**Supplementary Materials:**

**Database**

In this work, we use the first three formants at four different times of the duration of the spoken vowel: F1, F2 and F3, at the “steady state” and at 20%, 50%, and 80% of the vowel duration respectively (i. e. 12 parameters in total). The formants data is obtained from the Hillebrand database: <https://homepages.wmich.edu/~hillenbr/voweldata/vowdata.dat>, where we have neglected any data points (speakers) in which one of the 12 parameters is 0 (which corresponds to an acquisition mistake), and we have normalized the database to have the same number of speakers per spoken vowel. The resultant formants database that is applied to the system is given in the following table (frequencies in Hz):

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | F1steady\_state | F2steady\_state | F3steady\_state | F120% | F220% | F320% | F150% | F250% | F350% | F180% | F280% | F380% |
| w01ae | 678 | 2293 | 2861 | 681 | 2295 | 2868 | 711 | 2160 | 2867 | 705 | 1968 | 2906 |
| w02ae | 624 | 2442 | 3091 | 621 | 2470 | 3042 | 755 | 2237 | 3033 | 712 | 2000 | 3069 |
| w03ae | 666 | 2370 | 2814 | 701 | 2328 | 2768 | 799 | 2074 | 2595 | 925 | 1983 | 2695 |
| w05ae | 677 | 2320 | 2987 | 678 | 2263 | 2987 | 804 | 2056 | 2808 | 806 | 1988 | 2810 |
| w06ae | 627 | 2266 | 2875 | 628 | 2224 | 2918 | 730 | 1983 | 2791 | 763 | 1788 | 2760 |
| w07ae | 690 | 2327 | 2771 | 695 | 2277 | 2837 | 805 | 2088 | 2709 | 816 | 1938 | 2753 |
| w08ae | 658 | 2650 | 3471 | 668 | 2608 | 3520 | 719 | 2268 | 3435 | 734 | 2119 | 3525 |
| w09ae | 685 | 2299 | 2930 | 688 | 2330 | 2808 | 714 | 2245 | 2975 | 774 | 1870 | 2741 |
| w10ae | 621 | 2249 | 2873 | 609 | 2261 | 2917 | 649 | 2148 | 2934 | 734 | 1826 | 2858 |
| w12ae | 682 | 2486 | 3207 | 674 | 2484 | 3140 | 694 | 2442 | 2994 | 803 | 2051 | 2762 |
| w13ae | 668 | 2252 | 2790 | 676 | 2246 | 2776 | 727 | 1921 | 2727 | 781 | 1875 | 2757 |
| w14ae | 726 | 2350 | 2996 | 697 | 2358 | 3047 | 789 | 2326 | 3055 | 812 | 2035 | 2826 |
| w15ae | 620 | 2316 | 2849 | 602 | 2378 | 2931 | 687 | 1962 | 2749 | 709 | 1774 | 2819 |
| w16ae | 634 | 2596 | 3255 | 651 | 2545 | 3169 | 778 | 2276 | 2954 | 842 | 1913 | 3064 |
| w17ae | 672 | 2145 | 2764 | 678 | 2218 | 2772 | 688 | 2136 | 2751 | 794 | 1884 | 2784 |
| w19ae | 698 | 2339 | 3075 | 691 | 2357 | 3073 | 831 | 2101 | 3008 | 889 | 1950 | 3021 |
| w20ae | 586 | 2299 | 2748 | 593 | 2299 | 2740 | 724 | 2132 | 2697 | 930 | 1817 | 2610 |
| w21ae | 616 | 2156 | 2865 | 616 | 2151 | 2865 | 676 | 1997 | 2821 | 746 | 1874 | 2867 |
| w23ae | 674 | 2256 | 2818 | 669 | 2297 | 2795 | 772 | 2131 | 2712 | 791 | 2008 | 2877 |
| w24ae | 738 | 2378 | 3305 | 737 | 2417 | 3316 | 754 | 2233 | 3270 | 816 | 2140 | 3263 |
| w25ae | 646 | 2406 | 3283 | 652 | 2322 | 3268 | 802 | 2084 | 3154 | 776 | 1935 | 3083 |
| w27ae | 734 | 2518 | 3176 | 728 | 2530 | 3177 | 727 | 2504 | 3095 | 835 | 2028 | 3029 |
| w29ae | 696 | 2447 | 3122 | 700 | 2456 | 3136 | 747 | 2344 | 3013 | 982 | 2027 | 2830 |
| w30ae | 687 | 2378 | 2913 | 703 | 2379 | 2942 | 922 | 2125 | 2926 | 902 | 1858 | 2995 |
| w31ae | 645 | 2154 | 3139 | 671 | 2166 | 3036 | 749 | 2098 | 3030 | 756 | 1920 | 2931 |
| w32ae | 626 | 2374 | 2836 | 620 | 2373 | 2795 | 747 | 2090 | 2600 | 779 | 1871 | 2559 |
| w34ae | 557 | 2586 | 3202 | 606 | 2514 | 2902 | 689 | 2104 | 2802 | 731 | 1916 | 2854 |
| w35ae | 668 | 2296 | 2711 | 666 | 2281 | 2685 | 745 | 2078 | 2654 | 769 | 1871 | 2680 |
| w36ae | 746 | 2371 | 2984 | 746 | 2385 | 2983 | 789 | 2204 | 2999 | 807 | 1944 | 2915 |
| w38ae | 665 | 2408 | 3034 | 659 | 2436 | 3026 | 734 | 2114 | 2950 | 747 | 2005 | 2859 |
| w41ae | 625 | 2594 | 3146 | 625 | 2625 | 3158 | 653 | 2464 | 3146 | 773 | 2080 | 3187 |
| w42ae | 552 | 2227 | 2978 | 569 | 2204 | 3004 | 654 | 2070 | 2844 | 766 | 1746 | 2809 |
| w45ae | 657 | 2192 | 2654 | 649 | 2235 | 2698 | 754 | 2028 | 2574 | 880 | 1809 | 2706 |
