# ENCRYPTION METRICS

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000200\_00\_000100\_000171** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0177320756 | 0.0337963841 | | -0.0157216478 | 7.9997901349 | 7.9997842909 | 7.9997990220 | 7.9999318985 | 99.6078559028 | 33.4062216322 |
| **2** | 0.0195664191 | 0.0299366861 | | 0.0247861925 | 7.9997762529 | 7.9998252885 | 7.9997969948 | 7.9999361028 | 99.6052517361 | 33.3976725615 |
| **3** | -0.0021289968 | 0.0008130309 | | 0.0389127715 | 7.9997949572 | 7.9998164423 | 7.9998134273 | 7.9999327624 | 99.6140769676 | 33.3809179546 |
| **4** | 0.0116240581 | 0.0336381014 | | 0.0092467483 | 7.9998314073 | 7.9997730254 | 7.9997815543 | 7.9999394997 | 99.6133535880 | 33.3995516465 |
| **5** | 0.0055393053 | -0.0001298706 | | -0.0201104356 | 7.9997659373 | 7.9997830551 | 7.9997893264 | 7.9999189474 | 99.6092664931 | 33.3963009770 |
| **6** | -0.0182264075 | 0.0160175685 | | 0.0210749479 | 7.9998009569 | 7.9997933355 | 7.9997630639 | 7.9999373268 | 99.6059751157 | 33.3841986939 |
| **7** | -0.0075129874 | 0.0107734535 | | -0.0133812087 | 7.9997714355 | 7.9997955548 | 7.9998140269 | 7.9999380164 | 99.6089048032 | 33.3550484806 |
| **8** | -0.0183501459 | -0.0397232661 | | 0.0160111491 | 7.9998085853 | 7.9997876916 | 7.9997963348 | 7.9999330285 | 99.6094473380 | 33.3945197610 |
| **9** | -0.0100637307 | 0.0156141309 | | 0.0622857405 | 7.9998058456 | 7.9997906335 | 7.9997818580 | 7.9999281624 | 99.6098090278 | 33.6867491036 |
| **10** | 0.0373353818 | 0.0485381735 | | -0.0172625024 | 7.9998378898 | 7.9997924282 | 7.9998070854 | 7.9999470710 | 99.6038773148 | 33.3707764558 |
| **11** | -0.0693980787 | -0.0444353014 | | -0.0259099378 | 7.8606677995 | 7.8487161655 | 7.8557404906 | 7.8718961415 | 99.6065899884 | 31.2731541054 |
| **12** | 0.0133133491 | 0.0304839520 | | -0.0324050900 | 7.8034093533 | 7.7693869633 | 7.7464526540 | 7.8000842101 | 99.6097366898 | 32.6272132580 |
| **13** | 0.0192082074 | -0.0167142748 | | 0.0185108359 | 7.9998013337 | 7.9998217008 | 7.9998261376 | 7.9999409703 | 99.6131365741 | 33.4056724310 |
| **14** | 0.0051114457 | -0.0148126616 | | 0.0181711012 | 7.9998099845 | 7.9997851119 | 7.9997832256 | 7.9999296924 | 99.6048538773 | 33.3686848958 |
| **15** | -0.0196605781 | -0.0014775161 | | -0.0004273369 | 7.9998161925 | 7.9997980796 | 7.9998255744 | 7.9999461925 | 99.6104239005 | 33.3885833674 |
| **16** | -0.0703346888 | -0.0145923271 | | -0.1151762893 | 7.9998220001 | 7.9997827213 | 7.9998031772 | 7.9999457167 | 99.6040581597 | 33.3843247889 |
| **17** | 0.0080062592 | -0.0272489264 | | 0.0128172881 | 7.9997917908 | 7.9998093372 | 7.9998034671 | 7.9999325444 | 99.6047815394 | 33.4005221099 |
| **18** | 0.0488214201 | -0.0096287102 | | -0.0177391443 | 7.9997976938 | 7.9998093511 | 7.9997861861 | 7.9999307496 | 99.6028645833 | 33.4254811184 |
| **19** | 0.0153948678 | 0.0212397226 | | 0.0149318382 | 7.9998168433 | 7.9997951710 | 7.9998154372 | 7.9999352242 | 99.6100260417 | 33.3699401722 |
| **20** | -0.0019306140 | -0.0022814849 | | -0.0364023995 | 7.9998095732 | 7.9998078293 | 7.9998335207 | 7.9999376243 | 99.6080729167 | 33.4008018167 |
| **21** | 0.0248429714 | -0.0074796461 | | -0.0102694981 | 7.9998068309 | 7.9997998487 | 7.9997841909 | 7.9999297211 | 99.6151982060 | 33.3906929409 |
| **22** | -0.0356581374 | -0.0065571571 | | 0.0452157649 | 7.9997931244 | 7.9998186126 | 7.9998029886 | 7.9999334934 | 99.6104962384 | 33.3836989946 |
| **23** | -0.0184646600 | 0.0226490896 | | 0.0446264040 | 7.9997888901 | 7.9997867047 | 7.9997981398 | 7.9999290134 | 99.6081090856 | 33.3930239254 |
| **24** | -0.0068383477 | 0.0016907956 | | 0.0161722427 | 7.9997971414 | 7.9998074118 | 7.9998024194 | 7.9999327293 | 99.6104239005 | 33.4006404037 |
| **25** | -0.0273529271 | -0.0053126326 | | 0.0161930101 | 7.9997984016 | 7.9997846527 | 7.9998217170 | 7.9999304036 | 99.6102430556 | 33.3654773455 |
| **26** | -0.0090419076 | -0.0287330992 | | 0.0625338317 | 7.9998159704 | 7.9997699559 | 7.9998001808 | 7.9999360754 | 99.6039496528 | 34.2041400009 |
| **27** | 0.0164672528 | 0.0251439523 | | 0.0067128479 | 7.9998028586 | 7.9997842382 | 7.9997852086 | 7.9999365315 | 99.6135706019 | 33.3718164204 |
| **28** | -0.0257632743 | 0.0094197002 | | 0.0602603217 | 7.9997968521 | 7.9997989041 | 7.9998205658 | 7.9999382107 | 99.6138237847 | 33.3891782407 |
| **29** | 0.0133393440 | 0.0306851501 | | -0.0274133613 | 7.9998273509 | 7.9997870102 | 7.9998073488 | 7.9999382861 | 99.6085431134 | 33.4043875102 |
| **30** | 0.0016047764 | 0.0000171638 | | -0.0103861341 | 7.9998169443 | 7.9997967880 | 7.9998023351 | 7.9999381159 | 99.6098813657 | 33.3797724616 |
| **31** | -0.0030923599 | -0.0087331346 | | 0.0052625711 | 7.9997969426 | 7.9997556835 | 7.9998267570 | 7.9999292067 | 99.6058666088 | 33.3799493351 |
| **32** | 0.0094361224 | 0.0101555103 | | 0.0322609277 | 7.8947435013 | 7.8744553415 | 7.8926523076 | 7.9079793478 | 99.6097005208 | 31.5206815654 |
| **33** | -0.0114931243 | -0.0175073083 | | 0.0526662929 | 7.9997766315 | 7.9998133698 | 7.9998096643 | 7.9999358063 | 99.6125217014 | 33.3768105767 |
| **34** | 0.0122591284 | -0.0104413362 | | 0.0381390357 | 7.9997879831 | 7.9998260018 | 7.9997536452 | 7.9999330012 | 99.6042390046 | 33.3714910414 |
| **35** | -0.0060650209 | -0.0093756646 | | -0.0045913904 | 7.9997889584 | 7.9997769165 | 7.9998145273 | 7.9999372472 | 99.6091218171 | 33.3966684822 |
| **36** | 0.0063516090 | 0.0185699654 | | -0.0099892610 | 7.9998019730 | 7.9998275909 | 7.9998069669 | 7.9999389659 | 99.6079282407 | 33.3923738766 |
| **37** | 0.0054231874 | 0.0208759585 | | 0.0116132534 | 7.9998049720 | 7.9997830259 | 7.9997756734 | 7.9999297921 | 99.6080005787 | 33.4037211499 |
| **38** | 0.0113785003 | 0.0119716507 | | 0.0453418977 | 7.9997851959 | 7.9998139445 | 7.9997925360 | 7.9999345554 | 99.6064814815 | 33.4039590142 |
| **39** | -0.0235968890 | -0.0218270572 | | -0.0258702383 | 7.9997893299 | 7.9998043234 | 7.9998039075 | 7.9999248241 | 99.6134982639 | 33.3852691540 |
| **40** | 0.0126559032 | -0.0228406750 | | -0.0262030382 | 7.9997890329 | 7.9997969827 | 7.9998132562 | 7.9999314928 | 99.6090133102 | 33.3871944785 |
| **41** | -0.0051746639 | -0.0113868727 | | 0.0024424482 | 7.9997706852 | 7.9998145913 | 7.9997988512 | 7.9999283967 | 99.6085792824 | 33.3880835262 |
| **42** | -0.0091756643 | -0.0286555459 | | 0.0006845212 | 7.9998045653 | 7.9998151538 | 7.9998236612 | 7.9999366616 | 99.6076027199 | 34.7272909858 |
| **43** | 0.0245615305 | -0.0106368403 | | -0.0271939113 | 7.9998198989 | 7.9998248580 | 7.9998149413 | 7.9999355613 | 99.6100622106 | 33.3768952546 |
| **44** | -0.0199866893 | -0.0123430332 | | 0.0098811844 | 7.9997916160 | 7.9998096164 | 7.9997546277 | 7.9999346561 | 99.6104239005 | 33.3834784348 |
| **45** | 0.0224111677 | 0.0194542298 | | -0.0358154694 | 7.9997965522 | 7.9998120013 | 7.9997781511 | 7.9999299302 | 99.6141131366 | 32.6862399011 |
| **46** | 0.0306954866 | 0.0002021303 | | -0.0090247849 | 7.9997883225 | 7.9997394429 | 7.9998047960 | 7.9999207481 | 99.6087962963 | 33.3896314168 |
| **47** | -0.0223426045 | -0.0221080303 | | -0.0372702949 | 7.9997919609 | 7.9997864988 | 7.9998193405 | 7.9999325712 | 99.6074942130 | 33.4118169027 |
| **48** | -0.0140063868 | 0.0192792310 | | 0.0478033435 | 7.9997844495 | 7.9997805777 | 7.9997930767 | 7.9999325364 | 99.6063006366 | 33.3891515750 |
| **49** | -0.0175936480 | -0.0078203424 | | 0.0011462429 | 7.9997791967 | 7.9997981684 | 7.9998152344 | 7.9999262969 | 99.6049623843 | 33.3933955440 |
| **50** | 0.0155565417 | -0.0334334627 | | -0.0164234317 | 7.9998061428 | 7.9998185372 | 7.9997606468 | 7.9999368177 | 99.6134620949 | 33.3964594113 |
| **Total** | -0.0646162221 | -0.0052704466 | | 0.2007179489 | 399.5493682424 | 399.4830409302 | 399.4854502275 | 399.5768528782 | 4980.4447699653 | 1666.4597252008 |
| **Average** | -0.0012923237 | -0.0001054089 | | 0.0040143374 | 7.9909873648 | 7.9896608186 | 7.9897090045 | 7.9915370576 | 99.6088953993 | 33.3291945040 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000200\_01\_000226\_000268** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0175157488 | 0.0231987494 | | -0.0190674992 | 7.9997914072 | 7.9998056710 | 7.9998200871 | 7.9999342105 | 99.6114004630 | 33.3788059697 |
| **2** | -0.0059390741 | -0.0202788411 | | 0.0053516324 | 7.9997974981 | 7.9997856898 | 7.9998009877 | 7.9999389791 | 99.6171513310 | 33.3953316483 |
| **3** | 0.0255007090 | 0.0004757381 | | 0.0170703276 | 7.9998071673 | 7.9997934646 | 7.9998259071 | 7.9999444037 | 99.6034071181 | 33.3994815779 |
| **4** | -0.0167070032 | -0.0094915939 | | -0.0118083262 | 7.9997936238 | 7.9998161296 | 7.9997836007 | 7.9999400173 | 99.6116536458 | 33.4039293698 |
| **5** | 0.0376894347 | 0.0328922976 | | 0.0107976128 | 7.9997983387 | 7.9997984693 | 7.9998057681 | 7.9999332870 | 99.6120153356 | 33.4734096995 |
| **6** | -0.3610453733 | 0.8737269372 | | -0.1734988690 | 7.8086433203 | 7.7648650288 | 7.8913265193 | 7.8447754653 | 99.6115089699 | 30.9104019154 |
| **7** | 0.0277569344 | -0.0081133178 | | -0.0265470533 | 7.9997820613 | 7.9998336669 | 7.9998068643 | 7.9999462954 | 99.6087962963 | 33.3879791326 |
| **8** | -0.0048159032 | 0.0041271353 | | 0.0262198836 | 7.9998063826 | 7.9997937252 | 7.9998046800 | 7.9999357141 | 99.6069878472 | 33.3830788739 |
| **9** | 0.0407020577 | 0.0263667331 | | -0.0177784778 | 7.9998025388 | 7.9998188596 | 7.9997969693 | 7.9999358039 | 99.6041666667 | 33.3761863426 |
| **10** | -0.0043753851 | -0.0235499401 | | -0.0087028962 | 7.9998127940 | 7.9998196456 | 7.9997986171 | 7.9999300179 | 99.6032262731 | 33.3849992341 |
| **11** | -0.0330761655 | -0.0008606294 | | -0.0252699918 | 7.9997934761 | 7.9997926130 | 7.9997900438 | 7.9999313985 | 99.6097366898 | 33.3947520935 |
| **12** | -0.0007167006 | 0.0032289558 | | 0.0072182114 | 7.9997955504 | 7.9997837838 | 7.9997698114 | 7.9999185333 | 99.6068793403 | 33.3614303910 |
| **13** | -0.0240471885 | -0.0273436805 | | 0.0463324303 | 7.9998112945 | 7.9998034636 | 7.9997794103 | 7.9999346118 | 99.6059751157 | 33.3800801107 |
| **14** | 0.0497344314 | 0.0105276106 | | -0.0193281057 | 7.9998150952 | 7.9997986099 | 7.9997844591 | 7.9999280308 | 99.6057219329 | 33.4210499217 |
| **15** | -0.0193636332 | -0.0105399029 | | -0.0462729127 | 7.9997889319 | 7.9997945440 | 7.9997990479 | 7.9999276632 | 99.6104962384 | 33.4015294515 |
| **16** | 0.0257799045 | -0.0051288150 | | 0.0403793806 | 7.9998070775 | 7.9997910156 | 7.9998162697 | 7.9999311429 | 99.6089409722 | 33.3912544821 |
| **17** | 0.0037327856 | 0.0257040361 | | -0.0046645243 | 7.9997908479 | 7.9998054226 | 7.9998186124 | 7.9999334165 | 99.6009837963 | 32.2653048691 |
| **18** | -0.0170394741 | 0.0349338178 | | 0.0628812305 | 7.9998231773 | 7.9998185808 | 7.9997940023 | 7.9999378005 | 99.6064453125 | 33.4122185911 |
| **19** | 0.1869015547 | -0.3208072891 | | 0.0063724051 | 7.9272525158 | 7.9289426758 | 7.9252971321 | 7.9365450568 | 99.6300274884 | 33.3777753665 |
| **20** | -0.0056479411 | -0.0241420701 | | 0.0146529979 | 7.9997905550 | 7.9998165888 | 7.9997962823 | 7.9999366830 | 99.6083622685 | 33.3818006196 |
| **21** | -0.0050042647 | -0.0091740727 | | 0.0379804230 | 7.9997849044 | 7.9998126625 | 7.9998175929 | 7.9999388550 | 99.6145833333 | 33.3810390852 |
| **22** | 0.0335931159 | 0.0000020840 | | 0.0003158028 | 7.9998170214 | 7.9998052707 | 7.9998124234 | 7.9999351930 | 99.6089409722 | 33.3774721144 |
| **23** | 0.0089402279 | 0.0018761950 | | -0.0329978115 | 7.9998060775 | 7.9997992305 | 7.9998034103 | 7.9999322821 | 99.6020326968 | 33.3856180782 |
| **24** | 0.0130155836 | 0.0083590514 | | -0.0103440654 | 7.9998110211 | 7.9997955902 | 7.9998256370 | 7.9999420921 | 99.6091941551 | 33.3892548339 |
| **25** | -0.0206618817 | 0.0020286686 | | -0.0005191876 | 7.9997939774 | 7.9998345740 | 7.9998136171 | 7.9999413010 | 99.6098451968 | 33.3836443866 |
| **26** | -0.0071581328 | -0.0149784624 | | -0.0194435142 | 7.9998277947 | 7.9997958393 | 7.9998012140 | 7.9999379809 | 99.6104962384 | 33.3894319910 |
| **27** | -0.0045017339 | 0.0043830277 | | 0.0152856565 | 7.9998023402 | 7.9997956583 | 7.9997813635 | 7.9999331711 | 99.6128110532 | 33.3932304432 |
| **28** | 0.0022748464 | 0.0223462614 | | -0.0306206884 | 7.9998226489 | 7.9998344891 | 7.9997738875 | 7.9999320136 | 99.6080367477 | 34.6592114595 |
| **29** | 0.0300398574 | 0.0236984727 | | -0.0431867576 | 7.9997744782 | 7.9998086650 | 7.9998125244 | 7.9999391217 | 99.6085431134 | 33.4000971598 |
| **30** | 0.0104659415 | -0.0062377795 | | -0.0212651095 | 7.9998095268 | 7.9997775280 | 7.9997751534 | 7.9999278475 | 99.6096281829 | 33.3781380492 |
| **31** | -0.0371145237 | 0.0237185595 | | 0.0296909648 | 7.9997885398 | 7.9997951022 | 7.9998045816 | 7.9999249912 | 99.6055772569 | 33.3854378007 |
| **32** | 0.0284258146 | 0.0243354477 | | 0.0099333369 | 7.9998153127 | 7.9998067687 | 7.9997895534 | 7.9999290453 | 99.6121238426 | 33.3896620541 |
| **33** | -0.0050796841 | 0.0315074885 | | 0.0276599149 | 7.9997991343 | 7.9998059645 | 7.9997973057 | 7.9999353388 | 99.6092664931 | 33.3733878563 |
| **34** | 0.0099446322 | -0.0004837231 | | 0.0341911458 | 7.9998097593 | 7.9998175737 | 7.9998004639 | 7.9999316042 | 99.6069155093 | 33.3828937738 |
| **35** | -0.0157138160 | 0.0243634028 | | 0.0338706613 | 7.9998195298 | 7.9998070402 | 7.9997935180 | 7.9999355796 | 99.6109302662 | 33.7840160051 |
| **36** | 0.0333517423 | 0.0007531366 | | 0.0400037308 | 7.9997663152 | 7.9997926056 | 7.9998014541 | 7.9999380632 | 99.6044560185 | 33.8942089915 |
| **37** | 0.0157629310 | 0.0068793372 | | 0.0201978414 | 7.9998252625 | 7.9997793041 | 7.9997842774 | 7.9999319019 | 99.6101345486 | 33.3926273432 |
| **38** | 0.0233224934 | -0.0085598282 | | -0.0083104778 | 7.9997983047 | 7.9997873569 | 7.9998242185 | 7.9999348549 | 99.6125578704 | 34.3077682462 |
| **39** | -0.0174854296 | 0.0087605104 | | 0.0949223753 | 7.9997716038 | 7.9997889970 | 7.9997931170 | 7.9999210289 | 99.6040219907 | 33.4130679239 |
| **40** | -0.0253793587 | -0.0193345745 | | -0.0093285771 | 7.9997793208 | 7.9998027007 | 7.9997936922 | 7.9999318253 | 99.6002242477 | 33.3703737745 |
| **41** | -0.0170476217 | 0.0473502053 | | -0.0061748386 | 7.9997601221 | 7.9997886154 | 7.9997815453 | 7.9999253271 | 99.6059027778 | 33.3938253166 |
| **42** | 0.0069452773 | -0.0256999810 | | -0.0370033553 | 7.9998229210 | 7.9997919276 | 7.9997955231 | 7.9999369633 | 99.6071325231 | 33.3739657090 |
| **43** | 0.0063807276 | 0.0220178996 | | -0.0095037587 | 7.9997780733 | 7.9998070578 | 7.9997939186 | 7.9999248435 | 99.6094111690 | 33.3811919878 |
| **44** | 0.0021895179 | 0.0132994448 | | 0.0299154477 | 7.9998002010 | 7.9997922885 | 7.9998037445 | 7.9999365087 | 99.6095920139 | 33.3895122719 |
| **45** | -0.0352084214 | -0.0434409313 | | 0.0005007559 | 7.9997832166 | 7.9998194903 | 7.9997938554 | 7.9999257138 | 99.6086154514 | 32.7406676936 |
| **46** | -0.0227747497 | 0.0256740493 | | -0.0513170902 | 7.9998256996 | 7.9997919445 | 7.9997784733 | 7.9999335533 | 99.6070240162 | 33.3848511540 |
| **47** | 0.0253403772 | -0.0427730448 | | -0.0546113764 | 7.9997755026 | 7.9998225809 | 7.9998272044 | 7.9999364875 | 99.6078559028 | 33.3832992919 |
| **48** | 0.0164817263 | -0.0009281051 | | -0.0145567134 | 7.9998020265 | 7.9998076447 | 7.9997951221 | 7.9999392745 | 99.6091941551 | 33.3988586204 |
| **49** | -0.0916519450 | -0.3519879528 | | -0.0801649350 | 7.8922433976 | 7.8785814569 | 7.9222276719 | 7.9087376810 | 99.6130280671 | 31.8934724208 |
| **50** | -0.0073184783 | 0.0078735403 | | -0.0153128648 | 7.9998365044 | 7.9998063013 | 7.9998143460 | 7.9999415075 | 99.6107855903 | 33.3833272342 |
| **Total** | -0.1581170072 | 0.3605542583 | | -0.1858556081 | 399.6187541918 | 399.5631298775 | 399.7294254819 | 399.6869504831 | 4980.4427445023 | 1666.8343527312 |
| **Average** | -0.0031623296 | 0.0072109602 | | -0.0037170950 | 7.9923750838 | 7.9912625976 | 7.9945885096 | 7.9937390097 | 99.6088548900 | 33.3366870546 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000200\_05\_001525\_001575** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0035216515 | 0.0086965374 | | 0.0527184439 | 7.9998053820 | 7.9997726446 | 7.9998108778 | 7.9999355327 | 99.6100622106 | 33.3913222812 |
