

Electromagnetic Compatibility

Test Report

For the

MOSCAD-M with internal Radio

Models F4571, F4572, F4581 and F4582

Motorola Communications Israel Ltd.

According to:

CFR 47 FCC Part 15, Subpart B, Class A

TSU EMC Lab Report: MOT 080701

July 08, 2001

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1633.01

MOSCAD-M with internal Radio

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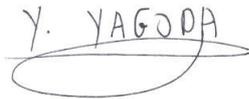
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Tests Performed By: -----

Mr. Y. Yagoda



Report Prepared By: -----

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Motorola, Project representative: -----

Mr. Rafi Brody,
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Test data:

Test commencement date: 28/06/2001
Test completion date: 28/06/2001

Test personnel:

Test technician: Yacov Yagoda
Report prepared by: Yossi Zucker

Issue date: 08.07.2001

Summary of Compliance Status

The MOSCAD-M, Supervisory Control Data Acquisition (SCADA) family F4581 and F4582 were tested according to the following test methods.

Test results are given in full in sections 3.

Test type	Application to	Reference Standard	Conformance
Radiated Emission	System	CFR 47 FCC Part 15 Subpart B,Class A	yes



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1. General

1.1. Purpose

The purpose of this report is to show compliance to Electromagnetic Emission and Immunity requirements outlined in the referenced specifications. *This report serves as the basis for the "Declaration of Conformity"*.

1.2. Referenced documents

CFR 47 FCC Part 15: Radio Frequency devices, Subpart B: Unintentional radiators Class A(1998)

1.3. Description of the EUT system

The product is a base station part of the Motorola SCADA family (Supervisory Control Data Acquisition), including the **F4571, F4572, F4581 and F4582 models**. Any of the units is a remote terminal that collects data in the field and transmits it to a center via one of numerous communication options (radio, dialup RS232 etc).

The unit is a low power product and enters sleep mode when it is idle (not performing tasks).

The user has the capability to program the unit with C application PC tool provided by Motorola.

The product is a radio accessory.

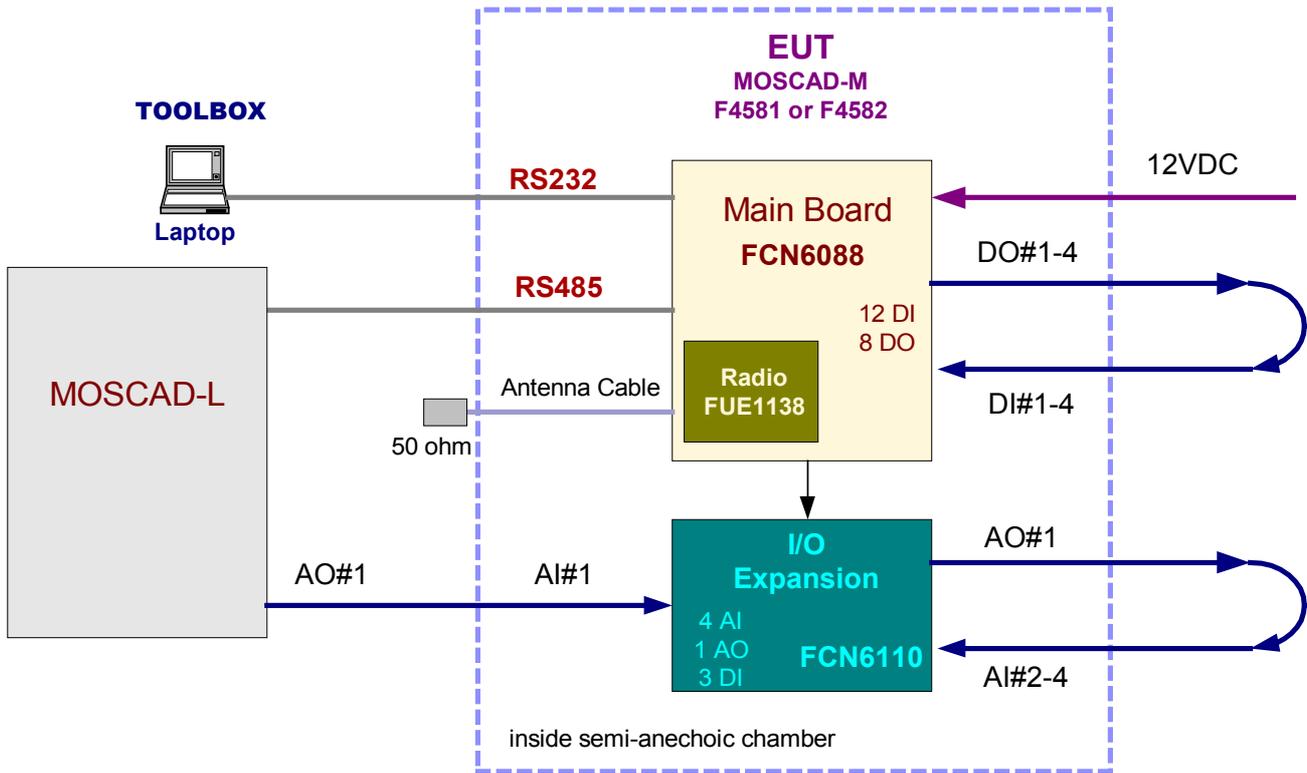
Pre-testing:

Pre-testing was performed, comparing the F4581 and F4582, MOSCAD-M devices with internal radio. By pre-testing the F4581 and F4582, the F4582 was found to be the worst case in terms of radiated emission. Since **F4571 and F4572 are the same units as F4581 and F4582 without the Expansion I/O, the F4582 is considered to be the worst case in this line of products.**

Therefore, measurements were taken for the F4582.

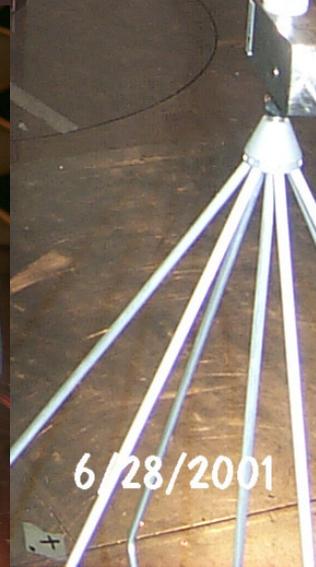
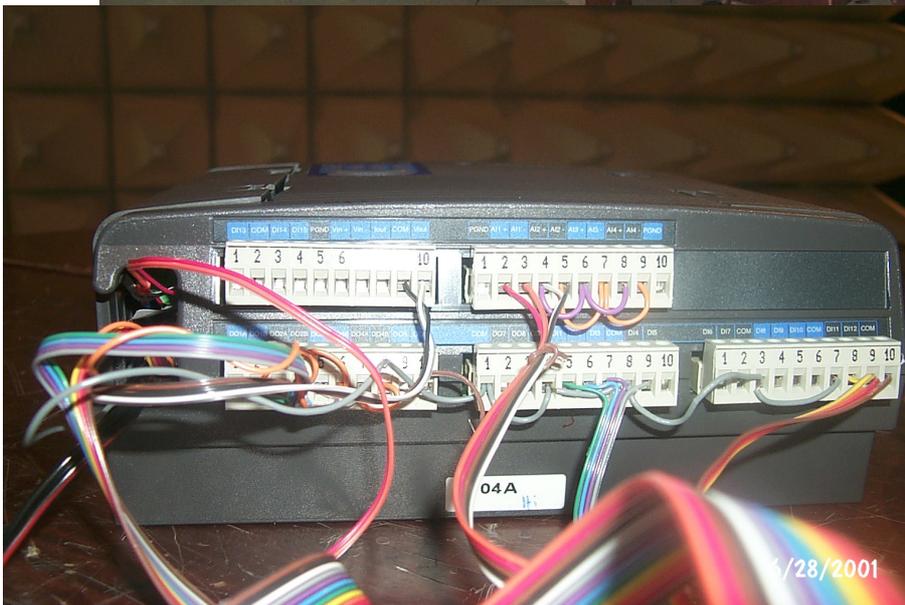
1.3.1. Configuration of EUT

“MOSCAD-M” Configuration for EMC Tests:





MOSCAD-L



2. Test Facility description

General

The tests were performed at the TSU EMC Laboratory of ECI Telecom.
 The Laboratory is part of Technical Service Unit department.
 The Lab is equipped to provide testing services for telecommunication products that will be put on the commercial market.

The Laboratory Manager is Mr. Yossi Zucker.

Address: 30 Hasivim St. Petah Tikva, Israel.
 Tel: 972-926-8443

2.1. 3m Semi-Anechoic Chamber

measurement distance	3m
Chamber dimensions	9.5m x 6.5m x 5.2m
Antenna height	1 - 4m
Shielding Effectiveness	Magnetic field $\geq 80\text{dB}$ at 15KHz $\geq 90\text{dB}$ at 100KHz Electric field $> 120\text{dB}$ from 1MHz to 1GHz $> 110\text{dB}$ from 1GHz to 10GHz
Absorbing material	Ferrite tiles on the walls and ceiling Frankonia hybrid absorbing material in selected positions on the walls
Normalized Site Attenuation measured at 5 positions	$\pm 3.49\text{dB}$, 30MHz to 1GHz
Transmission Loss measured at 5 positions, at 1.5m height	$\pm 3\text{dB}$, 1GHz to 18GHz

Note: Chamber performance was verified by Austrian Research Centers, Seibersdorf.

