FCC 47 CFR PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

Power Monitoring Node

MODEL NUMBER: P5T3

REPORT NUMBER: 10006685A-1

ISSUE DATE: March 3, 2014
REVISION DATE: March 14, 2014

Prepared for
Packet Power LLC
2095 Salem Ct.
Orono
MN, 55356, USA

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/04/14	Initial Issue	M.Ferrer
1	03/14/14	Updated 8.3.1-8.3.3, added 11	M.Ferrer

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Packet Power LLC
2095 Salem Ct
Orono, MN, 55356, USA

EUT DESCRIPTION: Power Monitoring Node

MODEL: P5T3

SERIAL NUMBER: None

DATE TESTED: March 3, 2014

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. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested 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 herein. 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:

Bart Mucha
Staff ENGINEER
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Tested By:

MICHAEL FERRER
PROJECT LEAD
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2003, 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 333 Pfingsten Road, Northbrook, IL 60062, USA.
UL NBK is accredited by NVLAP, Laboratory Code 100414-0

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

Sample Calculations
Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

Field Strength (dBuV/m) = Meter Reading (dBuV) + AF (dB/m) - Gain (dB) + Cable Loss (dB)
Conducted Voltage (dBuV) = Meter Reading (dBuV) + Cable Loss (dB) + LISN IL (dB)
Conducted Current (dBuA) = Meter Reading (dBuV) + Cable Loss (dB) - Transducer Factor (dBohms)

4.3. MEASUREMENT UNCERTAINTY

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

Test	Range	Equipment	Uncertainty k=2
Radiated Emissions	30-200MHz	Bicon 10m Horz	4.27dB
Radiated Emissions	30-200MHz	Bicon 10m Vert	4.28dB
Radiated Emissions	200-1000MHz	LogP 10m Horz	3.33dB
Radiated Emissions	200-1000MHz	LogP 10m Vert	3.39dB
Radiated Emissions	1-6GHz	Horn	5.02dB
Radiated Emissions	6-18GHz	Horn	5.34dB
Radiated Emissions	18-26GHz	Horn	6.60dB
Conducted Ant Port	30MHz-26GHz	Spectrum Analyzer	2.94dB
RF Power	dB	Power Meter	0.45dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a wireless monitoring device of AC power.

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)
2401-2464	Basic GFSK	-3.57	0.44

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a ¼ wave length 35mm antenna, with a maximum gain of 1.5 dBi. Antenna in integral, therefore Radiated Emissions represented Conducted Antenna port measurements.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

Line Conducted test, EUT was setup on 80cm table

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Use	Product Type	Manufacturer	Model	Comments
EUT	Power Monitoring Module	Packet Power L L C	P5T3	None
Note: **EUT** - Equipment Under Test, **AE** - Auxiliary/Associated Equipment, or **SIM** - Simulator (Not Subjected to Test)				

I/O CABLES

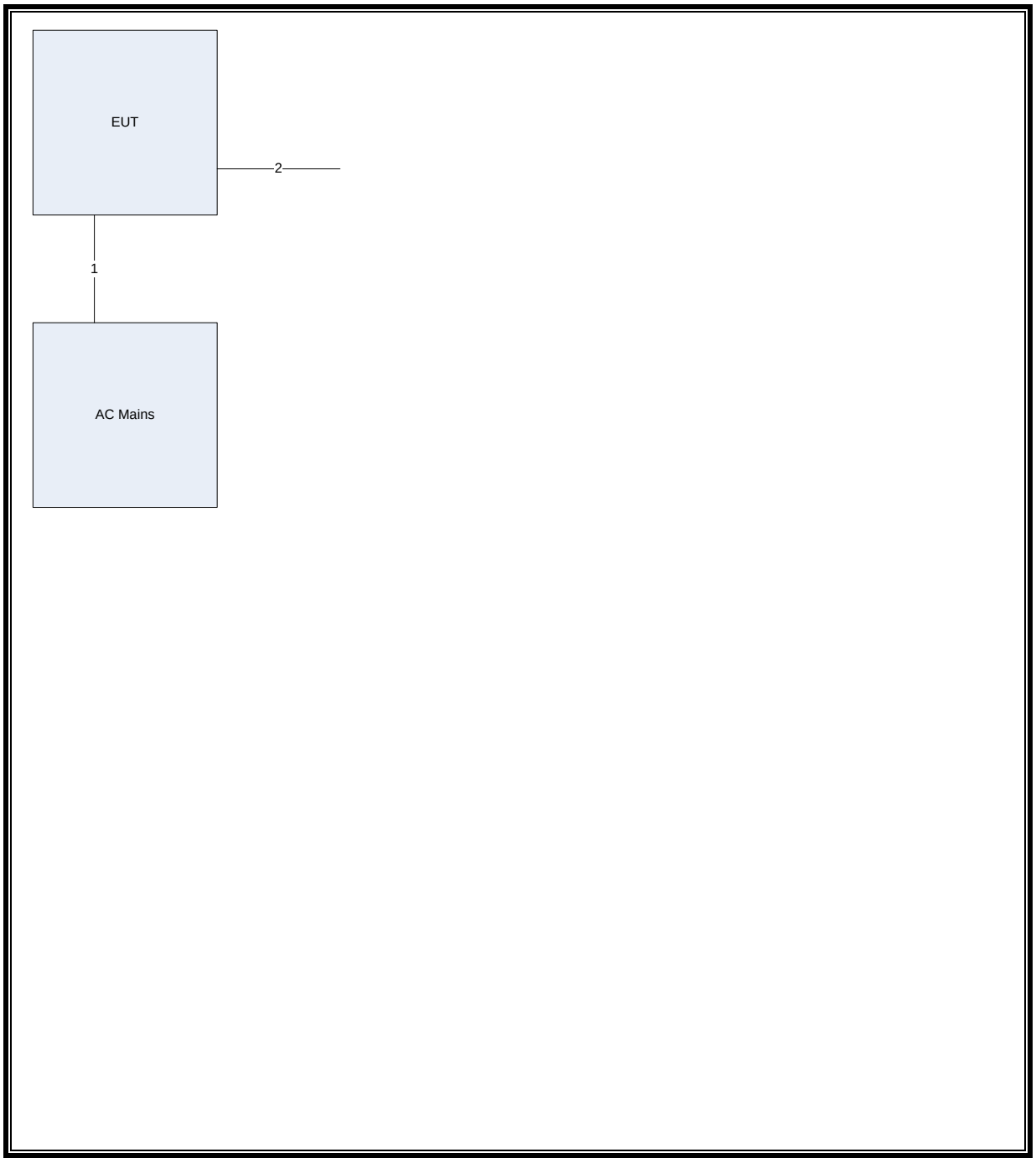
Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
1	Mains	AC	N	N	AC Input
2	Mains	AC	N	N	AC Output, no termination

Note:
AC = AC Power Port DC = DC Power Port N/E = Non-Electrical
I/O = Signal Input or Output Port (Not Involved in Process Control)
TP = Telecommunication Ports

TEST SETUP

The EUT is not installed in a conduit box during the tests. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List						
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**	**Test**
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20131220	20141231	RE
Bicon Antenna	Chase	VBA6106A	EMC4078	20130213	20140228	RE
Bicon Antenna	Electro-Metrics	EM-6981A	EMC4070	20130911	20140930	RE
Log-P Antenna	Chase	UPA6109	EMC4313	20131003	20141031	RE
Spectrum Analyzer	Agilent	E4446A	MY45300099	20130129	20150129	RE
Spectrum Analyzer	Rohde & Schwarz	FSEK	EMC4182	20131217	20143112	RE
Antenna Array	UL	BOMS	EMC4276	20130913	20140913	RE
EMI Test Receiver	Agilent	N9030A	EMC4360	20131221	20141221	OBW, Dwell
Antenna	EMCO	-	-	N/A	N/A	OBW, Dwell
EMI Test Receiver	Rohde & Schwarz	ESCI	EMC4328	20131217	20141231	CE
LISN	Solar	8602-50-TS-50-N	EMC4052	20140116	20150116	CE
LISN	Solar	8602-50-TS-50-N	EMC4064	20140116	20150116	CE
LISN	Solar	8602-50-TS-50-N	EMC4067	20140116	20150116	CE
LISN	Solar	8602-50-TS-50-N	EMC4065	20140116	20150116	CE

7. ANTENNA PORT TEST RESULTS

8. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

8.1. ON TIME AND DUTY CYCLE RESULTS

.

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4 GHz band (Hopping ON)						
EUT	4.870	100	0.049	4.87%	26.25	N/A

8.2. DUTY CYCLE PLOTS

HOPPING ON

DUTY CYCLE

Signal occurs twice within 100ms span

8.3. GFSK MODULATION

8.3.1. 20 dB AND 99% BANDWIDTH

LIMIT

None; for reporting purposes only.

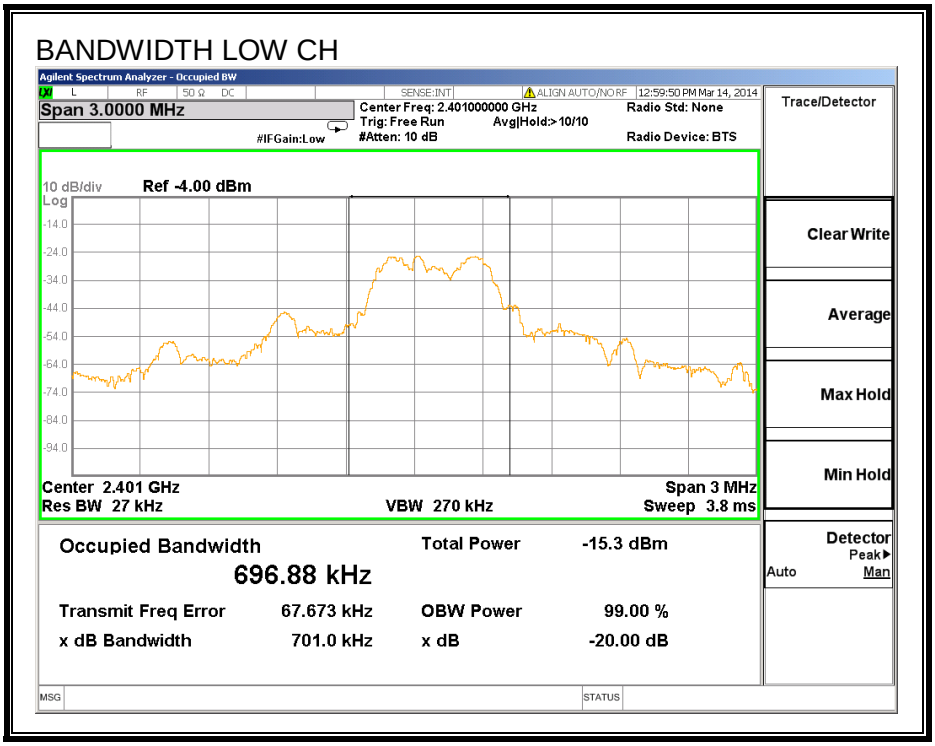
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB bandwidth. The VBW is set to ≥ RBW. The sweep time is coupled.

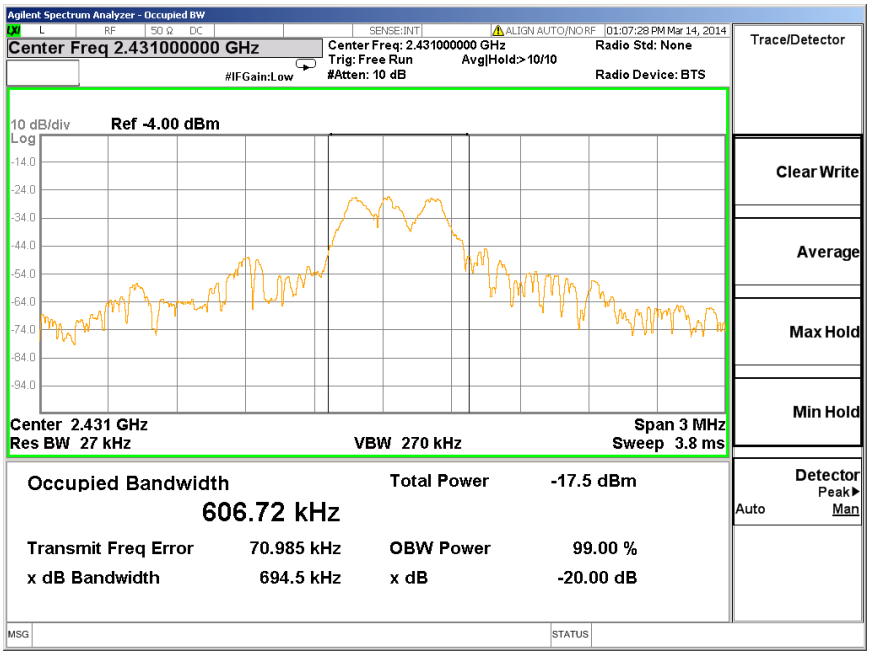
RESULTS

Channel	Frequency (MHz)	20 dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2401	0.701	0.59
Middle	2431	0.695	0.58
High	2464	0.626	0.577

