



**FCC CFR47 PART 15 SUBPART C**

**Bluetooth Low Energy**

**CERTIFICATION TEST REPORT**

**FOR**

**WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac**

**MODEL NUMBER : SM-W737N0**

**FCC ID: A3LSMW737N0**

**REPORT NUMBER: 4788556585-E2V2**

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**ACCREDITED\***

Testing  
Laboratory

**TL-637**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	09/04/18	Initial issue	Hoonpyo Lee
V2	09/06/18	Updated to address TCB's question	Hoonpyo Lee

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac  
**MODEL NUMBER:** SM-W737N0  
**SERIAL NUMBER:** BBMGR34K500613H (RADIATED);  
BBMGR34K50061VZ (CONDUCTED)  
**DATE TESTED:** JUL 18, 2018 - AUG 16, 2018

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 JUN 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  
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Tested By:



Hoonpyo Lee  
Suwon Lab Engineer  
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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05.
4. ANSI C63.10-2013.

## 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, 16675, 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 type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2
<input type="checkbox"/>	Chamber 3

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	3.86 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 WCDMA/LTE Tablet + BT/BLE and DTS/UNII a/b/g/n/ac.  
 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	1.742	1.49
		Average	1.339	1.36

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal antenna, with a maximum gain of -0.5 dBi.

### 5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. 1Mbps, 2Mbps Output Power are all investigated, the 1Mbps power is the worst case. All tests were performed in 1Mbps.

Radiated emission above 1GHz was performed with the EUT set to transmit low/mid/high channels.

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.

The fundamental level of the EUT was investigated on the condition of equipped with keyboard configuration also, but stand-alone configuration is more worse. So only below 1GHz and AC line conducted test were performed on the condition of equipped with keyboard configuration.

Note : All radiated and power line conducted tests were performed connected with earphone and charger for evaluation of worst case mode.



## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Charger	SAMSUNG	EP-TA300	R37K3AD0AC3SE3
Data Cable	SAMSUNG	EP-DW720CWE	N/A
Earphone	SAMSUNG	EO-EG920BW	N/A
keyboard	SAMSUNG	EJ-CW730	N/A

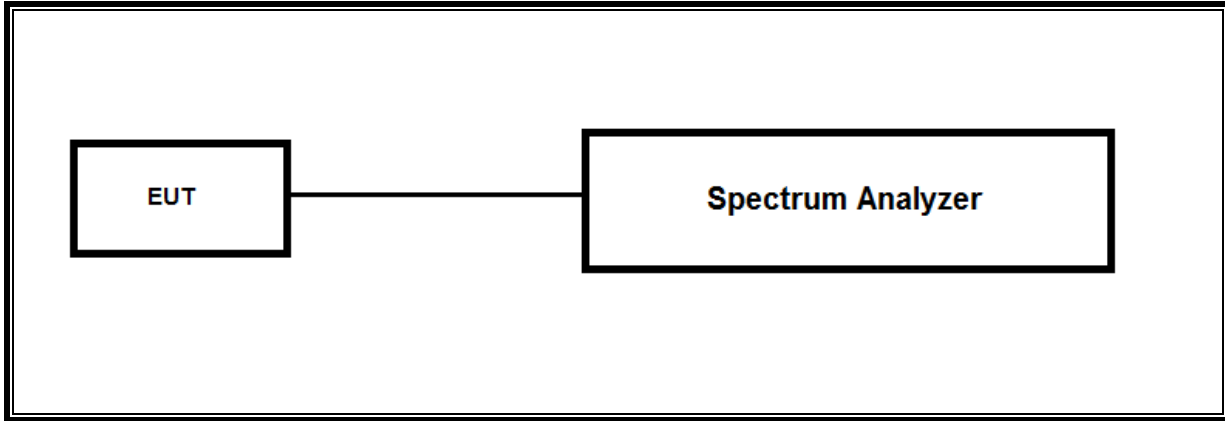
### I/O CABLES

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	2	Mini-Jack	Unshielded	1.2m	N/A

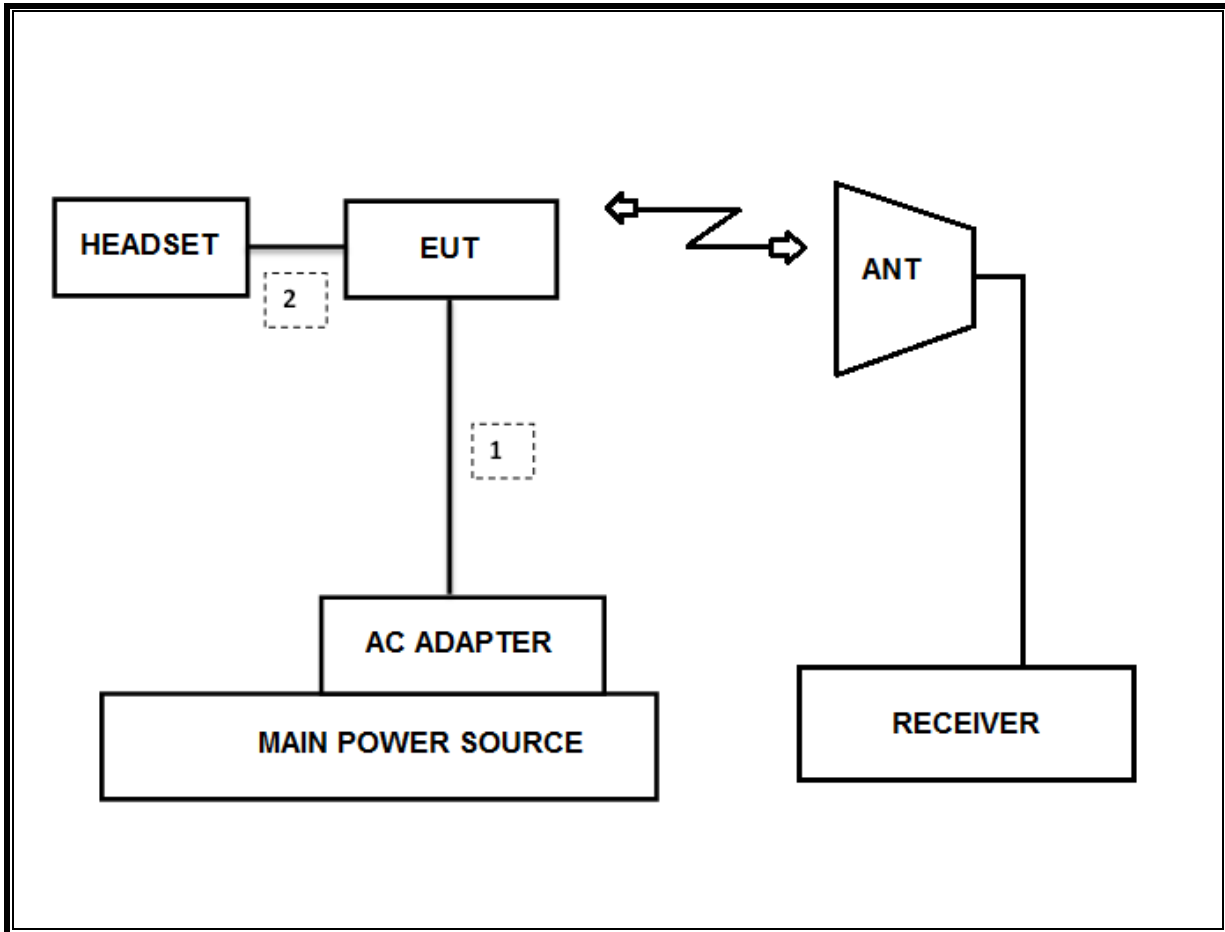
### TEST SETUP

The EUT is a stand-alone unit during the tests.  
 Test software in hidden menu exercised the EUT to enable BLE mode.

**SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)**



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 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	Old Cal Due	New Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	08-31-19	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	09-14-19	08-04-20
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	08-31-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18	08-04-20
Antenna, Horn, 18 GHz	ETS	3115	00161451	03-10-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168724	05-31-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00168717	05-31-19	08-04-20
Antenna, Horn, 18 GHz	ETS	3117	00205959	11-29-18	08-04-20
Antenna, Horn, 40 GHz	ETS	3116C	00166155	12-04-19	12-04-19
Antenna, Horn, 40 GHz	ETS	3116C	00168645	12-04-19	08-09-19
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	11-13-19	08-07-19
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18	08-07-19
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18	08-06-19
Preamplifier, 1000 MHz	Sonoma	310N	370599	08-10-18	08-07-19
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	08-08-18	08-07-19
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-08-18	08-07-19
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	08-11-18	08-07-19
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	08-08-18	08-06-19
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18	08-06-19
Average Power Sensor	Agilent / HP	U2000	MY54270007	08-08-18	08-07-19
Attenuator	PASTERNAK	PE7087-10	A001	08-08-18	08-08-19
Attenuator	PASTERNAK	PE7087-10	A008	08-08-18	08-08-19
Attenuator	PASTERNAK	PE7087-10	2	08-10-18	08-07-19
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18	08-06-19
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18	08-06-19
EMI Test Receive, 44 GHz	R&S	ESW44	101590	08-09-18	08-06-19
EMI Test Receive, 3 GHz	R&S	ESR3	101832	08-07-18	08-06-19
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	08-08-18	08-07-19
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	08-08-18	08-07-19
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	08-11-18	08-06-19
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	08-08-18	08-07-19
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	08-08-18	08-07-19
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	08-11-18	08-06-19
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	08-08-18	08-07-19
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	08-08-18	08-07-19
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	08-11-18	08-06-19
LISN	R&S	ENV-216	101837	08-09-18	08-09-19
UL Software					
Description	Manufacturer	Model	Version		
Radiated software	UL	UL EMC	Ver 9.5		
AC Line Conducted software	UL	UL EMC	Ver 9.5		

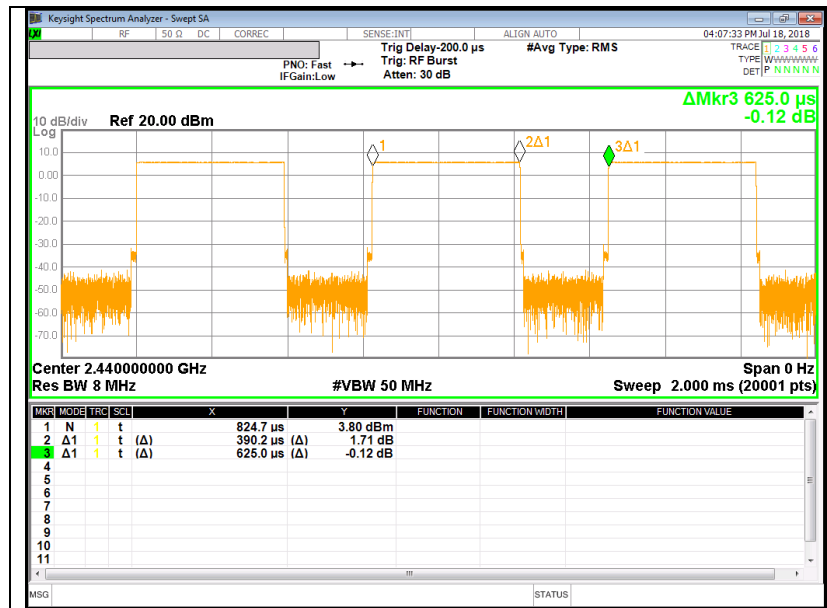
## 7. REFERENCE MEASUREMENT RESULTS

### 7.1. ON TIME AND DUTY CYCLE RESULTS

#### LIMITS

None: for reporting purposes only.

