



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 11, 2023 – 03:58 PM EDT

PDB ID : 7R9V  
Title : Structure of PIK3CA with covalent inhibitor 19  
Authors : Burke, J.E.; McPhail, J.A.  
Deposited on : 2021-06-29  
Resolution : 2.69 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35.1

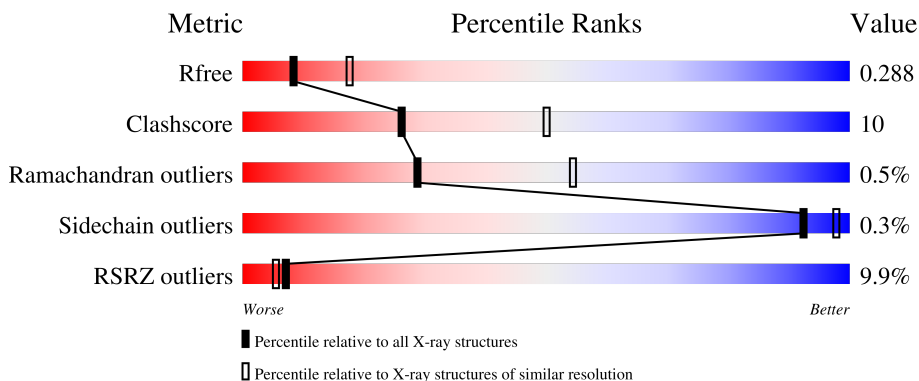
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.69 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	948	

## 2 Entry composition i

There are 2 unique types of molecules in this entry. The entry contains 6666 atoms, of which 35 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

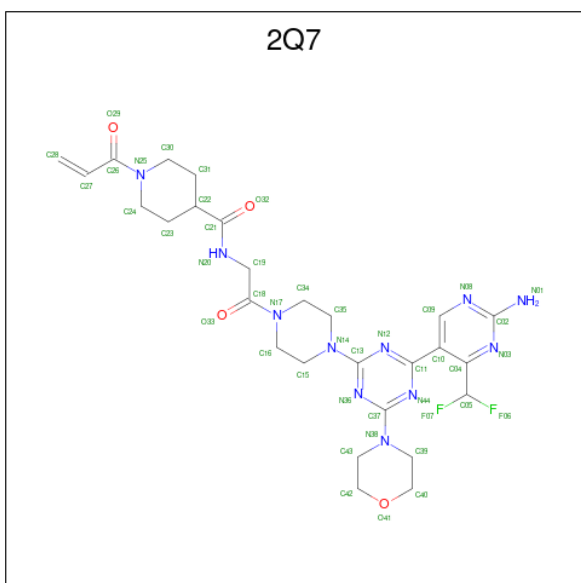
- Molecule 1 is a protein called Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic sub-unit alpha isoform.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	855	6587	4229	1102	1197	59	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	101	ALA	-	expression tag	UNP P42336
A	102	GLY	-	expression tag	UNP P42336
A	103	THR	-	expression tag	UNP P42336
A	104	MET	-	expression tag	UNP P42336

- Molecule 2 is N-[2-(4-{4-[2-amino-4-(difluoromethyl)pyrimidin-5-yl]-6-(morpholin-4-yl)-1,3,5-triazin-2-yl]piperazin-1-yl)-2-oxoethyl]-1-(prop-2-enoyl)piperidine-4-carboxamide (three-letter code: 2Q7) (formula: C<sub>27</sub>H<sub>35</sub>F<sub>2</sub>N<sub>11</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).

