



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

FOR

10.1 INCH TABLET WITH 802.11abgn 1X1 + BT 4.0

MODEL NUMBER: TP00043A/TP00043AFX

**FCC ID: PU5-TP00043AFX
IC: 4182A-TP00043AFX**

REPORT NUMBER: 12U14464

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NVLAP[®]

NVLAP LAB CODE 100255-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	8/29/12	Initial Issue	M. Antola
1	9/17/12	Updated Bandedge data with 10kHz VBW and updated average spurious with 10kHz VBW	M. Antola

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: WISTRON CORPORATION
21F, 88, SEC. 1, HSIN TAI WU RD., HSICHIH
TAIPEI HSIEN 221, TAIWAN R.O.C

EUT DESCRIPTION: 10.1 INCH TABLET WITH 802.11abgn 1X1 + BT 4.0

MODEL: TP00043A/TP00043AFX

SERIAL NUMBER: BCM4330

DATE TESTED: 2012-08-20 to 2012-08-28

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations of these calculations. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation, as described by the referenced documents. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL By:



Bob DeLisi
WiSE Principal Engineer
UL LLC

Tested By:



Mike Antola
WiSE Project Lead
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 1285 Walt Whitman Rd. Melville, NY 11747, USA.

UL Melville is accredited by NVLAP, Laboratory Code 100255-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/1002550.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	$\pm 3.3 \text{ dB}$
Radiated Disturbance, 30 to 1000 MHz	$\pm 4.00 \text{ dB}$

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a transceiver which utilizes 802.11abgn 1x1 + BT4.0.

The radio module is manufactured by Broadcom.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum average conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	16.00	39.81
2412 - 2462	802.11g	14.40	27.54
2412 - 2462	802.11n HT20	13.90	24.55
5745 - 5825	802.11a	12.65	18.41
5745 - 5825	802.11n HT20	12.40	17.38

Note: Output power measurements are average power measurements and used to confirm the device was operating within expected tolerances (+/- 0.5dB) of the power during original tests

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of 1.88 dBi in the 2.4GHz band and 0.17 dBi in the 5GHz band.

WHAYU Industrial Co.,Ltd.

Main Antenna : 25.90AG6.001 PIFA Antenna Gain: 0.04
Aux Antenna : 25.90AG7.001 PIFA Antenna Gain: -2.23

Wistron NeWeb Corporation

Main Antenna : 25.90ADN.001 PIFA Antenna Gain: 1.88
Aux Antenna : 25.90ADP.001 PIFA Antenna Gain: 0.17

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom version 5.93.97.48.

The test utility software used during testing was Broadcom "wl command" utility.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Headphone	---	---	---	---
Mouse	Dell	M-UK	---	---

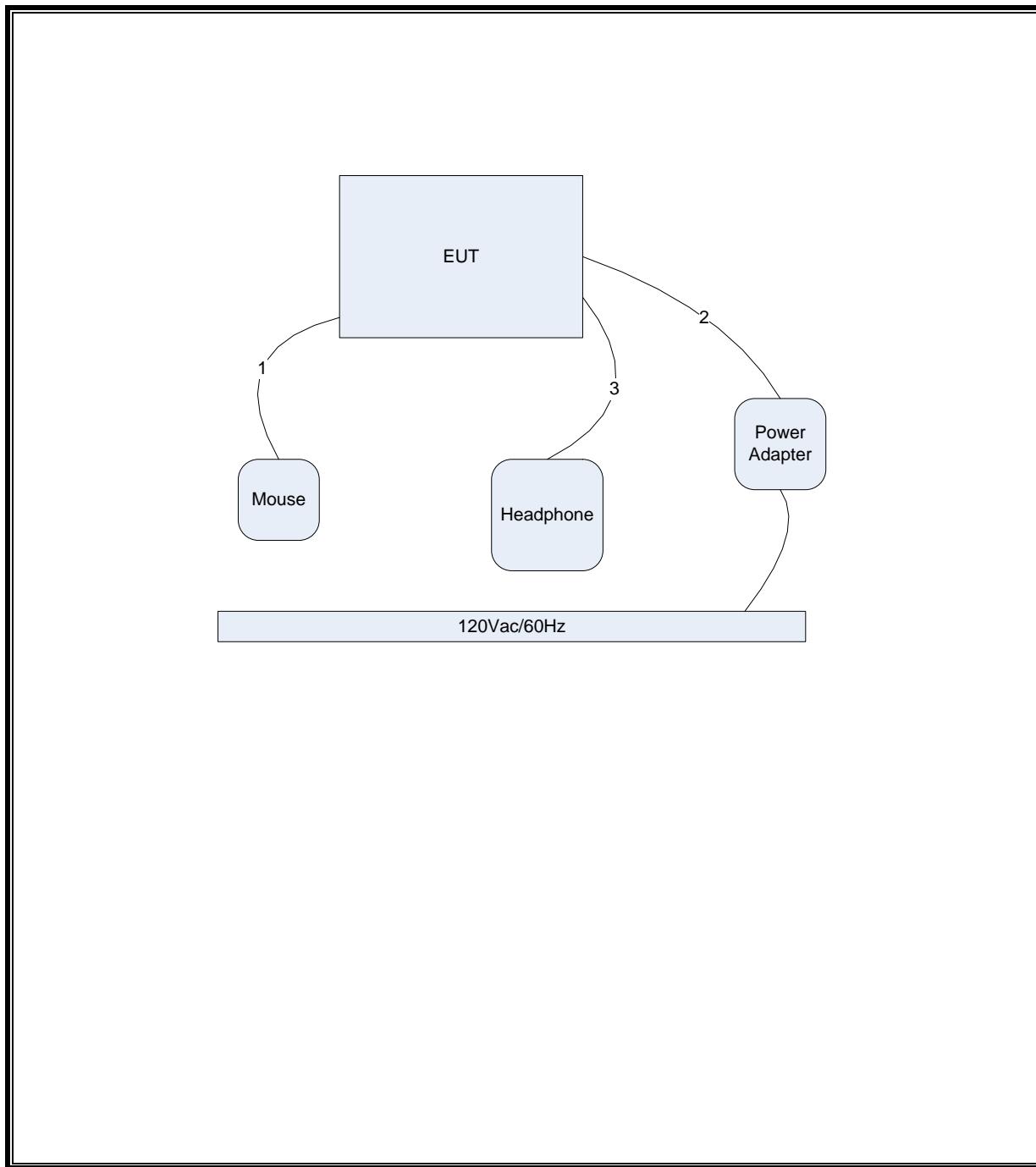
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB	USB	<3M	
2	Micro-USB	1	USB	USB	<3M	
3	Headphone	1	Phono	Phono	<3M	

TEST SETUP

The EUT is a stand-alone device. Test software exercised the radio module.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081	2012-01-30	2013-01-30
Bicon Antenna	Schaffner	VBA6106A	54	2012-04-10	2013-04-10
Log-P Antenna	Schaffner	UPA6109	44067	2012-05-16	2013-05-16
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	83III	ME5B-305	2012-02-01	2013-02-28
Above 1GHz (Band Optimized System)					
EMI Receiver	Rohde & Schwarz	ESIB40	34968	2012-03-06	2013-03-06
Horn Antenna (1-2 GHz)	ETS	3161-01	51442	2008-03-28	See * below
Horn Antenna (2-4 GHz)	ETS	3161-02	48107	2007-09-27	See * below
Horn Antenna (4-8 GHz)	ETS	3161-03	48106	2007-09-27	See * below
Horn Antenna (8-12 GHz)	ETS	3160-07	8933	2008-11-24	See * below
Horn Antenna (12-18 GHz)	ETS	3160-08	8932	2007-09-27	See * below
Horn Antenna (18-26.5 GHz)	ETS	3160-09	8947	2007-09-26	See * below
Horn Antenna (26.5-40 GHz)	ETS	3160-10	73004	2007-09-26	See * below
Signal Path Controller	HP	11713A	50250	N/A	N/A
Gain Controller	HP	11713A	50251	N/A	N/A
RF Switch / Preamp Fixture	UL	BOMS1	50249	N/A	N/A
System Controller	UL	BOMS2	50252	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	83III	ME5B-305	2012-02-01	2013-02-28

* - Note: As allowed by the calibration standard ANSI C63.4 Section 4.4.2, standard gain horns need only a one-time calibration. Only if physical damage occurs will the horn antenna require re-calibration.

