FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n, ANT+ & NFC

MODEL NUMBER: SM-A300FU

FCC ID: A3LSMA300FU

REPORT NUMBER: 14I19248-E4 REVISION A

ISSUE DATE: 12/4/14

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
--	10/30/14	Initial issue	P. Zhang
A	12/4/14	Updated page 20	P. Zhang

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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

TABLE OF CONTENTS

1. TEST METHODOLOGY 6

2. FACILITIES AND ACCREDITATION 6

3. CALIBRATION AND UNCERTAINTY 7

3.1. MEASURING INSTRUMENT CALIBRATION 7

3.2. SAMPLE CALCULATION 7

3.3. MEASUREMENT UNCERTAINTY 7

4. EQUIPMENT UNDER TEST 8

4.1. DESCRIPTION OF EUT 8

4.2. MAXIMUM OUTPUT POWER 8

4.3. DESCRIPTION OF AVAILABLE ANTENNAS 8

4.4. WORST-CASE CONFIGURATION AND MODE 9

4.5. DESCRIPTION OF TEST SETUP 10

5. TEST AND MEASUREMENT EQUIPMENT 12

6. MEASUREMENT METHODS 13

7. SUMMARY TABLE 14

8. ANTENNA PORT TEST RESULTS 15

8.1. 6 dB BANDWIDTH 15

8.1.1. 802.11b MODE IN THE 2.4 GHz BAND 15
8.1.2. 802.11g MODE IN THE 2.4 GHz BAND 16
8.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND 16
8.1.4. 6 dB BANDWIDTH MID CH PLOTS 17

8.2. 99% BANDWIDTH 18

8.2.1. 802.11b MODE IN THE 2.4 GHz BAND 18
8.2.2. 802.11g MODE IN THE 2.4 GHz BAND 18
8.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND 18
8.2.4. 99% BANDWIDTH MID CH PLOTS 19

8.3. OUTPUT POWER 20

8.3.1. 802.11b MODE IN THE 2.4 GHz BAND 21
8.3.2. 802.11g MODE IN THE 2.4 GHz BAND 22
8.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND 23

8.4. PSD 24

8.4.1. 802.11b MODE IN THE 2.4 GHz BAND 24
8.4.2. 802.11g MODE IN THE 2.4 GHz BAND 25

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND 25
8.4.4. PSD Chain 0 MID CH PLOTS 26

8.5. OUT-OF-BAND EMISSIONS 27
8.5.1. 802.11b MODE IN THE 2.4 GHz BAND 28
8.5.2. 802.11g MODE IN THE 2.4 GHz BAND 34
8.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND 40

9. RADIATED TEST RESULTS 46

9.1. LIMITS AND PROCEDURE 46

9.1. TRANSMITTER ABOVE 1 GHz 48
9.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND 48
9.1.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND 61
9.1.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND 74

9.2. WORST-CASE BELOW 1 GHz 87

10. AC POWER LINE CONDUCTED EMISSIONS 90

11. SETUP PHOTOS 95

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

ATTESTATION OF TEST RESULTS

COMPANY NAME:	**SAMSUNG ELECTRONICS CO., LTD.**
EUT DESCRIPTION:	**GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n, ANT+ & NFC**
MODEL:	**SM-A300FU**
SERIAL NUMBER:	**1950050 (Radiated), 1951552 (Conducted)**
DATE TESTED:	**September 3 - September 15, 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:

PENG ZHANG
CONSUMER TECHNOLOGY DIVISION
PROJECT LEAD
UL Verification Services Inc.

Tested By:

DANIEL SOPER
CONSUMER TECHNOLOGY DIVISION
LAB ENGINEER
UL Verification Services Inc.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

1. TEST METHODOLOGY

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

2. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A	☐ Chamber D
☐ Chamber B	☐ Chamber E
☒ Chamber C	☐ Chamber F
	☒ Chamber G

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

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

3. CALIBRATION AND UNCERTAINTY

3.1. 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.

3.2. 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

3.3. 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 26000 MHz	4.94 dB

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n, ANT+ & NFC

4.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	16.5	44.67
2412 - 2462	802.11g	13.5	22.39
2412 - 2462	802.11n HT20	12.5	17.78

4.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -1.85 dBi.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

4.4. 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.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20mode: MCS0

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

4.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	ETA0U83EWE	N/A	N/A
Earphone	Samsung	EHS64AVFWE	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

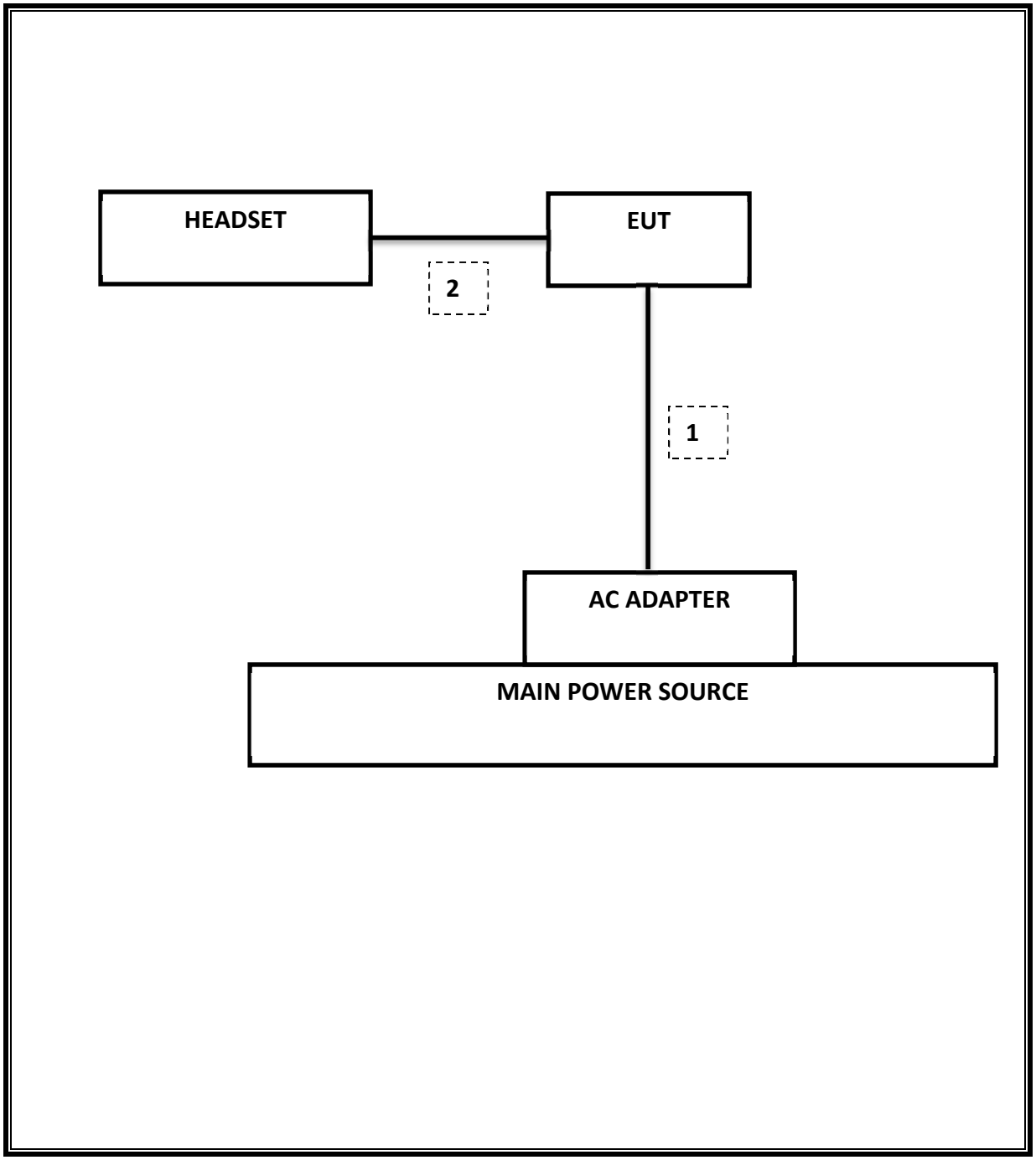
TEST SETUP

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

SETUP DIAGRAM FOR TESTS



UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

5. 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 Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/14
Spectrum Analyzer,9KHz-40GHz	HP	8564E	C00986	04/01/15
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	100773	08/15/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/14
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/14
Antenna, Horn, 1-18 GHz	ETS	3117	C01022	02/21/15
Antenna, Horn,18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/14
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	C00891	06/28/15
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/15
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/15
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/15
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	F00351	06/27/15
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR
RF Preamplifier, 1GHz - 18GHz	Miteq	AFS42-00101800-25-S-42	1818466	05/09/15
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	F00219	05/23/15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	F00222	05/22/15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	F00224	05/22/15

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r02: Measurement Procedure AVGPM-G is used for power and AVGPSD-3 is used for power spectral density.

Unwanted emissions within Restricted Bands are measured using traditional radiated procedures.

Band edge emissions within Restricted Bands are measured using RMS with duty cycle factor offset method.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

7. SUMMARY TABLE

The FCC ID: A3LSMA300FU shares the same enclosure and circuit board as FCC ID: A3LSMA300F. The WLAN circuitry and layout, including antennas, are almost identical between the two units. The WLAN antennas and surrounding circuitry are the same between these two units.

After confirming through preliminary radiated emissions that the performance of the FCC ID: A3LSMA300FU remains representative of FCC ID: A3LSMA300F, test data for FCC ID: A3LSMA300F is being submitted for this application to cover WLAN features.

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-210 A8.2(a)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	8.09MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-28.98dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	16.5dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-10.07dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	56.05dBuV
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	53.69dBuV/m

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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. ANTENNA PORT TEST RESULTS

8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

TEST PROCEDURE

Reference to KDB 558074 D01 DTS Meas Guidance v03r02: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

RESULTS

8.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.10	0.5
Mid	2437	8.10	0.5
High	2462	8.09	0.5
Worst		8.10	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.1.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.53	0.5
Mid	2437	16.43	0.5
High	2462	16.50	0.5
Worst		16.43	

8.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

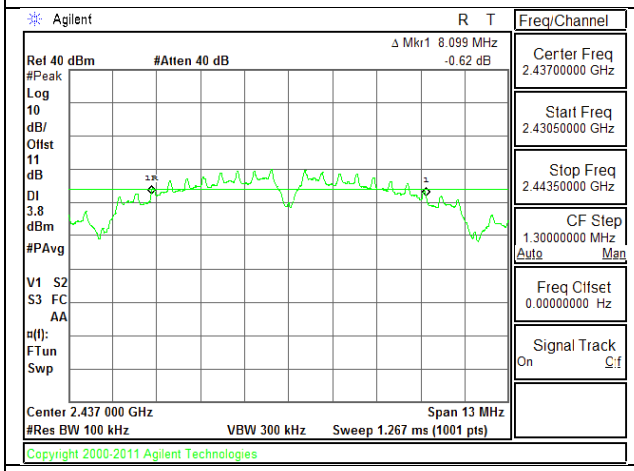
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.68	0.5
Mid	2437	17.68	0.5
High	2462	17.65	0.5
Worst		17.65	

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

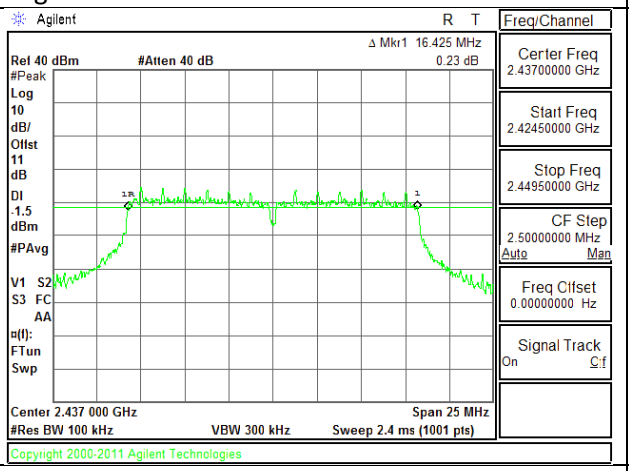
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.1.4. 6 dB BANDWIDTH MID CH PLOTS

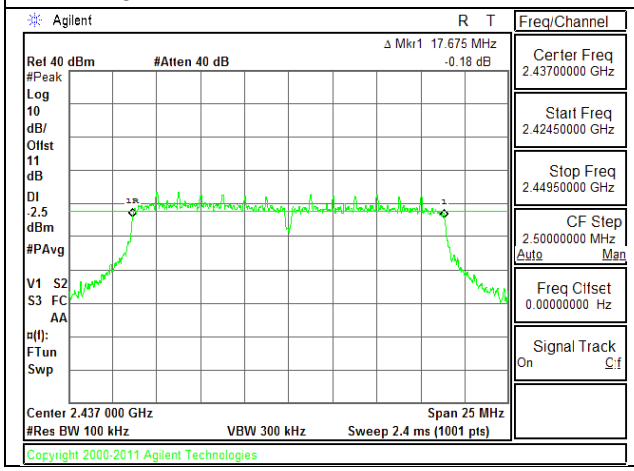
11b HT20 2.4



11g HT20 2.4



11n HT20 2.4



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

8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

8.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.54
Mid	2437	12.82
High	2462	12.43
Worst		12.43

8.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.42
Mid	2437	16.42
High	2462	16.34
Worst		16.34

8.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

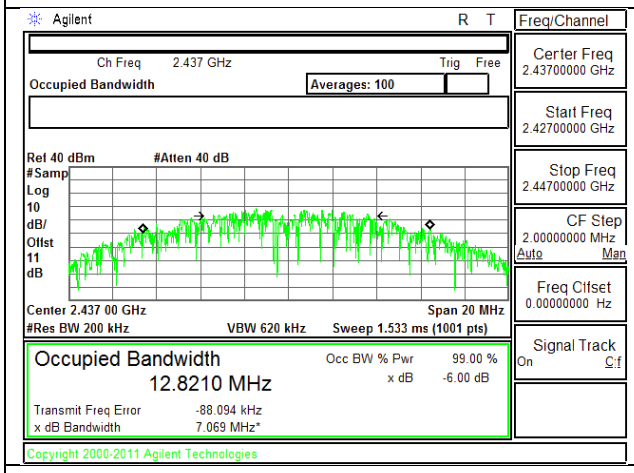
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.61
Mid	2437	17.60
High	2462	17.56
Worst		17.56

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

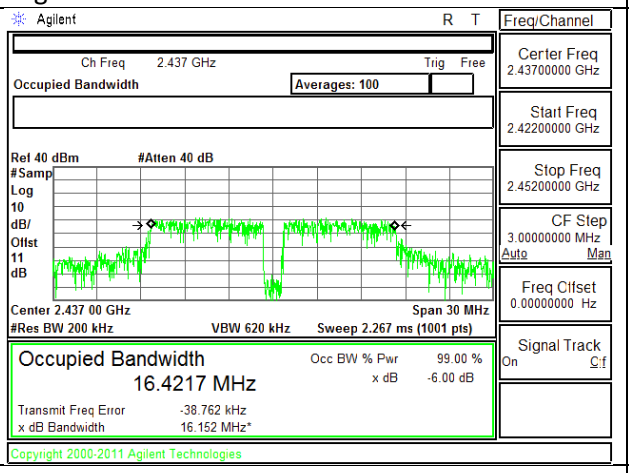
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.2.4. 99% BANDWIDTH MID CH PLOTS

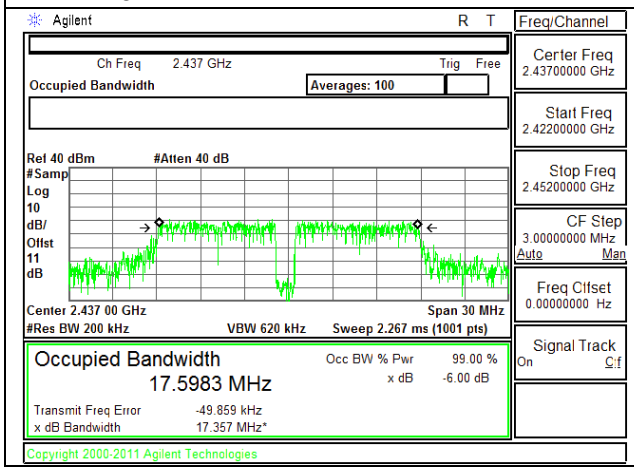
11b HT20 2.4



11g HT20 2.4



11n HT20 2.4



UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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

8.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.2 dB (including 10 dB pad and 0.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.85	30.00	30	36	30.00
Mid	2437	-1.85	30.00	30	36	30.00
High	2462	-1.85	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	16.50	16.50	30.00	-13.50
Mid	2437	16.00	16.00	30.00	-14.00
High	2462	15.90	15.90	30.00	-14.10
Worst			16.50		

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.85	30.00	30	36	30.00
Mid	2437	-1.85	30.00	30	36	30.00
High	2462	-1.85	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	13.00	13.00	30.00	-17.00
Mid	2437	13.50	13.50	30.00	-16.50
High	2462	12.70	12.70	30.00	-17.30
Worst			13.50		

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-1.85	30.00	30	36	30.00
Mid	2437	-1.85	30.00	30	36	30.00
High	2462	-1.85	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	12.00	12.00	30.00	-18.00
Mid	2437	12.50	12.50	30.00	-17.50
High	2462	12.50	12.50	30.00	-17.50
Worst			12.50		

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.4. PSD

LIMITS

FCC §15.247

IC RSS-210 A8.2

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

8.4.1. 802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.07	8.0	-19.1
Mid	2437	-11.09	8.0	-19.1
High	2462	-10.07	8.0	-18.1

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

8.4.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-18.88	8.0	-26.9
Mid	2437	-17.80	8.0	-25.8
High	2462	-18.84	8.0	-26.8

8.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

PSD Results

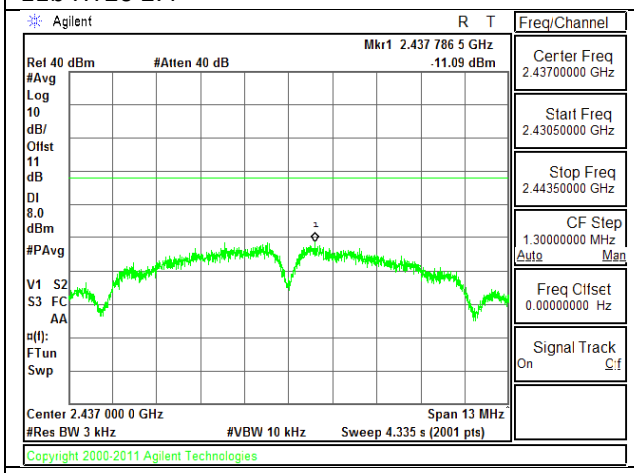
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-20.40	8.0	-28.4
Mid	2437	-18.95	8.0	-27.0
High	2462	-18.04	8.0	-26.0

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

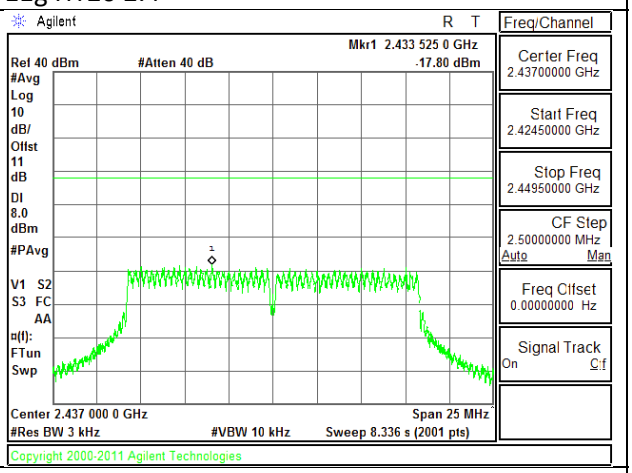
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.4.4. PSD Chain 0 MID CH PLOTS

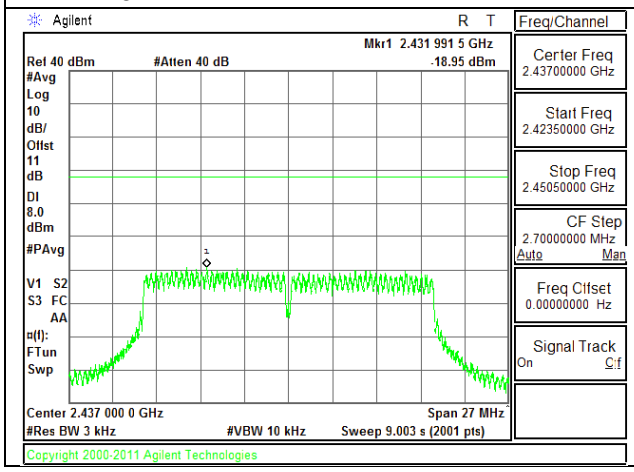
11b HT20 2.4



11g HT20 2.4



11n HT20 2.4



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

8.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

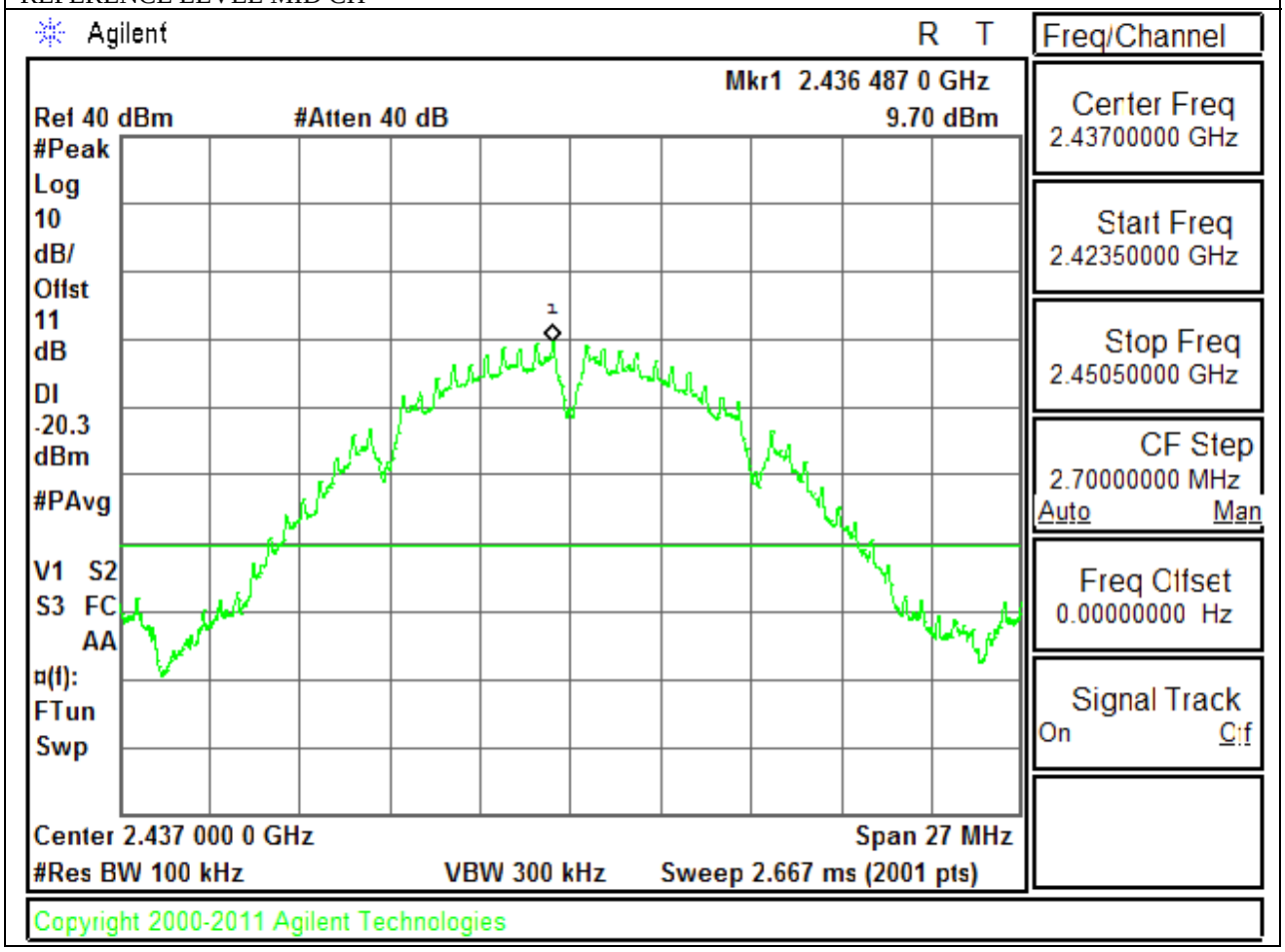
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

