



Test Report No.: SA180823W003



RF EXPOSURE REPORT

Product: Smart central controller

Model Name: V3LTE

FCC ID: 2AQ95-NIUUV3LTE

Applicant: Beijing Niu Technology Co., Ltd

Address: 11F, Fangheng Times Center Block A (Lianluo Building), No. 10 Wangjing street, Chaoyang, Beijing, China

Manufacturer: NIU INTERNATIONAL CO., LTD.

Address: Lingxiang Road, WEZ, Wujin, Changzhou, Jiangsu Province, China

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Report No.: SA180823W003

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA180823W003	Original release	Sep. 29, 2018



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Smart central controller	
MODEL NAME	V3LTE	
NOMINAL VOLTAGE	30Vdc (adapter or host equipment)	
OPERATING TEMPERATURE RANGE	-20 ~ 70°C	
MODULATION TYPE	WCDMA	BPSK/QPSK
	LTE	QPSK/16QAM
	GPS/Glonass	C/A code
OPERATING FREQUENCY	WCDMA	1852.4MHz ~ 1907.6MHz(FOR WCDMA B2) 1712.4MHz ~ 1907.6MHz(FOR WCDMA B4) 826.4MHz ~ 846.6MHz (FOR WCDMA B5)
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band4) 699.7MHz ~ 715.3MHz (FOR LTE Band12)
	GPS	1575.42MHz
	Glonass	1602MHz
ANTENNA TYPE	PIFA Antenna	
ANTENNA GAIN	0.6dBi for WCDMA B2/ LTE B4 0.5dBi for WCDMA B4/ LTE B2 0.4dBi for WCDMA B5 0.2dBi for LTE B12	
HW VERSION	TRA01D12	
SW VERSION	TRA01D14	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



3 RF EXPOSURE

3.1 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 (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	F/1500	30
1500-100,000	1.0	30

F = Frequency in MHz

3.2 MPE CALCULATION FORMULA

$$Pd = (Pout * G) / (4 * pi * r^2)$$

where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

3.3 CLASSIFICATION

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3.4 CONDUCTED POWER

Band	WCDMA II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
RMC 12.2K	21.22	21.48	21.54
HSPA			
HSDPA Subtest-1	20.88	21.14	21.20
HSDPA Subtest-2	20.73	20.99	21.05
HSDPA Subtest-3	20.45	20.71	20.77
HSDPA Subtest-4	20.42	20.68	20.74
HSUPA Subtest-1	20.65	20.91	20.97
HSUPA Subtest-2	19.89	20.15	20.21
HSUPA Subtest-3	19.96	20.22	20.28
HSUPA Subtest-4	19.84	20.10	20.16
HSUPA Subtest-5	20.52	20.78	20.84

Band	WCDMA IV		
Channel	1312	1413	1513
Frequency (MHz)	1712.4	1732.6	1752.6
RMC 12.2K	21.20	21.40	21.37
HSPA			
HSDPA Subtest-1	20.86	21.06	21.03
HSDPA Subtest-2	20.71	20.91	20.88
HSDPA Subtest-3	20.43	20.63	20.60
HSDPA Subtest-4	20.40	20.60	20.57
HSUPA Subtest-1	20.63	20.83	20.80
HSUPA Subtest-2	19.87	20.07	20.04
HSUPA Subtest-3	19.94	20.14	20.11
HSUPA Subtest-4	19.82	20.02	19.99
HSUPA Subtest-5	20.50	20.70	20.67



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Band	WCDMA V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	22.84	22.95	22.89
HSPA			
HSDPA Subtest-1	22.50	22.61	22.55
HSDPA Subtest-2	22.35	22.46	22.40
HSDPA Subtest-3	22.07	22.18	22.12
HSDPA Subtest-4	22.04	22.15	22.09
HSUPA Subtest-1	22.27	22.38	22.32
HSUPA Subtest-2	21.51	21.62	21.56
HSUPA Subtest-3	21.58	21.69	21.63
HSUPA Subtest-4	21.46	21.57	21.51
HSUPA Subtest-5	22.14	22.25	22.19



