Advanced
Compliance Laboratory

6 Randolph Way
Hillsborough, NJ 08844
Tel: (908) 927 9288
Fax: (908) 927 0728

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

MULTI HZ 16 CHANNEL TRANSMITTER
MODEL: M16CT
FCC ID: PUDM16CT

January 6, 2010

This report concerns (check one): Original grant __x__ Class II change _____
Equipment type: Low Power Intentional Radiator

Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes _____ no __x__
If yes, defer until: _____ (date)
Company agrees to notify the Commission by _____ (date)
of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? yes _____ no __x__
If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR [10-1-90 Edition] provision.

Report prepared for:	SIMU U.S. Inc.
Report prepared by:	Advanced Compliance Lab
Report number:	0048-091222-01

NVLAP®

The test result in this report IS supported and covered by the NVLAP accreditation

Table of Contents

Report Cover Page **1**

Table of Contents **2**

Figures **3**

1. GENERAL INFORMATION **4**
- **1.1 Verification of Compliance** **4**
- **1.2 Equipment Modifications** **5**
- **1.3 Product Information** **6**
- **1.4 Test Methodology** **6**
- **1.5 Test Facility** **6**
- **1.6 Test Equipment** **6**
- **1.7 Statement of the Document Use** **7**

2. PRODUCT LABELING **8**

3. SYSTEM TEST CONFIGURATION **9**
- **3.1 Justification** **9**
- **3.2 Special Accessories** **9**
- **3.3 Configuration of Tested System** **9**

4. SYSTEM SCHEMATICS **13**

5. CONDUCTED EMISSION DATA **14**
- **5.1 Test Methods and Conditions** **14**
- **5.2 Test Data** **14**

6. RADIATED EMISSION DATA **17**
- **6.1 Field Strength Calculation** **17**
- **6.2 Test Methods and Conditions** **17**
- **6.2 Test Data** **17**
- **6.4. Occupied Bandwidth** **19**

7. PHOTOS OF TESTED EUT **22**

Figures

Figure 2.1 FCC ID Label 8

Figure 2.2 Location of Label on Back of the EUT 8

Figure 3.1 Radiated Test Setup, Position 1 10

Figure 3.2 Radiated Test Setup, Position 2 10

Figure 3.3 Radiated Test Setup, Position 3 11

Figure 3.4 Conducted Test Setup, Front 12

Figure 3.5 Conducted Test Setup, Rear 12

Figure 4.1 EUT Schematics 13

Figure 5.1 Line Conducted 15

Figure 5.2 Neutral Conducted 16

Figure 6.1 Bandwidth Plot 19

Figure 6.2 Pulse Train Timing 20

Figure 7.1 Front View 23

Figure 7.2 Rear View 24

Figure 7.3 Component Side 25

Figure 7.4 Foil Side 26

1. GENERAL INFORMATION

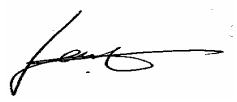
1.1 Verification of Compliance

EUT:	MULTI HZ 16 CHANNEL TRANSMITTER
Model:	M16CT
Applicant:	SIMU U.S. INC.
Test Type:	FCC Part 15C CERTIFICATION (15.231: a)
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Date:	January 4, 2010
Report Number:	0048-091222-01

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	±2.36	±2.99	±1.83



Wei Li
Lab Manager
Advanced Compliance Lab

Date: January 4, 2010

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	MULTI HZ 16 CHANNEL TRANSMITTER (1)	PUDM16CT	
Housing	PLASTICS		
Power Supply	3V Battery		
Operation Freq.	433.45 HMz		
Device Type	Periodic Operation		
Receiver	SENSOR Receiver	DoC	

(1) EUT submitted for grant.

1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 3 meters.