| w46ae | 649 | 2508 | 3050 | 612 | 2532 | 2973 | 736 | 2419 | 3082 | 824 | 2126 | 3018 |
| w48ae | 626 | 2331 | 2826 | 623 | 2266 | 2852 | 735 | 1897 | 2817 | 741 | 1811 | 2888 |
| w49ae | 706 | 2400 | 2923 | 724 | 2327 | 2929 | 754 | 2244 | 2940 | 697 | 2084 | 3077 |
| w50ae | 751 | 2432 | 2896 | 750 | 2432 | 2896 | 816 | 2093 | 2927 | 829 | 2044 | 2973 |
| w01ah | 1012 | 1603 | 2767 | 1001 | 1637 | 2762 | 1058 | 1692 | 2801 | 886 | 1784 | 2807 |
| w02ah | 883 | 1682 | 2962 | 908 | 1677 | 2903 | 885 | 1706 | 3048 | 783 | 1863 | 3081 |
| w03ah | 1025 | 1548 | 2748 | 1053 | 1574 | 2748 | 1014 | 1619 | 2745 | 970 | 1787 | 2900 |
| w05ah | 935 | 1377 | 2598 | 938 | 1423 | 2626 | 961 | 1499 | 2615 | 864 | 1697 | 2640 |
| w07ah | 939 | 1233 | 2564 | 920 | 1191 | 2670 | 942 | 1237 | 2560 | 884 | 1476 | 2721 |
| w09ah | 913 | 1436 | 2589 | 913 | 1436 | 2589 | 961 | 1496 | 2624 | 905 | 1597 | 2604 |
| w10ah | 856 | 1540 | 2667 | 855 | 1467 | 2625 | 840 | 1541 | 2687 | 804 | 1701 | 2831 |
| w11ah | 882 | 1380 | 2834 | 933 | 1458 | 2872 | 877 | 1421 | 2827 | 838 | 1571 | 2784 |
| w13ah | 869 | 1495 | 2731 | 897 | 1525 | 2748 | 929 | 1545 | 2716 | 817 | 1736 | 2753 |
| w14ah | 994 | 1609 | 2930 | 997 | 1613 | 2934 | 996 | 1663 | 2867 | 927 | 1745 | 2786 |
| w15ah | 955 | 1615 | 2678 | 908 | 1640 | 2628 | 947 | 1623 | 2682 | 803 | 1743 | 2726 |
| w16ah | 1085 | 1687 | 2870 | 1149 | 1762 | 2890 | 1072 | 1733 | 2898 | 775 | 1910 | 2973 |
| w17ah | 937 | 1623 | 2844 | 939 | 1617 | 2844 | 941 | 1608 | 2870 | 838 | 1658 | 2860 |
| w19ah | 918 | 1640 | 2801 | 939 | 1584 | 2687 | 918 | 1640 | 2801 | 890 | 1899 | 2867 |
| w20ah | 818 | 1351 | 2933 | 842 | 1320 | 2935 | 922 | 1384 | 2971 | 814 | 1585 | 2872 |
| w22ah | 1008 | 1495 | 3018 | 998 | 1482 | 3065 | 1005 | 1498 | 3016 | 912 | 1573 | 2952 |
| w23ah | 905 | 1514 | 2848 | 930 | 1494 | 2849 | 851 | 1536 | 2817 | 735 | 1896 | 2885 |
| w24ah | 1063 | 1680 | 2785 | 1042 | 1667 | 2791 | 1042 | 1740 | 2965 | 993 | 1808 | 3152 |
| w25ah | 1053 | 1677 | 2868 | 1066 | 1679 | 2866 | 994 | 1649 | 2841 | 898 | 1797 | 2744 |
| w28ah | 863 | 1538 | 3038 | 863 | 1538 | 3038 | 866 | 1625 | 3078 | 771 | 1920 | 3118 |
| w29ah | 938 | 1462 | 2825 | 914 | 1395 | 2836 | 1064 | 1469 | 2797 | 1030 | 1697 | 2836 |
| w30ah | 957 | 1591 | 2733 | 967 | 1579 | 2713 | 903 | 1637 | 2697 | 896 | 1797 | 2785 |
| w31ah | 827 | 1543 | 2980 | 878 | 1591 | 3082 | 823 | 1566 | 2958 | 822 | 1684 | 2889 |
| w33ah | 1163 | 1685 | 3250 | 1152 | 1676 | 3352 | 1117 | 1707 | 3357 | 1046 | 2078 | 3433 |
| w34ah | 1011 | 1541 | 2803 | 1013 | 1548 | 2798 | 980 | 1616 | 2815 | 931 | 1808 | 2852 |
| w35ah | 1035 | 1486 | 2865 | 1026 | 1490 | 2866 | 1004 | 1538 | 2817 | 946 | 1676 | 2754 |
| w36ah | 952 | 1676 | 2862 | 939 | 1616 | 2909 | 892 | 1681 | 2906 | 825 | 1836 | 2928 |
| w37ah | 810 | 1314 | 3236 | 833 | 1238 | 3279 | 838 | 1330 | 3170 | 907 | 1719 | 3115 |
| w38ah | 993 | 1671 | 2751 | 997 | 1671 | 2758 | 928 | 1647 | 2724 | 810 | 1819 | 2859 |
| w39ah | 931 | 1348 | 2698 | 958 | 1301 | 2603 | 947 | 1363 | 2671 | 873 | 1646 | 2723 |
| w41ah | 875 | 1491 | 2979 | 890 | 1513 | 2984 | 864 | 1537 | 3000 | 847 | 1782 | 2933 |
| w42ah | 884 | 1568 | 2819 | 900 | 1612 | 2812 | 880 | 1561 | 2820 | 869 | 1722 | 2917 |
| w44ah | 938 | 1492 | 2673 | 942 | 1492 | 2677 | 954 | 1531 | 2641 | 834 | 1627 | 2730 |
| w45ah | 914 | 1383 | 2854 | 944 | 1379 | 2810 | 930 | 1438 | 2829 | 907 | 1651 | 2817 |
| w46ah | 901 | 1509 | 2670 | 956 | 1515 | 2783 | 909 | 1613 | 2679 | 846 | 1743 | 2709 |
| w47ah | 975 | 1534 | 2658 | 963 | 1473 | 2607 | 975 | 1534 | 2658 | 845 | 1635 | 2671 |
| w50ah | 968 | 1433 | 2850 | 965 | 1427 | 2844 | 944 | 1520 | 2864 | 898 | 1849 | 2821 |
| w01aw | 815 | 1200 | 2783 | 815 | 1200 | 2783 | 844 | 1193 | 2833 | 831 | 1414 | 2825 |
| w02aw | 760 | 1225 | 2796 | 762 | 1227 | 2818 | 774 | 1375 | 2842 | 770 | 1772 | 2843 |
