



**FCC CFR47 PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

**FOR**

**GSM/WCDMA/LTE Phone + Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+**

**MODEL NUMBER : SM-A800YZ**

**FCC ID: A3LSMA800YZ**

**REPORT NUMBER: 15K21021-E2**

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*Prepared for*

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**ACCREDITED**

**TL-637**

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** GSM/WCDMA/LTE Phone+Bluetooth/BLE, DTS/UNII a/b/g/n/ac and ANT+  
**MODEL NUMBER:** SM-A800YZ  
**SERIAL NUMBER:** 4100e2844799149 (RADIATED); 4100855ef27d91c3 (CONDUCTED)  
**DATE TESTED:** JUN 06 - JUN 23, 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:



CY Choi  
Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Junwhan Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

## 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 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	
<input checked="" type="checkbox"/>	Chamber 1
<input type="checkbox"/>	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/BLE, DTS/UNII a/b/g/n/ac and ANT+. 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	Power Mode	Output Power [dBm]	Output Power [mW]
2402 - 2480	BLE	Peak	7.31	5.38
		Average	7.08	5.11

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an FPCB antennas, with a maximum gain of -0.15 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	EP-TA12JWS	N/A	N/A
Data Cable	SAMSUNG	EP-DG920UWE	N/A	N/A
Earphone	SAMSUNG	EHS64AVFWE	N/A	N/A

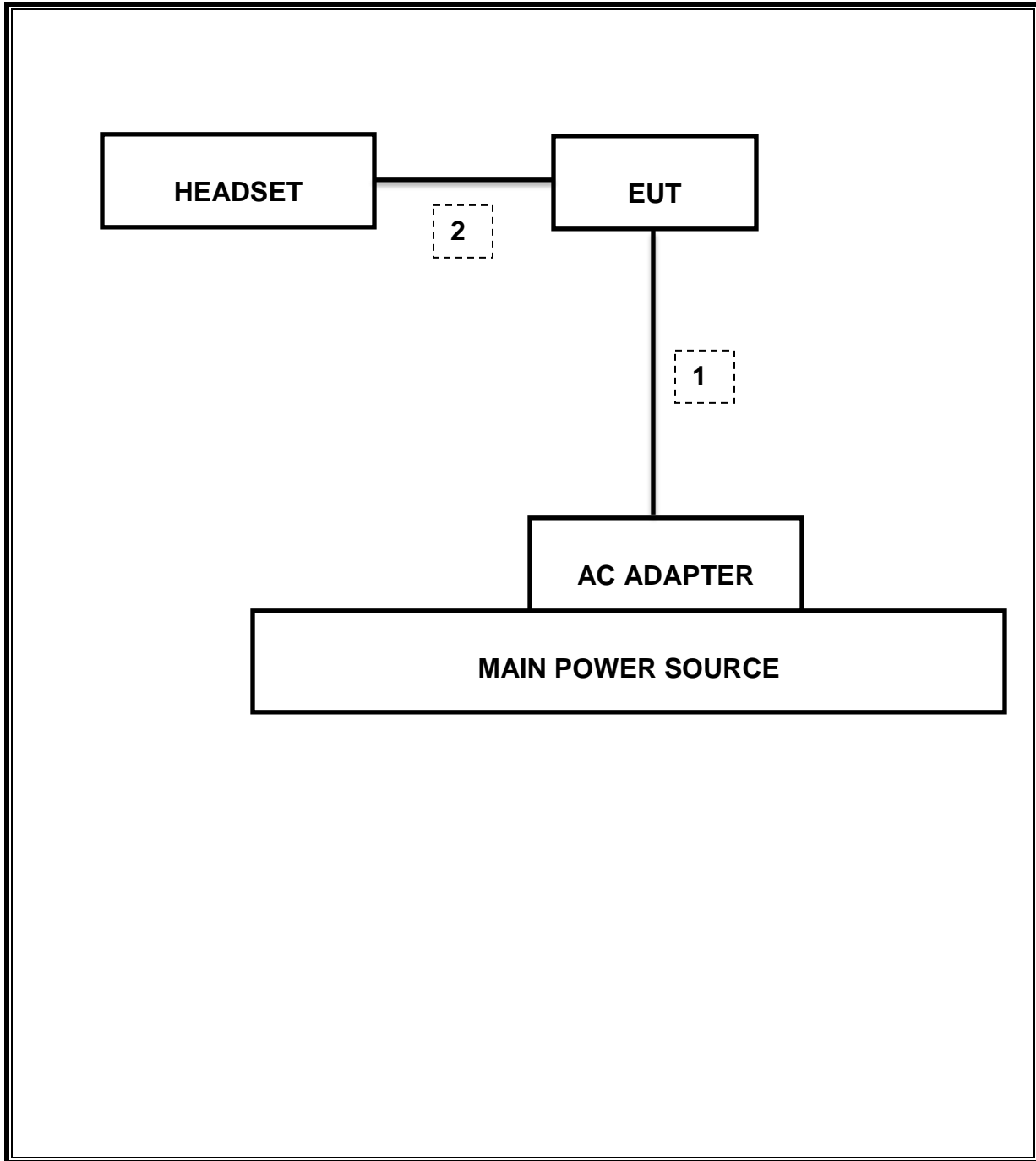
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	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
LISN	R&S	ENV-216	101836	04-09-16
LISN	R&S	ENV-216	101837	04-09-16

## 7. MEASUREMENT METHODS

KDB 558074 D01 DTS Meas Guidance v03r03: Measurement Procedure §9.1.1 is used for peak power and §10.2 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. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

### LIMITS

None: for reporting purposes only.

### 8.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B [msec]	Period [msec]	Duty Cycle x [linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
<b>2400MHz Bands</b>						
BLE	0.389	0.625	0.622	62.2%	2.06	2.571



## 9. 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	715.4 kHz
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-48.673 dBm
15.247	TX conducted output power	<30dBm		Pass	7.31 dBm
15.247	PSD	<8dBm		Pass	-7.08 dBm
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass	41.12 dBuV (QP)
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m	Radiated	Pass	52.36 dBuV/m (AV)

## 10. ANTENNA PORT TEST RESULTS

### 10.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

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

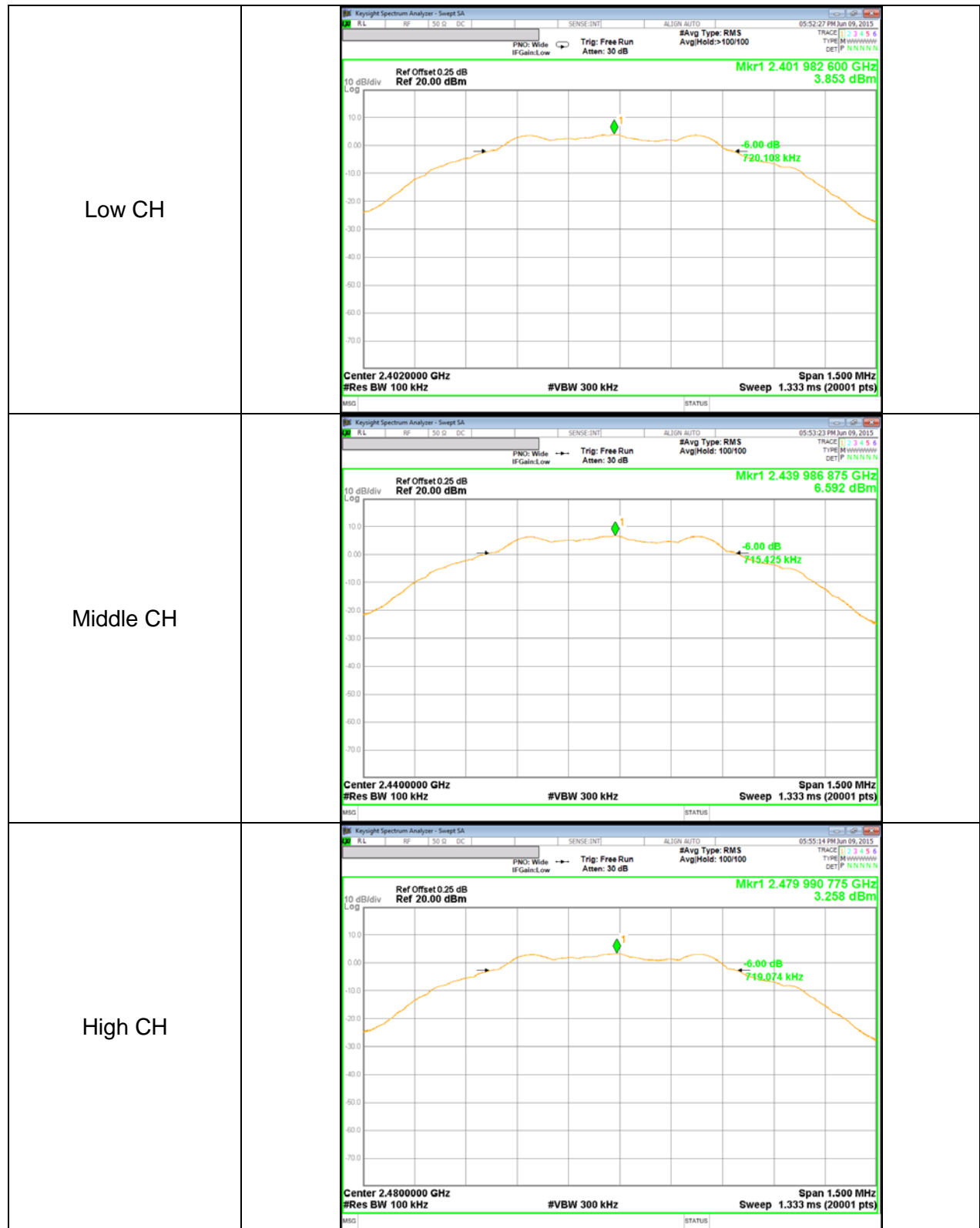
#### TEST PROCEDURE

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 [kHz]	Minimum Limit [kHz]
Low	2402	720.1	500.0
Mid	2440	715.4	500.0
High	2480	719.1	500.0
Worst		715.4	500.0

