Epoch: 0001 cost= 0.253558145

Big Test Set

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.5001071 0.5013813

Prediction and the mean error on train set are: 0.5001942 0.501125

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Epoch: 0006 cost= 0.192160135

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.38466576 0.19718748

Prediction and the mean error on train set are: 0.38261592 0.190875

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Epoch: 0011 cost= 0.047991793

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.13463321 0.050875008

Prediction and the mean error on train set are: 0.13147253 0.04387498

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Epoch: 0016 cost= 0.026941789

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.07793497 0.032937527

Prediction and the mean error on train set are: 0.07457461 0.029624999

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Epoch: 0021 cost= 0.018545055

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.05125059 0.021187484

Prediction and the mean error on train set are: 0.04660701 0.016187489

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Epoch: 0026 cost= 0.014433048

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.041490898 0.020375013

Prediction and the mean error on train set are: 0.03545088 0.015124977

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Epoch: 0031 cost= 0.012171302

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.03301659 0.015187502

Prediction and the mean error on train set are: 0.02600681 0.009249985

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Epoch: 0036 cost= 0.010352481

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.026287943 0.013000011

Prediction and the mean error on train set are: 0.02297117 0.008750021

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Epoch: 0041 cost= 0.009385771

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.025275711 0.0128750205

Prediction and the mean error on train set are: 0.019673806 0.007875025

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Epoch: 0046 cost= 0.008609004

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.019222157 0.009937525

Prediction and the mean error on train set are: 0.01753818 0.0068749785

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Epoch: 0051 cost= 0.007794067

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.020050086 0.011562526

Prediction and the mean error on train set are: 0.015262287 0.0058749914

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Epoch: 0056 cost= 0.007270322

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.01901529 0.012125015

Prediction and the mean error on train set are: 0.015443543 0.007250011

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Epoch: 0061 cost= 0.006880177

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.01630821 0.010312498

Prediction and the mean error on train set are: 0.01601175 0.008062482

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Epoch: 0066 cost= 0.006646484

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.014824425 0.008249998

Prediction and the mean error on train set are: 0.01302823 0.0059375167

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Epoch: 0071 cost= 0.006341684

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.013614697 0.007687509

Prediction and the mean error on train set are: 0.0106742615 0.004000008

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Epoch: 0076 cost= 0.006047753

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.012030962 0.0071874857

Prediction and the mean error on train set are: 0.010890902 0.0041875243

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Epoch: 0081 cost= 0.005970181

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.011565688 0.0065624714

Prediction and the mean error on train set are: 0.0086567635 0.0031874776

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Epoch: 0086 cost= 0.005724733

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.013013599 0.008937478

Prediction and the mean error on train set are: 0.009493878 0.004062474

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Epoch: 0091 cost= 0.005590248

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.012631564 0.008437514

Prediction and the mean error on train set are: 0.008083156 0.0034999847

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Epoch: 0096 cost= 0.005454067

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0104501555 0.0065624714

Prediction and the mean error on train set are: 0.008769163 0.0036249757

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Epoch: 0101 cost= 0.005325181

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.013406049 0.009062529

Prediction and the mean error on train set are: 0.005962005 0.0019375086

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Epoch: 0106 cost= 0.005202654

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.012689447 0.008374989

Prediction and the mean error on train set are: 0.007187702 0.003125012

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Epoch: 0111 cost= 0.005209182

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0120044295 0.008312523

Prediction and the mean error on train set are: 0.008942074 0.004812479

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Epoch: 0116 cost= 0.005113456

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.009861599 0.0060625076

Prediction and the mean error on train set are: 0.0073824013 0.0031874776

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Epoch: 0121 cost= 0.005024954

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.009584452 0.0066249967

Prediction and the mean error on train set are: 0.0068349964 0.003125012

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Epoch: 0126 cost= 0.004777306

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.010527173 0.0067499876

Prediction and the mean error on train set are: 0.0065002907 0.0037500262

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Epoch: 0131 cost= 0.004812399

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.010097292 0.007000029

Prediction and the mean error on train set are: 0.005942848 0.0019999743

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Epoch: 0136 cost= 0.004893079

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.009928347 0.0068749785

Prediction and the mean error on train set are: 0.006061286 0.0021250248

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Epoch: 0141 cost= 0.004739372

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00873761 0.006250024

Prediction and the mean error on train set are: 0.0055833976 0.0026875138

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Epoch: 0146 cost= 0.004480676

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0103559755 0.006687522

Prediction and the mean error on train set are: 0.0053871796 0.0019999743

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Epoch: 0151 cost= 0.004575265

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008369989 0.0061874986

Prediction and the mean error on train set are: 0.0067270016 0.0037500262

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Epoch: 0156 cost= 0.004560912

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008832846 0.006937504

Prediction and the mean error on train set are: 0.0064858194 0.003000021

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Epoch: 0161 cost= 0.004589920

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008327826 0.0059999824

Prediction and the mean error on train set are: 0.00536069 0.0021874905

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Epoch: 0166 cost= 0.004441198

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008212352 0.0059375167

Prediction and the mean error on train set are: 0.005531513 0.002562523

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Epoch: 0171 cost= 0.004265463

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.009756423 0.0073124766

Prediction and the mean error on train set are: 0.005152817 0.0023124814

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Epoch: 0176 cost= 0.004290331

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008770712 0.0067499876

Prediction and the mean error on train set are: 0.005823858 0.0024374723

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Epoch: 0181 cost= 0.004286735

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007901956 0.0056250095

Prediction and the mean error on train set are: 0.004626123 0.0018125176

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Epoch: 0186 cost= 0.004235023

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00900938 0.0064374804

Prediction and the mean error on train set are: 0.006142177 0.0030624866

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Epoch: 0191 cost= 0.004288352

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065408405 0.004999995

Prediction and the mean error on train set are: 0.005188761 0.0022500157

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Epoch: 0196 cost= 0.004454136

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006514035 0.00424999

Prediction and the mean error on train set are: 0.0063851625 0.0029374957

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Epoch: 0201 cost= 0.004333880

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.009522887 0.0073124766

Prediction and the mean error on train set are: 0.005573768 0.0028125048

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Epoch: 0206 cost= 0.004179748

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008148211 0.0059999824

Prediction and the mean error on train set are: 0.005542535 0.0028125048

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Epoch: 0211 cost= 0.004426926

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0077532767 0.0058125257

Prediction and the mean error on train set are: 0.005170865 0.0024999976

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Epoch: 0216 cost= 0.004291504

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007682644 0.005687475

Prediction and the mean error on train set are: 0.0049781813 0.0020624995

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Epoch: 0221 cost= 0.004120629

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065503456 0.004812479

Prediction and the mean error on train set are: 0.005327035 0.0024999976

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Epoch: 0226 cost= 0.004099065

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067408695 0.0046250224

Prediction and the mean error on train set are: 0.005157837 0.0028749704

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Epoch: 0231 cost= 0.004263672

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006685539 0.0048750043

Prediction and the mean error on train set are: 0.003675581 0.0016250014

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Epoch: 0236 cost= 0.004001856

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007892977 0.0055624843

Prediction and the mean error on train set are: 0.004635731 0.0021250248

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Epoch: 0241 cost= 0.004072830

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0074194977 0.0053125024

Prediction and the mean error on train set are: 0.0048671043 0.002562523

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Epoch: 0246 cost= 0.004010094

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00785486 0.0059375167

Prediction and the mean error on train set are: 0.0033802267 0.0011875033

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Epoch: 0251 cost= 0.004188427