| w03aw | 772 | 1051 | 2870 | 766 | 1053 | 2936 | 788 | 1067 | 2732 | 843 | 1415 | 2621 |
| w04aw | 770 | 1245 | 2811 | 747 | 1242 | 2785 | 771 | 1239 | 2811 | 759 | 1423 | 2812 |
| w06aw | 778 | 1220 | 2677 | 817 | 1275 | 2903 | 778 | 1211 | 2675 | 783 | 1374 | 2795 |
| w07aw | 809 | 1097 | 2646 | 736 | 1085 | 2621 | 814 | 1164 | 2653 | 820 | 1395 | 2547 |
| w08aw | 815 | 1426 | 2990 | 842 | 1435 | 3037 | 819 | 1429 | 2955 | 800 | 1667 | 3106 |
| w10aw | 771 | 1170 | 2760 | 758 | 1182 | 2733 | 791 | 1265 | 2868 | 789 | 1601 | 2820 |
| w11aw | 755 | 1114 | 2766 | 739 | 1116 | 2802 | 792 | 1135 | 2752 | 843 | 1253 | 2680 |
| w13aw | 697 | 1142 | 2507 | 699 | 1154 | 2538 | 735 | 1419 | 2641 | 711 | 1738 | 2639 |
| w14aw | 748 | 1063 | 2876 | 765 | 1101 | 2870 | 777 | 1053 | 2826 | 878 | 1441 | 2747 |
| w15aw | 827 | 1189 | 2633 | 838 | 1225 | 2641 | 848 | 1370 | 2693 | 803 | 1621 | 2733 |
| w16aw | 847 | 1192 | 2999 | 863 | 1233 | 2961 | 844 | 1185 | 2996 | 921 | 1492 | 2982 |
| w17aw | 794 | 1185 | 2896 | 777 | 1001 | 2844 | 794 | 1181 | 2884 | 830 | 1420 | 2864 |
| w19aw | 848 | 1175 | 2892 | 848 | 1182 | 2883 | 846 | 1182 | 2980 | 881 | 1646 | 2939 |
| w20aw | 713 | 1132 | 2948 | 690 | 1038 | 3270 | 713 | 1132 | 2948 | 728 | 1506 | 2895 |
| w21aw | 698 | 1127 | 2886 | 698 | 1133 | 2896 | 696 | 1159 | 2869 | 707 | 1446 | 2888 |
| w22aw | 736 | 1120 | 3055 | 714 | 1025 | 3066 | 762 | 1159 | 3051 | 834 | 1471 | 3004 |
| w23aw | 835 | 1326 | 2667 | 834 | 1319 | 2623 | 819 | 1301 | 2609 | 765 | 1662 | 2698 |
| w25aw | 811 | 1254 | 2824 | 777 | 1167 | 2769 | 811 | 1254 | 2824 | 805 | 1619 | 2846 |
| w28aw | 860 | 1504 | 2834 | 871 | 1474 | 2780 | 867 | 1539 | 2871 | 789 | 1866 | 3031 |
| w29aw | 740 | 1037 | 2736 | 742 | 1034 | 2710 | 877 | 1182 | 2774 | 927 | 1595 | 2920 |
| w31aw | 776 | 1324 | 2852 | 797 | 1217 | 2870 | 769 | 1303 | 2815 | 768 | 1457 | 2753 |
| w32aw | 699 | 1104 | 2513 | 728 | 1090 | 2463 | 705 | 1176 | 2513 | 732 | 1620 | 2557 |
| w34aw | 814 | 1144 | 2729 | 791 | 1161 | 2703 | 813 | 1297 | 2725 | 744 | 1667 | 2735 |
| w35aw | 801 | 1187 | 2935 | 783 | 1190 | 2909 | 862 | 1190 | 2902 | 840 | 1473 | 2803 |
| w36aw | 822 | 1177 | 2950 | 828 | 1137 | 2946 | 831 | 1243 | 2968 | 844 | 1724 | 2983 |
| w37aw | 851 | 1105 | 3249 | 843 | 1081 | 3254 | 878 | 1207 | 3279 | 901 | 1424 | 3183 |
| w38aw | 825 | 1213 | 2751 | 841 | 1248 | 2792 | 849 | 1485 | 2880 | 755 | 1941 | 2929 |
| w39aw | 752 | 1101 | 2616 | 713 | 1058 | 2674 | 750 | 1094 | 2628 | 782 | 1482 | 2610 |
| w42aw | 799 | 1146 | 2770 | 869 | 1236 | 2771 | 873 | 1302 | 2782 | 861 | 1507 | 2749 |
| w44aw | 715 | 963 | 2455 | 711 | 1007 | 2449 | 709 | 1298 | 2406 | 703 | 1548 | 2622 |
| w45aw | 790 | 1044 | 2933 | 815 | 1018 | 2934 | 785 | 1047 | 2888 | 867 | 1529 | 2760 |
| w46aw | 850 | 1182 | 2909 | 855 | 1188 | 2906 | 856 | 1335 | 2923 | 818 | 1643 | 2934 |
| w47aw | 813 | 1117 | 2585 | 799 | 1097 | 2561 | 837 | 1162 | 2600 | 793 | 1513 | 2699 |
| w48aw | 736 | 1098 | 2821 | 736 | 1103 | 2778 | 721 | 1231 | 2839 | 723 | 1557 | 2814 |
| w49aw | 677 | 1054 | 3278 | 674 | 1066 | 3264 | 818 | 1179 | 3209 | 748 | 1655 | 3204 |
| w01er | 470 | 1437 | 1672 | 464 | 1437 | 1659 | 460 | 1398 | 1741 | 499 | 1508 | 1982 |
| w02er | 500 | 1441 | 1914 | 493 | 1456 | 1914 | 449 | 1596 | 1998 | 439 | 1694 | 2068 |
| w04er | 619 | 1716 | 2138 | 620 | 1714 | 2138 | 612 | 1779 | 2117 | 575 | 1863 | 2176 |
| w05er | 494 | 1485 | 1863 | 503 | 1469 | 1911 | 496 | 1529 | 1938 | 499 | 1680 | 1990 |
| w07er | 518 | 1604 | 1912 | 568 | 1645 | 2429 | 559 | 1569 | 2019 | 505 | 1586 | 1863 |
| w09er | 503 | 1480 | 1735 | 524 | 1457 | 1854 | 503 | 1488 | 1682 | 537 | 1577 | 1863 |
| w10er | 495 | 1596 | 1973 | 510 | 1559 | 1840 | 489 | 1601 | 1978 | 482 | 1603 | 1985 |
| w11er | 567 | 1496 | 1803 | 569 | 1486 | 1853 | 562 | 1511 | 1867 | 552 | 1759 | 2016 |
| w12er | 501 | 1555 | 1938 | 511 | 1570 | 1932 | 484 | 1554 | 1943 | 467 | 1589 | 1937 |
