TEST REPORT

For

CAST Group of Companies Inc.

35 Ripley Avenue, Suite 1
Toronto, Ontario
M6S 3P2, Canada

Date:	April 09, 2013
Report No.:	11152-1E
Revision No.:	1
Project No.:	11152
Equipment:	2400MHz Data Transceiver
Model No.:	BTTKV01

ONE STOP GLOBAL CERTIFICATION SOLUTIONS

3133-20800 Westminster Hwy, Richmond, BC
V6V 2W3, Canada
Phone: 604-247-0444
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TEST REPORT

FCC15.247:2010 / RSS-210, Issue 8

Report reference No.....:	11152-1E
Report Revision History:	✓ Rev. 0: March 14, 2013 ✓ Rev. 1: April 09, 2013, add a test result of AC Power Line Conducted Emission.
Tested by (printed name and signature) .....:	Jeremy Lee
Approved by (printed name and signature) .....:	Kavinder Dhillon, Eng.L
Date of issue .....:	April 09, 2013

Note: By signing this report, both the Testing Technician and the Reviewer hereby declare to abide by the applicable LabTest policies:
1.) Statement of Independence # 3014 (LabTest Employees),
2.) Independence, Impartiality, and Integrity #1039, clause 11 (Engineering Service Subcontractors), or
3.) Independence, Impartiality, and Integrity #1019, clause 3.5 (Testing Subcontractors).

Testing Laboratory Name .....:	LabTest Certification Inc.
Address .....:	3133 – 20800 Westminster Hwy, Richmond, B.C. V6V 2W3 Canada
FCC Site Registration No......:	373387
IC Site Registration No. .....:	5970A-2
Test Location Name .....:	LabTest Certification Inc.
Address .....:	3133 – 20800 Westminster Hwy, Richmond, B.C. V6V 2W3 Canada
Applicant's Name .....:	CAST Group of Companies Inc.
Address .....:	35 Ripley Avenue, Unit 1, Toronto, Ontario, M6S 3P2, Canada
Manufacturer's Name .....:	Same as Applicant
Address .....:	Same as Applicant
Test specification	
Standards .....:	FCC15.247:2010 / RSS-210, Issue 8, December 2010
Testing	
Date of receipt of test item .....:	Feb 25, 2013
Date(s) of performance of test .....:	Feb. 25 to Mar. 06, 2013 and April 08, 2013
Test item description .....:	
Trademark .....:	N/A
Model and/or type reference .....:	BTTKV01 FCC ID: RKT-BTTKV01, IC ID:10858A-BTTKV01
Serial numbers .....:	TK#REVE-3

Electrical Rating(s) ..... :	PoE

Product descriptions	
Type of Emission ..... :	Digital Transmission System(DTS)
No. of Channels ..... :	16 Channels
Modulation ..... :	DSSS (Direct Sequence Spread Spectrum), O-QPSK with half-sine pulse shaping
Data Rates ..... :	250 kbps
Dwell time ..... :	< 5.5 ms
Period of Turn on time ..... :	≤ 100 ms
Operating Frequency Range:	2405 to 2480 MHz
Application for ..... :	2400MHz Data Transceiver Module
Equipment mobility ..... :	Yes.
Nominal Voltages for ..... :	_X__ stand-alone equipment ___ combined (or host) equipment __ test jig
Supply Voltage ..... :	_____ AC _____ Amps ____Hz ___PoE___ DC ____Amps
If DC Power ..... :	____ Internal Power Supply _X__ PoE ____ Battery ☐ Nickel Cadmium ☐ Alkaline ☐ Nickel-Metal Hydride ☐ Lithium-Ion ☐ Lead Acid (Vehicle regulated) ☐ Other
Size of equipment(H X D X W, inches) ..... :	2.80 x 2.45 x 1.01
Mass of equipment (g)..... :	126.5
Operating Temperature Range ..... :	0 °C to +40 °C
Test case verdicts	
Test case does not apply to the test object :	N/A
Test item does meet the requirement ..... :	Pass
Test item does not meet the requirement .. :	Fail

General remarks

"This report is not valid as a CB Test Report unless appended by an approved CB Testing Laboratory and appended to a CB Test Certificate.

The test result presented in this report relate only to the object(s) tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

☐ Throughout this report a comma is used as the decimal separator.

☒ Throughout this report a period is used as the decimal separator.

General product information:

The Timekeeper is a component of the CAST BlackTrax Tracking System. The BlackTrax Tracking System measures the position and orientation of people, props and set pieces, and other objects of interest in order to generate pose dependent special effects. The system is designed primarily for the entertainment industry but also in general for any application which requires precise position and orientation information in an open environment.

Frequencies

Module	Description	Frequences
X-Tal	Clock	25 MHz
X-Tal	CC2520, Clock of Radio IC	32 MHz

List of ancillary and/or support equipment provided by the applicant

Model No.	Description	Manufacturer	Approvals/Standards
GS108PE	Router with PoE	Netgear	CE, FCC
Satellite M50	Laptop	Toshiba	CE, FCC

Description of Interface Cables for Testing

Description	Cable Type	Cable length	Ferrite
Sync port to Terminated	Unshielded RCA cable	10 ft	Yes
Ethernet port to Router	Ethernet Cable, UTP, Cat 5E	6 ft	Yes
Mini USB port to Laptop	Unshielded USB Cable	2 ft	None

ARRANGEMENT OF INTERFACE CABLES: All interface cables were positioned for worst-case maximum emissions within the manner assumed to be a typical operation condition (please reference photographs).

Software and Firmware

Description	Version

Hyper Terminal	5.1

Worst-case configuration and mode of operation during testing

The worst case was described at each test description.

Modifications Required for Compliance

For reducing the radiated Emissions, two ferrited were attached on both connected cables, Ethernet and Sync, as seen below.

Test Equipment Verified for function

Model #	Description	Checked Function	Results
E7405	Spectrum Analyzer	Frequency and Amplitude	Connected 50MHz and -20dBm Cal_siganl and checked OK.
8611-50-TS-10-N	LISN	Insertion Loss at 150kHz to 30MHz	Insertion Losses are normal
PA-103	Pre-Amplifier, 30 to 1,000MHz	Gain at 30 and 1,000MHz	Gains are normal.
8449B	Pre-Amplifier, 1 to 26.5GHz	Gain at 1 to 4GHz	Gains were normal.
JB1	Anatenna, 30 MHz to 2 GHz	Checked structure	Normal – no damage
SAS-571	Anatenna, 1 to 18GHz	Checked structure	Normal – no damage
SAS-572	Anatenna, 18 to 26.5GHz	Checked structure	Normal – no damage
SAC-26G-3	RF Cable, SMA(m) to SMA(m)	Insertion Loss at 1 to 4GHz	Insertion Losses are normal
OC-LMR195-2	RF Cable, SMA(m) to SMA(m)	Insertion Loss at 30 MHz to 4GHz	Insertion Losses are normal
VAT-20+	Attenuator	Insertion Loss at 30 MHz to 4GHz	Insertion Losses are normal

Measurement Uncertainty

Where relevant, the folllowing measurement uncertainty levels have been estimated for tests:

Parameter	Uncertainty(dB)
Radiated Emission, 30 to 300MHz	4.94
Radiated Emission, 1 to 26.5GHz	5.05
Conducted Emission, 150kHz to 30MHz	3.59

Uncertainty figures are valid to a confidence level of 95%.

Markings

You should refer to the clause of FCC Part 2 Section 2.295 & 2.296 and FCC Part 15 Section 15.19 for information to be contained on the label as well as information about the label. Any other statements or labelling requirements may appear on a separate label at the option of the applicant/grantee. The label has to be including FCC IC/IC ID, Product Number and Manufacturer Info.

According to FCC Section 2.925(a),
(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:
(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term *FCC ID* in capital letters on a single line, and shall be a type size large enough to be legible without the aid of magnification.
Example: FCC ID XXX123. XXX-Grantee Code 123-Equipment Product Code”

According to FCC Section 15.19(a)(3),
This device shall bear the following statement in a conspicuous location on the device:
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: Some jurisdictions in Canada require Cautions and Warnings to also be in French. It is the responsibility of the Customer to provide bilingual marking, where applicable, in accordance with the requirements of the local regulatory authorities. It is the responsibility of the Customer to determine this requirement and have bilingual wording added to the "Markings".

Test Summary

When configured and operated as specified in this report, the product was found to comply with the requirements as indicated below.

Test Type	Regulation	Measurement Method	Result
6dB Bandwidth	15.247(a)(2) & RSS-210	KDB 558074 D01 v02	PASS
Maximum Peak Conducted Output Power	15.247(b)(3) & RSS-210	KDB 558074 D01 v02	PASS
Antenna Gain	15.247(b)(4) & RSS-210	N/A	PASS
Unwanted Emission: Antenna-port Conducted Emissions	15.247(d) & RSS-210	KDB 558074 D01 v02	PASS
Unwanted Emission: Radiated Emissions into Non-Restricted Frequency Bands	15.247(d) & RSS-210	KDB 558074 D01 v02	PASS
Unwanted Emission: Radiated Emissions into Restricted Frequency Bands	15.247(d) & RSS-210	KDB 558074 D01 v02	PASS
Band Edge	15.247(d) & RSS-210	KDB 558074 D01 v02	PASS
Power Spectral Density	15.247(e) & RSS-210	KDB 558074 D01 v02	PASS
Radiated Emission: Unintentional-Receive Mode	15.109, Class B & RSS-210	ANSI C63.4:2009 & ANSI C63.10:2009, Clause 6.5	PASS
AC Power Line Conducted Emission	15.207(a) RSS-Gen	ANSI C63.4:2009 & ANSI C63.10:2009	PASS

6dB Bandwidth

Temperature	21.3 °C
Relative Humidity	32.0 %
Barometric Pressure:	101.8 kPa
Test Date	Feb. 27, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272
Reference Equipment (ID) (Calibration not required)	N1, N3
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0248

Test Limits

15.247(a)(2)

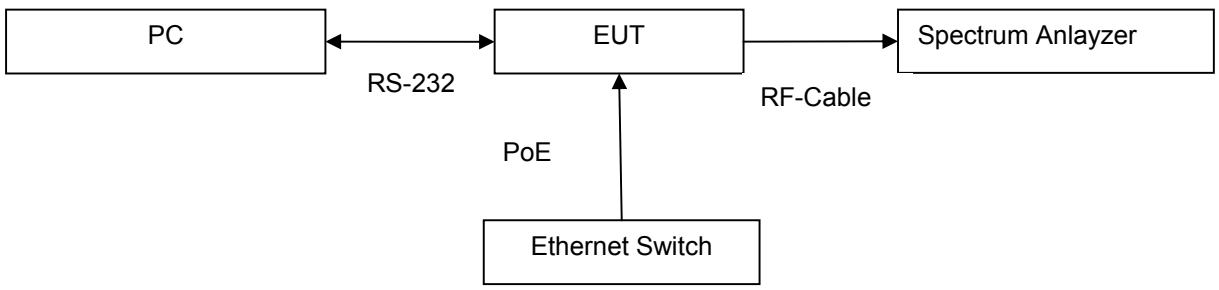
Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Setup

The test was performed in accordance with **FCC 15.247:2010, FCC 15.31:2010 and KDB 558074 D01 v02.**

- The RF output of the EUT was connected to the RF input port of the Spectrum Analyzer via attenuator.
- The EUT was measured at three differrent transmitting frequencies, low-end, middle, and high-end.
- The transmitter was set-up as its maximum power.
- The following measurements were made with
  - Set resolution bandwidth (RBW) = 1-5% or DTS BW, not to exceed 100 kHz.
  - Set the video bandwidth (VBW) ≥ 3 x RBW.
  - Detector = Peak.
  - Trace mode = max hold.
  - Sweep = auto couple.
  - Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Setup Block Diagram

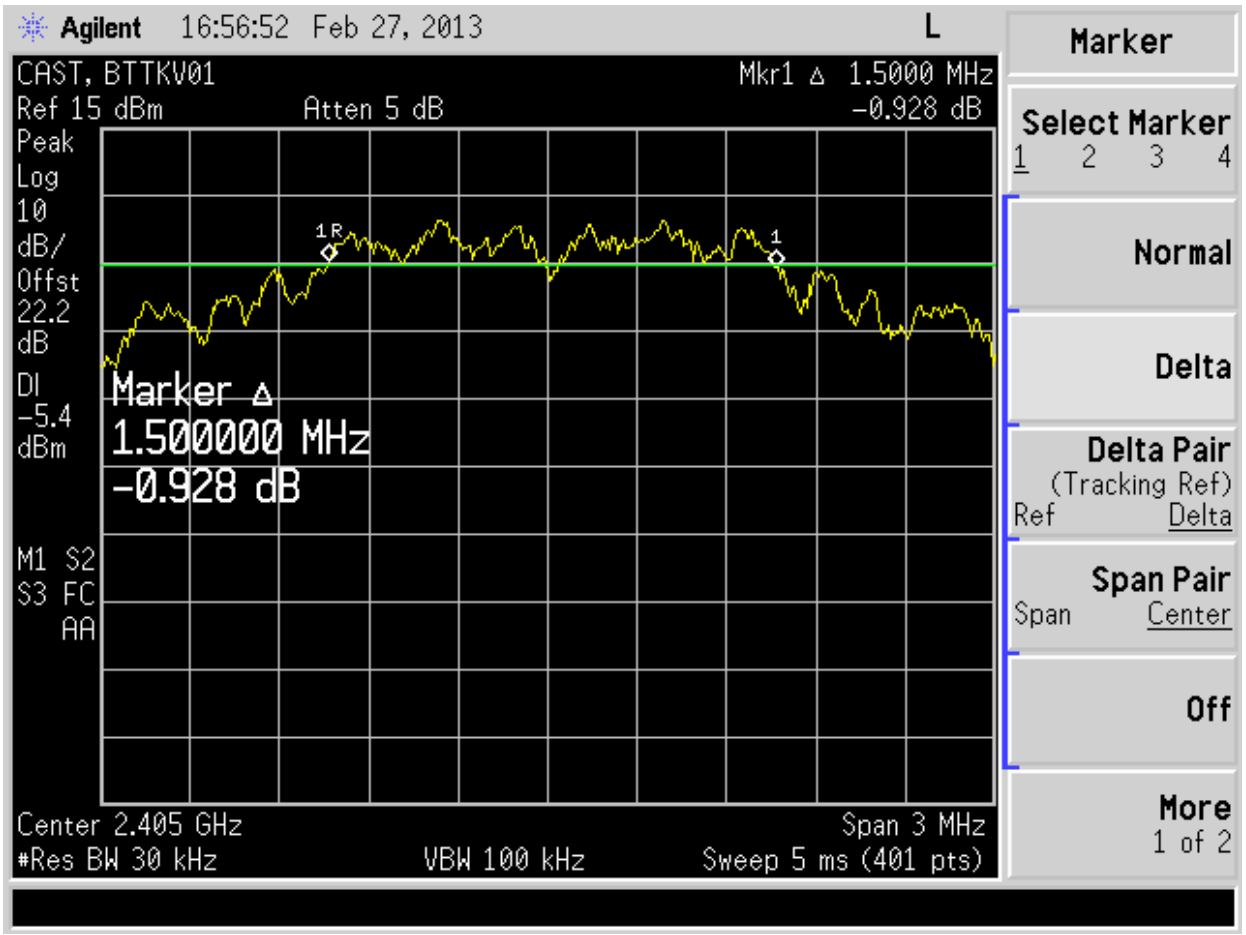


Test Results:

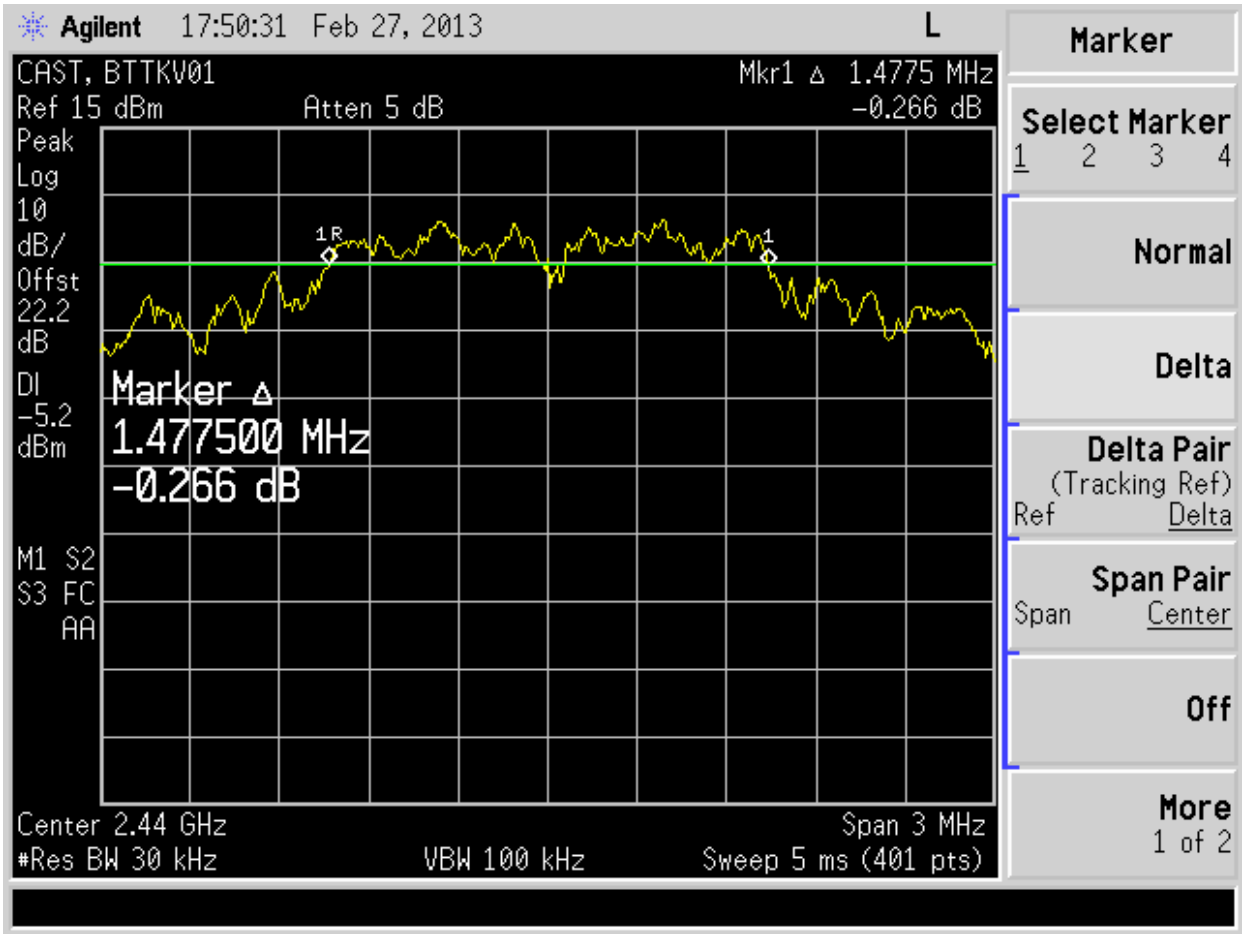
Carrier Frequency(MHz)	6dB BW(kHz)	Limit(kHz)	Pass/Fail
2405	1500.0	≥ 500	Pass
2440	1477.5	≥ 500	Pass
2480	1567.5	≥ 500	Pass

X Pass Fail N/A

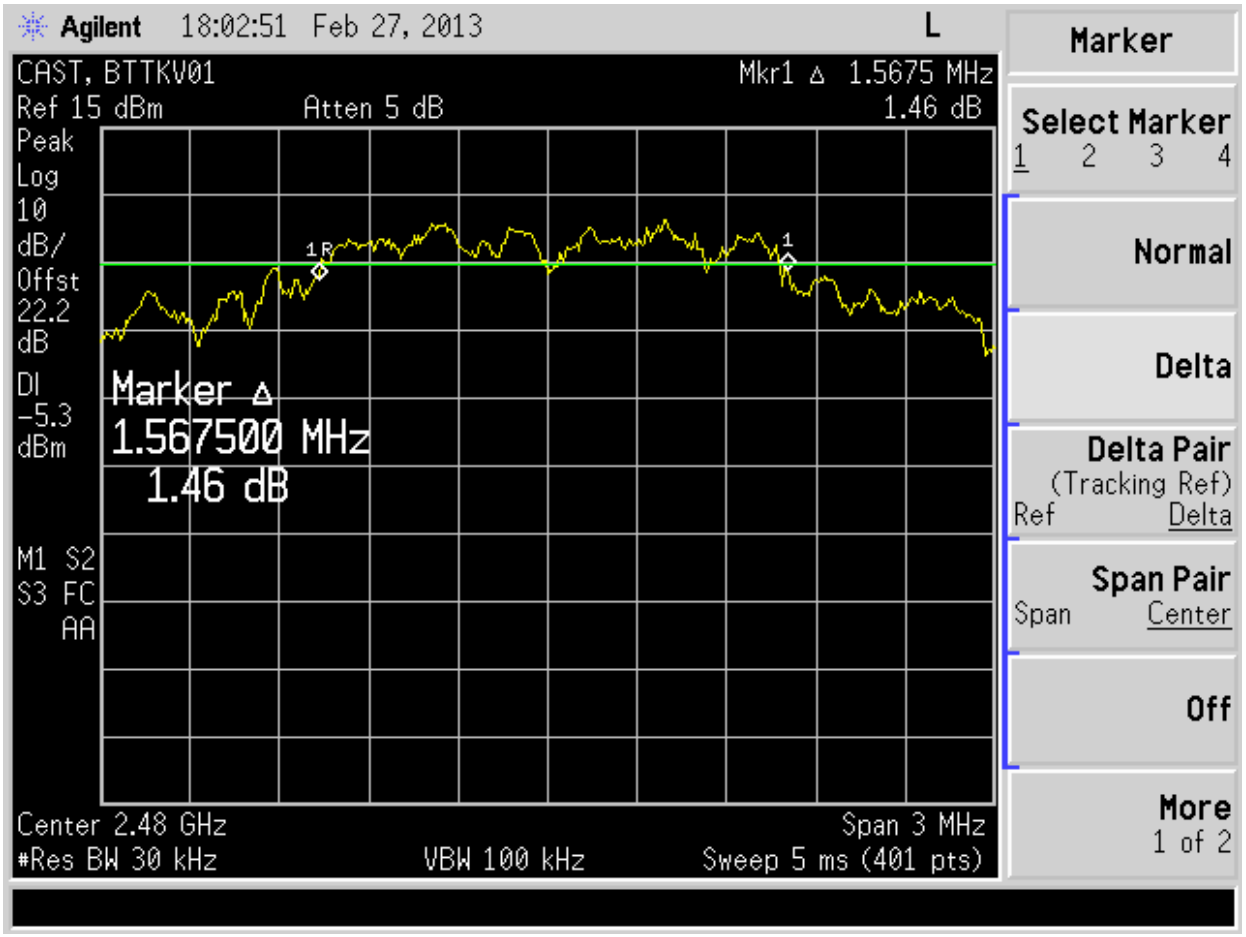
- 6dB Bandwidth of Low End; centre frequency is 2405 MHz



- 6dB Bandwidth of Low End; centre frequency is 2440 MHz



- 6dB Bandwidth of Low End; centre frequency is 2480 MHz



Maximum Peak Conducted Output Power

Temperature	21.3 °C
Relative Humidity	32.0 %
Barometric Pressure:	101.8 kPa
Test Date	Feb. 27, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272
Reference Equipment (ID) (Calibration not required)	N1, N3
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0248

Test Limits

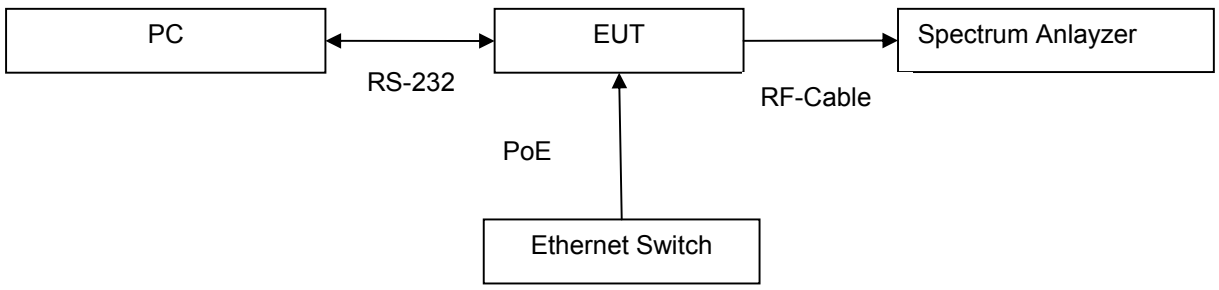
15.247(b)
The maximum peak conducted output power of the intentional radiator shall not exceed the following:
(3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

Test Setup

The test was performed in accordance with **FCC 15.247:2010 & FCC 15.31:2010 and KDB 558074 D01 v02.**

- The RF output of the EUT was connected to the RF input port of the Spectrum Analyzer via attenuator.
- The EUT was measured at three differrent transmitting frequencies, low-end, middle, and high-end.
- The transmitter was set-up as its maximum power.
- The following measurements were made with
  - Set the RBW ≥ DTS bandwidth.
  - Set VBW ≥ RBW.
  - Set span ≥ RBW.
  - Sweep time = auto couple.
  - Detector = peak.
  - Trace mode = max hold.
  - Allow trace to fully stabilize.
  - Use peak marker function to determine the peak amplitude level.
- The indicated level is the peak conductyed output power(with the addition of the cable loss).

