



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

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

MODEL NUMBER: SM-G3589W

FCC ID: A3LSMG3589W

REPORT NUMBER: 14U17686-4

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth, WLAN 2.4GHz b/g/n,
ANT+ and NFC

MODEL: SM-G3589W

SERIAL NUMBER: FL-161-A, FL-161-B, FL-161-C (Radiated), FL-161-D (Conducted)

DATE TESTED: MAY 9 - 21, 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.

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2. 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.

3. 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

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>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

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

5.2. 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	19.04	80.17
2412 - 2462	802.11g	22.52	178.65
2412 - 2462	802.11n HT20	21.75	149.62

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.

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

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

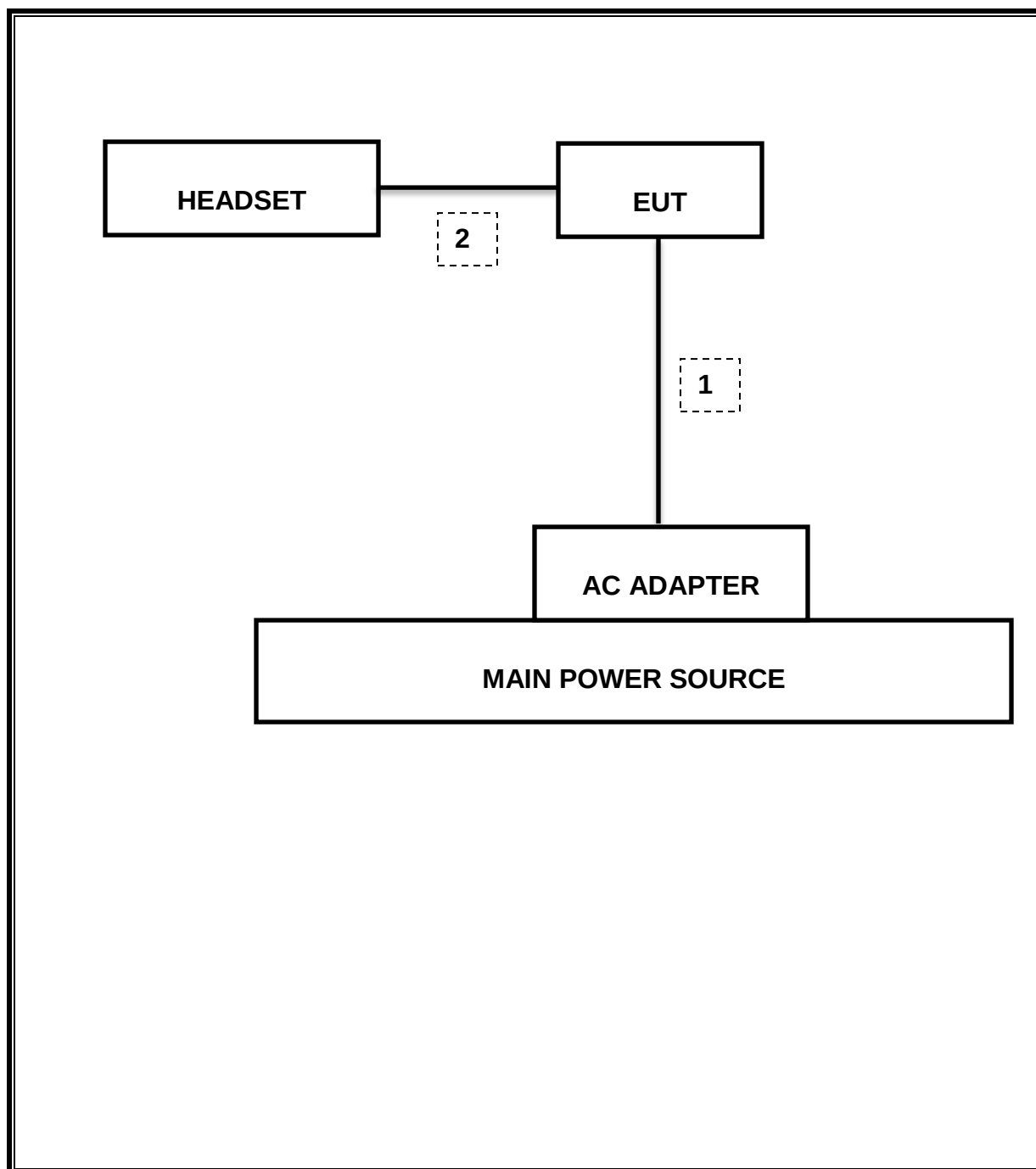
Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	SAMSUNG	ETA-U90CBC	N/A	N/A
Earphone	SAMSUNG	N/A	N/A	N/A

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.

SETUP DIAGRAM FOR TESTS

6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	Manufacturer	Model	Asset	Cal 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	1000741	08/13/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/18/14
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	06/28/14
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/15
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/14
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/14
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	F00351	06/27/14
AC Power Supply, 2,500VA 45-500Hz	Elgar-Ametek	CW2501M	F00013	CNR
RF Preamplifier, 1GHz - 40GHz	Miteq	NSP4000-SP2	C00990	08/20/14
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	F00219	05/23/14
High Pass Filter 5GHz	Micro-Tronics	HPS17542	F00222	05/22/14
High Pass Filter 6GHz	Micro-Tronics	HPM17543	F00224	05/22/14

7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r01:Measurement Procedure PK2 is used for power and PKPSD 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.

8. SUMMARY TABLE

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	7.98MHz
2.1051, 15.247 (d)	RSS-210 A8.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-19.61dBm
15.247	RSS-210 A8.4	TX conducted output power	<30dBm		Pass	22.52dBm
15.247	RSS-210 A8.2	PSD	<8dBm		Pass	-4.96dBm
15.207 (a)	RSS-GEN 7.2.2	AC Power Line conducted emissions	Section 10	Radiated	Pass	50.05dBuV
15.205, 15.209	RSS-210 Clause 2.6, RSS-210 Clause 6	Radiated Spurious Emission	< 54dBuV/m		Pass	48.12dBuV/m

9. ANTENNA PORT TEST RESULTS

9.1. 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 v03r01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100 kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

RESULTS

9.1.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	7.98	0.5
Mid	2437	8.03	0.5
High	2462	8.00	0.5
Worst		7.98	

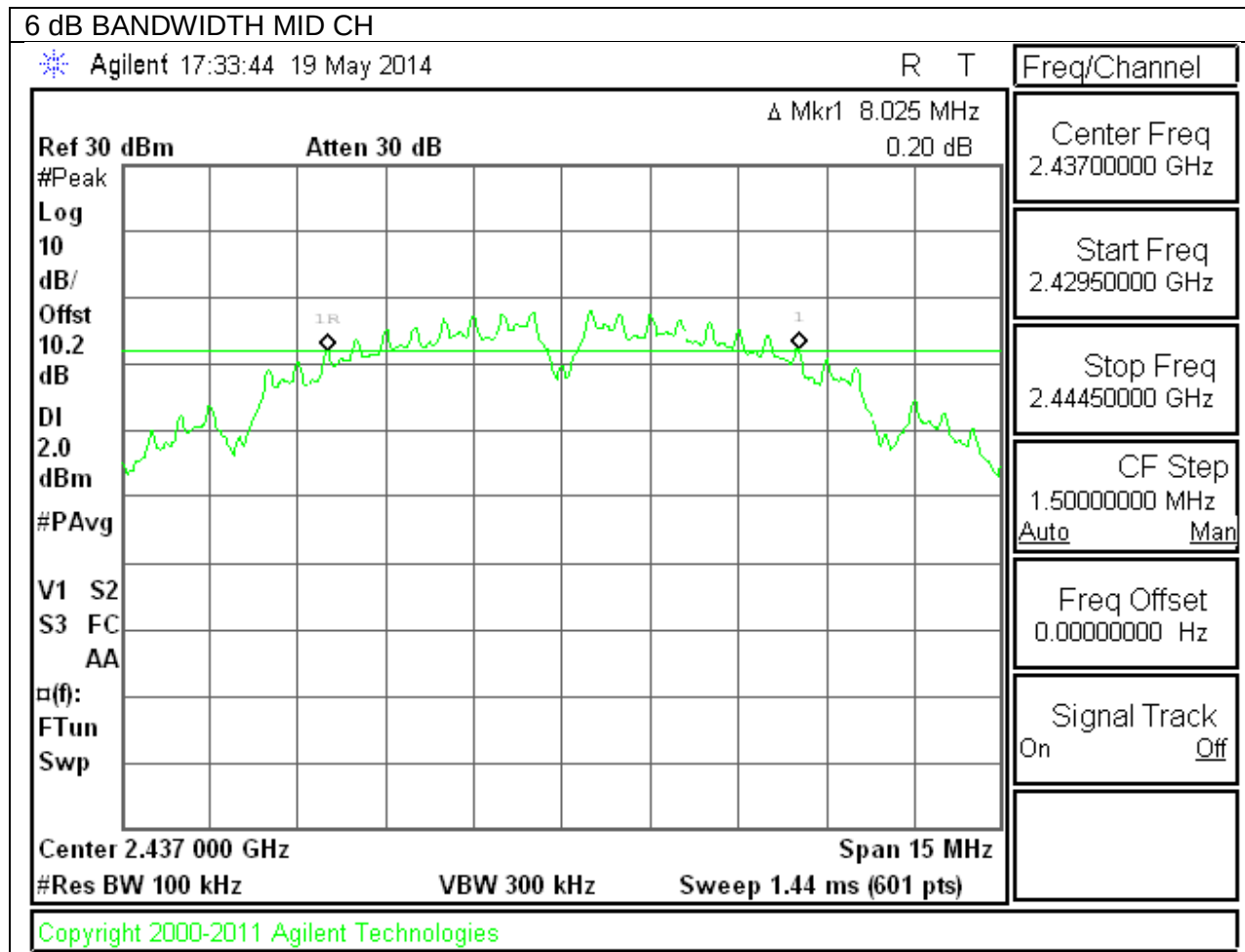
9.1.2. 802.11g MODE IN THE 2.4 GHz BAND

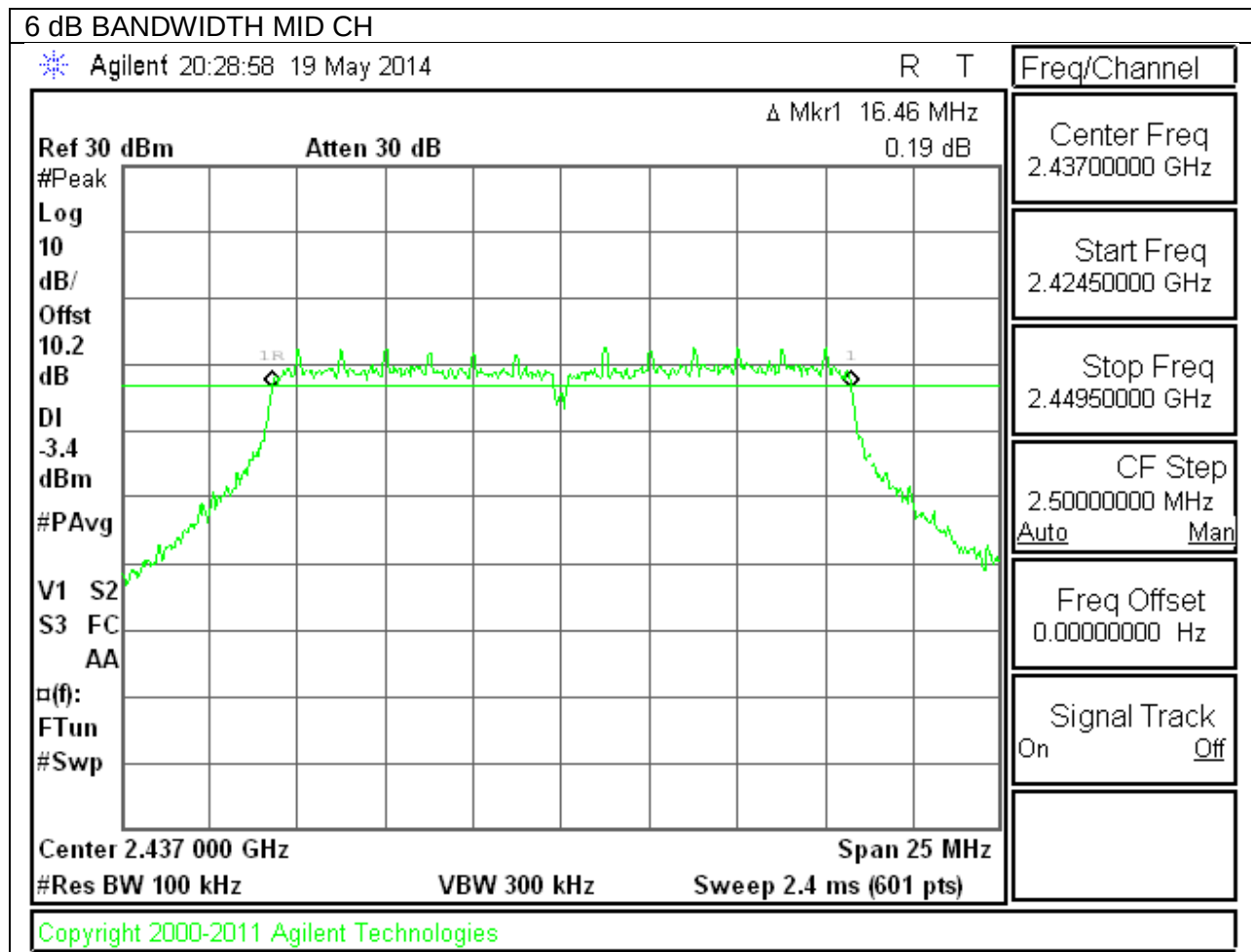
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.46	0.5
Mid	2437	16.46	0.5
High	2462	16.50	0.5
Worst		16.46	

9.1.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

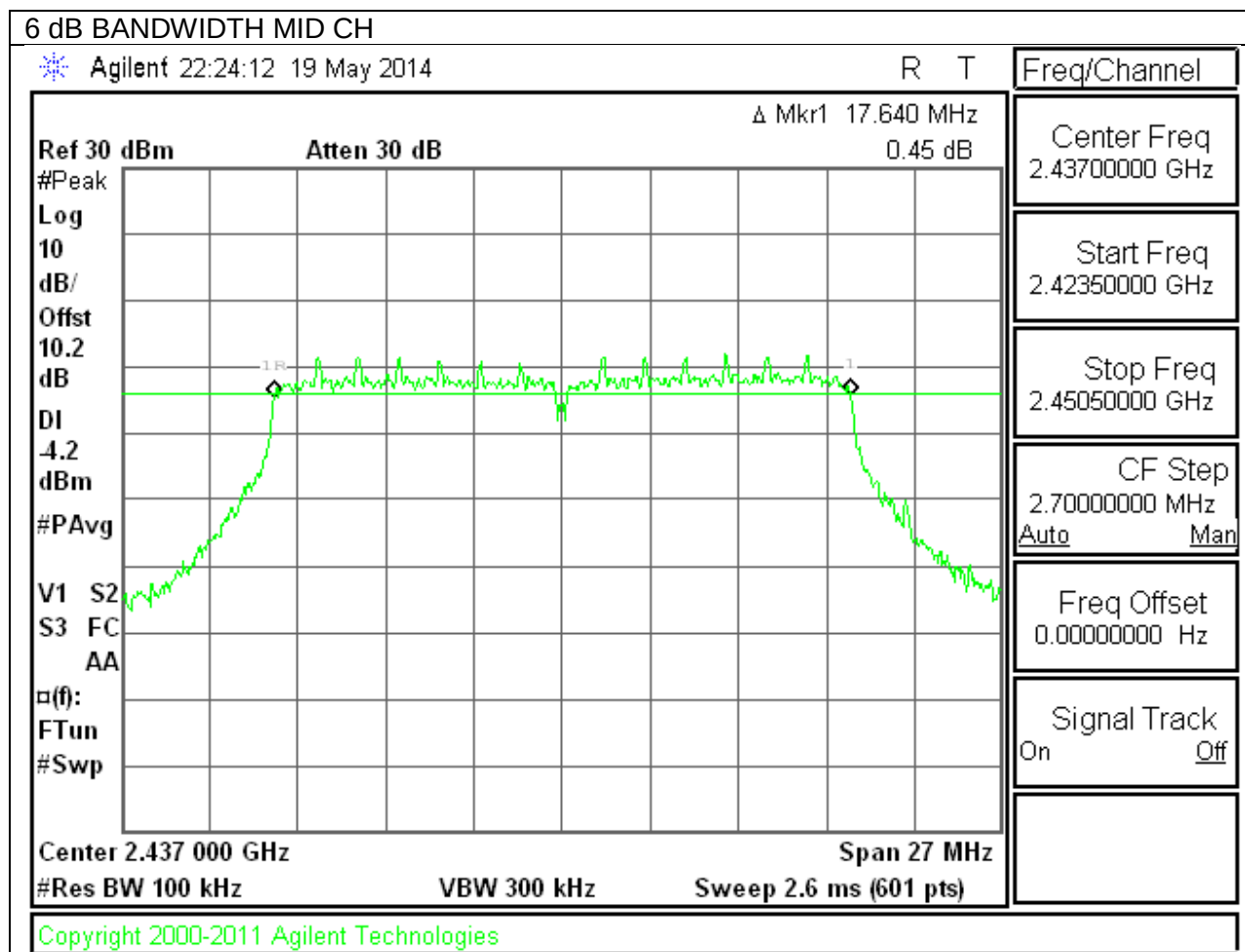
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.64	0.5
Mid	2437	17.64	0.5
High	2462	17.64	0.5
Worst		17.64	

9.1.4. 802.11b 6 dB BANDWIDTH



802.11g 6 dB BANDWIDTH

802.11n 6 dB BANDWIDTH



9.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	12.32
Mid	2437	12.36
High	2462	12.38
Worst		12.38

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

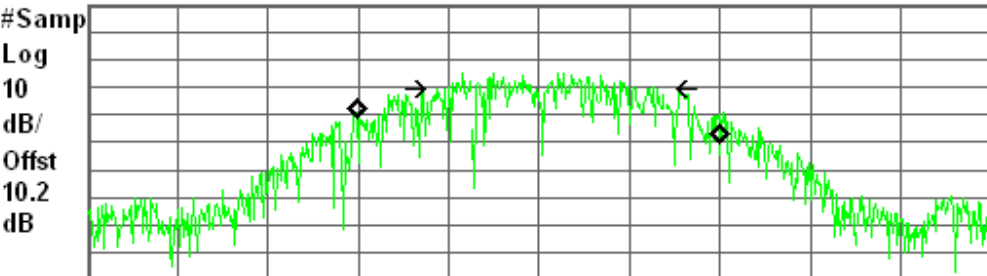
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.57
Mid	2437	16.51
High	2462	16.55
Worst		16.57

9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

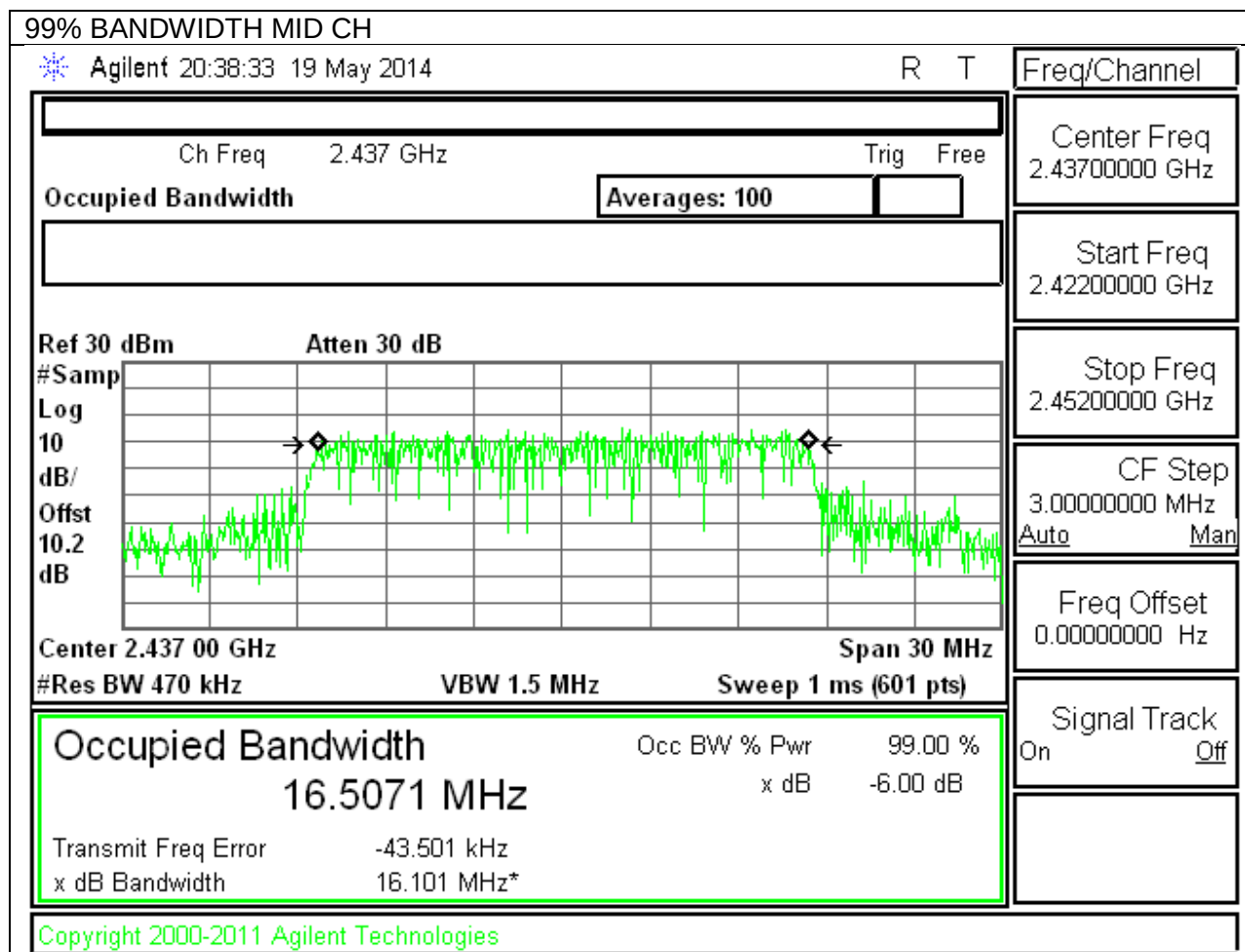
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	17.55
Mid	2437	17.63
High	2462	17.72
Worst		17.72

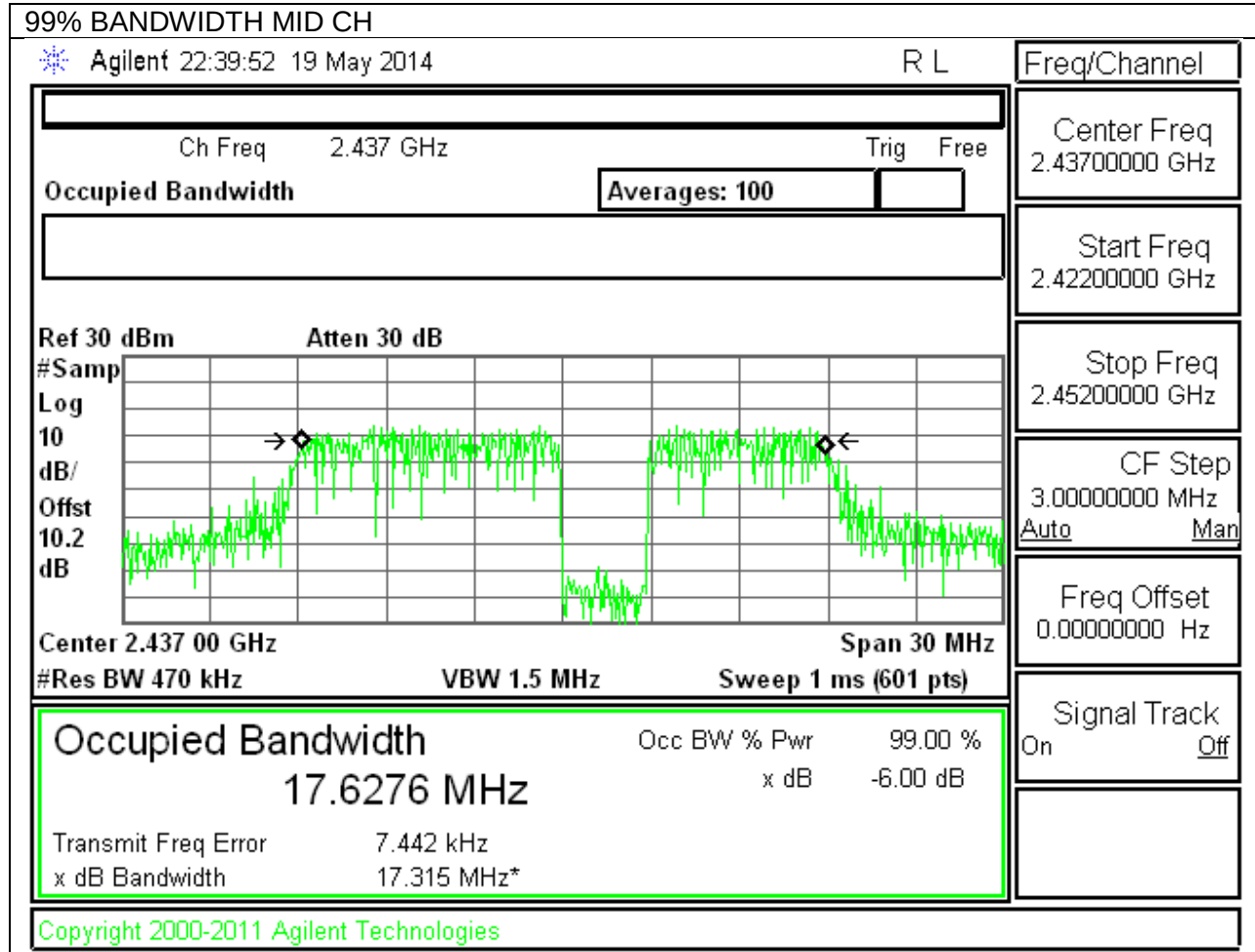
9.2.4. 802.11b 99% BANDWIDTH

99% BANDWIDTH MID CH

 Agilent 17:49:29 19 May 2014		R T		Freq/Channel	
Ch Freq 2.437 GHz Trig Free				Center Freq 2.43700000 GHz	
Occupied Bandwidth				Averages: 100	
Ref 30 dBm Atten 30 dB					
					
#Samp 10 Log dB/ Offst 10.2 dB					
Center 2.437 00 GHz Span 30 MHz					
#Res BW 200 kHz VBW 620 kHz Sweep 2.28 ms (601 pts)					
Occupied Bandwidth				Occ BW % Pwr 99.00 %	
12.3587 MHz				x dB -6.00 dB	
Transmit Freq Error 23.379 kHz				x dB Bandwidth 6.879 MHz*	
Copyright 2000-2011 Agilent Technologies					

802.11g 99% BANDWIDTH



802.11n 99% BANDWIDTH

9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 0.2 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

9.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	15.60
Mid	2437	15.60
High	2462	16.20
Worst		16.200

9.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	13.70
Mid	2437	13.60
High	2462	14.30
Worst		14.300

9.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency (MHz)	Avg Power (dBm)
Low	2412	12.70
Mid	2437	12.60
High	2462	13.30
Worst		13.300

9.4. 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.

