



FCC CFR47 PART 15 SUBPART C

**BLUETOOTH LOW ENERGY
CERTIFICATION TEST REPORT**

FOR

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

MODEL NUMBER: SM-G150N0, SM-G155S

FCC ID: A3LSMG150

REPORT NUMBER: 15I20924-E2

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Prepared for

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NVLAP LAB CODE 200065-0

Revision History

Issue			
Rev.	Date	Revisions	Revised By
--	6/15/15	Initial Issue	P. Zhang

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END OF REPORT61

ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth and WLAN 2.4GHz b/g/n
MODEL: SM-G150N0, SM-G155S
SERIAL NUMBER: R38G40TQMVX (Conducted), R38G40TQM9X (Radiated)
DATE TESTED: MAY 8 – JUN 5, 2015

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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1. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

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(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☐ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☒ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☐ Chamber G(IC: 2324B-7)
	☐ Chamber H(IC: 2324B-8)

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>.

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 18000 MHz	4.94 dB

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

4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

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

4.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402-2480	BLE	7.39	5.48

4.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of 2.61 dBi.

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.

4.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Samsung	ETA0U83KWK	DK1FB05HS	N/A
Earphone	Samsung	N/A	N/A	N/A

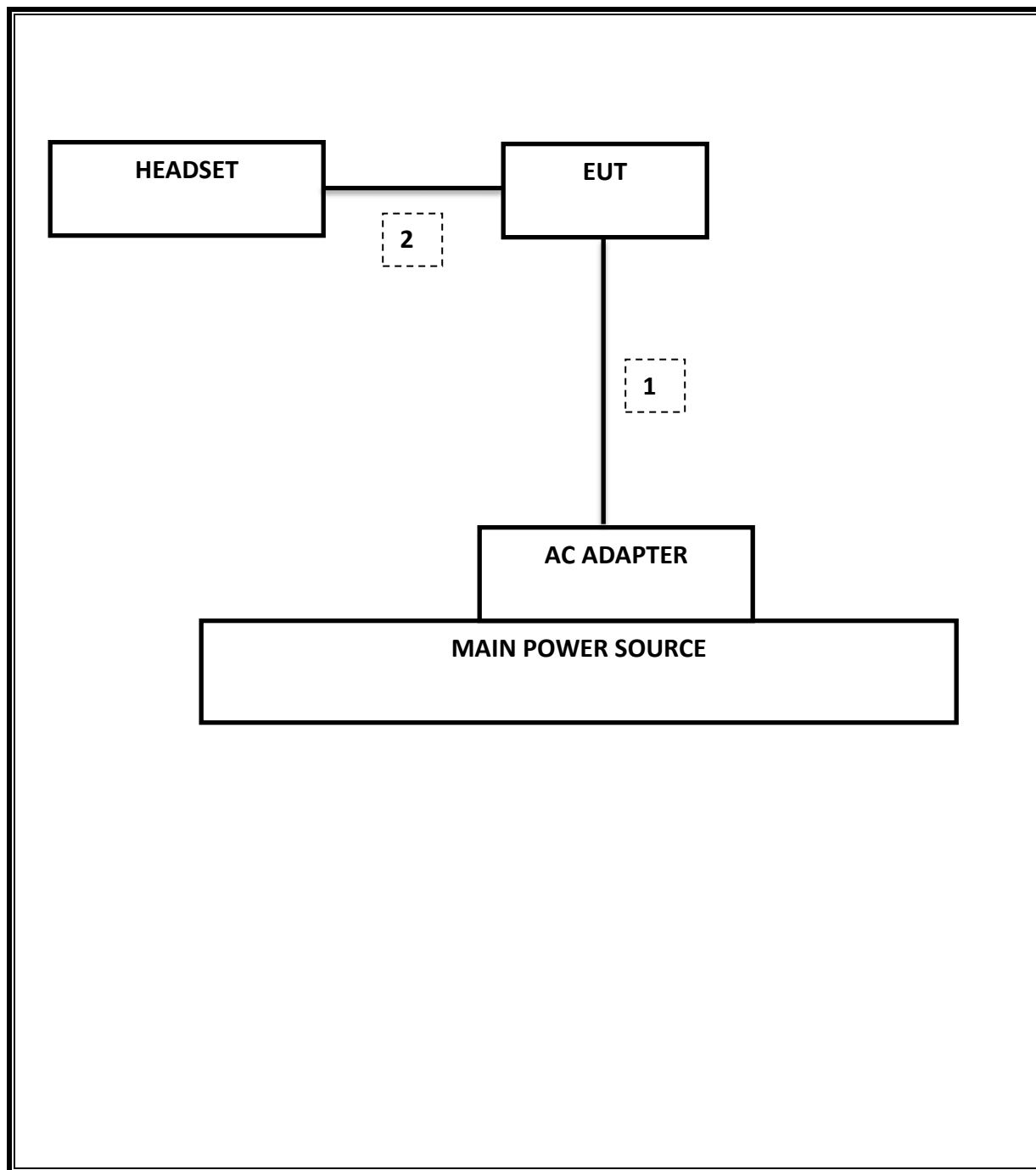
I/O CABLES

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

EUT was set in the Hidden menu mode to enable BLE communications.

SETUP DIAGRAM FOR TESTS



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	12/20/15
Spectrum Analyzer, 9KHz-40GHz	HP	8564E	C00986	04/01/16
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	08/13/15
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/18/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
Antenna, Horn, 1-18 GHz	ETS	3117	C01022	02/21/16
Antenna, Horn, 18- 26 GHz	ARA	MWH-1826/B	C00946	11/12/15
Antenna, Horn, 26-40 GHz	ARA	MWH-2640	C00891	06/28/15
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/16
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/16
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 - 40GHz	Miteq	NSP4000-SP2	C00990	08/20/15
Attenuator / Switch driver	HP	11713A	F00204	CNR
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	F00219	05/23/16
High Pass Filter 6GHz	Micro-Tronics	HPS17542	F00222	05/22/16
High Pass Filter 3GHz	Micro-Tronics	HPM17543	F00224	05/22/16

Test Software List			
Description	Manufacturer	Model	Version
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

6. SUMMARY

7.

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-247 5.2.1	Occupied Band width (6dB)	>500KHz	Conducted	Pass	0.6829 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-47.85 dBm
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm		Pass	7.39dBm
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass	-6.11 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass	40.8 dBuV(AV)
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m		Pass	41.42 dBuV/m

ANTENNA PORT TEST RESULTS

7.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

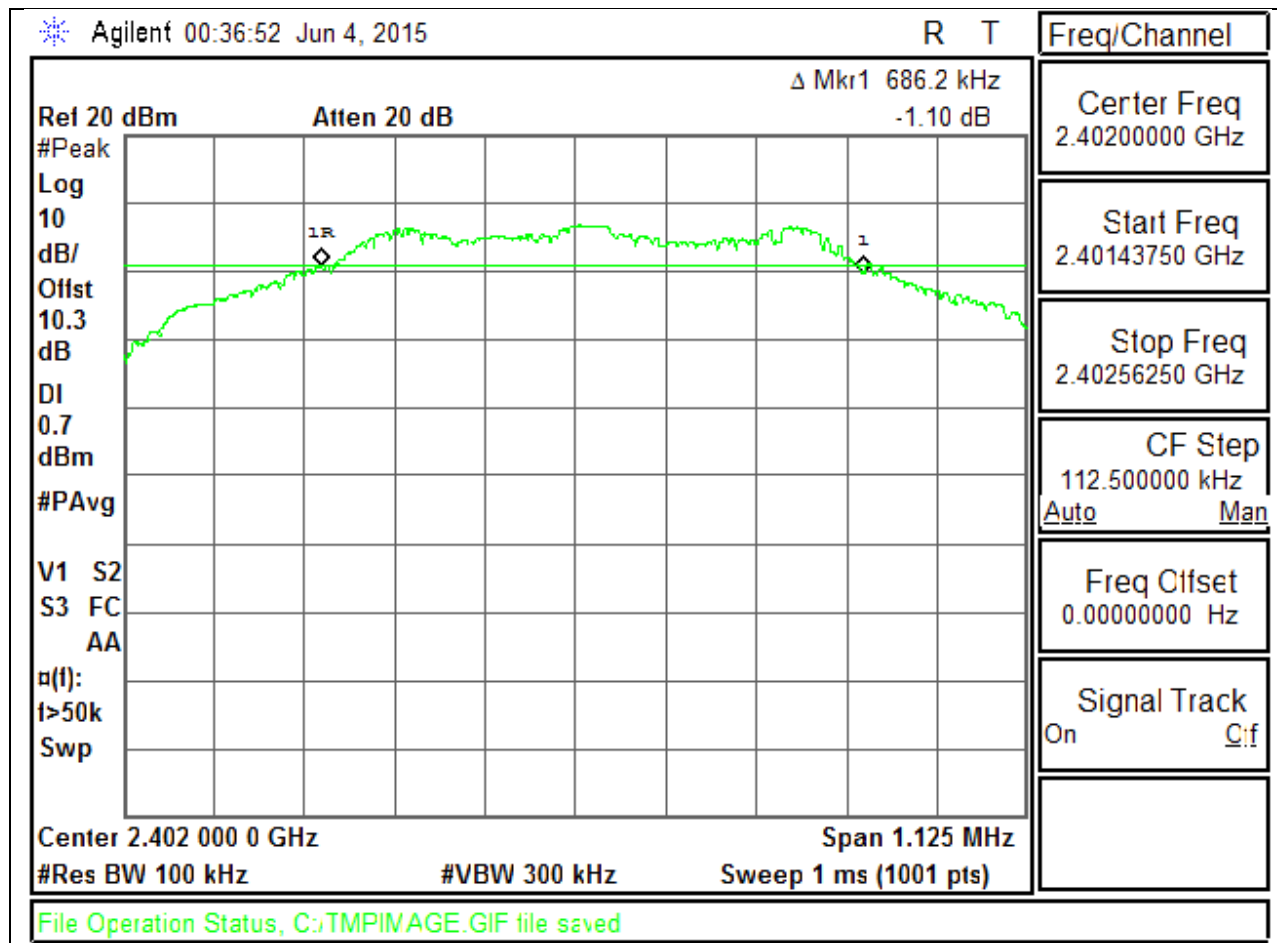
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

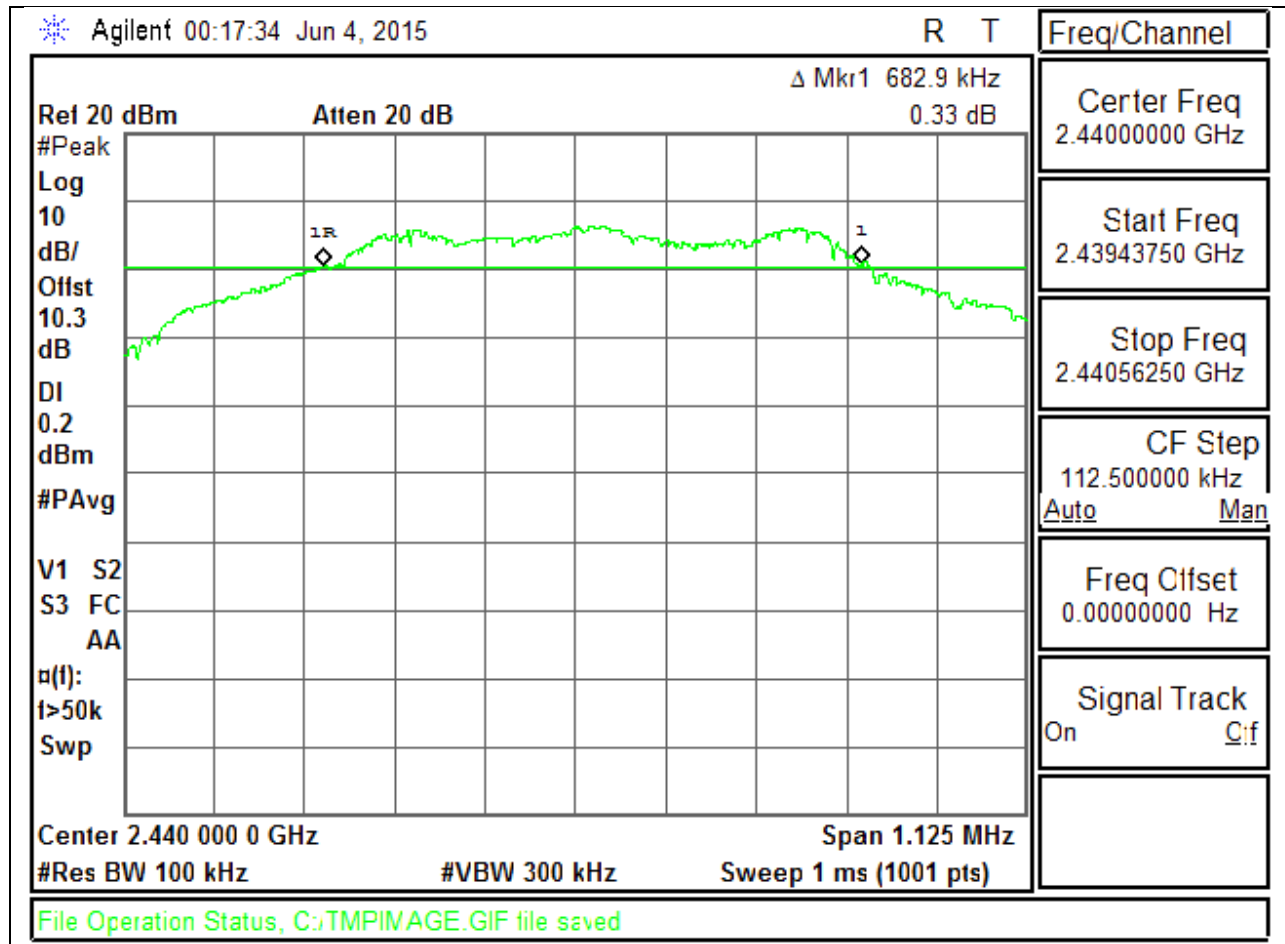
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6862	0.5
Middle	2440	0.6829	0.5
High	2480	0.7860	0.5