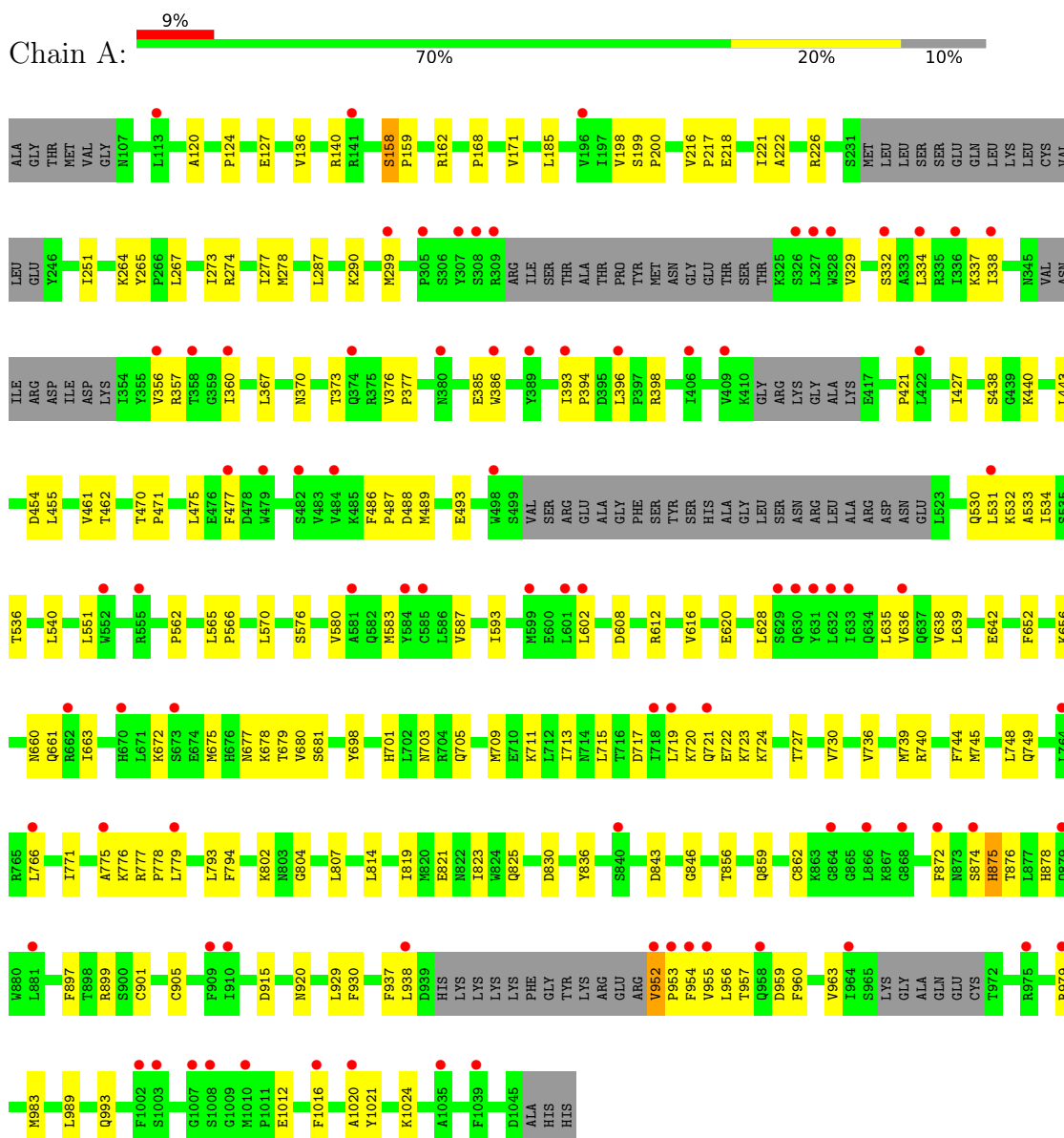


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	F	H	N	O		
2	A	1	79	27	2	35	11	4	0	0

### 3 Residue-property plots i

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Phosphatidylinositol 4,5-bisphosphate 3-kinase catalytic subunit alpha isoform



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	59.06Å 134.62Å 144.58Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.26 – 2.69 49.26 – 2.69	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.26-2.69) 88.4 (49.26-2.69)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.69 (at 2.69Å)	Xtrriage
Refinement program	PHENIX 1.19.1_4122	Depositor
R, $R_{free}$	0.253 , 0.292 0.249 , 0.288	Depositor DCC
$R_{free}$ test set	1634 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	78.2	Xtrriage
Anisotropy	0.469	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 85.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	6666	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	114.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.31% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 2Q7

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.25	0/6738	0.44	0/9175

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6587	0	6128	133	0
2	A	44	35	0	1	0
All	All	6631	35	6128	133	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 10.