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	0.390	0.625	0.624	62.4%	2.05	2.564



## 7.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

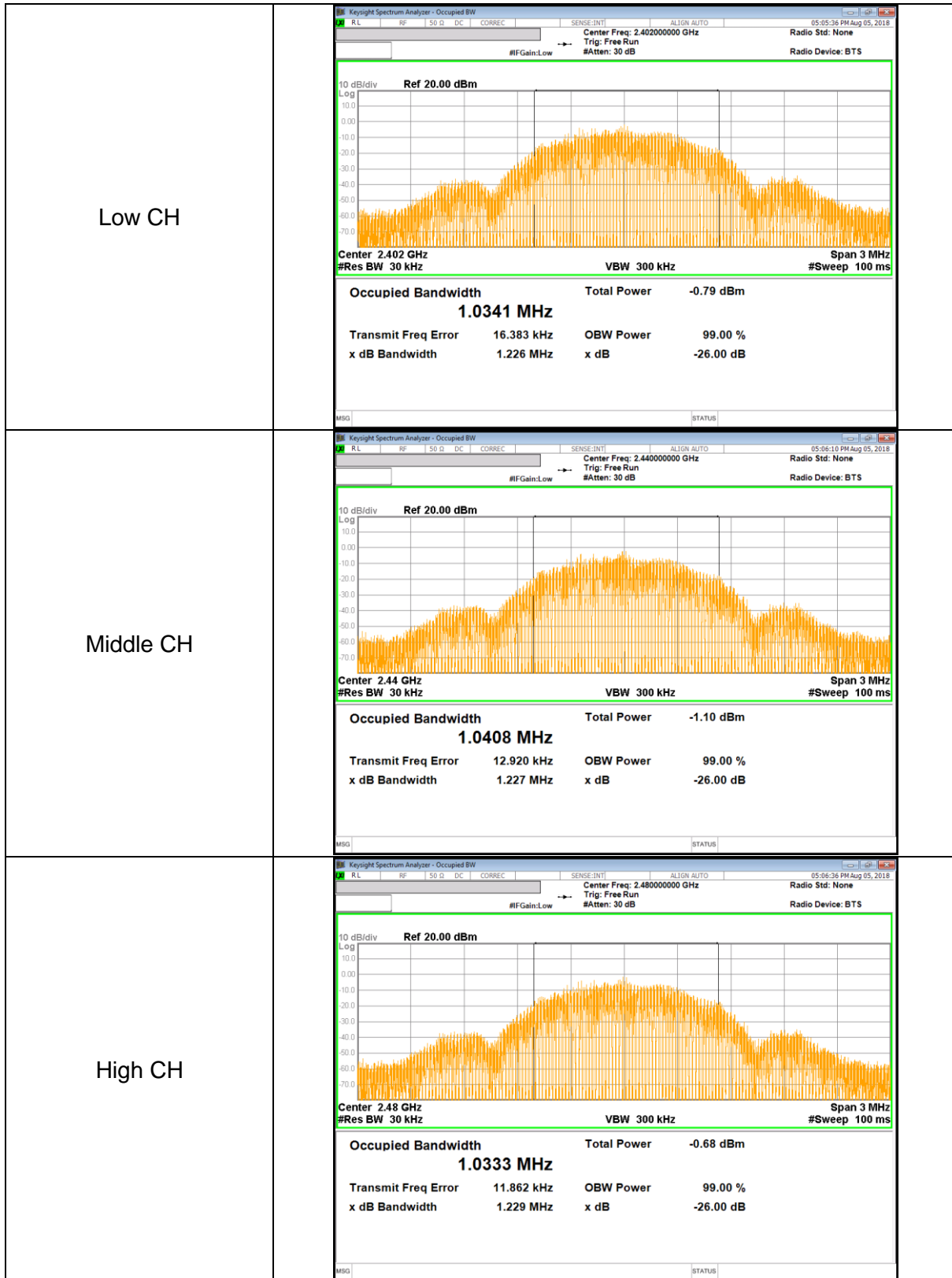
### TEST PROCEDURE

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  $\geq 3$  times the RBW. The spectrum analyzer internal 99% bandwidth function is utilized.

### RESULTS

Channel	Frequency [MHz]	99% Bandwidth [MHz]
Low	2402	1.034
Mid	2440	1.041
High	2480	1.033
Worst		1.041

**99% BANDWIDTH PLOTS**



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## 8. MEASUREMENT METHODS

6 dB BW : KDB 558074 D01 v05, Section 8.2.

OUTPUT POWER : KDB 558074 D01 v05, Section 8.3.2.3

POWER SPECTRAL DENSITY : KDB 558074 D01 v05, Section 8.4.

Out-of-band EMISSIONS (Conducted) : KDB 558074 D01 v05, Section 8.5.

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: KDB 558074 D01 v05, Section 8.5.

Out-of-band EMISSIONS IN RESTRICTED BANDS : KDB 558074 D01 v05, Section 8.6.

AC Power Line Conducted Emission : ANSI C63.10-2013, Section 6.2.

## 9. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Band width (6dB)	>500KHz	Conducted	Pass
2.1051, 15.247 (d)	Band Edge / Conducted Spurious Emission	-20dBc		Pass
15.247 (b)(3)	TX conducted output power	<30dBm		Pass
15.247 (e)	PSD	<8dBm		Pass
15.207 (a)	AC Power Line conducted emissions	Section 10	Power Line conducted	Pass
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	Pass



## 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.

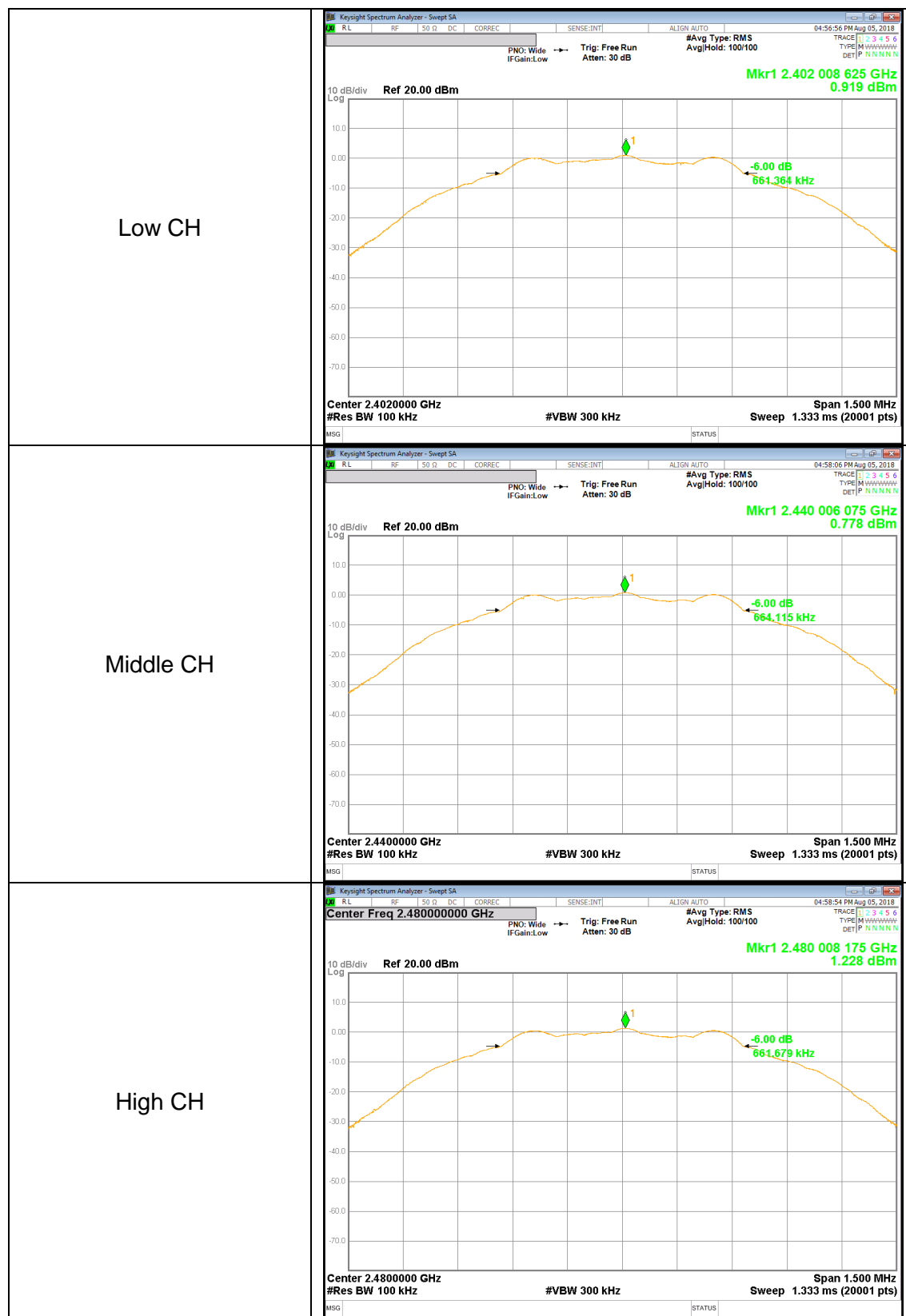
#### TEST PROCEDURE

Reference to KDB 558074 D01 15.247 Meas Guidance v05: The transmitter output is connected to a spectrum analyzer with the RBW set to 100kHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

#### RESULTS

Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
Low	2402	661.36	500.0
Mid	2440	664.12	500.0
High	2480	661.68	500.0
Worst		661.36	500.0

**6 dB BANDWIDTH PLOTS**



## 10.2. 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 15.247 Meas Guidance v05 under section 9.1.1 utilizing spectrum analyzer.