6 dB BANDWIDTH PLOTS

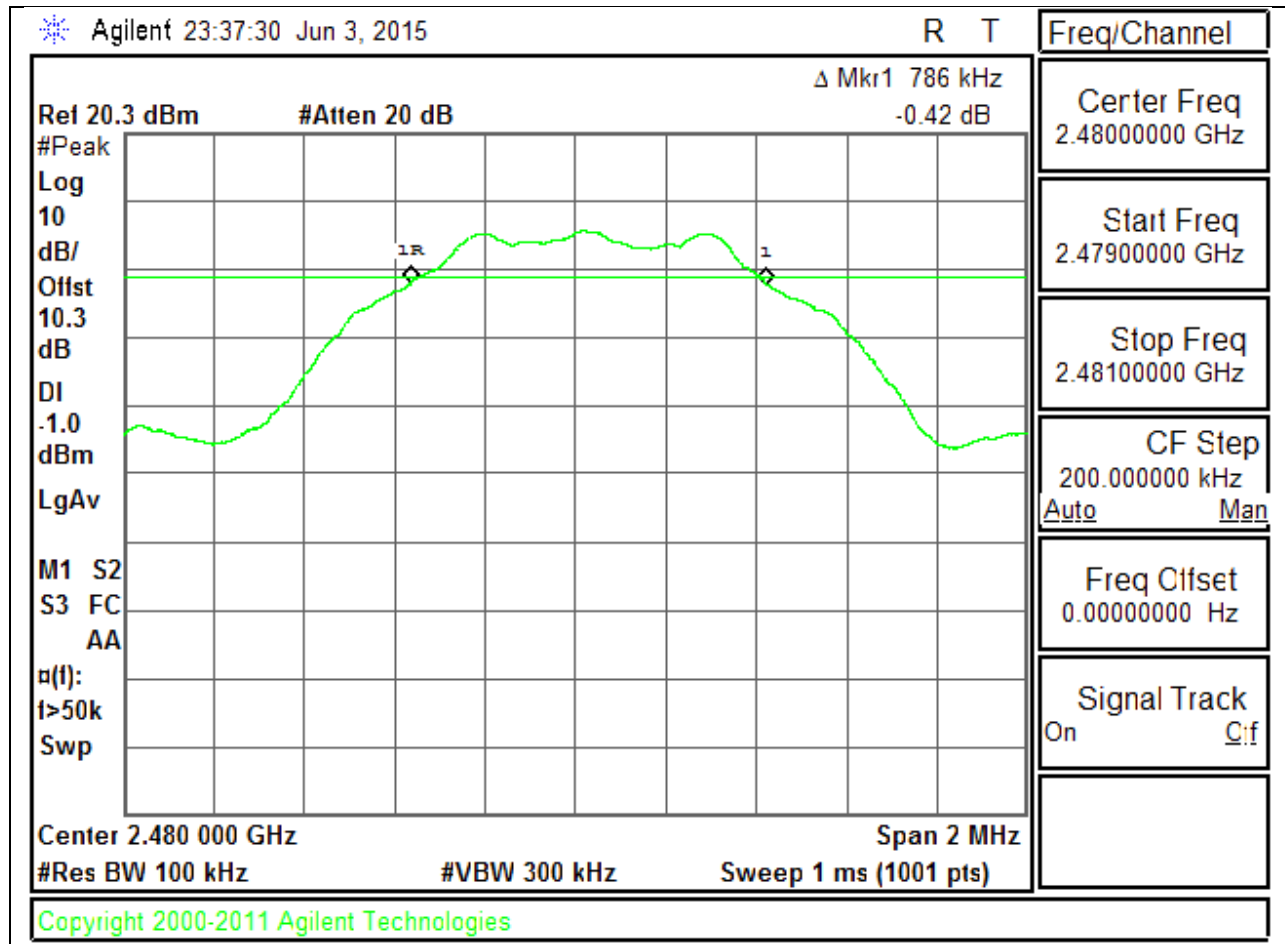
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



7.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

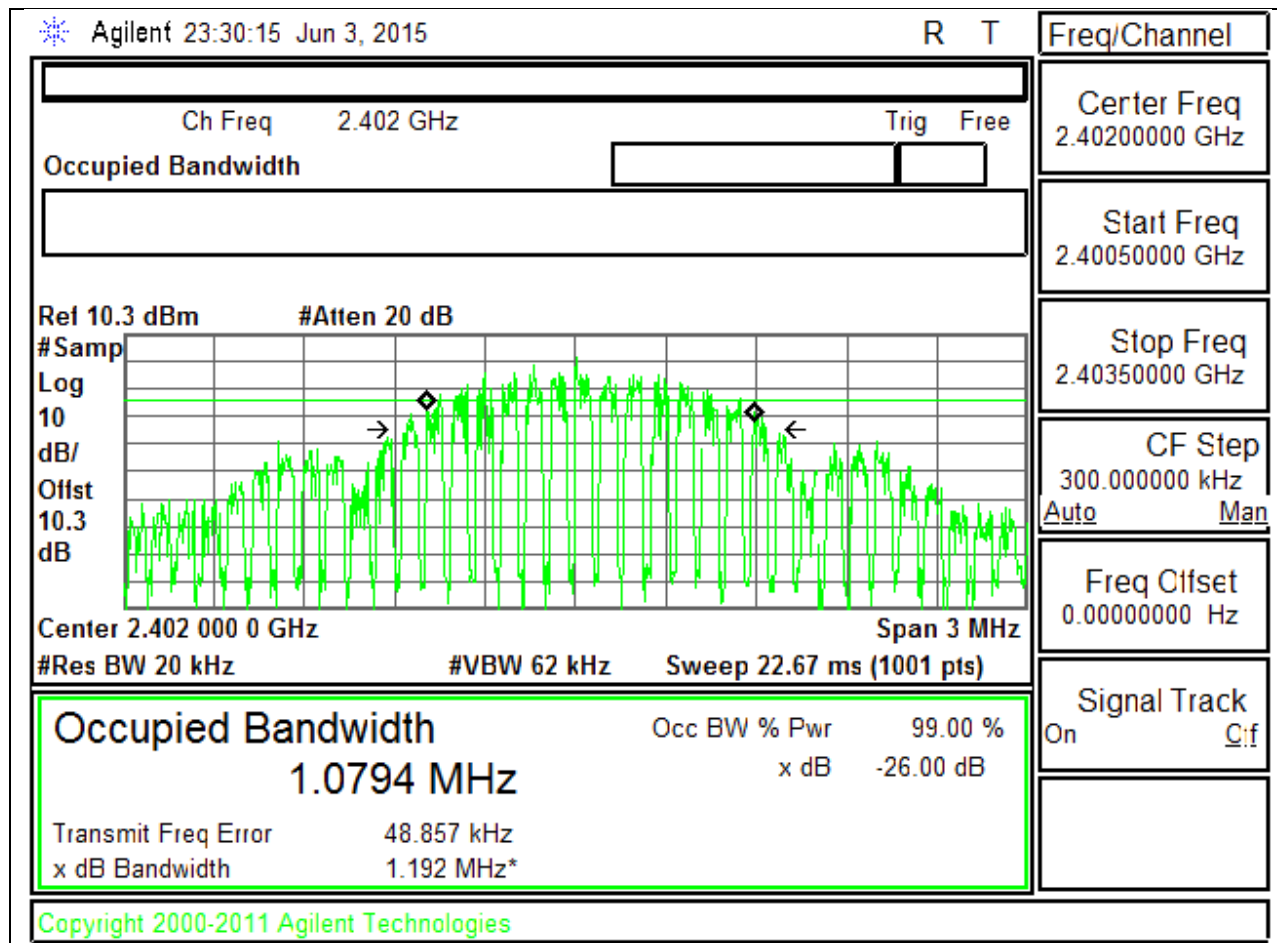
Reference to KDB558074 D01 DTS Meas Guidance v03r02: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

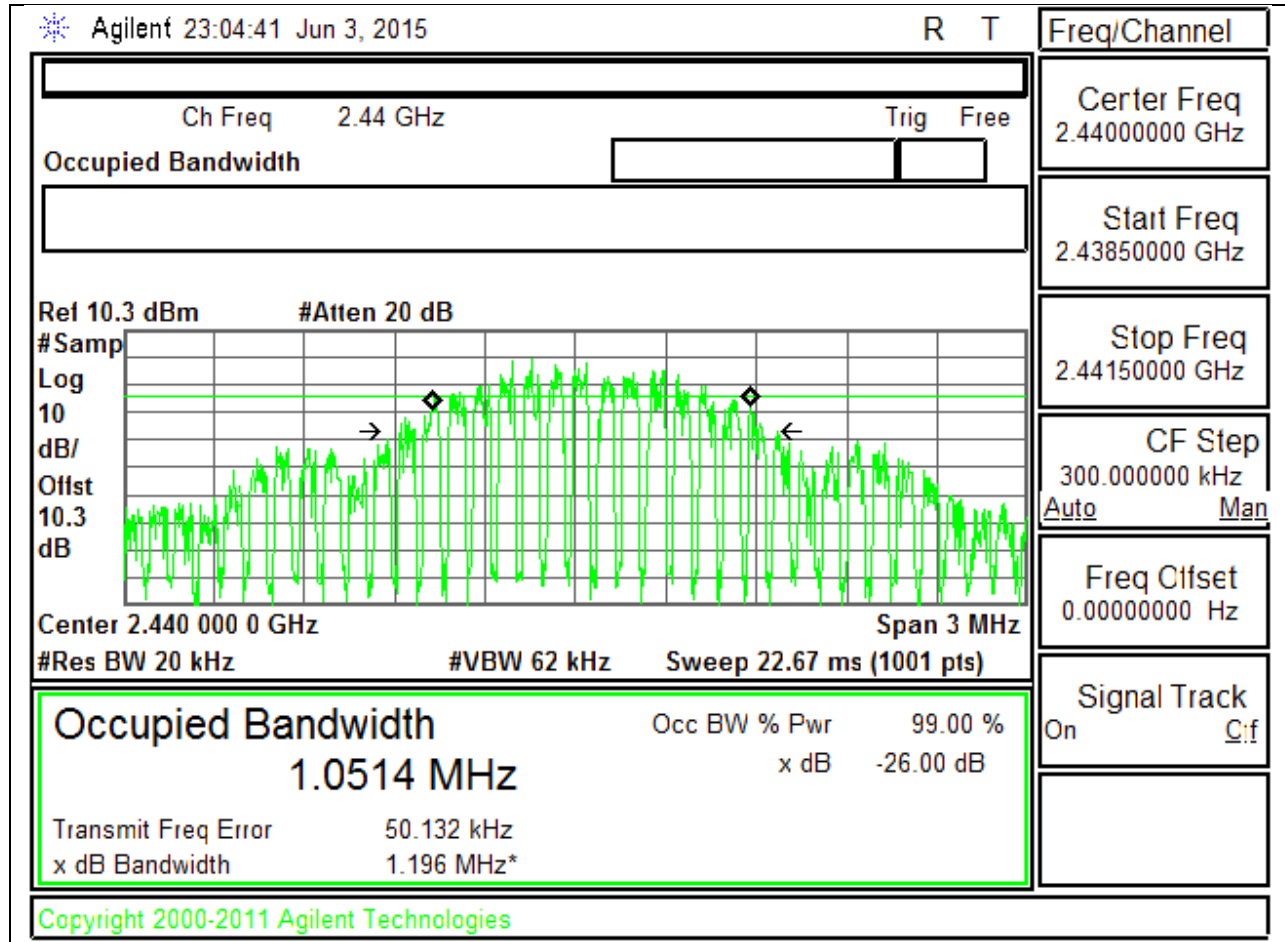
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0794
Middle	2440	1.0514
High	2480	1.0573

99% BANDWIDTH PLOTS

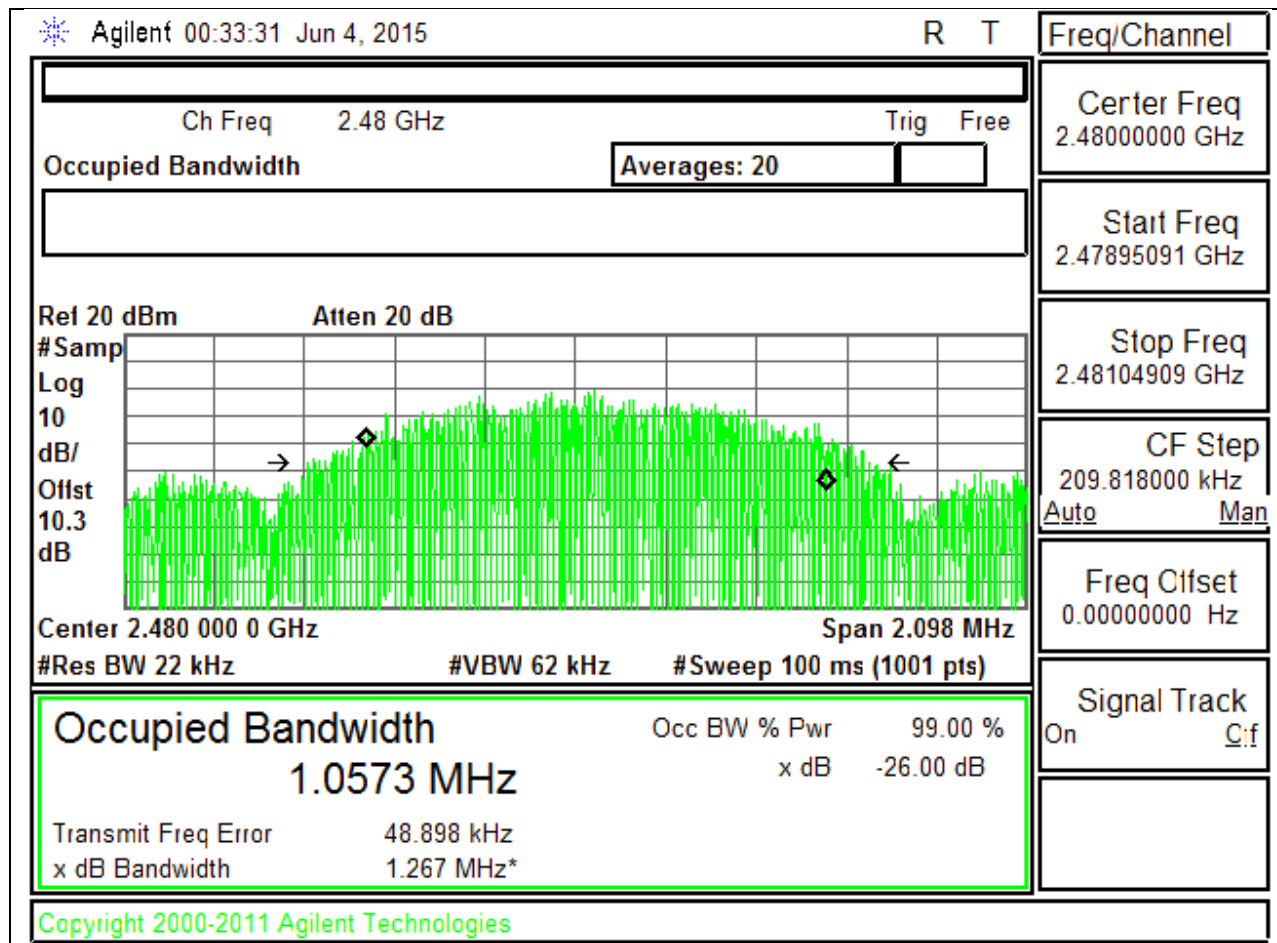
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

TEST PROCEDURE

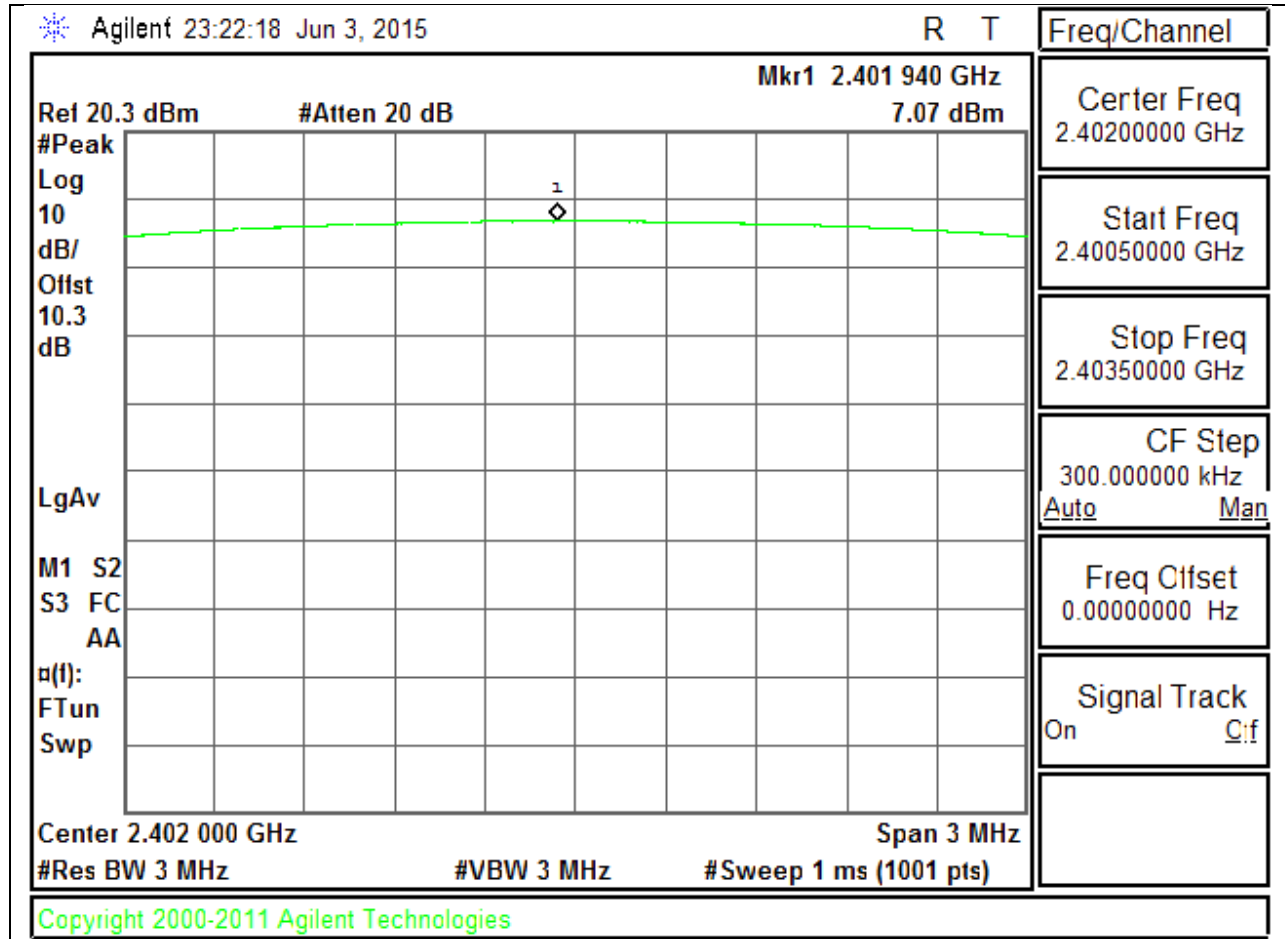
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r02 utilizing spectrum analyzer.

