



EMC TEST REPORT

Report No. : EME-021017
Model No. : WAB102
Issued Date : Sep. 11, 2002

Applicant : NETGEAR, Inc.
4500 Great America Parkway, Santa Clara,
CA 95054 USA

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Ko-Tze-Nan Chia-Tung Li, Shiang-Shan District,
Hsinchu, Taiwan, R.O.C.

This test report consists of 70 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of ITS Laboratory. The test result in this report only applies to the tested sample.

Project Engineer

Kaysi Chen

Reviewed By

Elton Chen



Table of Contents

Summary of Tests (15.407)..... 5

1. General information 6

 1.1 Identification of the EUT 6

 1.2 Additional information about the EUT 6

 1.3 Antenna description 7

 1.4 Peripherals equipment..... 7

2. Test specifications 8

 2.1 Test standard 8

 2.2 Operation mode..... 8

 2.3 Test equipment 9

3. Peak Output Power test..... 10

 3.1 Operating environment 10

 3.2 Test setup & procedure 10

 3.3 Limit..... 10

 3.4 Measured data of Maximum Output Power test results..... 11

4. Power Spectral Density test 12

 4.1 Operating environment 12

 4.2 Test setup & procedure 12

 4.3 Limit..... 12

 4.4 Measured data of Power Spectral Density test results..... 13

5. Peak excursion to average ratio test..... 14

 5.1 Operating environment 14

 5.2 Test setup & procedure 14

 5.3 Limit..... 14

 5.4 Measured data of Peak excursion to average ratio test results..... 14

6. Undesirable emission-conducted test..... 15

 6.1 Operating environment 15

 6.2 Test setup & procedure 15

 6.3 Limit..... 15

 6.4 Measured data of the highest Undesirable emission-conducted test result..... 15

7. Undesirable emission-radiated test 17

 7.1 Operating environment 17



7.2 Test setup & procedure	17
7.3 Emission limits.....	18
7.4 Undesirable emission-radiated test data.....	19
7.4.1 Measurement results: frequencies equal to or less than 1 GHz	19
7.4.2 Test results: frequency above 1GHz	27
8. Emission on the band edge §FCC 15.205 and RSS-210 6.3.....	35
9. Power Line Conducted Emission test §FCC 15.207 and RSS-210 6.6	36
9.1 Operating environment	36
9.2 Test setup & procedure	36
9.3 Power Line Conducted Emission test data.....	37
10. Frequency Stability	45
10.1 Operating environment	45
10.2 Test setup & procedure	45
10.3 Frequency Stability test results	45
Summary of Tests (15.247).....	46
11. General information	47
11.1 Identification of the EUT	47
11.2 Additional information about the EUT	47
11.3 Antenna description	48
11.4 Peripherals equipment.....	48
12. Test specifications.....	49
12.1 Test standard	49
12.2 Operation mode.....	49
12.3 Test equipment	50
13. Minimum 6dB Bandwidth test.....	51
13.1 Operating environment	51
13.2 Test setup & procedure	51
13.3 Measured data of Minimum 6dB Bandwidth test results.....	51
14. Maximum Output Power test.....	52
14.1 Operating environment	52
14.2 Test setup & procedure	52
14.3 Measured data of Maximum Output Power test results.....	52



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 4 of 70

15. RF Antenna Conducted Spurious test.....	53
15.1 Operating environment	53
15.2 Test setup & procedure	53
15.3 Measured data of the highest RF Antenna Conducted Spurious test result.....	53
16. Radiated Emission test.....	54
16.1 Operating environment	54
16.2 Test setup & procedure	54
16.3 Emission limits.....	55
16.4 Radiated spurious emission test data	56
16.4.1 Measurement results: frequencies equal to or less than 1 GHz	56
16.4.2 Measurement results: frequency above 1GHz	59
17. Power Spectrum Density test.....	65
17.1 Operating environment	65
17.2 Test setup & procedure	65
17.3 Measured data of Power Spectrum Density test results.....	65
18. Emission on the band edge §FCC 15.247(C)	66
19. Power Line Conducted Emission test §FCC 15.207.....	67
19.1 Operating environment	67
19.2 Test setup & procedure	67
19.3 Power Line Conducted Emission test data.....	68



Summary of Tests (15.407)

802.11 a+b Dual Band Wireless Access Point-Model: WAB102
FCC ID: PY3WAB102

Test	Reference		Results
	FCC P15	RSS-210	
Peak output power test	15.407 (a)(1)/(2)/(3)	6.2.2(q1) (i)/(ii)/(iii)	Complies
Power Spectral Density test	15.407 (a)(1)/(2)/(3)	6.2.2(q1) (i)/(ii)/(iii)	Complies
Peak excursion to average ratio test	15.407(a)(6)	N/A	Complies
Undesirable emission-radiated test	15.407(b)(1)/(2)/(3), 15.209	6.2.2(q1) (i)/(ii)/(iii)	Complies
Undesirable emission-conducted test	15.407(b)(1)/(2)/(3)	6.2.2(q1) (i)/(ii)/(iii)	Complies
AC line conducted emission test	15.407(b)(5) 15.207	6.6	Complies
Frequency Stability	15.407(g)	6.4	Complies



1. General information

1.1 Identification of the EUT

Manufacturer	: NETGEAR, Inc.
Product	: 802.11 a+b Dual Band Wireless Access Point
Model No.	: WAB102
FCC ID.	: PY3WAB102
Frequency Range	: 5150MHz ~ 5250MHz, 5250MHz ~ 5350MHz, 5725MHz ~ 5825MHz
Channel Number	: Normal mode: 12 Turbo mode: 5
Frequency of Each Channel (Normal mode)	: 5180MHz, 5200MHz, 5220MHz, 5240MHz, 5260MHz, 5280MHz, 5300MHz, 5320MHz, 5745MHz, 5765MHz, 5785MHz, 5805MHz
Frequency of Each Channel (Turbo mode)	: 5210MHz, 5250MHz, 5290MHz, 5760MHz, 5800MHz
Type of Modulation	: OFDM
Power Supply	: 120Vac, 60Hz with adapter
Power Cord	: N/A
Sample Received	: Sep. 5, 2002
Test Date(s)	: Sep. 5, 2002 to Sep. 11, 2002

A FCC DoC report has been generated for the client.

The test result of 2.4GHz and 5GHz are contained in this report. The test procedure and test data for 2.4GHz are arranged after the procedure and data of 5GHz.

1.2 Additional information about the EUT

The EUT is an Assess Point, which operate at 2.4GHz and 5GHz.

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



1.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain : 5dBi

Antenna Type : Dipole antenna

Connector Type : MMCX

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook	Acer	1904	9141H01LCJ14200114K000	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved
Adapter	LB	SA06N05-A	R00023100387	N/A

Data Cable: RJ-45 Cat. 5 UTP Cable 20m length × 1



2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart E Section § 15.207 、 § 15.209 、 § 15.407 and ANSI C63.4/1992 also compliance with Industry Canada RSS-210 6.2.2(q1).

The AC power conducted emissions was invested over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz. (15.207 paragraph)

Radiated emissions were invested 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 recorded also on the report.

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

The EUT was supplied with 120Vac, 60Hz and was running in accordance with the manufacture's operation manual.