All (133) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:158:SER:HB3	1:A:159:PRO:CD	1.98	0.94
1:A:158:SER:HB3	1:A:159:PRO:HD2	1.46	0.94

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:679:THR:HG22	1:A:680:VAL:HG13	1.64	0.80
1:A:461:VAL:HG11	1:A:679:THR:HG23	1.62	0.79
1:A:807:LEU:HD12	1:A:846:GLY:HA3	1.66	0.77
1:A:185:LEU:HD21	1:A:277:ILE:HD13	1.71	0.72
1:A:171:VAL:HG21	1:A:265:TYR:CZ	2.25	0.71
1:A:461:VAL:CG1	1:A:679:THR:HG23	2.25	0.66
1:A:959:ASP:O	1:A:963:VAL:HG23	1.96	0.65
1:A:267:LEU:HG	1:A:273:ILE:HG13	1.78	0.65
1:A:878:HIS:HD2	1:A:963:VAL:HA	1.62	0.64
1:A:216:VAL:HG12	1:A:218:GLU:H	1.63	0.63
1:A:216:VAL:HG13	1:A:217:PRO:HD2	1.82	0.61
1:A:356:VAL:H	1:A:373:THR:HG22	1.63	0.61
1:A:162:ARG:HH12	1:A:299:MET:HA	1.65	0.61
1:A:158:SER:CB	1:A:159:PRO:HD2	2.27	0.60
1:A:421:PRO:HG3	1:A:455:LEU:HA	1.83	0.60
1:A:158:SER:CB	1:A:159:PRO:CD	2.78	0.60
1:A:874:SER:HB2	1:A:959:ASP:CG	2.22	0.59
1:A:602:LEU:O	1:A:612:ARG:NH2	2.35	0.59
1:A:338:ILE:HD11	1:A:373:THR:OG1	2.02	0.59
1:A:438:SER:HA	1:A:477:PHE:HB2	1.85	0.59
1:A:766:LEU:H	1:A:766:LEU:HD12	1.68	0.58
1:A:171:VAL:HG11	1:A:265:TYR:CD2	2.38	0.58
1:A:954:PHE:HB3	1:A:956:LEU:HG	1.86	0.58
1:A:957:THR:H	1:A:960:PHE:HD2	1.50	0.57
1:A:635:LEU:HA	1:A:638:VAL:HG22	1.85	0.57
1:A:612:ARG:NH1	1:A:642:GLU:OE2	2.38	0.56
1:A:373:THR:OG1	1:A:385:GLU:OE1	2.22	0.56
1:A:470:THR:HB	1:A:471:PRO:HD2	1.87	0.56
1:A:862:CYS:HA	1:A:872:PHE:CE2	2.40	0.55
1:A:856:THR:OG1	1:A:859:GLN:HG3	2.06	0.55
1:A:332:SER:O	1:A:393:ILE:N	2.31	0.55
1:A:915:ASP:O	1:A:920:ASN:ND2	2.40	0.55
1:A:744:PHE:CE1	1:A:748:LEU:HD22	2.41	0.55
1:A:722:GLU:HG2	1:A:723:LYS:HD2	1.89	0.54
1:A:356:VAL:H	1:A:373:THR:CG2	2.20	0.54
1:A:565:LEU:N	1:A:566:PRO:HD2	2.23	0.54
1:A:938:LEU:HD22	1:A:1021:TYR:HB3	1.89	0.53
1:A:162:ARG:NH1	1:A:299:MET:HA	2.24	0.53
1:A:337:LYS:HB2	1:A:386:TRP:CE2	2.44	0.53
1:A:957:THR:HG23	1:A:960:PHE:CE2	2.43	0.52
1:A:955:VAL:HG12	1:A:957:THR:HG22	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:332:SER:O	1:A:393:ILE:HG13	2.10	0.52
1:A:628:LEU:HD23	1:A:663:ILE:HD13	1.90	0.52
1:A:814:LEU:HD13	1:A:836:TYR:O	2.10	0.52
1:A:620:GLU:HG2	1:A:652:PHE:CD1	2.45	0.51
1:A:771:ILE:HG21	1:A:777:ARG:HD2	1.91	0.51
1:A:802:LYS:NZ	2:A:1101:2Q7:F06	2.32	0.51
1:A:776:LYS:HE3	1:A:804:GLY:HA3	1.93	0.51
1:A:486:PHE:CG	1:A:487:PRO:HD2	2.45	0.51
1:A:171:VAL:HG21	1:A:265:TYR:CE2	2.45	0.51
1:A:136:VAL:O	1:A:140:ARG:HG3	2.11	0.50
1:A:427:ILE:HD11	1:A:443:LEU:HD22	1.92	0.50
1:A:636:VAL:O	1:A:639:LEU:HB2	2.11	0.50
1:A:612:ARG:O	1:A:616:VAL:HG23	2.12	0.50
1:A:628:LEU:CD2	1:A:656:LYS:HG2	2.41	0.50
1:A:532:LYS:O	1:A:536:THR:HG23	2.13	0.49
1:A:124:PRO:HG2	1:A:127:GLU:HG3	1.94	0.49
1:A:821:GLU:O	1:A:825:GLN:HG2	2.13	0.49
1:A:576:SER:O	1:A:580:VAL:HG23	2.13	0.49
1:A:672:LYS:HA	1:A:675:MET:HG2	1.95	0.49
1:A:709:MET:O	1:A:713:ILE:HG13	2.12	0.49
1:A:216:VAL:HG13	1:A:264:LYS:HA	1.94	0.48
1:A:901:CYS:O	1:A:905:CYS:SG	2.70	0.48
1:A:874:SER:C	1:A:876:THR:H	2.17	0.48