### RESULTS

#### - 1Mbps

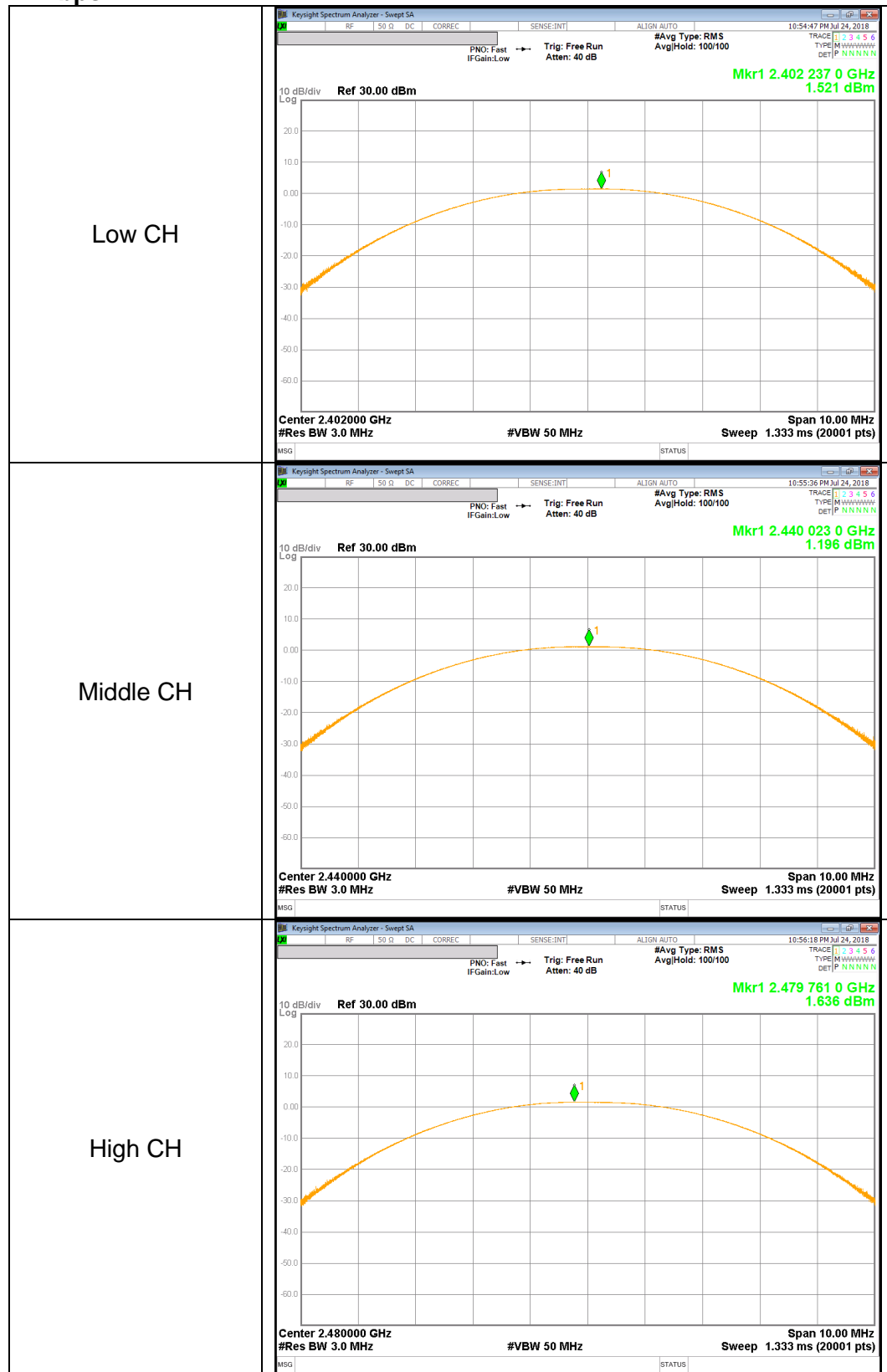
Channel	Frequency [MHz]	Peak Power Reading [dBm]	Limit [dBm]	Margin [dB]
Low	2402	1.521	30.000	-28.479
Mid	2440	1.196	30.000	-28.804
High	2480	1.636	30.000	-28.364
Worst		1.636	30.000	-28.364

#### - 2Mbps

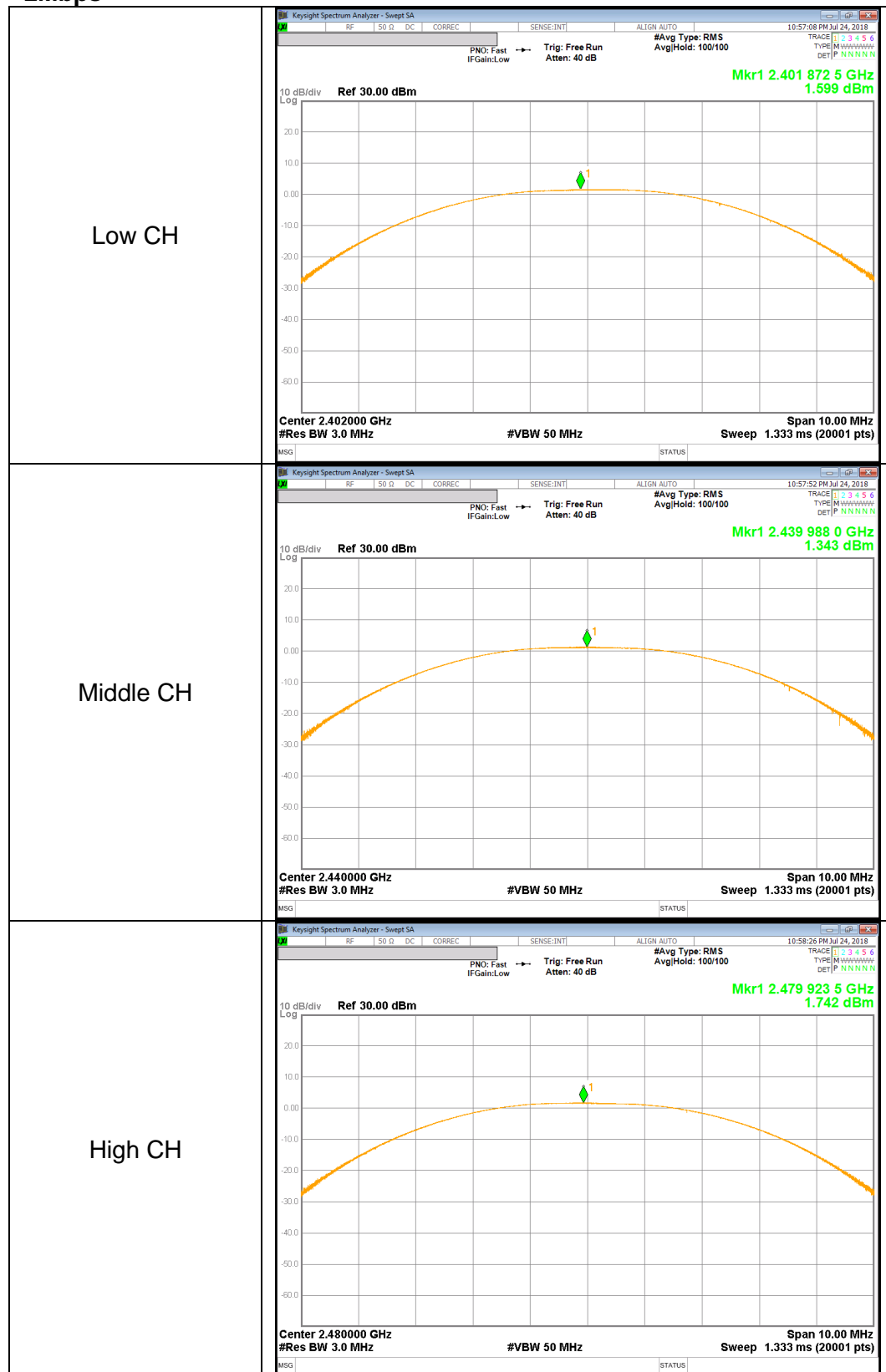
Channel	Frequency [MHz]	Peak Power Reading [dBm]	Limit [dBm]	Margin [dB]
Low	2402	1.599	30.000	-28.401
Mid	2440	1.343	30.000	-28.657
High	2480	1.742	30.000	-28.258
Worst		1.742	30.000	-28.258

**OUTPUT POWER PLOTS**

- 1Mbps



- 2Mbps



### 10.3. 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 was entered as an offset in the power meter to allow for direct reading of power.

##### - 1Mbps

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2402	1.236	1.329
Middle	2440	0.899	1.230
High	2480	1.339	1.361

##### - 2Mbps

Channel	Frequency [MHz]	AV power [dBm]	AV power [mW]
Low	2402	1.014	1.263
Middle	2440	0.682	1.170
High	2480	1.137	1.299

## 10.4. 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.

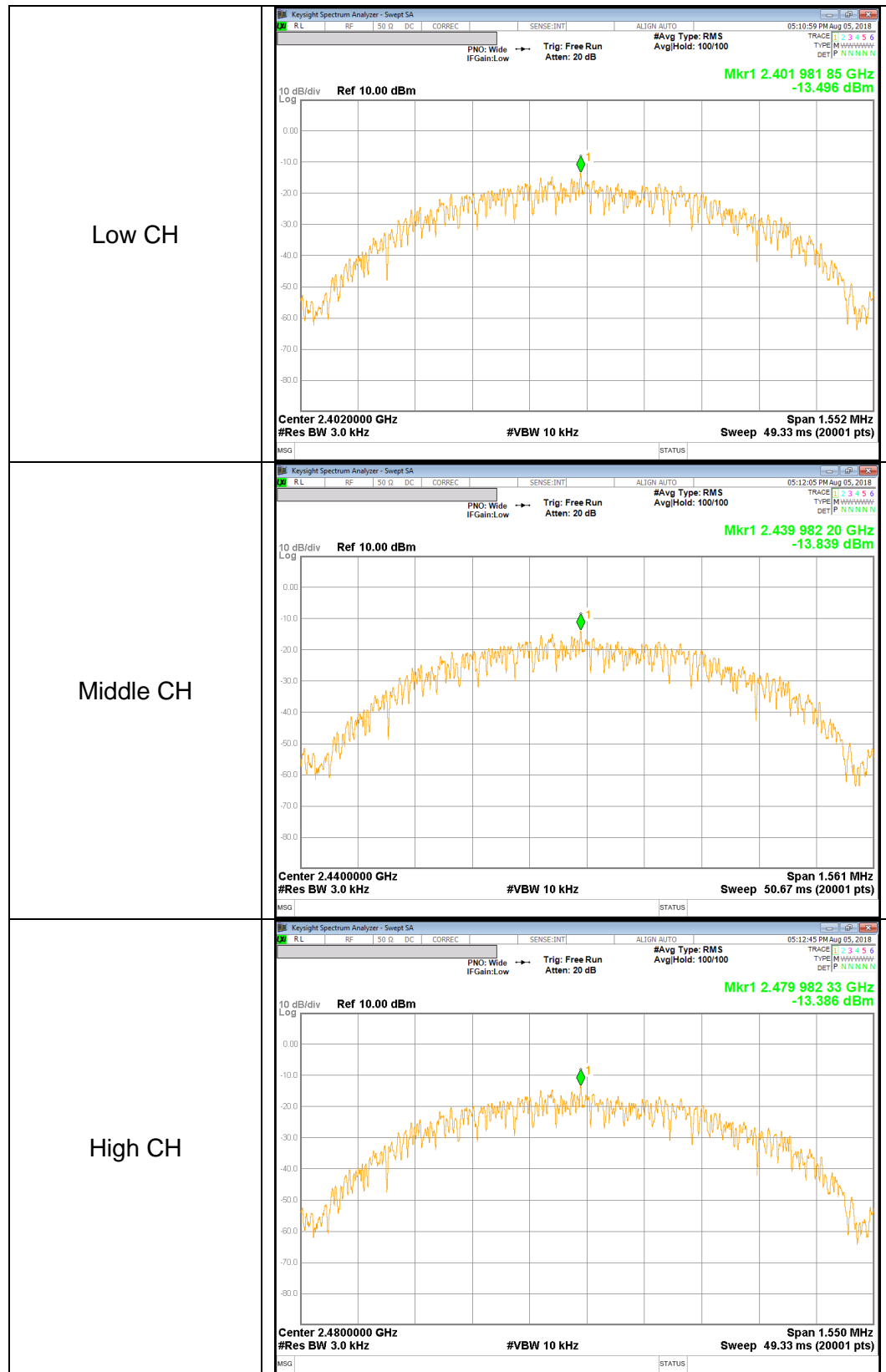
### TEST PROCEDURE

Power Spectral Density was performed utilizing the “§10.2 Method PKPSD (Peak PSD)” under KDB558074 D01 15.247 Meas Guidance v05

