FCC TEST REPORT

FOR

Haefele GmbH&Co.KG

Energy Saving Control Passive

Test Model: 917.56.907 110V white Additional Model: 917.56.909 110V silver

Prepared for : Haefele GmbH&Co.KG

Address : Adolf-Haefele-Str. 1,72202 Nagold, Germany

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.

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Date of receipt of test sample : June 13, 2016

Number of tested samples

Serial number : Prototype

Date of Test : June 13, 2016~June 28, 2016

: June 28, 2016 Date of Report

FCC TEST REPORT FCC CFR 47 PART 15 C (15.225)-2015

Report Reference No.: LCS1606130949E

Date of Issue: June 28, 2016

Testing Laboratory Name.....: Shenzhen LCS Compliance Testing Laboratory Ltd.

Address: 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue,

Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure......: Full application of Harmonised standards

Partial application of Harmonised standards

Other standard testing method

Applicant's Name: Haefele GmbH&Co.KG

Address: Adolf-Haefele-Str. 1,72202 Nagold, Germany

Test Specification

Standard: FCC CFR 47 PART 15 C(15.225)-2015

Test Report Form No.....: LCSEMC-1.0

TRF Originator: Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF.....: Dated 2011-03

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Test Item Description.: Energy Saving Control Passive

Trade Mark: N/A

Test Model.....: 917.56.907 110V white

Ratings: AC 110V-120V, 50/60Hz

Result: Positive

Compiled by:

Supervised by:

Approved by:

Calvin Weng/ Administrators

Glin Lu/ Technique principal

Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No.: LCS1606130949E

June 28, 2016 Date of issue

Test Model.....: : 917.56.907 110V white

EUT.....: : Energy Saving Control Passive

Applicant.....: : Haefele GmbH&Co.KG

Address.....: Adolf-Haefele-Str. 1,72202 Nagold, Germany

Telephone..... : +49 7452 95 273 Fax....: +49 7452 95 498

Manufacturer.....: : Orient RFID Technology Ltd.

District, Shekou, Shenzhen 518068, PR China

Telephone.....: : 86 755 2665 0078 Fax....:: 86 755 2665 0077

Factory.....: : Orient RFID Technology Ltd.

4/F, Section B, Block E, Chi Wan Industrial Zone, Nanshan Address....:

District, Shekou, Shenzhen 518068, PR China

Telephone.....: : 86 755 2665 0078 Fax.....:: 86 755 2665 0077

Test Result Positive

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.

SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD.	FCC ID:2AI2L917120	Report No.: LCS16061309491

Revision History

Revision	Issue Date	Revisions	Revised By
00	2016-06-28	Initial Issue	Gavin Liang

TABLE OF CONTENTS

1. GENERAL INFORMATION	6
1.1 Description of Device (EUT)	6
1.2 Host System Configuration List and Details	
1.3 External I/O	
1.4 Description of Test Facility	
1.5 Statement of The Measurement Uncertainty	
1.6 Measurement Uncertainty	
1.7 Description Of Test Modes	
1.8 Summary Of Test Result	
2. TEST METHODOLOGY	
2.1 EUT Configuration	
2.2 EUT Exercise	
2.3 General Test Procedures	
3. SYSTEM TEST CONFIGURATION	
3.1 Justification	
3.2 EUT Exercise Software	
3.3 Special Accessories	
3.4 Block Diagram/Schematics	
3.5 Equipment Modifications	
3.6 Test Setup	
4. RADIATED MEASUREMENT	
4.1 Radiated Emission	
4.2 Field Strength of Fundamental Emissions and Mask Measurement	
5. BANDWIDTH OF THE OPERATING FREQUENCY	
5.1 Standard Applicable	
5.2 Test Result	20
6. FREQUENCY STABILITY MEASUREMENT	21
6.1 Standard Applicable	
6.2 Test Result	21
7. LINE CONDUCTED EMISSIONS	22
7.1 Standard Applicable	
7.2 Block Diagram of Test Setup	
7.3 Test Results	
8. ANTENNA REQUIREMENT	24
8.1 Standard Applicable	
8.2 Antenna Connected Construction	24
9. PHOTOGRAPHS OF TEST SETUP	
9.1 Photo of Radiated Emissions Measurement	
9.2 Photo of Line Conducted Emissions Measurement	
10. LIST OF MEASURING EQUIPMENTS	25

1. GENERAL INFORMATION

1.1 Description of Device (EUT)

EUT : Energy Saving Control Passive

Model Number : 917.56.907 110V white, 917.56.909 110V silver

Model Declaration : PCB board, structure and internal of the related model(s)

are the same, so no additional models were tested.

