FCC CFR47 PART 15 SUBPART C

BLUETOOTH LOW ENERGY

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE PHONE + BLUETOOTH + DTS b/g/n + NFC

MODEL NUMBER: SM-G531F and SM-G531F/DD

FCC ID: A3LSMG531F

REPORT NUMBER: 15I20736-E2, Revision A

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
--	5/16/15	Initial Issue	P. Zhang
A	6/11/15	Add Another Model	A. Aumentado

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE PHONE + BLUETOOTH + DTS b/g/n + NFC
MODEL:	SM-G531F and SM-G531F/DD
SERIAL NUMBER:	R38G40TQMVX (Conducted), R38G40TQM9X (Radiated)
DATE TESTED:	MAY 8 – 16, 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.

Approved & Released For
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PROJECT LEAD
UL Verification Services Inc.

Tested By:

CHARLES VERGONIO
LAB ENGINEER
UL Verification Services Inc.

2. 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.

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(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.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE PHONE + BLUETOOTH + DTS b/g/n + NFC .

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402-2480	BLE	1.23	1.33

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antenna, with a maximum gain of -2.68 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.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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

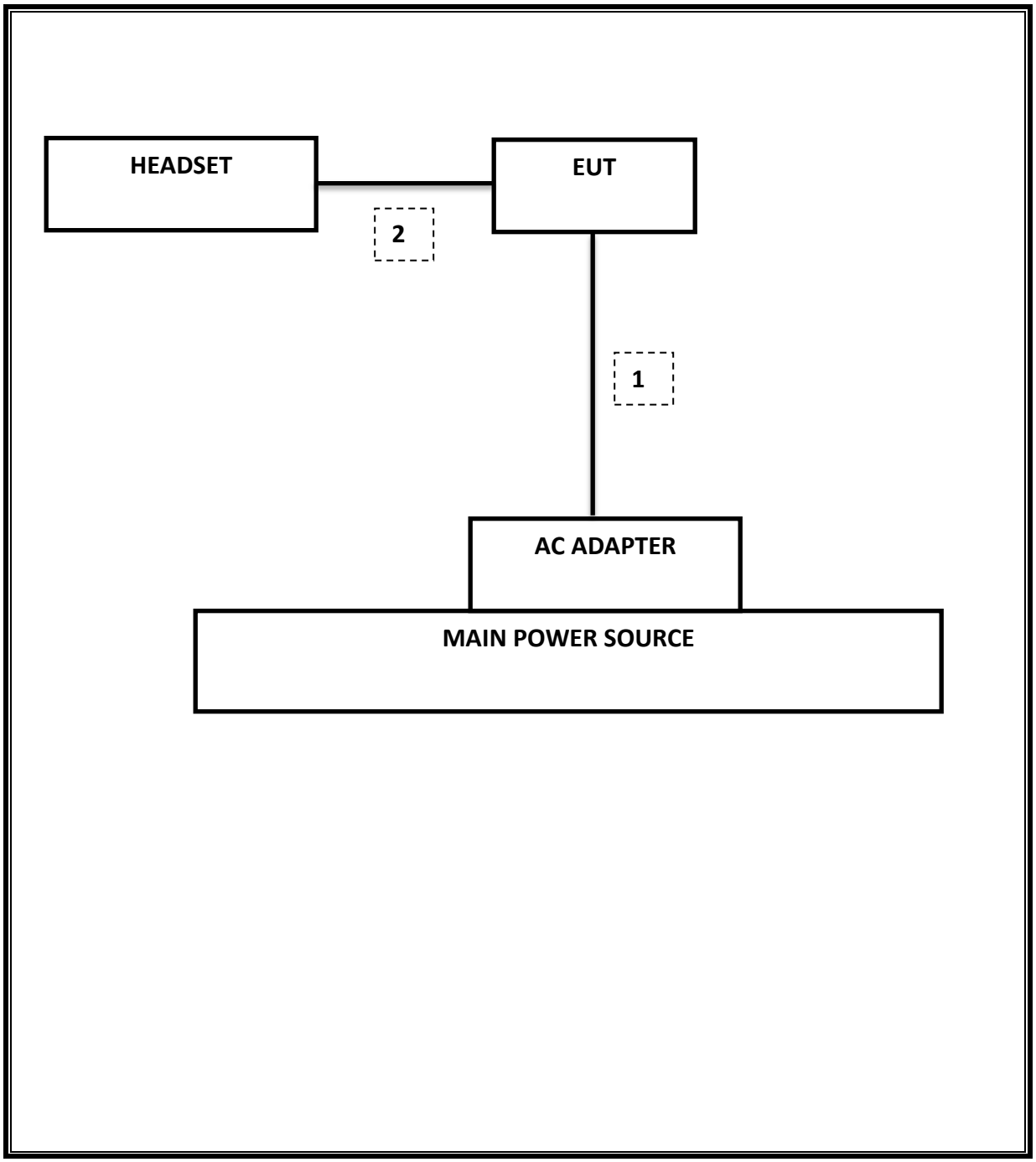
I/O CABLES

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

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

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**
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/16
Antenna, Horn, 18GHz	EMCO	3115	C00783	10/25/15
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/15
RF Preamplifier, 100KHz -> 1300MHz	HP	TBD	C00825	06/01/15
RF Preamplifier, 1GHz - 18GHz	Miteq	NSP4000-SP2	924343	03/23/16
RF Preamplifier, 1GHz - 26.5GHz	HP	8449B	F00351	06/27/15
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/15
CBT Bluetooth Tester	R & S	CBT	None	07/12/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/16
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR
Radiated Software	UL	UL EMC	Ver 9.5, July 22, 2014	
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012	
CLT Software	UL	UL RF	Ver 1.0, Feb 2 2015	
Antenna Port Software	UL	UL RF	Ver 2.1.1.1, Jan 20 2015	

7. SUMMARY

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FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	0.684MHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-45.84dBm
15.247	TX conducted output power	<30dBm		Pass	1.23dBm
15.247	PSD	<8dBm		Pass	-13.92dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Radiated	Pass	53.61dBuV
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m		Pass	53.58dBuV/m

ANTENNA PORT TEST RESULTS

8.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

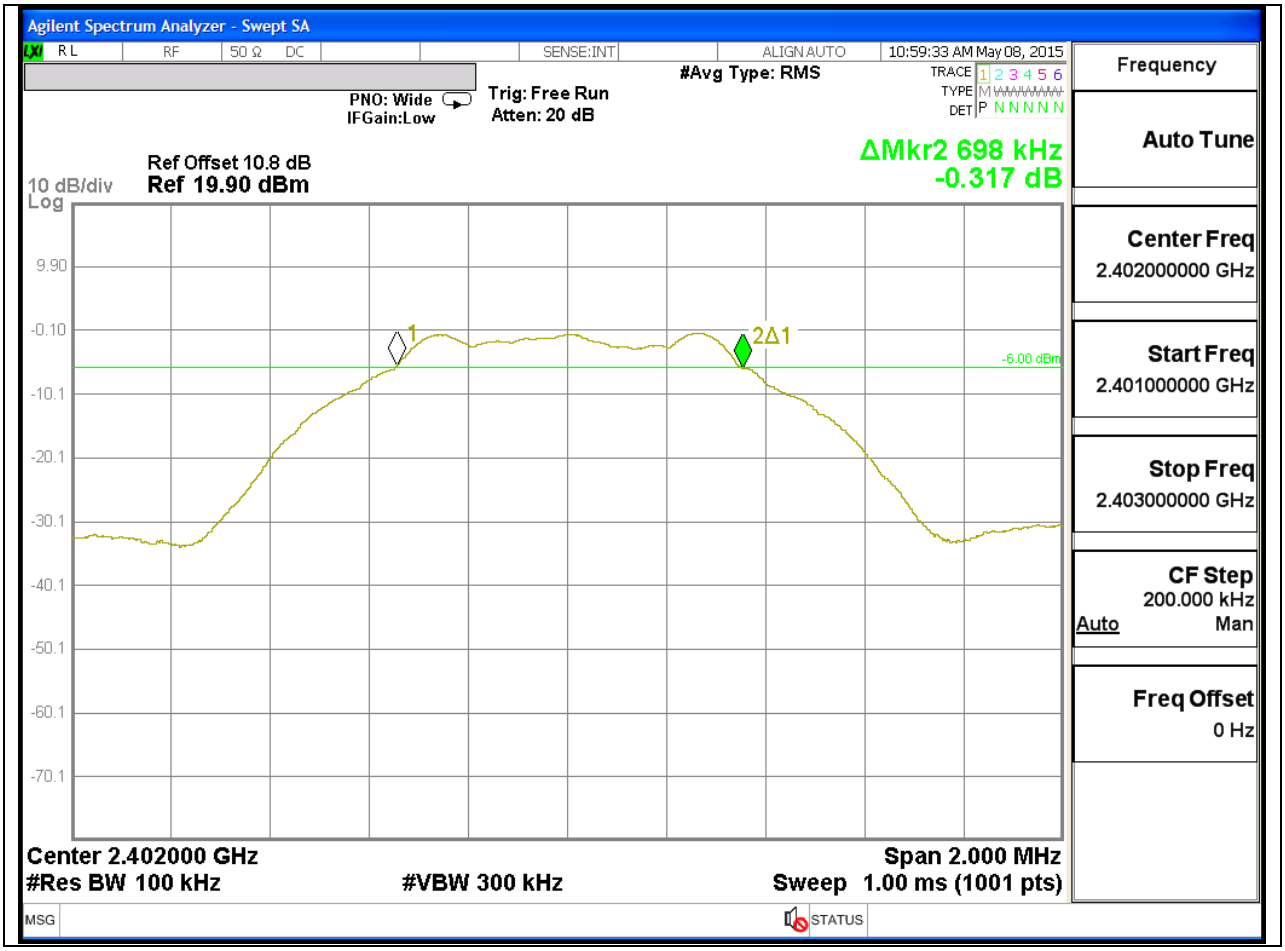
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

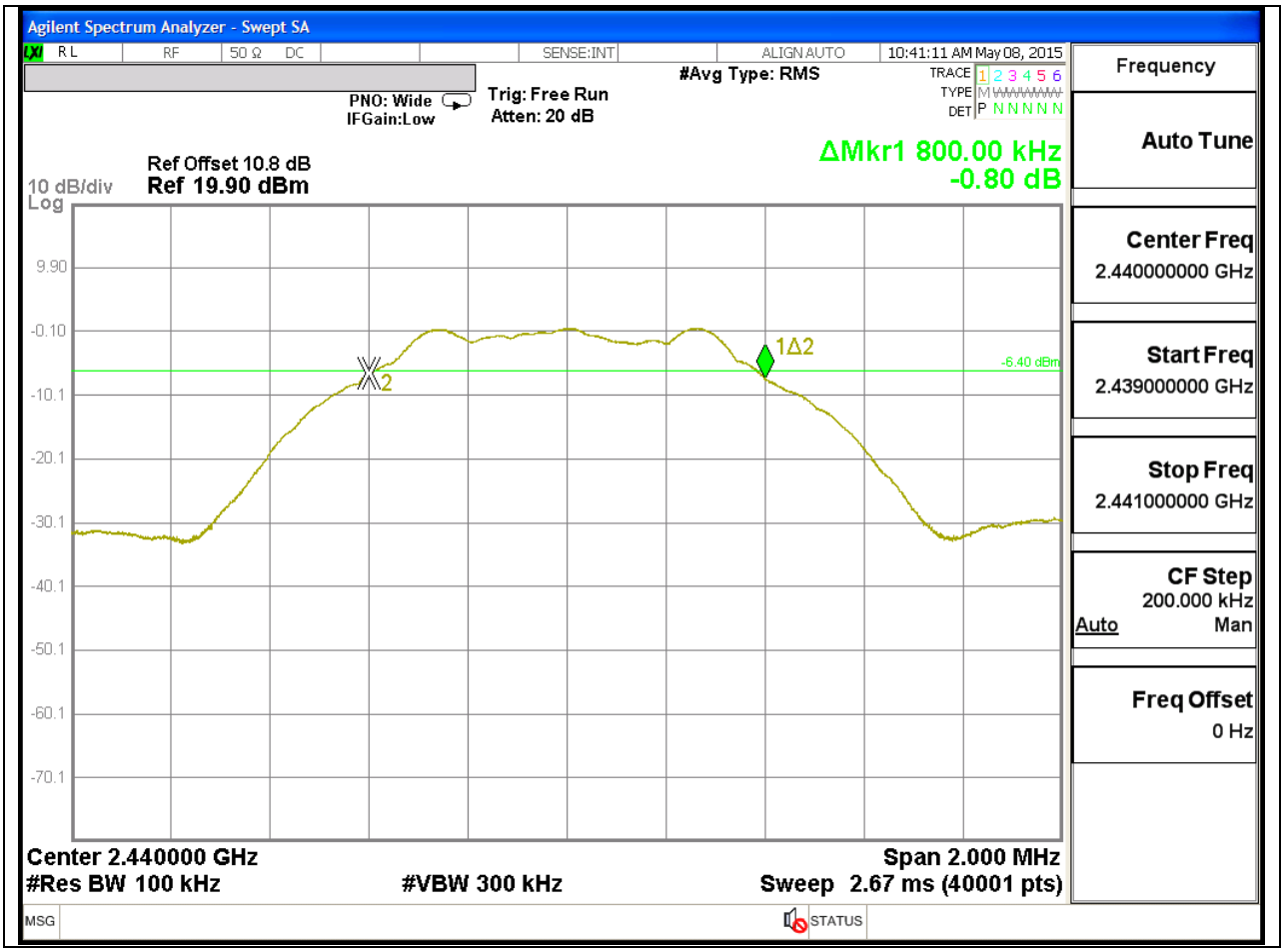
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6980	0.5
Middle	2440	0.8000	0.5
High	2480	0.6840	0.5

