

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CERTIFICATION

Test Report No. : E068R-046

AGR No. : A063A-163R

Applicant : 2MTECH Inc.
Address : 7th Block, 1st Lot, Naksan-ri, Waegwan-eup, Chilgok-gun, Gyeongsangbuk-do,
718-801, Korea

Manufacturer : 2MTECH Inc.
Address : 7th Block, 1st Lot, Naksan-ri, Waegwan-eup, Chilgok-gun, Gyeongsangbuk-do,
718-801, Korea

Type of Equipment : T-DMB(DAB) Navigation System (FM Transmitter)

FCC ID. : UJO-ZAMM-TM

Model Name : ZAMM-TM1

Multiple Model Name : CoolNavi-700

Serial number : N/A

Total page of Report : 13 pages (including this page)

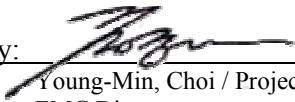
Date of Incoming : July 06, 2006

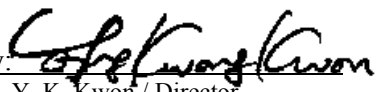
Date of Issuing : August 24, 2006

SUMMARY

The equipment complies with the regulation of *FCC CRF 47 PART 15, SUBPART C, SECTION 15.239*.

This test report contains only the results of a single test of the sample supplied for the examination. It is not a general valid assessment of the features of the respective products of the mass-production.

Prepared by: 
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ONETECH Corp.

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1. VERIFICATION OF COMPLIANCE

- APPLICANT : 2MTECH Inc.
- ADDRESS : 7th Block, 1st Lot, Naksan-ri, Waegwan-eup, Chilgok-gun, Gyeongsangbuk-do, 718-801, Korea
- CONTACT PERSON : Mr. Chul-Gu, Jung / Assistant Manager
- TELEPHONE NO : +82-54-977-2500
- BRAND NAME : ZAMM / CoolNavi
- FCC ID : UJO-ZAMM-TM
- MODEL NAME : ZAMM-TM1
- SERIAL NUMBER : N/A
- DATE : August 24, 2006

DEVICE TYPE	Low Power Communication Device Transmitter
E.U.T. DESCRIPTION	T-DMB(DAB) Navigation System (FM Transmitter)
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	Charter 7 and 13 of ANSI C63.4: 2003
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.239
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER 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. GENERAL INFORMATION

2.1 Product Description

The 2MTECH Inc., Model ZAMM-TM1 (referred to as the EUT in this report) is a T-DMB(DAB) Navigation System that has the FM transmitter from 88.5 MHz to 107.5 MHz for audio signal of FM radio receiver. Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	7.3728 MHz on the CPU Board 24.576 MHz on the Video Input Processor and Audio Codec Chip
POWER REQUIREMENT	DC 12V from a car battery
TX FREQUENCY RANGE	88.5 MHz ~ 107.5 MHz (range into 200 kHz Step)
NUMBER OF LAYERS	10 Layers
EXTERNAL CONNECTOR	Video In, EAR, USB, DMB ANT., DC In, CF and SD Card

2.2 Model Differences

The difference(s) compared to the EUT is as follows:

	Model	Model Differences
Basic Model	ZAMM-TM1	-
Multiple Model	CoolNavi-700	Only type designation according to the buyer's request.

2.3 Related Submittal(s) / Grant(s)

-. Original submittal only

2.4 Test System Details

The model numbers for all the equipments which were used in the tested system is:

Model	Manufacturer	FCC ID	Description	Connected to
ZAMM-TM1	2MTECH Inc.	UJO-ZAMM-TM	T-DMB(DAB) Navigation System(EUT)	-
DVD2000	Taeyoung Telstar	N/A	DVD Player	EUT
AXIS 2.0	Hana Micron	QH7AXIS20	Memory Stick	EUT
N/A	N/A	N/A	Earphone	EUT
HPC-CF100V	ACE S and C	N/A	CF Memory	EUT
N/A	N/A	N/A	SD Memory	EUT

2.5 Test Methodology

The radiated testing was performed according to the procedures in chapter 7, 13 of ANSI C63.4: 2003 and performed at a distance of 3 meters 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, Kwangju-City, Kyunggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on August 30, 2005. (Registration Number: 340658)

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EMC-002 (Rev.0)

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(TEL: +82-31-746-8500, FAX: +82-31-746-8700)

EMC Testing Dept : 307-51 Daessangryung-Ri, Chowol-Eup, Kwangju-City, Kyunggi-Do, 464-860, Korea. (TEL: +82-31-765-8289, FAX: +82-31-766-2904)

3. SYSTEM TEST CONFIGURATION

3.1 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	2MTECH	ZAMM	N/A
LCD	HITACHI	TX18D11VM1CAA	N/A
GPS Antenna	N/A	RGM-3311	N/A

3.2 EUT exercise Software

The Model, ZAMM-TM1 is included a FM transmitter designed to operate on function in the 88.5 ~ 107.5 MHz. The EUT has audio input ports, so the input ports were connected to a DVD player and audio signal was supplied with 1 kHz modulation and then the EUT was transmitted with maximum audio level.

