FCC TEST REPORT

UCS Co., Ltd.

#702, Megavalley, 799 Kwanyang-dong, Dongan-gu, Anyang-city, Kyunggi-do, 431-767, Korea
Tel : 82-31-420-5680/Fax :82-31-420-5685, Open Site : 82-31-355-2666

FCC Test Report

Report Number	UCSFR-1206-005			
Applicant	Company Name	DigitalCom Co., Ltd.		
	Address	RM #303-801, Bucheon Technopark Ⅲ 36-1, Samjeong-dong, Ojeong-gu, Bucheon-city, Gyeonggi-do, 421-741, Korea		
Product	Product Name	Wireless microphone		
	Model Name	DMK940TF	Manufacturer	DigitalCom Co., Ltd.
	Multiple Model Name	RSQ RM-942, DMK940, RSQ RM-942T	Country of origin	Korea
Other	Receipt Date	2012.06.01	Receipt Number	UCS-R-2012-308
	Issued Date	2012.06.05	Tested Date	2012.06.04 ~ 2012.06.05
Test Result	**Pass**			
Standard	**FCC CFR 47 Part 15.249 Subpart C**			
Test Method	**ANSI C63.4:2003**			
Tested by	Y. R. JO (sign)			
Approved by	K. T. Kim (sign)			

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Contents

1. Applicant Information

Applicant Name	:	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.
Country of Origin	:	Korea

2. Test Result Certification

2.1 Applicable standards

Standard	Test Item	CFR 47 Section	Result
FCC CFR 47 Part 15.249 Subpart C	Antenna Requirement	15.203	PASS
	Field Strength of Emission	15.249 (a)	PASS
	Measurement distance	15.249 (c)	PASS
	Emissions Radiated Outside of the Specified Frequency Band	15.249 (d)	PASS
	Radiated Emissions above 1 000 MHz	15.249 (e)	PASS
	Radiated Emission Limits, General Requirement	15.209	PASS
	Conducted Limits	15.207	PASS

3. EUT Information

3.1 RF specification

Product name	Wireless microphone	
Model name	DMK940TF	
Power source	DC 3.6 V from an rechargeable battery	
Ferquency range	903.00MHz ~ 927.00MHz	
Number of channels	60CH	
Modulation Technique	FM	
Antenna specification	Dipole	-5.0 dBi gain (Max)

4. Laboratory Information

4.1. General

UCS Co., Ltd. established 1999 as the International agreed upon laboratory(CBTL, KOLAS) for Standard. Internally, UCS Co., Ltd. is the designated test laboratory from Radio Research Laboratory of Korea Communications Commission and Korea Food & Drug Administration.
Based on its extensive experience and expertise, UCS Co., Ltd. is the Global test laboratory that has best professionalism in this field.

4.2. Test Site

- UCS Co., Ltd. (Universal Certification Solution)
- FCC Registration Number : 803225
- This test site is in compliance with ISO/IEC 17025 for general requirements for the competence of testing and calibration laboratories.

4.3 Location

UCS Co., Ltd.

- #702, Anyang Megavalley799, Gwanyang2-dong, Dongan-gu, Anyang-si, Gyeonggi-do, 431-767, Korea

ER Center

- #476-4, Hwalcho-dong, Hwaseong-si, Gyeonggi-do, 445-150, Korea

5. Measurement conditions

5.1 Scope

This test report certifies that the DigitalCom Co., Ltd. DMK940TF, as tested, meets the FCC Part 15.249, Subpart C requirements. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

5.2 Measurement Procedure

- Test measurements were made in accordance FCC Part 15.249: Operation within the bands 902 –928 MHz, 2400–2483.5 MHz, 5725–5875 MHZ, and 24.0–24.25 GHz.. The test methods used to generate the data in this test report is in accordance with ANSI C63.4: 2003, Radiated testing was Methods of Measurement of performed according to the procedures in ANSI C63.4: 2009 at a distance of 3 m from EUT to the antenna.

5.3 Product Description

- The DigitalCom Co., Ltd., Model: DMK940TF (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.

