

 Testing and Engineering Services Ltd.	Test Report Serial No.:	121409H25-T998-E90C	Test Report Issue Date:	June 02, 2010
	Measurement Date(s):	January 12-13, 2010	Test Report Revision No.:	Revision 1.0
	FCC Rule Part(s) Applied:	47 CFR §2.1053, §90.210	Test Firm Registration No.	714830

EMC/RF MEASUREMENT REPORT				
FCC PART 90 - RADIATED SPURIOUS EMISSIONS MEASUREMENTS				
MANUFACTURER / APPLICANT		DTC COMMUNICATIONS, INC.		
DEVICE UNDER TEST (DUT)		DIGITAL MICROWAVE VIDEO TRANSMITTER (COFDM)		
DEVICE MODEL(S)		PD2-TX-250-S		
DEVICE IDENTIFIER(S)		FCC ID:	H25PD2TX250S	
DUT FREQUENCY RANGE & MODULATION BANDWIDTHS		2451.00 - 2482.50 MHz		DOMO-N, 1.25 MHz BW Mode
		2451.25 - 2482.25 MHz		DOMO-W, 2.50 MHz BW Mode
		2453.00 - 2480.50 MHz		DVB-T, 6 MHz BW Mode
		2453.50 - 2480.00 MHz		DVB-T, 7 MHz BW Mode
MAX. RF OUTPUT POWER TESTED		2454.00 - 2479.50 MHz		DVB-T, 8 MHz BW Mode
APPLICATION TYPE		FCC Part 90 Certification		
STANDARD(S) & PROCEDURE(S)		FCC 47 CFR		Part 2.1053
				Part 90.210
		ANSI		TIA/EIA-603-C-2004
FCC DEVICE CLASSIFICATION		Licensed Non-Broadcast Station Transmitter (TNB)		
DATE OF SAMPLE RECEIPT		December 14, 2009		
DATE(S) OF EVALUATION(S)		January 12-13, 2010		
TEST REPORT SERIAL NO.		121409H25-T998-E90C		
TEST REPORT REVISION NO.		Revision 1.0	Initial Release	June 02, 2010
TEST REPORT SIGNATORIES		Jon Hughes	Report Writer	Celltech Labs Inc.
		Sean Johnston	Lab Manager	Celltech Labs Inc.
TEST LAB AND LOCATION		Celltech Compliance Testing and Engineering Laboratory		
		21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada		
TEST LAB CONTACT INFO.		Tel.: 250-765-7650		Fax: 250-765-7645
		info@celltechlabs.com		www.celltechlabs.com

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S	
DUT Type:	COFDM Digital Microwave Video Transmitter	Frequency Range:	2451.00 - 2482.50 MHz (S Band)			
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DECLARATION OF COMPLIANCE

Test Lab Information		Name	CELLTECH LABS INCORPORATED			
		Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada			
Test Firm Registration No.		FCC	714830			
Applicant Information		Name	DTC COMMUNICATIONS, INC.			
		Address	486 Amherst Street, Nashua, New Hampshire 03063 United States			
Standard(s) / Procedure(s)		FCC	47 CFR Part 2.1053, 90.210			
		ANSI	TIA/EIA-603-C-2004			
Device Classification(s)		FCC	Licensed Non-Broadcast Station Transmitter (TNB)			
Device Identifier(s)		FCC ID:	H25PD2TX250S			
Device Under Test (DUT)		Digital Microwave Video Transmitter (COFDM)				
Device Model(s) Tested		PD2-TX-250-S (S Band)				
Test Sample Serial No.		SB030471 (Identical Prototype)				
Test Sample Revision No.s		Hardware Version H		Software Version 3.4.3		
Rated RF Output Power		250 mW (Conducted)				
Device Modes of Operation		Mode	Modulation	Bandwidth	Frequency Range	Emission Designator
		DOMO-N	QPSK	1.25 MHz	2451.00 - 2482.50 MHz	1M3W7D
		DOMO-W	QPSK, 16-QAM	2.50 MHz	2451.25 - 2482.25 MHz	2M5W7D
		DVB-T	QPSK, 16-QAM, 64-QAM	6 MHz	2453.00 - 2480.50 MHz	6M0W7D
				7 MHz	2453.50 - 2480.00 MHz	7M0W7D
				8 MHz	2454.00 - 2479.50 MHz	8M0W7D
Power Source(s) Tested		Energizer Industrial Alkaline Batteries in Battery Case		15 VDC	AA (x10)	
This wireless device has demonstrated compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in FCC 47 CFR Rule Parts 2, 90 and ANSI TIA/EIA-603-C-2004.						
I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.						
The results and statements contained in this report pertain only to the device(s) evaluated.						
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Test Report Approved By			Sean Johnston	Lab Manager	Celltech Labs Inc.	

