



EMC TEST REPORT

Report No. : EME-030504
Model No. : 3CRWE154G72
Issued Date : April 29, 2003

Applicant : Accton Technology Corporation
No. 1 Creation Rd. III, Science-based Industrial Park
Hsinchu 30077, Taiwan

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
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Project Engineer

Kaysi Chen

Reviewed By

Elton Chen



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Summary of Tests

OfficeConnect Wireless 11g PC Card
Model: 3CRWE154G72
FCC ID: HED2835WACC

Test	Reference	Results
Minimum 6dB Bandwidth test	15.247(a)(2)	Complies
Maximum Output Power test	15.247(b)	Complies
Radiated Spurious Emission test	15.205, 15.209	Complies
Power Spectrum Density test	15.247(d)	Complies
Power Line Conducted Emission test	15.207	Complies



1. General information

1.1 Identification of the EUT

Applicant	: Accton Technology Corporation
Product	: OfficeConnect Wireless 11g PC Card
Model No.	: 3CRWE154G72
FCC ID.	: HED2835WACC
Frequency Range	: 2412~2462 MHz
Channel Number	: 11 Channels
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: DSSS, OFDM
Rated Power	: 3.0V ~ 3.6V
Power Cord	: N/A
Test Voltage	: 120Vac, 60Hz
Sample Received	: April 18, 2003
Test Date(s)	: April 21, 2003 to April 24, 2003

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is another cutting edge introduction in 2.4GHz wireless communication for user's laptop. Designed for both business and home users, the EUT provides the speed, coverage, and security expected by today wireless users. Based on the IEEE 802.11g draft standard, the new EZ Connect g Wireless Cardbus Adapter is 5 times faster than the widely used 802.11b wireless networking devices and is 100% compatible with existing 802.11b wireless networks.

The model SMC2835W and WN4301A are identical to model 3CRWE154G72 (EUT), the different model number for different brand serves as marketing strategy.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"



1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 1.5dBi

Antenna Type : PCB Printed

Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook	HP	XE ₃	TW20705468	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved



2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section §15.205 、 §15.207 、 §15.209 、 §15.247 and ANSI C63.4/1992.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

The EUT setup configurations please refer to the photo of test configuration in item.

2.2 Operation mode

Plug the EUT into Notebook and turn on the power, then run the test program “cTxRx 1.4.1” under Windows OS.

The EUT was transmitted continuously during the test.

After verifying the maximum output power, we found the maximum output power of 802.11b was occurred at 11Mbps data rate, and 802.11g was occurred at 12Mbps.

All the test data were performed under the above transmission rate.



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2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	May 24, 2002
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	825428/005	June 10, 2002
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2002
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100186	Oct. 9, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Sep. 19, 2002
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 20, 2002
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3111	June 20, 2002
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2002
RF Power Meter	Boonton	10kHz~100GHz	4231A	79401	May 22, 2002
Power Sensor	Boonton	30MHz~8GHz	51011-EMC	32482	May 25, 2002

Note:

1. The calibration interval of the above instruments is 12 months.



3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 23 °C
 Relative Humidity: 52 %
 Atmospheric Pressure 1023 hPa

3.2 Test setup & procedure

The minimum 6dB bandwidth per FCC §15.247(a)(2) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 100kHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The minimum 6-dB modulation bandwidth is in the following Table.

See Minimum 6dB Bandwidth plot as file name “Minimum 6dB Bandwidth plot.pdf”

3.3 Measured data of Minimum 6dB Bandwidth test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	8.26	> 500kHz
Middle	2437	8.26	> 500kHz
High	2462	8.22	> 500kHz

Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	15.67	> 500kHz
Middle	2437	15.63	> 500kHz
High	2462	15.47	> 500kHz



4. Maximum Output Power test

4.1 Operating environment

Temperature: 22 °C
Relative Humidity: 60 %
Atmospheric Pressure 1023 hPa

4.2 Test setup & procedure

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to power meter via power sensor. Power was read directly and cable loss correction (3dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