6 dB BANDWIDTH PLOTS

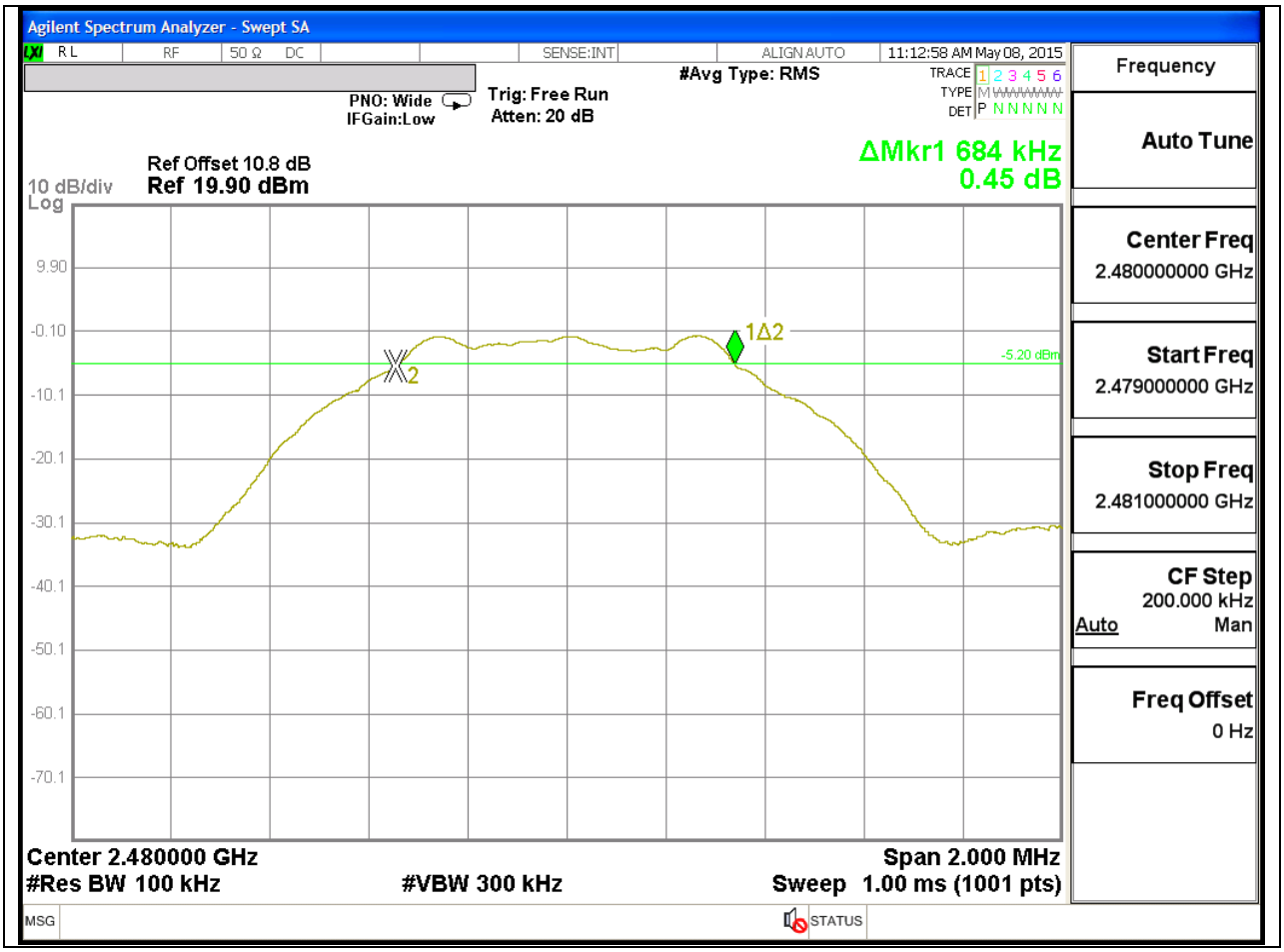
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

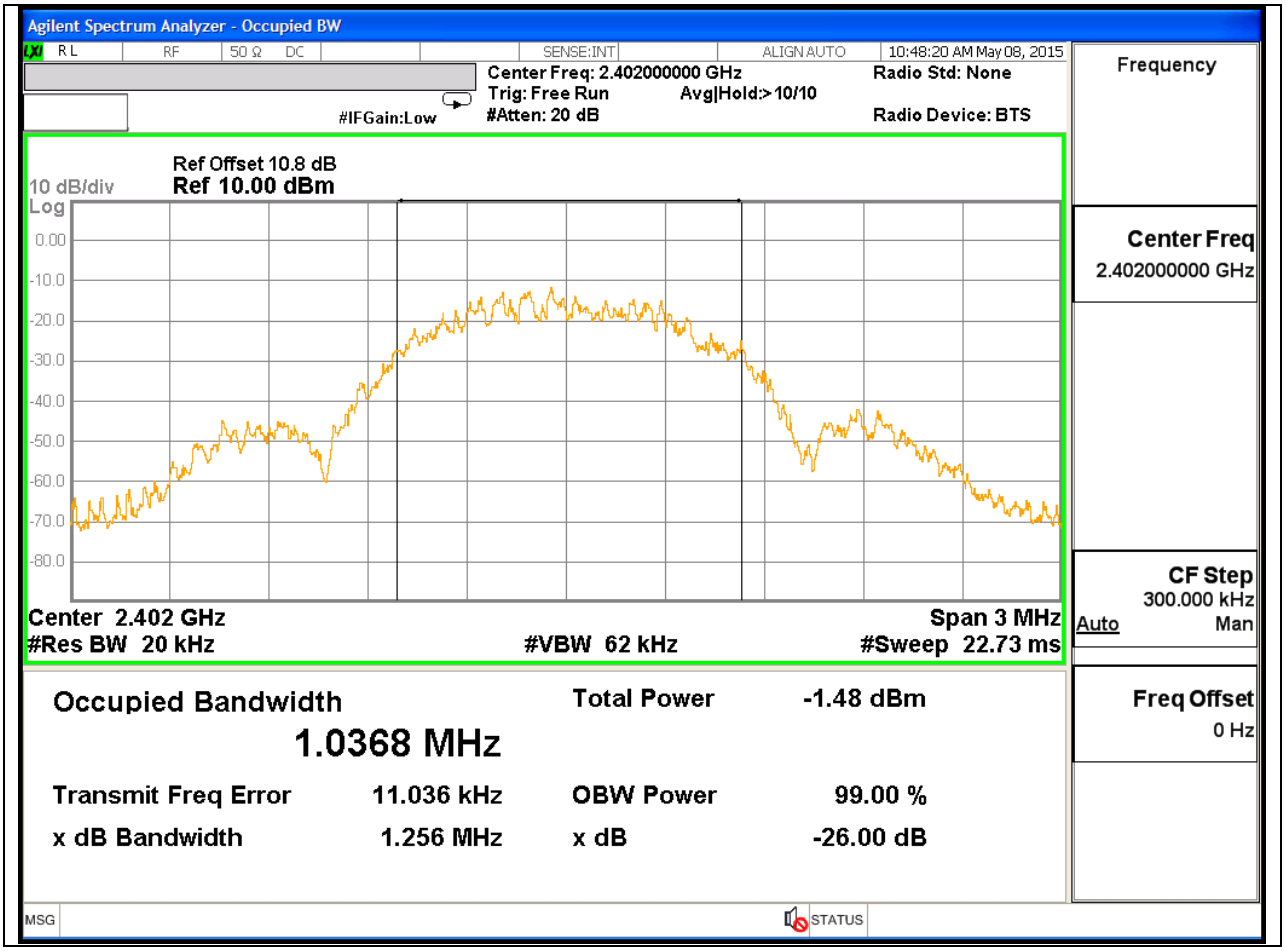
Reference to KDB558074 D01 DTS Meas Guidance v03r02: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function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

RESULTS

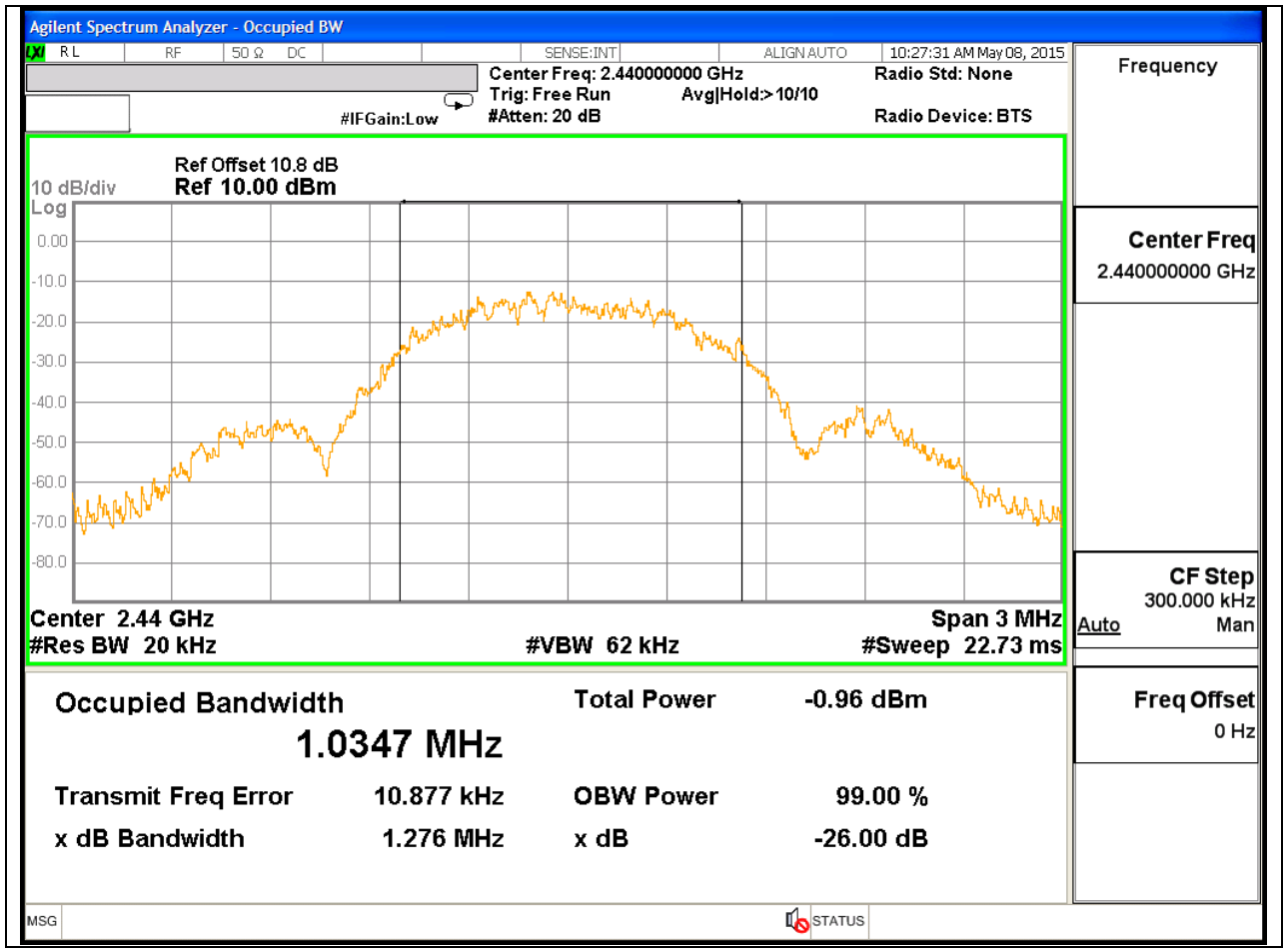
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0368
Middle	2440	1.0347
High	2480	1.0333

99% BANDWIDTH PLOTS

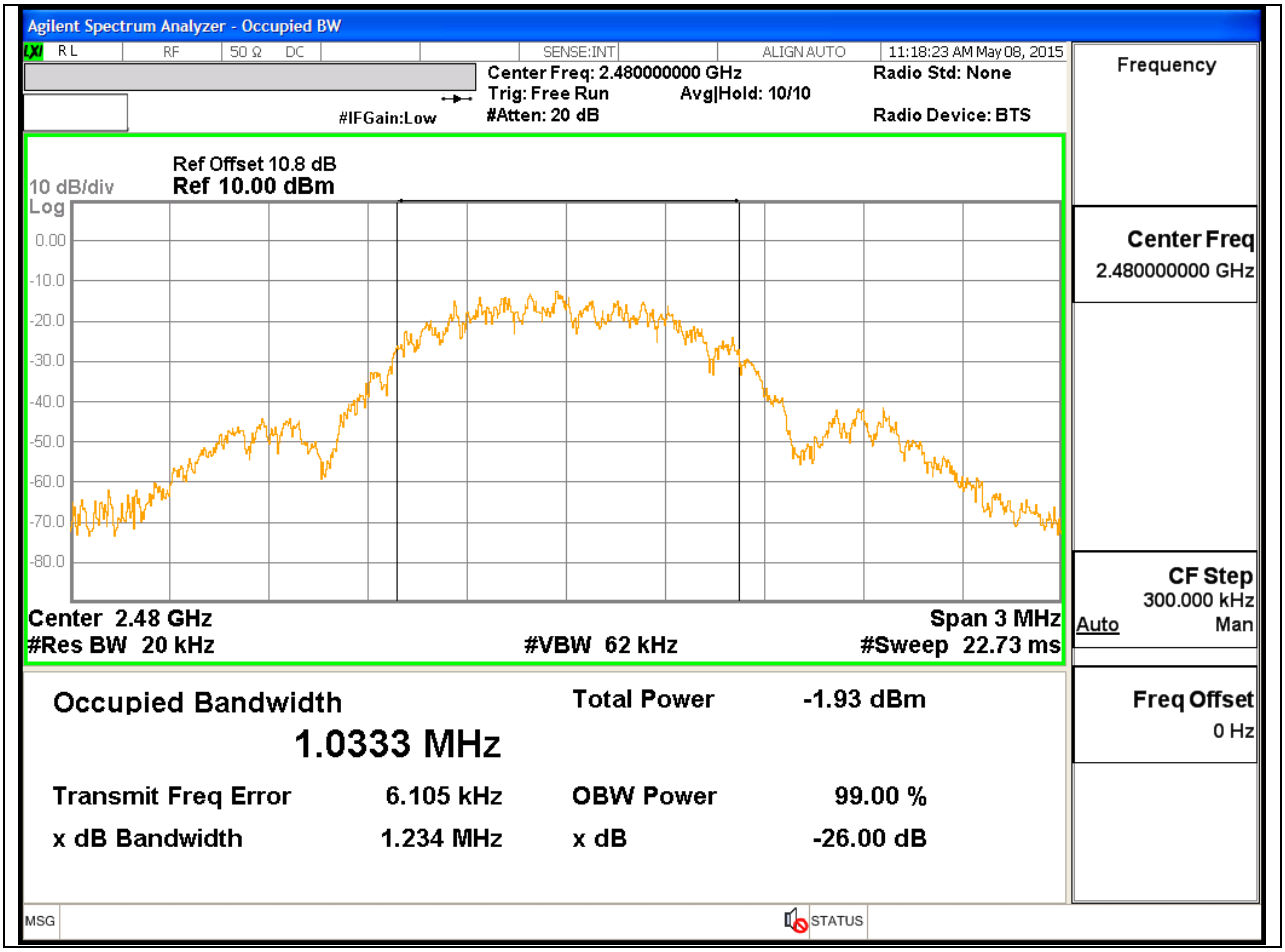
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.3. 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

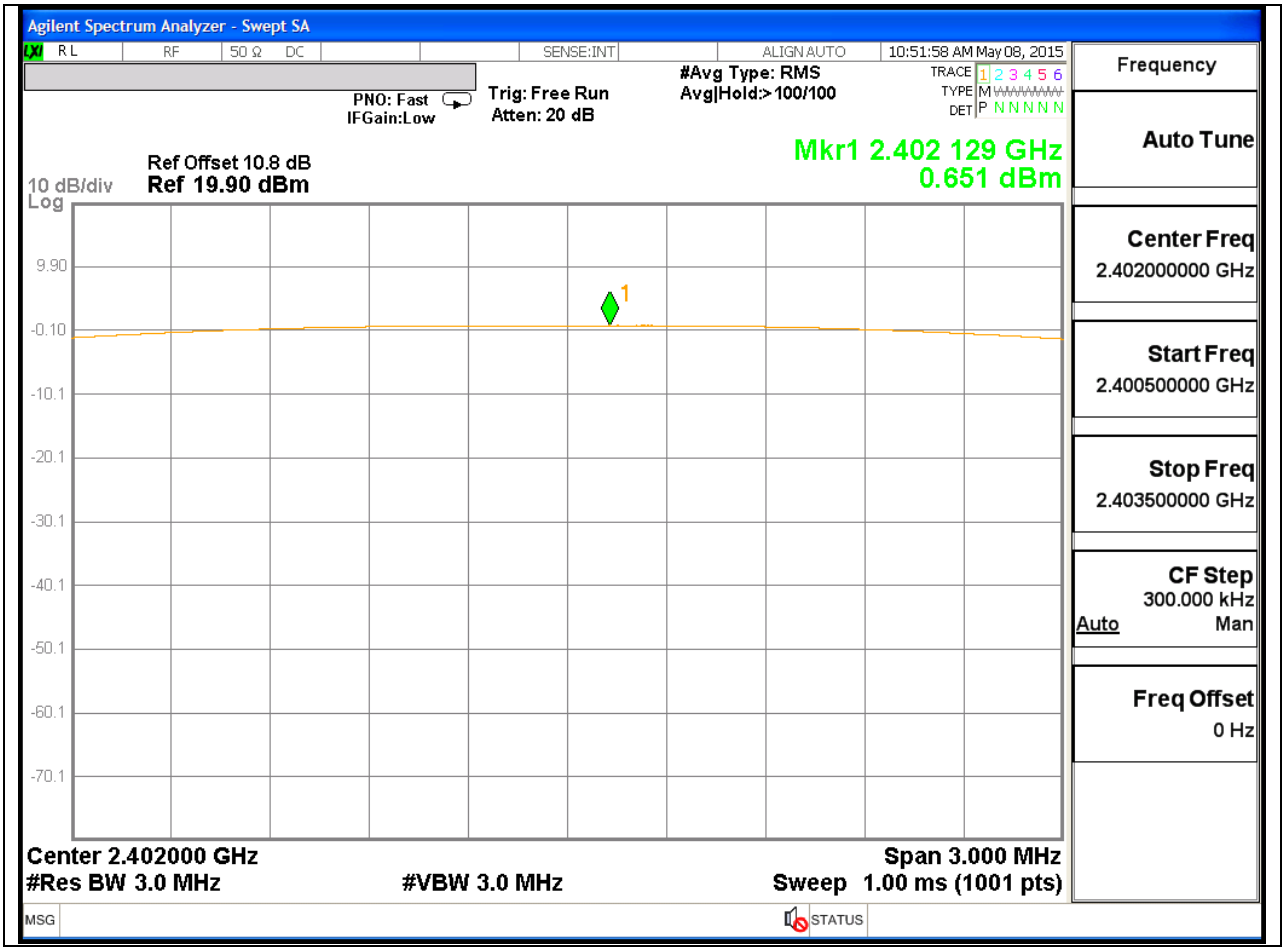
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r02 utilizing spectrum analyzer.