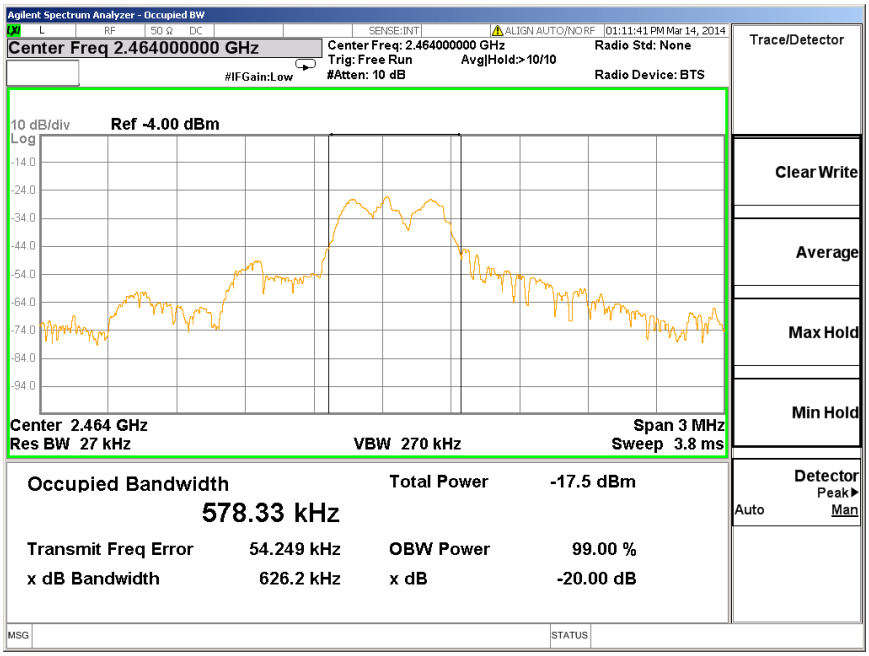
20 dB BANDWIDTH



BANDWIDTH MID CH

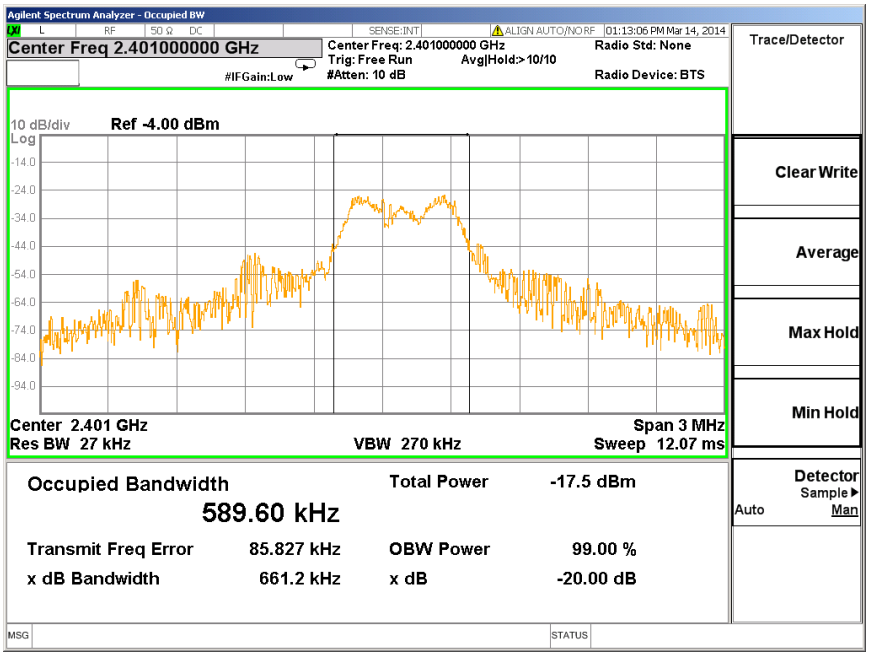


BANDWIDTH HIGH CH

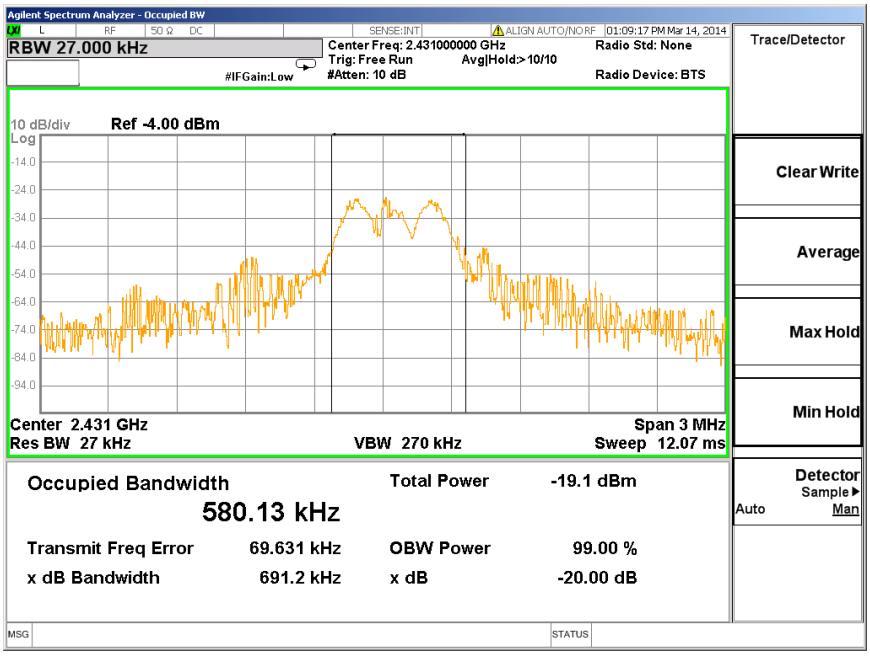


99% BANDWIDTH

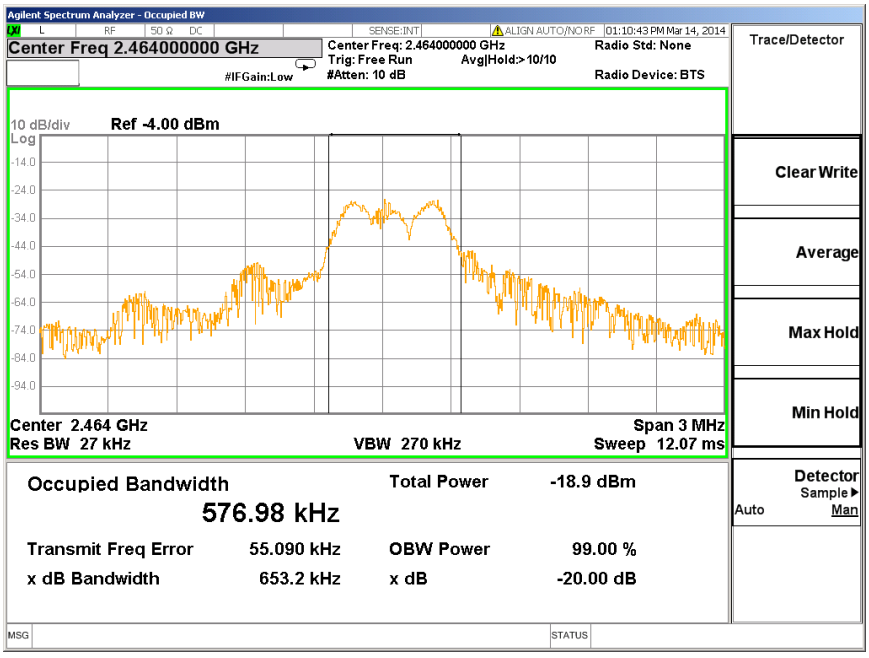
BANDWIDTH LOW CH



BANDWIDTH MID CH



BANDWIDTH HIGH CH



8.3.2. HOPPING FREQUENCY SEPARATION

LIMIT

FCC §15.247 (a) (1)

IC RSS-210 A8.1 (b)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hoping channel, whichever is greater.

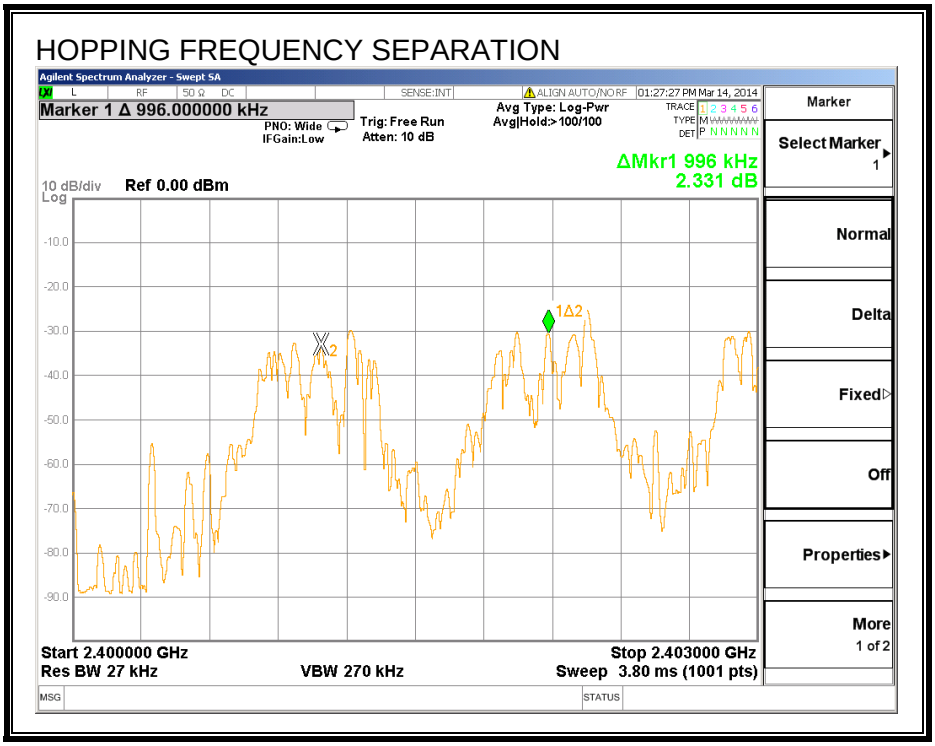
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% of the span and the VBW $\geq$ RBW. The sweep time is coupled.

RESULTS

HOPPING FREQUENCY SEPARATION



8.3.3. NUMBER OF HOPPING CHANNELS

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

TEST PROCEDURE

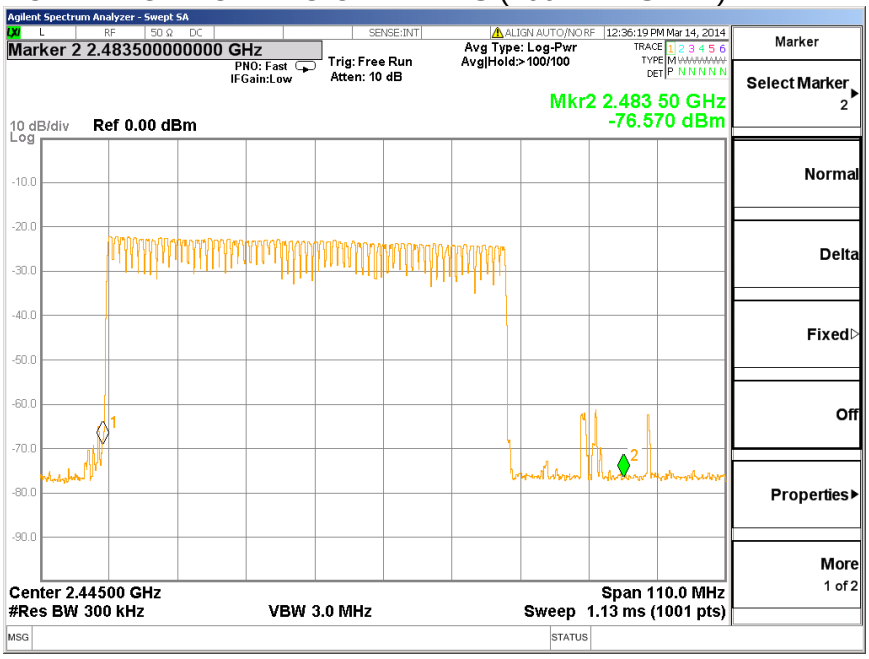
The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

