Inner vs. Inter City Transmission in the Hadith Social Network

Danny Halawi*1 and Mairaj Syed†2

¹Department of Computer Science, University of California, Berkeley ²Department of Religious Studies, University of California, Davis

^{*}dannyhalawi15@gmail.com

[†]msyed@ucdavis.edu

1 Hadith to Edges

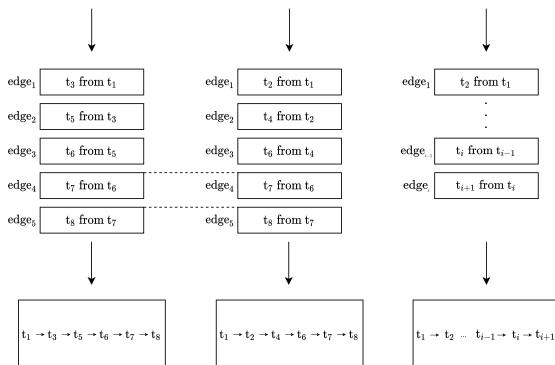
Hadith - 1

Hadith - 2

$Hadith - \alpha$

Bukhārī (id: t_8) writes: 'Ubaydallāh b. Musā (id: t_7) narrated to us, saying: Ḥanẓala b. Abī Sufyān (id: t_6) reported to us about 'Ikrima b. Khālid (id: t_5): about Ibn 'Umar (id: t_3), may God be pleased with them both, that he said that the Prophet (id: t_1), peace and blessings be upon him, said: "Islam is built on five things: testifying that there is no god but God and that Muhammad is the messenger of God, establishing daily prayer, giving the charity tax, the pilgrimage, and fasting in Ramaḍān."

Bukhārī (id: $t_{\rm g}$) writes: Ubaydallāh b. Musā (id: $t_{\rm 7}$) narrated to us, saying: Ḥanzala b. Abī Sufyān (id: $t_{\rm g}$) reported to us about al-Qāsim b. Muḥammad (id: $t_{\rm 4}$) about 'Ā'isha (id: $t_{\rm 2}$), may God be pleased with her, that she said: "the Prophet (id: $t_{\rm 1}$), peace and blessings be upon him, used to pray thirteen cycles during the night, including the witr and dawn prayers."



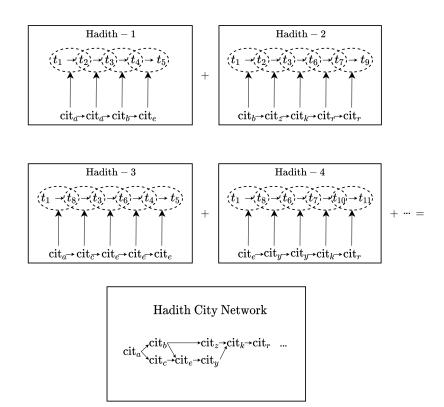
2 Edges to HSN

$$\begin{array}{c|c} \operatorname{Hadith} - 1 \\ \hline t_1 \to t_2 \to t_3 \to t_4 \to t_5 \end{array} \begin{array}{c} + \end{array} \begin{array}{c} \operatorname{Hadith} - 2 \\ \hline t_1 \to t_2 \to t_3 \to t_6 \to t_7 \to t_9 \end{array} \begin{array}{c} + \end{array}$$

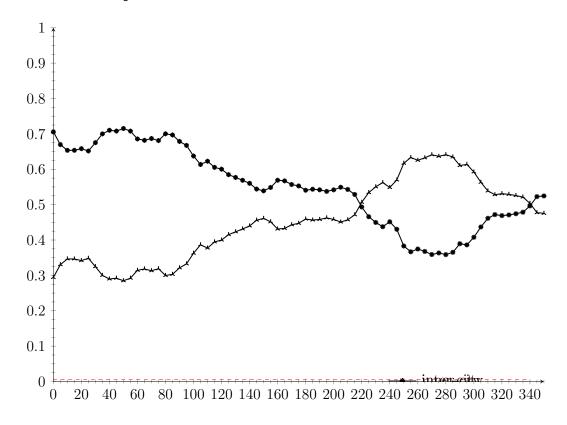
$$\begin{vmatrix} \text{Hadith} - 3 \\ t_1 \rightarrow t_8 \rightarrow t_3 \rightarrow t_6 \rightarrow t_4 \rightarrow t_5 \end{vmatrix} + \begin{vmatrix} \text{Hadith} - 4 \\ t_1 \rightarrow t_8 \rightarrow t_6 \rightarrow t_7 \rightarrow t_{10} \rightarrow t_{11} \end{vmatrix} + \cdots =$$

Hadith Social Network $t_1 < t_8 > t_3 > t_3 < t_4 \rightarrow t_5$ $t_{10} \rightarrow t_{11}$...