Setup Block Diagram

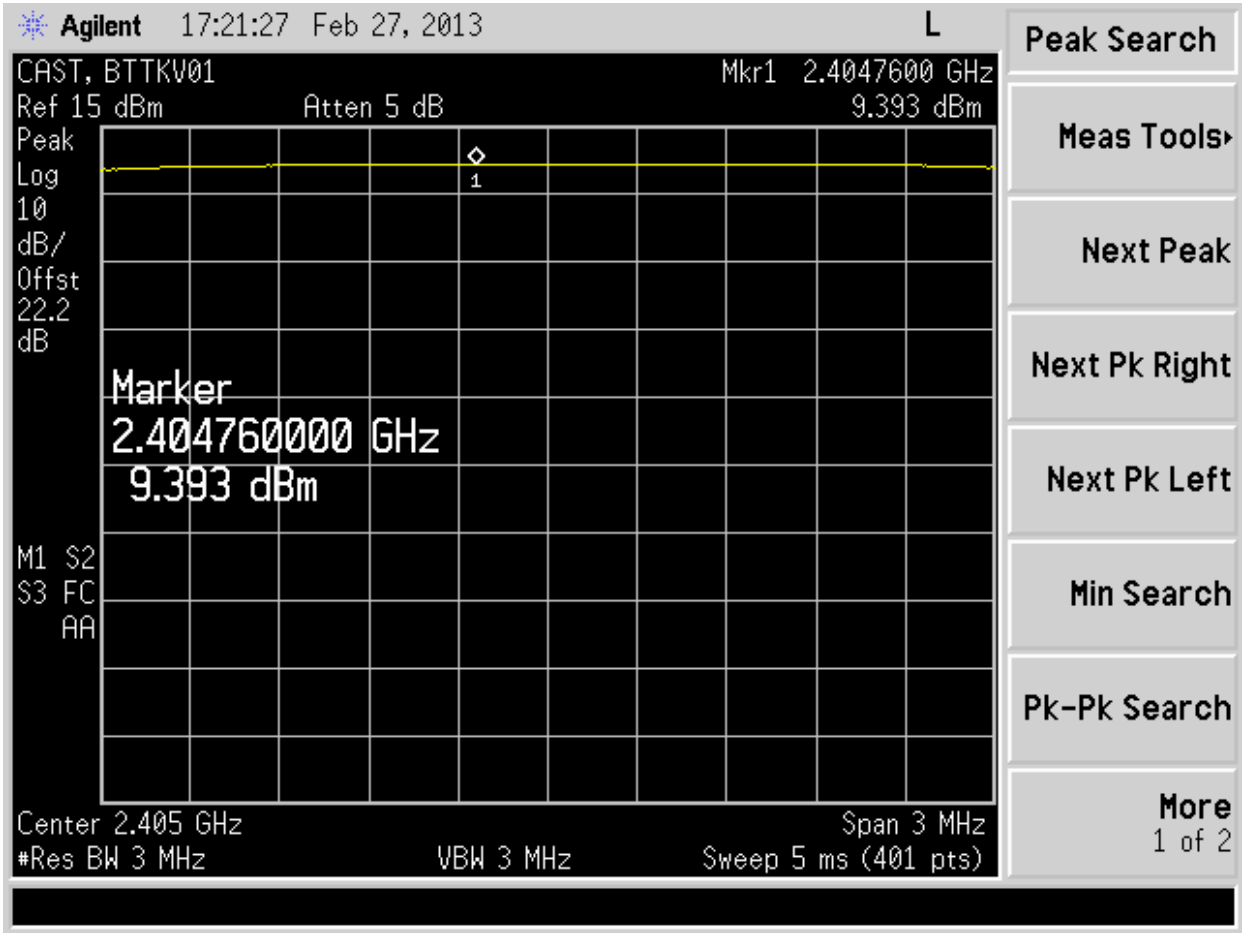


Test Results:

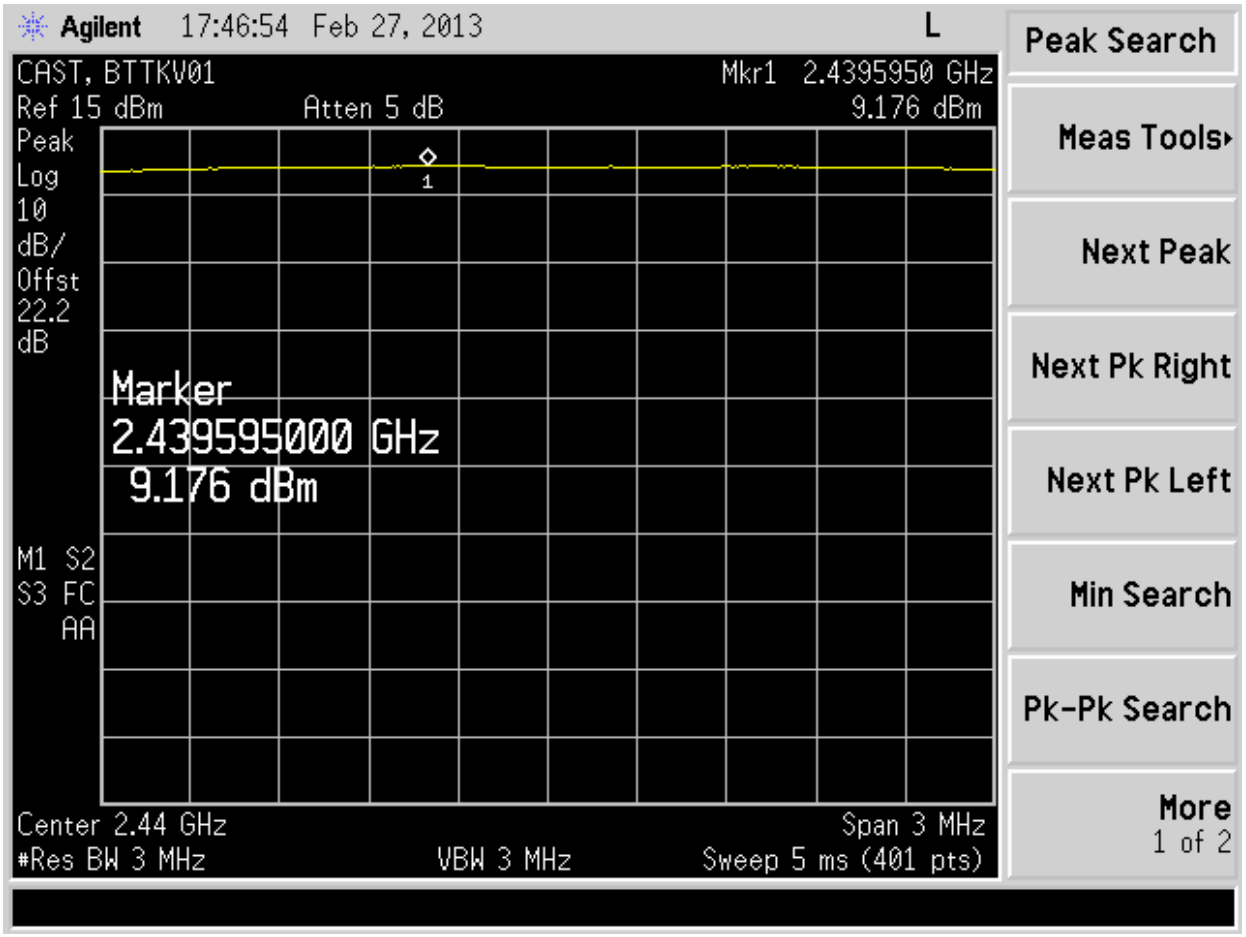
Channel Frequency(MHz)	Peak Power(dBm)	Limit(W/dBm)	Pass/Fail
2405	9.393	≤ 1 / + 30	Pass
2440	9.176	≤ 1 / + 30	Pass
2480	9.006	≤ 1 / + 30	Pass

X Pass Fail N/A

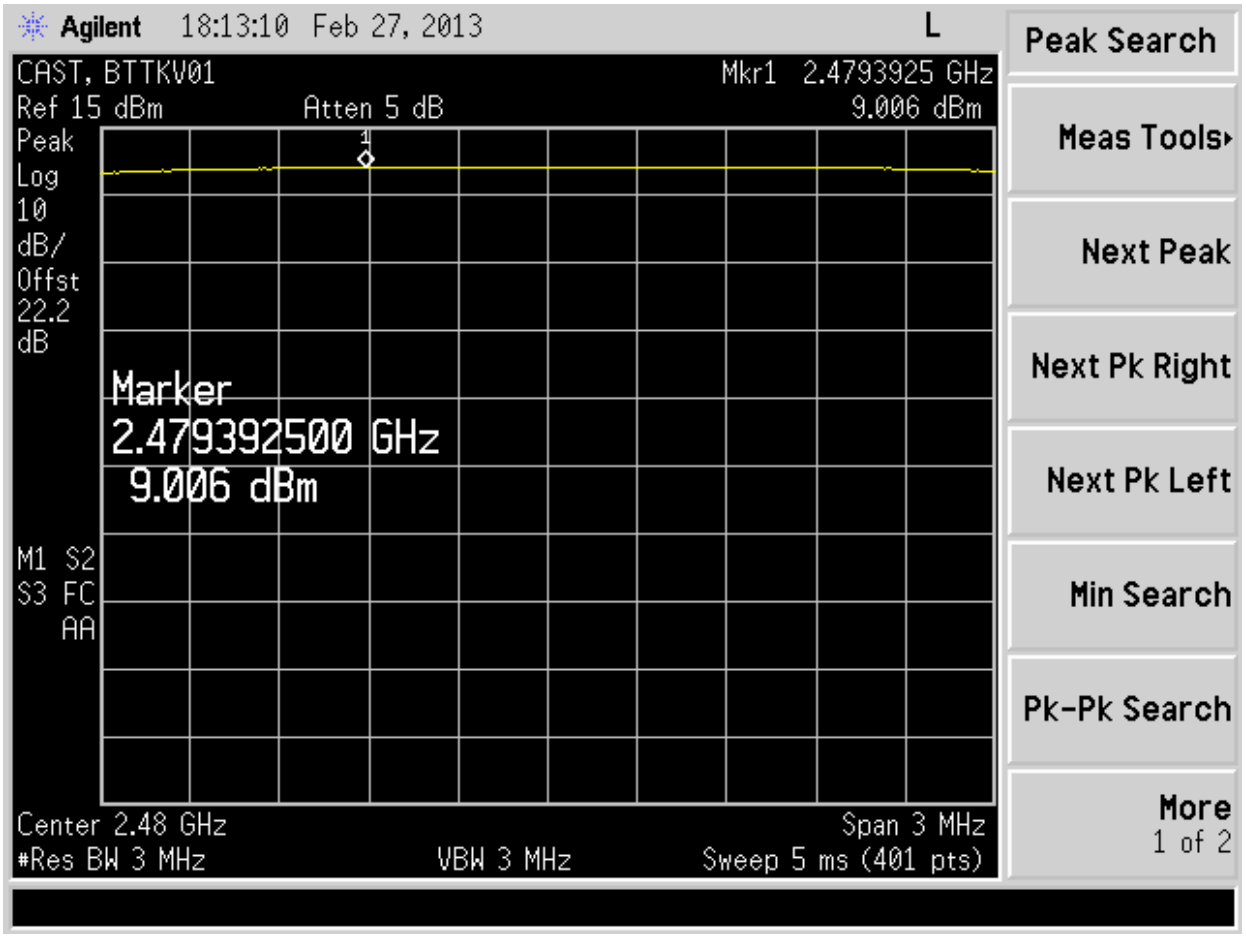
- Conducted maximum power at the Carrier Frequency is 2405 MHz



- Conducted maximum power at the Carrier Frequency is 2440 MHz



- Conducted maximum power at the Carrier Frequency is 2480 MHz



Antenna Gain

Test Date	March 14, 2013
Sample Number	1133453
Tested By	Jeremy Lee

Test Limits

15.247(b)

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Test Results:

Antenna description	Peak Antenna Gain(dBi)	Limit(dBi)	Pass/Fail
W1030, Wireless External Antenna for 2.4GHz Applications	2.0 [1)]	≤ 6.0	Pass

Note 1) The Gain was referenced by the Catalog of Manufacturer.

X Pass Fail N/A

Unwanted Emission: Antenna-port Conducted Emissions

Temperature	21.3 °C
Relative Humidity	30.0 %
Barometric Pressure:	102.4 kPa
Test Date	Feb. 28, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272
Reference Equipment (ID) (Calibration not required)	N1, N3
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0248

Test Limits

15.247(d)

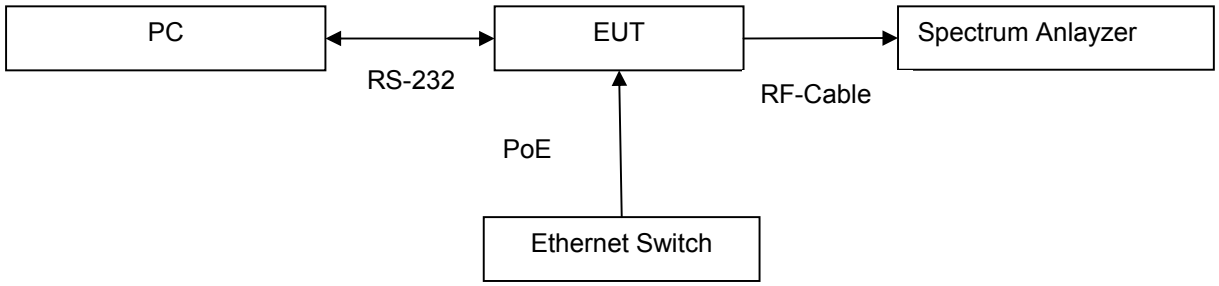
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Setup

The test was performed in accordance with **FCC 15.247:2010, FCC 15.31:2010 and KDB 558074 D01 v02.**

- The RF output of the EUT was connected to the RF input port of the Spectrum Analyzer.
- The EUT was set-up in three different transmiting modes, low-end, middle, and high-end.
- The transmitter was set to output its maximum power.
- The following measurements were made with
  - Span = wide enough to capture the peak level of the in-band emission and all spurious emissions(e.g., harmonics) from the lowest frequency generated in the EUT up through the 10^{th} harmonic.
  - RBW = 100kHz up to 1GHz, 1MHz over 1GHz.
  - VBW ≥ RBW
  - Sweep = Auto
  - Detector Function = peak
  - Trace = Single trace up to capturing the whole range of signal
  - Allowed the trace to stabilize.
- Set the marker on the peak of any spurious emission recorded.

Setup Block Diagram



Test Results:

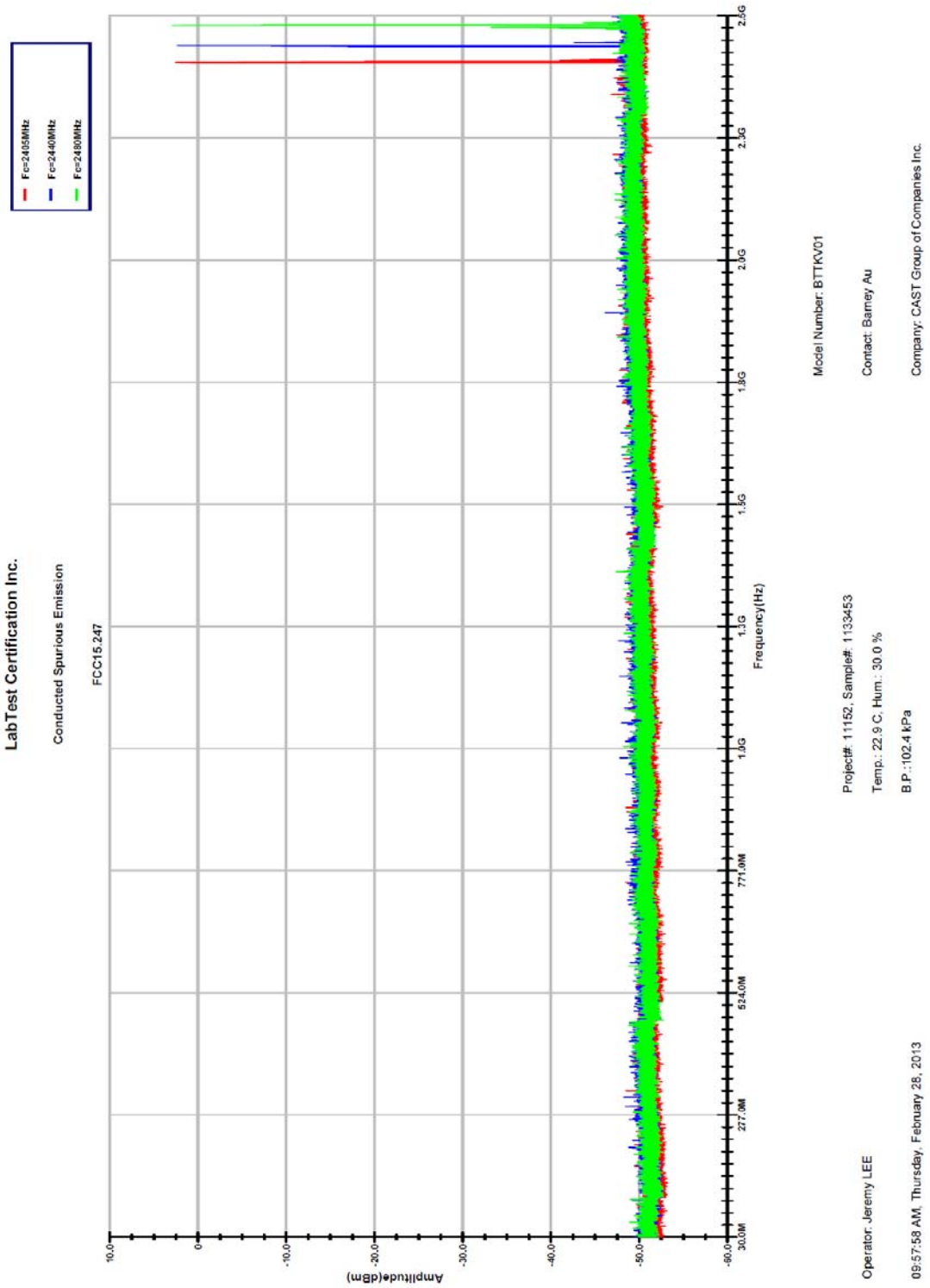
Difference(dB) = Measured Carrier Level(dBm) – Measured Spurious Level(dBm)

Description	Frequency (MHz)	Measured (dBm)	Difference (dB)	Limit (dB)	Pass/Fail
Carrier_Low End	2405	+8.58	-	-	-
Spurious	2758	-37.52	46.1	> 20	Pass
2nd Harmonic	4810	-33.05	41.63	> 20	Pass
3rd Harmonic	7215	Under noise floor	Over 40	> 20	Pass
4th Harmonic	9620			> 20	Pass
5th Harmonic	12025			> 20	Pass
6th Harmonic	14430			> 20	Pass
7th Harmonic	16835			> 20	Pass
8th Harmonic	19240			> 20	Pass
9th Harmonic	21645			> 20	Pass
10th Harmonic	24050			> 20	Pass
Carrier_Middle	2440	+8.40	-	-	-
Spurious	22893.64	-35.15	43.55	> 20	Pass
2nd Harmonic	4880	-31.97	40.37	> 20	Pass
3rd Harmonic	7320	Under noise floor	Over 40	> 20	Pass
4th Harmonic	9760			> 20	Pass
5th Harmonic	12200			> 20	Pass
6th Harmonic	14640			> 20	Pass

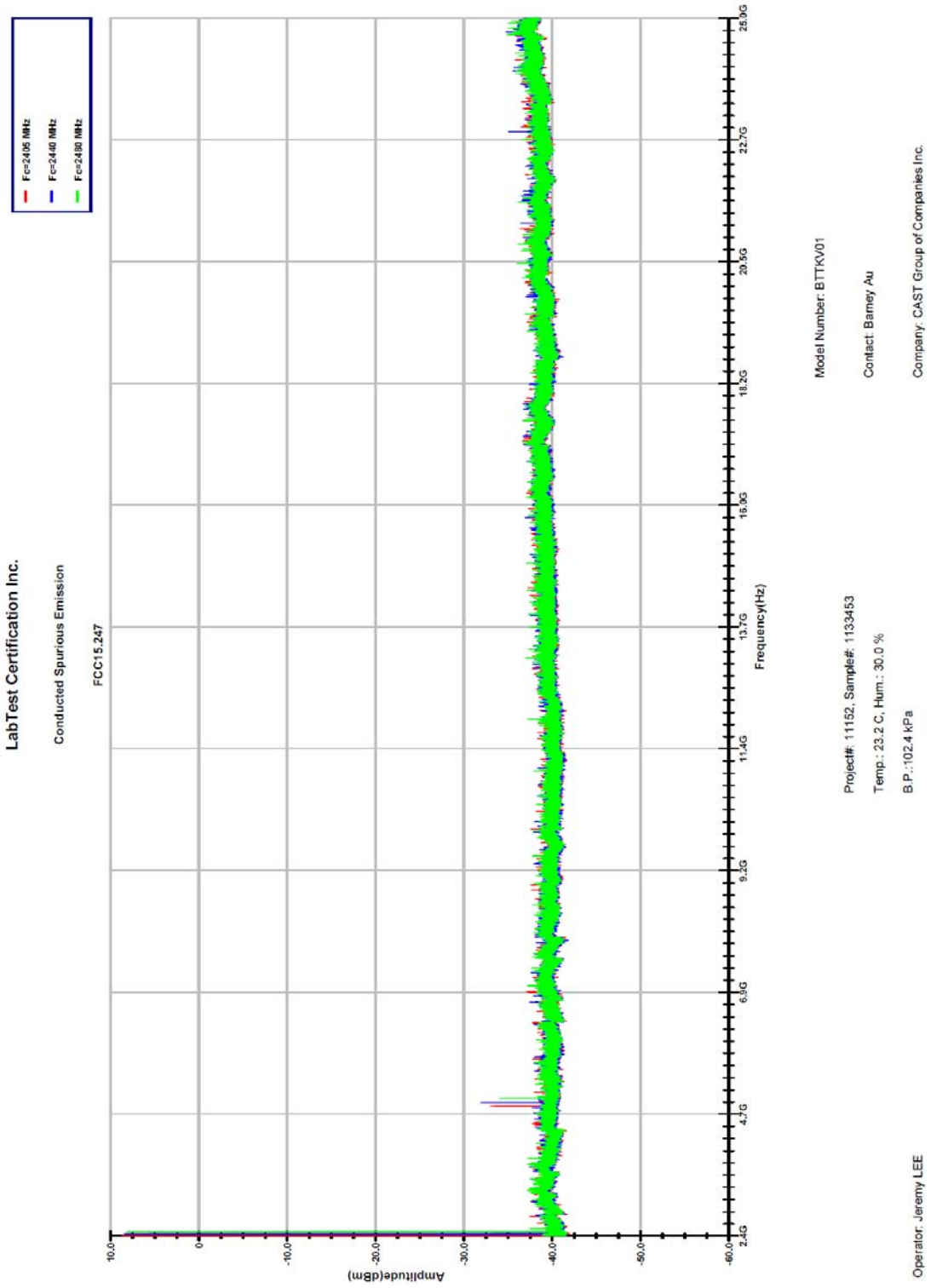
7th Harmonic	17080			> 20	Pass
8th Harmonic	19520			> 20	Pass
9th Harmonic	21960			> 20	Pass
10th Harmonic	24400			> 20	Pass
Carrier_High End	2480	+8.11	-	-	-
Spurious	11986.17	-37.29	45.40	> 20	Pass
2nd Harmonic	4960	-34.06	42.17	> 20	Pass
3rd Harmonic	7440	Under noise floor	Over 40	> 20	Pass
4th Harmonic	9920			> 20	Pass
5th Harmonic	12400			> 20	Pass
6th Harmonic	14880			> 20	Pass
7th Harmonic	17360			> 20	Pass
8th Harmonic	19840			> 20	Pass
9th Harmonic	22320			> 20	Pass
10th Harmonic	24800			> 20	Pass

X Pass Fail N/A

- Antenna-port Conducted Emissions; 30MHz to 2.5GHz.



