EMISSIONS TEST REPORT

Report Number: 101948295BOX-006d
Project Number: G101948295

Report Issue Date: 09/02/2015

Product Designation: ANDE-6C (RFID at 13.56 MHz)

Standards: CFR47 FCC Part 15 Subpart C:2015 Section 15.225,
Industry Canada RSS-210 Issue 8 December 2010, Annex 2 (A2.6)
Industry Canada RSS-Gen Issue 4 November 2014

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

Client:
NetBio
266 Second Avenue
Waltham, MA 02451 USA

Report prepared by

Kouma Sinn / Staff Engineer, EMC

Report reviewed by

Michael F. Murphy / Sr. Staff Engineer, EMC

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. 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 was found to Comply 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
3	Client Information	--
4	Description of Equipment Under Test	--
5	System Setup and Method	--
6	Fundamental Radiated Emissions FCC Part 15 Subpart C:2015 15.225(a), (b), (c), (d) IC RSS-210 Issue 8 December 2010 A2.6 (a), (b), (c), (d)	Pass
7	Transmitter Spurious Emissions Below 30MHz FCC Part 15 Subpart C:2015 15.209, 15.225(d), IC RSS-210 Issue 8 December 2010 A2.6(d)	Pass
8	Transmitter Spurious Emissions Above 30MHz FCC Part 15 Subpart C:2015 15.209, 15.225(d), IC RSS-210 Issue 8 December 2010 A2.6(d)	Pass
--	Receiver Spurious Emissions Below 30MHz FCC Part 15 Subpart B:2015 15.109, IC RSS-Gen Issue 3 December 2010: Section 6.0	N/A*
9	Receiver Spurious Emissions Above 30MHz FCC Part 15 Subpart B:2015 15.109, IC RSS-Gen Issue 3 December 2010: Section 6.0	Pass
10	AC Mains Conducted Emissions FCC Part 15 Subpart C:2015 15.207 IC RSS-Gen Section 7.2.2.	Pass
11	20dB Bandwidth FCC Part 15 Subpart C:2015 15.215 IC RSS-Gen Issue 3 December 2010 Section 4.6	Pass
12	Frequency Stability FCC Part 15 Subpart C:2015 15.225(e), IC RSS-Gen Issue 3 December 2010 Section 4.7 IC RSS-210 December 2010 A2.6	Pass
13	Revision History	--

* - no limits below 30 MHz

3 Client Information

This EUT was tested at the request of:

Client: NetBio
266 Second Avenue
Waltham, MA 02451
USA

Contact: Melissa May
Telephone: (781) 916-8273
Fax: (781) 890-2560
Email: Melissa.May@netbio.com

4 Description of Equipment Under Test

Manufacturer: NetBio
266 Second Avenue
Waltham, MA 02451
USA

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
DNA Sequencer	NetBio	ANDE-6C	0002-100-0919

Receive Date:	01/16/2015
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The EUT is a measurement system used in the analyzing of DNA sequencing. It uses RFID at 13.56 MHz

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
100-240 VAC	15 A	50/60 Hz	1

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	The RFID was programmed to transmit continuously at 13.56 MHz
2	The RFID was programmed to receive at 13.56 MHz

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	Pre-programmed

5 System Setup and Method

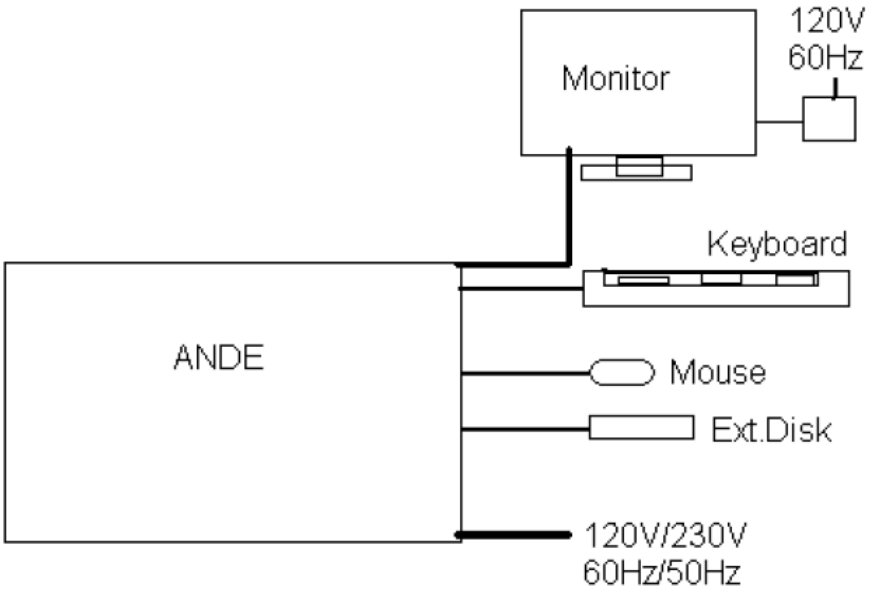
Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
1	AC Mains	2.5	None	None	AC Mains
2	VGA Cable	1.5	Braid	One	Monitor
3	Mouse Cable	1.25	Braid	None	USB
4	Keyboard Cable	1.25	Braid	None	USB
5	Ext Hard Drive Cable	0.25	Braid	None	USB

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Display	Dell	2007FPb	MX-0G324-74262-27P-1GUL
Keyboard	Microsoft	RT2300	7668208258746
Mouse	Dell	MS-111L	CN-09RRC7-44751-22I-0KW8
External Harddrive	Imation	IM250-1000S	BG904261-20111007

5.1 Method:

Configuration as required by CFR47 FCC Part 15 Subpart C:2015 Section 15.225, Industry Canada RSS-210 Issue 8 December 2010, Annex 2 (A2.6) Industry Canada RSS-Gen Issue 4 November 2014, and ANSI C63.4:2009.

5.2 EUT Block Diagram:



6 Fundamental Frequency Radiated Emissions

6.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C – 15.225(a), (b), (c), (d), IC RSS-210 – A2.6 (a), (b), (c), (d), and ANSI C63.4.

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 Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “AF” is the Antenna Factor; “PA+CL” are Preamp and Cable Loss. These are already accounted for in the “Level” column.

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
ETS003'	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	04/01/2014	04/01/2015
CBLBNC10'	25 ft, 50 Ohm BNC Cable	Pomona	RG 58 C/U	CBLBNC10	10/04/2014	10/04/2015
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/06/2014	10/06/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015

Software Utilized:

Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/2010

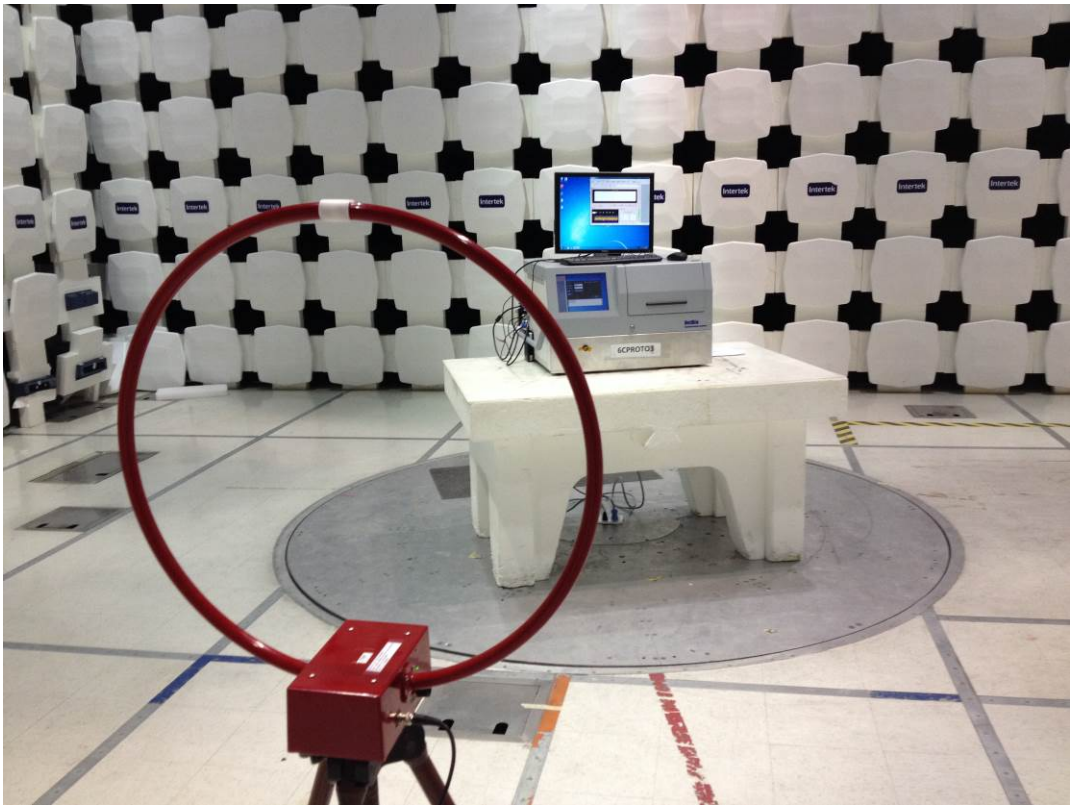
6.3 Results:

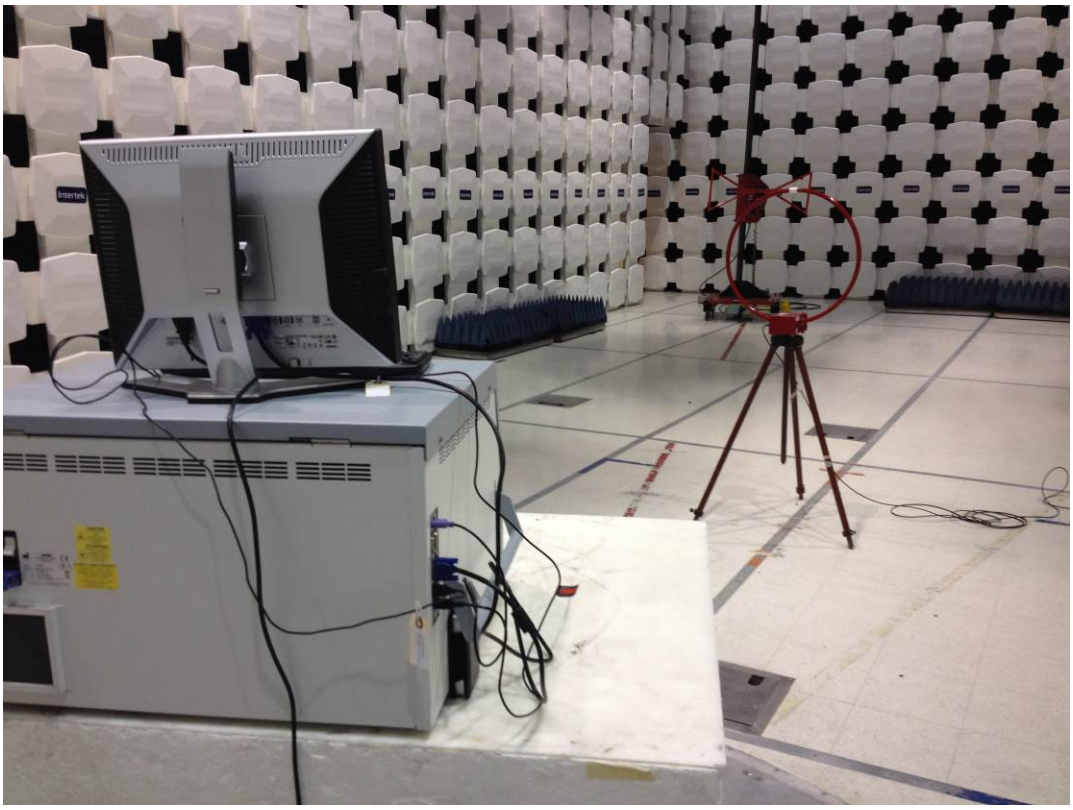
The sample tested was found to comply.