8.5.1. 802.11b MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH

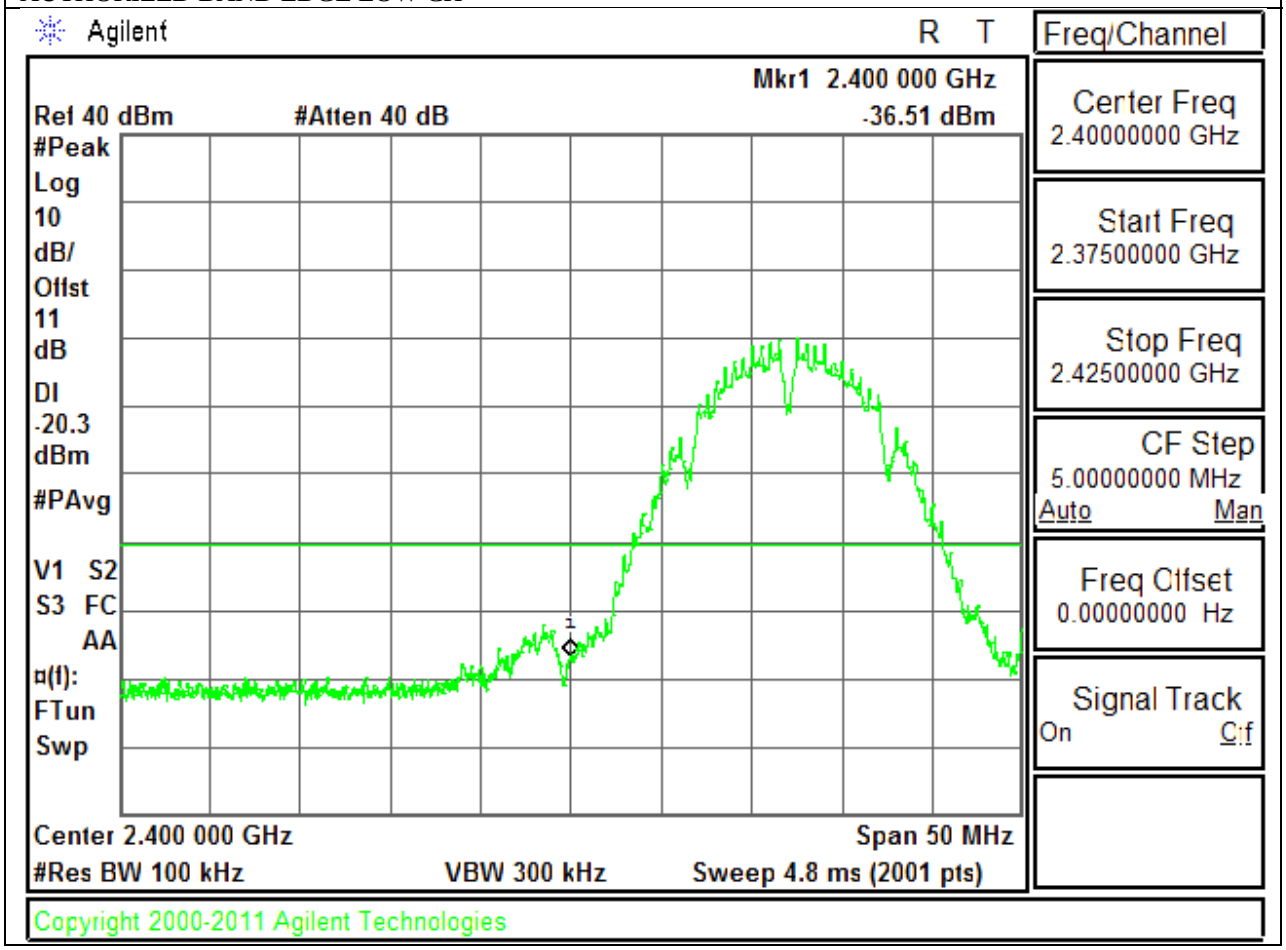


UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

LOW CHANNEL BANDEDGE

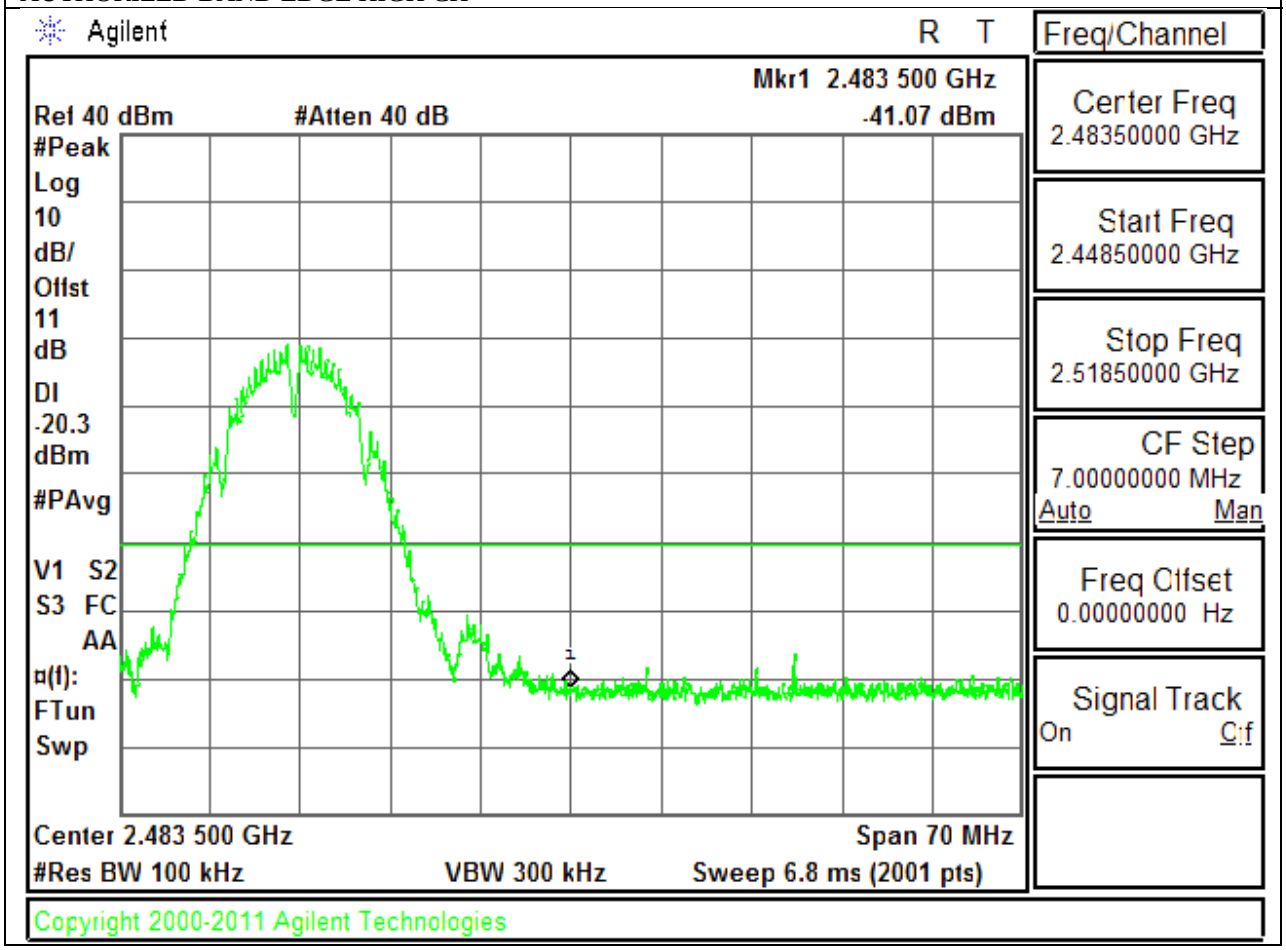
AUTHORIZED BAND EDGE LOW CH



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

HIGH CHANNEL BANDEDGE

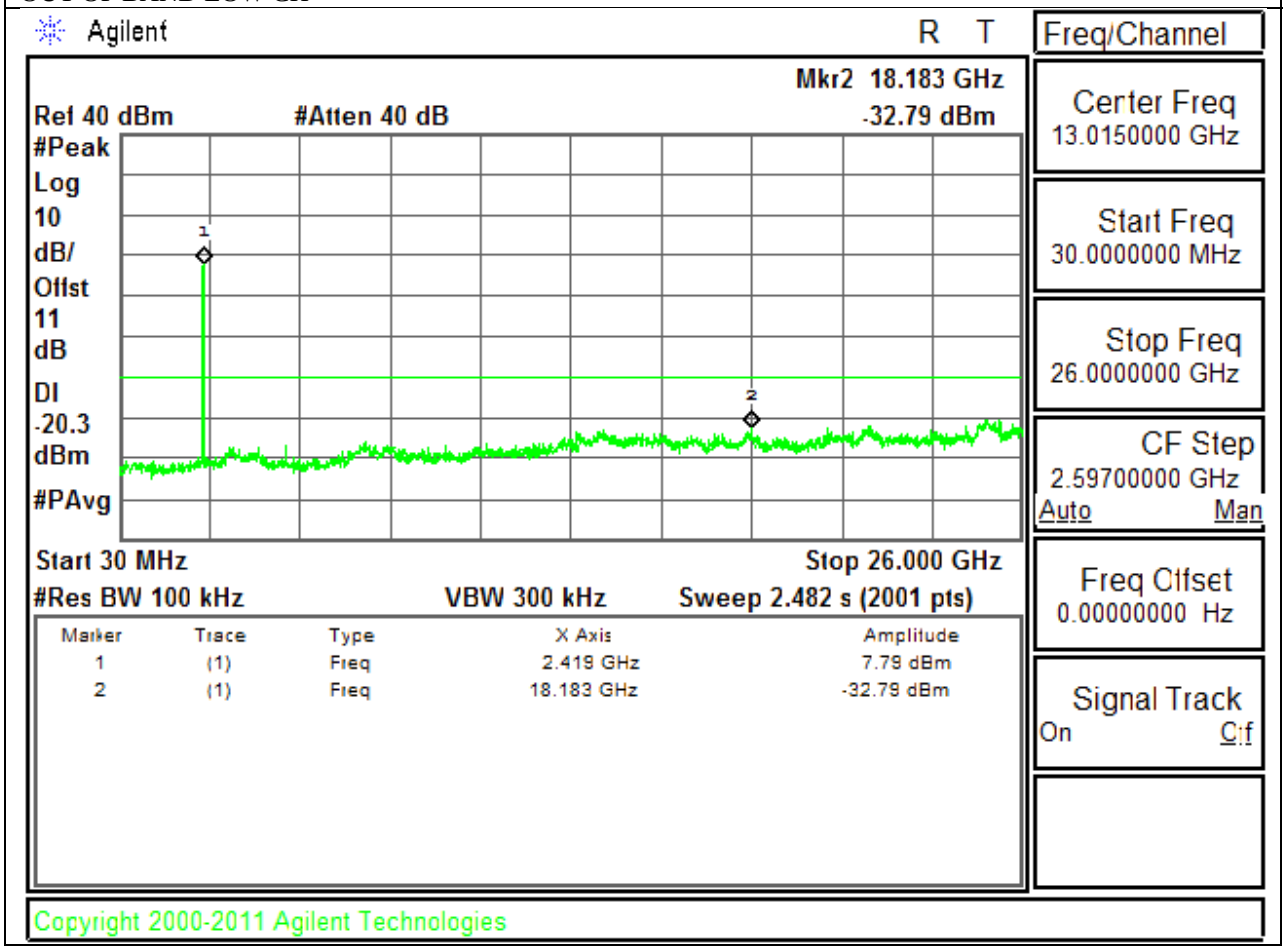
AUTHORIZED BAND EDGE HIGH CH



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

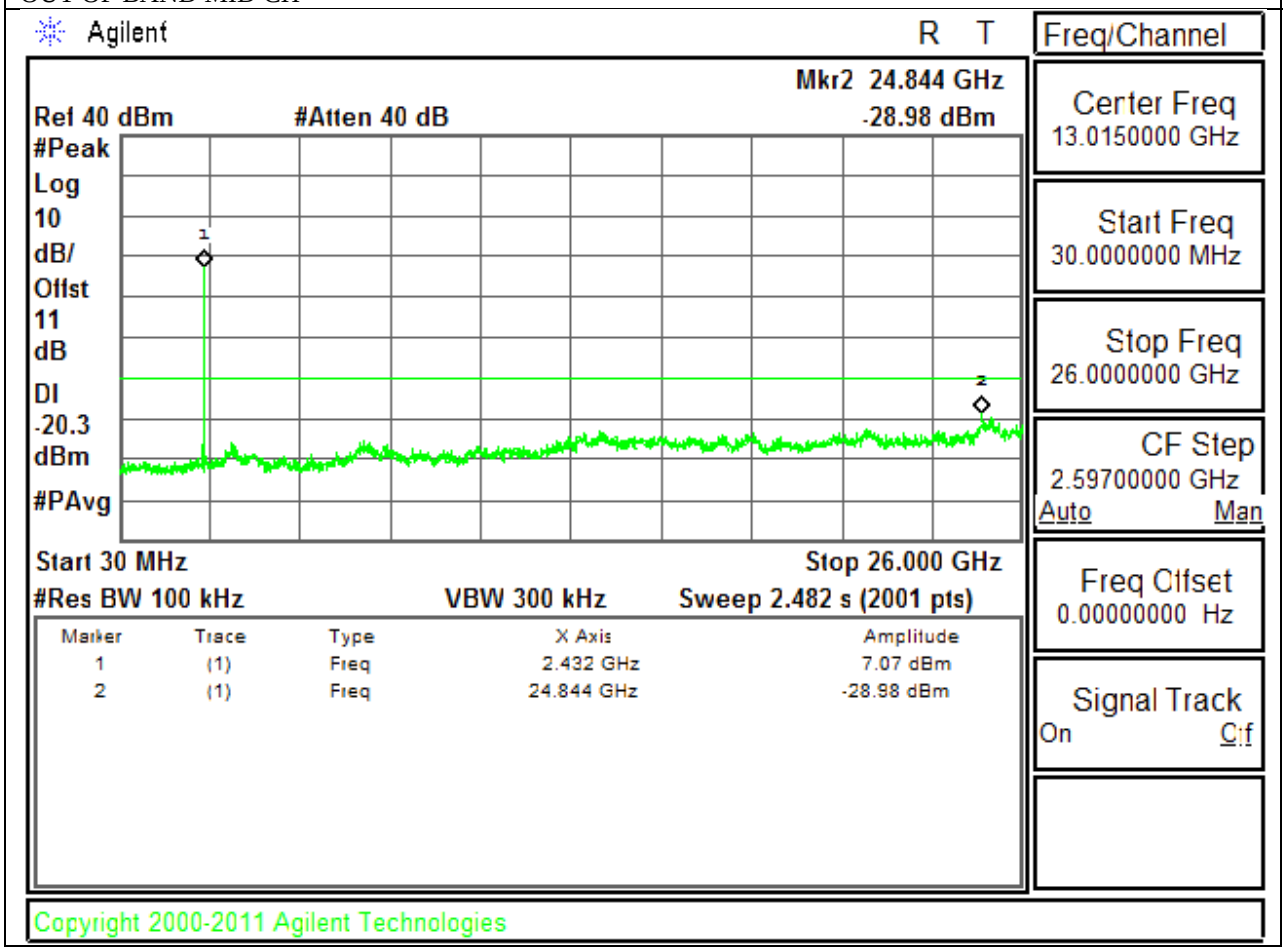
OUT-OF-BAND EMISSIONS

OUT OF BAND LOW CH



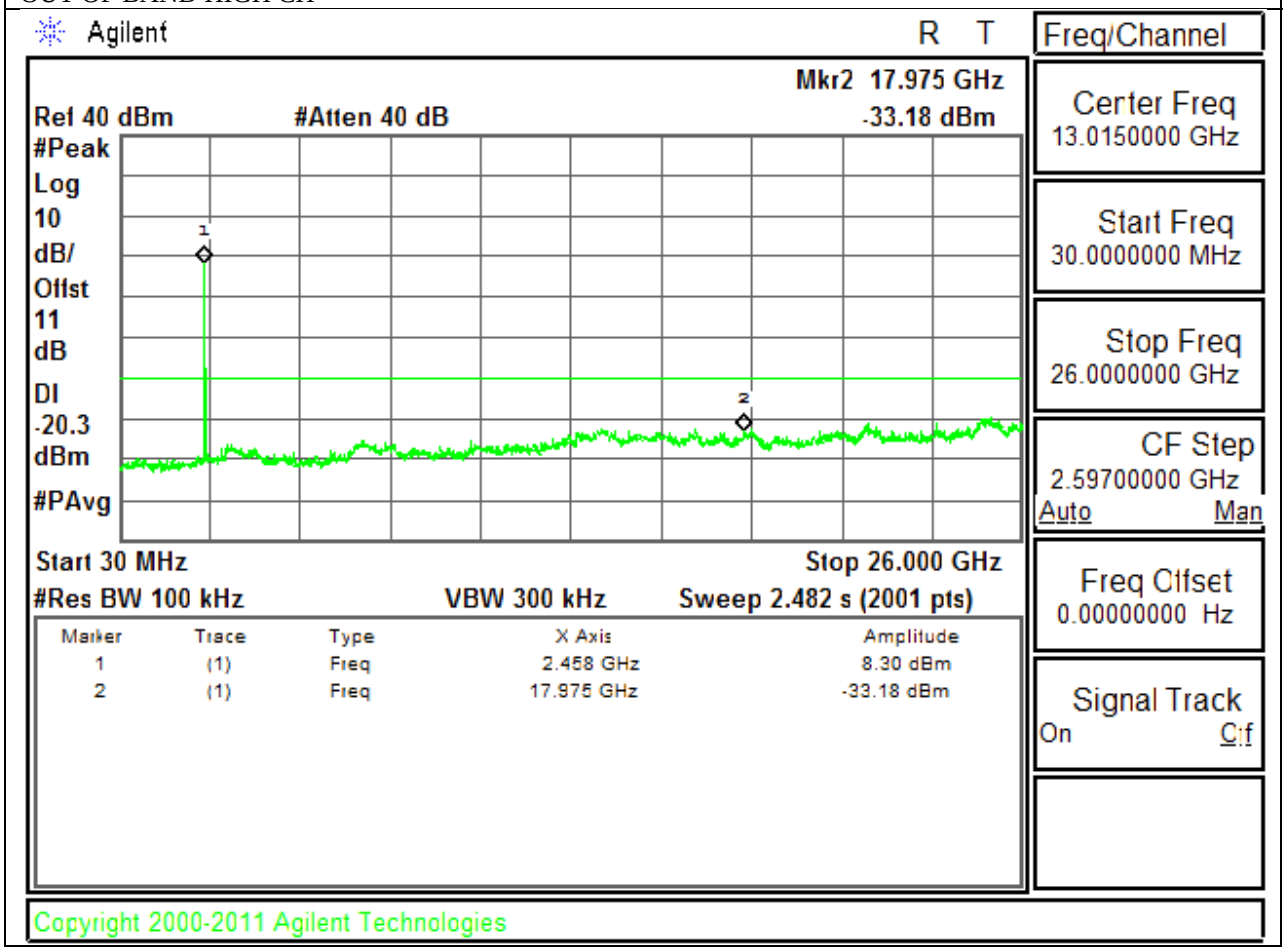
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

OUT OF BAND MID CH



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

OUT OF BAND HIGH CH



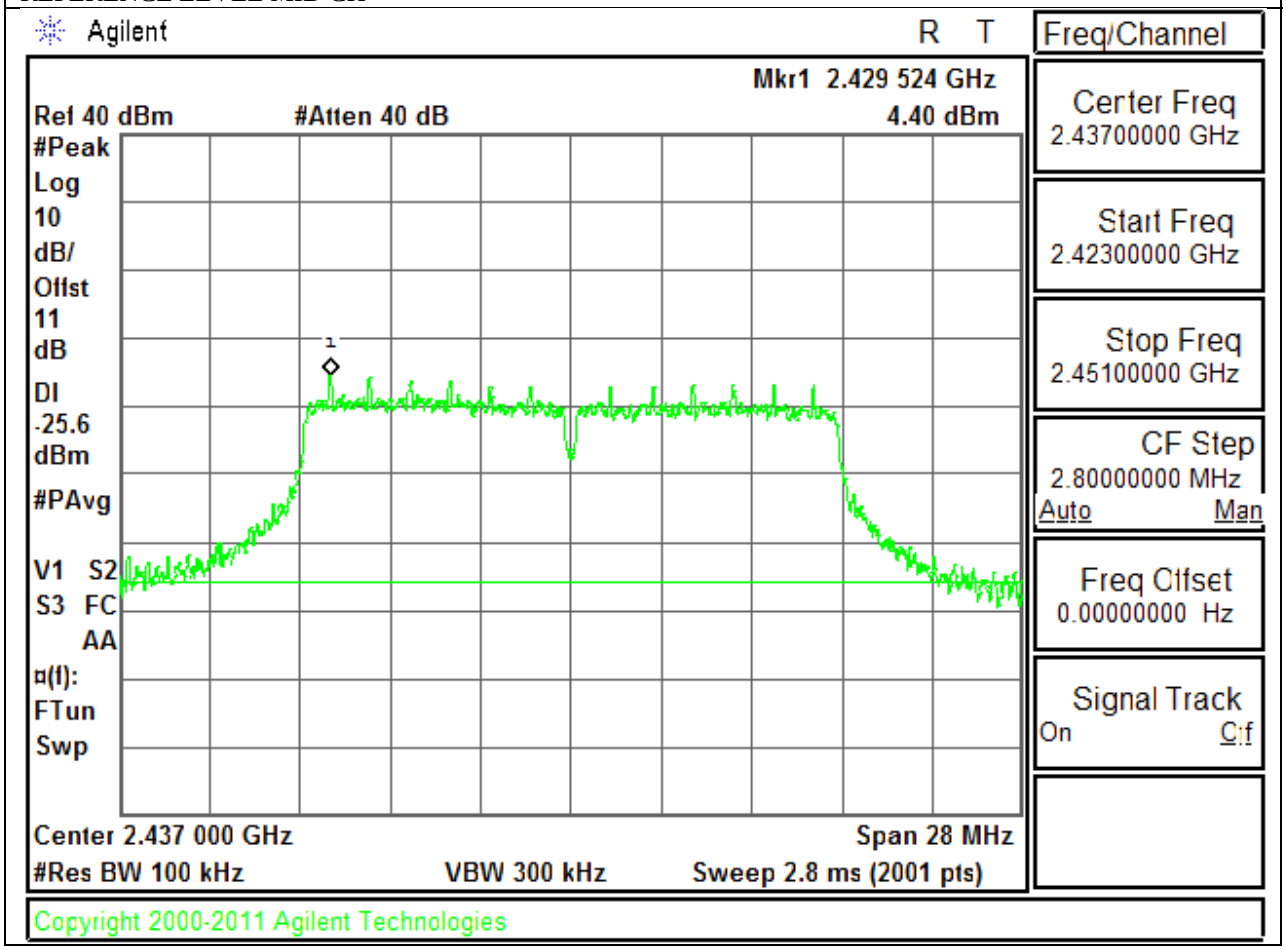
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FAX: (510) 661-0888

