

Supplementary Information for IMPRESSION Generation 2 – Accurate, fast and generalised neural network model for predicting NMR parameters in place of DFT.

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Statement on Software and Data availability

The IMPRESSION software is temporarily available at <https://www.impression-nmr.com/> but may have limited capacity or be inaccessible while the authors finalise this webtool for use. Once finalised, this Statement will be updated to identify avenues to accessing the software for academic and non-academic purposes.

The data presented in this work is available at: <https://github.com/orgs/Buttsgroup/repositories>

S1 Methods

S1.1 Graph Transformer Network

Graph Transformer Network¹ (GTN) is the implementation of the transformer² architecture into graphs data, enabling the use of the attention mechanism to evaluate interactions between nodes of different labelled data type. In the context of NMR parameter prediction, this allows the weighting of relationships between chemical shifts and coupling constants between different environments (e.g. the local environment of a $\delta^{13}\text{C}$ shift in an environment based on neighbouring atoms and atom-pair interaction over a given distance in space). This implementation of the GTN is an adapted version of the solution presented in the CHAMMPS Kaggle competition³.

S1.1.1 Graphs

A natural representation of a given molecule is a chemical graph, this data can then be directly converted to an input computational graph. This can be represented by the molecules as a graph (G) with atoms as a set of nodes (V) feature vectors and bonds as a set of edges (E), typically in the form of an adjacency matrix but not always, which corresponds to:

$$G = (V, E)$$

However, since IMP-G2 target values contain coupling constants for distances of up to six-bond, we generate edges (E) for all atoms within 6-bond hops away, this results in a partially connected graph.

In IMP-G2, the node only contains information about the atom type, both as a numeric and character representation, with the attached label being the associated chemical shift. The edge contains information about the atom-pair interaction which are: shortest number of direct bonds away (up to 6), and the associated coupling constant label (e.g. '3JCH'), the attached label to the edges contains the coupling constant for this specific interaction. Finally, instead of

an adjacency matrix, we use a distance matrix for edges recording absolute distance in Angstroms for atoms within six bonds of one another, and zero for distances beyond that.

S1.1.2 Multi-headed^{1, 2} attention

Multi-headed attention² is the fundamental feature which allows the transformer to resolve complex relationships. Functionally, it is the aggregation of multiple attention heads into a single final feature vector, each single attention head (k) focuses on information from a different target label.

For each head (k) we have the following steps:

1. Linear Transformation

$$h_i^k = W^k h_i$$

Where for node (i), with the feature vector (h) containing the node information, is multiplied by a weight matrix (W) associated with this attention head. The weight matrix (W) is a parameter adjusted through training. Resulting in the updated node feature vector of h_i^k .

2. Attention coefficient, e_{ij}

$$e_{ij}^k = \text{LeakyReLU}(a^k[h_i^k \mid h_j^k])$$

The attention coefficient (e_{ij}) is a measure of the contributions for a given neighbour (j) with respect to the focus of the attention head (i.e. how much this interaction is weighted when considering the chemical environment of a given atom.) for the node of interest (i). Using the transformed feature vectors, the features are concatenated together and then multiplied by a learnable parameter vector (a^k), specific to the attention head (k). The calculated value is then activated with LeakyReLU⁴ to return the same value if it's positive or reduced negative values by scaling if it's negative.

3. Normalised attention coefficient α_{ij} :

$$\alpha_{ij} = \frac{\exp(e_{ij})}{\sum_{k \in N(i)} \exp(e_{ik})}$$

The normalised attention coefficient for a given atom-pair interaction is a value between 0 and 1 directly correlating the weighted contribution of said interaction with a higher value being of greater importance. This is calculated by taking the exponent of the target attention coefficient of interest and dividing it by the sum of all attention coefficient present for atom (i) against the nodes in set k . The exponential is included to

exemplify higher calculated attention coefficients. As this is a division against a set of given data, the summation of all normalised attention coefficients α_{ij} , equated to one for a given atom.

$$\sum_{j \in N(i)} \alpha_{ij} = 1$$

4. Aggregation and activation:

$$\sum_{j \in N(i)} \alpha_{ij} W h_j$$

The updated feature vector, h_i' , after a pass through the attention head is calculated by summing all the feature neighbouring node vectors multiplied by their respective attention coefficients, where the weight is the attention coefficient calculated.

$$h_i^{k'} = \sigma \left(\sum_{j \in N(i)} \alpha_{ij} W h_j \right)$$

This is then passed to an activation function σ , to introduce non-linearity so inherent features can be derived in back-propagation. The updated feature vector is now $h_i^{k'}$ for node i after passing through attention head k .

This process is applied for each attention head present in multi-headed attention. The final feature vector is measured through either the concatenation or averaging of the values for each given attention head. For IMP-G2 we use averaging:

$$h_i' = \frac{1}{K} \sum_{k=1}^K h_i^{k'}$$

Where k is a given attention head, and K is all attention head present. The final feature, h_i' vectors contain the total sum of interaction accounting for all attention heads in representing the available features. For IMP-G2 with NMR parameter prediction, this equates to an attention head looking at each possible interaction from all given NMR parameters. Enabling the weighted contribution of each connected atom and edge interaction to evaluate a given NMR parameter's environment.

S1.1.3 Lamb⁵ Optimiser

We used the Lamb optimiser for the training optimisation for IMP-G2. This allows the optimiser to assign different learning rates per layer, providing improved stability and adaptive updates per parameter to prevent drastic changes in step sizes. In general, it has been shown to improve scalability of both batch sizes and model layer depth.

S1.2 IMPRESSION Generation 2 (IMP-G2)

S1.2.1 Data preparation

Prior to training the molecules are converted to graphs using DGL with atoms to nodes, and edges representing through space interaction, we only generate edges for nodes within 6 bonds of one another. We store the atom type as an integer value (H = 1, C = 6,...), with DFT calculated chemical shifts under ‘Shift’ as the label for ground truth.

For edges we store, the ‘nmr_type’ after it has been mapped based on the desired coupling constant to be trained on as this directly relates to the number of attention heads required; Distances as ‘dist’, the absolute distance from one atom to another in Angstroms; Path length as ‘path_len’ corresponding the number of bond hops away one atom is from another; finally a ‘coupling’ label to store coupling constant as the ground truth for loss calculation.

All chemical shifts and coupling are normalised with respect to each other to values between 0 and 1. Values are subsequently descaled after predictions.

S1.2.2 IMP-G2 – Architecture

IMP-G2 is an adapted version of the GTN using attention to weight the contribution of each NMR parameter with respect to the predicted chemical shift or coupling constant. Here we outline the architecture, comprising layers, hyperparameters, and data generation pipeline.

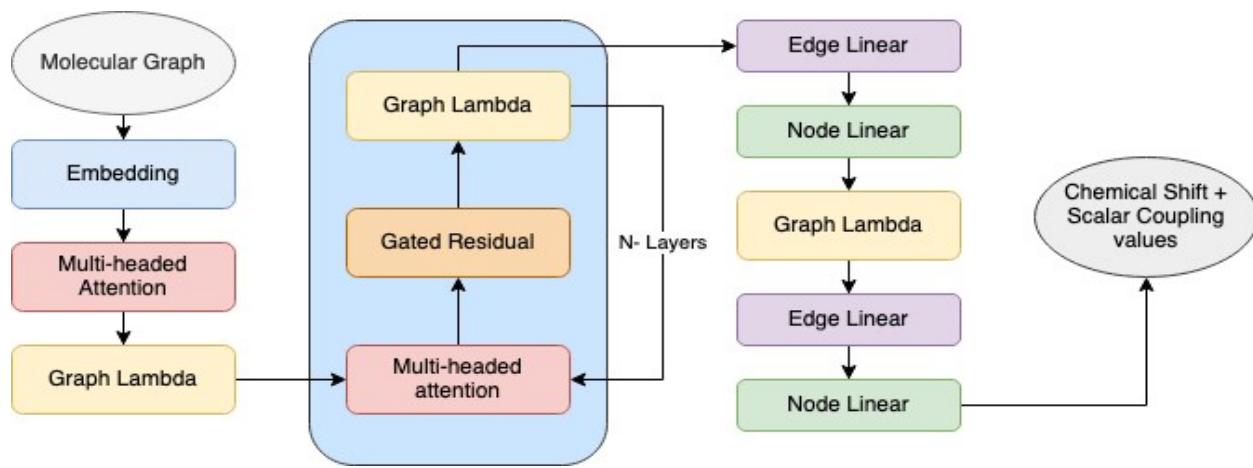


Figure S1. Flowchart of layers within the IMPRESSION-G2 model.

IMPRESSION Generation 2 (Figure S1) contains the following layers:

1. Embedding

The embedding layer is effectively tokenisation applied to the Graph Transformer Network, enabling the projection of node and edge features into a matrix representation of a predetermined dimension, desired predictions are mapped onto a specific row corresponding to a target flag (NMR parameter). Node embedding

dimensions are 61×48 , edge embeddings are 1000×48 . This produces the same dimensionality for all graphs, standardising the input format.

2. Multi-headed attention

Implementation of multiheaded attention (Section S1.1.2) layer with an attention head corresponding to each NMR parameters present in the graph. In IMP-G2 we utilise 42 attention heads.

3. Graph Lambda

Layer updating node and edge features with reshaped outputs from previous attention weighted interaction and/or gated residual layers to fit the layer dimensions.

4. Gated Residual⁶

Enables data to flowthrough prior to multi-headed attention layers for the model to evaluate the effect of attention on the updated representation and correlation to NMR parameters in this instance.

5. Attention Block

The repeating block of IMP-G2 where the effects of attention layers are culminated. It consists of the multi-headed attention layer, gated residual layer, and a graph lambda layer.

6. Node and Edge Linear

Linear layers of neurons to process the latent embeddings updated by multiheaded attention to the final output values of chemicals shifts (node layers) and coupling constants (edge layers). The first set of node and edge layers takes in input dimensions of 48×42 (embedding dimension by attention heads) to a 512×1 dimension, the second layer of linear layers takes the 512×1 into 42×1 for final output with each of those 42 values corresponding to the specific NMR parameters as mapped by the attention heads from the initial target labels.

We use L1 regularisation/loss (Mean absolute error) as the metric for determining loss during training.

S1.2.3 IMP-G2 - Hyperparameters

The following are the fundamental tune-able hyper-parameters for the model:

- Training epochs: **2000**
- Number of attention heads: **42**
- Number of layers (attention block): **4**
- Effective batch size: **16** (batch size, **2** * gradient accumulation, **8**)
- Targetflags (Predictable NMR parameters): `['HCS', 'CCS', 'NCS', 'FCS', '1JCH', '1JCC', '1JNH', '1JNC', '1JFC', '2JCH', '2JHH', '2JCC', '2JNH', '2JNC', '2JFH', '2JFC', '2JFN', '2JFF', '3JCH', '3JHH', '3JCC', '3JNH', '3JNC', '3JFH', '3JFC', '3JFN', '3JFF', '4JCH', '4JHH', '4JCC', '4JNH', '4JNC', '4JFH', '4JFC', '4JFN', '4JFF']`

Training epochs are how many full passes of training data the model sees; attention heads correspond to the number of heads in multi-headed attention (Section S1.1.2); layers are the repeating block as described in S1.2.2; effective batch size is the number of graphs (molecules)

the model sees at a time before updating weights and also how many graphs the models sees at one time during prediction – this is calculated through the batch size multiplied by the gradient accumulation value; targetflags are the labels of the NMR parameters to be predicted, the architecture of the model means that the number of attention heads must be greater than the number of targetflags as each labels corresponding to a prediction typed are mapped onto individual attention heads.

S1.3 Training and testing data

S1.3.1 Diversity sampling

All molecules we use in our training data were adaptively sampled from large databases. These consist of Cambridge Structural Database (CSD), ChEMBL, and OTAVA.

S1.3.2 DFT NMR parameter calculation workflow

In order to train and test IMPRESSION, we developed a dataset of NMR parameters computed using DFT in the Gaussian16 software package.⁷ We conducted a literature review and independent benchmarking of a wide range of functionals and basis sets and found that there is no best single method that is *both* optimally accurate and optimally computationally efficient for predicting *both* chemical shifts and scalar coupling constants for *both* ¹H and ¹³C nuclei. However there are many combinations which are good or near-best in several of those respects and alternative DFT methods would have provided very similar results (see S3.3 for evidence of this point), so the exact choice of which DFT method to choose for the IMPRESSION-G2 training set is not considered especially limiting unless a far superior DFT methodology is forthcoming, at which point retraining IMPRESSION-G2 using such training data would be sensible.

From this benchmarking we selected mPW1PW91/6-311g(d,p) for optimisation and wb97xd/6-311g(d,p)^{8–12} for computing both chemical shifts and scalar coupling constants as these were amongst the most computationally efficient methods that gave accurate results for both ¹H and ¹³C shifts and couplings.

S1.3.2.2 GFN-xTB⁹

The semi empirical quantum chemical method GFN2-xTB¹⁵ was used as another method of geometry optimisation. In each case, the Approximate Normal Coordinate Rational Function Optimizer was used (ANCOPT) with default parameters.

- Optimisation level: **normal**
- Maximum Optimisation Cycles: **200**
- ANC Micro Cycles: **20**

- RF Solver: **Davidson**
- Energy Convergence: **0.5x10-5 Eh**
- Gradient Convergence: **0.1x10-2 Eh/α**
- Maximum RF Displacement: **1.0**
- HLow Frequency Cut Off: **0.1x10-1**
- HMax Frequency Cut Off: **5.0**
- S6 in Model Hessian: **20.0**

S1.3.2.3 DFT Geometry Optimisation

Following initial geometry optimisation (Molecular Mechanics Section S1.3.2.1 for the generation of our training molecules) as highlighted in the main article, we carried out DFT geometry optimisation using Gaussian16 to get refined input coordinates. Here are the starting block and route line parameters used for all DFT geometry calculations for the training/testing data we generated:

```
%Chk={molecule_name}_OPT.chk
%NoSave
%mem=26GB
%NProcShared=8
# opt=tight freq mPW1PW/6-311g(d,p) integral=ultrafine MaxDisk=50GB
```

S1.3.2.4 DFT NMR Tensor and Scalar Coupling Constant Calculation

The optimised geometries are then extracted from the Gaussian16 output log files and used as input coordinates for the DFT NMR Tensor and Coupling Constant calculations. The NMR parameters were calculated using gauge independent atomic orbitals with uncontracted basis sets to improve descriptions of the core orbitals³⁰ and calculation of all components of the scalar couplings (Fermi contact, spin dipole, diamagnetic spin orbit, paramagnetic spin orbit). Here are the following block and route line parameters used for all DFT NMR parameters calculation for the training/testing data we generated:

```
%Chk={molecule_name}_NMR.chk
%NoSave
%mem=26GB
%NProcShared=8
#T nmr(giao,spinspin,mixed) wB97XD/6-311g(d,p) maxdisk=50GB
```

S1.3.2.5 Chemical Shift Scaling of DFT Tensors

As DFT calculates tensors, the values need to be linearly scaled to their chemical shift counterpart. This is done through comparison of DFT tensors against experimentally measured

chemical shifts and calculating the slope (m) and linear correction (c) typical of the $y = mx + c$ equation of a linear line, where x is the tensor and y is the chemical shift.

$$\delta_{EXP} = \frac{\sigma_{DFT} - c}{m}$$

For ^1H and ^{13}C , we used the CHESHIRE reference set to calculate our scaling factors which were.

- $^1\text{H} = -1.0594, 32.2293$ for m, c
- $^{13}\text{C} = -1.0207, 187.4436$ for m, c

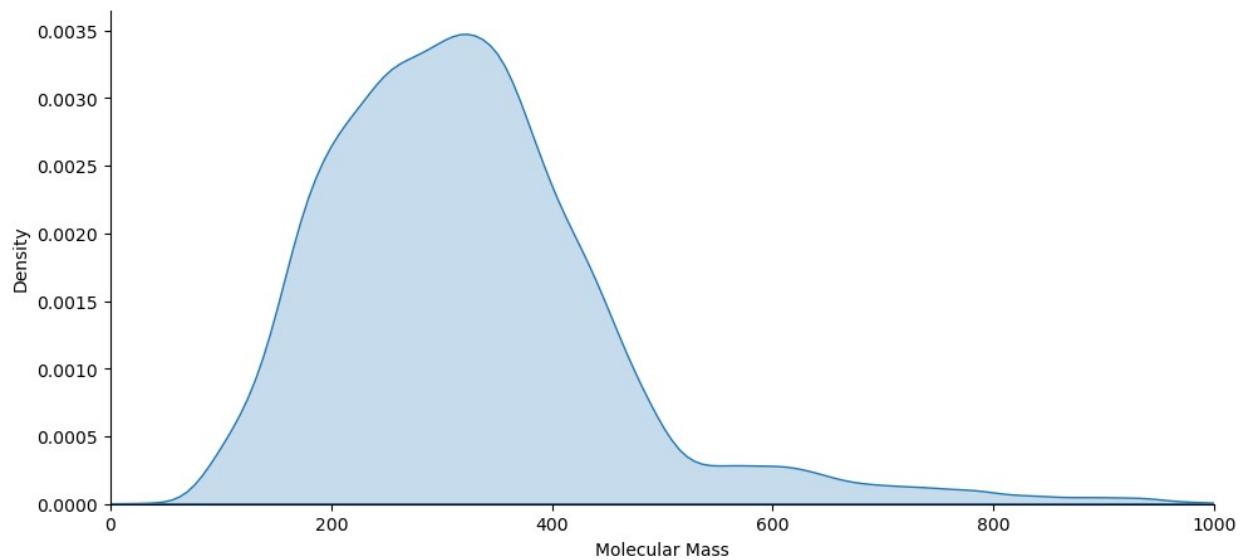
^{15}N , ^{19}F , and ^{31}P were gathered from literature with matching functional group and basis set^{16, 17}.

- $^{15}\text{N} = -1.0139, -148.67$ for m, c
- $^{19}\text{F} = -1.0940, 173.02$ for m, c
- $^{31}\text{P} = -1.2777, 307.74$ for m, c

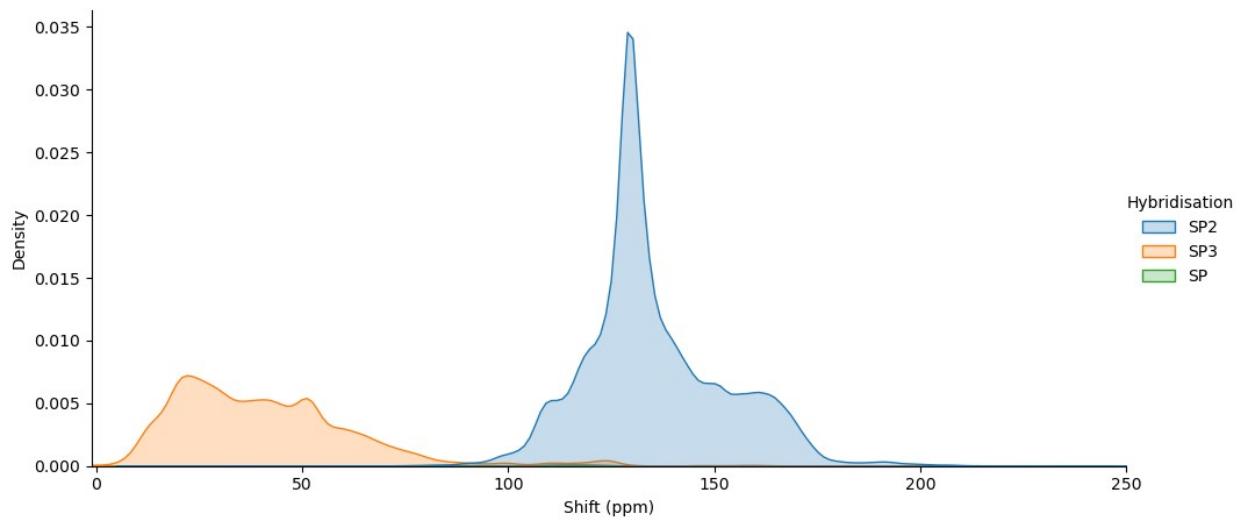
S1.3.3 Chemical Space covered by Training Dataset

The IMPRESSION-G2 training dataset covers 18182 organic molecules listed in Section S4. These molecules have masses primarily in the range of 50-1000 g/mol, contain C, H, N, O, F, Si, P, S, Cl, Br, and comprises 739,913 chemical shift environments (330,411 $\delta^1\text{H}$; 306,458 ^{13}C) and 5,696,784 scalar coupling constants (including 307,270 $^1\text{J}_{\text{CH}}$; 486,884 $^2\text{J}_{\text{CH}}$; 672,433 $^3\text{J}_{\text{CH}}$; 705,737 $^4\text{J}_{\text{CH}}$; 134,051 $^2\text{J}_{\text{HH}}$; 217,940 $^3\text{J}_{\text{HH}}$; 333,010 $^4\text{J}_{\text{HH}}$) in addition to corresponding NMR parameters for all other NMR-active nuclei in these molecules. While there is no entirely robust way to ensure diversity in a molecular dataset, various subsets of the data were selected using different diversity sampling methods, including Tanimoto analyses, cross-validation and by including the ChEMBL diversity-sampled dataset. The resulting structural and chemical space can be approximated by visualizing the mass, chemical shift, hybridization and scalar coupling constant distributions of the molecules, as seen here:

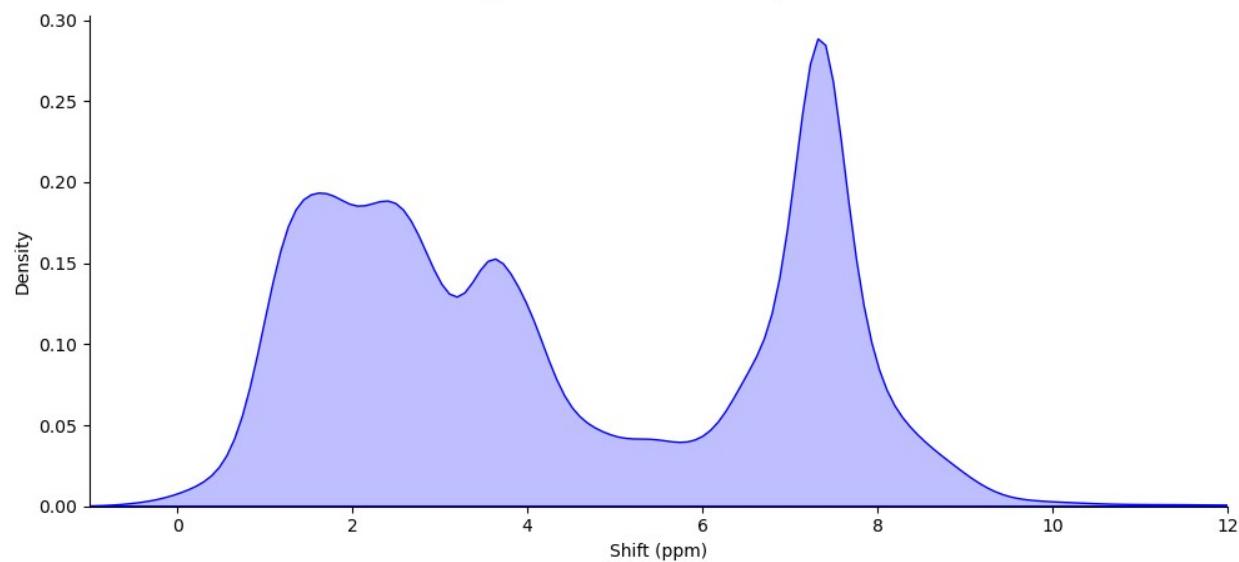
Training Set Molecular Mass Distribution



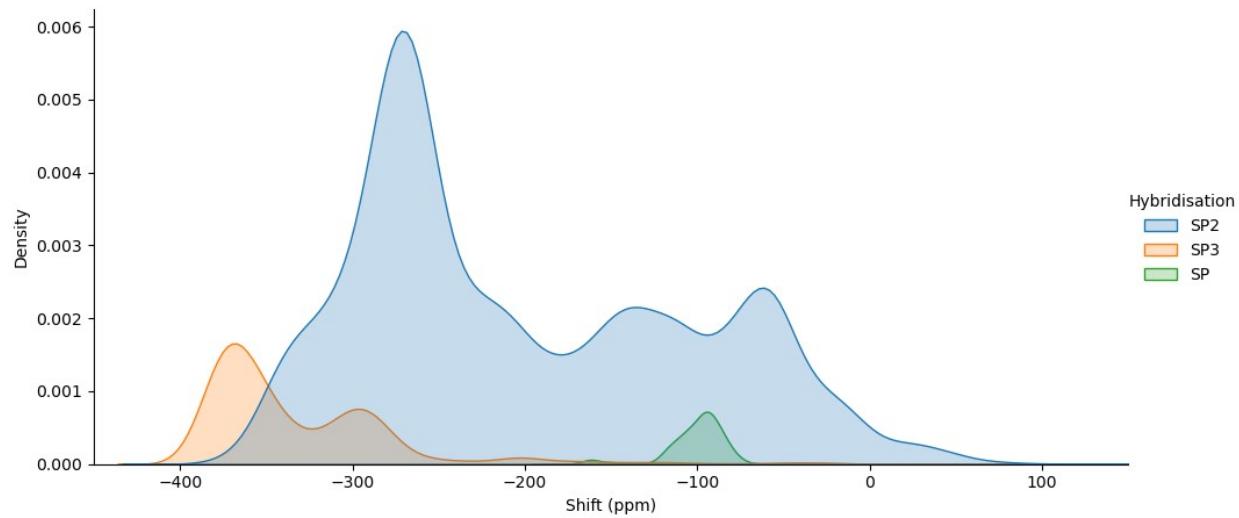
Training Set ^{13}C Shift Distribution - By Hybridisation



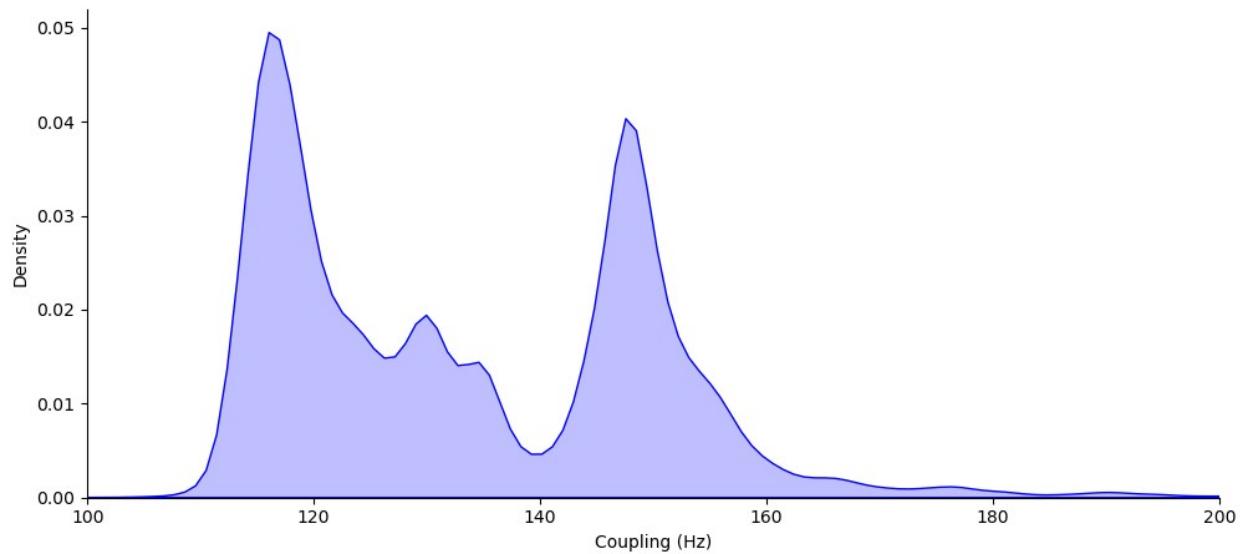
Training Set ^1H Shift Density Plot



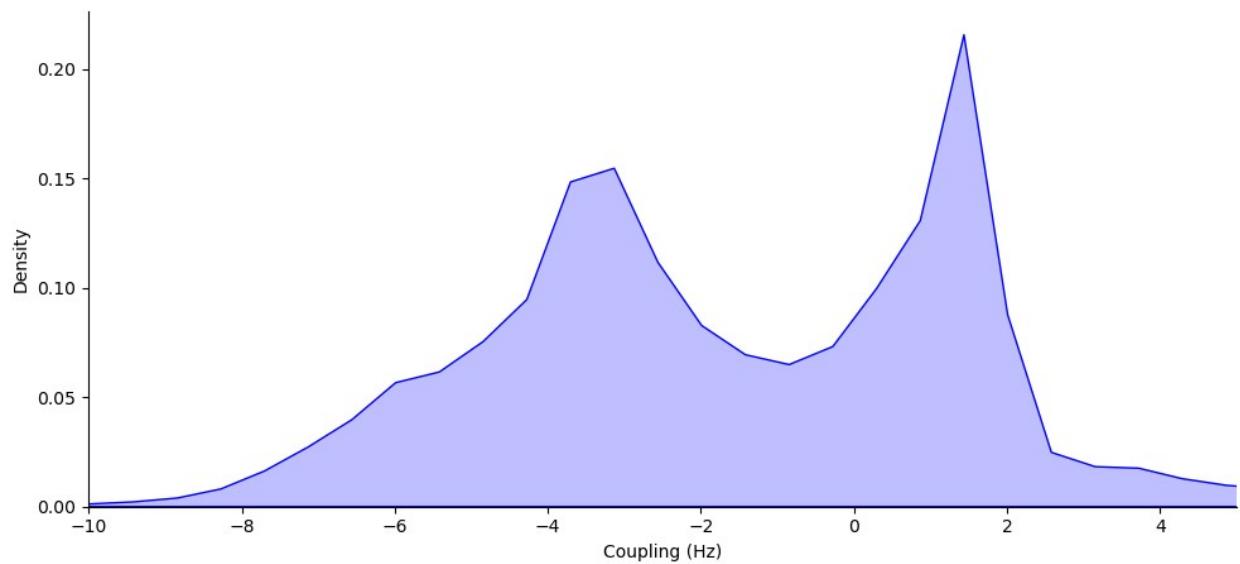
Training Set ^{15}N Shift Distribution - By Hybridisation



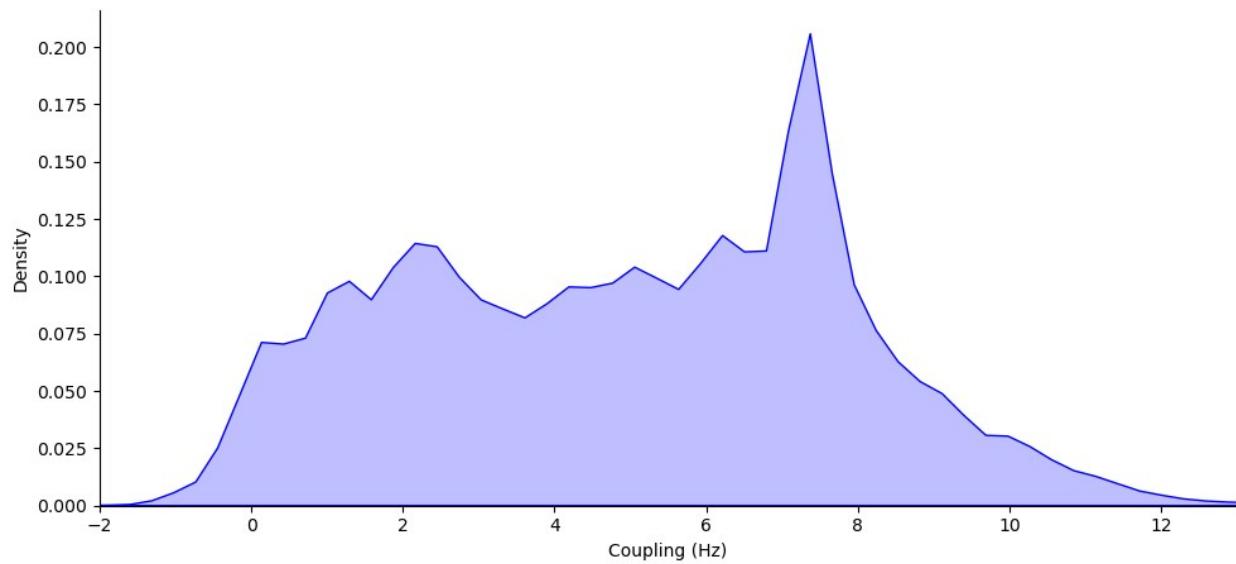
Training Set $^1J_{CH}$ Coupling Density Plot



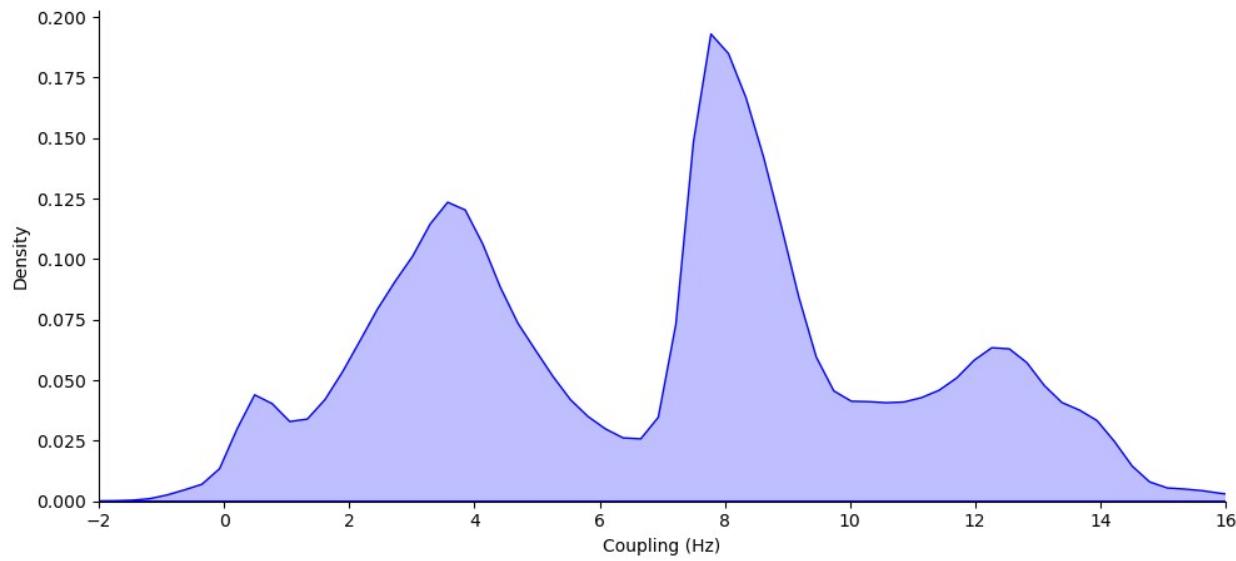
Training Set $^2J_{CH}$ Coupling Density Plot



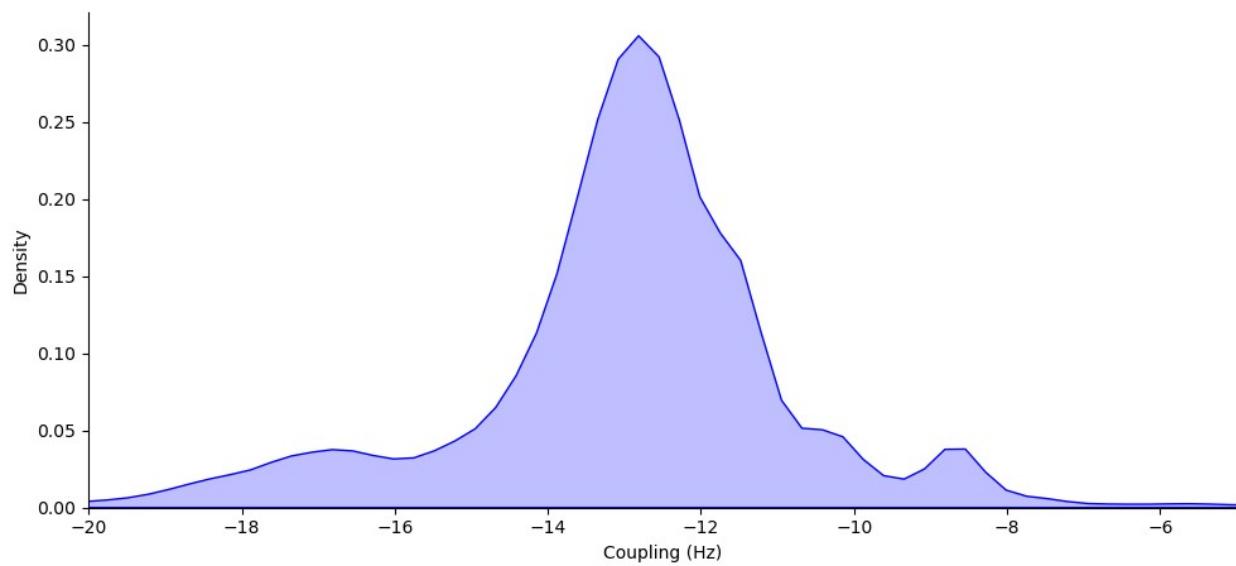
Training Set $^3J_{CH}$ Coupling Density Plot



Training Set $^3J_{HH}$ Coupling Density Plot



Training Set ${}^2J_{HH}$ Coupling Density Plot



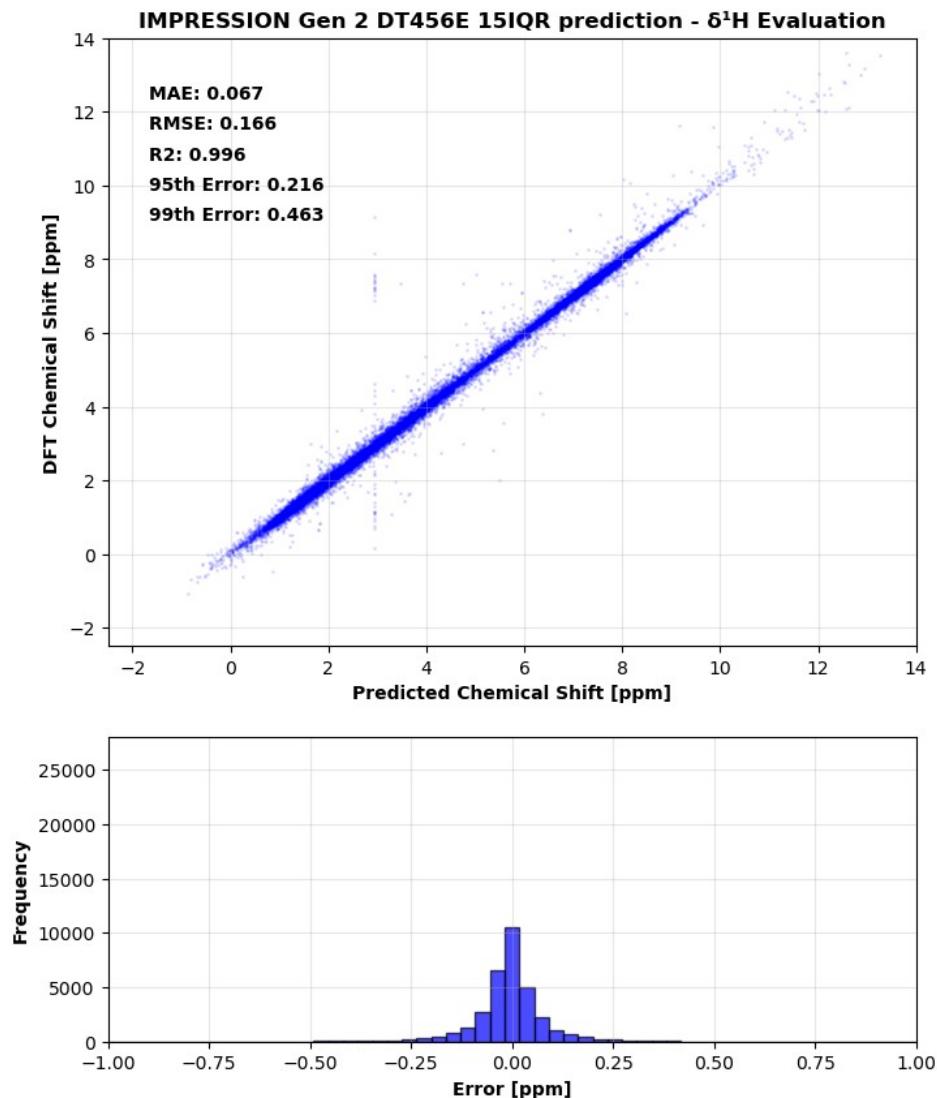
S2 IMPRESSION-G2 prediction against DFT calculated values

Here we present all of IMP-G2 predictions against DFT calculated values, where Chemical Tensors have been scaled to Chemical Shifts, and Scalar Couplings are taken as is from: the holdout set -10% of withheld structures from the total number of molecules in the training set, Data3 – Testing set from the original IMPRESSION¹⁸ paper, DFT8K_bg – DFT calculated values from DFT8K¹⁹ structures, recalculated using our DFT functional and basis set.

S2.1 Chemical Shifts

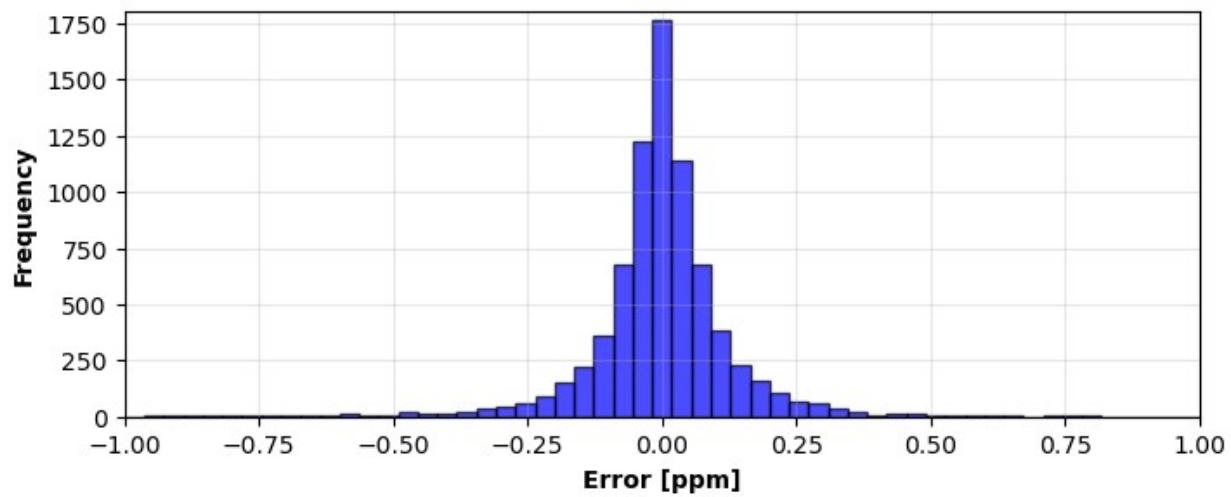
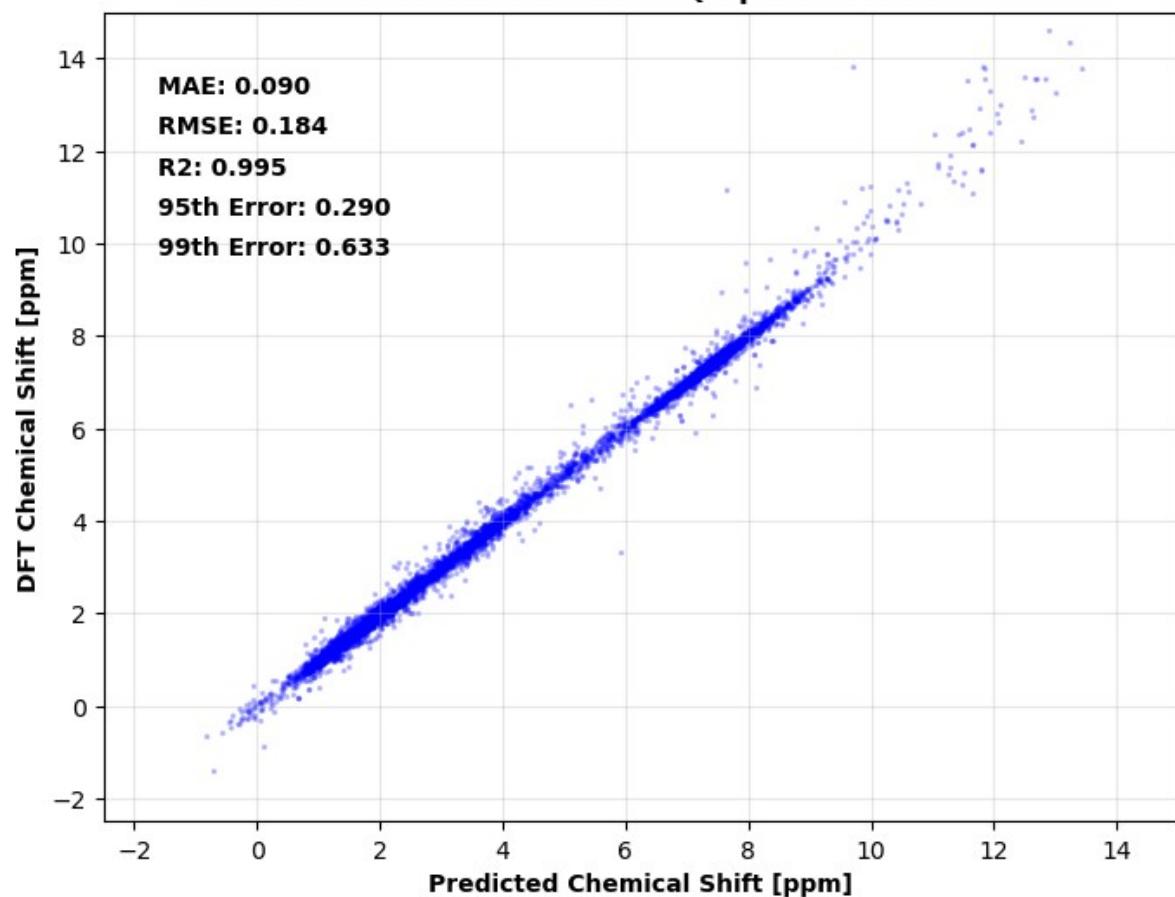
S2.1.1 $\delta^1\text{H}$

Holdout

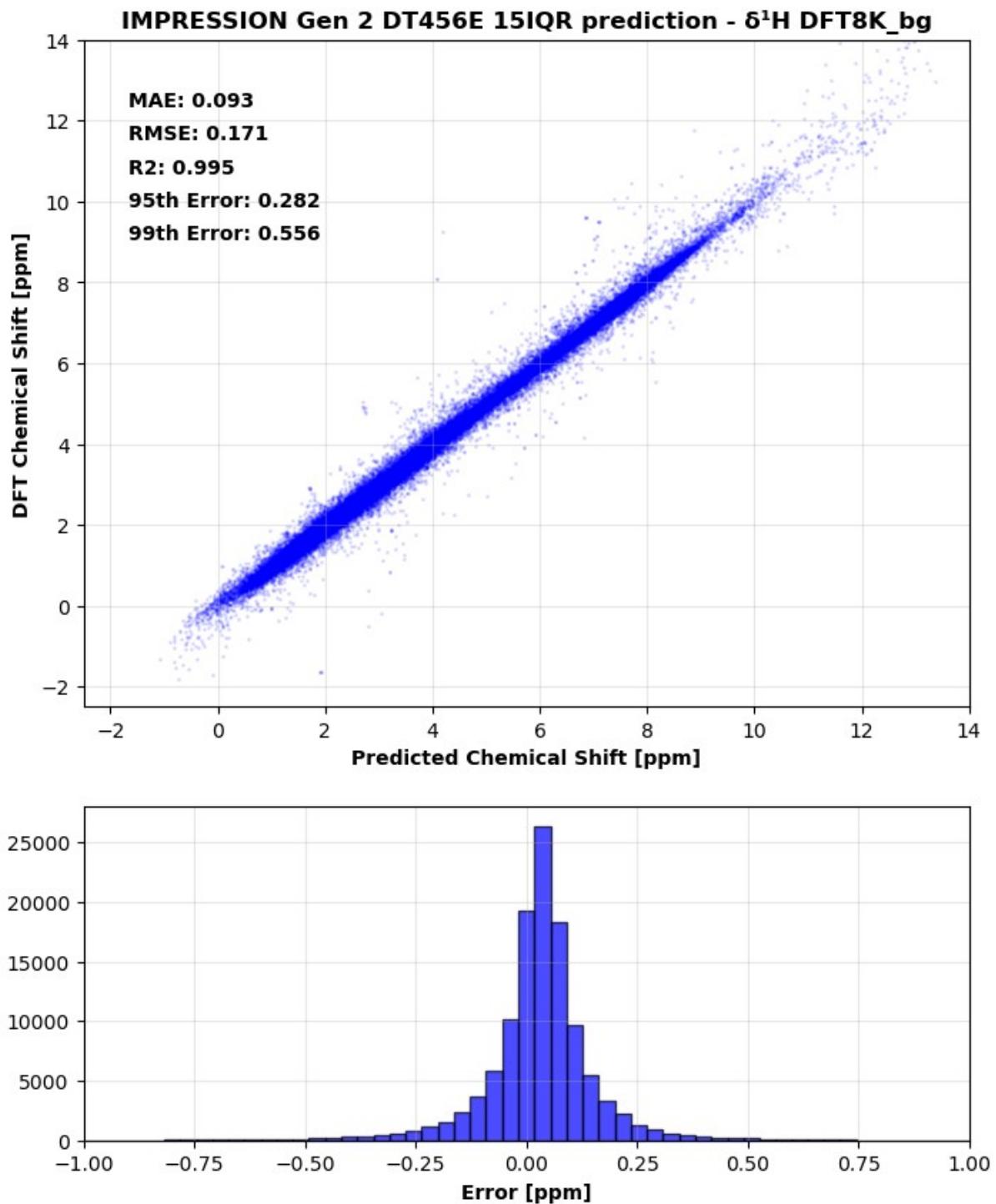


Dataset 3

IMPRESSION Gen 2 DT456E 15IQR prediction - $\delta^1\text{H}$ Data3

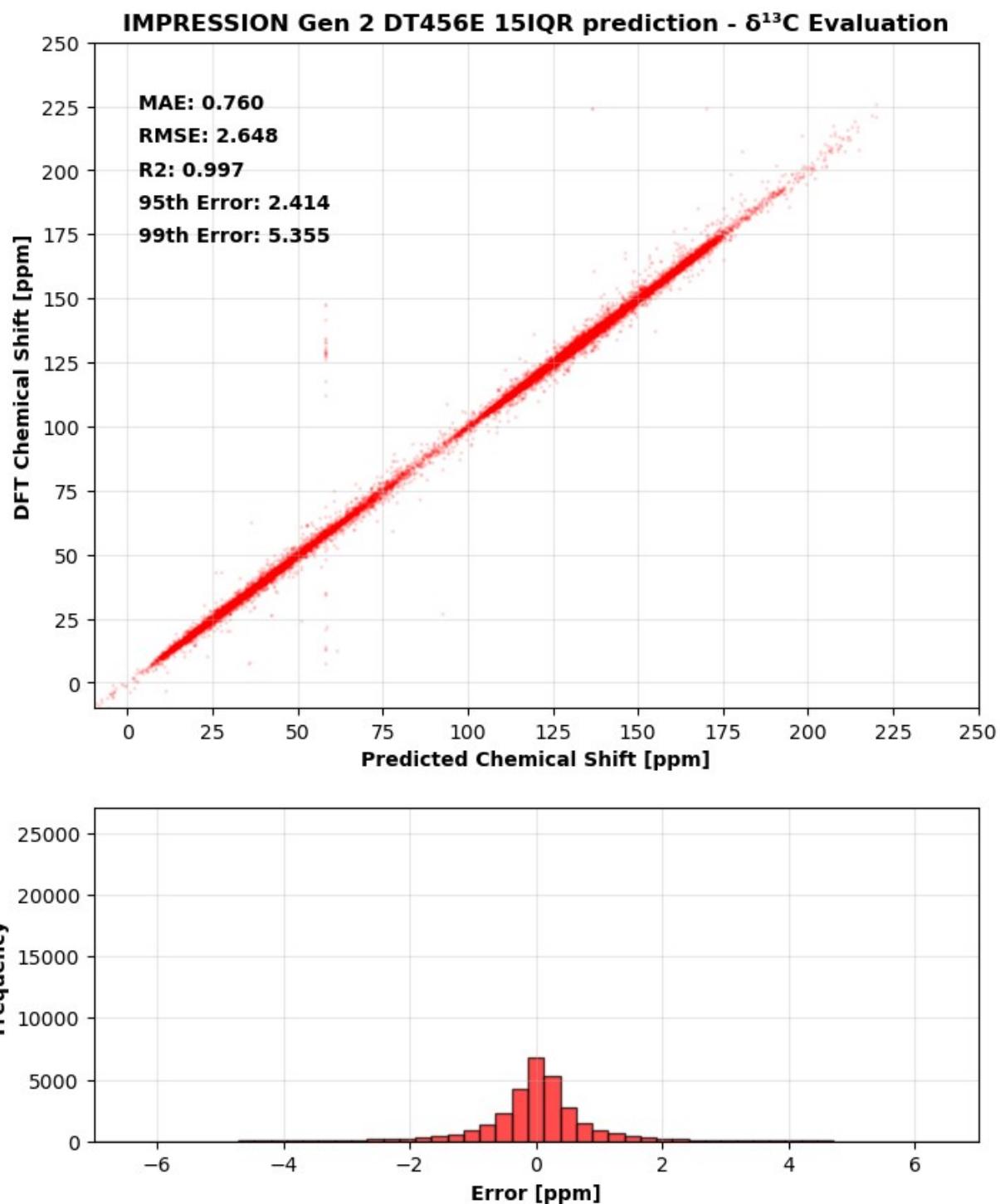


DFT8K_bg

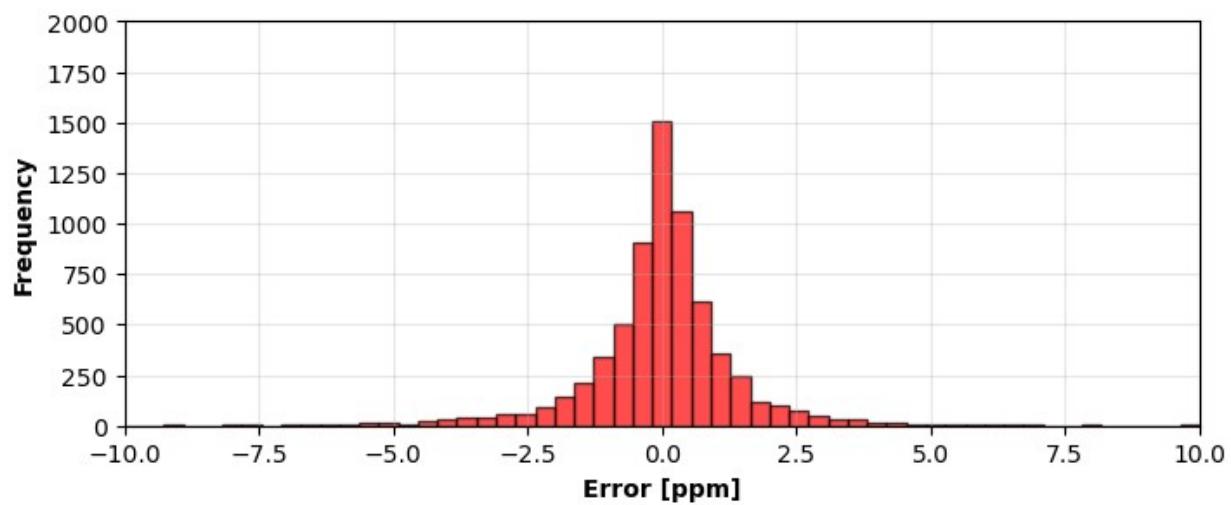
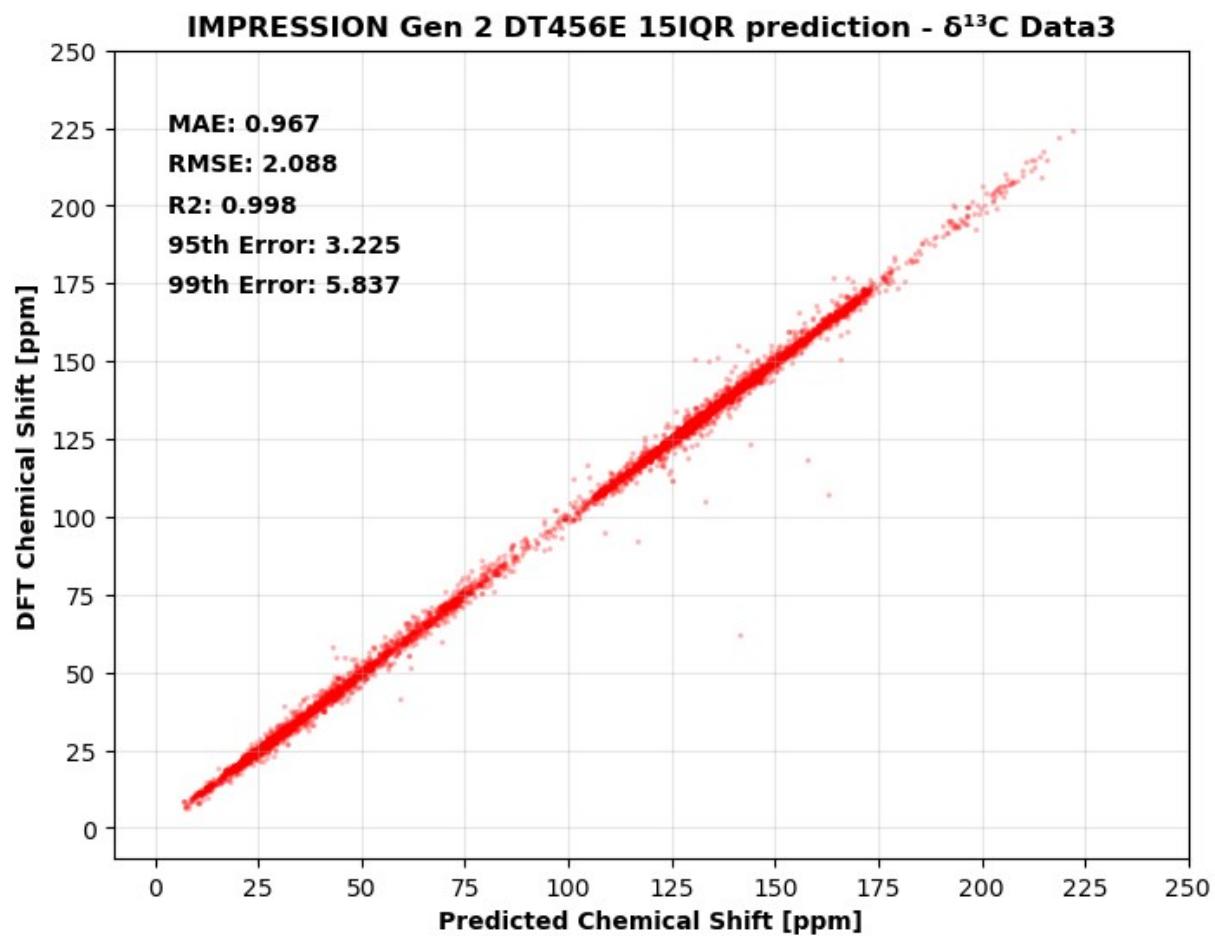


S2.1.2 $\delta^{13}\text{C}$

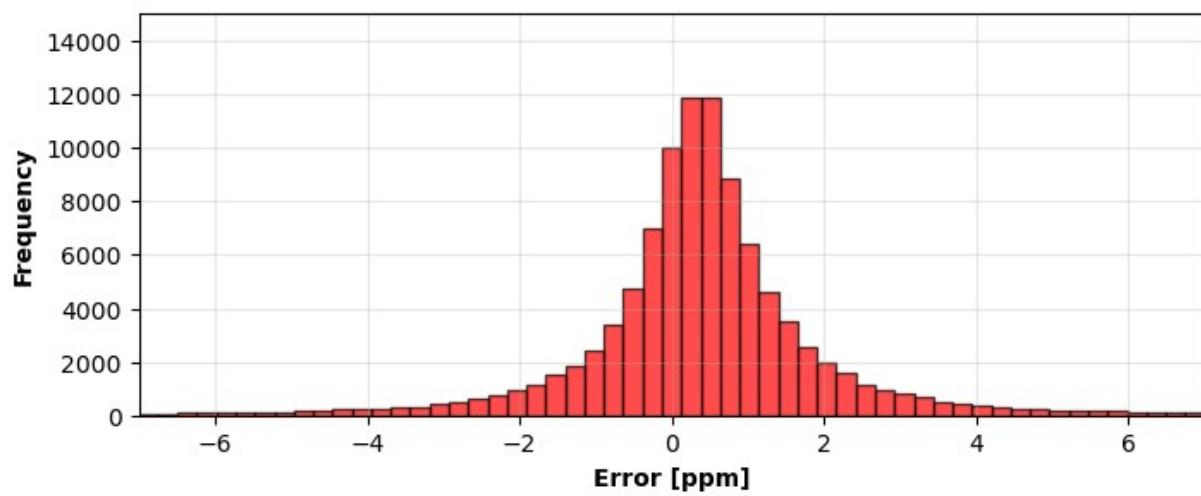
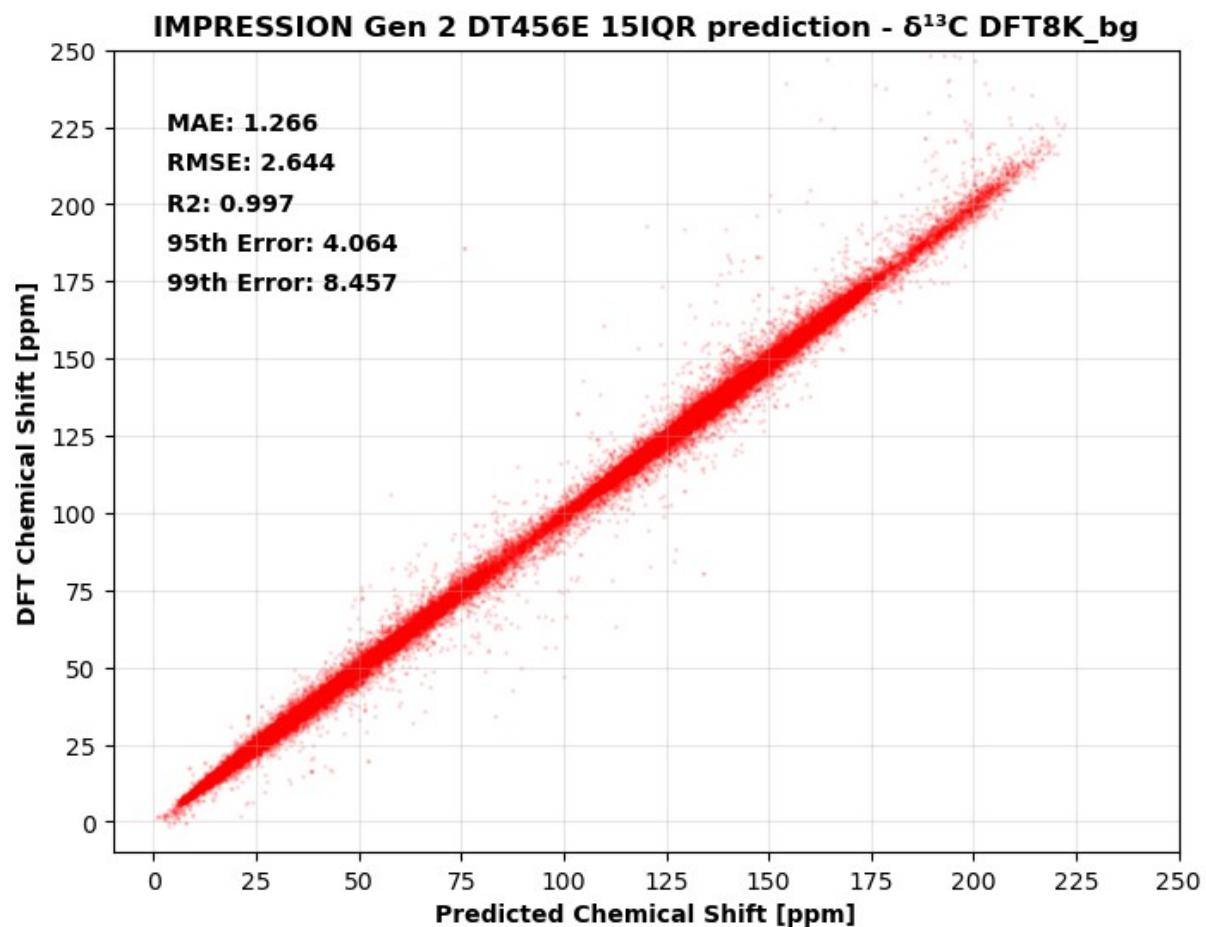
Holdout