* Gain standard horn antennas (sometimes called standard gain horn antennas) need not be calibrated beyond that which is provided by the manufacturer unless they are damaged or deterioration is suspected, or they are used at a distance closer than $2D^2/\lambda$. Gain standard horn antennas have gains that are fixed by their dimensions and dimensional tolerances.

Conducted Antenna Port Tests					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Spectrum Analyzer	Agilent	E4446A	72822	2012-01-31	2013-02-28
Power Sensor	Rohde & Schwarz	NRP-Z81	73137	2011-09-27	2012-09-27
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43733	2012-03-13	2014-03-13
Multimeter	Fluke	83III	ME5B-305	2012-02-01	2013-02-28

7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

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

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

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

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

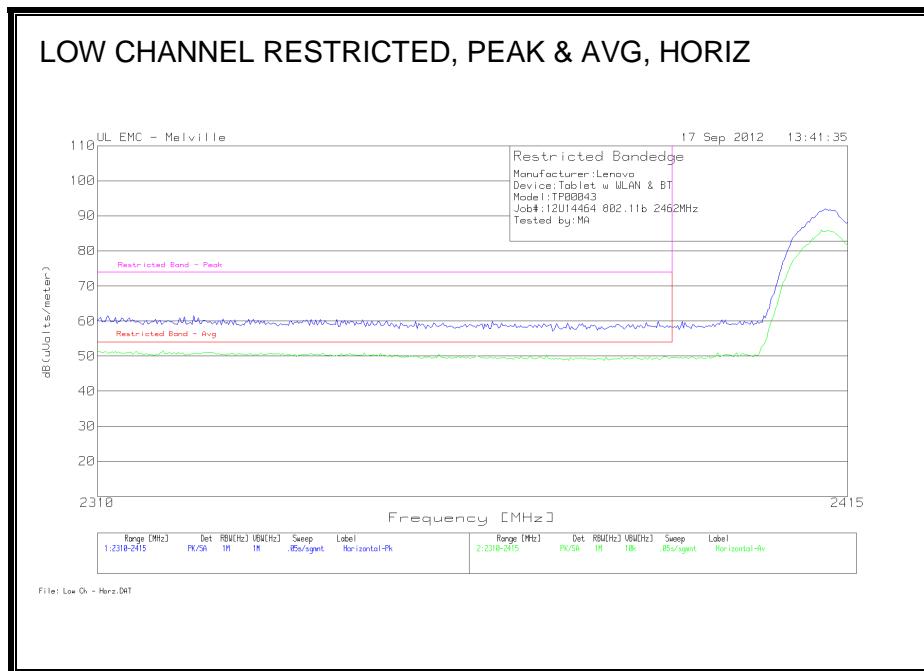
Mode	ON Time B (usec)	Period (usec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (Hz)
2437MHz b Mode	940	972	0.967	96.7%	0.15	1,064
2437MHz g Mode	176	214	0.822	82.2%	0.85	5,682
2437MHz n Mode	151	190	0.795	79.5%	1.00	6,623

*- A VBW of 10 kHz was used based on the measured Duty Cycle of the EUT.

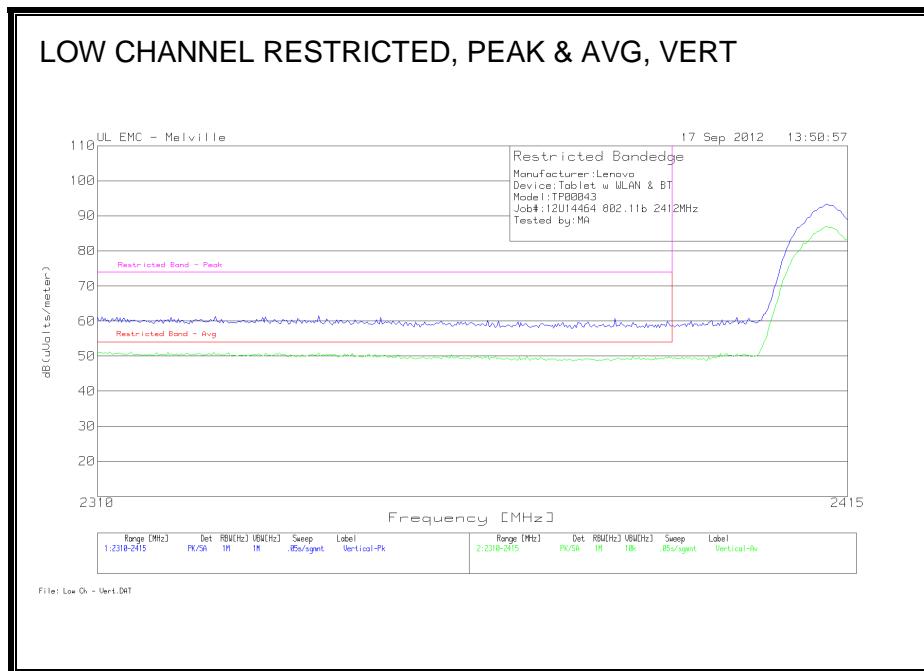
7.2. TRANSMITTER ABOVE 1 GHz

7.2.1. TX ABOVE 1 GHz FOR 802.11b 1TX MODE IN THE 2.4 GHz BAND

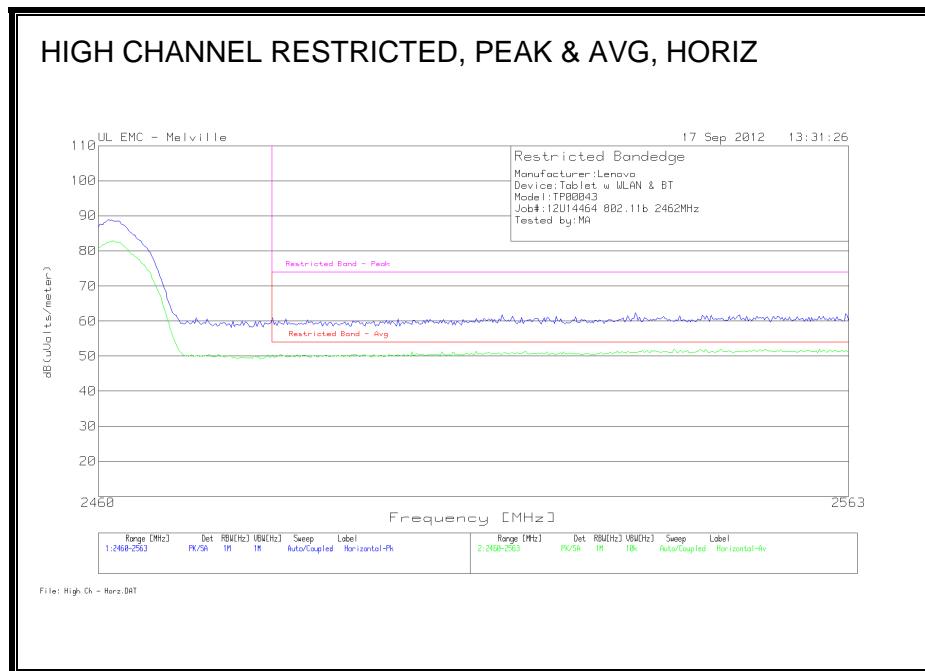
RESTRICTED BANDEdge (LOW CHANNEL, HORIZONTAL)



