EMC TEST REPORT

Report Number: 3194158BOX-001
Project Number: 3194158

Report Issue Date: 06/14/2010

Product Designation: **Planar Radar Module, Model: RRS24-F-S1**

Standards: **CFR47 "Telecommunications" FCC Part 15 Subpart C "Intentional Radiators" 15.245 "Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz"**

Intended FCC ID: W8Q-RRS24-F-S1-M1

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719

Client:
Traffipax, Inc.
514 Progress Drive
Linthicum, MD 21090

Report prepared by

Nicholas Abbondante, Senior Project Engineer

Report reviewed by

Vathana Ven, Senior Project Engineer

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2 Test Summary

Section	Test full name	Result
4	Description of Equipment Under Test	
5	System setup including cable interconnection details, support equipment and simplified block diagram	
6	Occupied Bandwidth (CFR47 Part 15.215)	Pass
7	Radiated Emissions (CFR47 Parts 15.209 and 15.245)	Pass
8	Conducted Emissions (CFR47 Part 15.207)	Pass
9	Revision History	

3 Client Information

This EUT was tested at the request of:

Company: Traffipax, Inc.
514 Progress Drive
Linthicum, MD 21090
Contact: Mr. Mike Zets
Telephone: 443-276-1976
Fax: 443-367-0012
Email: mike.zets@traffipaxinc.com

4 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Planar Radar	Robot	RRS24-F-S1	24FS1_SYS 81A
AC-DC Power Supply	Emerson Network Power	AD5012N2LM	G204CQ001601F

Receive Date:	11/09/2009
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)

The Planar Radar Module is a speed sensing doppler radar operating in the 24.075 to 24.175 GHz band. The antenna is installed at a 20 degree angle in the sample tested. The sample tested was operating at 24101.9 MHz. The EUT utilizes an integral waveguide antenna.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
13V	4.16A	DC	1

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	During testing, the EUT as transmitting continuously
2	

5 System setup including cable interconnection details, support equipment and simplified block diagram

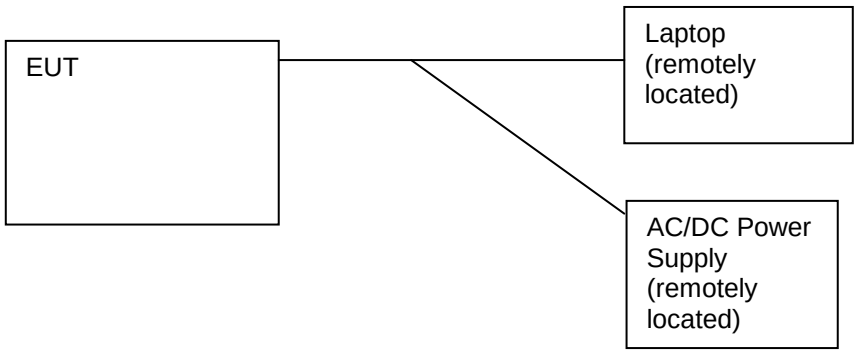
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
	Y-Communications/Power Harness	~1.0	Braid (comm.) None (power)	None	Laptop/EUT/PS
	Power Supply AC Mains	~1.8	None	None	EUT/PS
	Power Supply DC Output	~1.1	None	Molded in power cable	PS/AC Source

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop Computer	Hewlett Packard	NC6220	CNU6242KR1
Laptop Power Supply	Hewlett Packard	PA-1650-02H	CT: 592C40ALLSW8VC

5.1 Method:

Configuration as required by ANSI C63.4:2003.

5.2 EUT Block Diagram:



6 Occupied Bandwidth

6.1 Method

Tests are performed in accordance with ANSI C63.4:2003.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (4.9 dB at 3m and 4.2 dB at 10m) < U_{CISPR} (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
Horn2	HORN ANTENNA	EMCO	3115	9602-4675	09/24/2009	09/24/2010
DAV004	Weather Station	Davis Instruments	7400	PE80529A61A	06/10/2009	06/10/2010
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	12/04/2009	12/04/2010
PRE9	100MHz-40GHz Preamp	MITEQ	NSP4000-NFG	1260417	04/03/2009	04/03/2010
REA004	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	10/26/2009	10/26/2010
CBL027	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	58014001001	05/21/2009	05/21/2010
CBL030	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	01/04/2010	01/04/2011

Software Utilized:

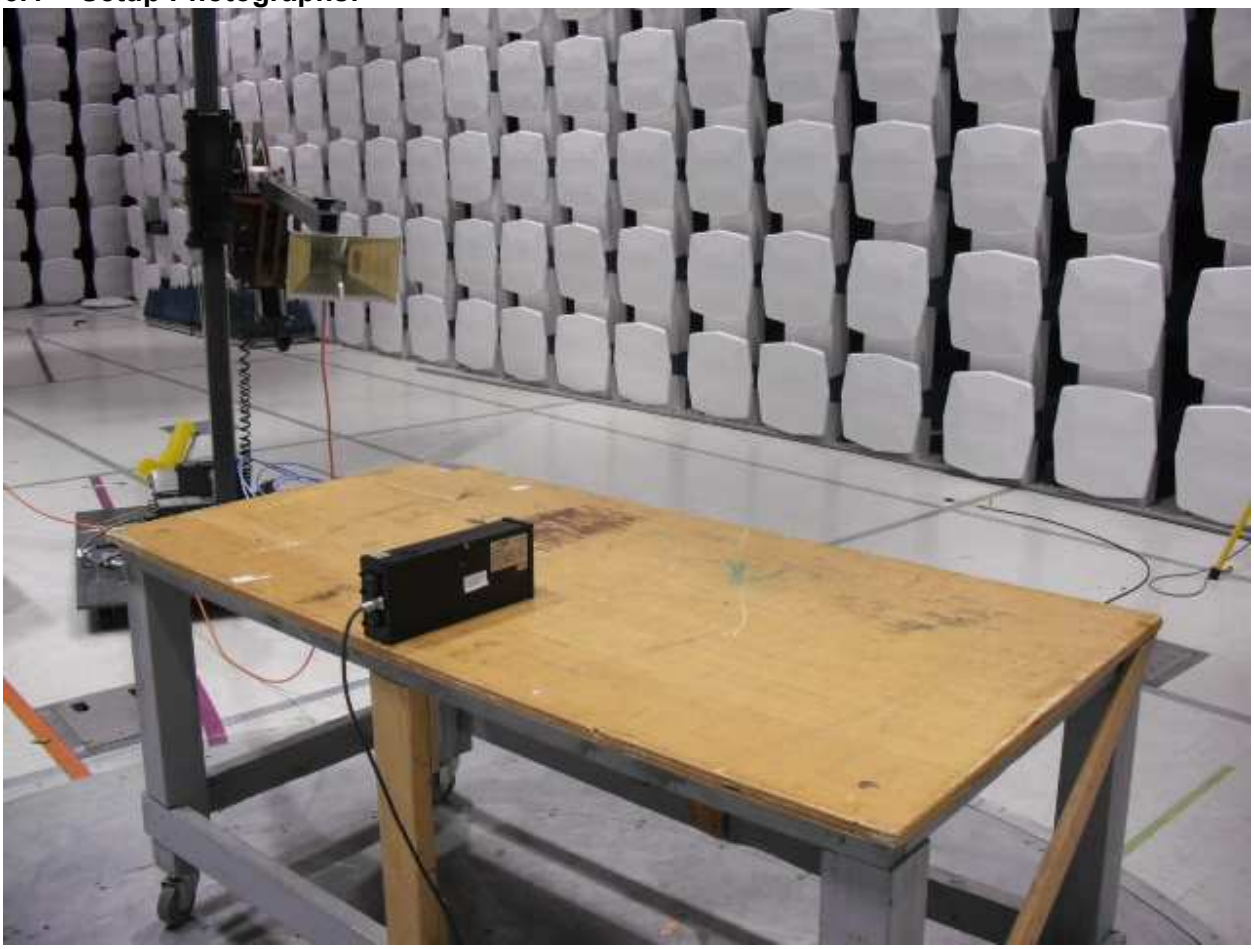
Name	Manufacturer	Version
None		

6.3 Results:

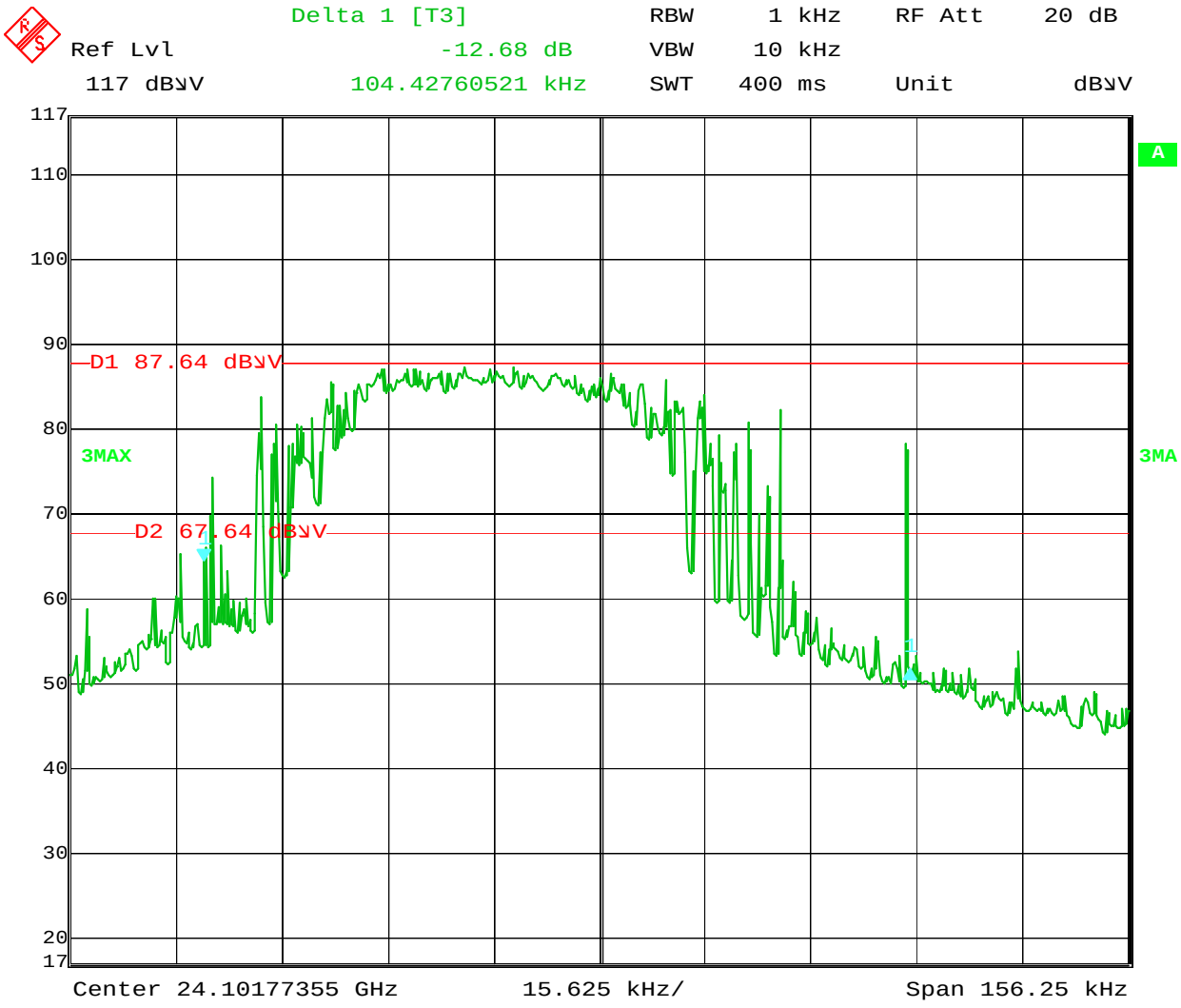
The fundamental frequency must stay within the assigned band.

