PRODUCT SPECIFICATION

TITLE

GPS/WIFI (2.4/5GHz) COMBO BALANCE PCB ANTENNA

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GPS/WIFI (2.4/5GHz) COMBO BALANCE PCB ANTENNA

1.0 SCOPE

This Product Specification covers the mechanical, electrical and environmental performances requirements and test methods for GPS/WiFi (2.4/5GHz) Combo Balance PCB Antenna.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Product name: GPS/WiFi (2.4/5GHz) Combo Balance PCB Antenna 146220.

2.2 Design and Construction

Antenna shall be of the design, construction and physical dimensions specified on the applicable sales drawing.

2.3 Materials

a) PCB: Refer to sales drawing SD of 1462200050.
b) Cable Line: Refer to sales drawing SD of 1462200050.
c) Connector: Refer to sales drawing SD of 1462200050.

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See drawings and other sections of this specification for the relevant reference documents. In cases where the specification differs from the drawings, the drawings take precedence.

4.0 RATINGS

4.1 RF POWER

2 WATTS

4.2 TEMPERATU

Operating: - 30°C to 85°C
Storage : - 40°C to 95°C

4.3 HUMIDITY

Operating : -30℃ to 85℃
-30℃ to 50℃, 85%RH or less
50℃ to 85℃, 60%RH or less

Storage : -40℃ to 95℃
-40℃ to 50℃, 85%RH or less
50℃ to 95℃, 60%RH or less

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 50mm (1462200050)

DESCRIPTION	TEST CONDITION	REQUIREMENTS			
Frequency Range	1575.42MHz~1602MHz / 2.4GHz~6GHz	1575.42 MHz-1602 MHz	2.4GHz~2.5GHz	5.15GHz~5.85 GHz	3GHz~6GHz
Return Loss	Antenna with 100mm long, 1.13mm diameter micro coaxial cable in free space. Measured by VNA5071C	< -8 dB			
Peak Gain	Measure antenna in free space through OTA chamber	2.6 dBi	3.1 dBi	4.1 dBi	3.8 dBi
Total Efficiency	Measure antenna in free space through OTA chamber	>84%	>82%	>88%	>82%
Polarization	Measure antenna in free space through OTA chamber	Linear			
Input Impedance	Measure antenna in free space through VNA E5071C	50 Ohms			

5.2 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 100mm (1462200100)

DESCRIPTION	TEST CONDITION	REQUIREMENTS			
Frequency Range	1575.42MHz~1602MHz / 2.4GHz~6GHz	1575.42 MHz-1602 MHz	2.4GHz~2.5GHz	5.15GHz~5.85GHz	3GHz~6GHz
Return Loss	Antenna with 100mm long, 1.13mm diameter micro coaxial cable in free space. Measured by VNA5071C	< -8 dB			
Peak Gain	Measure antenna in free space through OTA chamber	2.4 dBi	2.9 dBi	3.8 dBi	3.5 dBi
Total Efficiency	Measure antenna in free space through OTA chamber	>82%	>80%	>83%	>78%
Polarization	Measure antenna in free space through OTA chamber	Linear			
Input Impedance	Measure antenna in free space through VNA E5071C	50 Ohms			

5.3 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 150mm (1462200150)

DESCRIPTION	TEST CONDITION	REQUIREMENTS			
Frequency Range	1575.42MHz~1602MHz / 2.4GHz~6GHz	1575.42 MHz-1602 MHz	2.4GHz~2.5GHz	5.15GHz~5.85 GHz	3GHz~6GHz
Return Loss	Antenna with 100mm long, 1.13mm diameter micro coaxial cable in free space. Measured by VNA5071C	< -8 dB			
Peak Gain	Measure antenna in free space through OTA chamber	2.3 dBi	2.8 dBi	3.6 dBi	3.3 dBi
Total Efficiency	Measure antenna in free space through OTA chamber	>79%	>77%	>78%	>73%
Polarization	Measure antenna in free space through OTA chamber	Linear			
Input Impedance	Measure antenna in free space through VNA E5071C	50 Ohms			

5.4 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 200mm (1462200200)

DESCRIPTION	TEST CONDITION	REQUIREMENTS			
Frequency Range	1575.42MHz~1602MHz / 2.4GHz~6GHz	1575.42 MHz-1602 MHz	2.4GHz~2.5GHz	5.15GHz~5.85 GHz	3GHz~6GHz
Return Loss	Antenna with 100mm long, 1.13mm diameter micro coaxial cable in free space. Measured by VNA5071C	< -8 dB			
Peak Gain	Measure antenna in free space through OTA chamber	2.1 dBi	2.6 dBi	3.3 dBi	3 dBi
Total Efficiency	Measure antenna in free space through OTA chamber	>76%	>74%	>73%	>69%
Polarization	Measure antenna in free space through OTA chamber	Linear			
Input Impedance	Measure antenna in free space through VNA E5071C	50 Ohms			

