	-(-)	-
Awake	127(6)	83(6)	68(3)	97	44	-(-)	-(-)	-
Asleep	117(5)	78(6)	69(5)	90	38	-(-)	-(-)	-

TIME	SYS	DIA	HR	MAP	CODE	TIME	SYS	DIA	HR	MAP	CODE	TIME	SYS	DIA	HR	MAP	CODE
12.13.2018						21:30	127	80	63	95		09:00	121	78	65	91	
10:30	136	94	70	108		22:00	107	75	63	85		09:30	131	88	74	101	
11:00	133	85	85	101		22:30	122	77	66	92		10:00	127	83	64	97	
11:30	119	85	64	98		23:00	121	86	79	97		11:00	148	73	73	97	
12:00	120	80	67	93		23:30	105	74	71	84		11:30	121	88	67	97	
12:30	121	77	72	91		12.14.2018						12:00	134	72	68	89	
12:45					1	00:00	108	85	78	91		12:30	121	71	68	87	
13:00	120	78	78	92		00:30	119	82	71	94		13:00	140	80	66	100	
13:30	129	85	71	99		01:00	117	79	73	91		13:30	128	84	68	98	
14:00	104	83	58	78		01:30	119	79	70	92		14:00	132	79	62	96	
14:30	127	75	66	92		02:00	116	73	71	88		14:30	148	88	67	108	
15:00	125	90	68	101		03:00	114	79	66	90		15:00	131	88	71	102	
15:30	125	86	66	99		03:30	117	81	70	93		15:30	130	77	68	94	
16:00	127	79	72	95		04:00	107	69	66	81		16:00	122	81	69	94	
16:30	133	87	78	102	3	04:30	108	65	69	79		16:30	123	88	74	98	
17:00	124	85	63	98		05:00	115	88	71	82		17:00	128	81	69	96	
17:30	116	76	67	91		05:30	117	71	74	86		17:30	130	78	71	95	
18:00	128	82	64	97		06:00	110	71	67	84							
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18:40					1	07:00	119	88	72	98							
19:00	124	82	59	98		07:30	139	84	65	102							
20:00	128	87	61	100		07:58					1						
20:30	123	86	63	96		08:00	131	90	63	103							
21:00	129	87	62	99		08:30	141	86	65	109							

Comment:

Daytime Normotension, Isolated 24-h Diastolic Hypertension, Isolated NighTime Diastolic Hypertension, White Coat Hypertension, Non-Dipper

Signature:

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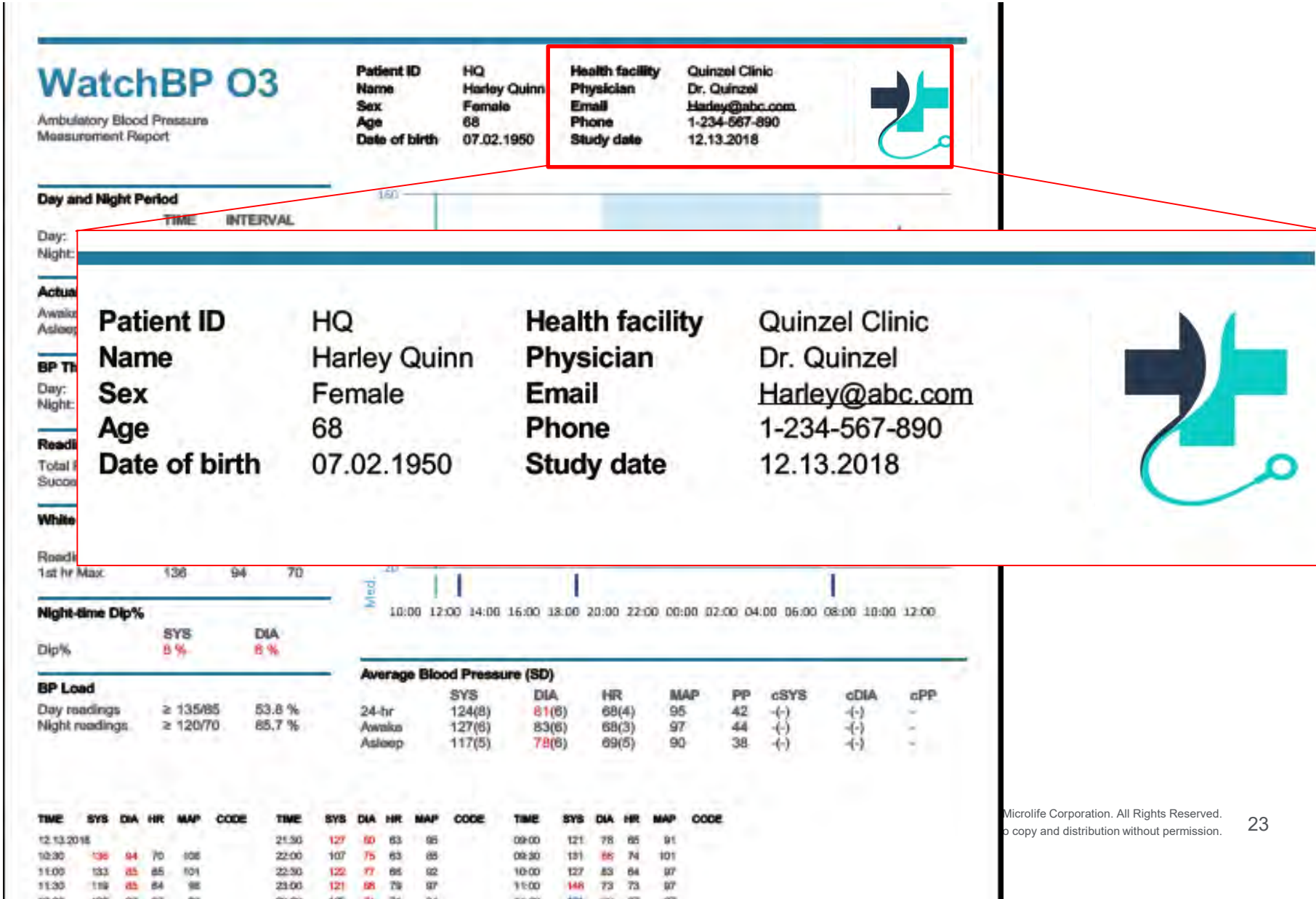
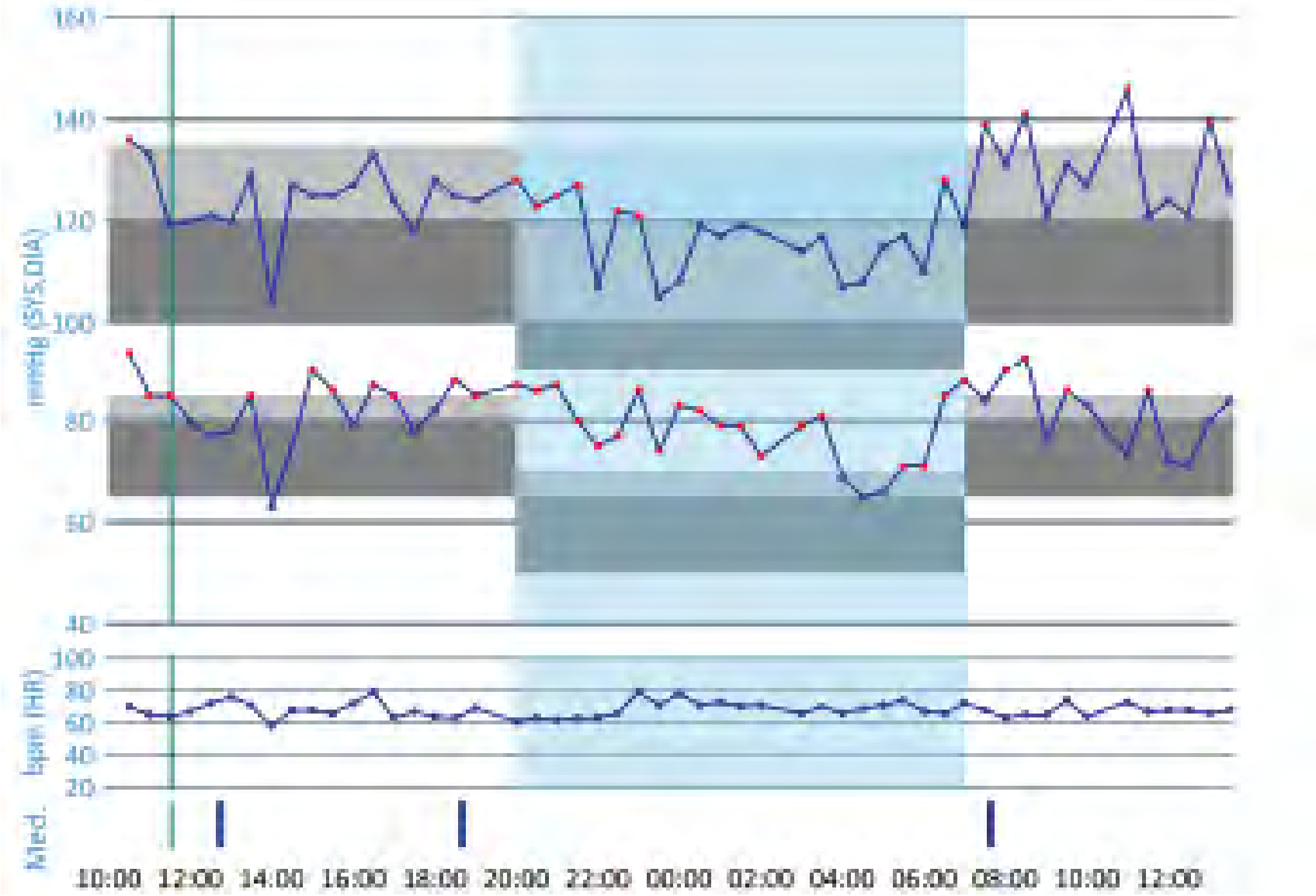
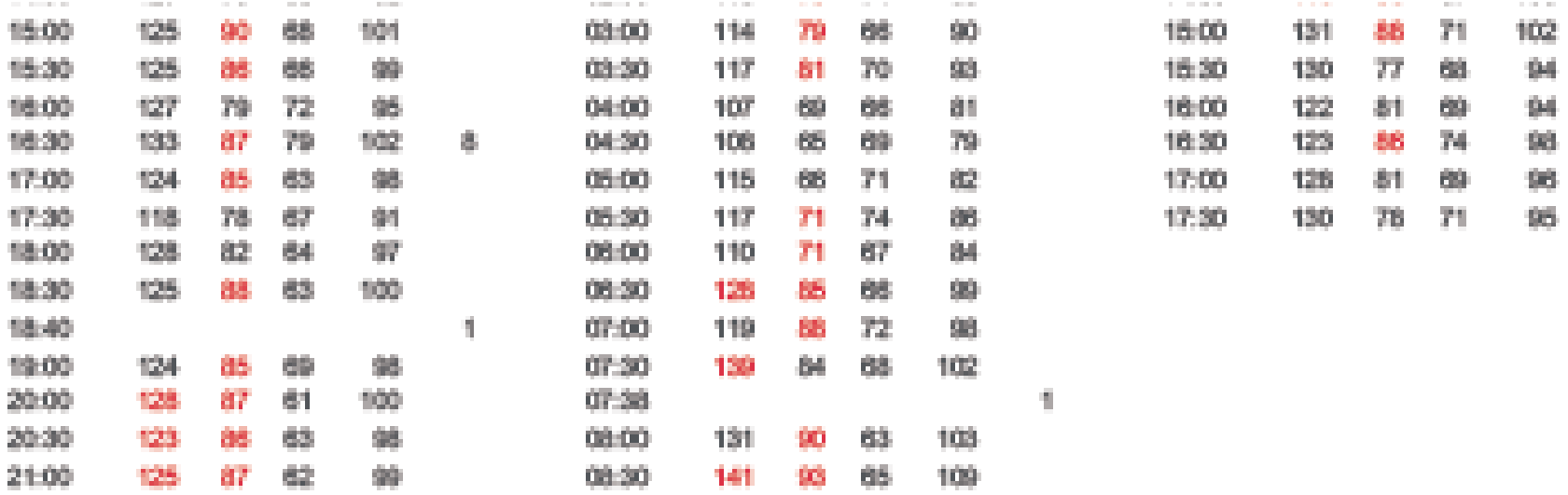
PDF report, Hospital logo can be implemented