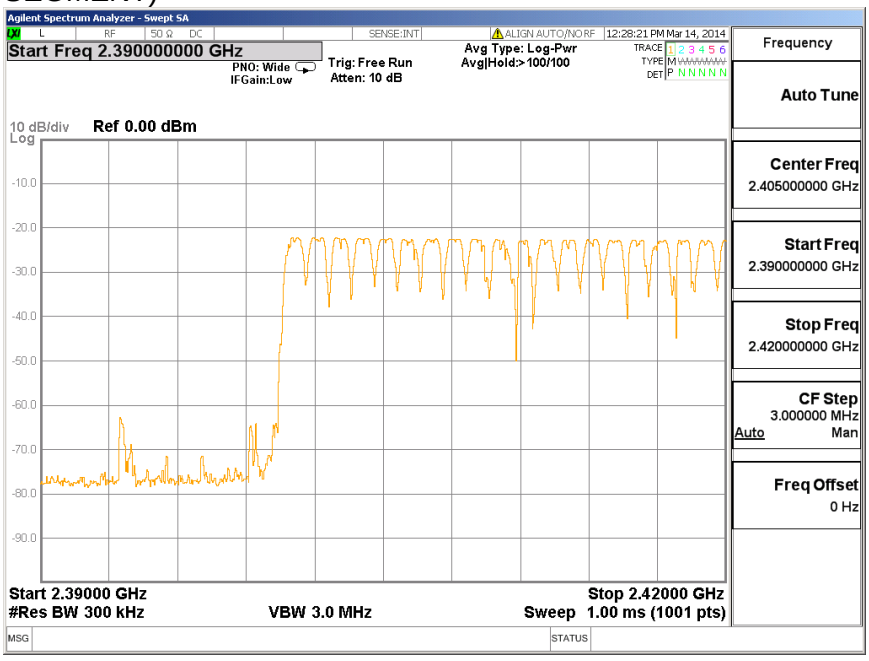
Normal Mode: 64 Channels observed

NUMBER OF HOPPING CHANNELS

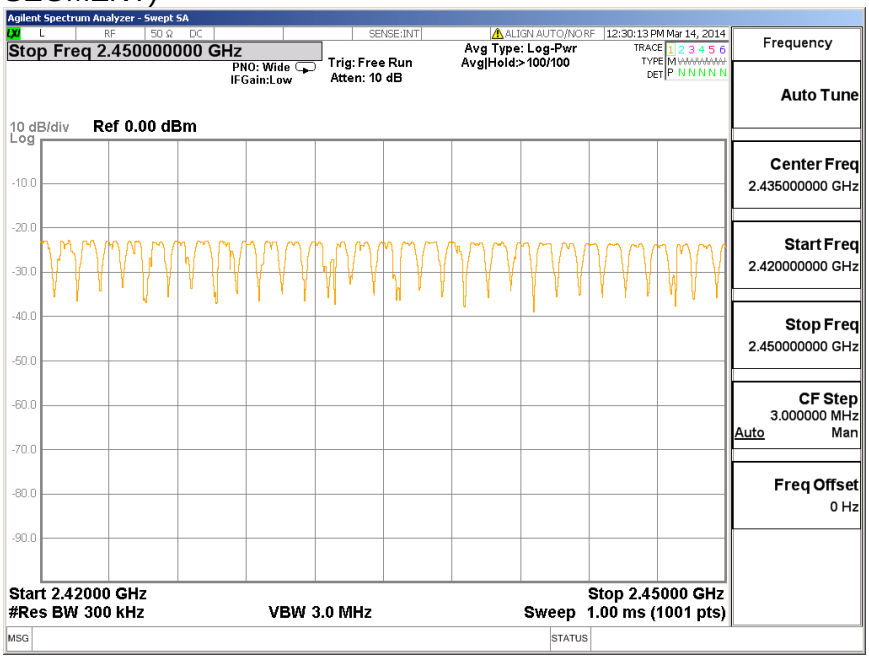
NUMBER OF HOPPING CHANNELS (100 MHZ SPAN)



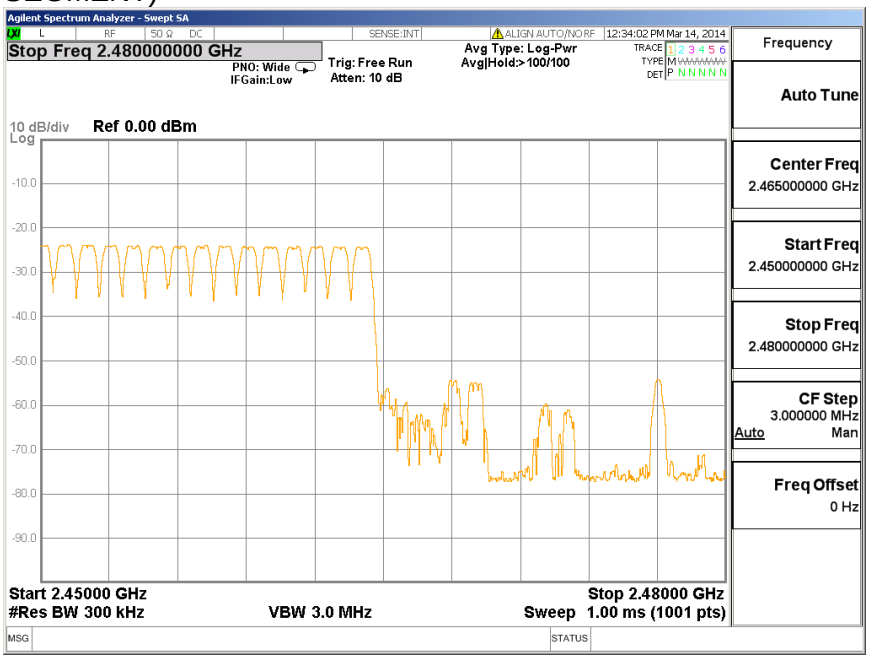
NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, FIRST SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, SECOND SEGMENT)



NUMBER OF HOPPING CHANNELS (30 MHZ SPAN, THIRD SEGMENT)



8.3.4. AVERAGE TIME OF OCCUPANCY

LIMIT

FCC §15.247 (a) (1) (iii)

IC RSS-210 A8.1 (d)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 25.6 second scan, to enable resolution of each occurrence.

The average time of occupancy in the specified 25.6 second period (64 channels * 0.4 s) is equal to pulse width.

RESULTS

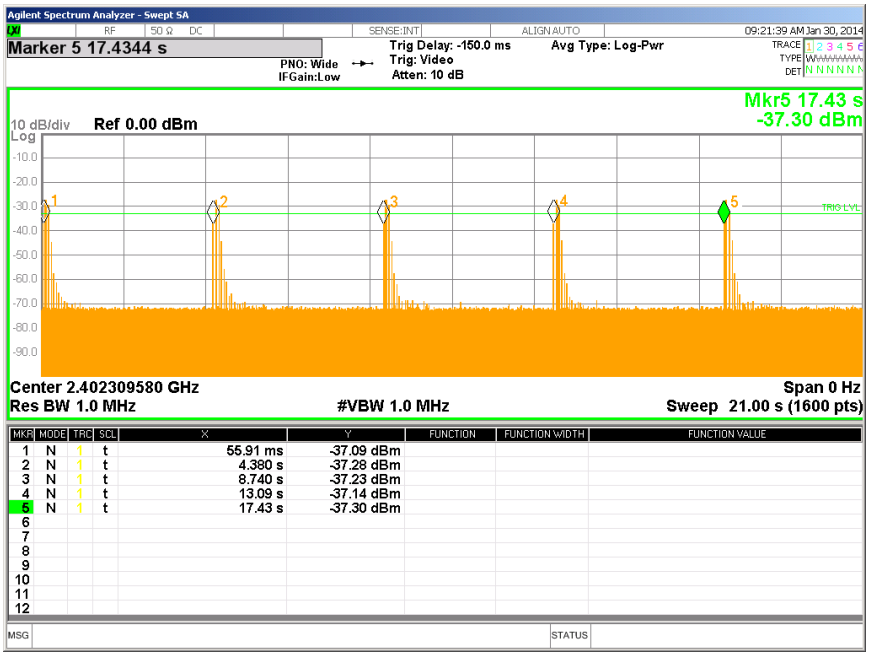
	Pulse Width (msec)	Number of Pulses in 25.6sec	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK Normal Mode					
EUT	2.435	5	0.012	0.4	-0.388

PULSE WIDTH

PULSE WIDTH

NUMBER OF PULSES OBSERVATION PERIOD

NUMBER OF PULSES - 5



Each pulse is spaced about 4.35s, within 25.6sec range there will be 5 pulses.

8.3.5. OUTPUT POWER

LIMIT

§15.247 (b) (1)

RSS-210 Issue 7 Clause A8.4

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output power was found using calculation from field strength measurement. See below for calculation.

RESULTS

Channel	Frequency (MHz)	Field Strength dBuV/m	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	92.61	-4.11	30	-34.11
Middle	2441	93.15	-3.57	30	-33.57
High	2480	91.51	-5.21	30	-35.21

The Maximum Peak Output Power was calculated from equitation
$P=(E \times d)^2/30G$, where
P is the power in watts;
E is the measured field strength in V/m;
d is the measurement distance, d = 3m;
G is the numerical antenna gain of the transmitter G = 1.5dBi , or G = 1.41 (numerical)

9. RADIATED TEST RESULTS

9.1. 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.

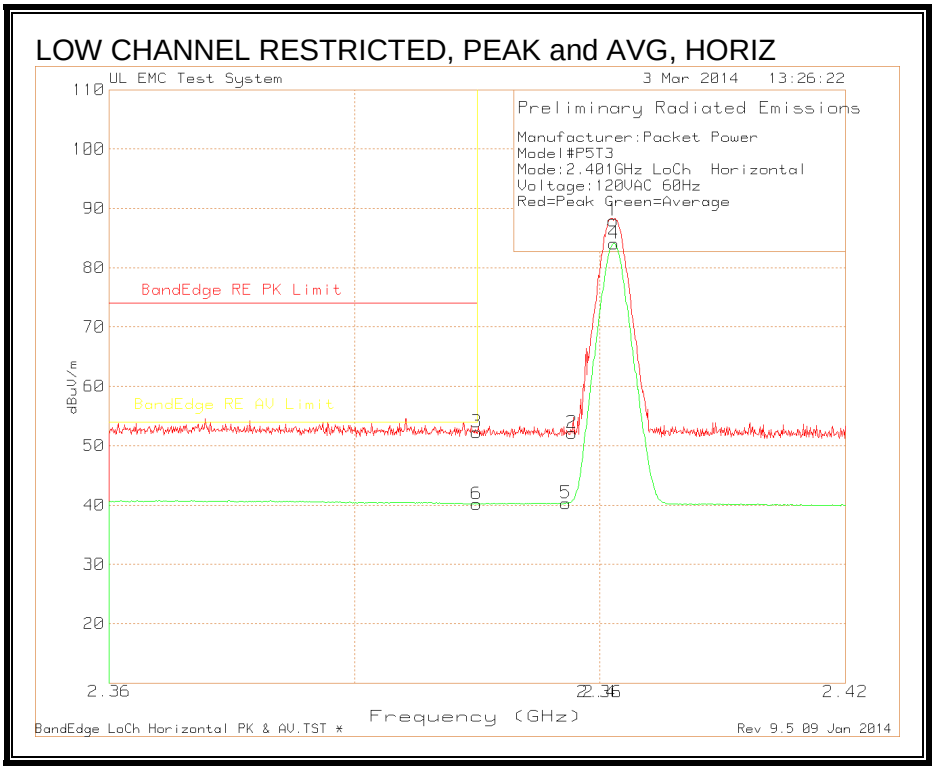
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

Note: Bandedge scans shows at least 20dB margin at the bandedge. This is shown because EUT antenna port was not available for conducted antenna port measurements. Average Scan was RBW 1MHz/ VBW 10Hz

9.2. TRANSMITTER ABOVE 1 GHz

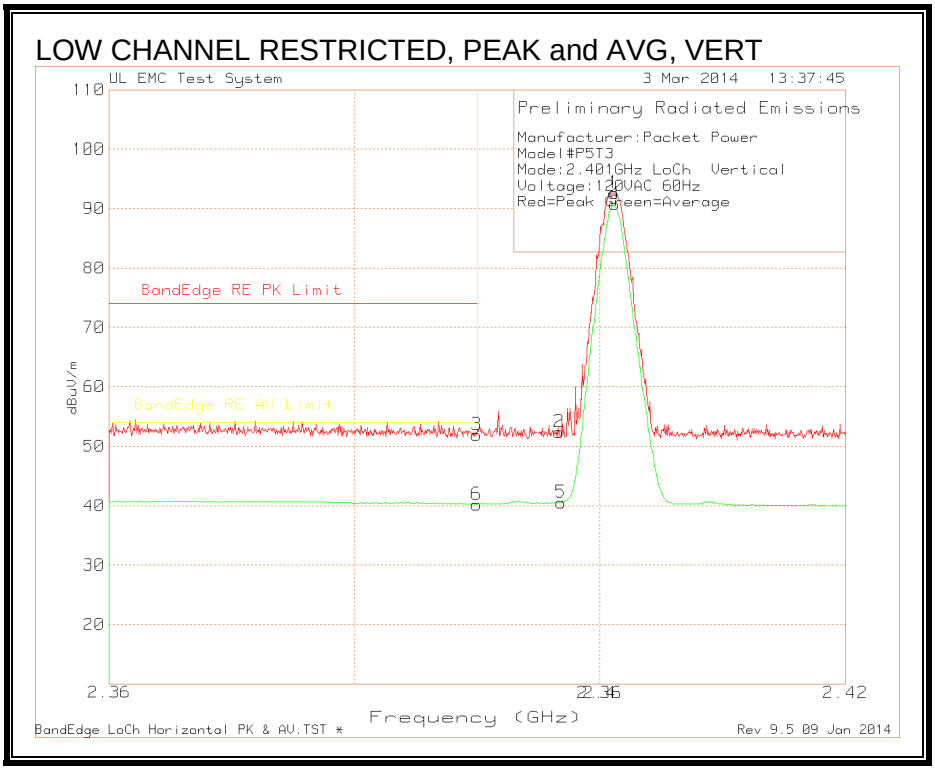
9.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



Manufacturer:Packet Power													
Model#P5T3													
Mode:2.401GHz LoCh Horizontal													
Voltage:120VAC 60Hz													
Red=Peak Green=Average													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3161-02 S/N 99061052 3m UL	BOMS Factor (dB)	Corrected Reading dBuV/m	BandEdge RE PK Limit	Margin (dB)	BandEdge RE AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.4011	61.63	PK	21.8	4.53	87.96	n/a	n/a	n/a	n/a	0-360	100	H
2	2.3977	25.82	PK	21.8	4.51	52.13	n/a	n/a	57.96	-5.83	0-360	100	H
3	2.39	25.98	PK	21.8	4.49	52.27	74	-21.73	54	-1.73	0-360	149	H
4	2.4011	57.73	LnAV	21.8	4.53	84.06	n/a	n/a	n/a	n/a	233	120	H
5	2.3972	14.01	LnAV	21.8	4.51	40.32	n/a	n/a	54.06	-1.73	233	120	H
6	2.39	13.86	LnAV	21.8	4.49	40.15	74	-33.85	54	-13.85	233	120	H
PK - Peak detector													
LnAv - Linear Average detector													

