



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA/LTE Phone + Bluetooth, 2.4GHz DTS & NFC

MODEL NUMBER : SM-G388F

FCC ID: A3LSMG388F

REPORT NUMBER: 15K19845-E2

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Prepared for

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ACCREDITED

TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
--	02/02/15	Initial issue	CY Choi

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. SAMPLE CALCULATION	5
4.3. MEASUREMENT UNCERTAINTY.....	6
5. EQUIPMENT UNDER TEST	7
5.1. DESCRIPTION OF EUT	7
5.2. MAXIMUM OUTPUT POWER.....	7
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	7
5.4. WORST-CASE CONFIGURATION AND MODE	7
5.5. DESCRIPTION OF TEST SETUP.....	8
6. TEST AND MEASUREMENT EQUIPMENT	10
7. SUMMARY TABLE	11
8. ANTENNA PORT TEST RESULTS	12
8.1. 6 dB BANDWIDTH.....	12
8.2. 99% BANDWIDTH.....	16
8.3. OUTPUT POWER.....	20
8.4. AVERAGE POWER	24
8.5. PSD	25
8.6. CONDUCTED SPURIOUS EMISSIONS.....	29
9. RADIATED TEST RESULTS.....	36
9.1. LIMITS AND PROCEDURE	36
9.2. TRANSMITTER ABOVE 1 GHz	37
9.3. WORST-CASE BELOW 1 GHz.....	50
10. AC POWER LINE CONDUCTED EMISSIONS	53
11. SETUP PHOTOS	56

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + Bluetooth, 2.4GHz DTS & NFC
MODEL NUMBER: SM-G388F
SERIAL NUMBER: R38G10B0RAZ (RADIATED); R38G10B0NMN (CONDUCTED)
DATE TESTED: JANUARY 24 - FEBRUARY 01, 2015

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

UL Korea, Ltd. 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 Korea, Ltd. 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 Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. 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 IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:

Tested By:



Ji Ho Choi
Suwon Lab Manager
UL Korea, Ltd.

CY Choi
Suwon Lab Engineer
UL Korea, Ltd.

2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 443-823, Korea. Line conducted emissions are measured only at the 218 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.

218 Maeyeong-ro	
☒	Chamber 1
☐	Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

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	2.32 dB
Radiated Disturbance, Below 1GHz	4.14 dB
Radiated Disturbance, Above 1 GHz	5.97 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, 2.4GHz DTS & NFC
This test report addresses the DTS (BLE) operational mode.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	1.73	1.49

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a maximum gain of -0.18 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 and 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
Charger	SAMSUNG	ETA0U10EBE	N/A	N/A
Data Cable	SAMSUNG	GH39-01710A	N/A	N/A
Earphone	SAMSUNG	GH59-11129H	N/A	N/A

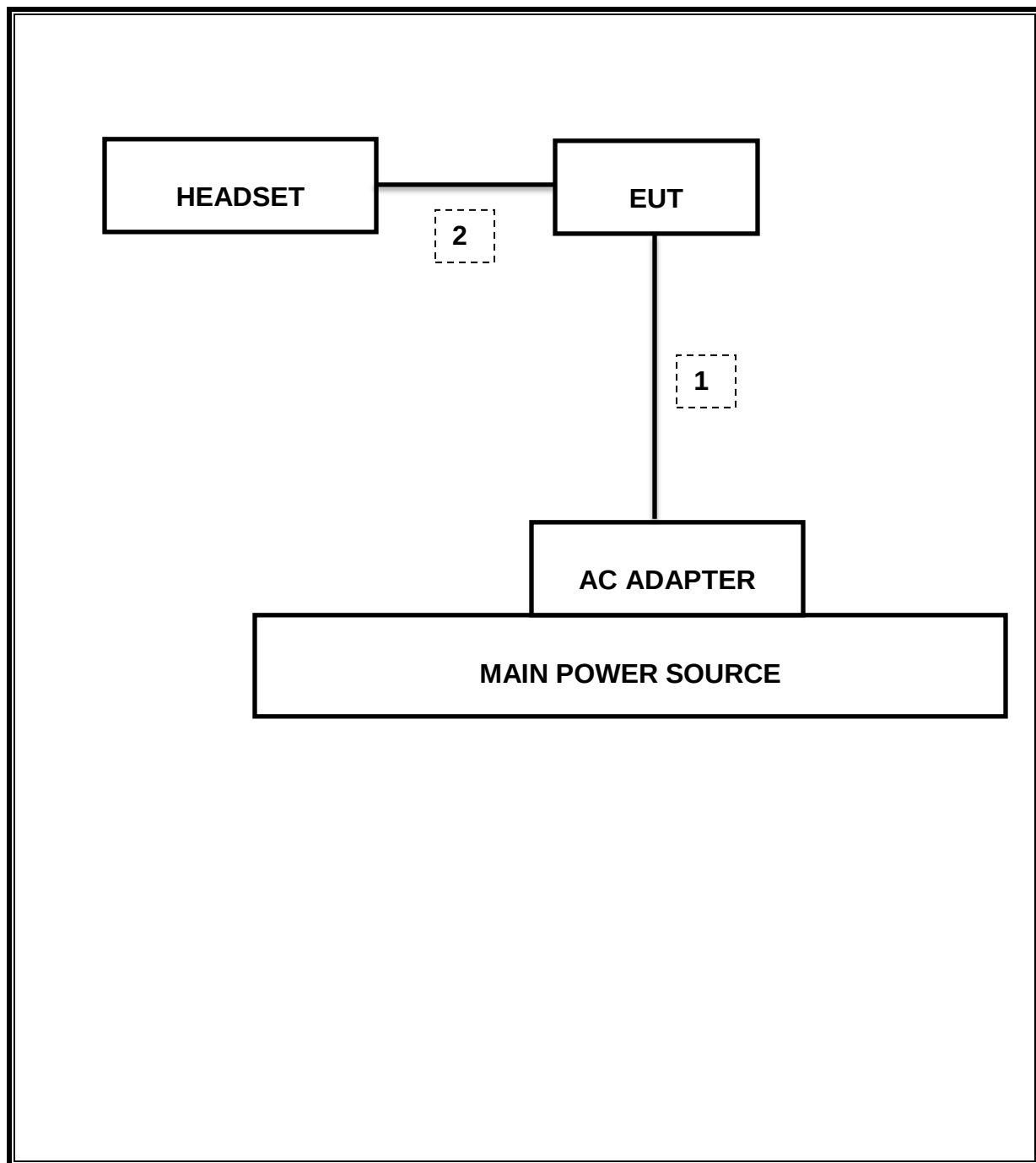
I/O CABLES

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	0.8m	N/A
2	Audio	1	Mini-Jack	Unshielded	1.0m	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	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	950	11-17-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	09-20-15
Antenna, Horn, 40 GHz	ETS	3116C	00166255	09-23-15
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	09-29-15
Preamplifier, 1000 MHz	Sonoma	310N	341282	11-17-15
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	11-18-15
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	09-23-15
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	11-17-15
Average Power Sensor	R&S	NRZ-Z91	102681	11-17-15
Average Power Sensor	Agilent / HP	U2000	MY54270007	09-23-15
EMI Test Receive, 40 GHz	R&S	ESU40	100439	11-17-15
EMI Test Receive, 3 GHz	R&S	ESR3	101832	11-17-15
Attenuator / Switch driver	HP	11713A	3748A04272	N/A
Low Pass Filter 3GHz	Micro-Tronics	LPS17541	009	11-17-15
High Pass Filter 5GHz	Micro-Tronics	HPS17542	009	11-17-15
High Pass Filter 6GHz	Micro-Tronics	HPM17543	010	11-17-15

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	Occupied Band width (6dB)	>500KHz	Conducted	Pass	749 kHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-44.831 dBm
15.247	TX conducted output power	<30dBm		Pass	1.728 dBm
15.247	PSD	<8dBm		Pass	-13.52dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	44.91 dBuV
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	45.9 dBuV/m (AV)

8. 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

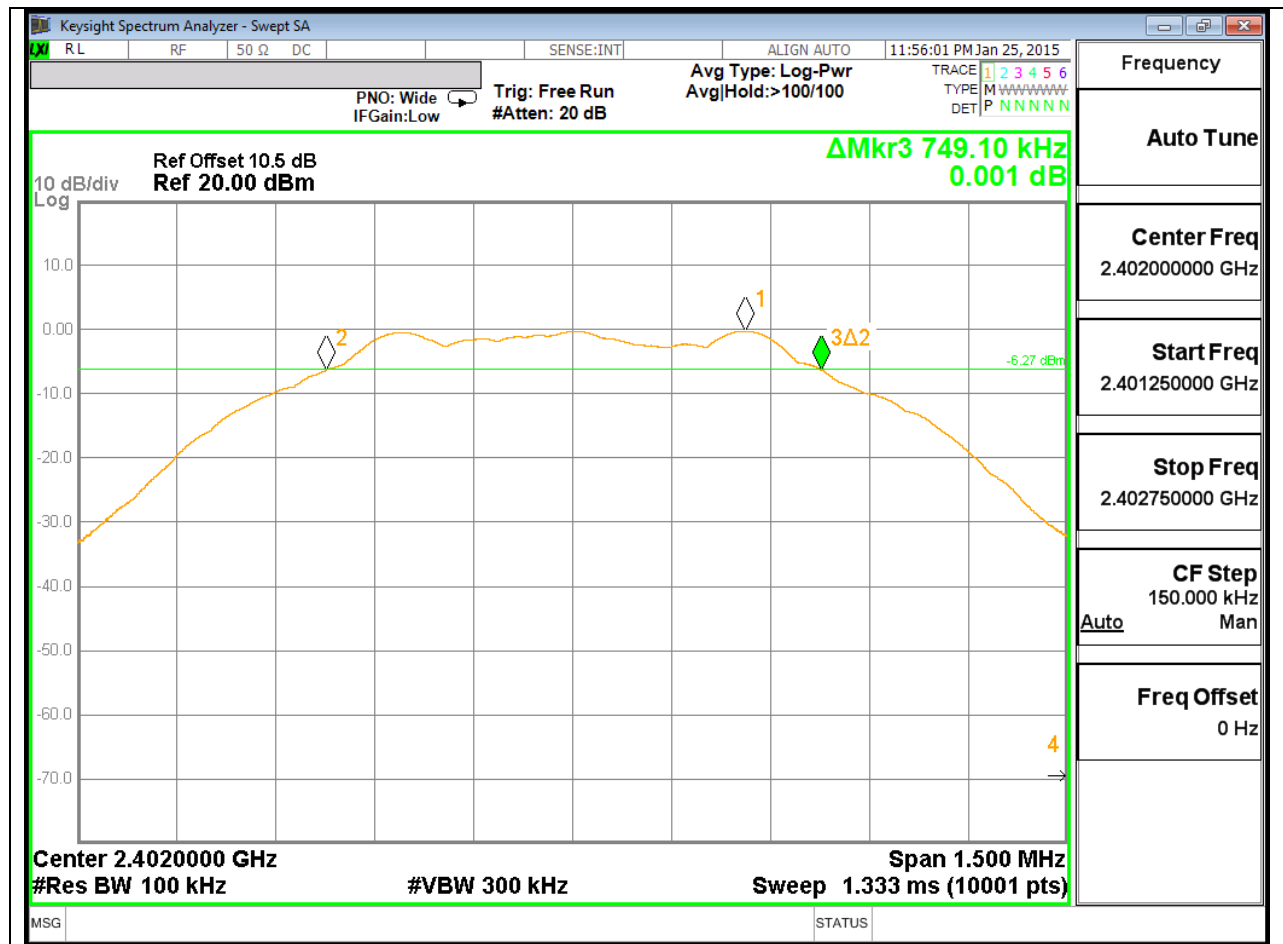
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

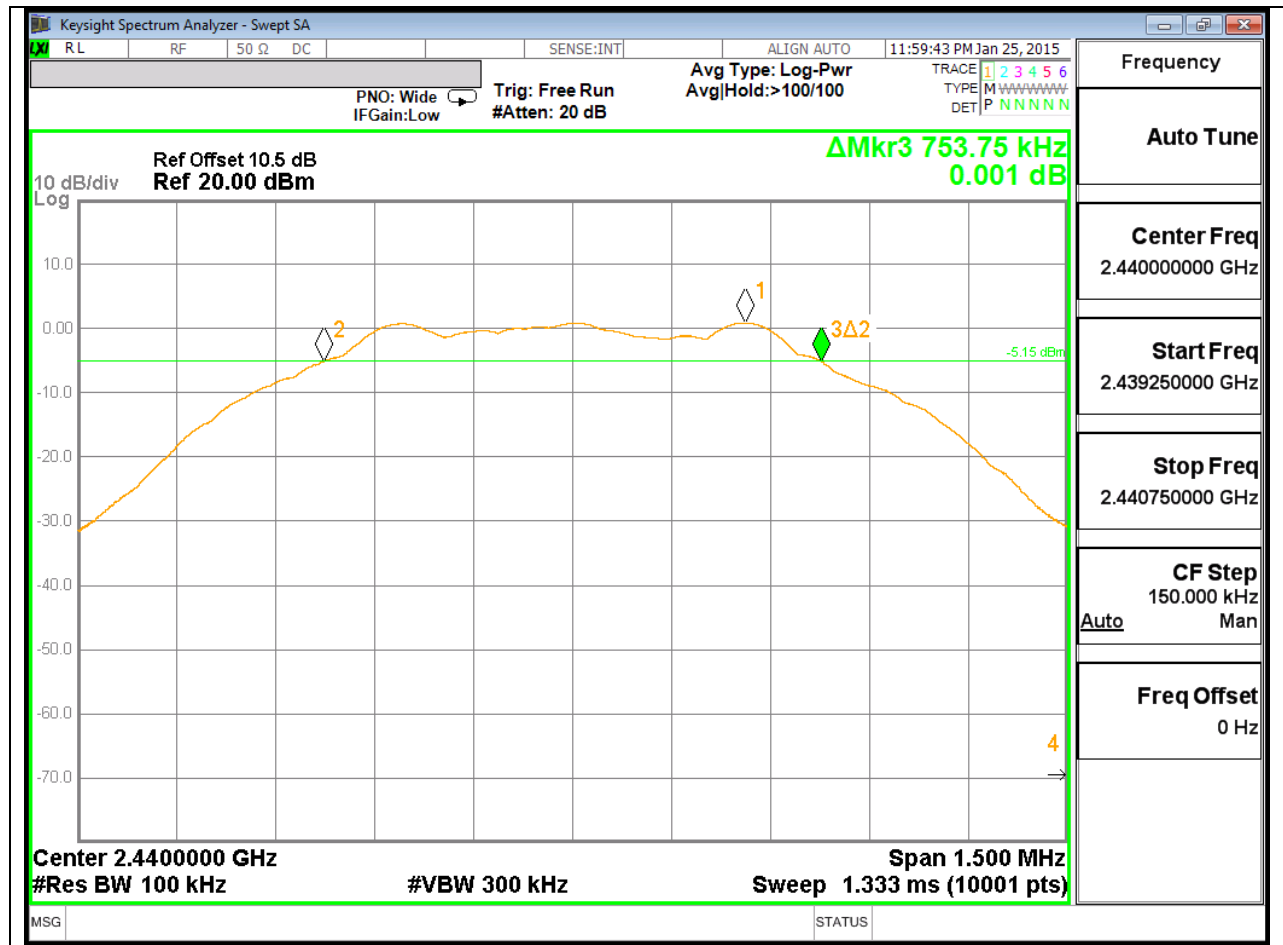
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.749	0.5
Mid	2440	0.754	0.5
High	2480	0.753	0.5
Worst		0.749	