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

8.5.2. 802.11g MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH

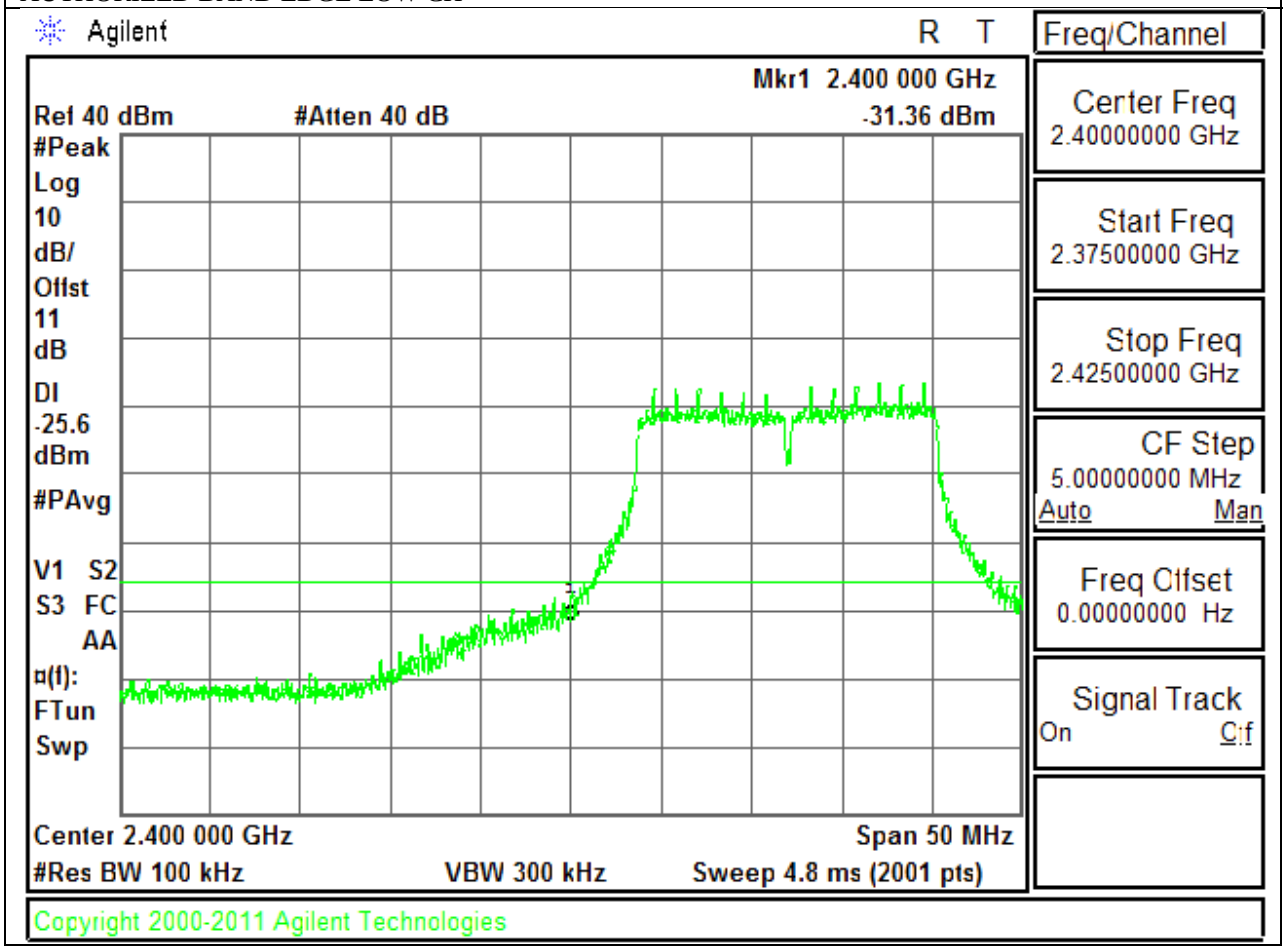


UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FAX: (510) 661-0888

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

LOW CHANNEL BANDEDGE

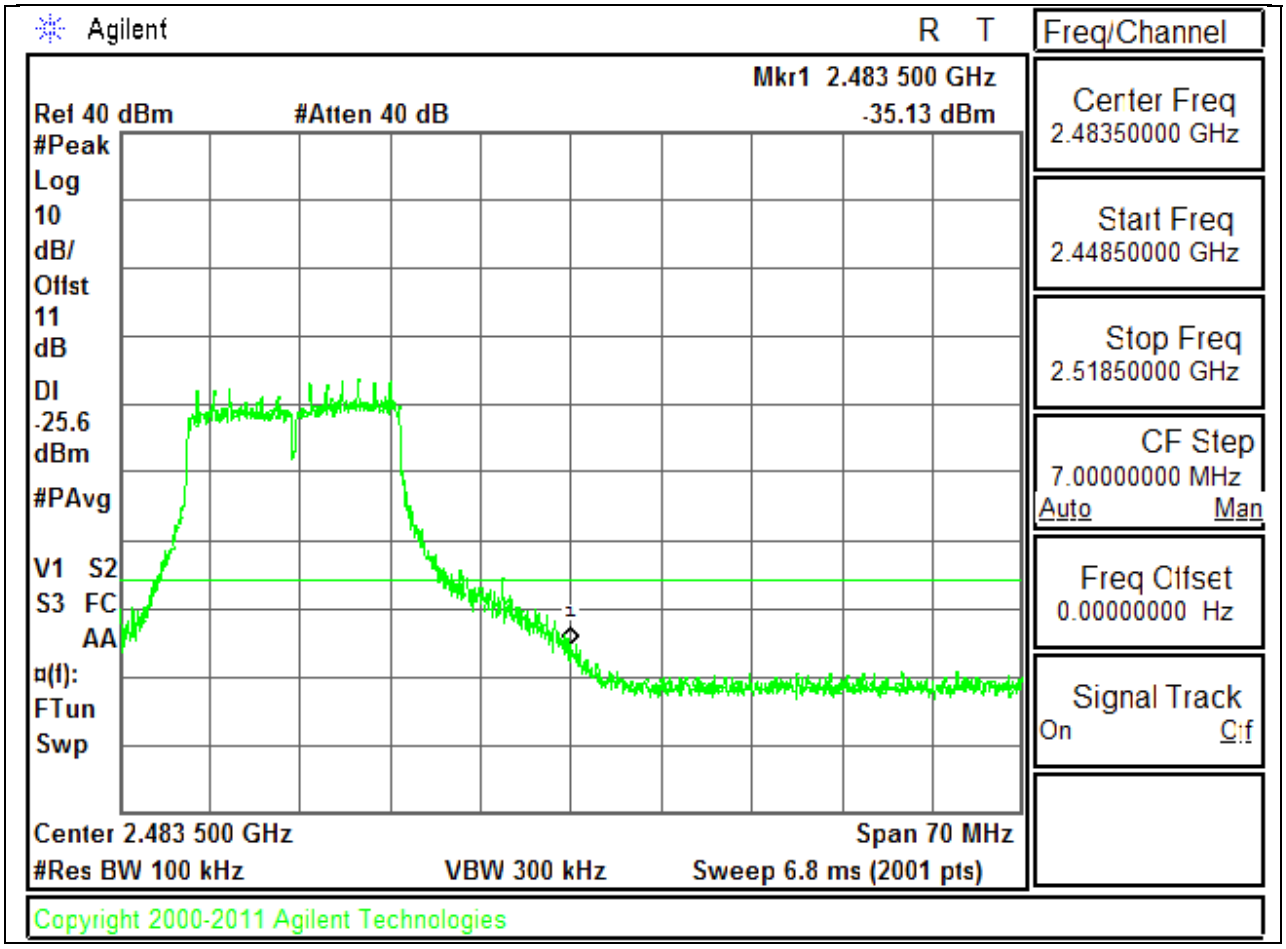
AUTHORIZED BAND EDGE LOW CH



HIGH CHANNEL BANDEDGE

AUTHORIZED BAND EDGE HIGH CH

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

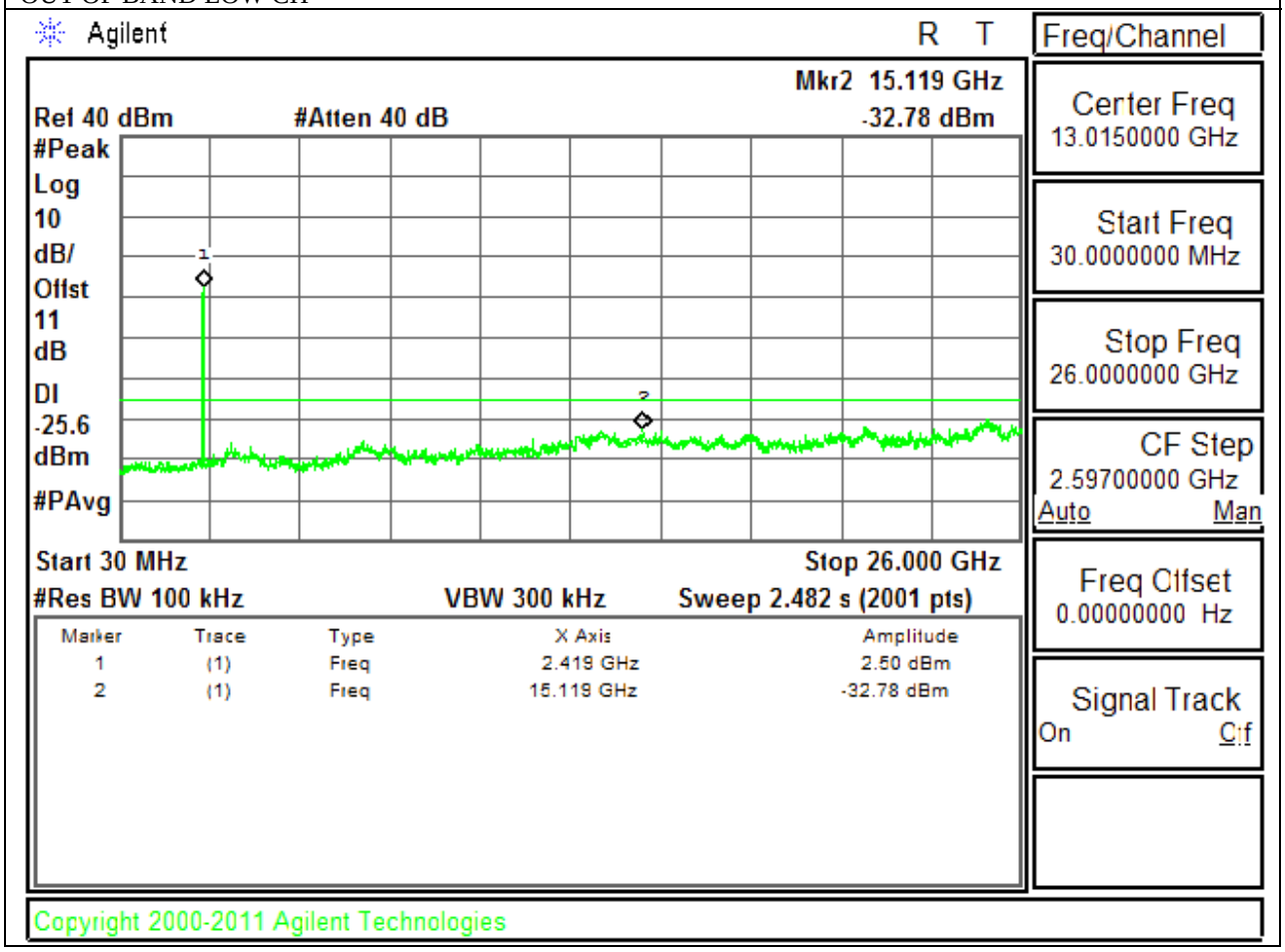


UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FAX: (510) 661-0888

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

OUT-OF-BAND EMISSIONS

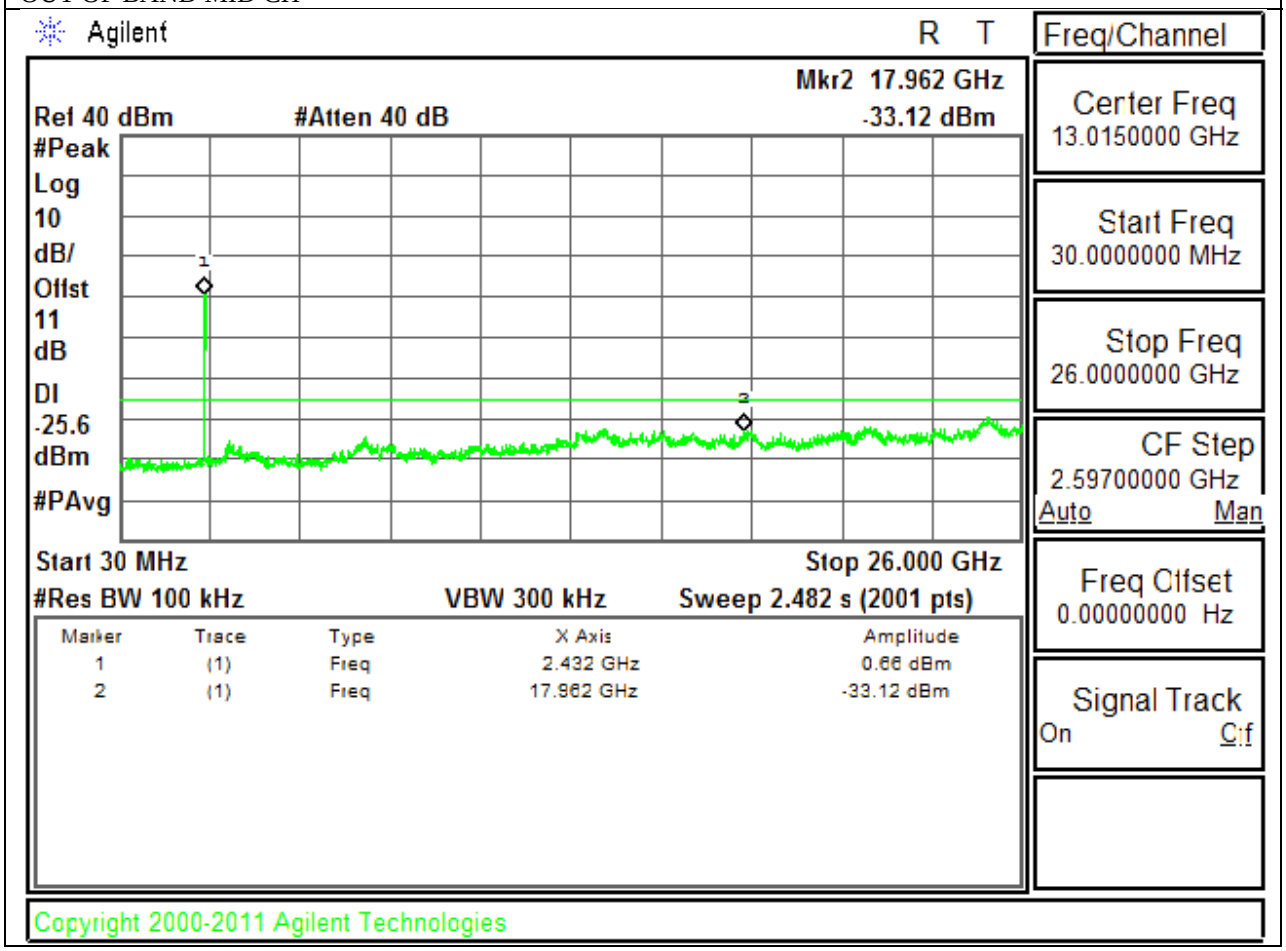
OUT OF BAND LOW CH



UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

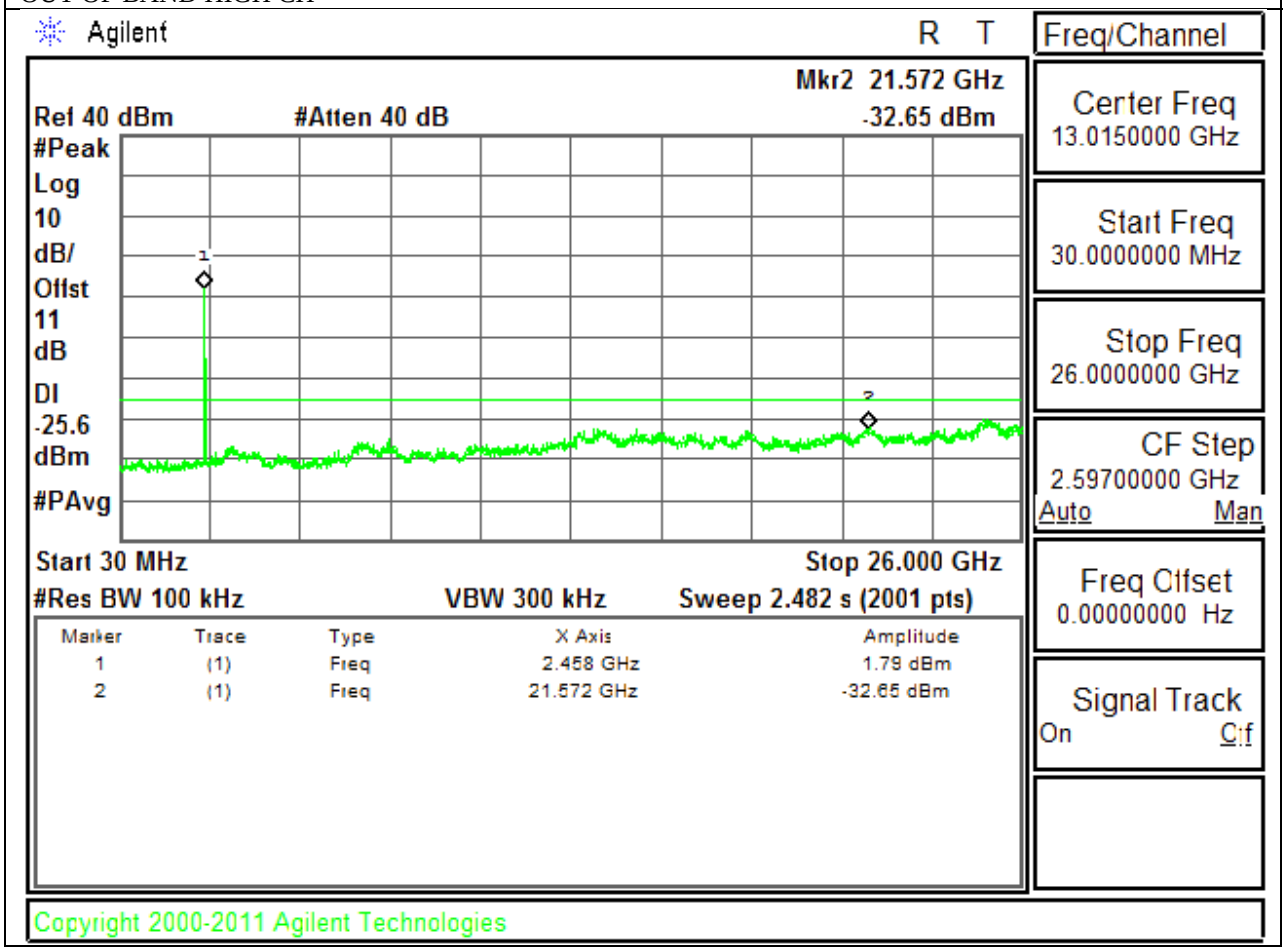
OUT OF BAND MID CH



UL VERIFICATION SERVICES INC.
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.

