SGS-CSTC Standards Technical Services Co., Ltd.

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RF Exposure Evaluation Report

Application No.:	SZEM1403000919RF
Applicant:	BANANA JOINT STOCK LIMITED
Manufacturer:	BANANA JOINT STOCK LIMITED
Product Name:	Banana TV
Model No.(EUT):	A211
Add Model No.:	A211S
FCC ID:	2AA2A-BATA211X
Standards:	47 CFR Part 1.1307(2013) 47 CFR Part 1.1310(2013)
Date of Receipt:	2014-03-12
Date of Test:	2014-03-19 to 2014-04-22
Date of Issue:	2014-04-29
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

2 Contents

3 General Information

3.1 Client Information

Applicant:	BANANA JOINT STOCK LIMITED
Address of Applicant:	UNIT 04, 7/F, BRIGHT WAY TOWER, NO.33 MONG KOK ROAD, KOWLOON, HK
Manufacturer:	BANANA JOINT STOCK LIMITED
Address of Manufacturer:	UNIT 04, 7/F, BRIGHT WAY TOWER, NO.33 MONG KOK ROAD, KOWLOON, HK

3.2 General Description of EUT

Product Name:	Banana TV
Model No.:	A211, A211S (Only the Model A211 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models. Only different on the Item number (model/item No). Power adapter model No.: MU10-Q050200-A1, K15S050200U. The two model adapter were tested, the worse model is the MU10-Q050200-A1, so only the MU10-Q050200-A1 test data is showed in the report.)
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Sample Type:	Fixed production
Test Power Grade:	b: 40; g, n (HT20), n (HT40): 38 (manufacturer declare)
Test Software of EUT:	Adb shell (manufacturer declare)
Modulation Type:	DSSS
Antenna Type and Gain:	Type : Integral antenna Gain : 1.42dBi

AC adapter:	I.T.E. POWER SUPPLY MODEL: MU10-Q050200-A1 INPUT: 100-240V~50/60Hz 0.3A OUTPUT:5.0V ⎓ 2.0A AC ADAPTER MODEL: K15S050200U INPUT: 100-240V~50/60Hz 0.5A OUTPUT:5.0V ⎓ 2.0A

Test Voltage:	AC 120V 60Hz
DC cable:	150cm (unshielded)
AV cable:	100cm (unshielded)

3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China 518057

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No tests were sub-contracted.

3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

  CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

  The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

3.5 Deviation from Standards

None.

3.6 Abnormalities from Standard Conditions

None.

3.7 Other Information Requested by the Customer

None.

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 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)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
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
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	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
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission 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

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

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

Antenna Gain: 1.42dBi
Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.3868 in linear scale.
Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
Highest	2462	17.78	59.9791	0.0165	1.0	PASS

Note: Refer to report No. SZEM140300091901 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.