RESULTS

9.4.1. 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	-0.19	30.00	30	36	30.00
Mid	2437	-0.19	30.00	30	36	30.00
High	2462	-0.19	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	18.22	18.22	30.00	-11.78
Mid	2437	18.14	18.14	30.00	-11.86
High	2462	19.04	19.04	30.00	-10.96
Worst			19.04		

9.4.2. 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	-0.19	30.00	30	36	30.00
Mid	2437	-0.19	30.00	30	36	30.00
High	2462	-0.19	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	22.03	22.03	30.00	-7.97
Mid	2437	21.90	21.90	30.00	-8.10
High	2462	22.52	22.52	30.00	-7.48
Worst			22.52		

9.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

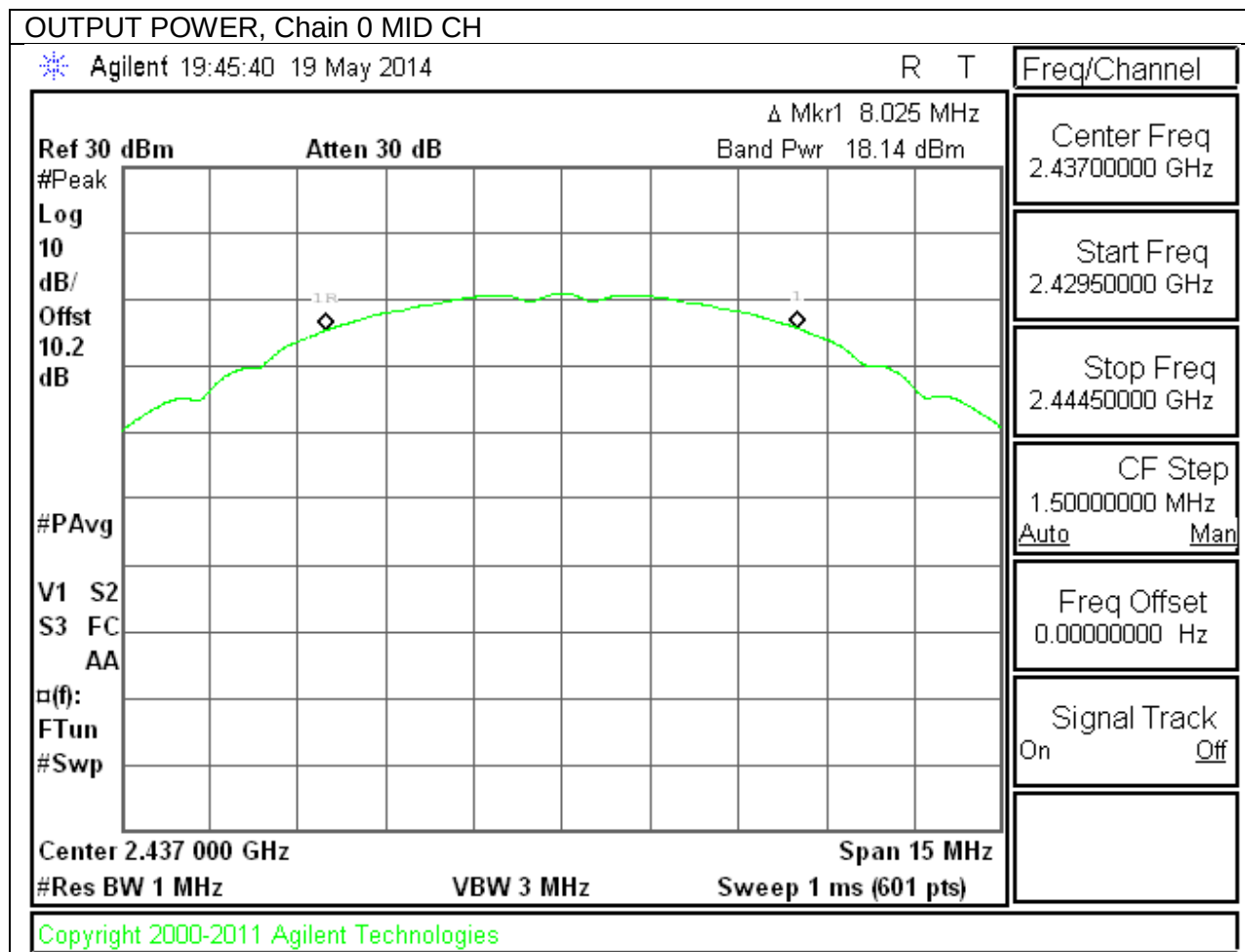
Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	-0.19	30.00	30	36	30.00
Mid	2437	-0.19	30.00	30	36	30.00
High	2462	-0.19	30.00	30	36	30.00

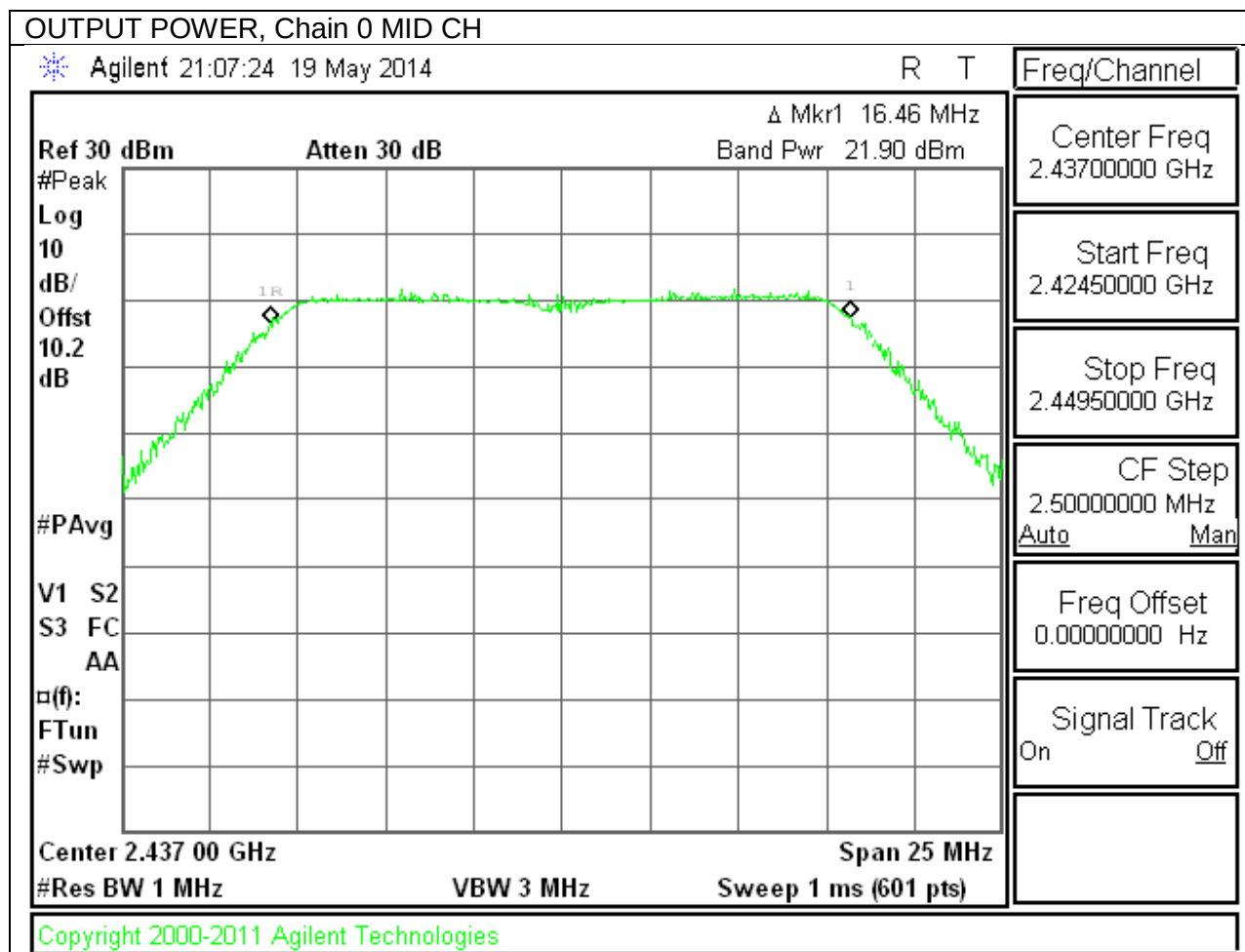
Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	21.23	21.23	30.00	-8.77
Mid	2437	21.03	21.03	30.00	-8.97
High	2462	21.75	21.75	30.00	-8.25
Worst			21.75		

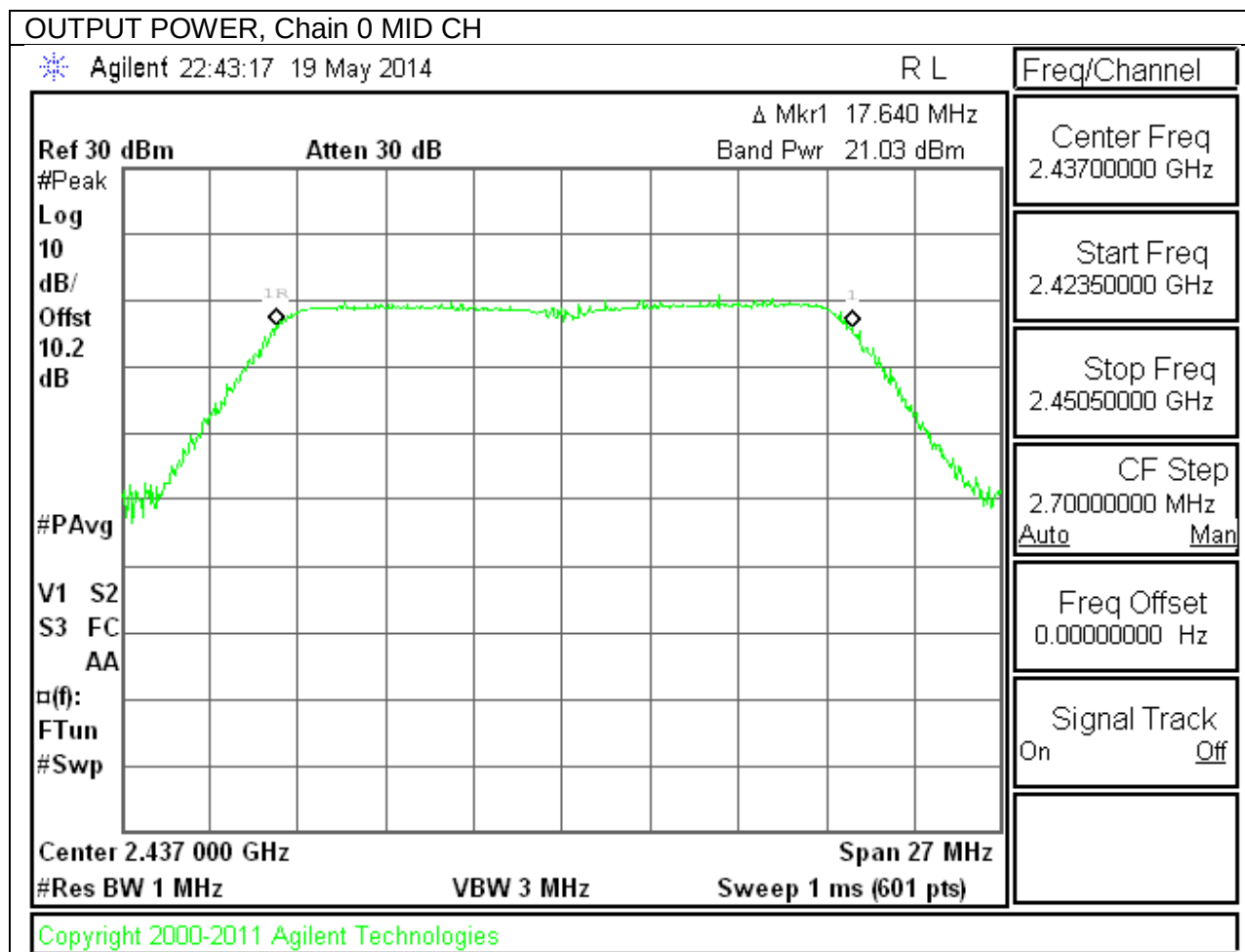
9.4.4. 802.11b OUTPUT POWER, Chain 0



802.11g OUTPUT POWER, Chain 0



802.11n OUTPUT POWER, Chain 0



9.5. 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

9.5.1. 802.11b MODE IN THE 2.4 GHz BAND

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-5.49	8.0	-13.5
Mid	2437	-4.96	8.0	-13.0
High	2462	-5.10	8.0	-13.1

9.5.2. 802.11g MODE IN THE 2.4 GHz BAND

PSD Results

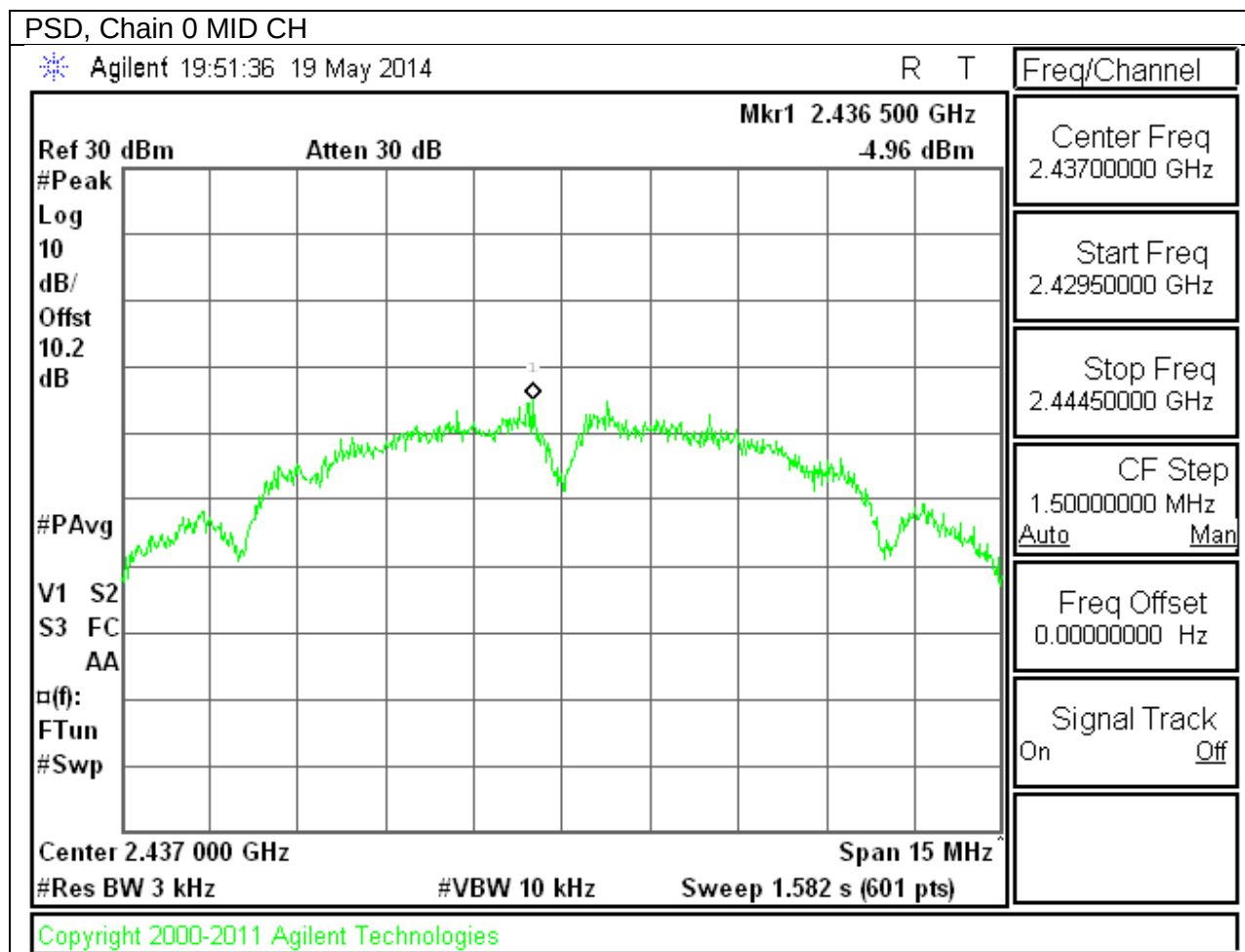
Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.90	8.0	-17.9
Mid	2437	-11.23	8.0	-19.2
High	2462	-10.46	8.0	-18.5

9.5.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

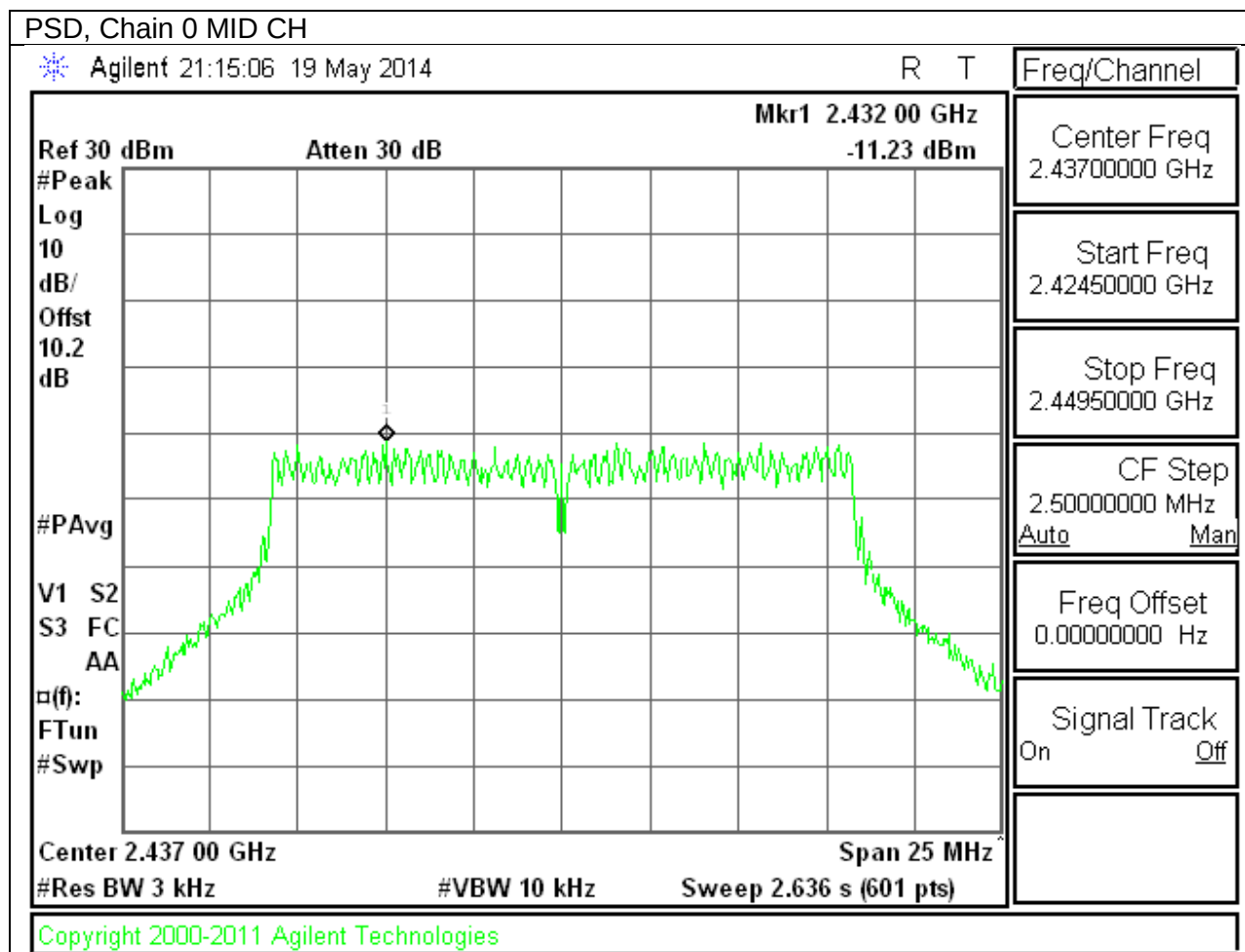
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.21	8.0	-19.2
Mid	2437	-11.48	8.0	-19.5
High	2462	-12.07	8.0	-20.1

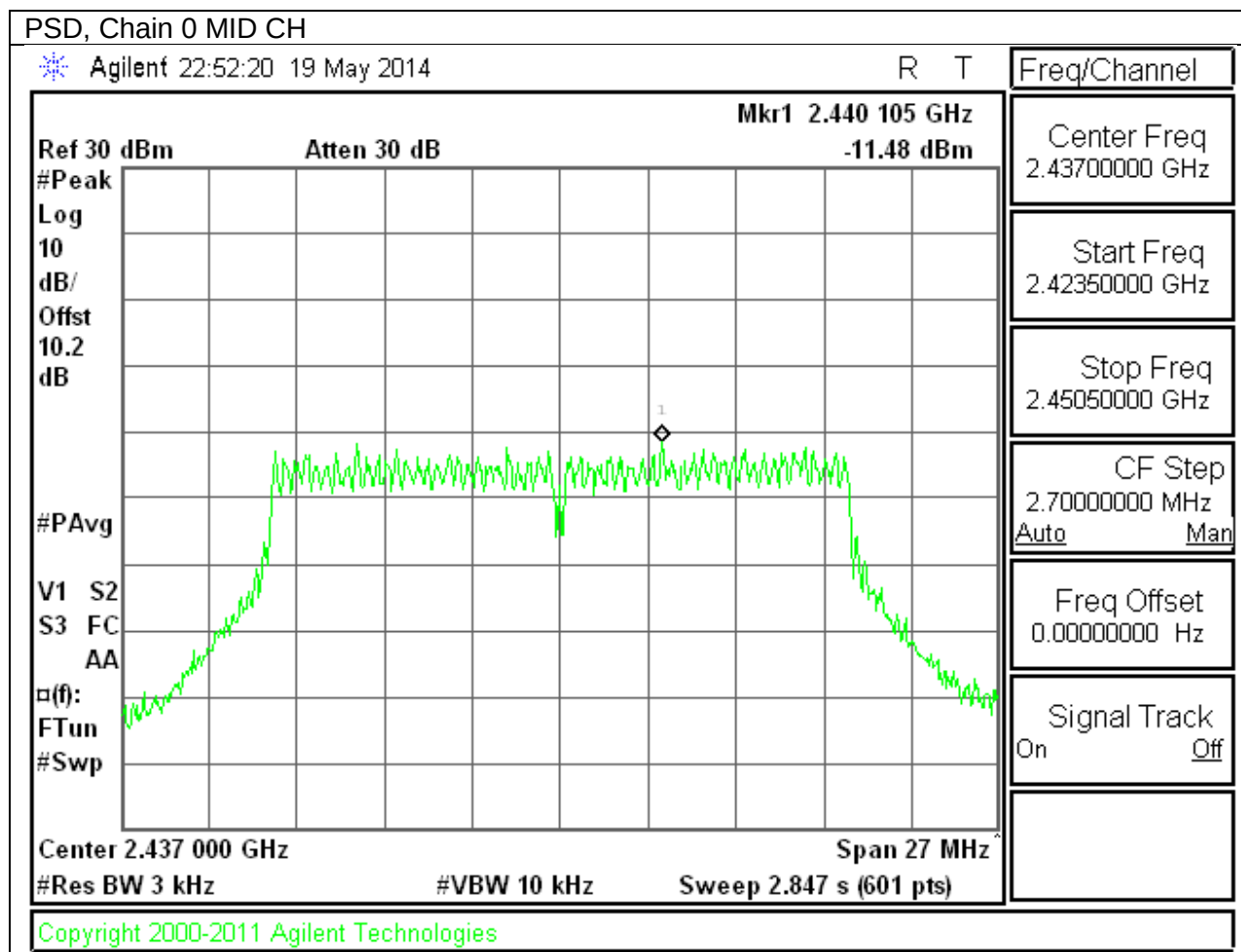
9.5.4. 802.11b PSD, Chain 0



802.11g PSD, Chain 0



802.11n PSD, Chain 0



9.6. 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.

