



# **CERTIFICATION TEST REPORT**

**Report Number.** : 4790577225-FR3V4

**Applicant** : SAMSUNG ELECTRONICS CO., LTD.  
129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI,  
GYEONGGI-DO, 16677, KOREA

**Model** : EP-P9500

**FCC ID** : A3LEPP9500

**EUT Description** : SmartThings Station with BLE, DTS/UNII a/b/g/n/ac, Zigbee and WPT

**Test Standard(s)** : FCC 47 CFR PART 15 SUBPART C

**Date Of Issue:**

2022-11-23

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2022-11-10	Initial issue	Hyunsik(Dexter) Yun
V2	2022-11-21	Updated to address TCB's Question	Hyunsik(Dexter) Yun
V3	2022-11-22	Updated to address TCB's Question	Hyunsik(Dexter) Yun
V4	2022-11-23	Updated to address TCB's Question	Hyunsik(Dexter) Yun

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.  
**EUT DESCRIPTION:** SmartThings Station with BLE, DTS/UNII a/b/g/n/ac, Zigbee and WPT  
**MODEL NUMBER:** EP-P9500  
**SERIAL NUMBER:** R37T9001P1AX3S, 00000000000000 (CONDUCTED);  
R37TA0004VFX3S (RADIATED);  
**DATE TESTED:** 2022-10-16 ~ 2022-11-10;

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

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  
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Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Hyunsik(Dexter) Yun  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. TEST METHODOLOGY

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
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 checked="" type="checkbox"/>	Chamber 1(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	Chamber 5(3m Full-anechoic chamber)

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf>.

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

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:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 28.9 \text{ dBuV/m} &= 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} \end{aligned}$$

### 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	3.02 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.05 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.78 dB
Radiated Disturbance, 18 GHz to 40 GHz	5.58 dB

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

### 4.4. DECISION RULES

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

## 5. EQUIPMENT UNDER TEST

### 5.1. EUT DESCRIPTION

The EUT is a SmartThings Station with BLE, DTS/UNII a/b/g/n/ac, Zigbee and WPT. This test report addresses the DTS (Zigbee) operational mode.

### 5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 405 ~ 2 480	O-QPSK	Peak	18.986	79.177
		Average	18.880	77.268

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

**The internal antenna was Permanently attached.  
Therefore this E.U.T Complies with the requirement of §15.203.**

The radio utilizes an internal antennas, with ANT maximum gain of 3.2 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.

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

Worst case of antenna axis: X

All radiated and power line conducted tests were performed attached with travel adapter and Test Zig for the worst case condition mode.

### - Test Case

Target Power[dBm]		
Ch.	Freq.	Target
11	2405	19
18	2440	19
25	2475	19
26	2480	8.5

	Radiated Band-Edge, Conducted Band-Edge
	Radiated Band-Edge, Radiated Spurious Emission, Conducted Band-Edge, Conducted Spurious Emission, PSD
	Radiated Spurious Emission, Conducted Spurious Emission, PSD

Note. The conducted and radiated test of 26 channels was replaced with 11 (low), 18 (mid), and 25 (high) channel tests with high target power and density.

## 5.5. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	-	N/A
Data Cable	SAMSUNG	EP-DN980	-	N/A
Test Zig	-	DJT150701	-	N/A