RESULTS

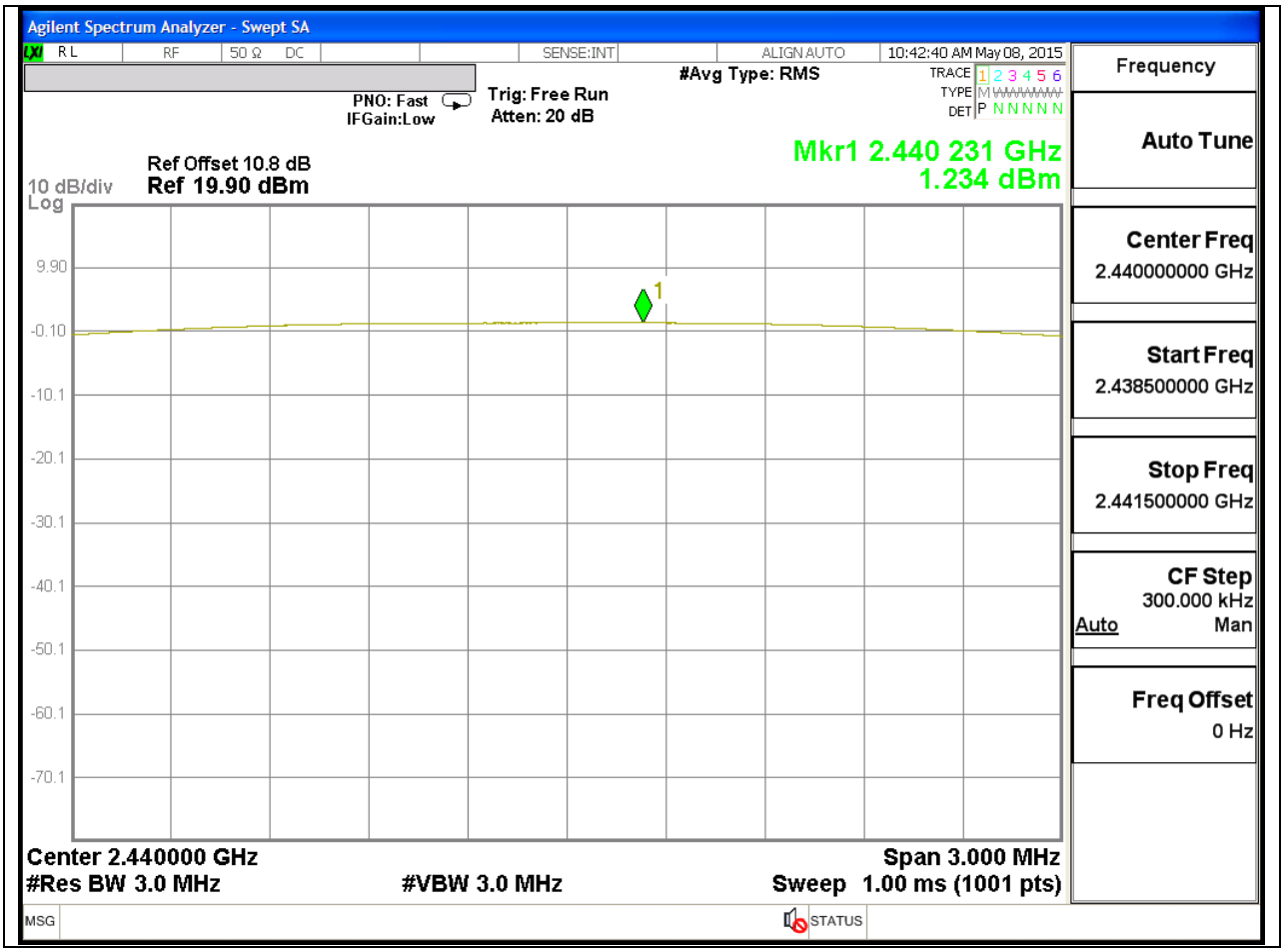
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	0.651	30	-29.349
Middle	2440	1.234	30	-28.766
High	2480	0.162	30	-29.838

OUTPUT POWER PLOTS

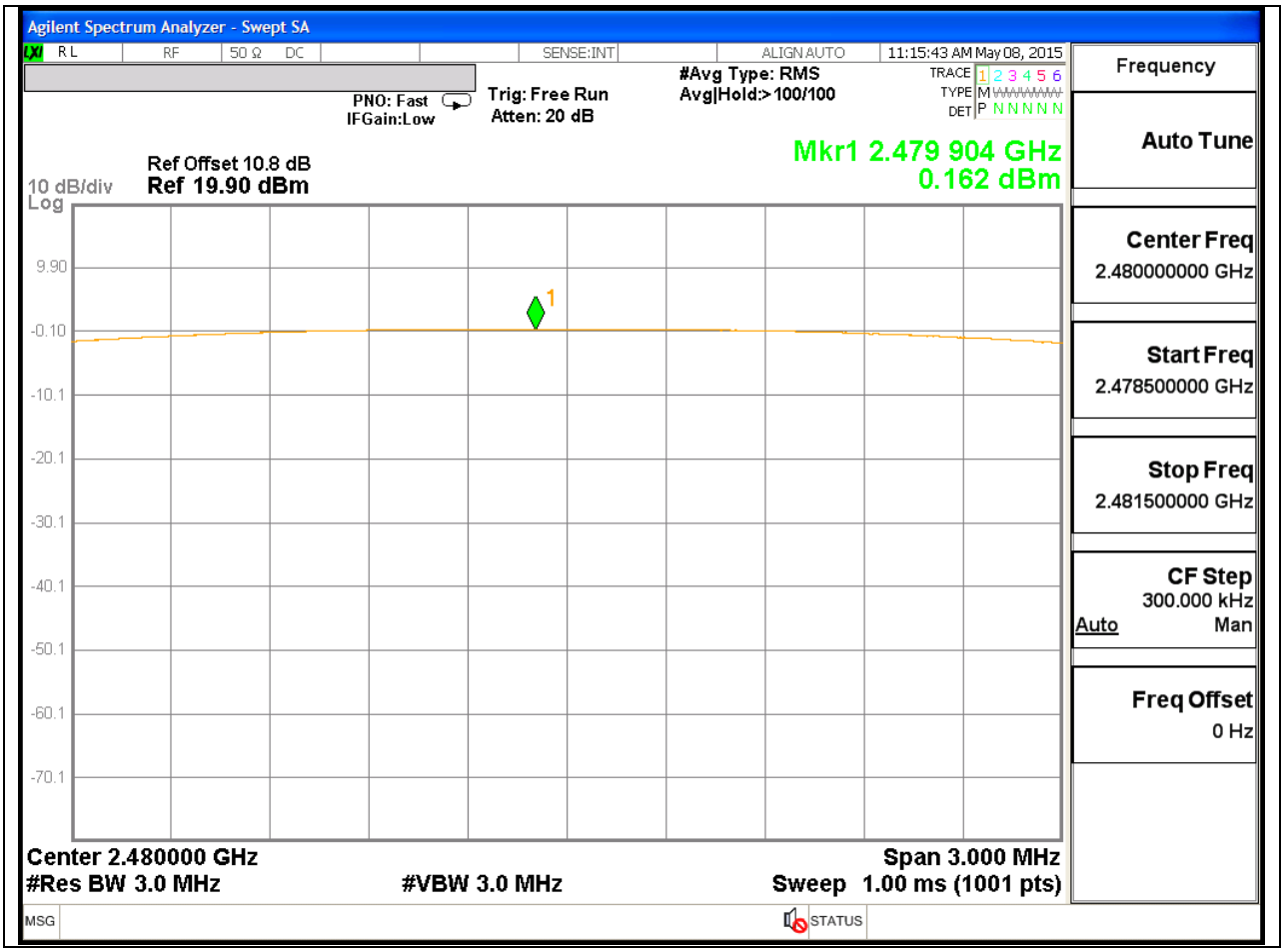
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.4. 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 0.8 dB (0.8 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	0.3
Middle	2440	1.1
High	2480	0.1

8.5. 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

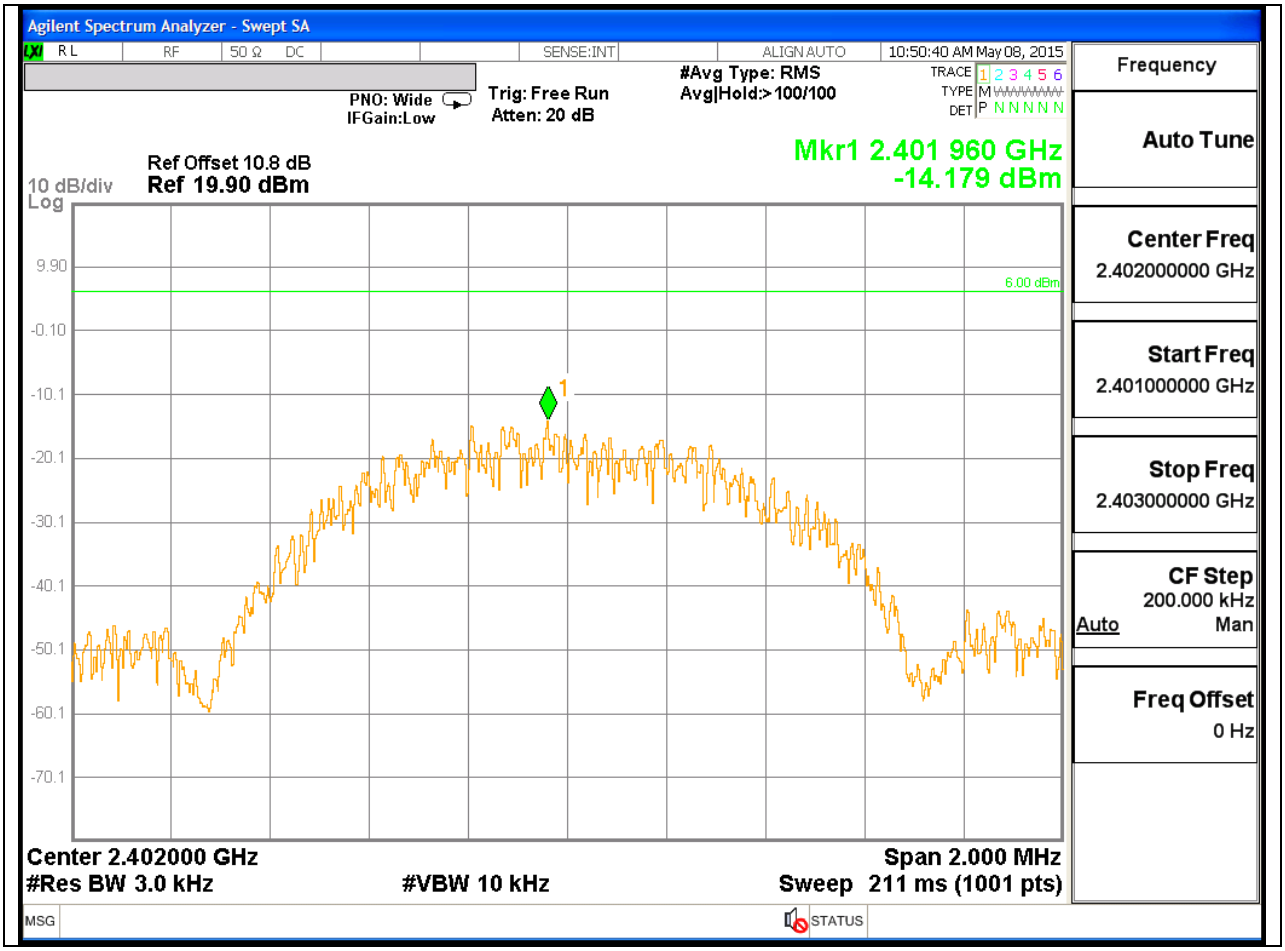
Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r02.