5.3.1 Choice of Model

- This test report is based on the test samples supplied by the manufacturer and are reported by the manufacturer to be equivalent to the production units.

5.3.2 Choice of Operating Frequencies

- The DMK940TF operates on a total of 60 channels, from channel 1 to channel 60.
- In accordance with ANSI C63.4-2009, section 13.2.1, the choice of operating frequencies selected for the testing detailed in this report was based on the lowest, middle and highest operating frequencies. The frequencies selected were 903.00 MHz (Channel 1), 919.4 MHz(Channel 30) and 927.00 MHz (Channel 60)

5.3.3 Channel Table

- See the user's manual.

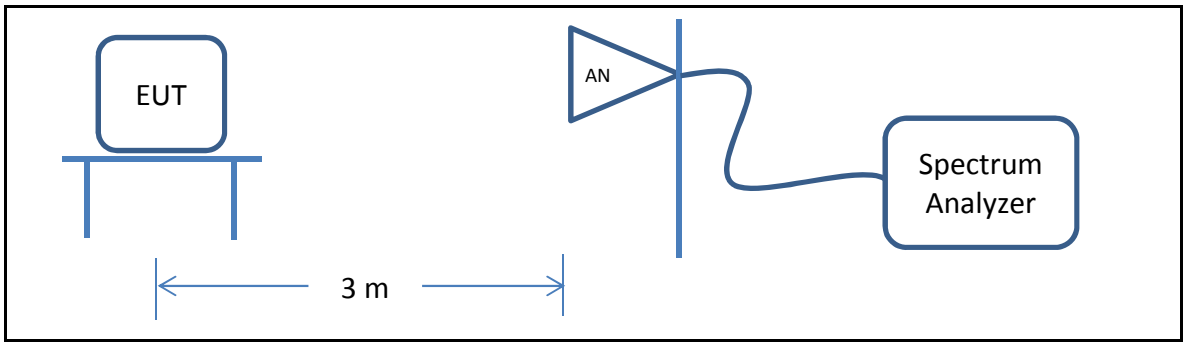
5.4 Description of test modes

- The EUT had been tested under the operating condition.
- There are three channels have been tested as following:
- Channel Low and Channel High with higher data rate were chosen for full testing.

Channel	TX Frequency (MHz)
LOW	903.00
MIDDLE	919.40
HIGH	927.00

5.5 Description of test configuration

- The measurements were taken in continuous transmitting mode using the TEST MODE.



[System Block Diagram of Test Configuration]

5.6 Setup of equipmet under test

5.6.1 Description of support units

- The EUT has been tested as an independent unit along with the following necessary accessories or support units, which are adopted to form a representative test configuration.

No	Equipment	Manufacturer	Model	S/N
-	-	-	-	-
-	-	-	-	-

5.6.2 Type of Used Cables

No	START		END		CABLE	
	NAME	I/O PORT	NAME	I/O PORT	LENGTH(m)	SHIELDED
-	-	-	-	-	-	-
-	-	-	-	-	-	-

6. Limite And Result

6.1 Antenna requirement

6.1.1 Regulation

According to §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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.1.2 Antenna Construction:

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

6.2 Field Strength of the Fundamental Frequency

6.2.1 Regulation

According to §15.249(a), Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

6.2.2 Test result : PASS

Table 1 : Measured values of the Field Strength of the Fundamental Frequency

Mode	Carrier Freq. (MHz)	Amplitude (dBμV)	Detect Mode	Pol.	Antenna (dB/m)	Cable (dB)	Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low	903.00	50.60	QP	H	21.96	5.14	77.70	94.00	16.30
		51.80	QP	V			78.90	94.00	15.10
Middle	919.40	54.90	QP	H	22.02	5.21	82.13	94.00	11.87
		55.30	QP	V			82.53	94.00	11.47
High	927.00	52.10	QP	H	22.05	5.21	79.36	94.00	14.64
		53.30	QP	V			80.56	94.00	13.44

Note: 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.