6 dB BANDWIDTH PLOTS

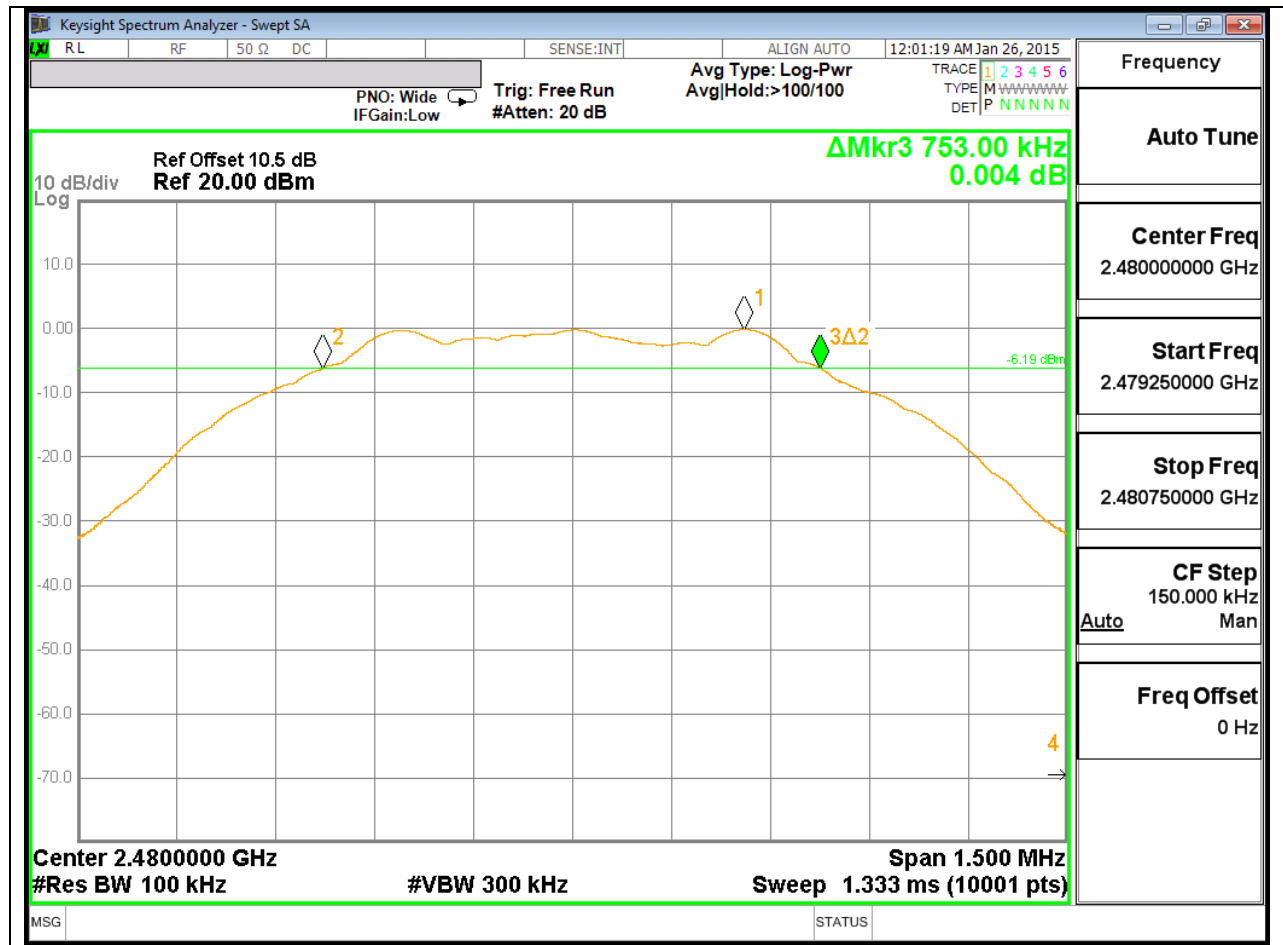
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

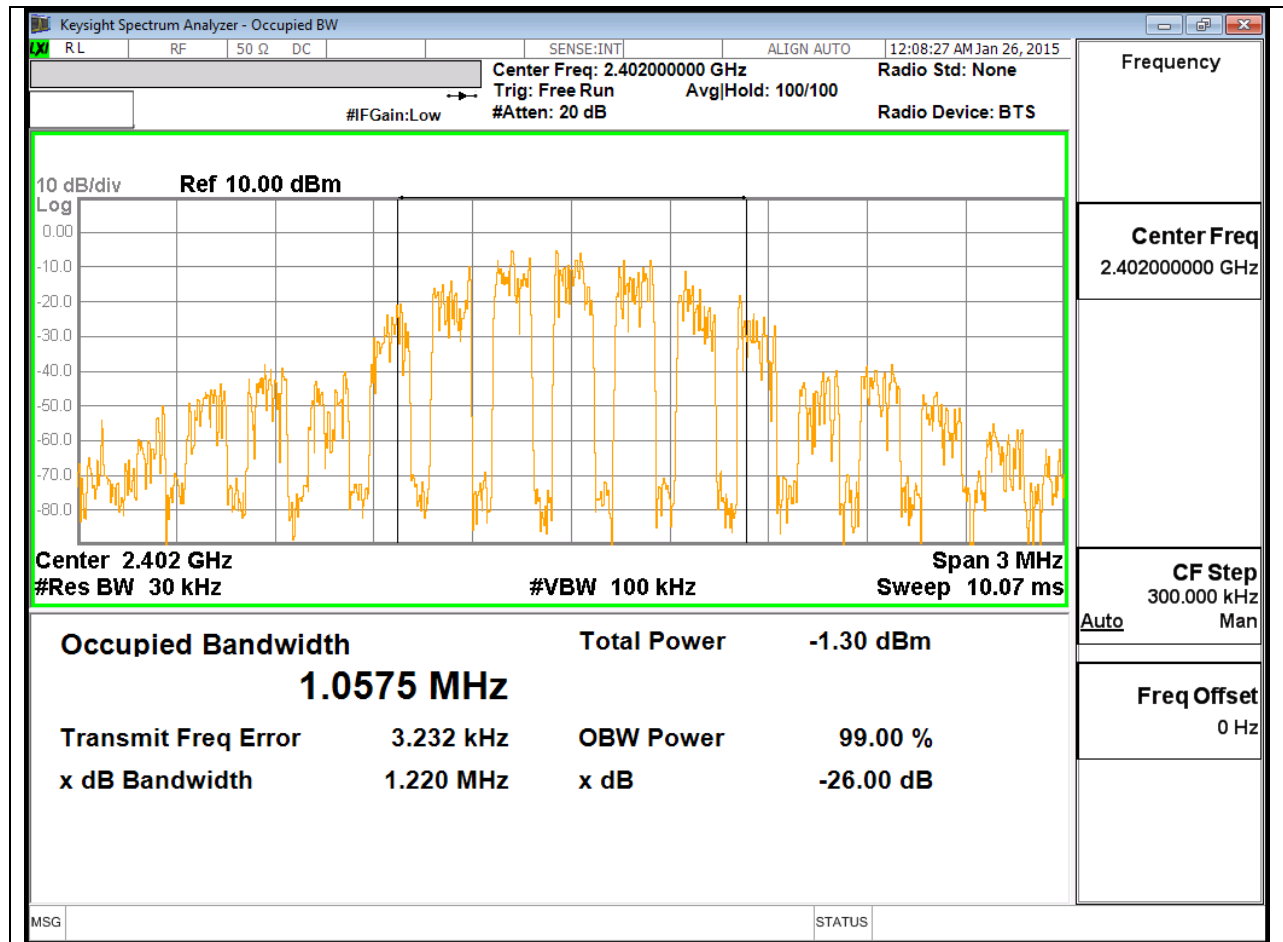
Reference to KDB558074 D01 DTS Meas Guidance v03r02: The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function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

RESULTS

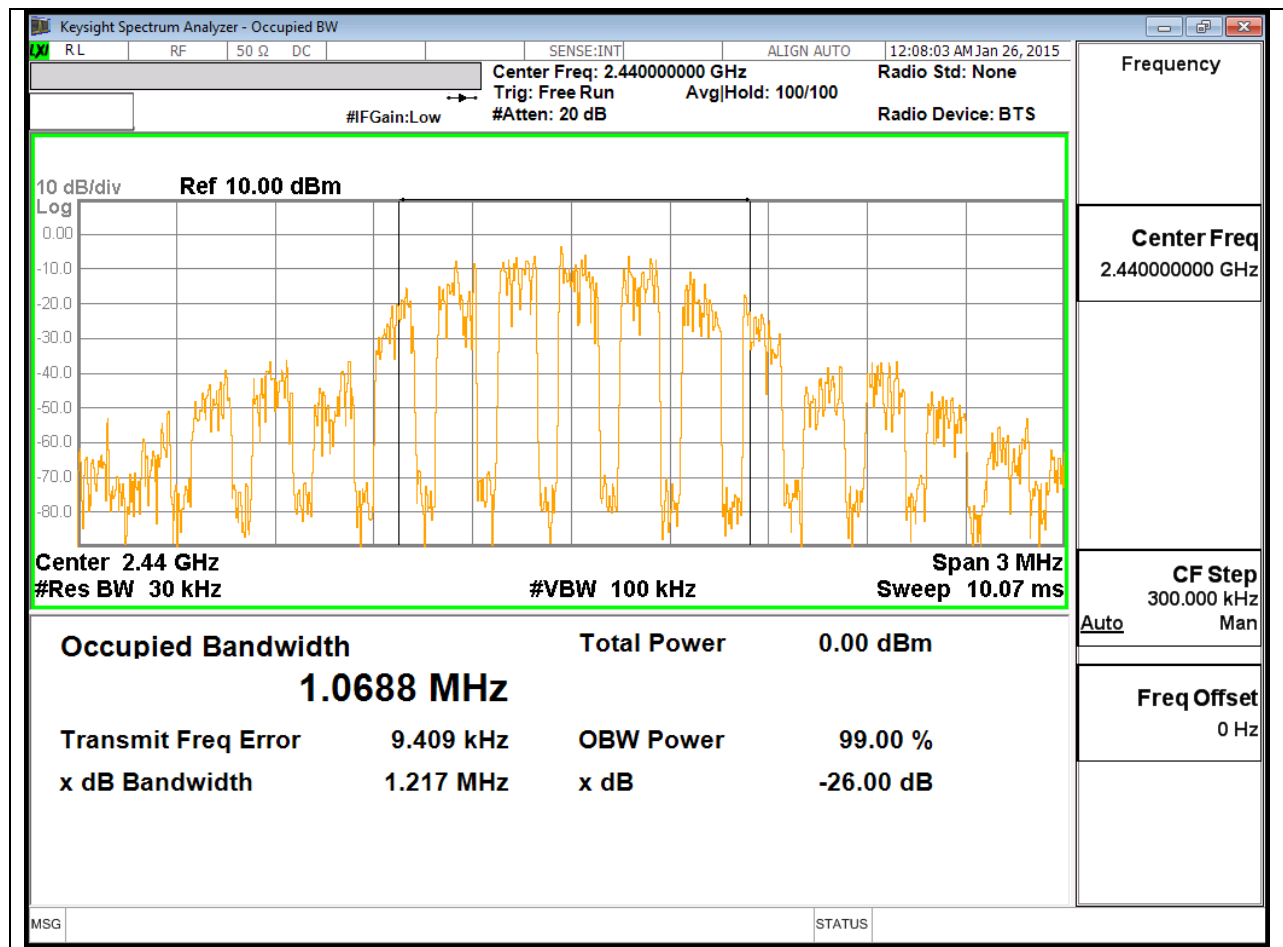
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.058
Mid	2440	1.069
High	2480	1.059
Worst		1.069

