

TEST REPORT

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The tests reported herein have been performed in accordance with its terms of accreditation.

Test Report No. : LR500111203K
FCC ID : PFNWC10HD
Issue Date : March 26, 2012
Applied Standard : FCC Part 15, Subpart B: (October 1,2010)
Trade Name : Digital Multimedia Technology Co., Ltd.
Category : QAM-B
Model Name : WC10HD
Variant Model name : DMS2004UHD W
Serial Number : Identification

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



NVLAP LAB CODE 200723-0

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LTA Certification

Applicant & Manufacture

Company name : Digital Multimedia Technology Co.,Ltd.
Address : 2nd Fl., 926, Gwanyang-dong, Dongan-gu, Anyang-si, Gyeonggi-do, Korea
Telephone / Facsimile : TEL : +82-31-420-7501 / FAX : +82-31-420-7502

Equipment Under Test (EUT)

Trade name : Digital Multimedia Technology Co., Ltd.
Category : QAM-B
Brand : -
FCC ID : PFNWC10HD
Model name : WC10HD
Variant Model name : DMS2004UHD W
Serial number : Identification
Intended environment : Residential area
Date of receipt : March 05, 2012
EUT condition : Pre-production, not damaged
Operating Mode : QAM-B mode
Interface Ports : CABLE IN, RF OUT, A/V OUT, IR IN, DC 5V IN
Power Source : DC 5V – 2A
Crystal/Oscillator(s) : 25MHz
Firmware version : V1.0.0

Model Description

- Model WC10HD is basic model, which was tested.
- Model DMS2004UHD W is identical to model WC10HD except for model name.

Model Specification

- NONE

Test Performed

Test started & completed : March 19-26 , 2012
Location : LTA Co., Ltd.

*** To be continued next page ***

LTA Certification –cont.-

Test Specification

Purpose of the test : Compliance test to the following standard
 Applied standard : FCC Part 15, Subpart B: (October 1,2010)
 Classification : Class B
 Deviations from Standard : N/A
 Test Method

Test Results

Measurement	Results*	Test method
Radiated disturbance	Complies	ANSI C 63.4:2003: (October 1,2009)
Conducted disturbance	Complies	ANSI C 63.4:2003: (October 1,2009)
Antenna Conducted Power Emissions	Complies	ANSI C 63.4:2003
Output Conducted level Emissions	Complies	ANSI C 63.4:2003
Conducted Spurious Emissions	Complies	ANSI C 63.4:2003

* : The compliance statement is based on nominal value only.

Modification performed by the lab.:

- N.A

-We were performed the test according to LTA procedure LTA-QI-04.

Laboratory's Certificate

Report number : LR500111203K
 Issue date : March 26, 2012

This test report is issued under the authority of:

The test was supervised by:



Kyu-Hyun Lee, Manager



Ki-Hun Cho, Test Engineer

The results in this report apply only to the sample(s) tested.

It is not allowed to copy this report even partly without the allowance of the test laboratory.

General information's

Purpose

This document is based on the Electromagnetic Interference (EMI) tests performed on the “DC10HD”. The measurements were performed according to the measurement procedure described in ANSI C 63.4:2003. The tests were carried out in order to confirm whether the electromagnetic emissions from the EUT(Equipment Under Test), are within the class B limits defined in FCC Part 15, Subpart B- “Section 15.107- Conducted limits” and “Section 15.109-Radiated emission limits”.

Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

Measurement uncertainty

Radiated disturbance (30 – 1000MHz) : +4.52 [dB] , -4.43 [dB] (k=2)
 Conducted disturbance (0.15 – 30MHz) : +1.45 [dB] , -1.45 [dB] (k=2)
 ANT. Conducted Emission (30 – 2150MHz) : ±0.54 [dB] (k=2)

The coverage factor k=2 yields approx. a 95% level of confidence for near-normal distribution typical of most measurement results.

Accredited agencies

LTA Co., Ltd. Is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2012-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2013-04-24	EMC accredited Lab.
FCC	U.S.A	610755	2014-04-27	FCC filing
FCC	U.S.A	649054	2013-04-13	FCC CAB
VCCI	JAPAN	R-2133, C-2307	2014-06-21	VCCI registration
VCCI	JAPAN	T-2009	2013-12-23	VCCI registration
IC	CANADA	5799A	2012-05-14	IC filing

Brief Information

1-1 Test Summary

Parameter	Applied Standard	Status (note 1)
I. Emission		
Radiated disturbance	FCC Part 15.109 : (October 1,2009)	C
Conducted disturbance	FCC Part 15.107 : (October 1,2009)	C
Antenna Conducted Power Emissions Measurement	FCC Part 15.111(a), 15.31(m), 15.33(b) : (October 1,2010)	C
Output Conducted level Emissions Measurement	FCC Part 15.115(b)(1) : (October 1,2010)	C
Conducted Spurious Emissions Measurement	FCC Part 15.115(b)(2) : (October 1,2010)	C
Antenna Transfer Switch Emissions Measurement	FCC Part 15.115(C) : (October 1,2010)	NT
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable		
* The data in this test report are traceable to the national or international standards.		

Frequency range to be scanned:

0.15 MHz - 30 MHz as conducted measurement

5th harmonic of the highest frequency or 40 GHz, whichever is lower

Bandwidth:

Measured by the CISPR quasi-peak function Bandwidth is 10kHz in the frequency 0.15MHz to 30MHz and 120kHz in the frequency 30MHz to 1,000MHz.

Measured by the CISPR Peak function Bandwidth is 1MHz in the frequency 1GHz to 40GHz.