The field strength of any emissions shall not exceed the limits as follows:

Frequency Bands	Field Strength Limits		Test Distance
(MHz)	µV/m	dBµV/m	(meters)
13.553 –13.567	15,848	84.00	30
13.410 –13.553	334	50.50	30
13.567 –13.710	334	50.50	30
13.110 –13.410	106	40.51	30
13.710 –14.010	106	40.51	30
Outside of 13.110 –14.010	§15.209		

6.4 Setup Photographs:





6.5 Test Data:

Radiated Emissions

Company: NetBio | Antenna & Cables: N | Bands: N, LF, HF, SHF
Model #: ANDE-6C | Antenna: ETS003 E-Field 04-01-2015.txt ETS003 H-Field 04-01-2015.txt
Serial #: 0002-100-0919 | Cable(s): CBLBNC10 10-04-15.txt NONE.
Engineers: Vathana Ven | Location: 10m Chamber | Barometer: DAV004 | Filter: NONE
Project #: G100435320 | Date(s): 01/22/15
Standard: FCC Part 15C, 15.225 | Temp/Humidity/Pressure: 22 deg C 15% 1012mB
Receiver: R&S ESI (145-128) 03-17-2015 | Limit Distance (m): 30
PreAmp: NONE. | Test Distance (m): 3
PreAmp Used? (Y or N): N | Voltage/Frequency: 120VAC/60Hz | Frequency Range: 9 kHz - 30 MHz

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: Tx Mode, 120V/60Hz FCC											
QP	V	0.064	48.27	-11.62	0.05	0.00	59.08	-22.38	43.00	-65.38	9/30 kHz
QP	V	0.088	45.50	-11.48	0.05	0.00	59.08	-25.01	43.00	-68.01	9/30 kHz
QP	V	0.131	42.10	-11.04	0.05	0.00	59.08	-27.97	43.00	-70.97	9/30 kHz
QP	V	13.560	26.04	-10.56	0.49	0.00	20.00	-4.02	84.00	-88.02	9/30 kHz
QP	V	13.410	3.38	-10.56	0.49	0.00	20.00	-26.69	50.48	-77.17	9/30 kHz
QP	V	13.553	12.16	-10.56	0.49	0.00	20.00	-17.90	50.48	-68.38	9/30 kHz
QP	V	13.567	12.50	-10.56	0.49	0.00	20.00	-17.56	50.48	-68.04	9/30 kHz
QP	V	13.710	3.10	-10.55	0.50	0.00	20.00	-26.95	50.48	-77.43	9/30 kHz
QP	V	13.110	3.38	-10.58	0.49	0.00	20.00	-26.71	40.51	-67.22	9/30 kHz
QP	V	14.010	3.10	-10.54	0.50	0.00	20.00	-26.94	40.51	-67.44	9/30 kHz
QP	V	27.120	9.00	-8.59	0.73	0.00	20.00	-18.86	40.00	-58.86	9/30 kHz

Notes: A 20dB/decade distance factor was used from 13.56 MHz to 30 MHz

Test Personnel(s):	Vathana F. Ven VFV	Test Date(s):	1/22/2015
Supervising Engineer: (Where Applicable)	N/A	Test Levels:	Per section 6.3
Product Standard:	FCC 15.225, IC RSS-210	Ambient Temperature:	22 ºC
Input Voltage:	120VAC/60Hz	Relative Humidity:	15 %
Pretest Verification w/ Ambient Signals or BB Source:	Ambient Signals	Atmospheric Pressure:	1012 mbars

Deviations, Additions, or Exclusions: None

7 Transmitter Spurious Emissions Below 30MHz

7.1 Method

Tests are performed in accordance with FCC Part 15 Subpart – 15.209, 15.225(d), IC RSS-210 – A2.6(d), and ANSI C63.

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 Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “AF” is the Antenna Factor; “PA+CL” are Preamp and Cable Loss. These are already accounted for in the “Level” column.

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
ETS003'	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	04/01/2014	04/01/2015
CBLBNC10'	25 ft, 50 Ohm BNC Cable	Pomona	RG 58 C/U	CBLBNC10	10/04/2014	10/04/2015
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/06/2014	10/06/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015

Software Utilized:

Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/2010

7.3 Results:

The sample tested was found to comply.

The field strength of any emissions shall not exceed the limits as follows:

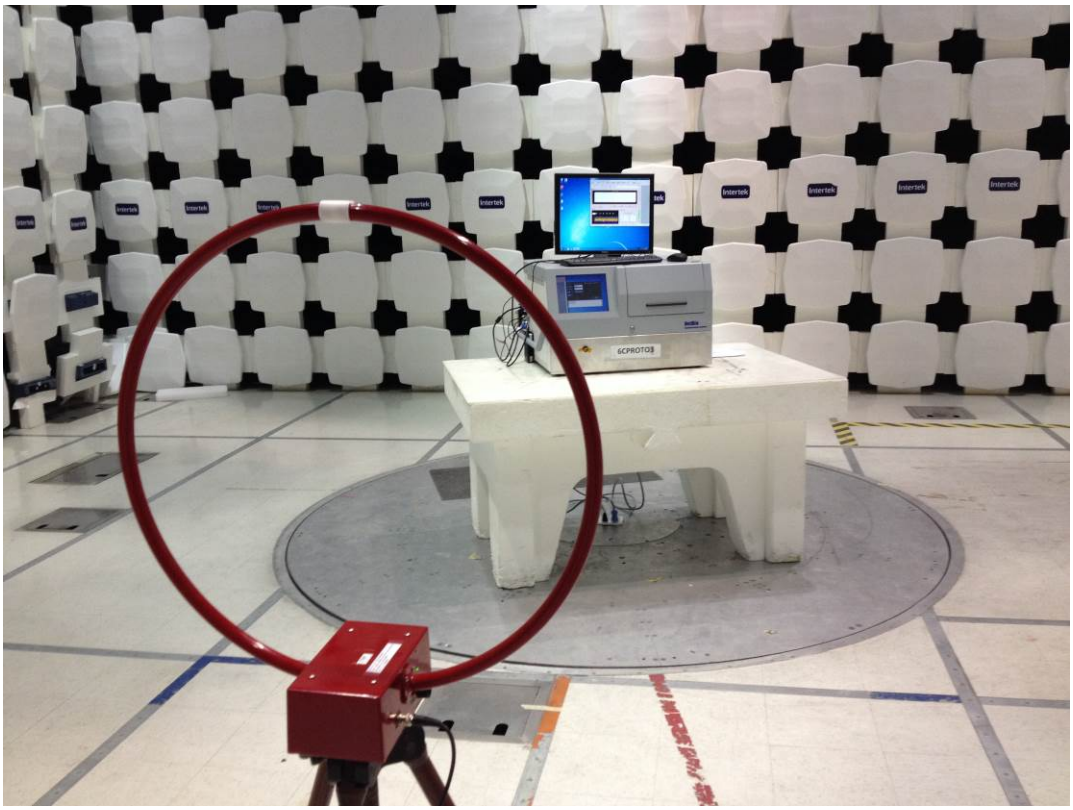
FCC Part 15.209

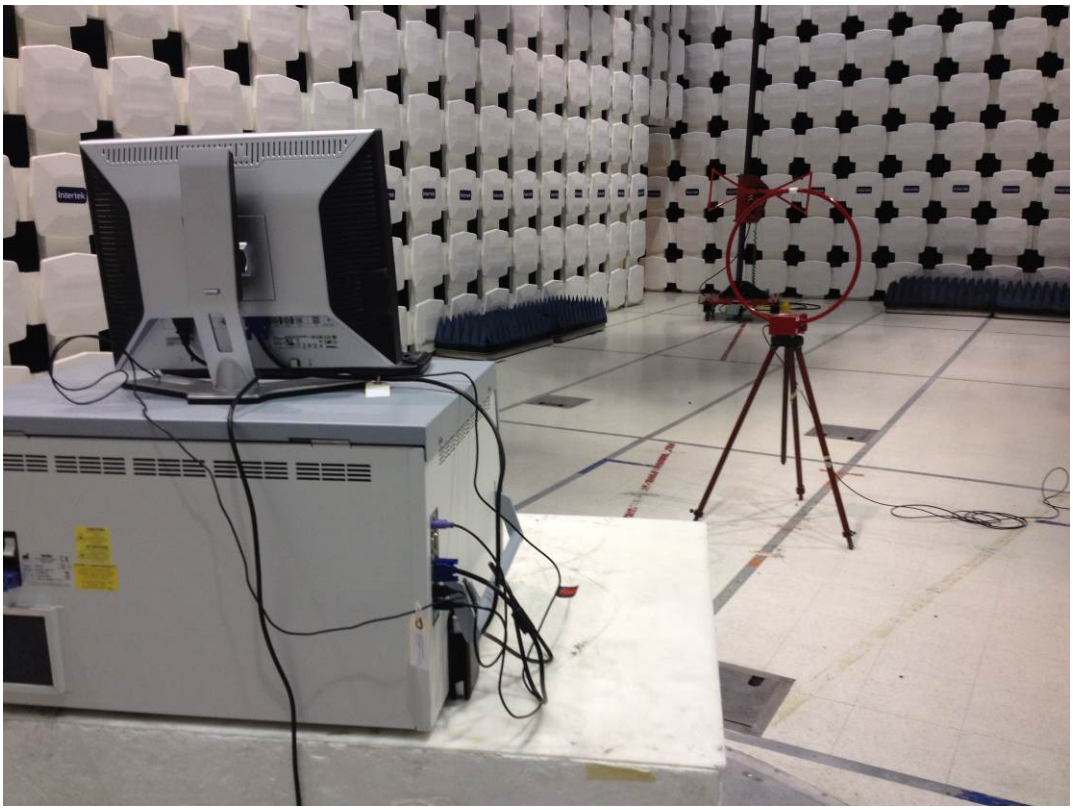
Frequency	Field Strength		Test Distance
(MHz)	µV/m	dBµV/m	(meters)
0.009–0.490	2400/F(kHz)	20*Log(2400/F(kHz))	300
0.490–1.705	24000/F(kHz)	20*Log(24000/F(kHz))	30
1.705–30.0	30.00	29.54	30

Note: The emission limits for the bands 9-90kHz and 110-490kHz are based on measurements employing an average detector.

IC RSS-210 A2.6(d): emissions outside the band 13.110-14.010 MHz must not exceed 30 microvolts/m (29.5 dBµV/m) at 30 m.

7.4 Setup Photographs:





7.5 Test Data:

Radiated Emissions

Company: NetBio | Antenna & Cables: N | Bands: N, LF, HF, SHF
Model #: ANDE-6C | Antenna: ETS003 E-Field 04-01-2015.txt ETS003 H-Field 04-01-2015.txt
Serial #: 0002-100-0919 | Cable(s): CBLBNC10 10-04-15.txt NONE.
Engineers: Vathana Ven | Location: 10m Chamber | Barometer: DAV004 | Filter: NONE
Project #: G100435320 | Date(s): 01/22/15
Standard: FCC Part 15C, 15.225 | Temp/Humidity/Pressure: 22 deg C 15% 1012mB
Receiver: R&S ESI (145-128) 03-17-2015 | Limit Distance (m): 30
PreAmp: NONE. | Test Distance (m): 3
PreAmp Used? (Y or N): N | Voltage/Frequency: 120VAC/60Hz | Frequency Range: 9 kHz - 30 MHz

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: Tx Mode, 120V/60Hz FCC											
QP	V	0.064	48.27	-11.62	0.05	0.00	59.08	-22.38	43.00	-65.38	9/30 kHz
QP	V	0.088	45.50	-11.48	0.05	0.00	59.08	-25.01	43.00	-68.01	9/30 kHz
QP	V	0.131	42.10	-11.04	0.05	0.00	59.08	-27.97	43.00	-70.97	9/30 kHz
QP	V	27.120	9.00	-8.59	0.73	0.00	20.00	-18.86	40.00	-58.86	9/30 kHz

Test Personnel(s): Vathana F. Ven VFV
Supervising Engineer: (Where Applicable) N/A
Product Standard: FCC 15.225, IC RSS-210
Input Voltage: 120VAC/60Hz
Pretest Verification w/ Ambient Signals or BB Source: Ambient Signals

Test Date(s): 1/22/2015
Test Levels: Per section 7.3
Ambient Temperature: 22 ºC
Relative Humidity: 15 %
Atmospheric Pressure: 1012 mbars

Deviations, Additions, or Exclusions: None

8 Transmitter Spurious Above 30MHz

8.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C – 15.209, 15.225(d), IC RSS-210 – A2.6(d), and ANSI C63.4.

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 Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “AF” is the Antenna Factor; “PA+CL” are Preamp and Cable Loss. These are already accounted for in the “Level” column.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/06/2014	10/06/2015
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	10/24/2014	10/24/2015
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/08/2014	10/08/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2014	10/04/2015

Software Utilized:

Name	Manufacturer	Version
C5	Teseq	5.26.46.46

8.3 Results:

The sample tested was found to Comply.