**6 dB BANDWIDTH PLOTS**



## 10.2. 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	1.067
Mid	2440	1.067
High	2480	1.084
Worst		1.084

**99% BANDWIDTH PLOTS**

<p>Low CH</p>	<p>KeySight Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 2.40200000 GHz      Trig: Free Run      #Atten: 30 dB</p> <p>Radio Std: None      Radio Device: BTS</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.402 GHz Span 3 MHz      #Res BW 30 kHz #VBW 100 kHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>1.99 dBm</td> </tr> <tr> <td><b>1.0668 MHz</b></td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-14.034 kHz</td> <td>x dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td>497.6 kHz</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	1.99 dBm	<b>1.0668 MHz</b>	OBW Power	99.00 %	Transmit Freq Error	-14.034 kHz	x dB	x dB Bandwidth	497.6 kHz	-6.00 dB
Occupied Bandwidth	Total Power	1.99 dBm											
<b>1.0668 MHz</b>	OBW Power	99.00 %											
Transmit Freq Error	-14.034 kHz	x dB											
x dB Bandwidth	497.6 kHz	-6.00 dB											
<p>Middle CH</p>	<p>KeySight Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 2.44000000 GHz      Trig: Free Run      #Atten: 30 dB</p> <p>Radio Std: None      Radio Device: BTS</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.44 GHz Span 3 MHz      #Res BW 30 kHz #VBW 100 kHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>4.76 dBm</td> </tr> <tr> <td><b>1.0667 MHz</b></td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-10.738 kHz</td> <td>x dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td>497.4 kHz</td> <td>-6.00 dB</td> </tr> </table>	Occupied Bandwidth	Total Power	4.76 dBm	<b>1.0667 MHz</b>	OBW Power	99.00 %	Transmit Freq Error	-10.738 kHz	x dB	x dB Bandwidth	497.4 kHz	-6.00 dB
Occupied Bandwidth	Total Power	4.76 dBm											
<b>1.0667 MHz</b>	OBW Power	99.00 %											
Transmit Freq Error	-10.738 kHz	x dB											
x dB Bandwidth	497.4 kHz	-6.00 dB											
<p>High CH</p>	<p>KeySight Spectrum Analyzer - Occupied BW</p> <p>Center Freq: 2.48000000 GHz      Trig: Free Run      #Atten: 30 dB</p> <p>Radio Std: None      Radio Device: BTS</p> <p>10 dB/div Ref 20.00 dBm</p> <p>Center 2.48 GHz Span 3 MHz      #Res BW 30 kHz #VBW 100 kHz #Sweep 100 ms</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>Total Power</td> <td>1.53 dBm</td> </tr> <tr> <td><b>1.0839 MHz</b></td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-17.895 kHz</td> <td>x dB</td> </tr> <tr> <td>x dB Bandwidth</td> <td>673.0 kHz</td> <td>-6.00 dB</td> </tr> </table> <p>Alignment Completed</p>	Occupied Bandwidth	Total Power	1.53 dBm	<b>1.0839 MHz</b>	OBW Power	99.00 %	Transmit Freq Error	-17.895 kHz	x dB	x dB Bandwidth	673.0 kHz	-6.00 dB
Occupied Bandwidth	Total Power	1.53 dBm											
<b>1.0839 MHz</b>	OBW Power	99.00 %											
Transmit Freq Error	-17.895 kHz	x dB											
x dB Bandwidth	673.0 kHz	-6.00 dB											

### 10.3. 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 v03r03 under section 9.1.1 utilizing spectrum analyzer.

#### RESULTS

Channel	Frequency [MHz]	Peak Power Reading [dBm]	Limit [dBm]	Margin [dB]
Low	2402	4.539	30.000	-25.461
Mid	2440	7.311	30.000	-22.689
High	2480	3.965	30.000	-26.035
Worst		7.311		-22.689



## 10.4. 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]	AV power [mW]
Low	2402	4.36	2.73
Middle	2440	7.08	5.11
High	2480	3.77	2.38

## 10.5. 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.

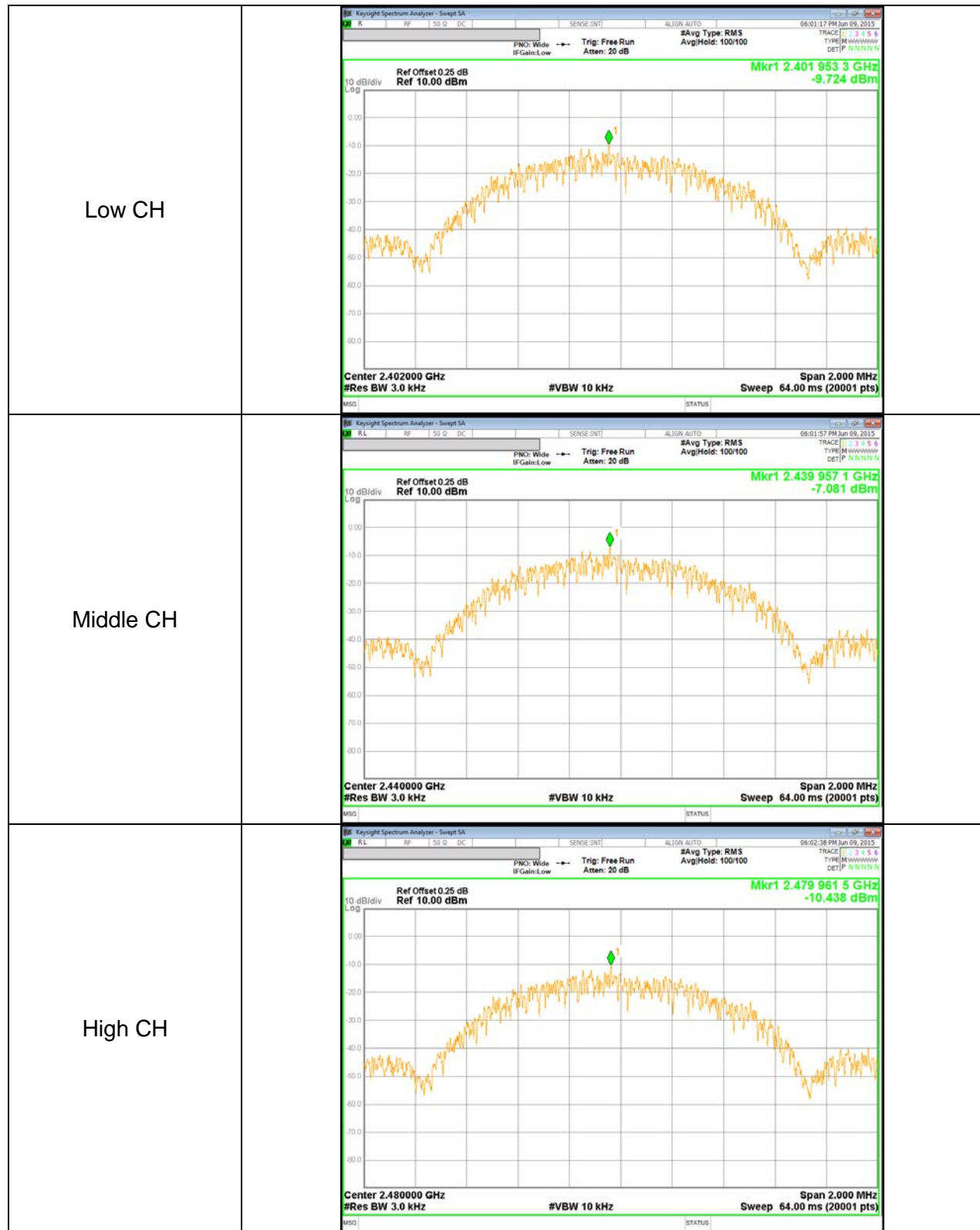
### TEST PROCEDURE

Power Spectral Density was performed utilizing the “Method PKPSD (Peak PSD)” under KDB558074 D01 DTS Meas Guidance v03r03

### RESULTS

Channel	Frequency [MHz]	PSD [dBm]	Limit [dBm]	Margin [dB]
Low	2402	-9.72	8.00	-17.72
Mid	2440	-7.08	8.00	-15.08
High	2480	-10.44	8.00	-18.44