1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 in a letter dated May 19, 1997 (Refer to: 31040/PRV 1300F2). The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

1.6 Test Equipment

Manufacture	Model	Serial No.	Description	Last Cal dd/mm/yy	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	25/09/09	25/09/10
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	17/10/09	17/10/10
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	19/10/09	19/10/10
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	19/10/09	19/10/10
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	18/10/09	18/10/10
EMCO	6502	2665	10KHz-30MHz Active Loop Antenna	05/10/09	05/10/10
EMCO	3115	4945	Double Ridge Guide Horn Antenna	25/09/09	25/09/10

All Test Equipment Used are Calibrated Traceable to NIST Standards.

1.7 Statement for the Document Use

This report shall not be reproduced except in full, without the written approval of the laboratory. And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

2. PRODUCT LABELING

FCC ID: PUDM16CT

This device complies with part 15 of the FCC Rules. Operating is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Figure 2.1 FCC ID Label

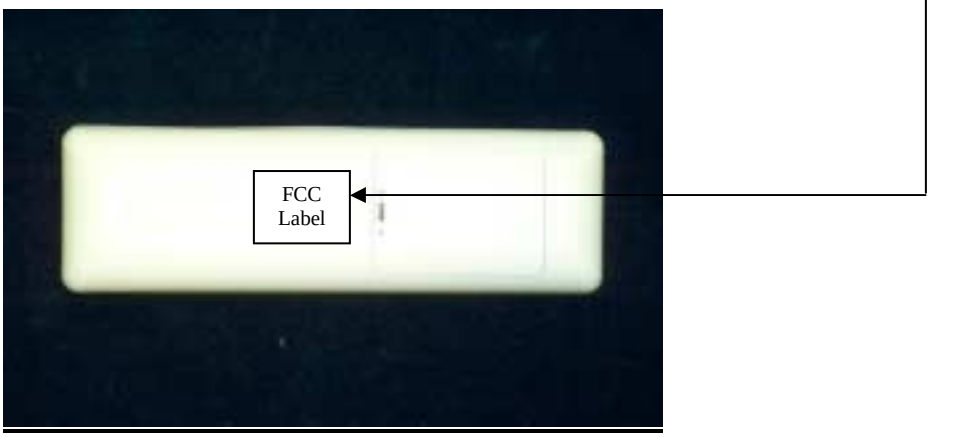


Figure 2.2 FCC ID Label Location

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna is on PCB.

The transmittion does stop when the button is released after the completion of the frame. This time is well under 1 second much less 5 seconds.

Testing was performed as EUT was operated continuously. Fresh batteries were used.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

Figure 3.1 to Figure 3.5 illustrate this system, which is tested standing along.

Figure 3.1 Radiated Test Setup, position 1-X

Figure 3.2 Radiated Test Setup, position 2-Y

Figure 3.3 Radiated Test Setup, position 3-Z

N/A

Figure 3.4 Conducted Setup- Front

N/A

Figure 3.5 Conducted Setup- Rear

4. SYSTEM SCHEMATICS

See Attachment.

Figure 4.1 System Schematics

5. CONDUCTED EMISSION DATA

5.1 Test Methods and Conditions

The EUT was under normal operational mode during the conducted emission test. EMI Receiver was scanned from 150KHz to 30MHz with maximum hold mode for maximum emission. Recorded data was sent to the plotter to generate output in linear format. At the input of the spectrum analyzer, a HP transient limiter is inserted for protective purpose. This limiter has a 10 dB attenuation in the range of 150KHZ to 30MHZ. That factor was automatically compensated by the receiver, so the readings are the corrected readings. The reference of the plot is the CISPR 22 Class B limit in Figure 5.1 through Figure 5.2.

Conducted Emission Technical Requirements				
	Class A		**Class B**	
Frequency Range	**Quasi-Peak dBuV**	**Average dBuV**	**Quasi-Peak DBuV**	**Average dBuV**
150kHz –0.5MHz	79 (8912uV)	66 (1995uV)	66-56	56-46
0.5MHz-30MHz	73 (4467uV)	60 (1000uV)	---	---
0.5MHz- 5MHz	---	---	56	46 (250uV)
5MHz-30MHz	---	---	60	50

Emissions that have peak values close to the specification limit (if any) are also measured in the quasi-peak mode to determine compliance.