- Antenna-port Conducted Emissions: 2.4 to 25 GHz.



Unwanted Emission: Radiated Emissions into Non-Restricted Frequency Bands

Temperature	21.1 to 21.3 °C
Relative Humidity	39.0 to 42.0 %
Barometric Pressure:	102.5 kPa
Test Date	Mar. 01, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	241, 266, 272, 273, 371
Reference Equipment (ID) (Calibration not required)	124, 374
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

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)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
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., §§ 15.231 and 15.241.

Test Setup

The test was performed in accordance with **FCC 15.247:2010, 15.209:2010, FCC 15.31:2010, FCC 15.33:2010, FCC 15.35:2010, and KDB 558074 D01 v02.**

Test procedure is based on the FCC15.31(a)(3) – Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4–2009: “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz” (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.

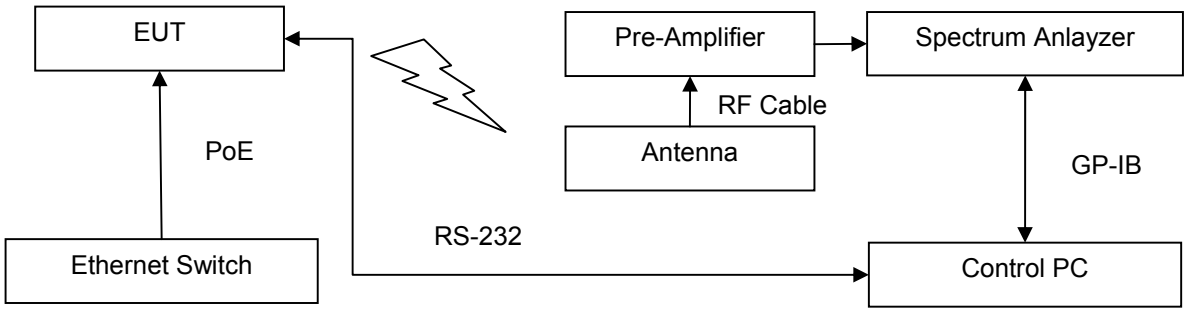
NOTE to Paragraph (a)(3): Digital devices tested to show compliance with the provisions of §§ 15.107(e) and 15.109(g) must be tested following the ANSI C63.4 procedure described in paragraph (a)(3) of this section.[As stated in the adopting R&O, ANSI C63.4 is not used for measurements below 30 MHz.]

The EUT was placed on a 1 meter by 1.5 meters wide and 0.8-meter high nonconductive table that was placed directly onto a flush mounted turntable. The EUT was connected to its support equipment with any excess I/O cabling bundled to approximately 1 meter. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna supporter. It is measured with a receiver – the spectrum analyzer, was software controlled. The antennas were balanced dipoles. For frequencies of 80 MHz or above, the antennas were resonant in length, and for frequencies below 80 MHz it had a length equal to the 80 MHz resonant length.

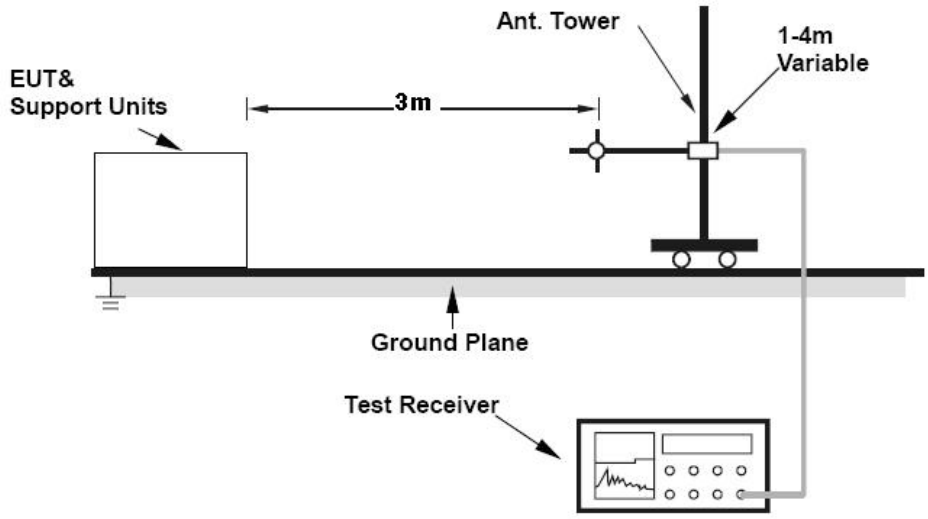
Tests were performed to determine the emissions with Transmit mode, Hopping mode. Antenna was connected to output port. The EUT was positioned emissions from the unit were maximized by manipulating the cables, and by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

- The EUT was set-up Transmit mode, Hopping.
- The transmitter was set-up as its maximum power with Antenna connected.
- The following measurements were made with
  - Span = wide enough to fully capture the emission being measured.
  - RBW = 9kHz & 120 kHz
  - VBW ≥ RBW
  - Sweep = Auto
  - Detector Function = Peak an QP, there was no strong signal in range to use the Averaging detector
  - Trace = Single trace up to capturing the whole range of signal

Setup Block Diagram



Test Setup in Chamber



Test Result

Radiated Emission (dBuV/m) = Measured Emission (dBuV) + Antenna Factor(1/m) + Cable Loss(dB)– Pre-Amplifier Gain(dB)

X Pass Fail N/A

- Table of Radiated Emissions of Transmit Mode, Fc=2405MHz: 30 to1000MHz, Quasi-Peak Detecting, Antenna was used JB1, the polarization of Antenna was Horizontal.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Horizontal

Operator: Jeremy Lee

02:33:10 PM, Friday, March 01, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency MHz	Measured dBuV	AntFactor dB/m	PathLoss dB	Emission dBuV/m	Limit dBuV/m	Margin dB	T/T Degree	Tower cm	POL
178.5583 MHz	52.74	11.39	-29.33	34.80	40.46	5.66	70.0	197.7	H
279.9507 MHz	43.62	13.70	-28.88	28.44	47.46	19.02	223.0	100.0	H

Project # : 11152, Sample #: 1133453
Temp.: 21.1 C, Hum.: 41.0 %
Barometer Pres.:102.5 kPa

- Table of Radiated Emissions of Transmit Mode, Fc=2405MHz: 30 to1000MHz, Quasi-Peak Detecting, Antenna was used JB1, the polarization of Antenna was Vertical.

LabTest Certification Inc.
Intentional Radiated Emissions
FCC15.209, 3 meters, Vertical

Operator: Jeremy Lee

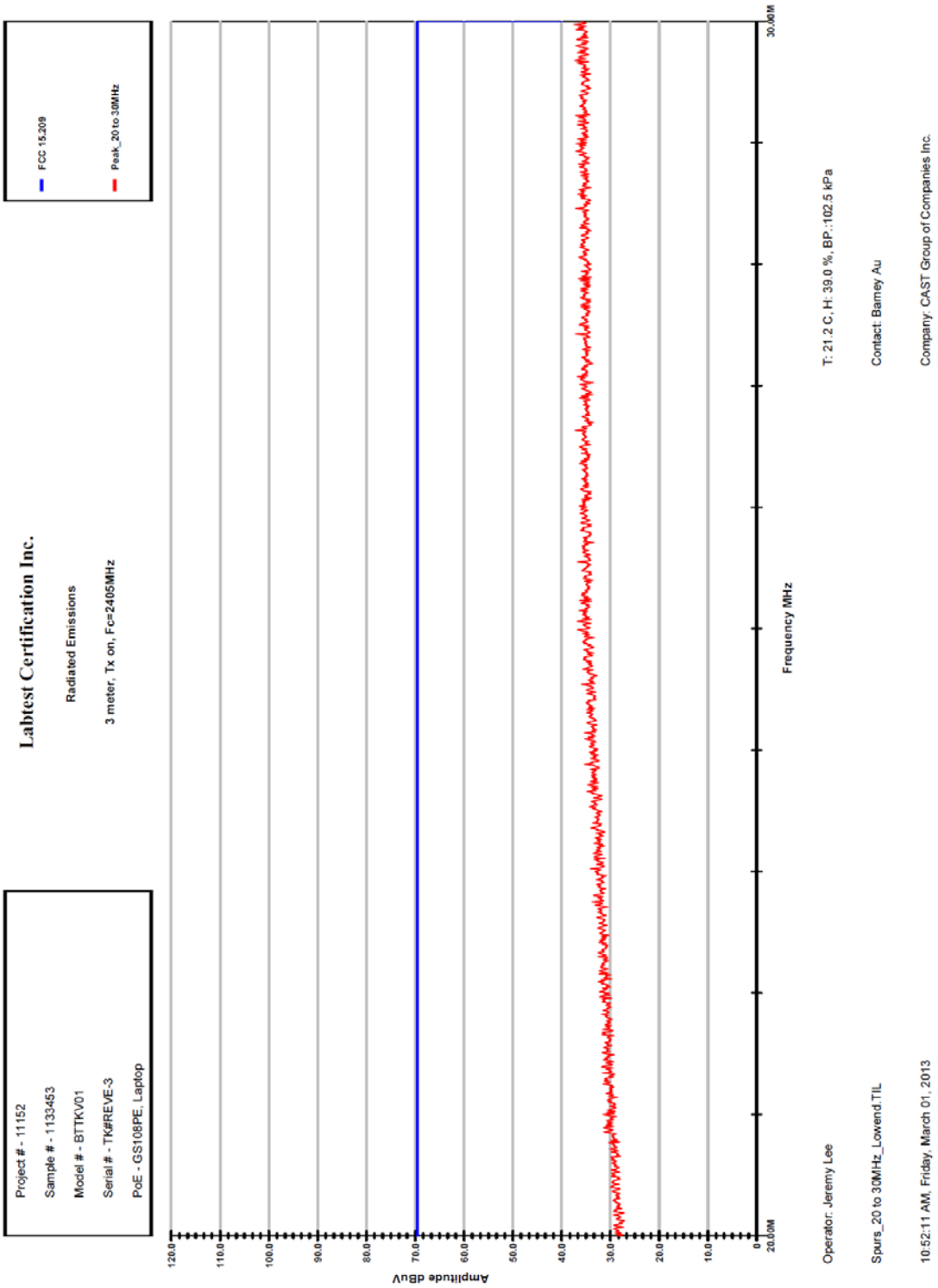
02:33:10 PM, Friday, March 01, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

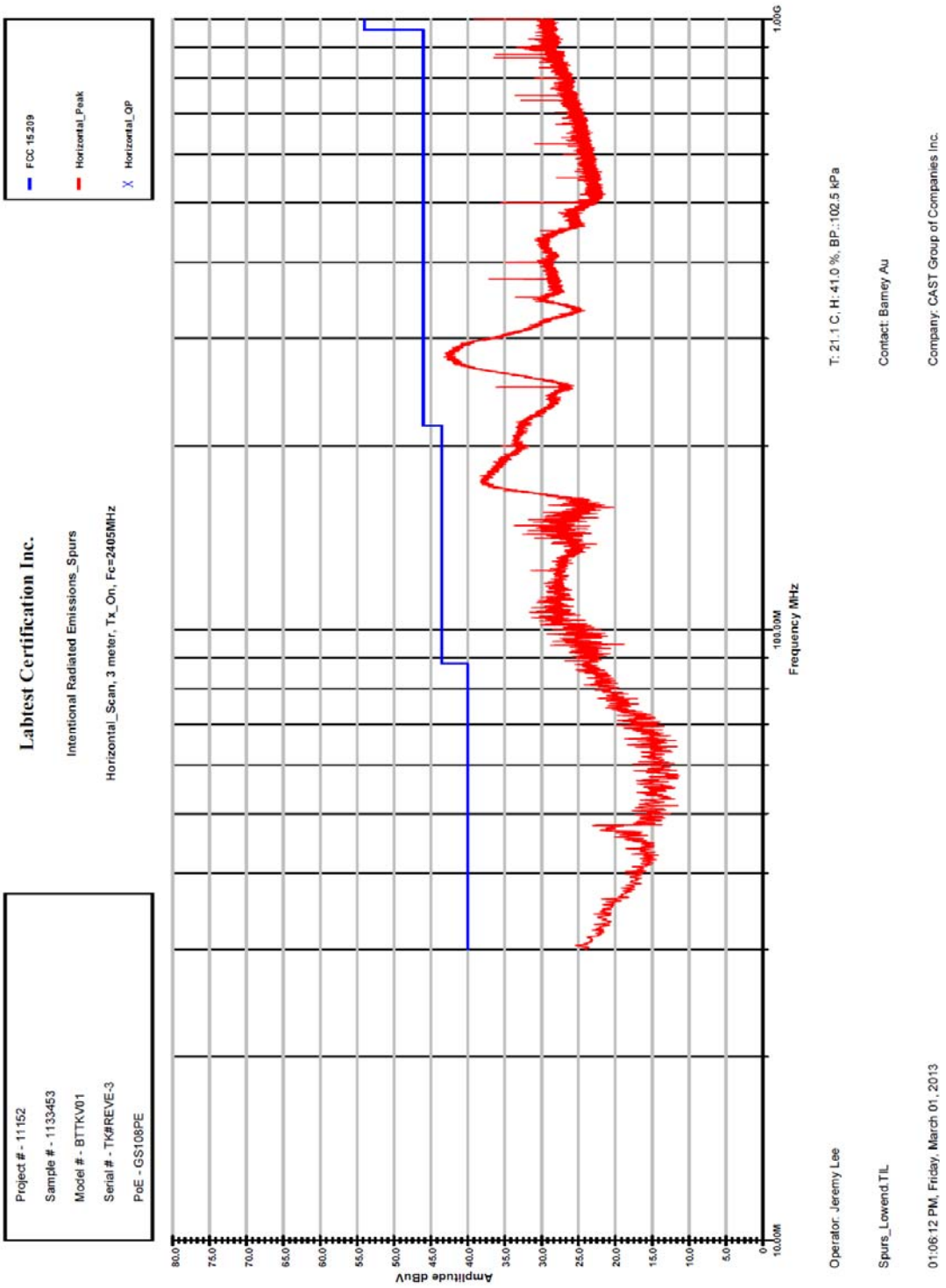
Frequency MHz	Measured dBuV	AntFactor dB/m	PathLoss dB	Emission dBuV/m	Limit dBuV/m	Margin dB	T/T Degree	Tower cm	POL
285.1779 MHz	49.07	13.59	-28.86	33.80	47.46	13.66	251.8	101.1	V

Project # : 11152, Sample #: 1133453
Temp.: 21.1 C, Hum.: 41.0 %
Barometer Pres.:102.5 kPa

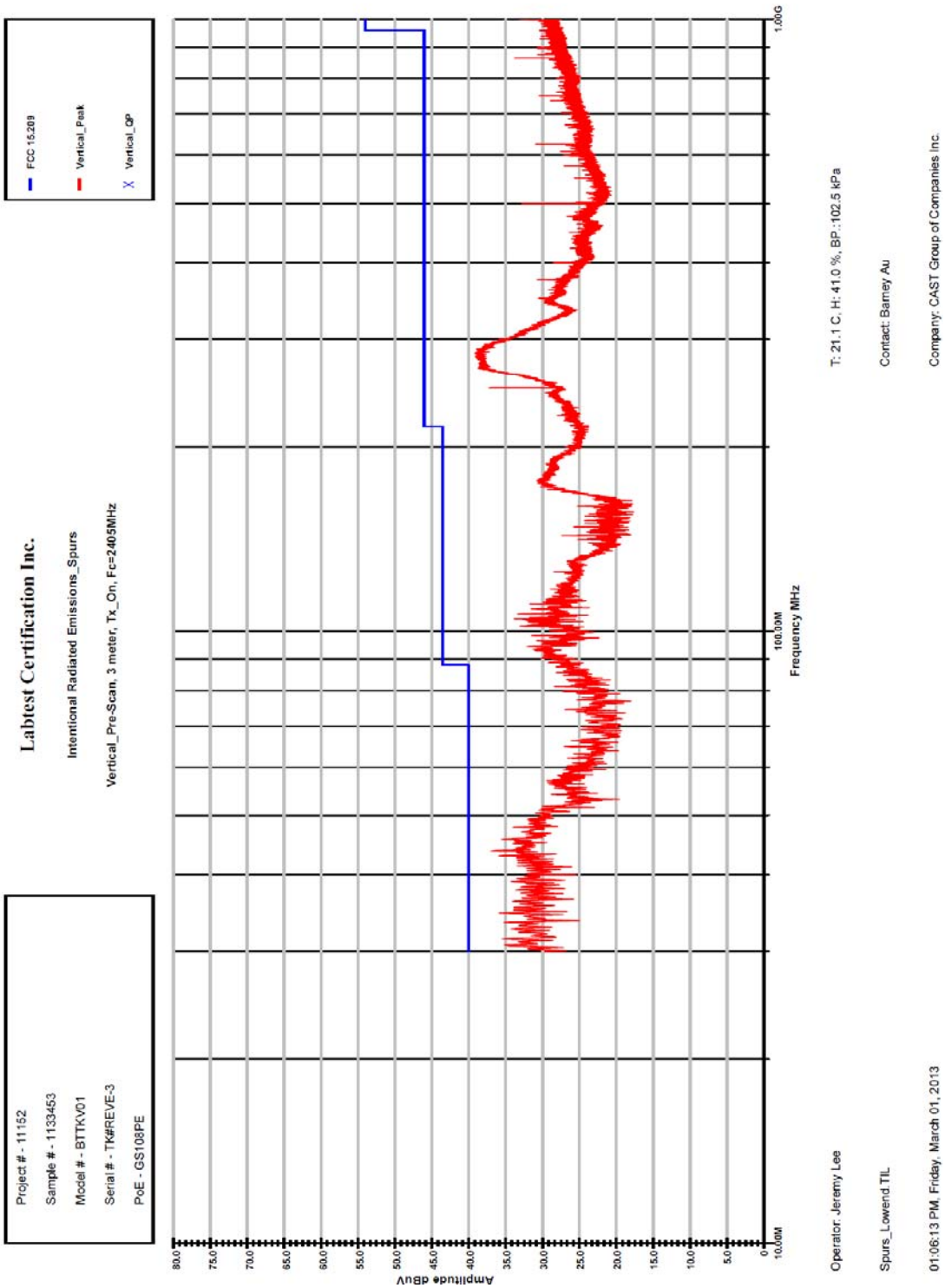
- Graph of Radiated Emissions of Transmit Mode, Fc=2405MHz: 20 to30MHz, Peak Detecting, Antenna was used AL-160.



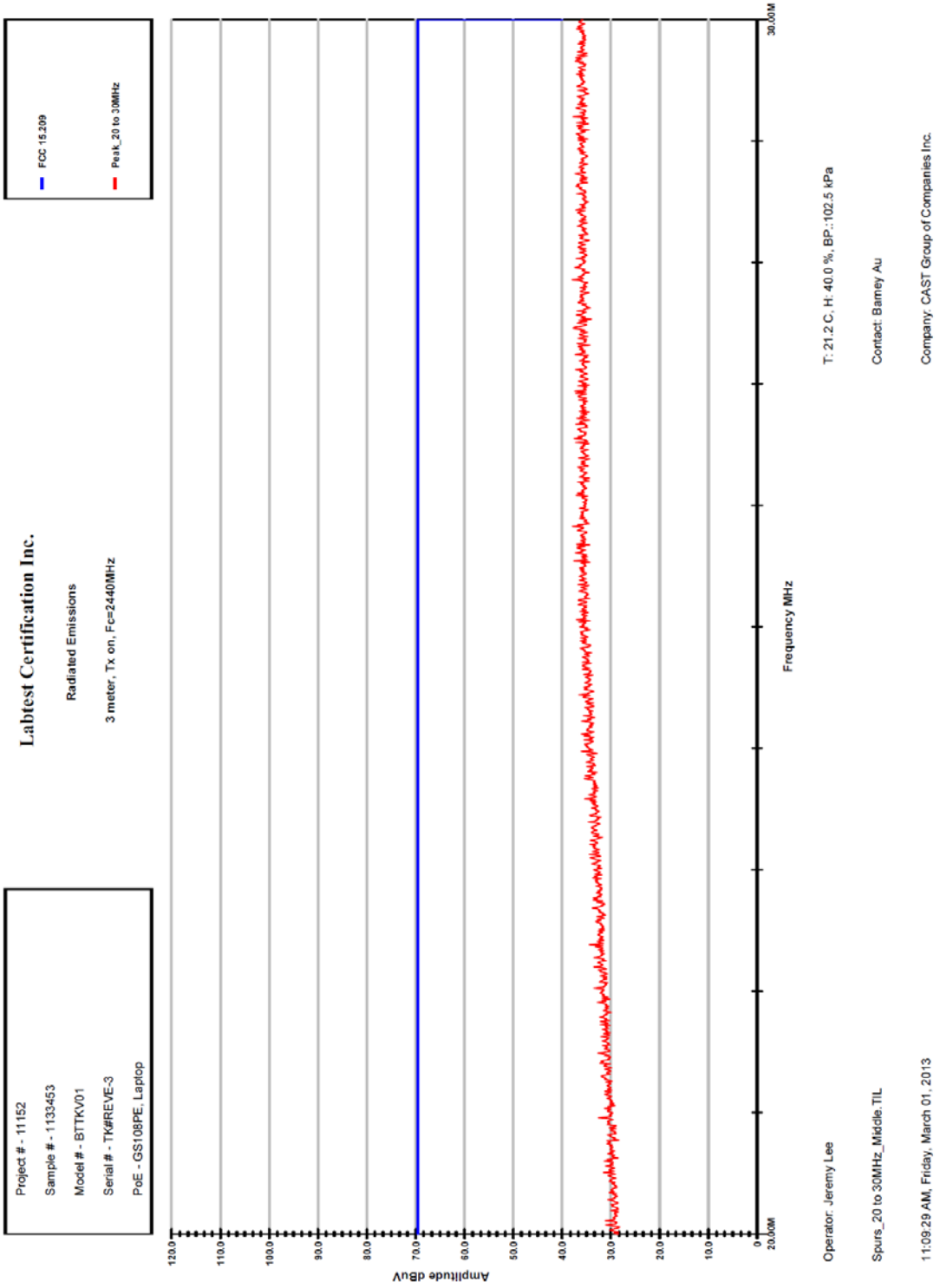
- Graph of Radiated Emissions of Transmit Mode, Fc=2405MHz: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Horizontal.



