



ANNEX D2

CALIBRATION CERTIFICATES
(TRANSFER STANDARDS)

ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-09-C01		
Product Model:	MAS Dust	Serial No.:	dev9204C230400001
Issue Date:	2025-10-13		
Version	V1.1_20251013		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: Tsuen Wan Air Quality Monitoring Station Collocation Data Time: 2025-09-01 05:00 to 2025-09-09 08:00

Calibration Result:

RSP:

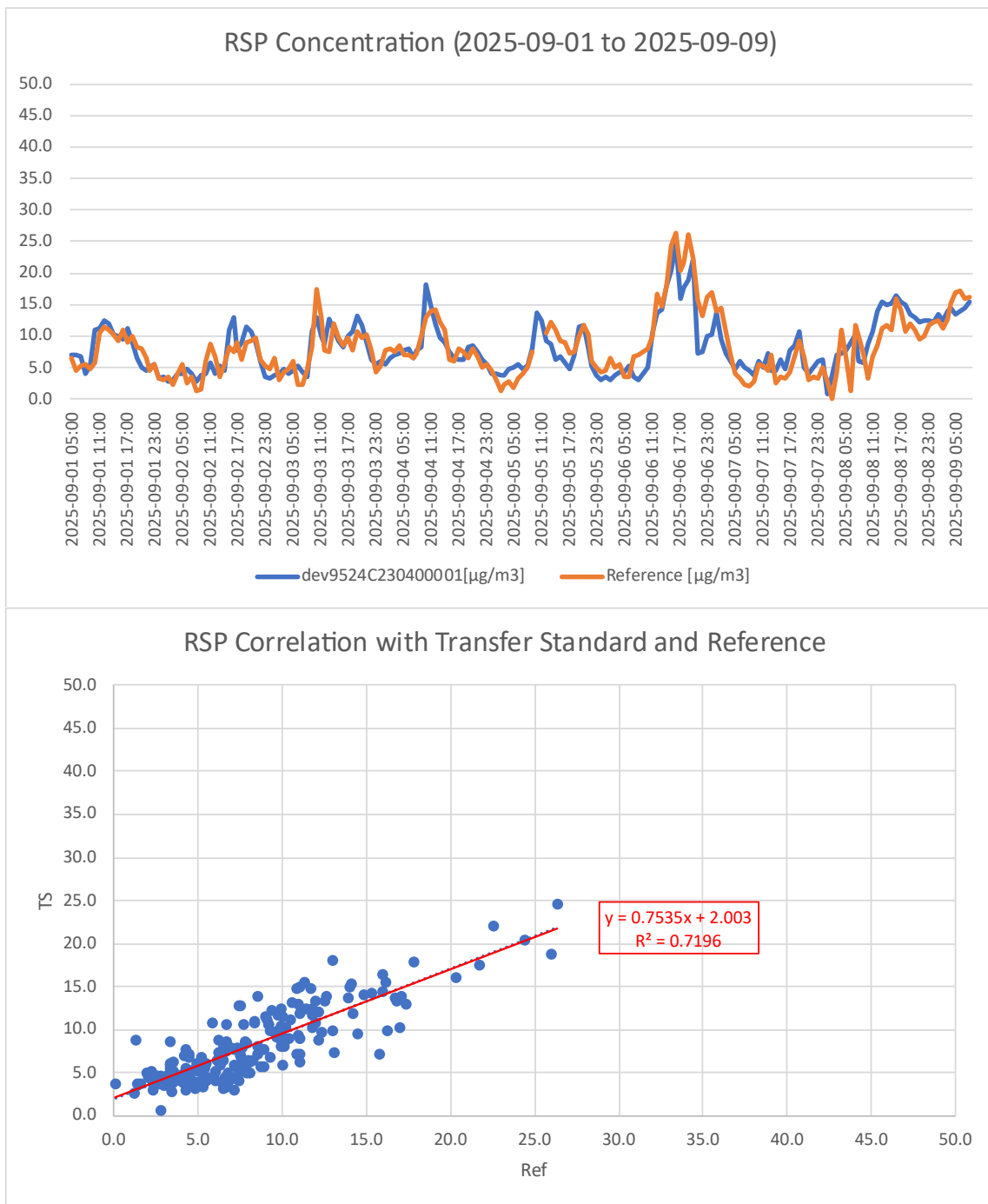
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.75	☒ PASS
Linearity (R ²)	> 0.70	0.72	☒ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	26.2 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	2.5 µg/m ³	☒ PASS

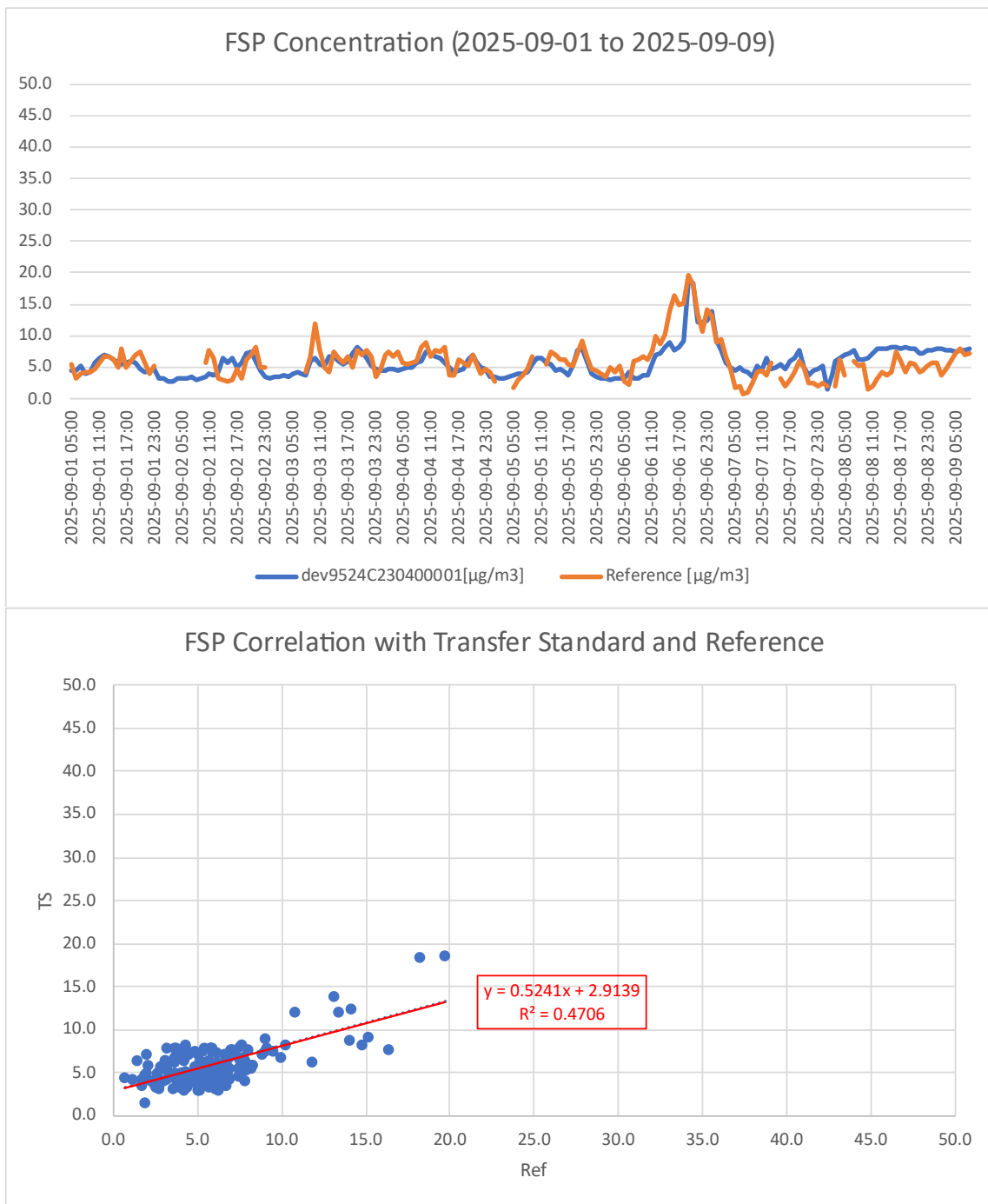
Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.

FSP:

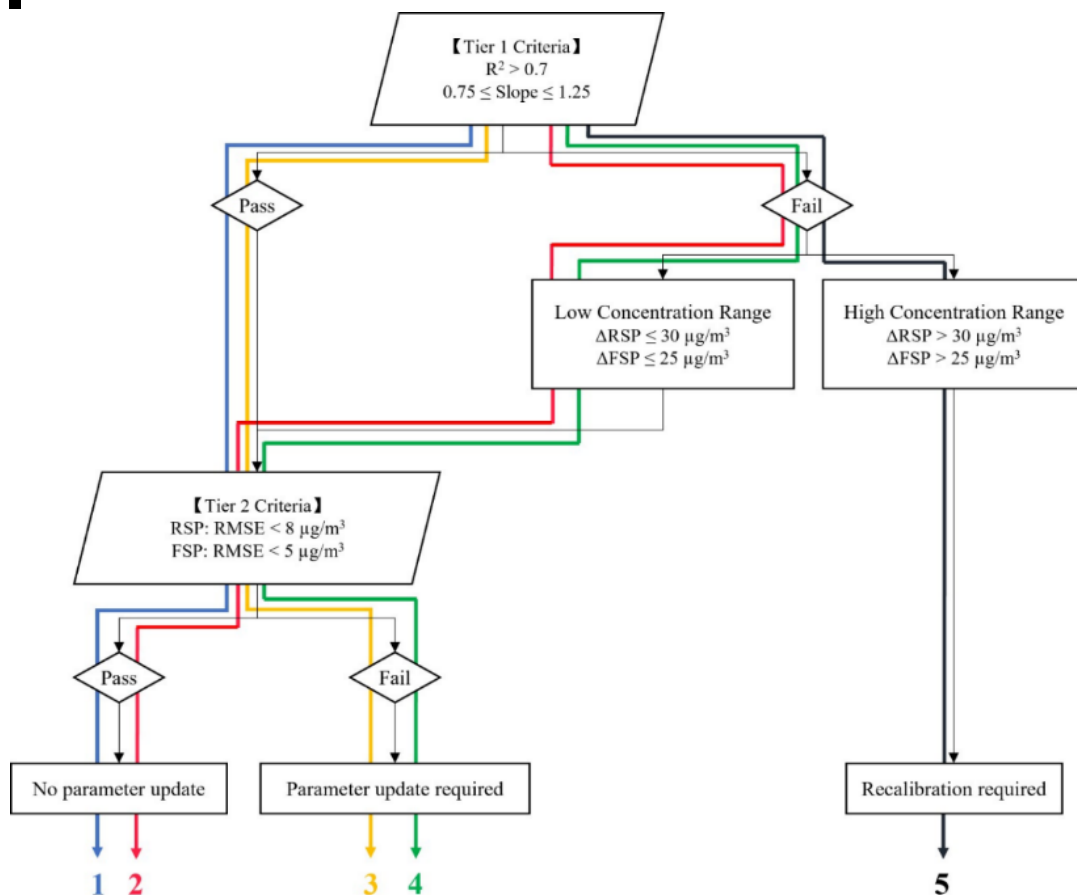
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.52	☒ FAIL
Linearity (R ²)	> 0.70	0.47	☒ FAIL
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	19.0 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.1 µg/m ³	☒ PASS

Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications.
No calibration action is needed during this time.