The sample tested was found to comply. The 20 dB bandwidth was measured to be 104.4 kHz.

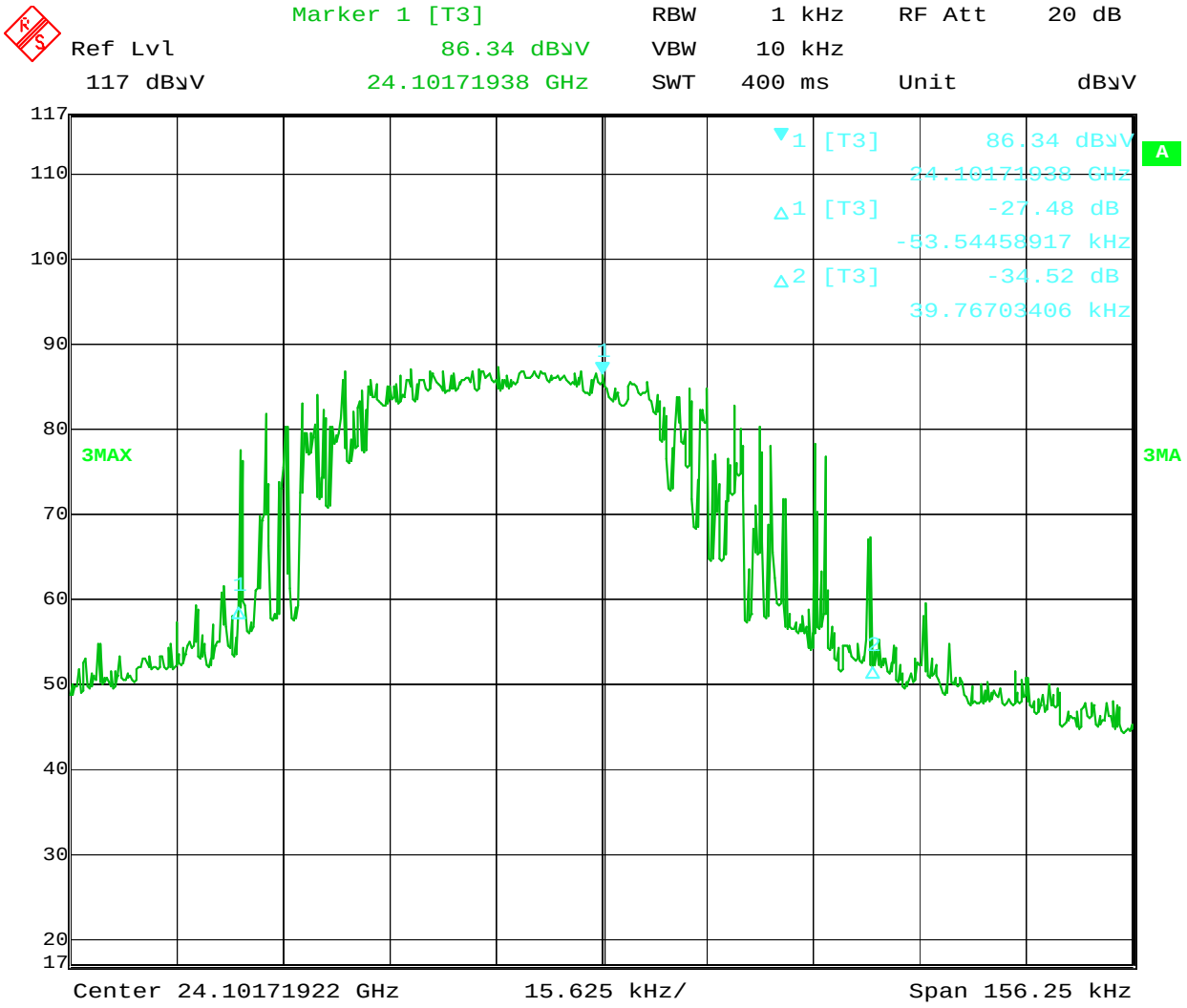
6.4 Setup Photographs:



6.5 Plots:

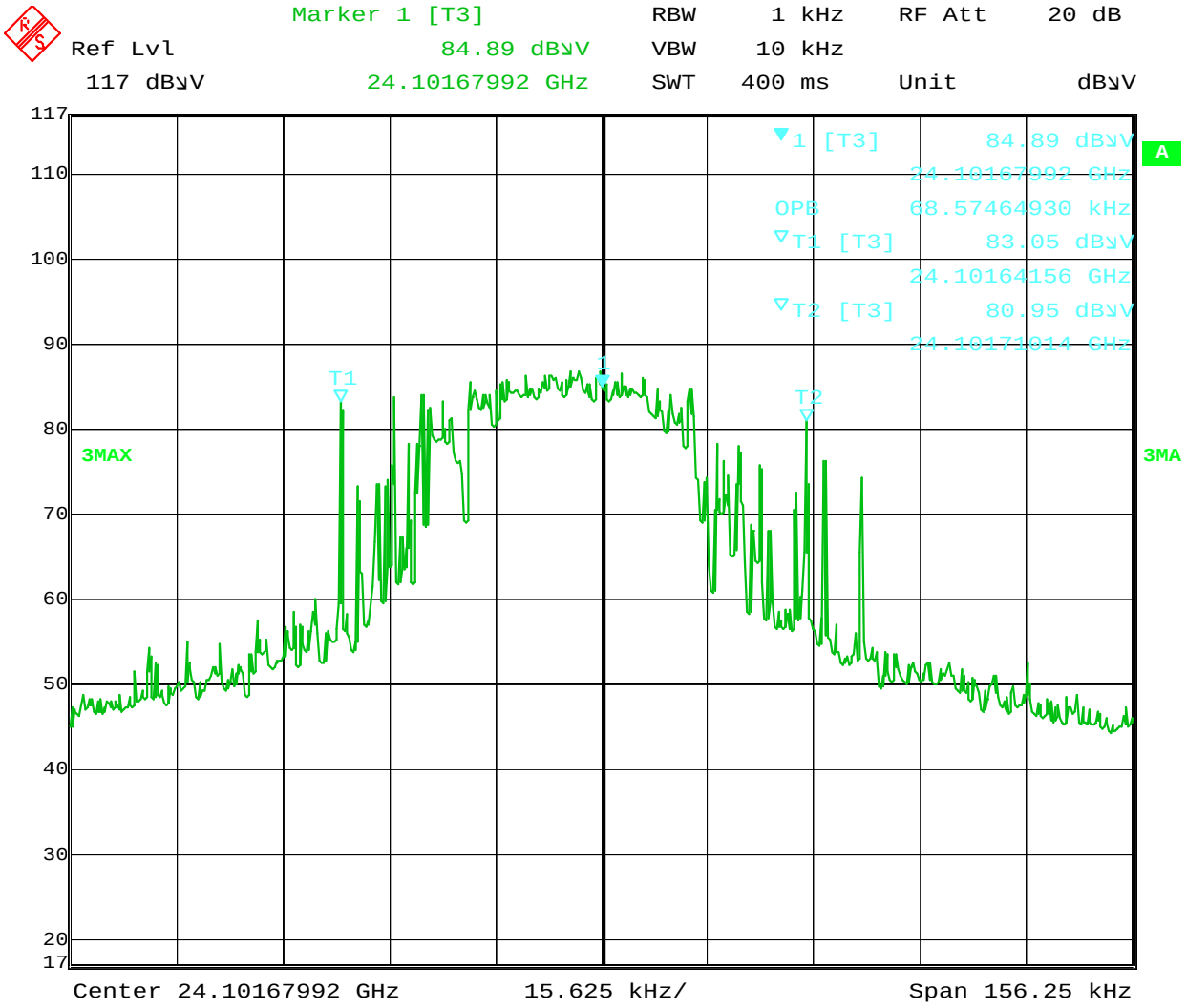


20 dB Bandwidth, Referenced to full power, 104.4 kHz



Date: 19.MAR.2010 21:34:18

20 dB Bandwidth, Unreferenced to full power, 93.2 kHz



99% Power Bandwidth, 68.57 kHz

6.6 Test Data:

Test Personnel:	Nicholas Abbondante	Test Date:	03/19/2010
Product Standard:	FCC Part 15 Subpart C 15.245	Test Levels:	Emission must stay within the assigned frequency band.
Input Voltage:	120VAC/60Hz		
		Ambient Temperature:	22 ºC
Pretest Verification w/ BB Source:	**No**	Relative Humidity:	26 %
		Atmospheric Pressure:	1001 mbars

Deviations, Additions, or Exclusions: None

7 Radiated Emissions

7.1 Method

Tests are performed in accordance with ANSI C63.4:2003.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A wooden table 80 cm high is used for table-top equipment.

