TITLE

WIFI 6E FLEX CABLED SIDE-FED BALANCED ANTENNA

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WIFI 6E FLEX CABLED SIDE-FED BALANCED ANTENNA

1.0 SCOPE

This Product Specification covers the mechanical, electrical and environmental performances specification for WIFI 6E flex cabled side-fed balanced antenna.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Product name: WIFI 6E flex cabled side-fed balanced antenna
Series Number: 204281

2.2 DESCRIPTION

Series 204281 is a balanced, dipole-type, high efficiency antenna for 2.4/5/6 GHz applications, including Wi-Fi 6E, Bluetooth, Zigbee and others. This antenna is made from poly flexible material with small size 35*11*0.1mm and has double-sided adhesive tape for easy “peel and stick” mounting. This balanced antenna with ground plane independent design offers various cable length options for ease of integration into various devices.

2.3 FEATURES

- Ground plane independent, balanced dual band antenna
- Flex size 35 x 11 x 0.1mm (not contain solder area)
- I-PEX MHF (U.FL compatible) connector (Such as MHF1/MHF4)
- Cable OD1.13mm, 6 standard length options (50/100/150/200/250/300mm)
- Cable and connector can be customized
- RoHS Compliant

Molex 204281 SERIES 3D VIEW

3.0 GENERAL SPECIFICATION

Product name	WIFI 6E flex cabled side-fed balanced antenna.		
Part number	204281		
Frequency	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925GHz-7.125GHz
Polarization	Linear		
Operating with matching	-40℃ to 85℃		
Storage with matching	-40℃ to 85℃		
RF Power	2 Watts		
Impedance with matching	50 Ohms		
Antenna type	Flex		
Connector type	204281 0XXX	204281 1XXX	
	Compatible MHF-1	Compatible MHF-4	
User Implementation type	Adhesive 3M9077		
Cable diameter	Ø1.13mm		
Cable length	50 mm (P/N for 2042810050/2042811050)		
	100 mm (P/N for 2042810100/2042811100)		
	150 mm (P/N for 2042810150/2042811150)		
	200 mm (P/N for 2042810200/2042811200)		
	250 mm (P/N for 2042810250/2042811250)		
	300 mm (P/N for 2042810300/2042811300)		

Manualfacturer:

DATAMARS SA
Via Industria 16, 6814 Lamone, Switzerland

5.0 APPLICABLE DOCUMENTS

DOCUMENT	NUMBER	DESCRIPTION
Sale Drawing (SD)	SD-2042810050	Mechanical Dimension of the product
	SD-2042811050	
Application Guide (AS)	AS-2042810100	Antenna Application and surrounding
Packing Drawing (PK)	PK-2042810100	Product packaging specifications

6.0 ANTENNA SPECIFICATION

All measurements are done of the antenna mounted on a PC/ABS material block of 1.5 mm thickness with VNA Agilent E5071C and Over-The-Air (OTA) chamber. All measurements in this document are done with the part no.2042810100 for different cable length.

6.1 ELECTRICAL REQUIREMENT

6.1.1 ELECTRICAL REQUIREMENTS FOR CABLE LENGHTH 50mm			
P/N	2042810050		
Frequency Range	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925-7.125GHz
Peak Gain (Max)	2.2dBi	3.5dBi	4.8dBi
Average Total efficiency	>68%	>70%	>54%
Return Loss	< -10 dB	< -10 dB	< -5 dB

6.1.2 ELECTRICAL REQUIREMENTS FOR CABLE LENGHTH 100mm			
P/N	2042810100		
Frequency Range	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925-7.125GHz
Peak Gain (Max)	2.0dBi	3.3dBi	4.5dBi
Average Total efficiency	>65%	>68%	>50%
Return Loss	< -10 dB	< -10 dB	< -5 dB

6.1.3 ELECTRICAL REQUIREMENTS FOR CABLE LENGHTH 150mm			
P/N	2042810150		
Frequency Range	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925-7.125GHz
Peak Gain (Max)	1.8dBi	3.0dBi	4.2dBi
Average Total efficiency	>62%	>65%	>46%
Return Loss	< -10 dB	< -10 dB	< -5 dB

