FCC 47 CFR PART 15 SUBPART C

C2PC CERTIFICATION TEST REPORT

FOR

Tablet with Bluetooth, DTS/UNII a/b/g/n/ac & ANT+

MODEL NUMBER: SM-T800

FCC ID: A3LSMT800

REPORT NUMBER: 14U17528-1

ISSUE DATE: April 18, 2014

Prepared for

SAMSUNG ELECTRONICS CO., LTD.
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA

Prepared by

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/18/14	Initial Issue	P. Kim

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS 4

2. TEST METHODOLOGY 5

3. FACILITIES AND ACCREDITATION 5

4. CALIBRATION AND UNCERTAINTY 5

4.1. MEASURING INSTRUMENT CALIBRATION 5

4.2. SAMPLE CALCULATION 5

4.3. MEASUREMENT UNCERTAINTY 5

5. EQUIPMENT UNDER TEST 6

5.1. DESCRIPTION OF EUT 6

5.2. MAXIMUM OUTPUT POWER 6

5.3. DESCRIPTION OF AVAILABLE ANTENNAS 6

5.4. WORST-CASE CONFIGURATION AND MODE 6

5.5. DESCRIPTION OF TEST SETUP 7

6. TEST AND MEASUREMENT EQUIPMENT 9

7. SUMMARY TABLE 10

8. RADIATED TEST RESULTS 11

8.1. LIMITS AND PROCEDURE 11

8.2. TRANSMITTER ABOVE 1 GHz 12

8.2.1. BASIC DATA RATE GFSK MODULATION 12

8.2.2. ENHANCED DATA RATE 8PSK MODULATION 25

8.3. WORST-CASE BELOW 1 GHz 38

9. SETUP PHOTOS 41

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: Tablet with Bluetooth, DTS/UNII a/b/g/n/ac & ANT+

MODEL: SM-T800

SERIAL NUMBER: R32F202ZF8E

DATE TESTED: April 8 - 18, 2014

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:

PHILIP KIM
CONSUMER TECHNOLOGY DIVISION
PROGRAM MANAGER
UL Verification Services Inc.

Tested By:

CHARLES VERGONIO
CONSUMER TECHNOLOGY DIVISION
LAB ENGINEER
UL Verification Services Inc.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

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	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a Tablet with Bluetooth, DTS/UNII a/b/g/n/ac & ANT+.

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	9.62	9.16
2402 - 2480	Enhanced 8PSK	9.31	8.53

Note: GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on this mode to showing compliance. For average power data please refer to section 8.6.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 0.19 dBi.

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 X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	Samsung	N/A	N/A
Earphone	Samsung	Samsung	N/A	N/A

I/O CABLES

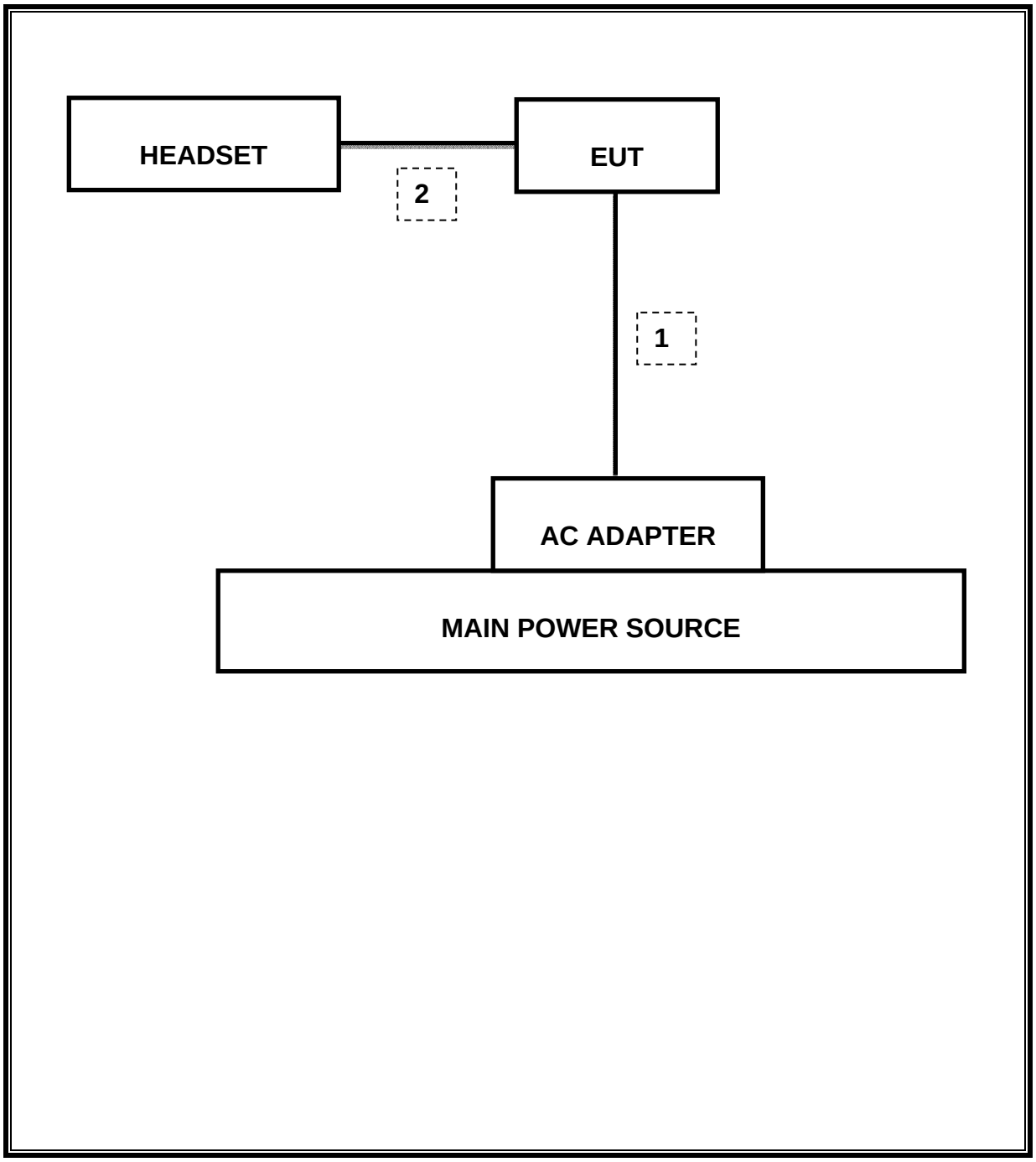
I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	DC Power	1	Mini-USB	Shielded	1.2m	N/A
2	Audio	1	Mini-Jack	Unshielded	1m	N/A

TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests.
EUT was set in the Hidden menu mode to enable BT communications.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

SETUP DIAGRAM FOR TESTS



UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

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**
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	03/23/14	02/13/15
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/13	10/25/14
Antenna, Horn, 25.5 GHz	ARA	MWH-1826/B	C00980	11/14/13	11/14/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/14	01/28/15
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	10/22/13	10/22/14
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/13	12/20/14
CBT Bluetooth Tester	R & S	CBT	None	07/12/13	07/12/14
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/13	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/13	12/13/14
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/14	01/14/15
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR	CNR

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
2.1049	RSS-GEN 4.6	Occupied Band width (99%)	N/A	Conducted	Pass	See original
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	See original
15.247 (b)(1)	RSS-210 A8.4	TX conducted output power	<21dBm		Pass	See original
15.247 (a)(1)	RSS-210 A8.1(b)	Hopping frequency separation	> 25KHz		Pass	See original
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Number of Hopping channels	More than 15 non-overlapping channels		Pass	See original
15.247 (a)(1)(iii)	RSS-210 A8.1(d)	Avg Time of Occupancy	< 0.4sec		Pass	See original
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	See original
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	50.71dBuV/m

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

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 1/T (on time) for average measurement. GFSK = 1/T = 1KHz.

The spectrum from 1GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

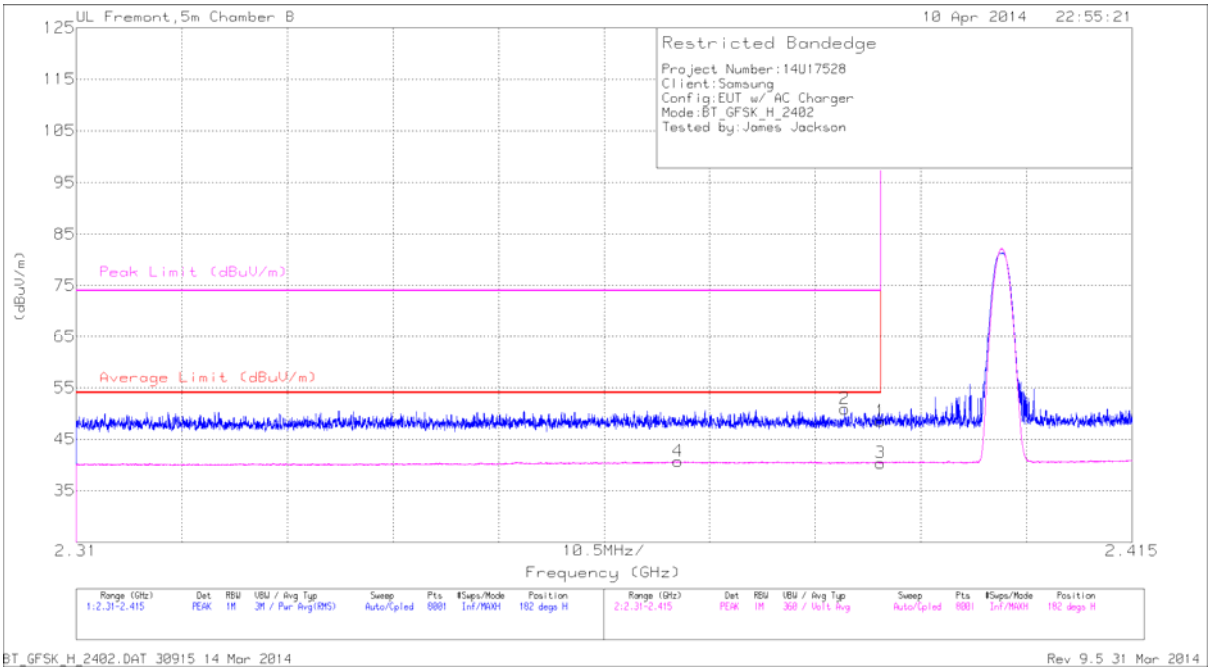
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. BASIC DATA RATE GFSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