### RESULTS

Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
Low	2402	-13.50	8.00	-21.50
Mid	2440	-13.84	8.00	-21.84
High	2480	-13.39	8.00	-21.39

**POWER SPECTRAL DENSITY PLOTS**





## 10.5. OUT-OF-BAND EMISSIONS

### LIMITS

FCC §15.247 (d)

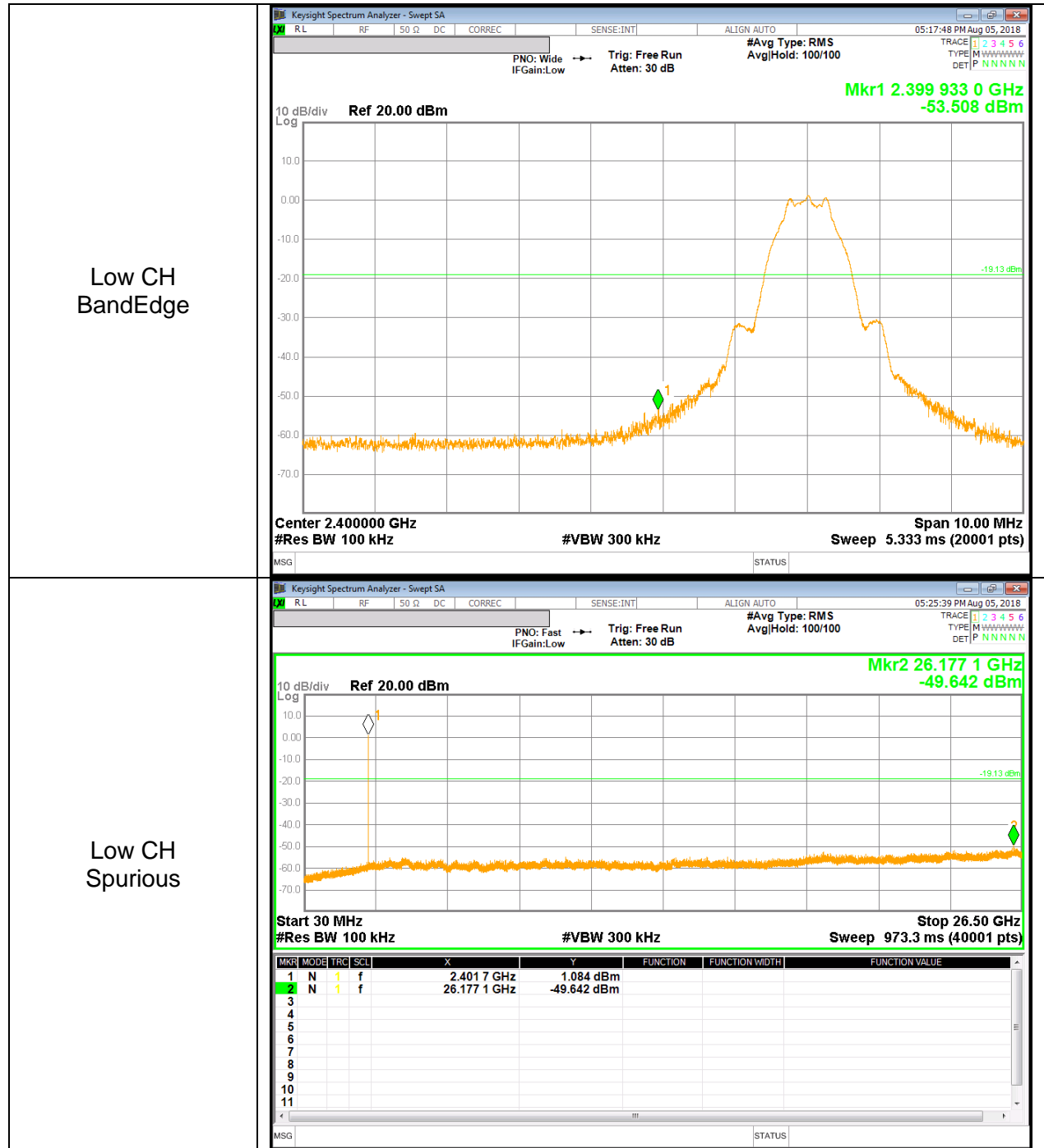
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

### TEST PROCEDURE

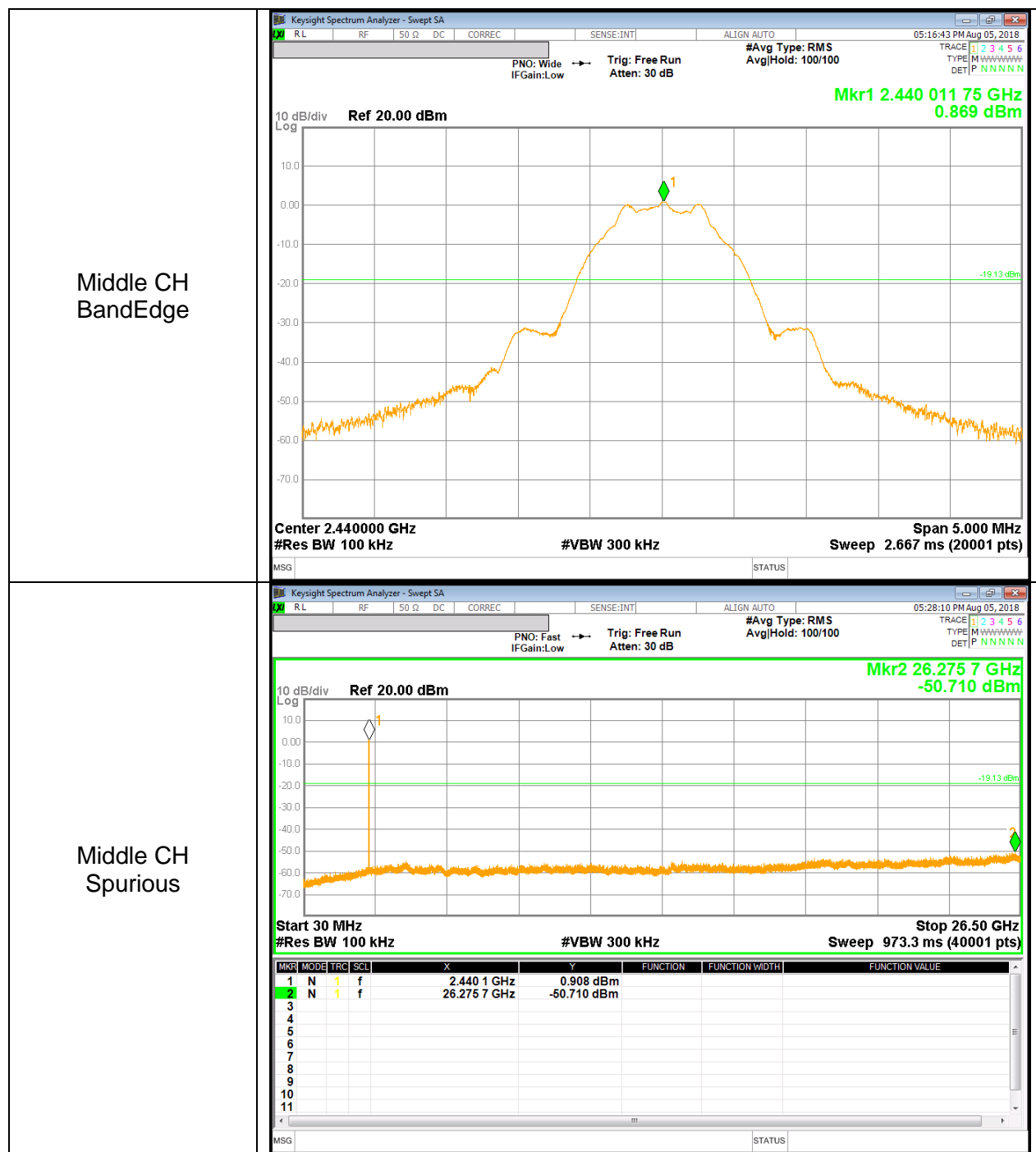
The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.

**RESULTS**

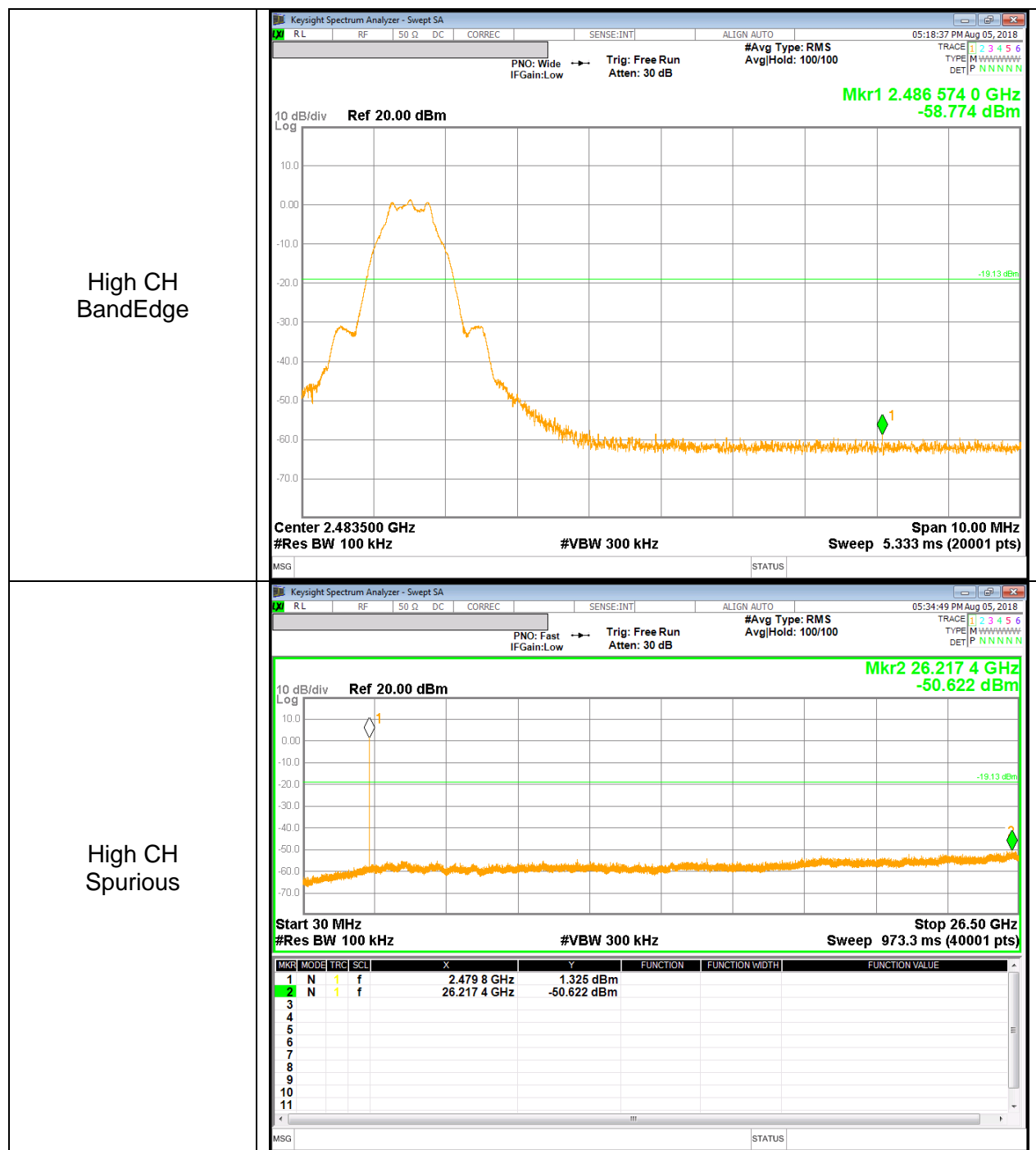
**BANDEDGE & SPURIOUS EMISSIONS, LOW CHANNEL**