PDF report, graph



PDF report, Automated comment



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15:30	125	86	66	99		03:30	117	81	70	93		15:30	130	77	66	94
16:00	127	79	72	95		04:00	107	69	66	81		16:00	122	81	69	94
16:30	133	87	79	102	8	04:30	106	65	69	79		16:30	123	86	74	98
17:00	124	85	63	96		05:00	115	66	71	82		17:00	126	81	69	96
17:30	118	78	67	91		05:30	117	71	74	86		17:30	130	76	71	95
18:00	128	82	64	97		06:00	110	71	67	84						
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19:00	124	85	69	96		07:30	139	84	66	102						
20:00	128	87	61	100		07:38					1					
20:30	123	86	63	96		08:00	131	90	63	103						
21:00	125	87	62	99		08:30	141	93	65	109						

Comment:

Signature:

Daytime Normotension, Isolated 24-h Diastolic Hypertension, Isolated NightTime Diastolic Hypertension, White Coat Hypertension, Non-Dipper

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Bluetooth WatchBP O3 Connectivity

- BT 4.2 connectivity
- To activate press Start/Stop for 5 seconds until the unique key appears on the Display

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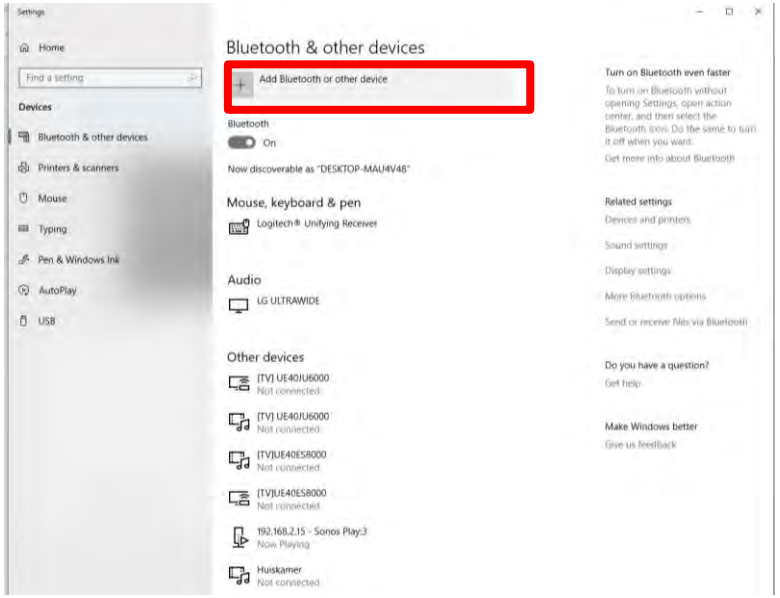
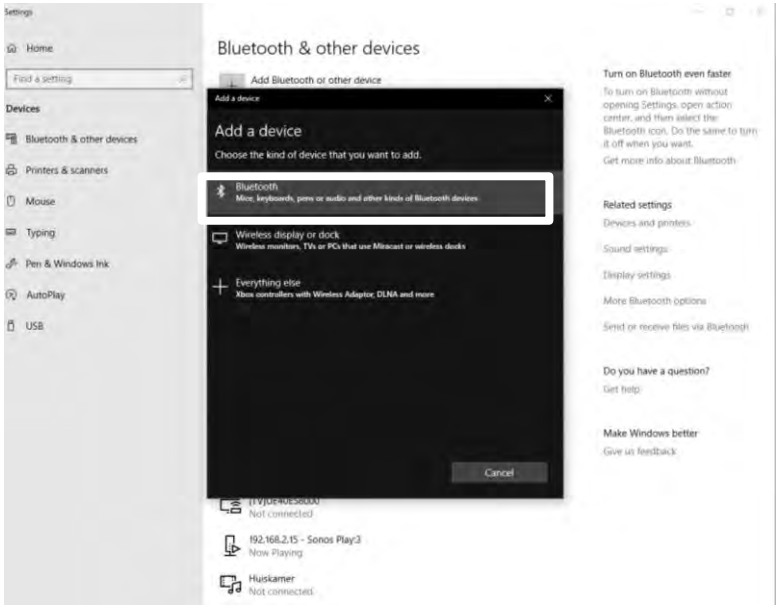
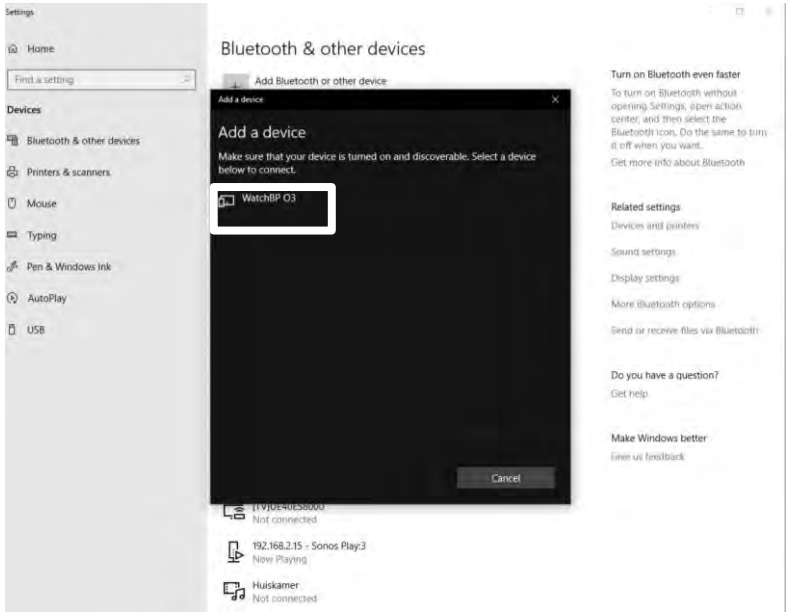
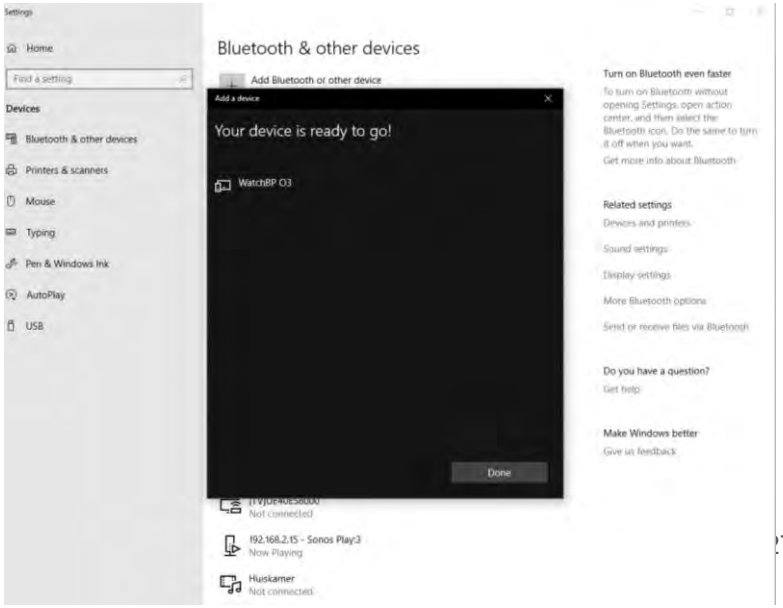
Bluetooth WatchBP O3 Connectivity



