

Antenna Composite Gain Test Report

1. Test Information

Equipment	EMT
Brand Name	Nokia
Model Name	G-1426G-F
Applicant	Nokia
Manufacturer	Nokia

2. Testing Location

Testing Location	
AOT Kunshan Lab	ADD: 289 Jinghua Road, Shipai, Bacheng Town, Kunshan City, Jiangsu Province

Test Condition	Test Engineer	Test Environment (°C / %)	Test Date	Signature
Radiated	Changgan Lai	20-24 / 45-60	03.30.2025~03.30.2025	Changgan Lai

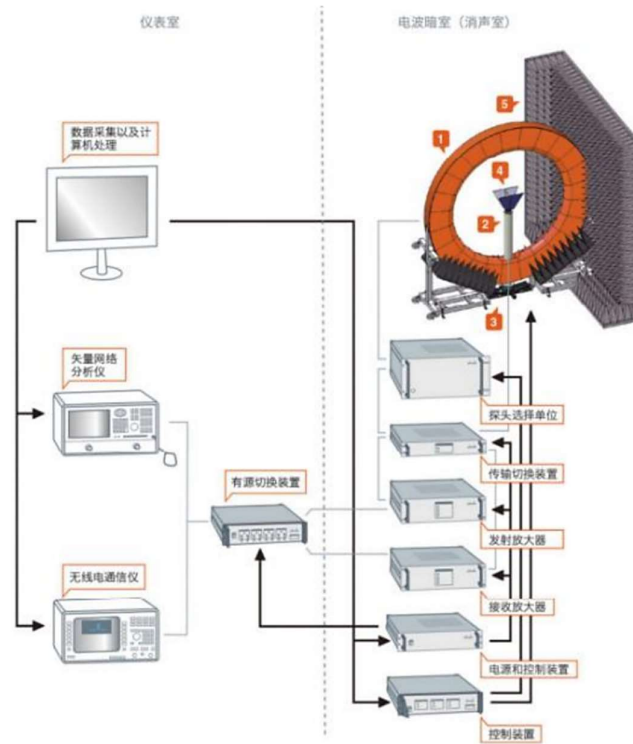
3. Test Frequency

Band (MHz)	Test Frequency (MHz)
2400-2500	2400/2450/2500
5150-5850	5150/5500/5850

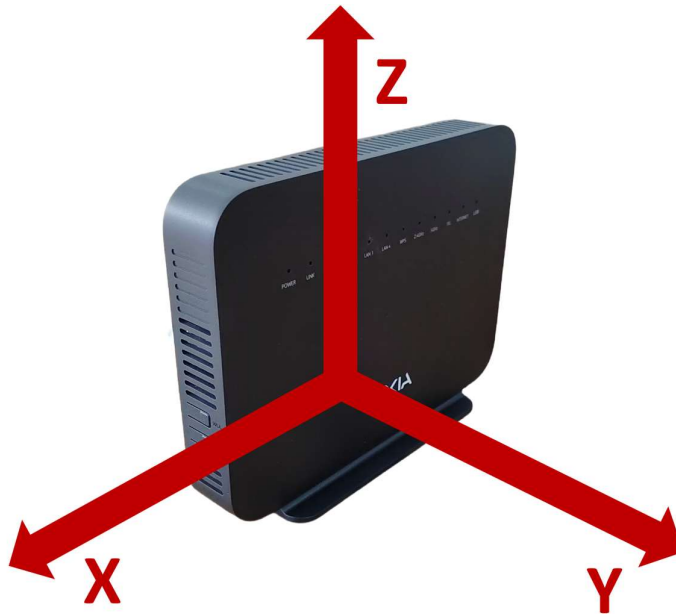
4. Antenna Information

Ant. Position	Brand Name	Model Name	Ant. Type	Connector
Antenna 1 (2.4G)	Nokia	ANT-P2425-N31	Dipole	I-PEX
Antenna 2 (5G)	Nokia	ANT-P5158-N22	Dipole	I-PEX
Antenna 3 (5G)	Nokia	ANT-P5158-N23	Dipole	I-PEX
Antenna 4 (2.4G)	Nokia	ANT-P2425-N32	Dipole	I-PEX

5. Test Configuration



6. Reference Calibration





CALIBRATION PASS

CAL.DATA: 2025.2.10

NEXT CAL.DATA: 2026.2.9

7. Test Method

The “great circle” cut method, whereby the Measurement Antenna remains fixed and the EUT is rotated about two axes in sequential order. The radiated RF performance of the Equipment Under Test (EUT) is measured by sampling the radiated transmit power of the mobile at various locations surrounding the device. A three-dimensional characterization of the 'transmit' performance of the EUT is pieced together by analyzing the data from the spatially distributed measurements.

Data points taken every 2 degrees in the theta and in the phi axes are deemed sufficient to fully characterize the EUT's Far-Field radiation pattern and total radiated power. All of the measured power values will be integrated.

8. Measured Values and Calculation of Correlated /

Uncorrelated Gains

Antenna Peak Gain Table (Ant. Position: 2.4G Ant.1,Ant.4)

Band (MHz)	2400-2500		
Frequency (MHz)	2400	2450	2500
Ant.1 Max Gain (dBi)	4.20	3.23	3.65
Ant.4 Max Gain (dBi)	3.94	3.79	3.47
Max Gain (dBi)	4.20	3.79	3.65

Antenna Peak Gain Table (Ant. Position: 5G Ant.2~3)

Band (MHz)	5150-5850		
Frequency (MHz)	5150	5500	5850
Ant.2 Max Gain (dBi)	3.59	3.19	2.91
Ant.3 Max Gain (dBi)	2.58	3.01	2.73
Max Gain (dBi)	3.59	3.19	2.91

Because the antennas are fixed in location within the device the directional antenna gain for MIMO is calculated over a sphere using the raw spatial data taken at 2 degree steps of theta and 10 degree of theta phi for each antenna using the equations from KDB 662911 D01. The raw antenna data is located in the appendix of this report.

The correlated antenna gain was calculated using KDB 662911 D01F(2)(f)(ii) for CDD and KDB 662911 D01, F(2)(e)(ii) for TxBF.

The uncorrelated antenna gain was calculated using KDB 662911 D01F(2)(d)(ii) for SDM.

The correlated and uncorrelated gains were calculated for each point in the spatial data and the highest values reported.

