

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR LOW-POWER, NON-LICENSED TRANSMITTER

Test Report No. : E117R-006

AGR No : A114A-122

Applicant : DigitalCom Co., Ltd.
Address : RM #303-801, Bucheon Technopark III 36-1, Samjeong-dong, Ojeong-gu, Bucheon-city,
Gyeonggi-do, 421-741, Korea

Manufacturer : DigitalCom Co., Ltd.
Address : RM #303-801, Bucheon Technopark III 36-1, Samjeong-dong, Ojeong-gu, Bucheon-city,
Gyeonggi-do, 421-741, Korea

Type of Equipment : Wireless microphone

FCC ID. : ZMU-DMK920TF1106

Model Name : DMK920TF

Multiple Model Name : CMK920TF, RM917T

Serial number : None

Total page of Report : 12 pages (including this page)

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SUMMARY

The equipment complies with the requirements of *FCC Part 15 Subpart C Section 15.249*.


This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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Revision History

Issue Report No.	Issued Date	Revisions	Effect Section
E117R-006	July 04, 2011	Initial Release	All

1. VERIFICATION OF COMPLIANCE

APPLICANT : DigitalCom Co., Ltd.
ADDRESS : RM #303-801, Bucheon Technopark III 36-1, Samjeong-dong, Ojeong-gu, Bucheon-city,
Gyeonggi-do, 421-741, Korea
CONTACT PERSON : Mr. Eun-Ju, Jung / General Manager
TELEPHONE NO : +82-32-624-1980
FCC ID : ZMU-DMK920TF1106
MODEL NAME : DMK920TF
SERIAL NUMBER : N/A
DATE : July 04, 2011

EQUIPMENT CLASS	DXX – Low Power Communications Transmitter
KIND OF EQUIPMENT	Wireless microphone
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.4: 2009
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.249
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 m open area test site

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.249 (a)	Field Strength of Emission	Met the Limit / PASS
15.249 (c)	Measurement distance	Met the Requirement / PASS
15.249 (d)	Emissions Radiated Outside of the Specified Frequency Band	Met the Limit / PASS
15.249 (e)	Radiated Emissions above 1 000 MHz	Met the Limit / PASS
15.209	Radiated Emission Limits, General Requirement	Met the Limit / PASS
15.207	Conducted Limits	N/A (See Note)
15.203	Antenna Requirement	Met the Requirement / PASS

Note: This test is not performed because the EUT is operated by DC battery.

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2009 at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51, Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. Description details of test facilities were submitted to the Commission on August 21, 2008. (Registration Number: 340658)

3. GENERAL INFORMATION

3.1 Product Description

The DigitalCom Co., Ltd., Model: DMK920TF (referred to as the EUT in this report) is a Wireless microphone shall be used with the receiver that was manufactured by DigitalCom Co., Ltd. The receiver shall be subject to DoC procedure and issued by another test report. Product specification information described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Portable Device
OPERATING FREQUENCY	914 MHz ~ 927.2 MHz
RATED RF OUTPUT POWER	Max. 8.0 dBm
ANTENNA	Dipole Antenna
CHANNEL	34 Channels (Channel Spacing: 200 kHz)
MODULATION METHOD	FM
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	8 MHz
NUMBER OF LAYER	4 Layers
POWER REQUIREMENT	DC 3.6 V from an rechargeable battery

3.2 Model Differences

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
DMK920TF	Basic Model	<input checked="" type="checkbox"/>
CMK920TF, RM917T	These models are identical to basic model except for the model designation only.	<input type="checkbox"/>

Note: 1. Applicant consigns only basic model to test, therefore this test report just guarantees the units which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	DigitalCom Co., Ltd.	N/A	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested: None

5.3 Mode of operation during the test

The EUT was set to Low Channel (914 MHz), Middle Channel (920.39 MHz), and High Channel (927.20 MHz) and then transmitted maximum power during the testing. For getting maximum emission from the EUT, the EUT was moved through XY, XZ, and YZ planes.

5.4 Configuration of Test System

Line Conducted Test : It is not need to test this requirement, because the EUT shall be operated by DC battery and charged from receiving device only.

Radiated Emission Test :Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2009 8.3.1.1 and 13.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 m open area test site.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

According to section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Antenna Construction:

The antenna of the EUT is a dipole antenna that is inside of EUT, so no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 AC Power line Conducted Emissions Tests

During Preliminary Tests, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
It is not need to test this requirement, because the power of the EUT is supplied from the rechargeable battery.	

6.2 General Radiated Emissions Tests

During Preliminary Tests, the following operating modes were investigated

Operation Mode	The Worse operating condition (Please check one only)
TX Mode	X

7. RADIATED EMISSION TEST

7.1 Test set-up

The radiated emissions measurements were on the 3 m, open-field test site. The EUT and other support equipment were placed on a non-conductive turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

7.2 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 300 MHz : ± 4.43 dB

Radiated emission electric field intensity, 300 MHz ~ 1 000 MHz : ± 3.80 dB

Radiated emission electric field intensity, 1 000 MHz ~ 3 000 MHz: ± 4.4 dB

Measurement uncertainty is calculated in accordance with WECC 19-1990. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, $k = 2$.