4.3 Measured data of Maximum Output Power test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Power Output		Limit (W)
				(dBm)	(mW)	
Lowest	2412	3	14.97	17.97	62.66	1
Middle	2437	3	16.31	19.31	85.31	1
Highest	2462	3	15.40	18.40	69.18	1

Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Power Output		Limit (W)
				(dBm)	(mW)	
Lowest	2412	3	16.92	19.92	98.17	1
Middle	2437	3	17.31	20.31	107.40	1
Highest	2462	3	16.99	19.99	99.77	1

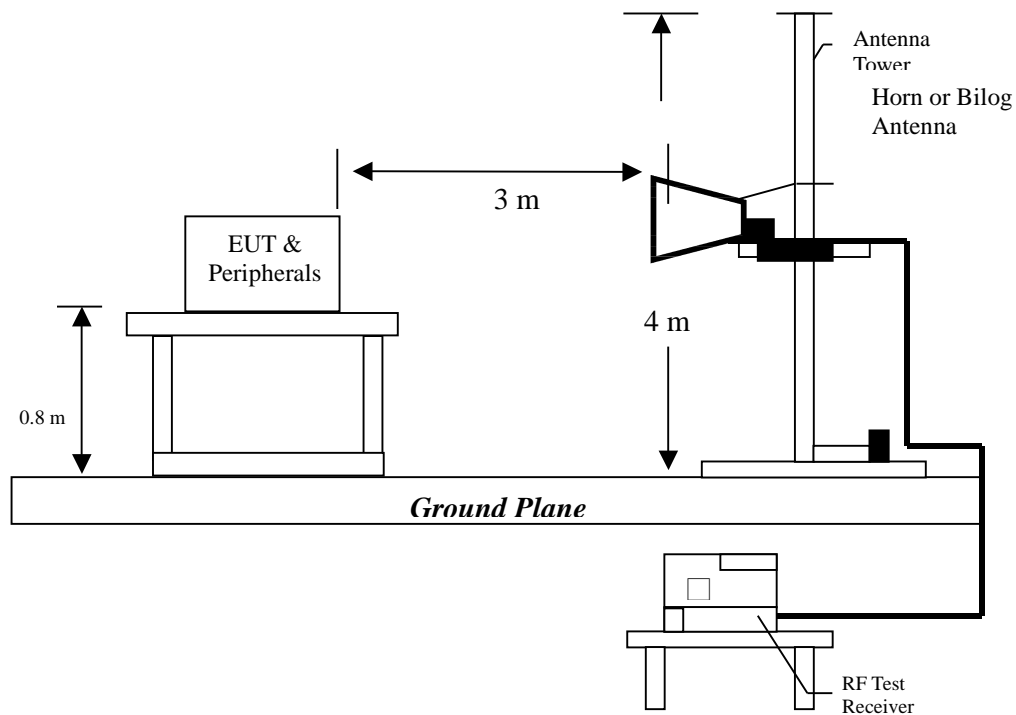
5. Radiated Emission test

5.1 Operating environment

Temperature:	23	°C
Relative Humidity:	52	%
Atmospheric Pressure	1023	hPa

5.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.



The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

5.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.98 dB.

Expanded uncertainty (k=2) of conducted emission measurement is ± 2.02 dB.



5.4 Radiated spurious emission test data

5.4.1 Measurement results: frequencies equal to or less than 1 GHz

EUT : 3CRWE154G72

Test Condition : 802.11b (DSSS modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
198.8000	QP	V	11.97	23.80	35.77	43.50	-7.73
400.5000	QP	V	17.72	24.80	42.52	46.00	-3.48
466.5000	QP	V	18.35	21.30	39.65	46.00	-6.35
532.5000	QP	V	19.67	20.70	40.37	46.00	-5.63
596.5000	QP	V	21.13	17.00	38.13	46.00	-7.87
666.3000	QP	V	21.98	16.60	38.58	46.00	-7.42
198.8000	QP	H	11.97	37.47	25.50	43.50	-6.03
398.6000	QP	H	17.66	41.36	23.70	46.00	-4.64
431.6000	QP	H	18.05	36.75	18.70	46.00	-9.25
464.6000	QP	H	18.35	41.15	22.80	46.00	-4.85
532.5000	QP	H	19.67	37.77	18.10	46.00	-8.23
666.3000	QP	H	21.98	39.58	17.60	46.00	-6.42