(ii) If antenna gains are not equal, the user may use either of the following methods to calculate directional gain. provided that each transmit antenna s driven by only one spatial stream.

- Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ur} set equal to the gain of the antenna having the highest gain, or.

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

If all transmit signals are completely uncorrelated, then

$$Directional\ gain = 10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10})/N_{ANT}] \text{ dBi}$$

Maximum Correlated / Uncorrelated Gain Calculation

Correlated Gain

(Ant. Position: 2.4G Ant.1,Ant.4)

Frequency (MHz)	2400	2450	2500
Ant.1 Gain(dBi)	2.72	2.01	2.03
Ant.4 Gain(dBi)	2.96	3.54	3.45
Phi (°)	100	106	108
Theta (°)	-82	-86	-88
Correlated Gain	5.85	5.82	5.78

(Ant. Position: 5G Ant.2~3)

Frequency (MHz)	5150	5500	5850
Ant.2 Gain(dBi)	2.25	3.07	2.91
Ant.3 Gain(dBi)	2.43	2.78	2.72
Phi (°)	130	172	6
Theta (°)	102	-86	-100
Correlated Gain	5.35	5.94	5.83

Calculation example

$$10 \times \log\{[10^{(2.72\text{dBi} / 20)} + 10^{(2.96\text{ dBi} / 20)}]^2 / 2\} = 5.85\text{dBi}$$

Uncorrelated Gain**(Ant. Position: 2.4G Ant.1,Ant.4)**

Frequency (MHz)	2400	2450	2500
Ant.1 Gain(dBi)	2.72	1.80	2.03
Ant.4 Gain(dBi)	2.96	3.68	3.45
Phi (°)	100	108	108
Theta (°)	-82	-86	-88
Uncorrelated Gain	2.84	2.84	2.80

(Ant. Position: 5G Ant.2~3)

Frequency (MHz)	5150	5500	5850
Ant.2 Gain(dBi)	2.25	3.07	2.91
Ant.3 Gain(dBi)	2.44	2.78	2.72
Phi (°)	130	172	6
Theta (°)	102	-86	-100
Uncorrelated Gain	2.35	2.93	2.82

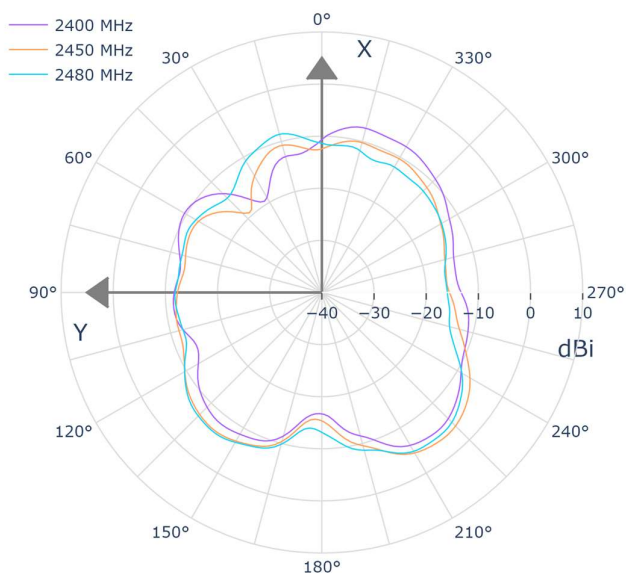
Calculation example

$$=10 \times \log_{10}(((10^{(2.72 \text{ dBi} / 10)} + 10^{(2.96 \text{ dBi} / 10)})) / 2) = 2.84 \text{ dBi}$$