**POWER SPECTRAL DENSITY PLOTS**



## **10.6. 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.

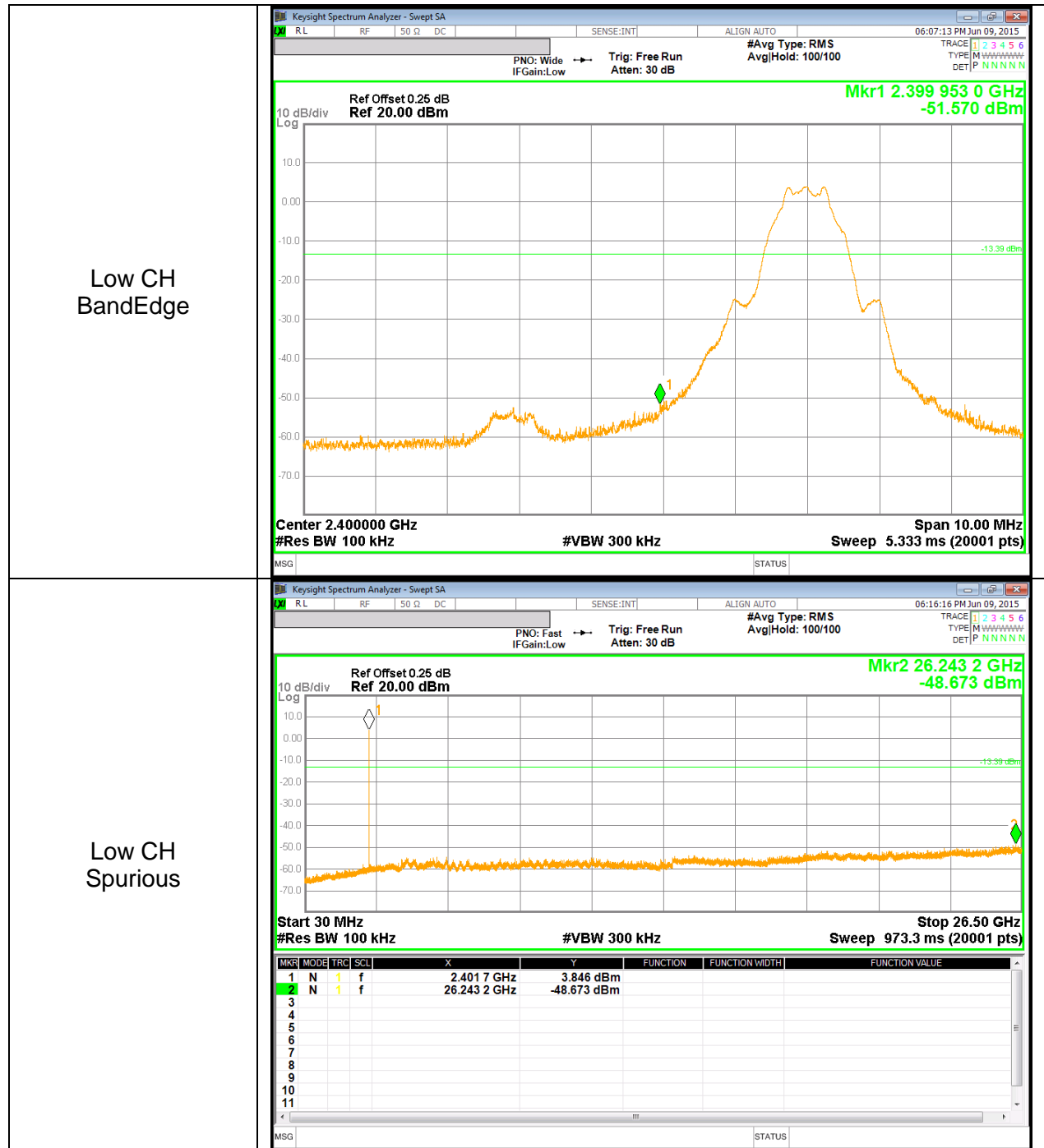
### **TEST PROCEDURE**

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.

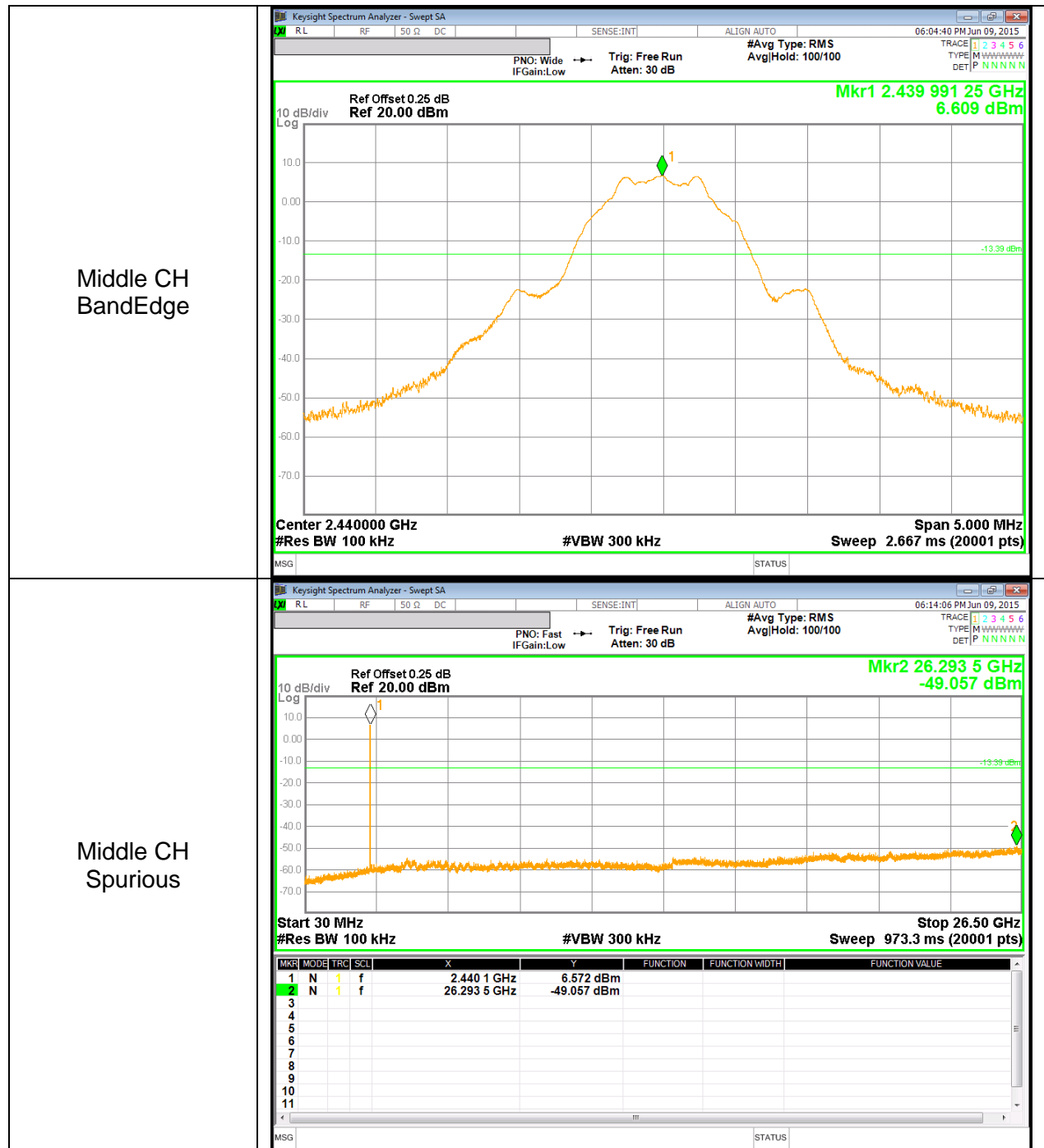
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

**RESULTS**

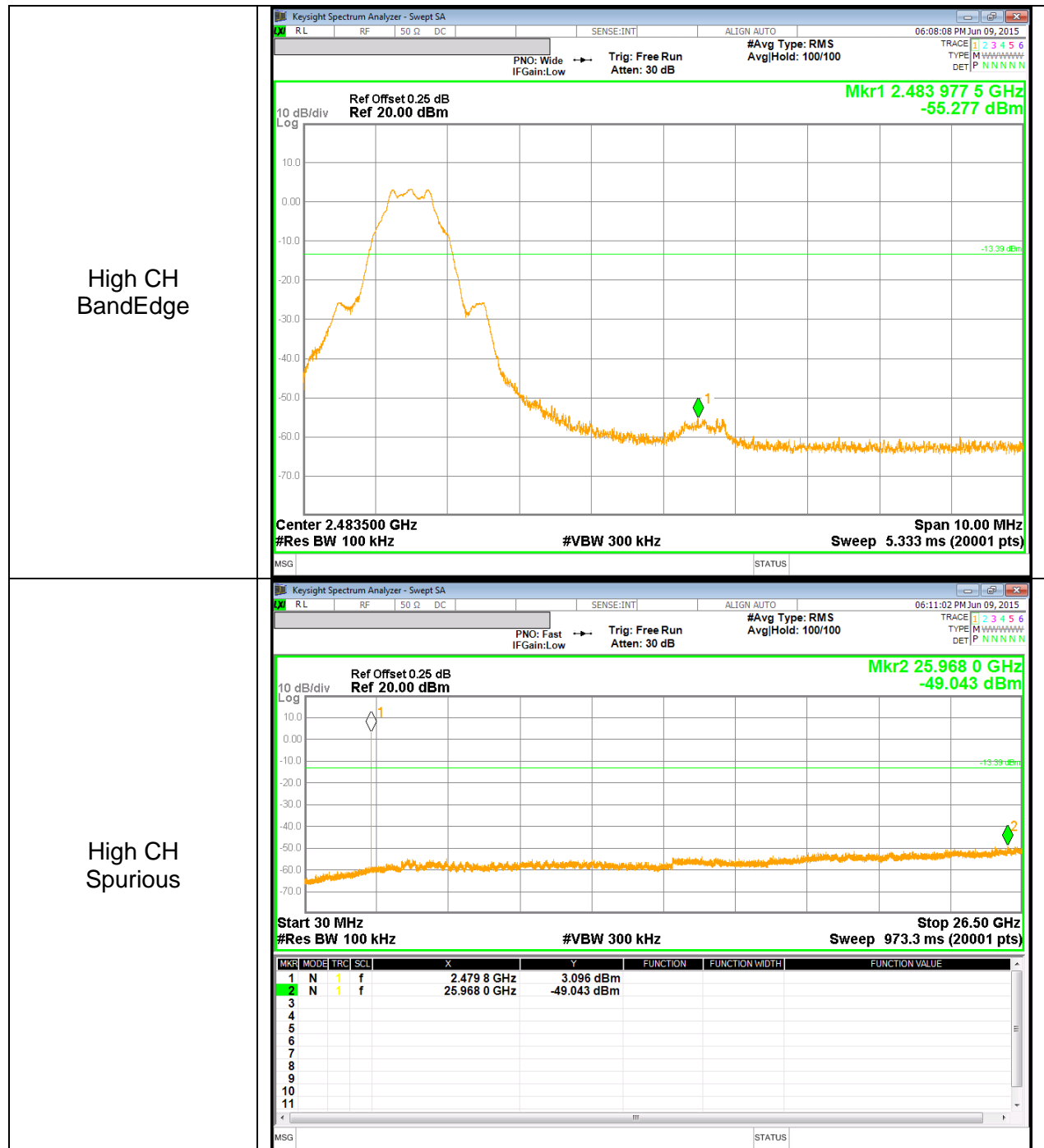
**BANDEDGE & SPURIOUS EMISSIONS, LOW CHANNEL**