A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

1-2 Variant Model

- DMS2004UHD W

1-3 Operating Mode of the EUT

The tests have been conducted with the following operational mode(s) of the EUT.

Name of mode in the report

Description

QAM-B mode

: -

1-4 Modification

- None

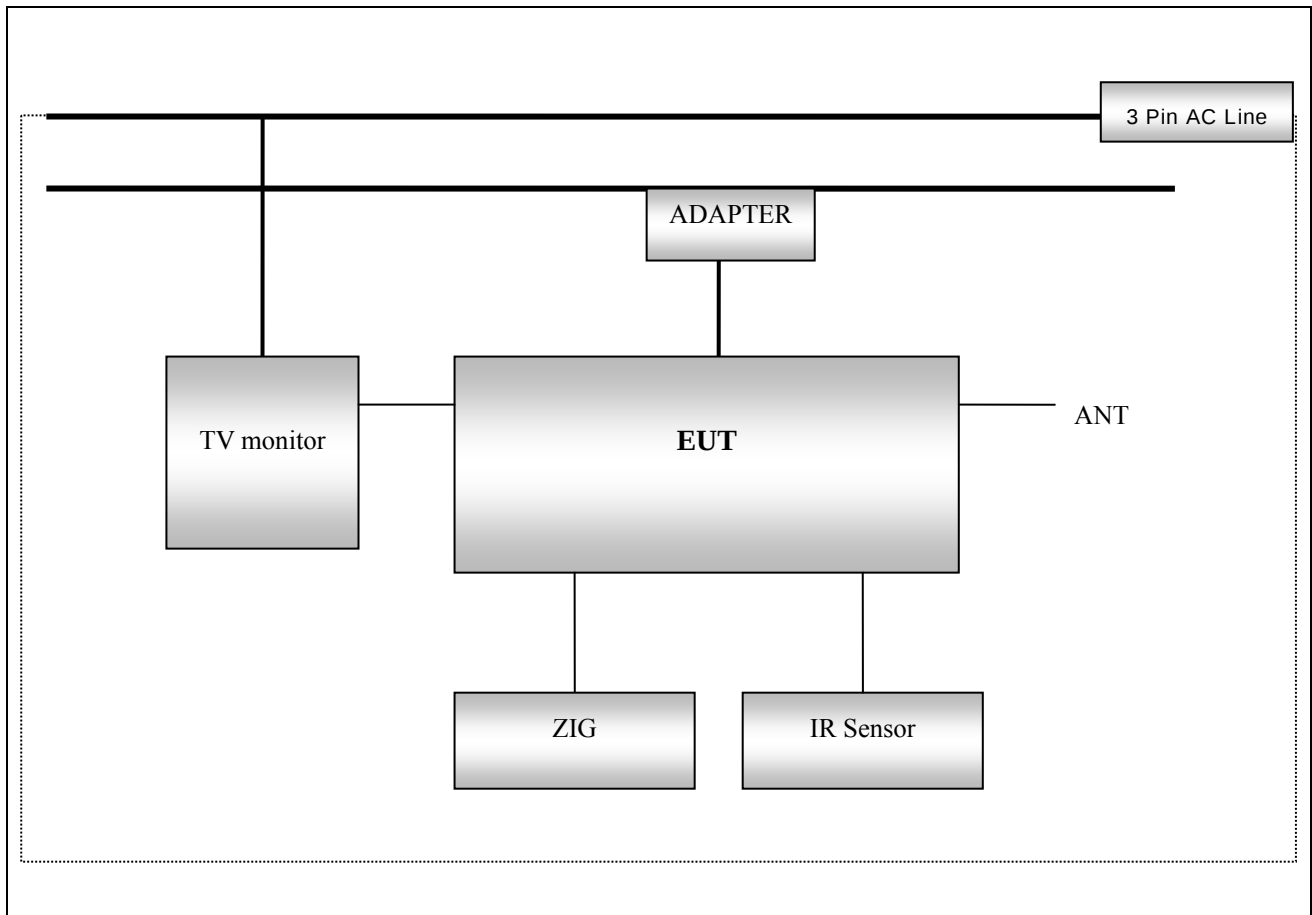
1-5 List of EUT and accessory

EUT				
Category	Model Name	Serial No.	Manufacturer	Remarks
QAM-B	WC10HD	N/A	Digital Multimedia Technology Co., Ltd.	-
ACCESSORY				
Category	Model Name	Serial No.	Manufacturer	Remarks
Industrial PC	MHG-10	11MH-G006	MFLO	-
TV monitor	LT-26H6TVH	DO8090SR100075	N/A	-
IR Sensor	N/A	N/A	N/A	-

1-6 Cable List

Cable List				
Type	Length	Shielding (Cable/backshell)	Remarks	
			From	to
JIG	0.7 m	NO / NO	RF OUT	LNB
IR Sensor	2.5 m	NO / NO	IR IN	-
Scart gender	1.2 m	NO / NO	A/V OUT	VIDEO
POWER	1.4 m	NO / NO	DC 5V IN	2Pin AC Line

1-7 Block diagram of the EUT test



Note) refer to the Test setup photograph.

