




TEST REPORT

Date: 2012-06-15

Report No.: 68.870.12.024.02F

Applicant: Shenzhen Yichen Technology Development Co., Ltd.
5F, No.1, Honghualing 2nd Industrial Zone, Xili Town,
Nanshan District, 518055 Shenzhen, Guangdong, People's
Republic Of China.

Description of Samples: Model name: Intelligent Wireless Router
Brand name:  JCG
Model no.: JHR-N926R, JHR-N936R, JHR-N946R,
JHR-N956R, JHR-N966R, JHR-976R,
JHR-986R, JHR-996R
FCCID: HHOYC002

Date Samples Received: 2012-06-01

Date Tested: 2012-06-01 to 2012-06-11

Investigation Requested: FCC Part 15 Subpart B

Conclusions: The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remarks: ----

Checked by:

Approved by:-

John Zhi
Project Engineer
Wireless & Telecom department

Nicolas Cheng
Project Manager
Wireless & Telecom department



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1.0 General Details

1.1 Test Laboratory

SEM.Test Compliance Services Co., Ltd.
EMC Laboratory registered by FCC with
FCC Registration Number: 994117

Test By: Susan Su
Susan Su

1.2 Applicant Details
Applicant

**Shenzhen Yichen Technology Development
Co., Ltd.**

5F, No.1, Honghualing 2nd Industrial Zone, Xili Town,
Nanshan District, 518055 Shenzhen, Guangdong,
People's Republic Of China.


Manufacturer

**Shenzhen Yichen Technology Development
Co., Ltd.**

5F, No.1, Honghualing 2nd Industrial Zone, Xili Town,
Nanshan District, 518055 Shenzhen, Guangdong,
People's Republic Of China.



1.3 Equipment Under Test [EUT] Description of Sample

Model Name: Intelligent Wireless Router
Manufacturer: Shenzhen Yichen Technology Development Co., Ltd.
Brand Name:  JCG
Model Number: JHR-N926R, JHR-N936R, JHR-N946R, JHR-N956R, JHR-N966R, JHR-976R, JHR-986R, JHR-996R
Rating: DC12V, 1A powered by AC/DC adapter
Model : HKA01212010-2F, XKD-C1000IC12.0-12W
Accessories and Auxiliary Equipment: AC/DC power adaptor.
EUT Exercising Software: Provided by manufacturer

Description of EUT

The Equipment Under Test (EUT) is a Intelligent Wireless Router System operated at 2.4GHz.

DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g/n Operation Principle:

This Systems using embedded MIMO RF transceiver consists of two receivers and two transmitters used to form a complete 2.4GHz ISM band Wireless LAN application. The EUT shall be simultaneous transmission at the antenna 0 and antenna 1 for 802.11g , 802.11n HT20 or HT40, 802.11b mode shall be transmission only single antenna (antenna 0 or antenna 1).

Since the EUT can communicate with computer via LAN port, this report is to demonstrate the EMC test result for this function.

As per client declaration, the model JHR-N936R, JHR-N946R, JHR-N956R, JHR-N966R, JHR-976R, JHR-986R, JHR-996R, which utilize the identical circuit design, PCB layout, shielding and interface with the model JHR-N926R, only the cosmetic is difference. Therefore the mainly perform test on JHR-N926R model.

1.4 Equipment Modification

No modification was done by TÜV SÜD China

1.5 Related Submittal(s) Grants

This is a signal application subject to Certificate Authorization.



2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 and ANSI C63.4: 2003 for FCC Verification.

2.2 Test Standards and Results Summary Tables

EMISSION Results Summary				
Test Condition	Test Requirement	Test Result		
		Pass	Failed	N/A
Radiated Emissions, 30MHz to 4.5GHz	Part 15.109	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conducted Emissions on AC, 0.15MHz to 30MHz	Part 15.107	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: N/A - Not Applicable

3.0 Test Methodology

3.1 Radiated Emission

The sample was placed 0.8m above the ground plane on a standard emission test site *. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

3.2 Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

$$\begin{aligned} \text{FS} &= \text{R} + \text{System Factor} \\ \text{System Factor} &= \text{AF} + \text{CF} + \text{FA} - \text{PA} \end{aligned}$$

Where FS = Net Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer / Test Receiver in dBuV.

AF = Antenna Factor in dB.

CF = Cable Attenuation Factor in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

3.3 Conducted Emissions

The EUT was placed on a non-metallic table 0.8m above the horizontal metal reference place and 0.4m from a vertical ground plane which is connected to the horizontal metal ground plane. Meanwhile, the AC main of EUT was connected to the distance of 0.8m line impedance stabilization network (LISN) during measurement.