| w13er | 531 | 1688 | 1971 | 553 | 1683 | 1944 | 511 | 1691 | 2013 | 507 | 1759 | 2045 |
| w14er | 506 | 1604 | 1915 | 514 | 1617 | 1925 | 504 | 1618 | 1917 | 444 | 1685 | 1840 |
| w15er | 484 | 1652 | 1928 | 497 | 1634 | 1922 | 472 | 1633 | 1954 | 460 | 1859 | 1972 |
| w16er | 597 | 1588 | 1905 | 612 | 1585 | 1913 | 542 | 1610 | 1871 | 462 | 1668 | 1930 |
| w17er | 491 | 1506 | 1727 | 483 | 1516 | 1739 | 461 | 1504 | 1723 | 444 | 1515 | 1802 |
| w19er | 524 | 1547 | 2066 | 584 | 1624 | 2068 | 523 | 1518 | 2103 | 500 | 1626 | 2134 |
| w22er | 505 | 1568 | 1845 | 505 | 1568 | 1845 | 508 | 1596 | 1851 | 516 | 1755 | 1950 |
| w23er | 508 | 1687 | 1913 | 526 | 1696 | 1883 | 460 | 1695 | 1961 | 440 | 1754 | 1973 |
| w24er | 538 | 1813 | 2236 | 554 | 1666 | 2131 | 546 | 1799 | 2194 | 537 | 1818 | 2220 |
| w25er | 617 | 1565 | 1930 | 556 | 1545 | 2049 | 617 | 1564 | 1927 | 604 | 1681 | 1981 |
| w26er | 522 | 1490 | 2094 | 556 | 1396 | 2075 | 514 | 1474 | 2078 | 497 | 1622 | 2106 |
| w27er | 507 | 1749 | 2028 | 514 | 1752 | 2049 | 508 | 1768 | 1991 | 536 | 1846 | 2116 |
| w28er | 514 | 1831 | 2192 | 552 | 1739 | 2153 | 509 | 1841 | 2200 | 498 | 1940 | 2389 |
| w29er | 580 | 1407 | 1837 | 580 | 1407 | 1837 | 582 | 1398 | 1775 | 536 | 1633 | 2017 |
| w31er | 555 | 1491 | 1998 | 560 | 1502 | 2044 | 550 | 1532 | 2000 | 549 | 1674 | 2096 |
| w33er | 549 | 1749 | 2209 | 553 | 1750 | 2220 | 554 | 1759 | 2242 | 560 | 1888 | 2258 |
| w34er | 461 | 1534 | 1878 | 499 | 1535 | 1863 | 450 | 1543 | 1878 | 437 | 1697 | 1970 |
| w35er | 537 | 1509 | 1682 | 541 | 1520 | 1705 | 497 | 1562 | 1733 | 456 | 1606 | 1809 |
| w36er | 492 | 1635 | 1871 | 484 | 1641 | 1933 | 460 | 1591 | 1841 | 434 | 1617 | 1870 |
| w37er | 455 | 1769 | 2070 | 487 | 1785 | 2108 | 446 | 1759 | 2054 | 437 | 1905 | 2157 |
| w38er | 656 | 1614 | 2008 | 679 | 1620 | 2058 | 588 | 1705 | 1988 | 566 | 1793 | 2041 |
| w40er | 584 | 1486 | 1783 | 600 | 1491 | 1804 | 563 | 1487 | 1792 | 494 | 1556 | 1867 |
| w45er | 537 | 1638 | 1932 | 537 | 1679 | 1936 | 534 | 1631 | 1930 | 512 | 1710 | 1957 |
| w46er | 500 | 1637 | 1928 | 508 | 1690 | 1912 | 499 | 1631 | 1938 | 490 | 1757 | 2065 |
| w47er | 456 | 1615 | 1826 | 456 | 1620 | 1864 | 493 | 1616 | 1927 | 501 | 1696 | 2017 |
| w48er | 604 | 1441 | 1835 | 592 | 1432 | 1817 | 538 | 1459 | 1686 | 470 | 1550 | 1817 |
| w49er | 513 | 1569 | 1869 | 461 | 1584 | 2109 | 446 | 1548 | 1860 | 499 | 1567 | 1981 |
| w50er | 503 | 1766 | 1956 | 613 | 1676 | 1961 | 498 | 1695 | 1979 | 437 | 1888 | 2152 |
| w01ih | 496 | 2260 | 3027 | 494 | 2266 | 2976 | 497 | 2259 | 3044 | 500 | 2308 | 3084 |
| w02ih | 446 | 2444 | 2956 | 444 | 2443 | 2934 | 448 | 2418 | 3010 | 487 | 2354 | 3051 |
| w03ih | 486 | 2332 | 2925 | 497 | 2332 | 2925 | 560 | 2209 | 2924 | 557 | 2188 | 2975 |
| w04ih | 502 | 2391 | 3071 | 500 | 2410 | 3084 | 557 | 2289 | 3102 | 545 | 2201 | 3170 |
| w05ih | 497 | 2379 | 3074 | 490 | 2357 | 3036 | 542 | 2181 | 3010 | 548 | 2070 | 3038 |
| w06ih | 531 | 2174 | 2984 | 476 | 2158 | 3005 | 517 | 2125 | 2989 | 492 | 1964 | 2947 |
| w07ih | 535 | 2380 | 2930 | 535 | 2380 | 2930 | 556 | 2238 | 2812 | 556 | 2111 | 2971 |
| w09ih | 500 | 2272 | 3028 | 499 | 2281 | 2927 | 501 | 2246 | 3024 | 515 | 2167 | 3041 |
| w10ih | 471 | 2277 | 2884 | 484 | 2317 | 2954 | 493 | 2199 | 2919 | 507 | 2039 | 3006 |
| w11ih | 453 | 2427 | 2932 | 542 | 2304 | 2932 | 588 | 2092 | 2887 | 595 | 2030 | 2985 |
| w14ih | 491 | 2316 | 2934 | 495 | 2429 | 3063 | 505 | 2317 | 2863 | 562 | 2208 | 2972 |
| w15ih | 485 | 2129 | 2967 | 489 | 2133 | 2965 | 457 | 2115 | 2965 | 459 | 2076 | 2887 |
| w17ih | 474 | 2362 | 2830 | 474 | 2362 | 2830 | 565 | 2170 | 2869 | 587 | 1973 | 2938 |
| w19ih | 501 | 2355 | 3161 | 501 | 2329 | 3158 | 497 | 2261 | 3086 | 508 | 2185 | 3093 |
| w20ih | 449 | 2173 | 2840 | 452 | 2171 | 2836 | 519 | 2278 | 2891 | 553 | 2138 | 2944 |