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067164046 0.0051875114

Prediction and the mean error on train set are: 0.0053799576 0.0034999847

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Epoch: 0256 cost= 0.004027247

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006837708 0.0048750043

Prediction and the mean error on train set are: 0.0036485882 0.0014374852

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Epoch: 0261 cost= 0.003928237

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061577507 0.003812492

Prediction and the mean error on train set are: 0.0044737174 0.0023750067

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Epoch: 0266 cost= 0.003819566

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0072515653 0.0058749914

Prediction and the mean error on train set are: 0.0044296877 0.0021250248

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Epoch: 0271 cost= 0.003886831

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0077041197 0.0051875114

Prediction and the mean error on train set are: 0.004625313 0.0018749833

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Epoch: 0276 cost= 0.003865668

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005910965 0.00424999

Prediction and the mean error on train set are: 0.0047077057 0.0023750067

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Epoch: 0281 cost= 0.003918471

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067589623 0.004687488

Prediction and the mean error on train set are: 0.0045422236 0.002562523

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Epoch: 0286 cost= 0.003778358

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0075913584 0.0056250095

Prediction and the mean error on train set are: 0.0043460894 0.0019999743

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Epoch: 0291 cost= 0.003943227

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007508392 0.005687475

Prediction and the mean error on train set are: 0.004886583 0.0028125048

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Epoch: 0296 cost= 0.003930860

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060616615 0.0046250224

Prediction and the mean error on train set are: 0.004406322 0.0019999743

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Epoch: 0301 cost= 0.003962548

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008437721 0.0065624714

Prediction and the mean error on train set are: 0.004601546 0.0023124814

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Epoch: 0306 cost= 0.003847180

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006572217 0.004812479

Prediction and the mean error on train set are: 0.004965241 0.0024374723

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Epoch: 0311 cost= 0.003915790

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058682878 0.004374981

Prediction and the mean error on train set are: 0.0037169028 0.0017499924

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Epoch: 0316 cost= 0.003916601

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066334675 0.0048750043

Prediction and the mean error on train set are: 0.0046223653 0.0022500157

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Epoch: 0321 cost= 0.003864397

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0072140815 0.0051875114

Prediction and the mean error on train set are: 0.004336977 0.0020624995

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Epoch: 0326 cost= 0.003686242

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005875555 0.004374981

Prediction and the mean error on train set are: 0.003813202 0.0016875267

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Epoch: 0331 cost= 0.003881539

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061754547 0.004812479

Prediction and the mean error on train set are: 0.0028502592 0.0011875033

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Epoch: 0336 cost= 0.003734035

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008047779 0.005687475

Prediction and the mean error on train set are: 0.0042316266 0.0021250248

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Epoch: 0341 cost= 0.003888459

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054465616 0.0041875243

Prediction and the mean error on train set are: 0.0033992599 0.0018125176

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Epoch: 0346 cost= 0.003794579

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007086395 0.0058749914

Prediction and the mean error on train set are: 0.004312107 0.0021250248

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Epoch: 0351 cost= 0.003770186

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006706371 0.0051875114

Prediction and the mean error on train set are: 0.00329351 0.0013124943

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Epoch: 0356 cost= 0.003804152

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059235794 0.0046250224

Prediction and the mean error on train set are: 0.0037634291 0.0015000105

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Epoch: 0361 cost= 0.003836953

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064324923 0.0050625205

Prediction and the mean error on train set are: 0.0043714265 0.0023124814

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Epoch: 0366 cost= 0.003808456

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059272973 0.004499972

Prediction and the mean error on train set are: 0.0032940712 0.0012500286

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Epoch: 0371 cost= 0.003827354

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006986278 0.0050625205

Prediction and the mean error on train set are: 0.004142082 0.0020624995

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Epoch: 0376 cost= 0.003769548

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060939253 0.00424999

Prediction and the mean error on train set are: 0.0042182626 0.0016875267

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Epoch: 0381 cost= 0.003765930

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007436402 0.0055000186

Prediction and the mean error on train set are: 0.0033502888 0.0015624762

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Epoch: 0386 cost= 0.003828382

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00563791 0.004374981

Prediction and the mean error on train set are: 0.004950365 0.0024999976

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Epoch: 0391 cost= 0.003779709

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0068740924 0.0050625205

Prediction and the mean error on train set are: 0.0035584127 0.0018749833

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Epoch: 0396 cost= 0.003862858

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0075275595 0.0057500005

Prediction and the mean error on train set are: 0.003588552 0.0017499924

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Epoch: 0401 cost= 0.003805863

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006715326 0.0051875114

Prediction and the mean error on train set are: 0.0043897694 0.0020624995

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Epoch: 0406 cost= 0.003674058

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066843014 0.005249977

Prediction and the mean error on train set are: 0.004059061 0.0018749833

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Epoch: 0411 cost= 0.003610186

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007346221 0.0061249733

Prediction and the mean error on train set are: 0.0034786395 0.0014374852

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Epoch: 0416 cost= 0.003743822

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006660475 0.0049375296

Prediction and the mean error on train set are: 0.003757039 0.0018749833

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Epoch: 0421 cost= 0.003671306

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007062282 0.0053125024

Prediction and the mean error on train set are: 0.0041185776 0.0017499924

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Epoch: 0426 cost= 0.003607294

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058665057 0.0041875243

Prediction and the mean error on train set are: 0.0046262806 0.0024999976

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Epoch: 0431 cost= 0.003645704

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00619674 0.004499972

Prediction and the mean error on train set are: 0.00341681 0.0015624762

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Epoch: 0436 cost= 0.003684695

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006856929 0.0051875114

Prediction and the mean error on train set are: 0.0040375483 0.0019999743

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Epoch: 0441 cost= 0.003804935

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007863819 0.0061874986

Prediction and the mean error on train set are: 0.004318504 0.0018749833

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Epoch: 0446 cost= 0.003624173

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006535221 0.0048750043

Prediction and the mean error on train set are: 0.00354969 0.0016875267

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Epoch: 0451 cost= 0.003673650

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063672415 0.004812479

Prediction and the mean error on train set are: 0.0044962186 0.0018749833

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Epoch: 0456 cost= 0.003596945

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0068013133 0.0050625205

Prediction and the mean error on train set are: 0.0034803886 0.0015000105

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Epoch: 0461 cost= 0.003675538

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006228799 0.004437506

Prediction and the mean error on train set are: 0.0057692192 0.0028125048

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Epoch: 0466 cost= 0.003572163

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006461312 0.0048750043

Prediction and the mean error on train set are: 0.0036663935 0.0014374852

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Epoch: 0471 cost= 0.003687741

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005490465 0.004000008

Prediction and the mean error on train set are: 0.003914835 0.0017499924

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Epoch: 0476 cost= 0.003616520

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063947276 0.005249977

Prediction and the mean error on train set are: 0.0042053503 0.0018125176

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Epoch: 0481 cost= 0.003461561

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006921095 0.0057500005

Prediction and the mean error on train set are: 0.003956426 0.0017499924

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Epoch: 0486 cost= 0.003727684

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055631753 0.003687501

Prediction and the mean error on train set are: 0.0047767106 0.0024374723

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Epoch: 0491 cost= 0.003632279

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0071260505 0.0057500005

Prediction and the mean error on train set are: 0.0036576823 0.0017499924

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Epoch: 0496 cost= 0.003602250

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065611755 0.004812479

Prediction and the mean error on train set are: 0.0057329196 0.0034999847

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Epoch: 0501 cost= 0.003583594