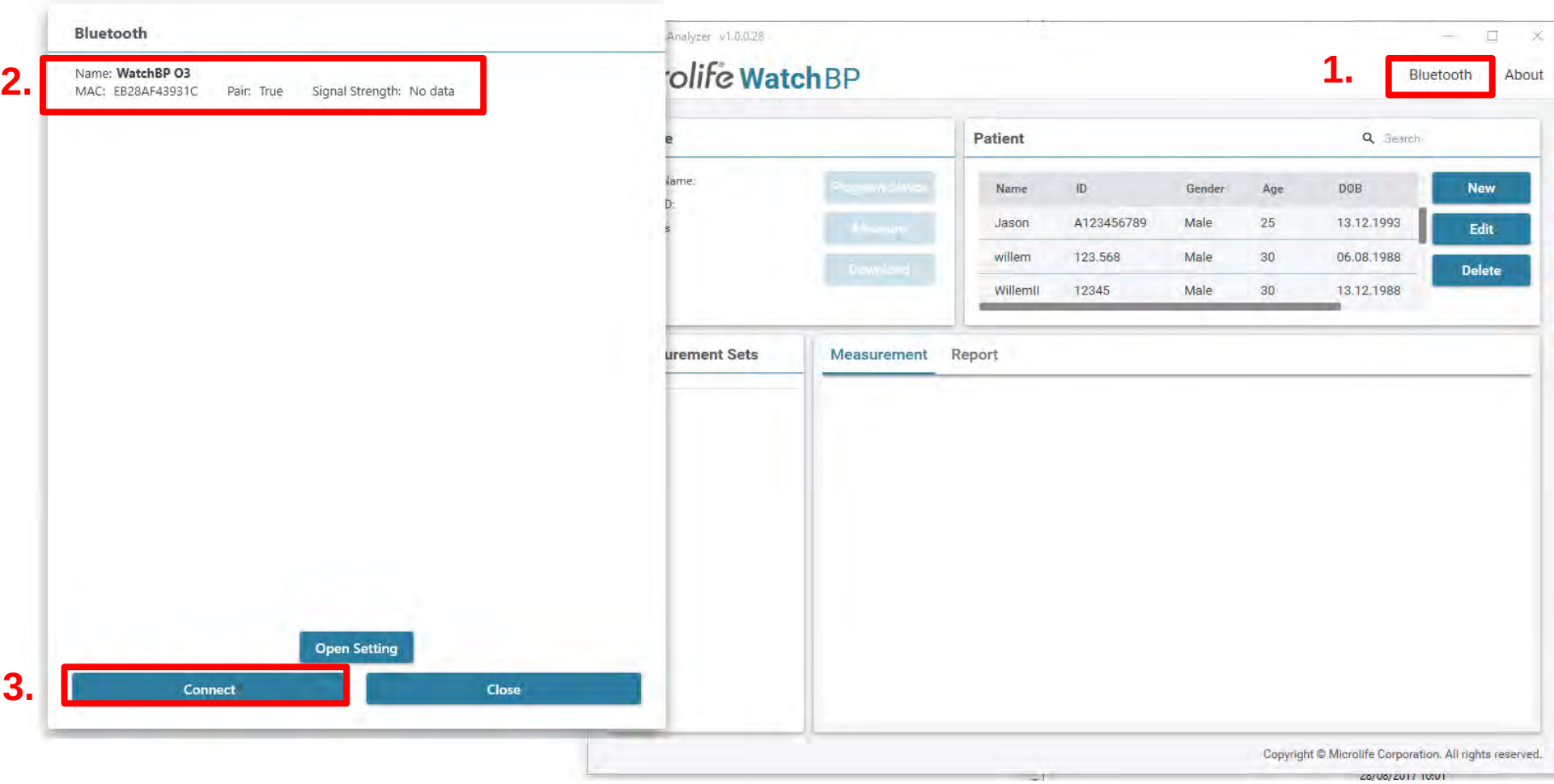




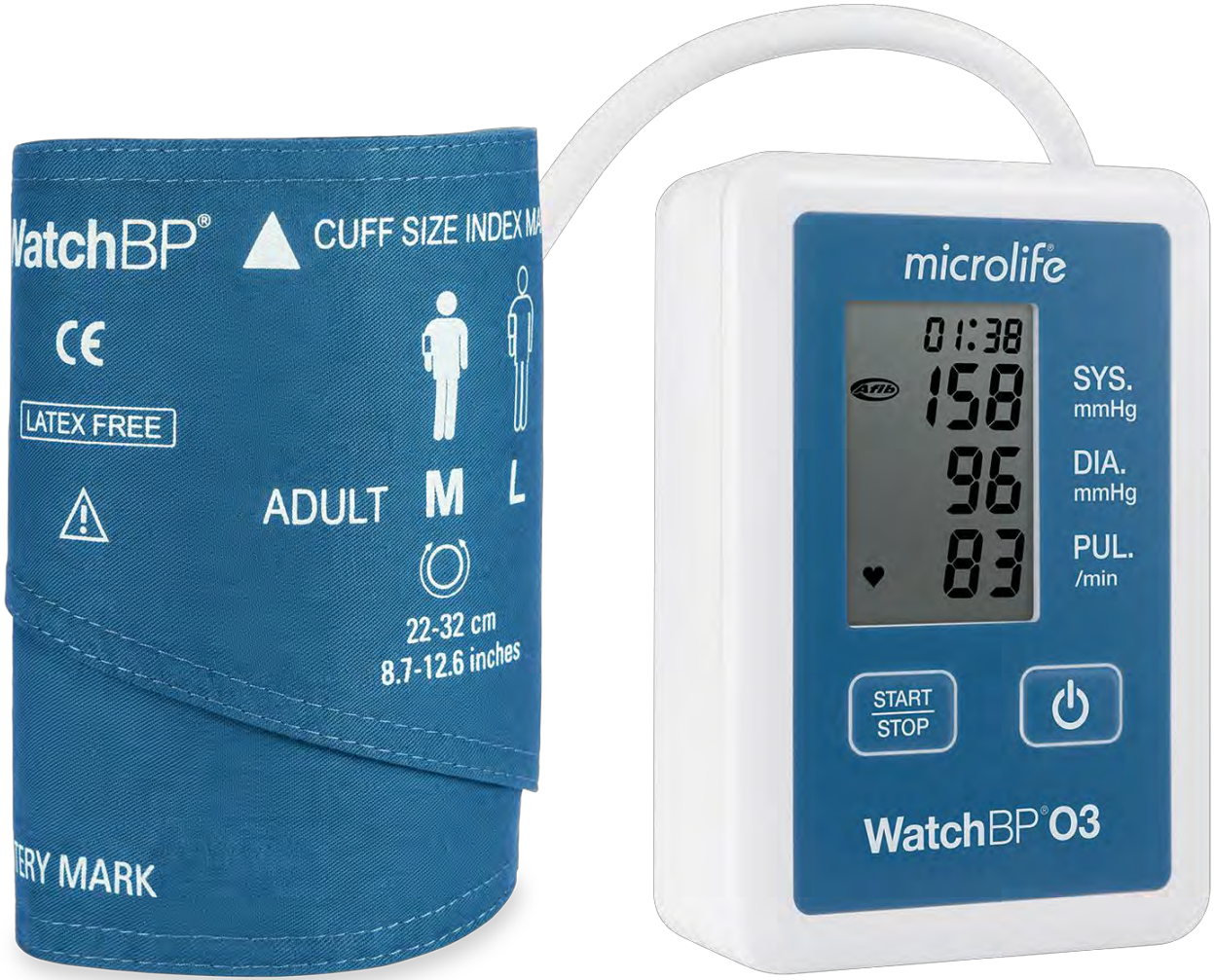


BT connectivity (3 steps to connect)

1. Open WatchBP Analyzer and
2. Click on “Bluetooth”, on the device and then on “Connect”



Upgrade the device, easy and convenient



Upgrade the device, easy and convenient