99% BANDWIDTH PLOTS

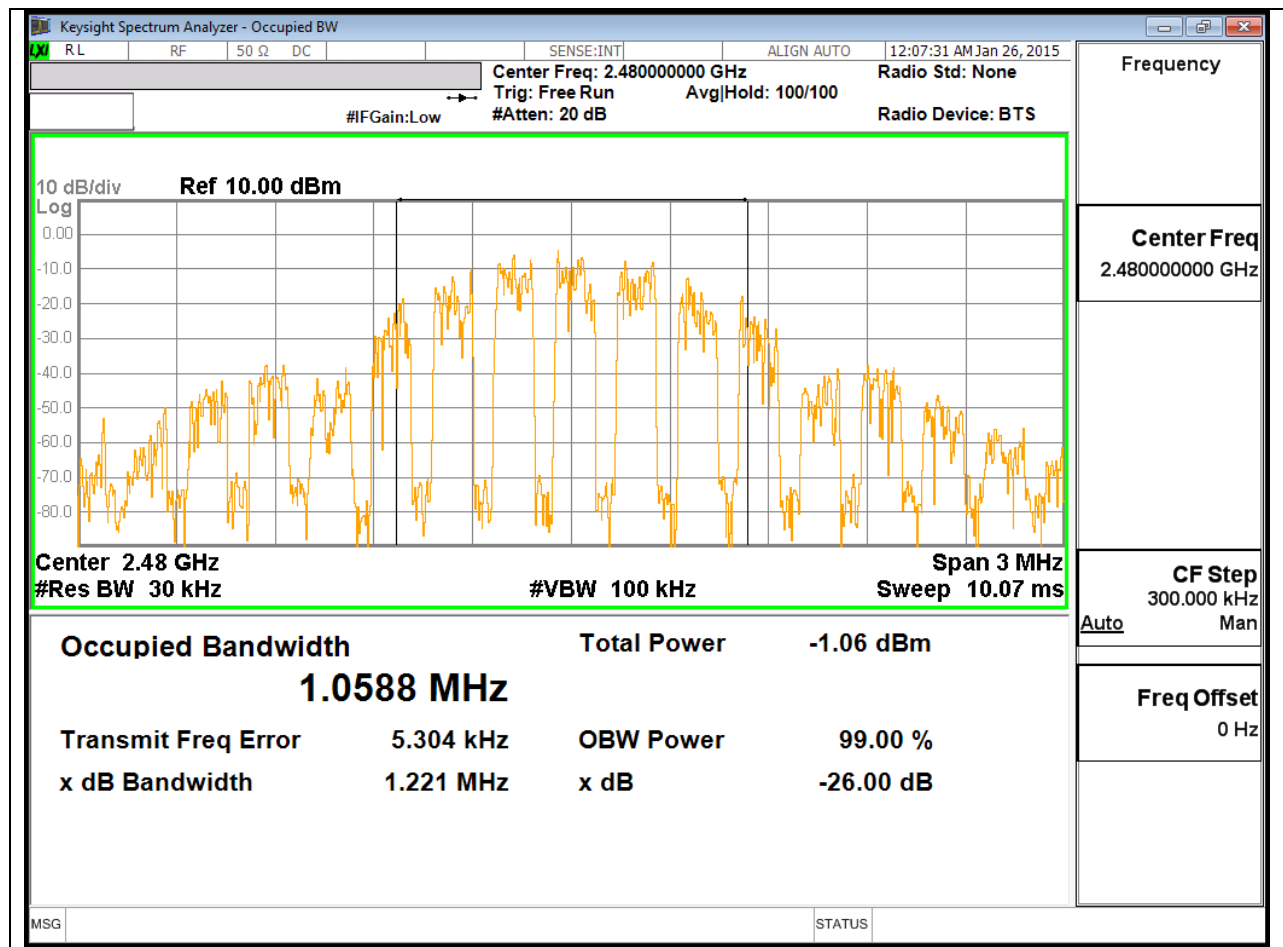
LOW CHANNEL



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

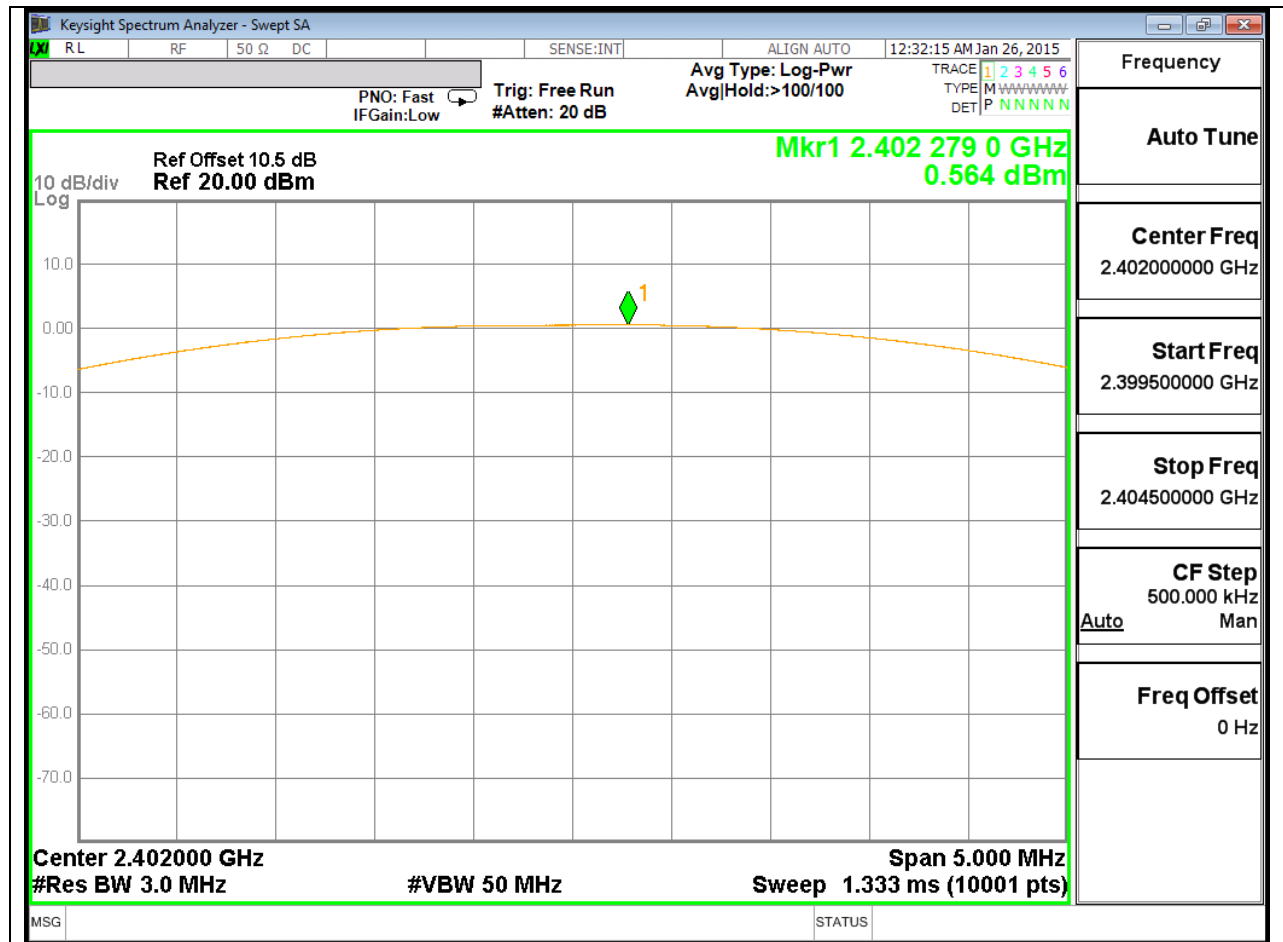
Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r02 under section 9.1.1 utilizing spectrum analyzer.

RESULTS

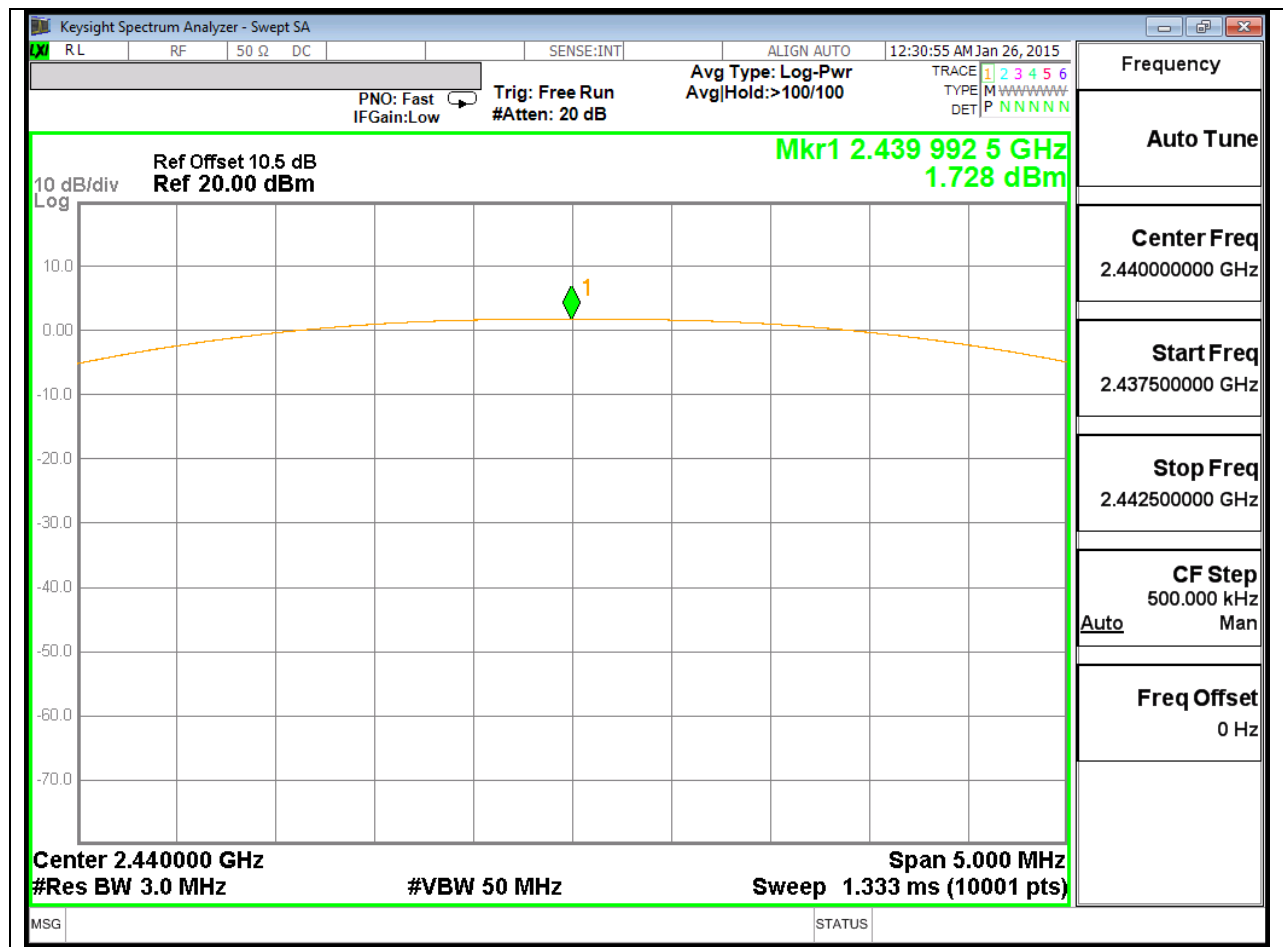
Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	0.564	30.000	-29.436
Mid	2440	1.728	30.000	-28.272
High	2480	0.682	30.000	-29.318
Worst		1.728		-28.272

OUTPUT POWER PLOTS

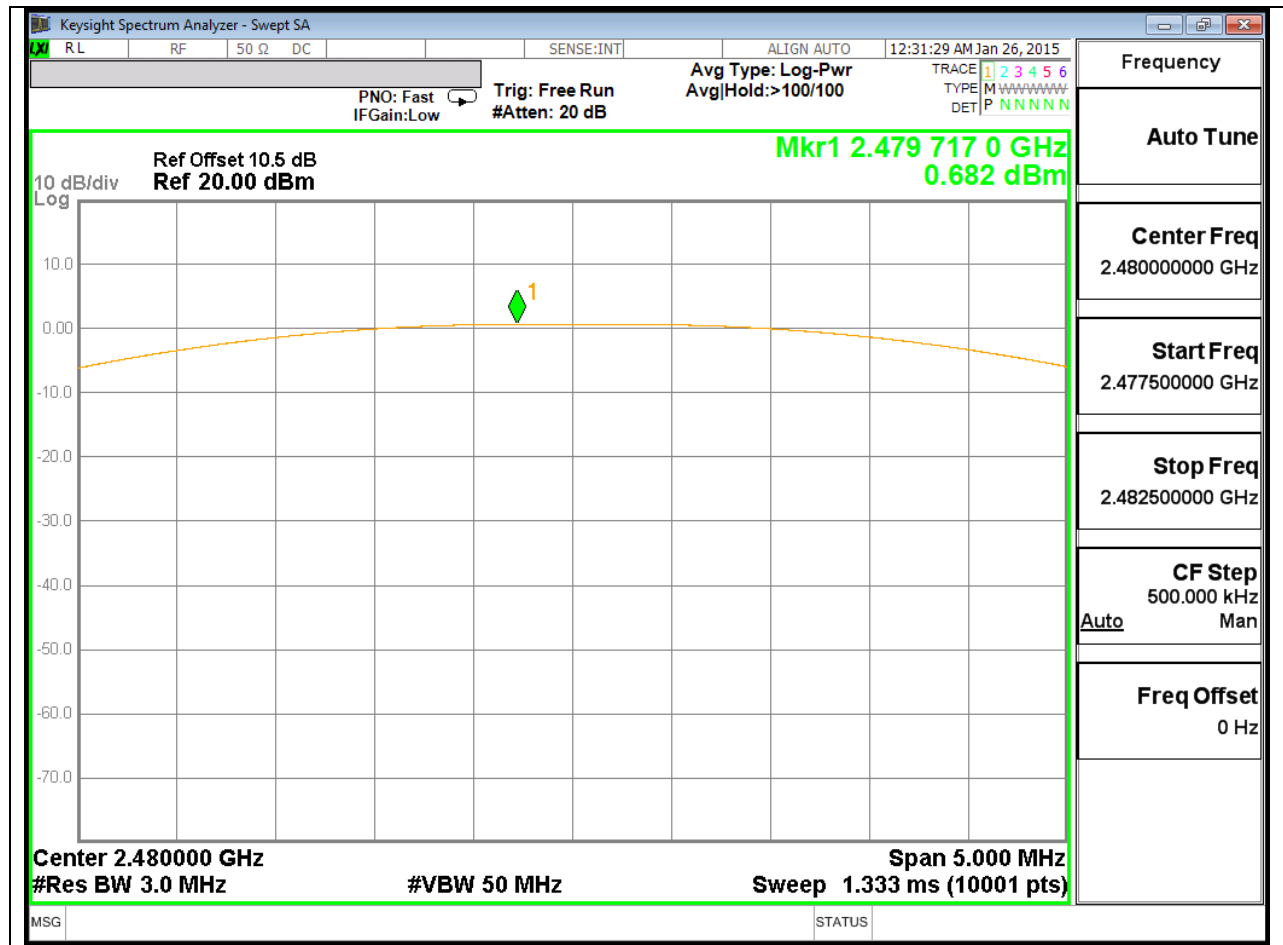
LOW CHANNEL



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 10.1 dB (including 10 dB pad and 0.1 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	-0.05
Middle	2440	1.17
High	2480	0.17

8.5. PSD

LIMITS

FCC §15.247

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

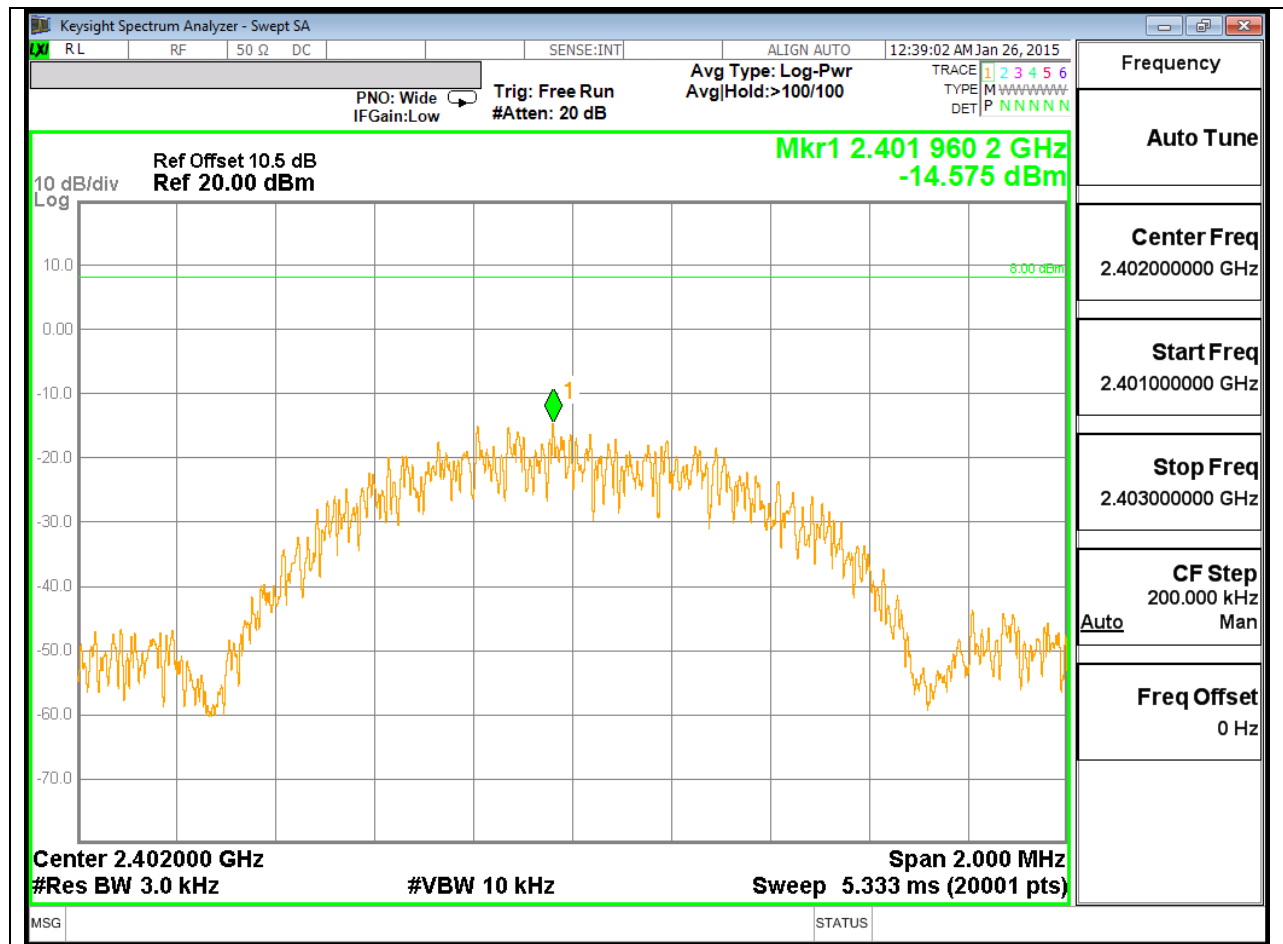
Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r02

RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-14.58	8.00	-22.58
Mid	2440	-13.52	8.00	-21.52
High	2480	-14.47	8.00	-22.47

POWER SPECTRAL DENSITY PLOTS

LOW CHANNEL



Keysight Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN AUTO 12:39:41 AM Jan 26, 2015

PNO: Wide IFGain:Low Trig: Free Run #Atten: 20 dB Avg Type: Log-Pwr AvalHold: >100/100

TRACE 1 2 3 4 5 6
TYPE M W W W W W W W
DET P N N N N N N

Ref Offset 10.5 dB
Ref 20.00 dBm

10 dB/div Log

Center 2.440000 GHz #Res BW 3.0 kHz #VBW 10 kHz Span 2.000 MHz Sweep 5.333 ms (20001 pts)

Mkr1 2.439 960 3 GHz -13.522 dBm

8.00 dBm

Frequency

Auto Tune

Center Freq 2.44000000 GHz

Start Freq 2.43900000 GHz

Stop Freq 2.44100000 GHz

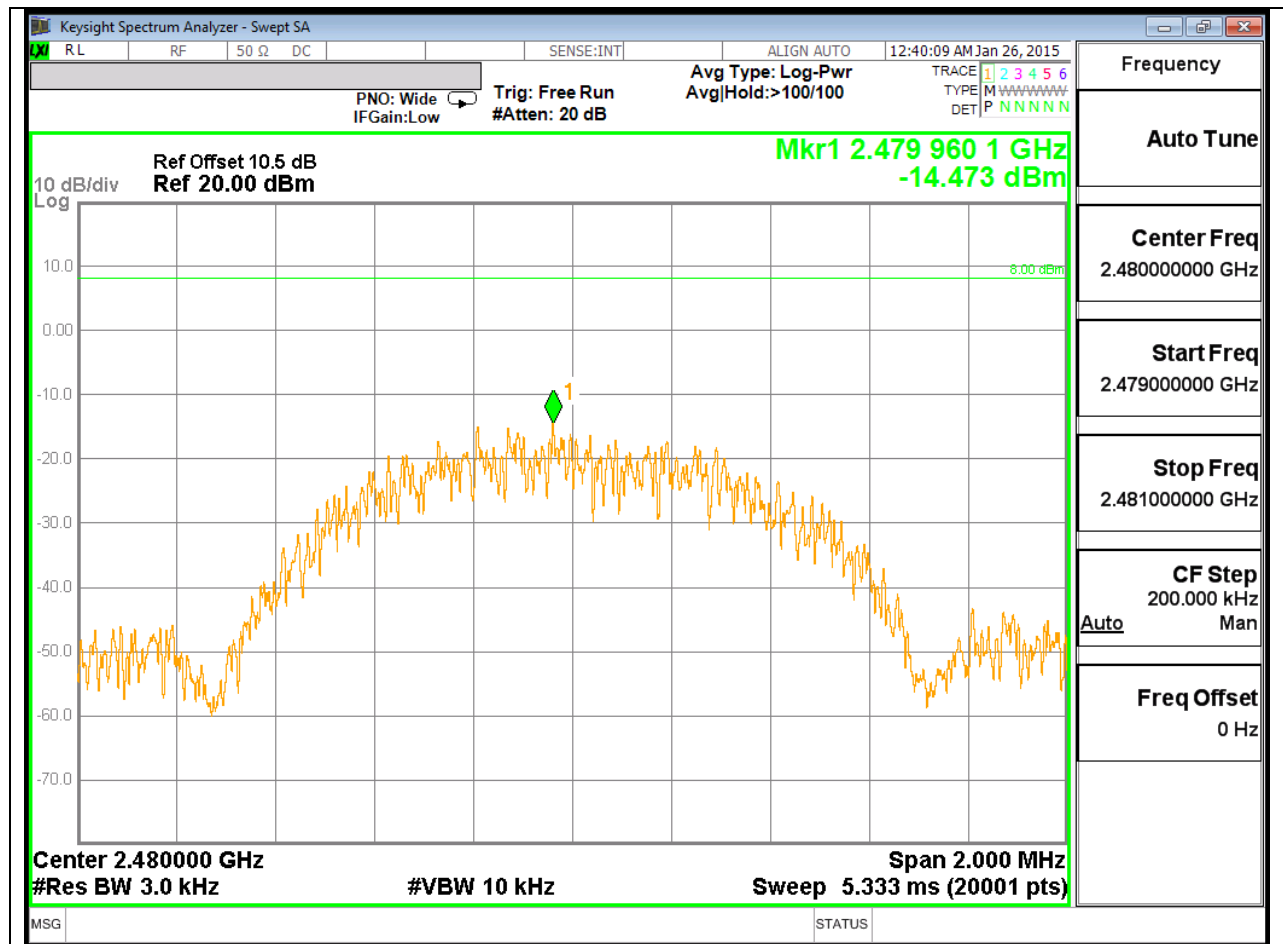
CF Step 200.000 kHz Man

Auto

Freq Offset 0 Hz

MSG STATUS

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

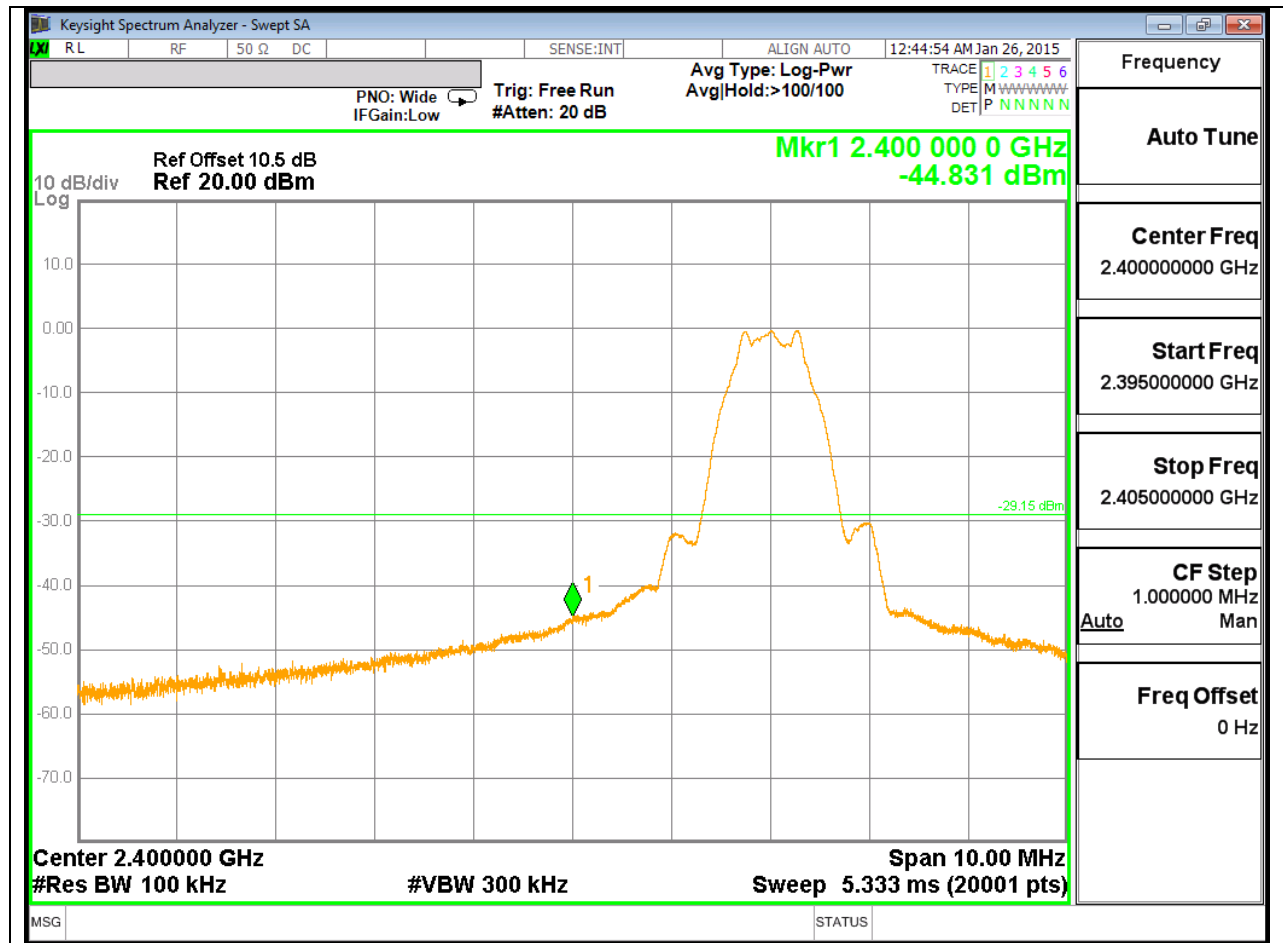
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

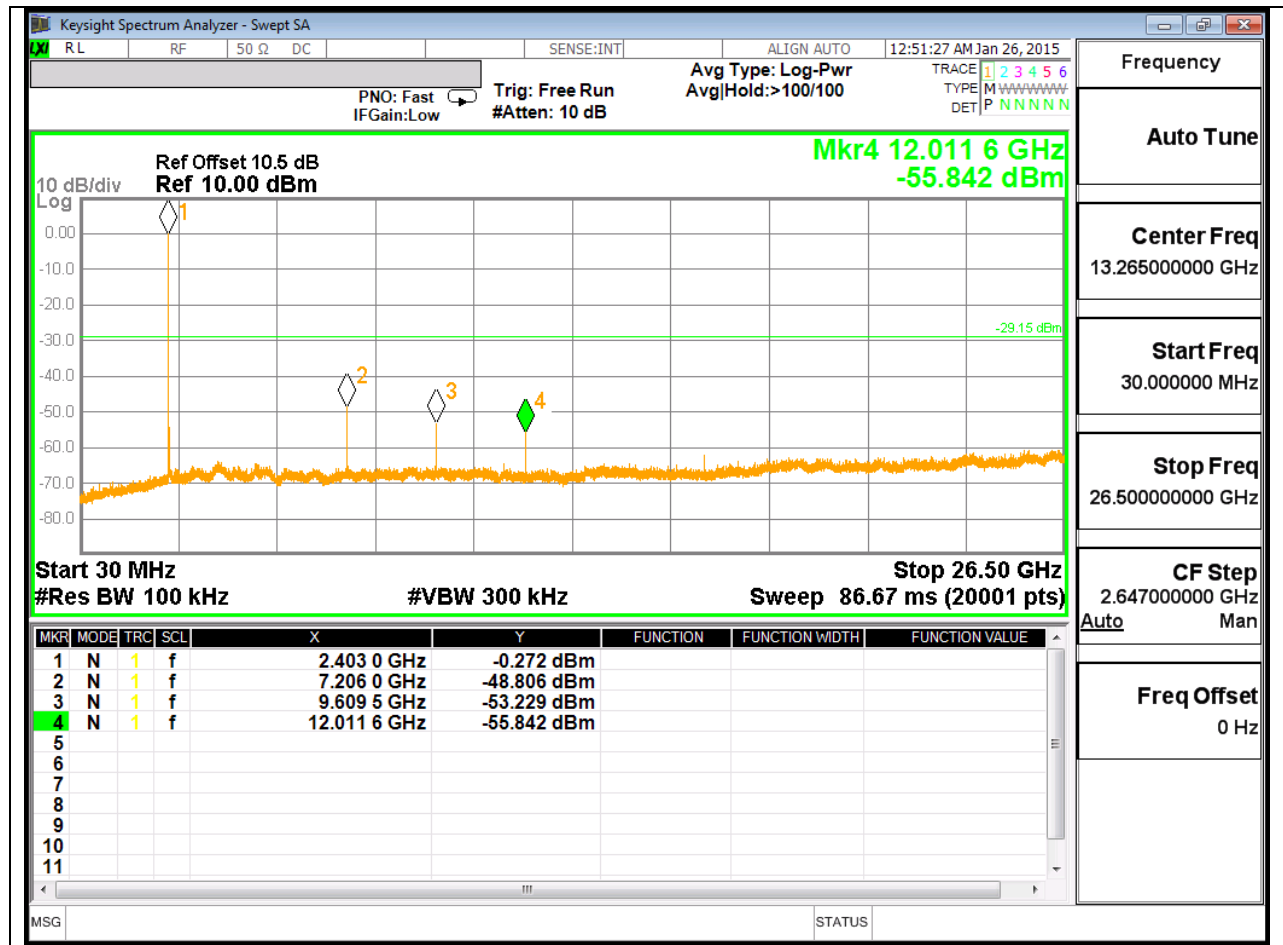
RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE

