

Dust Networks

ADDENDUM TO TEST REPORT ETS07-043B

2.4 GHZ WIRELESS MOTE, M2140 & M2040

Tested To The Following Standards:

ETSI EN 301 489-17 V2.1.1 (2009-05)
Radiated Immunity Only

Report No.: ETS07-043B1

Date of issue: September 1, 2010



TESTING
CERT #803.01, 803.02,
803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Dust Networks
30695 Huntwood Avenue
Hayward, CA 94544

Representative: Gordon Charles
Customer Reference Number: 4589

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 87117

July 22, 2010

July 22, 2010

Revision History

Original: To perform the testing of the 2.4 GHz Wireless Mote, M2140 & M2040 with the requirements for ETSI EN 301 489-17 V1.2.1 1 devices.

Addendum A: To include Radiated Immunity only testing of the 2.4 GHz Wireless Mote, M2140 & M2040 with the requirements for ETSI EN 301 489-17 V2.1.1 devices.

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

A handwritten signature in black ink that reads "Steve Behm".

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

SUMMARY OF RESULTS

Standard / Specification: ETSI EN 301 489-17 V2.1.1 (2009-05)

Description	Test Procedure/Method	Results
Radiated Immunity	EN 61000-4-3 (2006)	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
No modifications to the EUT were necessary during testing. Of the 2 models covered (M2140 & M2040); the M2140 only was chosen to be tested for immunity as both models contain exactly the same hardware, but the M2040 has the power amp disabled by the factory (firmware, not available to the end user).

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

EQUIPMENT UNDER TEST

The following model has been tested by CKC Laboratories: **M2140**

The manufacturer states that the following additional models are identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they meet the level of testing equivalent to the tested models.

M2040 and M2510

Models M2140 and M2040 contain exactly the same hardware, but the M2040 has the power amp disabled by the factory (firmware, not available to the end user).

EQUIPMENT UNDER TEST

2.4 GHz Wireless Mote

Manuf: Dust Networks

Model: M2140

Serial: NA

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

2.4 GHz Host Wireless Embedded Network Manager

Manuf: Dust Networks

Model: Smartmesh-XD D2511

Serial: D2511-01CE-S2C2

Laptop Computer

Manuf: Toshiba

Model: Client Pro Vxe

Serial: 211791-001

AC Adapter

Manuf: Lite-On

Model: PA329DU-2AC

Serial: F81B0448102129

Serial to USB Adapter

Manuf: Belkin

Model: FSU109

Serial: NA

ETSI EN 301 489-3 V1.4.1

This report contains EMC emissions and immunity test results under European Union (CE) requirements.

ETSI EN 301 489-17 CLAUSE 7 APPLICABILITY OVERVIEW

Phenomenon	Application	Equipment Test Requirement			Reference Subclause in ETSI EN 301 489
		Radio and ancillary equipment for fixed use (base station equipment)	Radio and ancillary equipment for vehicular use (mobile equipment)	Radio and ancillary equipment for portable use (portable equipment)	
Radiated Emission	Enclosure of ancillary equipment	Applicable for stand alone testing	Applicable for stand alone testing	Applicable for stand alone testing	EN 301 489-1 8.2
Conducted Emission	DC Power input/output port	Applicable	Applicable	Not Applicable	EN 301 489-1 8.3
Conducted Emission	AC mains input/output port	Applicable	Not Applicable	Not Applicable	EN 301 489-1 8.4
Harmonic Current Emissions	AC mains input port	Applicable	Not Applicable	Not Applicable	EN 301 489-1 8.5
Voltage Fluctuations and Flicker	AC mains input port	Applicable	Not Applicable	Not Applicable	EN 301 489-1 8.6
Conducted Emission	Telecommunication port	Applicable	Applicable	Not Applicable	EN 301 489-1 8.7
RF electromagnetic field (80 MHz to 1 000 MHz)	Enclosure	Applicable	Applicable	Applicable	EN 301 489-1 9.2
Electrostatic Discharge	Enclosure	Applicable	Applicable	Applicable	EN 301 489-1 9.3
Fast transients common mode	Signal, Telecommunication and control ports, DC and AC power ports	Applicable	Not Applicable	Not Applicable	EN 301 489-1 9.4
RF common mode 0,15 MHz to 80 MHz	Signal, Telecommunication and control ports, DC and AC power ports	Applicable	Applicable	Not Applicable	EN 301 489-1 9.5
Transients and surges	DC power input ports	Not Applicable	Applicable	Not Applicable	EN 301 489-1 9.6
Voltage dips and interruptions	AC mains power input ports	Applicable	Not Applicable	Not Applicable	EN 301 489-1 9.7
Surges, line to line and line to ground	AC mains power input ports, telecommunication ports	Applicable	Not Applicable	Not Applicable	EN 301 489-1 9.8

Immunity

Equipment Setup: The EUT is an 802.15.4, 2.4GHz radio for low power wireless networks.