OUT OF BAND HIGH CH

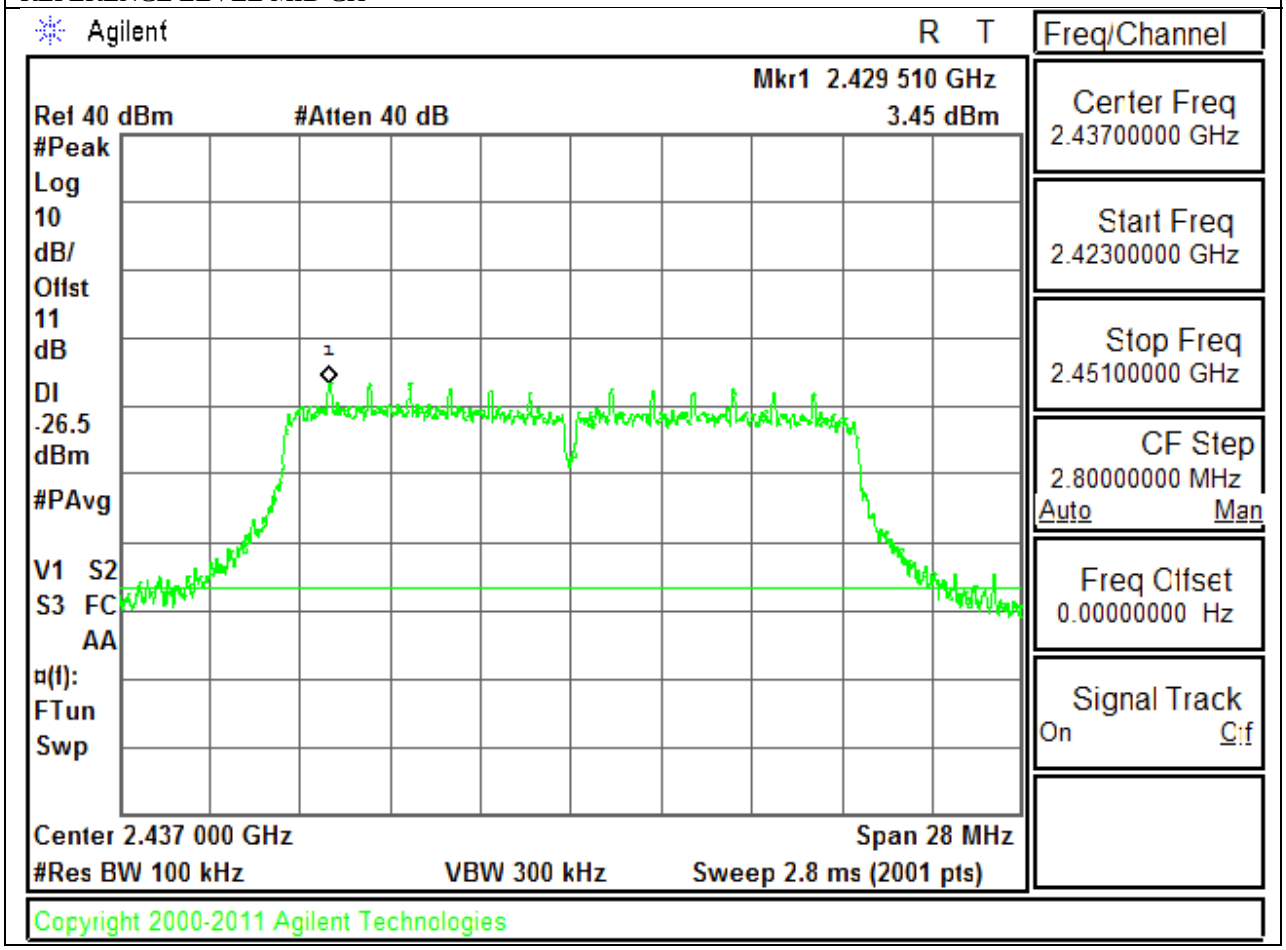


This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

8.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

REFERENCE LEVEL MID CH

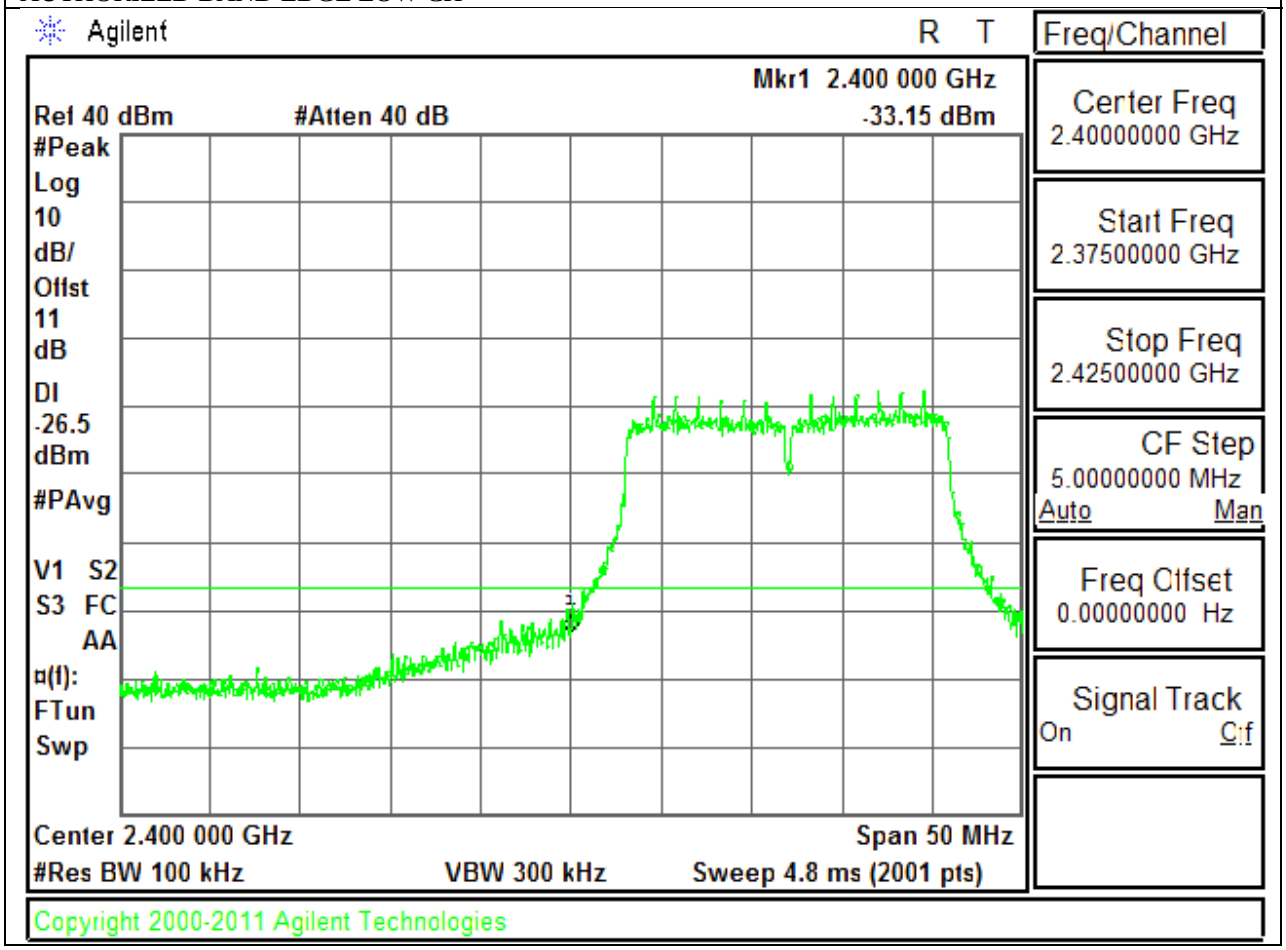


UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

LOW CHANNEL BANDEDGE

AUTHORIZED BAND EDGE LOW CH

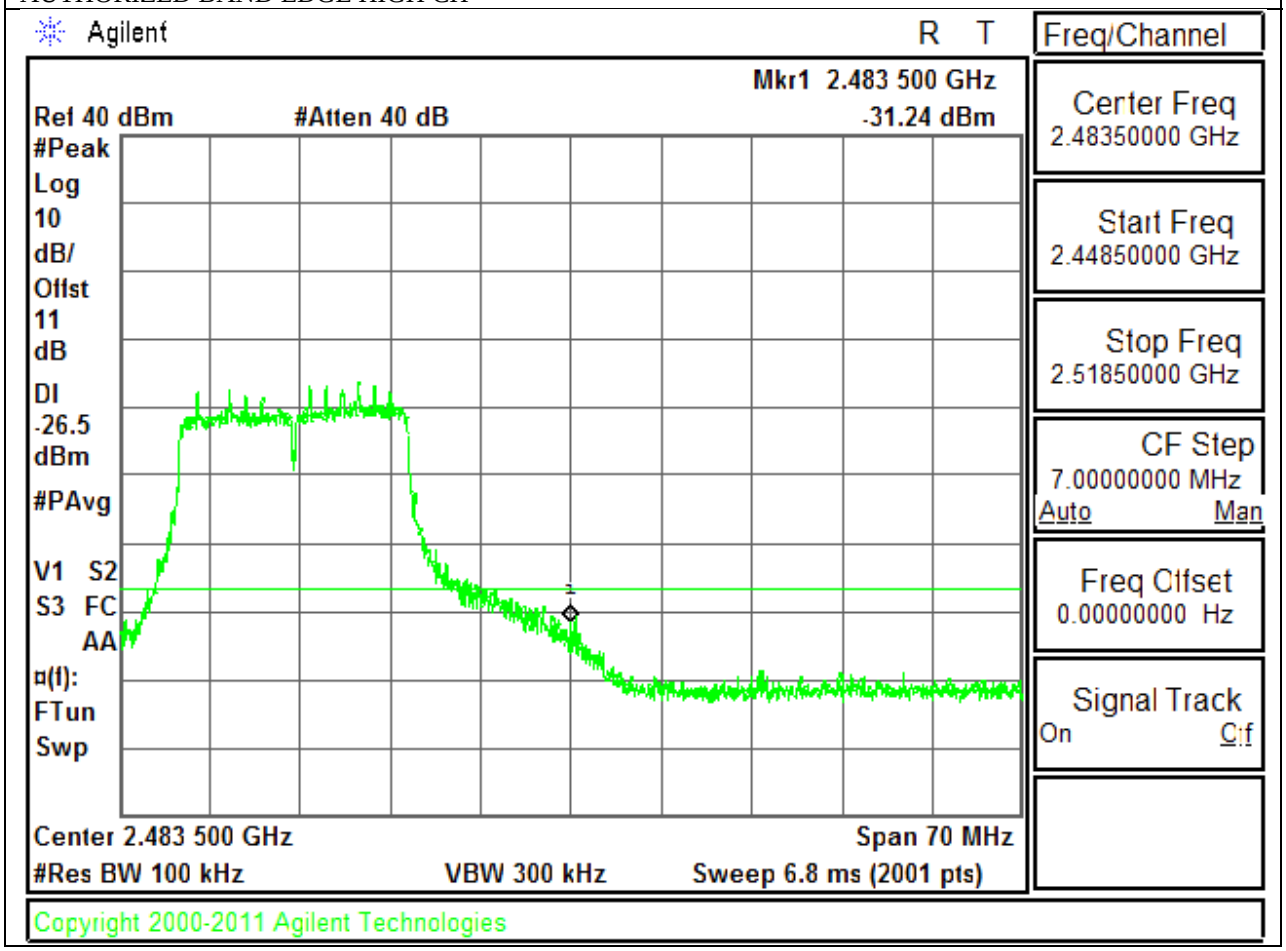


UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

HIGH CHANNEL BANDEDGE

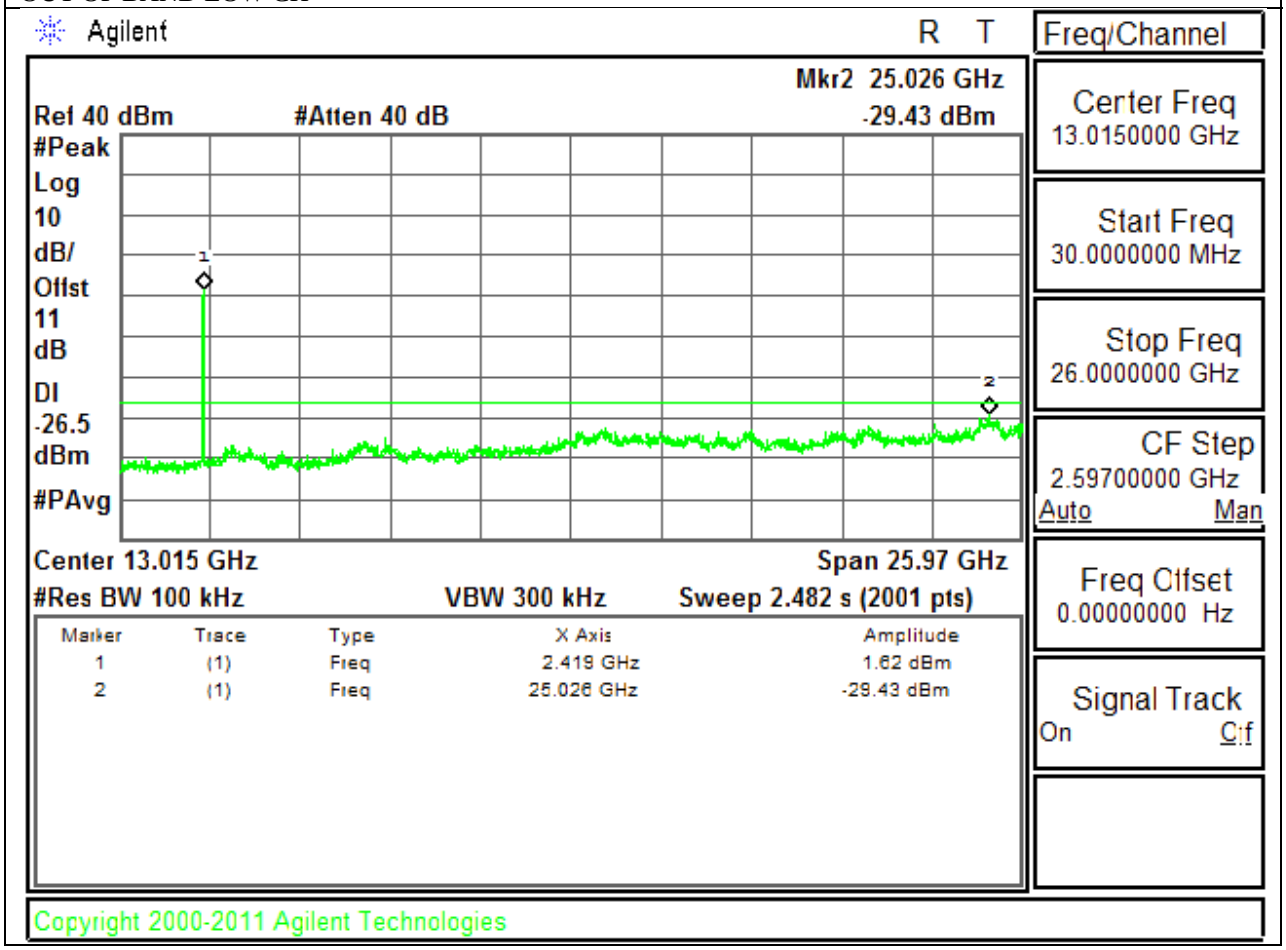
AUTHORIZED BAND EDGE HIGH CH



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

OUT-OF-BAND EMISSIONS

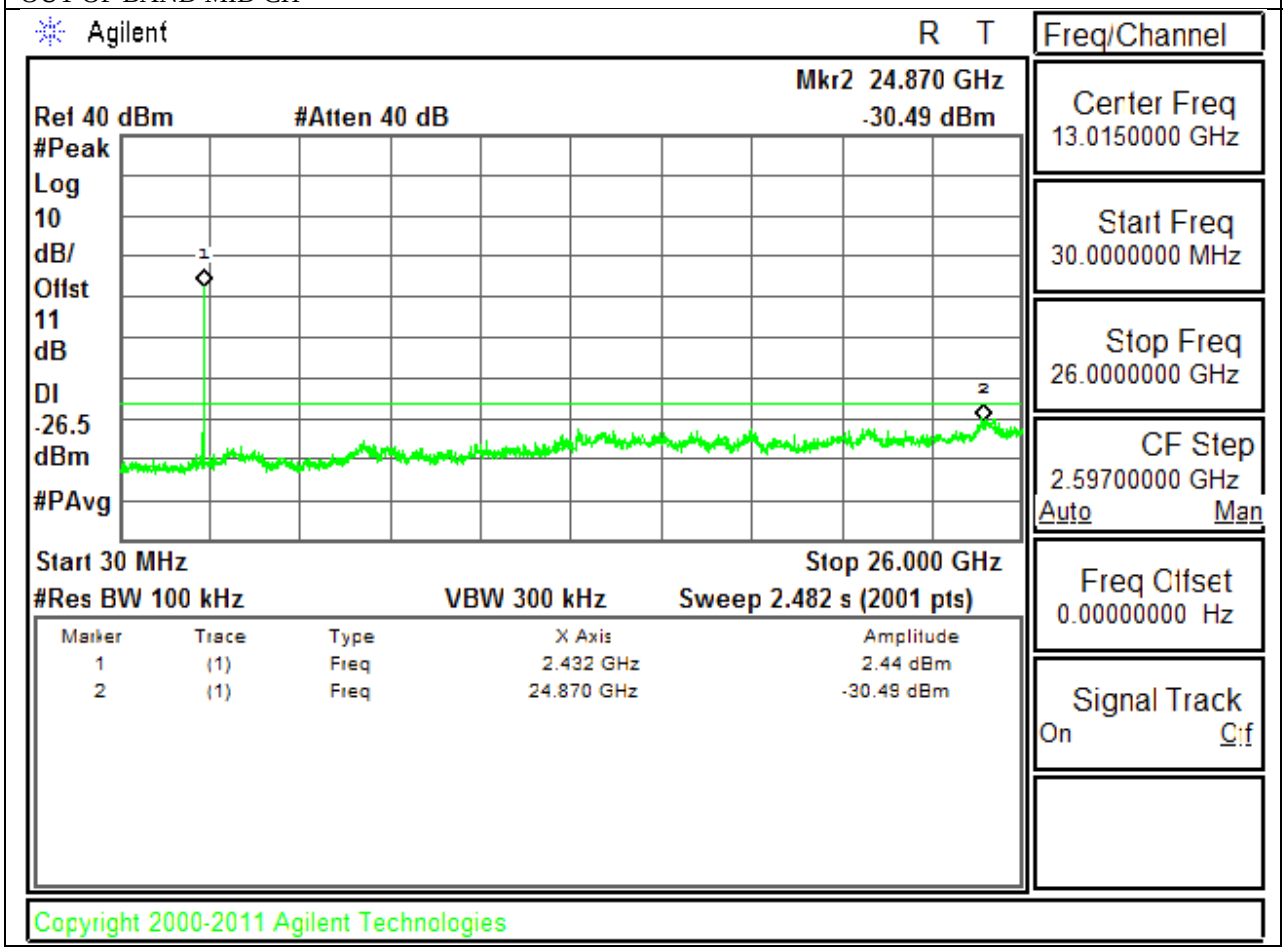
OUT OF BAND LOW CH



UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

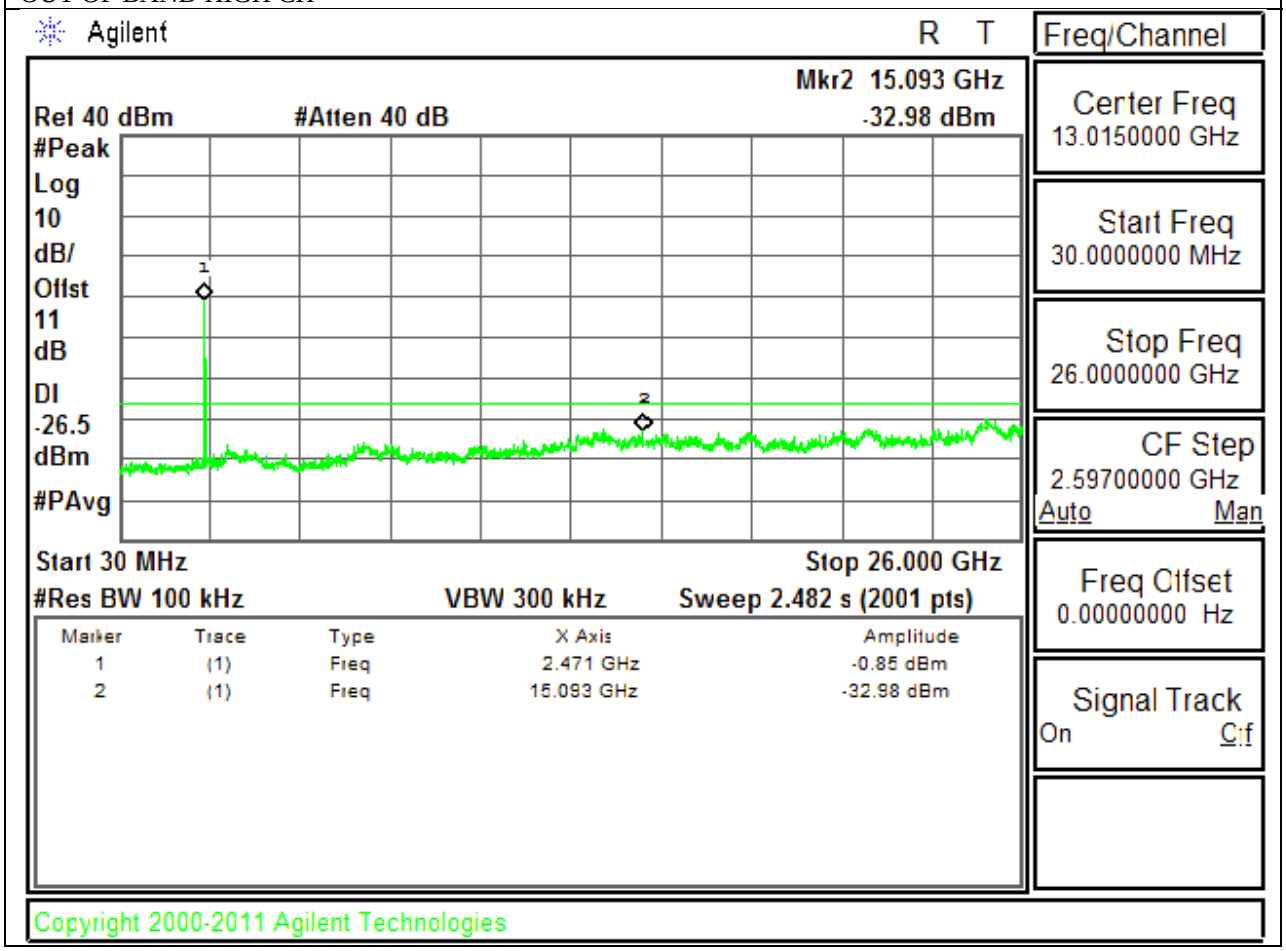
OUT OF BAND MID CH



UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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

OUT OF BAND HIGH CH



UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

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.

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; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor= 10log (1/x) For this sample B mode = 0dB (duty cycle >98%); G mode = 0.29 dB; N mode = 0.34 dB.

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

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

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

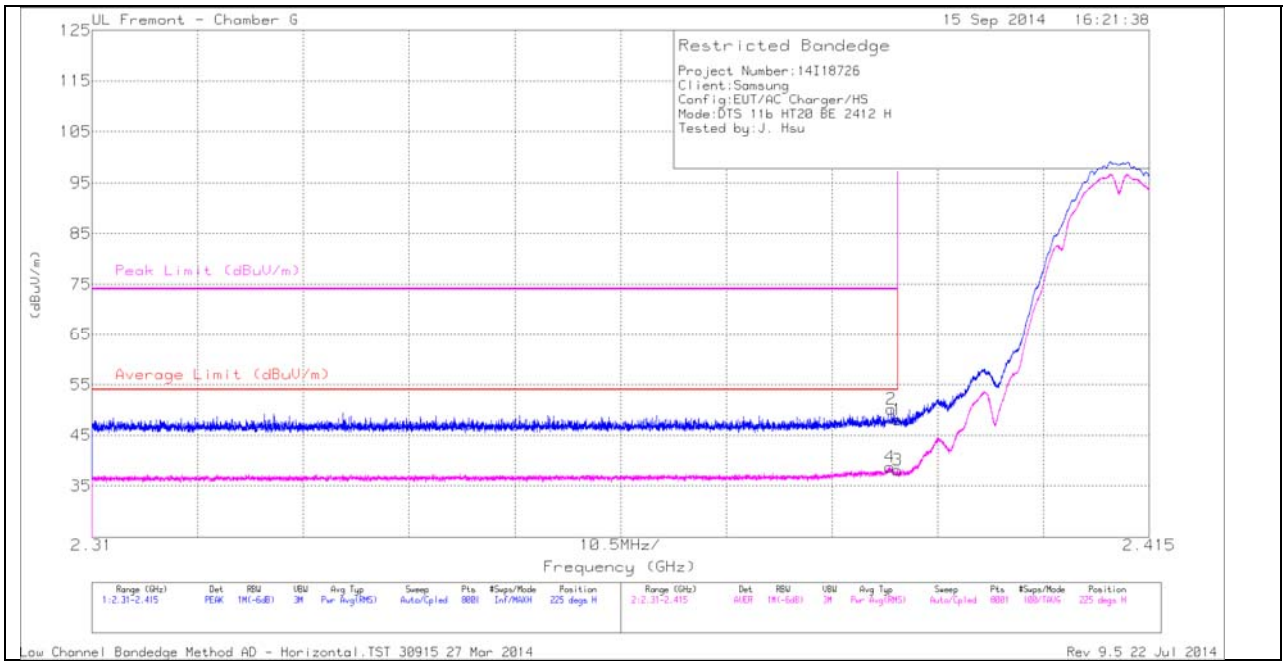
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

9.1. TRANSMITTER ABOVE 1 GHz

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

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



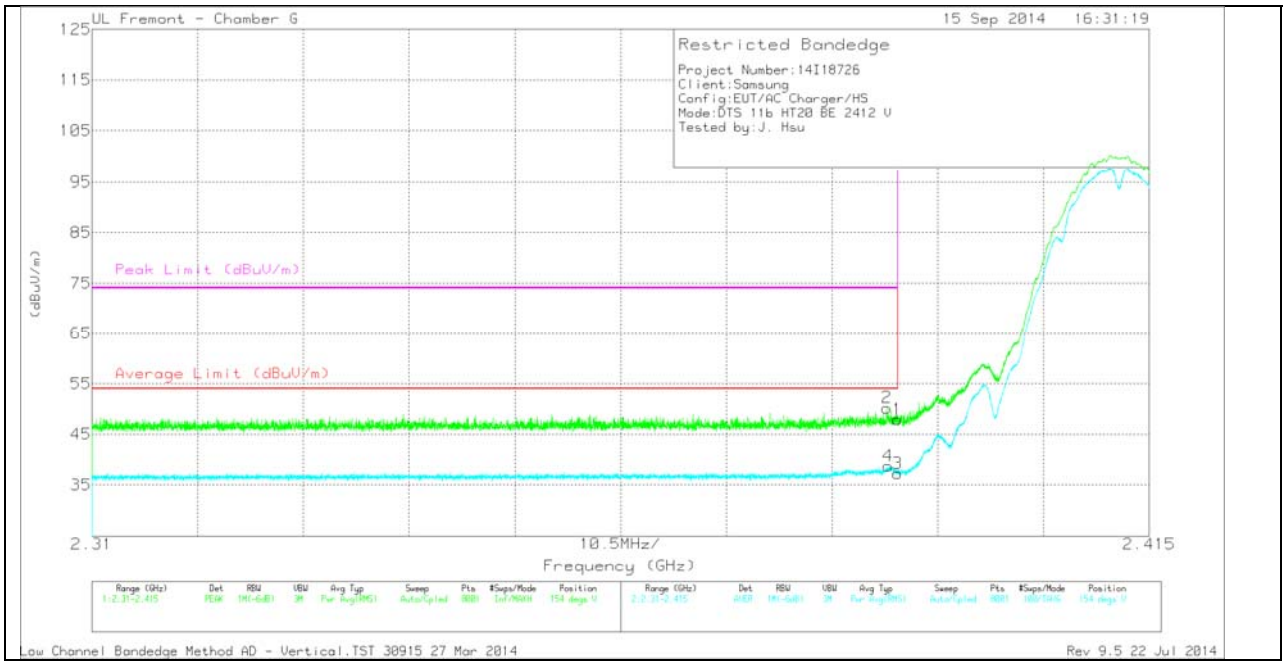
HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.389	43.31	PK	31.8	-24.9	0	50.21	-	-	74	-23.79	225	288	H
4	* 2.389	31.75	RMS	31.8	-24.9	0	38.71	54	-15.29	-	-	225	288	H
1	* 2.39	41.16	PK	31.8	-24.9	0	48.06	-	-	74	-25.94	225	288	H
3	* 2.39	31.16	RMS	31.8	-24.9	0	38.12	54	-15.88	-	-	225	288	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

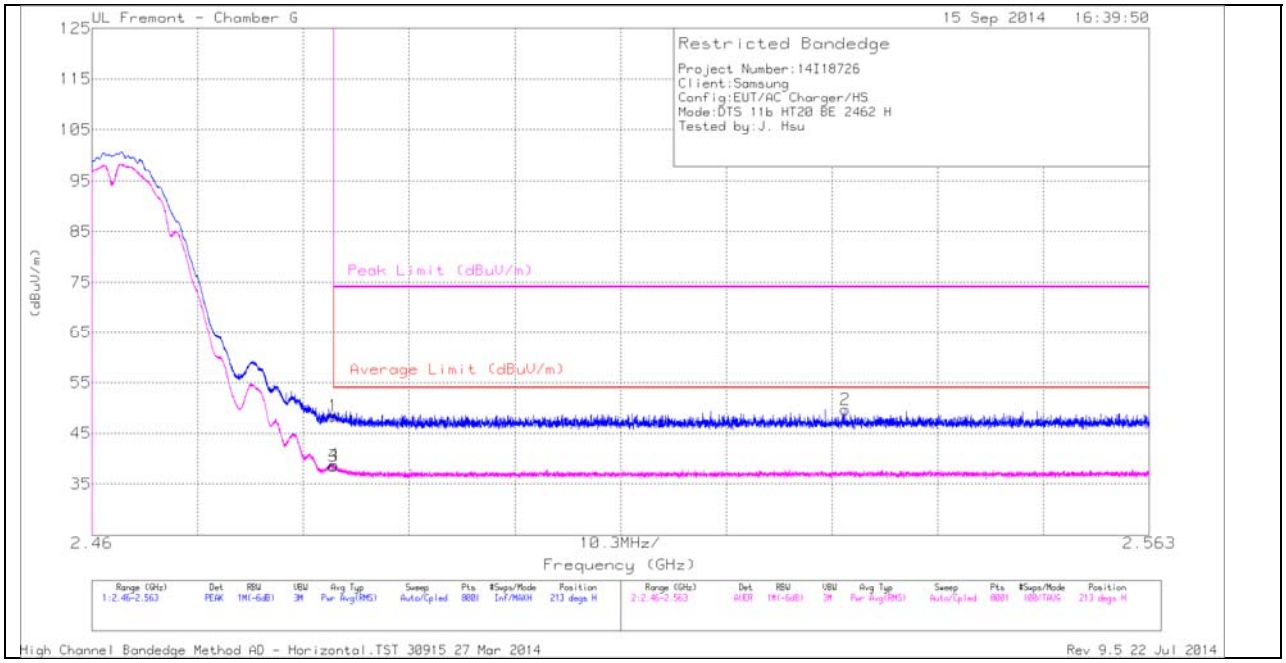
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.05	PK	31.8	-24.9	0	47.95	-	-	74	-26.05	154	372	V
2	* 2.389	43.33	PK	31.8	-24.9	0	50.23	-	-	74	-23.77	154	372	V
3	* 2.39	30.26	RMS	31.8	-24.9	0	37.22	54	-16.78	-	-	154	372	V
4	* 2.389	31.79	RMS	31.8	-24.9	0	38.75	54	-15.25	-	-	154	372	V

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



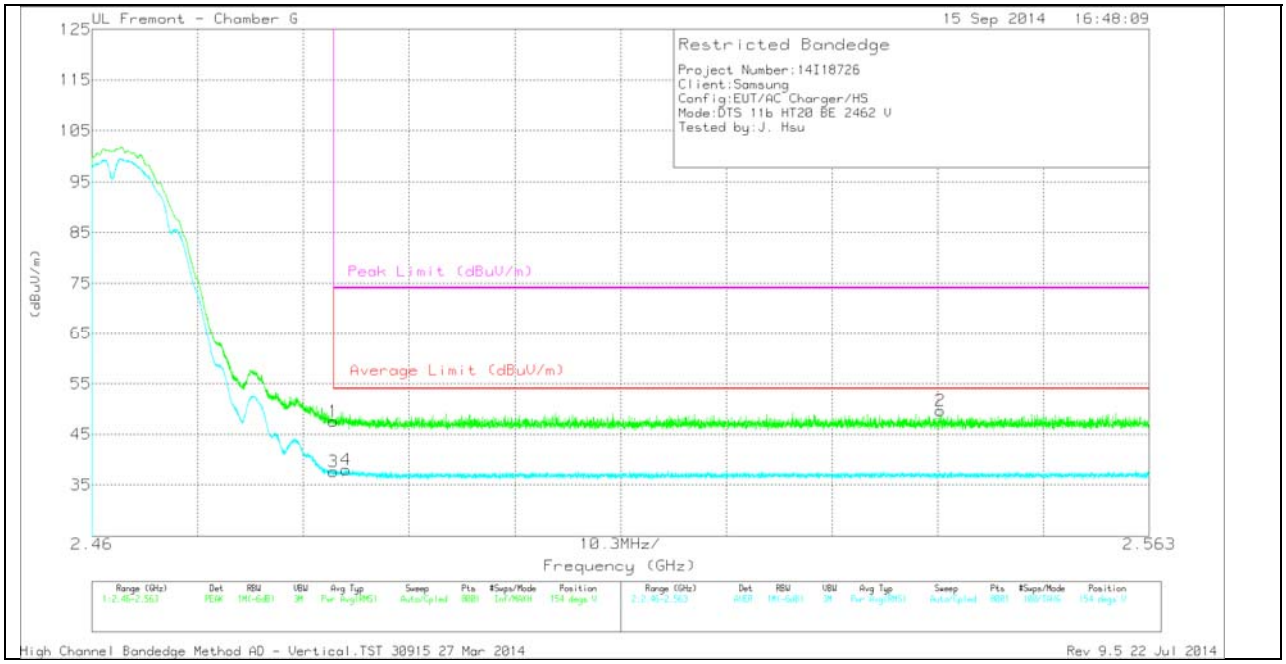
HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	41.29	PK	32	-24.9	0	48.39	-	-	74	-25.61	213	279	H
3	* 2.484	31.32	RMS	32	-24.9	0	38.48	54	-15.52	-	-	213	279	H
4	* 2.484	31.64	RMS	32	-24.9	0	38.8	54	-15.2	-	-	213	279	H
2	2.533	42.58	PK	32	-24.9	0	49.68	-	-	74	-24.32	213	279	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