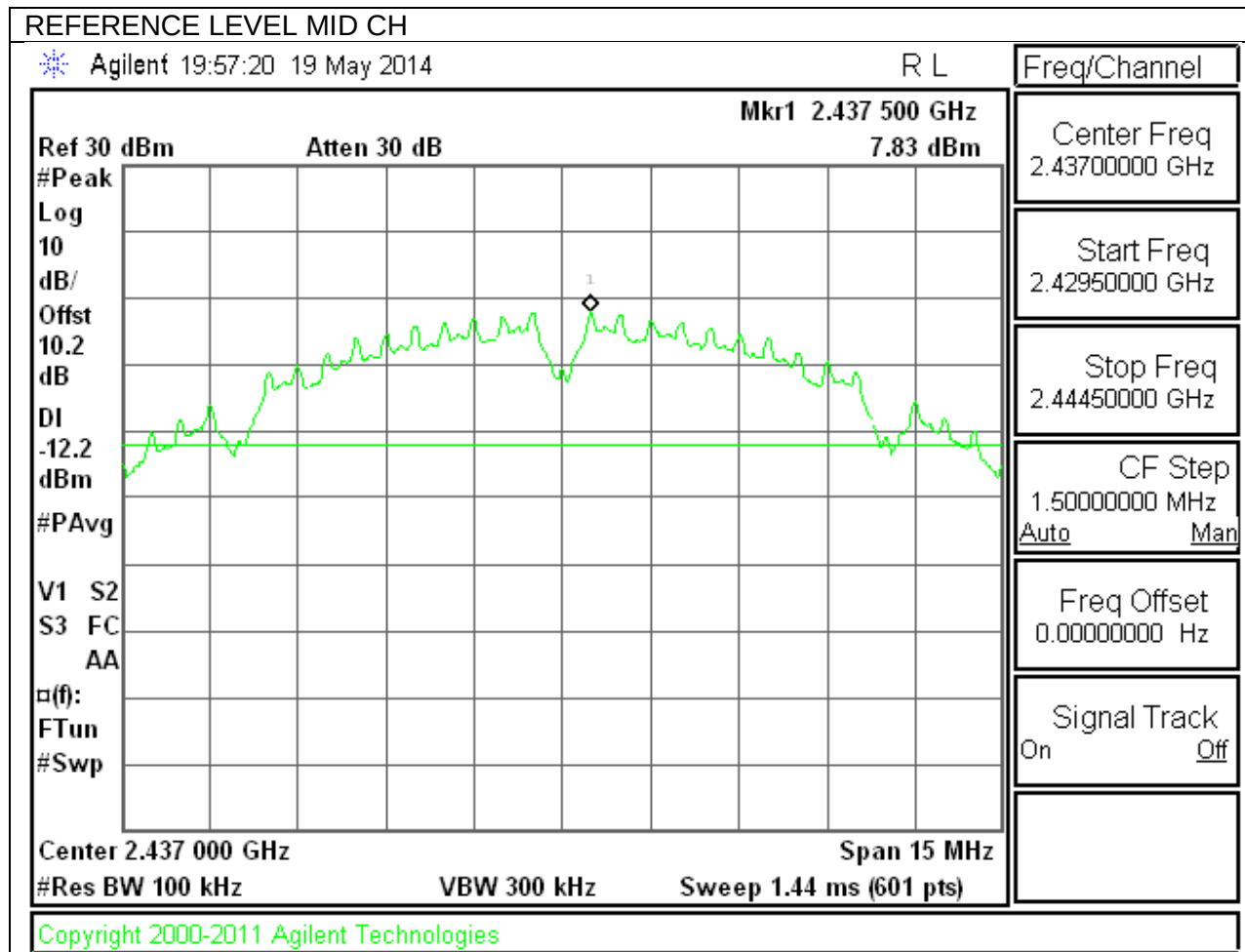
TEST PROCEDURE

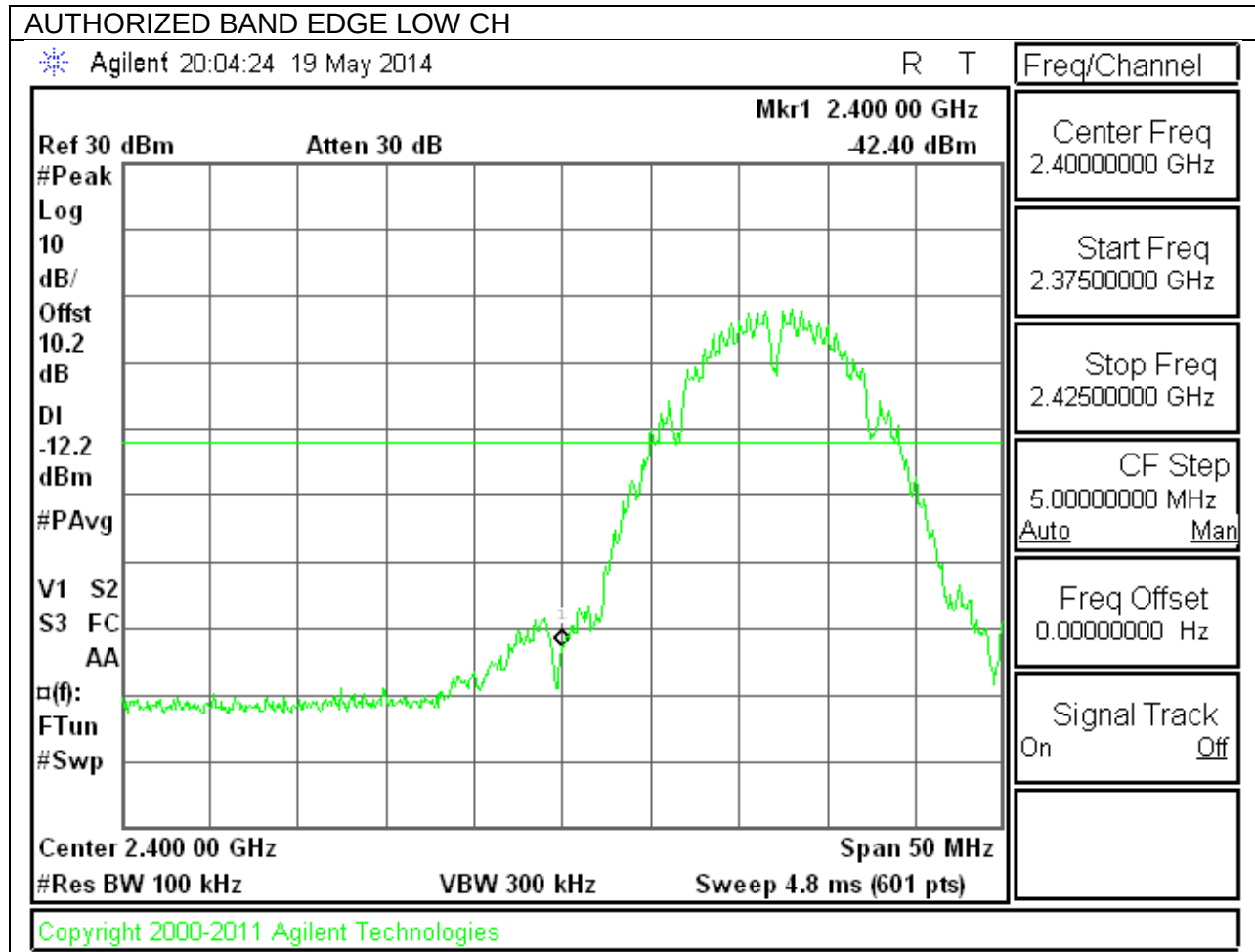
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

RESULTS

9.6.1. 802.11b MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL

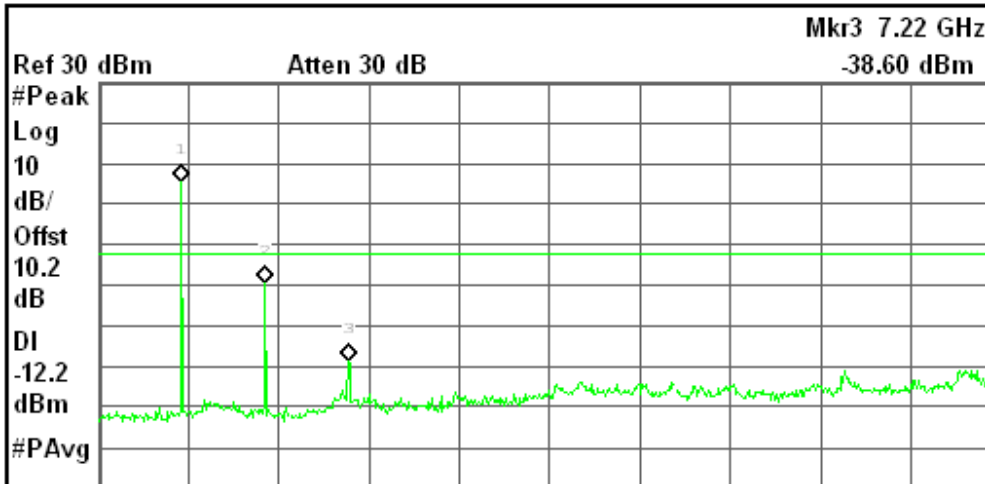


LOW CHANNEL BANDEDGE

OUT-OF-BAND EMISSIONS**OUT OF BAND LOW CH**

Agilent 20:02:43 19 May 2014

R T



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	5.65 dBm
2	(1)	Freq	4.83 GHz	-19.61 dBm
3	(1)	Freq	7.22 GHz	-38.60 dBm

Freq/Channel

Center Freq
13.0150000 GHzStart Freq
30.0000000 MHzStop Freq
26.0000000 GHzCF Step
2.59700000 GHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On Off

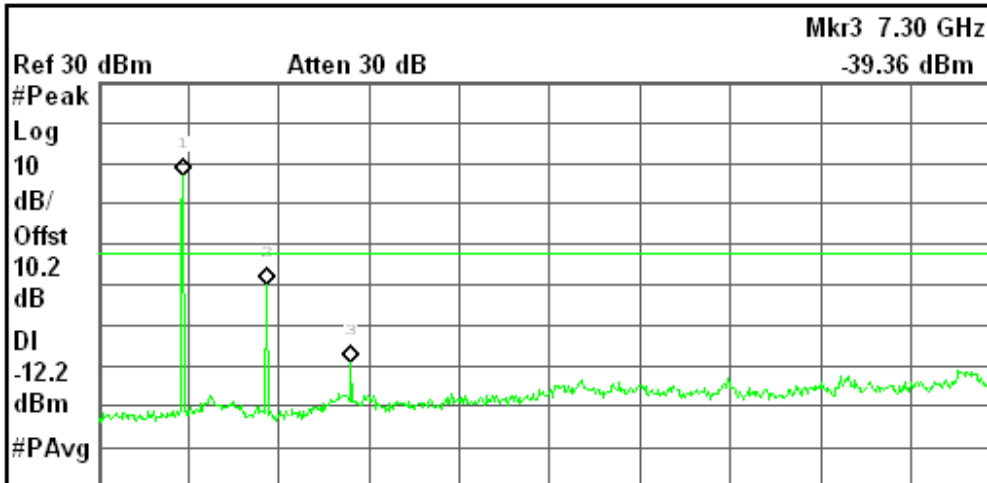
Copyright 2000-2011 Agilent Technologies

OUT OF BAND MID CH

Agilent 19:59:40 19 May 2014

R T

Freq/Channel



Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

Start 30 MHz Stop 26.00 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.482 s (601 pts)

Freq Offset
0.00000000 Hz

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.45 GHz	7.10 dBm
2	(1)	Freq	4.88 GHz	-20.08 dBm
3	(1)	Freq	7.30 GHz	-39.36 dBm

Signal Track
On Off

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OUT OF BAND HIGH CH

Agilent 20:01:24 19 May 2014

R T

Freq/Channel

Ref 30 dBm

Atten 30 dB

Mkr3 7.39 GHz

-35.81 dBm

#Peak

Log

10

dB/

Offst

10.2

dB

DI

-12.2

dBm

#PAvg

Start 30 MHz

#Res BW 100 kHz

VBW 300 kHz

Stop 26.00 GHz

Sweep 2.482 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.45 GHz	8.12 dBm
2	(1)	Freq	4.92 GHz	-19.81 dBm
3	(1)	Freq	7.39 GHz	-35.81 dBm

Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

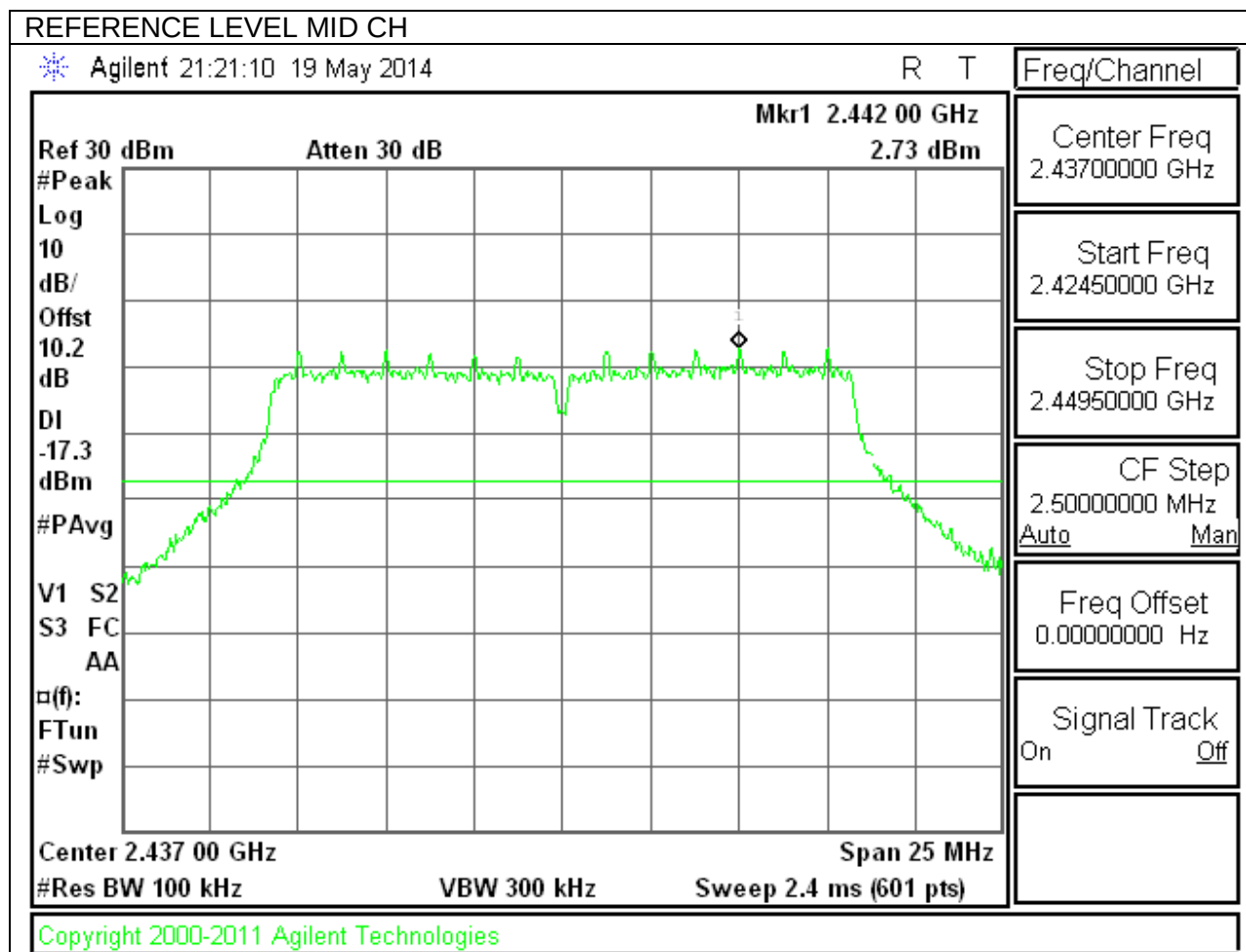
Freq Offset
0.00000000 Hz

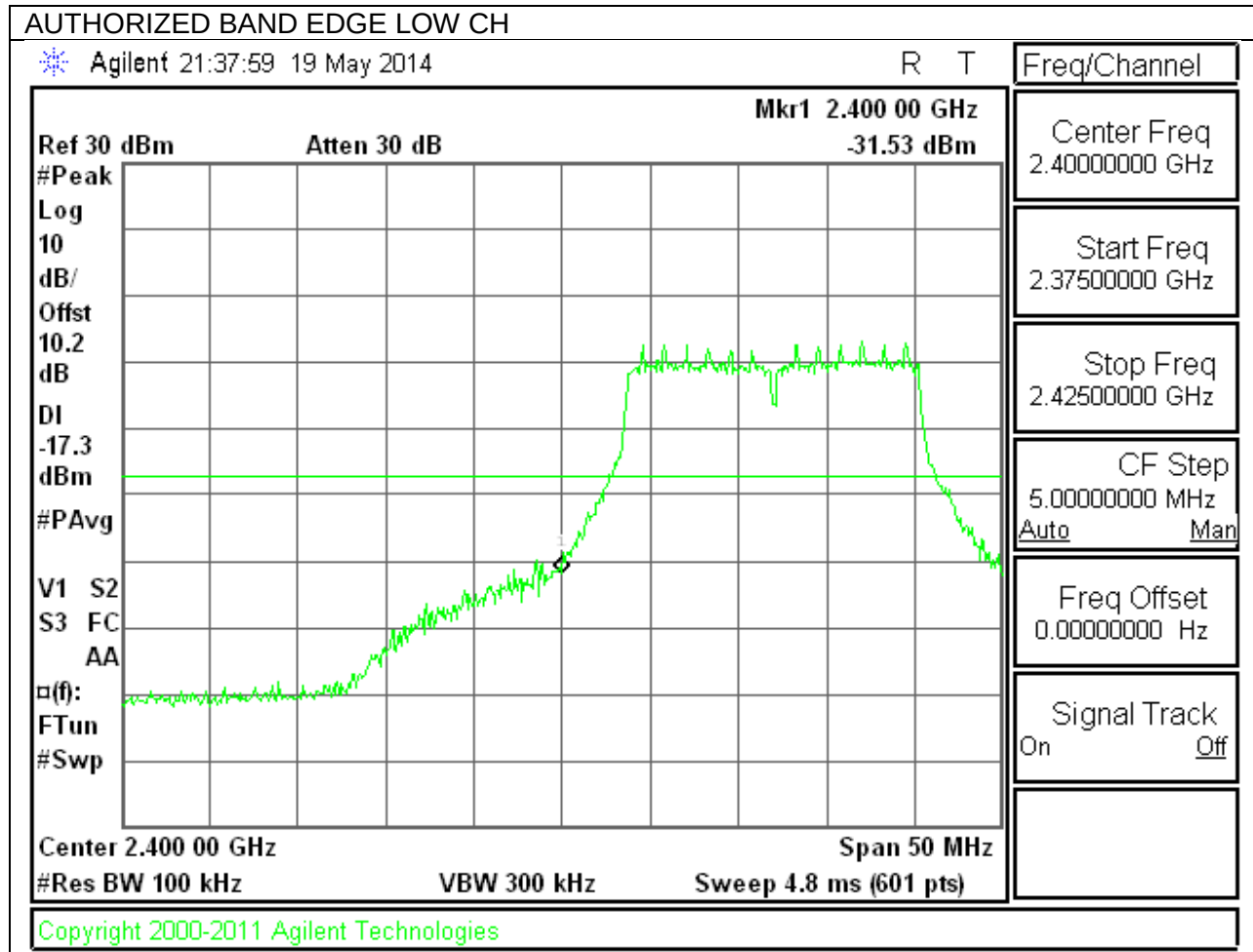
Signal Track
On Off

Copyright 2000-2011 Agilent Technologies

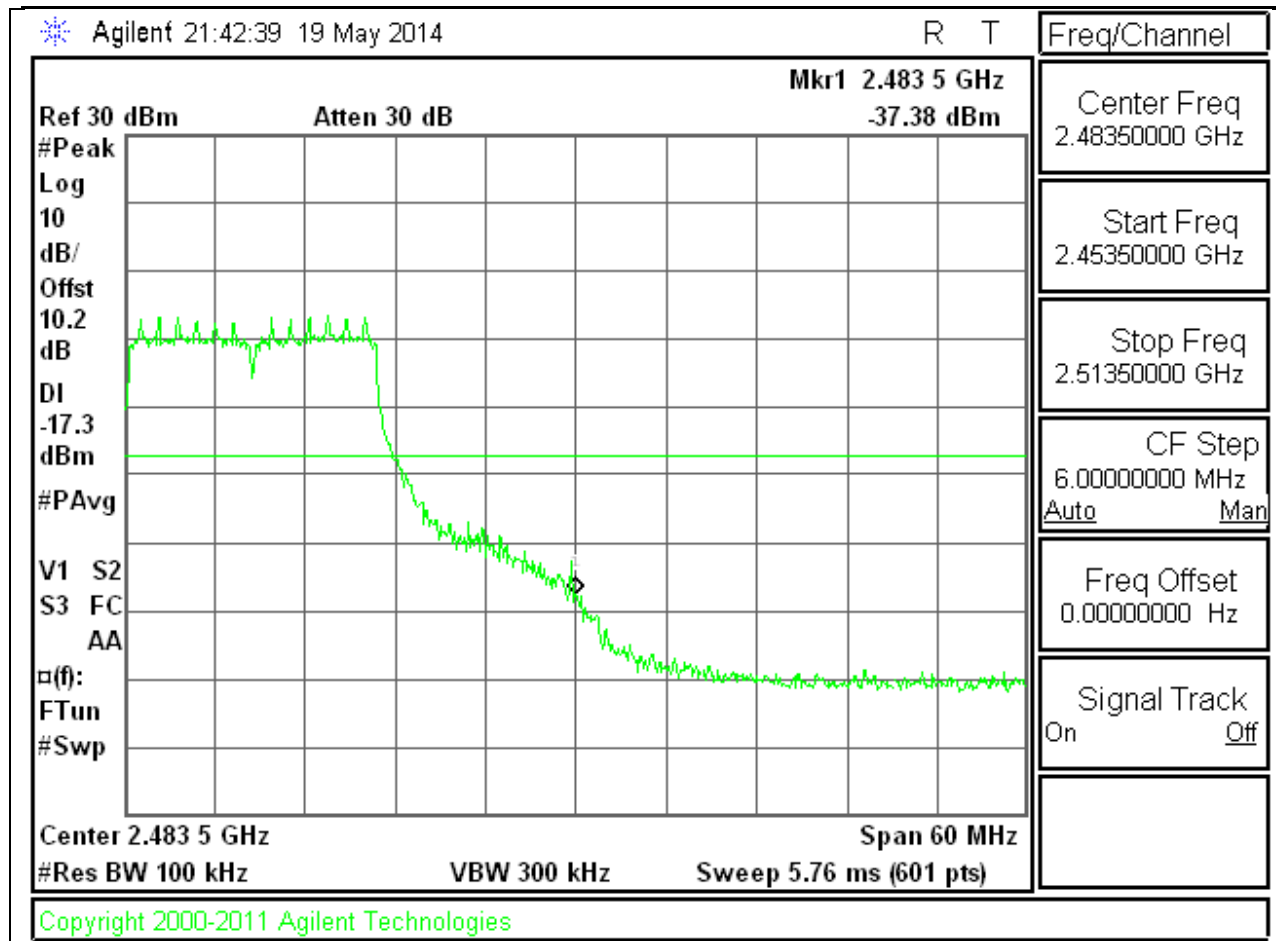
9.6.2. 802.11g MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL



LOW CHANNEL BANDEDGE**HIGH CHANNEL BANDEDGE**

AUTHORIZED BAND EDGE HIGH CH



OUT-OF-BAND EMISSIONS**OUT OF BAND LOW CH**

Agilent 21:49:24 19 May 2014

R L

Freq/Channel

Ref 30 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

10.2

dB

DI

-17.3

dBm

#PAvg

Start 30 MHz

#Res BW 100 kHz

VBW 300 kHz

Stop 26.00 GHz

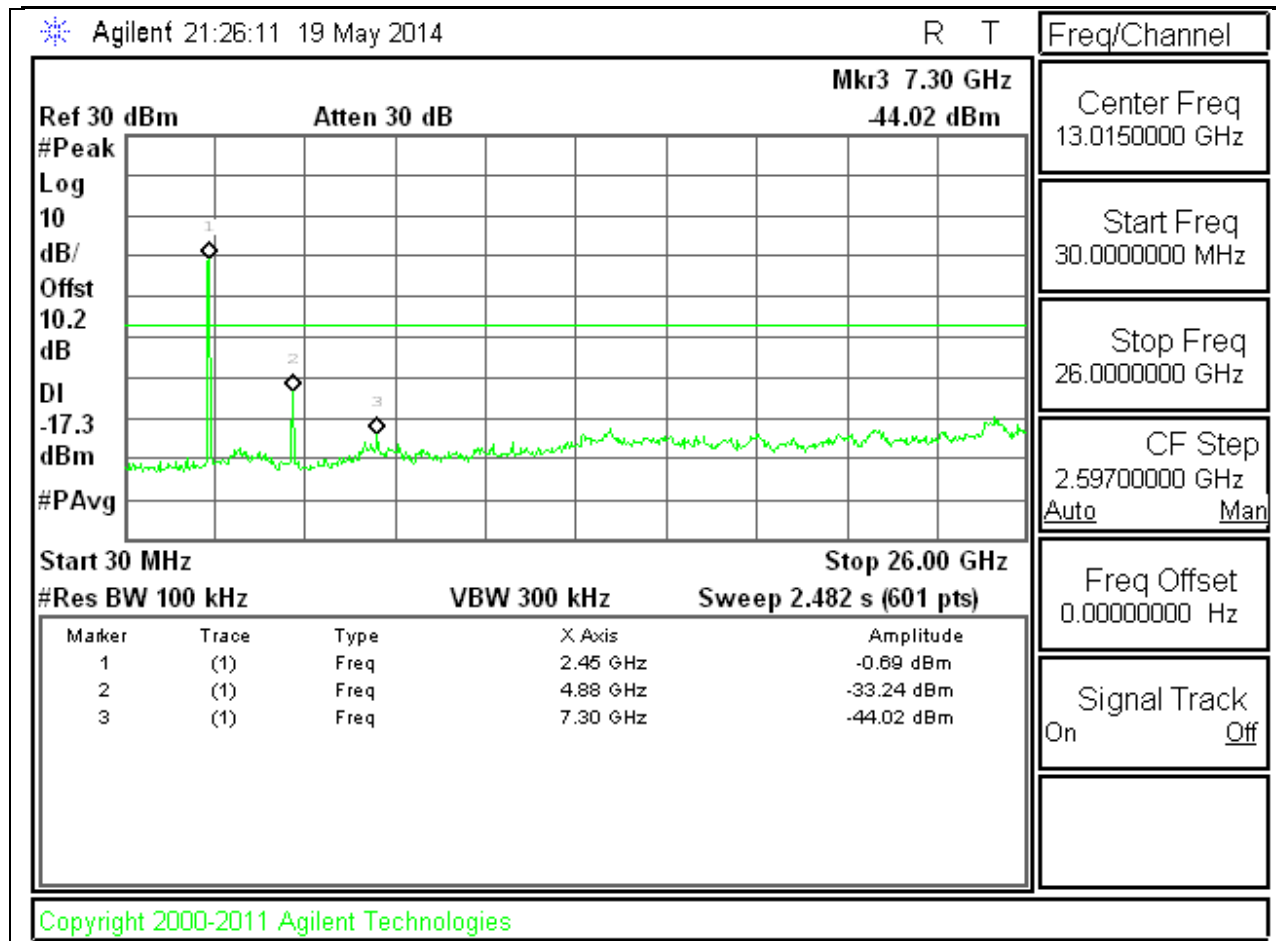
Sweep 2.482 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	1.53 dBm
2	(1)	Freq	4.83 GHz	-32.67 dBm
3	(1)	Freq	7.26 GHz	-42.91 dBm