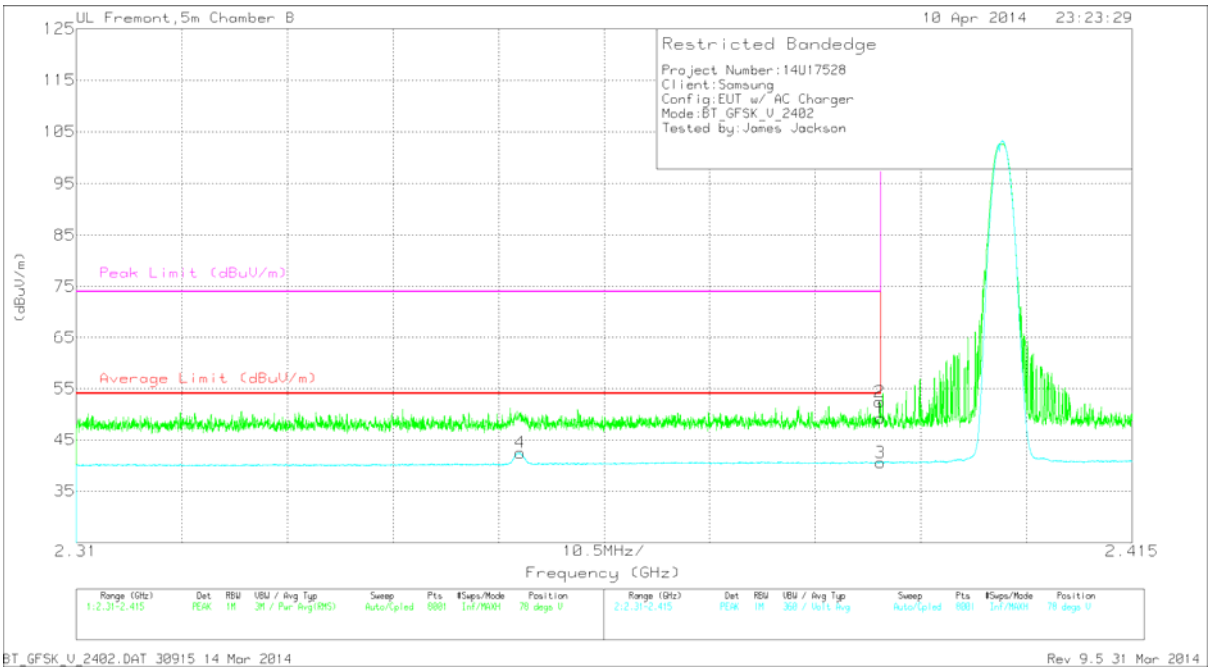
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.37	30.31	VB1T	32	-22.8	40.71	54	-13.29	-	-	182	330	H
2	* 2.386	41.7	PK	32.1	-22.9	50.9	-	-	74	-23.1	182	330	H
1	* 2.39	39.31	PK	32.1	-22.9	48.51	-	-	74	-25.49	182	330	H
3	* 2.39	29.97	VB1T	32.1	-22.9	40.37	54	-13.63	-	-	182	330	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



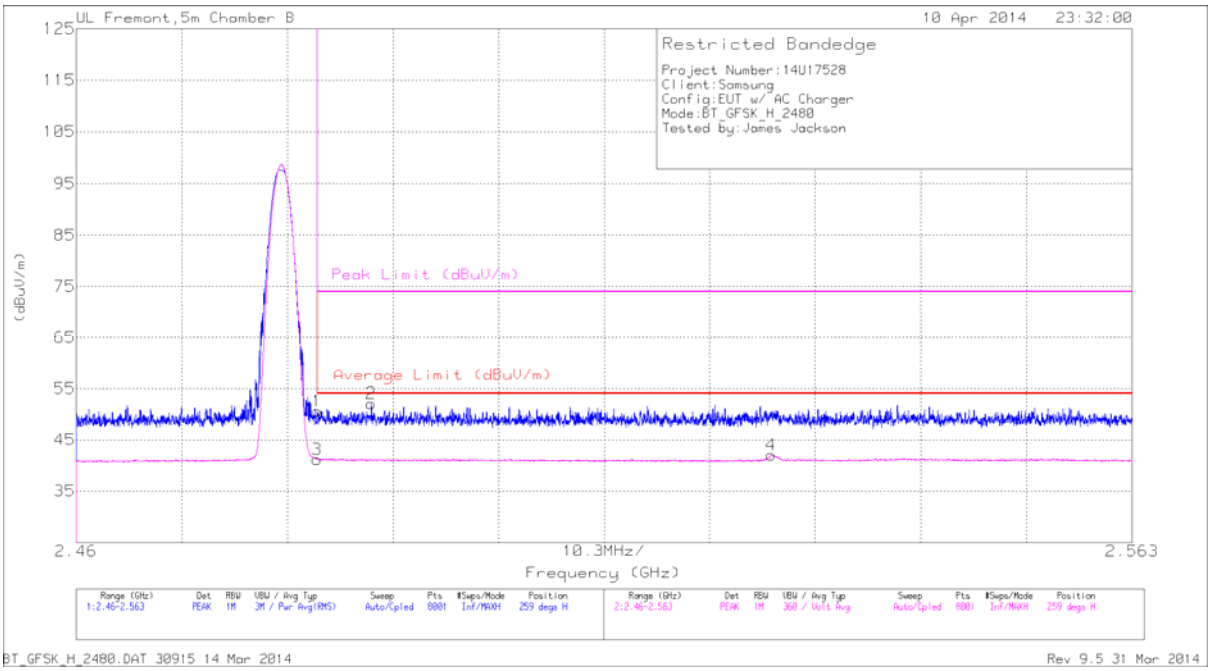
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.354	32.36	VB1T	31.9	-23	42.46	54	-11.54	-	-	78	358	V
1	* 2.39	40.01	PK	32.1	-22.9	49.21	-	-	74	-24.79	78	358	V
2	* 2.39	43.17	PK	32.1	-22.9	52.37	-	-	74	-21.63	78	358	V
3	* 2.39	30.13	VB1T	32.1	-22.9	40.53	54	-13.47	-	-	78	358	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



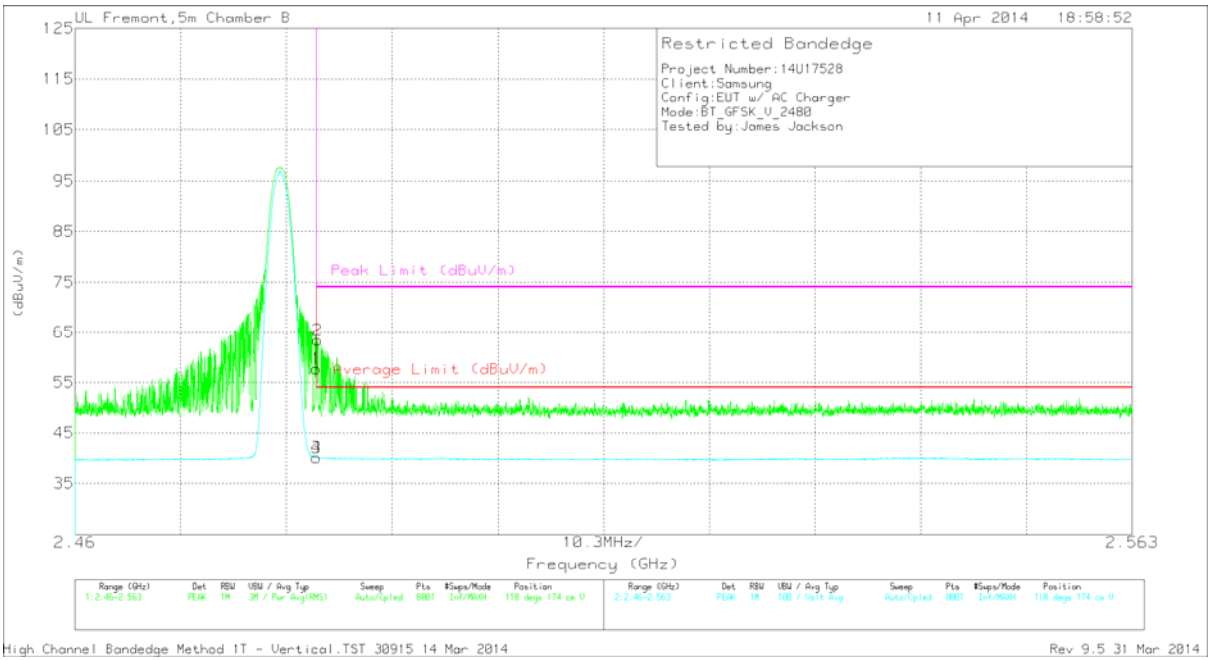
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.74	PK	32.4	-22.6	50.54	-	-	74	-23.46	259	323	H
3	* 2.484	30.17	VB1T	32.4	-22.6	41.17	54	-12.83	-	-	259	323	H
2	* 2.489	42.25	PK	32.4	-22.6	52.05	-	-	74	-21.95	259	323	H
4	2.528	31	VB1T	32.5	-22.7	42	54	-12	-	-	259	323	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Trace Markers

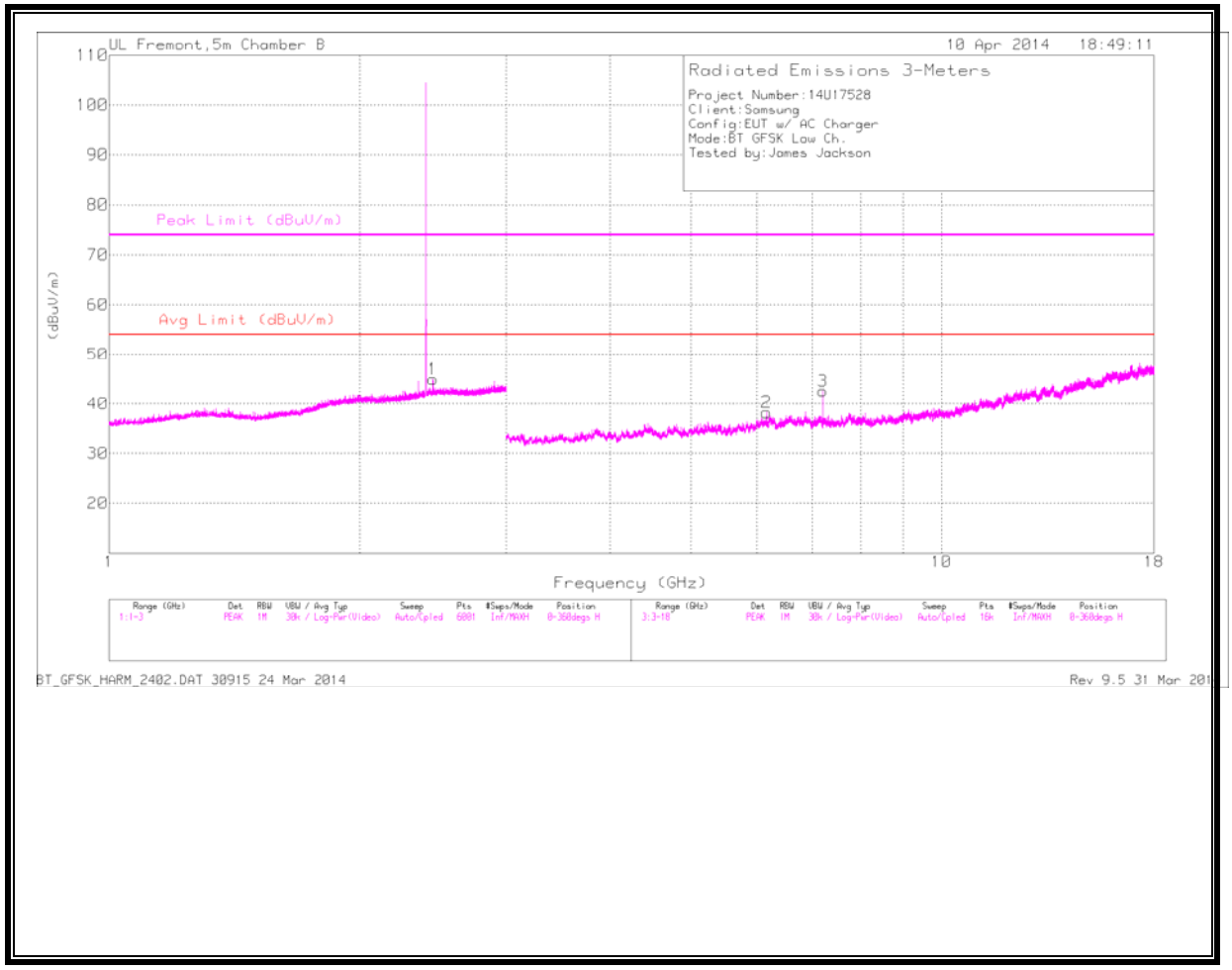
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	47.9	PK	32.4	-22.6	57.7	-	-	74	-16.3	118	174	V
2	* 2.484	53.64	PK	32.4	-22.6	63.44	-	-	74	-10.56	118	174	V
3	* 2.484	30.32	VB1T	32.4	-22.6	40.12	54	-13.88	-	-	118	174	V
4	* 2.484	30.32	VB1T	32.4	-22.6	40.12	54	-13.88	-	-	118	174	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HARMONICS AND SPURIOUS EMISSIONS