EUT operation condition:

1. Power on all equipment.
2. Run testing program under Windows OS on Notebook
3. Traffic cable length: Cat. 5 UTP cable 20m × 1

The EUT was operated at its maximum output and continuously transmit during the test.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 9 of 70

2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	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	Advantest	9kHz~8GHz	R3163	111000905	Nov. 28, 2001
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2002
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100189	June 4, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5822	Sep. 10, 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, 2001
RF Power Meter	Boonton	10kHz~100GHz	4231A	79401	May 22, 2002
Power Sensor	Boonton	30MHz~8GHz	51011-EMC	32482	May 25, 2002
Temperature Humidity Test Chamber	Juror	N/A	TR-4010	S22033	Aug. 9, 2002

Note:

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



3. Peak Output Power test

3.1 Operating environment

Temperature: 22 °C
Relative Humidity: 55 %

3.2 Test setup & procedure

The power output per FCC §15.407(a) 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 (1dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

For FCC 15.407

Operating Frequency (MHz)	Output power limit
5150~5250	< 50mW (17dBm) or 4dBm+10logB
5250~5350	< 250mW (24dBm) or 11dBm+10logB
5725~5825	< 1W (30dBm) or 17dBm+10logB

Note: Where B is the 26dB bandwidth in MHz, and please refer to “26dB bandwidth.pdf”

For RSS-210

Operating Frequency (MHz)	Output power limit
5150~5250	< 200mW (23dBm) or 10dBm+10logB
5250~5350	< 250mW (24dBm) or 11dBm+10logB
5725~5825	< 1W (30dBm) or 17dBm+10logB

Note: Where B is the 26dB bandwidth in MHz, and please refer to “26dB bandwidth.pdf”



3.4 Measured data of Maximum Output Power test results

Normal mode:

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Power Output		FCC 15.407	RSS-210 (q1)
				(dBm)	(mW)	Limit (W)	Limit (W)
1	5180	1	14.4	15.40	34.67	0.05	0.2
5	5260	1	19.04	20.04	100.92	0.25	0.25
8	5320	1	18.28	19.28	84.72	0.25	0.25
9	5745	1	20.63	21.63	145.54	1	1
12	5805	1	19.75	20.75	118.85	1	1

Turbo mode:

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Power Output		FCC 15.407	RSS-210 (q1)
				(dBm)	(mW)	Limit (W)	Limit (W)
1	5210	1	14.98	15.98	39.62	0.05	0.2
3	5290	1	20.48	21.48	140.60	0.25	0.25
5	5800	1	20.51	21.51	141.57	1	1



4. Power Spectral Density test

4.1 Operating environment

Temperature: 26 °C
Relative Humidity: 59 %

4.2 Test setup & procedure

The power spectral density per FCC §15.407(a) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 1MHz, the video bandwidth set at 3MHz. Power spectral density was read directly and cable loss (1dB) correction was added to the reading to obtain power at the EUT antenna terminals. See Power Spectral Density plot as file name “Power Spectral Density plot (15.407).pdf”

4.3 Limit

For FCC 15.407

Operating Frequency (MHz)	Power density limit
5150~5250	< 4dBm/MHz
5250~5350	< 11dBm/MHz
5725~5825	< 17dBm/MHz

For RSS-210

Operating Frequency (MHz)	Power density limit
5150~5250	< 10dBm/MHz
5250~5350	< 11dBm/MHz
5725~5825	< 17dBm/MHz



4.4 Measured data of Power Spectral Density test results

Normal mode:

Channel	Frequency (MHz)	Measured level (dBm/MHz)	FCC 15.407	RSS-210
			Limit (dBm/MHz)	Limit (dBm/MHz)
1	5180	-4.65	4	10
5	5260	1.90	11	11
8	5320	-0.79	11	11
9	5745	0.24	17	17
12	5805	0.62	17	17

Turbo mode:

Channel	Frequency (MHz)	Measured level (dBm/MHz)	FCC 15.407	RSS-210
			Limit (dBm/MHz)	Limit (dBm/MHz)
1	5210	-4.97	4	10
3	5290	2.49	11	11
5	5800	-1.02	17	17



5. Peak excursion to average ratio test

5.1 Operating environment

Temperature: 24 °C
Relative Humidity: 55 %

5.2 Test setup & procedure

The peak excursion to average ratio per FCC § 15.407(a)(6) was measured from the antenna port of the EUT. Using a 50ohm spectrum analyzer with the RBW=VBW=1MHz for peak detector measurement and RBW=1MHz, VBW=30kHz for average detector measurement. Peak excursion to average ratio was read directly. See peak excursion to average ratio plot as file name “Peak excursion to average ratio plot (15.407).pdf”

5.3 Limit

Operating Frequency (MHz)	Peak excursion to average ratio limit
5150~5250	<13dB
5250~5350	<13dB
5725~5825	<13dB

5.4 Measured data of Peak excursion to average ratio test results

Normal mode:

Channel	Frequency (MHz)	Measured level dB	Limit dB
1	5180	10.62	13
5	5260	9.57	13
8	5320	9.34	13
9	5745	9.58	13
12	5805	9.63	13

Turbo mode:

Channel	Frequency (MHz)	Measured level dB	Limit dB
1	5210	8.42	13
3	5290	8.74	13
5	5800	8.44	13



6. Undesirable emission-conducted test

6.1 Operating environment

Temperature: 25 °C
Relative Humidity: 55 %

6.2 Test setup & procedure

The measurements were performed from 30MHz to tenth harmonic or 40GHz. Undesirable emission-conducted measurements per 15.407(b) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 1MHz, and the video bandwidth set at 3MHz.

The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

See Undesirable emission-conducted measurements plot as file name “Undesirable emission-conducted measurements plot (15.407).pdf”

6.3 Limit

Specification Limits:

- ≤ -17dBm EIRP in 1MHz bandwidth within the 5725~5825MHz from the band-edge to 10MHz above or below the band-edge.
- ≤ -27dBm EIRP in 1MHz bandwidth in unrestricted band.
- ≤ -41dBm EIRP in 1MHz bandwidth in restricted band.

6.4 Measured data of the highest Undesirable emission-conducted test result

Normal mode:

Channel	Max Spurious level at Frequency (MHz)	Spurious Emission level (dBm)	Limit (dBm)
1	5125.10	-52.44	-41
5	5125.10	-52.68	-41
8	5350.00	-50.50	-41
9	5725.00	-30.74	-17
12	5825.02	-30.98	-17



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 16 of 70

Turbo mode:

Channel	Max Spurious level at Frequency (MHz)	Spurious Emission level (dBm)	Limit (dBm)
1	5129.52	-53.30	-41
3	5150.00	-51.97	-41
5	5825.00	-25.99	-17

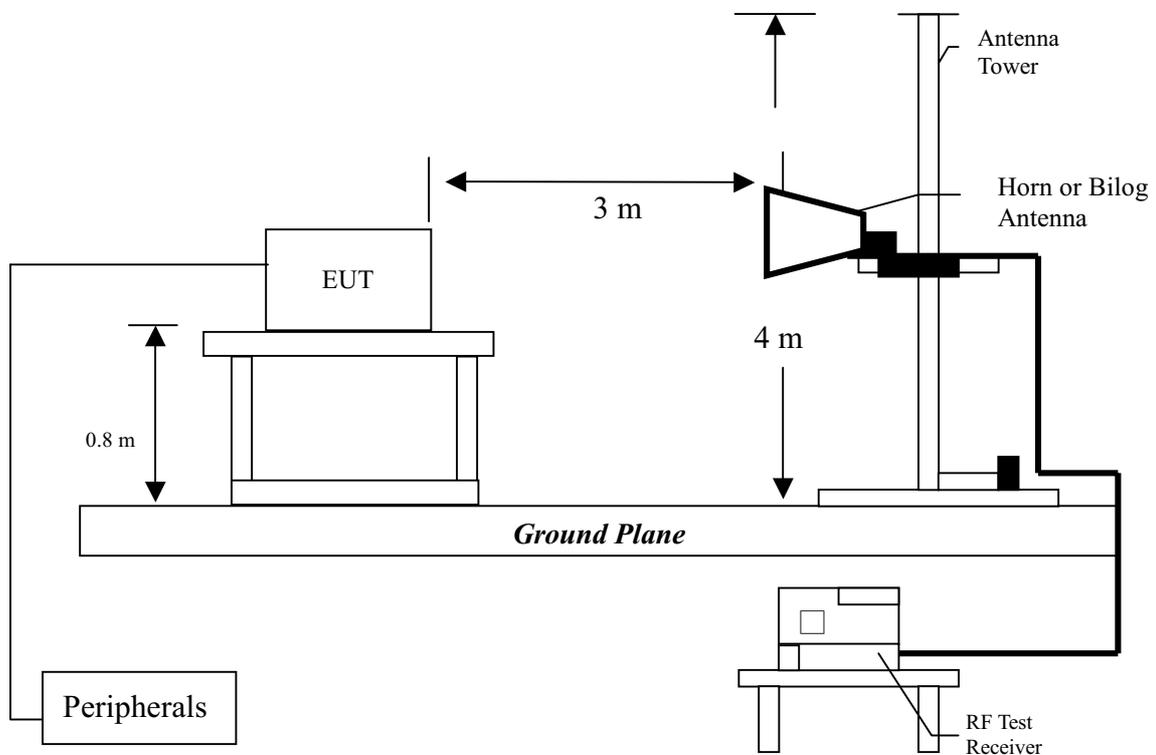
7. Undesirable emission-radiated test

7.1 Operating environment

Temperature: 22 °C
Relative Humidity: 55 %

7.2 Test setup & procedure

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



Radiated emission measurements were performed from 30MHz to tenth harmonic or 40GHz.

