FCC CFR47 PART 15 SUBPART C

Test Report for Class 2 Permissive Change Application

902-928 MHZ RFID READER

Model Number: IB500

FCC ID: VBLIB500

Report Number: 08PRO23

Issue Date: 31 October 2008

Prepared for

Intelleflex Corp
2465 Augustine Drive, Suite 102
Santa Clara, CA 95054

Prepared by

T.N. Cokenias Consulting
P.O. Box 1086
El Granada CA 94018

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1. TEST AND TEST LOCATION INFORMATION

COMPANY NAME: Intelleflex Corp
2465 Augustine Drive, Suite 102
Santa Clara, CA 95054

EUT DESCRIPTION: RFID READER CARD

MODEL: IB500
FCC ID: VBLIB500

DATA ALSO APPLIES TO : N/A

DATE TESTED: 13 March – 8 September 2008

All tests were performed by

Compliance Certification Services
47173 Benicia Street
Fremont CA 94538

31 October 2008

T.N. Cokenias
Agent for Intelleflex Inc..

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

3. EQUIPMENT UNDER TEST

3.1. DESCRIPTION OF EUT

The EUT is a 1 watt RFID Reader card with a 8.5dBi +/- 0.5 dB circularly polarized antenna. The antenna cable is supplied by Intelleflex. The cable has 2.75 dB of loss in the 902-928 MHz band.

Per OET KDB Publication 192659, "the Commission will use the highest linear vertical and horizontal gain to determine compliance with Section 15.247." In this case, vertical gain = horizontal gain = 8.5 – 3 = 5.5 dBi, +/- 0.5 dB.

RF power output was set to maximum limits determined by the original grant (0.721 watts = 28.58 dBm), using the class 3 modulation, determined previously as the worst-case modulation.

3.2. MAXIMUM OUTPUT POWER

CLASS 3

Channel	Frequency (MHz)	Power (dBm)	Power (mW)
Low	902.75	28.68	737.9
Middle	914.68	28.59	722.8
High	927.25	28.55	716.1

3.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a circularly polarized antenna, with a maximum published gain of 8.5 dBic, +/- 0,5 dB. The antenna cable is supplied by Intelleflex and has a minimum loss of 2.75 dB in the 902-928 MHz band.

Per OET KDB Publication 192659, "the Commission will use the highest linear vertical and horizontal gain to determine compliance with Section 15.247." In this case, vertical gain = horizontal gain = 8.5 – 3 = 5.5 dBi, +/- 0.5 dB.

All antenna port conducted tests were performed with the Intelleflex supplied antenna cable between the EUT antenna port and the spectrum analyzer.

3.4. SOFTWARE AND FIRMWARE

The EUT driver software installed in the host support equipment during testing was JFSS2 v2.2. The test utility software used during testing was Hyperterminal EUTAG.ht Linux Version 2.6.20.4

3.5. WORST-CASE CONFIGURATION AND MODE

For radiated and antenna conducted emissions, CLASS 3 modulations were investigated. During radiated emissions tests, there was an RFID tag on the table with the reader.

Worst-case emissions are reported.

3.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
LAPTOP	IBM	390E	AF - 1B8BD	N/A
AC/DC ADAPTER	IBM	N/A	02K6555	N/A
AC/DC POWER SUPPLY				

I/O CABLES

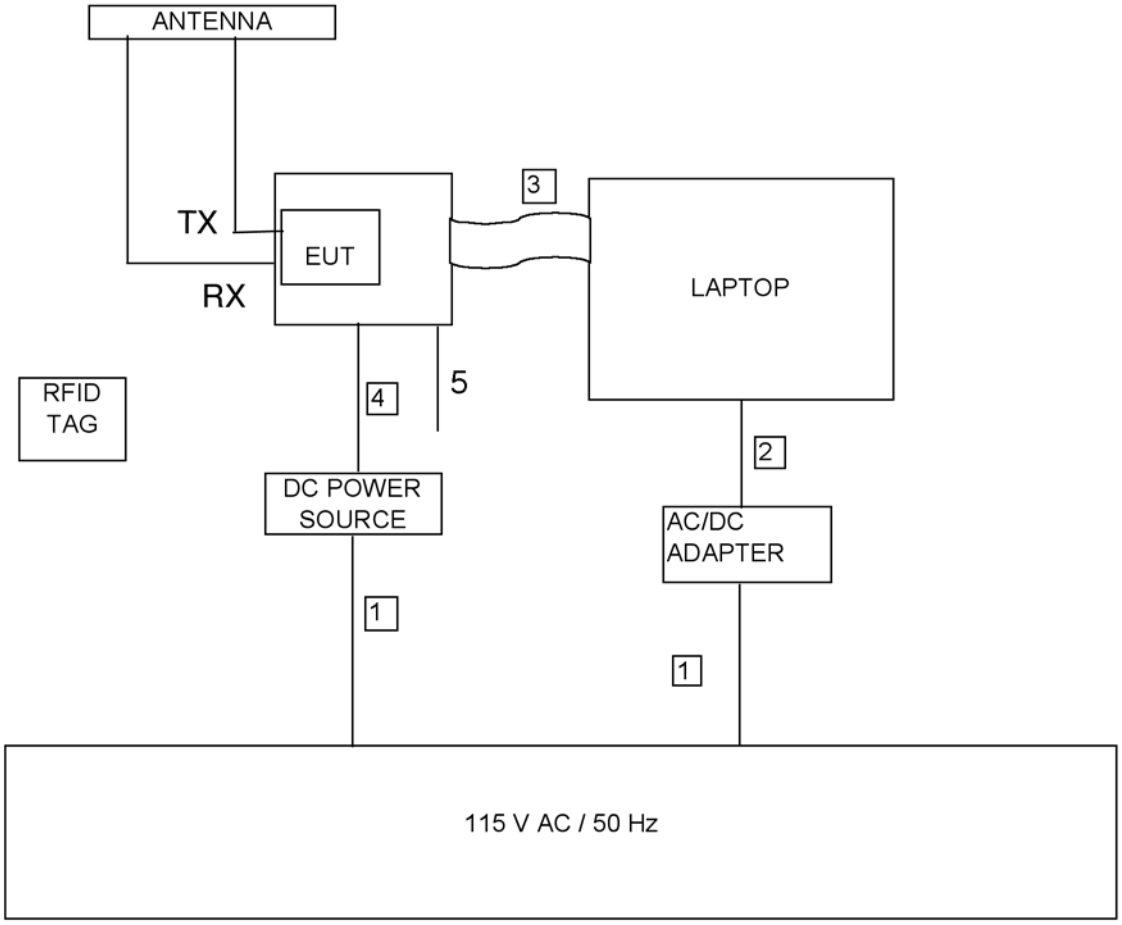
I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	AC	Un-shielded	0.5 m	N/A
2	DC	1	DC	Un-shielded	1m	N/A
3	SERIAL	1	RS-232	Un-shielded	1m	N/A
4	DC	1	DC	Un-shielded	0.5m	N/A
5	I/O	1	multi pin	Shielded	1m	N/A

TEST SETUP

The EUT is a stationary RFID reader, which is connected to the Laptop (support equipment) via a serial cable.

The software on the Laptop exercises the EUT in different channels and also into hopping mode when needed.

SETUP DIAGRAM FOR TESTS



3.7 Modifications to EUT

None.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Equipment	Mfr	Model	Asset No.	Cal Due
Spectrum analyzer	Agilent	E4446A	C01159	10/27/08
EMI Receiver	HP	8542E	C00967	09/10/09
Bilog antenna	Sunol Sciences	JBI	C01016	09/28/08
Pre-amplifier	Agilent	HP8447D	C00885	03/31/09
Horn antenna	EMCO	3115	C00872	03/31/09
Pre-amplifier	Agilent	HP 8449B	C00749	09/27/08
EMI Receiver	R & S	ESHS-20	827129/006	01/27/09
LISN	FCC	LISN50/250-25-2	2023	09/27/08

4. LIMITS AND RESULTS

4.1. ANTENNA PORT CHANNEL TESTS FOR CLASS 3

PEAK OUTPUT POWER

PEAK POWER LIMIT

§15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:

§15.247 (b) (2) For frequency hopping systems operating in the 902-928 MHz band , employing at least 50 hopping channels: 1 watt; and
employing less than 50 hopping channels, but at least 25 hopping channels: 0.25 watt.