Center Freq
13.0150000 GHzStart Freq
30.0000000 MHzStop Freq
26.0000000 GHzCF Step
2.59700000 GHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On Off

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OUT OF BAND MID CH



OUT OF BAND HIGH CH

Agilent 21:30:26 19 May 2014

R T

Freq/Channel

Ref 30 dBm

Atten 30 dB

Mkr2 4.88 GHz

-38.03 dBm

#Peak

Log

10

dB/

Offst

10.2

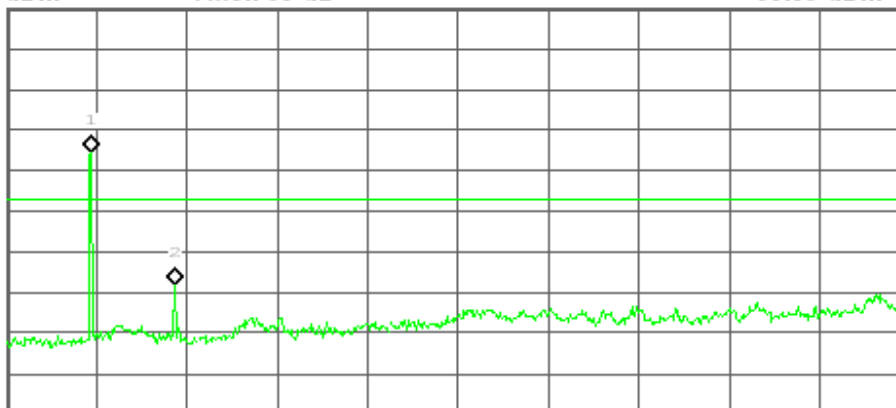
dB

DI

-17.3

dBm

#PAvg



Center 13.02 GHz

Span 25.97 GHz

#Res BW 100 kHz

VBW 300 kHz

Sweep 2.482 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.45 GHz	-5.53 dBm
2	(1)	Freq	4.88 GHz	-38.03 dBm

Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

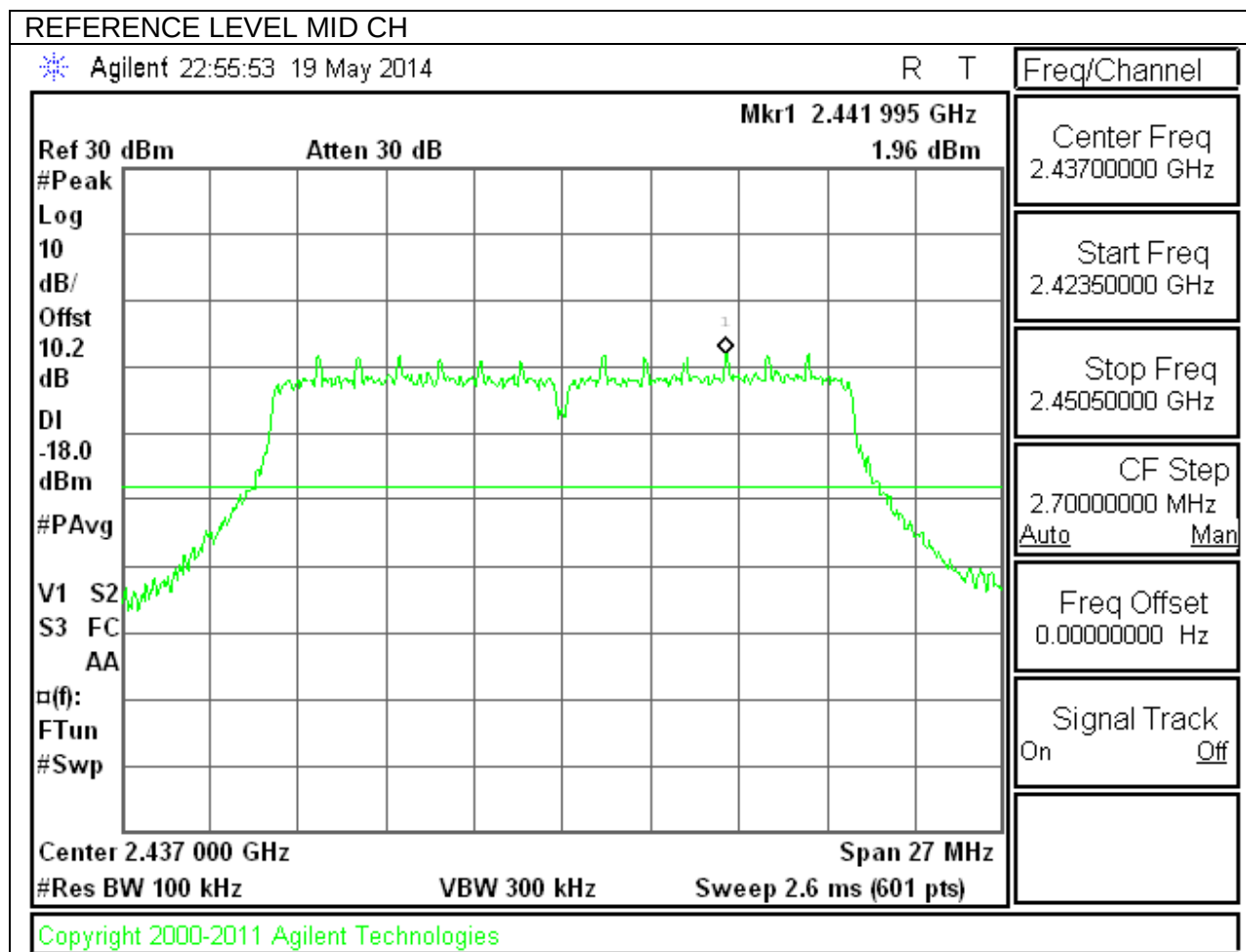
Freq Offset
0.00000000 Hz

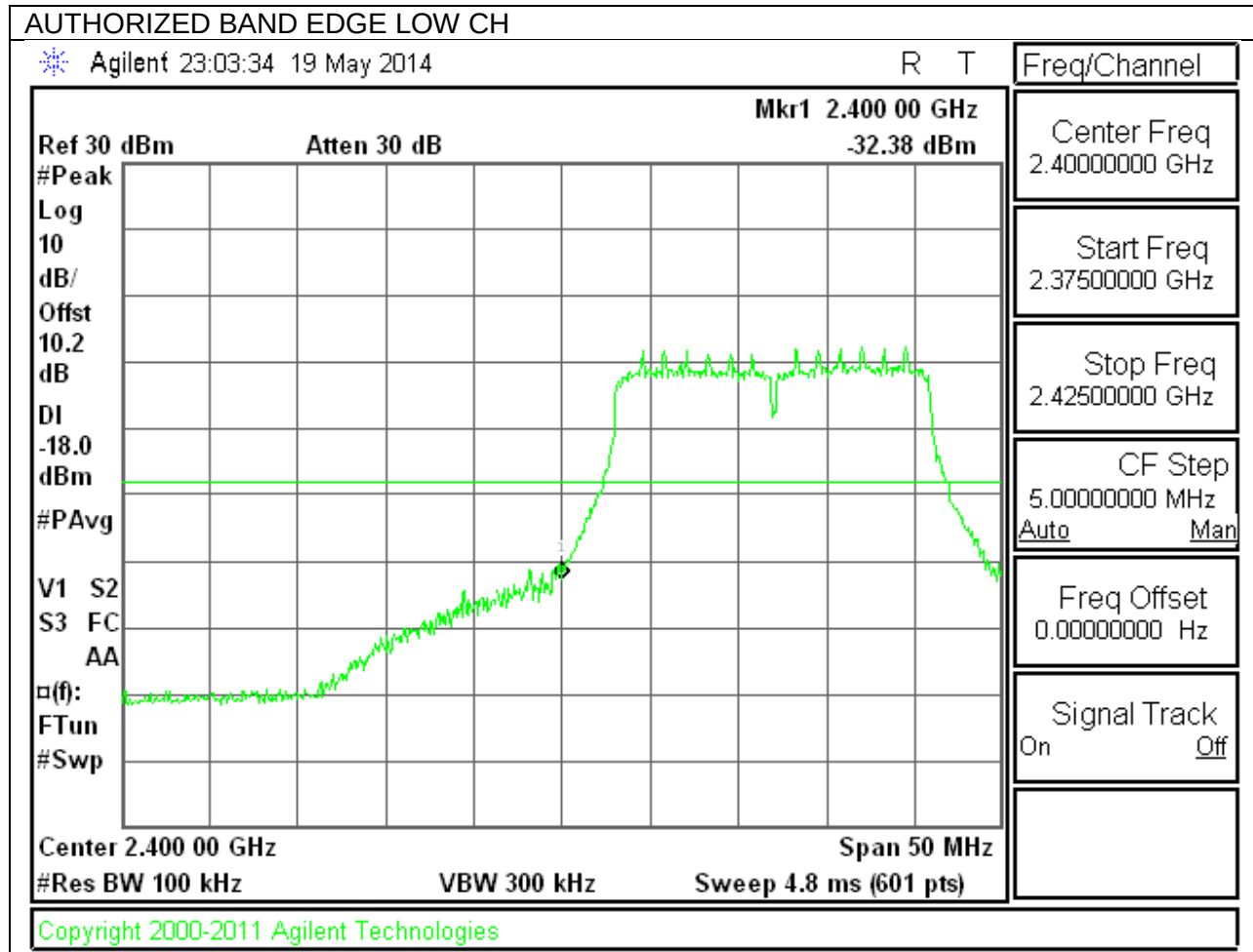
Signal Track
On Off

Copyright 2000-2011 Agilent Technologies

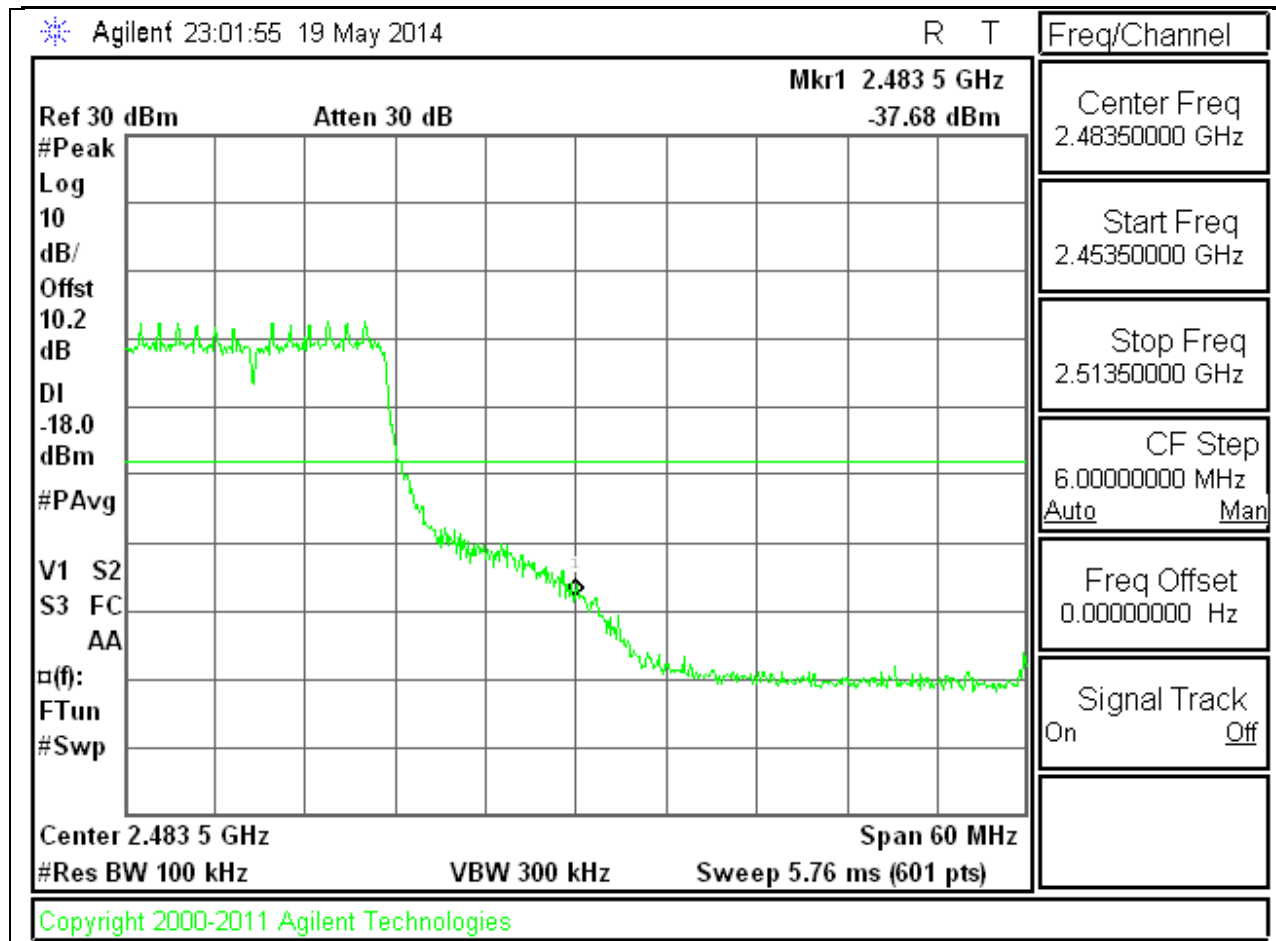
9.6.3. 802.11n MODE IN THE 2.4 GHz BAND

IN-BAND REFERENCE LEVEL



LOW CHANNEL BANDEDGE**HIGH CHANNEL BANDEDGE**

AUTHORIZED BAND EDGE HIGH CH

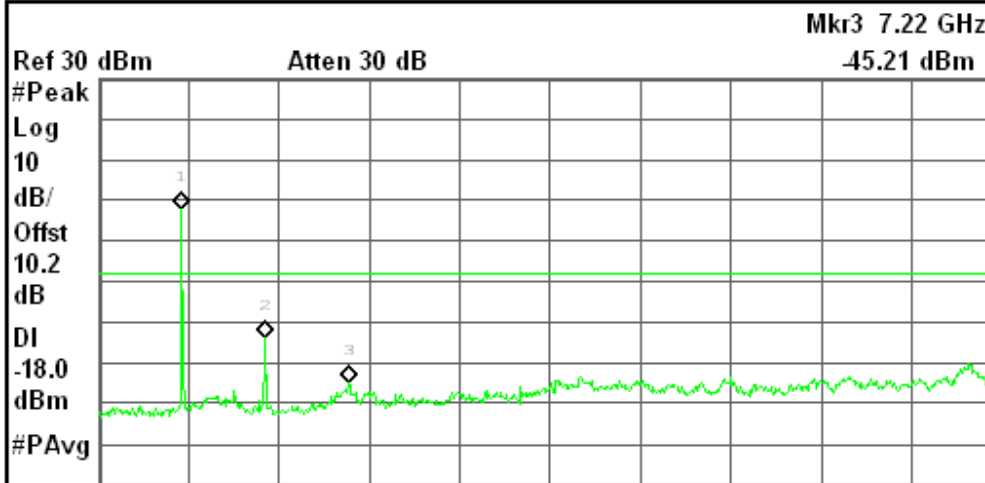


OUT-OF-BAND EMISSIONS**OUT OF BAND LOW CH**

Agilent 22:58:31 19 May 2014

R T

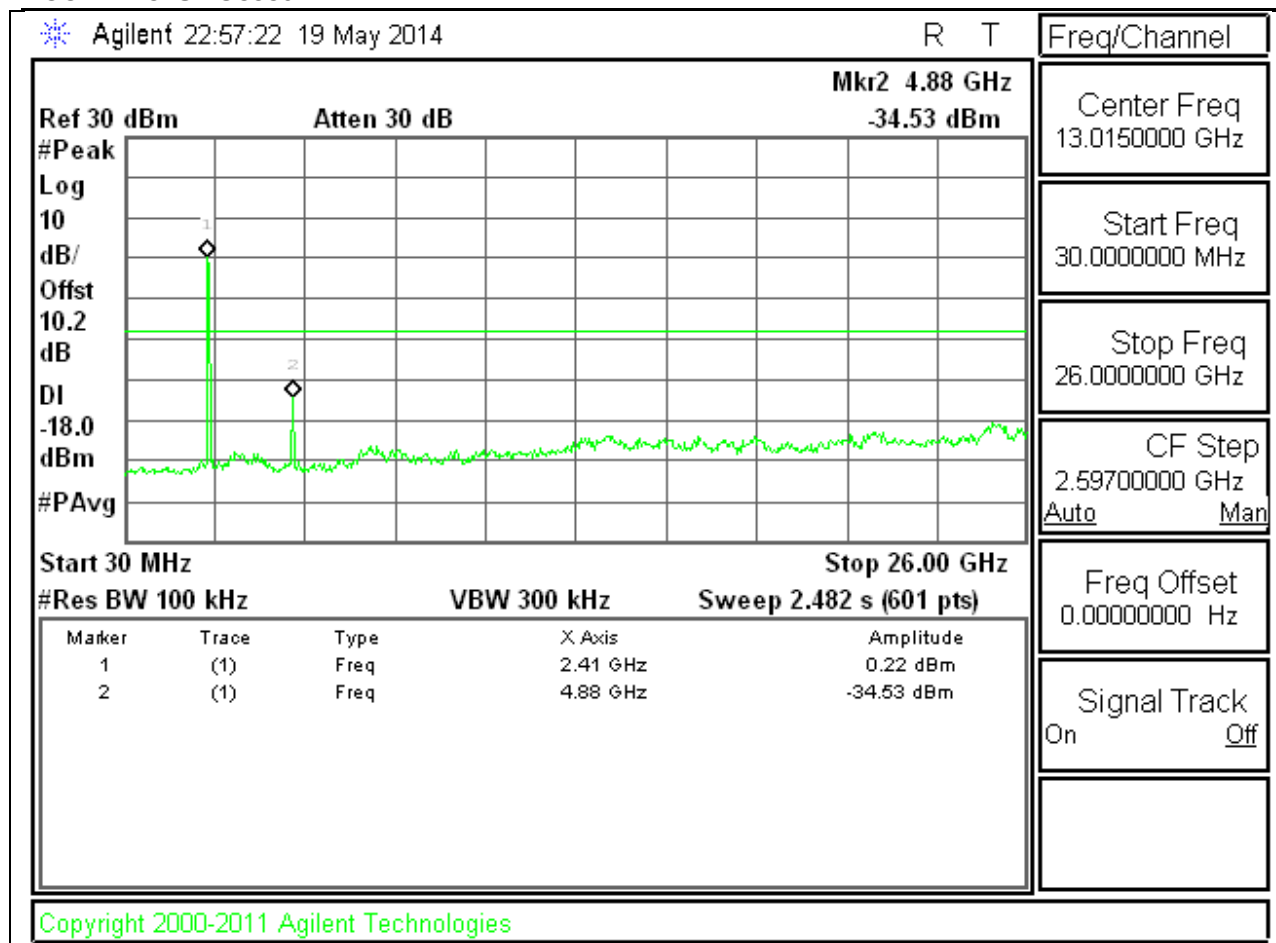
Freq/Channel

Center Freq
13.0150000 GHzStart Freq
30.0000000 MHzStop Freq
26.0000000 GHzCF Step
2.59700000 GHz
Auto ManFreq Offset
0.00000000 HzSignal Track
On OffStart 30 MHz Stop 26.00 GHz
#Res BW 100 kHz VBW 300 kHz Sweep 2.482 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	-2.23 dBm
2	(1)	Freq	4.83 GHz	-33.81 dBm
3	(1)	Freq	7.22 GHz	-45.21 dBm

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OUT OF BAND MID CH



OUT OF BAND HIGH CH

Agilent 22:59:57 19 May 2014

R T

Freq/Channel

Ref 30 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

10.2

dB

DI

-18.0

dBm

#PAvg

Start 30 MHz

#Res BW 100 kHz

VBW 300 kHz

Stop 26.00 GHz

Sweep 2.482 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.45 GHz	-1.04 dBm
2	(1)	Freq	4.92 GHz	-34.14 dBm
3	(1)	Freq	7.39 GHz	-43.45 dBm

Center Freq
13.0150000 GHz

Start Freq
30.0000000 MHz

Stop Freq
26.0000000 GHz

CF Step
2.59700000 GHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

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10. RADIATED TEST RESULTS

10.1. 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.

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= $10\log(1/x)$ For this sample B mode = 0dB (duty cycle >98%); G mode = 0.3dB; N mode = 0.3dB.

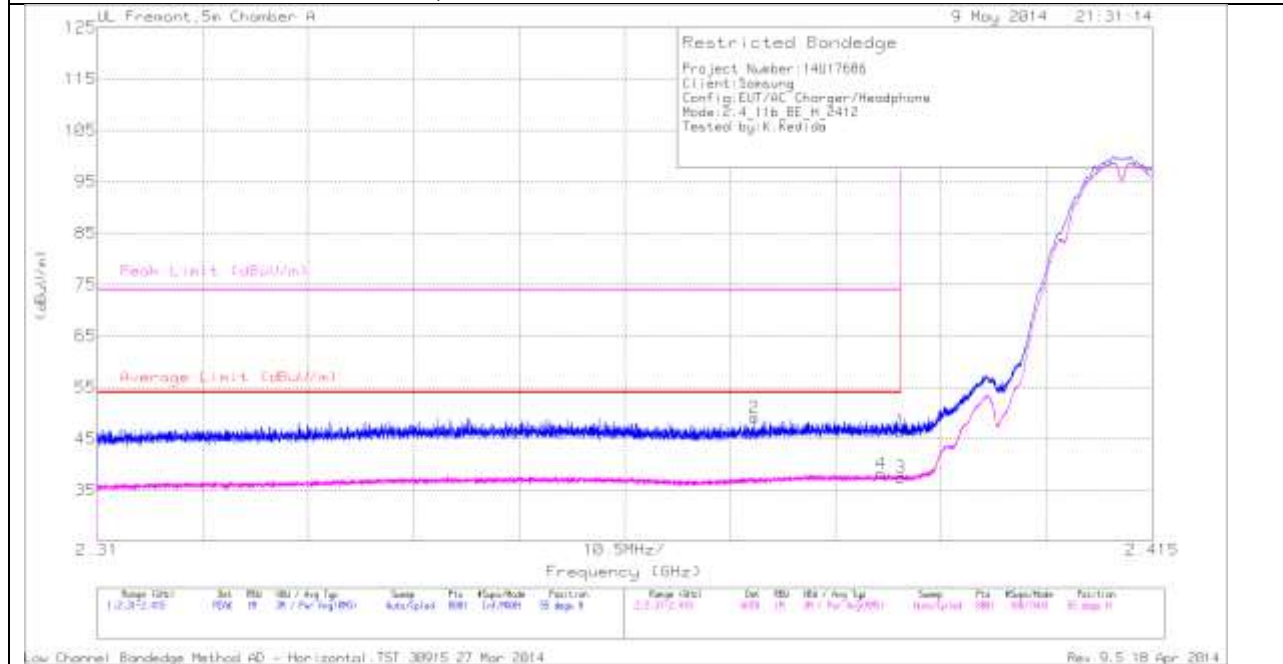
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED, HORIZ



