A3LSMA256U Main RF & BT/WIFI Ant Specification

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

Anechoic chamber is available for Over The Air Test per CTIA, LTE and WiFi 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	N5230A	MY45000186	2024.02.10

● Return Loss & VSWR Test

The VSWR measurement of antennas assembled into a fully operating SM-A256U 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.

Photo #1

- Return Loss & VSWR Test

Galtronics has a system that can measure VSWR using MTG chamber and N5230A 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-A256U is assembled in the same state as the user environment

Photo #2

- Radiation Pattern Test

Antennas tested for Gain and Efficiency must be assembled into the enclosure and tested in the fully assembled and operating SM-A256U 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.

Photo #3

- Test Method (Manufacturing)
  All measurements are done with SM-A256U 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-A256U

RF Antenna Gain

Antenna A(Main1)

- MFA

- Manufacturer : Galtronics.

	Band	B71	B12	B29	B28	B13	B14
Antenna A	Avg. gain (dBi)	-7.59	-7.62	-7.08	-7.13	-6.42	-6.33
	Peak gain (dBi)	-4.33	-4.55	-3.86	-3.94	-3.5	-3.56
	Band	B26	B5	B20	B8		
	Avg. gain (dBi)	-7.94	-7.28	-6.91	-5.86		
	Peak gain (dBi)	-5.02	-4.26	-3.84	-3.31		

Antenna B(Main2)

- MFA

- Manufacturer : Galtronics.

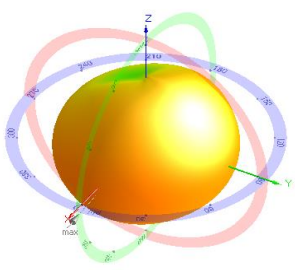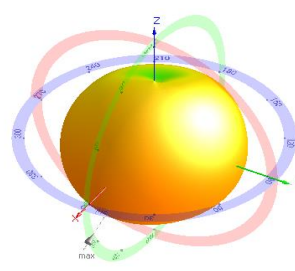|	Band	n70	B4	B66	B3	B2	B25
Antenna B	Avg. gain (dBi)	-6.21	-5.43	-5.01	-4.96	-4.57	-4.53
	Peak gain (dBi)	-1.92	-1.24	-0.97	-0.91	-0.02	0.09
	Band	B39	B1	B30	B40	B7	B41
	Avg. gain (dBi)	-4.11	-4.09	-3.85	-4.50	-4.03	-3.57
	Peak gain (dBi)	0.72	1.40	1.74	1.01	0.26	1.19
	Band	B38	n78	B48	n77		
	Avg. gain (dBi)	-3.59	-7.49	-8.22	-9.29		
	Peak gain (dBi)	1.19	-2.97	-3.39	-4.01		

Antenna C(Sub1)

- MFA

- Manufacturer : Galtronics.

Antenna C	Band	B1	B2	B3	B4	B5	B7
	Avg. gain (dBi)	-6.42	-8.54	-7.87	-6.59	-9.14	-5.87
	Peak gain (dBi)	-1.69	-4.35	-4.43	-1.89	-6.60	-1.81
	Band	B8	B12	B13	B14	B20	B25
	Avg. gain (dBi)	-10.30	-10.09	-10.62	-9.30	-10.55	-8.53
	Peak gain (dBi)	-7.15	-7.97	-8.39	-7.05	-7.94	-4.04
	Band	B26	B28	B29	B30	B38	B39
	Avg. gain (dBi)	-9.14	-9.47	-10.42	-7.35	-7.72	-7.21
	Peak gain (dBi)	-6.61	-7.21	-8.32	-1.65	-3.64	-3.91
	Band	B40	B41	B66	n70	B71	
	Avg. gain (dBi)	-7.19	-6.17	-6.45	-6.49	-11.17	
	Peak gain (dBi)	-1.24	-1.11	-1.76	-1.94	-9.05	

Antenna D(Sub2)

- MFA

- Manufacturer : Galtronics.

Antenna D	Band	n77	n78	B2	B4	n70	B66
	Avg. gain (dBi)	-6.72	-6.57	-8.32	-9.74	-9.28	-10.10
	Peak gain (dBi)	-2.20	-0.61	-1.76	-3.33	-2.12	-3.88
	Band	GPS					
	Avg. gain (dBi)	-6.02					
	Peak gain (dBi)	-0.87					

Antenna E & F(Main3 & Sub3)

- MFA

- Manufacturer : Galtronics.