- Features that can be activated
  1. AFIB
  2. Central blood pressure measurement & AFIB

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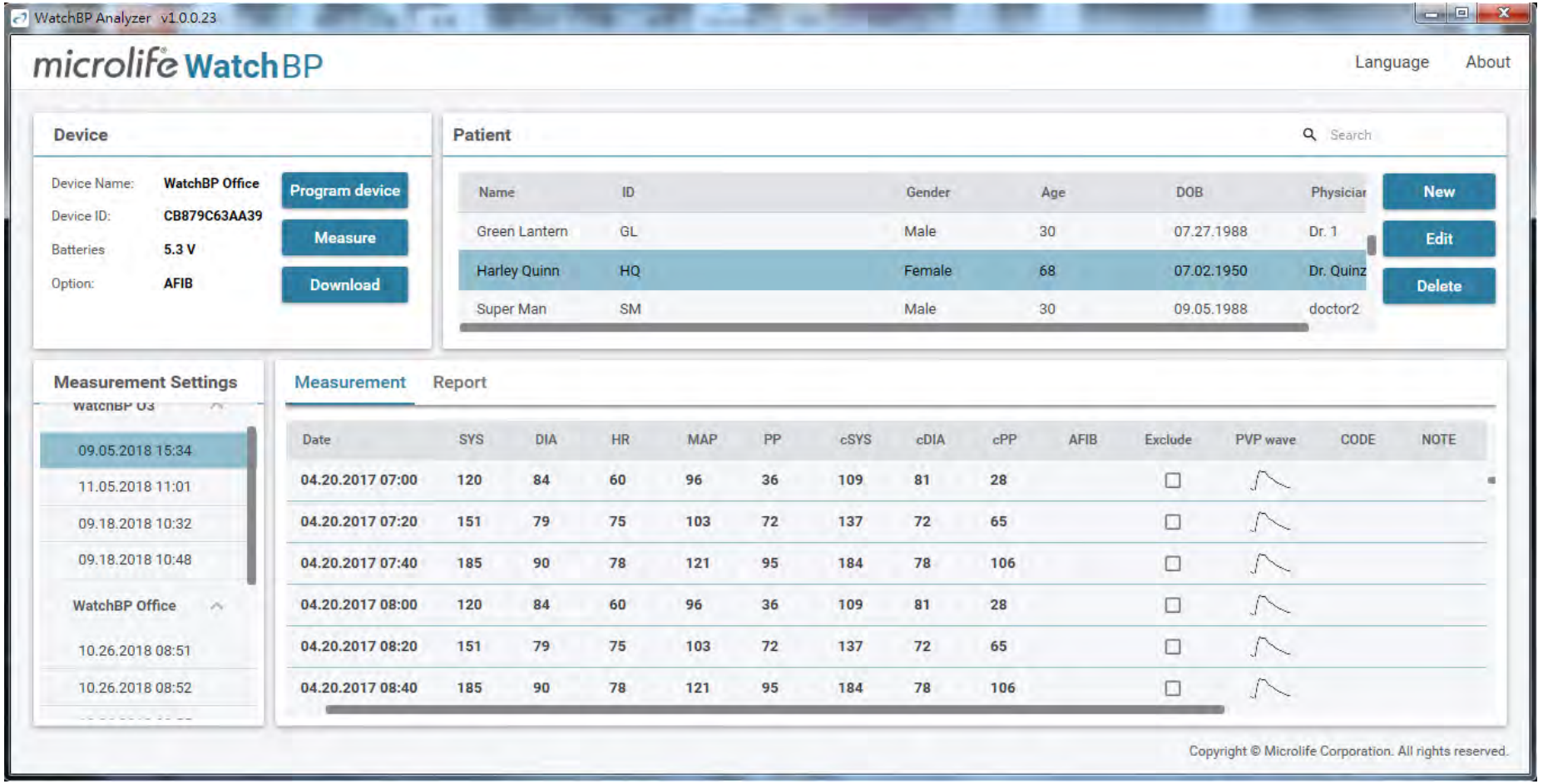
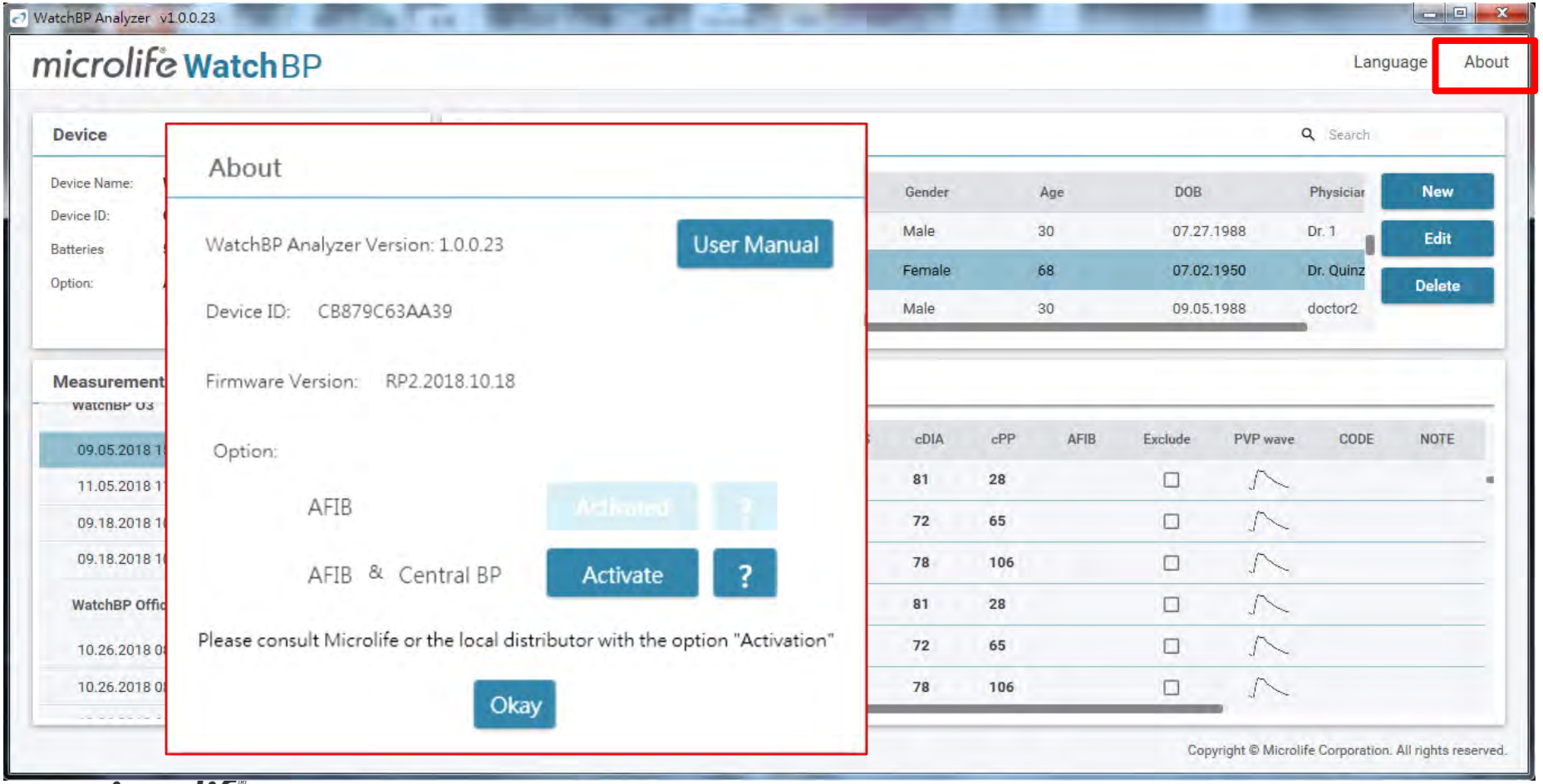
WatchBP Analyzer – activate device feature