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006557819 0.004999995

Prediction and the mean error on train set are: 0.0033776558 0.0013750196

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Epoch: 0506 cost= 0.003564101

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006071431 0.0047500134

Prediction and the mean error on train set are: 0.004396354 0.0024999976

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Epoch: 0511 cost= 0.003566968

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062771966 0.0049375296

Prediction and the mean error on train set are: 0.0027841323 0.0012500286

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Epoch: 0516 cost= 0.003507341

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004964308 0.003812492

Prediction and the mean error on train set are: 0.0032714123 0.0013124943

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Epoch: 0521 cost= 0.003570074

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00690053 0.0053750277

Prediction and the mean error on train set are: 0.00370597 0.0021250248

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Epoch: 0526 cost= 0.003634604

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060548787 0.004124999

Prediction and the mean error on train set are: 0.0024995732 0.00093752146

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Epoch: 0531 cost= 0.003515455

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061663482 0.004562497

Prediction and the mean error on train set are: 0.0041847546 0.0021250248

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Epoch: 0536 cost= 0.003567763

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066636796 0.0049375296

Prediction and the mean error on train set are: 0.004310485 0.0023124814

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Epoch: 0541 cost= 0.003631074

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006573956 0.0051875114

Prediction and the mean error on train set are: 0.003547086 0.0018125176

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Epoch: 0546 cost= 0.003656753

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061569735 0.004687488

Prediction and the mean error on train set are: 0.003659273 0.0019375086

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Epoch: 0551 cost= 0.003493280

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007835267 0.0065624714

Prediction and the mean error on train set are: 0.0042930287 0.0020624995

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Epoch: 0556 cost= 0.003503797

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056406306 0.0041875243

Prediction and the mean error on train set are: 0.004666005 0.002562523

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Epoch: 0561 cost= 0.003608620

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005835434 0.0043125153

Prediction and the mean error on train set are: 0.004293949 0.0021250248

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Epoch: 0566 cost= 0.003467422

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056670536 0.004437506

Prediction and the mean error on train set are: 0.004646683 0.0030624866

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Epoch: 0571 cost= 0.003453857

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058597126 0.004499972

Prediction and the mean error on train set are: 0.0034313817 0.0013750196

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Epoch: 0576 cost= 0.003601659

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004799056 0.0031874776

Prediction and the mean error on train set are: 0.004396698 0.0021250248

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Epoch: 0581 cost= 0.003446657

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005783928 0.0046250224

Prediction and the mean error on train set are: 0.0036046444 0.0018749833

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Epoch: 0586 cost= 0.003585170

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006396171 0.0050625205

Prediction and the mean error on train set are: 0.004207602 0.0022500157

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Epoch: 0591 cost= 0.003558966

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008287599 0.0068749785

Prediction and the mean error on train set are: 0.003495481 0.0015000105

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Epoch: 0596 cost= 0.003438093

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069857924 0.0055624843

Prediction and the mean error on train set are: 0.00463093 0.0024999976

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Epoch: 0601 cost= 0.003526223

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006666903 0.0047500134

Prediction and the mean error on train set are: 0.0038803741 0.0019375086

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Epoch: 0606 cost= 0.003468552

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004613927 0.0032500029

Prediction and the mean error on train set are: 0.0046529872 0.0024999976

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Epoch: 0611 cost= 0.003464577

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006405686 0.0058125257

Prediction and the mean error on train set are: 0.0041664457 0.0021874905

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Epoch: 0616 cost= 0.003359952

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053377086 0.0038750172

Prediction and the mean error on train set are: 0.0038198903 0.0019999743

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Epoch: 0621 cost= 0.003448187

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006660287 0.0050625205

Prediction and the mean error on train set are: 0.003976147 0.0019375086

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Epoch: 0626 cost= 0.003405734

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007735264 0.0059375167

Prediction and the mean error on train set are: 0.004513889 0.002562523

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Epoch: 0631 cost= 0.003476589

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005910239 0.004812479

Prediction and the mean error on train set are: 0.0037756276 0.0018125176

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Epoch: 0636 cost= 0.003379561

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063553196 0.004687488

Prediction and the mean error on train set are: 0.0034631307 0.0016875267

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Epoch: 0641 cost= 0.003477780

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054225945 0.00424999

Prediction and the mean error on train set are: 0.004246076 0.0024374723

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Epoch: 0646 cost= 0.003611808

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005783385 0.0041875243

Prediction and the mean error on train set are: 0.004234721 0.0022500157

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Epoch: 0651 cost= 0.003424606

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006852626 0.0058125257

Prediction and the mean error on train set are: 0.0038053903 0.0016875267

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Epoch: 0656 cost= 0.003553499

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056700744 0.004124999

Prediction and the mean error on train set are: 0.0038472065 0.0017499924

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Epoch: 0661 cost= 0.003318735

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053171082 0.004062474

Prediction and the mean error on train set are: 0.0040081386 0.0018125176

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Epoch: 0666 cost= 0.003455581

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007069914 0.0054374933

Prediction and the mean error on train set are: 0.003677788 0.0015624762

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Epoch: 0671 cost= 0.003458592

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006203581 0.0046250224

Prediction and the mean error on train set are: 0.0039595556 0.0021250248

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Epoch: 0676 cost= 0.003526286

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006308337 0.0046250224

Prediction and the mean error on train set are: 0.0032678319 0.0013124943

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Epoch: 0681 cost= 0.003334314

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067635784 0.0053125024

Prediction and the mean error on train set are: 0.0036529817 0.0013750196

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Epoch: 0686 cost= 0.003397179

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059774197 0.004562497

Prediction and the mean error on train set are: 0.0032450804 0.0015624762

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Epoch: 0691 cost= 0.003530911

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056701233 0.0037500262

Prediction and the mean error on train set are: 0.0050706835 0.003125012

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Epoch: 0696 cost= 0.003328765

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061954325 0.0043125153

Prediction and the mean error on train set are: 0.0036995248 0.0019375086

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Epoch: 0701 cost= 0.003390420

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0051708897 0.003812492

Prediction and the mean error on train set are: 0.0045352727 0.002562523

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Epoch: 0706 cost= 0.003403711

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057342774 0.004687488

Prediction and the mean error on train set are: 0.003682856 0.0018125176

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Epoch: 0711 cost= 0.003461881

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064783636 0.004999995

Prediction and the mean error on train set are: 0.003994644 0.0024374723

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Epoch: 0716 cost= 0.003363675

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064852857 0.0048750043

Prediction and the mean error on train set are: 0.003388027 0.0013750196

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Epoch: 0721 cost= 0.003391235

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005644366 0.004124999

Prediction and the mean error on train set are: 0.003317954 0.0015624762

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Epoch: 0726 cost= 0.003392775

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061747776 0.004499972

Prediction and the mean error on train set are: 0.0031942625 0.0013750196

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Epoch: 0731 cost= 0.003475301

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004982462 0.0033749938

Prediction and the mean error on train set are: 0.003339899 0.0016250014

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Epoch: 0736 cost= 0.003393085

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0070295427 0.005249977

Prediction and the mean error on train set are: 0.003103231 0.0013124943

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Epoch: 0741 cost= 0.003445147

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005544175 0.004124999

Prediction and the mean error on train set are: 0.005127817 0.0030624866

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Epoch: 0746 cost= 0.003390331

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005924345 0.0048750043

Prediction and the mean error on train set are: 0.0045588017 0.002562523

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Epoch: 0751 cost= 0.003291644

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0049227783 0.003812492

Prediction and the mean error on train set are: 0.0028906541 0.0012500286

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Epoch: 0756 cost= 0.003261532

