

A3LSMA236U Main RF & BT/WIFI Ant Specification

Main Ant A/B , Sub Ant C/D/E/F/G

- Antenna Type : MFA
- Antenna Manufacturer : Galtronics

Gain value is measured by Galtronics.

Gain Value is measured in active call & Antenna selection.

Antenna gain is measured in MTG Chamber.

* MTG Chamber

Anechoic chamber is available for Over The Air Test per CTIA, WiFi and WiMAX RPT Test. Also it is available for antenna pattern measurement for design and development. It's important to RF shielding, absorbing material, absorber layout, precision mechanical alignment and positioner accuracy, when anechoic chamber is designed and installed. MTG can provide the design and construction of anechoic chamber for customer requirements. MTG has a series of positioners, microwave transmit and receive instruments and measurement data acquisition and analysis software. We have the experience to offer anechoic chamber of any size; from the smallest unit for simple RF test to the largest and most complex custom-build for a research and development laboratory.

*Test Equipment list

Description	Manufacturer	Model	S/N	Cal Due
Network Analyzer	Agilent Technologies	E5071B	MY4230186	2022.02.11.

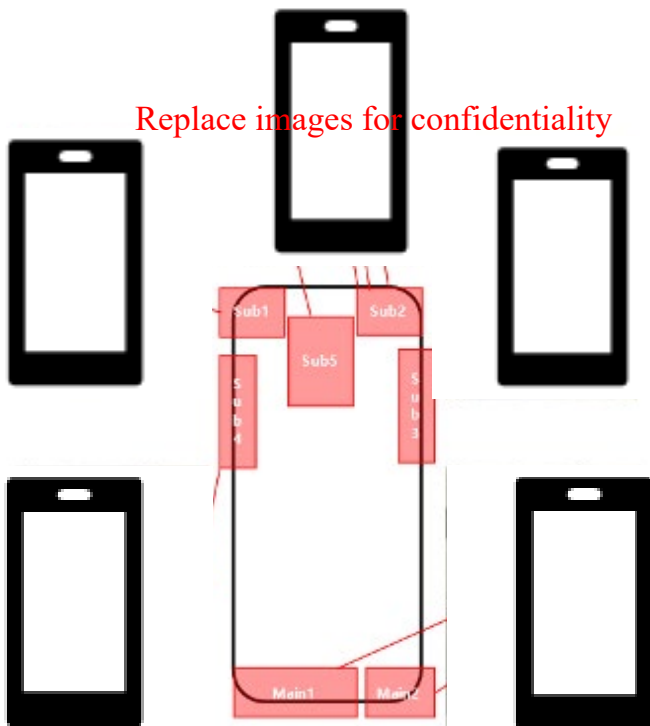
- Return Loss & VSWR Test

The VSWR measurement of antennas assembled into a fully operating SM-A236U phone handset is measured on the Network Analyzer. The handset is set up with a 50 Ohm coaxial cable connected to the 50 Ohm point. Calibration is done at the end of the 50 Ohm coaxial cable connection. The other end of the 50 Ohm coaxial cable is connected to a network analyzer. The handset is positioned on a non-conductive table for free space measurements.