Data3

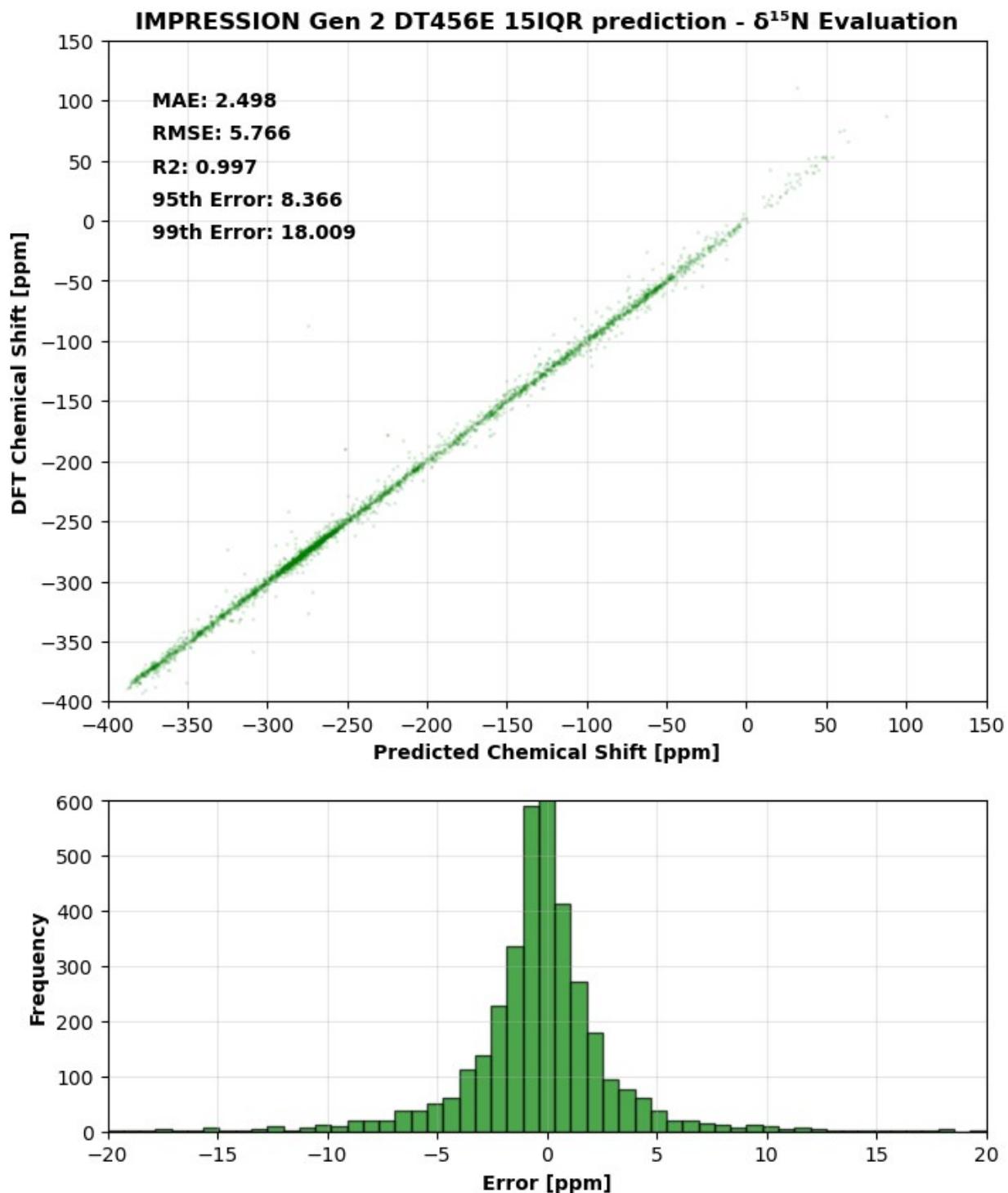


DFT8K_bg

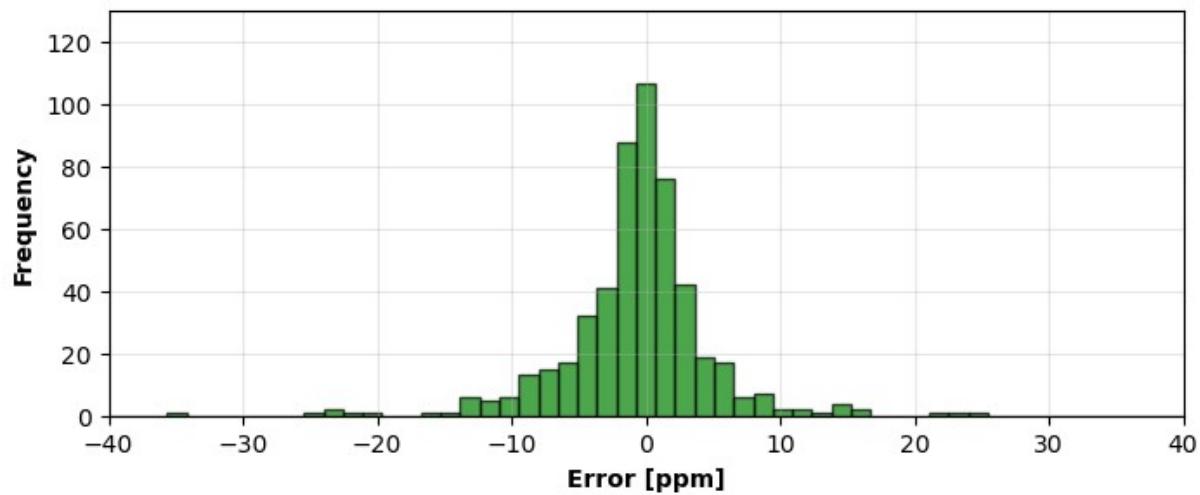
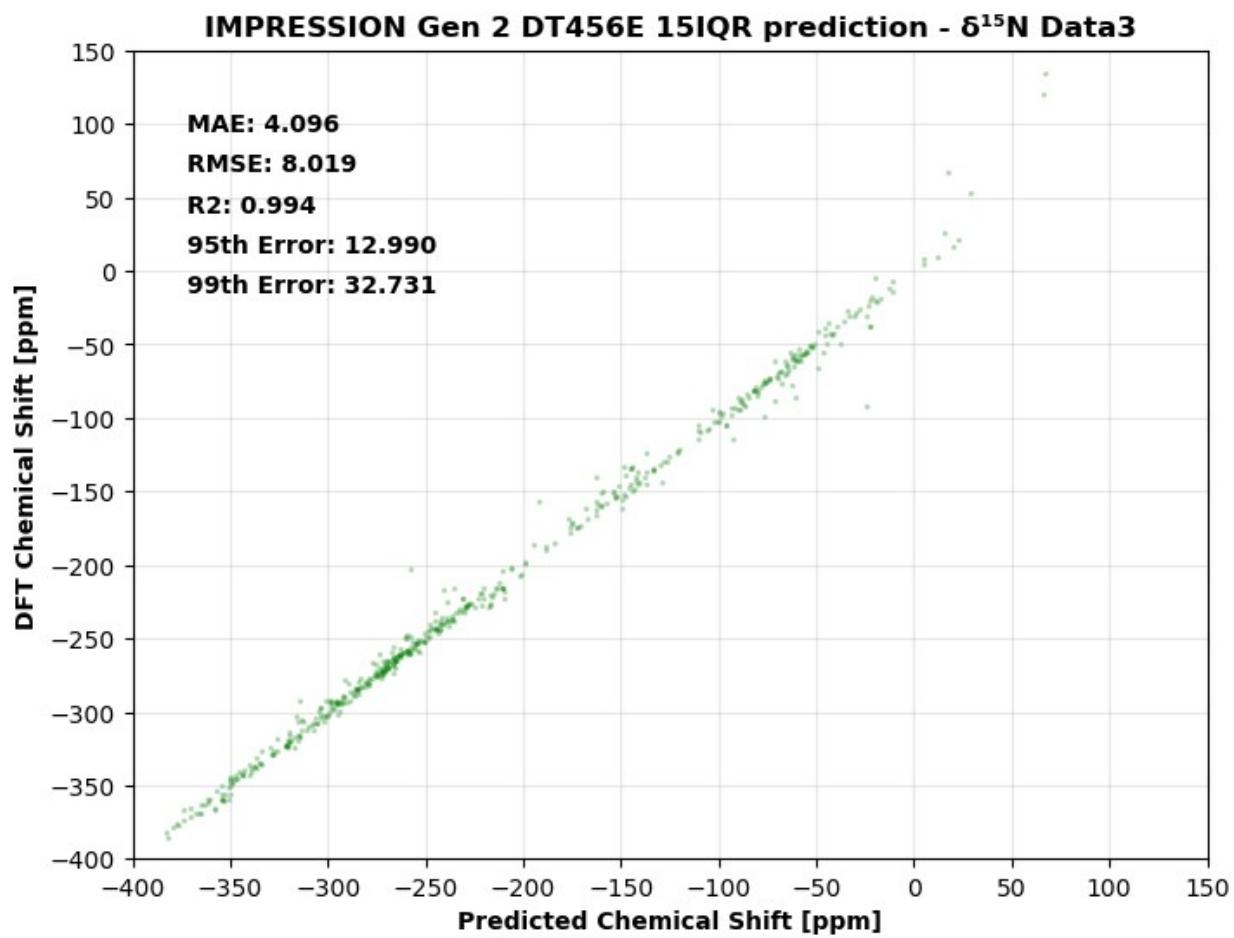


S2.1.3 $\delta^{15}\text{N}$

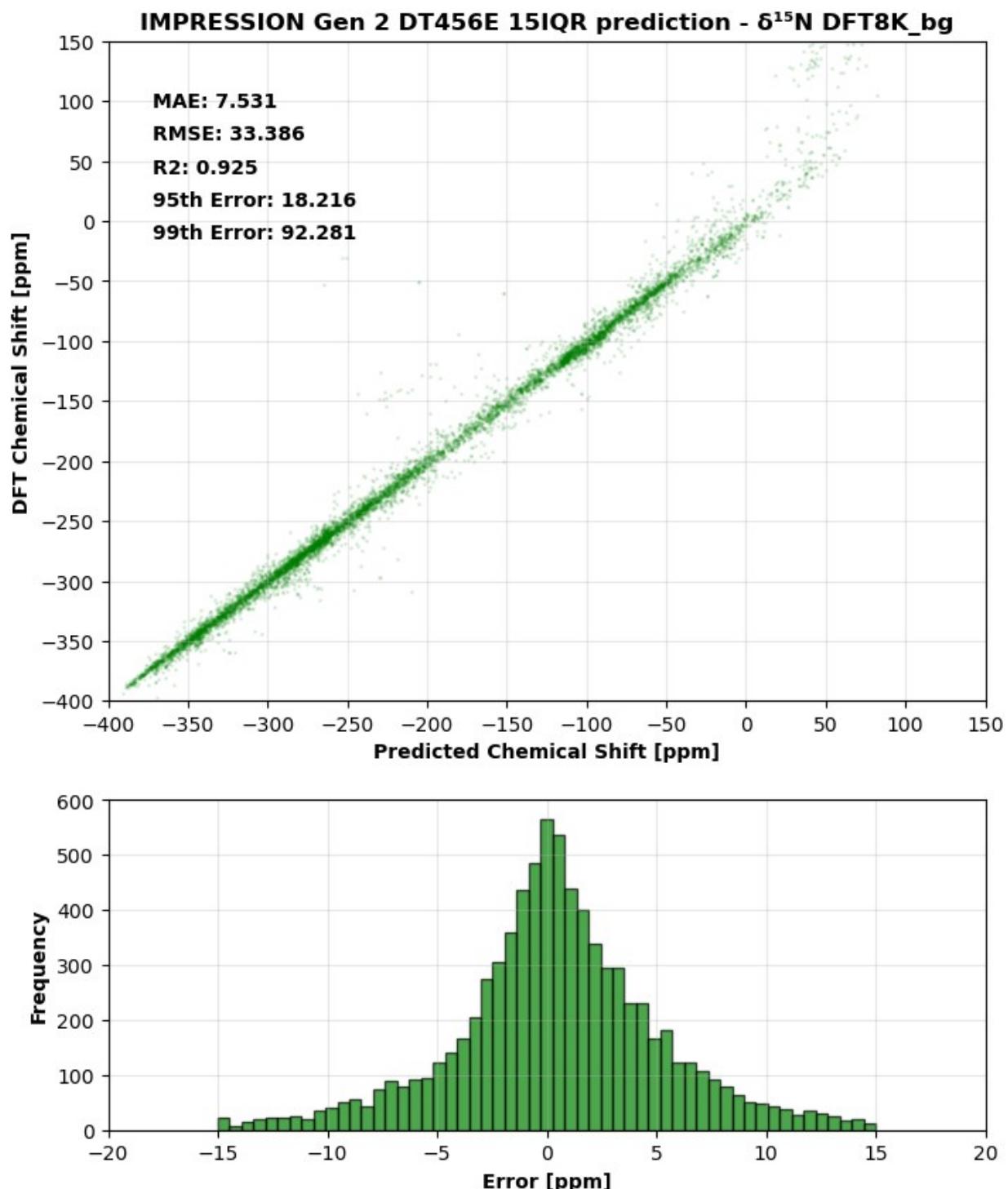
Holdout



Data3

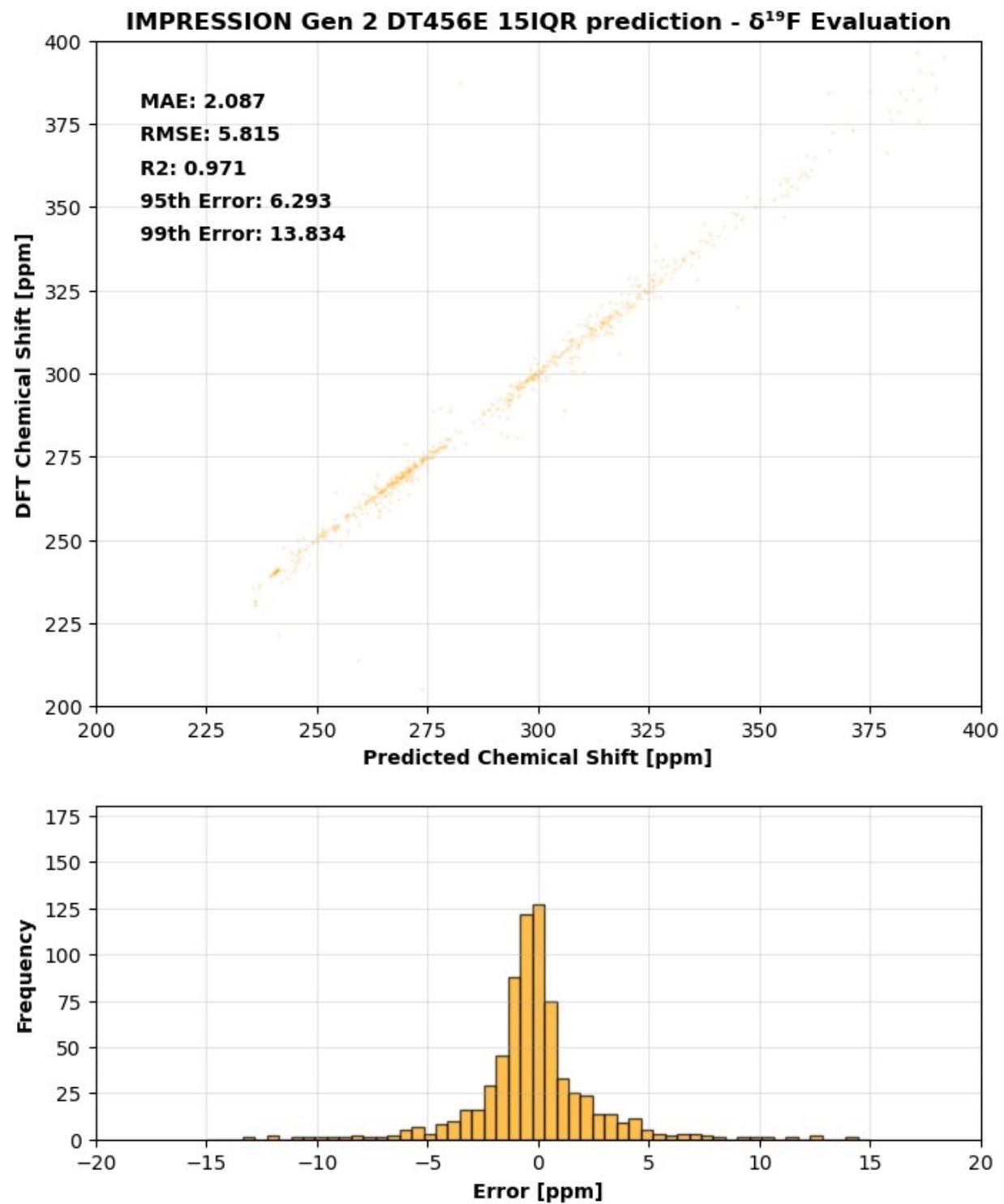


DFT8K_bg

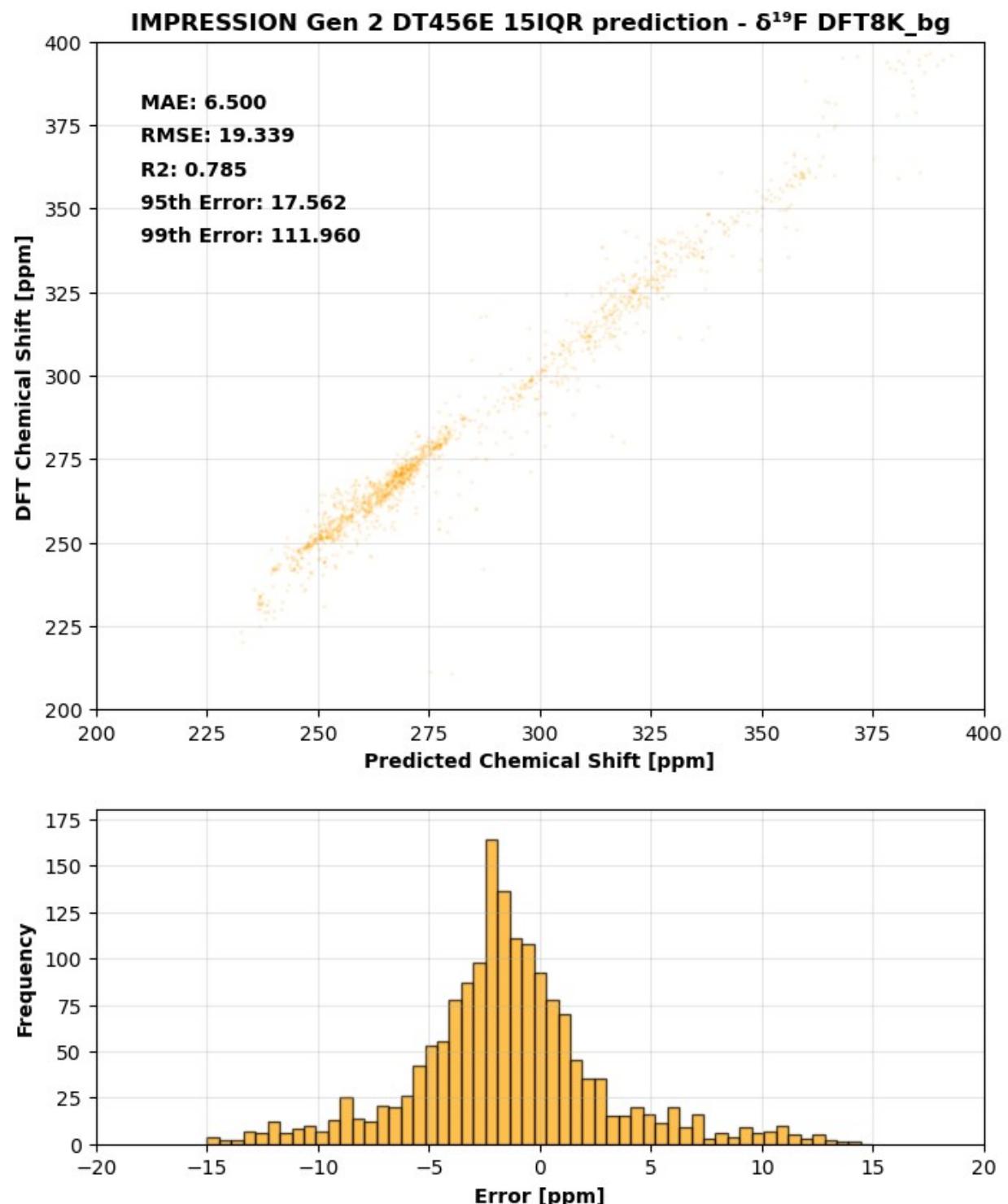


S2.1.4 $\delta^{19}\text{F}$

Holdout



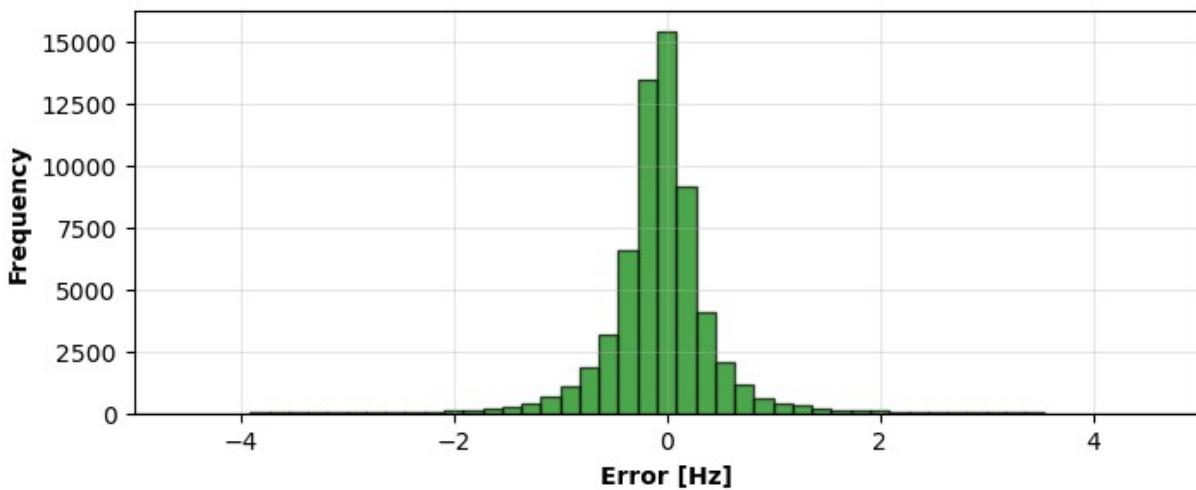
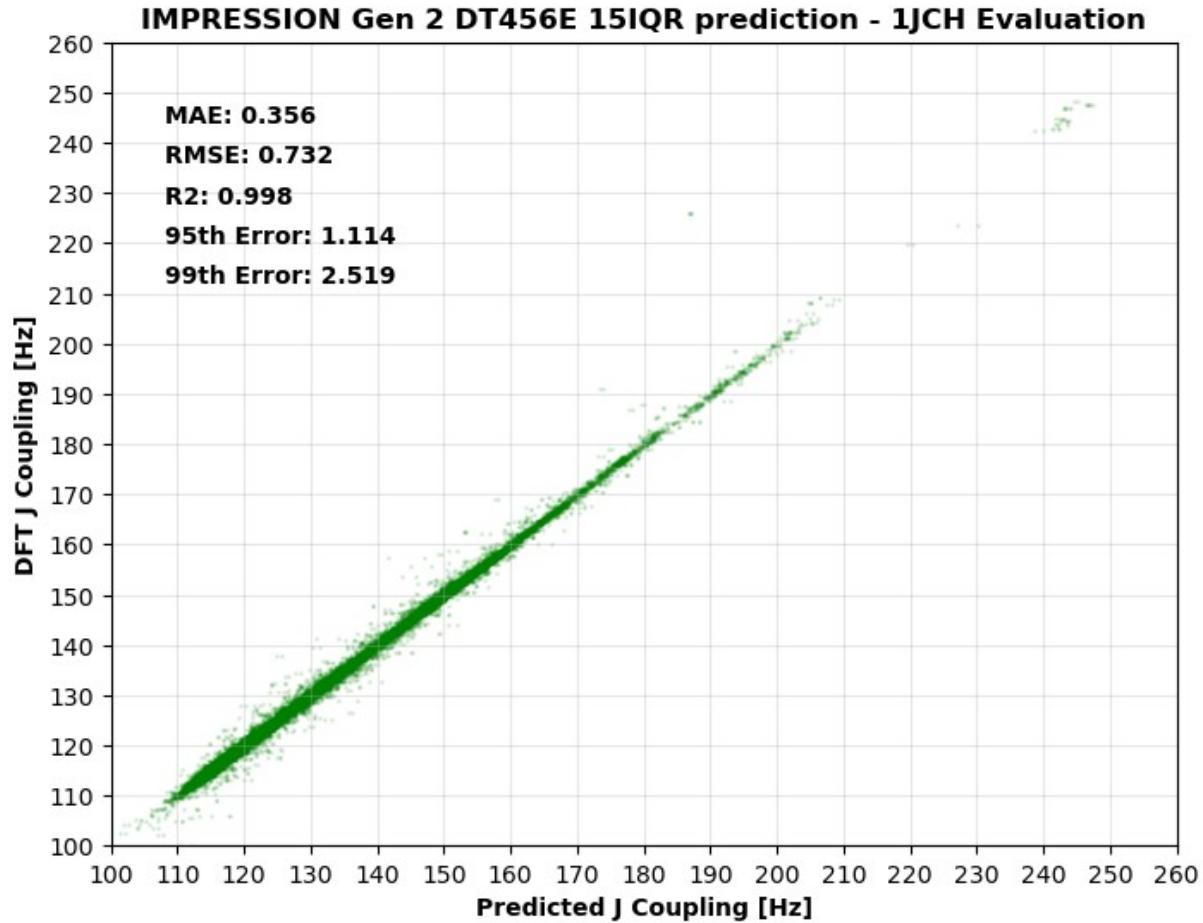
DFT8K_bg



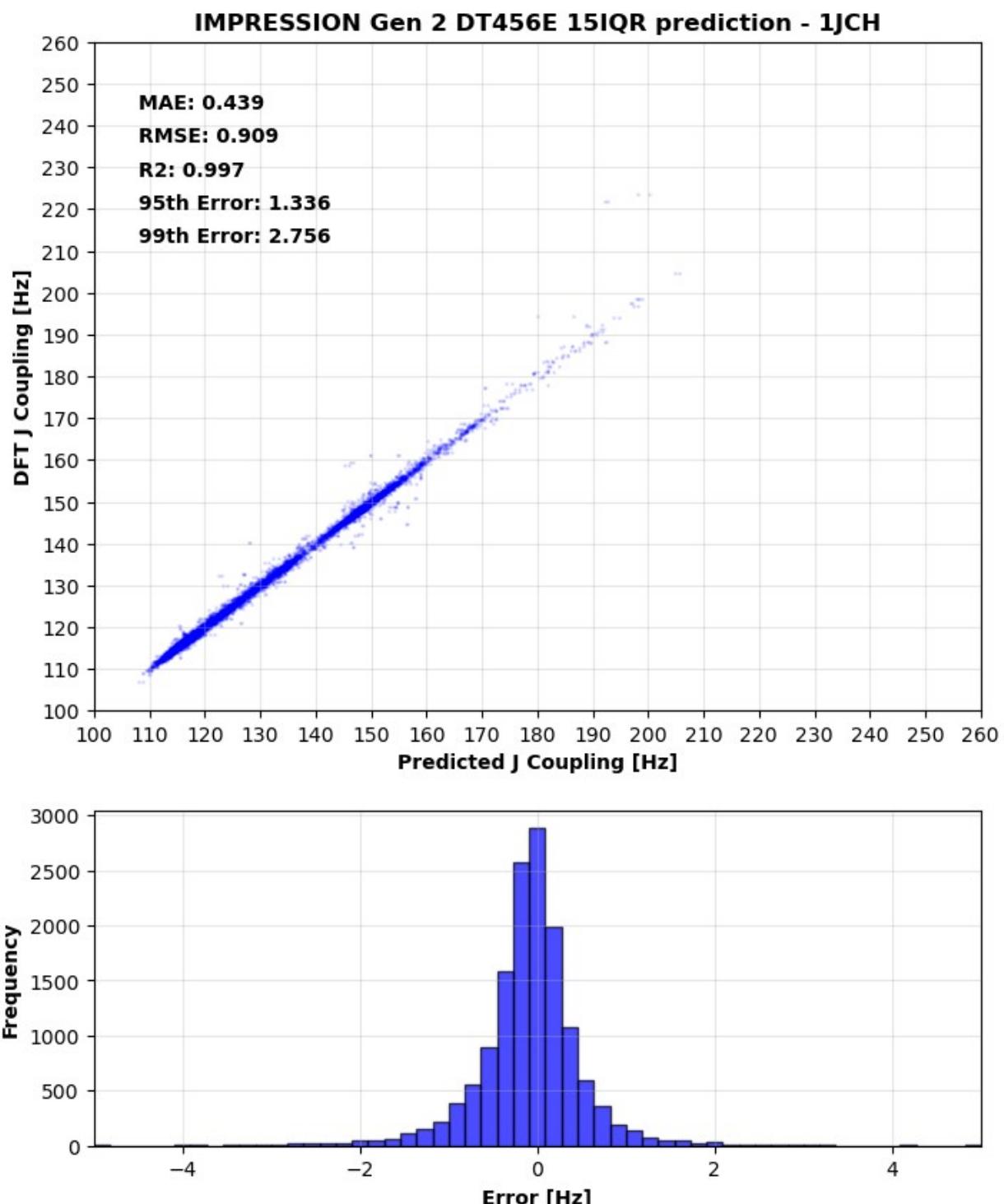
S2.2 Scalar couplings

S2.2.1 $^1\text{J}_{\text{CH}}$

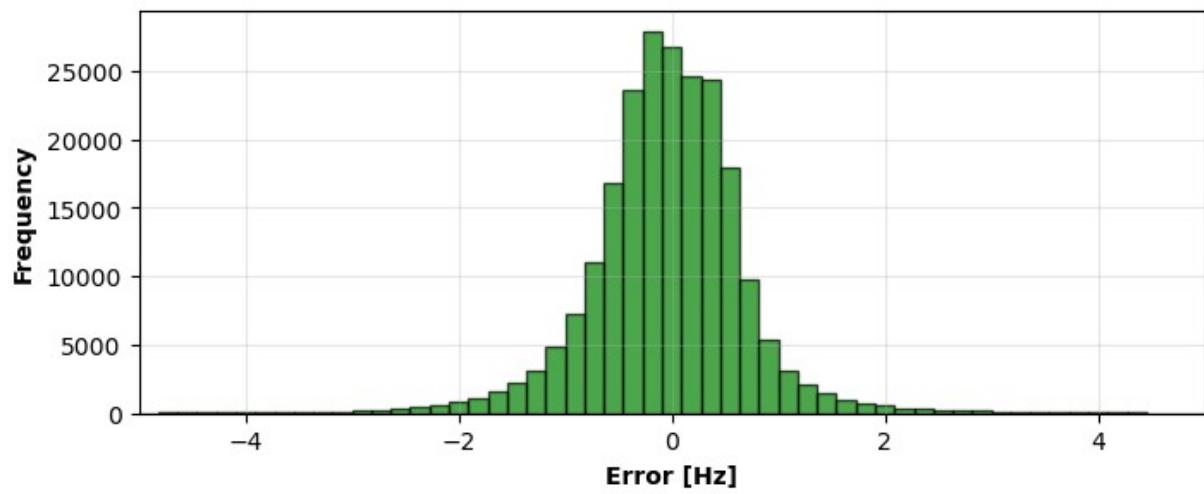
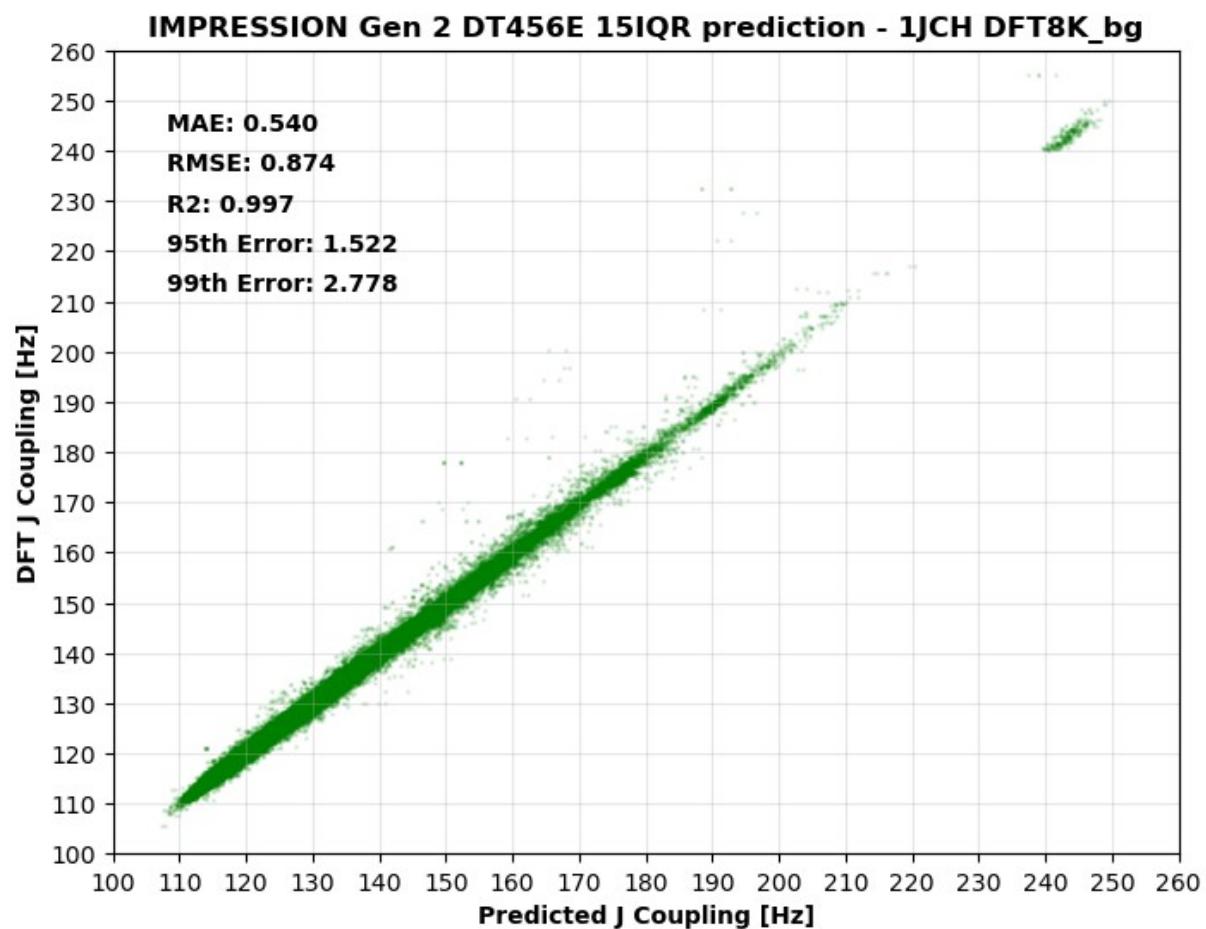
Holdout



Data3

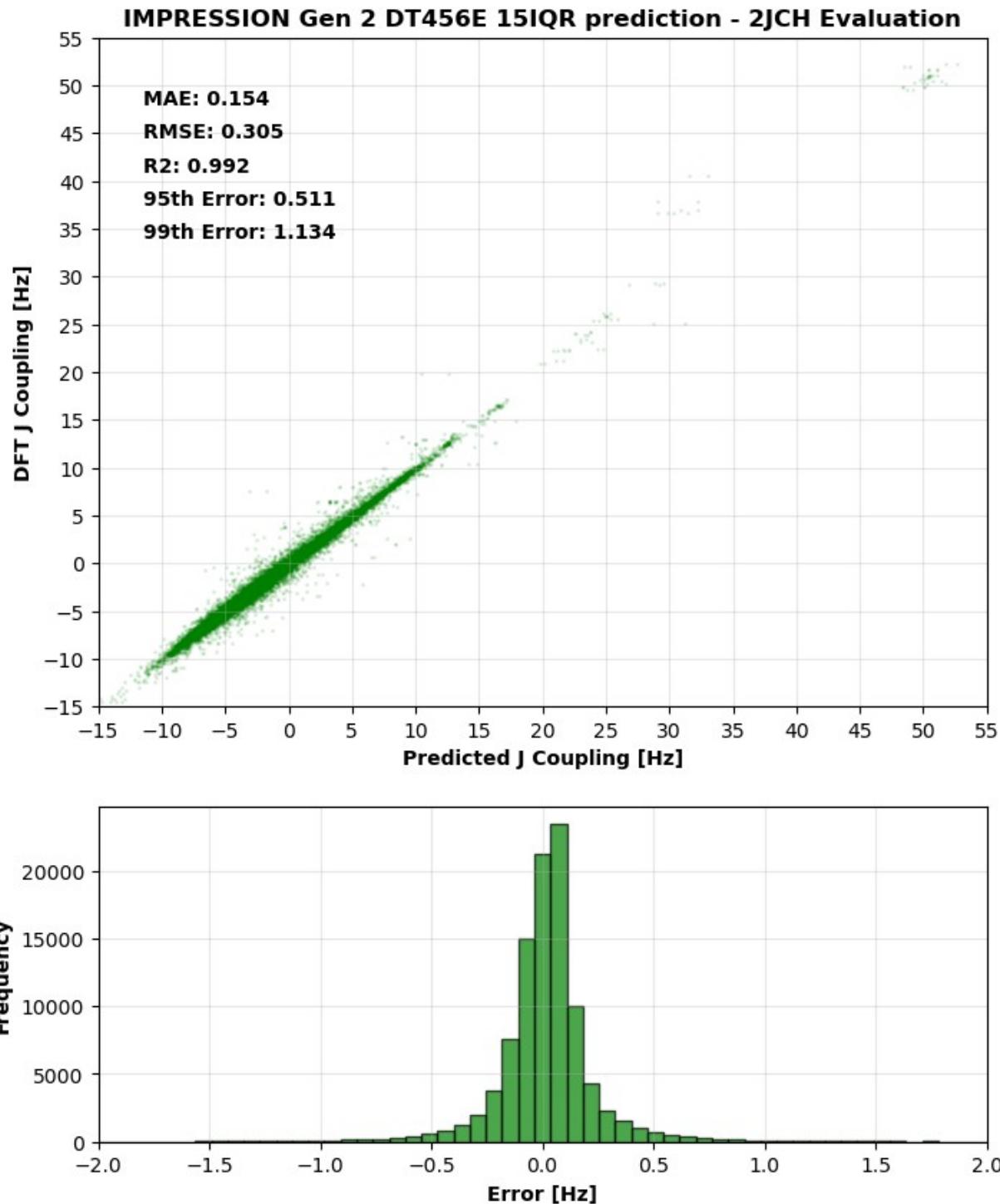


DFT8K_bg

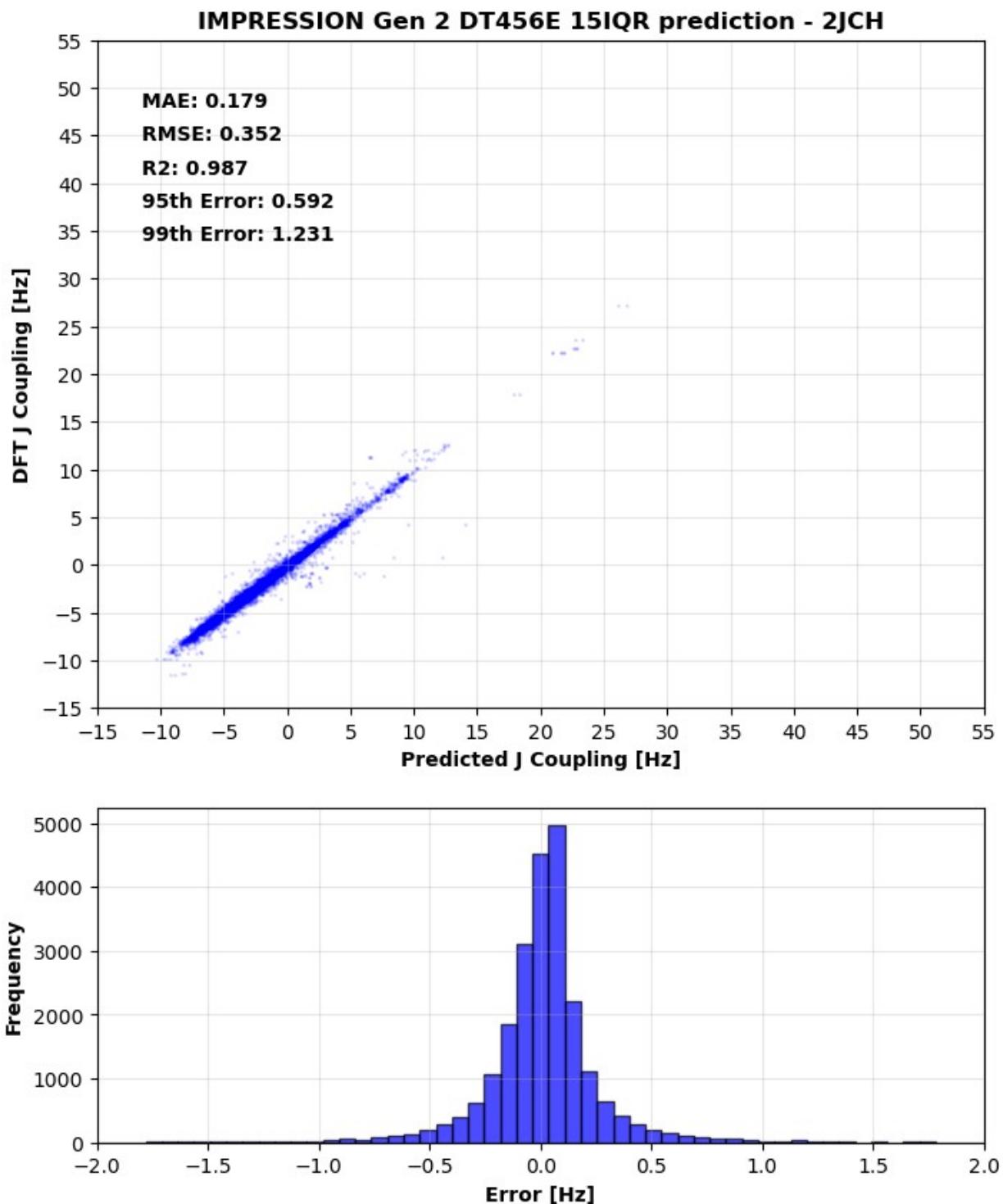


S2.2.2 $^2\text{J}_{\text{CH}}$

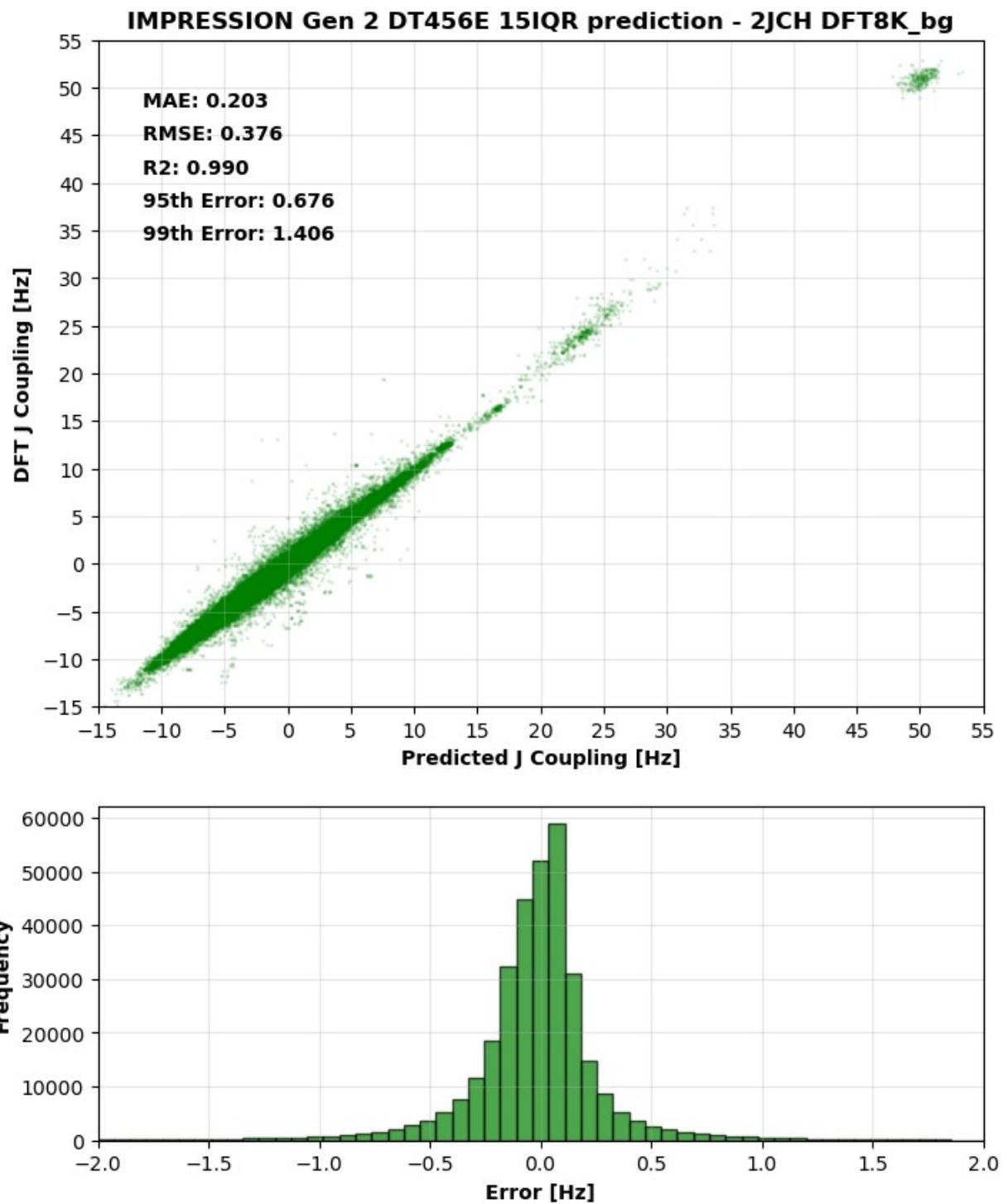
Holdout



Data3

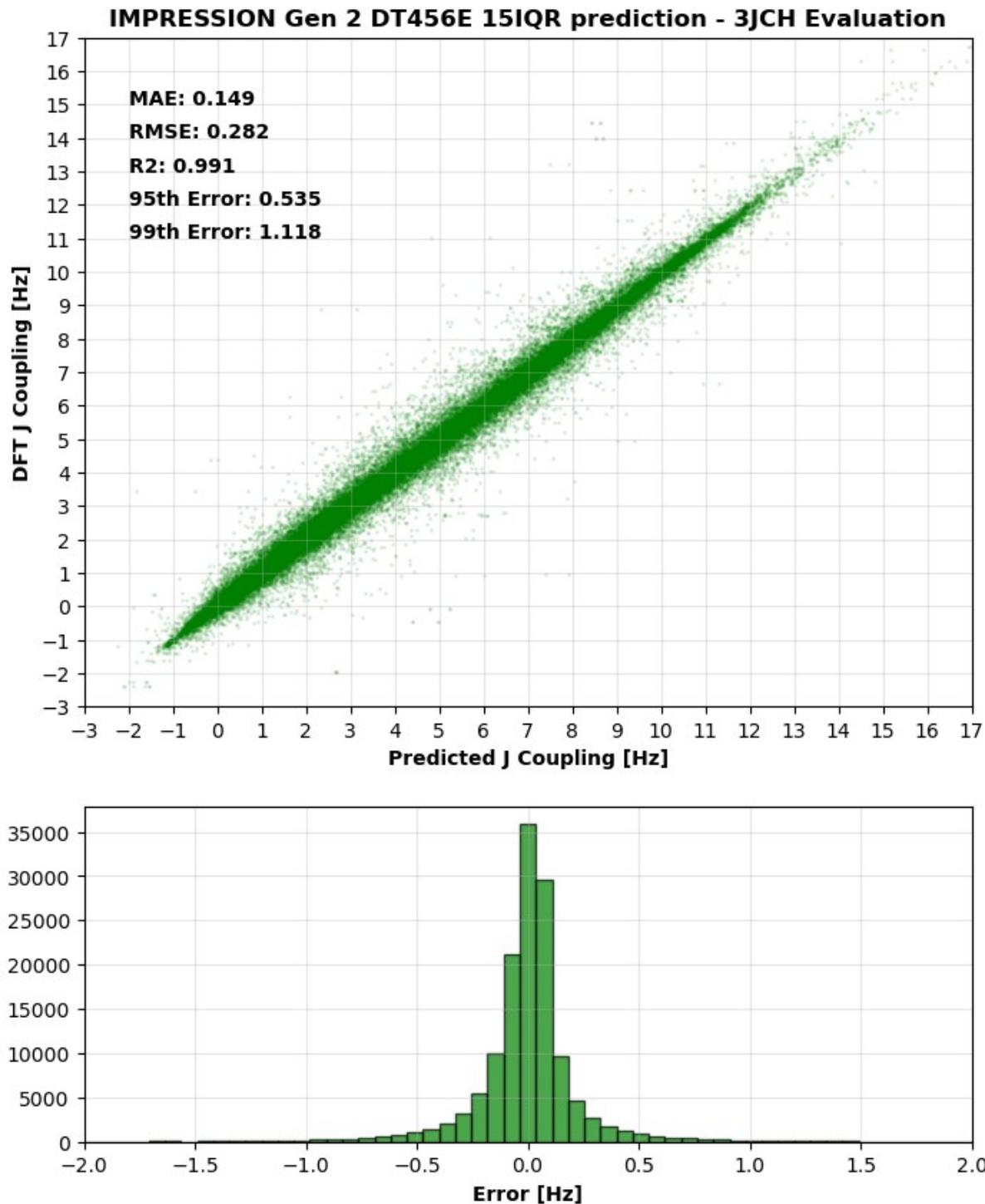


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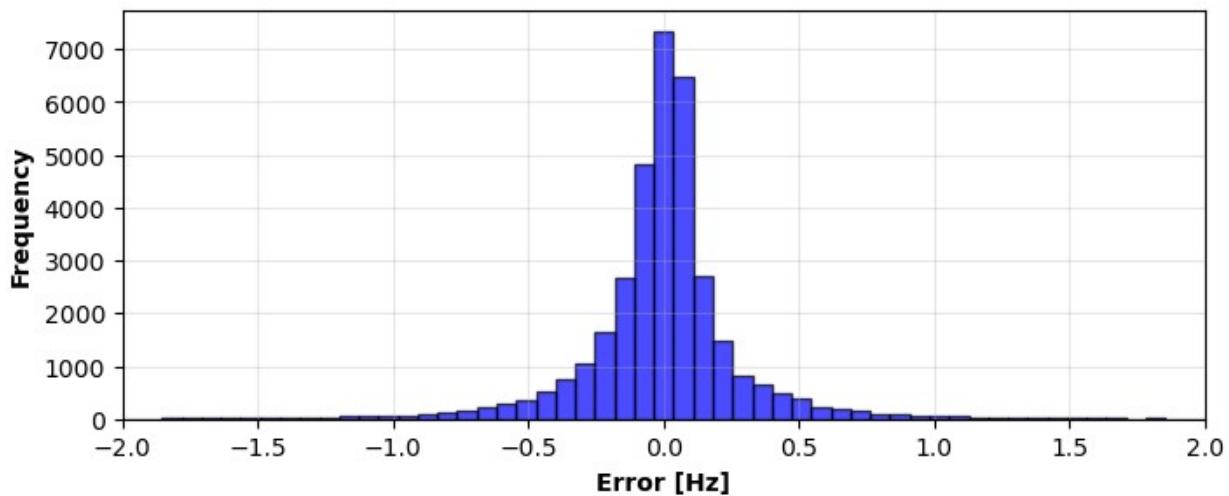
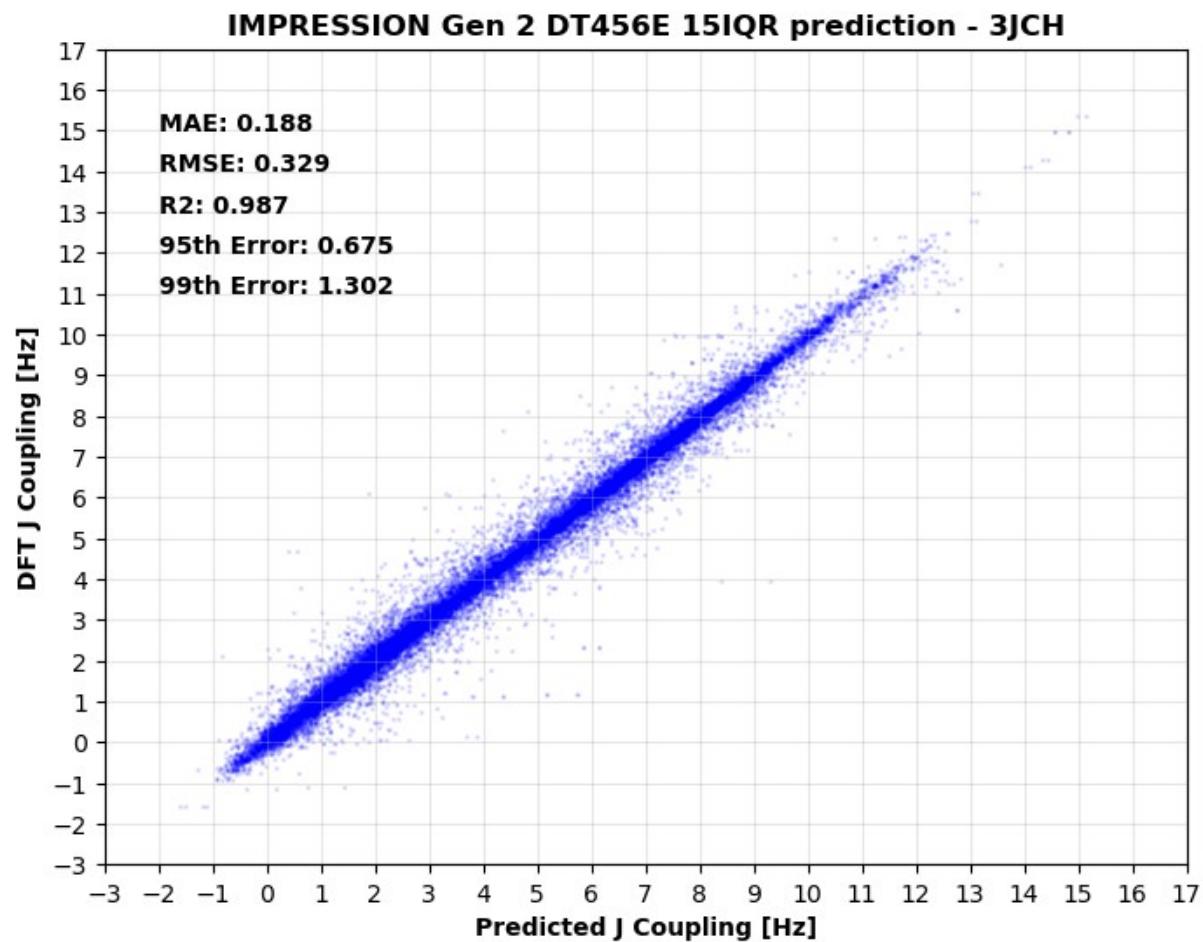


S2.2.3 ${}^3\text{J}_{\text{CH}}$

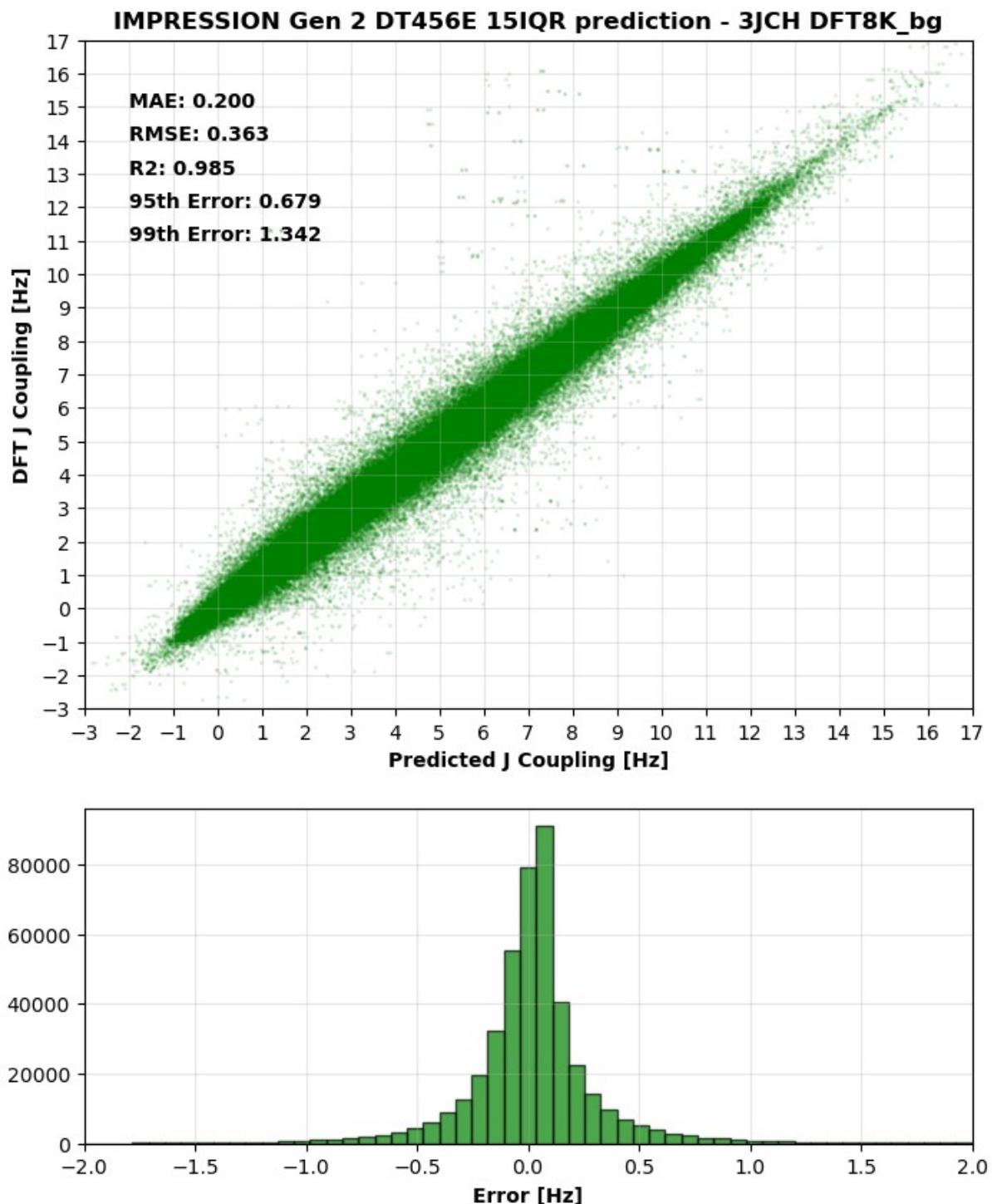
Holdout



Data3

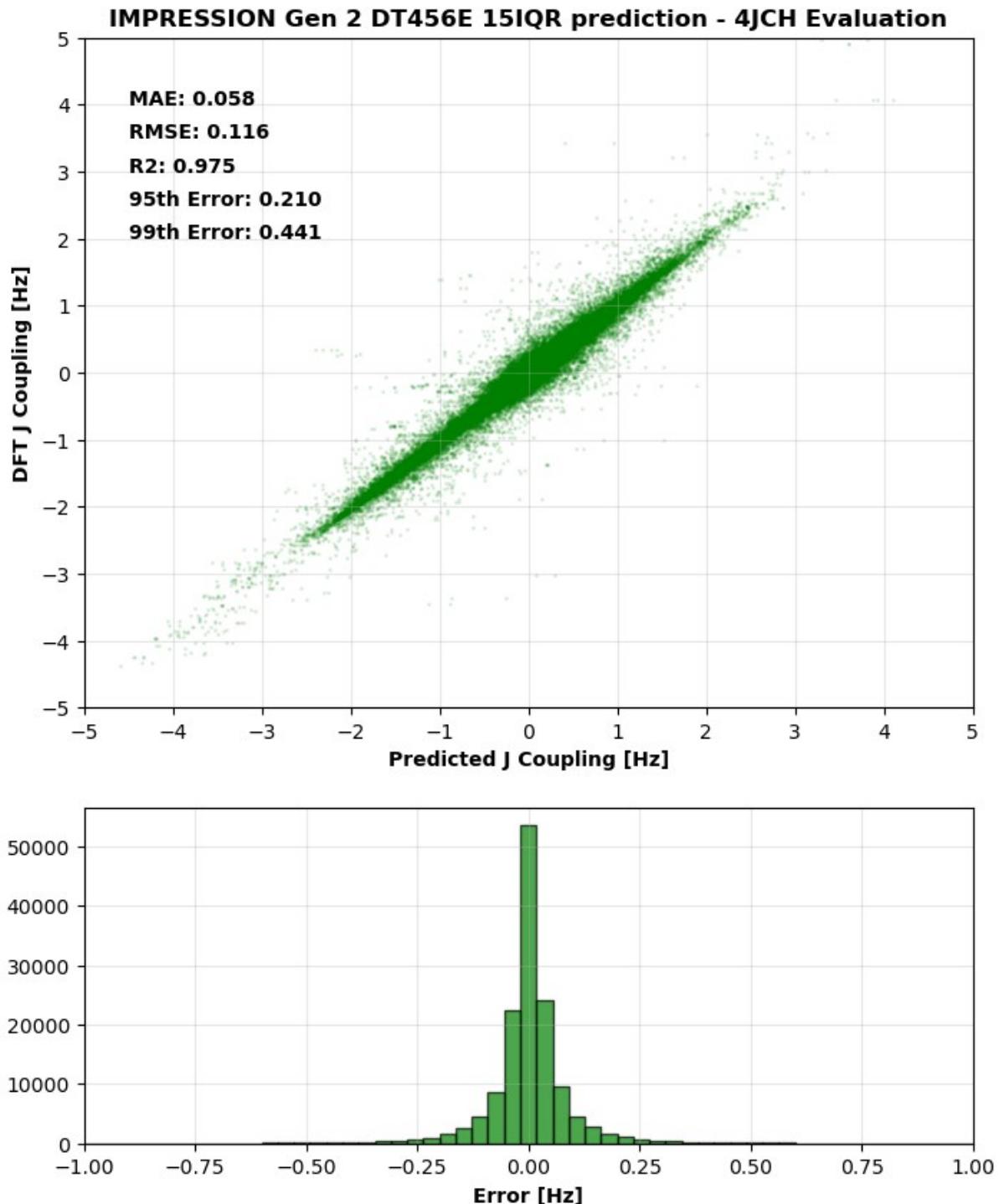


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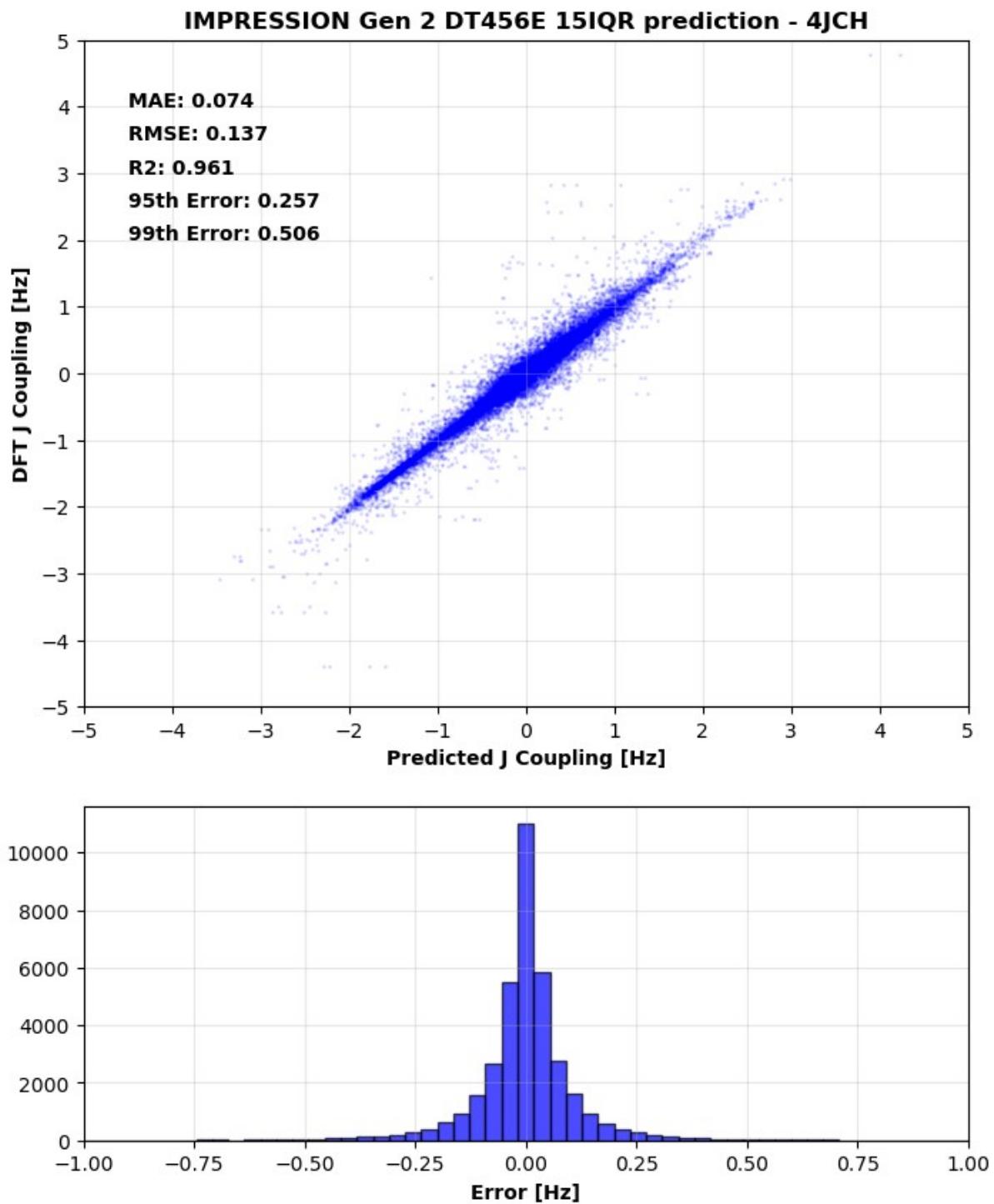