Trace Markers

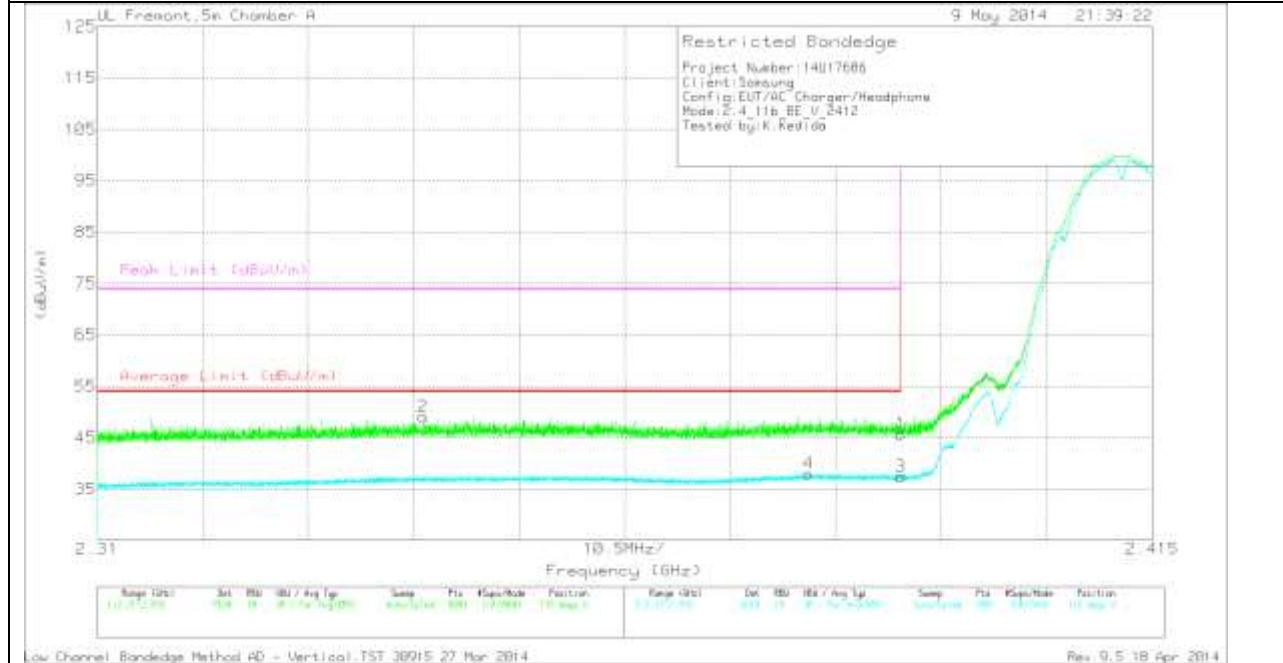
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.76	PK	32.2	-24.4	46.56	-	-	74	-27.44	55	229	H
2	* 2.375	40.99	PK	32.1	-24	49.09	-	-	74	-24.91	55	229	H
3	* 2.39	29.65	RMS	32.2	-24.4	37.45	54	-16.55	-	-	55	229	H
4	* 2.388	30.22	RMS	32.2	-24.2	38.22	54	-15.78	-	-	55	229	H

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

PK - Peak detector

RMS - RMS detection

LOW CHANNEL RESTRICTED, VERT



Trace Markers

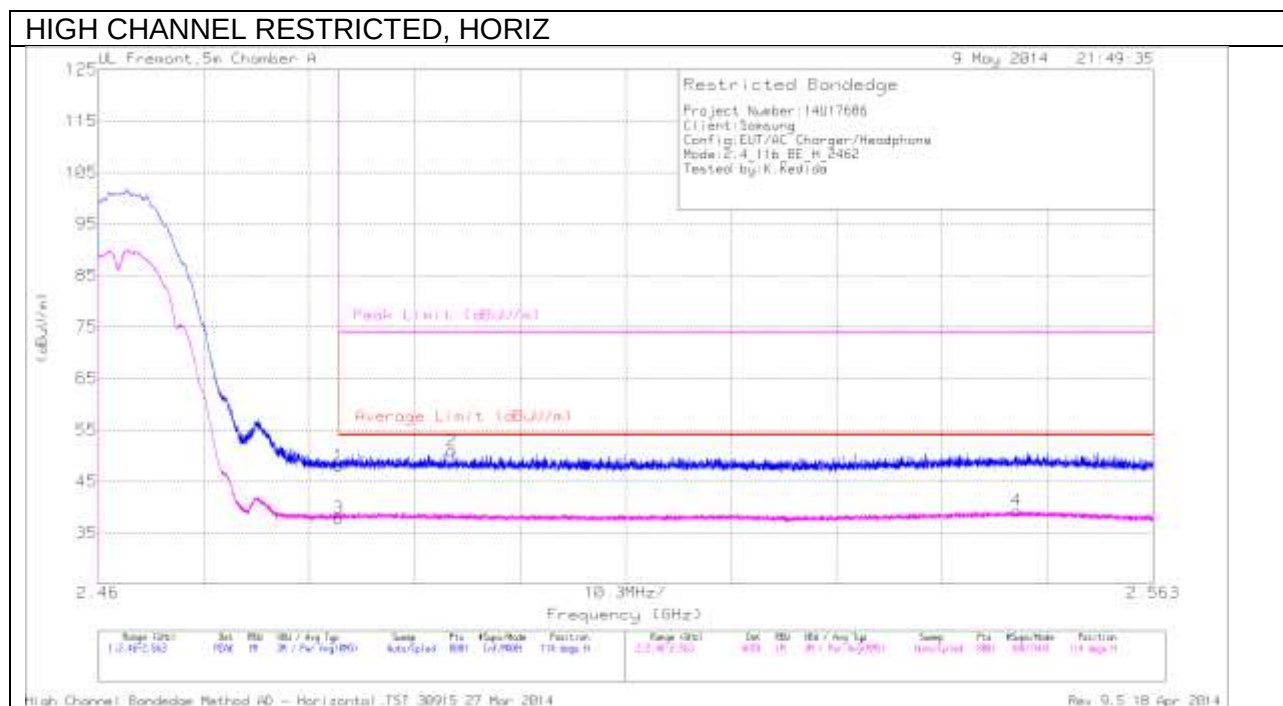
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.92	PK	32.2	-24.4	45.72	-	-	74	-28.28	115	367	V
2	* 2.342	41.07	PK	31.8	-23.8	49.07	-	-	74	-24.93	115	367	V
3	* 2.39	29.65	RMS	32.2	-24.4	37.45	54	-16.55	-	-	115	367	V
4	* 2.381	29.45	RMS	32.2	-23.6	38.05	54	-15.95	-	-	115	367	V

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

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)



Trace Markers

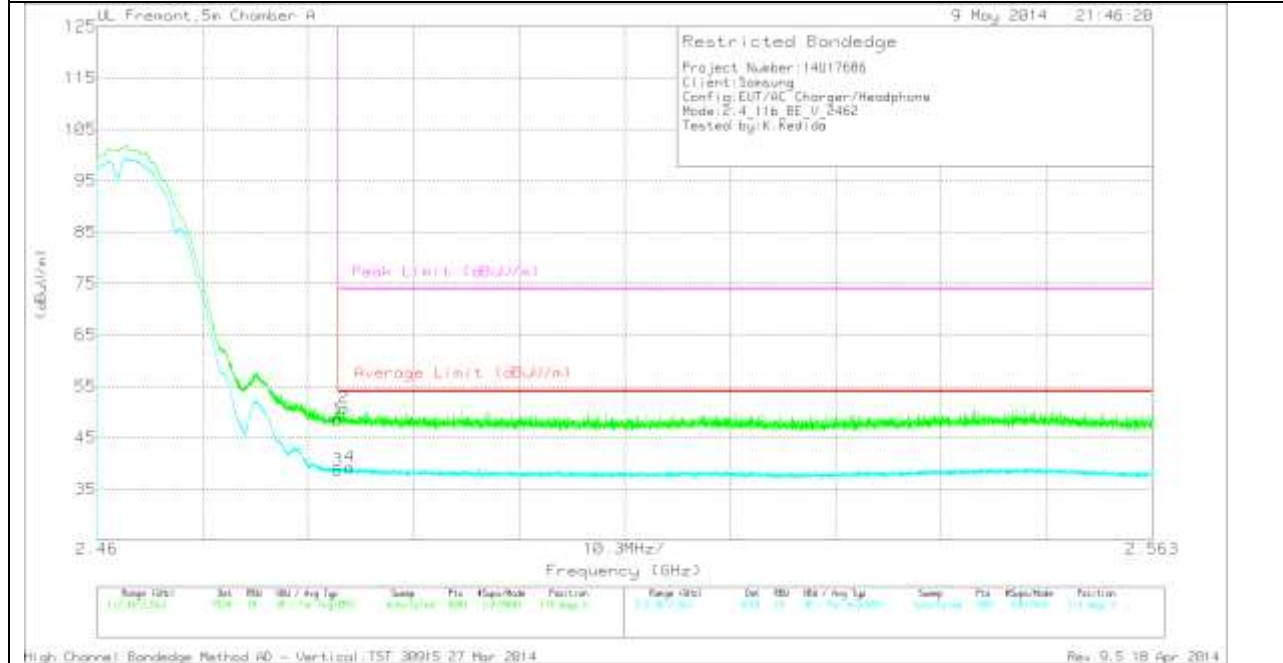
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	38.84	PK	32.7	-23.5	48.04	-	-	74	-25.96	114	358	H
2	* 2.495	41.61	PK	32.8	-23.5	50.91	-	-	74	-23.09	114	358	H
3	* 2.484	28.65	RMS	32.7	-23.5	37.85	54	-16.15	-	-	114	358	H
4	2.55	29.47	RMS	32.9	-23.1	39.27	54	-14.73	-	-	114	358	H

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

PK - Peak detector

RMS - RMS detection

HIGH CHANNEL BANDEDGE, VERT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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	39.36	PK	32.7	-23.5	48.56	-	-	74	-25.44	114	358	V
2	* 2.484	41.67	PK	32.7	-23.5	50.87	-	-	74	-23.13	114	358	V
3	* 2.484	29.56	RMS	32.7	-23.5	38.76	54	-15.24	-	-	114	358	V
4	* 2.485	30.07	RMS	32.7	-23.5	39.27	54	-14.73	-	-	114	358	V

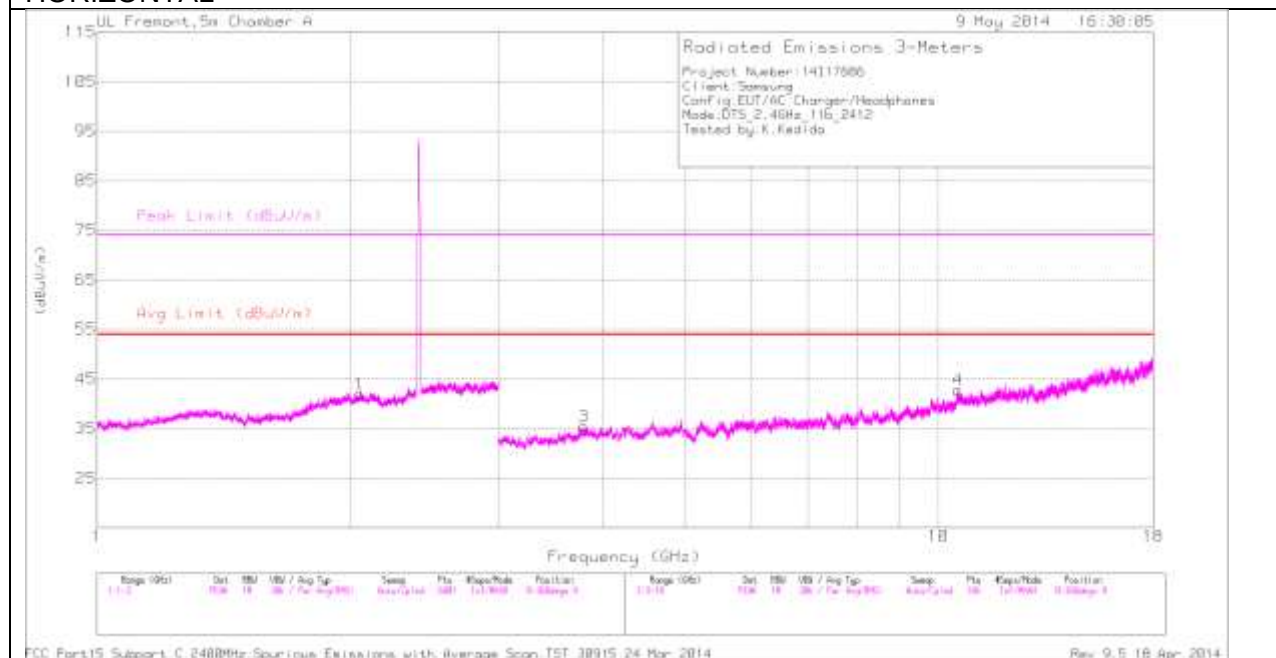
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

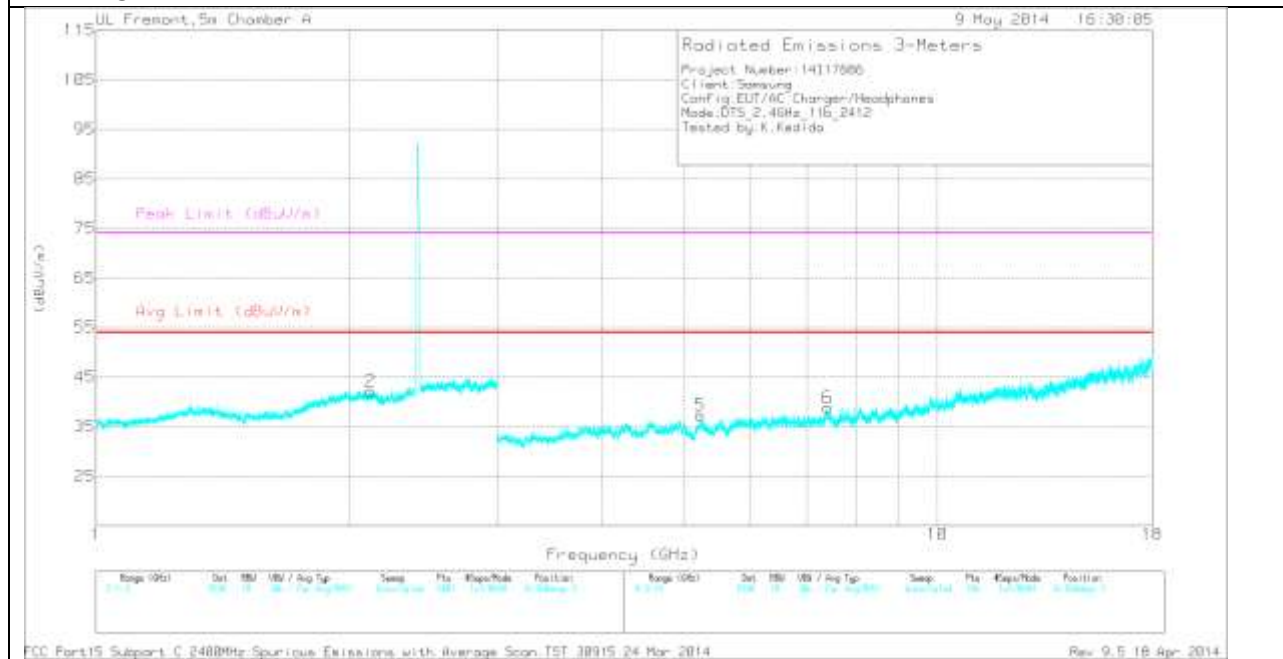
HARMONICS AND SPURIOUS EMISSIONS

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.

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.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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	* 3.79	32.41	PK	33.6	-30.6	35.41	-	-	74	-38.59	0-360	200	H
6	* 7.404	28.56	PK	35.3	-25	38.86	-	-	74	-35.14	0-360	200	V
1	2.052	34.45	PK	31.9	-24.4	41.95	-	-	-	-	0-360	200	H
2	2.119	34.64	PK	31.7	-24.2	42.14	-	-	-	-	0-360	200	V
5	5.226	30.86	PK	34.2	-27.7	37.36	-	-	-	-	0-360	100	V
4	10.54	26.71	PK	37.6	-21.5	42.81	-	-	-	-	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 T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.79	30.59	PK2	33.6	-30.6	33.59	-	-	74	-40.41	359	100	H
* 7.402	36.22	PK2	35.3	-25	46.52	-	-	74	-27.48	359	100	V
2.052	43.02	PK2	31.9	-24.4	50.52	-	-	-	-	359	100	H
2.119	43.13	PK2	31.7	-24.2	50.63	-	-	-	-	359	100	V
5.225	38.52	PK2	34.2	-27.8	44.92	-	-	-	-	359	100	V
10.539	34.08	PK2	37.6	-21.5	50.18	-	-	-	-	359	100	H

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

PK2 - KDB558074 Method: Maximum Peak

DL Fremont, Se Chamber A 9 May 2014 17:05:29

Radiated Emissions 3-Meters

Project Number: 14117888
 Client: Samsung
 Config: EU/AC Charger/Headphones
 Model: DTS_2_45Hz_116_2437
 Tested by: k.hadi@

Peak Limit (dBuV/m)
 Avg Limit (dBuV/m)

(dBuV/m)

Frequency (GHz)

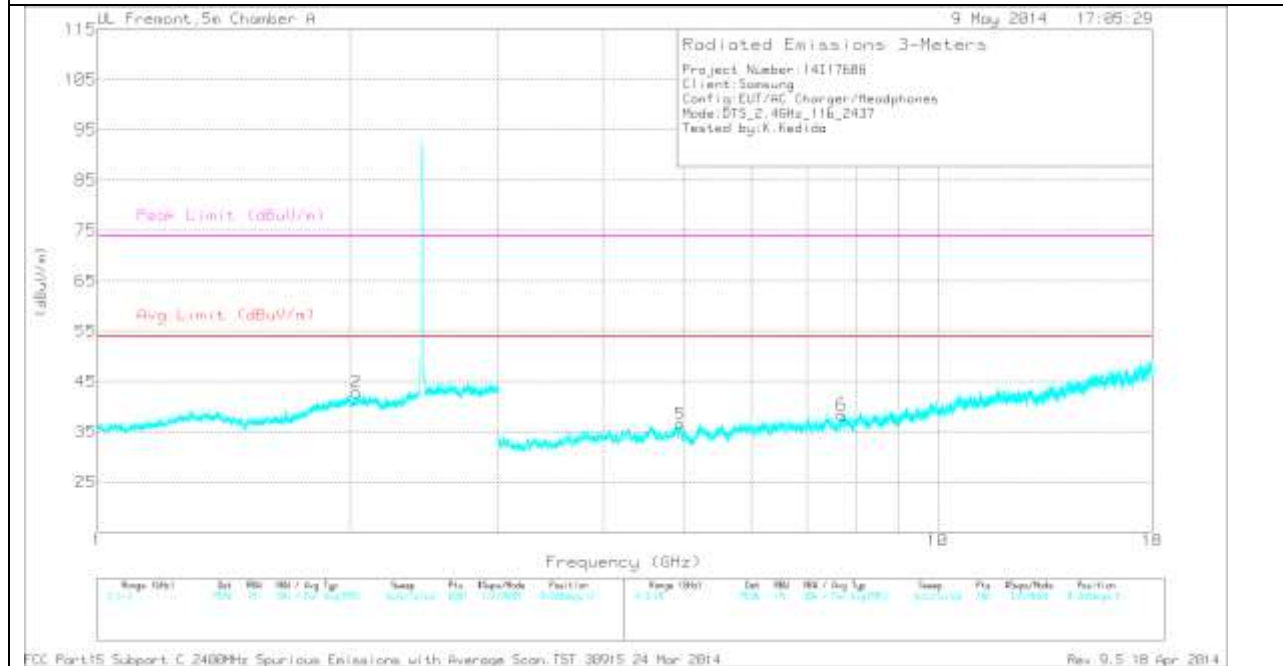
Range (Hz)	Set	Res	BW	Avg	Sweep	Pre	Steps/Div	Position
1-10	704	10	30	100	500	0.0001	0.0001	0.0001

Range (Hz)	Set	Res	BW	Avg	Sweep	Pre	Steps/Div	Position
1-10	704	10	30	100	500	0.0001	0.0001	0.0001

FCC Part15 Subpart C 2400MHz Spurious Emissions with Average Scan.TST 38915 24 Mar 2014 Rev 0.5 18

Page 62 of 108

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.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/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	* 4.581	31.09	PK	34	-28.7	36.39	-	-	74	-37.61	0-360	200	H
4	* 10.627	25.65	PK	37.7	-21	42.35	-	-	74	-31.65	0-360	200	H
5	* 4.938	31.43	PK	33.9	-28.8	36.53	-	-	74	-37.47	0-360	100	V
6	* 7.692	27.43	PK	35.4	-24.5	38.33	-	-	74	-35.67	0-360	100	V
1	1.902	35.46	PK	31.7	-25.2	41.96	-	-	-	-	0-360	200	H
2	2.035	35.85	PK	32	-25	42.85	-	-	-	-	0-360	100	V

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

PK - Peak detector

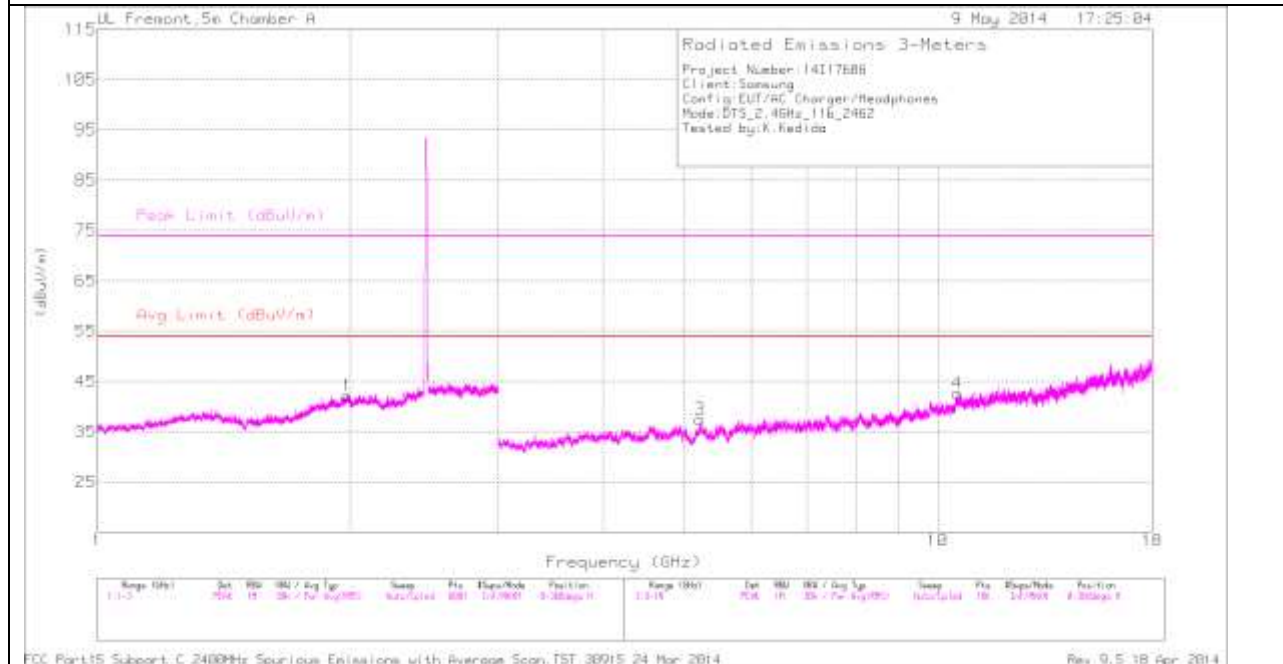
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.58	39.32	PK2	34	-28.6	44.72	-	-	74	-29.28	359	100	H
* 10.627	35.28	PK2	37.7	-20.9	52.08	-	-	74	-21.92	359	100	H
* 4.938	39.73	PK2	33.9	-28.8	44.83	-	-	74	-29.17	359	100	V
* 7.693	37.11	PK2	35.4	-24.5	48.01	-	-	74	-25.99	359	100	V
1.901	43.45	PK2	31.7	-25.2	49.95	-	-	-	-	359	100	H
2.034	42.77	PK2	32	-24.9	49.87	-	-	-	-	359	100	V

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

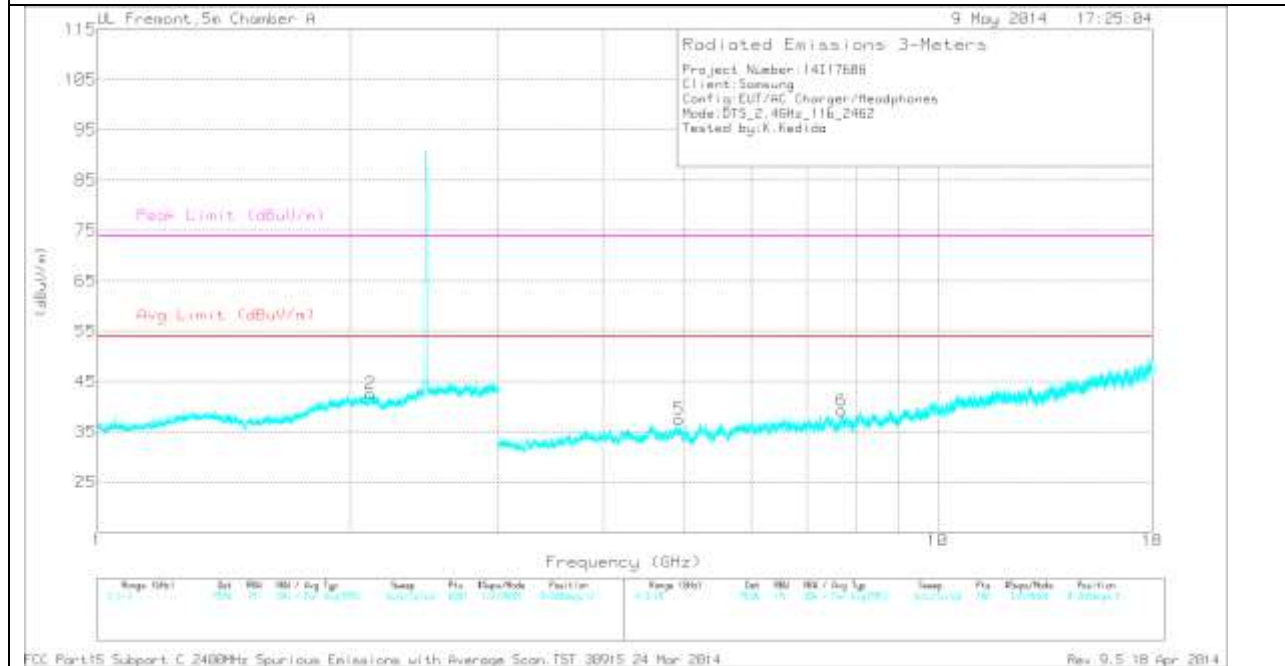
PK2 - KDB558074 Method: Maximum Peak

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.