The field strength of any emissions shall not exceed the limits as follows:

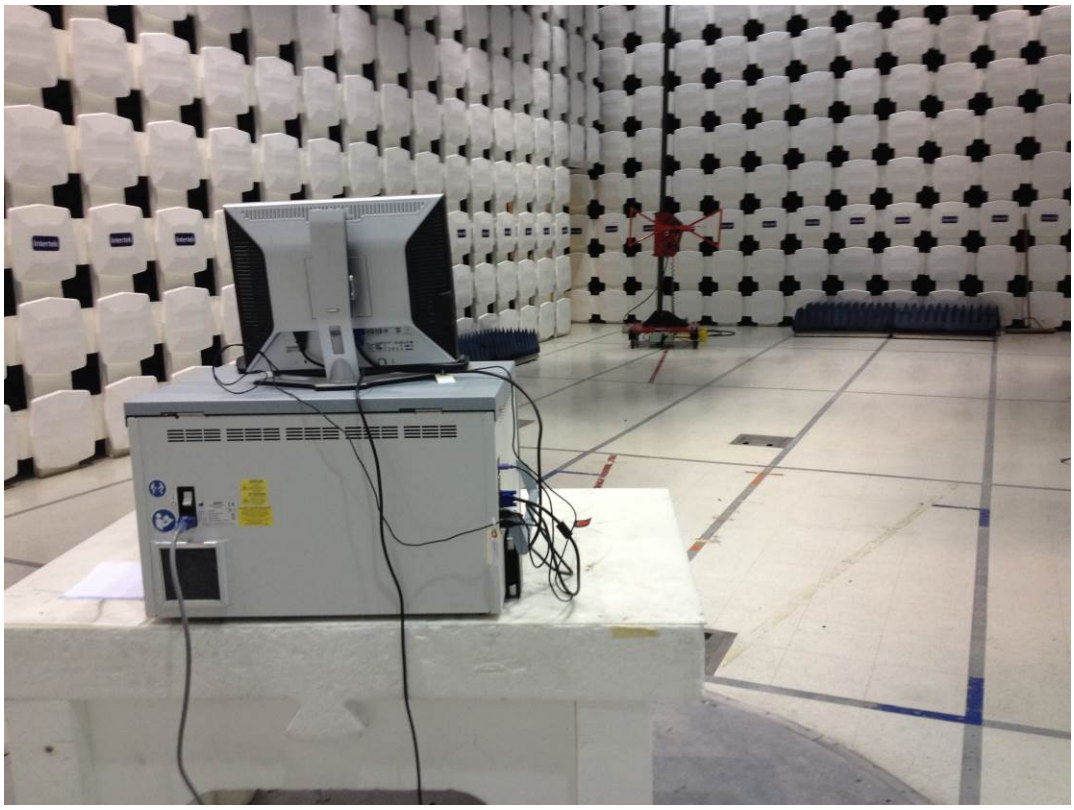
FCC Part 15.209

Frequency	Field Strength		Test Distance
(MHz)	µV/m	dBµV/m	(meters)
30–88	100	40.00	3
88–216	150	43.52	3
216–960	200	46.02	3
Above 960	500	53.98	3

IC RSS-210 A2.6(d): emissions outside the band 13.110-14.010 MHz must not exceed 30 microvolts/m (29.5 dBµV/m) at 30 m (49.5 dBµV/m at 3m)

Since the IC RSS-210 limits are less stringent than the FCC 15.209 limits under 960 MHz, the FCC limits were used.

8.4 Setup Photographs:

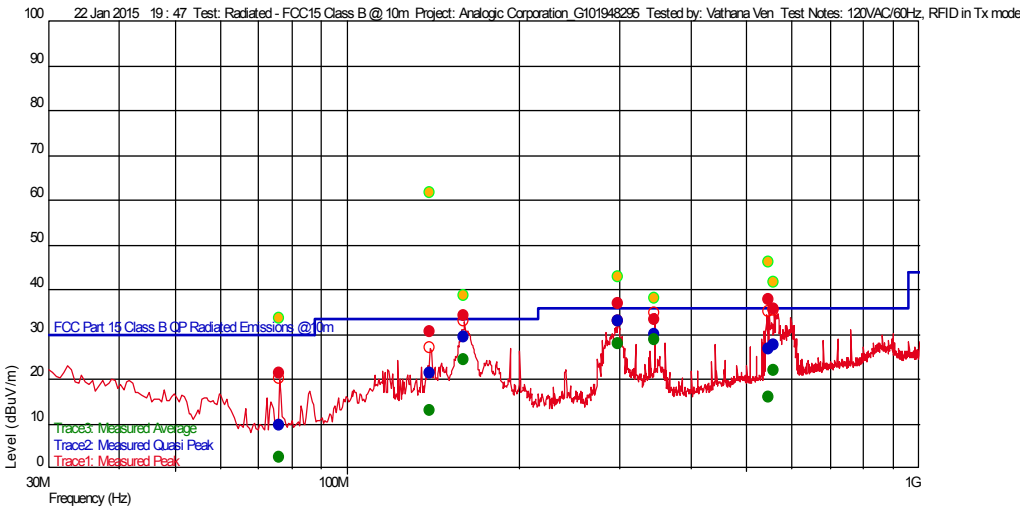


8.5 Plots/Data:

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	NetBio_G101948295	
Test Notes:	120VAC/60Hz, RFID in Tx mode	
Temperature:	22 deg C	
Humidity:	15%, 1012 mB	
Tested by:	Vathana Ven	
Test Started:	22 Jan 2015 19 : 47	

Prescan Emission Graph



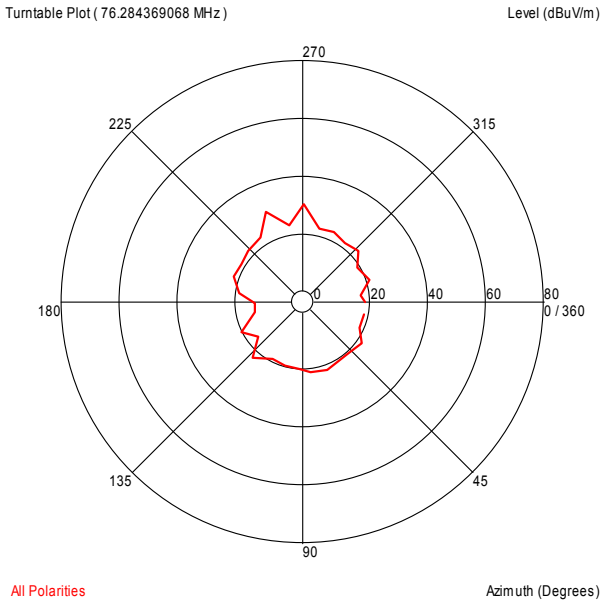
- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

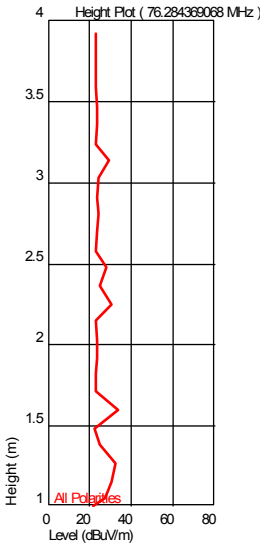
Trace2: Measured Quasi Peak

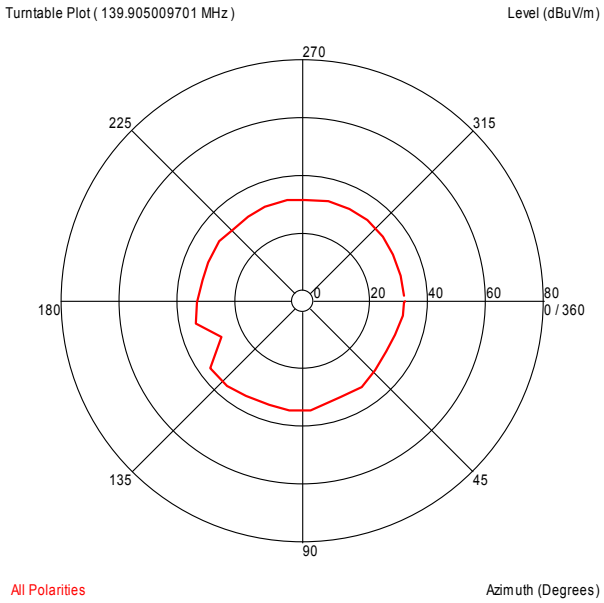
Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver (|)	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
76.284369068 M	9.63	7.872	-24.472	30.000	-20.37	|	259	1.71	120 k	
139.905009701 M	21.20	13.609	-23.930	33.520	-12.32	|	156	1.27	120 k	
546.182564778 M	26.85	18.224	-22.212	36.020	-9.17	--	126	1.04	120 k	
559.156713477 M	27.70	18.483	-22.109	36.020	-8.32	--	253	1.49	120 k	
344.931463287 M	29.93	14.299	-23.052	36.020	-6.09	--	103	1.93	120 k	
160.32304613 M	29.45	12.300	-23.841	33.520	-4.07	|	116	1.26	120 k	
298.80400799 M	33.01	13.476	-23.307	36.020	-3.01	|	44	1.04	120 k	

