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

FCC MODEL NUMBER: TP00043A
IC MODEL NUMBER: TP00043AEF

FCC ID: PU5-TP00043AEF
IC: 4182A-TP00043AEF

REPORT NUMBER: 12U14468

ISSUE DATE: 2012-08-31
REVISION DATE: 2012-10-05

Prepared for
WISTRON CORPORATION
21F, 88, SEC. 1, HSIN TAI WU RD., HSICHIH
TAIPEI HSIEN 221,
TAIWAN
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	8/31/12	Initial Issue	M. Antola
1	10/5/12	Updated bandedge section. Misc. editorial updates.	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 (FCC) / TP00043AEF (IC)

SERIAL NUMBER: PROTOTYPE

DATE TESTED: 2012-08-29 to 2012-08-31

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 Principle Engineer
UL

Tested By:

Mike Antola
WiSE Project Lead
UL

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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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	± 3.3 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.00 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 transmitter module is manufactured by Broadcom, model BCM94330LGA.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	8.35	6.84
2402 - 2480	Enhanced 8PSK	8.67	7.36

Note: Output power measurements are peak 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.

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 BT test mode tool, Win8DUTApp 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	---	---

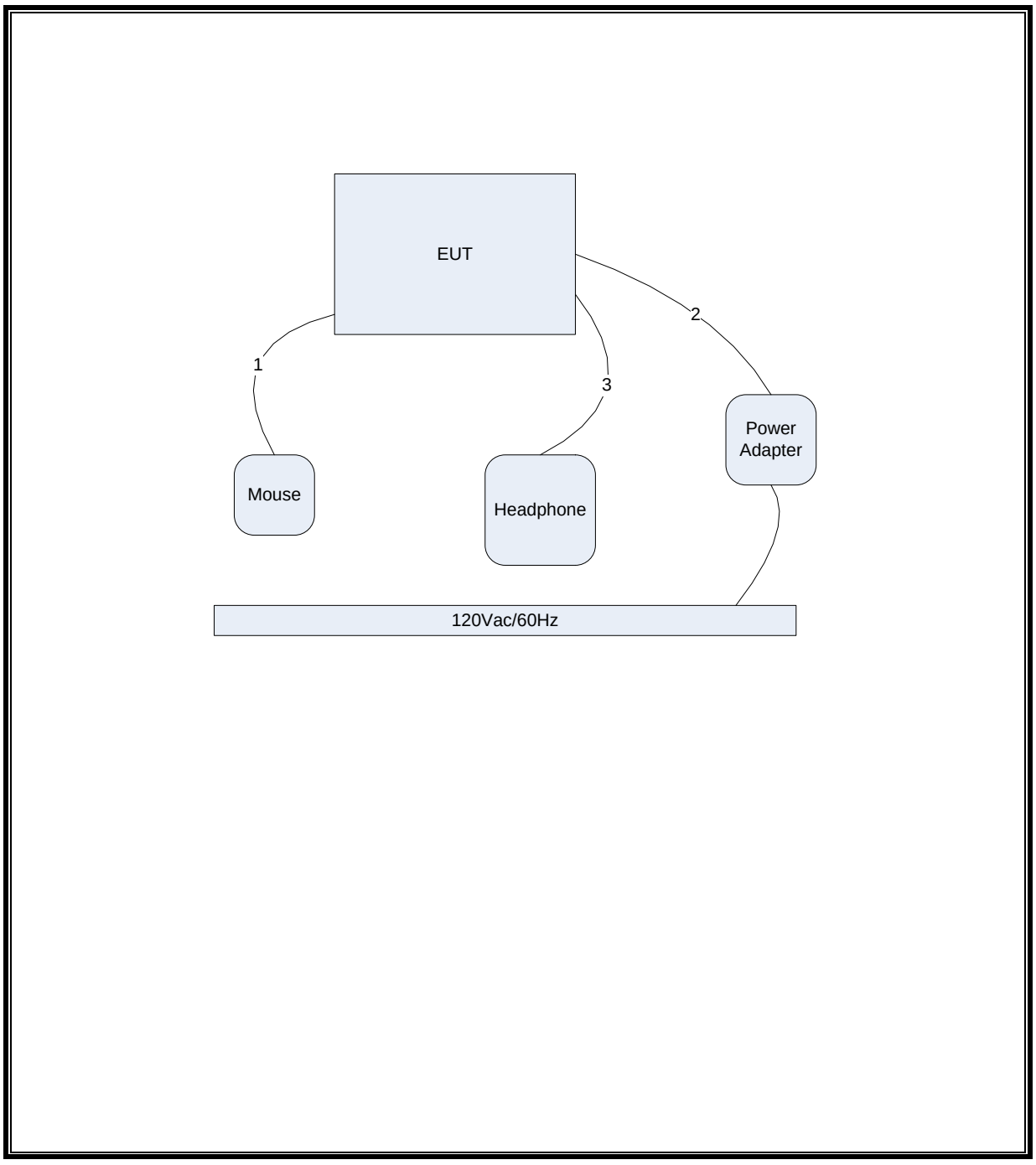
I/O CABLES

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
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
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. DUTY CYCLE

