



FCC TEST REPORT

FCC ID: 2AYG9-TR08D

IC: 26800-TR08D

On Behalf of

SHENZHEN YECON TECHNOLOGY CO., LTD

Face recognition intelligent terminal

Model No.: TR08D

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an District,
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TEST REPORT DECLARATION

Applicant : SHENZHEN YECON TECHNOLOGY CO., LTD

Address : 6 floor, East Second, Cuigang Industrial Park, Huai de community, Fuyong street, Baoan District, Shenzhen

Manufacturer : SHENZHEN YECON TECHNOLOGY CO., LTD

Address : 6 floor, East Second, Cuigang Industrial Park, Huai de community, Fuyong street, Baoan District, Shenzhen

EUT Description : Face recognition intelligent terminal

(A) Model No. : TR08D

(B) Trademark : /

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.225
RSS 210 Issue 10, RSS Gen Issue 5, ANSI C63.10:2013

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:

Lucas Pang
Project Engineer



Approved by (name + signature).....:

Simple Guan
Project Manager



Date of issue.....

January 28, 2021

Revision History

Revision	Issue Date	Revisions	Revised By
V0	January 28, 2021	Initial released Issue	Lucas Pang

1. General Information

1.1. Description of Device (EUT)

EUT : Face recognition intelligent terminal

Model No. : TR08D
DIFF : /

Trade mark : /

Power supply : DC 12V from adapter

NFC

Operation frequency : 13.56MHz
Channel No. : 1 Channel
Modulation : ASK
Antenna Type : Internal antenna, Antenna gain 1dBi.

Software version : V1.0
Hardware Version/ : YT-23-MB-V2.3
FVIN

Note: In this report, the main test model is TR08D, and the main test model serial number is YGKJ20208110041.

1.2. Accessories of Device (EUT)

Accessories1	:	AC/DC ADAPTER
Manufacturer	:	Shenzhen Jiuzhou Power Technology Co., LTD
Model	:	JZB024-120180D
Ratings	:	Input: 100-240V~ 50/60Hz 0.7A Output: 12.0V=1.8A
Accessories2	:	AC ADAPTER
Manufacturer	:	Dongguan Guanjin Electronics Technology Co., Ltd
Model	:	K25V120180E2
Ratings	:	Input: 100-240V~50/60Hz 0.6A Output: 12.0V=1.8A 21.6W

Note: The two power adapters of the product have been tested. This report only reflects the data of the worst power supply (JZB024-120180D).

1.3. Ancillary Equipment Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDOC
1.	N/A	N/A	N/A	N/A	N/A

1.4. Test Lab Information

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103,
Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961

July 15, 2019 Certificated by IC
Registration Number: CN0085

2. Summary of test

2.1. Summary of test result

Description of Test Item	Standard		Results
	FCC	IC	
Conducted Emission	15.207(a)	RSS-GEN 8.8	PASS
Radiated emissions	15.209(a)&15.225	RSS-Gen 8.9	PASS
Fundamental field strength limit	15.225(a)	RSS 210 B.6	PASS
Frequency stability	15.225(e)	RSS 210 B.6	PASS
Band edge compliance	15.225	RSS 210 B.6	PASS
Antenna Requirement	15.203	RSS-GEN(6.8)	PASS

2.2. Block Diagram



2.3. Test mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
1	CH1	13.56
Note: According exploratory test, EUT will have maximum output power in those data rate. so those data rate were used for all test.		

2.4. Test Conditions

Temperature range	21-25°C
Humidity range	40-75%
Pressure range	86-106kPa

2.5. Measurement Uncertainty (95% confidence levels, k=2)

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10^{-8}
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2 °C
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

2.6. Test Equipment

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2019.09.06	3 Year
Spectrum analyzer	ROHDE&SCHW ARZ	FSV40-N	102137	2020.09.02	1 Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2020.09.02	1 Year
Receiver	ROHDE&SCHW ARZ	ESR	1316.3003K03-10208 2-Wa	2020.09.02	1 Year
Receiver	R&S	ESCI	101165	2020.09.02	1 Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2 Year
Horn Antenna	SCHWARZBEC K	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2 Year
Active Loop Antenna	SCHWARZBEC K	FMZB 1519B	00059	2019.09.07	2 Year
Cable	Resenberger	N/A	No.1	2020.09.02	1 Year
Cable	Resenberger	N/A	No.2	2020.09.02	1 Year
Cable	Resenberger	N/A	No.3	2020.09.02	1 Year
Pre-amplifier	HP	HP8347A	2834A00455	2020.09.02	1 Year
Pre-amplifier	Agilent	8449B	3008A02664	2020.09.02	1 Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2020.09.02	1 Year
L.I.S.N.#2	ROHDE&SCHW ARZ	ENV216	101043	2020.09.02	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2020.09.02	1 Year
Horn Antenna	SCHWARZBEC K	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2020.09.02	1 Year
Power Meter	Agilent	E9300A	MY41496625	2020.09.02	1 Year
Temp. &Humid. Chamber	Weihuang	WHTH-1000-40-80	100631	2020.09.02	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2020.09.02	1 Year