S2.2.4 $^4\text{J}_{\text{CH}}$

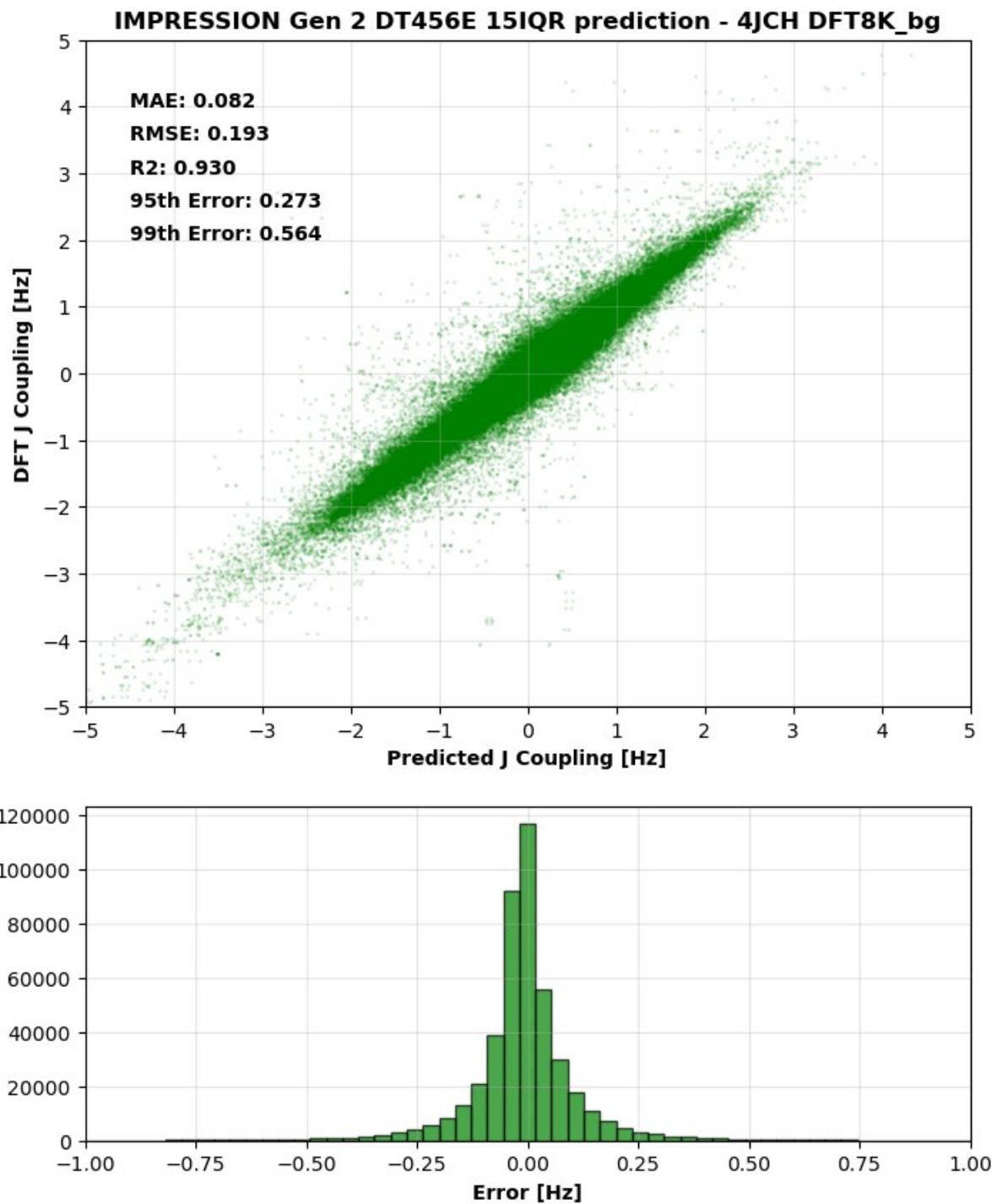
Holdout



Data3

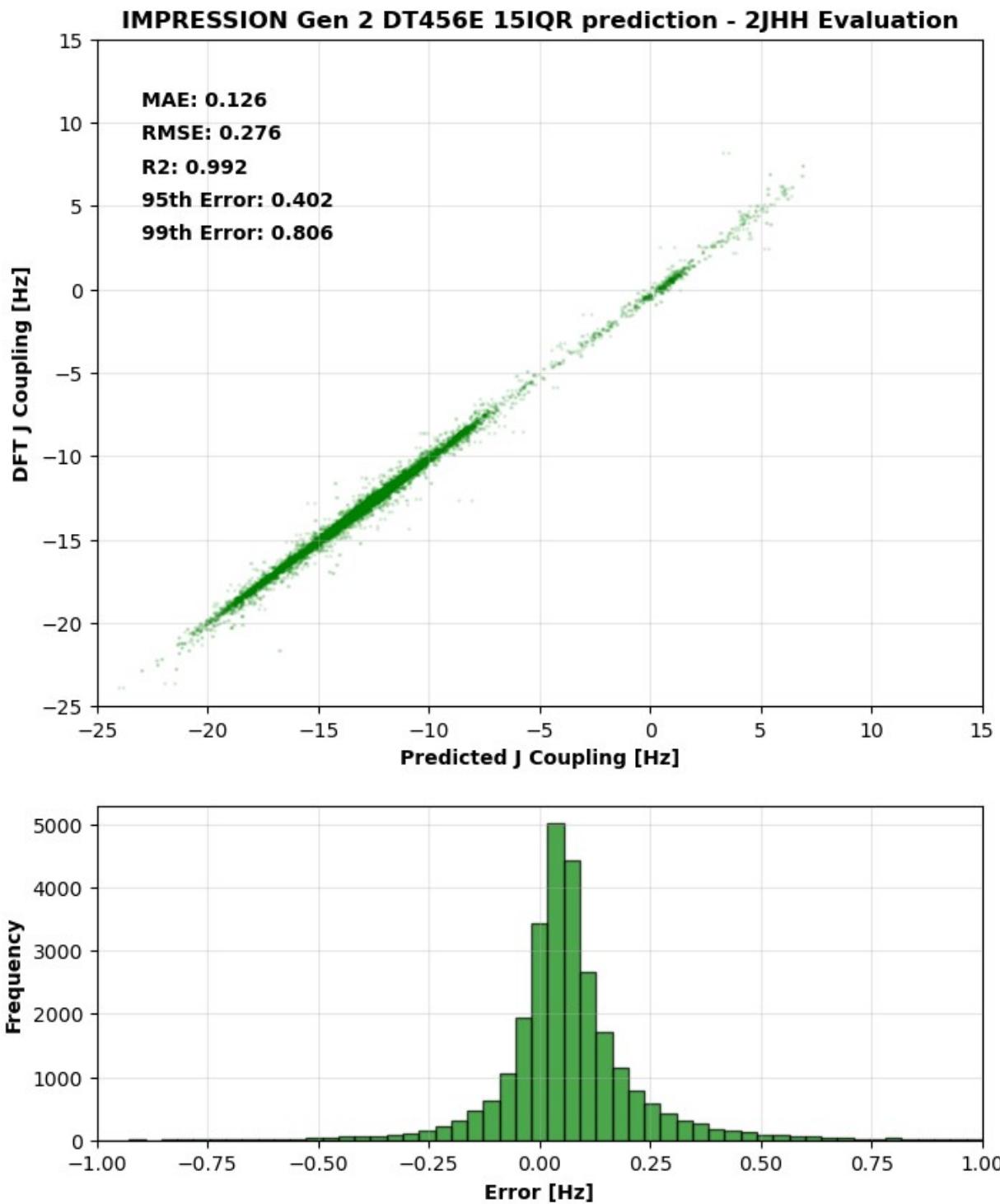


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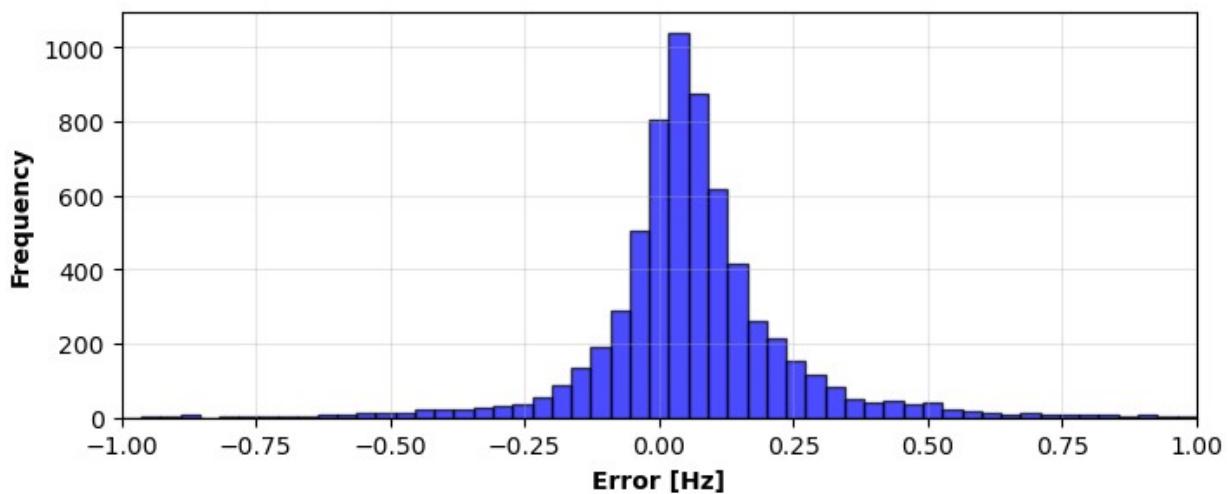
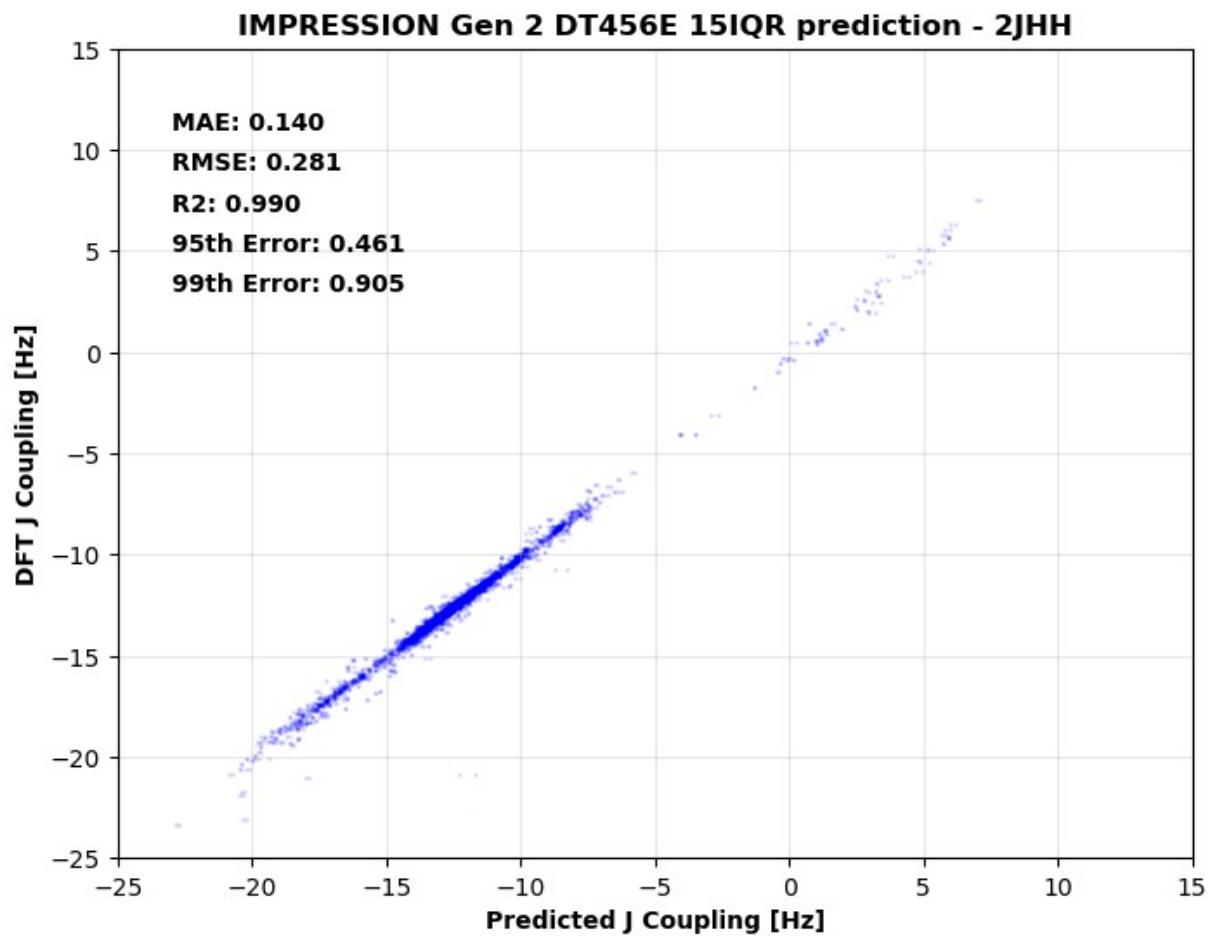


S2.2.5 $^2\text{J}_{\text{HH}}$

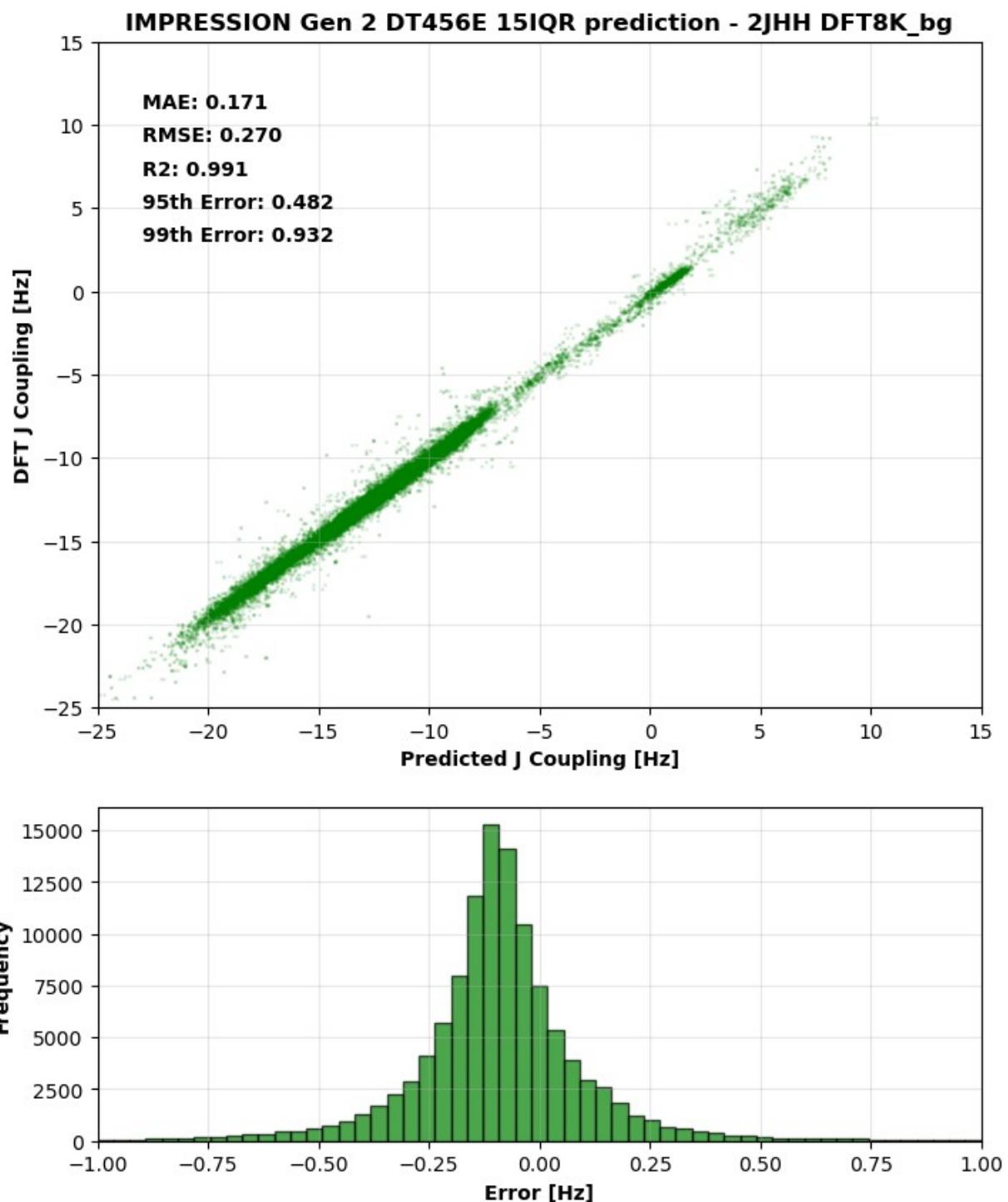
Holdout



Data3

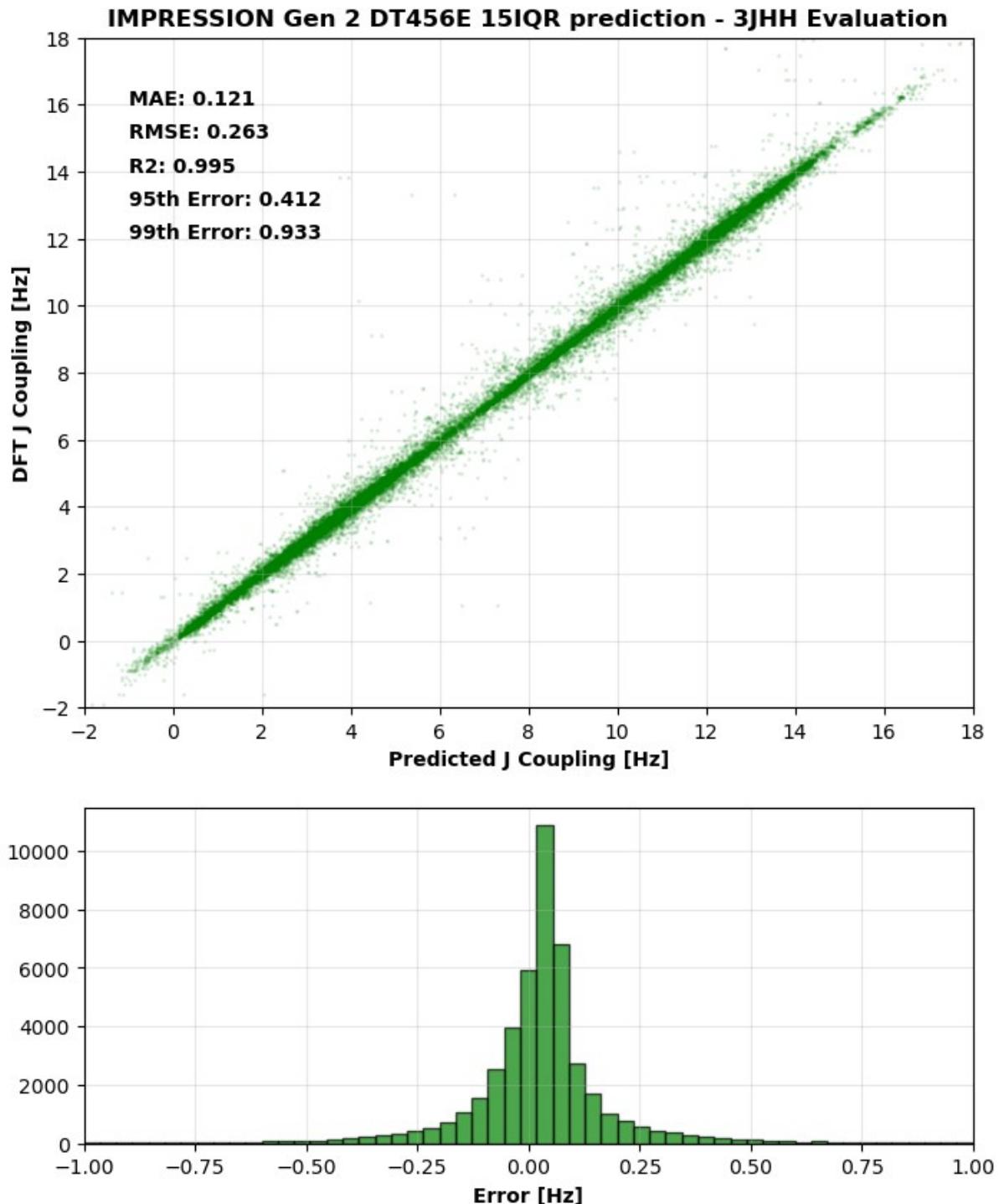


DFT8K_bg

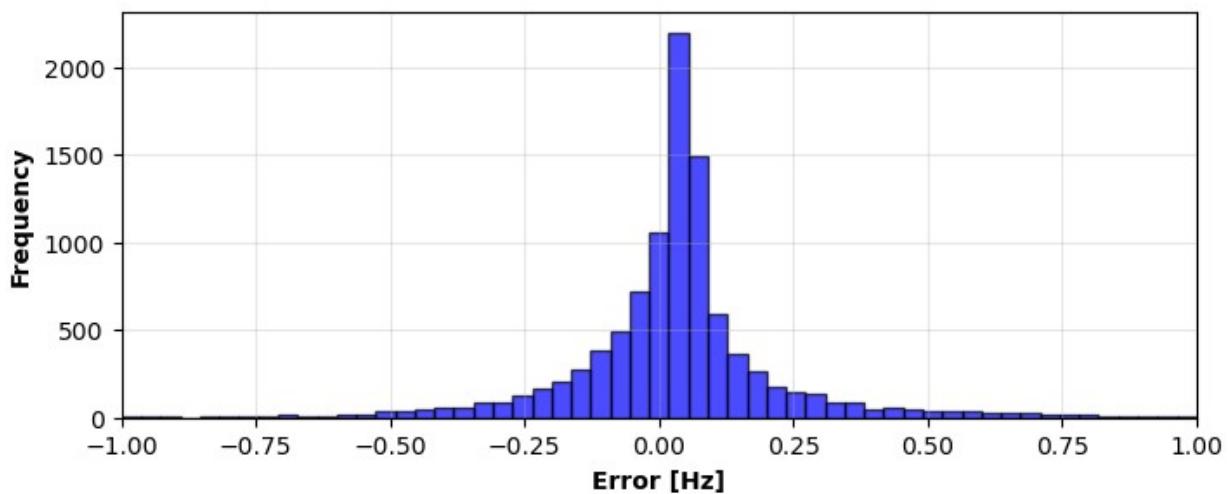
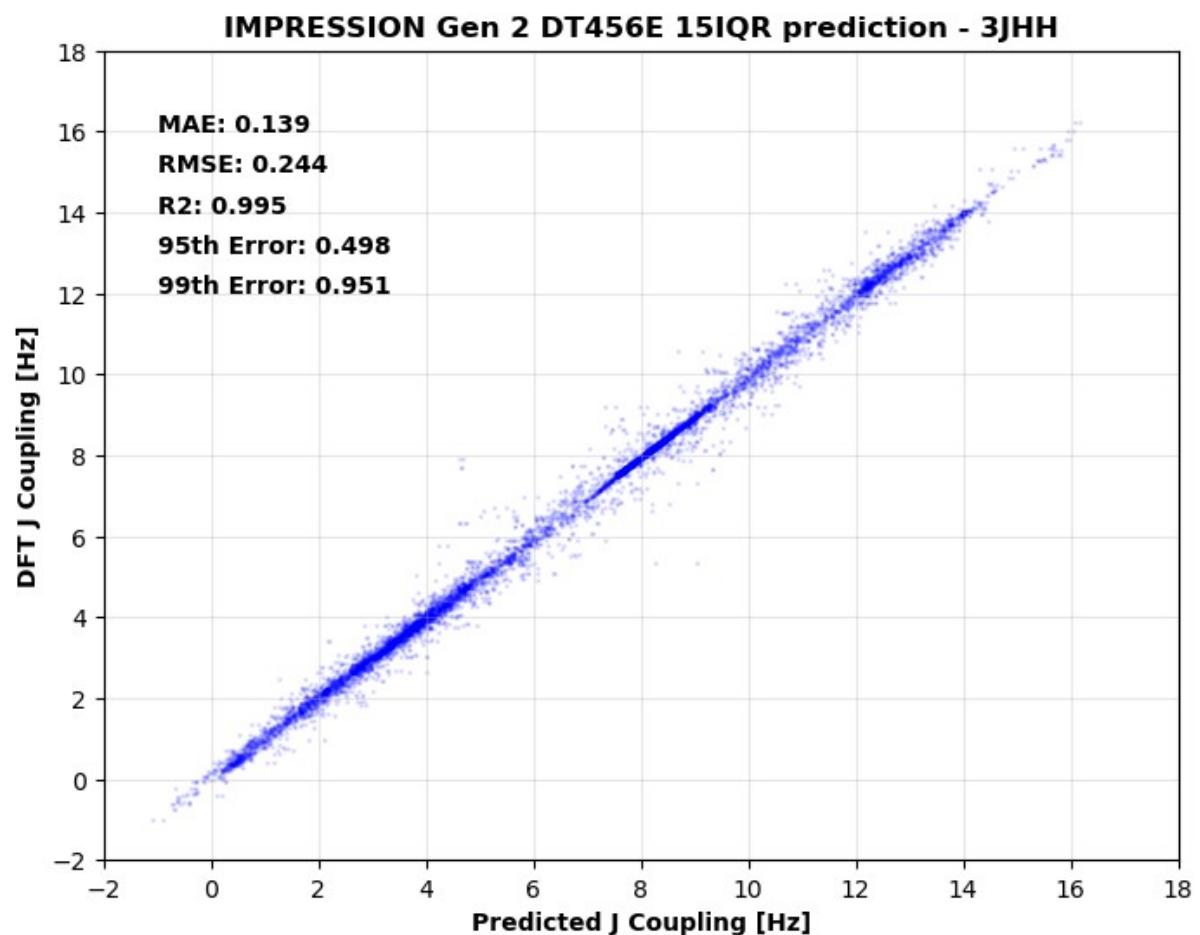


S2.2.6 $^3\text{J}_{\text{HH}}$

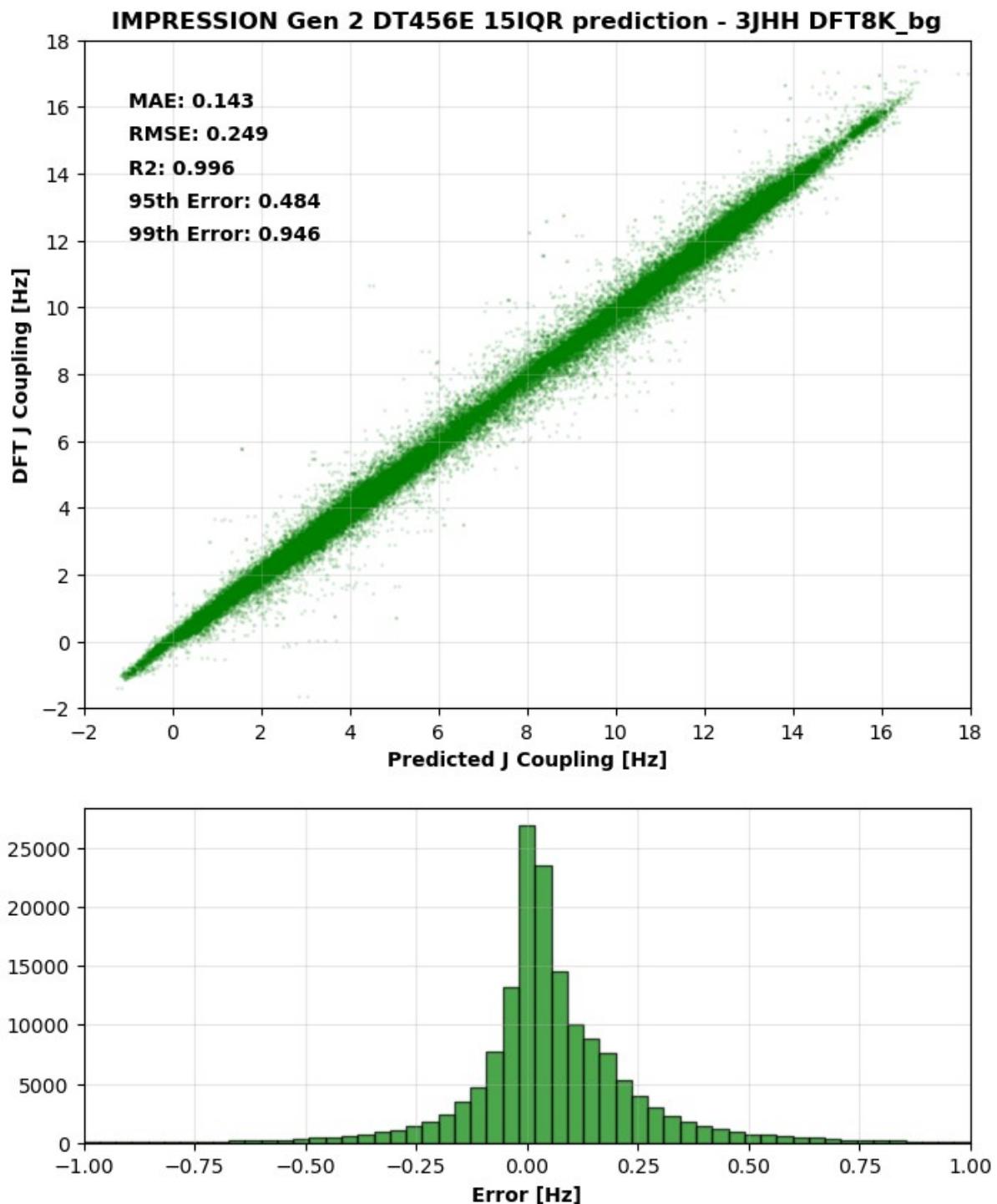
Holdout



Data3

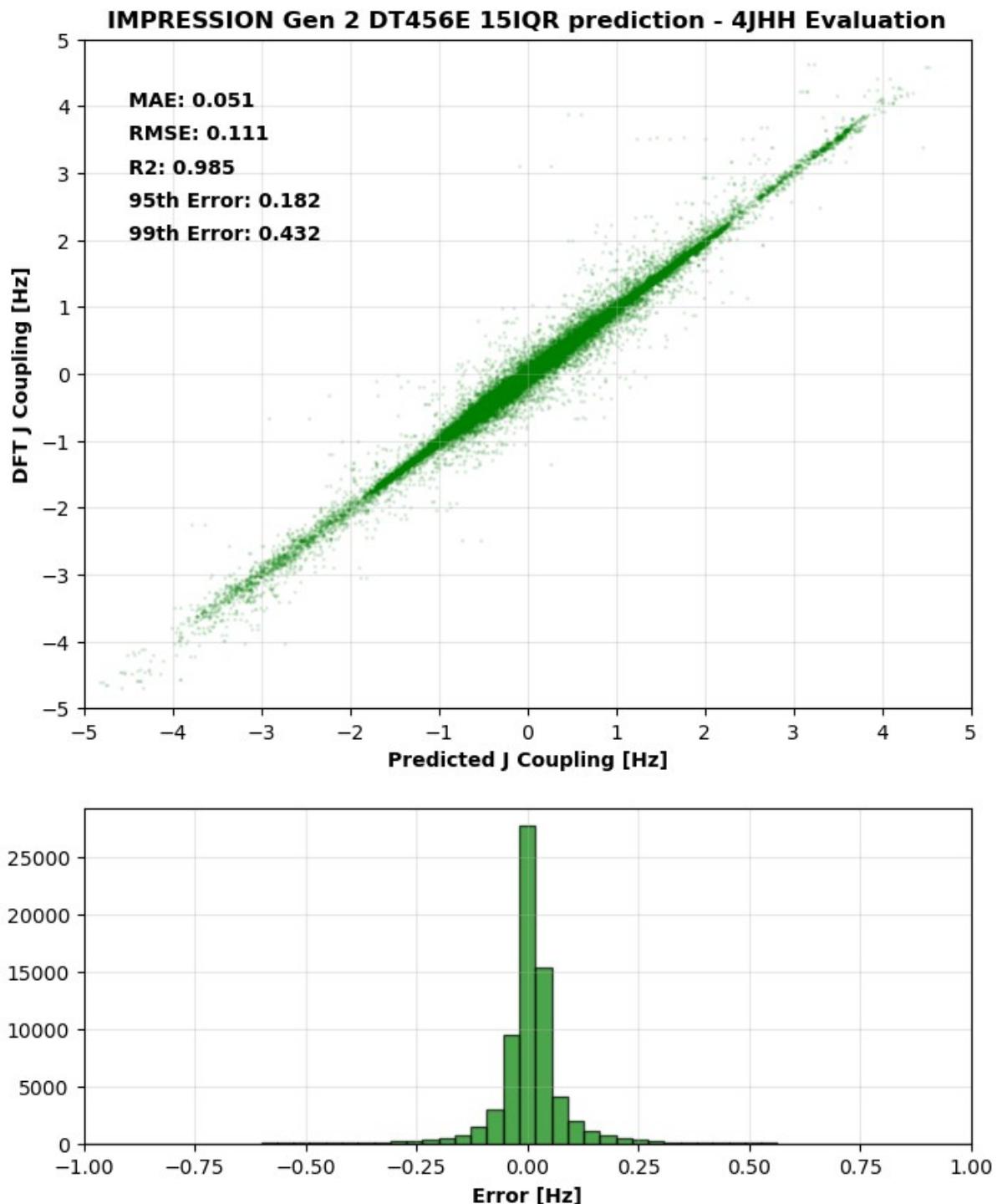


DFT8K_bg

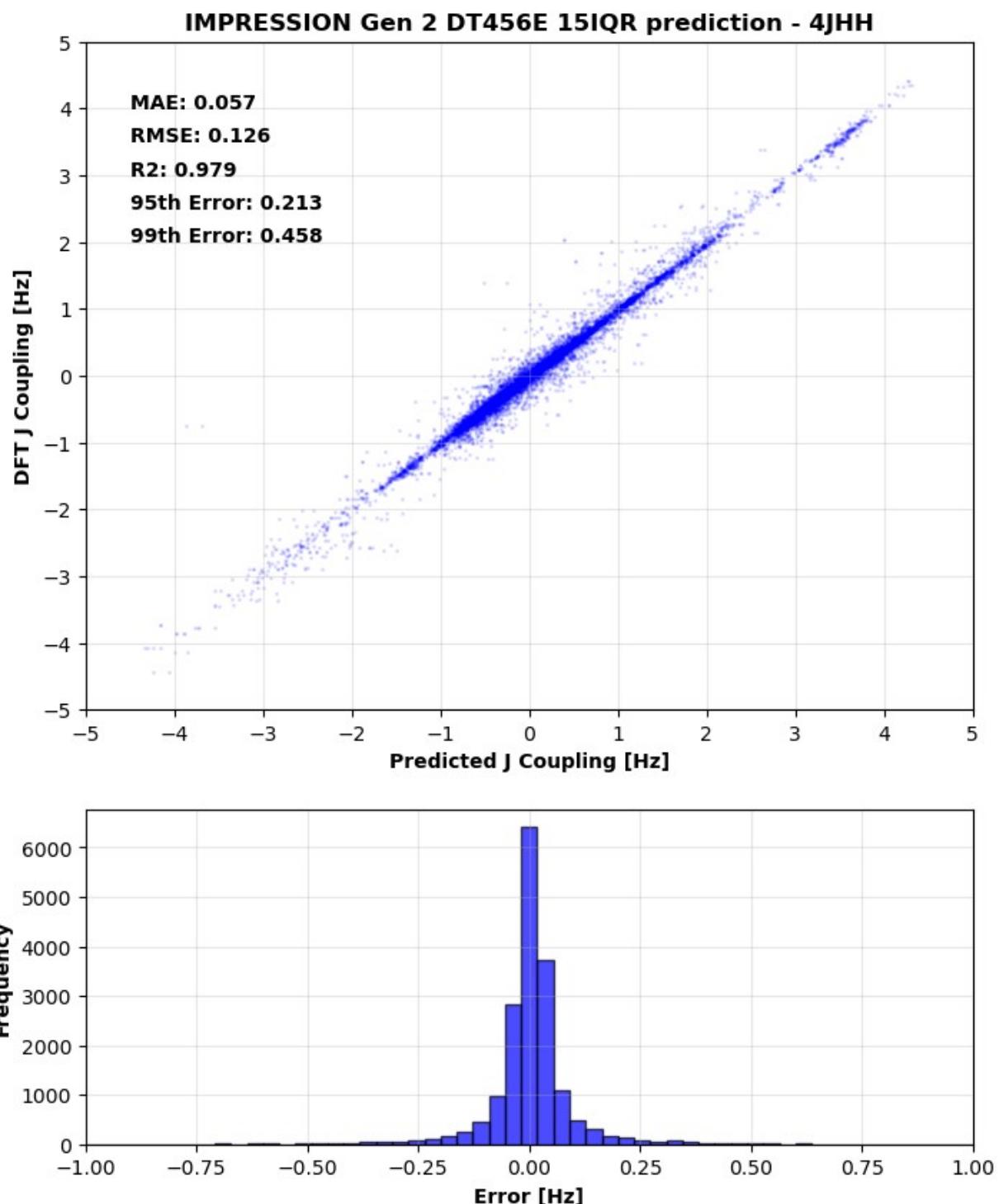


S2.2.7 $^4\text{J}_{\text{HH}}$

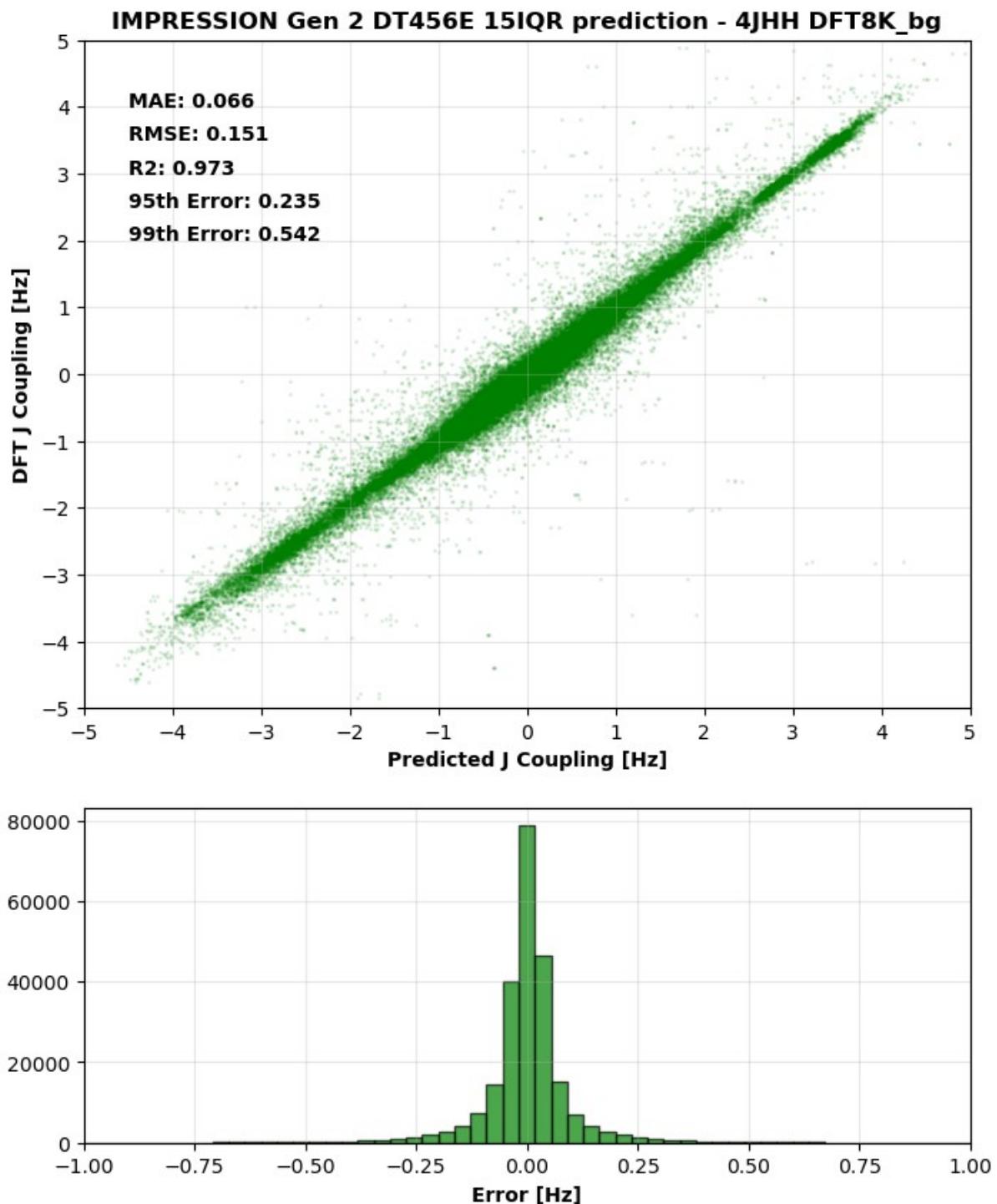
Holdout



Data3



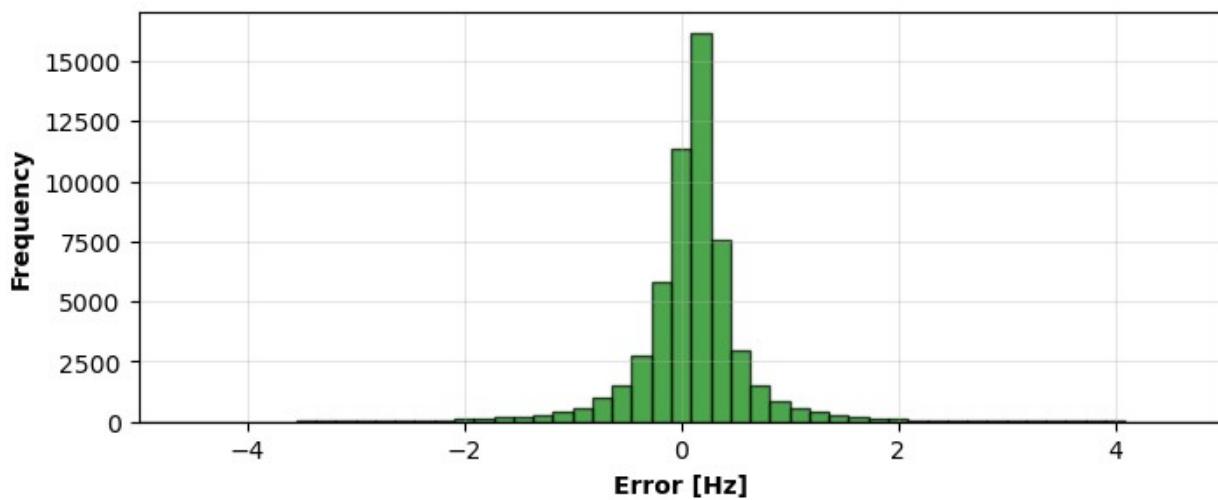
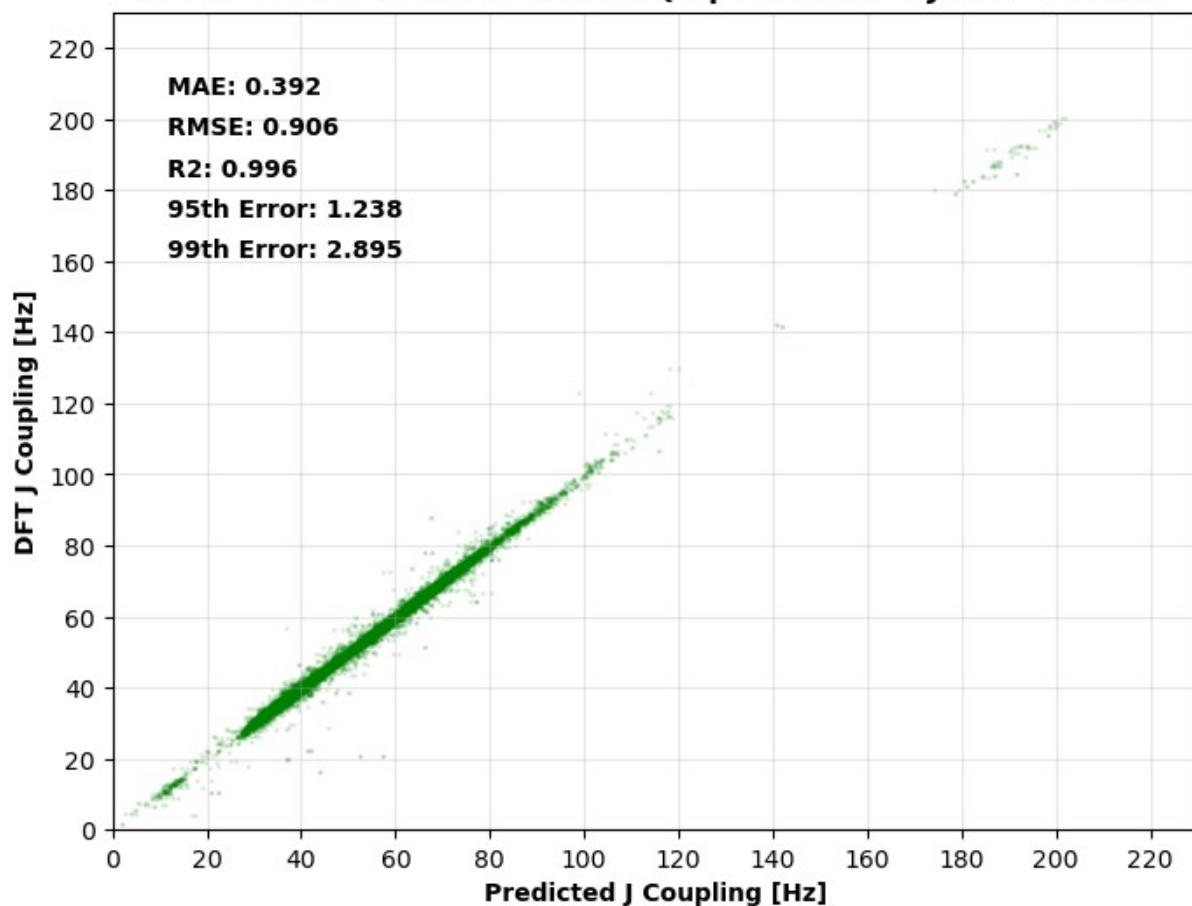
DFT8K_bg



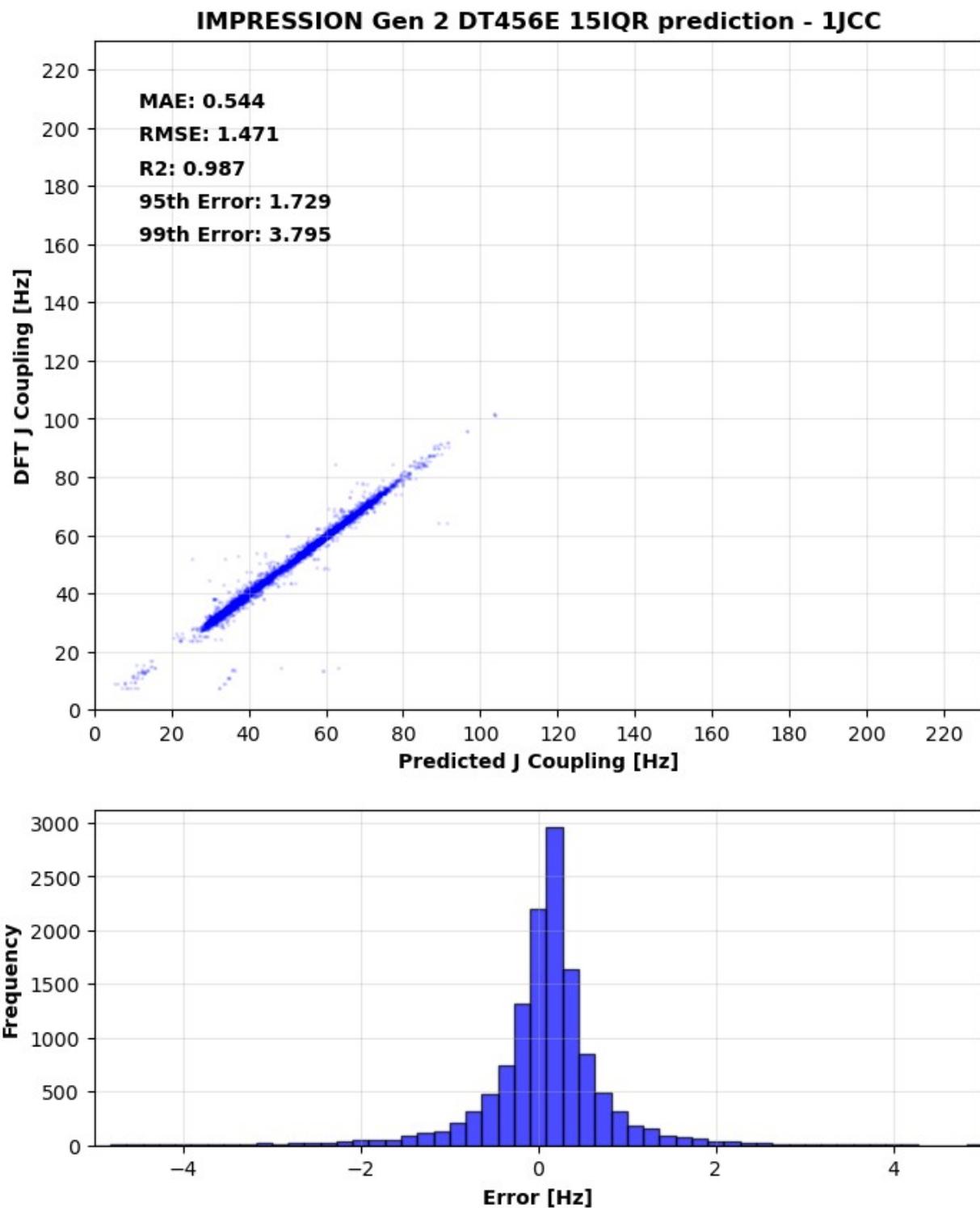
S2.2.8 $^1\text{J}_{\text{CC}}$

Holdout

IMPRESSION Gen 2 DT456E 15IQR prediction - 1JCC Evaluation

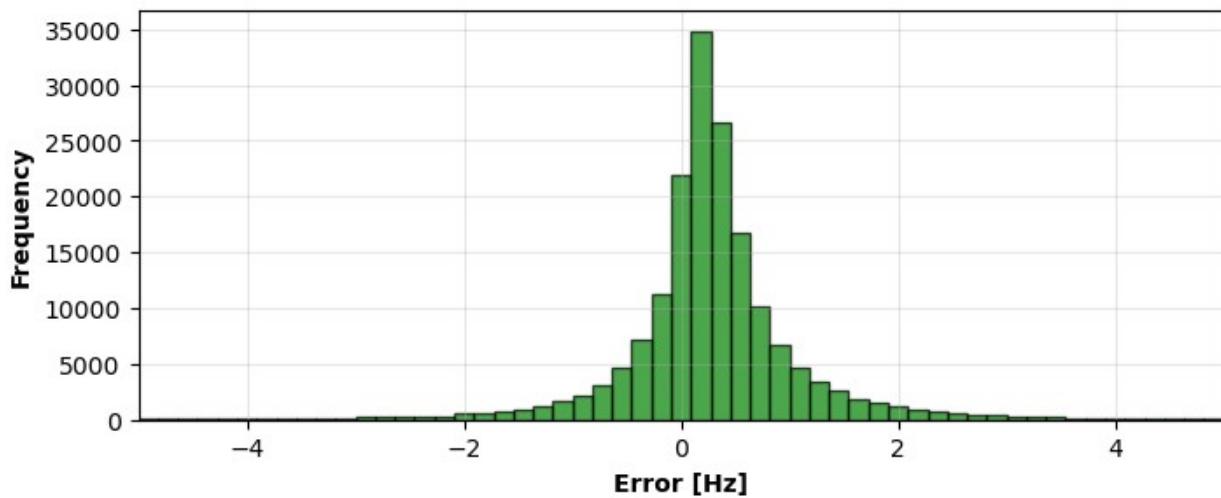
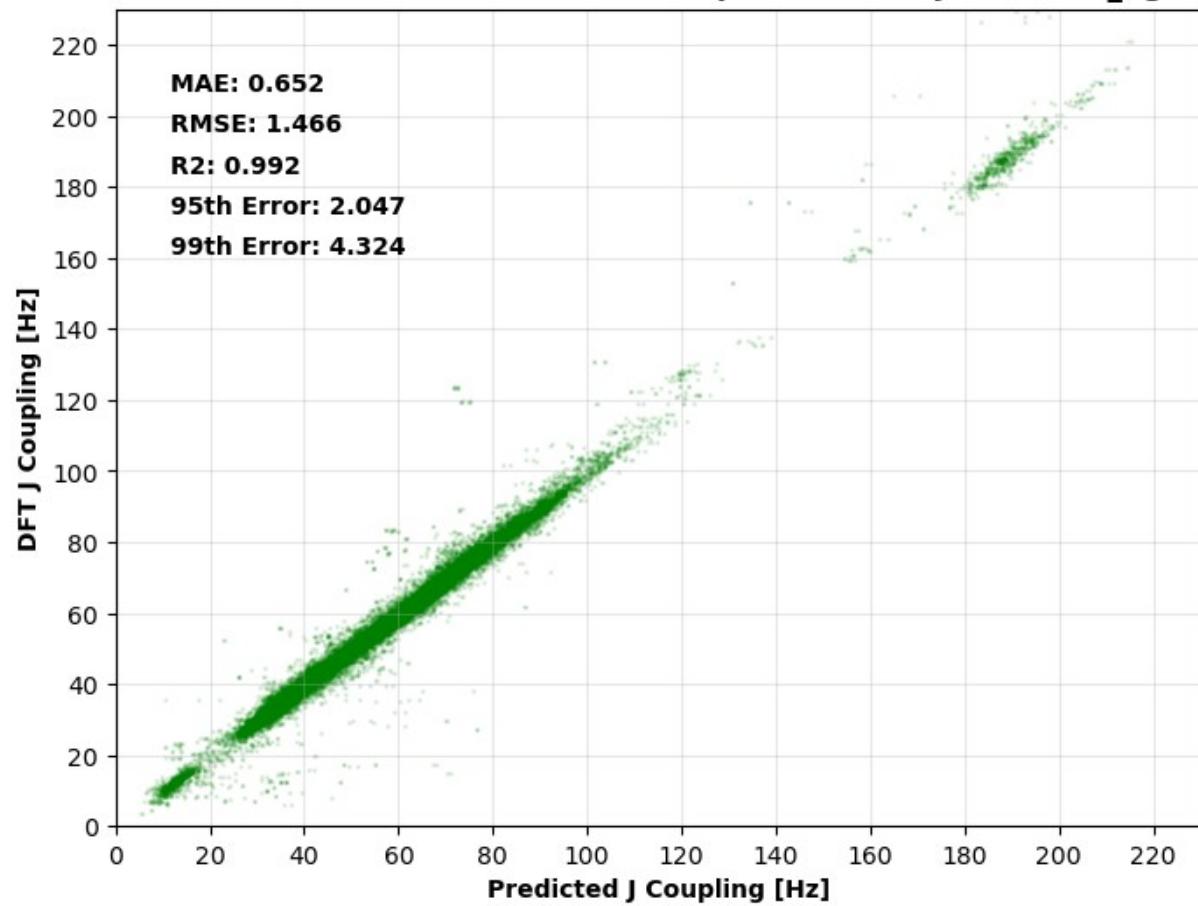


Data3



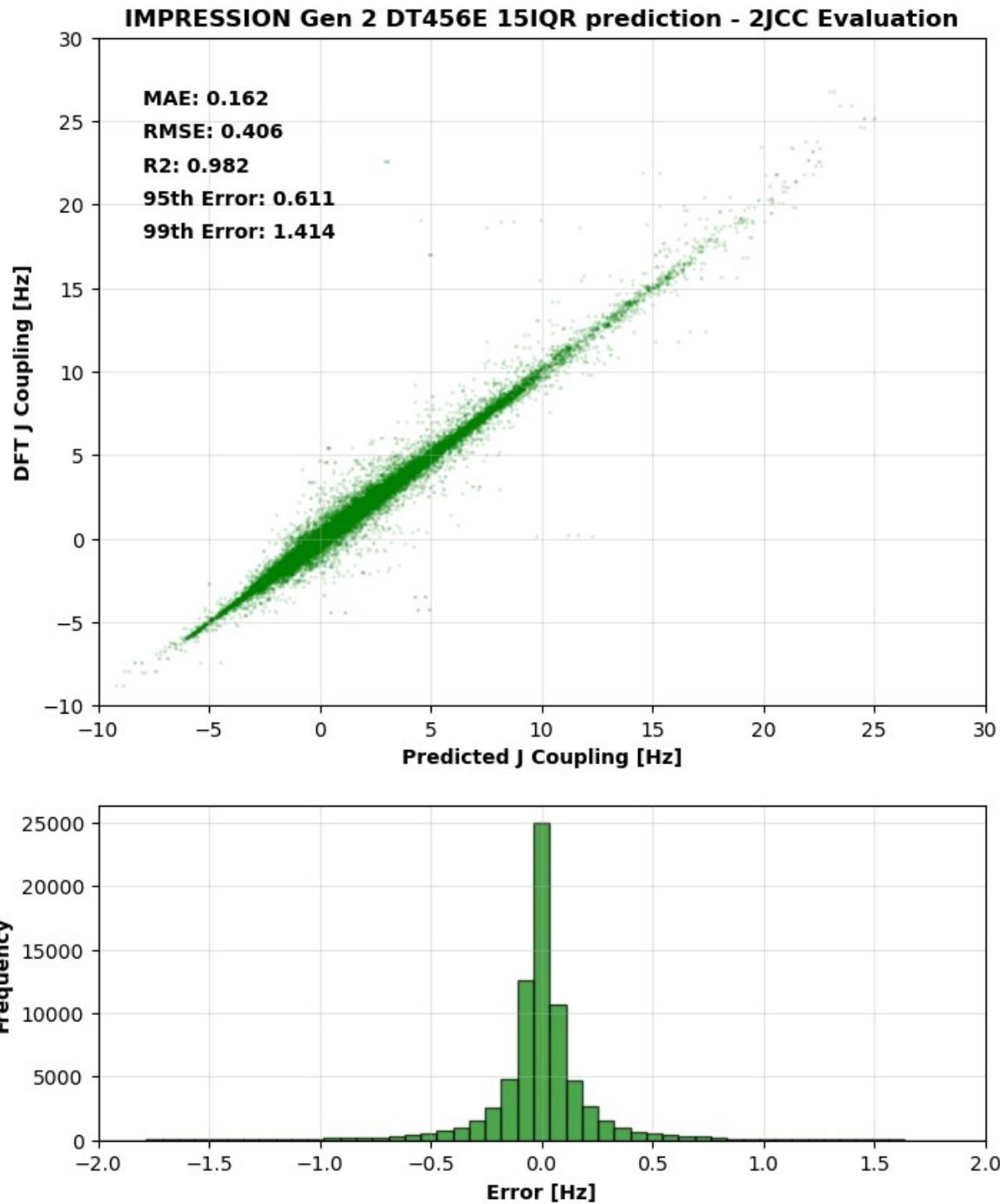
DFT8K_bg

IMPRESSION Gen 2 DT456E 15IQR prediction - 1JCC DFT8K_bg

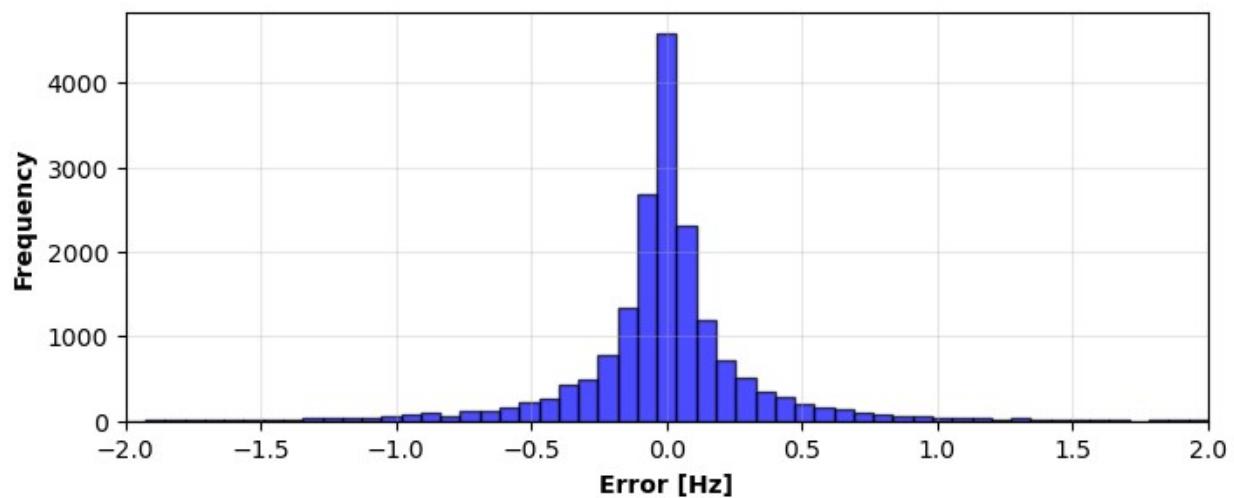
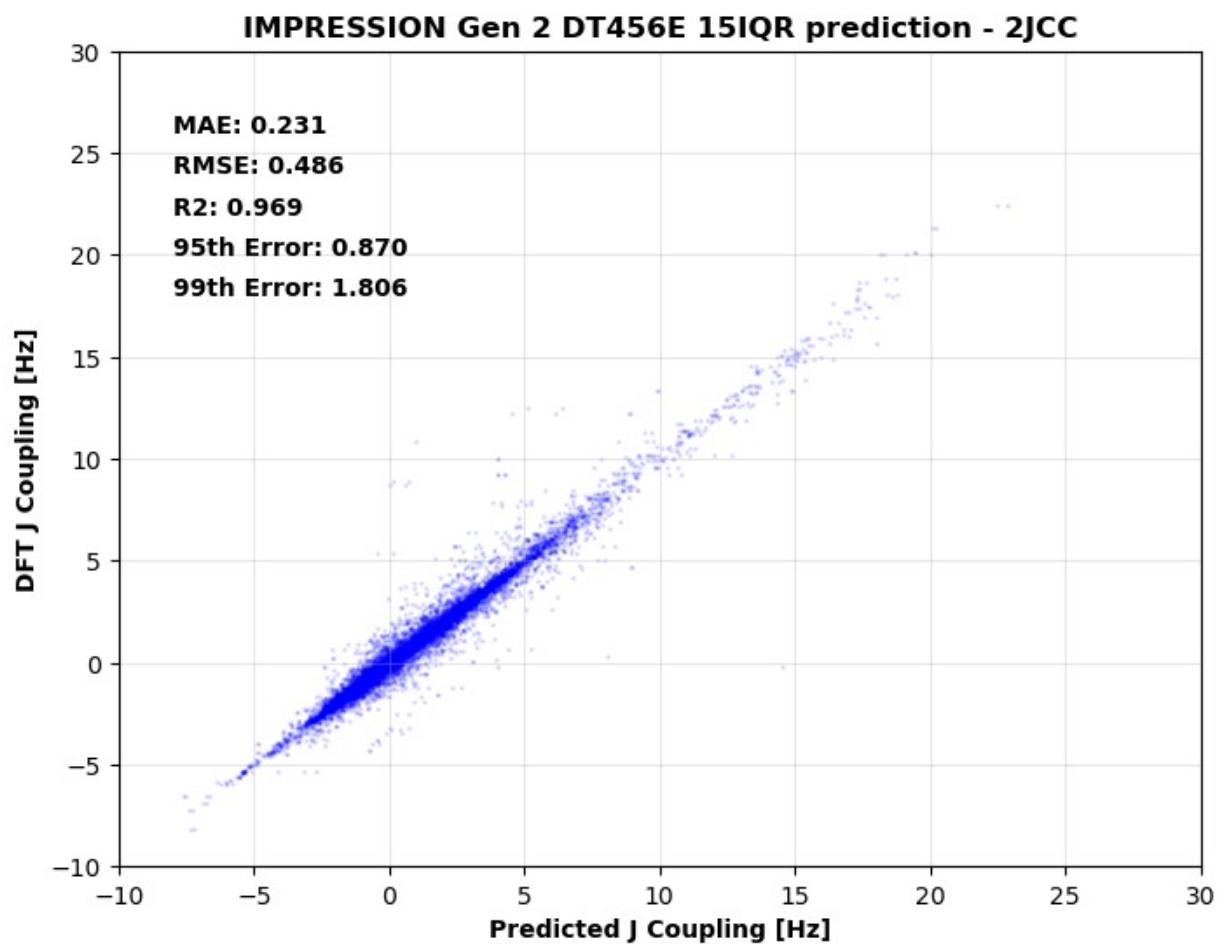


S2.2.9 $^2\text{J}_{\text{CC}}$

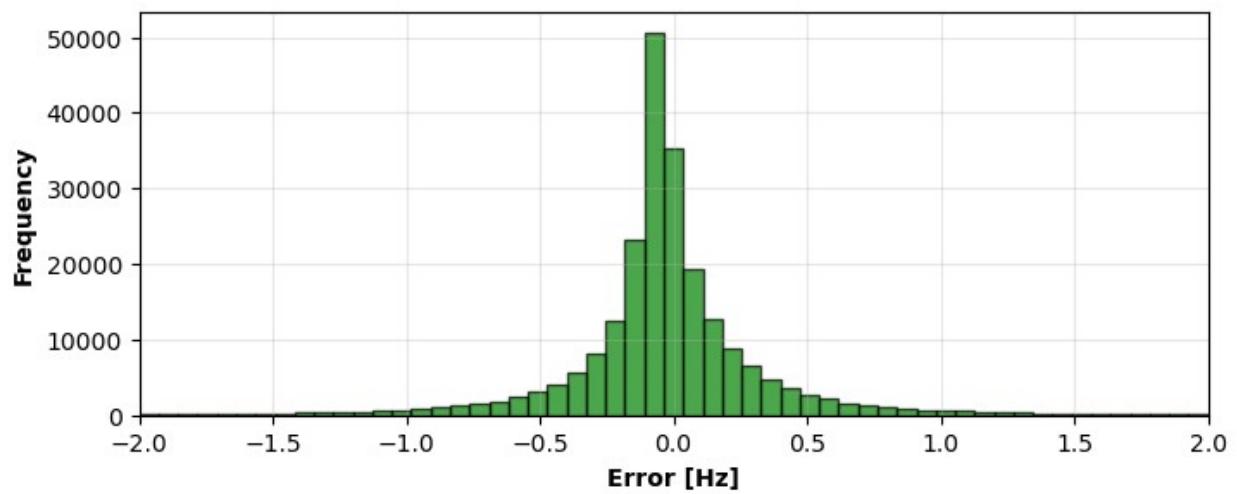
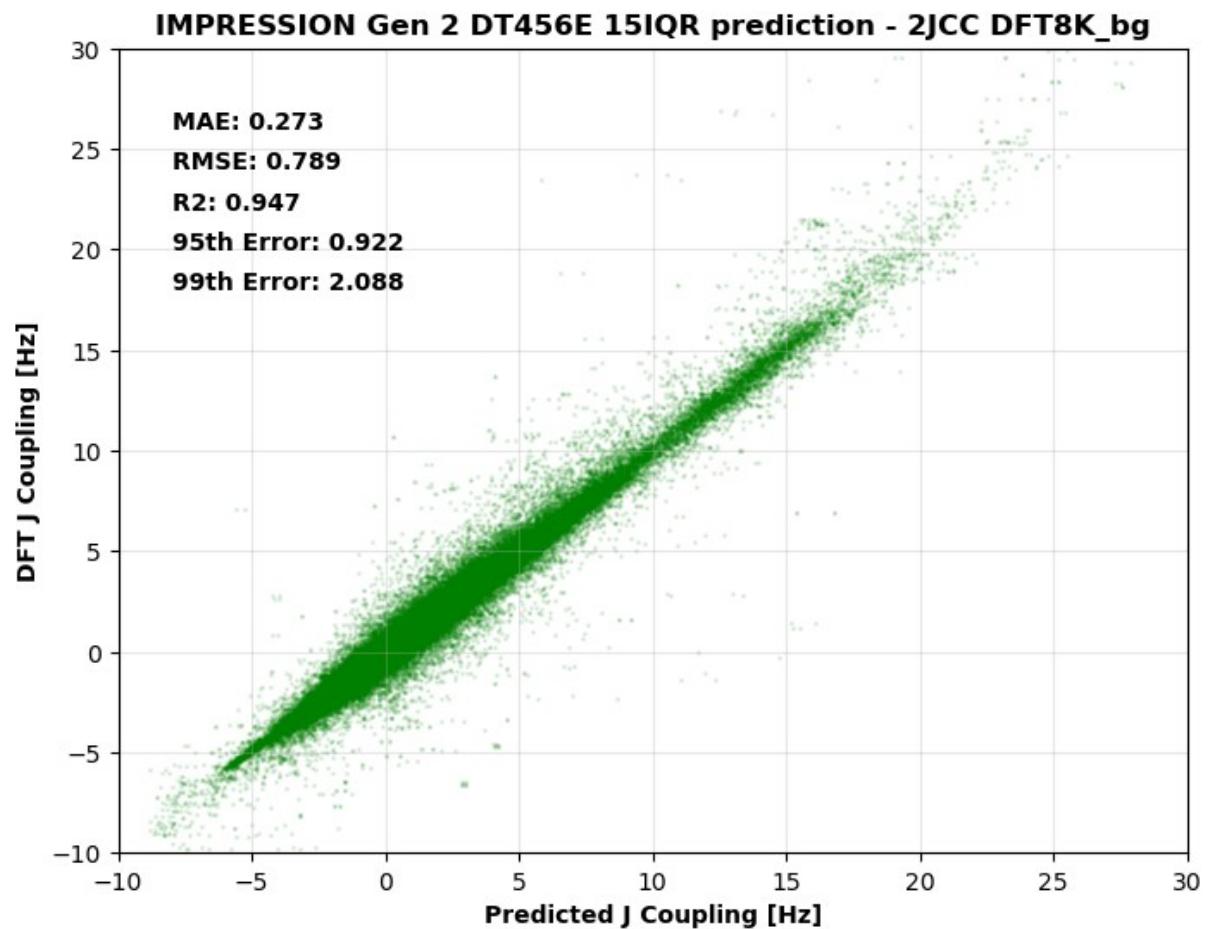
Holdout



Data3

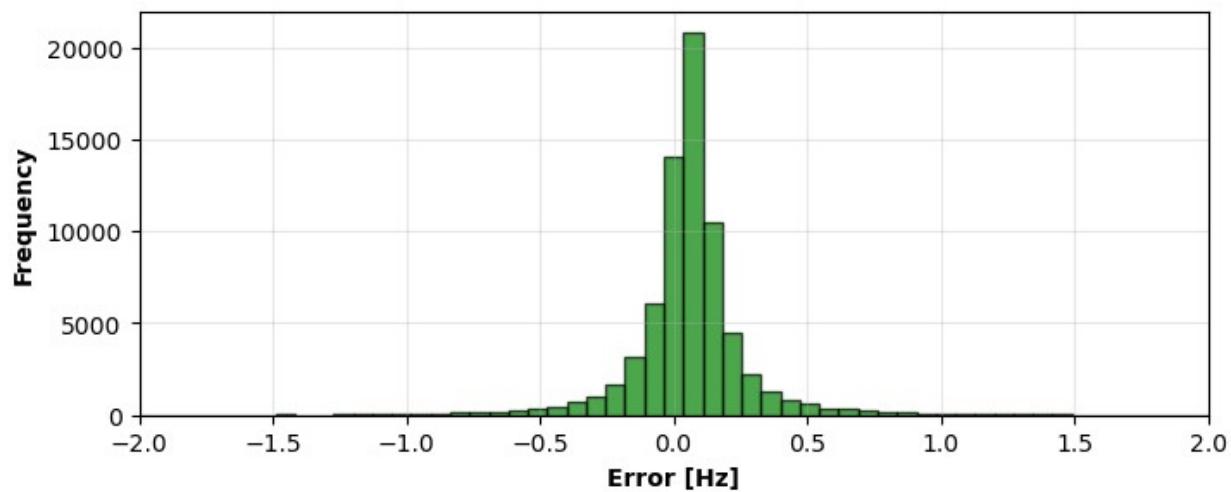
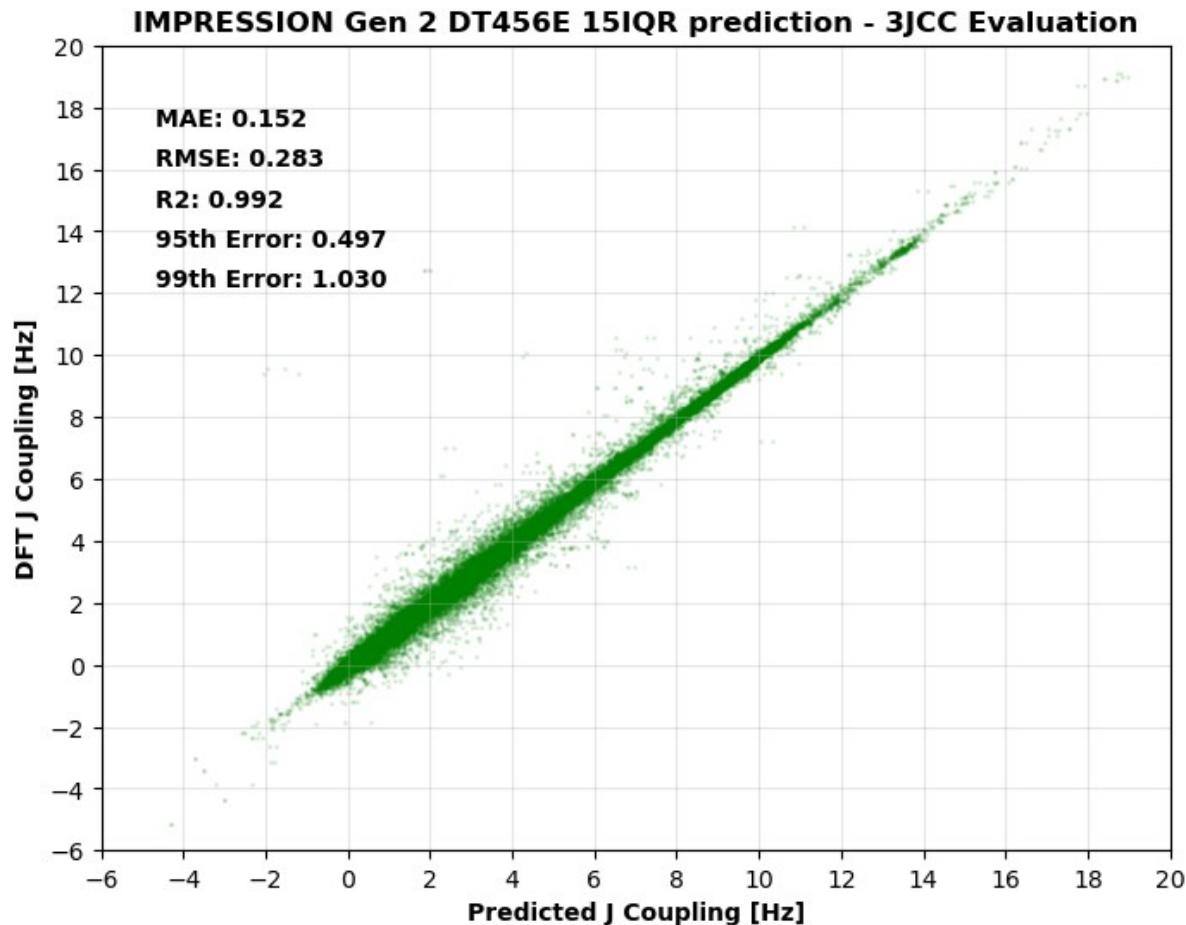