Test Model : 917.56.907 110V white

Hardware Version : PS1356 V2.6X

Software Version : V1.0

Power Supply : AC 110V-120V, 50/60Hz

Radios Application : RFID

RFID Technology :

Operating Frequency : 13.56MHz

Channel Number : 1

Modulation Technology: ASK

Antenna Description : PCB Loop Antenna, 5dBi(Max.)

1.2 Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate

1.3 External I/O

I/O Port Description	Quantity	Cable

1.4 Description of Test Facility

CNAS Registration Number. is L4595.

FCC Registration Number. is 899208.

Industry Canada Registration Number. is 9642A-1.

VCCI Registration Number. is C-4260 and R-3804.

ESMD Registration Number. is ARCB0108.

UL Registration Number. is 100571-492.

TUV SUD Registration Number. is SCN1081.

TUV RH Registration Number. is UA 50296516-001

1.5 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 CISPR 16 – 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS 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.

1.6 Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
		9KHz~30MHz	3.10dB	(1)
		30MHz~200MHz	2.96dB	(1)
Radiation Uncertainty	:	200MHz~1000MHz	3.10dB	(1)
		1GHz~26.5GHz	3.80dB	(1)
		26.5GHz~40GHz	3.90dB	(1)
Conduction Uncertainty	y: 150kHz~30MHz		1.63dB	(1)
Power disturbance	:	30MHz~300MHz	1.60dB	(1)

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

1.7 Description Of Test Modes

For pre-testing, when performed with the input Voltage/Frequency AC 120V/60Hz. Only recorded the worst case in this report.

The EUT was operated in the engineering mode. All X, Y, Z axis had been tested and the worst case(X axis) was record.

1.8 Summary Of Test Result

Test Items	FCC Rules	Result
Line Conducted Emissions	15.207	PASS
Field Strength of Fundamental Emissions	15.225(a)(b)(c)	PASS
Radiated Emissions	15.225(d) & 15.209	PASS
20dB Bandwidth	2.1049	PASS
Frequency Stability	15.225(e)	PASS
Antenna Requirement	15.203	PASS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013, FCC CFR PART 15C 15.225.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.225 under the FCC Rules Part 15 Subpart C.

2.3 General Test Procedures

2.3.1 Conducted Emissions

According to the requirements in Section 6.2 of ANSI C63.10: 2013, AC power-line conducted emissions shall be measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turn table and the turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10: 2013

3. SYSTEM TEST CONFIGURATION

3.1 Justification

N/A.

3.2 EUT Exercise Software

N/A.

3.3 Special Accessories

N/A.

3.4 Block Diagram/Schematics

Please refer to the report.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

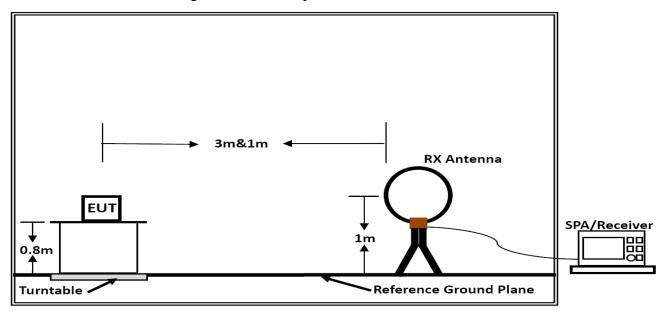
3.6 Test Setup

Please refer to the test setup photo.

