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ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮಾಲಿನ್ಯ ನಿಯಂತ್ರಣ ಮಂಡಳಿ
Karnataka State Pollution Control Board

"ಪರಿಸರ ಭವನ", 1 ರಿಂದ 5ನೇ ಮಹಡಿಗಳು, ನಂ. 49, ಚರ್ಚ್ ಸ್ಟ್ರೀಟ್, ಬೆಂಗಳೂರು - 560 001, ಕರ್ನಾಟಕ ರಾಜ್ಯ, ಭಾರತ
"Parisara Bhavan", 1st to 5th Floor, # 49, Church Street, Bangalore - 560 001, Karnataka State, India

NO.KSPCB/SEO-INFRA/AAQM/2021-22/ 5522 **Date:** 05 MAR 2021

ರವಾನಿಸಲಾಗಿದೆ

To

The Joint Commissioner (SWM),
Bruhat Bengaluru Mahanagara Palike,
BBMP Head Office, NR Square,
Bangalore – 560 002.

Sub: Intercomparison study of Air Unique-quality Monitoring (AUM) system with various CAAQMS stations of KSPCB in the city of BENGALURU.

Ref: 1) Your letter No. P1941 dt. 12.2.2021

2) Visit of the KSPCB dt. 24.2.2021

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With reference to the above, as per your letter dated, the undersigned visited the BBMP Office and verified the installation of AUM (AIR Unique-quality Monitoring) system on the terrace of BBMP Building on 24.02.2021.

About AUM System: AUM is a photonic system capable of non-intrusive monitoring in real time of all the air quality parameters of interest at one go, with very high sampling frequencies. The system has embedded intelligent algorithms and software operating on a user selectable remote server with data encryption, which ensures data security as well as free flow of desired information to authorized users as per specific requirements.

After the detail demonstration of the AUM system, it was decided to cross check the results of three existing CAAQMS stations of KSPCB in Bengaluru. The following three locations were identified:

1. City Railway Station, Mejestic,
2. Jayanagar 5th Block, Shalini Ground,
3. Rajeev Gandhi Child Care Institute, NIMHANS.

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On 26.02.2021 KSPCB conducted inspection on all three locations for Two hours each, in comparison with AUM system and the results are shown below:

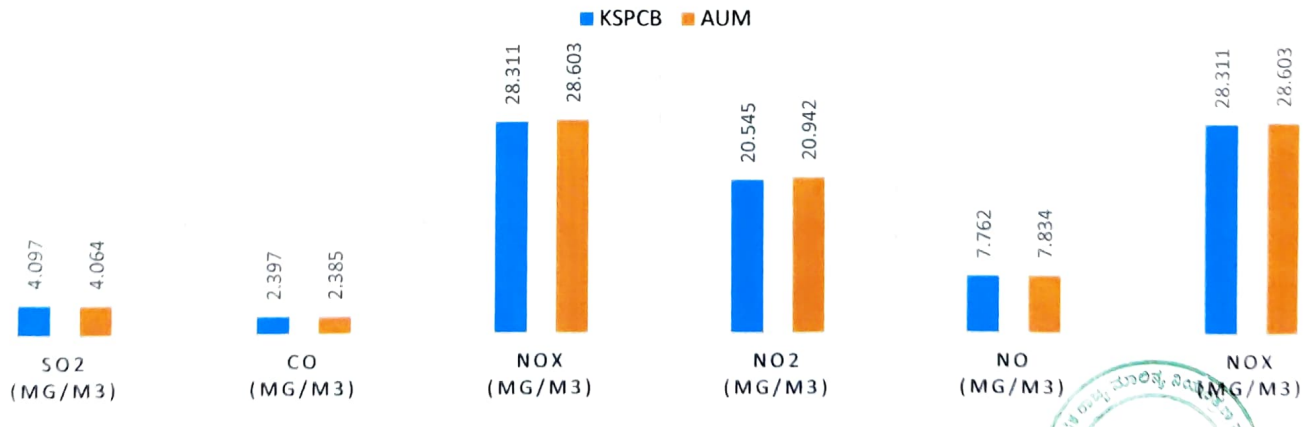
Location – 1

@ City Railway Station, KSPCB Station BENGALURU.

