

**TEST REPORT**

**THE ELECTROMAGNETIC EMISSIONS**

**ACCORDING TO**

**FCC PARTS 2, 15, 95 (all 2005)**

**OF THE**

**NOTIFLEX TRANSMISSION CONTROL UNIT (TCU)**

**PREPARED FOR**

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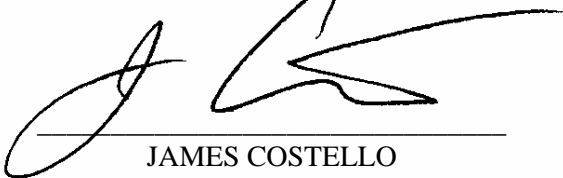
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**July 31, 2006**

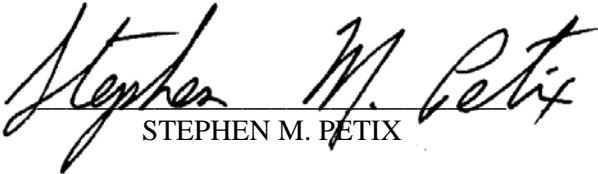
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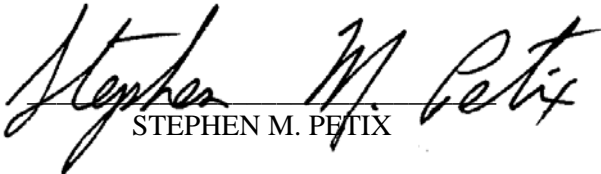
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## INTRODUCTION

This report describes the results of electromagnetic emissions testing of the:

NOTIFLEX TRANSMISSION CONTROL UNIT,

the Equipment Under Test. The EUT was subjected to the following tests:

FCC Part 15 CONDUCTED EMISSIONS,  
FCC Part 15 RADIATED EMISSIONS,  
FCC Part 95 POWER OUTPUT,  
FCC Part 95 MODULATION BANDWIDTH,  
FCC Part 95 SPURIOUS EMISSIONS,  
FCC Part 95 FREQUENCY STABILITY.

The results reported in this document relate only to the unit tested.

All testing was performed at the facilities of

***Global Certification Laboratories, Ltd.***  
***East Haddam CT.***

All test equipment calibration is N.I.S.T. traceable. Global's FCC registration number is 90615.

This report contains detailed descriptions of the test procedures, test data, and a written summary of the results. The report may not be reproduced, except in its entirety, without the permission of Global Certification Laboratories.

This report contains 22 numbered pages, plus Title, Signature, and Table of Contents Pages.

**PRODUCT IDENTIFICATION**

EQUIPMENT UNDER TEST (EUT):                    MURS Radio  
  
                                                                                 MODEL: NOTIFLEX TCU  
  
                                                                                 SERIAL: NONE

EUT SUPPORT EQUIPMENT:                            NONE

**TECHNICAL DESCRIPTION  
NOTIFLEX TCU**

The Notiflex Transmitter Control Unit provides the central control for a paging system that would normally consist of a single small portable VHF Paging Receiver, this Transmitter Control Unit (TCU) and external sensors wired directly to the TCU. These sensors would be either dry switch or 5 Volt CMOS logic.

The TCU has two wired sensor inputs, one for a Normally Open (NO) switch that would respond as an Active LOW logic input, and the other Normally Closed (NC) that has Active HIGH logic input. There is also a slide switch in parallel with the NC input to maintain closure if a sensor is not connected. The sensor input jacks are the small (sub RM45) modular type.

A 115 Volt wall mounted power adapter that is rated at 12 VRMS 50/60 Hz at 1 ampere supplies primary power to the TCU. This adapter connects to a 2.5 mm power jack on the rear panel of the 178 by 153 by 52 mm ABS plastic case.

Inside the case is a mother board on which are mounted sensor logic, power rectifier and voltage regulator, VHF FM Transmitter board, and Encoder module. Upon initiation of either sensor input (which are logic OR) the Encoder generates a digital signal that frequency modulates the 154.570 MHz transmitter. The signal uses the standard POCSAG paging protocol with unique factory generated recognition code that corresponds with the associated pager. Transmission is at 512 Baud and lasts about 4 seconds. The transmitter output is by way of a BNC coaxial connector, and its power is rated as 1.5 Watts.

On the front panel are the female BNC RF output connector and two Light Emitting Diode indicators, one green to signify normal ready power up, and the other red to signify an input alarm state. A single transmission is initiated each time an alarm condition occurs. For another transmission to occur, the alarm input must cease, and a new alarm must become present.

The transmitter conforms to FCC Parts 2, 15, and 95 for MURS (Multiple User Radio Service)

Output Power	1.8 +/- 0.2 Watts @ 20% Duty Ratio
Carrier Frequency	154.570 MHz
Frequency Accuracy over Temperature	+/-5 ppm
Modulation Frequency Shift Keying,	512 or 1200 Baud
Deviation	+/-4.5 KHz Peak
Maximum Deviation	+/- 5.0 KHz Peak
Maximum Emission Bandwidth	20 KHz @ -20 dBc
Emissions Mask Beyond 10 KHz from Carrier	-25 dBc down to -35 dBc to 20 KHz from Carrier to -46 dBc at 50 KHz from Carrier
Operating Temperature	-30 to +50 Deg. C.
Coax Connector:	BNC 50 Ohm Antenna jack

### EMISSIONS TEST INSTRUMENTATION

The following instrumentation is used in emissions measurements. All test equipment calibration is N.I.S.T. traceable.