3.3 Cable Description

Ports Name	Shielded	Ferrite Bead	Metal Hood	Length (m)	Connected to
Video In	N	N	BOTH END	1.5	DVD Player
EAR	N	N	EUT END	1.5	Headphone
USB	N/A	N/A	EUT END	Direct Inserted	Memory Stick
DMB Ant.	N	N	EUT END	1.5	DMB Ant.
DC In	N	N	EUT END	1.2	Car Battery
CF & SD Card	N/A	N/A	EUT END	Direct Inserted	CF & SD Card
Audio In	N	N	BOTH END	1.5	DVD Player

3.4 Equipment Modifications

-. None

3.5 Configuration of Test System

Line Conducted Test: It is not need to test this requirement, because the EUT shall be operated by car battery.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.4: 2003 8.3.1.1 and 13.1.4.1 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter open area test site.

Occupied Bandwidth Measurement:

This measurement is performed with the antenna located close enough to give a full-scale deflection of the modulated carrier on the spectrum analyzer.

3.6 Antenna Requirement

For intentional device, 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:

FM transmitter antenna of the EUT is fixed inside the EUT, no consideration of replacement by the user.

4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, 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 EUT shall be operated by car battery.	

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Transmit the RF Signal continuously	X

5. FINAL RESULT OF MEASUREMENT

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level

5.1 Radiated Emission Test (Within the permitted 200 kHz band)

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

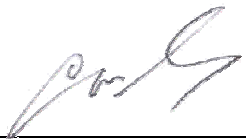
Humidity Level : 41% Temperature: 25°C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (b)
Type of Test : Low Power Communication Device Transmitter
Result : PASSED BY -3.80 dB at 98.70 MHz

EUT : T-DMB(DAB) Navigation System Date: July 24, 2006
Distance : 3 Meter

Radiated Emission			Ant	Correction Factors		Total	Limit (dBuV/m)	Margin (dB)
Freq. (MHz)	Amp. (dBuV)	Detect Mode	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)		
88.50	34.10	Peak	H	7.97	1.73	43.80	48.00	-4.20
98.70	32.50	Peak	V	9.80	1.90	44.20	48.00	-3.80
107.30	31.10	Peak	H	10.99	1.90	43.99	48.00	-4.01

Radiated Emission Tabulated Data

Remark: The peak values at each frequency were investigated under average limit, so the average mode was not performed.


Tested by: In-Sub, Youn / Test Engineer

5.2 Radiated Emission Test (Outside of the specified 200 kHz band)

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

Humidity Level : 45 % Temperature: 24 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.209 (a)
Type of Test : Low Power Communication Device Transmitter
Result : PASSED BY -2.32 dB at 297.01MHz

EUT : T-DMB(DAB) Navigation System Date: July 24, 2006
Frequency range : 30MHz – 1000MHz
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)
Distance : 3 Meter
Remark : Other emissions

Radiated Emission		Ant	Correction Factors		Total	FCC	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
99.91	24.60	V	10.01	1.90	36.51	43.52	-7.01
123.30	18.90	H	12.93	2.07	33.90	43.52	-9.62
147.44	20.30	H	14.52	2.33	37.15	43.52	-6.37
176.92	16.90	H	15.46	2.68	35.04	43.52	-8.48
297.01	19.90	H	20.04	3.76	43.70	46.02	-2.32
599.96	16.20	V	20.07	5.30	41.57	46.02	-4.45
643.20	16.10	H	21.14	5.65	42.89	46.02	-3.13