| **2** | 0.0152794997 | -0.0200946152 | | -0.0356863010 | 7.9997901200 | 7.9997885175 | 7.9998002892 | 7.9999262168 | 99.6038773148 | 33.3952967559 |
| **3** | -0.0039065269 | -0.0159209638 | | 0.0253292465 | 7.9998014703 | 7.9997825632 | 7.9997886002 | 7.9999278739 | 99.6076027199 | 33.3879097733 |
| **4** | -0.0317741374 | -0.0127729454 | | 0.0106147993 | 7.9997778623 | 7.9998135946 | 7.9998179015 | 7.9999399768 | 99.6061197917 | 33.3825069785 |
| **5** | -0.0114690651 | -0.0337883243 | | -0.0624037941 | 7.9997962781 | 7.9997991559 | 7.9998077743 | 7.9999416798 | 99.6094111690 | 33.3873346156 |
| **6** | 0.0058299698 | -0.0093608562 | | -0.0078631667 | 7.9997963261 | 7.9998308896 | 7.9998336996 | 7.9999494716 | 99.6115813079 | 33.3750560265 |
| **7** | 0.0044186096 | 0.0149616027 | | 0.0111871804 | 7.9998114227 | 7.9997873827 | 7.9998193121 | 7.9999328134 | 99.6100260417 | 33.3862783395 |
| **8** | -0.0166248264 | -0.0041740431 | | 0.0046456311 | 7.9998058738 | 7.9998183132 | 7.9998037066 | 7.9999396278 | 99.6055772569 | 33.3806827853 |
| **9** | 0.0132640181 | 0.0398141145 | | 0.0255091775 | 7.9998199470 | 7.9998050608 | 7.9997822502 | 7.9999310251 | 99.6086877894 | 33.3940481459 |
| **10** | -0.0063998939 | -0.0331637554 | | -0.0239358724 | 7.9998120310 | 7.9998175163 | 7.9997816348 | 7.9999382228 | 99.6047092014 | 33.3862682689 |
| **11** | -0.0401914936 | -0.0189045226 | | 0.0124165241 | 7.9997813664 | 7.9997923827 | 7.9997929154 | 7.9999327495 | 99.6107132523 | 33.3685813533 |
| **12** | -0.0228543969 | 0.0256141859 | | 0.0137444424 | 7.9997867118 | 7.9998098838 | 7.9998166184 | 7.9999306204 | 99.6116898148 | 33.4246238426 |
| **13** | -0.0095059058 | -0.0077278424 | | -0.0487187397 | 7.9997823254 | 7.9998008628 | 7.9997702718 | 7.9999256177 | 99.6121238426 | 33.3739435821 |
| **14** | 0.0140988841 | 0.0159023882 | | 0.0489070331 | 7.9997861403 | 7.9997720418 | 7.9997992093 | 7.9999298863 | 99.6116174769 | 33.3988103951 |
| **15** | 0.0219212130 | 0.0047409471 | | -0.0058611280 | 7.9997987127 | 7.9998229857 | 7.9997700271 | 7.9999316997 | 99.6126663773 | 33.3845558449 |
| **16** | -0.0461082913 | 0.0188454015 | | -0.0034429777 | 7.9998174397 | 7.9997798575 | 7.9997925194 | 7.9999373415 | 99.6112557870 | 33.4026884191 |
| **17** | 0.0001060347 | -0.0168994740 | | -0.0008368975 | 7.9998068690 | 7.9998002216 | 7.9997547041 | 7.9999246854 | 99.6144024884 | 33.3733312625 |
| **18** | 0.0496848736 | 0.0267164513 | | -0.0506484889 | 7.9998116778 | 7.9998039492 | 7.9998096449 | 7.9999413710 | 99.6029730903 | 33.4021073041 |
| **19** | -0.1482405739 | -0.3637056278 | | -0.1177605620 | 7.9294523324 | 7.9272533343 | 7.9419739690 | 7.9524672307 | 99.6061197917 | 34.6531496800 |
| **20** | 0.0041427423 | 0.0236129633 | | -0.0359184674 | 7.9997894654 | 7.9997944352 | 7.9997586155 | 7.9999336325 | 99.6118344907 | 33.4024095634 |
| **21** | 0.0279841661 | 0.0076108049 | | -0.0016157820 | 7.9998114593 | 7.9997912459 | 7.9997946921 | 7.9999371558 | 99.6147641782 | 33.4021158145 |
| **22** | -0.0054681124 | -0.0071525104 | | -0.0114955126 | 7.9998164116 | 7.9998051974 | 7.9998090758 | 7.9999399369 | 99.6079644097 | 33.3884101818 |
| **23** | -0.0068796429 | -0.0196439821 | | -0.0091364015 | 7.9998082594 | 7.9998164916 | 7.9997836798 | 7.9999343728 | 99.6032262731 | 33.3982926822 |
| **24** | 0.0449019344 | -0.0283626121 | | 0.0086762234 | 7.9997768289 | 7.9998217773 | 7.9997923907 | 7.9999226102 | 99.6038773148 | 33.6015034949 |
| **25** | 0.0740916818 | -0.0250954169 | | -0.2413418624 | 7.9832384427 | 7.9827986934 | 7.9864031814 | 7.9887826851 | 99.6043836806 | 33.7508652188 |
| **26** | 0.0067777319 | -0.0121279418 | | -0.0185747915 | 7.9997912704 | 7.9998157806 | 7.9998074558 | 7.9999408509 | 99.6101707176 | 33.3727848981 |
| **27** | -0.5112020352 | 0.0160281678 | | -0.0254010219 | 7.9070198695 | 7.9306572690 | 7.9320336467 | 7.9417963899 | 99.6097005208 | 33.2339989844 |
| **28** | -0.0737166205 | -0.0258665254 | | -0.1199661816 | 7.9477935122 | 7.9489331552 | 7.9618083027 | 7.9600178750 | 99.6068793403 | 34.4600073189 |
| **29** | 0.0251569182 | 0.0232158386 | | 0.0079291865 | 7.9998028893 | 7.9998096672 | 7.9998031221 | 7.9999361960 | 99.6105324074 | 33.3692671455 |
| **30** | 0.0266056097 | 0.0011234733 | | 0.0403940931 | 7.9998000239 | 7.9997926353 | 7.9998133597 | 7.9999320568 | 99.6063006366 | 33.6287825663 |
| **31** | -0.0081271459 | -0.0141511627 | | -0.0325336953 | 7.9997869383 | 7.9998355566 | 7.9998097227 | 7.9999367928 | 99.6069155093 | 33.4192396287 |
| **32** | -0.0123513893 | -0.0160336767 | | 0.0529534143 | 7.9997934854 | 7.9998012677 | 7.9998086740 | 7.9999340341 | 99.6056495949 | 33.3964184198 |
| **33** | -0.0123766177 | -0.0076784115 | | -0.0192640381 | 7.9998125043 | 7.9998408948 | 7.9998203424 | 7.9999371997 | 99.6072410301 | 33.3793734681 |
| **34** | 0.0043847176 | -0.0063019939 | | -0.0648546087 | 7.9997941362 | 7.9997888464 | 7.9998001811 | 7.9999326644 | 99.6113642940 | 33.3786578897 |
| **35** | 0.0218814051 | 0.0734791307 | | -0.1824665558 | 7.8738396712 | 7.8746837628 | 7.8897863334 | 7.9093922672 | 99.6054325810 | 35.0243466889 |
| **36** | 0.0190892144 | 0.0191501157 | | -0.0261339650 | 7.9998009096 | 7.9998286398 | 7.9997525056 | 7.9999296230 | 99.6149450231 | 33.3591046546 |
| **37** | 0.0213363882 | -0.0494368844 | | -0.0257626896 | 7.9997967115 | 7.9997886302 | 7.9997842630 | 7.9999268653 | 99.6008029514 | 33.3825691040 |
| **38** | -0.0140884301 | 0.0002697048 | | -0.0191180977 | 7.9998149472 | 7.9997916940 | 7.9998079077 | 7.9999343499 | 99.6125217014 | 33.3946855710 |
| **39** | -0.0130084956 | 0.0165899737 | | 0.0414082763 | 7.9997679374 | 7.9998112007 | 7.9998063364 | 7.9999248024 | 99.6124131944 | 33.4393834820 |
| **40** | 0.0045853913 | -0.0062444935 | | -0.0217409021 | 7.9998043393 | 7.9998043121 | 7.9998294193 | 7.9999408793 | 99.6154513889 | 33.3774299882 |
| **41** | 0.0060682860 | 0.0210795565 | | 0.0782388840 | 7.9998319229 | 7.9998001571 | 7.9997836019 | 7.9999334320 | 99.6051793981 | 33.3797682065 |
| **42** | 0.0020011101 | 0.0151256432 | | 0.0167880208 | 7.9998066669 | 7.9997940173 | 7.9997987367 | 7.9999353968 | 99.6091218171 | 33.3902591968 |
| **43** | 0.0024446042 | 0.0111558000 | | -0.0674262337 | 7.9998071783 | 7.9997729140 | 7.9997613821 | 7.9999335682 | 99.6097728588 | 33.4093947156 |
| **44** | 0.0134875975 | -0.0183076901 | | 0.0085484367 | 7.9998391583 | 7.9998027524 | 7.9997849139 | 7.9999330080 | 99.6132812500 | 33.3950152052 |
| **45** | -0.0007595058 | -0.0227827005 | | -0.0158879750 | 7.9998141251 | 7.9997944033 | 7.9998101911 | 7.9999320448 | 99.6114728009 | 33.3909740661 |
| **46** | 0.0367540389 | -0.0059983382 | | 0.0001028212 | 7.9997820289 | 7.9998288544 | 7.9997813100 | 7.9999318106 | 99.6062282986 | 35.5013064803 |
| **47** | -0.0003735753 | -0.0074646292 | | 0.0358303804 | 7.9998070663 | 7.9998025190 | 7.9998045992 | 7.9999405797 | 99.6055772569 | 33.4034181815 |
| **48** | 0.0136403770 | -0.0118122572 | | 0.0159445469 | 7.9997877467 | 7.9997946595 | 7.9997911330 | 7.9999256712 | 99.6097366898 | 33.3688382239 |
| **49** | -0.0308479452 | -0.0097547994 | | 0.0051568118 | 7.9998148880 | 7.9997854252 | 7.9998071221 | 7.9999319450 | 99.6105324074 | 32.4058372481 |
| **50** | 0.0055844627 | -0.0113892335 | | -0.0334824169 | 7.9997971976 | 7.9997607921 | 7.9998090295 | 7.9999307671 | 99.6054325810 | 33.3987363551 |
| **Total** | -0.5442747989 | -0.4583854285 | | -0.8122355530 | 399.6323882810 | 399.6553988052 | 399.7028711528 | 399.7494751065 | 4980.4399233218 | 1675.2516902970 |
| **Average** | -0.0108850660 | -0.0091674517 | | -0.0162432823 | 7.9926477656 | 7.9931079761 | 7.9940574231 | 7.9949895021 | 99.6087984664 | 33.5050338059 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000201\_01\_000384\_000589** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0051432652 | -0.0368450787 | | -0.0105998506 | 7.9997807989 | 7.9997754629 | 7.9997924230 | 7.9999307165 | 99.6063729745 | 33.4206697928 |
| **2** | -0.0300711930 | 0.0200005074 | | 0.0010366147 | 7.9998044665 | 7.9997938428 | 7.9998094312 | 7.9999386782 | 99.6124855324 | 33.3754792745 |
| **3** | -0.0005025802 | 0.0428850893 | | 0.0592840218 | 7.9997598209 | 7.9997880447 | 7.9998144318 | 7.9999339816 | 99.6094835069 | 33.4023586431 |
| **4** | -0.0057953446 | 0.0069351416 | | -0.0213179426 | 7.9997813089 | 7.9998147056 | 7.9998230742 | 7.9999391833 | 99.6110387731 | 32.4631491978 |
| **5** | -0.0038974242 | -0.0014812951 | | -0.0416301910 | 7.9998096588 | 7.9997990652 | 7.9998095196 | 7.9999357600 | 99.6157045718 | 33.4031896786 |
| **6** | 0.0122134005 | 0.0019725266 | | 0.0373075469 | 7.9997932690 | 7.9998114413 | 7.9997996436 | 7.9999409787 | 99.6085792824 | 33.3628429670 |
| **7** | 0.0234844909 | 0.0328341313 | | -0.0076275589 | 7.9997928739 | 7.9998040653 | 7.9997849454 | 7.9999349945 | 99.6072048611 | 33.3887993884 |
| **8** | -0.0173194051 | 0.0330748529 | | 0.0504283274 | 7.9998025594 | 7.9998133762 | 7.9997945016 | 7.9999214734 | 99.6107132523 | 33.3761921580 |
| **9** | 0.0009851664 | 0.0100830979 | | 0.0346543573 | 7.9997943344 | 7.9997982917 | 7.9998262398 | 7.9999330997 | 99.6111472801 | 33.4287915021 |
| **10** | -0.0190830947 | 0.0146246926 | | 0.0245424768 | 7.9997771570 | 7.9998230448 | 7.9998346518 | 7.9999407194 | 99.6105324074 | 33.3923150134 |
| **11** | -0.2553496013 | 0.7940371145 | | 0.1038688112 | 7.9364399459 | 7.9263495019 | 7.9427319628 | 7.9423569542 | 99.6141854745 | 34.5475579555 |
| **12** | -0.0107638131 | -0.0300406778 | | -0.0328004243 | 7.9997865503 | 7.9998013997 | 7.9997680121 | 7.9999255913 | 99.6116536458 | 33.3797531715 |
| **13** | -0.0181902503 | 0.0048890801 | | 0.0481551474 | 7.9997969907 | 7.9997796518 | 7.9997920800 | 7.9999269301 | 99.6085792824 | 33.4006524601 |
| **14** | 0.0098663370 | -0.0317677962 | | -0.0213371076 | 7.9998119783 | 7.9998077853 | 7.9997960990 | 7.9999395291 | 99.6065538194 | 33.4081951820 |
| **15** | -0.0130203495 | -0.0036700631 | | 0.0190056628 | 7.9997805330 | 7.9997871582 | 7.9997848592 | 7.9999210143 | 99.6060836227 | 33.3885483331 |
| **16** | 0.0249187667 | 0.0058959881 | | -0.0110202062 | 7.9998130070 | 7.9998332332 | 7.9998299437 | 7.9999407161 | 99.6100983796 | 33.3958452478 |
| **17** | 0.0051433378 | -0.0275911829 | | -0.0073152271 | 7.9997986557 | 7.9997762796 | 7.9998029457 | 7.9999201158 | 99.6090133102 | 33.3820654332 |
| **18** | 0.0230597722 | -0.0221769898 | | 0.0665155079 | 7.9998177741 | 7.9998083505 | 7.9998212621 | 7.9999422324 | 99.6078559028 | 33.3976417824 |
| **19** | 0.0160902317 | -0.0220519521 | | -0.0388091626 | 7.9998087939 | 7.9998114414 | 7.9998191018 | 7.9999309986 | 99.6029730903 | 33.3742201684 |
| **20** | 0.0004794151 | -0.0164105548 | | -0.0289862278 | 7.9997877483 | 7.9998135892 | 7.9998154396 | 7.9999329578 | 99.6052155671 | 33.3991458447 |
| **21** | 0.0002297781 | -0.0224347972 | | 0.0564905761 | 7.9997694688 | 7.9998115793 | 7.9997986935 | 7.9999325083 | 99.6114366319 | 32.8890518621 |
| **22** | 0.0087363993 | 0.0012656661 | | 0.0128429559 | 7.9997958967 | 7.9997837759 | 7.9997933907 | 7.9999221135 | 99.6061197917 | 33.4047782771 |
| **23** | -0.0053855296 | -0.0165489832 | | 0.0087814174 | 7.9998150326 | 7.9997897223 | 7.9998121210 | 7.9999369241 | 99.6087962963 | 33.3901679943 |
| **24** | -0.0020892452 | -0.0445697501 | | -0.0592633413 | 7.9998273246 | 7.9998084163 | 7.9997987632 | 7.9999364898 | 99.6097728588 | 33.3741459865 |
| **25** | -0.0113367720 | 0.0111470865 | | -0.0371373239 | 7.9998215659 | 7.9997999218 | 7.9998054896 | 7.9999369778 | 99.6170428241 | 34.8159220112 |
| **26** | -0.0013017623 | -0.0037473915 | | 0.0315867680 | 7.9998136717 | 7.9998006828 | 7.9998223519 | 7.9999355442 | 99.6096643519 | 33.3968887584 |
| **27** | 0.0039939537 | -0.0215071886 | | -0.0029249378 | 7.9998197783 | 7.9997792637 | 7.9998169491 | 7.9999319802 | 99.6097728588 | 33.4030628745 |
| **28** | 0.0256958264 | 0.0044387968 | | -0.0421317068 | 7.9998010179 | 7.9998071317 | 7.9998163332 | 7.9999383861 | 99.6173321759 | 33.3814474401 |
| **29** | -0.0245717331 | 0.0034440041 | | -0.0265663149 | 7.9998009944 | 7.9997947341 | 7.9997846146 | 7.9999380723 | 99.6078920718 | 32.5878466549 |
| **30** | 0.1657507099 | -0.2039572453 | | 0.0050903893 | 7.9041159439 | 7.9040891986 | 7.8689933414 | 7.9224239179 | 99.6119429977 | 32.4691221859 |
| **31** | 0.0198807439 | -0.0276384858 | | -0.0531463506 | 7.9998174243 | 7.9997835592 | 7.9997961390 | 7.9999337565 | 99.6059751157 | 32.5795382852 |
| **32** | 0.0132314284 | 0.0065762334 | | 0.0131378665 | 7.9997836396 | 7.9997739792 | 7.9998145097 | 7.9999339102 | 99.6064091435 | 33.3853422011 |
| **33** | 0.0301164012 | -0.0236976178 | | -0.0130286423 | 7.9998245583 | 7.9997869568 | 7.9998077880 | 7.9999307066 | 99.6035156250 | 33.3783807360 |
| **34** | 0.0254904928 | -0.0176899441 | | -0.0618544304 | 7.9998098793 | 7.9998281309 | 7.9997998897 | 7.9999308377 | 99.6127025463 | 33.4083617012 |
| **35** | -0.6012148843 | 0.1012768956 | | 0.0380169901 | 7.9564512163 | 7.9621708004 | 7.9700342587 | 7.9716358349 | 99.6077835648 | 32.8335033985 |
| **36** | -0.0223062200 | 0.0246359373 | | 0.0450469497 | 7.9998168707 | 7.9998093637 | 7.9997805996 | 7.9999235912 | 99.6098090278 | 33.3779376305 |
| **37** | 0.0180865318 | -0.0227592942 | | -0.0359008133 | 7.9998113984 | 7.9998138663 | 7.9998189451 | 7.9999423157 | 99.6170428241 | 33.4013334298 |
| **38** | 0.0202181035 | 0.0109020218 | | 0.0513842945 | 7.9998064261 | 7.9997659146 | 7.9997931437 | 7.9999302601 | 99.6055772569 | 33.3852236236 |
| **39** | 0.0077961990 | 0.0094470526 | | -0.0017040008 | 7.9998205479 | 7.9997789007 | 7.9997884952 | 7.9999338990 | 99.6104600694 | 33.4172733127 |
| **40** | 0.0140904022 | -0.0116374274 | | 0.0150665035 | 7.9998029152 | 7.9998207319 | 7.9998018338 | 7.9999332041 | 99.6152705440 | 33.3925704657 |
| **41** | 0.0026096531 | -0.0021187872 | | 0.0618431347 | 7.9998172068 | 7.9998160862 | 7.9997968015 | 7.9999368159 | 99.6131004051 | 31.5791215618 |
| **42** | 0.0291375909 | 0.0349614352 | | -0.0013540677 | 7.9997986885 | 7.9998112124 | 7.9997952369 | 7.9999349434 | 99.6138237847 | 33.4010225184 |
| **43** | -0.0002769643 | 0.0086408278 | | 0.0323178322 | 7.9997968727 | 7.9998007888 | 7.9997967661 | 7.9999325324 | 99.6009476273 | 33.3800290487 |
| **44** | 0.0263191345 | -0.0006721646 | | -0.0842420754 | 7.9997917422 | 7.9997848036 | 7.9998111669 | 7.9999286517 | 99.6077473958 | 33.4194784858 |
| **45** | -0.0141369457 | 0.0264094630 | | -0.0096284185 | 7.9998165445 | 7.9998081948 | 7.9998163590 | 7.9999416688 | 99.6114004630 | 33.3638362666 |
| **46** | 0.0015651702 | 0.0039659189 | | -0.0021922787 | 7.9998291920 | 7.9997811888 | 7.9997947327 | 7.9999428994 | 99.6077473958 | 33.3996483808 |
| **47** | 0.0039591207 | -0.0039682290 | | 0.0040435705 | 7.9997894710 | 7.9997790732 | 7.9998062128 | 7.9999390280 | 99.6053240741 | 33.3856858774 |
| **48** | 0.0043643309 | -0.0193628133 | | -0.0062567792 | 7.9998043871 | 7.9997957124 | 7.9998055990 | 7.9999336970 | 99.6094473380 | 33.3973253393 |
| **49** | -0.0148580451 | 0.0106812981 | | 0.0168313768 | 7.9997682317 | 7.9998091728 | 7.9998065492 | 7.9999323300 | 99.6082175926 | 33.3885176958 |
| **50** | -0.0072364282 | 0.0014788174 | | -0.0056791795 | 7.9997794429 | 7.9998256856 | 7.9997999781 | 7.9999305221 | 99.6037326389 | 33.3677510269 |
| **Total** | -0.5360514319 | 0.5921579672 | | 0.1728245395 | 399.7876555750 | 399.7831982798 | 399.7725576211 | 399.8333009439 | 4980.4712818287 | 1665.8417282248 |
| **Average** | -0.0107206179 | 0.0118426057 | | 0.0034564770 | 7.9957531115 | 7.9956639656 | 7.9954511524 | 7.9966660189 | 99.6094256366 | 33.3168345645 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000201\_02\_000590\_000623** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0070437819 | 0.0131483891 | | 0.0004085852 | 7.9997957402 | 7.9998108251 | 7.9997969794 | 7.9999331982 | 99.6129918981 | 33.3897664477 |
| **2** | 0.0109997669 | 0.0197674845 | | 0.0242654424 | 7.9998116379 | 7.9998125701 | 7.9997960901 | 7.9999301380 | 99.6083260995 | 33.3858322554 |
| **3** | -0.0224539569 | 0.0282472646 | | 0.0027317713 | 7.9998171346 | 7.9998079144 | 7.9997918039 | 7.9999369831 | 99.6052517361 | 33.4071513878 |