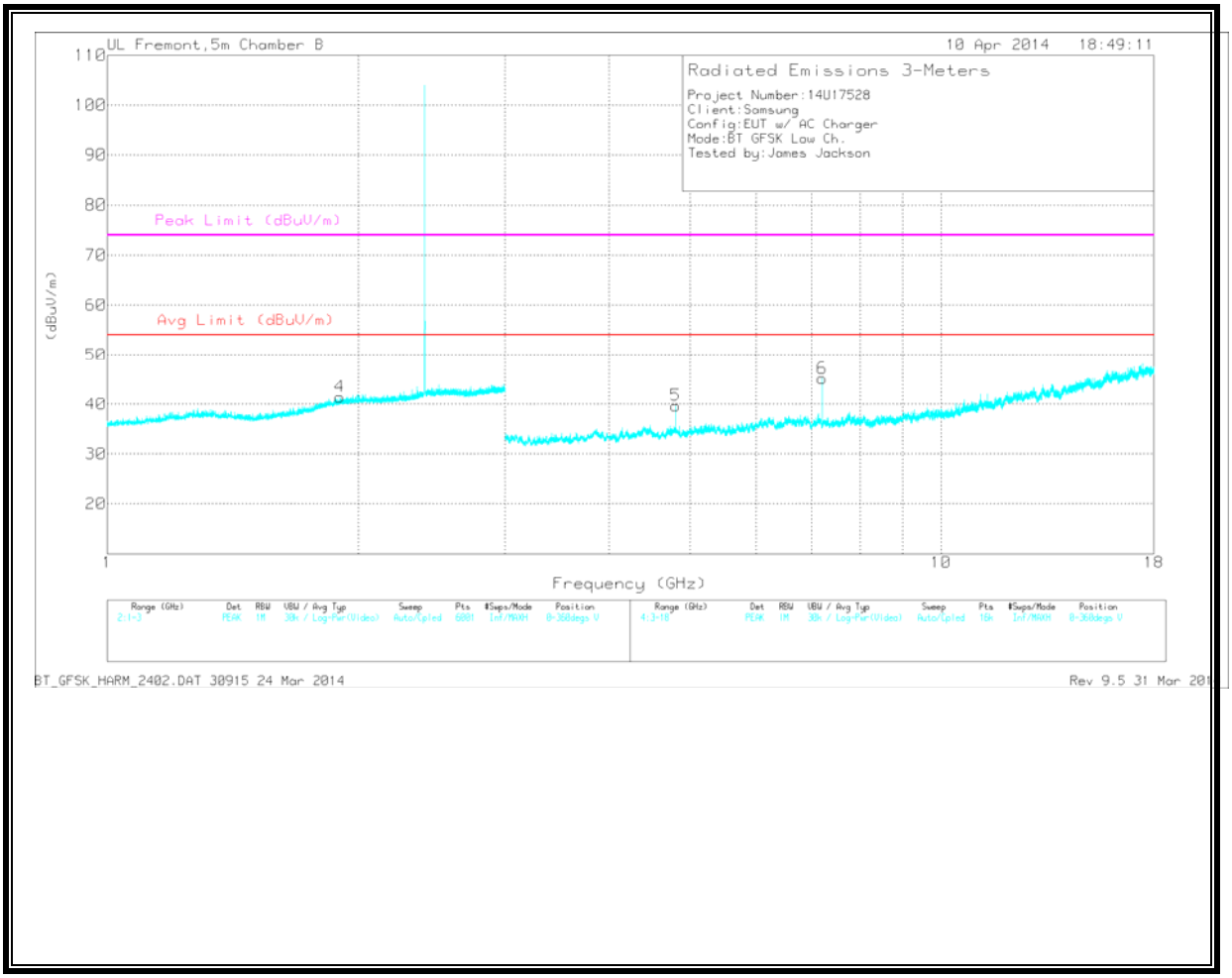
LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LOW CHANNEL DATA

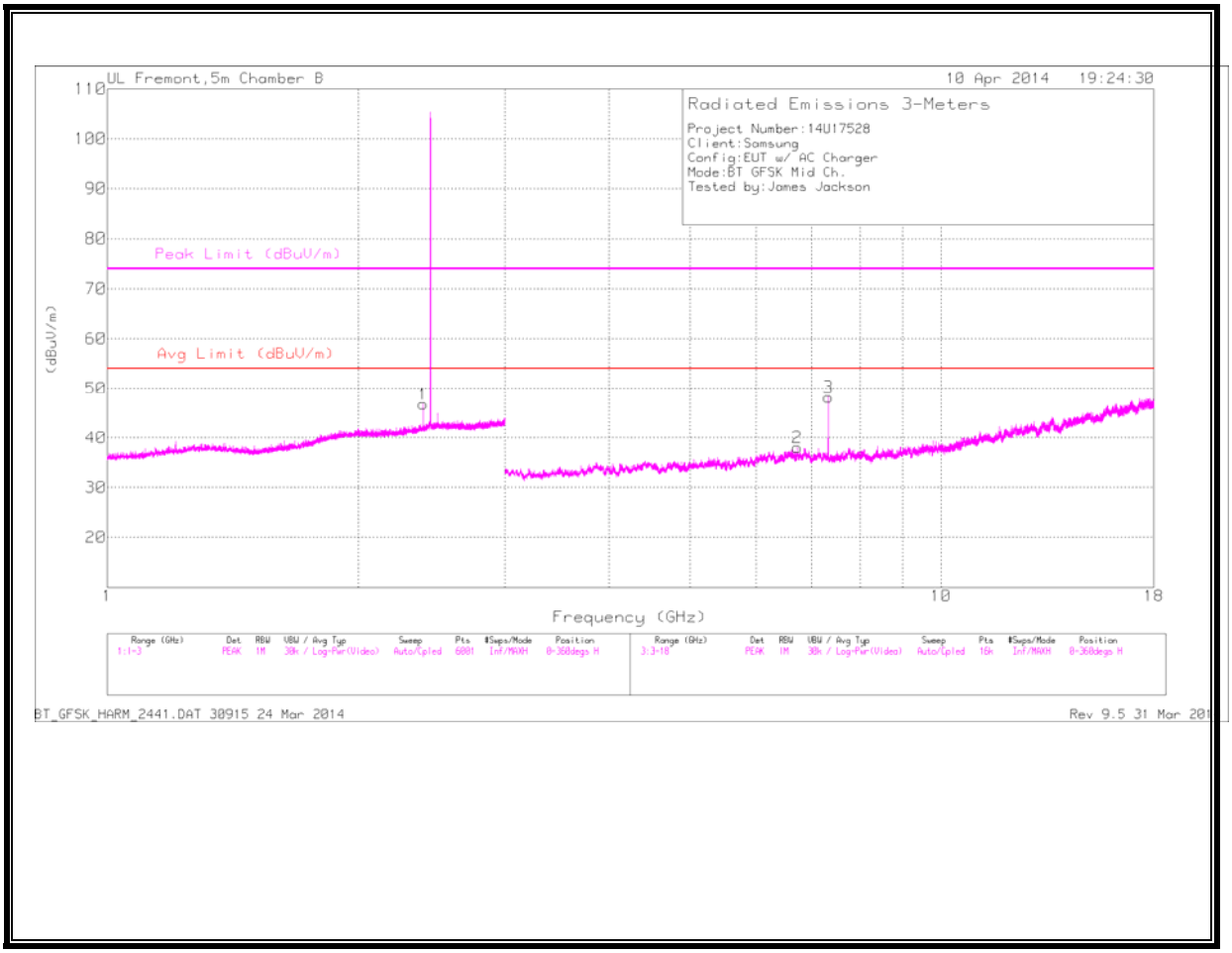
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.804	34.31	PK	34.2	-28.8	39.71	54	-14.29	74	-34.29	0-360	202	V
4	1.9	33.96	PK	31.1	-23.6	41.46	54	-12.54	74	-32.54	0-360	202	V
1	2.45	35.42	PK	32.3	-22.8	44.92	54	-9.08	74	-29.08	0-360	99	H
2	6.164	31.54	PK	35.4	-28.7	38.24	54	-15.76	74	-35.76	0-360	99	H
3	7.206	33.91	PK	35.5	-26.9	42.51	54	-11.49	74	-31.49	0-360	99	H
6	7.206	36.57	PK	35.5	-26.9	45.17	54	-8.83	74	-28.83	0-360	99	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
Radiated Emissions

