STC Test Report

Date : 2011-02-18

No. : HM166048

Applicant (MIS005): Violet SAS
73-77 rue de Sèvres 92514 Boulogne Billancourt FRANCE

Manufacturer: Rootland Ltd.
1/F., Block A, Cheung Mei Centre, No. 15 Hing Yip Street, Kwun Tong, Kowloon, Hong Kong.

Description of Sample(s): Submitted sample(s) said to be

Product:	KAROTZ
Brand Name:	KAROTZ
Model Number:	V2.1
FCC ID:	Y4EKAROTZ

Date Sample(s) Received: 2010-12-21

Date Tested: 2011-01-17 to 2011-2-10

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 and ANSI C63.4:2009 for FCC Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark(s): ---

Dr. LEE Kam Chuen
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

The Hong Kong Standards and Testing Centre Ltd.
10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

STC Test Report

CONTENT:

The Hong Kong Standards and Testing Centre Ltd.
10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

Applicant

Violet SAS
73-77 rue de Sèvres 92514 Boulogne Billancourt FRANCE

Manufacturer

Rootland Ltd.
1/F., Block A, Cheung Mei Centre, No. 15 Hing Yip Street, Kwun Tong, Kowloon, Hong Kong.

1.3 Equipment Under Test [EUT]
Description of Sample(s)

Product:	KAROTZ
Manufacturer:	Rootland Ltd.
Brand Name:	KAROTZ
Model Number:	V2.1
Input Voltage:	117Va.c. with DC / USB jack

The AC/DC Adaptor used for the tests was provided by the applicant with the following details: Two pins (Live / Neutral) only adaptor, Model Number: KSD10-050-2000, Input: 100-240Va.c. 50/60Hz 300mA, Output: 5Vd.c. 2000mA

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Violet SAS, KAROTZ, the transmission signal is digital modulated with channel frequency range 2412- 2462MHz. The device has no ad hoc mode function; The measurement were conducted at different modulation and data rate, the test results shown in this test report is based on the worst case of the initial investigation.

1.4 Date of Order

2010-12-21

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2011-01-17 to 2011-02-10

1.7 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 Regulations and ANSI C63.4:2009 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION (Operating Frequency band = 2400 – 2483.5 MHz)
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result	
				Pass	Fail
Output Power of Fundamental Emissions	FCC 47CFR 15.247(b)(3)	ANSI C63.4:2009	N/A	☒	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	☒	☐
Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2009	N/A	☒	☐
Power Spectral Density	FCC 47CFR 15.247(e)	ANSI C63.4:2009	N/A	☒	☐
Bandwidth	FCC 47CFR 15.247(a)(2)	ANSI C63.4:2009	N/A	☒	☐
Band Edge Emissions	FCC 47CFR 15.247(d)	ANSI C63.4:2009	N/A	☒	☐
Antenna requirement	FCC 47CFR 15.203	ANSI C63.4:2009	N/A	☒	☐
Number of Operating Channels	N/A	N/A	N/A	☒	☐
RF exposure	FCC 47CFR 15.247(b)(5)	ANSI C63.4:2009	N/A	☒	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

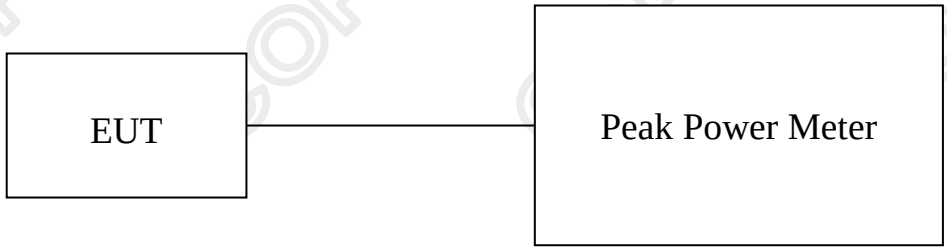
3.2.1 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(3)
Test Method:	N/A
Test Date:	2011-01-17
Mode of Operation:	Tx mode

Test Method:

The RF output of the EUT was connected to the peak power meter. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in mW.

Test Setup:



Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

Results of Tx Mode 802.11 b 11Mbit, Antenna 1, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power
Low	2412	1.54dBm
Middle	2437	1.37dBm
High	2462	1.44dBm

Results of Tx Mode 802.11 g 54Mbit , Antenna 1, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power
Low	2412	1.40dBm
Middle	2437	1.03dBm
High	2462	1.82dBm

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

3.2.2 Radiated Emissions

Test Requirement:	FCC 47CFR 15.209
Test Method:	ANSI C63.4:2009
Test Date:	2011-01-17
Mode of Operation:	TX mode / On modes (with Camera, Mic. & Speaker) / On mode connected to PC

Test Method:

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

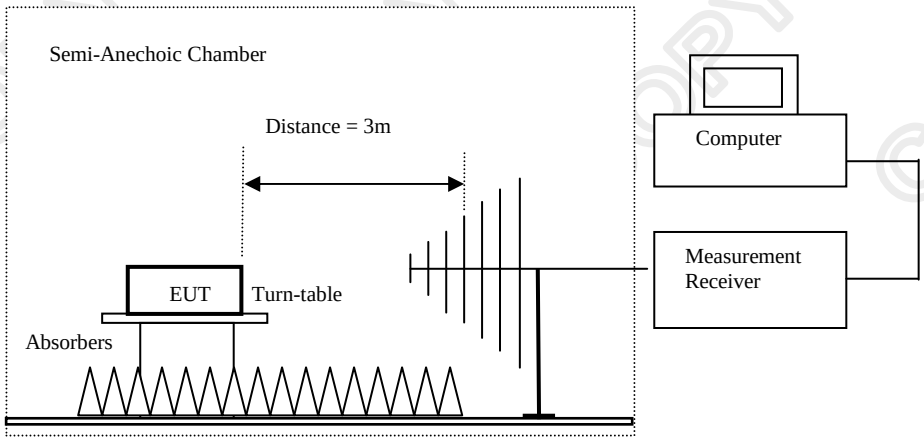
Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	3MHz
	VBW:	3MHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold

Test Setup:



Ground Plane

Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 b 11Mbit (CH1) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 79.3 dBμV/m. Limit for spurious emission = 59.3 dBμV/m.

Result of Tx Mode 802.11 b (CH1) Emission at lower restricted band: PASS

Field Strength of Harmonic Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2399.0	23.3	29.1	52.4	74.0	-21.6	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2399.0	8.1	29.1	37.2	54.0	-16.8	Vertical

Result of Tx Mode 802.11 b 11Mbit (CH1): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.3	7.1	34.1	41.2	74.0	-32.8	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.3	-3.3	34.1	30.8	54.0	-23.2	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 b 11Mbit (CH6) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 78.2 dBμV/m. Limit for spurious emission = 58.2 dBμV/m.

Result of Tx Mode 802.11 b 11Mbit (CH6): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.3	6.7	34.2	40.9	74.0	-33.1	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.3	-3.6	34.2	30.6	54.0	-23.4	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 b 11Mbit (CH11) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 80.9 dBμV/m. Limit for spurious emission = 60.9 dBμV/m.

Result of Tx Mode 802.11 b 11Mbit (CH11): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.1	4.0	34.4	38.4	74.0	-35.6	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.1	-4.0	34.4	30.4	54.0	-23.6	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 g 54Mbit (CH1) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 75.3 dBμV/m. Limit for spurious emission = 55.3 dBμV/m.

Result of Tx Mode 802.11 g (CH1) Emission at lower restricted band: PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2398.0	24.3	29.1	53.4	74.0	-20.6	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
2398.0	6.0	29.1	35.1	54.0	-18.9	Vertical

Result of Tx Mode 802.11 g 54Mbit (CH1): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.3	4.7	34.1	38.8	74.0	-35.2	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.3	-3.9	34.1	30.2	54.0	-23.8	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 g 54Mbit (CH6) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 74.3 dBμV/m. Limit for spurious emission = 54.3 dBμV/m.

Result of Tx Mode 802.11 g 54Mbit (CH6): PASS

Field Strength of Harmonic Emissions Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
4874.3	4.9	34.2	39.1	74.0	-34.9	Vertical

Field Strength of Harmonic Emissions Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
4874.3	-3.5	34.2	30.7	54.0	-23.3	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 g 54Mbit (CH11) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 76.7 dBμV/m. Limit for spurious emission = 56.7 dBμV/m.

Result of Tx Mode 802.11 g 54Mbit (CH11): PASS

Field Strength of Harmonic Emissions Peak Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
4924.1	3.0	34.4	37.4	74.0	-36.6	Vertical

Field Strength of Harmonic Emissions Average Value						
Frequency	Measured Level @3m	Correction Factor	Field Strength	Limit @3m	Margin	E-Field Polarity
MHz	dBμV	dB/m	dBμV/m	dBμV/m	dBμV/m	
4924.1	-4.1	34.4	30.3	54.0	-23.7	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of On Mode (with Camera, Mic. & Speaker) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of On Mode (with Camera, Mic. & Speaker): PASS

Field Strength of Radiated Emissions Quasi-Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
42.0	23.6	11.5	35.1	40.0	-4.9	Vertical
58.7	26.8	9.3	36.1	40.0	-3.9	Vertical
77.5	24.2	8.2	32.4	40.0	-7.6	Vertical
275.0	18.5	14.4	32.9	46.0	-13.1	Horizontal
375.0	14.2	17.9	32.1	46.0	-13.9	Horizontal
602.1	15.4	22.2	37.6	46.0	-8.4	Horizontal

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of On Mode connected to PC (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of On Mode connected to PC: PASS

Field Strength of Radiated Emissions Quasi-Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
42.0	24.9	11.5	36.4	40.0	-3.6	Vertical
58.7	26.0	9.3	35.3	40.0	-4.7	Vertical
77.5	25.6	8.2	33.8	40.0	-6.2	Vertical
192.1	25.4	11.3	36.7	43.5	-6.8	Horizontal
228.1	21.8	13.0	34.8	46.0	-11.2	Horizontal
602.1	16.9	22.2	39.1	46.0	-6.9	Horizontal

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

3.2.3 Power Spectral Density

Test Requirement: FCC 47CFR 15.247(e)
Test Method: ANSI C63.4:2009
Test Date: 2011-02-10
Mode of Operation: Tx Mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=3kHz and sweep time = span/3kHz. Measure the Power Spectral Density (PSD) and record the results in dBm.