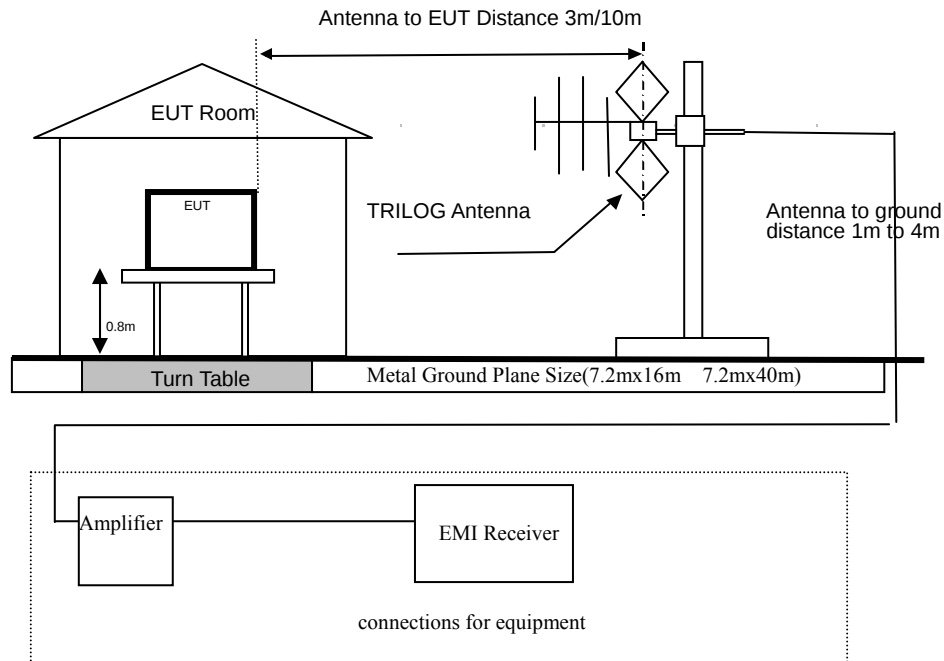
2- Test Site Description

1-Facility

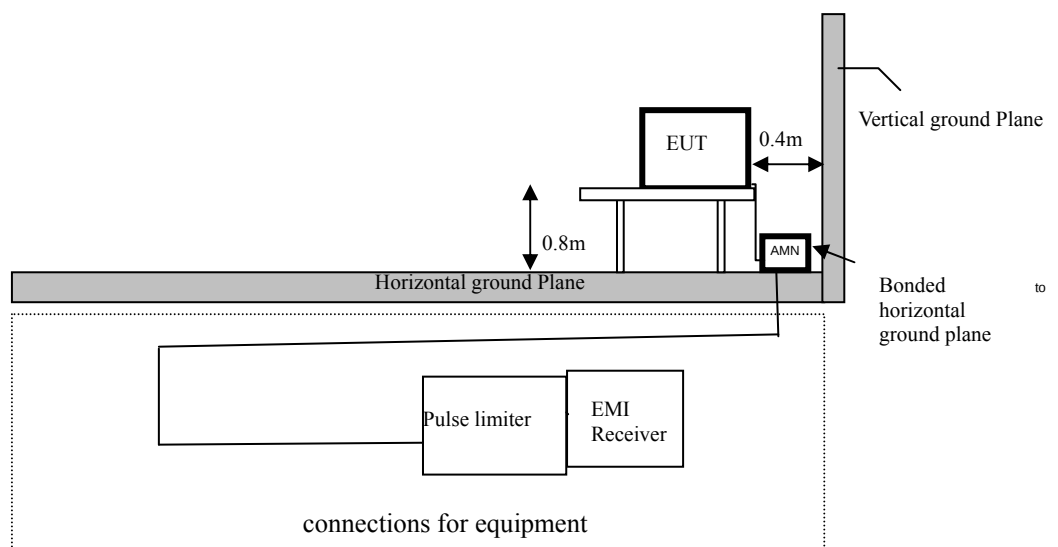
All the testing facilities are periodically serviced as a daily check for equipment and cables systems, an every 6 months facility check for the facilities and a monthly check and annual calibration for testing equipment according to ISO/IEC 17025. All the testing facilities are used as the same specifications shown below. There are descriptions both for radiated disturbance measurement and conducted disturbance measurement conformed by ANSI C 63.4:2003.

The NSA measurement of the OATS was performed on January 18, 2011 according to ANSI C 63.4 : 2003.

2-1 Radiated Disturbance Measurement



2-2 Conducted Disturbance Measurement



3- Test Procedure

3-1 Radiated Disturbance Measurements

- Test site is met the requirements of ANSI C 63.4:2003 and the distance between the EUT and the antenna is adjusted 3m/10m.
- The turntable can be rotated 360 degrees.
- The antenna can be adjusted between 1m and 4m in height above the ground.
- The EUT is placed on the non-conducting table with 0.8m height on the turntable.
- Measurements are carried out using a EMI test receiver with peak detectors (100kHz bandwidth) and an EMI receiver with quasi-peak detectors(120kHz bandwidth).
- Refer to the list of test equipment used for the test.
- TRILOG antenna are used as wideband antenna.
- The TRILOG antenna is used in the frequency range of 30MHz to 1000MHz, the Horn antenna is used in the frequency range of 1GHz to 18GHz.
- A variable attenuator is used for verifying amplifier's linearity.
- Rotating the turntable and adjusting the height of the antenna are carried out by control buttons on the console.
- Refer to "Brief Information"(page 7-8) about details of the EUT and configuration of the cables.