RESULTS

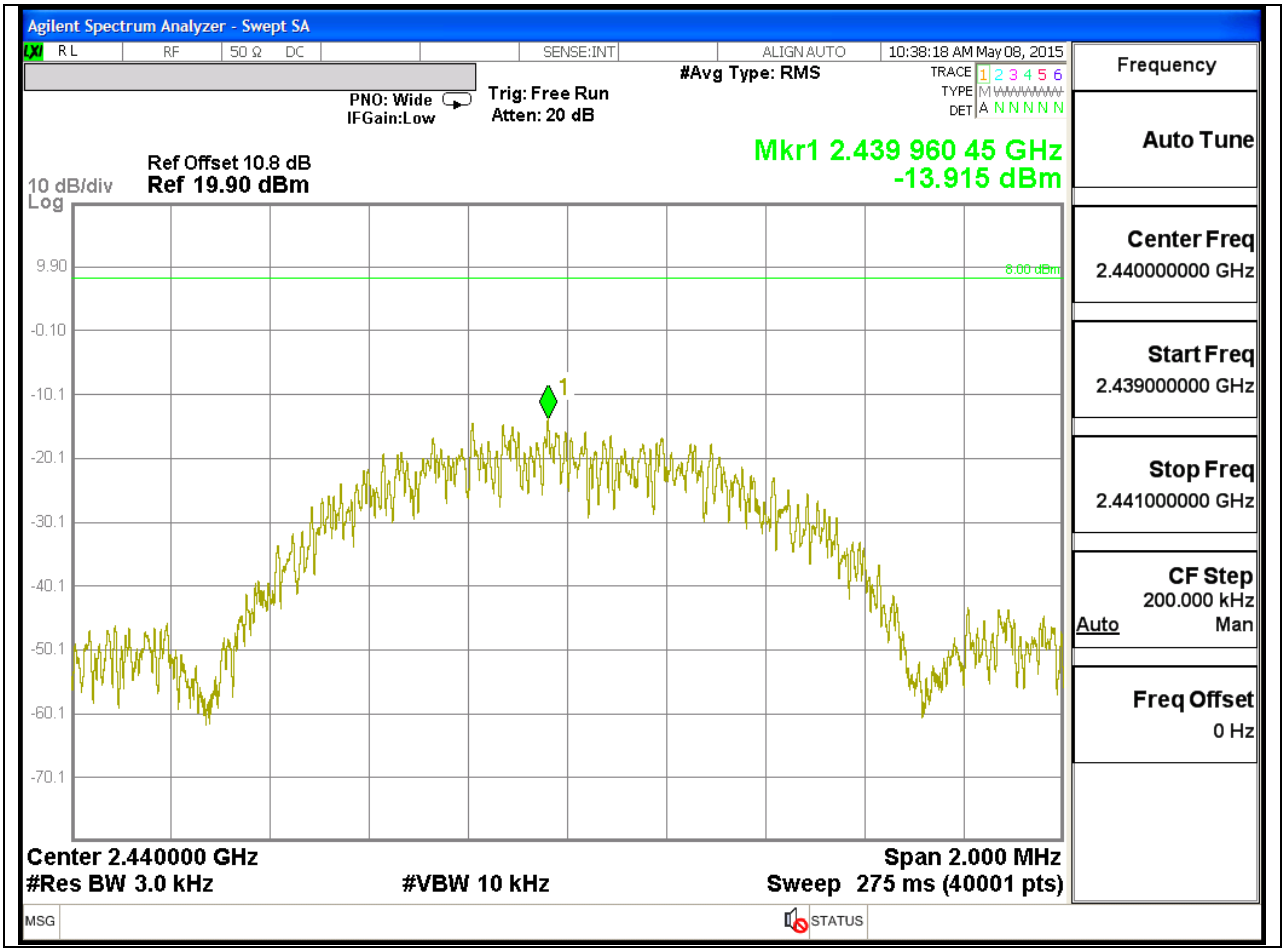
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-14.18	8	-22.18
Middle	2440	-13.92	8	-21.92
High	2480	-14.96	8	-22.96

POWER SPECTRAL DENSITY PLOTS

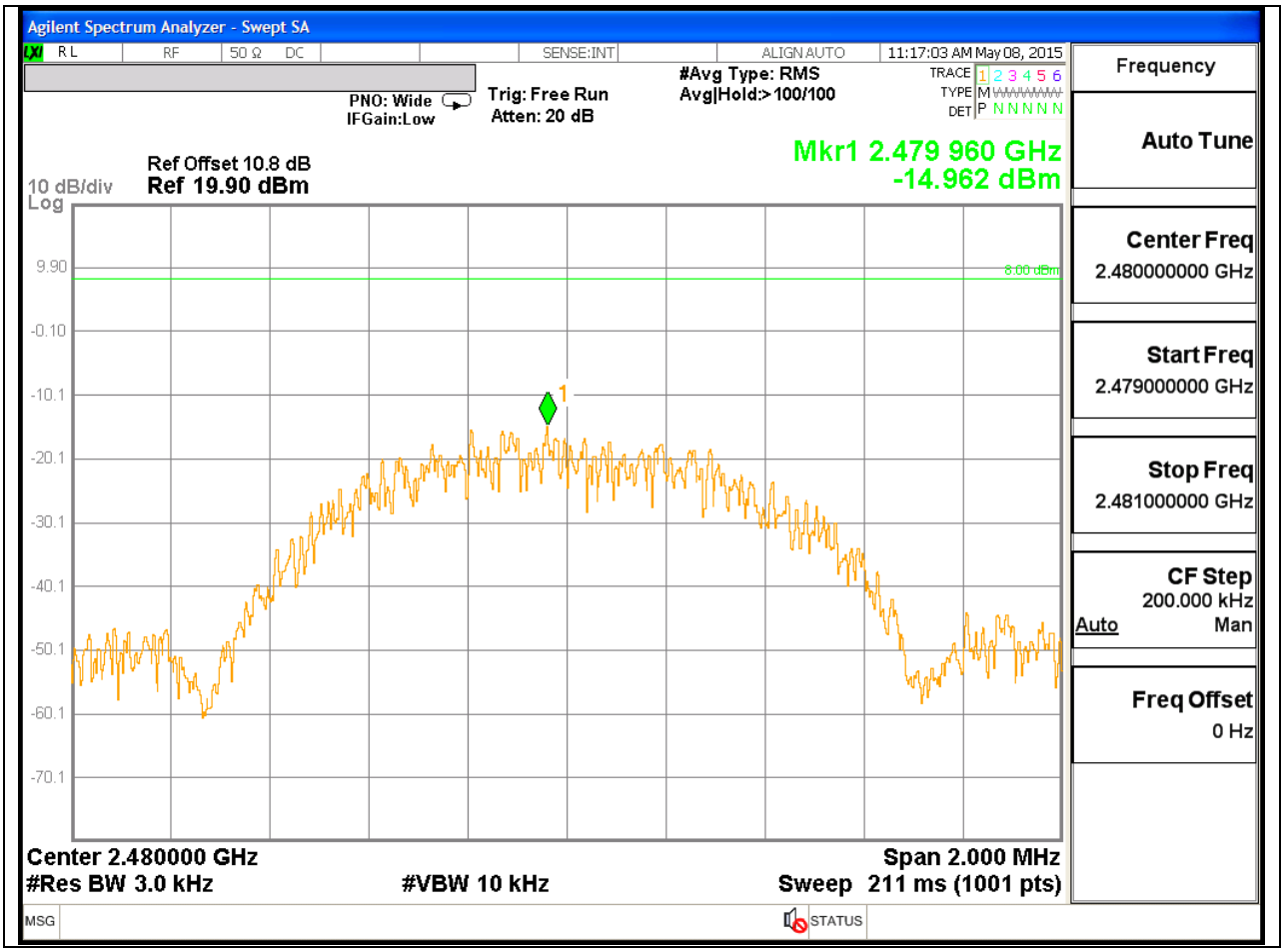
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.6. 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

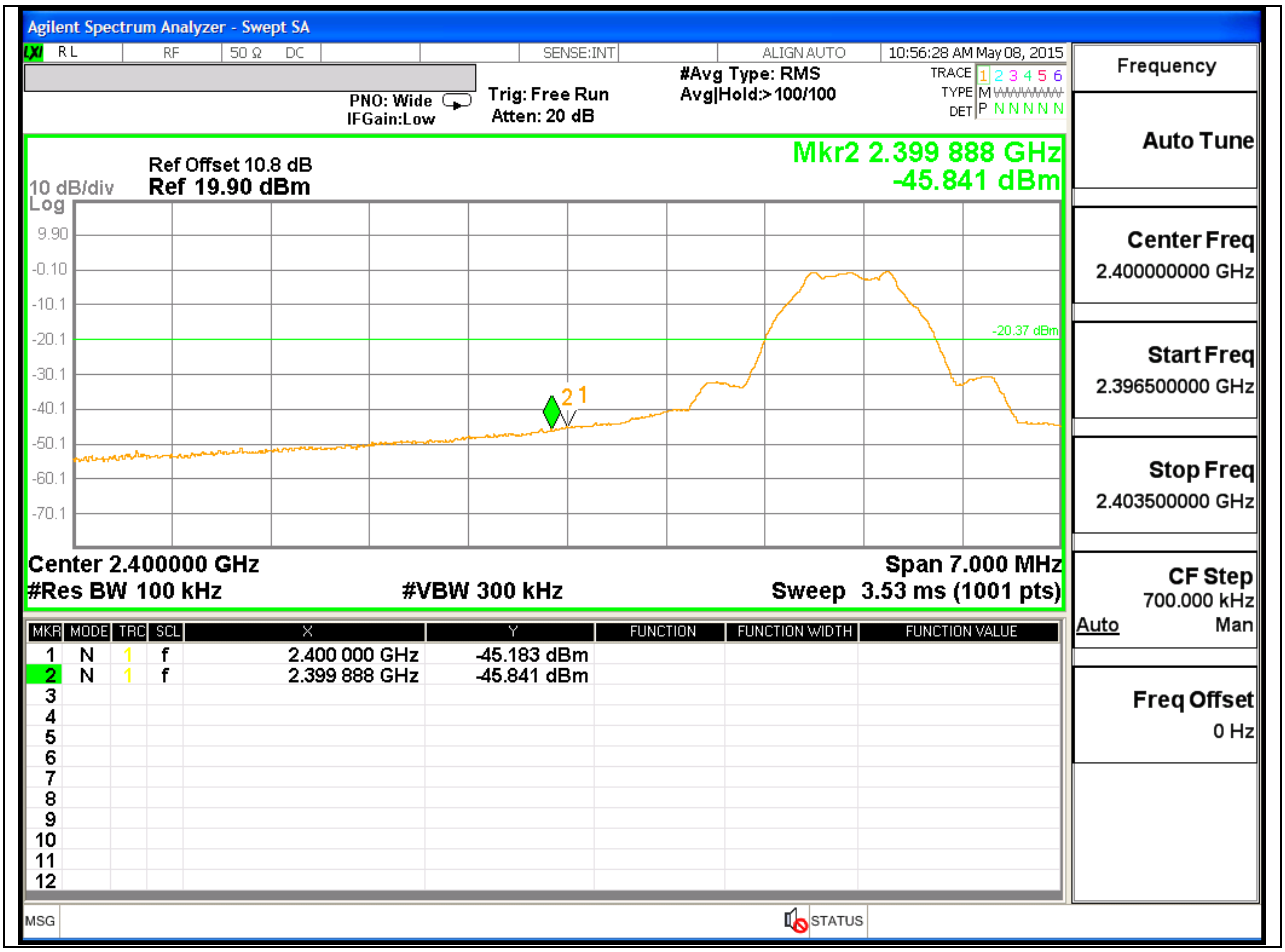
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

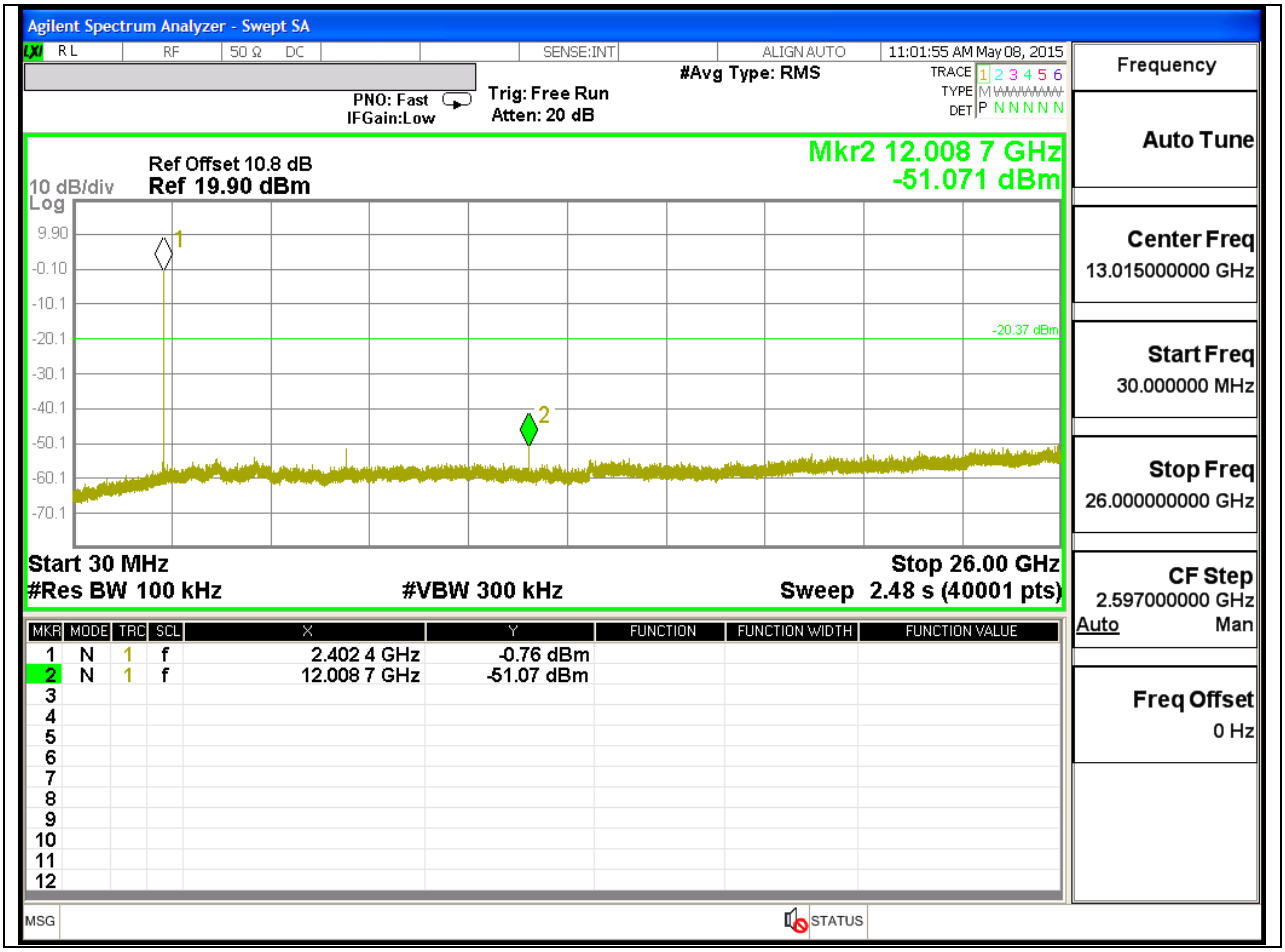
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