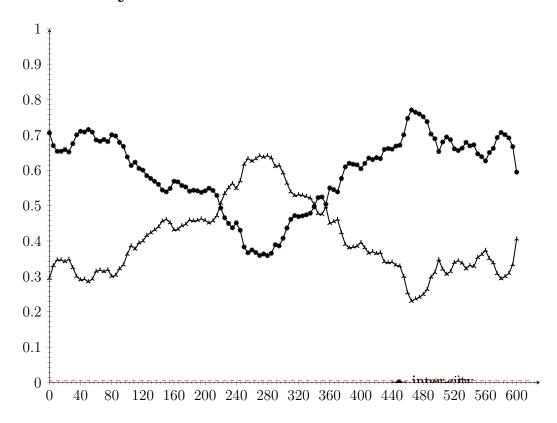
3 Edges to City Network



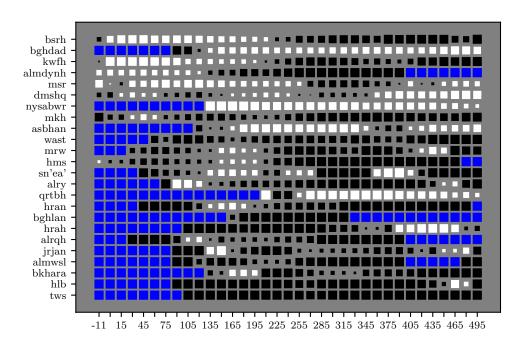
4 Bird's-eye View First 400 Years



5 Bird's-eye View First 630 Years



6 City Analysis



7 Transmitter Analysis (Inner)

year span transmitter inner inter ratio transmitter inner inter ratio -11 0 4049 2543 1 0.9996 3436 8849 4573 0.6593 0 15 4945 260 2 0.9978 5913 913 2 0.9978 30 45 5543 246 2 0.9919 5722 1021 777 0.568 45 60 4049 2543 1 0.9987 4967 3665 728 0.8342 75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 350 84 0.8072 120 135 6399 145 1 0.9932 7272			I		I	I			1	
0 15 4945 260 2 0.9924 4945 260 2 0.9978 15 30 5913 913 2 0.9978 5913 913 2 0.9978 30 45 5543 246 2 0.9919 5722 1021 777 0.568 45 60 4049 2543 1 0.9996 4396 5949 5 0.9992 60 75 4980 770 1 0.9987 4967 3665 728 0.8342 75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9932 7272 4993 <td>year</td> <td>span</td> <td>transmitter</td> <td>inner</td> <td>inter</td> <td>ratio</td> <td>transmitter</td> <td>inner</td> <td>inter</td> <td>ratio</td>	year	span	transmitter	inner	inter	ratio	transmitter	inner	inter	ratio
15 30 5913 913 2 0.9978 5913 913 2 0.9978 30 45 5543 246 2 0.9919 5722 1021 777 0.568 45 60 4049 2543 1 0.9986 4336 5949 5 0.9992 60 75 4980 770 1 0.9987 4967 3665 728 0.8342 75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9979 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9923 3436 <td< td=""><td>-11</td><td>0</td><td>4049</td><td>2543</td><td>1</td><td>0.9996</td><td>3436</td><td>8849</td><td>4573</td><td>0.6593</td></td<>	-11	0	4049	2543	1	0.9996	3436	8849	4573	0.6593
30 45 5543 246 2 0.9919 5722 1021 777 0.568 45 60 4049 2543 1 0.9996 4396 5949 5 0.9992 60 75 4980 770 1 0.9987 4967 3665 728 0.8342 75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 3500 8316 0.8075 120 135 6399 145 1 0.9932 7272 4993 3160 0.615 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436	0	15	4945	260	2	0.9924	4945	260	2	0.9924
45 60 4049 2543 1 0.9996 4396 5949 5 0.9992 60 75 4980 770 1 0.9987 4967 3665 728 0.8342 75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9932 7272 4993 3160 0.6124 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9923 3629 6202 1773 0.6593 165 180 6437 288 3 0.9877 2492	15	30	5913	913	2	0.9978	5913	913	2	0.9978
60 75 4980 770 1 0.9987 4967 3665 728 0.8342 75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9932 7272 4993 3160 0.6124 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904	30	45	5543		2	0.9919	5722	1021	777	0.568
75 90 2069 2817 5 0.9979 2069 2817 5 0.9979 90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9932 7272 4993 3160 0.6124 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9956 8160 <td>45</td> <td>60</td> <td>4049</td> <td>2543</td> <td>1</td> <td>0.9996</td> <td>4396</td> <td>5949</td> <td>5</td> <td>0.9992</td>	45	60	4049	2543	1	0.9996	4396	5949	5	0.9992
90 105 5739 659 5 0.9922 4903 1838 22 0.9877 105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9932 7272 4993 3160 0.6124 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533	60	75	4980	770	1	0.9987	4967	3665	728	0.8342
105 120 7863 3500 17 0.9949 6458 3500 834 0.8075 120 135 6399 145 1 0.9932 7272 4993 3160 0.6124 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5	75	90	2069	2817		0.9979	2069	2817	5	0.9979
120 135 6399 145 1 0.9932 7272 4993 3160 0.6124 135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5444 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9983 56	90	105	5739	659	5	0.9922	4903	1838	22	0.9877
135 150 6712 396 3 0.9925 3629 6202 1720 0.7828 150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9983 5649 6411 129 0.9802 255 270 12613 631 1 0.9968 86	105	120	7863	3500	17	0.9949	6458	3500	834	0.8075
150 165 7133 278 1 0.9929 3436 8849 4573 0.6593 165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 86	120	135	6399	145	1	0.9932	7272	4993	3160	0.6124
165 180 6437 288 3 0.9877 2492 8146 2338 0.777 180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9968 8613 2244 125 0.947 270 285 300 34407 105 1 0.9906<	135	150	6712	396	3	0.9925	3629	6202	1720	0.7828
