

Antenna Testing Report

Customer : Datecs

Project Name : ADYEN US SoC

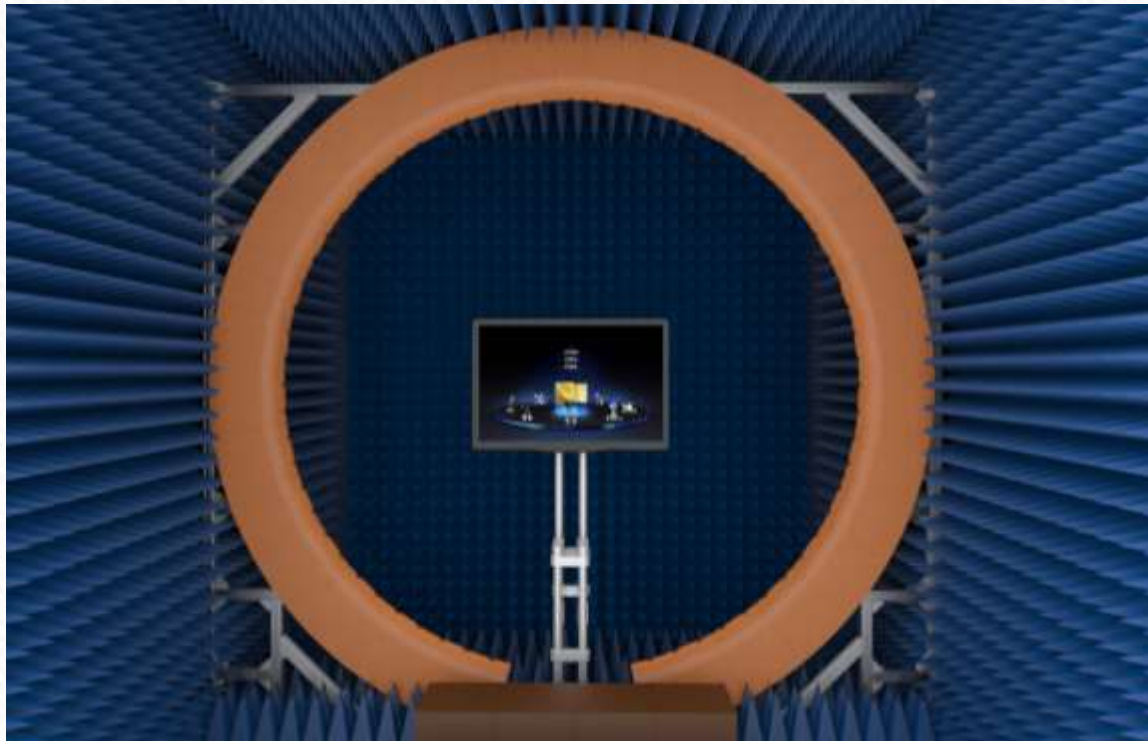
Report version: May. 15th, 2024 A0

Author: Kevin

Version	Report date	Remark
A0	2024.5.15	Preliminary Commissioning Report
A1		
A2		
A3		
A4		
A5		
A6		
A7		
A8		
A9		

1. Record	2
2. Project Overview	4
3. Equipment List	5
4. Project picture and Antenna location	6
5. Matching Network	7
6. Main antenna parameters	8
7. DIV antenna parameters	10
8. WiFi antenna parameters	12
9. GPS antenna parameters	14
10. Active test	16
11. Thank You	19

Prototype status	Debugging machine
Device type	POS
Number of antennas	LTE antenna
Frequency band	LTE-FDD B2/4/5/7/12/13/14/17/25/26/66/71 LTE TDD B41
	WLAN- 2.4G/5G, 802.11 a/b/g/n/ac
	GPS
Structural style	FPC
Environment adjustment	No change
Matching modification	No change