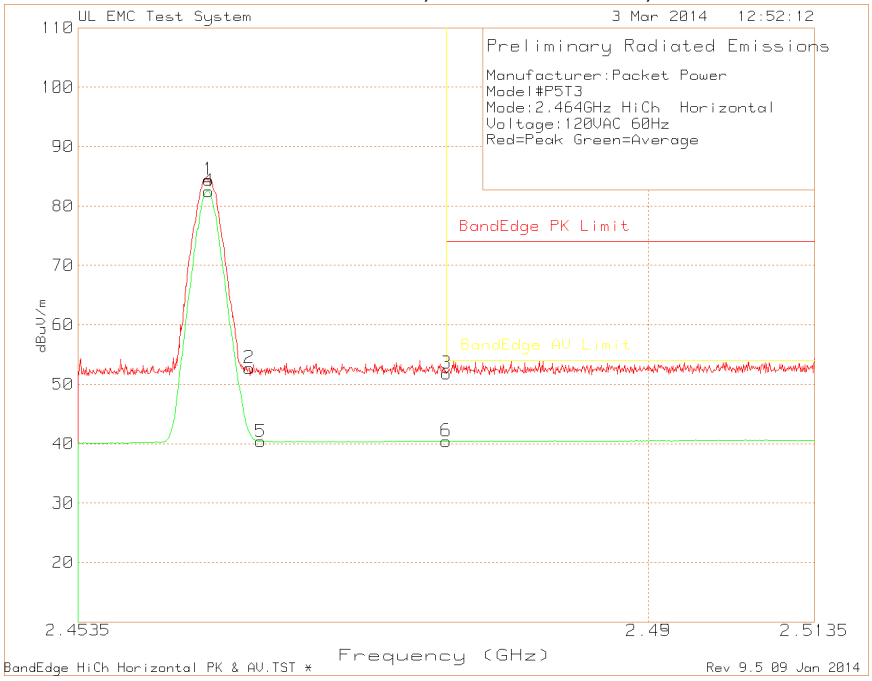
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



Manufacturer:Packet Power													
Model#P5T3													
Mode:2.401GHz LoCh Vertical													
Voltage:120VAC 60Hz													
Red=Peak Green=Average													
Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	EMCO3161-02 S/N 99061052 3m UL	BOMS Factor (dB)	Corrected Reading dBuV/m	BandEdge RE PK Limit	Margin (dB)	BandEdge RE AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.4011	66.28	PK	21.8	4.53	92.61	n/a	n/a	n/a	n/a	0-360	124	V
2	2.3967	26.07	PK	21.8	4.51	52.38	n/a	n/a	62.61	-10.23	0-360	100	V
3	2.39	25.66	PK	21.8	4.49	51.95	74	-22.05	54	-2.05	0-360	149	V
4	2.4012	64.41	LnAV	21.8	4.54	90.75	n/a	n/a	n/a	n/a	135	118	H
5	2.3968	14.26	LnAV	21.8	4.51	40.57	n/a	n/a	60.75	-20.18	135	118	H
6	2.3899	13.89	LnAV	21.8	4.49	40.18	74	-33.82	54	-13.82	135	118	H
PK - Peak detector													
LnAv - Linear Average detector													

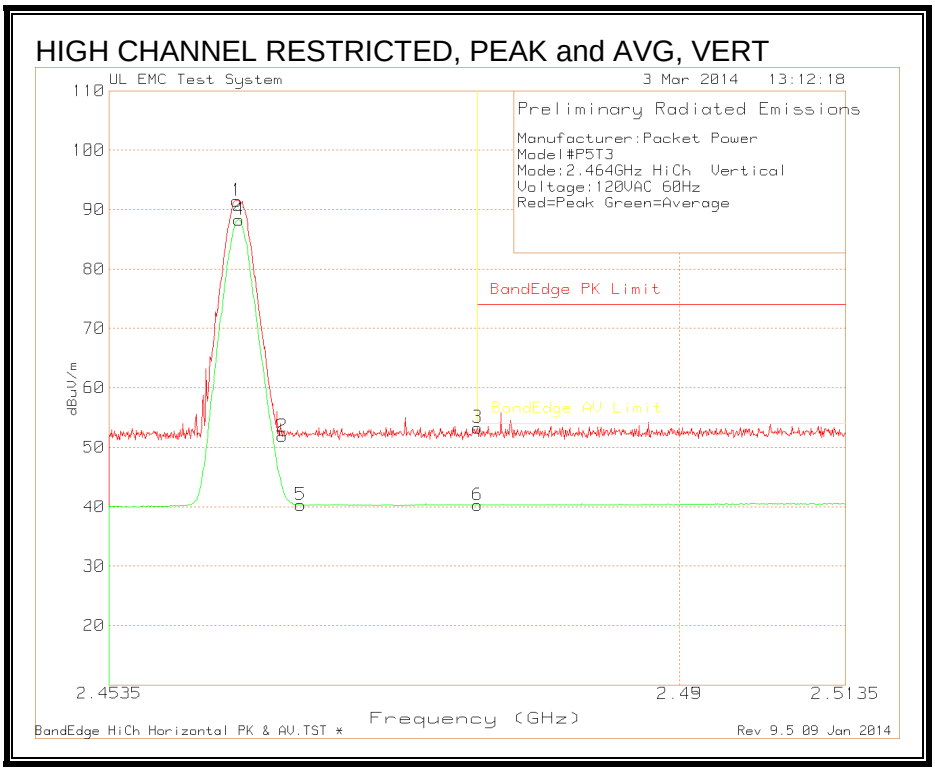
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

HIGH CHANNEL RESTRICTED, PEAK and AVG, HORIZ



Manufacturer:Packet Power													
Model#P5T3													
Mode:2.464GHz HiCh Horizontal													
Voltage:120VAC 60Hz													
Red=Peak Green=Average													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3161-02 S/N 99061052 3m UL	BOMS Factor (dB)	Corrected Reading dBuV/m	BandEdge RE PK Limit	Margin (dB)	BandEdge RE AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.4641	57.99	PK	22	4.41	84.4	n/a	n/a	n/a	n/a	0-360	100	H
2	2.4674	26.3	PK	22	4.43	52.73	n/a	n/a	n/a	n/a	0-360	124	H
3	2.4835	25.41	PK	22.1	4.34	51.85	74	-22.15	54	-2.15	0-360	149	H
4	2.4641	56.11	LnAv	22	4.41	82.52	n/a	n/a	n/a	n/a	228	111	H
5	2.4684	13.94	LnAv	22	4.42	40.36	n/a	n/a	n/a	n/a	228	111	H
6	2.4835	13.95	LnAv	22.1	4.34	40.39	74	-33.61	54	-13.61	228	111	H
PK - Peak detector													
LnAv - Linear Average detector													

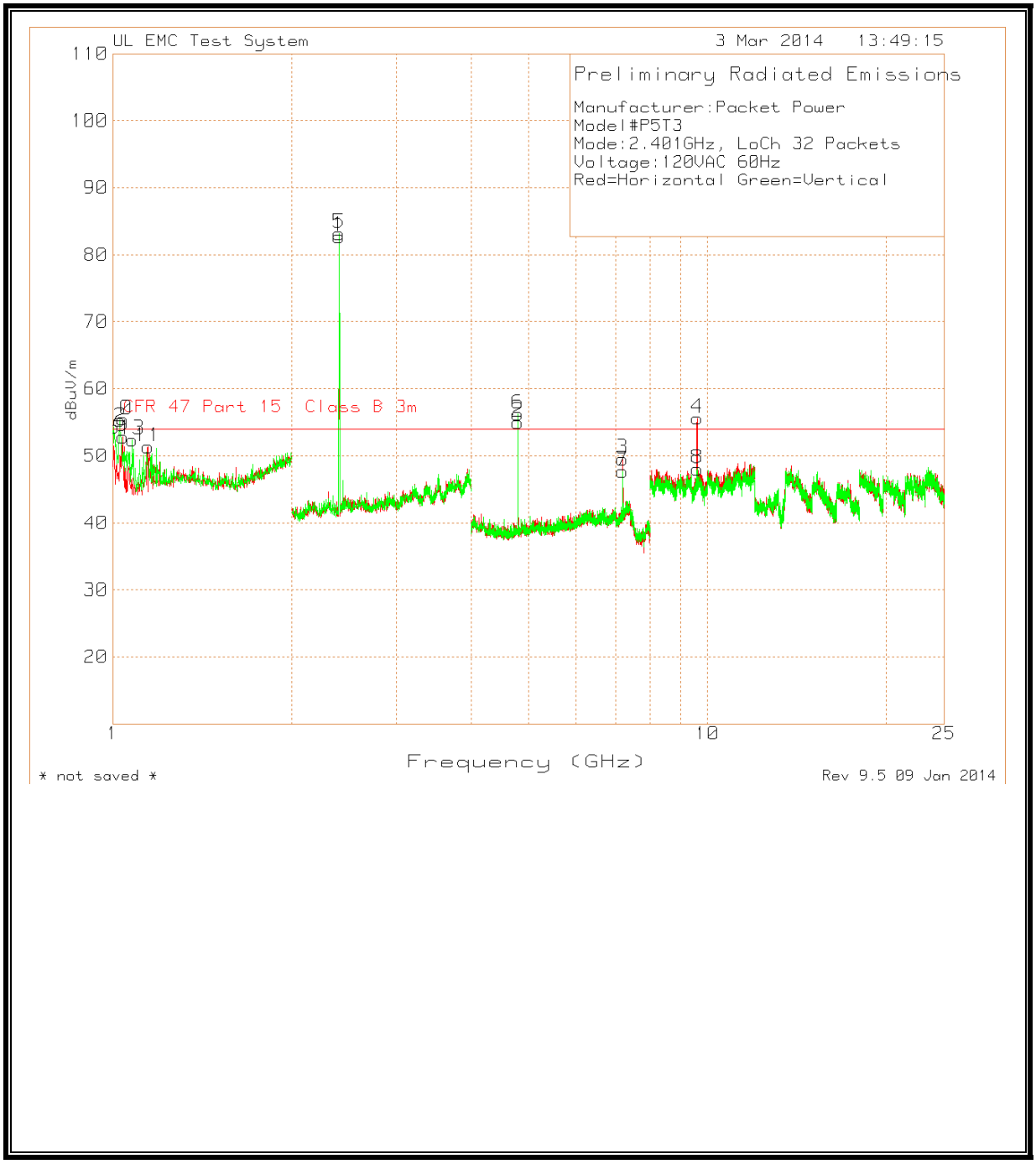
RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Manufacturer:Packet Power													
Model#P5T3													
Mode:2.464GHz HiCh Vertical													
Voltage:120VAC 60Hz													
Red=Peak Green=Average													
Marker No.	Test Frequency (GHz)	Meter Reading (dBuV)	Detector	EMCO3161-02 S/N 99061052 3m UL	BOMS Factor (dB)	Corrected Reading dBuV/m	BandEdge RE PK Limit	Margin (dB)	BandEdge RE AV Limit	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	2.4639	65.1	PK	22	4.41	91.51	n/a	n/a	n/a	n/a	0-360	100	V
2	2.4676	25.44	PK	22	4.43	51.87	n/a	n/a	n/a	n/a	0-360	124	V
3	2.4835	26.84	PK	22.1	4.34	53.28	74	-20.72	54	-0.72	0-360	124	V
4	2.4641	61.9	LnAv	22	4.41	88.31	n/a	n/a	n/a	n/a	160	114	H
5	2.4691	13.88	LnAv	22	4.41	40.29	n/a	n/a	n/a	n/a	160	114	H
6	2.4835	13.82	LnAv	22.1	4.34	40.26	74	-33.74	54	-13.74	160	114	H
PK - Peak detector													
LnAv - Linear Average detector													

HARMONICS AND SPURIOUS EMISSIONS

Lo Channel



Manufacturer:Packet Power
Model#P5T3
Mode: 2.401GHz, LoCh 32 Packets
Voltage:120VAC 60Hz
Red=Horizontal Green=Vertical