Test Setup:

As Test Setup of clause 3.2.1 in this test report.

Test Limit:
The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

Results of Tx Mode 802.11 b 11Mbit, Antenna 1, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Transmitter Frequency (MHz)	Maximum conducted output power (dBm)
2412.0	-30.01

Transmitter Frequency (MHz)	Maximum conducted output power (dBm)
2437.0	-29.13

Transmitter Frequency (MHz)	Maximum conducted output power (dBm)
2462.0	-29.58

Results of Tx Mode 802.11 g 54Mbit, Antenna 1, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

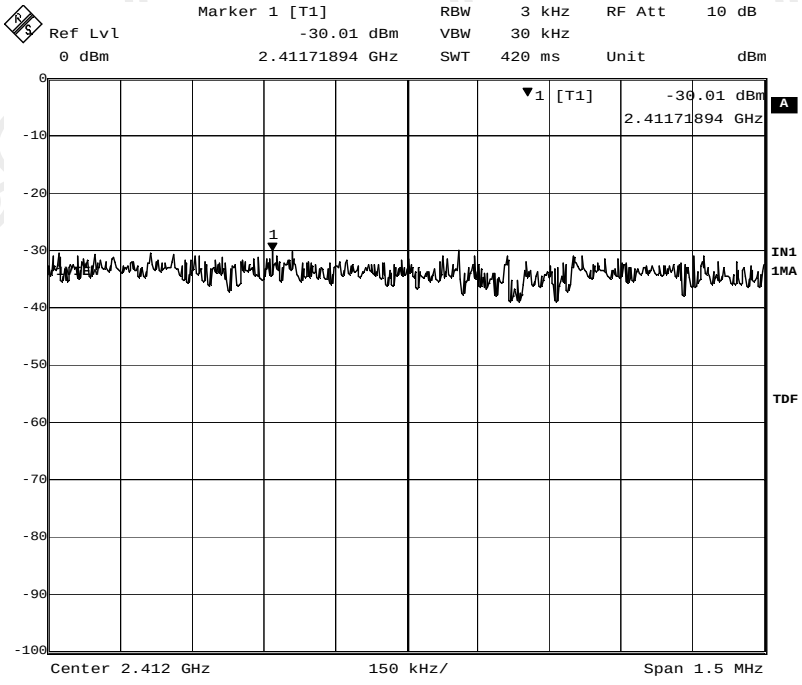
Transmitter Frequency (MHz)	Maximum conducted output power (dBm)
2412.0	-34.14

Transmitter Frequency (MHz)	Maximum conducted output power (dBm)
2437.0	-31.69

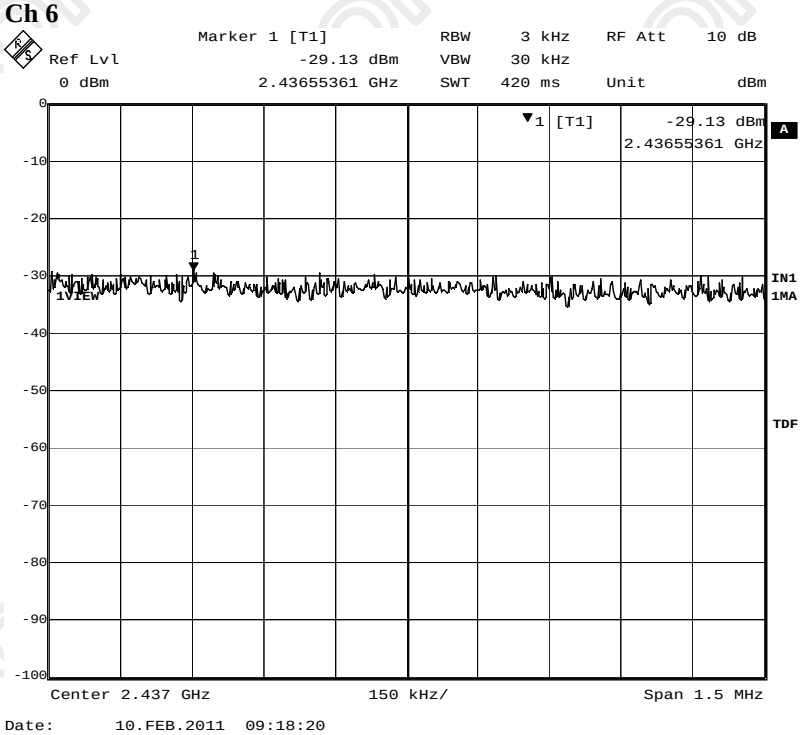
Transmitter Frequency (MHz)	Maximum conducted output power (dBm)
2462.0	-32.50

Tx Mode 802.11 b 11Mbit, Antenna 1 (2412MHz to 2462MHz)

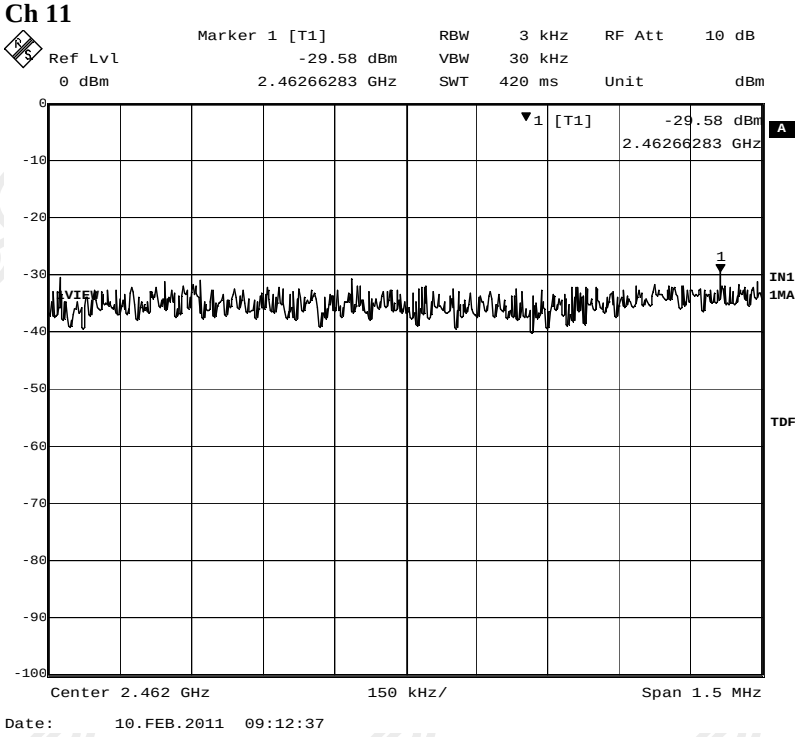
Ch 1



Ch 6

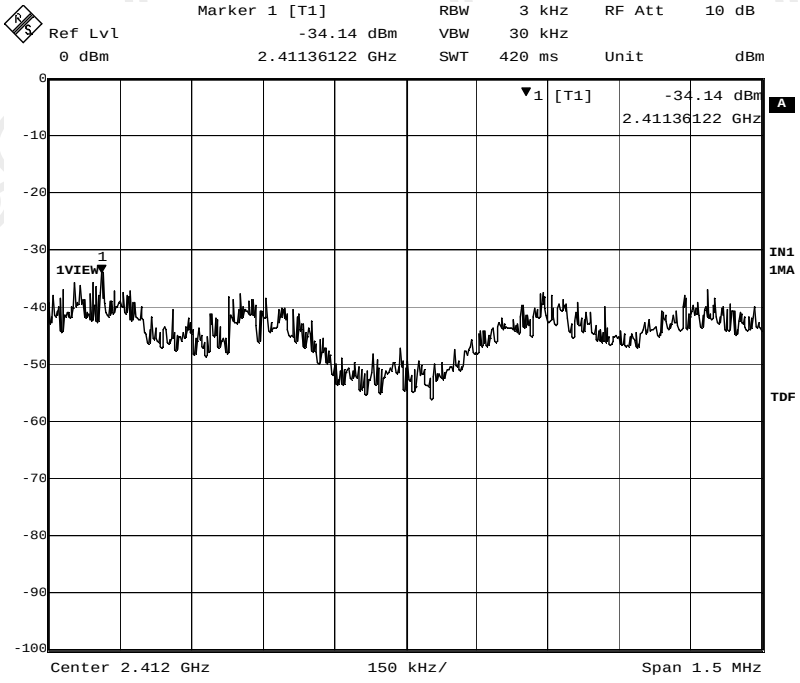


Ch 11

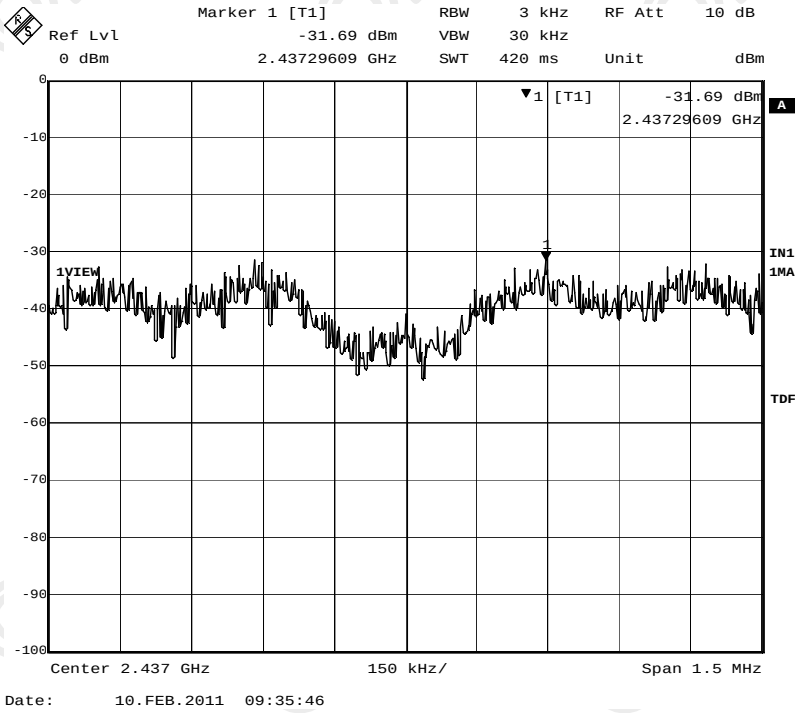


Tx Mode 802.11 g 54Mbit, Antenna 1 (2412MHz to 2462MHz)