| w21ih | 458 | 2143 | 2986 | 445 | 2216 | 2954 | 486 | 2115 | 2949 | 499 | 1983 | 2936 |
| w22ih | 440 | 2394 | 3136 | 449 | 2394 | 3054 | 501 | 2348 | 3097 | 555 | 2172 | 3059 |
| w23ih | 535 | 2134 | 2929 | 524 | 2156 | 2880 | 547 | 2134 | 2925 | 473 | 2098 | 2893 |
| w24ih | 516 | 2567 | 3485 | 529 | 2608 | 3420 | 521 | 2528 | 3479 | 551 | 2401 | 3495 |
| w25ih | 552 | 2453 | 3346 | 552 | 2476 | 3323 | 611 | 2334 | 3228 | 605 | 2280 | 3312 |
| w26ih | 455 | 2304 | 2999 | 449 | 2305 | 3000 | 446 | 2252 | 2914 | 495 | 2183 | 2870 |
| w27ih | 515 | 2378 | 3063 | 500 | 2466 | 3132 | 500 | 2254 | 3219 | 510 | 2193 | 3187 |
| w28ih | 504 | 2334 | 3063 | 510 | 2300 | 3054 | 562 | 2182 | 3116 | 509 | 2216 | 3320 |
| w30ih | 501 | 2449 | 3185 | 503 | 2446 | 3188 | 556 | 2270 | 3109 | 557 | 2141 | 3157 |
| w31ih | 431 | 2190 | 3060 | 428 | 2195 | 3053 | 524 | 2086 | 3007 | 561 | 1988 | 3051 |
| w32ih | 478 | 2157 | 2793 | 467 | 2214 | 2813 | 547 | 2109 | 2725 | 557 | 2014 | 2748 |
| w33ih | 556 | 2541 | 3684 | 532 | 2628 | 3644 | 565 | 2538 | 3738 | 570 | 2416 | 3745 |
| w34ih | 486 | 2454 | 3106 | 480 | 2446 | 3091 | 486 | 2360 | 3084 | 484 | 2220 | 3111 |
| w36ih | 486 | 2253 | 3212 | 444 | 2409 | 3201 | 478 | 2298 | 3216 | 483 | 2299 | 3178 |
| w37ih | 440 | 2453 | 3123 | 447 | 2423 | 3110 | 545 | 2242 | 3068 | 561 | 2121 | 3071 |
| w40ih | 501 | 2292 | 2863 | 502 | 2285 | 2863 | 552 | 2265 | 2884 | 557 | 2210 | 2926 |
| w42ih | 489 | 2175 | 2990 | 469 | 2130 | 3018 | 471 | 2105 | 3003 | 489 | 2050 | 3087 |
| w44ih | 451 | 2247 | 2929 | 444 | 2240 | 2891 | 471 | 2109 | 2865 | 497 | 1874 | 2812 |
| w45ih | 442 | 2316 | 2899 | 441 | 2310 | 2890 | 501 | 2221 | 2804 | 554 | 2146 | 2786 |
| w47ih | 444 | 2237 | 2711 | 445 | 2270 | 2748 | 554 | 2085 | 2737 | 573 | 1933 | 2726 |
| w48ih | 498 | 2234 | 2876 | 490 | 2224 | 2884 | 550 | 2179 | 2875 | 518 | 2060 | 2937 |
| w50ih | 499 | 2384 | 3091 | 496 | 2342 | 3086 | 580 | 2113 | 2939 | 589 | 2052 | 2961 |
| w01iy | 441 | 2806 | 3260 | 446 | 2767 | 3193 | 441 | 2815 | 3260 | 439 | 2822 | 3264 |
| w02iy | 435 | 2890 | 3667 | 437 | 2939 | 3679 | 435 | 2884 | 3663 | 434 | 2879 | 3593 |
| w03iy | 380 | 2703 | 3087 | 433 | 2716 | 3060 | 380 | 2703 | 3087 | 369 | 2700 | 2999 |
| w04iy | 428 | 2767 | 3627 | 430 | 2771 | 3728 | 428 | 2785 | 3619 | 430 | 2774 | 3540 |
| w05iy | 346 | 2703 | 3510 | 341 | 2697 | 3471 | 325 | 2727 | 3510 | 328 | 2707 | 3416 |
| w06iy | 439 | 2676 | 3291 | 446 | 2532 | 3287 | 437 | 2690 | 3283 | 439 | 2585 | 3068 |
| w07iy | 394 | 2689 | 3058 | 410 | 2710 | 3064 | 389 | 2801 | 3058 | 392 | 2688 | 3068 |
| w08iy | 493 | 2967 | 3496 | 499 | 2891 | 3614 | 493 | 2967 | 3496 | 496 | 2887 | 3404 |
| w09iy | 442 | 2850 | 3157 | 474 | 2744 | 3311 | 426 | 2815 | 3069 | 321 | 2876 | 3072 |
| w10iy | 477 | 2866 | 3236 | 486 | 2847 | 3099 | 477 | 2871 | 3238 | 468 | 2820 | 3220 |
| w11iy | 408 | 2627 | 3064 | 435 | 2597 | 3118 | 419 | 2656 | 3028 | 410 | 2630 | 3008 |
| w12iy | 435 | 2868 | 3625 | 446 | 2861 | 3662 | 435 | 2863 | 3703 | 433 | 2828 | 3605 |
| w13iy | 438 | 2813 | 3532 | 476 | 2895 | 3509 | 438 | 2822 | 3472 | 439 | 2761 | 3439 |
| w14iy | 440 | 2706 | 3404 | 438 | 2694 | 3389 | 436 | 2751 | 3285 | 421 | 2749 | 3168 |
| w15iy | 455 | 2797 | 3129 | 440 | 2767 | 3142 | 446 | 2779 | 3135 | 466 | 2851 | 3143 |
| w16iy | 443 | 2944 | 3546 | 448 | 2957 | 3555 | 439 | 2913 | 3567 | 441 | 2908 | 3459 |
| w17iy | 429 | 2698 | 3509 | 432 | 2678 | 3508 | 429 | 2708 | 3450 | 432 | 2661 | 3319 |
| w19iy | 492 | 2695 | 3371 | 496 | 2595 | 3301 | 496 | 2698 | 3355 | 486 | 2680 | 3346 |
| w21iy | 434 | 2512 | 2998 | 432 | 2505 | 3022 | 434 | 2511 | 2993 | 437 | 2493 | 2869 |
| w22iy | 435 | 2621 | 3116 | 436 | 2604 | 3163 | 433 | 2628 | 3073 | 435 | 2577 | 3043 |
| w23iy | 433 | 2634 | 3307 | 433 | 2621 | 3294 | 435 | 2631 | 3295 | 444 | 2673 | 3029 |
| w24iy | 531 | 2996 | 3831 | 520 | 3027 | 3816 | 524 | 3007 | 3806 | 533 | 3000 | 3600 |