	Band	B1	B4	B2	B25	B3	B39
Antenna E	Ave. gain (dBi)	-6.87	-7.18	-7.55	-7.58	-8.57	-7.03
	Peak gain (dBi)	-3.48	-4.01	-4.51	-4.61	-5.63	-3.32
	Band	B66	n70				
	Ave. gain (dBi)	-7.19	-7.07				
	Peak gain (dBi)	-3.81	-3.51				

	Band	n77	n78				
Antenna F	Ave. gain (dBi)	-4.90	-5.29				
	Peak gain (dBi)	0.84	0.75				

Antenna G(Sub4)

- MFA

- Manufacturer : Galtronics.

	Band	B41					
Antenna G	Ave. gain (dBi)	-6.93					
	Peak gain (dBi)	-1.36					

Antenna G(Sub5)

- MFA
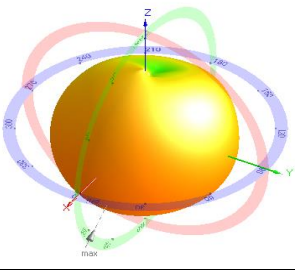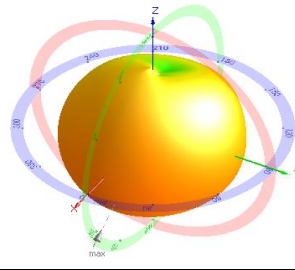
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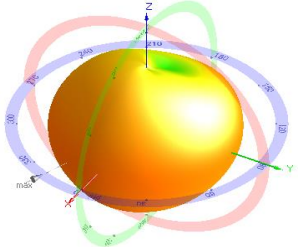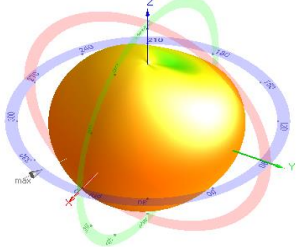
	Band	B41	B48	n77	n78	WiFi 2.4G	WiFi 5G
Antenna H	Ave. gain (dBi)	-11.63	-7.14	-6.31	-7.20	-5.84	-4.48
	Peak gain (dBi)	-9.54	-3.09	-2.10	-3.13	-1.12	-0.59
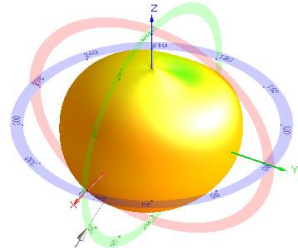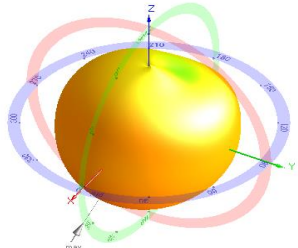
● Radiation Pattern
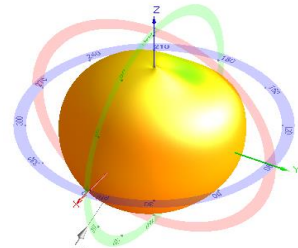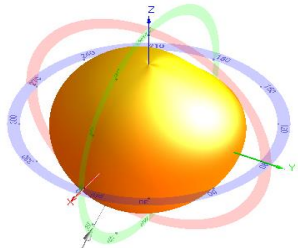
There is Radiation Pattern due to passive measurement with MTG chamber.

Antenna A(Main1)

주파수 대역	Main1	
(Frequency Band)	B71	B12
3D Radiation Pattern	680.500MHz	707.500MHz
Efficiency[%]	17.43	17.31
Avg Gain [dBi]	-7.59	-7.62
Peak Gain [dBi]	-4.33	-4.55

주파수 대역	Main1	
(Frequency Band)	B29	B28
3D Radiation Pattern	722.500MHz	725.500MHz
Efficiency[%]	19.58	19.35
Avg Gain [dBi]	-7.08	-7.13
Peak Gain [dBi]	-3.86	-3.94