QP:Quasi-Peak

6.3 Radiated Spurious emissions

6.3.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

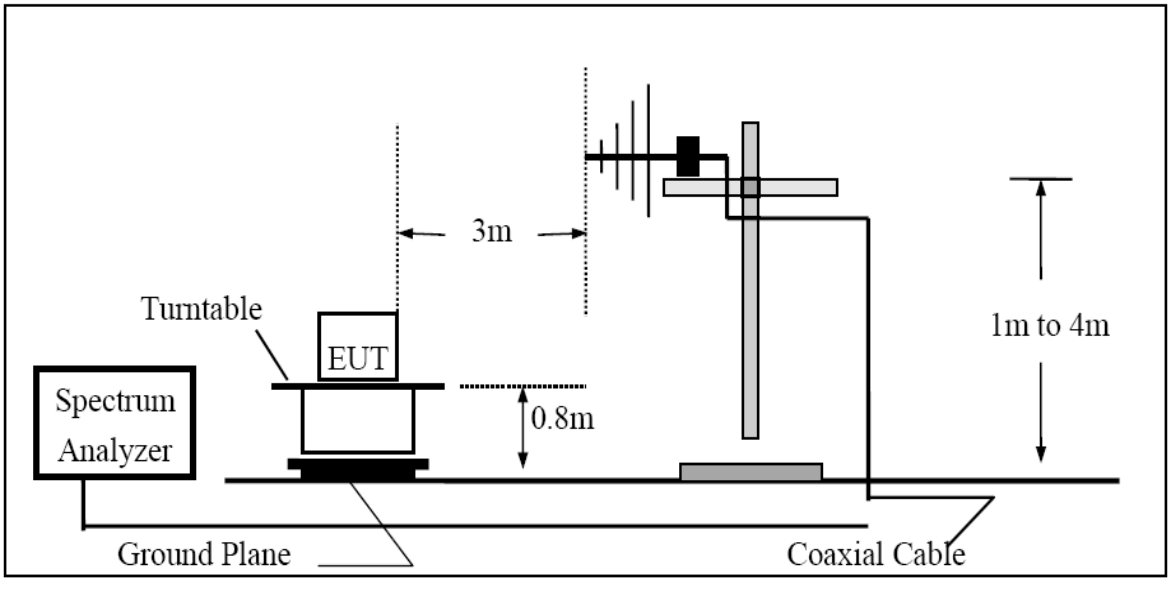
Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
Above 960	500	54.0	3

According to §15.109(a), for an unintentional device, except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the above table.

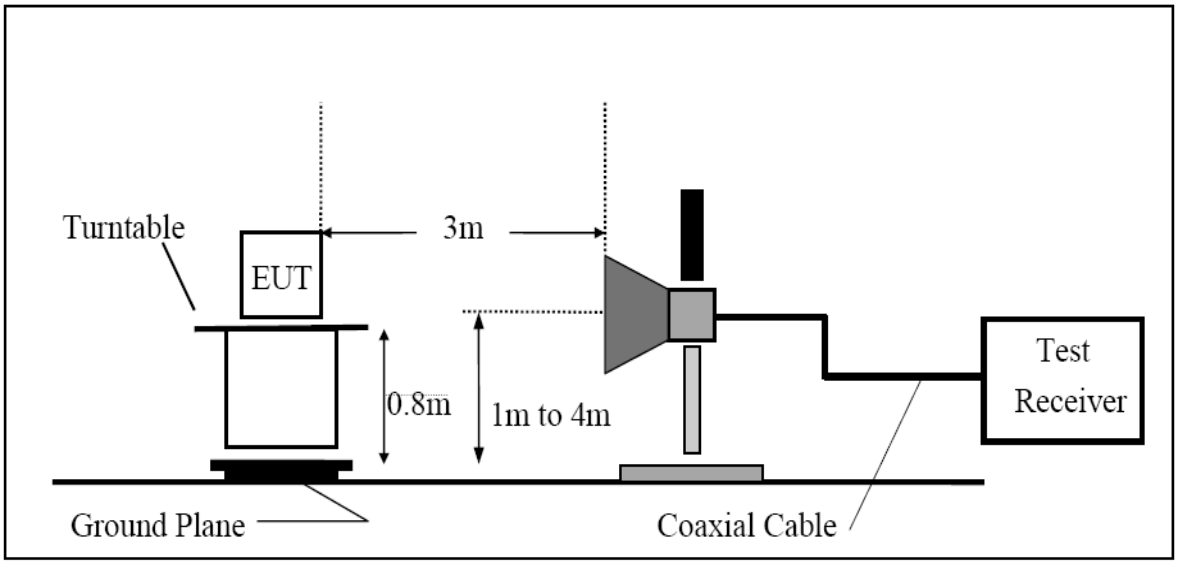
** The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector and above 1000 MHz are based on the average value of measured emissions.