LIMITS

FCC §15.35 (c)
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

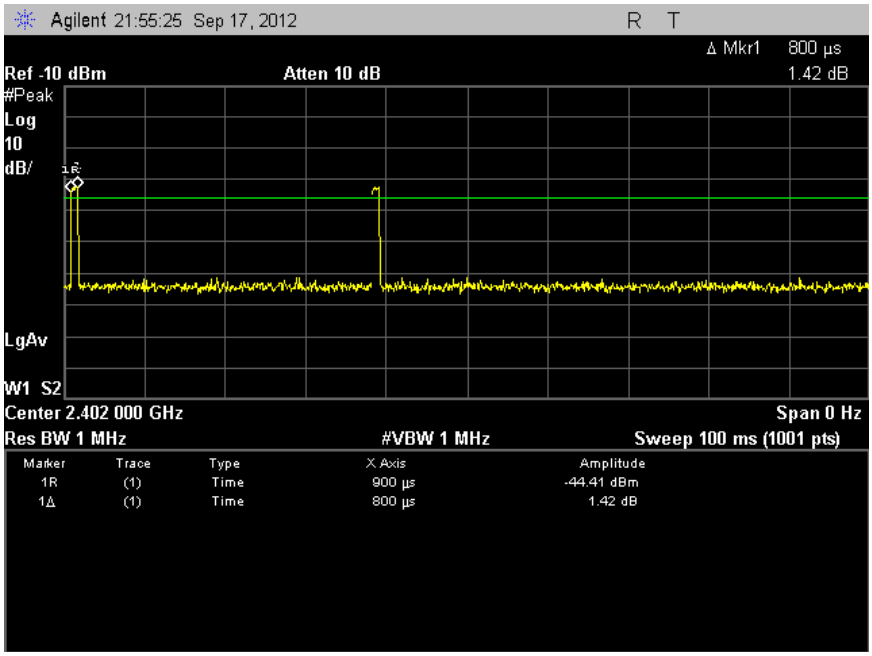
RESULTS

No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
8PSK						
100			0.84	2	0.017	-35.46
GFSK						
100			2.20	2	0.044	-27.13

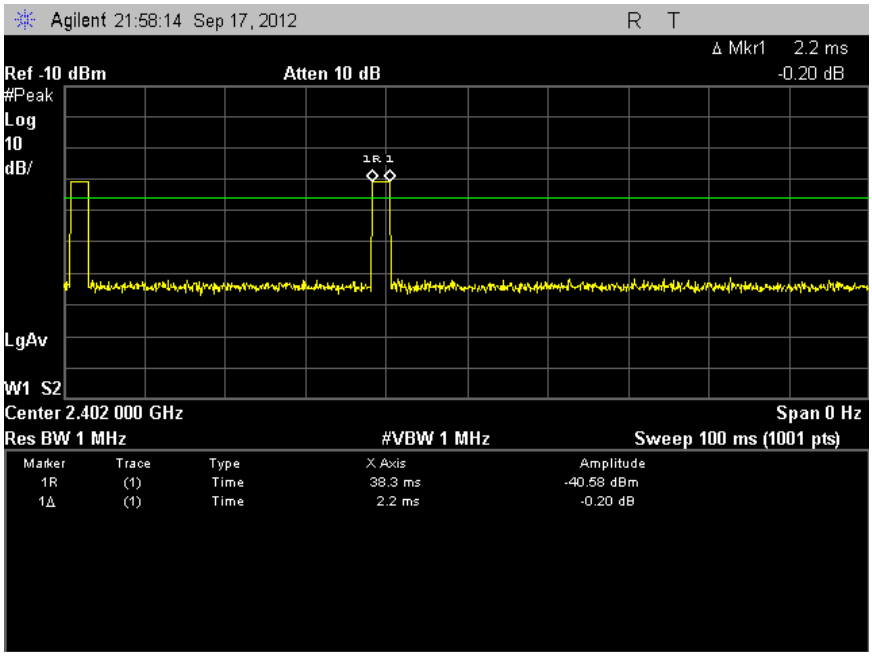
SHORT PULSE WIDTH / NUMBER OF SHORT PULSES

8PSK Mode



SHORT PULSE WIDTH / NUMBER OF SHORT PULSES

GFSK Mode



8. RADIATED TEST RESULTS

8.1. 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 Hz 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.

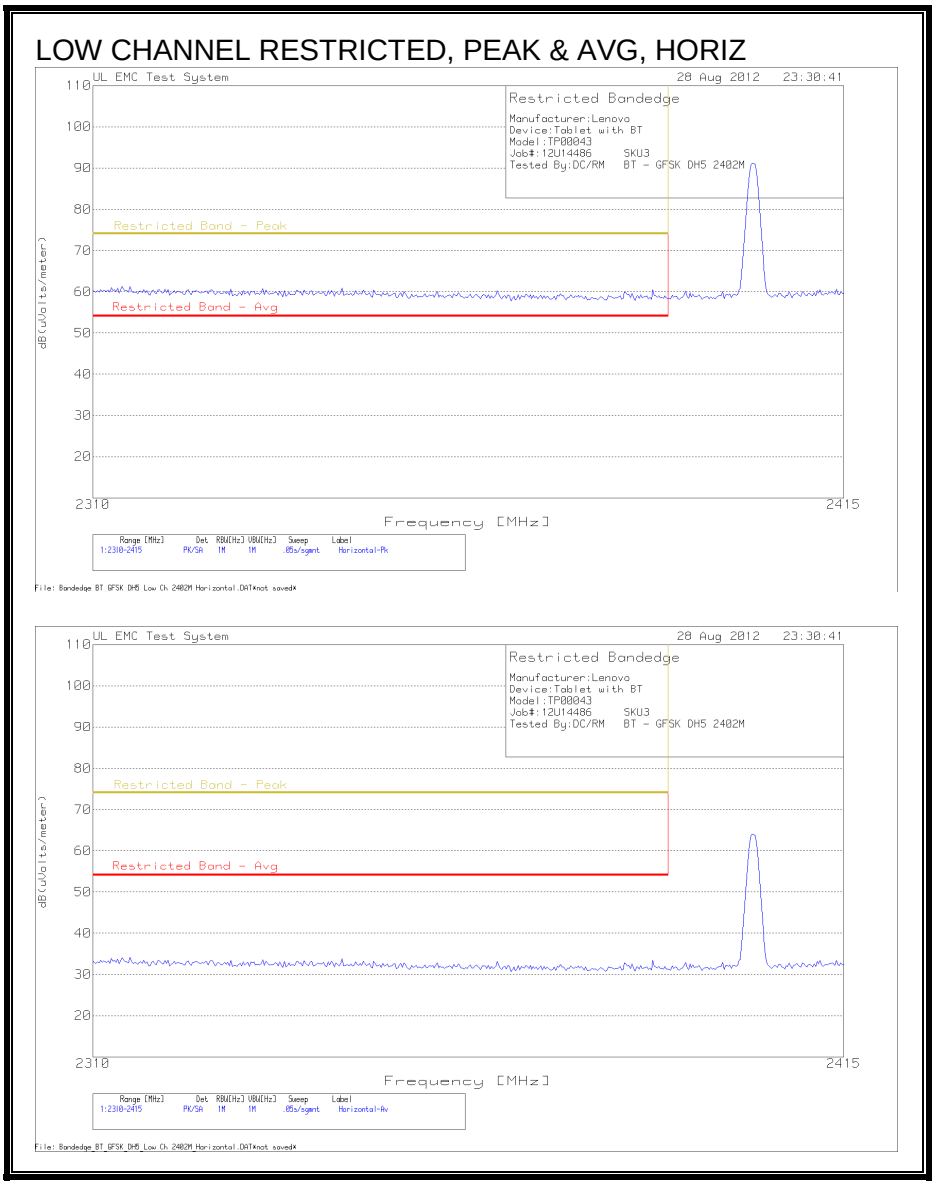
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