DFT8K_bg

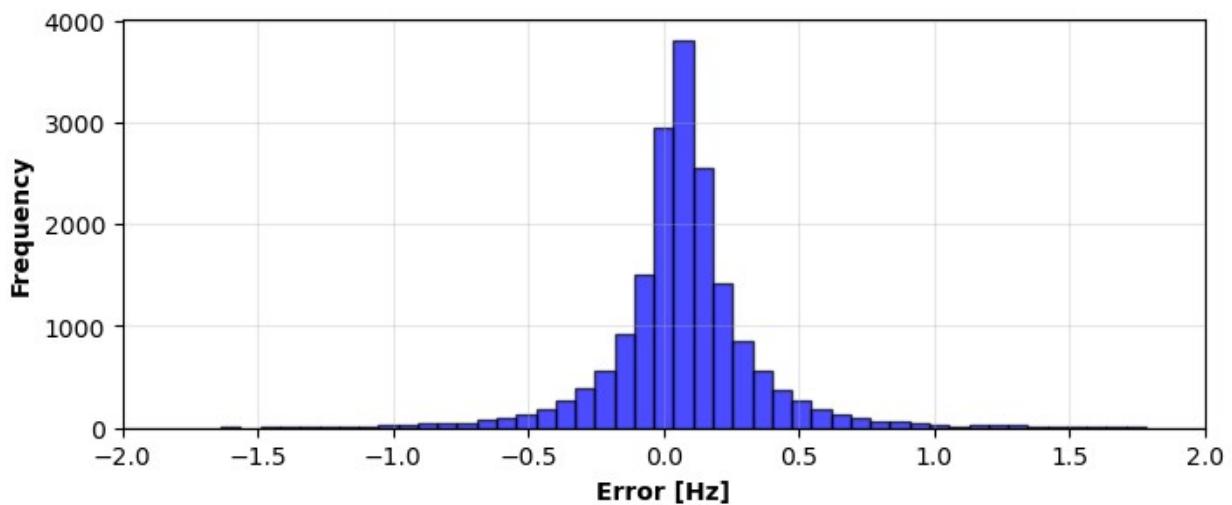
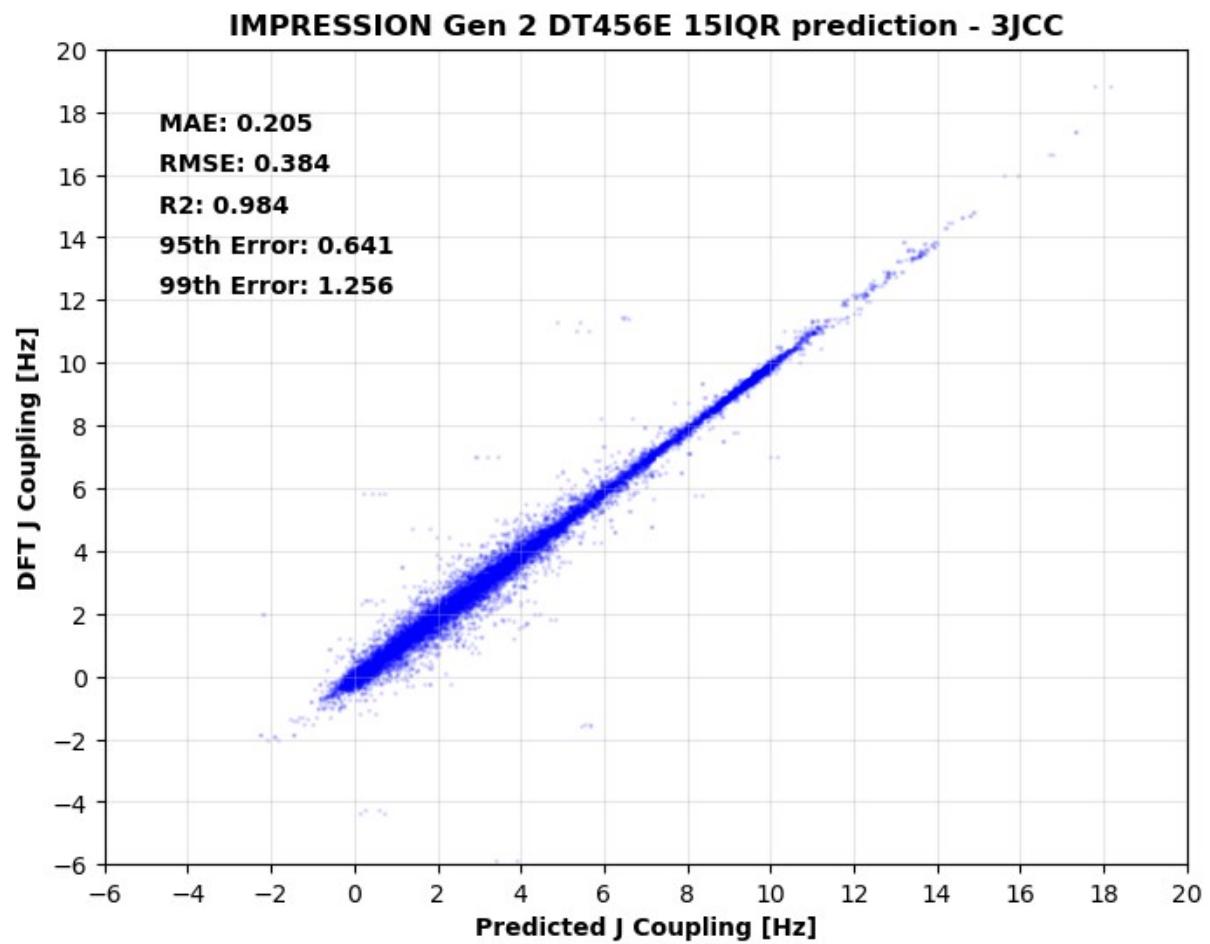


S2.2.10 $^3\text{J}_{\text{CC}}$

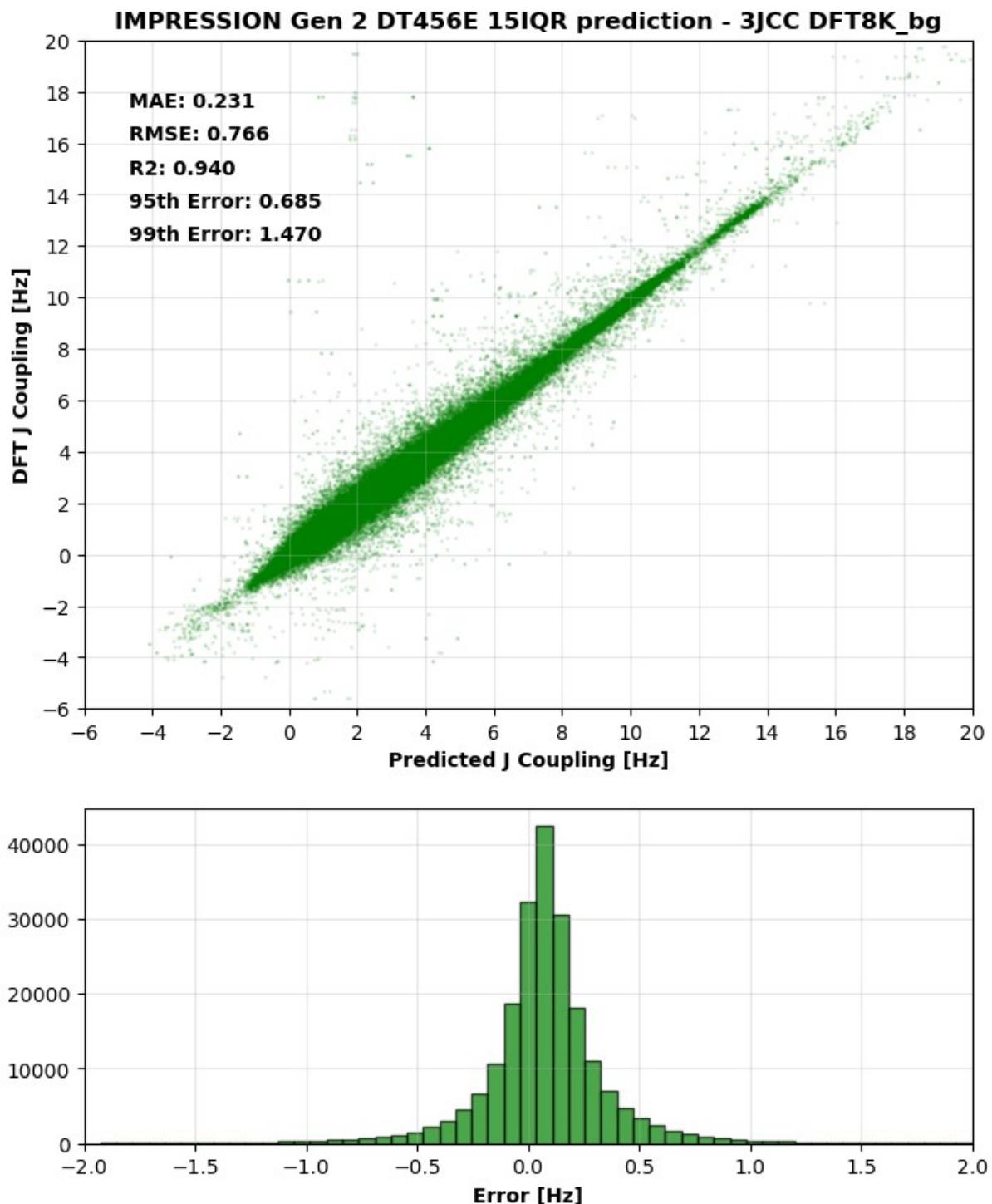
Holdout



Data3

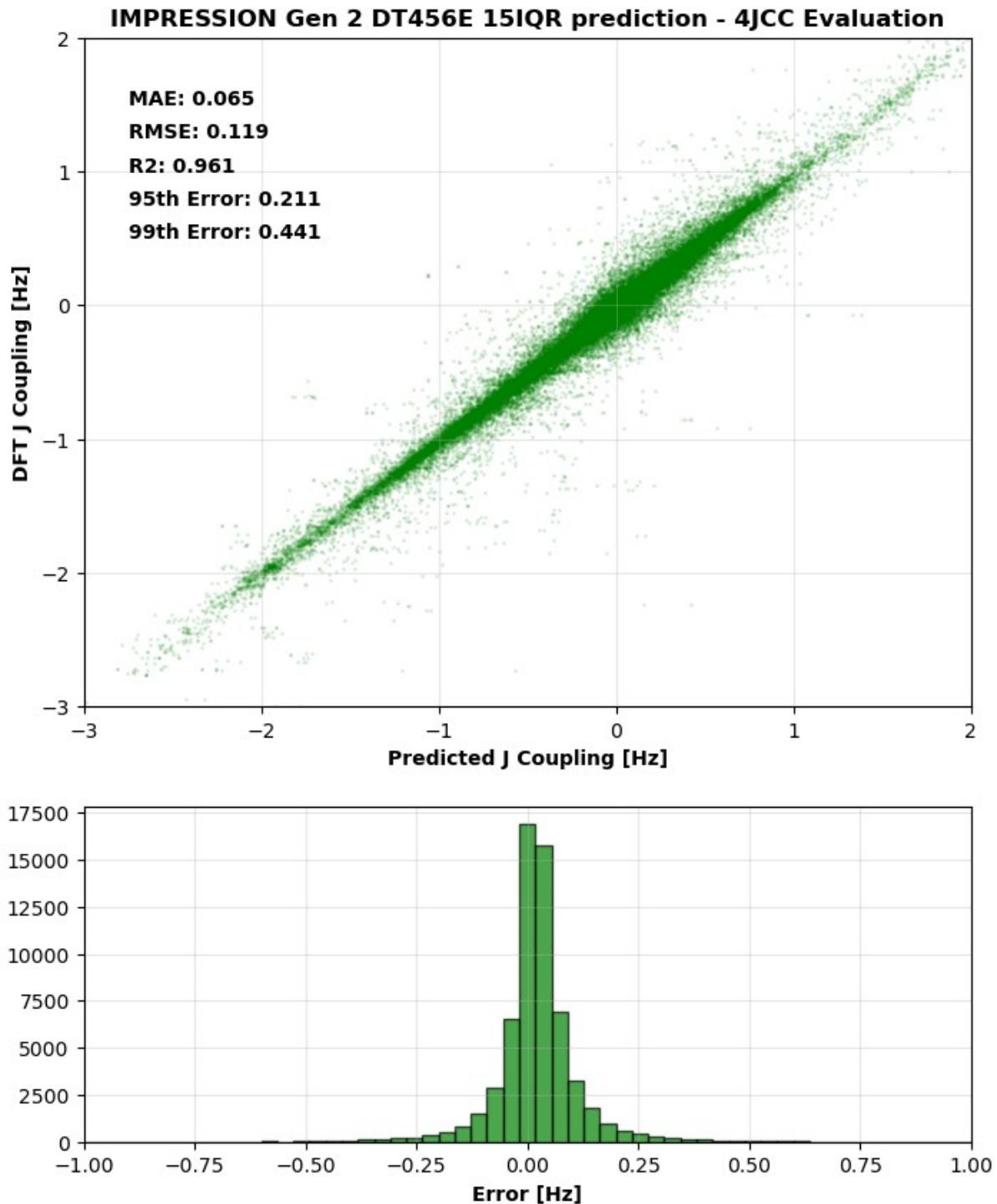


DFT8K_bg

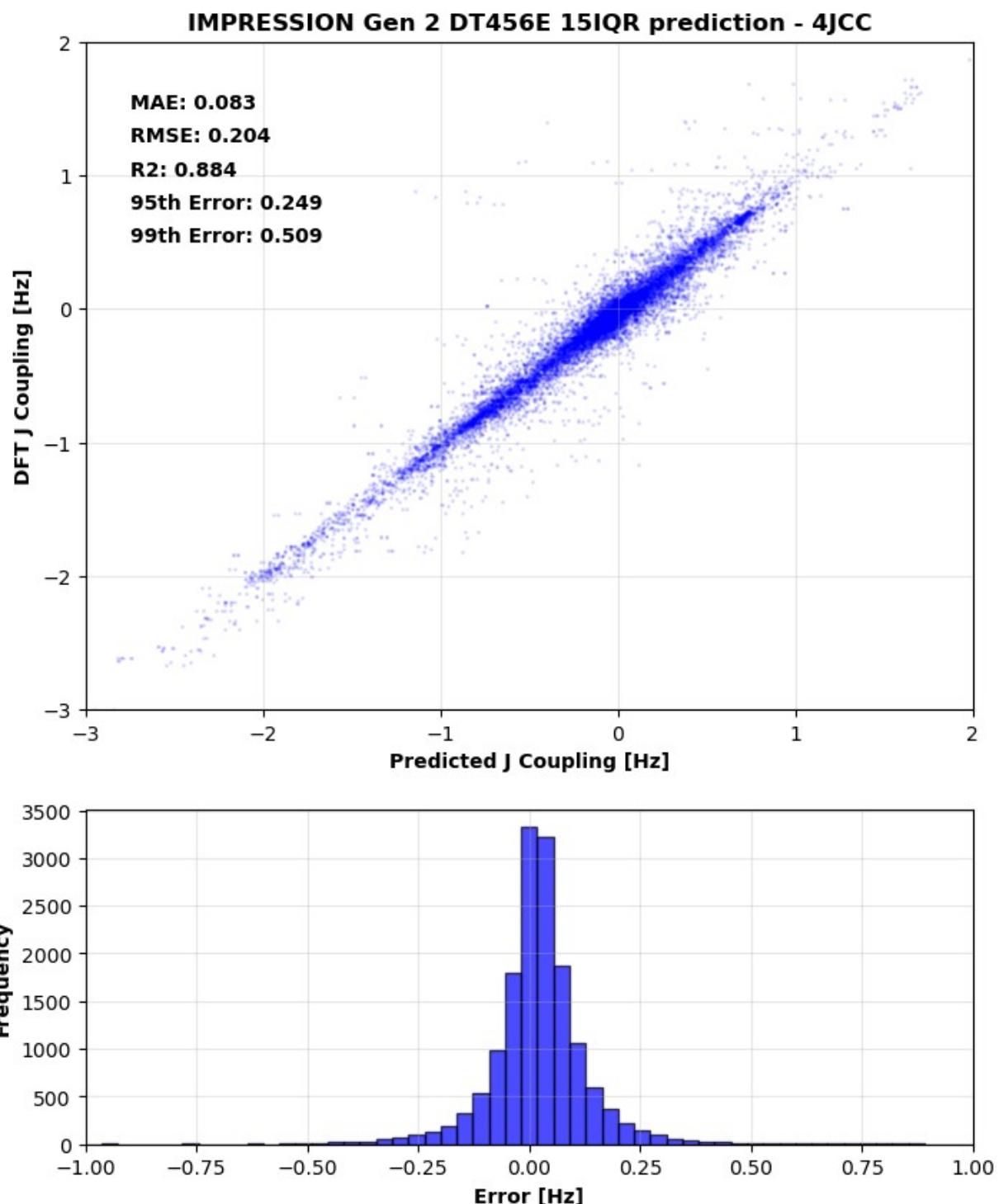


S2.2.11 $^4\text{J}_{\text{CC}}$

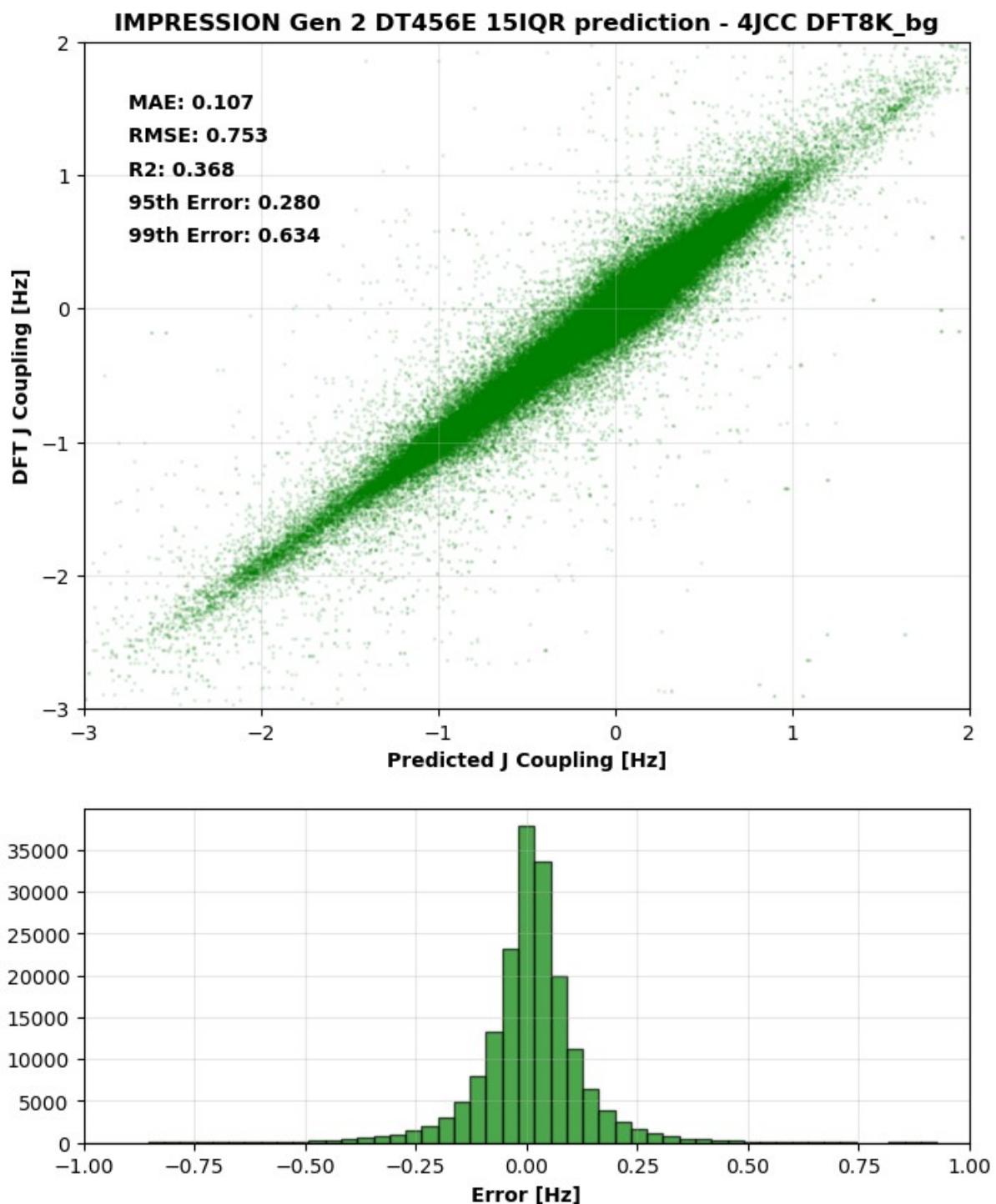
Holdout



Data3

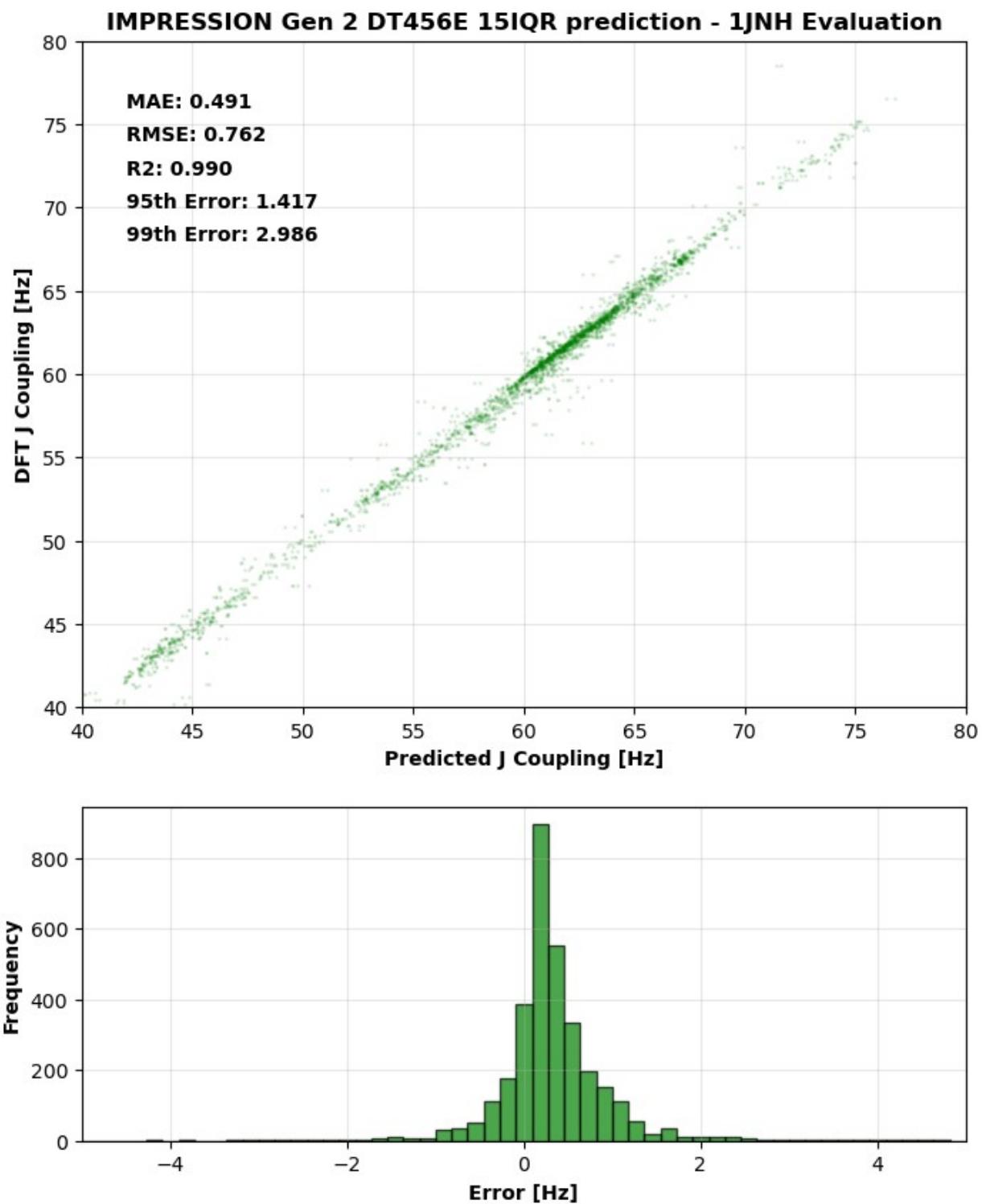


DFT8K_bg

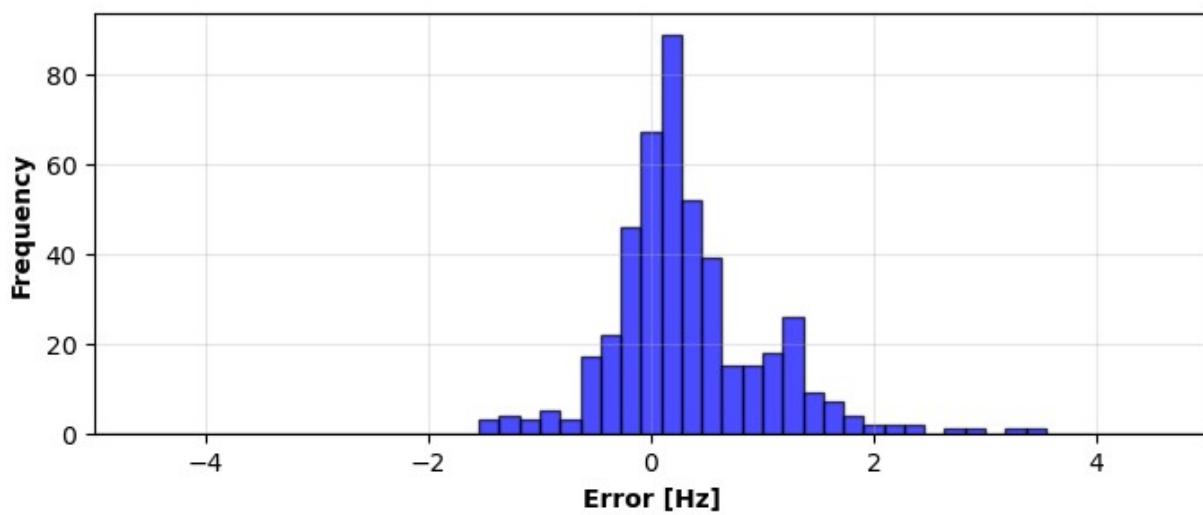
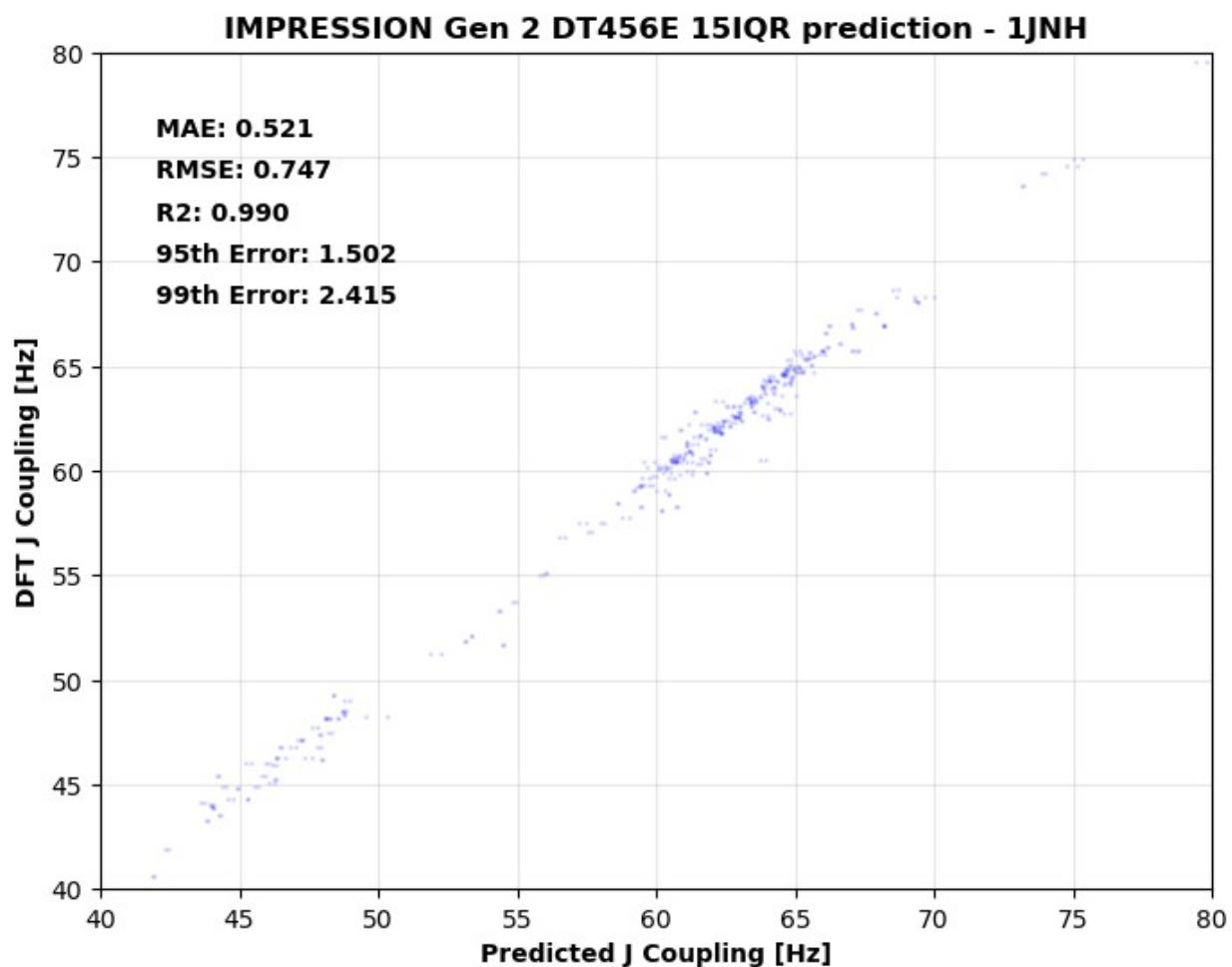


S2.2.12 $^1\text{J}_{\text{NH}}$

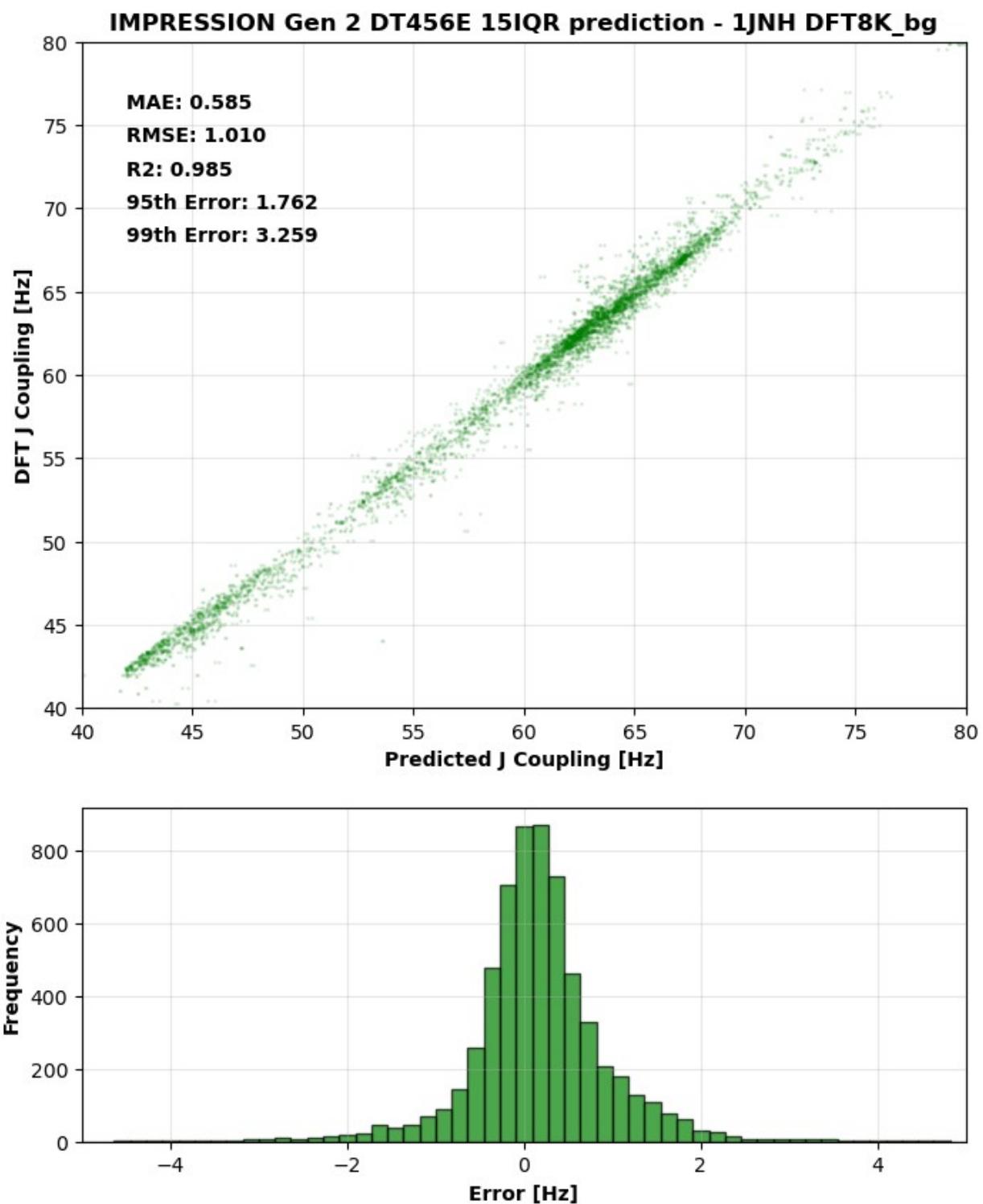
Holdout



Data3

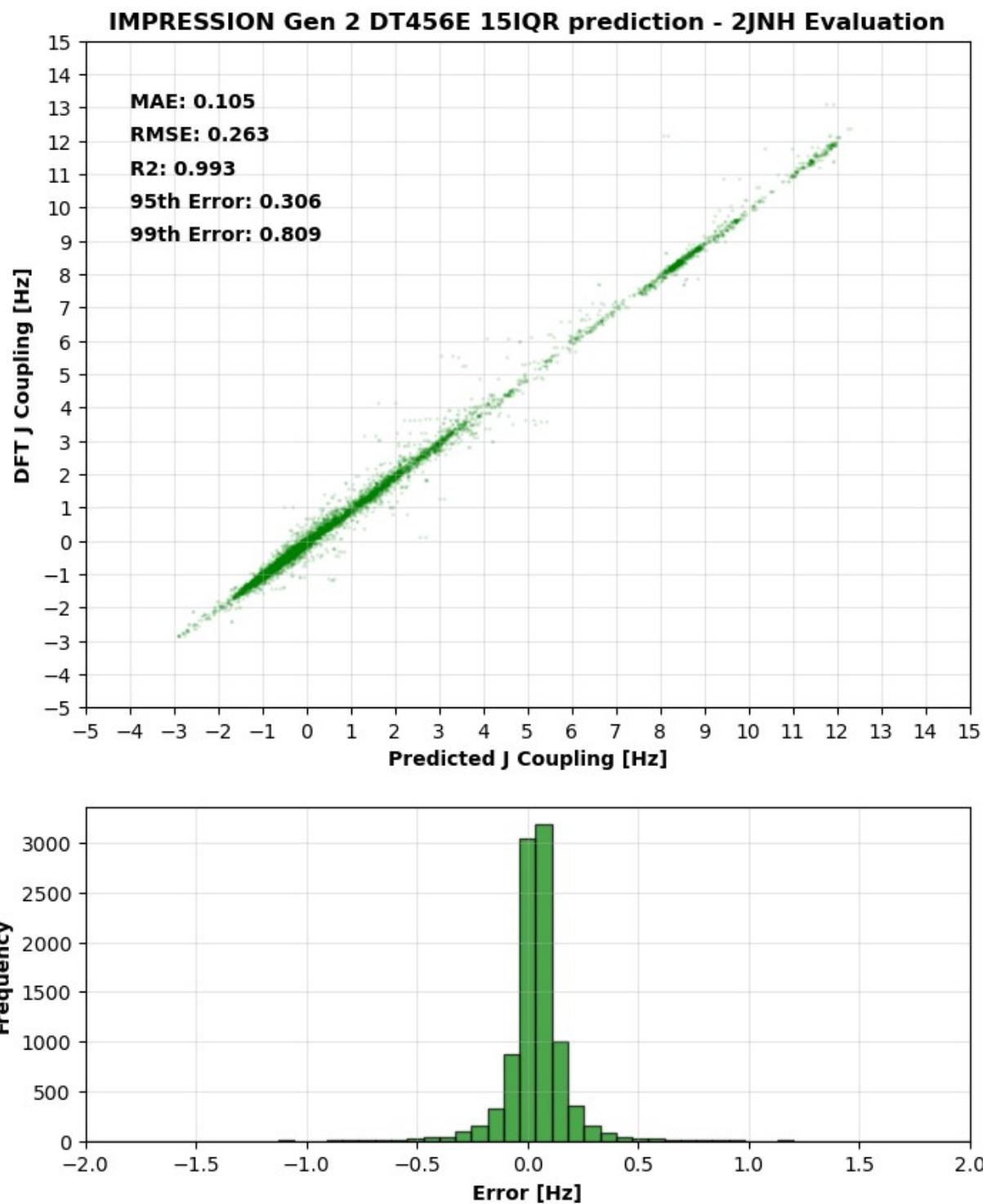


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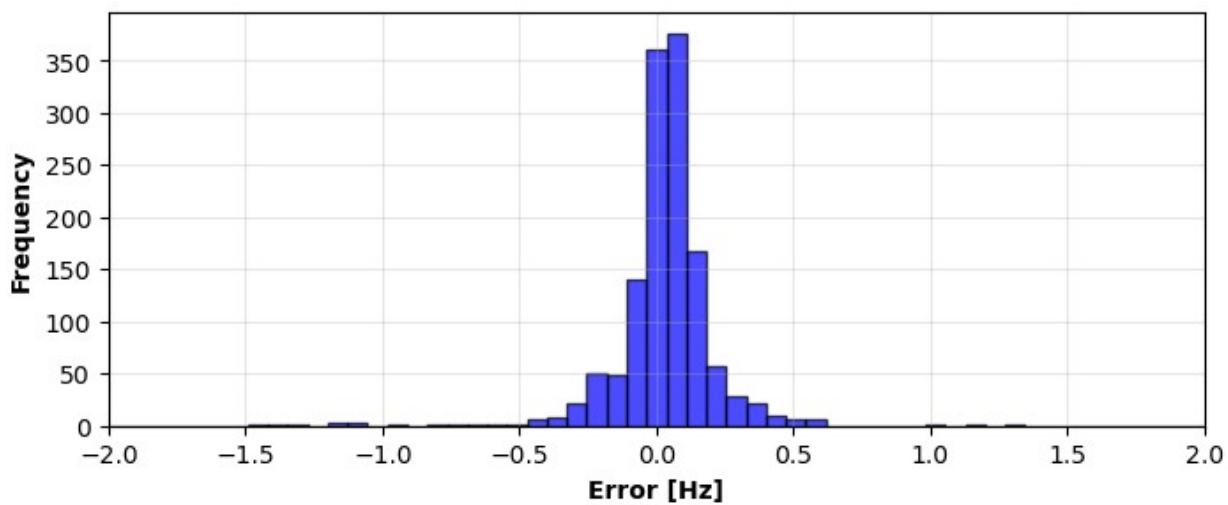
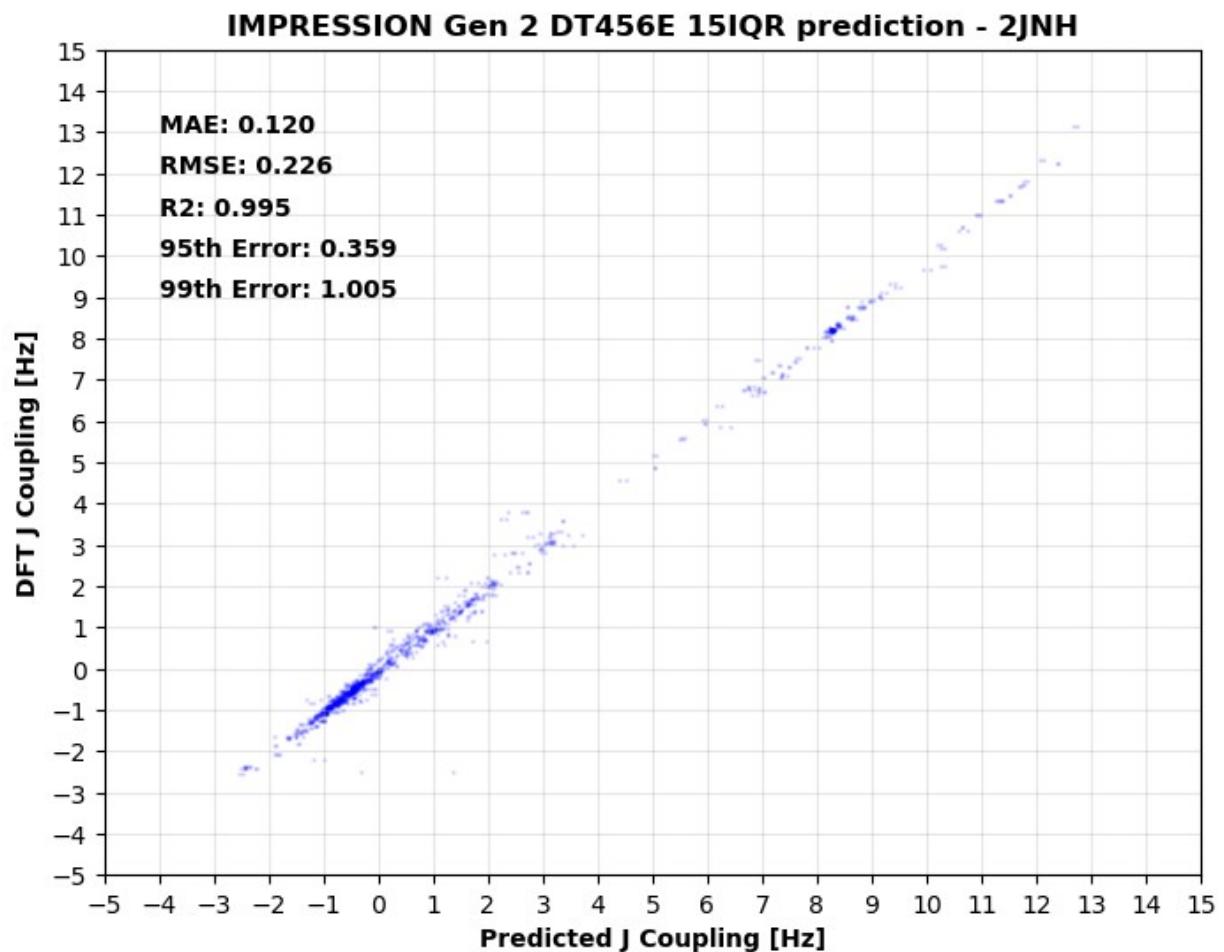


S2.2.13 ${}^2\text{J}_{\text{NH}}$

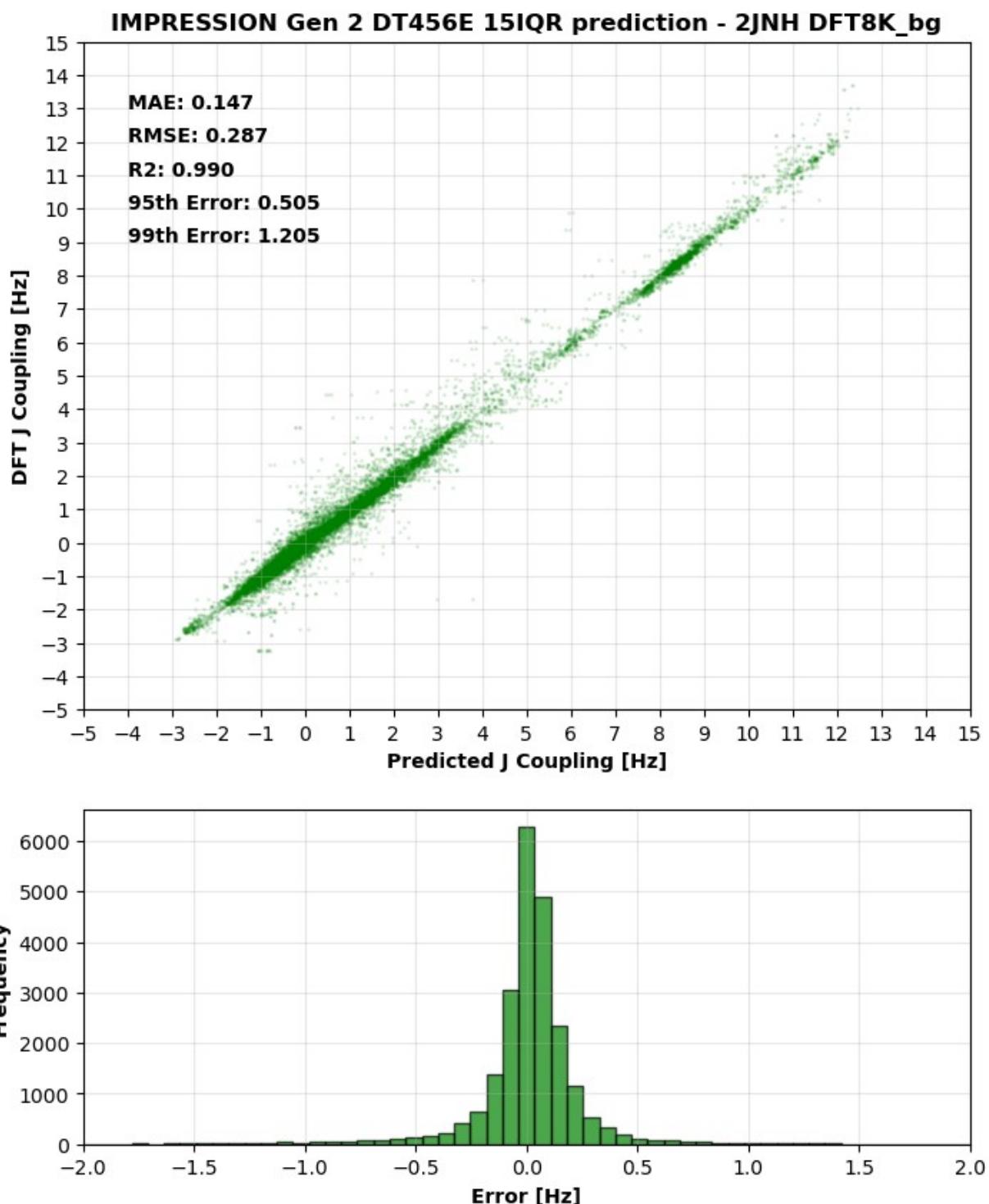
Holdout



Data3

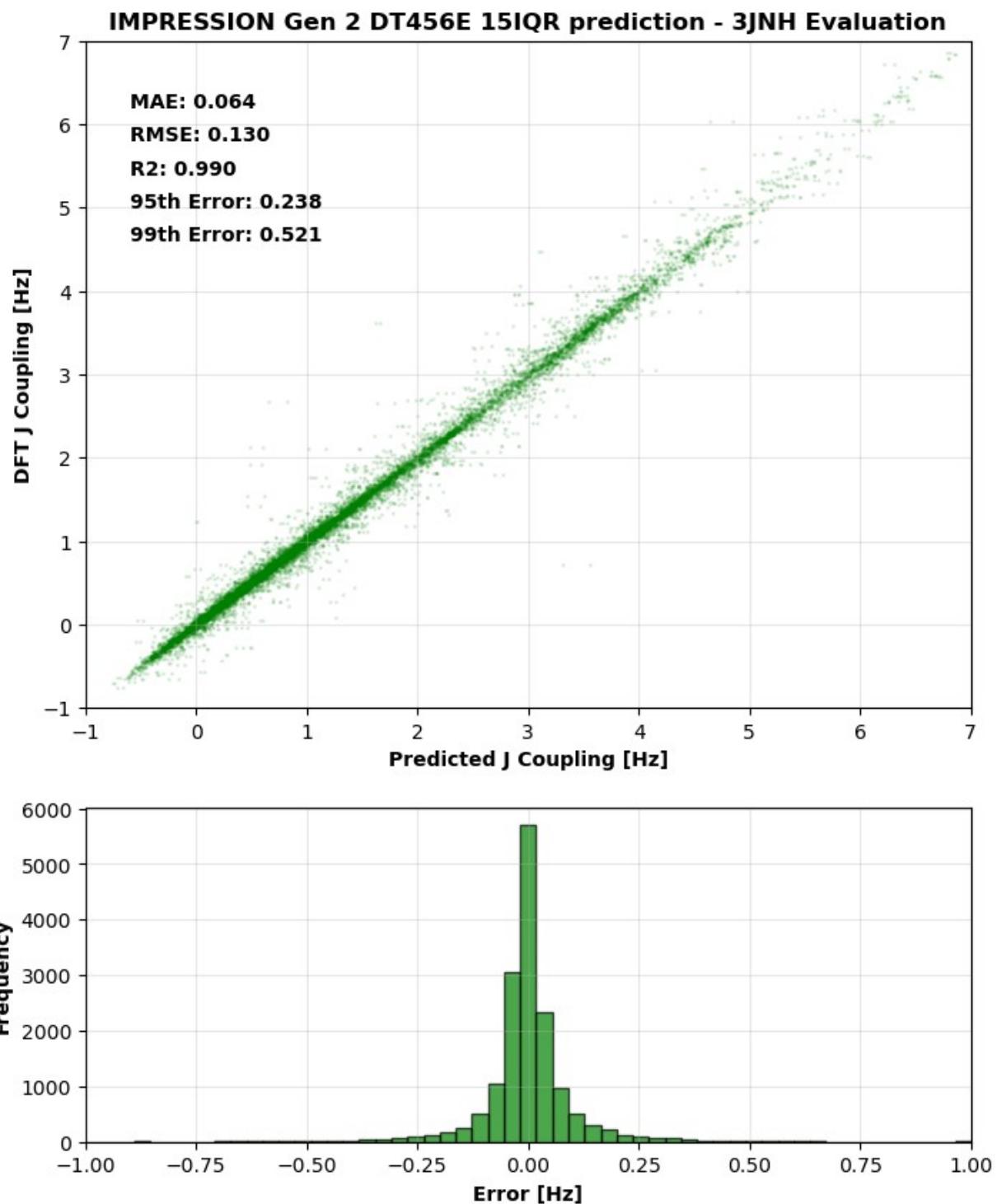


DFT8K_bg

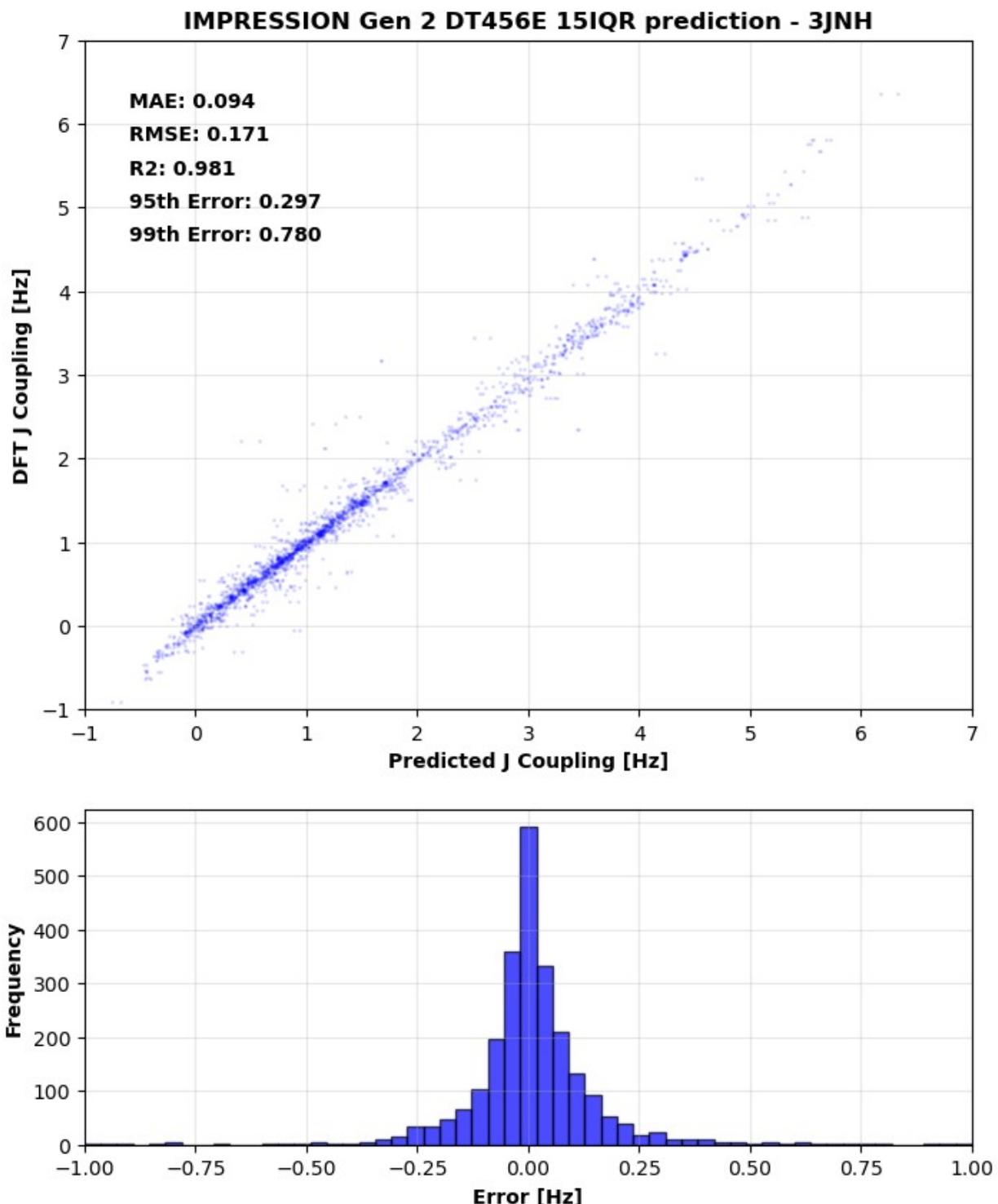


S2.2.14 ${}^3\text{J}_{\text{NH}}$

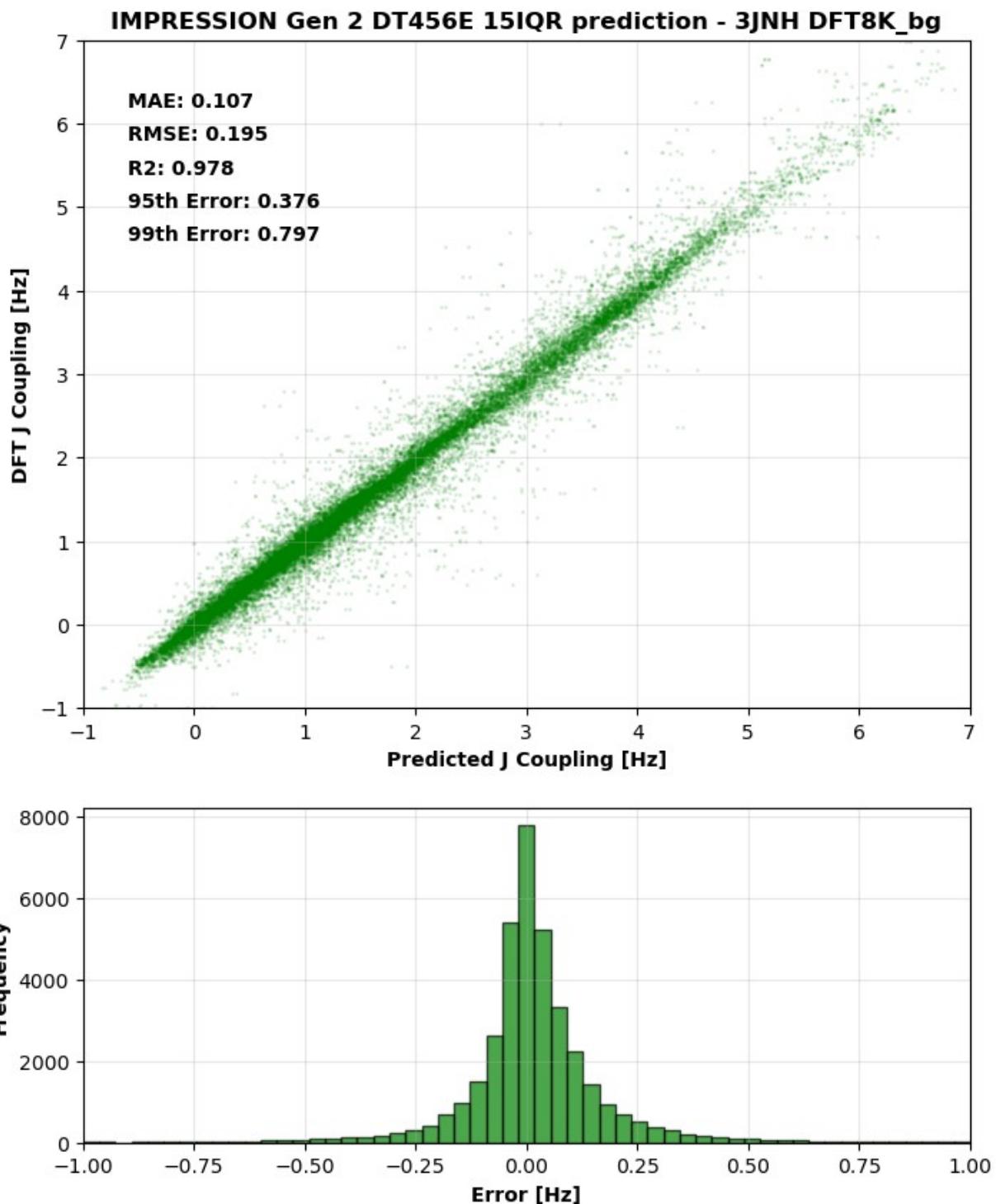
Holdout



Data3

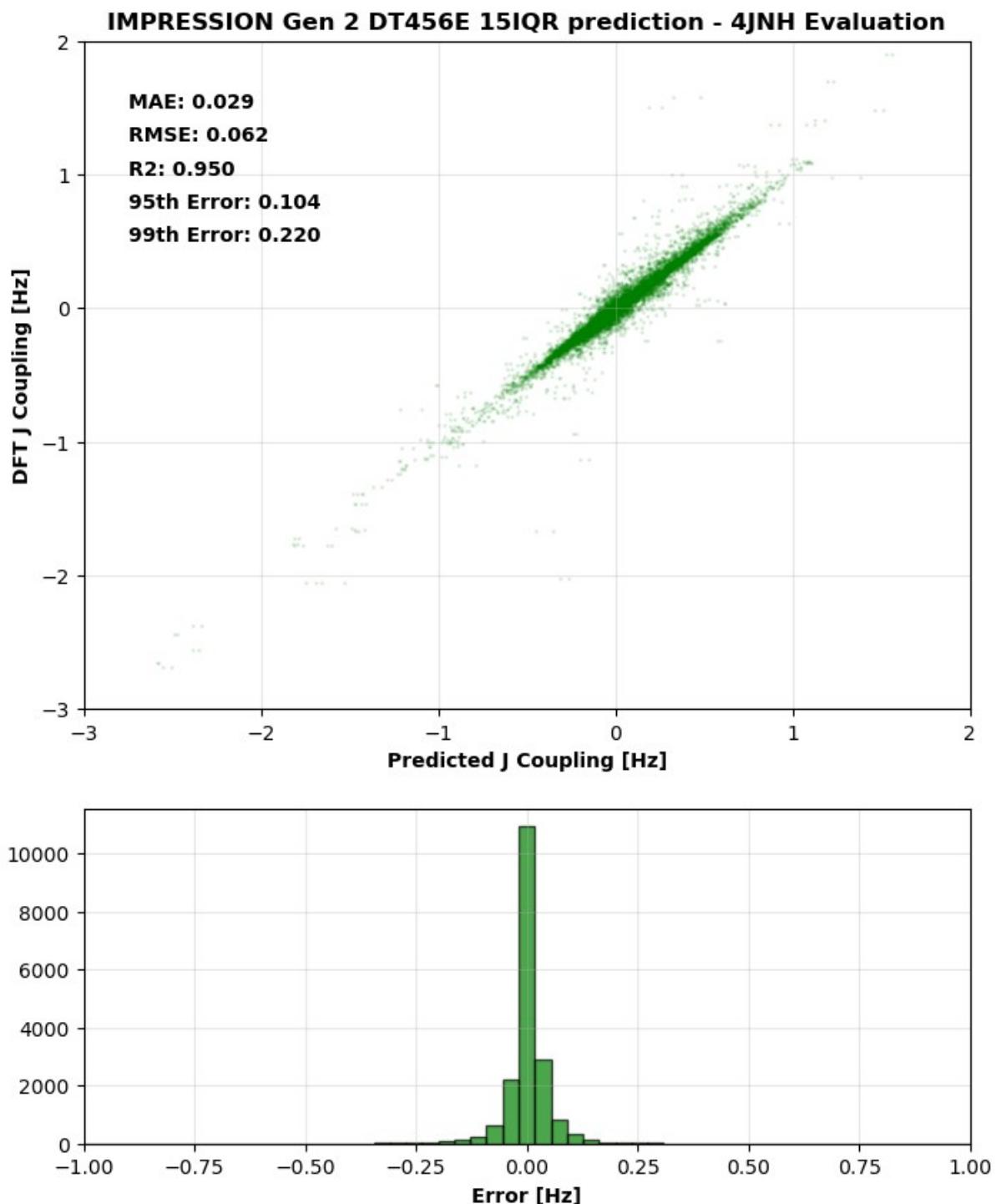


DFT8K_bg

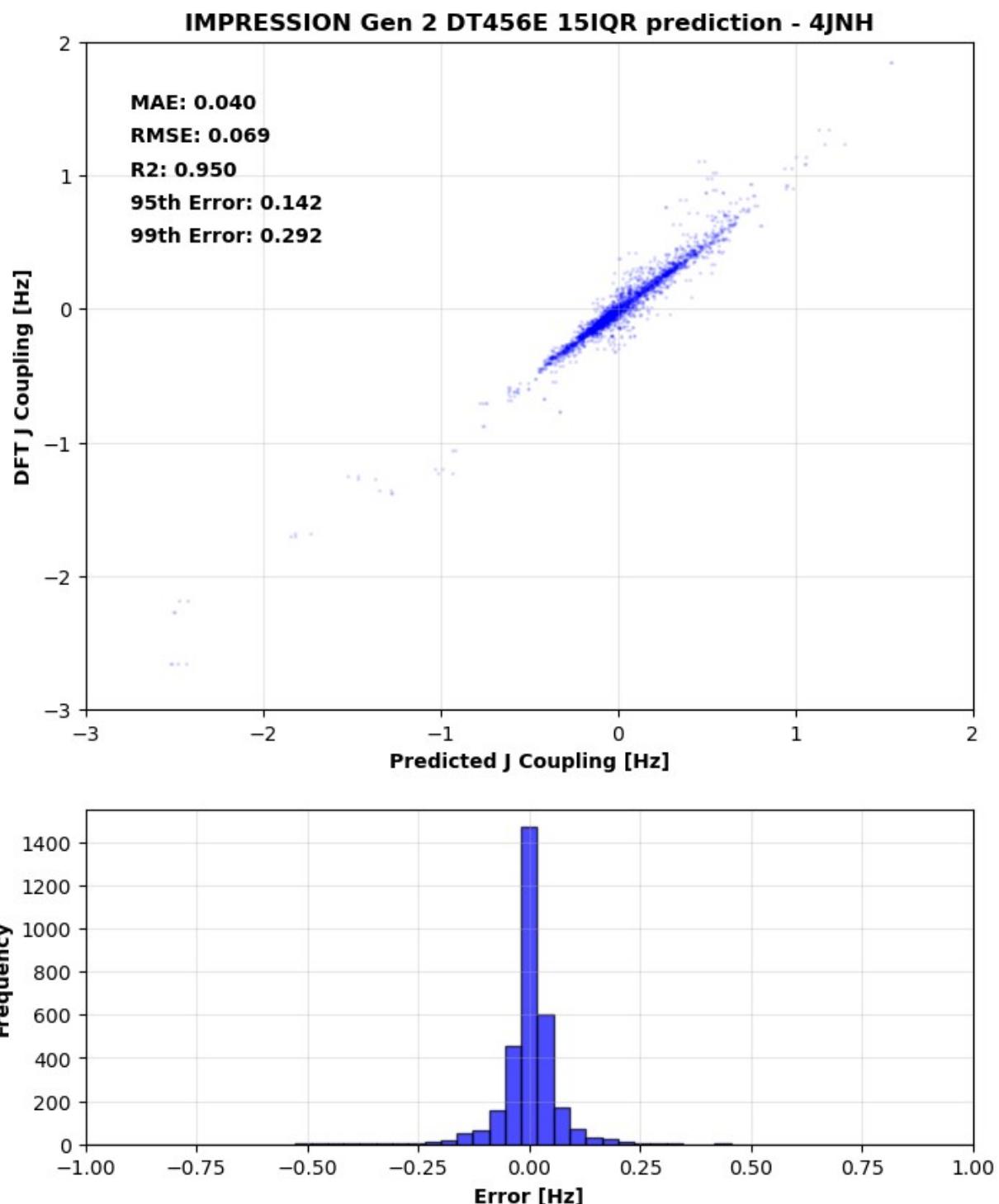


S2.2.15 $^4\text{J}_{\text{NH}}$

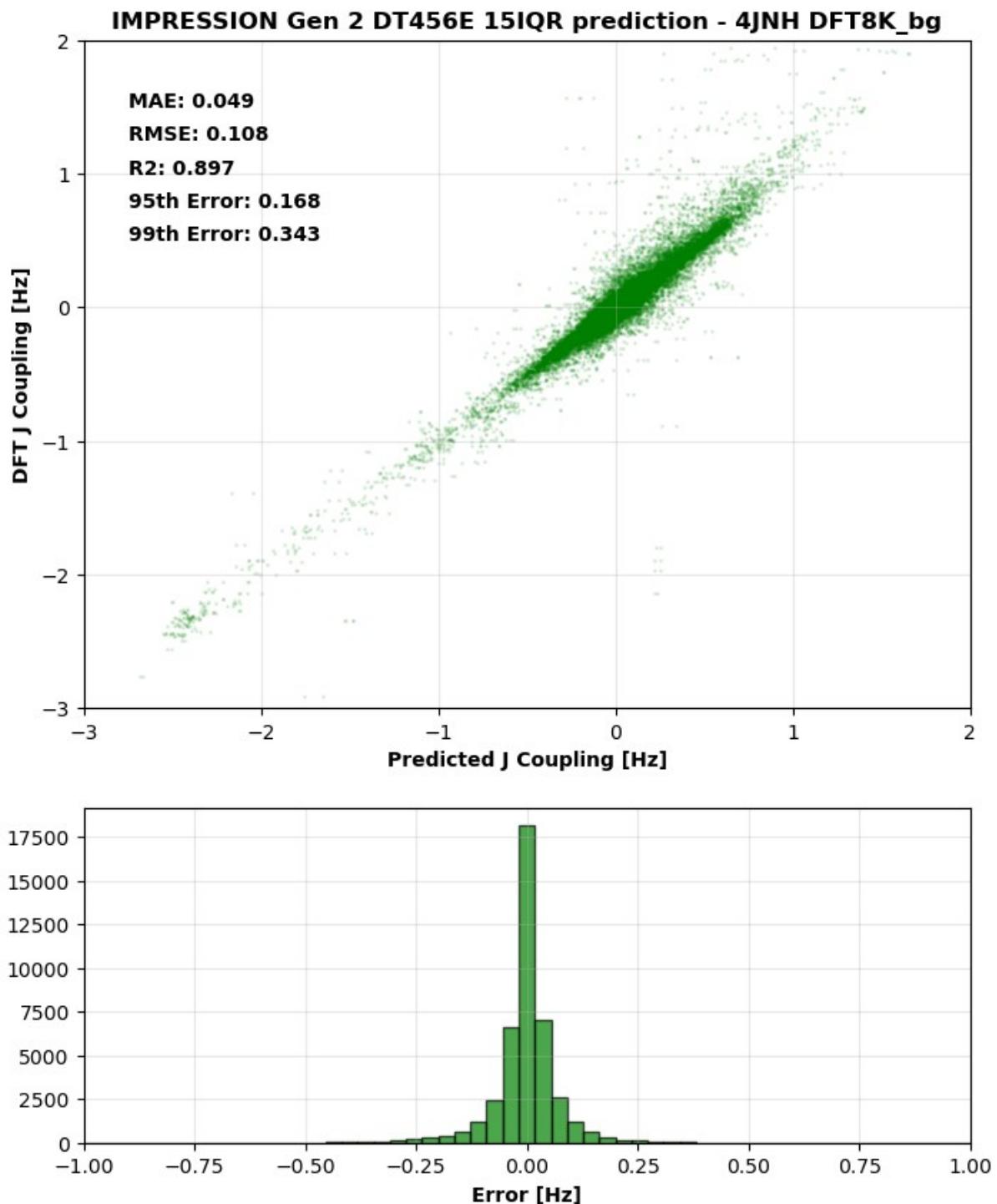
Holdout



Data3



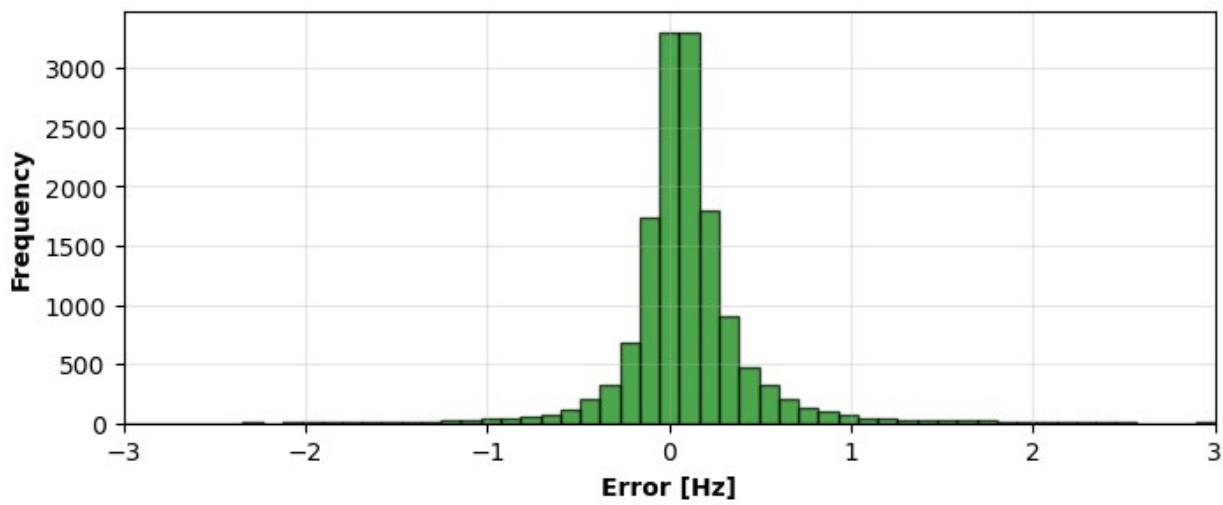
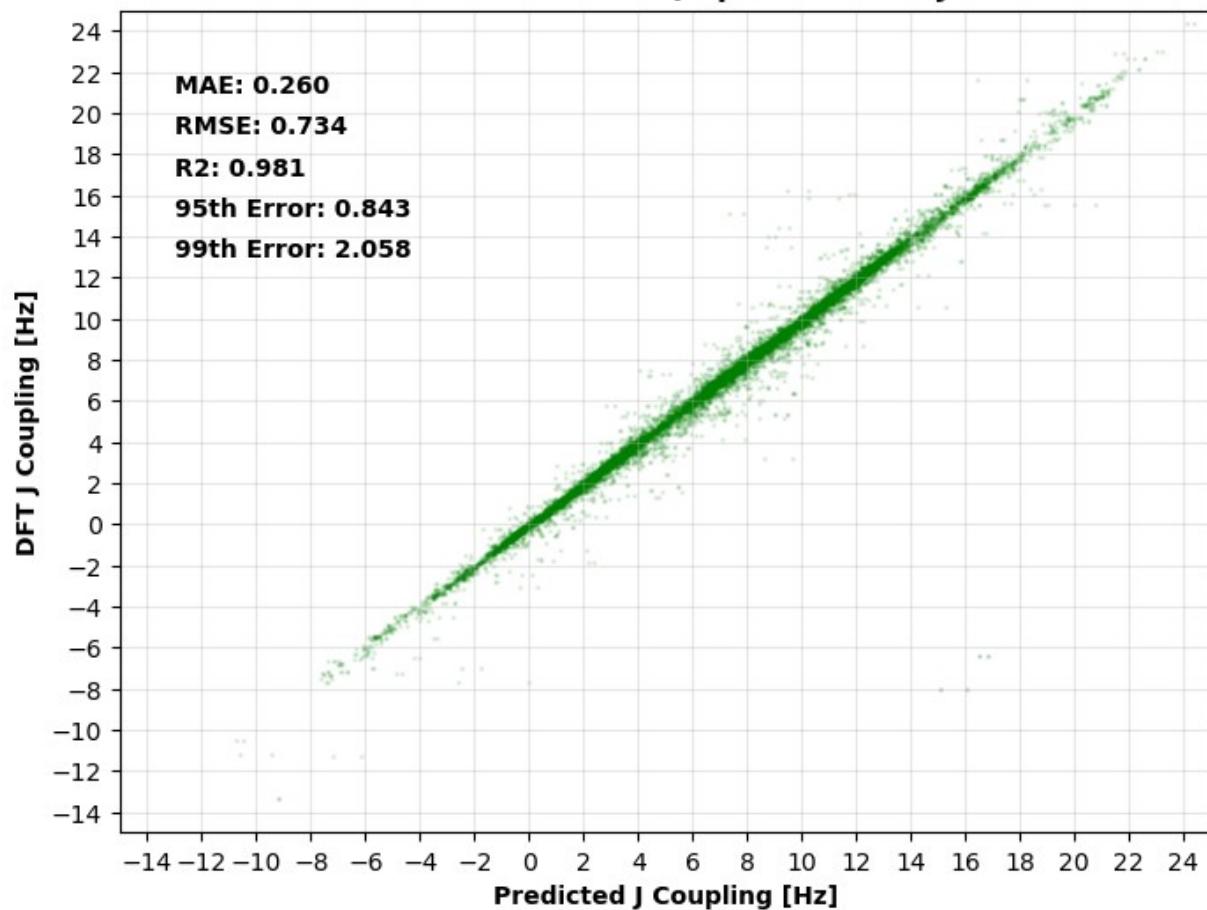
DFT8K_bg