§15.247 (b) (4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is 6.75 dBi, therefore the limit is 29.25 dBm.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer and the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

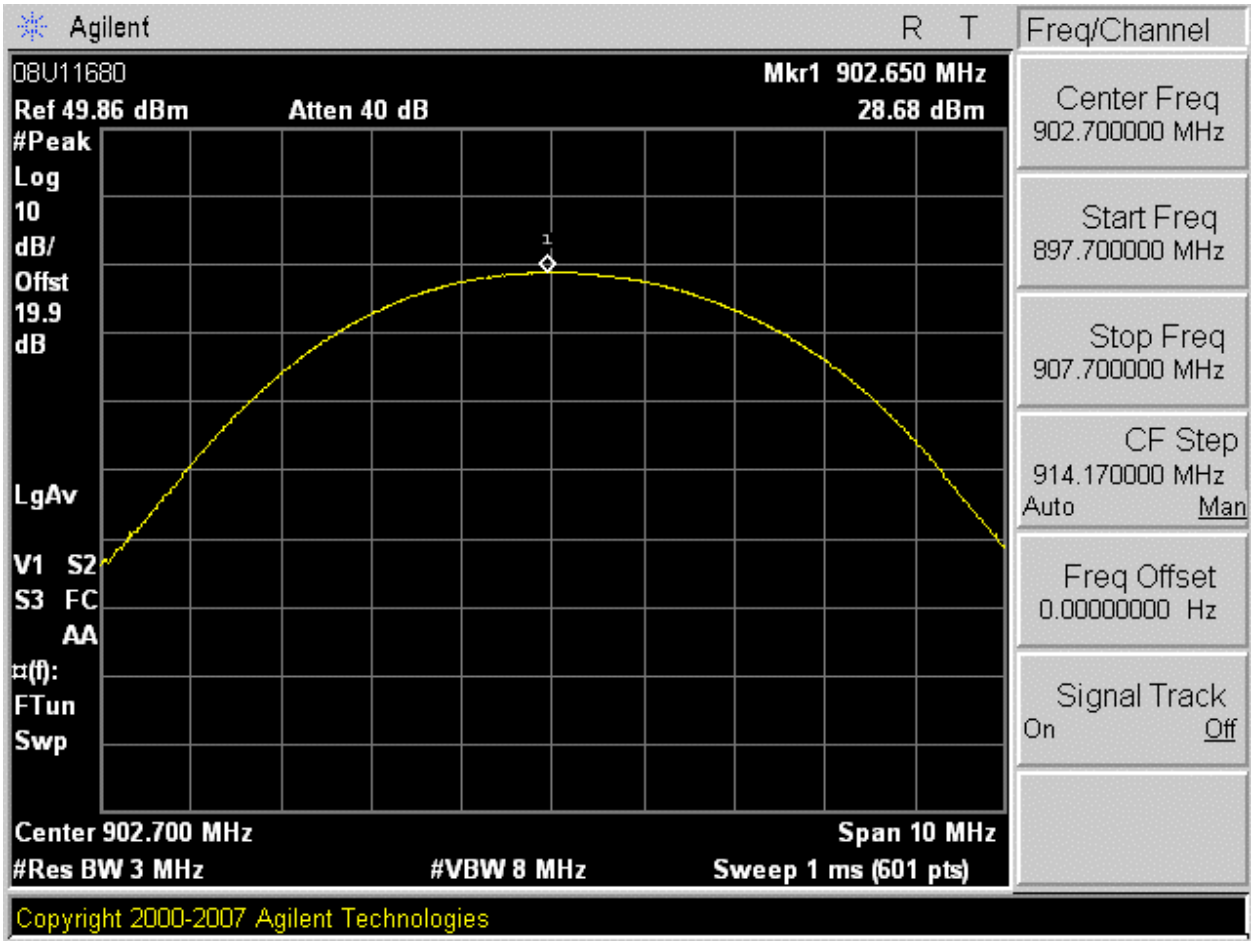
RESULTS

No non-compliance noted:

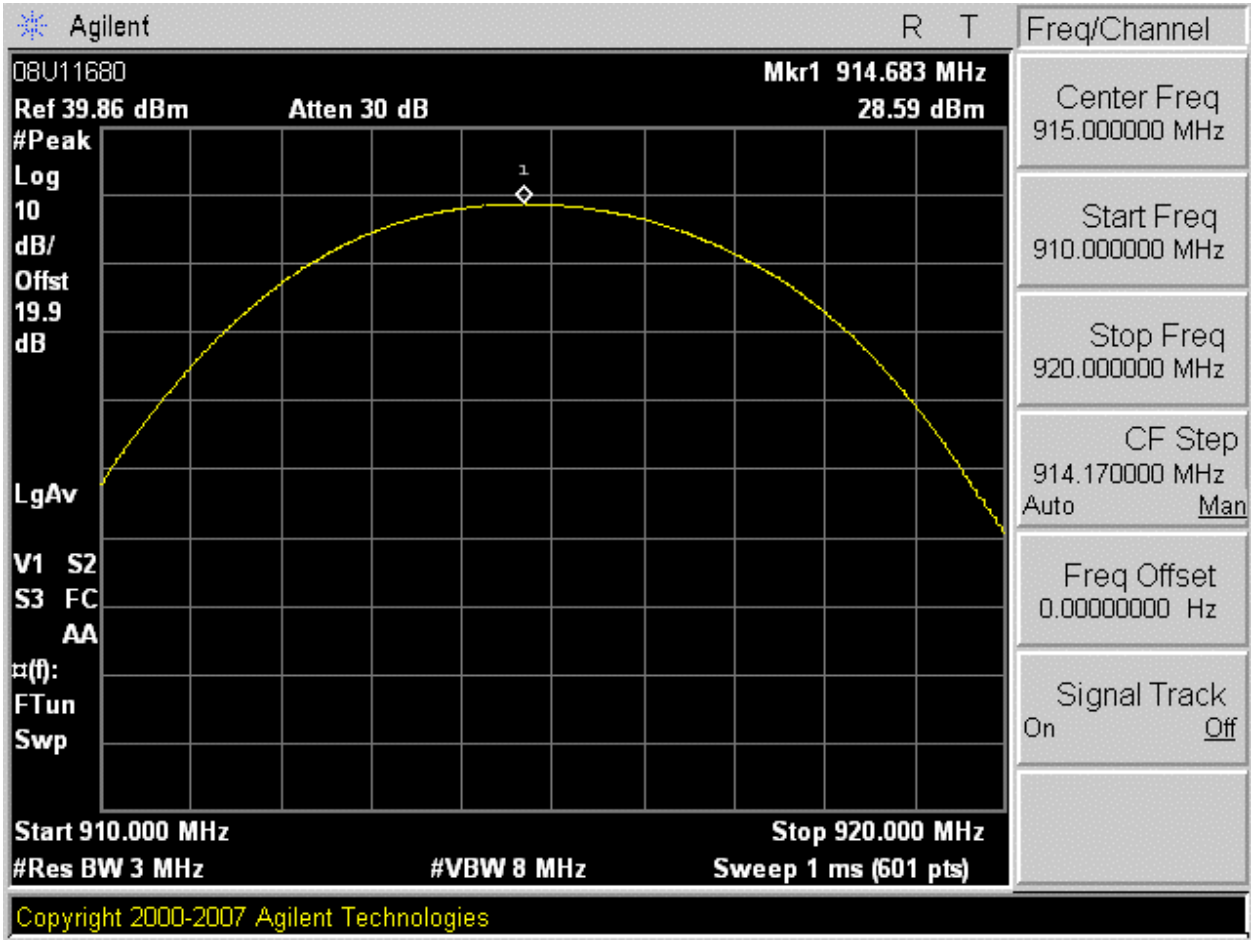
Class 3

Channel	Frequency (MHz)	Power (dBm)	Power (mW)
Low	902.75	28.68	737.9
Middle	915.25	28.59	722.8
High	927.25	28.55	716.1