6.1.4 ELECTRICAL REQUIREMENTS FOR CABLE LENGHTH 200mm			
P/N	2042810200		
Frequency Range	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925-7.125GHz
Peak Gain (Max)	1.6dBi	2.8dBi	3.8dBi
Average Total efficiency	>59%	>60%	>43%
Return Loss	< -10 dB	< -10 dB	< -5 dB

6.1.5 ELECTRICAL REQUIREMENTS FOR CABLE LENGHTH 250mm			
P/N	2042810250		
Frequency Range	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925-7.125GHz
Peak Gain (Max)	1.5dBi	2.6dBi	3.5dBi
Average Total efficiency	>56%	>55%	>40%
Return Loss	< -10 dB	< -10 dB	< -5 dB

6.1.6 ELECTRICAL REQUIREMENTS FOR CABLE LENGHTH 300mm			
P/N	2042810300		
Frequency Range	2.4GHz-2.5GHz	5.15GHz-5.85GHz	5.925-7.125GHz
Peak Gain (Max)	1.3dBi	2.3dBi	3.2dBi
Average Total efficiency	>53%	>50%	>37%
Return Loss	< -10 dB	< -10 dB	< -5 dB

Note that the above antenna performance is measured with just the antenna mounted on a PC/ABS block to similar a free-space condition. When implement into the system, the frequency resonant might be off-tune due to the loading of surrounding components especially metal plane. This off-tune can be compensated through matching. Although module manufacturers specify a peak gain limit, it is based on free-space conditions. The peak gain will be degraded by 1 to 2dBi in the actual implementation as the radiation pattern will change due to the surround components. As such, during selection of antenna, you can select one with high peak gain to compensate for the loss. Molex can offer assistant to choose the best location and best tuning in-order to meet this peak gain requirement.

6.2 CABLE LOSS

DESCRIPTION	TEST CONDITION	REQUIREMENTS		
Frequency Range	2 GHz~7.125GHz	2.0GHz~3.0GHz	5GHz~6GHz	6GHz~7.125GHz
Attenuation	1m cable measured by VNA5071C	≤3.5dB/m	≤5.5dB/m	≤6.5dB/m

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

7.0 MECHANICAL SPECIFICATION

All measurements in this document are done with the part no.2042810100 for different cable length.

DESCRIPTION	TEST CONDITION	TEST RESULT
Pull Test	1. Test machine: Max intelligent load tester 2. Stick the flex antenna on a plastic board, pull cable in axial direction.	Pull force >8N
Un-mating force (connector)	Solder the receptacle connector to the test board ,then place the board and plug on push-on/pull-off machine, and repeat mating and un-mating 30 cycles at a speed 25±3mm/min. along the mating axis.	Un-mating force : 0.5 kgf min

8.0 ENVIRONMENTAL SPECIFICATION

DESCRIPTION	SPECIFICATION
Temperature /Humidity cycling	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 ℃. 3. Kept for 2 Hours in an environment with a temperature of 125 ℃. 4. The cycle is repeated until a total of 40 cycles have been completed. Hereafter the conditions are stabilized at room temperature. Transfer temperature 8℃ per min. 5. Parts should meet RF spec before and after test. 6. No cosmetic problem (No soldering problem; No adhesion problem of glue.)
Temperature Shock	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. 2. Parts should meet RF spec before and after test. 3. No cosmetic problem（No soldering problem；No adhesion problem of glue）.
High Temperature	1.Temperature:125℃, time:1008 hours 2.There is no substantial obstruction to air flow across and around the samples, and the samples are not touching each other 3. Parts should meet RF spec before and after test. 4. No cosmetic problem（No soldering problem；No adhesion problem of glue）.
Salt mist test	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. 2. Parts should meet RF spec before and after test. 3. No visible corrosion. Discoloration accept.

10.0 CHANGE HISTORY

CHANGE HISTORY		
REV	DATA	DESCRIPTION
D	2020/06/30	Add 6-7.125GHz frequency range
E	2020/08/26	Version D is invalid, please refer to version E