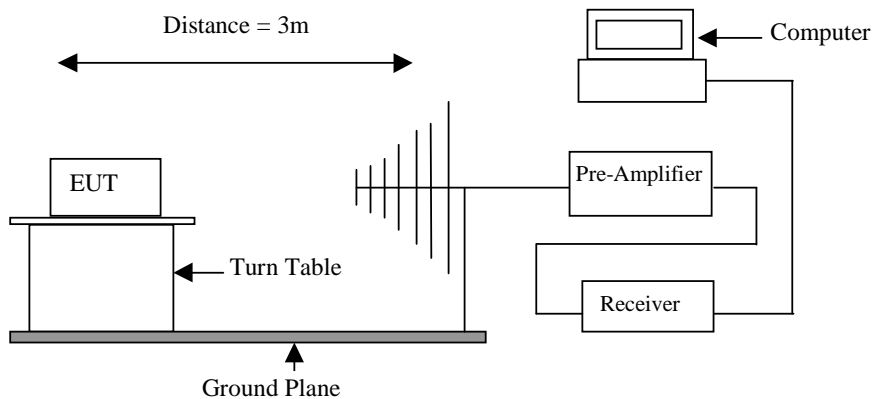
Initial measurements were performed in quasi-peak and average detection modes by the test receiver, any emissions recorded within 30dB of the relevant limit lines were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

4.0 Test Results

4.1 Radiated Emissions (30MHz to 1GHz)

Test Requirement:	FCC part 15 section 15.109 Class B
Test Method:	ANSI C63.4:2003
Test Date:	2012-06-07
Mode of Operation:	1) PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: HKA01212010-2F) mode 2) PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: XKD-C1000IC12.0-12W) mode
Detector Function	Quasi-peak (Below 1000 MHz) Average and Peak (Above 1000 MHz)
Measurement BW	120 kHz (Below 1000 MHz) 1 MHz (Above 1000 MHz)

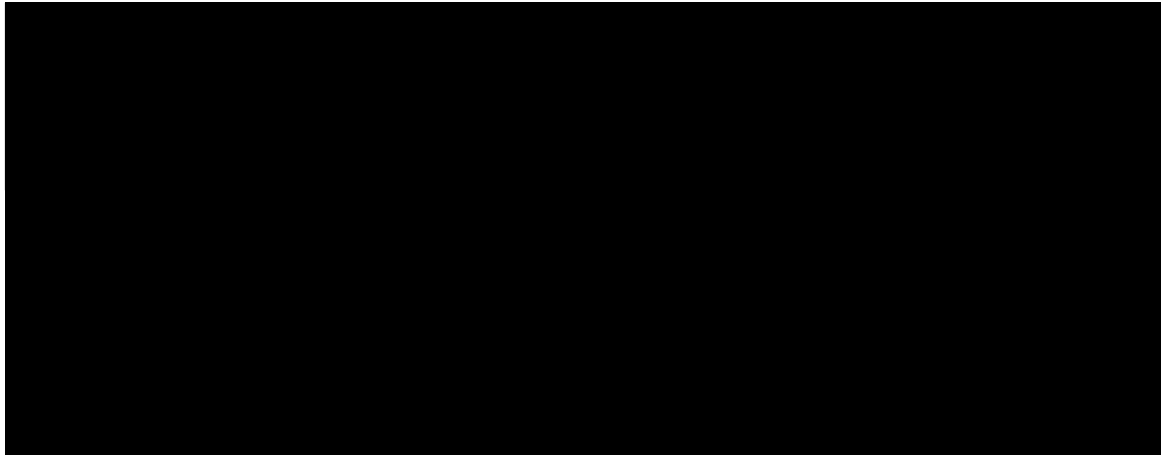
Test Setup:





Results: PASS

PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: HKA01212010-2F) mode:



Note:

- No further spurious emissions found between 30 MHz and lowest internal used/generated frequency.
- Result data graph is attached at the next pages for reference.

