

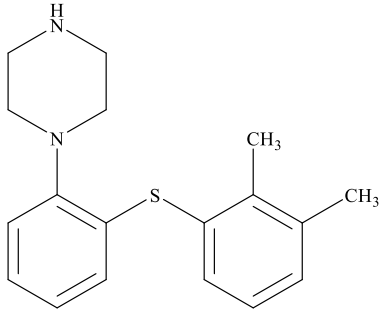
# Certificate of Analysis

Certificate No.: 20201111013

Date: November 11, 2020

Retest date: November 9, 2023

<b>Compound Name:</b> Vortioxetine Impurity 4	
<b>Synonyms:</b>	1-(2-((2,3-dimethylphenyl)thio)phenyl)piperazine
<b>TLC Catalogue Number:</b>	V-043005
<b>CAS Number:</b>	1293489-77-6
<b>Molecular Weight:</b>	298.45
<b>Molecular Formula:</b>	C <sub>18</sub> H <sub>22</sub> N <sub>2</sub> S
<b>Source:</b>	TLC Pharmaceutical Standards
<b>Source Lot No.:</b>	4113-062A3
<b>Storage Conditions:</b>	Store at 2-8 °C
<b>Solubility:</b>	Methanol, DMSO, Acetonitrile



Test Description	Specifications	Results
<b>Visual Description</b>	Off-white solid	<b>Conforms</b>
<b>Identification</b>		
IR	Conforms to structure	<b>Conforms</b>
MS	Conforms to structure	<b>Conforms</b>
<sup>1</sup> H NMR	Conforms to structure	<b>Conforms</b>
<b>Purity (HPLC)</b>	Not less than 95.0%	<b>99.7%</b>
<b>Impurity (HPLC)</b>	RT 2.76, 0.14%; RT 8.39, 0.18%	
<b>Water Content (KF)</b>	N/A	<b>0.1%</b>
<b>Residual Solvents (NMR)</b>	0.2% isopropyl ether and 0.1% ethyl acetate	
<b>Assay (%)</b>	Not less than 90.0%	<b>99.3%</b>
<b>Recommendation:</b>	<b>Released.</b>	

Name	Department	Signature	Date
Reviewed and approved by:	Analytical Services		
Approved by:	Quality Assurance		

**Attachments:** HPLC, IR, MS and NMR spectra.