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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Test Condition : 802.11b (DSSS modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
132.8000	QP	V	12.74	17.50	30.24	43.50	-13.26
198.8000	QP	V	11.97	24.10	36.07	43.50	-7.43
400.5000	QP	V	17.72	24.60	42.32	46.00	-3.68
532.5000	QP	V	19.67	22.90	42.57	46.00	-3.43
600.4000	QP	V	21.14	18.40	39.54	46.00	-6.46
666.3000	QP	V	21.98	17.10	39.08	46.00	-6.92
198.8000	QP	H	11.97	37.27	25.30	43.50	-6.23
398.6000	QP	H	17.66	42.66	25.00	46.00	-3.34
429.6000	QP	H	18.05	42.35	24.30	46.00	-3.65
509.2000	QP	H	19.09	40.89	21.80	46.00	-5.11
530.5000	QP	H	19.65	41.55	21.90	46.00	-4.45
666.3000	QP	H	21.98	40.18	18.20	46.00	-5.82

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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Test Condition : 802.11b (DSSS modulation) Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
134.8000	QP	V	12.79	25.80	38.59	43.50	-4.91
264.7000	QP	V	13.75	26.50	40.25	46.00	-5.75
398.6000	QP	V	17.66	24.90	42.56	46.00	-3.44
532.5000	QP	V	19.67	24.00	43.67	46.00	-2.33
600.4000	QP	V	21.14	20.00	41.14	46.00	-4.86
666.3000	QP	V	21.98	18.30	40.28	46.00	-5.72
198.8000	QP	H	11.97	35.37	23.40	43.50	-8.13
400.5000	QP	H	17.72	42.82	25.10	46.00	-3.18
433.5000	QP	H	18.05	38.95	20.90	46.00	-7.05
530.5000	QP	H	19.65	39.85	20.20	46.00	-6.15
600.4000	QP	H	21.14	39.74	18.60	46.00	-6.26
666.3000	QP	H	21.98	40.08	18.10	46.00	-5.92

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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Test Condition : 802.11g (OFDM modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
132.8000	QP	V	12.74	17.90	30.64	43.50	-12.86
198.8000	QP	V	11.97	21.00	32.97	43.50	-10.53
400.5000	QP	V	17.72	25.00	42.72	46.00	-3.28
530.5000	QP	V	19.65	23.80	43.45	46.00	-2.55
559.6000	QP	V	20.03	21.30	41.33	46.00	-4.67
666.3000	QP	V	21.98	17.90	39.88	46.00	-6.12
198.8000	QP	H	11.97	34.97	23.00	43.50	-8.53
332.6000	QP	H	15.04	37.54	22.50	46.00	-8.46
398.6000	QP	H	17.66	43.16	25.50	46.00	-2.84
431.6000	QP	H	18.05	38.95	20.90	46.00	-7.05
532.5000	QP	H	19.67	41.37	21.70	46.00	-4.63
666.3000	QP	H	21.98	39.88	17.90	46.00	-6.12

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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Test Condition : 802.11g (OFDM modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
132.8000	QP	V	12.74	23.30	36.04	43.50	-7.46
194.9000	QP	V	12.07	25.70	37.77	43.50	-5.73
400.5000	QP	V	17.72	25.10	42.82	46.00	-3.18
530.5000	QP	V	19.65	24.60	44.25	46.00	-1.75
600.4000	QP	V	21.14	18.70	39.84	46.00	-6.16
666.3000	QP	V	21.98	18.80	40.78	46.00	-5.22
198.8000	QP	H	11.97	36.37	24.40	43.50	-7.13
326.8000	QP	H	14.90	37.50	22.60	46.00	-8.50
396.7000	QP	H	17.57	43.77	26.20	46.00	-2.23
433.5000	QP	H	18.05	39.45	21.40	46.00	-6.55
530.5000	QP	H	19.65	41.65	22.00	46.00	-4.35
666.3000	QP	H	21.98	39.08	17.10	46.00	-6.92