| **4** | 0.0193381676 | -0.0101561621 | | -0.0034525345 | 7.9998061094 | 7.9997721943 | 7.9998145301 | 7.9999232538 | 99.6046368634 | 33.3938180828 |
| **5** | -0.0124161266 | 0.0291679980 | | 0.0010152160 | 7.9998070378 | 7.9998002271 | 7.9997905606 | 7.9999327461 | 99.6087601273 | 33.3756484886 |
| **6** | 0.0424468949 | -0.0338900149 | | 0.0319445020 | 7.9998090637 | 7.9998085394 | 7.9998145938 | 7.9999353128 | 99.6104962384 | 33.3848798055 |
| **7** | 0.0183298135 | 0.0070453865 | | 0.0124791099 | 7.9998050103 | 7.9998117069 | 7.9997914907 | 7.9999291623 | 99.6116536458 | 33.4145631922 |
| **8** | -0.0246196507 | -0.0180516714 | | 0.0065802463 | 7.9997932163 | 7.9998059816 | 7.9997912742 | 7.9999399347 | 99.6078559028 | 33.3787218591 |
| **9** | 0.0035527276 | -0.0103710817 | | -0.0506387458 | 7.9997873210 | 7.9997834992 | 7.9997850294 | 7.9999323377 | 99.6034432870 | 33.4003843841 |
| **10** | 0.0377054776 | 0.0095694063 | | 0.0007116366 | 7.9998265411 | 7.9997938141 | 7.9997792994 | 7.9999362037 | 99.6036603009 | 33.4018569581 |
| **11** | 0.0269481664 | -0.0099933749 | | 0.0454518075 | 7.9997946996 | 7.9997896870 | 7.9997984905 | 7.9999430706 | 99.6148365162 | 36.7470643553 |
| **12** | 0.0037395169 | -0.0056698522 | | 0.0507220889 | 7.9997894145 | 7.9998071452 | 7.9998129699 | 7.9999337827 | 99.6057942708 | 33.1966759997 |
| **13** | -0.0245824037 | -0.0166284701 | | -0.0048354579 | 7.9997797144 | 7.9997834539 | 7.9998091603 | 7.9999344309 | 99.6081452546 | 33.3927820897 |
| **14** | 0.0246379536 | 0.0028897672 | | -0.0051615139 | 7.9997904836 | 7.9997875929 | 7.9997964477 | 7.9999293723 | 99.6136067708 | 33.3851650440 |
| **15** | -0.0402057512 | 0.0050692589 | | 0.0112920754 | 7.9998199538 | 7.9998154416 | 7.9997958626 | 7.9999297804 | 99.6064814815 | 33.3630008340 |
| **16** | -0.1309511491 | 0.0710754436 | | -0.1869401334 | 7.9086396061 | 7.8932110641 | 7.9170033623 | 7.9187293626 | 99.6095196759 | 32.8653044435 |
| **17** | 0.0012956378 | 0.0331332248 | | -0.0332780984 | 7.9998159886 | 7.9998042379 | 7.9997869200 | 7.9999330761 | 99.6091218171 | 33.4073957766 |
| **18** | 0.0099759091 | 0.0172338012 | | -0.0025880504 | 7.9998231952 | 7.9998282670 | 7.9997975839 | 7.9999332960 | 99.6070963542 | 33.4021743941 |
| **19** | 0.0085325107 | -0.0097263562 | | -0.0102494164 | 7.9998028265 | 7.9998092572 | 7.9997856308 | 7.9999289401 | 99.6021050347 | 33.3618313703 |
| **20** | -0.0050515789 | -0.0006253646 | | -0.0533874668 | 7.9998005136 | 7.9997917051 | 7.9997845685 | 7.9999300607 | 99.6148726852 | 33.3603051811 |
| **21** | -0.0301417851 | 0.0263225658 | | -0.0647810197 | 7.9998066237 | 7.9998126303 | 7.9998052451 | 7.9999405433 | 99.6110387731 | 33.3785705167 |
| **22** | -0.0102381911 | -0.0162806970 | | -0.0201180744 | 7.9997800405 | 7.9997884053 | 7.9997670428 | 7.9999291407 | 99.6095196759 | 33.3650407646 |
| **23** | -0.0010108266 | -0.0359270503 | | 0.0175832096 | 7.9998002952 | 7.9997767576 | 7.9997768303 | 7.9999319835 | 99.6018518519 | 33.3879358717 |
| **24** | -0.0194231320 | 0.0001646345 | | -0.0345861716 | 7.9998121827 | 7.9998317279 | 7.9998071805 | 7.9999377369 | 99.6061197917 | 33.4149672919 |
| **25** | 0.0115860438 | -0.0135262324 | | 0.0425946311 | 7.9998176518 | 7.9998207532 | 7.9997924804 | 7.9999333664 | 99.6117983218 | 33.4048446578 |
| **26** | -0.0153228369 | -0.0172406465 | | 0.0176734373 | 7.9998263831 | 7.9998294218 | 7.9997914078 | 7.9999294690 | 99.6050347222 | 33.3942932439 |
| **27** | 0.0222049547 | 0.0022149041 | | -0.0096163386 | 7.9998153085 | 7.9998278097 | 7.9998030958 | 7.9999450869 | 99.6131727431 | 33.4236943707 |
| **28** | 0.0122618808 | 0.0090016576 | | 0.0339713340 | 7.9998251904 | 7.9997940879 | 7.9997856948 | 7.9999384785 | 99.6086154514 | 33.3883999694 |
| **29** | 0.0171082922 | -0.0032560961 | | -0.0050534945 | 7.9997870148 | 7.9998041951 | 7.9998108102 | 7.9999305818 | 99.6029369213 | 33.3609793425 |
| **30** | -0.0108934680 | -0.0054167360 | | 0.0700799480 | 7.9998077954 | 7.9998278572 | 7.9998122414 | 7.9999342862 | 99.6117259838 | 33.3886392520 |
| **31** | -0.0055792580 | -0.0258293708 | | 0.0205434281 | 7.9998161889 | 7.9997975583 | 7.9997862284 | 7.9999278352 | 99.6121238426 | 32.6337887788 |
| **32** | -0.0169372461 | 0.0073682172 | | -0.0028069391 | 7.9998072660 | 7.9997874084 | 7.9997949673 | 7.9999408852 | 99.6085069444 | 33.4202980324 |
| **33** | -0.0179588666 | -0.0058227845 | | 0.0265839884 | 7.9998145314 | 7.9998091263 | 7.9998028314 | 7.9999333560 | 99.6073495370 | 33.4004982809 |
| **34** | -0.0237207591 | -0.0121517493 | | -0.0222007960 | 7.9997943703 | 7.9997712236 | 7.9997944824 | 7.9999217240 | 99.6107855903 | 33.4042019846 |
| **35** | 0.0132468000 | 0.0012355580 | | 0.0203252197 | 7.9998100360 | 7.9998127182 | 7.9997809649 | 7.9999381468 | 99.6087239583 | 33.3846035029 |
| **36** | -0.0048383671 | 0.0032932658 | | -0.0538762933 | 7.9997724139 | 7.9997825172 | 7.9997790352 | 7.9999176940 | 99.6175491898 | 33.4049666394 |
| **37** | -0.0142265502 | 0.0003630485 | | 0.0780513718 | 7.9997774151 | 7.9998193393 | 7.9997858004 | 7.9999346872 | 99.6091579861 | 34.8900465800 |
| **38** | 0.0029276190 | 0.0168460686 | | -0.0057090893 | 7.9998246301 | 7.9998000315 | 7.9998365156 | 7.9999379348 | 99.6115813079 | 35.6280318117 |
| **39** | -0.0062482710 | 0.0104478997 | | 0.0044111570 | 7.9998183739 | 7.9997938637 | 7.9998100839 | 7.9999344814 | 99.6146556713 | 33.3838730313 |
| **40** | 0.0168656520 | 0.0349248776 | | 0.0629769614 | 7.9997959543 | 7.9997982141 | 7.9998162960 | 7.9999269076 | 99.6151620370 | 33.4091521707 |
| **41** | 0.0060357773 | 0.0450441259 | | -0.0157740893 | 7.9998001574 | 7.9998135459 | 7.9997895171 | 7.9999250864 | 99.6084346065 | 32.0237972041 |
| **42** | 0.0153942118 | -0.0188317589 | | -0.0598487068 | 7.9997925618 | 7.9998006599 | 7.9997939349 | 7.9999199554 | 99.6125578704 | 36.1630818242 |
| **43** | 0.0245339974 | -0.0524724006 | | -0.0192279125 | 7.9997926810 | 7.9998391877 | 7.9997889005 | 7.9999308820 | 99.6053964120 | 33.3762965516 |
| **44** | -0.0002816835 | 0.0125574075 | | -0.0092100839 | 7.9998016927 | 7.9998200319 | 7.9998120283 | 7.9999320740 | 99.6123770255 | 33.3960602760 |
| **45** | -0.0095728941 | -0.0016761986 | | 0.0479224397 | 7.9998086201 | 7.9998093320 | 7.9998193160 | 7.9999396311 | 99.6087601273 | 33.3718810991 |
| **46** | -0.0411180890 | -0.0231051684 | | 0.0156868891 | 7.9998180126 | 7.9998032538 | 7.9998349630 | 7.9999379259 | 99.6034432870 | 33.3949515194 |
| **47** | 0.0181209550 | 0.0065726058 | | -0.0045942194 | 7.9997921450 | 7.9997728458 | 7.9997902634 | 7.9999277755 | 99.6092303241 | 33.3179574029 |
| **48** | 0.0115690271 | 0.0064166255 | | -0.0174795543 | 7.9998203644 | 7.9997673025 | 7.9997832558 | 7.9999353182 | 99.6131727431 | 33.3909803071 |
| **49** | 0.0077614718 | -0.0058486878 | | -0.0251817109 | 7.9998081577 | 7.9998246983 | 7.9997958996 | 7.9999294526 | 99.6062282986 | 33.4025189213 |
| **50** | 0.0135925867 | -0.0046931856 | | -0.0038379003 | 7.9997993784 | 7.9998242695 | 7.9998004770 | 7.9999346407 | 99.6132450810 | 33.4009430885 |
| **Total** | -0.0941248112 | 0.0619297758 | | -0.0784273147 | 399.8990586455 | 399.8835958981 | 399.9070704382 | 399.9154315100 | 4980.4589120370 | 1676.5196166371 |
| **Average** | -0.0018824940 | 0.0012385949 | | -0.0015685450 | 7.9979811729 | 7.9976719180 | 7.9981414088 | 7.9983086302 | 99.6091782407 | 33.5303923327 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000201\_03\_000640\_000672** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0053759751 | 0.0201263418 | | 0.0072447551 | 7.9997621883 | 7.9997956467 | 7.9997887852 | 7.9999250121 | 99.6074942130 | 33.3875954577 |
| **2** | 0.0189766251 | 0.0244089418 | | -0.0398805521 | 7.9998196443 | 7.9997895378 | 7.9998144552 | 7.9999380524 | 99.6144748264 | 33.4054369780 |
| **3** | 0.0051007745 | -0.0084654677 | | -0.0379462545 | 7.9997928754 | 7.9997692529 | 7.9997948340 | 7.9999253332 | 99.6092664931 | 33.3878070817 |
| **4** | -0.0134235604 | 0.0003202520 | | -0.0424530250 | 7.9998199135 | 7.9997599313 | 7.9998115097 | 7.9999389950 | 99.6066261574 | 32.9060907146 |
| **5** | -0.0206521982 | 0.0064199503 | | -0.0048214459 | 7.9997615884 | 7.9997984729 | 7.9998082202 | 7.9999316896 | 99.6023582176 | 33.3850925642 |
| **6** | -0.0214888684 | 0.0015902270 | | 0.0392654858 | 7.9998408203 | 7.9997994992 | 7.9997921971 | 7.9999363938 | 99.6068793403 | 33.3956852533 |
| **7** | -0.1996242917 | -0.0513423322 | | 0.0099620295 | 7.9345250646 | 7.9281402155 | 7.9565192078 | 7.9467605313 | 99.6352719907 | 34.8188380821 |
| **8** | -0.0210708442 | -0.0007136616 | | 0.0444178862 | 7.9997750082 | 7.9998054563 | 7.9998080655 | 7.9999268898 | 99.6095558449 | 33.3995784541 |
| **9** | 0.0134871463 | -0.0016081802 | | 0.0090907823 | 7.9997977279 | 7.9998377506 | 7.9997870487 | 7.9999392293 | 99.6060836227 | 33.3927690405 |
| **10** | -0.0290886309 | 0.0366996935 | | -0.0126595249 | 7.9997977073 | 7.9997780929 | 7.9998075522 | 7.9999302951 | 99.6082537616 | 33.4008062137 |
| **11** | 0.0265914885 | -0.0006924242 | | -0.0217920121 | 7.9998042517 | 7.9997992137 | 7.9997873312 | 7.9999383773 | 99.6086516204 | 33.3941461567 |
| **12** | -0.0074502050 | -0.0062947183 | | 0.0473906547 | 7.9998342562 | 7.9998017949 | 7.9997956525 | 7.9999365462 | 99.6057942708 | 33.3910615809 |
| **13** | 0.2187363945 | 0.0947596344 | | -0.0502186624 | 7.8934184951 | 7.8887356429 | 7.9515759294 | 7.9253328236 | 99.6083622685 | 31.5095071941 |
| **14** | 0.0106849169 | -0.0017468902 | | -0.0076966615 | 7.9998024572 | 7.9997822900 | 7.9997644448 | 7.9999324241 | 99.6145109954 | 33.3851562500 |
| **15** | 0.0008071232 | 0.0023571497 | | 0.0449109410 | 7.9997978846 | 7.9997857496 | 7.9997884877 | 7.9999406398 | 99.6072048611 | 33.3890294515 |
| **16** | -0.0207313906 | 0.0087678612 | | -0.0202802888 | 7.9998228874 | 7.9998200526 | 7.9997772699 | 7.9999393629 | 99.6066623264 | 33.3820050098 |
| **17** | -0.0034466049 | 0.0058601520 | | -0.0234730272 | 7.9997922112 | 7.9997965265 | 7.9998006063 | 7.9999334654 | 99.6159577546 | 33.4024129675 |
| **18** | 0.0121477887 | 0.0228254627 | | -0.0005662170 | 7.9997677822 | 7.9998236123 | 7.9997948797 | 7.9999370759 | 99.6103877315 | 33.3966724537 |
| **19** | -0.0270775137 | 0.0128457691 | | 0.0066542693 | 7.9998195686 | 7.9997950294 | 7.9997641697 | 7.9999324223 | 99.6114004630 | 33.4247143360 |
| **20** | -0.0084050369 | 0.0034300750 | | 0.0044346548 | 7.9998123943 | 7.9997878513 | 7.9998247858 | 7.9999377812 | 99.6144748264 | 33.4027461476 |
| **21** | 0.4224830021 | -0.1955809786 | | -0.1077928061 | 7.9783208550 | 7.9781018758 | 7.9749063301 | 7.9845605325 | 99.6068431713 | 33.2975144109 |
| **22** | 0.0317820944 | 0.0283098509 | | 0.0558036323 | 7.9997879576 | 7.9997924096 | 7.9998018531 | 7.9999335660 | 99.6137152778 | 33.4121502247 |
| **23** | -0.0117947266 | 0.0119428944 | | 0.0450176584 | 7.9997932830 | 7.9998058094 | 7.9997937308 | 7.9999308548 | 99.6063368056 | 33.4082614209 |
| **24** | 0.0184446576 | 0.0099037831 | | 0.0342584568 | 7.9997830711 | 7.9997857551 | 7.9998296650 | 7.9999332416 | 99.6083984375 | 33.3747385905 |
| **25** | 0.0098930839 | 0.0122313811 | | -0.0240750961 | 7.9998299460 | 7.9997983125 | 7.9997501673 | 7.9999309617 | 99.6108579282 | 33.3676472007 |
| **26** | 0.0242410107 | 0.0050422511 | | -0.0385963024 | 7.9997980424 | 7.9998303385 | 7.9997945474 | 7.9999388633 | 99.6083260995 | 33.3851731289 |
| **27** | -0.0107936131 | -0.0220896589 | | 0.0373847803 | 7.9998023922 | 7.9998322876 | 7.9997848662 | 7.9999259945 | 99.6121600116 | 33.3625746074 |
| **28** | -0.0234542115 | -0.0154234495 | | -0.0321546365 | 7.9998126684 | 7.9997994123 | 7.9997797346 | 7.9999333672 | 99.6117983218 | 33.3950696714 |
| **29** | -0.0258401398 | 0.0117688143 | | -0.0134128981 | 7.9998150291 | 7.9998143676 | 7.9998047257 | 7.9999328511 | 99.6097005208 | 33.4030861361 |
| **30** | 0.0080240327 | 0.0119393223 | | -0.0099060182 | 7.9997950528 | 7.9998197016 | 7.9998008268 | 7.9999365219 | 99.6073857060 | 33.4054589631 |
| **31** | 0.0163972457 | 0.0013630321 | | 0.0319627550 | 7.9997521919 | 7.9997990413 | 7.9998086082 | 7.9999361736 | 99.6130642361 | 33.3978912775 |
| **32** | 0.0284282846 | -0.0003275688 | | -0.0487357742 | 7.9997702439 | 7.9998131062 | 7.9998026734 | 7.9999301741 | 99.6108217593 | 33.3817079986 |
| **33** | 0.0159527863 | -0.0159570971 | | 0.0126383387 | 7.9998121395 | 7.9998312834 | 7.9998020339 | 7.9999317977 | 99.6128833912 | 33.4011128699 |
| **34** | -0.0089949737 | -0.0054779768 | | 0.0011618256 | 7.9998080157 | 7.9998009467 | 7.9998213863 | 7.9999287607 | 99.6035517940 | 33.3920223992 |
| **35** | 0.0045993929 | -0.0154946722 | | -0.0472719015 | 7.9998106148 | 7.9998213355 | 7.9997927014 | 7.9999330989 | 99.6081452546 | 33.3971687489 |
| **36** | 0.0211160804 | 0.0093577331 | | -0.0166954950 | 7.9997744455 | 7.9998197581 | 7.9998173009 | 7.9999303028 | 99.6129195602 | 33.3853562432 |
| **37** | 0.0178089822 | 0.0057127414 | | -0.0050017751 | 7.9998187154 | 7.9997919146 | 7.9998255689 | 7.9999471698 | 99.6133897569 | 33.3943174984 |
| **38** | 0.0054571111 | 0.0087156704 | | 0.0684401286 | 7.9998110374 | 7.9997961691 | 7.9997975641 | 7.9999379597 | 99.6052155671 | 33.4121351897 |
| **39** | 0.0115020010 | 0.0121580658 | | -0.0266889113 | 7.9997892309 | 7.9998142895 | 7.9997874012 | 7.9999315812 | 99.6154875579 | 33.4096087509 |
| **40** | 0.0200870372 | -0.0200078842 | | -0.0042797422 | 7.9998117916 | 7.9998182174 | 7.9998058075 | 7.9999375595 | 99.6091218171 | 33.3878733206 |
| **41** | -0.0152066018 | -0.0046617151 | | -0.0006125544 | 7.9997864188 | 7.9998084628 | 7.9998070208 | 7.9999439387 | 99.6119068287 | 33.3842835138 |
| **42** | 0.0001172385 | 0.0077364222 | | -0.0073994256 | 7.9998171698 | 7.9997759123 | 7.9997718076 | 7.9999333353 | 99.6040943287 | 33.3798022479 |
| **43** | -0.0328546986 | 0.0009970173 | | -0.0045865424 | 7.9997993971 | 7.9997933622 | 7.9998220921 | 7.9999376218 | 99.6123046875 | 33.3690704146 |
| **44** | -0.0285581313 | -0.0151034995 | | -0.0252165744 | 7.9997848533 | 7.9998020458 | 7.9997939026 | 7.9999313252 | 99.6147641782 | 33.3937604961 |
| **45** | -0.0059047990 | -0.0211407286 | | 0.0481578073 | 7.9998207609 | 7.9998236978 | 7.9997882371 | 7.9999382579 | 99.6074942130 | 35.2533935015 |
| **46** | -0.0071216109 | -0.0025269797 | | -0.0360588980 | 7.9997612353 | 7.9998001251 | 7.9998100302 | 7.9999328177 | 99.6061197917 | 32.6334160256 |
| **47** | -0.0121076154 | 0.0053274930 | | 0.0326961145 | 7.9997708684 | 7.9997937363 | 7.9997890937 | 7.9999325025 | 99.6066261574 | 33.3953593069 |
| **48** | -0.0180014943 | -0.0270050772 | | 0.0507100836 | 7.9997934289 | 7.9997755365 | 7.9998268573 | 7.9999380085 | 99.6091218171 | 33.3684589461 |
| **49** | -0.2480661211 | -0.0041493303 | | -0.0437521303 | 7.9890904966 | 7.9894888167 | 7.9881287570 | 7.9926499952 | 99.6087962963 | 33.6595440723 |
| **50** | 0.0005114878 | 0.0076195186 | | 0.0470908410 | 7.9997948485 | 7.9998078814 | 7.9997894992 | 7.9999323336 | 99.6108217593 | 33.3898585013 |
| **Total** | 0.1368439298 | -0.0452727890 | | -0.0753312726 | 399.7860809288 | 399.7753575281 | 399.8618402232 | 399.8462848090 | 4980.5018446181 | 1669.9549670649 |
| **Average** | 0.0027368718 | -0.0009054555 | | -0.0015066243 | 7.9957216186 | 7.9955071506 | 7.9972368045 | 7.9969256962 | 99.6100368924 | 33.3990993413 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000203\_08\_001702\_001734** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | 0.0103554824 | 0.0237957356 | | -0.0273175904 | 7.9997759594 | 7.9998052383 | 7.9997976062 | 7.9999352639 | 99.6119068287 | 33.3833478009 |
| **2** | -0.0189240331 | -0.0085135782 | | 0.0281269643 | 7.9998336869 | 7.9998100118 | 7.9997815130 | 7.9999371144 | 99.6107494213 | 33.3878649521 |
| **3** | -0.1414395336 | -0.2991749463 | | 0.0504750788 | 7.9245808216 | 7.9047242413 | 7.9095755034 | 7.9364406160 | 99.6135344329 | 31.8963962929 |
| **4** | -0.0090641498 | -0.0046102746 | | 0.0286155458 | 7.9998141268 | 7.9997978595 | 7.9998168983 | 7.9999298248 | 99.6170066551 | 33.3720937160 |
| **5** | 0.0199876042 | -0.0108804774 | | -0.0014990914 | 7.9998160263 | 7.9998593023 | 7.9997920721 | 7.9999448243 | 99.6087962963 | 33.3719210977 |