Prepared by:

Yannis Qiu

Reviewed by:

George Zhang

ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-09-C02		
Product Model:	MAS Dust	Serial No.:	dev9204C230400002
Issue Date:	2025-10-13		
Version	V1.1_20251013		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: Tsuen Wan Air Quality Monitoring Station Collocation Data Time: 2025-09-01 05:00 to 2025-09-09 08:00

Calibration Result:

RSP:

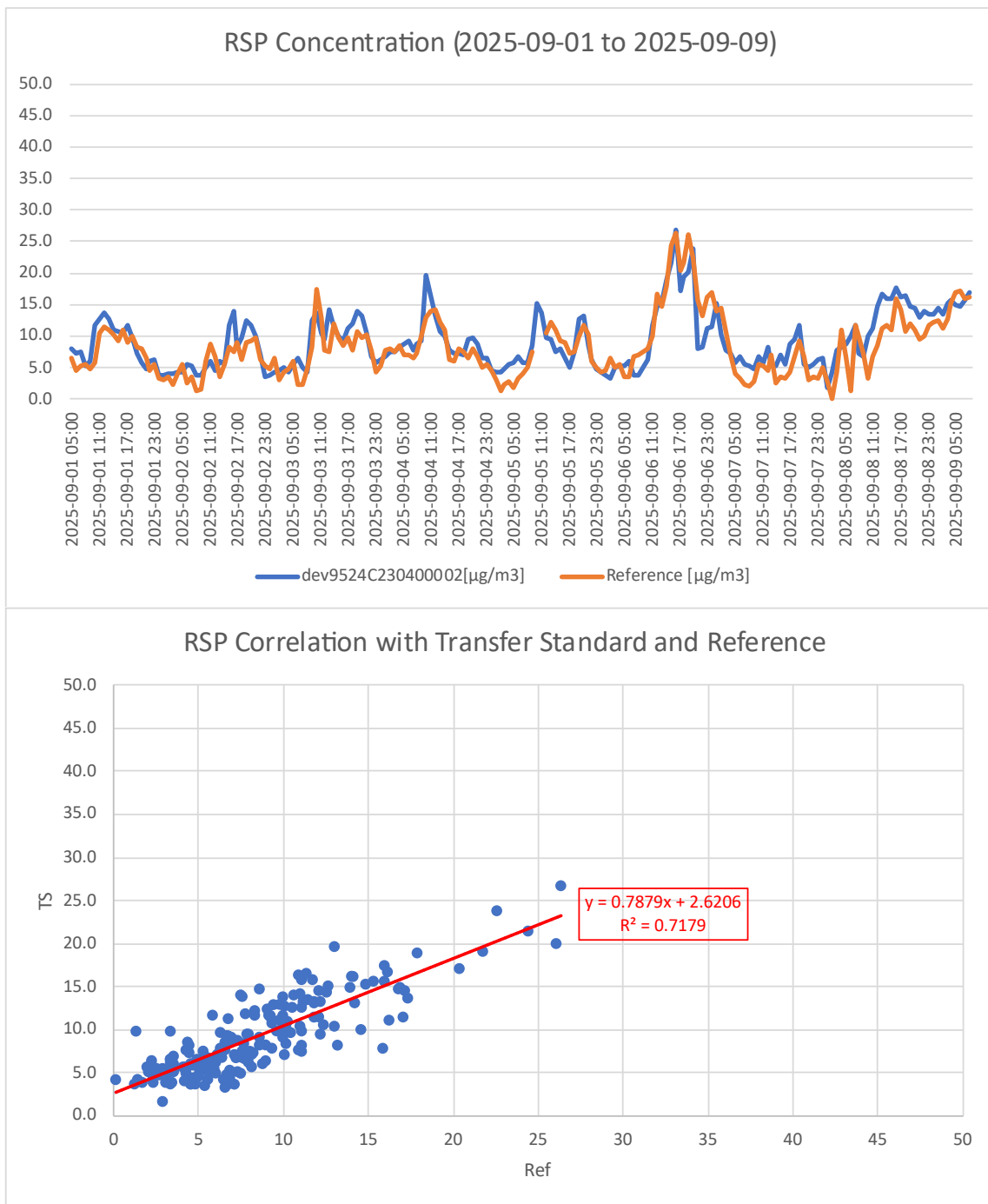
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.79	☒ PASS
Linearity (R ²)	> 0.70	0.72	☒ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	26.2 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	2.7 µg/m ³	☒ PASS

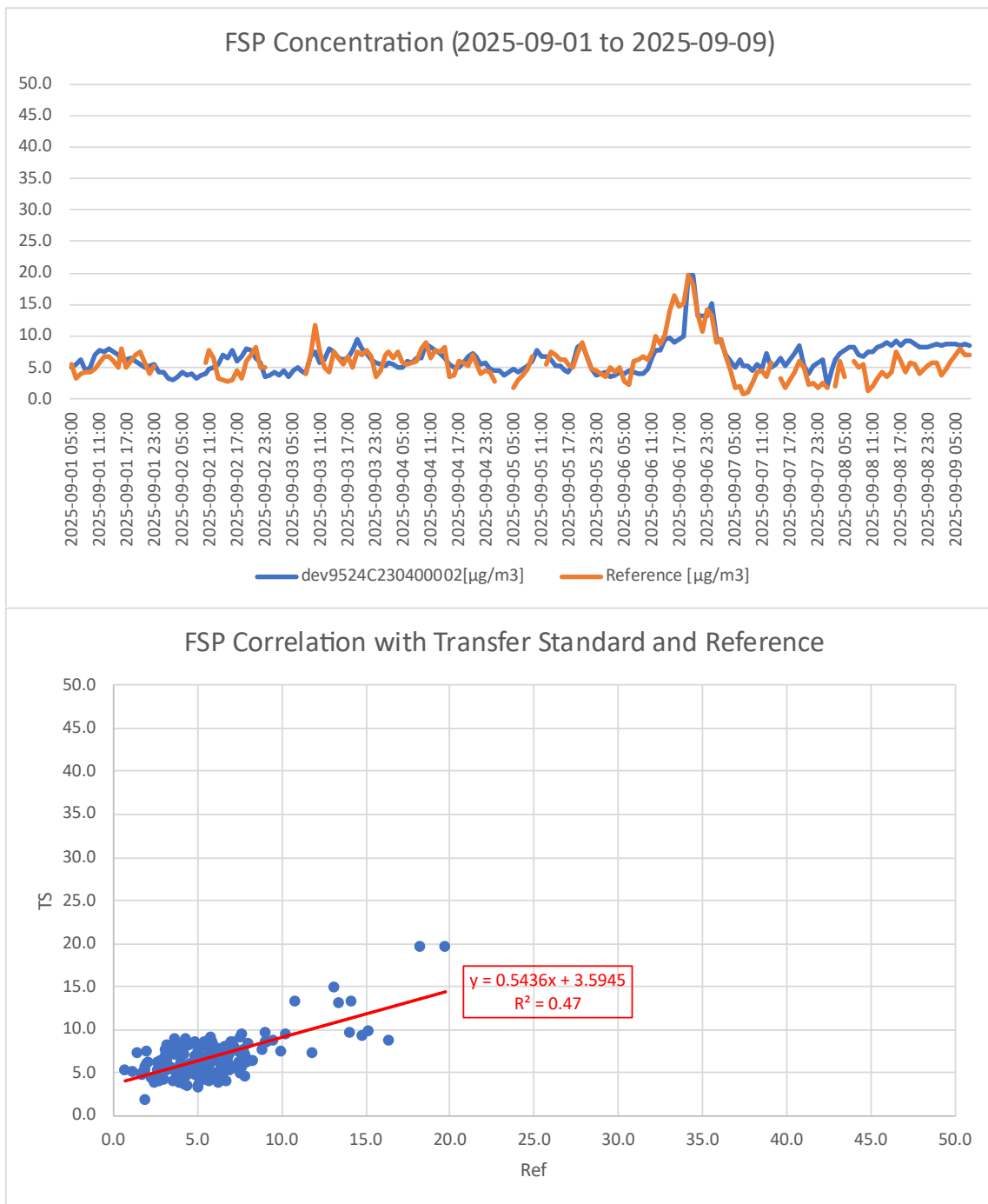
Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.

FSP:

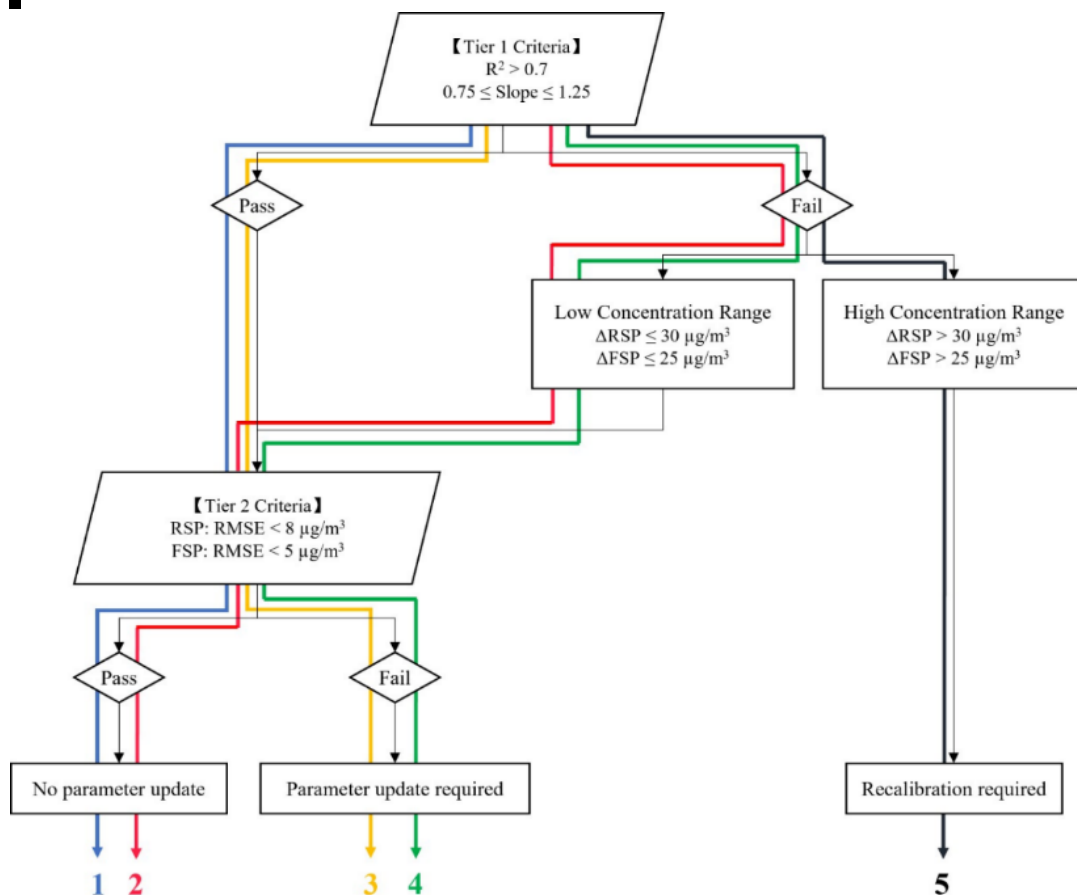
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.54	☒ FAIL
Linearity (R ²)	> 0.70	0.47	☒ FAIL
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	19.0 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.2 µg/m ³	☒ PASS

Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications. No calibration action is needed during this time.