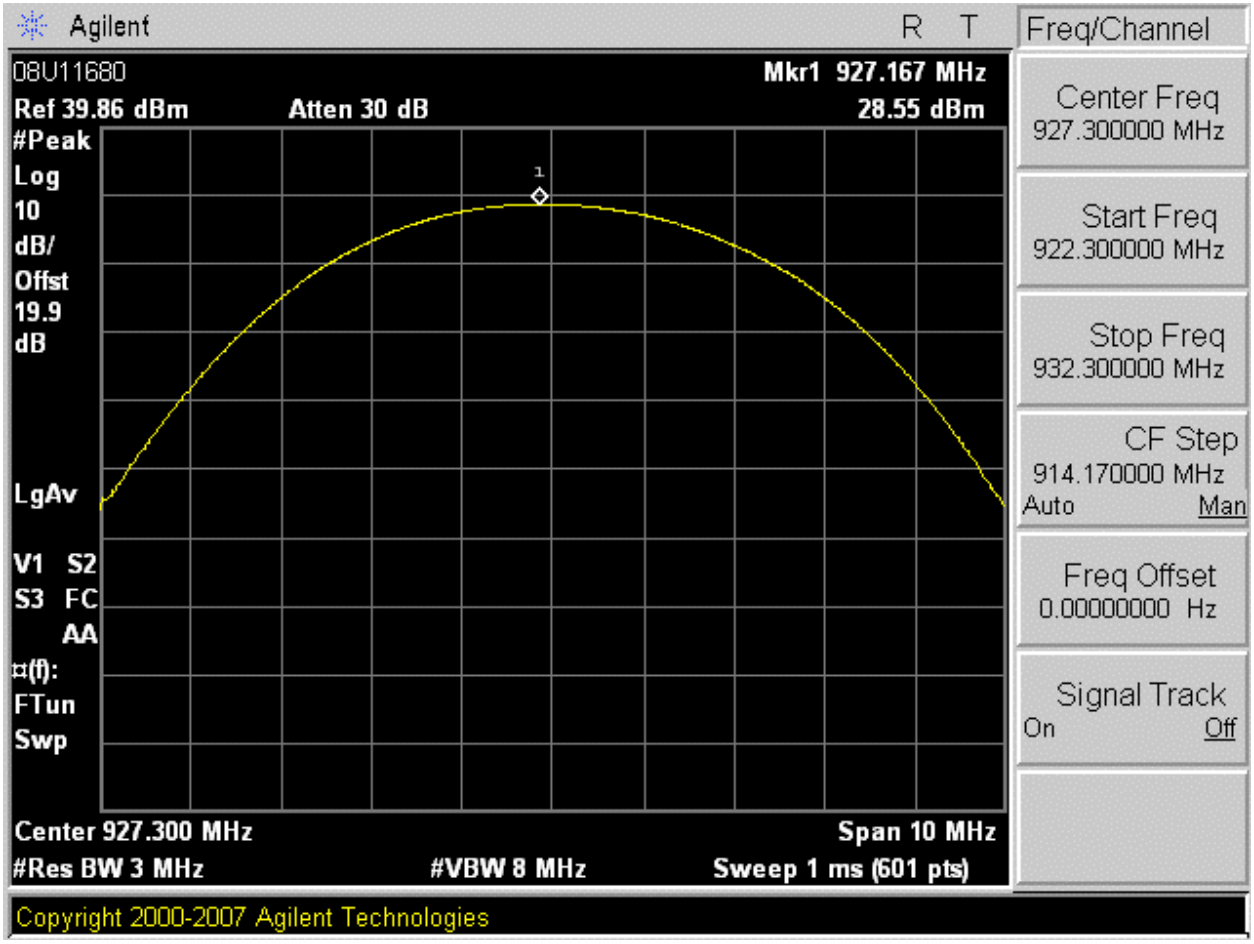
OUTPUT POWER LOW CHANNEL



OUTPUT POWER MID CHANNEL



OUTPUT POWER HIGH CHANNEL



4.1.1. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density
NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

CALCULATIONS

Given

$E = \sqrt{(30 * P * G) / d}$

and

$S = E ^ 2 / 3770$

where

E = Field Strength in Volts/meter
P = Power in Watts
G = Numeric antenna gain
d = Distance in meters
S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$d = \sqrt{((30 * P * G) / (3770 * S))}$

Changing to units of Power to mW and Distance to cm, using:

P (mW) = P (W) / 1000 and
d (cm) =100 * d (m)

yields

$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$
$d = 0.282 * \sqrt{(P * G / S)}$

where

d = distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P (mW) = 10 ^ (P (dBm) / 10) and
G (numeric) = 10 ^ (G (dBi) / 10)

yields

$d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}$ Equation (1)

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

Equation (1) and the measured peak power is used to calculate the MPE distance.

LIMITS

From §1.1310 Table 1 (B), S = 0.6 mW/cm^2

RESULTS

No non-compliance noted:

Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
0.6	28.68	8.50	26.31

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

4.1.2. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.247 (c) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

TEST PROCEDURE

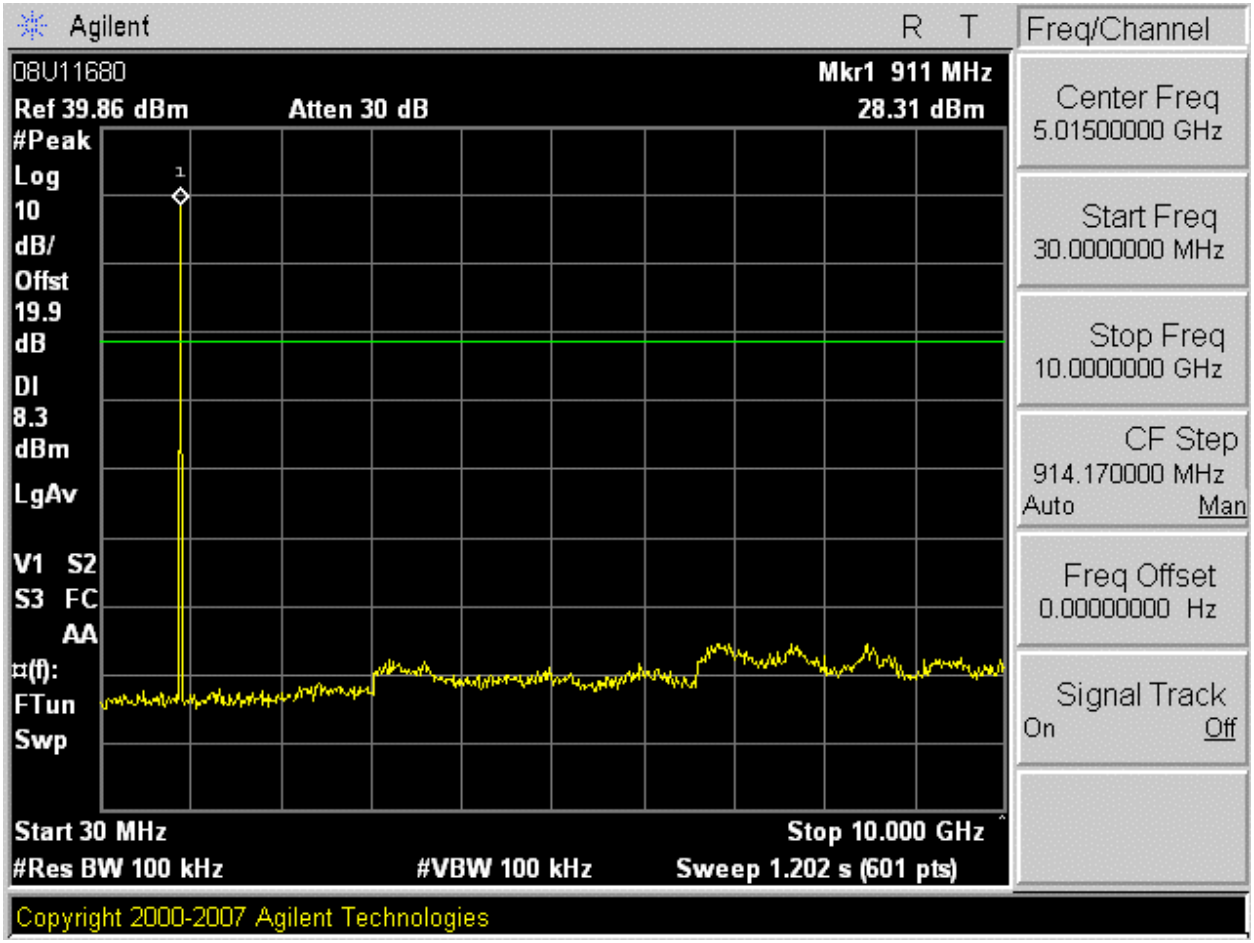
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