The EUT is operating in normal mode (transmitting and receiving). The EUT is communicating with the remote support Manager which is connected via a serial cable to the support computer. The EUT was also tested in the standby mode. Of the 2 models covered (M2140 & M2040; the M2140 only was chosen to be tested for immunity as both models contain exactly the same hardware, but the M2040 has the power amp disabled by the factory (firmware, not available to the end user).

Monitoring: Performance Criteria in operating mode was evaluated by monitoring the support computer which is displaying the results of data sent to the EUT and received from the EUT.

Performance Criteria in standby mode was evaluated by monitoring the support spectrum analyzer, which is connected to a horn antenna, for unwanted transmissions.

Radiated Immunity

Test Notes: Immunity threat to simulate radiated electro-magnetic fields.

Test Procedure: EN 61000-4-3

Testing performed in chamber: Mariposa C

CT=Continuous [phenomena applied to] Transmitters

CR=Continuous [phenomena applied to] Receivers

Ancillary Equipment not in connection with a receiver or transmitter shall have pass/fail criteria specified by the manufacturer

Radiated Immunity Performance Criteria (ETSI EN 301 489-17 Subclause 6.3 and 6.5)

Criteria	During Test	After Test
A	<p>Operate as intended May show degradation of performance * No loss of function No unintentional transmissions</p> <p><i>For Transmitters CT</i> - tests shall be repeated in standby mode.</p> <p><i>For transceivers-CR only:</i> Under no circumstances shall the transmitter operate unintentionally during the test.</p>	<p>Operate as intended No degradation of performance * No loss of function No loss of stored data or user programmable functions</p>

*See standard for more detail.

Test Engineer: C. Kendall

Test Equipment				
Equipment	Serial	Cal Date	Cal Due	Asset
Signal Generator	2822A00551	4/5/2010	4/5/2012	01469
Amplifier	24375	10/15/2008	10/15/2010	02160
Antenna, Horn	Ampex	NCR	NCR	01689
Function Generator	259-05324	7/16/2009	7/16/2011	02219
Directional Coupler	F293606-03	7/16/2009	7/16/2011	P05303
Power Meter	2912401452	10/23/2009	10/23/2011	02259
Power Sensor	2349A41124	11/25/2008	11/25/2010	00774

NCR = No Calibration Required.

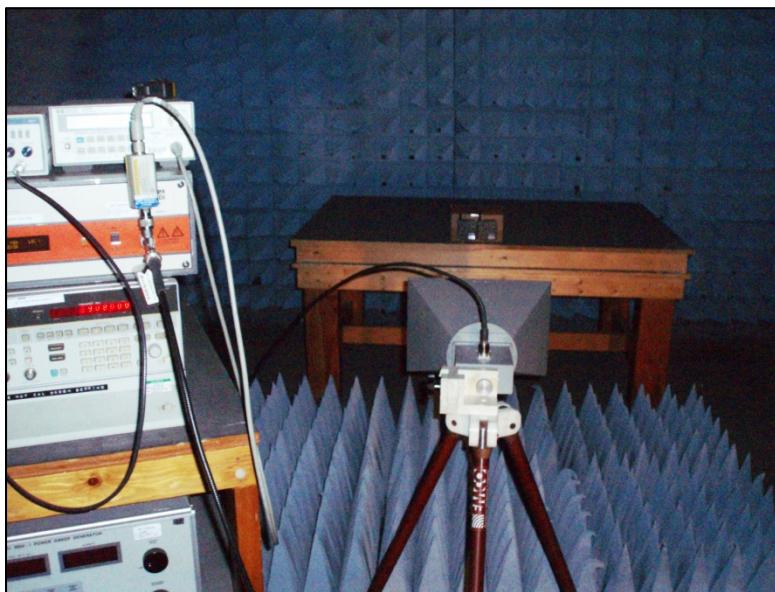
Test Data

Radiated Immunity Results Table							
Frequency Range MHz	3 V/m with 80% AM Modulation at 400 Hz	Test Distance (m)	Front V/H	Back V/H	Left Side V/H	Right Side V/H	Performance Criteria
2000-2700	80% 1kHz AM	1m	Pass	Pass	Pass	Pass	CT / CR / A

V=Vertical, H=Horizontal

Note: The EUT tested in Normal and Standby modes.

Test Setup Photos



SUPPLEMENTAL INFORMATION

Immunity Test Details

EN 61000-4-3 Field Intensity at 0.4m

Chamber (80-1000)	1V/m Testing	3V/m Testing	10V/m Testing	20V/m Testing	30V/m Testing
Fremont C1	1.0	3.1	10.2	NA	NA
Fremont C2	0.8	2.8	10.1	13.2	NA
Mariposa	0.9	2.9	10.2	NA	NA
Brea	1.1	3.2	11.8	NA	NA
Bothell C1	1.1	2.9	9.8	19.0	27.4
Bothell C2	.07	2.7	9.2	NA	NA

NA = Not applicable because these levels are not performed in this chamber.