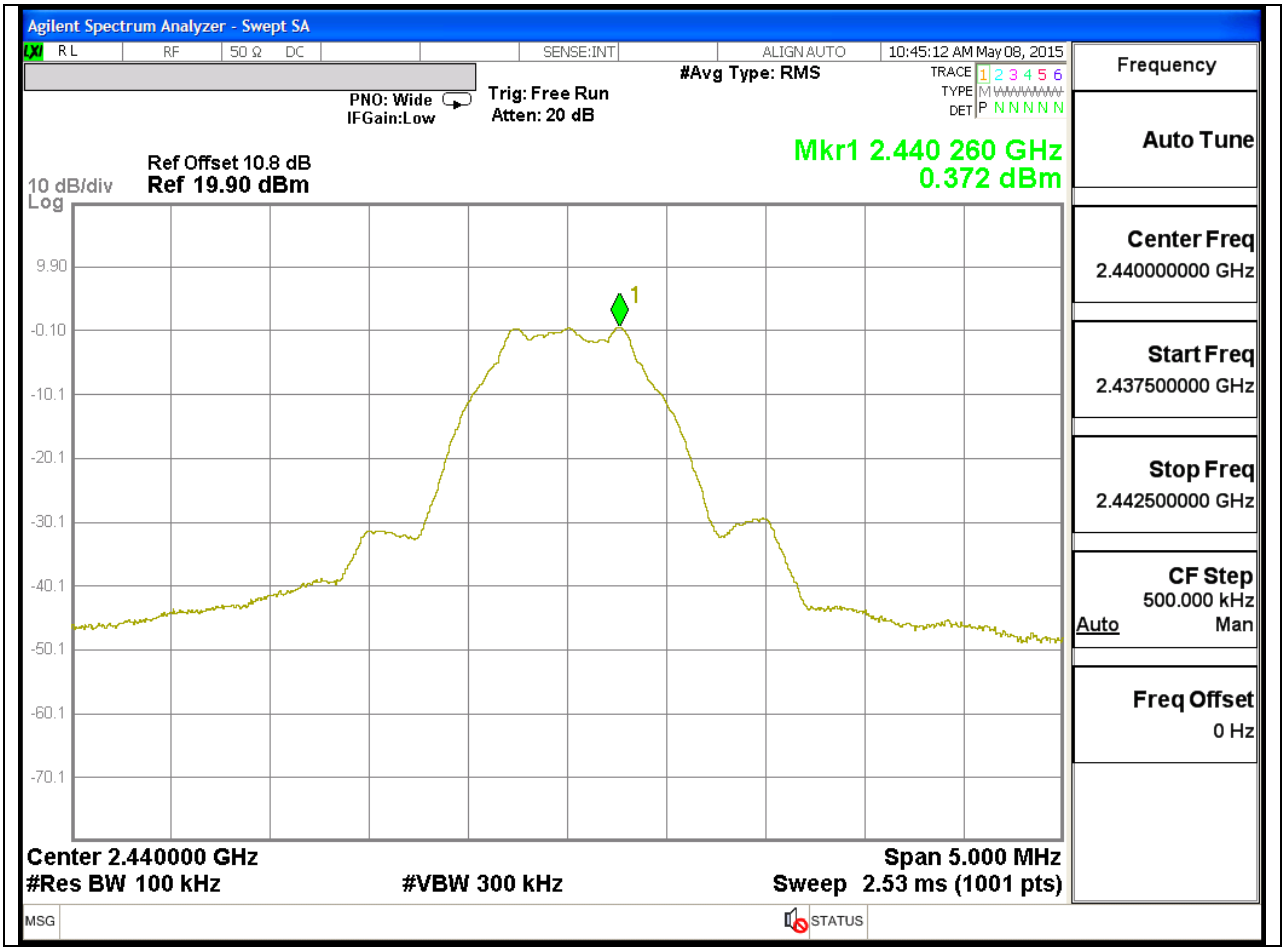


LOW CHANNEL SPURIOUS

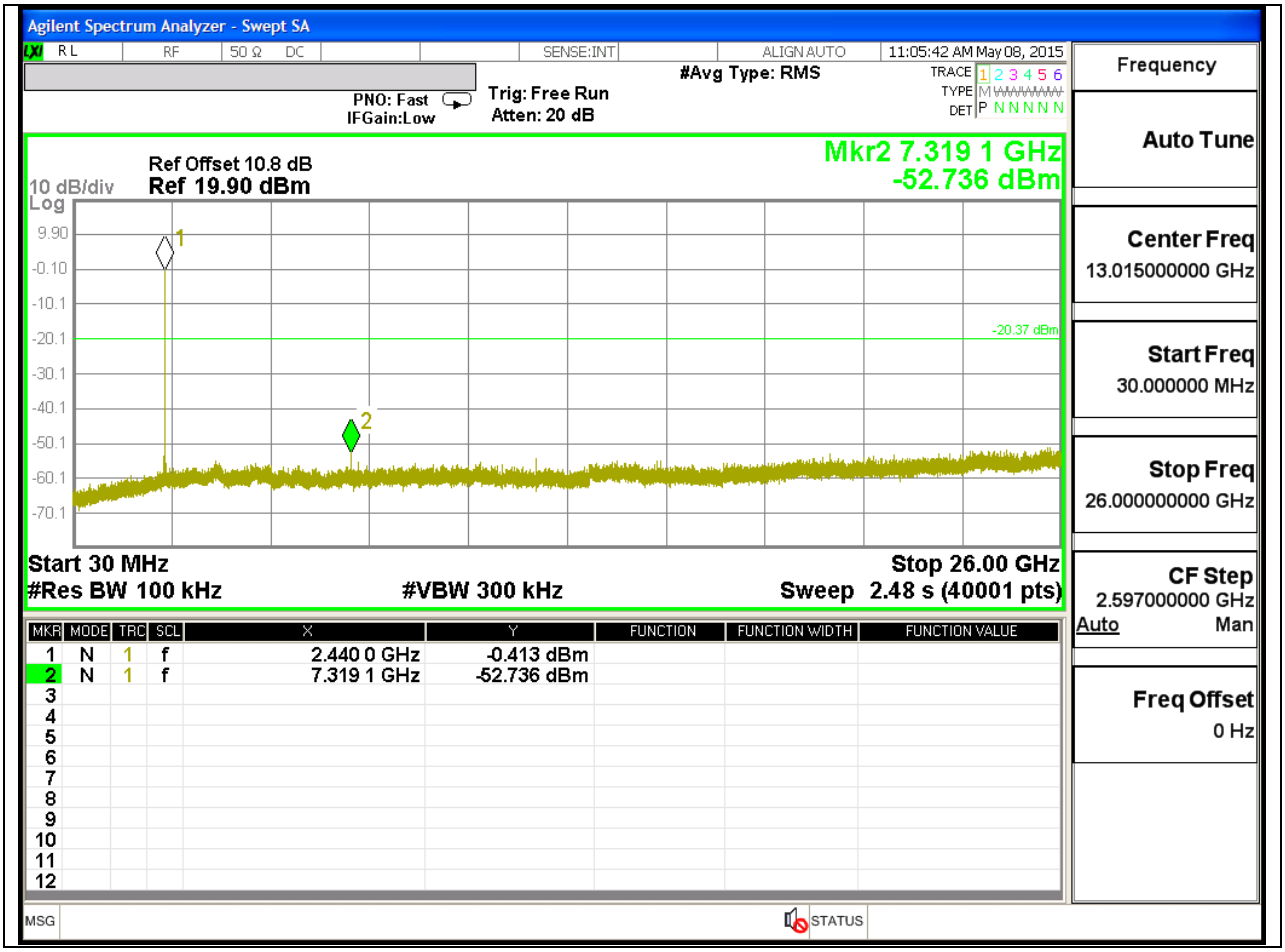


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

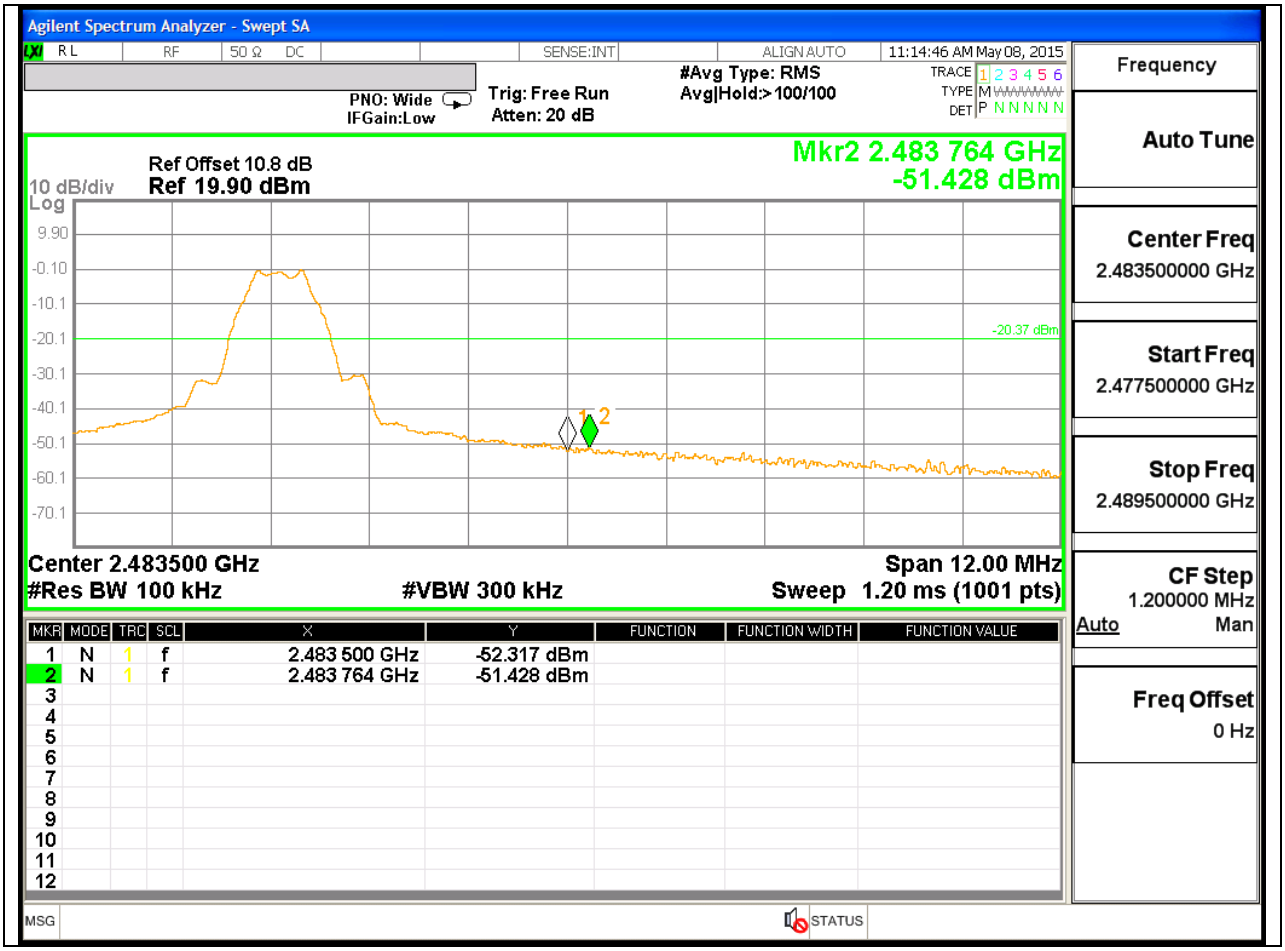


MID CHANNEL SPURIOUS

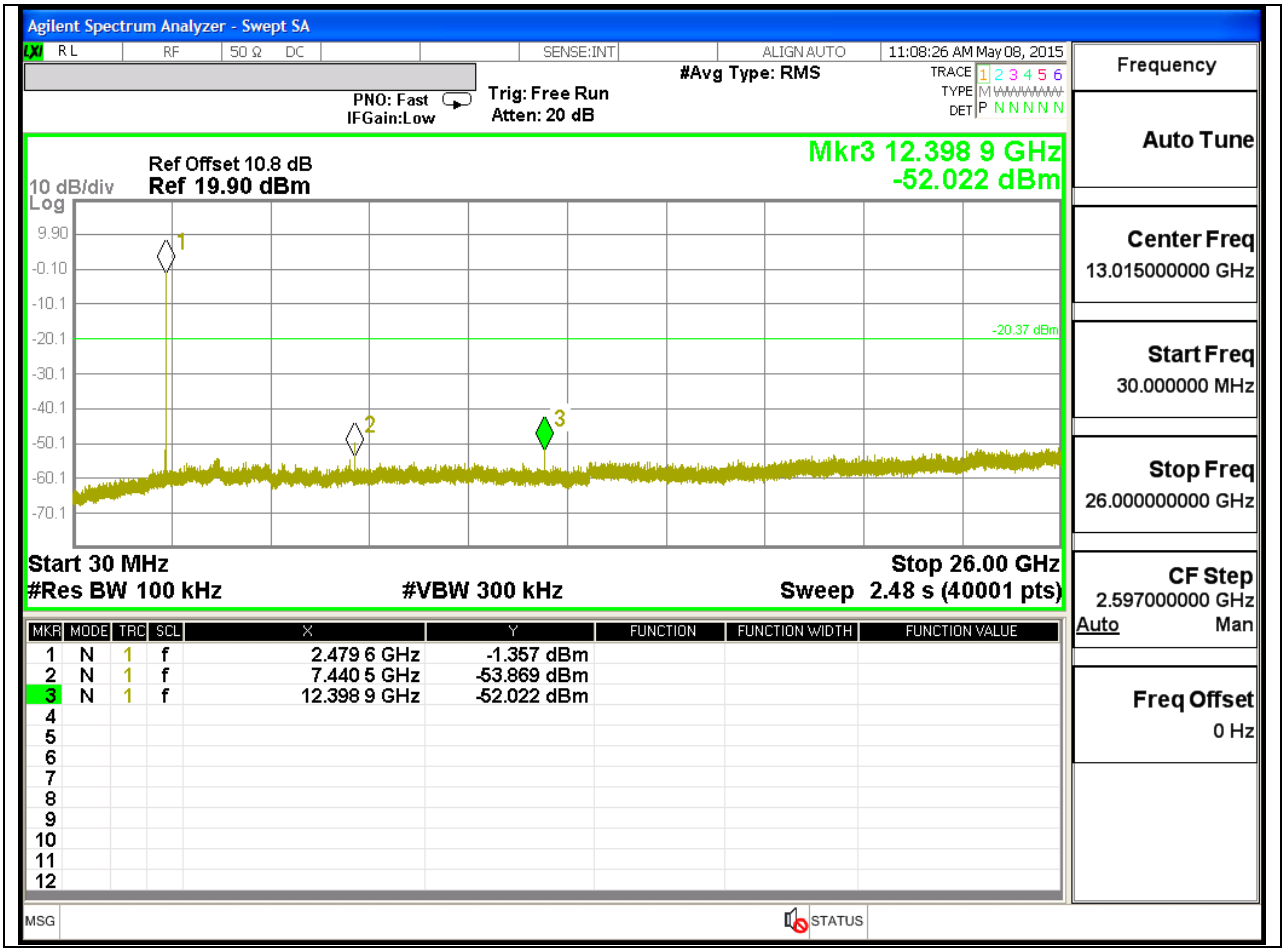


SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



HIGH CHANNEL SPURIOUS



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10 - 2009. 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 = 10log(1/0.625)=2.04dB

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.