RESULTS

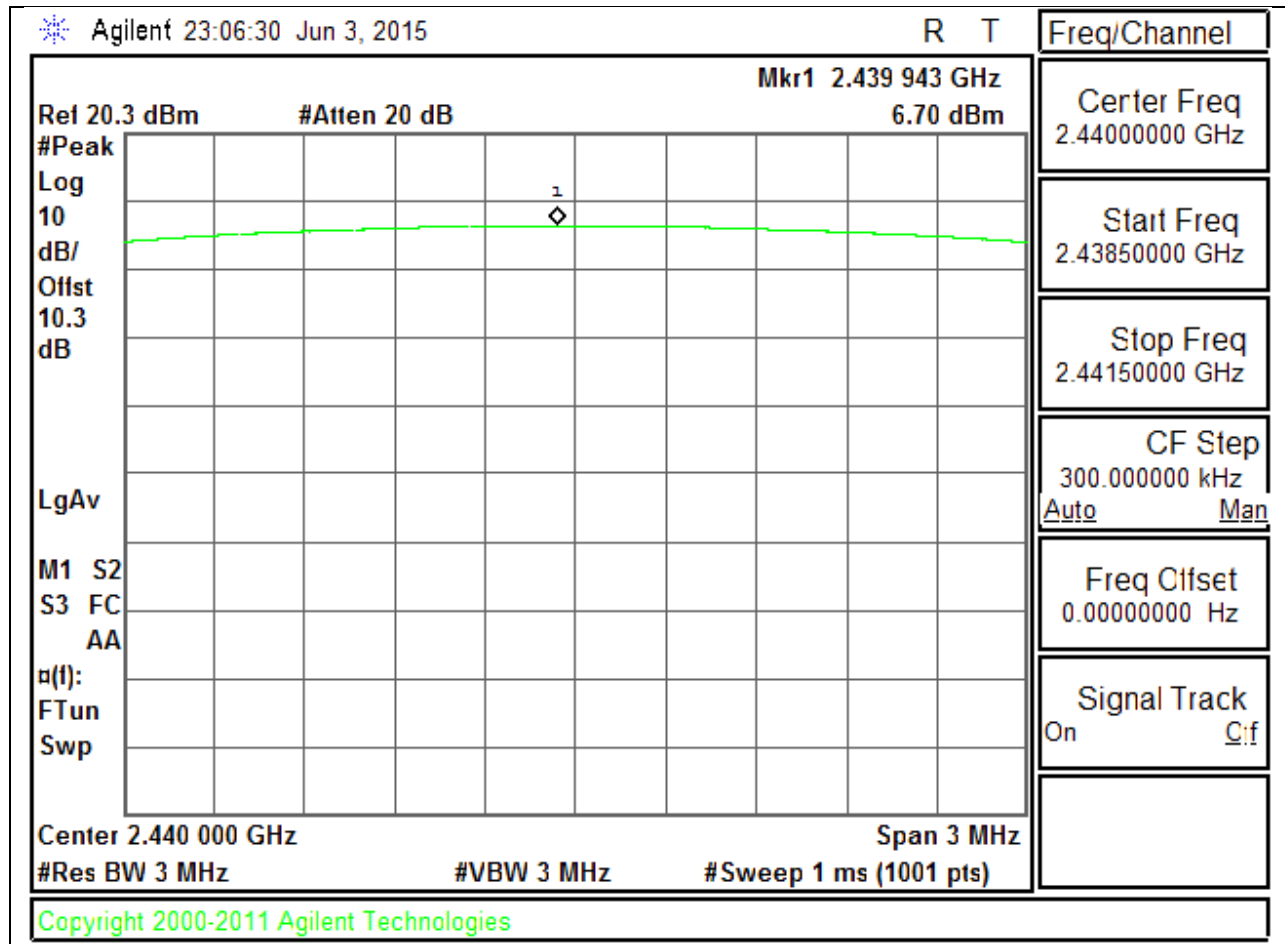
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	7.07	30	-22.93
Middle	2440	6.70	30	-23.30
High	2480	7.39	30	-22.61

OUTPUT POWER PLOTS

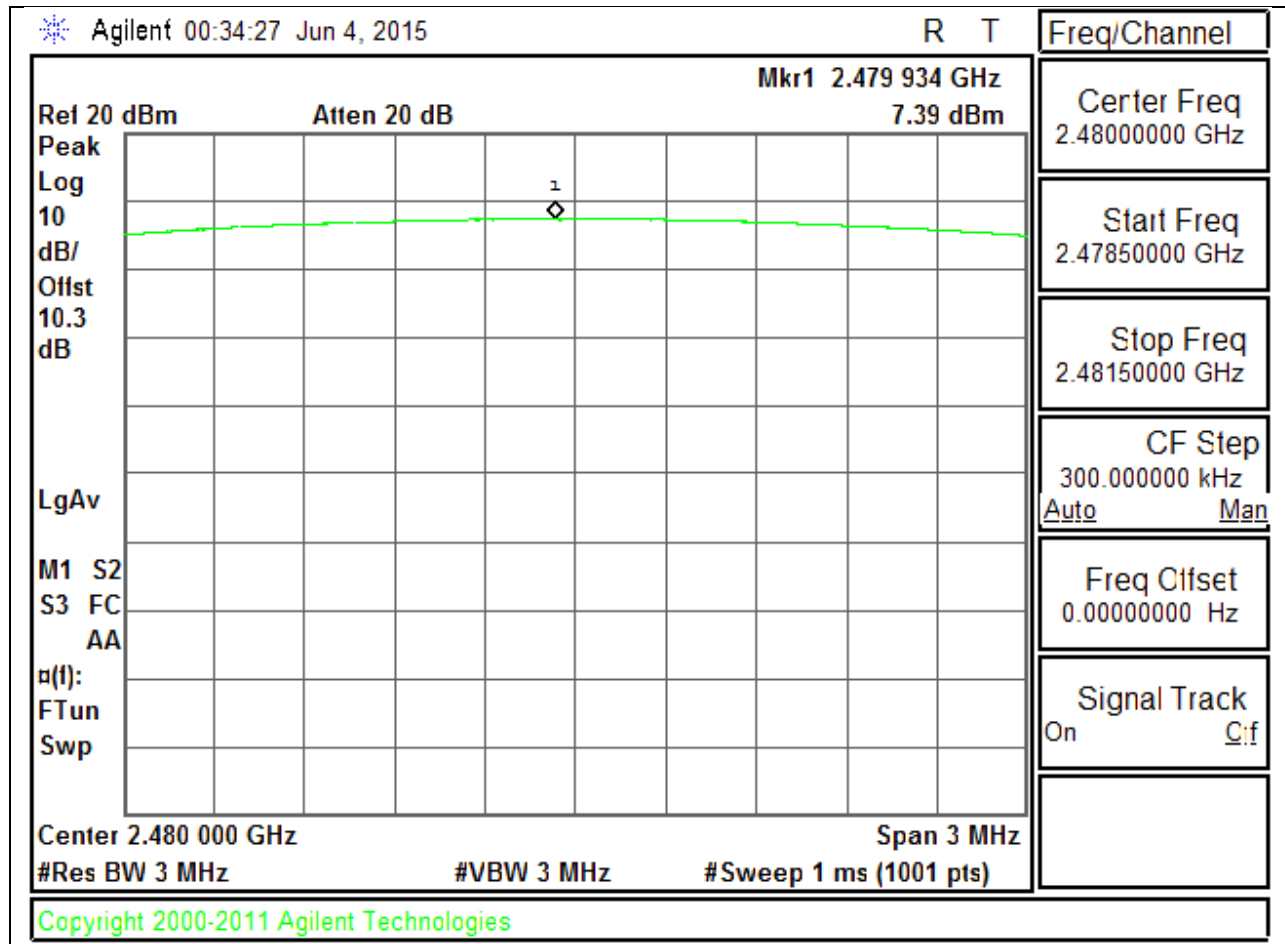
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



7.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	6.4
Middle	2440	6.3
High	2480	6.5

7.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

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.

TEST PROCEDURE

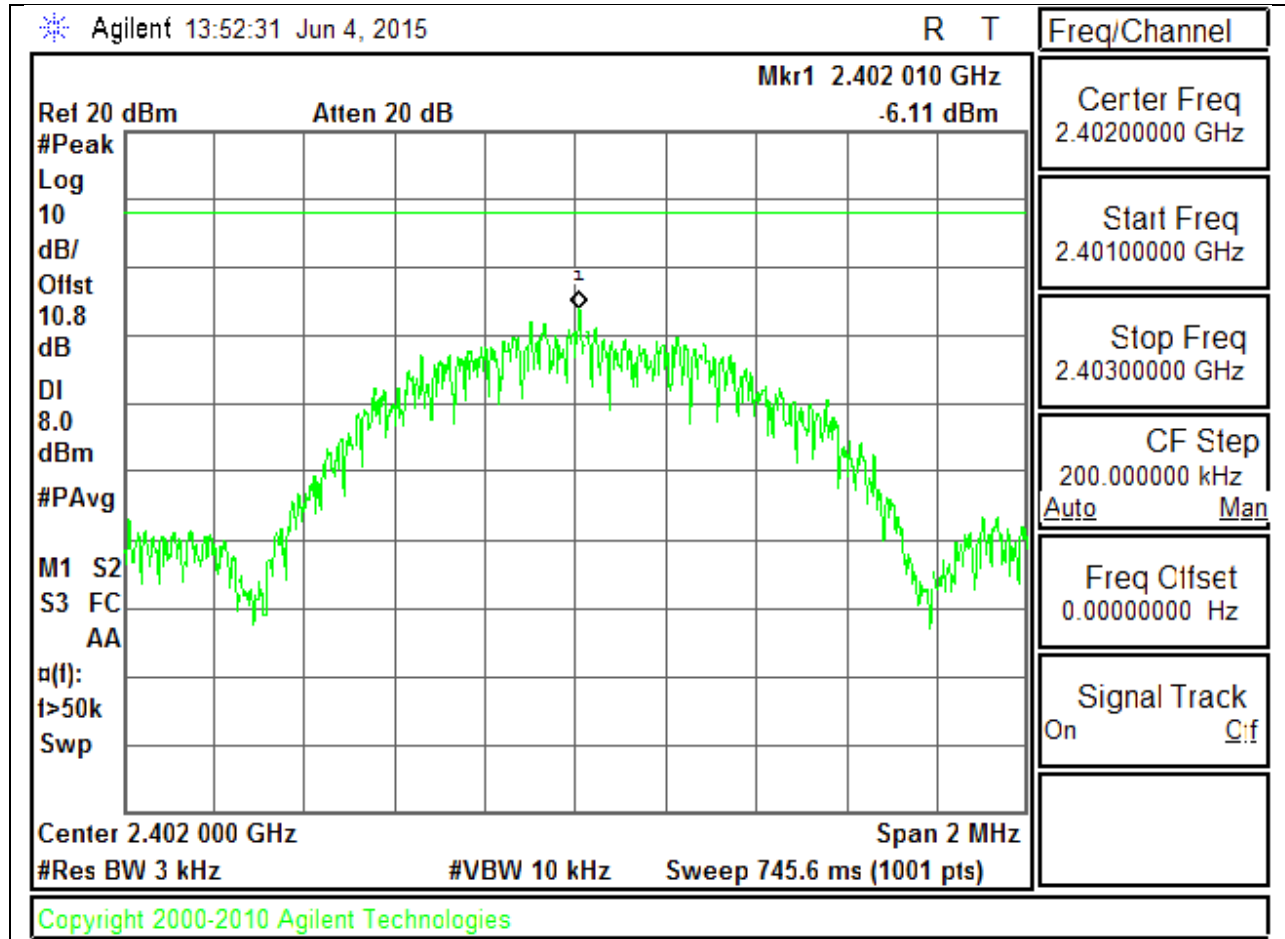
Power Spectral Density was performed utilizing the “Method PKPSD (Peak PSD)” under KDB558074 D01 DTS Meas Guidance v03r02.