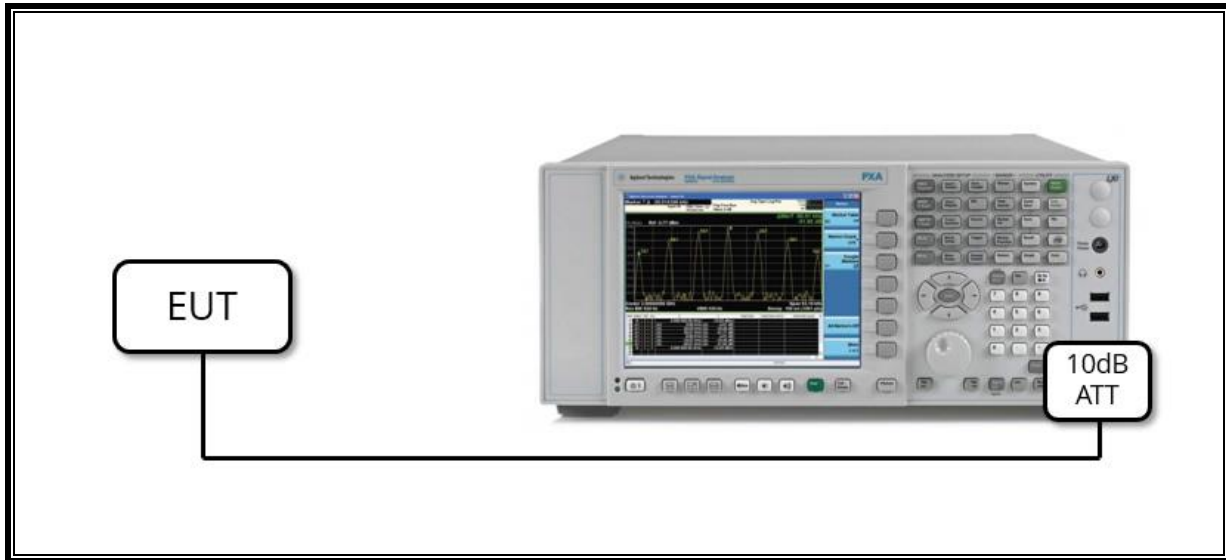
### I/O CABLE

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A

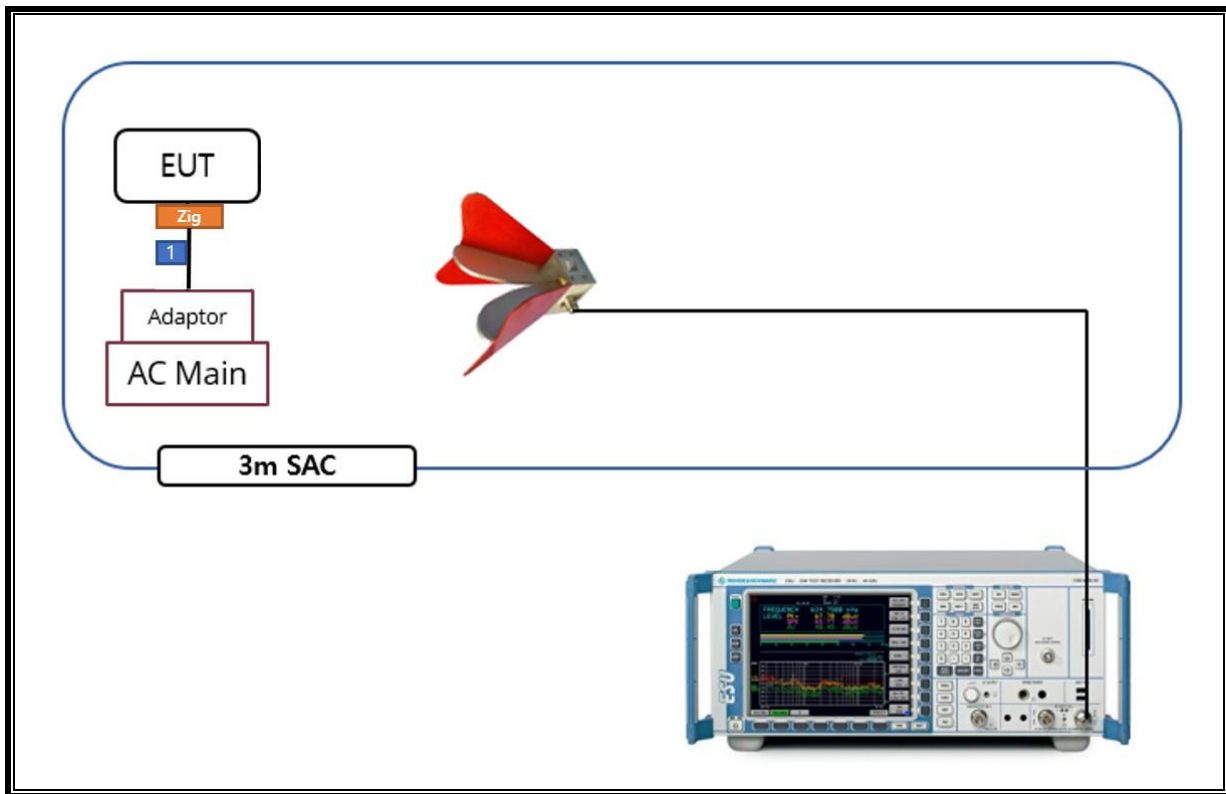
### TEST SETUP

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

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



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



## 6. MEASUREMENT METHOD

6 dB BW : ANSI C63.10-2013, Section 11.8.2 Option 2

OUTPUT POWER : ANSI C63.10-2013, Section 11.9.1.1 RBW  $\geq$  DTS bandwidth

POWER SPECTRAL DENSITY : ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

Out-of-band Emissions (Conducted) : ANSI C63.10-2013, Section 11.11 Emissions in nonrestricted frequency bands