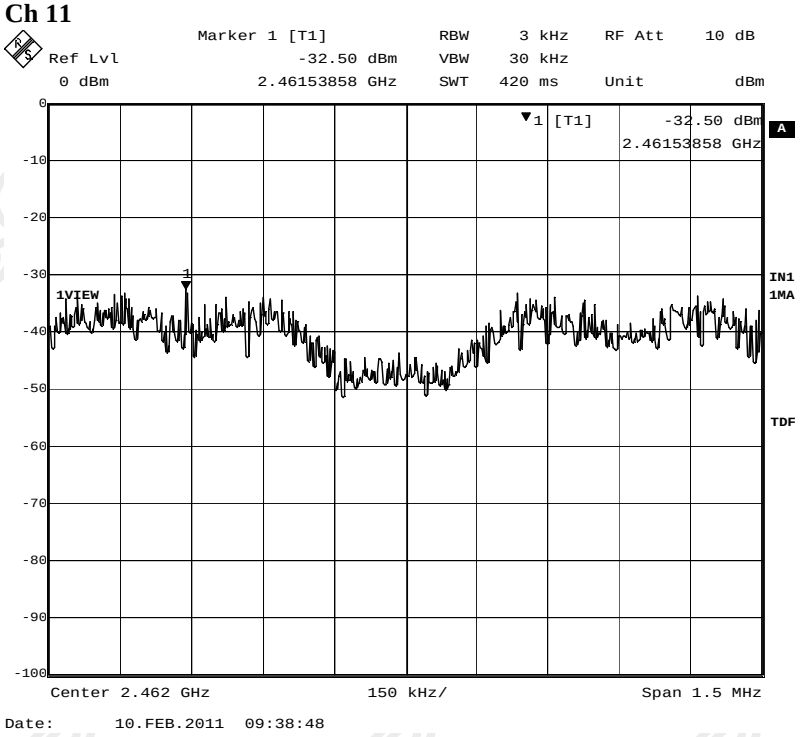
Ch 1



Ch 6



Ch 11



3.2.4 6dB Spectrum Bandwidth Measurement

Test Requirement:	FCC 47CFR 15.247(a)(2)
Test Method:	ANSI C63.4:2009
Test Date:	2011-02-10
Mode of Operation:	Tx Mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

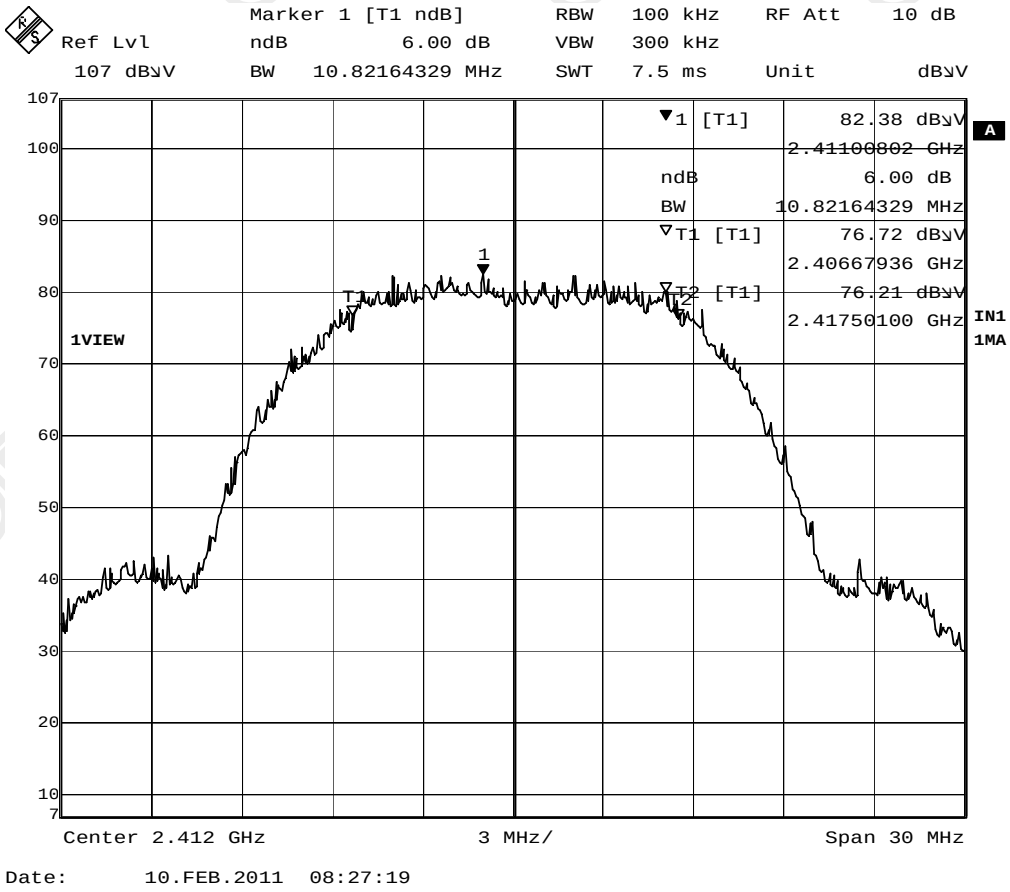
Test Setup:

As Test Setup of clause 3.2.1 in this test report.

Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412	10.82	> 500

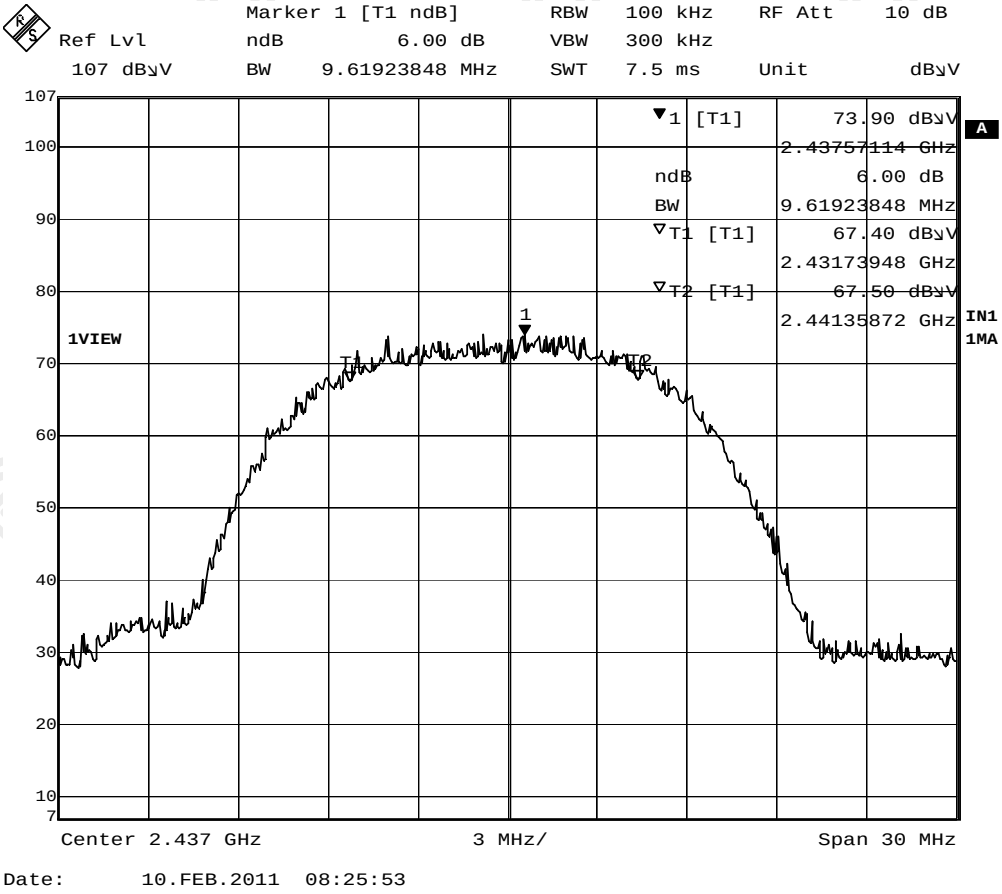
Tx mode 6 dB Bandwidth Plot on Configuration IEEE 802.11b CH1 **(Lowest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437	9.62	> 500