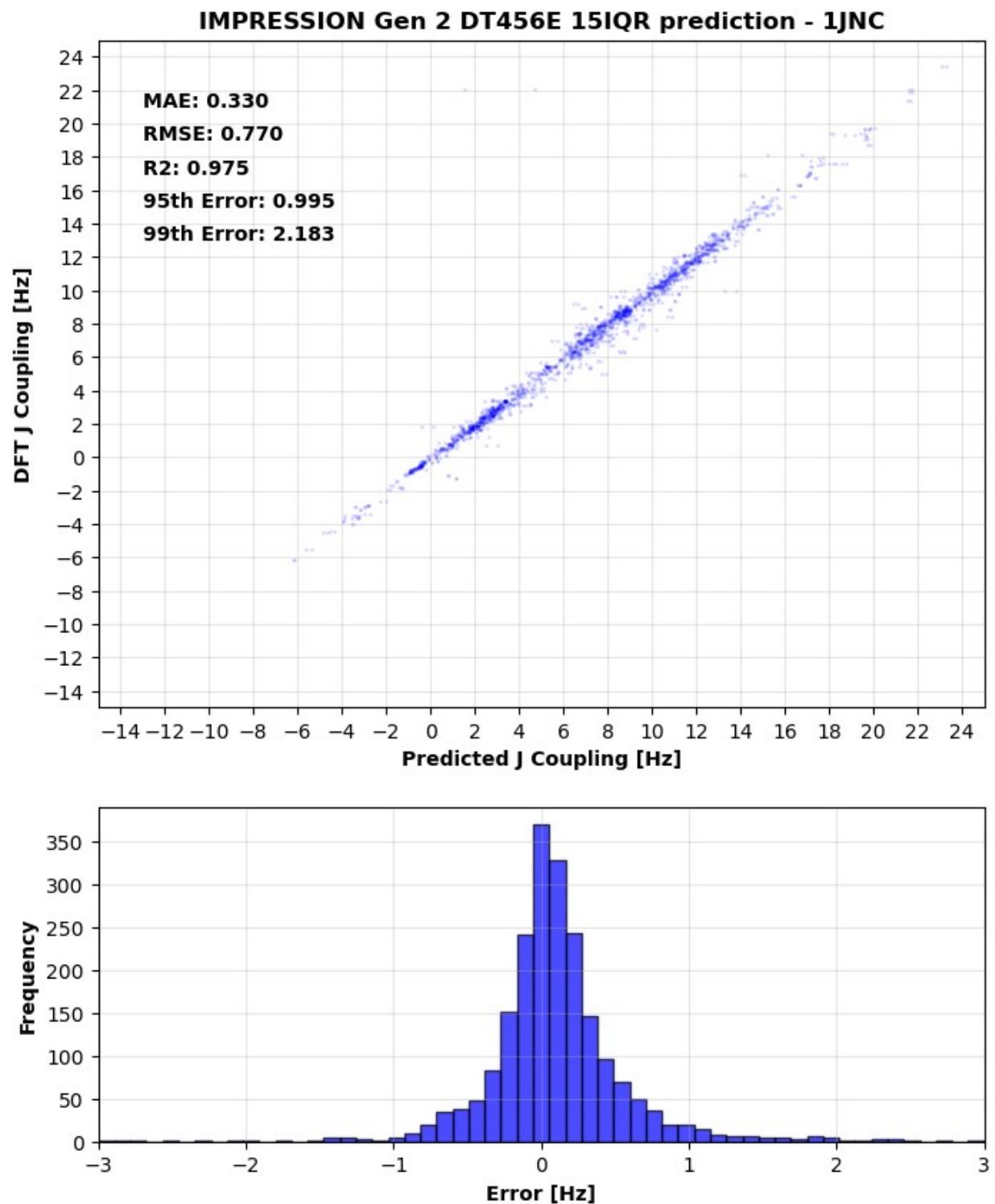
S2.2.16 $^1\text{J}_{\text{NC}}$

Holdout

IMPRESSION Gen 2 DT456E 15IQR prediction - 1JNC Evaluation

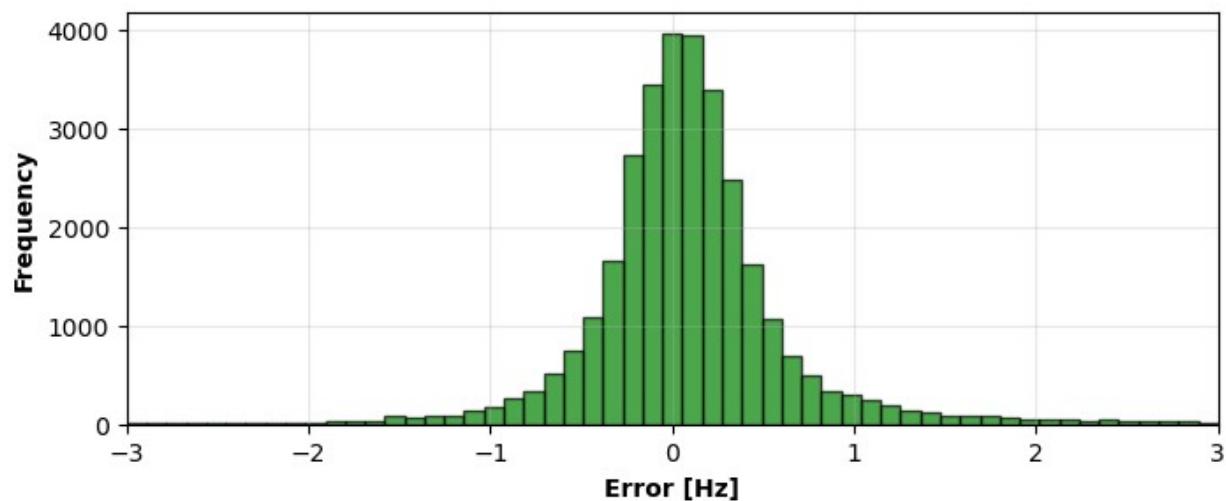
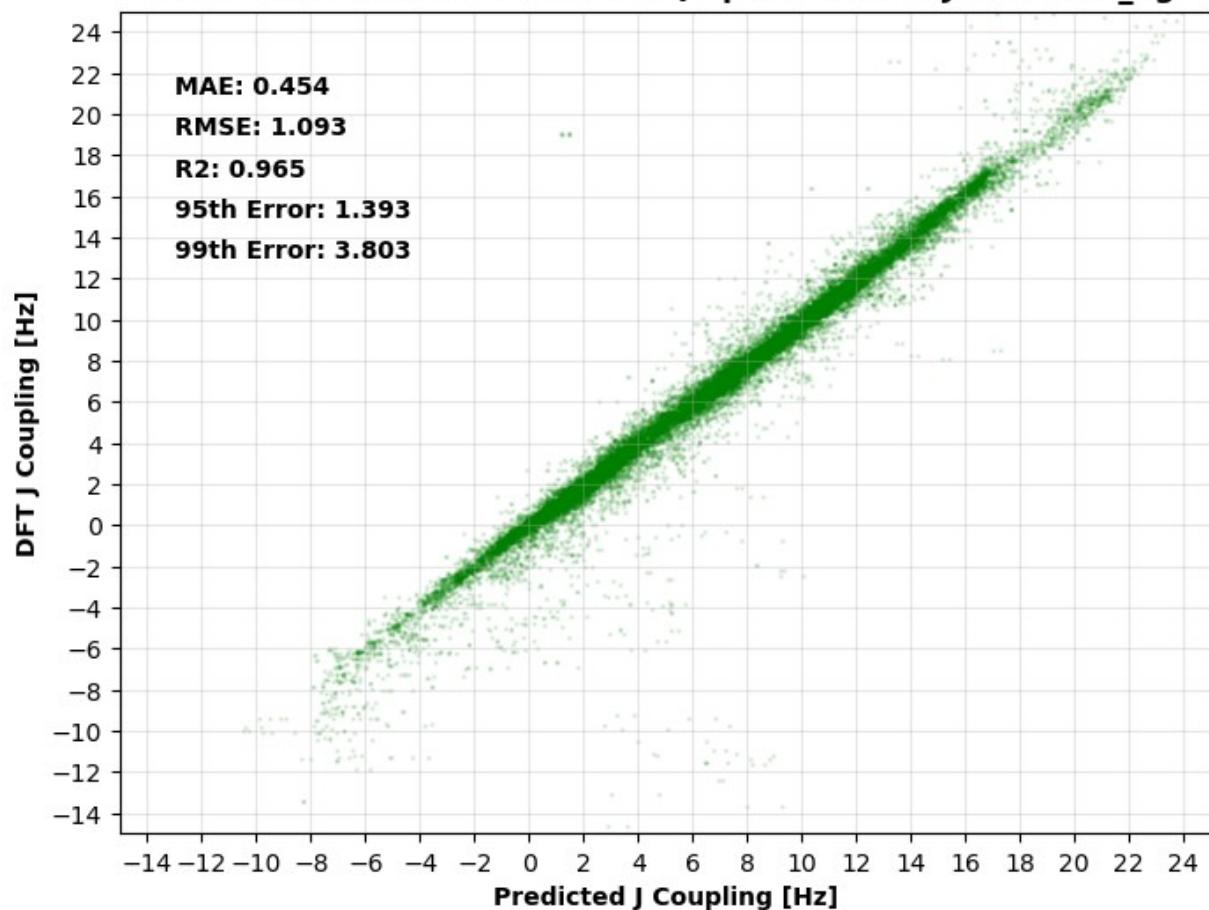


Data3



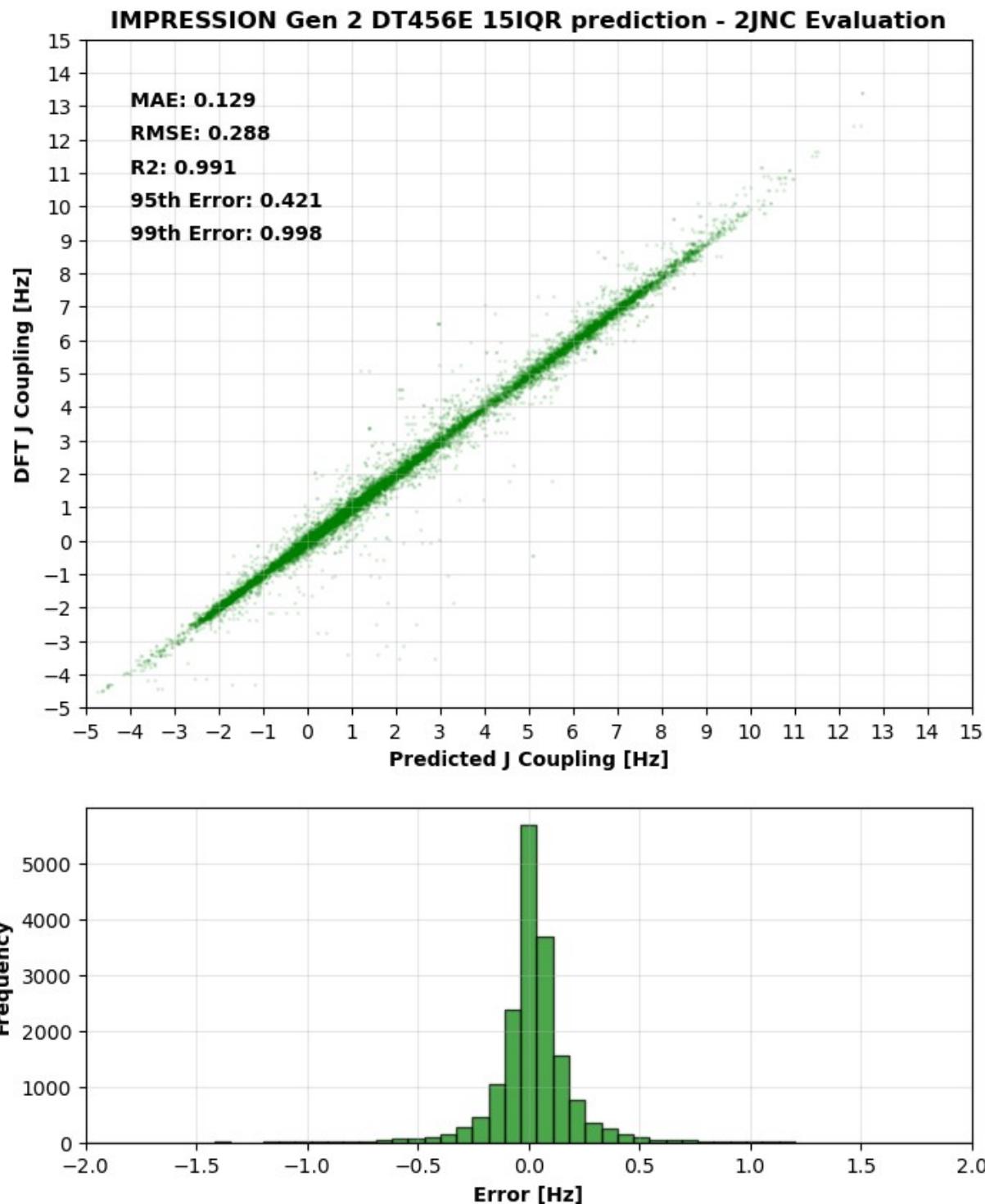
DFT8K_bg

IMPRESSION Gen 2 DT456E 15IQR prediction - 1JNC DFT8K_bg

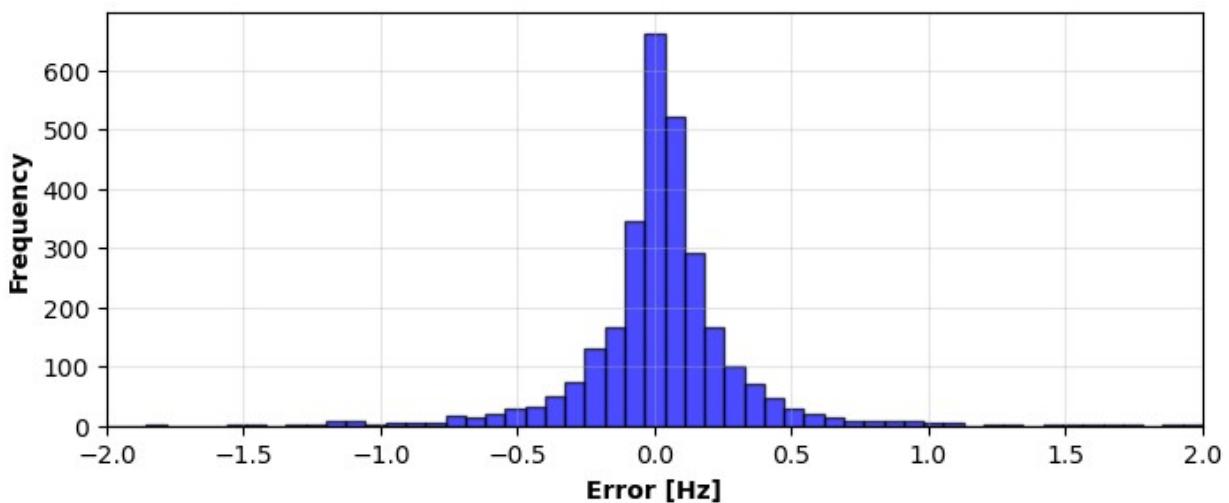
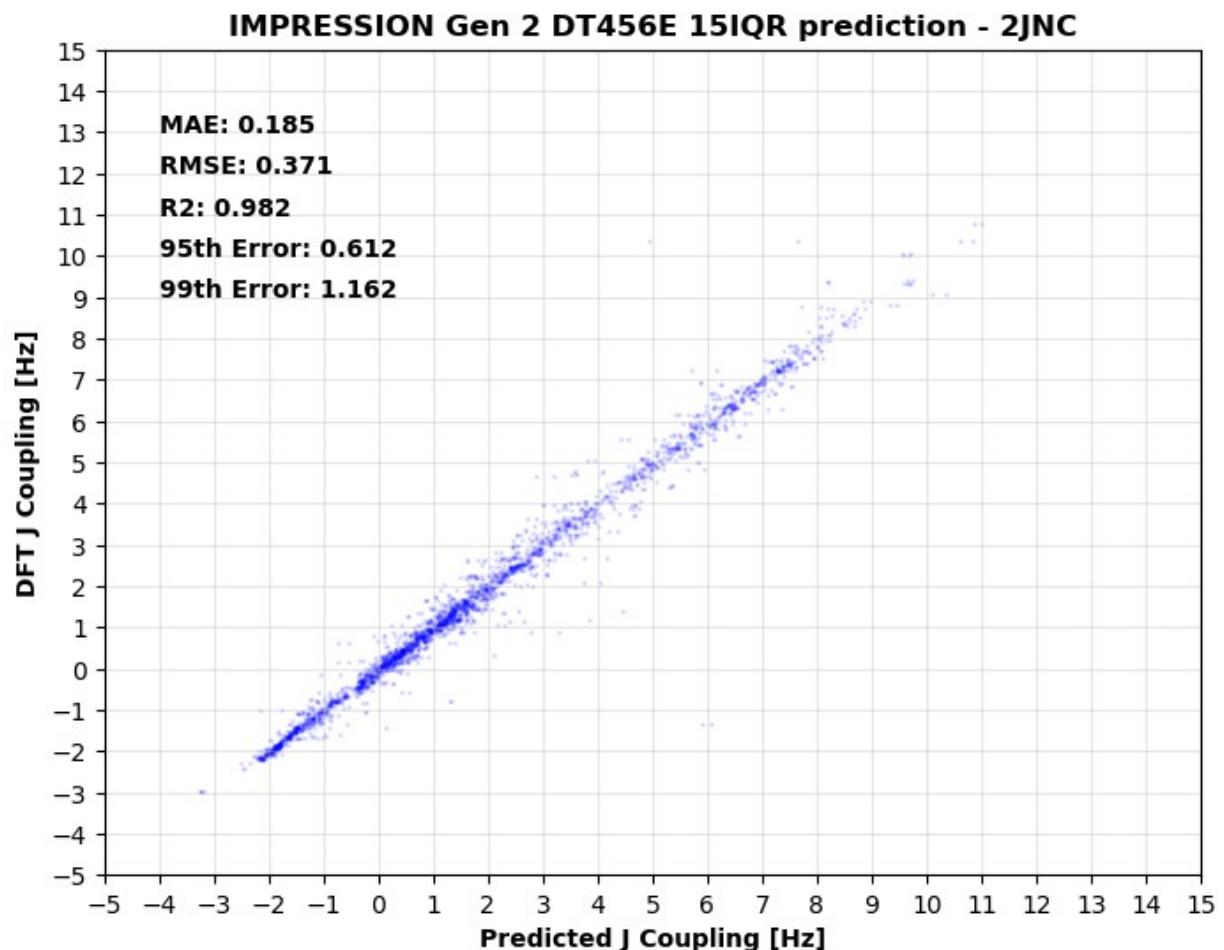


S2.2.17 ${}^2\text{J}_{\text{NC}}$

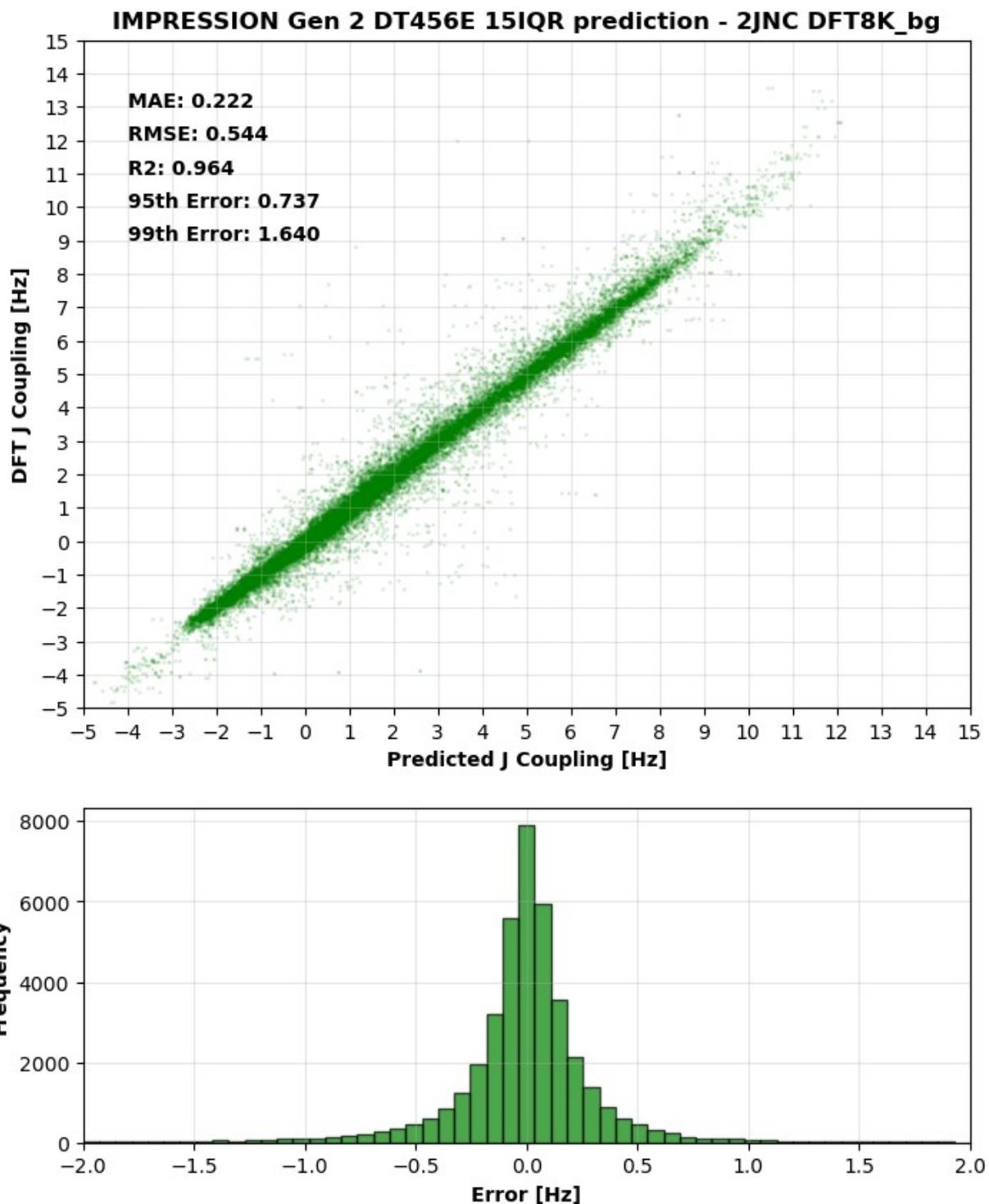
Holdout



Data3

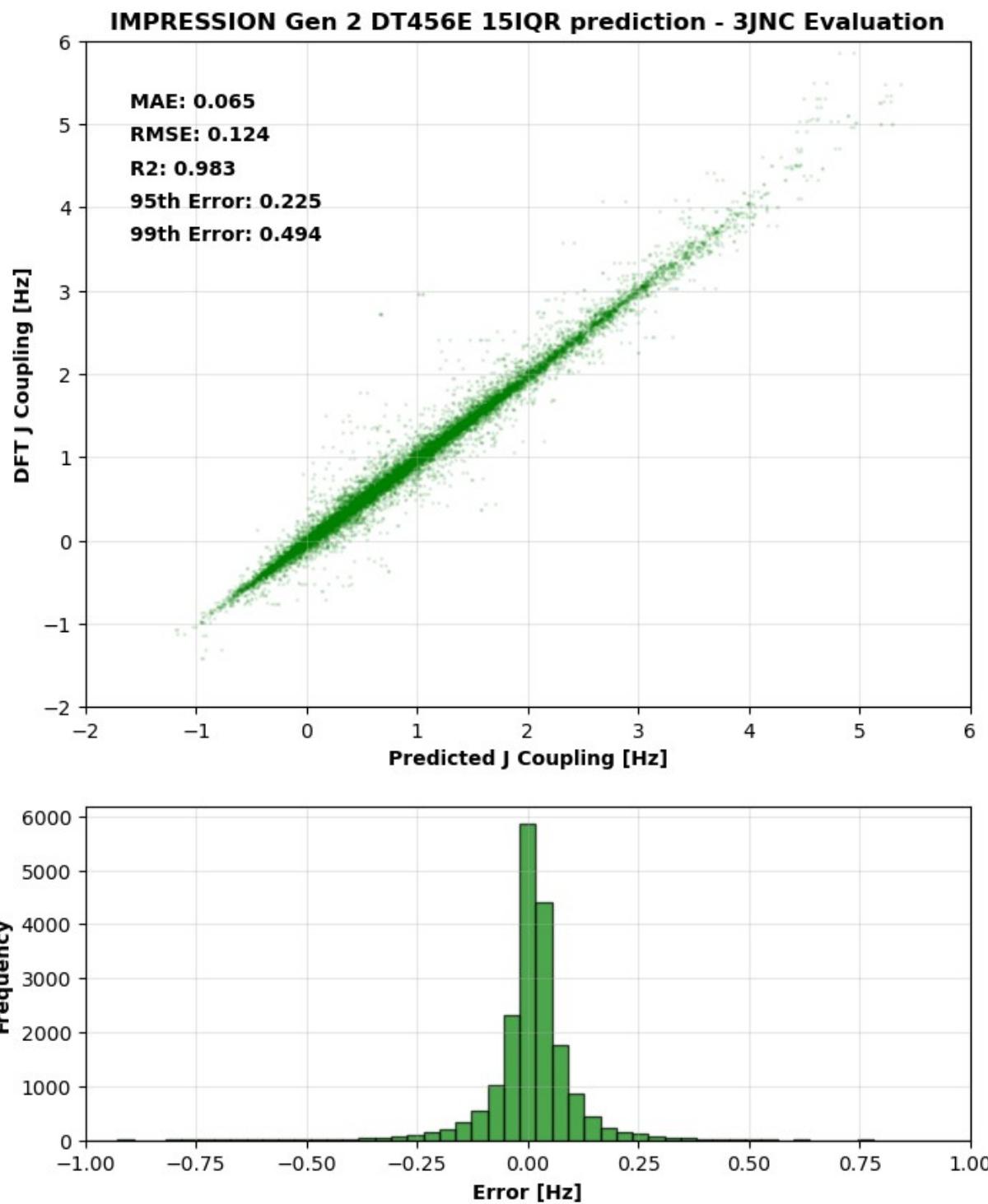


DFT8K_bg

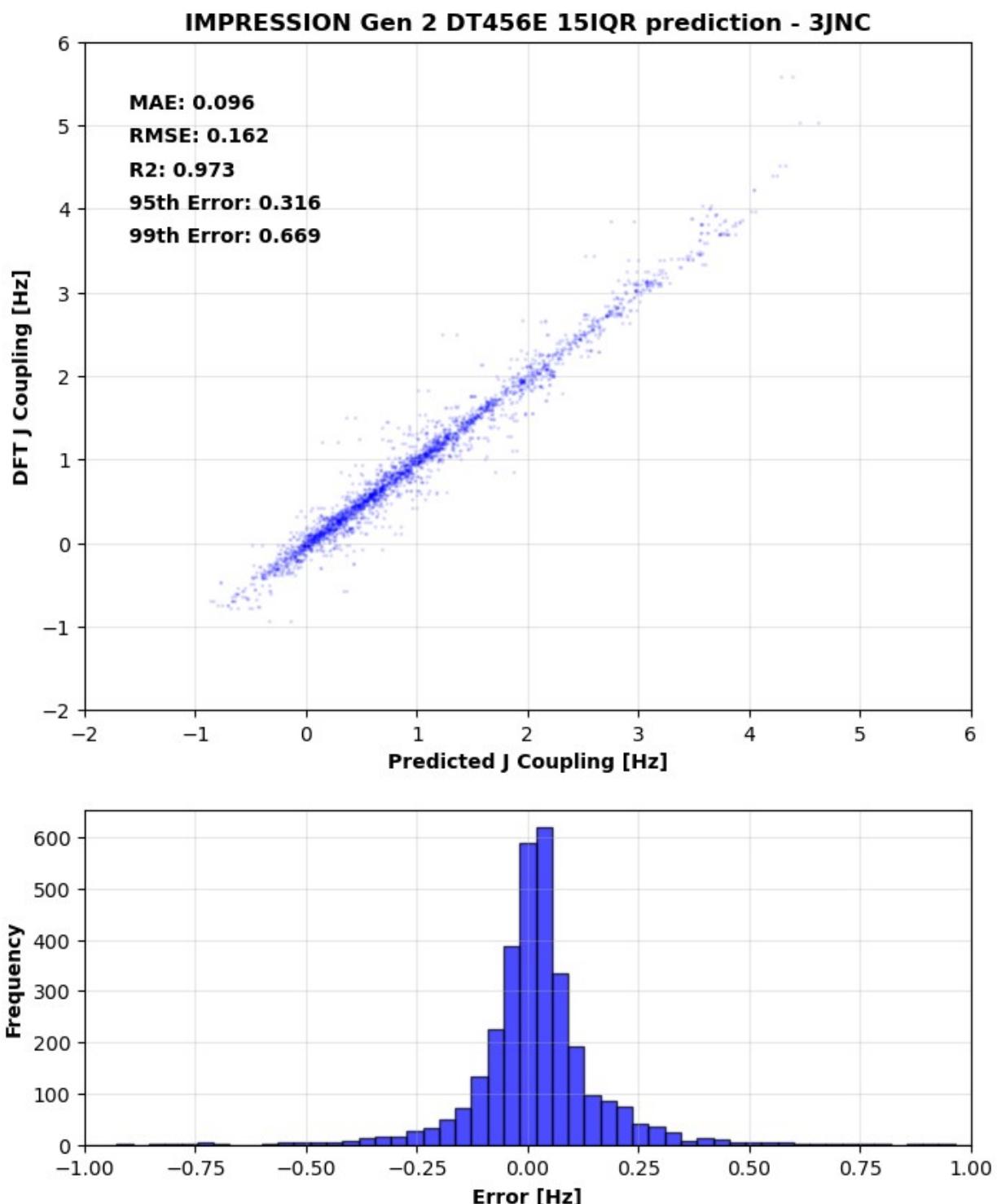


S2.2.18 ${}^3\text{J}_{\text{NC}}$

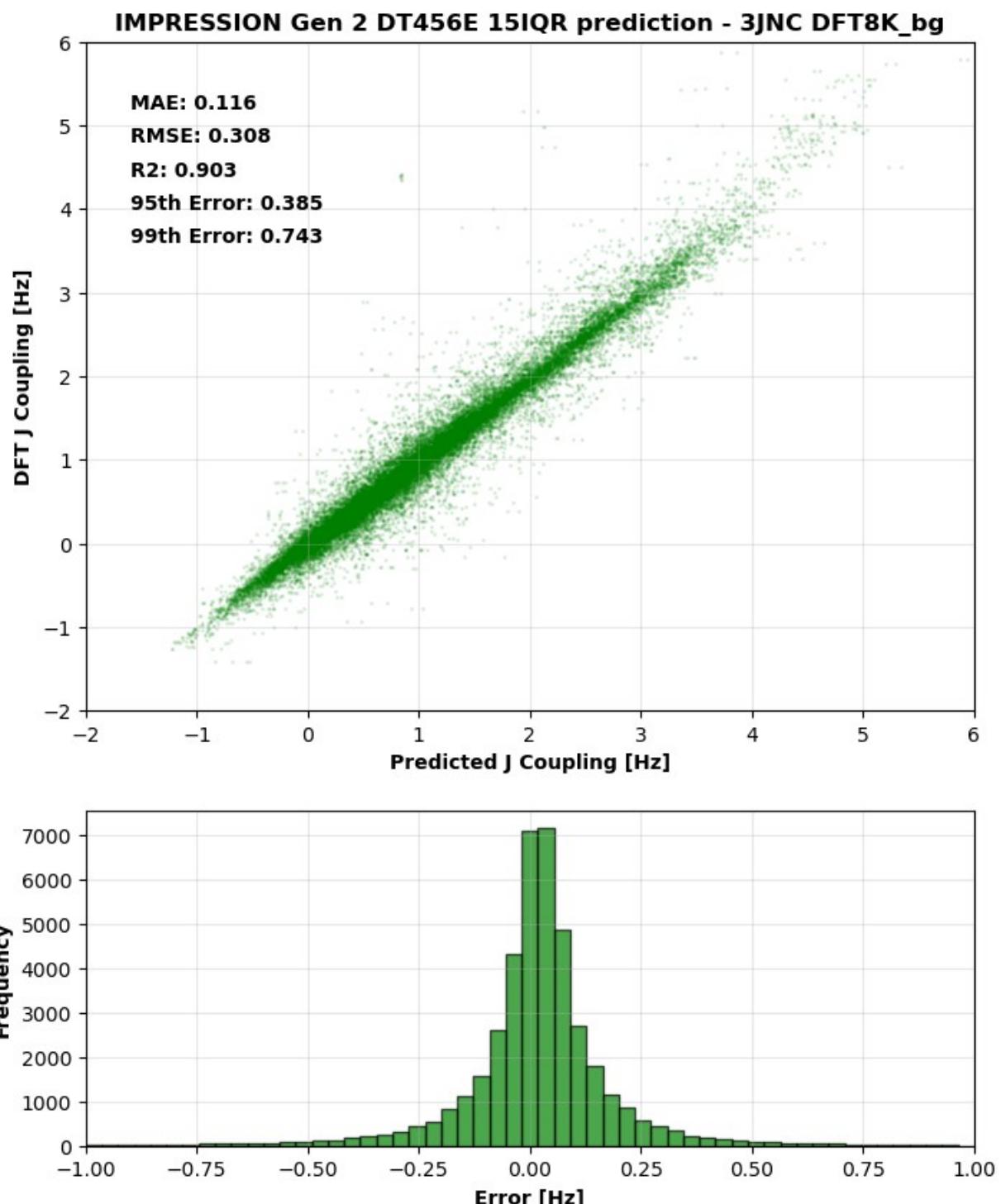
Holdout



Data3

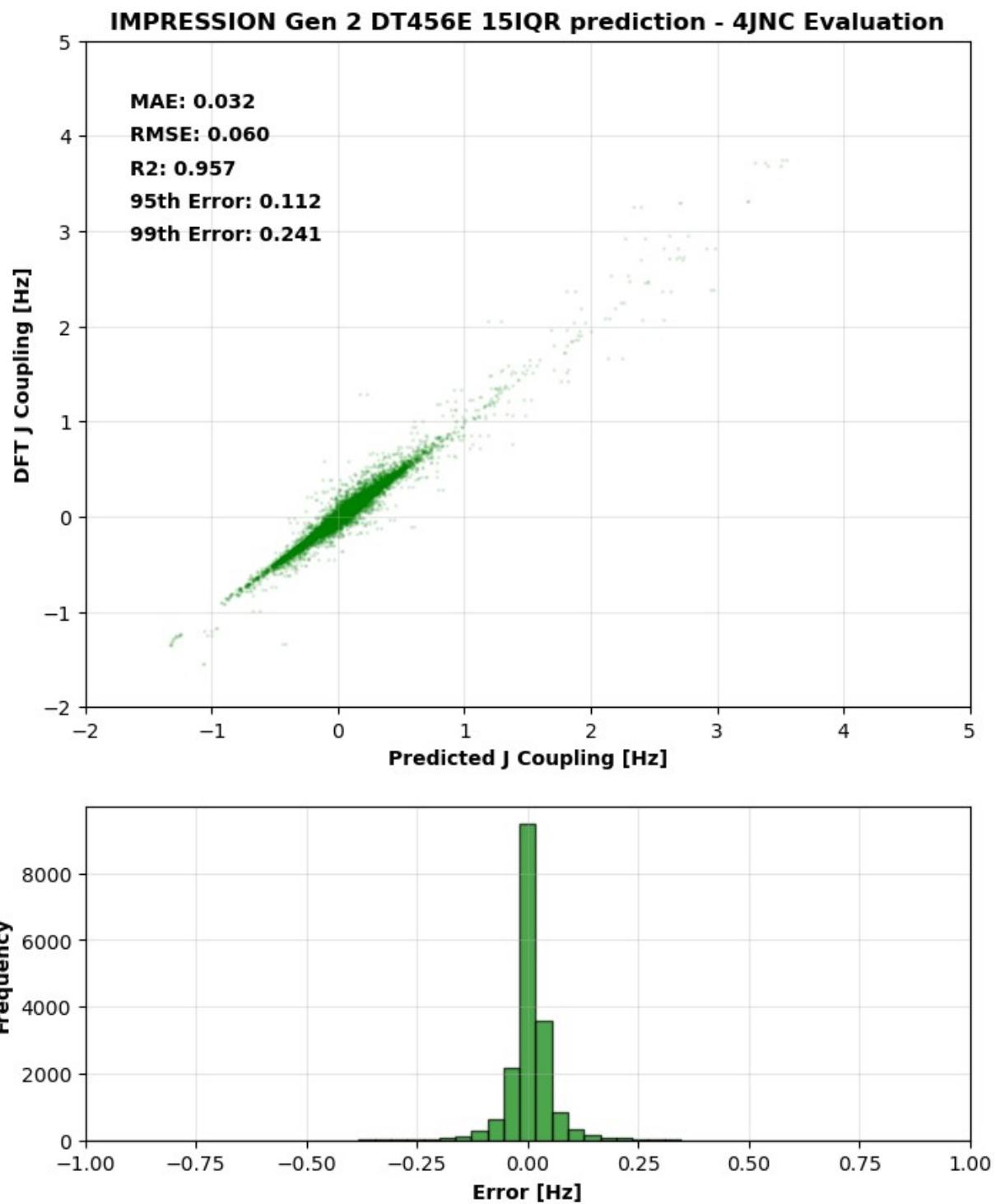


DFT8K_bg

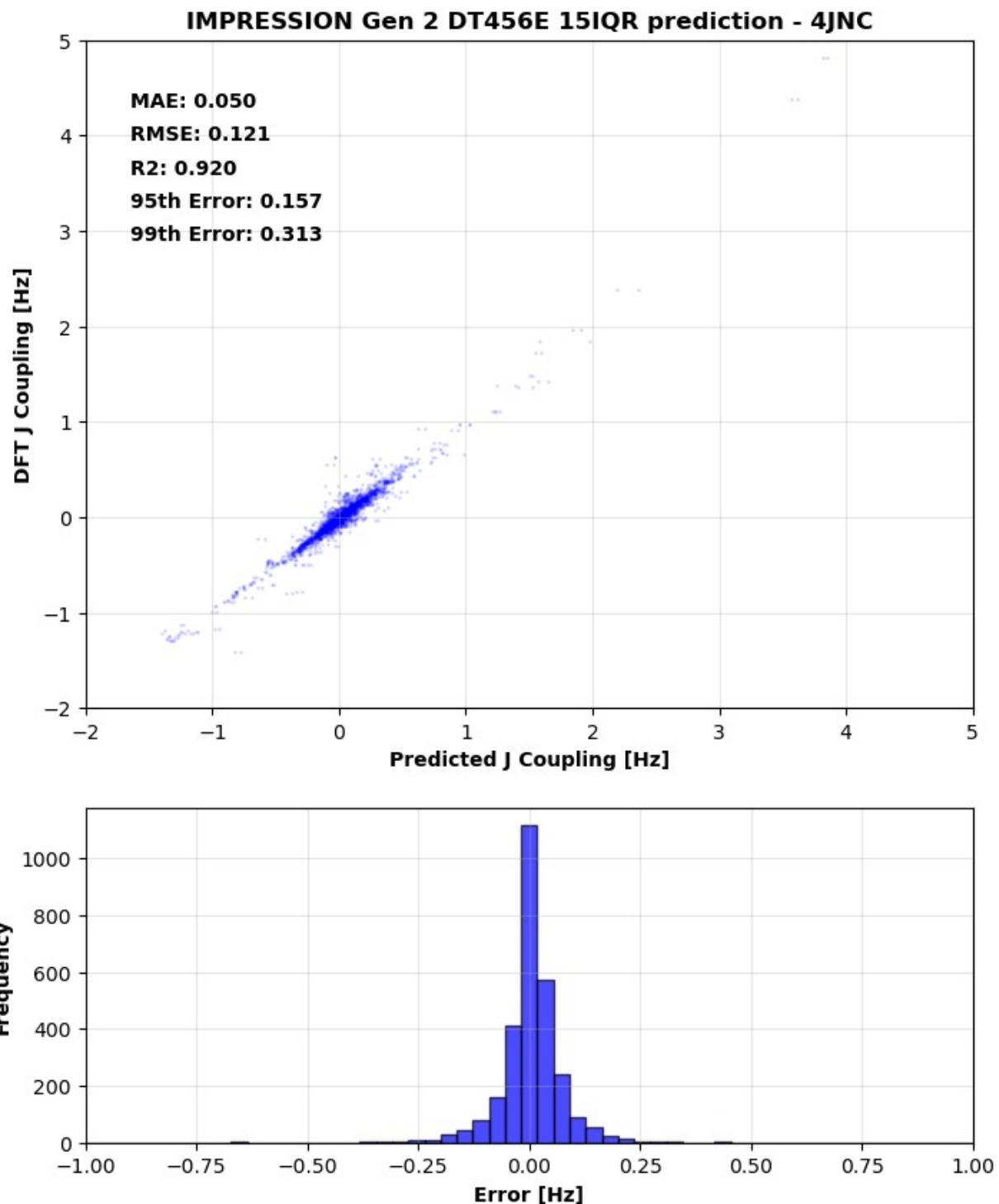


S2.2.19 ${}^4\text{J}_{\text{NC}}$

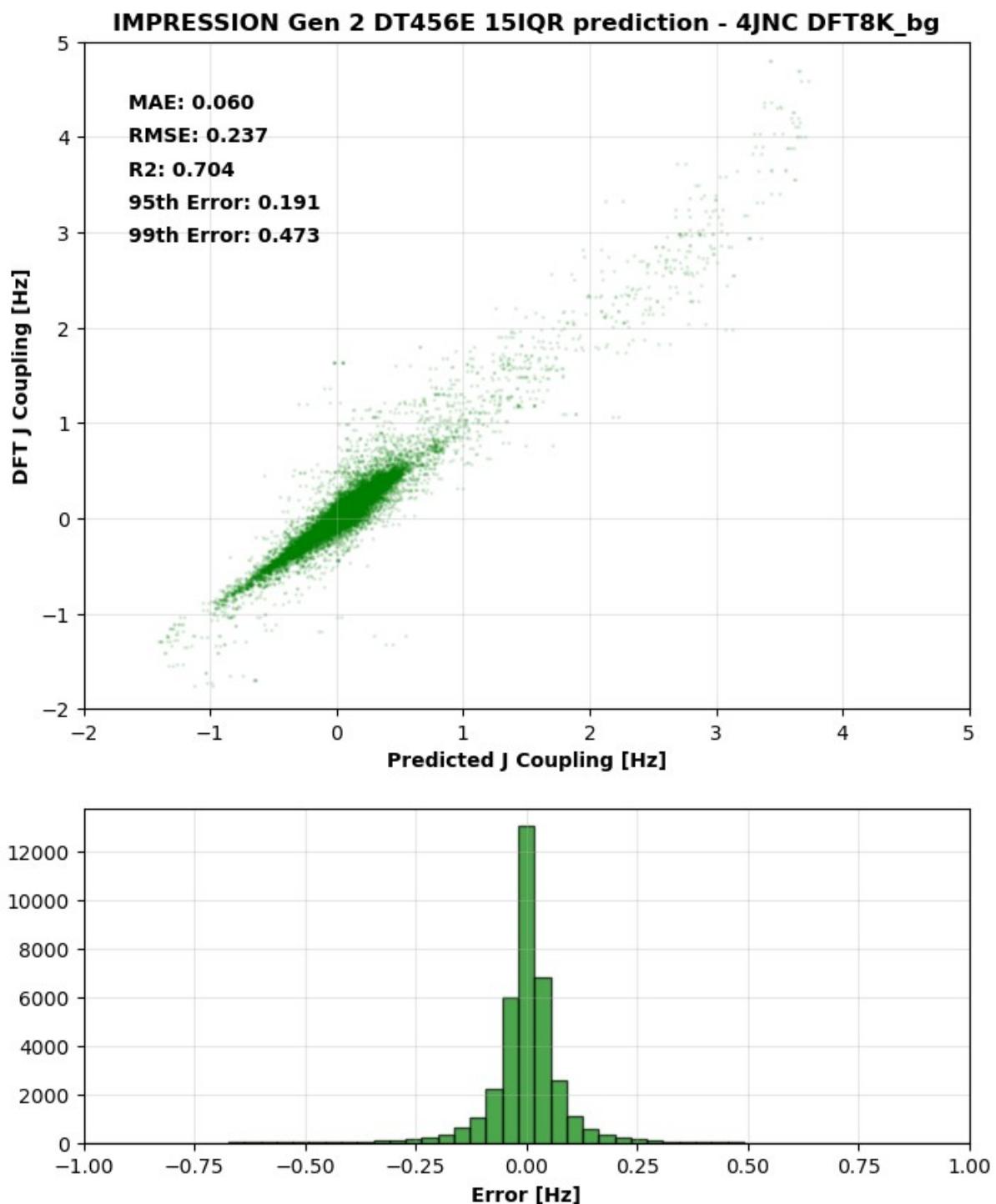
Holdout



Data3

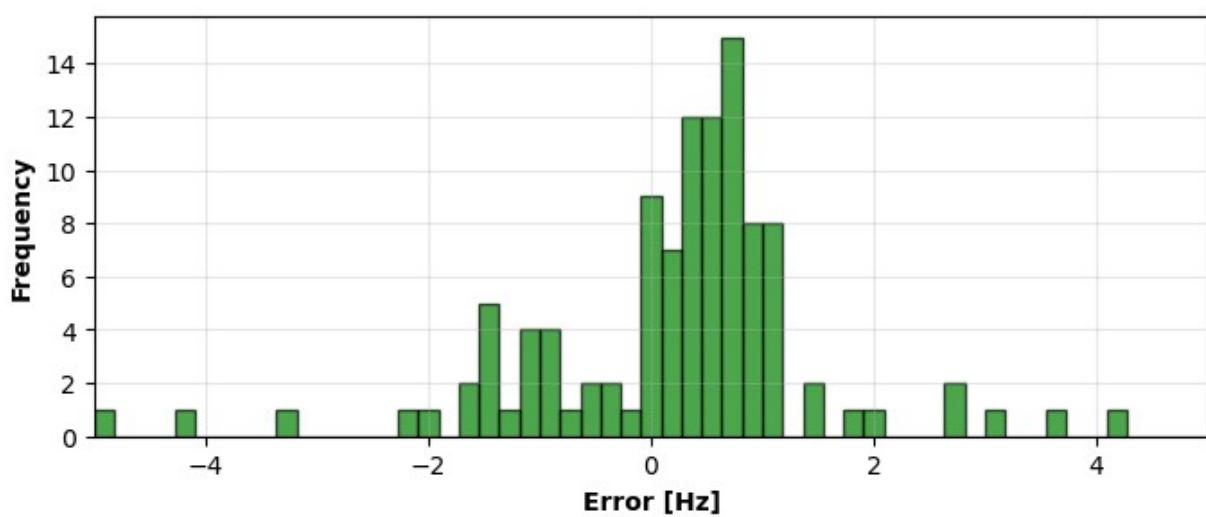
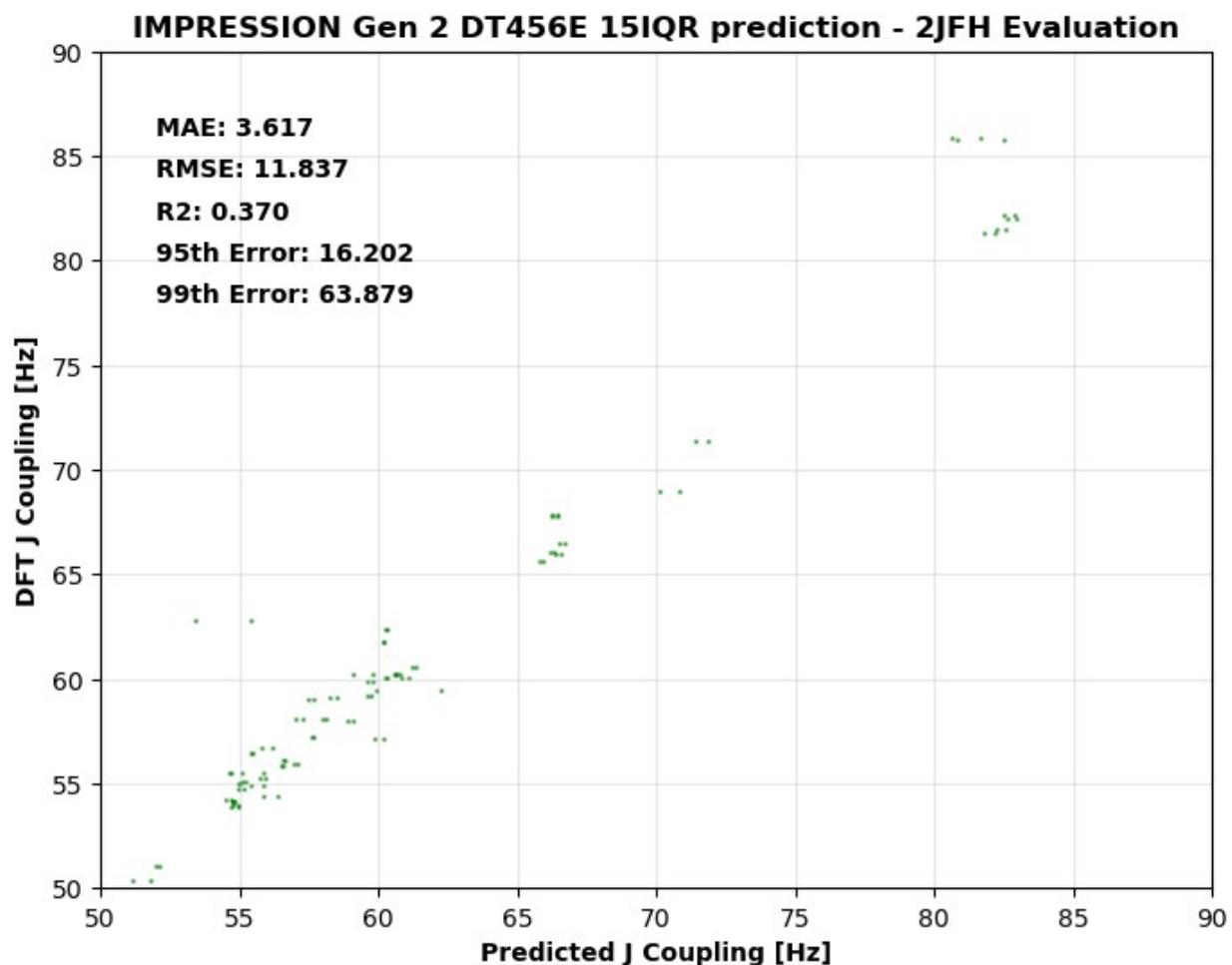


DFT8K_bg

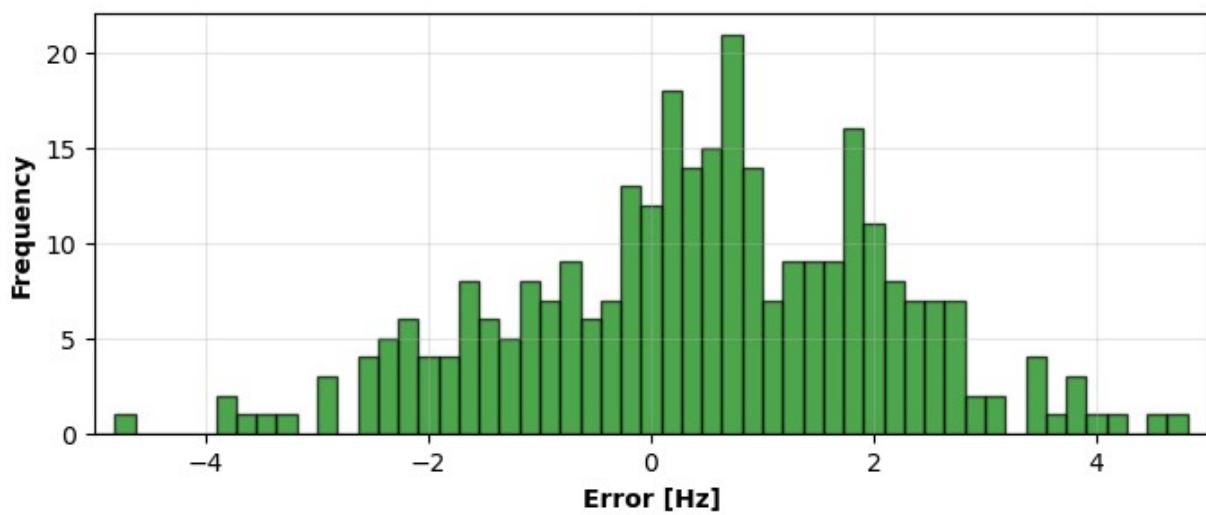
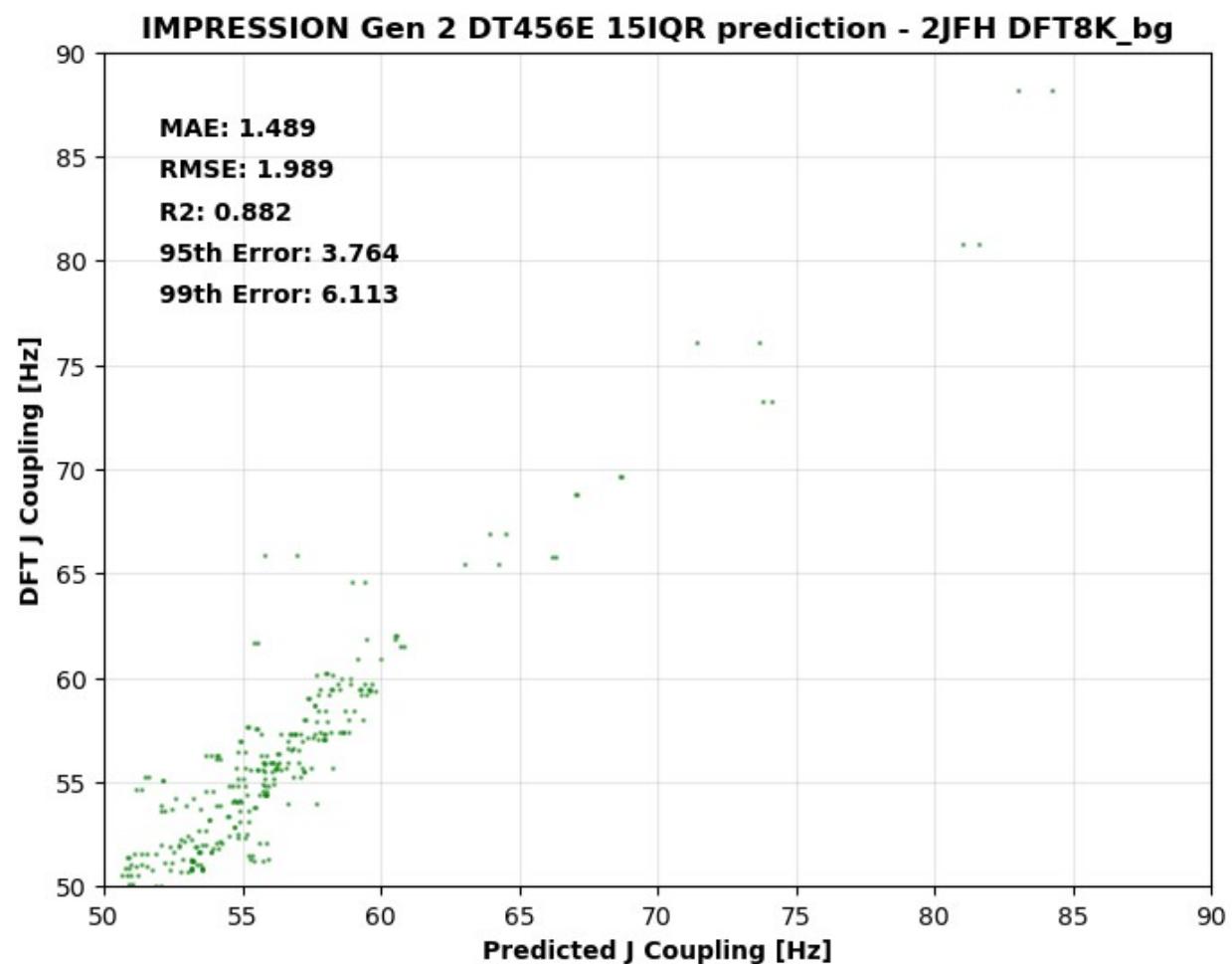


S2.2.24 $^2\text{J}_{\text{FH}}$

Holdout

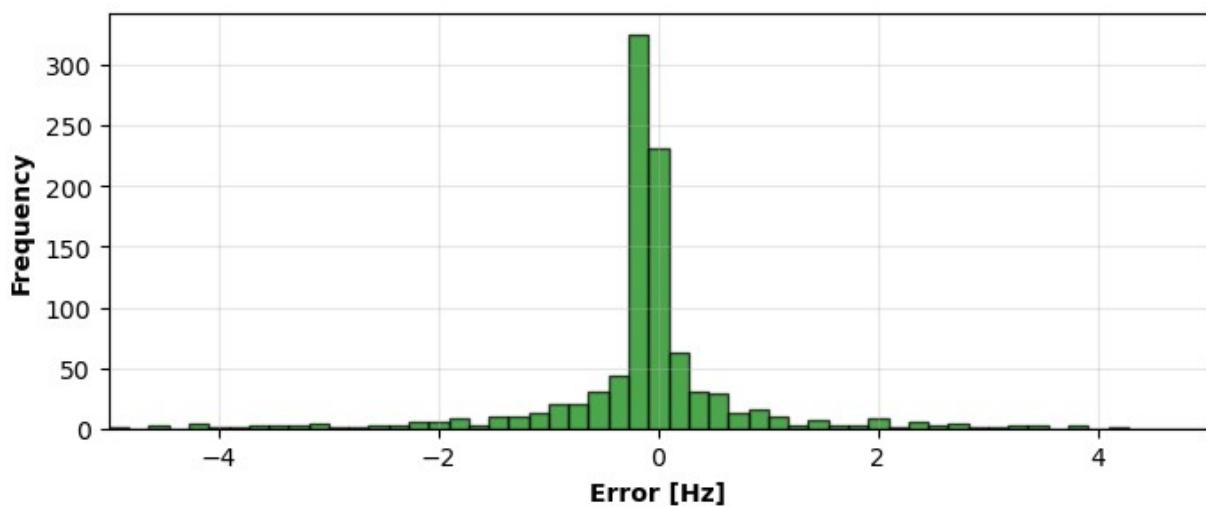
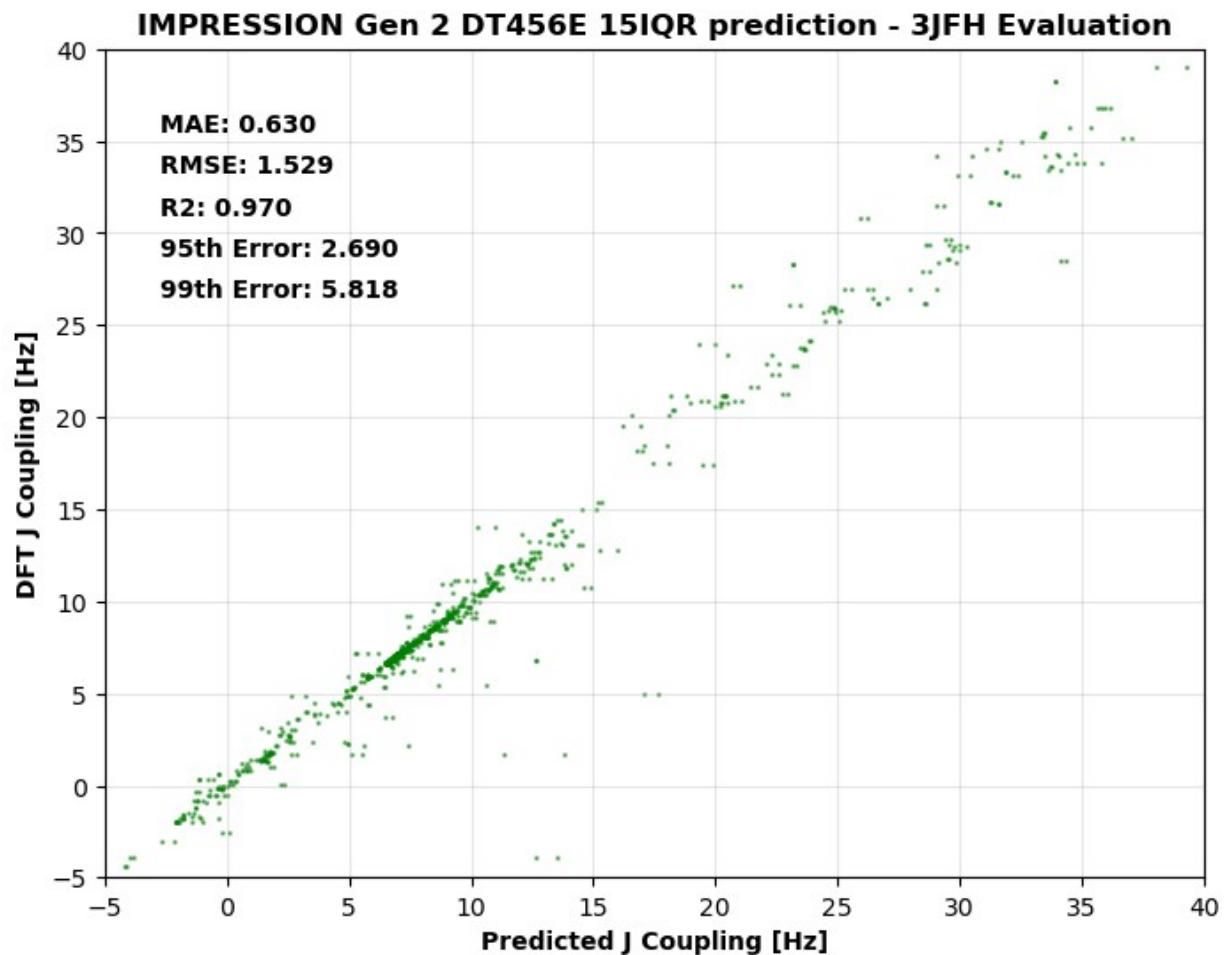