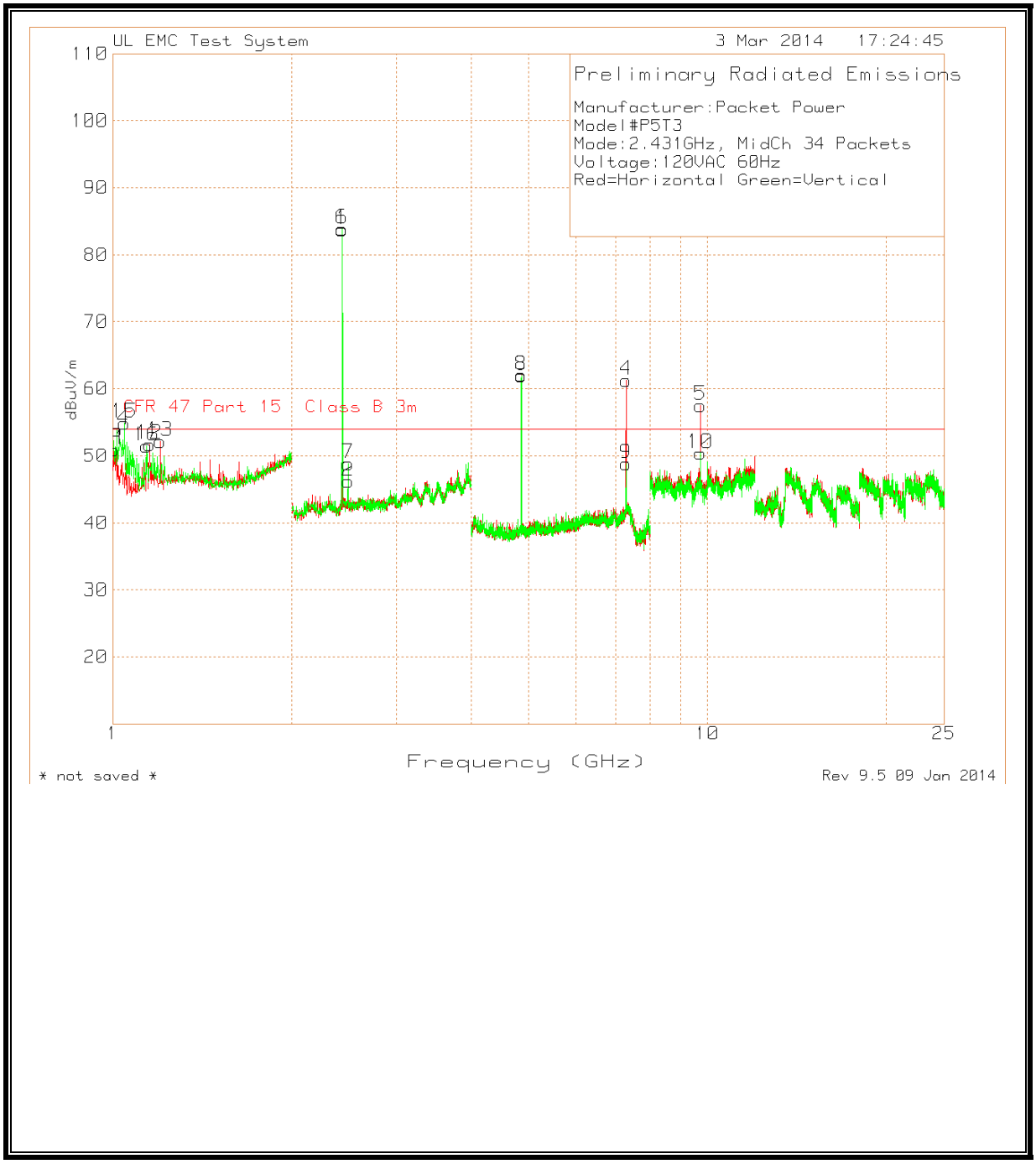
Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
9	1.0381	71.46	PK	27.3	-45.96	52.8	54	-1.2	0-360	100	H
11	1.1443	69.41	PK	27.7	-45.79	51.32	54	-2.68	0-360	149	H
1	2.4004	102.64	PK	21.8	-41.72	82.72	54	28.72	0-360	150	H
2	4.8024	77.79	PK	27.7	-50.48	55.01	54	1.01	0-360	150	H
3	7.2056	66.15	PK	29.7	-46.34	49.51	54	-4.49	0-360	150	H
4	9.6048	67.64	PK	36.4	-48.41	55.63	54	1.63	0-360	150	H
10	1.0261	73.82	PK	27.4	-45.9	55.32	54	1.32	0-360	100	V
12	1.002	72.93	PK	27.4	-46.05	54.28	54	0.28	0-360	100	V
13	1.0782	71.28	PK	27.2	-46.11	52.37	54	-1.63	0-360	100	V
5	2.4004	103.06	PK	21.8	-41.72	83.14	54	29.14	0-360	150	V
6	4.8024	79.01	PK	27.7	-50.48	56.23	54	2.23	0-360	150	V
7	7.2036	64.39	PK	29.7	-46.34	47.75	54	-6.25	0-360	150	V
8	9.6048	60.03	PK	36.4	-48.41	48.02	54	-5.98	0-360	150	V

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.0385	77.54	PK	27.3	-45.98	58.86	74	-15.14	91	106	H
1.0388	55.38	LnAv	27.3	-45.98	36.7	54	-17.3	91	106	H
1.1447	74.61	PK	27.7	-45.79	56.52	74	-17.48	91	106	H
1.1435	55.41	LnAv	27.7	-45.79	37.32	54	-16.68	91	106	H
1.0263	80.44	PK	27.3	-45.9	61.84	74	-12.16	337	100	V
1.0255	55.73	LnAv	27.4	-45.9	37.23	54	-16.77	337	100	V
1.0023	79.77	PK	27.4	-46.05	61.12	74	-12.88	337	100	V
1.002	55.73	LnAv	27.4	-46.05	37.08	54	-16.92	337	100	V
1.0786	78.31	PK	27.2	-46.11	59.4	74	-14.6	337	100	V
1.0784	55.4	LnAv	27.2	-46.11	36.49	54	-17.51	337	100	V
4.8018	83.86	PK	27.7	-50.48	61.08	74	-12.92	115	100	H
4.8022	66.4	LnAv	27.7	-50.48	43.62	54	-10.38	115	100	H
4.8024	83.93	PK	27.7	-50.48	61.15	74	-12.85	179	100	V
4.8021	66.48	LnAv	27.7	-50.48	43.7	54	-10.3	179	100	V
7.2038	75.36	PK	29.7	-46.34	58.72	74	-15.28	210	100	H
7.2032	57.4	LnAv	29.7	-46.34	40.76	54	-13.24	210	100	H
7.2037	69.14	PK	29.7	-46.34	52.5	74	-21.5	164	100	V
7.2033	52.78	LnAv	29.7	-46.34	36.14	54	-17.86	164	100	V
9.6041	73.17	PK	36.4	-48.41	61.16	74	-12.84	222	100	H
9.6046	55.59	LnAv	36.4	-48.41	43.58	54	-10.42	222	100	H
9.6041	67.61	PK	36.4	-48.41	55.6	74	-18.4	197	100	V
9.6045	52.18	LnAv	36.4	-48.41	40.17	54	-13.83	197	100	V

PK - Peak detector
LnAv - Linear Average detector

HARMONICS AND SPURIOUS EMISSIONS

Mid Channel



Manufacturer:Packet Power
Model#P5T3
Mode:2.431GHz, MidCh 34 Packets
Voltage:120VAC 60Hz
Red=Horizontal Green=Vertical

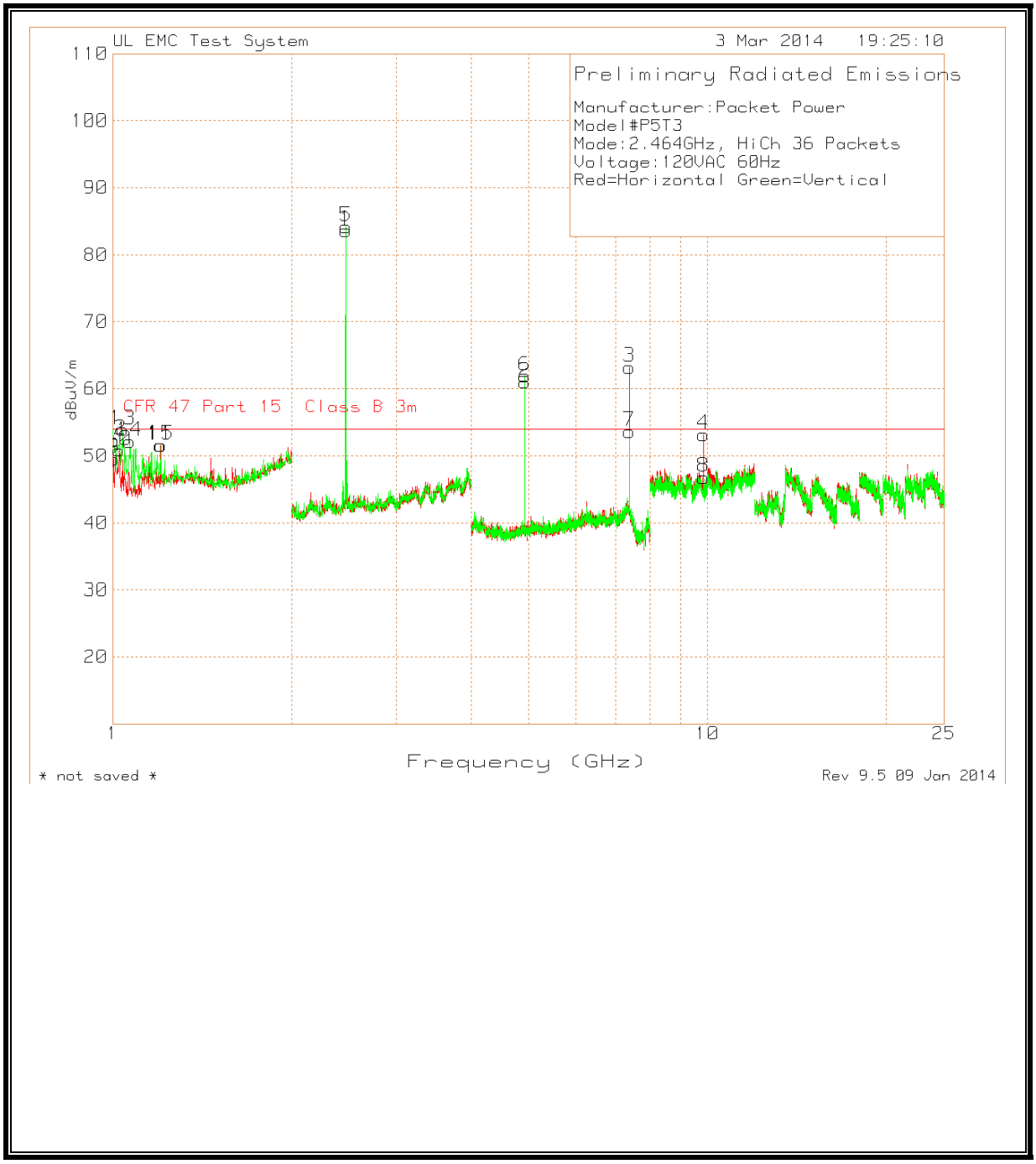
Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
11	1.002	69.57	PK	27.4	-46.05	50.92	54	-3.08	0-360	100	H
12	1.1523	69.71	PK	27.8	-45.82	51.69	54	-2.31	0-360	149	H
13	1.2024	69.42	PK	28.5	-45.72	52.2	54	-1.8	0-360	100	H
1	2.4304	102.86	PK	21.9	-41.02	83.74	54	29.74	0-360	100	H
2	2.4865	65.06	PK	22.1	-40.97	46.19	54	-7.81	0-360	100	H
3	4.8624	84.46	PK	27.7	-50.13	62.03	54	8.03	0-360	100	H
4	7.2936	76.7	PK	30.4	-45.79	61.31	54	7.31	0-360	100	H
5	9.7249	68.89	PK	36.4	-47.8	57.49	54	3.49	0-360	100	H
14	1.014	72.39	PK	27.4	-45.89	53.9	54	-0.1	0-360	100	V
15	1.0461	73.61	PK	27.3	-46.03	54.88	54	0.88	0-360	100	V
16	1.1403	69.51	PK	27.7	-45.77	51.44	54	-2.56	0-360	100	V
6	2.4304	102.99	PK	21.9	-41.02	83.87	54	29.87	0-360	100	V
7	2.4865	67.69	PK	22.1	-40.97	48.82	54	-5.18	0-360	149	V
8	4.8624	84.43	PK	27.7	-50.13	62	54	8	0-360	100	V
9	7.2936	64.2	PK	30.4	-45.79	48.81	54	-5.19	0-360	149	V
10	9.7249	61.79	PK	36.4	-47.8	50.39	54	-3.61	0-360	100	V

Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.0021	77.7	PK	27.4	-46.05	59.05	74	-14.95	91	100	H
1.0029	55.77	LnAv	27.4	-46.03	37.14	54	-16.86	91	100	H
1.1511	75.18	PK	27.8	-45.81	57.17	74	-16.83	306	100	H
1.1526	55.16	LnAv	27.8	-45.82	37.14	54	-16.86	306	100	H
1.2023	74.49	PK	28.5	-45.72	57.27	74	-16.73	306	100	H
1.2014	55.2	LnAv	28.5	-45.71	37.99	54	-16.01	306	100	H
1.0461	78.75	PK	27.3	-46.03	60.02	74	-13.98	0	100	V
1.0466	55.49	LnAv	27.3	-46.03	36.76	54	-17.24	0	100	V
1.0141	79.71	PK	27.4	-45.89	61.22	74	-12.78	0	100	V
1.0138	55.5	LnAv	27.4	-45.89	37.01	54	-16.99	0	100	V
1.1404	75.46	PK	27.7	-45.77	57.39	74	-16.61	360	100	V
1.1398	55.42	LnAv	27.7	-45.77	37.35	54	-16.65	360	100	V
4.8624	85.33	PK	27.7	-50.13	62.9	74	-11.1	112	110	H
4.8621	67.79	LnAv	27.7	-50.13	45.36	54	-8.64	112	110	H
4.8625	84.76	PK	27.7	-50.13	62.33	74	-11.67	181	100	V
4.8621	67.29	LnAv	27.7	-50.13	44.86	54	-9.14	181	100	V
7.2935	77.88	PK	30.4	-45.79	62.49	74	-11.51	213	100	H
7.2931	59.73	LnAv	30.4	-45.79	44.34	54	-9.66	213	100	H
7.2928	72.61	PK	30.4	-45.79	57.22	74	-16.78	175	105	V
7.2931	55.36	LnAv	30.4	-45.79	39.97	54	-14.03	175	105	V
9.7236	72.97	PK	36.4	-47.77	61.6	74	-12.4	224	103	H
9.7242	55.56	LnAv	36.4	-47.79	44.17	54	-9.83	224	103	H
9.725	68.38	PK	36.4	-47.81	56.97	74	-17.03	206	100	V
9.7241	52.71	LnAv	36.4	-47.78	41.33	54	-12.67	206	100	V