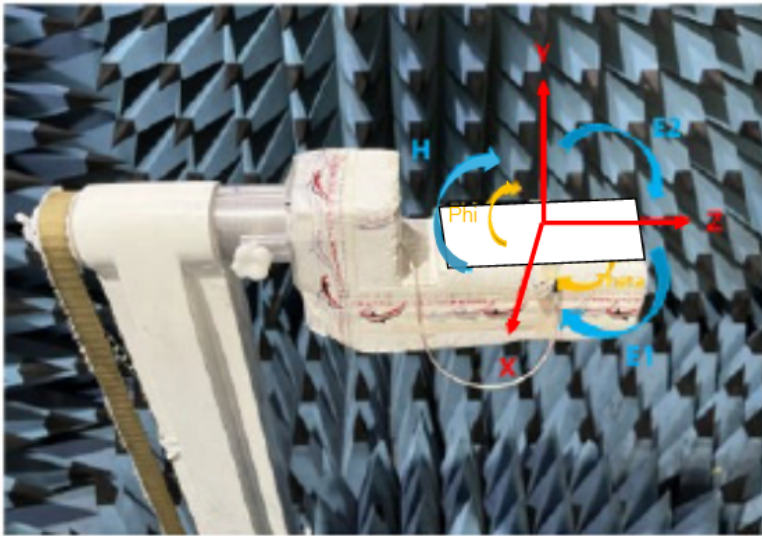
- Return Loss & VSWR Test

Galtronics has a system that can measure VSWR using MTG chamber and E5071B network analyzer for passive measurement. In order to measure the VSWR of each antenna, the lab connects the coaxial cable to the point in contact with the antenna on the main board. The VSWR is measured through the coaxial cable connected in the set. At this time, SM-A236U is assembled in the same state as the user environment



- Radiation Pattern Test

Antennas tested for Gain and Efficiency must be assembled into the enclosure and tested in the fully assembled and operating SM-A236U handset. The antenna is tested in free space in the anechoic chamber in the H, E1 and, E2 planes. The radiation patterns are measured at the center of transmit and receive bands.



- Test Method (Manufacturing)

All measurements are done with SM-A236U fully assembled. Measure in consideration of the Customer's usage environment. Use a fully shielded chamber environment to prevent any noise-induced errors. Typically. The electrical properties of antenna are measured using a jig that Can hold the set.

SM-A236U

Main RF Antenna Gain

Antenna A(Main1)

- MFA

- Manufacturer : Galtronics.

Antenna A	Band	B71/N71	B12/N12	B29	B28	B13	B14	B26
	Peak gain (dBi)	-3.52	-3.98	-3.7	-3.85	-3.92	-3.68	-4.31
	Ave. gain (dBi)	-6.83	-7.62	-7.56	-7.71	-7.13	-6.82	-7.42
	Band	B5/N5	B20	B8				
	Peak gain (dBi)	-4.05	-4.41	-3.46				
	Ave. gain (dBi)	-7.26	-7.58	-7.06				

Antenna B(Main2)

- MFA

- Manufacturer : Galtronics.

Antenna B	Band	B70	B4	B66/N66	B3	B2/N2	B25/N25	B39
	Peak gain (dBi)	-1.96	-0.83	-0.55	-0.64	0.55	0.66	1.07
	Ave. gain (dBi)	-6.22	-5.12	-5.07	-5.16	-4.44	-4.37	-4.2
	Band	B1	B30/N30	B40	B7	B41/N41	B38	N78
	Peak gain (dBi)	0.54	0.37	-0.57	0.03	0.12	0.11	-3.61
	Ave. gain (dBi)	-5.28	-5.31	-5.97	-4.07	-3.98	-4.01	-8.67
	Band	B48/N48	N77					
	Peak gain (dBi)	-4.04	-4.78					
	Ave. gain (dBi)	-9.5	-9.79					

Antenna C(Sub1)

- MFA

- Manufacturer : Galtronics.

Antenna G	Band	B1	B2	B3	B4	B5	B7
	Peak gain (dBi)	0.33	-0.76	-2.1	0.27	-5.26	-5.04
	Ave. gain (dBi)	-4.64	-6.92	-7.23	-4.69	-8.36	-7.71
	Band	B8	B12	B13	B14	B20	B25
	Peak gain (dBi)	-6.63	-5.66	-5.26	-4.81	-6.5	-0.78
	Ave. gain (dBi)	-10.08	-9.03	-8.67	-8.13	-9.02	-7
	Band	B26	B28	B29	B30	B66	B71
	Peak gain (dBi)	-5.48	-5.27	-5.17	-4.02	0.34	-15.96
	Ave. gain (dBi)	-8.45	-8.17	-8.5	-7.54	-4.7	-18.77
	Band	B38	B39	B40	B41	N70	
	Peak gain (dBi)	-2.69	-1.46	-4.12	-2.73	-0.87	
	Ave. gain (dBi)	-5.8	-6.17	-7.58	-5.84	-6.94	

Antenna D(Sub2)

- MFA

- Manufacturer : Galtronics.

