

TGU-5G

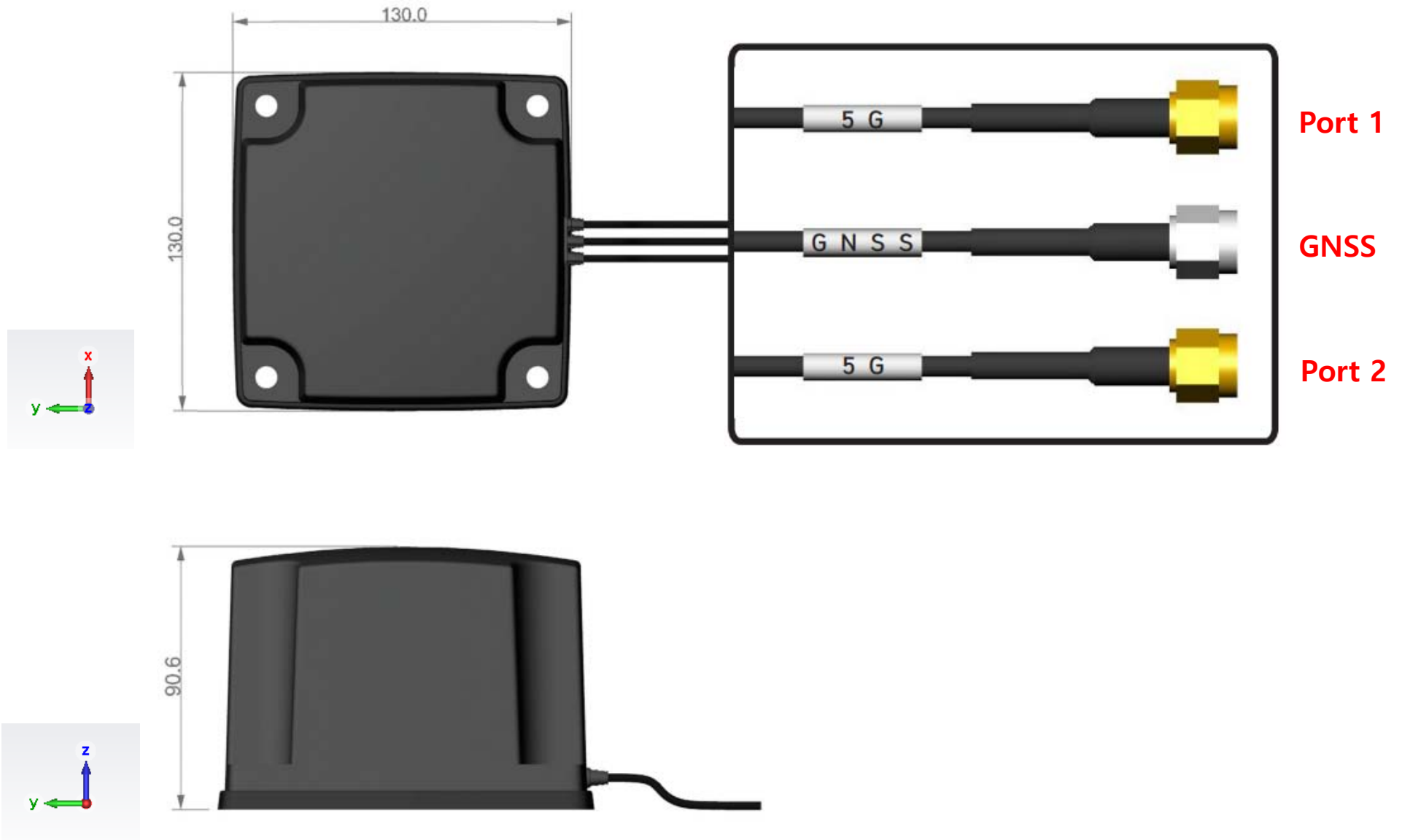


HANKOOK ANTENNA CO.LTD.