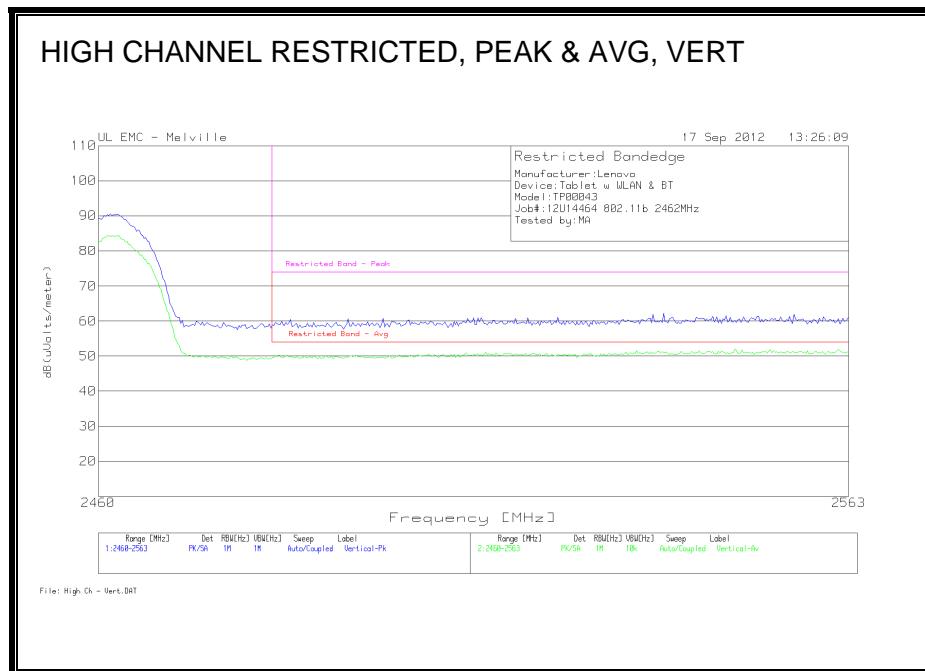
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



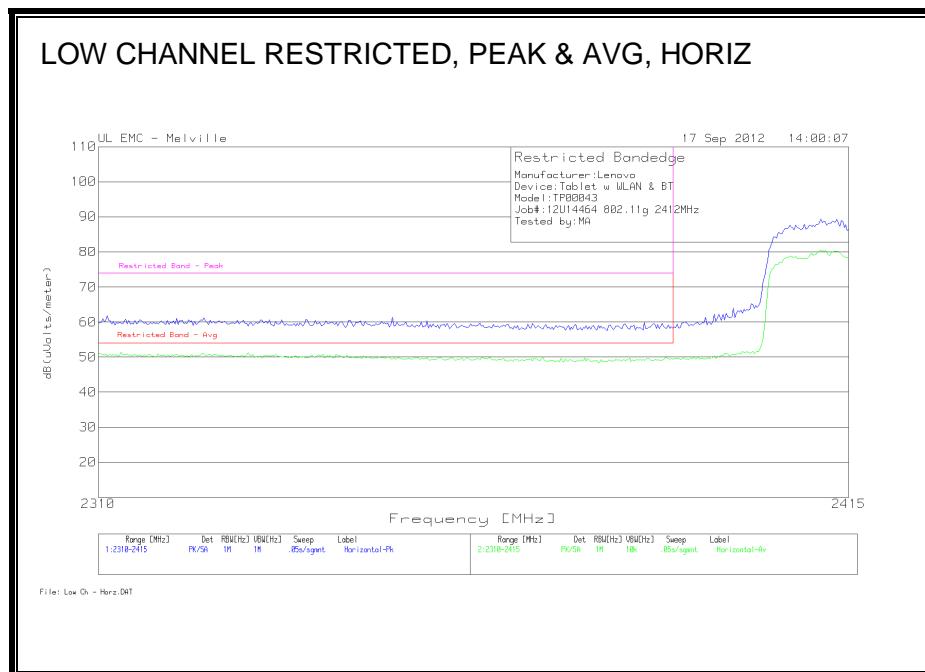
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