| **6** | -0.0437809075 | 0.0116541429 | | -0.0492992799 | 7.9998439588 | 7.9998157691 | 7.9997920196 | 7.9999373340 | 99.6094835069 | 33.4270504267 |
| **7** | -0.0153875422 | -0.0115093373 | | 0.0243582443 | 7.9997804118 | 7.9998121709 | 7.9998098374 | 7.9999355565 | 99.6077473958 | 33.3894938328 |
| **8** | -0.0114526456 | -0.0020926464 | | -0.0089364772 | 7.9997689950 | 7.9997979921 | 7.9997766690 | 7.9999206376 | 99.6119429977 | 33.4171513310 |
| **9** | 0.0383392984 | -0.0092127071 | | 0.0511196752 | 7.9998036570 | 7.9998183049 | 7.9998195436 | 7.9999371937 | 99.6107855903 | 33.3991431497 |
| **10** | -0.0073145602 | 0.0115806029 | | 0.0018610466 | 7.9998467746 | 7.9998240244 | 7.9997909272 | 7.9999387274 | 99.6096643519 | 33.3753141737 |
| **11** | 0.0018395170 | -0.0207052154 | | -0.0221174910 | 7.9997934159 | 7.9998036348 | 7.9998297681 | 7.9999423776 | 99.6060112847 | 33.3779079861 |
| **12** | -0.0169225556 | 0.0063496728 | | 0.0065541300 | 7.9997829546 | 7.9998121215 | 7.9997960909 | 7.9999389999 | 99.6114366319 | 33.3859762221 |
| **13** | 0.0082206414 | -0.0187821223 | | -0.0099894804 | 7.9998088389 | 7.9998120222 | 7.9998085058 | 7.9999348809 | 99.6094111690 | 33.3836585705 |
| **14** | -0.2715578040 | -0.1200177534 | | 0.0516199060 | 7.8140228242 | 7.7516405021 | 7.9147867216 | 7.8478101409 | 99.6516927083 | 31.6532004584 |
| **15** | 0.0018848842 | 0.0380280714 | | -0.0137566166 | 7.9997941382 | 7.9998124078 | 7.9998066579 | 7.9999368104 | 99.6112196181 | 33.4014681770 |
| **16** | -0.0227120348 | 0.0002216938 | | 0.0246403662 | 7.9998006201 | 7.9998203884 | 7.9997955517 | 7.9999291825 | 99.6089409722 | 33.3705844056 |
| **17** | 0.0086818469 | 0.0276754381 | | -0.0128191392 | 7.9998047742 | 7.9998194529 | 7.9998274956 | 7.9999346053 | 99.6157045718 | 33.4051704623 |
| **18** | -0.0464337109 | 0.0468576665 | | -0.0048949177 | 7.9998006047 | 7.9997767238 | 7.9997767770 | 7.9999300432 | 99.6087601273 | 33.3799053649 |
| **19** | 0.0064032262 | -0.0224691730 | | -0.0266620683 | 7.9997855342 | 7.9997998246 | 7.9998055477 | 7.9999253994 | 99.6091941551 | 33.3951254142 |
| **20** | 0.0863713715 | 0.1677698283 | | 0.0642526440 | 7.9908615633 | 7.9920863848 | 7.9908173732 | 7.9952999010 | 99.6072771991 | 33.6345931486 |
| **21** | 0.0472198033 | -0.2846200319 | | -0.0335434603 | 7.8299644641 | 7.7764909879 | 7.8903107662 | 7.8566673718 | 99.6066984954 | 36.1051835115 |
| **22** | -0.0238444627 | 0.0242639127 | | -0.0096506255 | 7.9997817203 | 7.9998104242 | 7.9998266046 | 7.9999413852 | 99.6046730324 | 33.4133592615 |
| **23** | 0.2407118456 | 0.0600274629 | | -0.0247511805 | 7.8028664458 | 7.7666705064 | 7.8347356209 | 7.8251674842 | 99.6088686343 | 31.1699949222 |
| **24** | 0.0047672402 | -0.0193957006 | | 0.0317883184 | 7.9997746785 | 7.9997999978 | 7.9998109519 | 7.9999253064 | 99.6117621528 | 33.3733697009 |
| **25** | -0.0238581461 | 0.0037752963 | | -0.0351753322 | 7.9997992652 | 7.9997926980 | 7.9997968428 | 7.9999377334 | 99.6059027778 | 33.3798969964 |
| **26** | -0.0064429281 | 0.0350014296 | | -0.0028333274 | 7.9998145645 | 7.9997686240 | 7.9997894852 | 7.9999274041 | 99.6107855903 | 33.3750526223 |
| **27** | -0.0211947702 | -0.0204651512 | | 0.0293459352 | 7.9997650998 | 7.9997884562 | 7.9997683292 | 7.9999271133 | 99.6149088542 | 33.4145349662 |
| **28** | 0.0005319077 | -0.0148547767 | | -0.0118678101 | 7.9998155142 | 7.9998092137 | 7.9997858260 | 7.9999324161 | 99.6070963542 | 33.3816355188 |
| **29** | -0.0208069924 | -0.0317036767 | | 0.0210618108 | 7.9998074538 | 7.9997928979 | 7.9997899734 | 7.9999354545 | 99.6127025463 | 33.3965711806 |
| **30** | -0.0165328863 | 0.0144212619 | | -0.0230244564 | 7.9997920312 | 7.9997823925 | 7.9997907604 | 7.9999292938 | 99.6085431134 | 33.4147098538 |
| **31** | -0.0053743923 | -0.0082985982 | | -0.0322156123 | 7.9997959490 | 7.9997791424 | 7.9998046080 | 7.9999340265 | 99.6096643519 | 33.3912371777 |
| **32** | 0.0125816222 | 0.0173263948 | | 0.0014471848 | 7.9998152767 | 7.9997945611 | 7.9997635794 | 7.9999332195 | 99.6128472222 | 33.3745472495 |
| **33** | -0.0036106231 | 0.0225634428 | | 0.0572709014 | 7.9997817285 | 7.9998236160 | 7.9998213933 | 7.9999356179 | 99.6079282407 | 33.3781007455 |
| **34** | -0.0067658782 | 0.0035127415 | | 0.0064251120 | 7.9998001798 | 7.9997655422 | 7.9997885691 | 7.9999189913 | 99.6081814236 | 33.3932521446 |
| **35** | 0.0191508499 | -0.0138302364 | | -0.0196249896 | 7.9997944829 | 7.9998178883 | 7.9998207526 | 7.9999362213 | 99.6134259259 | 33.3681495949 |
| **36** | 0.0017396518 | 0.0155633826 | | -0.0041302978 | 7.9998354199 | 7.9997986254 | 7.9997952841 | 7.9999384011 | 99.6124855324 | 33.1633299008 |
| **37** | -0.0117241988 | 0.0091011811 | | -0.0002255609 | 7.9997852933 | 7.9998350854 | 7.9997662368 | 7.9999306595 | 99.6107132523 | 33.4003605551 |
| **38** | 0.0051583348 | 0.0327804206 | | -0.0206337751 | 7.9997659342 | 7.9997802046 | 7.9998220354 | 7.9999238784 | 99.6108579282 | 33.3941664397 |
| **39** | -0.0450225794 | -0.0231730485 | | -0.0121075889 | 7.9997995845 | 7.9998240245 | 7.9998163009 | 7.9999425226 | 99.6123408565 | 33.4013148489 |
| **40** | -0.0118647376 | 0.0174784293 | | 0.0369241442 | 7.9997724026 | 7.9997836949 | 7.9998157439 | 7.9999335026 | 99.6057942708 | 33.3885118804 |
| **41** | -0.0380370779 | 0.0073919542 | | 0.0112950258 | 7.9998075575 | 7.9997763503 | 7.9997866549 | 7.9999325522 | 99.6064814815 | 33.4975535585 |
| **42** | 0.0361452729 | -0.0224682354 | | 0.0320662721 | 7.9998199729 | 7.9997963671 | 7.9997839016 | 7.9999326338 | 99.6084346065 | 33.3840918891 |
| **43** | 0.0243050525 | -0.0394795892 | | 0.0169363282 | 7.9998142219 | 7.9997824176 | 7.9998100678 | 7.9999221033 | 99.6106409144 | 33.3895023432 |
| **44** | -0.0213619960 | -0.0248772573 | | -0.0247175236 | 7.9997829195 | 7.9998072220 | 7.9998249027 | 7.9999313087 | 99.6066261574 | 33.3859828885 |
| **45** | -0.0323049881 | -0.0010063431 | | 0.0139752427 | 7.9998083926 | 7.9998052012 | 7.9997980298 | 7.9999395920 | 99.6052155671 | 33.3633120291 |
| **46** | 0.0109373941 | -0.0592954855 | | 0.0079911068 | 7.9998380682 | 7.9997996051 | 7.9997524564 | 7.9999397379 | 99.6067708333 | 33.3790035517 |
| **47** | -0.0247940417 | -0.0212034480 | | -0.0436443967 | 7.9998126388 | 7.9997782452 | 7.9997862882 | 7.9999245352 | 99.6118344907 | 33.3981701332 |
| **48** | -0.0000324706 | 0.0190468630 | | 0.0091116296 | 7.9997958221 | 7.9997785807 | 7.9998147777 | 7.9999266589 | 99.6088324653 | 33.3813865911 |
| **49** | -0.0178505455 | -0.0120624633 | | -0.0238276409 | 7.9998071807 | 7.9998213723 | 7.9998080359 | 7.9999330293 | 99.6055049190 | 33.3849563986 |
| **50** | 0.0206917026 | -0.0055714149 | | 0.0077992586 | 7.9997698910 | 7.9997960062 | 7.9997786958 | 7.9999360043 | 99.6148365162 | 33.3846592456 |
| **Total** | -0.3303886427 | -0.5140866625 | | 0.1157961415 | 399.3533038407 | 399.1826983283 | 399.5311665544 | 399.4583755929 | 4980.5326244213 | 1666.8332646831 |
| **Average** | -0.0066076767 | -0.0102813710 | | 0.0023159187 | 7.9870660768 | 7.9836539666 | 7.9906233311 | 7.9891675119 | 99.6106524884 | 33.3366652937 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000207\_03\_000556\_000590** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0192618759 | 0.0296921279 | | 0.0411838105 | 7.9998086645 | 7.9997969949 | 7.9997854037 | 7.9999290752 | 99.6132812500 | 33.4083652471 |
| **2** | 0.0014526435 | 0.0059005572 | | -0.0164874420 | 7.9997892009 | 7.9997625729 | 7.9997956617 | 7.9999260451 | 99.6152705440 | 33.3818142361 |
| **3** | -0.0287051226 | -0.0015720540 | | 0.0338518946 | 7.9998098322 | 7.9997976308 | 7.9997952904 | 7.9999387047 | 99.6054325810 | 33.3804369780 |
| **4** | 0.0247772990 | 0.2944135643 | | 0.1963923232 | 7.8160545247 | 7.7700248730 | 7.8469613150 | 7.8290257705 | 99.6061921296 | 35.8632335920 |
| **5** | -0.0128567474 | 0.0391880333 | | 0.0087667071 | 7.9998387996 | 7.9998077391 | 7.9998105811 | 7.9999476142 | 99.6119791667 | 33.0030461374 |
| **6** | -0.0467258296 | -0.0268718185 | | -0.0062418137 | 7.9997968241 | 7.9998224400 | 7.9997838244 | 7.9999281308 | 99.6112557870 | 33.3715004028 |
| **7** | -0.0151133441 | 0.0420252998 | | -0.0404944598 | 7.9998177518 | 7.9998263117 | 7.9998374494 | 7.9999455916 | 99.6109302662 | 33.3921649476 |
| **8** | 0.0115014520 | 0.0099177686 | | -0.0052133428 | 7.9998058444 | 7.9997799965 | 7.9997993571 | 7.9999307250 | 99.6053602431 | 33.3859911152 |
| **9** | -0.0118560701 | 0.0053951171 | | -0.0352693620 | 7.9997868006 | 7.9998322278 | 7.9998110417 | 7.9999385421 | 99.5993923611 | 33.3664957505 |
| **10** | -0.0117167073 | -0.0150600555 | | -0.0111628622 | 7.9998241258 | 7.9998076847 | 7.9997944042 | 7.9999298574 | 99.6137514468 | 33.4132700447 |
| **11** | 0.0282844945 | 0.0090772386 | | 0.0205302794 | 7.9997846147 | 7.9998357240 | 7.9998009363 | 7.9999352260 | 99.6082175926 | 33.3913947610 |
| **12** | -0.0139640264 | -0.0176709877 | | -0.0123182138 | 7.9997981757 | 7.9998048250 | 7.9998099698 | 7.9999369727 | 99.6081090856 | 33.4017651881 |
| **13** | 0.2670888052 | 0.2062169026 | | -0.1973298718 | 7.8193553869 | 7.9096816096 | 7.8731077985 | 7.8940345001 | 99.6030454282 | 33.4694027437 |
| **14** | 0.0026754810 | -0.0001951543 | | 0.0518464141 | 7.9998016409 | 7.9998009837 | 7.9997833590 | 7.9999315753 | 99.6104600694 | 33.4123045457 |
| **15** | 0.0163885413 | -0.0037403578 | | 0.0095867111 | 7.9998061402 | 7.9998000881 | 7.9998103294 | 7.9999414085 | 99.6074942130 | 33.3528589098 |
| **16** | -0.0126516867 | -0.0047274504 | | 0.0128735720 | 7.9997978203 | 7.9997769010 | 7.9997918233 | 7.9999202037 | 99.6071325231 | 33.4059267486 |
| **17** | -0.0003453111 | -0.0018945486 | | 0.0096629498 | 7.9997763009 | 7.9997987028 | 7.9997898122 | 7.9999303713 | 99.6117259838 | 33.3811268836 |
| **18** | 0.0201708625 | 0.0080398528 | | -0.0320847632 | 7.9998182878 | 7.9997811646 | 7.9998078225 | 7.9999360065 | 99.6116536458 | 33.4100467502 |
| **19** | 0.0435227821 | -0.0145776377 | | -0.0366145538 | 7.9997892231 | 7.9997980535 | 7.9997859374 | 7.9999279399 | 99.6065538194 | 33.3797545899 |
| **20** | 0.0191462926 | -0.0204628698 | | 0.0098459171 | 7.9998095793 | 7.9997843650 | 7.9998093984 | 7.9999439160 | 99.6092303241 | 33.3855576548 |
| **21** | 0.0249440582 | 0.0006109638 | | 0.0283657984 | 7.9998117284 | 7.9997662075 | 7.9997820523 | 7.9999293914 | 99.6090856481 | 33.3693604757 |
| **22** | -0.0046821773 | -0.0051628413 | | 0.0899675976 | 7.9997684189 | 7.9997799553 | 7.9998161865 | 7.9999253771 | 99.6150173611 | 33.4028779162 |
| **23** | -0.0159057057 | 0.0008184879 | | -0.0311653283 | 7.9998231057 | 7.9997888913 | 7.9997892468 | 7.9999346944 | 99.6073495370 | 33.3939061649 |
| **24** | 0.0023765202 | -0.0024937933 | | -0.0269512801 | 7.9998049686 | 7.9998136296 | 7.9997837895 | 7.9999323361 | 99.6144024884 | 33.3937929773 |
| **25** | 0.0088906910 | -0.0317329780 | | 0.0268706265 | 7.9998240983 | 7.9998281669 | 7.9998109498 | 7.9999426085 | 99.6045283565 | 33.3930128620 |
| **26** | -0.0087291451 | 0.0223432966 | | 0.0274965825 | 7.9997719441 | 7.9997937300 | 7.9998045461 | 7.9999307931 | 99.6080729167 | 33.3696464234 |
| **27** | 0.0520367338 | -0.0018624951 | | -0.0629442220 | 7.9997958957 | 7.9997852591 | 7.9998081728 | 7.9999289621 | 99.6076750579 | 33.3962862257 |
| **28** | 0.0168736368 | -0.0156244585 | | -0.0471298447 | 7.9997876253 | 7.9998210845 | 7.9997885953 | 7.9999372608 | 99.6146195023 | 33.3828661152 |
| **29** | 0.0057282542 | 0.0093277180 | | 0.0167151580 | 7.9998058615 | 7.9998216351 | 7.9998109431 | 7.9999370218 | 99.6045645255 | 33.3815207709 |
| **30** | -0.0010810224 | 0.0030365885 | | -0.0197755983 | 7.9998138623 | 7.9998130081 | 7.9998219687 | 7.9999262693 | 99.6080729167 | 33.3966554330 |
| **31** | -0.0056545997 | -0.0089982898 | | 0.0052323229 | 7.9997976404 | 7.9998032358 | 7.9998079939 | 7.9999336809 | 99.6070601852 | 30.3444777766 |
| **32** | 0.0038102310 | 0.0297022147 | | -0.0069977403 | 7.9998114793 | 7.9997937330 | 7.9997991753 | 7.9999434584 | 99.6167534722 | 33.3703445556 |
| **33** | 0.0214321664 | -0.0176608313 | | -0.0383518189 | 7.9998368896 | 7.9997767816 | 7.9998223130 | 7.9999404951 | 99.6137876157 | 33.3929722960 |
| **34** | 0.0077873580 | -0.0083586047 | | 0.0158797538 | 7.9997798167 | 7.9997695314 | 7.9997899099 | 7.9999249346 | 99.6086877894 | 33.4082252519 |
| **35** | 0.0258069444 | 0.0058403344 | | 0.0987623878 | 7.9998358945 | 7.9998044706 | 7.9997763912 | 7.9999354430 | 99.6087962963 | 33.3981752394 |
| **36** | 0.0343800599 | 0.0082283121 | | -0.0340180263 | 7.9998057152 | 7.9997837499 | 7.9997986059 | 7.9999317032 | 99.6050708912 | 33.4156830122 |
| **37** | -0.0049379686 | -0.0386922030 | | 0.0215988062 | 7.9997722104 | 7.9997799605 | 7.9997930108 | 7.9999145178 | 99.6067346644 | 33.3935772399 |
| **38** | 0.0038956202 | -0.0533193834 | | 0.0228038134 | 7.9997625278 | 7.9997751906 | 7.9997837993 | 7.9999324410 | 99.6132450810 | 33.3950092479 |
| **39** | -0.0248843095 | -0.0302590620 | | 0.0130202281 | 7.9997712646 | 7.9997654594 | 7.9997758289 | 7.9999184834 | 99.6112919560 | 33.3946684084 |
| **40** | 0.0101283544 | -0.0050721855 | | -0.0074078202 | 7.9997907458 | 7.9998249349 | 7.9997566888 | 7.9999225889 | 99.6070963542 | 33.3935345463 |
| **41** | -0.0113819673 | -0.0083691040 | | 0.0099202933 | 7.9997801681 | 7.9997892671 | 7.9998077696 | 7.9999314321 | 99.6092664931 | 33.3704841254 |
| **42** | -0.0005546278 | -0.0134315210 | | 0.0244931807 | 7.9998069219 | 7.9997986523 | 7.9997832147 | 7.9999316704 | 99.6086516204 | 33.3930381093 |
| **43** | -0.0313448455 | -0.0197073500 | | 0.0316413613 | 7.9997841832 | 7.9997796918 | 7.9997951247 | 7.9999180354 | 99.6141131366 | 33.3750347506 |
| **44** | 0.0026674164 | 0.0056930310 | | -0.0026063286 | 7.9997905397 | 7.9997902373 | 7.9998090813 | 7.9999281292 | 99.6124855324 | 33.4002954509 |
| **45** | -0.0114860527 | -0.0039619017 | | 0.0714602209 | 7.9997927209 | 7.9997881663 | 7.9998040972 | 7.9999272777 | 99.6051070602 | 33.3914309300 |
| **46** | -0.0003156782 | -0.0080317043 | | -0.0403511192 | 7.9998345333 | 7.9998085113 | 7.9998283534 | 7.9999361287 | 99.6111834491 | 33.3718534404 |
| **47** | -0.0133396471 | 0.0207431711 | | -0.0275830005 | 7.9998005673 | 7.9998081190 | 7.9997923318 | 7.9999379402 | 99.6125578704 | 33.3607406273 |
| **48** | -0.0046889723 | -0.0118499223 | | -0.0581430081 | 7.9997903008 | 7.9997876421 | 7.9998288733 | 7.9999326507 | 99.6095920139 | 33.4152699766 |
| **49** | -0.0145824357 | -0.0069475130 | | -0.0285686429 | 7.9998254805 | 7.9997659837 | 7.9998030733 | 7.9999285735 | 99.6117621528 | 33.4130706189 |
| **50** | 0.0099381828 | -0.0118565304 | | -0.0002610970 | 7.9997767490 | 7.9998254636 | 7.9997853834 | 7.9999352217 | 99.6092303241 | 33.3838682087 |
| **Total** | 0.3389390053 | 0.3460449737 | | 0.0732971496 | 399.6258233965 | 399.6699512385 | 399.7104289861 | 399.7198076972 | 4980.4723307292 | 1668.6181364038 |
| **Average** | 0.0067786763 | 0.0069207890 | | 0.0014659419 | 7.9925164679 | 7.9933990248 | 7.9942085797 | 7.9943961539 | 99.6094466146 | 33.3723627281 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000207\_04\_000902\_000934** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0137954561 | 0.0197040802 | | -0.0470677022 | 7.9998274991 | 7.9998052384 | 7.9997982391 | 7.9999363343 | 99.6049623843 | 33.3761189690 |
| **2** | 0.0148333543 | 0.0191470251 | | 0.0131602096 | 7.9998120424 | 7.9998121116 | 7.9997702842 | 7.9999352998 | 99.6038049769 | 33.3930457687 |
| **3** | -0.0182427276 | 0.0149525337 | | 0.0576180260 | 7.9998173206 | 7.9998191311 | 7.9997966561 | 7.9999353133 | 99.6130642361 | 35.1745361860 |
| **4** | -0.0068109441 | -0.0001944908 | | -0.0258991599 | 7.9998046443 | 7.9997979093 | 7.9998181953 | 7.9999342486 | 99.6098813657 | 33.3701401654 |
| **5** | -0.0277529175 | 0.0056506963 | | -0.0414623200 | 7.9998111891 | 7.9997604563 | 7.9998006477 | 7.9999355724 | 99.6127748843 | 33.3905406057 |
| **6** | 0.0366442460 | 0.0127774956 | | -0.0029334643 | 7.9997810936 | 7.9997925160 | 7.9997575872 | 7.9999249556 | 99.6110387731 | 33.4009703216 |