Manufacturer/Description	Model	Serial
ADVANTEST Spectrum Analyzer	R3361A	91730394
ADVANTEST Spectrum Analyzer	U4941	33140534
AILTECH Log Periodic Antenna	90005/3146	1095
DELTA DESIGN Heat chamber	7600 CDT	0-47-2
ELECTROMETRICS Horn Antenna	RGA-60	6139
FLUKE Digital Multimeter	76	6540398
FLUKE Thermocouple Module	801TK	6698122
GLOBAL Laboratories 3, 10 & 30 meter O.A.T.S.	N/A	N/A
Hewlett Packard Spectrum Analyzer	8569B	37974
HITACHI Oscilloscope	V-1100A	7053924
IFI 0.01 to 1000 MHz Amplifier	SMX-25	7053924
IFR Signal Generator	2023A	202305/810
KENMORE Freezer	253.16502100	WB62518061
MARCONI 9 kHz to 2.4 GHz Signal Generator	2024	112231 / 045
RAYPROOF Shielded Room		201005
SCHWARZBECK 50 Ω Artificial Mains Network	NNLK 8121	81996
SCHWARZBECK Biconical Antenna	VHA-9103	A
SCHWARZBECK RF Receiver 9KH to 30 MHz.	VUME 1518	9107209
SCHWARZBECK RF Receiver 30 to 1000 MHz	VUME 1520	1518167
XL Microwave RF Power meter/frequency counter	3080	910524092

**FCC PART 15, SUBPART B  
CONDUCTED EMISSIONS**

FCC PART 15 CONDUCTED EMISSIONS measurements are normally performed in an 8’x10’x15’ shielded enclosure with filtered power supply lines. A Radio Frequency test receiver, in accordance with CISPR 16 is used to measure disturbance voltages. An Artificial Mains Network (AMN), also in accordance with CISPR 16, is used to isolate the EUT from any interference on the power lines and to maintain a constant 50Ω/50μH impedance across the test bandwidth. Specific devices are noted on data pages.

The EUT is placed on a wooden table 0.8m high, located >0.4m from any wall of the shielded room and at least 0.8m from the AMN. Floor-standing EUTs are placed on a horizontal ground plane, which is not in contact with the reference ground. The EUT is connected to the AMN, which is supplied with the rated power of the EUT. If the EUT supply cord is >1m in length, it is shortened by bundling in a coil no longer than 0.4m. Ground wires are connected. Equipment with multiple power cords are connected per CISPR 16 or tested separately.

The frequency spectrum for the test is from 0.15MHz to 30MHz. The neutral and all phase lines are separately scanned for disturbance voltages.

The test spectrum is slowly scanned with the receiver in Quasi-Peak mode. When a disturbance signal is detected, its amplitude is compared to both Quasi-Peak and Average limits. If the Average limit is met with the Quasi-Peak measurement, the signal is deemed to have passed both limits. If the Average limit is exceeded, a measurement is made with the receiver in Average mode and compared to the Average limit. Both limits must be met. FCC limits now correspond with those of EN 55022 (CISPR 22).

Limits for CONDUCTED EMISSIONS are:

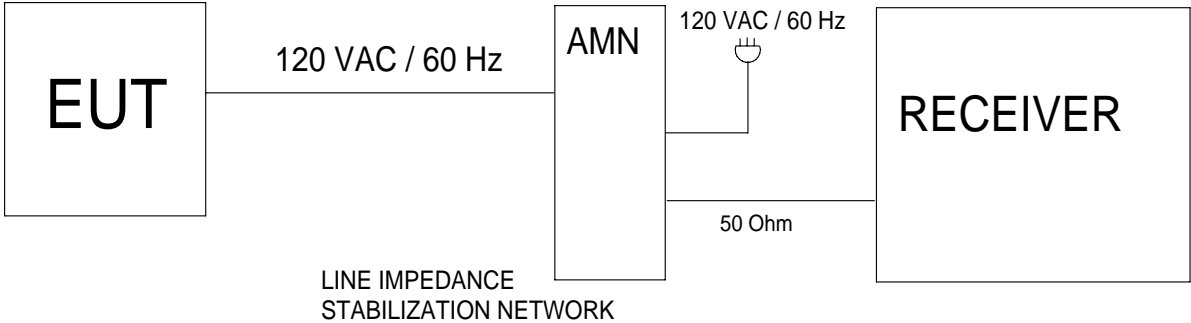
		dB(μV)	
	Freq. (MHz)	Quasi-Peak	Average
Class A	0.15-0.50	79	66
	0.50-30	73	60
Class B	0.15-0.50	66 to 56*	56 to 46*
	0.50-5.00	56	46
	5.00-30.00	60	50

\*Decreasing linearly with the log of the frequency.