1:A:711:LYS:HB2	1:A:748:LEU:HD11	1.95	0.48
1:A:701:HIS:O	1:A:705:GLN:HG3	2.14	0.48
1:A:661:GLN:NE2	1:A:698:TYR:HB2	2.28	0.48
1:A:727:THR:HG23	1:A:730:VAL:H	1.79	0.47
1:A:533:ALA:O	1:A:536:THR:OG1	2.31	0.47
1:A:393:ILE:HB	1:A:394:PRO:HD3	1.95	0.47
1:A:715:LEU:O	1:A:715:LEU:HD23	2.15	0.47
1:A:722:GLU:HG2	1:A:723:LYS:CD	2.45	0.47
1:A:744:PHE:CZ	1:A:748:LEU:HD22	2.50	0.47
1:A:489:MET:O	1:A:493:GLU:HG3	2.14	0.47
1:A:608:ASP:O	1:A:612:ARG:HG3	2.15	0.47
1:A:952:VAL:N	1:A:953:PRO:CD	2.77	0.47
1:A:168:PRO:HG3	1:A:660:ASN:OD1	2.15	0.47
1:A:678:LYS:HA	1:A:681:SER:OG	2.15	0.46
1:A:677:ASN:OD1	1:A:679:THR:HB	2.15	0.46
1:A:874:SER:O	1:A:876:THR:N	2.49	0.46
1:A:957:THR:N	1:A:960:PHE:HD2	2.14	0.46
1:A:719:LEU:HD23	1:A:719:LEU:HA	1.78	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:957:THR:HG23	1:A:960:PHE:HE2	1.81	0.46
1:A:461:VAL:HG22	1:A:462:THR:N	2.31	0.45
1:A:488:ASP:OD1	1:A:489:MET:N	2.49	0.45
1:A:470:THR:HB	1:A:471:PRO:CD	2.46	0.45
1:A:775:ALA:HB3	1:A:802:LYS:HZ1	1.82	0.45
1:A:715:LEU:HD23	1:A:719:LEU:HG	1.99	0.45
1:A:739:MET:HG3	1:A:744:PHE:CE1	2.52	0.45
1:A:793:LEU:HG	1:A:794:PHE:CD2	2.52	0.45
1:A:955:VAL:HG12	1:A:957:THR:CG2	2.47	0.45
1:A:929:LEU:HD23	1:A:930:PHE:N	2.32	0.44
1:A:566:PRO:O	1:A:570:LEU:HG	2.17	0.44
1:A:736:VAL:O	1:A:740:ARG:HG3	2.18	0.44
1:A:635:LEU:HA	1:A:638:VAL:CG2	2.48	0.44
1:A:875:HIS:O	1:A:875:HIS:ND1	2.50	0.44
1:A:979:ARG:O	1:A:983:MET:HG3	2.17	0.44
1:A:454:ASP:OD1	1:A:455:LEU:N	2.47	0.44
1:A:251:ILE:HG23	1:A:290:LYS:CG	2.48	0.43
1:A:720:LYS:O	1:A:724:LYS:CB	2.67	0.43
1:A:562:PRO:HB2	1:A:593:ILE:HG22	2.01	0.43
1:A:819:ILE:O	1:A:823:ILE:HG13	2.19	0.43
1:A:334:LEU:HD22	1:A:396:LEU:HD11	2.01	0.42
1:A:530:GLN:O	1:A:534:ILE:HG13	2.19	0.42
1:A:338:ILE:HG13	1:A:338:ILE:O	2.20	0.42
1:A:274:ARG:O	1:A:278:MET:HG3	2.19	0.42
1:A:583:MET:O	1:A:587:VAL:HG23	2.18	0.42
1:A:1020:ALA:O	1:A:1024:LYS:HG3	2.19	0.42
1:A:398:ARG:HD3	1:A:486:PHE:CD2	2.55	0.42
1:A:440:LYS:HA	1:A:475:LEU:O	2.19	0.42
1:A:329:VAL:O	1:A:329:VAL:HG12	2.19	0.42
1:A:357:ARG:NH2	1:A:370:ASN:HD22	2.18	0.42
1:A:937:PHE:O	1:A:938:LEU:HB2	2.20	0.42
1:A:376:VAL:HG13	1:A:377:PRO:HD2	2.02	0.41
1:A:199:SER:OG	1:A:200:PRO:HD2	2.20	0.41
1:A:897:PHE:CZ	1:A:960:PHE:HD1	2.38	0.41
1:A:989:LEU:O	1:A:993:GLN:HG3	2.20	0.41
1:A:120:ALA:HB2	1:A:703:ASN:OD1	2.21	0.41
1:A:531:LEU:HD22	1:A:551:LEU:HD23	2.02	0.41
1:A:717:ASP:O	1:A:721:GLN:HG3	2.21	0.41
1:A:221:ILE:HG23	1:A:287:LEU:HD11	2.03	0.41
1:A:222:ALA:O	1:A:226:ARG:HG3	2.20	0.41
1:A:775:ALA:O	1:A:778:PRO:HG3	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:830:ASP:O	1:A:899:ARG:HD3	2.21	0.41
1:A:705:GLN:O	1:A:709:MET:HG2	2.21	0.41
1:A:745:MET:HB3	1:A:749:GLN:NE2	2.36	0.41
1:A:739:MET:HG3	1:A:744:PHE:HE1	1.86	0.40
1:A:360:ILE:HG22	1:A:367:LEU:HD12	2.03	0.40
1:A:531:LEU:CD2	1:A:551:LEU:HD23	2.52	0.40
1:A:198:VAL:O	1:A:199:SER:HB3	2.22	0.40
1:A:540:LEU:HD21	1:A:1016:PHE:HD1	1.87	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	839/948 (88%)	796 (95%)	39 (5%)	4 (0%)	29 54