Banglore KSR Station

Sl. No		KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM
	Time (hh:mm:ss)	PM10 (µg/m3)	PM10 (µg/m3)	NO (µg/m3)	NO (µg/m3)	NO2 (µg/m3)	NO2 (µg/m3)	NOx (ppb)	NOx (ppb)	SO2 (µg/m3)	SO2 (µg/m3)	CO (µg/m3)	CO (µg/m3)
1	11:15:00	440.4	434.6496	10.43	8.7568	27.17	22.5658	37.61	31.9078	5.9	4.9321	2.31	2.1191
2	11:30:00	0	184.1082	0	5.7191	0	14.8532	0	20.8037	0	3.0919	0	1.5666
3	11:45:00	163.33	188.0246	9.48	7.5345	26.55	20.2905	36.03	33.4284	5.45	4.2336	0.89	1.1871
4	12:00:00	0	188.6326	0	3.0223	0	8.1119	0	11.0914	0	1.6453	0	0.7114
5	12:15:00	214.67	225.2029	9.43	9.635	26.96	25.2655	36.39	34.7503	5.28	4.9628	3.21	3.0532
6	12:30:00	214.67	165.2718	9.52	7.574	27.84	26.3564	37.37	26.4935	5.31	3.7935	3.43	2.9494
7	12:45:00	211.55	207.7083	11.9	10.6961	27.58	25.7211	39.49	36.3285	5.32	5.0473	2.76	2.566
8	13:00:00	235.41	207.1548	11.34	9.7395	28.26	24.3746	39.6	34.0243	5.52	4.8088	6.58	4.9269

@ CITY RAILWAY STATION

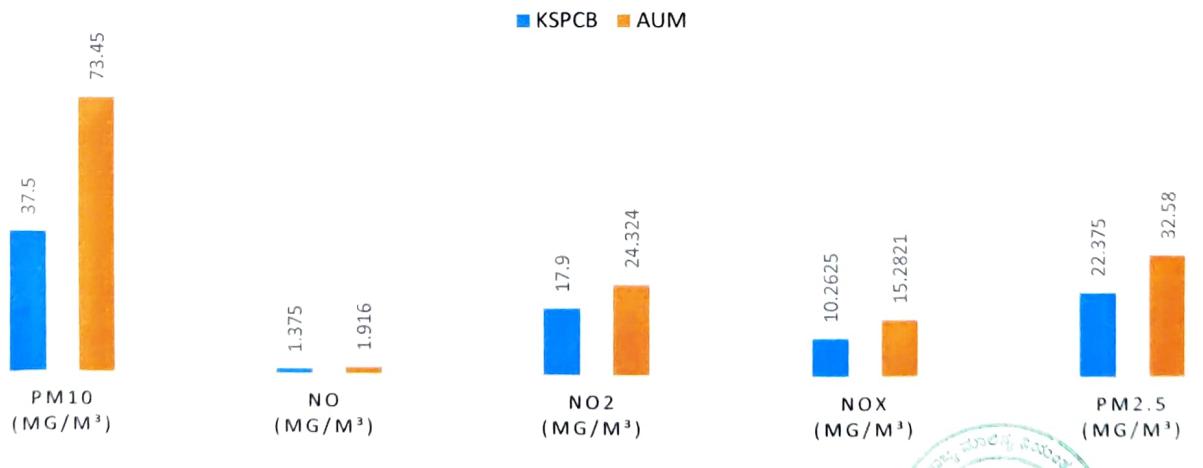


Location – 2

@ JAYANAGAR 5th Block, KSPCB Station BENGALURU.