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S	
DUT Type:	COFDM Digital Microwave Video Transmitter	Frequency Range:	2451.00 - 2482.50 MHz (S Band)			
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DUT Type:	COFDM Digital Microwave Video Transmitter	Frequency Range:	2451.00 - 2482.50 MHz (S Band)			
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TEST SUMMARY

Referenced Standard(s):		FCC CFR Title 47 Parts 2, 90				
Appendix	Description of Test	Procedure Reference	Limit Reference	Test Start	Test End	Result
A	Radiated TX Spurious Emissions	ANSI/TIA/EIA-603-C	§2.1053, §90.210	Jan-12, 2010	Jan-13, 2010	Pass

REVISION LOG

Revision	Description	Implemented By	Implementation Date
1.0	Initial Release	Jonathan Hughes	June 02, 2010

SIGNATORIES

Prepared By			June 02, 2010
Name/Title	Jon Hughes / Report Writer	Sean Johnston / Lab Manager	Date

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S					
DUT Type:	COFDM Digital Microwave Video Transmitter	Frequency Range:	2451.00 - 2482.50 MHz (S Band)							
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1.0 SCOPE

This report outlines the measurements made and results collected during electromagnetic emissions testing of the DTC Communications Inc. Model: PD2-TX-250-S COFDM Transmitter FCC ID: H25PD2TX250S. The measurement results were applied against the applicable EMC requirements and limits outlined in the technical rules and regulations set forth in the Federal Communication's Commission Code of Federal Regulations Title 47 Part 2 and Part 90.

2.0 REFERENCES

2.1 Normative References

ANSI/ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
ANSI/TIA/EIA-603-C:2004	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards
CFR Title 47 Part 2	Code of Federal Regulations Title 47: Telecommunication Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR Title 47 Part 90	Code of Federal Regulations Title 47: Telecommunication Part 90: Private Land Mobile Radio Services

3.0 PASS/FAIL CRITERIA

Unless otherwise noted in the Appendices, the pass/fail criteria is the limit set forth in the reference standards. The DUT is considered to have passed the requirements if the data collected during the described measurement procedure is no greater than the specified limits as defined. The pass/fail statements made in this report only apply to the unit tested.

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S	 DIC
DUT Type:	COFDM Digital Microwave Video Transmitter	Frequency Range:	2451.00 - 2482.50 MHz (S Band)			
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4.0 FACILITIES AND ACCREDITATIONS

The facilities used in collecting the test results outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8.

5.0 GENERAL INFORMATION

5.1 Applicant Information

Company Name	DTC COMMUNICATIONS, INC.
Address	486 Amherst Street
	Nashua, New Hampshire
	United States

5.2 DUT Description

Device Type	Digital Microwave Video Transmitter (COFDM)		
Device Model(s) Tested	PD2-TX-250-S		
Test Sample Serial No.(s)	SB030471 (Identical Prototype)		
Device Identifier(s)	FCC ID:	H25PD2TX250S	
Rated RF Output Power	250 mW (Conducted)		
Power Source Tested	Energizer Industrial Alkaline Batteries in Battery Case	15 VDC	AA x10

5.3 Rule Part(s) & Classification(s)

Rule Part(s) Applied	FCC	47 CFR §2; §90
Device Classification(s)	FCC	Part 90 Private Land Mobile Radio Services

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S	 DTC
DUT Type:	COFDM Digital Microwave Video Transmitter		Frequency Range:	2451.00 - 2482.50 MHz (S Band)		
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5.4 Mode(s) of Operation