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## CONDUCTED EMISSIONS MEASUREMENTS



(EXCEPT WHERE EUT SIZE PROHIBITS, TESTING IS DONE IN A SHIELDED ROOM)



**DATA TABLE EXPLANATION  
CONDUCTED EMISSIONS MEASUREMENT**

The DATA TABLE PAGES contain the following information:

- TITLE: indicating the test performed
- EUT
- PERSON WHO PERFORMED THE TEST
- TEST STANDARD(S)
- DATE OF TEST
- TEST SITE
- TEST INSTRUMENTATION
- NOTES
- THE LINE UNDER TEST

The DATA TABLE headings are as follows:

- FREQ.  
MHZ                                    the FREQUENCY, in megahertz, at which a signal is detected.
  
- QUASI-P  
dB(μV)                                    The QUASI-PEAK AMPLITUDE, in decibels per microvolt, of the signal.
  
- LIMIT  
QUASI-P  
dB(μV)                                    The LIMIT, in decibels per microvolt, or picowatt, for the above signal.
  
- PASS?                                    Is the signal acceptable under the standards? ("YES" or "NO")
  
- MARGIN  
dB                                            The MARGIN, in decibels per microvolt, by which the EUT passes or fails.
  
- AMPL  
AVER  
dB(μV)                                    The AVERAGE AMPLITUDE, in decibels per microvolt, of the signal.
  
- LIMIT  
AVER  
dB(μV)                                    The LIMIT, in decibels per microvolt, for the above signal.
  
- PASS?                                    Is the signal acceptable under the standards? ("YES" or "NO")
  
- MARGIN  
dB                                            The MARGIN, in decibels per microvolt, by which the EUT passes or fails.

## CONDUCTED EMISSIONS DATA

**CONDUCTED EMISSIONS DETECTED FROM 0.15MHz - 30MHz.  
THE FCC CLASS B LIMITS ARE USED.**

FILE NAME: BRN0601  
EUT NAME: NOTIFLEX TCU (TRANSMITTER CONTROL UNIT)

THE EUT IS A MURS (Multi User Radio Service)  
THE EUT IS POWERED BY: 120 VAC  
THE EUT IS NOT SERIALIZED.  
CUSTOMER REPRESENTATIVE: BROWN PULLIAM

MEASURED BY STEVE PETIX ON 7/25/06 FOR CLASS B EQUIPMENT IN AN 8'x10'x15'  
SHIELDED ROOM UTILIZING A SCHWARZBECK ARTIFICIAL MAINS NETWORK MODEL  
NNLK8121AND A SCHWARZBECK INTERFERENCE RECEIVER MODEL FMLK 1518.

MEASUREMENTS ARE TAKEN WITH A QUASI-PEAK RECEIVER AND COMPARED TO  
BOTH QUASI-P AND AVERAGE LIMITS. IF A QUASI-P SIGNAL PASSES BOTH SETS OF  
LIMITS, BOTH LIMITS ARE DEEMED TO BE MET. IF A SIGNAL PASSES QUASI-P LIMITS  
BUT FAILS AVERAGE LIMITS, A MEASUREMENT IS MADE WITH THE AVERAGE  
DETECTOR. THE EUT MUST MEET BOTH SETS OF LIMITS.

An ADVANTEST U4941 spectrum analyzer was used initially, to measure emissions on the Line  
and Neutral conductors in PEAK detection mode. The quasi-peak receiver was then used to  
measure signals close to the limit, for entry into the tables below. A 10dB attenuator was used on  
the spectrum analyzer input. The limit is lowered 10dB to account for the attenuator.

The following measurements are for spurious radiated emission measurements.

There is no switching power supply in this device, therefore no broadband emissions will be found.  
The following measurements are harmonics of the 6 MHz and 17 MHz crystals.

The transmitter frequency is 154.57 MHz. All measurements are done with the transmitter switched  
on for no more than 30 seconds.

No antenna is used. The antenna replaced with a 5 Watt, 50 ohm coaxial terminator.

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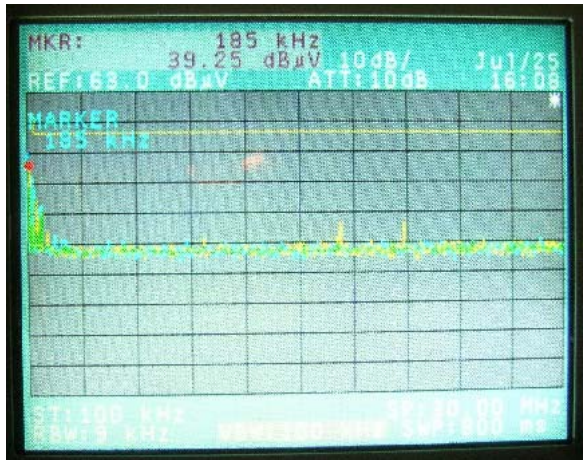
**CONDUCTED EMISSIONS DATA**