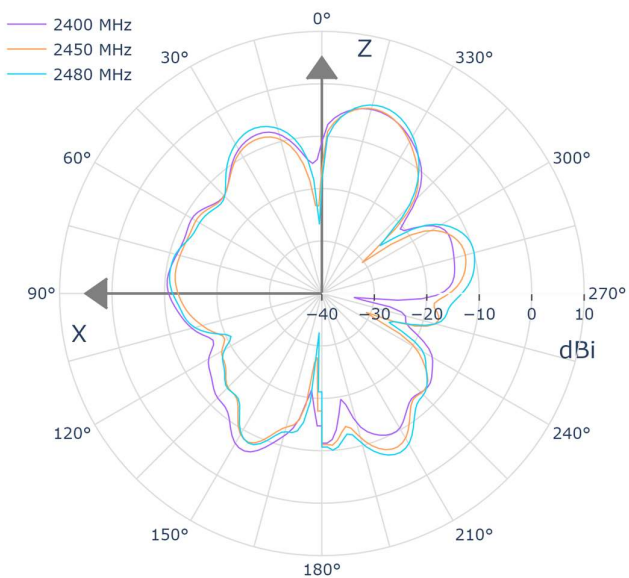
9. Radiation Pattern

Ant. Position: 2.4G Ant.1,Ant4

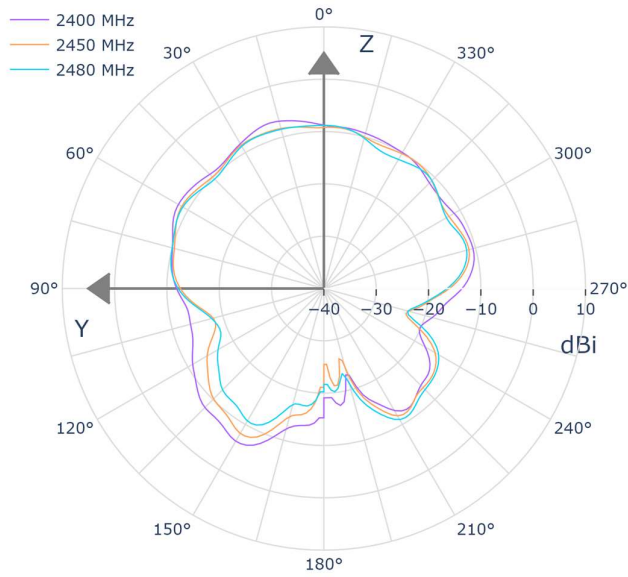
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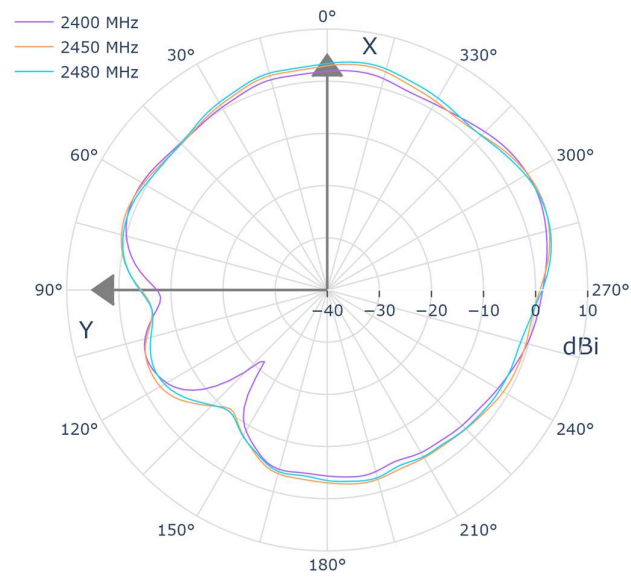
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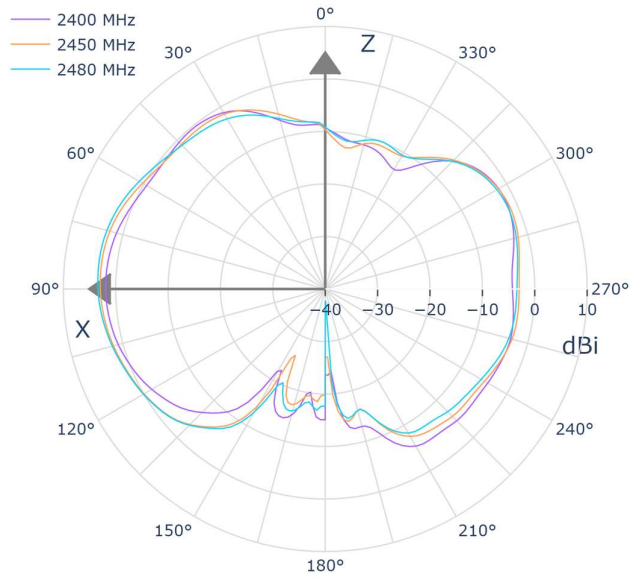
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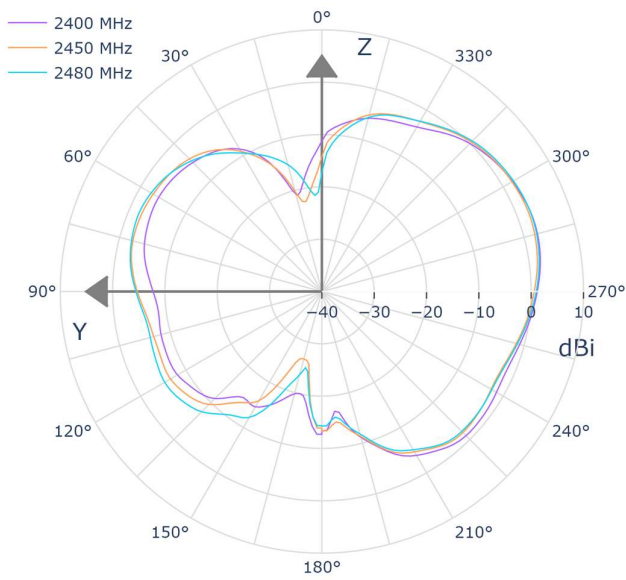
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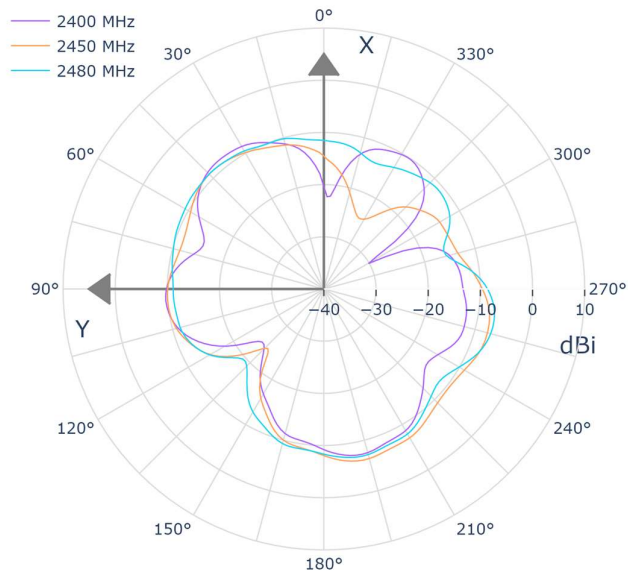
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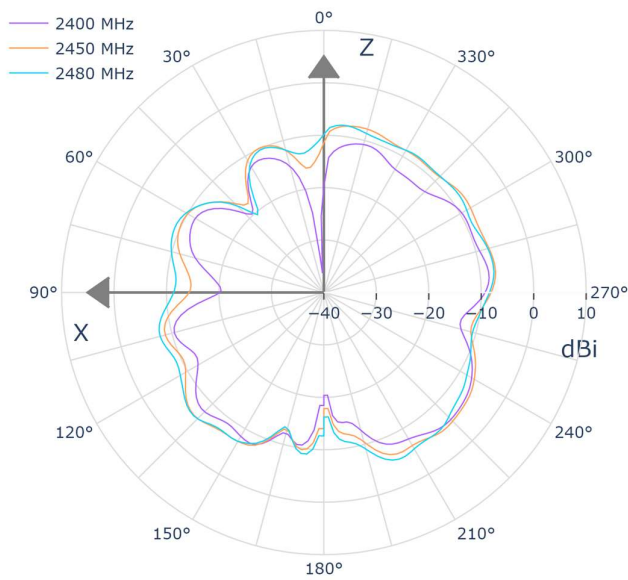
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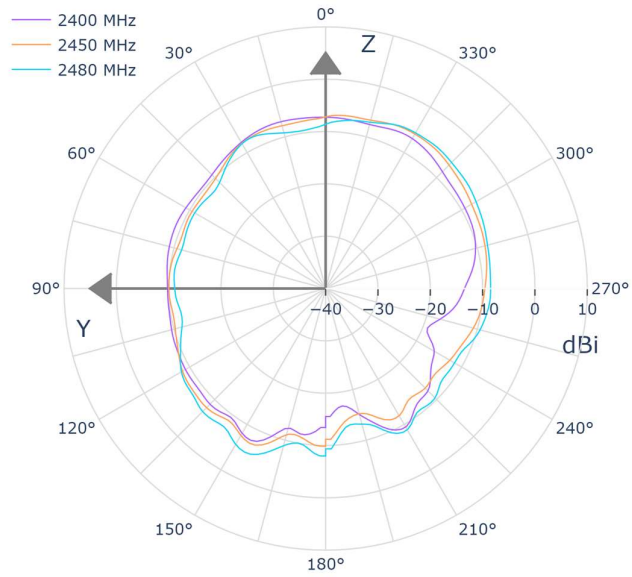
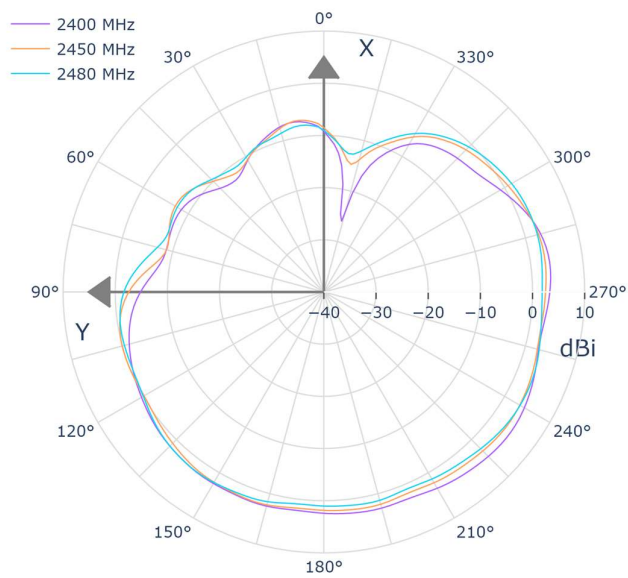