Remark:

- Calculated measurement uncertainty: ± 5.0 dB

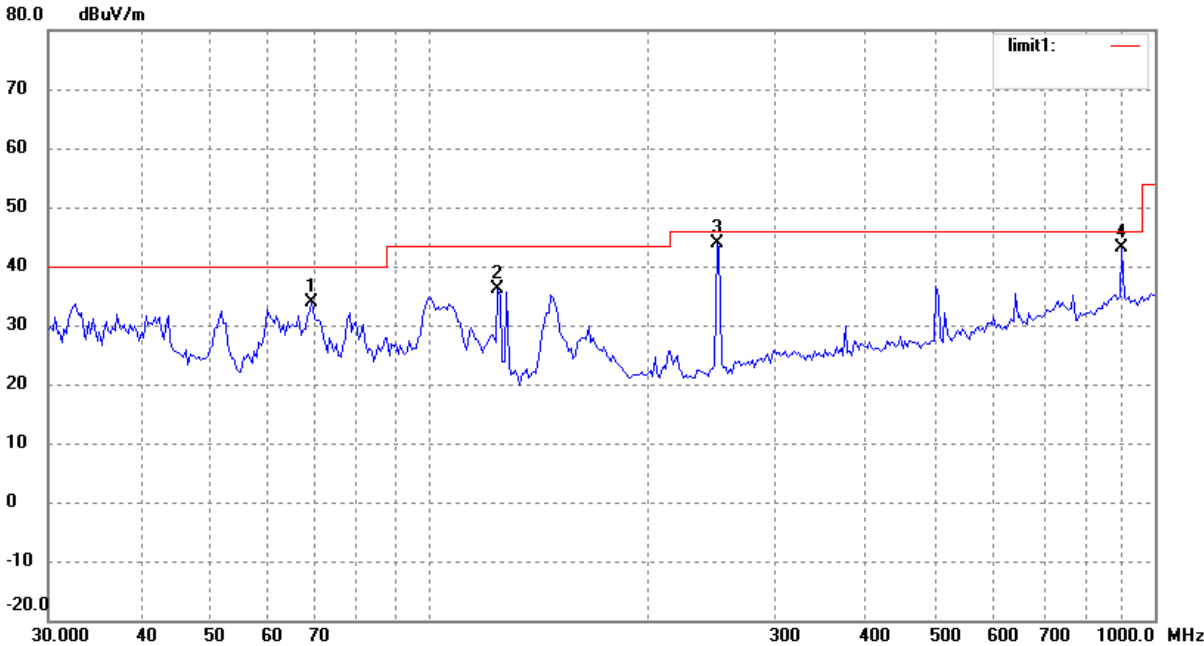
Limits for Radiated Emissions [Section 15.109 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
30-88	100
88-216	150
216-960	200
Above960	500

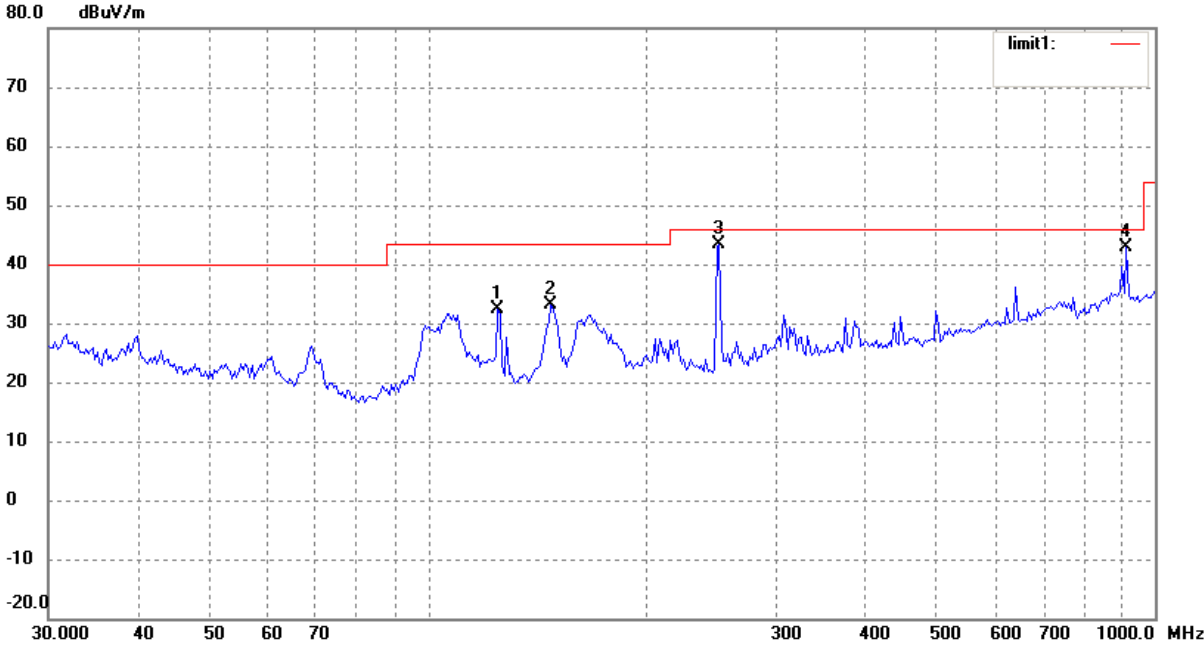
The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.



