Project Development Phase
Model Performance Test

Date	10 February 2025
Team ID	LTVIP2025TMID36237
Project Name	Sustainable smart city assistant using IBM granite LLM
Maximum Marks	

Model Performance Testing:

📊 **Performance Testing Template: Sustainable Smart City Assistant (IBM Granite LLM)**

S.No.	Parameter	Screenshot / Values
1	**Data Rendered**	*e.g.*, live sensor feeds (traffic, air quality, energy usage) displayed on a map or table. Screenshot of raw data input in the assistant.
2	**Data Preprocessing**	Describe transformations: e.g., imputation of missing values, timestamp alignment, coordinate normalization. Include screenshot of code or processed preview.
3	**Utilization of Filters**	*e.g.*, user-selectable filters by district, time window, pollutant thresholds. Screenshot showing filter UI and filtered metrics.
4	**Calculation Fields Used**	*e.g.*, DAX or LLM-generated formulas: • AvgEnergyPerCapita = TotalEnergy / Population • EmissionsIndex = WeightedSum(PM2.5, NO2) Screenshot of formula editor or code.
5	**Dashboard Design**	**No. of Visualizations / Graphs: ___** *e.g.*, 6 visuals: energy trends line chart, AQI map, resource usage gauge, KPIs, alert table, RAG-generated commentary.
6	**Story Design**	**No. of Visualizations / Graphs: ___** *e.g.*, 4 visuals: monthly sustainability summary, policy impact analysis,

S.No.	Parameter	Screenshot / Values

citizen request flow diagram, future outlook narrative.

🌍 **Integrating IBM Granite LLM for Smart City Use Cases**

1. **Data & Preprocessing**
   - The assistant ingests urban IoT, GIS, and environmental datasets.
   - Preprocessing pipelines include normalization, coordinate mapping, and error handling, feeding both visualization and retrieval modules (Granite RAG and vision).
   - IBM Granite's geospatial/time-series models enhance data reliability and contextual consistency ibm.com+3github.com+3news.sap.com+3reddit.com+12ibm.com+12reddit.com+12reddit.com+5reddit.com+5reddit.com+5reddit.com.
2. **Filtering**
   - Filters (by region, sensor type, thresholds) dynamically adjust dashboard visuals and RAG responses.
   - Granite LLM uses filter-meta context to tailor explanations or alerts based on the filtered subset.
3. **Calculation Fields**
   - Use DAX (e.g., in Power BI) or LLM-generated formula logic to calculate metrics such as "EnergyPerCapita" or "AQI weighted average."
   - Use time-series Granite models for forecasting trends (e.g., next-day energy demand or pollutant peaks) .
4. **Dashboard & Story Design**
   - Dashboards combine data visuals with Granite-generated commentary, explaining patterns or anomalies. Visuals may include maps, charts, KPIs, and alert widgets.
   - Story or report pages synthesize key insights—like monthly summaries—combining charts and narrative supported by RAG-enhanced LLM responses.

✅ **Example Entry**

S.No.	Parameter	Values
1	Data Rendered	Live traffic, energy, and AQI feeds from IoT sensors.
2	Data Preprocessing	Imputed missing timestamps, converted coordinates to GeoJSON.
3	Utilization of Filters	Filters by zone and AQI levels (>100).
4	Calculation Fields Used	- AvgEnergyPerCapita = SUM(Energy)/SUM(Population) - EmissionScore, a weighted average of PM2.5 & NO_2
5	Dashboard Design	**6 visuals**: line, bar, map, gauge, table, KPI card with commentary.

S.No.	Parameter	Values
6	Story Design	**4 visuals**: monthly summary, emissions trend, policy impact, forecast.