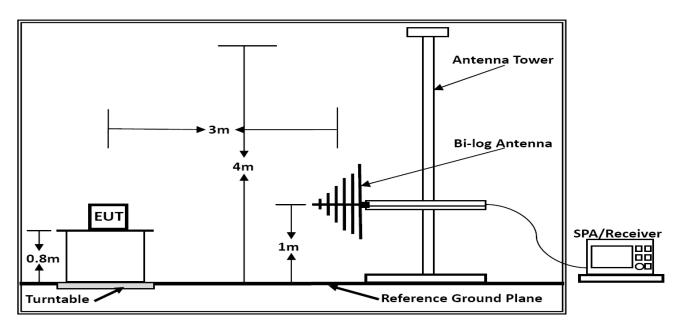
4. RADIATED MEASUREMENT

4.1 Radiated Emission

4.1.1 Block Diagram of Test Setup



Below 30MHz



Below 1GHz

4.1.2 Radiated Emission Limit

15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
\1\ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293.	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	$(\langle 2 \rangle)$
13.36-13.41			

^{\1\} Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

Part 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector.

According to Part 15.225 (a), the field strength of any emissions which appear outside of 13.553 ~ 13.567MHz band shall not exceed the general radiated emissions limits.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

^{\2\} Above 38.6

Limit calculation and transfer to 3m distance as showed in the following table:

Frequency	Limit	Distance
(MHz)	(dBuV/m)	(m)
0.009-0.490	20log(2400/F(KHz))+40lg(300/3)	3
0.490-1.705	20log(24000/F(KHz))+40lg(30/3)	3
1.705-30.0	69.5	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

4.1.3 Test Results

PASS.

The test data please refer to following page:

9KHz ~ 30MHz

Note: Only recorded the worst test result.

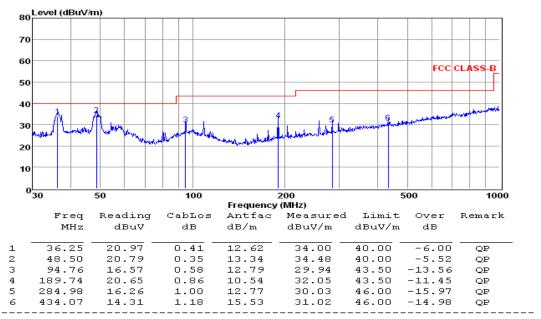
Freq.	Antenna	Reading	Factor	Measured	Limit	Margin	
MHz	Pol.	dBuV	dB	dBuV/m	dBuV/m	dB	Remark
0.350	Н				96.72		
1.000	Н				67.6		
4.77	Н	38.53	20.30	58.83	69.5	10.67	QP
11.15	Н	17.30	20.32	37.62	69.5	31.88	QP
13.56	Н	30.55	20.18	50.73	124	51.95	QP
15.64	Н	15.11	20.12	35.23	69.5	34.27	QP
25.31	Н	17.86	19.94	37.80	69.5	31.70	QP
27.53	Н	13.65	19.95	33.60	69.5	35.90	QP
0.350	V	-	-		96.72	-	
1.000	V	-	-		67.6	-	
4.77	V	37.74	20.30	58.04	69.5	11.46	QP
11.15	V	18.16	20.32	38.48	69.5	31.02	QP
13.56	V	36.03	20.18	56.21	124	50.47	QP
15.64	V	14.69	20.12	34.81	69.5	34.69	QP
25.31	V	18.36	19.94	38.30	69.5	31.20	QP
27.53	V	14.48	19.95	34.43	69.5	35.07	QP

^{*}Note: Emission Level= Reading Level + Antenna Factor + Cable Loss

[&]quot;--" means noise floor.