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.



7.3 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 ± 3.078 dB.



7.4 Undesirable emission-radiated test data

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

EUT : WAB102
Test Channel : Tx at 5180MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
55.65000	QP	V	12.91	22.37	35.28	40.00	-4.72
125.04000	QP	V	12.89	25.33	38.22	43.50	-5.28
149.88000	QP	V	14.29	22.20	36.49	43.50	-7.01
250.05000	QP	V	13.17	23.36	36.53	46.00	-9.47
639.50000	QP	V	21.42	18.71	40.13	46.00	-5.87
799.80000	QP	V	24.01	13.95	37.96	46.00	-8.04
250.05000	QP	H	13.17	26.95	40.12	46.00	-5.88
283.80000	QP	H	14.07	26.23	40.30	46.00	-5.70
300.00000	QP	H	14.47	19.03	33.50	46.00	-12.50
351.80000	QP	H	15.63	21.98	37.61	46.00	-8.39
720.00000	QP	H	22.56	15.45	38.01	46.00	-7.99
879.60000	QP	H	24.23	13.20	37.43	46.00	-8.57

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 20 of 70

EUT : WAB102
Test Channel : Tx at 5260MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
45.66000	QP	V	12.97	22.27	35.24	40.00	-4.76
125.04000	QP	V	12.89	24.88	37.77	43.50	-5.73
199.83000	QP	V	12.03	19.37	31.40	43.50	-12.10
250.05000	QP	V	13.17	22.80	35.97	46.00	-10.03
639.50000	QP	V	21.42	18.36	39.78	46.00	-6.22
799.80000	QP	V	24.01	13.69	37.70	46.00	-8.30
250.05000	QP	H	13.17	26.01	39.18	46.00	-6.82
283.80000	QP	H	14.07	25.83	39.90	46.00	-6.10
351.80000	QP	H	15.63	22.25	37.88	46.00	-8.12
639.50000	QP	H	21.42	18.58	40.00	46.00	-6.00
720.00000	QP	H	22.56	15.00	37.56	46.00	-8.44
879.60000	QP	H	24.23	13.42	37.65	46.00	-8.35

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 21 of 70

EUT : WAB102
Test Channel : Tx at 5320MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
45.66000	QP	V	12.97	21.23	34.20	40.00	-5.80
55.65000	QP	V	12.91	18.89	31.80	40.00	-8.20
125.04000	QP	V	12.89	23.26	36.15	43.50	-7.35
639.50000	QP	V	21.42	18.02	39.44	46.00	-6.56
720.00000	QP	V	22.56	13.28	35.84	46.00	-10.16
799.80000	QP	V	24.01	12.57	36.58	46.00	-9.42
47.01000	QP	H	12.91	14.59	27.50	40.00	-12.50
149.88000	QP	H	14.29	19.04	33.33	43.50	-10.17
250.05000	QP	H	13.17	23.81	36.98	46.00	-9.02
351.80000	QP	H	15.63	21.58	37.21	46.00	-8.79
750.14000	QP	H	23.43	13.05	36.48	46.00	-9.52
879.60000	QP	H	24.23	13.20	37.43	46.00	-8.57

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 22 of 70

EUT : WAB102
Test Channel : Tx at 5745MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
45.66000	QP	V	12.97	21.63	34.60	40.00	-5.40
125.04000	QP	V	12.89	23.61	36.50	43.50	-7.00
149.88000	QP	V	14.29	20.99	35.28	43.50	-8.22
199.83000	QP	V	12.03	18.83	30.86	43.50	-12.64
639.50000	QP	V	21.42	18.09	39.51	46.00	-6.49
720.00000	QP	V	22.56	13.93	36.49	46.00	-9.51
125.04000	QP	H	12.89	15.44	28.33	43.50	-15.17
149.88000	QP	H	14.29	18.85	33.14	43.50	-10.36
174.99000	QP	H	14.21	15.97	30.18	43.50	-13.32
250.05000	QP	H	13.17	26.71	39.88	46.00	-6.12
720.00000	QP	H	22.56	14.63	37.19	46.00	-8.81
879.60000	QP	H	24.23	12.66	36.89	46.00	-9.11

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 23 of 70

EUT : WAB102
Test Channel : Tx at 5805MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
125.04000	QP	V	12.89	24.77	37.66	43.50	-5.84
149.88000	QP	V	14.29	22.53	36.82	43.50	-6.68
174.99000	QP	V	14.21	15.89	30.10	43.50	-13.40
250.05000	QP	V	13.17	19.33	32.50	46.00	-13.50
720.00000	QP	V	22.56	14.84	37.40	46.00	-8.60
799.80000	QP	V	24.01	13.39	37.40	46.00	-8.60
125.04000	QP	H	12.89	16.71	29.60	43.50	-13.90
149.88000	QP	H	14.29	20.31	34.60	43.50	-8.90
174.99000	QP	H	14.21	15.99	30.20	43.50	-13.30
224.94000	QP	H	11.82	22.80	34.62	46.00	-11.38
283.80000	QP	H	14.07	25.53	39.60	46.00	-6.40
879.60000	QP	H	24.23	13.32	37.55	46.00	-8.45

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 24 of 70

EUT : WAB102
Test Channel : Tx at 5210MHz
Test Mode : Turbo mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
45.66000	QP	V	12.97	22.03	35.00	40.00	-5.00
125.05000	QP	V	12.89	23.91	36.80	43.50	-6.70
150.00000	QP	V	14.76	22.44	37.20	43.50	-6.30
283.80000	QP	V	14.07	20.53	34.60	46.00	-11.40
639.50000	QP	V	21.42	18.88	40.30	46.00	-5.70
799.80000	QP	V	24.01	14.59	38.60	46.00	-7.40
47.01000	QP	H	12.91	14.89	27.80	40.00	-12.20
74.55000	QP	H	10.57	17.03	27.60	40.00	-12.40
125.05000	QP	H	12.89	16.91	29.80	43.50	-13.70
150.00000	QP	H	14.76	18.84	33.60	43.50	-9.90
250.00000	QP	H	13.17	26.62	39.79	46.00	-6.21
283.50000	QP	H	14.07	25.81	39.88	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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 25 of 70

EUT : WAB102
Test Channel : Tx at 5290MHz
Test Mode : Turbo mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
45.60000	QP	V	13.58	21.63	34.60	40.00	-5.40
150.00000	QP	V	15.14	21.23	35.99	43.50	-7.51
250.00000	QP	V	13.19	21.80	34.97	46.00	-11.03
283.50000	QP	V	14.68	20.04	34.11	46.00	-11.89
640.00000	QP	V	21.83	18.98	40.30	46.00	-5.70
799.80000	QP	V	21.63	14.59	38.60	46.00	-7.40
47.01000	QP	H	13.29	15.39	28.30	40.00	-11.70
74.55000	QP	H	10.80	17.89	28.46	40.00	-11.54
150.00000	QP	H	15.14	19.90	34.66	43.50	-8.84
250.00000	QP	H	13.19	27.49	40.66	46.00	-5.34
283.50000	QP	H	14.68	26.24	40.31	46.00	-5.69
640.00000	QP	H	19.45	19.68	41.00	46.00	-5.00

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 26 of 70

EUT : WAB102
Test Channel : Tx at 5800MHz
Test Mode : Turbo mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
47.00000	QP	V	12.91	21.78	34.69	40.00	-5.31
150.00000	QP	V	14.76	21.73	36.49	43.50	-7.01
250.00000	QP	V	13.17	23.06	36.23	46.00	-9.77
283.50000	QP	V	14.07	18.84	32.91	46.00	-13.09
639.40000	QP	V	21.42	18.26	39.68	46.00	-6.32
720.00000	QP	V	22.56	15.04	37.60	46.00	-8.40
75.00000	QP	H	10.36	16.64	27.00	40.00	-13.00
150.00000	QP	H	14.76	19.74	34.50	43.50	-9.00
175.00000	QP	H	14.21	15.89	30.10	43.50	-13.40
250.00000	QP	H	13.17	26.86	40.03	46.00	-5.97
283.40000	QP	H	14.07	24.08	38.15	46.00	-7.85
640.00000	QP	H	21.32	18.68	40.00	46.00	-6.00

Remark:

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



7.4.2 Test results: frequency above 1GHz

EUT : WAB102
Test Channel : Tx at 5180MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
10360	PK	V	28.02	41.96	49.91	63.85	74	-10.15
10360	AV	V	28.02	41.96	34.9	48.84	54	-5.16
15540	PK	V	28.02	41.16	-	-	74	-
15540	AV	V	28.02	41.16	-	-	54	-
20720	PK	V	28.92	41.96	-	-	74	-
20720	AV	V	28.92	41.96	-	-	54	-
25900	PK	V	28.92	43.9	-	-	74	-
25900	AV	V	28.92	43.9	-	-	54	-
10360	PK	H	28.02	41.96	47.68	61.62	74	-12.38
10360	AV	H	28.02	41.96	33.25	47.19	54	-6.81
15540	PK	H	28.02	41.16	-	-	74	-
15540	AV	H	28.02	41.16	-	-	54	-
20720	PK	H	28.92	41.96	-	-	74	-
20720	AV	H	28.92	41.96	-	-	54	-
25900	PK	H	28.92	43.9	-	-	74	-
25900	AV	H	28.92	43.9	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 28 of 70

EUT : WAB102
 Test Channel : Tx at 5260MHz
 Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
10520	PK	V	28.02	42.11	45	59.09	74	-14.91
10520	AV	V	28.02	42.11	31.76	45.85	54	-8.15
15780	PK	V	28.02	41.55	-	-	74	-
15780	AV	V	28.02	41.55	-	-	54	-
21040	PK	V	28.92	41.81	-	-	74	-
21040	AV	V	28.92	41.81	-	-	54	-
26300	PK	V	28.92	43.68	-	-	74	-
26300	AV	V	28.92	43.68	-	-	54	-
10520	PK	H	28.02	42.11	43.49	57.58	74	-16.42
10520	AV	H	28.02	42.11	30.33	44.42	54	-9.58
15780	PK	H	28.02	41.55	-	-	74	-
15780	AV	H	28.02	41.55	-	-	54	-
21040	PK	H	28.92	41.81	-	-	74	-
21040	AV	H	28.92	41.81	-	-	54	-
26300	PK	H	28.92	43.68	-	-	74	-
26300	AV	H	28.92	43.68	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 29 of 70

EUT : WAB102
 Test Channel : Tx at 5320MHz
 Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
10640	PK	V	28.02	41.94	43.97	57.89	74	-16.11
10640	AV	V	28.02	41.94	30.99	44.91	54	-9.09
15960	PK	V	28.02	41.15	-	-	74	-
15960	AV	V	28.02	41.15	-	-	54	-
21280	PK	V	28.92	41.79	-	-	74	-
21280	AV	V	28.92	41.79	-	-	54	-
26600	PK	V	28.92	44.77	-	-	74	-
26600	AV	V	28.92	44.77	-	-	54	-
10640	PK	H	28.02	41.94	42.15	56.07	74	-17.93
10640	AV	H	28.02	41.94	30.21	44.13	54	-9.87
15960	PK	H	28.02	41.15	-	-	74	-
15960	AV	H	28.02	41.15	-	-	54	-
21280	PK	H	28.92	41.79	-	-	74	-
21280	AV	H	28.92	41.79	-	-	54	-
26600	PK	H	28.92	44.77	-	-	74	-
26600	AV	H	28.92	44.77	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 30 of 70

EUT : WAB102
Test Channel : Tx at 5745MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
11490	PK	V	28.02	42.55	41.61	56.14	74	-17.86
11490	AV	V	28.02	42.55	32.23	46.76	54	-7.24
17235	PK	V	28.02	46.15	-	-	74	-
17235	AV	V	28.02	46.15	-	-	54	-
22980	PK	V	28.92	42.59	-	-	74	-
22980	AV	V	28.92	42.59	-	-	54	-
11490	PK	H	28.02	42.55	44.58	59.11	74	-14.89
11490	AV	H	28.02	42.55	31.41	45.94	54	-8.06
17235	PK	H	28.02	46.15	-	-	74	-
17235	AV	H	28.02	46.15	-	-	54	-
22980	PK	H	28.92	42.59	-	-	74	-
22980	AV	H	28.92	42.59	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 31 of 70

EUT : WAB102
Test Channel : Tx at 5805MHz
Test Mode : Normal mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
11610	PK	V	28.02	43.44	44.11	59.53	74	-14.47
11610	AV	V	28.02	43.44	30.42	45.84	54	-8.16
17415	PK	V	28.02	45.81	-	-	74	-
17415	AV	V	28.02	45.81	-	-	54	-
23220	PK	V	28.92	43.44	-	-	74	-
23220	AV	V	28.92	43.44	-	-	54	-
11610	PK	H	28.02	43.44	40.88	56.3	74	-17.7
11610	AV	H	28.02	43.44	29.02	44.44	54	-9.56
17415	PK	H	28.02	45.81	-	-	74	-
17415	AV	H	28.02	45.81	-	-	54	-
23220	PK	H	28.92	43.44	-	-	74	-
23220	AV	H	28.92	43.44	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 32 of 70

EUT : WAB102
 Test Channel : Tx at 5210MHz
 Test Mode : Turbo mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
10420	PK	V	28.02	42.11	45.44	59.53	74	-14.47
10420	AV	V	28.02	42.11	32.84	46.93	54	-7.07
15630	PK	V	28.02	41.55	-	-	74	-
15630	AV	V	28.02	41.55	-	-	54	-
20840	PK	V	28.92	41.75	-	-	74	-
20840	AV	V	28.92	41.75	-	-	54	-
26050	PK	V	28.92	43.23	-	-	74	-
26050	AV	V	28.92	43.23	-	-	54	-
10420	PK	H	28.02	42.11	45.3	59.39	74	-14.61
10420	AV	H	28.02	42.11	31.96	46.05	54	-7.95
15630	PK	H	28.02	41.55	-	-	74	-
15630	AV	H	28.02	41.55	-	-	54	-
20840	PK	H	28.92	41.75	-	-	74	-
20840	AV	H	28.92	41.75	-	-	54	-
26050	PK	H	28.92	43.23	-	-	74	-
26050	AV	H	28.92	43.23	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 33 of 70

EUT : WAB102
 Test Channel : Tx at 5290MHz
 Test Mode : Turbo mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
10580	PK	V	28.02	42.11	44.25	58.34	74	-15.66
10580	AV	V	28.02	42.11	31.17	45.26	54	-8.74
15870	PK	V	28.02	41.15	-	-	74	-
15870	AV	V	28.02	41.15	-	-	54	-
21160	PK	V	28.92	41.81	-	-	74	-
21160	AV	V	28.92	41.81	-	-	54	-
26450	PK	V	28.92	43.9	-	-	74	-
26450	AV	V	28.92	43.9	-	-	54	-
10580	PK	H	28.02	42.11	43.15	57.24	74	-16.76
10580	AV	H	28.02	42.11	30.05	44.14	54	-9.86
15870	PK	H	28.02	41.15	-	-	74	-
15870	AV	H	28.02	41.15	-	-	54	-
21160	PK	H	28.92	41.81	-	-	74	-
21160	AV	H	28.92	41.81	-	-	54	-
26450	PK	H	28.92	43.9	-	-	74	-
26450	AV	H	28.92	43.9	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 34 of 70

EUT : WAB102
Test Channel : Tx at 5800MHz
Test Mode : Turbo mode

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
11600	PK	V	28.02	43.44	42.75	58.17	74	-15.83
11600	AV	V	28.02	43.44	29.7	45.12	54	-8.88
17400	PK	V	28.02	45.81	-	-	74	-
17400	AV	V	28.02	45.81	-	-	54	-
23200	PK	V	28.92	43.44	-	-	74	-
23200	AV	V	28.92	43.44	-	-	54	-
11600	PK	H	28.02	43.44	41.01	56.43	74	-17.57
11600	AV	H	28.02	43.44	29.85	45.27	54	-8.73
17400	PK	H	28.02	45.81	-	-	74	-
17400	AV	H	28.02	45.81	-	-	54	-
23200	PK	H	28.92	43.44	-	-	74	-
23200	AV	H	28.92	43.44	-	-	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.



8. Emission on the band edge §FCC 15.205 and RSS-210 6.3

The measurement was made to the average and peak field strength of the fundamental frequency. And the spurious emission in the restrict band must also comply with the FCC subpart C 15.209.