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	158	SER
1	A	843	ASP
1	A	1012	GLU
1	A	875	HIS

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	660/861 (77%)	658 (100%)	2 (0%)	92 98

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	779	LEU
1	A	952	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	370	ASN
1	A	878	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	2Q7	A	1101	1	47,48,48	2.56	15 (31%)	59,67,67	2.48	20 (33%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	2Q7	A	1101	1	-	10/35/63/63	1/5/5/5

All (15) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1101	2Q7	C13-N14	7.39	1.49	1.35
2	A	1101	2Q7	C18-N17	6.40	1.48	1.35
2	A	1101	2Q7	C21-N20	6.11	1.46	1.33
2	A	1101	2Q7	C37-N38	5.90	1.46	1.35
2	A	1101	2Q7	C02-N01	5.38	1.44	1.33
2	A	1101	2Q7	C26-N25	4.83	1.44	1.35
2	A	1101	2Q7	C34-N17	-3.34	1.41	1.47
2	A	1101	2Q7	C16-N17	-3.08	1.41	1.47
2	A	1101	2Q7	C10-C11	2.67	1.55	1.48
2	A	1101	2Q7	C02-N08	-2.34	1.32	1.35
2	A	1101	2Q7	C35-N14	2.33	1.50	1.46
2	A	1101	2Q7	C15-N14	2.26	1.50	1.46
2	A	1101	2Q7	O32-C21	-2.25	1.18	1.23
2	A	1101	2Q7	C02-N03	-2.06	1.31	1.35
2	A	1101	2Q7	O29-C26	-2.06	1.19	1.23