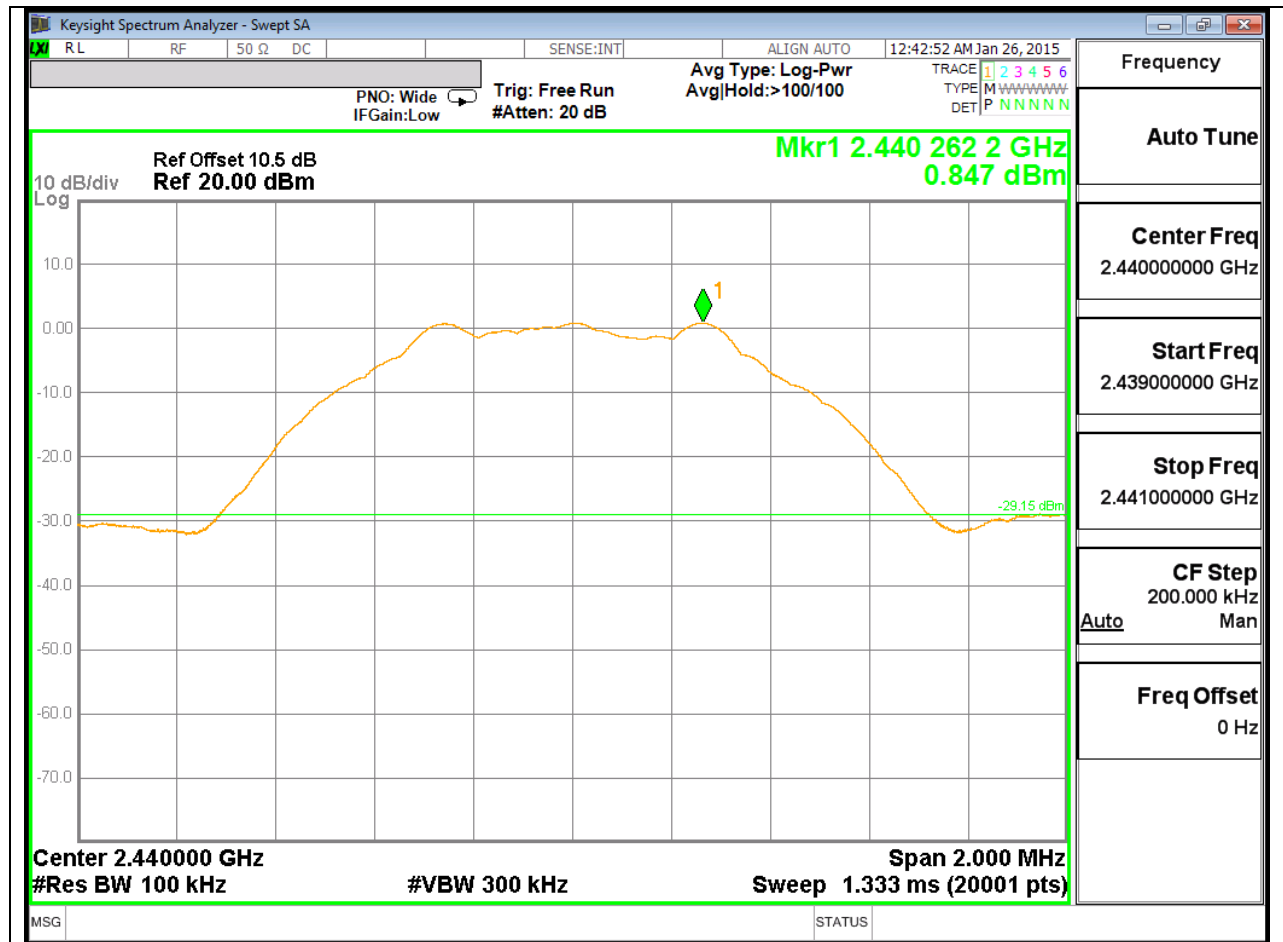


LOW CHANNEL SPURIOUS

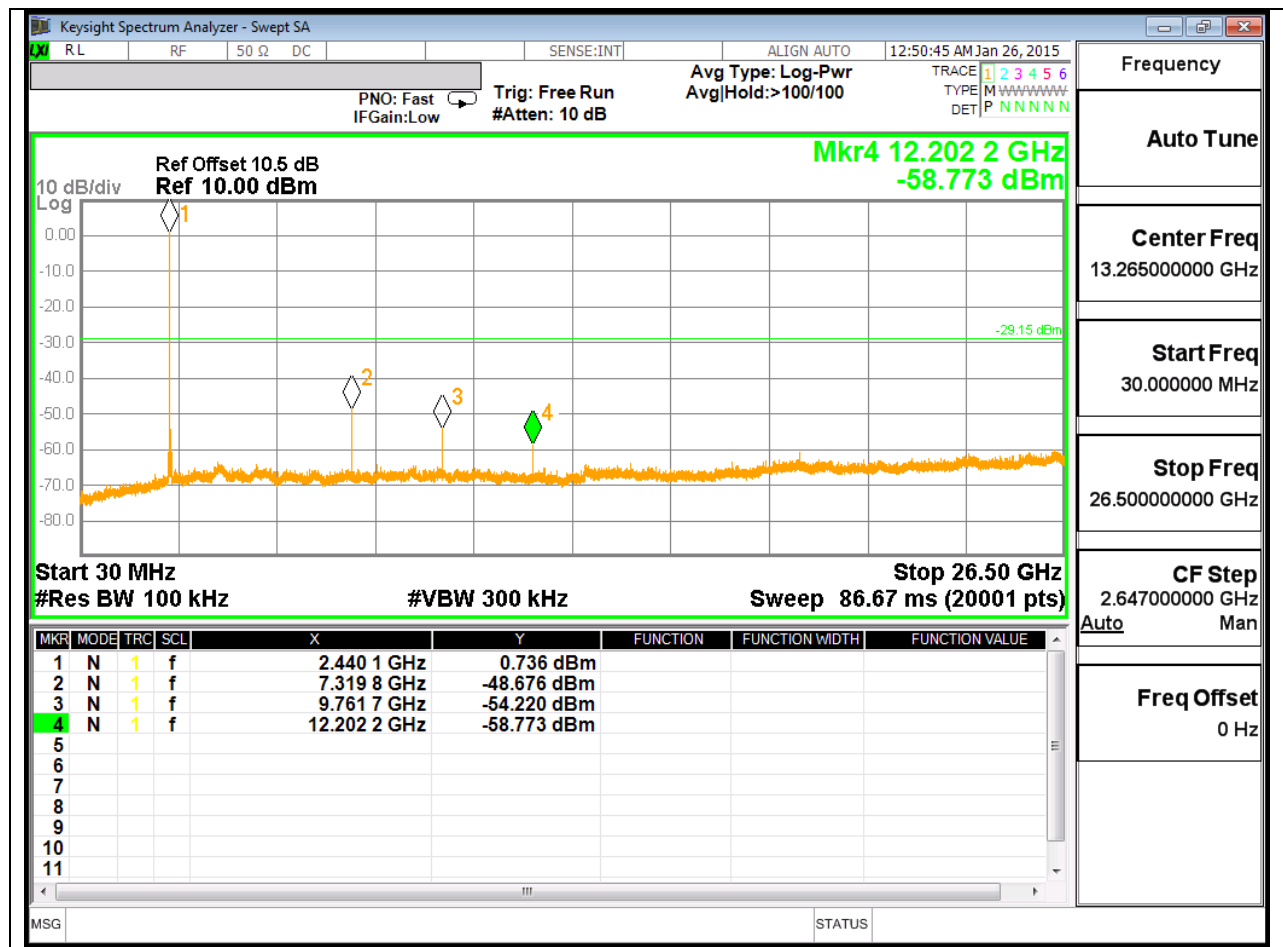


SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE

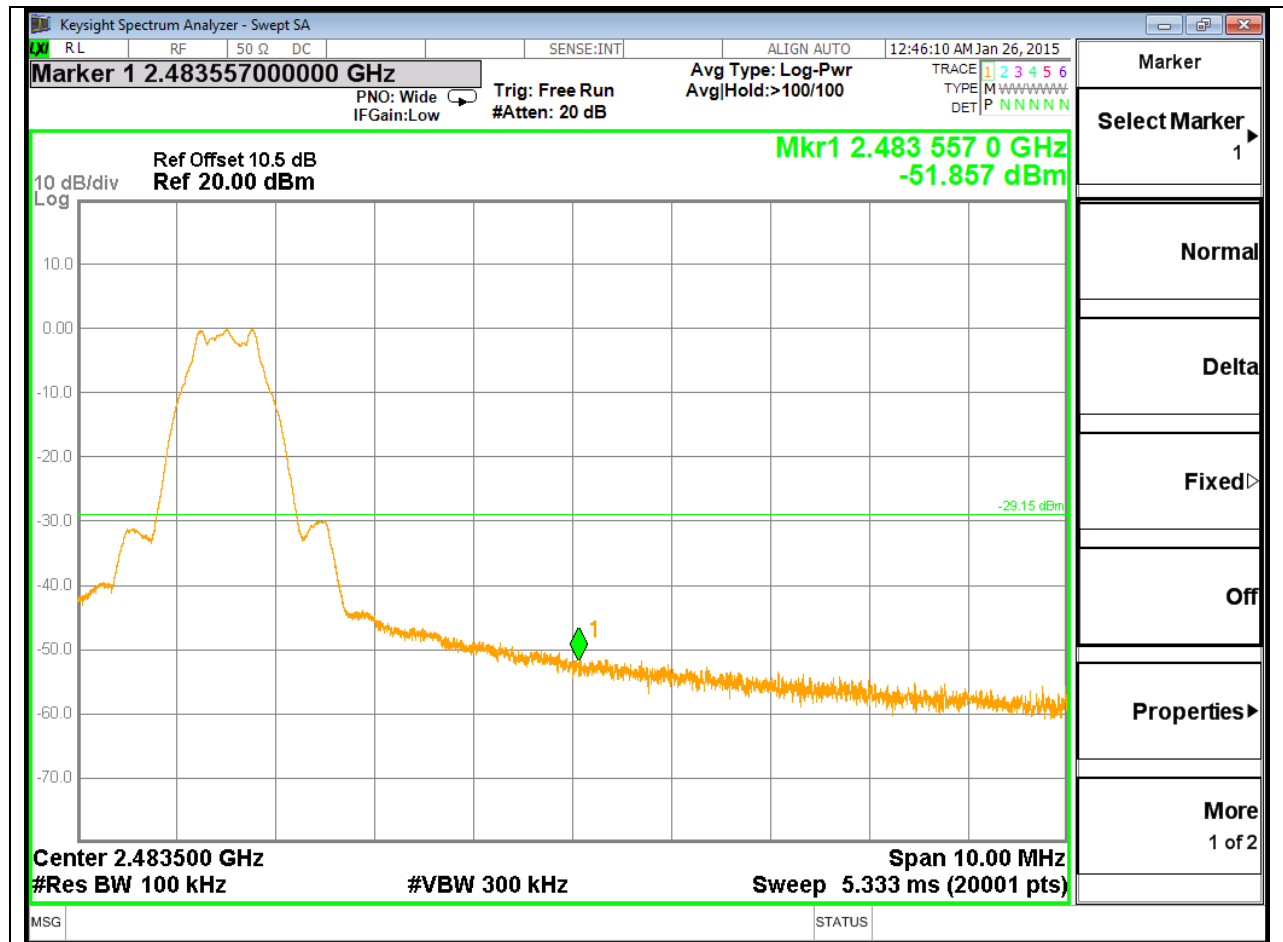


MID CHANNEL SPURIOUS

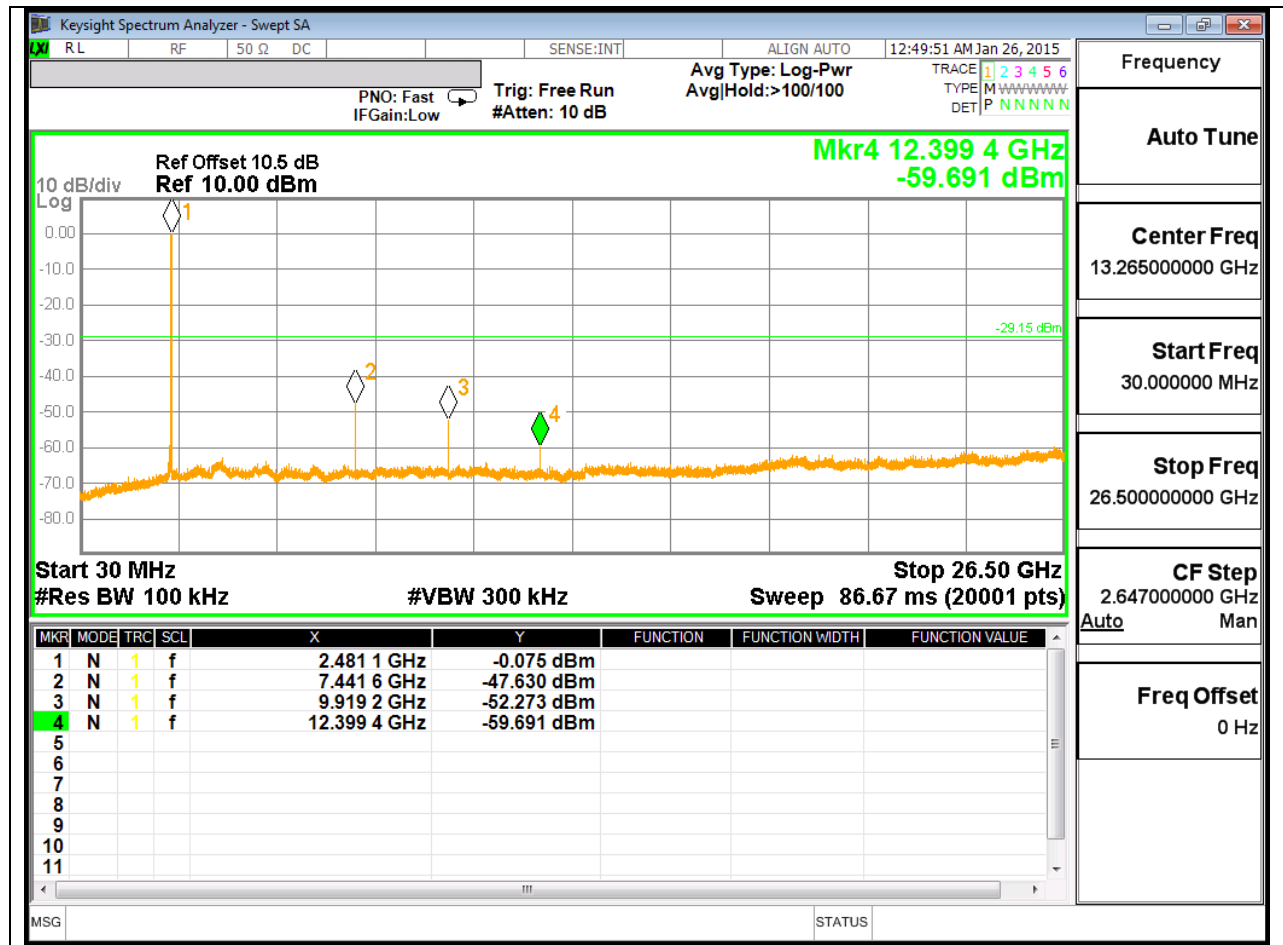


SPURIOUS EMISSIONS, HIGH CHANNEL

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 C63.4 - 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.