**TESTING NEUTRAL:**

FREQ. (MHz)	AMPL QUASI-P dB(μV)	AMPL + LISN LOSSES dB(μV)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB	AMPL AVER-AGE dB(μV)	AMPL + LISN LOSSES dB(μV)	LIMIT AVER dB(μV)	PASS?	MARGIN dB
0.150	55	55.11	66.0	YES	10.9	28	28.11	56.0	YES	27.9
0.189	54	54.11	64.0	YES	9.9	29	29.11	54.0	YES	24.9
0.205	53	53.11	63.3	YES	10.2	23	23.11	53.3	YES	30.2
0.325	38	38.11	59.3	YES	21.2			49.3	YES	11.2
0.452	39	39.11	56.4	YES	17.3			46.4	YES	7.3
0.616	31	31.11	56.0	YES	24.9			46.0	YES	14.9
ALL SIGNALS ARE BELOW 35 dBuV.										
3.400	-5	-4.80	56.0	YES	60.8			46.0	YES	50.8
ALL SIGNALS ARE BELOW 15 dBuV.										
ALL OTHER FREQUENCIES BELOW LIMITS										

**TESTING LINE:**

FREQ. (MHz)	AMPL QUASI-P dB(μV)	AMPL + LISN LOSSES dB(μV)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB	AMPL AVER-AGE dB(μV)	AMPL + LISN LOSSES dB(μV)	LIMIT AVER dB(μV)	PASS?	MARGIN dB
0.150	56	56.11	66.0	YES	9.9	26	26.11	56.0	YES	29.9
0.189	55	55.11	64.0	YES	8.9	25	25.11	54.0	YES	28.9
0.205	53	53.11	63.3	YES	10.2	22	22.11	53.3	YES	31.2
0.325	37	37.11	59.3	YES	22.2			49.3	YES	12.2
0.452	40	40.11	56.4	YES	16.3			46.4	YES	6.3
0.616	31	31.11	56.0	YES	24.9			46.0	YES	14.9
ALL SIGNALS ARE BELOW 35 dBuV.										
3.400	-5	-4.80	56.0	YES	60.8			46.0	YES	50.8
ALL SIGNALS ARE BELOW 15 dBuV.										
ALL OTHER FREQUENCIES BELOW LIMITS										



**THE EUT PASSES WITHOUT MODIFICATIONS.**

**EMI TEST PROCEDURES  
FCC PART 15, SUBPART B  
RADIATED E-FIELD EMISSIONS**

FCC Part 15 radiated measurements are performed on an open field test site with a metal ground plane which conforms to specifications in CISPR 16. At Global Laboratories, our 3 & 10m test site is sheltered with a pegged post-and-beam wooden building. The EUT is positioned on a remotely controlled turntable to permit emission measurements from all sides of the EUT. The EUT is configured per FCC Part 15 to maximize emissions.

A Radio Frequency test receiver, in accordance with CISPR 16 is used to measure radiated emissions. Antenna height is variable between 1 and 4 meters for maximum signal reception. An antenna-to-EUT separation of 3 (Class B), or 10 (Class A) meters is established. Broadband antennas are used in both horizontal and vertical attitudes for maximum signal reception.

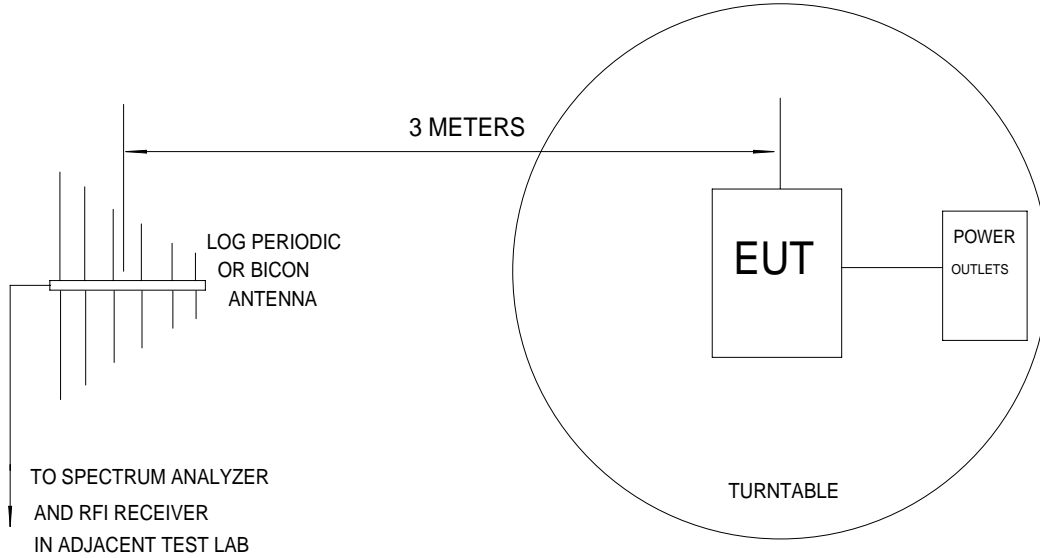
Emissions are first examined with a spectrum analyzer in Peak mode and EUT-generated signals are isolated from ambients. Signals are then measured with a Quasi-Peak receiver conforming to CISPR 16 and compared to limits. Antenna factors and cable loss are calculated in a computer spreadsheet.