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

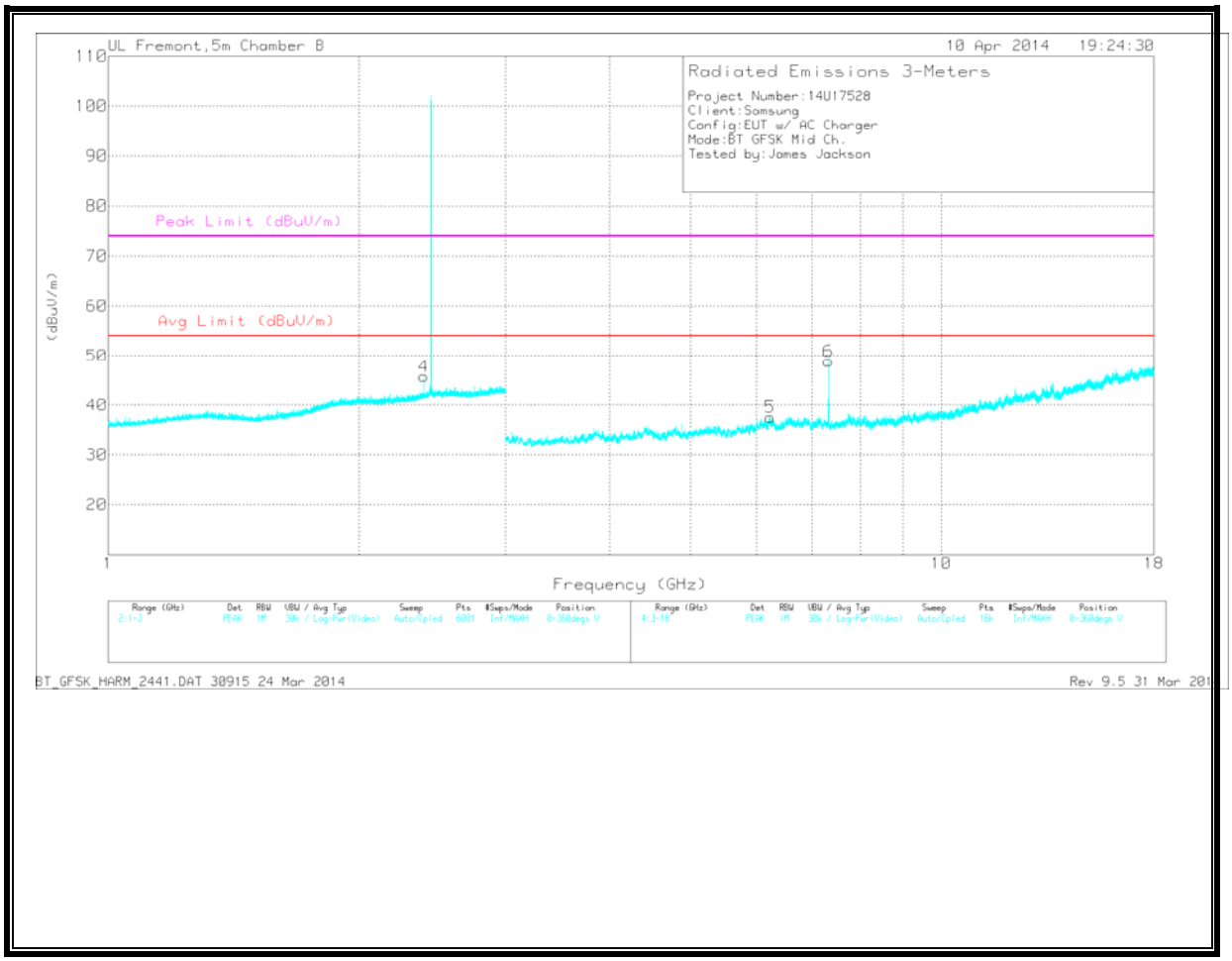
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

MID CHANNEL DATA

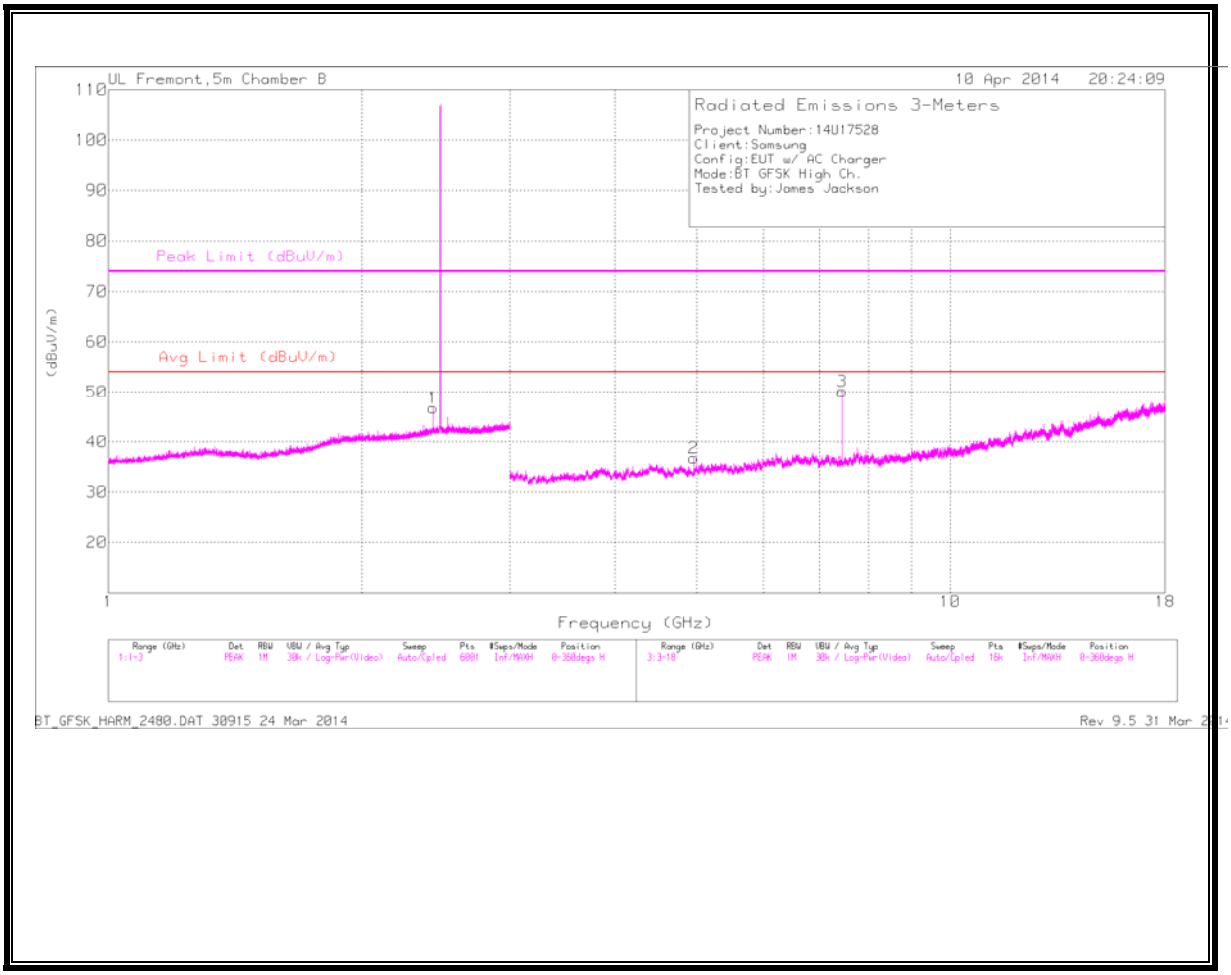
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 7.323	40.38	PK	35.6	-27.8	48.18	54	-5.82	74	-25.82	0-360	201	H
6	* 7.323	41.09	PK	35.6	-27.8	48.89	54	-5.11	74	-25.11	0-360	99	V
1	2.393	37.56	PK	32.1	-22.9	46.76	54	-7.24	74	-27.24	0-360	99	H
4	2.393	36.54	PK	32.1	-22.9	45.74	54	-8.26	74	-28.26	0-360	202	V
5	6.23	30.06	PK	35.4	-27.9	37.56	54	-16.44	74	-36.44	0-360	99	V
2	6.724	31.02	PK	35.7	-28.7	38.02	54	-15.98	74	-35.98	0-360	99	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.323	44.13	PK2	35.6	-27.8	51.93	-	-	74	-22.07	112	149	H
* 7.323	38.49	VB1T	35.6	-27.8	46.29	54	-7.71	-	-	112	149	H
* 7.323	41.68	VB1T	35.6	-27.8	49.48	54	-4.52	-	-	211	108	V

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

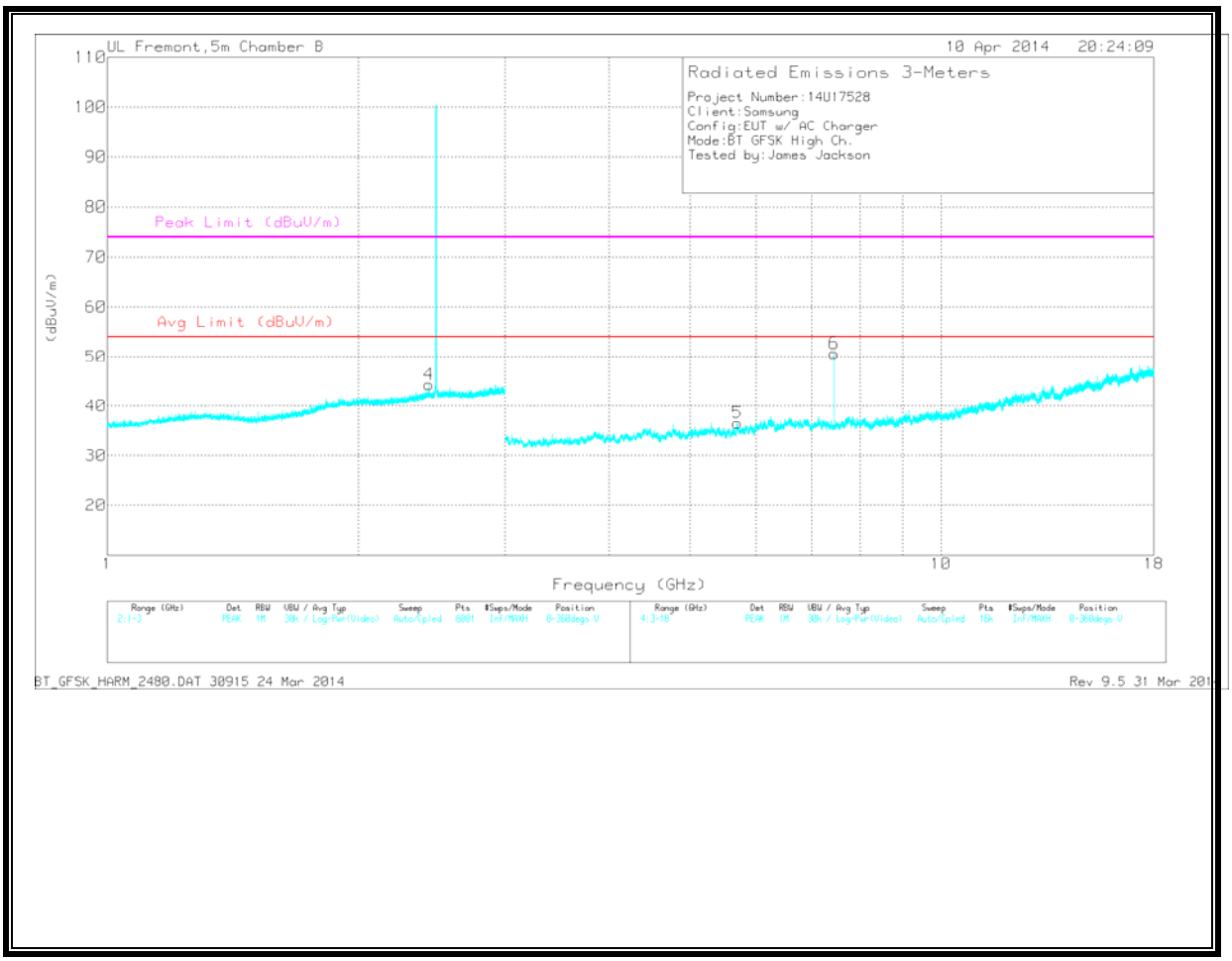
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.96	32.77	PK	34.2	-30.2	36.77	54	-17.23	74	-37.23	0-360	202	H
3	* 7.44	41.35	PK	35.6	-26.8	50.15	54	-3.85	74	-23.85	0-360	202	H
6	* 7.44	41.89	PK	35.6	-26.8	50.69	54	-3.31	74	-23.31	0-360	99	V
1	2.432	37.15	PK	32.2	-22.6	46.75	54	-7.25	74	-27.25	0-360	99	H
4	2.432	34.72	PK	32.2	-22.6	44.32	54	-9.68	74	-29.68	0-360	202	V
5	5.696	30.89	PK	34.5	-28.8	36.59	54	-17.41	74	-37.41	0-360	99	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector

Radiated Emissions

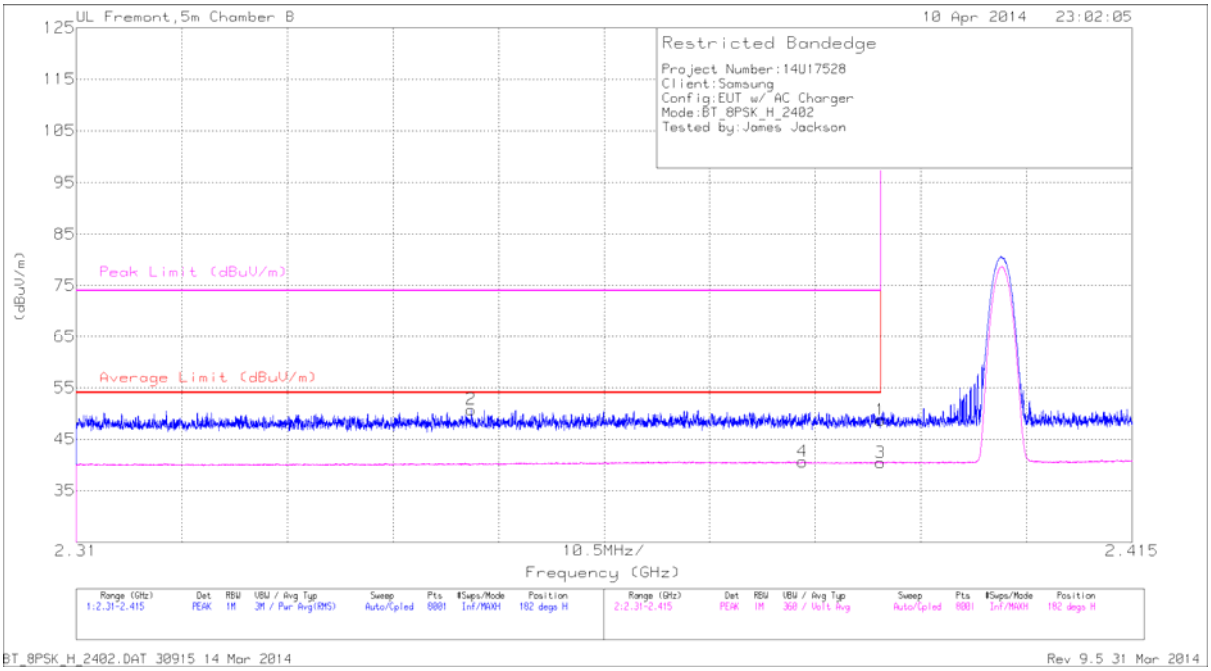
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.961	39.18	PK2	34.2	-30.2	43.18	-	-	74	-30.82	99	140	H
* 4.96	29.35	VB1T	34.2	-30.2	33.35	54	-20.65	-	-	99	140	H
* 7.44	40.62	PK2	35.6	-26.8	49.42	-	-	74	-24.58	210	140	H
* 7.44	32.2	VB1T	35.6	-26.8	41	54	-13	-	-	210	140	H
* 7.441	46.43	PK2	35.6	-26.8	55.23	-	-	74	-18.77	197	102	V
* 7.44	41.91	VB1T	35.6	-26.8	50.71	54	-3.29	-	-	197	102	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.2.2. ENHANCED DATA RATE 8PSK MODULATION

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



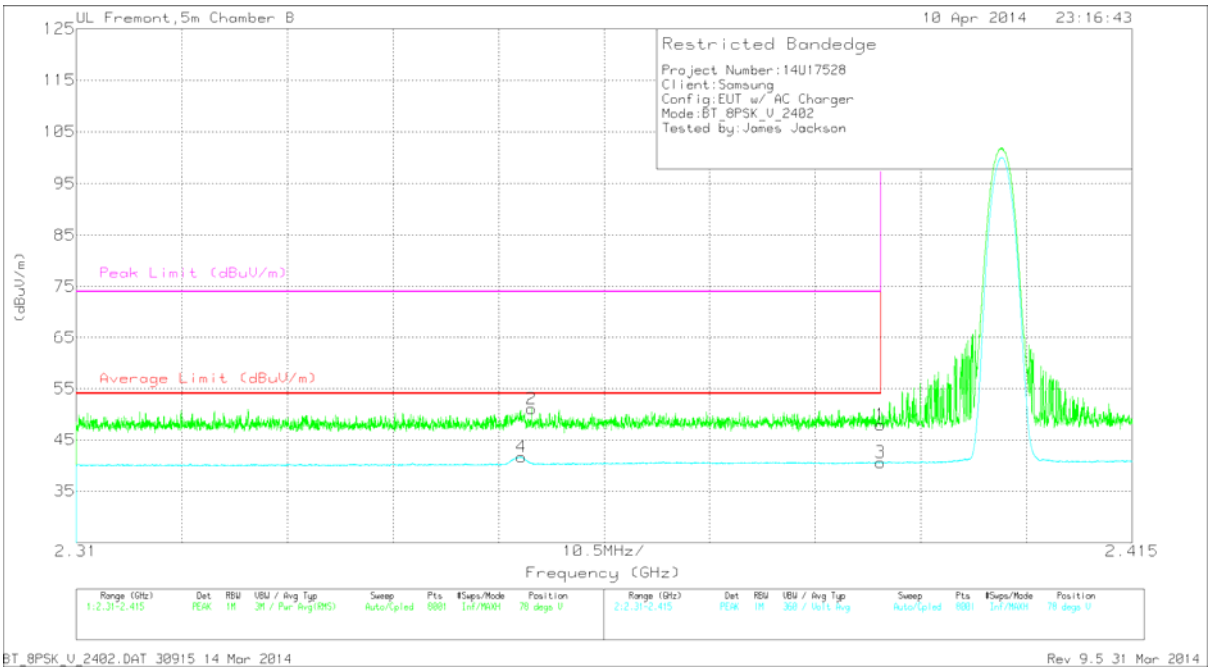
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.49	PK	32.1	-22.9	48.69	-	-	74	-25.31	182	330	H
2	* 2.349	41.85	PK	31.9	-23	50.75	-	-	74	-23.25	182	330	H
3	* 2.39	30.02	VB1T	32.1	-22.9	40.42	54	-13.58	-	-	182	330	H
4	* 2.382	30.23	VB1T	32.1	-22.9	40.63	54	-13.37	-	-	182	330	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



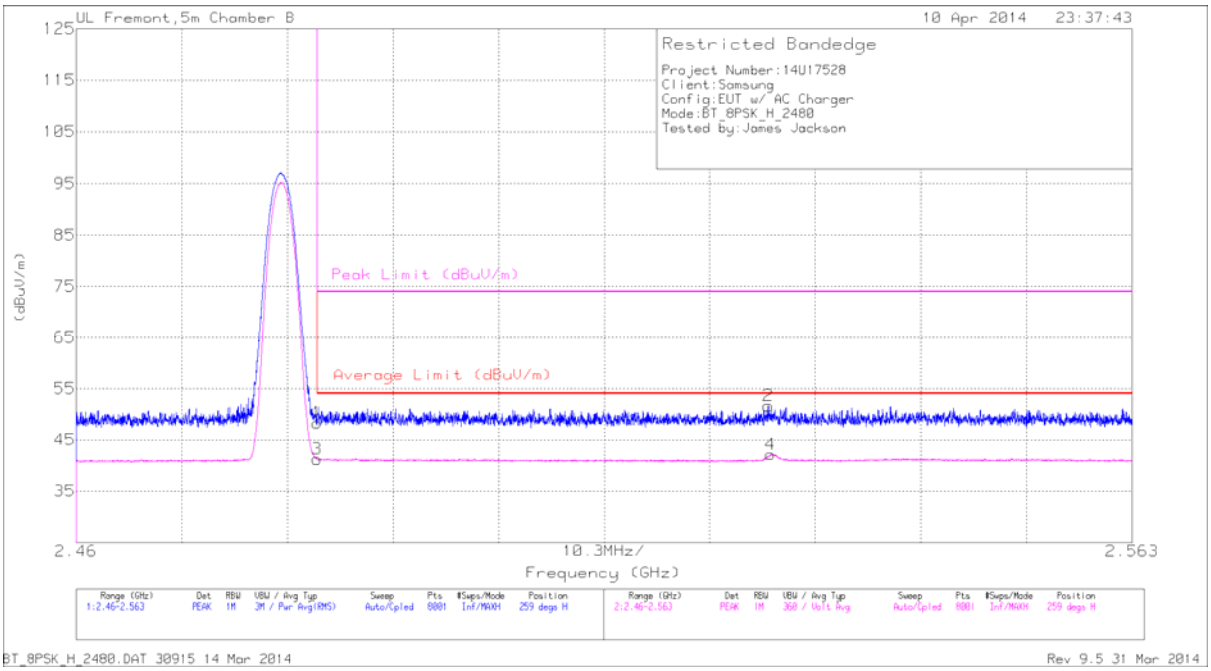
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.354	31.54	VB1T	31.9	-23	41.64	54	-12.36	-	-	78	358	V
2	* 2.355	42.17	PK	31.9	-23	51.07	-	-	74	-22.93	78	358	V
1	* 2.39	38.71	PK	32.1	-22.9	47.91	-	-	74	-26.09	78	358	V
3	* 2.39	30.19	VB1T	32.1	-22.9	40.59	54	-13.41	-	-	78	358	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



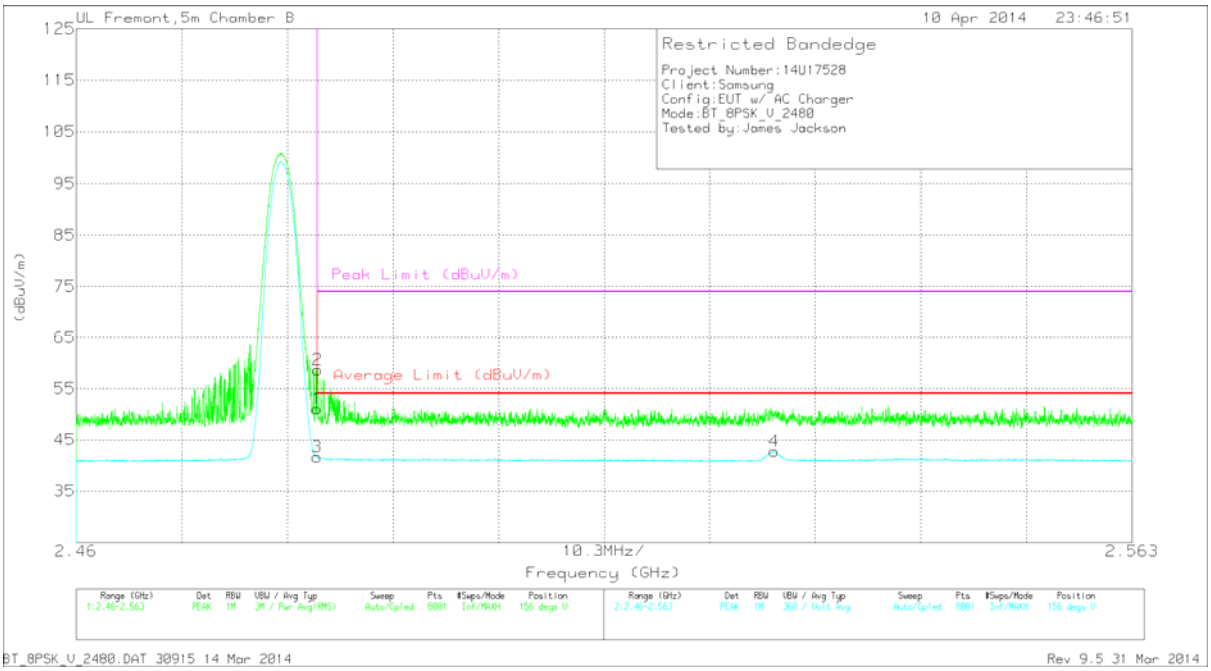
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	38.49	PK	32.4	-22.6	48.29	-	-	74	-25.71	259	323	H
3	* 2.484	30.25	VB1T	32.4	-22.6	41.25	54	-12.75	-	-	259	323	H
2	2.528	41.83	PK	32.5	-22.7	51.63	-	-	74	-22.37	259	323	H
4	2.528	31.15	VB1T	32.5	-22.7	42.15	54	-11.85	-	-	259	323	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Trace Markers