2023. 12. 12



- Port Location





- **Conditions**

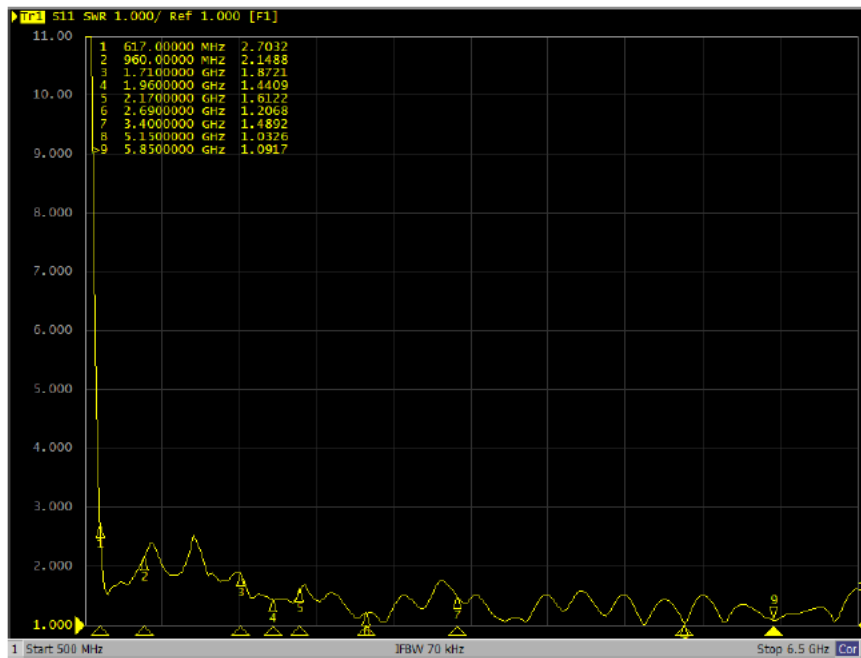
1. G.P size = No GP

2. Cable length = 200 (mm)

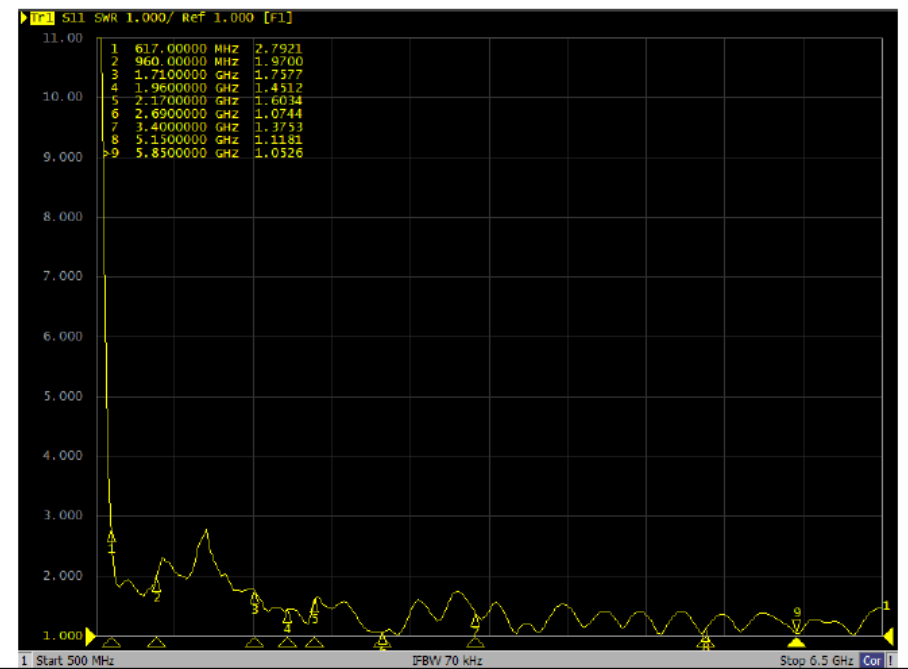
3. Cable type: RG-316/D cable

- 5G V.S.W.R

<Port1>



<Port2>





- 5G Efficiency

<617~960 MHz(Port2)>

	1	2	3	4	5	6	7		
Frequency [MHz]	617	700	750	824	880	894	960		
Efficiency [dB]	-1.76	-0.61	-0.86	-1.30	-1.31	-1.36	-0.98		
Efficiency [%]	66.7	86.9	82.1	74.2	74.0	73.1	79.8		
TRG _g [dB]	-4.15	-2.37	-2.61	-2.97	-2.82	-2.87	-2.11		
Gain _{g Peak} [dBi]	1.34	3.32	2.79	1.66	1.61	1.60	2.25		
Gain _{g Min} [dBi]	-30.32	-29.21	-22.36	-20.85	-21.69	-18.78	-22.63		
TRG _p [dB]	-5.49	-5.39	-5.63	-6.25	-6.61	-6.68	-7.38		
Gain _{p Peak} [dBi]	-1.83	-0.08	-0.02	-1.10	-1.63	-1.34	-0.45		
Gain _{p Min} [dBi]	-19.14	-44.36	-27.47	-26.03	-40.96	-32.95	-30.73		
UHRG [dB]	-4.66	-3.17	-3.31	-4.01	-4.07	-4.22	-3.45		
UHRG/TRG [%]	51.31	55.52	56.77	53.52	52.86	51.70	56.66		
H-Plane	-5.10	-2.18	-1.89	-1.71	-2.31	-2.55	-0.74		
E1-Plane, AVG [dB]	-7.93	-6.47	-6.78	-6.37	-6.06	-5.98	-4.55		
E2-Plane, AVG [dB]	-2.05	-0.30	-0.69	-1.49	-1.32	-1.36	-1.18		
Peak Gain [dBi]	1.85	3.44	2.99	1.98	1.76	1.63	2.51		
Directivity [dB]	3.61	4.05	3.85	3.28	3.06	2.99	3.49		
Minimum Gain [dBi]	-6.25	-16.38	-13.74	-11.94	-11.88	-12.79	-11.30		



