

This report cancels and replaces RG-06-91113-4A Ed. 1

RADIO TESTS REPORT

According to standard:

FCC Part. 15 subpart C, 15.231

Equipment under test:

RF Module 434MHz
MC33493MOD434EV (Tango3)
FCC ID: RUNMC33493MOD434E

Company:

FREESCALE

Diffusion: Mr GAUTHIER

(Company: FREESCALE)

Number of pages: 10 including 1 annex

Ed.	Date	Modified page(s)	Written by		Technical verification		Quality approval	
			Name	Visa	Name	Visa	Name	Visa
2	05-Feb-07	5	David MONTAULON		Régis GONZALEZ		Olivier HEYER	

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T) : RF Module 434MHz - MC33493MOD434EV (Tango3)

Serial number : None

Part number : None

Software Version : None

MANUFACTURER'S NAME : FREESCALE

APPLICANT'S ADDRESS:

Company: FREESCALE

Address: Semiconducteurs France SAS - Centre Electronique de Toulouse
134 Avenue General Eisenhower
BP 72329
31023 TOULOUSE CEDEX 1
FRANCE

Person(s) present during the tests: Mr GAUTHIER

Responsible: Mr GAUTHIER

DATES OF TESTS : July, 4th 5th 6th 7th 10th 11th and 12th of 2006, and November, the 15th of 2006

TESTS LOCATION : Emitech Grand Sud Laboratory in Vendargues (34)
Open area test site in Salinelles (30) Registration number 8127-19

TESTS SUPERVISOR : Nobody

TESTS OPERATOR : David MONTAULON

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1. INTRODUCTION

This document submits the results of Electromagnetic Compatibility tests performed on the equipment **RF Module 434MHz - MC33493MOD434EV (Tango3)** according to the document listed below.

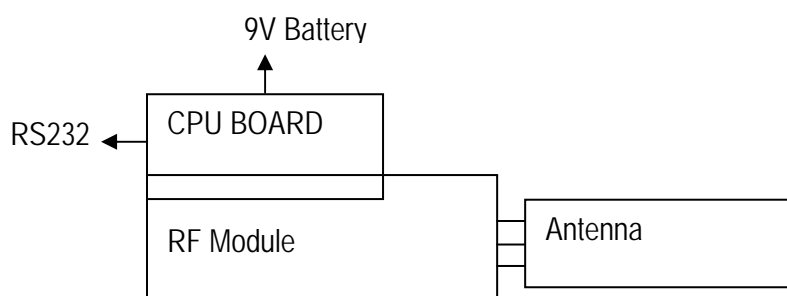
2. REFERENCE DOCUMENT

FCC Part 15 (February 2006)	Code of Federal Regulations Title 47 – Telecommunications Chapter 1 – Federal Communications Commission Part 15 – Radio frequency devices Subpart C – Intentional Radiators
ANSI C 63.4 (2003)	American National Standard for Methods of measurement of Radio-Noise from low-voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3. EQUIPMENT UNDER TEST CONFIGURATION AND DESCRIPTION

Product description:	FCC ID:	RUNMC33493MOD434E
	ITU emission code:	16K5A1DAN
	Utilization:	RF transmitter module used for customer evaluation of ISM band transceiver at lab.
	Antenna type:	Incorporated antenna
	Antenna gain:	Unknown
	Operating frequency range:	433.92 MHz
	Number of channels:	1
	Channel spacing:	-
	Frequency generation:	P.L.L. synthesizer
	Modulation:	ASK 100 % with Manchester code at 4800 bit per second
	Power source:	9 V battery
	Power level and frequency range are not user adjustable	

Cycle and operating mode during emission tests: Permanent emission



Equipment modifications applied before tests: No

4. SUMMARY OF TEST RESULTS

Tests designation or section		Results satisfying?	Comments
15.33	Frequency range of radiated measurement	-	Considered
15.35	Measurement detector functions and bandwidths	-	Considered
15.203	Antenna requirement	YES	Nota 1
15.205	Restricted bands of operation	YES	
15.207	Conducted limits	N.A.	Powered by internal batteries
15.209	Radiated emission limits, general requirements	N.A.	Transmitter only
15.231	Periodic operation in the band 40.66 40.70 MHz and above 70 MHz		
	a) Transmission requirements	YES	Nota 2
	b) Radiated emission	YES	
	c) Occupied bandwidth	YES	Nota 3
	d) Frequency tolerance	N.A.	E.U.T. does not transmit in the band 40.60 – 40.70 MHz
	e) Periodic alternate field strength measurement	N.A.	Requirements of b) are considered

N.P.: Not Performed.

N.A.: Not Applicable.

Sample submitted to the tests complies with the regulations of the standard FCC part 15 (02/2006) according to limits specified in this tests report.

Nota 1: Internal antenna without connector

Nota 2: (1) of the 15.231(a) is considered

Each time order is done by user, product sends a word. This word can't be bigger than 128 bits and transmission speed can't be lower than 2400 bits per second. Then TX time can't be longer than 54 ms between each manually operation.