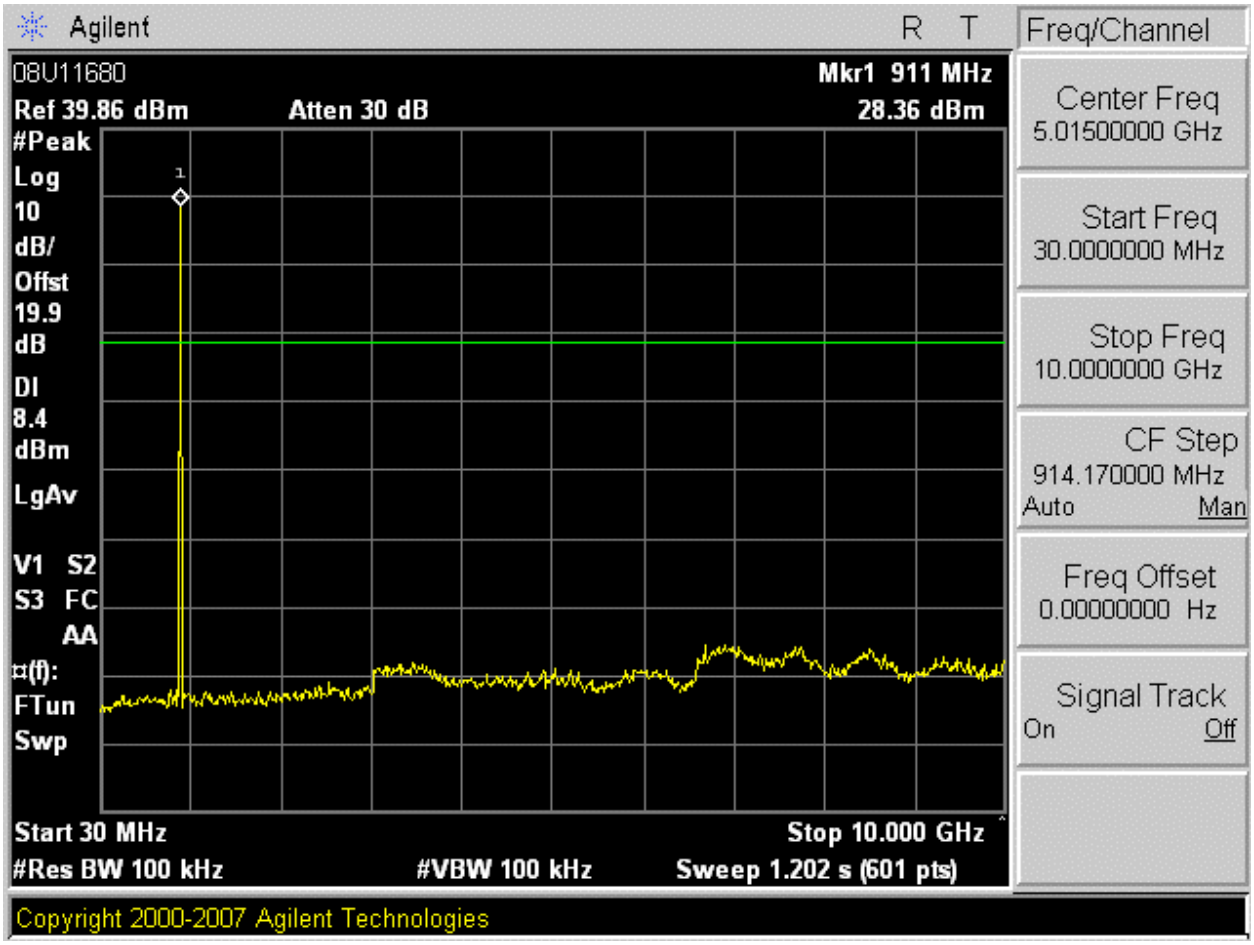
RESULTS

No non-compliance noted:

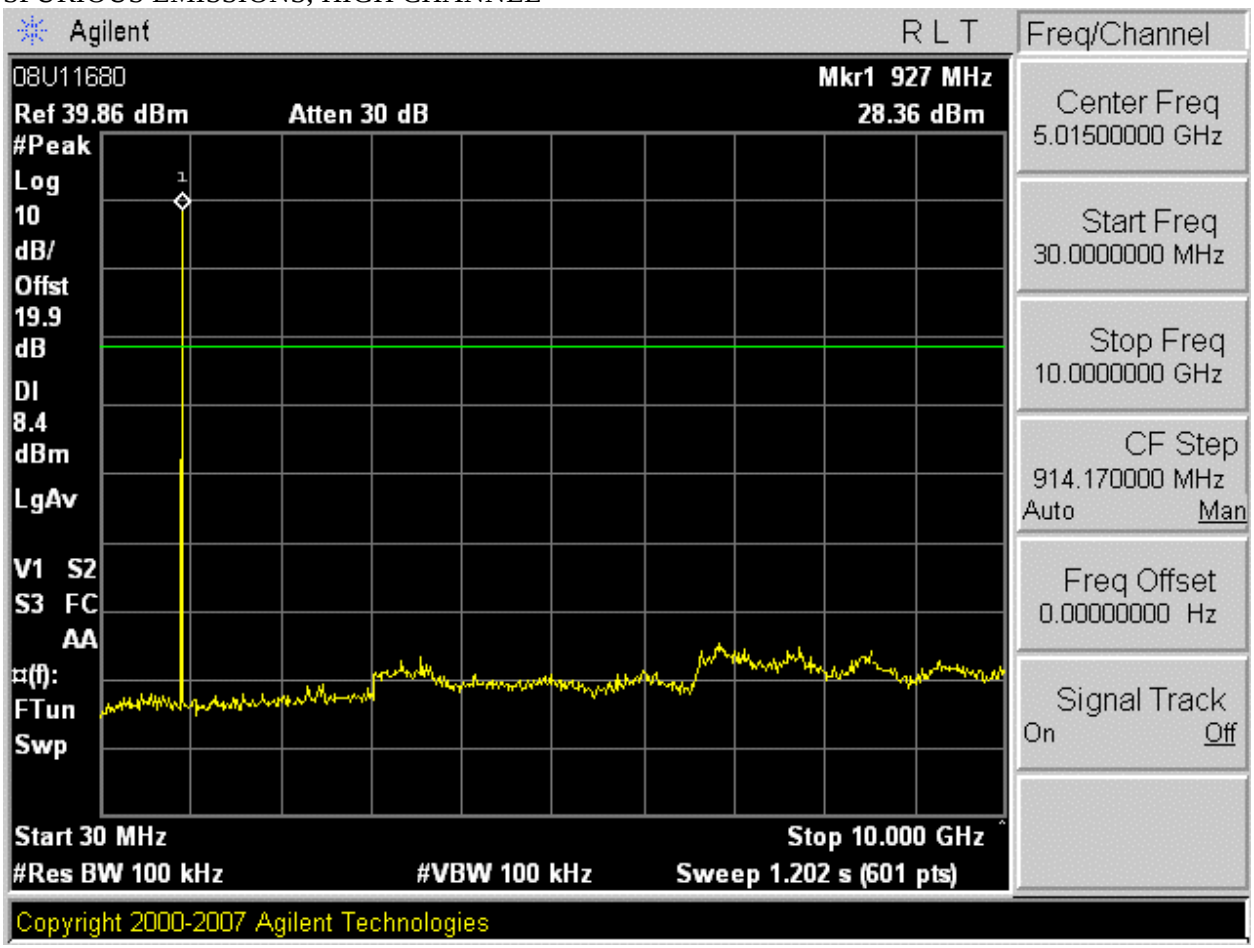
SPURIOUS EMISSIONS, LOW CHANNEL



SPURIOUS EMISSIONS, MID CHANNEL



SPURIOUS EMISSIONS, HIGH CHANNEL



4.2. RADIATED EMISSIONS

4.2.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak. Measurements are made to class A limits for the EUT's digital emissions, as the product is marketed and intended for non-residential use only. Emissions from the TX portion of the EUT that are below 1 GHz were all at least -20 dBc. There were no restricted band emissions detected in the 30-1000 MHz region.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 10 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 902-928 MHz band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

For each frequency investigated, the EUT was set to worst case CLASS 3 modulations.