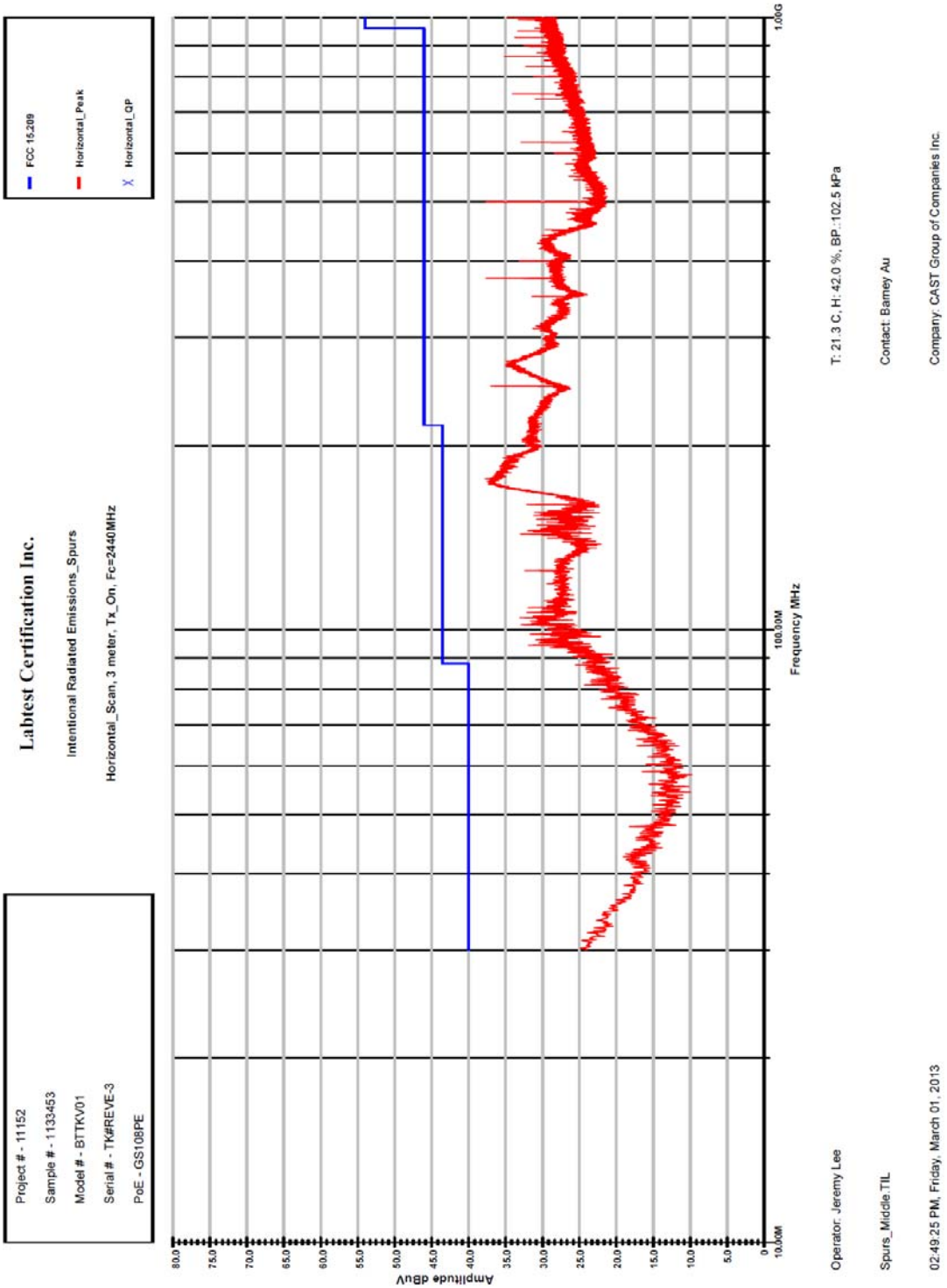
- Graph of Radiated Emissions of Transmit Mode, Fc=2405MHz: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Horizontal.



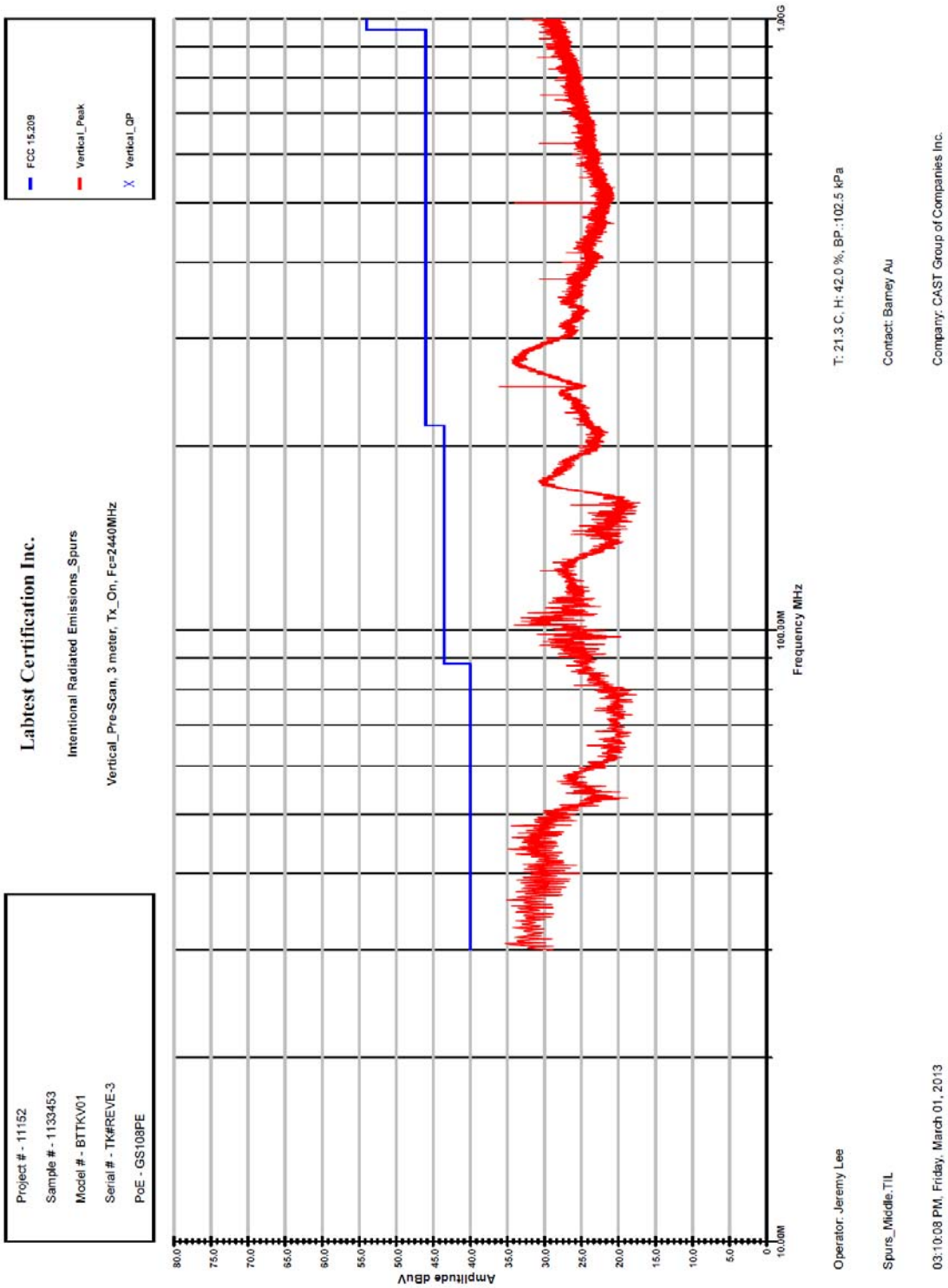
- Graph of Radiated Emissions of Transmit Mode, Fc=2440MHz: 20 to30MHz, Peak Detecting, Antenna was used AL-160.



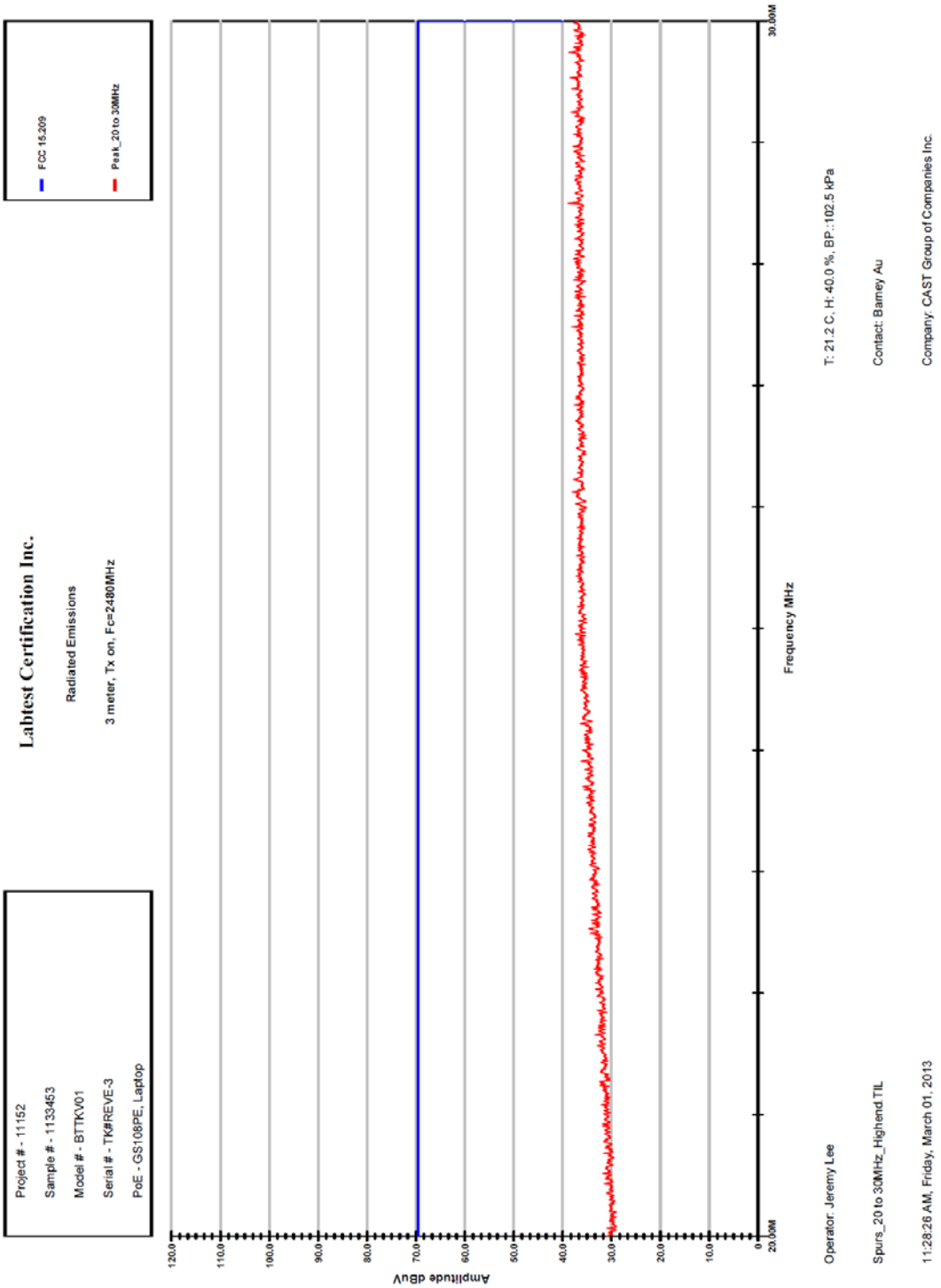
- Graph of Radiated Emissions of Transmit Mode, Fc=2440MHz: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Horizontal.



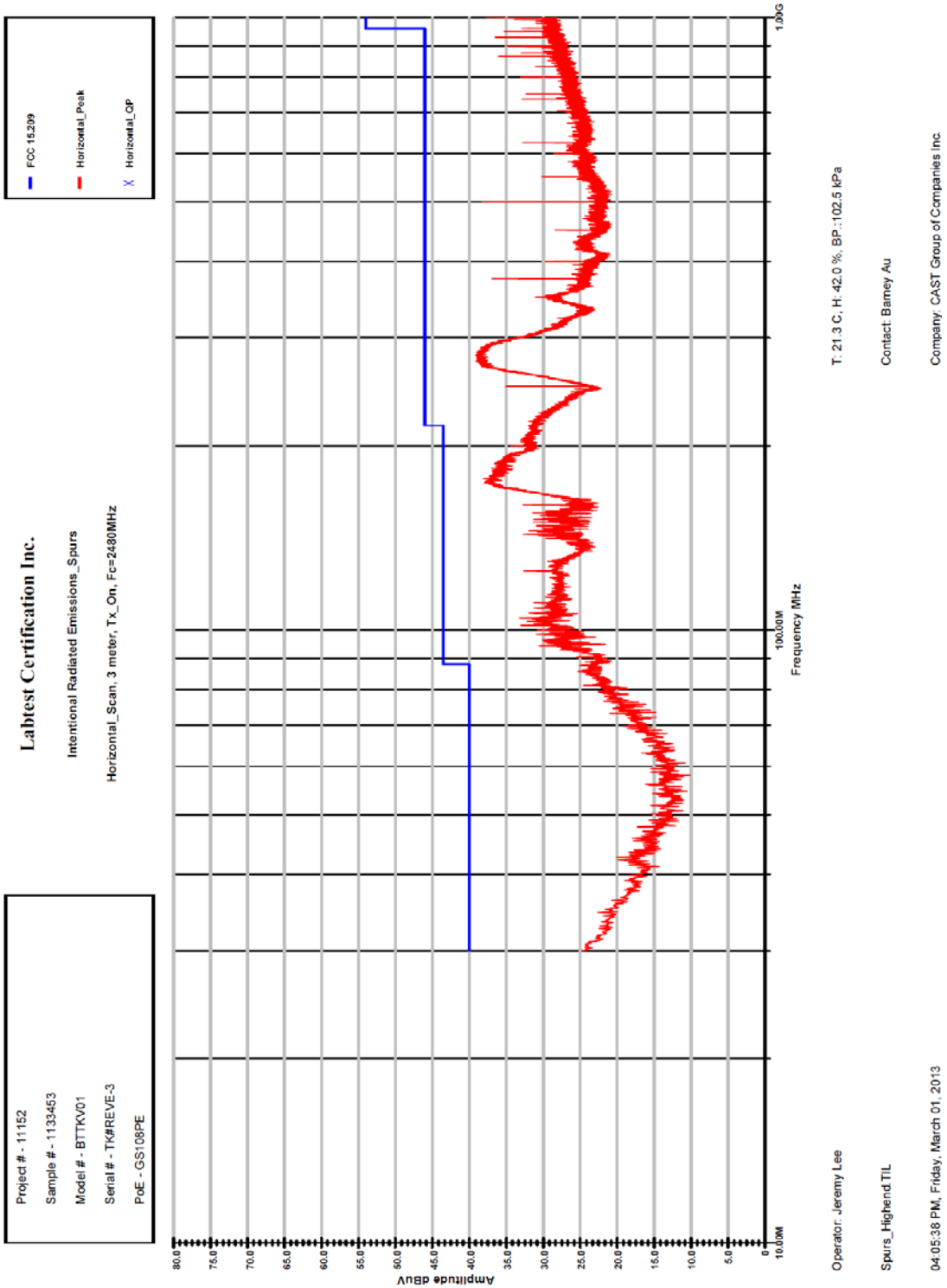
- Graph of Radiated Emissions of Transmit Mode, Fc=2440MHz: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Vertical.



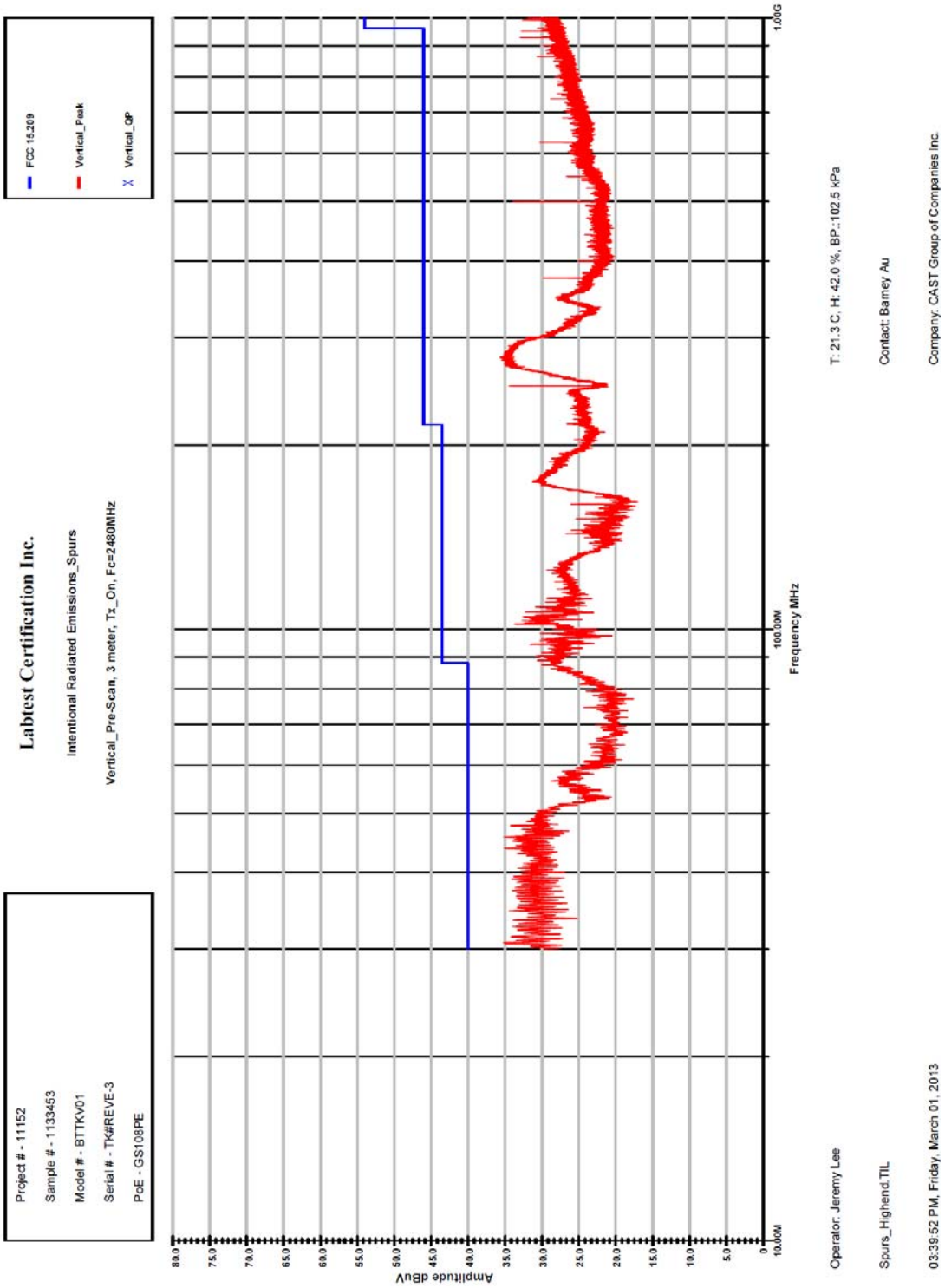
- Graph of Radiated Emissions of Transmit Mode, Fc=2480MHz: 20 to30MHz, Peak Detecting, Antenna was used AL-160.



- Graph of Radiated Emissions of Transmit Mode, Fc=2480MHz: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Horizontal.



- Graph of Radiated Emissions of Transmit Mode, Fc=2480MHz: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Vertical.



Unwanted Emission: Radiated Emissions into Restricted Frequency Bands

Temperature	23.5 °C
Relative Humidity	30.0 %
Barometric Pressure:	102.0 kPa
Test Date	March 06, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	227-3, 227-4, 266, 272, 273
Reference Equipment (ID) (Calibration not required)	374
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

15.247(d)
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)).

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	2690–2900	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

15.209(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)
0.009–0.490	2400/F(kHz)	300
0.490–1.705	24000/F(kHz)	30
1.705–30.0	30	30
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 permltted under other sections of this part, e.g., §§ 15.231 and 15.241.

Test Setup

The test was performed in accordance with **FCC 15.247:2010, FCC 15.31:2010, FCC 15.33:2010, FCC 15.35:2010, and KDB 558074 D01 v02.**

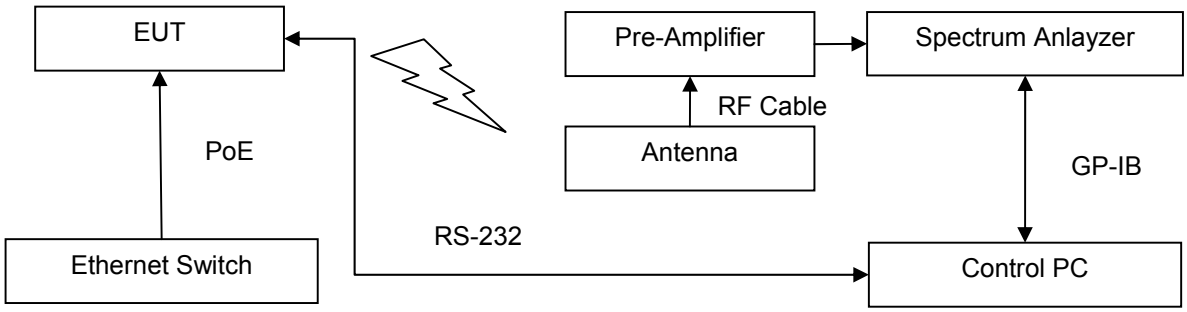
Test procedure is based on the FCC15.31(a)(3) – Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.
NOTE to Paragraph (a)(3): Digital devices tested to show compliance with the provisions of §§ 15.107(e) and 15.109(g) must be tested following the ANSI C63.4 procedure described in paragraph (a)(3) of this section.[As stated in the adopting R&O, ANSI C63.4 is not used for measurements below 30 MHz.]