NOTE: Duty cycle correction factor from Section 7.0 was applied to Bandedge measurements in order to obtain the Average data.

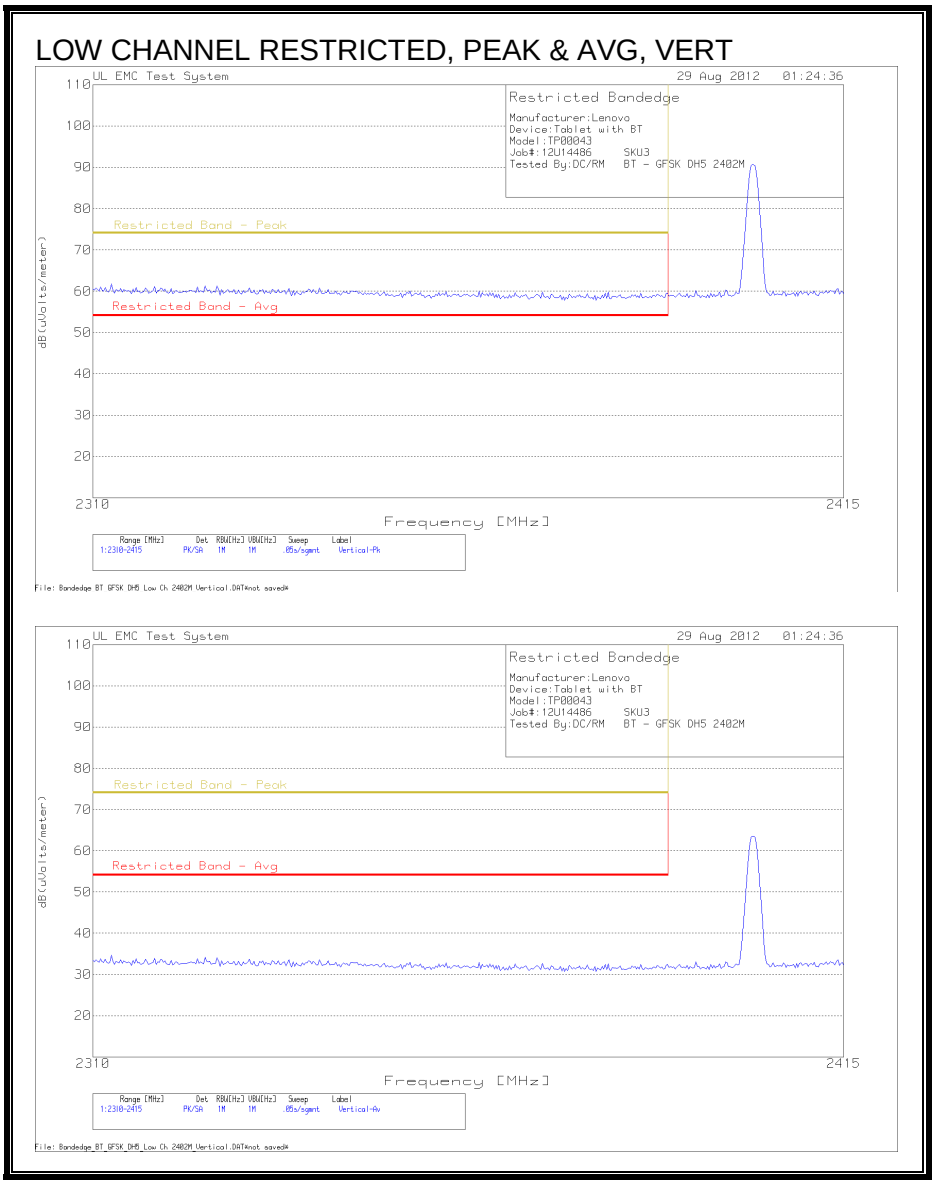
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