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LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18607	Mid CH 18900	High CH 19193	3GPP MPR (dB)
				Frequency 1850.7 MHz	Frequency 1880 MHz	Frequency 1909.3 MHz	
1.4MHz	QPSK	1	0	20.87	21.14	21.14	0
		1	2	21.03	21.30	21.30	0
		1	5	20.89	21.16	21.16	0
		3	0	19.73	20.00	20.00	0
		3	1	19.74	20.01	20.01	0
		3	3	19.56	19.83	19.83	0
		6	0	19.73	20.00	20.00	1
	16QAM	1	0	19.39	19.66	19.66	1
		1	2	19.84	20.11	20.11	1
		1	5	19.29	19.56	19.56	1
		3	0	19.45	19.72	19.72	1
		3	1	19.56	19.83	19.83	1
		3	3	19.50	19.77	19.77	1
		6	0	18.50	19.06	18.77	2
BW	Modulation	RB Size	RB Offset	Low CH 18615	Mid CH 18900	High CH 19185	3GPP MPR (dB)
				Frequency 1851.5 MHz	Frequency 1880 MHz	Frequency 1908.5 MHz	
3 MHz	QPSK	1	0	20.90	21.17	21.17	0
		1	7	21.06	21.33	21.33	0
		1	14	20.92	21.19	21.19	0
		8	0	19.74	20.01	20.01	1
		8	3	19.75	20.02	20.02	1
		8	7	19.57	19.84	19.84	1
		15	0	19.74	20.01	20.01	1
	16QAM	1	0	19.42	19.69	19.69	1
		1	7	19.87	20.14	20.14	1
		1	14	19.32	19.59	19.59	1
		8	0	19.47	19.74	19.74	2
		8	3	19.58	19.85	19.85	2
		8	7	19.52	19.79	19.79	2
		15	0	18.52	19.08	18.79	2



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LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18625	Mid CH 18900	High CH 19175	3GPP MPR (dB)
				Frequency 1852.5 MHz	Frequency 1880 MHz	Frequency 1907.5 MHz	
5 MHz	QPSK	1	0	20.93	21.20	21.20	0
		1	12	21.09	21.36	21.36	0
		1	24	20.95	21.22	21.22	0
		12	0	19.77	20.04	20.04	1
		12	6	19.78	20.05	20.05	1
		12	13	19.60	19.87	19.87	1
		25	0	19.77	20.04	20.04	1
	16QAM	1	0	19.45	19.72	19.72	1
		1	12	19.90	20.17	20.17	1
		1	24	19.35	19.62	19.62	1
		12	0	19.50	19.77	19.77	2
		12	6	19.61	19.88	19.88	2
		12	13	19.55	19.82	19.82	2
		25	0	18.55	19.11	18.82	2
BW	Modulation	RB Size	RB Offset	Low CH 18650	Mid CH 18900	High CH 19150	3GPP MPR (dB)
				Frequency 1855 MHz	Frequency 1880 MHz	Frequency 1905 MHz	
10 MHz	QPSK	1	0	20.95	21.22	21.22	0
		1	24	21.11	21.38	21.38	0
		1	49	20.97	21.24	21.24	0
		25	0	19.79	20.06	20.06	1
		25	12	19.80	20.07	20.07	1
		25	25	19.62	19.89	19.89	1
		50	0	19.79	20.06	20.06	1
	16QAM	1	0	19.47	19.74	19.74	1
		1	24	19.92	20.19	20.19	1
		1	49	19.37	19.64	19.64	1
		25	0	19.52	19.79	19.79	2
		25	12	19.63	19.90	19.90	2
		25	25	19.57	19.84	19.84	2
		50	0	18.57	19.13	18.84	2