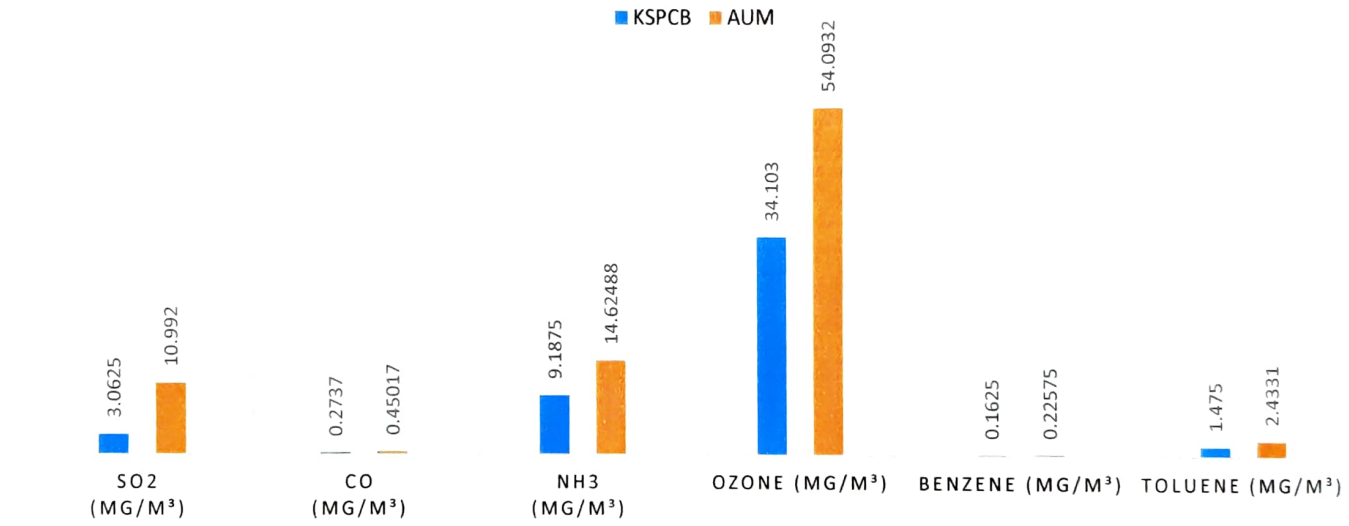
Sl. No		KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM
	Time (hh:mm:ss	PM2.5 (µg/m³)	PM2.5 (µg/m³)	PM10 (µg/m³)	PM10 (µg/m³)	NO (µg/m³)	NO (µg/m³)	NO2 (µg/m³)	NO2 (µg/m³)	NOx (ppb)	NOx (ppb)
1	14:45:00	0	32.84	0	74.32	0	2.176	0	21.019	0	16.492
2	15:00:00	34	32.99	0	73.73	2.2	2.09	27.7	21.829	15.9	17.275
3	15:15:00	0	37.35	77	75.89	0	1.462	0	22.246	0	13.581
4	15:30:00	34	32.61	0	63.39	2.2	1.826	27.7	23.263	15.9	13.346
5	15:45:00	0	26.7	77	84.31	0	2.418	0	26.254	0	13.104
6	16:00:00	37	32.87	0	76.88	2.2	1.792	28.4	24.283	16.3	16.145
7	16:15:00	37	33.88	73	75.8	2.2	1.672	29.3	27.148	16.8	15.72
8	16:30:00	37	31.4	73	63.34	2.2	1.892	30.1	28.55	17.2	16.594

@ JAYANAGAR 5TH BLOCK



Sl. No		KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM
	Time (hh:mm:ss	SO2 (µg/m³)	SO2 (µg/m³)	CO (µg/m³)	CO (µg/m³)	NH3 (µg/m³)	NH3 (µg/m³)	Ozone (µg/m³)	Ozone (µg/m³)	Benzene (µg/m³)	Benzene (µg/m³)	Toluene (µg/m³)	Toluene (µg/m³)
1	14:45:00	0	6.449	0	0.4342	0	15.172	0	54.3356	0	0.219	0	2.183
2	15:00:00	6.3	6.925	0.46	0.4932	14.8	16.158	55.66	54.3887	0.3	0.202	2.1	2.096
3	15:15:00	0	6.426	0	0.491	0	13.227	0	51.3743	0	0.259	0	2.484
4	15:30:00	7.2	5.262	0.44	0.3626	14.7	12.193	54.1	54.9277	0.3	0.236	2.1	1.919
5	15:45:00	0	50.564	0	0.4818	0	12.932	0	50.2942	0	0.252	0	2.477
6	16:00:00	6.9	7.767	0.45	0.454	14.7	15.572	54.49	59.5159	0.3	0.295	2.3	2.441
7	16:15:00	2.9	2.819	0.42	0.4208	14.7	16.171	54.29	51.2452	0.2	0.16	2.5	2.885
8	16:30:00	1.2	1.724	0.42	0.4638	14.6	15.574	54.29	56.6647	0.2	0.183	2.8	2.98