3. Occupied bandwidth and 20dB Bandwidth

3.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in FCC part 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

3.2. Test Procedure

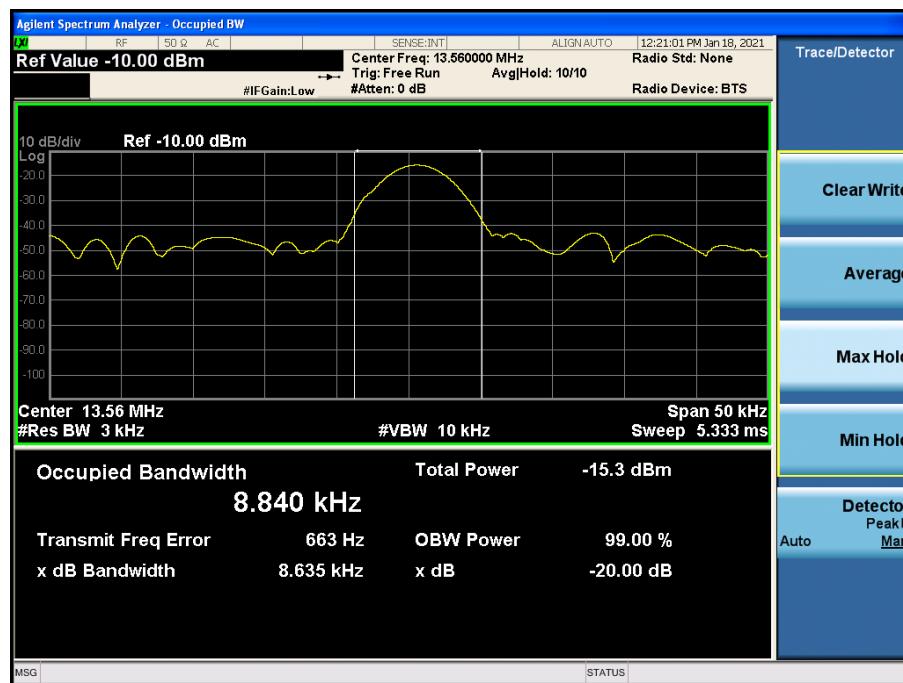
The transmitter output was directly connected to a spectrum analyzer with a 50Ω cable. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3KHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

3.3. Test Setup



3.4. Test Result

Mode	Freq (MHz)	20dB Bandwidth (KHz)	99% Bandwidth	Limit (kHz)	Conclusion
Tx Mode	13.56	8.365	8.840	/	PASS



4. Radiated emissions

4.1. Limit

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Note:

a) The tighter limit applies at the band edges.

For example: F.S limit at 88MHz is 100uV/m

b) If measurement is made at 3m distance, then F.S Limit at 3m distance is adjusted by using the formula of $L_{d1} = L_{d2} * (d2/d1)^2$.

For example:

F.S Limit at 30m(d2) distance is 30uV/m(L_{d2}), then F.S Limit at 3m(d1) distance is

$$L_{d1} = 30\text{uV/m} * (30/3)^2 = 100 * 30\text{uV/m} = 69.54 \text{ dBuV/m}$$

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

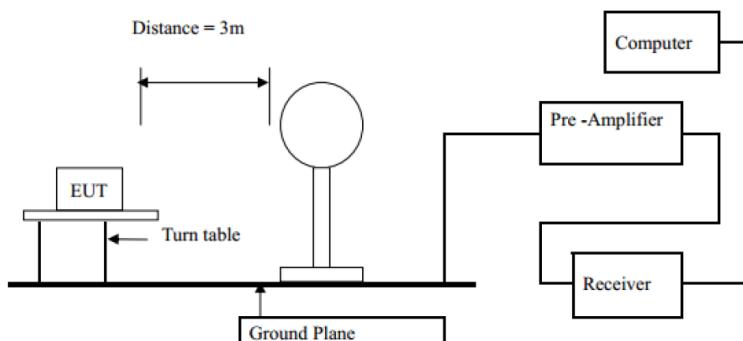
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