Prepared by:	Yannis Qiu	Reviewed by:	George Zhang
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ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-09-C03		
Product Model:	MAS Dust	Serial No.:	dev9204C230400003
Issue Date:	2025-10-13		
Version	V1.1_20251013		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: Tsuen Wan Air Quality Monitoring Station Collocation Data Time: 2025-09-01 05:00 to 2025-09-09 08:00

Calibration Result:

RSP:

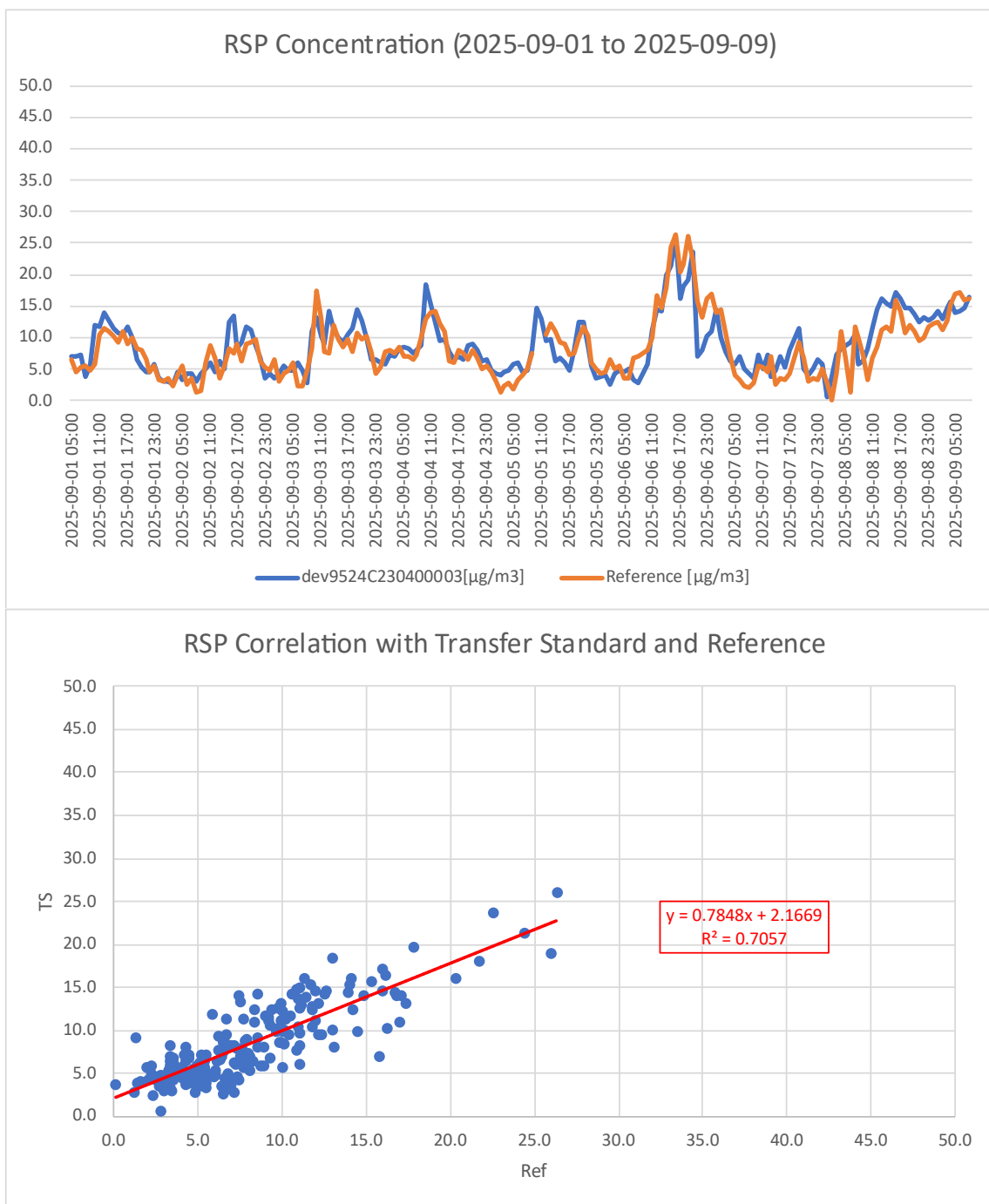
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.78	☒ PASS
Linearity (R ²)	> 0.70	0.71	☒ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	26.2 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	2.6 µg/m ³	☒ PASS

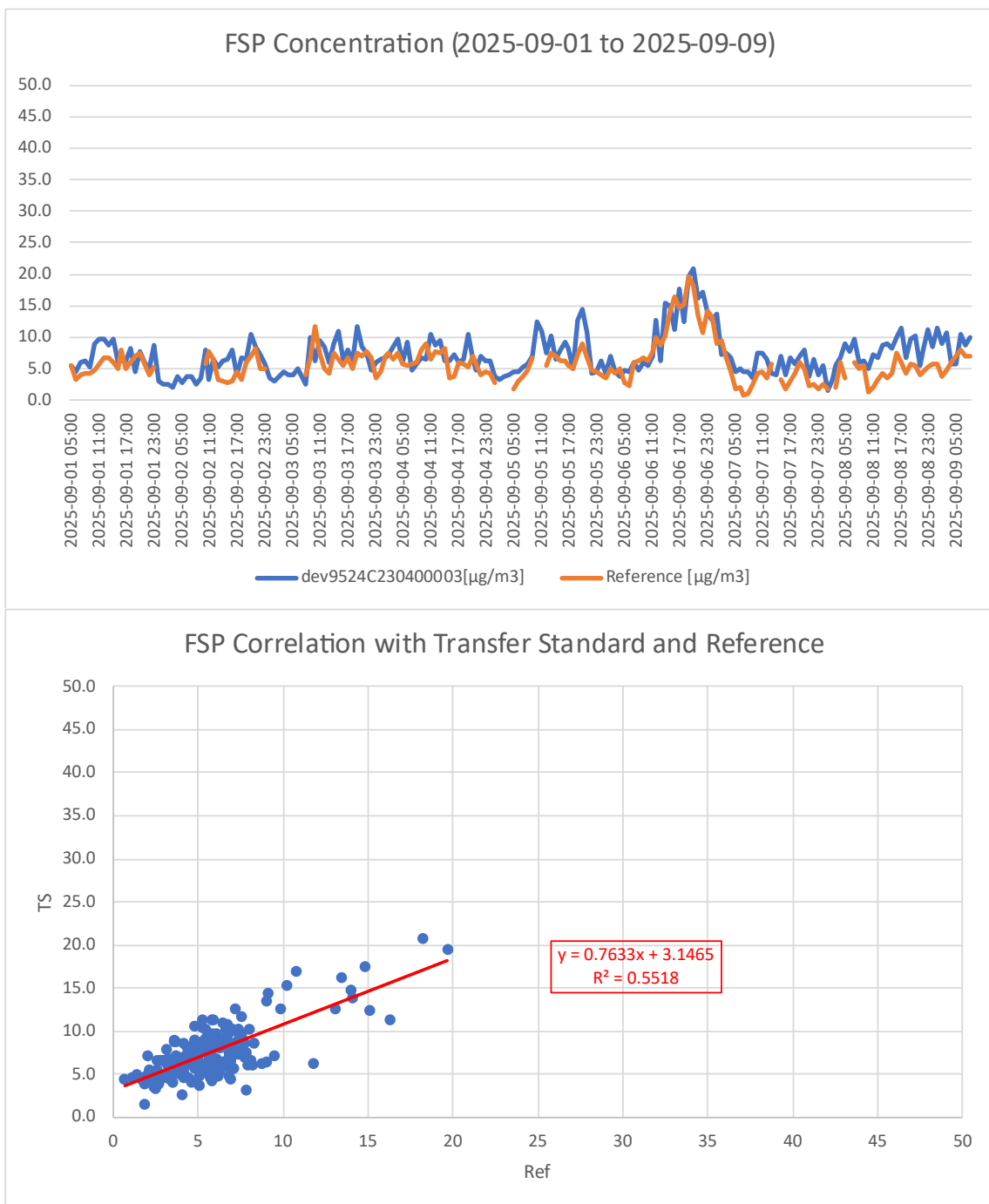
Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.

FSP:

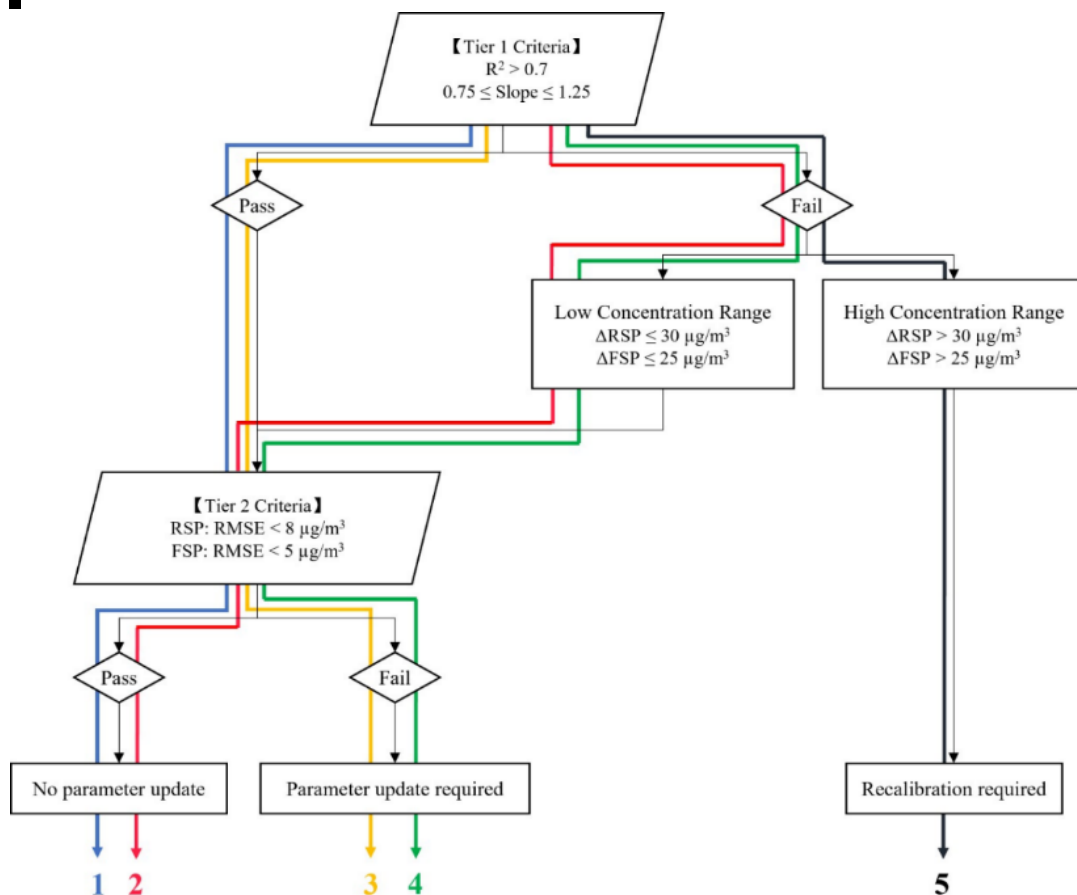
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.76	☒ PASS
Linearity (R ²)	> 0.70	0.55	☒ FAIL
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	19.0 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.6 µg/m ³	☒ PASS

Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications. No calibration action is needed during this time.