The industry's top 64 sensors OTA chamber

Frequency range: 400MHz-11GHz

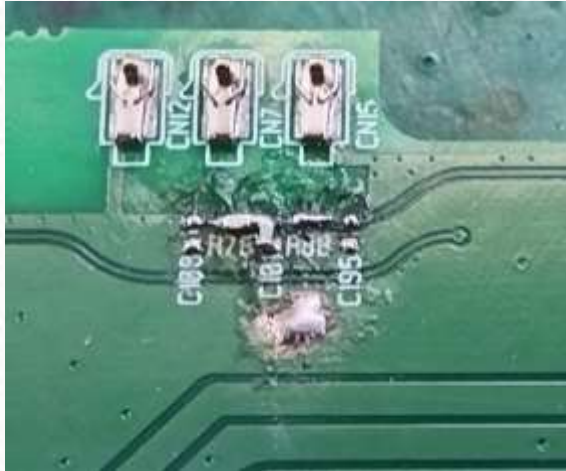
Device Llimitation: 2M

Load-bearing limitation:100KG

Equipments Items	Total Quantity	Quantity for Shanghai R&D	Quantity for Shenzhen R&D	Quantity for ChongQing R&D
OTA chamber	10	4	5	1
5G Tester (SP9500-CTS)	3	1	1	1
R&S Tester (high configuration CMW500)	6	3	2	1
Japan Anritsu Tester (Dual Channel 8820)	4	2	2	--
NB-IoT Tester (SP8315)	3	1	1	1
Agilent Tester (8960)	9	4	4	--
Agilent Network Analyzer (E5062A)	7	3	3	1
Agilent Network Analyzer (E5071C 8.5GHZ)	11	5	5	1
Agilent Network Analyzer (E5071B 8.5GHZ)	7	3	3	1
R&S Network Analyzer (ZND)	9	4	4	1
R&S Network Analyzer (ZVB)	3	1	1	1
OTA head hand / ear hand / arm hand	5	2	2	1
GPS/WIFI active test equipment	5	2	2	1



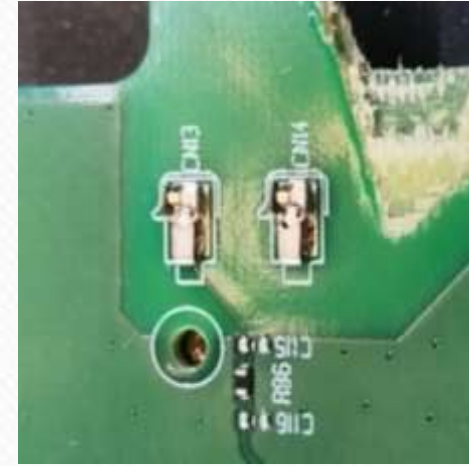
LTE ANT



WiFi ANT



GPS ANT



DIV ANT



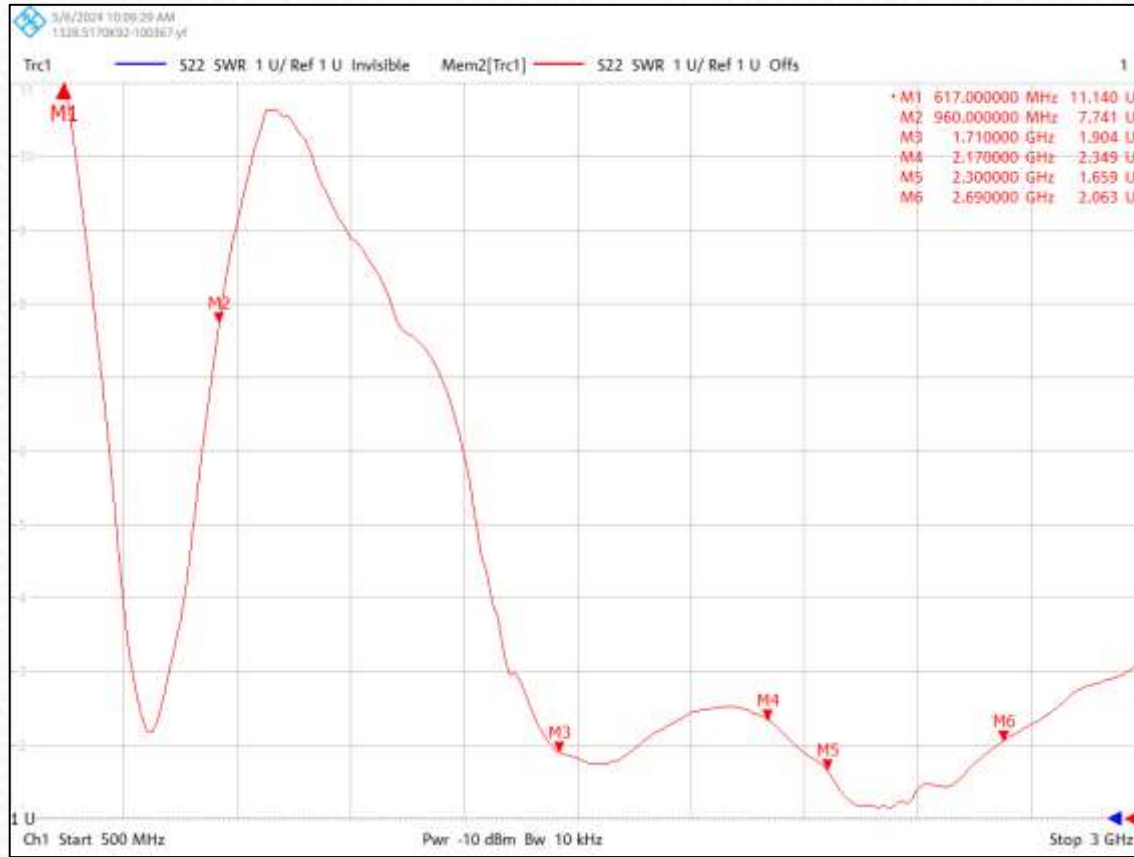
Element	Value
C100	NA
R78	4.7pF
C101	10nH
R88	0Ω
C195	NA