Limits for radiated emissions are:

	Freq. (MHz)	dB(μV/m) Quasi-Peak
Class A (@ 10m)	30-88	39
	88-216	43.5
	216-960	46.4
	960-1000	49.5
Class B (@ 3m)	30-88	40
	88-216	43.5
	216-960	46
	960-1000	54

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RADIATED EMISSIONS TEST SET-UP

TURNTABLE AND ANTENNA ARE LOCATED  
IN A POST-AND-BEAM WOODEN "BARN"



**DATA TABLE EXPLANATION  
RADIATED ELECTRIC EMISSIONS MEASUREMENT**

The DATA TABLE PAGES contain the following information:

- TITLE: indicating the test performed
- EUT
- PERSON WHO PERFORMED THE TEST
- TEST STANDARD(S)
- DATE OF TEST
- TEST SITE
- TEST INSTRUMENTATION
- NOTES

The DATA TABLE headings are as follows:

FREQ. MHZ	The FREQUENCY, in megahertz, at which a signal is detected.
AMPL QUASI-P dB(μV)	The QUASI-PEAK AMPLITUDE, in decibels microvolt, of the signal.
AZIMUTH DEGREES	Approximate turntable position with respect to the antenna (mostly for diagnostics).
CABLE LOSS	Insertion loss due to the transmission line between the antenna and the measuring set.
ANTENNA FACTORS dB /m	Convert measured antenna voltage to units of field strength, also account for antenna's loss receiving the radiated signal.
TOTAL FIELD dB(μV/m)	the sum of the received signal at the measuring set, plus cable and antenna losses.
LIMIT QUASI-P dB(μV/m)	the LIMIT, in decibels microvolt per meter, for the above signal
PASS?	Is the signal acceptable under the standards? ("YES" or "NO")
MARGIN dB	the MARGIN, in decibels, by which the EUT passes or fails.

## RADIATED EMISSIONS DATA

### RADIATED EMISSIONS DATA USING FCC PART 15 LIMITS FOR CLASS B EQUIPMENT AT A 3 METER EUT TO ANTENNA DISTANCE.

FILE NAME: BRN0601

EUT NAME: NOTIFLEX TCU (TRANSMITTER CONTROL UNIT)

THE EUT IS A MURS (Multi User Radio Service)

THE EUT IS POWERED BY: 120 VAC

THE EUT IS NOT SERIALIZED.

CUSTOMER REPRESENTATIVE: BROWN PULLIAM

MEASURED BY STEVE PETIX ON 7/25/06 TO FCC PART 15 FOR CLASS B EQUIPMENT USING THE 3 METER OPEN AREA TEST SITE, (i.e. OATS).

A SCHWARZBECK MODEL VHA9103 BICONICAL ANTENNA, (s/n: A) IS USED FOR 30 TO 200 MHz.

AN AILTECH MODEL 96005, (s/n 1095), LOG PERIODIC ANTENNA IS USED FOR 200 TO 1000 MHz.

THE ANTENNAS ARE FACING THE AC MAINS POWER CABLE SIDE OF THE EUT IN ORDER TO OBTAIN FREQUENCIES OF INTEREST. WHEN FOUND, THEY WILL BE MAXIMIZED BY TURNTABLE ROTATIONS AND ANTENNA HEIGHT SCANS.

THIS CORRESPONDS TO ZERO DEGREES ON THE TURNTABLE.

A SPECTRUM ANALYZER OPERATING IN PEAK MODE IS FIRST USED TO FIND THE INITIAL READING OF THE EUT SIGNAL.

ONCE FOUND, THE SIGNAL STRENGTH IS MAXIMIZED BY TURNTABLE ROTATIONS AND ANTENNA HEIGHT SCANS. THE SIGNAL IS THEN FED TO A QUASI-PEAK RECEIVER FOR USE IN THE TABLES.

ALL MEASUREMENTS USE QUASI-PEAK DETECTION UNLESS NOTED OTHERWISE.

The following measurements are for spurious radiated emission measurements.

There is no switching power supply in this device, therefore no broadband emissions will be found.

The following measurements are harmonics of the 6 MHz and 17 MHz crystals.

The transmitter frequency is 154.57 MHz. All measurements are done with the transmitter switched on for no more than 30 seconds.

No antenna is used. The antenna replaced with a 5 Watt, 50 ohm coaxial terminator.

continued on next page



**RADIATED EMISSIONS DATA**

<b>THE 30 TO 300 MHz ANTENNA IS VERTICAL AND AT 3 METERS.</b>								
FREQ. (MHz)	AMPL QUASI-P dB(μV)	AZIMUTH DEGREES	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
The following signals are narrowband peaks measured with the spectrum analyzer.								
154.69	30	0	5.81	13.83	49.65	43.5	NO	6.1
The 154 MHz signal is the transmitter fundamental. I does not have to meet the FCC(B) limits.								
NO SIGNIFICANT EUT GENERATED SPURIOUS SIGNALS FOUND FOR THIS RANGE.								