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.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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	* 4.924	32.56	PK	33.9	-29	37.46	-	-	74	-36.54	0-360	200	V
6	* 7.693	28.24	PK	35.4	-24.4	39.24	-	-	74	-34.76	0-360	100	V
1	1.985	34.54	PK	32	-24.4	42.14	-	-	-	-	0-360	100	H
2	2.113	35.05	PK	31.7	-24.2	42.55	-	-	-	-	0-360	201	V
3	5.216	31.56	PK	34.2	-28.3	37.46	-	-	-	-	0-360	200	H
4	10.56	26.84	PK	37.6	-21.8	42.64	-	-	-	-	0-360	200	H

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

PK - Peak detector

Radiated Emissions

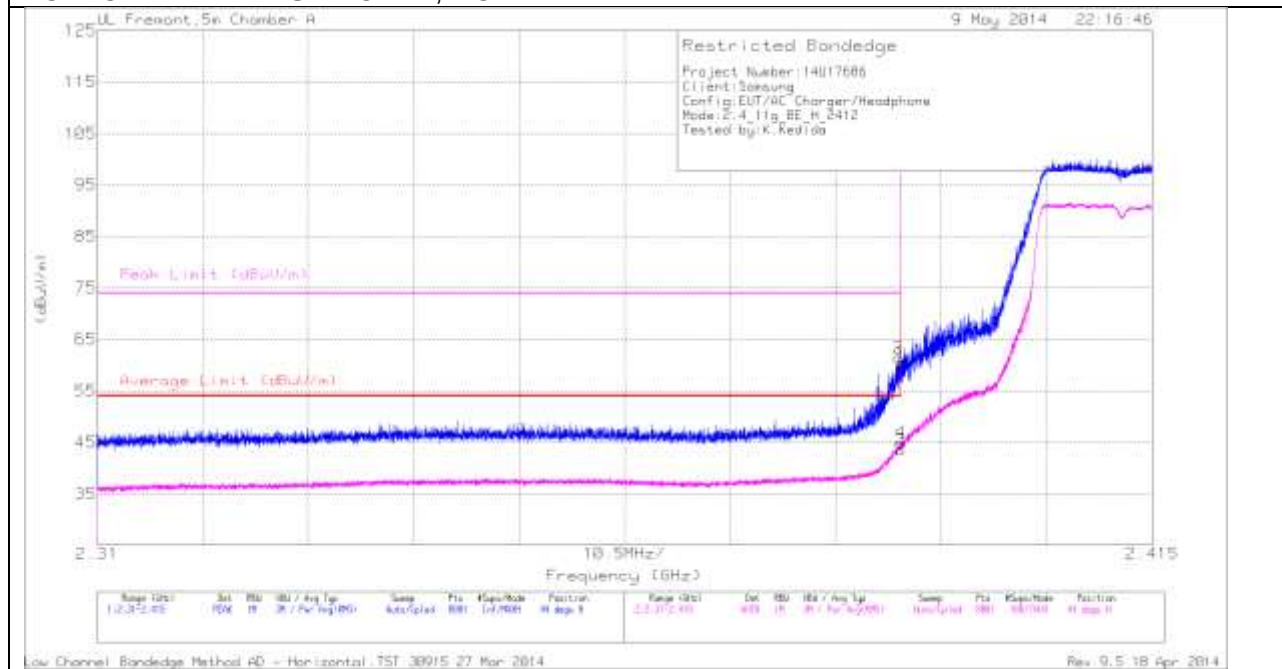
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.924	39.27	PK2	33.9	-29	44.17	-	-	74	-29.83	360	100	V
* 7.693	36.85	PK2	35.4	-24.5	47.75	-	-	74	-26.25	360	100	V
1.985	35.64	PK2	32	-24.5	43.14	-	-	-	-	360	100	H
2.112	43.37	PK2	31.7	-24.3	50.77	-	-	-	-	360	100	V
5.214	39.28	PK2	34.2	-28.4	45.08	-	-	-	-	360	100	H
10.559	35.11	PK2	37.6	-21.9	50.81	-	-	-	-	360	100	H

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

PK2 - KDB558074 Method: Maximum Peak

10.2.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED, HORIZ



Trace Markers

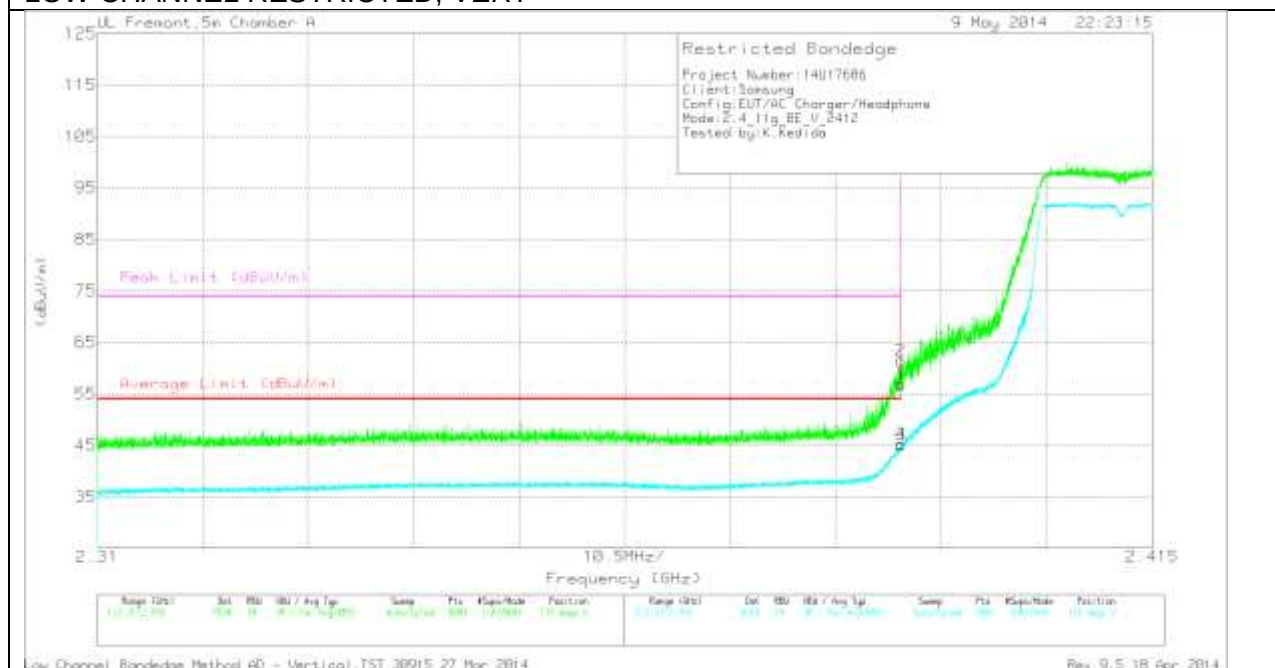
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Fl tri/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	52.61	PK	32.2	-24.4	0	60.41	-	-	74	-13.59	44	286	H
2	* 2.39	53.62	PK	32.2	-24.4	0	61.42	-	-	74	-12.58	44	286	H
3	* 2.39	35.52	RMS	32.2	-24.4	.3	43.62	54	-10.38	-	-	44	286	H
4	* 2.39	36.82	RMS	32.2	-24.4	.3	44.92	54	-9.08	-	-	44	286	H

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

PK - Peak detector

RMS - RMS detection

LOW CHANNEL RESTRICTED, VERT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/FI tr/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	48.99	PK	32.2	-24.4	0	56.79	-	-	74	-17.21	115	366	V
2	* 2.39	53.62	PK	32.2	-24.4	0	61.42	-	-	74	-12.58	115	366	V
3	* 2.39	37.09	RMS	32.2	-24.4	.3	45.19	54	-8.81	-	-	115	366	V
4	* 2.39	37.02	RMS	32.2	-24.4	.3	45.12	54	-8.88	-	-	115	366	V

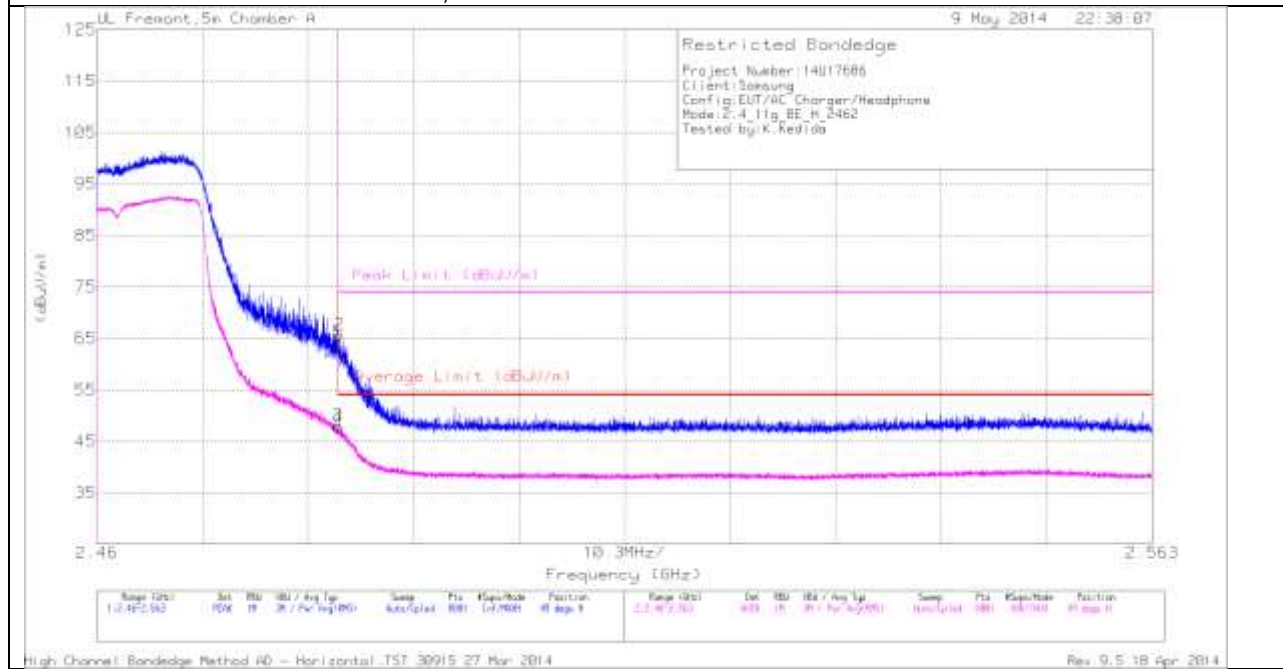
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL RESTRICTED, HORIZ



Trace Markers

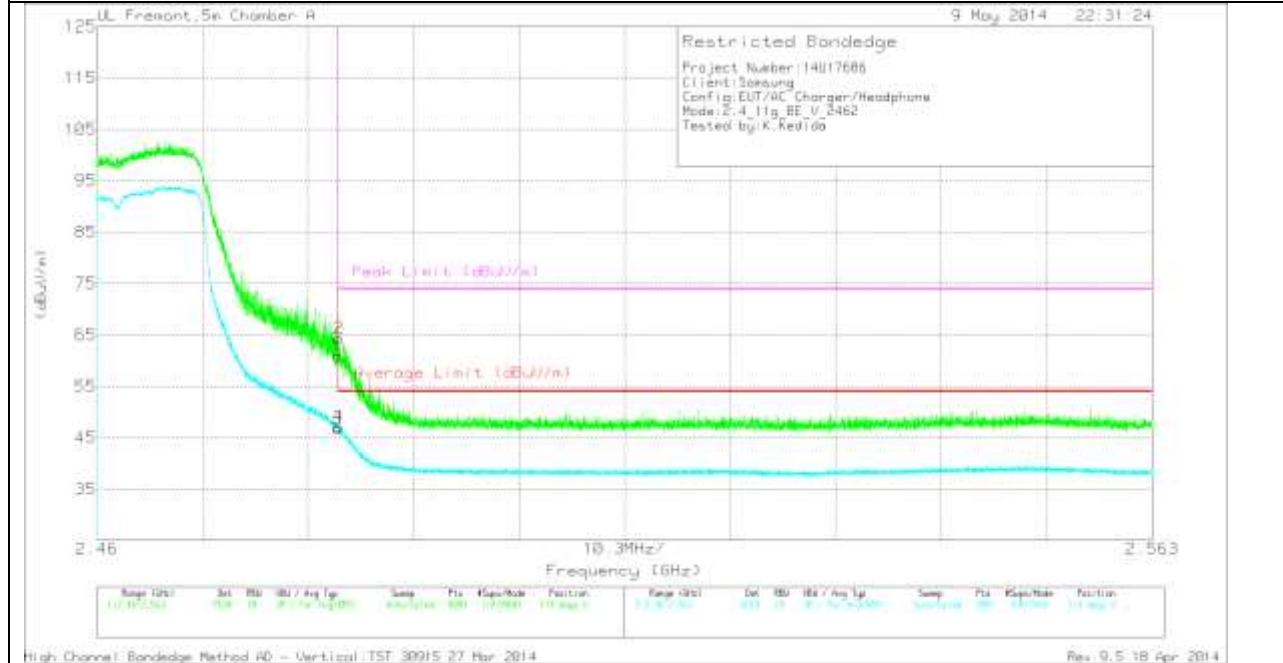
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	55.03	PK	32.7	-23.5	0	64.23	-	-	74	-9.77	49	339	H
2	* 2.484	56.51	PK	32.7	-23.5	0	65.71	-	-	74	-8.29	49	339	H
3	* 2.484	38.62	RMS	32.7	-23.5	.3	48.12	54	-5.88	-	-	49	339	H
4	* 2.484	38.25	RMS	32.7	-23.5	.3	47.75	54	-6.25	-	-	49	339	H

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

PK - Peak detector

RMS - RMS detection

HIGH CHANNEL BANDEDGE, VERT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/FI tr/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	51.74	PK	32.7	-23.5	0	60.94	-	-	74	-13.06	114	356	V
2	* 2.484	55.15	PK	32.7	-23.5	0	64.35	-	-	74	-9.65	114	356	V
3	* 2.484	37.32	RMS	32.7	-23.5	.3	46.82	54	-7.18	-	-	114	356	V
4	* 2.484	37.65	RMS	32.7	-23.5	.3	47.15	54	-6.85	-	-	114	356	V

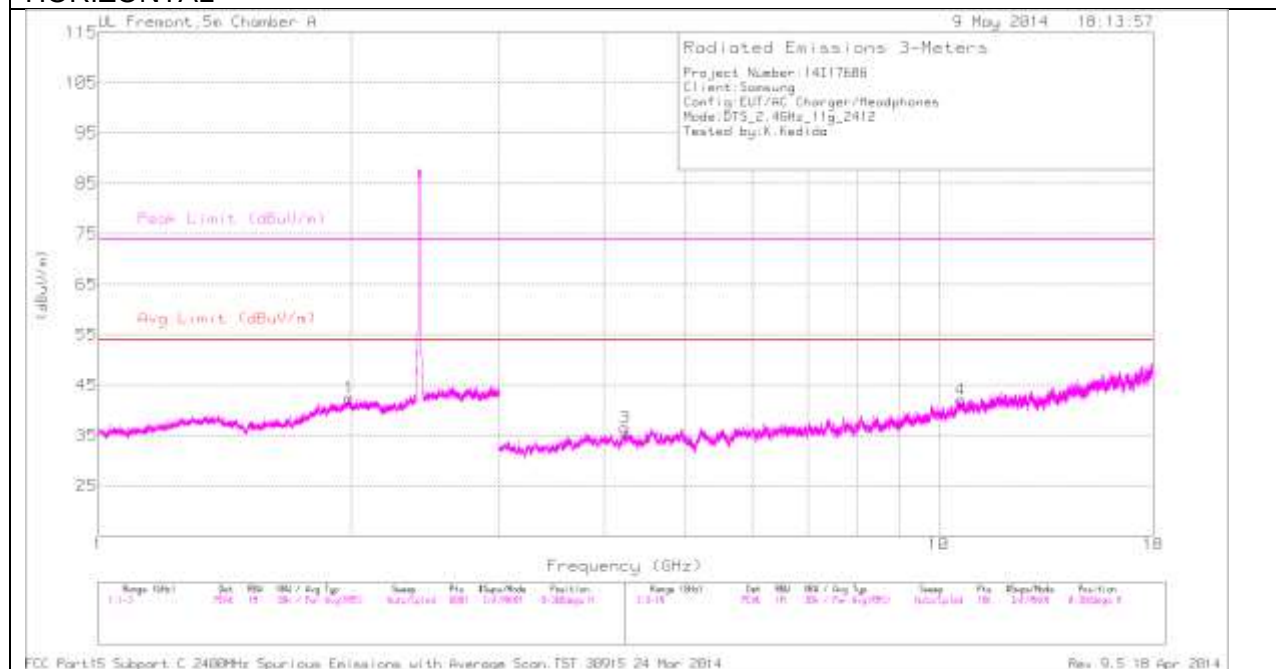
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

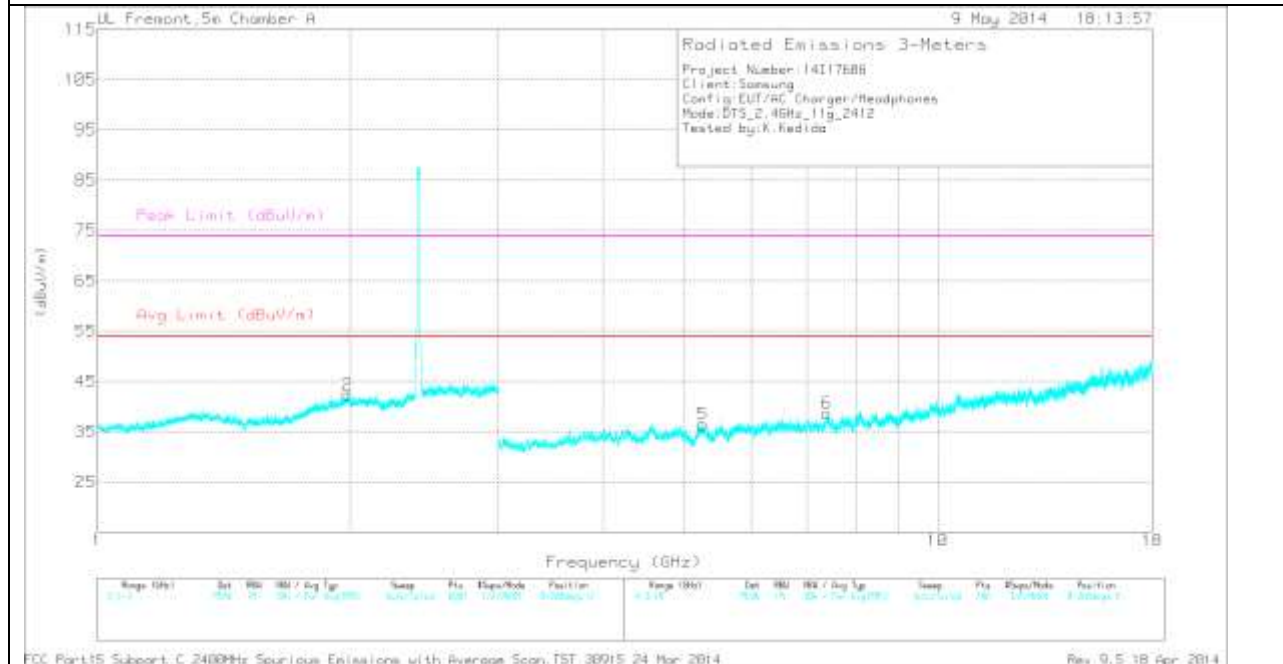
HARMONICS AND SPURIOUS EMISSIONS

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.

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.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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	* 4.235	32.4	PK	33.9	-29.8	36.5	-	-	74	-37.5	0-360	200	H
4	* 10.625	25.3	PK	37.7	-21	42	-	-	74	-32	0-360	100	H
6	* 7.376	27.79	PK	35.3	-24.5	38.59	-	-	74	-35.41	0-360	201	V
2	1.986	34.79	PK	32	-24.4	42.39	-	-	-	-	0-360	100	V
1	1.987	34.77	PK	32	-24.4	42.37	-	-	-	-	0-360	100	H
5	5.252	30.78	PK	34.2	-28.5	36.48	-	-	-	-	0-360	201	V

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

PK - Peak detector

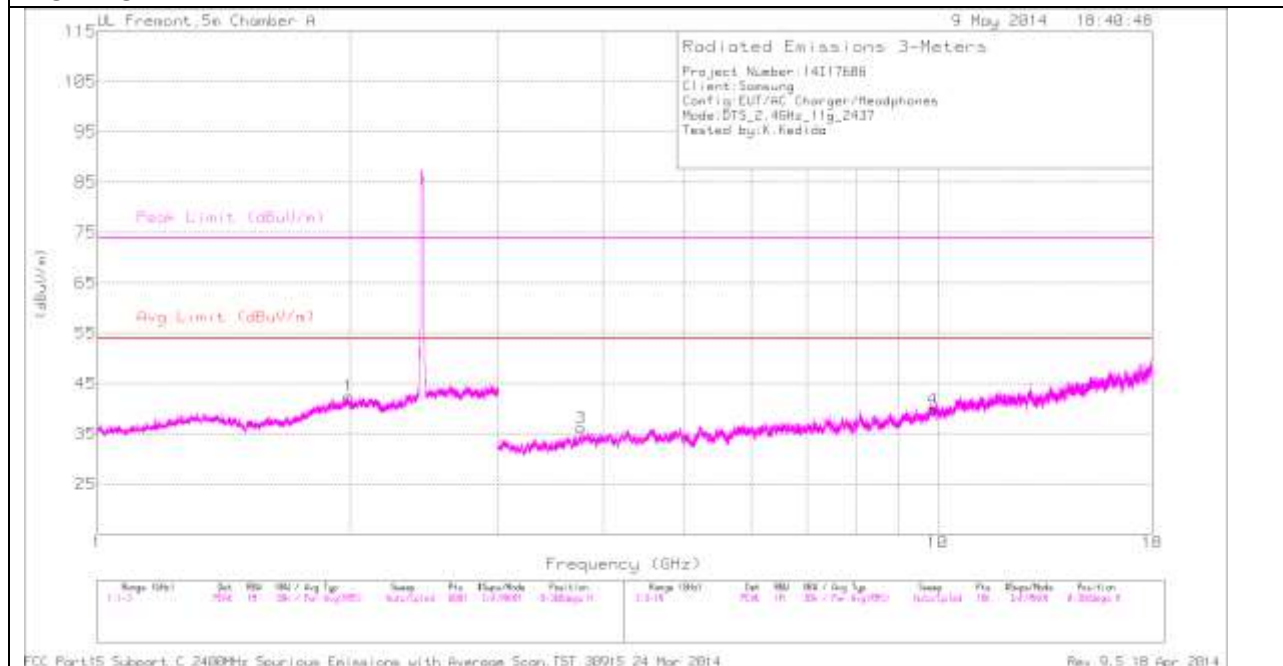
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.235	39.38	PK2	33.9	-29.7	43.58	-	-	74	-30.42	359	100	H
* 10.624	34.78	PK2	37.7	-21.1	51.38	-	-	74	-22.62	359	100	H
* 7.376	36.1	PK2	35.3	-24.5	46.9	-	-	74	-27.1	359	100	V
1.985	42.78	PK2	32	-24.4	50.38	-	-	-	-	359	100	H
1.985	33.02	PK2	32	-24.4	40.62	-	-	-	-	359	100	V
5.25	39.01	PK2	34.2	-28.6	44.61	-	-	-	-	359	100	V

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

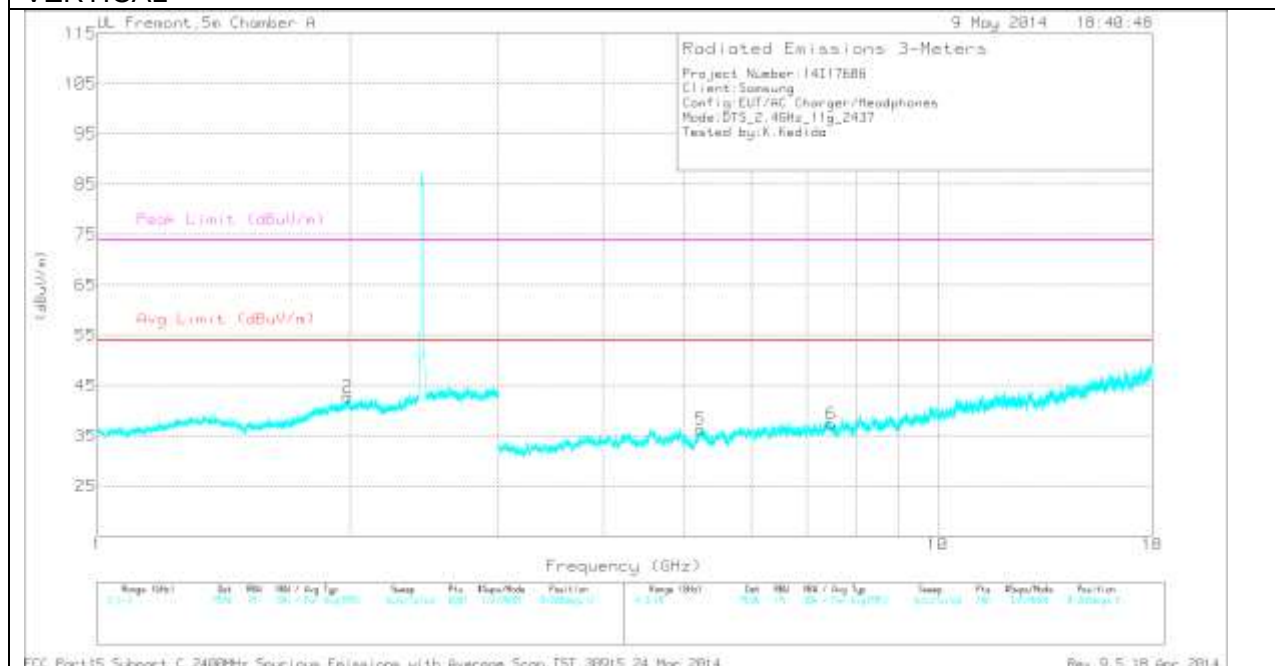
PK2 - KDB558074 Method: Maximum Peak

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.