The EUT was placed on a 1 meter by 1.5 meters wide and 0.8-meter high nonconductive table that was placed directly onto a flush mounted turntable. The EUT was connected to its support equipment with any excess I/O cabling bundled to approximately 1 meter. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna supporter. It is measured with a receiver – spectrum analyzer, was software controlled. The antennas were Horn Antennas.

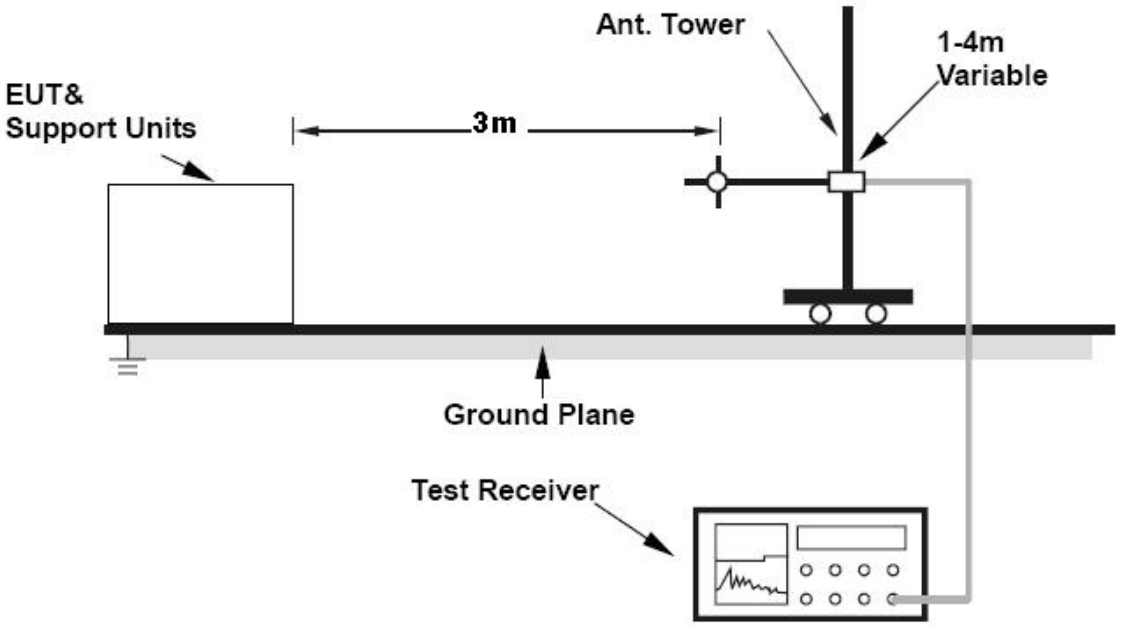
The tests were performed to determine the "worst-case" orientation of the EUT. With the EUT positioned in the "worst case" orientation, emissions from the unit were maximized, and by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

- The EUT was measured in three diferrent transmiting frequencies, low-end, middle, and high-end.
- The transmitter was set-up as its maximum power and terminated via 30dB attenuator.
- The following measurements were made with
  - Span = wide enough to fully capture the emission being measured.
  - RBW = 1MHz
  - VBW ≥ RBW
  - Sweep = Auto
  - Detector Function = Averaging and Peak
  - Trace = Single trace up to capturing the whole range of signal

Setup Block Diagram



Test Setup in Chamber



Test Result

Radiated Emission (dBuV/m) = Measured Emission (dBuV) + Antenna Factor(1/m) + Cable Loss(dB)– Pre-Amplifier Gain(dB)

Frequency (GHz)	Radiated Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (AVG/PK)	Pol(H/V)	Results
Low End, Fc: 2405 MHz						
4.810	60.16	73.98	13.82	PK	H	Pass
12.025	41.37	53.98	12.61	AVG	V	Pass
19.240	41.64		12.34	AVG	V	Pass
Middle, Fc: 2440 MHz						
4.880	59.79	73.98	14.19	PK	H	Pass
7.320	38.97	53.98	15.01	AVG	H	Pass
12.200	41.44		12.54	AVG	V	Pass
19.520	42.14		11.84	AVG	V	Pass
High End, Fc: 24780 MHz						
4.960	37.29	53.98	16.69	AVG	H	Pass
7.440	38.37		15.61	AVG	H	Pass
12.400	43.01		10.97	AVG	H	Pass
19.840	41.95		12.03	AVG	H	Pass
22.320	43.94		10.04	AVG	V	Pass

X Pass **Fail** **N/A**

- Table of Radiated Harmonic Emissions of LowEnd: 1 to 25GHz, Peak Detecting, Antenna was used SAS-571.

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Peak Detector_Low End_Horizontal

Operator: Jeremy Lee

10:11:31 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8100000 GHz	55.30	33.00	-28.14	60.16	73.98	13.82	200.0	110.0	H
12.0250000 GHz	40.58	39.56	-26.59	53.54	73.98	20.44	200.0	110.0	H
19.2400000 GHz	41.89	37.62	-25.80	53.71	73.98	20.27	200.0	110.0	H

Project # : 11152, Sample #: 1133453
Temp.: 23.5 C, Hum.: 30.0 %
Barometer Pres.:102.0 kPa

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Peak Detector_Low End_Vertical

Operator: Jeremy Lee

10:11:31 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8100000 GHz	42.30	33.17	-28.14	47.34	73.98	26.64	180.0	110.0	V
12.0250000 GHz	42.58	39.63	-26.59	55.62	73.98	18.36	180.0	110.0	V
19.2400000 GHz	44.24	37.62	-25.80	56.06	73.98	17.92	180.0	110.0	V

Project # : 11152, Sample #: 1133453
Temp.: 23.5 C, Hum.: 30.0 %
Barometer Pres.:102.0 kPa

- Table of Radiated Harmonic Emissions of Middle: 1 to 25GHz, Peak Detecting, Antenna was used SAS-571.

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Peak Detector_Middle_Horizontal

Operator: Jeremy Lee

10:24:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8800000 GHz	54.70	33.21	-28.12	59.79	73.98	14.19	200.0	110.0	H
7.3200000 GHz	42.05	37.44	-27.64	51.86	73.98	22.12	200.0	110.0	H
12.2000000 GHz	39.77	40.42	-26.56	53.63	73.98	20.35	200.0	110.0	H
19.5200000 GHz	43.66	37.36	-25.80	55.22	73.98	18.76	200.0	110.0	H

Project # : 11152, Sample #: 1133453
Temp.: 23.5 C, Hum.: 30.0 %
Barometer Pres.:102.0 kPa

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Peak Detector_Middle_Vertical

Operator: Jeremy Lee

10:24:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8800000 GHz	42.70	33.25	-28.12	47.83	73.98	26.15	180.0	110.0	V
7.3200000 GHz	42.68	37.49	-27.64	52.54	73.98	21.44	180.0	110.0	V
12.2000000 GHz	41.47	40.50	-26.56	55.41	73.98	18.57	180.0	110.0	V
19.5200000 GHz	43.97	37.36	-25.80	55.53	73.98	18.45	180.0	110.0	V

Project # : 11152, Sample #: 1133453
Temp.: 23.5 C, Hum.: 30.0 %
Barometer Pres.:102.0 kPa

- Table of Radiated Harmonic Emissions of HighEnd: 1 to 25GHz, Peak Detecting, Antenna was used SAS-571.

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Peak Detector_High End_Horizontal

Operator: Jeremy Lee

10:29:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.9600000 GHz	42.56	33.41	-28.11	47.86	73.98	26.12	200.0	110.0	H
7.4400000 GHz	42.48	37.13	-27.61	51.99	73.98	21.99	200.0	110.0	H
12.4000000 GHz	42.02	40.88	-26.52	56.38	73.98	17.60	200.0	110.0	H
19.8400000 GHz	44.14	37.28	-25.73	55.69	73.98	18.29	200.0	110.0	H
22.3200000 GHz	45.06	37.63	-25.44	57.25	73.98	16.73	200.0	110.0	H

Project # : 11152 Sample #: 1133453
Temp.: 23.5 C, Hum.: 30.0 %
Barometer Pres.: 102.0 kPa

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Peak Detector_High End_Vertical

Operator: Jeremy Lee

10:29:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_PK	AntFactor	PathLoss	Emission_PK	Limit_PK	Margin_PK	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.9600000 GHz	42.56	33.41	-28.11	47.86	73.98	26.12	180.0	110.0	V
7.4400000 GHz	42.48	37.18	-27.61	52.05	73.98	21.93	180.0	110.0	V
12.4000000 GHz	42.02	40.97	-26.52	56.47	73.98	17.51	180.0	110.0	V
19.8400000 GHz	44.14	37.28	-25.73	55.69	73.98	18.29	180.0	110.0	V
22.3200000 GHz	45.06	37.63	-25.44	57.25	73.98	16.73	180.0	110.0	V

Project # : 11152 Sample #: 1133453
Temp.: 23.5 C, Hum.: 30.0 %
Barometer Pres.: 102.0 kPa

- Table of Radiated Harmonic Emissions of LowEnd: 1 to 25GHz, Average Detecting, Antenna was used SAS-571.

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meter, Averaging Detector_Low End_Horizontal

Operator: Jeremy Lee

10:11:31 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_AVG	AntFactor	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8100000 GHz	31.36	33.00	-28.14	36.22	53.98	17.76	200.0	110.0	H
12.0250000 GHz	28.18	39.56	-26.59	41.14	53.98	12.84	200.0	110.0	H
19.2400000 GHz	29.76	37.62	-25.80	41.58	53.98	12.40	200.0	110.0	H
Project # : 11152, Sample #: 1133453									
Temp.: 23.5 C, Hum.: 30.0 %									
Barometer Pres.:102.0 kPa									

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Averaging Detector_Low End_Vertical

Operator: Jeremy Lee

10:11:31 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured+AVG	AntFactor	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8100000 GHz	27.93	33.17	-28.14	32.97	53.98	21.01	180.0	110.0	V
12.0250000 GHz	28.33	39.63	-26.59	41.37	53.98	12.61	180.0	110.0	V
19.2400000 GHz	29.82	37.62	-25.80	41.64	53.98	12.34	180.0	110.0	V
Project # : 11152, Sample #: 1133453									
Temp.: 23.5 C, Hum.: 30.0 %									
Barometer Pres.:102.0 kPa									

- Table of Radiated Harmonic Emissions of Middle: 1 to 25GHz, Average Detecting, Antenna was used SAS-571.

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meter, Averaging Detector_Middle_Horizontal

Operator: Jeremy Lee

10:24:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_AVG	AntFactor	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8800000 GHz	31.79	33.21	-28.12	36.88	53.98	17.10	200.0	110.0	H
7.3200000 GHz	29.16	37.44	-27.64	38.97	53.98	15.01	200.0	110.0	H
12.2000000 GHz	27.55	40.42	-26.56	41.41	53.98	12.57	200.0	110.0	H
19.5200000 GHz	30.46	37.36	-25.80	42.02	53.98	11.96	200.0	110.0	H
Project # : 11152, Sample #: 1133453									
Temp.: 23.5 C, Hum.: 30.0 %									
Barometer Pres.:102.0 kPa									

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Averaging Detector_Middle_Vertical

Operator: Jeremy Lee

10:24:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured+AVG	AntFactor	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.8800000 GHz	28.13	33.25	-28.12	33.26	53.98	20.72	180.0	110.0	V
7.3200000 GHz	29.00	37.49	-27.64	38.86	53.98	15.12	180.0	110.0	V
12.2000000 GHz	27.50	40.50	-26.56	41.44	53.98	12.54	180.0	110.0	V
19.5200000 GHz	30.58	37.36	-25.80	42.14	53.98	11.84	180.0	110.0	V
Project # : 11152, Sample #: 1133453									
Temp.: 23.5 C, Hum.: 30.0 %									
Barometer Pres.:102.0 kPa									

- Table of Radiated Harmonic Emissions of HighEnd: 1 to 25GHz, Average Detecting, Antenna was used SAS-571.

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meter, Averaging Detector_High End_Horizontal

Operator: Jeremy Lee

10:29:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured_AVG	AntFactor	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.9600000 GHz	31.99	33.41	-28.11	37.29	53.98	16.69	200.0	110.0	H
7.4400000 GHz	28.86	37.13	-27.61	38.37	53.98	15.61	200.0	110.0	H
12.4000000 GHz	28.65	40.88	-26.52	43.01	53.98	10.97	200.0	110.0	H
19.8400000 GHz	30.40	37.28	-25.73	41.95	53.98	12.03	200.0	110.0	H
22.3200000 GHz	31.71	37.63	-25.44	43.90	53.98	10.08	200.0	110.0	H
Project # : 11152 Sample #: 1133453									
Temp.: 23.5 C, Hum.: 30.0 %									
Barometer Pres.:102.0 kPa									

LabTest Certification Inc.
Intentional Radiated Emission-Harmonics
FCC15.247, 205 & 209, 3 meters, Averaging Detector_High End_Vertical

Operator: Jeremy Lee

10:29:08 AM, Wednesday, March 06, 2013

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency	Measured+AVG	AntFactor	PathLoss	Emission_AVG	Limit_AVG	Margin_AVG	T/T	Tower	POL
Hz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	Degree	cm	
4.9600000 GHz	27.80	33.41	-28.11	33.10	53.98	20.88	180.0	110.0	V
7.4400000 GHz	28.78	37.18	-27.61	38.35	53.98	15.63	180.0	110.0	V
12.4000000 GHz	28.40	40.97	-26.52	42.85	53.98	11.13	180.0	110.0	V
19.8400000 GHz	30.28	37.28	-25.73	41.83	53.98	12.15	180.0	110.0	V
22.3200000 GHz	31.75	37.63	-25.44	43.94	53.98	10.04	180.0	110.0	V
Project # : 11152 Sample #: 1133453									
Temp.: 23.5 C, Hum.: 30.0 %									
Barometer Pres.:102.0 kPa									

Band-Edge Compliance

Temperature	21.3 °C
Relative Humidity	32.0 %
Barometric Pressure:	101.8 kPa
Test Date	Feb. 27, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272
Reference Equipment (ID) (Calibration not required)	N1, N3
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

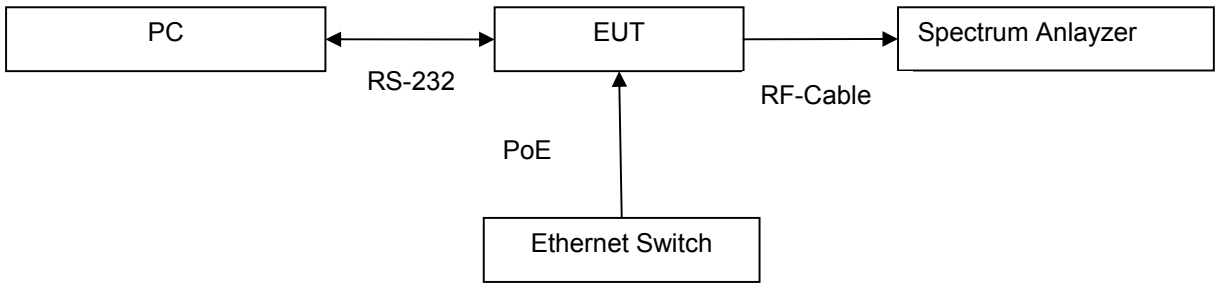
Test Setup

The test was performed in accordance with **FCC 15.247:2010, FCC 15.31:2010 and KDB 558074 D01 v02.**

This procedure is applicable for determining compliance at authorized band edges, but not at restricted band edges.

- The RF output of the EUT was connected to the RF input port of the Spectrum Analyzer via attenuator.
- The transmitter was transmitting at its maximum power.
- The following measurements were made with
  - Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
  - RBW ≥ 1% of spectrum analyzer display span
  - VBW ≥ RBW
  - Sweep = Auto
  - Detector Function = peak
  - Trace = Max Hold
  - Allowed the trace to stabilize.
- Set the marker on the emission at the bandedge, or on the highest modulation product outside of band, if this level is greater than that at the band edge.
- Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission.
- Now, using the same instrumentation settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

Setup Block Diagram

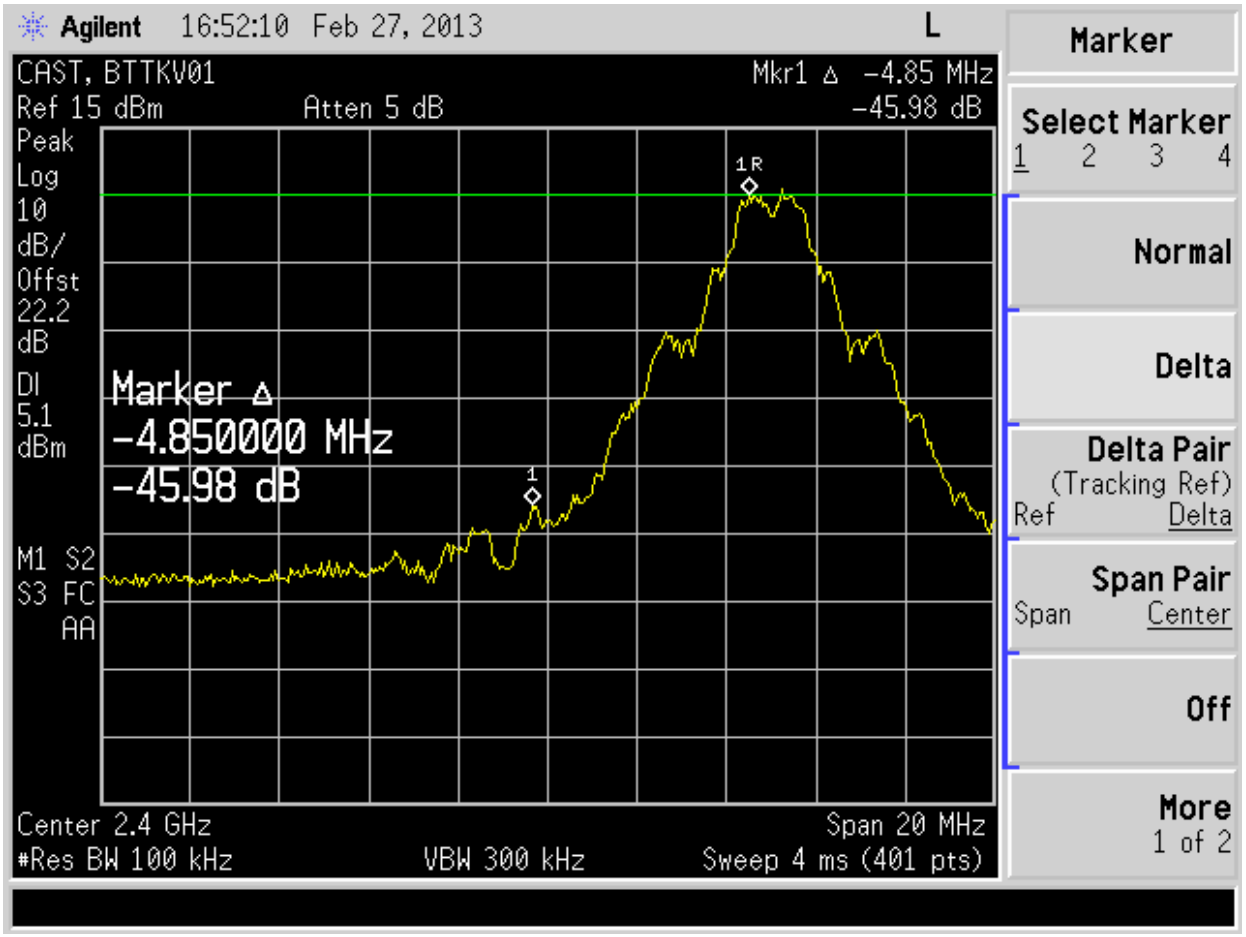


Test Results:

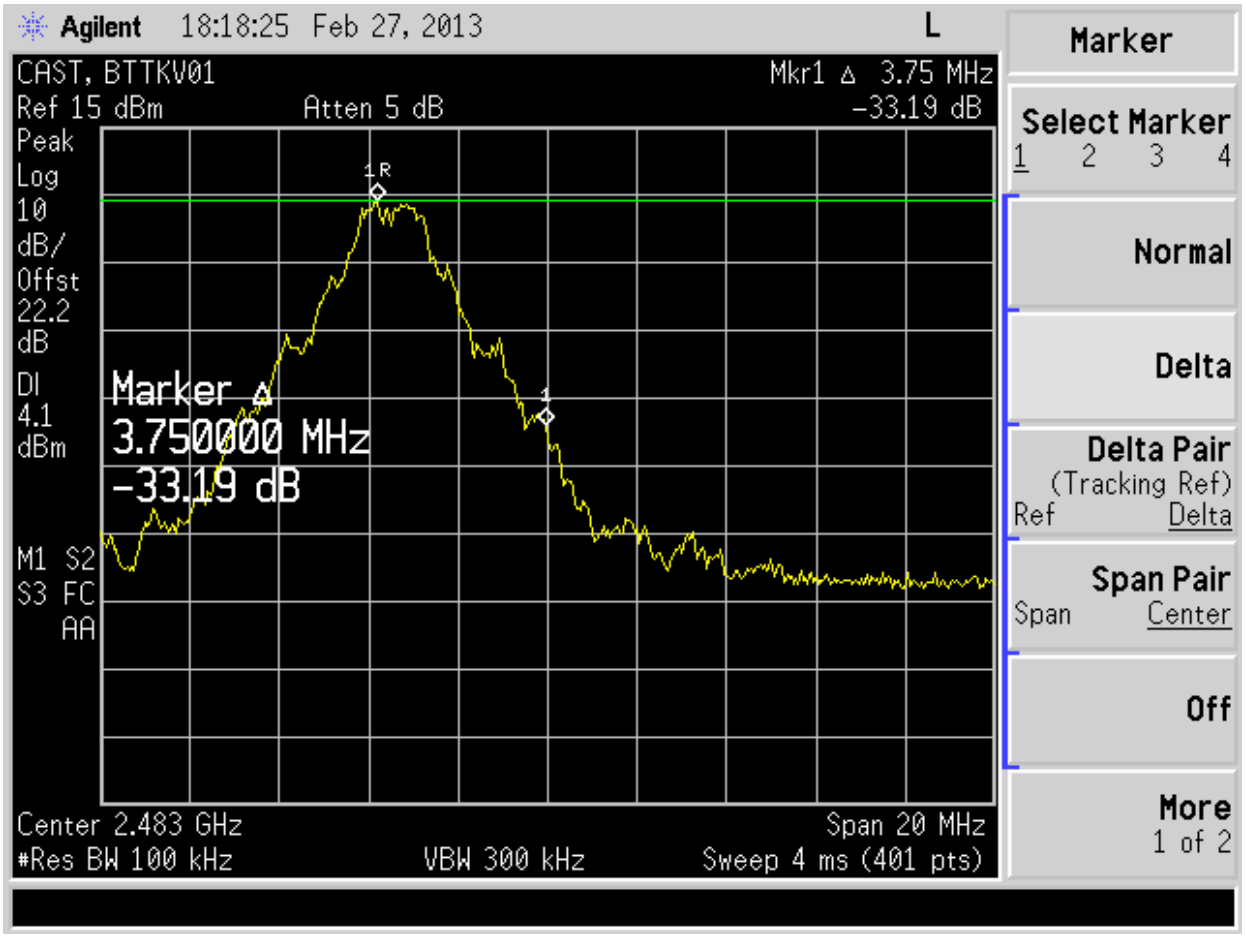
X Pass Fail N/A

Channel Frequency(MHz)	Band-edge(dB)	Limit(dB)	Pass/Fail
Low end	45.98	≥ 20	Pass
High end	33.19	≥ 20	Pass