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LTE Band 2							
BW	Modulation	RB Size	RB Offset	Low CH 18675	Mid CH 18900	High CH 19125	3GPP MPR (dB)
				Frequency 1857.5 MHz	Frequency 1880 MHz	Frequency 1902.5 MHz	
15 MHz	QPSK	1	0	20.98	21.25	21.25	0
		1	37	21.14	21.41	21.41	0
		1	74	21.00	21.27	21.27	0
		36	0	19.82	20.09	20.09	1
		36	19	19.83	20.10	20.10	1
		36	39	19.65	19.92	19.92	1
		75	0	19.82	20.09	20.09	1
	16QAM	1	0	19.50	19.77	19.77	1
		1	37	19.95	20.22	20.22	1
		1	74	19.40	19.67	19.67	1
		36	0	19.55	19.82	19.82	2
		36	19	19.66	19.93	19.93	2
		36	39	19.60	19.87	19.87	2
		75	0	18.60	19.16	18.87	2
BW	Modulation	RB Size	RB Offset	Low CH 18700	Mid CH 18900	High CH 19100	3GPP MPR (dB)
				Frequency 1860 MHz	Frequency 1880 MHz	Frequency 1900 MHz	
20MHz	QPSK	1	0	21.03	21.30	21.30	0
		1	50	21.19	21.46	21.46	0
		1	99	21.05	21.32	21.32	0
		50	0	19.87	20.14	20.14	1
		50	25	19.88	20.15	20.15	1
		50	50	19.70	19.97	19.97	1
		100	0	19.87	20.14	20.14	1
	16QAM	1	0	19.55	19.82	19.82	1
		1	50	20.00	20.27	20.27	1
		1	99	19.45	19.72	19.72	1
		50	0	19.60	19.87	19.87	2
		50	25	19.71	19.98	19.98	2
		50	50	19.65	19.92	19.92	2
		100	0	18.65	18.92	18.92	2



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LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19957	Mid CH 20175	High CH 20393	MPR
				Frequency 1710.7 MHz	Frequency 1732.5 MHz	Frequency 1754.3 MHz	
1.4MHz	QPSK	1	0	21.11	21.09	20.88	0
		1	2	20.60	20.58	20.37	0
		1	5	20.49	20.47	20.26	0
		3	0	20.34	20.32	20.11	0
		3	1	19.42	19.40	19.19	0
		3	3	19.49	19.47	19.26	0
		6	0	19.56	19.54	19.33	1
	16QAM	1	0	19.67	19.65	19.44	1
		1	2	19.61	19.59	19.38	1
		1	5	18.99	18.97	18.76	1
		3	0	19.70	19.68	19.47	1
		3	1	19.21	19.19	18.98	1
		3	3	19.40	19.38	19.17	1
		6	0	18.64	19.00	18.41	2
BW	Modulation	RB Size	RB Offset	Low CH 19965	Mid CH 20175	High CH 20385	MPR
				Frequency 1711.5 MHz	Frequency 1732.5 MHz	Frequency 1753.5 MHz	
3 MHz	QPSK	1	0	21.12	21.10	20.89	0
		1	7	20.61	20.59	20.38	0
		1	14	20.50	20.48	20.27	0
		8	0	20.36	20.34	20.13	1
		8	3	19.44	19.42	19.21	1
		8	7	19.51	19.49	19.28	1
		15	0	19.58	19.56	19.35	1
	16QAM	1	0	19.68	19.66	19.45	1
		1	7	19.62	19.60	19.39	1
		1	14	19.00	18.98	18.77	1
		8	0	19.71	19.69	19.48	2
		8	3	19.22	19.20	18.99	2
		8	7	19.41	19.39	19.18	2
		15	0	18.65	19.01	18.42	2