Out-of-band Emissions in Non-restricted Bands: ANSI C63.10-2013, Section 11.11 Emissions in nonrestricted frequency bands

Out-of-band Emissions in Restricted Bands : ANSI C63.10-2013, Section 11.12 Emissions in restricted frequency bands

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

## 7. 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	750	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2024-08-15
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2024-08-15
Antenna, Horn, 18 GHz	ETS	3115	00167211	2024-08-04
Antenna, Horn, 18 GHz	ETS	3115	00161451	2024-08-21
Antenna, Horn, 18 GHz	ETS	3117	00168724	2024-08-04
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3116C-PA	00168841	2023-08-04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2023-08-02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2023-08-02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2023-08-01
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2023-08-01
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2023-08-03
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2023-08-01
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9030B	MY60070693	2023-01-18
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2023-01-19
Average Power Sensor	Agilent / HP	U2000A	MY54270007	2023-08-03
Average Power Sensor	Agilent / HP	U2000A	MY54260010	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A001	2023-08-03
Attenuator	PASTERNAK	PE7087-10	A008	2023-08-03
Attenuator	PASTERNAK	PE7004-10	2	2023-08-01
Attenuator	PASTERNAK	PE7087-10	A009	2023-08-03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2023-08-02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2023-07-29
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2023-08-01
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2023-08-02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2023-08-01
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	020	2023-08-01
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2023-08-02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2023-08-01
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2023-08-02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	2023-08-01
LISN	R&S	ENV-216	101837	2023-08-04
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2023-10-06
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

## 8. TEST RESULTS SUMMARY

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
15.247 (a)(2)	Occupied Bandwidth(6dB)	> 500kHz	Conducted	PASS
2.1051, 15.247(d)	Band Edge / Conducted Spurious Emission	-20 dBc		PASS
15.247 (b)(3)	TX conducted output power	< 30 dBm		PASS
15.247(e)	PSD	< 8 dBm/3kHz		PASS
15.207(a)	AC Power Line conducted emissions	Section 11	Power Line conducted	PASS
15.205, 15.209	Radiated Spurious Emission	< 54dBuV/m(Av)	Radiated	PASS

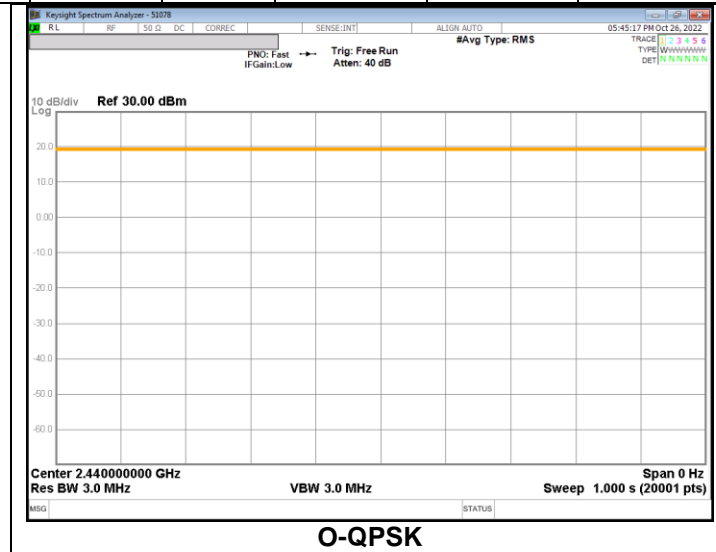
## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

**LIMITS**

None; for reporting purposes only.

Mode	On time [msec]	Period [msec]	Duty cycle x [Linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
<b>2 400 ~ 2 483.5 MHz Bands</b>						
O-QPSK	-	-	1.00	100	0.00	-



Note. This EUT only operates at 100% duty cycle. The average value can be calculated using the duty cycle correction factor, but no failure occurred even when the average value was measured with 100% duty, so a duty cycle correction factor was not applied.