5.4.1 COFDM Transmitter

Frequency Range(s)	Modulation Type(s)	Modulation Bandwidth	Description
2451.00 - 2482.50 MHz	QPSK	1.25 MHz	Ultra-Narrow Band
2451.25 - 2482.25 MHz	QPSK, 16-QAM	2.5 MHz	Narrow Band
2453.00 - 2480.50 MHz	QPSK, 16-QAM, 64-QAM	6 MHz	DVB-T
2453.50 - 2480.00 MHz	QPSK, 16-QAM, 64-QAM	7 MHz	DVB-T
2454.00 - 2479.50 MHz	QPSK, 16-QAM, 64-QAM	8 MHz	DVB-T

5.5 Modification(s)

None

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S					
DUT Type:	COFDM Digital Microwave Video Transmitter	Frequency Range:	2451.00 - 2482.50 MHz (S Band)							
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Appendix A Radiated Spurious Emissions

A.1 REFERENCES

Normative Reference Standard	FCC CFR 47 §2.1053, §90.210
Procedure Reference	The transmitter spurious emissions were measured in accordance with ANSI TIA/EIA Standard 603 using the substitution method on a 3-meter open area test site (OATS).

A.2 ENVIRONMENTAL CONDITIONS

Temperature	25 +/- 5 °C
Humidity	40 +/- 10 %
Barometric Pressure	101 +/- 3 kPa

A.3 TEST EQUIPMENT LIST

Asset Number	Manufacturer	Model	Description	Cal. Due Date
00072	EMCO	2075	Mini-mast	n/a
00073	EMCO	2080	Turn Table	n/a
00071	EMCO	2090	Multi-Device Controller	n/a
00015	HP	E4408B	Spectrum Analyzer	23Apr10
00050	Chase	CBL-6111A	Bilog Antenna	09Apr10
00055	EMCO	3121C	Dipole Antenna	04Apr10
00034	ETS	3115	Double Ridged Guide Horn	03Apr10
00035	ETS	3115	Double Ridged Guide Horn	03Aug10
00051	HP	8566B	Spectrum Analyzer RF Section	09Apr10
00049	HP	85650A	Quasi-peak Adapter	09Apr10
00047	HP	85685A	RF Preselector	09Apr10
00006	R & S	SMR 20	Signal Generator (10MHz-40GHz)	06Apr10
00114	Amplifier Research	DC7154	Directional Coupler (0.8-4.2 GHz)	n/a
00078	Pasternack	PE2214-20	Directional Coupler (1-18 GHz)	n/a
00106	Amplifier Research	5S1G4	Power Amplifier (5W, 800MHz-4.2GHz)	n/a
00041	Amplifier Research	10W1000C	Power Amplifier (0.5 - 1 GHz)	n/a
00007	Gigatronics	8652A	Power Meter	23Apr10
00014	Gigatronics	80701A	Power Sensor	23Apr10

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S	
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A.4 MEASUREMENT EQUIPMENT SETUP

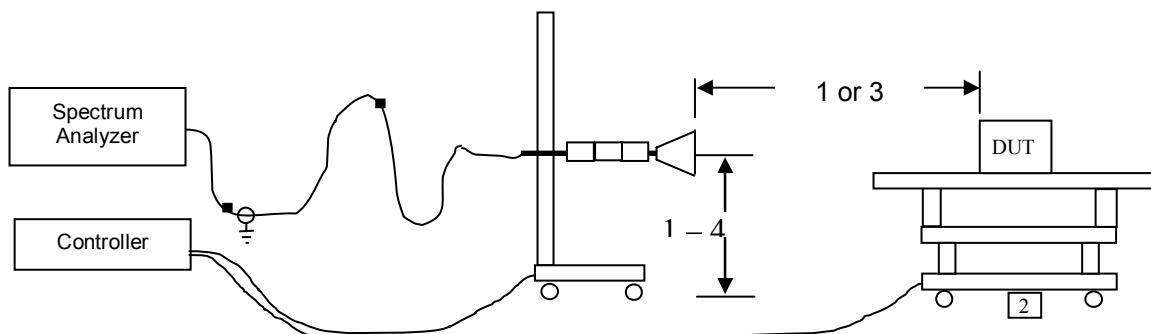
MEASUREMENT EQUIPMENT CONNECTIONS

For the field strength measurements the measurement equipment was connected as shown in A.4. A number of antennas were used to cover the applicable frequency range tested. The ranges in which each antenna was used are as follows. For the final substitutions the DUT was replaced with the appropriate antenna and fed from a CW signal source sufficient to replicate the received field strength of the emission being investigated (connection diagram A.5).

