



RF EXPOSURE Test Report

Report No.: MTi240820012-06E5

Date of issue: 2024-12-20

Applicant: IC Nexus Co., Ltd

Product: SBC_NSD_EC

Model(s): EC4107, EC4110, EC4107, EC4105, EC4110-HL,
EC4110-HL-KK3, EC4107-HL, EC4107-HL-KK3, EC4105-
HL, EC4105-HL-KK3, NSD4110, NSD4110-HL,
NSD4110-HL-KK3, NSD4107, NSD4107-HL, NSD4107-
HL-KK3, NSD4105, NSD4105-HL, NSD4105-HL-KK3,
SBC4100

FCC ID: 2ACLCECNSSBC410N60

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
Factory:	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:	EC4107
Serial Model:	EC4110, EC4107, EC4105, EC4110-HL, EC4110-HL-KK3, EC4107-HL, EC4107-HL-KK3, EC4105-HL, EC4105-HL-KK3, NSD4110, NSD4110-HL, NSD4110-HL-KK3, NSD4107, NSD4107-HL, NSD4107-HL-KK3, NSD4105, NSD4105-HL, NSD4105-HL-KK3, SBC4100
Standards:	N/A
Test procedure:	KDB 447498 D01 v06
Date of Test	
Date of test:	2024-11-11 to 2024-12-20
Test result:	Pass

Test Engineer	:	<i>James Qin</i>
		(James Qin)
Reviewed By	:	<i>David. Lee</i>
		(David Lee)
Approved By	:	<i>Leon Chen</i>
		(Leon Chen)



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

ANT Gain: 2.3dBi

Power density limited: 1mW/ cm²

BR&EDR:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm²)	(mW/cm²)
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	0.79	0±1	1	1.259	2.3	1.70	0.0004	1
2441		2.48	2±1	3	1.995	2.3	1.70	0.0007	1
2480		3.00	3±1	4	2.512	2.3	1.70	0.0008	1
2402	π/4-DQPSK	2.64	2±1	3	1.995	2.3	1.70	0.0007	1
2441		4.06	4±1	5	3.162	2.3	1.70	0.0011	1
2480		4.40	4±1	5	3.162	2.3	1.70	0.0011	1
2402	8DPSK	2.93	2±1	3	1.995	2.3	1.70	0.0007	1
2441		4.41	4±1	5	3.162	2.3	1.70	0.0011	1
2480		4.77	4±1	5	3.162	2.3	1.70	0.0011	1

BLE:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain			
				(dBm)	(mW)	(dBi)	Numeric	(mW/cm2)	(mW/cm2)
2402	GFSK-1M	0.39	0±1	1	1.259	2.3	1.70	0.0004	1
2440		1.79	1±1	2	1.585	2.3	1.70	0.0005	1
2480		2.01	2±1	3	1.995	2.3	1.70	0.0007	1
2402	GFSK-2M	0.28	0±1	1	1.259	2.3	1.70	0.0004	1
2440		1.70	1±1	2	1.585	2.3	1.70	0.0005	1
2480		1.89	1±1	2	1.585	2.3	1.70	0.0005	1



2.4G WIFI:

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

ANT Gain: 2.3dBi

Power density limited: 1mW/ cm²

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
2412	802.11b	17.20	17±1	18	63.096	1.7	0.0186	1
2437		16.87	16±1	17	50.119	1.7	0.0147	1
2462		17.09	17±1	18	63.096	1.7	0.0186	1
2412	802.11g	16.44	16±1	17	50.119	1.7	0.0147	1
2437		15.95	15±1	16	39.811	1.7	0.0117	1
2462		15.58	15±1	16	39.811	1.7	0.0117	1
2412	802.11n H20	15.94	15±1	16	39.811	1.7	0.0117	1
2437		16.51	16±1	17	50.119	1.7	0.0147	1
2462		16.49	16±1	17	50.119	1.7	0.0147	1



802.11a/n(HT20)/ac(HT20)):

U-NII 1: 5180MHz to 5240MHz;

U-NII 3: 5745MHz to 5825MHz;

802.11n(HT40)/ac(HT40):

U-NII 1: 5190MHz to 5230MHz;

U-NII 3: 5755MHz to 5795MHz;

802.11ac(HT80):

U-NII 1: 5210MHz;

U-NII 3: 5775MHz

ANT Gain: U-NII Band 1: 3dBi; U-NII Band 3: 3dBi;