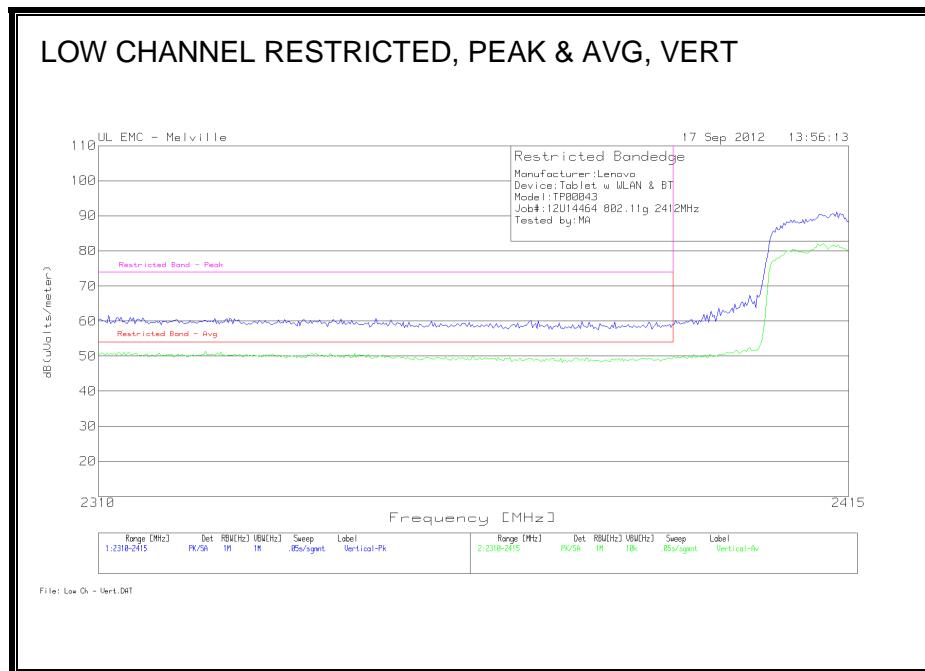
HARMONICS AND SPURIOUS EMISSIONS

7.2.2. TX ABOVE 1 GHz FOR 802.11g 1TX MODE IN THE 2.4 GHz BAND

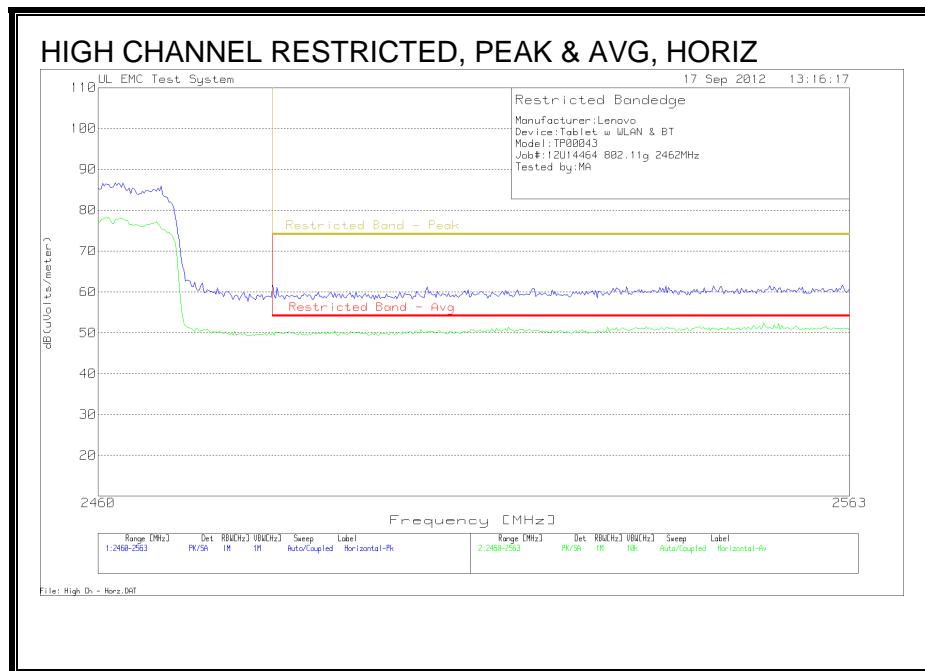
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



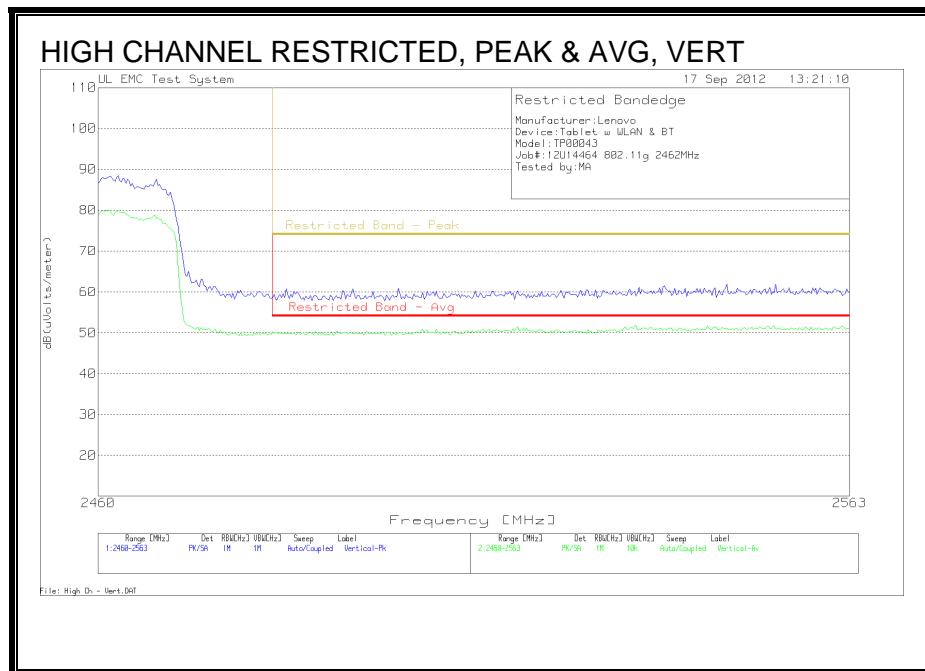
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



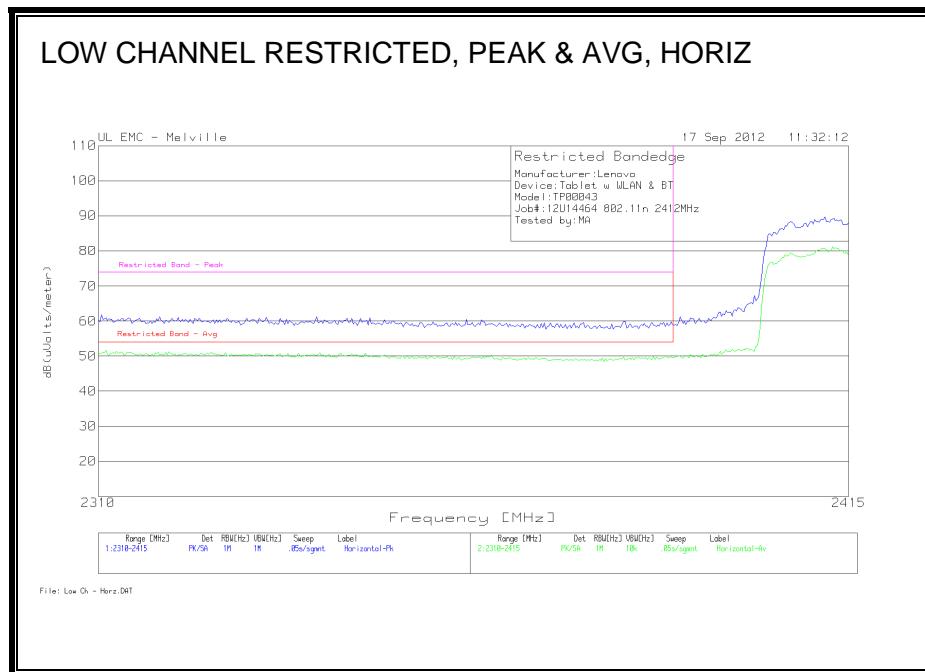
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



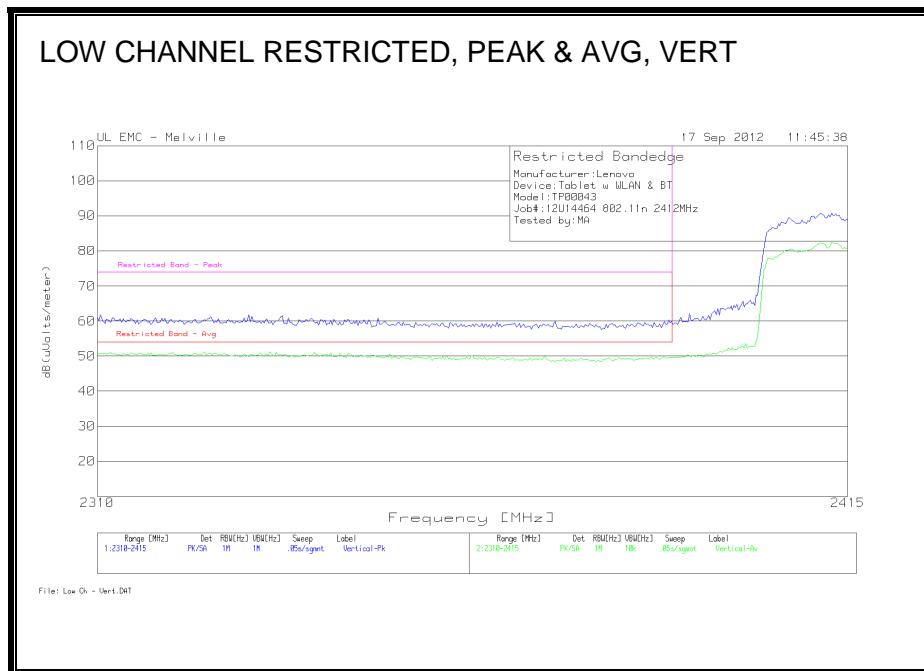
HARMONICS AND SPURIOUS EMISSIONS

7.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 1TX MODE IN THE 2.4 GHz BAND