@ JAYANAGAR 5TH BLOCK



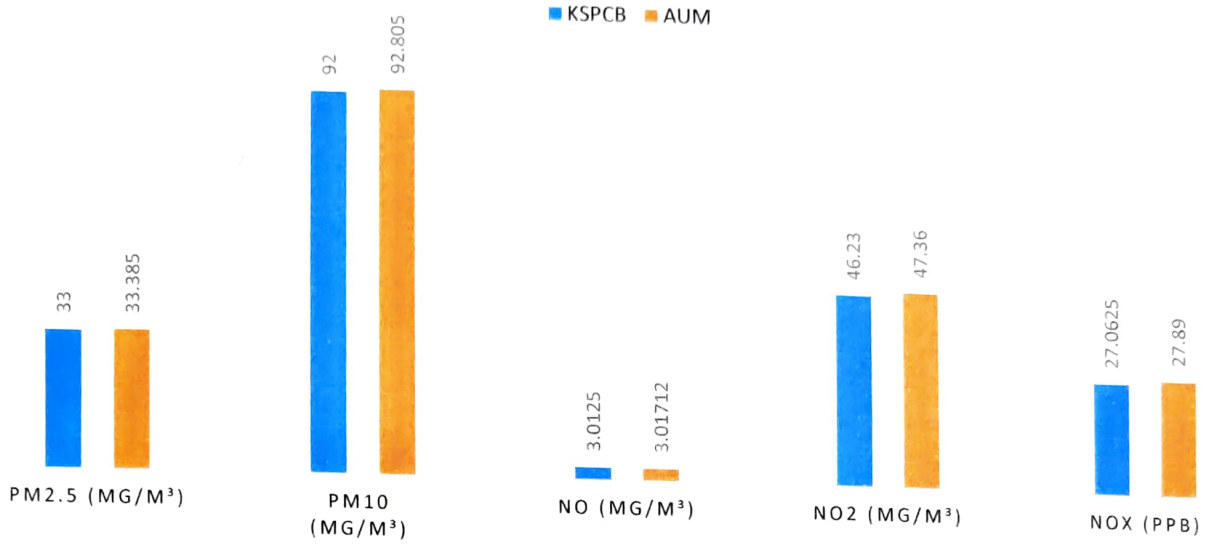
K.S.P.C.B. INFRA CELL

Location – 3

@ Hombegowda Nagar, KSPCB Station BENGALURU.

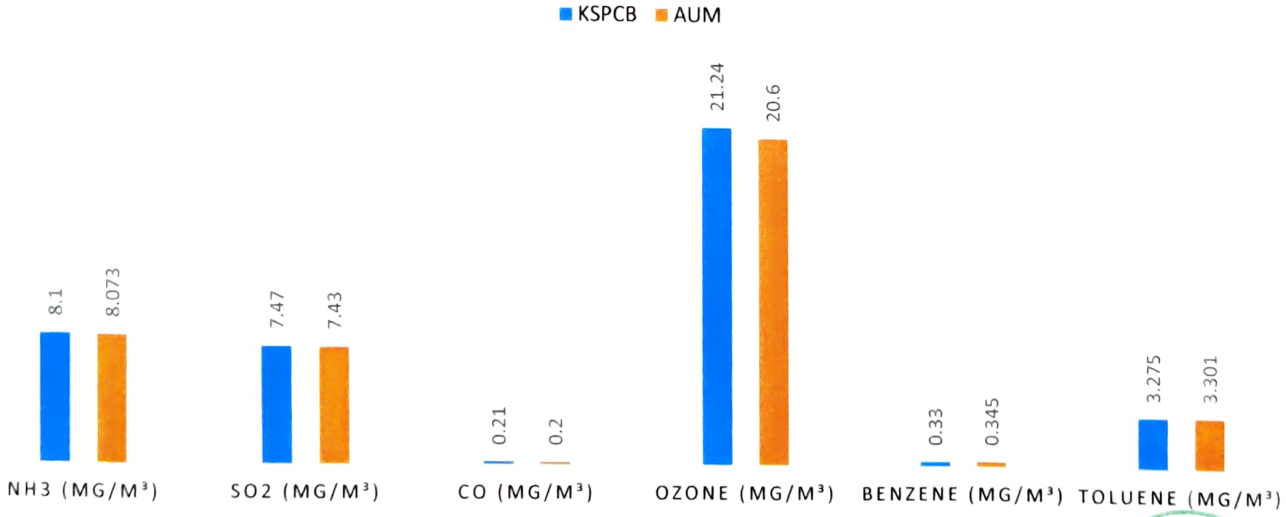
Sl. No		KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM
	Time (hh:mm:ss)	PM2.5 (µg/m³)	PM2.5 (µg/m³)	PM10 (µg/m³)	PM10 (µg/m³)	NO (µg/m³)	NO (µg/m³)	NO2 (µg/m³)	NO2 (µg/m³)	NOx (ppb)	NOx (ppb)
1	17:45:00	22	23.76	69	72.68	2.8	2.885	19.6	28.144	12.7	16.899
2	18:00:00	22	27.72	69	80.96	3.1	2.971	25.4	37.911	16	22.591
3	18:15:00	22	25.08	69	75.44	3	2.996	33.3	36.19	20.1	21.98
4	18:30:00	22	25.08	69	75.44	2.9	2.932	41.7	40.891	24.6	24.835
5	18:45:00	44	38.72	115	103.96	3	2.956	49.5	48.942	28.8	28.88
6	19:00:00	44	40.92	115	108.56	2.9	3.051	57.3	53.765	32.9	31.34
7	19:15:00	44	42.68	115	112.24	3.6	3.368	67.6	64.754	38.9	37.182
8	19:30:00	44	43.12	115	113.16	2.8	2.978	75.5	68.288	42.5	39.458