Prepared by:	Yannis Qiu	Reviewed by:	George Zhang
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ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-09-Z10		
Product Model:	MAS Dust	Serial No.:	dev9204Z250800010
Issue Date:	2025-10-13		
Version	V1.1_20251013		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: HKUST Air Quality Research Supersite Facility Collocation Data Time: 2025-09-15 00:00 to 2025-09-22 16:00

Calibration Result:

RSP:

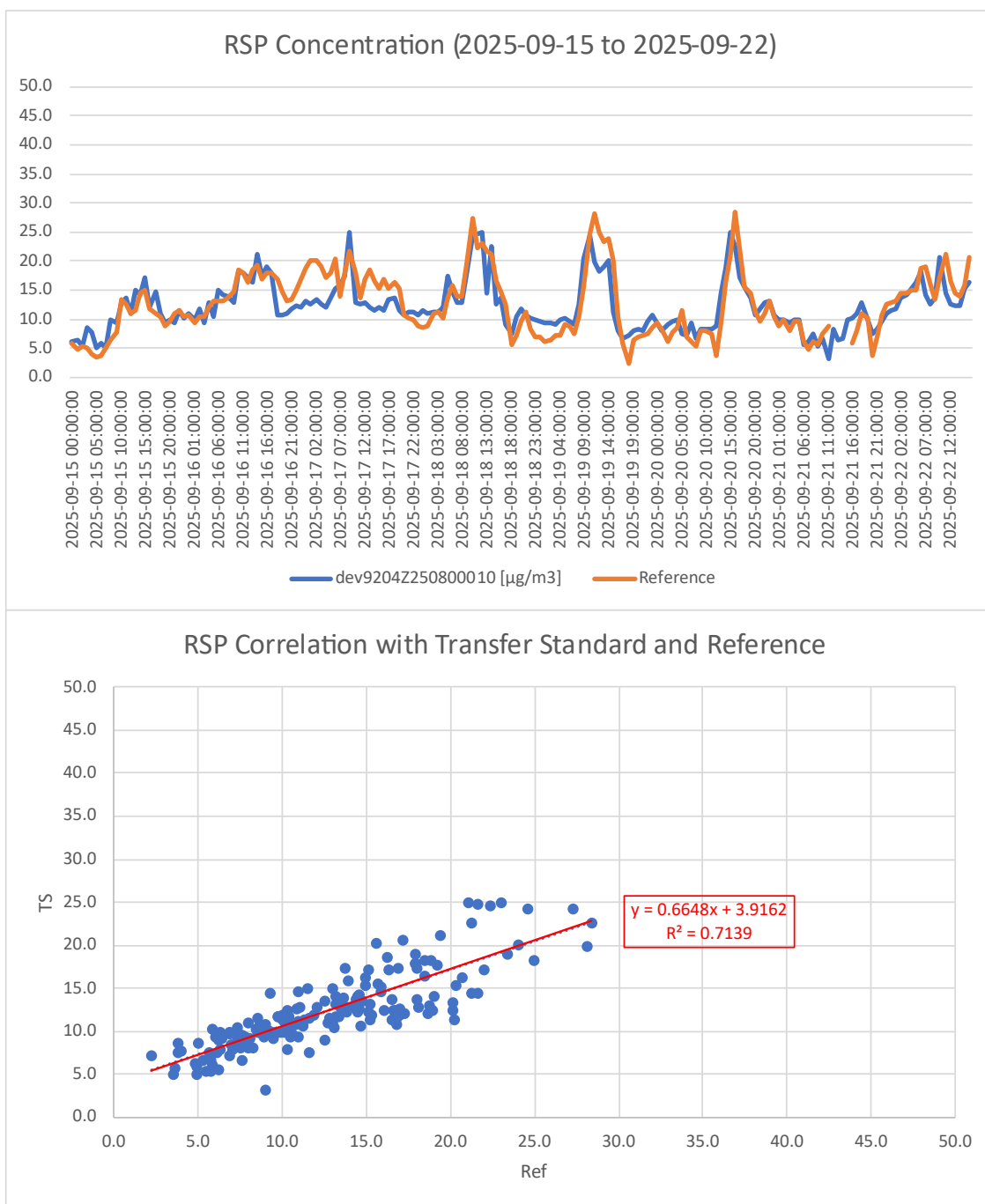
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.66	☒ FAIL
Linearity (R ²)	> 0.70	0.71	☒ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	26.2 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	2.9 µg/m ³	☒ PASS

Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.

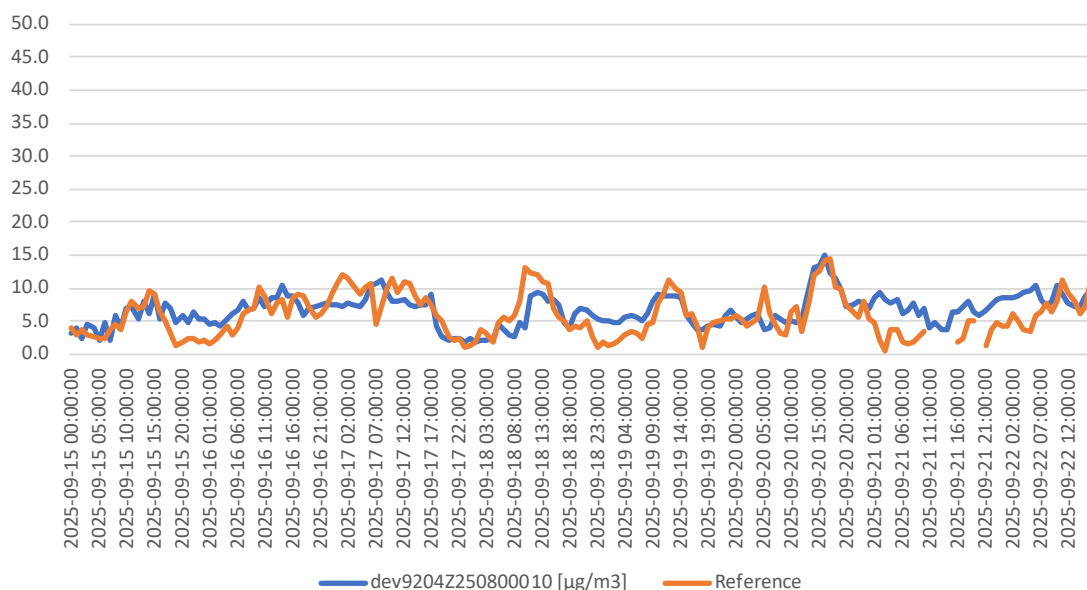
FSP:

Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.45	☒ FAIL
Linearity (R ²)	> 0.70	0.36	☒ FAIL
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	13.9 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.7 µg/m ³	☒ PASS

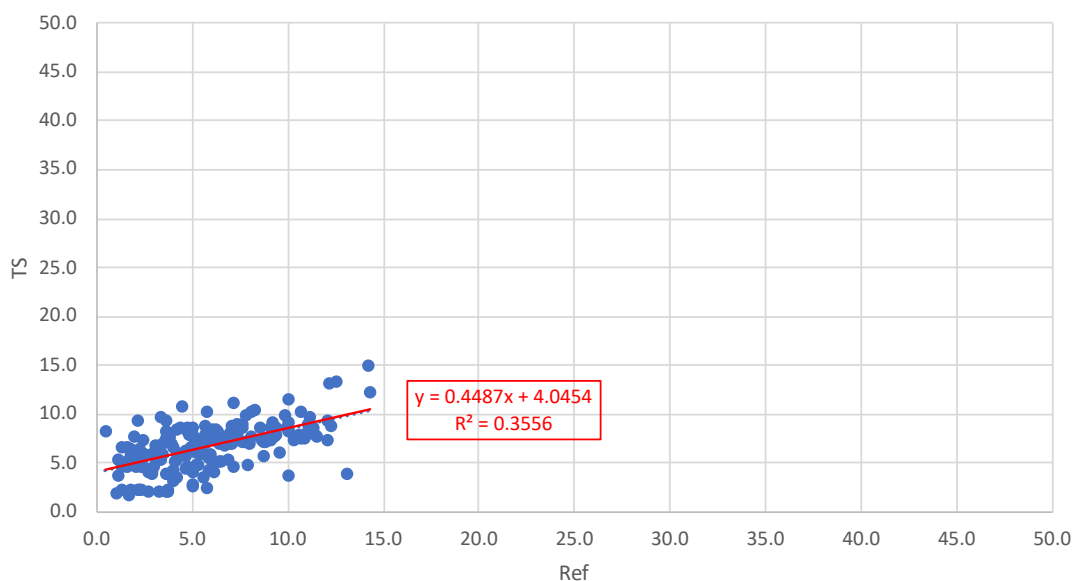
Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.



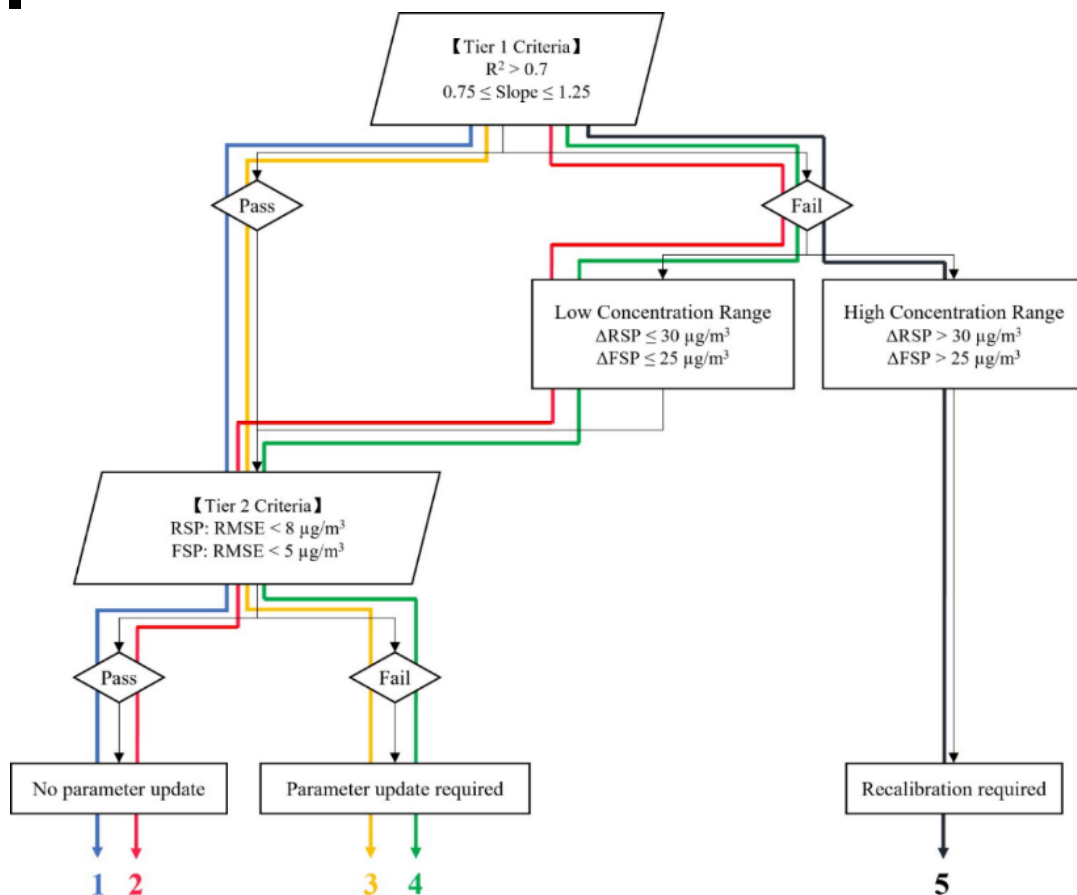
FSP Concentration (2025-09-15 to 2025-09-22)



FSP Correlation with Transfer Standard and Reference



QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications. No calibration action is needed during this time.