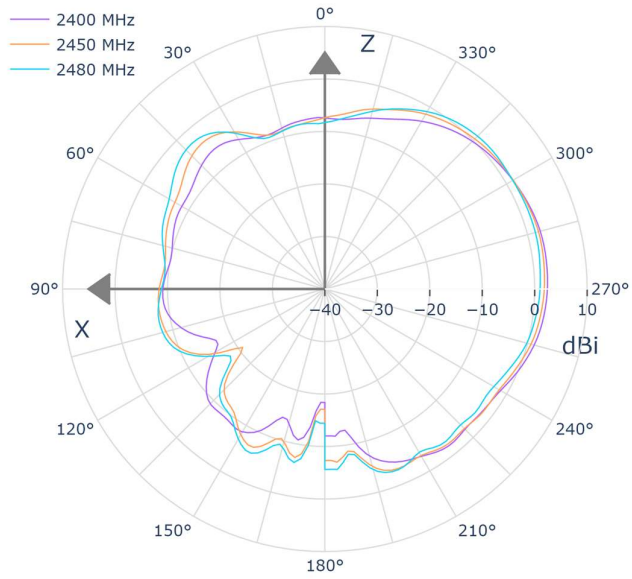
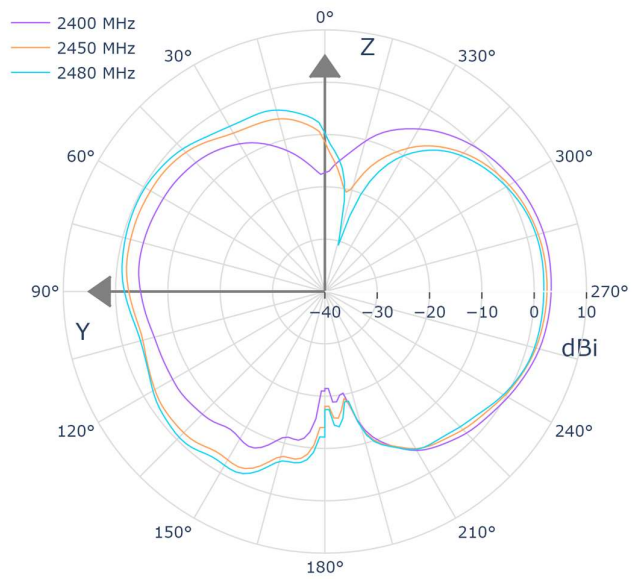
XY_Pol._Phi_Ant.4@2.4G



XZ_Pol._Phi_Ant.4@2.4G

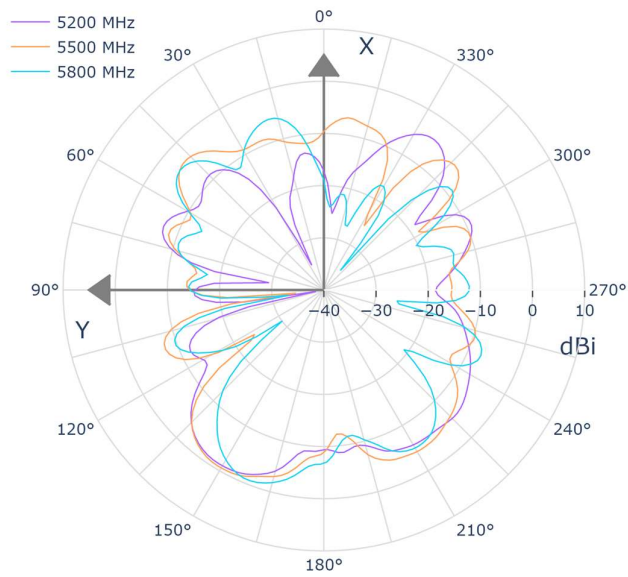


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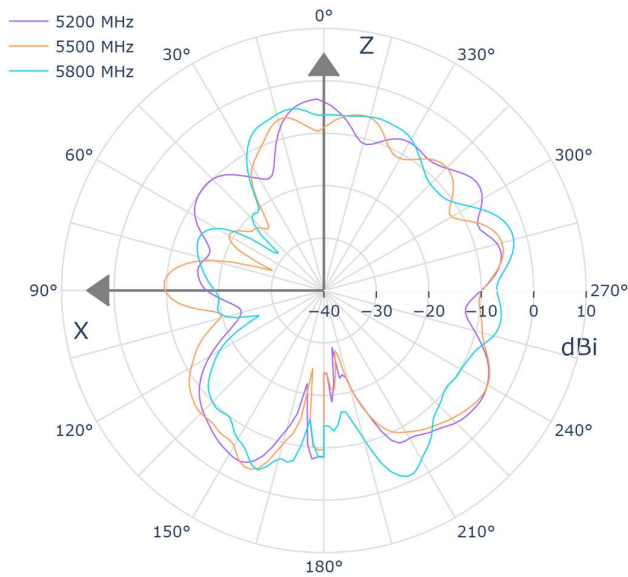
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Ant. Position: 5G Ant.2~3