- 5G Efficiency

<1,710~2,700 MHz(Port1)>

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	1710	1880	1920	2170	2300	2400	2500	2600	2700
Efficiency [dB]	-0.84	-1.43	-0.32	0.00	-0.19	-0.61	-0.86	-0.21	-0.14
Efficiency [%]	82.4	72.0	92.8	100.0	95.7	86.9	82.0	95.2	96.8
TRG _g [dB]	-2.20	-3.07	-1.80	-1.56	-1.39	-1.38	-1.70	-1.14	-1.27
Gain _{g Peak} [dBi]	2.09	2.42	2.94	3.96	3.60	3.93	3.38	4.69	5.05
Gain _{g Min} [dBi]	-18.84	-35.26	-29.22	-32.89	-24.38	-41.16	-23.96	-30.72	-41.70
TRG _g [dB]	-6.55	-6.45	-5.72	-5.20	-6.38	-8.48	-8.44	-7.39	-6.55
Gain _{g Peak} [dBi]	0.06	-1.18	0.40	0.29	-0.15	-2.97	-3.30	-0.91	-0.42
Gain _{g Min} [dBi]	-32.30	-29.95	-29.21	-33.75	-33.49	-28.98	-30.96	-37.42	-36.81
UHRG [dB]	-3.69	-4.47	-3.08	-2.61	-2.40	-2.42	-2.66	-2.01	-1.84
UHRG/TRG [%]	51.82	49.66	53.01	54.85	60.17	66.00	66.09	66.12	67.65
H-Plane	-1.31	-1.20	0.03	-0.24	-0.13	-0.59	-1.19	-0.61	-0.40
E1-Plane, AVG [dB]	-3.09	-3.90	-1.93	-2.90	-2.06	-3.03	-2.91	-1.98	-2.00
E2-Plane, AVG [dB]	-1.93	-3.51	-3.04	-2.59	-2.44	-1.71	-2.76	-2.69	-3.24
Peak Gain [dBi]	3.29	3.45	4.68	5.08	4.92	4.15	3.73	5.24	5.73
Directivity [dB]	4.13	4.88	5.01	5.08	5.11	4.76	4.59	5.45	5.87
Minimum Gain [dBi]	-9.53	-14.47	-14.54	-13.26	-12.23	-17.32	-17.41	-23.75	-21.35