DFT8K_bg

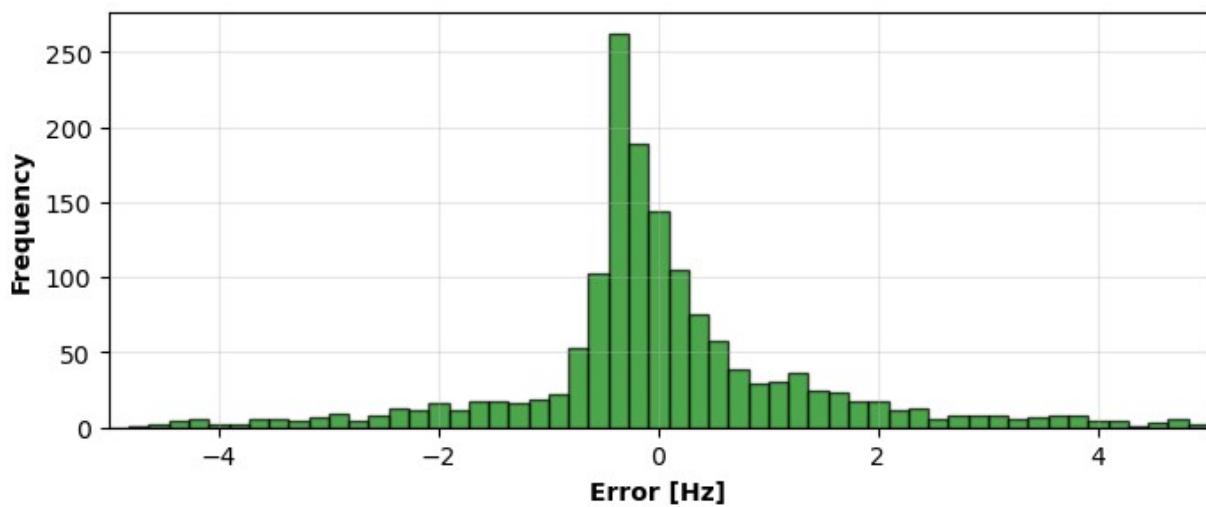
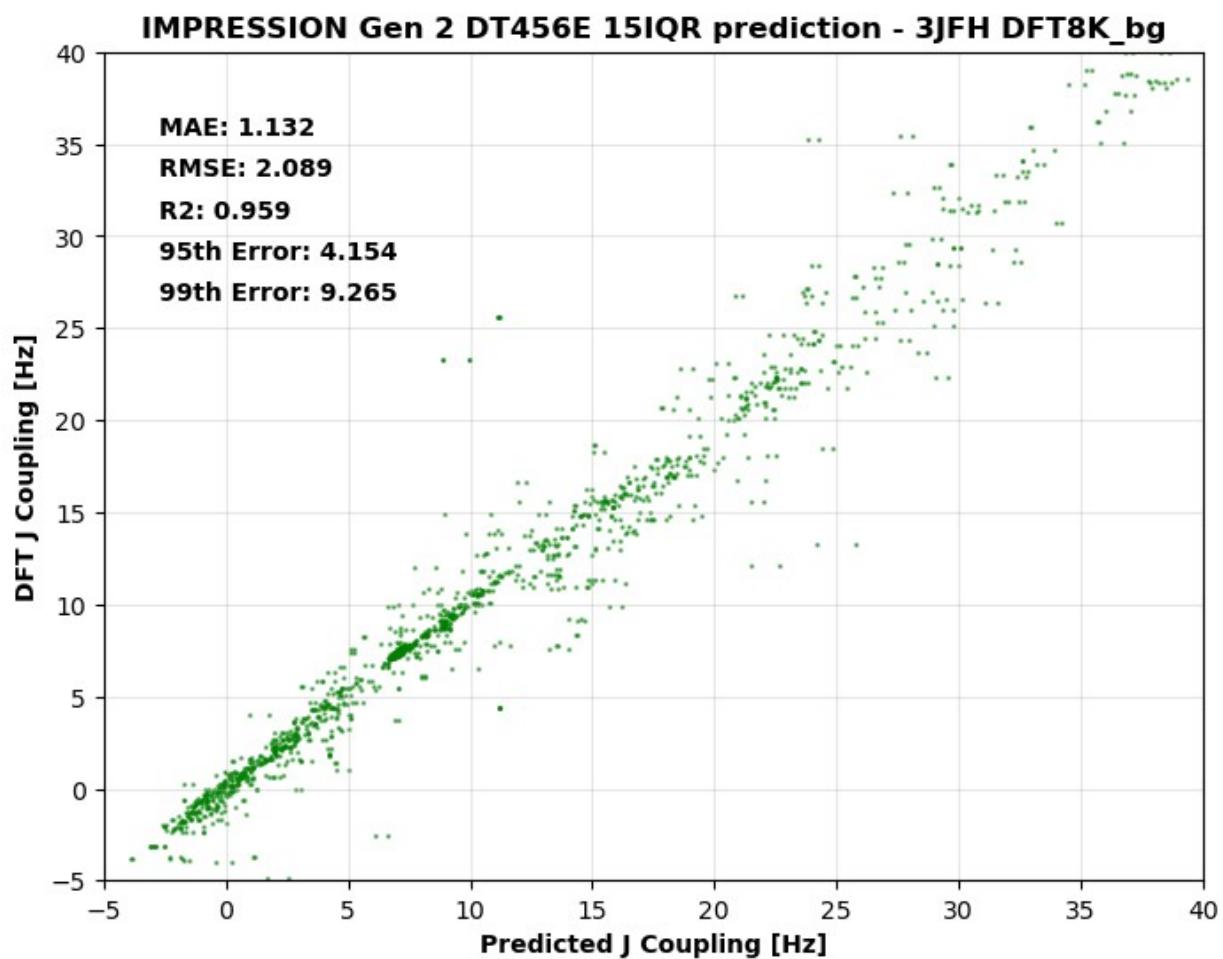


S2.2.25 ${}^3\text{J}_{\text{FH}}$

Holdout

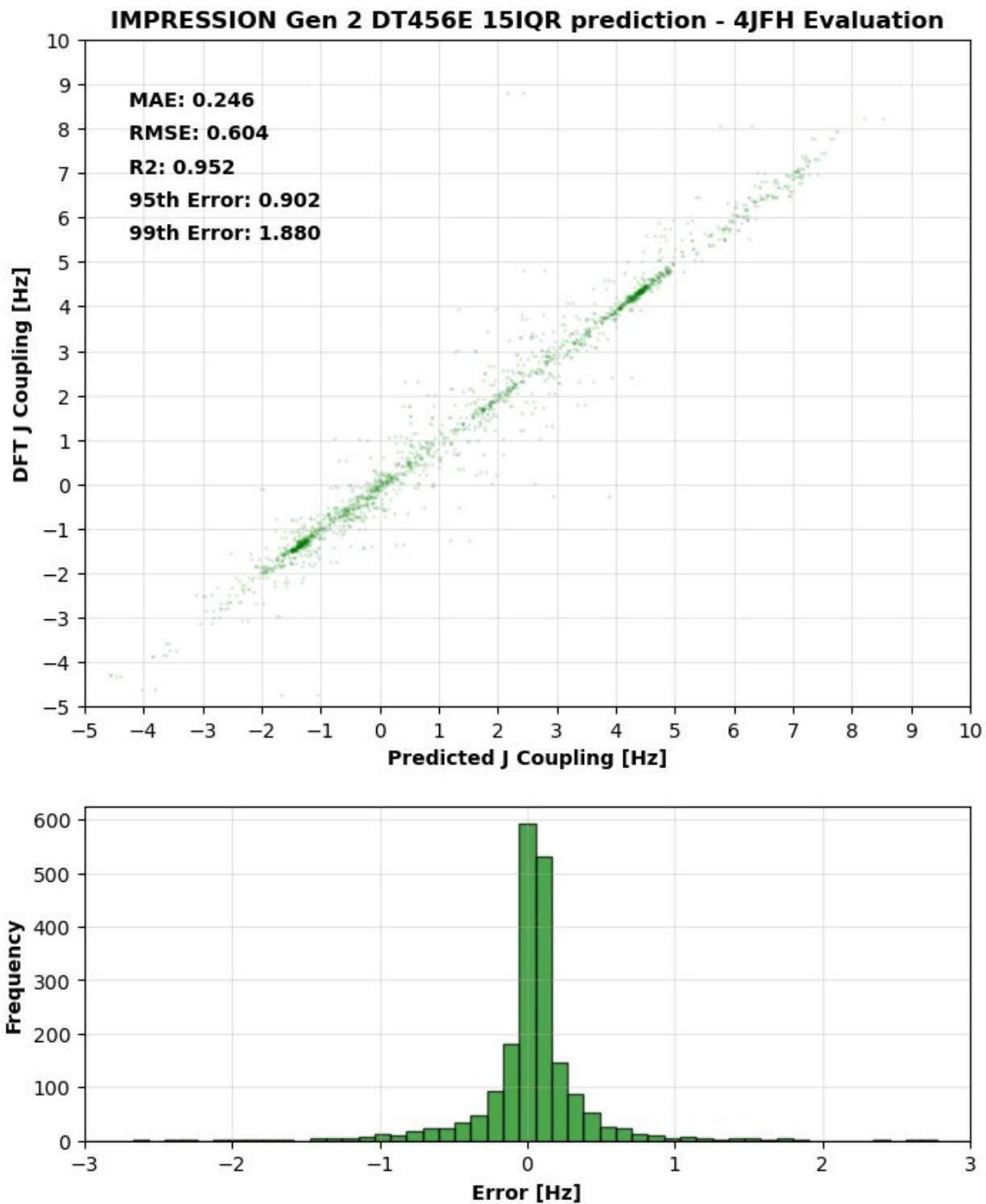


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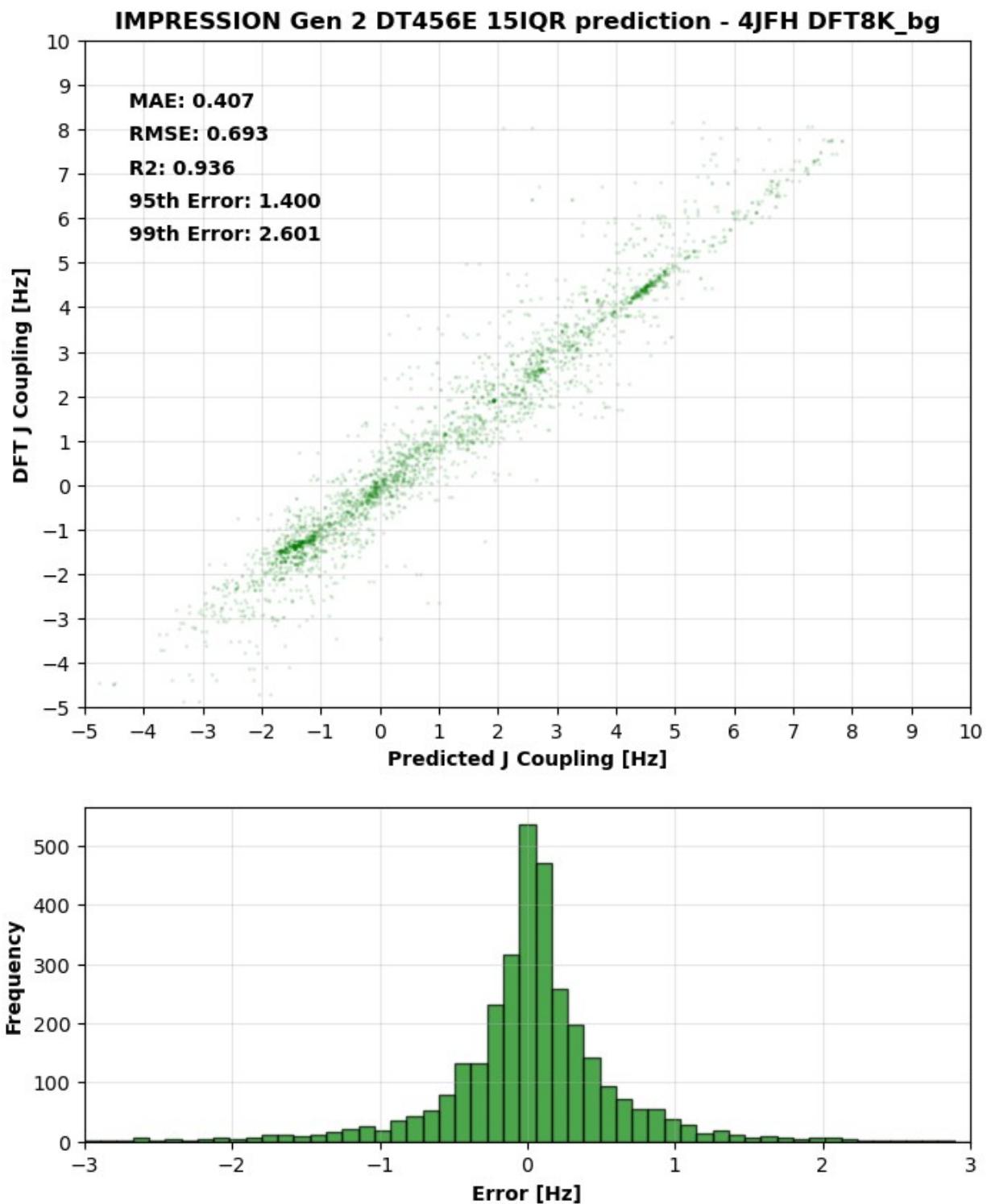


S2.2.26 $^4\text{J}_{\text{FH}}$

Holdout

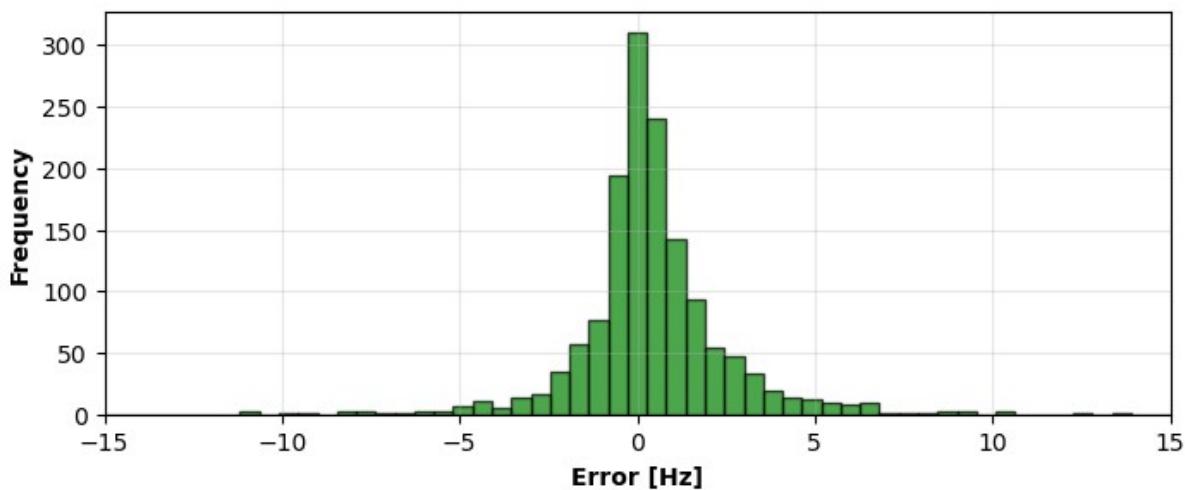
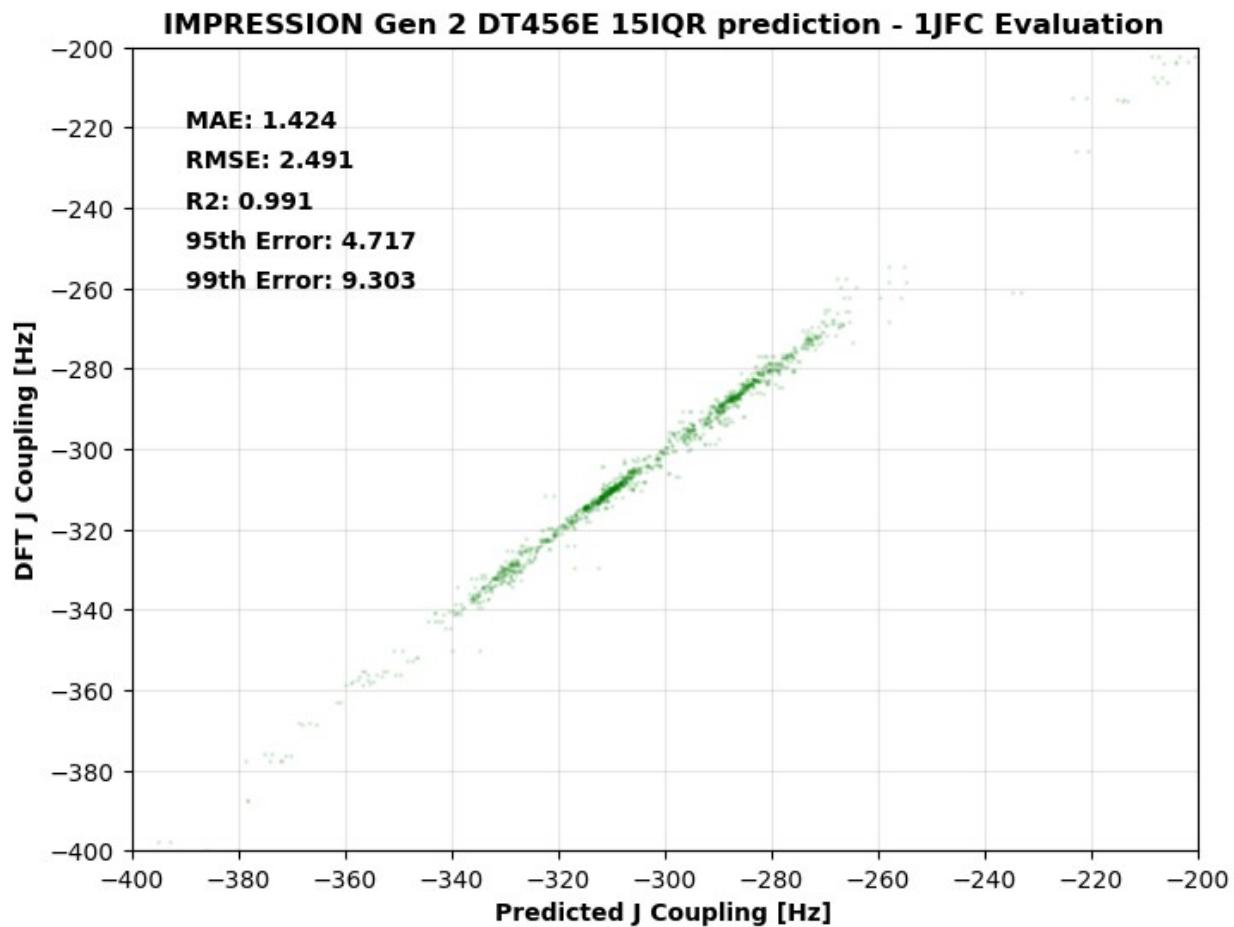


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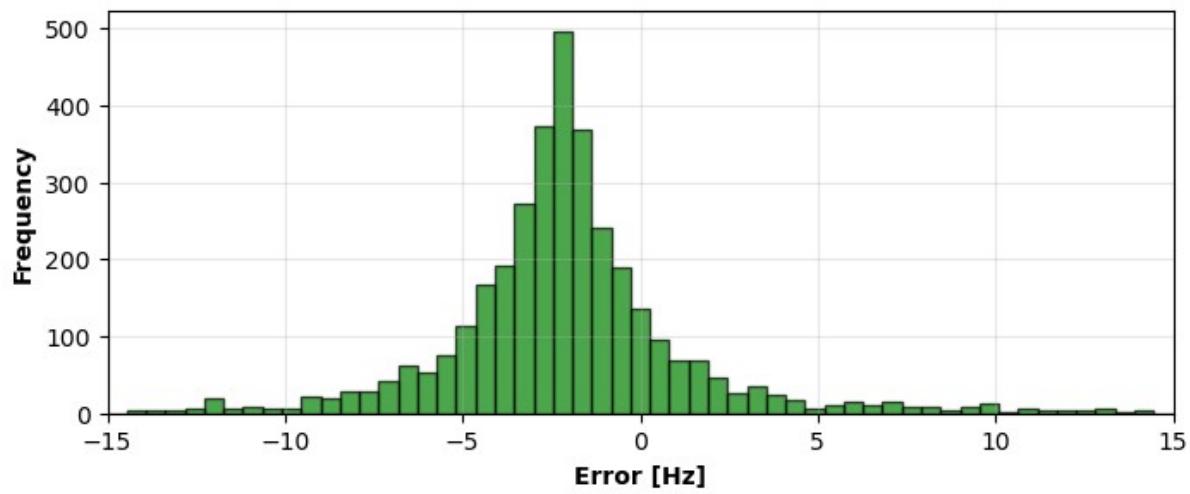
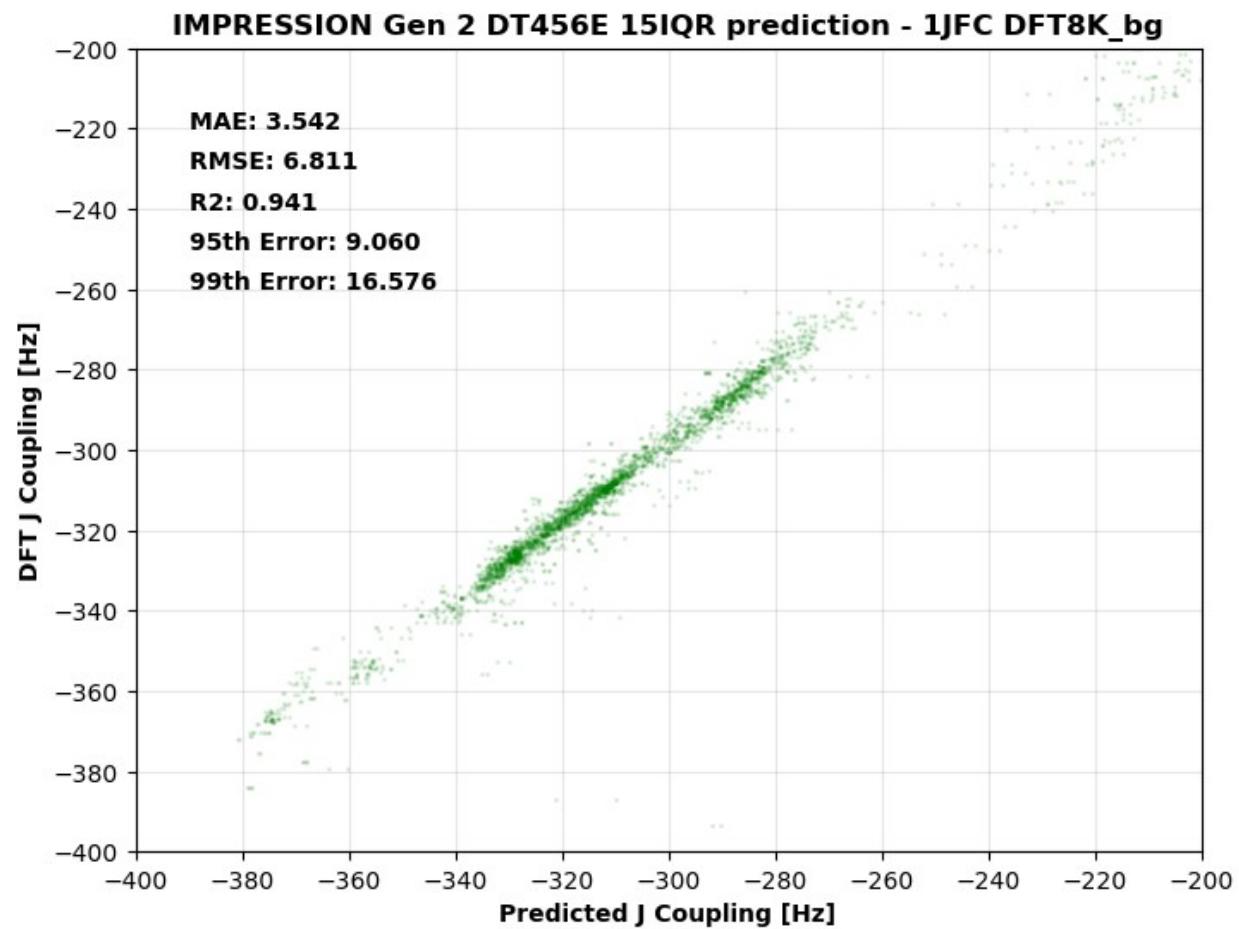


S2.2.27 $^1\text{J}_{\text{FC}}$

Holdout

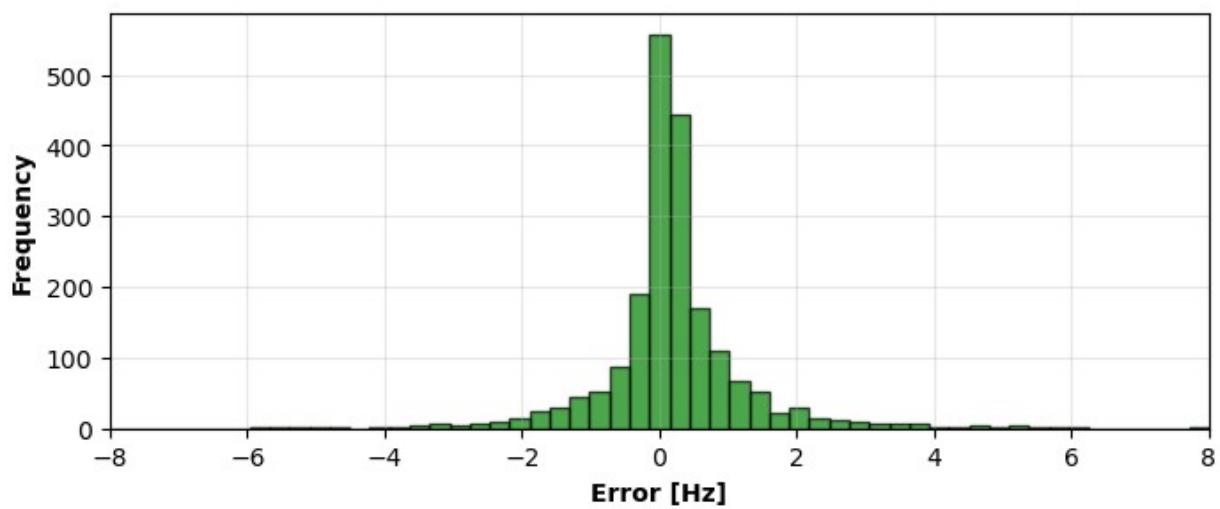
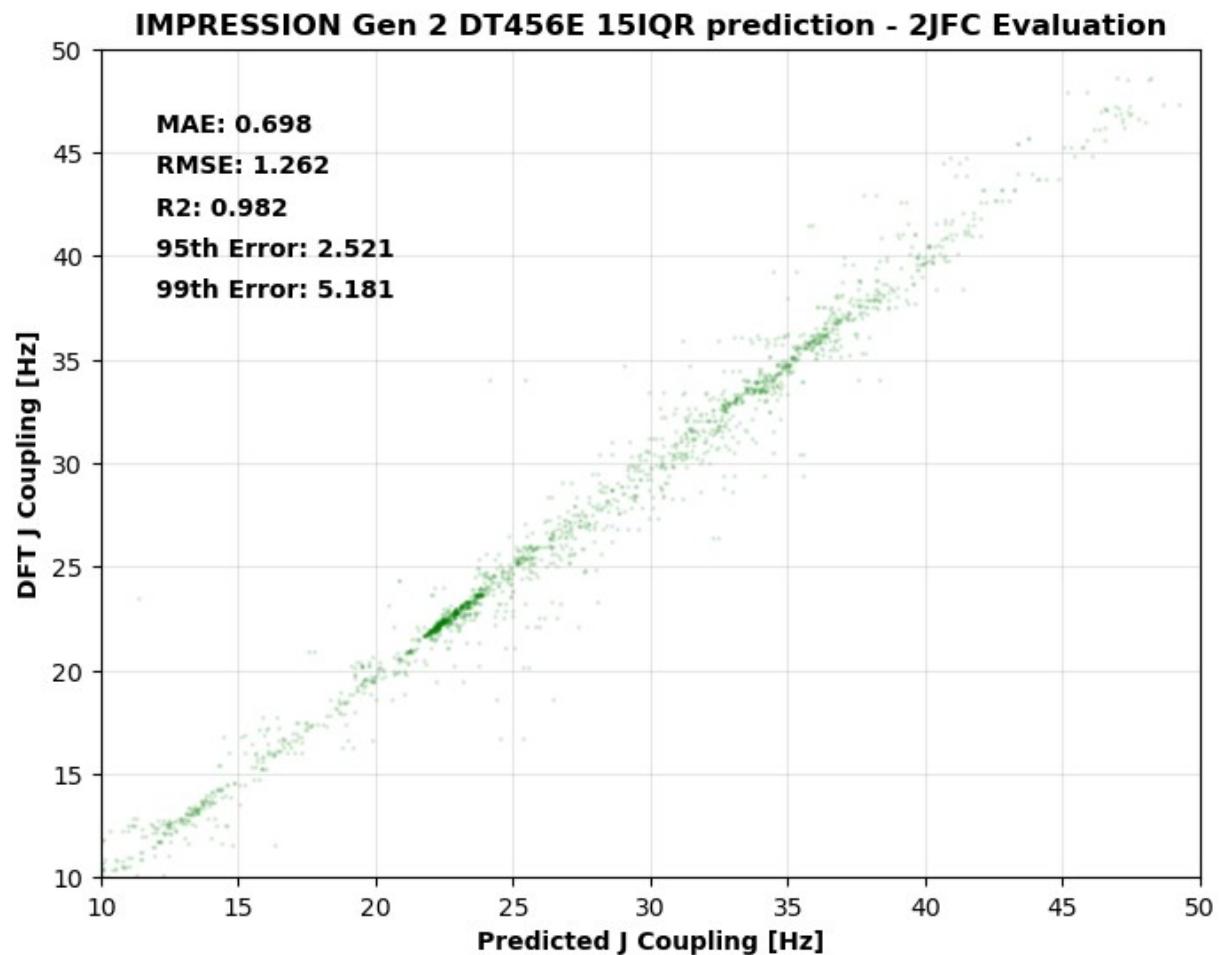


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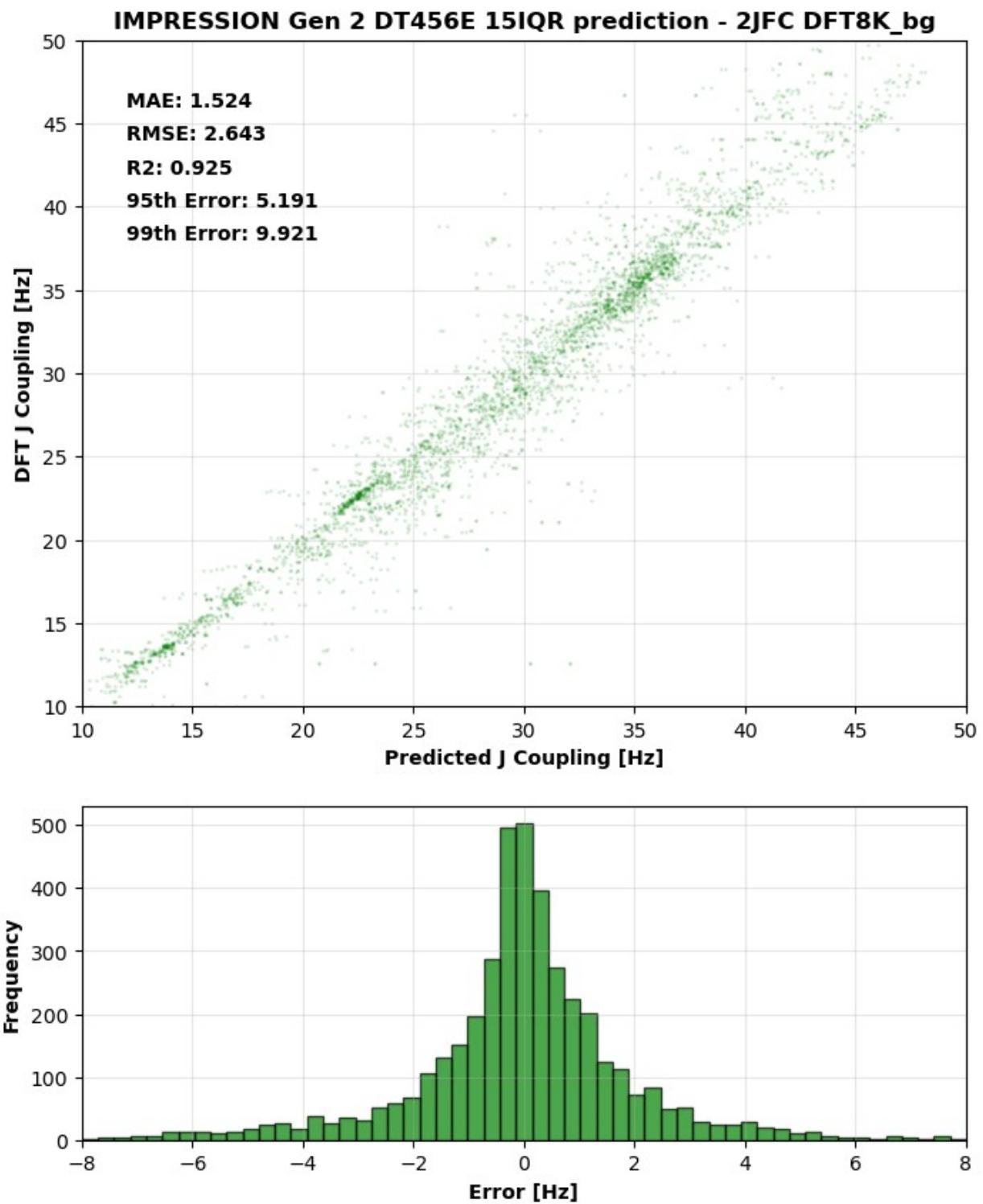


S2.2.28 ${}^2J_{FC}$

Holdout



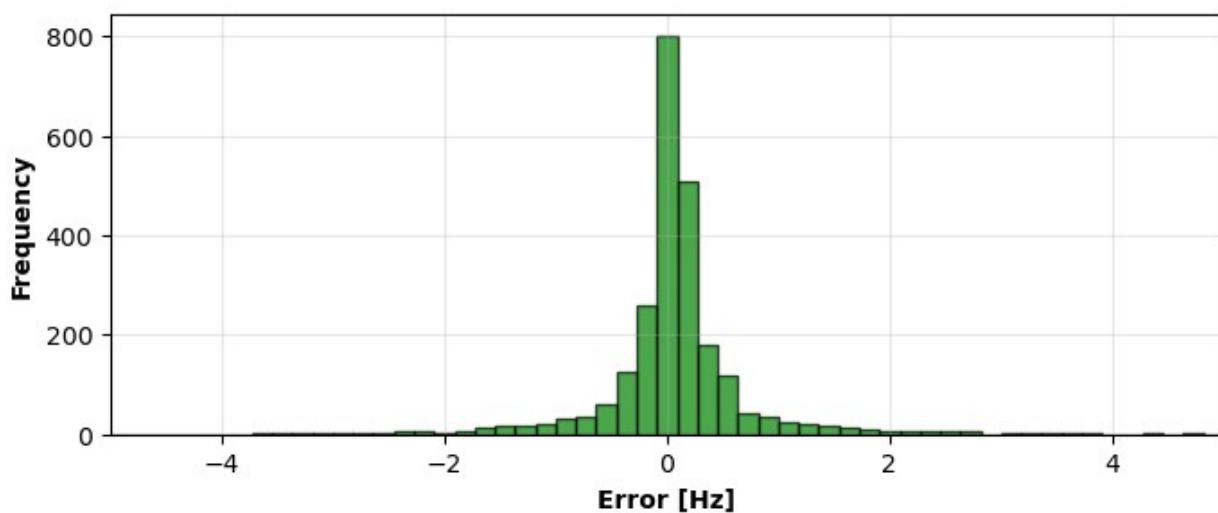
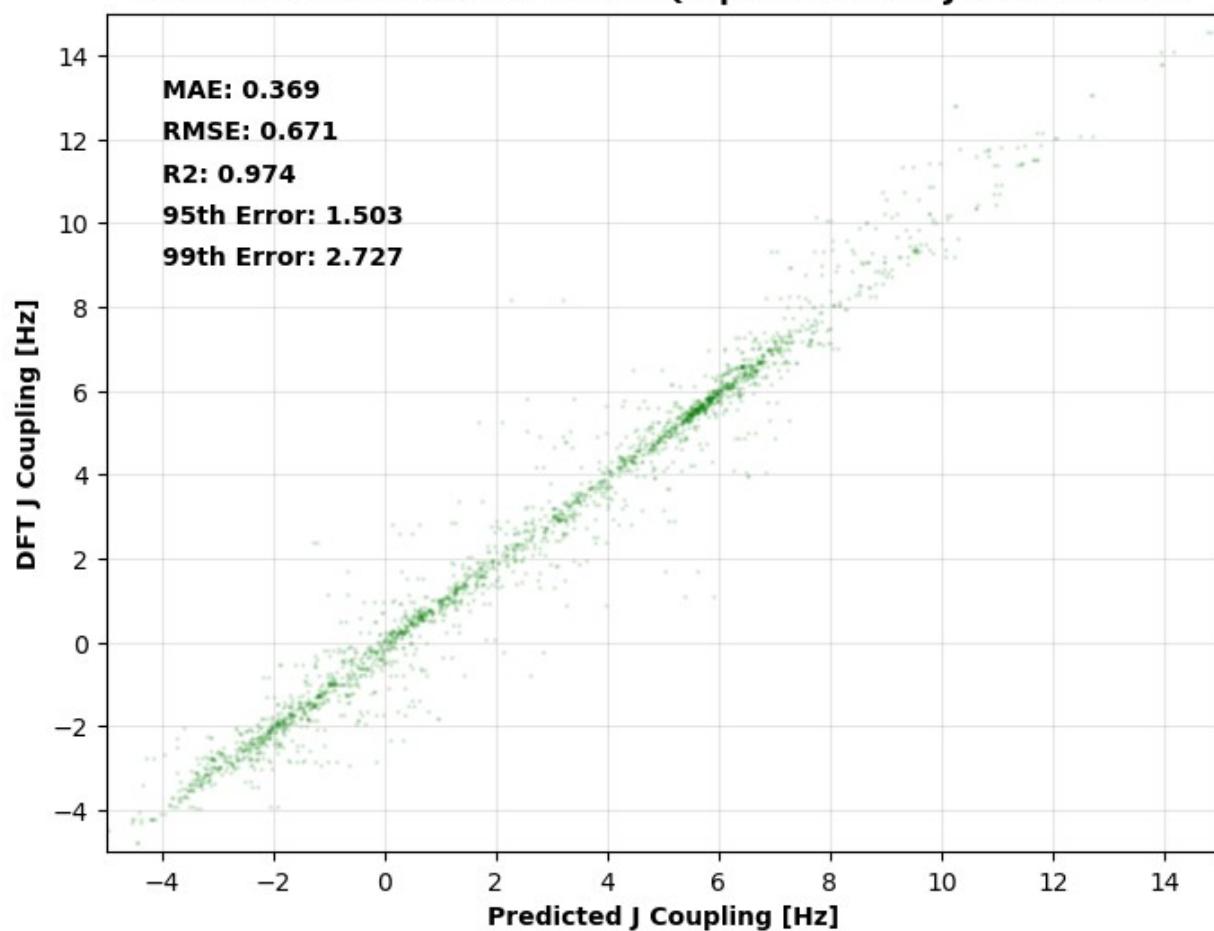
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S2.2.29 ${}^3\text{J}_{\text{FC}}$

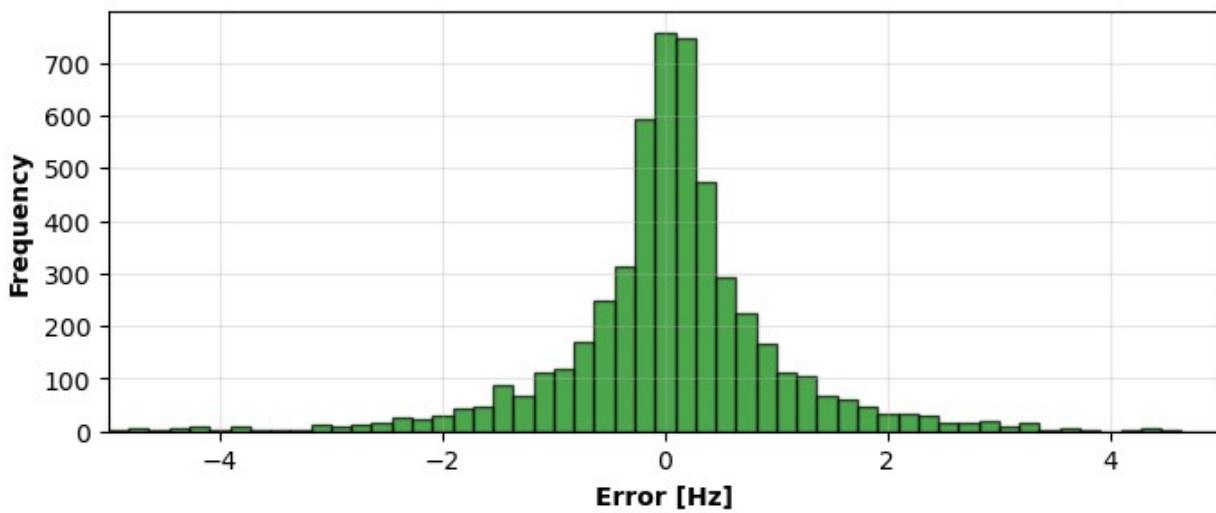
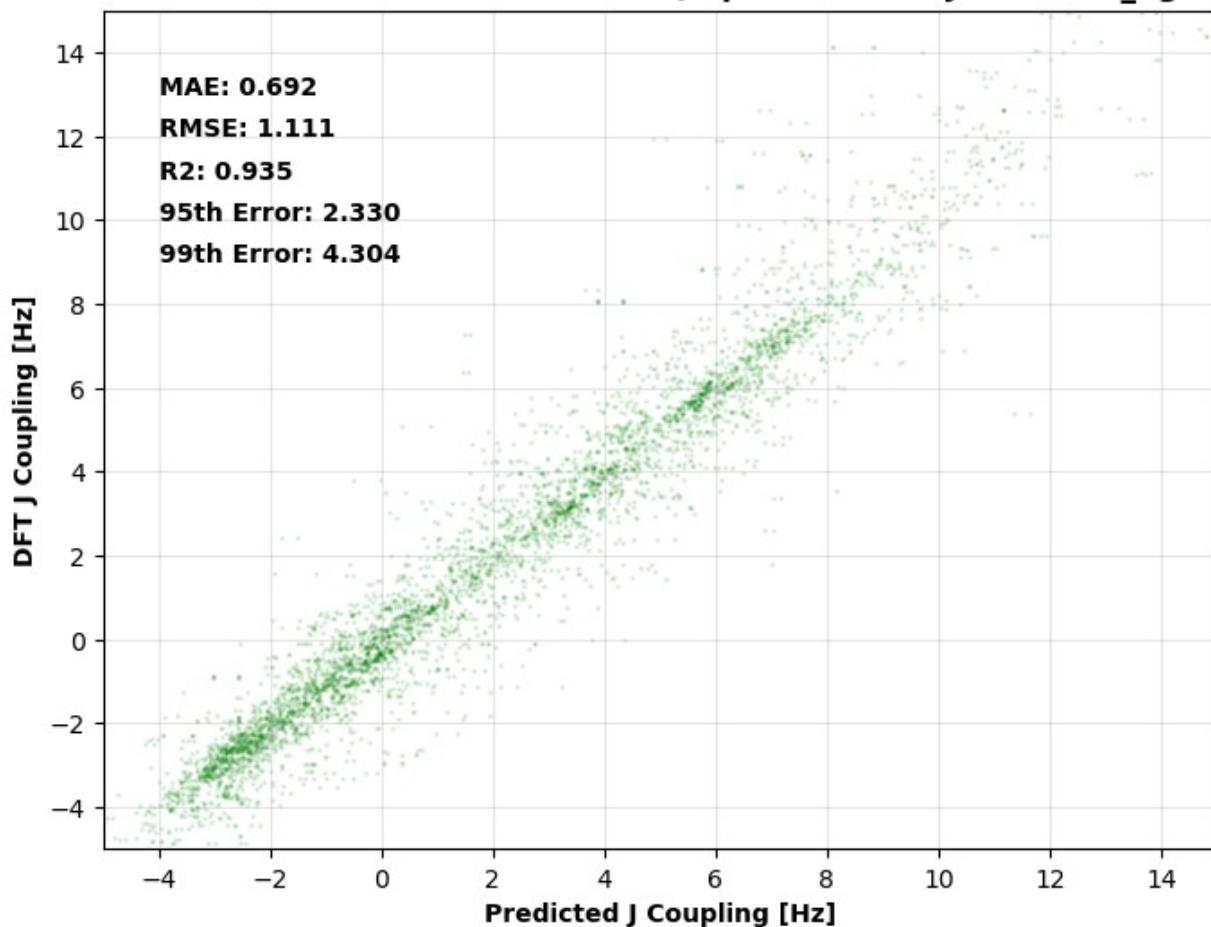
Holdout

IMPRESSION Gen 2 DT456E 15IQR prediction - 3JFC Evaluation



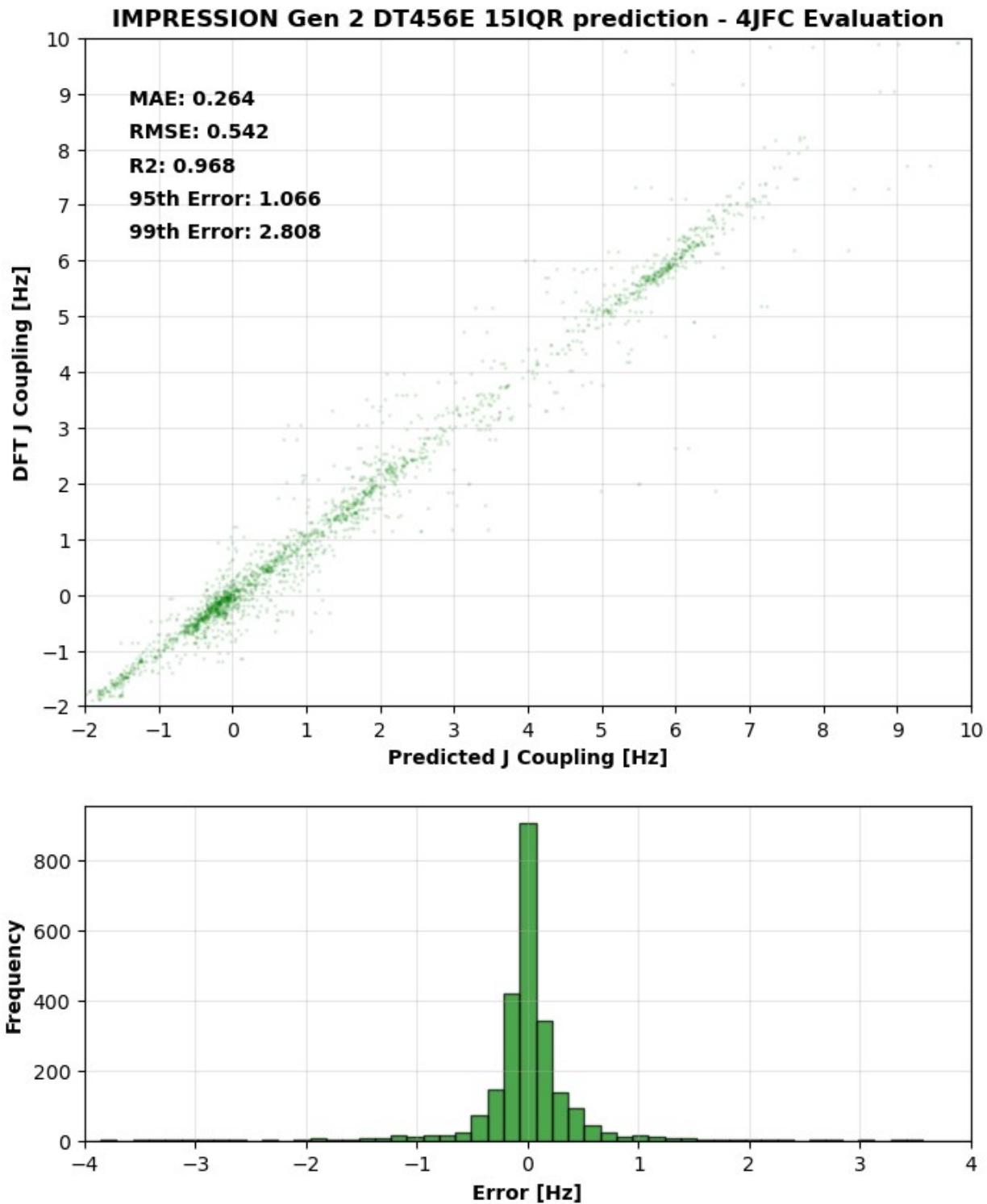
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IMPRESSION Gen 2 DT456E 15IQR prediction - 3JFC DFT8K_bg



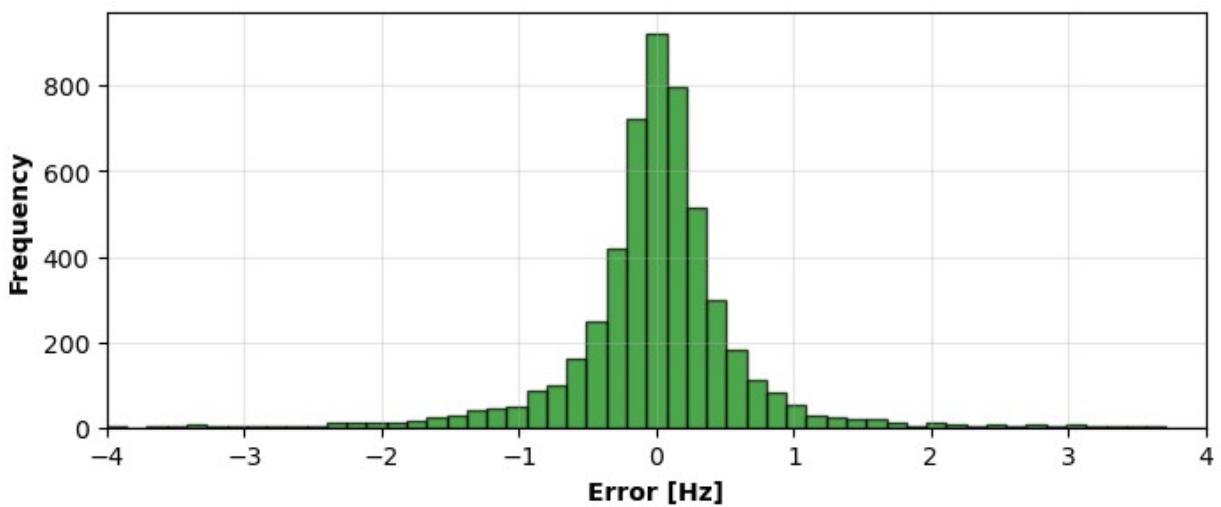
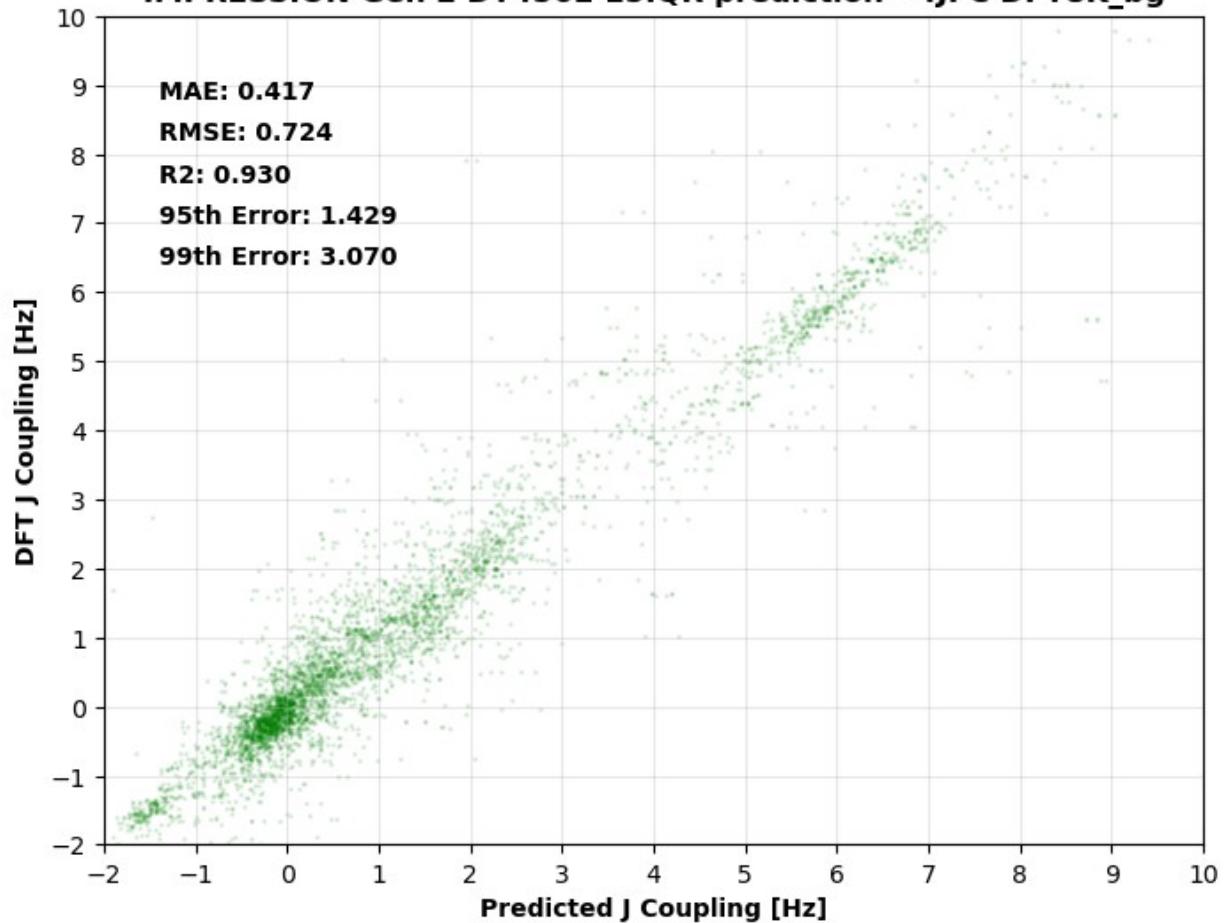
S2.2.30 $^4\text{J}_{\text{FC}}$

Holdout



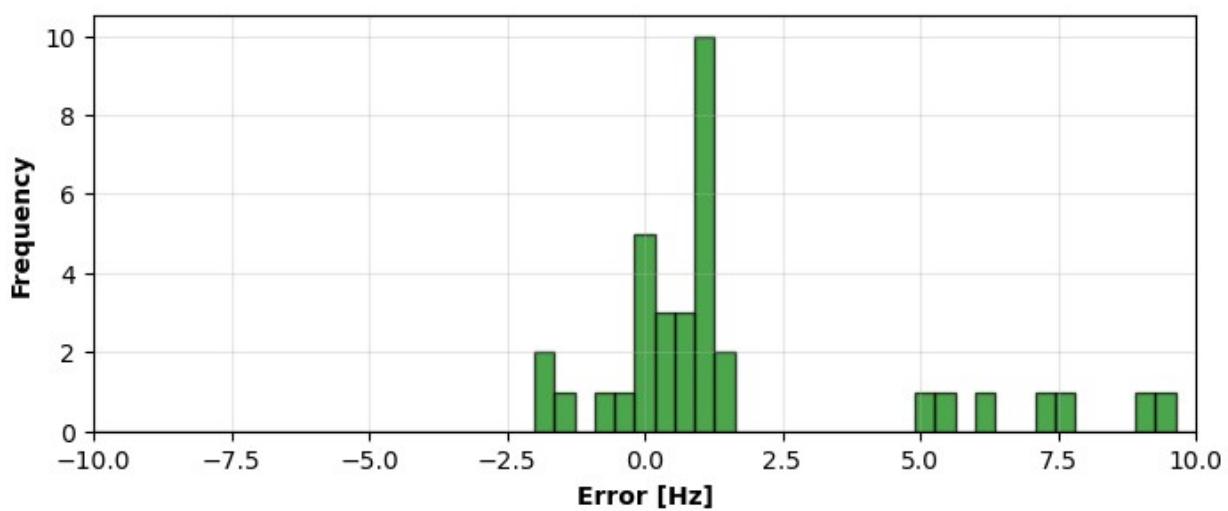
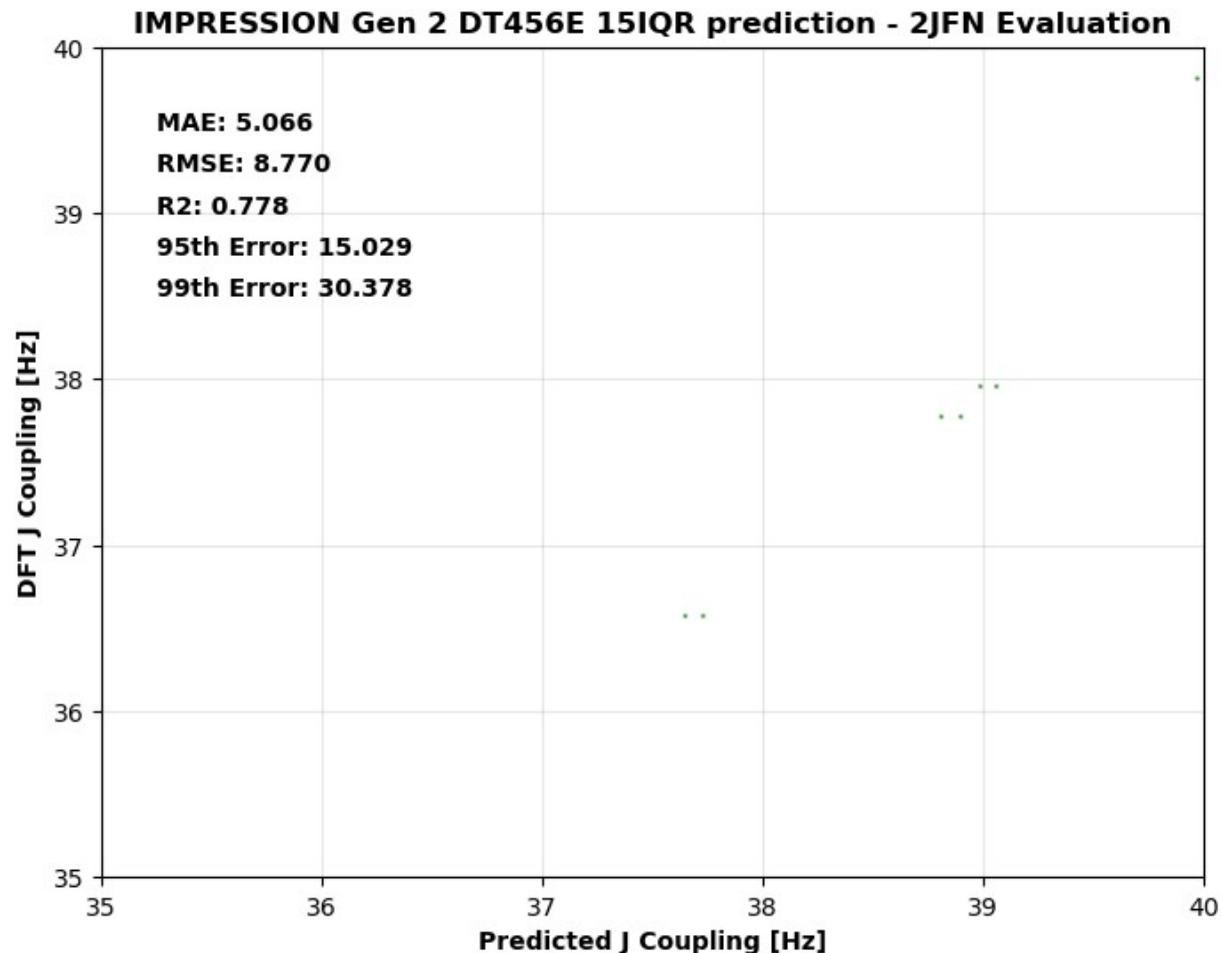
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IMPRESSION Gen 2 DT456E 15IQR prediction - 4JFC DFT8K_bg

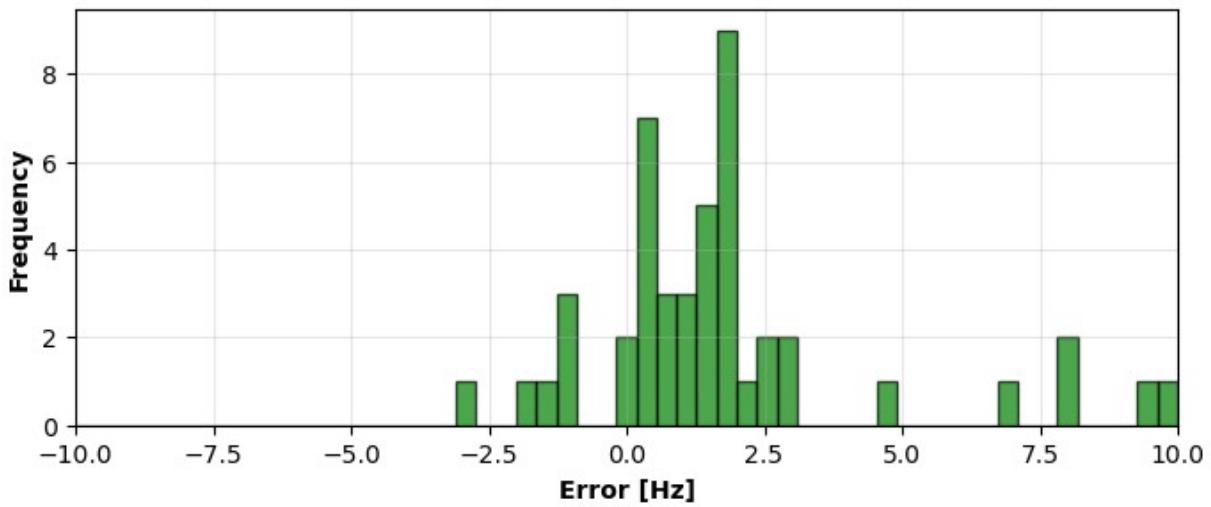
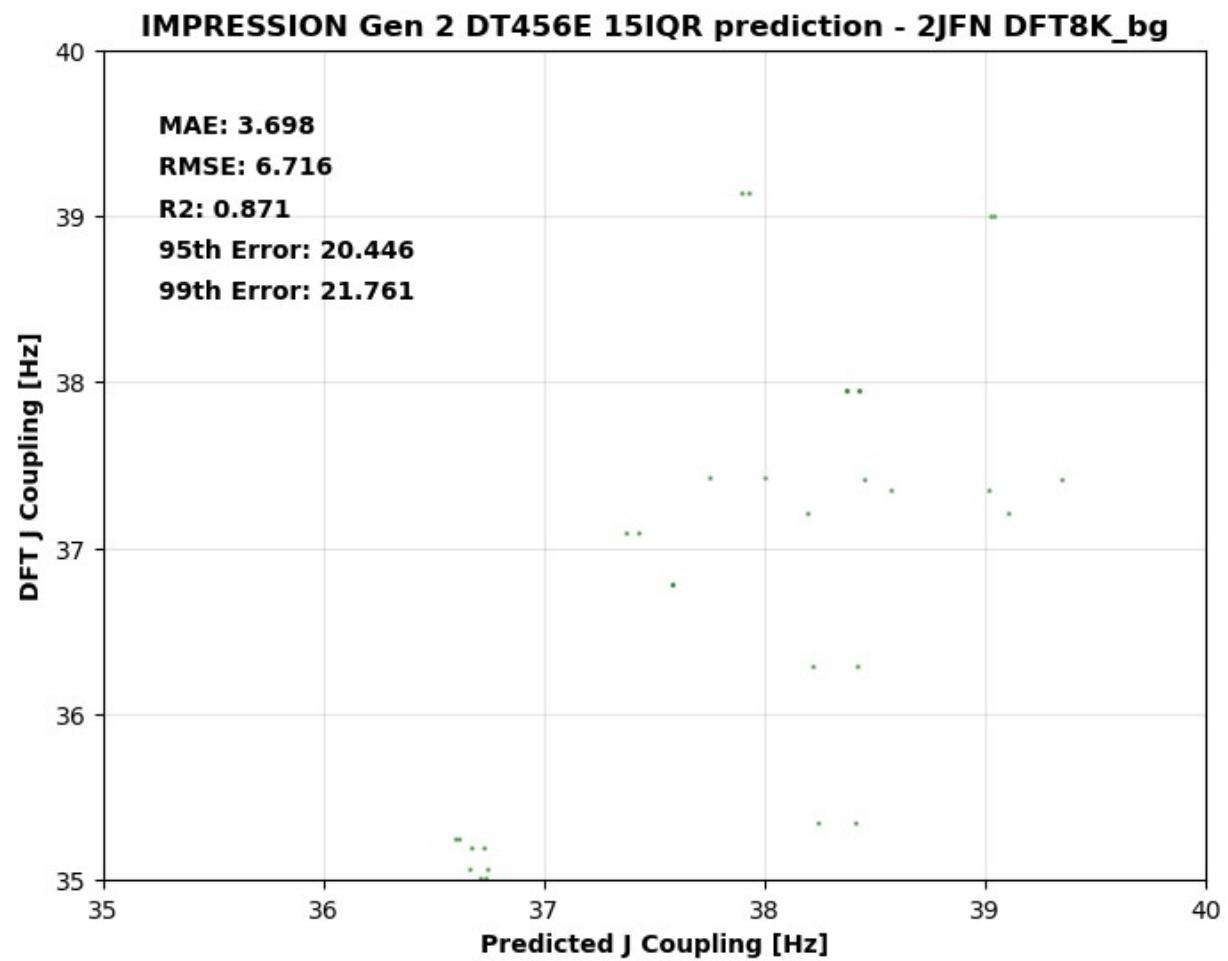