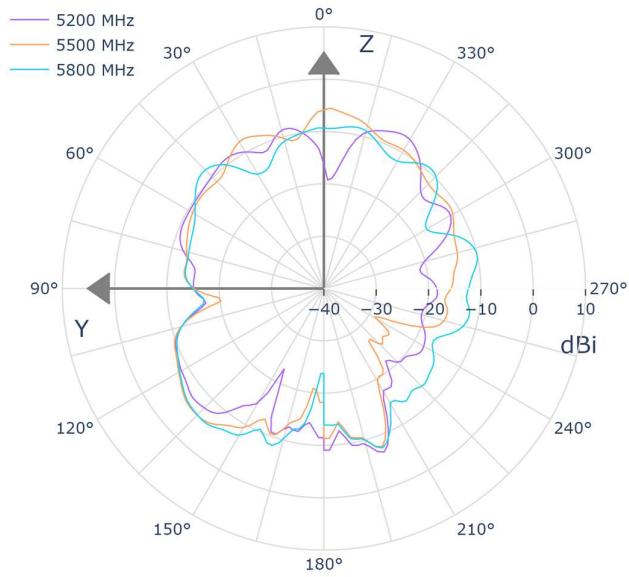
XY_Pol._Phi_Ant.2@5G



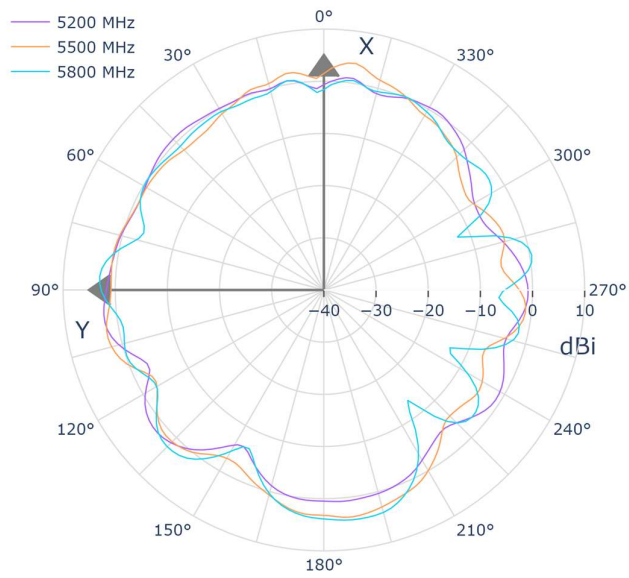
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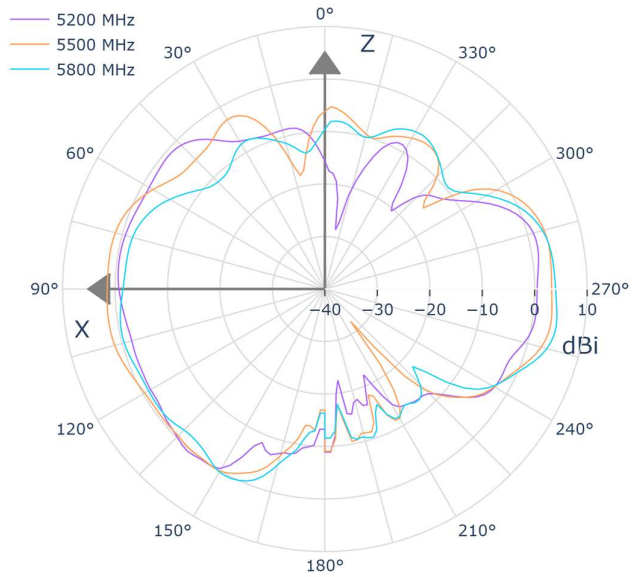
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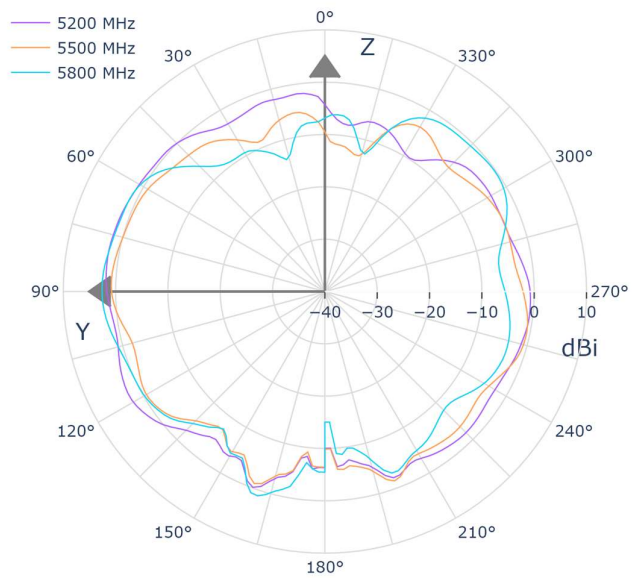
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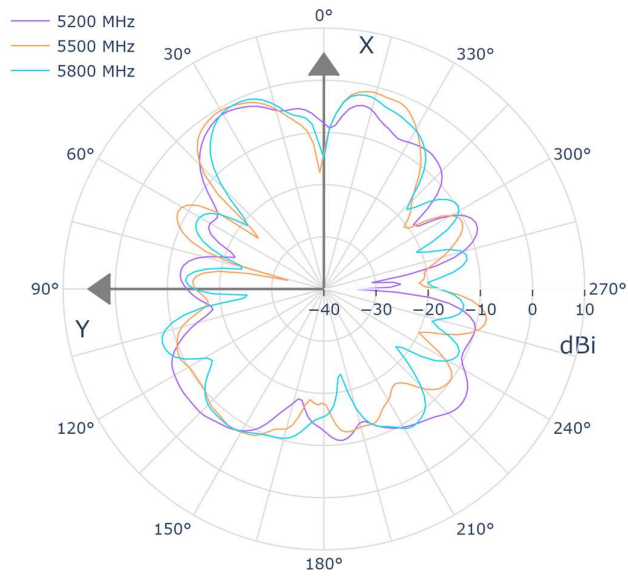
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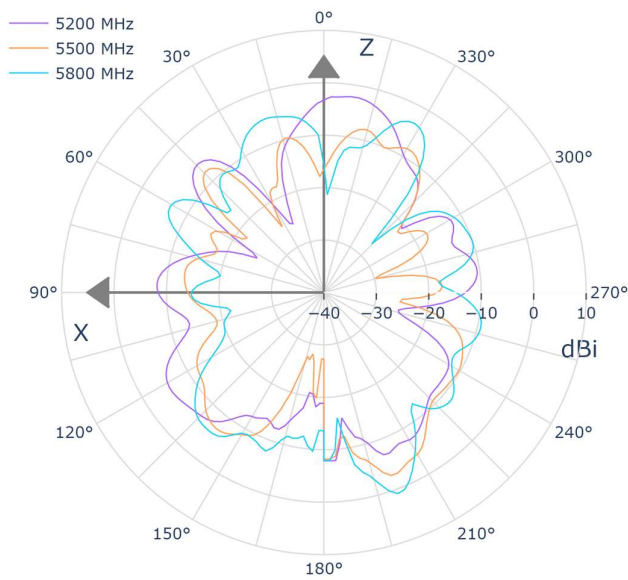
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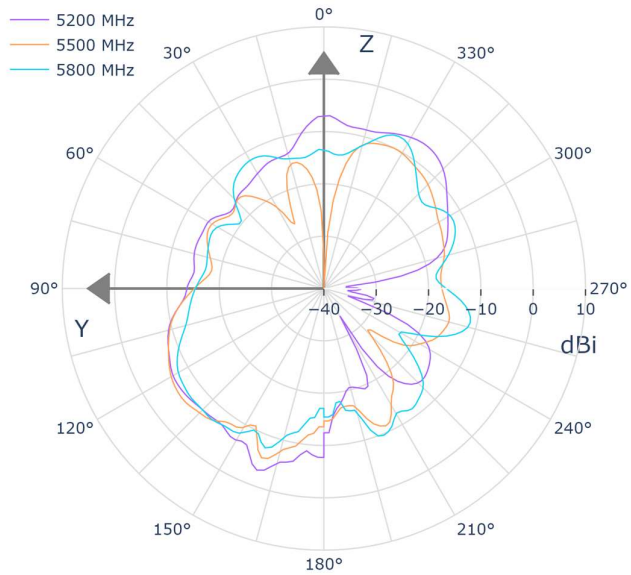
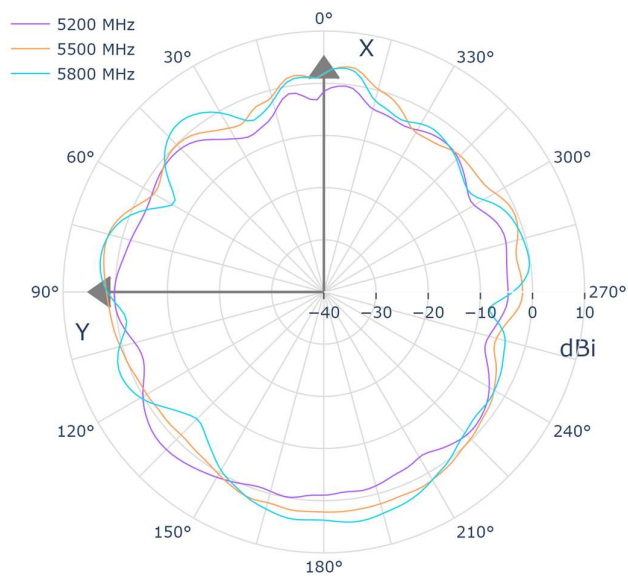