Element	Value
C111	NA
R85	0Ω
C112	NA

Element	Value
C115	NA
R86	0Ω
C116	NA

Element	Value
C183	NA
R82	0Ω
C184	NA

S11



Efficiency and gain

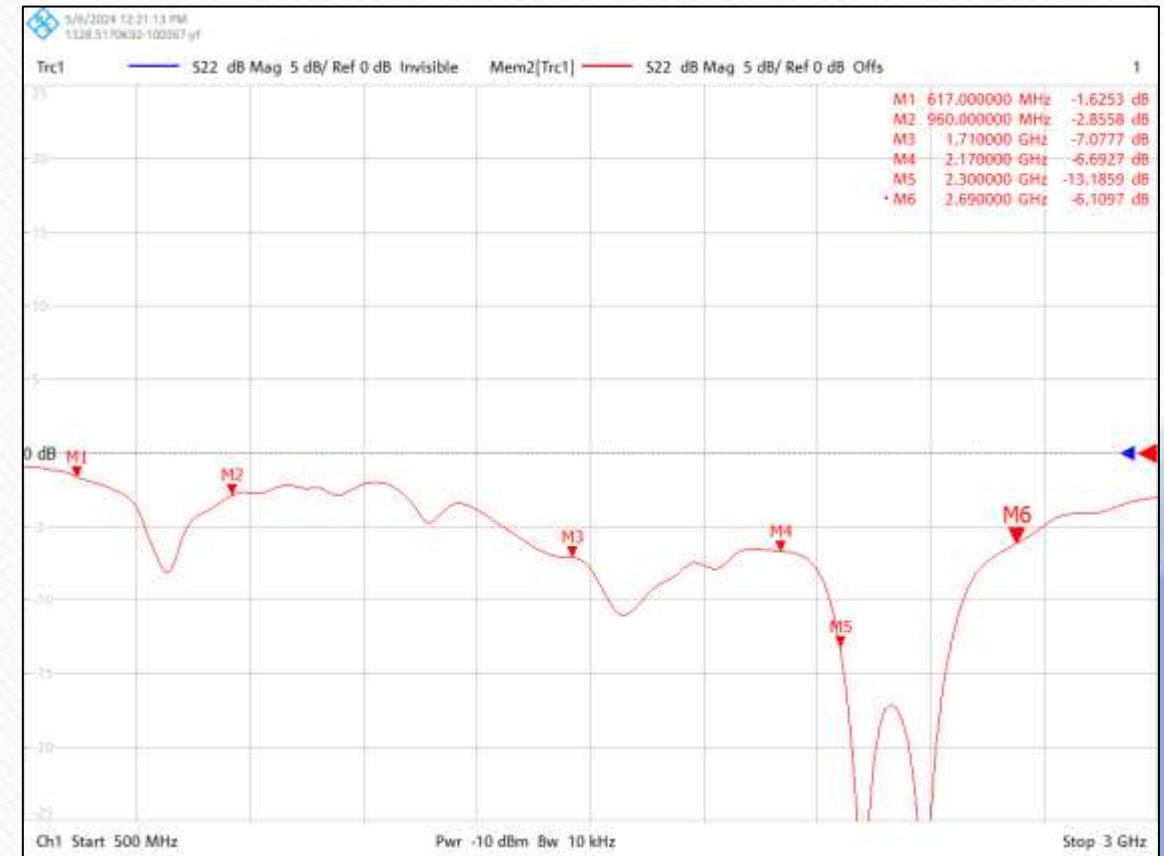
Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
610	1.45	-18.39	-12.49
620	1.61	-17.93	-13.98
630	1.73	-17.62	-14.96
640	1.8	-17.45	-14.16
650	2	-16.99	-11.04
660	2.23	-16.52	-9.26
670	3.62	-14.41	-8.24
680	4.15	-13.82	-7.95
690	6.96	-11.57	-6.51
700	8.75	-10.58	-5.42
710	9.42	-10.26	-5.29
720	10.98	-9.59	-5.9
730	12.1	-9.17	-5.53
740	13.65	-8.65	-3.94
750	14.91	-8.27	-2.46
760	16.83	-7.74	-1.59
770	19.22	-7.16	-1.28
780	22.22	-6.53	0.03
790	24.77	-6.06	0.58
800	24.91	-6.04	-1.32
810	25.28	-5.97	-1.51
820	24.63	-6.09	-2.68
830	22.42	-6.49	-4.19
840	20.6	-6.86	-4.35
850	19.39	-7.12	-3.92
860	18.37	-7.36	-3.66
870	17.3	-7.62	-3.91
880	16.64	-7.79	-3.61
890	16.48	-7.83	-3.29
900	15.81	-8.01	-3.63
910	14.82	-8.29	-3.98
920	14.2	-8.48	-4.03
930	13.59	-8.67	-4.21
940	12.64	-8.98	-5.19
950	11.75	-9.30	-6.19
960	11.14	-9.53	-7.26