- Measurement is carried out by a LTA operator as manual operation.
 - searching for some of High disturbance frequency points than the other points with the following settings; bandwidth 100kHz, frequency range 10MHz between 30MHz and 300MHz and frequency range 50MHz between 300MHz and 1GHz.
 - searching the worst direction with the maximum level of the disturbance wave in rotating the turntable 360 degrees at each searched frequency point.
 - setting the height of the antenna with the maximum level of the disturbance wave from 1m to 4m.
 - reading the disturbance level by the EMI receiver with quasi-peak detectors (120kHz bandwidth) according to ANSI C 63.4:2003.
 - measuring to vertical and horizontal polarization.
 - calculating the measurement result with the following formula or equation:
(Measurement result= measured value + antenna factor + antenna cable loss)

3-2 Conducted Disturbance Measurements

- The measurement is carried out on an open site with horizontal and metallic ground plane.
- An AMN(Artificial Mains Network) with a nominal impedance ($50\Omega/50\mu\text{H}$) as defined in ANSI C 63.4:2003, shall be utilized.

- The AMN is grounded on a horizontal metal ground plane.
- Measurement is carried out using an EMI receiver with quasi-peak detectors and average detector.

(Refer to the List of test equipment used for the test.)

- The shortest distance between the EUT and the AMN is 0.8m.
- The EUT is placed on the non-conducting table with 0.8m height.
- A remote switch is used for changing phases between Line (L) and Neutral (N).
- Refer to "Brief Information"(page 5-8) about details of the EUT and configuration of the cables.

- Measurement is carried out as manual operation.

-detecting the maximized emission level using the maxhold function after setting the spectrum analyzer bandwidth 1MHz and the frequency range from 150kHz to 1MHz , 1MHz to 5MHz and 5MHz to 30MHz.

—searching the maximum frequency point of the disturbance wave in each frequency range.

—reading the disturbance level of quasi-peak, average and Line (L) and Neutral (N) in 9kHz bandwidth by the EMI receiver.

—calculating the measurement result with the following formula or equation.

$$(\text{Result} = \text{Reading} + \text{Cor.F.})$$

$$(\text{Margin} = \text{Limit} - \text{Result})$$

3-3 Antenna Conducted Power Emissions Measurement

Power on the receive antenna terminals was to be determined by measurement of the voltage present at these terminals. Antenna-conducted power measurements was performed with the EUT antenna terminals connected directly to measuring instrument using a impedance-Matching network to connect the measurement Instrument to the antenna terminals of the EUT. Losses in decibels in impedance-matching network used was added to the measured values in dBuV. With the receiver tuned to one of the number of frequency and voltage present at the antenna input terminals over the frequency range specified in the individual equipment requirements, The measurements was repeated with the receiver tuned to another frequency until the number of frequencies had been successively measured. Power in the receive antenna terminals in the ratio of V^2/R , where V is the loss-corrected voltage measured at the antenna terminals, and R is the impedance of the measuring instrument.

3-4 Output Conducted level Emissions Measurement

The output signal level was the maximum voltage level present at the output terminal of EUT On a particular frequency during normal use. Measurement was made of the levels of the aural carrier, visual carrier and all spurious emissions. Measurement was made by direct connection to the measuring instrument with Proper impedance matching between the measuring instrument and the EUT. Losses in decibels in impedance-matching network used was added to the measured values in dBuV. The cable was supported between the EUT and the measuring instrument in a straight horizontal line so it had at least 75cm clearance from any conducting surface. The EUT was provided with a typical signal consistent with normal operation. For each channel on which the EUT operated the level the video carrier, audio carrier, the spurious emissions over the Frequency range measured and recorded.

3-5 Conducted Spurious Emissions

At any RF output terminal, the maximum measured RMS voltage, in microvolts, corresponding to the Peak envelope power of the modulated signal during maximum amplitude peaks across a resistance(R in ohms) matching the rated output impedance of the TV interface device, of any emission appearing on Frequencies removed by more than 4.6MHz below or 7.4MHz above the video carrier frequency on frequencies interface device is operated shall not exceed the following

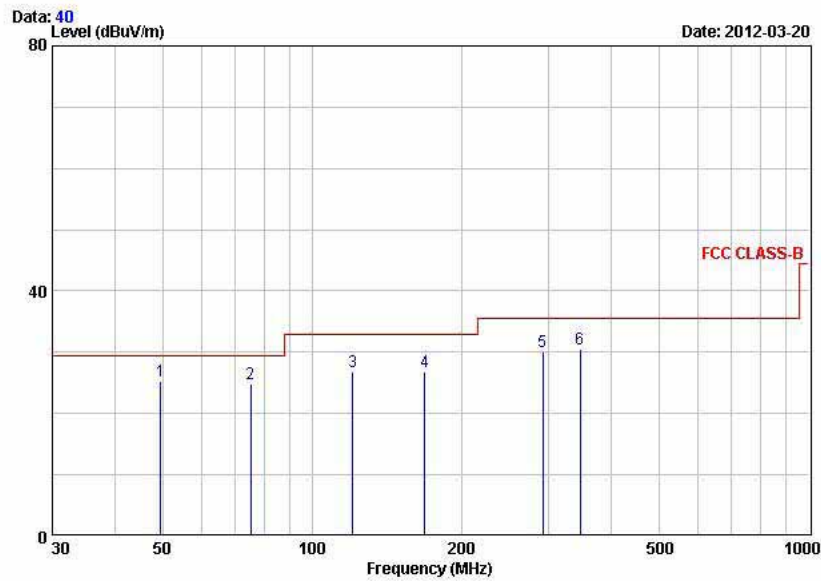
- (i) For a cable system terminal device or a TV interface device used with a master antenna, 692.8 times the square root of (R)
- (ii) For all other TV interface devices, 10.95 times the square root of (R)