XY_Pol._Phi_Ant.3@5G

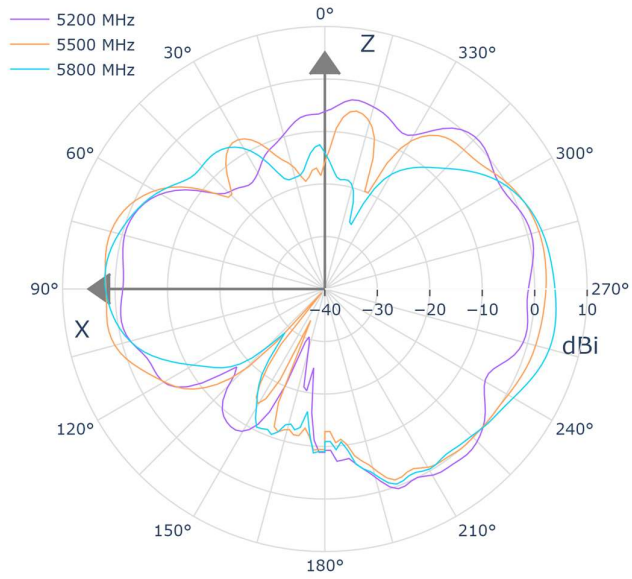


XZ_Pol._Phi_Ant.3@5G

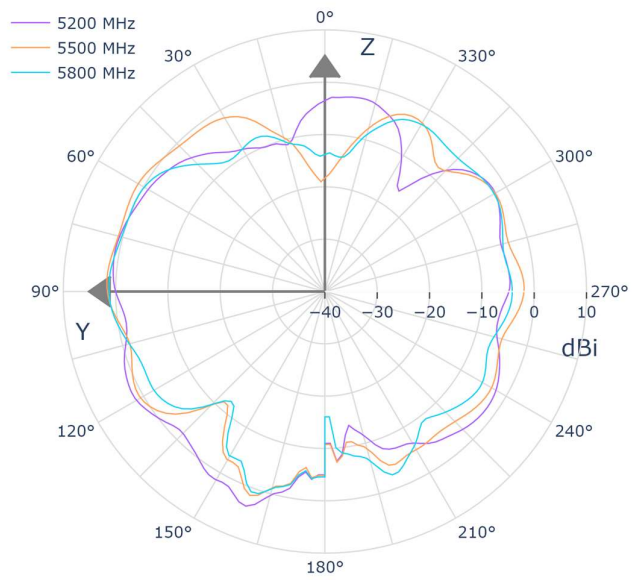


YZ_Pol._Phi_Ant.3@5G**XY_Pol._Theta_Ant.3@5G**

XZ_Pol._Theta_Ant.3@5G



YZ_Pol._Theta_Ant.3@5G



2500	178	-194193	-2335	-154016	-91409	-103760	-68911	-93881	-113217	-150206	-184676	-206387	-191544	-168277	-228962	-27383	-204849	-224916	-309644	-205332	-16497	-181852	-21348	-207705	-189118	-188938	-213316	-223639	-211360	-238963	-22711	-226444	-294111	-295881	-202383	-177831	-210293	-184
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Ant. Position: 2.4G Ant.4_GAIN THETA