Frequency Range	RX Antenna	TX Antenna
30 MHz - 1GHz	Bilog	Dipole
1 GHz - 18 GHz	ETS 3115 Horn	ETS 3115 Horn
18 GHz - 26 GHz	Wave Line	Wave Line

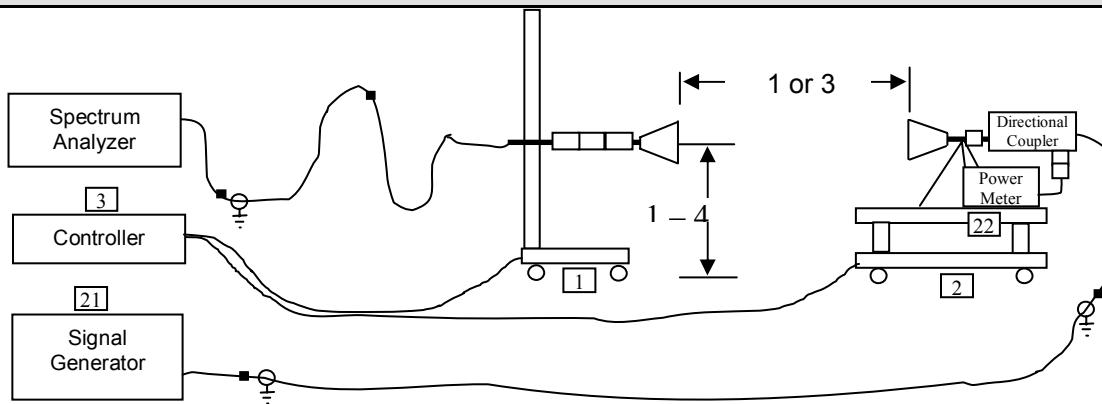
A.5 SETUP DRAWING

Figure A.5-1 - Setup Drawing – Radiated TX Spurious Emissions



A.6 SETUP DRAWING

Figure A.6-2- Setup Drawing – Signal Substitution



Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S		
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A.7 TEST RESULTS

Polarity	DUT Position	Distance	Substitution Antenna Type	Carrier Channel	Frequency	Corrected Field Strength	Power Applied to Substitution Antenna	Antenna Gain	EIRP Emission Level	Limit	Margin	Pass/Fail
V/H		m		MHz	MHz	dBuV/m	dBm	dBi	dBm	dBm or dBuV/m*	dB	
V	A	3	none	2451	4902	nf				82.3	n/a	Pass
V	A	3	none	2451	7353	48				82.3	34.3	Pass
V	A	3	none	2451	9804	nf				82.3	n/a	Pass
V	A	1	none	2451	12255	nf				91.9	n/a	Pass
H	A	3	none	2451	4902	nf				82.3	n/a	Pass
H	A	3	none	2451	7353	54				82.3	28.3	Pass
H	A	3	none	2451	9804	nf				82.3	n/a	Pass
H	A	1	none	2451	12255	nf				91.9	n/a	Pass
V	A	3	none	2466	4932	nf				82.3	n/a	Pass
V	A	3	none	2466	7398	nf				82.3	n/a	Pass
V	A	3	none	2466	9864	nf				82.3	n/a	Pass
V	A	1	none	2466	12330	nf				91.9	n/a	Pass
H	A	3	none	2466	4932	nf				82.3	n/a	Pass
H	A	3	none	2466	7398	nf				82.3	n/a	Pass
H	A	3	none	2466	9864	nf				82.3	n/a	Pass
H	A	1	none	2466	12330	nf				91.9	n/a	Pass
V	A	3	none	2482.5	4965	49				82.3	33.3	Pass
V	A	3	none	2482.5	7447.5	nf				82.3	n/a	Pass
V	A	3	none	2482.5	9930	nf				82.3	n/a	Pass
V	A	1	none	2482.5	12412.5	nf				91.9	n/a	Pass
H	A	3	none	2482.5	4965	46.3				82.3	36	Pass
H	A	3	none	2482.5	7447.5	54.1				82.3	28.2	Pass
H	A	3	none	2482.5	9930	nf				82.3	n/a	Pass
H	A	1	none	2482.5	12412.5	nf				91.9	n/a	Pass