4- List of Equipment Used For the Tests

	Item	Model Name	Serial No.	Manufacturer	Interval	Last Cal.
1	EMI TEST Receiver	ESCI7	100722	R&S	1 year	Oct-11
2	Two-Line V-Network <MAIN>	ENV216	100408	R&S	1 year	Oct-11
3	Two-Line V-Network <SUB>	ESH3-Z5	893045/017	R&S	1 year	Oct-11
4	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	2 year	Oct-10
5	HORN ANTENNA	BBHA 9120D	9120D122	SCHWARZBECK	2 year	Dec-10
6	Amplifier (1 - 18GHz)	8449B	3008A02126	Agilent	1 year	Mar-11
7	ABSORBING CLAMP	MDS21	3665	SCHWARZBECK	2 year	Aug-10
8	V-NETWORK	ESH3-Z6	100378	R&S	1 year	Oct-11
9	Pulse Limiter	ESH3-Z2	100710	R&S	1 year	Mar-11
10	RF AMPLIFIER(~1.3GHz)	8447D OPT 010	2944A07684	HP	1 year	Oct-11
11	e3 software	e3	5.5.201a	AUDIX	-	-
12	Impedance Stabilization Network	ISN T800	27109	TESEQ	1 year	Feb-11
13	Impedance Stabilization Network	ENY81-CA6	101565	R&S	1 year	Jan-12
14	EZ-17 RF-CURRENT PROBE	EZ-17	100508	R&S	1 year	Jan-12
15	Attenuator (3dB)	8491A	37822	HP	2 year	Oct-10
16	Attenuator (10dB)	8491A	63196	HP	2 year	Oct-10
17	Hygro-Thermograph	THB-36	0041557-01	ISUZU	1 year	Apr-11
18	Mini-Circuits Splitter	ZFSC-2-2500	SF617800326	Mini-Circuits	N/A	N/A
19	Mini-Circuits Splitter	ZFM-150	15542	Mini-Circuits	N/A	N/A
20	Spectrum Analyzer (- 2.9GHz)	8594E	3624A03313	HP	2 year	Mar-10
21	Test Receiver(~30MHz)	ESHS10	828404/009	R&S	1 year	Mar-11

5-1 Radiated Disturbance Measurements

EUT/Model No.: WC10HD TEST MODE: Wireless + QAM B mode
Temp Humi : 4 / 22 Tested by: PARK.H.W



Freq	Reading	C.F	Result	Limit	Margin	Height	Angle	Polarity
MHz	dBuV/m	dB/m	dBuV/m	QP	dB	cm	deg	
1 49.55	40.66	-15.41	25.25	29.50	4.25	100	301	VERTICAL
2 75.33	43.26	-18.35	24.91	29.50	4.59	100	32	VERTICAL
3 120.78	43.34	-16.58	26.76	33.00	6.24	400	113	HORIZONTAL
4 168.68	39.97	-13.26	26.71	33.00	6.29	400	195	HORIZONTAL
5 291.56	41.18	-11.14	30.04	35.60	5.56	150	205	HORIZONTAL
6 346.74	40.26	-9.75	30.51	35.60	5.09	338	272	HORIZONTAL

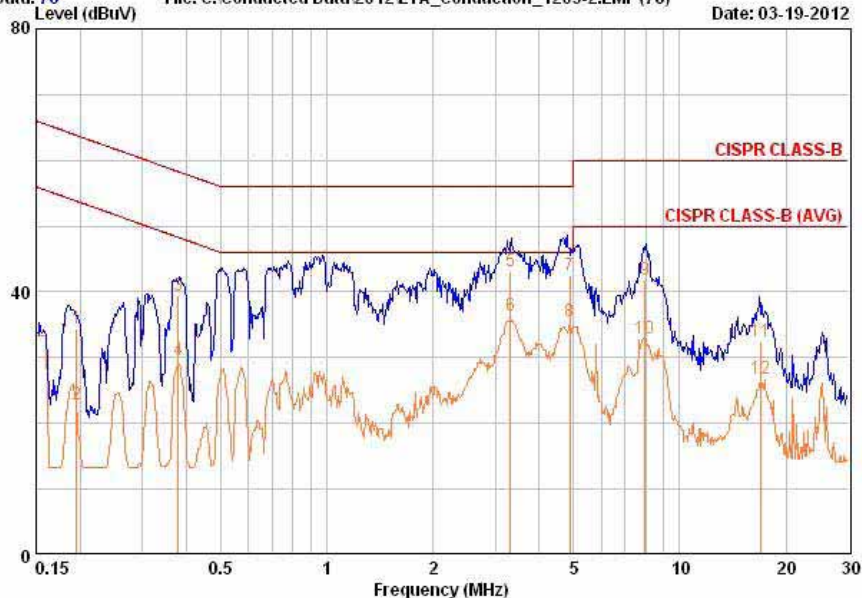
Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

5-2 Conducted Disturbance Measurements

LINE

EUT / Model No. : WC10HD	Phase : LINE
Test Mode : Wireless + QAM-B mode	Test Power : 120 / 60
Temp./Humi. : 22 / 31	Test Engineer : Park H W

Data: 78 File: C:\Conducted Data\2012\LTA_Conduction_1203-2.EMI (78) Date: 03-19-2012



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.195	24.74	13.34	9.62	34.36	22.96	63.82	53.82	29.46	30.86
0.379	29.93	20.13	9.62	39.55	29.75	58.30	48.30	18.76	18.56
3.310	33.40	26.70	9.71	43.11	36.41	56.00	46.00	12.89	9.59
4.878	32.86	25.86	9.74	42.60	35.60	56.00	46.00	13.40	10.40
7.973	32.21	23.11	9.73	41.94	32.84	60.00	50.00	18.06	17.16
16.962	22.49	16.89	10.00	32.50	26.90	60.00	50.00	27.50	23.10