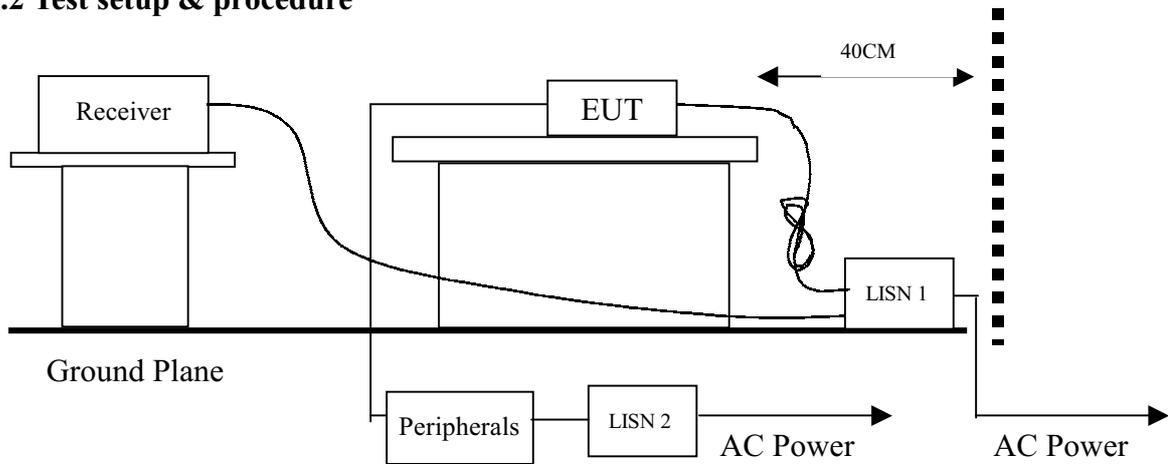
See band-edge plot as file name “Band-edge plot (15.407).pdf”.

9. Power Line Conducted Emission test §FCC 15.207 and RSS-210 6.6

9.1 Operating environment

Temperature: 24 °C
 Relative Humidity: 55 %

9.2 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 bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

See Power Line Conducted Emission plot as file name “Power Line Conducted Emission plot (15.407).pdf”.

Emission Limit

FCC Part 15 Paragraph 15.207 and RSS-210 6.6		
Freq. (MHz)	Maximum RF Line Voltage	
	uV	dBuV
0.45 - 30	250	48.0



9.3 Power Line Conducted Emission test data

EUT : WAB102
Test Channel : Tx at 5180MHz
Test Mode : Normal mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.67400	35.1	48.00	-12.90
LINE	1.01000	36.1	48.00	-11.90
LINE	2.35400	31.6	48.00	-16.40
LINE	7.07400	32.6	48.00	-15.40
LINE	11.80200	38.2	48.00	-9.80
LINE	16.85000	35.9	48.00	-12.10
NEUTRAL	1.35400	32.2	48.00	-15.80
NEUTRAL	2.36200	34.0	48.00	-14.00
NEUTRAL	2.93000	36.7	48.00	-11.30
NEUTRAL	7.43400	35.6	48.00	-12.40
NEUTRAL	12.14600	36.2	48.00	-11.80
NEUTRAL	15.53800	32.9	48.00	-15.10

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 38 of 70

EUT : WAB102
Test Channel : Tx at 5260MHz
Test Mode : Normal mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	1.01800	35.9	48.00	-12.10
LINE	2.37000	39.0	48.00	-9.00
LINE	4.06600	36.5	48.00	-11.50
LINE	5.76200	38.2	48.00	-9.80
LINE	12.19400	40.9	48.00	-7.10
LINE	15.58600	38.9	48.00	-9.10
NEUTRAL	1.35400	33.6	48.00	-14.40
NEUTRAL	2.71400	35.4	48.00	-12.60
NEUTRAL	5.74600	26.5	48.00	-21.50
NEUTRAL	7.77800	32.4	48.00	-15.60
NEUTRAL	12.06600	33.4	48.00	-14.60
NEUTRAL	15.55400	34.3	48.00	-13.70

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 39 of 70

EUT : WAB102
Test Channel : Tx at 5320MHz
Test Mode : Normal mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	1.01800	33.3	48.00	-14.70
LINE	2.37000	39.1	48.00	-8.90
LINE	2.70600	41.2	48.00	-6.80
LINE	6.77000	34.9	48.00	-13.10
LINE	12.18600	41.6	48.00	-6.40
LINE	16.58600	34.9	48.00	-13.10
NEUTRAL	1.35400	33.1	48.00	-14.90
NEUTRAL	2.92200	36.7	48.00	-11.30
NEUTRAL	4.06600	31.3	48.00	-16.70
NEUTRAL	7.10600	33.7	48.00	-14.30
NEUTRAL	12.18600	41.2	48.00	-6.80
NEUTRAL	16.92200	34.3	48.00	-13.70

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 40 of 70

EUT : WAB102
Test Channel : Tx at 5745MHz
Test Mode : Normal mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	2.37000	37.9	48.00	-10.10
LINE	2.70600	40.9	48.00	-7.10
LINE	4.05800	38.0	48.00	-10.00
LINE	5.41000	38.9	48.00	-9.10
LINE	12.17800	40.9	48.00	-7.10
LINE	14.87400	36.2	48.00	-11.80
NEUTRAL	1.35400	32.7	48.00	-15.30
NEUTRAL	2.70600	38.8	48.00	-9.20
NEUTRAL	4.05800	35.4	48.00	-12.60
NEUTRAL	5.41000	35.5	48.00	-12.50
NEUTRAL	12.17000	36.5	48.00	-11.50
NEUTRAL	14.87400	37.2	48.00	-10.80

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 41 of 70

EUT : WAB102
Test Channel : Tx at 5805MHz
Test Mode : Normal mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.67400	33.8	48.00	-14.20
LINE	2.02600	35.0	48.00	-13.00
LINE	2.70600	41.0	48.00	-7.00
LINE	7.09800	38.8	48.00	-9.20
LINE	11.82600	40.5	48.00	-7.50
LINE	16.56200	38.6	48.00	-9.40
NEUTRAL	1.35400	33.3	48.00	-14.70
NEUTRAL	2.37000	35.6	48.00	-12.40
NEUTRAL	2.70600	38.8	48.00	-9.20
NEUTRAL	7.10600	36.1	48.00	-11.90
NEUTRAL	12.18600	39.6	48.00	-8.40
NEUTRAL	16.57800	38.4	48.00	-9.60

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 42 of 70

EUT : WAB102
Test Channel : Tx at 5210MHz
Test Mode : Turbo mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	1.01800	35.9	48.00	-12.10
LINE	2.37800	39.9	48.00	-8.10
LINE	2.71400	36.0	48.00	-12.00
LINE	7.13000	39.2	48.00	-8.80
LINE	11.89800	41.4	48.00	-6.60
LINE	16.63400	37.0	48.00	-11.00
NEUTRAL	1.01800	32.4	48.00	-15.60
NEUTRAL	2.37800	35.3	48.00	-12.70
NEUTRAL	2.85000	36.8	48.00	-11.20
NEUTRAL	7.47400	29.2	48.00	-18.80
NEUTRAL	11.89000	35.9	48.00	-12.10
NEUTRAL	16.98600	34.4	48.00	-13.60

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 43 of 70

EUT : WAB102
Test Channel : Tx at 5290MHz
Test Mode : Turbo mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	1.01800	36.0	48.00	-12.00
LINE	2.71400	36.9	48.00	-11.10
LINE	5.77000	38.5	48.00	-9.50
LINE	7.12200	37.2	48.00	-10.80
LINE	11.89800	41.2	48.00	-6.80
LINE	16.96200	36.9	48.00	-11.10
NEUTRAL	2.37800	35.9	48.00	-12.10
NEUTRAL	2.85000	36.8	48.00	-11.20
NEUTRAL	5.77000	34.1	48.00	-13.90
NEUTRAL	7.13000	35.4	48.00	-12.60
NEUTRAL	11.97000	37.6	48.00	-10.40
NEUTRAL	16.97800	37.4	48.00	-10.60

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 44 of 70

EUT : WAB102
Test Channel : Tx at 5800MHz
Test Mode : Turbo mode

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	1.01800	35.8	48.00	-12.20
LINE	2.03400	34.1	48.00	-13.90
LINE	2.37800	39.6	48.00	-8.40
LINE	5.77000	38.0	48.00	-10.00
LINE	12.04200	37.9	48.00	-10.10
LINE	16.96200	35.6	48.00	-12.40
NEUTRAL	1.35400	33.0	48.00	-15.00
NEUTRAL	2.37000	33.8	48.00	-14.20
NEUTRAL	2.70600	35.6	48.00	-12.40
NEUTRAL	4.06600	31.9	48.00	-16.10
NEUTRAL	12.18600	39.1	48.00	-8.90
NEUTRAL	16.60200	36.2	48.00	-11.80

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.