- 5G Efficiency

<1,710~2,700 MHz(Port2)>

	1	2	3	4	5	6	7	8	9
Frequency [MHz]	1710	1880	1920	2170	2300	2400	2500	2600	2700
Efficiency [dB]	-0.75	-1.05	-0.67	-0.16	-0.32	-0.56	-0.93	-0.22	-0.21
Efficiency [%]	84.2	78.6	85.8	96.3	93.0	87.9	80.7	95.0	95.2
TRG _g [dB]	-1.89	-2.67	-2.40	-2.27	-1.34	-1.53	-1.85	-1.09	-1.22
Gain _{g Peak} [dBi]	3.21	2.25	1.97	4.33	4.90	4.71	5.16	5.68	5.58
Gain _{g Min} [dBi]	-18.45	-25.86	-18.11	-22.61	-30.75	-32.16	-28.80	-26.09	-37.86
TRG _p [dB]	-7.10	-6.11	-5.50	-4.32	-7.11	-7.56	-8.12	-7.67	-7.03
Gain _{p Peak} [dBi]	0.79	1.83	0.29	2.77	0.86	0.45	-1.29	-1.03	0.03
Gain _{p Min} [dBi]	-41.55	-31.84	-27.88	-36.06	-30.75	-39.51	-28.05	-30.67	-40.65
UHRG [dB]	-3.84	-3.88	-3.29	-2.88	-2.34	-2.57	-2.69	-1.93	-1.97
UHRG/TRG [%]	49.09	52.04	54.68	53.45	62.74	62.95	66.69	67.41	66.68
H-Plane	-0.79	-1.08	-0.33	-0.81	-0.37	-0.27	-1.27	-0.42	-0.41
E1-Plane, AVG [dB]	-2.79	-2.88	-2.42	-3.23	-2.30	-2.10	-2.91	-1.94	-1.59
E2-Plane, AVG [dB]	-1.23	-3.25	-3.50	-3.16	-2.29	-2.89	-3.08	-2.56	-3.39
Peak Gain [dBi]	3.85	3.88	3.17	5.82	5.91	5.78	5.62	6.39	6.33
Directivity [dB]	4.60	4.93	3.84	5.98	6.23	6.34	6.55	6.61	6.54
Minimum Gain [dBi]	-9.88	-14.50	-10.68	-17.04	-16.18	-15.03	-16.55	-15.63	-19.22