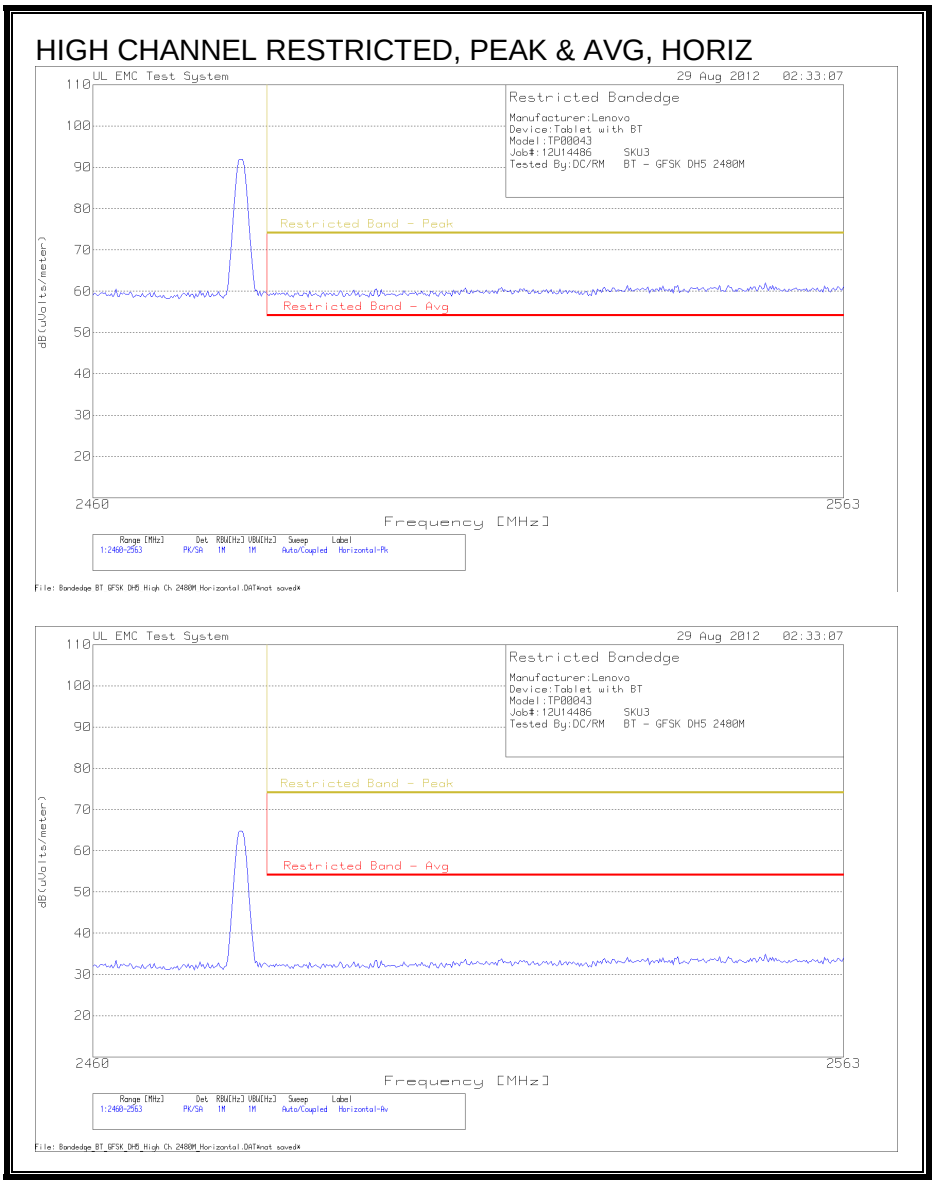
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



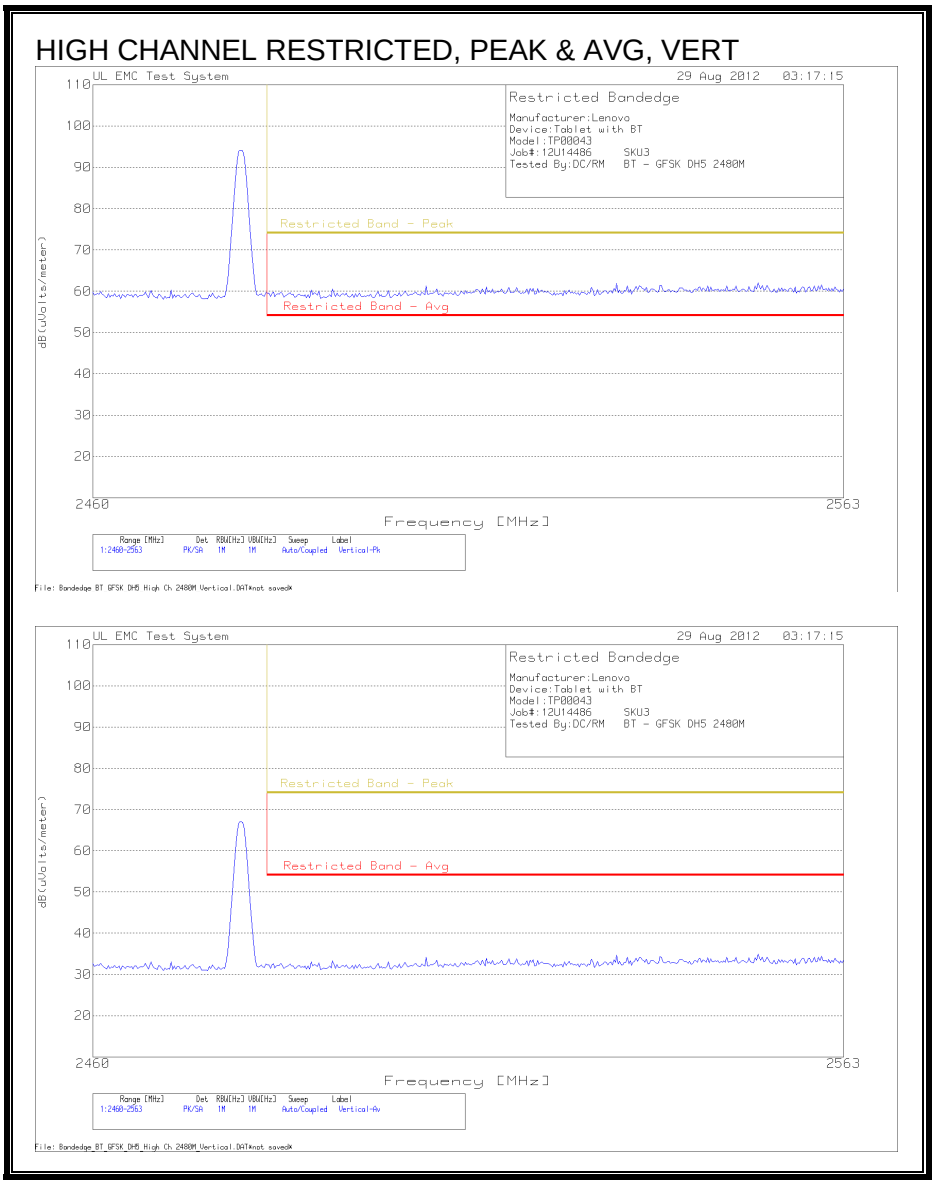
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HARMONICS AND SPURIOUS EMISSIONS