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.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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	* 3.763	32.56	PK	33.5	-29.9	36.16	-	-	74	-37.84	0-360	200	H
6	* 7.468	28.14	PK	35.3	-26.1	37.34	-	-	74	-36.66	0-360	100	V
2	1.986	35.15	PK	32	-24.4	42.75	-	-	-	-	0-360	200	V
1	1.99	34.89	PK	32	-24.5	42.39	-	-	-	-	0-360	200	H
5	5.224	29.86	PK	34.2	-27.8	36.26	-	-	-	-	0-360	100	V
4	9.873	25.99	PK	37	-23.1	39.89	-	-	-	-	0-360	100	H

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

PK - Peak detector

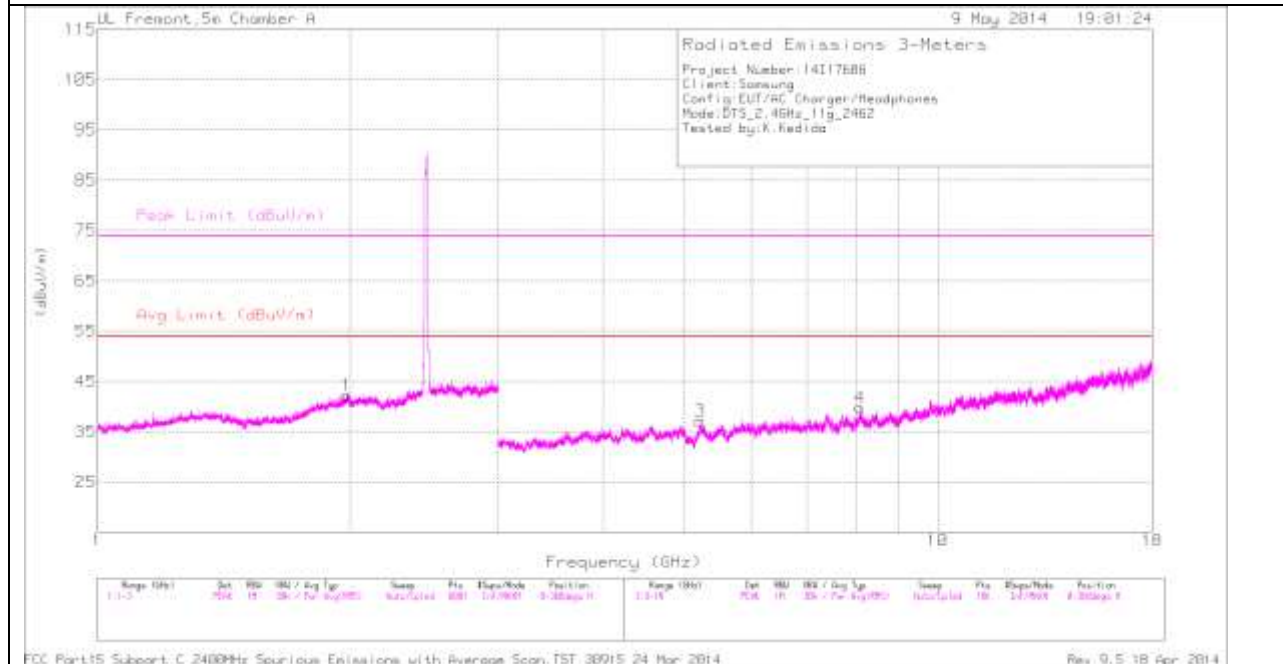
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.762	40.35	PK2	33.5	-29.9	43.95	-	-	74	-30.05	359	100	H
* 7.467	37.29	PK2	35.3	-26.1	46.49	-	-	74	-27.51	359	100	V
1.984	43.12	PK2	32	-24.5	50.62	-	-	-	-	359	100	H
1.99	42.71	PK2	32	-24.5	50.21	-	-	-	-	359	100	H
5.223	38.98	PK2	34.2	-27.9	45.28	-	-	-	-	359	100	V
9.873	35.1	PK2	37	-23.1	49	-	-	-	-	359	100	H

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

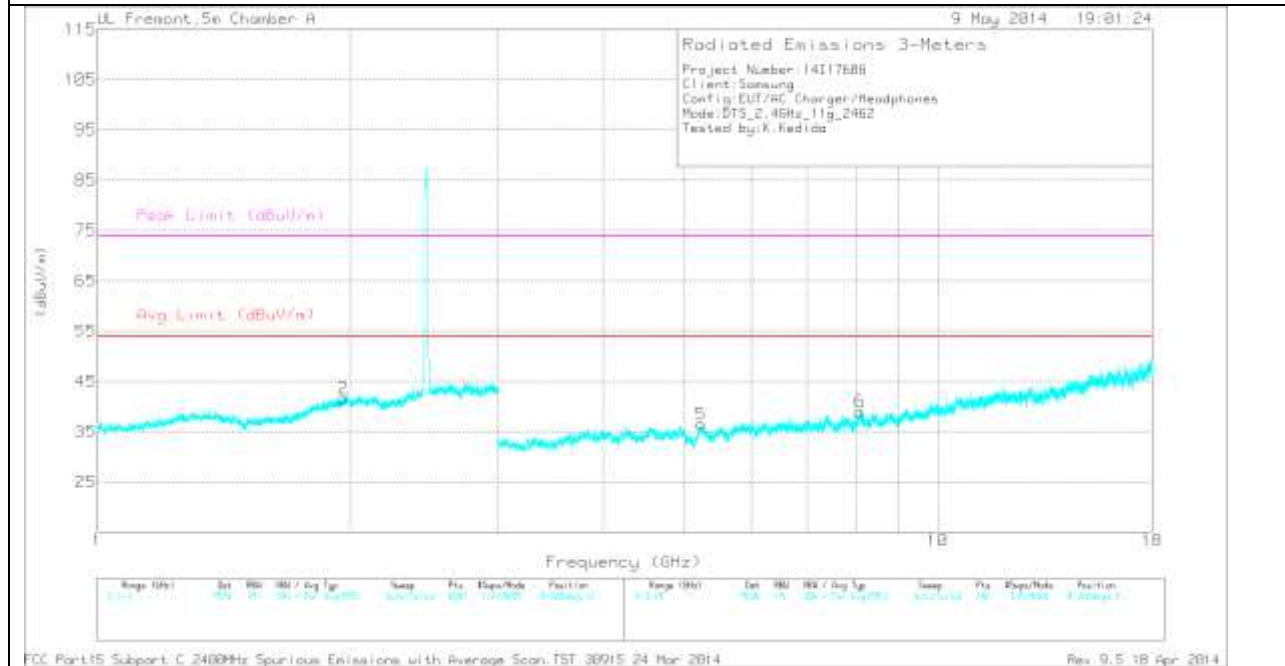
PK2 - KDB558074 Method: Maximum Peak

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.

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.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/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	* 8.082	27.99	PK	35.5	-23.7	39.79	-	-	74	-34.21	0-360	100	H
6	* 8.082	27.16	PK	35.5	-23.7	38.96	-	-	74	-35.04	0-360	200	V
2	1.964	34.73	PK	31.9	-25	41.63	-	-	-	-	0-360	200	V
1	1.981	34.87	PK	32	-24.6	42.27	-	-	-	-	0-360	100	H
3	5.217	31.2	PK	34.2	-28.2	37.2	-	-	-	-	0-360	200	H
5	5.227	30	PK	34.2	-27.7	36.5	-	-	-	-	0-360	100	V

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

PK - Peak detector

Radiated Emissions

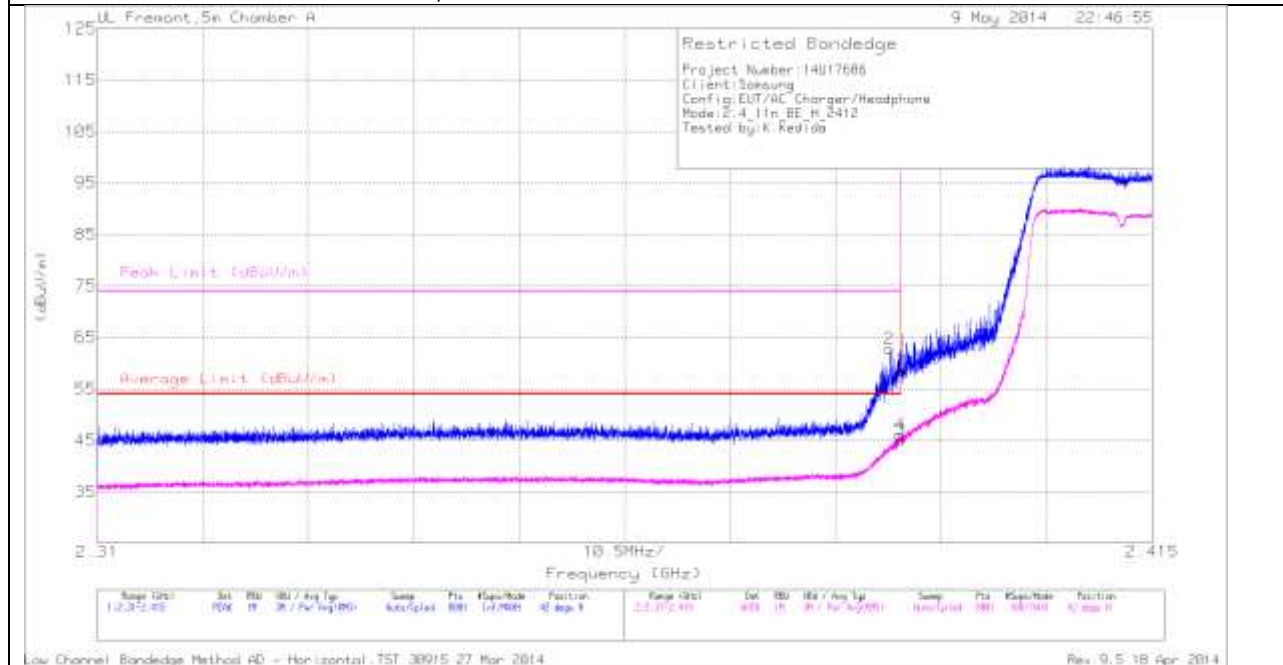
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 8.083	36.14	PK2	35.5	-23.7	47.94	-	-	74	-26.06	1	100	H
* 8.081	36.16	PK2	35.5	-23.6	48.06	-	-	74	-25.94	1	100	V
1.962	43.26	PK2	31.9	-25	50.16	-	-	-	-	1	100	H
1.963	43.01	PK2	31.9	-25	49.91	-	-	-	-	1	100	H
5.216	39.23	PK2	34.2	-28.2	45.23	-	-	-	-	1	100	H
5.225	38.32	PK2	34.2	-27.8	44.72	-	-	-	-	1	100	V

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

PK2 - KDB558074 Method: Maximum Peak

10.2.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

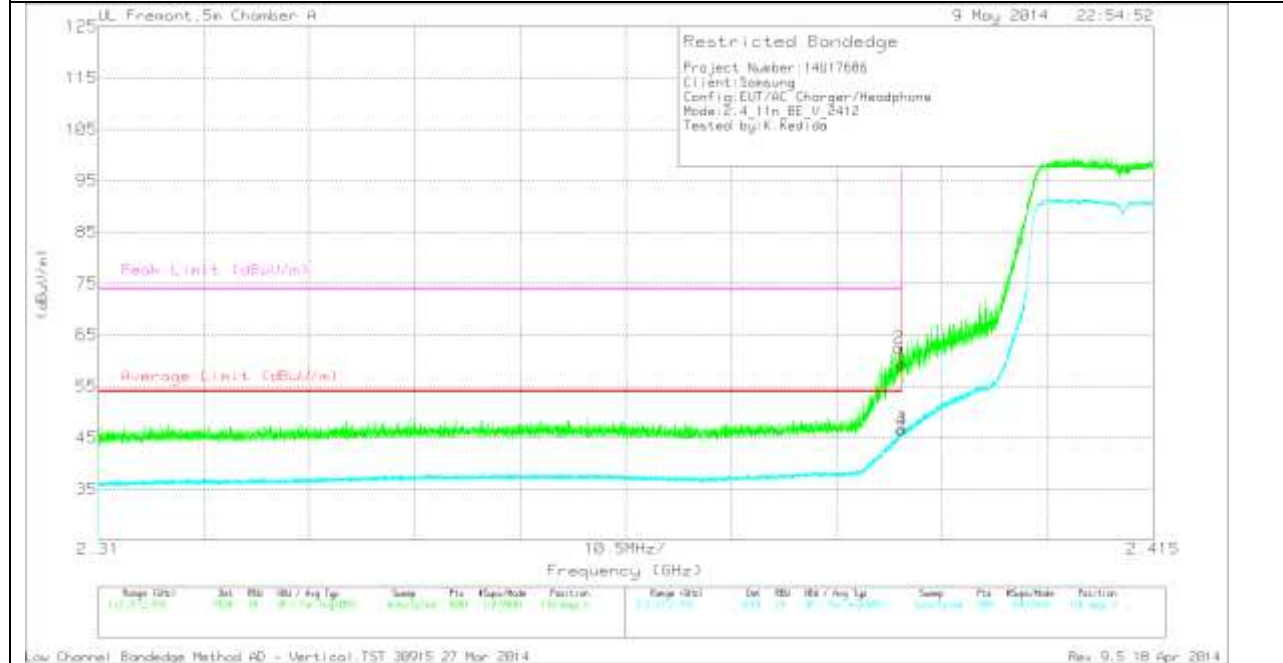
LOW CHANNEL RESTRICTED, HORIZ



Trace Markers

Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	50.88	PK	32.2	-24.4	0	58.68	-	-	74	-15.32	42	363	H
2	* 2.389	54.87	PK	32.2	-24.3	0	62.77	-	-	74	-11.23	42	363	H
3	* 2.39	36.98	RMS	32.2	-24.4	.3	45.08	54	-8.92	-	-	42	363	H
4	* 2.39	37.97	RMS	32.2	-24.4	.3	46.07	54	-7.93	-	-	42	363	H

LOW CHANNEL RESTRICTED, VERT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fi tri/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	51.37	PK	32.2	-24.4	0	59.17	-	-	74	-14.83	110	369	V
2	* 2.39	54.7	PK	32.2	-24.4	0	62.5	-	-	74	-11.5	110	369	V
3	* 2.39	38.61	RMS	32.2	-24.4	.3	46.71	54	-7.29	-	-	110	369	V
4	* 2.39	38.47	RMS	32.2	-24.4	.3	46.57	54	-7.43	-	-	110	369	V

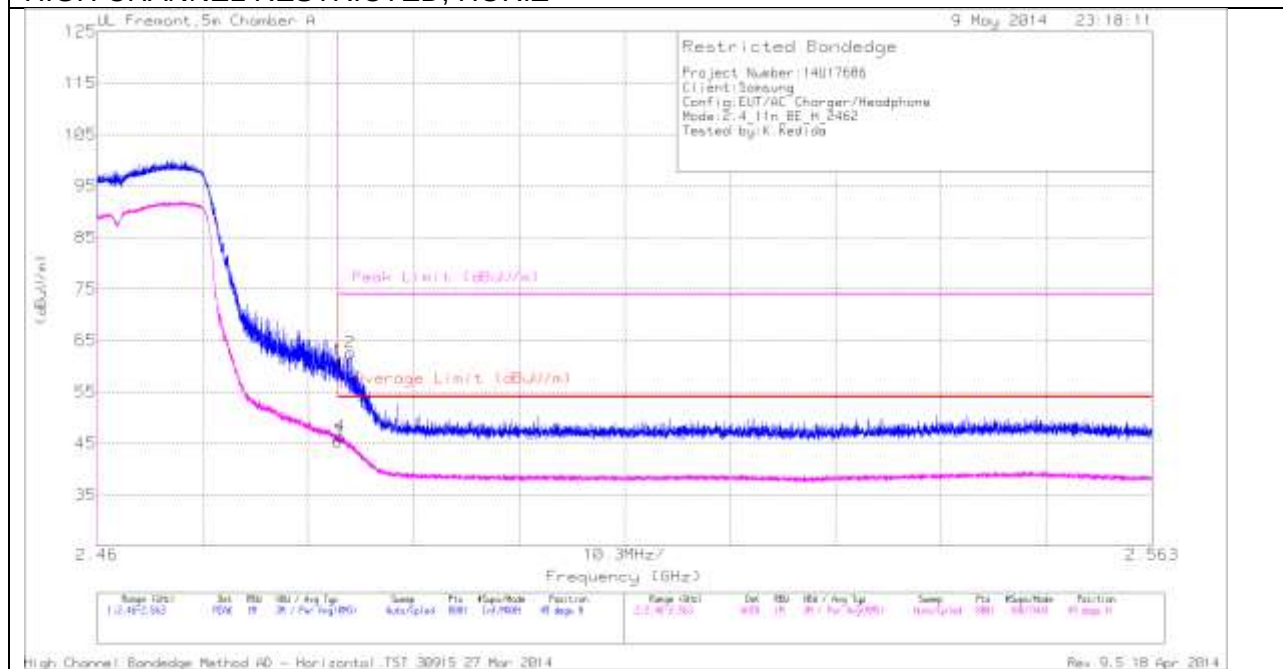
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HIGH CHANNEL RESTRICTED, HORIZ



Trace Markers

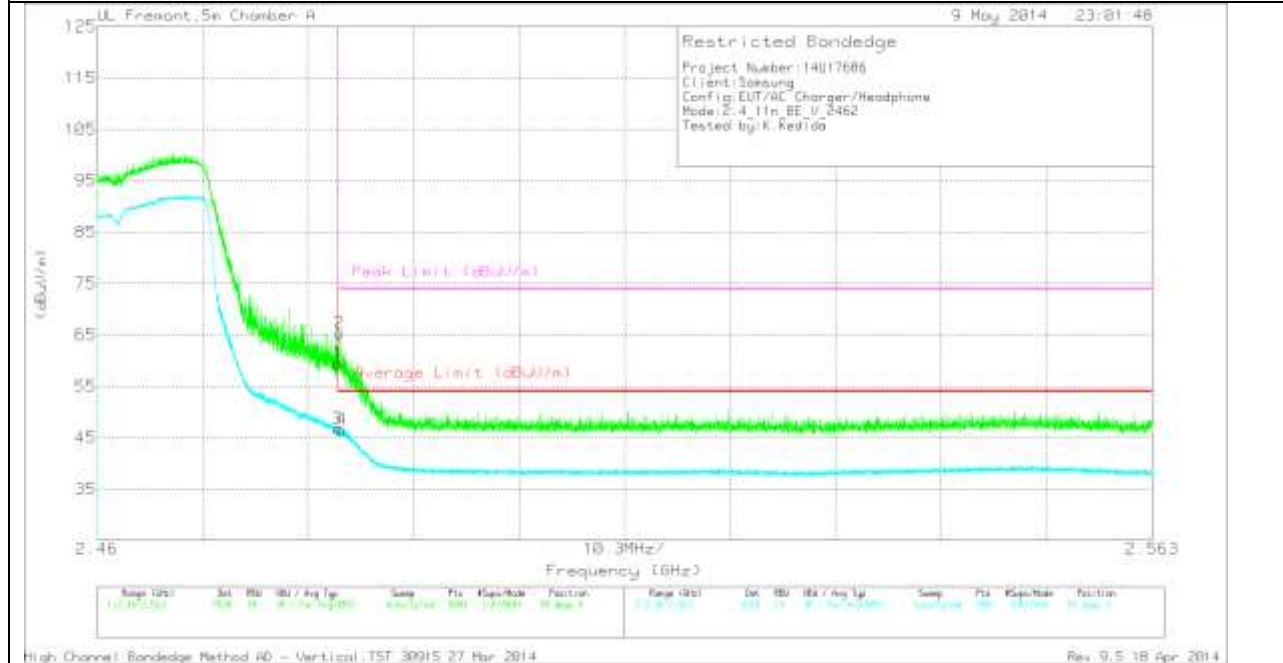
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	51.82	PK	32.7	-23.5	0	61.02	-	-	74	-12.98	49	343	H
2	* 2.485	53.42	PK	32.7	-23.5	0	62.62	-	-	74	-11.38	49	343	H
3	* 2.484	35.89	RMS	32.7	-23.5	.3	45.39	54	-8.61	-	-	49	343	H
4	* 2.484	36.86	RMS	32.7	-23.5	.3	46.36	54	-7.64	-	-	49	343	H

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

PK - Peak detector

RMS - RMS detection

HIGH CHANNEL BANDEDGE, VERT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/FI tr/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	50.35	PK	32.7	-23.5	0	59.55	-	-	74	-14.45	94	338	V
2	* 2.484	56.15	PK	32.7	-23.5	0	65.35	-	-	74	-8.65	94	338	V
3	* 2.484	37.25	RMS	32.7	-23.5	.3	46.75	54	-7.25	-	-	94	338	V
4	* 2.484	37.12	RMS	32.7	-23.5	.3	46.62	54	-7.38	-	-	94	338	V

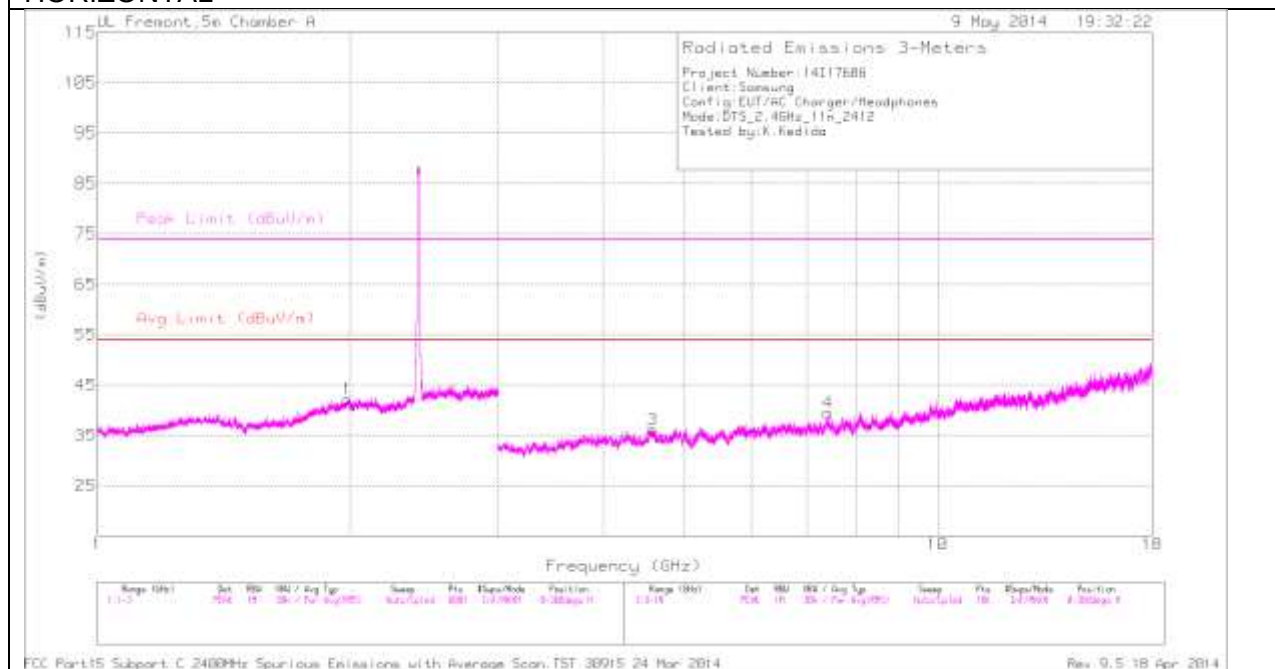
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

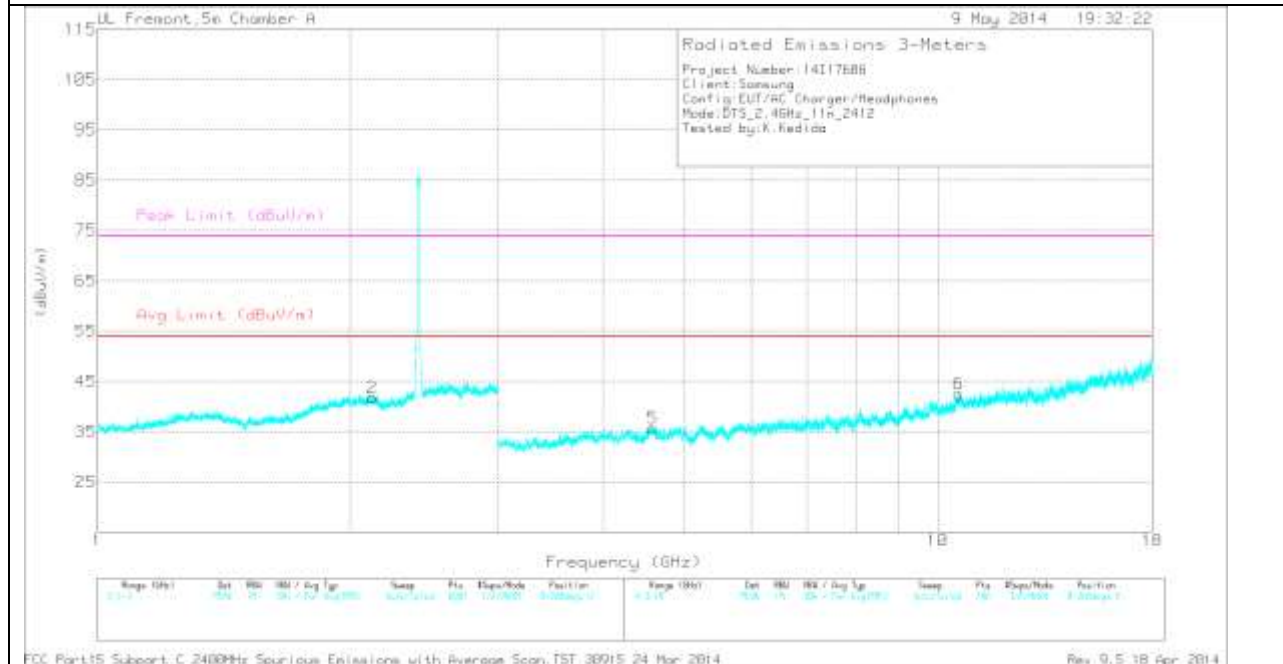
HARMONICS AND SPURIOUS EMISSIONS

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.