- 5G Efficiency

<3,400~4,000 MHz(Port1)>

	1	2	3	4	5	6	7		
Frequency [MHz]	3400	3500	3600	3700	3800	3900	4000		
Efficiency [dB]	-0.13	-0.04	-0.10	-0.35	-0.58	0.00	-0.55		
Efficiency [%]	97.0	99.2	97.8	92.2	87.5	99.9	88.0		
TRG _p [dB]	-1.70	-1.91	-1.69	-1.64	-1.91	-1.52	-2.18		
Gain _{p Peak} [dBi]	6.03	5.44	6.91	6.92	6.69	6.90	5.62		
Gain _{p Min} [dBi]	-31.97	-24.52	-24.35	-28.55	-25.20	-28.42	-32.40		
TRG _g [dB]	-5.31	-4.59	-5.22	-6.26	-6.37	-5.30	-5.62		
Gain _{g Peak} [dBi]	0.48	0.78	0.06	0.30	1.39	3.02	3.23		
Gain _{g Min} [dBi]	-35.08	-30.70	-27.26	-26.95	-25.94	-29.86	-30.13		
UHRG [dB]	-1.60	-1.78	-1.74	-1.57	-1.64	-1.08	-1.64		
UHRG/TRG [%]	71.35	66.93	68.51	75.57	78.23	78.05	77.85		
H-Plane	-2.70	-1.85	-0.96	-2.18	-3.49	-3.82	-4.79		
E1-Plane, AVG [dB]	-0.43	-1.12	-1.16	-1.40	-1.61	-1.43	-1.89		
E2-Plane, AVG [dB]	-4.04	-4.18	-4.34	-3.87	-3.46	-2.67	-3.05		
Peak Gain [dBi]	6.26	6.19	7.27	7.03	6.75	6.97	5.72		
Directivity [dB]	6.40	6.23	7.37	7.38	7.33	6.98	6.28		
Minimum Gain [dBi]	-14.76	-10.69	-14.08	-19.61	-14.62	-14.76	-15.72		



- 5G Efficiency

<3,400~4,000 MHz(Port2)>

	1	2	3	4	5	6	7		
Frequency [MHz]	3400	3500	3600	3700	3800	3900	4000		
Efficiency [dB]	-0.19	-0.06	-0.25	-0.29	-0.62	-0.09	-0.53		
Efficiency [%]	95.7	98.6	94.4	93.6	86.8	98.0	88.6		
TRG _g [dB]	-1.85	-1.89	-1.83	-1.52	-1.85	-1.54	-2.16		
Gain _{g Peak} [dBi]	6.61	6.78	7.57	7.71	7.29	7.11	5.74		
Gain _{g Min} [dBi]	-28.78	-39.94	-25.24	-28.38	-39.34	-27.64	-28.13		
TRG _g [dB]	-5.18	-4.70	-5.41	-6.35	-6.68	-5.55	-5.56		
Gain _{g Peak} [dBi]	2.52	2.71	1.68	0.75	0.80	3.04	3.94		
Gain _{g Min} [dBi]	-26.72	-28.86	-22.04	-32.89	-25.69	-41.13	-25.22		
UHRG [dB]	-1.67	-1.72	-1.81	-1.47	-1.65	-1.06	-1.55		
UHRG/TRG [%]	71.12	68.25	69.75	76.16	78.78	80.02	79.07		
H-Plane	-2.66	-1.72	-1.11	-1.88	-3.21	-3.84	-4.85		
E1-Plane, AVG [dB]	-1.59	-0.60	-0.95	-0.92	-1.26	-0.53	-1.05		
E2-Plane, AVG [dB]	-3.35	-4.83	-4.67	-3.75	-3.94	-3.73	-3.73		
Peak Gain [dBi]	6.98	7.16	7.82	7.78	7.39	7.36	6.11		
Directivity [dB]	7.17	7.23	8.07	8.07	8.01	7.45	6.64		
Minimum Gain [dBi]	-15.38	-20.64	-11.62	-19.30	-21.57	-16.15	-19.19		



