

**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

RF Exposure evaluation**Report Reference No.....: GTS20191205012-2-8****FCC ID.....: 2AUUTOPS-A45**

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Representative Laboratory Name .: Shenzhen Global Test Service Co.,Ltd.**Address.....:** No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong**Applicant's name: VIA TECHNOLOGIES (SHENZHEN) CO., LTD.****Address:** VIA Building 4F, No.9966, Shennan Ave, Nanshan District, Shenzhen, Guangdong, China**Test specification****Standard: 47CFR §1.1310****47CFR §2.1091****KDB447498 v06****TRF Originator: Shenzhen Global Test Service Co.,Ltd.****Master TRF.....: Dated 2014-12****Shenzhen Global Test Service Co.,Ltd. All rights reserved.**

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Test item description: Distributed media player**Trade Mark: N/A****Manufacturer: VIA TECHNOLOGIES (SHENZHEN) CO., LTD.****Model/Type reference.....: OPS-A45****Listed Models: OPS-B45,OPS-C45,OPS-D45,OPS-E45,OPS-B28, OPS-C28,OPS-E28,OPS-F28,OPS-G28,KB-FB4000, KB-FB5000,KB-FB6000,KB-FB7000,KB-FB8000,KB-FB9000****Exposure category.....: General population/uncontrolled environment****EUT Type: Production Unit****Rating: DC 12.0V****Result.....: PASS**

TEST REPORT

Test Report No. :	GTS20191205012-2-8	Apr.01, 2020
		Date of issue

Equipment under Test : Distributed media player

Model /Type : OPS-A45

Listed Models : OPS-B45,OPS-C45,OPS-D45,OPS-E45,OPS-B28,
OPS-C28,OPS-E28,OPS-F28,OPS-G28,KB-FB4000,
KB-FB5000,KB-FB6000,KB-FB7000,KB-FB8000,KB-FB9000

Applicant : **VIA TECHNOLOGIES (SHENZHEN) CO., LTD.**

Address : VIA Building 4F, No.9966, Shennan Ave, Nanshan District, Shenzhen,
Guangdong, China

Manufacturer : **VIA TECHNOLOGIES (SHENZHEN) CO., LTD.**

Address : VIA Building 4F, No.9966, Shennan Ave, Nanshan District, Shenzhen,
Guangdong, China

Test Result:	PASS
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The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. SUMMARY

1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

●	Adapter	Length (m) :	1.5m
		Shield :	Non-Shielded
		Detachable :	Non- Detachable

1.2. Product Description

Name of EUT	Distributed media player
Trade Mark:	N/A
Model/Type reference:	OPS-A45
List Model:	OPS-B45,OPS-C45,OPS-D45,OPS-E45,OPS-B28, OPS-C28,OPS-E28,OPS-F28,OPS-G28,KB-FB4000, KB-FB5000,KB-FB6000,KB-FB7000,KB-FB8000,KB-FB9000
Model Declaration	PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
FCC ID	2AUUTOPS-A45
Power Supply	DC 12.0V
Hardware Version	ZX2800 ReV.A1
Software Version	zx2800_general-userdebug 7.1.2 V1.0.6 20190717.093102 derkeys
Adapter information:	Model: MX24W1-1202000C Input: AC 100-240V~50/60Hz 0.8A Output:DC 12V/2A
WIFI	
WLAN	Supported 802.11 a/n/ac
Modulation Type	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac20/40/80: OFDM(64QAM, 16QAM, QPSK, BPSK)
Operation frequency	IEEE 802.11a:5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11n HT40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz IEEE 802.11ac20: 5180-5240MHz,5260-5320MHz,5500-5700MHz,5745-5825MHz IEEE 802.11ac40: 5190-5230MHz,5270-5310MHz,5510-5670MHz,5755-5795MHz IEEE 802.11ac80:5210MHz,5290MHz,5530MHz,5775MHz
Channel number	4 Channels for 20MHz bandwidth(5180-5240MHz) 4 Channels for 20MHz bandwidth(5260-5320MHz) 11 Channels for 20MHz bandwidth(5500-5700MHz) 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 2 channels for 40MHz bandwidth(5270~5310MHz) 5 Channels for 40MHz bandwidth(5510-5670MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5210MHz) 1 channels for 80MHz bandwidth(5290MHz) 1 Channels for 80MHz bandwidth(5530Hz) 1 channels for 80MHz bandwidth(5775MHz)
Antenna Description	External Antenna; 2.0dBi(Max.)
Device Type	Movable Type

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

2.2. Test Facility

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

CNAS (No. CNAS L8169)

Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA (Certificate No. 4758.01)

Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

2.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

2.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Method of measurement

3.1. Applicable Standard

[ANSI C95.1–1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

[FCC KDB publication 447498 D01 General RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices

3.2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 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

*=Plane-wave equivalent power density

3.3. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

4. Conducted Power Results

[5GWLAN Band 1]

