

RF EXPOSURE REPORT

Report No.: SA160724W003

FCC ID: ZMOL816AM

Test Model: L816-AM

Received Date: Jul. 24, 2016

Test Date: Jul. 25, 2016 ~ Aug. 11, 2016

Issued Date: Aug. 12, 2016

Applicant: Fibocom Wireless Inc.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA160724W003	Original release	Aug. 12, 2016

1 Certificate of Conformity

Product: LTE module

Brand: Fibocom

Test Model: L816-AM

Sample Status: Identical Prototype

Applicant: Fibocom Wireless Inc.

Test Date: Jul. 25, 2016 ~ Aug. 11, 2016

Standards: **FCC Part 2 (Section 2.1091)**

FCC OET Bulletin 65, Supplement C (01-01)

IEEE C95.1

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Yuqiang Yin, **Date:** Aug. 12, 2016
Yuqiang Yin / Engineer

Approved by : Bill Yao, **Date:** Aug. 12, 2016
Bill Yao / Manager

2 GENERAL INFORMATI

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	LTE module	
BRAND	Fibocom	
MODEL NAME	L816-AM	
POWER SUPPLY	3.8Vdc (host equipment)	
OPERATING TEMPERATURE RANGE	-10 ~ 55°C	
MODULATION TECHNOLOGY	DSSS, OFDM	
MODULATION TYPE	GPRS/EDGE	GMSK, 8PSK
	WCDMA	BPSK/QPSK
	LTE	QPSK, 16QAM
OPERATING FREQUENCY	GPRS/EDGE	824.2MHz ~ 848.8MHz (FOR GSM 850) 1850.2MHz ~ 1909.8MHz (FOR PCS 1900)
	WCDMA	1852.4MHz ~ 1907.6MHz (FOR WCDMA II) 826.4MHz ~ 846.6MHz (FOR WCDMA V)
	LTE	1850.7MHz ~ 1909.3MHz (FOR LTE Band 2) 1710.7MHz ~ 1754.3MHz (FOR LTE Band 4) 699.7MHz ~ 715.3MHz (FOR LTE Band 12)
ANTENNA TYPE	External Antenna	
ANTENNA GAIN	5dBi gain for PCS1900/WCDMA Band II/ LTE Band 2/ LTE Band 4 3dBi gain for GSMS850/WCDMA Band V/ LTE Band 12	
HW VERSION	V1.0.0	
SW VERSION	L816_V1A.0D.01.01	
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

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

a. 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 **Module Approval**.

3.4 CONDUCTED POWER

GSM

Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power						
GPRS 8	32.07	32.14	32.23	29.23	29.24	29.36
GPRS 10	29.42	29.43	29.49	26.79	26.76	26.88
EDGE 8 (MCS1)	26.51	26.38	26.25	25.49	25.35	25.31
EDGE 10 (MCS1)	23.98	23.84	23.75	23.00	22.87	22.80
Maximum Frame-Averaged Output Power						
GPRS 8	23.07	23.14	23.23	20.23	20.24	20.36
GPRS 10	23.42	23.43	23.49	20.79	20.76	20.88
EDGE 8 (MCS1)	17.51	17.38	17.25	16.49	16.35	16.31
EDGE 10 (MCS1)	17.98	17.84	17.75	17.00	16.87	16.80

WCDMA

BAND	WCDMA II			WCDMA V		
CHANNEL	9262	9400	9538	4132	4182	4233
FREQUENCY (MHz)	1852.4	1880.0	1907.6	826.4	836.4	846.6
RMC 12.2K	22.84	22.86	22.91	22.74	23.00	22.94
HSPA						
HSDPA Subtest-1	21.46	21.48	21.53	21.36	21.62	21.56
HSDPA Subtest-2	21.44	21.46	21.51	21.34	21.60	21.54
HSDPA Subtest-3	20.94	20.96	21.01	20.84	21.10	21.04
HSDPA Subtest-4	20.89	20.91	20.96	20.79	21.05	20.99
HSUPA Subtest-1	21.76	21.78	21.83	21.66	21.92	21.86
HSUPA Subtest-2	19.78	19.80	19.85	19.68	19.94	19.88
HSUPA Subtest-3	20.87	20.89	20.94	20.77	21.03	20.97
HSUPA Subtest-4	19.81	19.83	19.88	19.71	19.97	19.91
HSUPA Subtest-5	21.81	21.83	21.88	21.71	21.97	21.91