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
1700	21.73	-6.63	-0.84
1710	21.53	-6.67	-1.54
1720	22.28	-6.52	-2.25
1730	23.71	-6.25	-2.08
1740	24.49	-6.11	-2.44
1750	24.83	-6.05	-3.08
1760	25.23	-5.98	-3.25
1770	26.06	-5.84	-3.19
1780	26.73	-5.73	-3.08
1790	26.98	-5.69	-2.59
1800	27.54	-5.6	-2.52
1810	28.44	-5.46	-3.21
1820	28.97	-5.38	-3.2
1830	29.51	-5.3	-2.99
1840	30.76	-5.12	-2.34
1850	32.36	-4.9	-1.85
1860	33.5	-4.75	-0.89
1870	34.59	-4.61	-0.46
1880	36.06	-4.43	-0.08
1890	37.24	-4.29	-0.32
1900	37.76	-4.23	-0.44
1910	38.99	-4.09	-0.27
1920	40.93	-3.88	0.36
1930	42.17	-3.75	0.88
1940	42.85	-3.68	1.07
1950	44.46	-3.52	1.07
1960	45.5	-3.42	0.69
1970	44.77	-3.49	0.35
1980	43.75	-3.59	0.32
1990	43.65	-3.6	0.52
2000	43.25	-3.64	0.95
2010	40.46	-3.93	0.61
2020	40.74	-3.9	0.4
2030	40.09	-3.97	0.71
2040	39.9	-3.99	0.85
2050	39.72	-4.01	1.14

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
2060	40.74	-3.9	1.38
2070	42.27	-3.74	1.24
2080	43.35	-3.63	1.29
2090	42.07	-3.76	1.08
2100	42.85	-3.68	1.9
2110	41.98	-3.77	1.71
2120	41.69	-3.8	1.9
2130	40.18	-3.96	1.89
2140	41.11	-3.86	0.86
2150	42.85	-3.68	1.55
2160	40.83	-3.89	1.31
2170	39.63	-4.02	0.37
2180	42.07	-3.76	0.75
2190	43.05	-3.66	0.84
2200	43.25	-3.64	0.03
2210	45.08	-3.46	0.73
2220	46.99	-3.28	0.63
2230	47.42	-3.24	0.45
2240	45.39	-3.43	1.12
2250	44.87	-3.48	0.46
2260	47.97	-3.19	0.85
2270	45.6	-3.41	0.51
2280	42.66	-3.7	-0.17
2290	43.15	-3.65	0.12
2300	44.06	-3.56	0.49
2310	41.21	-3.85	-0.98
2320	40.27	-3.95	-0.98
2330	41.78	-3.79	-0.49
2340	44.26	-3.54	-0.74
2350	43.55	-3.61	-0.89
2360	43.05	-3.66	0.04
2370	44.06	-3.56	-0.24
2380	44.46	-3.52	-0.1
2390	39.45	-4.04	0.89
2400	35.65	-4.48	0.31

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
2410	38.99	-4.09	-0.42
2420	37.58	-4.25	0.5
2430	35.73	-4.47	0.04
2440	35.56	-4.49	-0.15
2450	34.51	-4.62	0.55
2460	31.26	-5.05	0.59
2470	32.14	-4.93	-0.42
2480	30.76	-5.12	1.25
2490	30.27	-5.19	0.54
2500	31.48	-5.02	1.94
2510	30.69	-5.13	1.1
2520	31.62	-5	1.37
2530	31.77	-4.98	0.74
2540	31.62	-5	0.79
2550	29.99	-5.23	0.08
2560	30.27	-5.19	0.77
2570	29.79	-5.26	1.34
2580	29.11	-5.36	0.78
2590	28.05	-5.52	1.28
2600	27.16	-5.66	0.77
2610	27.54	-5.6	1.01
2620	27.16	-5.66	0.51
2630	27.54	-5.6	1.32
2640	27.16	-5.66	0.79
2650	27.16	-5.66	0.65
2660	27.04	-5.68	1.11
2670	27.29	-5.64	0.52
2680	26.49	-5.77	0.28
2690	26.55	-5.76	0.47
2700	27.16	-5.66	0.52