<b>THE 30 TO 300 MHz ANTENNA IS HORIZONTAL AND AT 3 METERS.</b>								
FREQ. (MHz)	AMPL QUASI-P dB(μV)	AZIMUTH DEGREES	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
The following signals are narrowband peaks measured with the spectrum analyzer.								
154.69	28	0	5.81	13.83	47.65	43.5	NO	4.1
The 154 MHz signal is the transmitter fundamental. I does not have to meet the FCC(B) limits.								
NO SIGNIFICANT EUT GENERATED SPURIOUS SIGNALS FOUND FOR THIS RANGE.								

<b>THE 300 TO 1000 MHz ANTENNA IS VERTICAL AND AT 3 METERS.</b>								
FREQ. (MHz)	AMPL QUASI-P dB(μV)	AZIMUTH DEGREES	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
NO SIGNIFICANT EUT GENERATED SPURIOUS SIGNALS FOUND FOR THIS RANGE.								

<b>THE 300 TO 1000 MHz ANTENNA IS HORIZONTAL AND AT 3 METERS.</b>								
FREQ. (MHz)	AMPL QUASI-P dB(μV)	AZIMUTH DEGREES	CABLE LOSS dB(μV)	ANTENNA FACTORS dB	TOTAL FIELD dB(μV/m)	LIMIT QUASI-P dB(μV)	PASS?	MARGIN dB
NO SIGNIFICANT EUT GENERATED SPURIOUS SIGNALS FOUND FOR THIS RANGE.								

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**RADIATED EMISSIONS DATA**

The HP8569B spectrum analyzer is moved to the OATS facility for measurements with a 3 meter antenna to EUT separation distance. The ELECTROMECHANICS model 3115, s/n 2498 double ridged guide horn antenna is used. It is one meter from the floor.

The cable loss from the one meter SMA cable that is used to connect the antenna to the spectrum analyzer is negligible.

The HP8569B reads in dBm rather than dBuV. The AVERAGE detection mode is used for measurements entered into the tables below.

The spectrum analyzer is using RBW=100kHz, Span=1MHz, ATTEN=0dB and 2dB/division.

The limit of 49.5 dBuV/m from FCC Part 15, table 15.109 is assuming a 10 meter distance. For a 3-meter measurement distance, the limit is 54 dBuV/m.

<b>THE 1 TO 18 GHz ANTENNA IS VERTICAL &amp; AT 3 METERS.</b>							
FREQ. (GHz)	AMPL AVERAGE dBm	AMPL AVERAGE dB(μV)	ANTENNA FACTORS dB/m	TOTAL FIELD dB(μV/m)	FCC LIMIT QUASI-P dB(μV/m)	PASS?	MARGIN dB
NO SIGNIFICANT EUT GENERATED SPURIOUS SIGNALS FOUND FOR THIS RANGE.							

<b>THE 1 TO 18 GHz ANTENNA IS HORIZONTAL &amp; AT 3 METERS.</b>							
FREQ. (GHz)	AMPL AVERAGE dBm	AMPL AVERAGE dB(μV)	ANTENNA FACTORS dB/m	TOTAL FIELD dB(μV/m)	FCC LIMIT QUASI-P dB(μV/m)	PASS?	MARGIN dB
NO SIGNIFICANT EUT GENERATED SPURIOUS SIGNALS FOUND FOR THIS RANGE.							

In addition to looking at the entire .01 to 1.8 GHz span, the >1GHz harmonics of the transmitter were measured with a 1 MHz span and 2dB/ sensitivity. The harmonics that were measured are: 1.082 GHz, 1.237 GHz, 1.391 GHz and 1.546 GHz.

In no case was any emission detected.

**THE EUT PASSES WITHOUT MODIFICATIONS.**

**POWER OUTPUT**

Power output measurement procedure is specified in Part 2.1046. Part 95.639(h) specifies a maximum power output of 2 Watts.

TRANSMITTER POWER AT ANTENNA TERMINALS:

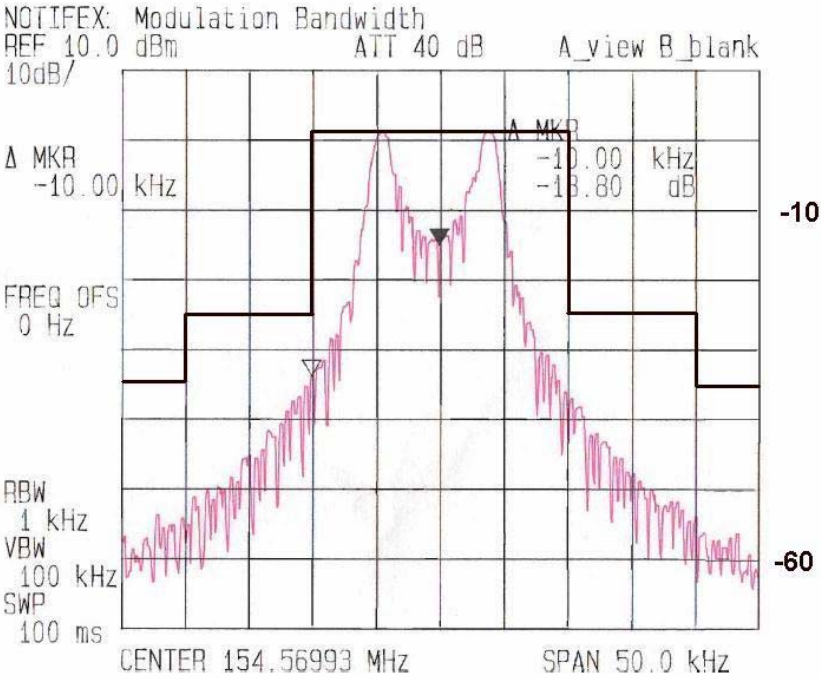
<b>NOTIFLEX @ fixed, nominal power and NO modulation.</b>	<b>XL Microwave Frequency Counter/Power meter Reading in dBm.</b>
154.57 MHz	2.3 dBm (1.698 watts)