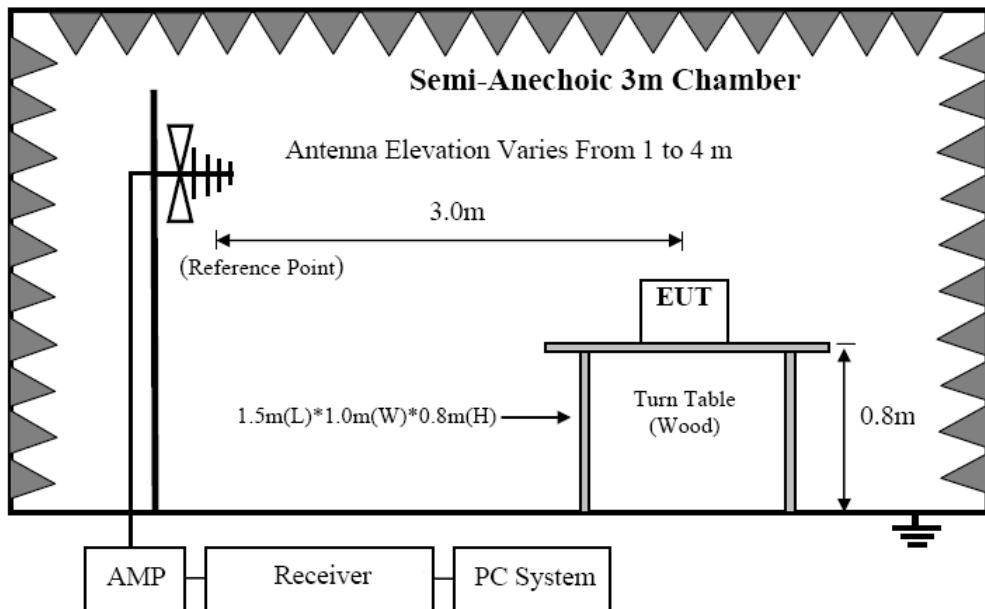
(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

4.2. Block Diagram of Test setup

In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



In 3m Anechoic Chamber Test Setup Diagram for frequency 30MHz-1GHz



4.3. Test Procedure

Procedure of Preliminary Test

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 4.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.10:2013. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Receiver quickly scanned from 9KHz to 30MHz and 30MHz to 1GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The test mode(s) described in clause 2.4 were scanned during the preliminary test:

After the preliminary scan, we found the test mode producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Receiver scanned from 9KHz to 30MHz and 30MHz to 1GHz. Emissions were scanned and

measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 200Hz for 9 KHz to 150 KHz measure, 10 KHz for 150 KHz to 30MHz measure and 120 KHz for 30 MHz to 1GHz measure .

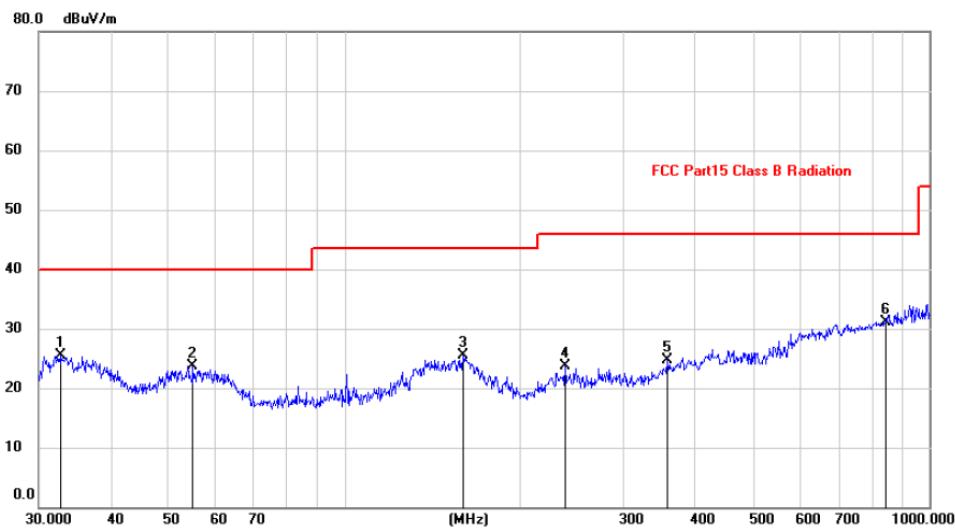
4.4. Test Result

PASS. (See below detailed test result)

Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

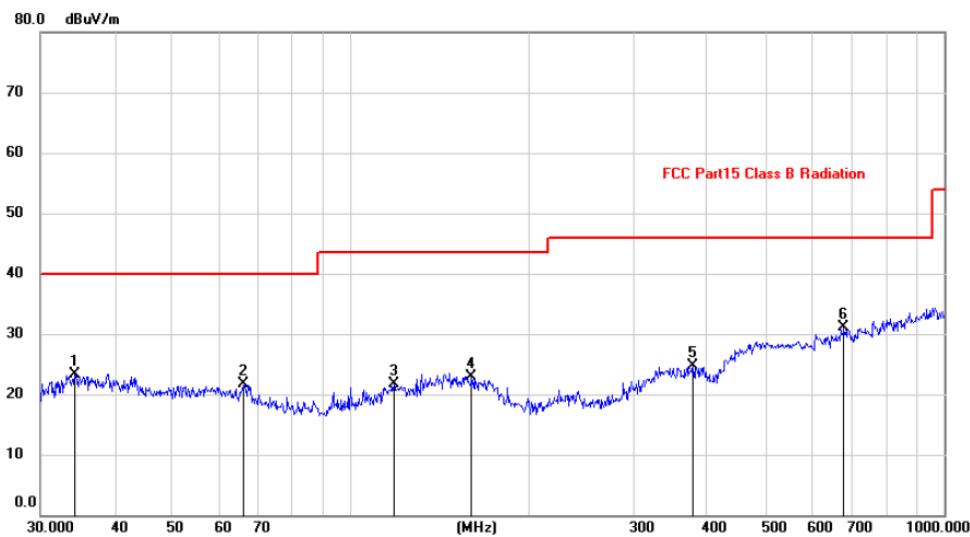
Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Vertical:

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment		Limit	Margin	Antenna Height	Table Degree
				MHz	dBuV	dB	dBuV/m	dB	Detector
1 *	32.6340	11.99	13.42	25.41	40.00	-14.59	peak		
2	55.0274	10.40	13.25	23.65	40.00	-16.35	peak		
3	160.3454	10.94	14.56	25.50	43.50	-18.00	peak		
4	239.1468	11.68	11.96	23.64	46.00	-22.36	peak		
5	356.6757	10.32	14.47	24.79	46.00	-21.21	peak		
6	845.0877	8.48	22.68	31.16	46.00	-14.84	peak		

Note: 1. *:Maximum data; x:Over limit; !:over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Horizontal:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	Antenna Height		Table Degree						
								MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
1		34.2760	9.87	13.47	23.34	40.00	-16.66				peak					
2		66.2660	9.90	11.76	21.66	40.00	-18.34				peak					
3		118.1860	9.24	12.40	21.64	43.50	-21.86				peak					
4		159.7844	8.26	14.58	22.84	43.50	-20.66				peak					
5		378.5842	9.33	15.36	24.69	46.00	-21.31				peak					
6	*	677.5797	10.18	20.97	31.15	46.00	-14.85				peak					

Note: 1. *:Maximum data; x:Over limit; !:over margin.

2. Measurement=Reading Level+Correct Factor; Correct Factor=Antenna Factor+Cable Loss.

Field Strength Emissions Result

Temperature	24°C			Relative Humidity		56%	
Pressure	960hPa			Distance		3m	
Test Mode	TX						
Freq. (MHz)	Position H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limits 3m (dBuV/m)	Margin (dBuV/m)
13.560	H	Peak	57.38	-13.94	43.44	124	-80.56
13.560	H	AV	49.97	-13.94	36.03	104	-67.97
13.110	H	Peak	50.89	-13.94	36.95	80.5	-43.55
13.410	H	Peak	50.14	-13.94	36.20	90.5	-54.30
13.553	H	Peak	48.87	-13.94	34.93	90.5	-55.57
13.567	H	Peak	45.91	-13.93	31.98	90.5	-58.52
13.710	H	Peak	44.98	-13.93	31.05	80.5	-49.45
14.010	H	Peak	44.85	-13.93	30.92	80.5	-49.58
Freq. (MHz)	Position H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limits 3m (dBuV/m)	Margin (dBuV/m)
13.560	V	Peak	57.66	-13.94	43.72	124	-80.28
13.560	V	AV	50.45	-13.94	36.51	104	-67.49
13.110	V	Peak	51.39	-13.94	37.45	80.5	-43.05
13.410	V	Peak	49.55	-13.94	35.61	90.5	-54.89
13.553	V	Peak	49.16	-13.94	35.22	90.5	-55.28
13.567	V	Peak	47.07	-13.93	33.14	90.5	-57.36
13.710	V	Peak	45.10	-13.93	31.17	80.5	-49.33
14.010	V	Peak	45.38	-13.93	31.45	80.5	-49.05