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1101	2Q7	C13-N12-C11	8.30	120.46	114.43
2	A	1101	2Q7	C37-N44-C11	7.21	119.67	114.43
2	A	1101	2Q7	C02-N03-C04	5.01	120.33	116.26
2	A	1101	2Q7	C37-N36-C13	4.36	120.08	113.55
2	A	1101	2Q7	N36-C13-N12	-3.99	119.73	126.31
2	A	1101	2Q7	C22-C21-N20	3.97	121.14	115.99
2	A	1101	2Q7	N08-C02-N03	-3.74	121.14	125.70
2	A	1101	2Q7	N44-C37-N36	-3.73	120.14	126.31
2	A	1101	2Q7	N44-C11-N12	-3.28	119.92	125.23
2	A	1101	2Q7	C10-C09-N08	-3.23	119.42	124.49

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1101	2Q7	N36-C13-N14	3.10	120.93	117.11
2	A	1101	2Q7	C09-N08-C02	2.84	121.69	116.44
2	A	1101	2Q7	N44-C37-N38	2.78	120.54	117.11
2	A	1101	2Q7	C39-N38-C37	-2.73	117.16	121.69
2	A	1101	2Q7	C19-C18-N17	2.55	121.42	117.15
2	A	1101	2Q7	C35-N14-C15	-2.33	106.38	111.52
2	A	1101	2Q7	C42-C43-N38	2.26	114.18	110.02
2	A	1101	2Q7	C43-N38-C39	-2.17	106.72	111.52
2	A	1101	2Q7	C27-C26-N25	2.07	120.06	117.66
2	A	1101	2Q7	C30-N25-C24	-2.06	108.66	112.62

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1101	2Q7	N25-C26-C27-C28
2	A	1101	2Q7	N36-C13-N14-C35
2	A	1101	2Q7	N36-C37-N38-C43
2	A	1101	2Q7	N12-C13-N14-C35
2	A	1101	2Q7	N44-C37-N38-C43
2	A	1101	2Q7	N20-C21-C22-C23
2	A	1101	2Q7	O29-C26-C27-C28
2	A	1101	2Q7	O32-C21-C22-C23
2	A	1101	2Q7	N17-C18-C19-N20
2	A	1101	2Q7	O33-C18-C19-N20

All (1) ring outliers are listed below:

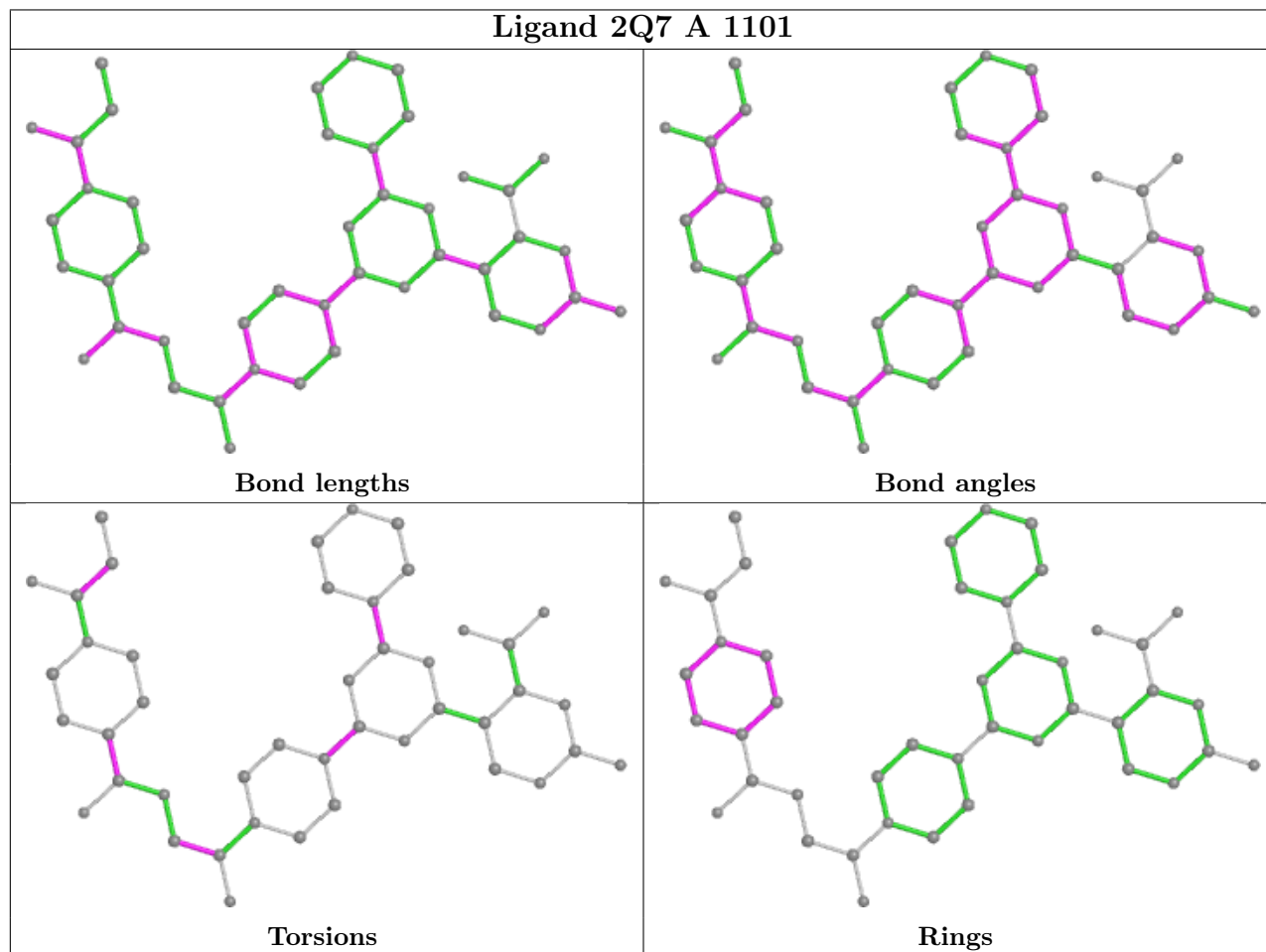
Mol	Chain	Res	Type	Atoms
2	A	1101	2Q7	C22-C23-C24-C30-C31-N25