| **7** | 0.0009898999 | 0.0176883431 | | -0.0146422477 | 7.9997987695 | 7.9998215681 | 7.9997964981 | 7.9999434441 | 99.6062282986 | 33.4201693843 |
| **8** | 0.0010868718 | -0.0067800832 | | -0.0521236567 | 7.9997906687 | 7.9997934098 | 7.9997956344 | 7.9999307864 | 99.6120153356 | 33.4036585989 |
| **9** | 0.0282416133 | -0.0172200786 | | -0.0505861711 | 7.9998171910 | 7.9997749660 | 7.9998150902 | 7.9999446120 | 99.6103877315 | 33.4773552390 |
| **10** | 0.0054095892 | -0.0308453712 | | 0.0459689602 | 7.9997863898 | 7.9998072471 | 7.9997971065 | 7.9999371158 | 99.6030815972 | 33.3969247855 |
| **11** | -0.0217742120 | -0.0015170790 | | 0.0427615221 | 7.9998129587 | 7.9997913032 | 7.9998050804 | 7.9999349588 | 99.6072048611 | 33.3986760734 |
| **12** | -0.0110280568 | 0.0201672907 | | 0.0301208785 | 7.9998206989 | 7.9997968973 | 7.9998153216 | 7.9999365136 | 99.6085069444 | 33.3976875964 |
| **13** | 0.0102441995 | 0.0281789746 | | 0.0147057527 | 7.9997961274 | 7.9997876565 | 7.9998120695 | 7.9999334739 | 99.6125940394 | 33.4032040044 |
| **14** | -0.0200713697 | 0.0079750726 | | 0.0047306003 | 7.9998000076 | 7.9997847375 | 7.9998058323 | 7.9999342731 | 99.6110749421 | 33.4073184743 |
| **15** | 0.0014351910 | 0.0295623862 | | -0.0265584865 | 7.9998272701 | 7.9997780345 | 7.9997905452 | 7.9999390534 | 99.6034794560 | 33.4060003631 |
| **16** | -0.0071957075 | -0.0145179364 | | 0.0131336679 | 7.9997894756 | 7.9997991328 | 7.9997814883 | 7.9999308522 | 99.6159939236 | 33.3928803842 |
| **17** | 0.0146297068 | -0.0184345666 | | 0.0189447082 | 7.9997978216 | 7.9997912363 | 7.9998257919 | 7.9999361167 | 99.6112196181 | 33.4067448768 |
| **18** | 0.0180041828 | -0.0049299632 | | -0.0489203853 | 7.9997856797 | 7.9998049466 | 7.9998013692 | 7.9999389556 | 99.6048177083 | 33.3999377326 |
| **19** | 0.0007974511 | 0.0123192475 | | 0.0080432387 | 7.9997934468 | 7.9998033487 | 7.9997935487 | 7.9999261823 | 99.6091218171 | 33.3876602782 |
| **20** | 0.0122066261 | -0.0267621630 | | -0.0304053311 | 7.9997779858 | 7.9997922699 | 7.9998006403 | 7.9999342961 | 99.6115089699 | 33.3617763367 |
| **21** | -0.0087879213 | -0.0378231902 | | 0.0027410854 | 7.9997960729 | 7.9998287628 | 7.9998100920 | 7.9999385014 | 99.6119429977 | 33.3842079135 |
| **22** | 0.0203759022 | -0.0179374642 | | -0.0263339936 | 7.9997918656 | 7.9997852454 | 7.9998287334 | 7.9999401440 | 99.6106409144 | 33.3817099843 |
| **23** | -0.7060588401 | 0.9812585404 | | -0.0761317444 | 7.9601669233 | 7.9769696024 | 7.9748086754 | 7.9769207659 | 99.6091218171 | 33.5482211953 |
| **24** | 0.0297753402 | 0.0134420997 | | -0.0129172576 | 7.9998123383 | 7.9997984893 | 7.9997928871 | 7.9999323950 | 99.6084707755 | 33.3854795014 |
| **25** | 0.0299403103 | 0.0046133579 | | -0.0025048523 | 7.9998018645 | 7.9997605460 | 7.9997842248 | 7.9999226282 | 99.6070963542 | 33.3622465334 |
| **26** | 0.0251644467 | 0.0281075233 | | -0.0100913946 | 7.9998118037 | 7.9997977564 | 7.9997770598 | 7.9999325464 | 99.6098451968 | 33.3935444751 |
| **27** | 0.0350725462 | -0.0090677053 | | 0.0825778294 | 7.9997994144 | 7.9998024811 | 7.9997935345 | 7.9999303392 | 99.6098813657 | 33.1107621868 |
| **28** | 0.0153952339 | 0.0063633604 | | 0.0066700167 | 7.9997914209 | 7.9997692500 | 7.9997718825 | 7.9999128000 | 99.6026114005 | 33.3740981867 |
| **29** | -0.0075093449 | 0.0003249091 | | 0.0071482680 | 7.9997671567 | 7.9997963655 | 7.9997649347 | 7.9999257157 | 99.6084707755 | 33.3820611781 |
| **30** | 0.0022695906 | -0.0138503897 | | 0.0086150568 | 7.9998165783 | 7.9998299008 | 7.9997683843 | 7.9999418335 | 99.6114366319 | 33.4019056089 |
| **31** | 0.0228725074 | -0.0110376529 | | 0.0428607888 | 7.9998166818 | 7.9997977050 | 7.9997560066 | 7.9999355547 | 99.6087601273 | 33.3644814928 |
| **32** | 0.0003345420 | -0.0212144550 | | 0.0071943452 | 7.9998298801 | 7.9997882195 | 7.9997812143 | 7.9999305213 | 99.6100983796 | 33.4221400974 |
| **33** | 0.0095893775 | 0.0004164633 | | 0.0020658281 | 7.9997947634 | 7.9998198902 | 7.9997944470 | 7.9999402890 | 99.6096281829 | 33.4037418584 |
| **34** | -0.0216384265 | 0.0135513072 | | -0.0820300936 | 7.9997879110 | 7.9998292431 | 7.9998130557 | 7.9999315004 | 99.6046368634 | 33.4092801096 |
| **35** | 0.0041347970 | -0.0047838155 | | -0.0360452676 | 7.9997781543 | 7.9997859884 | 7.9998103654 | 7.9999263515 | 99.6116174769 | 33.3795154491 |
| **36** | -0.0253424829 | -0.0278216626 | | 0.0251413600 | 7.9998104435 | 7.9997761527 | 7.9997855545 | 7.9999361422 | 99.6120876736 | 33.3827693809 |
| **37** | 0.0248275443 | 0.0028012750 | | -0.0651799343 | 7.9997806786 | 7.9997842335 | 7.9997859828 | 7.9999305135 | 99.6122685185 | 33.3905916678 |
| **38** | -0.0349049164 | -0.0041317966 | | -0.0403471036 | 7.9997898674 | 7.9997798244 | 7.9998071910 | 7.9999297025 | 99.6159577546 | 33.3963072179 |
| **39** | 0.0081076345 | 0.0316425412 | | -0.0471885232 | 7.9998208629 | 7.9998020147 | 7.9998124295 | 7.9999337930 | 99.6150896991 | 33.0948699619 |
| **40** | -0.0122337748 | -0.0016986796 | | 0.0069134540 | 7.9998235998 | 7.9997964107 | 7.9997794991 | 7.9999254083 | 99.6064814815 | 33.4003260882 |
| **41** | -0.0014281196 | 0.0097151407 | | 0.0475183971 | 7.9998151447 | 7.9997874659 | 7.9997788667 | 7.9999257110 | 99.6125578704 | 33.3871987337 |
| **42** | -0.1787836136 | -0.1290959286 | | -0.0920215068 | 7.8651352456 | 7.8277474749 | 7.9214125877 | 7.8854430704 | 99.6108579282 | 31.2278807530 |
| **43** | -0.0062176840 | 0.0083585410 | | -0.0496325406 | 7.9997890031 | 7.9998030466 | 7.9998070285 | 7.9999275261 | 99.6032624421 | 33.4139145618 |
| **44** | 0.0158303458 | 0.0171335347 | | 0.0654578161 | 7.9997997909 | 7.9997950669 | 7.9997704594 | 7.9999364576 | 99.6072410301 | 33.3952873945 |
| **45** | 0.0260553817 | 0.0081494731 | | -0.0144270545 | 7.9997949609 | 7.9998127305 | 7.9998197026 | 7.9999402893 | 99.6090494792 | 33.3718287604 |
| **46** | -0.0167483676 | -0.0040074492 | | -0.0243986268 | 7.9998037546 | 7.9997859627 | 7.9997781995 | 7.9999296747 | 99.6042751736 | 33.3840247992 |
| **47** | -0.0015933958 | 0.0308307440 | | -0.0176138483 | 7.9998185829 | 7.9997985329 | 7.9997787694 | 7.9999396245 | 99.6115089699 | 33.4181495949 |
| **48** | 0.0311464003 | -0.0242732290 | | 0.0152766223 | 7.9997605688 | 7.9997944772 | 7.9998001467 | 7.9999257023 | 99.6093026620 | 33.4039042643 |
| **49** | -0.0216244070 | -0.0003082185 | | 0.0154278549 | 7.9997910906 | 7.9997776836 | 7.9997796371 | 7.9999338209 | 99.6119791667 | 33.3833398579 |
| **50** | 0.0049550708 | 0.0031207457 | | 0.0466868739 | 7.9997653139 | 7.9997465628 | 7.9998467539 | 7.9999308646 | 99.6072048611 | 33.4107760871 |
| **Total** | -0.7191727828 | 0.9196993335 | | -0.3059795059 | 399.8157100179 | 399.7948612030 | 399.8863759324 | 399.8591525448 | 4980.4661458333 | 1668.9299110384 |
| **Average** | -0.0143824638 | 0.0183919125 | | -0.0061195137 | 7.9963142004 | 7.9958972241 | 7.9977275186 | 7.9971830509 | 99.6093229167 | 33.3785982208 |

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| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | | | | | | | |
| **Video Stream** | | | **VIRAT\_S\_000205\_05\_001092\_001124** | | | | | | | |
| **Resolution** | | | **720p** | | | | | | | |
| **Frame Number** | **Correlation Coefficient** | | | | **E(i)** | | | | **Differential Attacks** | |
| **CCh** | **CCv** | | **CCd** | **Red** | **Green** | **Blue** | **Combined** | **NPCR** | **UACI** |
| **1** | -0.0166602316 | 0.0082417445 | | -0.0027060648 | 7.9998175326 | 7.9997865951 | 7.9998203525 | 7.9999313288 | 99.6121961806 | 33.3827425733 |
| **2** | 0.0071102037 | -0.0150711093 | | 0.0248642869 | 7.9997810981 | 7.9998121811 | 7.9998229974 | 7.9999337580 | 99.6125578704 | 33.4074747810 |
| **3** | 0.0076080418 | 0.0159077173 | | -0.0489770128 | 7.9997844623 | 7.9997905076 | 7.9998001388 | 7.9999302779 | 99.6091941551 | 33.4128849514 |
| **4** | 0.0146855202 | 0.0136598449 | | 0.0114615846 | 7.9997820319 | 7.9997951999 | 7.9997744333 | 7.9999198819 | 99.6069516782 | 33.9656082630 |
| **5** | -0.0461647166 | 0.0199798635 | | 0.0206143911 | 7.9997757641 | 7.9998057263 | 7.9998120489 | 7.9999369221 | 99.6147280093 | 33.3801076275 |
| **6** | 0.0434404106 | -0.1046561941 | | 0.0088340148 | 7.9760350630 | 7.9682792086 | 7.9699491266 | 7.9788105900 | 99.6094473380 | 33.4044875068 |
| **7** | 0.0160973898 | 0.0252016832 | | -0.0181835931 | 7.9997954824 | 7.9998217076 | 7.9998071785 | 7.9999325745 | 99.6122685185 | 33.3612346530 |
| **8** | -0.0043329509 | 0.0124038226 | | -0.0034905809 | 7.9997649744 | 7.9997650469 | 7.9998084435 | 7.9999182288 | 99.6107132523 | 33.3838361531 |
| **9** | 0.0345213883 | -0.0037057816 | | 0.0094566247 | 7.9998357913 | 7.9997794371 | 7.9998116420 | 7.9999350579 | 99.6070601852 | 33.3863674144 |
| **10** | -0.0084086830 | -0.0080959921 | | 0.0348607167 | 7.9997929875 | 7.9997998933 | 7.9998176176 | 7.9999278165 | 99.6028645833 | 33.3961760167 |
| **11** | -0.0045449187 | 0.0196770076 | | -0.0117043374 | 7.9998204905 | 7.9998043968 | 7.9997895708 | 7.9999430230 | 99.6162471065 | 33.3902956495 |
| **12** | 0.0118830412 | 0.0061353221 | | -0.0306861738 | 7.9997877627 | 7.9997651307 | 7.9997697304 | 7.9999210586 | 99.6065176505 | 33.3694640182 |
| **13** | -0.0275975578 | 0.0258660401 | | -0.0185879380 | 7.9998233337 | 7.9998084010 | 7.9998227344 | 7.9999269514 | 99.6141493056 | 33.3963387062 |
| **14** | -0.0441234282 | -0.0209598960 | | 0.0011904006 | 7.9998015684 | 7.9997817366 | 7.9997997575 | 7.9999322846 | 99.6064814815 | 33.3845077614 |
| **15** | 0.0204292814 | 0.0047264980 | | -0.0155743307 | 7.9997808050 | 7.9997847909 | 7.9998016527 | 7.9999257641 | 99.6095558449 | 33.3942692731 |
| **16** | -0.0408669509 | -0.0076405924 | | 0.0158283592 | 7.9998030792 | 7.9998199553 | 7.9997845980 | 7.9999331635 | 99.6072771991 | 33.4004387085 |
| **17** | 0.0230628142 | -0.0083168868 | | 0.0111274786 | 7.9998018444 | 7.9998198706 | 7.9997890271 | 7.9999284358 | 99.6065899884 | 33.3921633873 |
| **18** | -0.0002410810 | -0.0074927151 | | -0.0112195707 | 7.9998150761 | 7.9997863623 | 7.9997944815 | 7.9999307253 | 99.6052517361 | 33.3997289454 |
| **19** | 0.0016783573 | 0.0005346753 | | 0.0087542067 | 7.9997965060 | 7.9998337276 | 7.9998035311 | 7.9999461094 | 99.6089409722 | 33.3981668709 |
| **20** | -0.0133668497 | 0.0057495371 | | -0.0166762722 | 7.9997873916 | 7.9997946103 | 7.9997886683 | 7.9999317029 | 99.6150173611 | 33.4036068276 |
| **21** | 0.0172401020 | 0.0082432452 | | -0.0164392920 | 7.9997819862 | 7.9998329542 | 7.9997822609 | 7.9999393810 | 99.6102430556 | 33.3825953443 |
| **22** | -0.7289476448 | -0.0914159642 | | -0.0249228469 | 7.9925677766 | 7.9826973183 | 7.9777084652 | 7.9885811862 | 99.6022135417 | 33.2187400713 |
| **23** | -0.0299900360 | 0.0157324711 | | 0.0014688405 | 7.9997808401 | 7.9998155623 | 7.9998329888 | 7.9999330332 | 99.6086877894 | 33.4012554183 |
| **24** | 0.0008752424 | -0.0257730657 | | 0.0104628124 | 7.9998460422 | 7.9997957561 | 7.9997800453 | 7.9999318861 | 99.6045645255 | 33.3742380401 |
| **25** | 0.0008785514 | -0.0016776679 | | 0.0057258499 | 7.9997735852 | 7.9998106761 | 7.9997982248 | 7.9999362135 | 99.6134259259 | 33.3801388322 |
| **26** | -0.0103389927 | -0.0296110649 | | -0.0458044772 | 7.9997802197 | 7.9997838777 | 7.9997979668 | 7.9999234723 | 99.6093388310 | 33.4016545536 |
| **27** | -0.0018315079 | 0.0058816367 | | 0.0502371597 | 7.9998169834 | 7.9998295423 | 7.9998254048 | 7.9999378482 | 99.6124855324 | 33.3850057587 |
| **28** | 0.0019196875 | 0.0003102768 | | -0.0281812254 | 7.9998038620 | 7.9997928997 | 7.9997585729 | 7.9999377692 | 99.6111111111 | 33.3814433268 |
| **29** | -0.0323043475 | 0.0083529791 | | -0.0263399278 | 7.9997949528 | 7.9997849534 | 7.9998104640 | 7.9999386251 | 99.6121600116 | 33.3693187750 |
| **30** | -0.0339919749 | 0.0166509667 | | -0.0156931408 | 7.9997908241 | 7.9998115609 | 7.9997739556 | 7.9999270188 | 99.6099898727 | 33.4142809323 |
| **31** | 0.0013063552 | -0.0015324902 | | 0.0285090936 | 7.9998164808 | 7.9998212342 | 7.9998160372 | 7.9999438427 | 99.6085431134 | 33.3799689089 |
| **32** | 0.0192461286 | -0.0109908975 | | -0.0028727942 | 7.9997674460 | 7.9998255004 | 7.9998216752 | 7.9999392857 | 99.6080367477 | 33.3927276235 |
| **33** | 0.0064804488 | 0.0271431444 | | 0.0025174441 | 7.9998151225 | 7.9998049953 | 7.9998115074 | 7.9999428422 | 99.6012369792 | 33.4134159972 |
| **34** | -0.0080531862 | 0.0016130389 | | 0.0169020004 | 7.9998218418 | 7.9998173395 | 7.9997991207 | 7.9999304758 | 99.6030092593 | 33.3901723913 |
| **35** | 0.0103921684 | 0.0016016807 | | -0.0568504598 | 7.9998004093 | 7.9998039279 | 7.9997866159 | 7.9999322325 | 99.6063006366 | 33.4218856379 |
| **36** | 0.0119023908 | -0.0318880156 | | 0.0193407302 | 7.9998177490 | 7.9998136756 | 7.9997837199 | 7.9999290338 | 99.6100622106 | 33.3884462089 |
| **37** | 0.0100549442 | -0.0104851919 | | -0.0316102147 | 7.9998121375 | 7.9997923932 | 7.9998095803 | 7.9999367267 | 99.6044198495 | 33.3759920230 |
| **38** | -0.0149271555 | -0.0046390436 | | -0.0465893041 | 7.9998010377 | 7.9998027679 | 7.9998311662 | 7.9999375435 | 99.6125578704 | 33.7139693117 |
| **39** | -0.0010534604 | 0.0032627076 | | -0.0196539650 | 7.9998103445 | 7.9997868149 | 7.9997747720 | 7.9999310248 | 99.6124855324 | 33.4044187148 |
| **40** | -0.0026024359 | -0.0220700253 | | -0.0577284370 | 7.9997829261 | 7.9997746351 | 7.9997972879 | 7.9999252658 | 99.6095196759 | 33.3761523012 |
| **41** | 0.0067617470 | 0.0015216916 | | -0.0496983709 | 7.9998163142 | 7.9997464712 | 7.9997889080 | 7.9999293022 | 99.6138237847 | 33.3888270470 |
| **42** | 0.0097759625 | 0.0040588830 | | 0.0594762692 | 7.9997924132 | 7.9997848274 | 7.9997898320 | 7.9999179335 | 99.6093388310 | 33.3958253903 |
| **43** | -0.0106491225 | -0.0004672103 | | -0.0088570680 | 7.9997759732 | 7.9998079175 | 7.9998029050 | 7.9999259728 | 99.6090856481 | 33.3992456994 |
| **44** | -0.0185982997 | -0.0045753804 | | 0.0243519665 | 7.9997841334 | 7.9997898631 | 7.9997820260 | 7.9999240767 | 99.6119791667 | 33.3641378166 |
| **45** | -0.0020858027 | 0.0168255594 | | -0.0273323151 | 7.9998328598 | 7.9997885435 | 7.9997878478 | 7.9999314666 | 99.6077112269 | 33.3949501010 |
| **46** | 0.0307775162 | -0.0101041454 | | 0.0085056962 | 7.9997785964 | 7.9998168159 | 7.9998095677 | 7.9999423930 | 99.6092664931 | 33.3883203976 |
| **47** | 0.0359293698 | -0.0040582421 | | 0.0211314150 | 7.9998089053 | 7.9998075715 | 7.9998059425 | 7.9999338495 | 99.6123770255 | 33.4076896673 |
| **48** | 0.0375831949 | -0.0345781668 | | -0.0579693683 | 7.9998139081 | 7.9998140164 | 7.9997934937 | 7.9999299550 | 99.6126663773 | 33.4045097756 |
| **49** | -0.0181379985 | 0.0077461479 | | -0.0232394251 | 7.9997833929 | 7.9998020764 | 7.9997811375 | 7.9999304606 | 99.6052517361 | 33.9777560764 |
| **50** | 0.1426436708 | -0.2285970444 | | -0.0203341480 | 7.9836110858 | 7.9742571776 | 7.9716002107 | 7.9825502405 | 99.6015986690 | 33.5194987688 |
| **Total** | -0.5955354045 | -0.4113745984 | | -0.3423013129 | 399.9427631949 | 399.9158481512 | 399.9098094335 | 399.9467460127 | 4980.4575014468 | 1671.0164809992 |
| **Average** | -0.0119101449 | -0.0082273063 | | -0.0068459193 | 7.9988552639 | 7.9983169630 | 7.9981961887 | 7.9989349203 | 99.6091500289 | 33.4203296200 |

# DECRYPTION METRICS

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **VIRAT\_S\_000200\_00\_000100\_000171** | |
| **Resolution** | | **720p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002997159 | | 35.2329017014 |
| **2** | 0.0002078377 | | 36.8227561980 |
| **3** | 0.0002084755 | | 36.8094499771 |
| **4** | 0.0002119953 | | 36.7367371577 |
| **5** | 0.0002133675 | | 36.7087164213 |
| **6** | 0.0002157778 | | 36.6599316699 |
| **7** | 0.0002161042 | | 36.6533679375 |
| **8** | 0.0002168500 | | 36.6384058323 |
| **9** | 0.0002172011 | | 36.6313792427 |
| **10** | 0.0002183487 | | 36.6084932124 |
| **11** | 0.0002183227 | | 36.6090109009 |
| **12** | 0.0002187599 | | 36.6003219364 |
| **13** | 0.0001925429 | | 37.1547250649 |
| **14** | 0.0002009710 | | 36.9686651596 |
| **15** | 0.0002030529 | | 36.9239089611 |
| **16** | 0.0002054604 | | 36.8727195099 |
| **17** | 0.0002068341 | | 36.8437790759 |
| **18** | 0.0002087777 | | 36.8031593437 |
| **19** | 0.0002092364 | | 36.7936274160 |