주파수 대역	Main1	
(Frequency Band)	B13	B14
3D Radiation Pattern	782.000MHz 	793.000MHz
Efficiency[%]	22.82	23.28
Avg Gain [dBi]	-6.42	-6.33
Peak Gain [dBi]	-3.50	-3.56
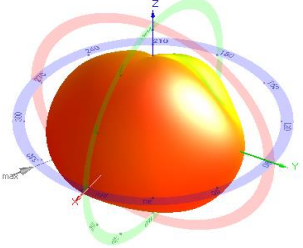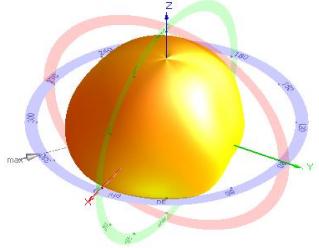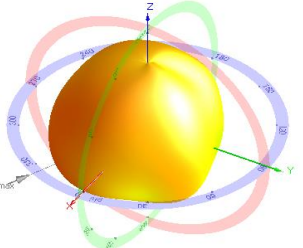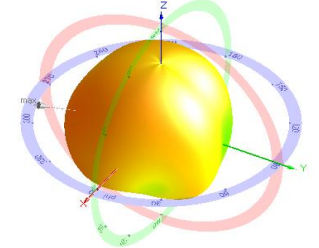
주파수 대역	Main1	
(Frequency Band)	B26	B5
3D Radiation Pattern	831.500MHz 	836.500MHz
Efficiency[%]	16.06	18.69
Avg Gain [dBi]	-7.94	-7.28
Peak Gain [dBi]	-5.02	-4.26

주파수 대역	Main1	
(Frequency Band)	B20	B8
3D Radiation Pattern	847.000MHz 	897.500MHz
Efficiency[%]	20.38	25.92
Avg Gain [dBi]	-6.91	-5.86
Peak Gain [dBi]	-3.84	-3.31
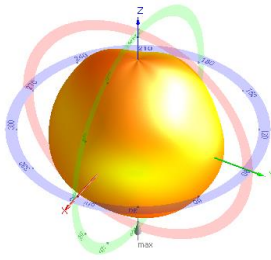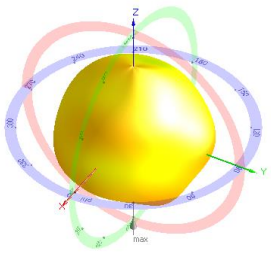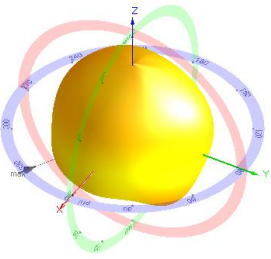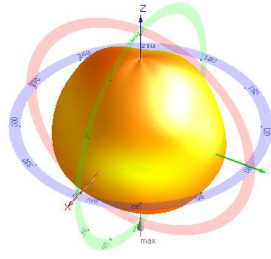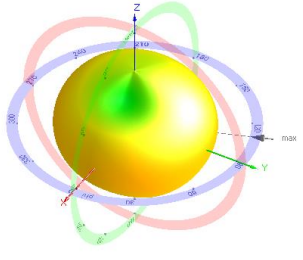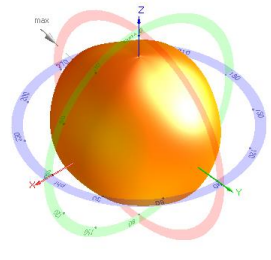
Antenna B(Main2)
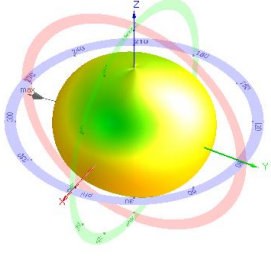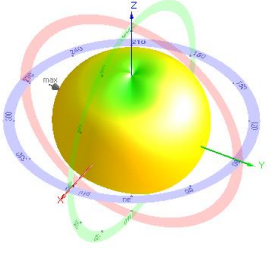
주파수 대역	Main2	
(Frequency Band)	n70	B4
3D Radiation Pattern	1702.500MHz	1732.500MHz
Efficiency[%]	23.93	28.61
Avg Gain [dBi]	-6.21	-5.43
Peak Gain [dBi]	-1.92	-1.24

주파수 대역	Main2	
(Frequency Band)	B66	B3
3D Radiation Pattern	1745.000MHz	1747.500MHz
Efficiency[%]	31.58	31.91
Avg Gain [dBi]	-5.01	-4.96
Peak Gain [dBi]	-0.97	-0.91