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
196.8000	QP	V	12.02	24.70	36.72	43.50	-6.78
260.9000	QP	V	13.62	23.50	37.12	46.00	-8.88
400.5000	QP	V	17.72	24.10	41.82	46.00	-4.18
458.7000	QP	V	18.33	21.10	39.43	46.00	-6.57
532.5000	QP	V	19.67	20.70	40.37	46.00	-5.63
586.8000	QP	V	21.01	19.70	40.71	46.00	-5.29
198.8000	QP	H	11.97	35.37	23.40	43.50	-8.13
299.7000	QP	H	14.29	35.99	21.70	46.00	-10.01
365.6000	QP	H	16.10	35.90	19.80	46.00	-10.10
400.5000	QP	H	17.72	43.02	25.30	46.00	-2.98
432.5000	QP	H	18.05	39.75	21.70	46.00	-6.25
666.3000	QP	H	21.98	39.78	17.80	46.00	-6.22

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



5.4.2 Measurement results: frequency above 1GHz

EUT : 3CRWE154G72
Test Condition : 802.11b (DSSS modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
4824	PK	V	32.496	35.47	-	-	74	-
4824	AV	V	32.496	35.47	-	-	54	-
7236	PK	V	34.32	38.42	-	-	74	-
7236	AV	V	34.32	38.42	-	-	54	-
9648	PK	V	35.808	41.35	-	-	74	-
9648	AV	V	35.808	41.35	-	-	54	-
4824	PK	H	32.496	35.47	-	-	74	-
4824	AV	H	32.496	35.47	-	-	54	-
7236	PK	H	34.32	38.42	-	-	74	-
7236	AV	H	34.32	38.42	-	-	54	-
9648	PK	H	35.808	41.35	-	-	74	-
9648	AV	H	35.808	41.35	-	-	54	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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Test Condition : 802.11b (DSSS modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
4874	PK	V	32.496	35.47	-	-	74	-
4874	AV	V	32.496	35.47	-	-	54	-
7311	PK	V	34.32	38.42	48.01	52.11	74	-21.89
7311	AV	V	34.32	38.42	36.18	40.28	54	-13.72
9748	PK	V	35.808	41.35	-	-	74	-
9748	AV	V	35.808	41.35	-	-	54	-
4874	PK	H	32.496	35.47	-	-	74	-
4874	AV	H	32.496	35.47	-	-	54	-
7311	PK	H	34.32	38.42	49.74	53.84	74	-20.16
7311	AV	H	34.32	38.42	37.57	41.67	54	-12.33
9748	PK	H	35.808	41.35	-	-	74	-
9748	AV	H	35.808	41.35	-	-	54	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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EUT : 3CRWE154G72

Test Condition : 802.11b (DSSS modulation) Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
4924	PK	V	32.496	35.47	-	-	74	-
4924	AV	V	32.496	35.47	-	-	54	-
7386	PK	V	34.32	38.42	46.78	50.88	74	-23.12
7386	AV	V	34.32	38.42	35.65	39.75	54	-14.25
9848	PK	V	35.919	41.55	-	-	74	-
9848	AV	V	35.919	41.55	-	-	54	-
4924	PK	H	32.496	35.47	-	-	74	-
4924	AV	H	32.496	35.47	-	-	54	-
7386	PK	H	34.32	38.42	-	-	74	-
7386	AV	H	34.32	38.42	-	-	54	-
9848	PK	H	35.919	41.55	-	-	74	-
9848	AV	H	35.919	41.55	-	-	54	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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Test Condition : 802.11g (OFDM modulation) Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
4824	PK	V	32.496	35.47	-	-	74	-
4824	AV	V	32.496	35.47	-	-	54	-
7236	PK	V	34.32	38.42	-	-	74	-
7236	AV	V	34.32	38.42	-	-	54	-
9648	PK	V	35.808	41.35	-	-	74	-
9648	AV	V	35.808	41.35	-	-	54	-
4824	PK	H	32.496	35.47	-	-	74	-
4824	AV	H	32.496	35.47	-	-	54	-
7236	PK	H	34.32	38.42	-	-	74	-
7236	AV	H	34.32	38.42	-	-	54	-
9648	PK	H	35.808	41.35	-	-	74	-
9648	AV	H	35.808	41.35	-	-	54	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