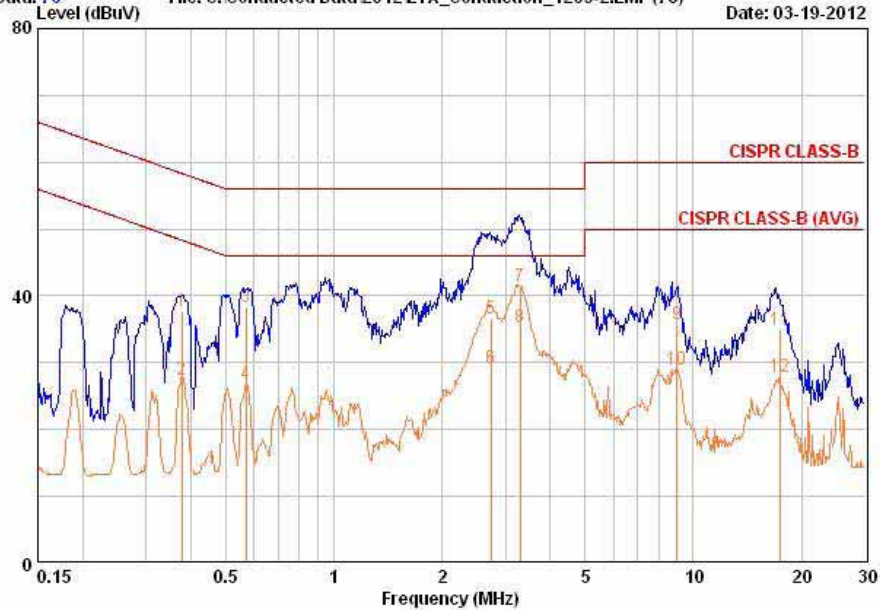
Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

5-2 Conducted Disturbance Measurements

Neutral

EUT / Model No. : WC10HD Phase : NEUTRAL
Test Mode : Wireless + QAM-B mode Test Power : 120 / 60
Temp./Humi. : 22 / 31 Test Engineer : Park H W

Data: 76 File: C:\Conducted Data\2012\LTA_Conduction_1203-2.EMI (78) Date: 03-19-2012



Freq	RD	RD	C.F	Result	Result	Limit	Limit	Margin	Margin
MHz	QP	AV	dB	QP	AV	QP	AV	QP	AV
	dBuV	dBuV		dBuV	dBuV	dBuV	dBuV	dB	dB
0.378	28.03	17.73	9.63	37.66	27.36	58.32	48.32	20.66	20.96
0.570	28.72	17.22	9.66	38.38	26.88	56.00	46.00	17.62	19.12
2.740	26.98	19.58	9.70	36.68	29.28	56.00	46.00	19.32	16.72
3.295	31.70	25.70	9.68	41.38	35.38	56.00	46.00	14.62	10.62
9.011	26.04	19.34	9.72	35.76	29.06	60.00	50.00	24.24	20.94
17.383	24.99	18.09	9.91	34.90	28.00	60.00	50.00	25.10	22.00

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss

5-3 Antenna Conducted Power Emissions Measurement

Test procedure: ANSI C 63.4:2003
FCC Part 15.111(a), 15.31(m), 15.33(b) : (October 1,2010)

Date of measurement: 23-Mar-12 Temperature: [18] Humidity: [%] 32

Mode: The fundamental and 2nd harmonic freq. of the local oscillator

Frequency (MHz)	Har.	Level (dBuV)	C.L (dB/m)	Result (dBuV)	Limit (nW)	Limit (dBuV)	Margin (dBuV)
1119.5	1	"There was no found any emission			2.0	50.0	N/A
	2	during the above test"			2.0	50.0	N/A
1587.5	1	"There was no found any emission			2.0	50.0	N/A
	2	during the above test"			2.0	50.0	N/A
1981.0	1	"There was no found any emission			2.0	50.0	N/A
	2	during the above test"			2.0	50.0	N/A

Note)

1	The value for 3 frequency were less then 30dBuV
2	C.L: Cable loss
3	N/A = Not Applicable

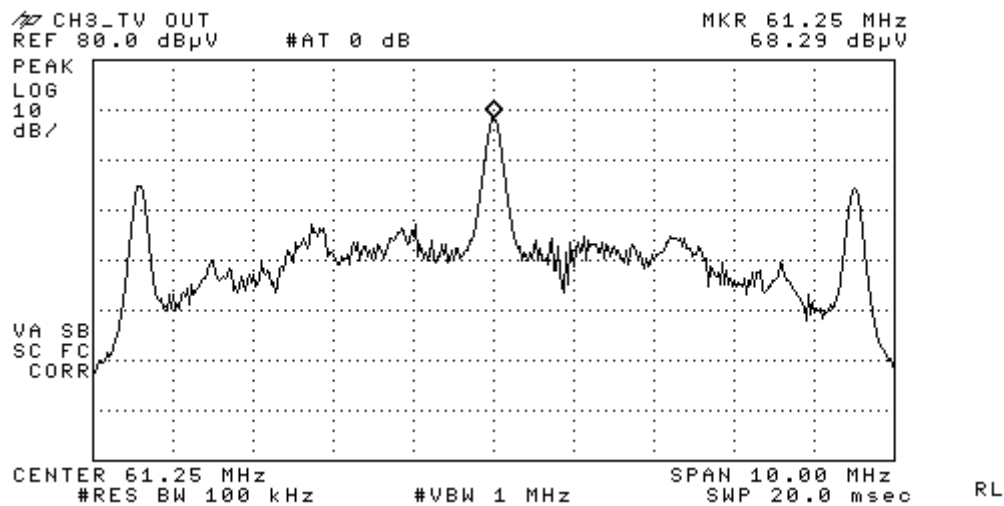
5-4 Output Conducted level Emissions Measurement