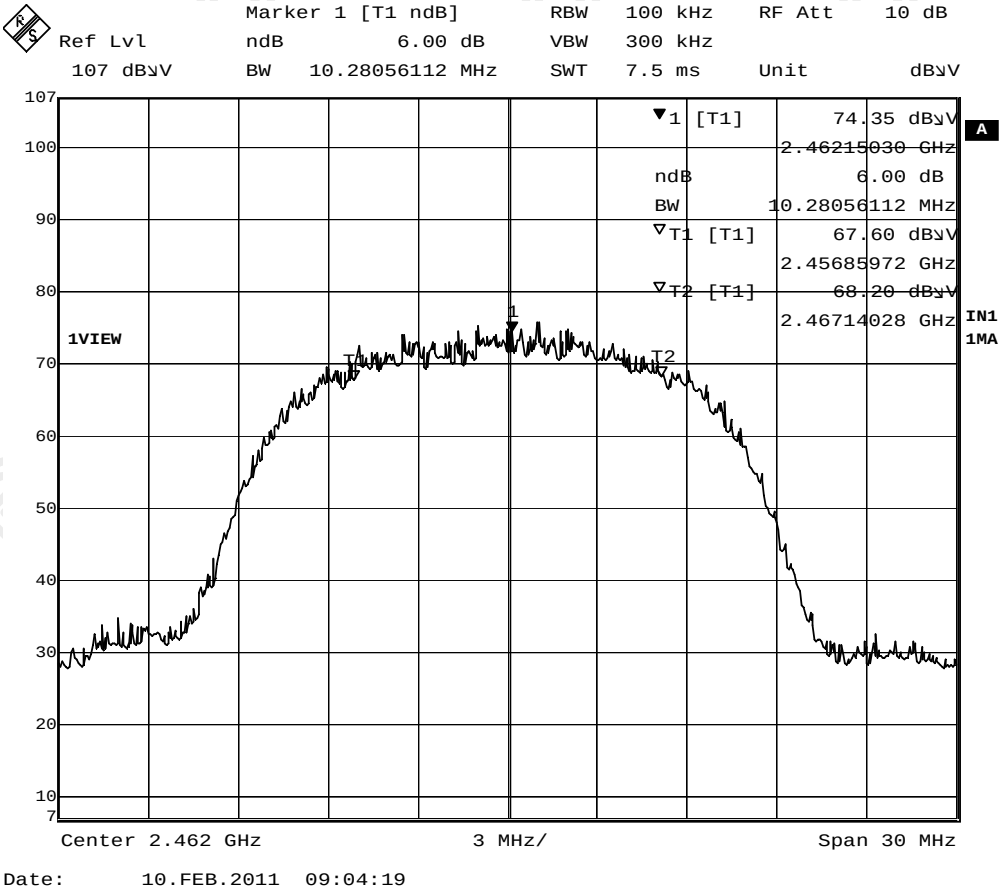
Tx mode 6 dB Bandwidth Plot on Configuration IEEE 802.11b CH6 **(Mid. Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462	10.28	> 500

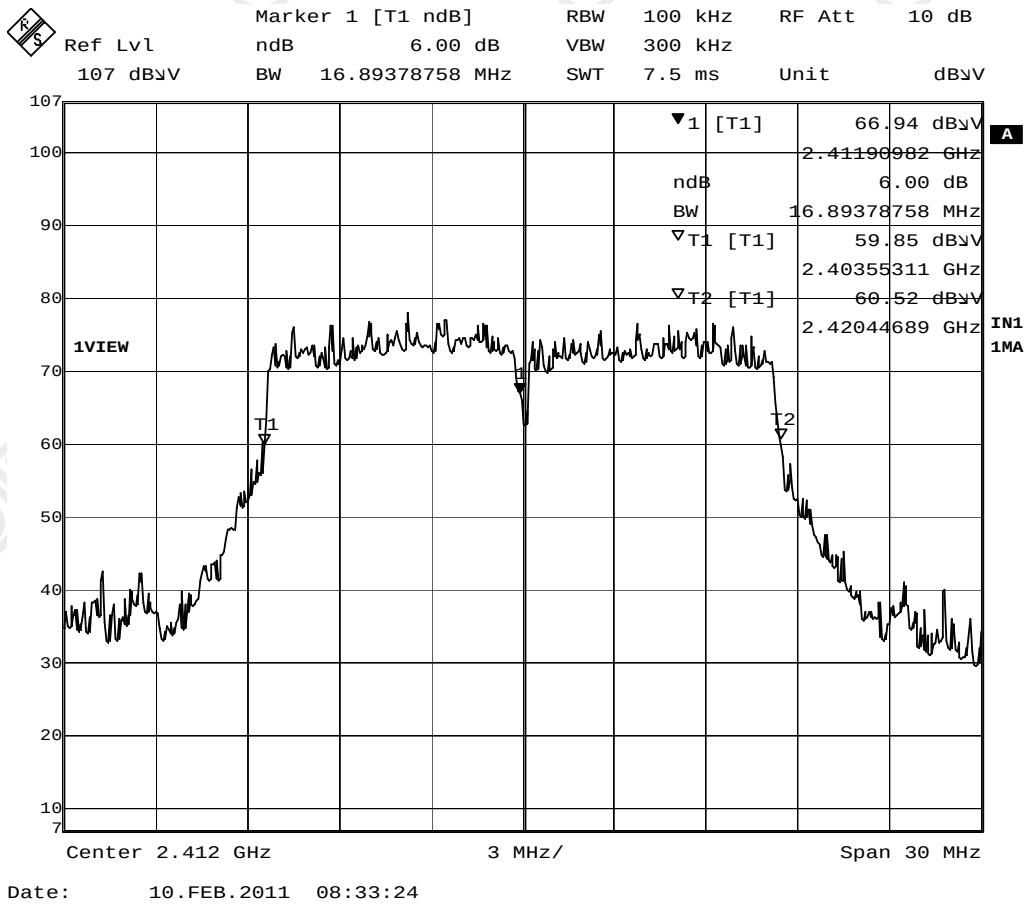
Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11b CH11**(Highest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412	16.89	> 500

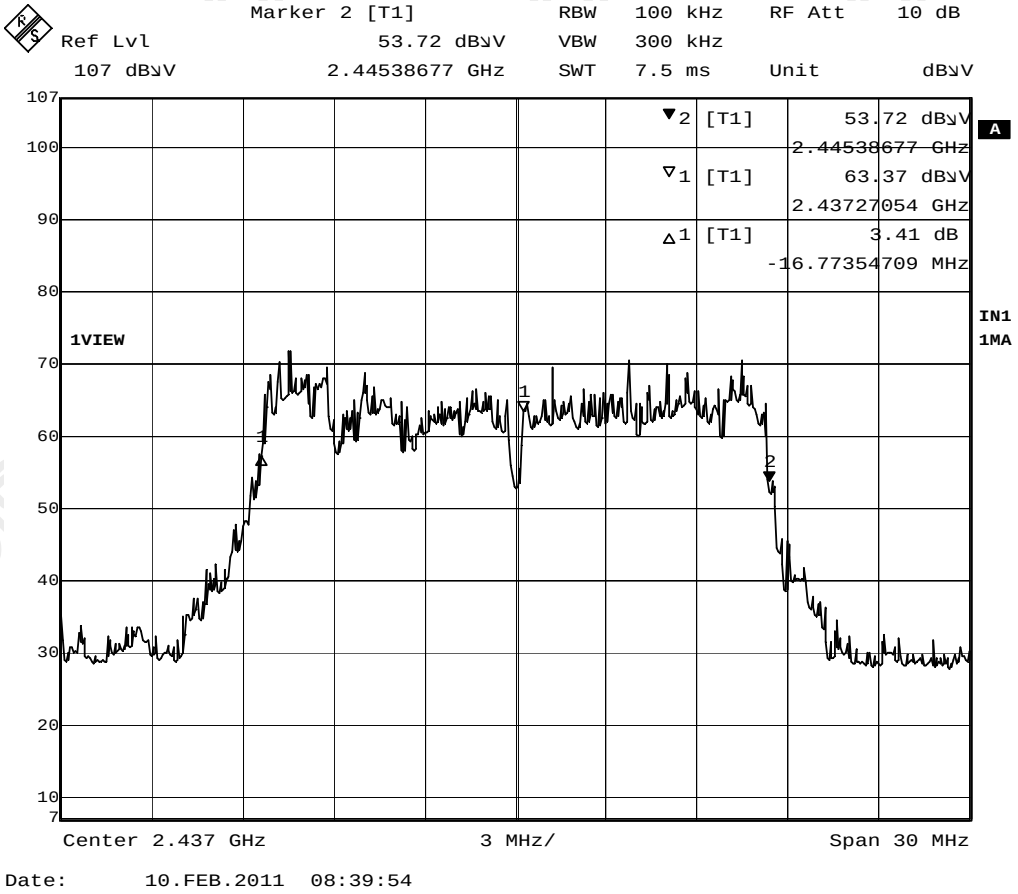
Tx mode 6 dB Bandwidth Plot on Configuration IEEE 802.11g CH1 **(Lowest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437	16.77	> 500