180 195 4553 578 2 0.9953 6904 3376 67 0.9803 195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 <t< td=""><td>150</td><td>165</td><td>7133</td><td>278</td><td>1</td><td>0.9929</td><td>3436</td><td>8849</td><td>4573</td><td>0.6593</td></t<>	150	165	7133	278	1	0.9929	3436	8849	4573	0.6593
195 210 4244 295 1 0.9966 8160 6936 2066 0.7705 210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9905 12383 1437 430 0.7697 285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9977 23051 2507 641 0.7962 330 345 10437 182 3 0.9837	165	180	6437	288	3	0.9877	2492	8146	2338	0.777
210 225 5938 360 1 0.9953 4533 6210 5175 0.5454 225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9905 12383 1437 430 0.7697 285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837	180	195	4553	578	2	0.9953	6904	3376	67	0.9803
225 240 5435 594 1 0.9983 5049 6627 9838 0.4025 240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9905 12383 1437 430 0.7697 285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9958	195	210	4244	295	1	0.9966	8160	6936	2066	0.7705
240 255 5219 129 1 0.9923 6879 6411 129 0.9802 255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9905 12383 1437 430 0.7697 285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959	210	225	5938	360	1	0.9953	4533	6210	5175	0.5454
255 270 12613 631 1 0.9968 8613 2244 125 0.947 270 285 17654 119 1 0.9905 12383 1437 430 0.7697 285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955	225	240	5435	594	1	0.9983	5049	6627	9838	0.4025
270 285 17654 119 1 0.9905 12383 1437 430 0.7697 285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9889 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977	240	255	5219	129	1	0.9923	6879	6411	129	0.9802
285 300 34407 105 1 0.9906 11603 1773 1421 0.5551 300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 <t< td=""><td>255</td><td>270</td><td>12613</td><td>631</td><td>1</td><td>0.9968</td><td>8613</td><td>2244</td><td>125</td><td>0.947</td></t<>	255	270	12613	631	1	0.9968	8613	2244	125	0.947
300 315 11548 231 1 0.9957 10025 2964 8106 0.2678 315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 147	270	285	17654	119	1	0.9905	12383	1437	430	0.7697
315 330 10596 476 1 0.9979 23051 2507 641 0.7962 330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387<	285	300	34407	105	1	0.9906	11603	1773	1421	0.5551
330 345 10437 182 3 0.9837 27677 648 38 0.9435 345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 <td>300</td> <td>315</td> <td>11548</td> <td>231</td> <td>1</td> <td>0.9957</td> <td>10025</td> <td>2964</td> <td>8106</td> <td>0.2678</td>	300	315	11548	231	1	0.9957	10025	2964	8106	0.2678
345 360 22973 154 1 0.9918 28131 1515 24 0.9843 360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277	315	330	10596	476	1	0.9979	23051	2507	641	0.7962
360 375 26320 547 2 0.9959 8994 3976 40 0.9899 375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779	330	345	10437	182	3	0.9837	27677	648	38	0.9435
375 390 22975 574 2 0.9955 24549 801 612 0.5668 390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	345	360	22973	154	1	0.9918	28131	1515	24	0.9843
390 405 18175 529 1 0.9977 26123 781 9 0.9884 405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	360	375	26320	547	2	0.9959	8994	3976	40	0.9899
405 420 41612 81 1 0.9878 13204 806 12 0.985 420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	375	390	22975	574	2	0.9955	24549	801	612	0.5668
420 435 46431 91 1 0.9892 14773 744 51 0.9354 435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	390	405	18175	529	1	0.9977	26123	781	9	0.9884
435 450 29523 148 1 0.9933 28387 207 11 0.9488 450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	405	420	41612	81	1	0.9878	13204	806	12	0.985
450 465 10610 210 1 0.995 29539 494 5 0.9898 465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	420	435	46431	91	1	0.9892	14773	744	51	0.9354
465 480 46135 351 1 0.9972 21277 908 250 0.784 480 495 9601 312 3 0.9904 24779 528 38 0.9329	435	450	29523	148	1	0.9933	28387	207	11	0.9488
480 495 9601 312 3 0.9904 24779 528 38 0.9329	450	465	10610	210	1	0.995	29539	494	5	0.9898
	465	480	46135	351	1	0.9972	21277	908	250	0.784
495 510 46384 95 1 0.9896 27317 325 10 0.9687	480	495	9601	312	3	0.9904	24779	528	38	0.9329
	495	510	46384	95	1	0.9896	27317	325	10	0.9687