Power density limited: 1mW/ cm2

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
5180	11A	15.44	15±1	16	39.811	2.00	0.01580	1
5200		15.61	15±1	16	39.811	2.00	0.01580	1
5240		16.08	16±1	17	50.119	2.00	0.01989	1
5745		15.30	15±1	16	39.811	2.00	0.01580	1
5785		15.20	15±1	16	39.811	2.00	0.01580	1
5825		14.73	14±1	15	31.623	2.00	0.01255	1
5180	11N20SISO	14.98	14±1	15	31.623	2.00	0.01255	1
5200		15.24	15±1	16	39.811	2.00	0.01580	1
5240		13.62	13±1	14	25.119	2.00	0.00997	1
5745		13.12	13±1	14	25.119	2.00	0.00997	1
5785		13.12	13±1	14	25.119	2.00	0.00997	1
5825		12.27	12±1	13	19.953	2.00	0.00792	1
5190	11N40SISO	12.63	12±1	13	19.953	2.00	0.00792	1
5230		13.26	13±1	14	25.119	2.00	0.00997	1
5755		13.12	13±1	14	25.119	2.00	0.00997	1
5795		12.50	12±1	13	19.953	2.00	0.00792	1
5180	11AC20SISO	12.95	12±1	13	19.953	2.00	0.00792	1
5200		13.04	13±1	14	25.119	2.00	0.00997	1
5240		13.68	13±1	14	25.119	2.00	0.00997	1
5745		13.23	13±1	14	25.119	2.00	0.00997	1
5785		13.12	13±1	14	25.119	2.00	0.00997	1
5825		12.44	12±1	13	19.953	2.00	0.00792	1
5190	11AC40SISO	9.98	9±1	10	10.000	2.00	0.00397	1
5230		10.63	10±1	11	12.589	2.00	0.00500	1
5755		10.51	10±1	11	12.589	2.00	0.00500	1
5795		9.85	9±1	10	10.000	2.00	0.00397	1
5210	11AC80SISO	12.19	12±1	13	19.953	2.00	0.00792	1
5775		12.29	12±1	13	19.953	2.00	0.00792	1



GSM

WCDMA

LTE:

Protocol	Fre. (MHz)	Separation distance (cm)	Max Turn up power (dBm)	ANT Gain (dBi)	Max EIRP (dBm)	Max EIRP (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Ratio	Result
GPRS 850*	824	20	30	-0.46	29.54	1000.000	0.17895	0.55	0.3254	Pass
GPRS1900*	1850	20	24	1.25	25.25	251.189	0.06664	1	0.0666	Pass
WCDMA Band 2	1850	20	25	1.25	26.25	316.228	0.08389	1	0.0839	Pass
WCDMA Band 4	1710	20	24	0.52	24.52	251.189	0.05633	1	0.0563	Pass
WCDMA Band 5	824	20	25	-0.46	24.54	316.228	0.05659	0.55	0.1029	Pass
LTE Band2	1910	20	24	1.25	25.25	251.189	0.06664	1.00	0.0666	Pass
LTE Band4	1755	20	24	0.52	24.52	251.189	0.05633	1.00	0.0563	Pass
LTE Band5	849	20	26	-0.46	25.54	398.107	0.07124	0.57	0.1250	Pass
LTE Band12	716	20	25	-0.6	24.4	316.228	0.05479	0.48	0.1141	Pass
LTE Band13	787	20	23	-0.6	22.4	199.526	0.03457	0.52	0.0665	Pass
LTE Band25	1915	20	24	1.25	25.25	251.189	0.06664	1.00	0.0666	Pass
LTE Band26	849	20	24	-0.46	23.54	251.189	0.04495	0.57	0.0789	Pass
LTE Band26(Part 90)	849	20	25	-0.46	24.54	316.228	0.05659	0.57	0.0993	Pass
LTE Band41	2690	20	24	5.54	29.54	251.189	0.17895	1.00	0.1790	Pass
LTE Band66	1780	20	24	3.31	27.31	251.189	0.10709	1.00	0.1071	Pass

Mode	Duty cycle	Duty Cycle fator
GSM	12.50%	-9.03
GPRS(1slot)	12.50%	-9.03
GPRS(2slot)	25.00%	-6.02
GPRS(3slot)	37.50%	-4.26
GPRS(4slot)	50.00%	-3.01
WCDMA/HSPA	100%	0.00
FDD-LTE	100%	0.00
TDD-LTE	63.30%	-1.99

Conclusion:**SIMULTANEOUS TRANSMISSIONS**

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Simultaneous transmit:

Operating Band	The MPE ratio
BR&EDR	0.0011
BLE	0.0007
2.4G WIFI	0.0186
5G WIFI	0.01989
GSM	0.3254
WCDMA	0.1029
LTE	0.1790

So the Maximum simultaneous transmitting antenna pairs as below:

BR&EDR+BLE+5G WIFI+LTE=0.0011+0.0007+0.01989+0.3254=0.34709

For the max result: $0.5261 \leq 1.0$, No SAR is required.

----END OF REPORT----