S11



Efficiency and gain

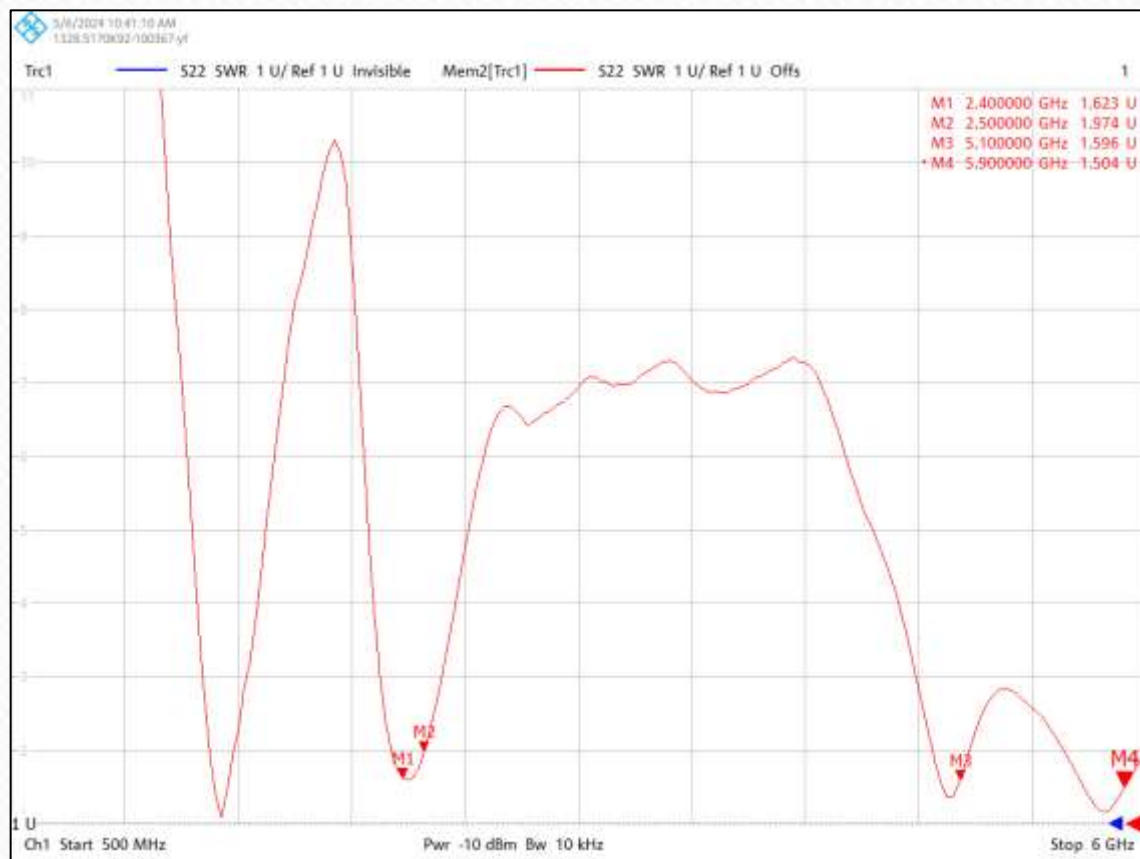
Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
610	1.29	-18.89	-14.16
620	1.51	-18.21	-14.49
630	1.6	-17.96	-15.38
640	1.6	-17.96	-15.17
650	1.67	-17.77	-12.98
660	1.77	-17.52	-11.76
670	1.91	-17.19	-11.02
680	2.11	-16.76	-10.48
690	2.33	-16.33	-9.71
700	2.47	-16.07	-9.1
710	2.48	-16.06	-9.85
720	3.49	-14.57	-10.91
730	4.73	-13.25	-10.77
740	5.24	-12.81	-8.93
750	5.7	-12.44	-6.96
760	6.56	-11.83	-5.48
770	7.62	-11.18	-4.68
780	8.3	-10.81	-4.02
790	8.11	-10.91	-4.98
800	7.38	-11.32	-8
810	6.99	-11.56	-8.93
820	6.48	-11.88	-10.46
830	5.54	-12.56	-11.87
840	4.64	-13.33	-11.88
850	4.06	-13.91	-11.89
860	4.04	-13.94	-11.47
870	4.32	-13.65	-11.25
880	4.72	-13.26	-11.14
890	5.27	-12.78	-10.17
900	5.67	-12.46	-9.74
910	5.95	-12.25	-9.42
920	6.31	-12.00	-8.93
930	6.44	-11.91	-8.68
940	6.21	-12.07	-9.09
950	5.82	-12.35	-9.88
960	5.46	-12.63	-10.08