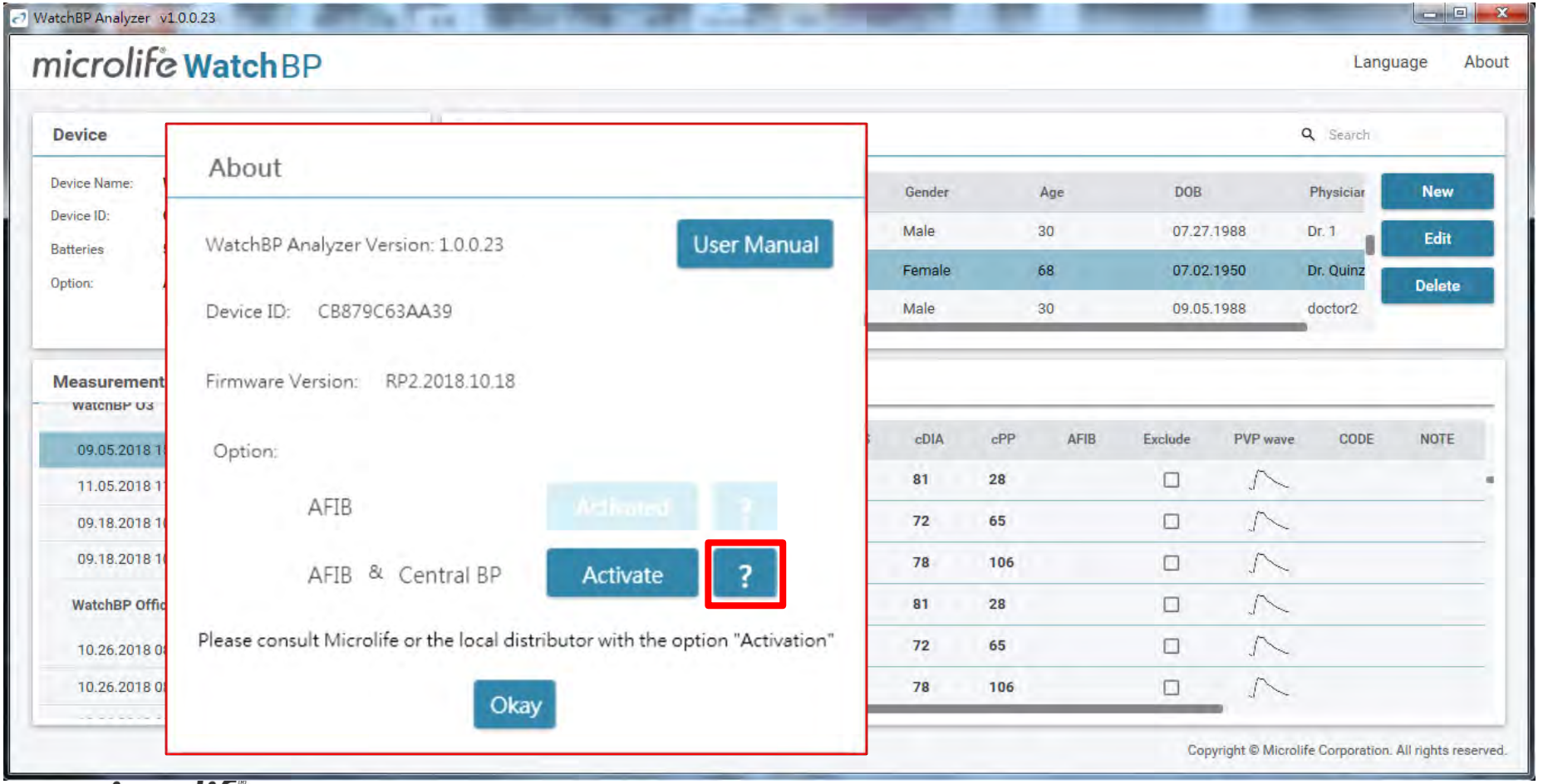
WatchBP Analyzer – activate device feature

- Click on “About”