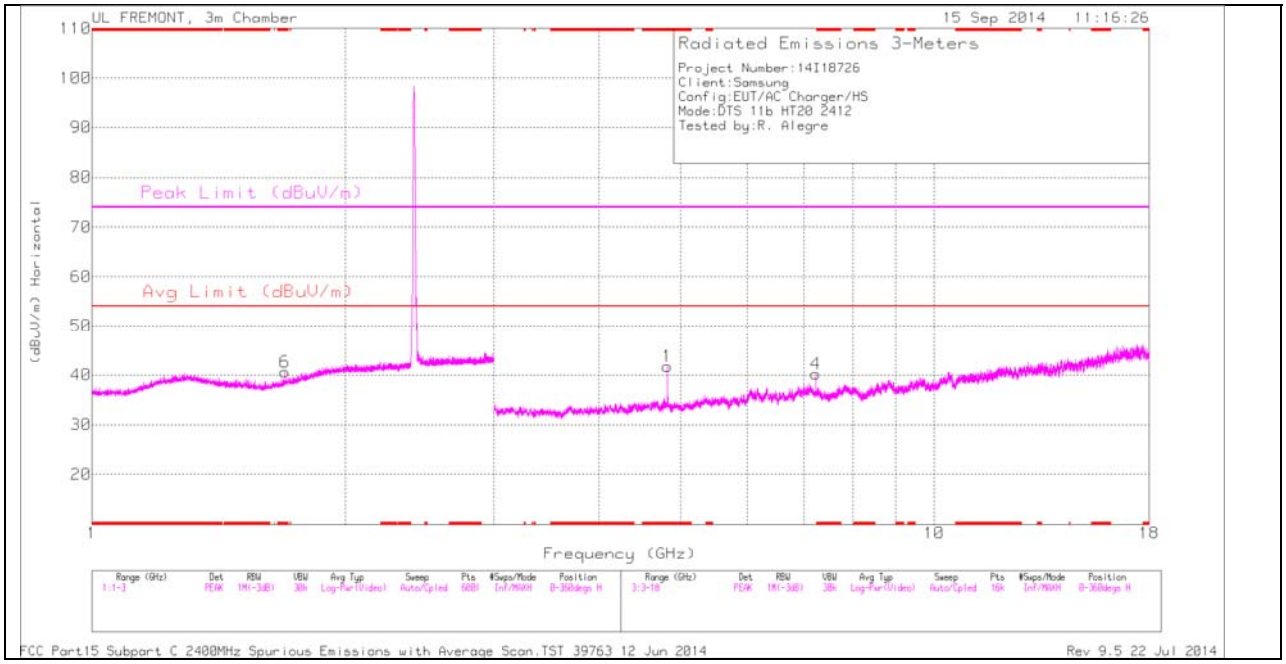
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.45	PK	32	-24.9	0	47.55	-	-	74	-26.45	154	283	V
3	* 2.484	30.51	RMS	32	-24.9	0	37.67	54	-16.33	-	-	154	283	V
4	* 2.485	30.84	RMS	32	-24.9	0	38	54	-16	-	-	154	283	V
2	2.543	42.57	PK	32	-24.9	0	49.67	-	-	74	-24.33	154	283	V

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL

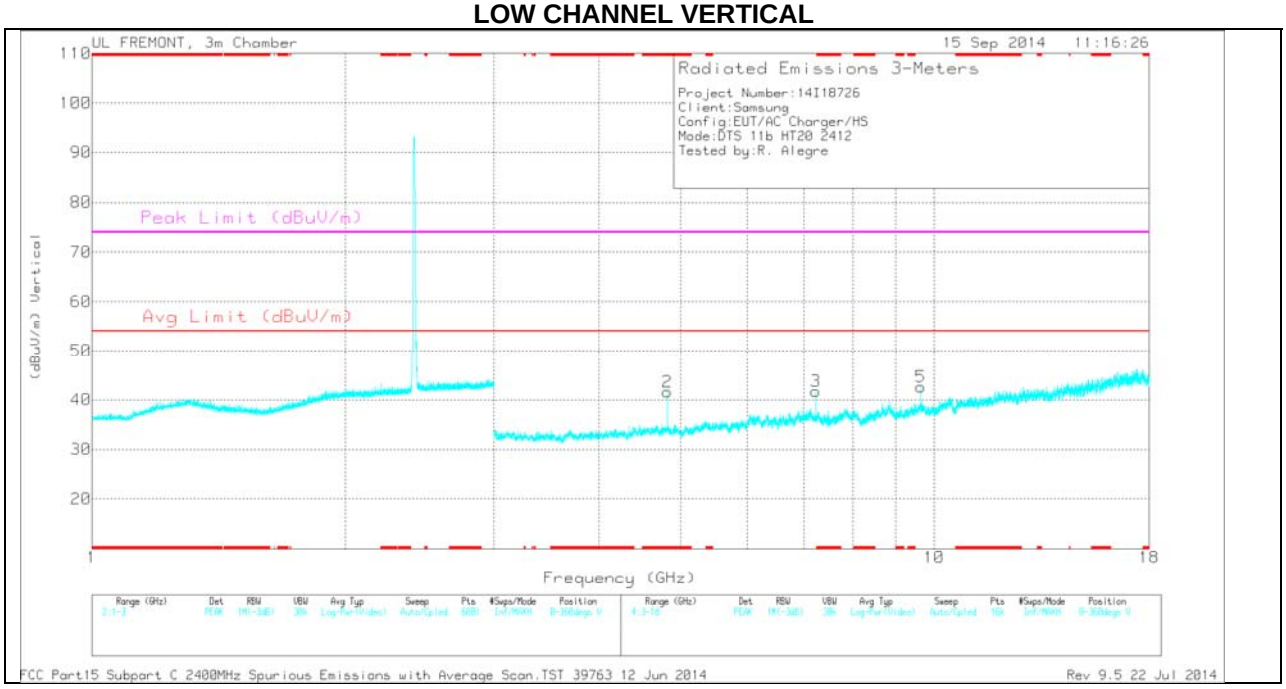


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

LOW CHANNEL 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.

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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 T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	* 1.695	34.95	PK	29	-23.4	0	40.55	-	-	74	-33.45	0-360	200	H
1	* 4.824	37.99	PK	34	-30.2	0	41.79	-	-	74	-32.21	0-360	200	H
2	* 4.824	37.84	PK	34	-30.2	0	41.64	-	-	74	-32.36	0-360	100	V
4	7.236	34.33	PK	35.6	-29.7	0	40.23	-	-	-	-	0-360	200	H
3	7.237	35.84	PK	35.6	-29.7	0	41.74	-	-	-	-	0-360	200	V
5	9.647	31.44	PK	36.8	-25.6	0	42.64	-	-	-	-	0-360	200	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.824	41.4	PK2	34	-30.2	0	45.2	-	-	74	-28.8	228	357	H
* 4.824	32.38	MAv1	34	-30.3	0	36.08	54	-17.92	-	-	228	357	H
* 4.823	40.78	PK2	34	-30.3	0	44.48	-	-	74	-29.52	1	253	V
* 4.823	29.23	MAv1	34	-30.3	0	32.93	54	-21.07	-	-	322	253	V
7.237	29.27	MAv1	35.6	-29.7	0	35.17	-	-	-	-	322	253	H
7.237	42.41	PK2	35.6	-29.7	0	48.31	-	-	-	-	1	200	V
7.237	32.41	MAv1	35.6	-29.7	0	38.31	-	-	-	-	1	200	V
7.238	40.69	PK2	35.6	-29.7	0	46.59	-	-	-	-	1	200	H
9.648	38.84	PK2	36.8	-25.6	0	50.04	-	-	-	-	117	166	V
9.648	29.68	MAv1	36.8	-25.6	0	40.88	54	-13.12	-	-	117	166	V

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

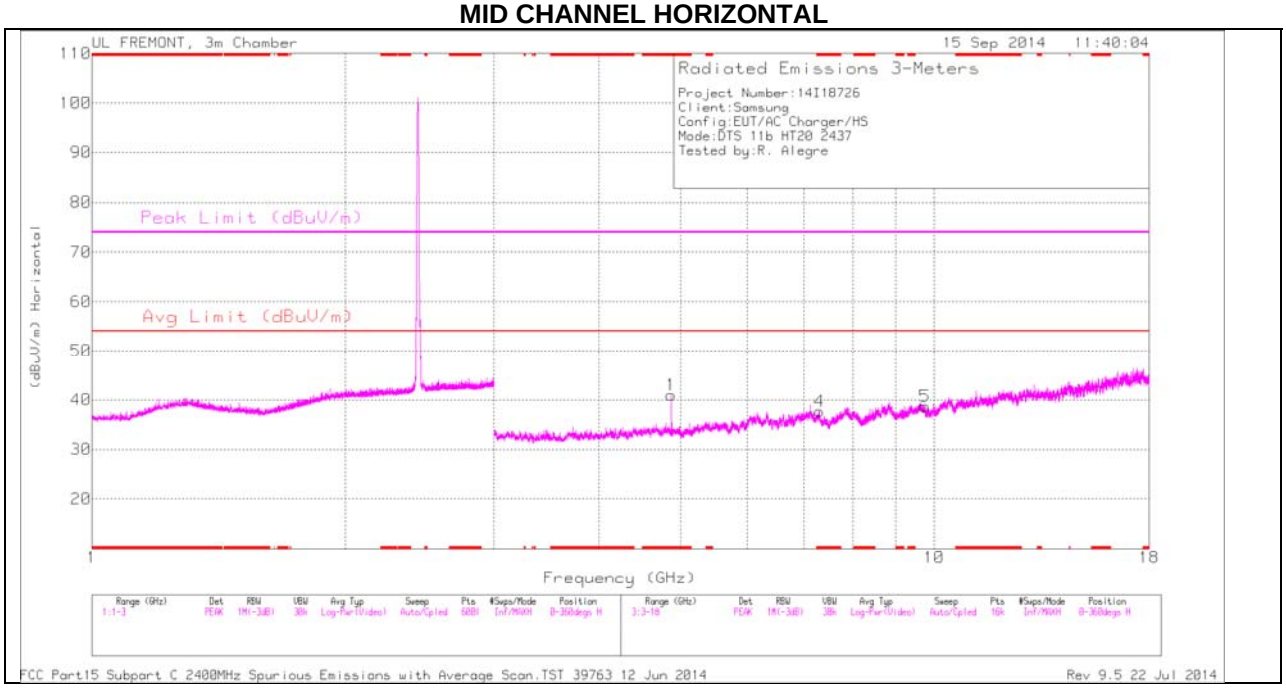
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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

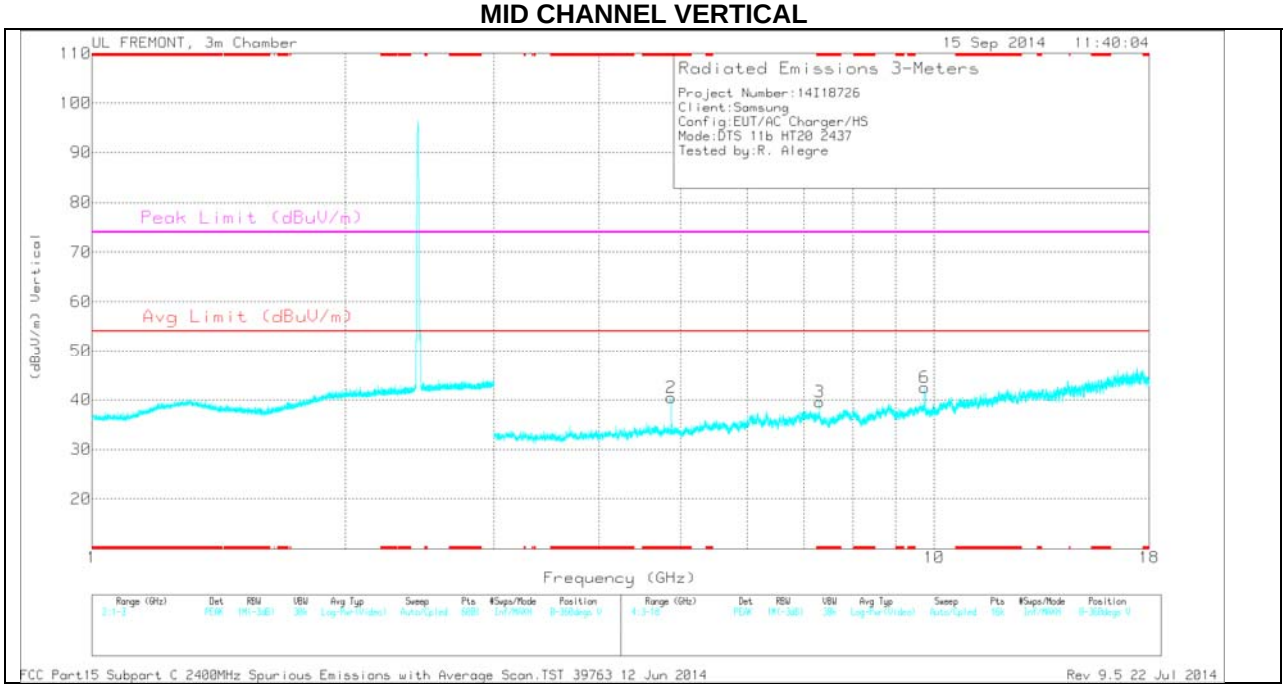


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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 DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.874	37.1	PK	34	-30.1	0	41	-	-	74	-33	0-360	200	H
4	* 7.309	30.66	PK	35.6	-28.6	0	37.66	-	-	74	-36.34	0-360	200	H
2	* 4.874	36.54	PK	34	-30.1	0	40.44	-	-	74	-33.56	0-360	200	V
3	* 7.312	32.55	PK	35.6	-28.6	0	39.55	-	-	74	-34.45	0-360	200	V
6	9.748	31.25	PK	36.9	-25.7	0	42.45	-	-	-	-	0-360	200	V
5	9.749	27.54	PK	36.9	-25.7	0	38.74	-	-	-	-	0-360	200	H

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.874	42.16	PK2	34	-30.1	0	46.06	-	-	74	-27.94	219	253	H
* 4.874	33.77	MAv1	34	-30.1	0	37.67	54	-16.33	-	-	219	253	H
* 7.314	40.04	PK2	35.6	-28.5	0	47.14	-	-	74	-26.86	215	268	V
* 7.312	29.62	MAv1	35.6	-28.6	0	36.62	54	-17.38	-	-	215	268	V
9.748	38.22	PK2	36.9	-25.7	0	49.42	-	-	-	-	116	201	V
9.748	28.5	MAv1	36.9	-25.7	0	39.7	54	-14.3	-	-	116	201	V

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

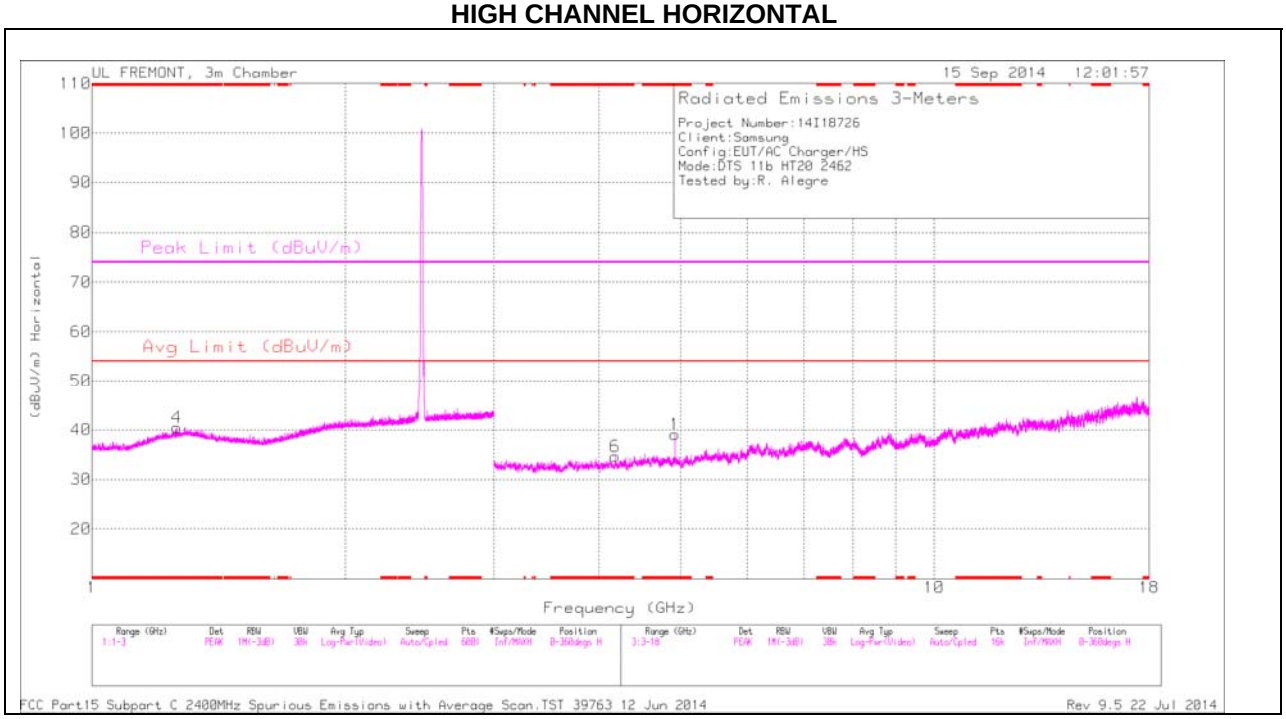
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

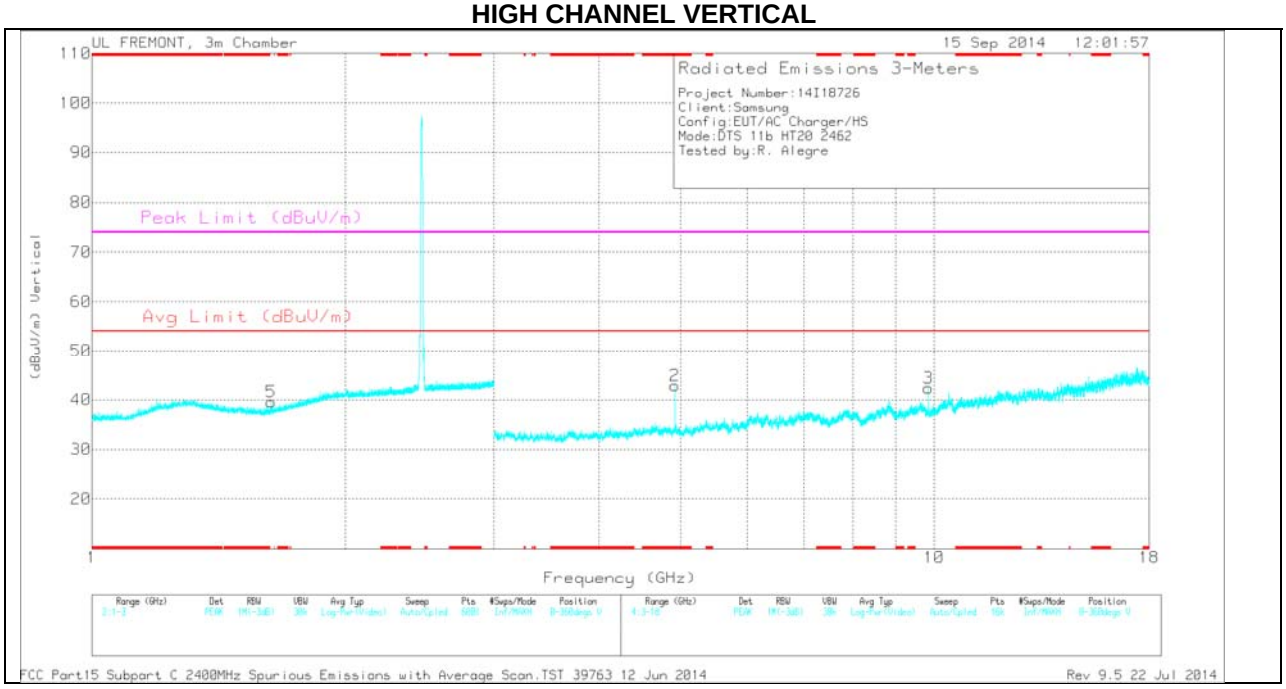
HIGH CHANNEL HORIZONTAL



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.

HIGH CHANNEL 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.