@ HOMBEGOWDA NAGAR



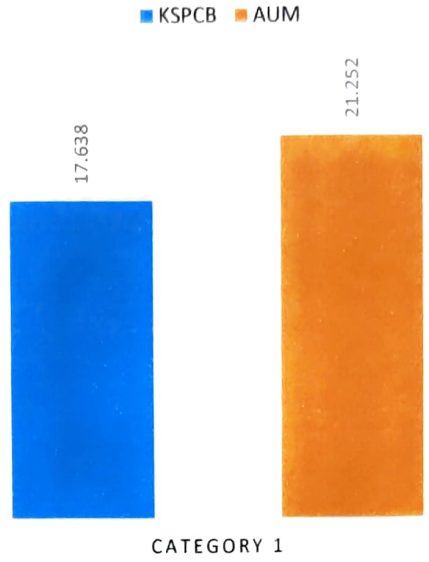
Sl. No		KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM	KSPCB	AUM
	Time (hh:mm:ss	NH3 (µg/m³)	NH3 (µg/m³)	SO2 (µg/m³)	SO2 (µg/m³	CO (µg/m³)	CO (µg/m³)	Ozone (µg/m³)	Ozone (µg/m³)	Benzene (µg/m³)	Benzene (µg/m³)	Toluene (µg/m³)	Toluene (µg/m³)
1	17:45:00	7.9	7.841	8	7.759	0.48	0.4066	63.07	51.7706	0.1	0.182	1.6	2.025
2	18:00:00	7.6	7.618	7.8	7.353	0.4	0.2832	49.49	34.4296	0.2	0.237	2.1	2.62
3	18:15:00	7.6	7.526	7.3	7.326	0.32	0.292	36.14	33.6215	0.2	0.216	2.3	2.505
4	18:30:00	7.1	7.254	6.9	7.08	0.21	0.225	14.94	19.3912	0.2	0.21	2.6	2.643
5	18:45:00	7.5	7.775	7	7.229	0.15	0.151	6.35	9.7251	0.3	0.324	3.1	3.259
6	19:00:00	8.2	8.235	7.4	7.499	0.06	0.1265	0	8.8505	0.3	0.388	4.1	3.678
7	19:15:00	9	8.911	7.6	7.537	0.01	0.0465	0	3.0827	0.5	0.493	5.1	4.776
8	19:30:00	9.9	9.425	7.8	7.672	0.05	0.0722	0	3.9827	0.9	0.736	5.3	4.906

@ HOMBEGOWDA NAGAR



K.S.P.C.B. INFRA CELL

OVERAL COMPARISION



Conclusion: Based on intercomparison with the AUM system with the ambient air quality monitoring of KSPCB. The results are almost equivalent to the CAAQM stations set up by the Board. The percentage of variation is only 3.614%. This has more advantage of being compact, portable, light weight, low power consumption, one system to monitor all air quality parameters simultaneously at very high sampling intervals with high accuracies and sensitivities make it more suitable and attractive for field applications in the real time compared to the existing conventional systems.

Yours faithfully,

Syed Khaja Mohiddin
Senior Environmental Officer