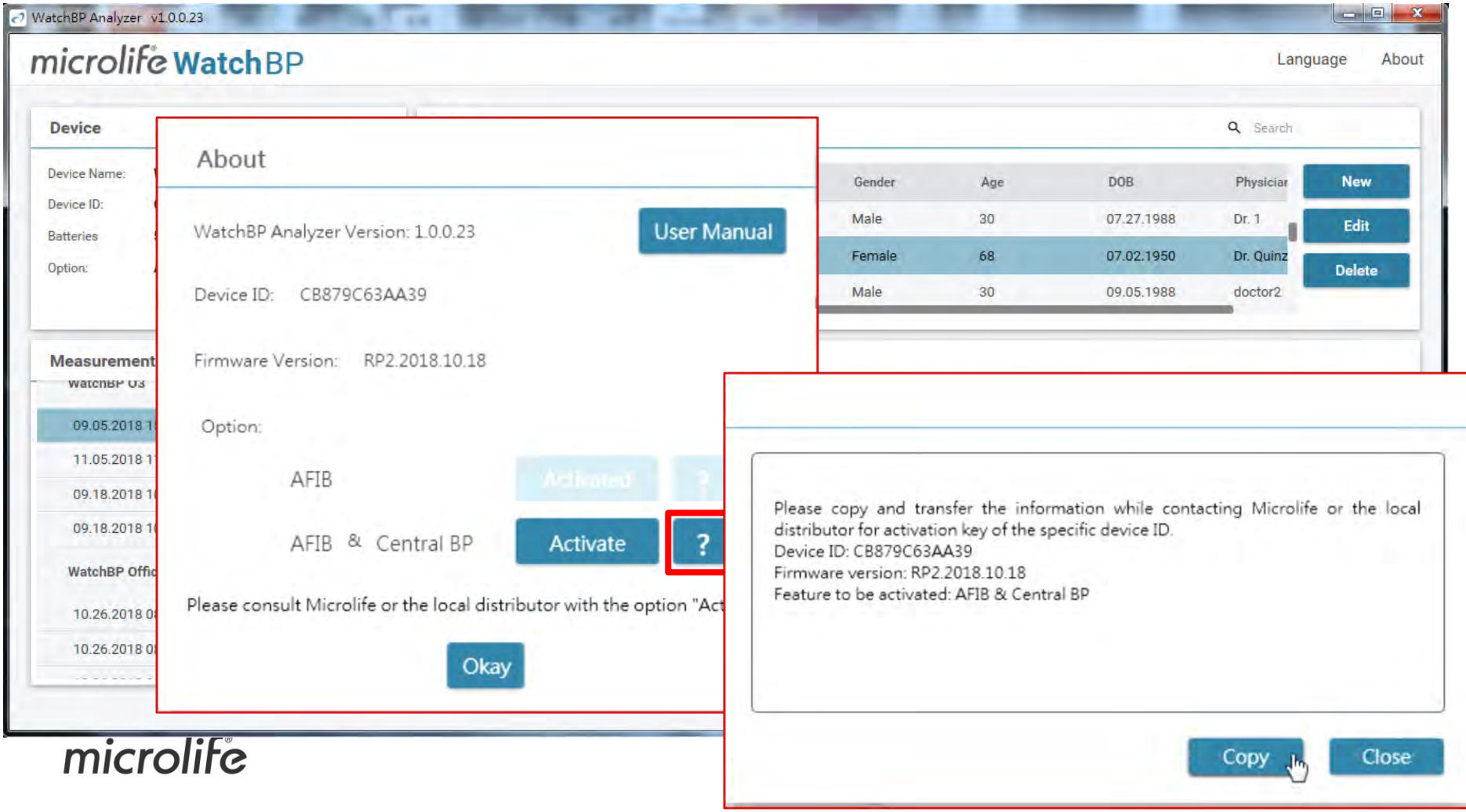
WatchBP Analyzer – activate device feature