Measurement Uncertainty

For radiated emissions, U_{lab} (4.9 dB at 3m and 4.2 dB at 10m) < U_{CISPR} (5.2 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
ROS001	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	12/04/2009	12/04/2010
PRE9	100MHz-40GHz Preamp	MITEQ	NSP4000-NFG	1260417	04/03/2009	04/03/2010
REA006	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	04/21/2009	04/21/2010
REA004	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	10/26/2009	10/26/2010
CBL027	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	58014001001	05/21/2009	05/21/2010
CBL030	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	01/04/2010	01/04/2011
EMC04	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	02/04/2010	02/04/2011
OML4	Mixer / Antenna	Oleson Microwave Lab	M19HWA	U21011-1	01/01/2002	Verified
145415	Bilog Antenna	Chase	CBL6140A	4195	06/12/2009	06/12/2010
145003	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	01/05/2009	09/06/2010
145128	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESI	837771/027	02/22/2010	02/22/2011
145403	Cable	Huber and Suhner	Sucoflex 106	233089 004	04/16/2009	04/16/2010
145400	Cable	Huber and Suhner	Sucoflex 106	233096 002	04/16/2009	04/16/2010
145406	Cable	Huber and Suhner	Sucoflex 106	233089 001	04/16/2009	04/16/2010
145407	Cable	Huber and Suhner	Sucoflex 106	233089 002	04/16/2009	04/16/2010
145405	Cable	Huber and Suhner	Sucoflex 106	145405	04/16/2009	04/16/2010
145414	Emissions Cable	H&S	None	None	05/01/2009	05/01/2010
Horn2	HORN ANTENNA	EMCO	3115	9602-4675	09/24/2009	09/24/2010
145014	Preamplifier (1 GHz to 26.5 GHz)	Hewlett Packard	8449B	3008A00232	01/05/2010	01/05/2011
DAV004	Weather Station	Davis Instruments	7400	PE80529A61A	06/10/2009	06/10/2010

Software Utilized:

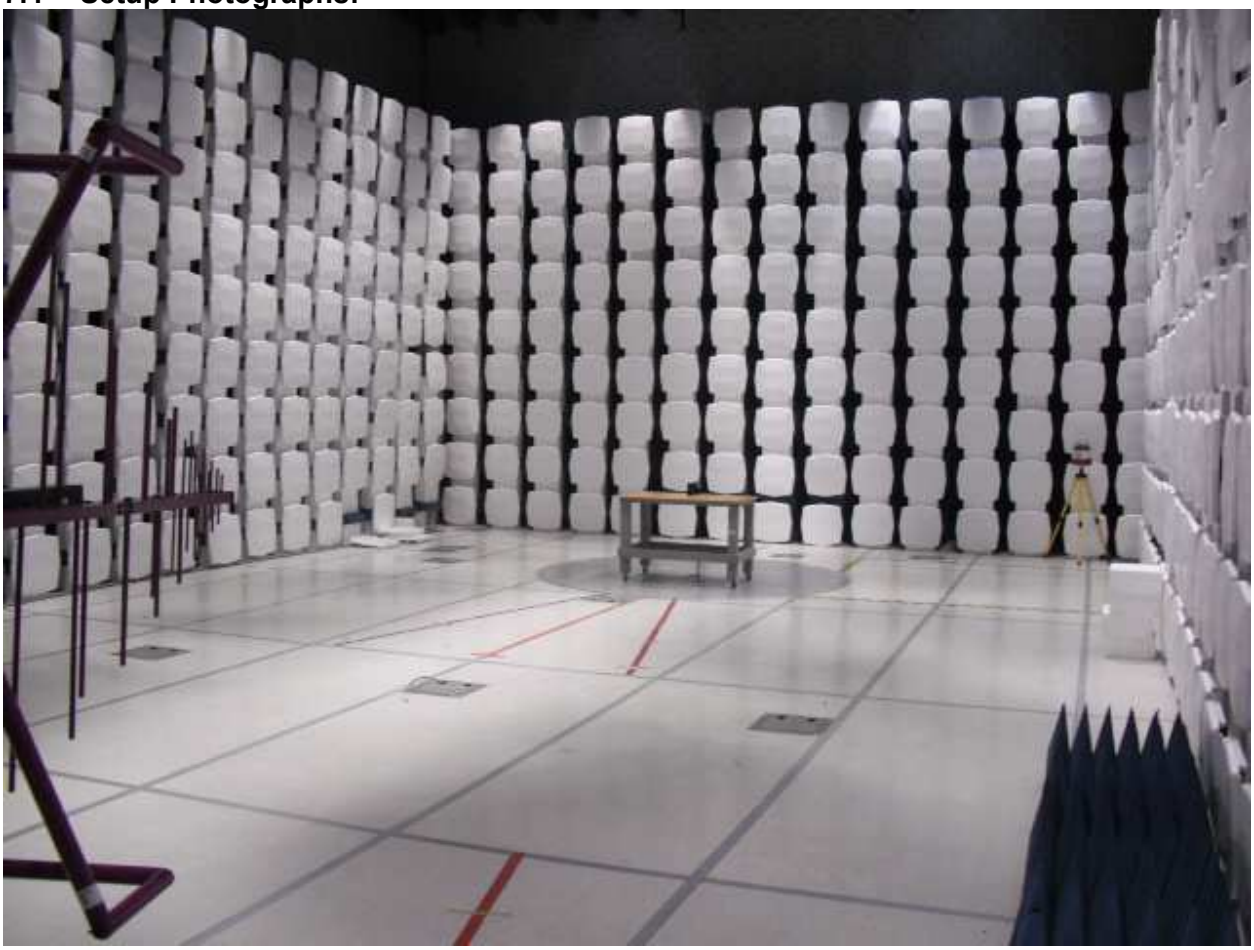
Name	Manufacturer	Version
C5	Teseq	Rev 1.0
Excel 2003	Microsoft	(11.5612.5606) SP3
EMI Boxborough.xls	Intertek	4/17/09

7.3 Results:

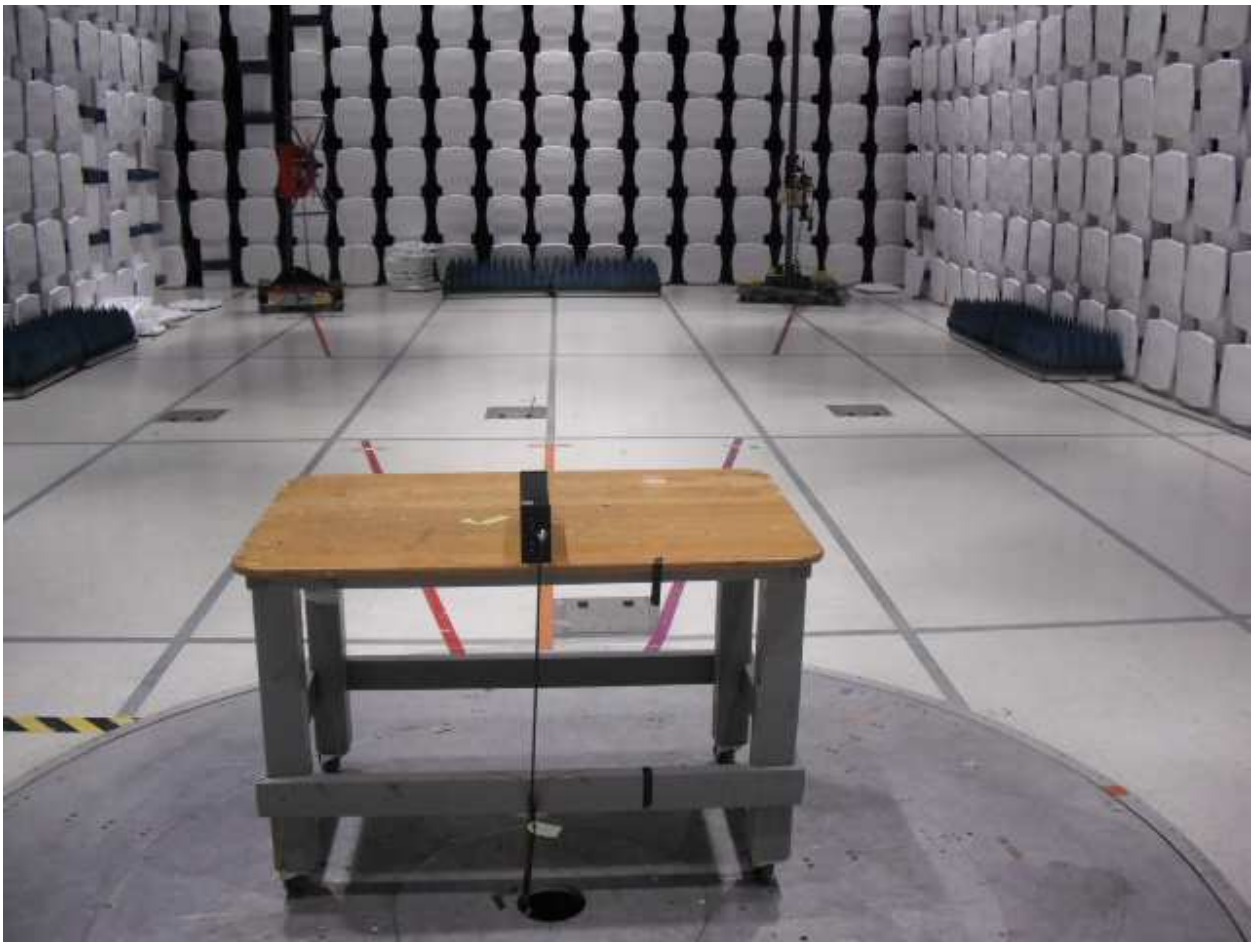
The fundamental field strength must not exceed 2500 mV/m (128 dBuV/m) at a distance of 3 meters using an average detector. The Harmonic emissions must not exceed 7.5 mV/m (77.5 dBuV/m), and non-harmonic spurious emissions must be at least 50 dB down from the fundamental field strength or must meet the general limits of 15.209, whichever is the lesser attenuation. All limits are specified at a distance of 3 meters, using an average detector. Peak emissions must meet a limit that is 20 dB higher than the average limit.