5.2 Test Data

Figure 5.1-5.2 show the neutral and line conducted emissions for the standard operation.

N/A

Test Personnel:

Tester Signature: _____ Date: _____

Typed/Printed Name:_____

N/A

Fig. 5.1 Conducted Emission-Line

N/A

Fig. 5.2 Conducted Emission- Neutral

6. RADIATED EMISSION DATA

6.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dBμV/m
RA: Amplitude of EMI Receiver before correction in dBμV
AF: Antenna Factor in dB/m
CF: Cable Attenuation Factor in dB
AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

The pulse train timing plots are showed in Figure 6.2.
The pulse train timing plots as follows:
The total time for each pulse train is 139.62 ms, The short pulse is 0.640ms, The middle pulse is 2.5 ms, The long pulse is 4.8ms.
Coeff. =(55x0.640+1x4.8+4x2.5+5x2.5)/100=0.525
The maximum average field strength should be 0.525 of the peak field strength measured. So we use peak value minus 5.6dB as calculated maximum average field strength.

6.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak detector and 9KHz IF bandwidth / 30KHz video bandwidth. For the range 30MHz - 1GHz, 120KHz IF bandwidth / 120KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. Up to 10^{th} harmonics were investigated.

6.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 6.1.

Test Personnel: 

Typed/Printed Name: Edward Lee Date: January 4, 2010

Radiated Test Data

Frequency (MHz)	Polarity [H or V], Position (X,Y,Z)	Height (m)	Azimuth (Degree)	Peak Reading (dBmV/m)	Calculated Average Reading (dBmV/m	FCC 3m Limit (dBmV/m)	Difference from limit (dB)
433.45	H,X(1)	1.1	180	67.7	62.1	80.8(3)	-18.7
866.90	H,X	1.1	045	49.4	43.8	60.8(4)	-17
1300.35	H,X	1.2	225	49.4	43.8	54.0(2)	-10.2
1733.80	H,X	1.2	090	48.6	43	60.80	-17.8
2167.25	H,X	1.2	180	47.1	41.5	60.80	-19.3
433.45	V,X	1.0	090	82.4	76.8	80.80	-4
866.90	V,X	1.0	090	49.9	44.3	60.80	-16.5
1300.35	V,X	1.2	180	53.3	47.7	54.00	-6.3
1733.80	V,X	1.2	225	48.2	42.6	60.80	-18.2
2167.25	V,X	1.2	225	43.1	37.5	60.80	-23.3
433.45	H,Y	1.0	180	78.3	72.7	80.80	-8.1
866.90	H,Y	1.0	225	49.7	44.1	60.80	-16.7
1300.35	H,Y	1.2	270	48.8	43.2	54.00	-10.8
1733.80	H,Y	1.2	135	46.0	40.4	60.80	-20.4
2167.25	H,Y	1.2	180	46.7	41.1	60.80	-19.7
433.45	V,Y	1.2	090	71.4	65.8	80.80	-15
866.90	V,Y	1.2	180	50.1	44.5	60.80	-16.3
1300.35	V,Y	1.2	170	53.5	47.9	54.00	-6.1
1733.80	V,Y	1.2	000	51.3	45.7	60.80	-15.1
2167.25	V,Y	1.2	000	47.2	41.6	60.80	-19.2
433.45	H,Z	1.0	180	68.8	63.2	80.80	-17.6
866.90	H,Z	1.0	135	48.7	43.1	60.80	-17.7
1300.35	H,Z	1.2	045	47.9	42.3	54.00	-11.7
1733.80	H,Z	1.2	000	54.1	48.5	60.80	-12.3
2167.25	H,Z	1.2	000	48.5	42.9	60.80	-17.9
433.45	V,Z	1.2	045	80.7	75.1	80.80	-5.7
866.90	V,Z	1.2	000	47.5	41.9	60.80	-18.9
1300.35	V,Z	1.1	045	47.3	41.7	54.00	-12.3
1733.80	V,Z	1.1	270	46.5	40.9	60.80	-19.9
2167.25	V,Z	1.1	180	44.9	39.3	60.80	-21.5