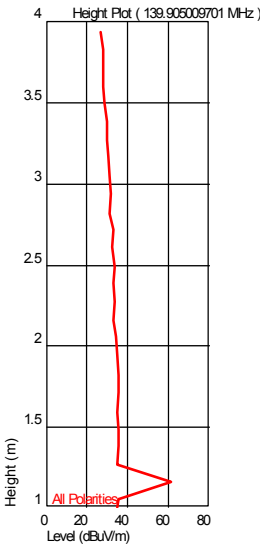
Azimuth Plots

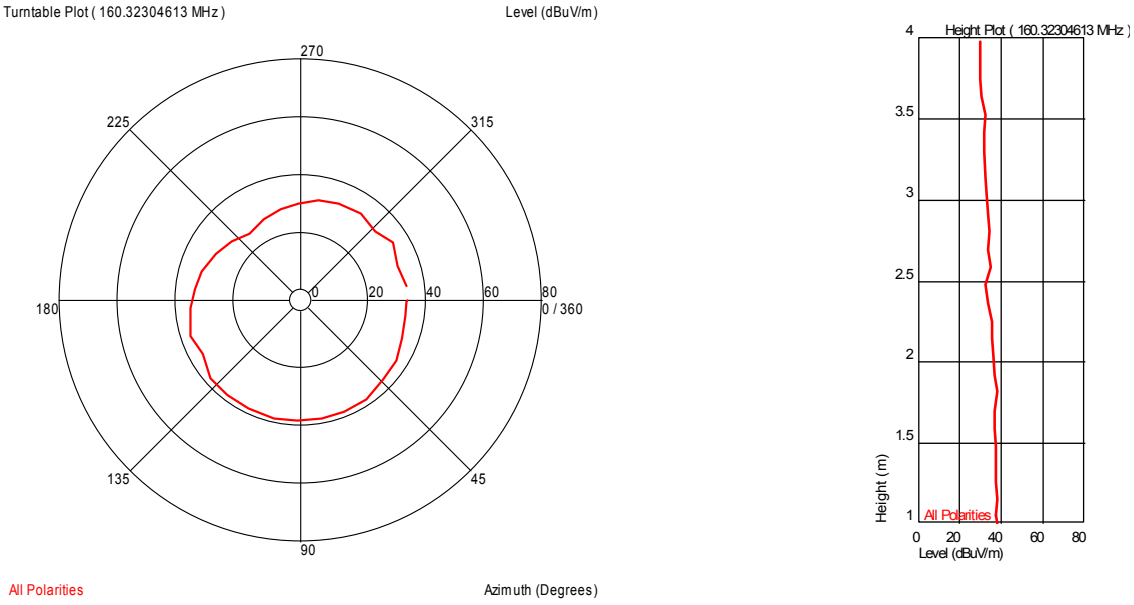


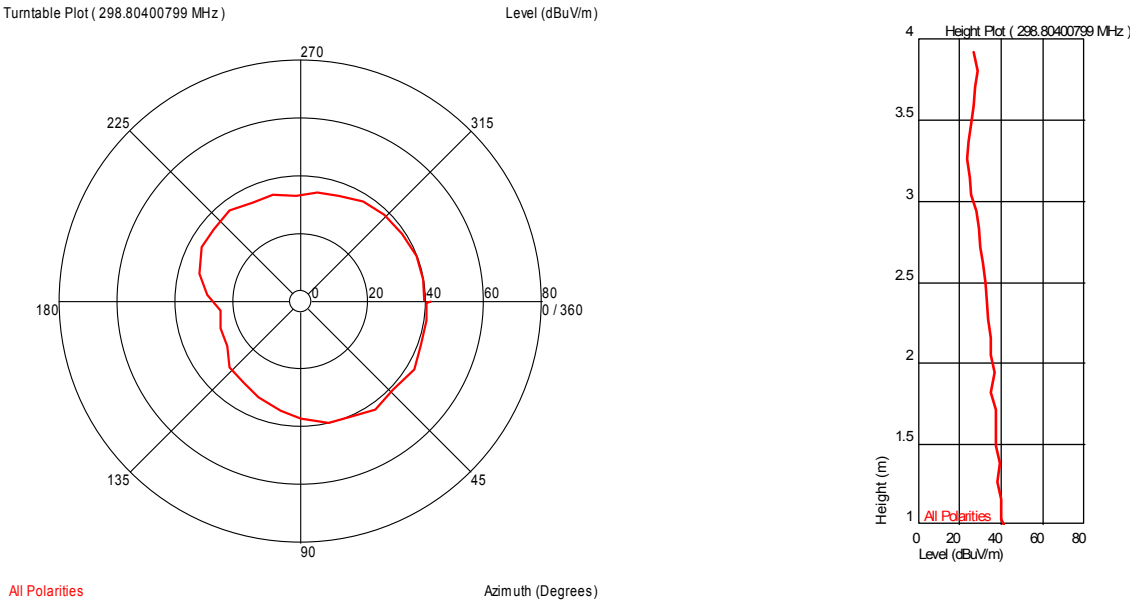
Turntable Plots

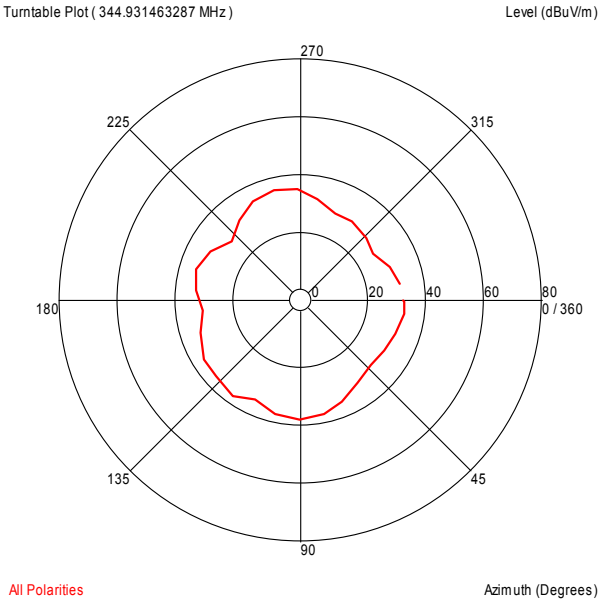


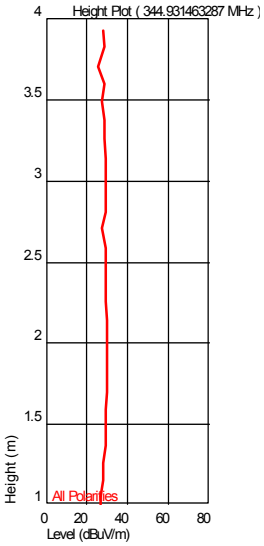


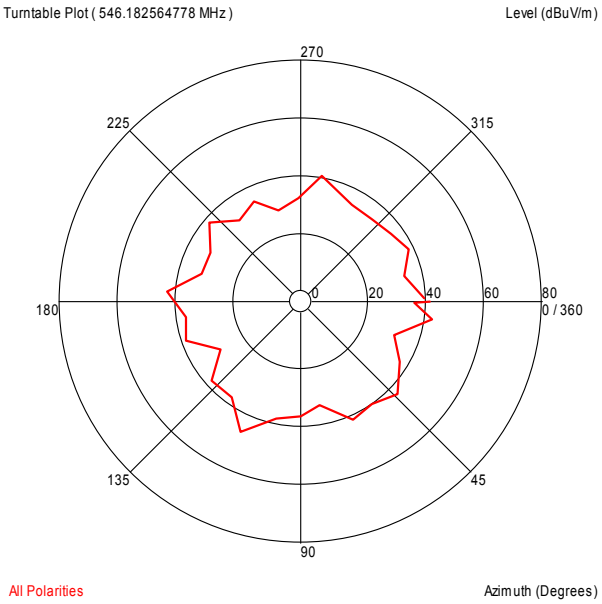


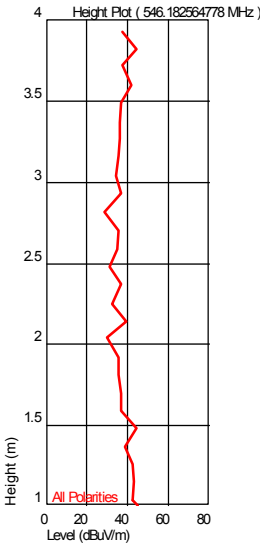

Turntable Plot (160.32304613 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)
Height Plot (160.32304613 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

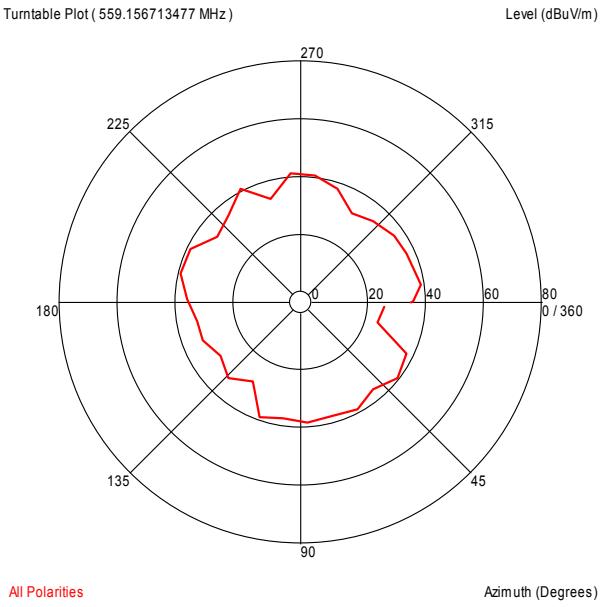

Turntable Plot (298.80400799 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)
Height Plot (298.80400799 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

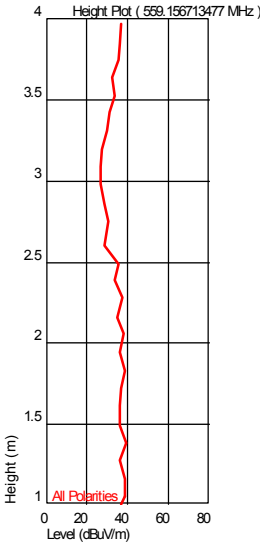

Turntable Plot (344.931463287 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (344.931463287 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)


Turntable Plot (546.182564778 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (546.182564778 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)





Test Personnel:	Vathana F. Ven VFV	Test Date:	1/22/2015
Supervising/Reviewing Engineer:	N/A	Test Levels:	Per section 8.3
Product Standard:	FCC 15.225, IC RSS-210		
Input Voltage:	120VAC/60Hz	Ambient Temperature:	22 ºC
		Relative Humidity:	15 %
Pretest Verification w/ Ambient Signals or BB Source:	Ambient Signals	Atmospheric Pressure:	1012mbars

Deviations, Additions, or Exclusions: None

9 Receiver Spurious Emissions Above 30MHz

9.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B – 15.109, IC RSS-Gen – Section 6.0, and ANSI C63.4.

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 Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “AF” is the Antenna Factor; “PA+CL” are Preamp and Cable Loss. These are already accounted for in the “Level” column.

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/06/2014	10/06/2015
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	10/24/2014	10/24/2015
145003'	Preamplifier (150 KHz to 1.3 GHz)	Hewlett Packard	8447D	2443A04077	10/08/2014	10/08/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
145-410'	Cables 145-400 145-403 145-405 145-406 145-407	Huber + Suhner	10m Track A Cables	multiple	10/04/2014	10/04/2015

Software Utilized:

Name	Manufacturer	Version
C5	Teseq	5.26.46.46

9.3 Results:

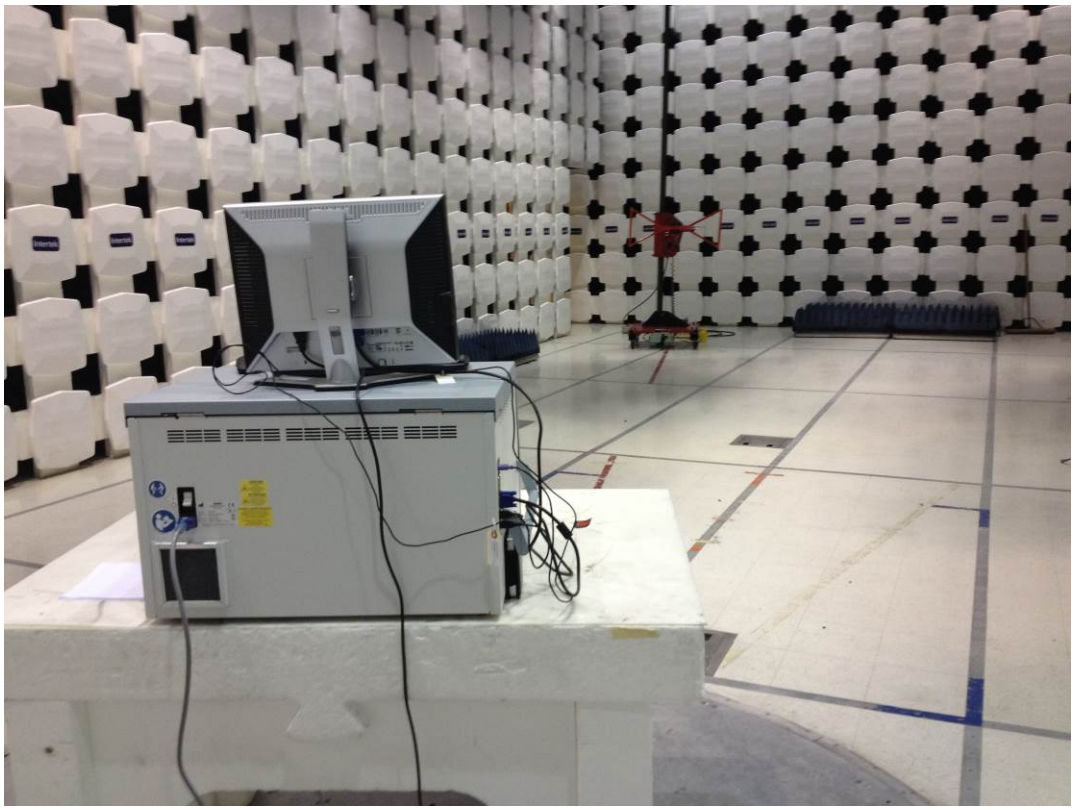
The sample tested was found to Comply.