| w27iy | 497 | 2795 | 3266 | 497 | 2819 | 3245 | 498 | 2769 | 3253 | 508 | 2824 | 3202 |
| w30iy | 452 | 2754 | 3511 | 482 | 2850 | 3572 | 453 | 2755 | 3540 | 466 | 2786 | 3365 |
| w32iy | 433 | 2720 | 3035 | 435 | 2692 | 3041 | 423 | 2741 | 3019 | 408 | 2660 | 3039 |
| w33iy | 505 | 2982 | 3741 | 504 | 2984 | 3739 | 505 | 3039 | 3717 | 495 | 3006 | 3774 |
| w34iy | 434 | 2854 | 3614 | 437 | 2907 | 3595 | 432 | 2831 | 3684 | 434 | 2858 | 3669 |
| w35iy | 426 | 2775 | 3535 | 428 | 2787 | 3560 | 421 | 2748 | 3531 | 425 | 2810 | 3505 |
| w36iy | 424 | 2692 | 3336 | 426 | 2714 | 3439 | 424 | 2692 | 3336 | 428 | 2701 | 3230 |
| w37iy | 380 | 2816 | 3312 | 396 | 2831 | 3322 | 382 | 2828 | 3335 | 382 | 2818 | 3314 |
| w40iy | 383 | 2733 | 3326 | 407 | 2637 | 3278 | 380 | 2714 | 3282 | 379 | 2740 | 3179 |
| w41iy | 438 | 2964 | 3632 | 447 | 3033 | 3623 | 439 | 3007 | 3679 | 439 | 2967 | 3626 |
| w42iy | 427 | 2772 | 3762 | 369 | 2797 | 3708 | 434 | 2761 | 3794 | 446 | 2859 | 3859 |
| w46iy | 331 | 3049 | 3736 | 332 | 3057 | 3750 | 363 | 2980 | 3772 | 373 | 2996 | 3620 |
| w48iy | 489 | 2641 | 2952 | 490 | 2653 | 2882 | 491 | 2688 | 2944 | 497 | 2622 | 2913 |
| w49iy | 419 | 2874 | 3367 | 398 | 2885 | 3382 | 395 | 2860 | 3408 | 365 | 2899 | 3495 |
| w50iy | 437 | 2778 | 3139 | 437 | 2823 | 3423 | 436 | 2805 | 3129 | 430 | 2839 | 3153 |
| w01uw | 503 | 1068 | 2810 | 513 | 1122 | 2860 | 504 | 1075 | 2801 | 487 | 1125 | 2865 |
| w05uw | 455 | 994 | 2612 | 453 | 990 | 2611 | 446 | 997 | 2676 | 406 | 1064 | 2651 |
| w06uw | 437 | 1113 | 2676 | 438 | 1115 | 2682 | 434 | 1088 | 2685 | 440 | 1143 | 2673 |
| w07uw | 384 | 1084 | 2929 | 427 | 1032 | 2907 | 384 | 1137 | 2939 | 432 | 1298 | 2962 |
| w09uw | 504 | 1096 | 2665 | 500 | 1163 | 2751 | 500 | 1066 | 2679 | 443 | 1136 | 2729 |
| w10uw | 473 | 1113 | 2626 | 493 | 1161 | 2627 | 472 | 1116 | 2644 | 477 | 1177 | 2678 |
| w12uw | 477 | 998 | 2690 | 494 | 1116 | 2978 | 477 | 998 | 2690 | 480 | 1035 | 2802 |
| w13uw | 445 | 1136 | 2692 | 494 | 1211 | 2645 | 457 | 1177 | 2641 | 445 | 1161 | 2714 |
| w14uw | 483 | 1117 | 2707 | 488 | 1120 | 2706 | 452 | 1120 | 2741 | 426 | 1067 | 2692 |
| w15uw | 466 | 778 | 2699 | 368 | 843 | 2630 | 509 | 815 | 2716 | 472 | 946 | 2750 |
| w16uw | 440 | 1122 | 2856 | 453 | 1173 | 2823 | 440 | 1122 | 2856 | 441 | 1195 | 2893 |
| w17uw | 436 | 911 | 2724 | 447 | 974 | 2723 | 436 | 916 | 2744 | 434 | 975 | 2720 |
| w19uw | 506 | 1030 | 2575 | 518 | 1034 | 2586 | 506 | 1030 | 2575 | 501 | 1011 | 2587 |
| w20uw | 360 | 1034 | 2731 | 376 | 1011 | 2798 | 373 | 1046 | 2777 | 365 | 1046 | 2753 |
| w21uw | 491 | 1260 | 2502 | 489 | 1263 | 2505 | 497 | 1175 | 2501 | 506 | 1064 | 2549 |
| w22uw | 391 | 971 | 2945 | 427 | 1025 | 2920 | 391 | 959 | 2953 | 426 | 1053 | 2954 |
| w23uw | 431 | 1003 | 2366 | 436 | 1016 | 2375 | 427 | 996 | 2387 | 431 | 1056 | 2340 |
| w24uw | 525 | 1065 | 2942 | 546 | 1102 | 2980 | 538 | 1082 | 2950 | 530 | 1084 | 2925 |
| w26uw | 445 | 881 | 2580 | 442 | 890 | 2642 | 375 | 938 | 2593 | 317 | 955 | 2496 |
| w27uw | 503 | 963 | 2776 | 502 | 963 | 2776 | 503 | 983 | 2725 | 504 | 1349 | 2745 |
| w28uw | 508 | 1001 | 2763 | 503 | 1288 | 2801 | 510 | 1035 | 2755 | 518 | 1082 | 2847 |
| w30uw | 502 | 1050 | 2695 | 502 | 1039 | 2700 | 507 | 1102 | 2752 | 486 | 1120 | 2813 |
| w31uw | 488 | 1119 | 2702 | 494 | 1131 | 2675 | 445 | 1109 | 2742 | 381 | 1307 | 2648 |
| w32uw | 477 | 1184 | 2610 | 477 | 1184 | 2623 | 440 | 1125 | 2754 | 426 | 1195 | 2703 |
| w33uw | 504 | 1068 | 3121 | 497 | 1095 | 3078 | 504 | 1064 | 3201 | 470 | 1118 | 3161 |
| w34uw | 483 | 938 | 2835 | 496 | 995 | 2863 | 485 | 950 | 2848 | 485 | 950 | 2861 |
| w37uw | 437 | 1178 | 2852 | 438 | 1174 | 2871 | 435 | 1179 | 2820 | 435 | 1111 | 2843 |
| w38uw | 504 | 1041 | 2838 | 503 | 1107 | 2804 | 503 | 1043 | 2816 | 514 | 1076 | 2916 |