- 5G Efficiency

<663~798 MHz (Port1)> B13, B14, B17, B71

	1	2	3	4	5	6	7	8	9	10	11	12
Frequency [MHz]	663	680	698	704	710	716	777	782	787	788	793	798
Efficiency [dB]	-1.61	-0.50	-0.23	-0.18	-0.08	-0.06	-1.41	-1.46	-1.39	-1.41	-1.38	-1.50
Efficiency [%]	69.0	89.0	94.9	96.0	98.2	98.6	72.3	71.5	72.7	72.3	72.7	70.8
TRG _g [dB]	-3.78	-2.29	-2.00	-1.97	-1.91	-1.95	-3.26	-3.27	-3.18	-3.19	-3.14	-3.21
Gain _{g, Peak} [dBi]	1.48	3.35	3.61	3.65	3.73	3.72	1.74	1.65	1.65	1.62	1.59	1.41
Gain _{g, Min} [dBi]	-31.24	-37.94	-26.50	-25.99	-24.98	-35.37	-25.47	-26.47	-27.82	-27.73	-28.81	-30.71
TRG _g [dB]	-5.67	-5.24	-4.97	-4.87	-4.71	-4.58	-5.99	-6.11	-6.10	-6.13	-6.17	-6.36
Gain _{g, Peak} [dBi]	-0.94	-0.27	-0.07	0.03	0.19	0.31	-0.89	-1.06	-1.07	-1.12	-1.18	-1.41
Gain _{g, Min} [dBi]	-38.96	-26.73	-26.37	-24.21	-24.47	-22.90	-28.59	-25.27	-25.15	-25.51	-26.84	-27.96
UHRG [dB]	-4.04	-2.95	-2.65	-2.56	-2.42	-2.37	-3.95	-4.06	-4.04	-4.07	-4.09	-4.25
UHRG/TRG [%]	57.11	56.99	57.25	57.71	58.28	58.82	55.64	54.94	54.29	54.18	53.59	53.03
H-Plane	-4.00	-2.31	-1.92	-1.81	-1.66	-1.58	-2.22	-2.25	-2.15	-2.17	-2.11	-2.16
E1-Plane, AVG [dB]	-8.61	-6.34	-5.71	-5.61	-5.53	-5.58	-6.78	-6.71	-6.55	-6.55	-6.42	-6.42
E2-Plane, AVG [dB]	-1.47	-0.40	-0.21	-0.17	-0.09	-0.11	-1.55	-1.60	-1.55	-1.58	-1.57	-1.71
Peak Gain [dBi]	1.49	3.37	3.65	3.70	3.80	3.80	2.17	2.07	2.06	2.03	2.00	1.79
Directivity [dB]	3.10	3.87	3.88	3.87	3.88	3.87	3.58	3.52	3.44	3.44	3.38	3.29
Minimum Gain [dBi]	-6.76	-11.49	-13.01	-13.04	-15.49	-18.00	-10.80	-10.57	-10.21	-10.24	-9.93	-9.95