Antenna D	Band	B2	B4	B25	B48	N70	N77
	Peak gain (dBi)	-3.47	-3.1	-3.24	-1.09	-2.66	-0.06
	Ave. gain (dBi)	-9.96	-8.34	-9.78	-7.24	-7.45	-5.96
	Band	N78	GPS				
	Peak gain (dBi)	-1.27	-0.32				
	Ave. gain (dBi)	-7.63	-4.85				

Antenna E(Sub3)

- MFA

- Manufacturer : Galtronics.

Antenna E	Band	B2/N2	B25/N25	N70	B4	B66/N66	N78
	Peak gain (dBi)	-0.18	-0.11	0.3	-0.37	-0.05	0.28
	Ave. gain (dBi)	-6	-5.95	-5.26	-4.88	-4.72	-4.43
	Band	B48/N48	N77				
	Peak gain (dBi)	-0.36	-0.63				
	Ave. gain (dBi)	-5.16	-5.77				

Antenna F(Sub4)

- MFA

- Manufacturer : Galtronics.

Antenna F	Band	B41
	Peak gain (dBi)	-0.72
	Ave. gain (dBi)	-6.13

Antenna G(Sub5)

- MFA

- Manufacturer : Galtronics.

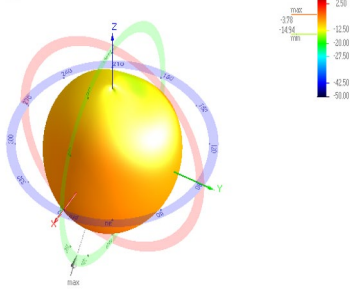
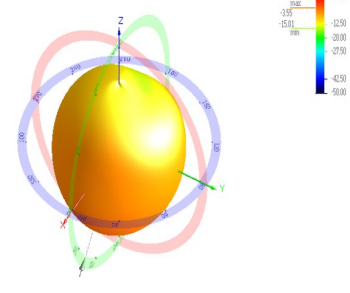
Antenna G	Band	B41	B48	N77	N78	WiFi 2G	WiFi 5G
	Peak gain (dBi)	-7.5	-3.63	-3.53	-2.44	-4.7	-3.9
	Ave. gain (dBi)	-11.75	-7.33	-7.38	-6.18	-6.7	-4.6

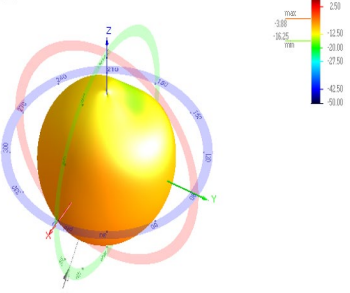
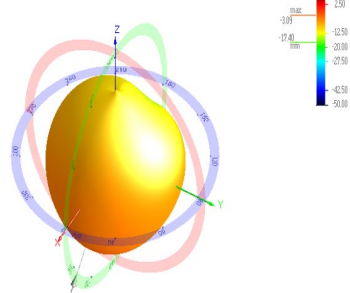
● Radiation Pattern

There is Radiation Pattern due to passive measurement with MTG chamber.