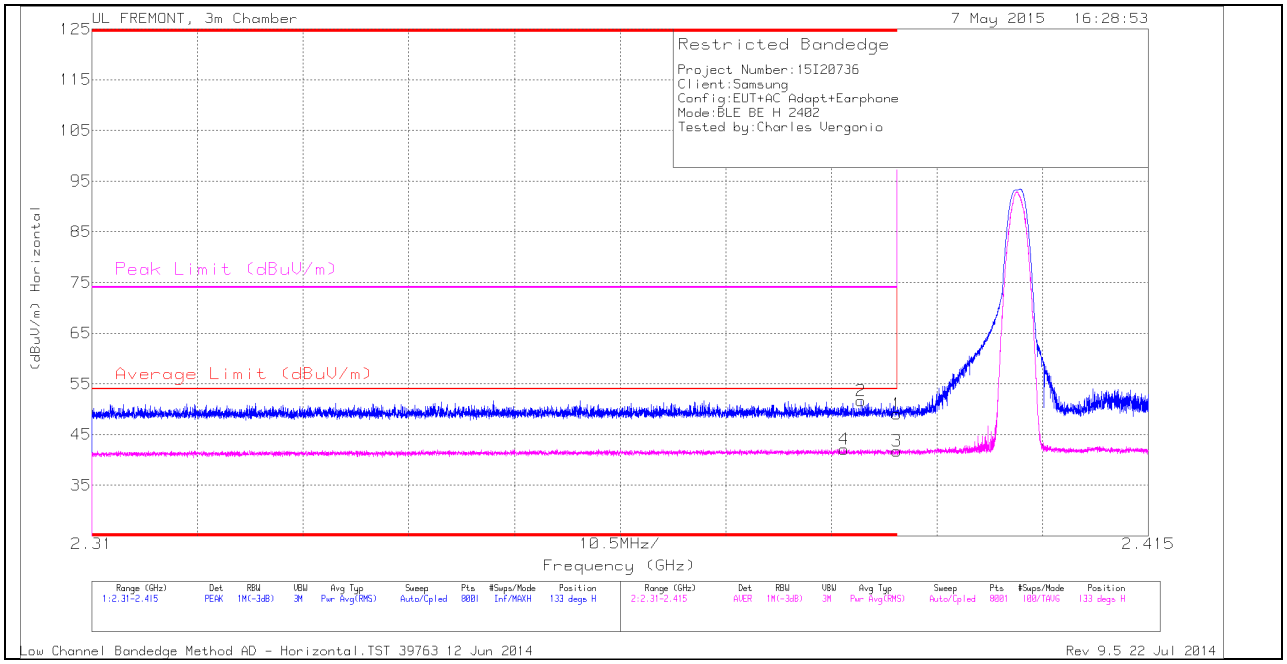
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

9.2. TRANSMITTER ABOVE 1 GHz

RESTRICTED BANDEDGE (LOW CHANNEL)

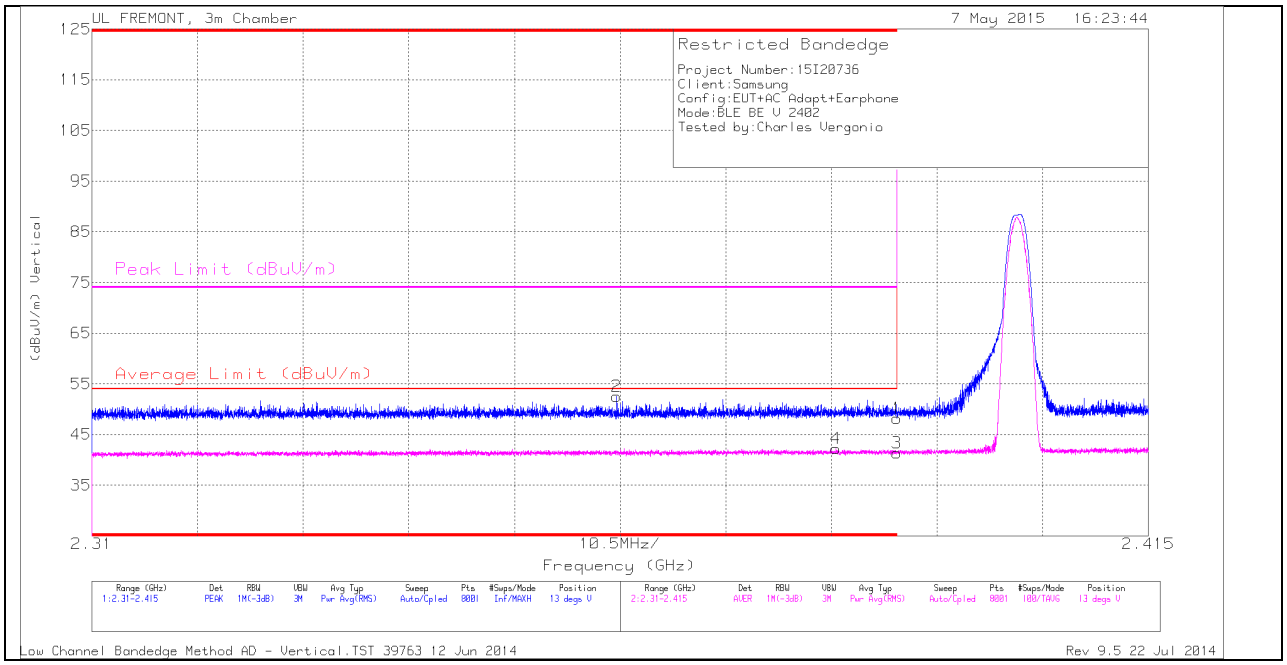
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/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	40.16	PK	32	-23.1	0	49.06	-	-	74	-24.94	133	100	H
2	* 2.386	42.8	PK	32	-23.1	0	51.7	-	-	74	-22.3	133	100	H
3	* 2.39	30.75	RMS	32	-23.1	2.04	41.69	54	-12.31	-	-	133	100	H
4	* 2.385	31.1	RMS	32	-23.1	2.04	42.04	54	-11.96	-	-	133	100	H

VERTICAL PEAK AND AVERAGE PLOT

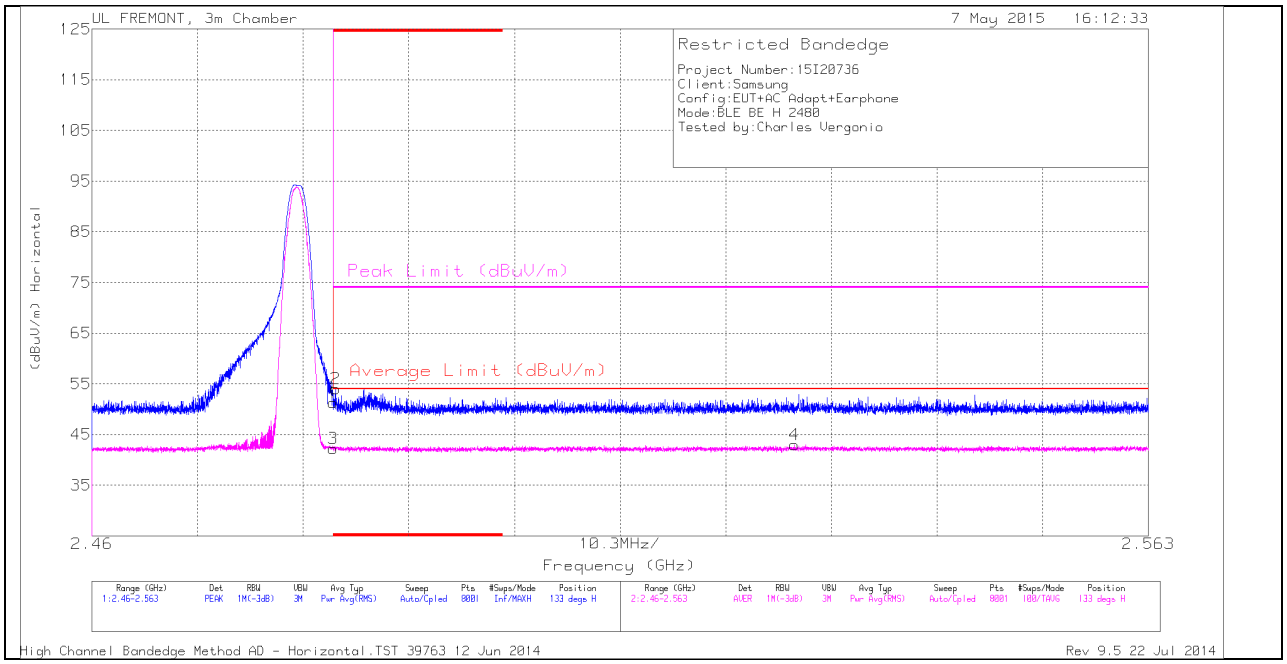


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	39.28	PK	32	-23.1	0	48.18	-	-	74	-25.82	13	120	V
2	* 2.362	43.67	PK	31.9	-23.1	0	52.47	-	-	74	-21.53	13	120	V
3	* 2.39	30.35	RMS	32	-23.1	2.04	41.29	54	-12.71	-	-	13	120	V
4	* 2.384	31.21	RMS	32	-23.1	2.04	42.15	54	-11.85	-	-	13	120	V

AUTHORIZED BANDEDGE (HIGH CHANNEL)

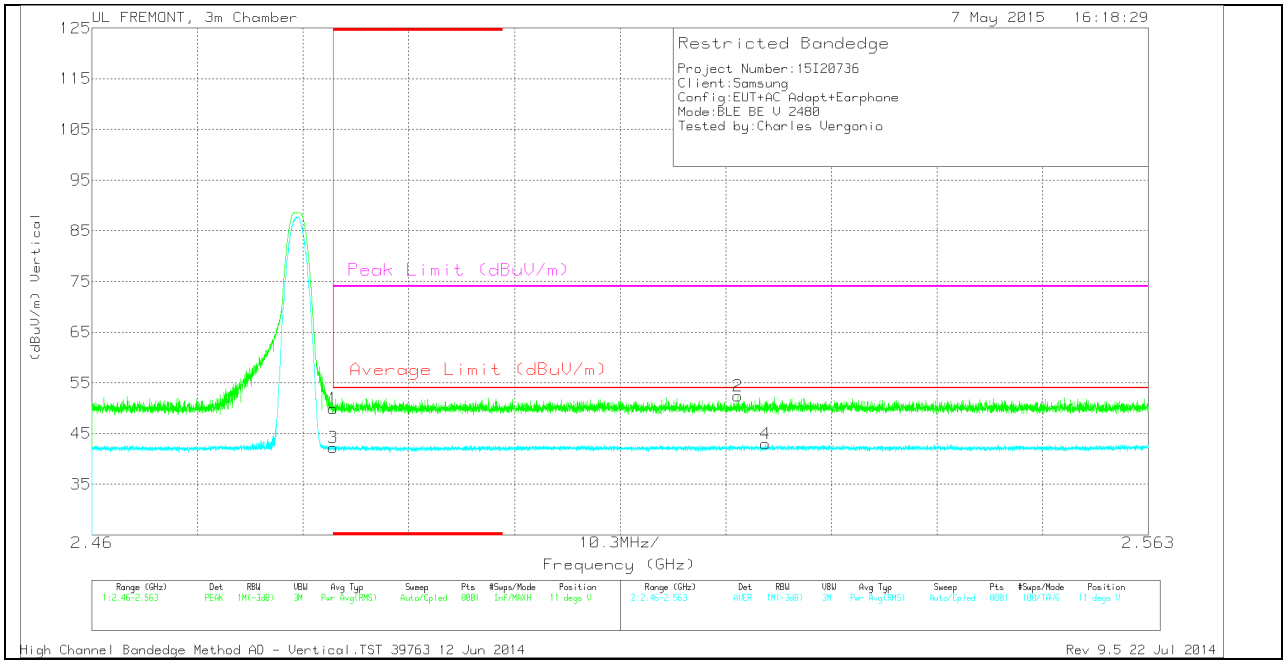
HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/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	41.73	PK	32.3	-22.8	0	51.23	-	-	74	-22.77	133	112	H
2	* 2.484	44.49	PK	32.3	-22.8	0	53.99	-	-	74	-20.01	133	112	H
3	* 2.484	30.66	RMS	32.3	-22.8	2.04	42.20	54	-11.80	-	-	133	112	H
4	2.529	31.07	RMS	32.4	-22.6	2.04	42.91	54	-11.09	-	-	133	112	H

VERTICAL PEAK AND AVERAGE PLOT

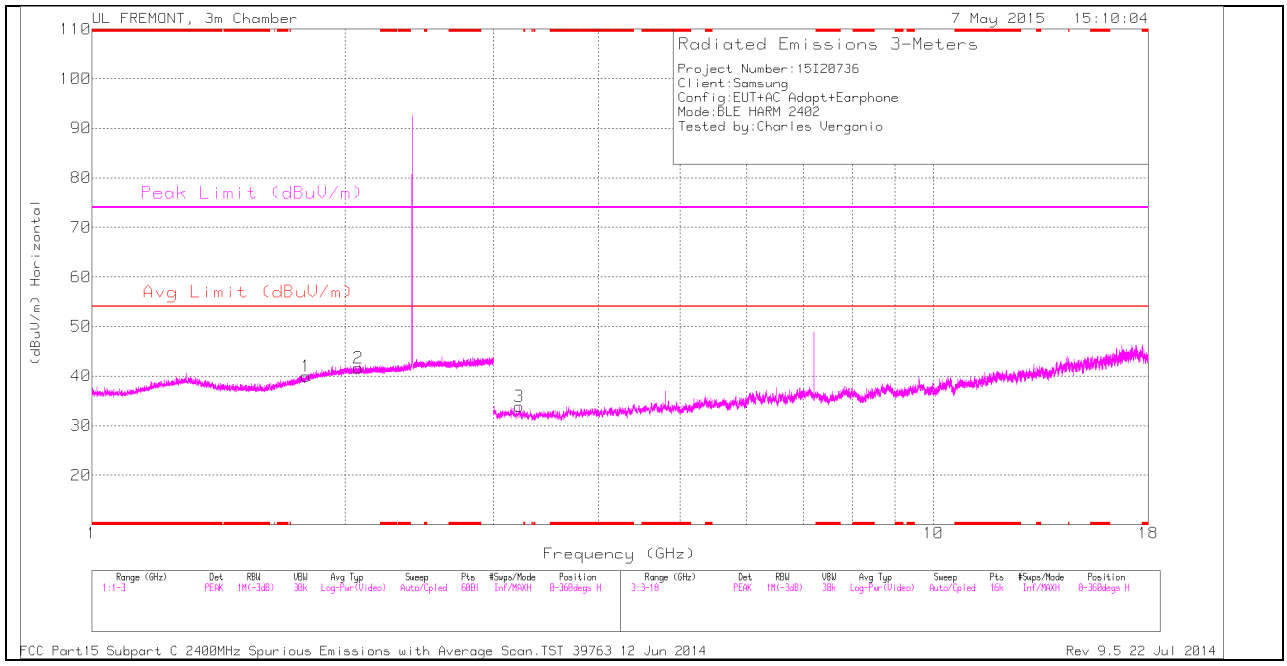


VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	40.38	PK	32.3	-22.8	0	49.88	-	-	74	-24.12	11	127	V
3	* 2.484	30.61	RMS	32.3	-22.8	2.04	42.15	54	-11.85	-	-	11	127	V
2	2.523	42.78	PK	32.4	-22.8	0	52.38	-	-	74	-21.62	11	127	V
4	2.526	31.12	RMS	32.4	-22.7	2.04	42.86	54	-11.14	-	-	11	127	V