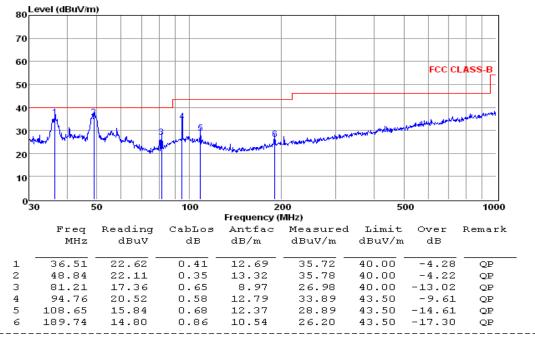
30MHz ~ 1GHz

Horizontal:



- Note: 1. All readings are Quasi-peak values. 2. Measured= Reading + Antenna Factor + Cable Loss
- 3. The emission that ate 20db blow the offficial limit are not reported

Vertical:

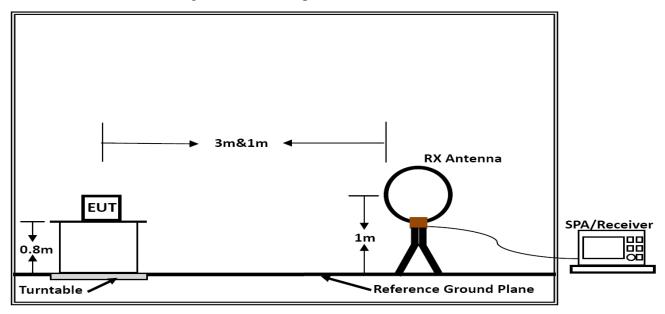


Note: 1. All readings are Quasi-peak values.

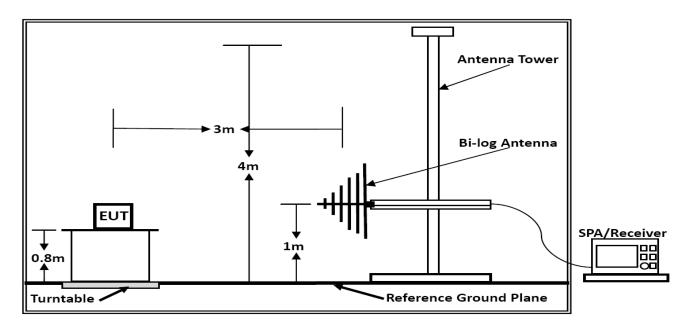
- 2. Measured= Reading + Antenna Factor + Cable Loss
- The emission that ate 20db blow the offficial limit are not reported

4.2 Field Strength of Fundamental Emissions and Mask Measurement

4.2.1 Block Diagram of Test Setup



Below 30MHz



Below 1GHz

4.2.2 Field strength of fundamental emissions limit and Mask limit

The field strength of fundamental emissions shall not exceed 15848 microvolts/meter at 30 meters. The emissions limit in this paragraph is based on measurement instrumentation employing a QP detector.

Frequencies	Field Strength	Field Strength	Field Strength	
(MHz)	(microvolts/meter)	$(dB\mu V/m)$ at $10m$	$(dB\mu V/m)$ at 3m	
13.553 ~ 13.567MHz	15848 at 30m	103.08 (QP)	124 (QP)	

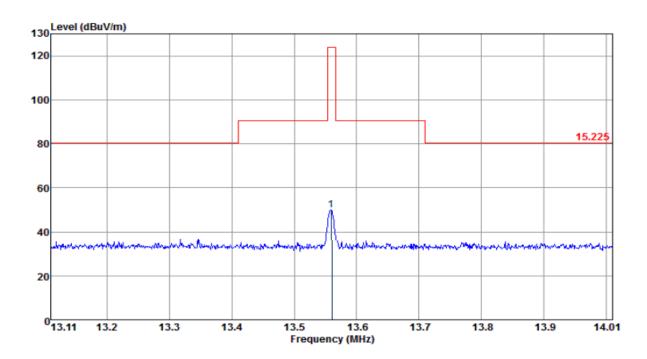
Mask Limit:

Frequency (MHz)	Limit (dBuV/m)	Distance (m)
1.705-13.110	69.5	3
13.110-13.410	80.5	3
13.410-13.553	90.5	3
13.553-13.567	124.0	3
13.567-13.710	90.5	3
13.710-14.010	80.5	3
14.010-30.000	69.5	3