6.3.2 Test Setup Layout

6.3.2.1 Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3.2.2 Radiated Emission Test Set-UP Frequency Over 1000MHz



6.3.3 Test Procedure

1) Spurious Radiated Emissions:

1. The preliminary radiated measurements were performed to determine the frequency producing the maximum emissions in an anechoic chamber at a distance of 3 meters for above 30 MHz, and at 1 meter distance for below 30 MHz.
2. The EUT was placed on the top of the 0.8-meter height, 1 × 1.5 meter non-metallic table. To find the maximum emission levels, the height of a measuring antenna was changed and the turntable was rotated 360°.
3. The antenna polarization was also changed from vertical to horizontal. The spectrum was scanned from 9 kHz to 30 MHz using the loop antenna, from 30 to 1000 MHz using the Trilog broadband antenna, and from 1 GHz to tenth harmonic of the highest fundamental frequency using the horn antenna.
4. To obtain the final measurement data, the EUT was arranged on a turntable situated on a 4 × 4 meter at the Open Area Test Site. The EUT was tested at a distance 3 meters.
5. Each frequency found during preliminary measurements was re-examined and investigated. The test-receiver system was set up to average, peak, and quasi-peak detector function with specified bandwidth.
6. The EUT is situated in three orthogonal planes (if appropriate)
7. The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT.
8. If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method may be employed.

6.3.4 Test Results:

Table 2 : Measured values of the Radiated Spurious emissions

Frequency (MHz)		Detect Mode	Polarization (V/H)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low	Below 30MHz					
	All radiated results are exist under 20dB below than the limit					
	Below 1GHz					
	42	Quasi-peak	V	31.03	40.00	8.97
	115	Quasi-peak	H	27.41	43.50	16.09
	120	Quasi-peak	V	37.30	43.50	6.20
	171	Quasi-peak	H	25.90	43.50	17.60
	280	Quasi-peak	V	26.22	46.00	19.78
	299	Quasi-peak	V	29.67	46.00	16.33
	311	Quasi-peak	V	25.65	46.00	20.35
	Above 1GHz					
	1830	Peak	V	46.23	74.00	27.77
	1830	Average	V	32.12	54.00	21.88
Middle	Below 30MHz					
	All radiated results are exist under 20dB below than the limit					
	Below 1GHz					
	42	Quasi-peak	V	30.28	43.50	13.22
	116	Quasi-peak	H	28.03	46.00	17.97
	173	Quasi-peak	V	27.01	46.00	18.99
	280	Quasi-peak	V	25.39	46.00	20.61
	300	Quasi-peak	V	30.12	46.00	15.88
	314	Quasi-peak	V	27.41	74.00	46.59
	Above 1GHz					
	1830	Peak	V	45.83	74.00	28.17
	1830	Average	V	33.67	54.00	20.33
High	Below 30MHz					
	All radiated results are exist under 20dB below than the limit					
	Below 1GHz					
	43	Quasi-peak	V	31.25	43.50	12.25
	117	Quasi-peak	H	28.48	46.00	17.52
	123	Quasi-peak	V	33.69	46.00	12.31
	278	Quasi-peak	V	27.46	46.00	18.54
	299	Quasi-peak	V	30.09	46.00	15.91
	314	Quasi-peak	V	28.10	74.00	45.90
	Above 1GHz					
	1760	Peak	V	46.37	74.00	27.63
	1760	Average	V	31.13	54.00	22.87

Note.