- Band-edge compliance at low-end, the Carrier Frequency is 2405 MHz



- Band-edge compliance at High-end, the Carrier Frequency is 2480 MHz



Power Spectral Density

Temperature	21.3 °C
Relative Humidity	32.0 %
Barometric Pressure:	101.8 kPa
Test Date	Feb. 27, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272
Reference Equipment (ID) (Calibration not required)	N1, N3
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0248

Test Limits

15.247(e)

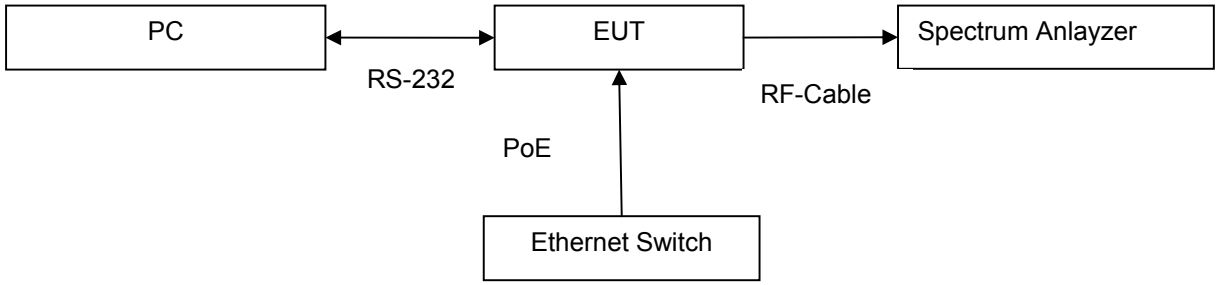
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Setup

The test was performed in accordance with **FCC 15.247:2010, FCC 15.31:2010 and KDB 558074 D01 v02.**

- The RF output of the EUT was connected to the RF input port of the Spectrum Analyzer via attenuator.
- The EUT was measured at three differrent transmitting frequencies, low-end, middle, and high-end.
- The transmitter was set-up as its maximum power.
- The following measurements were made with
  - Set analyzer center frequency to DTS channel center frequency.
  - Set the span to 1.5 times the DTS channel bandwidth.
  - Set the RBW ≥ 3 kHz.
  - Set the VBW ≥ 3 x RBW.
  - Detector = peak.
  - Sweep time = auto couple.
  - Trace mode = max hold.
  - Allow trace to fully stabilize.
  - Use the peak marker function to determine the maximum amplitude level.
  - If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Setup Block Diagram

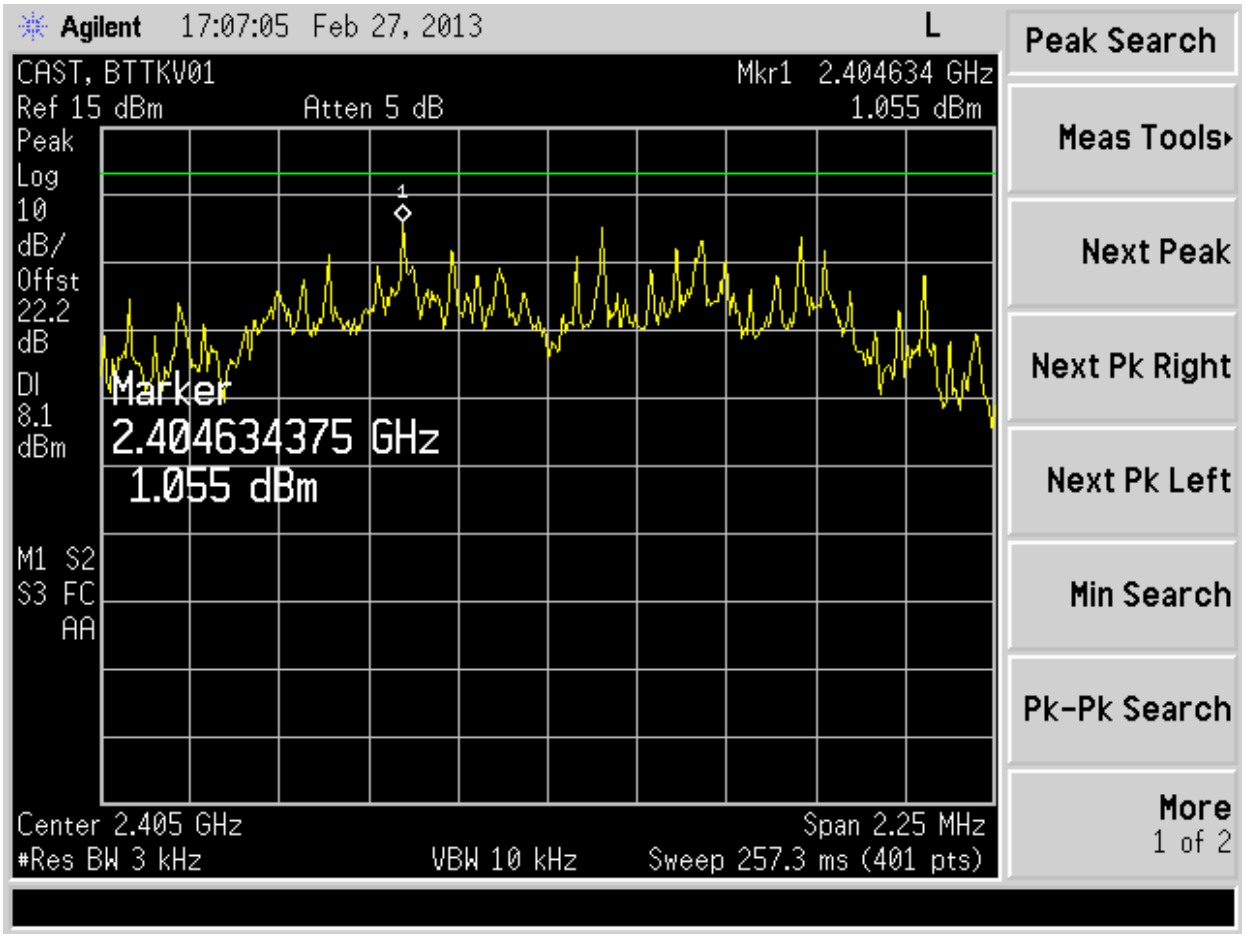


Test Results:

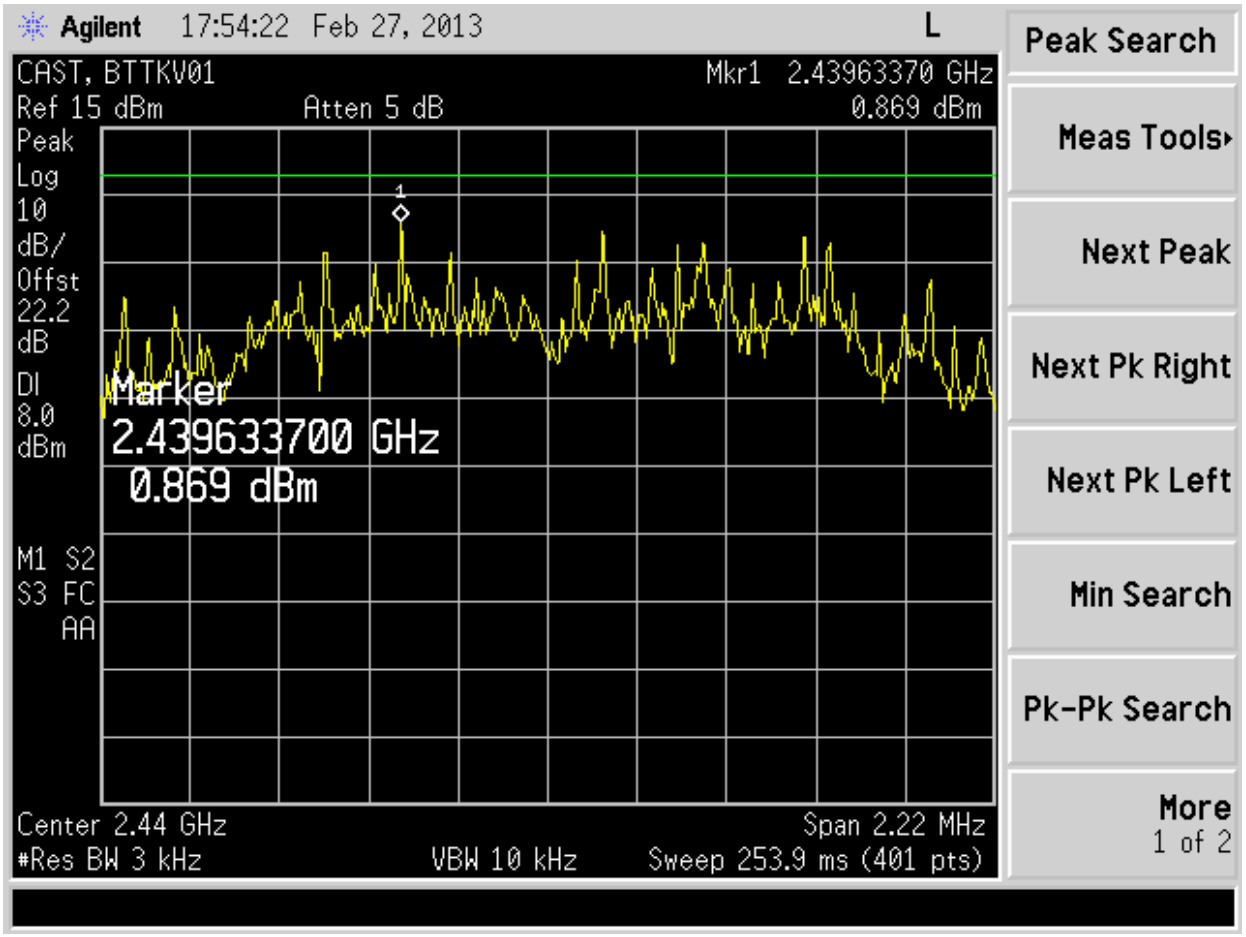
Centre Frequency(MHz)	Power Spectral Density (dBm)	Limit(dBm)	Pass/Fail
2405	1.055	≤ 8	Pass
2440	0.869	≤ 8	Pass
2480	0.187	≤ 8	Pass

X Pass Fail N/A

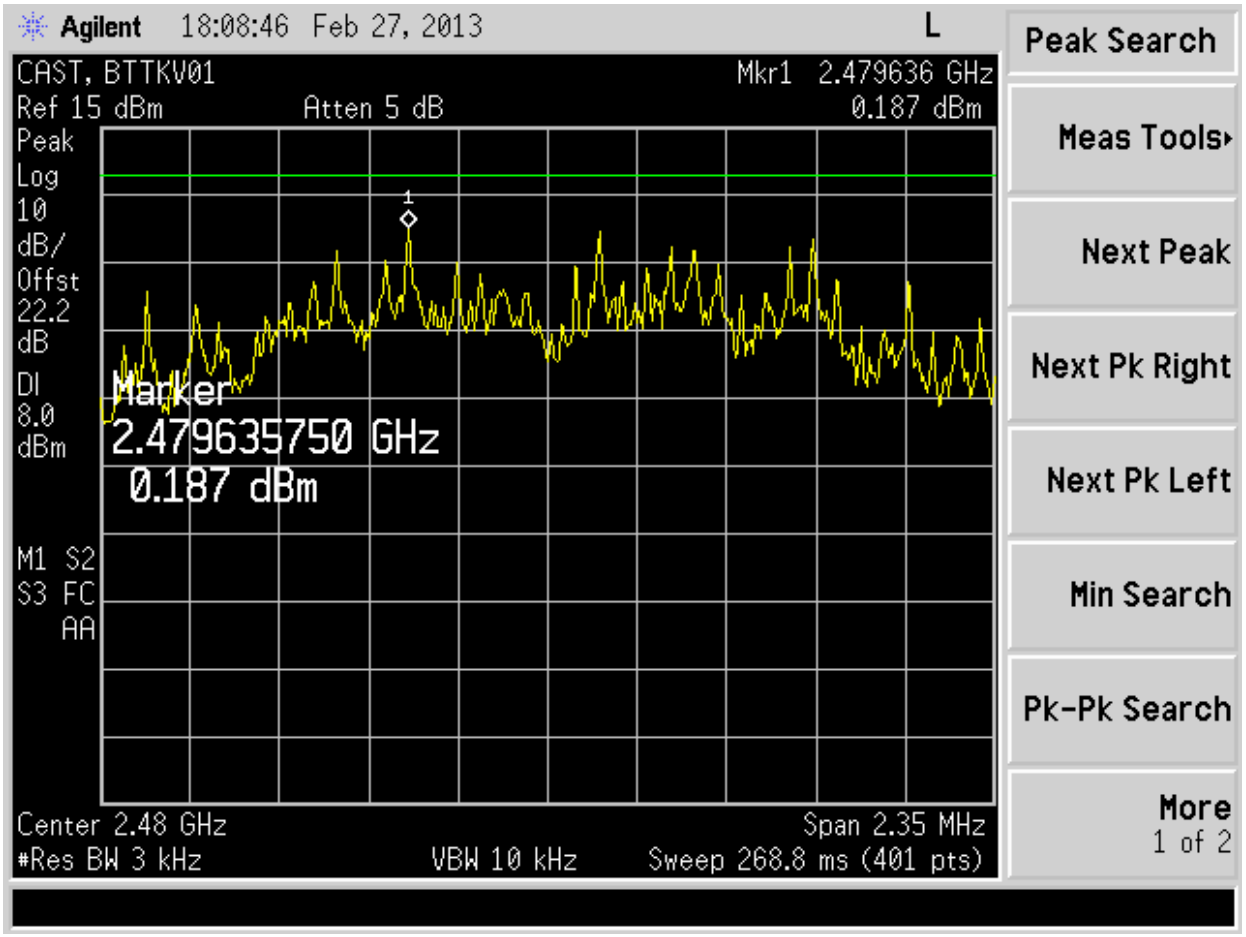
- Power Spectral Density; centre frequency is 2405 MHz.



- Power Spectral Density; centre frequency is 2440 MHz.



- Power Spectral Density; centre frequency is 2480 MHz.



Radiated Emission: Unintentional-Receive Mode

Temperature	21.9 to 22.3 °C
Relative Humidity	33.0 %
Barometric Pressure:	101.7 kPa
Test Date	Feb. 25, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272, 371
Reference Equipment (ID) (Calibration not required)	124, 374
Tested By	Jeremy Lee

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0284

Test Limits

FCC 15.109 (a):
Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field strength (microvolts/ meter)
30–88	100
88–216	150
216–960	200
Above 960	500

Test Setup

The test was performed in accordance with **FCC 15.109:2010, FCC 15.31:2010, FCC 15.33:2010, FCC 15.35:2010, and ANSI C63.4:2009, and ANSI C63.10:2009.**

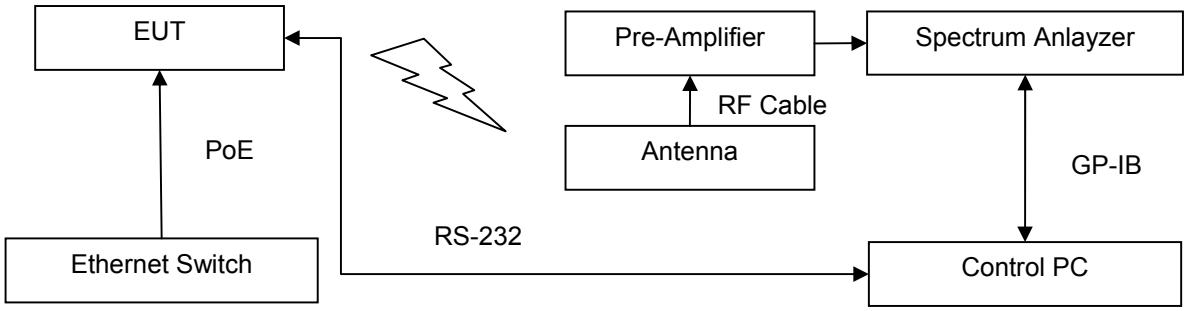
Test procedure is based on the FCC15.31(a)(3) – Other intentional and unintentional radiators are to be measured for compliance using the following procedure excluding sections 4.1.5.2, 5.7, 9 and 14: ANSI C63.4–2009: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference, see § 15.38). This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51.
NOTE to Paragraph (a)(3): Digital devices tested to show compliance with the provisions of §§ 15.107(e) and 15.109(g) must be tested following the ANSI C63.4 procedure described in paragraph (a)(3) of this section.[As stated in the adopting R&O, ANSI C63.4 is not used for measurements below 30 MHz.]

The EUT was placed on a 1 meter by 1.5 meters wide and 0.8-meter high nonconductive table that was placed directly onto a flush mounted turntable. The EUT was connected to its support equipment with any excess I/O cabling bundled to approximately 1 meter. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna supporter. It is measured with a receiver – the spectrum analyzer, was software controlled. The antennas were balanced dipoles. For frequencies of 80 MHz or above, the antennas were resonant in length, and for frequencies below 80 MHz it had a length equal to the 80 MHz resonant length.

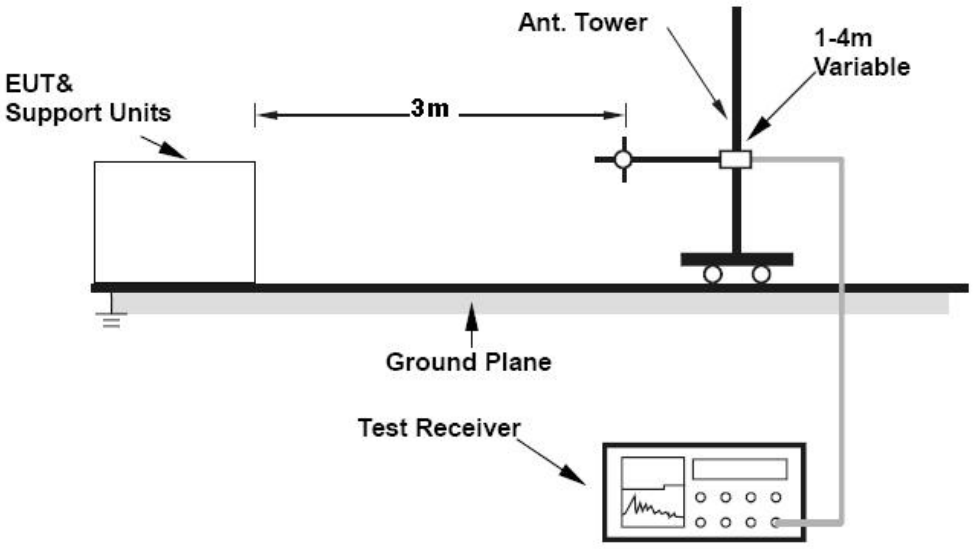
Tests were performed to determine the emissions with Receive mode, Antenna was connected. The EUT was positioned emissions from the unit were maximized by manipulating the cables, and by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable.

- The EUT was set-up Receive mode.
- The following measurements were made with
  - Span = wide enough to fully capture the emission being measured.
  - RBW = 120 kHz
  - VBW ≥ RBW
  - Sweep = Auto
  - Detector Function = peak
  - Trace = Single trace up to capturing the whole range of signal
  - QP Detecting; there was no strong signal to detect QP level.

Setup Block Diagram



Test Setup in Chamber



Test Result

Radiated Emission (dBuV/m) = Measured Emission (dBuV) + Antenna Factor(1/m) + Cable Loss(dB)– Pre-Amplifier Gain(dB)

X Pass **Fail** **N/A**

- Table of Radiated Emissions, Receive Mode: 30 to1000MHz, Peak Detecting, Antenna was used JB1.

LabTest Certification Inc.
Unintentional Radiated Emissions
FCC15.209, 3 meters, Horizontal

Operator: Jeremy Lee

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency MHz	Measured dBuV	AntFactor dB/m	PathLoss dB	Emission dBuV/m	Limit dBuV/m	Margin dB	T/T Degree	Tower cm	POL
347.0429 MHz	57.74	15.08	-28.65	44.17	46.02	1.85	314.3	101.1	H

Project # : 11152 , Sample #: 1133453
Temp.: 21.9 C, Hum.: 33.0 %
Barometer Pres.: 101.7 kPa

LabTest Certification Inc.
Unintentional Radiated Emissions
FCC15.209, 3 meters, Vertical

