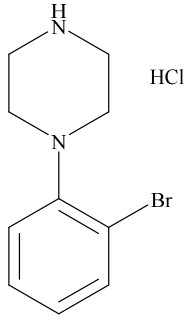


## Certificate of Analysis

Certificate No.: 20181126006

Date: November 26, 2018

Retest date: November 21, 2021

<b>Compound Name:</b>	<b>Vortioxetine Impurity 13 HCl</b>	
<b>Synonyms:</b>	1-(2-Bromophenyl)piperazine, hydrochloride (1:1)	
<b>TLC Catalogue Number:</b>	V-043014	
<b>CAS Number:</b>	853745-55-8	
<b>Molecular Weight:</b>	241.13 36.46	
<b>Molecular Formula:</b>	C10H13BrN2. HCl	
<b>Source:</b>	TLC Pharmaceutical Standards	
<b>Source Lot No.:</b>	3166-063A4	
<b>Storage Conditions:</b>	Store at 2-8 °C.	
<b>Solubility:</b>	Methanol, DMSO, DMF	

Test Description	Specifications	Results
<b>Visual Description</b>	White to off-white solid	<b>Conforms</b>
<b>Identification</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>99.9%</b>
<b>Impurity (HPLC)</b>	RT 3.44, 0.1%	
<b>Water Content (KF)</b>	N/A	<b>2.2%</b>
<b>Residual Solvents (NMR)</b>	No residual solvent	
<b>Assay (%)</b>	Not less than 90.0%	<b>97.7%</b>
<b>Recommendation:</b>	<b>Released.</b>	

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

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