10. Frequency Stability

10.1 Operating environment

Temperature: -20~50 °C
Relative Humidity: 58 %

10.2 Test setup & procedure

The measurement per RSS-210 section 6.4 was performed under normal and extreme test conditions. During the test, the spectrum analyzer was set to Frequency counter function and the resolution was set to 1Hz.

For tests at the upper or lower temperature, after thermal balance has been attained the equipment shall be switched on in the transmit condition for half an hour, after which the appropriate tests shall be carried out.

10.3 Frequency Stability test results

Operating Frequency (MHz)	Voltage (V)	Temperature (°C)	Measured Frequency (MHz)	Limits (frequency range) (MHz)
5180	120Vac, 60Hz	0	5180.051586	5179.996420~5180.100020
		+20	5180.048220	5179.996420~5180.100020
		+55	5180.028114	5179.996420~5180.100020

Remark: The limit frequency range is between 5179.996420MHz ~ 5180.100020MHz (± 10 ppm of 5180.048220MHz).

Operating Frequency (MHz)	Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limits (frequency range) (MHz)
5180	+20	102Vac, 60Hz	5180.052529	5179.996891~5180.100491
		120Vac, 60Hz	5180.048691	5179.996891~5180.100491
		138Vac, 60Hz	5180.050675	5179.996891~5180.100491

Remark: The limit frequency range is between 5179.996891MHz~5180.100491MHz (± 10 ppm of 5180.048691MHz).



Summary of Tests (15.247)

802.11 a+b Dual Band Wireless Access Point-Model: WAB102
FCC ID: PY3WAB102

Test	Reference		Results
	FCC P15	RSS-210	
Minimum 6dB Bandwidth test	15.247(a)(2)	6.2.2(O)	Complies
Maximum Output Power test	15.247(b)	6.2.2(O)	Complies
RF Antenna Conducted test	15.247(c)	6.2.2(O)(el)	Complies
Radiated Spurious Emission test	15.205, 15.209	6.2.2(O)(el)	Complies
Power Spectrum Density test	15.247(d)	6.2.2 (O)(b)	Complies
Power Line Conducted Emission test	15.207	6.4	Complies



11. General information

11.1 Identification of the EUT

Manufacturer	: Z-COM, Inc.
Product	: 802.11 a+b Dual Band Wireless Access Point
Model No.	: WAB102
FCC ID.	: PY3WAB102
Frequency Range	: 2412MHz to 2462MHz
Channel Number	: 11 channels
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: CCK, DQPSK, DBPSK, DSSS
Power Supply	: 120Vac, 60Hz with adapter
Power Cord	: N/A
Sample Received	: Sep. 5, 2002
Test Date(s)	: Sep. 5, 2002 to Sep. 11, 2002

A FCC DoC report has been generated for the client.

11.2 Additional information about the EUT

The EUT is an Assess Point, which operate at 2.4Ghz and 5GHz.

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



11.3 Antenna description

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain : 3dBi

Antenna Type : Dipole antenna

11.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook	Acer	1904	9141H01LCJ14200114K000	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved
Adapter	LB	SA06N05-A	R00023100387	N/A

Data Cable: RJ-45 Cat. 5 UTP Cable 20m length × 1



12. Test specifications

12.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.207 、 § 15.209 、 § 15.247 and ANSI C63.4/1992 and also compliance with Industry Canada RSS-210 6.2.2(O)..

The AC power conducted emissions was invested over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz. (15.207 paragraph)

Radiated emissions were invested 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 recorded also on the report.

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.

12.2 Operation mode

The EUT was supplied with 120Vac, 60Hz and was running in accordance with the manufacture's operation manual.

EUT operation condition:

1. Power on all equipment.
2. Run testing program under Windows OS on Notebook
3. Traffic cable length: Cat. 5 UTP cable 20m × 1

The EUT was operated at its maximum output and continuously transmit during the test.



12.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	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	Advantest	9kHz~8GHz	R3163	111000905	Nov. 28, 2001
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2002
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100189	June 4, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5822	Sep. 10, 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, 2001
RF Power Meter	Boonton	10kHz~100GHz	4231A	79401	May 22, 2002
Power Sensor	Boonton	30MHz~8GHz	51011-EMC	32482	May 25, 2002
Temperature Humidity Test Chamber	Juror	N/A	TR-4010	S22033	Aug. 9, 2002

Note:

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



13. Minimum 6dB Bandwidth test

13.1 Operating environment

Temperature: 22 °C
Relative Humidity: 58 %

13.2 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 1MHz, the video bandwidth set at 3MHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The minimum 6dB modulation bandwidth is in the following Table.

See Minimum 6dB Bandwidth plot as file name “Minimum 6dB Bandwidth plot (15.247).pdf”

13.3 Measured data of Minimum 6dB Bandwidth test results

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2413.60	11.70	> 500kHz
Middle	2438.50	11.90	> 500kHz
High	2463.80	11.90	> 500kHz



14. Maximum Output Power test

14.1 Operating environment

Temperature: 22 °C
Relative Humidity: 60 %

14.2 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 (1dB) 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).

14.3 Measured data of Maximum Output Power test results

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Power Output		Limit (W)
				(dBm)	(mW)	
Lowest	2412	1	16.42	17.42	55.20	1
Middle	2437	1	16.70	17.70	58.88	1
Highest	2462	1	16.24	17.24	52.97	1



15. RF Antenna Conducted Spurious test

15.1 Operating environment

Temperature: 22 °C
Relative Humidity: 58 %

15.2 Test setup & procedure

The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (c) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 300 kHz.

Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

See RF Antenna Conducted plot as file name “RF Antenna Conducted plot (15.247).pdf”

15.3 Measured data of the highest RF Antenna Conducted Spurious test result

Channel	Max Spurious level at Frequency (MHz)	Spurious Emission level (dBm)	Limit (dB)
Low	672.20	-43.98	-18.12
Middle	698.92	-40.03	-16.91
High	721.60	-43.40	-18.81

Note: 1. Limit = peak power output (in 100kHz RBW) – 20dB
2. All the other emissions were very low the limit.

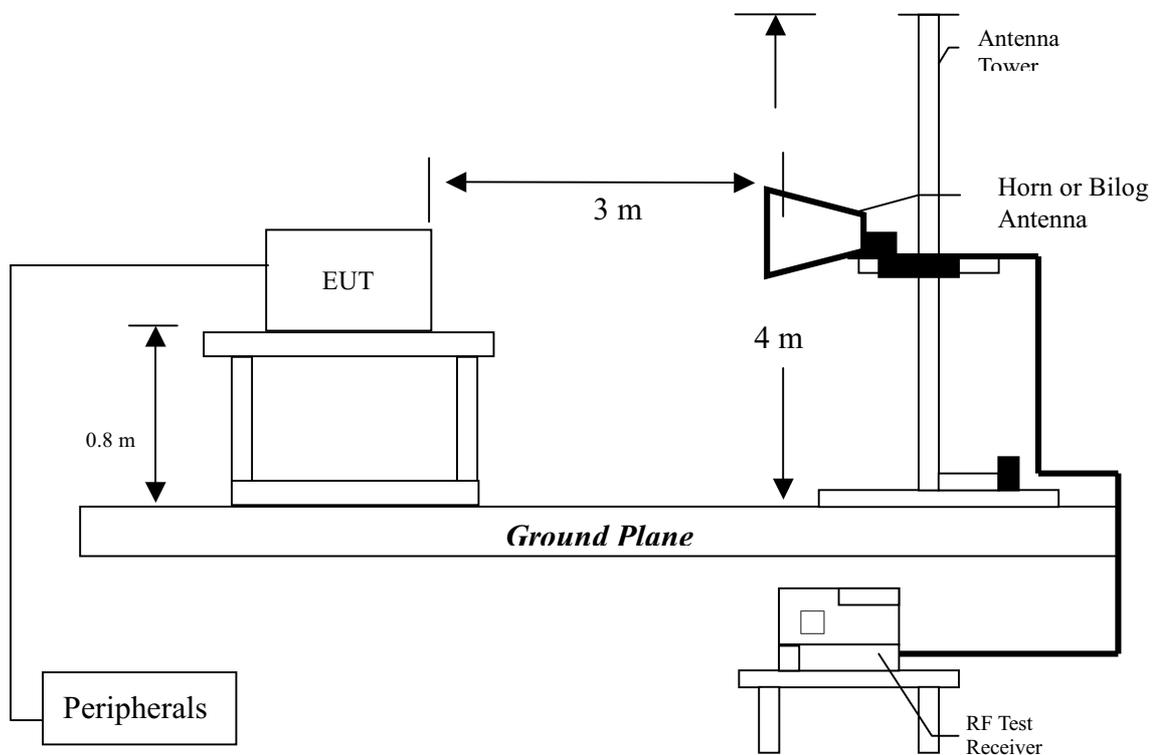
16. Radiated Emission test

16.1 Operating environment

Temperature: 22 °C
Relative Humidity: 58 %

16.2 Test setup & procedure

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



Radiated emission measurements were performed from 30MHz to 25GHz. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz – for frequencies above 1GHz.