| **20** | 0.0002106828 | | 36.7637097290 |
| **21** | 0.0002112806 | | 36.7514044596 |
| **22** | 0.0002118967 | | 36.7387578455 |
| **23** | 0.0002129544 | | 36.7171335434 |
| **24** | 0.0002055305 | | 36.8712378570 |
| **25** | 0.0001835394 | | 37.3627071732 |
| **26** | 0.0001976421 | | 37.0412045589 |
| **27** | 0.0001969152 | | 37.0572083519 |
| **28** | 0.0002049232 | | 36.8840876971 |
| **29** | 0.0002021910 | | 36.9423807745 |
| **30** | 0.0002090214 | | 36.7980926387 |
| **31** | 0.0002065327 | | 36.8501122562 |
| **32** | 0.0002118907 | | 36.7388801724 |
| **33** | 0.0002089383 | | 36.7998201933 |
| **34** | 0.0002135796 | | 36.7044030694 |
| **35** | 0.0002106705 | | 36.7639631346 |
| **36** | 0.0002156641 | | 36.6622211400 |
| **37** | 0.0001921802 | | 37.1629144192 |
| **38** | 0.0002048249 | | 36.8861724763 |
| **39** | 0.0002032135 | | 36.9204743971 |
| **40** | 0.0002097238 | | 36.7835225486 |
| **41** | 0.0002069662 | | 36.8410047185 |
| **42** | 0.0002124504 | | 36.7274244526 |
| **43** | 0.0002096092 | | 36.7858963350 |
| **44** | 0.0002147079 | | 36.6815205154 |
| **45** | 0.0002104580 | | 36.7683452608 |
| **46** | 0.0002157915 | | 36.6596575071 |
| **47** | 0.0002130446 | | 36.7152944433 |
| **48** | 0.0002166288 | | 36.6428385384 |
| **49** | 0.0001950812 | | 37.0978462652 |
| **50** | 0.0002075393 | | 36.8289955694 |
| **Total** | 0.0105157045 | | 1839.0212887601 |
| **Average** | 0.0002103141 | | 36.7804257752 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **VIRAT\_S\_000200\_01\_000226\_000268** | |
| **Resolution** | | **720p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0003024208 | | 35.1938836714 |
| **2** | 0.0002117223 | | 36.7423342215 |
| **3** | 0.0002081860 | | 36.8154851678 |
| **4** | 0.0002166914 | | 36.6415826417 |
| **5** | 0.0002134857 | | 36.7063116776 |
| **6** | 0.0002207078 | | 36.5618230156 |
| **7** | 0.0002185076 | | 36.6053339841 |
| **8** | 0.0002253536 | | 36.4713549548 |
| **9** | 0.0002227162 | | 36.5224816896 |
| **10** | 0.0002282593 | | 36.4157160997 |
| **11** | 0.0002253206 | | 36.4719903478 |
| **12** | 0.0002303891 | | 36.3753812876 |
| **13** | 0.0001952456 | | 37.0941880193 |
| **14** | 0.0002082907 | | 36.8133003156 |
| **15** | 0.0002065998 | | 36.8487017849 |
| **16** | 0.0002144309 | | 36.6871268078 |
| **17** | 0.0002113014 | | 36.7509760661 |
| **18** | 0.0002177701 | | 36.6200181024 |
| **19** | 0.0002138329 | | 36.6992552217 |
| **20** | 0.0002196115 | | 36.5834499249 |
| **21** | 0.0002151283 | | 36.6730246273 |
| **22** | 0.0002207604 | | 36.5607876165 |
| **23** | 0.0002161262 | | 36.6529255216 |
| **24** | 0.0002205842 | | 36.5642560422 |
| **25** | 0.0001970938 | | 37.0532698946 |
| **26** | 0.0002101899 | | 36.7738818671 |
| **27** | 0.0002069740 | | 36.8408420156 |
| **28** | 0.0002134933 | | 36.7061566588 |
| **29** | 0.0002083573 | | 36.8119133413 |
| **30** | 0.0002127672 | | 36.7209525939 |
| **31** | 0.0002056425 | | 36.8688710120 |
| **32** | 0.0002073458 | | 36.8330467750 |
| **33** | 0.0002029178 | | 36.9267985907 |
| **34** | 0.0002091875 | | 36.7946434005 |
| **35** | 0.0002065551 | | 36.8496399820 |
| **36** | 0.0002130716 | | 36.7147443163 |
| **37** | 0.0001921554 | | 37.1634734384 |
| **38** | 0.0002061106 | | 36.8589961984 |
| **39** | 0.0002038959 | | 36.9059152205 |
| **40** | 0.0002119339 | | 36.7379966006 |
| **41** | 0.0002092192 | | 36.7939848713 |
| **42** | 0.0002162056 | | 36.6513297116 |
| **43** | 0.0002119748 | | 36.7371584509 |
| **44** | 0.0002185735 | | 36.6040251139 |
| **45** | 0.0002146488 | | 36.6827152015 |
| **46** | 0.0002205264 | | 36.5653943604 |
| **47** | 0.0002158493 | | 36.6584926483 |
| **48** | 0.0002208719 | | 36.5585949525 |
| **49** | 0.0001961393 | | 37.0743531777 |
| **50** | 0.0002093218 | | 36.7918554677 |
| **Total** | 0.0107244647 | | 1834.7507346713 |
| **Average** | 0.0002144893 | | 36.6950146934 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000200\_05\_001525\_001575** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0002804379 | | 35.5216335184 |
| **2** | | 0.0002041528 | | 36.9004457684 |
| **3** | | 0.0001988783 | | 37.0141264374 |
| **4** | | 0.0002065309 | | 36.8501494508 |
| **5** | | 0.0002019459 | | 36.9476505632 |
| **6** | | 0.0002085173 | | 36.8085796204 |
| **7** | | 0.0002041965 | | 36.8995177086 |
| **8** | | 0.0002105644 | | 36.7661496870 |
| **9** | | 0.0002057783 | | 36.8660039261 |
| **10** | | 0.0002117338 | | 36.7420979334 |
| **11** | | 0.0002071992 | | 36.8361199848 |
| **12** | | 0.0002135301 | | 36.7054083469 |
| **13** | | 0.0001878829 | | 37.2611269606 |
| **14** | | 0.0002018353 | | 36.9500277124 |
| **15** | | 0.0001981130 | | 37.0308711118 |
| **16** | | 0.0002060675 | | 36.8599050879 |
| **17** | | 0.0002018474 | | 36.9497688395 |
| **18** | | 0.0002091169 | | 36.7961090815 |
| **19** | | 0.0002043120 | | 36.8970606802 |
| **20** | | 0.0002110979 | | 36.7551610868 |
| **21** | | 0.0002043833 | | 36.8955455257 |
| **22** | | 0.0002112702 | | 36.7516174717 |
| **23** | | 0.0002060479 | | 36.8603190392 |
| **24** | | 0.0002114222 | | 36.7484933132 |
| **25** | | 0.0001900724 | | 37.2108097905 |
| **26** | | 0.0002036071 | | 36.9120703997 |
| **27** | | 0.0001994593 | | 37.0014565311 |
| **28** | | 0.0002079213 | | 36.8210095058 |
| **29** | | 0.0002030947 | | 36.9230139361 |
| **30** | | 0.0002098685 | | 36.7805264923 |
| **31** | | 0.0001955691 | | 37.0869978551 |
| **32** | | 0.0001990930 | | 37.0094390642 |
| **33** | | 0.0001928675 | | 37.1474088832 |
| **34** | | 0.0002008455 | | 36.9713790558 |
| **35** | | 0.0001969756 | | 37.0558762904 |
| **36** | | 0.0002043522 | | 36.8962060430 |
| **37** | | 0.0001856351 | | 37.3133995820 |
| **38** | | 0.0001987331 | | 37.0172969932 |
| **39** | | 0.0001953282 | | 37.0923504665 |
| **40** | | 0.0002037298 | | 36.9094554338 |
| **41** | | 0.0001995842 | | 36.9987380624 |
| **42** | | 0.0002063525 | | 36.8539018986 |
| **43** | | 0.0002016080 | | 36.9549225113 |
| **44** | | 0.0002083495 | | 36.8120754278 |
| **45** | | 0.0002040412 | | 36.9028218380 |
| **46** | | 0.0002102506 | | 36.7726266826 |
| **47** | | 0.0002043851 | | 36.8955073492 |
| **48** | | 0.0002111112 | | 36.7548865675 |
| **49** | | 0.0001898203 | | 37.2165734625 |
| **50** | | 0.0002038167 | | 36.9076020592 |
| **Total** | | 0.0102333338 | | 1844.8322410377 |
| **Average** | | 0.0002046667 | | 36.8966448208 |

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| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **VIRAT\_S\_000201\_01\_000384\_000589** | |
| **Resolution** | | **720p** | |
| **Frame Number** | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | 0.0002799786 | | 35.5287513037 |
| **2** | 0.0001697693 | | 37.7014081210 |
| **3** | 0.0001695429 | | 37.7072047024 |
| **4** | 0.0001715147 | | 37.6569873454 |
| **5** | 0.0001724070 | | 37.6344507086 |
| **6** | 0.0001744742 | | 37.5826888245 |
| **7** | 0.0001755113 | | 37.5569486312 |
| **8** | 0.0001772986 | | 37.5129473297 |
| **9** | 0.0001773467 | | 37.5117683864 |
| **10** | 0.0001790345 | | 37.4706337926 |
| **11** | 0.0001793069 | | 37.4640288068 |
| **12** | 0.0001799839 | | 37.4476626300 |
| **13** | 0.0001585956 | | 37.9970881385 |
| **14** | 0.0001651763 | | 37.8205229879 |
| **15** | 0.0001674460 | | 37.7612511320 |
| **16** | 0.0001705175 | | 37.6823105928 |
| **17** | 0.0001719782 | | 37.6452650834 |
| **18** | 0.0001731207 | | 37.6165111693 |
| **19** | 0.0001737979 | | 37.5995558824 |
| **20** | 0.0001744787 | | 37.5825766773 |
| **21** | 0.0001752778 | | 37.5627319941 |
| **22** | 0.0001761794 | | 37.5404489880 |
| **23** | 0.0001762883 | | 37.5377642826 |
| **24** | 0.0001773512 | | 37.5116595540 |
| **25** | 0.0001642183 | | 37.8457854951 |
| **26** | 0.0001702544 | | 37.6890176500 |
| **27** | 0.0001730253 | | 37.6189048992 |
| **28** | 0.0001751481 | | 37.5659466034 |
| **29** | 0.0001761114 | | 37.5421265032 |
| **30** | 0.0001776857 | | 37.5034761971 |
| **31** | 0.0001761751 | | 37.5405547049 |
| **32** | 0.0001730372 | | 37.6186041798 |
| **33** | 0.0001716030 | | 37.6547517376 |
| **34** | 0.0001714804 | | 37.6578539054 |
| **35** | 0.0001720329 | | 37.6438856596 |
| **36** | 0.0001726281 | | 37.6288855366 |
| **37** | 0.0001544147 | | 38.1131125959 |
| **38** | 0.0001605577 | | 37.9436895401 |
| **39** | 0.0001623918 | | 37.8943588472 |
| **40** | 0.0001648334 | | 37.8295474306 |
| **41** | 0.0001667411 | | 37.7795733354 |
| **42** | 0.0001684801 | | 37.7345127477 |
| **43** | 0.0001693228 | | 37.7128459590 |
| **44** | 0.0001707937 | | 37.6752826155 |
| **45** | 0.0001712200 | | 37.6644549835 |
| **46** | 0.0001723561 | | 37.6357323914 |
| **47** | 0.0001733838 | | 37.6099142382 |
| **48** | 0.0001742936 | | 37.5871860987 |
| **49** | 0.0001626363 | | 37.8878257641 |
| **50** | 0.0001690463 | | 37.7199424676 |
| **Total** | 0.0086802472 | | 1880.9309391511 |
| **Average** | 0.0001736049 | | 37.6186187830 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000201\_02\_000590\_000623** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0002918322 | | 35.3486683863 |
| **2** | | 0.0001721035 | | 37.6421024117 |
| **3** | | 0.0001615640 | | 37.9165549090 |
| **4** | | 0.0001712797 | | 37.6629422344 |
| **5** | | 0.0001643167 | | 37.8431840388 |
| **6** | | 0.0001735952 | | 37.6046240551 |
| **7** | | 0.0001676340 | | 37.7563776614 |
| **8** | | 0.0001774670 | | 37.5088229722 |
| **9** | | 0.0001704949 | | 37.6828863691 |
| **10** | | 0.0001797871 | | 37.4524155608 |
| **11** | | 0.0001734812 | | 37.6074764418 |
| **12** | | 0.0001826542 | | 37.3837043821 |
| **13** | | 0.0001559064 | | 38.0713618370 |
| **14** | | 0.0001702972 | | 37.6879252590 |
| **15** | | 0.0001635970 | | 37.8622458910 |
| **16** | | 0.0001722999 | | 37.6371501664 |
| **17** | | 0.0001656985 | | 37.8068145093 |
| **18** | | 0.0001746035 | | 37.5794706580 |
| **19** | | 0.0001686361 | | 37.7304937754 |
| **20** | | 0.0001772298 | | 37.5146325181 |
| **21** | | 0.0001694096 | | 37.7106209173 |
| **22** | | 0.0001779255 | | 37.4976169192 |
| **23** | | 0.0001705874 | | 37.6805297682 |
| **24** | | 0.0001799144 | | 37.4493406626 |
| **25** | | 0.0001625772 | | 37.8894045107 |
| **26** | | 0.0001767802 | | 37.5256631555 |
| **27** | | 0.0001697999 | | 37.7006258690 |
| **28** | | 0.0001799075 | | 37.4495071588 |
| **29** | | 0.0001732713 | | 37.6127338543 |
| **30** | | 0.0001817068 | | 37.4062870038 |
| **31** | | 0.0001751240 | | 37.5665444003 |
| **32** | | 0.0001788388 | | 37.4753833074 |
| **33** | | 0.0001673706 | | 37.7632082587 |
| **34** | | 0.0001763218 | | 37.5369390274 |
| **35** | | 0.0001676338 | | 37.7563841461 |
| **36** | | 0.0001766780 | | 37.5281756279 |
| **37** | | 0.0001489863 | | 38.2685363080 |
| **38** | | 0.0001632677 | | 37.8709979871 |
| **39** | | 0.0001557855 | | 38.0747308641 |
| **40** | | 0.0001668631 | | 37.7763957656 |
| **41** | | 0.0001596858 | | 37.9673374658 |
| **42** | | 0.0001702393 | | 37.6894026059 |
| **43** | | 0.0001621486 | | 37.9008689971 |
| **44** | | 0.0001729795 | | 37.6200540791 |
| **45** | | 0.0001648489 | | 37.8291400321 |
| **46** | | 0.0001762267 | | 37.5392828439 |
| **47** | | 0.0001678730 | | 37.7501917655 |
| **48** | | 0.0001779807 | | 37.4962698883 |
| **49** | | 0.0001595129 | | 37.9720406534 |
| **50** | | 0.0001744755 | | 37.5826547647 |
| **Total** | | 0.0086391981 | | 1882.1867226446 |
| **Average** | | 0.0001727840 | | 37.6437344529 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000201\_03\_000640\_000672** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0002895708 | | 35.3824523190 |
| **2** | | 0.0001726412 | | 37.6285560004 |
| **3** | | 0.0001620578 | | 37.9033014740 |
| **4** | | 0.0001701506 | | 37.6916662070 |
| **5** | | 0.0001638729 | | 37.8549275010 |
| **6** | | 0.0001738568 | | 37.5980830745 |
| **7** | | 0.0001671222 | | 37.7696596134 |
| **8** | | 0.0001758171 | | 37.5493893098 |
| **9** | | 0.0001690125 | | 37.7208105334 |
| **10** | | 0.0001781621 | | 37.4918474307 |
| **11** | | 0.0001707572 | | 37.6762098457 |
| **12** | | 0.0001798918 | | 37.4498860957 |
| **13** | | 0.0001566818 | | 38.0498151700 |
| **14** | | 0.0001711605 | | 37.6659640256 |
| **15** | | 0.0001631386 | | 37.8744334632 |
| **16** | | 0.0001702276 | | 37.6897008886 |
| **17** | | 0.0001618607 | | 37.9085855485 |
| **18** | | 0.0001693608 | | 37.7118715072 |
| **19** | | 0.0001621381 | | 37.9011484920 |
| **20** | | 0.0001684627 | | 37.7349635608 |
| **21** | | 0.0001608081 | | 37.9369203915 |
| **22** | | 0.0001687079 | | 37.7286446897 |
| **23** | | 0.0001613694 | | 37.9217889760 |
| **24** | | 0.0001693716 | | 37.7115946606 |
| **25** | | 0.0001632756 | | 37.8707859677 |
| **26** | | 0.0001760776 | | 37.5429591929 |
| **27** | | 0.0001689530 | | 37.7223414331 |
| **28** | | 0.0001785954 | | 37.4812978586 |
| **29** | | 0.0001711798 | | 37.6654753004 |
| **30** | | 0.0001794816 | | 37.4598000119 |
| **31** | | 0.0001718674 | | 37.6480650229 |
| **32** | | 0.0001748838 | | 37.5725034175 |
| **33** | | 0.0001648548 | | 37.8289847032 |
| **34** | | 0.0001748958 | | 37.5722067226 |
| **35** | | 0.0001679858 | | 37.7472734562 |
| **36** | | 0.0001771691 | | 37.5161206500 |
| **37** | | 0.0001520865 | | 38.1790932350 |
| **38** | | 0.0001668355 | | 37.7771156237 |
| **39** | | 0.0001599801 | | 37.9593399917 |
| **40** | | 0.0001709949 | | 37.6701673841 |
| **41** | | 0.0001639537 | | 37.8527890788 |
| **42** | | 0.0001744073 | | 37.5843533744 |
| **43** | | 0.0001675994 | | 37.7572752379 |
| **44** | | 0.0001774929 | | 37.5081891067 |
| **45** | | 0.0001705728 | | 37.6809015097 |
| **46** | | 0.0001793117 | | 37.4639146975 |
| **47** | | 0.0001724999 | | 37.6321112746 |
| **48** | | 0.0001812890 | | 37.4162848617 |
| **49** | | 0.0001621320 | | 37.9013137243 |
| **50** | | 0.0001777120 | | 37.5028321010 |
| **Total** | | 0.0086022881 | | 1883.0657157166 |
| **Average** | | 0.0001720458 | | 37.6613143143 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000203\_08\_001702\_001734** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0004292220 | | 33.6731798612 |
| **2** | | 0.0002246331 | | 36.4852624201 |
| **3** | | 0.0002178279 | | 36.6188646022 |
| **4** | | 0.0002224468 | | 36.5277377055 |
| **5** | | 0.0002173879 | | 36.6276467875 |
| **6** | | 0.0002224126 | | 36.5284061656 |
| **7** | | 0.0002182654 | | 36.6101509403 |
| **8** | | 0.0002234447 | | 36.5082996834 |
| **9** | | 0.0002194303 | | 36.5870339318 |
| **10** | | 0.0002245845 | | 36.4862016608 |
| **11** | | 0.0002207952 | | 36.5601037602 |
| **12** | | 0.0002250777 | | 36.4766748841 |
| **13** | | 0.0001841876 | | 37.3473971618 |
| **14** | | 0.0001966335 | | 37.0634251329 |
| **15** | | 0.0001926971 | | 37.1512492726 |
| **16** | | 0.0002002839 | | 36.9835389846 |
| **17** | | 0.0001972168 | | 37.0505609454 |
| **18** | | 0.0002033423 | | 36.9177224989 |
| **19** | | 0.0001995594 | | 36.9992780369 |
| **20** | | 0.0002057548 | | 36.8665001729 |
| **21** | | 0.0002022391 | | 36.9413489885 |
| **22** | | 0.0002069694 | | 36.8409392398 |
| **23** | | 0.0002018952 | | 36.9487400830 |
| **24** | | 0.0002079089 | | 36.8212686008 |
| **25** | | 0.0001867892 | | 37.2864815491 |
| **26** | | 0.0001993276 | | 37.0043252809 |
| **27** | | 0.0001970306 | | 37.0546633169 |
| **28** | | 0.0002041164 | | 36.9012213545 |
| **29** | | 0.0002015857 | | 36.9554036188 |
| **30** | | 0.0002076644 | | 36.8263788342 |
| **31** | | 0.0002071208 | | 36.8377625478 |
| **32** | | 0.0002083118 | | 36.8128618303 |
| **33** | | 0.0002027516 | | 36.9303568285 |
| **34** | | 0.0002075737 | | 36.8282769971 |
| **35** | | 0.0002035993 | | 36.9122381661 |
| **36** | | 0.0002089235 | | 36.8001272833 |
| **37** | | 0.0001819731 | | 37.3999273645 |
| **38** | | 0.0001939782 | | 37.1224705071 |
| **39** | | 0.0001926699 | | 37.1518603289 |
| **40** | | 0.0001990553 | | 37.0102626392 |
| **41** | | 0.0001956292 | | 37.0856630477 |
| **42** | | 0.0002023294 | | 36.9394109161 |
| **43** | | 0.0001984608 | | 37.0232524894 |
| **44** | | 0.0002046251 | | 36.8904109130 |
| **45** | | 0.0002008507 | | 36.9712673211 |
| **46** | | 0.0002057354 | | 36.8669089998 |
| **47** | | 0.0002018678 | | 36.9493294013 |
| **48** | | 0.0002078839 | | 36.8217907880 |