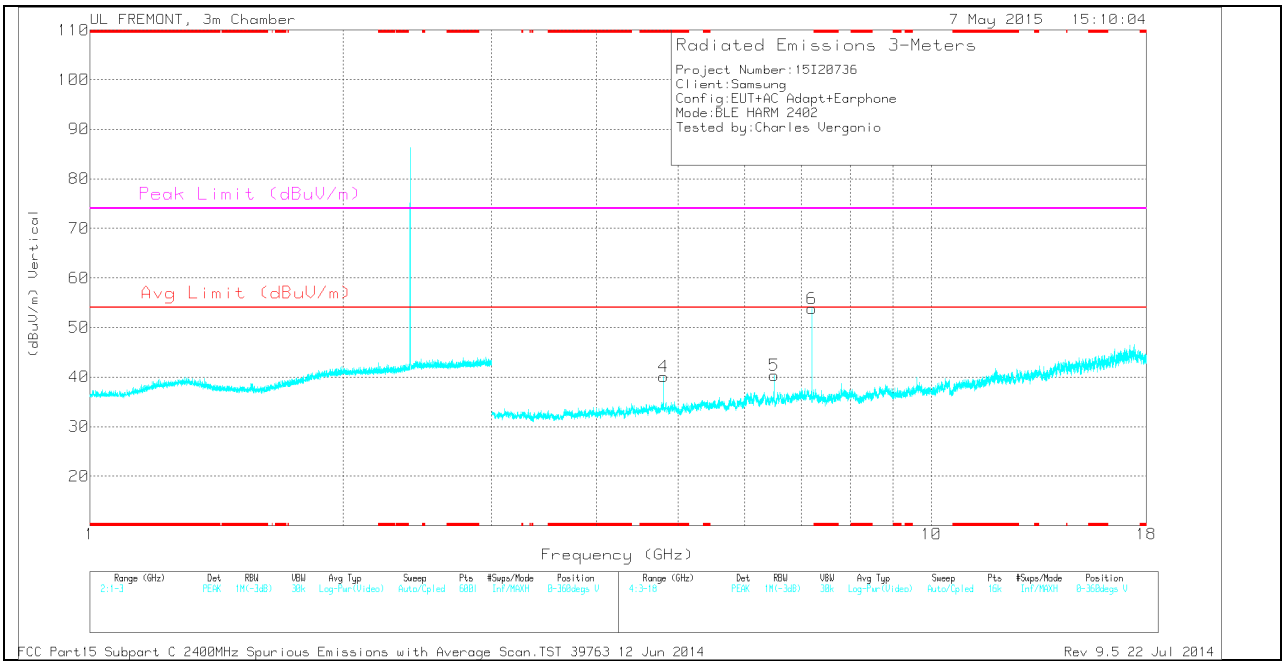
HARMONICS AND SPURIOUS EMISSIONS

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 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	* 4.805	36.34	PK	34	-30.3	0	40.04	-	-	74	-33.96	0-360	100	V
1	1.796	33.06	PK	30.2	-23.3	0	39.96	-	-	-	-	0-360	100	H
2	2.072	33.27	PK	31.5	-23.1	0	41.67	-	-	-	-	0-360	100	H
3	3.217	32.66	PK	32.6	-31.4	0	33.86	-	-	-	-	0-360	200	H
5	6.499	34.59	PK	35.6	-29.9	0	40.29	-	-	-	-	0-360	100	V
6	7.206	47.45	PK	35.6	-29.2	0	53.85	-	-	-	-	0-360	100	V

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
* 4.803	43.68	PK2	34	-30.3	0	47.38	-	-	74	-26.62	30	104	V
* 4.804	34.15	MAv1	34	-30.3	2.04	39.89	54	-14.11	-	-	30	104	V
6.498	42.3	PK2	35.6	-29.9	0	48	-	-	-	-	45	110	V
6.499	33.69	MAv1	35.6	-29.9	2.04	41.43	-	-	-	-	45	110	V
7.205	44.46	MAv1	35.6	-29.2	2.04	52.90	-	-	-	-	21	100	V
7.207	51.15	PK2	35.6	-29.2	0	57.55	-	-	-	-	21	100	V

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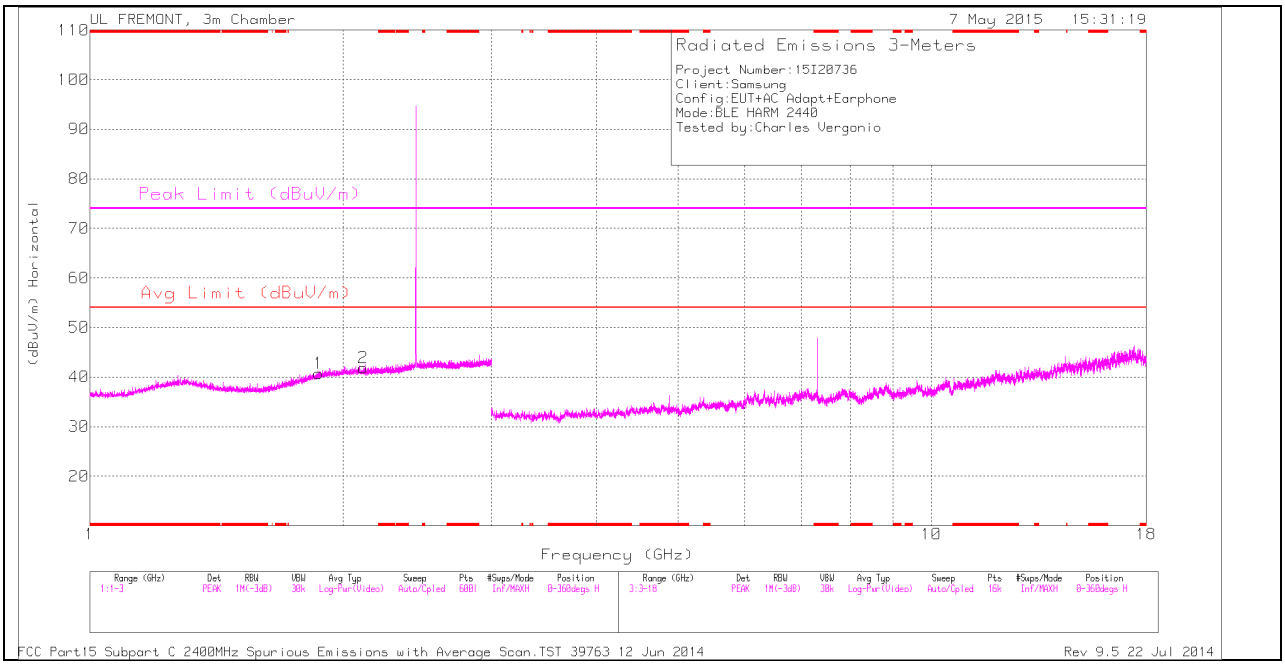
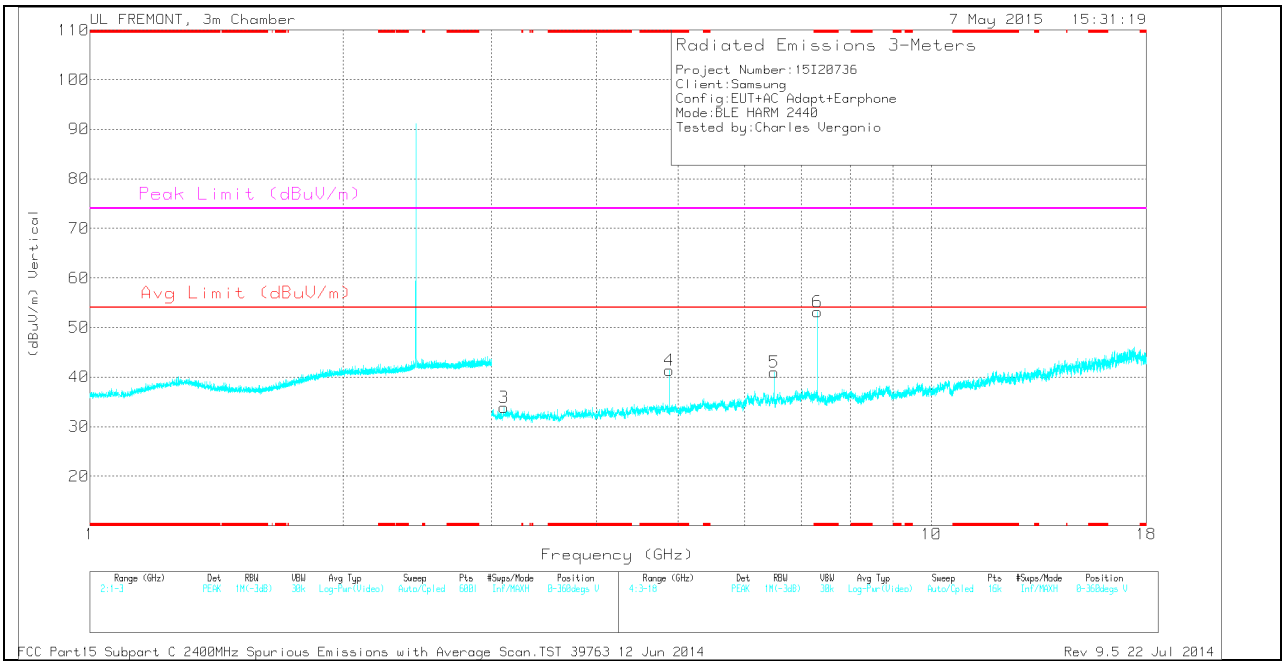
MID CHANNEL HORIZONTAL



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/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	* 4.881	37.54	PK	34	-30.2	0	41.34	-	-	74	-32.66	0-360	100	V
6	* 7.321	45.98	PK	35.6	-28.4	0	53.18	-	-	74	-20.82	0-360	100	V
1	1.868	33.17	PK	30.8	-23.3	0	40.67	-	-	-	-	0-360	200	H
2	2.113	33.38	PK	31.5	-23	0	41.88	-	-	-	-	0-360	200	H
3	3.105	32.44	PK	32.8	-31.4	0	33.84	-	-	-	-	0-360	200	V
5	6.499	35.3	PK	35.6	-29.9	0	41	-	-	-	-	0-360	100	V

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
* 4.88	44.09	PK2	34	-30.2	0	47.89	-	-	74	-26.11	230	100	V
* 4.88	35.07	MAv1	34	-30.2	2.04	40.91	54	-13.09	-	-	230	100	V
* 7.321	50.43	PK2	35.6	-28.4	0	57.63	-	-	74	-16.37	25	110	V
* 7.319	43.86	MAv1	35.6	-28.4	2.04	53.46	54	-.54	-	-	25	110	V
* 7.321	50.5	PK2	35.6	-28.4	0	57.7	-	-	74	-16.3	25	110	V
* 7.319	44.01	MAv1	35.6	-28.4	2.04	53.25	54	-.75	-	-	25	110	V
6.499	42.83	PK2	35.6	-29.9	0	48.53	-	-	-	-	198	101	V
6.499	34.91	MAv1	35.6	-29.9	2.04	42.65	-	-	-	-	198	101	V

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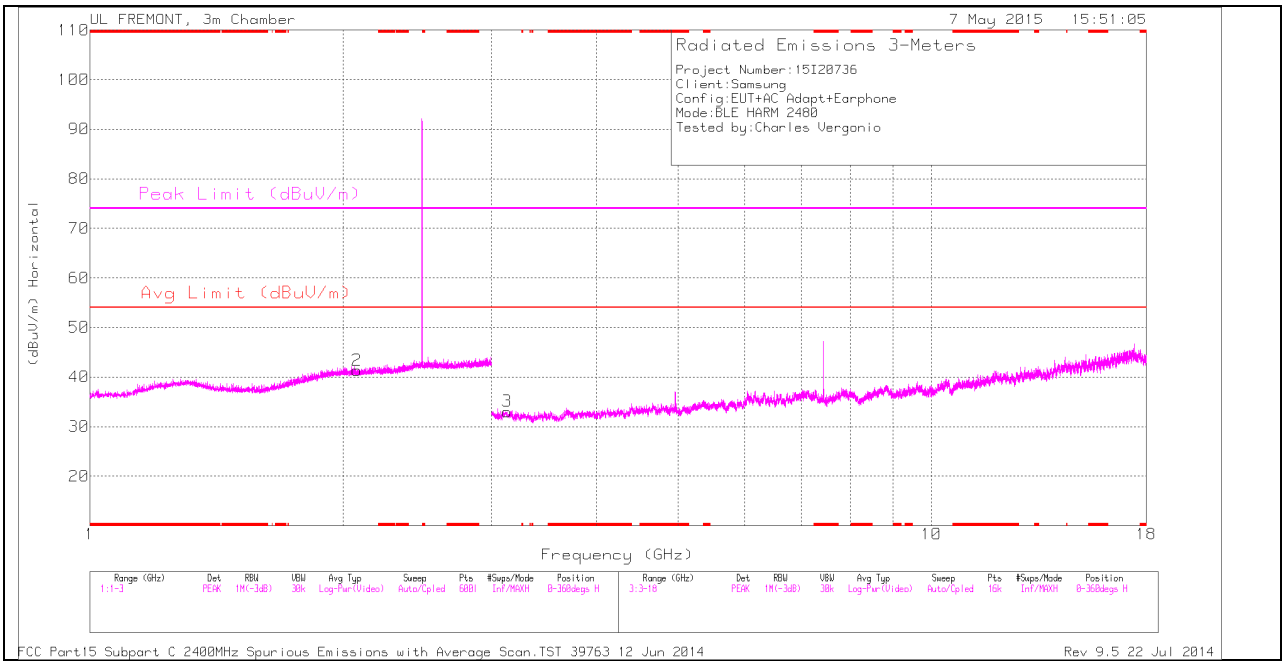
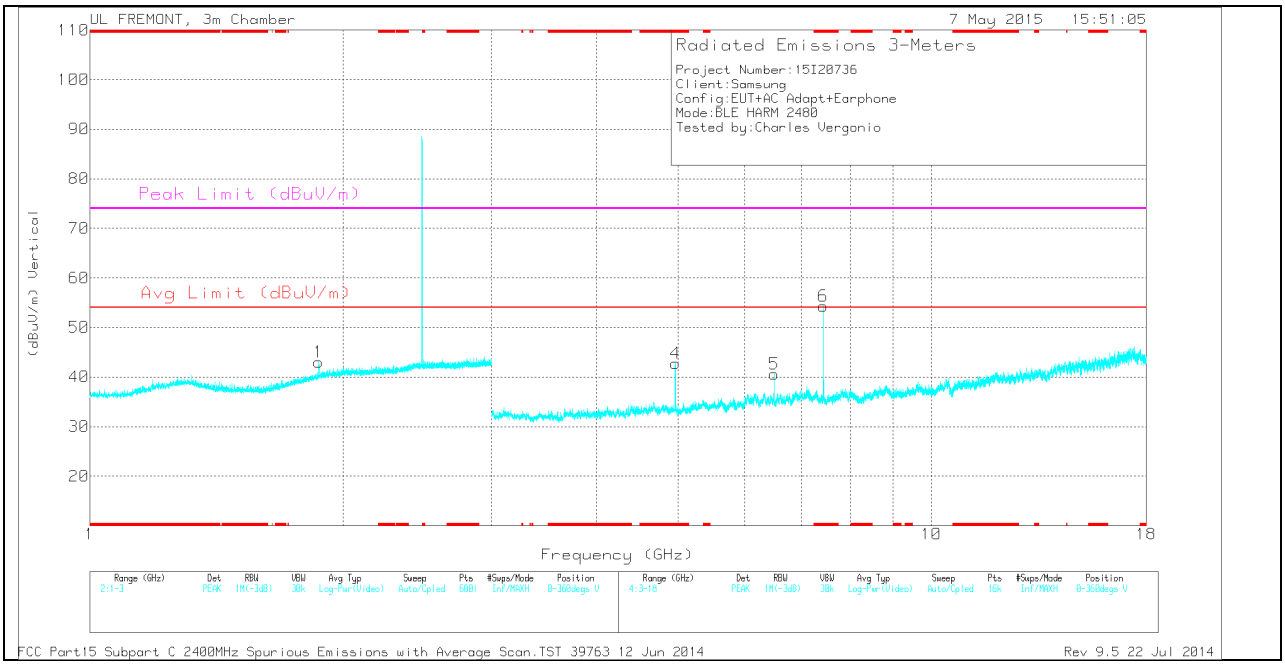
HIGH CHANNEL HORIZONTAL



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/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	* 4.96	39.71	PK	34	-31	0	42.71	-	-	74	-31.29	0-360	100	V
6	* 7.441	47.48	PK	35.7	-28.9	0	54.28	-	-	74	-19.72	0-360	100	V
1	1.871	35.57	PK	30.8	-23.3	0	43.07	-	-	-	-	0-360	100	V
2	2.075	32.97	PK	31.5	-23.1	0	41.37	-	-	-	-	0-360	100	H
3	3.132	31.55	PK	32.7	-31.2	0	33.05	-	-	-	-	0-360	100	H
5	6.499	34.91	PK	35.6	-29.9	0	40.61	-	-	-	-	0-360	100	V