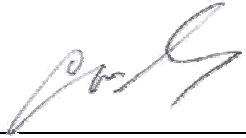

Tested by: In-Sub, Youn / Test Engineer

5.3 Bandwidth of the operating frequency

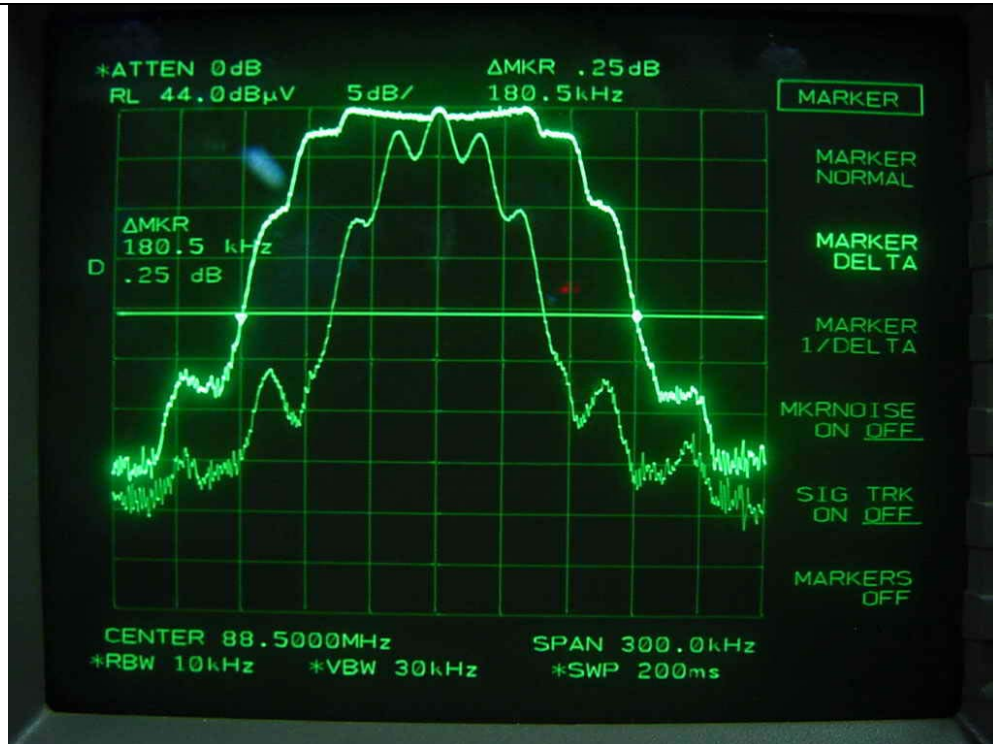
Humidity Level : 45 % Temperature: 24 °C
Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.239 (a)
Result : PASSED

EUT : T-DMB(DAB) Navigation System Date: July 24, 2006
Operating Condition : Transmit the RF signal.
Minimum Resolution
Bandwidth : 10 kHz
Remark : Refer to test data in next page.

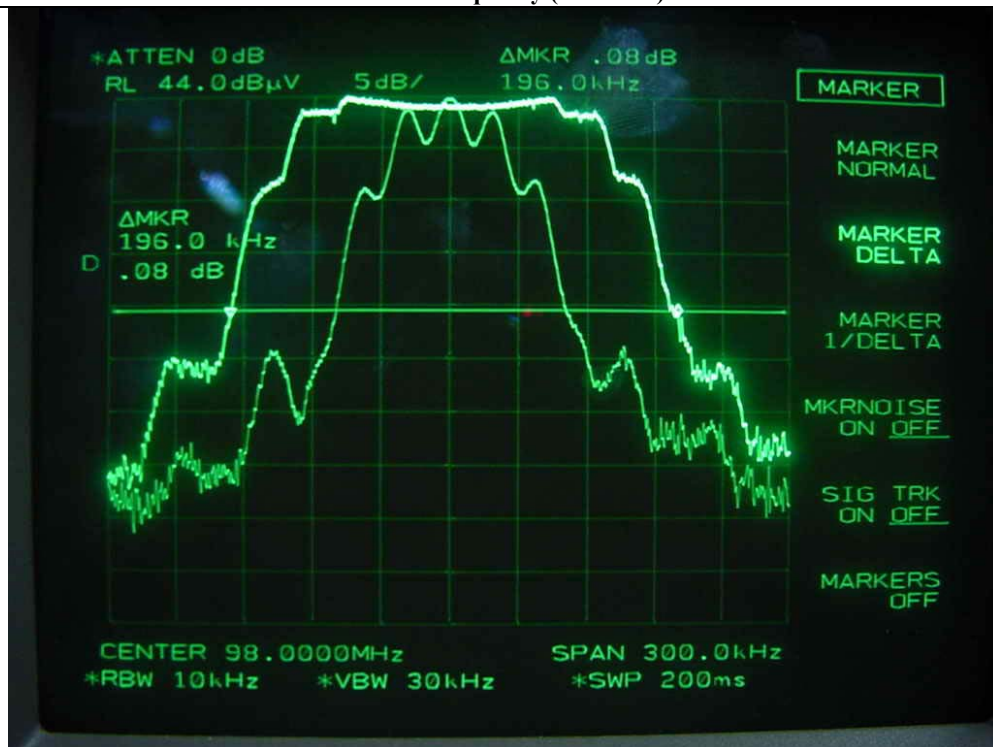
Frequency (MHz)	Measured Value (kHz)	Limit (kHz)	Margin (kHz)
88.5	180.5	200	-19.5
98.0	196.0		-4.0
107.5	193.0		-7.0