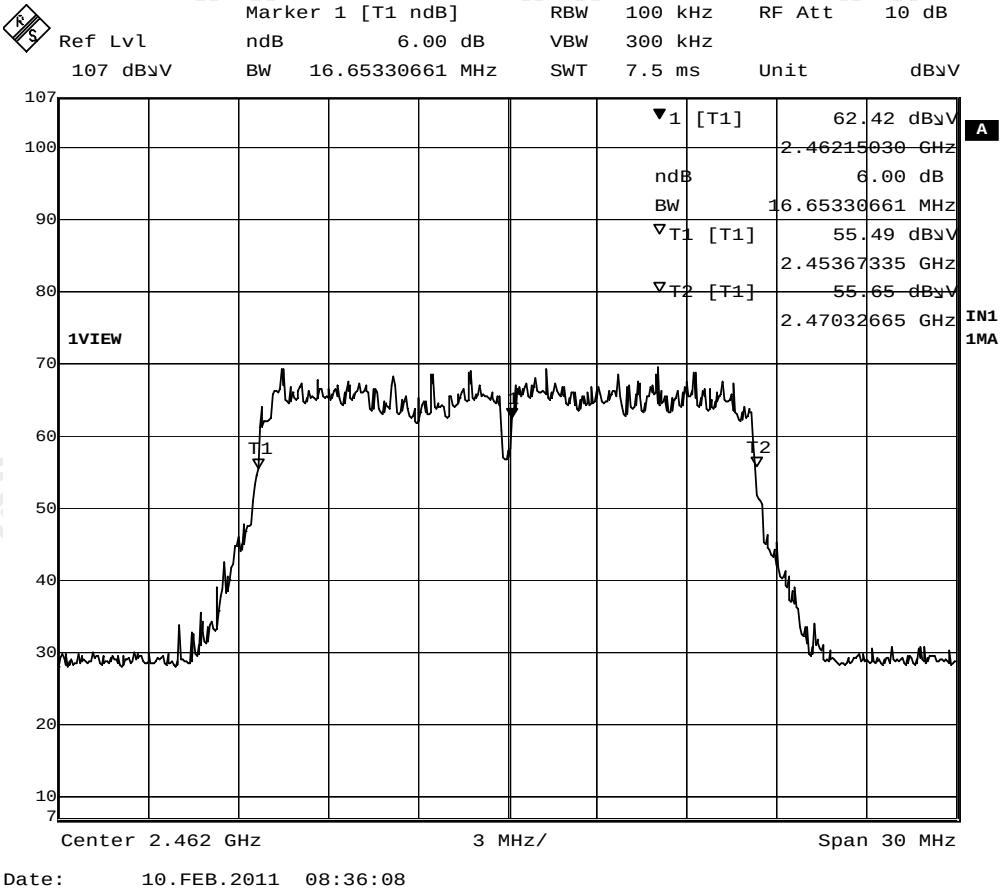
Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11g CH6 **(Mid. Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462	16.65	> 500

Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11g CH11 **(Highest Operating Frequency)**



3.2.5 Band Edges Measurement

Test Requirement:	FCC 47CFR 15.247
Test Method:	ANSI C63.4:2009
Test Date:	2011-02-10
Mode of Operation:	On Mode

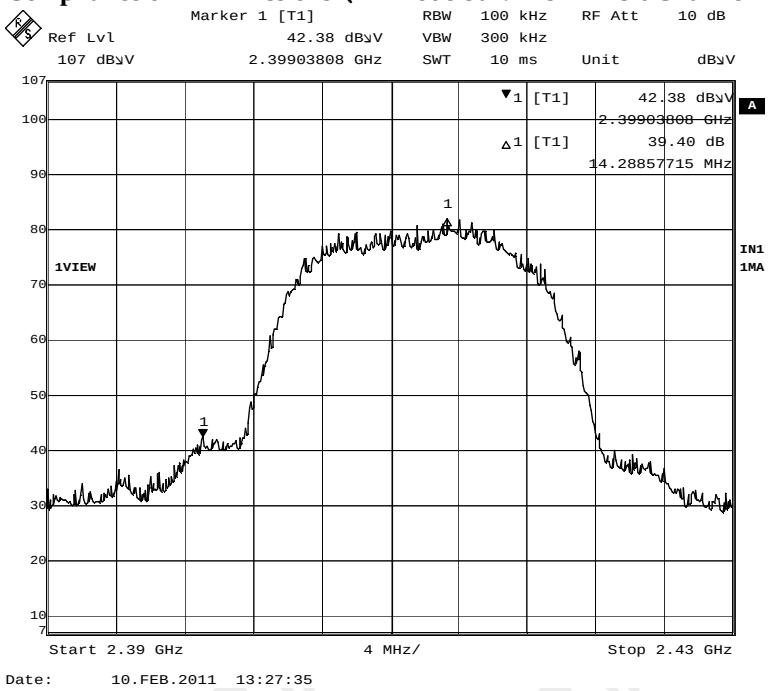
Test Method:

The band edge is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. The RBW and VBW are set to 100kHz for this measurement.

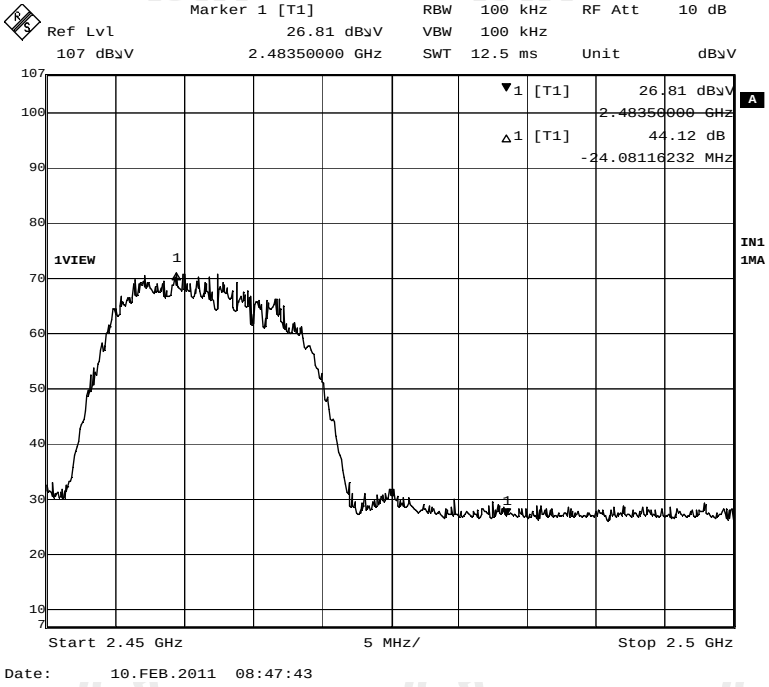
Test Setup:

As Test Setup of clause 3.2.1 in this test report.

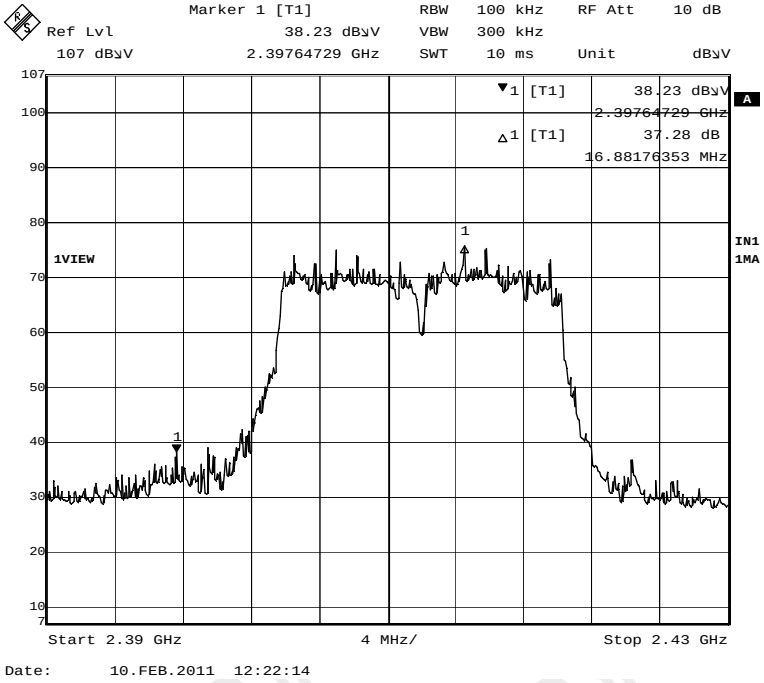
Band-edge Compliance of RF Emissions（Tx Mode 802.11 b 11Mbit Channel 1 - Lowest）



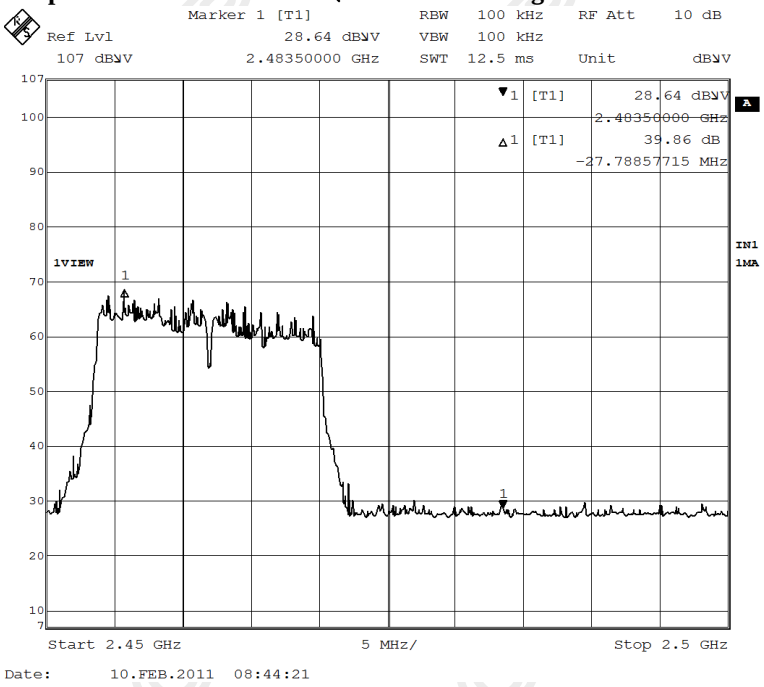
Band-edge Compliance of RF Emissions（Tx Mode 802.11 b 11Mbit Channel 11 - Highest）