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EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
4874	PK	V	32.496	35.47	-	-	74	-
4874	AV	V	32.496	35.47	-	-	54	-
7311	PK	V	34.32	38.42	-	-	74	-
7311	AV	V	34.32	38.42	-	-	54	-
9748	PK	V	35.808	41.35	-	-	74	-
9748	AV	V	35.808	41.35	-	-	54	-
4874	PK	H	32.496	35.47	-	-	74	-
4874	AV	H	32.496	35.47	-	-	54	-
7311	PK	H	34.32	38.42	-	-	74	-
7311	AV	H	34.32	38.42	-	-	54	-
9748	PK	H	35.808	41.35	-	-	74	-
9748	AV	H	35.808	41.35	-	-	54	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



Intertek Testing Services

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EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
4924	PK	V	32.496	35.47	-	-	74	-
4924	AV	V	32.496	35.47	-	-	54	-
7386	PK	V	34.32	38.42	46.78	50.88	74	-23.12
7386	AV	V	34.32	38.42	35.65	39.75	54	-14.25
9848	PK	V	35.919	41.55	-	-	74	-
9848	AV	V	35.919	41.55	-	-	54	-
4924	PK	H	32.496	35.47	-	-	74	-
4924	AV	H	32.496	35.47	-	-	54	-
7386	PK	H	34.32	38.42	-	-	74	-
7386	AV	H	34.32	38.42	-	-	54	-
9848	PK	H	35.919	41.55	-	-	74	-
9848	AV	H	35.919	41.55	-	-	54	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor



6. Power Spectrum Density test

6.1 Operating environment

Temperature: 24 °C
Relative Humidity: 60 %
Atmospheric Pressure 1023 hPa

6.2 Test setup & procedure

The power spectrum density per FCC § 15.247(d) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 3kHz, the video bandwidth set at 10kHz, a span of 1.5 MHz, and the sweep time set at 500 seconds. Power Density was read directly and cable loss (3dB)/external attenuator (6dB) correction was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel). The Power Spectral Density measured result is in the following table.

See Power Spectrum Density plot as file name “Power Spectrum Density plot.pdf”

6.3 Measured data of Power Spectrum Density test results

Test Condition: 802.11b operation (DSSS modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2411.32	-6.69	8
Middle	2436.32	-5.10	8
High	2461.32	-6.15	8

Test Condition: 802.11g operation (OFDM modulation)

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2412.63	-10.34	8
Middle	2437.62	-9.78	8
High	2462.63	-10.58	8



7. Emission on the band edge §FCC 15.247(C)

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

See band-edge plot as file name “Band-edge plot.pdf”.