The field strength of any emissions shall not exceed the limits as follows:

FCC Part 15.109

Frequency	Field Strength		Test Distance
(MHz)	µV/m	dBµV/m	(meters)
30–88	100	40.00	3
88–216	150	43.52	3
216–960	200	46.02	3
Above 960	500	53.98	3

9.4 Setup Photographs:

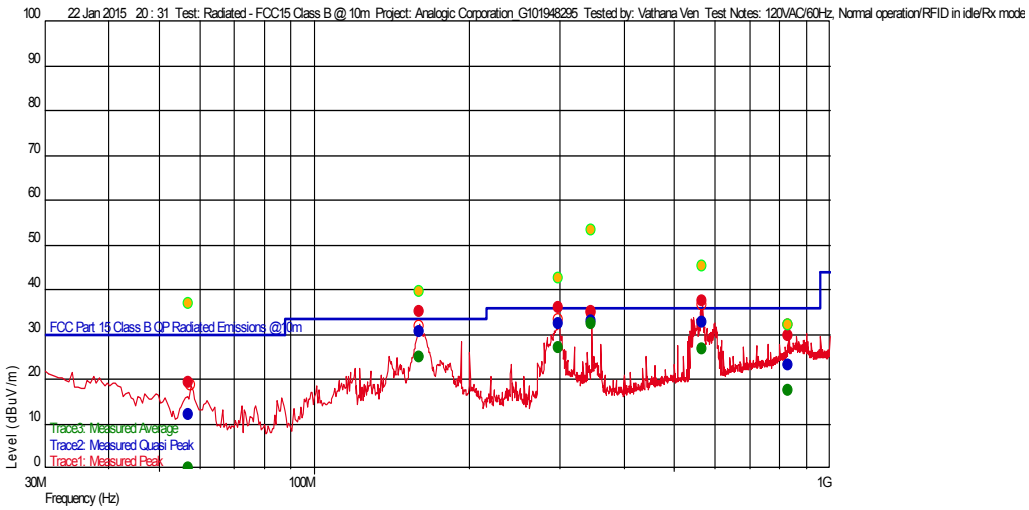


9.5 Test Data:

Test Information

Test Details	User Entry	Additional Information
Test:	Radiated - FCC15 Class B @ 10m	
Project:	NetBio_G101948295	
Test Notes:	120VAC/60Hz, Normal operation/RFID in idle/Rx mode	
Temperature:	22 deg C	
Humidity:	15%, 1012 mB	
Tested by:	Vathana Ven	
Test Started:	22 Jan 2015 20 : 31	

Prescan Emission Graph



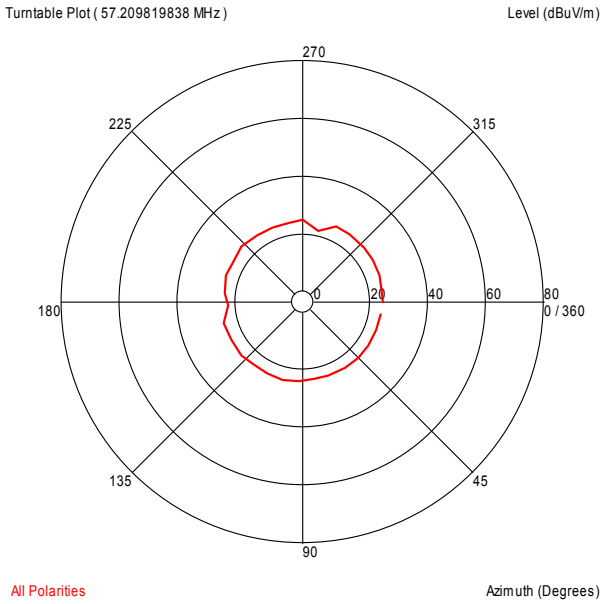
- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

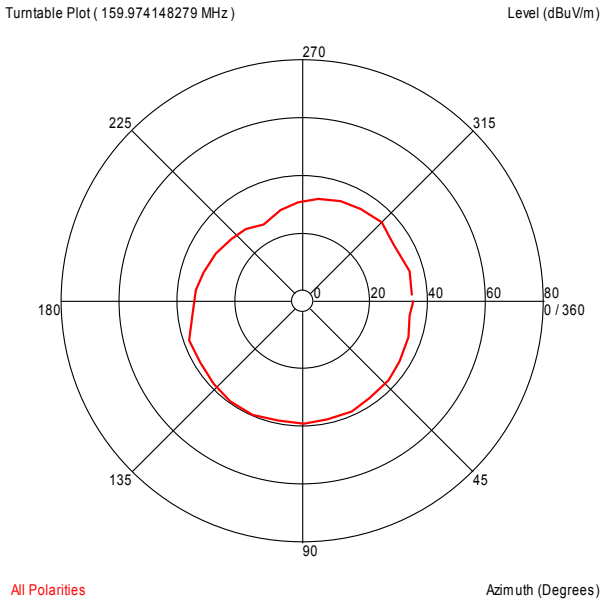
Emissions Test Data

Trace2: Measured Quasi Peak

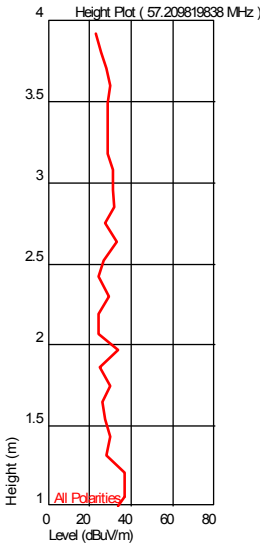
Frequency (Hz)	Level (dBuV/m)	AF	PA+CL	Limit (dBuV/m)	Margin (dBuV/m)	Hor (--), Ver (|)	Azimuth (deg)(Deg)	Mast Height(m)	RBW(Hz)	Comment
57.209819838 M	11.95	7.200	-24.696	30.000	-18.05	|	211	1.21	120 k	
833.090981661 M	23.18	21.662	-21.192	36.020	-12.84	|	164	1.16	120 k	
298.762324623 M	32.32	13.475	-23.292	36.020	-3.70	|	66	1.04	120 k	
566.256913663 M	32.78	18.550	-22.029	36.020	-3.24	--	258	1.48	120 k	
344.99478994 M	32.99	14.300	-23.043	36.020	-3.03	--	101	1.15	120 k	
159.974148279 M	30.70	12.303	-23.790	33.520	-2.82	|	126	1.16	120 k	

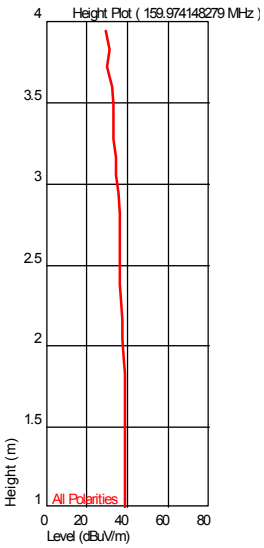
Azimuth Plots

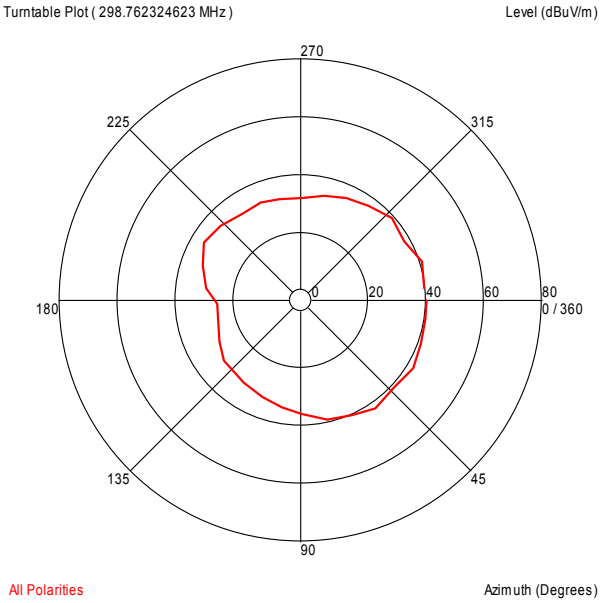


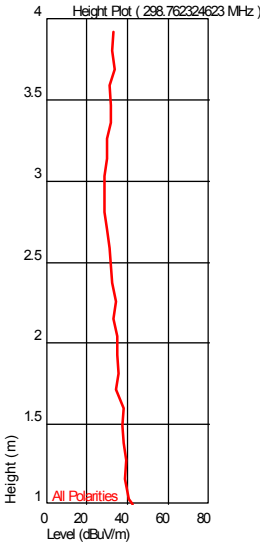


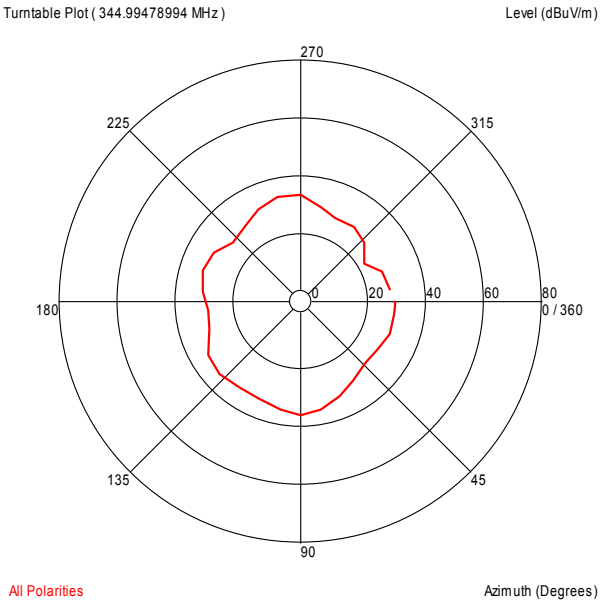
Turntable Plots

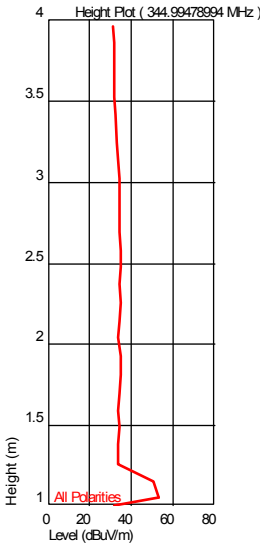


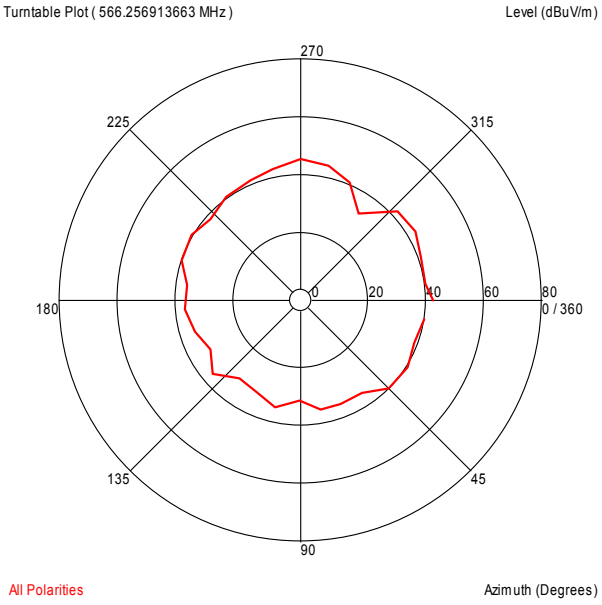


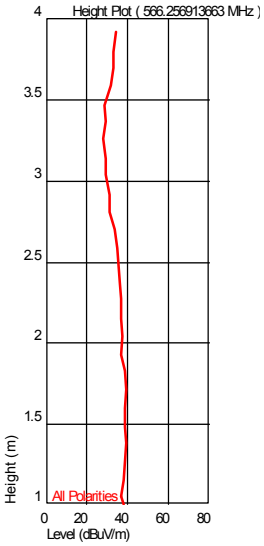

Turntable Plot (298.762324623 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)

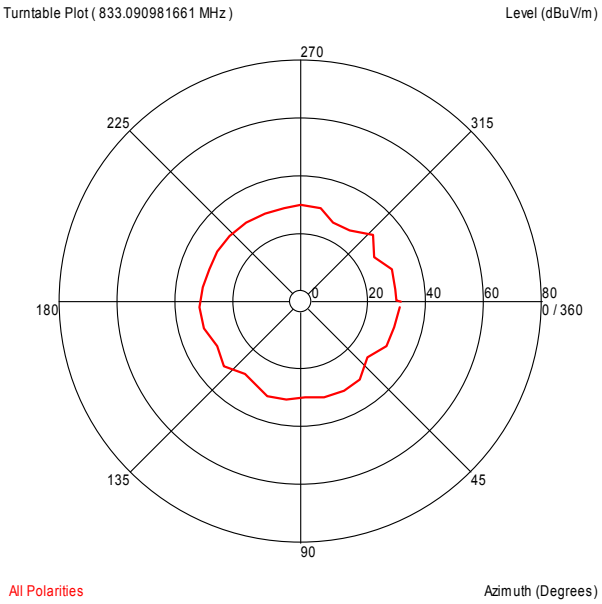

Height Plot (298.762324623 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)

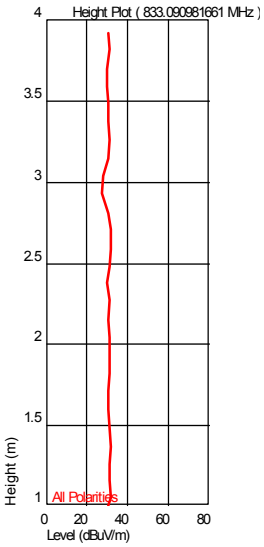

Turntable Plot (344.99478994 MHz)
Level (dBuV/m)
270
225
315
180
0
20
40
60
80
0 / 360
135
45
90
All Polarities
Azimuth (Degrees)


Height Plot (344.99478994 MHz)
4
3.5
3
2.5
2
1.5
1
Height (m)
All Polarities
0
20
40
60
80
Level (dBuV/m)









Test Personnel:	Vathana F. Ven VFV	Test Date:	1/22/2015
Supervising/Reviewing Engineer:	N/A	Test Levels:	Per section 9.3
Product Standard:	FCC 15.225, IC RSS-210		
Input Voltage:	120VAC/60Hz	Ambient Temperature:	22 ºC
		Relative Humidity:	15 %
Pretest Verification w/ Ambient Signals or BB Source:	Ambient Signals	Atmospheric Pressure:	1012mbars

Deviations, Additions, or Exclusions: None

10 AC Mains Conducted Emissions

10.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B – 15.207, IC RSS-Gen – Section 7.2.2, and ANSI C63.4.