Antenna A(Main1)

주파수 대역	Main1	
(Frequency Band)	B71/N71	B12/N12
3D Radiation Pattern	680.500MHz 	707.500MHz
Avg Gain [dBi]	-6.83	-7.62
Efficiency[%]	20.77	17.28
Peak Gain [dBi]	-3.52	-3.98
주파수 대역	Main1	
(Frequency Band)	B29	B28
3D Radiation Pattern	722.500MHz 	725.500MHz
Avg Gain [dBi]	-7.56	-7.71
Efficiency[%]	17.55	16.93
Peak Gain [dBi]	-3.7	-3.85
주파수 대역	Main1	
(Frequency Band)	B13	B14
3D Radiation Pattern	782.000MHz 	793.000MHz
Avg Gain [dBi]	-7.13	-6.82
Efficiency[%]	19.38	20.8
Peak Gain [dBi]	-3.92	-3.68

주파수 대역	Main1	
(Frequency Band)	B26	B5/N5
3D Radiation Pattern	<p>831.500MHz</p> 	<p>836.500MHz</p> 
Avg Gain [dBi]	-7.42	-7.26
Efficiency[%]	18.12	18.8
Peak Gain [dBi]	-4.31	-4.05

주파수 대역	Main1	
(Frequency Band)	B20	B8
3D Radiation Pattern	<p>847.000MHz</p> 	<p>897.500MHz</p> 
Avg Gain [dBi]	-7.58	-7.06
Efficiency[%]	17.44	19.69
Peak Gain [dBi]	-4.41	-3.46

Antenna B(Main2)

주파수 대역	Main2	
(Frequency Band)	B70	B4
3D Radiation Pattern	<p>1702.500MHz</p>	<p>1732.500MHz</p>
Avg Gain [dBi]	-6.22	-5.12
Efficiency[%]	23.89	30.77
Peak Gain [dBi]	-1.96	-0.83

주파수 대역	Main2	
(Frequency Band)	B66/N66	B3
3D Radiation Pattern	<p>1745.000MHz</p>	<p>1747.500MHz</p>
Avg Gain [dBi]	-5.07	-5.16
Efficiency[%]	31.14	30.47
Peak Gain [dBi]	-0.55	-0.64

주파수 대역	Main2	
(Frequency Band)	B2/N2	B25/N25
3D Radiation Pattern	<p>1880.000MHz</p>	<p>1882.500MHz</p>
Avg Gain [dBi]	-4.44	-4.37
Efficiency[%]	36.01	36.54
Peak Gain [dBi]	0.55	0.66

주파수 대역	Main2	
(Frequency Band)	B39	B1
3D Radiation Pattern	1900.000MHz 	1950.000MHz
Avg Gain [dBi]	-4.2	-5.28
Efficiency[%]	37.99	29.64
Peak Gain [dBi]	1.07	0.54

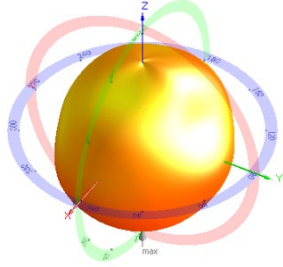
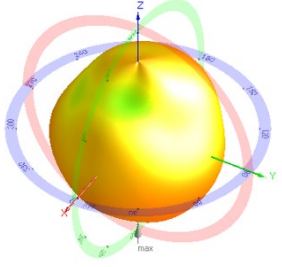
주파수 대역	Main2	
(Frequency Band)	B30/N30	B40
3D Radiation Pattern	2310.000MHz 	2350.000MHz
Avg Gain [dBi]	-5.31	-5.97
Efficiency[%]	29.45	25.29
Peak Gain [dBi]	0.37	-0.57

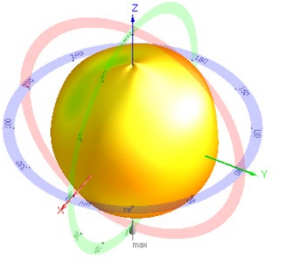
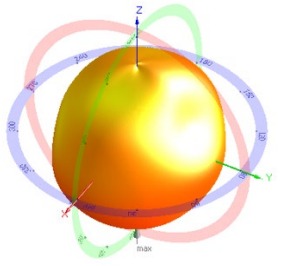
주파수 대역	Main2	
(Frequency Band)	B7	B41/N41
3D Radiation Pattern	2535.000MHz 	2593.000MHz
Avg Gain [dBi]	-4.07	-3.98
Efficiency[%]	39.15	40
Peak Gain [dBi]	0.03	0.12