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
* 4.96	45.07	PK2	34	-31	0	48.07	-	-	74	-25.93	237	101	V
* 4.96	36.51	MAv1	34	-31	2.04	41.55	54	-12.45	-	-	237	101	V
* 7.439	51.17	PK2	35.7	-28.9	0	57.97	-	-	74	-16.03	16	100	V
* 7.439	44.74	MAv1	35.7	-28.9	2.04	53.58	54	-.42	-	-	16	100	V
6.499	43.01	PK2	35.6	-29.9	0	48.71	-	-	-	-	197	101	V
6.499	35.06	MAv1	35.6	-29.9	2.04	42.80	-	-	-	-	197	101	V

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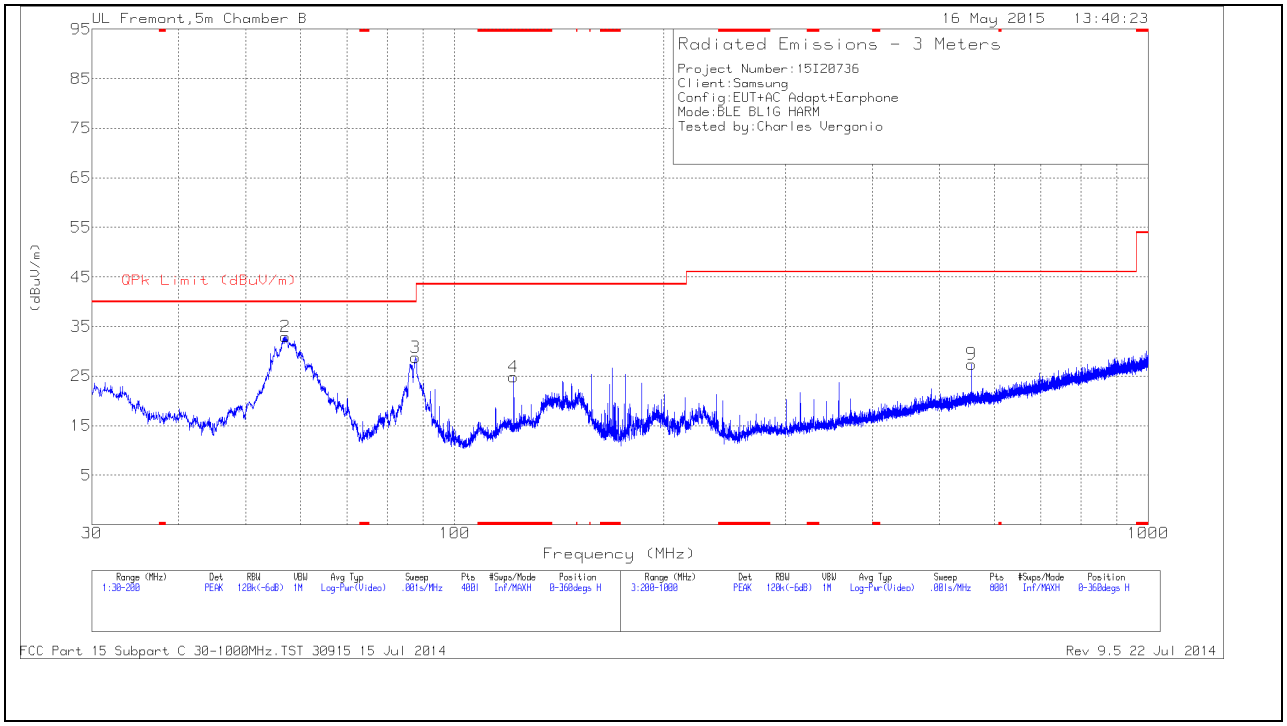
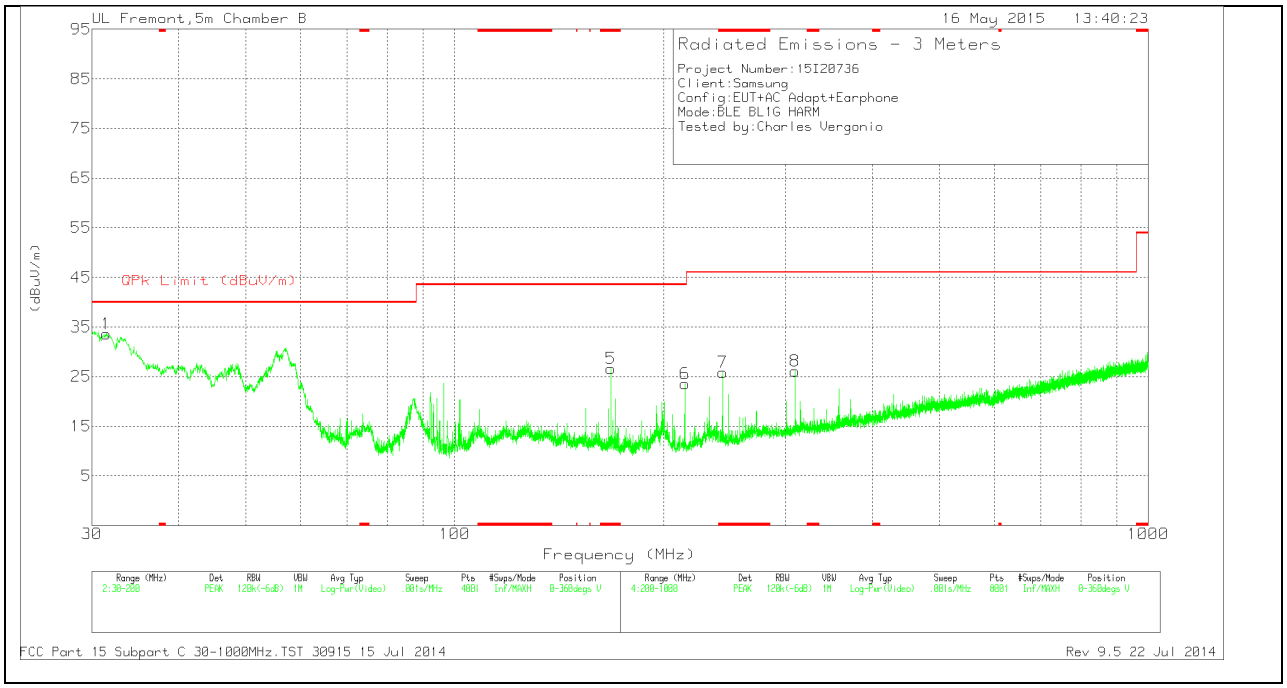
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T243 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 121.6725	38.56	PK	14.1	-27.8	24.86	43.52	-18.66	0-360	100	H
5	* 167.9975	42.08	PK	11.8	-27.3	26.58	43.52	-16.94	0-360	101	V
7	* 243.4	40.7	PK	11.6	-26.5	25.8	46.02	-20.22	0-360	300	V
1	31.4875	42.65	PK	19.8	-28.9	33.55	40	-6.45	0-360	101	V
2	57.0725	54.02	PK	7.4	-28.5	32.92	40	-7.08	0-360	300	H
3	87.8425	49.42	PK	7.5	-28.2	28.72	40	-11.28	0-360	200	H
6	214.7	39.81	PK	10.6	-26.8	23.61	43.52	-19.91	0-360	200	V
8	309.4	38.3	PK	13.8	-26	26.1	46.02	-19.92	0-360	200	V
9	556	34.34	PK	18.6	-25.5	27.44	46.02	-18.58	0-360	101	H

* - indicates frequency in CFR 47, Part 15 and Industry Canada RSS-Restricted Band.

PK - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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.

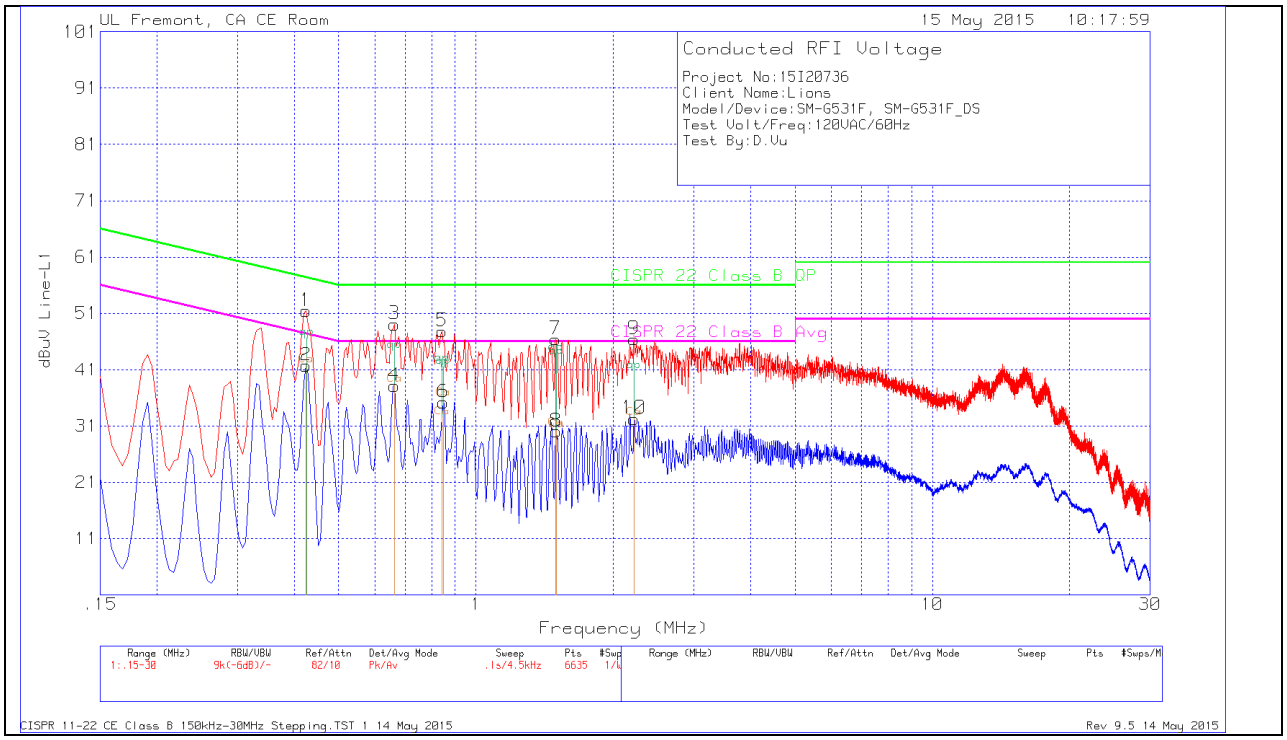
TEST PROCEDURE

ANSI C63.10 - 2009

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT

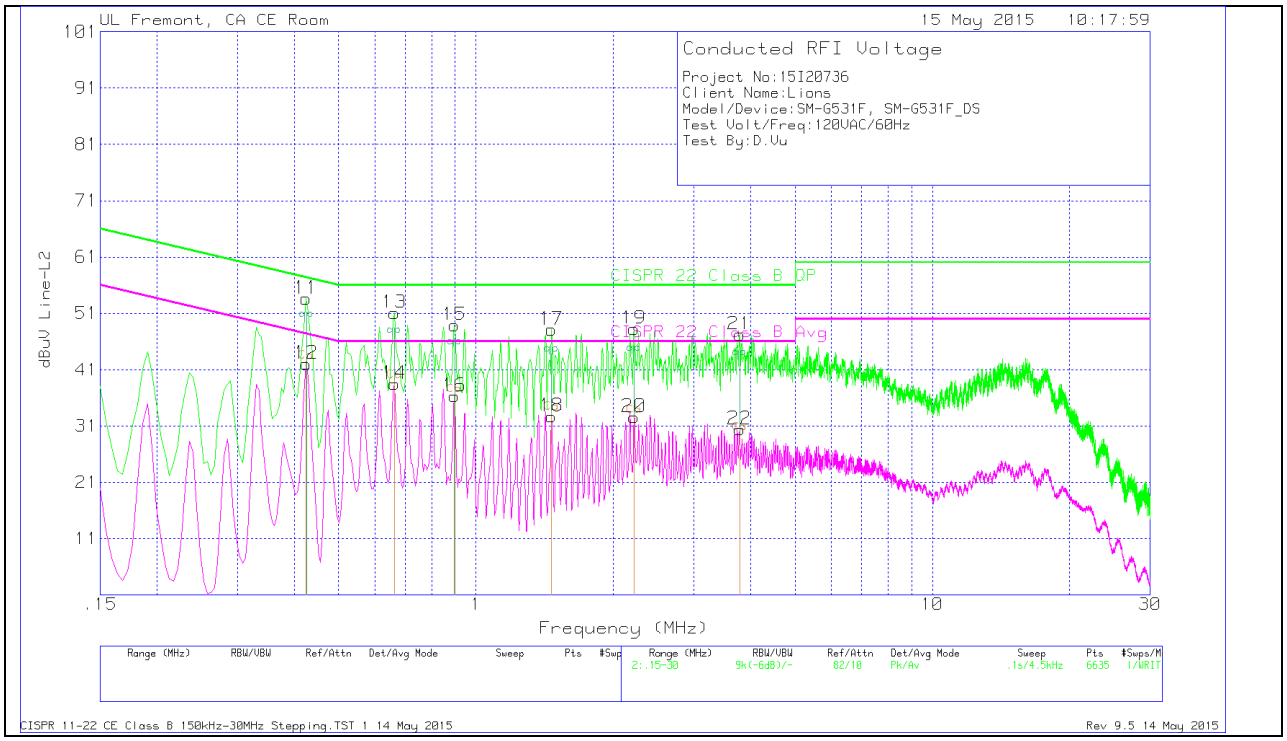


LINE 1 RESULTS

Range 1: Line-L1 .15 - 30MHz

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	.4245	51.03	Pk	.4	0	51.43	57.36	-5.93		
2	.4245	41.35	Av	.4	0	41.75	-	-	47.36	-5.61
3	.663	48.77	Pk	.3	0	49.07	56	-6.93		
4	.663	37.85	Av	.3	0	38.15	-	-	46	-7.85
5	.843	47.51	Pk	.3	0	47.81	56	-8.19		
6	.8475	34.92	Av	.3	0	35.22	-	-	46	-10.78
7	1.4955	46.1	Pk	.2	.1	46.4	56	-9.6		
8	1.5	29.73	Av	.2	.1	30.03	-	-	46	-15.97
9	2.22	46.1	Pk	.2	.1	46.4	56	-9.6		
10	2.22	32	Av	.2	.1	32.3	-	-	46	-13.7

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)
11	.4245	53.21	Pk	.4	0	53.61	57.36	-3.75		
12	.4245	41.64	Av	.4	0	42.04	-	-	47.36	-5.32
13	.663	50.78	Pk	.3	0	51.08	56	-4.92		
14	.663	38.18	Av	.3	0	38.48	-	-	46	-7.52
15	.897	48.59	Pk	.3	0	48.89	56	-7.11		
16	.897	36	Av	.3	0	36.3	-	-	46	-9.7
17	1.464	47.79	Pk	.2	.1	48.09	56	-7.91		
18	1.464	32.4	Av	.2	.1	32.7	-	-	46	-13.3
19	2.22	47.95	Pk	.2	.1	48.25	56	-7.75		
20	2.22	32.28	Av	.2	.1	32.58	-	-	46	-13.42
21	3.7815	46.96	Pk	.2	.1	47.26	56	-8.74		
22	3.7815	30.11	Av	.2	.1	30.41	-	-	46	-15.59