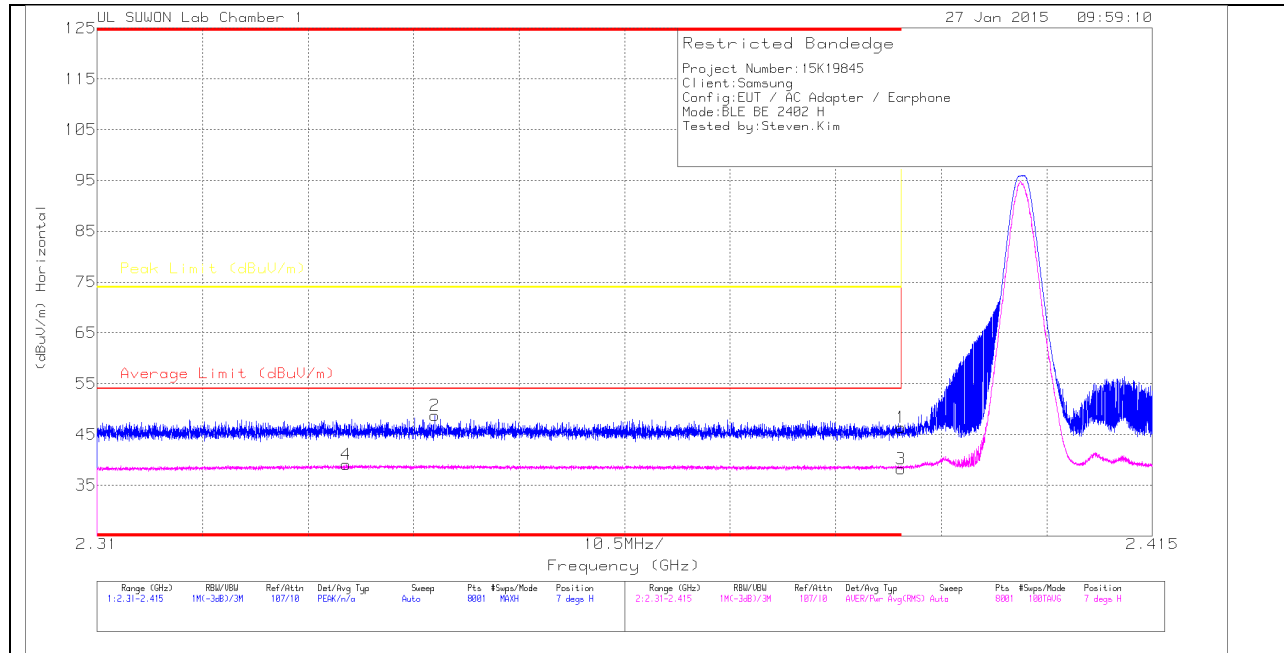
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor = $10 \log(1/x)$. For this sample: $DCF = 10\log(1/0.607)=2.17\text{dB}$ (Spectrum Analyzer round it up to 2.17dB)

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 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

Trace Markers

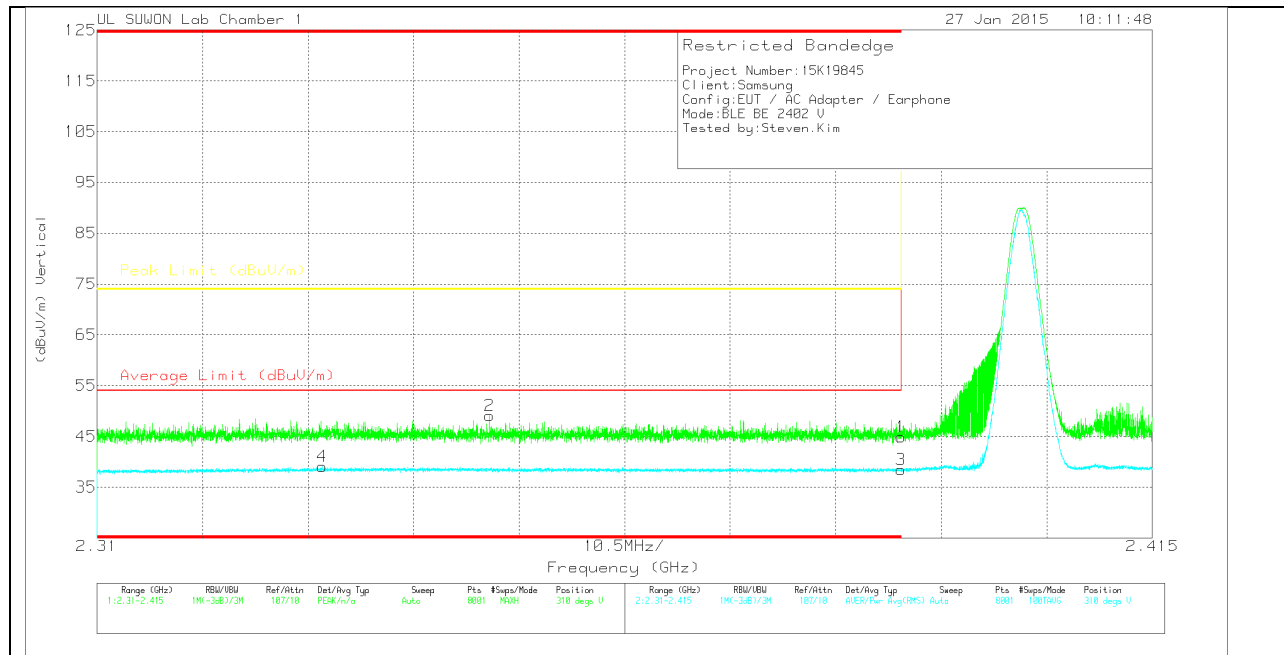
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	10dB_Path2	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.06	Pk	27.9	-22.6	0	46.36	-	-	74	-27.64	7	100	H
2	* 2.344	43.59	Pk	27.8	-22.7	0	48.69	-	-	74	-25.31	7	100	H
3	* 2.39	30.77	RMS	27.9	-22.6	2.17	38.24	54	-15.76	-	-	7	100	H
4	* 2.335	31.77	RMS	27.8	-22.7	2.17	39.04	54	-14.96	-	-	7	100	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	10dB_Path2	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	39.64	Pk	27.9	-22.6	0	44.94	-	-	74	-29.06	310	100	V
2	* 2.349	43.98	Pk	27.8	-22.7	0	49.08	-	-	74	-24.92	310	100	V
3	* 2.39	30.93	RMS	27.9	-22.6	2.17	38.4	54	-15.6	-	-	310	100	V
4	* 2.332	31.8	RMS	27.8	-22.7	2.17	39.07	54	-14.93	-	-	310	100	V

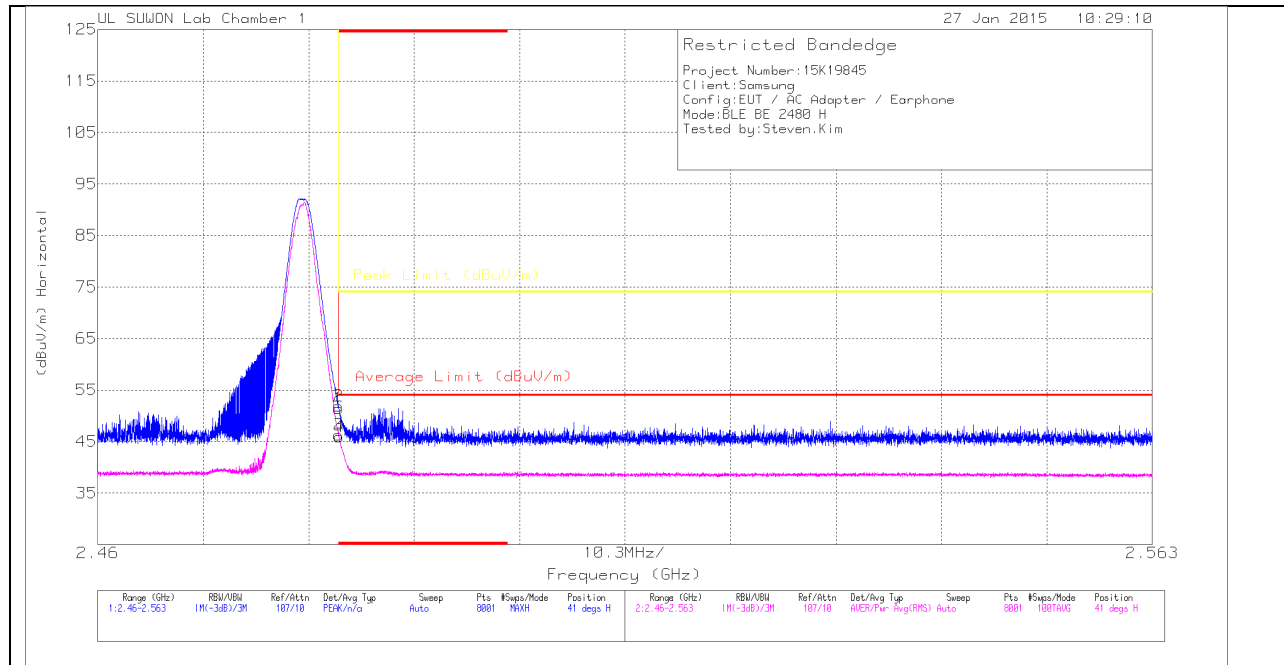
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

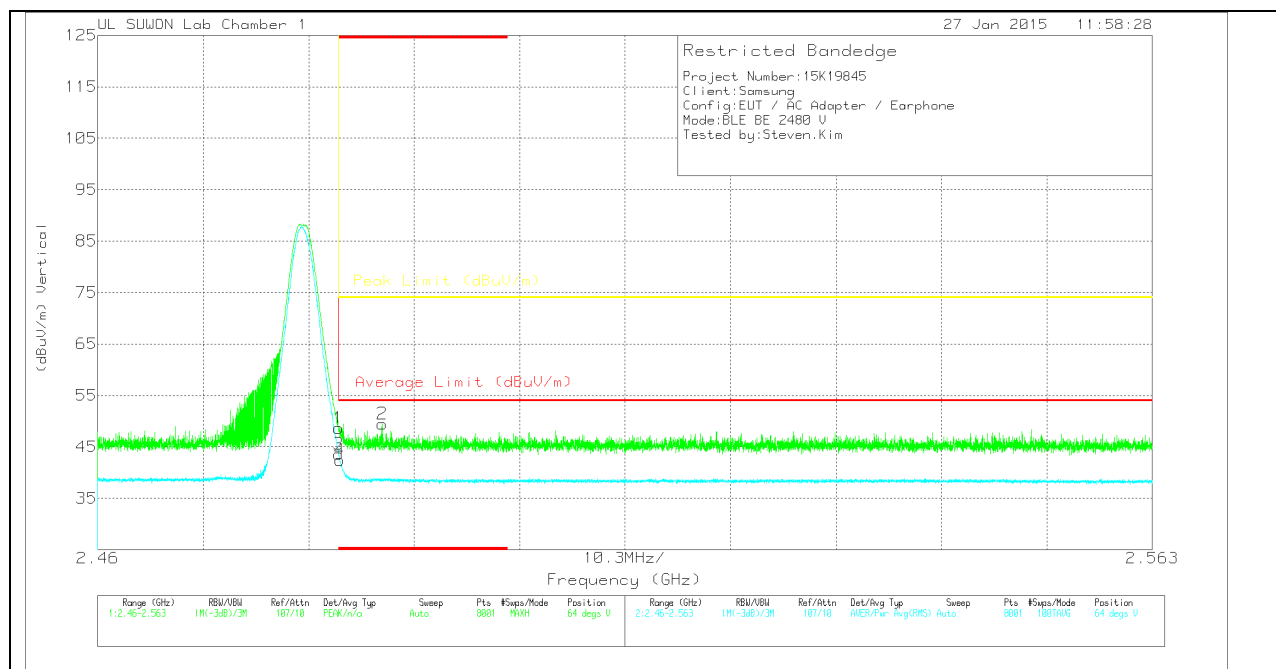
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	10dB_Path2	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	46	Pk	27.9	-22.5	0	51.4	-	-	74	-22.6	41	101	H
2	* 2.484	46.47	Pk	27.9	-22.5	0	51.87	-	-	74	-22.13	41	101	H
3	* 2.484	38.71	RMS	27.9	-22.5	2.17	46.28	54	-7.72	-	-	41	101	H
4	* 2.484	38.33	RMS	27.9	-22.5	2.17	45.9	54	-8.1	-	-	41	101	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	10dB_Path2	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	43.25	PK	27.9	-22.5	0	48.65	-	-	74	-25.35	64	156	V
2	* 2.488	44.08	PK	27.9	-22.5	0	49.48	-	-	74	-24.52	64	156	V
3	* 2.484	36.03	RMS	27.9	-22.5	2.17	43.6	54	-10.4	-	-	64	156	V
4	* 2.484	34.86	RMS	27.9	-22.5	2.17	42.43	54	-11.57	-	-	64	156	V

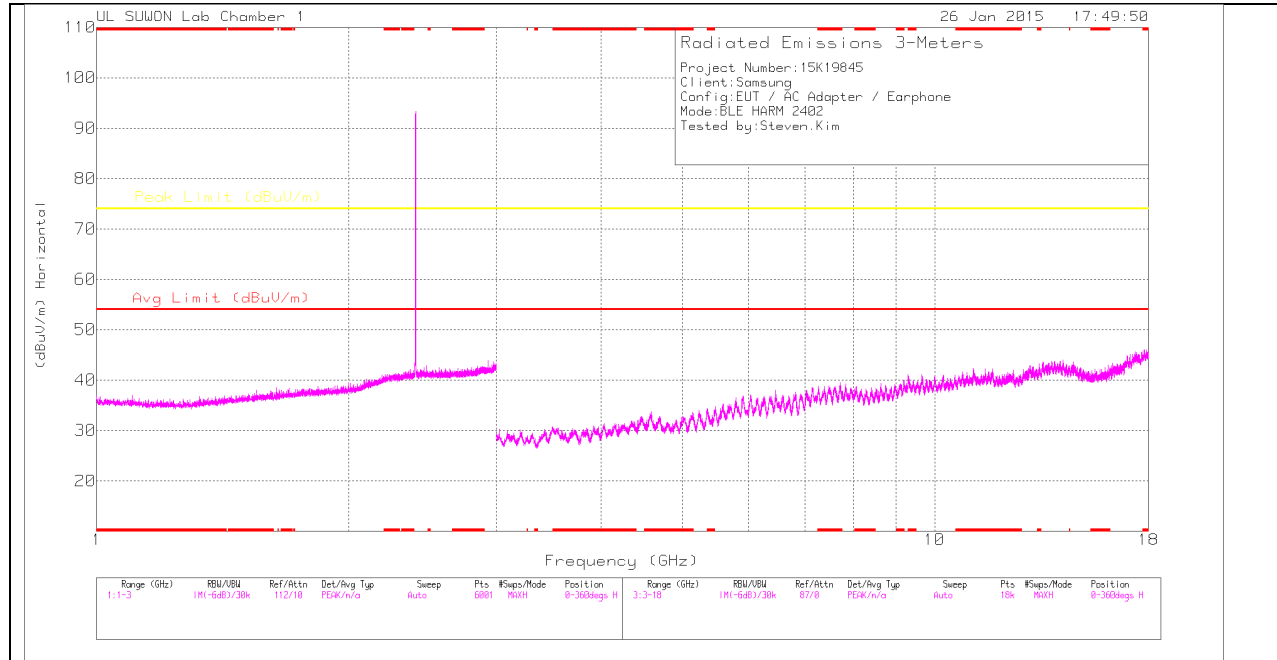
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK - Peak detector

RMS - RMS detection

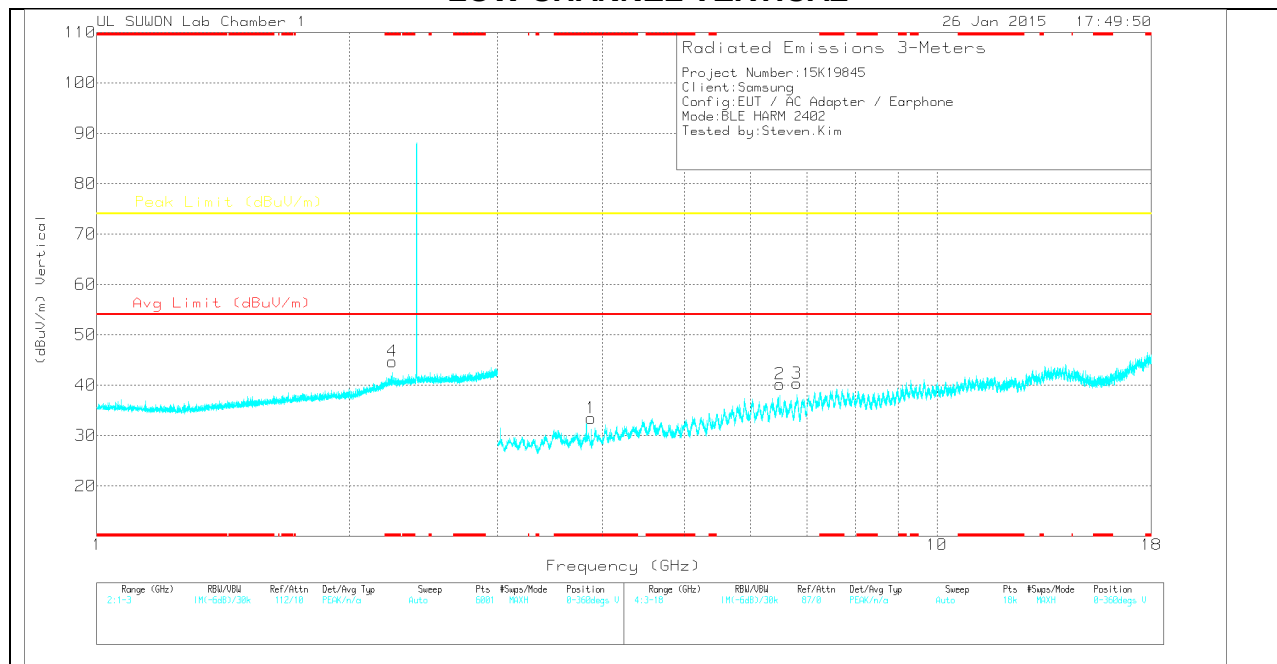
HARMONICS AND SPURIOUS EMISSIONS

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	3115D Factor	10dB_Path2	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.248	37.52	PK	27.8	-22.8	0	42.52	-	-	74	-31.48	0-360	100	V
1	* 3.878	30.98	PK	30.5	-30.2	0	31.28	-	-	74	-42.72	0-360	100	V
2	6.498	28.72	PK	35.6	-26.3	0	38.02	-	-	-	-	0-360	100	V
3	6.816	27.68	PK	36.3	-25.8	0	38.18	-	-	-	-	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