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005355112 0.003812492

Prediction and the mean error on train set are: 0.0047824904 0.0026249886

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Epoch: 0761 cost= 0.003517406

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061364053 0.0047500134

Prediction and the mean error on train set are: 0.0047854367 0.0027499795

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Epoch: 0766 cost= 0.003481419

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067227865 0.005124986

Prediction and the mean error on train set are: 0.0032112878 0.0015624762

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Epoch: 0771 cost= 0.003476253

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005792148 0.0046250224

Prediction and the mean error on train set are: 0.0038892843 0.0017499924

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Epoch: 0776 cost= 0.003386605

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006035113 0.0049375296

Prediction and the mean error on train set are: 0.0038830312 0.0018749833

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Epoch: 0781 cost= 0.003385770

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0073508006 0.0056250095

Prediction and the mean error on train set are: 0.003940409 0.0018749833

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Epoch: 0786 cost= 0.003313120

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069497568 0.005687475

Prediction and the mean error on train set are: 0.004179529 0.0024374723

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Epoch: 0791 cost= 0.003370678

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059157675 0.004562497

Prediction and the mean error on train set are: 0.0040978715 0.0018749833

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Epoch: 0796 cost= 0.003478043

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056524286 0.004374981

Prediction and the mean error on train set are: 0.003359231 0.0015000105

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Epoch: 0801 cost= 0.003433528

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005744997 0.0038750172

Prediction and the mean error on train set are: 0.00333497 0.0016250014

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Epoch: 0806 cost= 0.003504975

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005796361 0.004499972

Prediction and the mean error on train set are: 0.0042657997 0.0023124814

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Epoch: 0811 cost= 0.003477100

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055400613 0.0038750172

Prediction and the mean error on train set are: 0.0043020924 0.0018749833

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Epoch: 0816 cost= 0.003401791

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0038956476 0.003125012

Prediction and the mean error on train set are: 0.0036302211 0.0019375086

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Epoch: 0821 cost= 0.003487973

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007216547 0.0056250095

Prediction and the mean error on train set are: 0.003657557 0.0018749833

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Epoch: 0826 cost= 0.003436859

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064688837 0.0050625205

Prediction and the mean error on train set are: 0.0046368353 0.0024374723

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Epoch: 0831 cost= 0.003398573

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055640764 0.0038750172

Prediction and the mean error on train set are: 0.003734669 0.0019999743

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Epoch: 0836 cost= 0.003203392

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0074477363 0.0051875114

Prediction and the mean error on train set are: 0.0034158533 0.0012500286

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Epoch: 0841 cost= 0.003383843

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00555705 0.004499972

Prediction and the mean error on train set are: 0.0029839769 0.0014374852

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Epoch: 0846 cost= 0.003201469

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064537404 0.0053125024

Prediction and the mean error on train set are: 0.004363537 0.0024999976

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Epoch: 0851 cost= 0.003466825

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005713055 0.0041875243

Prediction and the mean error on train set are: 0.0039428966 0.0015624762

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Epoch: 0856 cost= 0.003374651

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005686634 0.004124999

Prediction and the mean error on train set are: 0.0044107335 0.0023124814

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Epoch: 0861 cost= 0.003461548

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058488036 0.004562497

Prediction and the mean error on train set are: 0.004386312 0.0021250248

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Epoch: 0866 cost= 0.003433835

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054853703 0.004062474

Prediction and the mean error on train set are: 0.0033029856 0.0016250014

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Epoch: 0871 cost= 0.003327227

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005609477 0.004374981

Prediction and the mean error on train set are: 0.0042497995 0.0021874905

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Epoch: 0876 cost= 0.003345264

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062459633 0.0049375296

Prediction and the mean error on train set are: 0.0030362313 0.0013750196

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Epoch: 0881 cost= 0.003400043

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063095246 0.005249977

Prediction and the mean error on train set are: 0.004604728 0.002562523

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Epoch: 0886 cost= 0.003353719

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006558442 0.004812479

Prediction and the mean error on train set are: 0.0040749027 0.0021250248

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Epoch: 0891 cost= 0.003333858

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0049445 0.003437519

Prediction and the mean error on train set are: 0.0042660874 0.0019999743

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Epoch: 0896 cost= 0.003342133

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061904183 0.0048750043

Prediction and the mean error on train set are: 0.0043245275 0.0021874905

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Epoch: 0901 cost= 0.003478127

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060162637 0.0048750043

Prediction and the mean error on train set are: 0.003833323 0.0023124814

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Epoch: 0906 cost= 0.003325254

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069401027 0.0050625205

Prediction and the mean error on train set are: 0.0036563117 0.0015000105

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Epoch: 0911 cost= 0.003341250

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0068894215 0.0054374933

Prediction and the mean error on train set are: 0.004122354 0.0019999743

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Epoch: 0916 cost= 0.003279110

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00563118 0.003937483

Prediction and the mean error on train set are: 0.0042405436 0.0019375086

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Epoch: 0921 cost= 0.003246503

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006340049 0.0049375296

Prediction and the mean error on train set are: 0.0041974173 0.0021874905

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Epoch: 0926 cost= 0.003374683

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069631804 0.0053750277

Prediction and the mean error on train set are: 0.004467165 0.0024374723

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Epoch: 0931 cost= 0.003268324

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059064766 0.0041875243

Prediction and the mean error on train set are: 0.004192351 0.0021874905

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Epoch: 0936 cost= 0.003248300

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065673357 0.004812479

Prediction and the mean error on train set are: 0.003830326 0.0017499924

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Epoch: 0941 cost= 0.003244414

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067085894 0.0050625205

Prediction and the mean error on train set are: 0.0037884566 0.0016250014

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Epoch: 0946 cost= 0.003351535

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005794319 0.004124999

Prediction and the mean error on train set are: 0.0035294413 0.0017499924

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Epoch: 0951 cost= 0.003385534

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005058399 0.003687501

Prediction and the mean error on train set are: 0.004159395 0.0015000105

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Epoch: 0956 cost= 0.003346410

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006646982 0.0050625205

Prediction and the mean error on train set are: 0.0036592102 0.0018749833

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Epoch: 0961 cost= 0.003241502

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059387414 0.0038750172

Prediction and the mean error on train set are: 0.003173275 0.0012500286

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Epoch: 0966 cost= 0.003318263

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065051215 0.0048750043

Prediction and the mean error on train set are: 0.004771331 0.0023750067

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Epoch: 0971 cost= 0.003266375

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055472604 0.003812492

Prediction and the mean error on train set are: 0.004016282 0.0018125176

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Epoch: 0976 cost= 0.003272864

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006100661 0.004562497

Prediction and the mean error on train set are: 0.004947842 0.003000021

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Epoch: 0981 cost= 0.003254941

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055651153 0.0038750172

Prediction and the mean error on train set are: 0.0032774433 0.0011875033

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Epoch: 0986 cost= 0.003342394

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005872537 0.0046250224

Prediction and the mean error on train set are: 0.0041425927 0.0020624995

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Epoch: 0991 cost= 0.003355870

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005391924 0.004374981

Prediction and the mean error on train set are: 0.0034069235 0.0009999871

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Epoch: 0996 cost= 0.003316524

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005094544 0.0036249757

Prediction and the mean error on train set are: 0.0050857356 0.0026249886

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Epoch: 1001 cost= 0.003398871

Big Test Set

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00614266 0.0045687556

Prediction and the mean error on train set are: 0.004703946 0.0024374723

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Epoch: 1006 cost= 0.003310504

