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FCC PART 15 RADIATED EMISSIONS BELOW 1 GHZ TEST REPORT

Applicant	MOTOROLA SOLUTIONS, INC.
Address	8000 WEST SUNRISE BLVD
	FT. LAUDERDALE FL 33322-9947 USA
FCC ID	AZ489FT5870
Model Number	DLR1060
Product Description	PORTABLE 2 WAY RADIO
Date Sample Received	4/9/2015
Date Tested	4/9/2015
Tested By	Cory Leverett
Approved By	Sid Sanders
Test Results	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

Report Number	Version Number	Description	Issue Date
618UT15TestReport.docx	Rev.1	Initial Issue	4/10/2015
618UT15TestReport.docx	Rev.2	Updated Report	4/22/2015

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN
FULL WITHOUT THE WRITTEN APPROVAL OF TIMCO

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

The test results relate only to the items tested.

Summary

The device under test does:

- ☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025: 2005 requirements.

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669

Authorized Signatory Name:

A handwritten signature in blue ink, appearing to read 'Cory Leverett', is written over a circular purple stamp. The stamp contains the text 'TIMCO ENGINEERING, INC.' and 'NEWBERRY, FL 32669'.

Cory Leverett
Engineering Project Manager

Date: 4/10/2015

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APPLICANT: MOTOROLA SOLUTIONS, INC.
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GENERAL INFORMATION

EUT Specification

Applicable Standard	Part 15.209		
EUT Description	PORTABLE 2 WAY RADIO		
FCC ID	AZ489FT5870		
Operating Frequency	TX: 902.525 – 927.475 MHz	RX: Same as Tx	
EUT Power Source	<input type="checkbox"/> 110–120Vac/50– 60Hz		
	<input type="checkbox"/> DC Power		
	<input checked="" type="checkbox"/> Battery Operated Exclusively		
Test Item	<input type="checkbox"/> Prototype	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Production
Type of Equipment	<input checked="" type="checkbox"/> Fixed	<input type="checkbox"/> Mobile	<input type="checkbox"/> Portable
Antenna Connector	Fixed Antenna		
Antenna	NA		
Test Facility	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.		
Test Conditions	Temperature: 24-26°C Relative humidity: 50-65%		
Test Exercise	The EUT was placed in Normal Hopping mode		

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TEST RESULTS SUMMARY

Specification – Rules Part No.	RESULTS – Pass/Fail/NA/Not Tested
Radiated Emissions 19 MHz – 1 GHz only- FCC Rules 15.209	Pass

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RADIATION INTERFERENCE

Rules Part No.: 15.247, 15.209

Requirements: Any emissions that fall in the restricted bands (15.205) must be less than or equal to 54 dB μ V/m. Spurious emissions not in a restricted band must be 20 dBc. Emissions were scanned from 9KHz through the 10th harmonic of the highest tuned fundamental frequency.

Frequency	Limits
Part 15.209	
9 to 490 kHz	2400/F (kHz) μ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB μ V/m @ 30 meters
30 – 88	40.0 dB μ V/m @ 3 meters
80 – 216	43.5 dB μ V/m @ 3 meters
216 – 960	46.0 dB μ V/m @ 3 meters
Above 960	54.0 dB μ V/m @ 3 meters
Part 15.247	
Fundamental 902 – 928 MHz	127.37 dB μ V/m @ 3 meters
Fundamental 2.4 – 2.4835 MHz	127.37 dB μ V/m @ 3 meters
Harmonics	54.0 dB μ V/m @ 3 meters

Method of Measuring Radiated Spurious Emissions: Radiation Interference: ANSI C63.4-2003 using a spectrum analyzer, a preselector, a quasi-peak adapter, and an appropriate antenna. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100 kHz with an appropriate sweep speed and the video bandwidth was 300 kHz up to 1 GHz and 1 MHz with a video BW of 3 MHz above 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worst case emissions were reported. The spectrum was searched from 19 MHz to at least the tenth (10) harmonic of the fundamental and emissions within 20 dB of limit reported for the worst case configuration.

ANSI C63.4-2003 10.1 Measurement Procedures: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes. Emissions attenuated more than 20 dB below the permissible value are not reported.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL	= FS
33	20 dB μ V	+ 10.36 dB	+ 0.5	= 30.86 dB μ V/m @ 3m

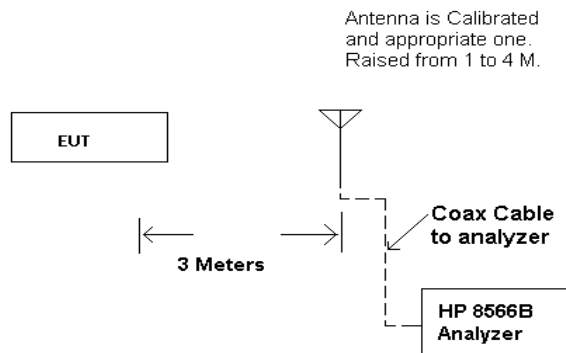
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RADIATION INTERFERENCE

SETUP:



Test Data: The following data is with the EUT's Hopping enabled. This was the worst case. All measurements are peak unless noted. Emissions greater than 20 dB below the limit are not reported

Peak Measurements								
Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Antenna Correction Factor dB/m	Duty Cycle dB	Field Strength dBuV/m	Margin dB
915.5	192.50	16.2	H	0.84	14.25	0	31.24	12.26
915.3	614.00	17.3	V	1.65	18.42	0	37.36	8.64
915.3	653.37	17.1	V	1.8	20.13	0	39.06	6.94
915.3	701.75	16.9	V	1.99	21.1	0	39.97	6.03
915.3	729.87	21.1	V	1.95	21.3	0	44.35	1.65
Quasi Peak Measurements								
Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Antenna Correction Factor dB/m	Duty Cycle dB	Field Strength dBuV/m	Margin dB
915.3	955.09	22.1	V	2.46	23.75	19	29.31	16.69
915.3	985.84	27.7	V	2.51	24.16	19	35.37	18.63
915.3	986.32	27.9	V	2.51	24.16	19	35.57	18.43
915.3	986.83	27.5	V	2.51	24.17	19	35.18	18.82
915.3	991.84	27.2	V	2.52	24.2	19	34.92	19.08
915.3	993.34	26.4	V	2.52	24.2	19	34.12	19.88
915.3	996.85	26.9	V	2.53	24.2	19	34.63	19.37

Results Meet Requirements

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EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconnical Chamber	Eaton Chamber	94455-1	1057	06/14/13	06/14/15
Antenna: Log-Periodic Chamber	Eaton	96005	1243	05/31/13	05/31/15
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	06/14/12	06/14/15
LISN	Electro-Metrics	ANS-25/2	2604	01/07/14	01/07/16
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	12/31/13	12/31/15
Ant: Double-Ridged Horn/ETS Horn 1 Ch	ETS-Lindgren Chamber	3117	00035923	06/13/14	06/13/16
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/12/14	08/12/16
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	03/11/14	03/11/16

*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

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