Prepared by:	Yannis Qiu	Reviewed by:	George Zhang
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ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-09-Z11		
Product Model:	MAS Dust	Serial No.:	dev9204Z250800011
Issue Date:	2025-10-13		
Version	V1.1_20251013		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: HKUST Air Quality Research Supersite Facility Collocation Data Time: 2025-09-15 00:00 to 2025-09-22 16:00

Calibration Result:

RSP:

Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.67	☒ FAIL
Linearity (R ²)	> 0.70	0.71	☒ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	26.2 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	3.0 µg/m ³	☒ PASS

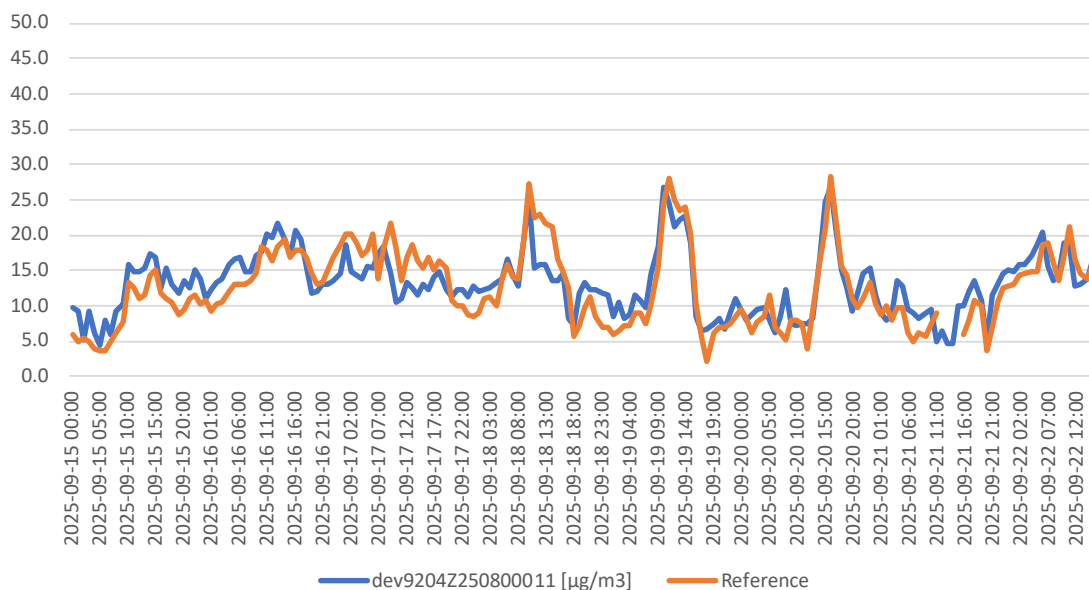
Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.

FSP:

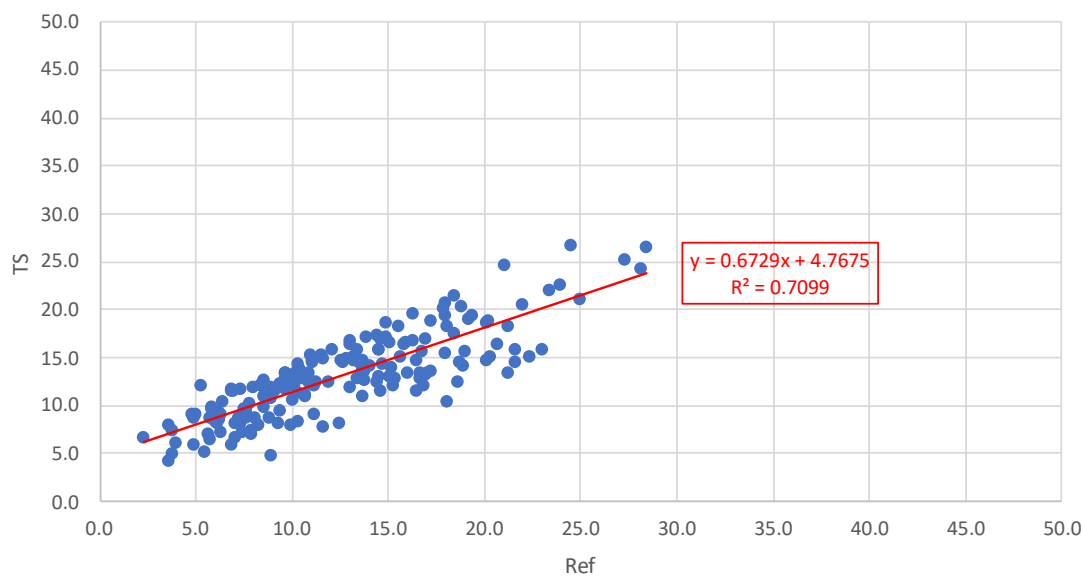
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.43	☒ FAIL
Linearity (R ²)	> 0.70	0.41	☒ FAIL
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	13.9 µg/m ³	If Tier 1 criteria are not met due to narrow range of PM concentration, during the collocation period, Tier 2 will apply.
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.4 µg/m ³	☒ PASS

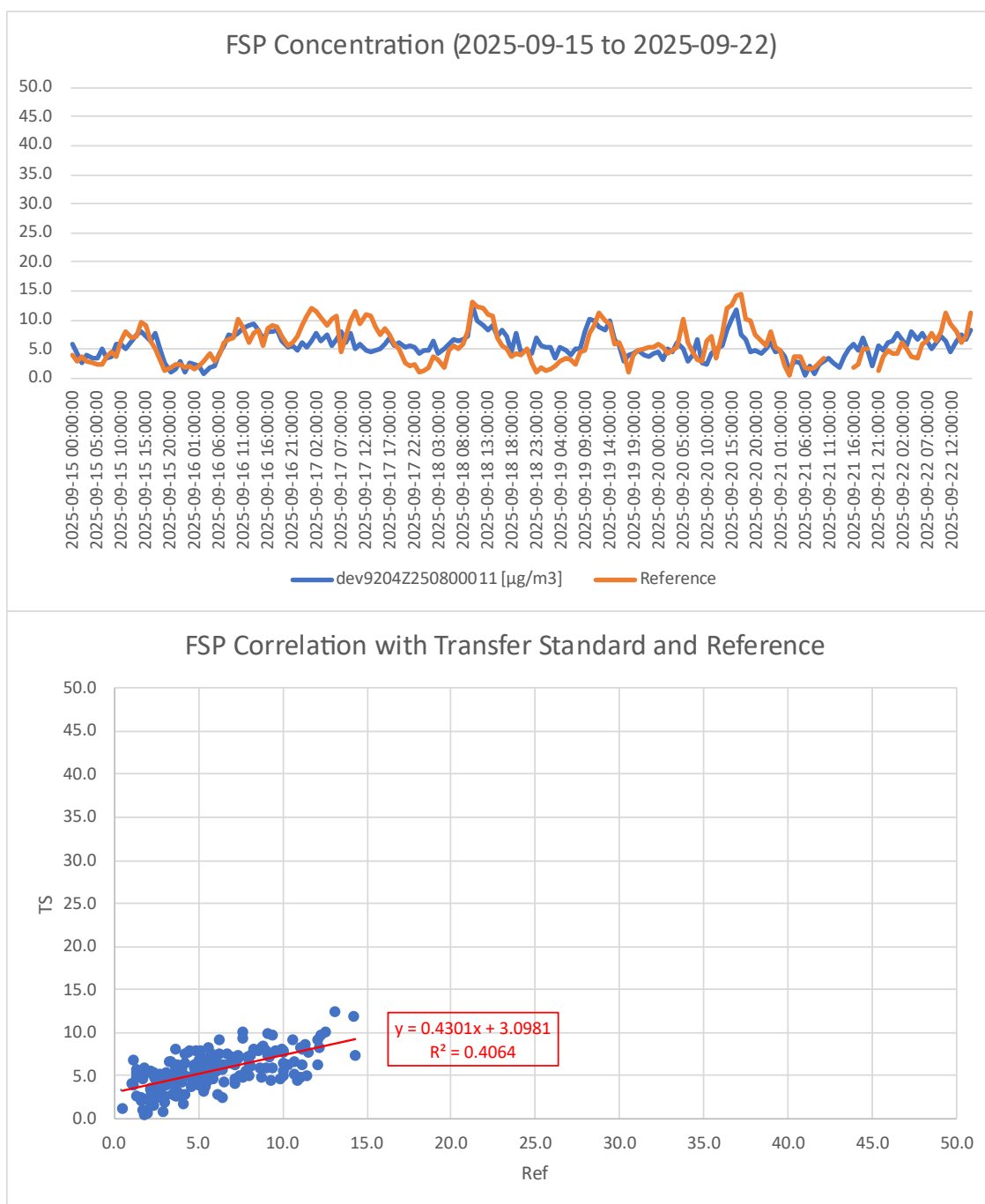
Remark: Follow QAQC Protocol Path 2 which is Criteria Tier 1 failed while Tier 2 passed.

RSP Concentration (2025-09-15 to 2025-09-22)

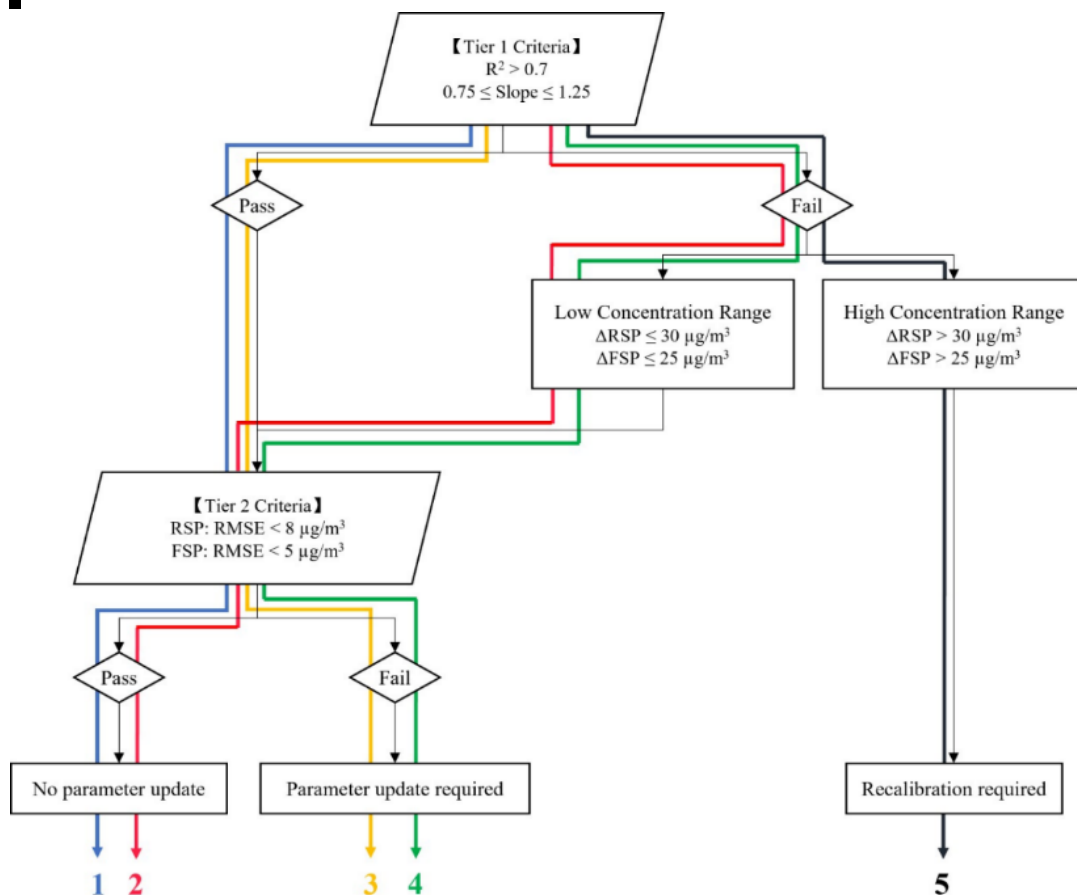


RSP Correlation with Transfer Standard and Reference





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications. No calibration action is needed during this time.