2.2. Uncertainty of Measurement

Test Name	Test Method & Range	Uncertainty	
		Combined std. Uc(y)	Expanded U
Radiated Emission	EN55022	[dB]	[dB]
	30MHz÷80MHz	+3.157, -2.685	+6.32, -5.37
	80MHz÷200MHz	+2.630, -2.253	+5.26, -4.51
	200MHz÷1GHz	+2.63	+5.26
Conducted Emission	EN55022	[dB]	[dB]
	9KHz÷150KHz	+1.293, -1.43	+2.59, -2.86
	150KHz÷30MHz	+1.338, -1.487	+2.675, -2.974

Note: Supporting data available in the Quality Assurance Guide.

3. Electric Field Emission measurements in the 30MHz to 1GHz frequency range

Date of Test: 28.06.2001

Relative Humidity: 43%

Ambient: Temperature: 22°C

Test Method: CFR 47 FCC Part 15 Subpart B, Class A

Limits:

Frequency [MHz]	QP Limit [dB(µV/m)]
30÷88	49.5
88÷216	54
216÷960	56.9
960÷1000	60

Test Procedure:

Measurements were performed at a 3-meter measurement distance in the semi-anechoic chamber in order to evaluate the radiated electromagnetic interference characteristics of the EUT. The EUT was placed on a non-metallic table, 0.8m above the turn-table and operated in Rx mode only. A broadband antenna was used at a height varied from 1 to 4m. The highest radiated emission was detected by manipulating the system cables to the worst case length. The turntable was rotated by 360° and the frequency range 30MHz÷1GHz was investigated. This process was repeated for both antenna polarizations.

The amplitudes of worst case emission were measured with the QP detector.

List of Test Equipment:

Semi Anechoic Chamber, 9.5m[L] x 6.5m[W] x 5.2m[H]

Schwarzbeck VHBB9124, Biconical Antenna

Schwarzbeck VUSLP9111, LogPeriodic Antenna

HP8546A, CISPR16 EMI Receiver

Test Results:

Measurements taken at 3 meter distance in the semi-anechoic chamber. See Plot 3

Frequency [MHz]	Ant. Type	Ant. Pol.	Ant. Pos. [cm]	Turntable Azimuth [°]	Radiated Emission dB(µV/m)	Limit at 3m dB(µV/m)	Margin [dB]	Pass/Fail
53.888800	Biconical	V	103	272	33.6	49.5	-15.9	pass
62.193750	Biconical	H	110	350	32.1	49.5	-17.4	pass
58.039700	Biconical	V	100	0	37.8	49.5	-11.8	pass
99.534600	Biconical	V	120	347	42.6	49.5	-11.4	pass
232.290500	LogPeriodic	H	273	277	36.0	56.9	-26.9	pass
298.664881	LogPeriodic	H	140	197	37.5	56.9	-19.4	pass

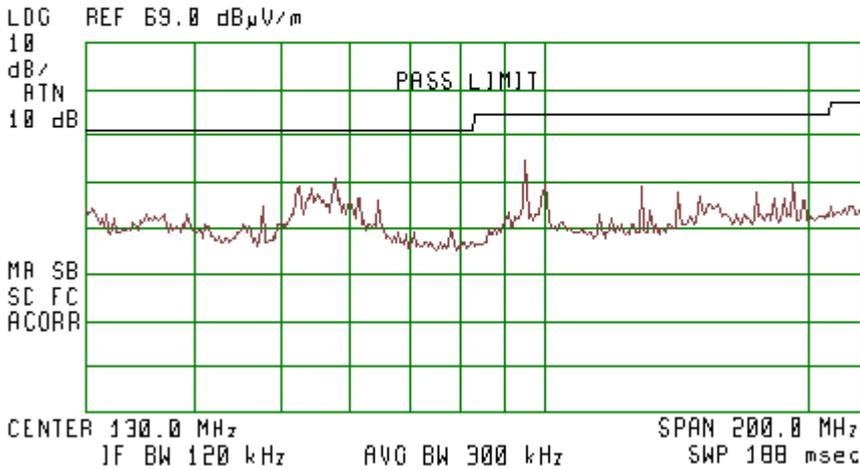
note: Radiated Emission = measured dB(µV/m) + Correction-factor dB(1/m)