Mode	Channel	Frequency (MHz)	Maximum Average Conducted (dBm)
IEEE 802.11a	36	5180	8.38
	40	5200	8.37
	48	5240	8.66
IEEE 802.11n HT20	36	5180	8.29
	40	5200	8.16
	48	5240	8.09
IEEE 802.11n HT40	38	5190	8.42
	46	5230	8.79
IEEE 802.11ac VHT20	36	5180	8.11
	40	5200	8.74
	48	5240	8.7
IEEE 802.11ac VHT40	38	5190	8.09
	46	5230	8.32
IEEE 802.11ac VHT80	42	5210	8.05

[5GWLAN Band 2A]

Mode	Channel	Frequency (MHz)	Maximum Average Conducted (dBm)
IEEE 802.11a	52	5260	8.37
	56	5280	8.73
	64	5320	8.48
IEEE 802.11n HT20	52	5260	8.36
	56	5280	8.58
	64	5320	8.25
IEEE 802.11n HT40	54	5270	8.41
	62	5310	8.78
IEEE 802.11ac VHT20	52	5260	8.42
	56	5280	8.16
	64	5320	8.27
IEEE 802.11ac VHT40	54	5270	8.25
	62	5310	8.19
IEEE 802.11ac VHT80	58	5290	8.18

[5GWLAN Band 2C]

Mode	Channel	Frequency (MHz)	Maximum Average Conducted (dBm)
IEEE 802.11a	100	5500	8.3
	132	5660	8.81
	140	5700	8.18
IEEE 802.11n HT20	100	5500	8.54
	132	5660	8.16
	140	5700	8.47
IEEE 802.11n HT40	102	5510	8.52
	110	5550	8.43
	134	5670	8.66
IEEE 802.11ac VHT20	100	5500	8.73
	132	5660	8.2
	140	5700	8.55
IEEE 802.11ac VHT40	102	5510	8.49
	110	5550	8.17
	134	5670	8.24
IEEE 802.11ac VHT80	106	5530	8.25

[5GWLAN Band 3]

Mode	Channel	Frequency (MHz)	Maximum Average Conducted (dBm)
IEEE 802.11a	149	5745	8.72
	157	5785	8.1
	165	5825	8.22
IEEE 802.11n HT20	149	5745	8.81
	157	5785	8.5
	165	5825	8.73
IEEE 802.11n HT40	151	5755	8.63
	159	5795	8.1
IEEE 802.11ac VHT20	149	5745	8.13
	157	5785	8.22
	165	5825	8.68
IEEE 802.11ac VHT40	151	5755	8.47
	159	5795	8.36
IEEE 802.11ac VHT80	155	5775	8.13

5. Manufacturing Tolerance

[5GWLAN Band 1]

IEEE 802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 38	---	Channel 46
Target (dBm)	8.0	---	8.0
Tolerance $\pm$ (dB)	1.0	---	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 38	---	Channel 46
Target (dBm)	8.0	---	8.0
Tolerance $\pm$ (dB)	1.0	---	1.0
IEEE 802.11ac VHT80 (Average)			
Channel	---	Channel 42	---
Target (dBm)	---	8.0	---
Tolerance $\pm$ (dB)	---	1.0	---

[5GWLAN Band 2A]

IEEE 802.11a (Average)			
Channel	Channel 52	Channel 56	Channel 64
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 52	Channel 56	Channel 64
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 54	---	Channel 62
Target (dBm)	8.0	---	8.0
Tolerance $\pm$ (dB)	1.0	---	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 52	Channel 56	Channel 64
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 54	---	Channel 62
Target (dBm)	8.0	---	8.0
Tolerance $\pm$ (dB)	1.0	---	1.0
IEEE 802.11ac VHT80 (Average)			
Channel	---	Channel 58	---
Target (dBm)	---	8.0	---
Tolerance $\pm$ (dB)	---	1.0	---

[5GWLAN Band 2C]			
IEEE 802.11a (Average)			
Channel	Channel 100	Channel 132	Channel 140
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 100	Channel 132	Channel 140
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 100	Channel 132	Channel 140
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT80 (Average)			
Channel	Channel 106	---	---
Target (dBm)	8.0	---	---
Tolerance $\pm$ (dB)	1.0	---	---

[5GWLAN Band 3]			
IEEE 802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 151	---	Channel 159
Target (dBm)	8.0	---	8.0
Tolerance $\pm$ (dB)	1.0	---	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	8.0	8.0	8.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 151	---	Channel 159
Target (dBm)	8.0	---	8.0
Tolerance $\pm$ (dB)	1.0	---	1.0
IEEE 802.11ac VHT80 (Average)			
Channel	---	Channel 155	---
Target (dBm)	---	8.0	---
Tolerance $\pm$ (dB)	---	1.0	---

6. Measurement Results

6.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r = 20\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[5GWLAN Band 1]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT80	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000

[5GWLAN Band 2A]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT80	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000

[5GWLAN Band 2C]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT80	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000

[5GWLAN Band 3]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11a	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11n HT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT20	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT40	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000
IEEE 802.11ac VHT80	9.00	7.9433	2.0	1.5849	100%	0.0025	1.0000

Remark:

1. Output power including tune-up tolerance;
2. MPE evaluate distance is 20cm from user manual provide by manufacturer;

6.2 Simultaneous Transmission MPE

The sample support one WLAN modular and one antenna, Not need consider simultaneous transmission;

7. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

.....End of Report.....