**SPURIOUS EMISSIONS, MID CHANNEL**



**SPURIOUS EMISSIONS, HIGH CHANNEL**



## 11. RADIATED TEST RESULTS

### 11.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm 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 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted bandedge, Final detection of spurious harmonic emissions) Duty cycle factor =  $10 \log(1/x)$ . For this sample: DCF =  $10 \log(1/0.624) = 2.05 \text{dB}$  (Spectrum Analyzer round it up to 2.05dB)

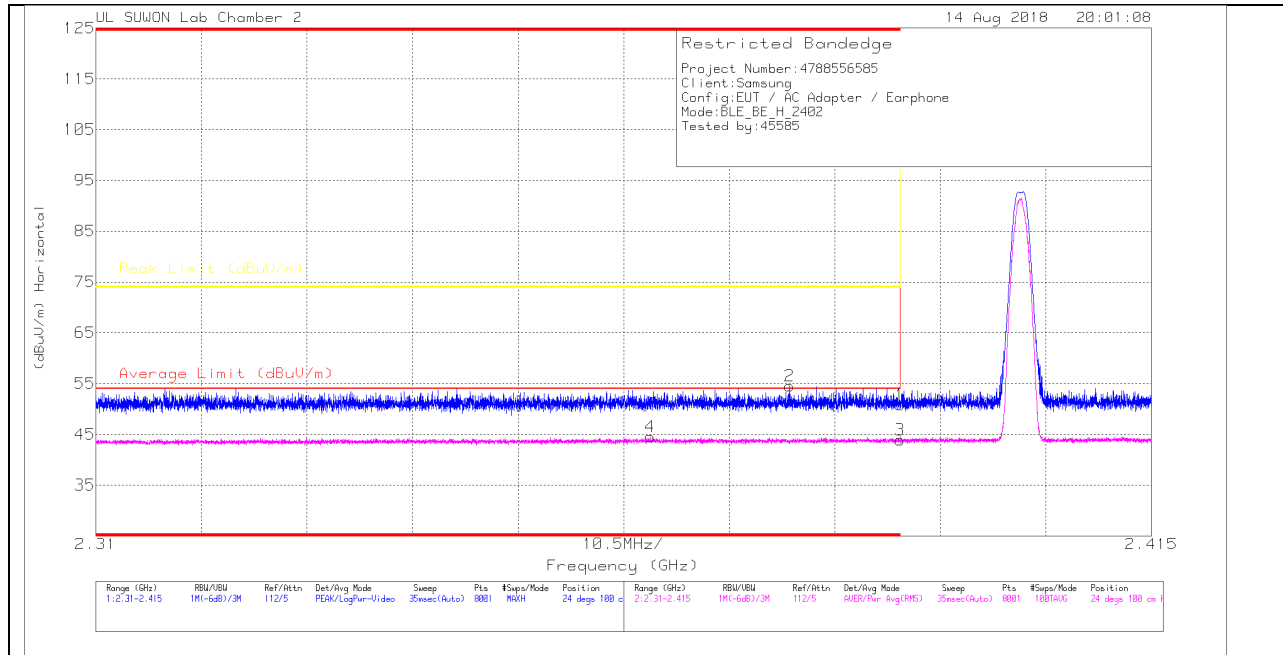
Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.  
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

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

#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB(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	40.04	Pk	31.6	-20.8	0	50.84	-	-	74	-23.16	24	100	H
2	* 2.379	43.69	Pk	31.6	-20.8	0	54.49	-	-	74	-19.51	24	100	H
3	* 2.39	31.07	RMS	31.6	-20.8	2.05	43.92	54	-10.08	-	-	24	100	H
4	* 2.365	31.63	RMS	31.6	-20.8	2.05	44.48	54	-9.52	-	-	24	100	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

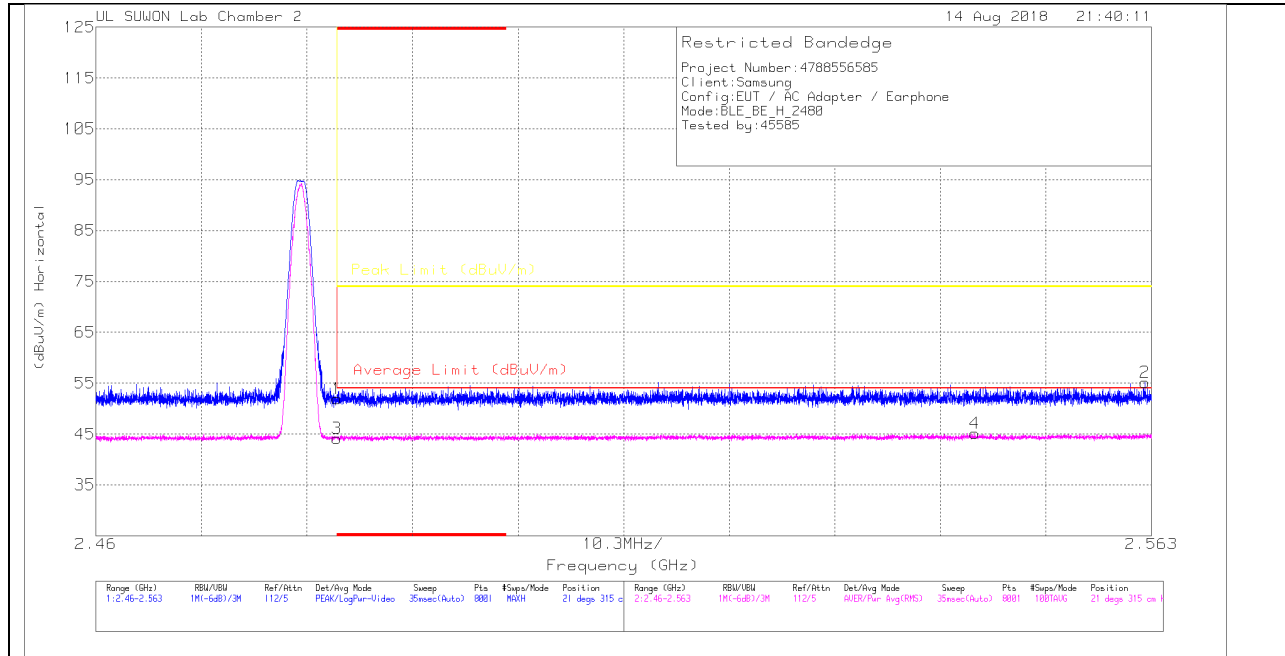
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.19	Pk	31.6	-20.8	0	51.99	-	-	74	-22.01	223	357	V
2	* 2.361	44.15	Pk	31.6	-20.8	0	54.95	-	-	74	-19.05	223	357	V
3	* 2.39	30.76	RMS	31.6	-20.8	2.05	43.61	54	-10.39	-	-	223	357	V
4	* 2.355	31.57	RMS	31.6	-20.8	2.05	44.42	54	-9.58	-	-	223	357	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection



### AUTHORIZED BANDEDGE (HIGH CHANNEL)

#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

##### Trace Markers

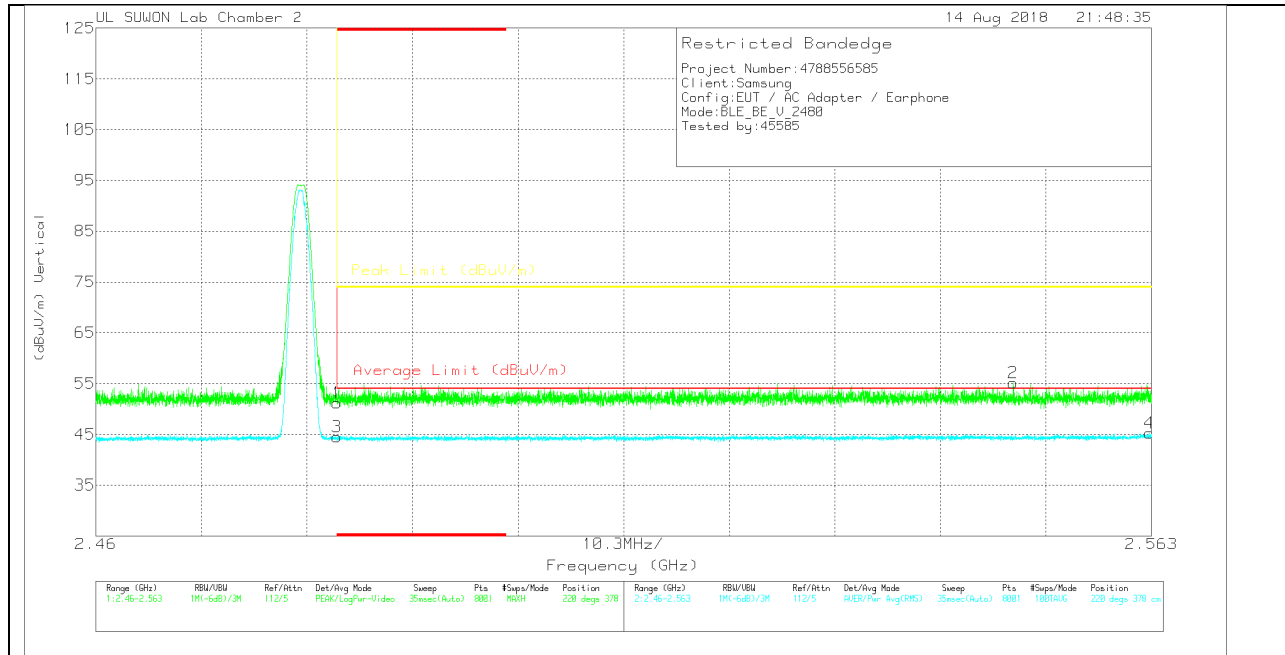
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.69	PK		31.9	-20.6	0	51.99	-	74	-22.01	21	315	H
2	2.562	43.47	PK		32	-20.3	0	55.17	-	74	-18.83	21	315	H
3	* 2.484	30.84	RMS		31.9	-20.6	2.05	44.19	54	-9.81	-	21	315	H
4	2.546	31.61	RMS		32	-20.5	2.05	45.16	54	-8.84	-	21	315	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