| w39uw | 429 | 827 | 2719 | 417 | 916 | 2688 | 425 | 815 | 2704 | 435 | 930 | 2668 |
| w40uw | 438 | 1078 | 2774 | 438 | 1078 | 2774 | 435 | 1011 | 2698 | 437 | 1024 | 2757 |
| w41uw | 450 | 916 | 2959 | 455 | 919 | 2664 | 445 | 930 | 2885 | 443 | 1012 | 2944 |
| w42uw | 474 | 974 | 2540 | 445 | 1243 | 2562 | 473 | 974 | 2544 | 489 | 986 | 2518 |
| w44uw | 430 | 954 | 2491 | 430 | 940 | 2485 | 452 | 1014 | 2526 | 479 | 1004 | 2611 |
| w45uw | 415 | 1001 | 2556 | 436 | 978 | 2548 | 418 | 1000 | 2546 | 405 | 1005 | 2577 |
| w47uw | 482 | 987 | 2781 | 494 | 1006 | 2727 | 483 | 969 | 2821 | 493 | 1026 | 2727 |
| w48uw | 458 | 1163 | 2651 | 488 | 1192 | 2643 | 462 | 1161 | 2687 | 460 | 1174 | 2662 |
| w49uw | 467 | 993 | 2802 | 438 | 934 | 2752 | 387 | 785 | 2704 | 363 | 824 | 2757 |

We perform two linear combinations of these formants in order to obtained two characteristic frequencies (FA and FB) in the range of operation of the spin torque nano-oscillators (between 325 MHz and 380 MHz):

FA=A1⋅F1steady\_state+B1⋅F2steady\_state+C1⋅F3steady\_state+D1⋅F120%+E1⋅F220%+G1⋅F320%+H1⋅F150%+I1⋅F250%+J1⋅F350%+ K1⋅F180%+L1⋅F280%+M1⋅F380%+N1

FB=A2⋅F1steady\_state+B2⋅F2steady\_state+C2⋅F3steady\_state+D2⋅F120%+E2⋅F220%+G2⋅F320%+H2⋅F150%+I2⋅F250%+J2⋅F350%+ K2⋅F180%+L2⋅F280%+M2⋅F380%+N2

Table I shows the coefficients used in the two linear combinations and table II shows the two characteristic frequencies obtained.

|  |  |  |  |
| --- | --- | --- | --- |
| FA | | FB | |
| A1 | 434.12796 | A2 | -2132.59467 |
| B1 | 3876.66394 | B2 | 3471.05641 |
| C1 | -2720.95643 | C2 | 1761.05172 |
| D1 | 23736.72522 | D2 | -14515.22882 |
| E1 | -8692.08149 | E2 | 3704.32823 |
| G1 | 1978.73518 | G2 | -117.44496 |
| H1 | 4297.31026 | H2 | 3038.31175 |
| I1 | -149.58903 | I2 | 1409.6298 |
| J1 | -23.0464 | J2 | -80.14666 |
| K1 | 6447.12594 | K2 | 5676.35479 |
| L1 | 5821.65047 | L2 | 2441.92994 |
| M1 | -2904.5703 | M2 | -3344.9537 |
| N1 | 3.27684⋅108 | N2 | 3.38139⋅108 |

Table I: Coefficients used in the linear combinations of the formants to obtain two characteristic frequencies in the range of operation of the spin torque nano-oscillators.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| FA (ae) [MHz] | FB (ae) [MHz] | FA (ah) [MHz] | FB (ah) [MHz] | FA (aw) [MHz] | FB (aw) [MHz] | FA (er) [MHz] | FB (er) [MHz] | FA (ih) [MHz] | FB (ih) [MHz] | FA (iy) [MHz] | FB (iy) [MHz] | FA (uw) [MHz] | FB (uw) [MHz] |
| 341.202 | 352.033 | 353.979 | 342.999 | 348.306 | 340.495 | 338.682 | 346.576 | 335.773 | 353.739 | 333.914 | 359.592 | 335.788 | 340.846 |
| 338.461 | 354.37 | 349.672 | 343.539 | 348.231 | 342.098 | 339.443 | 346.623 | 333.895 | 355.973 | 331.681 | 360.381 | 334.759 | 340.585 |
| 344.129 | 354.246 | 355.69 | 341.701 | 348.347 | 340.785 | 343.384 | 348.371 | 335.988 | 354.563 | 333.197 | 358.937 | 334.287 | 342.225 |
| 342.869 | 353.345 | 353.078 | 341.888 | 345.716 | 341.44 | 340.614 | 347.222 | 334.937 | 354.619 | 332.204 | 359.113 | 334.152 | 341.772 |
| 340.355 | 352.765 | 352.856 | 339.597 | 347.551 | 340.259 | 342.114 | 347.789 | 334.603 | 354.496 | 329.142 | 359.194 | 335.574 | 341.256 |
| 343.415 | 352.966 | 352.329 | 342.644 | 347.586 | 341.352 | 341.493 | 346.991 | 334.591 | 352.597 | 334.744 | 358.205 | 335.817 | 341.874 |
| 338.452 | 354.254 | 349.687 | 342.828 | 348.031 | 341.842 | 339.404 | 347.849 | 336.214 | 354.117 | 332.645 | 359.157 | 335.179 | 340.457 |
| 341.135 | 353.02 | 350.815 | 341.282 | 347.531 | 341.383 | 343.17 | 346.699 | 335.13 | 353.643 | 335.466 | 360.464 | 334.862 | 341.997 |
| 338.891 | 352.704 | 350.976 | 343.042 | 346.305 | 341.011 | 339.4 | 347.61 | 334.193 | 353.493 | 335.515 | 359.13 | 334.912 | 341.252 |
| 341.155 | 355.65 | 353.84 | 343.268 | 347.098 | 342.336 | 340.905 | 348.424 | 337.083 | 353.938 | 334.746 | 359.905 | 332.736 | 340.339 |
| 341.846 | 352.114 | 350.742 | 343.657 | 347.759 | 340.868 | 340.073 | 348.442 | 335.192 | 354.963 | 334.181 | 358.185 | 333.651 | 341.997 |