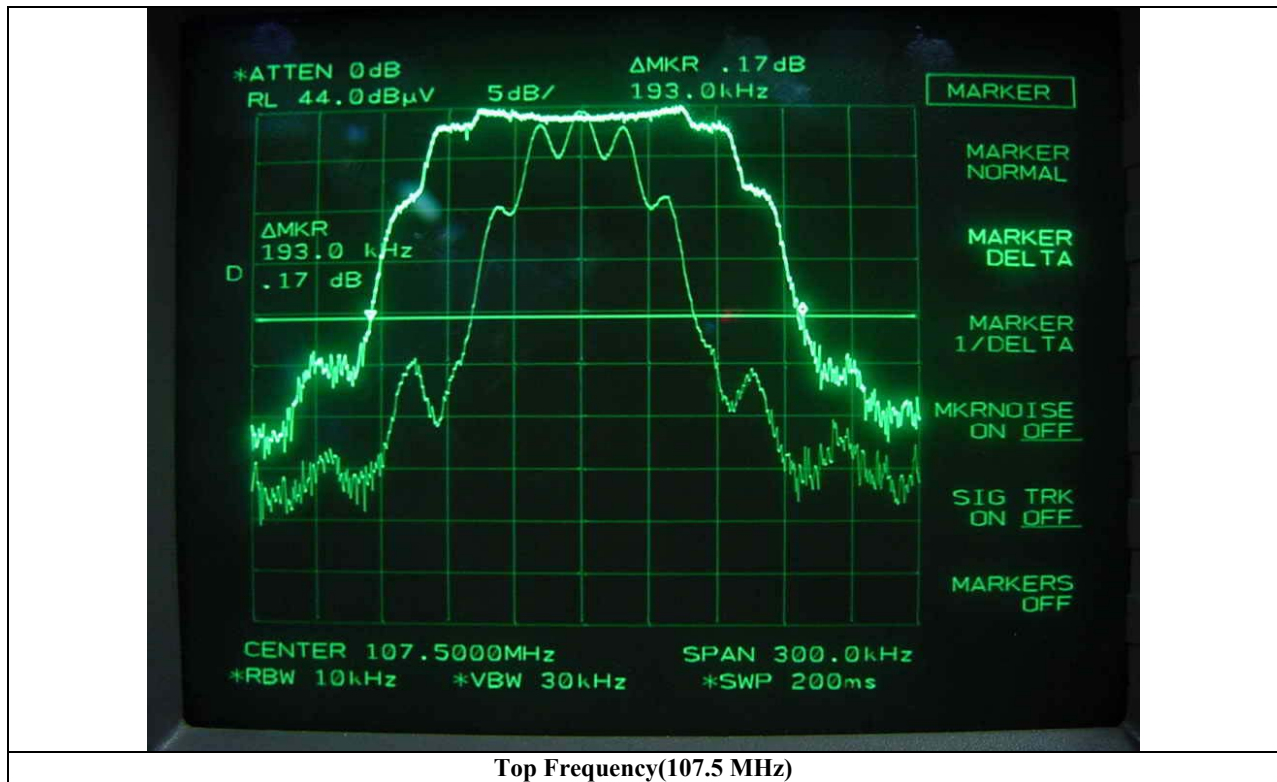
Tested by: In-Sub, Youn / Test Engineer



Bottom Frequency (88.5MHz)



Middle Frequency (98.0MHz)



6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)

7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS10	827864/005	DEC/05	12MONTH	■
2.	Test receiver	R/S	ESHS 10	834467/007	MAY/06	12MONTH	■
3.	Spectrum analyzer	HP	8566B	3407A08547	JUN/06	12MONTH	■
4.	TRILOG Broadband Antenna	Schwarzbeck	VULB9163	VULB9163 166	MAY/06	12MONTH	
5.	Biconical antenna	EMCO	3110	9003-1121	FEB/06	12MONTH	
		Schwarzbeck	VHA9103	91031852	FEB/06		■
6.	Log Periodic antenna	EMCO	3146	9001-2614	FEB/06	12MONTH	
		Schwarzbeck	9108-A(494)	62281001	FEB/06		■
7.	LISN	EMCO	3825/2	9109-1867	JUN/06	12MONTH	■
				9109-1869	JUN/06		
		Schwarzbeck	NSLK 8126	8126-404	AUG/05		■
8.	Position Controller	HD GmbH	HD100	N/A	N/A	N/A	■
9.	Turn Table	HD GmbH	DS420S	N/A	N/A	N/A	■
10.	Antenna Master	HD GmbH	MA240	N/A	N/A	N/A	■