Correction Factor = Antenna factor + Cable Loss

30MHz-230MHz

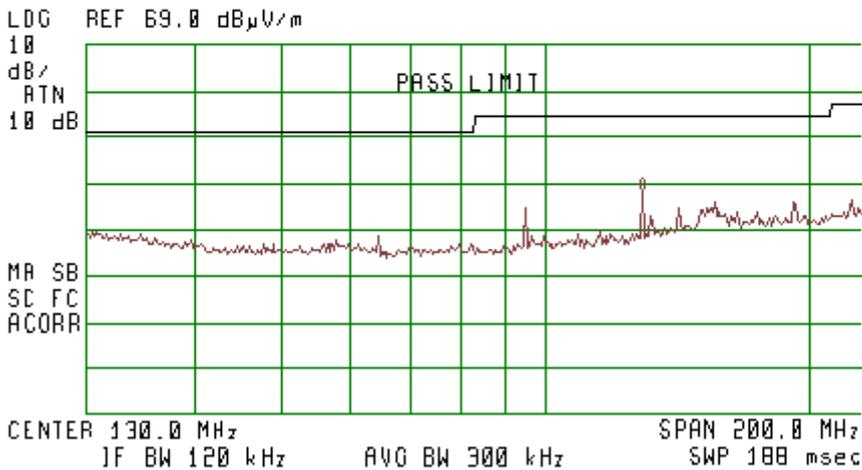
Vertical

10:58:24 JUN 28, 2001
16:28:13 AUG 31, 2000 18:01:47 FEB 19, 2001
ACTV DET: PEAK
MEAS DET: _PEAK DP AVG



Horizontal

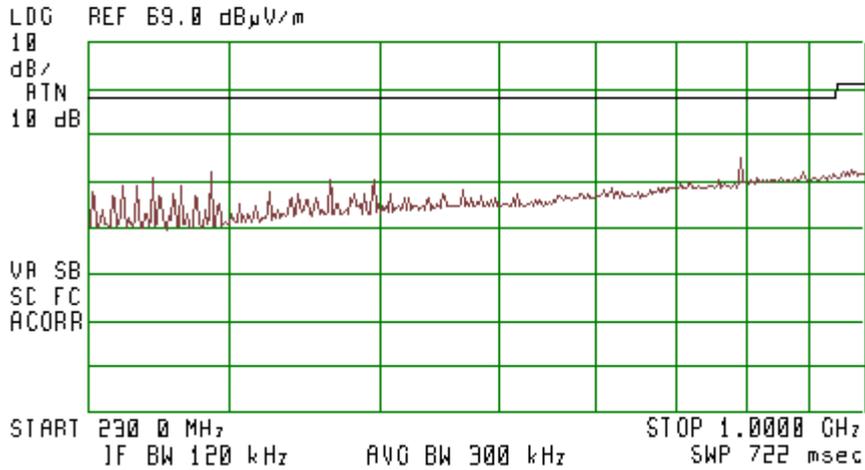
11:15:14 JUN 28, 2001
16:28:13 AUG 31, 2000 18:01:47 FEB 19, 2001
ACTV DET: PEAK
MEAS DET: _PEAK DP AVG
MKR 132.0 MHz
37.17 dBµV/m



230MHz-1000MHz

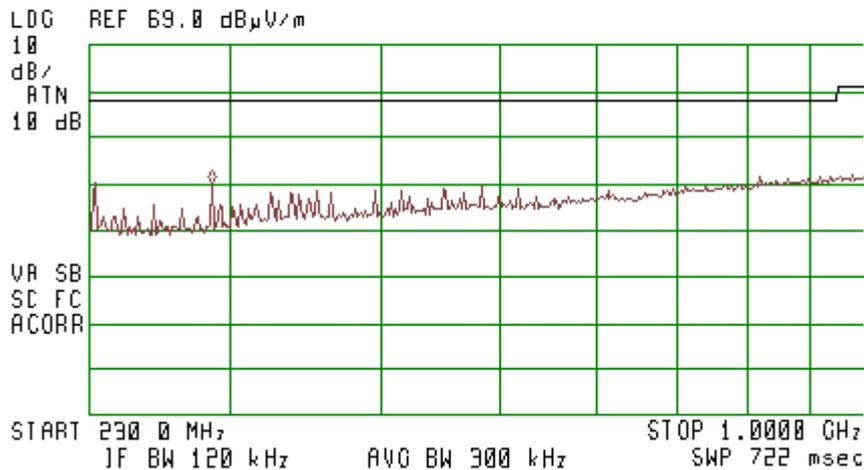
Vertical

12:23:16 JUN 20, 2001
16:20:13 AUG 31, 2000 18:01:47 FEB 19, 2001
ACTV DET: PEAK
MEAS DET: PEAK DP AVG



Horizontal

12:40:24 JUN 20, 2001
16:20:13 AUG 31, 2000 18:01:47 FEB 19, 2001
ACTV DET: PEAK
MEAS DET: PEAK DP AVG
MKR 298.9 MHz
39.21 dB μ V/m



4. Appendix

Appendix: Accreditation Certificate



END of Test Report