PRODUCT SPECIFICATION

TITLE

MULTI-BAND CELLULAR/WIFI COMBO FLEX ANTENNA

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MULTI-BAND CELLULAR/WIFI COMBO FLEX ANTENNA

1.0 SCOPE

This Product Specification covers the mechanical, electrical and environmental performances requirements and test methods for balance antenna.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Product name: MULTI-BAND CELLULAR/WIFI COMBO FLEX ANTENNA-146185-0100

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) Flex: Refer to respective Molex sales or engineering drawings
b) Plating: Refer to respective Molex sales or engineering drawings
c) Cable Line: Refer to respective Molex sales or engineering drawings
d) Connector: Refer to respective Molex sales or engineering drawings

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 TEMPERATURE

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

4.3 HUMIDITY

Operating : -30°C to+85°C
-30°C to+50°C, 85%RH or less
+50°C to+85°C, 60%RH or less

Storage : -40°C to+95°C
-40°C to+50°C, 85%RH or less
+50°C to+95°C, 60%RH or less

5.0 PERFORMANCE

5.1 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 50mm (1461850050)

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	0.824GHz~6GHz	824MHz~960MHz	1.71GHz~2.7GHz	3GHz~6GHz
Return Loss	Antenna loaded on PC/ABS housing (thickness 1mm) with 100mm 1.13mm diameter micro coaxial cable Measured by VNA5071C	< -4 dB	< -4 dB	< -6 dB
Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	1.6dBi	3.4dBi	4.2dBi
Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>65%	>72%	74%
Polarization	Measure antenna on recommended PC/ABS housing through OTA chamber	Linear		
Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms		

5.2 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 100mm (1461850100)

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	0.824GHz~6GHz	824MHz~960MHz	1.71GHz~2.7GHz	3GHz~6GHz
Return Loss	Antenna loaded on PC/ABS housing (thickness 1mm) with 100mm 1.13mm diameter micro coaxial cable Measured by VNA5071C	< -4 dB	< -4 dB	< -6 dB
Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	1.5 dBi	3.2 dBi	4.0dBi
Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>64%	>70%	70%
Polarization	Measure antenna on recommended PC/ABS housing through OTA chamber	Linear		
Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms		

5.3 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 150mm (1461850150)

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	0.824GHz~6GHz	824MHz~960MHz	1.71GHz~2.7GHz	3GHz~6GHz
Return Loss	Antenna loaded on PC/ABS housing (thickness 1mm) with 100mm 1.13mm diameter micro coaxial cable Measured by VNA5071C	< -4 dB	< -4 dB	< -6 dB
Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	1.4 dBi	3.0 dBi	3.7dBi
Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>62%	>67%	66%
Polarization	Measure antenna on recommended PC/ABS housing through OTA chamber	Linear		
Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms		

5.4 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 200mm (1461850200)

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	0.824GHz~6GHz	824MHz~960MHz	1.71GHz~2.7GHz	3GHz~6GHz
Return Loss	Antenna loaded on PC/ABS housing (thickness 1mm) with 100mm 1.13mm diameter micro coaxial cable Measured by VNA5071C	< -4 dB	< -4 dB	< -6 dB
Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	1.3dBi	2.9dBi	3.5dBi
Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>61%	>65%	62%
Polarization	Measure antenna on recommended PC/ABS housing through OTA chamber	Linear		
Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms		

5.5 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 250mm (1461850250)

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	0.824GHz~6GHz	824MHz~960MHz	1.71GHz~2.7GHz	3GHz~6GHz
Return Loss	Antenna loaded on PC/ABS housing (thickness 1mm) with 100mm 1.13mm diameter micro coaxial cable Measured by VNA5071C	< -4 dB	< -4 dB	< -6 dB
Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	1.2dBi	2.7dBi	3.3dBi
Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>60%	>63%	59%
Polarization	Measure antenna on recommended PC/ABS housing through OTA chamber	Linear		
Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms		

5.6 ELECTRICAL REQUIREMENTS FOR CABLE LENGTH 300mm (1461850300)

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	0.824GHz~6GHz	824MHz~960MHz	1.71GHz~2.7GHz	3GHz~6GHz
Return Loss	Antenna loaded on PC/ABS housing (thickness 1mm) with 100mm 1.13mm diameter micro coaxial cable Measured by VNA5071C	< -4 dB	< -4 dB	< -6 dB
Peak Gain	Measure antenna on recommended PC/ABS housing through OTA chamber	1.1dBi	2.6dBi	3dBi
Total Efficiency	Measure antenna on recommended PC/ABS housing through OTA chamber	>59%	>61%	56%
Polarization	Measure antenna on recommended PC/ABS housing through OTA chamber	Linear		
Input Impedance	Measure antenna on recommended PC/ABS housing through VNA E5071C	50 Ohms		

5.7 CABLE LOSS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT			
5.7.1	Frequency Range	824MHz~6GHz	824MHz~960 MHz	1.7GHz~2.7 GHz	3GHz~5GHz	5GHz~6GHz
5.7.2	Attenuation	1m cable measured by VNA5071C	≤1.8dB/m	≤3.5dB/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 Stick the flex antenna in a PC block, pull cable in horizontal direction	Pull force <18 N

5.10 RELIABILITY REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.10.1	Cross section	Cross section on pad soldering area. Check under microscope	No soldering problem

5.11 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5.11.1	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

5.11.2	Temperature Shock	Test condition: 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
5.11.3	High Temperature	Test condition: Temperature:125℃, time:1008hours There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other	Parts should meet RF spec before and after test. No cosmetic problem
5.11.4	Salt mist test	1.Test condition: 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 adhesion problem of glue
c. no peel off of plating

6.0 TEST GROUPINGS

Test Item	Description	Group1	Group2	Group3	Group4	Group5	Group6
5.9.1	Pull test	X					
5.10.1	Cross section		X				
5.11.1	Temperature /Humidity cycling			X			
5.11.2	Temperature Shock				X		
5.11.3	High Temperature					X	
5.11.4	Salt mist test						X
	Sample Quantity	5	5	5	5	5	5

7.0 PACKAGING

Refer to the Molex related packaging drawings.