RESULTS

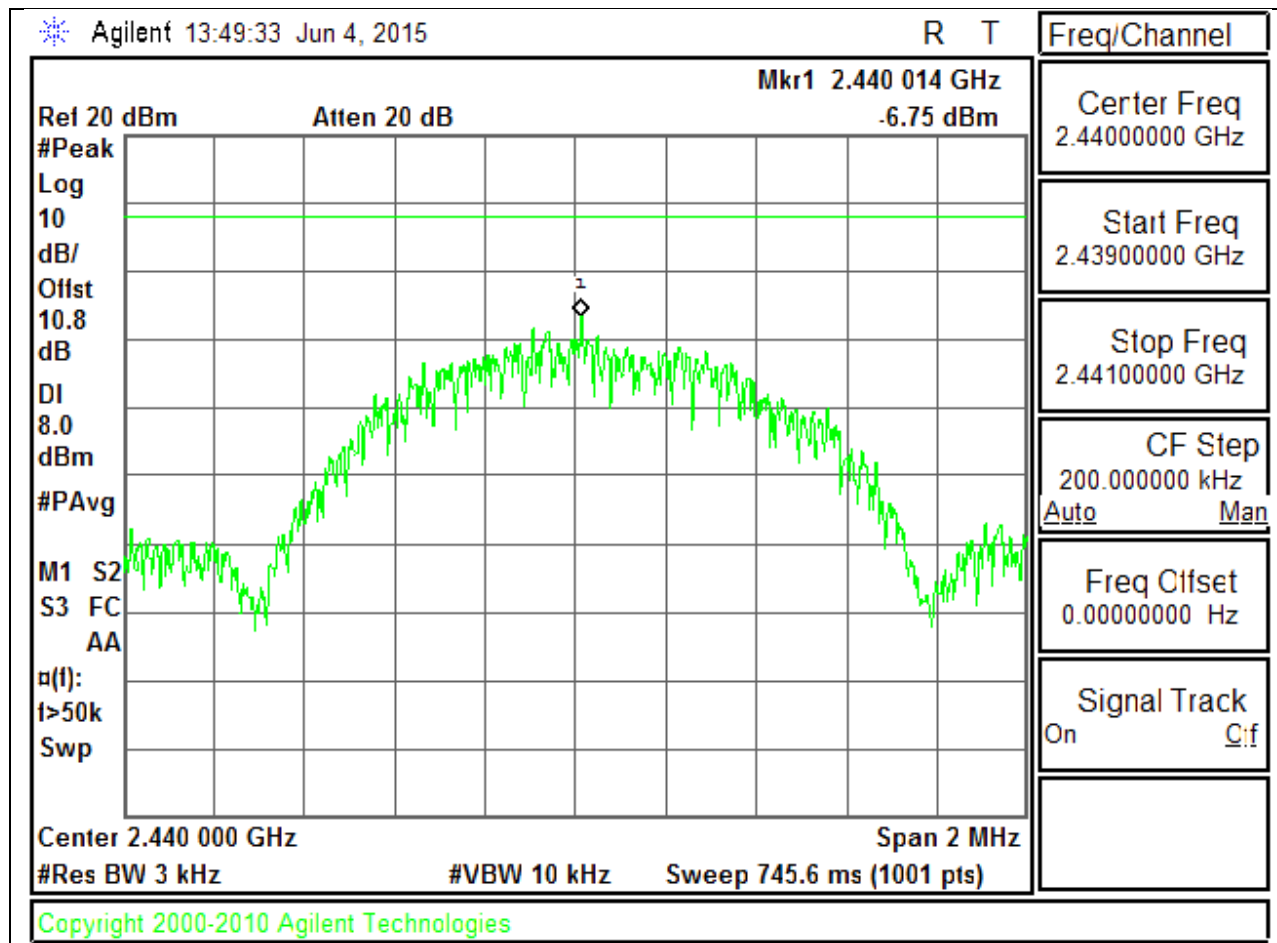
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-6.11	8	-14.11
Middle	2440	-6.75	8	-14.75
High	2480	-6.59	8	-14.59

POWER SPECTRAL DENSITY PLOTS

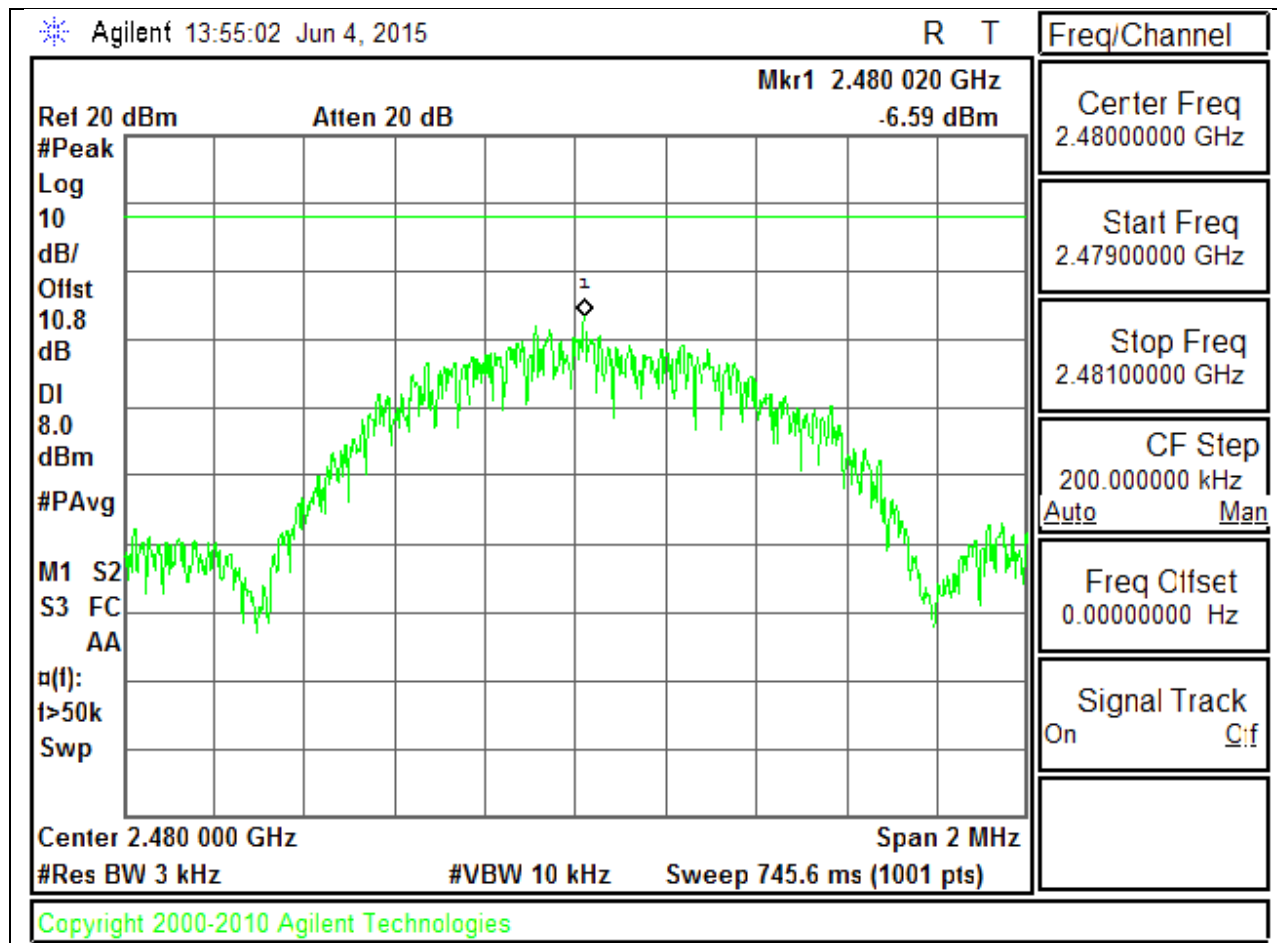
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



7.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

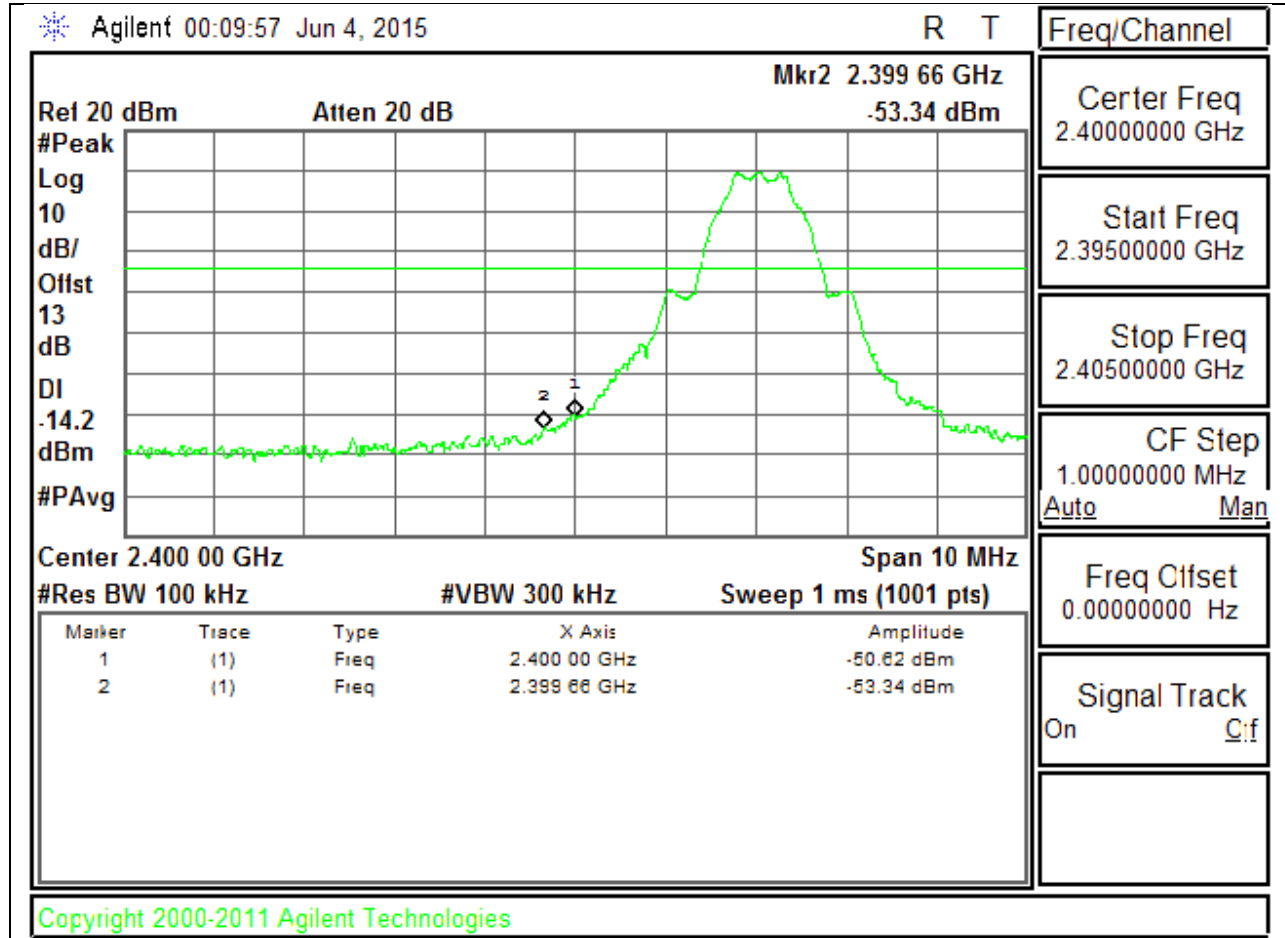
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

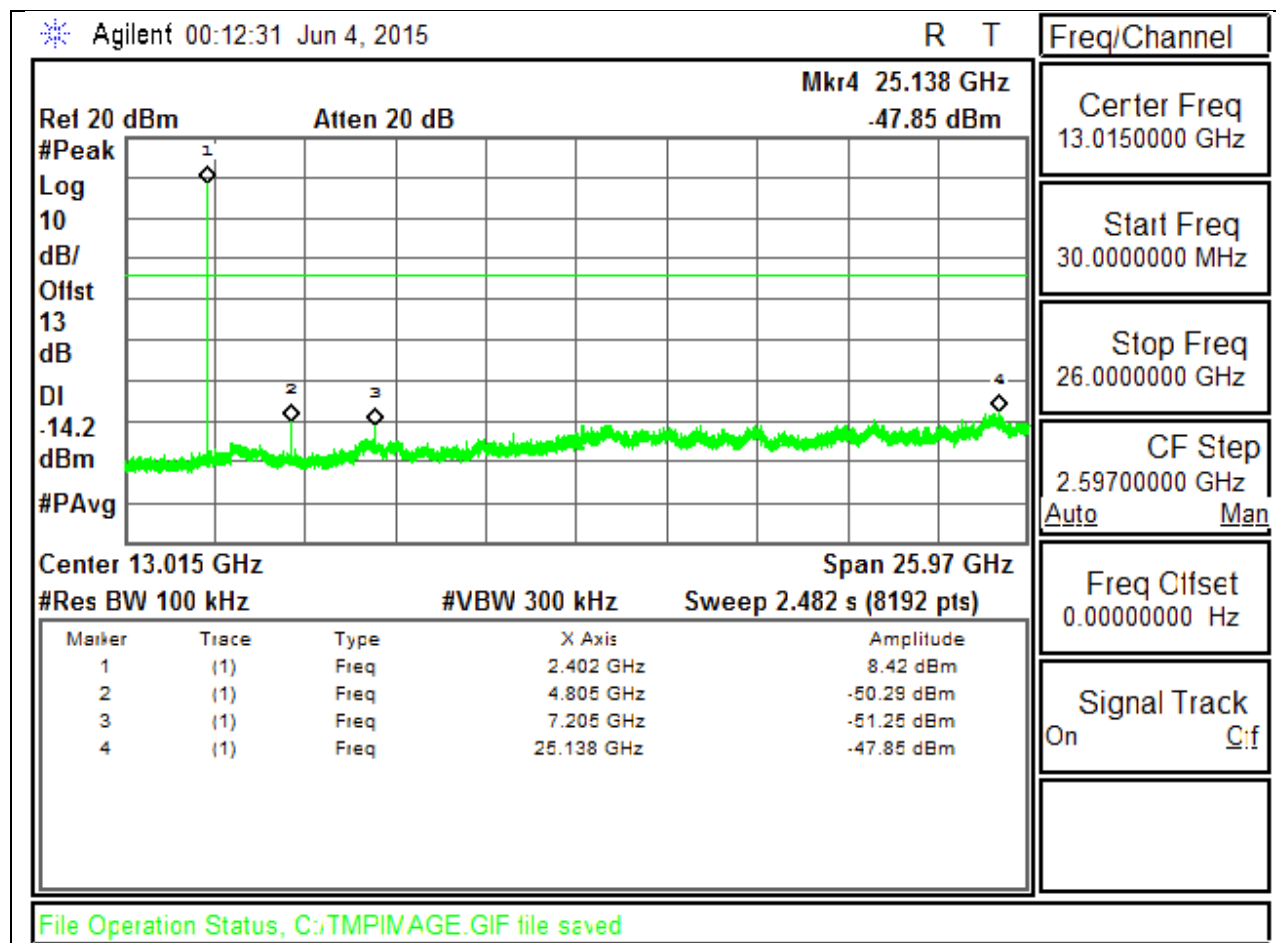
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