Manufacturer:Lenovo
Device:Tablet with BT
Model:TP00043
Job#:12U14486 SKU3
DC/RM BT GFSK DH5

Low Channel - 2402MHz

Test Frequency	Meter Reading	Detector	AF-48106 [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]	Polarity
4804.1222	64.31	PK	27.1	-52.69	38.72	54	-15.28	74	-35.28	48	346	Vert
4804.1222	50.18	Av	27.1	-52.69	24.59	54	-29.41	74	-49.41	48	346	Vert
4804.1222	64.79	PK	27.1	-52.69	39.2	54	-14.8	74	-34.8	146	135	Horz
4804.1222	50.09	Av	27.1	-52.69	24.5	54	-29.5	74	-49.5	146	135	Horz

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]	Polarity
9608.4158	62.68	PK	33.3	-50.59	45.39	54	-8.61	74	-28.61	338	356	Horz
9608.4158	48.53	Av	33.3	-50.59	31.24	54	-22.76	74	-42.76	338	356	Horz
9608.4158	62.78	PK	33.3	-50.59	45.49	54	-8.51	74	-28.51	216	284	Vert
9608.4158	49.09	Av	33.3	-50.59	31.8	54	-22.2	74	-42.2	216	284	Vert

Mid Channel - 2441MHz

Test Frequency	Meter Reading	Detector	AF-48106 [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]	Polarity
4882.0982	64.56	PK	27.2	-52.5	39.26	54	-14.74	74	-34.74	53	352	Vert
4882.0982	51.04	Av	27.2	-52.5	25.74	54	-28.26	74	-48.26	53	352	Vert
4882.0982	64.5	PK	27.2	-52.5	39.2	54	-14.8	74	-34.8	128	122	Horz
4882.0982	50.27	Av	27.2	-52.5	24.97	54	-29.03	74	-49.03	128	122	Horz
7323.4158	60.71	PK	28	-51.79	36.92	54	-17.08	74	-37.08	354	197	Vert
7323.4158	46.59	Av	28	-51.79	22.8	54	-31.2	74	-51.2	354	197	Vert
7323.4158	60.69	PK	28	-51.79	36.9	54	-17.1	74	-37.1	323	119	Horz
7323.4158	46.32	Av	28	-51.79	22.53	54	-31.47	74	-51.47	323	119	Horz

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]	Polarity
9764.5952	63.21	PK	33.2	-49.58	46.83	54	-7.17	74	-27.17	141	310	Horz
9764.5952	49.09	Av	33.2	-49.58	32.71	54	-21.29	74	-41.29	141	310	Horz
9764.5952	65.38	PK	33.2	-49.58	49	54	-5	74	-25	117	318	Vert
9764.5952	50.95	Av	33.2	-49.58	34.57	54	-19.43	74	-39.43	117	318	Vert

High Channel - 2480MHz

Test Frequency	Meter Reading	Detector	AF-48106 [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]	Polarity
4960.0701	61.79	PK	27.3	-52.34	36.75	54	-17.25	74	-37.25	259	261	Horz
4960.0701	49.21	Av	27.3	-52.34	24.17	54	-29.83	74	-49.83	259	261	Horz
7439.5291	59.91	PK	28.1	-51.38	36.63	54	-17.37	74	-37.37	218	336	Horz
7439.5291	48.15	Av	28.1	-51.38	24.87	54	-29.13	74	-49.13	218	336	Horz
4960.3106	66	PK	27.4	-52.34	41.06	54	-12.94	74	-32.94	48	253	Vert
4960.3106	52.95	Av	27.4	-52.34	28.01	54	-25.99	74	-45.99	48	253	Vert
7439.9499	60.13	PK	28	-51.38	36.75	54	-17.25	74	-37.25	35	232	Vert
7439.9499	48.44	Av	28	-51.38	25.06	54	-28.94	74	-48.94	35	232	Vert