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 1.262	34.42	PK	29.9	-23.8	0	40.52	-	-	74	-33.48	0-360	200	H
1	* 4.925	35.48	PK	34	-30.4	0	39.08	-	-	74	-34.92	0-360	200	H
6	* 4.18	31.47	PK	33.5	-30.3	0	34.67	-	-	74	-39.33	0-360	100	H
2	* 4.924	39.28	PK	34	-30.4	0	42.88	-	-	74	-31.12	0-360	200	V
5	1.633	34.51	PK	28.4	-23.3	0	39.61	-	-	-	-	0-360	100	V
3	9.848	31.34	PK	36.9	-25.9	0	42.34	-	-	-	-	0-360	100	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.924	41.67	PK2	34	-30.4	0	45.27	-	-	74	-28.73	0	200	V
* 4.924	31.74	MAv1	34	-30.4	0	35.34	54	-18.66	-	-	0	200	V
9.848	37.55	PK2	36.9	-25.9	0	48.55	-	-	-	-	0	100	V
9.848	27.59	MAv1	36.9	-25.9	0	38.59	-	-	-	-	0	100	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

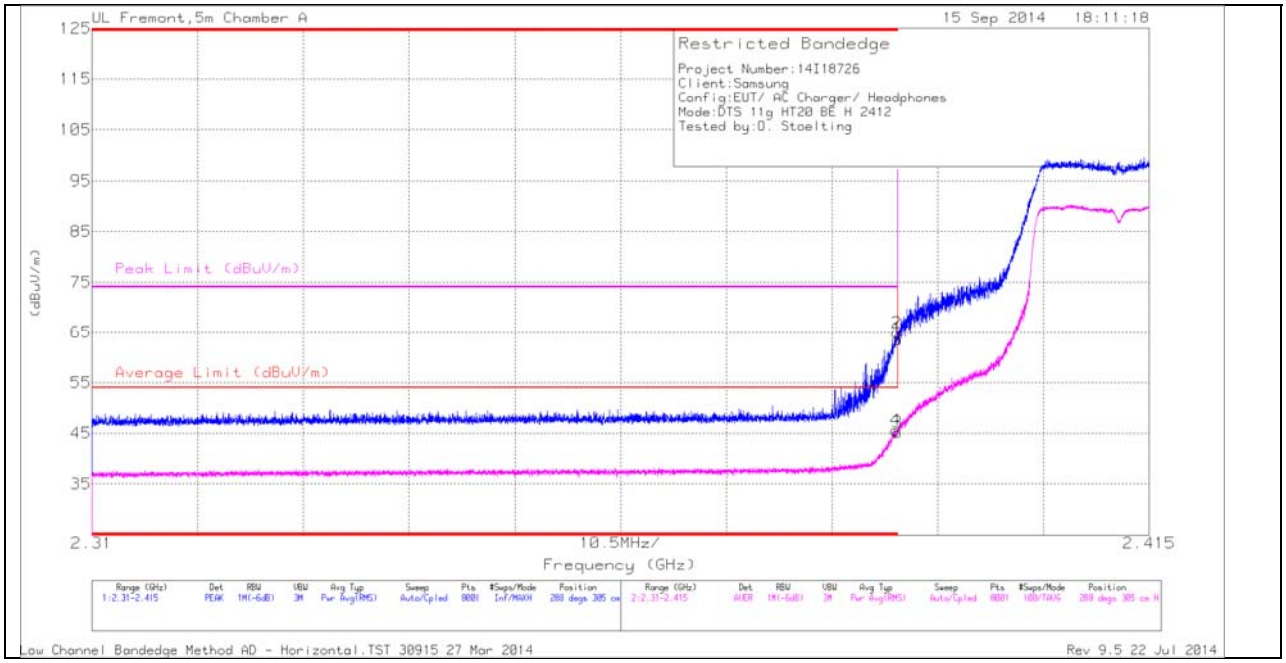
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

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

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



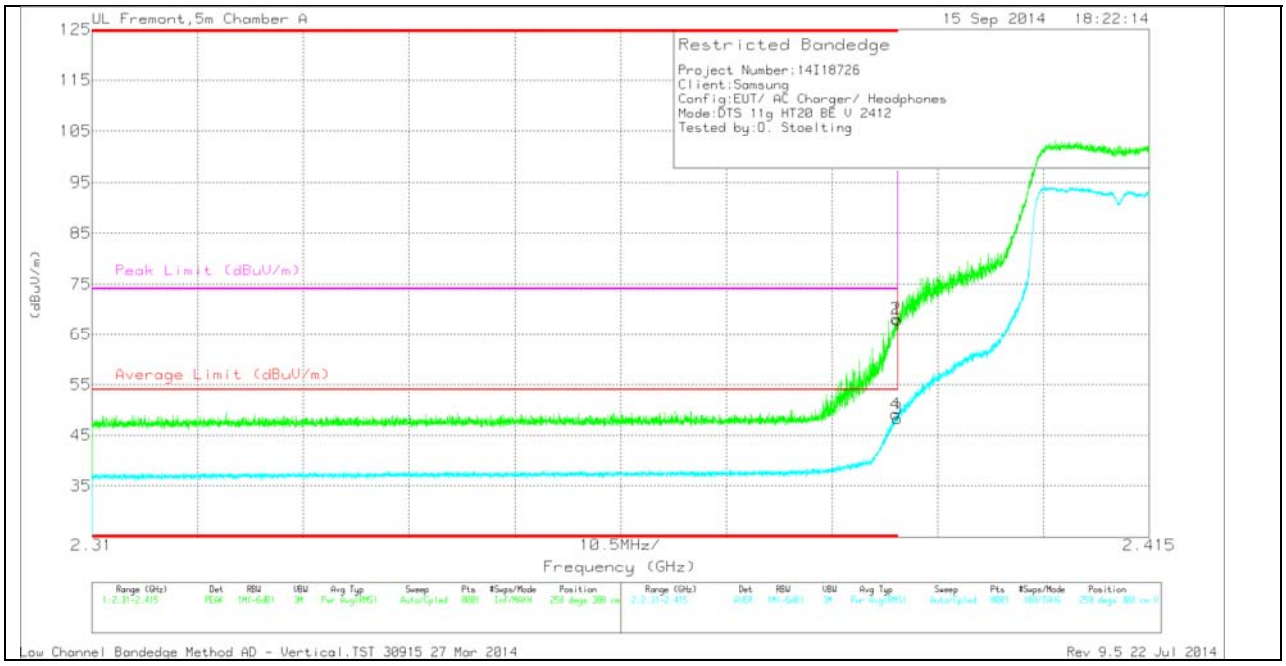
HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	55.54	PK	32.2	-24.1	0	63.64	-	-	74	-10.36	288	305	H
2	* 2.39	56.79	PK	32.2	-24.1	0	64.89	-	-	74	-9.11	288	305	H
3	* 2.39	36.81	RMS	32.2	-24.1	.29	45.2	54	-8.8	-	-	288	305	H
4	* 2.39	37.23	RMS	32.2	-24.1	.29	45.62	54	-8.38	-	-	288	305	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

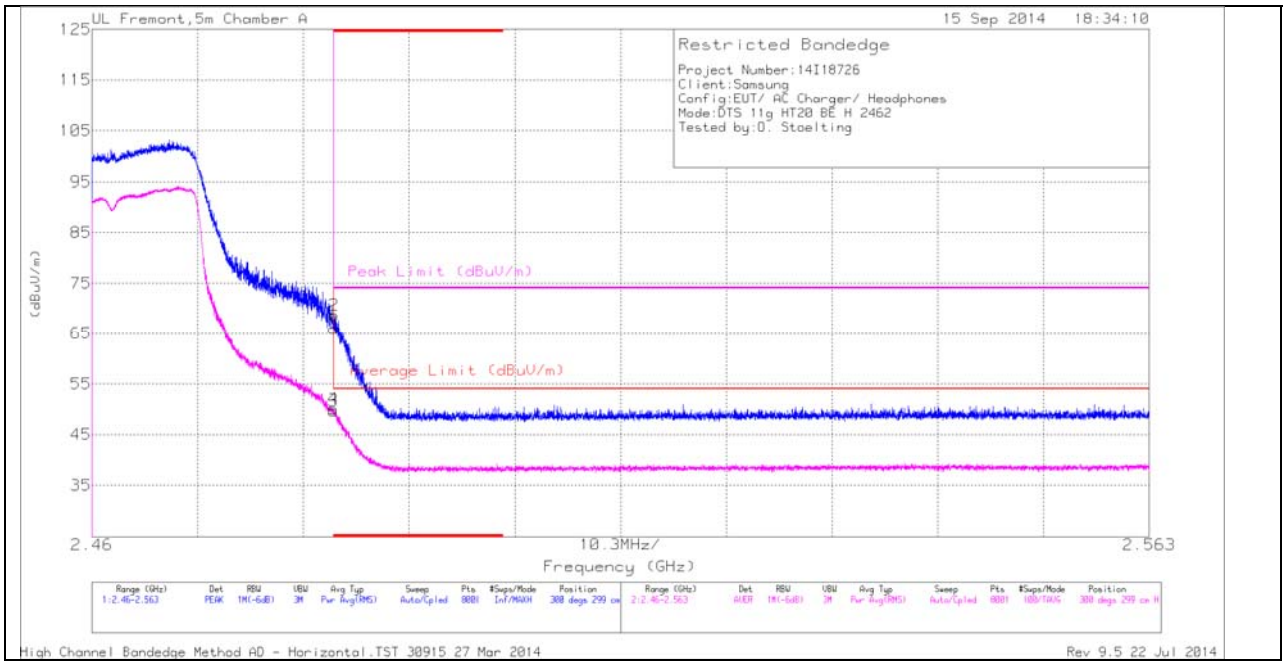
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	59.87	PK	32.2	-24.1	0	67.97	-	-	74	-6.03	258	308	V
2	* 2.39	60.09	PK	32.2	-24.1	0	68.19	-	-	74	-5.81	258	308	V
3	* 2.39	39.97	RMS	32.2	-24.1	.29	48.36	54	-5.64	-	-	258	308	V
4	* 2.39	40.73	RMS	32.2	-24.1	.29	49.12	54	-4.88	-	-	258	308	V

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



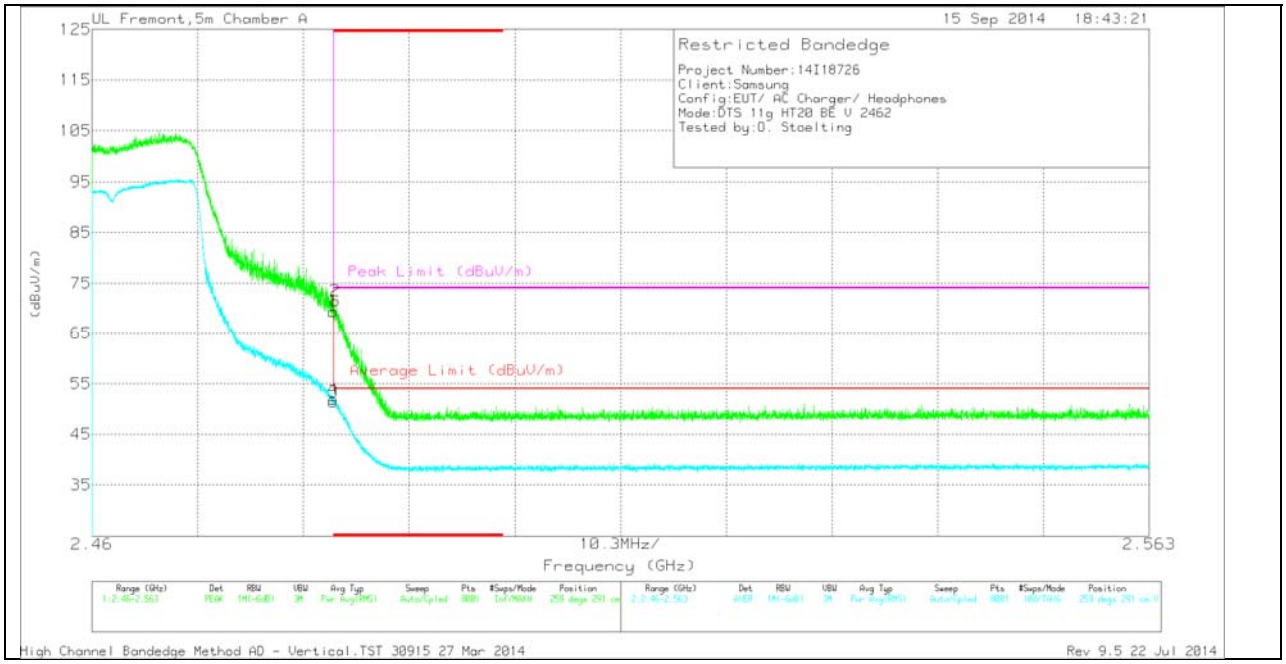
HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	57.47	PK	32.7	-24.2	0	65.97	-	-	74	-8.03	300	299	H
2	* 2.484	60.2	PK	32.7	-24.2	0	68.7	-	-	74	-5.3	300	299	H
3	* 2.484	40.94	RMS	32.7	-24.2	.29	49.73	54	-4.27	-	-	300	299	H
4	* 2.484	41.29	RMS	32.7	-24.2	.29	50.08	54	-3.92	-	-	300	299	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

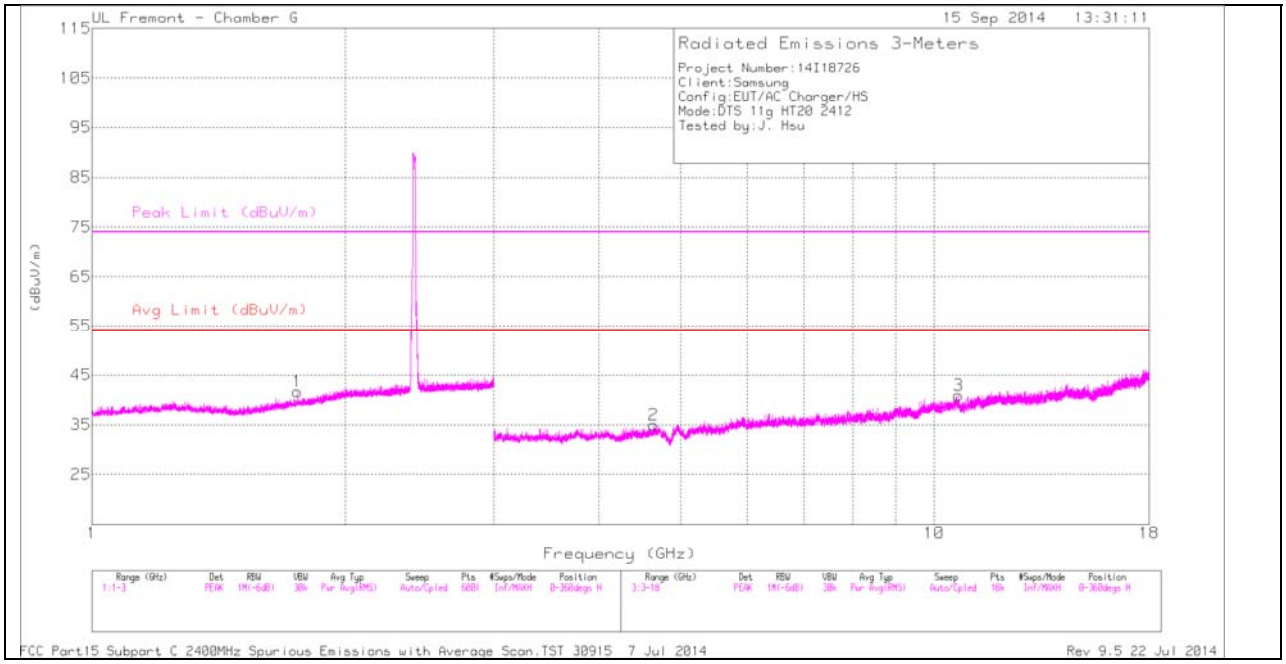
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	60.97	PK	32.7	-24.2	0	69.47	-	-	74	-4.53	259	291	V
2	* 2.484	63.01	PK	32.7	-24.2	0	71.51	-	-	74	-2.49	259	291	V
3	* 2.484	42.64	RMS	32.7	-24.2	.29	51.43	54	-2.57	-	-	259	291	V
4	* 2.484	43.16	RMS	32.7	-24.2	.29	51.95	54	-2.05	-	-	259	291	V

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL

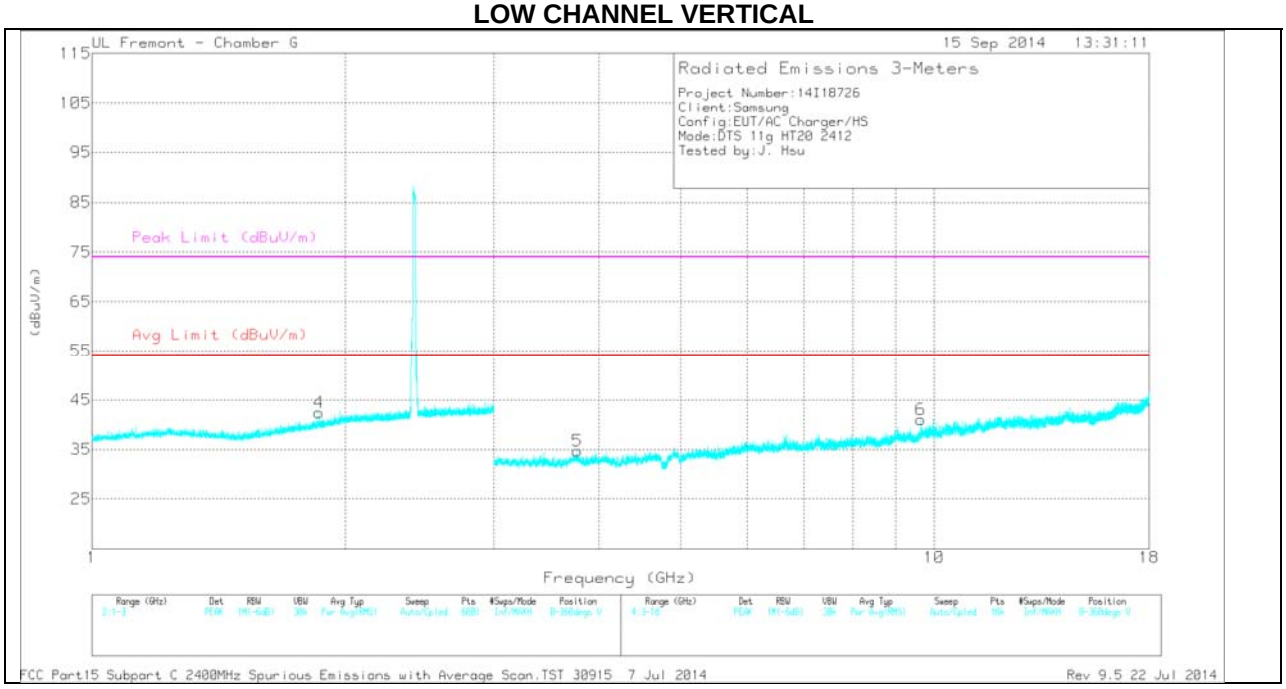


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

LOW CHANNEL 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 4.64	34.01	PK	33.9	-33	0	34.91	-	-	74	-39.09	0-360	101	H
3	* 10.68	29.92	PK	37.7	-26.7	0	40.92	-	-	74	-33.08	0-360	101	H
5	* 3.771	34.38	PK	32.9	-32.6	0	34.68	-	-	74	-39.32	0-360	201	V
1	1.755	37.47	PK	29.6	-25.4	0	41.67	-	-	-	-	0-360	201	H
4	1.861	37.47	PK	30.4	-25.5	0	42.37	-	-	-	-	0-360	101	V
6	9.648	32.03	PK	36.9	-27.9	0	41.03	-	-	-	-	0-360	101	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.648	31.58	MAv1	36.9	-27.9	.29	40.87	-	-	-	-	10	265	V
9.649	39.87	PK2	36.9	-27.9	0	48.87	-	-	-	-	10	265	V

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

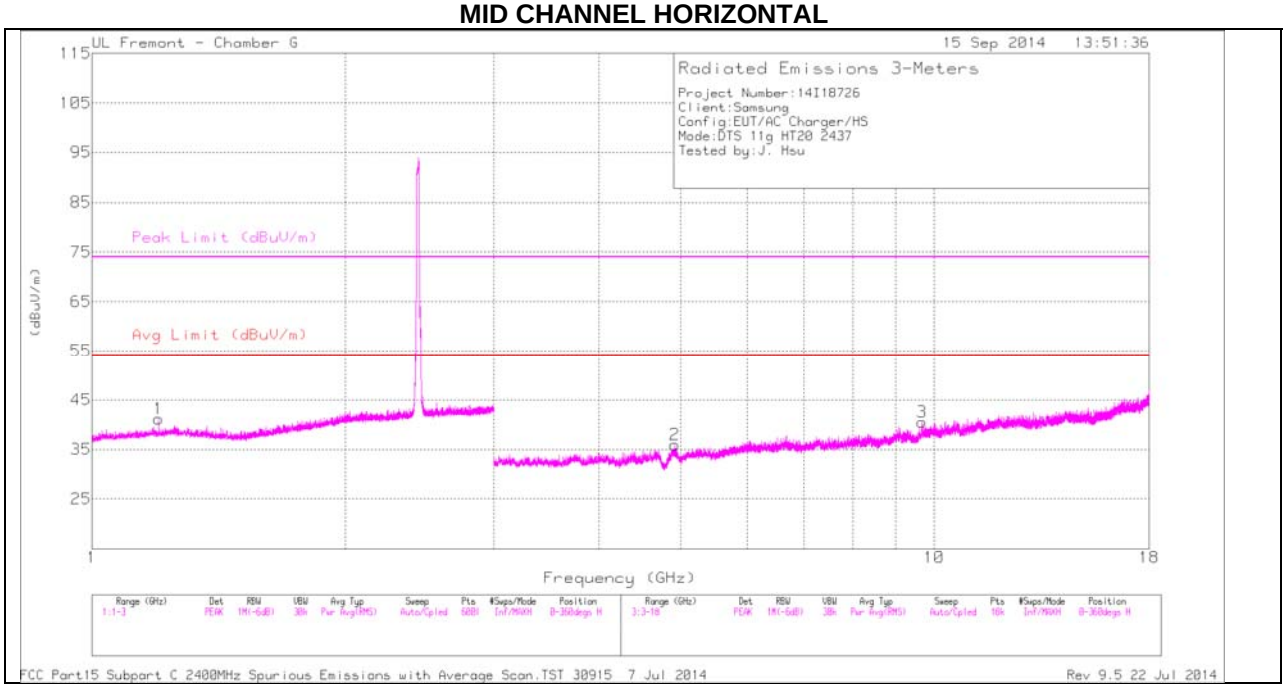
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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

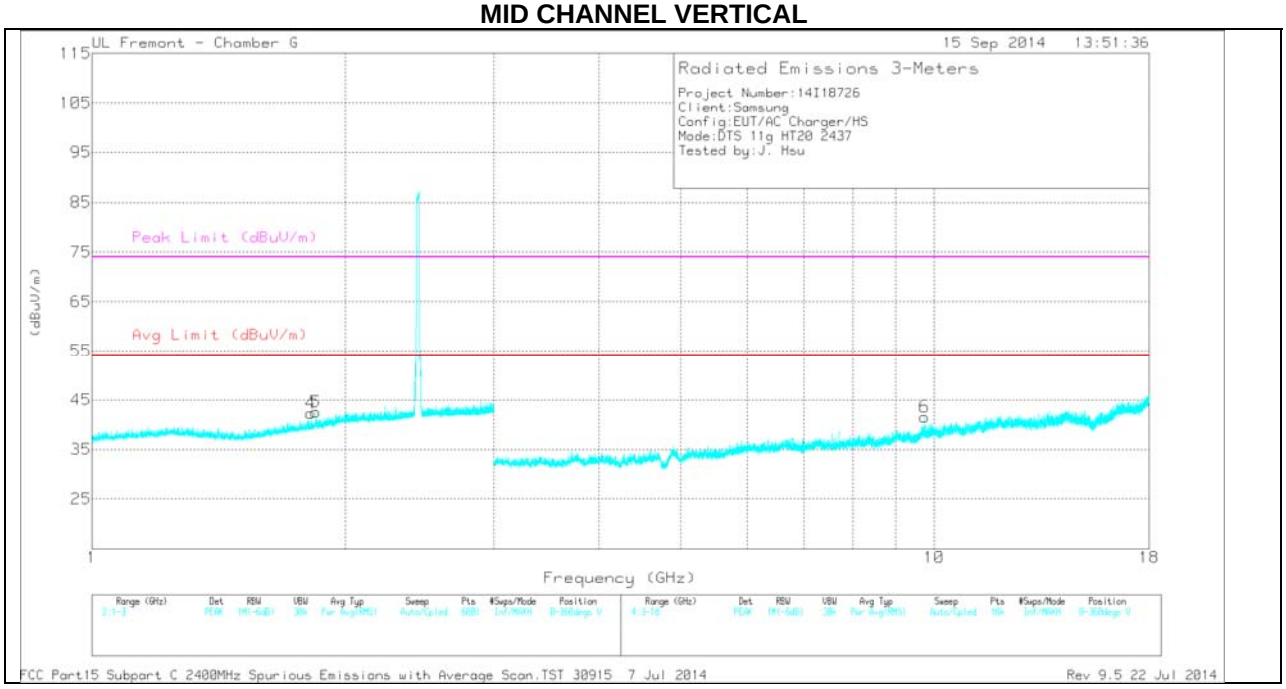


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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 DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.2	38.15	PK	29	-26	0	41.15	-	-	74	-32.85	0-360	201	H
2	* 4.924	34.98	PK	34.1	-33.1	0	35.98	-	-	74	-38.02	0-360	101	H
4	1.82	37.6	PK	30.1	-25.4	0	42.3	-	-	-	-	0-360	101	V
5	1.845	37.75	PK	30.2	-25.4	0	42.55	-	-	-	-	0-360	201	V
3	9.669	31.17	PK	36.9	-27.5	0	40.57	-	-	-	-	0-360	201	H
6	9.748	32.4	PK	37	-27.8	0	41.6	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.199	44.58	PK2	29	-26	0	47.58	-	-	74	-26.42	202	382	H
* 1.201	32.2	MAv1	29	-26	.29	35.49	54	-18.51	-	-	202	382	H
9.748	39.03	PK2	37	-27.8	0	48.23	-	-	-	-	196	231	V
9.748	30.08	MAv1	37	-27.8	.29	39.57	-	-	-	-	196	231	V

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

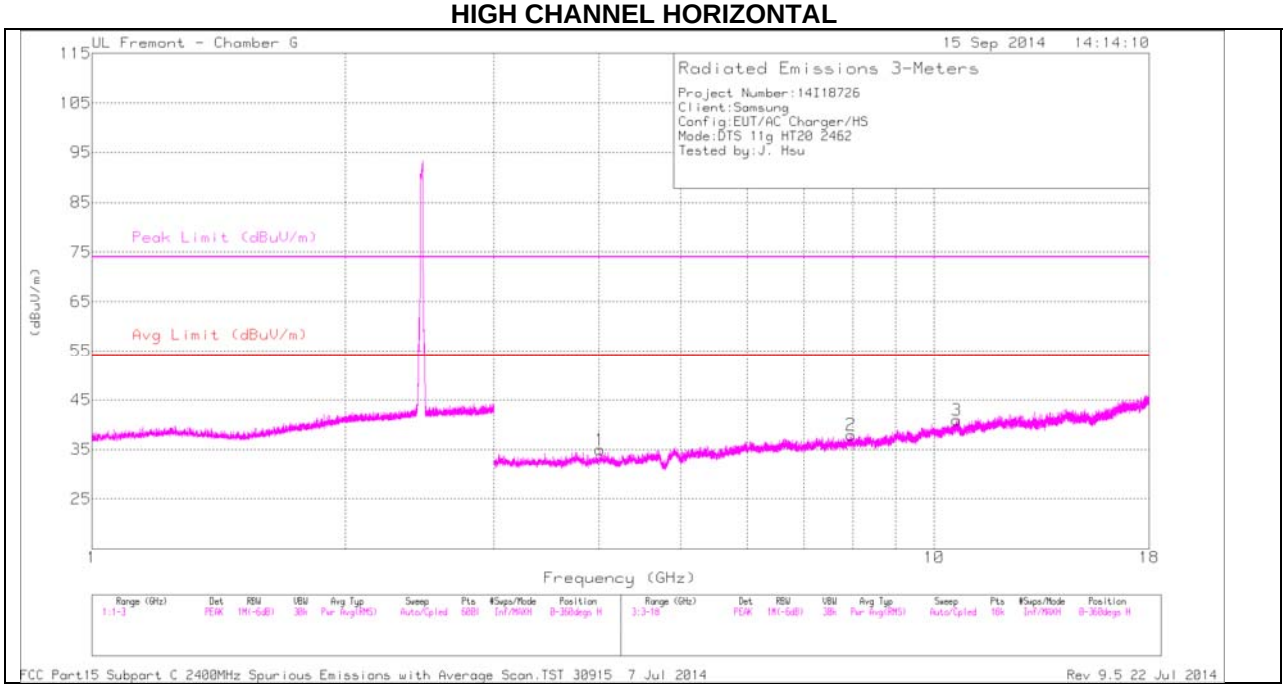
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HIGH CHANNEL HORIZONTAL