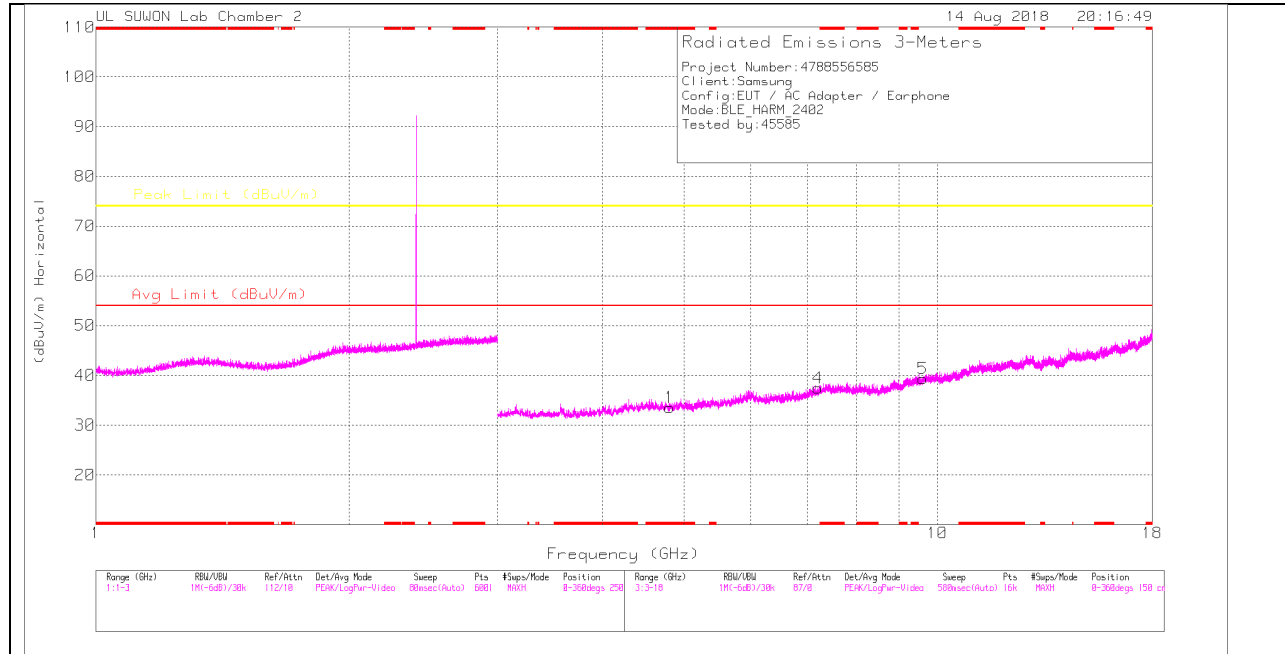
**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB[dB]	DC Corr (dB)	Corrected Reading (dBuV)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.91	Pk	31.9	-20.6	0	51.21	-	-	74	-22.79	220	378	V
2	2.55	43.71	Pk	32	-20.6	0	55.11	-	-	74	-18.89	220	378	V
3	* 2.484	31.13	RMS	31.9	-20.6	2.05	44.48	54	-9.52	-	-	220	378	V
4	2.563	31.59	RMS	32	-20.4	2.05	45.24	54	-8.76	-	-	220	378	V

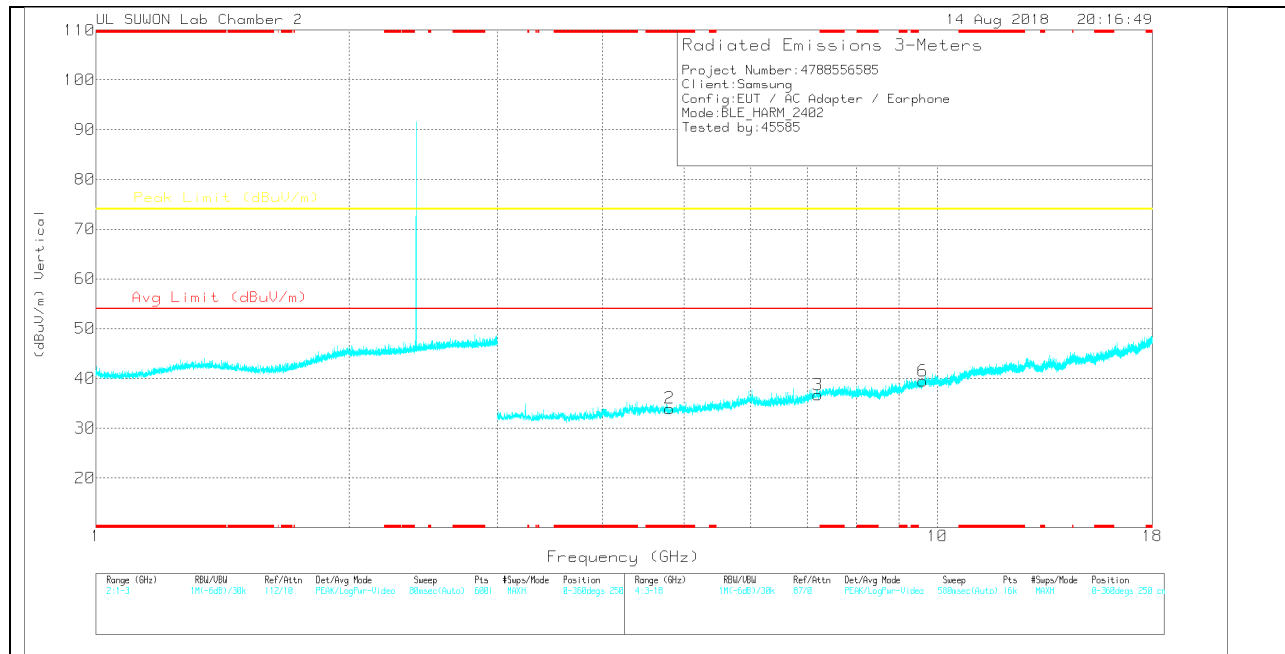
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**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**

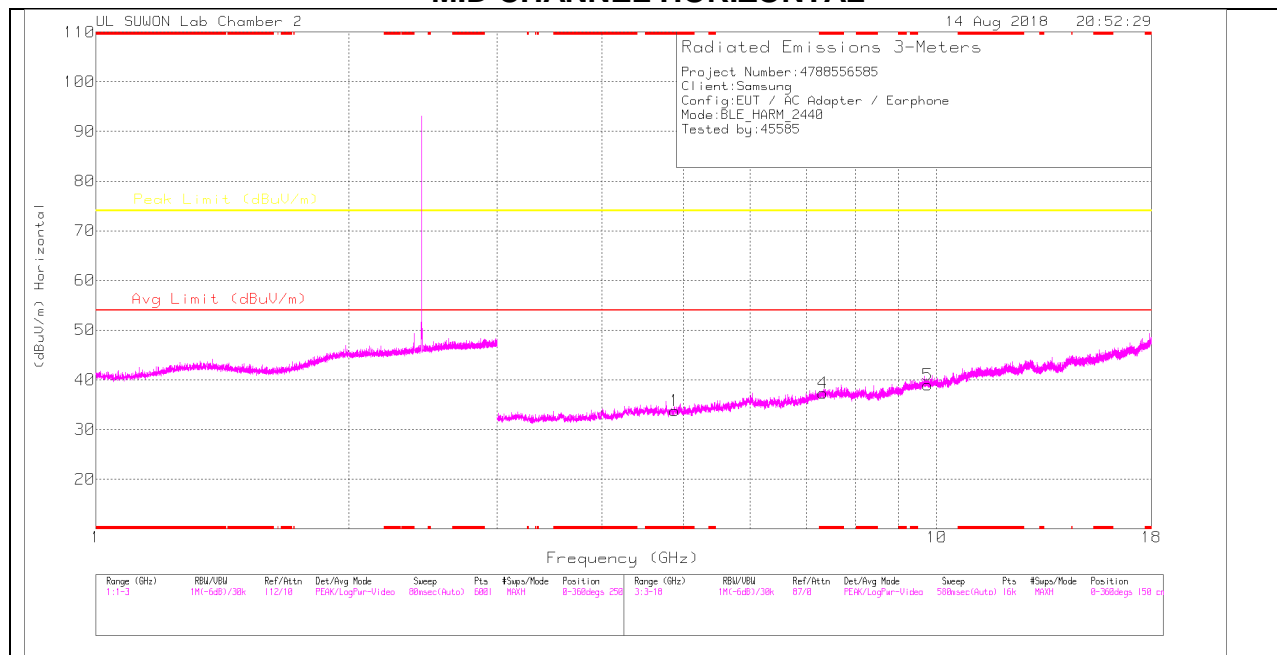
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	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	* 4.806	27.59	PK	34	-28	0	33.59	-	-	74	-40.41	0-360	250	H
4	7.209	26.62	PK	36.1	-25.3	0	37.42	-	-	74	-36.58	0-360	150	H
5	9.609	24.22	PK	37	-21.9	0	39.32	-	-	74	-34.68	0-360	250	H
2	* 4.803	27.98	PK	34	-28	0	33.98	-	-	74	-40.02	0-360	250	V
3	7.209	25.91	PK	36.1	-25.3	0	36.71	-	-	74	-37.29	0-360	150	V
6	9.609	24.34	PK	37	-21.9	0	39.44	-	-	74	-34.56	0-360	250	V

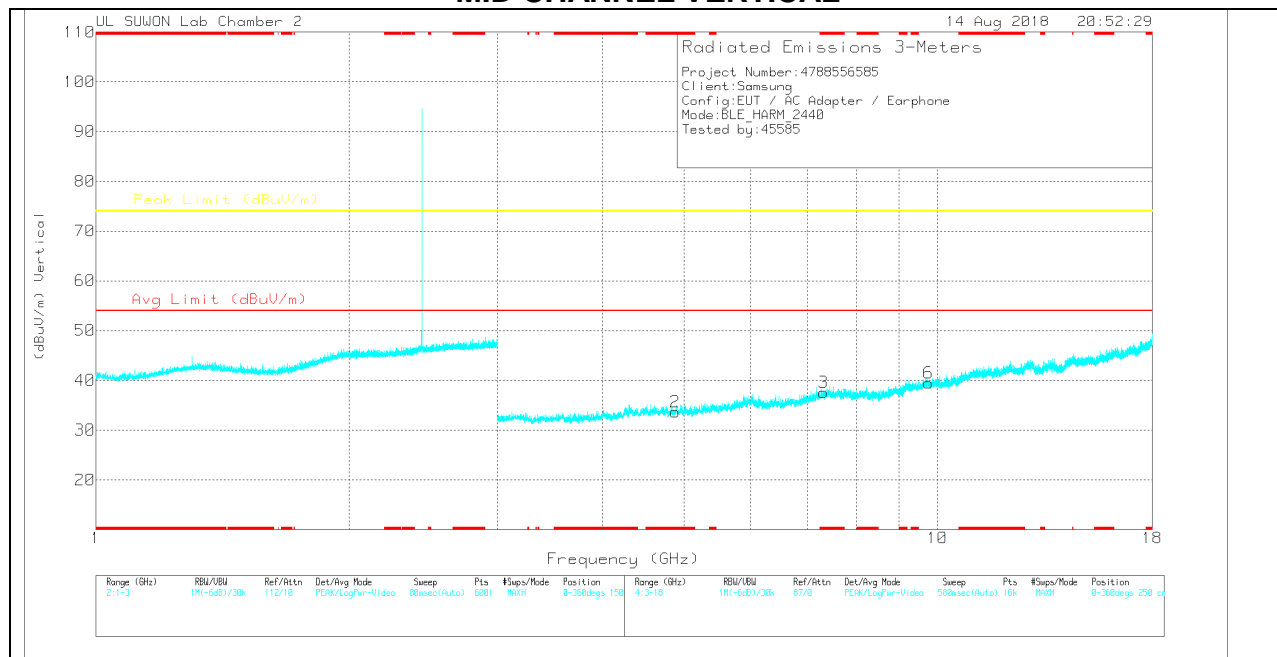
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