**SPURIOUS EMISSIONS, MID CHANNEL**



**SPURIOUS EMISSIONS, HIGH CHANNEL**



## 11. RADIATED TEST RESULTS

### 11.1. 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.

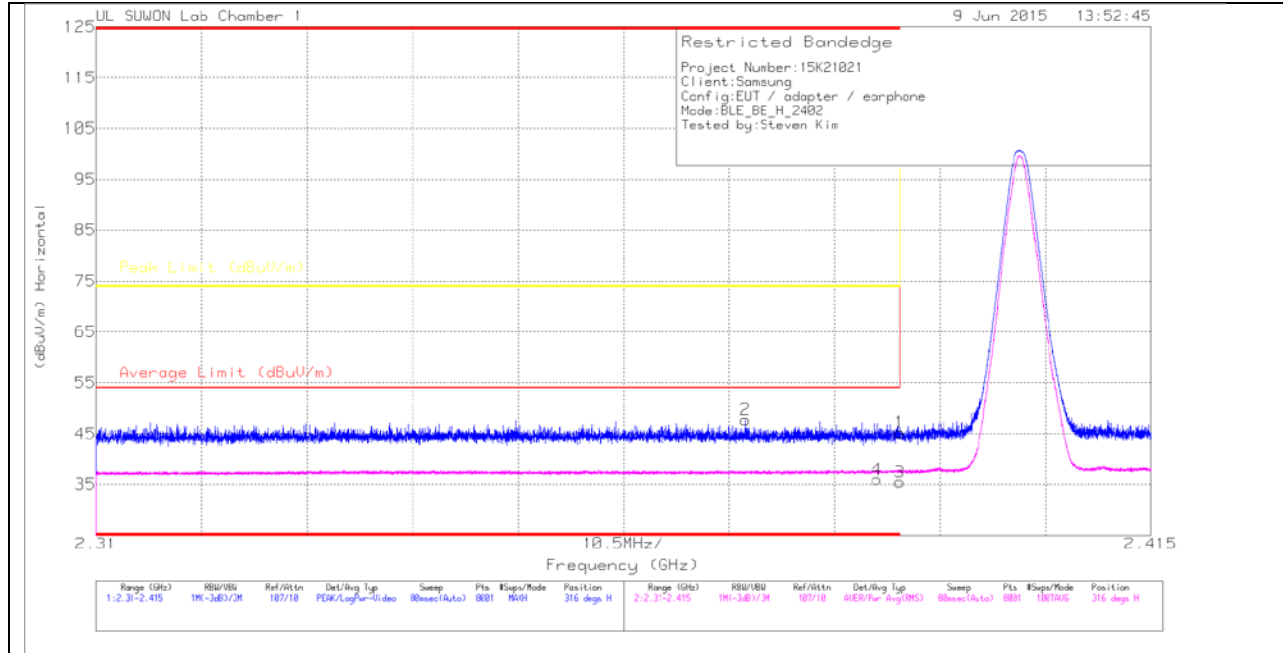
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and add duty cycle factor for average measurements. Duty cycle factor =  $10 \log(1/x)$ . For this sample: DCF =  $10\log(1/0.625)=2.06\text{dB}$  (Spectrum Analyzer round it up to 2.06dB)

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.

## 11.2. TRANSMITTER ABOVE 1 GHz RESTRICTED BANDEDGE (LOW CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

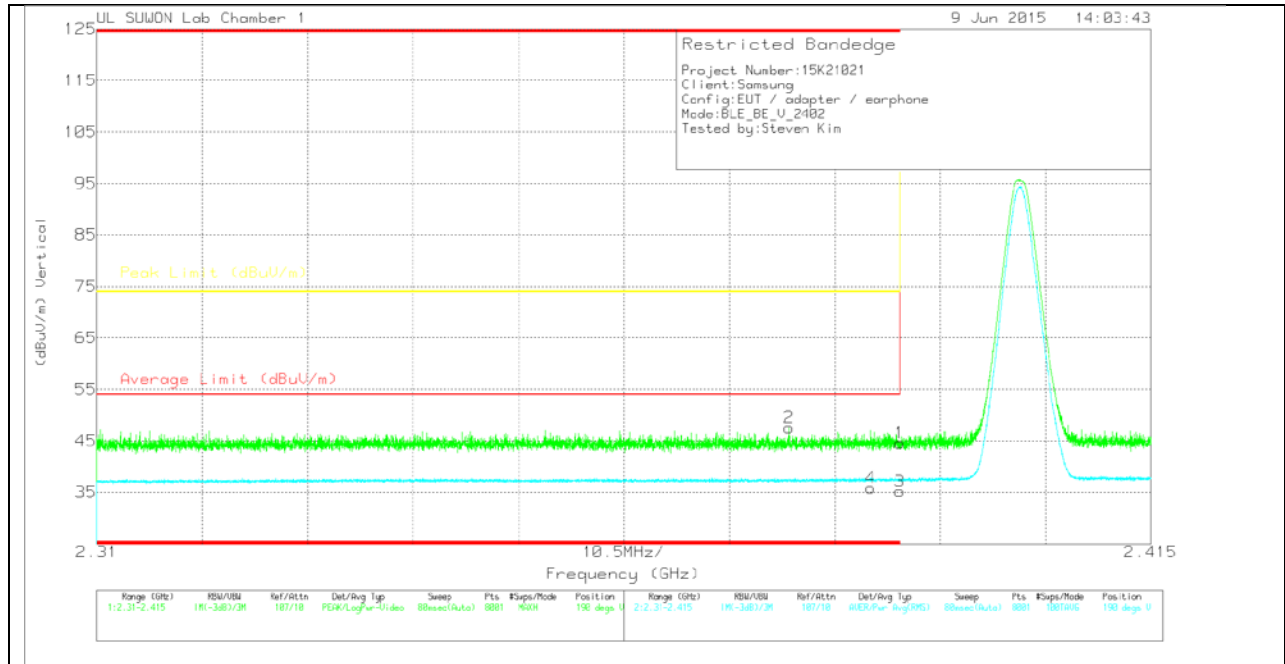
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10dB	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.16	Pk	27.9	-22.8	0	45.26	-	-	74	-28.74	316	100	H
2	* 2.375	42.74	Pk	27.8	-22.8	0	47.74	-	-	74	-26.26	316	100	H
3	* 2.39	30.38	RMS	27.9	-22.8	2.06	37.54	54	-16.46	-	-	316	100	H
4	* 2.388	30.86	RMS	27.9	-22.8	2.06	38.02	54	-15.98	-	-	316	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**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10dB	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	39.48	Pk	27.9	-22.8	0	44.58	-	-	74	-29.42	190	317	V
2	* 2.379	42.45	Pk	27.9	-22.8	0	47.55	-	-	74	-26.45	190	317	V
3	* 2.39	30.11	RMS	27.9	-22.8	2.06	37.27	54	-16.73	-	-	190	317	V
4	* 2.387	30.76	RMS	27.9	-22.8	2.06	37.92	54	-16.08	-	-	190	317	V

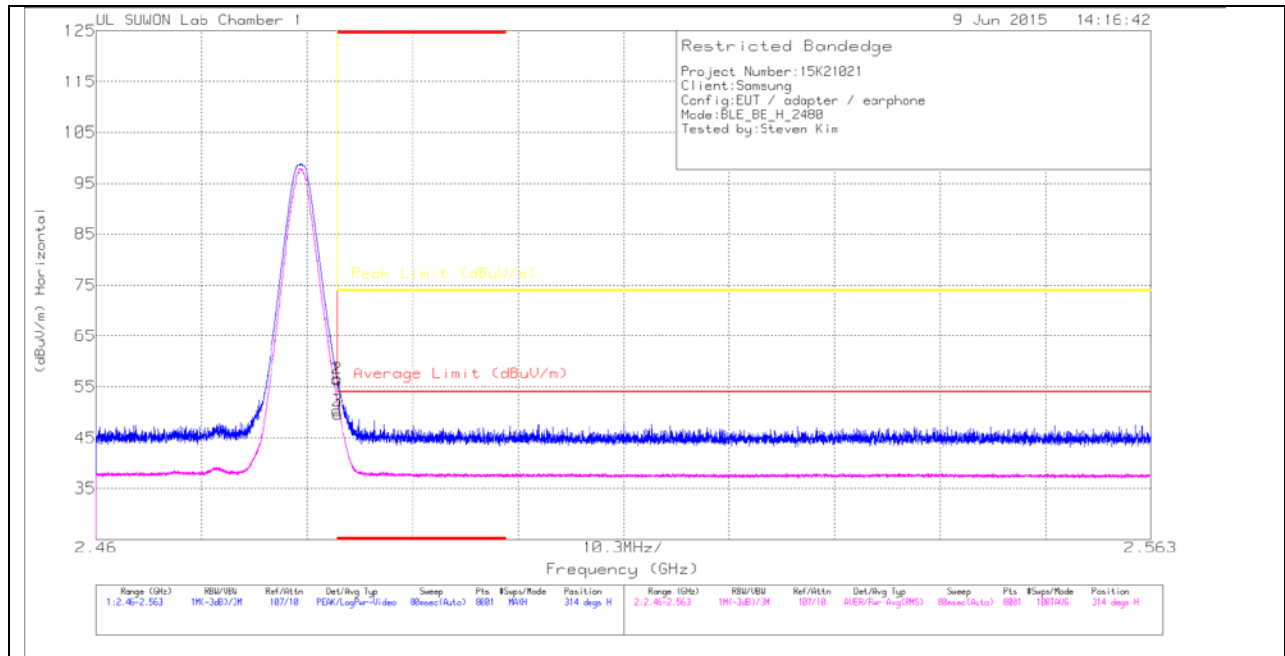
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