PK - Peak detector
LnAv - Linear Average detector

HARMONICS AND SPURIOUS EMISSIONS

Hi Channel



Manufacturer:Packet Power
Model#P5T3
Mode:2.464GHz, HiCh 36 Packets
Voltage:120VAC 60Hz
Red=Horizontal Green=Vertical

Marker No.	Test Frequency (GHz)	Meter Reading(dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
9	1.004	68.14	PK	27.4	-46.01	49.53	54	-4.47	0-360	100	H
10	1.024	69.35	PK	27.4	-45.91	50.84	54	-3.16	0-360	100	H
11	1.2024	68.81	PK	28.5	-45.72	51.59	54	-2.41	0-360	100	H
1	2.4645	102.47	PK	22	-40.8	83.67	54	29.67	0-360	100	H
2	4.9285	83.54	PK	27.8	-50.35	60.99	54	6.99	0-360	100	H
3	7.3917	78.36	PK	31.1	-46.25	63.21	54	9.21	0-360	100	H
4	9.8569	66.62	PK	36.4	-49.79	53.23	54	-0.77	0-360	100	H
12	1.002	71.06	PK	27.4	-46.05	52.41	54	-1.59	0-360	100	V
13	1.0381	72.59	PK	27.3	-45.96	53.93	54	-0.07	0-360	100	V
14	1.0681	71.06	PK	27.2	-46.12	52.14	54	-1.86	0-360	100	V
15	1.2044	68.78	PK	28.5	-45.71	51.57	54	-2.43	0-360	149	V
5	2.4625	102.99	PK	22	-40.78	84.21	54	30.21	0-360	100	V
6	4.9285	84.47	PK	27.8	-50.35	61.92	54	7.92	0-360	100	V
7	7.3937	68.7	PK	31.2	-46.28	53.62	54	-0.38	0-360	100	V
8	9.8569	60.23	PK	36.4	-49.79	46.84	54	-7.16	0-360	100	V

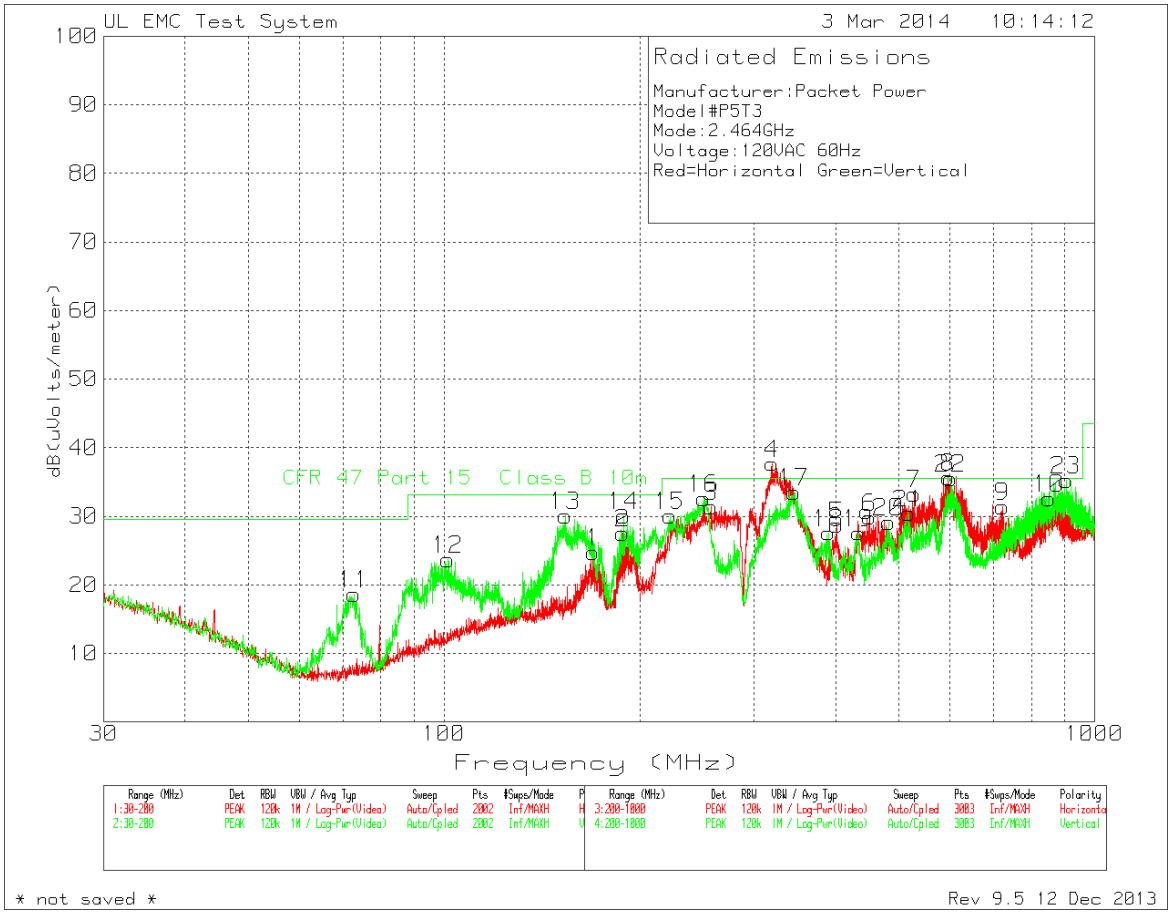
Test Frequency (GHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	BOMS Factor (dB)	Corrected Reading dBuV/m	CFR 47 Part 15 3m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1.0044	78.22	PK	27.4	-45.99	59.63	54	5.63	93	100	H
1.0038	55.92	LnAv	27.4	-46.01	37.31	54	-16.69	93	100	H
1.0238	77.7	PK	27.4	-45.91	59.19	54	5.19	93	100	H
1.0238	56.02	LnAv	27.4	-45.91	37.51	54	-16.49	93	100	H
1.2021	76.91	PK	28.5	-45.72	59.69	54	5.69	297	132	H
1.2012	55.26	LnAv	28.5	-45.71	38.05	54	-15.95	297	132	H
1.0017	80.99	PK	27.4	-46.05	62.34	54	8.34	0	100	V
1.0028	55.84	LnAv	27.4	-46.03	37.21	54	-16.79	0	100	V
1.0371	79.56	PK	27.3	-45.95	60.91	54	6.91	0	100	V
1.0388	55.47	LnAv	27.3	-45.98	36.79	54	-17.21	0	100	V
1.0684	76.5	PK	27.2	-46.12	57.58	54	3.58	0	100	V
1.0671	55.48	LnAv	27.2	-46.13	36.55	54	-17.45	0	100	V
1.2046	75.94	PK	28.5	-45.71	58.73	54	4.73	360	141	V
1.203	55.15	LnAv	28.5	-45.72	37.93	54	-16.07	360	141	V
4.9284	85.42	PK	27.8	-50.35	62.87	54	8.87	106	107	H
4.9281	67.87	LnAv	27.8	-50.35	45.32	54	-8.68	106	107	H
4.9278	85.15	PK	27.8	-50.35	62.6	54	8.6	163	100	V
4.9281	67.59	LnAv	27.8	-50.35	45.04	54	-8.96	163	100	V
7.3916	79.51	PK	31.1	-46.24	64.37	54	10.37	211	105	H
7.3921	61.12	LnAv	31.1	-46.25	45.97	54	-8.03	211	105	H
7.3921	73.49	PK	31.1	-46.25	58.34	54	4.34	173	100	V
7.3921	55.98	LnAv	31.1	-46.25	40.83	54	-13.17	173	100	V
9.8569	72.55	PK	36.4	-49.79	59.16	54	5.16	236	103	H
9.8561	55.4	LnAv	36.4	-49.78	42.02	54	-11.98	236	103	H
9.8556	68.61	PK	36.4	-49.78	55.23	54	1.23	200	100	V
9.8558	53.16	LnAv	36.4	-49.78	39.78	54	-14.22	200	100	V

PK - Peak detector
LnAv - Linear Average detector

9.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION

PLOT



Manufacturer:Packet Power
Model#P5T3
Mode:2.464GHz
Voltage:120VAC 60Hz
Red=Horizontal Green=Vertical

Marker No.	Test Frequency (MHz)	Meter Reading(dBuV)	Detector	Antenna Factor dB/m	Cable Factor dB	Corrected Reading dB(uVolts/ meter)	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1	169.5852	38.65	PK	15.6	-29.5	24.75	33.07	-8.32	0-360	249	H
2	188.2759	40.81	PK	15.8	-29.1	27.51	33.07	-5.56	0-360	400	H
11	72.6487	41.94	PK	6.6	-29.9	18.64	29.55	-10.91	0-360	99	V
12	101.5342	41.98	PK	11.5	-29.8	23.68	33.07	-9.39	0-360	250	V
13	153.5282	44.34	PK	15.3	-29.6	30.04	33.07	-3.03	0-360	99	V
14	189.1254	43.44	PK	15.7	-29.1	30.04	33.07	-3.03	0-360	99	V
3	257.2951	45.57	PK	12.3	-26.5	31.37	35.57	-4.2	0-360	299	H
4	319.6536	50.11	PK	13.6	-26	37.71	35.57	2.14	0-360	299	H
5	401.1992	38.49	PK	15.6	-25.4	28.69	35.57	-6.88	0-360	199	H
6	450.7662	38.07	PK	17.1	-25.3	29.87	35.57	-5.7	0-360	199	H
7	527.7815	39.52	PK	18.6	-24.8	33.32	35.57	-2.25	0-360	199	H
8	596.2692	40.47	PK	19.8	-24.6	35.67	35.57	0.1	0-360	199	H
9	722.8514	35.17	PK	20.5	-24.3	31.37	35.57	-4.2	0-360	99	H
10	851.8321	34.86	PK	22.5	-24.8	32.56	35.57	-3.01	0-360	299	H
15	222.3851	45.94	PK	10.8	-26.7	30.04	35.57	-5.53	0-360	99	V
16	250.8994	47.06	PK	12.1	-26.6	32.56	35.57	-3.01	0-360	99	V
17	344.97	44.68	PK	14.6	-25.7	33.58	35.57	-1.99	0-360	399	V
18	390.0067	37.71	PK	15.4	-25.5	27.61	35.57	-7.96	0-360	399	V
19	433.4444	36.51	PK	16.4	-25.3	27.61	35.57	-7.96	0-360	299	V
20	482.7448	36.97	PK	17.3	-25.1	29.17	35.57	-6.4	0-360	399	V
21	517.9214	37.32	PK	18.1	-25	30.42	35.57	-5.15	0-360	99	V
22	601.3324	40.06	PK	19.9	-24.4	35.56	35.57	-0.01	0-360	99	V
23	904.064	37.1	PK	23	-24.8	35.3	35.57	-0.27	0-360	199	V