The sample tested was found to Comply.

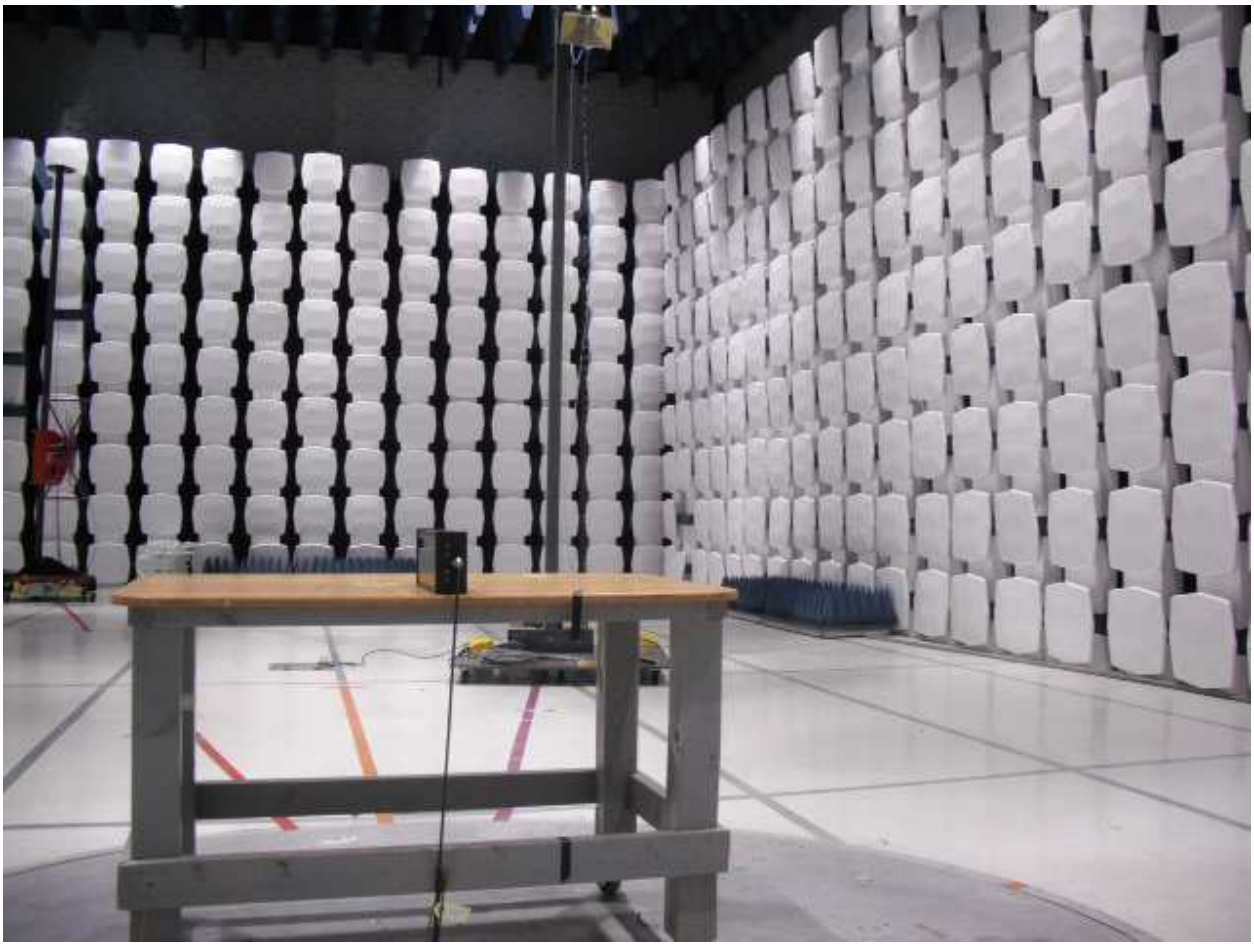
7.4 Setup Photographs:



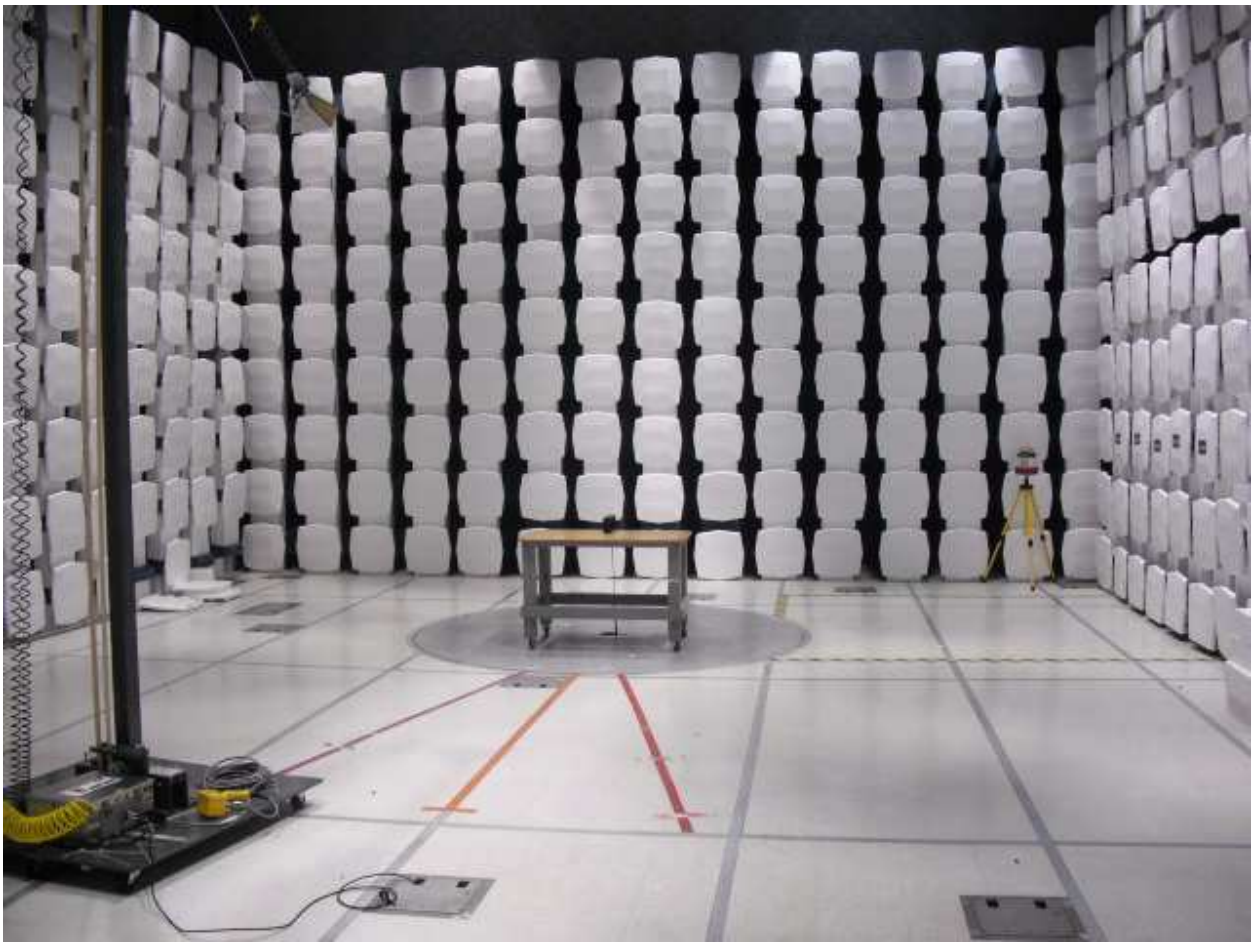
30-1000 MHz



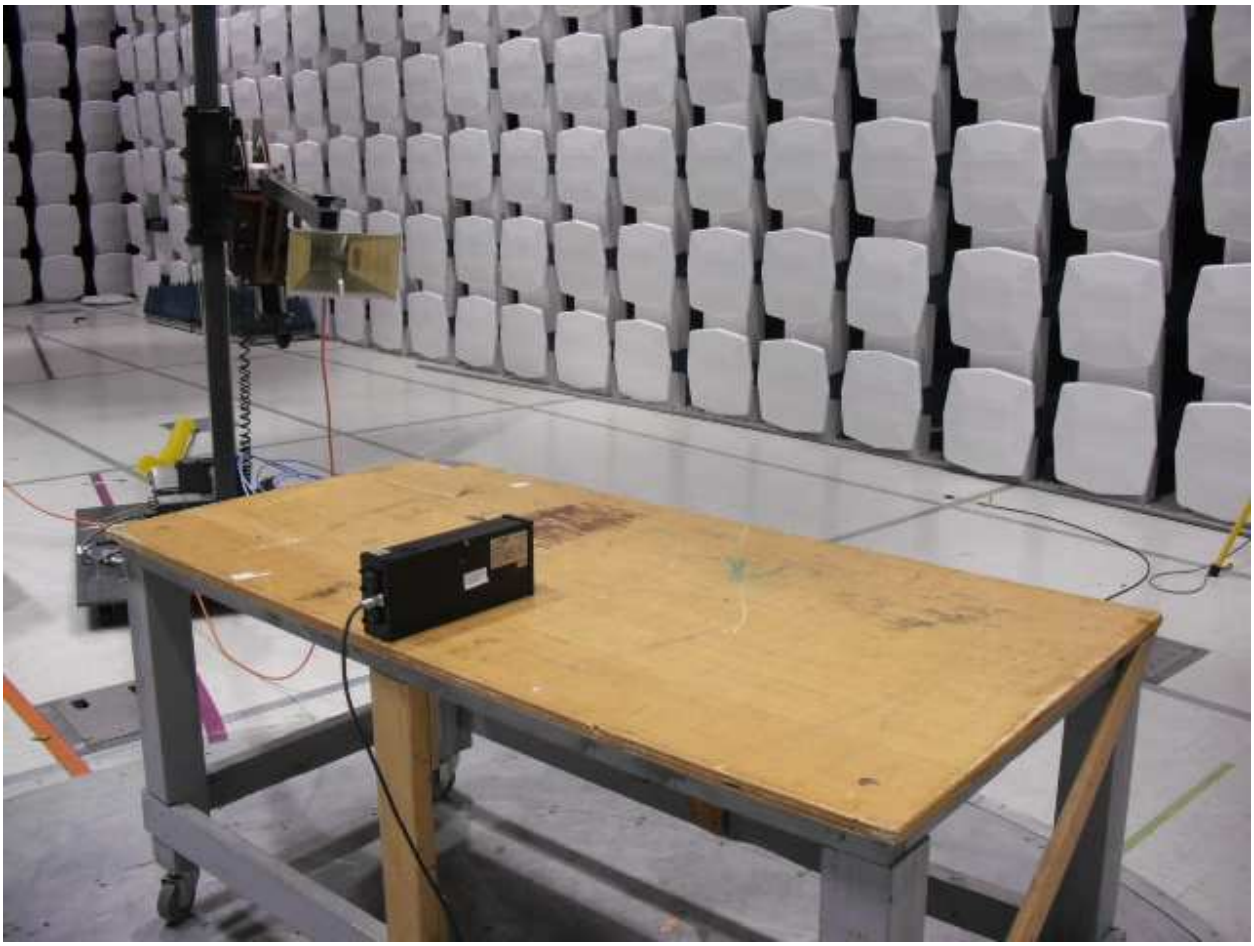
30-1000 MHz



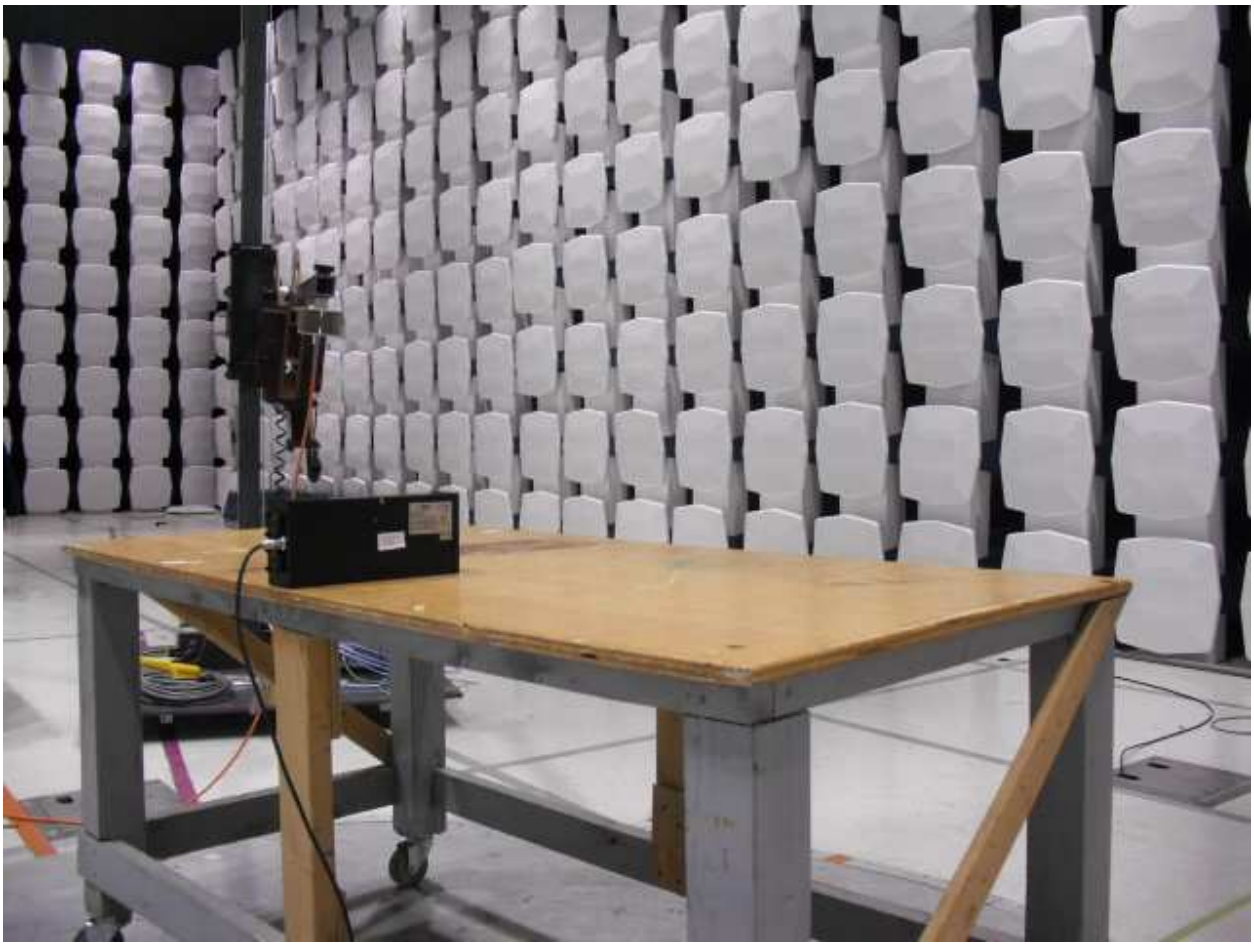
1-15 GHz



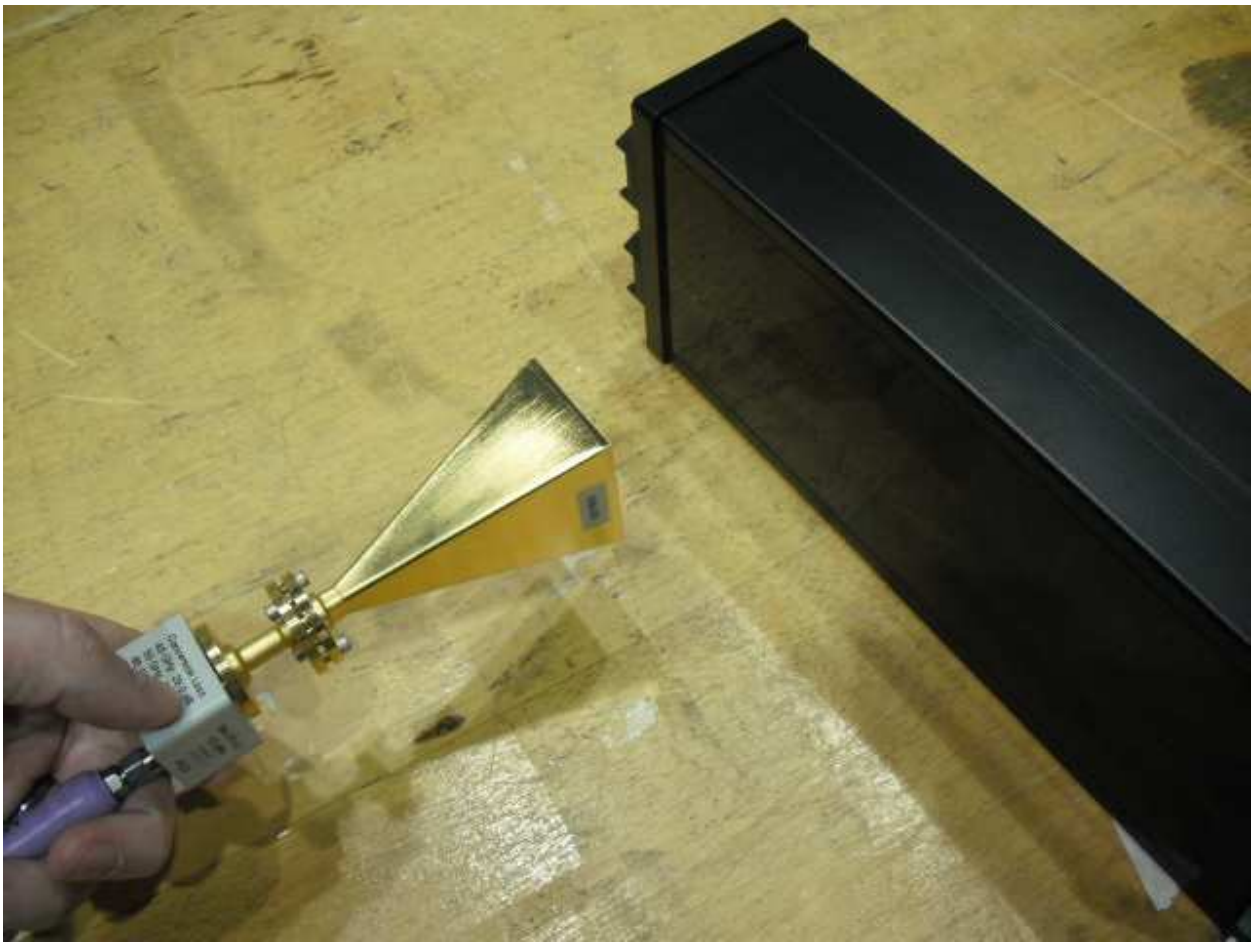
1-15 GHz



15-18 GHz



18-40 GHz



40-100 GHz

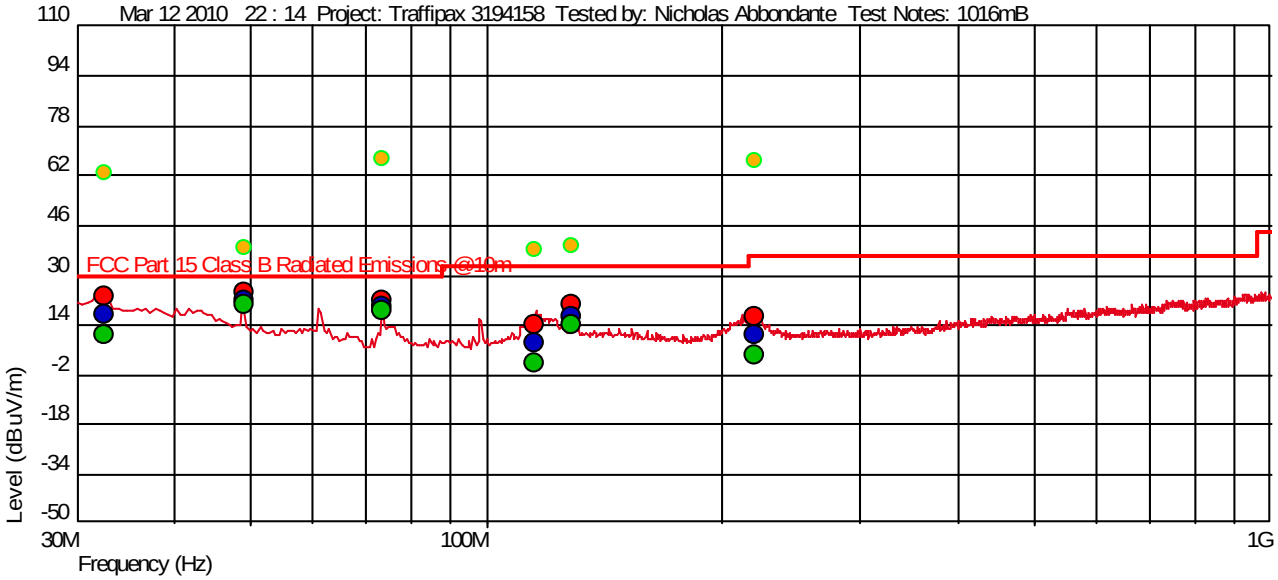
7.5 Plots:

See test data, section 7.6

7.6 Test Data:

Test Information

Test Details	User Input
Project:	Traffipax 3194158
Test Notes:	1016mB
Temperature:	21 Celsius
Humidity:	23%
Tested by:	Nicholas Abbondante
Test Started:	Mar 12 2010 22 : 14



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

Level (dBuV/m) = AF + CL + PA + Raw

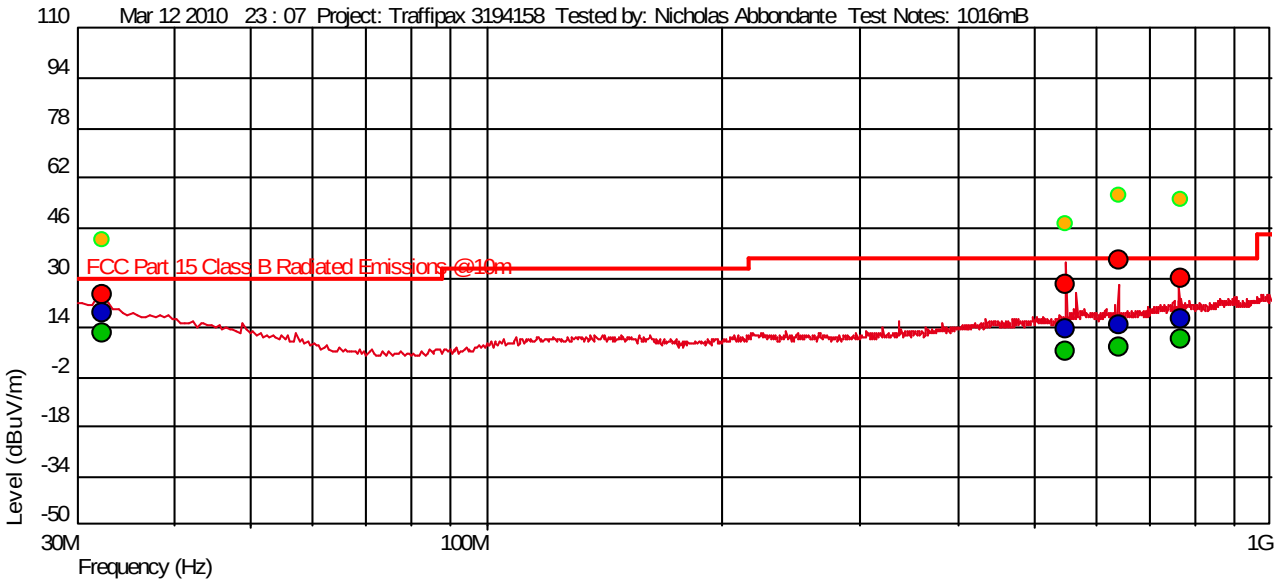
AF = Antenna Factor
CL = Cable Losses
PA = Pre-Amplifier
Raw = Raw Instrument Reading (Not listed on Spot Tables)

Measured: QP

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dB)	Ver (|)	Angle(Deg)	Mast Height (m)	Detector	RBW (Hz)
32.561589 M	17.20	20.551	-26.430	30.00	-12.80	|	3	1.02	QP	120 k
49.121563 M	21.67	13.603	-26.167	30.00	-8.33	|	214	3.97	QP	120 k
73.754201 M	19.92	7.500	-25.900	30.00	-10.08	|	356	1.02	QP	120 k
115.125931 M	8.14	11.118	-25.387	33.00	-24.86	|	66	3.29	QP	120 k
128.039038 M	16.49	12.282	-25.218	33.00	-16.51	|	150	2.32	QP	120 k
219.74975 M	10.70	12.870	-24.611	36.00	-25.30	|	62	1.01	QP	120 k

Test Information

Test Details	User Input
Project:	Traffipax 3194158
Test Notes:	1016mB
Temperature:	21c
Humidity:	23%
Tested by:	Nicholas Abbondante
Test Started:	Mar 12 2010 23 : 07



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

Level (dBuV/m) = AF + CL + PA + Raw

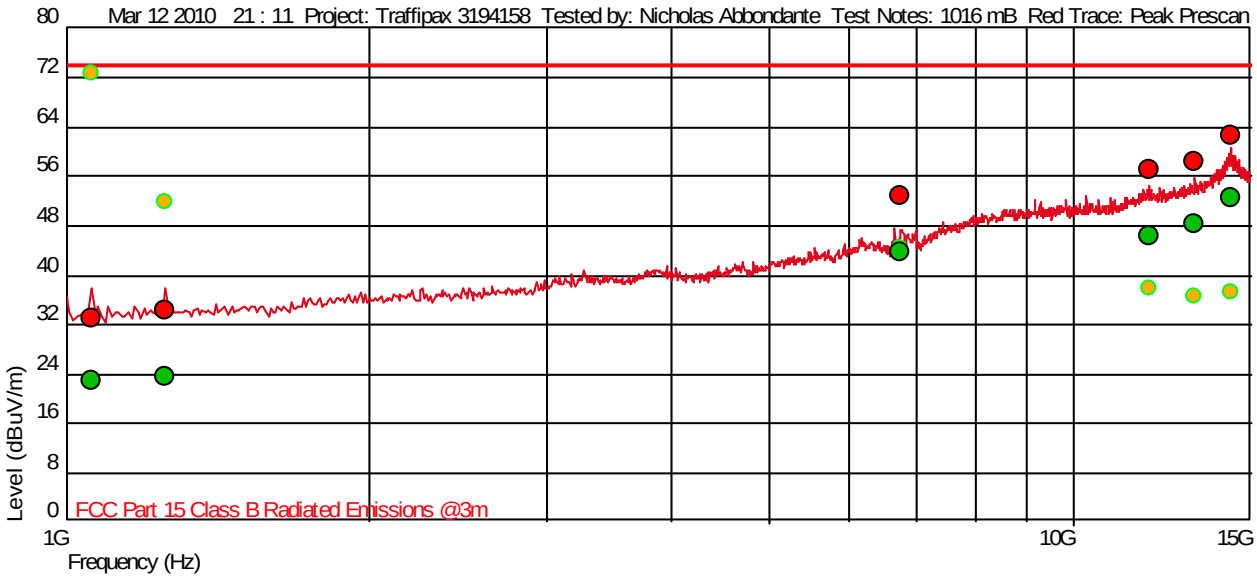
AF = Antenna Factor
CL = Cable Losses
PA = Pre-Amplifier
Raw = Raw Instrument Reading (Not listed on Spot Tables)

Measured: QP

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dB)	Hor (--)	Angle(Deg)	Mast Height (m)	Detector	RBW (Hz)
32.348857 M	18.48	21.595	-26.431	30.00	-11.52	--	36	3.29	QP	120 k
549.394041 M	13.33	19.152	-25.172	36.00	-22.67	--	100	3.78	QP	120 k
639.566252 M	14.41	20.265	-24.988	36.00	-21.59	--	40	1.01	QP	120 k
766.568617 M	16.60	21.869	-24.156	36.00	-19.40	--	117	1.02	QP	120 k

Test Information

Test Details	User Input
Project:	Traffipax 3194158
Test Notes:	1016 mB
Temperature:	21 Celsius
Humidity:	23%
Tested by:	Nicholas Abbondante
Test Started:	Mar 12 2010 21 : 11



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

Level (dBuV/m) = AF + CL + PA + Raw

AF = Antenna Factor
CL = Cable Losses
PA = Pre-Amplifier
Raw = Raw Instrument Reading (Not listed on Spot Tables)

Measured: PEAK

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin(dBuV/m)	Ver (|)	Angle(Deg)	Mast Height (m)	Detector	RBW (Hz)
1.060686 G	33.02	24.298	-31.285	74.00	-40.98	|	8	1.09	PEAK	1 M
1.254370 G	34.22	24.929	-30.717	74.00	-39.78	|	90	3.46	PEAK	1 M
6.750068 G	52.88	34.573	-27.396	74.00	-21.12	|	306	1.11	PEAK	1 M
11.902497 G	56.95	38.977	-22.177	74.00	-17.05	|	324	1.21	PEAK	1 M
13.187620 G	58.25	39.419	-20.517	74.00	-15.75	|	272	2.81	PEAK	1 M
14.354788 G	62.74	42.177	-19.802	74.00	-11.26	|	34	3.89	PEAK	1 M

Measured: AVERAGE

Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dB)	Ver (|)	Angle (Deg)	Mast Height (m)	Detector	RBW (Hz)
1.060686 G	23.01	24.298	-31.285	54.0	-30.99	|	8	1.09	AVERAGE	1 M
1.254370 G	23.61	24.929	-30.717	54.0	-30.39	|	90	3.46	AVERAGE	1 M
6.750068 G	43.62	34.573	-27.396	54.0	-10.38	|	306	1.11	AVERAGE	1 M
11.902497 G	46.20	38.977	-22.177	54.0	-7.8	|	324	1.21	AVERAGE	1 M
13.187620 G	48.45	39.419	-20.517	54.0	-5.55	|	272	2.81	AVERAGE	1 M
14.354788 G	52.66	42.177	-19.802	54.0	-1.34	|	34	3.89	AVERAGE	1 M