1. Margin (dB) = Limit – Emission Level
2. H = Horizontal, V = Vertical Polarization

6.4 AC Power Line Conducted Emissions

6.4.1 Regulation

According to §15.207(a), for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Qausi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

6.4.2 Test Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

6.4.2 Test Results:

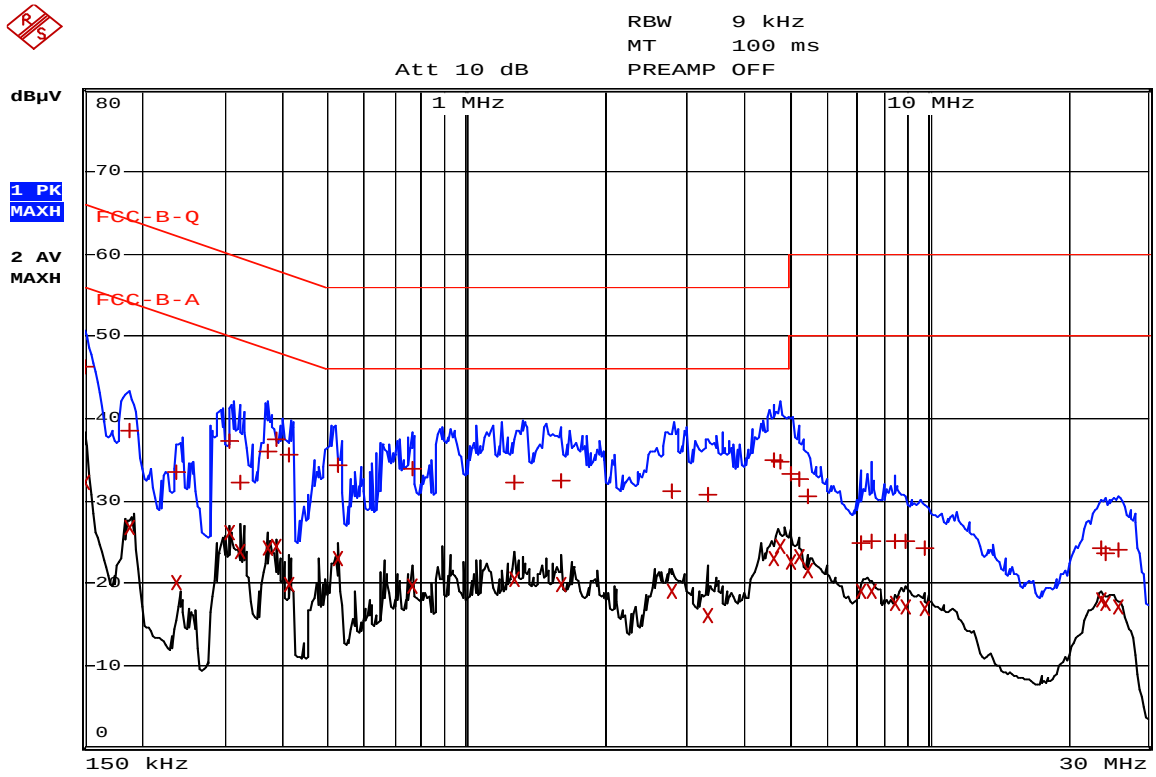
Table 3 : Measured values of the AC Power Line Conducted Emissions

