



RF EXPOSURE Test Report

Report No.: MTi221111011-05E5

Date of issue: 2023-06-01

Applicant: IC Nexus Co. LTD.

Product: SBC_NSD_EC

Model(s): EC3510HL, EC3510, EC3507, EC3505, EC3510-HL, EC3510-HL-KK3, EC3507-HL, EC3507-HL-KK3, EC3505-HL, EC3505-HL-KK3, NSD3510, NSD3510-HL, NSD3510-HL-KK3, NSD3507, NSD3507-HL, NSD3507-HL-KK3, NSD3505, NSD3505-HL, NSD3505-HL-KK3, SBC3500

FCC ID: 2ACLCECNSDSBC350L60

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>

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Test Result Certification	
Applicant:	IC Nexus Co. LTD.
Address:	6F-1, No.3-2 Park Street, Nankang Software Park(NKSP), Taipei 115, Taiwan ROC
Manufacturer:	IC Nexus Co. LTD.
Address:	6F-1, No.3-2 Park Street, Nankang Software Park(NKSP), Taipei 115, Taiwan ROC
Product description	
Product name:	SBC_NSD_EC
Trademark:	ICNexus
Model name:	EC3510HL
Serial Model:	EC3510, EC3507, EC3505, EC3510-HL, EC3510-HL-KK3, EC3507-HL, EC3507-HL-KK3, EC3505-HL, EC3505-HL-KK3, NSD3510, NSD3510-HL, NSD3510-HL-KK3, NSD3507, NSD3507-HL, NSD3507-HL-KK3, NSD3505, NSD3505-HL, NSD3505-HL-KK3, SBC3500
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2023-01-11 ~ 2023-06-13
Test result:	Pass

Test Engineer :

Letter Lan.

(Letter Lan)

Reviewed By: :

Leon Chen

(Leon Chen)

Approved By: :

Tom Xue

(Tom Xue)

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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

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

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

Measurement Result

BT/BLE:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm²

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

Power density limited: 1mW/ cm²

5GWiFi:

802.11a: 20 MHz

802.11n: 20 MHz

802.11ac: 20 MHz

Antenna Type: PCB Antenna;

BT/BLE/2.4G WIFI antenna gain: 2.35 dBi

5G WIFI antenna gain: 3dBi

R=20cm

$mW=10^{(dBm/10)}$

BT/BLE/2.4G WIFI antenna gain Numeric= $10^{(dBi/10)}=10^{(2.3/10)}=1.72$

5G WIFI antenna gain Numeric= $10^{(dBi/10)}=10^{(3/10)}=2$

BR+EDR:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	3.99	4±1	5	3.162	2.35	1.72	0.0011	1
2441		6.32	6±1	7	5.012	2.35	1.72	0.0017	1
2480		5.76	6±1	7	5.012	2.35	1.72	0.0017	1
2402	π/4-DQPSK	3.38	4±1	5	3.162	2.35	1.72	0.0011	1
2441		5.47	5±1	6	3.981	2.35	1.72	0.0014	1
2480		4.87	5±1	6	3.981	2.35	1.72	0.0014	1
2402	8DPSK	3.61	4±1	5	3.162	2.35	1.72	0.0011	1
2441		5.73	5±1	6	3.981	2.35	1.72	0.0014	1
2480		5.12	5±1	6	3.981	2.35	1.72	0.0014	1



BLE:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric		
2402	BLE-1M	3.11	4±1	5	3.162	2.35	1.72	0.0011	1
2440		5.26	5±1	6	3.981	2.35	1.72	0.0014	1
2480		4.49	4±1	5	3.162	2.35	1.72	0.0011	1
2402	BLE-2M	3.12	4±1	5	3.162	2.35	1.72	0.0011	1
2440		5.28	5±1	6	3.981	2.35	1.72	0.0014	1
2480		4.57	4±1	5	3.162	2.35	1.72	0.0011	1

2.4GWiFi:

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna	Evaluation result at 20cm Power density(mW/cm ²)	Power density Limits (mW/cm ²)
				tune-up power		Gain		
				(dBm)	(mW)	Numeric		
2412	802.11b	16.48	17±1	18	63.096	1.72	0.02156	1
2437		17.77	17±1	18	63.096	1.72	0.02156	1
2462		17.54	17±1	18	63.096	1.72	0.02156	1
2412	802.11g	17.11	17±1	18	63.096	1.72	0.02156	1
2437		17.46	17±1	18	63.096	1.72	0.02156	1
2462		17.25	17±1	18	63.096	1.72	0.02156	1
2412	802.11n H20	16.96	17±1	18	63.096	1.72	0.02156	1
2437		17.28	17±1	18	63.096	1.72	0.02156	1
2462		16.88	17±1	18	63.096	1.72	0.02156	1



5GWiFi: UNII-1

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna Gain	Evaluation result at 20cm	Power density Limits (mW/cm ²)
				tune-up power				
				(dBm)	(dBm)	(dBm)	(mW)	Numeric
5180	11a	16.25	16±1	17	50.119	2.00	0.01989	1
5200	11a	16.20	16±1	17	50.119	2.00	0.01989	1
5240	11a	16.17	16±1	17	50.119	2.00	0.01989	1
5180	11n (HT20)	15.97	16±1	17	50.119	2.00	0.01989	1
5200	11n (HT20)	16.32	16±1	17	50.119	2.00	0.01989	1
5240	11n (HT20)	16.32	16±1	17	50.119	2.00	0.01989	1
5180	11ac (HT20)	15.96	16±1	17	50.119	2.00	0.01989	1
5200	11ac (HT20)	16.52	16±1	17	50.119	2.00	0.01989	1
5240	11ac (HT20)	16.33	16±1	17	50.119	2.00	0.01989	1

UNII-3

Channel Freq. (MHz)	modulation	conducted power (dBm)	Tune-up power (dBm)	Max		Antenna Gain	Evaluation result at 20cm	Power density Limits (mW/cm ²)
				tune-up power				
				(dBm)	(dBm)	(dBm)	(mW)	Numeric
5745	11a	16.11	16±1	17	50.119	2.00	0.01989	1
5785	11a	15.82	16±1	17	50.119	2.00	0.01989	1
5825	11a	15.98	16±1	17	50.119	2.00	0.01989	1
5745	11n (HT20)	16.26	16±1	17	50.119	2.00	0.01989	1
5785	11n (HT20)	15.86	16±1	17	50.119	2.00	0.01989	1
5825	11n (HT20)	16.05	16±1	17	50.119	2.00	0.01989	1
5745	11ac (HT20)	16.48	16±1	17	50.119	2.00	0.01989	1
5785	11ac (HT20)	15.90	16±1	17	50.119	2.00	0.01989	1
5825	11ac (HT20)	16.22	16±1	17	50.119	2.00	0.01989	1

Conclusion:

The device can transmitter simultaneously.



Simultaneous transmission condition

WWAN Band	The MPE ratio
Wi-Fi 2.4G	0.02156
BT	0.0017

Note:The MPE ratio=Mac Test Result/Limit Value

So the simultaneous transmitting antenna pairs as below:

\sum of MPE ratio=Wi-Fi 2.4G+BT=0.02156+0.0017=0.02173<1

---END OF REPORT---