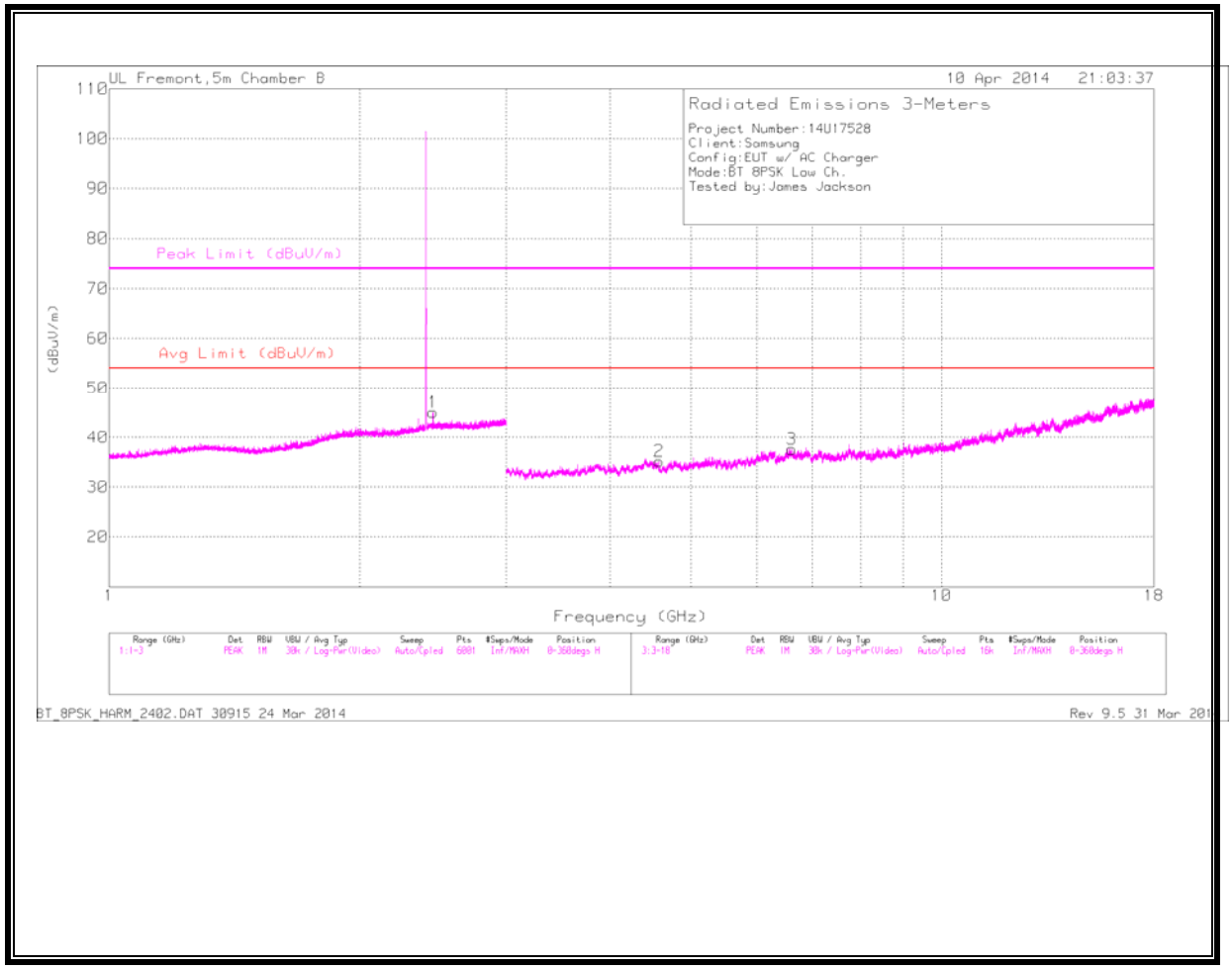
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.27	PK	32.4	-22.6	51.07	-	-	74	-22.93	156	279	V
2	* 2.484	48.82	PK	32.4	-22.6	58.62	-	-	74	-15.38	156	279	V
3	* 2.484	30.62	VB1T	32.4	-22.6	41.62	54	-12.38	-	-	156	279	V
4	2.528	31.72	VB1T	32.5	-22.7	42.72	54	-11.28	-	-	156	279	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector
VB1T - FHSS Method: VB=1/Ton, Voltage Averaging Max Hold where: Ton is the duration of the packet

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HARMONICS AND SPURIOUS EMISSIONS

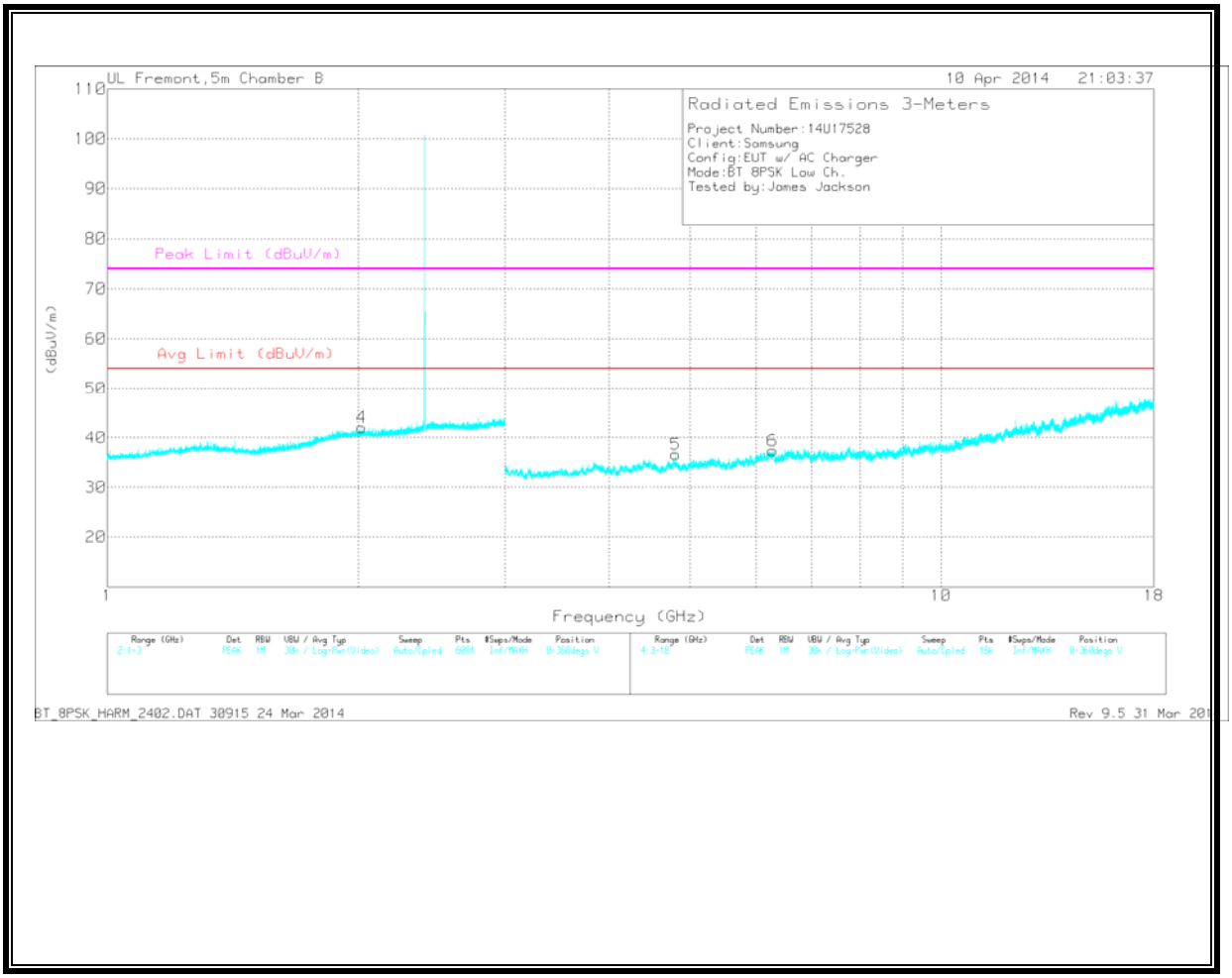
LOW CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.581	31.89	PK	34.1	-30.8	35.19	54	-18.81	74	-38.81	0-360	202	H
5	* 4.804	31.23	PK	34.2	-28.8	36.63	54	-17.37	74	-37.37	0-360	202	V
4	2.02	34.26	PK	31.3	-23.5	42.06	54	-11.94	74	-31.94	0-360	202	V
1	2.45	35.54	PK	32.3	-22.8	45.04	54	-8.96	74	-28.96	0-360	102	H
6	6.283	29.91	PK	35.5	-28	37.41	54	-16.59	74	-36.59	0-360	202	V
3	6.611	29.61	PK	35.7	-27.7	37.61	54	-16.39	74	-36.39	0-360	202	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector

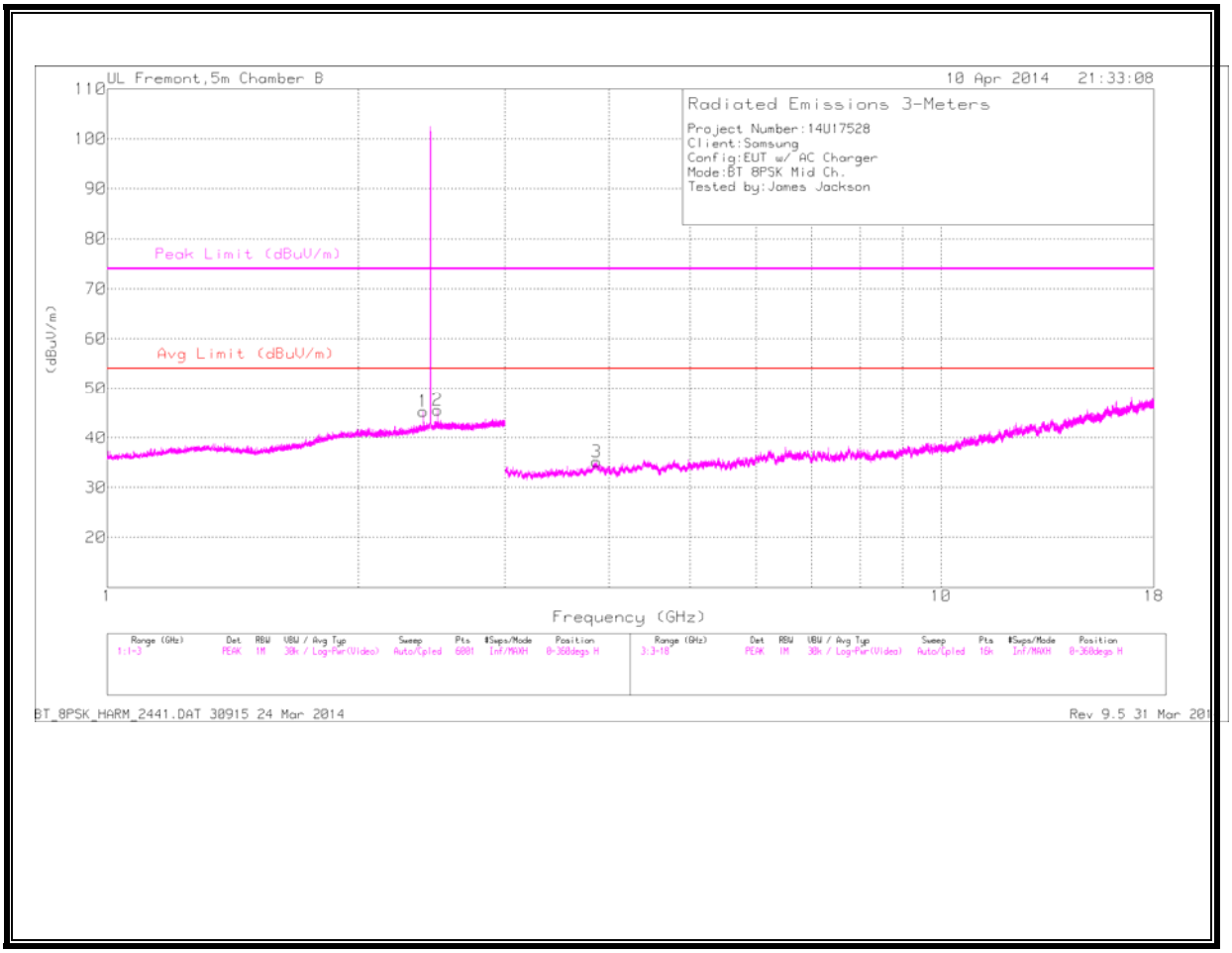
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.575	39.86	PK2	34.1	-30.7	43.26	-	-	74	-30.74	359	100	H
* 4.8	38.47	PK2	34.2	-28.8	43.87	-	-	74	-30.13	359	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

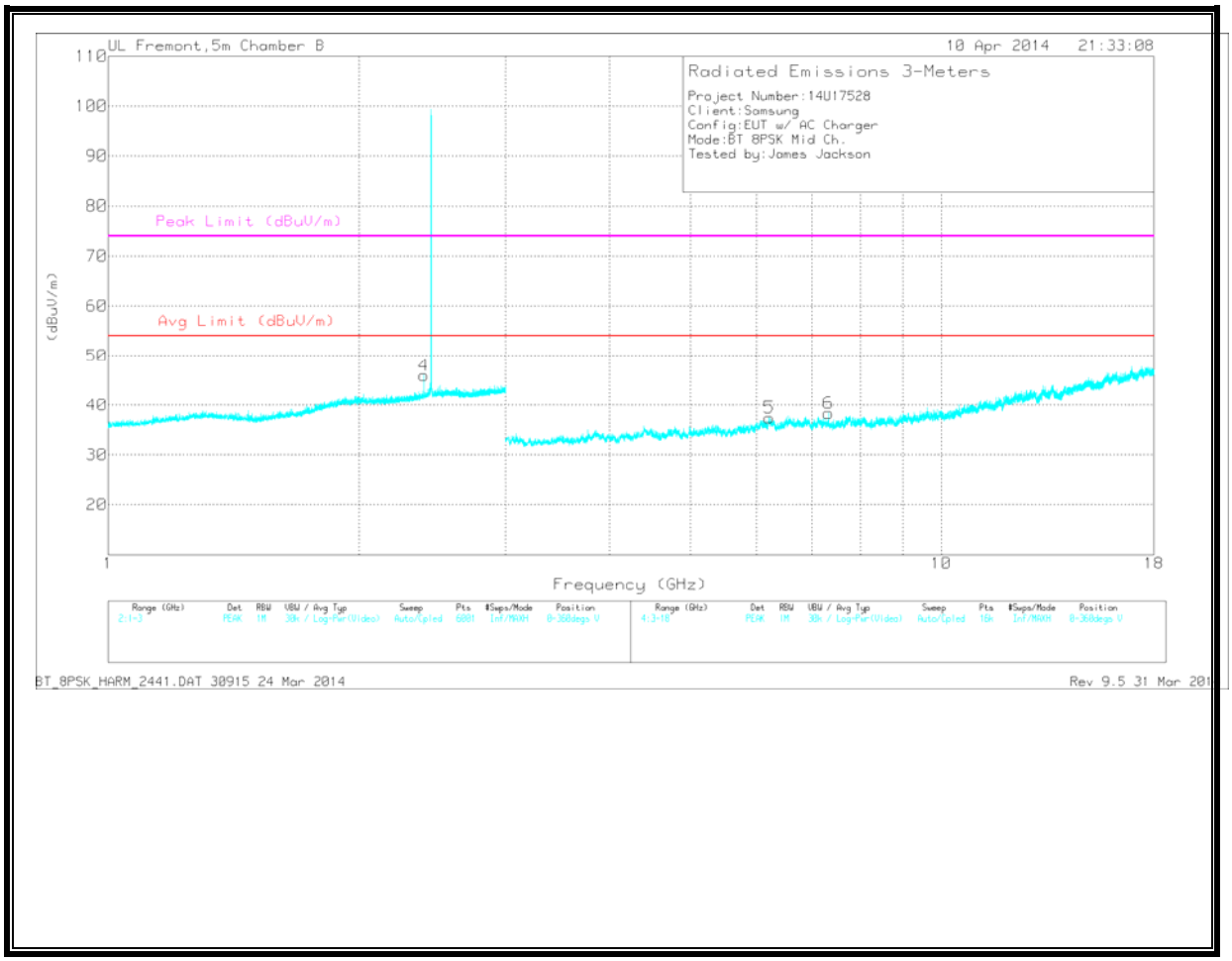
MID CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.489	35.77	PK	32.4	-22.6	45.57	54	-8.43	74	-28.43	0-360	99	H
3	* 3.862	31.68	PK	33.7	-30.2	35.18	54	-18.82	74	-38.82	0-360	202	H
6	* 7.323	30.56	PK	35.6	-27.8	38.36	54	-15.64	74	-35.64	0-360	99	V
1	2.393	36.11	PK	32.1	-22.9	45.31	54	-8.69	74	-28.69	0-360	99	H
4	2.393	36.77	PK	32.1	-22.9	45.97	54	-8.03	74	-28.03	0-360	202	V
5	6.217	29.75	PK	35.4	-27.7	37.45	54	-16.55	74	-36.55	0-360	99	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector

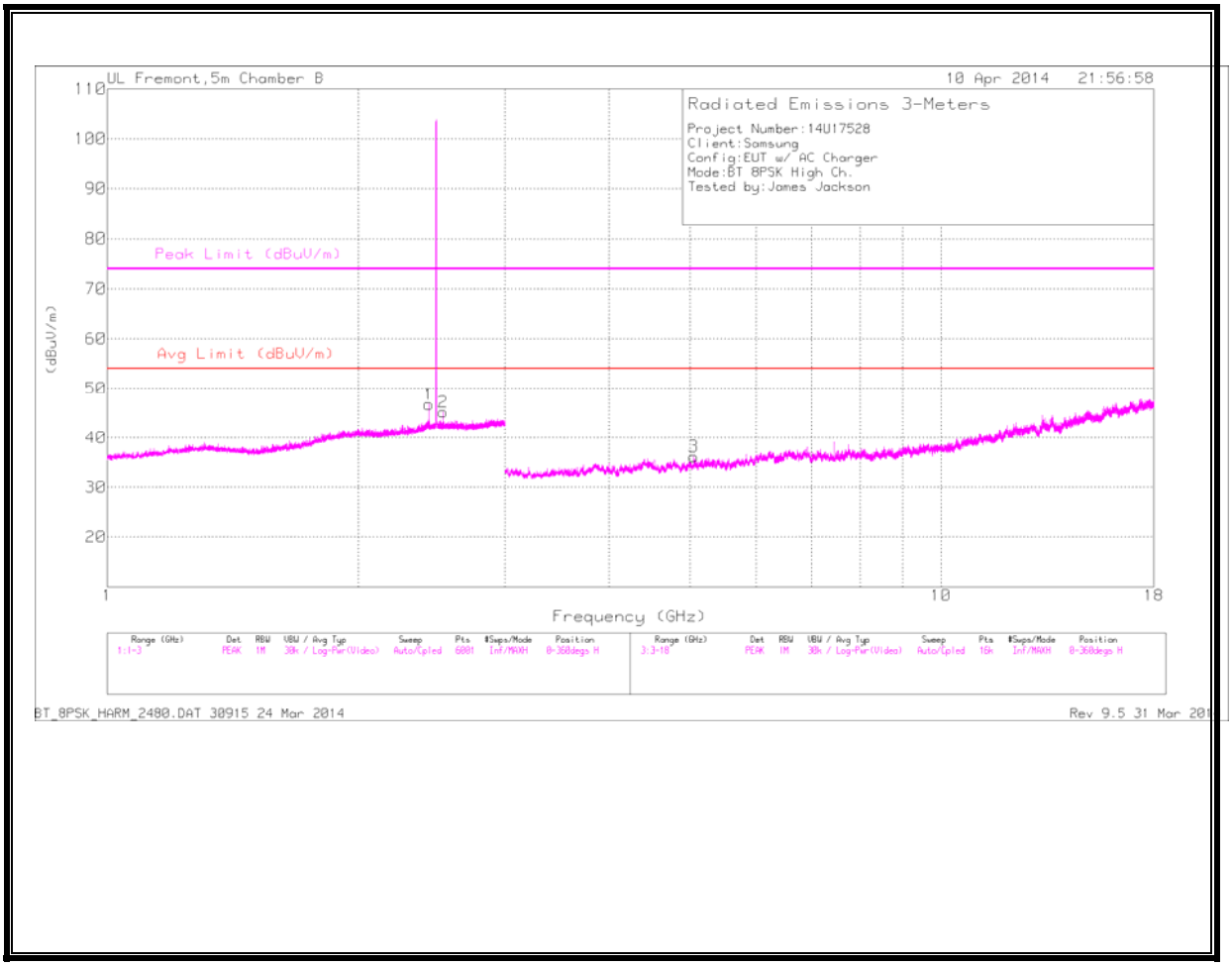
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.86	39.66	PK2	33.7	-30.2	43.16	-	-	74	-30.84	359	100	H
* 7.324	38.7	PK2	35.6	-27.8	46.5	-	-	74	-27.5	359	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