Band-edge Compliance of RF Emissions（Tx Mode 802.11 g 54Mbit Channel 1 - Lowest）



Band-edge Compliance of RF Emissions（Tx Mode 802.11 g 54Mbit Channel 11 - Highest）



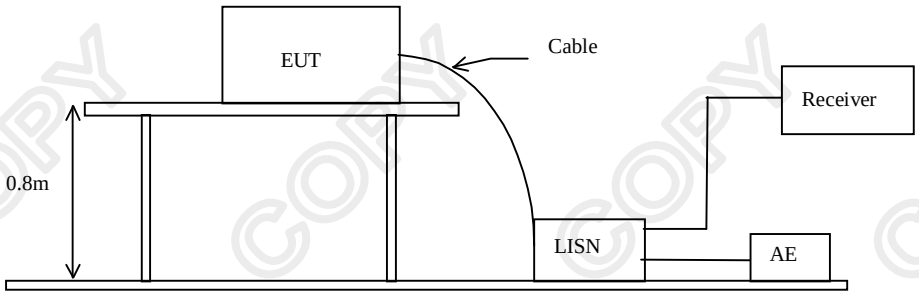
3.2.6 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2011-01-17
Mode of Operation:	Tx mode / On mode (connected to PC)

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:



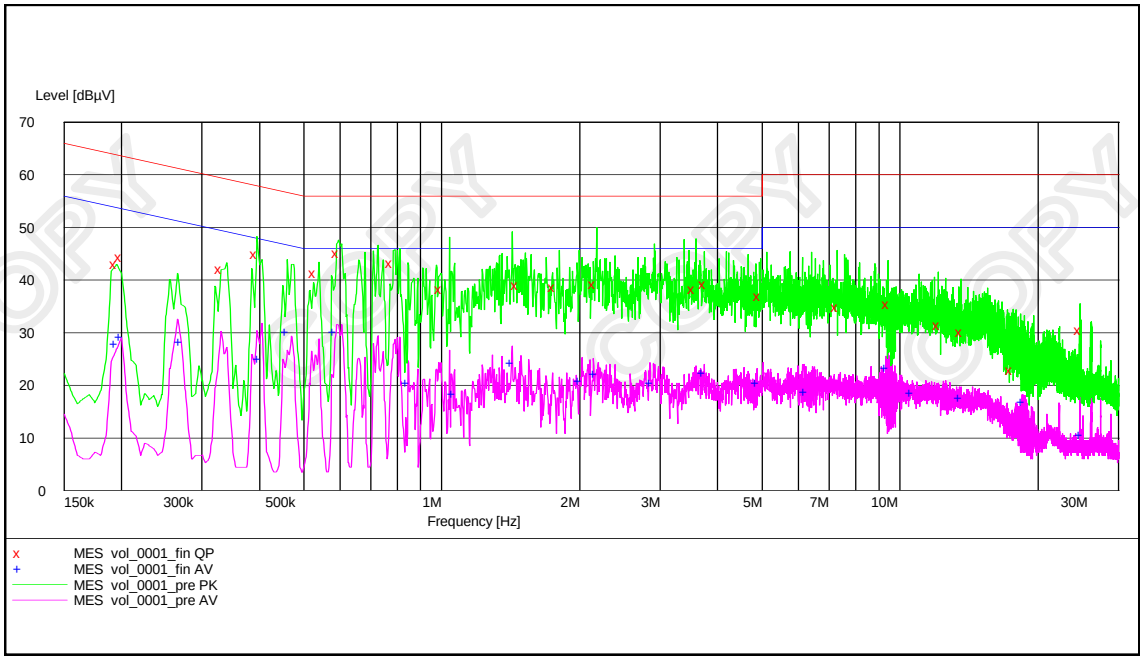
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Tx mode: PASS
Please refer to the following diagram for individual results.



Results of Tx mode: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBμV	dBμV	dBμV	dBμV
Live	0.195	43.0	64.0	-*-	-*-
Live	0.200	44.4	64.0	29.1	54.0
Live	0.270	-*-	-*-	28.2	51.0
Live	0.330	42.2	60.0	-*-	-*-
Live	0.395	44.9	58.0	-*-	-*-
Live	0.400	-*-	-*-	25.0	48.0
Live	0.530	41.3	56.0	-*-	-*-
Live	0.585	-*-	-*-	30.2	46.0
Live	0.595	45.1	56.0	-*-	-*-
Live	0.780	43.2	56.0	-*-	-*-
Live	1.065	-*-	-*-	18.4	46.0
Live	1.425	-*-	-*-	24.3	46.0
Live	1.765	38.8	56.0	-*-	-*-
Live	2.165	-*-	-*-	22.2	46.0
Live	3.765	39.2	56.0	-*-	-*-
Live	4.950	36.9	56.0	-*-	-*-
Live	9.445	35.4	60.0	-*-	-*-
Live	10.600	-*-	-*-	18.6	50.0
Live	13.540	-*-	-*-	17.6	50.0
Live	13.660	30.1	60.0	-*-	-*-
Live	17.565	22.9	60.0	-*-	-*-
Live	18.620	-*-	-*-	16.8	50.0
Live	24.780	30.5	60.0	-*-	-*-
Live	24.835	-*-	-*-	10.6	50.0

To be continues…

Results of Tx mode: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBμV	dBμV	dBμV	dBμV
Neutral	0.195	-*-	-*-	27.8	54.0
Neutral	0.460	-*-	-*-	30.2	47.0
Neutral	0.845	-*-	-*-	20.5	46.0
Neutral	1.000	38.2	56.0	-*-	-*-
Neutral	1.465	39.0	56.0	-*-	-*-
Neutral	2.005	-*-	-*-	20.9	46.0
Neutral	2.160	39.3	56.0	-*-	-*-
Neutral	2.870	-*-	-*-	20.5	46.0
Neutral	3.560	38.4	56.0	-*-	-*-
Neutral	3.735	-*-	-*-	22.3	46.0
Neutral	4.895	-*-	-*-	20.4	46.0
Neutral	6.235	-*-	-*-	18.7	50.0
Neutral	7.305	35.0	60.0	-*-	-*-
Neutral	9.375	-*-	-*-	23.3	50.0
Neutral	12.200	31.4	60.0	-*-	-*-

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

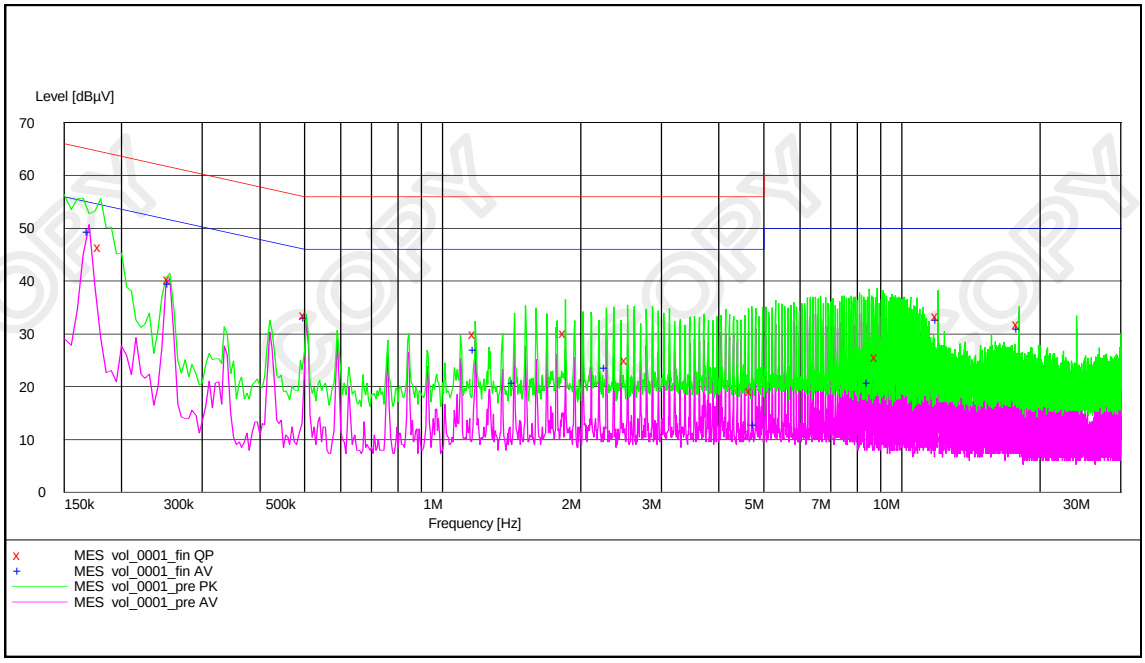
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode (connected to PC) – PC Side: PASS
Please refer to the following diagram for individual results.