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	23.24	23.31	23.44	0
		1	2	23.16	23.19	23.31	0
		1	5	23.05	23.15	23.12	0
		3	0	23.23	23.30	23.43	0
		3	1	23.15	23.18	23.30	0
		3	3	23.04	23.14	23.11	0
		6	0	22.32	22.39	22.52	1
	16QAM	1	0	22.63	22.66	22.70	1
		1	2	22.33	22.43	22.40	1
		1	5	22.10	22.17	22.30	1
		3	0	22.61	22.64	22.68	1
		3	1	22.31	22.41	22.38	1
		3	3	22.08	22.15	22.28	1
		6	0	21.40	21.43	21.47	2
LTE Band 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	23.27	23.34	23.47	0
		1	7	23.19	23.22	23.34	0
		1	14	23.08	23.18	23.15	0
		8	0	22.51	22.58	22.71	1
		8	3	22.33	22.36	22.48	1
		8	7	22.15	22.25	22.22	1
		15	0	22.35	22.42	22.55	1
	16QAM	1	0	22.66	22.69	22.73	1
		1	7	22.36	22.46	22.43	1
		1	14	22.13	22.20	22.33	1
		8	0	21.57	21.60	21.64	2
		8	3	21.26	21.36	21.33	2
		8	7	21.23	21.30	21.43	2
		15	0	21.43	21.46	21.50	2

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	23.30	23.37	23.50	0
		1	12	23.22	23.25	23.37	0
		1	24	23.11	23.21	23.18	0
		12	0	22.54	22.61	22.74	1
		12	6	22.36	22.39	22.51	1
		12	13	22.18	22.28	22.25	1
		25	0	22.38	22.45	22.58	1
	16QAM	1	0	22.69	22.72	22.76	1
		1	12	22.39	22.49	22.46	1
		1	24	22.16	22.23	22.36	1
		12	0	21.60	21.63	21.67	2
		12	6	21.29	21.39	21.36	2
		12	13	21.26	21.33	21.46	2
		25	0	21.46	21.49	21.53	2
LTE Band 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	23.32	23.39	23.52	0
		1	24	23.24	23.27	23.39	0
		1	49	23.13	23.23	23.20	0
		25	0	22.56	22.63	22.76	1
		25	12	22.38	22.41	22.53	1
		25	25	22.20	22.30	22.27	1
		50	0	22.40	22.47	22.60	1
	16QAM	1	0	22.71	22.74	22.78	1
		1	24	22.41	22.51	22.48	1
		1	49	22.18	22.25	22.38	1
		25	0	21.62	21.65	21.69	2
		25	12	21.31	21.41	21.38	2
		25	25	21.28	21.35	21.48	2
		50	0	21.48	21.51	21.55	2

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	23.05	23.30	23.07	0
		1	2	22.91	23.12	22.94	0
		1	5	22.81	23.01	22.75	0
		3	0	23.03	23.28	23.05	0
		3	1	22.89	23.10	22.92	0
		3	3	22.79	22.99	22.73	0
		6	0	21.85	22.10	21.87	1
	16QAM	1	0	22.16	22.23	22.05	1
		1	2	21.88	22.08	21.82	1
		1	5	21.77	22.02	21.79	1
		3	0	22.15	22.22	22.04	1
		3	1	21.87	22.07	21.81	1
		3	3	21.76	22.01	21.78	1
		6	0	21.07	21.14	20.96	2
LTE Band 4							
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	23.06	23.31	23.08	0
		1	7	22.92	23.13	22.95	0
		1	14	22.82	23.02	22.76	0
		8	0	21.94	22.19	21.96	1
		8	3	21.90	22.11	21.93	1
		8	7	21.83	22.03	21.77	1
		15	0	21.86	22.11	21.88	1
	16QAM	1	0	22.17	22.24	22.06	1
		1	7	21.89	22.09	21.83	1
		1	14	21.78	22.03	21.80	1
		8	0	21.17	21.24	21.06	2
		8	3	20.86	21.06	20.80	2
		8	7	20.80	21.05	20.82	2
		15	0	21.08	21.15	20.97	2