Nota 3: .The bandwidth of the emission at 20 dBc is less than 20 kHz (see **Photo** in annex), less than 0.25 % of the center frequency (1084.75 kHz)

5. RADIATED ELECTRIC EMISSION

Standard: FCC Part. 15 subparts C (06), 15.231 (b)

Test method: ANSI C64-3 (03)

Resolution bandwidth and test configuration:

Frequency band	Resolution Bandwidth	Detection mode
25MHz-1GHz	120kHz	Quasi-peak
1GHz-5GHz	1MHz	Average

Measure applies on open area test site (registration number 8127-19). Test antenna is oriented in vertical and horizontal polarization. Product is rotated through 360° in the horizontal plane only. Highest levels are recorded in the worst configuration (see photo in annex). All other disturbances are very lower than limit. To ensure easiest measure conditions, E.U.T. is placed in specific permanent emission mode.

Instrumentation test List:

CATEGORY	BRAND	TYPE	N° EMITECH
Antenna	Electro-Metrics	BIA-30HF	0824
Antenna	Emco	3115	1053
Antenna	Rohde & Schwarz	HL223	3126
Cable		N-6m	3610
Cable		N-17m	3620
Open Area Test Site	Emitech	Open area test site	3482
Preamplifier	Microwave	HF	2165
Preamplifier	MINI-CIRCUITS	RF	1321
Receiver	Agilent Technologies	Agilent E7405A	2161

Results: See Boards hereafter

VERTICAL POLARIZATION: PERMANENT TRANSMITTER MODE

Frequency (MHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
434.02	0	100	69.71	80.6	C
868.07	-	-	Background Noise << 60.6 dB μ V/m		C
1301.90	60	127	60.10	60.6	C
1736.20	260	110	55.50	60.6	C

C: Compliant

N.C: Not Compliant

HORIZONTAL POLARIZATION: PERMANENT TRANSMITTER MODE

Frequency (MHz)	Azimut (degrees)	Antenna height (cm)	Measure (dB μ V/m)	Standard limit (dB μ V/m)	Comments
434.02	245	111	74.71	80.6	C
868.07	-	-	Background Noise<< 60.6 dB μ V/m		C
1301.90	60	125	60.50	60.6	C
1736.20	352	119	57.30	60.6	C

C: Compliant

N.C: Not Compliant

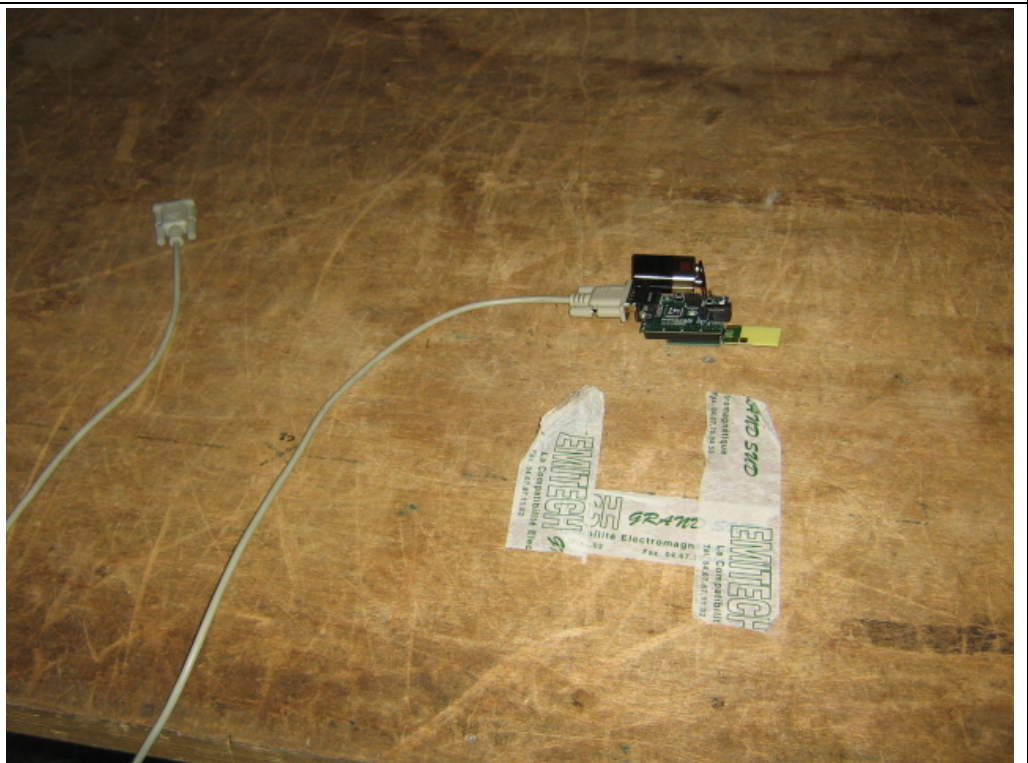
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ANNEX: PHOTOGRAPHS

Equipment Under Test (E.U.T.) Photograph(s)

RF Module 434MHz - MC33493MOD434EV (Tango3)

Radiated electric
measurement



Emission
bandwidth

