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VERIFICATION TEST REPORT

Report Number:	2009 05127987 FCC
Project Number:	28035-1
Nex Number:	127987
Applicant:	GLOBAL MICROWAVE SYSTEMS 1916 PALOMAR OAKS WAY, STE. 100 CARLSBAD, CA 92008
Equipment Under Test (EUT):	HI-DEF VIDEO TRANSMITTER
Model:	M2T
FCC ID:	KPB-M2T-D3
In Accordance With:	FCC Part 2 Subpart J, 2.1053
Tested By:	Nemko USA Inc. 11696 Sorrento Valley Road, Suite F San Diego, CA 92121
Authorized By:	 Alan Laudani, EMC/RF Test Engineer
Date:	May 16, 2009
Total Number of Pages:	17

Section1: Summary of Test Results

General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 74.637 and FCC Part 90.210. Radiated tests were conducted is accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and IC.

The assessment summary is as follows:

Apparatus Assessed:	Hi-Def Video Transmitter
Model:	M2T
Specification:	FCC Part 74 Subpart F, 74.637 FCC Part 90 Subpart I, 90.210
Date Received in Laboratory:	May 11, 2009
Compliance Status:	Complies
Exclusions:	Verified only to FCC Part 2.1053 Radiated Spurious Emissions. All other requirements mandated by the specification standard/s will be provided by the client and will be performed conductively from the RF output port.
Non-compliances:	None

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1.1 Report Release History

REVISION	DATE	COMMENTS
-	May 16, 2009	Prepared By: Ferdinand Custodio
-	May 16, 2009	Initial Release: Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY: _____ Date: May 16, 2009
Ferdinand S. Custodio, EMC Test Engineer

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Section 2: Equipment Under Test

2.1 Product Identification

The Equipment Under Test was indentified as follows:

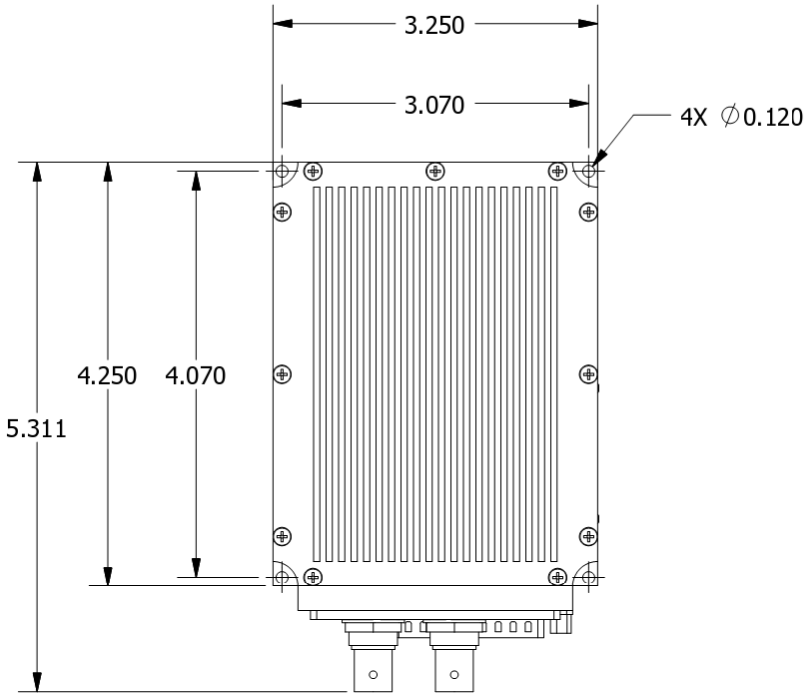
GLOBAL MICROWAVE SYSTEMS M2T HI-DEF VIDEO TRANSMITTER

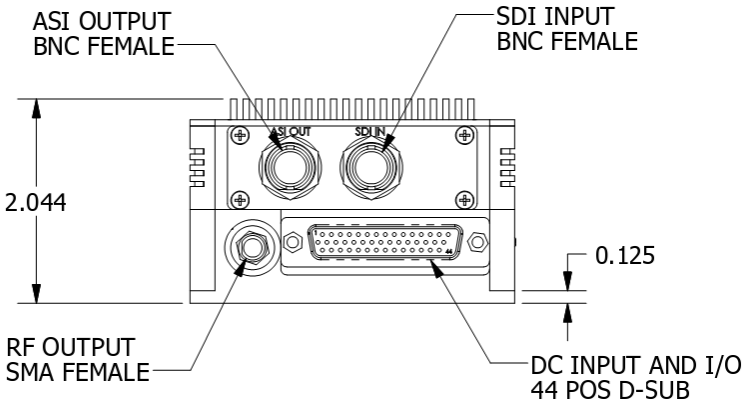
2.2 Samples Submitted for Assessment

The following sample of the apparatus has been submitted for type assessment:

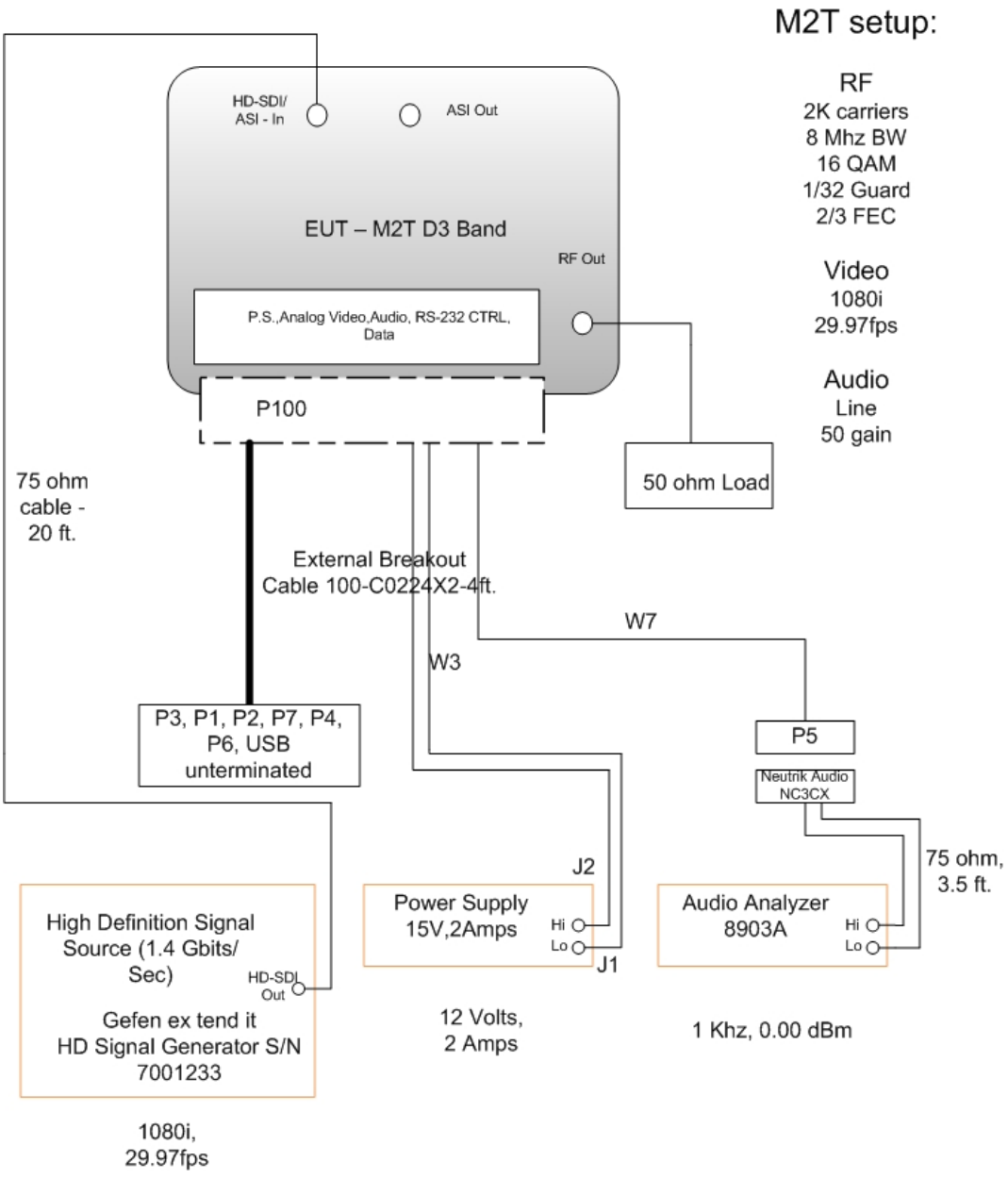
Sample No.	Description	Serial No.
127987-1	HI-DEF VIDEO TRANSMITTER	121707-79 (102408-07)