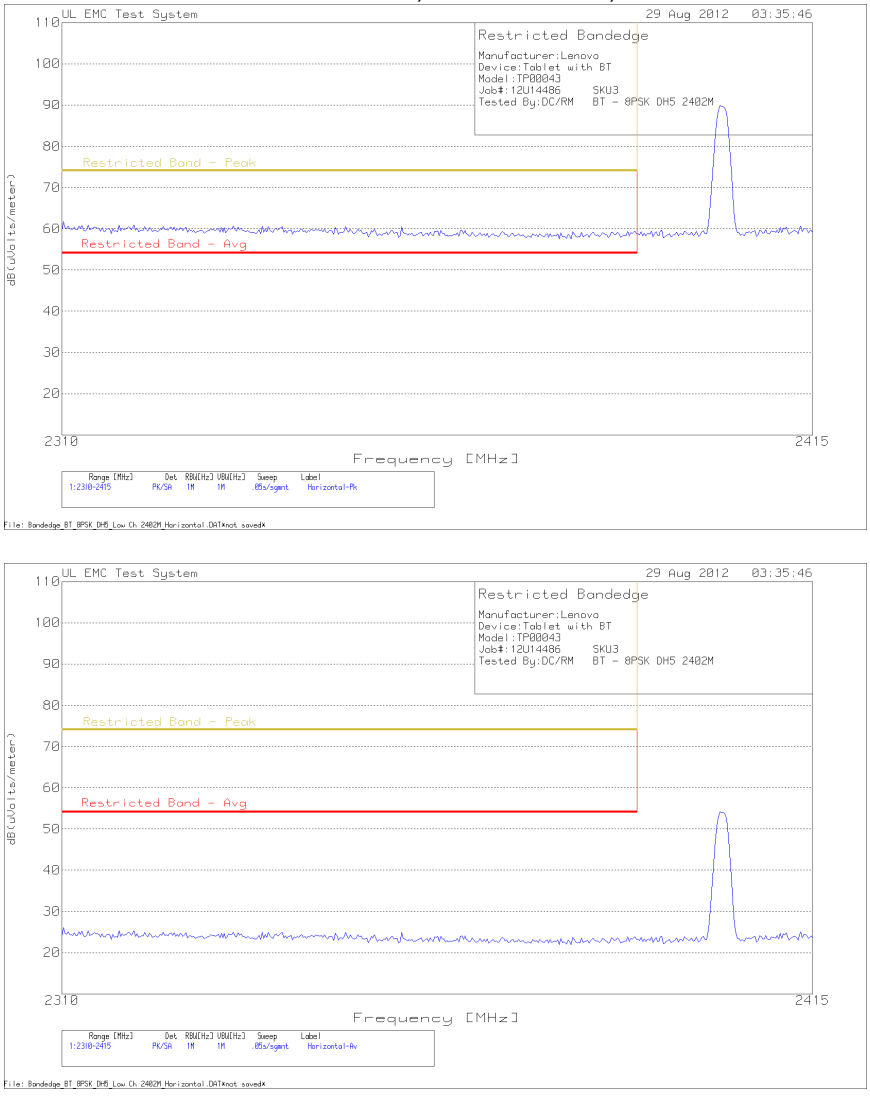
PK - Peak detector
Av - Average detector

NOTE: No other emissions detected above the system noise floor.

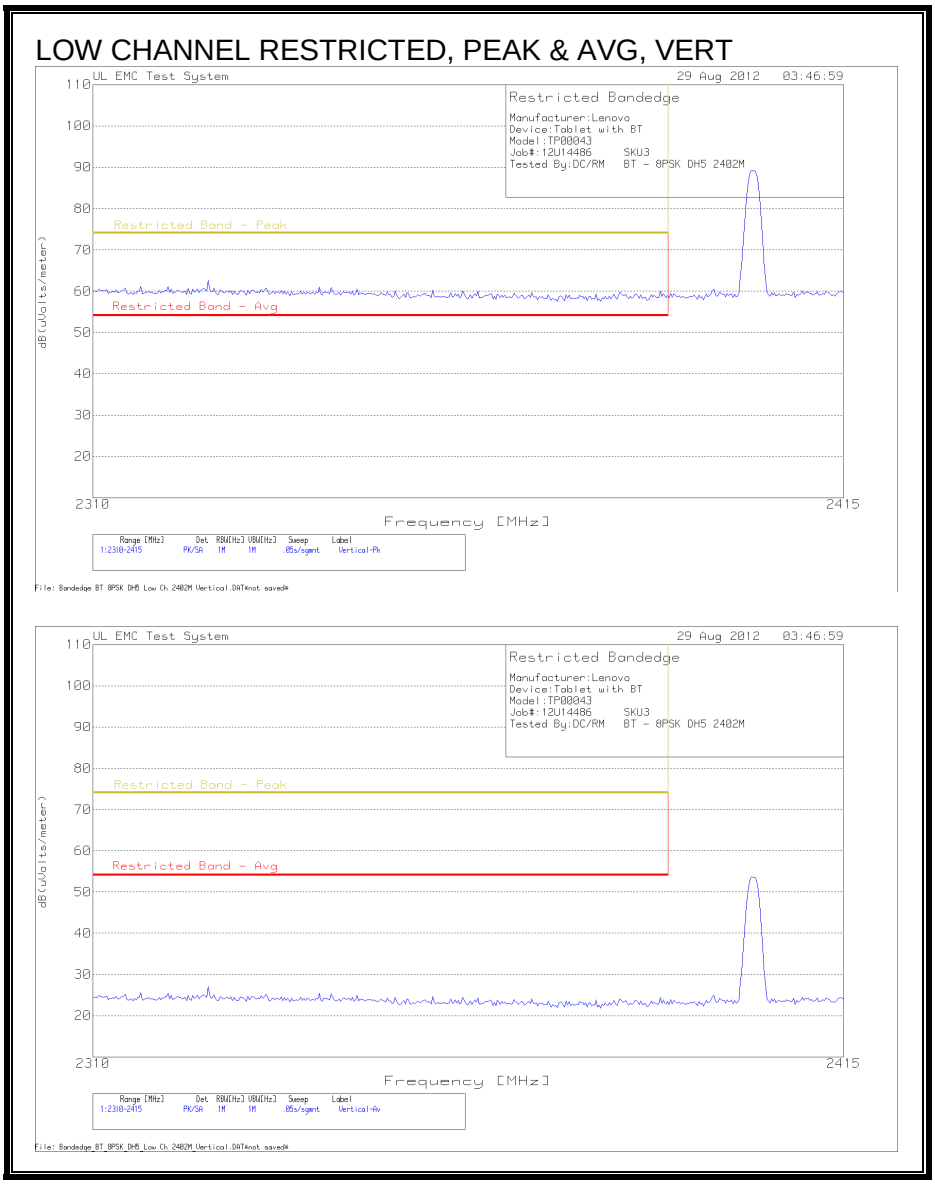
8.2.2. ENHANCED DATA RATE 8PSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