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
1700	6.69	-11.75	-11.99
1710	6.69	-11.75	-13.08
1720	6.77	-11.69	-13.62
1730	6.95	-11.58	-13.6
1740	7.08	-11.50	-13.64
1750	7.18	-11.44	-13.95
1760	7.32	-11.35	-13.7
1770	7.45	-11.28	-13.1
1780	7.53	-11.23	-12.5
1790	7.6	-11.19	-12.31
1800	7.76	-11.10	-12.12
1810	7.89	-11.03	-12.5
1820	7.99	-10.97	-12.22
1830	8.06	-10.94	-11.8
1840	8.26	-10.83	-11.36
1850	8.48	-10.72	-10.85
1860	8.65	-10.63	-9.72
1870	8.77	-10.57	-8.97
1880	8.91	-10.50	-8.4
1890	8.95	-10.48	-8.4
1900	8.93	-10.49	-8.53
1910	8.94	-10.49	-8.73
1920	9.08	-10.42	-8.35
1930	9.15	-10.39	-8.34
1940	9.19	-10.37	-8.51
1950	9.25	-10.34	-8.8
1960	9.24	-10.34	-9.12
1970	9.08	-10.42	-9.22
1980	9	-10.46	-8.96
1990	9.09	-10.41	-8.54
2000	9.25	-10.34	-8.12
2010	9.37	-10.28	-7.21
2020	9.69	-10.14	-7.16
2030	9.93	-10.03	-6.19
2040	10.12	-9.95	-6
2050	10.26	-9.89	-5.7

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
2060	10.51	-9.78	-5.34
2070	10.92	-9.62	-5.64
2080	11.24	-9.49	-5.52
2090	11.21	-9.50	-5.88
2100	11.37	-9.44	-5.28
2110	11.35	-9.45	-5.69
2120	11.3	-9.47	-5.6
2130	11.12	-9.54	-5.42
2140	11.35	-9.45	-5.89
2150	11.7	-9.32	-6.09
2160	11.59	-9.36	-6.15
2170	11.73	-9.31	-7.08
2180	12.4	-9.07	-6.93
2190	13.07	-8.84	-6.17
2200	13.53	-8.69	-7.14
2210	14.44	-8.40	-6.63
2220	15.59	-8.07	-5.94
2230	16.51	-7.82	-6.37
2240	17.02	-7.69	-5.66
2250	17.76	-7.51	-6.07
2260	19.79	-7.04	-5.04
2270	20.14	-6.96	-5.04
2280	20.42	-6.90	-5.68
2290	22.26	-6.52	-4.85
2300	23.88	-6.22	-4.14
2310	23.41	-6.31	-5.24
2320	22.74	-6.43	-5.06
2330	23.66	-6.26	-3.86
2340	23.97	-6.20	-4.32
2350	23.54	-6.28	-4.44
2360	22.34	-6.51	-4.17
2370	22.66	-6.45	-4.09
2380	21.79	-6.62	-4.71
2390	20.89	-6.80	-3.11
2400	18.77	-7.27	-4.23

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
2410	18.74	-7.27	-5.24
2420	18.37	-7.36	-4.04
2430	16.46	-7.84	-5.5
2440	15.45	-8.11	-5.8
2450	14.71	-8.32	-4.88
2460	13.51	-8.69	-5.75
2470	12.69	-8.97	-6.6
2480	12.57	-9.01	-5.01
2490	11.87	-9.26	-6.8
2500	11.89	-9.25	-5.39
2510	11.1	-9.55	-5.51
2520	10.69	-9.71	-6.49
2530	10.24	-9.90	-5.99
2540	9.74	-10.11	-6.14
2550	9.16	-10.38	-7.35
2560	8.95	-10.48	-6.47
2570	8.72	-10.59	-6.59
2580	8.52	-10.70	-6.89
2590	8.23	-10.85	-7.01
2600	7.99	-10.97	-7.94
2610	7.85	-11.05	-8.51
2620	7.68	-11.15	-8.5
2630	7.6	-11.19	-8.49
2640	7.55	-11.22	-8.4
2650	7.6	-11.19	-8.61
2660	7.67	-11.15	-8.63
2670	7.79	-11.08	-8.07
2680	7.74	-11.11	-8.99
2690	7.89	-11.03	-8.43
2700	7.96	-10.99	-7.61