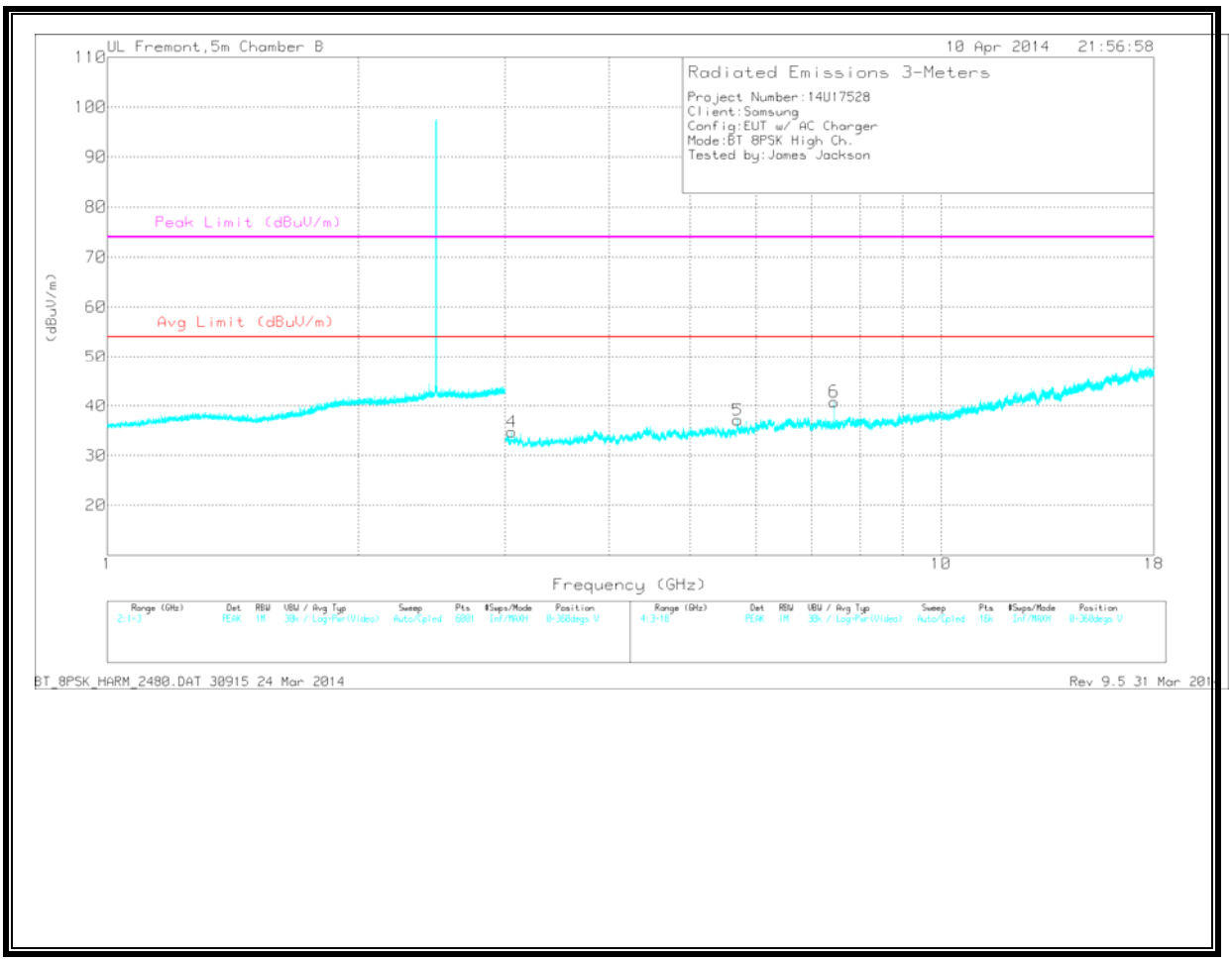
HIGH CHANNEL
HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 5.05	30.8	PK	34.2	-28.8	36.2	54	-17.8	74	-37.8	0-360	99	H
6	* 7.44	32.02	PK	35.6	-26.8	40.82	54	-13.18	74	-33.18	0-360	99	V
1	2.432	37.12	PK	32.2	-22.6	46.72	54	-7.28	74	-27.28	0-360	99	H
2	2.528	35.35	PK	32.5	-22.7	45.15	54	-8.85	74	-28.85	0-360	202	H
4	3.056	33.77	PK	32.8	-31.8	34.77	54	-19.23	74	-39.23	0-360	99	V
5	5.704	31.54	PK	34.5	-28.9	37.14	54	-16.86	74	-36.86	0-360	202	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 5.049	38.66	PK2	34.2	-28.7	44.16	-	-	74	-29.84	360	100	H
* 7.44	37.25	PK2	35.6	-26.8	46.05	-	-	74	-27.95	39	334	V
* 7.44	27.08	MAv1	35.6	-26.8	35.88	54	-18.12	-	-	39	334	V

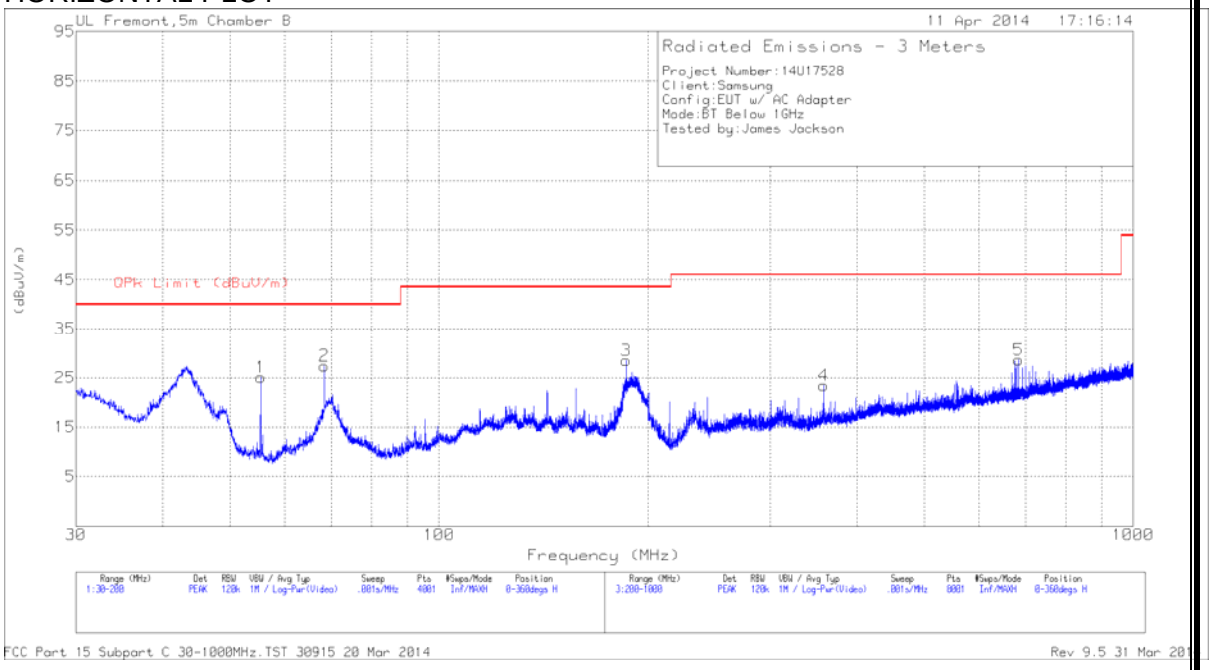
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.3. WORST-CASE BELOW 1 GHz

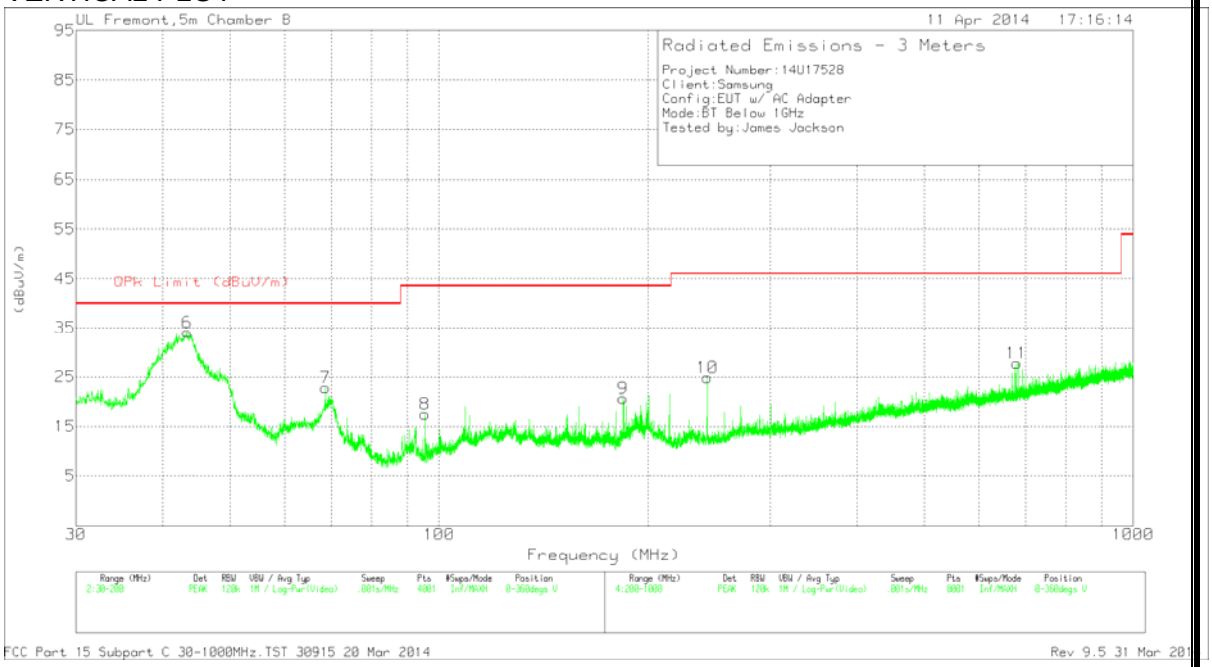
GFSK SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

VERTICAL PLOT



This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

DATA
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
10	* 243.4	39.86	PK	11.5	-26.5	24.86	46.02	-21.16	0-360	200	V
6	43.345	51.57	PK	11.2	-28.7	34.07	40	-5.93	0-360	101	V
1	55.33	46.75	PK	7	-28.6	25.15	40	-14.85	0-360	300	H
2	68.3775	47.74	PK	8.1	-28.4	27.44	40	-12.56	0-360	300	H
7	68.59	43.06	PK	8.1	-28.4	22.76	40	-17.24	0-360	101	V
8	95.535	36.42	PK	9.1	-28	17.52	43.52	-26	0-360	101	V
9	184.3175	36.48	PK	11.3	-27.1	20.68	43.52	-22.84	0-360	101	V
3	186.145	44.3	PK	11.3	-27.1	28.5	43.52	-15.02	0-360	101	H
4	357.9	34.57	PK	14.7	-25.8	23.47	46.02	-22.55	0-360	200	H
11	680	33.31	PK	19.4	-24.9	27.81	46.02	-18.21	0-360	200	V
5	684	33.93	PK	19.6	-24.9	28.63	46.02	-17.39	0-360	300	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band
PK - Peak detector

This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.