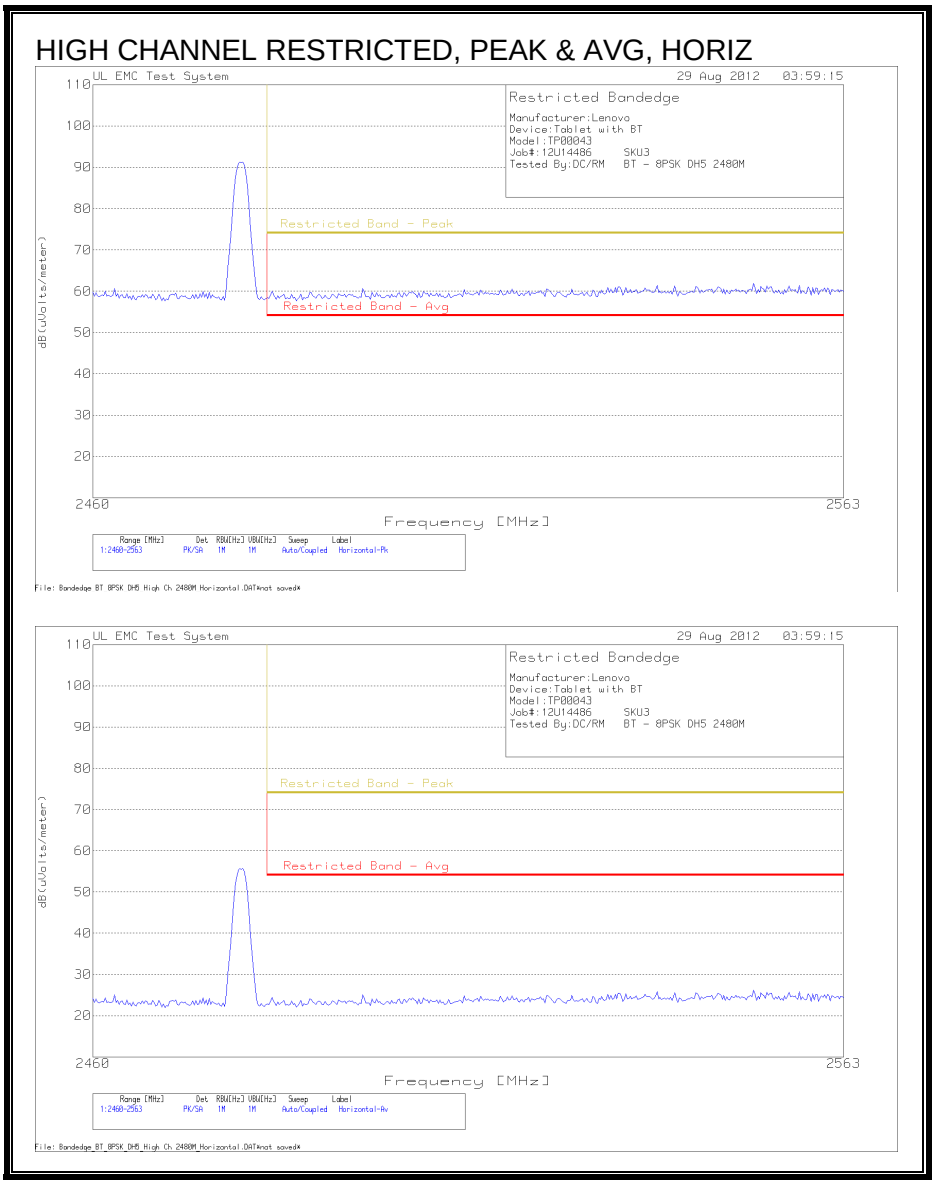
LOW CHANNEL RESTRICTED, PEAK & AVG, HORIZ



RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

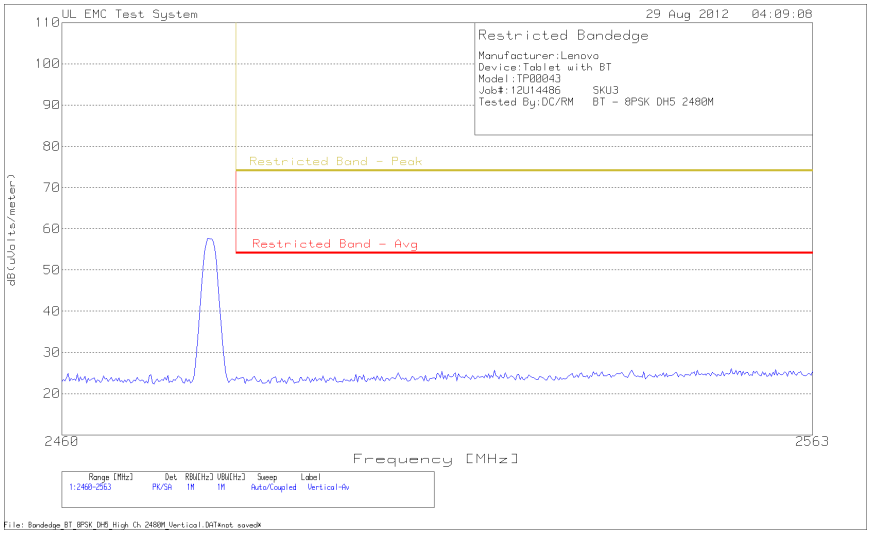


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANNEL RESTRICTED, PEAK & AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

Manufacturer:Lenovo
Device:Tablet with BT
Model:TP00043
Job#:12U14486 SKU3
MA BLE Mode