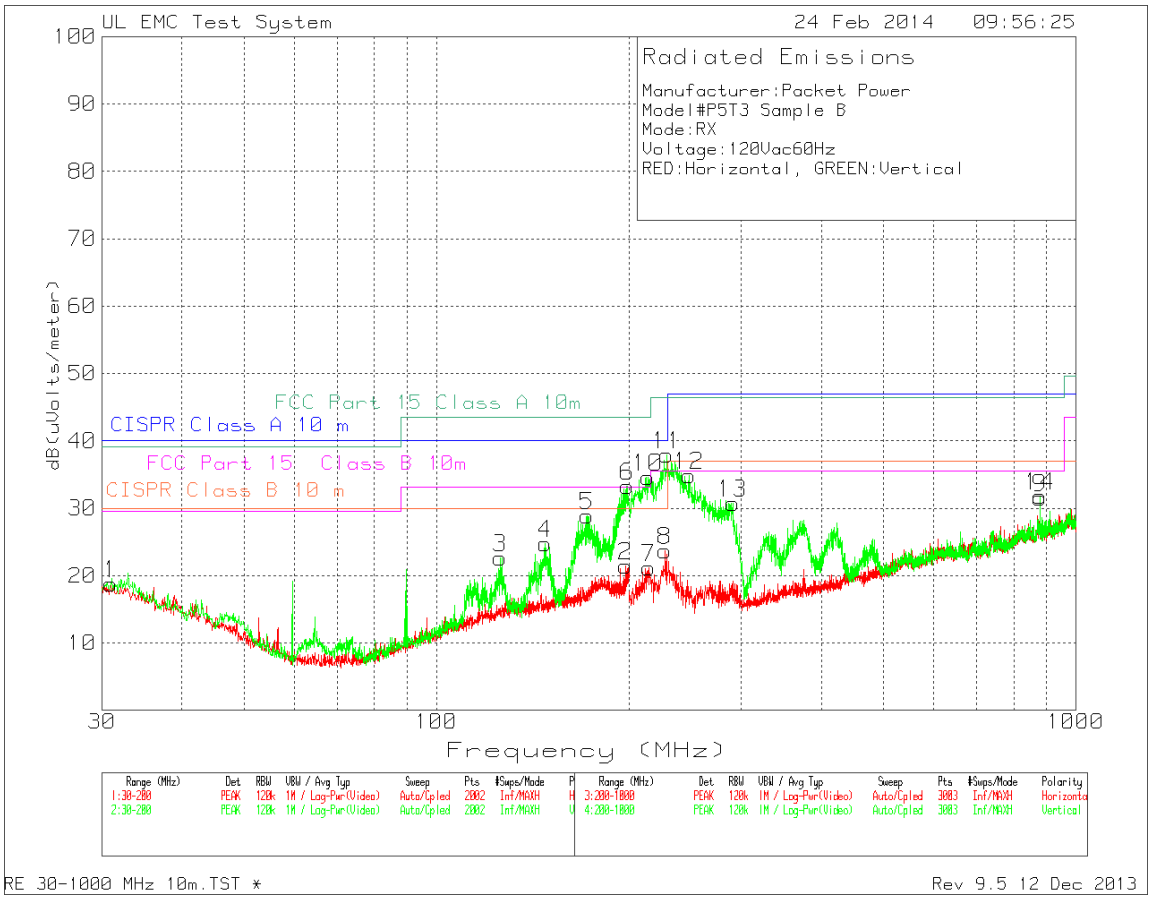
Test Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor dB/m	Cable Factor dB	Corrected Reading dB(uVolts/meter)	Limit dBuV/m	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
187.7828	32.07	QP	15.8	-29.1	18.77	33.07	-14.3	193	336	H
153.649	26.83	QP	15.3	-29.6	12.53	33.07	-20.54	1	294	H
189.1325	34.35	QP	15.7	-29.1	20.95	33.07	-12.12	217	338	H
152.692	36.69	QP	15.2	-29.6	22.29	33.07	-10.78	191	101	V
189.14	35.67	QP	15.7	-29.1	22.27	33.07	-10.8	210	105	V
315.5785	42.08	QP	13.4	-26	29.48	35.57	-6.09	185	301	H
596.4135	29.29	QP	19.8	-24.6	24.49	35.57	-11.08	156	192	H
257.3145	37.78	QP	12.3	-26.5	23.58	35.57	-11.99	188	295	H
450.996	31.59	QP	17.1	-25.3	23.39	35.57	-12.18	342	174	H
527.476	31.63	QP	18.6	-24.8	25.43	35.57	-10.14	220	165	H
722.6405	26.68	QP	20.5	-24.2	22.98	35.57	-12.59	221	119	H
851.928	25.17	QP	22.5	-24.8	22.87	35.57	-12.7	180	371	H
319.4245	43.1	QP	13.6	-26	30.7	35.57	-4.87	3	274	H
601.319	32.04	QP	19.9	-24.4	27.54	35.57	-8.03	236	146	H
903.8165	25.84	QP	23	-24.8	24.04	35.57	-11.53	187	346	H
345.0805	38.23	QP	14.6	-25.7	27.13	35.57	-8.44	155	298	H
251.0295	39.76	QP	12.1	-26.6	25.26	35.57	-10.31	193	260	H
222.393	37.61	QP	10.8	-26.7	21.71	35.57	-13.86	11	277	H
517.82	31.85	QP	18.1	-25	24.95	35.57	-10.62	237	186	H
222.5275	39.38	QP	10.8	-26.7	23.48	35.57	-12.09	271	270	V
601.3365	30.52	QP	19.9	-24.4	26.02	35.57	-9.55	194	100	V
904.2625	26.5	QP	23.1	-24.8	24.8	35.57	-10.77	310	171	V
345.152	38.89	QP	14.6	-25.7	27.79	35.57	-7.78	248	394	V
250.662	41.3	QP	12	-26.6	26.7	35.57	-8.87	277	209	V
518.0125	27.83	QP	18.1	-25	20.93	35.57	-14.64	234	288	V

PK - Peak detector
QP - Quasi-Peak detector

9.4. DIGITAL DEVICE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (DIGITAL DEVICE)

PLOT



Manufacturer:Packet Power
Model#P5T3 Sample B
Mode:RX
Voltage:120Vac60Hz
RED:Horizontal, GREEN:Vertical

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3	4	5	6
Bicon Horizonta 30 - 200MHz											
1	30.9345	31.36dBuV PK	17.5	-30.1	18.76	40	30	39.08	29.55	-	-
		Azimuth:0-360	Height:250 Horz		Margin (dB)	-21.24	-11.24	-20.32	-10.79	-	-
2	197.7061	34.14dBuV PK	16.1	-28.8	21.44	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:250 Horz		Margin (dB)	-18.56	-8.56	-22.08	-11.63	-	-
Bicon Vertical 30 - 200MHz											
3	125.7471	38.65dBuV PK	13.7	-29.7	22.65	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-17.35	-7.35	-20.87	-10.42	-	-
4	148.091	39.8dBuV PK	14.6	-29.6	24.8	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-15.2	-5.2	-18.72	-8.27	-	-
5	172.1339	42.95dBuV PK	15.3	-29.4	28.85	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-11.15	-1.15	-14.67	-4.22	-	-
6	198.8106	45.95dBuV PK	16	-28.7	33.25	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-6.75	3.25	-10.27	.18	-	-
LogP Horizontal 200 - 1000MHz											
7	214.9234	37.04dBuV PK	10.9	-26.8	21.14	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:399 Horz		Margin (dB)	-18.86	-8.86	-22.38	-11.93	-	-
8	227.9813	39.61dBuV PK	10.8	-26.7	23.71	40	30	46.44	35.57	-	-
		Azimuth:0-360	Height:299 Horz		Margin (dB)	-16.29	-6.29	-22.73	-11.86	-	-
9	879.8135	33.62dBuV PK	22.8	-24.9	31.52	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:99 Horz		Margin (dB)	-15.48	-5.48	-14.92	-4.05	-	-
LogP Vertical 200 - 1000MHz											
10	214.3904	50.47dBuV PK	10.9	-26.8	34.57	40	30	43.52	33.07	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-5.43	4.57	-8.95	1.5	-	-
11	229.5803	53.76dBuV PK	10.8	-26.6	37.96	40	30	46.44	35.57	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-2.04	7.96	-8.48	2.39	-	-
12	248.7675	49.58dBuV PK	11.9	-26.6	34.88	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-12.12	-2.12	-11.56	-.69	-	-
13	290.6063	43.89dBuV PK	13.2	-26.3	30.79	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:99 Vert		Margin (dB)	-16.21	-6.21	-15.65	-4.78	-	-
14	879.547	33.89dBuV PK	22.8	-24.9	31.79	47	37	46.44	35.57	-	-
		Azimuth:0-360	Height:299 Vert		Margin (dB)	-15.21	-5.21	-14.65	-3.78	-	-

LIMIT 1: CISPR Class A 10 m
LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class A 10m
LIMIT 4: FCC Part 15 Class B 10m
LIMIT 5: NONE
LIMIT 6: NONE

PK - Peak detector

Radiated Emission Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3	4	5	6
Bicon Vertical 30 - 200MHz										
198.66637	38.81dBuV QP	16	-28.7	26.11	40	30	43.52	33.07	-	-
Azimuth: 115	Height:100 Vert			Margin (dB): -13.89		-3.89	-17.41	-6.96	-	-
172.22685	34.58dBuV QP	15.3	-29.4	20.48	40	30	43.52	33.07	-	-
Azimuth: 318	Height:100 Vert			Margin (dB): -19.52		-9.52	-23.04	-12.59	-	-
148.10703	27.13dBuV QP	14.6	-29.6	12.13	40	30	43.52	33.07	-	-
Azimuth: 139	Height:104 Vert			Margin (dB): -27.87		-17.87	-31.39	-20.94	-	-
LogP Horizontal 200 - 1000MHz										
879.62489	31.41dBuV QP	22.8	-24.9	29.31	47	37	46.44	35.57	-	-
Azimuth: 180	Height:331 Horz			Margin (dB): -17.69		-7.69	-17.13	-6.26	-	-
LogP Vertical 200 - 1000MHz										
229.52261	45.87dBuV QP	10.8	-26.6	30.07	40	30	46.44	35.57	-	-
Azimuth: 1	Height:118 Vert			Margin (dB): -9.93		.07	-16.37	-5.5	-	-
214.41444	43.47dBuV QP	10.9	-26.8	27.57	40	30	43.52	33.07	-	-
Azimuth: 163	Height:100 Vert			Margin (dB): -12.43		-2.43	-15.95	-5.5	-	-
249.0191	41.45dBuV QP	11.9	-26.5	26.85	47	37	46.44	35.57	-	-
Azimuth: 168	Height:100 Vert			Margin (dB): -20.15		-10.15	-19.59	-8.72	-	-
290.45085	36.49dBuV QP	13.2	-26.3	23.39	47	37	46.44	35.57	-	-
Azimuth: 81	Height:100 Vert			Margin (dB): -23.61		-13.61	-23.05	-12.18	-	-
879.63194	31.29dBuV QP	22.8	-24.9	29.19	47	37	46.44	35.57	-	-
Azimuth: 171	Height:318 Vert			Margin (dB): -17.81		-7.81	-17.25	-6.38	-	-

LIMIT 1: CISPR Class A 10 m
LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class A 10m
LIMIT 4: FCC Part 15 Class B 10m
LIMIT 5: NONE
LIMIT 6: NONE

QP - Quasi-Peak detector

Rev 9.5 12 Dec 2013

Radiated Emission Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading dB(uVolts/meter)	Limit:1	2	3	4	5	6
Bicon Vertical 30 - 200MHz										
196.16892	36.5dBuV QP	16	-28.8	23.7	40	30	43.52	33.07	-	-
Azimuth: 38	Height:100 Vert			Margin (dB):	-16.3	-6.3	-19.82	-9.37	-	-
196.16892	36.57dBuV QP	16	-28.8	23.77	40	30	43.52	33.07	-	-
Azimuth: 38	Height:100 Vert			Margin (dB):	-16.23	-6.23	-19.75	-9.3	-	-
170.33862	34.12dBuV QP	15.2	-29.4	19.92	40	30	43.52	33.07	-	-
Azimuth: 162	Height:101 Vert			Margin (dB):	-20.08	-10.08	-23.6	-13.15	-	-
LogP Vertical 200 - 1000MHz										
233.27584	47.65dBuV QP	10.9	-26.6	31.95	47	37	46.44	35.57	-	-
Azimuth: 0	Height:107 Vert			Margin (dB):	-15.05	-5.05	-14.49	-3.62	-	-
216.34715	42.97dBuV QP	10.9	-26.7	27.17	40	30	46.44	35.57	-	-
Azimuth: 92	Height:100 Vert			Margin (dB):	-12.83	-2.83	-19.27	-8.4	-	-
208.50837	41.61dBuV QP	11	-26.8	25.81	40	30	43.52	33.07	-	-
Azimuth: 167	Height:100 Vert			Margin (dB):	-14.19	-4.19	-17.71	-7.26	-	-
257.67859	43.64dBuV QP	12.4	-26.4	29.64	47	37	46.44	35.57	-	-
Azimuth: 128	Height:102 Vert			Margin (dB):	-17.36	-7.36	-16.8	-5.93	-	-
879.66667	29.87dBuV QP	22.8	-24.9	27.77	47	37	46.44	35.57	-	-
Azimuth: 40	Height:354 Horz			Margin (dB):	-19.23	-9.23	-18.67	-7.8	-	-
352.43491	33.7dBuV QP	14.8	-25.9	22.6	47	37	46.44	35.57	-	-
Azimuth: 100	Height:100 Vert			Margin (dB):	-24.4	-14.4	-23.84	-12.97	-	-

LIMIT 1: CISPR Class A 10 m
LIMIT 2: CISPR Class B 10 m
LIMIT 3: FCC Part 15 Class A 10m
LIMIT 4: FCC Part 15 Class B 10m
LIMIT 5: NONE
LIMIT 6: NONE

QP - Quasi-Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	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 PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