Notes:

1. The DUT RF port was terminated to a 50 ohm load.
2. All modes and modulations were investigated and the worst-case is reported (1.25 MHz BW, QPSK modulation).
3. All orthogonal device positions were investigated, worst case position reported.
4. The emissions reported above represent the highest emissions or noise floor measured within the frequency band of 30MHz and the 10th harmonic of the carrier. All emissions attributed to the EUT had field strengths greater than 20 dB below the theoretical limit and substitutions were not made. All other emissions were at the noise floor.

Formulae:

$$\text{ERP Emission Level (dBm)} = \text{Power applied to antenna (dBm)} + \text{Antenna Gain (dBd)}$$

$$\text{Margin (dB)} = \text{Limit (dBm)} - \text{ERP Emission Level (dBm)} \text{ or Theoretical Limit (dBuV/m)} - \text{Corrected Field Strength (dBuV/m)}$$

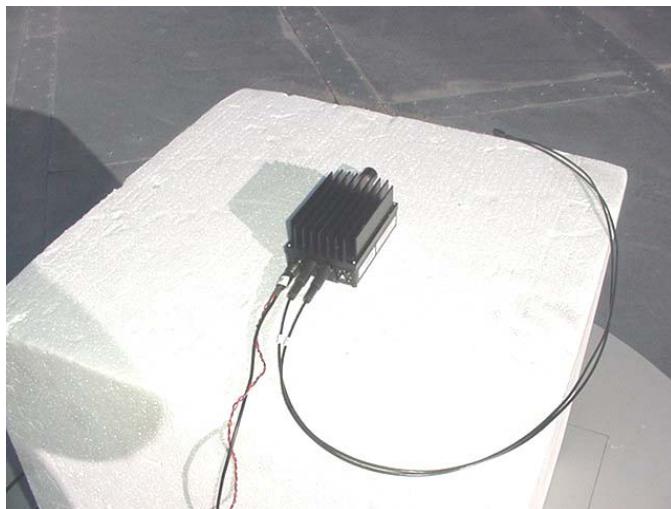
$$\text{Theoretical Limit (V/m)} = \text{SQRT}(30 * P / r^2) \text{ where P is the total transmitted power (W), r is measurement distance (m)}$$

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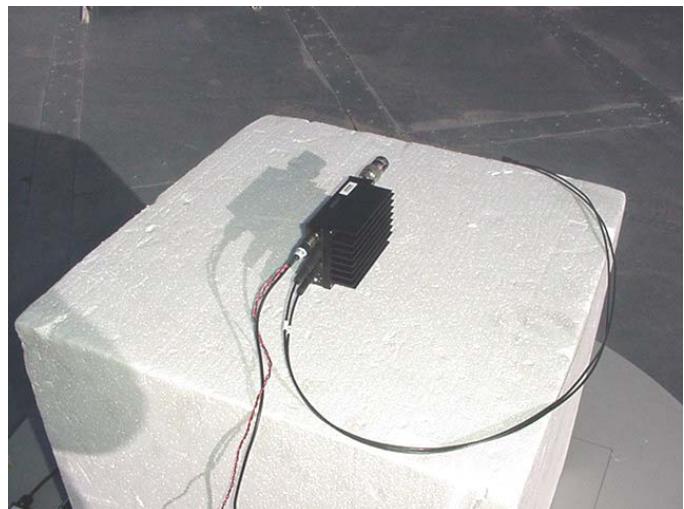
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A.8 SETUP PHOTOGRAPHS

DUT TEST POSITION A



DUT TEST POSITION B



DUT TEST POSITION C

Applicant:	DTC Communications Inc.	FCC ID:	H25PD2TX250S	Model:	PD2-TX-250-S	
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