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.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/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	* 4.58	30.71	PK	34	-28.6	36.11	-	-	74	-37.89	0-360	200	H
4	* 7.403	29.18	PK	35.3	-25	39.48	-	-	74	-34.52	0-360	200	H
5	* 4.583	30.4	PK	34	-28.7	35.7	-	-	74	-38.3	0-360	201	V
1	1.985	34.56	PK	32	-24.4	42.16	-	-	-	-	0-360	200	H
2	2.124	34.59	PK	31.6	-24.4	41.79	-	-	-	-	0-360	200	V
6	10.587	26.79	PK	37.7	-22	42.49	-	-	-	-	0-360	201	V

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

PK - Peak detector

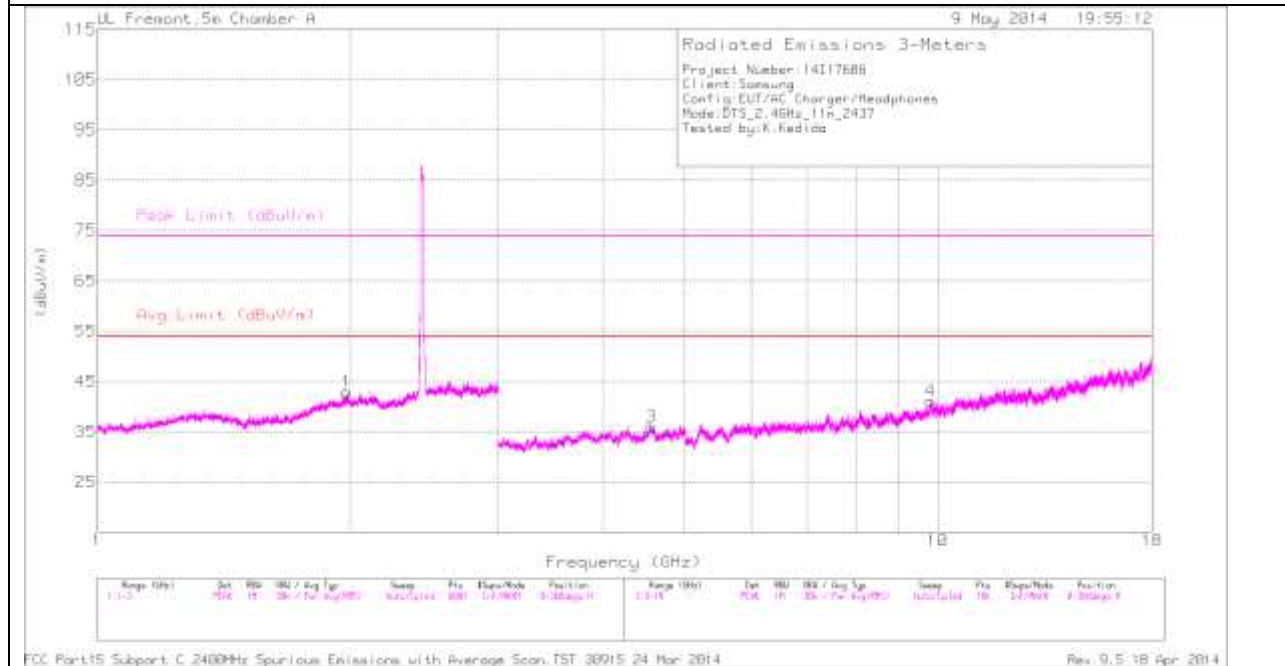
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.58	38.89	PK2	34	-28.6	44.29	-	-	74	-29.71	1	100	H
* 7.402	37.04	PK2	35.3	-25	47.34	-	-	74	-26.66	1	100	H
* 4.583	39.27	PK2	34	-28.7	44.57	-	-	74	-29.43	1	100	V
1.985	43.09	PK2	32	-24.4	50.69	-	-	-	-	1	100	H
2.123	43.5	PK2	31.6	-24.4	50.7	-	-	-	-	1	100	V
10.586	34.75	PK2	37.7	-22	50.45	-	-	-	-	1	100	V

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

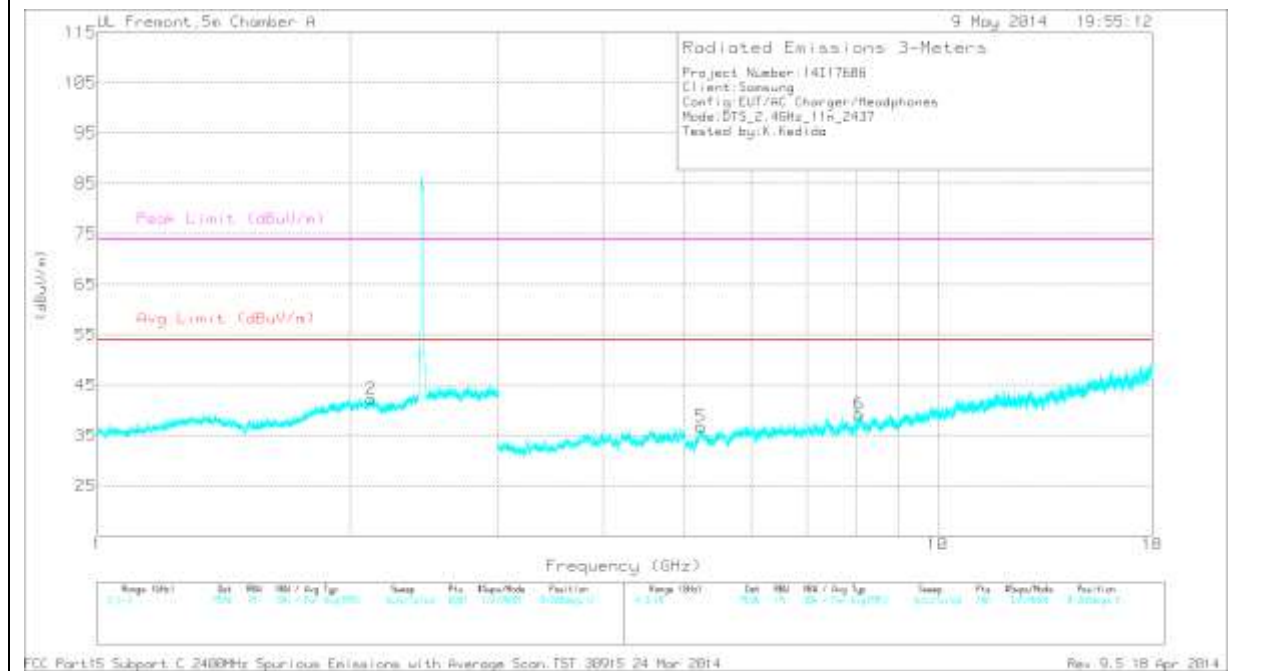
PK2 - KDB558074 Method: Maximum Peak

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.

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.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/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	* 4.567	30.5	PK	33.9	-28.4	36	-	-	74	-38	0-360	100	H
6	* 8.061	28.33	PK	35.5	-24.6	39.23	-	-	74	-34.77	0-360	201	V
1	1.981	35.46	PK	32	-24.6	42.86	-	-	-	-	0-360	200	H
2	2.118	34.69	PK	31.7	-24.1	42.29	-	-	-	-	0-360	100	V
5	5.225	30.33	PK	34.2	-27.8	36.73	-	-	-	-	0-360	100	V
4	9.805	26.95	PK	36.9	-22.7	41.15	-	-	-	-	0-360	100	H

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

PK - Peak detector

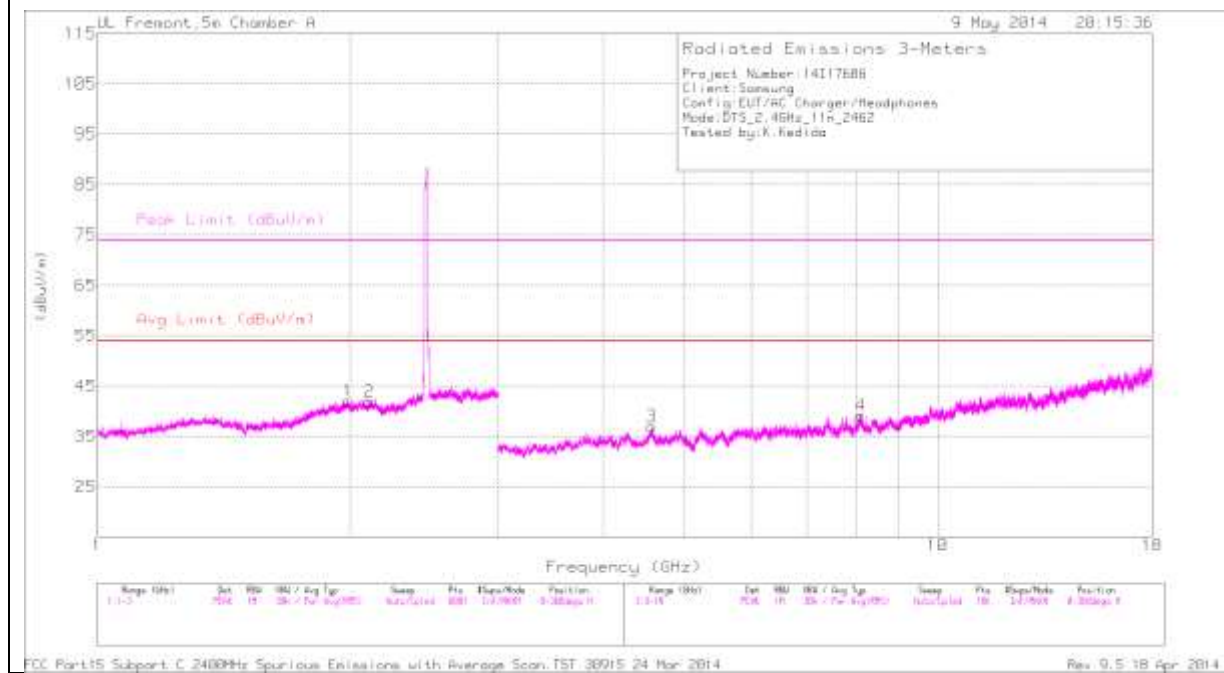
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.565	39.25	PK2	33.9	-28.3	44.85	-	-	74	-29.15	1	100	H
* 8.061	36.64	PK2	35.5	-24.7	47.44	-	-	74	-26.56	1	100	V
1.98	42.53	PK2	32	-24.6	49.93	-	-	-	-	1	100	H
2.117	43.33	PK2	31.7	-24.1	50.93	-	-	-	-	1	100	V
5.225	38.84	PK2	34.2	-27.8	45.24	-	-	-	-	1	100	V
9.806	35.04	PK2	36.9	-22.7	49.24	-	-	-	-	1	100	H

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

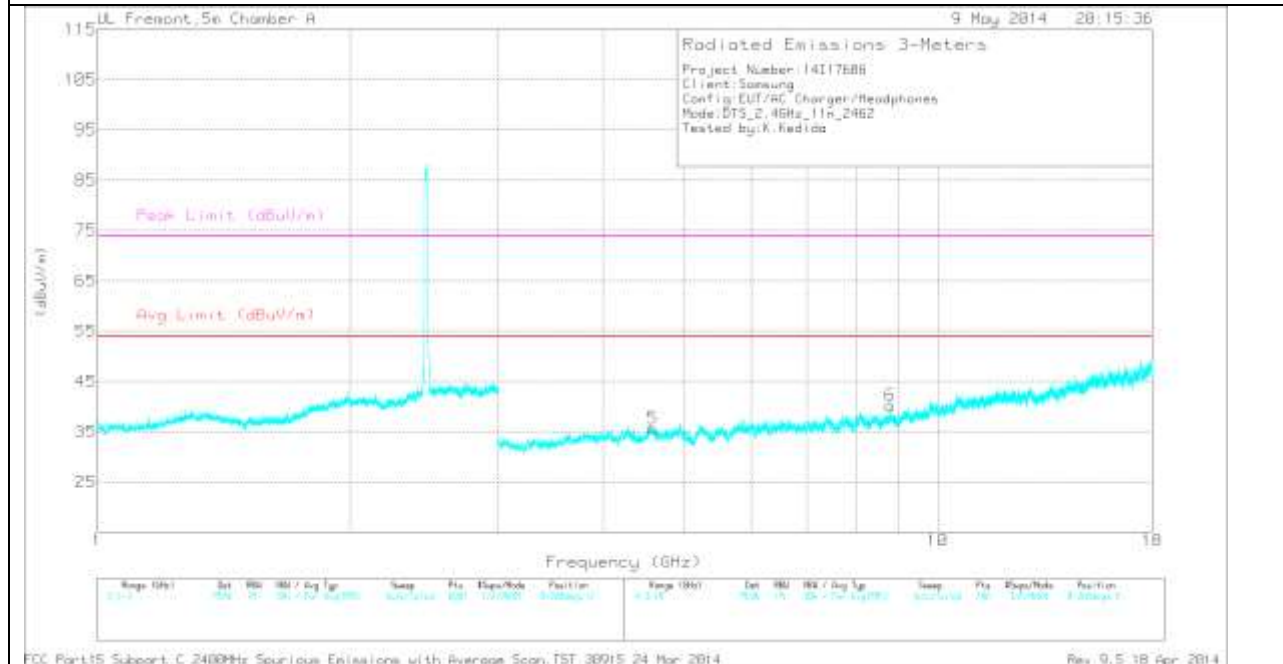
PK2 - KDB558074 Method: Maximum Peak

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.

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.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/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	* 4.568	31.45	PK	33.9	-28.4	36.95	-	-	74	-37.05	0-360	200	H
4	* 8.093	27.66	PK	35.5	-24	39.16	-	-	74	-34.84	0-360	200	H
5	* 4.58	30.3	PK	34	-28.6	35.7	-	-	74	-38.3	0-360	100	V
1	1.989	34.42	PK	32	-24.4	42.02	-	-	-	-	0-360	200	H
2	2.108	34.7	PK	31.7	-24.5	41.9	-	-	-	-	0-360	200	H
6	8.774	28.02	PK	35.8	-23.6	40.22	-	-	-	-	0-360	100	V

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

PK - Peak detector

Radiated Emissions

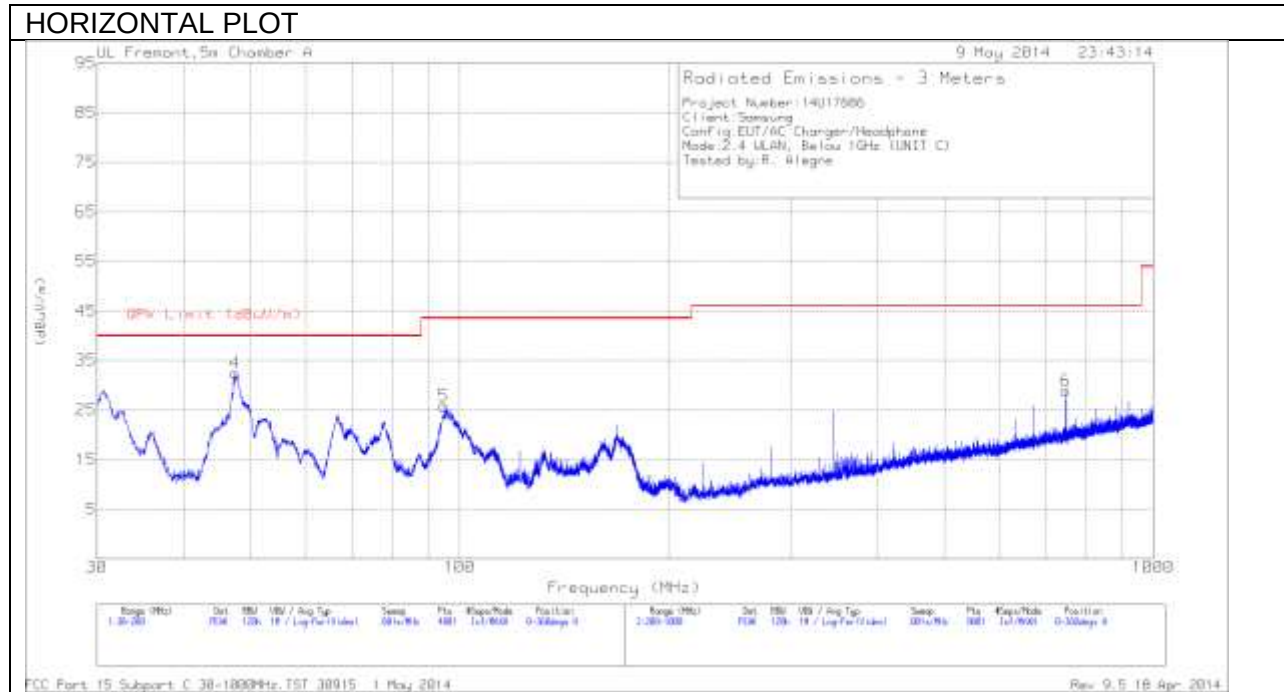
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.568	40.34	PK2	33.9	-28.4	45.84	-	-	74	-28.16	1	100	H
* 8.093	36.13	PK2	35.5	-24	47.63	-	-	74	-26.37	1	100	H
* 4.578	40.25	PK2	34	-28.6	45.65	-	-	74	-28.35	1	100	V
1.989	42.76	PK2	32	-24.4	50.36	-	-	-	-	1	100	H
2.108	42.63	PK2	31.7	-24.5	49.83	-	-	-	-	1	100	H
8.773	34.93	PK2	35.8	-23.5	47.23	-	-	-	-	1	100	V

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

PK2 - KDB558074 Method: Maximum Peak

10.3. WORST-CASE BELOW 1 GHz

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



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



Below 1G Data

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.935	54.15	PK	20.8	-31.2	43.75	40	3.75	0-360	101	V
4	47.425	54.56	PK	9.1	-31.2	32.46	40	-7.54	0-360	400	H
2	47.425	59.31	PK	9.1	-31.2	37.21	40	-2.79	0-360	101	V
5	94.94	47.71	PK	8.8	-30.6	25.91	43.52	-17.61	0-360	200	H
6	748.8	36.45	PK	20.7	-28.2	28.95	46.02	-17.07	0-360	101	H
3	748.8	31.78	PK	20.7	-28.2	24.28	46.02	-21.74	0-360	200	V

PK - Peak detector
Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
30.935	50.28	QP	20.9	-31.2	39.98	40	-.02	210	102	V
30.935	50.22	QP	20.9	-31.2	39.92	40	-.08	210	102	V

QP - Quasi-Peak detector

11. 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.

RESULTS

6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

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	.159	41.59	PK	1.3	0	42.89	65.5	-22.61	-	-
2	.159	28.86	Av	1.3	0	30.16	-	-	55.5	-25.34
3	.366	49.55	PK	.5	0	50.05	58.6	-8.55	-	-
4	.366	41.17	Av	.5	0	41.67	-	-	48.6	-6.93
5	1.419	47.54	PK	.2	.1	47.84	56	-8.16	-	-
6	1.419	33.32	Av	.2	.1	33.62	-	-	46	-12.38
7	2.274	48.44	PK	.2	.1	48.74	56	-7.26	-	-
8	2.274	33.78	Av	.2	.1	34.08	-	-	46	-11.92
9	2.58	48.42	PK	.2	.1	48.72	56	-7.28	-	-
10	2.58	34.43	Av	.2	.1	34.73	-	-	46	-11.27
11	2.985	48.11	PK	.2	.1	48.41	56	-7.59	-	-
12	2.985	32.51	Av	.2	.1	32.81	-	-	46	-13.19
13	8.6145	36.39	PK	.2	.1	36.69	60	-23.31	-	-
14	8.6145	22.99	Av	.2	.1	23.29	-	-	50	-26.71
15	29.9265	35.8	PK	.3	.3	36.4	60	-23.6	-	-
16	29.9265	18.59	Av	.3	.3	19.19	-	-	50	-30.81

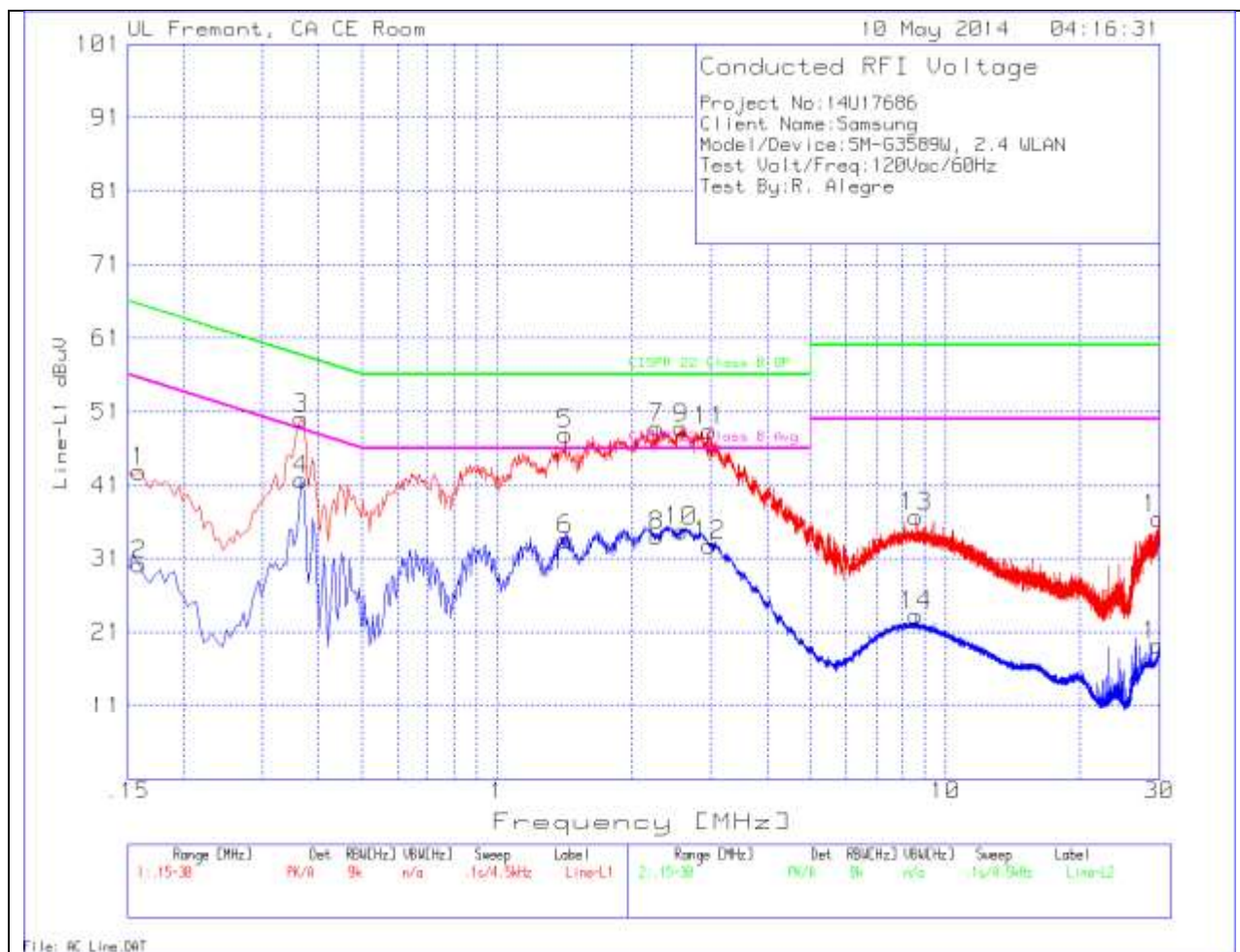
Line-L2 .15 - 30MHz

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)
17	.15	41.7	PK	1.5	0	43.2	66	-22.8	-	-
18	.15	20.86	Av	1.5	0	22.36	-	-	56	-33.64
19	.3615	44.35	PK	.5	0	44.85	58.7	-13.85	-	-
20	.3615	29.7	Av	.5	0	30.2	-	-	48.7	-18.5
21	1.6035	44.58	PK	.2	.1	44.88	56	-11.12	-	-
22	1.6035	27.6	Av	.2	.1	27.9	-	-	46	-18.1
23	1.8375	46.52	PK	.2	.1	46.82	56	-9.18	-	-
24	1.8375	28.82	Av	.2	.1	29.12	-	-	46	-16.88
25	1.8825	46.61	PK	.2	.1	46.91	56	-9.09	-	-
26	1.8825	29.17	Av	.2	.1	29.47	-	-	46	-16.53
27	2.463	47.85	PK	.2	.1	48.15	56	-7.85	-	-
28	2.463	30.91	Av	.2	.1	31.21	-	-	46	-14.79
29	2.958	45.62	PK	.2	.1	45.92	56	-10.08	-	-
30	2.958	28.31	Av	.2	.1	28.61	-	-	46	-17.39
31	8.2815	32.7	PK	.2	.1	33	60	-27	-	-
32	8.2815	17.64	Av	.2	.1	17.94	-	-	50	-32.06
33	8.43	32.9	PK	.2	.1	33.2	60	-26.8	-	-
34	8.43	17.7	Av	.2	.1	18	-	-	50	-32
35	9.1185	33.97	PK	.2	.1	34.27	60	-25.73	-	-
36	9.1185	17	Av	.2	.1	17.3	-	-	50	-32.7
37	27.3435	28.92	PK	.3	.3	29.52	60	-30.48	-	-
38	27.3435	13.75	Av	.3	.3	14.35	-	-	50	-35.65
39	29.8455	28.81	PK	.3	.3	29.41	60	-30.59	-	-
40	29.8455	13.32	Av	.3	.3	13.92	-	-	50	-36.08

PK - Peak detector
Av - average detection

LINE 1 RESULTS



LINE 2 RESULTS