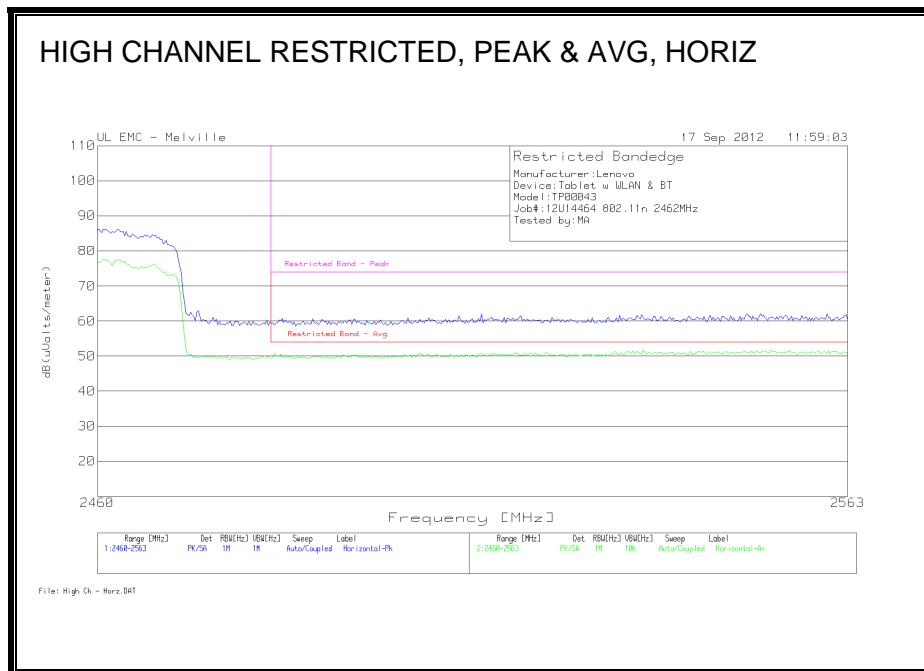
RESTRICTED BANDEdge (LOW CHANNEL, HORIZONTAL)



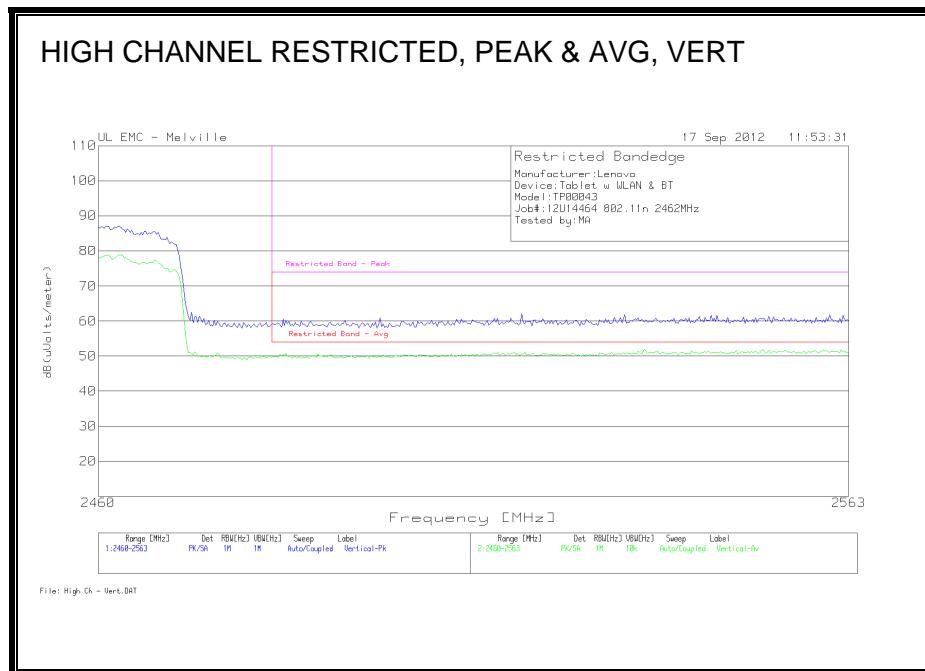
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

7.2.4. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

Manufacturer:Lenovo											
Device:Tablet with BT and WLAN											
Model:TP00043											
Job#:12U14464											
Tested by:MA 802.11a 54Mbps											
Low Channel - 5745MHz											
Test Frequency		Meter Reading	Detector	AF-8933 [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	FCC Part 15 Subpart C Margin	Margin Peak	Azimuth [Degs]	Height [cm]
11490.04		54.31	PK	33.4	-49.48	38.23	54	-15.77	74	-35.77	201
11490.04		44.48	LnAv	33.4	-49.48	28.4	54	-25.6	74	-45.6	201
11485.792		58.75	PK	33.4	-49.75	42.4	54	-11.6	74	-31.6	250
11485.792		46.29	LnAv	33.4	-49.75	29.94	54	-24.06	74	-44.06	250
Mid Channel - 5785MHz											
Test Frequency		Meter Reading	Detector	AF-8933 [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	FCC Part 15 Subpart C Margin	Margin Peak	Azimuth [Degs]	Height [cm]
11569.238		61.64	PK	33.5	-49.57	45.57	54	-8.43	74	-28.43	20
11569.238		48.96	LnAv	33.5	-49.57	32.89	54	-21.11	74	-41.11	20
11570.361		61.57	PK	33.5	-49.58	45.49	54	-8.51	74	-28.51	206
11570.361		48.52	LnAv	33.5	-49.58	32.44	54	-21.56	74	-41.56	206
High Channel - 5825MHz											
Test Frequency		Meter Reading	Detector	AF-8933 [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	FCC Part 15 Subpart C Margin	Margin Peak	Azimuth [Degs]	Height [cm]
11649.579		58.67	PK	33.5	-49.51	42.66	54	-11.34	74	-31.34	16
11649.579		45.93	LnAv	33.5	-49.51	29.92	54	-24.08	74	-44.08	16
11650.421		60.83	PK	33.6	-49.52	44.91	54	-9.09	74	-29.09	198
11650.421		47.19	LnAv	33.6	-49.52	31.27	54	-22.73	74	-42.73	198
PK - Peak detector											
LnAv - Linear Average detector											