7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESVD	Rohde & Schwarz	Test Receiver	838453/018	Oct. 05, 2010 (1Y)
■ -	8564E	HP	Spectrum Analyzer	3650A00756	Jun. 10, 2011 (1Y)
■ -	83051A	Agilent	Microwave System Preamplifier	3950M00201	Jun. 11, 2011 (1Y)
■ -	MA240	HD GmbH	Antenna Master	N/A	N/A
■ -	HD100	HD GmbH	Position Controller	N/A	N/A
■ -	DS420S	HD GmbH	Turn Table	N/A	N/A
■ -	VHA9103	Schwarzbeck	Biconical Antenna	91031852	Mar. 30, 2010 (2Y)
■ -	9108-A(494)	Schwarzbeck	Log Periodic Antenna	62281001	Mar. 30, 2010 (2Y)
■ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D294	Jun. 17, 2011 (2Y)

All test equipment used is calibrated on a regular basis.

7.4 Final Result of Measurement

7.4.1 Field Strength of the Fundamental Frequency

The following table shows the highest levels of radiated emissions on both polarizations of horizontal and vertical.

Humidity Level : 43 % R.H. Temperature: 25 °C
 Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249(a)
 Result : PASSED BY -7.30 dB at 920.39 MHz

EUT : Wireless microphone Date: July 02, 2011
 Operating Condition : TX mode
 Distance : 3 m

Channel	Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
	Carrier Freq. (MHz)	Amplitude (dBμV)	Detect Mode	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low	914.00	51.20	Quasi-Peak	H	23.30	7.46	81.96	94.00	-12.04
		52.20	Quasi-Peak	V			82.96	94.00	-11.04
Middle	920.39	55.90	Quasi-Peak	H	23.32	7.48	86.70	94.00	-7.30
		56.80	Quasi-Peak	V			87.60	94.00	-6.40
High	927.20	53.70	Quasi-Peak	H	23.34	7.51	84.55	94.00	-9.45
		54.40	Quasi-Peak	V			85.25	94.00	-8.75

*Remark: To get a maximum emission level from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes, but the worst plane data were recorded in the report.



Tested by: Seung-Sik, Kim / Project Engineer

7.4.2 Emissions Radiated Outside of the Specified Frequency Bands

7.4.2.1 Test Data for Harmonic

Humidity Level : 40 % R.H. Temperature: 25 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.249(a)
Result : PASSED

EUT : Wireless microphone Date: July 02, 2011
Operating Condition : TX mode
Distance : 3 m

Channel	Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low	It was not observed any emissions from the EUT.									
Middle										
High										

Tabulated test data for Restricted Band




Tested by: Seung-Sik, Kim / Project Engineer

7.4.2.2 Test Data for Spurious except for Harmonic

Humidity Level : 43 % R.H. Temperature: 25 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209 (a)
Result : PASSED BY -2.96 dB at 2991.90MHz under high channel

EUT : Wireless microphone Date: July 02, 2011
Frequency range : 30 MHz ~ 3 000 MHz
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Low Channel									
255.26	16.58	H	1.30	220.00	17.63	3.40	37.61	54.00	-16.39
1 704.70	19.90	H	1.40	200.00	25.73	1.34	46.97	54.00	-7.03
1 974.90	21.40	H	1.00	210.00	25.98	1.17	48.55	54.00	-5.45
2 437.40	20.64	H	1.00	210.00	27.18	1.30	49.12	54.00	-4.88
2 442.40	20.95	H	1.00	210.00	27.19	1.29	49.43	54.00	-4.57
2 727.40	20.69	H	1.00	190.00	27.96	1.26	49.91	54.00	-4.09
Middle Channel									
260.12	19.12	H	1.00	160.00	17.84	3.40	40.36	54.00	-13.64
1 343.30	19.67	H	1.00	150.00	25.41	1.07	46.15	54.00	-7.85
1 350.30	19.84	V	1.00	140.00	25.42	1.08	46.34	54.00	-7.66
1 442.40	20.04	H	1.00	150.00	25.50	1.16	46.70	54.00	-7.30
1 566.50	20.15	V	1.00	130.00	25.60	1.16	46.91	54.00	-7.09
2 706.70	17.62	V	1.50	150.00	28.05	1.29	46.96	54.00	-7.04
High Channel									
256.72	17.23	H	1.10	150.00	17.69	3.40	38.32	54.00	-15.68
1 167.10	19.62	H	1.00	110.00	25.26	1.00	45.88	54.00	-8.12
1 533.50	19.67	V	1.00	100.00	25.58	1.16	46.41	54.00	-7.59
1 683.60	19.81	H	1.00	120.00	25.71	1.31	46.83	54.00	-7.17
2 772.70	20.74	V	1.00	150.00	28.08	1.30	50.12	54.00	-3.88
2 991.90	20.88	H	1.00	140.00	28.67	1.49	51.04	54.00	-2.96


Tested by: Seung-Sik, Kim / Project Engineer

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