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1101	2Q7	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	855/948 (90%)	0.63	85 (9%) <b>7</b> <b>5</b>	64, 110, 174, 236	0

All (85) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	498	TRP	6.2
1	A	866	LEU	6.1
1	A	879	GLN	5.5
1	A	393	ILE	5.0
1	A	938	LEU	4.9
1	A	328	TRP	4.8
1	A	952	VAL	4.5
1	A	955	VAL	4.5
1	A	954	PHE	4.4
1	A	327	LEU	4.2
1	A	334	LEU	3.9
1	A	309	ARG	3.6
1	A	958	GLN	3.6
1	A	872	PHE	3.5
1	A	718	ILE	3.5
1	A	552	TRP	3.5
1	A	581	ALA	3.5
1	A	874	SER	3.5
1	A	299	MET	3.5
1	A	775	ALA	3.4
1	A	975	ARG	3.4
1	A	358	THR	3.3
1	A	868	GLY	3.2
1	A	336	ILE	3.2
1	A	409	VAL	3.0
1	A	633	ILE	2.9
1	A	308	SER	2.9

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	721	GLN	2.9
1	A	380	ASN	2.8
1	A	629	SER	2.8
1	A	599	MET	2.8
1	A	396	LEU	2.8
1	A	719	LEU	2.7
1	A	909	PHE	2.7
1	A	374	GLN	2.7
1	A	332	SER	2.6
1	A	555	ARG	2.6
1	A	631	TYR	2.6
1	A	406	ILE	2.6
1	A	670	HIS	2.6
1	A	484	VAL	2.5
1	A	1016	PHE	2.5
1	A	953	PRO	2.5
1	A	531	LEU	2.5
1	A	360	ILE	2.4
1	A	422	LEU	2.4
1	A	477	PHE	2.4
1	A	386	TRP	2.4
1	A	482	SER	2.4
1	A	479	TRP	2.4
1	A	779	LEU	2.4
1	A	1003	SER	2.3
1	A	979	ARG	2.3
1	A	636	VAL	2.3
1	A	910	ILE	2.3
1	A	196	VAL	2.3
1	A	1007	GLY	2.3
1	A	766	LEU	2.3
1	A	141	ARG	2.3
1	A	864	GLY	2.2
1	A	1008	SER	2.2
1	A	305	PRO	2.2
1	A	338	ILE	2.2
1	A	307	TYR	2.2
1	A	1002	PHE	2.2
1	A	585	CYS	2.2
1	A	601	LEU	2.2
1	A	632	LEU	2.2
1	A	584	TYR	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	840	SER	2.2
1	A	964	ILE	2.2
1	A	630	GLN	2.2
1	A	389	TYR	2.1
1	A	1039	PHE	2.1
1	A	673	SER	2.1
1	A	1035	ALA	2.1
1	A	326	SER	2.1
1	A	881	LEU	2.1
1	A	662	ARG	2.1
1	A	1020	ALA	2.1
1	A	1010	MET	2.1
1	A	113	LEU	2.1
1	A	602	LEU	2.1
1	A	764	LEU	2.1
1	A	356	VAL	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