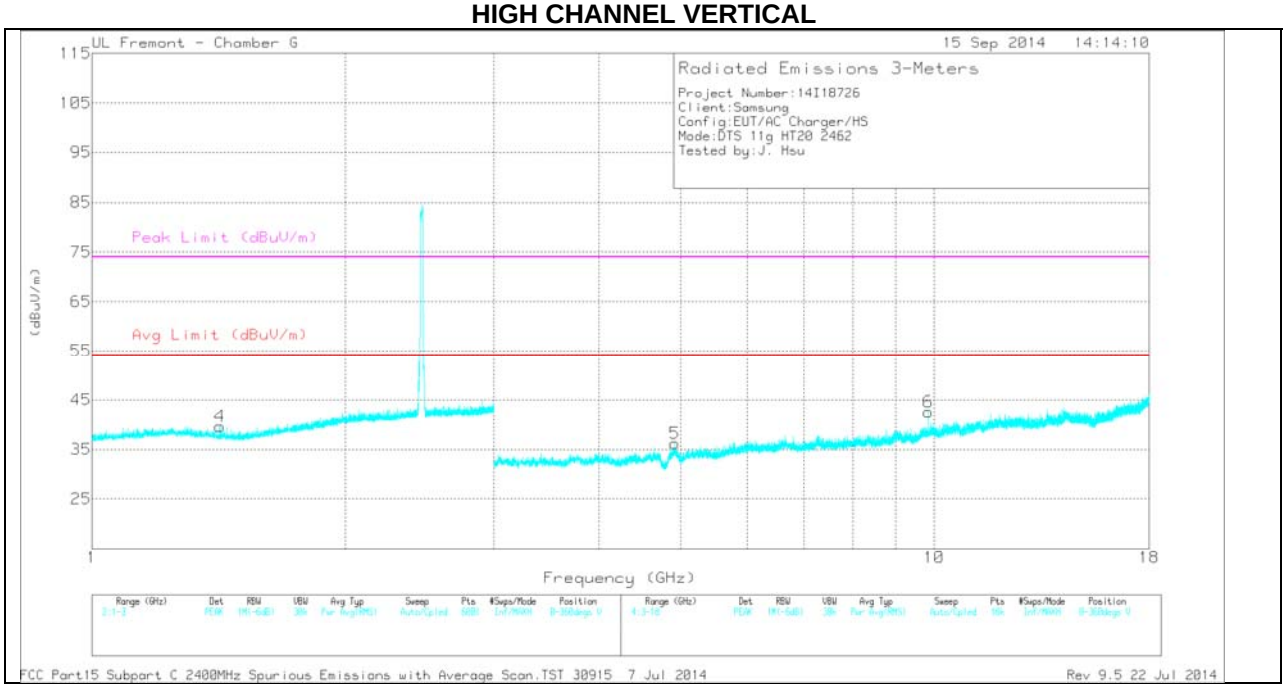


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HIGH CHANNEL 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 1.419	37.05	PK	28.3	-25.7	0	39.65	-	-	74	-34.35	0-360	101	V
1	* 4.009	34.26	PK	33.4	-32.7	0	34.96	-	-	74	-39.04	0-360	201	H
3	* 10.639	29.32	PK	37.7	-26.1	0	40.92	-	-	74	-33.08	0-360	100	H
5	* 4.925	35.25	PK	34.1	-33.1	0	36.25	-	-	74	-37.75	0-360	201	V
2	7.971	33.02	PK	35.8	-30.9	0	37.92	-	-	-	-	0-360	201	H
6	9.848	34.19	PK	37.2	-28.8	0	42.59	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.848	40.18	PK2	37.2	-28.8	0	48.58	-	-	-	-	126	207	V
9.848	31.22	MAv1	37.2	-28.8	.29	39.91	-	-	-	-	126	207	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

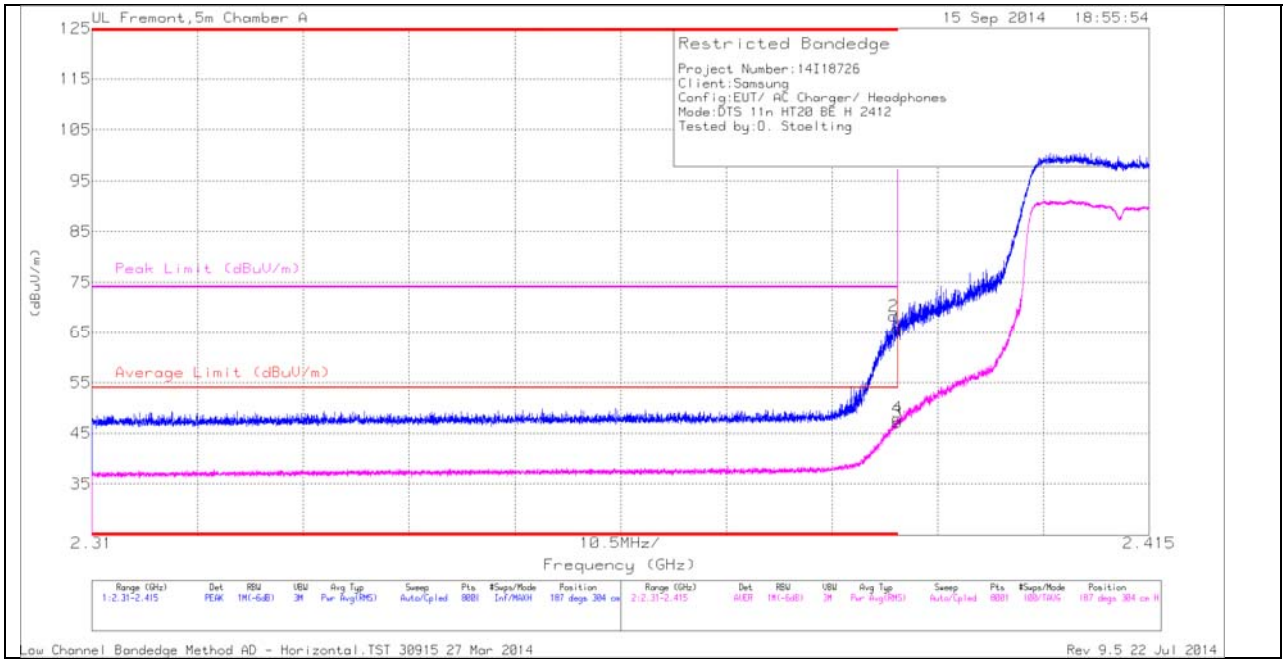
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

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

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



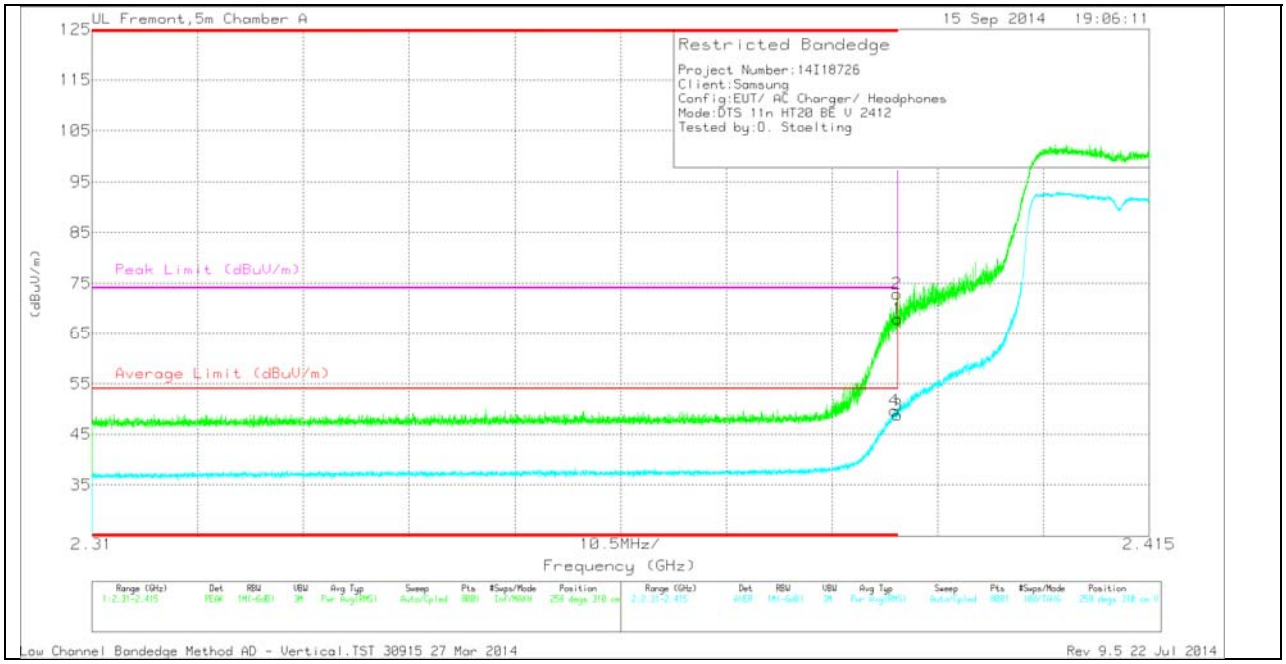
HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	57.66	PK	32.2	-24.1	0	65.76	-	-	74	-8.24	187	304	H
2	* 2.39	60.24	PK	32.2	-24.1	0	68.34	-	-	74	-5.66	187	304	H
3	* 2.39	38.72	RMS	32.2	-24.1	.34	47.16	54	-6.84	-	-	187	304	H
4	* 2.39	39.55	RMS	32.2	-24.1	.34	47.99	54	-6.01	-	-	187	304	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

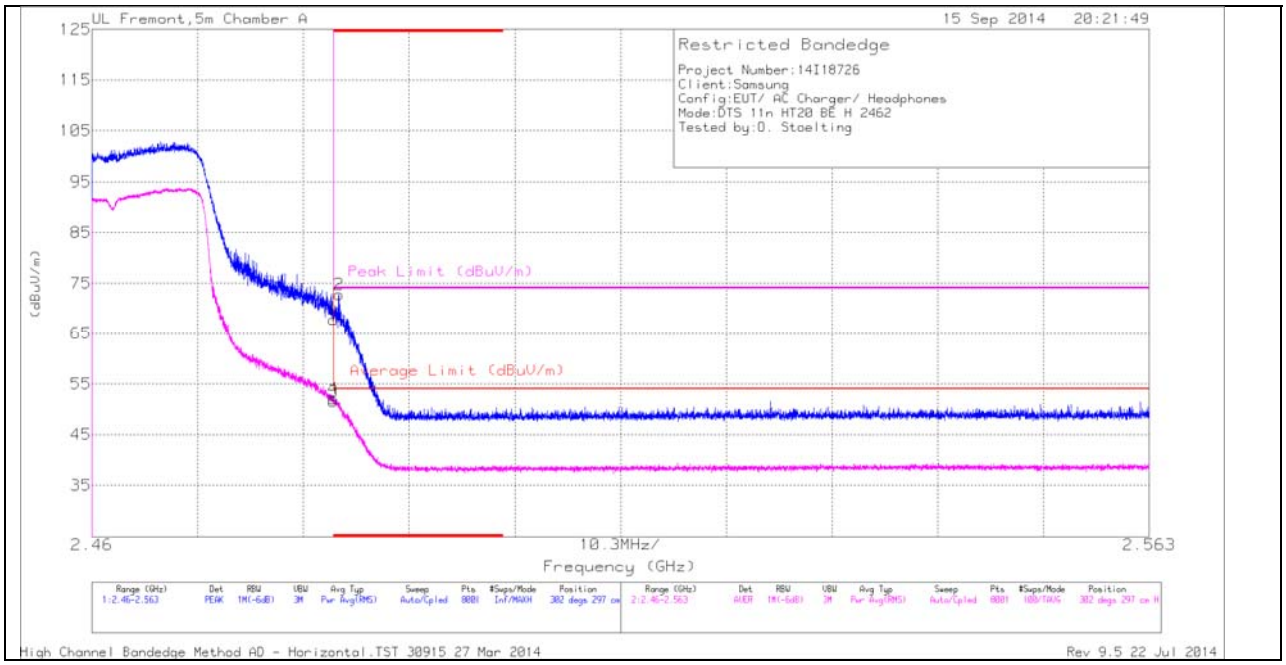
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	59.79	PK	32.2	-24.1	0	67.89	-	-	74	-6.11	258	310	V
2	* 2.39	64.8	PK	32.2	-24.1	0	72.9	-	-	74	-1.1	258	310	V
3	* 2.39	40.32	RMS	32.2	-24.1	.34	48.76	54	-5.24	-	-	258	310	V
4	* 2.39	41.25	RMS	32.2	-24.1	.34	49.69	54	-4.31	-	-	258	310	V

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



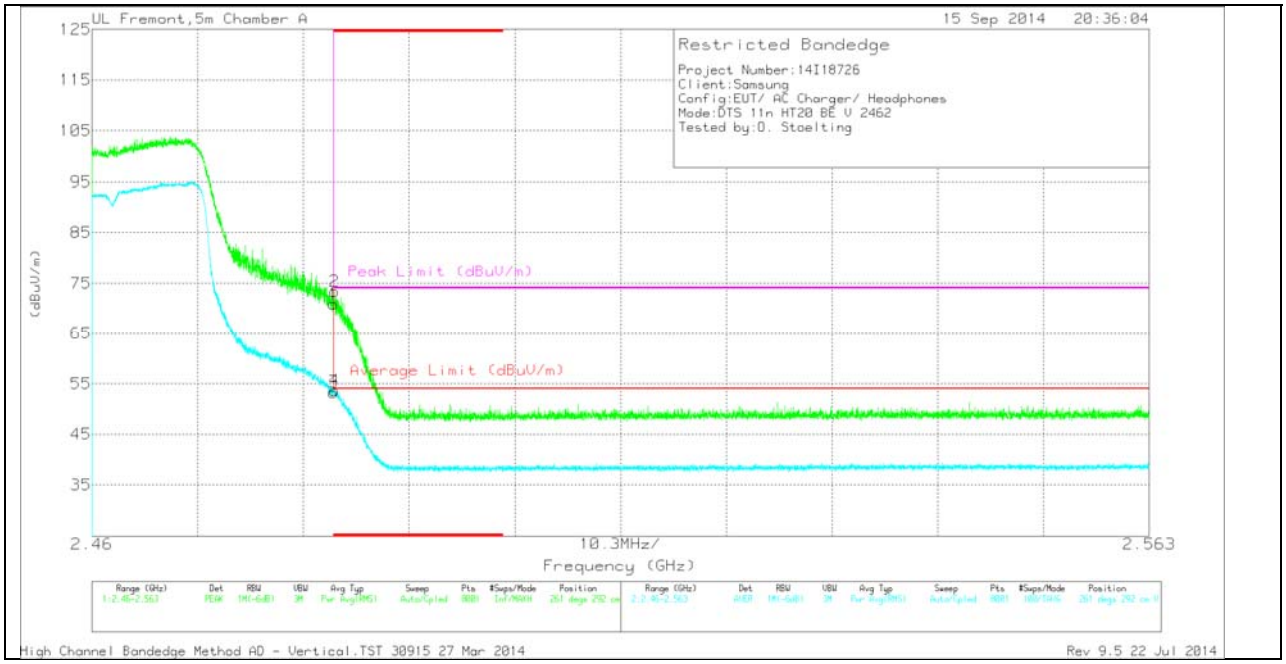
HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (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	59.28	PK	32.7	-24.2	0	67.78	-	-	74	-6.22	302	297	H
2	* 2.484	64.13	PK	32.7	-24.1	0	72.73	-	-	74	-1.27	302	297	H
3	* 2.484	42.64	RMS	32.7	-24.2	.34	51.48	54	-2.52	-	-	302	297	H
4	* 2.484	43.23	RMS	32.7	-24.2	.34	52.07	54	-1.93	-	-	302	297	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

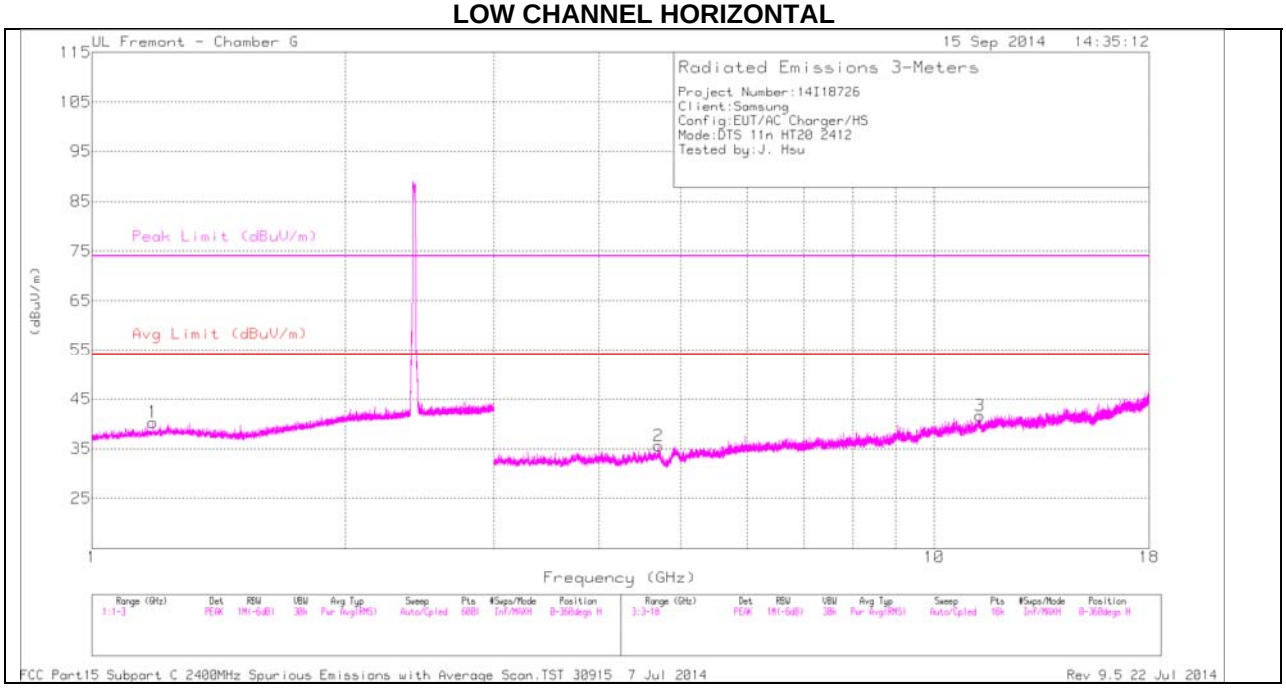
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	62.35	PK	32.7	-24.2	0	70.85	-	-	74	-3.15	261	292	V
2	* 2.484	64.84	PK	32.7	-24.2	0	73.34	-	-	74	-.66	261	292	V
3	* 2.484	44.49	RMS	32.7	-24.2	.34	53.33	54	-.67	-	-	261	292	V
4	* 2.484	44.85	RMS	32.7	-24.2	.34	53.69	54	-.31	-	-	261	292	V

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL

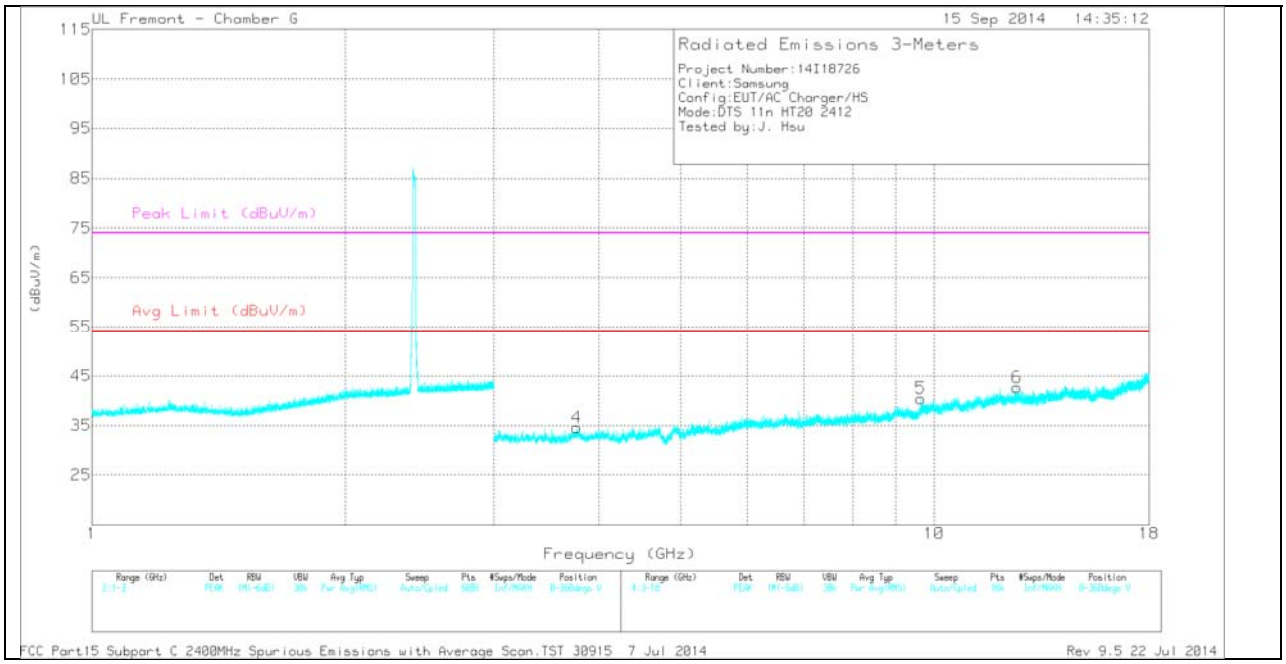


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

LOW CHANNEL 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.182	37.43	PK	28.9	-26	0	40.33	-	-	74	-33.67	0-360	101	H
2	* 4.703	34.58	PK	34	-33	0	35.58	-	-	74	-38.42	0-360	201	H
3	* 11.323	29.63	PK	38.1	-26.1	0	41.63	-	-	74	-32.37	0-360	201	H
4	* 3.762	33.85	PK	32.9	-32.2	0	34.55	-	-	74	-39.45	0-360	201	V
6	* 12.535	30.51	PK	39	-26.8	0	42.71	-	-	74	-31.29	0-360	101	V
5	9.647	31.56	PK	36.9	-28	0	40.46	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.648	39.13	PK2	36.9	-28	0	48.03	-	-	-	-	2	101	V
9.648	29.86	MAv1	36.9	-27.9	.34	39.2	-	-	-	-	2	101	V

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

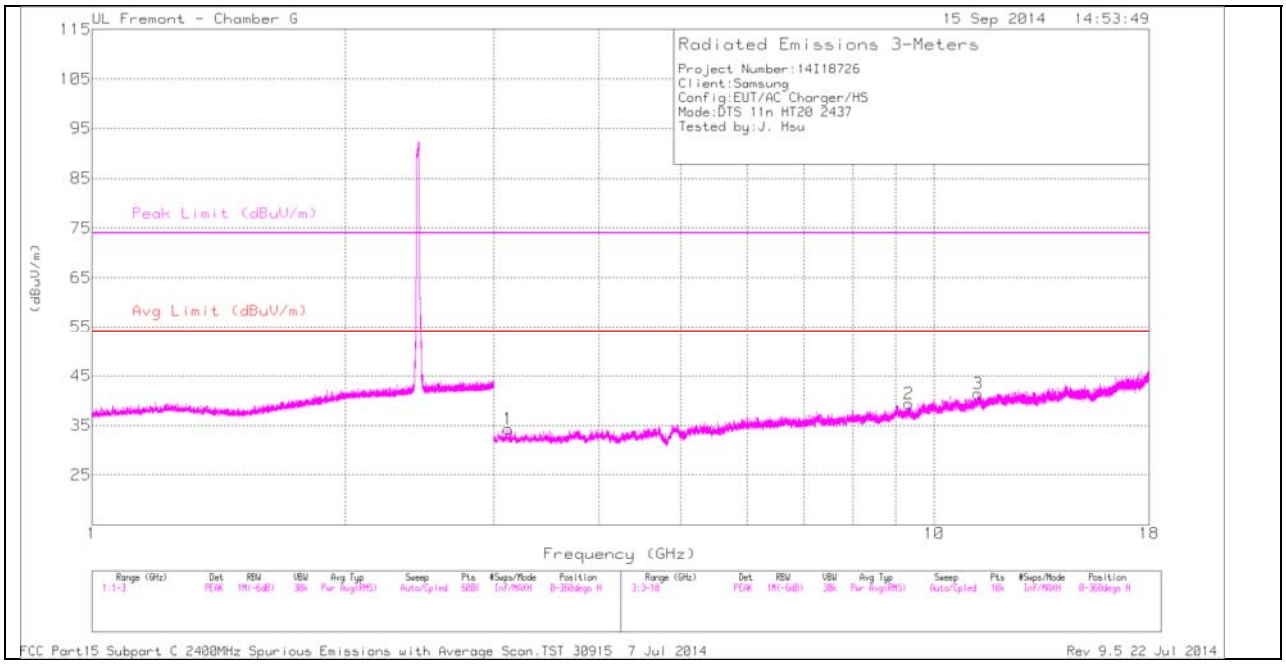
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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