Results of On mode (connected to PC) – PC Side: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBμV	dBμV	dBμV	dBμV
Live	0.170	-*-	-*-	49.2	55.0
Live	0.180	46.4	65.0	-*-	-*-
Live	0.255	40.5	62.0	-*-	-*-
Live	0.505	-*-	-*-	33.1	46.0
Live	1.180	-*-	-*-	26.9	46.0
Live	2.530	25.0	56.0	-*-	-*-
Live	8.850	25.7	60.0	-*-	-*-
Live	18.000	31.9	60.0	30.8	50.0
Neutral	0.255	-*-	-*-	39.5	52.0
Neutral	0.505	33.5	56.0	-*-	-*-
Neutral	1.180	30.0	56.0	-*-	-*-
Neutral	1.435	-*-	-*-	20.8	46.0
Neutral	1.855	30.2	56.0	-*-	-*-
Neutral	2.275	-*-	-*-	13.5	46.0
Neutral	4.720	19.1	56.0	-*-	-*-
Neutral	4.805	-*-	-*-	12.7	46.0
Neutral	8.510	-*-	-*-	20.8	50.0
Neutral	12.000	33.4	60.0	32.5	50.0

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

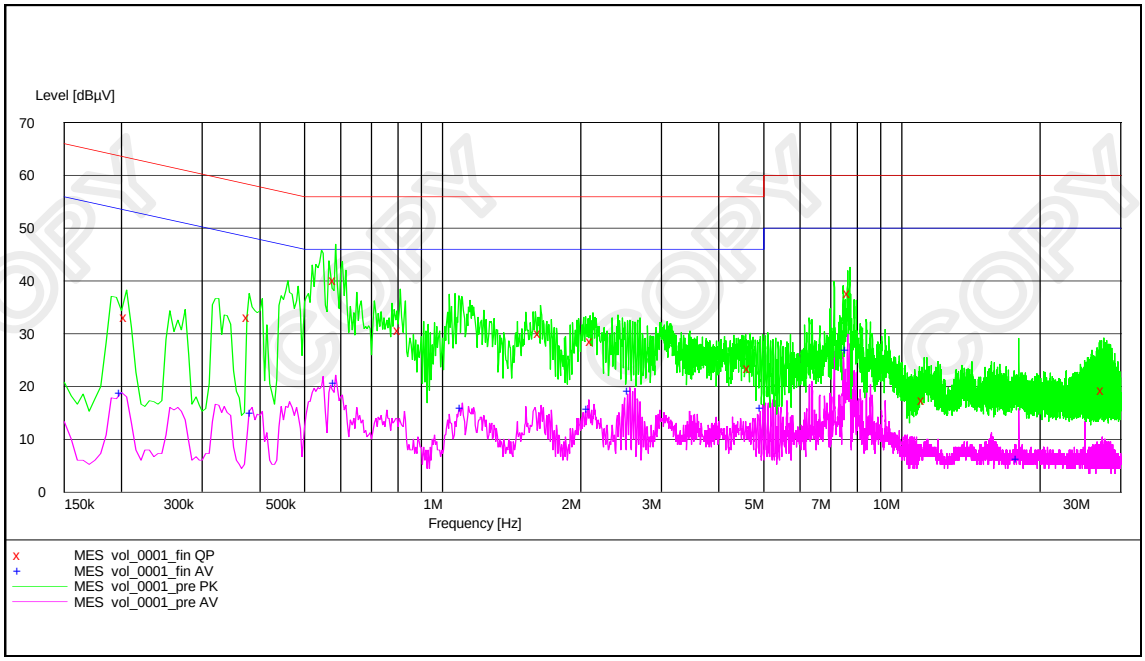
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode (connected to PC) - EUT side: PASS
Please refer to the following diagram for individual results.



Results of On mode (connected to PC) - EUT side: PASS

Conductor	Frequency	Quasi-peak		Average	
		Level	Limit	Level	Limit
Live or Neutral	MHz	dBμV	dBμV	dBμV	dBμV
Live	0.205	33.2	63.0	-*-	-*-
Live	0.380	33.2	58.0	-*-	-*-
Live	0.385	-*-	-*-	15.0	48.0
Live	0.585	-*-	-*-	20.6	46.0
Live	0.810	30.6	56.0	-*-	-*-
Live	1.105	-*-	-*-	16.0	46.0
Live	2.085	-*-	-*-	15.7	46.0
Live	4.675	23.4	56.0	-*-	-*-
Live	4.980	-*-	-*-	15.9	46.0
Live	7.625	-*-	-*-	26.9	50.0
Live	11.195	17.5	60.0	-*-	-*-
Live	27.565	19.4	60.0	-*-	-*-
Neutral	0.200	-*-	-*-	18.7	54.0
Neutral	0.585	40.2	56.0	-*-	-*-
Neutral	1.635	30.2	56.0	-*-	-*-
Neutral	2.125	28.7	56.0	-*-	-*-
Neutral	2.555	-*-	-*-	19.1	46.0
Neutral	7.710	37.7	60.0	-*-	-*-
Neutral	17.995	-*-	-*-	6.2	50.0

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

3.2.7 Antenna Requirement

Test Requirements: § 15.203

Test Specification:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Results:

The EUT has 1 Antenna which is permanently attached to the main unit and attached on PCB board, the antenna gain = 0dBi. All component install on inside of EUT. User unable to remove or changed the Antenna.

3.2.8 Number of Operating Channels

Frequency List for 802.11 b/g.

Item	Frequency（MHz）
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

3.2.9 RF Exposure

Test Requirement:	FCC 47CFR 15.247(b)(5)
Test Date:	2011-01-17
Mode of Operation:	Tx mode

Test Method:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

Test Results:

The EUT complied with the requirement(s) of this section.
EUT meets the requirements of these sections as proven through MPE calculation
The MPE calculation for EUT @ 20cm
Based on the highest P = 1.52mW

Pd = PG/ 4pi*R^2 = (1.52 x 1.0)/12.566* $(20)^2$
= (1.52)/12.56637x 400= 1.52 / 5026.55
= 0.0003mW/cm^2

where:
*Pd = power density in mW/cm2
* G = Antenna numeric gain (1.0); Log G = g/10 (g = 0).
* P = Conducted RF power to antenna (1.87 mW).
* R = Minimum allowable distance.(20 cm)

*The power density Pd = 0.00037 mW/cm^2 is less than 1 mW/cm^2 (listed MPE limit)
*The SAR evaluation is not needed (this is a desk top device, R> 20 cm)
* The EUT(antenna) must be 0.2 meters away from the General Population.

Appendix A

List of Measurement Equipment

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM020	HORN ANTENNA	EMCO	3115	4032	2009/09/02	2011/09/02
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2010/10/25	2011/10/25
EM174	BICONILOG ANTENNA	EMCO	3142B	1671	2010/02/09	2012/02/09
EM229	EMI Test Receiver	R&S	ESIB40	100248	2010/11/02	2011/11/02
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2009/09/07	2011/09/07

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2010/10/13	2011/10/13
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2010/07/01	2011/07/01
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2011/01/23	2012/01/23

Remarks:-

CM Corrective Maintenance

N/A Not Applicable or Not Available

TBD To Be Determined

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	IBM NOTEBOOK	ThinkPad T400	N/A	P8700/3M/2.53GHz C2D; 2G DDR3 RAM, 320GB HDD, DVD+/-RW, 14.1" WXGA, Intel X4500, 1.3M Web Cam, Intel 5100 AGN, BT, FPR, 6CELL, Eng/TC(C&L)Win 7 Pro(EE), 2GB DDR3-1066 SO-DIMM Memory
2	DELL MONITOR	E551C	ARSCM356N	RESOLUTION:800x600(DURING TESTING) 1.0M UNSHIEDED POWER CORD CONNECTED TO THE COMPUTER 2.8M SHIELDED CABLE CONNECTED TO THE COMPUTER
4	DELL MOUSE	N/A	N/A	2.4M UNSHIELDED CABLE CONNECTED TO THE COMPUTER