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057792496 0.0047500134

Prediction and the mean error on train set are: 0.0037883064 0.0015000105

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Epoch: 1011 cost= 0.003319745

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063287537 0.004000008

Prediction and the mean error on train set are: 0.0030690862 0.0010625124

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Epoch: 1016 cost= 0.003381279

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004851821 0.0036249757

Prediction and the mean error on train set are: 0.004415125 0.0021250248

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Epoch: 1021 cost= 0.003339423

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00669657 0.0047500134

Prediction and the mean error on train set are: 0.0041457443 0.0018125176

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Epoch: 1026 cost= 0.003229567

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062473756 0.004562497

Prediction and the mean error on train set are: 0.0043947846 0.0024374723

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Epoch: 1031 cost= 0.003311343

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0050582923 0.0036249757

Prediction and the mean error on train set are: 0.0038888757 0.0018125176

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Epoch: 1036 cost= 0.003294135

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006093844 0.004437506

Prediction and the mean error on train set are: 0.0039359345 0.0017499924

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Epoch: 1041 cost= 0.003366458

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064672725 0.004437506

Prediction and the mean error on train set are: 0.0045058466 0.0023124814

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Epoch: 1046 cost= 0.003387390

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056106616 0.004000008

Prediction and the mean error on train set are: 0.003998366 0.0018125176

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Epoch: 1051 cost= 0.003301342

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057580452 0.004124999

Prediction and the mean error on train set are: 0.004875864 0.0023124814

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Epoch: 1056 cost= 0.003381080

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007124427 0.0055624843

Prediction and the mean error on train set are: 0.004060267 0.0019999743

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Epoch: 1061 cost= 0.003350596

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058191246 0.0041875243

Prediction and the mean error on train set are: 0.0041981316 0.0028749704

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Epoch: 1066 cost= 0.003296210

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00574096 0.0041875243

Prediction and the mean error on train set are: 0.0040081157 0.0017499924

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Epoch: 1071 cost= 0.003286584

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006830266 0.0046250224

Prediction and the mean error on train set are: 0.0044731866 0.0020624995

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Epoch: 1076 cost= 0.003160189

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005738497 0.0041875243

Prediction and the mean error on train set are: 0.0044050086 0.0021250248

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Epoch: 1081 cost= 0.003317748

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006362573 0.0047500134

Prediction and the mean error on train set are: 0.0041854125 0.0020624995

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Epoch: 1086 cost= 0.003241398

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058327774 0.00424999

Prediction and the mean error on train set are: 0.0053852033 0.0030624866

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Epoch: 1091 cost= 0.003201659

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059524896 0.004374981

Prediction and the mean error on train set are: 0.0031722868 0.0016250014

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Epoch: 1096 cost= 0.003288172

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058275345 0.0047500134

Prediction and the mean error on train set are: 0.0040623676 0.0022500157

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Epoch: 1101 cost= 0.003162571

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006069227 0.00424999

Prediction and the mean error on train set are: 0.003222164 0.0016250014

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Epoch: 1106 cost= 0.003178218

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062456112 0.0043125153

Prediction and the mean error on train set are: 0.0032953266 0.0013124943

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Epoch: 1111 cost= 0.003232479

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0044020326 0.0026875138

Prediction and the mean error on train set are: 0.004077279 0.0020624995

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Epoch: 1116 cost= 0.003430263

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069857254 0.004999995

Prediction and the mean error on train set are: 0.0045850524 0.0026249886

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Epoch: 1121 cost= 0.003335888

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006433077 0.004374981

Prediction and the mean error on train set are: 0.003711807 0.0016875267

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Epoch: 1126 cost= 0.003095275

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006202505 0.0047500134

Prediction and the mean error on train set are: 0.0035543223 0.0016250014

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Epoch: 1131 cost= 0.003206622

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00463376 0.0030624866

Prediction and the mean error on train set are: 0.0035403147 0.0017499924

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Epoch: 1136 cost= 0.003163425

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0052077468 0.0037500262

Prediction and the mean error on train set are: 0.0036556027 0.0018749833

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Epoch: 1141 cost= 0.003257337

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005679206 0.004000008

Prediction and the mean error on train set are: 0.0041815373 0.0020624995

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Epoch: 1146 cost= 0.003308524

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006393262 0.00424999

Prediction and the mean error on train set are: 0.0036824404 0.0017499924

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Epoch: 1151 cost= 0.003197323

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005097958 0.003937483

Prediction and the mean error on train set are: 0.0036423446 0.0016250014

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Epoch: 1156 cost= 0.003211221

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058291024 0.00424999

Prediction and the mean error on train set are: 0.004814888 0.0024999976

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Epoch: 1161 cost= 0.003150177

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005425108 0.004062474

Prediction and the mean error on train set are: 0.0031655857 0.0013124943

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Epoch: 1166 cost= 0.003260093

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005811096 0.004124999

Prediction and the mean error on train set are: 0.004093208 0.0019375086

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Epoch: 1171 cost= 0.003213812

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00638637 0.004687488

Prediction and the mean error on train set are: 0.0039220285 0.0016250014

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Epoch: 1176 cost= 0.003257653

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005690861 0.004562497

Prediction and the mean error on train set are: 0.0036325832 0.0022500157

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Epoch: 1181 cost= 0.003367036

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0052951267 0.0038750172

Prediction and the mean error on train set are: 0.0036022244 0.0018125176

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Epoch: 1186 cost= 0.003256870

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00800268 0.006375015

Prediction and the mean error on train set are: 0.0047988268 0.0030624866

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Epoch: 1191 cost= 0.003247812

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066297892 0.0051875114

Prediction and the mean error on train set are: 0.00532933 0.0028125048

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Epoch: 1196 cost= 0.003312714

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005755909 0.004437506

Prediction and the mean error on train set are: 0.004752477 0.0024999976

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Epoch: 1201 cost= 0.003372528

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0051808823 0.0038750172

Prediction and the mean error on train set are: 0.004426696 0.002562523

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Epoch: 1206 cost= 0.003228080

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062858956 0.004437506

Prediction and the mean error on train set are: 0.0043163425 0.0021250248

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Epoch: 1211 cost= 0.003131726

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0071986364 0.0061249733

Prediction and the mean error on train set are: 0.0034697414 0.0015624762

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Epoch: 1216 cost= 0.003098566

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0052607893 0.003437519

Prediction and the mean error on train set are: 0.0044176024 0.0022500157

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Epoch: 1221 cost= 0.003200121

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.003669484 0.0024374723

Prediction and the mean error on train set are: 0.0046285708 0.0019999743

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Epoch: 1226 cost= 0.003093304

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0050604055 0.003812492

Prediction and the mean error on train set are: 0.004661356 0.0023750067

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Epoch: 1231 cost= 0.003135052

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006713465 0.0051875114

Prediction and the mean error on train set are: 0.0040361434 0.0019375086

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Epoch: 1236 cost= 0.003320339

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005719514 0.003937483

Prediction and the mean error on train set are: 0.003950486 0.0017499924

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Epoch: 1241 cost= 0.003223851

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007119185 0.0051875114

Prediction and the mean error on train set are: 0.00476868 0.0023750067

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Epoch: 1246 cost= 0.003118627

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005990244 0.0046250224

Prediction and the mean error on train set are: 0.003330689 0.0015000105

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Epoch: 1251 cost= 0.003189276

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064141396 0.0041875243

Prediction and the mean error on train set are: 0.0045331526 0.0019999743

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Epoch: 1256 cost= 0.003299081