5. Frequency stability

5.1. Test limit

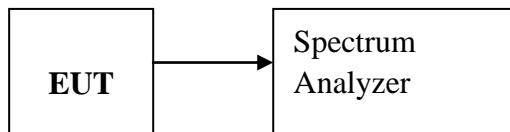
Please refer section RSS-Gen & 15.225e.

Regulation 15.225(e) The frequency tolerance of the carrier signal shall be maintained within +/-0.01% (± 100 ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.2. Test Procedure

The following equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.3. Test Setup



5.4. Test Results

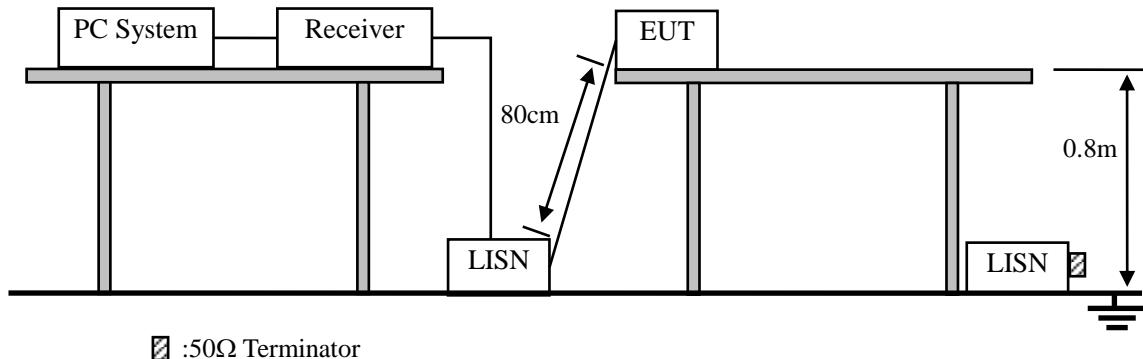
PASS.

Detailed information please see the following page.

Assigned Frequency(MHz): 13.56MHz				
Voltage	Temperature	Measured Frequency (MHz)	Frequency stability	Limit
Low DC 10.8V	+20°C	13.560633	0.000633	
Normal DC 12V	-10°C	13.560901	0.000901	$\pm 100 \text{ ppm}$ $\pm 0.001356 \text{ MHz}$
	-5°C	13.560566	0.000566	
	0°C	13.560399	0.000399	
	+10°C	13.560524	0.000524	
	+20°C	13.560408	0.000408	
	+30°C	13.560444	0.000444	
	+40°C	13.559798	-0.000202	
	+50°C	13.560524	0.000524	
	+60°C	13.560599	0.000599	
High DC 13.2V	+20°C	13.560679	0.000679	

6. Power Line Conducted Emissions

6.1. Block Diagram of Test Setup



6.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

6.3. Test Procedure

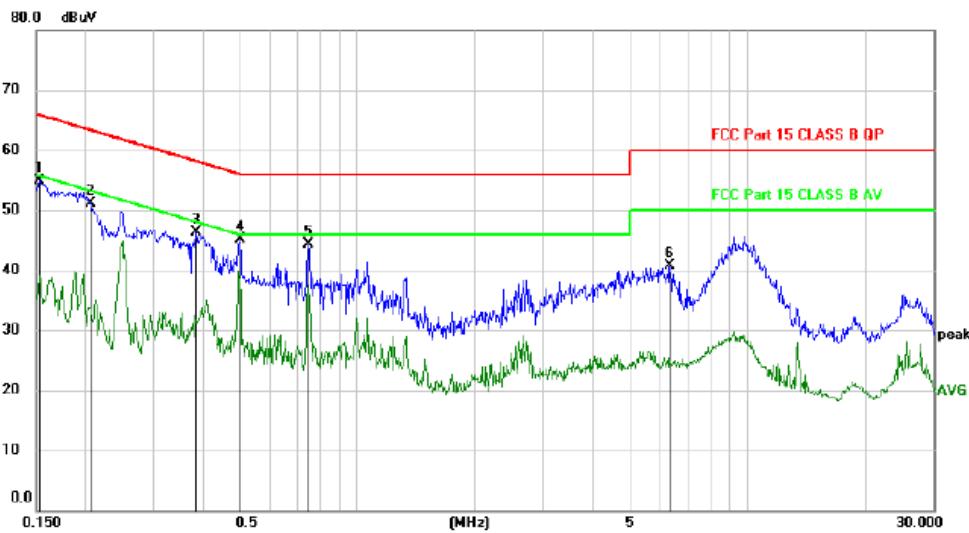
- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N1), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C64.10:2013 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