## AUTHORIZED BANDEDGE (HIGH CHANNEL)

### HORIZONTAL PEAK AND AVERAGE PLOT



### HORIZONTAL DATA

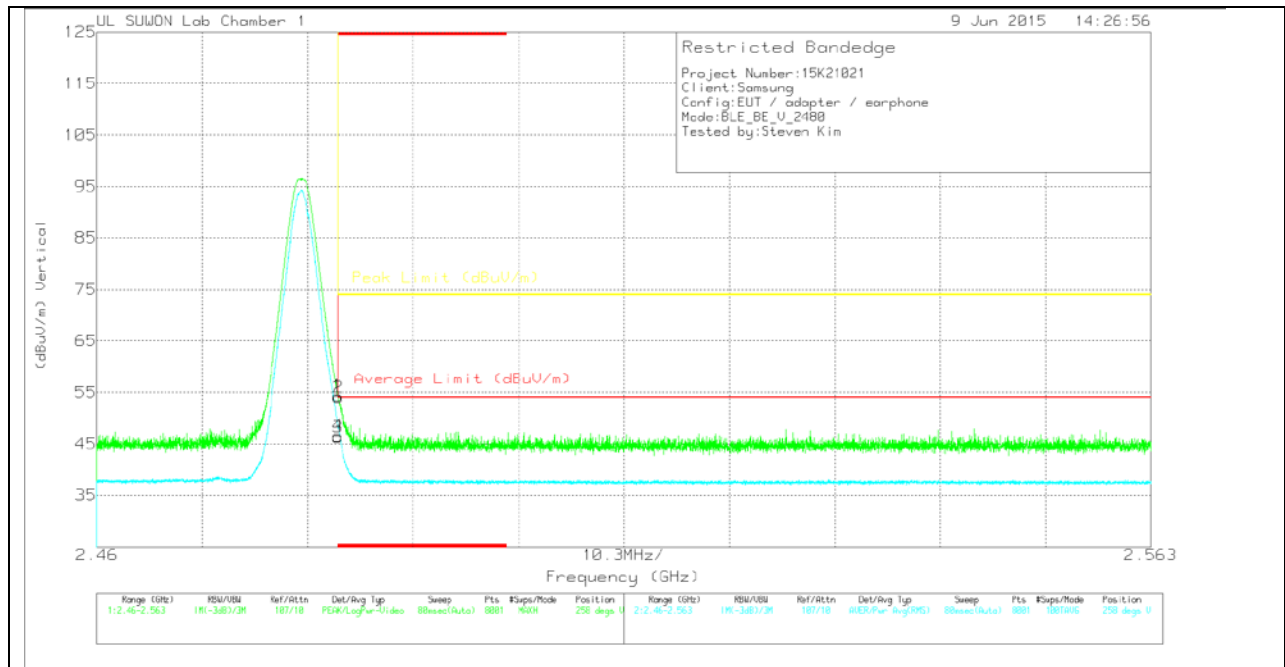
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10d B	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	51.05	Pk	27.9	-22.6	0	56.35	-	-	74	-17.65	314	100	H
2	* 2.484	51.34	Pk	27.9	-22.6	0	56.64	-	-	74	-17.36	314	100	H
3	* 2.484	45	RMS	27.9	-22.6	2.06	52.36	54	-1.64	-	-	314	100	H
4	* 2.484	44.3	RMS	27.9	-22.6	2.06	51.66	54	-2.34	-	-	314	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**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_2_10dB	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	49.02	Pk	27.9	-22.6	0	54.32	-	-	74	-19.68	258	360	V
2	* 2.484	48.71	Pk	27.9	-22.6	0	54.01	-	-	74	-19.99	258	360	V
3	* 2.484	41.01	RMS	27.9	-22.6	2.06	48.37	54	-5.63	-	-	258	360	V
4	* 2.484	41.24	RMS	27.9	-22.6	2.06	48.6	54	-5.4	-	-	258	360	V

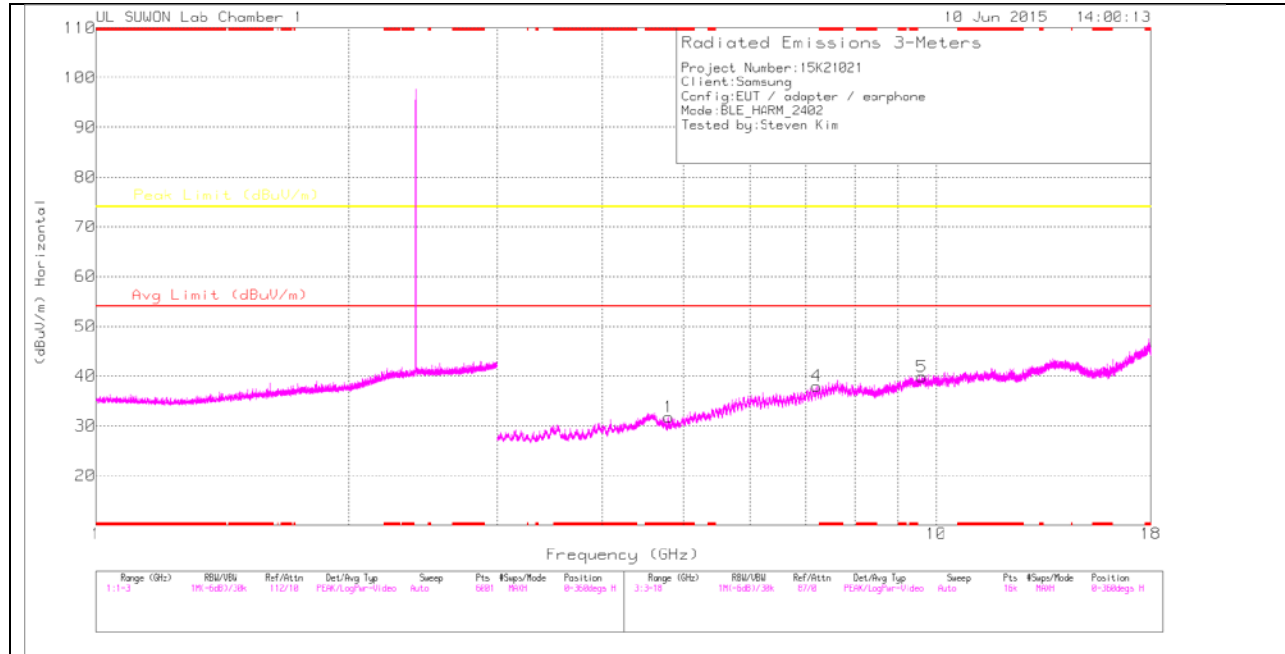
\* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

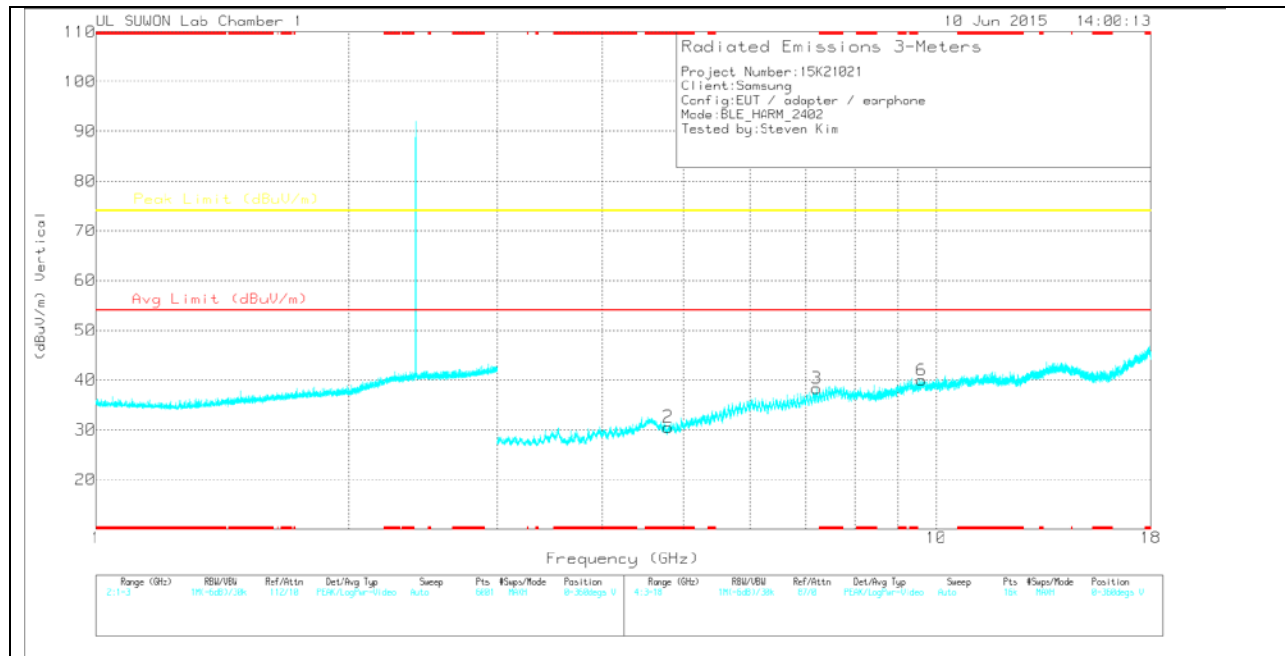
RMS - RMS detection

**HARMONICS AND SPURIOUS EMISSIONS**

**LOW CHANNEL HORIZONTAL**



**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	Path_3_3GHP	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	* 4.808	29.62	PK	31.9	-29.8	0	31.72	-	-	74	-42.28	0-360	100	H
4	7.201	26.44	PK	36.9	-25.4	0	37.94	-	-	-	-	0-360	100	H
5	9.615	23.16	PK	37.7	-21	0	39.86	-	-	-	-	0-360	200	H
2	* 4.8	28.56	PK	31.9	-29.9	0	30.56	-	-	74	-43.44	0-360	100	V
3	7.203	26.87	PK	36.9	-25.4	0	38.37	-	-	-	-	0-360	100	V
6	9.612	23.28	PK	37.7	-21	0	39.98	-	-	-	-	0-360	200	V