주파수 대역	Main2	
(Frequency Band)	B2	B25
3D Radiation Pattern	1880.000MHz	1882.500MHz
Efficiency[%]	34.92	35.26
Avg Gain [dBi]	-4.57	-4.53
Peak Gain [dBi]	-0.02	0.09
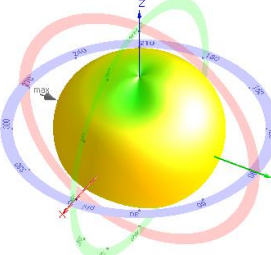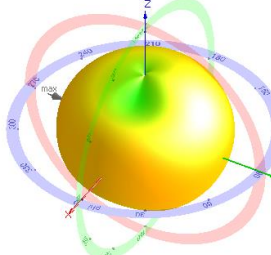
주파수 대역	Main2	
(Frequency Band)	B39	B1
3D Radiation Pattern	1900.000MHz	1950.000MHz
Efficiency[%]	38.81	38.99
Avg Gain [dBi]	-4.11	-4.09
Peak Gain [dBi]	0.72	1.40

주파수 대역	Main2	
(Frequency Band)	B30	B40
3D Radiation Pattern	2310.000MHz	2350.000MHz
Efficiency[%]	41.19	35.47
Avg Gain [dBi]	-3.85	-4.50
Peak Gain [dBi]	1.74	1.01

주파수 대역	Main2	
(Frequency Band)	B7	B41
3D Radiation Pattern	2535.000MHz	2593.000MHz
Efficiency[%]	39.51	43.99
Avg Gain [dBi]	-4.03	-3.57
Peak Gain [dBi]	0.26	1.19
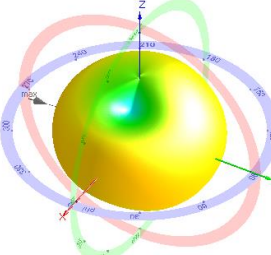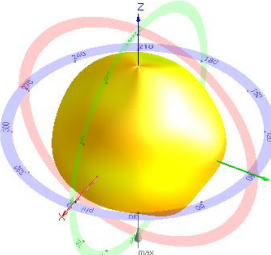
주파수 대역	Main2	
(Frequency Band)	B38	n78
3D Radiation Pattern	2595.000MHz	3550.000MHz
Efficiency[%]	43.76	17.83
Avg Gain [dBi]	-3.59	-7.49
Peak Gain [dBi]	1.19	-2.97

주파수 대역	Main2	
(Frequency Band)	B48	n77
3D Radiation Pattern	3625.000MHz	3750.000MHz
Efficiency[%]	15.06	11.78
Avg Gain [dBi]	-8.22	-9.29
Peak Gain [dBi]	-3.39	-4.01
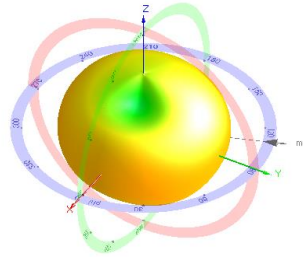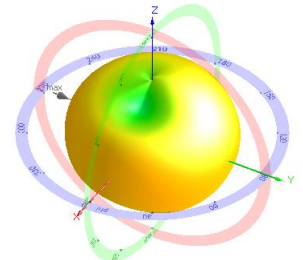
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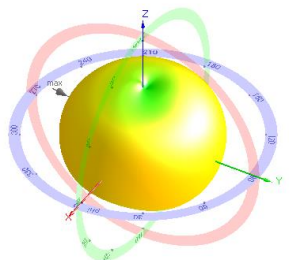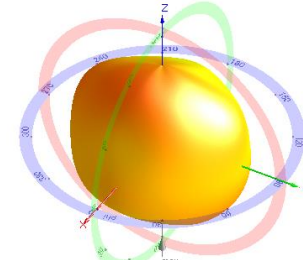
주파수 대역	Sub1	
(Frequency Band)	B1	B2
3D Radiation Pattern	2140.000MHz	1960.000MHz
Efficiency[%]	22.79	14.01
Avg Gain [dBi]	-6.42	-8.54
Peak Gain [dBi]	-1.69	-4.35

주파수 대역	Sub1	
(Frequency Band)	B3	B4
3D Radiation Pattern	1842.500MHz	2132.500MHz
Efficiency[%]	16.34	21.93
Avg Gain [dBi]	-7.87	-6.59
Peak Gain [dBi]	-4.43	-1.89