2.3 General Dimensions of EUT





2.4 Configuration of EUT during evaluation



2.5 Theory of Operation

The M2T is aHi-Def Video Transmitter. Its primary applications are for Electronics News Gathering (ENG), Sports, Point of View, Helicopter Links, UAV/UGV Applications and Mobile and Portable AV Applications.

The Messenger 2 Transmitter (M2T) accepts Standard Definition (SD) or High Definition (HD) 4:2:2 digital video or analog SD video and analog stereo audio inputs (Mic or Line level) or optional Embedded Audio (Future option) (up to a total of 2 Stereo pairs or 4 Mono channels). The video is compressed according to the Advanced Video Compression (AVC) / h.264 specifications. The low-latency AVC Encoder supports the Baseline Profiles with resolutions from 480 to 1080 with support for either interlaced or progressive formats. The audio is compressed using MPEG Layer II compression. Low rate user data up to 38.4K Baud can be optionally supported. The audio, video and user data packets PES streams are multiplexed with basic service data to indicate the service name. The stream can be scrambled with AES scrambling system to provide protection in sensitive applications.

2.6 Technical Specifications of the EUT

Manufacturer:	Global Microwave Systems
Operating Frequency Verified:	2050 MHz in the 1990 to 2110 MHz band 2465 MHz in the 2450 to 2483.5 MHz band
Bandwidth:	6,7 and 8 MHz Standard
Rated Power:	200mW at the RF Output connector (from specification)
Modulation:	COFDM with QPSK, 16QAM or 64QAM
RF Output Connector:	SMA Female
Power Source:	9-15VDC

Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 2 Subpart J, 2.1053
Equipment Authorization Procedures Certification – Measurement Required: Field strength of spurious radiation.

3.2 Deviations from Laboratory Test Procedures

No deviations from Laboratory Test Procedure

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	20 ^{o}C
Humidity range	:	62 %
Pressure range	:	101.2 kPa
Power supply range	:	12VDC from external PSU

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3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
746	Signal Generator	HP	8648B	3642U1905	22-Jan-09	22-Jan-10
765	Antenna Set, Dipole	EMCO	3121C	1214	25-Jul-08	25-Jul-10
755	Antenna, LPA	EMCO	3147	1246	10-Oct-07	10-Oct-09
317	Preamplifier	HP	8449A	2749A00167	16-Apr-09	16-Apr-10
902	pre amp	Sonoma	310 N	185803	17-Jul-08	17-Jul-09
116	Antenna, Bicon	EMCO	3110	1267	12-Nov-08	12-Nov-10
877	Antenna, DRG Horn, .7-18GHz	AH Systems	SAS-571	688	28-Jul-08	28-Jul-10
911	Spectrum Analyzer	Agilent	E4440A	US41421266	06-Nov-08	06-Nov-09

Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record of Technical Judgements

Verification test performed using Channel with worst emissions based from initial prescan inside a shielded room.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Test Deleted

See Section 1 Exclusions.

4.5 Additional Observations

There were no additional observations made during this assessment.

Appendix A: Test Results

Section 2.1053 (a) – Measurements required: Field strength of spurious radiation.

§2.1053(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required; with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half wave dipole antennas.