Frequency (MHz)	Mode	Hot/Neutral (H/N)	Measured Value (dBμV)	Correction Factor (dB)	Cable Loss (dB)	Emission Level (dBμV)	Limit (dBμV)	Margin (dB)
0.15	Qausi-peak	N	46.37	0.03	0.04	46.44	64.49	18.05
	Average		33.30			33.37	54.49	21.12
0.19	Qausi-peak	N	39.09	0.05	0.04	39.18	62.10	22.92
	Average		29.76			29.85	52.10	22.25
0.30	Qausi-peak	N	38.23	0.03	0.05	38.31	61.43	23.12
	Average		24.03			24.11	51.43	27.32
0.31	Qausi-peak	N	38.43	0.05	0.05	38.53	60.24	21.71
	Average		28.05			28.15	50.24	22.09
0.39	Qausi-peak	H	37.41	0.03	0.00	37.44	58.73	21.29
	Average		24.51			24.54	48.73	24.19
0.53	Qausi-peak	H	34.34	0.04	0.07	34.45	56.51	22.06
	Average		22.94			23.05	46.51	23.46
1.68	Qausi-peak	N	34.30	0.05	0.13	34.48	56.00	21.52
	Average		-			-	-	-
4.61	Qausi-peak	N	36.90	0.09	0.28	37.27	56.00	18.73
	Average		28.13			28.50	46.00	17.50
4.65	Qausi-peak	H	34.97	0.09	0.28	35.34	56.00	20.66
	Average		-			-	-	-
4.75	Qausi-peak	N	38.38	0.09	0.29	38.76	56.00	17.24
	Average		28.59			28.97	46.00	17.03
4.81	Qausi-peak	H	34.75	0.09	0.29	35.13	56.00	20.87
	Average		24.42			24.80	46.00	21.20
5.04	Qausi-peak	H	33.38	0.09	0.30	33.77	56.00	22.23
	Average		-			-	-	-
5.27	Qausi-peak	H	32.58	0.09	0.31	32.98	60.00	27.02
	Average		-			-	-	-
5.49	Qausi-peak	H	30.50	0.09	0.32	30.91	60.00	29.09
	Average		-			-	-	-
9.30	Qausi-peak	N	27.98	0.15	0.41	28.54	60.00	31.46
	Average		-			-	-	-
23.69	Qausi-peak	N	25.95	0.33	0.68	26.96	60.00	33.04
	Average		-			-	-	-
25.13	Qausi-peak	N	25.28	0.37	0.71	26.36	60.00	33.64
	Average					-	-	-

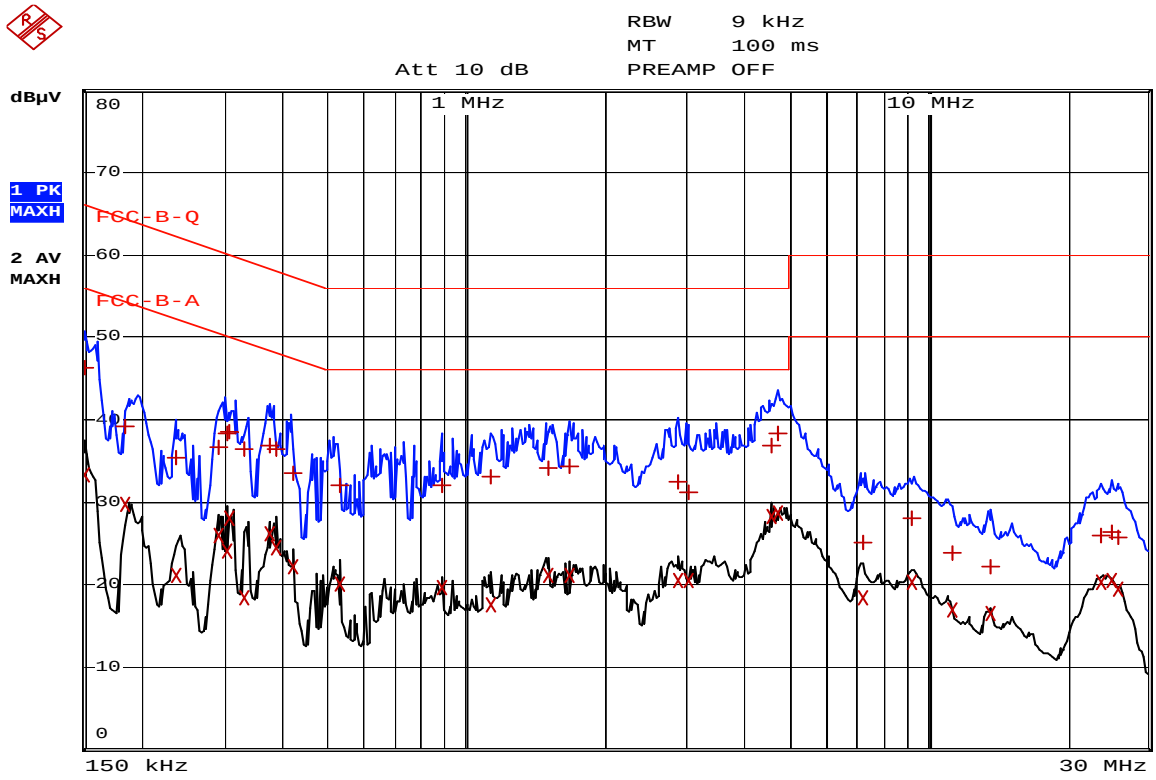
1. Margin (dB) = Limit – Emission Level
2. Emission Level = Measured Value + CF + CL

