FCC ID : I4L-MSNDA201

1. RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b).

Limits for Maximum Permissible Exposure (MPE).

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density(mW/cm^2)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	**--**	**--**	**F/300**	**6**
1500-100000	**--**	**--**	**5**	**6**
(B) Limits for General Population/Uncontrol Exposures				
300-1500	**--**	**--**	**F/1500**	**6**
1500-100000	**--**	**--**	**1**	**30**

Friis transmission formula: Pd= (Pout*G)\ ($4*pi*R^2$)

Where

Pd= Power density in mW/cm^2.

Pout=output power to antenna in mW.

G= Numeric gain of the antenna relative to isotropic antenna.

Pi=3.1416.

R= distance between observation point and center of the radiator in 20cm.

Pd the limit of MPE, $1mW/cm^2$. If we know the maximum gain of the nd total. power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

2. EUT TECHNICAL DESCRIPTION

Product Name:	Tablet
Model Number:	MS-NDA2
Power Supply:	Rechargeable Li-ion Cylindrical Battery Model: 18650-2S3P 2INR19/66-3 Rating: 7.2V, 9447mAh, 68Wh
Temperature Range:	0℃~ 50℃

Bluetooth Version:	V5.0
Data Rate:	1Mbps for GFSK modulation 2Mbps for pi/4-DQPSK modulation 3Mbps for 8DPSK modulation
Modulation:	GFSK, pi/4-DQPSK, 8DPSK
Operating Frequency Range(s):	2402-2480MHz
Number of Channels:	79 channels
Antenna Type:	Integrated Antenna
Antenna Gain:	3.98dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)

BLE Version:	V5.0
Device Type:	Bluetooth with BLE mode
Data Rate :	1Mbps and 2Mbps
Modulation:	GFSK
Operating Frequency Range:	2402-2480MHz
Number of Channels:	40 Channels
Antenna Type:	Integrated Antenna
Antenna Gain:	3.98dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)

IEEE 802.11 WLAN Mode Supported:	802.11b 802.11g 802.11n(20MHz channel bandwidth) 802.11n(40MHz channel bandwidth)
Modulation:	DSSS, OFDM
Operating Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11b/g/n(HT40)
Number of Channels:	11 channels for 802.11b/g/n(HT20) 7 Channels for 802.11n(HT40)
Antenna Type:	Integrated Antenna
Antenna Gain:	3.98dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)

Wifi Type:	UNII-1: 5150MHz-5250MHz Band UNII-2A: with 5250MHz-5350MHz Band UNII-2C: with 5470MHz-5725MHz Band UNII-3: with 5725MHz-5850MHz Band
WLAN Supported:	802.11a 802.11n(20MHz channel bandwidth) 802.11n(40MHz channel bandwidth) 802.11ac(20MHz channel bandwidth) 802.11ac(40MHz channel bandwidth) 802.11ac(80MHz channel bandwidth)
Modulation:	OFDM, OFDMA
Frequency Range:	5150MHz-5250MHz Band
	5180-5240MHz for 802.11a 5180-5240MHz for 802.11n(HT20) 5190-5230MHz for 802.11n(HT40) 5180-5240MHz for 802.11ac(HT20) 5190-5230MHz for 802.11ac(HT40) 5210MHz for 802.11ac(HT80)
	5250MHz-5350MHz Band
	5260-5320MHz for 802.11a 5260-5320MHz for 802.11n(HT20) 5270-5310MHz for 802.11n(HT40) 5260-5320MHz for 802.11ac(HT20) 5270-5310MHz for 802.11ac(HT40) 5290MHz for 802.11ac(HT80)
	5470MHz-5725MHz Band
	5500-5700MHz for 802.11a 5500-5700MHz for 802.11n(HT20) 5510-5670MHz for 802.11n(HT40) 5500-5700MHz for 802.11ac(HT20) 5510-5670MHz for 802.11ac(HT40) 5530-5610MHz for 802.11ac(HT80)
	5725MHz-5850MHz Band
	5745-5825MHz for 802.11a

	5745-5825MHz for 802.11n(HT20) 5755-5795MHz for 802.11n(HT40) 5745-5825MHz for 802.11ac(HT20) 5755-5795MHz for 802.11ac(HT40) 5775MHz for 802.11ac(HT80)
TPC Function:	Not Support
Beamforming:	Not Support
Antenna Type:	Integrated Antenna
Antenna Gain:	3.34dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)