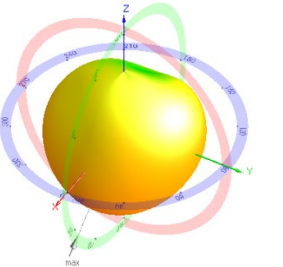
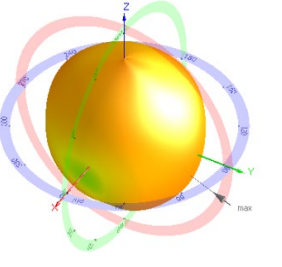
주파수 대역	Main2	
(Frequency Band)	B38	N78
3D Radiation Pattern	2595.000MHz 	3550.000MHz
Avg Gain [dBi]	-4.01	-8.67
Efficiency[%]	39.74	13.6
Peak Gain [dBi]	0.11	-3.61

주파수 대역	Main2	
(Frequency Band)	B48/N48	N77
3D Radiation Pattern	3625.000MHz 	3750.000MHz
Avg Gain [dBi]	-9.5	-9.79
Efficiency[%]	11.23	10.5
Peak Gain [dBi]	-4.04	-4.78

Antenna C(Sub1)

주파수 대역	Sub1	
(Frequency Band)	B1	B2
3D Radiation Pattern	2140.000MHz 	1960.000MHz 
Efficiency[%]	34.33	20.32
Avg Gain [dBi]	-4.64	-6.92
Peak Gain [dBi]	0.33	-0.76

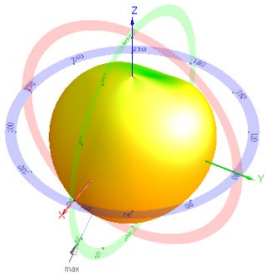
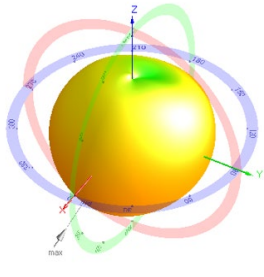
주파수 대역	Sub1	
(Frequency Band)	B3	B4
3D Radiation Pattern	1842.500MHz 	2132.500MHz 
Efficiency[%]	18.94	33.96
Avg Gain [dBi]	-7.23	-4.69
Peak Gain [dBi]	-2.1	0.27

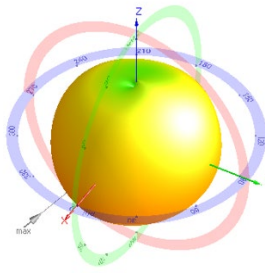
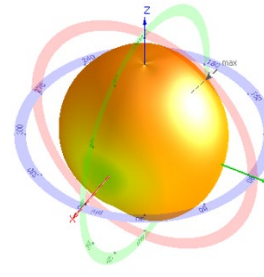
주파수 대역	Sub1	
(Frequency Band)	B5	B7
3D Radiation Pattern	881.500MHz 	2655.000MHz 
Efficiency[%]	14.85	16.92
Avg Gain [dBi]	-8.36	-7.71
Peak Gain [dBi]	-5.26	-5.04

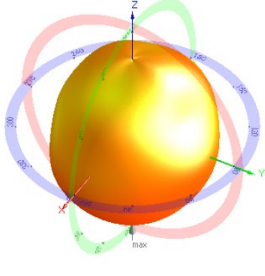
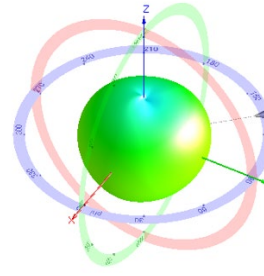
주파수 대역	Sub1	
(Frequency Band)	B8	B12
3D Radiation Pattern	942.500MHz 	737.500MHz
Efficiency[%]	9.81	12.51
Avg Gain [dBi]	-10.08	-9.03
Peak Gain [dBi]	-6.63	-5.66