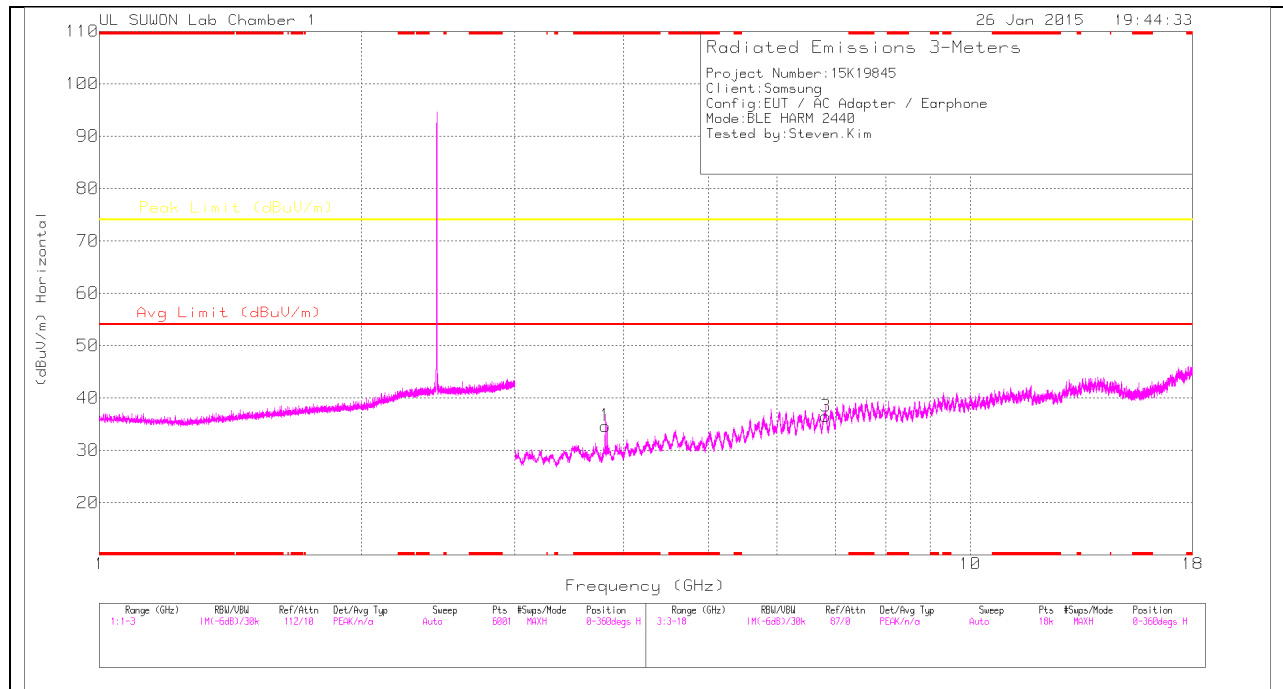
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	10dB_Path 2	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 2.248	43.65	PK2	27.8	-22.8	0	48.65	-	-	74	-25.35	354	244	V
* 2.25	31.39	MAV1	27.8	-22.8	0	36.39	54	-17.61	-	-	354	244	V
* 3.88	26.58	MAV1	30.5	-30.2	0	26.88	54	-27.12	-	-	270	206	V
6.499	29.69	MAV1	35.6	-26.3	0	38.99	-	-	-	-	323	100	V
6.818	24.76	MAV1	36.3	-25.8	0	35.26	-	-	-	-	105	304	V
* 3.879	38.52	PK2	30.5	-30.2	0	38.82	-	-	74	-35.18	270	206	V
6.498	38.74	PK2	35.6	-26.3	0	48.04	-	-	-	-	323	100	V
6.818	37.15	PK2	36.3	-25.8	0	47.65	-	-	-	-	105	304	V

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

PK2 - KDB558074 Method: Maximum Peak

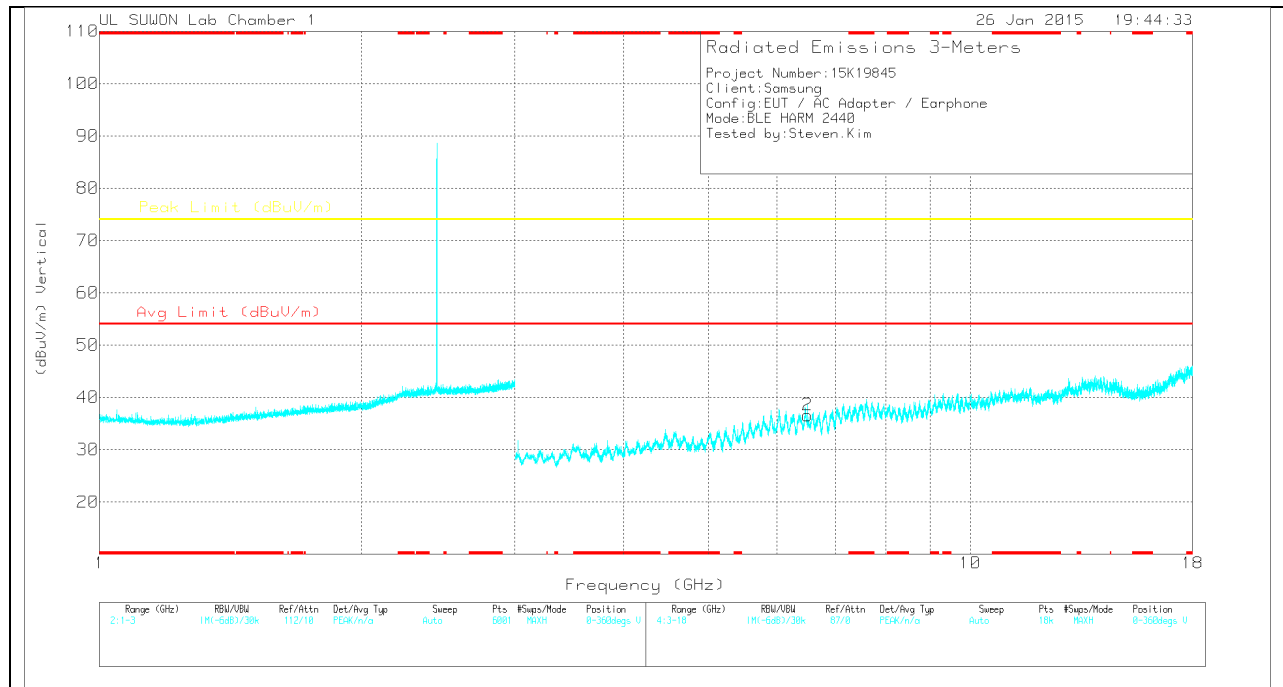
MAV1 - KDB558074 Option 1 Maximum RMS Average

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	3115D Factor	3 GHz HPF_Path3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.807	36.24	PK	30.4	-29.8	0	36.84	-	-	74	-37.16	0-360	100	H
3	6.825	28.26	PK	36.3	-25.9	0	38.66	-	-	-	-	0-360	100	H
2	6.498	29.45	PK	35.6	-26.3	0	38.75	-	-	-	-	0-360	100	V

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

PK – Peak Detector

Radiated Emissions

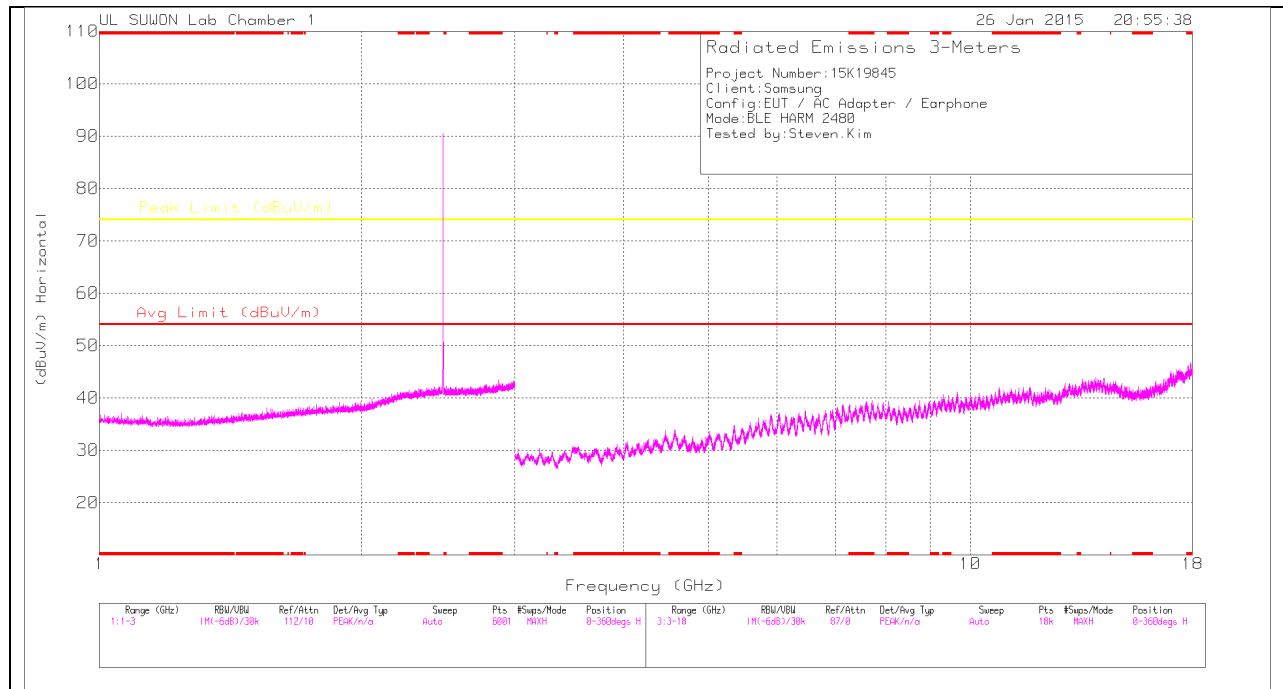
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	3 GHz HPF_Path3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.807	40.09	PK2	30.4	-29.8	0	40.69	-	-	74	-33.31	285	118	H
* 3.805	28.03	MAv1	30.4	-29.8	0	28.63	54	-25.37	-	-	285	118	H
6.825	38.07	PK2	36.3	-25.9	0	48.47	-	-	-	-	195	340	H
6.823	24.86	MAv1	36.3	-25.9	0	35.26	-	-	-	-	195	340	H
6.499	38.96	PK2	35.6	-26.3	0	48.26	-	-	-	-	323	107	V
6.499	29.3	MAv1	35.6	-26.3	0	38.6	-	-	-	-	323	107	V

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

PK2 - KDB558074 Method: Maximum Peak

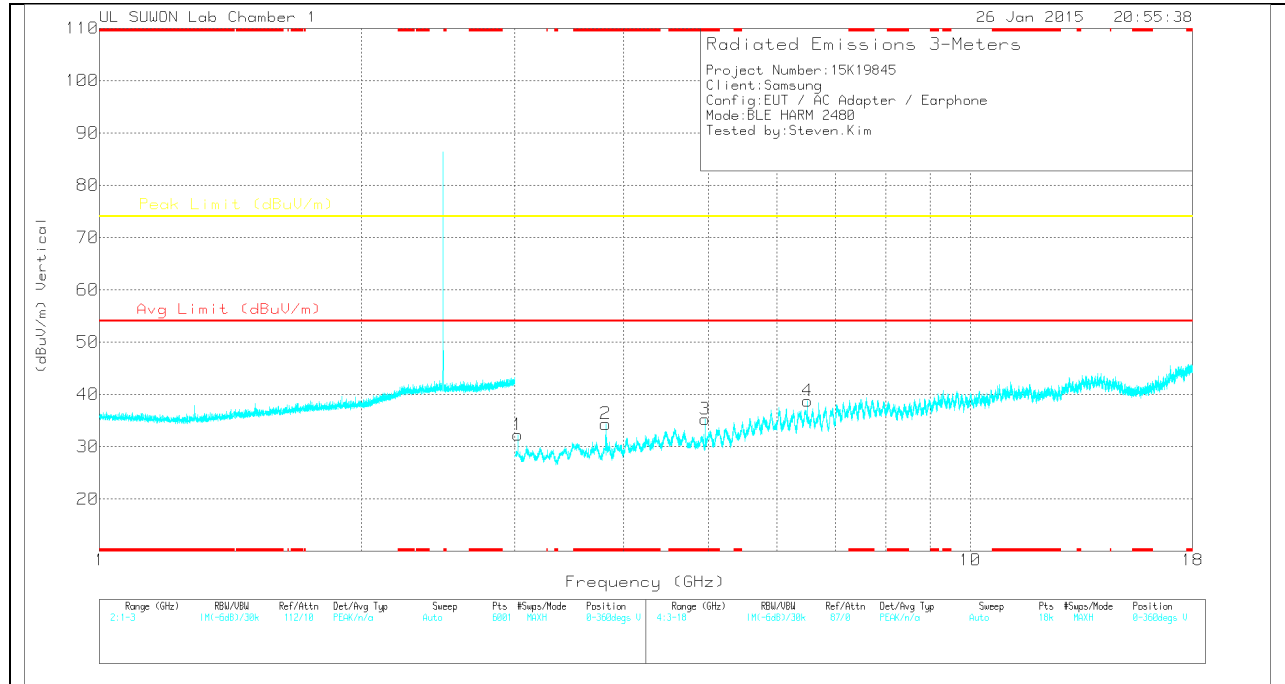
MAv1 - KDB558074 Option 1 Maximum RMS Average

