



EMC TEST REPORT

Report No. : EME-030419
Model No. : HTKWLAN01
Issued Date : April 10, 2003

Applicant : HIGH-TEK HARNESS ENTERPRISE CO., LTD.
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Test By : Intertek Testing Services Taiwan Ltd.
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Project Engineer

Jerry Liu

Reviewed By

Elton Chen



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Summary of Tests

802.11b MiniPCI WLAN Card-Model: HTKWLAN01

FCC ID: Q2EWLAN01

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



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1. General information

1.1 Identification of the EUT

Applicant	: HIGH-TEK HARNESS ENTERPRISE CO., LTD.
Product	: 802.11b MiniPCI WLAN Card
Model No.	: HTKWLAN01
FCC ID.	: Q2EWLAN01
Frequency Range	: 2412MHz~2462MHz
Channel Number	: 11
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: CCK (11Mbps, 5.5Mbps), DQPSK (2Mbps), DBPSK (1Mbps)
Rated Power	: DC 3.3V
Power Cord	: N/A
Test Voltage	: 3.3Vdc from PC
Sample Received	: April 1, 2003
Test Date(s)	: April 1, 2003 to April 3, 2003

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The HTKWLAN01 Wireless Local Area Network (WLAN) MINIPCI Card enables high- speed access without wires to network assets. This WLAN card uses the IEEE 802.11b protocol to enable communications between the host and the other computers, using the 2.4GHz ISM Radio Band for the communications medium. It supports the IEEE 802.11b network specification for Direct Sequence Spread Spectrum (DSSS) signaling, providing data rates of 1, 2, 5.5, 11Mbps.

The EUT meets special requirements for full modular approval on FCC Public Notice DA 00-1407 and the device is only for OEM integrator, please refer the test result in this report.

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



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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 : 0dBi

Antenna Type : PIFA

Connector Type : Emboss tape(MHF)

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
PC	Acer	N/A	N/A	N/A
Key Board	HP	C4734-60323	MR80700043	FCC DoC Approved
Monitor	HP	D2827A	KR91050275	ARSCM560S
Mouse	Logitech	850693-0001	LAZ82706831	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved

The PC is provided by client.



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

Settle the EUT into PC via a MiniPCI to PCI interface extended Card. Run the test program “PRISM test Utility”, provided by manufacturer. The main functions of the test program are ① mode transfer ② channel control ③ output power control.

The EUT was transmitted continuously during all the test.



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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: 25 °C
Relative Humidity: 60 %
Atmospheric Pressure 1020 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

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
Low	2412	6.80	> 500kHz
Middle	2437	6.84	> 500kHz
High	2462	6.84	> 500kHz



4. Maximum Output Power test

4.1 Operating environment

Temperature: 22 °C
Relative Humidity: 60 %
Atmospheric Pressure 1020 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 (0.7dB) 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

Channel	Frequency (MHz)	C.B.L. (dB)	Reading (dBm)	Power Output		Limit (W)
				(dBm)	(mW)	
Lowest	2412	0.7	14.10	14.80	30.20	1
Middle	2437	0.7	14.19	14.89	30.83	1
Highest	2462	0.7	13.78	14.48	28.05	1