## 6.3 Carbohydrates [i](#)

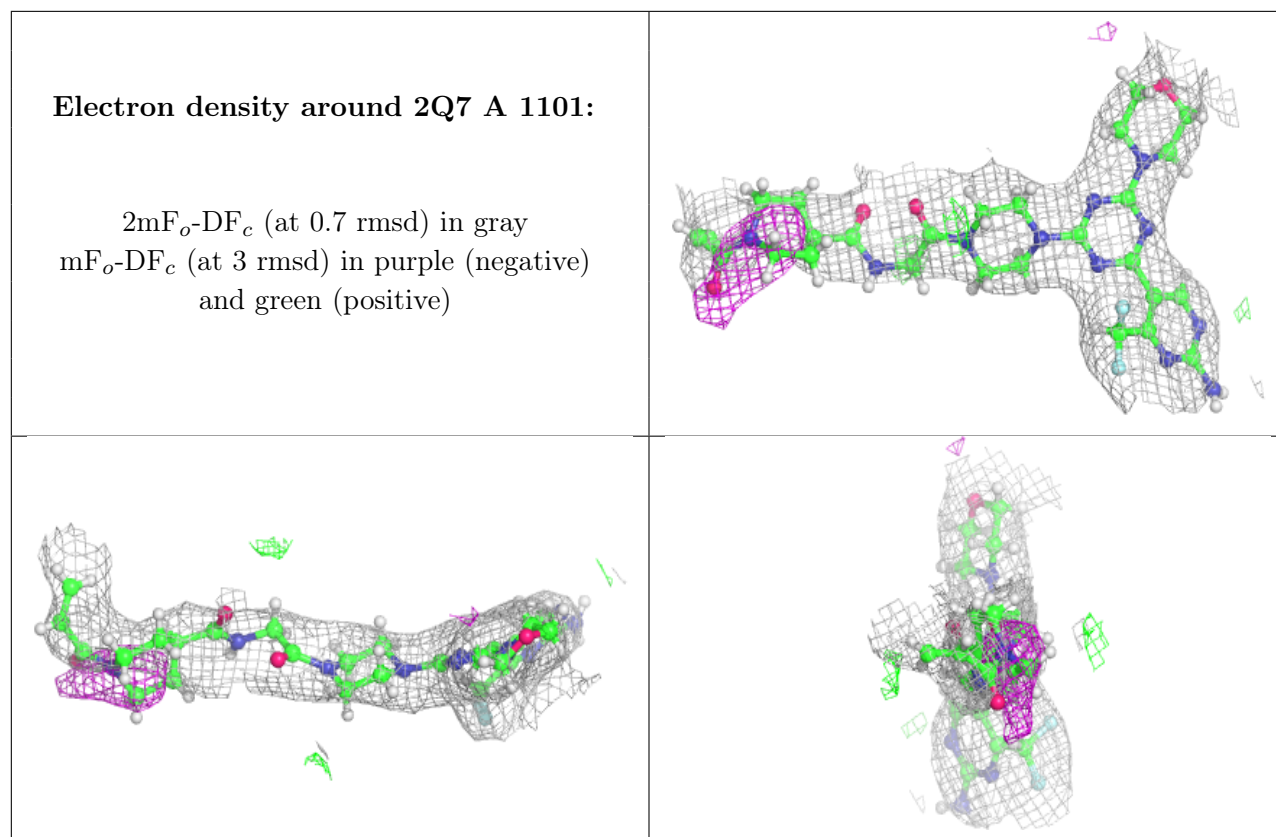
There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	2Q7	A	1101	44/44	0.88	0.22	81,119,156,160	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



## 6.5 Other polymers [i](#)

There are no such residues in this entry.