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	23.09	23.34	23.11	0
		1	12	22.95	23.16	22.98	0
		1	24	22.85	23.05	22.79	0
		12	0	21.97	22.22	21.99	1
		12	6	21.93	22.14	21.96	1
		12	13	21.86	22.06	21.80	1
		25	0	21.89	22.14	21.91	1
	16QAM	1	0	22.20	22.27	22.09	1
		1	12	21.92	22.12	21.86	1
		1	24	21.81	22.06	21.83	1
		12	0	21.20	21.27	21.09	2
		12	6	20.89	21.09	20.83	2
		12	13	20.83	21.08	20.85	2
		25	0	21.11	21.18	21.00	2
LTE Band 4							
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	23.13	23.38	23.15	0
		1	24	22.99	23.20	23.02	0
		1	49	22.89	23.09	22.83	0
		25	0	22.01	22.26	22.03	1
		25	12	21.97	22.18	22.00	1
		25	25	21.90	22.10	21.84	1
		50	0	21.93	22.18	21.95	1
	16QAM	1	0	22.24	22.31	22.13	1
		1	24	21.96	22.16	21.90	1
		1	49	21.85	22.10	21.87	1
		25	0	21.24	21.31	21.13	2
		25	12	20.93	21.13	20.87	2
		25	25	20.87	21.12	20.89	2
		50	0	21.15	21.22	21.04	2

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	23.19	23.44	23.21	0
		1	37	23.05	23.26	23.08	0
		1	74	22.95	23.15	22.89	0
		36	0	22.07	22.32	22.09	1
		36	19	22.03	22.24	22.06	1
		36	39	21.96	22.16	21.90	1
		75	0	21.99	22.24	22.01	1
	16QAM	1	0	22.30	22.37	22.19	1
		1	37	22.02	22.22	21.96	1
		1	74	21.91	22.16	21.93	1
		36	0	21.30	21.37	21.19	2
		36	19	20.99	21.19	20.93	2
		36	39	20.93	21.18	20.95	2
		75	0	21.21	21.28	21.10	2
LTE Band 4							
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	23.22	23.47	23.24	0
		1	50	23.08	23.29	23.11	0
		1	99	22.98	23.18	22.92	0
		50	0	22.10	22.35	22.12	1
		50	25	22.06	22.27	22.09	1
		50	50	21.99	22.19	21.93	1
		100	0	22.02	22.27	22.04	1
	16QAM	1	0	22.33	22.40	22.22	1
		1	50	22.05	22.25	21.99	1
		1	99	21.94	22.19	21.96	1
		50	0	21.33	21.40	21.22	2
		50	25	21.02	21.22	20.96	2
		50	50	20.96	21.21	20.98	2
		100	0	21.24	21.31	21.13	2

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	23.36	23.32	23.10	0
		1	2	23.24	23.25	23.18	0
		1	5	23.05	23.07	23.10	0
		3	0	23.34	23.30	23.08	0
		3	1	23.22	23.23	23.16	0
		3	3	23.03	23.05	23.08	0
		6	0	22.31	22.27	22.05	1
	16QAM	1	0	22.42	22.41	22.34	1
		1	2	22.35	22.37	22.40	1
		1	5	22.25	22.21	21.99	1
		3	0	22.41	22.40	22.33	1
		3	1	22.34	22.36	22.39	1
		3	3	22.24	22.20	21.98	1
		6	0	21.30	21.29	21.22	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	23.40	23.36	23.14	0
		1	7	23.28	23.29	23.22	0
		1	14	23.09	23.11	23.14	0
		8	0	22.43	22.39	22.17	1
		8	3	22.30	22.31	22.24	1
		8	7	22.25	22.27	22.30	1
		15	0	22.35	22.31	22.09	1
	16QAM	1	0	22.46	22.45	22.38	1
		1	7	22.39	22.41	22.44	1
		1	14	22.29	22.25	22.03	1
		8	0	21.38	21.37	21.30	2
		8	3	21.29	21.31	21.34	2
		8	7	21.33	21.29	21.07	2
		15	0	21.34	21.33	21.26	2