Prepared by:	Yannis Qiu	Reviewed by:	George Zhang
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ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-10-Z10		
Product Model:	MAS Dust	Serial No.:	dev9204Z250800010
Issue Date:	2025-10-16		
Version	V1.0_20251016		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: HKUST Air Quality Research Supersite Facility Collocation Data Time: 2025-10-08 08:00 to 2025-10-15 16:00

Calibration Result:

RSP:

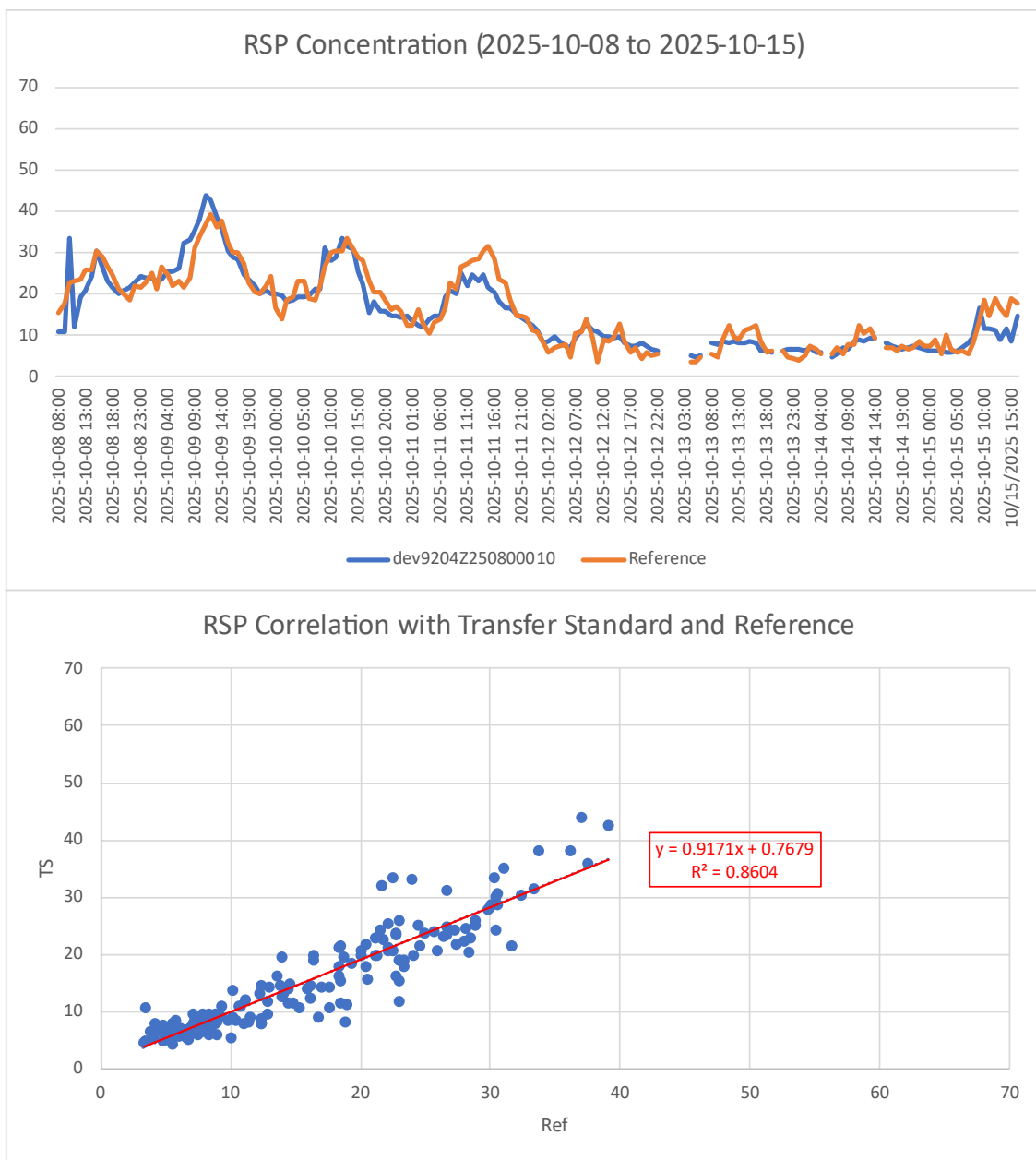
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.92	☑ PASS
Linearity (R ²)	> 0.70	0.86	☑ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	35.8 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	3.5 µg/m ³	☑ PASS

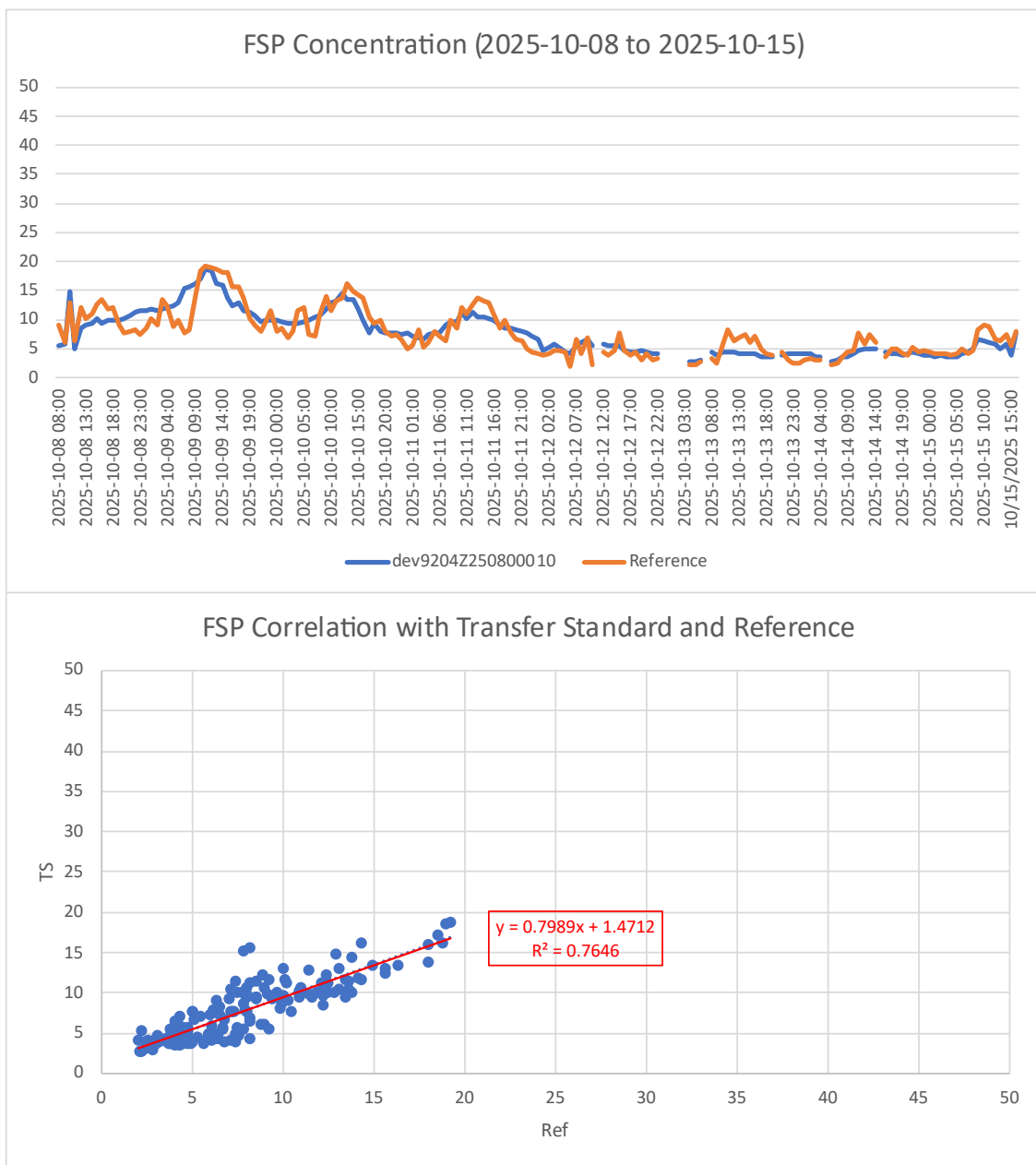
Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.

FSP:

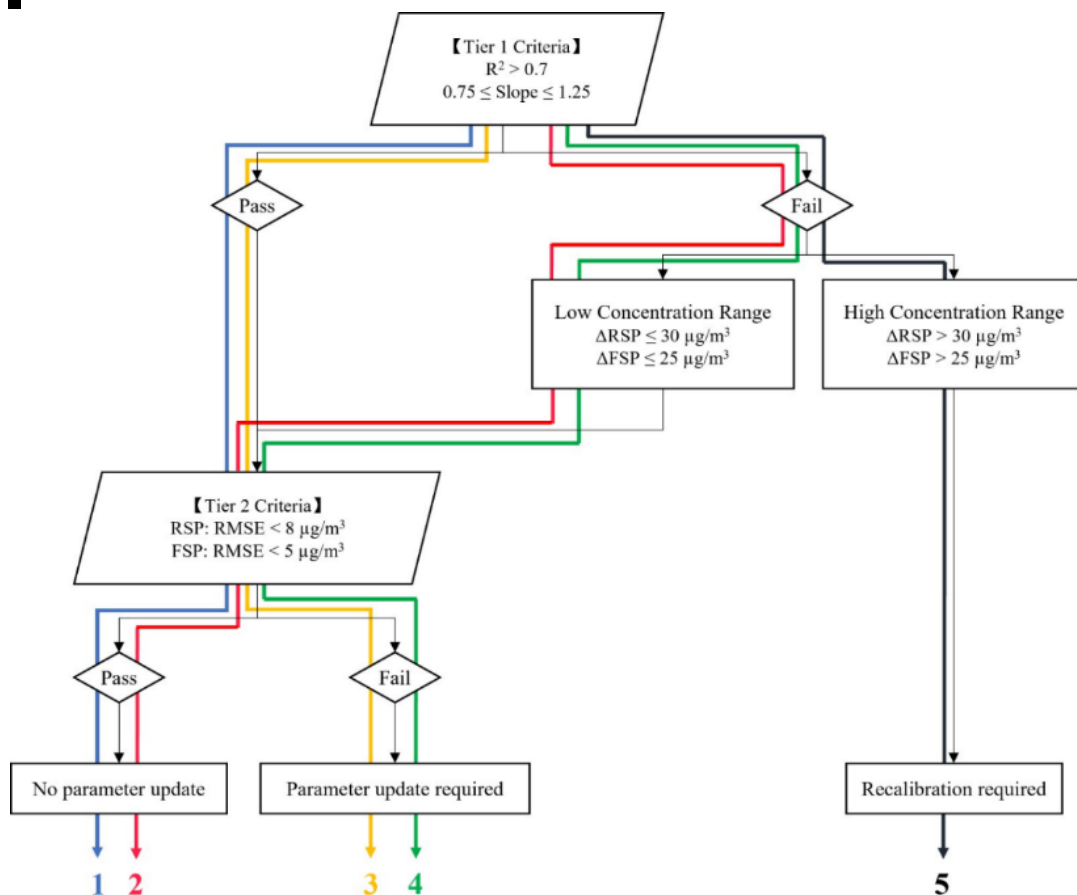
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.80	☑ PASS
Linearity (R ²)	> 0.70	0.76	☑ PASS
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	17.2 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.0 µg/m ³	☑ PASS

Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications. No calibration action is needed during this time.