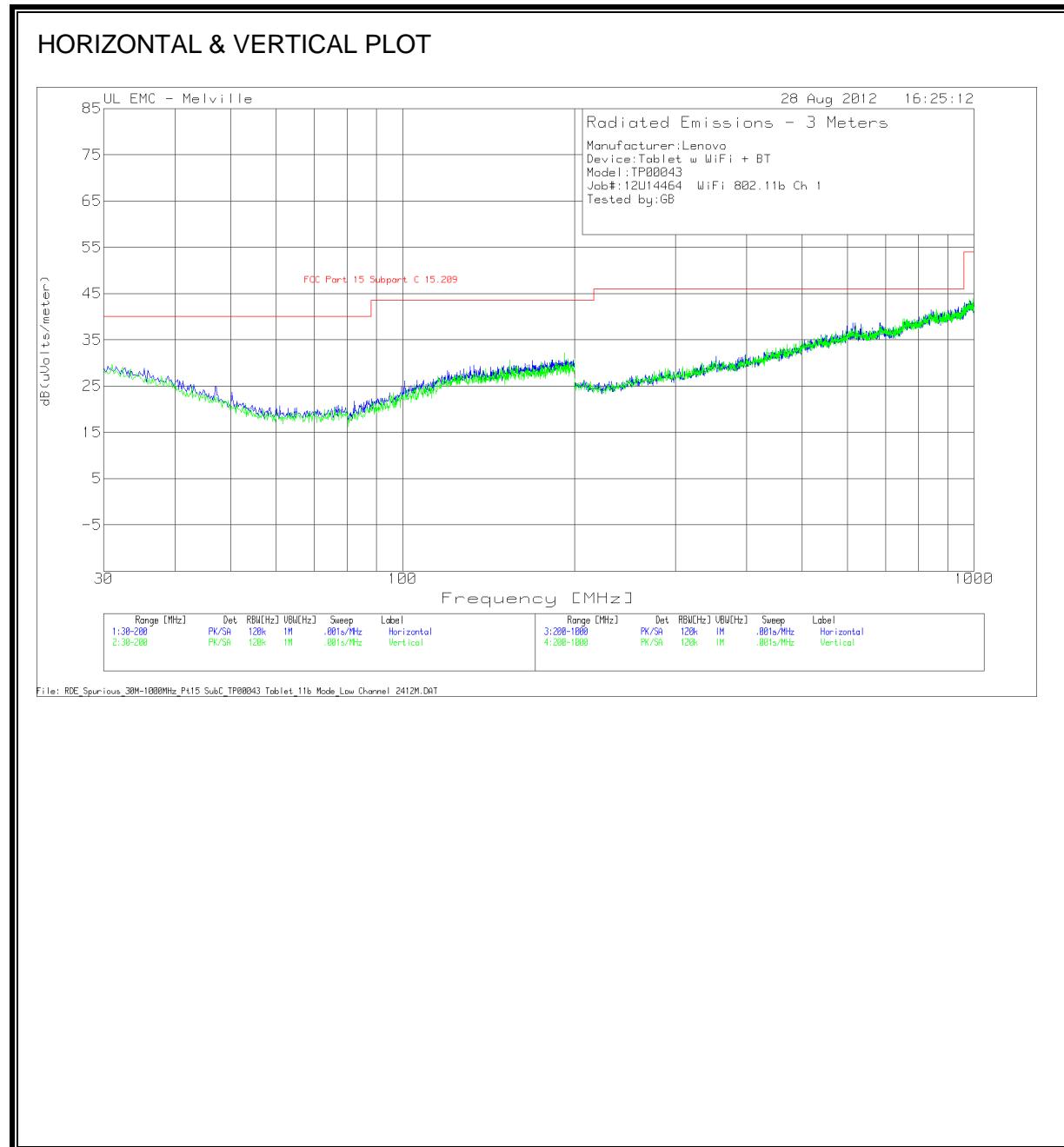
7.2.5. TRANSMITTER ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

Manufacturer:Lenovo											
Device:Tablet with BT and WLAN											
Model:TP00043											
Job#:12U14464											
Tested by:MA 802.11n MCS7											
Low Channel - 5745MHz											
Test Frequency	Meter Reading	Detector	AF-8933 [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]
11491.363	56.66	PK	33.4	-49.41	40.65	54	-13.35	74	-33.35	194	165 Horz
11491.208	47.24	LnAv	33.4	-49.42	31.22	54	-22.78	74	-42.78	194	165 Horz
11481.824	57.71	PK	33.4	-49.57	41.54	54	-12.46	74	-32.46	253	303 Vert
11481.824	45.64	LnAv	33.4	-49.57	29.47	54	-24.53	74	-44.53	253	303 Vert
Mid Channel - 5785MHz											
Test Frequency	Meter Reading	Detector	AF-8933 [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]
11573.447	58.77	PK	33.5	-49.23	43.04	54	-10.96	74	-30.96	184	160 Horz
11573.447	46	LnAv	33.5	-49.23	30.27	54	-23.73	74	-43.73	184	160 Horz
11569.9	57.82	PK	33.5	-49.62	41.7	54	-12.3	74	-32.3	72	189 Vert
11569.9	45.49	LnAv	33.5	-49.62	29.37	54	-24.63	74	-44.63	72	189 Vert
High Channel - 5825MHz											
Test Frequency	Meter Reading	Detector	AF-8933 [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]
11647.715	61.92	PK	33.5	-49.72	45.7	54	-8.3	74	-28.3	300	272 Horz
11647.715	48.33	LnAv	33.5	-49.72	32.11	54	-21.89	74	-41.89	300	272 Horz
11649.058	62.22	PK	33.5	-49.57	46.15	54	-7.85	74	-27.85	205	369 Vert
11649.058	49	LnAv	33.5	-49.57	32.93	54	-21.07	74	-41.07	205	369 Vert
PK - Peak detector											
LnAv - Linear Average detector											

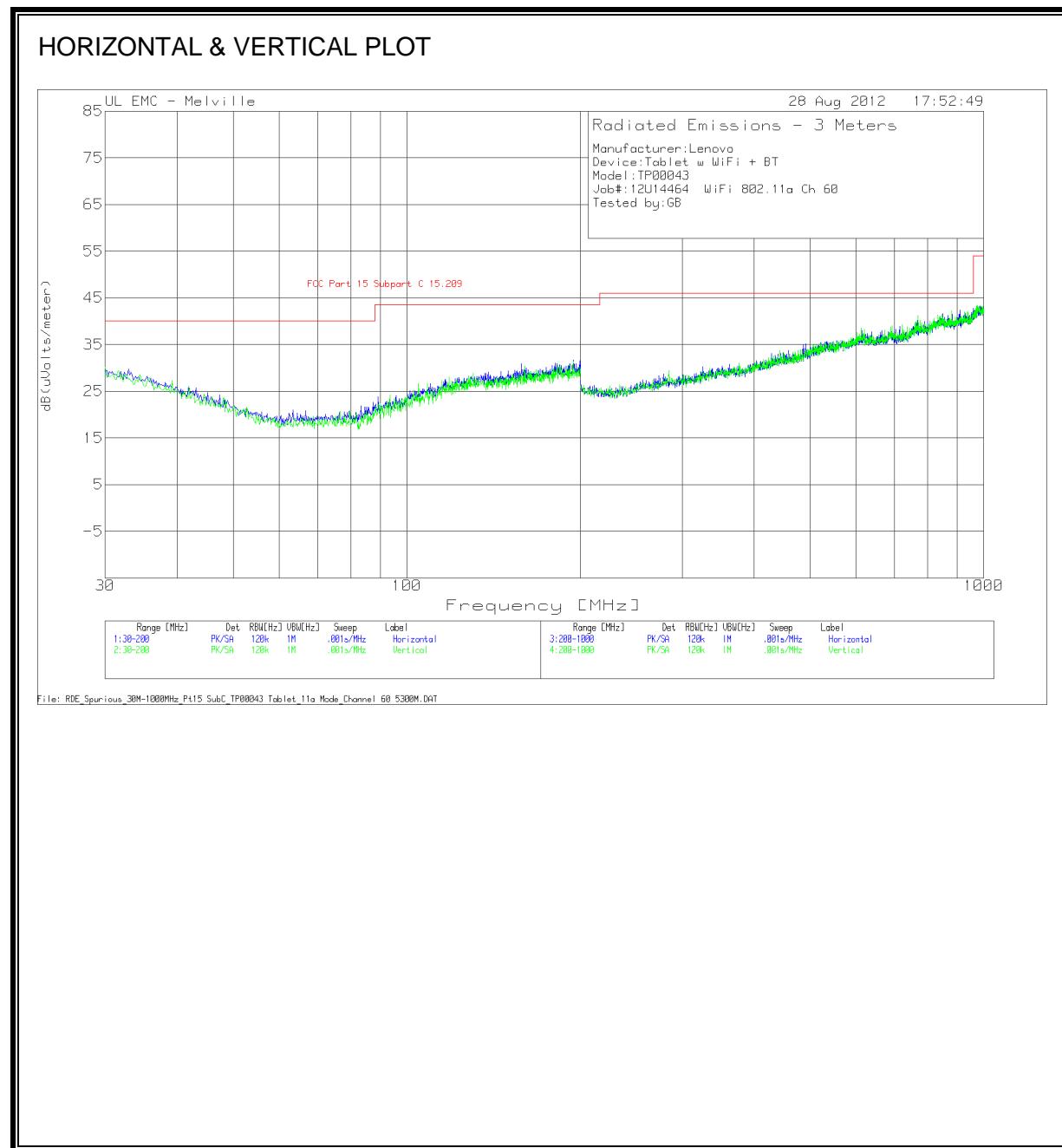
7.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION IN 2.4GHz BAND)