5.5 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 250mm (1462200250)

DESCRIPTION	TEST CONDITION	REQUIREMENTS			
Frequency Range	1575.42MHz~1602MHz / 2.4GHz~6GHz	1575.42 MHz-1602 MHz	2.4GHz~2.5GHz	5.15GHz~5.85 GHz	3GHz~6GHz
Return Loss	Antenna with 100mm long, 1.13mm diameter micro coaxial cable in free space. Measured by VNA5071C	< -8 dB			
Peak Gain	Measure antenna in free space through OTA chamber	2 dBi	2.5 dBi	3.1 dBi	2.8 dBi
Total Efficiency	Measure antenna in free space through OTA chamber	>73%	>71%	>69%	>65%
Polarization	Measure antenna in free space through OTA chamber	Linear			
Input Impedance	Measure antenna in free space through VNA E5071C	50 Ohms			

5.6 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 300mm (1462200300)

DESCRIPTION	TEST CONDITION	REQUIREMENTS			
Frequency Range	1575.42MHz~1602MHz / 2.4GHz~6GHz	1575.42 MHz-1602 MHz	2.4GHz~2.5GHz	5.15GHz~5.85 GHz	3GHz~6GHz
Return Loss	Antenna with 100mm long, 1.13mm diameter micro coaxial cable in free space. Measured by VNA5071C	< -8 dB			
Peak Gain	Measure antenna in free space through OTA chamber	1.8 dBi	2.3 dBi	2.8 dBi	2.5 dBi
Total Efficiency	Measure antenna in free space through OTA chamber	>70%	>68%	>65%	>61%
Polarization	Measure antenna in free space through OTA chamber	Linear			
Input Impedance	Measure antenna in free space through VNA E5071C	50 Ohms			

5.7 CABLE LOSS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENTS		
5.7.1	Frequency Range	1.5 GHz~6GHz	1.5GHz~3GHz	3GHz~5GHz	5GHz~6.0GHz
5.7.2	Attenuation	1m cable. Measured by VNA5071C	≤3dB/m	≤4dB/m	≤5dB/m

5.8 CABLE LENGTH AFFECT THE ANTENNA PERFORMANCE

Balance antenna resonance is insensitive by cable's length, but the cable's loss will affect the total efficiency. Refer to 5.7

5.9 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.9.1	Pull test	Test machine : Max intelligent load tester fixed the PCB antenna in an instrument, pull cable in horizontal direction.	Pull force >8N

5.10 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.10.1	Temperature /Humidity cycling	Test condition: 1) The device under test is kept for 30 mins in an environment with a temperature of -40 ℃. 2) Kept for 4 Hours in an environment with a temperature of 85 degrees and a relative humidity of 95%. 3) Kept for 2 Hours in an environment with a temperature of 125 degrees and a relative humidity of 95%. 4) The cycle is repeated until a total of 40 cycles have been completed. Hereafter the conditions are stabilized at room temperature.	1) Parts should meet RF spec before and after test. 2） No cosmetic problem
5.10.2	Temperature Shock	Test condition: 1) The device under test at -40 ℃⇔125 ℃ by 100 cycles, Dwell of 30 mins, transition time between Dwell 30 secs (~ 61 mins / cycle) and each item should be measured after exposing them in normal temperature and humidity for 24 h.	1) Parts should meet RF spec before and after test. 2） No cosmetic problem

5.10.3	High Temperature	Test condition: 1) Temperature:125℃， time:1008hours 2) There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other	1) Parts should meet RF spec before and after test. 2) No cosmetic problem
5.10.4	Salt mist test	Test condition: 1) The device under test is exposed to a spray of a 5% (by volume) resolution of Nacl in water for 2 hours. Thereafter the device under test is left for 1 week in room temperature at a relative humidity of 95%. The cycle is repeated until a total of 2 cycles have been completed. Here after the conditions are stabilized at room temperature.	1) Parts should meet RF spec before and after test. 2) No visible corrosion. Discoloration accept.

The meaning of text "**No Cosmetic Problem"** in the table above is:

a. No soldering problem
b. No mechanical damage

6.0 TEST GROUPINGS

Test Item	Description	Group1	Group2	Group3	Group4	Group5
5.9.1	Pull test	X				
5.10.1	Temperature /Humidity cycling		X			
5.10.2	Temperature Shock			X		
5.10.3	High Temperature				X	
5.10.4	Salt mist test					X
	Sample Quantity	5	5	5	5	5

7.0 PACKAGING

Refer to the Molex related packaging drawing of 1462200100.