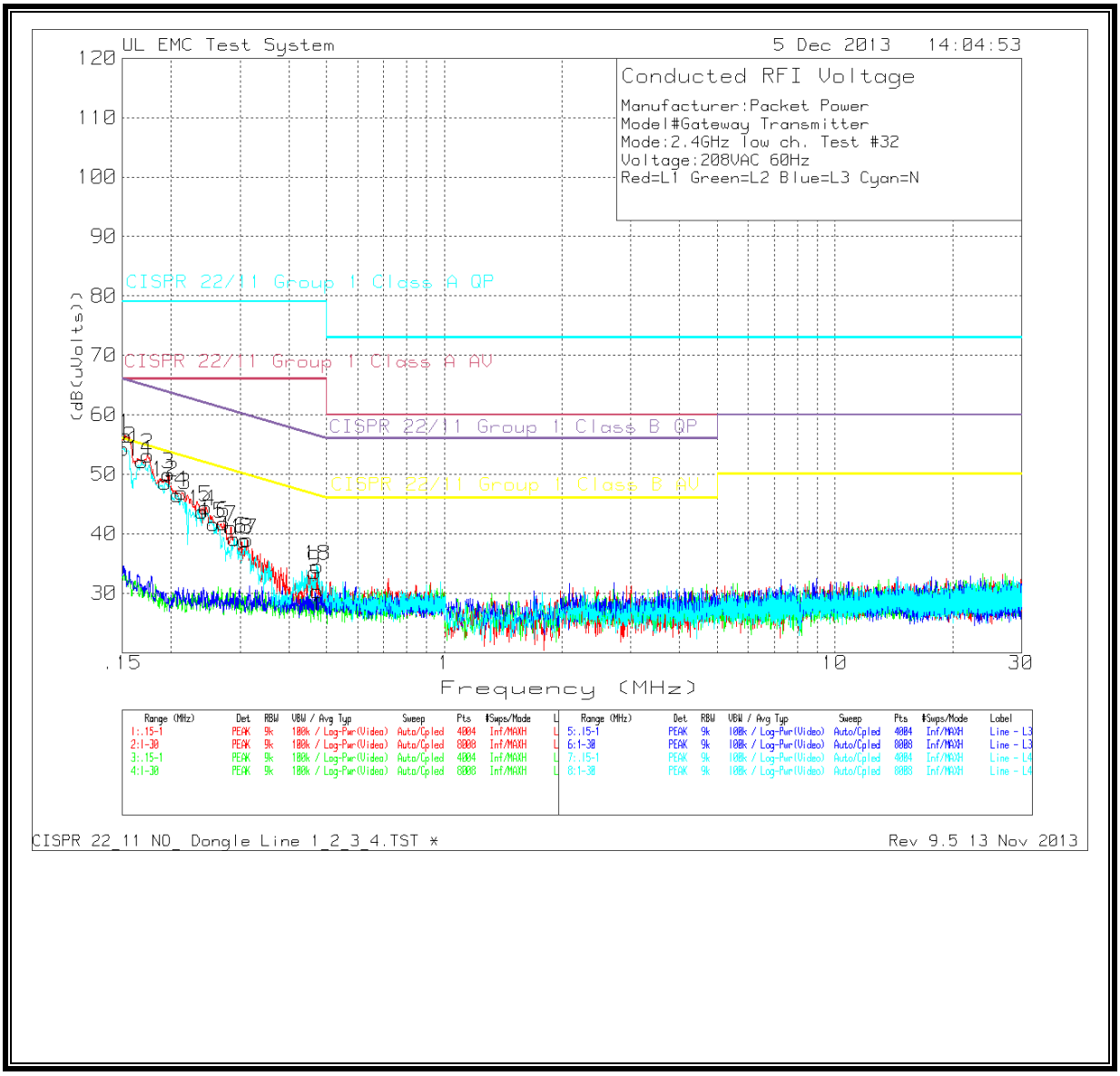
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

6 WORST EMISSIONS

LINE RESULTS



Manufacturer:Packet Power
Model#P5T3
Mode:Running with radio at 2.4GHz
Voltage:120VAC 60Hz

Trace Markers

No.	Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading (dB(uVolts))	Limit:1	2	3	4	5	6
Line - L1 .15 - 1MHz											
1	.15382	41.12dBuV PK	.1	14.3	55.52	79	66	65.79	55.79	-	-
					Margin (dB)	-23.48	-10.48	-10.27	-.27	-	-
2	.17325	39.78dBuV PK	.1	12.7	52.58	79	66	64.8	54.8	-	-
					Margin (dB)	-26.42	-13.42	-12.22	-2.22	-	-
3	.19141	37.62dBuV PK	.1	11.6	49.32	79	66	63.98	53.98	-	-
					Margin (dB)	-29.68	-16.68	-14.66	-4.66	-	-
4	.21073	35.69dBuV PK	.1	11.5	47.29	79	66	63.18	53.18	-	-
					Margin (dB)	-31.71	-18.71	-15.89	-5.89	-	-
5	.23398	33.72dBuV PK	.1	11.3	45.12	79	66	62.31	52.31	-	-
					Margin (dB)	-33.88	-20.88	-17.19	-7.19	-	-
6	.25267	31.95dBuV PK	.1	11.2	43.25	79	66	61.67	51.67	-	-
					Margin (dB)	-35.75	-22.75	-18.42	-8.42	-	-
7	.64688	21.94dBuV PK	.1	10.6	32.64	73	60	56	46	-	-
					Margin (dB)	-40.36	-27.36	-23.36	-13.36	-	-
Line - L2 .15 - 1MHz											
8	.15457	41.01dBuV PK	.1	14.3	55.41	79	66	65.75	55.75	-	-
					Margin (dB)	-23.59	-10.59	-10.34	-.34	-	-
9	.17145	39.16dBuV PK	.1	12.9	52.16	79	66	64.89	54.89	-	-
					Margin (dB)	-26.84	-13.84	-12.73	-2.73	-	-
10	.19077	37.27dBuV PK	.1	11.6	48.97	79	66	64	54	-	-
					Margin (dB)	-30.03	-17.03	-15.03	-5.03	-	-
11	.21476	35.11dBuV PK	.1	11.5	46.71	79	66	63.02	53.02	-	-
					Margin (dB)	-32.29	-19.29	-16.31	-6.31	-	-
12	.23748	33.31dBuV PK	.1	11.3	44.71	79	66	62.18	52.18	-	-
					Margin (dB)	-34.29	-21.29	-17.47	-7.47	-	-
13	.25086	31.98dBuV PK	.1	11.2	43.28	79	66	61.73	51.73	-	-
					Margin (dB)	-35.72	-22.72	-18.45	-8.45	-	-
14	.27868	31.17dBuV PK	.1	11	42.27	79	66	60.86	50.86	-	-
					Margin (dB)	-36.73	-23.73	-18.59	-8.59	-	-

LIMIT 1: CISPR 22/11 Group 1 Class A QP
LIMIT 2: CISPR 22/11 Group 1 Class A AV
LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV
LIMIT 5: NONE
LIMIT 6: NONE

PK - Peak detector

Quais-peak Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading(dB(uVolts))	Limit:1	2	3	4	5
Line - L1 .15 - 1MHz									
.15382	38.42dBuV QP .1	14.3	52.82	79	66	65.79	55.79	-	-
		Margin (dB):		-26.18	-13.18	-12.97	-2.97	-	-
.17325	36.91dBuV QP .1	12.7	49.71	79	66	64.8	54.8	-	-
		Margin (dB):		-29.29	-16.29	-15.09	-5.09	-	-
.19141	34.68dBuV QP .1	11.6	46.38	79	66	63.98	53.98	-	-
		Margin (dB):		-32.62	-19.62	-17.6	-7.6	-	-
.21073	31.39dBuV QP .1	11.5	42.99	79	66	63.18	53.18	-	-
		Margin (dB):		-36.01	-23.01	-20.19	-10.19	-	-
.23398	29.78dBuV QP .1	11.3	41.18	79	66	62.31	52.31	-	-
		Margin (dB):		-37.82	-24.82	-21.13	-11.13	-	-
.25267	27.93dBuV QP .1	11.2	39.23	79	66	61.67	51.67	-	-
		Margin (dB):		-39.77	-26.77	-22.44	-12.44	-	-
.64688	12.88dBuV QP .1	10.6	23.58	73	60	56	46	-	-
		Margin (dB):		-49.42	-36.42	-32.42	-22.42	-	-
Line - L2 .15 - 1MHz									
.15457	38.3dBuV QP .1	14.3	52.7	79	66	65.75	55.75	-	-
		Margin (dB):		-26.3	-13.3	-13.05	-3.05	-	-
.17145	36.26dBuV QP .1	12.9	49.26	79	66	64.89	54.89	-	-
		Margin (dB):		-29.74	-16.74	-15.63	-5.63	-	-
.19077	33.27dBuV QP .1	11.6	44.97	79	66	64	54	-	-
		Margin (dB):		-34.03	-21.03	-19.03	-9.03	-	-
.21476	31.28dBuV QP .1	11.5	42.88	79	66	63.02	53.02	-	-
		Margin (dB):		-36.12	-23.12	-20.14	-10.14	-	-
.23748	29.11dBuV QP .1	11.3	40.51	79	66	62.18	52.18	-	-
		Margin (dB):		-38.49	-25.49	-21.67	-11.67	-	-
.25086	27.01dBuV QP .1	11.2	38.31	79	66	61.73	51.73	-	-
		Margin (dB):		-40.69	-27.69	-23.42	-13.42	-	-
.27868	25.05dBuV QP .1	11	36.15	79	66	60.86	50.86	-	-
		Margin (dB):		-42.85	-29.85	-24.71	-14.71	-	-

LIMIT 1: CISPR 22/11 Group 1 Class A QP
LIMIT 2: CISPR 22/11 Group 1 Class A AV
LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV
LIMIT 5: NONE
LIMIT 6: NONE

QP - Quasi-Peak detector

Average Data

Test Frequency (MHz)	Meter Reading	Transducer Factor (dB)	Gain/Loss Factor (dB)	Corrected Reading(dB(uVolts))	Limit:1	2	3	4	5
Line - L1 .15 - 1MHz									
.15382	23.51dBuV Av .1	14.3	37.91	79	66	65.79	55.79	-	-
		Margin (dB):		-41.09	-28.09	-27.88	-17.88	-	-
.17325	22.27dBuV Av .1	12.7	35.07	79	66	64.8	54.8	-	-
		Margin (dB):		-43.93	-30.93	-29.73	-19.73	-	-
.19141	20.32dBuV Av .1	11.6	32.02	79	66	63.98	53.98	-	-
		Margin (dB):		-46.98	-33.98	-31.96	-21.96	-	-
.21073	18.46dBuV Av .1	11.5	30.06	79	66	63.18	53.18	-	-
		Margin (dB):		-48.94	-35.94	-33.12	-23.12	-	-
.23398	18.21dBuV Av .1	11.3	29.61	79	66	62.31	52.31	-	-
		Margin (dB):		-49.39	-36.39	-32.7	-22.7	-	-
.25267	17.02dBuV Av .1	11.2	28.32	79	66	61.67	51.67	-	-
		Margin (dB):		-50.68	-37.68	-33.35	-23.35	-	-
.64688	10.34dBuV Av .1	10.6	21.04	73	60	56	46	-	-
		Margin (dB):		-51.96	-38.96	-34.96	-24.96	-	-
Line - L2 .15 - 1MHz									
.15457	23.98dBuV Av .1	14.3	38.38	79	66	65.75	55.75	-	-
		Margin (dB):		-40.62	-27.62	-27.37	-17.37	-	-
.17145	21.46dBuV Av .1	12.9	34.46	79	66	64.89	54.89	-	-
		Margin (dB):		-44.54	-31.54	-30.43	-20.43	-	-
.19077	19.01dBuV Av .1	11.6	30.71	79	66	64	54	-	-
		Margin (dB):		-48.29	-35.29	-33.29	-23.29	-	-
.21476	19.26dBuV Av .1	11.5	30.86	79	66	63.02	53.02	-	-
		Margin (dB):		-48.14	-35.14	-32.16	-22.16	-	-
.23748	16.5dBuV Av .1	11.3	27.9	79	66	62.18	52.18	-	-
		Margin (dB):		-51.1	-38.1	-34.28	-24.28	-	-
.25086	15.42dBuV Av .1	11.2	26.72	79	66	61.73	51.73	-	-
		Margin (dB):		-52.28	-39.28	-35.01	-25.01	-	-
.27868	13.68dBuV Av .1	11	24.78	79	66	60.86	50.86	-	-
		Margin (dB):		-54.22	-41.22	-36.08	-26.08	-	-

NOTE: "+" - Indicates an emission level in excess of the applicable limit (s).

PK - Peak detector
QP - Quasi-Peak detector
LnAv - Linear average detector
Avg - Video bandwidth < Resolution bandwidth
Av - average detection
CAV - CISPR average detection
RMS - RMS detection
CRMS - CISPR RMS detection

LIMIT 1: CISPR 22/11 Group 1 Class A QP
LIMIT 2: CISPR 22/11 Group 1 Class A AV
LIMIT 3: CISPR 22/11 Group 1 Class B QP
LIMIT 4: CISPR 22/11 Group 1 Class B AV
LIMIT 5: NONE
LIMIT 6: NONE

Av - Average detector

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11. RF EXPOSURE

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500	.....	.....	f/300	6
1500–100,000	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500	.....	.....	f/1500	30
1500–100,000	.....	.....	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

11.1. IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.
2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2.
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

11.2. EQUATIONS

POWER DENSITY

Power density is given by:

S = EIRP / (4 * Pi * D^2)

Where

S = Power density in mW/cm^2
EIRP = Equivalent Isotropic Radiated Power in mW
D = Separation distance in cm

Power density in units of mW/cm^2 is converted to units of W/m^2 by multiplying by 10.

DISTANCE

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

Where

D = Separation distance in cm
EIRP = Equivalent Isotropic Radiated Power in mW
S = Power density in mW/cm^2

SOURCE-BASED DUTY CYCLE

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

Source-based time-averaged EIRP = (DC / 100) * EIRP

Where

DC = Duty Cycle in %, as applicable
EIRP = Equivalent Isotropic Radiated Power in W

11.3. LIMITS AND IC EXEMPTION

FIXED LIMITS

For operation in the PCS band, the 2.4 GHz band and the 5 GHz bands:

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2
From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m^2

INDUSTRY CANADA EXEMPTION

RSS-102 Clause 2.5.2 RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 2.5 W;
- at or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

(Single chain transmitters, no colocation, 20 cm MPE distance)

Band	Mode	Separation Distance (cm)	Output AVG Power (dBm)	Antenna Gain (dBi)	Duty Cycle (%)	EIRP (mW)	FCC Power Density (mW/cm^2)	IC Power Density (W/m^2)
2.4GHz	GFSK	20	3.57	1.50	4.9	0.2	0.00003	0.0003

The device operates below 1.5 GHz with a maximum EIRP less than or equal to 2.5 Watts as a mobile device with a minimum separation distance of 20 cm, therefore it is exempt from routine RF Exposure Evaluation under RSS-102.