HORIZONTAL & VERTICAL DATA

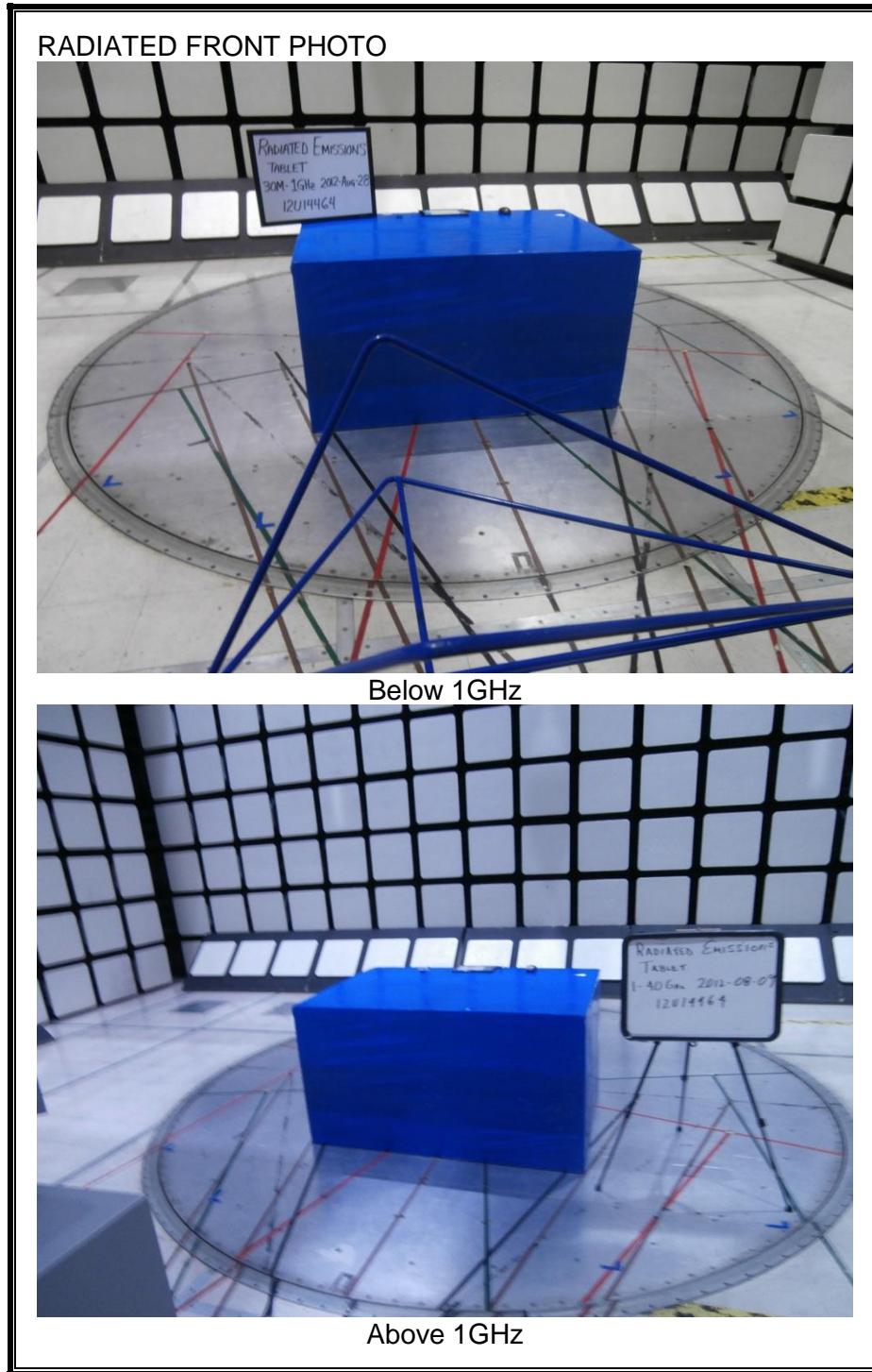
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION IN 5GHz BAND)