Prepared by:	Yannis Qiu	Reviewed by:	George Zhang
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ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-10-Z11		
Product Model:	MAS Dust	Serial No.:	dev9204Z250800011
Issue Date:	2025-11-12		
Version	V2.0_20251112		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: HKUST Air Quality Research Supersite Facility Collocation Data Time: 2025-10-08 08:00 to 2025-10-15 16:00

Calibration Result:

RSP:

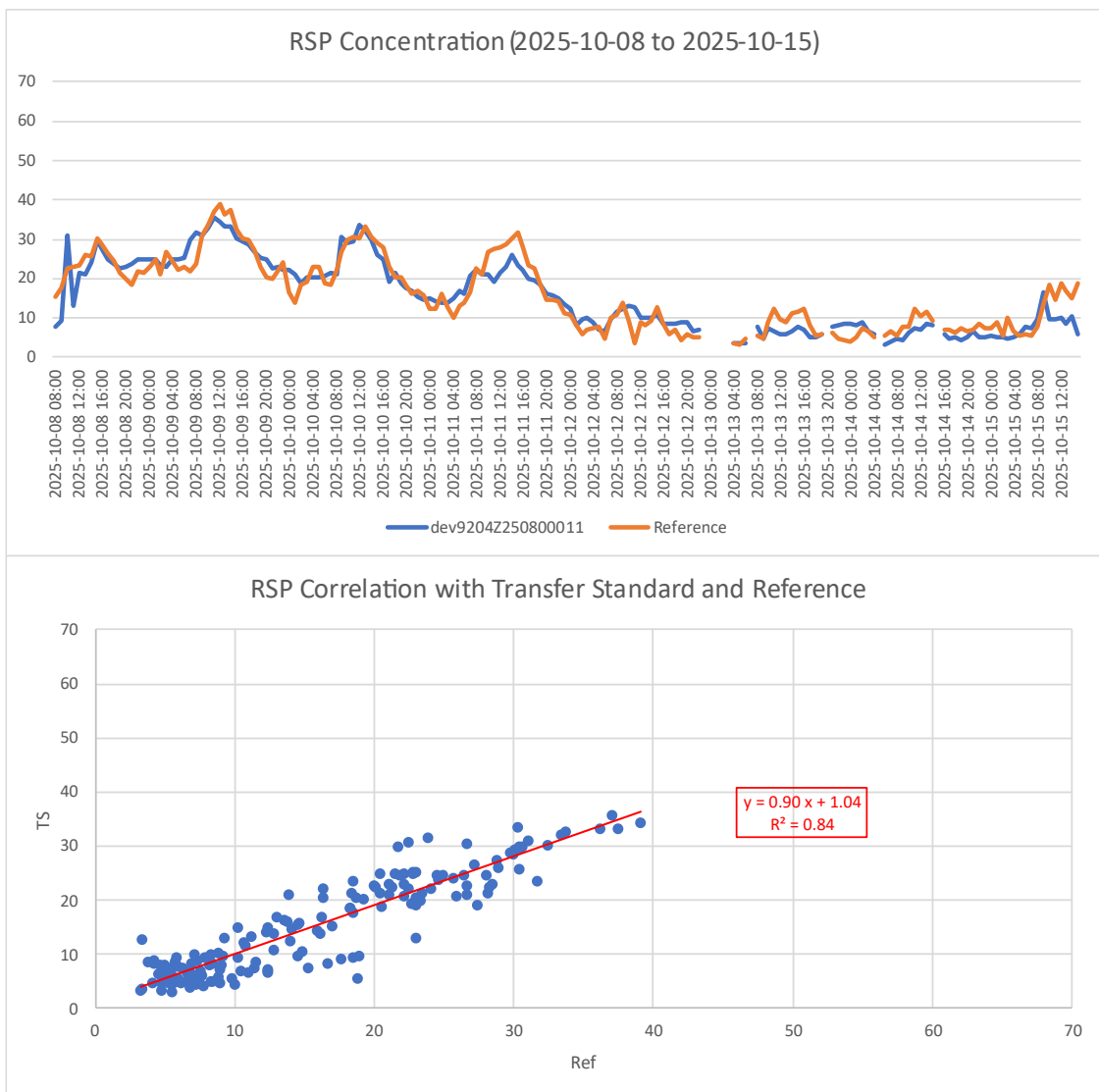
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.90	☒ PASS
Linearity (R ²)	> 0.70	0.84	☒ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	35.8 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	3.7 µg/m ³	☒ PASS

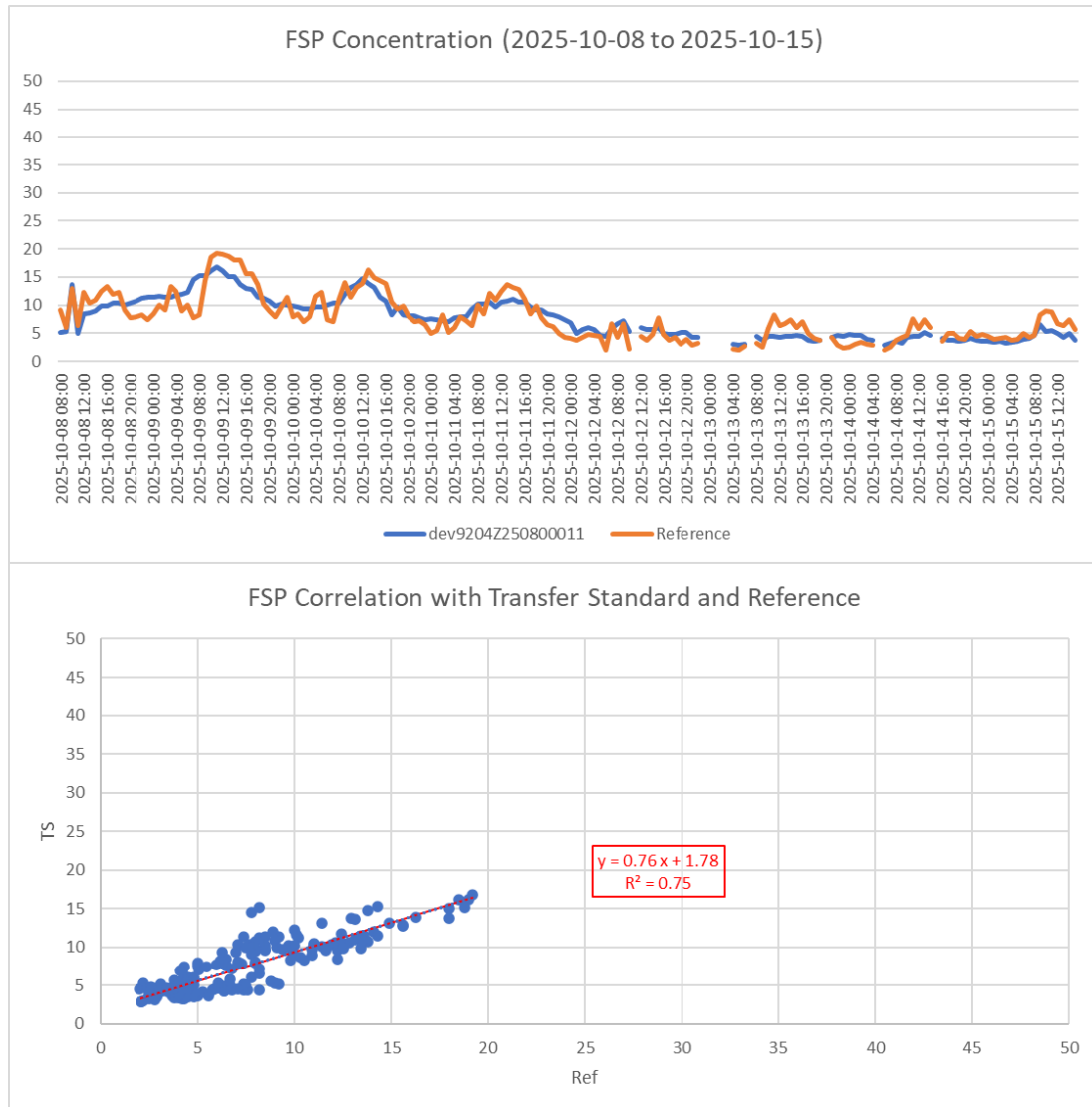
Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.

FSP:

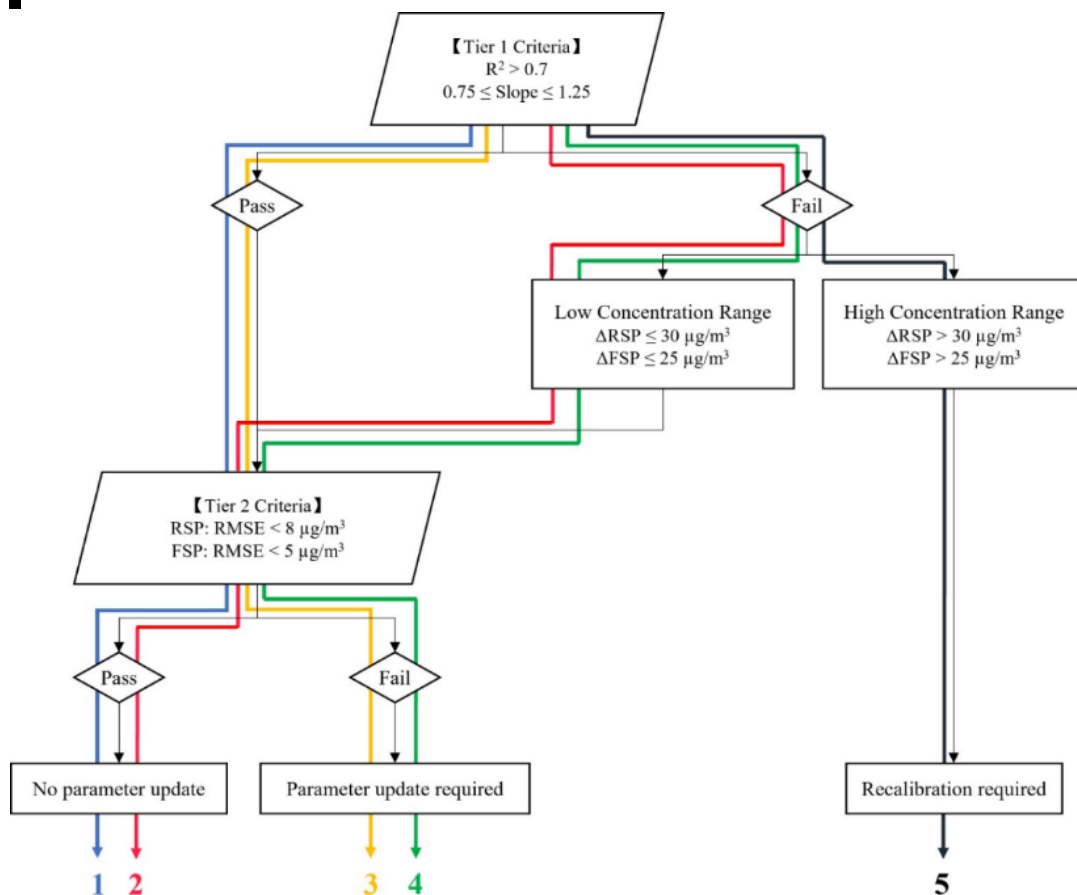
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.76	☒ PASS
Linearity (R ²)	> 0.70	0.75	☒ PASS
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	17.2 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	2.0 µg/m ³	☒ PASS

Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications.
No calibration action is needed during this time.