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	3115D Factor	3 GHz HPF_Path3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.023	34.53	PK	28.8	-31.1	0	32.23	-	-	-	-	0-360	200	V
2	* 3.813	33.73	PK	30.4	-29.8	0	34.33	-	-	74	-39.67	0-360	100	V
3	* 4.96	34.11	PK	32.1	-28.8	2.17	39.58	-	-	74	-34.42	0-360	100	V
4	6.498	29.41	PK	35.6	-26.3	0	38.71	-	-	-	-	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	3115D Factor	3 GHz HPF_Path3	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3.024	42.9	PK2	28.8	-31.1	0	40.6	-	-	-	-	173	193	V
3.024	33.02	MAv1	28.8	-31.1	0	30.72	-	-	-	-	173	193	V
* 3.814	40.41	PK2	30.4	-29.8	0	41.01	-	-	74	-32.99	33	216	V
* 3.813	27.79	MAv1	30.4	-29.8	0	28.39	54	-25.61	-	-	33	216	V
* 4.96	40.07	PK2	32.1	-28.8	0	43.37	-	-	74	-30.63	314	303	V
* 4.96	27.62	MAv1	32.1	-28.8	2.17	33.09	54	-20.91	-	-	314	303	V
6.499	38.65	PK2	35.6	-26.3	0	47.95	-	-	-	-	323	100	V
6.499	29.61	MAv1	35.6	-26.3	0	38.91	-	-	-	-	323	100	V

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

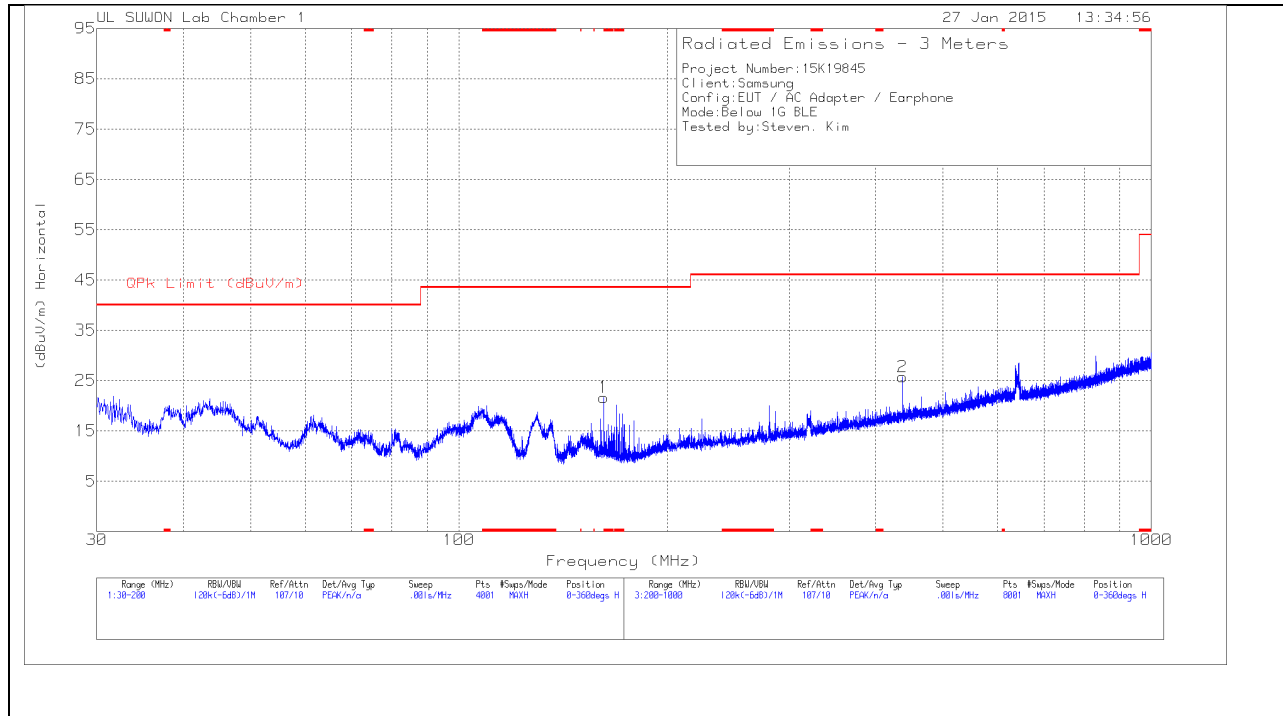
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

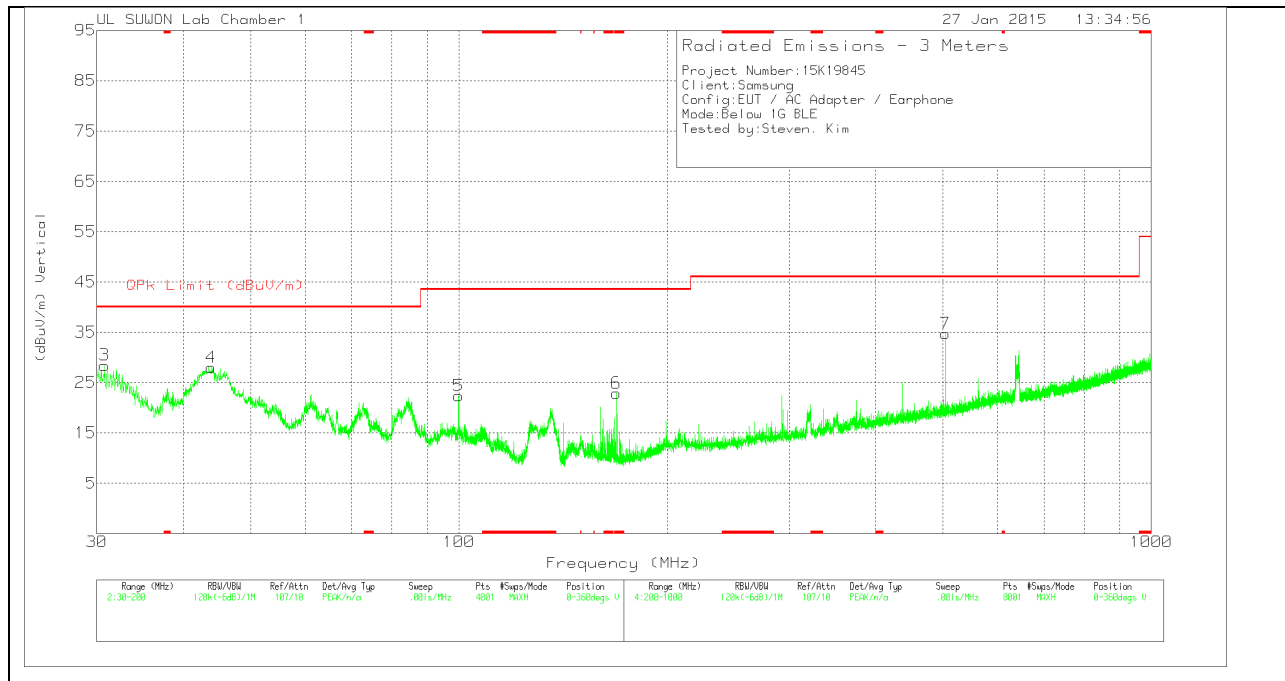
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163-750	Bi-Log Ant Pathloss	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	161.835	41.88	Pk	8.6	-28.8	21.68	43.52	-21.84	0-360	200	H
3	30.765	48.93	Pk	10.3	-30.8	28.43	40	-11.57	0-360	100	V
4	43.8975	45.11	Pk	13.4	-30.5	28.01	40	-11.99	0-360	100	V
5	99.9125	40.49	Pk	11.5	-29.6	22.39	43.52	-21.13	0-360	100	V
6	* 168.89	42.81	Pk	8.9	-28.8	22.91	43.52	-20.61	0-360	100	V
2	437.5	36.45	Pk	16.1	-26.8	25.75	46.02	-20.27	0-360	100	H
7	504	44.04	Pk	17.1	-26.4	34.74	46.02	-11.28	0-360	100	V

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

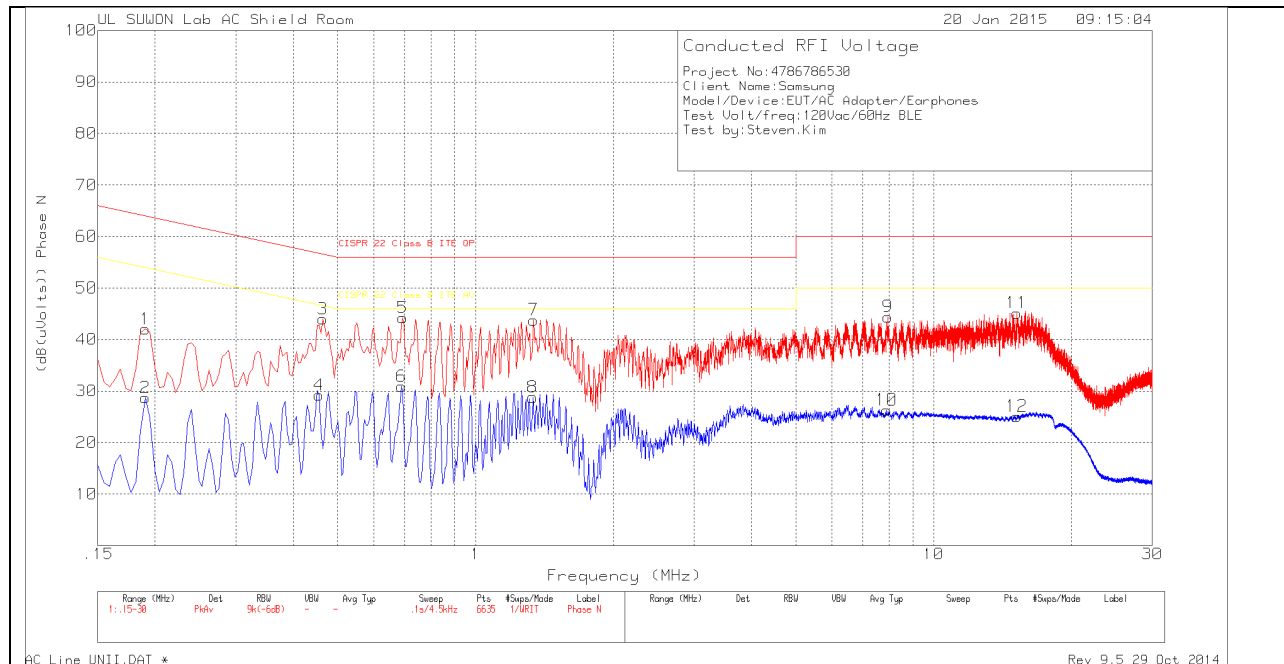
TEST PROCEDURE

ANSI C63.4 - 2009

RESULTS

6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

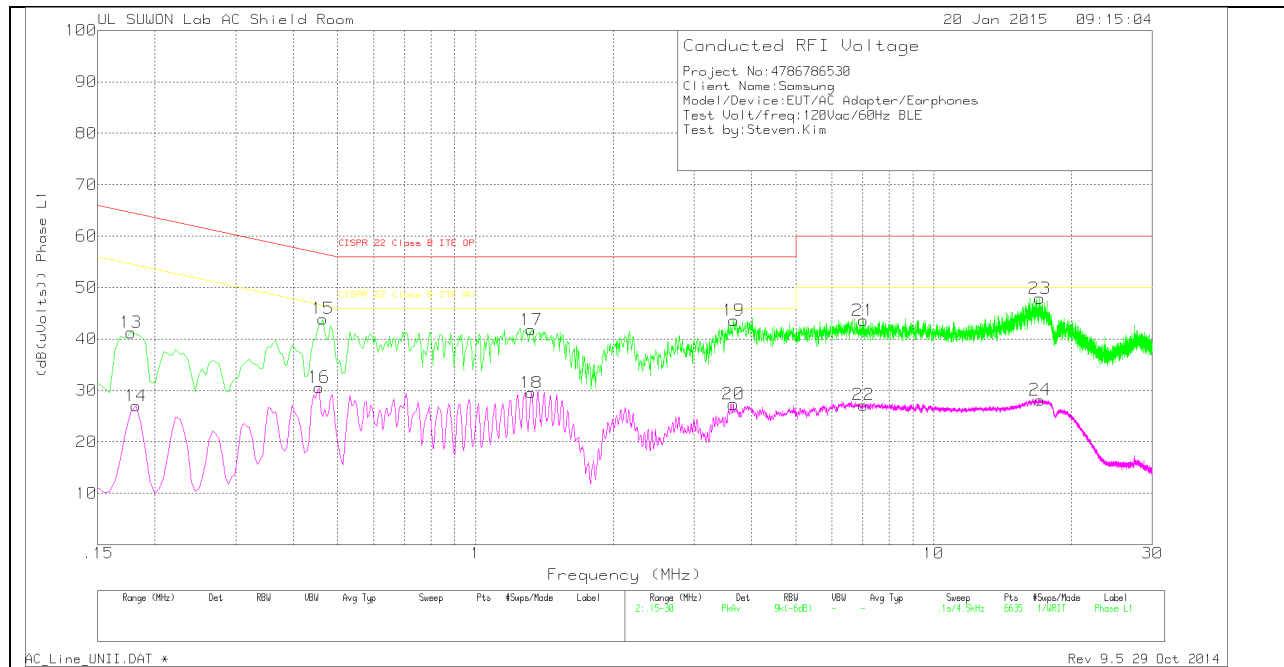
Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N	CE Shield Room	Corrected Reading (dB(uV s))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.1905	32.04	Pk	10	0	42.04	64.01	-21.97	-	-
2	.1905	18.7	Av	10	0	28.7	-	-	54.01	-25.31
3	.465	33.88	Pk	10.1	0	43.98	56.6	-12.62	-	-
4	.456	19.09	Av	10.1	0	29.19	-	-	46.77	-17.58
5	.6945	34.21	Pk	10	0	44.21	56	-11.79	-	-
6	.69	20.93	Av	10	0	30.93	-	-	46	-15.07
7	1.338	33.89	Pk	9.8	.1	43.79	56	-12.21	-	-
8	1.3335	18.88	Av	9.8	.1	28.78	-	-	46	-17.22
9	7.935	34.61	Pk	9.7	.1	44.41	60	-15.59	-	-
10	7.89	16.52	Av	9.7	.1	26.32	-	-	50	-23.68
11	15.1755	35.15	Pk	9.8	.2	45.15	60	-14.85	-	-
12	15.1845	15.08	Av	9.8	.2	25.08	-	-	50	-24.92

Pk - Peak detector

Av - Average detection

LINE 2 PLOT



LINE 2 RESULTS

Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L 1	CE Shield Room	Corrected Reading (dB(uVolts))	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.177	31.45	Pk	9.8	0	41.25	64.63	-23.38	-	-
14	.1815	17.19	Av	9.8	0	26.99	-	-	54.42	-27.43
15	.465	33.93	Pk	10	0	43.93	56.6	-12.67	-	-
16	.456	20.6	Av	10	0	30.6	-	-	46.77	-16.17
17	1.3245	32.18	Pk	9.5	.1	41.78	56	-14.22	-	-
18	1.3245	19.96	Av	9.5	.1	29.56	-	-	46	-16.44
19	3.66	34.12	Pk	9.4	.1	43.62	56	-12.38	-	-
20	3.6555	17.82	Av	9.4	.1	27.32	-	-	46	-18.68
21	7.0125	34.11	Pk	9.4	.1	43.61	60	-16.39	-	-
22	7.0215	17.68	Av	9.4	.1	27.18	-	-	50	-22.82
23	17.0385	38.32	Pk	9.4	.2	47.92	60	-12.08	-	-
24	17.061	18.55	Av	9.4	.2	28.15	-	-	50	-21.85

Pk - Peak detector

Av - Average detection