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	23.46	23.42	23.20	0
		1	12	23.34	23.35	23.28	0
		1	24	23.15	23.17	23.20	0
		12	0	22.49	22.45	22.23	1
		12	6	22.36	22.37	22.30	1
		12	13	22.31	22.33	22.36	1
		25	0	22.41	22.37	22.15	1
	16QAM	1	0	22.52	22.51	22.44	1
		1	12	22.45	22.47	22.50	1
		1	24	22.35	22.31	22.09	1
		12	0	21.44	21.43	21.36	2
		12	6	21.35	21.37	21.40	2
		12	13	21.39	21.35	21.13	2
		25	0	21.40	21.39	21.32	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	23.49	23.45	23.23	0
		1	24	23.37	23.38	23.31	0
		1	49	23.18	23.20	23.23	0
		25	0	22.52	22.48	22.26	1
		25	12	22.39	22.40	22.33	1
		25	25	22.34	22.36	22.39	1
		50	0	22.44	22.40	22.18	1
	16QAM	1	0	22.55	22.54	22.47	1
		1	24	22.48	22.50	22.53	1
		1	49	22.38	22.34	22.12	1
		25	0	21.47	21.46	21.39	2
		25	12	21.38	21.40	21.43	2
		25	25	21.42	21.38	21.16	2
		50	0	21.43	21.42	21.35	2

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	23.35	23.42	23.55	0
		1	37	23.27	23.30	23.42	0
		1	74	23.16	23.26	23.23	0
		36	0	22.59	22.66	22.79	1
		36	19	22.41	22.44	22.56	1
		36	39	22.23	22.33	22.30	1
		75	0	22.43	22.50	22.63	1
	16QAM	1	0	22.74	22.77	22.81	1
		1	37	22.44	22.54	22.51	1
		1	74	22.21	22.28	22.41	1
		36	0	21.65	21.68	21.72	2
		36	19	21.34	21.44	21.41	2
		36	39	21.31	21.38	21.51	2
		75	0	21.51	21.54	21.58	2
LTE Band 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	23.40	23.47	23.60	0
		1	50	23.32	23.35	23.47	0
		1	99	23.21	23.31	23.28	0
		50	0	22.64	22.71	22.84	1
		50	25	22.46	22.49	22.61	1
		50	50	22.28	22.38	22.35	1
		100	0	22.48	22.55	22.68	1
	16QAM	1	0	22.79	22.82	22.86	1
		1	50	22.49	22.59	22.56	1
		1	99	22.26	22.33	22.46	1
		50	0	21.70	21.73	21.77	2
		50	25	21.39	21.49	21.46	2
		50	50	21.36	21.43	21.56	2
		100	0	21.56	21.59	21.63	2

3.5 CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

GPRS

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Conducted Time Average Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm ²)	limit (mW/cm ²)	PASS / FAIL
GPRS 850	848.8	GPRS12	3	23.49	445.656	0.089	0.57	PASS
PCS 1900	1909.8	GPRS12	5	20.88	387.258	0.077	1.00	PASS

WCDMA

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Conducted Average Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm ²)	limit (mW/cm ²)	PASS / FAIL
WCDMA850	836.4	RMC12.2k	3	23.00	398.107	0.079	0.56	PASS
WCDMA1900	1907.6	RMC12.2k	5	22.91	618.016	0.123	1.00	PASS

LTE

Band	Frequency (MHz)	Operating Mode	Antenna Gain (dBi)	Conducted Average Power (dBm)	E.I.R.P Power (mW)	Power Density (mW/cm ²)	limit (mW/cm ²)	PASS / FAIL
Band2	1900.0	QPSK	5	23.60	724.436	0.144	1.00	PASS
Band4	1732.5	QPSK	5	23.47	703.072	0.140	1.00	PASS
Band12	704.0	QPSK	3	23.49	445.656	0.089	0.47	PASS