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LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 19975	Mid CH 20175	High CH 20375	MPR
				Frequency 1712.5 MHz	Frequency 1732.5 MHz	Frequency 1752.5 MHz	
5 MHz	QPSK	1	0	21.15	21.13	20.92	0
		1	12	20.64	20.62	20.41	0
		1	24	20.53	20.51	20.30	0
		12	0	20.39	20.37	20.16	1
		12	6	19.47	19.45	19.24	1
		12	13	19.54	19.52	19.31	1
		25	0	19.61	19.59	19.38	1
	16QAM	1	0	19.71	19.69	19.48	1
		1	12	19.65	19.63	19.42	1
		1	24	19.03	19.01	18.80	1
		12	0	19.74	19.72	19.51	2
		12	6	19.25	19.23	19.02	2
		12	13	19.44	19.42	19.21	2
		25	0	18.68	19.04	18.45	2
BW	Modulation	RB Size	RB Offset	Low CH 20000	Mid CH 20175	High CH 20350	MPR
				Frequency 1715 MHz	Frequency 1732.5 MHz	Frequency 1750 MHz	
10 MHz	QPSK	1	0	21.19	21.17	20.96	0
		1	24	20.68	20.66	20.45	0
		1	49	20.57	20.55	20.34	0
		25	0	20.43	20.41	20.20	1
		25	12	19.51	19.49	19.28	1
		25	25	19.58	19.56	19.35	1
		50	0	19.65	19.63	19.42	1
	16QAM	1	0	19.75	19.73	19.52	1
		1	24	19.69	19.67	19.46	1
		1	49	19.07	19.05	18.84	1
		25	0	19.78	19.76	19.55	2
		25	12	19.29	19.27	19.06	2
		25	25	19.48	19.46	19.25	2
		50	0	18.72	19.08	18.49	2



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LTE Band 4							
BW	Modulation	RB Size	RB Offset	Low CH 20025	Mid CH 20175	High CH 20325	MPR
				Frequency 1717.5 MHz	Frequency 1732.5 MHz	Frequency 1747.5 MHz	
15 MHz	QPSK	1	0	21.25	21.23	21.02	0
		1	37	20.74	20.72	20.51	0
		1	74	20.63	20.61	20.40	0
		36	0	20.49	20.47	20.26	1
		36	19	19.57	19.55	19.34	1
		36	39	19.64	19.62	19.41	1
		75	0	19.71	19.69	19.48	1
	16QAM	1	0	19.81	19.79	19.58	1
		1	37	19.75	19.73	19.52	1
		1	74	19.13	19.11	18.90	1
		36	0	19.84	19.82	19.61	2
		36	19	19.35	19.33	19.12	2
		36	39	19.54	19.52	19.31	2
		75	0	18.78	19.14	18.55	2
BW	Modulation	RB Size	RB Offset	Low CH 20050	Mid CH 20175	High CH 20300	MPR
				Frequency 1720 MHz	Frequency 1732.5 MHz	Frequency 1745 MHz	
20MHz	QPSK	1	0	21.28	21.26	21.05	0
		1	50	20.77	20.75	20.54	0
		1	99	20.66	20.64	20.43	0
		50	0	20.52	20.50	20.29	1
		50	25	19.60	19.58	19.37	1
		50	50	19.67	19.65	19.44	1
		100	0	19.74	19.72	19.51	1
	16QAM	1	0	19.84	19.82	19.61	1
		1	50	19.78	19.76	19.55	1
		1	99	19.16	19.14	18.93	1
		50	0	19.87	19.85	19.64	2
		50	25	19.38	19.36	19.15	2
		50	50	19.57	19.55	19.34	2
		100	0	18.81	18.79	18.58	2