Test Conditions:

Sample Number:	M2T	Temperature:	20°C
Date:	May 11, 2009	Humidity:	62%
Modification State:	2050 MHz (worst case)	Tester:	FSCustodio
		Laboratory:	SOATS

Test Results:

See attached plots.

Additional Observations:

- Emissions were searched over a range of 30 MHz to 26500 MHz while in transmit mode.
- Investigations were made at 3 meters. The channel investigated was maximized in the OATS.
- A correction factor was added to compensate for antenna factor and cable loss at the fundamental frequencies, example below.
- Sample Computation:

Correction factor @ 243MHz = -17.5
= Antenna factor + Cable loss – Preamp gain
= 11.6 + 2.7 – 31.8

Corrected reading = Max. Reading + Correction factor
= 91.49 + (-17.5)
= 73.9 dBµV/m

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Radiated Emissions Data

Job # :	28035-1	Date :	5/11/2009	Page	1 of 1
NEX #:	127987	Time :	3:30PM		
		Staff :	FSC		

Client Name :	Global Microwave Systems	EUT Voltage :	12VDC
EUT Name :	High Def Video Transmitter	EUT Frequency :	
EUT Model # :	M2T	Phase:	
EUT Serial # :	121707-79 (102408-07)	NOATS	X
EUT Config. :	Transmitting at 2050 MHz terminated to	SOATS	
	50ohm load	Distance < 1000 MHz:	3 m
		Distance > 1000 MHz:	3 m

Specification :	CFR47 Part 2.1053, Part 74.637 and Part 90.210		
Loop Ant. #:	NA		
Bicon Ant.#:	116_3m	Temp. (°C) :	20
Log Ant.#:	755	Humidity (%) :	62
DRG Ant. #	NA	Spec An.#:	911
Cable LF#:	NOATS	Spec An. Display #:	911
Cable HF#:	NA	QP #:	911
Preamp LF#:	902	PreSelect#:	NA
Preamp HF#	NA		

Quasi-Peak	RBW:	120 kHz
	Video Bandwidth	300 kHz
Peak	RBW:	1 MHz
	Video Bandwidth	3 MHz
Average	RBW:	1 MHz
	Video Bandwidth	10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.

Measurements above 1 GHz are Average values, unless otherwise stated.

Meas. Freq. (MHz)	Meter Reading **Vertical**	Meter Reading **Horizontal**	Det.	EUT Side F/L/R/B	Ant. Height m	Max. Reading (dBµV)	Corrected Reading (dBµV/m)	Spec. limit (dBµV/m)	CR/SL Diff. (dB)	Pass Fail	Comment
108.0	76.3	73.0	Q	B	1.0	76.28	57.2	84.4	-27.1	Pass	
135.0	70.7	72.5	Q	B	2.2	72.5	56.6	84.4	-27.8	Pass	
216.0	72.8	72.7	Q	FR	1.2	72.84	54.8	84.4	-29.5	Pass	
243.0	91.5	86.4	Q	B	1.2	91.49	73.9	84.4	-10.4	Pass	
297.0	73.4	71.4	Q	F	1.0	73.36	57.4	84.4	-27.0	Pass	
432.0	70.6	72.7	Q	L	1.0	72.74	61.3	84.4	-23.0	Pass	

Substitution Method:

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Substitution Method For Radiated Emissions

Complete	X			Job # :	28035-1	Test # :	1
Preliminary				Page	1	of	1

Client Name :	Global Microwave Systems				
EUT Name :	High Def Video Transmitter				
EUT Model # :	M2T				
EUT Part # :					
EUT Serial # :	121707-79				
EUT Config. :	Transmit @ 2050 MHz terminated to 50 ohm load				
Specification :	CFR47 Part 2.1053			Reference :	
Rod. Ant. #:	NA	Temp. (deg. C) :	20	Date :	5/13/2009
Bicon Ant.#:	116	Humidity (%) :	62	Time :	1PM
Log Ant.#:	NA	EUT Voltage :	NA	Staff :	FSCustodio
DRG Ant. #	NA	EUT Frequency :	NA	Photo ID:	
Dipole Ant.#:	765	Phase:	NA	Peak Bandwidth:	120 kHz RBW
Cable#:	NOATS	Location:	RN# 329550-01		
Preamp#:	NA	Distance:	3m		
Spec An.#:	911				
QP #:	911				
Sig Gen#:	746				