4.2.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ HARMONICS AND SPURIOUS EMISSIONS

Emissions for Original Case

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Intelleflex Corp.
Project #: 08U11680
Date: 03/19/2008
Test Engineer: Thanh Nguyen
Configuration: EUT with Antenna S/N 262013/TRHAKB-00199
Mode: Transmit

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz
T73; S/N: 6717 @3m	T144 Miteq 3008A00931		

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		A-5m Chamber	HPF_1.5GHz	

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics Spurious															
Low Channel 902.75															
1.805	3.0	57.3	49.5	26.7	4.0	-38.3	0.0	0.3	50.1	42.2	74	54	-23.9	-11.8	V
2.708	3.0	45.2	38.3	29.2	5.1	-37.4	0.0	0.6	42.6	35.7	74	54	-31.4	-18.3	Noise floor
1.807	3.0	61.0	54.5	26.7	4.0	-38.3	0.0	0.3	53.8	47.3	74	54	-20.2	-6.7	H
2.708	3.0	46.6	38.4	29.2	5.1	-37.4	0.0	0.6	43.9	35.8	74	54	-30.1	-18.2	Noise floor
Mid Channel 915MHz															
1.830	3.0	61.7	54.0	26.8	4.1	-38.3	0.0	0.3	54.6	46.9	74	54	-19.4	-7.1	H
2.745	3.0	46.9	38.4	29.3	5.1	-37.4	0.0	0.6	44.4	35.9	74	54	-29.6	-18.1	Noise floor
1.830	3.0	53.2	43.7	26.8	4.1	-38.3	0.0	0.3	46.1	36.6	74	54	-27.9	-17.4	V
2.745	3.0	44.6	38.3	29.3	5.1	-37.4	0.0	0.6	42.1	35.8	74	54	-31.9	-18.2	Noise floor
High Channel 927.25MHz															
1.854	3.0	54.7	46.3	26.9	4.1	-38.3	0.0	0.3	47.7	39.4	74	54	-26.3	-14.6	V
2.782	3.0	44.7	39.1	29.4	5.1	-37.4	0.0	0.6	42.3	36.8	74	54	-31.7	-17.2	Noise floor
1.854	3.0	59.7	49.3	26.9	4.1	-38.3	0.0	0.3	52.7	42.4	74	54	-21.3	-11.6	H
2.782	3.0	45.3	38.7	29.4	5.1	-37.4	0.0	0.6	42.9	36.3	74	54	-31.1	-17.7	Noise floor
Spurious emissions															
1.023	3.0	61.0	52.3	23.9	3.0	-39.5	0.0	0.0	48.5	39.8	74	54	-25.5	-14.2	V
1.205	3.0	56.6	49.6	24.5	3.3	-39.2	0.0	0.1	45.3	38.3	74	54	-28.7	-15.7	V
No other emissions were detected above nois floor.															

Rev. 4.12.7

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

Emissions for **New Case**

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Intelleflex Corp.
Project #: 08U12075
Date: 09/08/2008
Test Engineer: Tom Chen
Configuration: EUT with Aluminum case, Antenna S/N 262013/TRHAKB-00199
Mode: Transmit normal

Test Equipment:

Horn 1-18GHz: T60; S/N: 2238 @3m
Pre-amplifer 1-26GHz: T145 Agilent 3008A005(
Pre-amplifer 26-40GHz:
Horn > 18GHz:
Hi Frequency Cables
2 foot cable:
3 foot cable:
12 foot cable: A-5m Chamber
HPF: HPF_1.5GHz
Reject Filter:

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Harmonics Spurious															
Low Channel 902.75															
1.805	3.0	52.8	46.6	27.4	4.0	-35.5	0.0	0.3	49.1	42.9	74	54	-24.9	-11.1	V
2.708	3.0	42.6	31.8	29.5	5.1	-35.2	0.0	0.6	42.6	31.8	74	54	-31.4	-22.2	Noise floor
1.805	3.0	56.1	49.7	27.4	4.0	-35.5	0.0	0.3	52.4	46.0	74	54	-21.6	-8.0	H
2.708	3.0	42.8	30.0	29.5	5.1	-35.2	0.0	0.6	42.8	30.0	74	54	-31.2	-24.0	Noise floor
Mid Channel 915.25MHz															
1.830	3.0	47.9	41.4	27.5	4.1	-35.5	0.0	0.3	44.3	37.8	74	54	-29.7	-16.2	V
2.745	3.0	41.7	31.0	29.7	5.1	-35.2	0.0	0.6	41.9	31.1	74	54	-32.1	-22.9	Noise floor
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2.745	3.0	42.3	29.6	29.7	5.1	-35.2	0.0	0.6	42.4	29.8	74	54	-31.6	-24.2	Noise floor
High Channel 927.25MHz															
1.854	3.0	45.8	31.5	27.6	4.1	-35.5	0.0	0.3	42.3	28.0	74	54	-31.7	-26.0	V
2.782	3.0	42.4	28.8	29.8	5.1	-35.2	0.0	0.6	42.7	29.1	74	54	-31.3	-24.9	Noise floor
1.854	3.0	48.5	39.2	27.6	4.1	-35.5	0.0	0.3	45.0	35.8	74	54	-29.0	-18.2	H
2.782	3.0	41.5	29.8	29.8	5.1	-35.2	0.0	0.6	41.8	30.1	74	54	-32.2	-23.9	Noise floor
Spurious emissions															
1.392	3.0	54.1	45.2	26.4	3.5	-35.9	0.0	0.2	48.3	39.4	74	54	-25.7	-14.6	V
1.492	3.0	52.0	41.8	26.7	3.6	-35.8	0.0	0.2	46.7	36.5	74	54	-27.3	-17.5	V
No other emissions were detected above nois floor.															

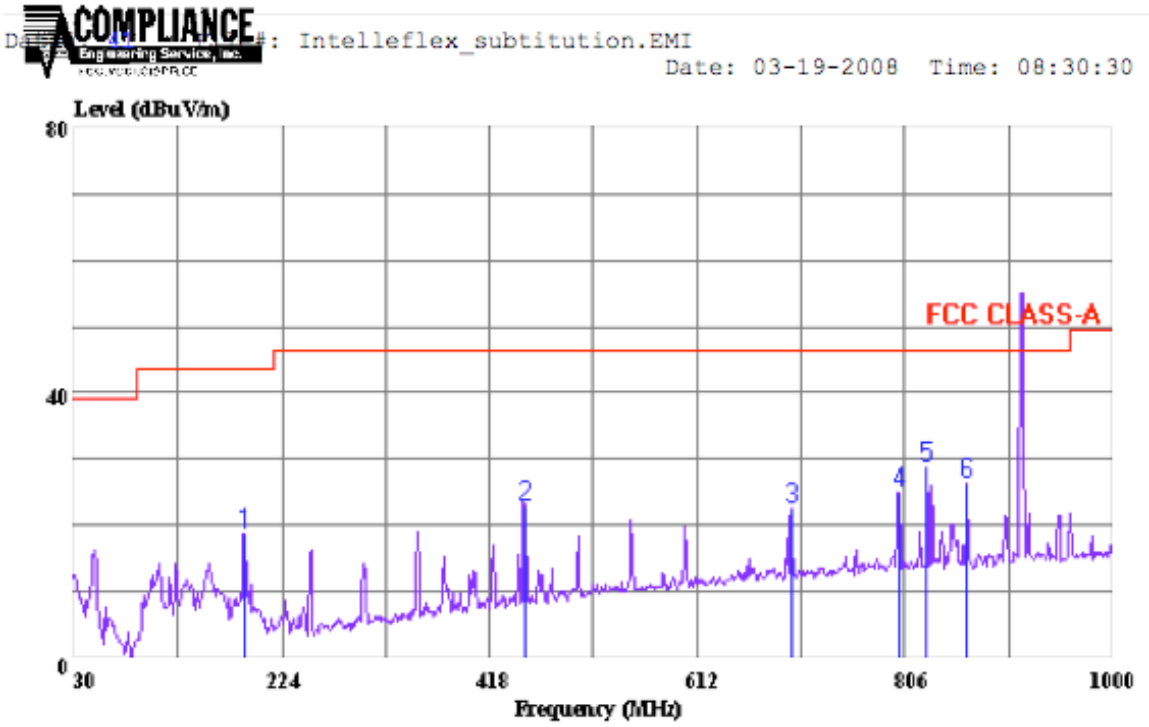
Rev. 4.12.7

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

1. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

ORIGINAL CASE

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



Trace: 40 Ref Trace:

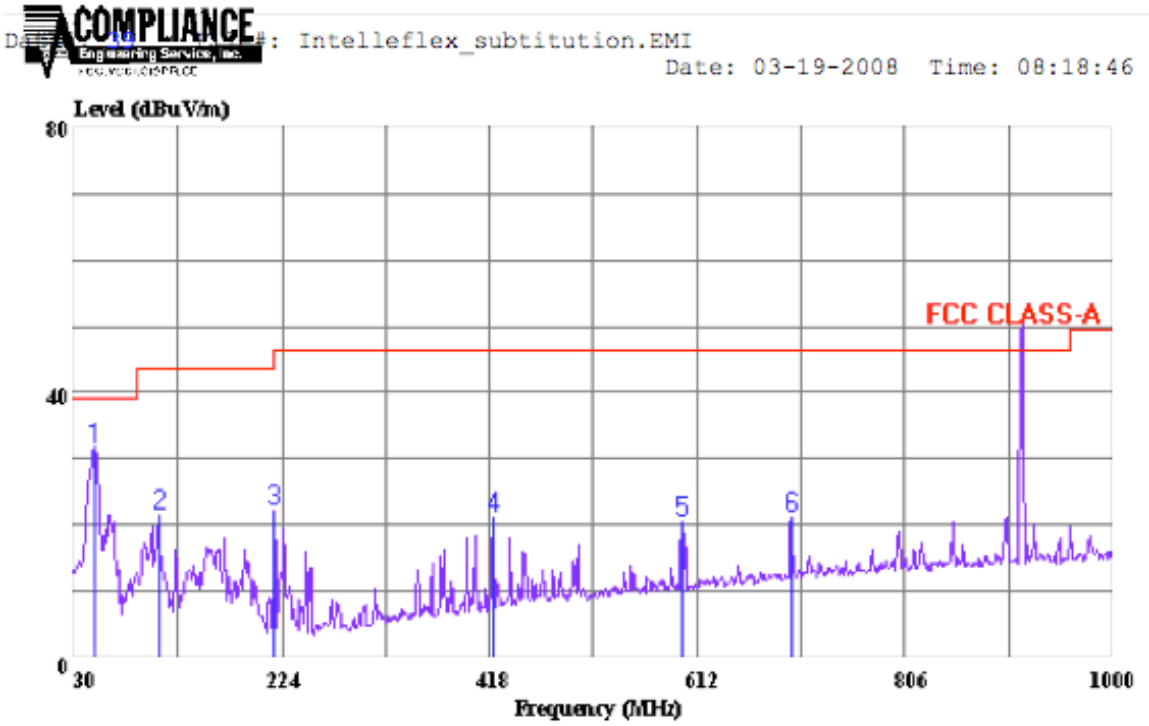
Condition: FCC CLASS-A HORIZONTAL
Engineer: : Thanh Nguyen
Company: : Intelleflex
Project #: : 08U11680
Test Configuration:: EUT remote support equipment
Mode of operation: : Transmit normal
Test Target: : FCC Class A
: Tx on with 50 Ohms load

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	189.080	33.33	-14.75	18.58	43.50	-24.92	Peak
2	450.980	31.25	-8.51	22.74	46.40	-23.66	Peak
3	700.270	26.00	-3.51	22.49	46.40	-23.91	Peak
4	801.150	27.00	-2.05	24.95	46.40	-21.45	Peak
5	826.370	30.67	-1.85	28.82	46.40	-17.58	Peak
6	864.200	27.67	-1.40	26.26	46.40	-20.14	Peak

ORIGINAL CASE

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



Trace: 38 Ref Trace:

Condition: FCC CLASS-A VERTICAL
Engineer: : Thanh Nguyen
Company: : Intelleflex
Project #: : 08U11680
Test Configuration:: EUT remote support equipment
Mode of operation: : Transmit normal
Test Target: : FCC Class A
: Tx on with 50 Ohms load

Page: 1

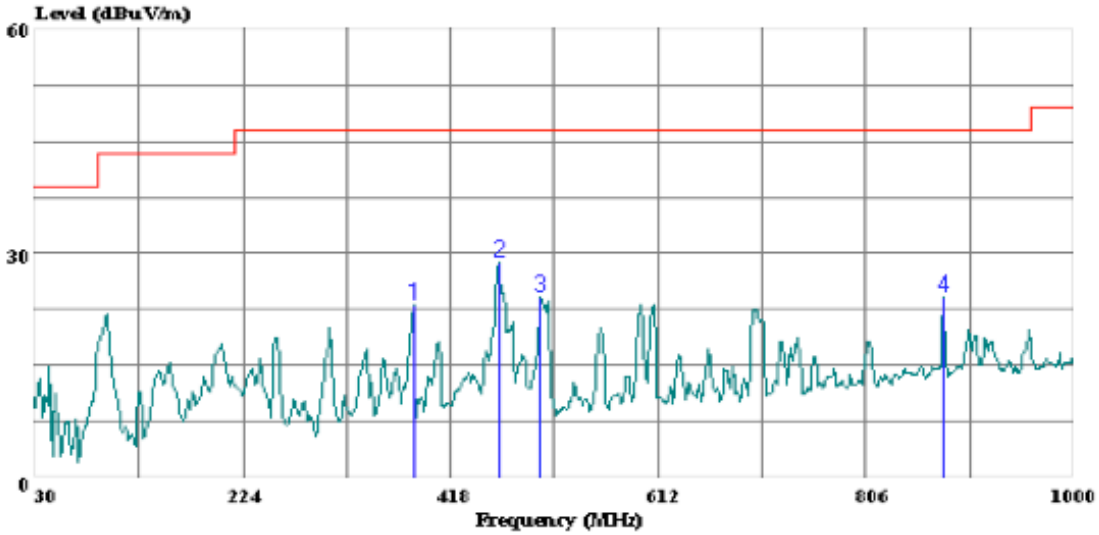
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	48.430	49.33	-17.85	31.48	39.00	-7.52	Peak
2	108.570	37.00	-15.41	21.59	43.50	-21.91	Peak
3	217.210	37.50	-15.26	22.24	46.40	-24.16	Peak
4	420.910	30.50	-9.33	21.17	46.40	-25.23	Peak
5	597.450	26.00	-5.47	20.53	46.40	-25.87	Peak
6	700.270	24.67	-3.51	21.15	46.40	-25.25	Peak

NEW CASE

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 08U12071EMI.EMI Date: 09-05-2008 Time: 10:58:34



Trace: 6 Ref Trace:

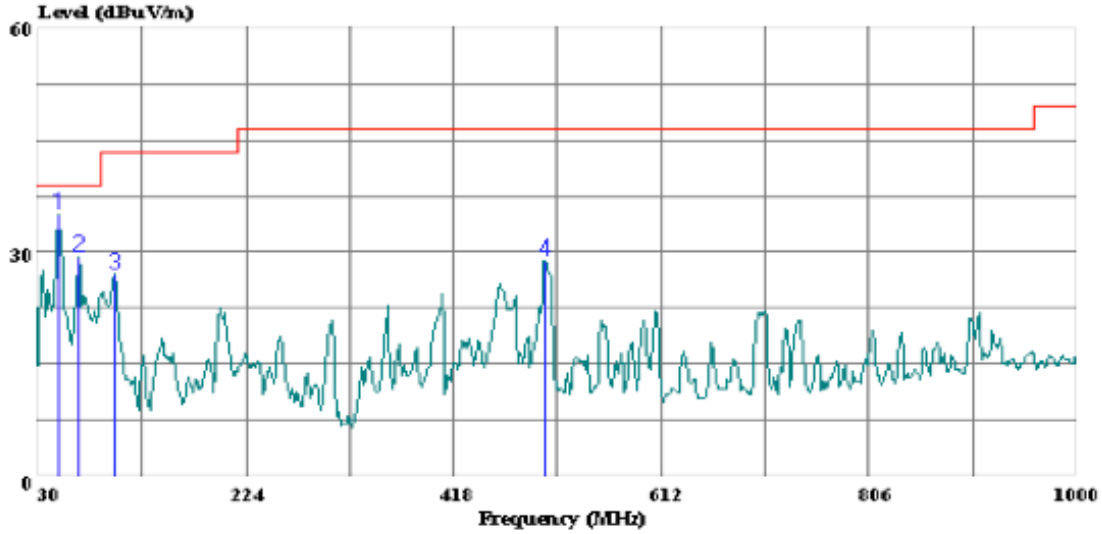
Condition: FCC CLASS-A HORIZONTAL
Test Operator:: Thanh Nguyen
Project #: : 08u12071
Company: : Intellflex
Configuration:: RFID Reader
: EUT w/ aluminum case, ant, remote equipe
Mode : : Normal
Target: : FCC Class A