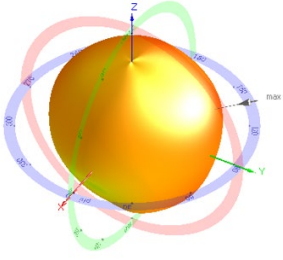
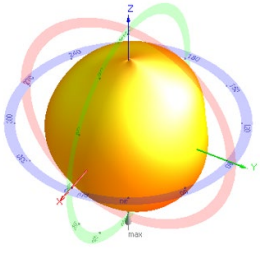
주파수 대역	Sub1	
(Frequency Band)	B13	B14
3D Radiation Pattern	751.000MHz 	763.000MHz
Efficiency[%]	13.59	13.59
Avg Gain [dBi]	-8.67	-8.13
Peak Gain [dBi]	-5.26	-4.81

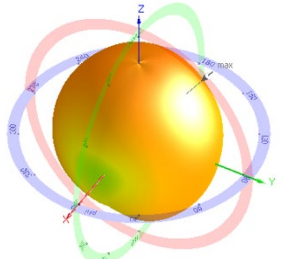
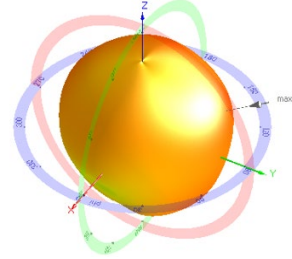
주파수 대역	Sub1	
(Frequency Band)	B20	B25
3D Radiation Pattern	806.000MHz 	1962.500MHz
Efficiency[%]	12.54	19.95
Avg Gain [dBi]	-9.02	-7
Peak Gain [dBi]	-6.5	-0.78

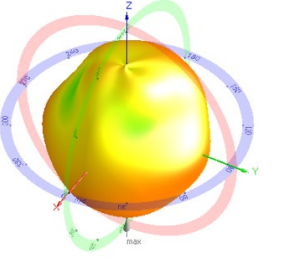
주파수 대역	Sub1	
(Frequency Band)	B26	B28
3D Radiation Pattern	876.500MHz 	780.500MHz 
Efficiency[%]	14.3	15.23
Avg Gain [dBi]	-8.45	-8.17
Peak Gain [dBi]	-5.48	-5.27

주파수 대역	Sub1	
(Frequency Band)	B29	B30
3D Radiation Pattern	722.500MHz 	2355.000MHz 
Efficiency[%]	14.14	17.63
Avg Gain [dBi]	-8.5	-7.54
Peak Gain [dBi]	-5.17	-4.02

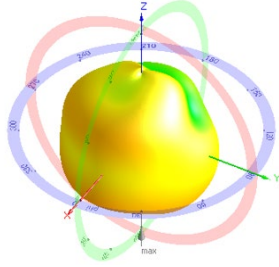
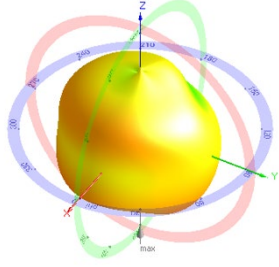
주파수 대역	Sub1	
(Frequency Band)	B66	B71
3D Radiation Pattern	2155.000MHz 	634.500MHz 
Efficiency[%]	33.88	1.33
Avg Gain [dBi]	-4.7	-18.77
Peak Gain [dBi]	0.34	-15.96