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061832503 0.0049375296

Prediction and the mean error on train set are: 0.0042089224 0.0019375086

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Epoch: 1261 cost= 0.003159355

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00588919 0.0043125153

Prediction and the mean error on train set are: 0.004622182 0.0021250248

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Epoch: 1266 cost= 0.003122527

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005471116 0.004000008

Prediction and the mean error on train set are: 0.003245576 0.0012500286

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Epoch: 1271 cost= 0.003132217

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067252084 0.004812479

Prediction and the mean error on train set are: 0.004247412 0.0019999743

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Epoch: 1276 cost= 0.003317090

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063830465 0.0050625205

Prediction and the mean error on train set are: 0.0038045621 0.0019375086

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Epoch: 1281 cost= 0.003150089

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00605548 0.004437506

Prediction and the mean error on train set are: 0.005342613 0.0028125048

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Epoch: 1286 cost= 0.003139721

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004951214 0.0041875243

Prediction and the mean error on train set are: 0.004641237 0.0021874905

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Epoch: 1291 cost= 0.003165530

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005548207 0.004062474

Prediction and the mean error on train set are: 0.0038893342 0.0016250014

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Epoch: 1296 cost= 0.003259006

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061835605 0.00424999

Prediction and the mean error on train set are: 0.00401526 0.0019375086

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Epoch: 1301 cost= 0.003161162

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0052248975 0.00356251

Prediction and the mean error on train set are: 0.0032169532 0.0013750196

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Epoch: 1306 cost= 0.003243611

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064273793 0.004437506

Prediction and the mean error on train set are: 0.003748612 0.0015000105

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Epoch: 1311 cost= 0.003211957

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061411597 0.0049375296

Prediction and the mean error on train set are: 0.003655739 0.0016875267

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Epoch: 1316 cost= 0.003258470

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006549762 0.0047500134

Prediction and the mean error on train set are: 0.0041740593 0.0020624995

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Epoch: 1321 cost= 0.003141031

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067211334 0.0046250224

Prediction and the mean error on train set are: 0.0037774579 0.0017499924

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Epoch: 1326 cost= 0.003200154

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0047536795 0.0033125281

Prediction and the mean error on train set are: 0.0046050358 0.0017499924

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Epoch: 1331 cost= 0.003204474

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054015694 0.003812492

Prediction and the mean error on train set are: 0.0050646686 0.002562523

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Epoch: 1336 cost= 0.003198601

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061089024 0.004562497

Prediction and the mean error on train set are: 0.004023281 0.0017499924

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Epoch: 1341 cost= 0.003302949

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006646997 0.0049375296

Prediction and the mean error on train set are: 0.0044718967 0.0016250014

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Epoch: 1346 cost= 0.003117181

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062643494 0.004812479

Prediction and the mean error on train set are: 0.0038920427 0.0019375086

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Epoch: 1351 cost= 0.003167940

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006034456 0.004812479

Prediction and the mean error on train set are: 0.003300432 0.0013750196

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Epoch: 1356 cost= 0.003250755

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062091937 0.0051875114

Prediction and the mean error on train set are: 0.0034699407 0.0015624762

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Epoch: 1361 cost= 0.003267323

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007841907 0.0059999824

Prediction and the mean error on train set are: 0.0045033246 0.0020624995

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Epoch: 1366 cost= 0.003175229

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.008084194 0.0058125257

Prediction and the mean error on train set are: 0.003587107 0.0018125176

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Epoch: 1371 cost= 0.003150080

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0051870053 0.00356251

Prediction and the mean error on train set are: 0.003976828 0.0021250248

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Epoch: 1376 cost= 0.003123043

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005951369 0.0043125153

Prediction and the mean error on train set are: 0.0034169566 0.0016875267

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Epoch: 1381 cost= 0.003246871

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061376113 0.003937483

Prediction and the mean error on train set are: 0.0045470125 0.0021250248

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Epoch: 1386 cost= 0.003133828

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0052878475 0.0037500262

Prediction and the mean error on train set are: 0.0039785285 0.0014374852

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Epoch: 1391 cost= 0.003064180

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005470293 0.003437519

Prediction and the mean error on train set are: 0.0038833353 0.0022500157

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Epoch: 1396 cost= 0.003242918

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006088427 0.00424999

Prediction and the mean error on train set are: 0.004534446 0.0023124814

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Epoch: 1401 cost= 0.003147073

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055097598 0.003812492

Prediction and the mean error on train set are: 0.0040354943 0.0016875267

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Epoch: 1406 cost= 0.003058745

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005033725 0.0033749938

Prediction and the mean error on train set are: 0.0034055028 0.0013124943

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Epoch: 1411 cost= 0.003177002

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063740197 0.0048750043

Prediction and the mean error on train set are: 0.0037862742 0.0017499924

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Epoch: 1416 cost= 0.003232365

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005843454 0.004499972

Prediction and the mean error on train set are: 0.003794452 0.0015000105

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Epoch: 1421 cost= 0.003152343

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0072042323 0.0057500005

Prediction and the mean error on train set are: 0.0038521956 0.0016875267

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Epoch: 1426 cost= 0.003002135

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053165276 0.004000008

Prediction and the mean error on train set are: 0.0034026597 0.0015624762

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Epoch: 1431 cost= 0.003219612

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006702988 0.0053125024

Prediction and the mean error on train set are: 0.0044559287 0.0019375086

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Epoch: 1436 cost= 0.003151556

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055783815 0.00356251

Prediction and the mean error on train set are: 0.0041482975 0.0020624995

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Epoch: 1441 cost= 0.003240215

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004502532 0.0033125281

Prediction and the mean error on train set are: 0.003925793 0.0021874905

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Epoch: 1446 cost= 0.003179845

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0049791243 0.0032500029

Prediction and the mean error on train set are: 0.0041051116 0.0021250248

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Epoch: 1451 cost= 0.003198859

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057926932 0.004499972

Prediction and the mean error on train set are: 0.004567051 0.0019999743

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Epoch: 1456 cost= 0.003159977

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006127605 0.0043125153

Prediction and the mean error on train set are: 0.0032181442 0.0012500286

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Epoch: 1461 cost= 0.003203766

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057986756 0.004000008

Prediction and the mean error on train set are: 0.004741791 0.0023750067

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Epoch: 1466 cost= 0.003209791

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00556214 0.0043125153

Prediction and the mean error on train set are: 0.0039005764 0.0017499924

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Epoch: 1471 cost= 0.003200207

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065335217 0.0053125024

Prediction and the mean error on train set are: 0.0033639113 0.0013750196

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Epoch: 1476 cost= 0.003255201

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0063522058 0.004999995

Prediction and the mean error on train set are: 0.004421517 0.0022500157

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Epoch: 1481 cost= 0.003085806

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0073885694 0.0066249967

Prediction and the mean error on train set are: 0.0036011988 0.0015624762

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Epoch: 1486 cost= 0.003260737

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059106955 0.004562497

Prediction and the mean error on train set are: 0.004658456 0.0022500157

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Epoch: 1491 cost= 0.003097656

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005596647 0.003937483

Prediction and the mean error on train set are: 0.0033812313 0.0014374852

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Epoch: 1496 cost= 0.003091807

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065206713 0.004000008

Prediction and the mean error on train set are: 0.003557323 0.0016250014

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Epoch: 1501 cost= 0.003174441

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004823735 0.003437519

Prediction and the mean error on train set are: 0.003339694 0.0015624762

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Epoch: 1506 cost= 0.003107506