6.4. Test Result

PASS. (See below detailed test data)

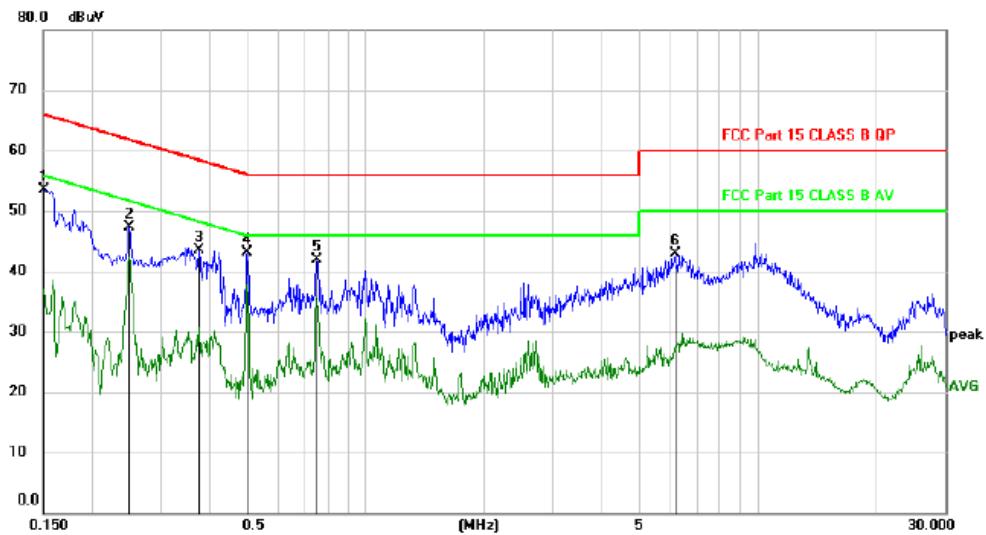
Note: If peak Result comply with AV limit, QP and AV Result is deemed to comply with AV limit

Line:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Margin	Comment
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV	dB	Detector	
1	*	0.1530	45.01	9.94	54.95	65.84	-10.89	peak
2		0.2072	41.13	9.93	51.06	63.32	-12.26	peak
3		0.3870	36.29	9.94	46.23	58.13	-11.90	peak
4		0.5010	35.07	9.96	45.03	56.00	-10.97	peak
5		0.7470	34.41	9.93	44.34	56.00	-11.66	peak
6		6.3480	30.60	10.09	40.69	60.00	-19.31	peak

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

Neutral:

No. Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Margin	
		dBuV	dB	dBuV	dB	Detector	Comment
1 *	0.1508	43.54	9.94	53.48	65.96	-12.48	peak
2	0.2490	37.26	9.97	47.23	61.79	-14.56	peak
3	0.3750	33.64	9.94	43.58	58.39	-14.81	peak
4	0.4980	33.07	9.96	43.03	56.03	-13.00	peak
5	0.7500	32.05	9.94	41.99	56.00	-14.01	peak
6	6.1260	32.88	10.08	42.96	60.00	-17.04	peak

Note: Measurement=Reading Level+Correc Factor. Factor=(LISN or ISN or PLC or Current Probe)Factor+Cable

7. Antenna Requirements

7.1. Limit

For intentional device, according to RSS-Gen Section 6.8 and FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.209, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

7.2. Antenna Connected Construction

The antenna is internal antenna and no consideration of replacement. Please see EUT photo for details.

7.3. Results

The EUT antenna is Internal Antenna. It complies with the standard requirement.

-----END OF THE REPORT-----