Part 2.1053 Substitution

Target		dipole	Cable loss	Signal Generator	Total (ERP)	Spec	Margin
Frequency	Level						
MHz	dBuV/m		dB	dBm	dBm	dBm	dBm
243.00	91.5		2.67	-21.45	-24.12	-13	-11.1

Note: Spurious not within 20dB of the limit is not reported

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Appendix B: Test Setup Photographs

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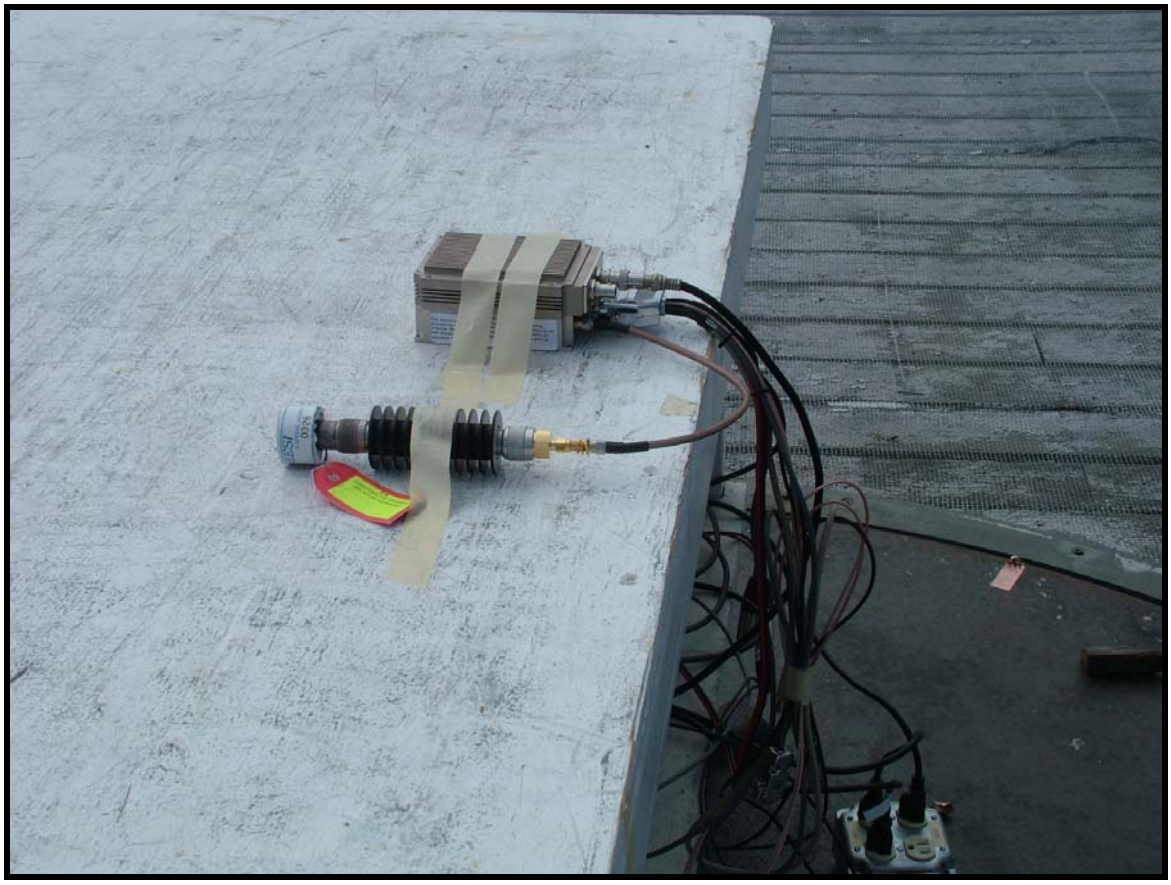

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Appendix C: Block Diagram of Test Setups

Test Site for Radiated Emissions