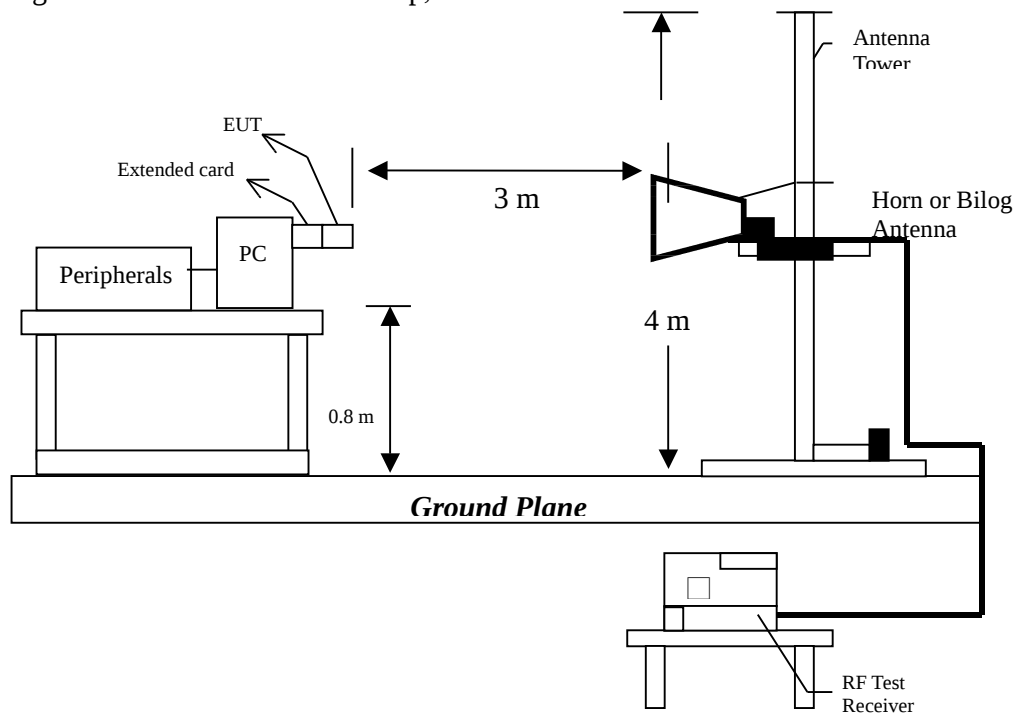
5. Radiated Emission test

5.1 Operating environment

Temperature: 23 °C
 Relative Humidity: 55 %
 Atmospheric Pressure 1020 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 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

The radiated spurious emissions at

Frequency (MHz)	Margin	Frequency (MHz)	Margin
133.1	-3.9486	668.20	-4.09
143.9	-2.3041	143.90	-2.80
240.10	-2.72	400.80	-1.09

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

EUT : HTKWLAN01
Test Condition : 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)
133.1	PK	V	12.75144	26.8	39.55144	43.5	-3.9486
143.9	PK	V	12.89586	28.3	41.19586	43.5	-2.3041
233.6	PK	V	12.83904	25.7	38.53904	46	-7.461
240.10	PK	V	12.98	30.30	43.28	46.00	-2.72
399.40	PK	V	17.70	16.10	33.80	46.00	-12.20
668.20	PK	V	22.01	19.90	41.91	46.00	-4.09
133.10	PK	H	12.75	25.30	38.05	43.50	-5.45
143.90	PK	H	12.90	27.80	40.70	43.50	-2.80
233.00	PK	H	12.83	25.00	37.83	46.00	-8.17
240.10	PK	H	12.98	24.60	37.58	46.00	-8.42
400.80	PK	H	17.71	27.20	44.91	46.00	-1.09
668.20	PK	H	22.01	15.90	37.91	46.00	-8.09

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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The radiated spurious emissions at

Frequency (MHz)	Margin
400.80	-4.49
666.80	-4.11
903.40	-2.67

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

EUT : HTKWLAN01
Test Condition : 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)
133.1	PK	V	12.75144	23.9	36.6514	43.5	-6.8486
139.6	PK	V	12.89704	22.2	35.097	43.5	-8.403
143.9	PK	V	12.89586	24.9	37.7959	43.5	-5.7041
240.10	PK	V	12.98	26.60	39.58	46.00	-6.42
400.80	PK	V	17.71	23.80	41.51	46.00	-4.49
666.80	PK	V	21.99	19.90	41.89	46.00	-4.11
133.70	PK	H	12.76	22.70	35.46	43.50	-8.04
143.90	PK	H	12.90	23.00	35.90	43.50	-7.60
233.60	PK	H	12.84	25.00	37.84	46.00	-8.16
399.40	PK	H	17.70	21.60	39.30	46.00	-6.70
666.80	PK	H	21.99	17.20	39.19	46.00	-6.81
903.40	PK	H	26.03	17.30	43.33	46.00	-2.67

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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The radiated spurious emissions at

Frequency (MHz)	Margin	Frequency (MHz)	Margin
143.9	-4.6041	400.80	-2.39
240.1	-1.6212	399.40	-1.50

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

EUT : HTKWLAN01
Test Condition : 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)
133.7	PK	V	12.76488	25.5	38.2649	43.5	-5.2351
143.9	PK	V	12.89586	26	38.8959	43.5	-4.6041
240.1	PK	V	12.97884	31.4	44.3788	46	-1.6212
400.80	PK	V	17.71	25.90	43.61	46.00	-2.39
666.80	PK	V	21.99	17.60	39.59	46.00	-6.41
876.80	PK	V	25.02	15.50	40.52	46.00	-5.48
133.70	PK	H	12.76	20.60	33.36	43.50	-10.14
143.90	PK	H	12.90	22.80	35.70	43.50	-7.80
240.10	PK	H	12.98	27.00	39.98	46.00	-6.02
375.60	PK	H	16.58	21.70	38.28	46.00	-7.72
399.40	PK	H	17.70	26.80	44.50	46.00	-1.50
668.20	PK	H	22.01	16.50	38.51	46.00	-7.49