(1) See Figure 3.1, 3.2 and 3.3 for definition of position X-1, Y-2, Z-3.
(2) Restricted band.
(3) Fundamental limit is 3750-12500 microvolts/meter linear interpolations (average reading). Per FCC 15.231(a).
(4) Spurious limit is 375-1250 microvolts/meter linear interpolations (average reading). Per 15.231(a).

5.4 Occupied Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency, in this case, 1.084MHz(433.5x0.25%). Bandwidth is determined at the points 20dB down from the modulated carrier. Figure 5.2 shows the occupied bandwidth plot.

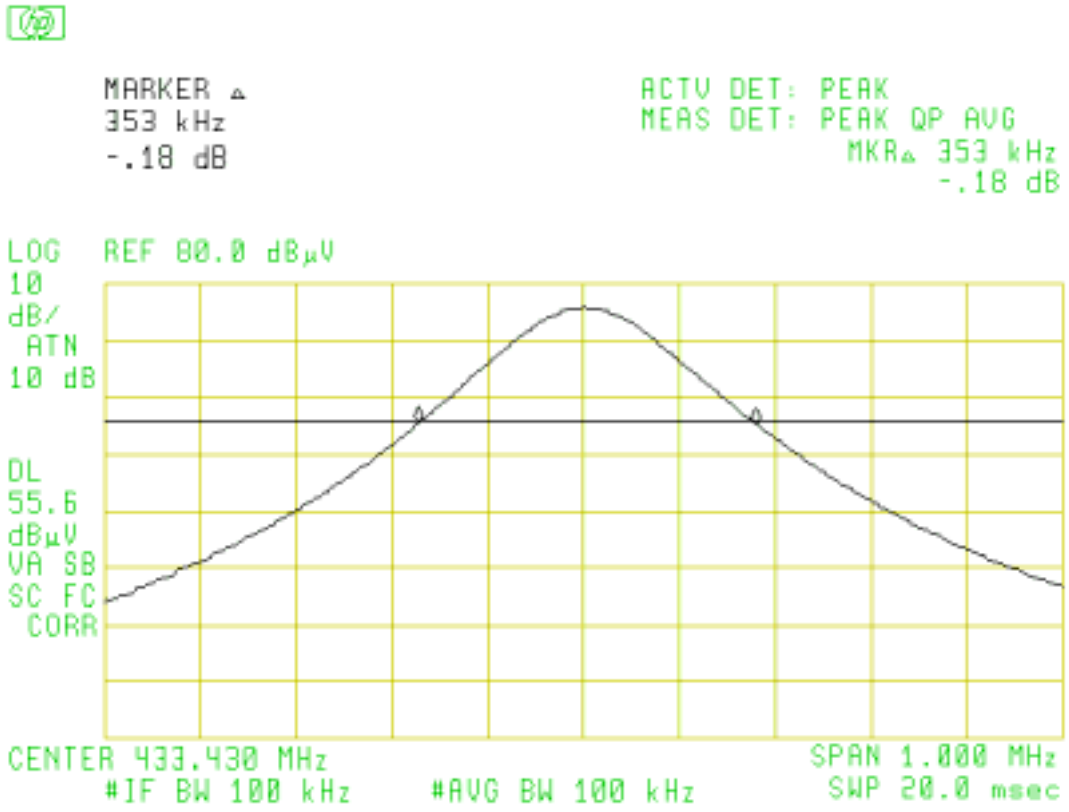


Figure 6.1 Occupied Bandwidth