Prepared by:

Yannis Qiu

Reviewed by:

George Zhang

ONSITE EQUIPMENT VALIDATION RECORD

Product Information:

Report No.:	ZR/T CS.004-2025-10-Z12		
Product Model:	MAS Dust	Serial No.:	dev9204Z250800012
Issue Date:	2025-10-16		
Version	V1.0_20251016		

Traceability of Calibration Instrument:

Test Item	Calibration Instrument
PM _{2.5} (FSP) PM ₁₀ (RSP)	Location: HKUST Air Quality Research Supersite Facility Collocation Data Time: 2025-10-08 08:00 to 2025-10-15 16:00

Calibration Result:

RSP:

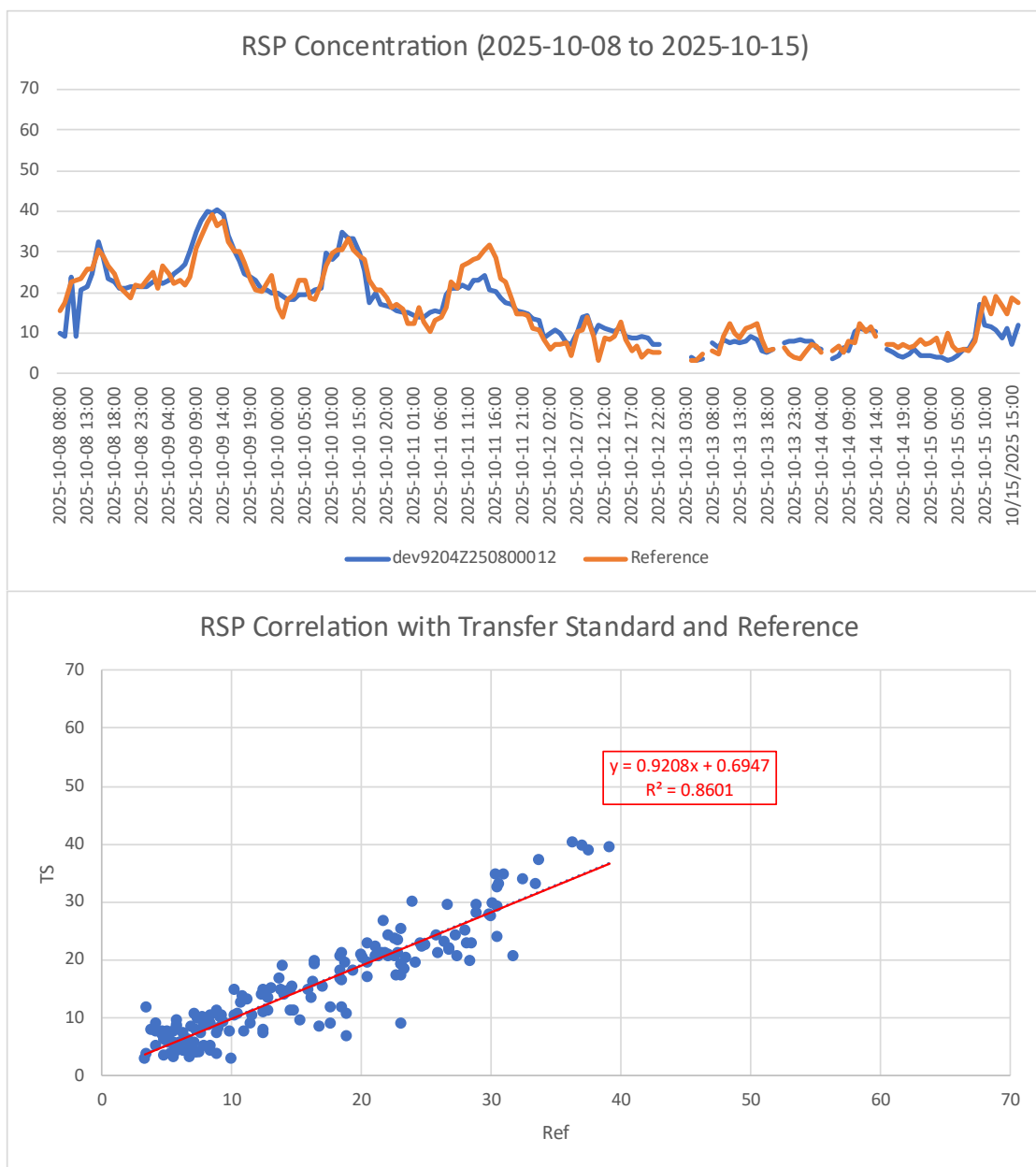
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.92	☑ PASS
Linearity (R ²)	> 0.70	0.86	☑ PASS
If Tier 1 fails, Conc. Range will be checked	RSP ≤ 30 µg/m ³ is low conc. range	35.8 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 8 µg/m ³ for RSP	3.5 µg/m ³	☑ PASS

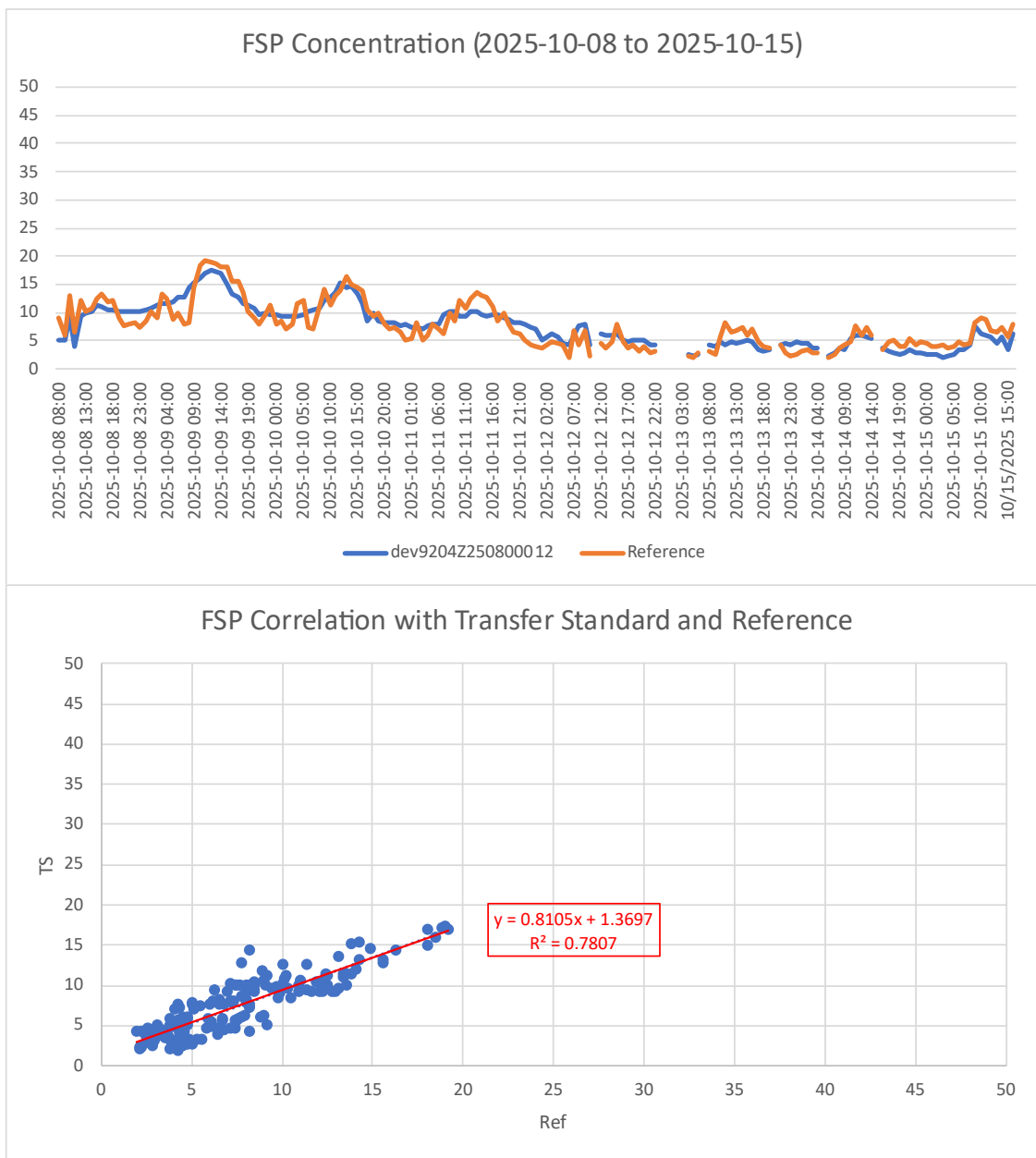
Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.

FSP:

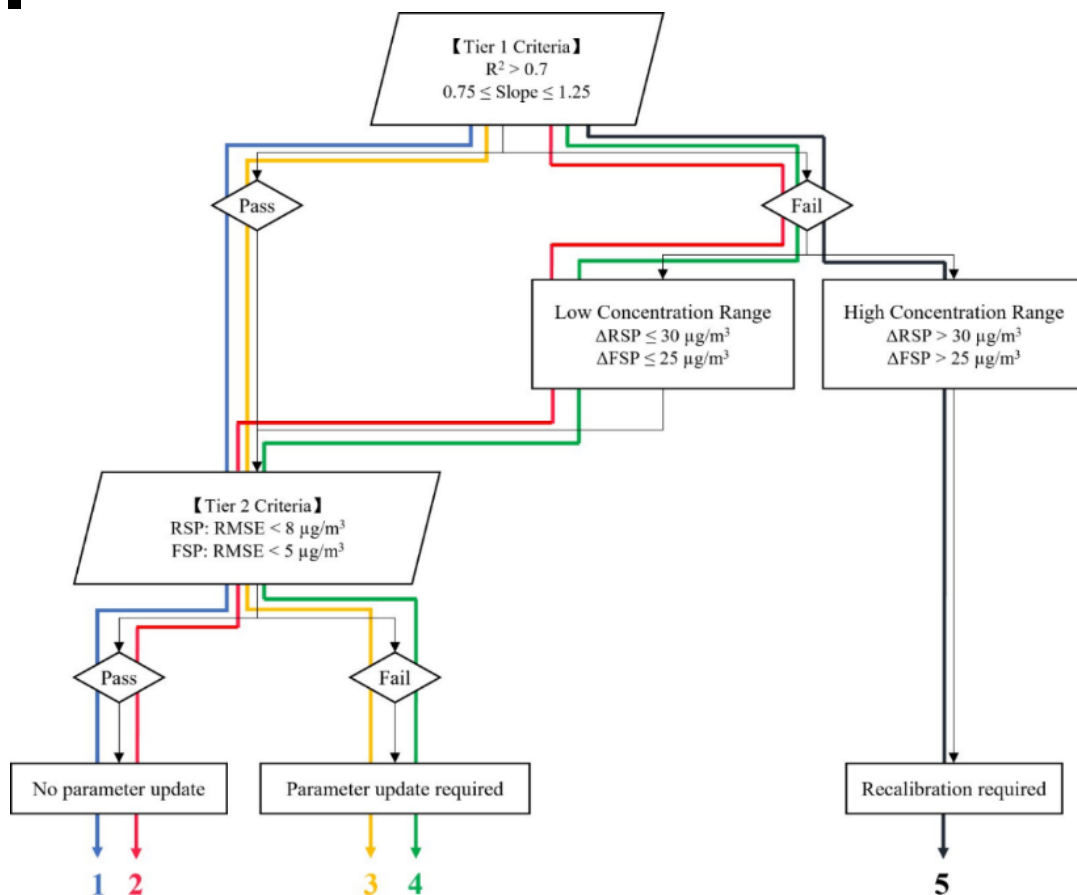
Performance Metric	Target Value	Actual Value	Result
<u>Tier 1</u>			
Bias (Slope)	1.00±0.25	0.81	☑ PASS
Linearity (R ²)	> 0.70	0.78	☑ PASS
If Tier 1 fails, Conc. Range will be checked	FSP ≤ 25 µg/m ³ is low conc. range	17.2 µg/m ³	Not applicable
<u>Tier 2</u>			
Error (RMSE)	< 5 µg/m ³ for FSP	1.9 µg/m ³	☑ PASS

Remark: Follow QAQC Protocol Path 1 which both Criteria Tier 1 and Tier 2 passed.





QAQC Protocol chart flow



Conclusion:

The report approves that each calibrated item of the product meets its technical specifications. No calibration action is needed during this time.

Prepared by:

Yannis Qiu

Reviewed by:

George Zhang