Frequency	0	100	150	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330	340	350	360	370	380	390	400	410	420	430	440	450	460	470	480	490	500	510	520	530	540	550	560	570	580	590	600	610	620	630	640	650	660	670	680	690	700	710	720	730	740	750	760	770	780	790	800	810	820	830	840	850	860	870	880	890	900	910	920	930	940	950	960	970	980	990	1000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
0	17.0877	17.0884	17.0891	17.0898	17.0905	17.0912	17.0919	17.0926	17.0933	17.0940	17.0947	17.0954	17.0961	17.0968	17.0975	17.0982	17.0989	17.0996	17.1003	17.1010	17.1017	17.1024	17.1031	17.1038	17.1045	17.1052	17.1059	17.1066	17.1073	17.1080	17.1087	17.1094	17.1101	17.1108	17.1115	17.1122	17.1129	17.1136	17.1143	17.1150	17.1157	17.1164	17.1171	17.1178	17.1185	17.1192	17.1199	17.1206	17.1213	17.1220	17.1227	17.1234	17.1241	17.1248	17.1255	17.1262	17.1269	17.1276	17.1283	17.1290	17.1297	17.1304	17.1311	17.1318	17.1325	17.1332	17.1339	17.1346	17.1353	17.1360	17.1367	17.1374	17.1381	17.1388	17.1395	17.1402	17.1409	17.1416	17.1423	17.1430	17.1437	17.1444	17.1451	17.1458	17.1465	17.1472	17.1479	17.1486	17.1493	17.1500	17.1507	17.1514	17.1521	17.1528	17.1535	17.1542	17.1549	17.1556	17.1563	17.1570	17.1577	17.1584	17.1591	17.1598	17.1605	17.1612	17.1619	17.1626	17.1633	17.1640	17.1647	17.1654	17.1661	17.1668	17.1675	17.1682	17.1689	17.1696	17.1703	17.1710	17.1717	17.1724	17.1731	17.1738	17.1745	17.1752	17.1759	17.1766	17.1773	17.1780	17.1787	17.1794	17.1801	17.1808	17.1815	17.1822	17.1829	17.1836	17.1843	17.1850	17.1857	17.1864	17.1871	17.1878	17.1885	17.1892	17.1899	17.1906	17.1913	17.1920	17.1927	17.1934	17.1941	17.1948	17.1955	17.1962	17.1969	17.1976	17.1983	17.1990	17.1997	17.2004	17.2011	17.2018	17.2025	17.2032	17.2039	17.2046	17.2053	17.2060	17.2067	17.2074	17.2081	17.2088	17.2095	17.2102	17.2109	17.2116	17.2123	17.2130	17.2137	17.2144	17.2151	17.2158	17.2165	17.2172	17.2179	17.2186	17.2193	17.2200	17.2207	17.2214	17.2221	17.2228	17.2235	17.2242	17.2249	17.2256	17.2263	17.2270	17.2277	17.2284	17.2291	17.2298	17.2305	17.2312	17.2319	17.2326	17.2333	17.2340	17.2347	17.2354	17.2361	17.2368	17.2375	17.2382	17.2389	17.2396	17.2403	17.2410	17.2417	17.2424	17.2431	17.2438	17.2445	17.2452	17.2459	17.2466	17.2473	17.2480	17.2487	17.2494	17.2501	17.2508	17.2515	17.2522	17.2529	17.2536	17.2543	17.2550	17.2557	17.2564	17.2571	17.2578	17.2585	17.2592	17.2599	17.2606	17.2613	17.2620	17.2627	17.2634	17.2641	17.2648	17.2655	17.2662	17.2669	17.2676	17.2683	17.2690	17.2697	17.2704	17.2711	17.2718	17.2725	17.2732	17.2739	17.2746	17.2753	17.2760	17.2767	17.2774	17.2781	17.2788	17.2795	17.2802	17.2809	17.2816	17.2823	17.2830	17.2837	17.2844	17.2851	17.2858	17.2865	17.2872	17.2879	17.2886	17.2893	17.2900	17.2907	17.2914	17.2921	17.2928	17.2935	17.2942	17.2949	17.2956	17.2963	17.2970	17.2977	17.2984	17.2991	17.2998	17.3005	17.3012	17.3019	17.3026	17.3033	17.3040	17.3047	17.3054	17.3061	17.3068	17.3075	17.3082	17.3089	17.3096	17.3103	17.3110	17.3117	17.3124	17.3131	17.3138	17.3145	17.3152	17.3159	17.3166	17.3173	17.3180	17.3187	17.3194	17.3201	17.3208	17.3215	17.3222	17.3229	17.3236	17.3243	17.3250	17.3257	17.3264	17.3271	17.3278	17.3285	17.3292	17.3299	17.3306	17.3313	17.3320	17.3327	17.3334	17.3341	17.3348	17.3355	17.3362	17.3369	17.3376	17.3383	17.3390	17.3397	17.3404	17.3411	17.3418	17.3425	17.3432	17.3439	17.3446	17.3453	17.3460	17.3467	17.3474	17.3481	17.3488	17.3495	17.3502	17.3509	17.3516	17.3523	17.3530	17.3537	17.3544	17.3551	17.3558	17.3565	17.3572	17.3579	17.3586	17.3593	17.3600	17.3607	17.3614	17.3621	17.3628	17.3635	17.3642	17.3649	17.3656	17.3663	17.3670	17.3677	17.3684	17.3691	17.3698	17.3705	17.3712	17.3719	17.3726	17.3733	17.3740	17.3747	17.3754	17.3761	17.3768	17.3775	17.3782	17.3789	17.3796	17.3803	17.3810	17.3817	17.3824	17.3831	17.3838	17.3845	17.3852	17.3859	17.3866	17.3873	17.3880	17.3887	17.3894	17.3901	17.3908	17.3915	17.3922	17.3929	17.3936	17.3943	17.3950	17.3957	17.3964	17.3971	17.3978	17.3985	17.3992	17.3999	17.4006	17.4013	17.4020	17.4027	17.4034	17.4041	17.4048	17.4055	17.4062	17.4069	17.4076	17.4083	17.4090	