### 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**

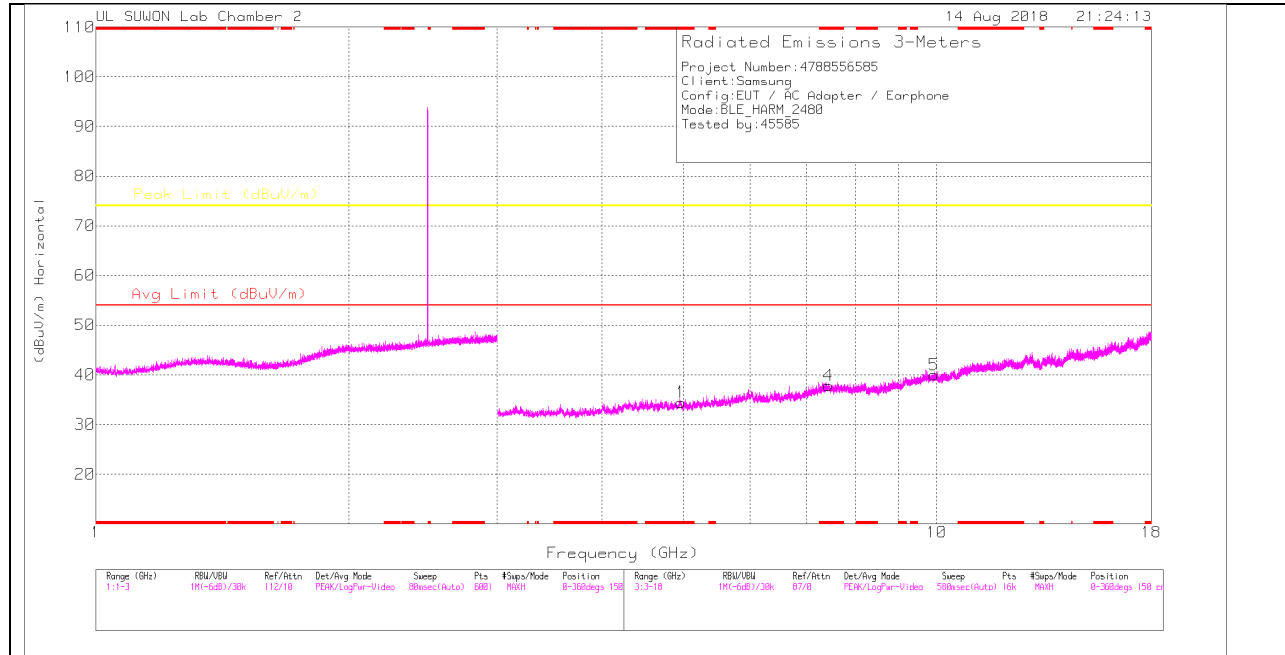
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	3GHz_HP[dB]	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	* 4.881	27.66	PK	34	-27.9	0	33.76	-	-	74	-40.24	0-360	150	H
4	* 7.32	28.02	PK	36.2	-24.9	0	37.32	-	-	74	-36.68	0-360	250	H
5	9.76	23.23	PK	37.2	-21.5	0	38.93	-	-	74	-35.07	0-360	150	H
2	* 4.881	27.51	PK	34	-27.9	0	33.61	-	-	74	-40.39	0-360	250	V
3	* 7.32	26.25	PK	36.2	-24.9	0	37.55	-	-	74	-36.45	0-360	150	V
6	9.759	23.81	PK	37.2	-21.5	0	39.51	-	-	74	-34.49	0-360	150	V

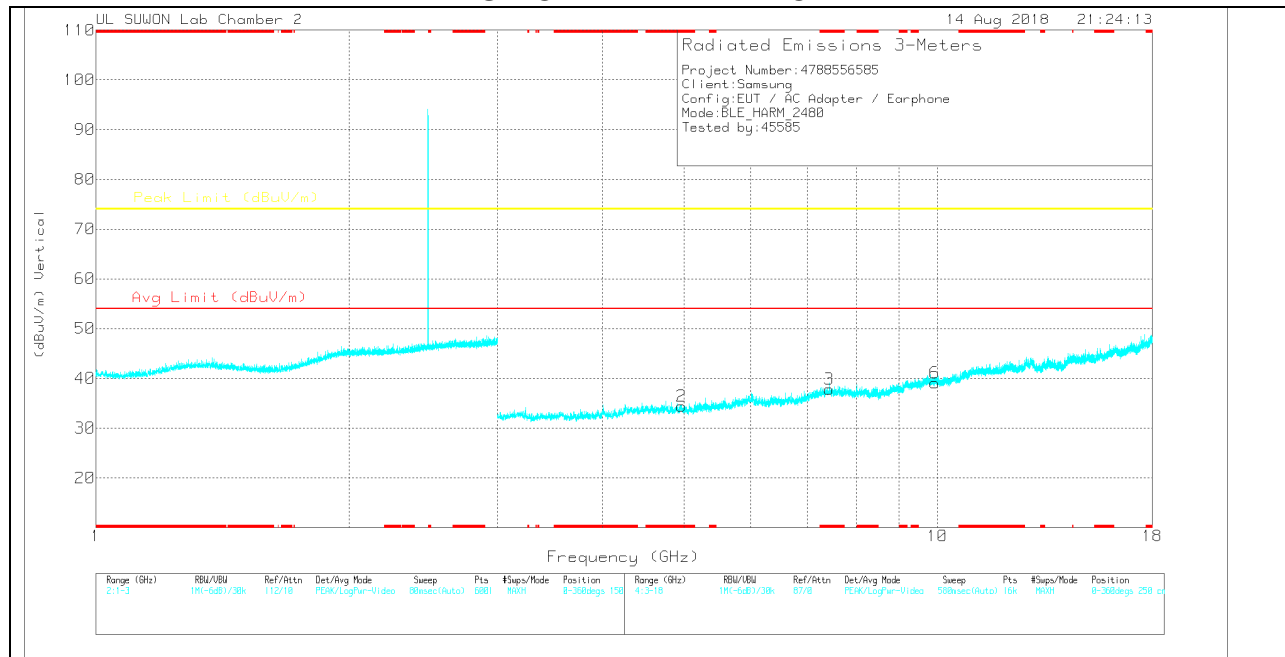
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK – Peak Detector

Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).

### HIGH CHANNEL HORIZONTAL



### 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	3117_00168724	3GHz_HP[dB]	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	* 4.962	27.38	PK	34.1	-27	0	34.48	-	-	74	-39.52	0-360	150	H
4	* 7.441	25.71	PK	36.2	-24.1	0	37.81	-	-	74	-36.19	0-360	150	H
5	9.92	23.54	PK	37.4	-21	0	39.94	-	-	74	-34.06	0-360	250	H
2	* 4.96	27.43	PK	34.1	-27.1	0	34.43	-	-	74	-39.57	0-360	250	V
3	* 7.44	25.62	PK	36.2	-24	0	37.82	-	-	74	-36.18	0-360	150	V
6	9.921	22.72	PK	37.4	-21	0	39.12	-	-	74	-34.88	0-360	250	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK – Peak Detector

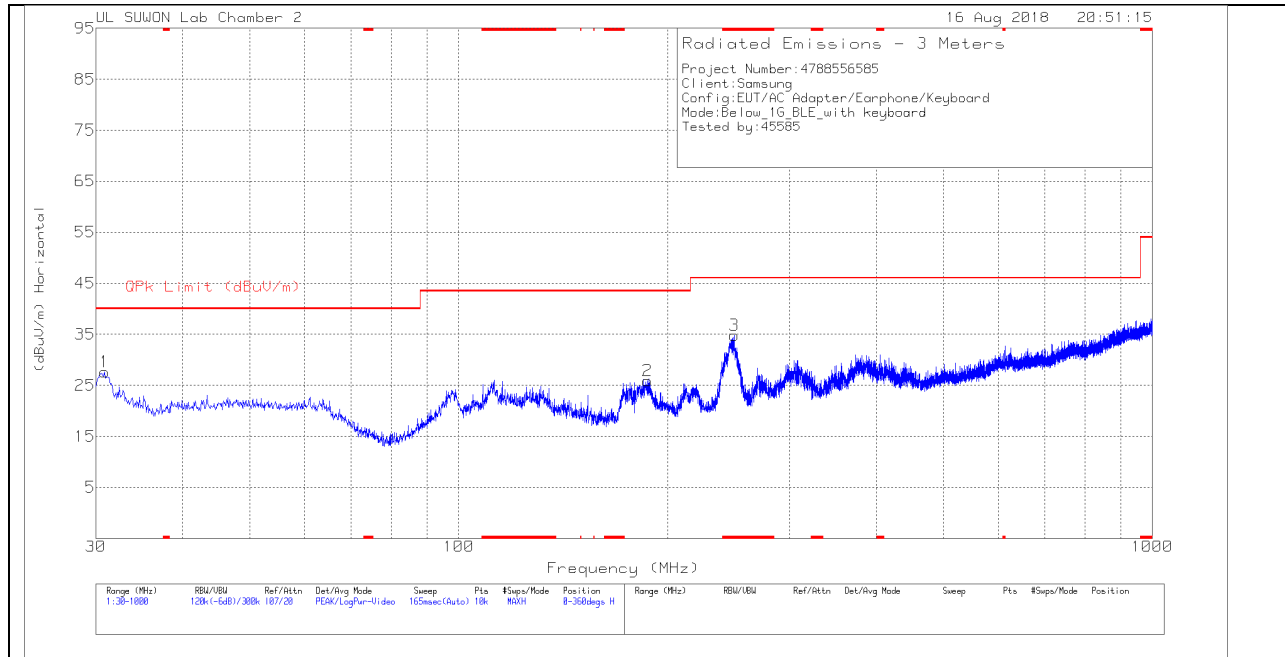
Note: Only peak measurement was performed. Because peak measurement result of unwanted emission is less than average limit (54dBuV/m).