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

PK – Peak detector

#### Radiated Emissions

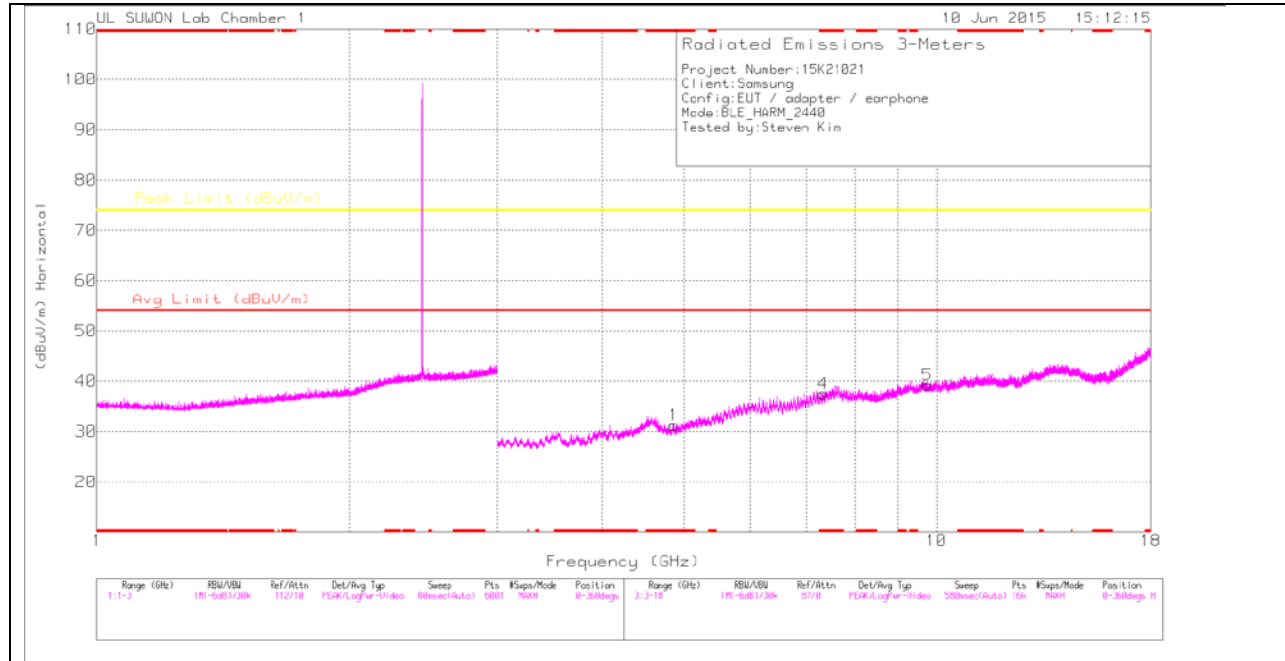
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.807	39.48	PK2	31.9	-29.8	0	41.58	-	-	74	-32.42	117	138	H
* 4.807	26.87	MAv1	31.9	-29.8	2.06	31.03	54	-22.97	-	-	117	138	H
7.2	36.29	PK2	36.9	-25.4	0	47.79	-	-	-	-	243	102	H
7.201	24.44	MAv1	36.9	-25.4	2.06	38	-	-	-	-	243	102	H
9.614	33.67	PK2	37.7	-21	0	50.37	-	-	-	-	298	151	H
9.613	21.15	MAv1	37.7	-21	2.06	39.91	-	-	-	-	298	151	H
* 4.799	40.55	PK2	31.9	-29.9	0	42.55	-	-	74	-31.45	315	250	V
* 4.8	27.2	MAv1	31.9	-29.9	2.06	31.26	54	-22.74	-	-	315	250	V
7.204	36.89	PK2	37	-25.4	0	48.49	-	-	-	-	76	335	V
7.201	24.08	MAv1	36.9	-25.4	2.06	37.64	-	-	-	-	76	335	V
9.611	33.94	PK2	37.7	-21	0	50.64	-	-	-	-	298	200	V
9.613	19.92	MAv1	37.7	-21	2.06	38.68	-	-	-	-	298	200	V

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

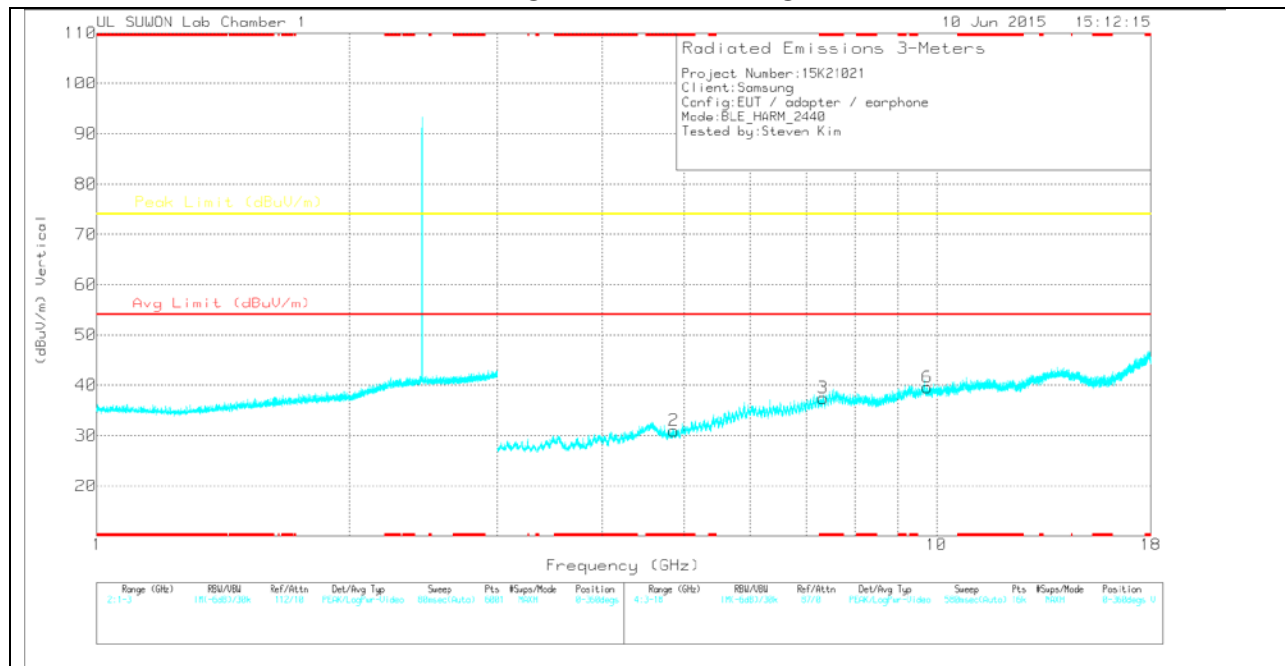
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### MID CHANNEL HORIZONTAL



### 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	Path_3_3GHP	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	* 4.867	28.44	PK	32	-29.2	0	31.24	-	-	74	-42.76	0-360	100	H
4	* 7.324	25.87	PK	37.2	-25.6	0	37.47	-	-	74	-36.53	0-360	200	H
5	9.748	23.55	PK	37.6	-21.9	0	39.25	-	-	-	-	0-360	100	H
2	* 4.87	28.15	PK	32	-29.2	0	30.95	-	-	74	-43.05	0-360	200	V
3	* 7.326	25.85	PK	37.2	-25.6	0	37.45	-	-	74	-36.55	0-360	100	V
6	9.753	23.98	PK	37.6	-22	0	39.58	-	-	-	-	0-360	100	V

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

PK – Peak detector

**Radiated Emissions**

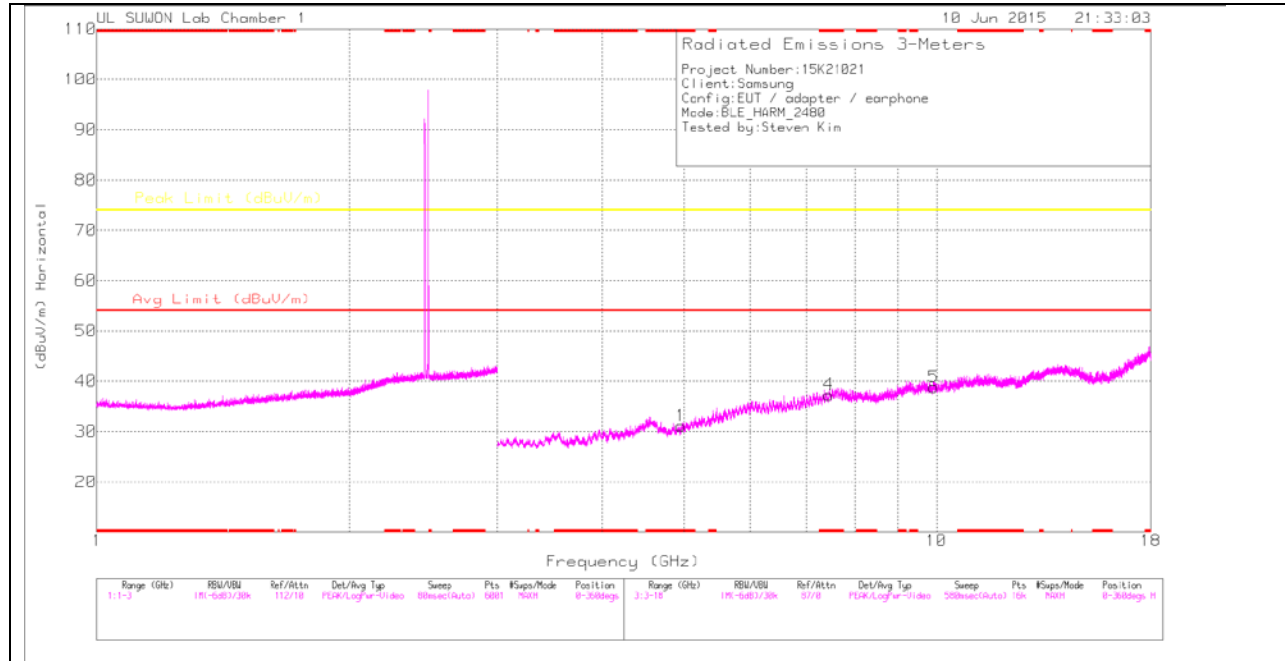
Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.867	39.16	PK2	32	-29.2	0	41.96	-	-	74	-32.04	115	376	H
* 4.869	26.31	MAv1	32	-29.2	0	29.11	54	-24.89	-	-	115	376	H
* 7.325	36.85	PK2	37.2	-25.6	0	48.45	-	-	74	-25.55	220	195	H
* 7.325	24.37	MAv1	37.2	-25.6	2.06	38.03	54	-15.97	-	-	220	195	H
9.748	33.55	PK2	37.6	-21.9	0	49.25	-	-	-	-	22	234	H
9.746	21.45	MAv1	37.6	-21.9	0	37.15	-	-	-	-	22	234	H
* 4.869	38.76	PK2	32	-29.2	0	41.56	-	-	74	-32.44	166	270	V
* 4.868	26.62	MAv1	32	-29.2	0	29.42	54	-24.58	-	-	166	270	V
* 7.327	37.03	PK2	37.2	-25.6	0	48.63	-	-	74	-25.37	136	312	V
* 7.328	24.54	MAv1	37.2	-25.6	2.06	38.2	54	-15.8	-	-	136	312	V
9.752	33.43	PK2	37.6	-22	0	49.03	-	-	-	-	219	291	V
9.753	21.42	MAv1	37.6	-22	2.06	39.08	-	-	-	-	219	291	V