8 Transmitter Analysis (Inter)

year	span	transmitter	inner	inter	ratio	transmitter	inner	inter	ratio
-11	0	30371	1	768	0.9987	3795	6140	13990	0.695
0	15	6618	1	3	0.75	6618	1	3	0.75
15	30	322	1	27	0.9643	7547	109	179	0.6212
30	45	3476	1	184	0.9946	5079	122	1750	0.9344
45	60	5672	1	304	0.9967	5021	2	485	0.9949
60	75	6259	1	81	0.9878	4883	2749	2806	0.5051
75	90	4622	1	127	0.9922	3929	14	780	0.9824
90	105	720	6	220	0.9692	2840	562	606	0.5186
105	120	4002	4	276	0.9858	5625	1261	1065	0.4579
120	135	4612	1	141	0.993	7272	4993	3160	0.3876
135	150	2622	1	123	0.992	3629	6202	1720	0.2172
150	165	8621	1	100	0.9902	3795	6140	13990	0.695
165	180	2201	1	165	0.994	2492	8146	2338	0.223
180	195	2450	1	127	0.9922	4716	189	3086	0.9421
195	210	3741	3	574	0.9944	3443	4433	13741	0.7561
210	225	1326	1	172	0.9942	4533	6210	5175	0.4546
225	240	3840	1	478	0.9979	5049	6627	9838	0.5975
240	255	5390	1	353	0.9972	488	3995	12611	0.7594
255	270	448	1	250	0.996	6817	663	3268	0.8313
270	285	30371	1	768	0.9987	28612	260	1415	0.8444
285	300	9844	1	419	0.9976	24433	29	3375	0.9914
300	315	25528	1	365	0.9973	10025	2964	8106	0.7322
315	330	9869	1	113	0.9912	22334	55	791	0.9345
330	345	30623	1	222	0.9955	10289	102	1213	0.9223
345	360	9866	1	712	0.9986	31063	422	3391	0.8891
360	375	28652	1	29	0.9673	22989	947	1387	0.594
375	390	17165	3	84	0.9643	28230	191	1492	0.8861
390	405	16463	3	303	0.9897	28679	83	527	0.8638
405	420	27629	6	748	0.9908	27629	6	748	0.9908
420	435	41400	1	90	0.9891	9927	147	952	0.8658
435	450	14991	1	309	0.9968	14991	1	309	0.9968
450	465	11867	1	322	0.9969	10034	489	543	0.5261
465	480	62375	1	176	0.9944	21277	908	250	0.216
480	495	46105	1	22	0.9578	18850	25	67	0.7287
495	510	63281	1	5	0.8453	27317	325	10	0.03131