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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5.4.2 Measurement results: frequency above 1GHz

The radiated spurious emissions at

Frequency (MHz)	Margin
2038	-1.17

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

EUT : HTKWLAN01

Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamplifier (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2038	PK	V	33.74	29.36	58.71	54.33	74	-19.67
2038	AV	V	33.74	29.36	57.21	52.83	54	-1.17
4076	PK	V	31.88	34.59	41.33	44.04	74	-29.96
4076	AV	V	31.88	34.59	29.57	32.28	54	-21.72
6114	PK	V	33.42	37.74	47.71	52.03	74	-21.97
6114	AV	V	33.42	37.74	40.4	44.72	54	-9.28
8152	PK	V	34.92	40.05	48.87	54	74	-20
8152	AV	V	34.92	40.05	38.52	43.65	54	-10.35
10190	PK	V	36.03	41.99	45.54	51.5	74	-22.5
10190	AV	V	36.03	41.99	35.08	41.04	54	-12.96
12228	PK	V	35.315	43.75	-	-	74	-
12228	AV	V	35.315	43.75	-	-	54	-
4824	PK	V	32.496	35.47	-	-	74	-
4824	AV	V	32.496	35.47	-	-	54	-
7236	PK	V	34.32	38.42	45.33	49.43	74	-24.57
7236	AV	V	34.32	38.42	33.42	37.52	54	-16.48
9648	PK	V	35.808	41.35	-	-	74	-
9648	AV	V	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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The radiated spurious emissions at

Frequency (MHz)	Margin
2038	-4.55

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

EUT : HTKWLAN01

Test Condition : 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)
2038	PK	H	33.74	29.36	56.07	51.69	74	-22.31
2038	AV	H	33.74	29.36	53.83	49.45	54	-4.55
4076	PK	H	31.88	34.59	42.67	45.38	74	-28.62
4076	AV	H	31.88	34.59	32.74	35.45	54	-18.55
6114	PK	H	33.42	37.74	44.09	48.41	74	-25.59
6114	AV	H	33.42	37.74	34.6	38.92	54	-15.08
8152	PK	H	34.92	40.05	45.51	50.64	74	-23.36
8152	AV	H	34.92	40.05	35.55	40.68	54	-13.32
10190	PK	H	36.03	41.99	45.41	51.37	74	-22.63
10190	AV	H	36.03	41.99	35.3	41.26	54	-12.74
12228	PK	H	35.315	43.75	-	-	74	-
12228	AV	H	35.315	43.75	-	-	54	-
4824	PK	H	32.496	35.47	-	-	74	-
4824	AV	H	32.496	35.47	-	-	54	-
7236	PK	H	34.32	38.42	44.31	48.41	74	-25.59
7236	AV	H	34.32	38.42	32.37	36.47	54	-17.53
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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The radiated spurious emissions at

Frequency (MHz)	Margin
2063	-1.37

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

EUT : HTKWLAN01

Test Condition : Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamplifier (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2063	PK	V	33.74	29.36	58.58	54.2	74	-19.8
2063	AV	V	33.74	29.36	57.01	52.63	54	-1.37
4126	PK	V	31.88	34.59	42.02	44.73	74	-29.27
4126	AV	V	31.88	34.59	30.91	33.62	54	-20.38
6189	PK	V	33.42	37.74	47.8	52.12	74	-21.88
6189	AV	V	33.42	37.74	42.76	47.08	54	-6.92
8252	PK	V	35.031	39.97	46.32	51.259	74	-22.741
8252	AV	V	35.031	39.97	39.03	43.969	54	-10.031
10315	PK	V	35.967	42.06	46.78	52.873	74	-21.127
10315	AV	V	35.967	42.06	35.78	41.873	54	-12.127
12378	PK	V	35.315	43.75	-	-	74	-
12378	AV	V	35.315	43.75	-	-	54	-
4874	PK	V	32.496	35.47	47.09	50.064	74	-23.936
4874	AV	V	32.496	35.47	33.73	36.704	54	-17.296
7311	PK	V	34.32	38.42	44.66	48.76	74	-25.24
7311	AV	V	34.32	38.42	33.05	37.15	54	-16.85
9748	PK	V	35.808	41.35	-	-	74	-
9748	AV	V	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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The radiated spurious emissions at