주파수 대역	Sub1	
(Frequency Band)	B5	B7
3D Radiation Pattern	881.500MHz	2655.000MHz
Efficiency[%]	12.19	25.88
Avg Gain [dBi]	-9.14	-5.87
Peak Gain [dBi]	-6.60	-1.81
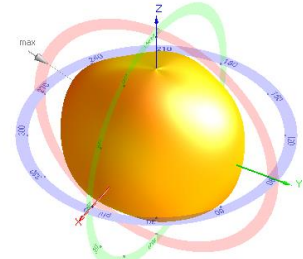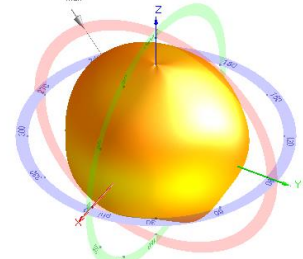
주파수 대역	Sub1	
(Frequency Band)	B8	B12
3D Radiation Pattern	942.500MHz	737.500MHz
Efficiency[%]	9.34	9.81
Avg Gain [dBi]	-10.30	-10.09
Peak Gain [dBi]	-7.15	-7.97

주파수 대역	Sub1	
(Frequency Band)	B13	B14
3D Radiation Pattern	751.000MHz	763.000MHz
Efficiency[%]	8.67	11.74
Avg Gain [dBi]	-10.62	-9.30
Peak Gain [dBi]	-8.39	-7.05

주파수 대역	Sub1	
(Frequency Band)	B20	B25
3D Radiation Pattern	806.000MHz	1962.500MHz
Efficiency[%]	8.81	14.04
Avg Gain [dBi]	-10.55	-8.53
Peak Gain [dBi]	-7.94	-4.04

주파수 대역	Sub1	
(Frequency Band)	B26	B28
3D Radiation Pattern	876.500MHz	780.500MHz
Efficiency[%]	12.18	11.30
Avg Gain [dBi]	-9.14	-9.47
Peak Gain [dBi]	-6.61	-7.21
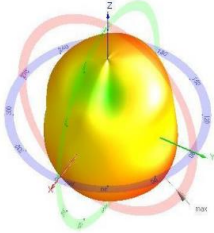
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(Frequency Band)	B29	B30
3D Radiation Pattern	722.500MHz	2355.000MHz
Efficiency[%]	9.07	18.40
Avg Gain [dBi]	-10.42	-7.35
Peak Gain [dBi]	-8.32	-1.65

주파수 대역	Sub1	
(Frequency Band)	B38	B39
3D Radiation Pattern	2595.000MHz	1900.000MHz
Efficiency[%]	16.89	19.00
Avg Gain [dBi]	-7.72	-7.21
Peak Gain [dBi]	-3.64	-3.91
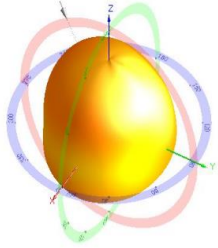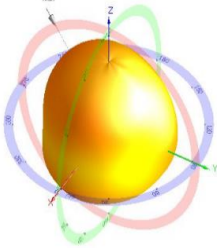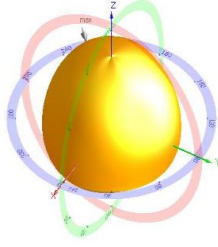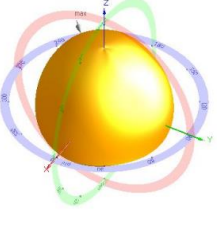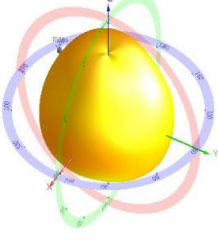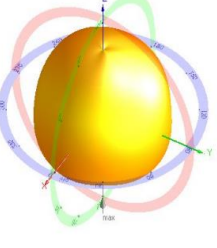
주파수 대역	Sub1	
(Frequency Band)	B40	B41
3D Radiation Pattern	2350.000MHz 	2595.000MHz
Efficiency[%]	19.09	24.14
Avg Gain [dBi]	-7.19	-6.17
Peak Gain [dBi]	-1.24	-1.11

주파수 대역	Sub1	
(Frequency Band)	B66	n70
3D Radiation Pattern	2155.000MHz 	2007.500MHz
Efficiency[%]	22.64	22.45
Avg Gain [dBi]	-6.45	-6.49
Peak Gain [dBi]	-1.76	-1.94

주파수 대역	Sub1	
(Frequency Band)	B71	
3D Radiation Pattern	634.500MHz 	
Efficiency[%]	7.64	
Avg Gain [dBi]	-11.17	
Peak Gain [dBi]	-9.05	
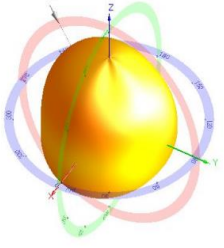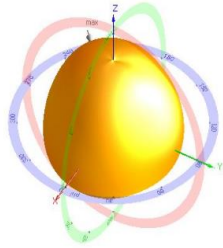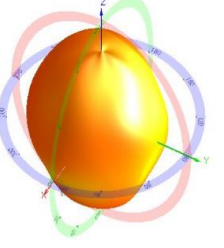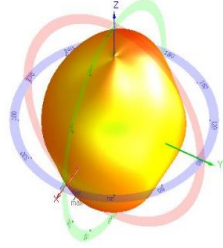
Antenna D(Sub2)