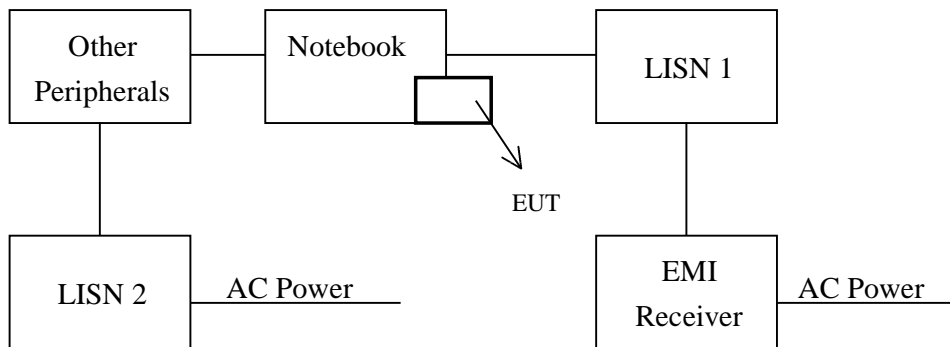


8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature: 24 °C
Relative Humidity: 60 %
Atmospheric Pressure 1023 hPa

8.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/1992 on conducted measurement. The AC power conducted emissions was investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz. (15.207 paragraph)

See Power Line Conducted Emission plot as file name “Power Line Conducted Emission plot.pdf”.



Emission Limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.



8.3 Power Line Conducted Emission test data

(1) Line

EUT : 3CRWE154G72

Test Condition : 802.11b (DSSS modulation) Tx at low channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.10	66.00	12.80	56.00	-30.90	-43.20
0.20600	45.50	63.37	34.10	53.37	-17.87	-19.27
0.27000	39.70	61.12	29.40	51.12	-21.42	-21.72
0.34200	30.60	59.15	24.70	49.15	-28.55	-24.45
0.40600	30.20	57.73	24.40	47.73	-27.53	-23.33
0.54200	28.30	56.00	17.20	46.00	-27.70	-28.80

(2) Neutral

EUT : 3CRWE154G72

Test Condition : 802.11b (DSSS modulation) Tx at low channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	34.40	66.00	13.40	56.00	-31.60	-42.60
0.19800	41.00	63.69	28.20	53.69	-22.69	-25.49
0.27000	39.70	61.12	28.50	51.12	-21.42	-22.62
0.34200	30.30	59.15	20.80	49.15	-28.85	-28.35
0.47800	29.90	56.37	25.60	46.37	-26.47	-20.77
3.79000	25.50	56.00	18.40	46.00	-30.50	-27.60

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.



(1) Line

EUT : 3CRWE154G72
Test Condition : 802.11b (DSSS modulation) Tx at middle channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.60	66.00	12.90	56.00	-30.40	-43.10
0.19800	40.90	63.69	29.10	53.69	-22.79	-24.59
0.27000	39.70	61.12	29.60	51.12	-21.42	-21.52
0.34200	30.80	59.15	24.70	49.15	-28.35	-24.45
0.40600	30.00	57.73	24.30	47.73	-27.73	-23.43
0.47800	31.00	56.37	27.70	46.37	-25.37	-18.67

(2) Neutral

EUT : 3CRWE154G72
Test Condition : 802.11b (DSSS modulation) Tx at middle channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.20	66.00	14.30	56.00	-30.80	-41.70
0.20600	45.90	63.37	33.40	53.37	-17.47	-19.97
0.27000	39.80	61.12	28.60	51.12	-21.32	-22.52
0.34200	30.30	59.15	20.90	49.15	-28.85	-28.25
0.40600	29.70	57.73	26.10	47.73	-28.03	-21.63
0.47800	29.90	56.37	25.70	46.37	-26.47	-20.67

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.



(1) Line

EUT : 3CRWE154G72
Test Condition : 802.11b (DSSS modulation) Tx at high channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	34.90	66.00	13.30	56.00	-31.10	-42.70
0.19800	41.80	63.69	29.30	53.69	-21.89	-24.39
0.27000	39.80	61.12	29.70	51.12	-21.32	-21.42
0.34200	31.00	59.15	24.80	49.15	-28.15	-24.35
0.40600	30.50	57.73	24.30	47.73	-27.23	-23.43
0.47800	31.20	56.37	27.70	46.37	-25.17	-18.67

(2) Neutral

EUT : 3CRWE154G72
Test Condition : 802.11b (DSSS modulation) Tx at high channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.00	66.00	13.90	56.00	-31.00	-42.10
0.20600	46.10	63.37	33.20	53.37	-17.27	-20.17
0.27000	40.00	61.12	28.80	51.12	-21.12	-22.32
0.34200	30.30	59.15	20.90	49.15	-28.85	-28.25
0.40600	29.60	57.73	26.00	47.73	-28.13	-21.73
0.47800	29.90	56.37	25.70	46.37	-26.47	-20.67

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.