- Click on “?” of the preferred option to activate

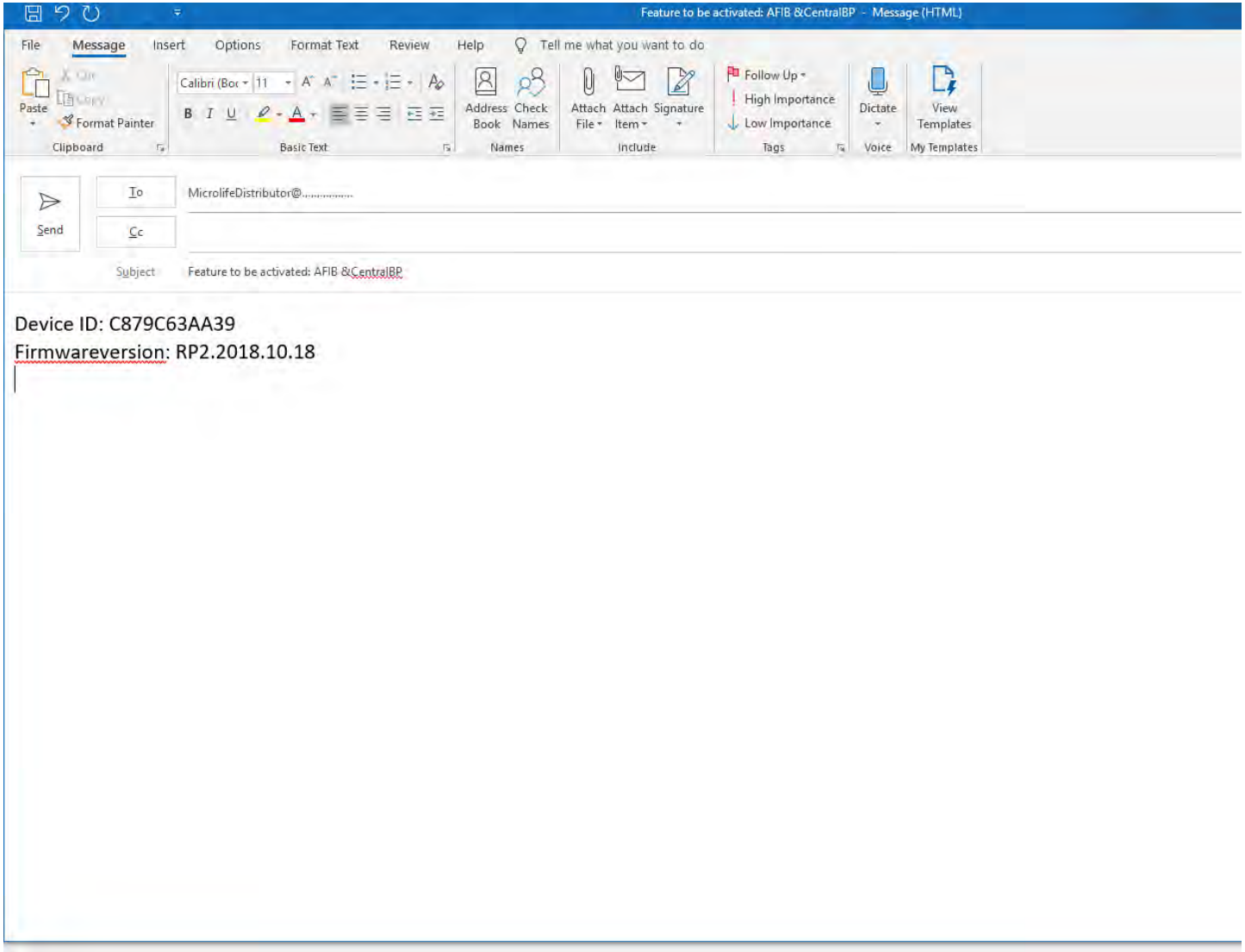


WatchBP Analyzer – activate device feature

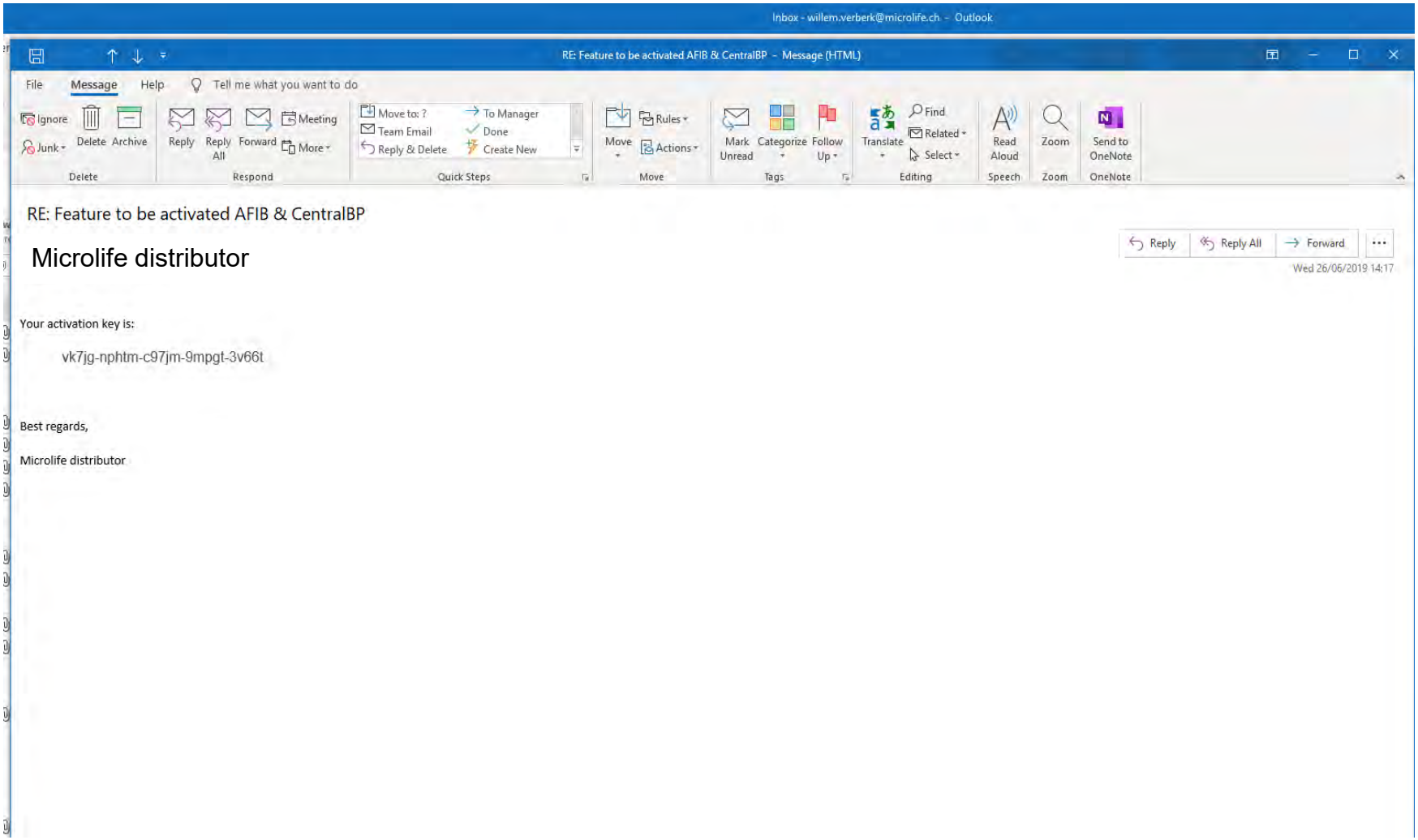
- Click on “Copy” for the required information activate