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.



16.3 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. In the General Radiated Emission Test, the uncertainty is within ± 2.5 dB



16.4 Radiated spurious emission test data

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

EUT : WAB102
Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
54.30000	QP	V	12.93	21.62	34.55	40.00	-5.45
123.70000	QP	V	12.89	24.36	37.25	43.50	-6.25
144.59000	QP	V	14.29	21.06	35.35	43.50	-8.15
230.22000	QP	V	12.35	24.18	36.53	46.00	-9.47
638.52000	QP	V	21.42	19.83	41.25	46.00	-4.75
790.28000	QP	V	24.01	15.56	39.57	46.00	-6.43
247.52000	QP	H	12.86	28.26	41.12	46.00	-4.88
285.35000	QP	H	14.07	25.35	39.42	46.00	-6.58
299.38000	QP	H	14.39	20.98	35.37	46.00	-10.63
350.48000	QP	H	15.63	21.21	36.84	46.00	-9.16
729.32000	QP	H	22.56	14.46	37.02	46.00	-8.98
880.79000	QP	H	24.47	11.81	36.28	46.00	-9.72

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 57 of 70

EUT : WAB102
Test Condition : Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
46.66000	QP	V	12.94	21.29	34.23	40.00	-5.77
124.07000	QP	V	12.89	23.61	36.50	43.50	-7.00
200.81000	QP	V	11.53	19.26	30.79	43.50	-12.71
247.58000	QP	V	12.86	22.10	34.96	46.00	-11.04
650.23000	QP	V	21.49	17.50	38.99	46.00	-7.01
799.80000	QP	V	24.01	13.69	37.70	46.00	-8.30
247.47000	QP	H	12.86	26.10	38.96	46.00	-7.04
285.96000	QP	H	14.07	25.93	40.00	46.00	-6.00
352.28000	QP	H	15.63	21.35	36.98	46.00	-9.02
636.59000	QP	H	21.42	17.78	39.20	46.00	-6.80
717.20000	QP	H	22.77	13.73	36.50	46.00	-9.50
877.95000	QP	H	24.23	11.22	35.45	46.00	-10.55

Remark:

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



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 58 of 70

EUT : WAB102

Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
46.58000	QP	V	12.94	20.58	33.52	40.00	-6.48
55.63000	QP	V	12.91	19.89	32.80	40.00	-7.20
124.08000	QP	V	12.89	24.36	37.25	43.50	-6.25
638.68000	QP	V	21.42	18.03	39.45	46.00	-6.55
719.10000	QP	V	22.77	14.20	36.97	46.00	-9.03
769.58000	QP	V	23.58	14.70	38.28	46.00	-7.72
45.20000	QP	H	12.97	13.31	26.28	40.00	-13.72
150.25000	QP	H	14.76	19.20	33.96	43.50	-9.54
247.09000	QP	H	12.86	23.88	36.74	46.00	-9.26
350.70000	QP	H	15.63	21.37	37.00	46.00	-9.00
758.96000	QP	H	23.43	13.44	36.87	46.00	-9.13
880.96000	QP	H	24.47	12.96	37.43	46.00	-8.57

Remark:

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



16.4.2 Measurement results: frequency above 1GHz

The radiated spurious emissions at

Frequency(MHz)	Margin
2037.95	-2.01

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

EUT : WAB102

Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2037.95	PK	V	0	31.99	26.94	58.93	74	-15.07
2037.95	AV	V	0	31.99	20	51.99	54	-2.01
4076.1	PK	V	28.02	38.94	42.84	53.76	74	-20.24
4076.1	AV	V	28.02	38.94	30.51	41.43	54	-12.57
6113.79	PK	V	28.02	41.72	41.93	55.63	74	-18.37
6113.79	AV	V	28.02	41.72	28.91	42.61	54	-11.39
8151.86	PK	V	28.02	45.75	-	-	74	-
8151.86	AV	V	28.02	45.75	-	-	54	-
4823.98	PK	V	28.02	38.7	40.12	50.8	74	-23.2
4823.98	AV	V	28.02	38.7	28.22	38.9	54	-15.1
7236.54	PK	V	28.02	43.86	40.38	56.22	74	-17.78
7236.54	AV	V	28.02	43.86	29.94	45.78	54	-8.22
9648	PK	V	28.02	46.9	42.78	61.66	74	-12.34
9648	AV	V	28.02	46.9	31.28	50.16	54	-3.84
12060.2	PK	V	28.02	48.97	38.64	59.59	74	-14.41
12060.2	AV	V	28.02	48.97	29.51	50.46	54	-3.54
14472	PK	V	28.02	52.05	-	-	74	-
14472	AV	V	28.02	52.05	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 60 of 70

EUT : WAB102

Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2037.95	PK	H	0	31.99	23.65	55.64	74	-18.36
2037.95	AV	H	0	31.99	13.49	45.48	54	-8.52
4076.1	PK	H	28.02	38.94	40.95	51.87	74	-22.13
4076.1	AV	H	28.02	38.94	29.88	40.8	54	-13.2
6113.79	PK	H	28.02	41.72	40.88	54.58	74	-19.42
6113.79	AV	H	28.02	41.72	29.52	43.22	54	-10.78
8151.86	PK	H	28.02	45.75	-	-	74	-
8151.86	AV	H	28.02	45.75	-	-	54	-
4824	PK	H	28.02	38.7	40.73	51.41	74	-22.59
4824	AV	H	28.02	38.7	28.81	39.49	54	-14.51
7236	PK	H	28.02	43.86	41.74	57.58	74	-16.42
7236	AV	H	28.02	43.86	30.41	46.25	54	-7.75
9648	PK	H	28.02	46.9	43.02	61.9	74	-12.1
9648	AV	H	28.02	46.9	31.65	50.53	54	-3.47
12060.2	PK	H	28.02	48.97	-	-	74	-
12060.2	AV	H	28.02	48.97	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 61 of 70

EUT : WAB102

Test Condition : Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2062.96	PK	V	0	31.99	23.97	55.96	74	-18.04
2062.96	AV	V	0	31.99	12.96	44.95	54	-9.05
4125.5	PK	V	28.02	38.94	37.97	48.89	74	-25.11
4125.5	AV	V	28.02	38.94	28.3	39.22	54	-14.78
6188.25	PK	V	28.02	41.72	40.84	54.54	74	-19.46
6188.25	AV	V	28.02	41.72	29.34	43.04	54	-10.96
8251	PK	V	28.02	45.92	-	-	74	-
8251	AV	V	28.02	45.92	-	-	54	-
4873.82	PK	V	28.02	38.7	39.97	50.65	74	-23.35
4873.82	AV	V	28.02	38.7	28.84	39.52	54	-14.48
7311	PK	V	28.02	43.86	40.64	56.48	74	-17.52
7311	AV	V	28.02	43.86	30.84	46.68	54	-7.32
9748	PK	V	28.02	46.9	43.86	62.74	74	-11.26
9748	AV	V	28.02	46.9	31.5	50.38	54	-3.62
12185	PK	V	28.02	48.97	-	-	74	-
12185	AV	V	28.02	48.97	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 62 of 70