| **49** | | 0.0001861793 | | 37.3006856894 |
| **50** | | 0.0001976934 | | 37.0400786443 |
| **Total** | | 0.0104679423 | | 1841.3449481780 |
| **Average** | | 0.0002093588 | | 36.8268989636 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000207\_03\_000556\_000590** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0003015110 | | 35.2069690518 |
| **2** | | 0.0002078454 | | 36.8225963856 |
| **3** | | 0.0002089135 | | 36.8003352982 |
| **4** | | 0.0002127322 | | 36.7216678192 |
| **5** | | 0.0002142842 | | 36.6900987788 |
| **6** | | 0.0002168361 | | 36.6386845612 |
| **7** | | 0.0002170722 | | 36.6339586161 |
| **8** | | 0.0002185999 | | 36.6035006154 |
| **9** | | 0.0002198011 | | 36.5797012677 |
| **10** | | 0.0002218437 | | 36.5395293107 |
| **11** | | 0.0002213940 | | 36.5483410163 |
| **12** | | 0.0002241108 | | 36.4953717777 |
| **13** | | 0.0001941479 | | 37.1186736370 |
| **14** | | 0.0002021456 | | 36.9433575953 |
| **15** | | 0.0002051763 | | 36.8787288875 |
| **16** | | 0.0002100264 | | 36.7772610502 |
| **17** | | 0.0002110127 | | 36.7569130864 |
| **18** | | 0.0002125133 | | 36.7261391985 |
| **19** | | 0.0002136227 | | 36.7035252396 |
| **20** | | 0.0002144645 | | 36.6864466463 |
| **21** | | 0.0002151602 | | 36.6723802404 |
| **22** | | 0.0002151515 | | 36.6725561770 |
| **23** | | 0.0002155807 | | 36.6639015245 |
| **24** | | 0.0002165329 | | 36.6447611072 |
| **25** | | 0.0001960564 | | 37.0761891672 |
| **26** | | 0.0002056127 | | 36.8695012848 |
| **27** | | 0.0002079252 | | 36.8209277140 |
| **28** | | 0.0002103072 | | 36.7714585825 |
| **29** | | 0.0002112812 | | 36.7513911967 |
| **30** | | 0.0002137623 | | 36.7006882653 |
| **31** | | 0.0002005917 | | 36.9768710710 |
| **32** | | 0.0002026012 | | 36.9335804209 |
| **33** | | 0.0002030035 | | 36.9249643378 |
| **34** | | 0.0002052798 | | 36.8765387067 |
| **35** | | 0.0002059081 | | 36.8632659033 |
| **36** | | 0.0002055987 | | 36.8697963050 |
| **37** | | 0.0001909604 | | 37.1905657788 |
| **38** | | 0.0001992716 | | 37.0055462161 |
| **39** | | 0.0002017603 | | 36.9516428149 |
| **40** | | 0.0002056957 | | 36.8677479081 |
| **41** | | 0.0002078185 | | 36.8231576728 |
| **42** | | 0.0002082269 | | 36.8146315827 |
| **43** | | 0.0002097199 | | 36.7836026023 |
| **44** | | 0.0002125952 | | 36.7244645620 |
| **45** | | 0.0002122693 | | 36.7311277238 |
| **46** | | 0.0002120528 | | 36.7355597591 |
| **47** | | 0.0002129553 | | 36.7171145995 |
| **48** | | 0.0002134962 | | 36.7060983868 |
| **49** | | 0.0001947935 | | 37.1042548446 |
| **50** | | 0.0002046989 | | 36.8888441447 |
| **Total** | | 0.0105647214 | | 1838.0049304403 |
| **Average** | | 0.0002112944 | | 36.7600986088 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000207\_04\_000902\_000934** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0003053014 | | 35.1527120916 |
| **2** | | 0.0002082058 | | 36.8150708268 |
| **3** | | 0.0002070419 | | 36.8394179833 |
| **4** | | 0.0002090431 | | 36.7976423968 |
| **5** | | 0.0002094345 | | 36.7895186774 |
| **6** | | 0.0002109855 | | 36.7574741916 |
| **7** | | 0.0002110617 | | 36.7559047447 |
| **8** | | 0.0002121760 | | 36.7330376411 |
| **9** | | 0.0002125089 | | 36.7262282047 |
| **10** | | 0.0002129789 | | 36.7166349043 |
| **11** | | 0.0002135927 | | 36.7041367160 |
| **12** | | 0.0002140045 | | 36.6957705708 |
| **13** | | 0.0001888349 | | 37.2391772225 |
| **14** | | 0.0001958529 | | 37.0806989130 |
| **15** | | 0.0001990324 | | 37.0107615684 |
| **16** | | 0.0002013852 | | 36.9597235107 |
| **17** | | 0.0002029682 | | 36.9257196786 |
| **18** | | 0.0002044250 | | 36.8946605805 |
| **19** | | 0.0002048756 | | 36.8850974773 |
| **20** | | 0.0002053962 | | 36.8740751173 |
| **21** | | 0.0002067268 | | 36.8460320200 |
| **22** | | 0.0002073885 | | 36.8321533893 |
| **23** | | 0.0002073603 | | 36.8327435228 |
| **24** | | 0.0002077118 | | 36.8253880794 |
| **25** | | 0.0001914532 | | 37.1793746779 |
| **26** | | 0.0001980627 | | 37.0319731756 |
| **27** | | 0.0002011902 | | 36.9639324355 |
| **28** | | 0.0002032845 | | 36.9189568763 |
| **29** | | 0.0002046861 | | 36.8891166420 |
| **30** | | 0.0002067018 | | 36.8465577778 |
| **31** | | 0.0002040964 | | 36.9016463644 |
| **32** | | 0.0002015627 | | 36.9558990414 |
| **33** | | 0.0002020113 | | 36.9462425004 |
| **34** | | 0.0002017127 | | 36.9526675887 |
| **35** | | 0.0002022189 | | 36.9417834388 |
| **36** | | 0.0002038653 | | 36.9065661785 |
| **37** | | 0.0001860409 | | 37.3039165088 |
| **38** | | 0.0001930577 | | 37.1431292879 |
| **39** | | 0.0001967024 | | 37.0619024018 |
| **40** | | 0.0001980779 | | 37.0316399782 |
| **41** | | 0.0002000951 | | 36.9876346411 |
| **42** | | 0.0002022746 | | 36.9405863865 |
| **43** | | 0.0002025987 | | 36.9336341956 |
| **44** | | 0.0002040195 | | 36.9032833546 |
| **45** | | 0.0002054787 | | 36.8723317674 |
| **46** | | 0.0002054752 | | 36.8724058332 |
| **47** | | 0.0002060628 | | 36.8600040294 |
| **48** | | 0.0002068977 | | 36.8424429319 |
| **49** | | 0.0001895666 | | 37.2223817490 |
| **50** | | 0.0001967368 | | 37.0611448587 |
| **Total** | | 0.0102722231 | | 1844.1609346504 |
| **Average** | | 0.0002054445 | | 36.8832186930 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000205\_05\_001092\_001124** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Mean Square Error** | | **Peak Signal-to-Noise Ratio** |
| **1** | | 0.0004473362 | | 33.4936597227 |
| **2** | | 0.0002253335 | | 36.4717423759 |
| **3** | | 0.0002205877 | | 36.5641871591 |
| **4** | | 0.0002201504 | | 36.5728055931 |
| **5** | | 0.0002197361 | | 36.5809867759 |
| **6** | | 0.0002199230 | | 36.5772931869 |
| **7** | | 0.0002196885 | | 36.5819266083 |
| **8** | | 0.0002254328 | | 36.4698292978 |
| **9** | | 0.0002234853 | | 36.5075110847 |
| **10** | | 0.0002317832 | | 36.3491806946 |
| **11** | | 0.0002304179 | | 36.3748382910 |
| **12** | | 0.0002305661 | | 36.3720455366 |
| **13** | | 0.0001761104 | | 37.5421489988 |
| **14** | | 0.0001963778 | | 37.0690770592 |
| **15** | | 0.0001951845 | | 37.0955476035 |
| **16** | | 0.0001983805 | | 37.0250112269 |
| **17** | | 0.0001979563 | | 37.0343067615 |
| **18** | | 0.0001982288 | | 37.0283334167 |
| **19** | | 0.0001983179 | | 37.0263797753 |
| **20** | | 0.0002192704 | | 36.5902001422 |
| **21** | | 0.0002284701 | | 36.4117071772 |
| **22** | | 0.0002298025 | | 36.3864524917 |
| **23** | | 0.0002290627 | | 36.4004554809 |
| **24** | | 0.0002299357 | | 36.3839352813 |
| **25** | | 0.0001866920 | | 37.2887430281 |
| **26** | | 0.0001888061 | | 37.2398400564 |
| **27** | | 0.0001885072 | | 37.2467206431 |
| **28** | | 0.0001888487 | | 37.2388602341 |
| **29** | | 0.0001887642 | | 37.2408041031 |
| **30** | | 0.0001897086 | | 37.2191309021 |
| **31** | | 0.0001895185 | | 37.2234846853 |
| **32** | | 0.0002193090 | | 36.5894354149 |
| **33** | | 0.0002171789 | | 36.6318229171 |
| **34** | | 0.0002178878 | | 36.6176713845 |
| **35** | | 0.0002173875 | | 36.6276540105 |
| **36** | | 0.0002197166 | | 36.5813720078 |
| **37** | | 0.0001912976 | | 37.1829047579 |
| **38** | | 0.0001935442 | | 37.1321991425 |
| **39** | | 0.0001930379 | | 37.1435740142 |
| **40** | | 0.0001934626 | | 37.1340290382 |
| **41** | | 0.0001934779 | | 37.1336867948 |
| **42** | | 0.0001938900 | | 37.1244463118 |
| **43** | | 0.0001944029 | | 37.1129732407 |
| **44** | | 0.0002181888 | | 36.6116748907 |
| **45** | | 0.0002202208 | | 36.5714158802 |
| **46** | | 0.0002213849 | | 36.5485204009 |
| **47** | | 0.0002208098 | | 36.5598163539 |
| **48** | | 0.0002227007 | | 36.5227843166 |
| **49** | | 0.0001932918 | | 37.1378648577 |
| **50** | | 0.0001956002 | | 37.0863060703 |
| **Total** | | 0.0106691732 | | 1837.6572971992 |
| **Average** | | 0.0002133835 | | 36.7531459440 |

# PROCESSING TIME

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **VIRAT\_S\_000200\_00\_000100\_000171** | |
| **Resolution** | | **720p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.3564956188 | | 0.3844385147 |
| **2** | 0.3189053535 | | 0.3138170242 |
| **3** | 0.3199326992 | | 0.3159360886 |
| **4** | 0.3190095425 | | 0.3116307259 |
| **5** | 0.3178412914 | | 0.3124835491 |
| **6** | 0.3180174828 | | 0.3130776882 |
| **7** | 0.3200700283 | | 0.3118333817 |
| **8** | 0.3194959164 | | 0.3140728474 |
| **9** | 0.3168516159 | | 0.3121085167 |
| **10** | 0.3198039532 | | 0.3134241104 |
| **11** | 0.3169956207 | | 0.3119378090 |
| **12** | 0.3201816082 | | 0.3161633015 |
| **13** | 0.3235201836 | | 0.3132965565 |
| **14** | 0.3186616898 | | 0.3176531792 |
| **15** | 0.3175182343 | | 0.3131132126 |
| **16** | 0.3208429813 | | 0.3131728172 |
| **17** | 0.3167302608 | | 0.3132169247 |
| **18** | 0.3187761307 | | 0.3161249161 |
| **19** | 0.3161289692 | | 0.3122854233 |
| **20** | 0.3225765228 | | 0.3154950142 |
| **21** | 0.3204617500 | | 0.3150746822 |
| **22** | 0.3200752735 | | 0.3154873848 |
| **23** | 0.3177053928 | | 0.3142409325 |
| **24** | 0.3184595108 | | 0.3135397434 |
| **25** | 0.3175787926 | | 0.3147895336 |
| **26** | 0.3202674389 | | 0.3140449524 |
| **27** | 0.3171977997 | | 0.3141989708 |
| **28** | 0.3195316792 | | 0.3139896393 |
| **29** | 0.3156225681 | | 0.3146831989 |
| **30** | 0.3187708855 | | 0.3178534508 |
| **31** | 0.3188612461 | | 0.3125510216 |
| **32** | 0.3219661713 | | 0.3140997887 |
| **33** | 0.3169112206 | | 0.3151166439 |
| **34** | 0.3198428154 | | 0.3117856979 |
| **35** | 0.3219118118 | | 0.3124103546 |
| **36** | 0.3197309971 | | 0.3144884109 |
| **37** | 0.3181080818 | | 0.3156933784 |
| **38** | 0.3171064854 | | 0.3120949268 |
| **39** | 0.3157429695 | | 0.3146913052 |
| **40** | 0.3175101280 | | 0.3134136200 |
| **41** | 0.3164863586 | | 0.3117377758 |
| **42** | 0.3191828728 | | 0.3146727085 |
| **43** | 0.3198740482 | | 0.3120596409 |
| **44** | 0.3345172405 | | 0.3140139580 |
| **45** | 0.3317987919 | | 0.3154993057 |
| **46** | 0.3328099251 | | 0.3123250008 |
| **47** | 0.3186554909 | | 0.3126802444 |
| **48** | 0.3179001808 | | 0.3139259815 |
| **49** | 0.3177475929 | | 0.3137249947 |
| **50** | 0.3188986778 | | 0.3134710789 |
| **Total** | 16.0195899010 | | 15.7636399269 |
| **Average** | 0.3203917980 | | 0.3152727985 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Encryption Algorithm** | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | **VIRAT\_S\_000200\_01\_000226\_000268** | |
| **Resolution** | | **720p** | |
| **Frame Number** | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | 0.3490478992 | | 0.3723256588 |
| **2** | 0.3175745010 | | 0.3116266727 |
| **3** | 0.3190975189 | | 0.3116431236 |
| **4** | 0.3206689358 | | 0.3121275902 |
| **5** | 0.3184051514 | | 0.3121352196 |
| **6** | 0.3194820881 | | 0.3107230663 |
| **7** | 0.3194472790 | | 0.3122491837 |
| **8** | 0.3183000088 | | 0.3106775284 |
| **9** | 0.3168439865 | | 0.3100676537 |
| **10** | 0.3209214211 | | 0.3124890327 |
| **11** | 0.3163356781 | | 0.3118414879 |
| **12** | 0.3204443455 | | 0.3118362427 |
| **13** | 0.3342072964 | | 0.3120415211 |
| **14** | 0.3205513954 | | 0.3131296635 |
| **15** | 0.3170943260 | | 0.3098604679 |
| **16** | 0.3206877708 | | 0.3148324490 |
| **17** | 0.3167157173 | | 0.3132185936 |
| **18** | 0.3204507828 | | 0.3110170364 |
| **19** | 0.3222413063 | | 0.3152945042 |
| **20** | 0.3197135925 | | 0.3126616478 |
| **21** | 0.3174281120 | | 0.3129251003 |
| **22** | 0.3201067448 | | 0.3136894703 |
| **23** | 0.3165874481 | | 0.3136422634 |
| **24** | 0.3201069832 | | 0.3135118484 |
| **25** | 0.3199260235 | | 0.3169035912 |
| **26** | 0.3198645115 | | 0.3149299622 |
| **27** | 0.3168628216 | | 0.3156266212 |
| **28** | 0.3187274933 | | 0.3132774830 |
| **29** | 0.3160722256 | | 0.3127336502 |
| **30** | 0.3213346004 | | 0.3143014908 |
| **31** | 0.3193883896 | | 0.3149483204 |
| **32** | 0.3219444752 | | 0.3148057461 |
| **33** | 0.3179349899 | | 0.3135168552 |
| **34** | 0.3204076290 | | 0.3134498596 |
| **35** | 0.3182895184 | | 0.3144941330 |
| **36** | 0.3213407993 | | 0.3154172897 |
| **37** | 0.3190217018 | | 0.3173825741 |
| **38** | 0.3198490143 | | 0.3312666416 |
| **39** | 0.3170213699 | | 0.3161218166 |
| **40** | 0.3218097687 | | 0.3119854927 |
| **41** | 0.3165555000 | | 0.3125946522 |
| **42** | 0.3215548992 | | 0.3132164478 |
| **43** | 0.3200442791 | | 0.3122878075 |
| **44** | 0.3216185570 | | 0.3388912678 |
| **45** | 0.3176238537 | | 0.3105049133 |
| **46** | 0.3209364414 | | 0.3128538132 |
| **47** | 0.3167653084 | | 0.3115458488 |
| **48** | 0.3210005760 | | 0.3119952679 |
| **49** | 0.3217430115 | | 0.3159687519 |
| **50** | 0.3203091621 | | 0.3112878799 |
| **Total** | 16.0104072094 | | 15.7578752041 |
| **Average** | 0.3202081442 | | 0.3151575041 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000200\_05\_001525\_001575** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3645942211 | | 0.3785715103 |
| **2** | | 0.3197033405 | | 0.3162922859 |
| **3** | | 0.3211820126 | | 0.3150014877 |
| **4** | | 0.3163869381 | | 0.3139572144 |
| **5** | | 0.3219013214 | | 0.3123331070 |
| **6** | | 0.3233106136 | | 0.3158109188 |
| **7** | | 0.3213446140 | | 0.3177561760 |
| **8** | | 0.3193538189 | | 0.3127248287 |
| **9** | | 0.3209643364 | | 0.3111727238 |
| **10** | | 0.3196759224 | | 0.3129334450 |
| **11** | | 0.3207337856 | | 0.3123261929 |
| **12** | | 0.3182559013 | | 0.3130595684 |
| **13** | | 0.3330080509 | | 0.3160481453 |
| **14** | | 0.3210093975 | | 0.3143036366 |
| **15** | | 0.3195495605 | | 0.3120267391 |
| **16** | | 0.3187637329 | | 0.3138072491 |
| **17** | | 0.3219234943 | | 0.3147222996 |
| **18** | | 0.3194210529 | | 0.3126015663 |
| **19** | | 0.3203568459 | | 0.3111276627 |
| **20** | | 0.3170878887 | | 0.3125646114 |
| **21** | | 0.3231589794 | | 0.3137102127 |
| **22** | | 0.3218379021 | | 0.3154845238 |
| **23** | | 0.3202610016 | | 0.3112246990 |
| **24** | | 0.3158667088 | | 0.3131322861 |
| **25** | | 0.3218719959 | | 0.3138961792 |
| **26** | | 0.3214628696 | | 0.3117215633 |
| **27** | | 0.3219430447 | | 0.3138854504 |
| **28** | | 0.3193836212 | | 0.3138785362 |
| **29** | | 0.3211984634 | | 0.3094344139 |
| **30** | | 0.3237030506 | | 0.3154199123 |
| **31** | | 0.3205103874 | | 0.3152508736 |
| **32** | | 0.3167557716 | | 0.3154191971 |
| **33** | | 0.3226075172 | | 0.3124842644 |
| **34** | | 0.3236587048 | | 0.3138501644 |
| **35** | | 0.3225400448 | | 0.3126852512 |
| **36** | | 0.3195092678 | | 0.3139889240 |
| **37** | | 0.3230409622 | | 0.3162074089 |
| **38** | | 0.3199779987 | | 0.3148291111 |
| **39** | | 0.3198938370 | | 0.3132209778 |
| **40** | | 0.3177483082 | | 0.3124508858 |
| **41** | | 0.3223185539 | | 0.3103919029 |
| **42** | | 0.3194565773 | | 0.3124747276 |
| **43** | | 0.3213832378 | | 0.3259253502 |
| **44** | | 0.3162741661 | | 0.3378622532 |
| **45** | | 0.3228282928 | | 0.3138272762 |
| **46** | | 0.3228330612 | | 0.3139305115 |
| **47** | | 0.3220152855 | | 0.3105230331 |
| **48** | | 0.3179478645 | | 0.3125786781 |
| **49** | | 0.3221278191 | | 0.3137321472 |
| **50** | | 0.3216011524 | | 0.3138327599 |
| **Total** | | 16.0842432976 | | 15.7763948441 |
| **Average** | | 0.3216848660 | | 0.3155278969 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000201\_01\_000384\_000589** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3515002728 | | 0.3742697239 |
| **2** | | 0.3186149597 | | 0.3128235340 |
| **3** | | 0.3226296902 | | 0.3185813427 |
| **4** | | 0.3201918602 | | 0.3153038025 |
| **5** | | 0.3163685799 | | 0.3128621578 |
| **6** | | 0.3203523159 | | 0.3156094551 |
| **7** | | 0.3189287186 | | 0.3122558594 |
| **8** | | 0.3205716610 | | 0.3162758350 |
| **9** | | 0.3163816929 | | 0.3171482086 |
| **10** | | 0.3249685764 | | 0.3121764660 |
| **11** | | 0.3186266422 | | 0.3187427521 |
| **12** | | 0.3235480785 | | 0.3132174015 |
| **13** | | 0.3193736076 | | 0.3147382736 |
| **14** | | 0.3204467297 | | 0.3147301674 |
| **15** | | 0.3168830872 | | 0.3152620792 |
| **16** | | 0.3325426579 | | 0.3145256042 |
| **17** | | 0.3213746548 | | 0.3139984608 |
| **18** | | 0.3194763660 | | 0.3173098564 |
| **19** | | 0.3184244633 | | 0.3135626316 |
| **20** | | 0.3201205730 | | 0.3190822601 |
| **21** | | 0.3170127869 | | 0.3140287399 |
| **22** | | 0.3196551800 | | 0.3174169064 |