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005475792 0.003937483

Prediction and the mean error on train set are: 0.004162205 0.0016875267

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Epoch: 1511 cost= 0.003122248

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057398877 0.0041875243

Prediction and the mean error on train set are: 0.0035943752 0.0017499924

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Epoch: 1516 cost= 0.003093829

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005988132 0.004562497

Prediction and the mean error on train set are: 0.0050934223 0.0021874905

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Epoch: 1521 cost= 0.003016790

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005449856 0.00424999

Prediction and the mean error on train set are: 0.0034977926 0.0013750196

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Epoch: 1526 cost= 0.003057138

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005650815 0.0046250224

Prediction and the mean error on train set are: 0.0035181912 0.0015000105

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Epoch: 1531 cost= 0.003223809

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006233327 0.0048750043

Prediction and the mean error on train set are: 0.0044212695 0.0021874905

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Epoch: 1536 cost= 0.003189917

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004657937 0.0032500029

Prediction and the mean error on train set are: 0.004145718 0.0021250248

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Epoch: 1541 cost= 0.003030299

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006431833 0.0047500134

Prediction and the mean error on train set are: 0.0039201104 0.0018749833

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Epoch: 1546 cost= 0.003144901

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058775805 0.004687488

Prediction and the mean error on train set are: 0.003478282 0.0013750196

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Epoch: 1551 cost= 0.003180387

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058812983 0.00424999

Prediction and the mean error on train set are: 0.0035094449 0.0015000105

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Epoch: 1556 cost= 0.003178502

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006524793 0.004437506

Prediction and the mean error on train set are: 0.00376299 0.0018125176

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Epoch: 1561 cost= 0.003210079

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054146317 0.00356251

Prediction and the mean error on train set are: 0.0039697727 0.0011875033

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Epoch: 1566 cost= 0.003149263

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065009133 0.00424999

Prediction and the mean error on train set are: 0.0039775427 0.0019999743

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Epoch: 1571 cost= 0.003255850

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005018823 0.0034999847

Prediction and the mean error on train set are: 0.005151561 0.002562523

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Epoch: 1576 cost= 0.003147532

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066913688 0.004999995

Prediction and the mean error on train set are: 0.0047083837 0.0023124814

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Epoch: 1581 cost= 0.003113265

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005891564 0.0038750172

Prediction and the mean error on train set are: 0.0036442652 0.0015624762

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Epoch: 1586 cost= 0.003045256

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005363565 0.0038750172

Prediction and the mean error on train set are: 0.0031579481 0.0014374852

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Epoch: 1591 cost= 0.003024288

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00596129 0.0037500262

Prediction and the mean error on train set are: 0.0046639605 0.0027499795

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Epoch: 1596 cost= 0.003124315

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069085886 0.0051875114

Prediction and the mean error on train set are: 0.004296498 0.0019375086

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Epoch: 1601 cost= 0.003127304

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053482573 0.0036249757

Prediction and the mean error on train set are: 0.003502534 0.0019375086

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Epoch: 1606 cost= 0.003052936

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006661506 0.004999995

Prediction and the mean error on train set are: 0.004089526 0.0020624995

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Epoch: 1611 cost= 0.003184756

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066344286 0.0053125024

Prediction and the mean error on train set are: 0.0040101204 0.0019375086

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Epoch: 1616 cost= 0.003187055

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053745518 0.004000008

Prediction and the mean error on train set are: 0.004583062 0.0022500157

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Epoch: 1621 cost= 0.003102271

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067155627 0.005249977

Prediction and the mean error on train set are: 0.0041063433 0.0019375086

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Epoch: 1626 cost= 0.003076625

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0071162623 0.0057500005

Prediction and the mean error on train set are: 0.0043538827 0.0023124814

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Epoch: 1631 cost= 0.003091374

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007445517 0.0055624843

Prediction and the mean error on train set are: 0.005037927 0.0032500029

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Epoch: 1636 cost= 0.003167820

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005419817 0.003937483

Prediction and the mean error on train set are: 0.0037020373 0.0018749833

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Epoch: 1641 cost= 0.003077516

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006109435 0.004562497

Prediction and the mean error on train set are: 0.0041013355 0.0016875267

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Epoch: 1646 cost= 0.003115977

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005725755 0.0041875243

Prediction and the mean error on train set are: 0.0034763904 0.0018125176

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Epoch: 1651 cost= 0.003164486

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005803154 0.004062474

Prediction and the mean error on train set are: 0.0048960336 0.0024374723

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Epoch: 1656 cost= 0.003195553

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0072343866 0.0053750277

Prediction and the mean error on train set are: 0.004378527 0.0019999743

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Epoch: 1661 cost= 0.003100724

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0050024167 0.003687501

Prediction and the mean error on train set are: 0.0039023343 0.0016875267

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Epoch: 1666 cost= 0.003085637

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006607432 0.0050625205

Prediction and the mean error on train set are: 0.004684042 0.002562523

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Epoch: 1671 cost= 0.003084620

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00567524 0.004062474

Prediction and the mean error on train set are: 0.0038016378 0.0018125176

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Epoch: 1676 cost= 0.003026275

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0071075866 0.0051875114

Prediction and the mean error on train set are: 0.0039357794 0.0016875267

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Epoch: 1681 cost= 0.003079269

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0057573677 0.004062474

Prediction and the mean error on train set are: 0.0035731392 0.0018749833

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Epoch: 1686 cost= 0.003100016

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00642451 0.0047500134

Prediction and the mean error on train set are: 0.0043184003 0.0018749833

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Epoch: 1691 cost= 0.003236542

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005854464 0.00424999

Prediction and the mean error on train set are: 0.005236057 0.0021250248

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Epoch: 1696 cost= 0.003169883

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00480998 0.0032500029

Prediction and the mean error on train set are: 0.0045590624 0.0023750067

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Epoch: 1701 cost= 0.003198994

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005160637 0.004000008

Prediction and the mean error on train set are: 0.0041523455 0.0018749833

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Epoch: 1706 cost= 0.003061467

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059397393 0.0043125153

Prediction and the mean error on train set are: 0.004021723 0.0013750196

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Epoch: 1711 cost= 0.003200608

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005188151 0.003437519

Prediction and the mean error on train set are: 0.0045358394 0.0023124814

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Epoch: 1716 cost= 0.003014873

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005775372 0.00424999

Prediction and the mean error on train set are: 0.004004895 0.0013124943

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Epoch: 1721 cost= 0.003161693

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004972787 0.00356251

Prediction and the mean error on train set are: 0.0038096514 0.0020624995

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Epoch: 1726 cost= 0.003093493

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006696374 0.0055000186

Prediction and the mean error on train set are: 0.0035386728 0.0018125176

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Epoch: 1731 cost= 0.003185563

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005667971 0.004374981

Prediction and the mean error on train set are: 0.0041043484 0.0019375086

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Epoch: 1736 cost= 0.003100931

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004632224 0.003437519

Prediction and the mean error on train set are: 0.0037230335 0.0015624762

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Epoch: 1741 cost= 0.003134183

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006281856 0.0050625205

Prediction and the mean error on train set are: 0.0046643247 0.0019999743

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Epoch: 1746 cost= 0.003075397

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058771726 0.0043125153

Prediction and the mean error on train set are: 0.005123317 0.0026249886

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Epoch: 1751 cost= 0.003133519

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0069901412 0.0053750277

Prediction and the mean error on train set are: 0.005000679 0.0024999976

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Epoch: 1756 cost= 0.003176859

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0062598973 0.004812479

Prediction and the mean error on train set are: 0.0034651256 0.0016250014

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Epoch: 1761 cost= 0.003068807