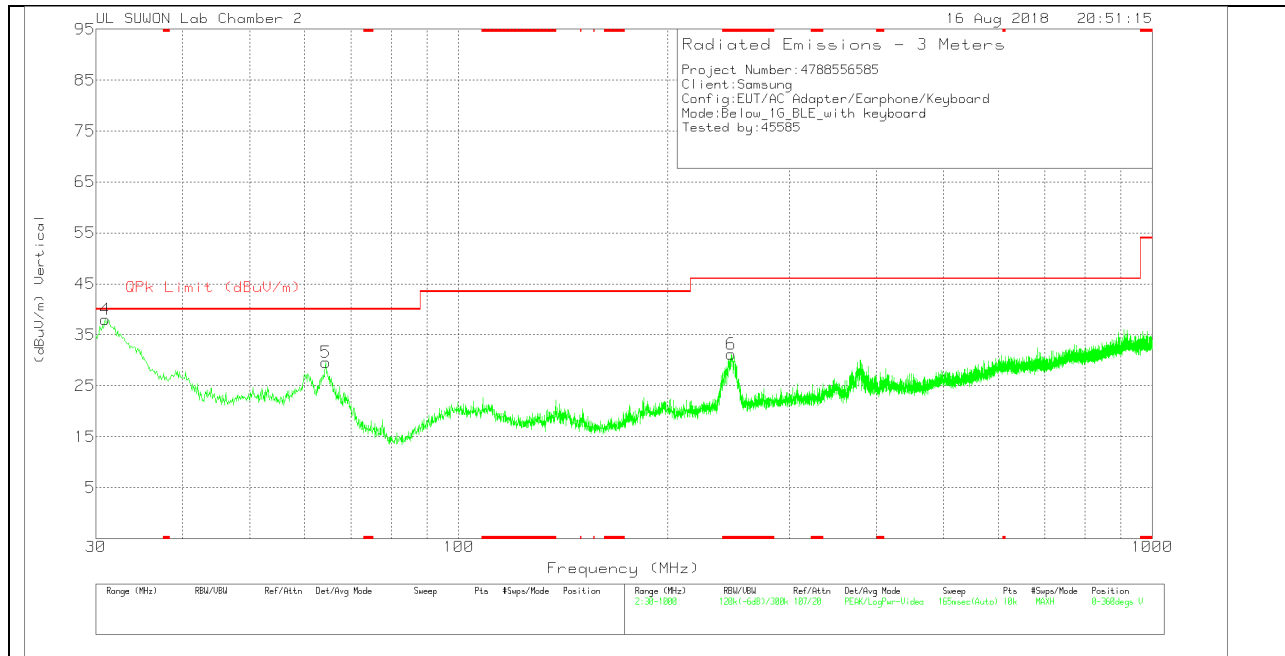
### 11.3. WORST-CASE BELOW 1 GHz

#### SPURIOUS EMISSIONS 30 TO 1000 MHz (with Keyboard)

#### HORIZONTAL PLOT



#### VERTICAL PLOT



**BELOW 1 GHz TABLE**

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.873	44.06	Pk	15.6	-32	27.66	40	-12.34	0-360	300	H
2	187.237	40.22	Pk	16.7	-31	25.92	43.52	-17.6	0-360	100	H
3	* 249.608	46.37	Pk	19	-30.6	34.77	46.02	-11.25	0-360	100	H
4	30.97	54.34	Pk	15.6	-31.9	38.04	40	-1.96	0-360	100	V
5	64.338	43.9	Pk	17.4	-31.7	29.6	40	-10.4	0-360	100	V
6	* 247.28	42.94	Pk	18.9	-30.6	31.24	46.02	-14.78	0-360	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-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

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

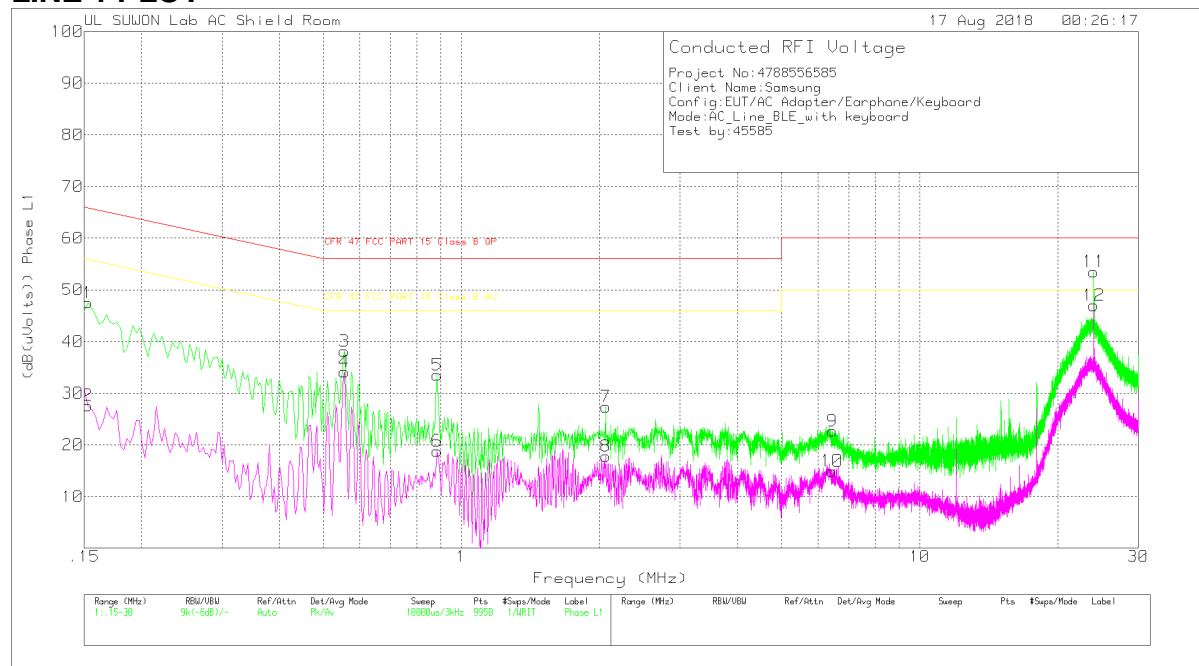
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

**RESULTS**

**WORST EMISSIONS (with Keyboard)**

**LINE 1 PLOT**



**LINE 1 RESULTS**

**Trace Markers**

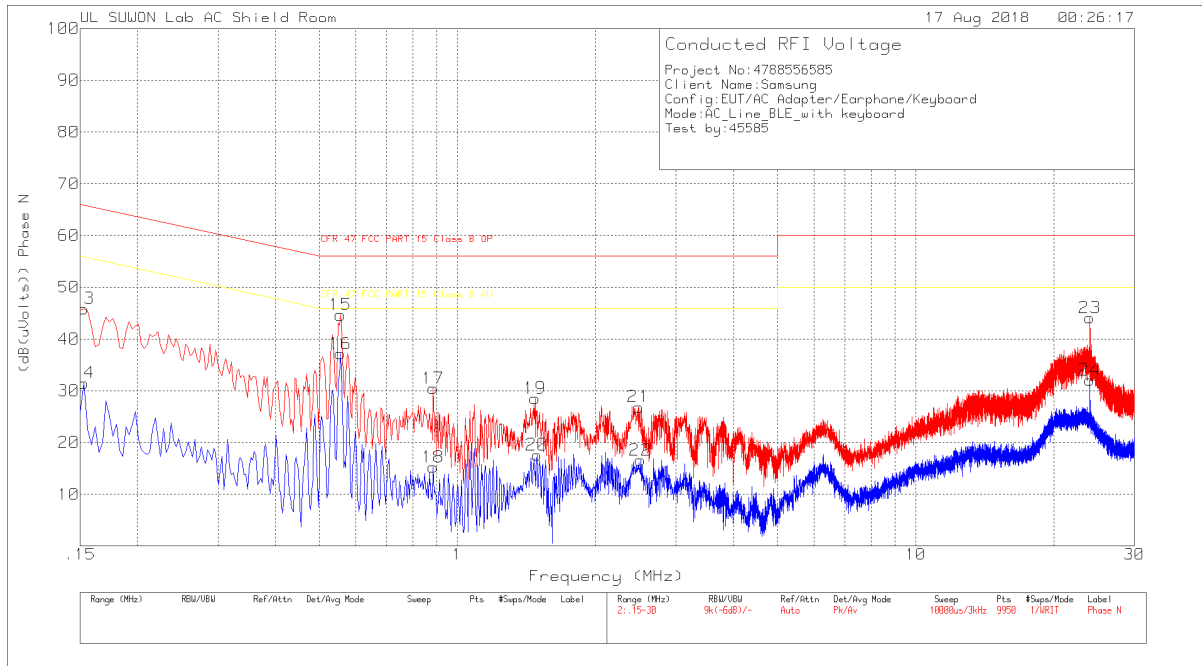
**Range 1: Phase L1 .15 - 30MHz**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_L1_wi th extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.153	37.4	Pk	10	.1	47.5	65.84	-18.34	-	-
2	.153	17.51	Av	10	.1	27.61	-	-	55.84	-28.23
3	.555	28.11	Pk	9.8	.2	38.11	56	-17.89	-	-
4	.555	24.15	Av	9.8	.2	34.15	-	-	46	-11.85
5	.885	23.49	Pk	9.7	.3	33.49	56	-22.51	-	-
6	.885	8.81	Av	9.7	.3	18.81	-	-	46	-27.19
7	2.064	17.19	Pk	9.9	.3	27.39	56	-28.61	-	-
8	2.064	7.6	Av	9.9	.3	17.8	-	-	46	-28.2
9	6.444	12.67	Pk	9.7	.3	22.67	60	-37.33	-	-
10	6.438	4.92	Av	9.7	.3	14.92	-	-	50	-35.08
11	24	42.9	Pk	10.2	.4	53.5	60	-6.5	-	-
12	23.997	36.39	Av	10.2	.4	46.99	-	-	50	-3.01

Pk - Peak detector

Av - Average detection

**LINE 2 PLOT**



**LINE 2 RESULTS**

**Trace Markers**

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101837_N_wit h extension	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
13	.153	35.77	Pk	10	.1	45.87	65.84	-19.97	-	-
14	.153	21.4	Av	10	.1	31.5	-	-	55.84	-24.34
15	.555	34.67	Pk	9.8	.2	44.67	56	-11.33	-	-
16	.555	27.15	Av	9.8	.2	37.15	-	-	46	-8.85
17	.885	20.44	Pk	9.7	.3	30.44	56	-25.56	-	-
18	.885	5.27	Av	9.7	.3	15.27	-	-	46	-30.73
19	1.476	18.34	Pk	9.9	.3	28.54	56	-27.46	-	-
20	1.491	7.41	Av	9.9	.3	17.61	-	-	46	-28.39
21	2.484	16.68	Pk	9.9	.3	26.88	56	-29.12	-	-
22	2.508	6.41	Av	9.9	.3	16.61	-	-	46	-29.39
23	24	33.5	Pk	10.2	.4	44.1	60	-15.9	-	-
24	23.997	21.49	Av	10.2	.4	32.09	-	-	50	-17.91

Pk - Peak detector  
 Av - Average detection