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. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
AC Line Conducted Emissions	150 kHz - 30 MHz	2.8	3.4
Telco Port Emissions	150 kHz - 30 MHz	3.2	5

Sample Calculations

The following is how net line-conducted readings were determined:

NF = RF + LF + CF + AF
Where NF = Net Reading in dBμV
RF = Reading from receiver in dBμV
LF = LISN or ISN Correction Factor in dB
CF = Cable Correction Factor in dB
AF = Attenuator Loss Factor in dB

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBμV
$UF = 10^{(49.1\ dB\mu V / 20)}$ = 285.1 μV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “TF” is the Transducer Factor; in this case LISN or ISN loss.

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/06/2014	10/06/2015
DS27'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS27	10/01/2014	10/01/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015
CBLBNC10'	50 Ohm Coaxial Cable	L-Com	RG-58 C/U	CBLBNC10	10/04/2014	10/04/2015
LISN32'	CISPR 16 LISN	Com-Power	LI-215A	191955	02/26/2014	02/26/2015
145-416'	Cables 145-400 145-402 145-404 145-408	Huber + Suhner	3m Track B cables	multiple	10/04/2014	10/04/2015

Software Utilized:

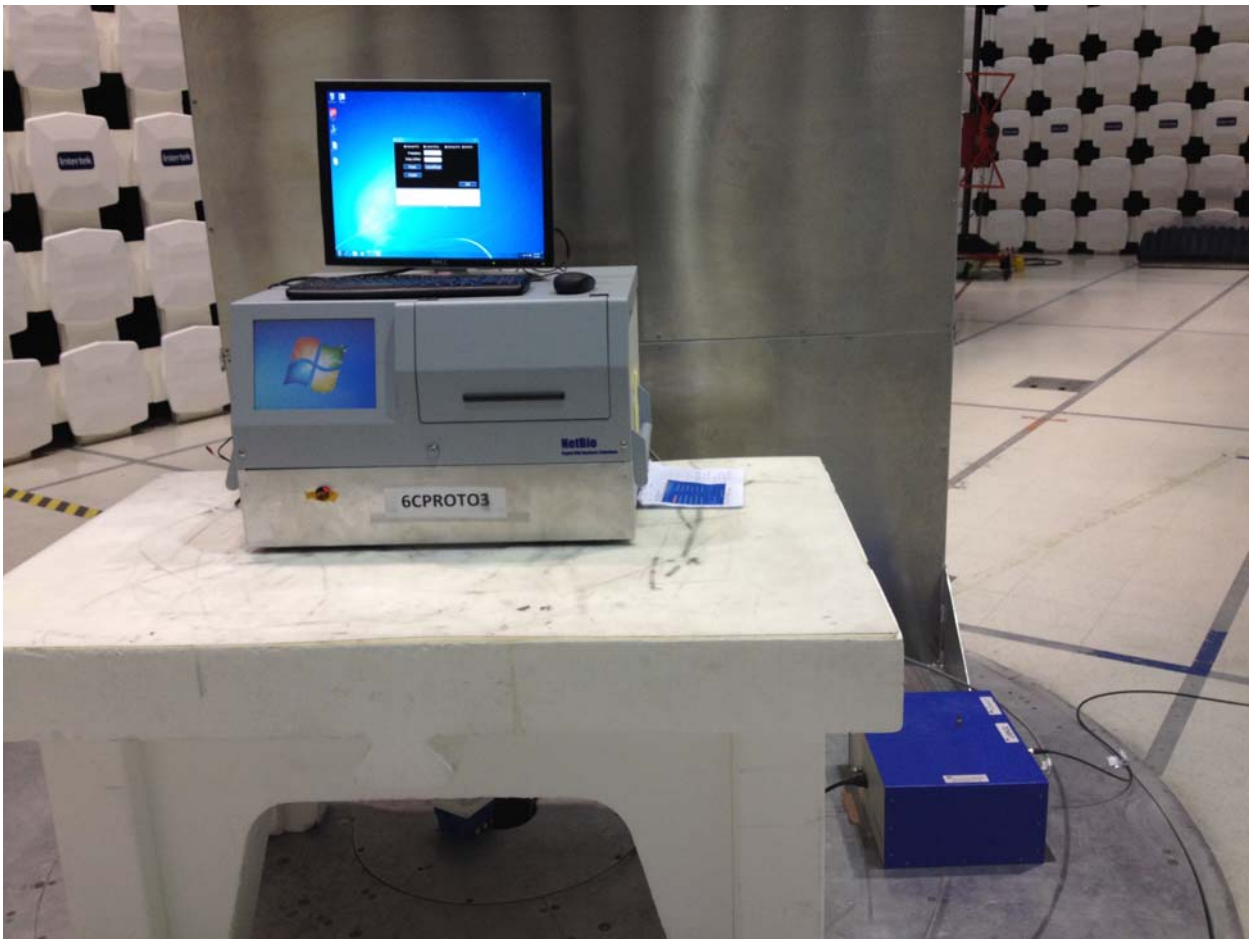
Name	Manufacturer	Version
C5 Emissions	TESEQ	5.26.46.46

10.3 Results:

The sample tested was found to Comply.

Limits: Per FCC Part 15 Subpart B – 15.207 and IC RSS-Gen – Section 7.2.2.

10.4 Setup Photograph:



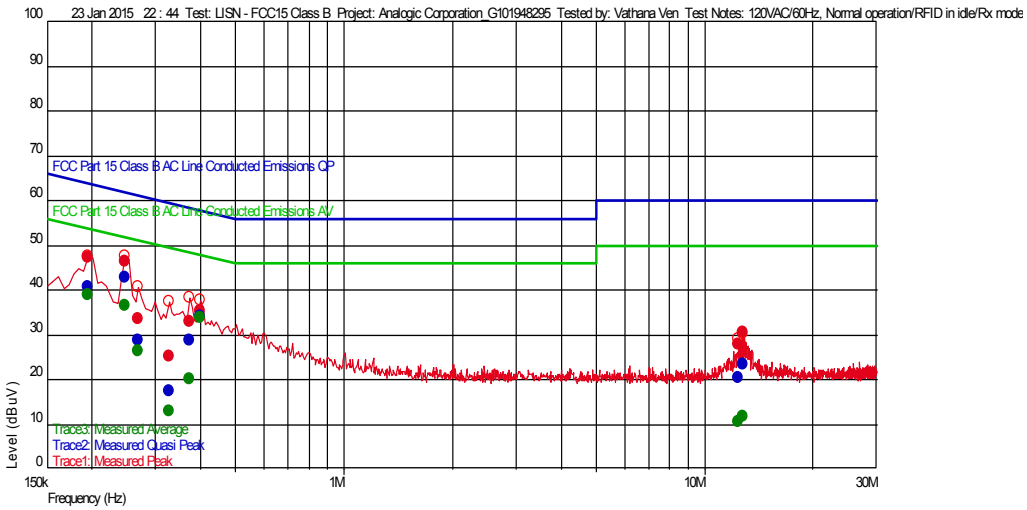
10.5 Plots/Data:

Receive Mode

Test Information

Test Details	User Entry	Additional Information
Test:	LISN - FCC15 Class B	
Project:	Analogic Corporation_G101948295	
Test Notes:	120VAC/60Hz, Normal operation/RFID in idle/Rx mode	
Temperature:	22 deg C	
Humidity:	12%, 1003 mB	
Tested by:	Vathana Ven	
Test Started:	23 Jan 2015 22 : 44	

Prescan Emission Graph



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

Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
327.054108216 k	17.33	0.070	20.570	59.526	-42.20	9 k		N
12.46 M	20.39	0.060	20.932	60.000	-39.61	9 k		L1
12.76 M	23.36	0.060	20.913	60.000	-36.64	9 k		N
269.93987976 k	28.89	0.080	20.570	61.120	-32.23	9 k		N
372.745490982 k	28.73	0.079	20.580	58.440	-29.71	9 k		N
401.30260521 k	34.12	0.080	20.574	57.826	-23.70	9 k		N
195.691382766 k	40.75	0.080	20.500	63.791	-23.04	9 k		L1
247.094188377 k	42.74	0.080	20.560	61.854	-19.12	9 k		N

Trace3: Measured Average

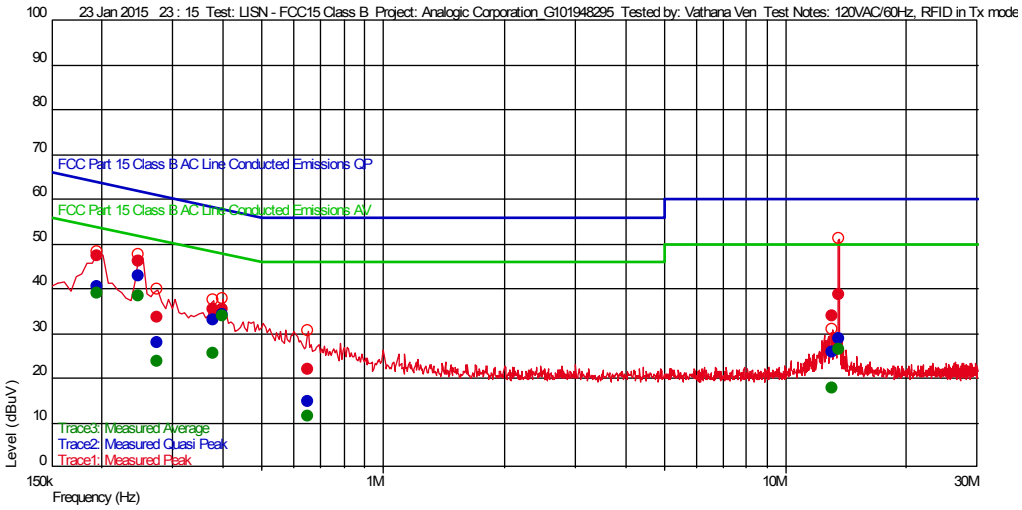
Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
12.46 M	10.53	0.060	20.932	50.000	-39.47	9 k		L1
12.76 M	11.85	0.060	20.913	50.000	-38.15	9 k		N
327.054108216 k	13.03	0.070	20.570	49.526	-36.49	9 k		N
372.745490982 k	20.21	0.079	20.580	48.440	-28.23	9 k		N
269.93987976 k	26.52	0.080	20.570	51.120	-24.60	9 k		N
247.094188377 k	36.53	0.080	20.560	51.854	-15.32	9 k		N
195.691382766 k	39.01	0.080	20.500	53.791	-14.78	9 k		L1
401.30260521 k	33.78	0.080	20.574	47.826	-14.05	9 k		N

Transmit Mode

Test Information

Test Details	User Entry	Additional Information
Test:	LISN - FCC15 Class B	
Project:	Analogic Corporation_G101948295	
Test Notes:	120VAC/60Hz, RFID in Tx mode	
Temperature:	22 deg C	
Humidity:	12%, 1003 mB	
Tested by:	Vathana Ven	
Test Started:	23 Jan 2015 23 : 15	

Prescan Emission Graph



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

Swept Peak Data
Swept Quasi Peak Data
Swept Average Data

Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
652.605210421 k	14.64	0.070	20.596	56.000	-41.36	9 k		N
13.09 M	25.88	0.060	20.959	60.000	-34.12	9 k		N
275.651302605 k	27.88	0.080	20.566	60.946	-33.07	9 k		N
13.57 M	28.76	0.060	20.980	60.000	-31.24	9 k		L1
378.456913828 k	32.91	0.080	20.580	58.313	-25.40	9 k		N
401.30260521 k	34.06	0.080	20.574	57.826	-23.76	9 k		N
195.691382766 k	40.58	0.080	20.500	63.791	-23.21	9 k		N
247.094188377 k	42.75	0.080	20.560	61.854	-19.11	9 k		N

Trace3: Measured Average

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
652.605210421 k	11.55	0.070	20.596	46.000	-34.45	9 k		N
13.09 M	17.71	0.060	20.959	50.000	-32.29	9 k		N
275.651302605 k	23.67	0.080	20.566	50.946	-27.28	9 k		N
13.57 M	26.46	0.060	20.980	50.000	-23.54	9 k		L1
378.456913828 k	25.43	0.080	20.580	48.313	-22.88	9 k		N
195.691382766 k	38.91	0.080	20.500	53.791	-14.89	9 k		N
401.30260521 k	33.75	0.080	20.574	47.826	-14.08	9 k		N
247.094188377 k	38.42	0.080	20.560	51.854	-13.43	9 k		N

Test Personnel:	Vathana F. Ven VFV	Test Date:	1/23/2015
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC 15.225, IC RSS-210	Limit Applied:	Per Section 10.3
Input Voltage:	120VAC/60Hz	Ambient Temperature:	22 ºC
Pretest Verification w/ Ambient Signals or BB Source:	Ambient Signals	Relative Humidity:	12 %
		Atmospheric Pressure:	1003 mbars

Deviations, Additions, or Exclusions: None

11 20 dB Bandwidth

11.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C – 15.215, IC RSS-Gen – Section 4.6, and 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 Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6	6.3
Radiated Emissions, 3m	30-1000 MHz	5.3	6.3
Radiated Emissions, 3m	1-6 GHz	4.5	5.2
Radiated Emissions, 3m	6-15 GHz	5.2	5.5
Radiated Emissions, 3m	15-18 GHz	5.0	5.5
Radiated Emissions, 3m	18-40 GHz	5.0	5.5

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “AF” is the Antenna Factor; “PA+CL” are Preamp and Cable Loss. These are already accounted for in the “Level” column.