Frequency (MHz)	Margin
2063	-1.32

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

EUT : HTKWLAN01

Test Condition : 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)
2063	PK	H	33.74	29.36	58.54	54.16	74	-19.84
2063	AV	H	33.74	29.36	57.06	52.68	54	-1.32
4126	PK	H	31.88	34.59	43.82	46.53	74	-27.47
4126	AV	H	31.88	34.59	32.7	35.41	54	-18.59
6189	PK	H	33.42	37.74	44.09	48.41	74	-25.59
6189	AV	H	33.42	37.74	34.84	39.16	54	-14.84
8252	PK	H	35.031	39.97	45.61	50.549	74	-23.451
8252	AV	H	35.031	39.97	34.74	39.679	54	-14.321
10315	PK	H	35.967	42.06	46.37	52.463	74	-21.537
10315	AV	H	35.967	42.06	33.36	39.453	54	-14.547
12378	PK	H	35.315	43.75	-	-	74	-
12378	AV	H	35.315	43.75	-	-	54	-
4874	PK	H	32.496	35.47	-	-	74	-
4874	AV	H	32.496	35.47	-	-	54	-
7311	PK	H	34.32	38.42	45.18	49.28	74	-24.72
7311	AV	H	34.32	38.42	32.4	36.5	54	-17.5
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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The radiated spurious emissions at

Frequency (MHz)	Margin
2088	-1.97

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

EUT : HTKWLAN01

Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamplifier (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2088	PK	V	33.74	29.36	58.28	53.9	74	-20.1
2088	AV	V	33.74	29.36	56.41	52.03	54	-1.97
4176	PK	V	31.88	34.59	45.51	48.22	74	-25.78
4176	AV	V	31.88	34.59	34.79	37.5	54	-16.5
6264	PK	V	33.57	37.74	49.05	53.22	74	-20.78
6264	AV	V	33.57	37.74	43.26	47.43	54	-6.57
8352	PK	V	35.031	39.97	47.72	52.659	74	-21.341
8352	AV	V	35.031	39.97	37.47	42.409	54	-11.591
10440	PK	V	35.904	42.21	46.13	52.436	74	-21.564
10440	AV	V	35.904	42.21	36.32	42.626	54	-11.374
12528	PK	V	35.23	42.9	-	-	74	-
12528	AV	V	35.23	42.9	-	-	54	-
4924	PK	V	32.496	35.47	43.02	45.994	74	-28.006
4924	AV	V	32.496	35.47	32.11	35.084	54	-18.916
7386	PK	V	34.32	38.42	43.54	47.64	74	-26.36
7386	AV	V	34.32	38.42	31.44	35.54	54	-18.46
9848	PK	V	35.919	41.55	-	-	74	-
9848	AV	V	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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The radiated spurious emissions at

Frequency (MHz)	Margin
2088	-3.53

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

EUT : HTKWLAN01

Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamplifier (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)
2088	PK	H	33.74	29.36	57	52.62	74	-21.38
2088	AV	H	33.74	29.36	54.85	50.47	54	-3.53
4176	PK	H	31.88	34.59	43.29	46	74	-28
4176	AV	H	31.88	34.59	31.43	34.14	54	-19.86
6264	PK	H	33.57	37.74	45.89	50.06	74	-23.94
6264	AV	H	33.57	37.74	37.86	42.03	54	-11.97
8352	PK	H	35.031	39.97	44.46	49.399	74	-24.601
8352	AV	H	35.031	39.97	33.6	38.539	54	-15.461
10440	PK	H	35.904	42.21	46.16	52.466	74	-21.534
10440	AV	H	35.904	42.21	36.35	42.656	54	-11.344
12528	PK	H	35.23	42.9	-	-	74	-
12528	AV	H	35.23	42.9	-	-	54	-
4924	PK	H	32.496	35.47	-	-	74	-
4924	AV	H	32.496	35.47	-	-	54	-
7386	PK	H	34.32	38.42	42.65	46.75	74	-27.25
7386	AV	H	34.32	38.42	32.13	36.23	54	-17.77
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: 23 °C
Relative Humidity: 55 %
Atmospheric Pressure 1020 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 (0.7dB) 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

Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
Low	2410.412	-12.19	8
Middle	2435.412	-12.04	8
High	2460.412	-12.57	8



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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”.