Vertical



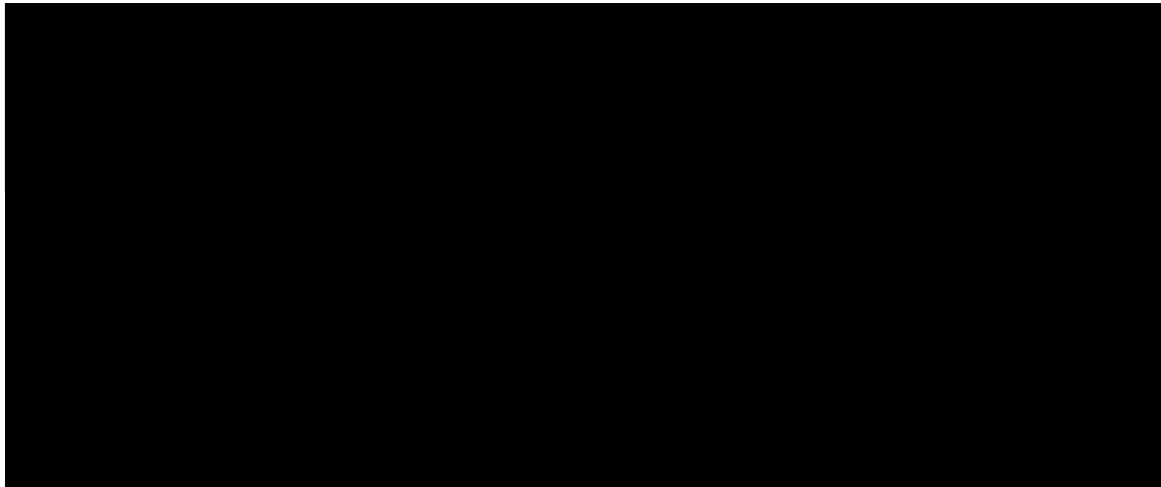
Horizontal





Results: PASS

PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: XKD-C1000IC12.0-12W) mode



Note:

- No further spurious emissions found between 30 MHz and lowest internal used/generated frequency.
- Result data graph is attached at the next pages for reference.

Remark:

- Calculated measurement uncertainty: ± 5.0 dB

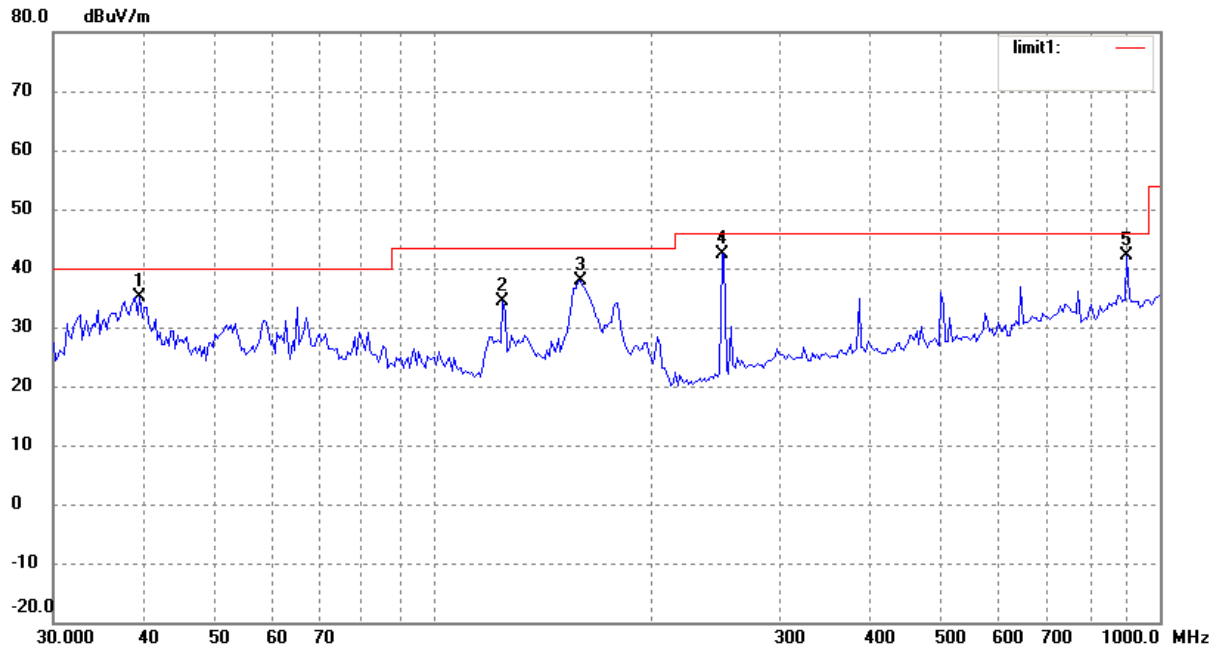
Limits for Radiated Emissions [Section 15.109 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μ V/m]
30-88	100
88-216	150
216-960	200
Above960	500