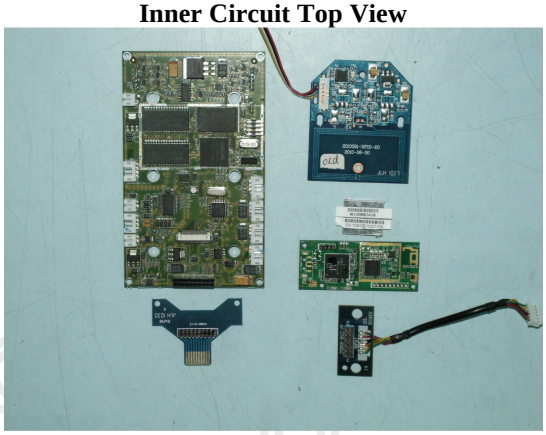
Appendix C

Photographs of EUT

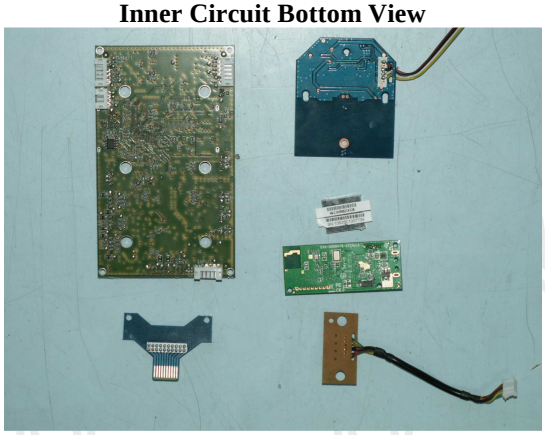
Front View of the product

Rear View of the product

Inner Circuit Top View



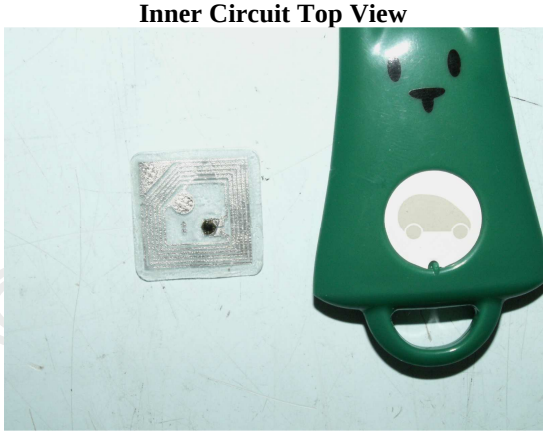
Inner Circuit Bottom View



Front View of the product

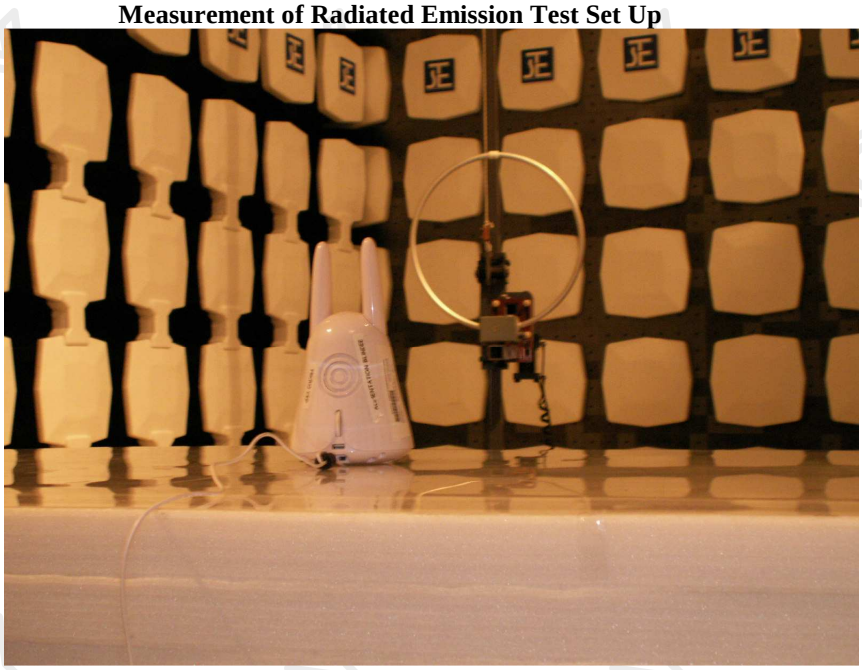
Rear View of the product

Inner Circuit Top View

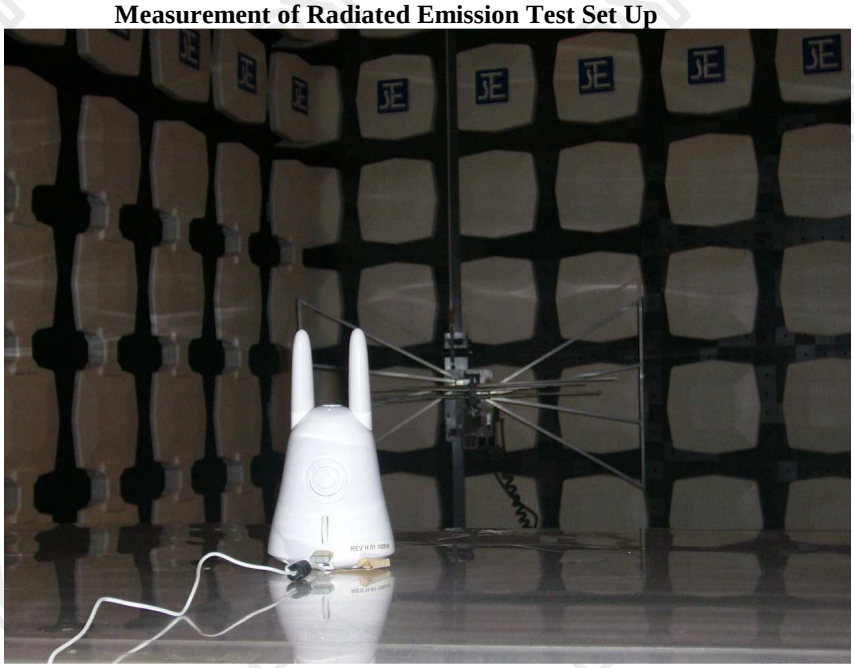


Inner Circuit Bottom View

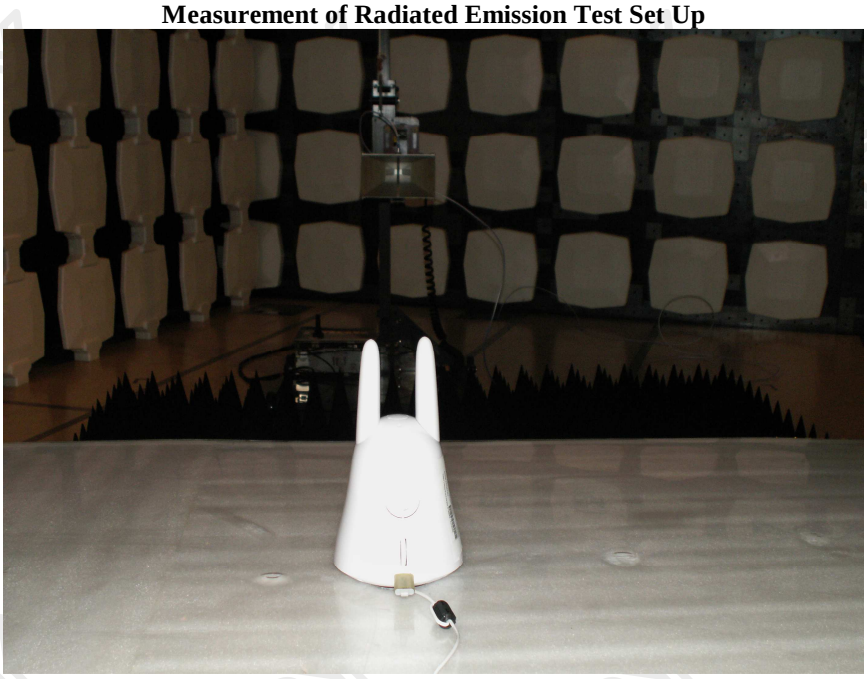
Measurement of Radiated Emission Test Set Up



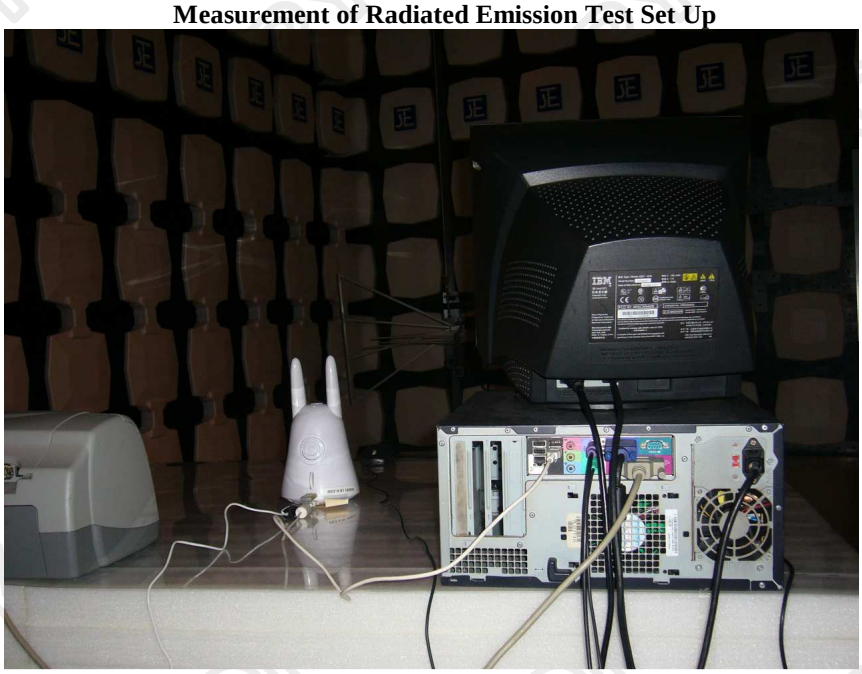
Measurement of Radiated Emission Test Set Up



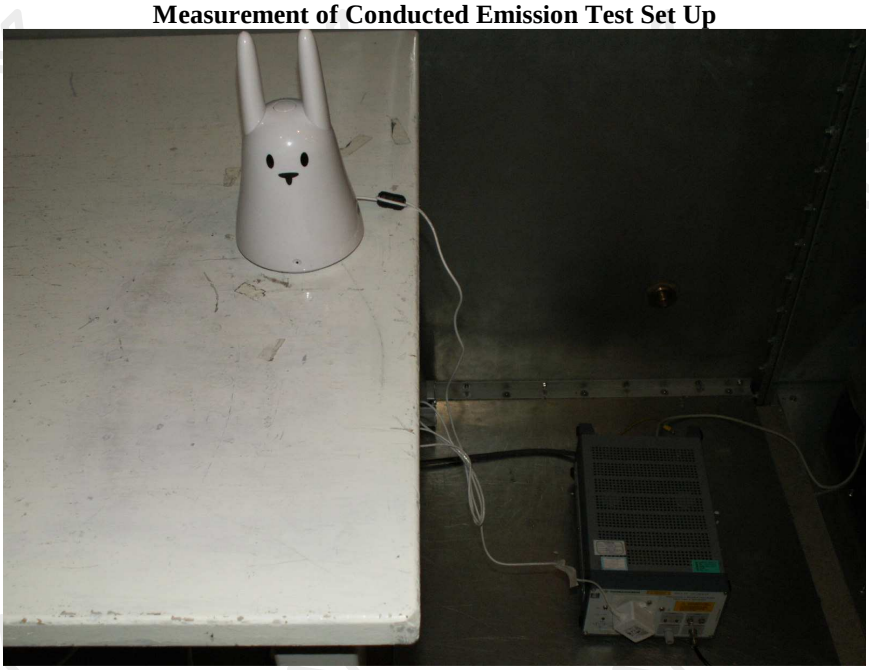
Measurement of Radiated Emission Test Set Up



Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



Measurement of Conducted Emission Test Set Up

******* End of Test Report *******

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