| 342.881 | 353.841 | 356.324 | 340.831 | 350.01 | 340.87 | 340.249 | 348.983 | 335.248 | 352.325 | 332.232 | 359.61 | 333.772 | 340.11 |
| 337.905 | 353.159 | 350.99 | 342.943 | 349.482 | 340.336 | 342.58 | 346.502 | 334.441 | 354.716 | 332.542 | 359.353 | 336.878 | 340.62 |
| 339.369 | 355.673 | 352.757 | 343.704 | 348.581 | 340.2 | 338.93 | 347.336 | 335.065 | 354.119 | 333.692 | 359.257 | 331.92 | 341.531 |
| 341.644 | 351.744 | 349.436 | 341.971 | 350.413 | 340.42 | 340.589 | 346.557 | 335.329 | 353.942 | 334.723 | 359.997 | 335.515 | 343.068 |
| 342.18 | 353.473 | 353.066 | 341.204 | 346.066 | 340.837 | 340.752 | 348.352 | 333.15 | 353.338 | 332.701 | 360.879 | 332.374 | 340.529 |
| 340.611 | 355.27 | 351.683 | 341.857 | 344.293 | 340.772 | 339.704 | 348.518 | 333.583 | 355.831 | 332.695 | 358.699 | 335.3 | 341.732 |
| 340.041 | 351.908 | 354.769 | 342.22 | 346.384 | 340.892 | 341.372 | 349.183 | 336.44 | 352.173 | 335.589 | 357.558 | 336.628 | 340.499 |
| 341.869 | 352.867 | 355.459 | 342.599 | 349.488 | 341.619 | 342.89 | 347.898 | 334.191 | 355.835 | 334.331 | 357.456 | 334.021 | 339.399 |
| 342.349 | 352.625 | 349.382 | 343.111 | 348.574 | 341.463 | 341.629 | 345.953 | 336.241 | 354.949 | 333.894 | 358.1 | 338.202 | 340.921 |
| 340.494 | 353.587 | 353.824 | 343.339 | 350.116 | 342.477 | 340.122 | 349.837 | 334.288 | 354.953 | 334.125 | 358.901 | 333.896 | 341.384 |
| 341.768 | 354.389 | 353.15 | 342.921 | 348.877 | 341.218 | 340.715 | 348.974 | 333.958 | 354.227 | 334.847 | 361.205 | 336.3 | 340.662 |
| 343.152 | 355.605 | 348.973 | 343.352 | 347.894 | 341.361 | 342.919 | 345.478 | 335.33 | 353.047 | 335.629 | 359.604 | 336.127 | 341.638 |
| 342.614 | 353.522 | 358.625 | 341.384 | 347.628 | 341.244 | 341.835 | 346.708 | 334.58 | 355.035 | 333.643 | 359.228 | 335.112 | 341.979 |
| 341.254 | 351.861 | 354.745 | 342.16 | 348.874 | 340.907 | 341.109 | 349.343 | 333.355 | 353.895 | 333.729 | 358.856 | 334.211 | 340.347 |
| 340.383 | 354.94 | 355.049 | 341.669 | 347.955 | 341.474 | 339.544 | 347.439 | 335.367 | 353.922 | 334.068 | 360.346 | 334.83 | 339.595 |
| 337.672 | 355.858 | 351.823 | 343.2 | 350.308 | 340.576 | 341.091 | 346.803 | 333.572 | 355.449 | 331.449 | 359.665 | 333.196 | 342.403 |
| 341.689 | 352.875 | 349.961 | 341.874 | 348.92 | 339.318 | 338.671 | 348.536 | 333.879 | 355.139 | 332.222 | 359.201 | 335.131 | 340.71 |
| 343.005 | 352.53 | 352.892 | 342.46 | 350.919 | 341.193 | 338.571 | 349.837 | 332.727 | 354.842 | 332.998 | 358.956 | 333.044 | 339.947 |
| 340.463 | 354.072 | 353.661 | 340.643 | 347.267 | 341.157 | 345.255 | 346.577 | 333.571 | 355.999 | 331.504 | 360.129 | 333.448 | 341.431 |
| 337.92 | 355.643 | 350.347 | 342.93 | 350.136 | 340.567 | 342.675 | 345.815 | 336.641 | 354.319 | 332.934 | 359.067 | 333.366 | 339.627 |
| 338.126 | 353.381 | 350.03 | 343.267 | 346.743 | 340.194 | 340.572 | 348.582 | 334.543 | 352.253 | 331.821 | 361.097 | 332.99 | 342.193 |
| 341.785 | 352.867 | 352.02 | 341.984 | 350.021 | 339.892 | 339.399 | 348.637 | 332.999 | 353.814 | 329.839 | 359.556 | 334.826 | 340.906 |
| 339.444 | 356.151 | 352.651 | 341.475 | 350.167 | 340.291 | 338.683 | 349.011 | 334.803 | 355.651 | 328.57 | 362.986 | 334.245 | 340.833 |
| 339.78 | 352.538 | 353.027 | 342.384 | 349.276 | 340.141 | 342.571 | 345.514 | 334.477 | 354.615 | 336.024 | 358.363 | 335.627 | 340.46 |
| 342.621 | 351.85 | 353.143 | 342.004 | 346.365 | 340.617 | 338.479 | 348.132 | 335.514 | 353.342 | 331.178 | 360.082 | 335.449 | 342.288 |
| 343.687 | 352.809 | 354.158 | 341.97 | 344.752 | 341.369 | 342.688 | 347.357 | 335.507 | 354.862 | 334.234 | 359.945 | 332.449 | 339.22 |

Table II: Characteristic frequencies obtained from the linear combinations. Two microwave signals with these characteristic frequencies are used as inputs to our experimental network of coupled nano-oscillators.