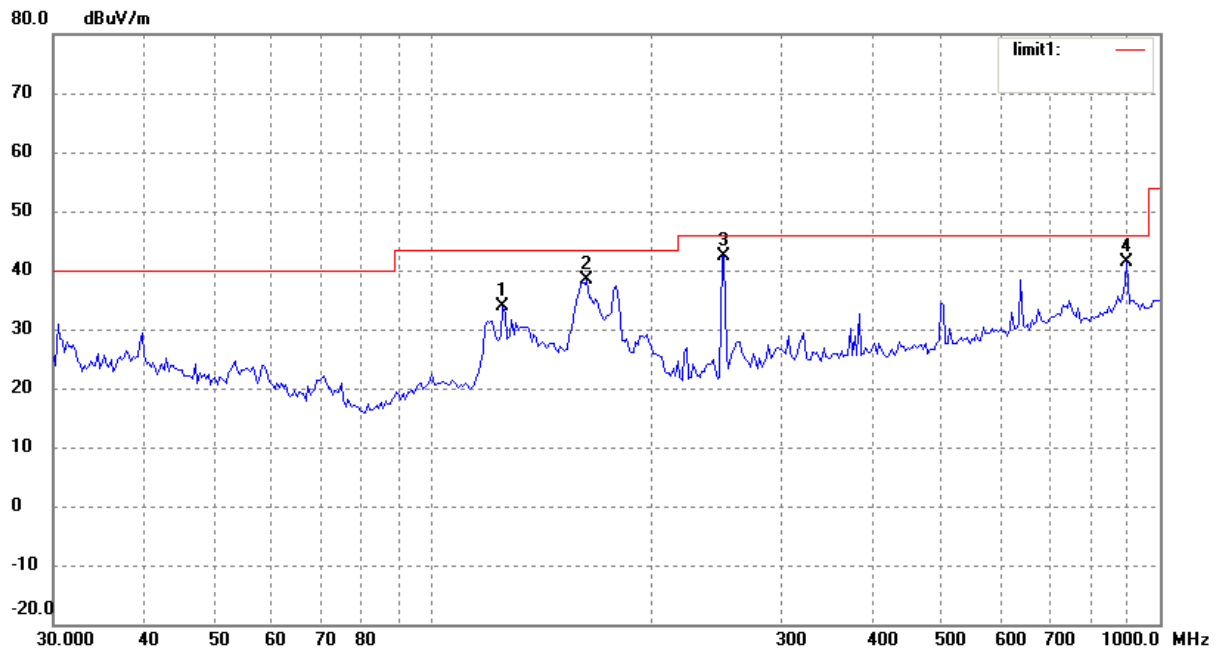
The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.