6.4.3 Plot of the AC Power Line Conducted Emissions

HOT LINE



NEUTRAL LINE

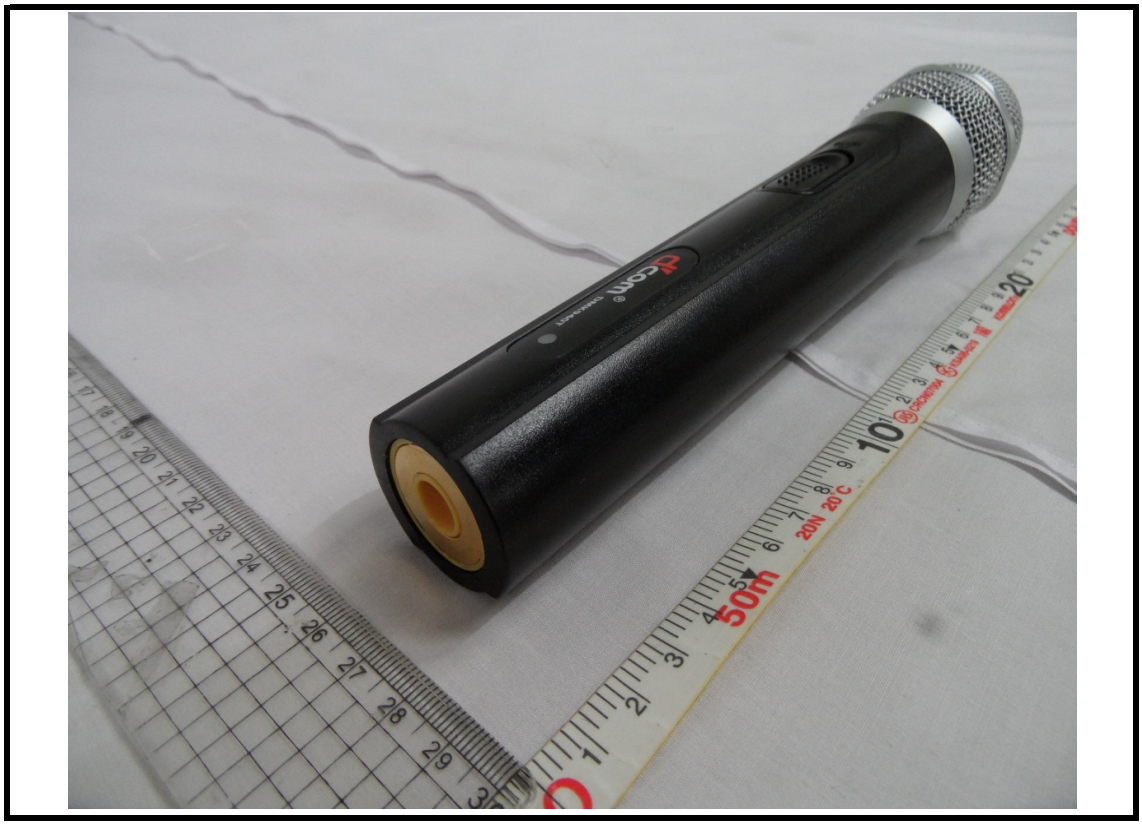


7.Test Equipment Used For Test

Used equipment	Description	Manufacturer	Model Name	Serial Number	Specifications	Next Cal. Data
■	Spectrum Analyzer	ADVANTEST	R3273	101102518	100Hz ~ 26.5GHz	2012-10-13
□	MICROWAVE FREQUENCY COUNTER	ANRITSU	MF2414B	6200003197	10Hz ~ 26.5GHz	2012-10-04
□	EPM-P SERIES POWER METER	Agilent	E4416A	GB38272722	1CH 100-240VAC	2012-10-04
□	Power Sensor	Agilent	8481A	US41030240	MAX.23dBm AVG, 18GHz	2012-10-14
□	Signal Generator	ROHDE&SCHWARZ	SMIQ03B	832870/056	300kHz ~ 3.3GHz	2012-10-04
□	Signal Generator	AGILENT	83732B	US37101885	10MHz ~ 20GHz	2013-01-16
□	Modulation Analyzer	HP	8901B	3028A02980	150kHz-1.3GHz	2012-10-13
□	Audio Analyzer	HP	8903B	3729A17164	20Hz-100kHz	2012-10-04
□	Attenuator	Weinschel	41-6-12	21644	6dB, 10W	2012-10-13
□	Attenuator	Weinschel	41-10-12	13218	10dB, 10W	2012-10-13
□	Dual Directional Coupler	HP	778D	15923	20dB Coupler	2012-10-04
□	Dual Directional Coupler	AGILENT	11691D	1212A01281	18GHz 20dB	2013-02-29
□	BT SIMULATOR	TESCOM CO. LTD	TC-3000A	3000A4C0158	100-240VAC 50/60Hz 40W	2012-10-06
□	Power Divider	H.P	11636B	07317	DC-26.5GHz	2012-10-13