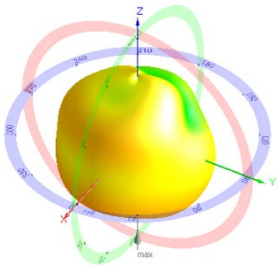
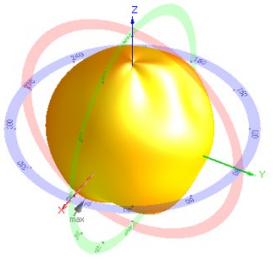
주파수 대역	Sub1	
(Frequency Band)	B38	B39
3D Radiation Pattern	2595.000MHz 	1900.000MHz 
Efficiency[%]	26.33	24.18
Avg Gain [dBi]	-5.8	-6.17
Peak Gain [dBi]	-2.69	-1.46

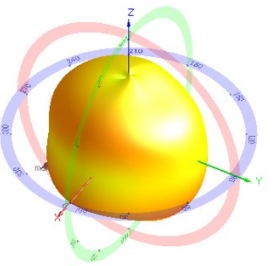
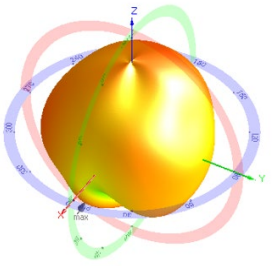
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(Frequency Band)	B40	B41
3D Radiation Pattern	2350.000MHz 	2593.000MHz 
Efficiency[%]	17.45	26.05
Avg Gain [dBi]	-7.58	-5.84
Peak Gain [dBi]	-4.12	-2.73

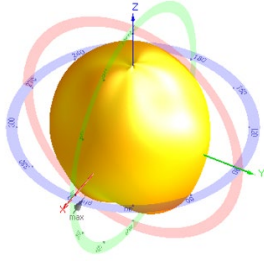
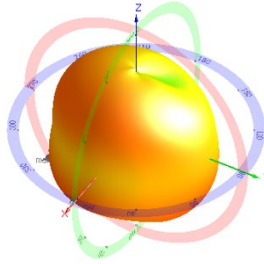
주파수 대역	Sub1	
(Frequency Band)	N70	
3D Radiation Pattern	2007.500MHz 	
Efficiency[%]	20.23	
Avg Gain [dBi]	-6.94	
Peak Gain [dBi]	-0.87	

Antenna D(Sub2)

주파수 대역	Sub2	
(Frequency Band)	B2	B4
3D Radiation Pattern	1880.000MHz 	1732.500MHz 
	Efficiency[%]	10.1
Avg Gain [dBi]	-9.96	-8.34
Peak Gain [dBi]	-3.47	-3.1

주파수 대역	Sub2	
(Frequency Band)	B25	B48
3D Radiation Pattern	1882.500MHz 	3625.000MHz 
	Efficiency[%]	10.52
Avg Gain [dBi]	-9.78	-7.24
Peak Gain [dBi]	-3.24	-1.09

주파수 대역	Sub2	
(Frequency Band)	N70	N77
3D Radiation Pattern	1702.500MHz 	3750.000MHz 
	Efficiency[%]	18.01
Avg Gain [dBi]	-7.45	-5.96
Peak Gain [dBi]	-2.66	-0.06

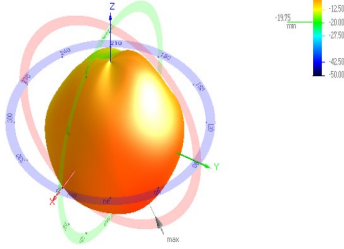
주파수 대역	Sub2	
(Frequency Band)	N78	GPS
3D Radiation Pattern	3550.000MHz 	1575.000MHz 
	Efficiency[%]	17.26
Avg Gain [dBi]	-7.63	-4.85
Peak Gain [dBi]	-1.27	-0.32

Antenna E(Sub3)