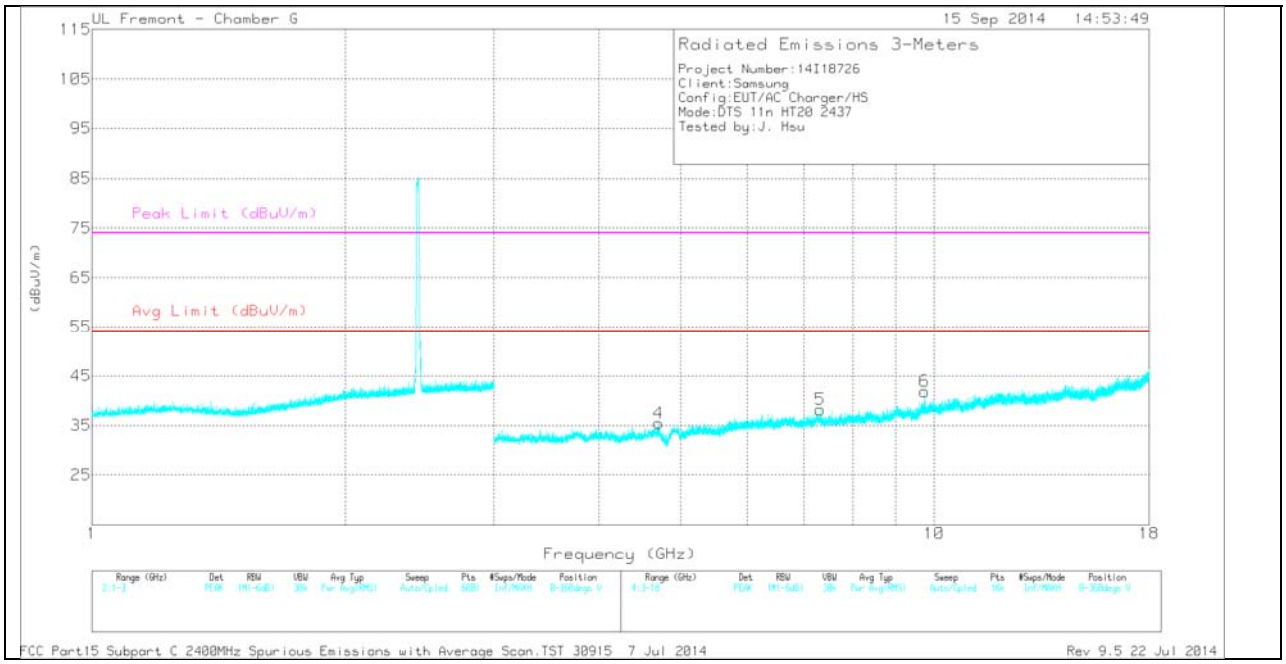


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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 DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 9.33	31.63	PK	36.6	-28.9	0	39.33	-	-	74	-34.67	0-360	101	H
3	* 11.265	29.16	PK	38	-25.8	0	41.36	-	-	74	-32.64	0-360	101	H
4	* 4.709	34.49	PK	34	-33	0	35.49	-	-	74	-38.51	0-360	101	V
5	* 7.326	33.78	PK	35.6	-31.2	0	38.18	-	-	74	-35.82	0-360	201	V
1	3.119	34.96	PK	32.7	-33.4	0	34.26	-	-	-	-	0-360	101	H
6	9.748	32.66	PK	37	-27.8	0	41.86	-	-	-	-	0-360	201	V

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
9.748	39.52	PK2	37	-27.8	0	48.72	-	-	-	-	199	196	V
9.748	31.41	MAv1	37	-27.8	.34	40.95	-	-	-	-	199	196	V

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

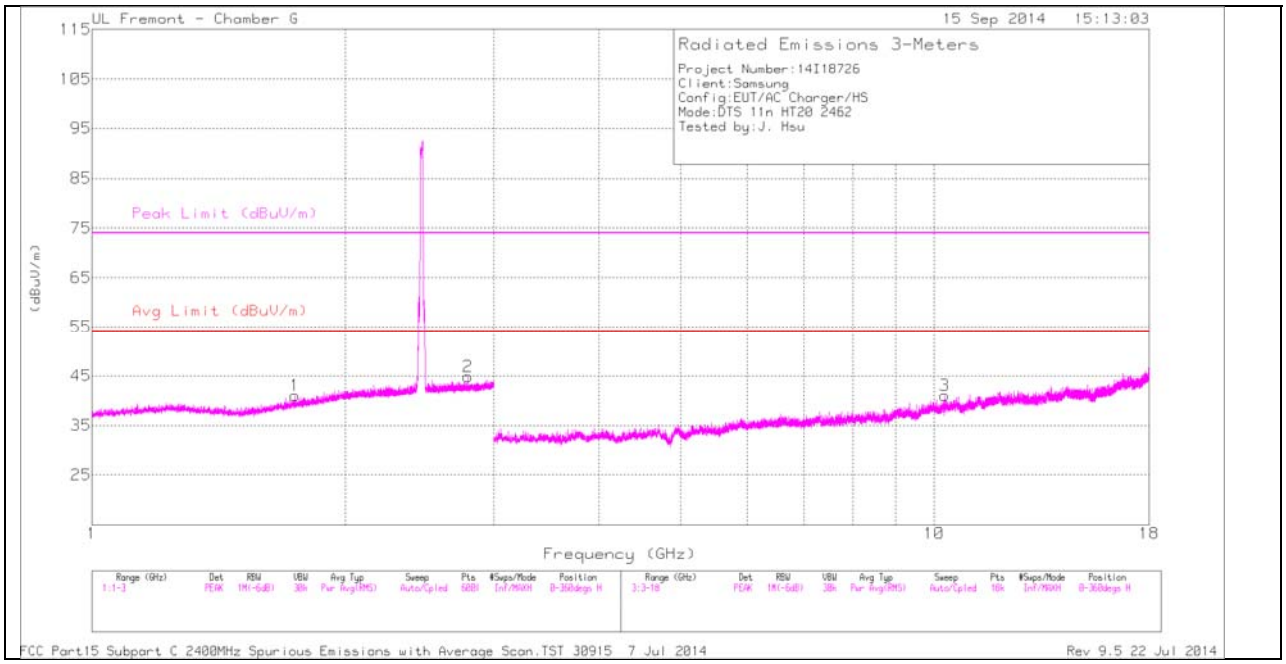
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HIGH CHANNEL HORIZONTAL

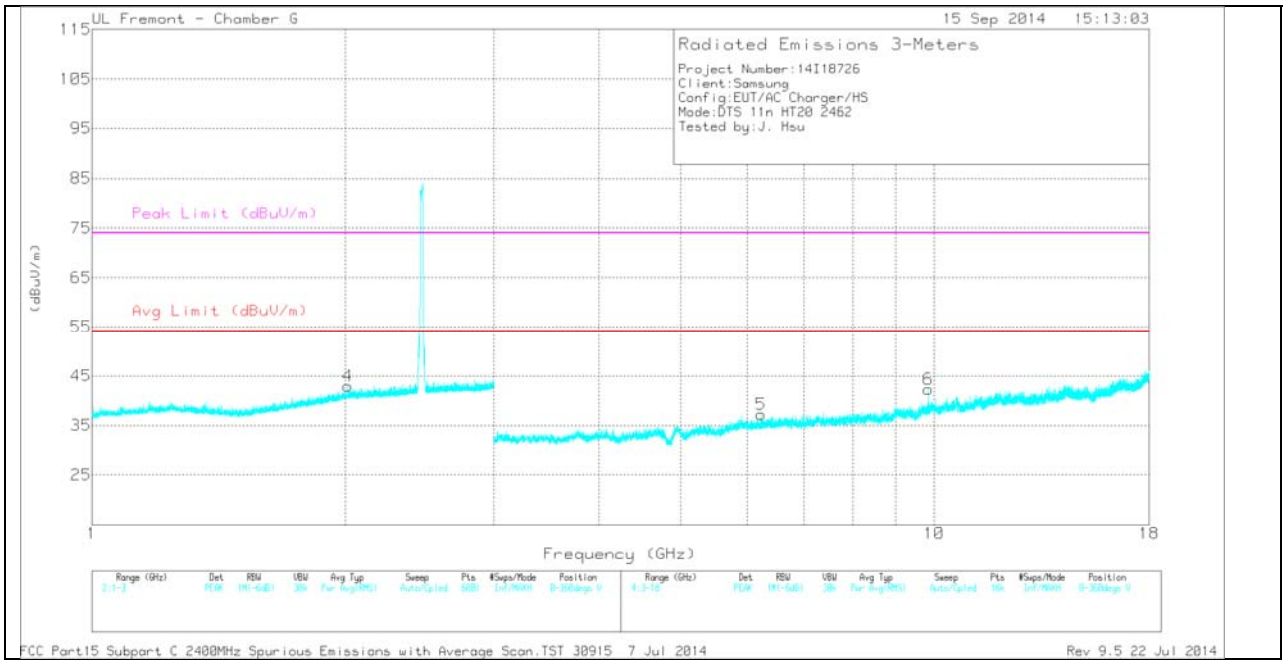


Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HIGH CHANNEL 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.

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

HIGH CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.796	37.51	PK	32.2	-24.9	0	44.81	-	-	74	-29.19	0-360	101	H
1	1.743	36.79	PK	29.6	-25.4	0	40.99	-	-	-	-	0-360	101	H
4	2.014	36.93	PK	31.3	-25.3	0	42.93	-	-	-	-	0-360	201	V
5	6.228	33.84	PK	35.7	-32.3	0	37.24	-	-	-	-	0-360	201	V
6	9.848	33.91	PK	37.2	-28.8	0	42.31	-	-	-	-	0-360	101	V
3	10.293	30.6	PK	37.5	-27.1	0	41	-	-	-	-	0-360	101	H

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

PK - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T862 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.796	43.31	PK2	32.2	-24.9	0	50.61	-	-	74	-23.39	94	250	H
* 2.796	31.65	MAv1	32.2	-24.9	.34	39.29	54	-14.71	-	-	94	250	H
9.848	40.23	PK2	37.2	-28.8	0	48.63	-	-	-	-	360	298	V
9.848	32.15	MAv1	37.2	-28.8	.34	40.89	-	-	-	-	360	298	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

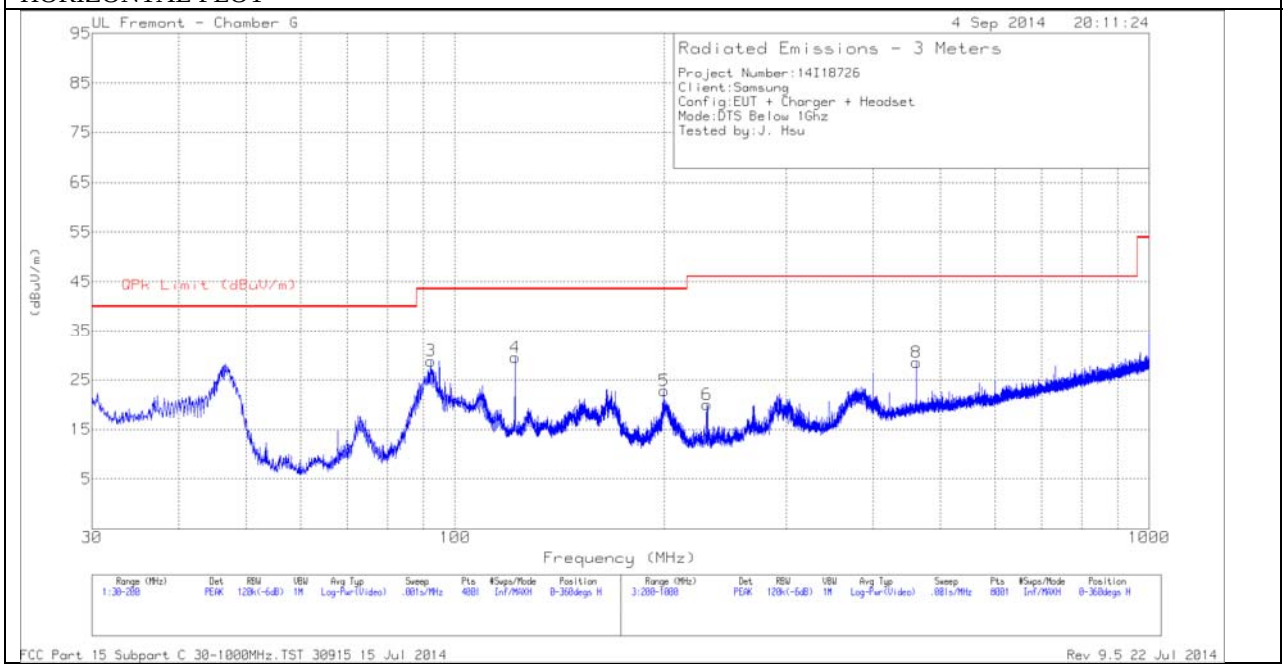
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

9.2. WORST-CASE BELOW 1 GHz

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

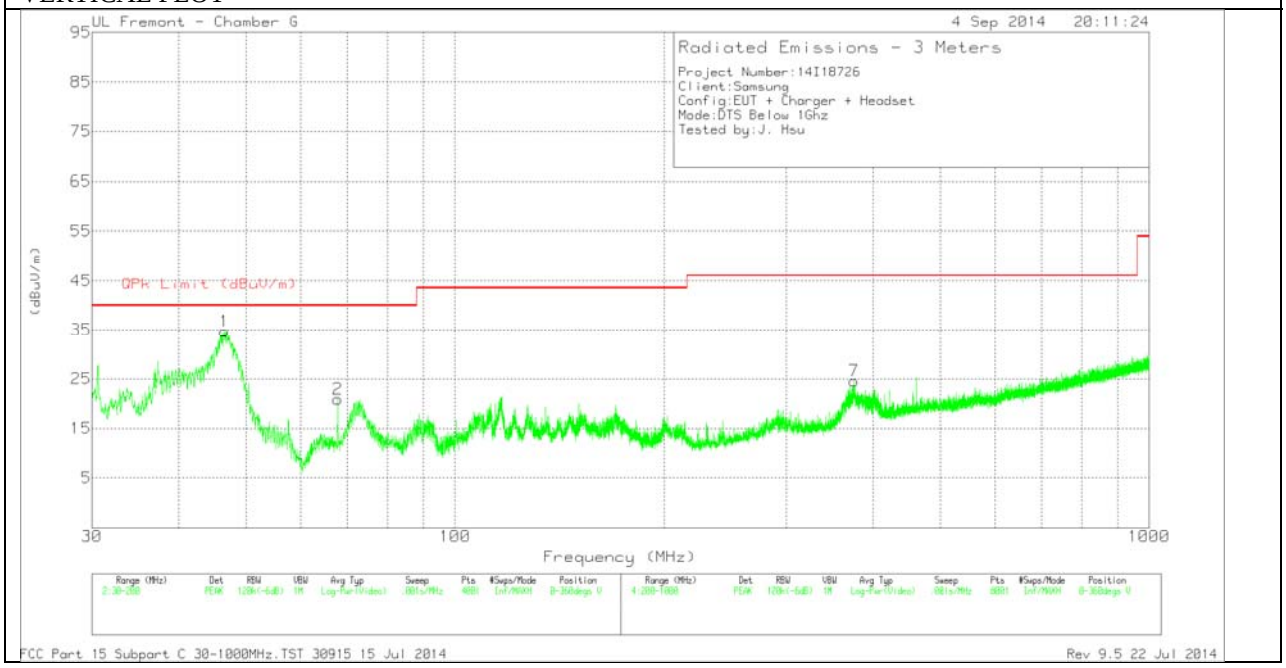
HORIZONTAL PLOT



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

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

VERTICAL PLOT



UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

Below 1G Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Hybrid	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 122.055	42.82	PK	16.6	-29.9	29.52	43.52	-14	0-360	301	H
1	46.575	52.85	PK	12.6	-30.7	34.75	40	-5.25	0-360	100	V
2	67.7825	40.15	PK	11.2	-30.4	20.95	40	-19.05	0-360	100	V
3	92.2625	47.94	PK	11.1	-30.2	28.84	43.52	-14.68	0-360	301	H
5	200	36.4	PK	15.6	-29.2	22.8	43.52	-20.72	0-360	201	H
6	230.9	35.04	PK	14	-29	20.04	46.02	-25.98	0-360	100	H
7	375.6	34.85	PK	17.8	-28.1	24.55	46.02	-21.47	0-360	100	V
8	461.9	36.17	PK	20.1	-27.7	28.57	46.02	-17.45	0-360	201	H

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

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 2009.

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.

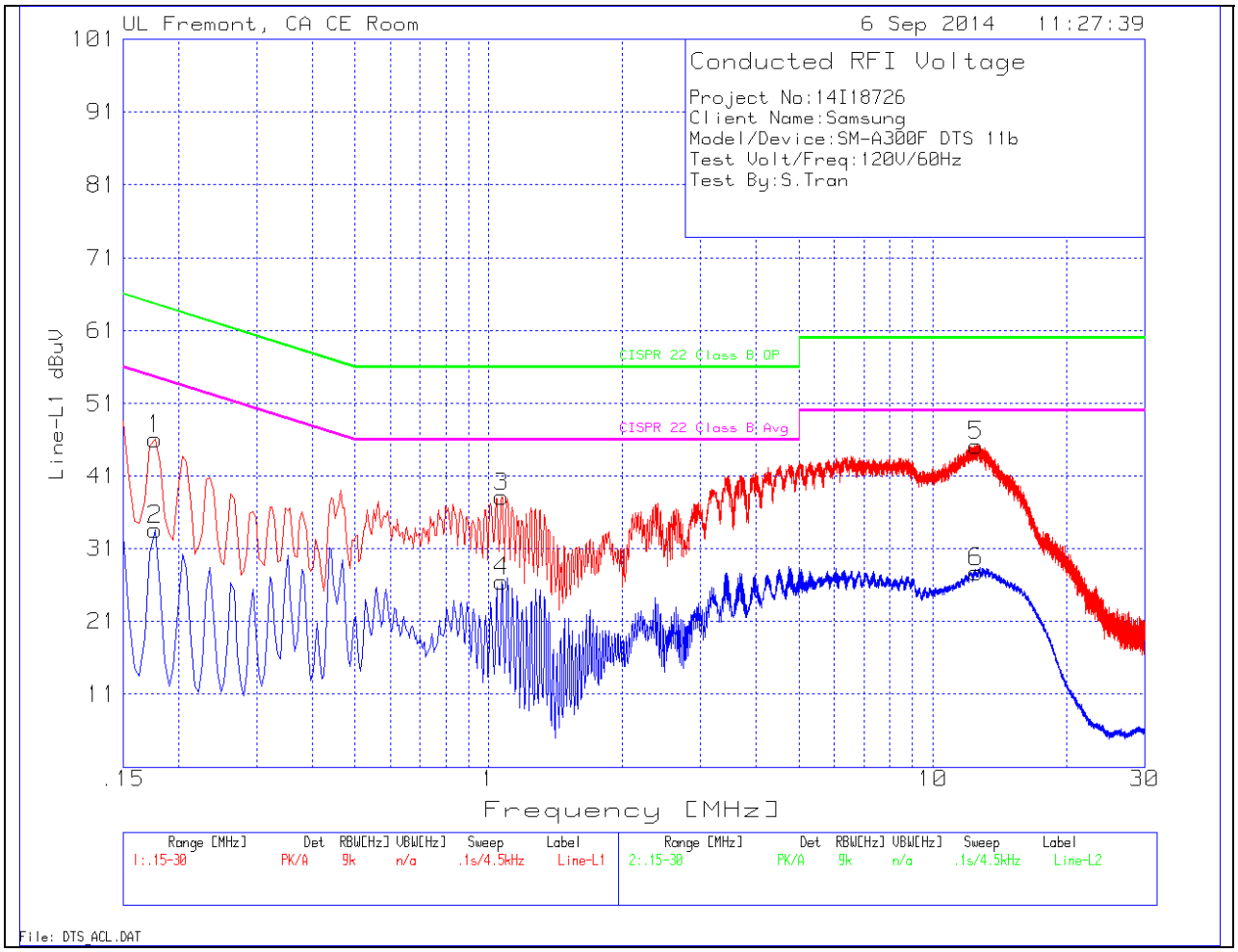
UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

Trace Markers

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

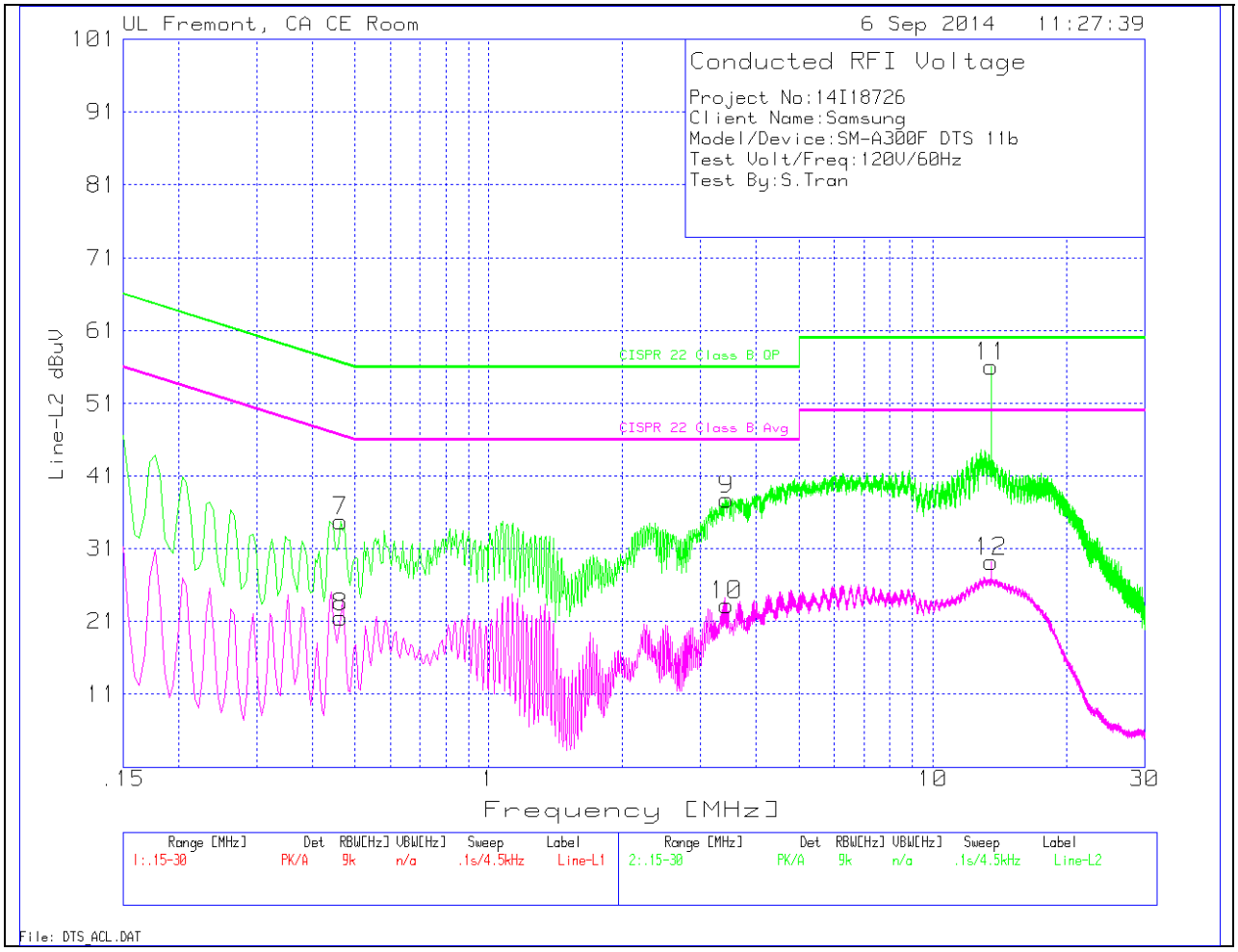
This report shall not be reproduced except in full, without the written approval of UL Verification Services Inc.

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.177	44.99	PK	1.1	0	46.09	64.6	-18.51	-	-
2	.177	32.41	Av	1.1	0	33.51	-	-	54.6	-21.09
3	1.068	37.93	PK	.2	0	38.13	56	-17.87	-	-
4	1.068	26.2	Av	.2	0	26.4	-	-	46	-19.6
5	12.498	44.83	PK	.2	.2	45.23	60	-14.77	-	-
6	12.498	27.34	Av	.2	.2	27.74	-	-	50	-22.26

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701D
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.

LINE 2 PLOT



UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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

LINE 2 RESULTS

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
7	.465	34.37	PK	.4	0	34.77	56.6	-21.83	-	-
8	.465	21.12	Av	.4	0	21.52	-	-	46.6	-25.08
9	3.4395	37.41	PK	.2	.1	37.71	56	-18.29	-	-
10	3.4395	22.86	Av	.2	.1	23.16	-	-	46	-22.84
11	13.5555	55.55	PK	.3	.2	56.05	60	-3.95	-	-
12	13.5555	28.68	Av	.3	.2	29.18	-	-	50	-20.82

UL VERIFICATION SERVICES INC.
47173 BENICIA STREET, FREMONT, CA 94538, USA
TEL: (510) 771-1000
FORM NO: CCSUP4701D
FAX: (510) 661-0888

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