□	Power Divider	H.P	11636B	07412	DC-26.5GHz	2012-10-13
■	Test receiver	ROHDE&SCHWARZ	ESPI3	101171	9kHz~3GHz	2012-08-12
■	BI-LOG ANT	SCHWARZBECK	VULB9163	398	30MHz~1GHz	2013-10-03
■	Loop Antenna	EMCO	6502	9801-3191	9KHz~30MHz	2014-02-02
■	Horn antenna	Schwarzbeck	BBHA 9120D	769	1GHz ~ 18GHz	2013-03-22
□	Horn antenna	Schwarzbeck	BBHA 9120D	768	1GHz ~ 18GHz	2013-03-22
■	Spectrum Analyzer	ROHDE&SCHWARZ	FSPI3	100640	9kHz ~ 13.6GHz	2013-01-04
■	Amplifier	TESTEK	TS-PA2	120005	500MHz~18GHz	2013-03-01
□	DC Power Supply	ODA Tech	OPE-505S	oda-01-0923-03430	1CH 50V 5A	-
□	Slidacs	Daekwang	-	-	5KVA, OUTPUT:AC:0~300V	-
□	DC Power Supply	Maynuo	M8811	080010960011103046	30V 5A	2012-08-16
□	Digital Mutil Meter	UTI	DMSC 683A	06086830042	750V 10A	-
□	Digital Mutil Meter	FLUKE	8842A	5126272	1000V 2A	2012-08-11
□	Continuous operation tester	-	-	-	MAX 999시간	2013-03-11
□	Vibration Tester	Gana	GNV-500	-	0~60Hz/50Kg	2012-10-04
□	HUMIDITY CHAMBER	BUM JIN Eng.	-	-	-40~120°C 95%	2012-09-16
□	Drop Tester	JUNG JIN Eng.	-	-	0-120Cm	-
■	Test Receiver	R&S	ESPI3	101171	9kHz ~ 1.3GHz	2012-08-12
■	ARTFICIAL MAINS NETWORK	SCHWARZBECK	NSLK 8127	8127518	9kHz ~ 30MHz	2012-10-04

8. EUT Photographs

8.1 Front view



8.2 Back view