Vertical



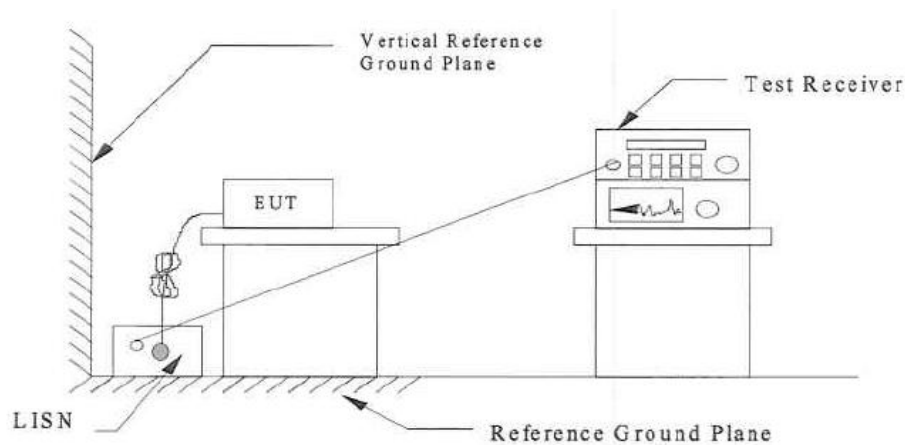
Horizontal



4.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC part 15 Section 15.107 Class B
Test Method:	ANSI C63.4:2003
Test Date:	2012-06-07
Mode of Operation:	1) PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: HKA01212010-2F) mode 2) PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: XKD-C1000IC12.0-12W) mode
Detector Function:	CISPR Quasi Peak
Measurement BW:	100 kHz

Test Setup:

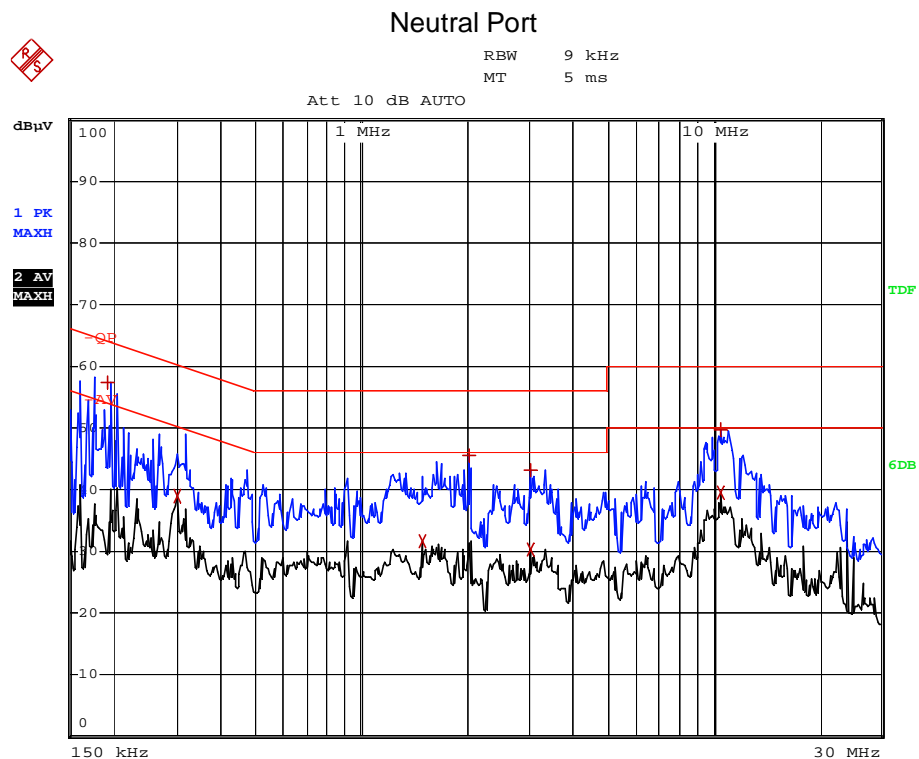
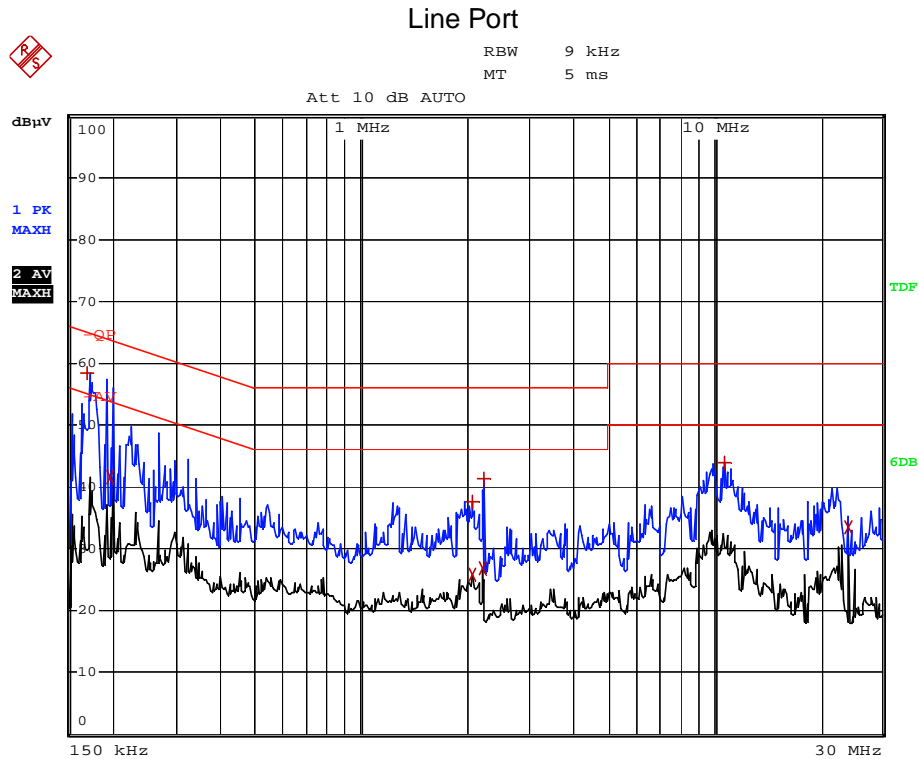