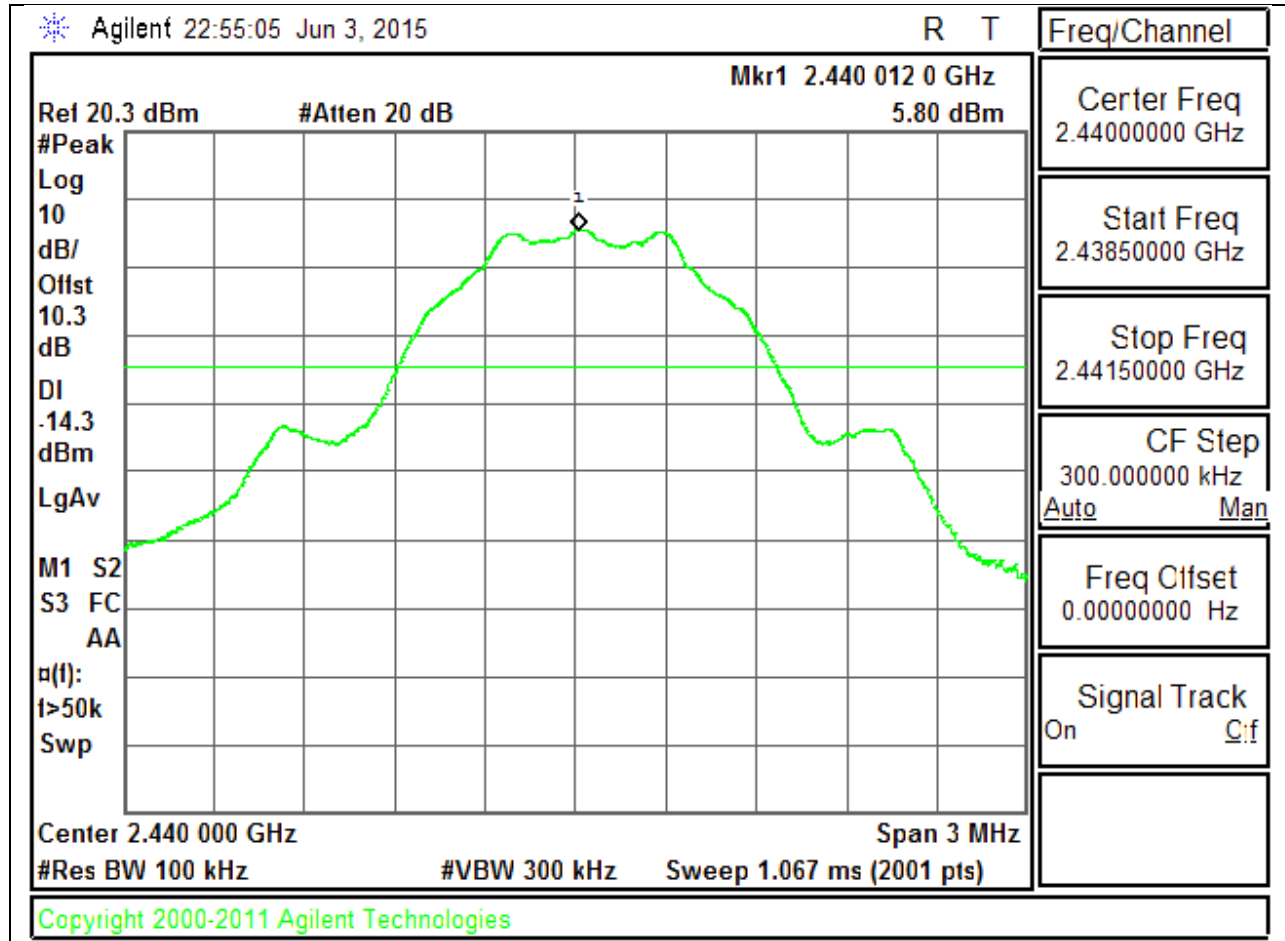


LOW CHANNEL SPURIOUS

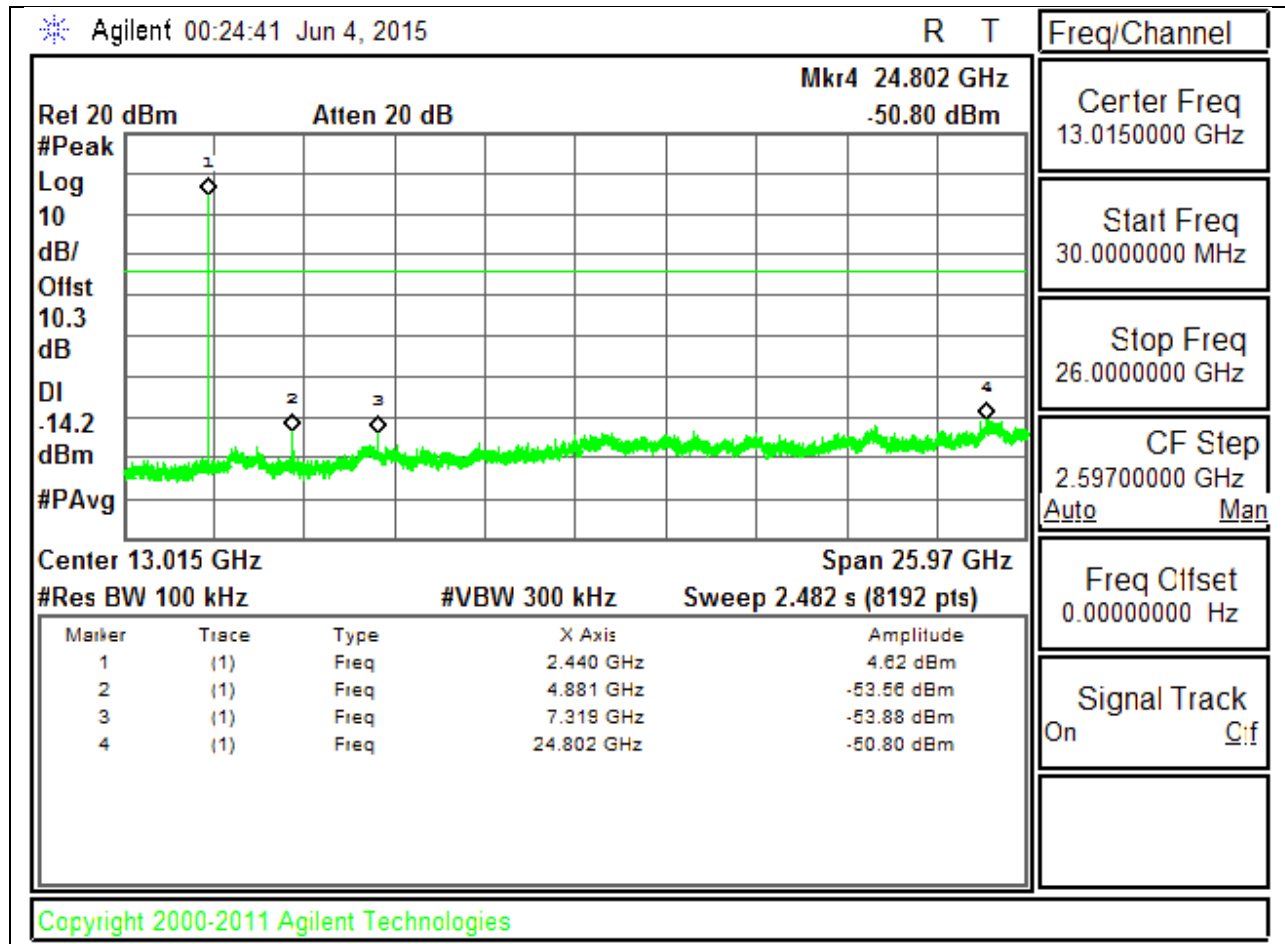


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

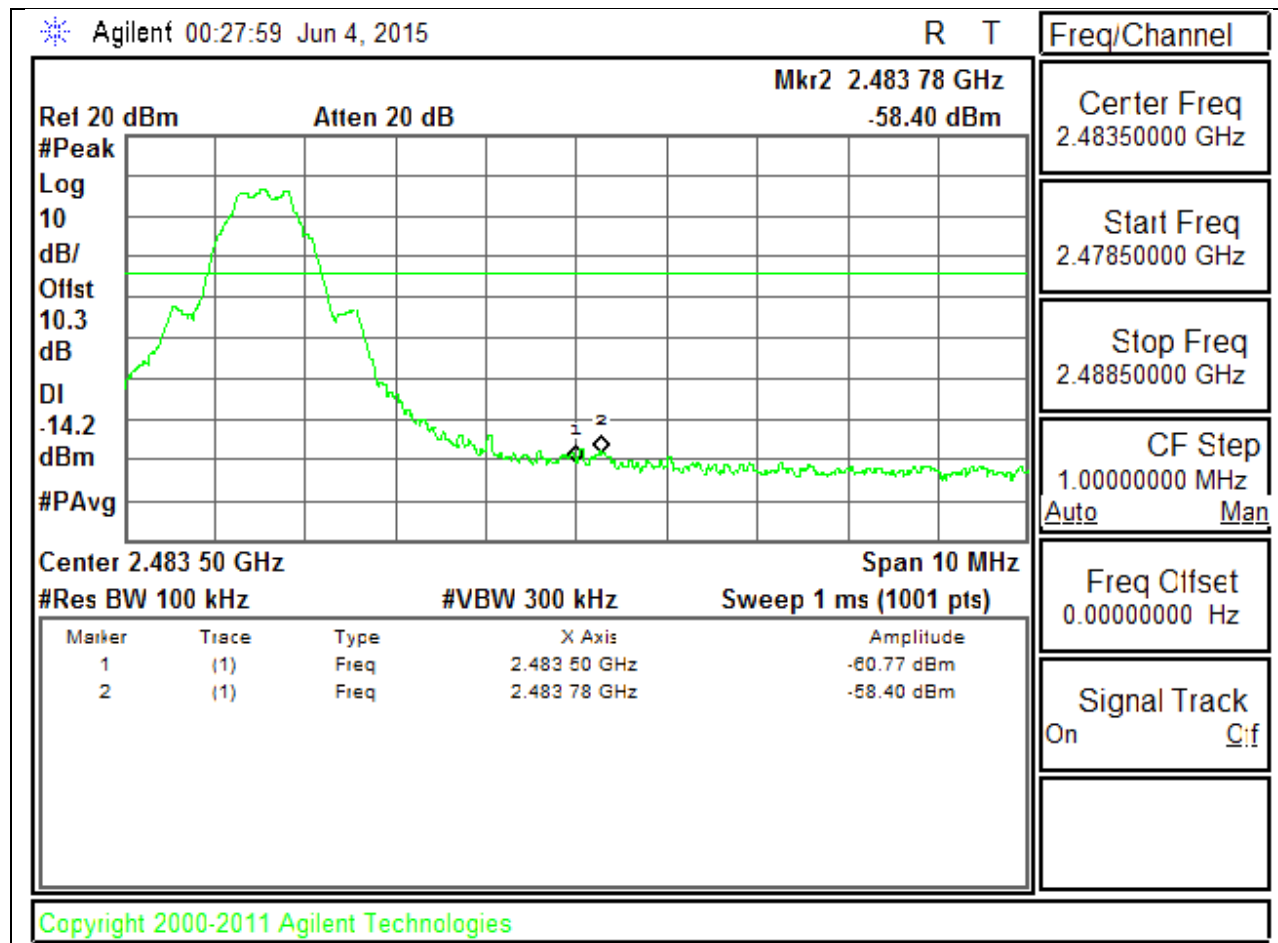


MID CHANNEL SPURIOUS

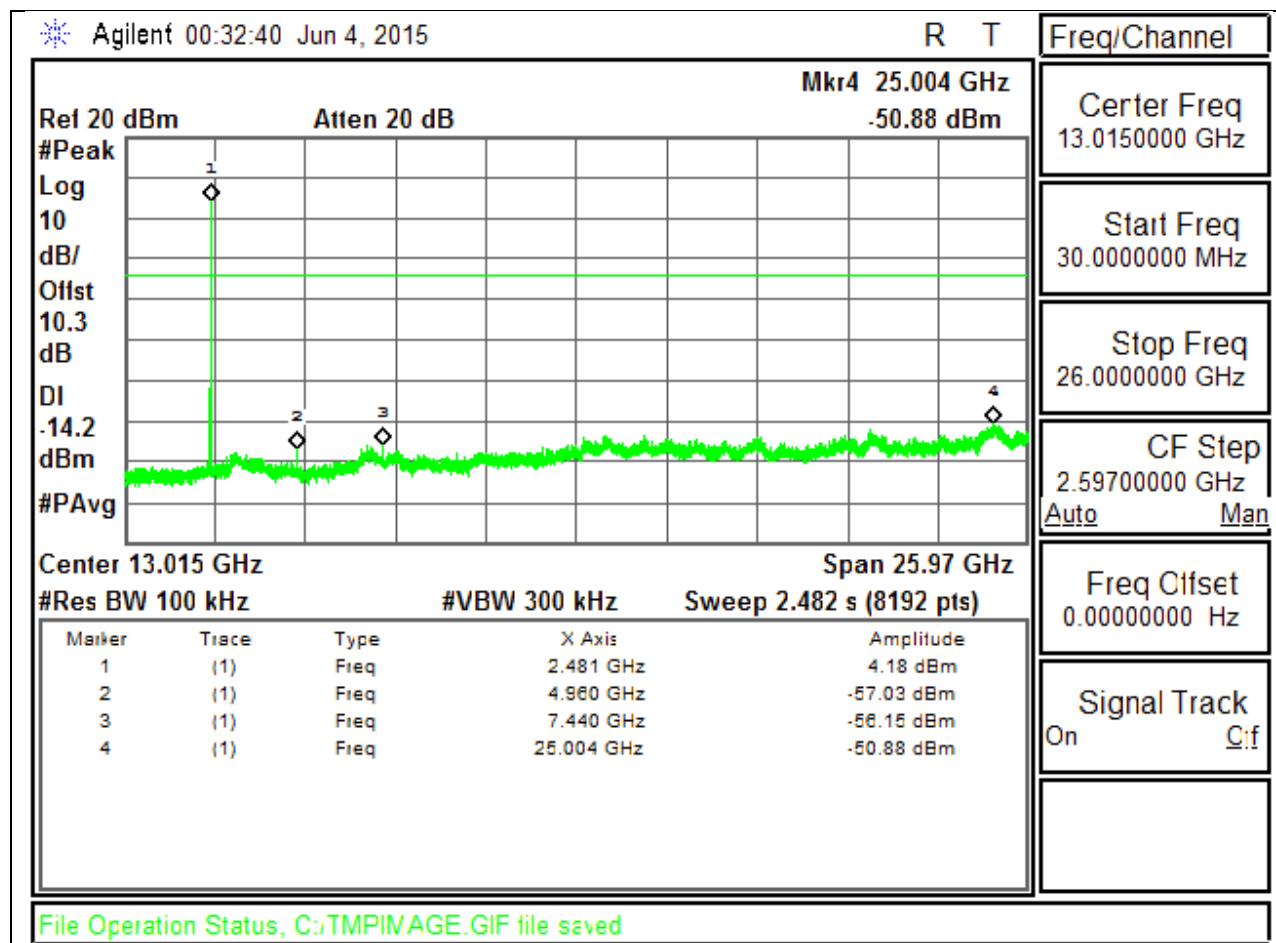


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (μ V/m) at 3 m	Field Strength Limit (dB μ V/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 for below 1GHz and 150cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor = $10 \log (1/x)$. For this sample: DCF = $10\log(1/0.6224)$ = 2.06 dB
(Spectrum Analyzer round it up to 2.1dB)

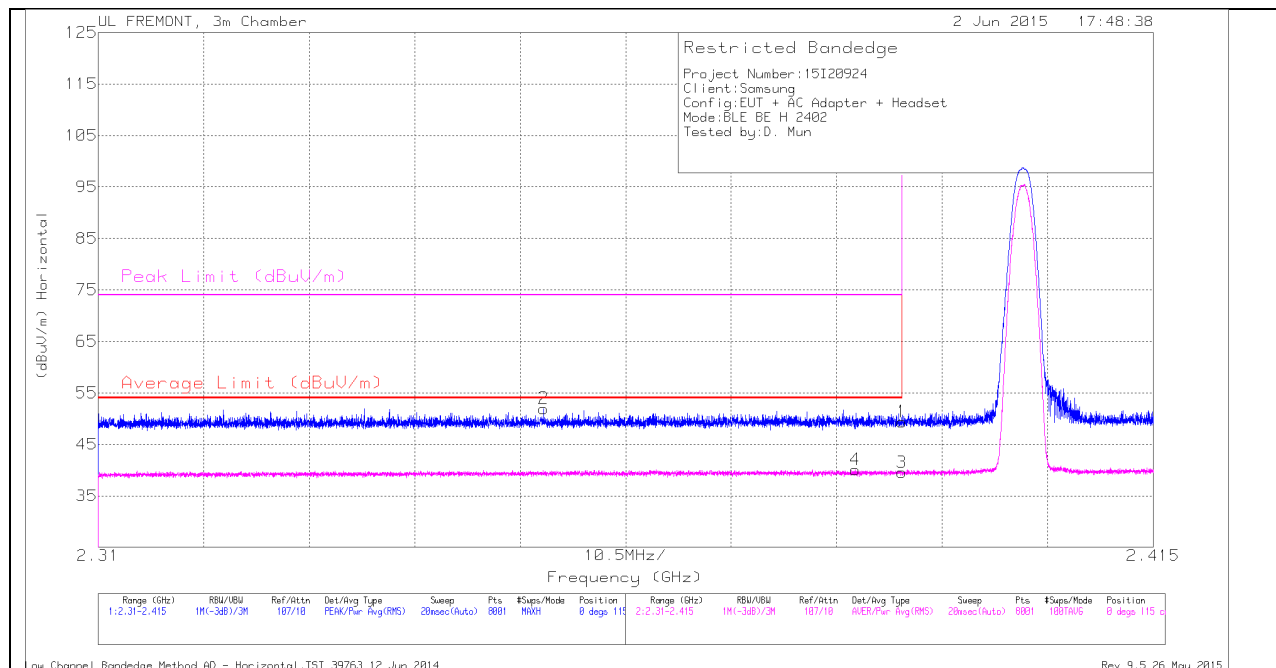
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

The 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.