NOTE: 0.1dBm was subtracted for deviation found calibrating the power meter.



**MODULATION BANDWIDTH**

Modulation is type F2D as defined in Part 2.201, as authorized in Part 95.631(j), with a Peak Deviation of 4.5 KHz. Testing is conducted using spectral Emission Mask 2, as outlined in Part 95.635(e)(2). Scope of testing is defined in Part 2.1049.

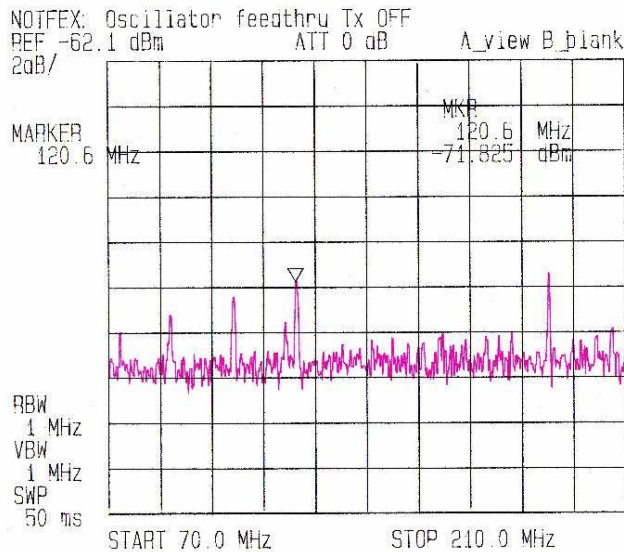
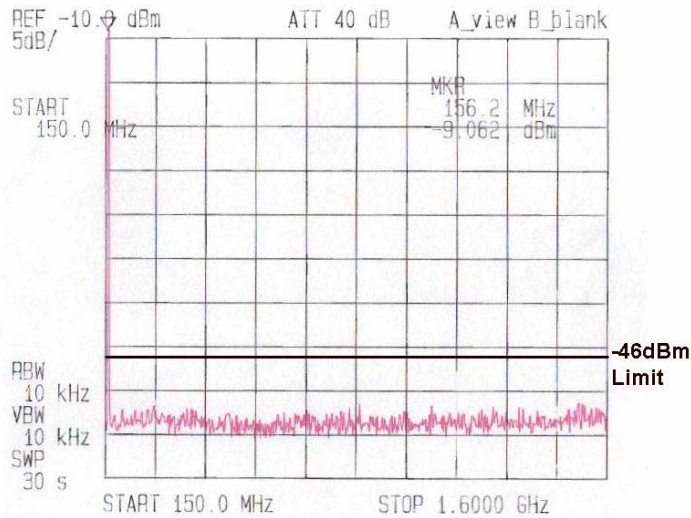


**SPURIOUS EMISSIONS**

Spurious Emissions at Antenna Terminal. A 30 dB attenuator connects a fraction of the output signal to a spectrum analyzer having sufficient dynamic range to assure that all harmonics of the 154.570 MHz output up to the 10th harmonic are below a level of -46 dBc, per Parts 95.635 and 2.1053. Measurements should also be made to assure the same freedom from spurs at the harmonics plus and minus 51.52333 MHz.

The following table was produced with the transmitter disabled and the EUT powered up. This requirement is in Part 15.111 (b).

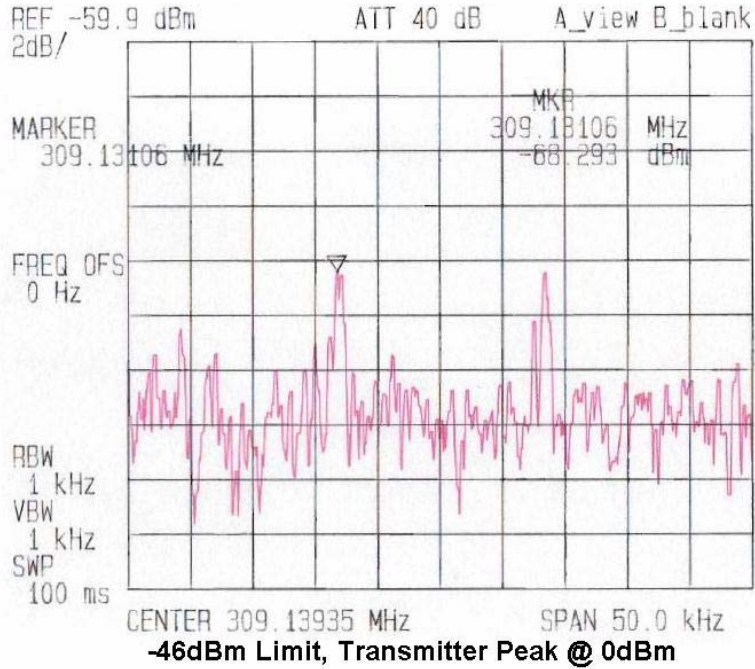
**Spurious Emissions at Antenna Terminal  
Transmitter ON**