- 5G Efficiency

<663~798 MHz (Port2)> B13, B14, B17, B71

	1	2	3	4	5	6	7	8	9	10	11	12
Frequency [MHz]	663	680	698	704	710	716	777	782	787	788	793	798
Efficiency [dB]	-0.64	-0.57	-0.49	-0.62	-0.58	-0.66	-1.10	-1.22	-1.24	-1.23	-1.30	-1.19
Efficiency [%]	86.3	87.7	89.3	86.7	87.5	85.8	77.7	75.5	75.1	75.4	74.2	76.0
TRG _g [dB]	-3.61	-3.60	-3.48	-3.53	-3.39	-3.34	-2.66	-2.77	-2.79	-2.77	-2.84	-2.71
Gain _{g, Peak} [dBi]	1.14	1.33	1.69	1.71	1.85	1.85	1.95	1.84	1.76	1.77	1.66	1.70
Gain _{g, Min} [dBi]	-31.71	-33.29	-33.08	-34.64	-37.24	-25.63	-29.14	-25.84	-26.94	-27.30	-28.07	-29.24
TRG _g [dB]	-3.70	-3.56	-3.52	-3.73	-3.80	-4.03	-6.30	-6.45	-6.49	-6.46	-6.55	-6.49
Gain _{g, Peak} [dBi]	-0.05	-0.27	0.01	-0.10	-0.06	-0.11	-0.56	-0.66	-0.72	-0.69	-0.78	-0.70
Gain _{g, Min} [dBi]	-27.43	-29.39	-16.57	-14.30	-12.53	-11.26	-28.63	-29.86	-30.57	-31.35	-32.46	-32.16
UHRG [dB]	-3.47	-3.55	-3.58	-3.72	-3.69	-3.76	-3.89	-4.02	-4.05	-4.03	-4.10	-4.00
UHRG/TRG [%]	52.16	50.35	49.15	48.95	48.86	48.98	52.62	52.54	52.47	52.47	52.40	52.38
H-Plane	-3.34	-3.60	-4.00	-4.20	-4.20	-4.22	-2.49	-2.51	-2.41	-2.38	-2.33	-2.06
E1-Plane, AVG [dB]	-4.49	-4.71	-5.21	-5.55	-5.68	-5.92	-5.62	-5.67	-5.62	-5.58	-5.59	-5.38
E2-Plane, AVG [dB]	-2.27	-1.93	-1.50	-1.48	-1.29	-1.26	-1.34	-1.49	-1.55	-1.54	-1.63	-1.55
Peak Gain [dBi]	2.27	2.44	2.55	2.46	2.55	2.44	2.15	1.99	1.94	1.96	1.82	1.87
Directivity [dB]	2.91	3.01	3.04	3.08	3.13	3.10	3.25	3.21	3.18	3.18	3.11	3.06
Minimum Gain [dBi]	-18.51	-12.82	-8.98	-8.93	-8.46	-8.10	-12.78	-13.46	-14.07	-14.19	-15.10	-15.78



- 5G Efficiency

<2305~2315 MHz(Port1)> B30

	1	2	3
Frequency [MHz]	2305	2310	2315
Efficiency [dB]	-0.35	-0.25	-0.32
Efficiency [%]	92.2	94.3	92.9
TRG _p [dB]	-1.17	-1.06	-1.12
Gain _{p, Peak} [dBi]	4.36	4.39	4.28
Gain _{p, Min} [dBi]	-25.90	-23.39	-23.99
TRG _p [dB]	-7.99	-7.99	-8.03
Gain _{p, Peak} [dBi]	-3.13	-3.14	-3.14
Gain _{p, Min} [dBi]	-27.21	-26.14	-26.84
UHRG [dB]	-2.65	-2.55	-2.60
UHRG/TRG [%]	58.91	58.99	59.07
H-Plane	0.18	0.27	0.13
E1-Plane, AVG [dB]	-2.46	-2.30	-2.36
E2-Plane, AVG [dB]	-1.89	-1.80	-1.88
Peak Gain [dBi]	4.55	4.57	4.50
Directivity [dB]	4.90	4.82	4.82
Minimum Gain [dBi]	-21.78	-21.16	-22.18

<2305~2315 MHz(Port2)> B30

	1	2	3
Frequency [MHz]	2305	2310	2315
Efficiency [dB]	-0.09	-0.04	-0.04
Efficiency [%]	98.1	99.2	99.0
TRG _p [dB]	-1.06	-0.99	-1.00
Gain _{p, Peak} [dBi]	4.99	5.04	5.08
Gain _{p, Min} [dBi]	-33.10	-31.50	-34.32
TRG _p [dB]	-7.06	-7.08	-7.08
Gain _{p, Peak} [dBi]	1.86	1.78	1.74
Gain _{p, Min} [dBi]	-32.35	-34.44	-45.02
UHRG [dB]	-2.58	-2.51	-2.51
UHRG/TRG [%]	56.33	56.55	56.65
H-Plane	0.28	0.33	0.31
E1-Plane, AVG [dB]	-2.04	-1.94	-1.91
E2-Plane, AVG [dB]	-2.03	-1.97	-2.01
Peak Gain [dBi]	5.97	5.94	5.96
Directivity [dB]	6.05	5.98	6.00
Minimum Gain [dBi]	-21.49	-19.30	-18.07