S11



Efficiency and gain

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
2400	33.73	-4.72	0.49
2410	35.33	-4.52	-0.3
2420	38.46	-4.15	0.69
2430	36.46	-4.38	0.52
2440	37.26	-4.29	-0.28
2450	38.64	-4.13	0.82
2460	36.11	-4.42	0.63
2470	35.93	-4.45	0.05
2480	34.73	-4.59	1.09
2490	33.41	-4.76	0.3
2500	33.54	-4.74	0.53

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
5050	31.58	-5.01	0.69
5100	32.55	-4.87	1.24
5150	31.04	-5.08	2.35
5200	29.23	-5.34	1.99
5250	25.53	-5.93	1.1
5300	22.2	-6.54	0.19
5350	21.06	-6.77	-0.06
5400	22.54	-6.47	0.64
5450	23.28	-6.33	0.32
5500	22.28	-6.52	-0.36
5550	22.41	-6.50	-1.09
5600	23.68	-6.26	-0.36
5650	22.41	-6.50	-0.37
5700	22.49	-6.48	0.18
5750	23.91	-6.21	0.59
5800	25.68	-5.90	1.33
5850	27.23	-5.65	1.71
5900	27.82	-5.56	1.46
5950	28.42	-5.46	1.46

S11



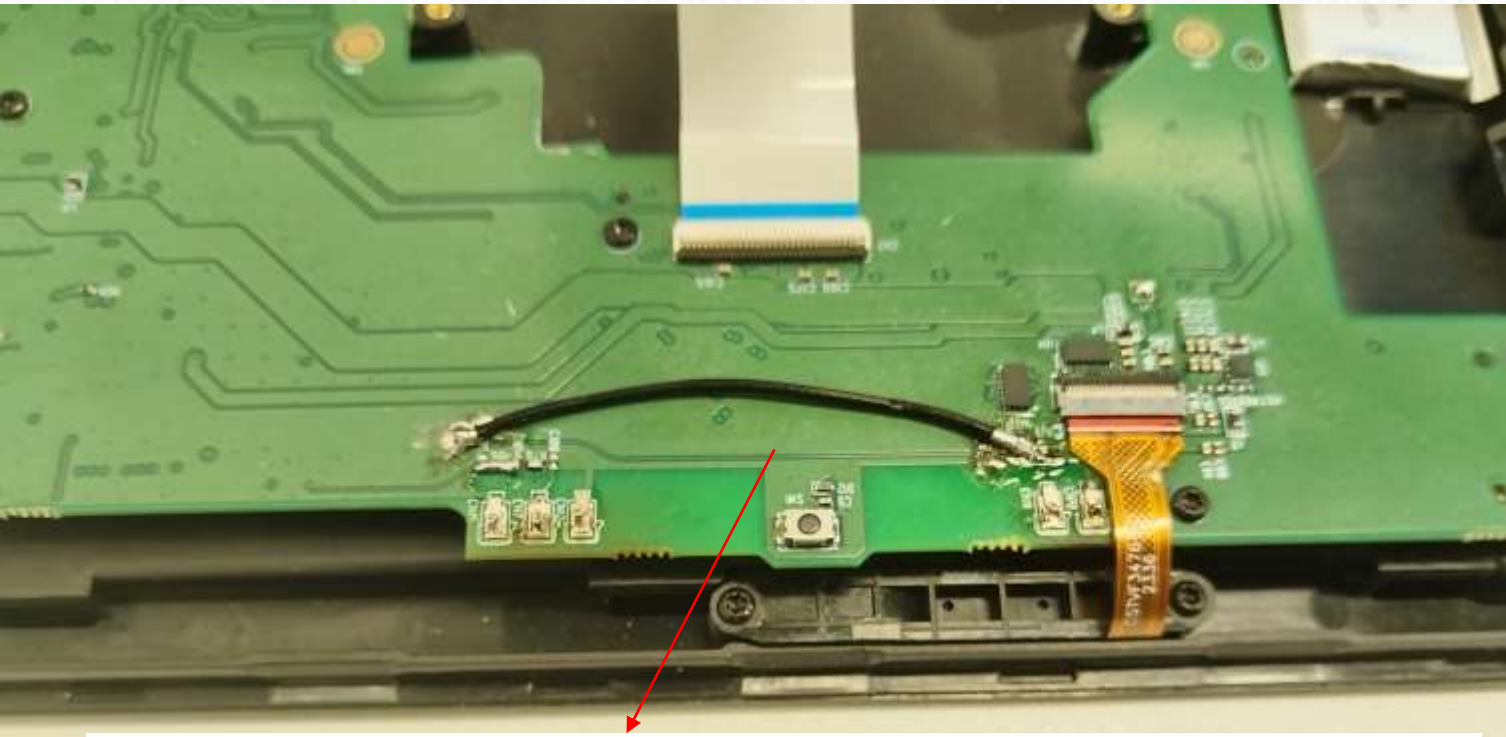
Efficiency and gain

Frequency/Mhz	Efficiency / %	Efficiency / dB	MaxGain/dBi
1550	19.46	-7.11	-2.06
1555	20.23	-6.94	-2.15
1560	21.01	-6.78	-2.17
1565	21.54	-6.67	-2.52
1570	22.49	-6.48	-2.12
1575	24.62	-6.09	-1.83
1580	24.78	-6.06	-1.78
1585	24.41	-6.12	-1.56
1590	22.63	-6.45	-1.94
1595	21.63	-6.65	-2.31
1600	21.14	-6.75	-2.5
1605	20.45	-6.89	-2.87
1610	20.76	-6.83	-3.21

Band	Test Item	Channel	FREQ (MHz)	FS(dBm)
FDD LTE B2(10M)	TRP	18650	1855.00	16.13
		18900	1880.00	15.76
		19150	1905.00	15.54
	TIS	1150	1985.00	-89.27
FDD LTE B4(10M)	TRP	20000	1715.00	16.04
		20175	1732.50	16.52
		20350	1750.00	16.64
	TIS	2350	2150.00	-89.95
FDD LTE B5(10M)	TRP	20450	829.00	12.93
		20525	836.50	12.78
		20600	844.00	12.07
	TIS	2600	889.00	-80.84
FDD LTE B7(10M)	TRP	20800	2505.00	15.74
		21100	2535.00	15.46
		21400	2565.00	15.25
	TIS	3400	2685.00	-87.26
FDD LTE B12(10M)	TRP	23060	704.00	11.87