Send request to Microlife distributor or Microlife

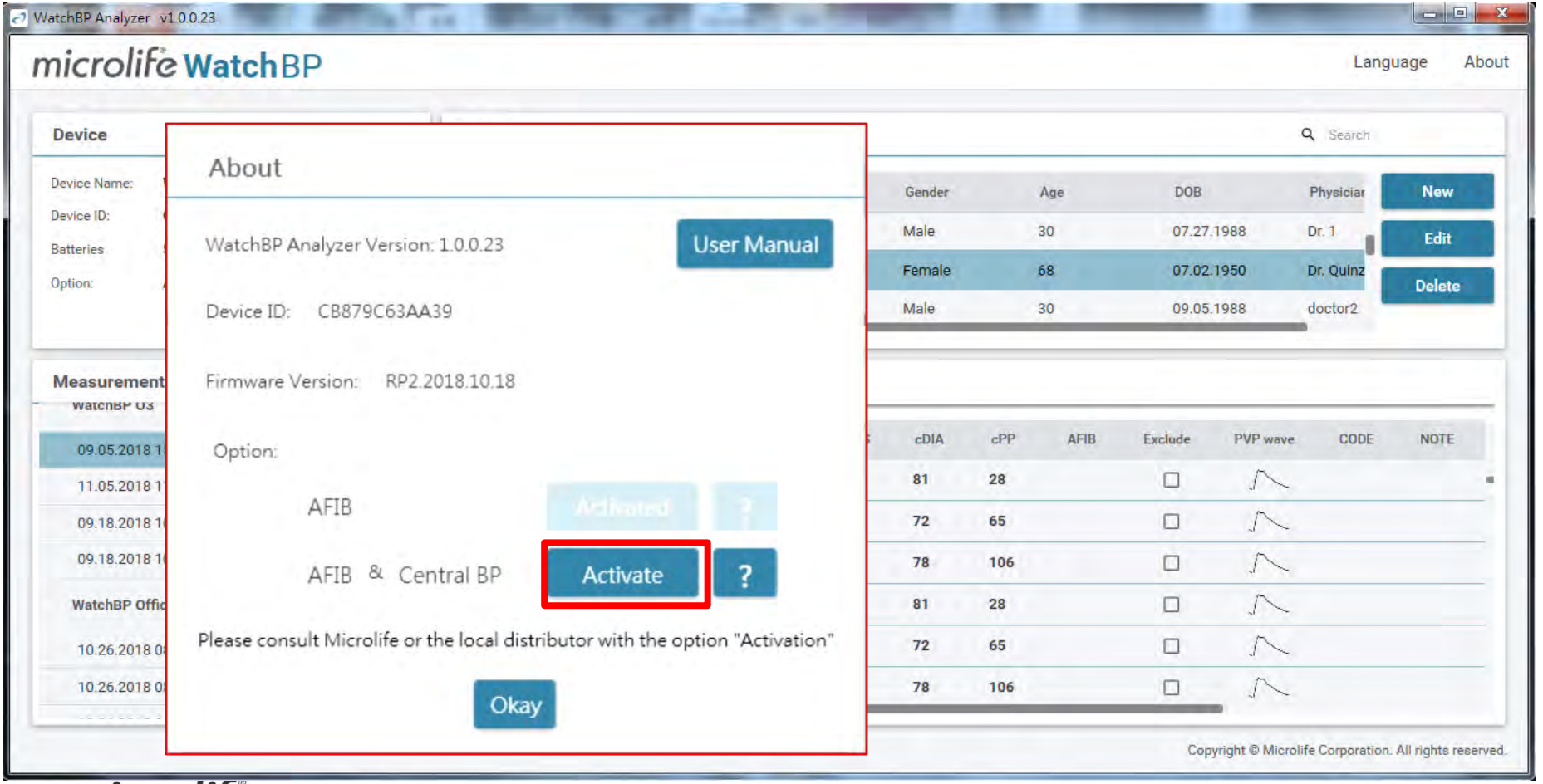


Activation key will be sent by distributor



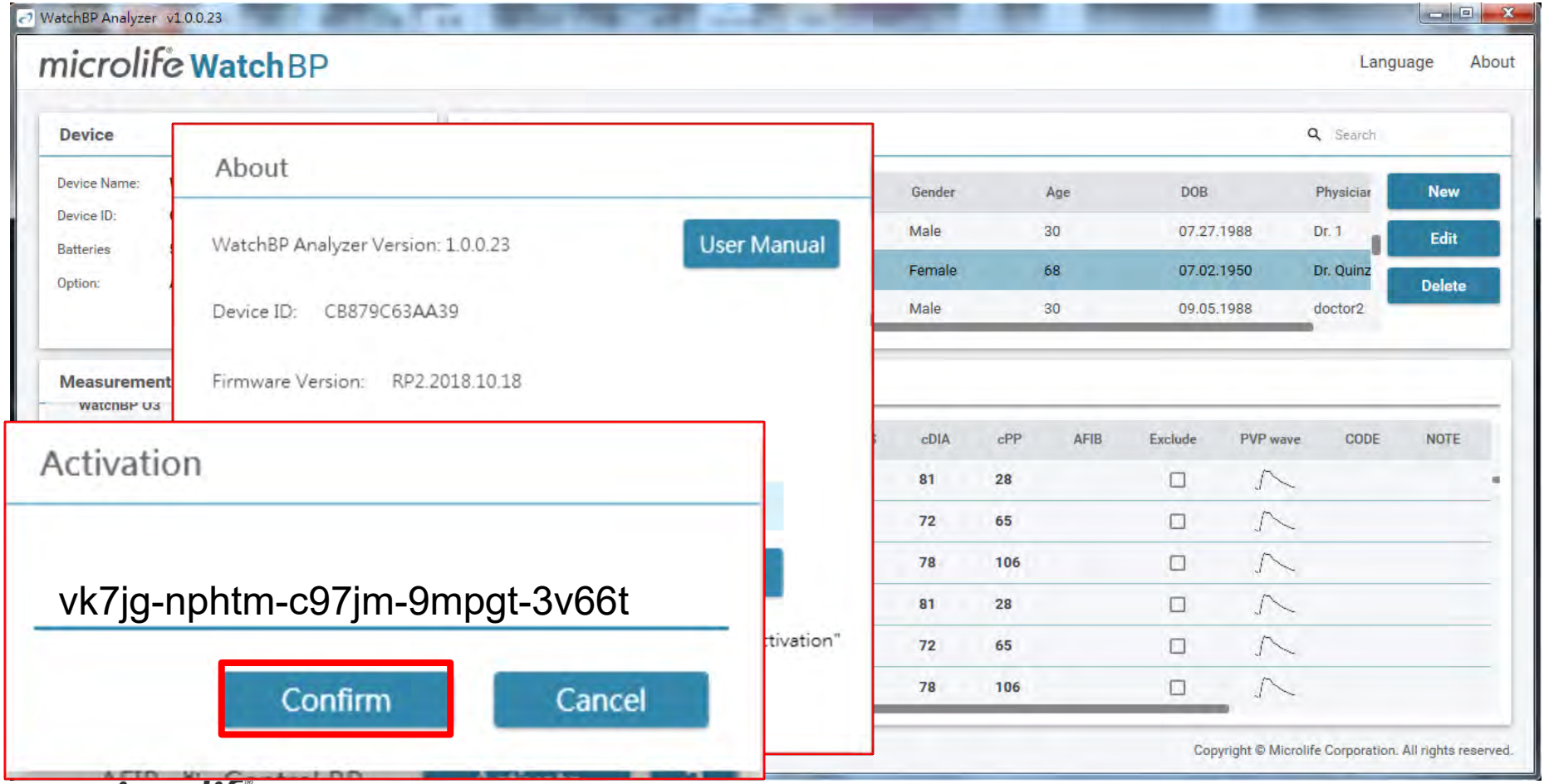
WatchBP Analyzer – activate device feature

- Click on “Activate”



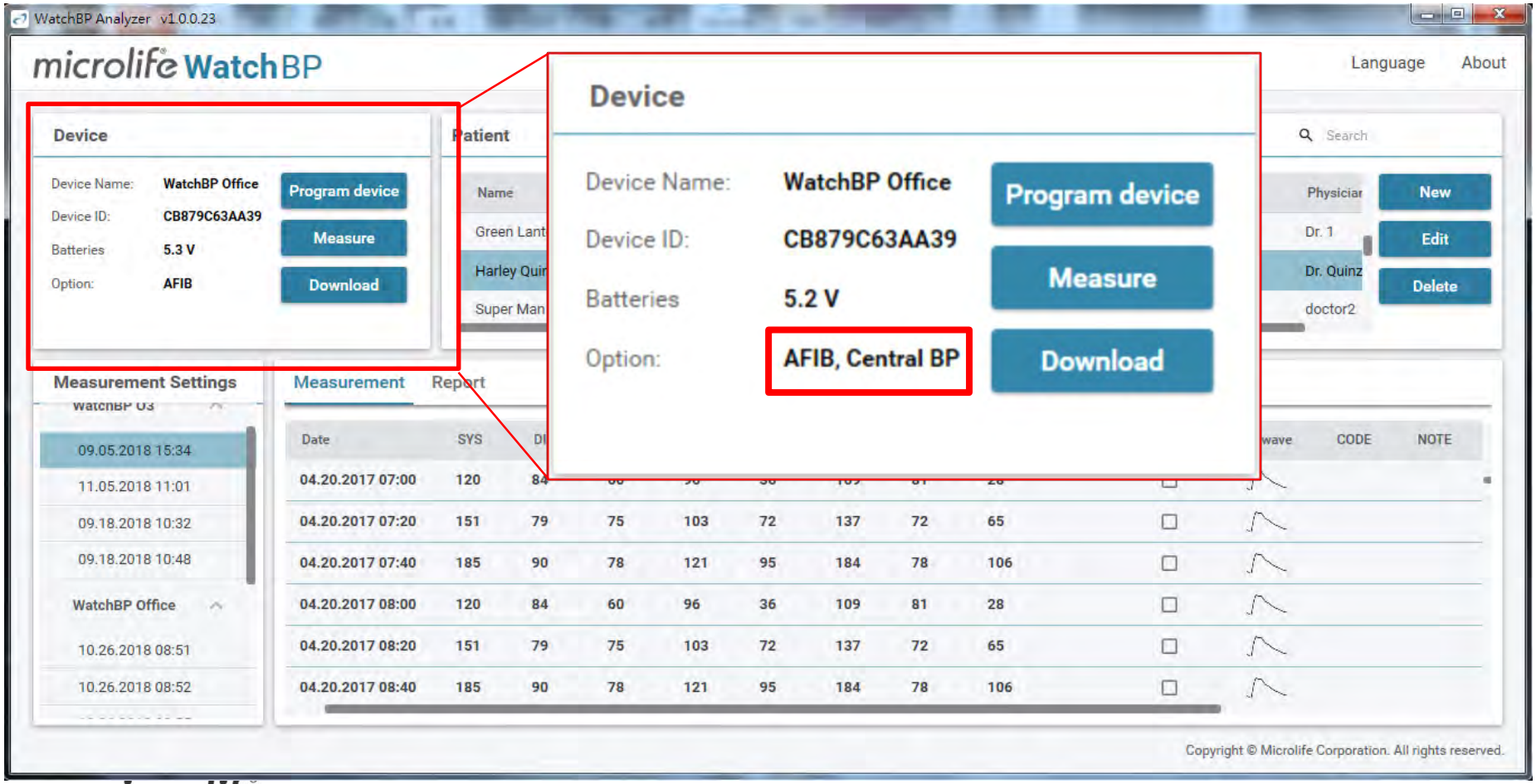
WatchBP Analyzer – activate device feature

- Copy in activation key and click on confirm



WatchBP Analyzer – activate device feature

- The option(s) are visible



The device covers many “special patients” validations

Special population validations with oscillometric devices

	Stiff arteries						Very low BP values		Cuff fit		AF	
company	ESRD	Diabetes	elderly	Dialysis	Pre-Eclampsia	Pregnancy alone	Hypo-tension	Children & adolescents	Obesity	Cuff Wide-range		(n)
Microlife	●	●	●	●	●	●	●	●	●	●	●	11

AFIB has been investigated in many clinical studies

Full Paper	Patients	Number of subjects	Age (Years)	AF (*n*)	Non-AF arrhythmia	Sinus (*n*)	Sensitivity (%)	Specificity (%)
Wiesel 2004	outpatients	450	31-99	54	1	395	100	92
Stergiou 2009	outpatients	73	49-92	27	23	23	100	89
Wiesel 2009	outpatients	405	34-98	93	64	248	97	89
Wiesel 2013	outpatients	139	26-89	14	n.s.	125	99	92
Oxford 2014	Primary care	999	75+	79	n.s.	920	95	90
Wiesel 2014	outpatients	183	50-100	30	n.s.	153	100	92
Gandolfo 2015	Stroke patients	207	27-101	38	n.s.	169	89	99
Chan 2017	Primary care	2052	68	24	156	1872	83	99
Chan 2017	Primary care	5969	67	72	430	5467	81	99

Confirmed with 12-lead ECG

Overall: Sensitivity 98%, Specificity 92%

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