S2.2.31 $^2\text{J}_{\text{FN}}$

Holdout

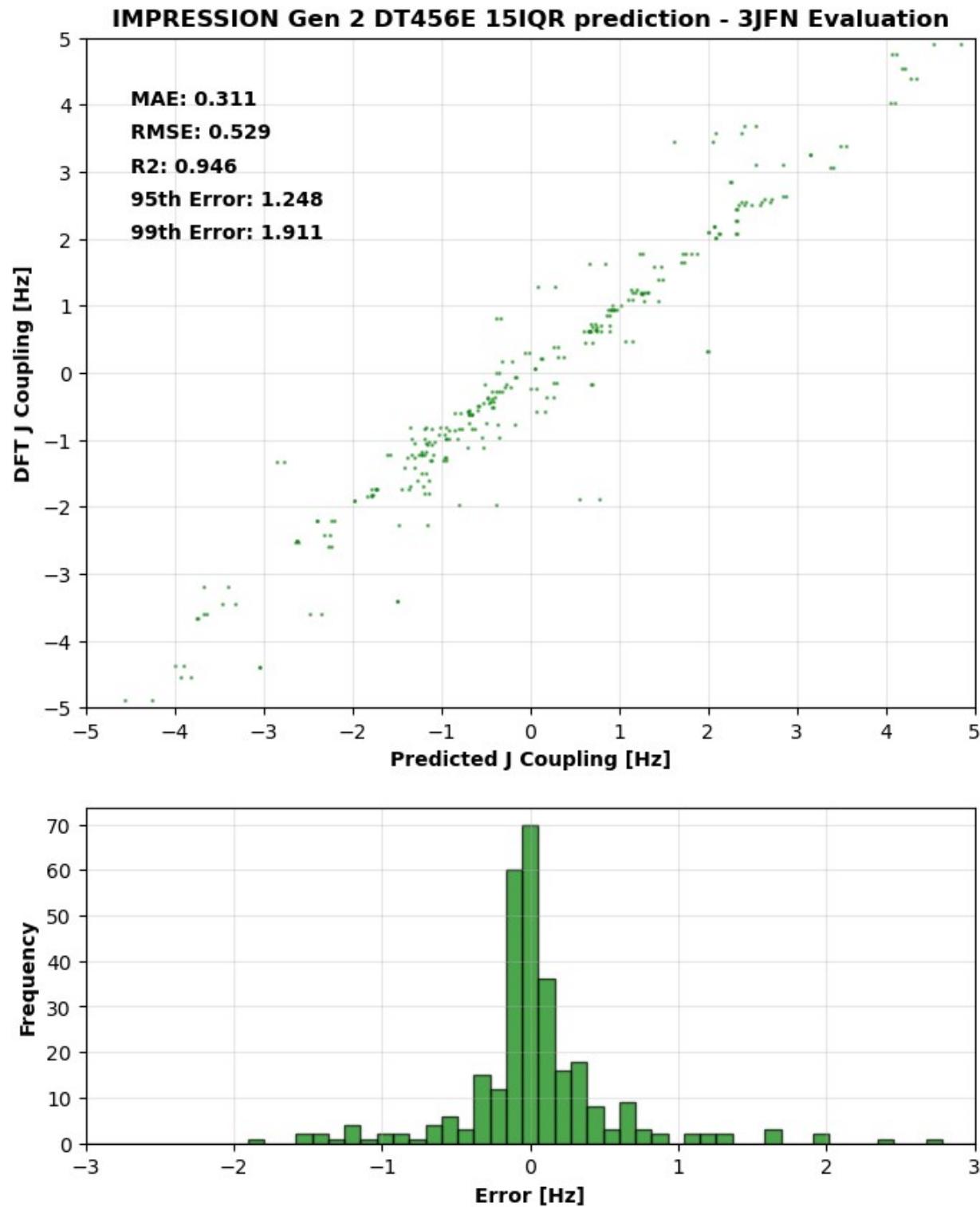


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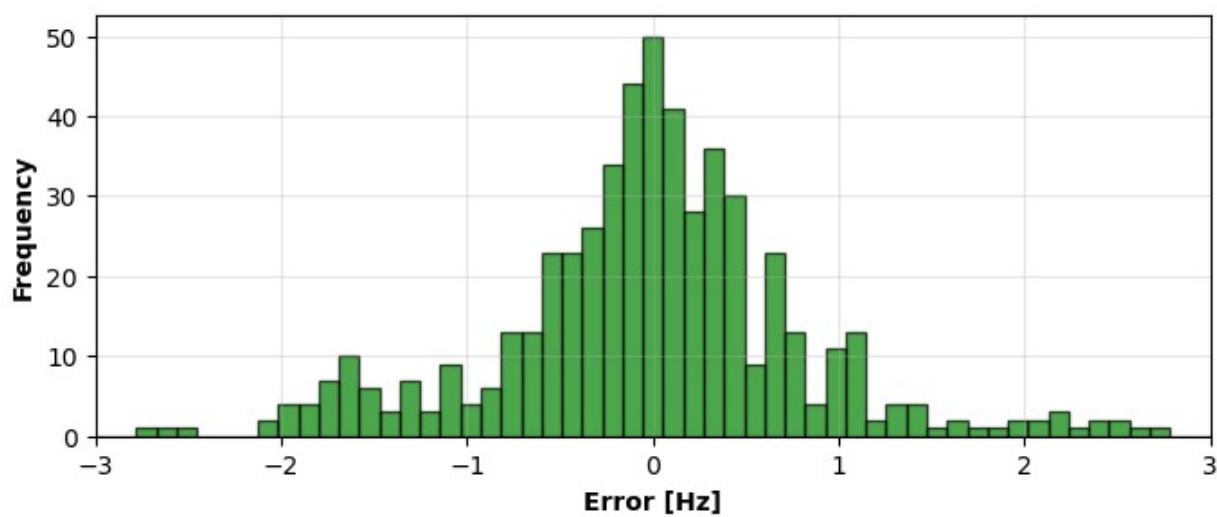
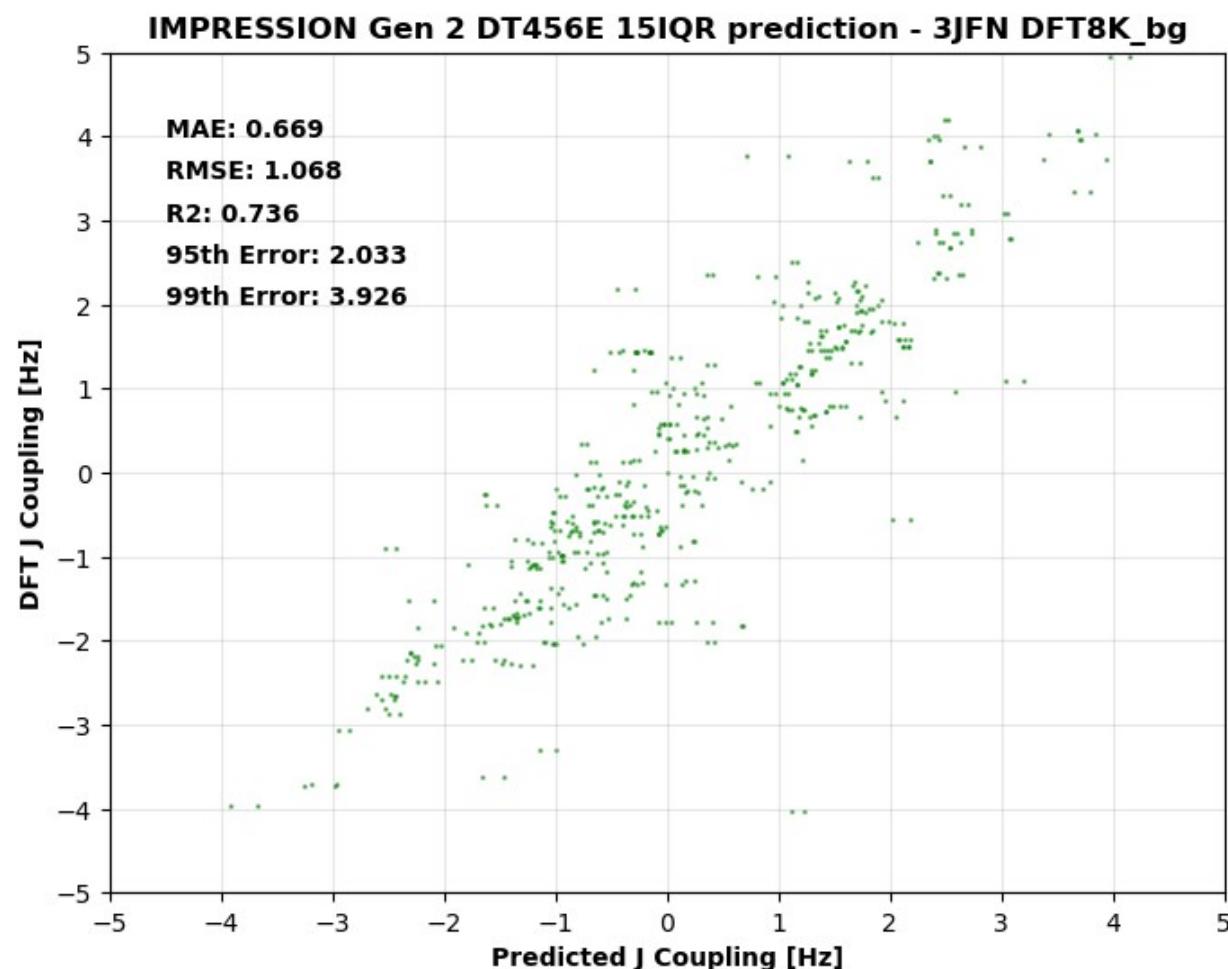


S2.2.32 ${}^3\text{J}_{\text{FN}}$

Holdout

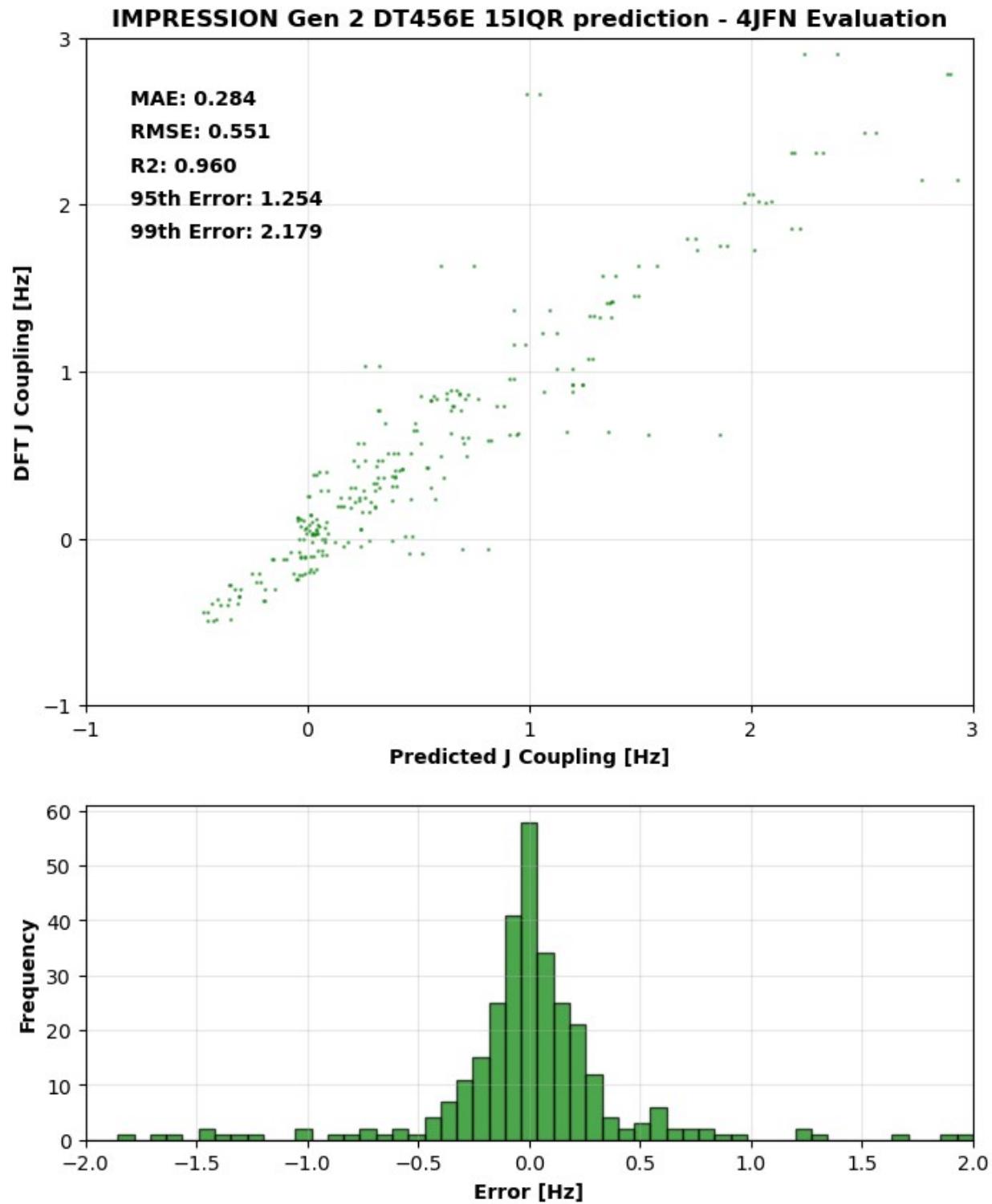


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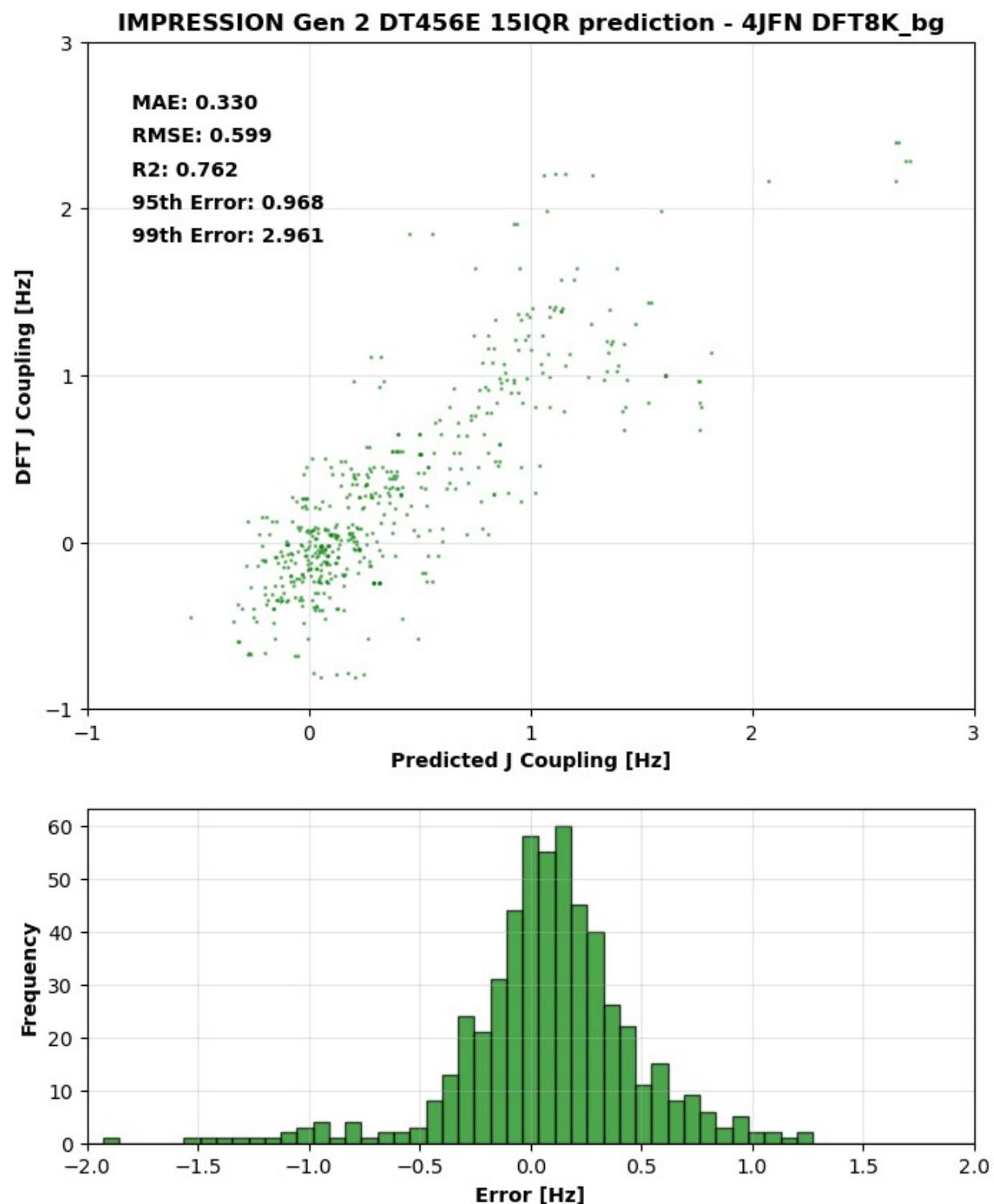


S2.2.33 $^4\text{J}_{\text{FN}}$

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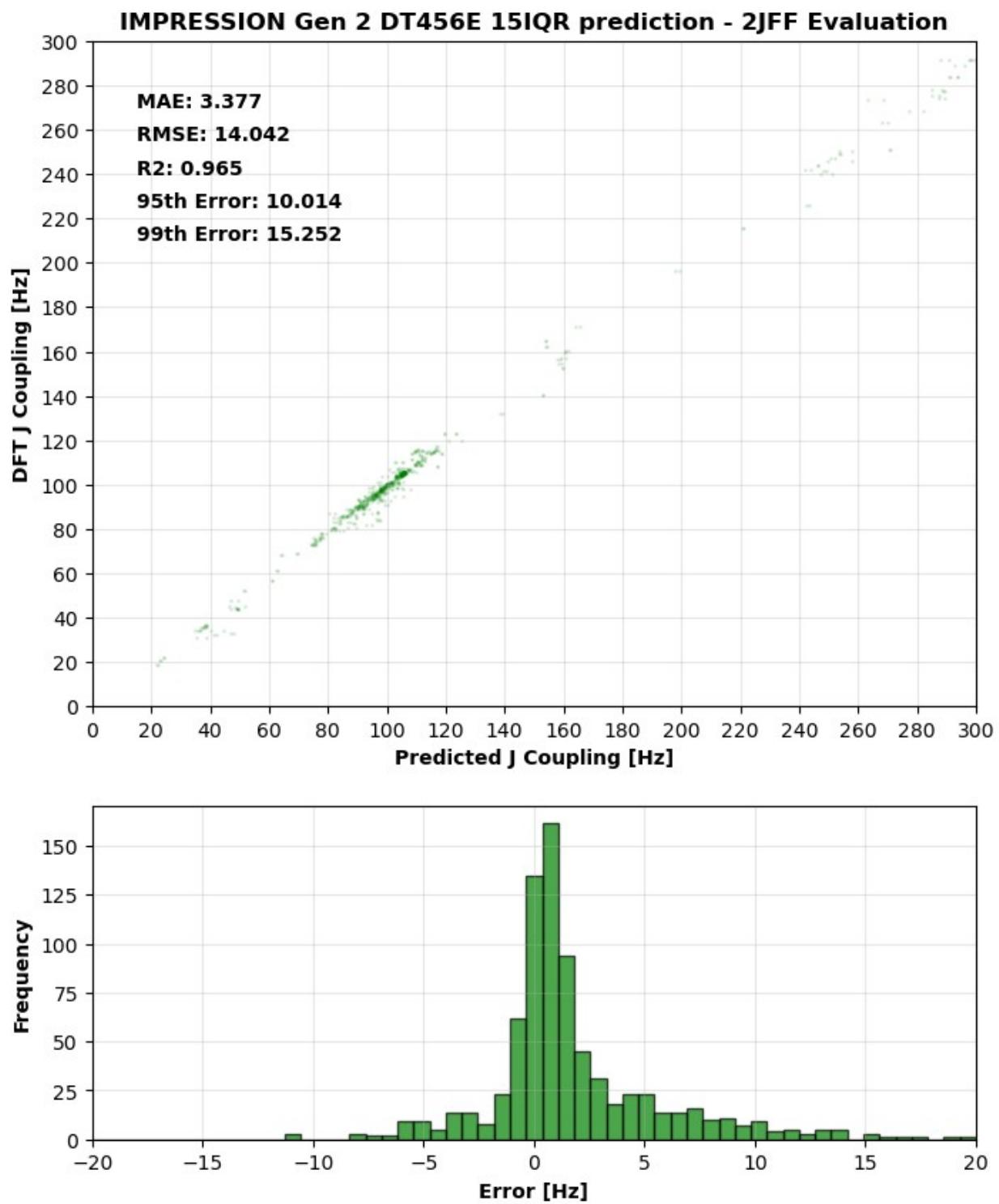


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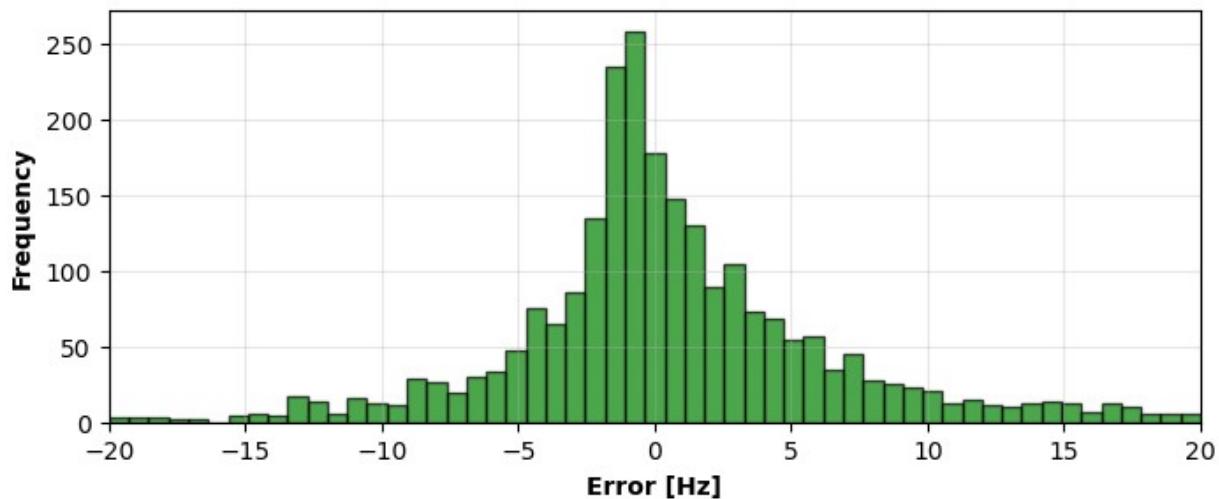
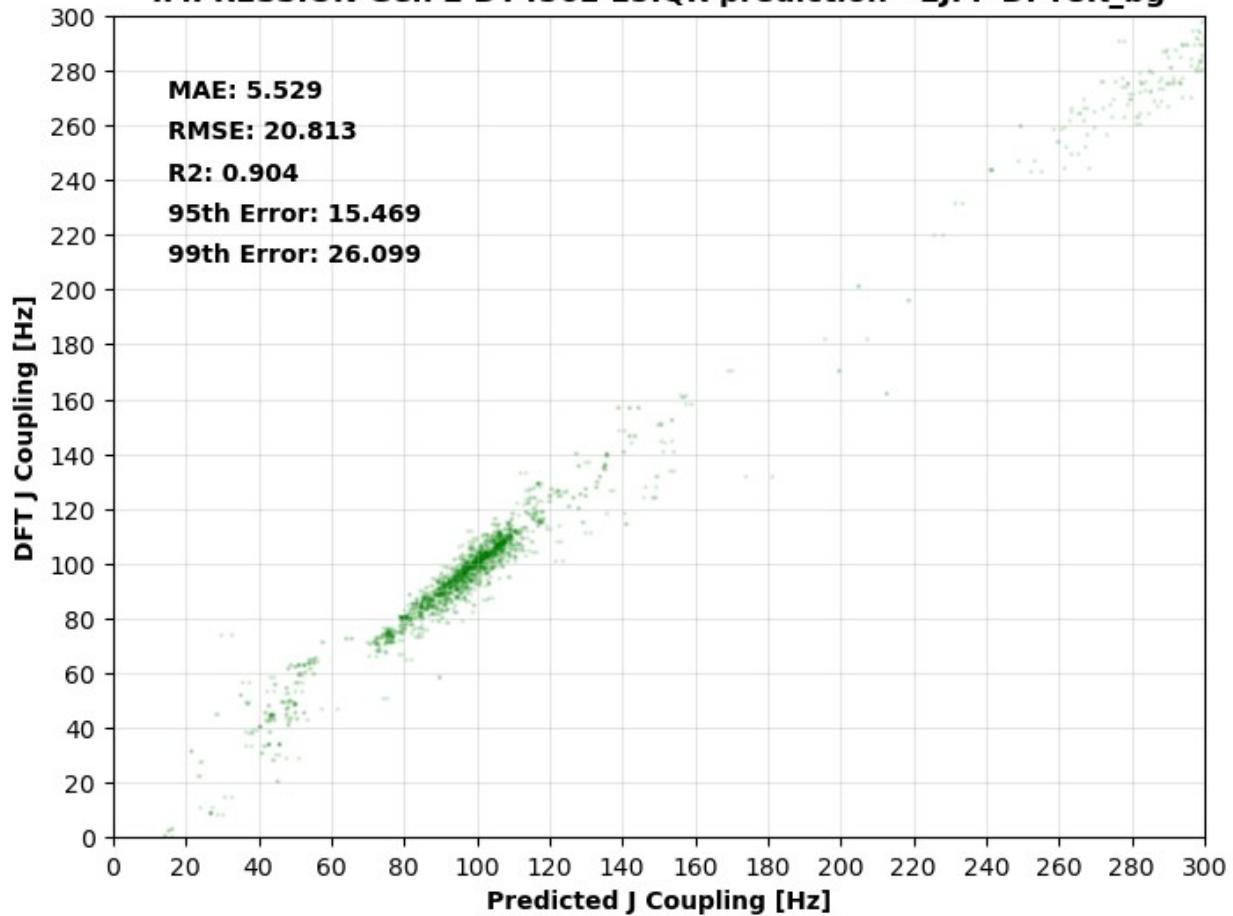
S2.2.34 ${}^2\text{J}_{\text{FF}}$

Holdout



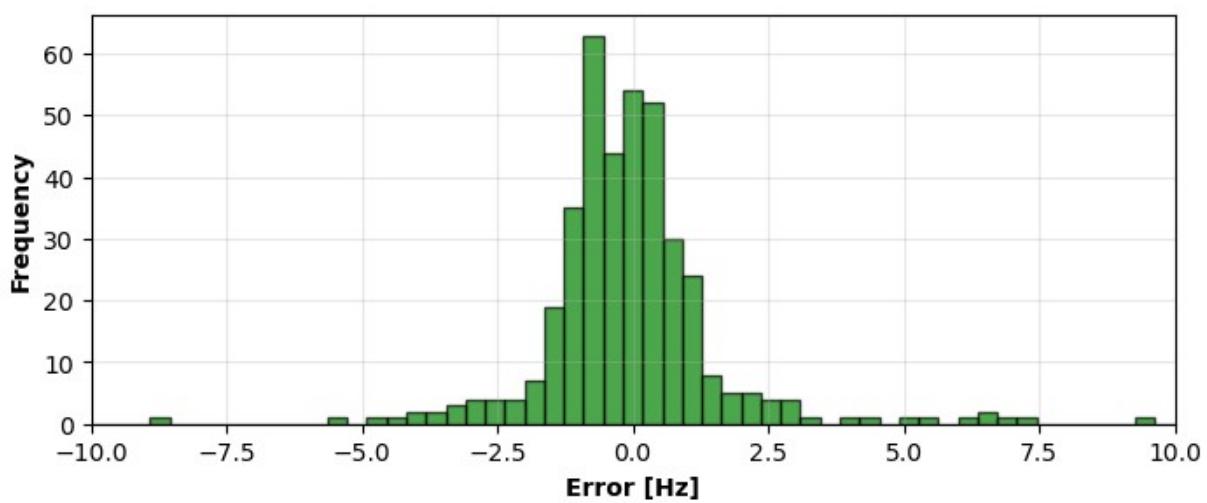
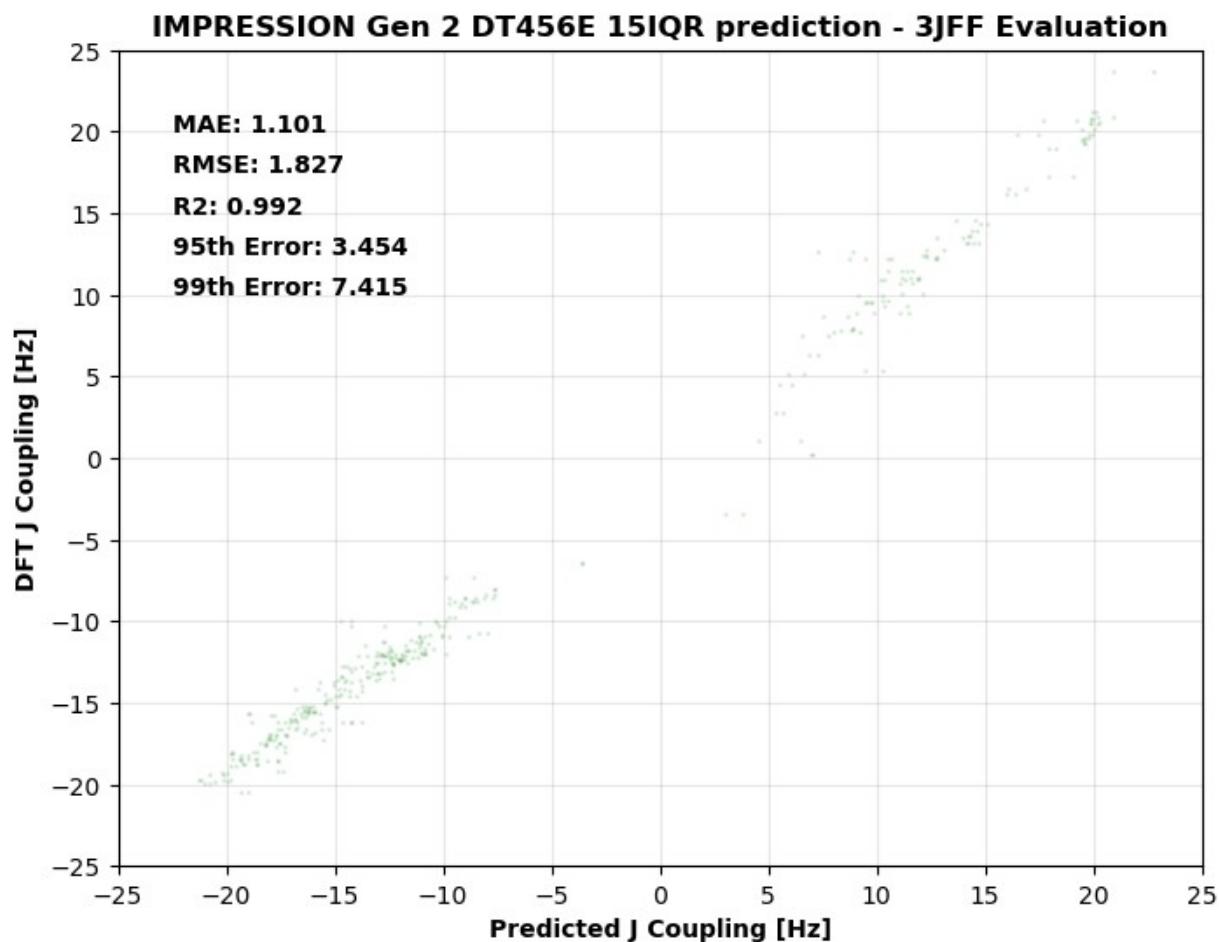
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IMPRESSION Gen 2 DT456E 15IQR prediction - 2JFF DFT8K_bg

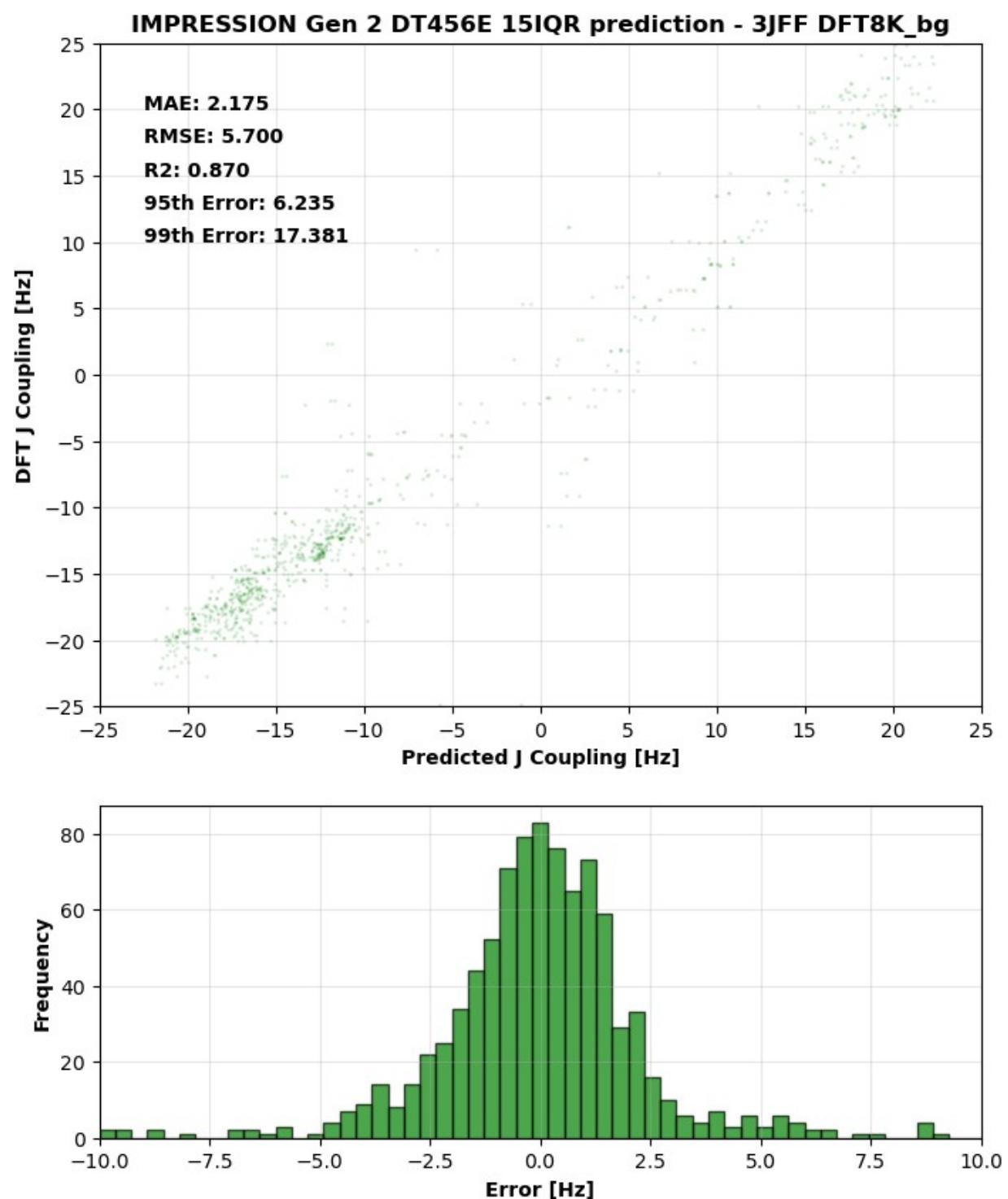


S2.2.35 ${}^3\text{J}_{\text{FF}}$

Holdout

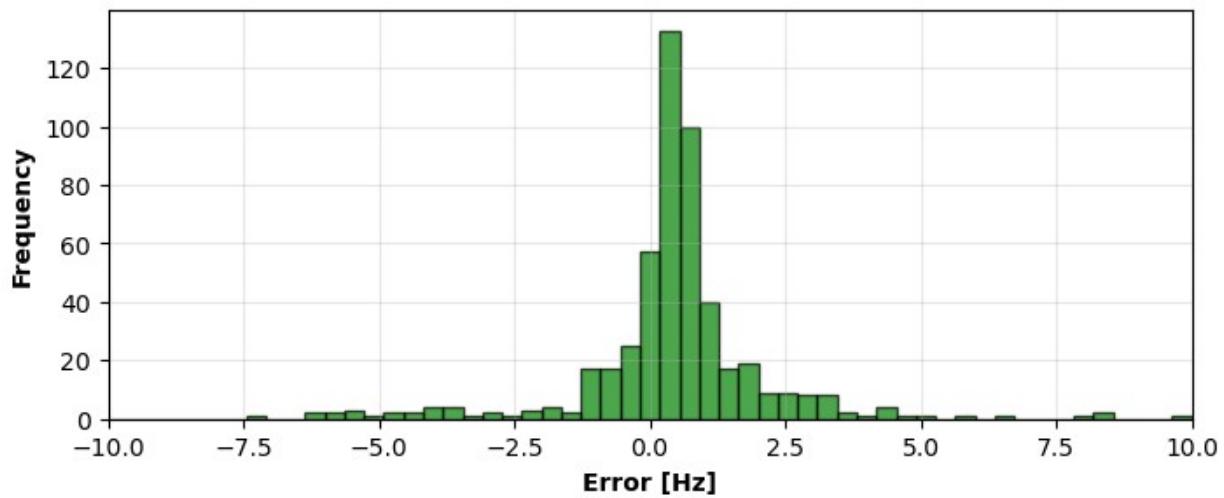
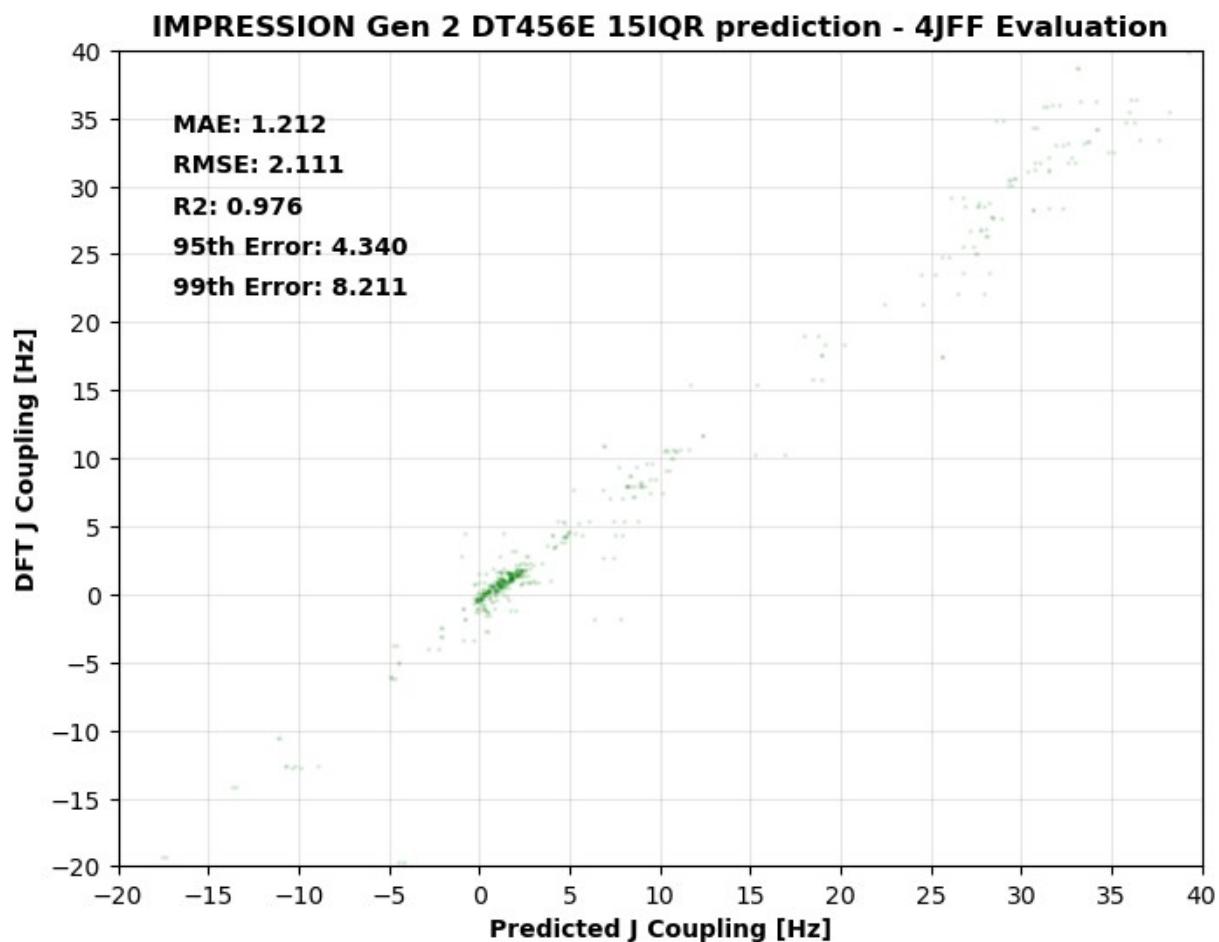


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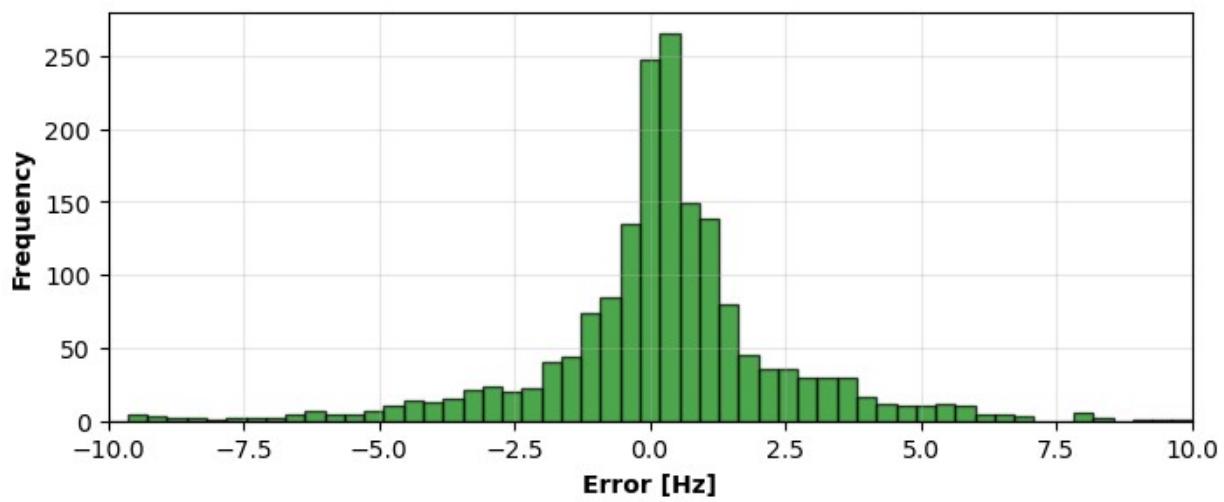
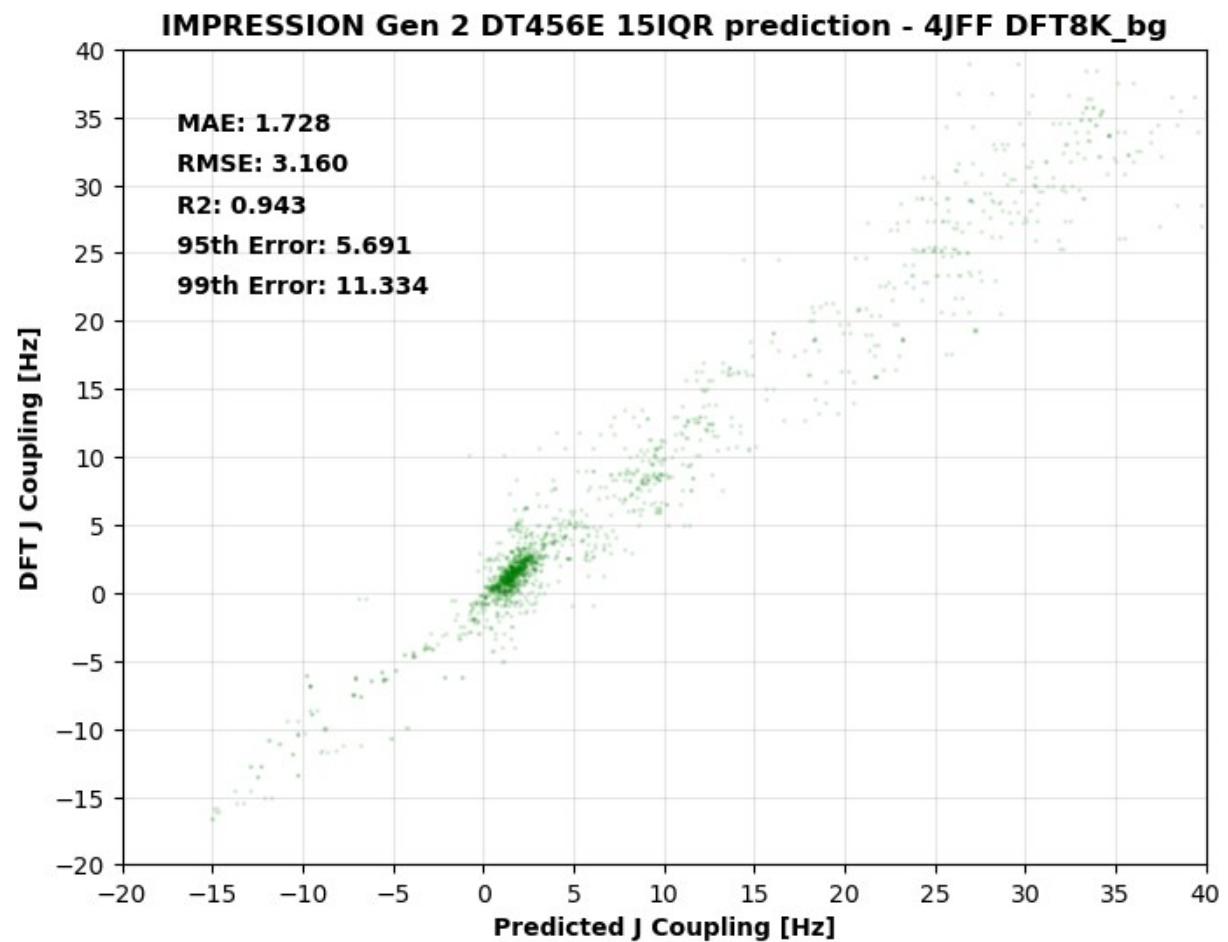


S2.2.36 $^4\text{J}_{\text{FF}}$

Holdout



DFT8K_bg



S3 Comparison of IMPRESSION Generation 2 errors between various DFT methods on CHESHIRE Test Set

We compared the mean absolute error (deviation) of IMPRESSION generation 2 predicted values against DFT calculated shifts to see the deviations between the methodologies. The table shows a comparative close alignment with alternate methodologies at a similar level of theory. ω B97XD/6-311G(d,p) was our selected methods as it offered a reasonable balance of n>1JXY accuracy against the computational resources required (underlined in Table VI.7)

	Optimisation Method	NMR Calculation Method	^{13}C MAE (ppm)	^1H MAE (ppm)
Electronic Structure methods	mPW1PW91/6-311G(d,p)	<u>ωB97XD/6-311G(d,p)</u>	1.76	0.09
	M062X/6-311G(d,p)	mPW1PW91/6-311G(d,p)	2.52	0.30
	B3LYP/6-311G(d,p)	mPW1PW91/6-311G(d,p)	2.64	0.30
	B3LYP /6-311G(d,p)	<u>ωB97XD/6-311G(d,p)</u>	2.19	0.10
	M062X /6-311G(d,p)	<u>ωB97XD/6-311G(d,p)</u>	1.78	0.10

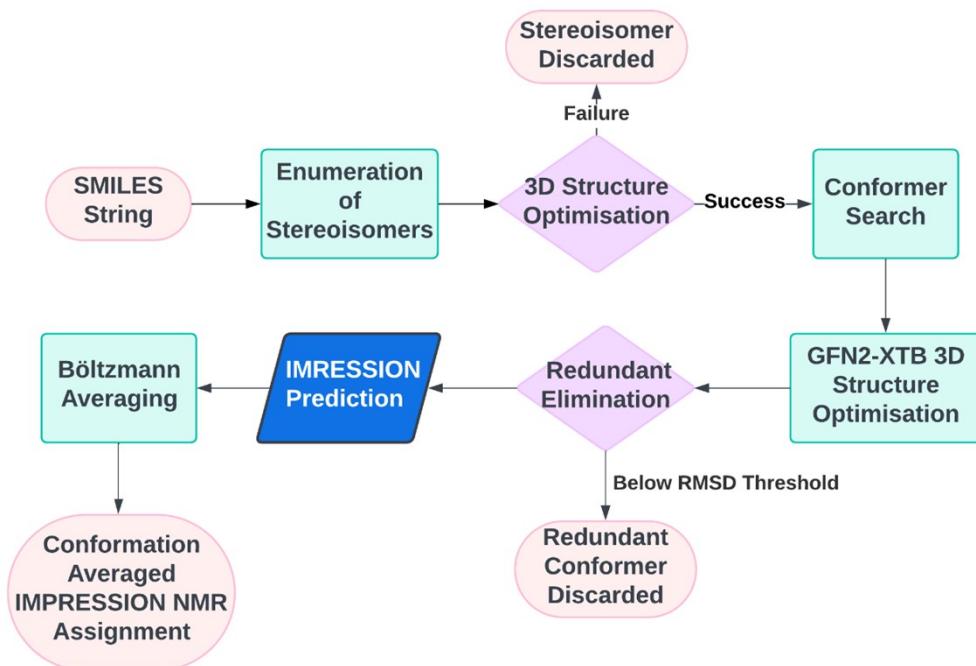
S4 Experimental comparison

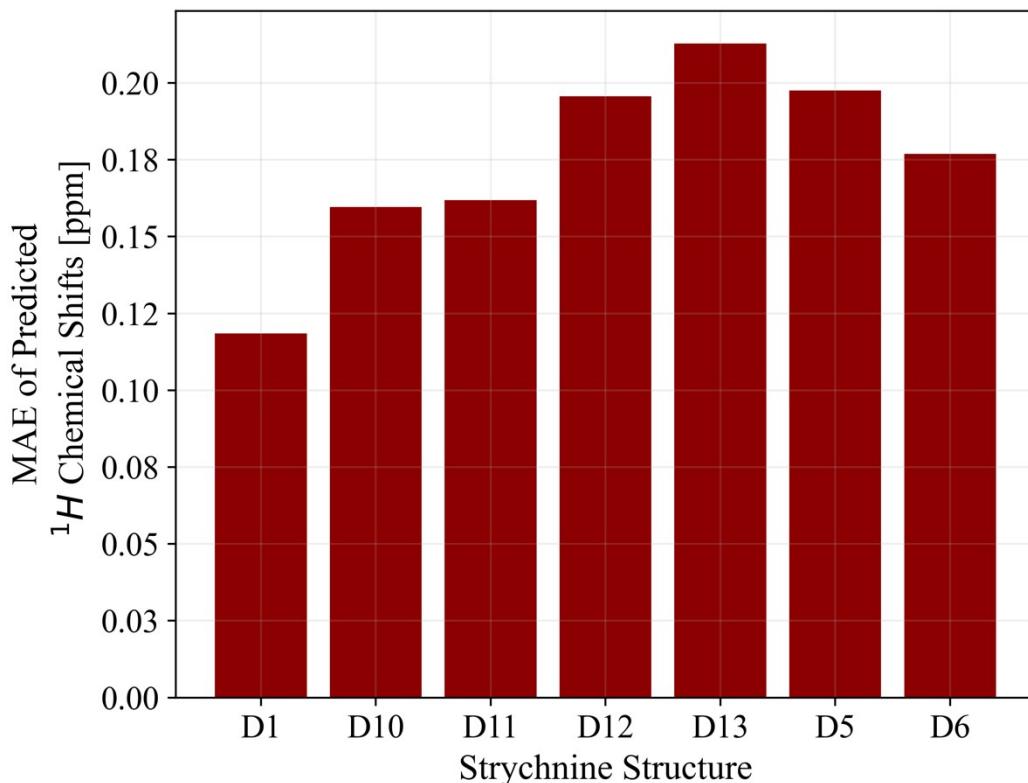
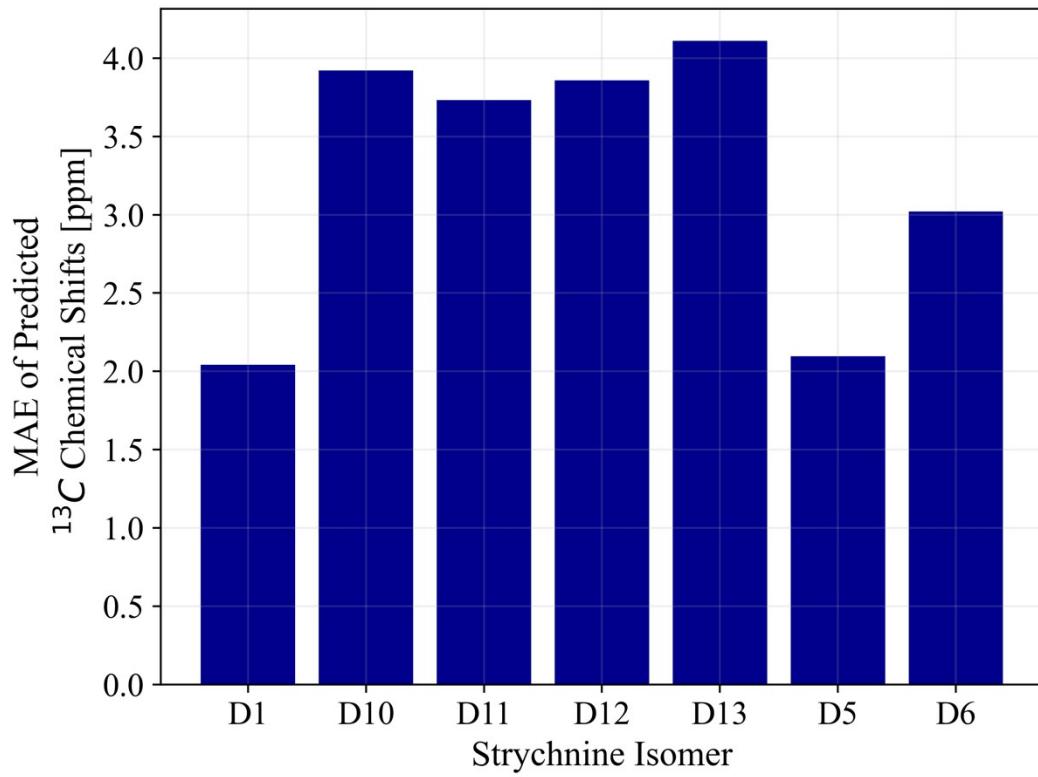
S4.1 Strychnine

Strychnine was used to evaluate the ability of IMPRESSION to predict stereochemistry, it is a rigid molecule and so does not have as many low energy conformers as many other organic molecules. Strychnine has six stereo centres and so 64 stereoisomers which were generated in RDKit. Of those 64, enantiomers were removed and RDKit was then able to create a 3D structure for seven unique diastereomers. The remaining stereoisomers were deemed to be too strained and not possess an energetically accessible 3D conformation.

For each of the seven diastereomers, a molecular mechanics-based conformer search was run with the MMFF94 force field in RDKit. 50 conformers were generated for each structure. This was considered enough to capture the conformational space of strychnine. The conformers were then optimised by GFN2-XTB and a redundant elimination was performed to eliminate equivalent conformers. The root mean squared deviation difference threshold was 0.35Å and the energy difference threshold was 0.1 kcal/mol.

The conformers were processed in RDKit and run through IMPRESSION, then the predicted NMR parameters were Boltzmann averaged based on the energy calculation by GFN2-XTB to give conformationally averaged NMR predictions for each of the seven stable diastereomers of strychnine. These were then compared against the experimental data for ^1H and ^{13}C chemical shift and $^1\text{J}_{\text{CH}}$ coupling constant.



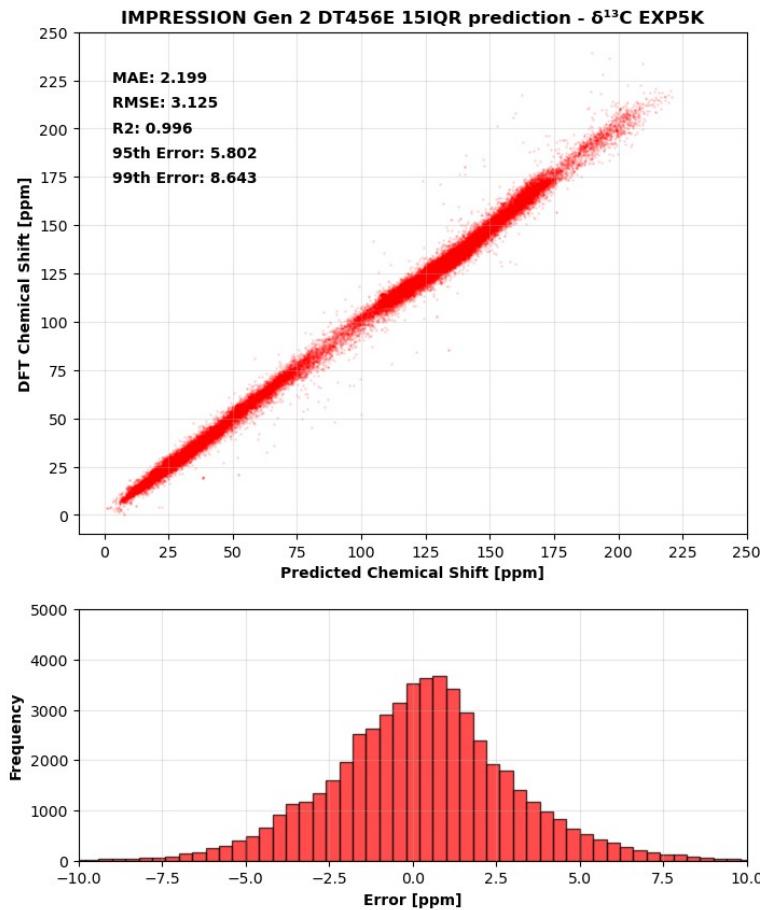


The diastereomer to consistently give the best fit to the experimental data is the right answer.
D1 is the unique naturally occurring diastereomer of strychnine.

S4.2 Exp5K

Figure 2 in the main text demonstrates the performance of computational workflows using IMPRESSION-G2 and DFT, compared against experimental dataset Exp5k from Guan et. al.¹³ We note that experimental NMR data are a measured property derived from an ensemble of 3D conformers with populations controlled by relative free energies - and free energy is notoriously difficult to predict accurately. To avoid obscuring the comparison of NMR prediction accuracy with comparisons that also depended on energy prediction accuracy, we use the same approach as the CASCADE report and assess only a single conformer for each molecule calculated. To do this we initiated both IMPRESSION-G2 and DFT workflows from the same initial low energy conformer geometries thus removing energy prediction as an obscuring factor. Thus the workflows using only a single conformer (no Boltzmann averaging) were:

- (i) Generate a single conformer for each molecule (both workflows used the same initial conformer)
- (ii) Geometry optimize that conformer (GFN-xTB for the IMPRESSION-G2 workflow; mPW1PW91/6-311g(d,p) for the DFT workflow)
- (iii) Predicting NMR parameters for that conformer (IMPRESSION-G2 for IMPRESSION-G2 workflow; ω B97xd/6-311g(d,p) for DFT workflow”)



S4.3 CHESHIRE Test Set IMPRESSION/DFT to Experiment Comparison

We compared a selection of DFT methods, and IMPRESSION,

	Optimisation Method	NMR Calculation Method	CHESHIRE TEST 13C MAE* (ppm)	CHESHIRE TEST 1H MAE* (ppm)
Neural Network	XTB	IMPRESSION-G2	3.19	0.22
Electronic Structure methods	mPW1PW91/6-311G(d,p)	wB97XD/6-311G(d,p)	2.31	0.16
	M062X/6-311G(d,p)	mPW1PW91/6-311G(d,p)	2.51	0.15
	B3LYP/6-311G(d,p)	mPW1PW91/6-311G(d,p)	2.73	0.14
	B3LYP/6-311G(d,p)	wB97XD/6-311G(d,p)	2.58	0.15
	M062X /6-311G(d,p)	wB97XD/6-311G(d,p)	2.37	0.16

*2-cyanopropane, t-butylacetylene removed from CHESHIRE Test set as DFT calculations failed during testing.