Intertek

Special Radiated Emissions

Company: Traffipax Inc. Antenna & Cables: HF Bands: N, LF, HF, SHF
Model #: RRS-24F-S1 Antenna: HORN2 V3m 09-24-2010.txt HORN2 H3m 09-24-2010.txt
Serial #: 24FS1_SYS 81A Cable(s): CBL027 05-21-10.txt CBL030 01-04-2011.txt
Engineers: Nicholas Abbondante Location: 10m Chamber Barometer: DAV004 Filter: REA004
Project #: 3194158 Date(s): 03/19/10
Standard: FCC Part 15 Subpart C 15.245 Temp/Humidity/Pressure: 22c 26% 1001mB
Receiver: R&S FSEK-30 (ROS001) 12-04-2010 Limit Distance (m): 3
PreAmp: PRE9 04-03-10.txt Test Distance (m): 1
PreAmp Used? (Y or N): Y Voltage/Frequency: 120VAC/60Hz Frequency Range: 15-18 GHz
Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
Note: No emissions detected, measurements are of instrumentation noise floor												
PK	V	15000.000	34.04	39.51	13.20	26.40	9.54	50.81	74.00	-23.19	1/3 MHz	
AVG	V	15000.000	22.06	39.51	13.20	26.40	9.54	38.83	54.00	-15.17	1/3 MHz	
PK	V	18000.000	34.27	47.10	15.02	27.78	9.54	59.07	74.00	-14.93	1/3 MHz	RB
AVG	V	18000.000	21.10	47.10	15.02	27.78	9.54	45.90	54.00	-8.10	1/3 MHz	RB

Intertek

Special Radiated Emissions

Company: Traffipax Inc. | Antenna & Cables: SHF | Bands: N, LF, HF, SHF
Model #: RRS-24F-S1 | Antenna: EMC04_1M_Vert_2-4-2011.txt | EMC04_1M_H_2-4-2011.txt
Serial #: 24FS1_SYS 81A | Cable(s): CBL027 05-21-10.txt | CBL030 01-04-2011.txt
Engineers: Nicholas Abbondante | Location: 10m Chamber | Barometer: DAV004 | Filter: REA006
Project #: 3194158 | Date(s): 03/19/10
Standard: FCC Part 15 Subpart C 15.245 | Temp/Humidity/Pressure: 22c | 26% | 1001mB
Receiver: R&S FSEK-30 (ROS001) 12-04-2010 | Limit Distance (m): 3
PreAmp: PRE9 04-03-10.txt | Test Distance (m): 1
PreAmp Used? (Y or N): Y | Voltage/Frequency: 120VAC/60Hz | Frequency Range: 18-40 GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
Note: No emissions detected except for Fundamental, measurements are of instrumentation noise floor. Test distance 1m												FCC
PK	V	18000.000	34.10	44.91	15.02	27.78	9.54	56.71	74.00	-17.29	1/3 MHz	RB
AVG	V	18000.000	22.59	44.91	15.02	27.78	9.54	45.20	54.00	-8.80	1/3 MHz	RB
PK	V	24101.900	88.99	45.55	18.92	29.59	9.54	114.33	148.00	-33.67	1/3 MHz	
AVG	V	24101.900	88.88	45.55	18.92	29.59	9.54	114.22	128.00	-13.78	1/3 MHz	
PK	H	24101.900	88.74	45.13	18.92	29.59	9.54	113.66	148.00	-34.34	1/3 MHz	
AVG	H	24101.900	87.49	45.13	18.92	29.59	9.54	112.41	128.00	-15.59	1/3 MHz	
Note: Test distance 0.1 m												
PK	V	26000.000	33.51	46.50	20.18	25.10	29.54	45.55	74.00	-28.45	1/3 MHz	
AVG	V	26000.000	22.06	46.50	20.18	25.10	29.54	34.10	54.00	-19.90	1/3 MHz	
PK	V	38000.000	46.06	44.96	26.84	25.74	29.54	62.58	74.00	-11.42	1/3 MHz	
AVG	V	38000.000	36.15	44.96	26.84	25.74	29.54	52.67	54.00	-1.33	1/3 MHz	

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Radiated Emissions

Company: Traffipax Inc. | Antenna & Cables: N | Bands: N, LF, HF, SHF
Model #: RRS-24F-S1 | Antenna: OML2, 3, 4 02-22-2011 | NONE.
Serial #: 24FS1_SYS 81A | Cable(s): CBL030 | NONE.
Engineers: Nicholas Abbondante | Location: 10m Chamber | Barometer: DAV004 | Filter: NONE
Project #: 3194158 | Date(s): 03/19/10
Standard: FCC Part 15 Subpart C 15.245 | Temp/Humidity/Pressure: 22c | 26% | 1001mB
Receiver: R&S FSEK-30 (ROS001) 12-04-2010 | Limit Distance (m): 3
PreAmp: PRE9 04-03-10.txt | Test Distance (m): 0.05
PreAmp Used? (Y or N): N | Voltage/Frequency: 120VAC/60Hz | Frequency Range: 40-100 GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC
Note: 40-60 GHz range using mixer OML4, all emissions noise floor except for the harmonic t 48203.8 MHz												
PK	V	40000.000	42.63	38.24	0.61	0.00	35.56	45.92	74.00	-28.08	1/3 MHz	RB
AVG	V	40000.000	33.02	38.24	0.61	0.00	35.56	36.31	54.00	-17.69	1/3 MHz	RB
PK	V	48203.800	54.30	39.85	0.61	0.00	35.56	59.19	108.00	-48.81	1/3 MHz	RB
AVG	V	48203.800	52.62	39.85	0.61	0.00	35.56	57.51	88.00	-30.49	1/3 MHz	RB
PK	V	60000.000	48.61	41.75	0.61	0.00	35.56	55.40	74.00	-18.60	1/3 MHz	RB
AVG	V	60000.000	38.64	41.75	0.61	0.00	35.56	45.43	54.00	-8.57	1/3 MHz	RB
Note: 60-90 GHz range using mixer OML4												
PK	V	60000.000	48.13	41.75	0.61	0.00	35.56	54.92	74.00	-19.08	1/3 MHz	RB
AVG	V	60000.000	37.20	41.75	0.61	0.00	35.56	43.99	54.00	-10.01	1/3 MHz	RB
PK	V	72305.700	47.27	43.37	0.61	0.00	35.56	55.68	108.00	-52.32	1/3 MHz	RB
AVG	V	72305.700	34.86	43.37	0.61	0.00	35.56	43.27	88.00	-44.73	1/3 MHz	RB
PK	V	90000.000	52.12	45.27	0.61	0.00	35.56	62.44	74.00	-11.56	1/3 MHz	RB
AVG	V	90000.000	40.25	45.27	0.61	0.00	35.56	50.57	54.00	-3.43	1/3 MHz	RB
Note: 90-100 GHz range using mixer OML2 (0.03 m test distance)												
PK	V	90000.000	56.24	45.27	0.61	0.00	40.00	62.12	74.00	-11.88	1/3 MHz	RB
AVG	V	90000.000	44.26	45.27	0.61	0.00	40.00	50.14	54.00	-3.86	1/3 MHz	RB
PK	V	96407.600	56.62	45.87	0.61	0.00	40.00	63.10	97.50	-34.40	1/3 MHz	RB
AVG	V	96407.600	46.22	45.87	0.61	0.00	40.00	52.70	77.50	-24.80	1/3 MHz	RB
PK	V	100000.000	57.13	46.18	0.00	0.00	40.00	63.31	74.00	-10.69	1/3 MHz	RB
AVG	V	100000.000	45.44	46.18	0.00	0.00	40.00	51.62	54.00	-2.38	1/3 MHz	RB

Test Personnel: Nicholas Abbondante
Product Standard: FCC Part 15 Subpart C 15.245
Input Voltage: 13VDC
Pretest Verification w/ BB Source: **No**

Test Date: 03/12/2010, 03/19/2010
Test Levels: See section 7.3
Ambient Temperature: 21 ºC, 22 ºC
Relative Humidity: 23 %, 26%
Atmospheric Pressure: 1016 mbars, 1001mB

Deviations, Additions, or Exclusions: None

8 AC Mains Conducted Emissions

8.1 Method

Tests are performed in accordance with ANSI C63.4:2003.

TEST SITE: AMAP Building

The AMAP Building and Lab includes general lab space that can be used for testing where a shielded/enclosed environment is not required.

Measurement Uncertainty

For conducted emissions, U_{lab} (3.2 dB in worst case) < U_{CISPR} (3.6 dB), which is the reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004	Weather Station	Davis Instruments	7400	PE80529A61 A	06/10/2009	06/10/2010
LISN12	LISN, 50uH, .01 - 50MHz, 24A	Solar Electronics	9252-50-R-24-BNC	941714	11/03/2009	11/03/2010
145108	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	02/26/2010	02/26/2011
DS20	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS20	06/03/2009	06/03/2010
N/A	BNC Cable	N/L	N/L	N/L	03/17/2010	03/17/2011

Software Utilized:

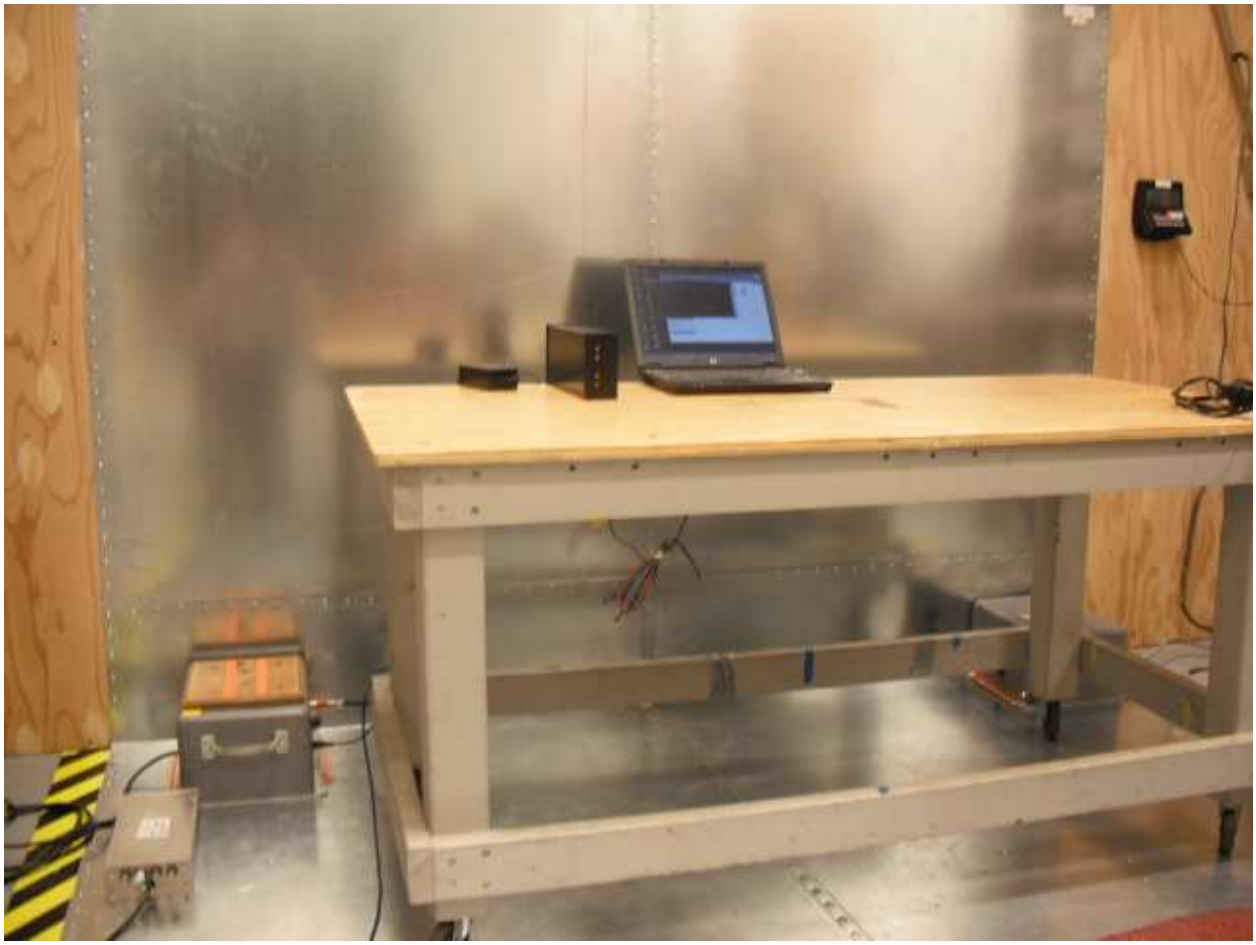
Name	Manufacturer	Version
Excel 2003	Microsoft	(11.5612.5606) SP3
EMI Boxborough.xls	Intertek	4/17/09

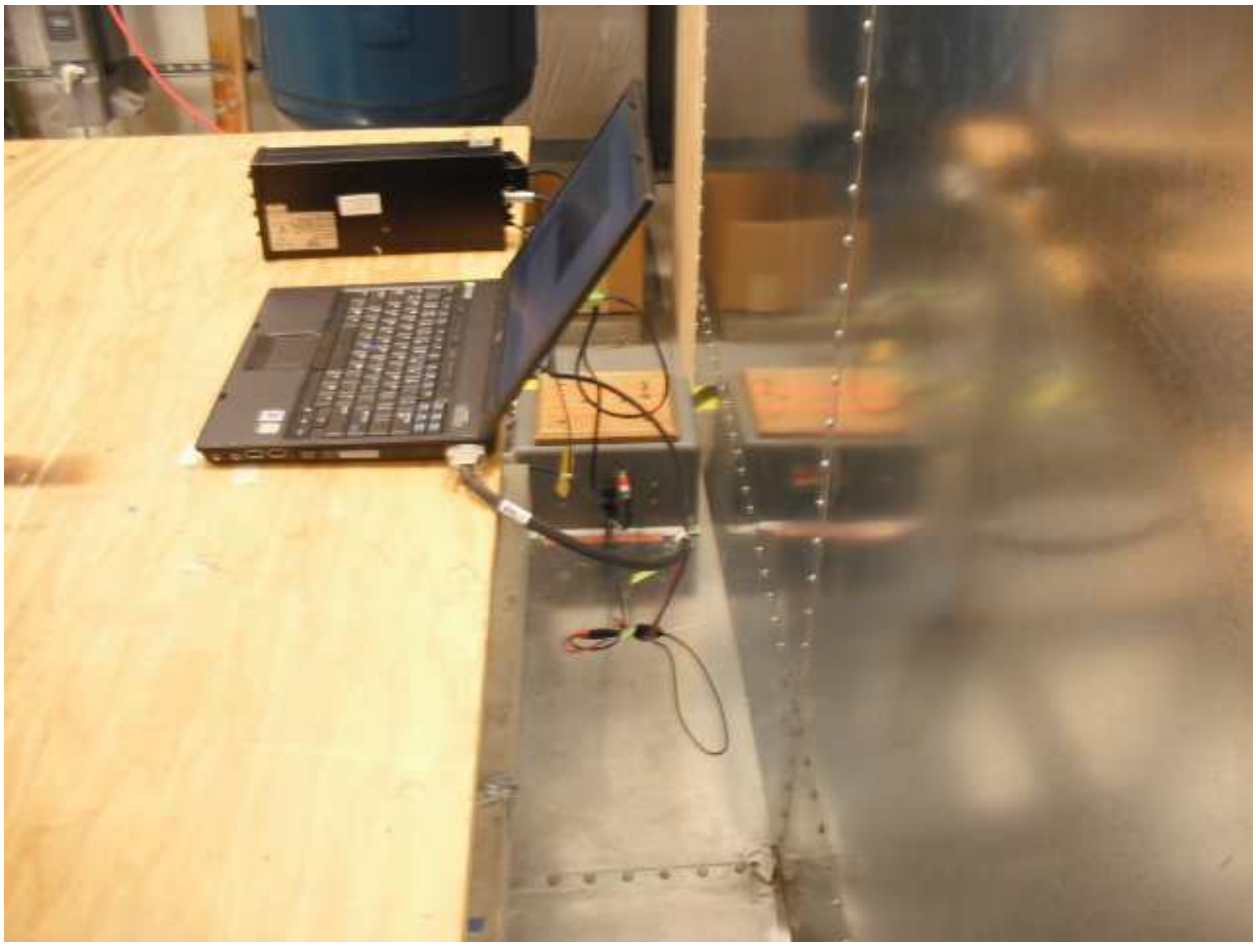
8.3 Results:

Emissions must be below the 15.207 limits.

The sample tested was found to comply.

8.4 Setup Photographs:





8.5 Plots:

Not available

8.6 Data:

Intertek

Conducted Emissions

Company: Traffipax Inc. | Receiver: R&S ESIB 40 (145-108) 2-26-2011
Model #: RRS-24F-S1 | Cable: CBLBNC 03-17-11.txt
Serial #: 24FS1_SYS 81A | LISN 1: LISN12 [1] 11-03-10.txt
Engineer(s): Nicholas Abbondante | Location: AMAP Bldg | LISN 2: LISN12 [2] 11-03-10.txt
Project #: 3194158 | Date: 03/17/10 | LISN 3: NONE.
Standard: FCC Part 15 Subpart C 15.245 | LISN 4: NONE.
Barometer: DAV004 | Temp/Humidity/Pressure: 22c 26% 1001mB | Attenuator: DS20 06-03-10.txt
Voltage/Frequency: 120V/60Hz | Frequency Range: 150 kHz - 30 MHz

Net is the sum of worst-case lisn, cable, & attenuator losses, and initial reading, factors are not shown
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor; Bandwidth denoted as RBW/VBW

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Line 4 dB(uV)	Net dB(uV)	QP Limit dB(uV)	Margin dB	Bandwidth
QP	0.202	22.60	23.13			43.16	63.53	-20.36	9/30 kHz
QP	0.520	25.06	25.56			45.94	56.00	-10.06	9/30 kHz
QP	0.816	13.23	13.71			34.05	56.00	-21.95	9/30 kHz
QP	2.627	7.69	8.24			28.70	56.00	-27.30	9/30 kHz
QP	17.459	17.90	19.82			40.20	60.00	-19.80	9/30 kHz
QP	18.555	17.42	19.59			39.93	60.00	-20.07	9/30 kHz
QP	30.000	0.01	-0.46			20.84	60.00	-39.16	9/30 kHz

Detector Type	Frequency MHz	Reading Line 1 dB(uV)	Reading Line 2 dB(uV)	Reading Line 3 dB(uV)	Reading Line 4 dB(uV)	Net dB(uV)	Average Limit dB(uV)	Margin dB	Bandwidth
AVG	0.202	20.28	21.08			41.11	53.53	-12.41	9/30 kHz
AVG	0.520	0.01	0.46			20.84	46.00	-25.16	9/30 kHz
AVG	0.816	-0.46	-0.96			19.87	46.00	-26.13	9/30 kHz
AVG	2.627	-5.57	-4.74			15.72	46.00	-30.28	9/30 kHz
AVG	17.459	7.88	9.40			29.78	50.00	-20.22	9/30 kHz
AVG	18.555	7.69	9.24			29.58	50.00	-20.42	9/30 kHz
AVG	30.000	-4.74	-4.74			16.09	50.00	-33.91	9/30 kHz

Test Personnel: Nicholas Abbondante
Product Standard: FCC Part 15 Subpart C 15.245
Input Voltage: 120VAC/60Hz
Pretest Verification w/ BB Source: **No**

Test Date: 03/17/2010
Test Levels: Emissions must be below the 15.207 limits
Ambient Temperature: 22 ºC
Relative Humidity: 26 %
Atmospheric Pressure: 1001 mbars

Deviations, Additions, or Exclusions: None

9 Revision History

Revision Level	Date	Report Number	Notes
0	03/30/2010	3194158BOX-001	Original Issue
1	06/14/2010	3194158BOX-001	Added better product description and updated 1-15 GHz graph to show peak limit