(1) Line

EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at low channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.20600	46.30	63.37	34.70	53.37	-17.07	-18.67
0.27000	40.20	61.12	29.80	51.12	-20.92	-21.32
0.34200	31.40	59.15	25.10	49.15	-27.75	-24.05
0.40600	30.40	57.73	23.80	47.73	-27.33	-23.93
0.47800	31.30	56.37	27.40	46.37	-25.07	-18.97
3.46200	24.50	56.00	16.50	46.00	-31.50	-29.50

(2) Neutral

EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at low channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	36.10	66.00	13.60	56.00	-29.90	-42.40
0.20600	46.90	63.37	34.00	53.37	-16.47	-19.37
0.27000	40.30	61.12	29.00	51.12	-20.82	-22.12
0.40600	29.60	57.73	25.70	47.73	-28.13	-22.03
0.47800	30.20	56.37	25.40	46.37	-26.17	-20.97
4.05400	27.10	56.00	19.80	46.00	-28.90	-26.20

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.



(1) Line

EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at middle channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.10	66.00	13.40	56.00	-30.90	-42.60
0.20600	46.20	63.37	34.60	53.37	-17.17	-18.77
0.27000	40.00	61.12	29.80	51.12	-21.12	-21.32
0.34200	31.30	59.15	25.00	49.15	-27.85	-24.15
0.47800	31.10	56.37	27.70	46.37	-25.27	-18.67
3.59800	26.40	56.00	19.60	46.00	-29.60	-26.40

(2) Neutral

EUT : 3CRWE154G72

Test Condition : 802.11g (OFDM modulation) Tx at middle channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.30	66.00	13.30	56.00	-30.70	-42.70
0.20600	46.40	63.37	33.80	53.37	-16.97	-19.57
0.27000	40.20	61.12	28.80	51.12	-20.92	-22.32
0.34200	30.90	59.15	21.10	49.15	-28.25	-28.05
0.40600	29.60	57.73	25.70	47.73	-28.13	-22.03
0.47800	30.00	56.37	25.60	46.37	-26.37	-20.77

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.



(1) Line

EUT : 3CRWE154G72
Test Condition : 802.11g (OFDM modulation) Tx at high channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.40	66.00	13.60	56.00	-30.60	-42.40
0.20600	46.10	63.37	34.50	53.37	-17.27	-18.87
0.27000	40.00	61.12	29.70	51.12	-21.12	-21.42
0.34200	31.20	59.15	25.00	49.15	-27.95	-24.15
0.47800	31.10	56.37	27.70	46.37	-25.27	-18.67
3.66200	25.50	56.00	19.40	46.00	-30.50	-26.60

(2) Neutral

EUT : 3CRWE154G72
Test Condition : 802.11g (OFDM modulation) Tx at high channel

Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Reading (dB μ V) AV	Limit (dB μ V) AV	Margin (dB)	
					QP	AV
0.15000	35.10	66.00	13.20	56.00	-30.90	-42.80
0.20600	46.40	63.37	33.70	53.37	-16.97	-19.67
0.27000	40.10	61.12	28.80	51.12	-21.02	-22.32
0.34200	30.70	59.15	21.10	49.15	-28.45	-28.05
0.40600	29.40	57.73	25.80	47.73	-28.33	-21.93
0.47800	30.00	56.37	25.60	46.37	-26.37	-20.77

Remark:

1. The reading value included cable loss and LISN factor.
2. Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of conducted emission measurement is ± 2.6 dB.