주파수 대역	Sub2	
(Frequency Band)	n77	n78
3D Radiation Pattern	3750.000MHz 	3550.000MHz
Efficiency[%]	21.26	22.02
Avg Gain [dBi]	-6.72	-6.57
Peak Gain [dBi]	-2.20	-0.61

주파수 대역	Sub2	
(Frequency Band)	B2	B4
3D Radiation Pattern	1960.000MHz 	2132.500MHz
Efficiency[%]	14.71	10.63
Avg Gain [dBi]	-8.32	-9.74
Peak Gain [dBi]	-1.76	-3.33

주파수 대역	Sub2	
(Frequency Band)	n70	B66
3D Radiation Pattern	2007.500MHz 	2155.000MHz
Efficiency[%]	11.81	9.77
Avg Gain [dBi]	-9.28	-10.1
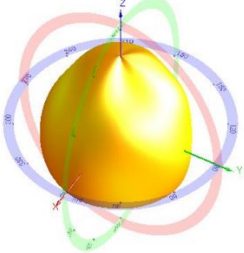
주파수 대역	Sub2	
(Frequency Band)	GPS	
3D Radiation Pattern	1575.000MHz	
Efficiency[%]	25.03	
Avg Gain [dBi]	-6.02	
Peak Gain [dBi]	-0.87	

Antenna E & F (Main3 & Sub3)

주파수 대역	Main3	
(Frequency Band)	B1	B4
3D Radiation Pattern	2140.000MHz	2132.500MHz
Efficiency[%]	20.57	19.12
Avg Gain [dBi]	-6.87	-7.18
Peak Gain [dBi]	-3.48	-4.01

주파수 대역	Main3	
(Frequency Band)	B2	B25
3D Radiation Pattern	1960.000MHz	1962.500MHz
Efficiency[%]	17.59	17.45
Avg Gain [dBi]	-7.55	-7.58
Peak Gain [dBi]	-4.51	-4.61

주파수 대역	Main3	
(Frequency Band)	B3	B39
3D Radiation Pattern	1842.500MHz	1900.000MHz
Efficiency[%]	13.90	19.80
Avg Gain [dBi]	-8.57	-7.03
Peak Gain [dBi]	-5.63	-3.32

주파수 대역	Main3	
(Frequency Band)	B66	n70
3D Radiation Pattern	2155.000MHz	2007.500MHz
Efficiency[%]	19.08	19.64
Avg Gain [dBi]	-7.19	-7.07
Peak Gain [dBi]	-3.81	-3.51

주파수 대역	SUB3	
(Frequency Band)	n77	n78
3D Radiation Pattern	3750.000MHz	3550.000MHz
Efficiency[%]	32.38	29.57
Avg Gain [dBi]	-4.90	-5.29
Peak Gain [dBi]	0.84	0.75

Antenna G (Sub4)

주파수 대역 (Frequency Band)	Sub4	
	B41	
3D Radiation Pattern	2593.000MHz	
Efficiency[%]	20.29	
Avg Gain [dBi]	-6.93	
Peak Gain [dBi]	-1.36	

Antenna H (Sub5)

주파수 대역	Sub5	
(Frequency Band)	B41	B48
3D Radiation Pattern	2593.000MHz	3625.000MHz
Efficiency[%]	6.87	19.31
Avg Gain [dBi]	-11.63	-7.14
Peak Gain [dBi]	-9.54	-3.09

주파수 대역	Sub5	
(Frequency Band)	n77	n78
3D Radiation Pattern	3750.000MHz	3550.000MHz
Efficiency[%]	23.39	19.03
Avg Gain [dBi]	-6.31	-7.20
Peak Gain [dBi]	-2.10	-3.13

주파수 대역	Sub5	
(Frequency Band)	WiFi 2.4GHz	WiFi 5GHz
3D Radiation Pattern	2437.000MHz	5500.000MHz
Efficiency[%]	26.06	35.63
Avg Gain [dBi]	-5.84	-4.48
Peak Gain [dBi]	-1.12	-0.59