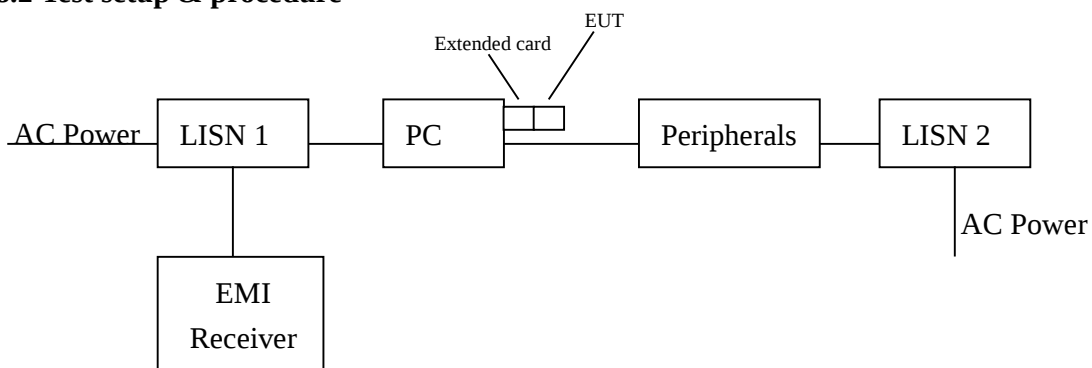


8. Power Line Conducted Emission test §FCC 15.207

8.1 Operating environment

Temperature: 25 °C
Relative Humidity: 60 %
Atmospheric Pressure 1020 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 measured 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.



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8.3 Power Line Conducted Emission test data

(1) Line

EUT : HTKWLAN01
Test Condition : 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	50.60	63.37	51.20	53.37	-12.77	-2.17
0.31000	36.40	59.97	36.90	49.97	-23.57	-13.07
0.61400	38.00	56.00	36.80	46.00	-18.00	-9.20
4.07800	31.50	56.00	30.00	46.00	-24.50	-16.00
5.15800	33.20	60.00	33.00	50.00	-26.80	-17.00
6.61400	41.20	60.00	40.30	50.00	-18.80	-9.70

(2) Neutral

EUT : HTKWLAN01
Test Condition : 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	45.70	63.37	46.30	53.37	-17.67	-7.07
0.30200	30.70	60.19	30.50	50.19	-29.49	-19.69
0.61400	38.70	56.00	37.20	46.00	-17.30	-8.80
0.71000	26.00	56.00	24.50	46.00	-30.00	-21.50
4.07800	32.40	56.00	30.20	46.00	-23.60	-15.80
6.56600	41.00	60.00	38.30	50.00	-19.00	-11.70

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.



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(1) Line

EUT : HTKWLAN01
Test Condition : 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
0.20600	50.30	63.37	50.90	53.37	-13.07	-2.47
0.31000	35.70	59.97	36.10	49.97	-24.27	-13.87
0.61400	38.00	56.00	36.70	46.00	-18.00	-9.30
4.12600	32.00	56.00	30.50	46.00	-24.00	-15.50
5.11000	33.10	60.00	32.50	50.00	-26.90	-17.50
6.56600	40.40	60.00	38.20	50.00	-19.60	-11.80

(2) Neutral

EUT : HTKWLAN01
Test Condition : 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
0.20600	46.20	63.37	46.80	53.37	-17.17	-6.57
0.30200	30.30	60.19	30.30	50.19	-29.89	-19.89
0.61400	39.30	56.00	37.80	46.00	-16.70	-8.20
0.71800	27.20	56.00	25.80	46.00	-28.80	-20.20
4.07800	31.50	56.00	30.30	46.00	-24.50	-15.70
6.56600	40.70	60.00	38.30	50.00	-19.30	-11.70

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.



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(1) Line

EUT : HTKWLAN01

Test Condition : 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
0.20600	50.70	63.37	51.30	53.37	-12.67	-2.07
0.31000	36.90	59.97	37.30	49.97	-23.07	-12.67
0.61400	38.00	56.00	36.80	46.00	-18.00	-9.20
4.12600	31.70	56.00	30.20	46.00	-24.30	-15.80
5.91000	35.90	60.00	35.60	50.00	-24.10	-14.40
6.61400	41.10	60.00	40.30	50.00	-18.90	-9.70

(2) Neutral

EUT : HTKWLAN01

Test Condition : 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
0.20600	47.40	63.37	48.00	53.37	-15.97	-5.37
0.31000	33.30	59.97	33.40	49.97	-26.67	-16.57
0.61400	39.40	56.00	38.00	46.00	-16.60	-8.00
0.71800	29.60	56.00	28.50	46.00	-26.40	-17.50
4.07800	31.50	56.00	30.00	46.00	-24.50	-16.00
6.61400	41.20	60.00	40.40	50.00	-18.80	-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.