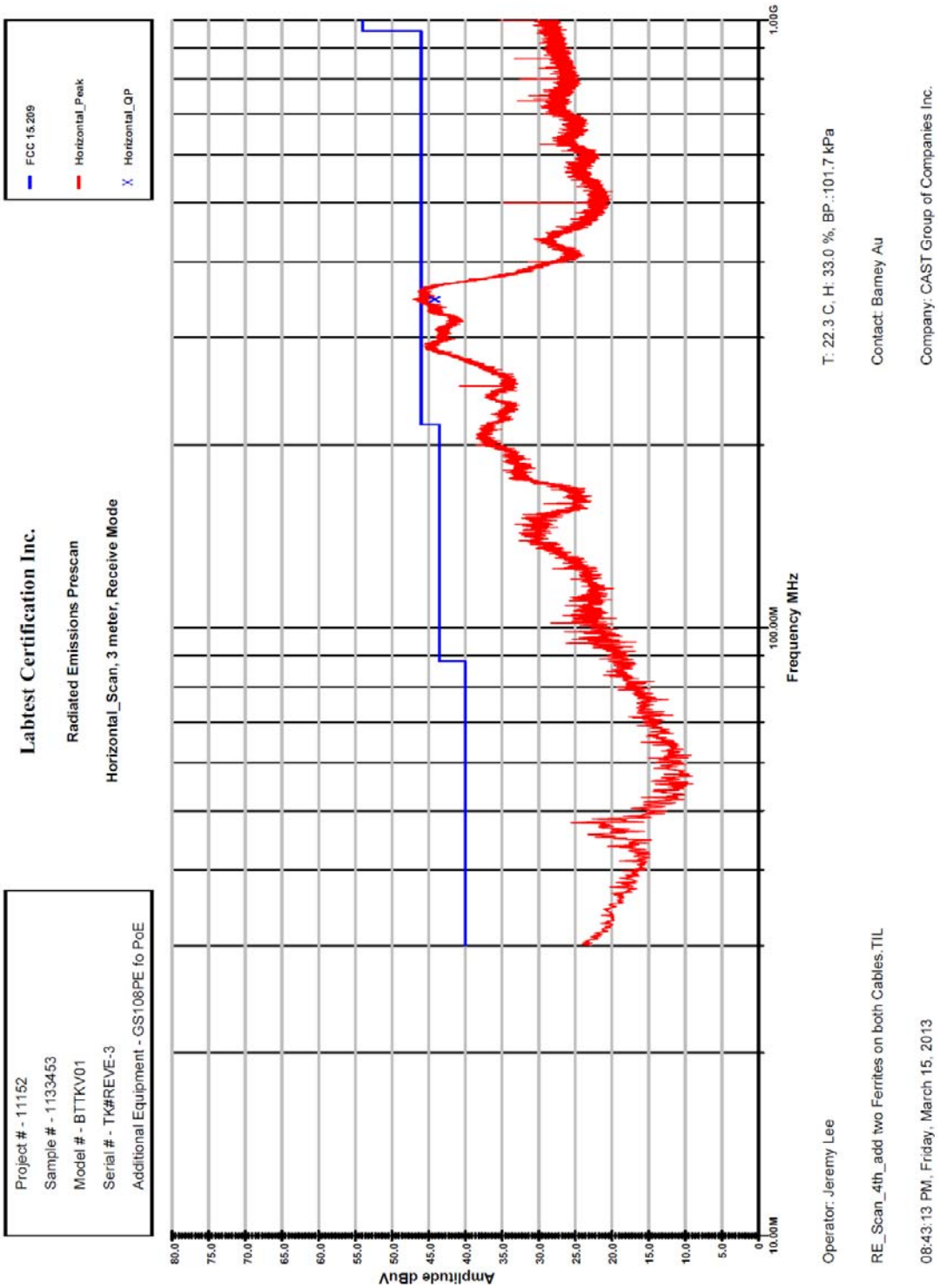
Operator: Jeremy Lee

Model #: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

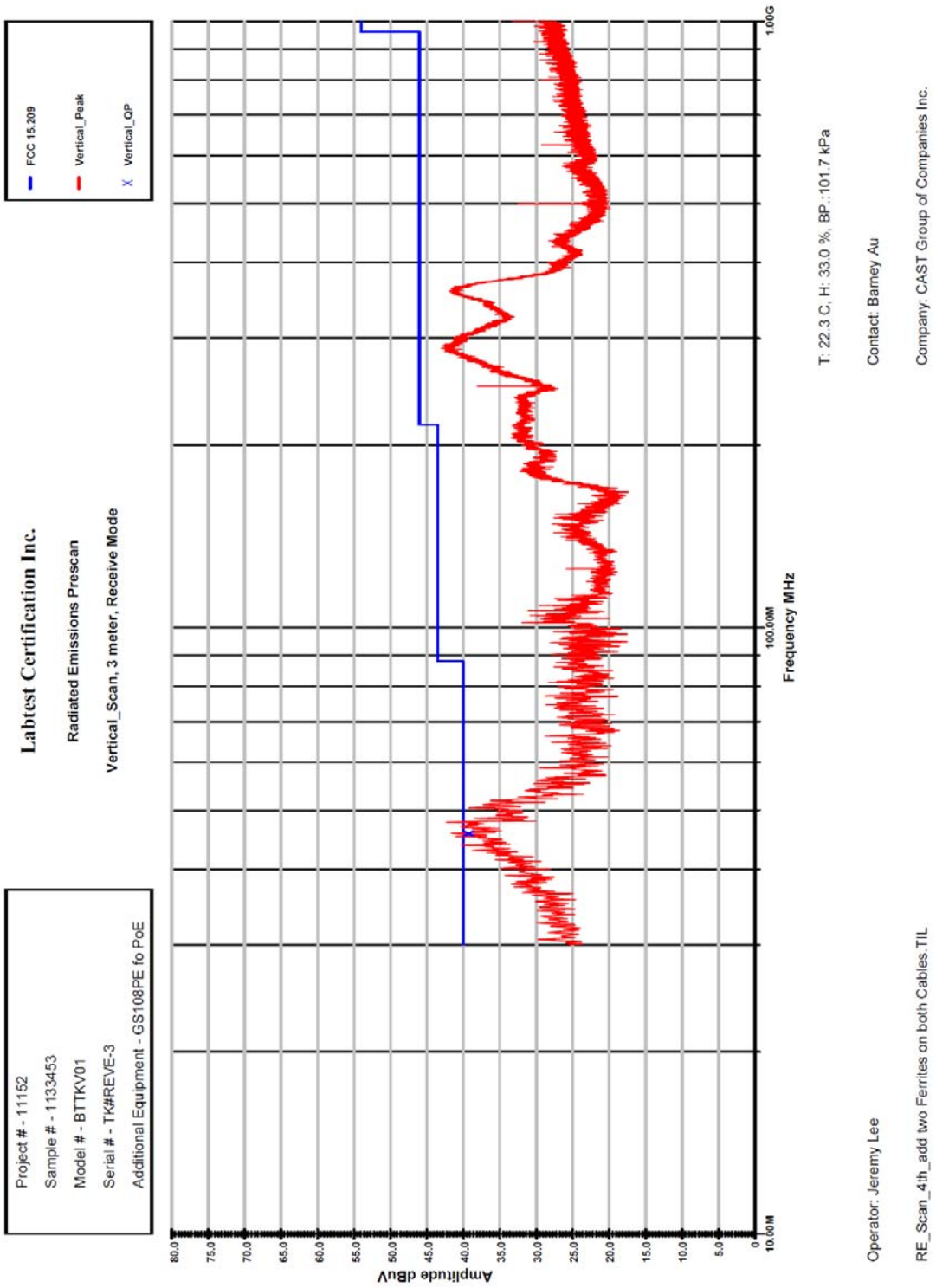
Frequency MHz	Measured dBuV	AntFactor dB/m	PathLoss dB	Emission dBuV/m	Limit dBuV/m	Margin dB	T/T Degree	Tower cm	POL
45.7427 MHz	60.00	9.32	-30.08	39.24	40.00	0.76	331.3	101.1	V

Project # : 11152 , Sample #: 1133453
Temp.: 21.9 C, Hum.: 33.0 %
Barometer Pres.: 101.7 kPa

- Graph of Radiated Emissions of Receive Mode: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Horizontal.



- Graph of Radiated Emissions of Receive Mode: 30 to1000MHz, Peak Detecting, Antenna was used JB1, the polarization of Antenna was Vertical.



AC Power Line Conducted Emission

Temperature	19.4 °C
Relative Humidity	40.4 %
Barometric Pressure:	102.0 kPa
Test Date	Apr. 08, 2013
Sample Number	1133453
Calibrated Test Equipment (ID)	266, 272, 377, 378
Reference Equipment (ID) (Calibration not required)	059
Tested Voltages	110VAC, 60Hz, Single Phase to GS108PE
Tested By	Jeremy LEE

Use the barometric pressure reported at: http://www.theweathernetwork.com/weather/cabc0248

Test Limits

FCC 15.107(a):
Except for Class A digital devices, for equipment 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 50µH/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 band edges.

Frequency of emission (MHz)	Conducted limit (dBµV)	
	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 Setup

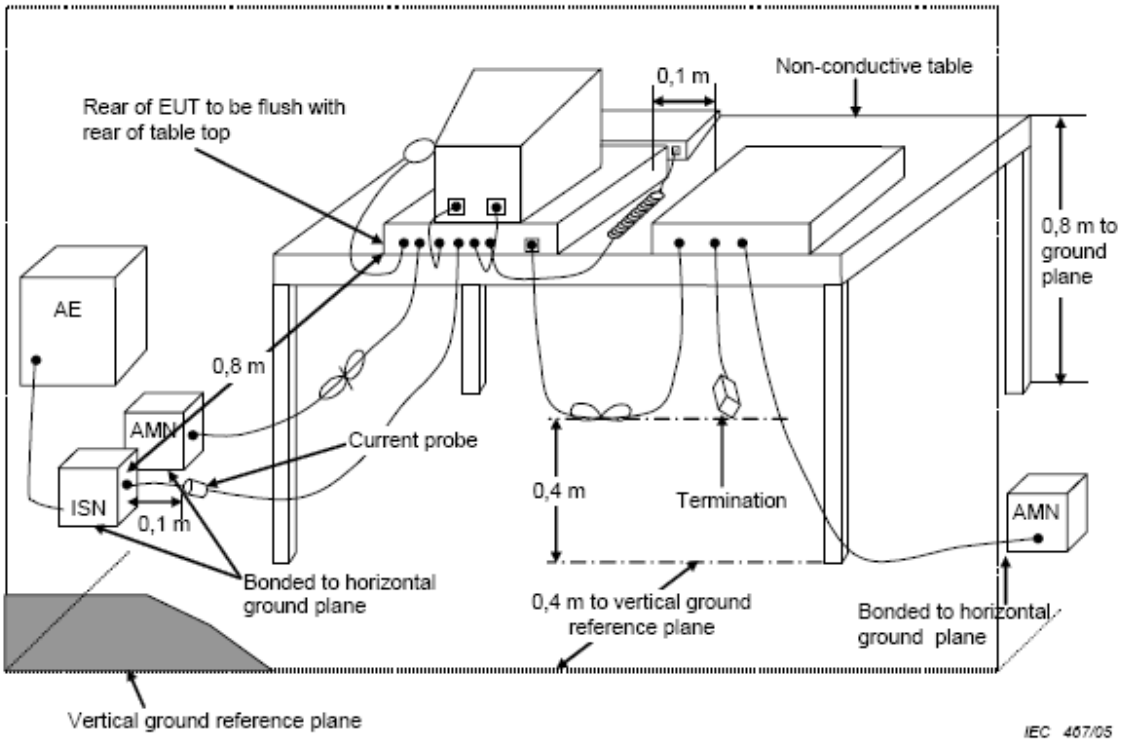
The test was performed in accordance with **FCC 15.107:2010 and ANSI C63.4, 2009.**

The EUT was placed on the table, referenced by ANSI C63.4 and 0.4 meters from the conducting wall with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

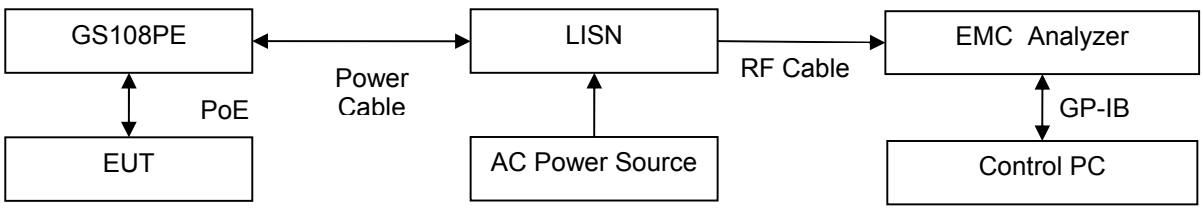
The EUT was set up as per the test configuration to simulate typical actual usage per the user's manual. The PoE cable was connected to GS108PE, Ethernet Switch with PoE, which was supplying DC Power to EUT and the AC power adaptor of GS108PE was connected to LISN for maximum conducted interference. The EUT was set on the maximum operating; the EUT was setup to continuing operating to communicate with Beacon.

Initially a scan was made with an EMC Analyzer from 150 kHz to 30 MHz on each phase with the receiver in the peak mode. The measuring bandwidth was set up 9 kHz. Measurements were then made using CISPR16-1 quasi peak and averaging detectors when the peak readings were within 20dB of the Quasi-peak limit line.

Test setup for Conducted emissions



Setup Block Diagram



Test Result

Conducted Emission (dBuV) = Measured Emission (dBuV) + Cable Loss(dB)+LISN(dB)

X Pass **Fail** **N/A**

- Table of Conducted Emissions: Hot Line

LabTest Certification Inc.
Conducted Emission
FCC15.107, Class B, AVG_Hot_110Vac/60Hz

Operator: Jeremy LEE

12:55:18 PM, Monday, April 08, 2013

Model Number: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

Frequency MHz	Measured_AVG dBuV	CableLoss dB	LISN dB	Emission_AVG dBuV	Limit_AVG dBuV	Margin_AVG dB
150.522 KHz	20.07	0.00	1.95	32.01	55.99	23.98
158.242 KHz	16.13	0.00	1.82	27.94	55.76	27.83
1.131 MHz	21.49	0.04	0.41	31.93	46.00	14.07
1.320 MHz	24.47	0.04	0.40	34.91	46.00	11.09
15.138 MHz	29.56	0.32	0.32	40.45	50.00	9.55
16.228 MHz	30.20	0.30	0.32	41.10	50.00	8.90

Project #: 11152, Sample #: 1133453
Temp.: 19.4 C, Hum.: 40.4 %
Barometer Pres.: 102.0 kPa

- Table of Conducted Emissions: Neutral Line

LabTest Certification Inc.
Conducted Emission
FCC15.107, Class B, AVG_Neutral_110Vac/60Hz

Operator: Jeremy LEE

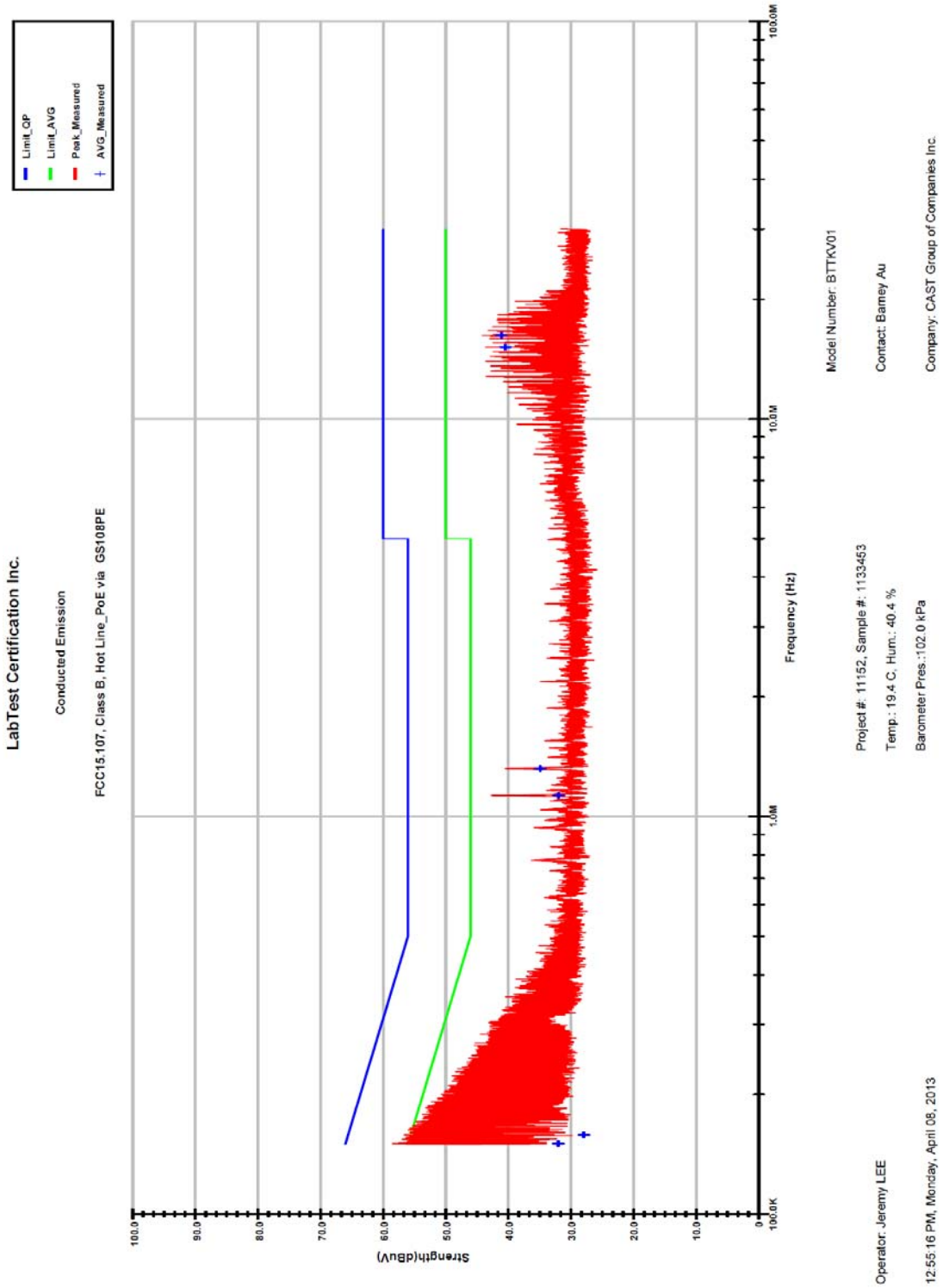
12:55:18 PM, Monday, April 08, 2013

Model Number: BTTKV01
Contact: Barney Au
Company: CAST Group of Companies Inc.

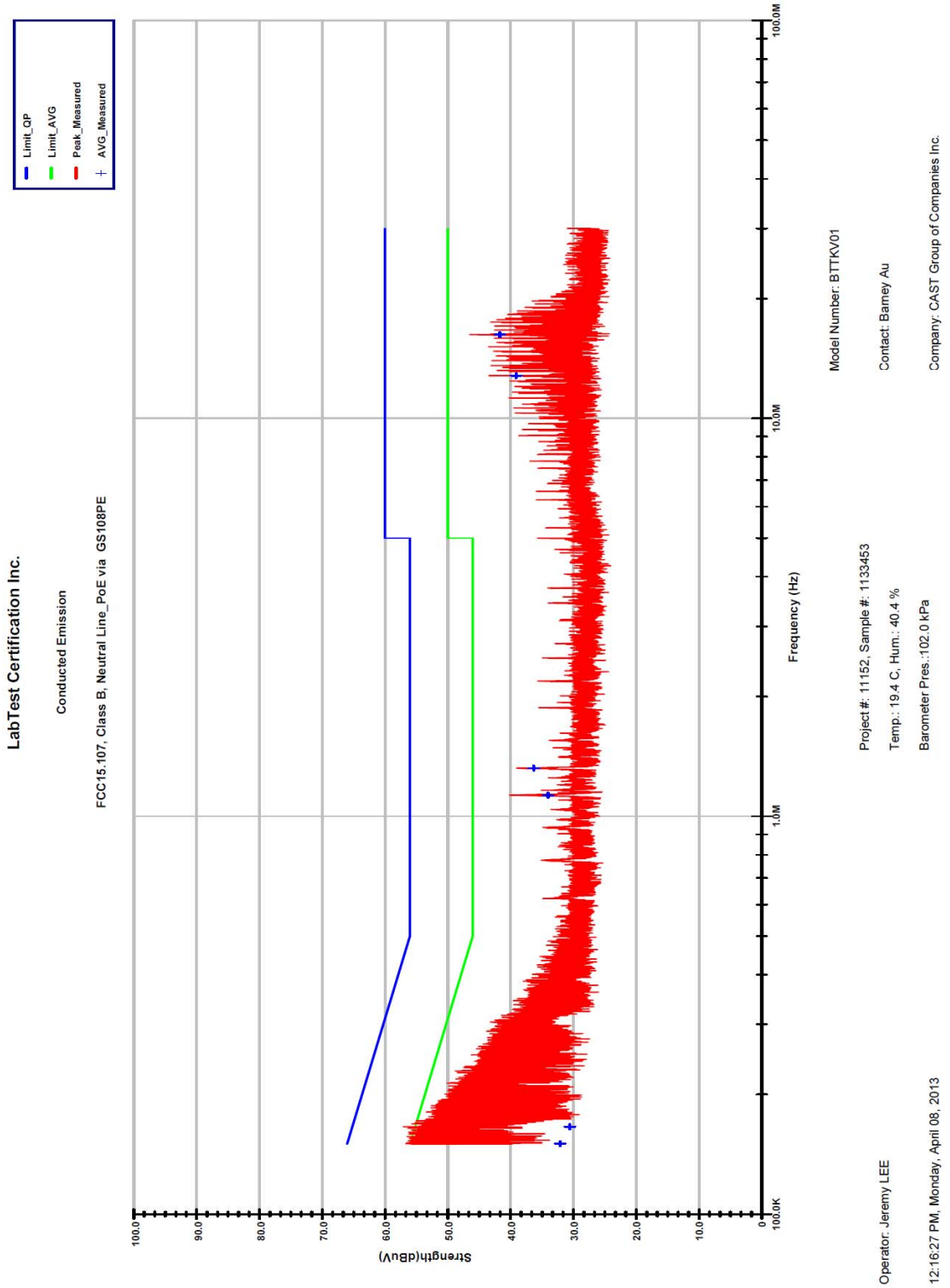
Frequency MHz	Measured_AVG dBuV	CableLoss dB	LISN dB	Emission_AVG dBuV	Limit_AVG dBuV	Margin_AVG dB
150.406 KHz	20.22	0.00	1.90	32.11	55.99	23.88
165.846 KHz	18.93	0.01	1.66	30.58	55.55	24.97
1.130 MHz	23.67	0.04	0.33	34.03	46.00	11.97
1.321 MHz	25.95	0.04	0.32	36.31	46.00	9.69
12.802 MHz	28.36	0.30	0.25	39.11	50.00	10.89
16.231 MHz	30.90	0.30	0.26	41.73	50.00	8.27

Project #: 11152, Sample #: 1133453
Temp.: 19.4 C, Hum.: 40.4 %
Barometer Pres.: 102.0 kPa

- Graph of Conducted Emissions: Hot Line



- Graph of Conducted Emissions: Neutral Line



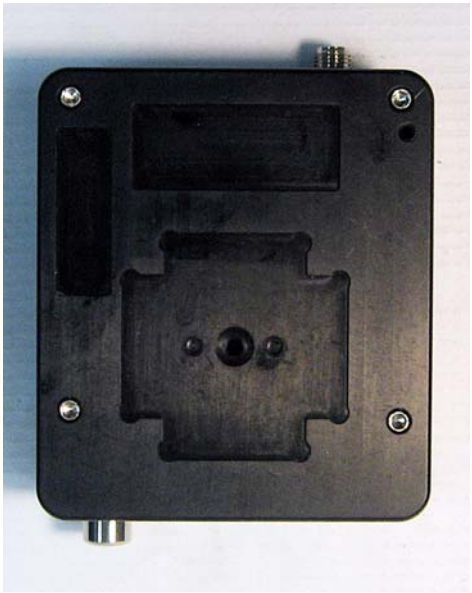
APPENDIX A: Test Equipment Used

ID No.	Description	Manufacturer	Model	Serial No.	Calibration Date	Calibration Due Date	Calibration Certificate No:	Calibration Laboratory
059	AC Power Source	California Instrument	5000i	HK51870	N/A	N/A	N/A	N/A
124	Pre-Amplifier	Com-Power	PA-103	161118	N/A	N/A	N/A	N/A
227-3	Horn Antenna	A.H. Systems	SAS-571	936	12-Jul-2012	12-Jul-2014	2012062215	Liberty Labs
227-4	Horn Antenna	A.H. Systems	SAS-572	233	12-Jul-2012	12-Jul-2014	2012062215	Liberty Labs
241	Active Loop Antenna	AL-130	Com-Power	17075	01-Nov-2011	01-Nov-2013	071075A	Com-Power
266	Humidity/ Temperature Logger	Onset HOBO	U14-001	2436907	02-Jan-2013	02-Jan-2014	345135	Wescan
272	EMC Analyzer	Agilent	E7405A	US41110263	11-May-2012	11-May-2013	1-4321111743-1	Agilent
273	RF Preamplifier	Agilent	8449B	3008A02264	28-Mar-2012	28-Mar-2013	2008120104207	Micro Precision
371	EMC Broadband Antenna	Sunol	JB1	A022012	07-Mar-2012	07-Mar-2014	2012022808	Liberty Labs
374	EMC Shielded Enclosure	USC	USC-26	111811	N/A	N/A	N/A	N/A
377	LISN	Solar Electronics Co.	8611-50-TS-10-N	118553	05-Jun-2012	05-Jun-2013	T120607-09	Solar Electronics Co.
378	LISN	Solar Electronics Co.	8611-50-TS-10-N	118554	05-Jun-2012	05-Jun-2013	T120607-10	Solar Electronics Co.
N1	Coaxial RF Cable	N/A	OC-LMR195-2	N/A	N/A	N/A	N/A	N/A
N2	Coaxial RF Cable	A.H. Systems	SAC-26G-3	N/A	N/A	N/A	N/A	N/A
N3	20dB Attenuator	Mini-circuits	VAT-20+	N/A	N/A	N/A	N/A	N/A