Test procedure: ANSI C 63.4:2003
FCC Part 15.115(b)(1) : (October 1,2010)

Date of measurement: 23-Mar-12 Temperature: [21] Humidity: [%] 40

Mode: QAM-B channel 3

CH.	Frequency (MHz)	level (dB μ V)	C.L (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)
CH 3	56.83	54.8	0.5	55.3	62.5	7.2
	61.25	68.3	0.5	68.8	75.5	6.7
	65.75	54.4	0.5	54.9	62.5	7.6



TEST EQUIPMENT USED: 01,15,16,17,18,19,20

5-4 Output Conducted level Emissions Measurement

-Continue

Test procedure: ANSI C 63.4:2003

FCC Part 15.115(b)(1) : (October 1,2010)

Date of measurement: Temperature: [] Humidity: [%]

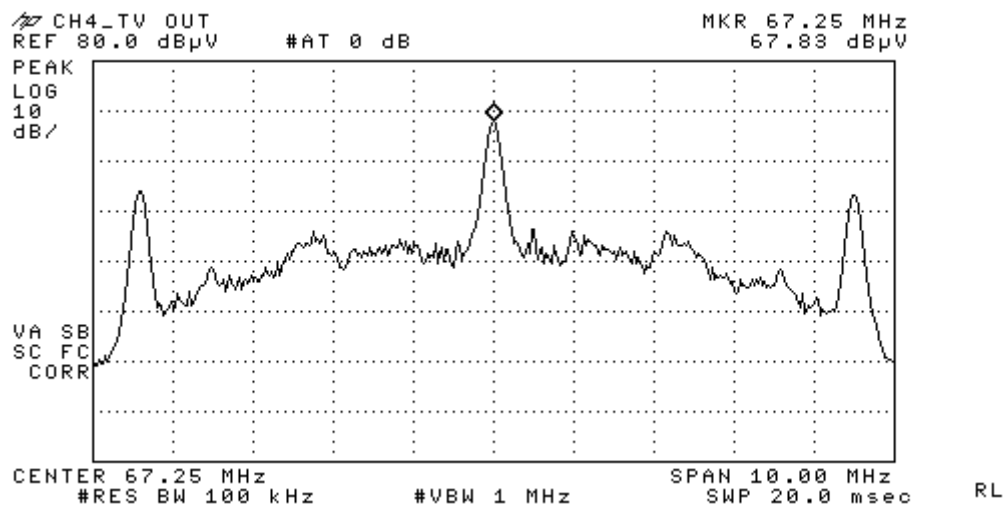
23-Mar-12

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Mode: QAM- B channel 4

CH.	Frequency (MHz)	level (dB μ V)	C.L (dB)	Result (dB μ V)	Limit (dB μ V)	Margin (dB)
CH 4	62.83	54.0	0.5	54.5	62.5	8.0
	67.25	67.8	0.5	68.3	75.5	7.2
	71.75	53.3	0.5	53.8	62.5	8.7



TEST EQUIPMENT USED: 01,15,16,17,18,19,20

5-5 Conducted Spurious Emissions

Test procedure: ANSI C 63.4:2003

FCC Part 15.115(b)(2) : (October 1,2010)

Date of measurement: Temperature: [] Humidity: [%]

23-Mar-12

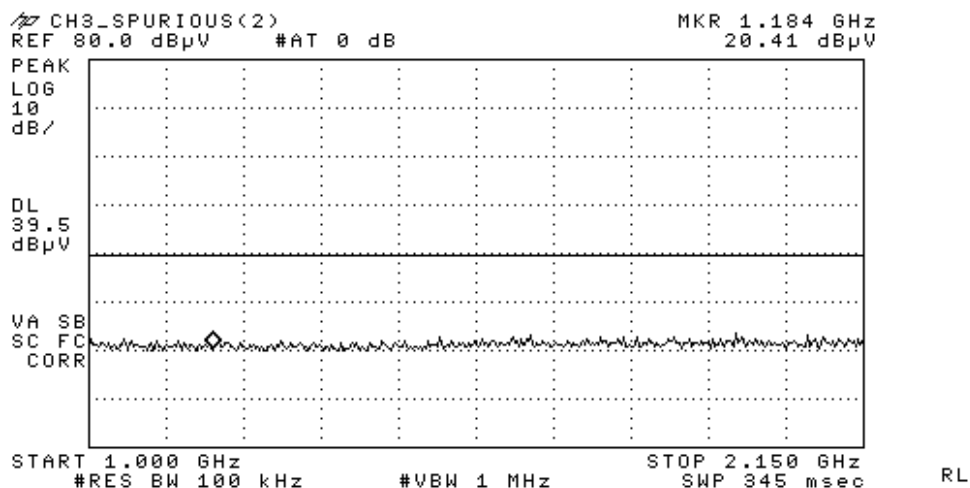
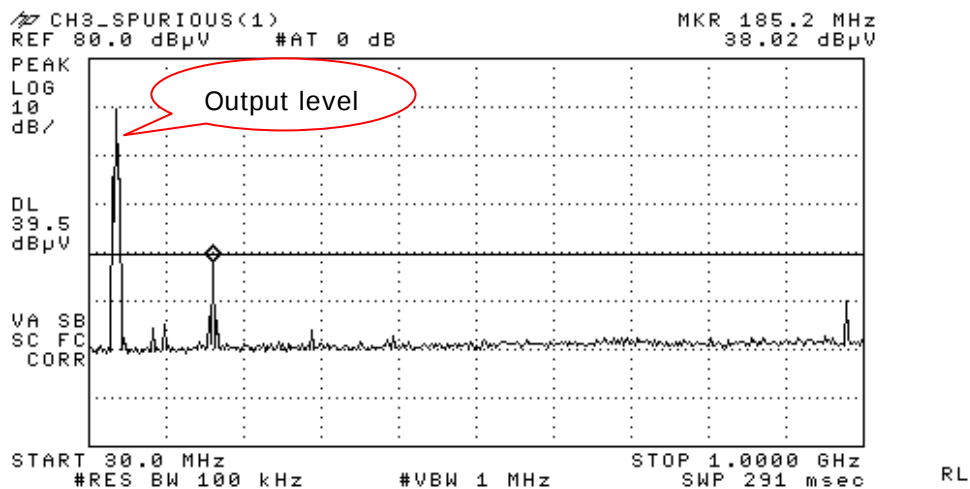
21