Operation Band:	WCDMA Band 2 WCDMA Band 4 WCDMA Band 5
Supported Type:	WCDMA/HSUPA/HSDPA
Modulation:	QPSK for WCDMA/HSUPA/HSDPA
Operating Frequency Range(s):	WCDMA Band 2: Tx: 1850~1910MHz/ Rx: 1930~1990MHz WCDMA Band 4: Tx:1710~1755MHz/ Rx: 2110~2155MHz WCDMA Band 5: Tx: 824~849MHz/ Rx: 869~894MHz
Channel Bandwidth:	5 MHz
Antenna Type:	Integrated Antenna
Antenna Gain:	WCDMA Band 2: 2.95dBi WCDMA Band 4: 1.12dBi WCDMA Band 5: 0.02dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)

Operation Band:	LTE Band 2 LTE Band 4 LTE Band 5 LTE Band 7 LTE Band 12 LTE Band 13 LTE Band 17 LTE Band 25 LTE Band 26 LTE Band 41 LTE Band 66
Modulation:	QPSK, 16QAM
Operating Frequency Range(s):	LTE Band 2: Tx: 1850~1910MHz/ Rx: 1930~1990MHz LTE Band 4: Tx:1710~1755MHz/ Rx: 2110~2155MHz LTE Band 5: Tx: 824~849MHz/ Rx: 869~894MHz LTE Band 7: Tx: 2500~2570MHz/ Rx: 2620~2690MHz LTE Band 12: Tx: 699~716MHz/ Rx: 729~746MHz LTE Band 13: Tx: 777~787MHz/ Rx: 746~756MHz LTE Band 17: Tx: 704~716MHz/ Rx: 734~746MHz LTE Band 25: Tx: 1850~1915MHz/ Rx: 1930~1995MHz

	LTE Band 26: Tx: 824~849MHz/ Rx: 869~894MHz LTE Band 41: Tx/Rx: 2496~2690MHz LTE Band 66: Tx/Rx: 1710~1780MHz
Antenna Type:	Integrated Antenna
Antenna Gain:	LTE Band 2: 2.95dBi LTE Band 4: 1.12dBi LTE Band 5: 0.02dBi LTE Band 7: 4.64dBi LTE Band 12: -0.41dBi LTE Band 13: 0.02dBi LTE Band 17: -0.41dBi LTE Band 25: 2.95dBi LTE Band 26: 0.02dBi LTE Band 41: 4.64dBi LTE Band 66: 1.12dBi (Note: The antenna information is provided by the customers, which will have a certain impact on the test results.)

3. Measurement Result

Mode	Frequency （MHz）	Max Power (dBm)	Antenna gain (dBi)	Antenna Gain Numeric	R (cm)	Evaluation result (mW/cm2)	Power density Limits (mW/cm2)
BT	2402	6.67	3.98	2.50	20	0.002	1.0000
2.4G WIFI	2412	12.61	3.98	2.50	20	0.009	1.0000
5G WIFI	5180	14.85	3.34	2.16	20	0.013	1.0000
WCDMA B2	1852.4	22.37	2.95	1.97	20	0.068	1.0000
WCDMA B4	1712.4	22.45	1.12	1.29	20	0.045	1.0000
WCDMA B5	826.4	24.45	0.02	1.00	20	0.056	0.5509
LTE Band 2	1860	22.96	2.95	1.97	20	0.078	1.0000
LTE Band 4	1720	23.23	1.12	1.29	20	0.054	1.0000
LTE Band 5	829	24.07	0.02	1.00	20	0.051	0.5527
LTE Band 7	2510	21.89	4.64	2.91	20	0.089	1.0000
LTE Band 12	699.7	24.63	-0.41	0.91	20	0.053	0.4665
LTE Band 13	779.5	24.57	0.02	1.00	20	0.057	0.5197
LTE Band 17	706.5	24.54	-0.41	0.91	20	0.051	0.4710
LTE Band 25	1850.7	22.94	2.95	1.97	20	0.077	1.0000
LTE Band 26	814.7	24.21	0.02	1.00	20	0.053	0.5431
LTE Band 41	2535	23.77	4.64	2.91	20	0.138	1.0000
LTE Band 66	1720	23.96	1.12	1.29	20	0.064	1.0000

NOTE: All the modes are tested, only the worst data are described in the table.

Conclusion of simultaneous transmitter:
Both of the module 1 and module 2 can transmit simultaneously, the formula of calculated the MPE is:

CPD1/LPD1+CPD2/LPD2+……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Therefore the worst-case situation is 0.013/1+ 0.138/1= 0.151, which is less than 1, this confirmed that the device comply with FCC 1.1310 MPE limit.

----- The End -----