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

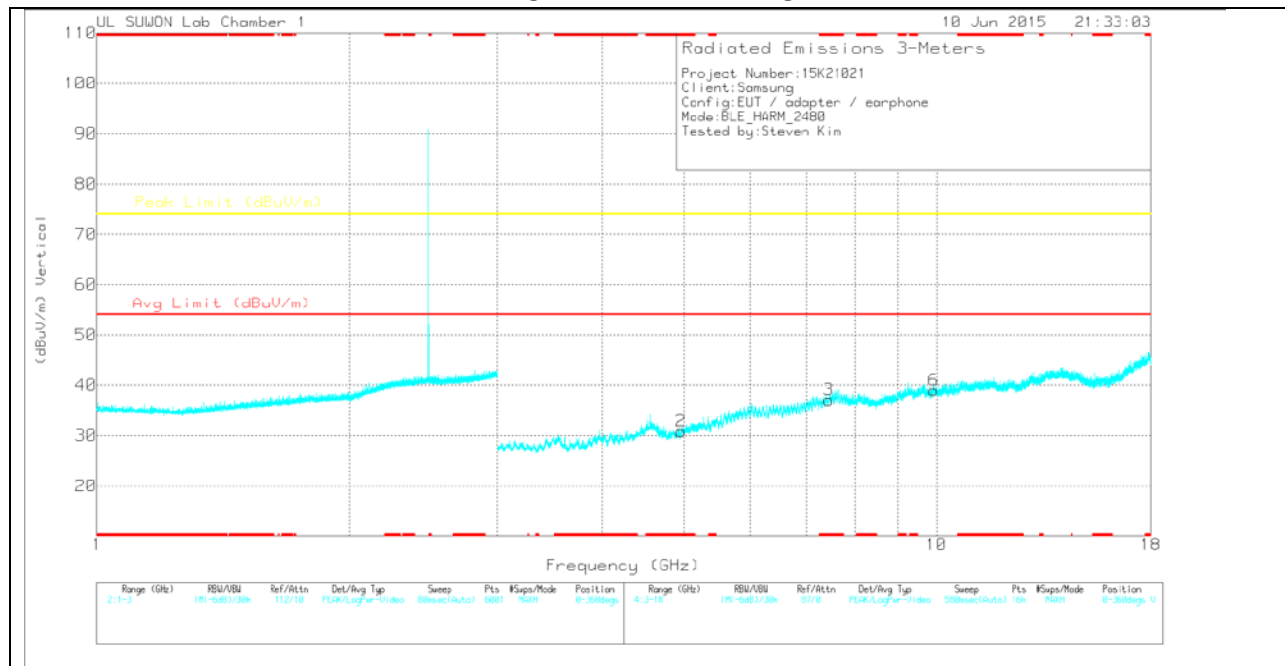
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### HIGH CHANNEL HORIZONTAL



### 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	Path_3_3GHP	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	* 4.958	27.89	PK	32.1	-28.9	0	31.09	-	-	74	-42.91	0-360	200	H
4	* 7.439	24.8	PK	37.3	-24.8	0	37.3	-	-	74	-36.7	0-360	100	H
5	9.92	21.33	PK	37.9	-20.4	0	38.83	-	-	-	-	0-360	100	H
2	* 4.96	27.63	PK	32.1	-28.9	0	30.83	-	-	74	-43.17	0-360	200	V
3	* 7.439	24.58	PK	37.3	-24.8	0	37.08	-	-	74	-36.92	0-360	100	V
6	9.919	21.5	PK	37.9	-20.4	0	39	-	-	-	-	0-360	200	V

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

PK – PK detector

#### Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3115D Factor	Path_3_3 GHP	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96	38.01	PK2	32.1	-28.9	0	41.21	-	-	74	-32.79	357	183	H
* 4.958	27.34	MAv1	32.1	-28.9	2.06	32.6	54	-21.4	-	-	357	183	H
* 7.438	35.92	PK2	37.3	-24.8	0	48.42	-	-	74	-25.58	122	153	H
* 7.44	25.36	MAv1	37.3	-24.8	2.06	39.92	54	-14.08	-	-	122	153	H
9.922	32.79	PK2	37.9	-20.4	0	50.29	-	-	-	-	85	105	H
9.919	19.21	MAv1	37.9	-20.4	2.06	38.77	-	-	-	-	85	105	H
* 4.961	38.21	PK2	32.1	-28.9	0	41.41	-	-	74	-32.59	167	188	V
* 4.962	22.87	MAv1	32.1	-28.9	2.06	28.13	54	-25.87	-	-	167	188	V
* 7.439	35.85	PK2	37.3	-24.8	0	48.35	-	-	74	-25.65	37	144	V
* 7.439	23.99	MAv1	37.3	-24.8	2.06	38.55	54	-15.45	-	-	37	144	V
9.918	32.88	PK2	37.9	-20.4	0	50.38	-	-	-	-	2	207	V
9.921	20.01	MAv1	37.9	-20.4	2.06	39.57	-	-	-	-	2	207	V

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

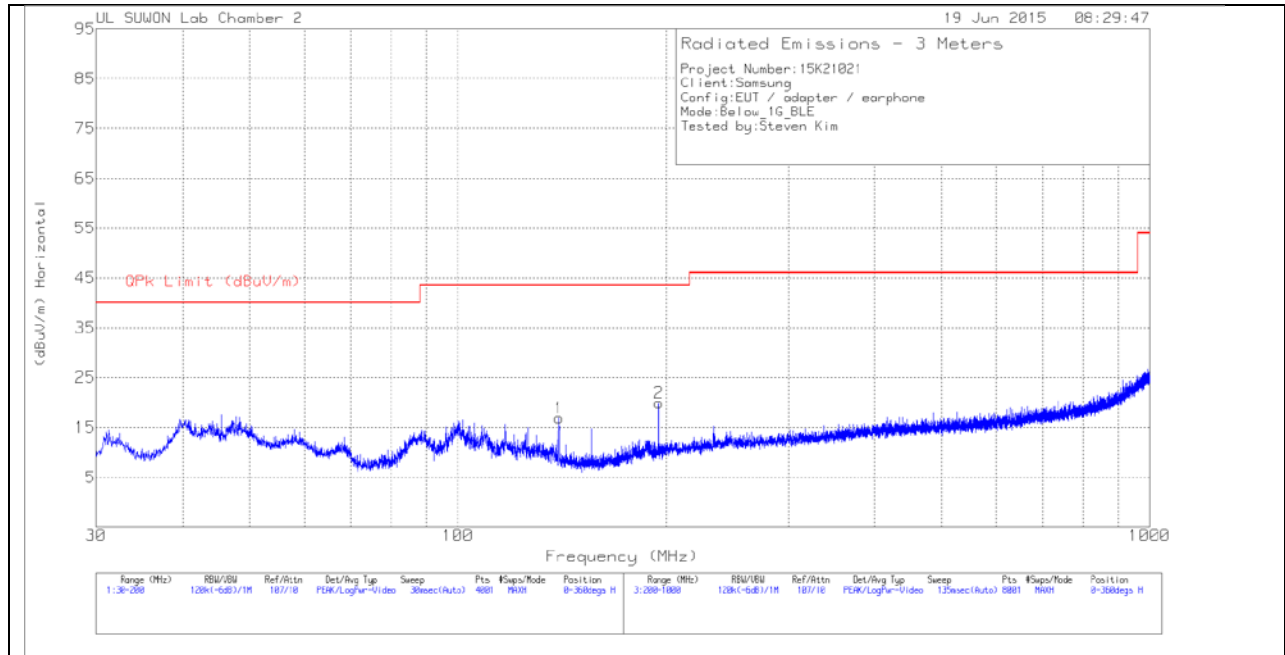
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