8.2. TRANSMITTER ABOVE 1 GHz

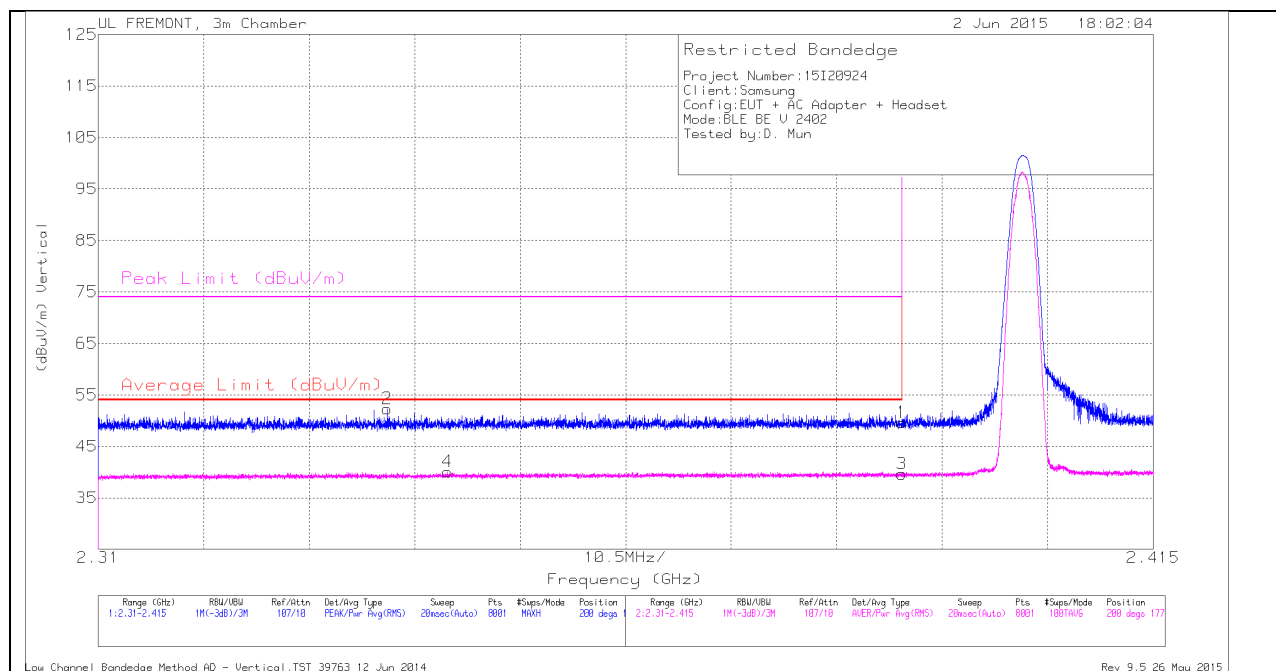
RESTRICTED BANDEDGE (LOW CHANNEL) HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	DCCF	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.354	43.25	Pk	31.8	-23.1		51.95	-	-	74	-22.05	0	115	H
4	2.385	31.19	RMS	32	-23.1	2.1	42.19	54	-11.81	-	-	0	115	H
1	2.39	40.48	Pk	32	-23.1		49.38	-	-	74	-24.62	0	115	H
3	2.39	30.66	RMS	32	-23.1	2.1	41.66	54	-12.34	-	-	0	115	H

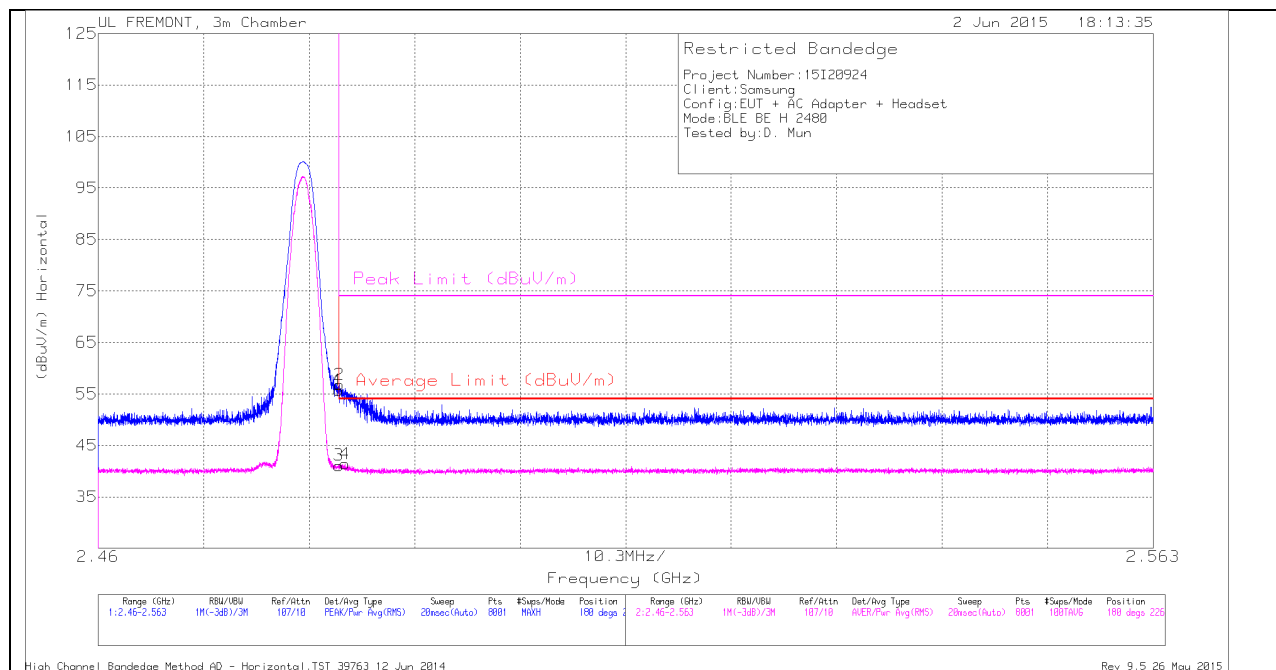
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DCCF	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.339	43.61	Pk	31.8	-23.1		52.31	-	-	74	-21.69	200	177	V
4	2.345	31.39	RMS	31.8	-23.1	2.1	42.19	54	-11.81	-	-	200	177	V
1	2.39	40.74	Pk	32	-23.1		49.64	-	-	74	-24.36	200	177	V
3	2.39	30.76	RMS	32	-23.1	2.1	41.76	54	-12.24	-	-	200	177	V

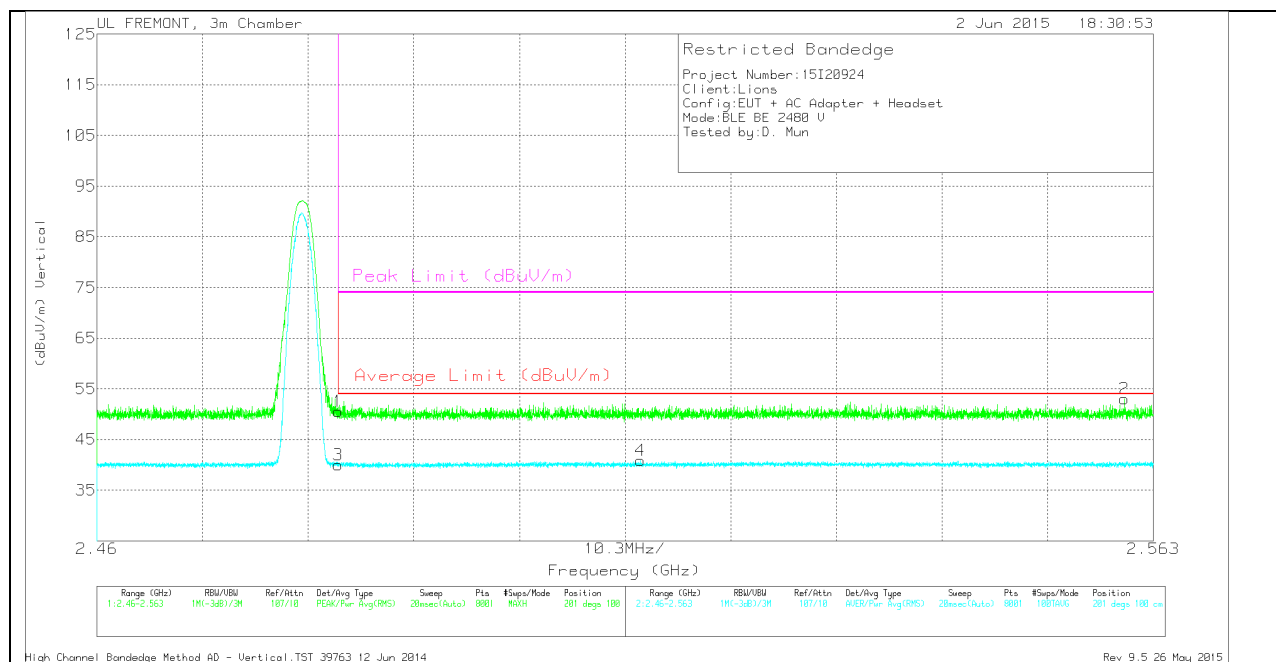
AUTHORIZED BANDEDGE (HIGH CHANNEL) **HORIZONTAL PEAK AND AVERAGE PLOT**



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DCCF	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	46.19	Pk	32.3	-22.8		55.69	-	-	74	-18.31	180	226	H
2	2.484	47.29	Pk	32.3	-22.8		56.79	-	-	74	-17.21	180	226	H
3	2.484	31.6	RMS	32.3	-22.8	2.1	43.2	54	-10.8	-	-	180	226	H
4	2.484	31.92	RMS	32.3	-22.8	2.1	43.52	54	-10.48	-	-	180	226	H

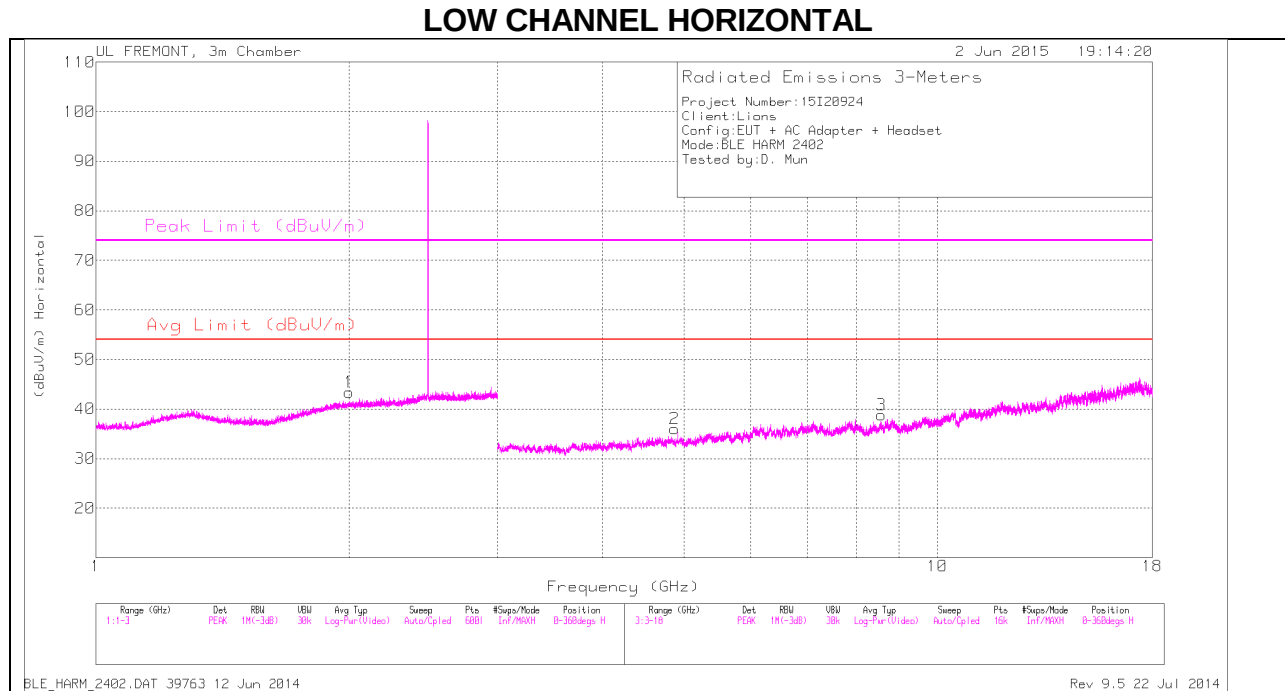
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

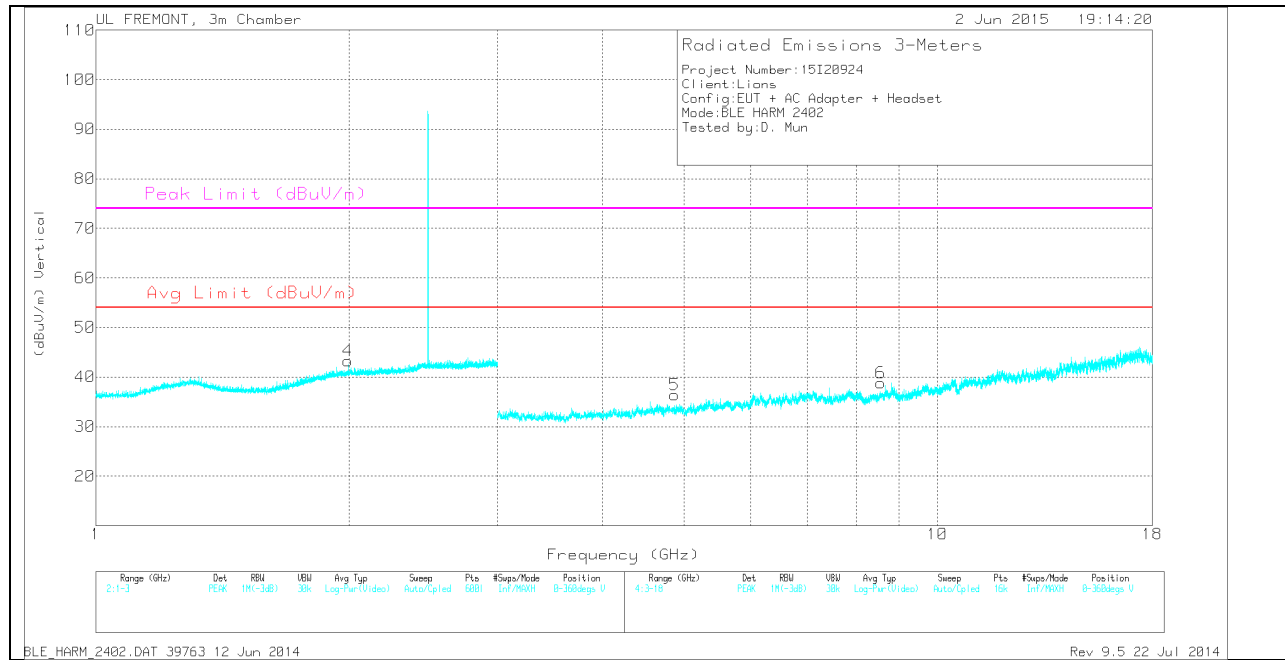
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DCCF	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.484	41	Pk	32.3	-22.8		50.5	-	-	74	-23.5	201	100	V
3	2.484	30.47	RMS	32.3	-22.8	2.1	42.07	54	-11.93	-	-	201	100	V
4	2.513	31.3	RMS	32.3	-22.8	2.1	42.9	54	-11.1	-	-	201	100	V
2	2.56	43.36	Pk	32.4	-22.7		53.06	-	-	74	-20.94	201	100	V

HARMONICS AND SPURIOUS EMISSIONS



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 T119 (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	1.993	32.99	Avg	31.5	-23.3	43.3	54	-10.7	-	-	0-360	100	V
1	1.999	32.96	Avg	31.5	-23.2	43.37	54	-10.63	-	-	0-360	100	H
2	4.868	30.09	Avg	34	-30.2	36	54	-18	-	-	0-360	100	H
5	4.873	30.35	Avg	34	-30.1	36.36	54	-17.64	-	-	0-360	200	V
6	8.566	28.42	Avg	35.8	-27.5	38.83	54	-15.17	-	-	0-360	100	V
3	8.581	28.24	Avg	35.8	-27.3	38.85	54	-15.15	-	-	0-360	100	H