Low Channel - 2402MHz

Test Frequency	Meter Reading	Detector	AF-48106 [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]	Polarity
4804	64.11	PK	27.3	-52.69	38.72	54	-15.28	74	-35.28	191	323	Horz
4804	48.92	Av	27.3	-52.69	23.53	54	-30.47	74	-50.47	191	323	Horz
4804	62.52	PK	27.3	-52.69	37.13	54	-16.87	74	-36.87	309	211	Vert
4804	48.31	Av	27.3	-52.69	22.92	54	-31.08	74	-51.08	309	211	Vert

Mid Channel - 2441MHz

Test Frequency	Meter Reading	Detector	AF-48106 [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]	Polarity
4882	66.42	PK	27.5	-52.5	41.42	54	-12.58	74	-32.58	190	164	Horz
4882	49.74	Av	27.5	-52.5	24.74	54	-29.26	74	-49.26	190	164	Horz
4882	66.93	PK	27.5	-52.5	41.93	54	-12.07	74	-32.07	33	202	Vert
4882	50.3	Av	27.5	-52.5	25.3	54	-28.7	74	-48.7	33	202	Vert

High Channel - 2480MHz

Test Frequency	Meter Reading	Detector	AF-48106 [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]	Polarity
4960.2568	60.1	PK	27.4	-52.34	35.16	54	-18.84	74	-38.84	360	270	Vert
4960.2568	48.46	Av	27.4	-52.34	23.52	54	-30.48	74	-50.48	360	270	Vert
4960	63.33	PK	27.4	-52.34	38.39	54	-15.61	74	-35.61	70	240	Horz
4960	48.4	Av	27.4	-52.34	23.46	54	-30.54	74	-50.54	70	240	Horz

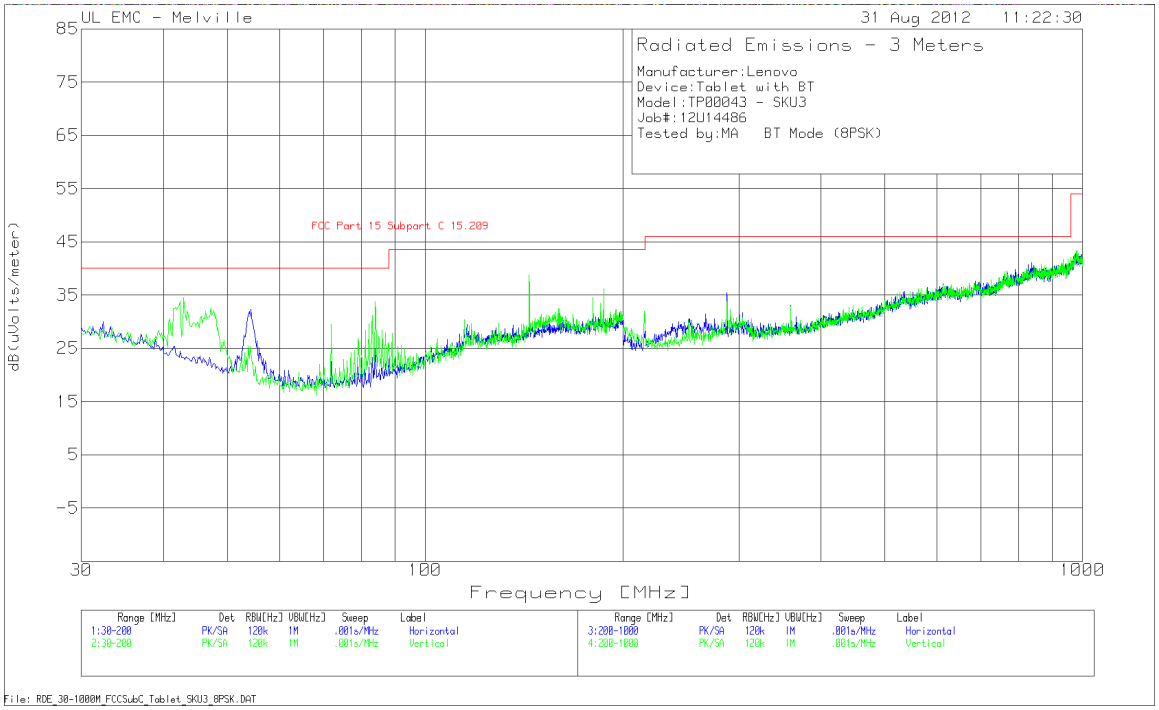
PK - Peak detector
Av-Average detector

NOTE: No other emissions detected above the system noise floor.

8.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL & VERICAL PLOT



HORIZONTAL & VERTICAL DATA

Manufacturer:Lenovo										
Device:Tablet with BT										
Model:TP00043 - SKU3										
Job#:12U14486										
Tested by:MA BT Mode (8PSK)										
Horizontal 30 - 200MHz										
Test Frequency	Meter Reading	Detector	AF-54 (dB)	GL-3M (dB)	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
54.3343	23.56	PK	8	0.7	32.26	40	-7.74	54	299	Horz
Vertical 30 - 200MHz										
Test Frequency	Meter Reading	Detector	AF-54 (dB)	GL-3M (dB)	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
42.9329	21.34	PK	12.5	0.7	34.54	40	-5.46	114	100	Vert
47.1872	21.19	PK	10.8	0.7	32.69	40	-7.31	8	100	Vert
83.9439	25.18	PK	7.6	1	33.78	40	-6.22	114	100	Vert
144.014	23.48	PK	14.1	1.2	38.78	43.5	-4.72	358	100	Vert
186.8969	19.27	PK	15.4	1.5	36.17	43.5	-7.33	8	100	Vert
Vertical 30 - 200MHz										
Test Frequency	Meter Reading	Detector	AF-54 [dB]	GL-3M [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
42.9361	11.56	QP	12.5	0.7	24.76	40	-15.24	335	202	Vert
143.9802	22.78	QP	14.1	1.2	38.08	43.5	-5.42	320	112	Vert
PK - Peak detector										
QP - Quasi-Peak detector										