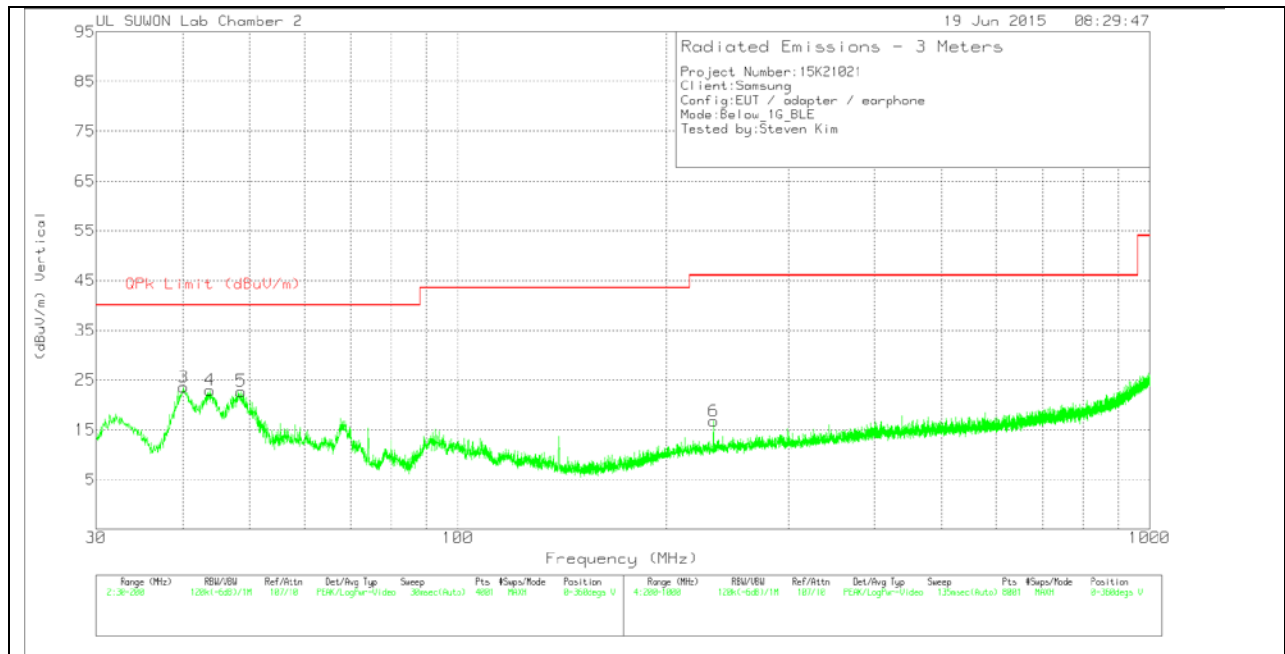
### 11.3. WORST-CASE BELOW 1 GHz

#### 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	VULB9163-749	Below_1G	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	140.1175	39.32	Pk	8	-30.4	16.92	43.52	-26.6	0-360	200	H
2	195.0275	39.37	Pk	10.9	-30.3	19.97	43.52	-23.55	0-360	100	H
3	40.0725	41.69	Pk	12.7	-30.8	23.59	40	-16.41	0-360	100	V
4	43.8125	40.06	Pk	13.6	-30.7	22.96	40	-17.04	0-360	100	V
5	48.5725	39.57	Pk	14	-30.8	22.77	40	-17.23	0-360	200	V
6	234	34.84	Pk	12.1	-30.2	16.74	46.02	-29.28	0-360	200	V

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

Pk - Peak detector

## 12. 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.

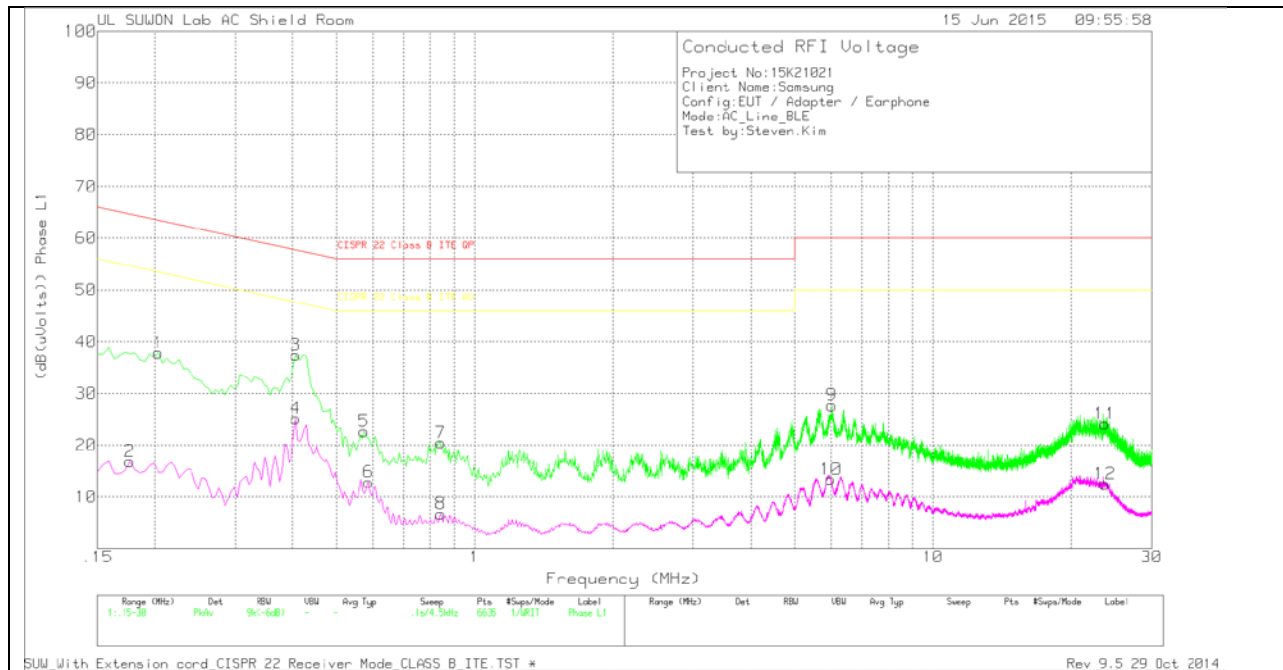
### TEST PROCEDURE

ANSI C63.4 - 2009

**RESULTS**

**6 WORST EMISSIONS**

**LINE 1 PLOT**



**LINE 1 RESULTS**

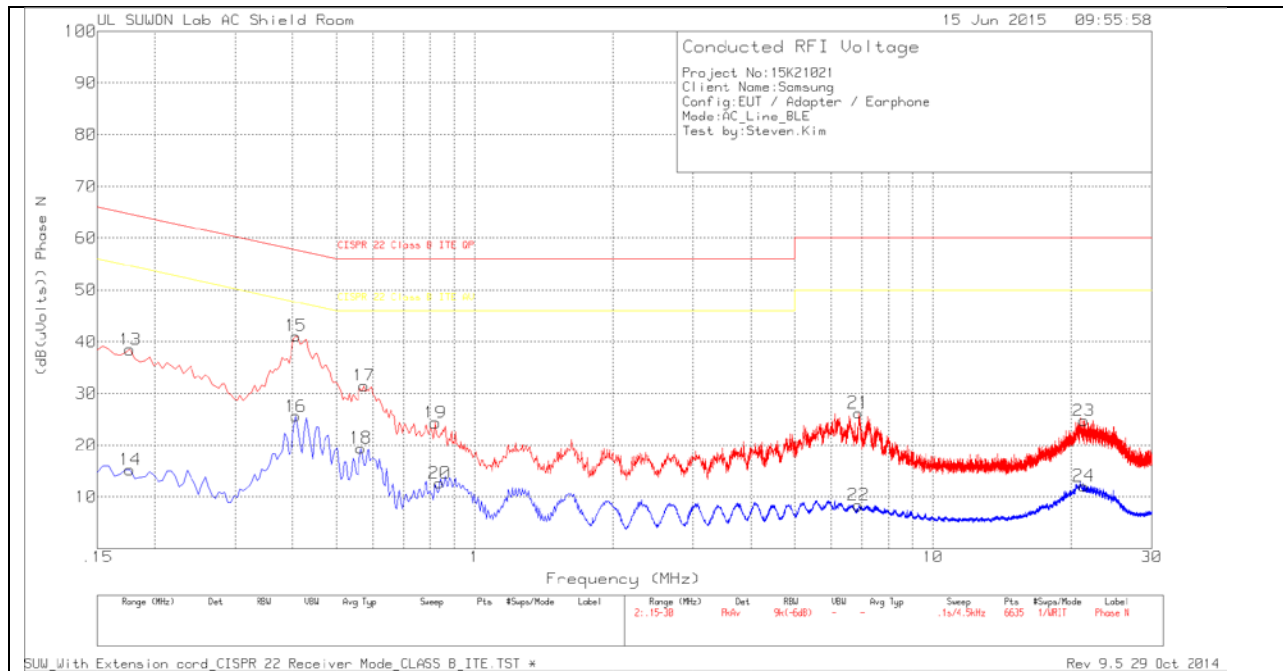
Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex-cord_L1	CE Shield Room	Corrected Reading (dBuV)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
1	.204	27.95	Pk	9.9	0	37.85	63.45	-25.6	-	-
2	.177	6.66	Av	10.2	0	16.86	-	-	54.63	-37.77
3	.4065	27.34	Pk	10.1	0	37.44	57.72	-20.28	-	-
4	.4065	15.06	Av	10.1	0	25.16	-	-	47.72	-22.56
5	.573	12.55	Pk	10.1	0	22.65	56	-33.35	-	-
6	.5865	2.78	Av	10.1	0	12.88	-	-	46	-33.12
7	.843	10.59	Pk	9.9	0	20.49	56	-35.51	-	-
8	.843	-3.12	Av	9.9	0	6.78	-	-	46	-39.22
9	6.018	17.85	Pk	9.8	.1	27.75	60	-32.25	-	-
10	5.9865	3.52	Av	9.8	.1	13.42	-	-	50	-36.58
11	23.73	13.46	Pk	10.5	.2	24.16	60	-35.84	-	-
12	23.7345	1.84	Av	10.5	.2	12.54	-	-	50	-37.46

Pk - Peak detector

Av - Average detection

### LINE 2 PLOT



### LINE 2 RESULTS

Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_w ith ex-cord_N	CE Shield Room	Corrected Reading (dBuV)	CISPR 22 Class B ITE QP	Margin (dB)	CISPR 22 Class B ITE AV	Margin (dB)
13	.177	28.37	Pk	10.1	0	38.47	64.63	-26.16	-	-
14	.177	5.14	Av	10.1	0	15.24	-	-	54.63	-39.39
15	.4065	31.02	Pk	10.1	0	41.12	57.72	-16.6	-	-
16	.4065	15.49	Av	10.1	0	25.59	-	-	47.72	-22.13
17	.573	21.4	Pk	10.1	0	31.5	56	-24.5	-	-
18	.564	9.33	Av	10.1	0	19.43	-	-	46	-26.57
19	.8205	14.44	Pk	9.9	0	24.34	56	-31.66	-	-
20	.8385	2.79	Av	9.9	0	12.69	-	-	46	-33.31
21	6.8775	16.26	Pk	9.9	.1	26.26	60	-33.74	-	-
22	6.8775	-1.6	Av	9.9	.1	8.4	-	-	50	-41.6
23	21.345	13.93	Pk	10.6	.2	24.73	60	-35.27	-	-
24	21.345	1.34	Av	10.6	.2	12.14	-	-	50	-37.86

Pk - Peak detector

Av - Average detection