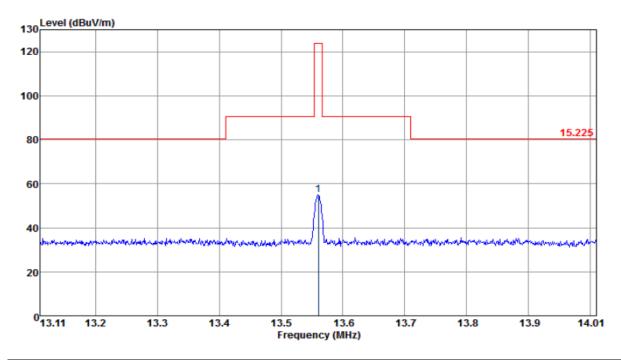
4.2.3 Test Results

PASS.

The test data please refer to following page:



	Freq.(MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Pol.	Remark
1	13.56	30.55	20.18	50.73	124	Н	QP



	Freq.(MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Pol.	Remark	
1	13.56	36.03	20.18	56.21	124	V	QP	

*Note: Factor= Antenna Factor + Cable Loss

Emission level ($dB\mu V/m$) = 20 log Emission level ($\mu V/m$).

Measured distance is 3m.

All emissions emit from non-NFC function of digital unintentional emissions. All NFC's spurious emissions are below 20dB of limits.

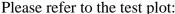
5. BANDWIDTH OF THE OPERATING FREQUENCY

5.1 Standard Applicable

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emissions in the specific band $(13.553 \sim 13.567 \text{MHz})$.

5.2 Test Result

EUT	Energy Saving Control Passive		
RBW	100Hz		
VBW	100Hz		
SPAN	500Hz		
Carrier Freq. (MHz)	20dBBandwidth (KHz)		
13.56	0.250		





6. FREQUENCY STABILITY MEASUREMENT

6.1 Standard Applicable

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) 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.

6.2 Test Result

Voltage vs. Frequency Stability

Voltage(V)	Measurement Frequency (MHz)		
DC 102V	13.56046		
DC 120V	13.56039		
DC 138V	13.56042		
Max. Deviation (MHz)	0.00046		
Max. Deviation (ppm)	33.9233		

Temperature vs. Frequency Stability

Temperature vs. Frequency Stability				
Temperature ($^{\circ}$ C)	Measurement Frequency (MHz)			
-20	13.56051			
-10	13.56048			
0	13.56045			
10	13.56043			
20	13.56039			
30	13.56041			
40	13.56049			
50	13.56055			
Max. Deviation (MHz)	0.00055			
Max. Deviation (ppm)	40.5605			

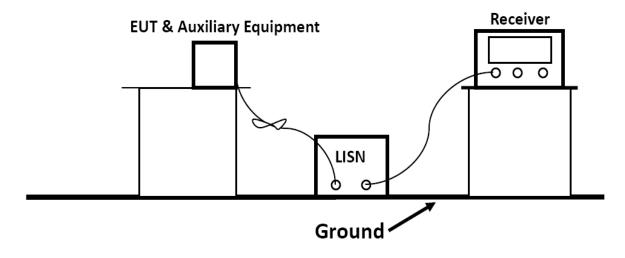
7. LINE CONDUCTED EMISSIONS

7.1 Standard Applicable

According to §15.207 (a) or RSS-GEN: For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolt (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Eraguanay Danga (MHz)	Limits (dBμV)			
Frequency Range(MHz)	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		

7.2 Block Diagram of Test Setup



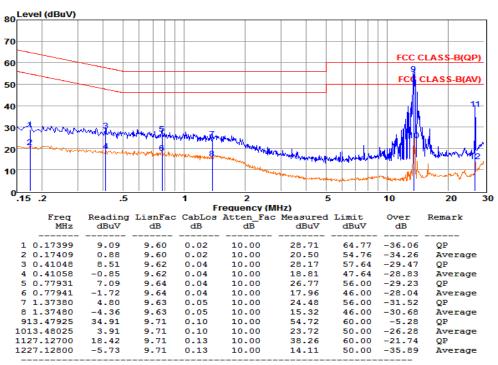
7.3 Test Results

PASS.