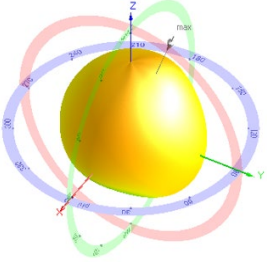
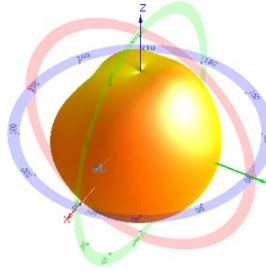
주파수 대역	Sub3	
(Frequency Band)	B2/N2	B25/N25
3D Radiation Pattern	<p>1960.000MHz</p>	<p>1962.500MHz</p>
Avg Gain [dBi]	-6	-5.95
Efficiency[%]	25.11	25.43
Peak Gain [dBi]	-0.18	-0.11
주파수 대역	Sub3	
(Frequency Band)	N70	B4
3D Radiation Pattern	<p>2007.500MHz</p>	<p>2132.500MHz</p>
Avg Gain [dBi]	-5.26	-4.88
Efficiency[%]	29.79	32.53
Peak Gain [dBi]	0.3	-0.37
주파수 대역	Sub3	
(Frequency Band)	B66/N66	N78
3D Radiation Pattern	<p>2155.000MHz</p>	<p>3550.000MHz</p>
Avg Gain [dBi]	-4.72	-4.43
Efficiency[%]	33.74	36.07
Peak Gain [dBi]	-0.05	0.28

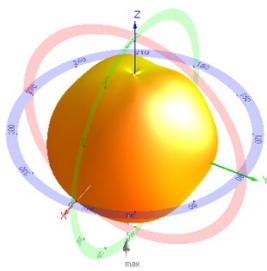
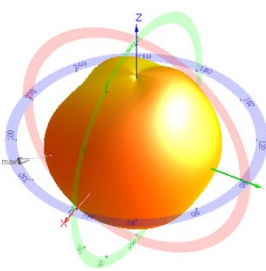
주파수 대역	Sub3	
(Frequency Band)	B48/N48	N77
3D Radiation Pattern	<p>3625.000MHz</p>	<p>3750.000MHz</p>
Avg Gain [dBi]	-5.16	-5.77
Efficiency[%]	30.45	26.51
Peak Gain [dBi]	-0.36	-0.63

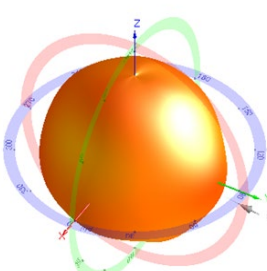
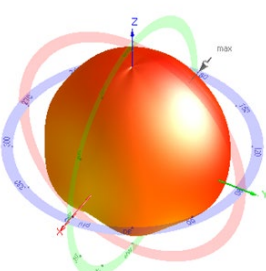
Antenna F(Sub4)

주파수 대역	Sub4	
(Frequency Band)	B41	
3D Radiation Pattern	<p data-bbox="357 412 526 434">2593.000MHz</p> 	
Avg Gain [dBi]	-6.13	
Efficiency[%]	24.36	
Peak Gain [dBi]	-0.72	

Antenna G(Sub5)

주파수 대역	Sub5	
(Frequency Band)	B41	B48
3D Radiation Pattern	2593.000MHz 	3625.000MHz 
Efficiency[%]	6.68	18.49
Avg Gain [dBi]	-11.75	-7.33
Peak Gain [dBi]	-7.51	-3.63

주파수 대역	Sub5	
(Frequency Band)	N77	N78
3D Radiation Pattern	3750.000MHz 	3550.000MHz 
Efficiency[%]	18.28	24.08
Avg Gain [dBi]	-7.38	-6.18
Peak Gain [dBi]	-3.53	-2.44

주파수 대역	Sub5	
(Frequency Band)	WiFi 2G	WiFi 5G
3D Radiation Pattern	2436.000MHz 	5500.000MHz 
Efficiency[%]	21.52	34.48
Avg Gain [dBi]	-6.7	-4.6
Peak Gain [dBi]	-4.7	-3.9