S5. Sampled structures

VESHUX	OLOJAB	PARHAR	BEDJOM	YUNYIR
CASTEV	NESZOB	YAPZEU	BULKID	NUPQUEU
PAJVOO	CIBFEA	XIWREA02	INACET03	PEGLUL
UYUDUO	COTMEE	TARGEB	FOCBEF	BIBXIT02
OCEHIP01	MIQNEF	JABKUV	VOFSEP	XAXHOW
FEKDUU	DAWYEI	BULHIZ	CTOGBS20	JECNUD
FULZIV	ZIFKEG	FIKCAE	NEPXOX	DICRUD
RUWMAX	SELKEB	ZETHUD	HOVFUT	KIMSUU01
KUVBEI	VUFSEU	DOTPOS	MENNAV	SAKJUM
EFIKOT01	SEHNAW01	VAPCEW	FOMZUD	VIGXAK
KUXJIY	VOLKIS	SUFGAB	HOZGAG	OHIWUX
XEDNAX	HAHVIY	TUCNUC	LOMHOK	RUWJAU
VUPHIZ	EWODEA01	XOGXEX	JINHET	OWOHAL01
AGAVOU	QIWMUG	FUCVOO	NOFYEM	MECZID
ATUJEF	XEMDAX	WACZUX	LUPGAG	GITNEE
VUDKIP	WAZMAL	AYEROL	CEPKIS	MIHZUZ
GOCCOS	SIQQEP	WUSQUY	UHADOX	AXEHAO01
CIXGOF	ANIZUT	XEZYIK	YUDLAM	TALNAV01
GEYTIN	FICTOC	MAXDUL	SAPHAU	TATNEI
SAHZAF	URESOB	TOPSEW	OJAQOH	LEPPIF
NAMZAC	ESTILO03	KATKIA	SUZJAZ	NIVMIQ
CYTOSM13	QUYJUQ	QEPNUW	SIYYUU	BUYZUQ01
FASZOP	JUNJIN	YUQCUJ	QALZUA	PAGLEO

KAGZIE	OLOREM	KONTIQ01	BEMZAV	GODSOH
BASDOO	XIJFEB	TUSQUU	ELENEQ	CUSFEC
POZWUW	DAFLIH	NACGOP	RAFINO01	DETPAU
YARDUQ	COWLUX	FULJON	EFUMUP	XAZROH
LIWFEC	CIGJUX	YIDPEG	YOXGIB	CEKPIR
ZZZMBS02	AMUVIP	XEVCEH	ONILAZ	YOKYOO
HIFGEJ	YIFWAM	NINWEO	SAWHUV	QAKMOG
BAFDIV	OMCHDO	AFIHOO	LUQSOG	VIBZUB
JUSQL	DAJXUI	BAYZUW	LOKDEW	AWOTAH
EDEKOQ	VAJVOU	QAKJUJ	DODWOI	TIQWOG
TARGUO	BOVJOL	VEFFIF	WOGQEO	CMXMICH
ATOGB	RUCFAX	HURLAI	KUVKES	QIRLUA
NUKXEX	KIGQIA	NIJKEX	TPHETY01	DAQJOV
HDPDXZ	WOBWUF01	CUDSAX	FICLEK	NEWREN
COFGUA	PHTHAC02	CIQHOA	BANJOQ	BOCHIL
HOQSIQ	KUWZOS	JEXBOE	KUKCUP	SUCANH12
BAVZEE	XETMAL	SANWEJ	YUHTOK	PENTYN
TUJJEP	AQUWOY	QIQYIA	FOGKIW	AXADUZ
VUTBUI	PAYJEH	WESVIZ	REZJUC	DOVGUR
PEXLAH	TECQEX	QECHO	GUHXOY01	NEDYEA
AFIFAX01	TICBUD	URAWEQ	KOKLIH	UCOMOO
SUVCUJ	ITUVOI	CIQYAD	MOGYIR	QANQUR
WOZPUW	RUJQOE	JAPBIO	PADTIX	YEXZIM01
VACLAM02	TIHBAO	CISXOT	COFNUI	HOWWOH
MTYROS01	SUCROS47	RAMZEL	FUTWAU	LILDEP
GIMGIU	HOCPUL	KIZVEV	UCUZOJ	EGUQAY
GATVED	JOZYUU	EGOTAW	SEQREN	TIXPOF
MATVAE	SIWDEH	HALVAT	TOVSUS02	DIBENZ13
POSJAI	MOFCOA	TIQNIQ	NEXMOT	TOPROG
PORROE	HEQWOQ	KEMHAL	CANPEM	BEJTEP
YUNTOR	BICVIS01	UFAGOY	EGAXAL	AVALAM
AHMVAL	HIGCIK	ZAJVAK	LEGXUS	XUVSUE
XAYDIK	FAHPAH	TIMHED	PEXFUT	NUHFEB
REBXON	FOFQOG	EZUJIU	VUZQOX	AXADAF
BASHUA	METAMI02	COYREO	MOBXAC	BZCPRO
MEQFAS	EZUTIC	HEVDIW	HIFQET	XOBGAY
GEHXEZ	YOGSIY	XENLAE	MUVCAI	REGFER
CEBQIK	DOPSAC	NAYZOD	LAFHEH	WECXUZ
YEKVEQ	DOYVUK	DIGGOP	WUYMUZ	ICEMIO01
IHOQUT	LEHJAM	VIHBIZ	BUBPAQ	PEPGEW
SEDMOD	QIKJIF	LUVPEX	WEWTUP	DEYTIL01
LILJOG	FEFYEX	HEXVAI	SADXOL	QAPVOT
RALQUR	NOQBUQ	DUNTOV	CUKSEG	SUXCAQ
NAPTYR11	IVAKAS	FRANAC04	CEGREL	CITQAY

EHAJUS	FNPEYO	VUNFUF	GEFLER	ITIKEB
XEHTUZ	NAFHOR	BIFFAZ	NEMZAG	DEBDIX04
RIFBUE	BUDHOZ	HAWTEF	YEJPAG	VIDFEV
EKAHOO1	JOCDAG	MATPEC	YUDPAQ	ITAFEP
DLHTDA10	ZUPGUM	MAMKAO	GAMLOV	MIPYAL
FACWUC	ECIPIR	CEKYAS	QAJBZU	FOTYAP
RIWNEQ	MULBIE	BOAYPI	DLALNI14	LUQYIG
EMAQEQQ	ZOLBUX	NIVJAE	SAYWOG	DETLAQ
HXOCTM	SAZLAH	WIPHAG	ILIMEV02	FAFXUF
TENMIK	LOMNUY	KOWCAC	GUKXIT	KAYHIE
XOGWAR	BZPHAN01	ERISII	DOQDET	SUCTAN
IDILUD01	RUJSAS	CIRGOB	DUNSAH	NISMAD
UQIMUE	ICOYEE	JOYGEJ	IQUFUX01	NETIND01
YUFYED	VUTNAB	CUZPAP	COCPAN	UTIHOV
ORIDAW	FEHLEL	EYIKUS	FABVUC	CEFBOH
QUVPOO	TUWCEU	YIGSUE	ZZZLUK05	ETIROQ
PINVOX	QUWJOJ	MIXWEX	MEYCIC	NAMZEG
TANBEP	UXICAH	MENSEE	ZUQVOY	FAMFII
TABNIV	ATEZOO	HIFPIX	PAXCEX	KAVCOC
KINGUJ	GENFUA	MEDLEN	DLTYRS	XEWNES
YUCQUJ	COMXOR	PHTHAC06	CUGLIA	BOMBEC
UYIREB	YAGJEX	OQUHEP	TELKAZ	GILKIW01
TAPCIW	EYOGEG	TUNTUT	MINGAR	FAVYIN
BEZREF	BOPKAS	DEVcir	ZIYSIL	UKUTUP
CEBKEZ	TEPHME02	CTPROL10	NIHNEY	QAZMIP
RUGCED	LGLUAC13	WOBLAA	ENIJIV	LAVCET
KIXROA	CUVBIF	CAGMIJ	UWACEB	ECMPCA
WIBXUA	QAHSOI	PINYIW	YIHHON16	NATNAA
GASNEU03	OGOXEP	IVIDAS	YENLAF	XINJIN
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XIVVAA	UTAGAZ	BOVCEW	SUSYAI01	OTAKEB01
VECSAZ	XISHOY	EVOGOM	DEGREM	RUWQIK
FESNOG	ADAZUB	RURRAY	WIVYUV	RAYXEU
EVAWEE	SEJWOT	YUHTEA03	DUFVEG	UZUHED
LOVCAC	FECQAF	DOFGEK	MVAHIV	MEWROX
ZEWPUM	UPADOG	VUFWAV	SECTIF	MUNWUP
LACVAM	DEBGIB	LOSMOW	TULDAH	CAHBUL
SADJEM	NAXRUC	YAPBUO	KOPBAS	JUPJAH
QUDREM	AHUHUH	XAZQOF	IVIHAY	MOYKUG
DMTCUN10	TEVLIQ	WABTAU	TUNCOW	NIFRAX
ZUPHAT	VOKXOJ	TACRIB02	SUPKET	WIBWIN
PUDDUP	CEMBED	AHUYUX	PIPINE01	REGYEJ
MELVAA	GEFQIS	FOQNUV	GICCEA	WADGEO01
USUZUF	REYCII	UPACUK	MEYWOC	XUHPIB

YOPLIY10	TOHVIW	YONBOT	COBROB	BEWLOG
TALHAR	BUGKIX01	HXMTAM10	BONDIT	AMAMOR
GUYBOR01	GUFXOV	YUQMED	BIPTEZ	CAVQEY
IHANAG	SAWJUX	MAQWIM16	AFEBAO	ACIYAP
ECASAC	CONNUP	ELOKIB	ATELOB	COZKUZ
SUCACB12	IBUYIQ	XIMCOL	TEDJOE	ACUPEV
ESUQOZ	ROSLAO	NUKJIO	BAKVUE	BEBCUG
EREVUS	HAKWUN	CEHZIY	APOHOE	ASUHUS
DIBNEH	JOTBAV	POBSAB	COFHEM	DBPOLO
CEBKEZ06	XOMJIS	PENBUH	BUCZUU	CEJJOR
MESYIS	LESCET	RAYXOH	DABPED	WEFXAJ
SOXHAQ	FOGBIN	RIXXOM	WEGPAC	AHIGAA
DIKFEJ	WUWMEG	DISJEW	CBZMAL10	BESSOJ
NADVIX	WADQID	TEGVUW	DAHSUD	BOFKOX
DUCWAA	BUGMOG	WIFZOC	AGAFAR	AGATOT
CIKBUU	SUXROS	FOLQUT	DIHLUC	AQINIX
XEYRIE	AFIGIG	ZODXEV	ATIRAX	ACEDES
NIFJOB	IGENOZ	EVAWIJ	BEWKUJ12	HEFFIK
ARIWAB	PEZFEG01	IQIDIV	WEHKOM	BAYQUP
AXMQOL	XAVZOJ	OBOWOU	DATWEB	BIBJAY
SOPLEO	GUMMOZ01	MUKBUR	AGARUX	ALEGEF
PAJDOUN	HELYOM01	VEXCUW	CAGLAA	BATGOU
BAPQOA	BATVEY	BEVXAD	CEGJOP	DERSID
GELDEI01	MEGNES	ANIBEG	BAXWOP	BASLUE
PABBIF	SIVJOY	CIPWOP	BEXYEJ	DEJXOI
CATKAL	RELCUH	BEFROU	CAPDEE	BONCIS
HIYHAY	TUCJEI	BAZZIN	DBPHEN02	BIBJEC
QEYRER	MIDXIH	ABOBIF	CUPMOR	BPSIND
FERTON	ZOFCUU	COSROT	BOLDOV	ABOGAC
DUDKUJ	BEFJAY	BECLAW	BZDCPB14	TEHCER
WIZZAI	PAFGUA	ABEMIG	BEGYOB	ALETUG
CBUDCX02	XUPYIR	CEWLIA	BEWMEW	AZPACN
IQIZAK	PIGTAC	CEKFOP01	QEFLAR	BAGVUB
WAGBEO	SUHYIE	CEBTEI10	BEWLIY10	BAHQUX
JEGTUN	QIMKIG03	BILBOP	AFUYOP	CUGSAY
KOXBEE	CIFSIV	CILLUG	CACRIK	BALJEG
COLYIN	XEXQOH01	AHEPEI01	AMODOW	COWKIK
OPOZAW	NAPHTA23	ANOCOW01	BHPETS10	BUBVEZ
ESUROZ	FEVHEV	BAGKEB	BALNOU	BAPXOI
MEYTUH	HAFDIC	BOPQIG	APOWIM	AWOJIH
JUMCEB	ABIVIQ	BOXQIQ	CIZGEY	BEVQIE
IXOYEA	WALNEC	BPAFAC	BEDDIZ	ANURAE
LIHMOG	FACQUV	AXOLIJ	BEPNIU	BOGBEE
FEQFIT	NIYWID	BABNEX01	CUTJIM	DEBHOOH

ARUWAL	BANTES	DAXKAP	BASMOZ	BZOYAC06
ACULUH	AZIHOU	ZIFROV01	ABULIT	BATROF
BAGLIH	BEBWIP	COFZOO	CUPWUG	BEGJEE
BBCPEO01	BEGBAQ	CEBLAY	CUKDER03	AFUZUW
HAZWUD	MEJREB	AHATAE	QAZTAP	DATSEY
BODCED	BODTOE	DEFWIX	BIMCEG	CEJLAF
DBTACD01	CUVQEQQ	DIDMUZ	CIDJUV	BEPYIE
BUGKEU	AVOSAH	BARNUE	BIDRAH10	ACUXAZ
CAKSAJ01	CIKTAS	BASVUM	CUHQEC	CAXREB
CUFTEC01	BOWBEW	COKCOU	CUVWIB	MEFPEV
ACORES	AKOCEJ	AWETED	CANTEQ01	BAXYEH
CACGET	CARJIQ	DICWIW	GEDLEJ	AFAWIO
BZYACO04	BEVREZ	DEMDEF	BALTUD	DARXUS
AYASUP	TAYGEI	CUMKIF	BUGDAI	ATYREE
DASBIL	BUFFAL	VEHSOT	DAWSID	BZQTCQ10
DARVEX02	AHUCUB	DBOXAN10	AMAXAP	WEDKEY
CADWOV	DEGLAD	CILBOP	BESSID	AHEPIO
BAZPO01	CURDUP	BODMOY	COQDOB01	COSXEO
YEHYUI	COUMAR11	COZFIG	BZOCND	CEFVAK
CURQOV	CAZVIJ	VEJLAA	COBMUB	ACALIA
BUVXAT	BUBPAP	BIJRIW	AYERIH	CIRHER
AVUGON	BENANT03	BEKDEB01	AMATUD01	BEGSEN
NAZPIQ	BOZYEW	BAGVIQ	ABIPOQ	CAXMUJ
CEKFIJ	ADIPOU	DIKSAR	BILCOO12	AXAMER
ADIBOG	BECPIL	AWIXUZ02	DAPHSD	ABUPOC
CUBHEO	DADFEW	ADUNET	AGIYOF	BEDRAD01
CUDXUU	CAPZIF	BASLIS	ABAdeo	BALQEM
CLBZAC03	CUXBAA	CAMFOO	CEJWAP	BIDYOE
DATRAT	DAZIMP10	DEJJOR	DCACNP	AKUNAX
ARIGAL	CIBRAI	CIHJAE	BABYIO	CADZOW
NAZPEM	CIYWIR	COBFIK	CEBKEZ02	CEFQIP
CUTLEK	AXOLOP	ACOSIW	CIMJUF	CAYREC
ATIYAF	DEZBEQ	NEBZAY	CIVRUU02	BUDRUO
AMPHFR	BIFLAF	CEFCOU	BUDJER	CACYEN
AZUWEY	CEMGEI	CILKAL	AKIDIJ	ADISEM
COJYAD	DANSOD	CIQDUD	BPTTAZ	ADOHIK
CEDYEQ	CILZUS01	ABELAV	AFUTAX	ARERUL
BEFTAH	CEGCAS10	ABIJAY	BUHJAQ	AZUGIM01
BRBZPH	BAKVUF	AMUVEL	BEPNUG	AFEPIL
CIQFEP	DATDEI	CITSOO	CAFNUU01	BOGXUQ
BULJUN	AXEPOJ	COPTEI	BOKTUS	CUFHES
YEBMOK	ADUPOF	DARVOH	BAVTOK	QEDMOE
AXUDED04	COYKIM	BUCLUI	AROHOG	ATUVOC
CIYWIQ	BAXJUF02	BAQBUS	CUWYUP	CIBMEH

CIKTIA	BABBAH	AXODAS	COZFUT	DATCAF
BIMPTZ10	AJOMUI	COMFAN	CUJHAQ	ACUNEU
BALKAC	CAYKIZ	DALZIZ	VEDBIS	BECPAC01
BADBIU	CEHDAW	CILFAG	BADTIM01	AJIDAA
VEDGOD	BORLIF	CAQSOD	DBRNAQ01	CAQVOH
ATAKUB	CIPREA	ACMIEBZ	APEQAO	BONKAQ
AHEFAV	CIMYOO	BZOYNEY01	BOBDAZ	BNPHTA01
ASIJOB	CIZNOP	BURGIG	AXOQOU	CAKXUI
ABOFUV	DATTID	CAGFEX	AMAWUI	BAPRUG
BUTYIA	AQASOB	AJIXIC	ATELAO	COBJUA
AYATAW	BOKCEJ	DIMROI	ASOHEV	DEJGII
BAXNIA	CITMAV	BALSAK	CELTES10	ABUBEE
BAWVUR	ANTMEU03	APAVIX	BIXHIA	ABEBIS
BESZOQ	ADETUA	APUVOX	ADAVOS	DAVJER
WEDHUL	QEDSIE	CARYEB	BAVHIR	BAGCER
BUVZAV	BTZAC	BOCFAA10	DAYHUJ	CAGGIB
CEVTAA	AFUBAG	CINNUK	BZPHOS10	BEYDUG
CAYJUI	HEJPEU	AJOPIA	CEGWOB	DIJYIF
BAPTIX	CEHROX	AZORUD	CIVSIL	CURPUB
DANTRO01	CAPDEF	DHNAPH05	CEZDOA	HEJLAM
BONWEI	BZAMID13	DATTEZ	COPPOO	BUSYIZ
CIVLOK	COJCIP	CAZMOH	TECHUH	CIKCIJ
ADAJUK	CAQVAS	ABUVIE	BUWBUR	BUWBOL
ATUTEQ	CINZOP	GEHVOH	BAWWUS	DAXGOZ01
AXIFET	AQEREV	CUMKEB	ANUKIE	CAKSUF
DADPAZ01	ACRDIN09	DAJXAO	BONQAX	DALGAY
ALUQON	DEBRAG	DAHHAY	BEPYEB	CEGMIM
ACAYIN01	DAMHIL	DERKEQ	ARARUH	BOZSOZ
CEDJAX	CIVWUZ10	AVOBOD	CARGOS	CAJWUG
BACQOM	CIBMIL	DIKLOZ	ACUGUA01	BIGXUM
CUPVOA	AZUJEL	CATYED	QEGRMAT	AZISOR
AKIPOB	ALAJUT	BETQUA	CERJIT	CEGSUE
DADGOF	BUYPOA01	DASNUG	CETRUQ01	DIMNAP04
COPDIV	BIBZUJ02	BOQCEP	ATALOX	ACORIV
AQIKES	DAVJUI	ANINOC	BEWDOW10	BANHEG
BESVAW	DANZIE	DIDRAK	CEJRIT	BUVDIG
AFIRIS	CUGDUE	CUTLIO	BORZUE	WEFWUC
BEBRIJ	BPACLA	CAWZEG	DEXWOU	AFURIE
DAYMAU	BUFZOT	QEBVIF	COLROL	AFUZOQ
ATEQAS	AZEKIB	ATISED	DALLAF	BIPZUV
CEGXUJ	AYEGAM	BICFOI	BUPCIZ	CIYTEJ
ACUTOJ	CAWWAA	AKOHUF	BODYUQ	CLDZPB
CURRIS	DEFZIY	AMUXUD	ACENEBC	BOCXEX
ABIBES	APUCEU	BIMJEM	MAZQOW	CURPIP

BOVTUD	BOSBOB	APAKOS	CEDBIX	DIBENZ06
CONPAW	AHUSAY	CEWWEH	ACORER	GEHCUU
BAHBOB	BECRUY	DESWAZ	AZAFAJ01	CUBVOM
BEQXUQ	ACSALA23	CUTTAM	AXURIW	BEQWIE
ADOHOS	CIDFIF	AKUXOU	DEDLOQ	CIRKEV
AXUGUX	CEJSOZ	BUHLUN	CINTIE	AXIYEM
DAVCAH	CHMPOA01	CEZGIZ	MEBZAX	BEPJOX
AXOXAN	ABIHOI	YEBMUQ	ANUCOD	DAZBAJ02
DAVBUA	AYUFAC01	BAWQAS	DAVFEO	BCPSBZ
BERDUY	CUBTEA	BABCUF	AFIFOK	BEHMIUY
DEMTAQ	NEHVOO	HEHSOF	BACTAB	DABZEN
ALEJOR	BEDREJ	CEGYOC01	BEDROR01	DEZJEY
DACBAM	ASULEF	VEBKOF	ABILOM	YEHFID
ARANEO	BANBEZ	DABRON	YEJJAB	BOHMUH
ADAVEH	CADFUI	CONSII	AVAGIN	CISPOK
DAKJAB	CEVQOL	CIMDUZ	AXADIO	COPQIJ
BORKID	ALURAA	BELPUF	AJIWIB	ACIVEP
CIKFEH	ARIGEP	BIXGUL	COKCEK	COZROA
APUTOU	GEDQAK	BIHMOW	BUVSES	DAHREJ
AFUYEF	BOWCOG	NEBSIZ	DEWYOT	HEBKOR
AKUZIP	TEHPII	BIZYOZ	DIHMAJ	CUBTIE
CIRKAR	CODMAL	AFUKES	AJUTIJ	ACECAN
CIJTIA	BONPOL	CORONE04	YEGBAQ	COTRAE
CAZRIE	ACIJIF	ALEDIF	APINIY	CUYPOB
LEFLOA	BADRON	COLHES	BEJJIL	BAFPED11
AFIJUW	AROBUF	CUNSOT	BICROU	BIBCUL
APOTOP	CAQDUW	BACREF	DIDQOY	BAPXKEY
BUFFAJ	BAHPAC	ARUDUM	DIHVUL	AGOLIT
BERFEJ10	BEMDUU	KECZOK	ACAXEI	BIDYEU
VEBVOQ	BUTFIH	DACLIF	CUCPOH	BOPWEJ
BAFTOT	ABEPUU	LEHMAP	BITROL	BOQTIK
BUPDUL	CAXSEZ	ABEJAV	CADDUI	DAFCES
AJURED	AFEBET	AYUSUJ	BUYPUH	GAZDIX
BECVIR	ACSKAT01	CAYJAQ	GEFJUZ	CIKTEW
DECZOA	AFASIK	DASDAD	AXEJUJ	COJKUJ
BESKAM	BOZHIJ	CUVPUG	CADMOK	ATEWEC
BERGOU	BEDZPN10	ADISIQ	BIXKEZ	GEGKEL
BTOLYL	VAQKAC01	BUWCOM	AXARIA	BATBAC
CIKQAP	LECGOS	DIFYAT	BUCTOJ	CIVWAH
BENZON10	BAYDAI	AMIFEH	ALASAH	MEHCUA
DAYBOX	CITKUN	CUVXOI	BUDVON	BRPVAM
BOZLIM	BUJJEX	TEHDIW	AYOPOU	COTDIA
BEFTUB	CIPSOK	AYOZAR	AYOJAZ	BOYCUO
PECKUG	DARTEW	COKKES	CEPPOC	CUXNAM

DIGLOW	ADIJOO	BZAMTZ	CEBJOL	CUHGIW
CERYII	BUVCAY	DASTOG	CITSAZ10	BUKNEC
AMUZUE	DAKCEZ	ATELAN	AXAREX	ATUKUV
CAMCIE	ABAGAN	BAQRET	DIHDUU	DAYLOF
CAWMAQ	CEFNUH	ATEQOG	CISPOL	ASTLLD
DAVQUO	CALCOJ	AFOFAE	AFUZEG	CEKCIE
AKOWUU	BOWSOV	CNAPAN	DIGMAJ	ANUYIT
BIDKEE	ABULEQ	DEYMUR	AGEVIT	MEDXOL
BOXQIO	ASUYES	AJOFUB	BAGKID10	CAMZIC
CIPNOE01	ADAJAR	AHATAF	BEWGUH	AFUXII
DACSAB	ZECSUY	ALAZAP	BIRKIW03	AGASEH
KAXFAT	AKUYIP	BUFMOF	CIWJUO	CAGHAU
CUNHUP	COSDAR01	AKAVIS	CIPWOO	COVGUR
ALUJIC	DATJOY	DIDGIG	DEBLII	ACANAC01
BAPROC	BAPBID10	DILSIC	BACCOY	COMGEQ
BZPPOS	CAYTIG	CUNTAK	ZEFQIN	CACWAF
DEYRUV	BAPZEZ	DABMF	DABBTT	DEDCUN
TEHFEU	DETFUC	CUFCIR	DEVBIP	VAYRIZ
BOLDIR	CAGFUN	BIXSAD	DAXPAT10	AQOTAC
CIMHUB	AYUPOA	DACKIE	LEJTIG	YEFSOU
AYUMAJ	CAMDEC	CEMZIF	BEJZEV	JONXOZ01
BADMOJ	AHUPAW	DABLOJ	CERTAW	ABAWIM
CUDZOS	CASDEG	CORWOW	BMPPZA10	CUSHUU
AVAMAN	CIQFEO	CUVWAT	BATZIG	BAYDOW
AFALAW	AYEXEJ	CUVQIU	AJOGAJ	BOXZUL
BIKQIW	DILHOW	CERKOAO2	BIZTIP	CISDUD
AQEDEH	CEDWIT	ALOFIS	BALXAQ	ARIFEN
YEHDIB	BAJTAJ	CUHGOC	BRTCBN	BUDMUJ
AXAHOT	AXIDER	DAGYES	ATULIL	DARBIK
DEGMOU	BUKYAI01	BESXUU	AMOSUS	COBMEM
BEWYUY02	DAVGAI	BOLBEL	AMIFAD	BATKIR
CUXHIN	ASINEW	HECQIS	AHOPIW	BZANTC10
BOTLHD	DIHQI	CECQEI	AZOPEL	ALEYOH
BUFJOB	COTSAF02	AMAZAR	DAYYIM	BEPGIO
CAHDAT	NEDCIL	AQANUB	CUPJOM	CUPWAN
ADYPNL01	CUYDOR	AKERUF	ABEKUN02	DAVLOE
DALJUY	AWUNIP	ARIGEP01	BIQCEJ	BOQSIJ
CONZEK01	DARCIJ	BZHTHP	ADICOG	AJOLAN
DADPOQ	DIHMOX	CETRAV	BAGWOW	LEJWEF
CUHJUL	BOVBUL	AZUPIV	BOVTAJ	KAHHUZ02
ARIMEU	CLMANT	DECMED	CINMAC	AQONUQ
CAXHIS	BZOYAC04	CAWMII	CAFZIV	CAWHOZ
CUSXOF	ARASUI	CIZMII	AGUXAB	COQCIW
DEYNAP	CORSIL01	WEFXEN	BUCXII	BAZFUG

CEHQIQ01	BETSUO	HEFHEI	AJULUO	BICLEG
BERKEO	AGIYOG	CAMIGII	CIHFOP	DAHKAB
AROMAV	BAVCOT	BANHOO01	CURJAB	AREQAR
MEHDEL	BUDXUV	BUVYUO	WEFJAV	ASOBER
BEXLAT	DEFQAJ	LEJWOP	ALUMUQ	ARUJEE
AVAZOM	CAXMOE	CEMGIM	BUYFIM	AYECIAI
DABCOA	DAKXET	CITBIR	AXOJIH	DIGVIA
CIXWAJ	BADBOA	BEVHIV	CEFROW	CEZBOA
CADFAQ	BUTWAO	CEHLUY	CACRAC	ADUWIF
DEYSUW	ABAKIZ	ARADUT	CIYPUV	COPHAR
AHETAJ	AYUQAM	ASEDUZ	BESYEF	AFOBOO
YONSIE01	AYUZUQ	CUJWAH	AWODIB	AFOCAB
AYATOK	ASOQOO	BERBAB	BOKYUX	AYIMUQ
ACERAC	VEBTUU	AFIZAS01	COVNOQ	BACLCH
CEJVES	NAYMAE	BAMIBID	BEZHUL	CIWYOW
ANINUI	BEPXUQ	ABUSAR	DEZJUO	CUCPUN
NECJAJ	BIYBIW	ARAGAC	CILNOC	AFITAM
DAPNEO	BECSAG	BARWID	DIFZIB01	CARSIA
ALICAZ	CIPZUW	CUBRAT	BIGSEP	AMEXOF
CEFBAR	BPSOME10	AHUFOY	DAZTIK	BAXXUU
DADTAF	DACXAJ	BUBQOF	ABOHUV	BEZGIW
CONXEK	DIHDON	BUCTAW	BEBFAS	ABODON
AFAKOJ	AMEMUB	DIKLIT	CULVOU	CARWAV
ADUMUI	CEDGEY	DEFCEZ	COQCOB	DEJYUM
BUMHEW	GEDQOY	WEDPON	CEPYED	AQABOK
BZIDMS	DARXAW	BETMUI	DEYDOB	ADITAJ
CIQFIS	BAXMAP	BAVXEE	LEDFIM	BOYDAV
CLPOPA	AYUTIY	DHCBAN	AHIGEF	CETRUQ03
BOTDOD	BOGXOK	VEJRIO	CISNOJ	AYUWEX
ANEJUZ	CPPHOS	CIWNUS	CUNHID	BILYEB
BOYDOJ	COGRUN	CEJDEC	CIHGUW	ABUVAX
BUWVAS	CEYKOG	BRPHAN	DEKKIQ	BUWVAR
CAMFII	CAJSOY	BIFBIC	CUHGUJ	BAKTUD
BERFOT	BEDHUP	DETGUJ	BENZDC01	AFEQEJ
CEHFUS	DABBAM	CUZHOU01	BURQUA	BPHSUL02
BADSEF	MECWEZ	BABKAQ10	BOBHIL	CITTAB
AYIJEX	AYUFIK	CILPAQ	CURJOQ	ARUWEQ
DENCOO	TEGTAD	CAXSUS	ATUSAL	BAPYOI
CIPROK	CIDPOV	CAGXOX	CEQKAL	CIWJID02
BZTZAC01	COLQOL	BADPUR	COZJOR	HECDEB
CADMEA	COLJUK	CERKAM	BAMZUM	BEWLAR
AKATEM	COVNOS	CUXBEE	BOQPAAC	CAJLII
CAKZIA	CAWXEF	AJOHOW03	BAKMAE	ACAZOV
CIDHON	BUDNIZ	BUKBON	BEBGOG	CIJZIE

BANWOE	ABESIK	HEJMAN	COUMAR12	AZUZIE
CAZUYU	ACEFEV	TEHNEC	AVOTOU	CUXHEK
BONFAN	ABEJOJ	BMCBIB	AXEJUK	CUYZUT
BUFCUB	CUMZEQ	ANEHUX	CEYKEW	AVOZAM
AVEGOX	DAVREZ	ABOLUB	CICPEK	RAXFII
CERBEH	COCKEM	CURKIJ01	APUKUS	AKOZOQ
DELVEW	CUGMIB	DEBMEF	CIBCOF	DAXWIL
BTCDOD	VEGBAN	CABRAA	BZTBZT	CAKNEI
AWOFEZ	ASIWEF	CAHGOJ	AZACUA	CACHAP
AKUJEX	BEBPON10	DERFIQ	BIKNUE	ANTHOB
AEFQIN	DADTEJ	BOLNOH	COYRUD	AZUHAE
BEZWAE	COMWUW	CUGFEQ	ASONEC	BEBMOL
BERJIT	AYUPUH	BOVBIY	BIHVIY	COPBAK10
COBSAO	BZTRIP	BOGZOO	CARLEO	DAXPEZ01
DACSIM	CEBLEC	AXAWAY	CIQDEN	CUNLEE
DAJKUW	HECNOV	BIDQAH	CLPHUR	BIFPUD
BPCXIM	ANEMIR	CIRLIZ	AMIXOJ	CIWYE0
CUQBEW	CAQTOF	AFIPOW	CIKQAQ	ABAHAP
BESREX	AHEVOY	CADGAR	DECBUK	CUBLER
DIFVAQ	ARIXEG	BOJLAP	DELKUD	CURQUD
BEBMUR	DEWLLOH	BEPDIJ	BMDAZC	CUTHAB
ASUZAP	AHUYIM	TEGWOU	CABBIR	COSVEN
CUVVUM	CAYZIO	BUFLIY	CAYKUL	ATUPAH
DAJLIL	DAXYUZ	QAZSAO	CUCSUP	HEJKEP
COMGUI	CIHLEL	ALUXUA	BIGHUW	YAZCUA
AZERII	CUBZEF	COZXIA	BASCON	BIRYIM
AKUSUV	YEGLAA	BUCHOY	ARANUE	ABIVAL
BOCNOX	AYEDIR	BITBOX	BARVIA	BEYXOS
ASUWIV	CIRHUH	CIMROH	ANTMET05	CERBEG
BAWSAT01	DAJJUV	CACXUB	AXIGOE	BUBBAC
BUHNOH	CAWXEE	ATIWUV	CANZEY	PHBENZ02
LEFNUI	BAVREY	ANUBIV	DICZUK	AJOCOR
CIBDOG	DIKCUV	QEFOV	CERZUV	APOFES
CEBKID10	DEXBEN	AJEQAH	AMAFAV	BUVXUN
APERUJ	CAXZIL	DETJIW	BINGOW	DEGXOE
AKOWOO	BUZYUS	AKOWUS	BAQGOS	AQUTAJ
DAWDOX	DIDCEZ	CEDBUK	BAFXEO	ANISAZ05
BETCEK	AYEQOK	BOHCIL	AMAJEF	CINSUP
CLPCPN02	AQAFOO	BOLFIR	ALAPIO	BIZZER
CODDAC	AXIDAM	JASDAL	CUNPOR	CINMAC04
CAMGOP	AGULOF	DANTEN12	CABJEW	ASEGUC
BEGVIU	CIBPUY	COGREV	BUDWUU02	CIQPUO
BAQTET	CAVZEE	BOVVUE	DELSUJ	WAZSOI
APAPEO	CIPWII	BAZHUI	AKOVAZ	ANTCEN20

ALOVUS01	AYUTOE	AYOTEQ	ABOFON	DIDNEK
BOLZEH	AMUSOS	CEVXEH	BEJYOE	AFOLOY
BAFLAY	MAYHUS	AMETAN	BOVWEQ	CADBOY
BILRAR	HEHXEA	DEGVUG	AKOSIE	BECPUX
COJHEP	CASCEF	CAPQIV	BINDEI	BIHLOV
ATEKOA	BELVIY	NEHDAI	DAJJIJ	DIGZAW
CEKNOV	CADGET	BIMJIQ	BOQZUE	DAPTEL
CUWZUR	DAMNUD	ASOVIO	CEBQAC	BIDZOF
AYEDAJ	QEDVUT	COSFOF	ADIJII	VEFYUD
CAXKIY	CAWHUE	BEDWUC	DICSAJ	DAWJET
BAVHIS	AMAJAB	ADOFAC	CIBFUQ	CORWAJ
AGUMOG	AKIZIE	BOQGAP	DEVXUX	DEBKIH
CAJDAV	BISNOI	CUGNID	AHEDIB	TEHHEW
DIGFEE	BINVIF	BINAPH11	AQILOC	BUFHAM
BIXKUP	AFIHII	CIHCUR02	CAPHIM	ADAVUX
DESNOE	BAFHAR	ANAZTP10	CEGGED	VECBIR
BIZFOG	AZIQIJ	AYOVUG01	CAFLAY	BITBIR
CUNRIN	DARVID	AMACPH01	APANBZ	COZTUI
AFUWOP	DEZRAD01	CODHUY01	BANNEL	ATAJUB
BADMAW	CBZYAN01	AYOXIX	AMODIQ	ABOSEP
BACVAF	AMEZOH	CATZUV	CEMJOT02	HEJOY
AJAKAZ	DIFWAR	BOLLIZ	CIRMUN	COGQOG
AKAWOZ	ABANEY01	COMDUF	CEQ NAN	CUCZOQ
MEJLOF	AVILOI02	DASVEY	BIXYOX	BATXOK
AXAGEL01	AXEDUC	BOBFIH	ARIVOM	DADHOG
CAJRAH	DEHCIF	DICHOM	AXARAS	COKPUO
BOMWIJ01	AYUROC	BOJNEV	COZHIJ	ANUWUC
LEJRAW	AFOCUU	CEBKOL	ARAYUO	VAZKIT
AJUMEZ	BIPYRL03	ADIJUU	ANUXIS	CORMOM
YAZQUO	DEGFEB	BOCZOI	BOTCOD	QEKGZAG
BZDCPB13	AVAGAF	BURQOU	CDAGLN	DEVREB
CIPMET	ADAPUS	TEHGIZ	BEJXEU	ACIDIZ
APOZEL	CIPQUO	ADISUC	ATELES	ABAJIY
COMQUS	BUBNER	DIBDEY01	BUHCUE	BEVJET
DAQJIP	DECGLIE	AQELEP	COMRUR	CAMGUUV
CARXOL	APAPAK	ADULUG	COCHOS	CECYEQ
COLROM	BUNKEC	AHOVEY	LECKIW	SAXCAY
BUWWEW	CXAEZT10	AKIFUV	LEcqoc	BROPSY
DAGTUB	CARZIF08	BAVGEM	BAJCOH	ANUVUC
BUWCIG	DANJOU	BAJXOZ	DAHLEG	CEKNUB
BERMES	COCGAD	AZOTUF	CEYGET	BOCJAE
BRHPQU	CIWHUM	BAZYOS	ADURIA	BILYIE
CYMINO02	APUZUG	DEDPEK	ANUSIM	BIYXUC
DADCOC	APEMAK	CIJGEJ	ANIVEA	HICFEE01

ARAJIM	CASREU	AVULOS	CIHVUM	CUHRUT
ASOQAB	AJOHOW02	DBANTH11	BICBOF	AMOXUX
COSVUD	ARANAK	BAWFIR	CENYAV	ACATUW
DAJWUG	AXANIY	CIPWED	COFDOS	CARHOS
CENSAQ	BAWGAI	GEDTER	BOQBEQ	CIHGIK
CIKVIB	AMUVUB	COGHOX	BATTAT	CASGEI01
CIQFOZ	ARASOB01	CUNCAP	BESSEZ	COQYOY
TAYPIV	COMHAN01	CEZGOF	AYIHEV	BUVYOI
DAJFUS	DIBENZ11	CPHACR	BOQBOY	AHEBUK
BOZROY	CUNPIL	CIDSEN	AWOBEV	AKEKUW
BAZYUW	COBZOK	CALFIE	BOXCEX	AMODAI
BOPJOG	ACBIPH	AWODOH	AHEJAZ09	BIJDOP
BAPZUP	ADULOA	CIBTAJ	CIQNEW	AJIXUM
BAYHOB	CUQKII	ATEZEE	BUZROD	AREJUE
CAFGOH	BICSOV	DICYAQ	ALUQUT	CIVTAE
CURPAI	CUXBII	CEVDAK02	CAWMOE	CUQCAU
ARATAQ01	YEHSIQ	BUZFEH	BOCDUS10	CAYZAG
BUYXIE	BABYEJ	CIHMOW	CUYSUM	BUNQIM
AWEVEF	ADEKOK	DAFBIX	AMOSIG	ABEKOK
CAQWID	ALEXIA	BAZOCT	ALONUL	AKIPUF
CUPJAY	ACSALA20	DECPUW	CIRSED	AGEHEB
HEFGAD	QAZSUI	DEDMAB	CUDQID	CAMMIM
CUQYES	CAMDUS	CIMRIB01	BAQDOO	BOLJOB
AJETIT	CIYFUN	NECYEC	BOXYIW	AJAJEC
DECNEE	DASHUD	AMIYEA	COGWEB	DACXAI
CARKIQ	BETNUK	ANIZON	CEMVEV	CIWFEU01
DAFMEE	BEDPUX	BETFAH	CARYOM	TEGWIO
BAMYUL	DALZIA	CAMVOE	CIVSUX	ARICEL
APIFOW	BICWOB	AMXBPM10	ADUHEM	BALCUP
CINGUB	DECUSN	HEDKIN	CUZKAL	BILVIB
BUSJEF	BNPERY02	CEPHEL	BAFKOK	AGAMEA01
BEXLIB	ALITOF	CIQREB	DEGGOM	QEFD AJ
CUBQEW	BOWGUP	COKJAO	ANOFUF	ANUXOY
LEGMES	BOKYIL	AMUJUP	DEJGEE	DACNOL
BICSEN	COWNIN	DCTXAN	APOXOT	BAQCAZ
ATEHIR	BAWTOL	DCLANT10	ADIRAH	BIFRIS
CIGTOD	DADBAN	DAWSOM	ACUQOG	AVEWIJ
AJULAS01	CAGKUQ	XEFKAX	AHIKUY	DEJGII03
BEPYIE01	ABUCAD	AZAFOY	DAYNOH	CUSMOU
DAFYEO	CUMVIP01	DAWHEO01	BADJOH	HEDFOO
AYUJUA	CEVKEV	COCBEC	CIYDIY	AFOFEI
BIBQAE	AZERON	BEGJOO	BIKLEO	LAYREL
DIHDII	DAZCAL	BALJUV	DAXCUD	BUVJEI
AHUQOK	AZOTIT	DAMPIR	COZYUM	DACXIQ

ASUJAA	DASDEH	CANDOM10	BIZXAK	CEBGUL
CASGOS	CODDUW	CUCHUF	ACOGEG	CENRIX
CORNUT	AXARUM	ABOQUD	CANTAO	ADOYAT
ACEQEG	AKOZUW	BEBXUB	AKATIQ	BTRYPT
BOLMIZ	BILDAD	DEXYOV	AWAHOX	AMATOX
AYEGEQ	ANPHXN	CIHHUW	BRFUSO02	BEBDET
BENZID13	CUVJIO	CIMZAB	DICRAI	CIHLOV
CUCDAF	BUCKUH	AZEJEU	CAWHOY	DADTEH04
CEPNIV	ADOTUI	BAGXOX	BAXNAQ	DICFOK
DEDCEX	AXANEU02	ACUYAA	QAYHUW	ACOKUA
CAPZOL	BILCUU12	BARKAH	BAFYOZ	BIGBEY
DAXSOM01	GEHNOZ	CIYSUZ	APEZEB	CEPFAG
COYPIP01	AWUFEF	LECWIC	CAYTOM	CIRLUL
BIBSUB	COXCAT	CUWCAA	COVDOI	DEHXIY
DAMPEO	WEBGUI	QEDVED	ASUZUK	BASJAI
COVPIM	BUCKOZ	PEC DIN	AYUKEL	DAQNOZ
GAYZUE	AXEHER	DETGOZ01	BHXPAM10	CEMZEB
AGIPAJ	CIPRUQ	NEBXUQ	DABVAD01	BORLEA
CANXAR	HEHJEM	DIKTAS	AYATEA	BBZOCO
COFYON	ANISIC03	DABLAV	ATEVOL	BAXHEO
AQEBAB	CONPEB	BAWVAZ	AXUDED05	BUVKEK
BIFQIS	QEDTIF	DANTEN01	ABIBIY	BAKCUM
AQUCEV	DACBEQ	ADODUT	CEXNOJ	BASMAL
BUBLIT01	CUSWIY	AZUKEM	NEGJIV	DAGJOK
LEJRIE	AROBOZ	COZCUQ	DEPRUM	BOLGOZ
AXAMES	BERDOT	BOKPEX	BICZET	TEHGEV
DAKZAQ	BARDEV	BAKYUK	DIBENZ14	ADAKOG
BOPRAZ	AWULEK	DAHBAP	ADUQOG	CAYXEI
CIPFAJ	BOMSIH	BEJZEV11	CUWZOL	AQANEL
CAWDUB	COVPEK	AMUGAS	ACEPII	AVUTOB
CUNJEB	AZEQUT	ACORUH	TAXRIW	BOWVIT
ABUSEV	BODFOR	BATKIR01	DAFFIZ01	BUWBIF
CUXXAW	ANIVID	BEDQEI	BAVDEJ	CEDPEI
ASOXUC	DAQVUM	CUNTUA	DERVIG	GECTUG
CINNDS01	DIJLIT	ANIXUR	BINAPH12	DAXXEI
CEYQEC	CORWAI	ATOPOP	BEVROJ	BUFQOI
CABYEK	AVAFIM	BOQTAC	BZTETO	BOYHED
ACSLCB10	BDPPRP	CUQHAX	BOFKIR	CEPGEK
CARXOI	ABAGOB	DERHIR	AZUJIP	BARKOX
BESKEP01	AXONIM	ABABEL	CUJMOJ	QEDYAC
BADVEH01	CAFPEG01	BUBSAT	DEGDAV01	AZOQEM
ASECEI	BASMAJ	BUMWIP10	COYCUQ	AYERUR
DEBYEO	BEPZEB01	AZAFEN	BEYFER	AZUYUR
CESPIB	CINXAZ	ATUJOP	DANTEN13	DEGCEY

CUCTIE	BOZDIE	AZOMEI	CUQFIE	BEYTUU
BARNUE01	AMEXEX	APUDOF	AMUBIV	APAWEV
AXOWAM	BMBZCH	CUQGOK	BANZIA	BUBHIP
VEFNEC	CAQKEN	DAYJEV	DIGGAD	CIYLAY
CAHDEW	BADJEX	ADABOX	ATELER	CUFQAW
QECLIW	DATMAO	BAVYOP	CIZRAF	CARBIJ01
CARWOK	ALUVOS	AQEFAE	DEBXAL	BUXGAD
CIYDUK	AHUNEX	DEJBUP	DASJOX	DASPUL
ASOHUN	AGUZUZ	AHAVAI	CEFSEN	DIDJEG
AWAZAB	CIYRUY	DEMTUL	CUWQUI	ARUBEV
COCHUY	BUVNIQ	WAZHIR	AKUQIH	BZAPRM10
CAQZOL	CAHHID	DAFBOD	AKOFOW	CMPDZB
WEDPIH	BEKBAV	DIMNAP02	AKESOA	YEJPIP
BAGVOV	CEWYIN	CEHRUD	CEPPIX	AMHCIN
ABABOV	CAZSAX	BAXCOT	CISMEX	ASOFOD
BAQBIG	BIKXID	DAQHUY	DAPNIS	AYUBIG
ADUXED	BIXVIP	VEJQAF	AGURIF	UQUYIQ01
AHUMEW	CURSOZ	CUZXUQ	ATIQR	ABOJAD
DEYREG	BAMTEO	BUMHUM	BILJOX	CIVWUB
BOHTAT	AWATUO	ANUYOZ	CUWCEE	ALORIE
ASOTAE	CBENPH02	WAZMUI	BEPZIH	DAMLEL
DEKQOC	AZPCYM	CAGDOG	ANISAZ04	CAVGEN
HAZDUK	DEKMUC	CIDKEH	CEPZAZ	AGAKIE
AREROE	TEHCOB	ABEFAQ	DIDJOQ	COMSEE
AGUREZ	CASGAF	CHBZOA10	ASOTEH	BAVXAA
CEDPOS	BOCZAV	AGEBUL	TEHBAM	ACRDIN06
CAMHAC	ACIYIX	CARNOA	CEFSAJ	BZTROP10
BAJSUC	CAHXAM	CEYJAR	ATUGAX	BAHROS
CFPZBZ	APELAJ	VEGBER	BAXBEI	CUFRIF
HECLAF	ANIBAC	BEBBUH	CIMWOL	CODDOQ
ACAGIX	AJEGOM	BAQCED	AJUQIG	ARUGEY
WEBZEL	BUVBEZ	CUQCAU01	CAJQAG	BZILBY
BAFYEM10	DASNOA	BODKOW	CUXYUR	GEBHED
CEBPAA10	AWOQUA	OHOCEV	BUQPEK	CELCIF
AXOXUH	CIPVII	ATAMEO	CARREU	COWNEJ01
BAHMIIG	BEGBAR	ADELUS	DAFGIA	AXUDED02
DATHUE	DAZKAT	ALAHEA	DEWZEM	CASMIT
BUYZOM	BRACPH02	CIKSIZ	CICHEB	ANIROG
QAZYIC	ALABOE	AYUVOH	ACEFIZ	DELKEL
AHACUJ	CPCPRB	CETDUB	AKIPUH	BOPSUW
ARERAQ	DABVUX	AVUXAS	CUYHEL	CEWYEK
WEDPED	COWXAP	MAZREN	BORZOY	AGATIN
CAFGOF	DERSOJ	CAPBIG	DAKDAX	COYJAB10
QAYJIM	CEBJUR	BENLUD	BONXUZ	COZTIW

AQUBEV	DIDRUD	CIQDUB	DATMIW	AXADOT
CEZCEQ	DACGOE	CIPTIF	AWUXAT	BZCPTK01
ARABOK	DAVJOC	BOGZIH	BYITOT	CONCAL
AGAVUB	BEWNEY	BUNROT	AZEYIP	ANEWEW
CUQXER	CUCKES	CEXKUM01	AXUSET	AZIJOK
BAGXEN	AFOFAC	BAQROD	DBZOSS05	AFIPUC
DASPEV	CAPDIJ	DIGXOH	BEPJEN	BURMOS
DBNTHR01	AJUMOJ	BECYIT	QEDKAO	BAFLOL
DAJGOL	AZITEK	ABIJUT	DECCAR	BELZEY
BALCAS	BUGPUP	ALUKOH	AROHUM	ANIFOU
BAPALC10	CETRUQ02	DASPOF	BAKWAL10	DIMQUN
COJKET	BIRFOX	BOCWEW	BAKRIQ	AVAKOX
BAKWOA	CUVXKEY	CIRDIR	ANICEH	DANTRO02
CAJWIW	APELIR	DAJMEH	COVYES01	AHIDOM
COSXAL	DIBENZ04	ASUMOR	AMOBIN	YAZXAB
CENBON	DANKIN	BAGTUZ	DEBQEJ	CPHPPS
DETZUX03	CEDVEO	COXJAC	MODDOA02	BAVTIE
CUNQAE	AVIWIN	BOYREM	AJEDOI	COTROT
QECNOE	AXAXON	CUWBOM	AXAMIW	BIHYEW10
DEMSUK	BAYCUB	DAVWUU	DAVFEN	BOYDAV02
ADIBIA	COCJAG	QAYHOQ	AVIYAF	CARYOK
BYIMVX	COTQAE	BAPRAN	ARAZIC	DELWUN
BUFWEE	LEGCUY	BABMAS01	BUDYOP01	CANCEA
DAMZIA	CAFGEV	BOMRIG	CHRTCQ01	CUMHEY
BUSQOV	DADDIY	ABUNOA	CAKZUJ	FECHAY01
COTGUP	BRBZNT03	ANETUJ	FINHIU02	DAJKAC
DIFMEL	BUCJUG	BAYNOH	ABOWET	DIKREU
COBNUD	BEVQUQ	BANPAI	ABOBEB	BEWBUC
BAWNUL	ABOVAP	BIHMIQ	HAZSOT	CAYGUF
YEGQAF	CEGBOH	AWEROJ	APEYUQ	ATERAS
ALOHAM	AWOXEP	CUVTOC	BAKTEN	AGUXEF
AXURES	AREFIO	ARUVAK	BERDOS	CIQMAR
BARVIA02	APIOG	AREPIY	COBJAG	BEZHIZ
DADBIV	BEZLEZ	DADSOT	CUMKAY	APUWAJ
DAXLIA	ATECAF	DICXAO	CEGSAI	WEJGOK
BEQCEH	CAYXUY	BAWFUD	BPTPCA01	BUJTAC
DASBII	DAYXOR	DEHBEA	DBNTHR02	CESXAZ
WEHHOJ	HEDHIK	DHTRBP	BISMIB	CEWYUA
COTJOL	CEJJAD	BERXIG	COFZUU	CACYAJ
AZEYEL	BUNYIT	AGAXUD	MEDNOB	DIFXIB
AFESIO	CERKEQ	ACITOX	BUKTRY	BIRKOC01
CIVRUU01	BOXTIT01	CARLOY	HEJJIS	AMOQIE
DEGMOS	DIBENZ15	WEDGOE	BIXGOF	CUBJIT
CABCEQ	DICHON	CEGXIX	HEHWOJ	BADQEC

BINPOD	CEJFIH	BAKXOD	LEFLEQ	DICFOK10
CHBZOB20	COVXEQ	APAXAR	BONZUZ	DARVUN
AKOTIF	NEJGUH	BEZHAR	HEKLIV	BAFWOU
AZEXIO	DIDKEI	AYUHOT	TEBRIE	BEGTUC
DIBVER	BAWGIQ	DIDGUS	CETKUJ	CAGLAX
BEYFAO	AKOYOO	BEJLIM	AYUWOH	AWEMOF
DAQJOX	APAKAF	CAJSUE	AYEPOL	BEMZEZ
BIJLOX	AXEQEA	DALTIT	BEZBIT	BEGTUE
ASOHAR	WAYQIZ	BEMXTZ10	AJUFIV	BALQAI
DADWAJ	BANWEV	AGOTIB	CITSEE	CURYEU
APOXUZ	HEHZEC	CIWYEN	CAFTEL	ARICAH
TEFMUP	CUTZUM	ARAYID	AJEGUS	GEGKOV
CUJNAX	DAYTUV	COVCAT	BALFAW	AJEDIC
BZCPTJ10	AWUTOD	BAPGUW	ARABUQ	DADRAD
CIBFOK	ASAKOU	CACVUX	CEJTIU	AWEKAP
AGAYAK	DALJOS	OFOJOI01	AHAYOY	ATUQAJ
ASOREF	BUCVAW	CEJHIJ	CEQGEL	DEHYUN
BUWSAP	AFEBIY01	NAYFUR	BAYJUJ	DIGGIL
DELDII	BEKVIW	ATIPOI	DAFPEI	CUVJUZ01
CIXVUC	CLMIND	BOLQAW	BANZUM	CUMQIK
ARIXAC	AZOVAN	ADAFEQ	AKEKIK	BENZID12
SAWSUH	BAHDIY	DIGTOD	QEDJER	BECNII
CUBJEP	VEBRUS	AXENAU	CICJAZ	YE BXUB
CEBVOW	DERBOS	DATMEQ	ASOHOF	ABUTIA01
AXOQIP	BZDCPB12	VEBWUX	DEWCEO	ADOKEJ
CILLUE	COUMAR02	BAZGEO	BUWYEZ	CIQZAD
AXABAD	CAFTIO	TEHTAE	CUHRII	COJMET
DAZQIH	AZIBIV	AZABIN	BIKDAC	CORPII
CEGDEZ	AHASOS	BAGXAJ	CEDRIN	BILQUK
CAFWUE	ASIZUY	ZAXVOM	AYOYUJ	CUPNIM
COTYUF01	DERXAA	VEBPOK	CIVTUY	ABOVOE
HEDQEP	DIJZON	NEDQIZ	DILDAF	CUKYUC
COCMOX	AVIYIP	BIMSIZ01	AJUMIC	CIKKUE
AWAPOD	BOLMEV	VEHVEM	AJUDIT	CEKVIX
AVOBIX	BAQYUQ	BEHROX	COQQIK	BAPWAS
DEZSOQ	DAVFOW	CIZPIL	BICJOO	BUGJIW
CANMOV	AVEPIC	ADIGUR	AJUXUZ	VEDSUV
ACEXOW	BAHDOF	BUCKAN	BEFJUT	COTCAR
BIHPOZ	BONXAF	BUPPOR	DEBVOX	NAYGEC
CUJPIG	ABUCUV	AFIBIB	BEGNEI	CILTAT
BANMAE	ABULIU	DAYJAO	DEMFXU	WAZXUT
CIGSOC	DATTUO	ATAVUN	CUJMIIE	BAGXUC
ACOBEB	AYUTAQ	AVUZOI	DICPAI	XEDVUA
AZOSUL01	BUTCEZ	CANNOW	PBPACB03	COHHAI

BIXPON10	BEPHSI	CAZZUZ	QAZGOQ	CAJFAX
ATIDAJ	ADELOL	AMEQIT	AKULUO	BARYIC
CEJMEK	NAZYAR	DAWSAV	CANLOS	CUSSUG
DIDPUC	CNPHAN	DAYLIZ	CAGNUV	APOWEI
CEGSOY	COQQUW	BOJFOW	BAMBOJ	BOGFOT
DIFFEE	CEKDOL	DEPGEK	ABUHUD	BIWFAO
ABUBIJ	VAYZAZ	AQAMOW	BUZSOF	CEYJIZ
BITDAL	CEXKIB	DAVBIM	AVOTUB	DETZEH
TECGEQ	BUDJUG	CEVPEZ	BUCNEU	QEDQUO
DILDOR	ANIYEC	DEDZUH	DAKLEJ	CIQRID
BIHXAS	DALDAY	DCDPCP	BANNUA	COKLIZ
AJEDOK	BUTDOJ	BUJVOS	ACETUZ	CIZDUM
BUXMOX	VEGZUF	CERHOX	AVAWEB	BILTAR
ABALUM	BASPEQ	BASNOA	BEJBEZ	AFOLEO
BXBFUR	CEGYEU	DAWCIQ	BUMBOA	BAVQEX
DIJTIA	BUVXEX	CUKDUI	COBVIZ	CEWMOI
BURMUY	VEGQEG	ABAHAO	BUNTUB	ANUQUX
CAQZUR	AFANAW	AYANEU	COYHAB	BIYPUW
ABESOS	BAGTOU	AFOHOU	BENRIX	CALZAR
BICKOP	CENSIY	COFHAI	BUGPEY	RASZAP
CEWZUB	AZISAD	BAVXUU	DEYGUL	ACSALA19
BAGRUX	CMXPXZ	ANTPYR	NAYLAD	DAKQOX
CADKAW	APUGUN	NAZTIU	ALAFOI	AFIZIA
COXLEG10	ANDRAN	COMHIV	ASEVAX	BEPPAO
DECFLT	DELJUC	CAWF AJ	AZAHUG	CIDCAV
CUSNIO	GEGKIP	APOCOY	ACOGIK	ABELEZ
DAFWOW	BATLIS	ACENAP04	HAZSUZ	CAQSUJ
CEHWUI	AJIBOL	BUYDA A	AKUSAA	BHNAPO
BOWWEQ	BAHGAU	BEFFEX02	CABSEF	BORREM10
CUTCUQ	AGONOA	BUVFUV	CUNDIA	CEFHUQ
CIQXIL	DAFREK	DAXQUR	ANQDAZ	ALOKAP
BOPQUS	CEGVER	COYQIS	AWABAD	MEHVUT
APUVUC	ATAYAV	AJESEO	COSQUX	AGAWEM
CUFH IW	CURJEF	BEVJIX	CIHDUT	YEJPOV
AJUQOM	BIPHME	CAFxit	BEBBOC	COFGAG
QEDXUV	CUBWAZ	ACUPAR	TEHPAA	BENZID07
BADSIJ	JASTIJ	CIPGIR	DEBLUR	DIMNAP03
DIBENZ12	WEGCUJ	DERJAM	MEGRAU	CNANTH01
WEDQAA	AYUWAS	BOJVAX	DAXRUR01	BEFSAG
BEZXIP	BAVCAF	BECRAE	CEPOD	CUCBUX
DEWGUTH	BAXVAA	AJEGIH	DADNUR	AQABOJ
CETHEP	CAQBAA	DAQJAJ	DABHIX	ABIZUJ
ARAWIB	ATEQUM	BEXKAS	AKIXUN	AVILEW
BIFVUI	AZEHUI	BEQBEF	CLPXAD01	COQDER01

NEDZEE	CABGUI	DABCUG	DEMYEZ03	AXIHAR
BUDXED	AMOCIQ	AXUDED08	CUNJIG	DHXANT10
COKYEH	AJEXOE	ASIDIP	APUYIT	ALOLAQ
AXUDED03	BAJRAH	AJOROH	BOMDAJ	DEJSAM
APIBEH	COCFAC	DIBCIC	COSRIM	AVUNUB
BUNKIF	QESNIM01	ANOXIM	CEWMUO	BOPGAQ
BANSOZ	CIBPEI	DEXWAG	CALDOL	CUMQUX
AWIRIJ	VEDDEQ	CONXUZ	COCXID	AYUQER
TEHDOC	CAKBAU	CUXYIE	DAZJOF	CAYNIB
BIWWUZ	BOSYAL	COJYUV	DEJWUM	AVEGIS
DAVVEC	DANDUT	CUWGEI	DADTOU	MEHRAV
CUHBIS	DEFGEA	BUPPAD	ABILOO	BAWMEU
DAJZAP	DIGMEL	DANNAH	BUWDDED	ATODOD
COSFUN	CAFFUM	DCPZCO10	ANAZUM	AFUNOG
GAYXOW	BUXLLOW	COFSUL10	BEFCEU	BEDVIP01
AVUDEB	AWAVAW	GAZXOX	COCJEJ	BINXIH
BOVVUF	AVARIZ	AMOHAN	BAGJAU10	ACOCAY
AZANUM	ATUJIJ	HEFCAZ	TEHFAQ	ATAMUE
AMUHOG	AJEXIY	AGOBOPO	DERVUS	CIVRUU10
AJAXUE	BAXBOS	BOJVOL	DATJOA	AHUSIF
DEMYEZ02	AFUSOK	AXALAN	AXAVUR	ANUMAZ
DAXSOM02	APUREI01	BAVCUZ	BACSUT	BITVIJ
BOWPEJ	DEMBAZ	QEDRAV	DIBZUK	BACPEB
BOCCIH	AWUQIU	AXELIZ	COTLAA	AMEZEZ
BAKWUF	BUDPEW01	CEWKAQ	CUSHAA	AXUDED06
AYEXIN	APALOU	CICJIH	CUMHOI	BOWTEO
AGIROZ	TECXAD	AFUJUH	CIPQOI	AYASOI
CNDPEU10	BANDIF01	BABVIM	BAPQOY	VEREY
CUGWEI	BEWYUY01	ABEXOX	CAVMOB	CIWYAJ
CANDEB01	ANTCEN17	BUXQIU	CMBTDZ	CORWOV10
DELQAN	CABTAC	AKAYIW	CUWDIH	CONQAY
BUPDUN	BAWWOO	ACOWIZ	ANIXIG	ALOGOZ
CAMGAY	AJANAC	ARORAB	BUXWOI	BODHAE
CIJYAX	CADBAN	DAGXIV	BEJDUP	BAFFOF
AFITIU	DAGWOY	BEZHEV	ADICIB	CIFNOV
CIXHOI	ASIZAF	CAZJOF	AQEDEG	CEZCIU
TEBSUR	CEGQUC	AGOPOD	BUNVOX	AKERAK
DABBEQ	ACENAP03	AMUCIW	DIDGAY	CIMQEWF
BALXET	CANPAK	CEQCOR	AWOMIK	CEMBUT
ASASOD	GUHCOB02	AZAMOE	BAXPOI	AYUYOJ
BIGLIM	DABLID	DATXON	APERUK	AZEGUH
BOPBIR	CUPXIV	AGEHUR	AFAADEQ	BAHDOD
AJEZOF	CAPISQ	DEMBON	ANOYAE	BUJRUT01
AWERUP	BENTIZ	ARAZID	BOTCUJ	BZHYDX01

CEDPOR	AZEYUB	DAKRUF	CIPQID	DAXTIH01
QECTUQ	AJOJEP	CEWHES	AXOQUA	DADNEB
BENTUJ	TEGYUC	AKERUE01	ACETOT	COMQUQ
FOCYOM01	COWKUW	ATIXOS	BUCKIV	BIVWEJ
CACKOJ03	CEBGOF04	DAVQUN	COTXUE	CEWYUZ
DATGOV	BAQYAW	AQERAQ	CEGCAS01	BOWGOJ
AWELIY	WEGWAJ	ATACON	BOKZAE	BEXLOF
AHQUD	CANWUK	QEJMUQ	CEYKOG01	BINGUC
DANCIG	DARYON	BAMLAF	BALVIW	CALWOD
BUDJIV	DBONAP	YEBMAW	DEXWUA	LEJZUY
DACWUC	BQUINL	CAZWEF	ACUDEI01	ALONAQ
AFOMOX	CUNDAR	ASONED	BESFUB	BABMUP
CENCUU	BENMIS	AGELED	LAGUR	TEHNOM
ALIMEN	CIWYAK	CUFHUH	ACEYIR	AJOMOC
AZOJOO	AKOSAW	CABQUT	CAVHOZ	CISGUI
BENZEB	CEKDIH	AVILAS	BUTSEO01	ASONAZ
JAHQER01	DIBLOP	COBYOJ	BEGZIX	DEJMUC
BEGTOW	BUKMUR	AYIRIJ	DIBBUN	AXEPID
DEHCIE	QEBZAB	ABOBAX	ADAMOI	BUGTII
DAKXOD	CILTUO	DAFKAY	BEQKEP	ACEPEF
CEFsov	BOHROH	HEGKIQ	CIYTOU	BUJXEK
BEFZUI	CUHSAA	AMDPYR10	MEDQAQ	CUQYAO
BOTTUA03	CAMJUW	ADIWOZ	BEJTAM	CIGPUD
MEGCOT	BUHQOK	GAZCES	BIQCAF	AHAPEG
BEXLUL02	DEWZIP	CAKMEI	AXEFOZ	ASEFAF
DAWZOS	BAHRUY	AHEDEY	AYAGUE	ACUHAH
DENYUQ	AWUGII	CEMHUZ	ABAQOL	BMBZDZ
DIGPAK	TEGVAF01	NEBNAM	BENZIL03	ANEWUM
CUHHET	AJEFAW	AVAMAM	ATEGOW	AGELUV
AJOSIC	CIKKOK	AQIQOI	BUJWAG	APUXAK
ABEKIB	CIJWEX	MECXEA	AGALIF	AVEWIH
BELQEQQ	DADDER	AYUVUN	AVEHOA	DAXMIB
AKUXAG	AGEWOA	BESHUE01	AHUXOR	AKEYOF
BOPNOJ10	CEMJOT01	ABUNIU01	BOVSUC	BENZID14
CIJLAK	COZLEK	AGAJOI	BOLYUW	DEWSOO
CIRNAU	AMEXUL	AYORIQ	CARYIE	HEKRAT
CEWYAF	CUKGOE	AGERAH	COPVEK	DESMOD
BRANIL	DEMCEE	BIDWIU	LECCOO	AYOCIA
BATNIW	TEHNAY	DAXBIQ	DARXEC	COXBEW
HEGWAU	DASJIT	AGISUG	ASEWIF	BONJIY
BONSEE	CIMBAD	ACEBIT	CIQGOZ	DATGUB
COXKAB	BAWXED	BUFQEY	TEFBOY	BAPYUO
BUDXUU	BURLAC01	BIKBIG	CRYSEN02	DALHED
COMSOO	BEYNID	CASZII	ACEWAH	CATWEC

BUWGOR	BURFUR	AXUMEN	BALFID	BECPEH
BAWYUU	DETSEB	AHFUPEP	BRBZET10	AVILOG
BPHENO03	IMEMUI01	CLPHCA	AMOQOK	CUNPUX
BTPMET	BUKMIF	CBOZET	CUZWAX	AFIFOL
AVULAE	BAZVEE	LEJSEB	ABIWIU	BOVWIU
ARAZUP	BULLUP	CIRHAN	DABGIW	DBEZPO
COPKIB	CAXRAX	DARYUR	DECCYI	DAYVAD
AFIJJ	CEHYUL	CIWLUQ	COQRAD	AROFOC
CUCLAP	ABUMOZ05	DERFEM	DAMWOE	CIBPIM
DAQLAL	BIYSUY	AJEVOB01	BOZXOE	BOHBIL
CADFAO	CURREO	CEWGUG	AJOSID	ARUWIU
ASIKOC	AQABUQ	ASEPOE	AQOFIV	AHILIN
APUCOE	BAWDUF	ASOYOX	ALODUC	DAZKUN
ADUWAY	ACONUD	BERWEA	BEDFUL	AZIWEN
AFAZIS	ACINDD	DIGWOG	COZTOC	APAPYR
BEFQEI	CEXQUT	CEBBAN	ARAZOK	APUGUO
CIWCIW	BRPCYQ01	BINDPY	DEZKAV	BIHWIZ
BIDREN	AXEMIZ	TEBPOI	SAWTIW	AGASUY
ALUQIH	DAVCOS	BZCPTG10	BUDJEP	BECRIM
BUJBEN01	WEDJOH	COMCAI	AZOXIX	DEPXOL
BOHCEH	BACVUX	BAJJOL10	ADUQUM	CAGKEC
NEGZAD	AWEKUJ	GAZBAN	BAPRER	CURFOL
CEHGUT	DAZYIP	BEFVEN	AHUFIS	AMPTOP10
BONTUV	CAMPIR	AJAROU	ASAXEX	NEHDOW
COJWEF	CUNHOJ	ANIJUE01	ANUBAN	DEJMEN
CUZQIZ	CUBMIW	NECGUA	BIKCIJ	ASITAY
DIHNUD10	DAJTEN	BAVHOY	CIGPEN01	BEZGOE01
CADXAI	CUBXOO	XEDBEQ	DEGVUI	CUZXOL
BUXTUT	DADVEJ	CUYYUS	ASEPUJ	TEBPAU
BEMZID	HECNIP	BOWGAV	AKOJAN	ACEYOT
CIWXIR	BZOYAC03	DEWCAK01	ATO FAR	KEFFIN
BOQXUC	ACAYEL	AYEFAL01	ACAYIP	CADPAA
ARAGOQ	AXEMOF	APESIY	DADDER04	CIZQAE
AGARAD	AXOSIR	ALACEV01	JAWBAN	ACUMEQ
CASHUC	DICGED	BOTTUA01	BOCYEZ	CODHAE
BUPPOT	DECfas	COCKEK	BERHEM	BEHZOF01
CEFPUA	COPLEA	CUNQAF	AGICEA	BESLOC
BALDUP	DIFWEV	BETTID	CEGLOR	AHETOW
CUVSET	ABICIZ	CERPAR	AJOHOW05	ADEDOD
CEMRAO	CADZOZ	BAGQOP	COZSIV	CIHHEG
AROQIJ	VEJKUT	TAYQES	ABOFAB	TEHPUU
BAGXEO	DATDIO	AFIGAZ	CAQVEW	AMATAL
AGINEL	CNCHAL	QEBCUD	VEDGIX	AMOWIK
AREVAW	ATIWIL	SAYCUT	CIJXUO	BAGLED

CAWGAK	BOQVUY	CUMPEH	ATEKEQ	BESNAO01
AGATAF	AJIKIN	DEBUGUP	AFERIN	BONJUJ
ALEKEJ	CIKLEP01	AFININ	DADCAM	CIRLEV
CODDEG	ACIDEV03	AXUDED07	DABHET	AVIBEN
DIBENZ05	BFUOXF10	DEKRUJ	DIBDUO	QEQQOL
DBANQU	BETCAG	BAXXEE	ASUKIJ	BEQWAX
WEGVUC	AFURCM	FEGBAX	DENHIN	AXEBOW
TEHHIA	BIMYIH	AQILER	BIPHME01	ACGLPR
AXUNIR	COCQAM	AQACIG	BOQHAR	CURCAV
CIWBIT10	COXGED	NAZBUO	CORGUM	CIVYUD
AQEQQE	BOBMEL	AHOXIF	BEQQUB	DEXQIG
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DAVBOT	ABAVID	BAPWUM	BEGVAM	BIMSEW
DENWAU	COGYAA	CUZQET	BTCRDX	AGOLAJ
ASOLAX	DAGTIP	AJUZIQ	DEPMIV	ATOMIG
DEBHEA	AYEYOU	CIRPOK	ATEHOX	DADPDS01
NEBXOK	AZONAE	ATIJEU	DAVFAH	CEJVUI
CIPWAB	CAWJES	ASIJIV01	CAMGEF	DIMGOV
BAGGUL	DAVTAY	CAPDAB	CUPYIW	HAZXIS
COBPAL	AWECAG	BACTOQ	CAQXAV	CEZTUY
COFQIY	DANCOM	WEGWIR	BEBCIU	DEBHIB
TEGZOX	VEDKAT	ATATIZ	ATOZOY01	COFQUE
BITJOD	CIBZIW	BITNAT10	BOPDER	CEGCEY
CUSLUX	DARZUU	ABUVHEY	DEGCIC	BPHENO19
CACDOA	BATREU	BAXBIM	QECCRIC	BAPNAH
DESSAV	CAWHIT01	BAVHUB	CAPXAT	HECKUY
AGANIH	BOSDUJ	BUJGUK	BEXMUM	ADILAB
ACOTUI	BUBYEC	AKUHAR	DAKYOE02	CUSKOS
ACOVUK	COLQUQ	DIBPUZ	AFOJIQ	BODMIQ01
CBXPCP10	BUGQFA	DIBZOE	BOGZUU	CEFXES
BZCDOD	AFOKUB	AFAXAH	NAZDIE	AVIFUI
ASUQAG	DARVUQ	AVUHEG	ABALEX	CADDIW
CALDOK	AZABAG	CUSTAN	BIGXOG	AWUVAR
CUDWED	AZUBON	DANKAH	AWIWAG	BAYDAH
AKOWEE	DAKYOD	BUJTEG	ACEQUV	AYUZAW
ADAXOT	BIZZOB	CUMVAJ01	DEDDOF	COJXIK
CETQOJ	AXASUP	DAKPAG	BAQQOC	CBENPH01
BUYGAF	BEMHAC	CORPIJ	CAQLEO	ACOSET
COYNAF	ABOFIJ	DEC PIN	DEBLOO	CARVAV
PAZHUW	CASHAH	AVEHIU	CUNNEG	CUFWAB
CATMOB	ASORUV	BAFYEP	CAWNET	COBFEF
DIMNAP01	BOVYAO	CENXUP	BUWRIW	AHUFIT
DACQII	CAGKAZ	APALAG	DEXTIK	CUYXIF
CESVIF10	DEXXAG01	DAFCEU	ANEDII	AWABUX

CUVLUB	CALTEQ	COBJEK	AZESTD	APERET
AGASIM	CIQSAW	CIQCUC	AXEPUP	BOVTOX
BUWVIZ	AXOLAB	CAFMUU	AKOVED	DIGDUS
BOTROR	QEGLUM	CADJEY	AJOCEJ	CEHBAS
COPLUQ	DAMMAH	CIMZEY	ABUMIV	BISREA
CUWLUC	CUKDES	AJOHOW01	BONQUZ	CEGFOL
AWUNEL	BUMCIV	ASULIK	DIGSUH	BASNOZ
QEBREX	ABOWIX	DAGJUQ	AMOXEG	BADNAX
ATUDUQ	MEFZOP	CIZGOH	BZPPOS01	DAFJAV
AFIPIP	COGVUR	AKUREF	COWNUZ	AWIVEH
DIJCOO	ABUSOH	BAWFIP	AYANAQ	AZENOK
CILMAN	ZEBDUI	CIQHIU	ANUVIP	ACULIV
BIQZOS	CEPZON	BABCIQ	ADUTIE	DEFGAW
AXUDED01	COGWUQ	CEGBIB	ACETUY	AKELEI
DALGON02	BABLIC	DASJAL	AQEQUJ	CAQBON
CAMGIH	CASDEI	DAZJEV	DIKGIO	CIWJEX10
DEXHEU	APEKOX	CAMNOV	BAXMUJ	YEKPAL
BIQGIN	BYITOT02	BUNHAV	CEWRED	AKOQUO
CEDVUC	BULBEP	DAYVIK	BMBZTP	CEWWOR
DADCOD	CXPTDZ	DETHAZ	AHEFEA	ALAFIC
CUNTIO	HEHTIA	AFUSAX	BAPZID	BULQOQ
AGEKAA	AKUZAH	CAMZOI	DEZNOL	AWUKIN
AFUZIK	CAPROA	ACICAR	AZUMUE	DECKIF
YEFKOM	BEBKUP	CEKWOE	BEDXIR	BUSGIH
AGAJUN	COXKEH	AYUWIB	BATPET	DANHUW
DEYJUO	AFEXOZ	CUZYEB	TEGMEA	DEZWEK
DECDDUM	AVAFEK	ABEFUJ	CAKBHEY	BEKMIN
CAGWUE	ADUSOJ	BETTAW	HEDCEB	ZEFPEI
ADUMOB	CARMEP	DEFZEV	COFJOW	AFESEK
AGAWAH	CAHHEZ	CEWXUY	MAZMOS	AGEXAN
ABONIQ	DEKKUA	CEVYUY	BEWTEE	CATTID
CINMAC06	BAJNIJ	DEGLAE	CUHRED	BAFPEF
CEZGEU	ALEM0V	AKOJEQ	DECYUF	DEKNOY
BICFUQ	AKOGAJ	VEDYEL	ALAFID	VEFVUA
COHTIE	ASONIF	BOMLUM	COZPEM	CEWGES
COLBUA	BOXQEK	BUXSIX	CEVRIG	CAWTIE
AXOQIO	ATEBOS	AMEXOH	DIDHII	LECHAF
CUBNES01	AXOYOB	BRACTN01	COGNOD	AZADAG02
CUVSUH	ABACOW	BOPTAD	DHXBZP	ALEXIZ
DEZJAU	CEKRIT	DAPYID	AXULOW	CIKSEU10
BOVTEN	CECGOI	DICNUY02	DANTEN14	AXIGUK
COBHUV	YEHSEM	BPHCOY10	HAZXAK	DAGCIZ
DEYBOY	BIVRUU	CAYPIE	QEGNUO	CANKOR
ACOSIV	BRPCYP02	AWODEX	DEGHIJ	BARZUQ

DELKAH	AXALIV	APUQOT	CEJXOE	ADAJUK01
CITSII	DAKYAP	AVOYIT	COWBIB	CEMBAX
AGODEH	TEFNAW	HEDCOL	ACACTA	AWUSOB
BAFHOU	COMFER	TEBCAH	ACUYIG	DEGLEI
BUDYAB	BUYMAL	CODNOZ	BADTAE	DEPJAK
BUFUZUZ	ACAYAE	ACAXEK	BICXUG	CUYCAA01
ALOHIT	DAXRUR03	BUVDAZ	BUWYEV	BADMID
AQEDOQ	CORTEJ	BOCBOM	ATUDIE	COSNOP
GEFFOP	BPEBXP	AXIPUT	CASBUU	
BOBVOF	CUGHIW	CIPPUO	ACOTOD	
CEZDOC01	CAFFAT	ABOCUS	BAWMUK	
CIKFAE	BESMIW	ARIMIZ	LEBKOV	
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S5.2 ChEMBL structures

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