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Mode: QAM- B channel 3

CH 3

Frequency MHz	Peak Value dBuV/75ohm	Limit dBuV	Margin dB	Frequency MHz	Peak Value dBuV/75ohm	Limit dBuV	Margin dB
185.2	38.0	75.5	37.5	*	*	*	*
980.6	30.3	75.5	45.2	*	*	*	*
*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*



TEST EQUIPMENT USED: 01,15,16,17,18,19,20

5-5 Conducted Spurious Emissions

-Continue

Test procedure: ANSI C 63.4:2003: (October 1,2010)

FCC Part 15.115(b)(2)

Date of measurement: Temperature: [] Humidity: [%]

23-Mar-12

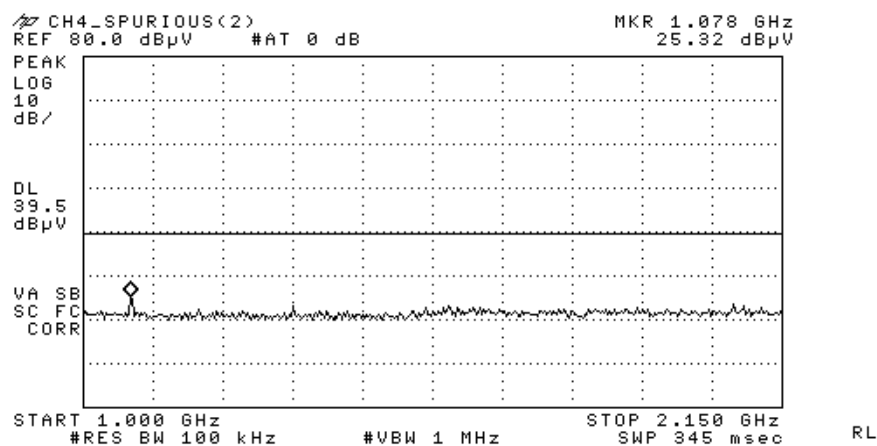
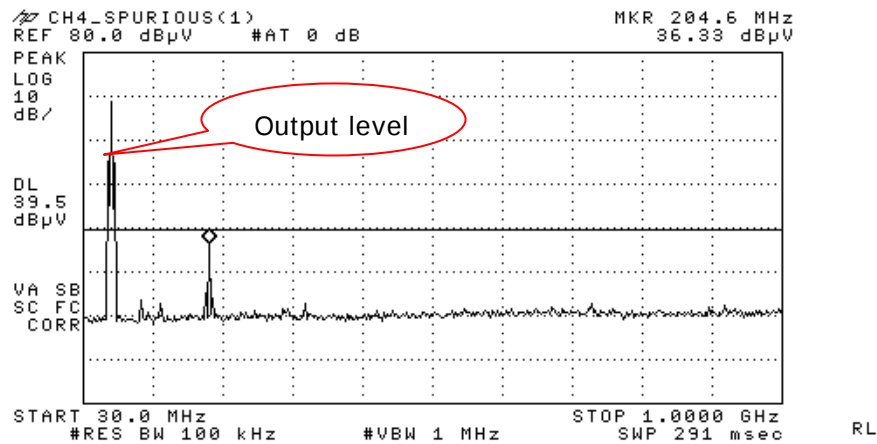
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Mode: QAM- B channel 4

CH 4

Frequency MHz	Peak Value dBuV/75ohm	Limit dBuV	Margin dB	Frequency MHz	Peak Value dBuV/75ohm	Limit dBuV	Margin dB
204.6	36.3	75.5	39.2	*	*	*	*
1078.0	25.3	75.5	50.2	*	*	*	*
*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*



TEST EQUIPMENT USED: 01,15,16,17,18,19,20

Conclusions

Product models " **WC10HD**" meets all of the Class B requirements of the FCC Part 15, Subpart A (Limits of Antenna conducted power emissions, Output conducted level emissions and Conducted spurious emissions) and Subpart B (Limits of radio disturbance characteristics of ITE).

(Refer to Test Specification and Test Results in the "LTA certification", page 3 and 4.)