Results: PASS

- Refer Figures and tables for the result.

Refer to the following diagram for the result details

PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: HKA01212010-2F) mode



Results: PASS

Refer to the following table for the result details

PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: HKA01212010-2F) mode

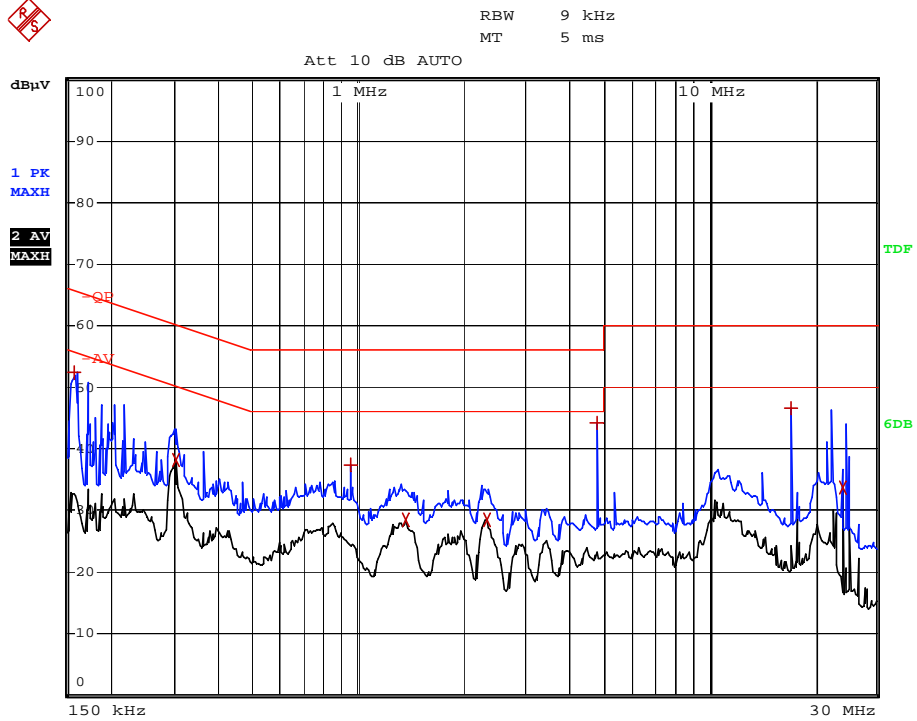
Frequency (MHz)	Detector (QP/AV)	Phase	Result (dB μ V)	Limit (dB μ V)	Margin
0.170	QP	L	58.42	64.95	-6.53
0.198	AV	L	41.64	53.68	-12.04
2.078	QP	L	37.78	56.00	-18.22
2.078	AV	L	25.83	46.00	-20.17
2.210	AV	L	26.94	46.00	-19.06
2.222	QP	L	41.21	56.00	-14.79
10.754	QP	L	43.99	60.00	-16.01
23.982	AV	L	33.39	50.00	-16.61
0.194	QP	N	57.28	63.86	-6.58
0.298	AV	N	38.85	50.30	-11.45
1.498	AV	N	31.72	46.00	-14.28
2.030	QP	N	45.44	56.00	-10.56
3.050	QP	N	43.27	56.00	-12.73
3.050	AV	N	30.29	46.00	-15.71
10.458	QP	N	49.70	60.00	-10.30
10.466	AV	N	39.48	50.00	-10.52

Remarks:

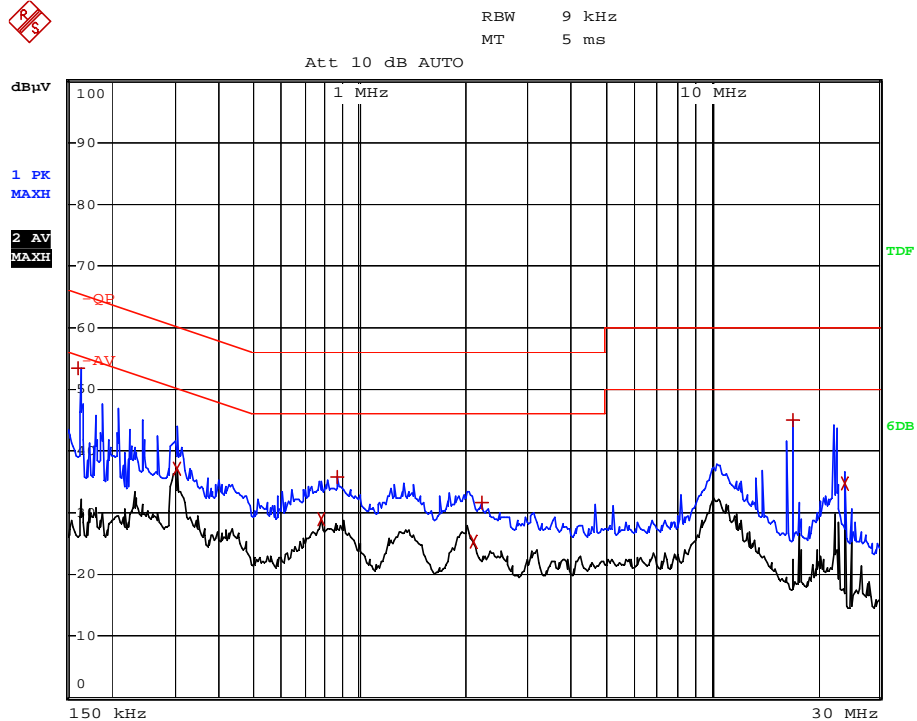
Calculated measurement uncertainty: ± 2.8 dB

PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: XKD-C1000IC12.0-12W) mode

Line Port



Neutral Port



Results: PASS

Refer to the following table for the result details

PC connects to Internet network via router's wired connectivity (Powered by AC Adapter: XKD-C1000IC12.0-12W) mode

0.302	AV	L	38.21	50.18	-11.97
0.958	QP	L	37.52	56.00	-18.48
1.366	AV	L	28.41	46.00	-17.59
2.334	AV	L	28.61	46.00	-17.39
4.806	QP	L	44.16	56.00	-11.84
17.182	QP	L	46.48	60.00	-13.52
23.982	AV	L	33.78	50.00	-16.22
0.162	QP	N	53.50	65.35	-11.85
0.302	AV	N	37.07	50.18	-13.11
0.778	AV	N	28.90	46.00	-17.10
0.870	QP	N	35.82	56.00	-20.18
2.122	AV	N	25.39	46.00	-20.61
2.230	QP	N	31.68	56.00	-24.32
17.046	QP	N	45.03	60.00	-14.97
23.982	AV	N	34.90	50.00	-15.10

Remarks:

Calculated measurement uncertainty: ± 2.8 dB

Limits for Conducted Emissions (Section 15.107):

Frequency Range [MHz]	Quasi-Peak Limits [dB μ V]	Average [dB μ V]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.



5.0 List of Measurement Equipment

Radiated Emission

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2012-03-28	2013-03-27
Positioning Controller	C&C	CC-C-1F	N/A	2012-03-28	2013-03-27
RF Switch	EM	EMSW18	SW060023	2012-03-28	2013-03-27
Pre-amplifier	Agilent	8447F	3113A06717	2012-03-28	2013-03-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2012-03-28	2013-03-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-02-25	2013-03-24
Horn Antenna	ETS	3117	00086197	2012-02-25	2013-03-24
Signal Generator	Rohde & Schwarz	SMR20	100047	2012-03-28	2013-03-27

Conducted Emission

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Rohde & Schwarz	EMI Test Receiver	ESPI	101611	2012-03-28	2013-03-27
Schwarz beck	L.I.S.N	NSLK8126	8126-224	2012-03-28	2013-03-27
Rohde & Schwarz	Pulse Limiter	ESH3-Z2	100911	2012-03-28	2013-03-27
EMCO	AMN	3825/2	11967C	2012-03-28	2013-03-27
FCC	Current Probe	F-33-4	091684	2012-03-28	2013-03-27

Remarks:

CM Corrective Maintenance
 N/A Not Applicable or Not Available
 TBD To Be Determined