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	383.080	31.69	-8.65	23.04	46.40	-23.36	Peak
2	463.590	34.77	-5.97	28.80	46.40	-17.60	Peak
3	502.390	28.90	-4.73	24.17	46.40	-22.23	Peak
4	877.780	21.63	2.40	24.03	46.40	-22.37	Peak

NEW CASE SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 5 File#: 08U12071EMI.EMI Date: 09-05-2008 Time: 10:55:48



Trace: 4 Ref Trace:

Condition: FCC CLASS-A VERTICAL
Test Operator:: Thanh Nguyen
Project #: : 08u12071
Company: : Intellflex
Configuration:: RFID Reader
: EUT w/ aluminum case, ant, remote equipe
Mode : : Normal
Target: : FCC Class A

Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	48.430	53.95	-18.84	35.11	39.00	-3.89	Peak
2	67.830	48.65	-19.18	29.47	39.00	-9.53	Peak
3	101.780	43.38	-16.41	26.97	43.50	-16.53	Peak
4	503.360	33.53	-4.71	28.82	46.40	-17.58	Peak

4.4 POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

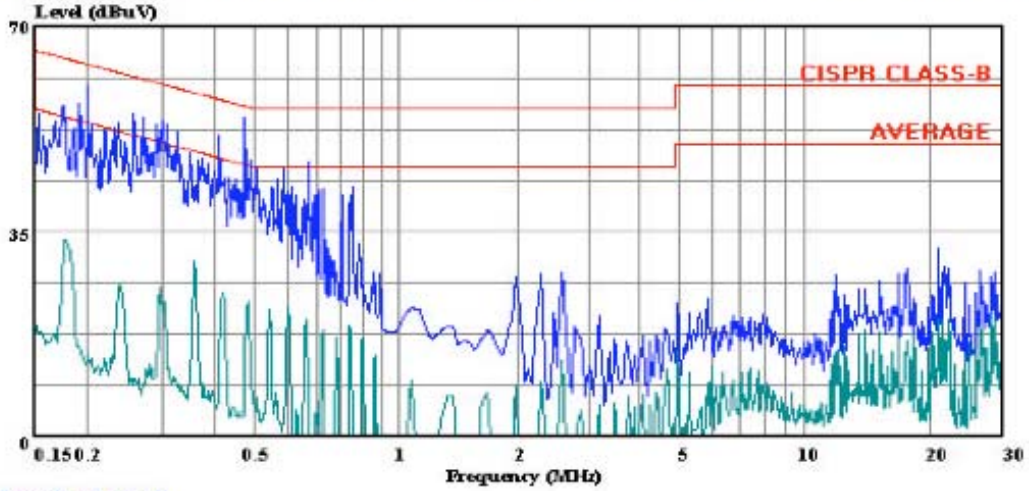
RESULTS

No non-compliance noted:

LINE 1 RESULTS, NEW CASE

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 08U12075 LC.EMI Date: 09-08-2008 Time: 11:05:33



(Line Conduction)

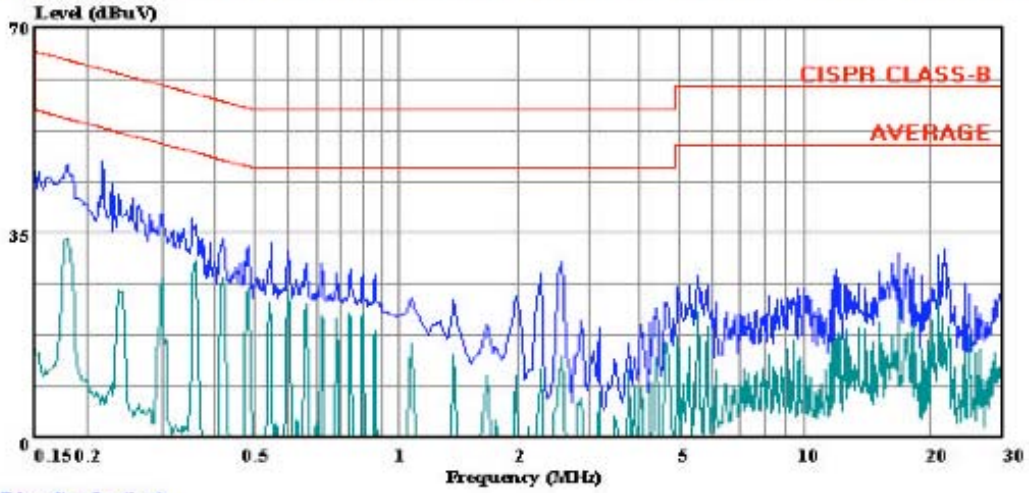
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Tom Chen
Project #: : 08U12075
Company: : Intelleflex
Configuration:: EUT with peripherals
Mode: : Transmit Normal
Target: : FCC Class B
Voltage: : 115 VAC / 60 Hz
: L1: Peak (Blue); Average (Green)
: RFID Reader FCC ID:UBLIB500

LINE 2 RESULTS, NEW CASE

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 14 File#: 08U12075 LC.EMI Date: 09-08-2008 Time: 11:32:29



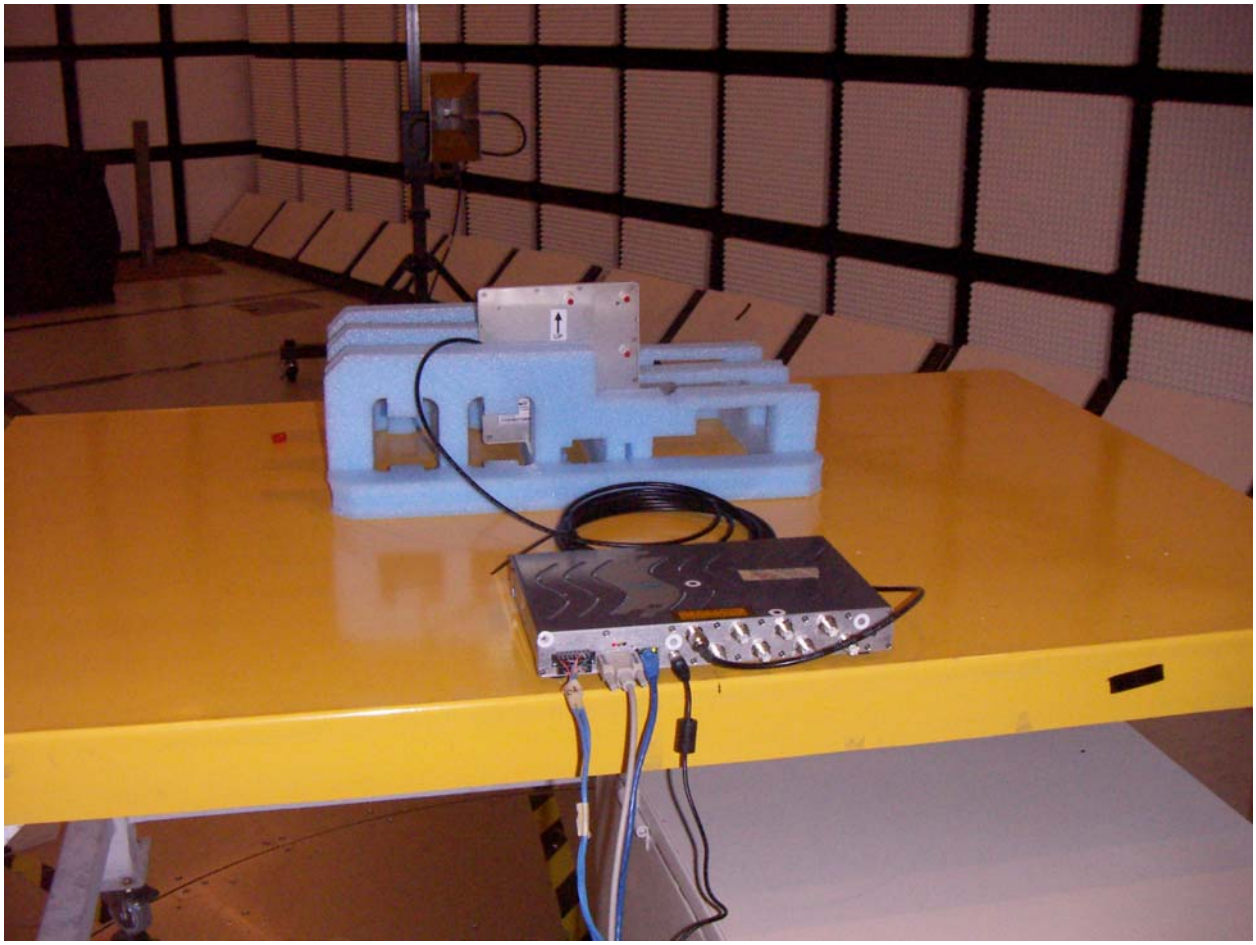
(Line Conduction)