APPENDIX B: EUT photos

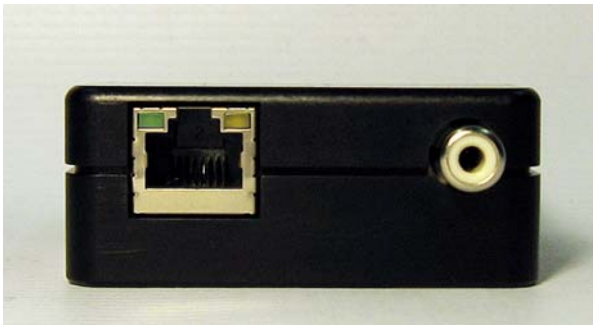
- EUT: Top View

- EUT: Bottom View



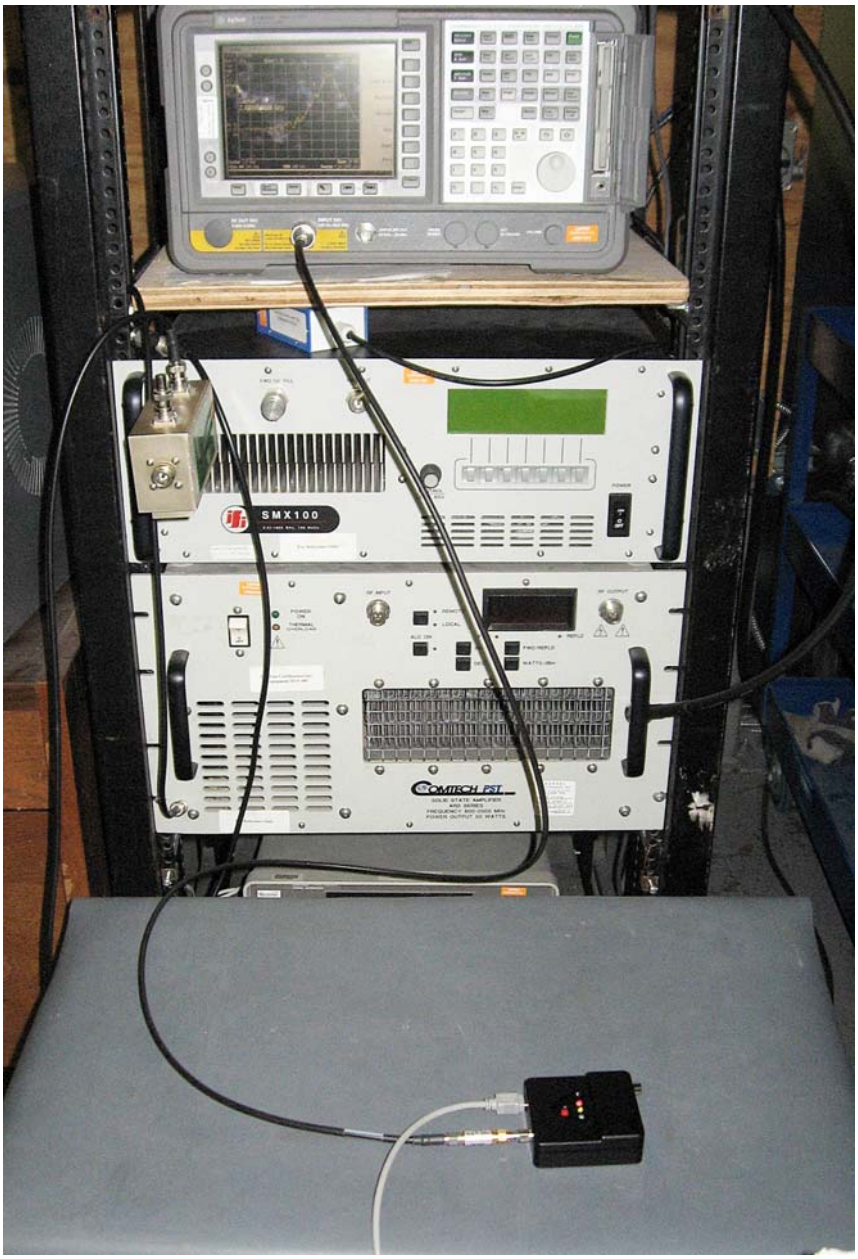
- EUT: Connector view of Antenna side

- EUT: Connector view of Ethernet side

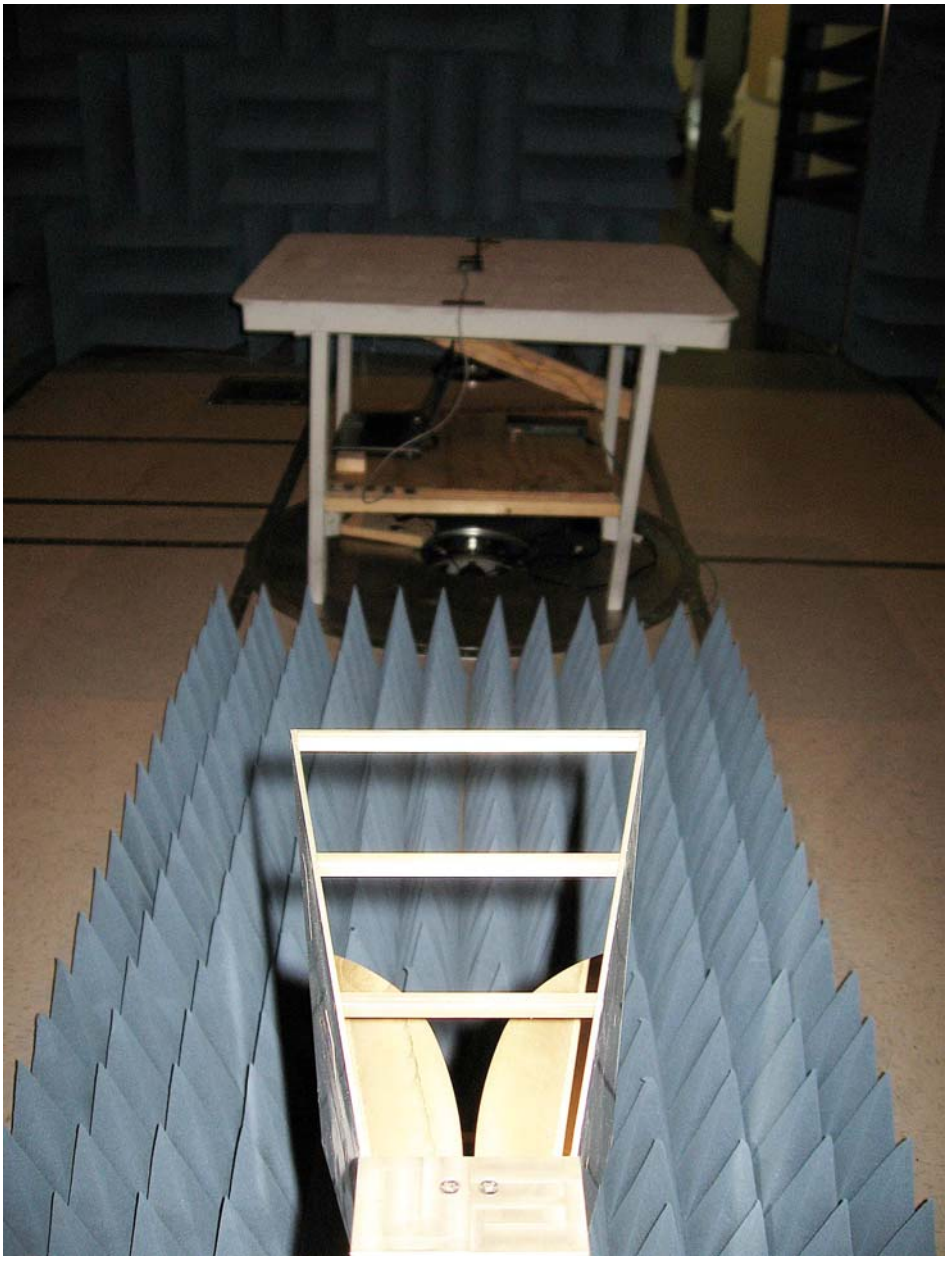


APPENDIX C: Test setup photos

- Test configuration for Conducted measurement

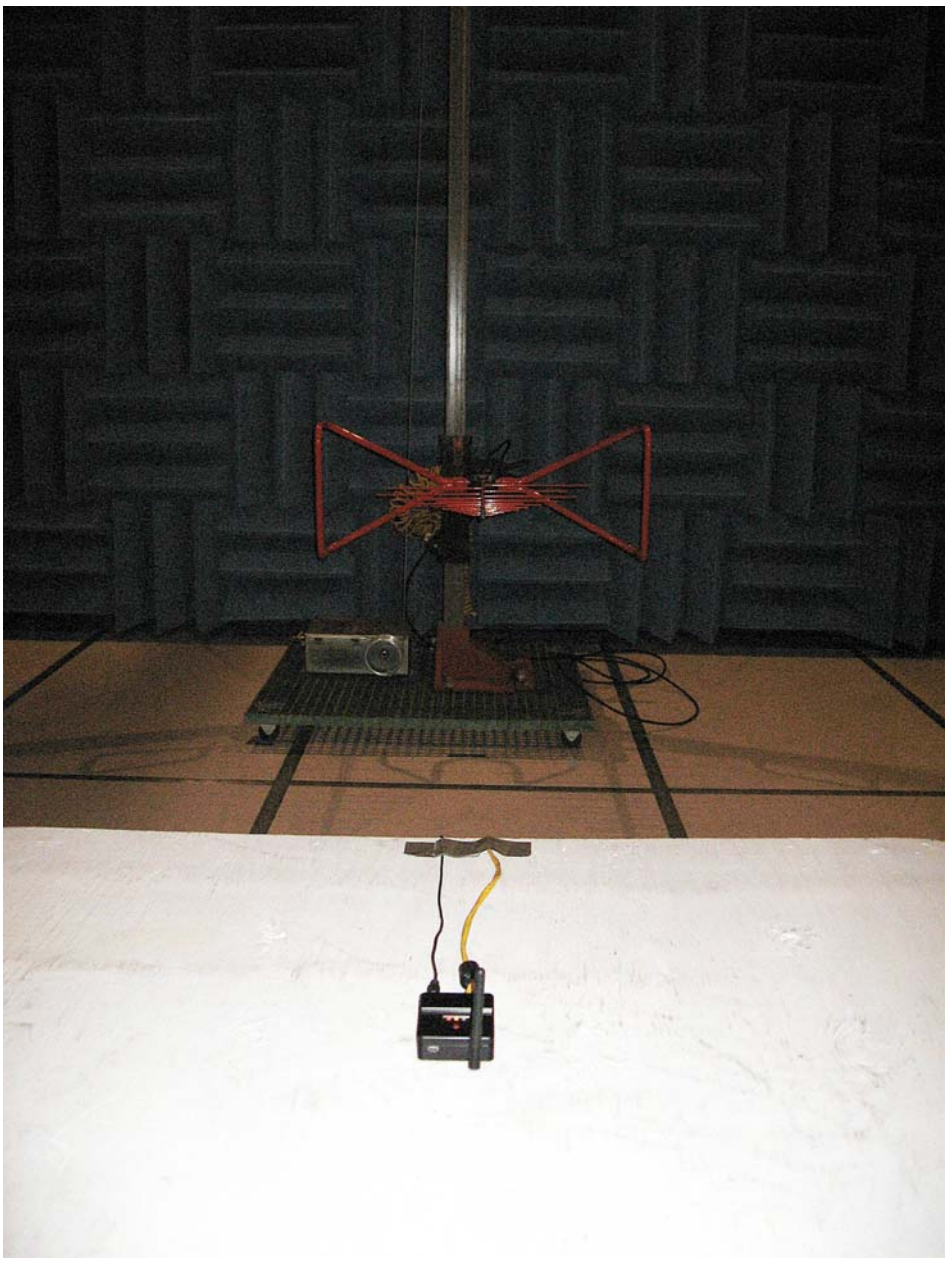


- Test configuration for Radiated measurement, over 1 GHz for Harmonics

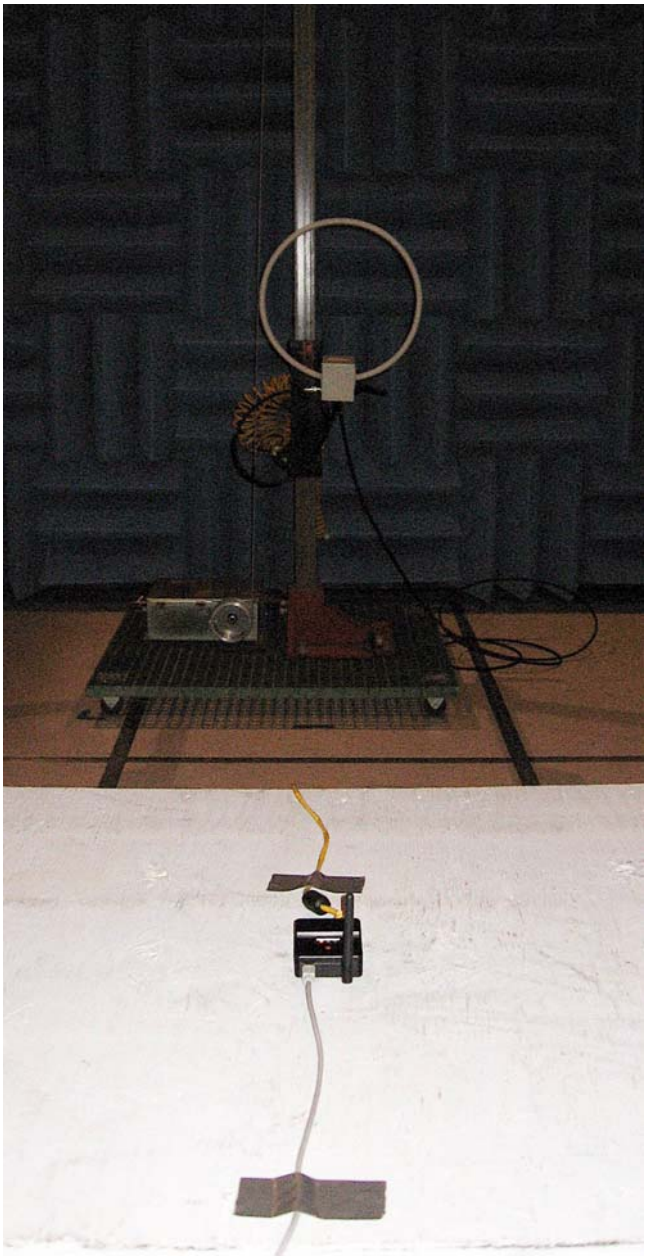


- Table setup for Radiated measurement, 30 MHz to1 GHz for Spurious and Receive Mode

- Test configuration for Radiated measurement, 30 MHz to1 GHz for Spurious and Receive Mode



- Test configuration for Radiated measurement, under 30MHz for Intentional Emissions



- Test configuration for AC Power Line Conducted Emissions measurement

APPENDIX D: ISO 17025:2005 Accreditation Certificate

International Accreditation Service

CERTIFICATE OF ACCREDITATION

This is to signify that

LABTEST CERTIFICATION, INC.
3133-20800 WESTMINSTER HIGHWAY
RICHMOND, BRITISH COLUMBIA V6V 2W3
CANADA

Testing Laboratory TL-367
(Revised May 9, 2012)

has met the requirements of the IAS Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ANS/ISO/IEC Standard 17025:2005, *General requirements for the competence of testing and calibration laboratories*, and has been accredited, commencing May 5, 2011, for the test methods listed in the approved scope of accreditation.

Patrick V. McCullen
Vice President

C. P. Ramani, P.E.
President

ilac-MRA

IAS ACCREDITED

(see attached scope of accreditation for fields of testing and accredited test methods)

Print Date: 05/23/2012

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This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation or revocation of accreditation. See the IAS Accreditation Listings on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.

11-04577

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised May 9, 2012)

LabTest Certification, Inc.
3133-20800 Westminster Hwy.
Richmond, British Columbia V6V 2W3
Canada

Kavinder Dhillon
QMS Manager
(604) 247-0444

FIELDS OF TESTING	ACCREDITED TEST METHODS
Gas and Plumbing	ANSI Standards Z21.1, Z21.15, Z21.19/1.6, Z21 50, Z21.57, Z21.58. Z21.97 and Z21.89/CGA1.18; CSA Standards B45 Series, B125, B140.0, B140.1, B140.3, B140.4, B140.8 and B140.9.3; CGA 1.16; AS 4551/Ag101, AS 4553/AG 103, AS 4563 and AS 2658; EN Standards 30-1-1, 30-1-2, 30-1-3, 30-1-4, 30-2-1 and 30-2-2
Electrical, EMC and Electro-mechanical	AS 4268.1, 4268.2; AS/NZS 1044, 1053, 2064, 3548, 3652, 4051, 4251.1, 4251.2, 62040.2; 60335.1; AS/NZS 60598.1, AS/NZS 60950.1, AS/NZS 60745.1, AS/NZS 60730.1; CISPR 11 / EN55011; CISPR 14 / EN55014, CISPR 15 / EN55015, CISPR 22 / EN55022, CISPR 24 / EN55024, EN 12895, 301 489, 300 386, 50083-2, 50090-2-2, 50091-2, 50121-1, 50121-2, 50121-3-1, 50121-3-2, 50121-4, 50121-5, 50130-4, 50263, 50270, 50293, 50295, 50370-1, 50370-2, 50428, 50470-1, 55012, 55013, 55103-1, 55103-1, 55103-2, 55103-2, 60204-31, 60439-1, 60669-2-1, 60669-2-1, 60669-2-2, 60669-2-3, 60730-1, 60730-2-11, 60730-2-13, 60730-2-14, 60730-2-18, 60730-2-5, 60730-2-6, 60730-2-7, 60730-2-8, 60730-2-9, 60870-2-1, 60945, 61204-3, 61326, 61347-1 Part 1, 61543, 61547, 61547, 617:2001, 618, 619, 620 and 62040-2; FCC Part 15, 18; GB 13837 (CISPR 13); GB 4943, 9254, 7000.1, 7000.10, 7000.11, 7000.12, 2313, 8898, 15143, 14045, 17743, 13836 and 13837; GB/T 9383; GB/T 17618; GB 17625.1, 2; GB/T 17626.2 and 17626.4 and 17626.5

May 5, 2011
Commencement Date

ACCREDITED

C. P. Ramani, P.E.
President

Print Date: 05/23/2012

Page 2 of 4

This accreditation certificate supersedes any IAS accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation or revocation of accreditation. See the IAS Accreditation Listings on the web at www.iasonline.org for current accreditation information, or contact IAS directly at (562) 364-8201.

11-04680

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised May 9, 2012)

FIELDS OF TESTING	ACCREDITED TEST METHODS
Electrical, EMC and Electro-mechanical (cont)	GB/T 176262.6, 176262.8, 176262.11; GB 4343.1 (CISPR 14.1), 4343.2 (CISPR 14.2), GB 4824; HKTA 1001, 1005, 1007 and 1022; ICES-001, 003; JIS T 0601-1-2; IEC/EN/AS/KN: 60601-1-2; IEC/EN/AS/KN/JIS C: 61000-3-2, 61000-3-3, 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-9, 61000-4-11, 61000-4-12, 61000-4-13, 61000-6-1, 61000-6-2, 61000-6-3 and 61000-6-4; IEC/EN/AS/KN: 61326; RSS-130, 136, 138, 182, 187, 210, 213, 215, 243 and 310; MIL-STD-461E; MIL-STD-462D; KN60601-1-2; KN301 489; KN22, 24; YD 1032; YD/T 965, 968, 993, 1103; CSA Standards C22.2 No. 0, .1, .17, .4, 6, 8, 9, 10, 12, 14, 15, 18, 24, 36, 37, 40, 43, 53, 61, 66-1-06, 63, 64, 66.1, 66.2, 66.3, 68, 71.1, 71.2, 72, 73, 81, 85, 89, 94, 99, 100, 101, 104, 107.1, 107.2, 108, 109, 110, 112, 113, 114, 117, 122, 125, 139, 141, 147, 148, 149, 156, 157, 158, 164, 166, 167, 168, 169, 173, 177, 184, 187, 191, 195, 205, 207, 213, 217, 218.1, 218.2, 223, 224, 225, 231, 234, 236, 243, 247, 250 and 60065; CSA Standards E60079-0, -1 (except Explosión Proof Test), -6, -11, -15, E60335-1, -2, E60730-1, -2, E60745-1, -2, E61010-1, -2, E742, Z240 RV Series 08; IEC/EN Standards 60335-1, -2, 60730-1, -2, 60745-1, -2; 61010-1, -2, 60601-1, -2, 60065, 60079-0, -6, -11, -15 and 60950-1, -2; IEC/EN 60529; 60945, 60598-1, -2, 61347-1; UL Standards 48, 50, 73, 197, 499, 507, 508, 508A, 676, 745-1, 751, 763, 778, 858, 867, 875, 924, 935, 982, 987, 998, 1004, 1012, 1026, 1261, 1310, 1431, 1472, 5085-2_1; 5085-3; 1563, 1564, 1585, 1598, 1647, 1795, 1993, 1995, UL/CSA 5085-1_1

May 5, 2011
Commencement Date

ACCREDITED

C. P. Ramani, P.E.
President

Print Date: 05/23/2012

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11-04680

International Accreditation Service

SCOPE OF ACCREDITATION

LabTest Certification, Inc. TL-367
(Revised May 9, 2012)

FIELDS OF TESTING	ACCREDITED TEST METHODS
Electrical, EMC and Electro-mechanical (cont)	6500, 8750, 2388; 60079-0, 60079-1, 60079-6, 60079-11, 60079-15, 60335-1, 60335-2, 60601-1, 60601-2, 60730-1, 60730-2, 60745-1, 60745-2, 60950-1, 61010-1 and 61010-2; ISO EN Standards 60601-1-2 Part 1-2, 61000-3-2 (Equipment input current less than or equal to 16 Amps/Phase) and 61000-4-3; ANSI Standards C63.4 and C63.7 (only to 26.5GHz)
Environmental and Energy	IEC/EN Standards 60068-2-1, 2-2, 2-6, 2-30, 2-27, 2-14, 2-64, 60092-101, 60695-2-2; MIL-STD-810: Method 500.4, 501.4, 502.4, 503.4, 506.4, 507.4, 510.4, 512.4 and 514.5; RTCA-DO-160E: Section 4, 5, 6, 7.2, 8, 10, 12, 16, 17 and 25; CSA Standard P4; CAN/CSA Standards C-300 and C-814; Qualification Criteria for Bottled Water Cooler Version 1.1 - May 2004; Qualification Criteria for Compact Fluorescent Lamps Version 3.0 - October 2003; Qualification Criteria for Decorative Light Strings Version 1.3 - March 9, 2007; Qualification Criteria for Residential Light Fixtures Version 4.0; Qualification Criteria for Home Audio and DVD Equipment; ISO Standards 9806-1, 9806-2 and 9806-3; SRCC 100-08, SRCC TM-1, SRCC-150; CSA Standards F378 and F379, EN Standards 12975-1 and 12975-2
Maritime	ABYC Standards A-3, A-7, A-26, A-27, A-28, A-30, A-31, E-2, E-11, H-2, P-14, P-17, P-18, P-21, P-22, P-24 and P-27; EN Standards 28846, 28848, 28849, 29775, 60092-507; EN ISO 10133, 12216, 13297, 13929, 14895, 15083, 8847, 8849, 10239, 10240, 10592: 1995/A1, 11105, 11192 and 9097:1994/A1; IACS E1 – E21; 21005; DNV 2.4, BV: Rules for Classification of Steel Ships – Part C, Chapter 3, Section 6.2 Type Approval; ABS Part 4, Chapter 9, Section 7, Lloyds Type Approval Systems – Test Specification Number 1; GL VI-Part 7 Section 3 – Section – B Test Requirements, Chapter 2
Appliances	CSA Standard B 140.0-3

May 5, 2011
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C. P. Ramani, P.E.
President

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