17.4097	17.4104	17.4111	17.4118	17.4125	17.4132	17.4139	17.4146	17.4153	17.4160	17.4167	17.4174	17.4181	17.4188	17.4195	17.4202	17.4209	17.4216	17.4223	17.4230	17.4237	17.4244	17.4251	17.4258	17.4265	17.4272	17.4279	17.4286	17.4293	17.4300	17.4307	17.4314	17.4321	17.4328	17.4335	17.4342	17.4349	17.4356	17.4363	17.4370	17.4377	17.4384	17.4391	17.4398	17.4405	17.4412	17.4419	17.4426	17.4433	17.4440	17.4447	17.4454	17.4461	17.4468	17.4475	17.4482	17.4489	17.4496	17.4503	17.4510	17.4517	17.4524	17.4531	17.4538	17.4545	17.4552	17.4559	17.4566	17.4573	17.4580	17.4587	17.4594	17.4601	17.4608	17.4615	17.4622	17.4629	17.4636	17.4643	17.4650	17.4657	17.4664	17.4671	17.4678	17.4685	17.4692	17.4699	17.4706	17.4713	17.4720	17.4727	17.4734	17.4741	17.4748	17.4755	17.4762	17.4769	17.4776	17.4783	17.4790	17.4797	17.4804	17.4811	17.4818	17.4825	17.4832	17.4839	17.4846	17.4853	17.4860	17.4867	17.4874	17.4881	17.4888	17.4895	17.4902	17.4909	17.4916	17.4923	17.4930	17.4937	17.4944	17.4951	17.4958	17.4965	17.4972	17.4979	17.4986	17.4993	17.5000	17.5007	17.5014	17.5021	17.5028	17.5035	17.5042	17.5049	17.5056	17.5063	17.5070	17.5077	17.5084	17.5091	17.5098	17.5105	17.5112	17.5119	17.5126	17.5133	17.5140	17.5147	17.5154	17.5161	17.5168	17.5175	17.5182	17.5189	17.5196	17.5203	17.5210	17.5217	17.5224	17.5231	17.5238	17.5245	17.5252	17.5259	17.5266	17.5273	17.5280	17.5287	17.5294	17.5301	17.5308	17.5315	17.5322	17.5329	17.5336	17.5343	17.5350	17.5357	17.5364	17.5371	17.5378	17.5385	17.5392	17.5399	17.5406	17.5413	17.5420	17.5427	17.5434	17.5441	17.5448	17.5455	17.5462	17.5469	17.5476	17.5483	17.5490	17.5497	17.5504	17.5511	17.5518	17.5525	17.5532	17.5539	17.5546	17.5553	17.5560	17.5567	17.5574	17.5581	17.5588	17.5595	17.5602	17.5609	17.5616	17.5623	17.5630	17.5637	17.5644	17.5651	17.5658	17.5665	17.5672	17.5679	17.5686	17.5693	17.5700	17.5707	17.5714	17.5721	17.5728	17.5735	17.5742	17.5749	17.5756	17.5763	17.5770	17.5777	17.5784	17.5791	17.5798	17.5805	17.5812	17.5819	17.5826	17.5833	17.5840	17.5847	17.5854	17.5861	17.5868	17.5875	17.5882	17.5889	17.5896	17.5903	17.5910	17.5917	17.5924	17.5931	17.5938	17.5945	17.5952	17.5959	17.5966	17.5973	17.5980	17.5987	17.5994	17.6001	17.6008	17.6015	17.6022	17.6029	17.6036	17.6043	17.6050	17.6057	17.6064	17.6071	17.6078	17.6085	17.6092	17.6099	17.6106	17.6113	17.6120	17.6127	17.6134	17.6141	17.6148	17.6155	17.6162	17.6169	17.6176	17.6183	17.6190	17.6197	17.6204	17.6211	17.6218	17.6225	17.6232	17.6239	17.6246	17.6253	17.6260	17.6267	17.6274	17.6281	17.6288	17.6295	17.6302	17.6309	17.6316	17.6323	17.6330	17.6337	17.6344	17.6351	17.6358	17.6365	17.6372	17.6379	17.6386	17.6393	17.6400	17.6407	17.6414	17.6421	17.6428	17.6435	17.6442	17.6449	17.6456	17.6463	17.6470	17.6477	17.6484	17.6491	17.6498	17.6505	17.6512	17.6519	17.6526	17.6533	17.6540	17.6547	17.6554	17.6561	17.6568	17.6575	17.6582	17.6589	17.6596	17.6603	17.6610	17.6617	17.6624	17.6631	17.6638	17.6645	17.6652	17.6659	17.6666	17.6673	17.6680	17.6687	17.6694	17.6701	17.6708	17.6715	17.6722	17.6729	17.6736	17.6743	17.6750	17.6757	17.6764	17.6771	17.6778	17.6785	17.6792	17.6799	17.6806	17.6813	17.6820	17.6827	17.6834	17.6841	17.6848	17.6855	17.6862	17.6869	17.6876	17.6883	17.6890	17.6897	17.6904	17.6911	17.6918	17.6925	17.6932	17.6939	17.6946	17.6953	17.6960	17.6967	17.6974	17.6981	17.6988	17.6995	17.7002	17.7009	17.7016	17.7023	17.7030	17.7037	17.7044	17.7051	17.7058	17.7065	17.7072	17.7079	17.7086	17.7093	17.7100	17.7107	17.7114	17.7121	17.7128	17.7135	17.7142	17.7149	17.7156	17.7163	17.7170	17.7177	17.7184	17.7191	17.7198	17.7205	17.7212	17.7219	17.7226	17.7233	17.7240	17.7247	17.7254	17.7261	17.7268	17.7275	17.7282	17.7289	17.7296	17.7303	17.7310	17.7317	17.7324	17.7331	17.7338	17.7345	17.7352	17.7359	17.7366	17.7373	17.7380	17.7387	17.7394	17.7401	17.7408	17.7415	17.7422	17.7429	17.7436	17.7443	17.7450	17.7457	17.7464	17.7471	17.7478	17.7485	17.7492	17.7499	17.7506	17.7513	17.7520	17.7527	17.7534	17.7541	17.7548	17.7555	17.7562	17.7569	17.7576	17.7583	17.7590	17.7597	17.7604	17.7611	1

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