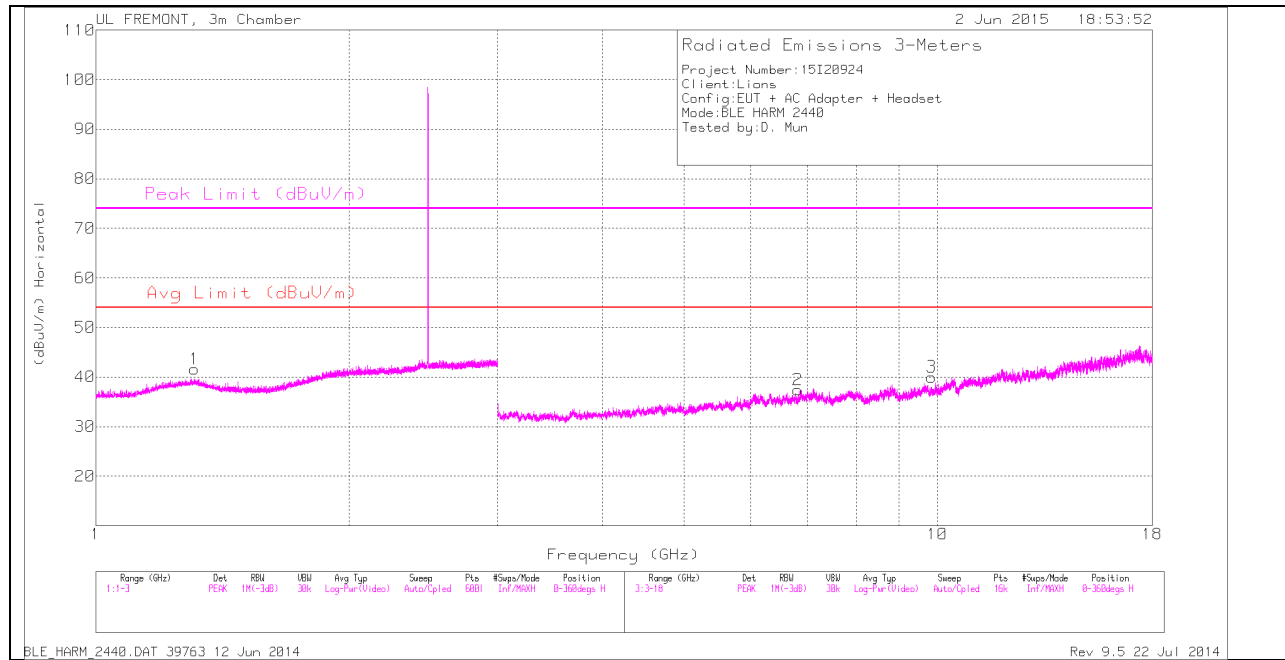
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/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
1.994	41.91	PK2	31.5	-23.3	0	50.11	-	-	74	-23.89	0	100	V
1.994	30.5	MAV1	31.5	-23.3	2.1	40.81	54	-13.19	-	-	0	100	V
2.001	41.97	PK2	31.5	-23.2	0	50.27	-	-	74	-23.73	0	100	H
2.001	30.53	MAV1	31.5	-23.2	2.1	40.94	54	-13.06	-	-	0	100	H
4.866	28.11	MAV1	34	-30.2	2.1	34.02	54	-19.98	-	-	0	100	H
4.87	39.5	PK2	34	-30.1	0	43.4	-	-	74	-30.6	0	100	H
4.874	28.07	MAV1	34	-30.1	2.1	34.08	54	-19.92	-	-	0	200	V
4.875	39.64	PK2	34	-30.1	0	43.54	-	-	74	-30.46	0	200	V
8.564	26.59	MAV1	35.8	-27.6	2.1	36.9	54	-17.1	-	-	0	100	V
8.566	37.9	PK2	35.8	-27.5	0	46.2	-	-	74	-27.8	0	100	V
8.582	37.54	PK2	35.8	-27.3	0	46.04	-	-	74	-27.96	0	100	H
8.582	25.89	MAV1	35.8	-27.3	2.1	36.5	54	-17.5	-	-	0	100	H

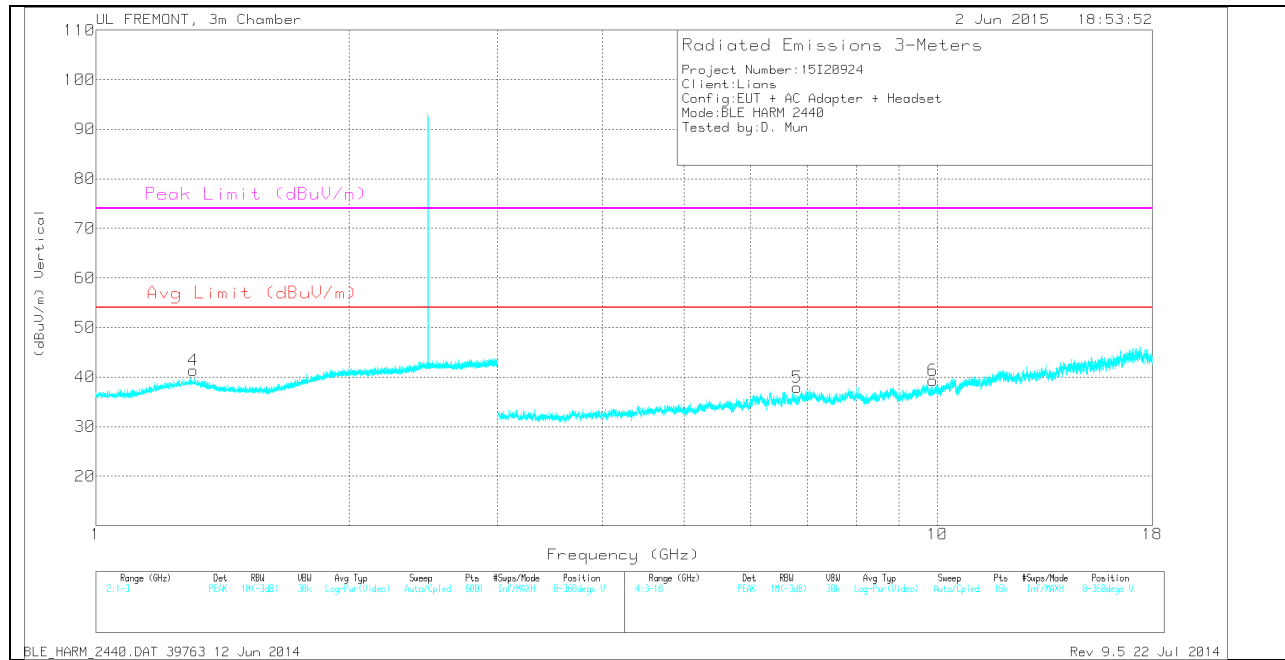
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T119 (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	1.305	33.21	Avg	29.8	-23.8	41.32	54	-12.68	-	-	0-360	200	V
1	1.31	33.53	Avg	29.8	-23.8	41.64	54	-12.36	-	-	0-360	200	H
5	6.813	29.46	Avg	35.6	-29.2	37.97	54	-16.03	-	-	0-360	100	V
2	6.821	28.96	Avg	35.6	-29.2	37.47	54	-16.53	-	-	0-360	200	H
3	9.849	26.92	Avg	36.9	-25.9	40.03	54	-13.97	-	-	0-360	200	H
6	9.871	26.16	Avg	36.9	-25.8	39.37	54	-14.63	-	-	0-360	100	V

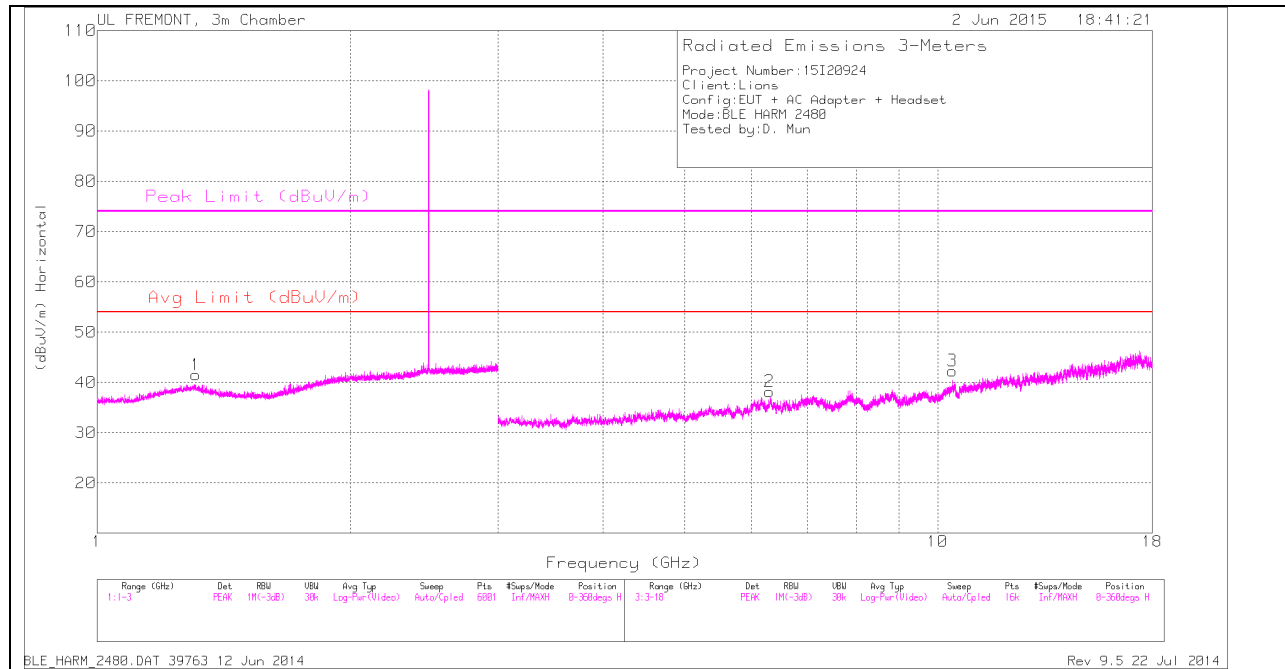
PK - Peak detector

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/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
1.303	31.03	MAV1	29.9	-23.8	2.1	39.24	54	-14.76	-	-	0	200	V
1.305	42.28	PK2	29.8	-23.8	0	48.28	-	-	74	-25.72	0	200	V
1.307	42.7	PK2	29.8	-23.8	0	48.7	-	-	74	-25.3	0	200	V
1.308	42.93	PK2	29.8	-23.8	0	48.93	-	-	74	-25.07	0	200	H
1.31	43.06	PK2	29.8	-23.8	0	49.06	-	-	74	-24.94	0	200	H
1.311	31	MAV1	29.7	-23.8	2.1	39.01	54	-14.99	-	-	0	200	H
6.813	39.22	PK2	35.6	-29.2	0	45.62	-	-	74	-28.38	0	100	V
6.814	27.59	MAV1	35.6	-29.2	2.1	36.1	54	-17.9	-	-	0	100	V
6.82	39.33	PK2	35.6	-29.2	0	45.73	-	-	74	-28.27	0	200	H
6.821	27.85	MAV1	35.6	-29.2	2.1	36.36	54	-17.64	-	-	0	200	H
9.847	36.24	PK2	36.9	-25.9	0	47.24	-	-	74	-26.76	0	200	H
9.847	24.74	MAV1	36.9	-25.9	2.1	37.85	54	-16.15	-	-	0	200	H
9.869	24.47	MAV1	36.9	-25.8	2.1	37.68	54	-16.32	-	-	0	100	V
9.871	35.56	PK2	36.9	-25.8	0	46.66	-	-	74	-27.34	0	100	V

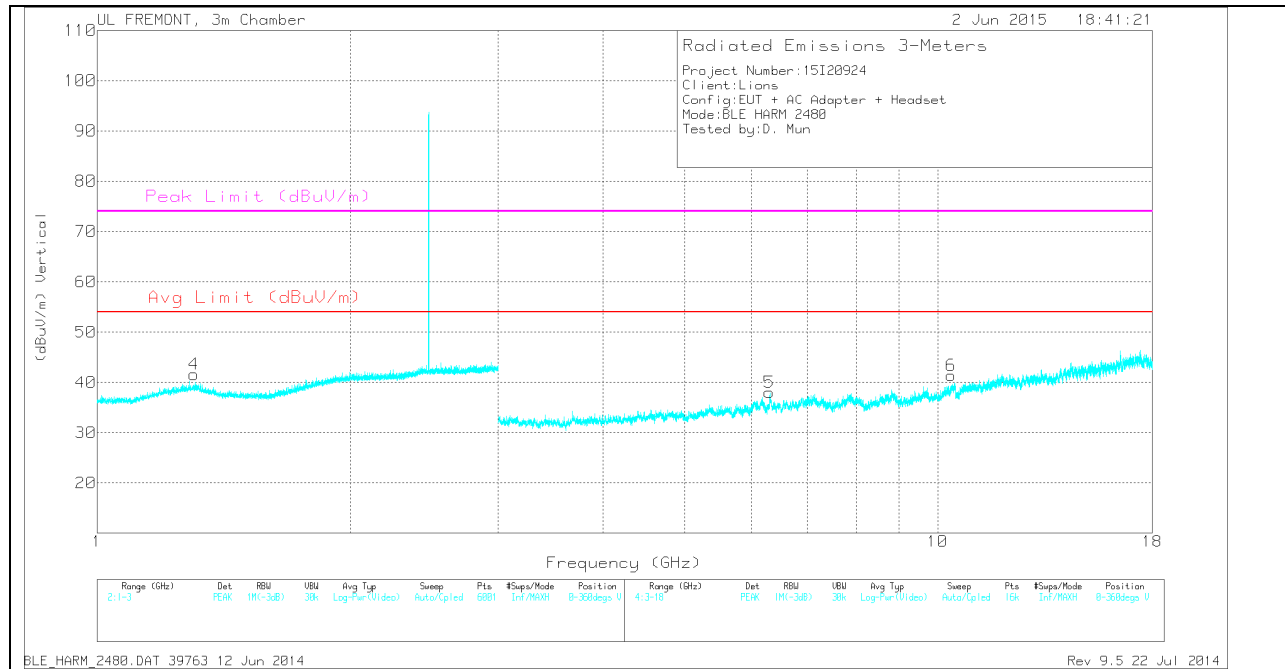
FCC Part15 Subpart C T186 2400MHz Spurious Emissions.TST 12746Rev 9.5 12 Jun 2013

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 T119 (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	1.304	33.5	Avg	29.8	-23.8	41.61	54	-12.39	-	-	0-360	100	V
1	1.311	33.52	Avg	29.7	-23.8	41.53	54	-12.47	-	-	0-360	200	H
5	6.304	30.31	Avg	35.4	-29.8	38.02	54	-15.98	-	-	0-360	100	V
2	6.305	30.48	Avg	35.4	-29.8	38.19	54	-15.81	-	-	0-360	200	H
6	10.38	27.78	Avg	37.2	-25.7	41.39	54	-12.61	-	-	0-360	200	V
3	10.411	28	Avg	37.3	-25.1	42.31	54	-11.69	-	-	0-360	200	H