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064660474 0.004999995

Prediction and the mean error on train set are: 0.004676129 0.0019999743

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Epoch: 1766 cost= 0.003050476

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005812462 0.0037500262

Prediction and the mean error on train set are: 0.003230334 0.0011249781

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Epoch: 1771 cost= 0.003068224

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006001988 0.004124999

Prediction and the mean error on train set are: 0.004425727 0.0022500157

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Epoch: 1776 cost= 0.003034152

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056190356 0.00424999

Prediction and the mean error on train set are: 0.003712969 0.0017499924

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Epoch: 1781 cost= 0.003066580

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0048523224 0.003687501

Prediction and the mean error on train set are: 0.004320172 0.0022500157

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Epoch: 1786 cost= 0.003167835

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053245034 0.003812492

Prediction and the mean error on train set are: 0.003871874 0.0018125176

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Epoch: 1791 cost= 0.003170804

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0053759688 0.0033125281

Prediction and the mean error on train set are: 0.005780215 0.0033749938

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Epoch: 1796 cost= 0.002973537

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.004835378 0.0034999847

Prediction and the mean error on train set are: 0.0033757905 0.0010625124

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Epoch: 1801 cost= 0.003029979

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005259745 0.0034999847

Prediction and the mean error on train set are: 0.004440764 0.0013750196

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Epoch: 1806 cost= 0.003092685

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0049211597 0.00356251

Prediction and the mean error on train set are: 0.0033822646 0.0016250014

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Epoch: 1811 cost= 0.002978021

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005933112 0.004124999

Prediction and the mean error on train set are: 0.0037692585 0.0018749833

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Epoch: 1816 cost= 0.003116757

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056990236 0.004124999

Prediction and the mean error on train set are: 0.003311763 0.0012500286

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Epoch: 1821 cost= 0.003108683

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005655448 0.003812492

Prediction and the mean error on train set are: 0.0031341554 0.0012500286

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Epoch: 1826 cost= 0.003067645

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0061338083 0.004499972

Prediction and the mean error on train set are: 0.004276719 0.0023124814

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Epoch: 1831 cost= 0.002979322

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066743516 0.004999995

Prediction and the mean error on train set are: 0.004052463 0.0018749833

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Epoch: 1836 cost= 0.003039034

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0055117724 0.003812492

Prediction and the mean error on train set are: 0.0033070445 0.0015624762

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Epoch: 1841 cost= 0.003076957

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005734307 0.0043125153

Prediction and the mean error on train set are: 0.0051890058 0.003125012

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Epoch: 1846 cost= 0.002896512

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.007602994 0.0054374933

Prediction and the mean error on train set are: 0.0034554952 0.0012500286

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Epoch: 1851 cost= 0.003102526

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059509324 0.0038750172

Prediction and the mean error on train set are: 0.0041563073 0.0019375086

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Epoch: 1856 cost= 0.003157853

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0068790987 0.005249977

Prediction and the mean error on train set are: 0.004268368 0.0018749833

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Epoch: 1861 cost= 0.003063372

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0048823175 0.003125012

Prediction and the mean error on train set are: 0.00390855 0.0019375086

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Epoch: 1866 cost= 0.003029957

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0050065904 0.0031874776

Prediction and the mean error on train set are: 0.0041004135 0.0016250014

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Epoch: 1871 cost= 0.003090672

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0051226923 0.0031874776

Prediction and the mean error on train set are: 0.0040142126 0.0019375086

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Epoch: 1876 cost= 0.003116595

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0047791223 0.0038750172

Prediction and the mean error on train set are: 0.0037283844 0.0018749833

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Epoch: 1881 cost= 0.003109437

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005843712 0.003937483

Prediction and the mean error on train set are: 0.0034091806 0.0016250014

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Epoch: 1886 cost= 0.003115881

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0049765445 0.003437519

Prediction and the mean error on train set are: 0.0038951798 0.0016250014

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Epoch: 1891 cost= 0.003140459

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006504076 0.00424999

Prediction and the mean error on train set are: 0.0043782652 0.0022500157

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Epoch: 1896 cost= 0.003016570

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060910243 0.00424999

Prediction and the mean error on train set are: 0.0041172835 0.0019375086

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Epoch: 1901 cost= 0.003043772

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067117587 0.0049375296

Prediction and the mean error on train set are: 0.0037631697 0.0015000105

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Epoch: 1906 cost= 0.003087702

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0064086537 0.0048750043

Prediction and the mean error on train set are: 0.0043104547 0.0024374723

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Epoch: 1911 cost= 0.002949090

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0058731297 0.004000008

Prediction and the mean error on train set are: 0.0035598956 0.0016875267

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Epoch: 1916 cost= 0.003041235

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054925983 0.0041875243

Prediction and the mean error on train set are: 0.003482358 0.0013750196

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Epoch: 1921 cost= 0.003271983

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067151417 0.004812479

Prediction and the mean error on train set are: 0.0039662146 0.0021250248

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Epoch: 1926 cost= 0.003077396

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060098106 0.004687488

Prediction and the mean error on train set are: 0.004683064 0.0021250248

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Epoch: 1931 cost= 0.003067884

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006053797 0.004687488

Prediction and the mean error on train set are: 0.003104918 0.0011249781

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Epoch: 1936 cost= 0.003129386

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0056793164 0.004499972

Prediction and the mean error on train set are: 0.0046156663 0.0026249886

1936

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Epoch: 1941 cost= 0.003166625

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0065396247 0.005124986

Prediction and the mean error on train set are: 0.003628001 0.0015000105

1941

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Epoch: 1946 cost= 0.003232420

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006189551 0.004562497

Prediction and the mean error on train set are: 0.0042020245 0.0016875267

1946

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1950

Epoch: 1951 cost= 0.003113457

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0059571303 0.00424999

Prediction and the mean error on train set are: 0.0058404123 0.0030624866

1951

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Epoch: 1956 cost= 0.003201175

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0067703496 0.0049375296

Prediction and the mean error on train set are: 0.0044658245 0.0019999743

1956

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Epoch: 1961 cost= 0.003011576

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005804586 0.0038750172

Prediction and the mean error on train set are: 0.0034821401 0.0015000105

1961

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Epoch: 1966 cost= 0.003055707

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060359887 0.0041875243

Prediction and the mean error on train set are: 0.0040474227 0.0016250014

1966

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Epoch: 1971 cost= 0.003137817

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0054988475 0.004062474

Prediction and the mean error on train set are: 0.0052705165 0.0031874776

1971

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1975

Epoch: 1976 cost= 0.003137898

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.005328475 0.0038750172

Prediction and the mean error on train set are: 0.0037846072 0.0016250014

1976

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1980

Epoch: 1981 cost= 0.003003196

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0066048354 0.004562497

Prediction and the mean error on train set are: 0.0043723 0.0021250248

1981

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1985

Epoch: 1986 cost= 0.003083427

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.00440054 0.0032500029

Prediction and the mean error on train set are: 0.0035890287 0.0013750196

1986

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1990

Epoch: 1991 cost= 0.003099254

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.006836547 0.0050625205

Prediction and the mean error on train set are: 0.004370368 0.0019999743

1991

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1995

Epoch: 1996 cost= 0.003007408

OFDM Detection QAM output number is 16 ,SNR = 20 ,Num Pilot = 64 , prediction and the mean error on test set are: 0.0060113533 0.0046250224

Prediction and the mean error on train set are: 0.0044131125 0.0022500157

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optimization finished

Process finished with exit code 0