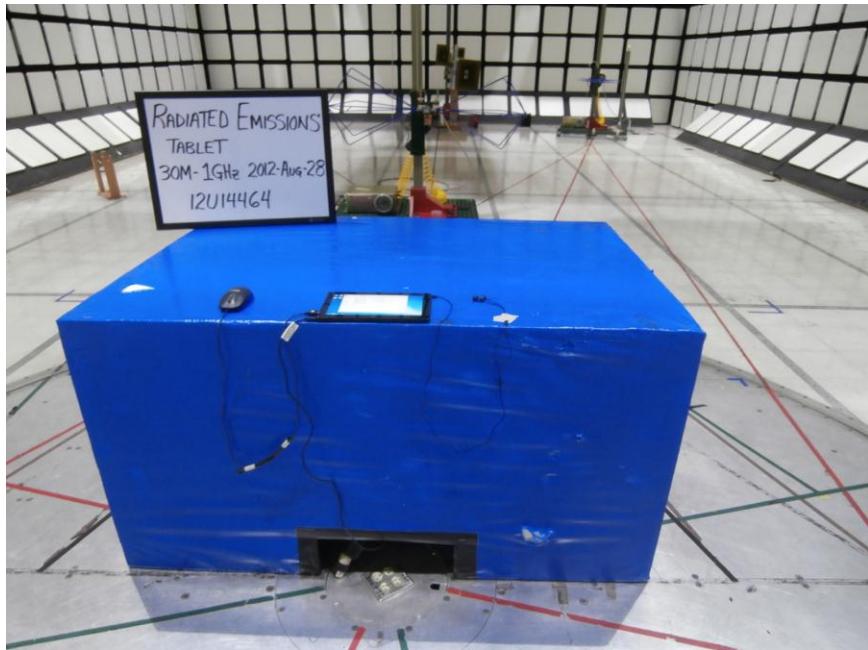
HORIZONTAL & VERTICAL DATA

8. SETUP PHOTOS

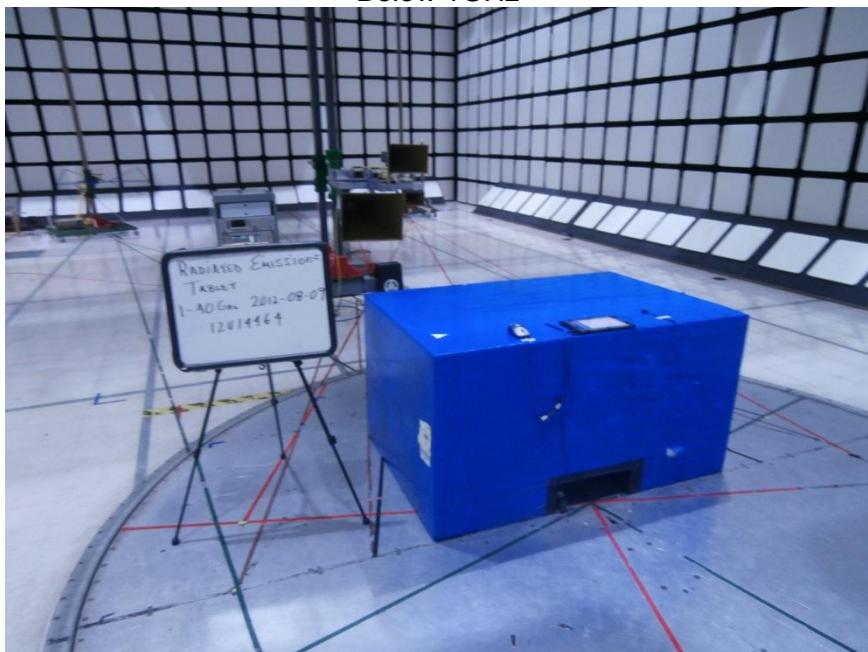
RADIATED RF MEASUREMENT SETUP



RADIATED BACK PHOTO



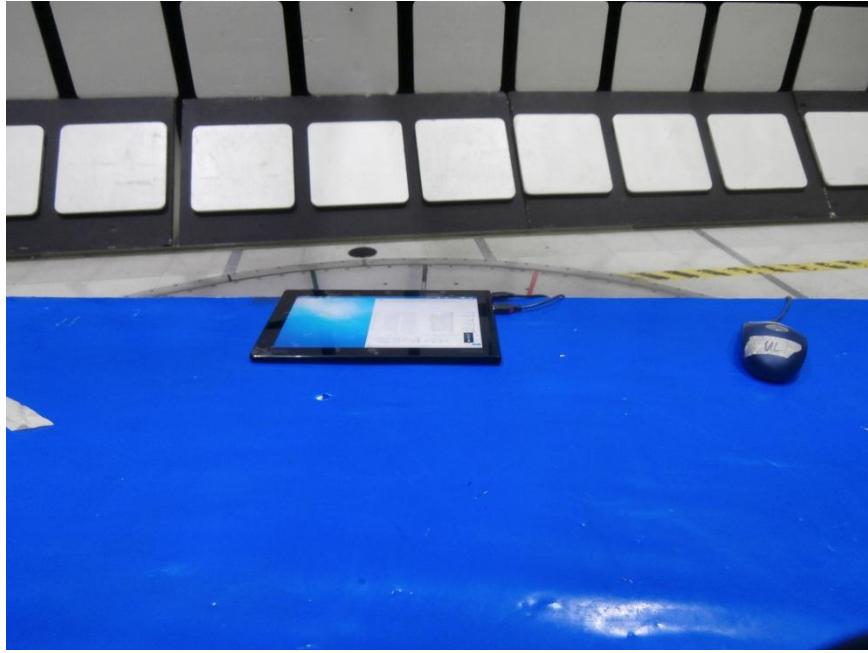
Below 1GHz



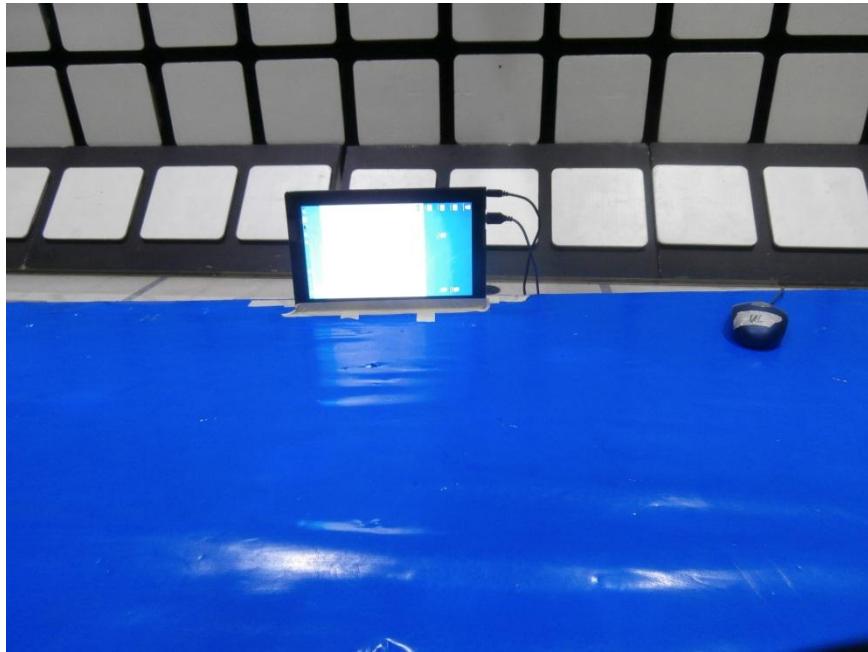
Above 1GHz

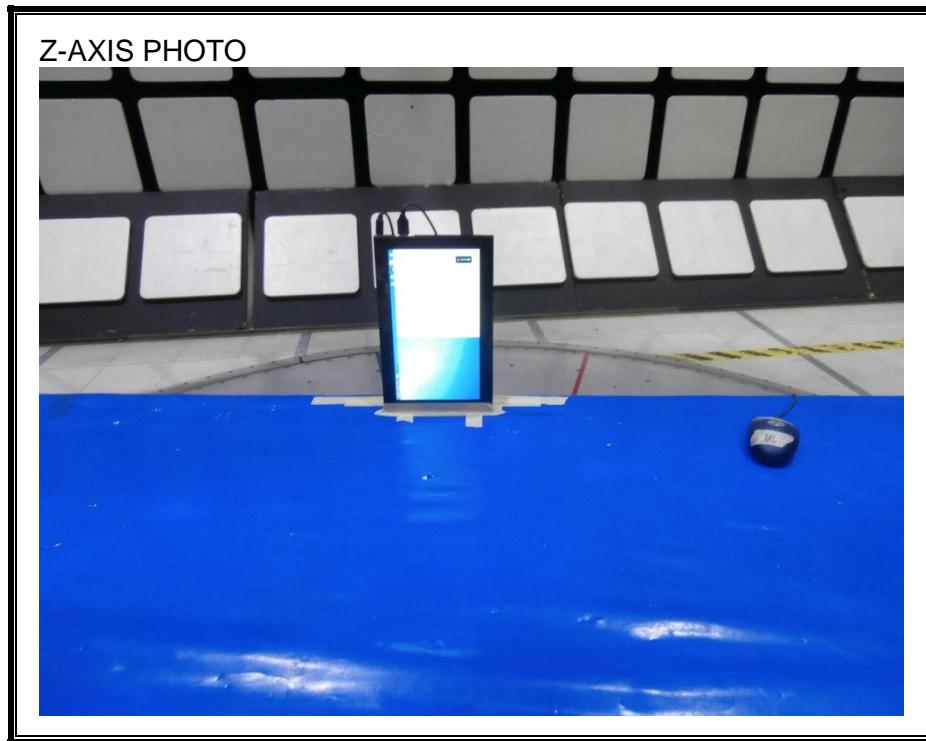
RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

X-AXIS PHOTO



Y-AXIS PHOTO





END OF REPORT