PK - Peak detector

RADIATED EMISSIONS

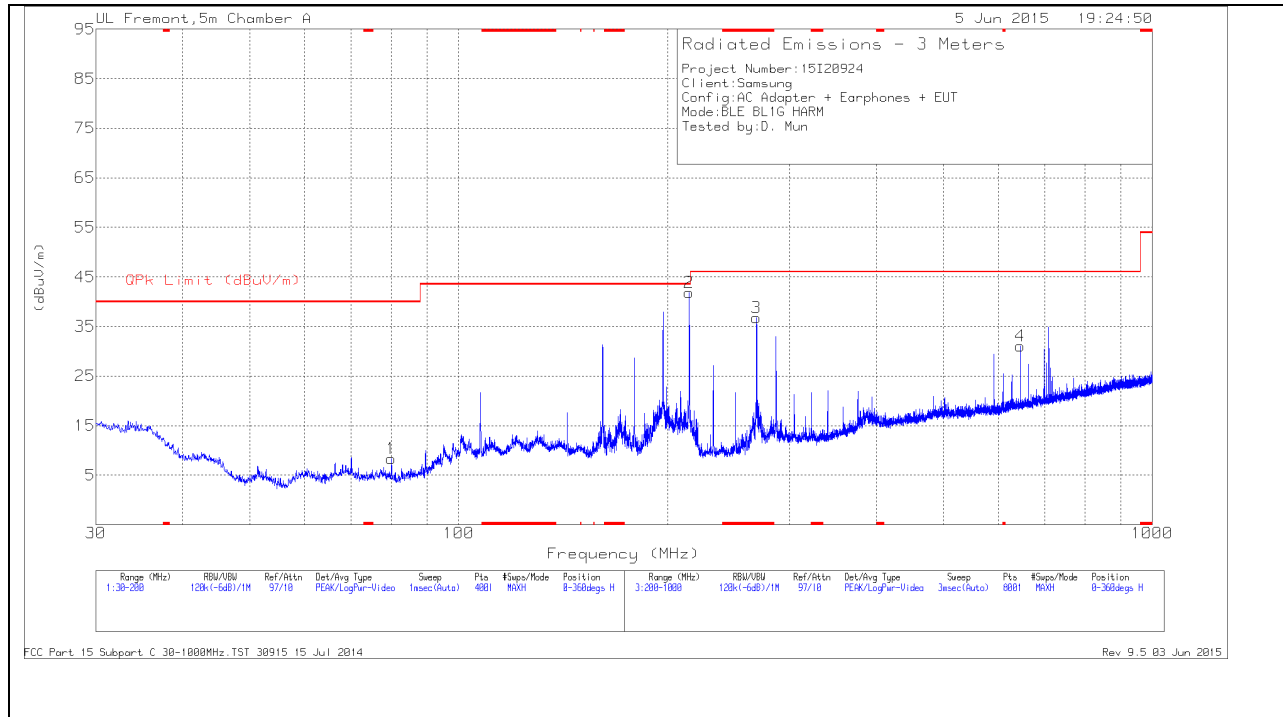
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1.302	42.27	PK2	29.9	-23.8	0	48.37	-	-	74	-25.63	0	100	V
1.303	30.87	MAV1	29.9	-23.8	2.1	39.08	54	-14.92	-	-	0	100	V
1.303	31.03	MAV1	29.9	-23.8	2.1	39.24	54	-14.76	-	-	0	200	V
1.307	42.7	PK2	29.8	-23.8	0	48.7	-	-	74	-25.3	0	200	V
1.31	42.54	PK2	29.8	-23.8	0	48.54	-	-	74	-25.46	0	200	H
1.31	30.94	MAV1	29.8	-23.8	2.1	39.05	54	-14.95	-	-	0	200	H
6.304	39.02	PK2	35.4	-29.9	0	44.52	-	-	74	-29.48	0	200	H
6.305	39.72	PK2	35.4	-29.8	0	45.32	-	-	74	-28.68	0	100	V
6.306	27.92	MAV1	35.4	-29.8	2.1	35.63	54	-18.37	-	-	0	200	H
6.306	28.05	MAV1	35.4	-29.8	2.1	35.76	54	-18.24	-	-	0	100	V
10.378	24.55	MAV1	37.2	-25.7	2.1	38.16	54	-15.84	-	-	0	200	V
10.379	36.17	PK2	37.2	-25.7	0	47.67	-	-	74	-26.33	0	200	V
10.41	24.42	MAV1	37.3	-25	2.1	38.83	54	-15.17	-	-	0	200	H
10.412	35.67	PK2	37.3	-25.1	0	47.87	-	-	74	-26.13	0	200	H

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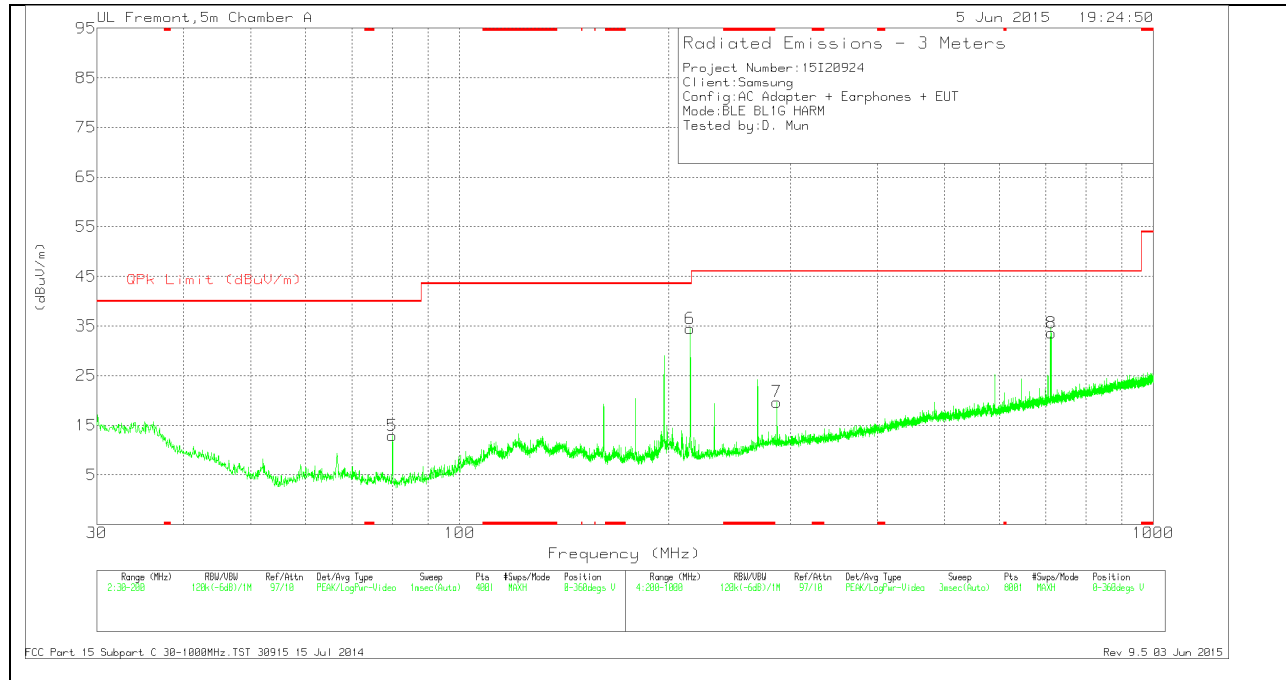
8.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

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
3	* 268.8	53.46	Pk	12.9	-29.6	36.76	46.02	-9.26	0-360	101	H
1	79.98	31.78	Pk	7.2	-30.7	8.28	40	-31.72	0-360	199	H
5	80.0225	36.4	Pk	7.2	-30.7	12.9	40	-27.1	0-360	100	V
2	215	61.22	Pk	10.5	-29.9	41.82	43.52	-1.7	0-360	101	H
6	215	53.9	Pk	10.5	-29.9	34.5	43.52	-9.02	0-360	199	V
7	286.7	35.9	Pk	13.3	-29.5	19.7	46.02	-26.32	0-360	101	V
4	645.1	39.95	Pk	19.5	-28.4	31.05	46.02	-14.97	0-360	101	H
8	713.2	41.65	Pk	20.2	-28.3	33.55	46.02	-12.47	0-360	101	V

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

Pk - Peak detector

FCC Part 15 Subpart C 30-1000MHz.TST 30915 9 Jul 2013 Rev 9.5 12 Jun 2013

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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.

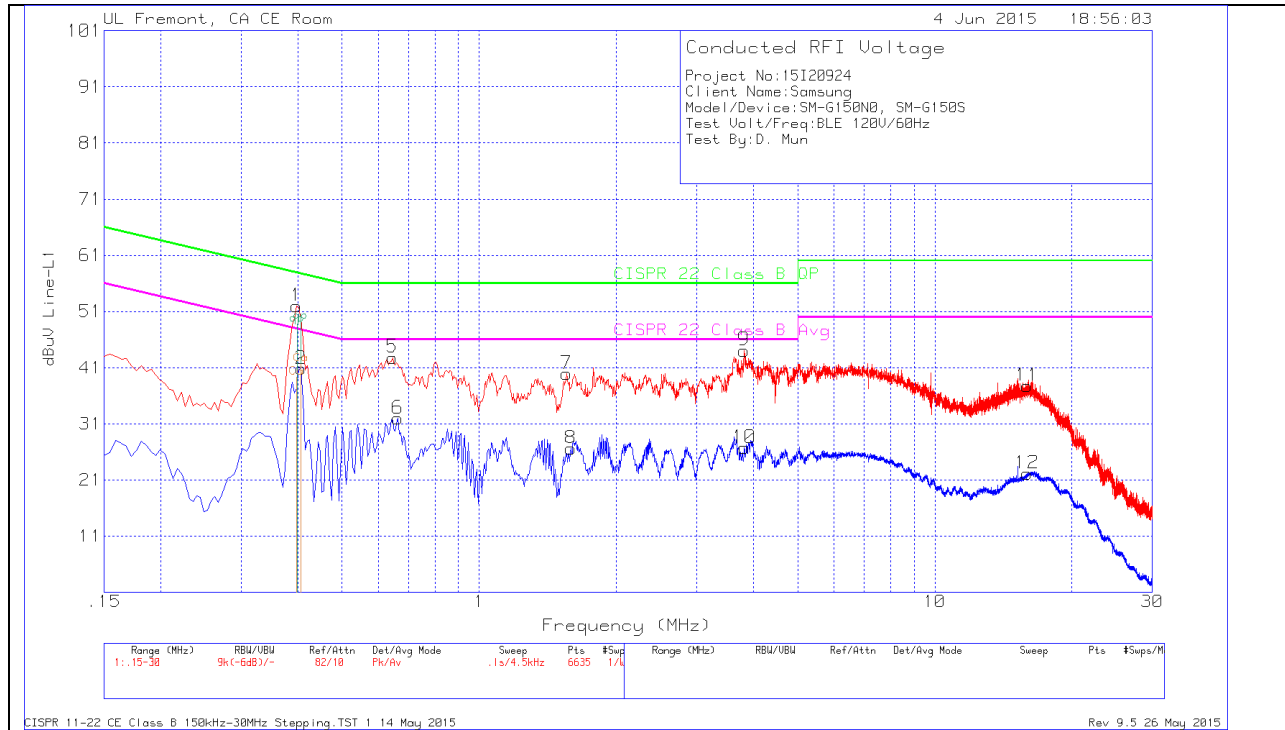
TEST PROCEDURE

ANSI C63.10

RESULTS

6 WORST EMISSIONS

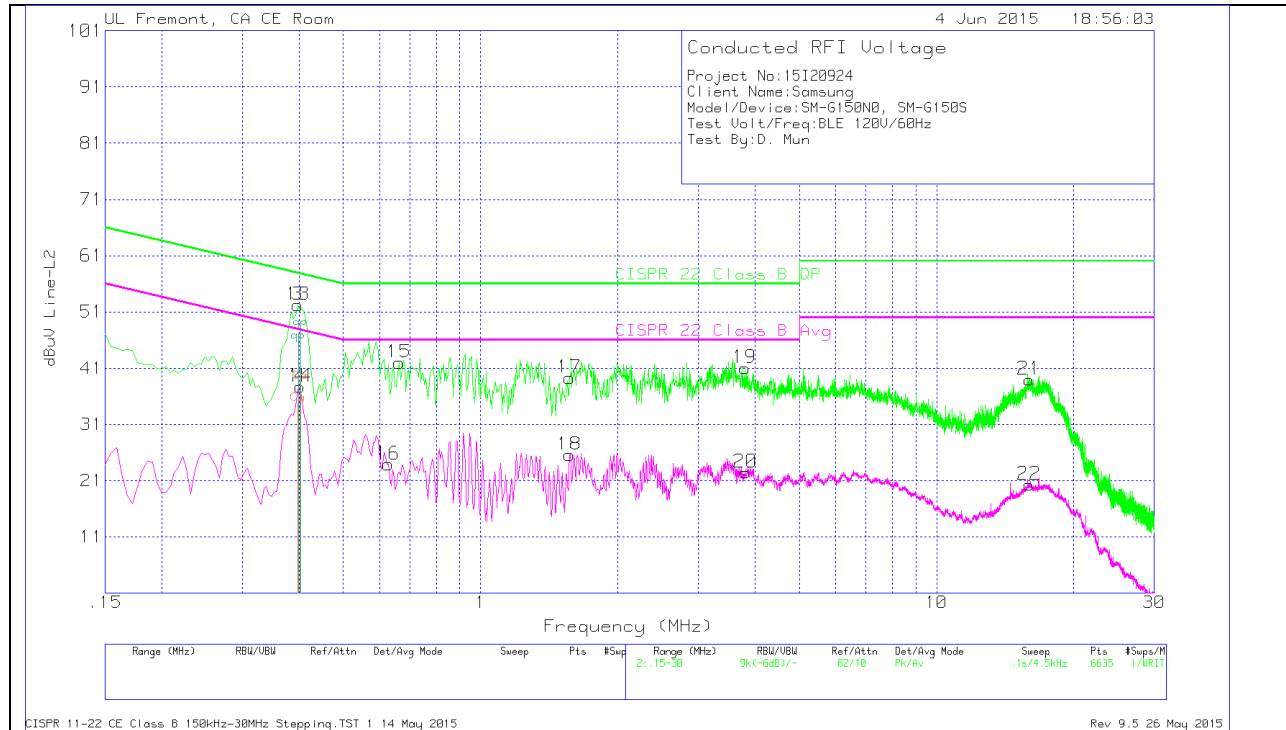
LINE 1 PLOT



LINE 1 RESULTS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.3975	51.56	Pk	.4	0	51.96	57.91	-5.95		
2	.4065	40.4	Av	.4	0	40.8	-	-	47.72	-6.92
5	.645	42.5	Pk	.3	0	42.8	56	-13.2		
6	.663	31.66	Av	.3	0	31.96	-	-	46	-14.04
7	1.554	39.61	Pk	.2	.1	39.91	56	-16.09		
8	1.59	26.3	Av	.2	.1	26.6	-	-	46	-19.4
9	3.813	43.77	Pk	.2	.1	44.07	56	-11.93		
10	3.8175	26.42	Av	.2	.1	26.72	-	-	46	-19.28
11	15.9585	37.24	Pk	.3	.2	37.74	60	-22.26		
12	15.945	21.67	Av	.3	.2	22.17	-	-	50	-27.83

LINE 2 PLOT



LINE 2 RESULTS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
3	.3975	51.86	Pk	.4	0	52.26	57.91	-5.65		
4	.402	37.29	Av	.4	0	37.69	-	-	47.81	-10.12
13	.3975	51.86	Pk	.4	0	52.26	57.91	-5.65		
14	.402	37.29	Av	.4	0	37.69	-	-	47.81	-10.12
15	.663	41.7	Pk	.3	0	42	56	-14		
16	.627	23.6	Av	.3	0	23.9	-	-	46	-22.1
17	1.5675	39.01	Pk	.2	.1	39.31	56	-16.69		
18	1.5675	25.3	Av	.2	.1	25.6	-	-	46	-20.4
19	3.795	40.72	Pk	.2	.1	41.02	56	-14.98		
20	3.8085	22.17	Av	.2	.1	22.47	-	-	46	-23.53
21	15.9675	38.46	Pk	.3	.2	38.96	60	-21.04		
22	15.963	19.78	Av	.3	.2	20.28	-	-	50	-29.72