| **23** | | 0.3179461956 | | 0.3308804035 |
| **24** | | 0.3207733631 | | 0.3292136192 |
| **25** | | 0.3192381859 | | 0.3304624557 |
| **26** | | 0.3187143803 | | 0.3302657604 |
| **27** | | 0.3167107105 | | 0.3224561214 |
| **28** | | 0.3208184242 | | 0.3138689995 |
| **29** | | 0.3172945976 | | 0.3144524097 |
| **30** | | 0.3212370872 | | 0.3189773560 |
| **31** | | 0.3205859661 | | 0.3176696301 |
| **32** | | 0.3202280998 | | 0.3189353943 |
| **33** | | 0.3155505657 | | 0.3153517246 |
| **34** | | 0.3193256855 | | 0.3151953220 |
| **35** | | 0.3191490173 | | 0.3210580349 |
| **36** | | 0.3214147091 | | 0.3146626949 |
| **37** | | 0.3214752674 | | 0.3173396587 |
| **38** | | 0.3230869770 | | 0.3148841858 |
| **39** | | 0.3190793991 | | 0.3135781288 |
| **40** | | 0.3216991425 | | 0.3152899742 |
| **41** | | 0.3153321743 | | 0.3146750927 |
| **42** | | 0.3212180138 | | 0.3138051033 |
| **43** | | 0.3204529285 | | 0.3117654324 |
| **44** | | 0.3185317516 | | 0.3142912388 |
| **45** | | 0.3177301884 | | 0.3137464523 |
| **46** | | 0.3182191849 | | 0.3393559456 |
| **47** | | 0.3154299259 | | 0.3143198490 |
| **48** | | 0.3228151798 | | 0.3157572746 |
| **49** | | 0.3193469048 | | 0.3122336864 |
| **50** | | 0.3186516762 | | 0.3130595684 |
| **Total** | | 16.0200488567 | | 15.9114730358 |
| **Average** | | 0.3204009771 | | 0.3182294607 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000201\_02\_000590\_000623** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3675169945 | | 0.3787584305 |
| **2** | | 0.3336532116 | | 0.3126504421 |
| **3** | | 0.3368415833 | | 0.3156728745 |
| **4** | | 0.3360929489 | | 0.3133289814 |
| **5** | | 0.3315963745 | | 0.3130364418 |
| **6** | | 0.3409006596 | | 0.3158268929 |
| **7** | | 0.3346900940 | | 0.3216991425 |
| **8** | | 0.3378086090 | | 0.3132534027 |
| **9** | | 0.3334672451 | | 0.3135423660 |
| **10** | | 0.3350360394 | | 0.3135931492 |
| **11** | | 0.3365764618 | | 0.3143134117 |
| **12** | | 0.3407051563 | | 0.3149235249 |
| **13** | | 0.3408305645 | | 0.3147828579 |
| **14** | | 0.3366181850 | | 0.3148436546 |
| **15** | | 0.3351812363 | | 0.3161585331 |
| **16** | | 0.3343474865 | | 0.3154511452 |
| **17** | | 0.3357980251 | | 0.3160855770 |
| **18** | | 0.3311073780 | | 0.3135733604 |
| **19** | | 0.3362717628 | | 0.3307070732 |
| **20** | | 0.3377299309 | | 0.3191983700 |
| **21** | | 0.3370227814 | | 0.3127095699 |
| **22** | | 0.3327159882 | | 0.3140861988 |
| **23** | | 0.3339262009 | | 0.3153238297 |
| **24** | | 0.3323450089 | | 0.3151965141 |
| **25** | | 0.3352725506 | | 0.3150186539 |
| **26** | | 0.3333029747 | | 0.3146095276 |
| **27** | | 0.3364567757 | | 0.3146090508 |
| **28** | | 0.3334400654 | | 0.3146090508 |
| **29** | | 0.3341677189 | | 0.3132402897 |
| **30** | | 0.3406586647 | | 0.3137059212 |
| **31** | | 0.3348817825 | | 0.3168528080 |
| **32** | | 0.3336384296 | | 0.3235273361 |
| **33** | | 0.3357491493 | | 0.3159282207 |
| **34** | | 0.3335301876 | | 0.3194336891 |
| **35** | | 0.3365719318 | | 0.3165147305 |
| **36** | | 0.3330543041 | | 0.3156495094 |
| **37** | | 0.3353910446 | | 0.3153030872 |
| **38** | | 0.3335878849 | | 0.3137693405 |
| **39** | | 0.3362839222 | | 0.3139379025 |
| **40** | | 0.3314166069 | | 0.3126347065 |
| **41** | | 0.3358058929 | | 0.3451743126 |
| **42** | | 0.3313984871 | | 0.3217945099 |
| **43** | | 0.3386764526 | | 0.3132030964 |
| **44** | | 0.3365986347 | | 0.3139250278 |
| **45** | | 0.3356056213 | | 0.3138825893 |
| **46** | | 0.3337910175 | | 0.3138239384 |
| **47** | | 0.3333332539 | | 0.3123567104 |
| **48** | | 0.3332614899 | | 0.3144459724 |
| **49** | | 0.3347489834 | | 0.3138964176 |
| **50** | | 0.3355019093 | | 0.3135144711 |
| **Total** | | 16.7949056625 | | 15.8640766144 |
| **Average** | | 0.3358981133 | | 0.3172815323 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000201\_03\_000640\_000672** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3575055599 | | 0.3755807877 |
| **2** | | 0.3174595833 | | 0.3120510578 |
| **3** | | 0.3211462498 | | 0.3134083748 |
| **4** | | 0.3208560944 | | 0.3133802414 |
| **5** | | 0.3160741329 | | 0.3139498234 |
| **6** | | 0.3187923431 | | 0.3152315617 |
| **7** | | 0.3201732635 | | 0.3116657734 |
| **8** | | 0.3416507244 | | 0.3117213249 |
| **9** | | 0.3176777363 | | 0.3106589317 |
| **10** | | 0.3200883865 | | 0.3143947124 |
| **11** | | 0.3157269955 | | 0.3155734539 |
| **12** | | 0.3191623688 | | 0.3105146885 |
| **13** | | 0.3309352398 | | 0.3141913414 |
| **14** | | 0.3181762695 | | 0.3146929741 |
| **15** | | 0.3160002232 | | 0.3159341812 |
| **16** | | 0.3219771385 | | 0.3139958382 |
| **17** | | 0.3152139187 | | 0.3128108978 |
| **18** | | 0.3192307949 | | 0.3128082752 |
| **19** | | 0.3199603558 | | 0.3124339581 |
| **20** | | 0.3202700615 | | 0.3129792213 |
| **21** | | 0.3170647621 | | 0.3128995895 |
| **22** | | 0.3187105656 | | 0.3120715618 |
| **23** | | 0.3160216808 | | 0.3108632565 |
| **24** | | 0.3199067116 | | 0.3130538464 |
| **25** | | 0.3179833889 | | 0.3153142929 |
| **26** | | 0.3195230961 | | 0.3129611015 |
| **27** | | 0.3153376579 | | 0.3121311665 |
| **28** | | 0.3192887306 | | 0.3141841888 |
| **29** | | 0.3175363541 | | 0.3111894131 |
| **30** | | 0.3189668655 | | 0.3153109550 |
| **31** | | 0.3191895485 | | 0.3138065338 |
| **32** | | 0.3196792603 | | 0.3143324852 |
| **33** | | 0.3159182072 | | 0.3105340004 |
| **34** | | 0.3187191486 | | 0.3149244785 |
| **35** | | 0.3147947788 | | 0.3137536049 |
| **36** | | 0.3232870102 | | 0.3151943684 |
| **37** | | 0.3208696842 | | 0.3161487579 |
| **38** | | 0.3195154667 | | 0.3112537861 |
| **39** | | 0.3169138432 | | 0.3116450310 |
| **40** | | 0.3204259872 | | 0.3134155273 |
| **41** | | 0.3162035942 | | 0.3124091625 |
| **42** | | 0.3194041252 | | 0.3163790703 |
| **43** | | 0.3190472126 | | 0.3119130135 |
| **44** | | 0.3199660778 | | 0.3150629997 |
| **45** | | 0.3159468174 | | 0.3135733604 |
| **46** | | 0.3198242188 | | 0.3126735687 |
| **47** | | 0.3168911934 | | 0.3140995502 |
| **48** | | 0.3187384605 | | 0.3137240410 |
| **49** | | 0.3191285133 | | 0.3144760132 |
| **50** | | 0.3182480335 | | 0.3131358624 |
| **Total** | | 16.0011284351 | | 15.7304120064 |
| **Average** | | 0.3200225687 | | 0.3146082401 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000203\_08\_001702\_001734** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3638606071 | | 0.3846404552 |
| **2** | | 0.3213462830 | | 0.3113269806 |
| **3** | | 0.3237066269 | | 0.3122708797 |
| **4** | | 0.3200988770 | | 0.3123703003 |
| **5** | | 0.3169920444 | | 0.3128871918 |
| **6** | | 0.3200576305 | | 0.3115861416 |
| **7** | | 0.3195779324 | | 0.3124043941 |
| **8** | | 0.3188486099 | | 0.3114256859 |
| **9** | | 0.3159847260 | | 0.3124718666 |
| **10** | | 0.3193118572 | | 0.3136537075 |
| **11** | | 0.3152630329 | | 0.3169033527 |
| **12** | | 0.3210284710 | | 0.3158936501 |
| **13** | | 0.3273036480 | | 0.3131504059 |
| **14** | | 0.3201363087 | | 0.3157274723 |
| **15** | | 0.3159182072 | | 0.3148787022 |
| **16** | | 0.3203768730 | | 0.3150603771 |
| **17** | | 0.3156189919 | | 0.3143429756 |
| **18** | | 0.3193604946 | | 0.3155100346 |
| **19** | | 0.3199968338 | | 0.3137938976 |
| **20** | | 0.3199813366 | | 0.3159248829 |
| **21** | | 0.3177464008 | | 0.3120317459 |
| **22** | | 0.3188104630 | | 0.3154723644 |
| **23** | | 0.3158862591 | | 0.3133530617 |
| **24** | | 0.3190009594 | | 0.3133778572 |
| **25** | | 0.3190059662 | | 0.3161299229 |
| **26** | | 0.3187582493 | | 0.3129761219 |
| **27** | | 0.3167924881 | | 0.3131594658 |
| **28** | | 0.3188526630 | | 0.3148550987 |
| **29** | | 0.3171465397 | | 0.3148365021 |
| **30** | | 0.3198876381 | | 0.3109412193 |
| **31** | | 0.3189051151 | | 0.3139729500 |
| **32** | | 0.3194670677 | | 0.3140461445 |
| **33** | | 0.3169617653 | | 0.3101742268 |
| **34** | | 0.3194653988 | | 0.3140079975 |
| **35** | | 0.3150069714 | | 0.3123476505 |
| **36** | | 0.3184795380 | | 0.3146214485 |
| **37** | | 0.3188934326 | | 0.3173370361 |
| **38** | | 0.3188941479 | | 0.3158433437 |
| **39** | | 0.3146681786 | | 0.3152790070 |
| **40** | | 0.3229501247 | | 0.3123965263 |
| **41** | | 0.3167977333 | | 0.3129205704 |
| **42** | | 0.3188822269 | | 0.3139278889 |
| **43** | | 0.3186635971 | | 0.3127603531 |
| **44** | | 0.3193745613 | | 0.3138413429 |
| **45** | | 0.3158514500 | | 0.3123931885 |
| **46** | | 0.3181893826 | | 0.3140709400 |
| **47** | | 0.3156104088 | | 0.3131420612 |
| **48** | | 0.3213522434 | | 0.3139791489 |
| **49** | | 0.3186309338 | | 0.3136682510 |
| **50** | | 0.3192620277 | | 0.3144118786 |
| **Total** | | 15.9829633236 | | 15.7584986687 |
| **Average** | | 0.3196592665 | | 0.3151699734 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000207\_03\_000556\_000590** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3559248447 | | 0.3911049366 |
| **2** | | 0.3184504509 | | 0.3249680996 |
| **3** | | 0.3214242458 | | 0.3277568817 |
| **4** | | 0.3191630840 | | 0.3266930580 |
| **5** | | 0.3160042763 | | 0.3280405998 |
| **6** | | 0.3246343136 | | 0.3272316456 |
| **7** | | 0.3215634823 | | 0.3253283501 |
| **8** | | 0.3194966316 | | 0.3265323639 |
| **9** | | 0.3170442581 | | 0.3260169029 |
| **10** | | 0.3208241463 | | 0.3299801350 |
| **11** | | 0.3164253235 | | 0.3274989128 |
| **12** | | 0.3211975098 | | 0.3151688576 |
| **13** | | 0.3285841942 | | 0.3147385120 |
| **14** | | 0.3239617348 | | 0.3147356510 |
| **15** | | 0.3169875145 | | 0.3148865700 |
| **16** | | 0.3204157352 | | 0.3142673969 |
| **17** | | 0.3170745373 | | 0.3150808811 |
| **18** | | 0.3198182583 | | 0.3151724339 |
| **19** | | 0.3193655014 | | 0.3129606247 |
| **20** | | 0.3210539818 | | 0.3141961098 |
| **21** | | 0.3176002502 | | 0.3167617321 |
| **22** | | 0.3201115131 | | 0.3152711391 |
| **23** | | 0.3172123432 | | 0.3134372234 |
| **24** | | 0.3198809624 | | 0.3148505688 |
| **25** | | 0.3183369637 | | 0.3174228668 |
| **26** | | 0.3209700584 | | 0.3166799545 |
| **27** | | 0.3178939819 | | 0.3160665035 |
| **28** | | 0.3205246925 | | 0.3135445118 |
| **29** | | 0.3174655437 | | 0.3129382133 |
| **30** | | 0.3217816353 | | 0.3133788109 |
| **31** | | 0.3185052872 | | 0.3155817986 |
| **32** | | 0.3200287819 | | 0.3123075962 |
| **33** | | 0.3155326843 | | 0.3148822784 |
| **34** | | 0.3208270073 | | 0.3149271011 |
| **35** | | 0.3172607422 | | 0.3153455257 |
| **36** | | 0.3224735260 | | 0.3146162033 |
| **37** | | 0.3200163841 | | 0.3172457218 |
| **38** | | 0.3192491531 | | 0.3137590885 |
| **39** | | 0.3242988586 | | 0.3139061928 |
| **40** | | 0.3186767101 | | 0.3137247562 |
| **41** | | 0.3143613338 | | 0.3148152828 |
| **42** | | 0.3204736710 | | 0.3134558201 |
| **43** | | 0.3172249794 | | 0.3158764839 |
| **44** | | 0.3192272186 | | 0.3412230015 |
| **45** | | 0.3154330254 | | 0.3144109249 |
| **46** | | 0.3195843697 | | 0.3131978512 |
| **47** | | 0.3150224686 | | 0.3126895428 |
| **48** | | 0.3191747665 | | 0.3158462048 |
| **49** | | 0.3179907799 | | 0.3156349659 |
| **50** | | 0.3174529076 | | 0.3163588047 |
| **Total** | | 16.0040066242 | | 15.9625155926 |
| **Average** | | 0.3200801325 | | 0.3192503119 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000207\_04\_000902\_000934** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3588654995 | | 0.3867614269 |
| **2** | | 0.3176224232 | | 0.3107643127 |
| **3** | | 0.3208944798 | | 0.3173596859 |
| **4** | | 0.3209192753 | | 0.3156974316 |
| **5** | | 0.3191297054 | | 0.3136484623 |
| **6** | | 0.3206145763 | | 0.3158676624 |
| **7** | | 0.3213210106 | | 0.3133244514 |
| **8** | | 0.3213005066 | | 0.3123748302 |
| **9** | | 0.3169143200 | | 0.3137793541 |
| **10** | | 0.3375670910 | | 0.3147726059 |
| **11** | | 0.3274195194 | | 0.3127512932 |
| **12** | | 0.3213398457 | | 0.3130590916 |
| **13** | | 0.3301484585 | | 0.3150889874 |
| **14** | | 0.3209948540 | | 0.3124277592 |
| **15** | | 0.3174395561 | | 0.3141210079 |
| **16** | | 0.3214273453 | | 0.3157341480 |
| **17** | | 0.3161954880 | | 0.3145368099 |
| **18** | | 0.3224036694 | | 0.3159618378 |
| **19** | | 0.3208146095 | | 0.3143389225 |
| **20** | | 0.3187999725 | | 0.3134047985 |
| **21** | | 0.3172996044 | | 0.3151526451 |
| **22** | | 0.3226346970 | | 0.3158481121 |
| **23** | | 0.3162028790 | | 0.3162088394 |
| **24** | | 0.3206586838 | | 0.3161222935 |
| **25** | | 0.3193442822 | | 0.3158214092 |
| **26** | | 0.3205373287 | | 0.3154654503 |
| **27** | | 0.3163661957 | | 0.3138422966 |
| **28** | | 0.3217444420 | | 0.3152456284 |
| **29** | | 0.3164772987 | | 0.3143250942 |
| **30** | | 0.3212263584 | | 0.3110632896 |
| **31** | | 0.3212482929 | | 0.3152871132 |
| **32** | | 0.3200836182 | | 0.3140330315 |
| **33** | | 0.3162412643 | | 0.3144552708 |
| **34** | | 0.3213324547 | | 0.3146014214 |
| **35** | | 0.3170125484 | | 0.3125326633 |
| **36** | | 0.3221254349 | | 0.3140859604 |
| **37** | | 0.3186357021 | | 0.3182518482 |
| **38** | | 0.3209328651 | | 0.3137505054 |
| **39** | | 0.3164923191 | | 0.3152923584 |
| **40** | | 0.3194603920 | | 0.3130772114 |
| **41** | | 0.3156421185 | | 0.3144960403 |
| **42** | | 0.3221242428 | | 0.3117139339 |
| **43** | | 0.3208911419 | | 0.3146305084 |
| **44** | | 0.3187916279 | | 0.3127031326 |
| **45** | | 0.3197093010 | | 0.3124017715 |
| **46** | | 0.3208158016 | | 0.3137192726 |
| **47** | | 0.3151295185 | | 0.3135726452 |
| **48** | | 0.3215866089 | | 0.3098595142 |
| **49** | | 0.3188457489 | | 0.3138346672 |
| **50** | | 0.3213300705 | | 0.3108198643 |
| **Total** | | 16.0530550480 | | 15.7779886723 |
| **Average** | | 0.3210611010 | | 0.3155597734 |
| **Encryption Algorithm** | | | **Modified Permutation Approach Using Logistic Maps-Integrated Fisher-Yates Shuffling Algorithm** | |
| **Video Stream** | | | **VIRAT\_S\_000205\_05\_001092\_001124** | |
| **Resolution** | | | **720p** | |
| **Frame Number** | | **Encryption (In seconds)** | | **Decryption (In seconds)** |
| **1** | | 0.3484871387 | | 0.3727257252 |
| **2** | | 0.3182637691 | | 0.3337285519 |
| **3** | | 0.3199479580 | | 0.3211572170 |
| **4** | | 0.3203544617 | | 0.3177762032 |
| **5** | | 0.3145723343 | | 0.3189144135 |
| **6** | | 0.3189187050 | | 0.3200361729 |
| **7** | | 0.3190274239 | | 0.3201479912 |
| **8** | | 0.3173172474 | | 0.3293321133 |
| **9** | | 0.3159763813 | | 0.3285861015 |
| **10** | | 0.3210656643 | | 0.3131721020 |
| **11** | | 0.3157835007 | | 0.3121552467 |
| **12** | | 0.3184180260 | | 0.3106753826 |
| **13** | | 0.3269696236 | | 0.3142900467 |
| **14** | | 0.3203043938 | | 0.3134486675 |
| **15** | | 0.3153269291 | | 0.3117339611 |
| **16** | | 0.3194591999 | | 0.3154096603 |
| **17** | | 0.3153789043 | | 0.3137688637 |
| **18** | | 0.3204002380 | | 0.3186826706 |
| **19** | | 0.3148140907 | | 0.3139536381 |
| **20** | | 0.3201661110 | | 0.3140320778 |
| **21** | | 0.3148856163 | | 0.3137481213 |
| **22** | | 0.3200361729 | | 0.3135735989 |
| **23** | | 0.3151578903 | | 0.3139367104 |
| **24** | | 0.3194398880 | | 0.3138754368 |
| **25** | | 0.3170690536 | | 0.3164055347 |
| **26** | | 0.3190755844 | | 0.3145132065 |
| **27** | | 0.3147704601 | | 0.3133525848 |
| **28** | | 0.3175292015 | | 0.3135821819 |
| **29** | | 0.3212857246 | | 0.3141126633 |
| **30** | | 0.3182229996 | | 0.3155448437 |
| **31** | | 0.3173265457 | | 0.3129508495 |
| **32** | | 0.3196666241 | | 0.3152670860 |
| **33** | | 0.3156468868 | | 0.3133006096 |
| **34** | | 0.3172414303 | | 0.3119931221 |
| **35** | | 0.3151197433 | | 0.3129365444 |
| **36** | | 0.3186690807 | | 0.3114895821 |
| **37** | | 0.3202025890 | | 0.3161580563 |
| **38** | | 0.3228056431 | | 0.3152279854 |
| **39** | | 0.3162784576 | | 0.3111066818 |
| **40** | | 0.3179035187 | | 0.3139445782 |
| **41** | | 0.3141405582 | | 0.3101079464 |
| **42** | | 0.3182537556 | | 0.3117334843 |
| **43** | | 0.3169548512 | | 0.3120660782 |
| **44** | | 0.3194553852 | | 0.3432548046 |
| **45** | | 0.3174710274 | | 0.3146796227 |
| **46** | | 0.3171639442 | | 0.3137443066 |
| **47** | | 0.3143918514 | | 0.3102648258 |
| **48** | | 0.3170049191 | | 0.3126926422 |
| **49** | | 0.3179142475 | | 0.3138964176 |
| **50** | | 0.3194065094 | | 0.3123688698 |
| **Total** | | 15.9314422607 | | 15.8455557823 |
| **Average** | | 0.3186288452 | | 0.3169111156 |