EUT : WAB102

Test Condition : Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2062.95	PK	H	0	31.99	24.54	56.53	74	-17.47
2062.95	AV	H	0	31.99	13.38	45.37	54	-8.63
4125.5	PK	H	28.02	38.94	39.35	50.27	74	-23.73
4125.5	AV	H	28.02	38.94	28.44	39.36	54	-14.64
6188.25	PK	H	28.02	41.72	40.18	53.88	74	-20.12
6188.25	AV	H	28.02	41.72	29.37	43.07	54	-10.93
8251	PK	H	28.02	45.92	-	-	74	-
8251	AV	H	28.02	45.92	-	-	54	-
4874	PK	H	28.02	38.7	39.42	50.1	74	-23.9
4874	AV	H	28.02	38.7	28.89	39.57	54	-14.43
7311	PK	H	28.02	43.86	42.18	58.02	74	-15.98
7311	AV	H	28.02	43.86	30.87	46.71	54	-7.29
9748	PK	H	28.02	46.9	42.51	61.39	74	-12.61
9748	AV	H	28.02	46.9	31.44	50.32	54	-3.68
12185	PK	H	28.02	48.97	-	-	74	-
12185	AV	H	28.02	48.97	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 63 of 70

EUT : WAB102

Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2087.92	PK	V	0	31.99	25.11	57.1	74	-16.9
2087.92	AV	V	0	31.99	14.45	46.44	54	-7.56
4175.89	PK	V	28.02	38.94	41.06	51.98	74	-22.02
4175.89	AV	V	28.02	38.94	29.59	40.51	54	-13.49
6263.25	PK	V	28.02	41.88	40.14	54	74	-20
6263.25	AV	V	28.02	41.88	29.79	43.65	54	-10.35
8351	PK	V	28.02	45.92	-	-	74	-
8351	AV	V	28.02	45.92	-	-	54	-
4924	PK	V	28.02	38.7	41.99	52.67	74	-21.33
4924	AV	V	28.02	38.7	29.56	40.24	54	-13.76
7386	PK	V	28.02	43.86	42.53	58.37	74	-15.63
7386	AV	V	28.02	43.86	30.5	46.34	54	-7.66
9848	PK	V	28.02	46.88	42.63	61.49	74	-12.51
9848	AV	V	28.02	46.88	31.57	50.43	54	-3.57
12310	PK	V	28.02	49.12	-	-	74	-
12310	AV	V	28.02	49.12	-	-	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

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 64 of 70

EUT : WAB102

Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Reading (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2087.982	PK	H	0	31.99	23.95	55.94	74	-18.06
2087.982	AV	H	0	31.99	13.26	45.25	54	-8.75
4176.03	PK	H	28.02	38.94	39.94	50.86	74	-23.14
4176.03	AV	H	28.02	38.94	29.89	40.81	54	-13.19
6263.25	PK	H	28.02	41.88	39.56	53.42	74	-20.58
6263.25	AV	H	28.02	41.88	29.71	43.57	54	-10.43
8351	PK	H	28.02	45.92	-	-	74	-
8351	AV	H	28.02	45.92	-	-	54	-
4924	PK	H	28.02	38.7	40.66	51.34	74	-22.66
4924	AV	H	28.02	38.7	28.7	39.38	54	-14.62
7386	PK	H	28.02	43.86	41.9	57.74	74	-16.26
7386	AV	H	28.02	43.86	30.14	45.98	54	-8.02
9848	PK	H	28.02	46.88	42.64	61.5	74	-12.5
9848	AV	H	28.02	46.88	31.77	50.63	54	-3.37
12310	PK	H	28.02	49.12	-	-	74	-
12310	AV	H	28.02	49.12	-	-	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.



17. Power Spectrum Density test

17.1 Operating environment

Temperature: 25 °C
Relative Humidity: 59 %

17.2 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 30kHz, a span of 1.5 MHz, and the sweep time set at 500 seconds. Power Density was read directly and cable loss (1dB)/external attenuator (3dB) 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 (15.247).pdf”

17.3 Measured data of Power Spectrum Density test results

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2413.647	-7.20	8
Middle	2437.789	-6.69	8
High	2459.999	-8.20	8



18. 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.

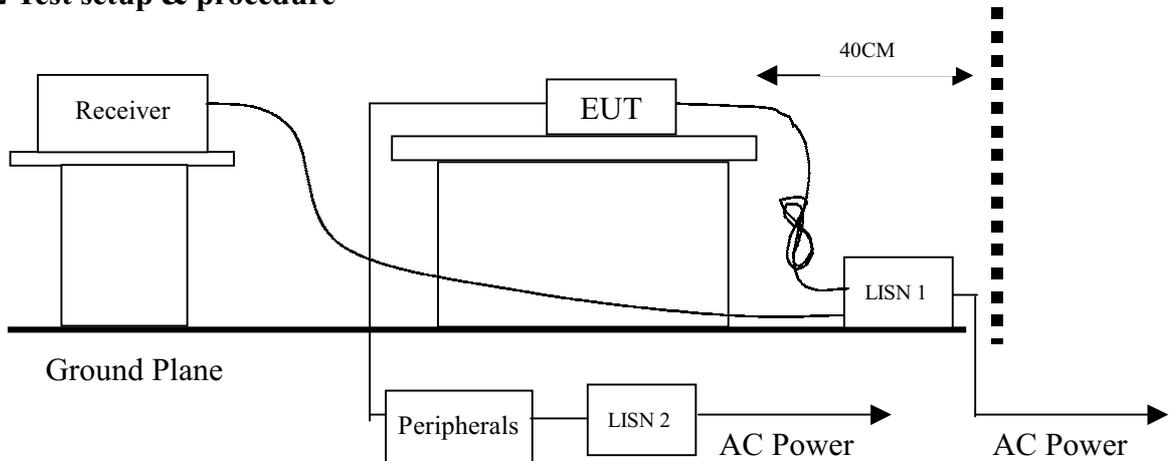
See band-edge plot as file name “Band-edge plot (15.247).pdf”.

19. Power Line Conducted Emission test §FCC 15.207

19.1 Operating environment

Temperature: 22 °C
 Relative Humidity: 59 %

19.2 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 bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

See Power Line Conducted Emission plot as file name “Power Line Conducted Emission plot (15.247).pdf”.

Emission Limit

FCC Part 15 Paragraph 15.207		
Freq. (MHz)	Maximum RF Line Voltage	
	uV	dBuV
0.45 - 30	250	48.0



19.3 Power Line Conducted Emission test data

EUT : WAB102

Test Condition : Tx at low channel

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.50600	27.5	48.00	-20.50
LINE	1.58600	23.9	48.00	-24.10
LINE	1.90600	25.7	48.00	-22.30
LINE	2.81000	30.1	48.00	-17.90
LINE	2.88200	28.7	48.00	-19.30
LINE	11.74600	27.7	48.00	-20.30
NEUTRAL	0.50600	28.7	48.00	-19.30
NEUTRAL	1.58600	26.8	48.00	-21.20
NEUTRAL	4.12200	27.6	48.00	-20.40
NEUTRAL	5.07400	23.5	48.00	-24.50
NEUTRAL	6.34600	24.6	48.00	-23.40
NEUTRAL	11.25000	26.7	48.00	-21.30

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 69 of 70

EUT : WAB102
Test Condition : Tx at middle channel

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.50600	27.1	48.00	-20.90
LINE	0.86600	25.2	48.00	-22.80
LINE	2.81000	29.5	48.00	-18.50
LINE	2.88200	28.8	48.00	-19.20
LINE	4.13800	26.8	48.00	-21.20
LINE	14.33000	28.6	48.00	-19.40
NEUTRAL	0.57800	24.6	48.00	-23.40
NEUTRAL	2.73800	25.9	48.00	-22.10
NEUTRAL	2.81000	26.0	48.00	-22.00
NEUTRAL	2.95400	25.1	48.00	-22.90
NEUTRAL	11.59400	27.9	48.00	-20.10
NEUTRAL	18.97400	15.1	48.00	-32.90

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.



Intertek Testing Services

ETL SEMKO

FCC ID. : PY3WAB102

Report No.: EME-021017

Page 70 of 70

EUT : WAB102
Test Condition : Tx at high channel

Power Line (circle)	Freq. (MHz)	Reading (dB μ V) QP	Limit (dB μ V) QP	Margin (dB) QP
LINE	0.50600	26.0	48.00	-22.00
LINE	0.65000	24.8	48.00	-23.20
LINE	2.80200	27.7	48.00	-20.30
LINE	2.87400	30.2	48.00	-17.80
LINE	6.38600	15.6	48.00	-32.40
LINE	12.22600	28.8	48.00	-19.20
NEUTRAL	0.50600	21.3	48.00	-26.70
NEUTRAL	2.73800	23.7	48.00	-24.30
NEUTRAL	2.81000	24.2	48.00	-23.80
NEUTRAL	2.87400	27.5	48.00	-20.50
NEUTRAL	11.80200	31.6	48.00	-16.40
NEUTRAL	19.13800	23.6	48.00	-24.40

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.