		23095	707.50	12.74
		23130	711.00	13.45
	TIS	5130	741.00	-78.38
FDD LTE B13(10M)	TRP	23230	782.00	16.31
	TIS	5230	751.00	-79.39
FDD LTE B14(10M)	TRP	23330	793.00	16.49
	TIS	5330	763.00	-81.09

Band	Test Item	Channel	FREQ (MHz)	FS(dBm)
FDD LTE B17(10M)	TRP	23780	709.00	10.99
		23790	710.00	12.07
		23800	711.00	12.74
	TIS	5800	741.00	-79.63
FDD LTE B25(10M)	TRP	26090	1855.00	16.87
		26365	1882.50	15.99
		26640	1910.00	14.29
	TIS	8640	1990.00	-89.34
FDD LTE B26(10M)	TRP	26740	819.00	14.84
		26865	831.50	12.44
		26990	844.00	12.98
	TIS	8990	889.00	-81.82
FDD LTE B66(10M)	TRP	132022	1715.00	16.87
		132322	1745.00	16.33
		132622	1775.00	16.19
	TIS	67036	2170.00	-89.31
FDD LTE B71(10M)	TRP	133172	668.00	6.91
		133297	680.50	8.2
		133422	693.00	9.11
	TIS	68836	642.00	-81.45
TDD LTE B41(20M))	TRP	40340	2565.00	13.99
		40740	2605.00	14.15
		41140	2645.00	14.25
	TIS	41140	2645.00	-84.69

Band	Test Item	Channel	FREQ (MHz)	FS(dBm)
802.11b(11M)	TRP	1	2412.00	11.56
		7	2437.00	11.4
		13	2472.00	12.27
	TIS	13	2472.00	-83.5
802.11g(54M)	TRP	1	2412.00	11.14
		7	2437.00	10.5
		13	2472.00	12.26
	TIS	13	2472.00	-68.34
802.11n(MCS07 65M)	TRP	1	2412.00	11.65
		7	2437.00	13.66
		13	2472.00	12.31
	TIS	13	2472.00	-65.01
802.11a(54M)	TRP	36	5180.00	9.16
		149	5745.00	6.82
		165	5825.00	7.69
	TIS	165	5825.00	-63.71



Disconnect the microstrip line from the antenna and use a cable to connect the module and antenna. The 5G wifi has improved, and it is suspected that there may be a mismatch in the motherboard microstrip line

Band	Test Item	Channel	FREQ (MHz)	FS(dBm)
802.11a(54M)	TRP	36	5180.00	9.16
		149	5745.00	10.31
		165	5825.00	9.12
	TIS	165	5825.00	-68.12

Thank You

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