The test data please refer to following page.

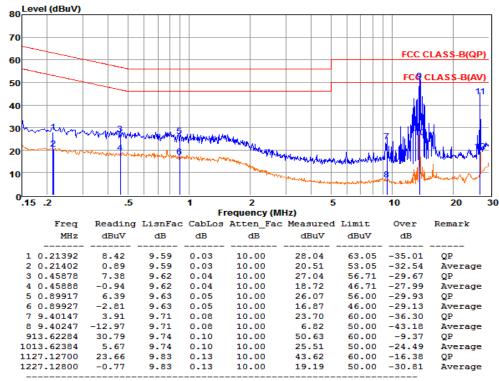
Test Result

Line:



Measured = Reading + Lisn Factor +Cable Loss+Atten_Fac. The emission levels that are 20dB below the official Remarks: 1. limit are not reported.

Neutral:



Remarks: 1. Measured = Reading + Lisn Factor +Cable Loss+Atten_Fac. The emission levels that are 20dB below the official limit are not reported.

8. ANTENNA REQUIREMENT

8.1 Standard Applicable

According to § 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

8.2 Antenna Connected Construction

The antenna used for transmitting is permanently attached and no consideration of replacement. Please see EUT photo for details.

10. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Cal Date	Due Date
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	June 18,2016	June 17,2017
Signal analyzer	Agilent	E4448A(External mixers to 40GHz)	US44300469	9kHz~40GHz	July 16,2015	July 15,2016
LISN	MESS Tec	NNB-2/16Z	99079	9KHz-30MHz	June 18,2016	June 17,2017
LISN (Support Unit)	EMCO	3819/2NM	9703-1839	9KHz-30MHz	June 18,2016	June 17,2017
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9KHz-30MHz	June 18,2016	June 17,2017
ISN	SCHAFFNER	ISN ST08	21653	9KHz-30MHz	June 18,2016	June 17,2017
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03СН03-НҮ	30M-1GHz 3m	June 18,2016	June 17,2017
Amplifier	SCHAFFNER	COA9231A	18667	9kHz-2GHzz	June 18,2016	June 17,2017
Amplifier	Agilent	8449B	3008A02120	1GHz-26.5GHz	July 16,2015	July 15,2016
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5GHz-40GHz	July 16,2015	July 15,2016
Spectrum Analyzer	Agilent	E4407B	MY41440292	9k-26.5GHz	July 16,2015	July 15,2016
MAX Signal Analyzer	Agilent	N9020A	MY50510140	20Hz~26.5GHz	Oct. 27, 2015	Oct. 26, 2016
Loop Antenna	SCHWARZBECK	1519 B	00005	9k-30MHz	June 18,2016	June 17,2017
By-log Antenna	SCHWARZBECK	VULB9163	9163-470	30MHz-1GHz	June 10,2016	June 09,2017
Horn Antenna	EMCO	3115	6741	1GHz-18GHz	June 10,2016	June 09,2017
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz-40GHz	June 10,2016	June 09,2017
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz-1GHz	June 18,2016	June 17,2017
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz-40GHz	June 18,2016	June 17,2017
Power Meter	R&S	NRVS	100444	DC-40GHz	June 18,2016	June 17,2017
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	June 18,2016	June 17,2017
Power Sensor	R&S	NRV-Z51	100458	DC-30GHz	June 18,2016	June 17,2017
Power Sensor	R&S	NRV-Z32	10057	30MHz-6GHz	June 18,2016	June 17,2017
RF CABLE-1m	JYE Bao	RG142	CB034-1m	20MHz-7GHz	June 18,2016	June 17,2017
RF CABLE-2m	JYE Bao	RG142	CB035-2m	20MHz-1GHz	June 18,2016	June 17,2017
DC power Source	GW	GPC-6030D	C671845	/	June 18,2016	June 17,2017
Temperature & Humidity Chamber	Wuhuan	HTP205	/	/	June 18,2016	June 17,2017

Note: All equipment through GRGT EST calibration

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