Trace: 12 Ref Trace:

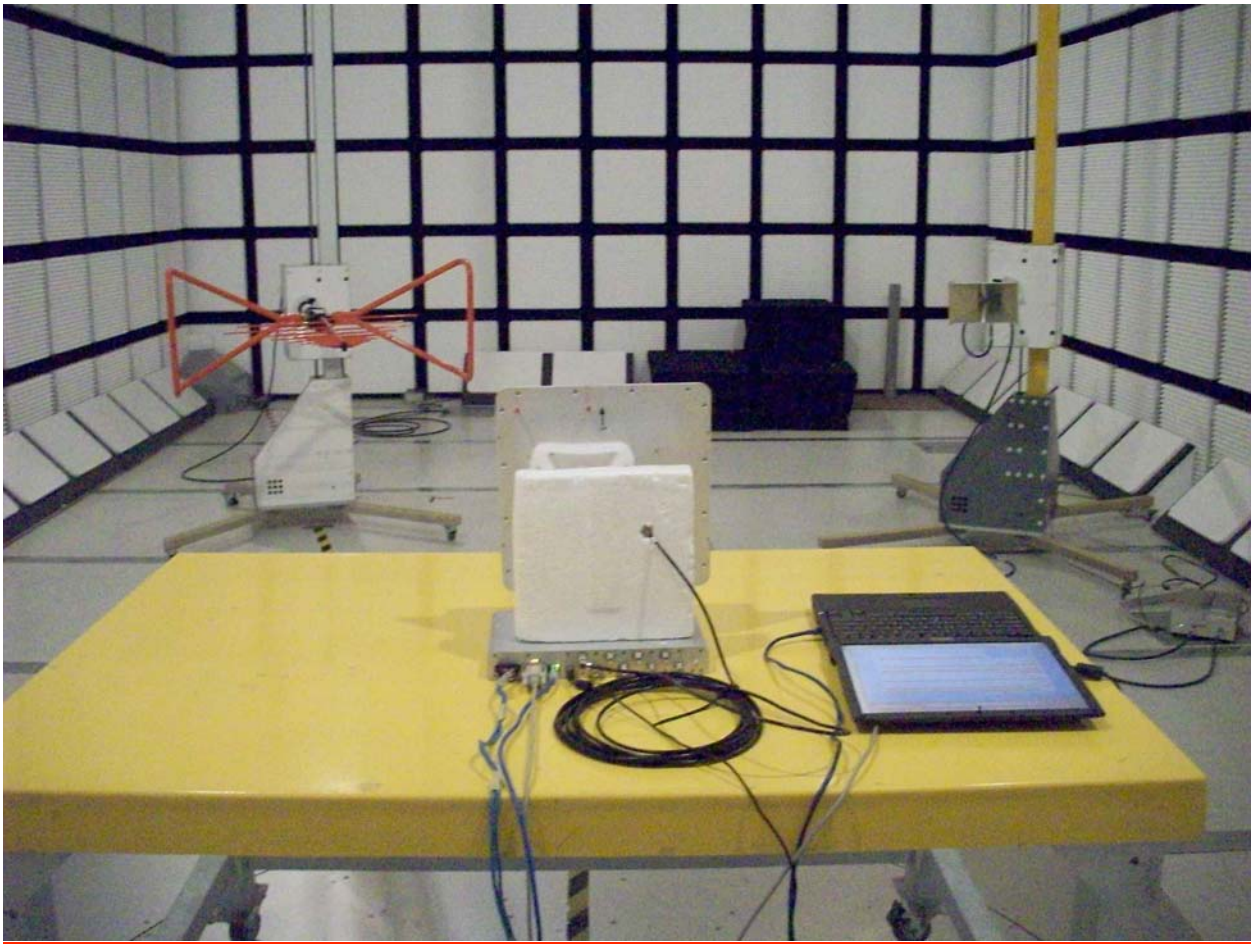
Condition: CISPR CLASS-B
Test Operator:: Tom Chen
Project #: : 08U12075
Company: : Intelleflex
Configuration:: EUT with peripherals
Mode: : Transmit Normal
Target: : FCC Class B
Voltage: : 115 VAC / 60 Hz
: L2: Peak (Blue); Average (Green)
: RFID Reader FCC ID:UBLIB500

5. SETUP PHOTOS

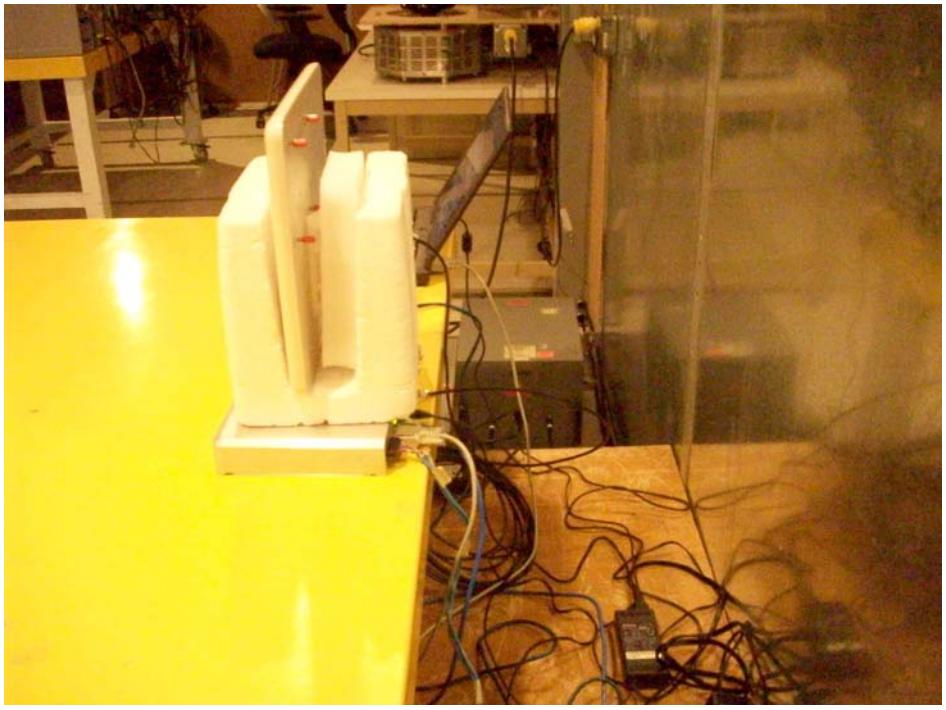
RADIATED RF MEASUREMENT SETUP ORIGINAL CASE



RADIATED RF MEASUREMENT SETUP NEW CASE



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



END OF REPORT