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LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23017	Mid CH 23095	High CH 23173	MPR
				Frequency 699.7 MHz	Frequency 707.5 MHz	Frequency 715.3 MHz	
1.4 MHz	QPSK	1	0	22.81	22.72	22.66	0
		1	2	23.18	23.09	23.03	0
		1	5	22.80	22.71	22.65	0
		3	0	21.76	21.67	21.61	0
		3	1	22.01	21.92	21.86	0
		3	3	21.92	21.83	21.77	0
	16QAM	6	0	21.90	21.81	21.75	1
		1	0	21.36	21.27	21.21	1
		1	2	21.43	21.34	21.28	1
		1	5	21.62	21.53	21.47	1
		3	0	20.87	20.78	20.72	1
		3	1	21.10	21.01	20.95	1
		3	3	21.01	20.92	20.86	1
		6	0	21.19	21.10	21.04	2
LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23025	Mid CH 23095	High CH 23165	MPR
				Frequency 700.5 MHz	Frequency 707.5 MHz	Frequency 714.5 MHz	
3 MHz	QPSK	1	0	22.85	22.76	22.70	0
		1	7	23.22	23.13	23.07	0
		1	14	22.84	22.75	22.69	0
		8	0	21.78	21.69	21.63	1
		8	3	22.03	21.94	21.88	1
		8	7	21.94	21.85	21.79	1
		15	0	21.92	21.83	21.77	1
	16QAM	1	0	21.40	21.31	21.25	1
		1	7	21.47	21.38	21.32	1
		1	14	21.66	21.57	21.51	1
		8	0	20.88	20.79	20.73	2
		8	3	21.11	21.02	20.96	2
		8	7	21.02	20.93	20.87	2
		15	0	21.20	21.11	21.05	2



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LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23035	Mid CH 23095	High CH 23155	MPR
				Frequency 701.5 MHz	Frequency 707.5 MHz	Frequency 713.5 MHz	
5 MHz	QPSK	1	0	22.91	22.82	22.76	0
		1	12	23.28	23.19	23.13	0
		1	24	22.90	22.81	22.75	0
		12	0	21.84	21.75	21.69	1
		12	6	22.09	22.00	21.94	1
		12	13	22.00	21.91	21.85	1
		25	0	21.98	21.89	21.83	1
	16QAM	1	0	21.46	21.37	21.31	1
		1	12	21.53	21.44	21.38	1
		1	24	21.72	21.63	21.57	1
		12	0	20.94	20.85	20.79	2
		12	6	21.17	21.08	21.02	2
		12	13	21.08	20.99	20.93	2
		25	0	21.26	21.17	21.11	2
LTE Band 12							
BW	Modulation	RB Size	RB Offset	Low CH 23060	Mid CH 23095	High CH 23130	MPR
				Frequency 704 MHz	Frequency 707.5 MHz	Frequency 711 MHz	
10 MHz	QPSK	1	0	22.94	22.85	22.79	0
		1	24	23.31	23.22	23.16	0
		1	49	22.93	22.84	22.78	0
		25	0	21.87	21.78	21.72	1
		25	12	22.12	22.03	21.97	1
		25	25	22.03	21.94	21.88	1
		50	0	22.01	21.92	21.86	1
	16QAM	1	0	21.49	21.40	21.34	1
		1	24	21.56	21.47	21.41	1
		1	49	21.75	21.66	21.60	1
		25	0	20.97	20.88	20.82	2
		25	12	21.20	21.11	21.05	2
		25	25	21.11	21.02	20.96	2
		50	0	21.29	21.20	21.14	2



3.5 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

TUNE-UP POWER TABLE

Band	Frequency (MHz)	Operating Mode	Tune-Up Power And Tolerance (dBm)
WCDMA II	1907.6	RMC 12.2K	21.5±1.0
WCDMA IV	1732.6	RMC 12.2K	21.0±1.0
WCDMA V	836.4	RMC 12.2K	22.5±1.0
Band 2	1880	QPSK	21.5±1.0
Band 4	1720	QPSK	21.0±1.0
Band 12	704	QPSK	22.5±1.0

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Tune-up Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm ²)	limit (mW/cm ²)	PASS / FAIL
WCDMA II	1907.6	RMC 12.2K	0.6	22.5	204.174	0.041	1.00	PASS
WCDMA IV	1732.6	RMC 12.2K	0.6	22.0	181.970	0.036	1.00	PASS
WCDMA V	836.4	RMC 12.2K	0.5	23.5	251.189	0.050	0.56	PASS
Band 2	1880	QPSK	0.7	22.5	208.930	0.042	1.00	PASS
Band 4	1720	QPSK	0.6	22.0	181.970	0.036	1.00	PASS
Band 12	704	QPSK	0.4	23.5	245.471	0.049	0.47	PASS

--END--