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
ETS003'	9kHz-30MHz Active Loop Antenna	ETS Lindgren	6502	00143396	04/01/2014	04/01/2015
CBLBNC10'	25 ft, 50 Ohm BNC Cable	Pomona	RG 58 C/U	CBLBNC10	10/04/2014	10/04/2015
DAV004'	Weather Station	Davis Instruments	7400	PE80529A61A	10/06/2014	10/06/2015
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/17/2014	03/17/2015

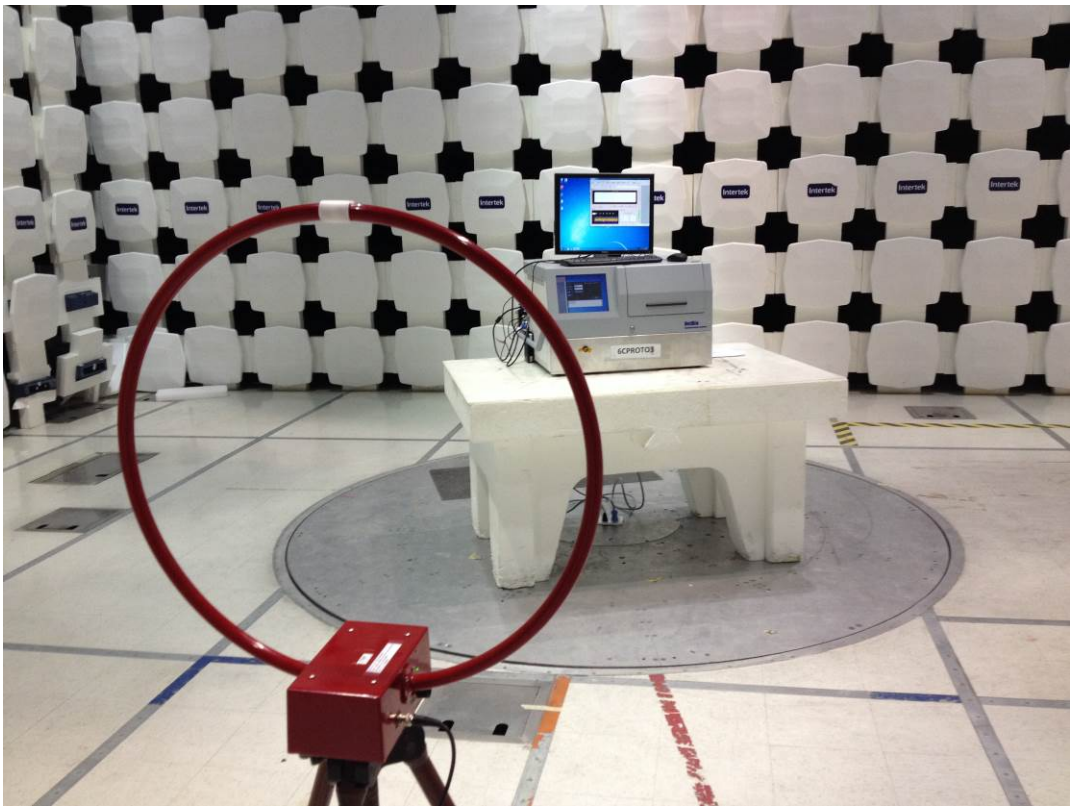
Software Utilized:

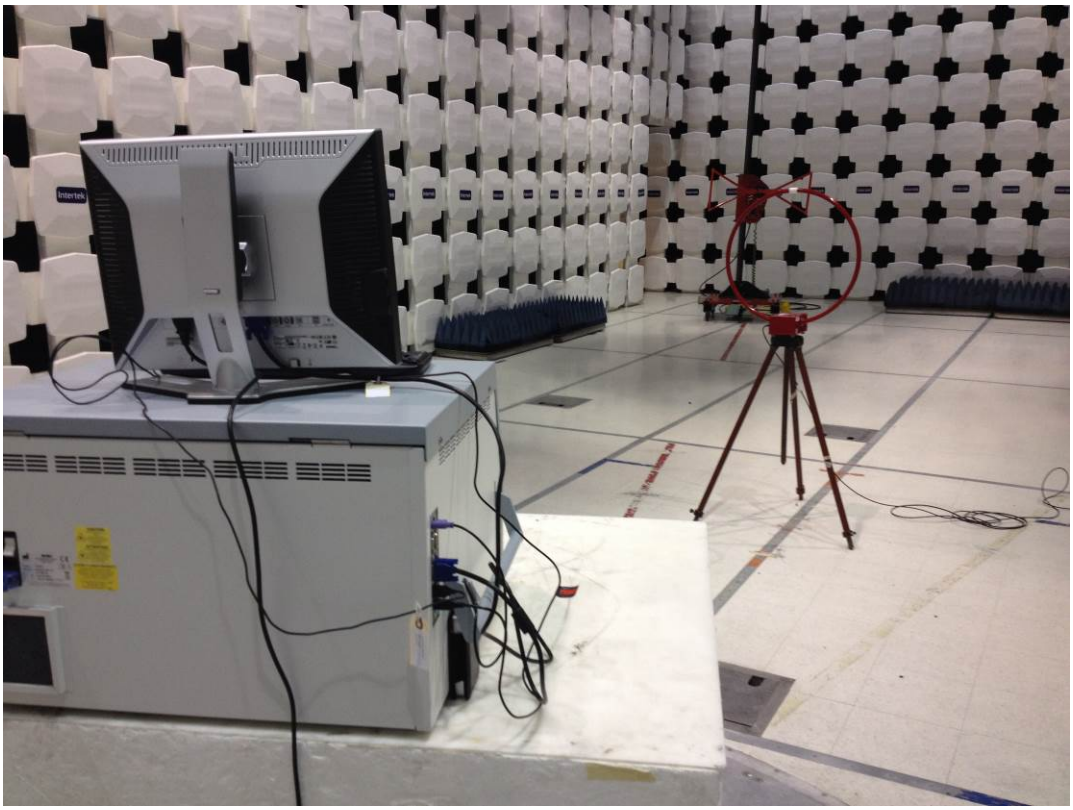
Name	Manufacturer	Version
None		

11.3 Results:

The sample tested was found to Comply. The 20 dB bandwidth remains within the assigned band.

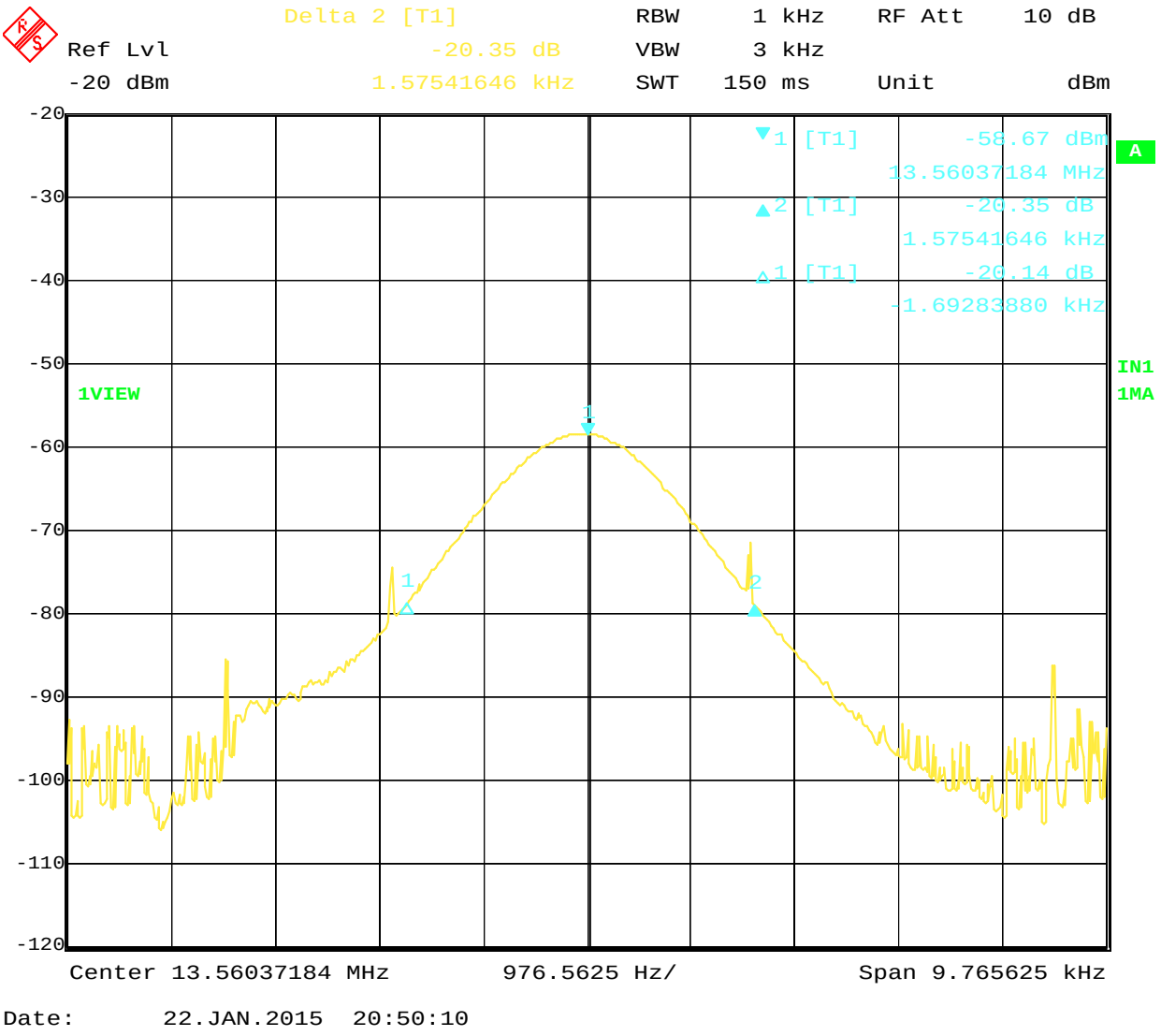
11.4 Setup Photographs:



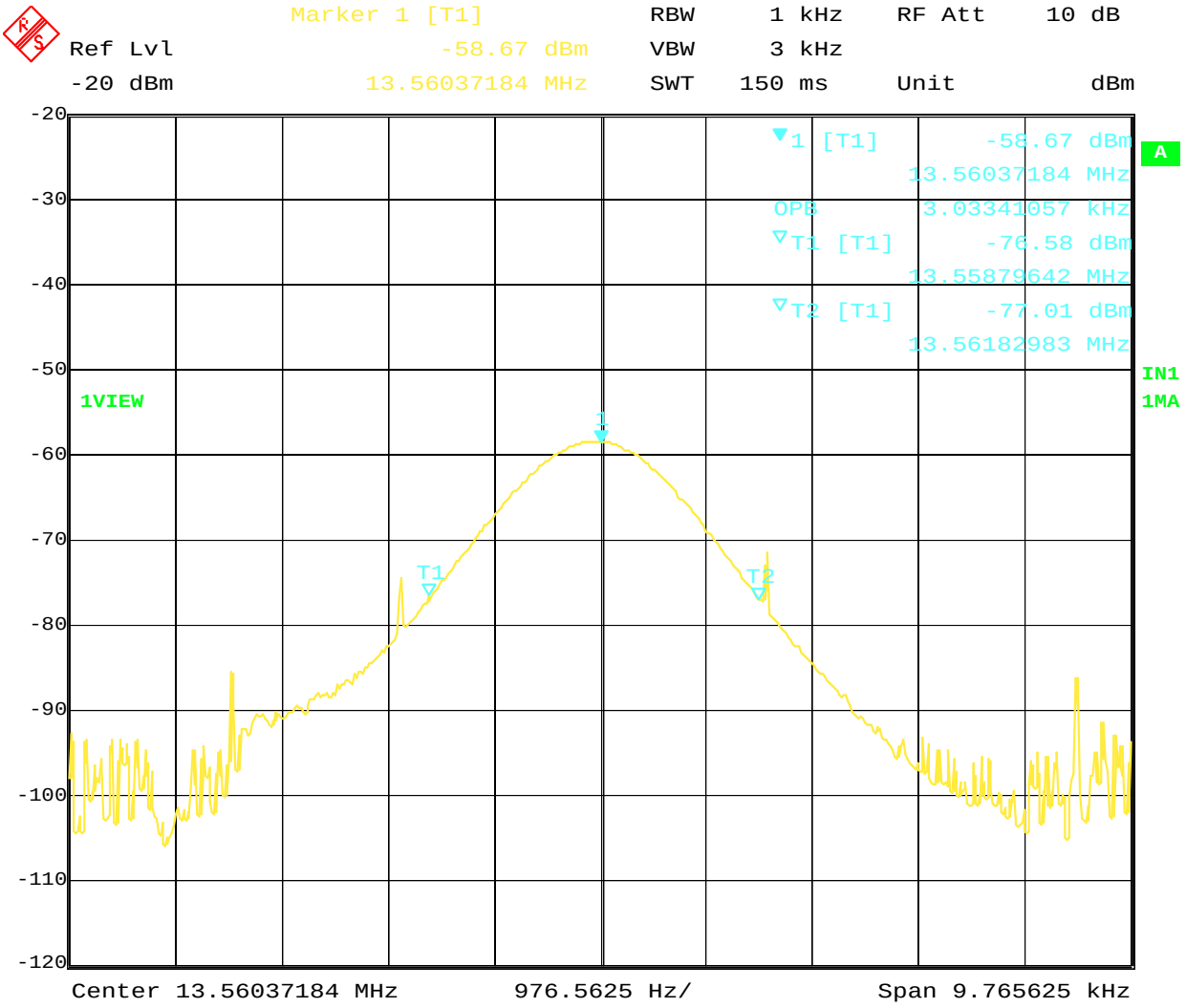


11.5 Test Data:

20 dB Bandwidth



Occupied Bandwidth



Test Personnel(s):	Vathana F. Ven VFV	Test Date(s):	1/22/2015
Supervising Engineer: (Where Applicable)	N/A	Test Levels:	Per section 11.3
Product Standard:	FCC 15.225, IC RSS-210	Ambient Temperature:	22 ºC
Input Voltage:	120VAC/60Hz	Relative Humidity:	15 %
Pretest Verification w/ Ambient Signals or BB Source:	Ambient Signals	Atmospheric Pressure:	1012mbars

Deviations, Additions, or Exclusions: None

12 Frequency Stability

12.1 Method

Tests are performed in accordance with FCC Part 15 Subpart C – 15.225(e), IC RSS-Gen – Section 4.7, IC RSS-210 A2.6, and ANSI C63.

TEST SITE: Safety Lab

12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
SAF1153'	Freezing Rain\Icing\Temp\Humidity\ -73deg C to +190deg C, 95% humidity, Ice Freezing Rain	Cincinnati Sub-Zero	CTH-(FR)64-6-6-SC/AC	12-CT15628	10/11/2014	10/11/2015
MET2'	Digital Multimeter	Meterman	15XP	050407779	01/14/2015	01/1542016
ROS001'	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	05/19/2014	05/19/2015
CBLBNC2012-2'	50 Ohm Coaxial Cable	Pomona	RG-58 C/U	CBLBNC2012-2	12/04/2014	12/04/2015

Software Utilized:

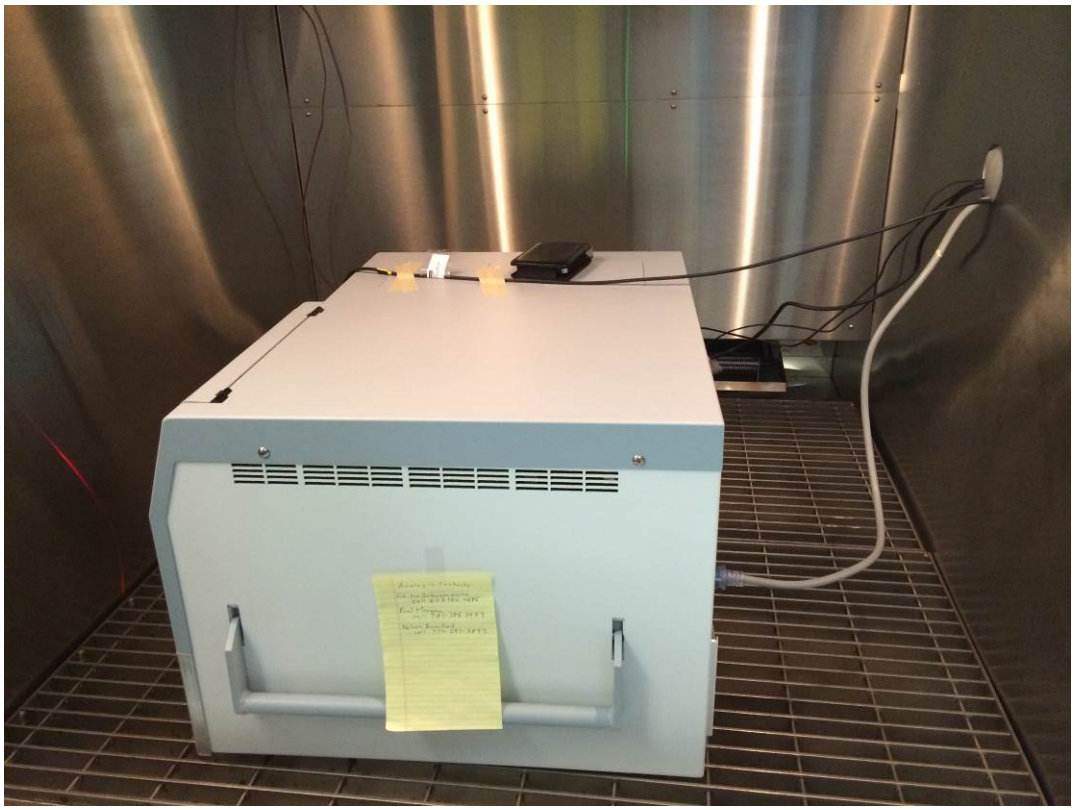
Name	Manufacturer	Version
EMI Boxborough.xls	Intertek	08/27/2011

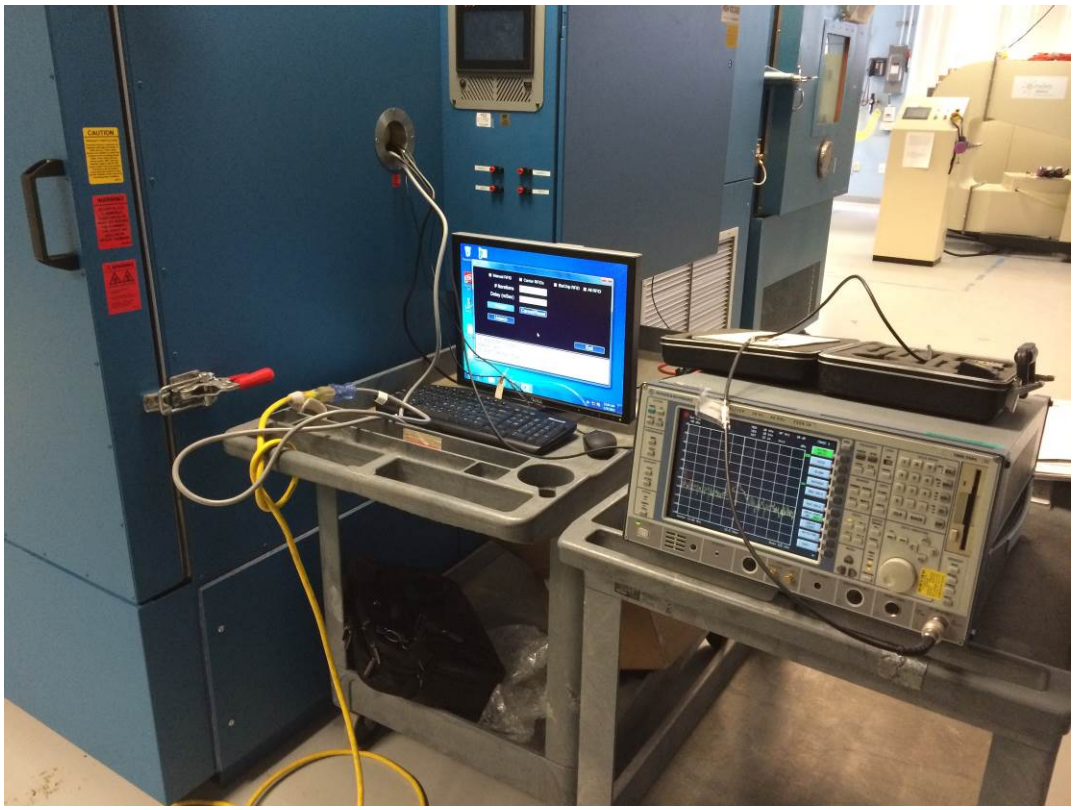
12.3 Results:

The sample tested was found to Comply.

The fundamental frequency shall remain within ±0.01% of the operating frequency over a temperature variation of -30 degrees to +50 degrees. Voltage variations of ±15% were also performed.

12.4 Setup Photographs:





12.5 Test Data:

Intertek

Frequency Stability

Company: NetBio
Model #: ANDE-1
Serial #: 0002-100-0919
Engineer(s): Kouma Sinn
Project #: G101948295
Standard: FCC Part 15 Subpart C Section 15.225 & RSS-210
Limit: 100 PPM

Location: Safety
Date(s): 01/31/15

Test Equipment Used:
SAF1153 MET2 ROS001
CBLBNC2012-2 Near Field Probe

Nominal f: 13.56 MHz

Voltage: 120 VAC 60Hz

%	Voltage Volts	Frequency MHz	Deviation kHz	Limit kHz
-15%	102	13.560752	0.2505	1.36
-10%	108	13.560752	0.2505	1.36
-5%	114	13.560755	0.254	1.36
+0%	120	13.560501	0	1.36
+5%	126	13.560752	0.2505	1.36
+10%	132	13.560752	0.2505	1.36
+15%	138	13.560752	0.2505	1.36

Temp Celsius	Frequency MHz	Deviation kHz	Limit kHz
-30	13.561002	0.501	1.36
-20	13.560752	0.2505	1.36
-10	13.560752	0.2505	1.36
0	13.560752	0.2505	1.36
10	13.560752	0.2505	1.36
20	13.560501	0	1.36
30	13.560752	0.2505	1.36
40	13.560752	0.2505	1.36
50	13.560752	0.2505	1.36

Test Personnel: Kouma Sinn KPS
Supervising Engineer: (Where Applicable) N/A
Product Standard: FCC 15.225, IC RSS-210
Input Voltage: 120VAC/60Hz

Setup Verified: **Yes**

Test Date: 01/31/2015

Test Levels: Must remain within assigned band

Ambient Temperature: N/A
Relative Humidity: N/A
Atmospheric Pressure: N/A

Deviations, Additions, or Exclusions: None

13 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	01/31/2015	101948295BOX-006a	KPS	MFM	Original Issue
1	09/02/2015	101948295BOX-006d	KPS	MFM	Changed company name and address