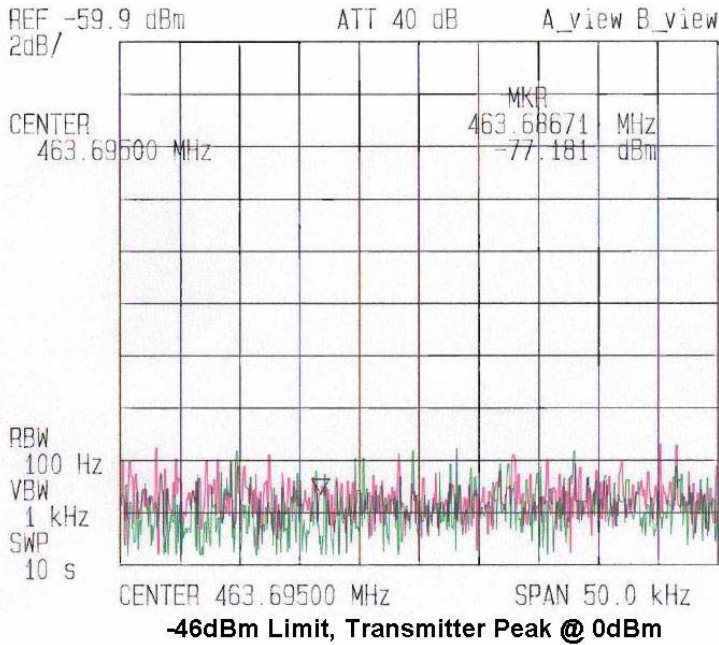
**-57dBm Limit, Transmitter OFF**

**SPURIOUS EMISSIONS**

**Spurious Emissions at Antenna Terminals  
2nd Harmonic**



**Spurious Emissions at Antenna Terminal  
3rd Harmonic**



**FREQUENCY STABILITY**

Part 95.632(c) specifies a frequency stability of +/-5 parts per million. Part 2.1055(a)(1) specifies a temperature range of -30 to +50 degrees centigrade, and Part 2.1055(b) requires the measurements to be made at 10 degree increments.

For all frequency stability measurements:

A maximum ±5 ppm tolerance (± 775 Hz) is allowed for MURS transmitter, according to Part 95.

FREQUENCY STABILITY vs. TEMPERATURE (Modulation ON):

<b>Temp. °C</b>	<b>Frequency (MHz)</b>
-30	154.569783
-20	154.569896
-10	154.569912
0	154.570008
10	154.570087
20	154.570083
30	154.569937
40	154.569943
50	154.569866

The maximum measured deviation is:  $154.70087 - 154.569783 = 0.131 = 131 \text{ Hz}$ .

All the above measurements are within ±5 ppm, or ± 775 Hz.

**Heat chamber**



**Freezer**



**FREQUENCY STABILITY**

Part 2.1055(d) requires the power line voltage varied from 85% to 115% of nominal value (93.6 to 134.6 Vrms), to observe the specified stability at room temperature.

FREQUENCY STABILITY vs. POWER VARIATION (Modulation ON):

AC Voltage to the Power supply	Frequency (MHz)
132.25 VAC	154.569992
115.00 VAC	154.569955
97.75 VAC	154.569951

The maximum measured deviation is:  $154.69992 - 154.569951 = 41 \text{ Hz}$ .  
 All the above measurements are within  $\pm 5 \text{ ppm}$  or  $\pm 775 \text{ Hz}$ .





**SUMMARY**  
**S. BROWN PULLIAM, CONSULTANT**  
**NOTIFLEX TCU**

The NOTIFLEX TCU, the EUT, was tested for RF emissions in accordance with the applicable agency rules and guidelines.

The EUT passed FCC Part 15 Class B CONDUCTED EMISSIONS measurement.  
The signal closest to limits was 0.542 MHz, with a 6.3 dB margin.

The EUT passed FCC Part 15 RADIATED EMISSIONS measurement.  
No signals were detected except at the fundamental transmit frequency, which is excluded from these limits.

The EUT meets the POWER OUTPUT requirements of FCC Part 95.

The EUT meets the MODULATION BANDWIDTH requirements of FCC Part 95.

The EUT passed FCC PART 95 SPURIOUS EMISSIONS measurement.

The EUT meets the FREQUENCY STABILITY requirements of FCC Part 95 for -30°C to +50°C and 97.75 VAC to 132.25 VAC ranges.

The NOTIFLEX TCU complies with the essential technical requirements of FCC Parts 15 for Class B, Part 95 and Part 2 (all 2005), without modifications.