## 9.2. 6 dB BANDWIDTH

### LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

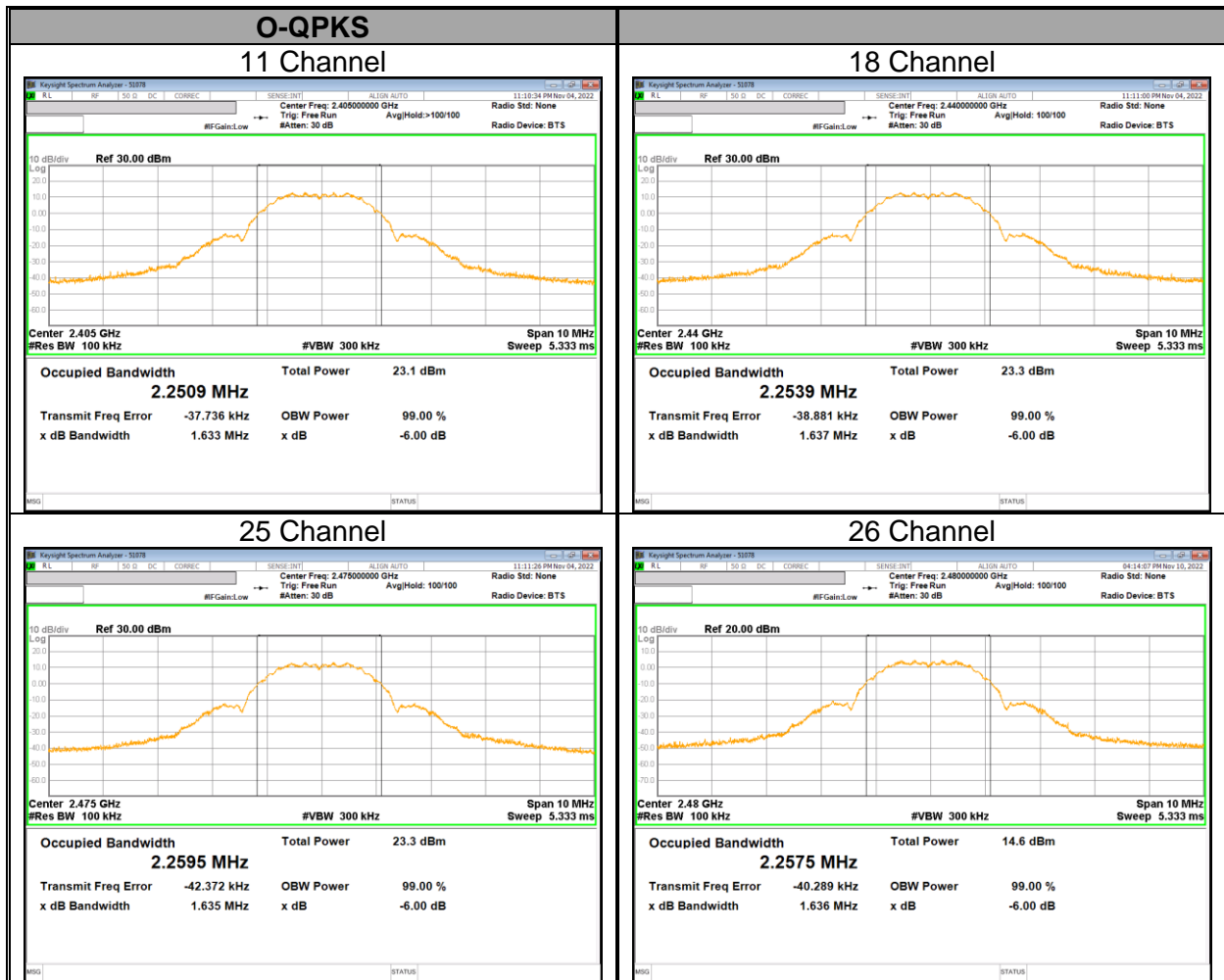
The minimum 6 dB bandwidth shall be at least 500 kHz.

### RESULTS

#### 9.2.1. Test data

Mode	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
O-QPSK	11	2 405	1 633.0	500.0
	18	2 440	1 637.0	500.0
	25	2 475	1 635.0	500.0
	26	2 480	1 636.0	500.0
<b>Worst</b>			<b>1 633.0</b>	500.0

### 9.2.2. 6 dB BANDWIDTH PLOTS





### 9.3. OUTPUT POWER

#### LIMITS

FCC §15.247 (b) (3)

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

#### TEST PROCEDURE

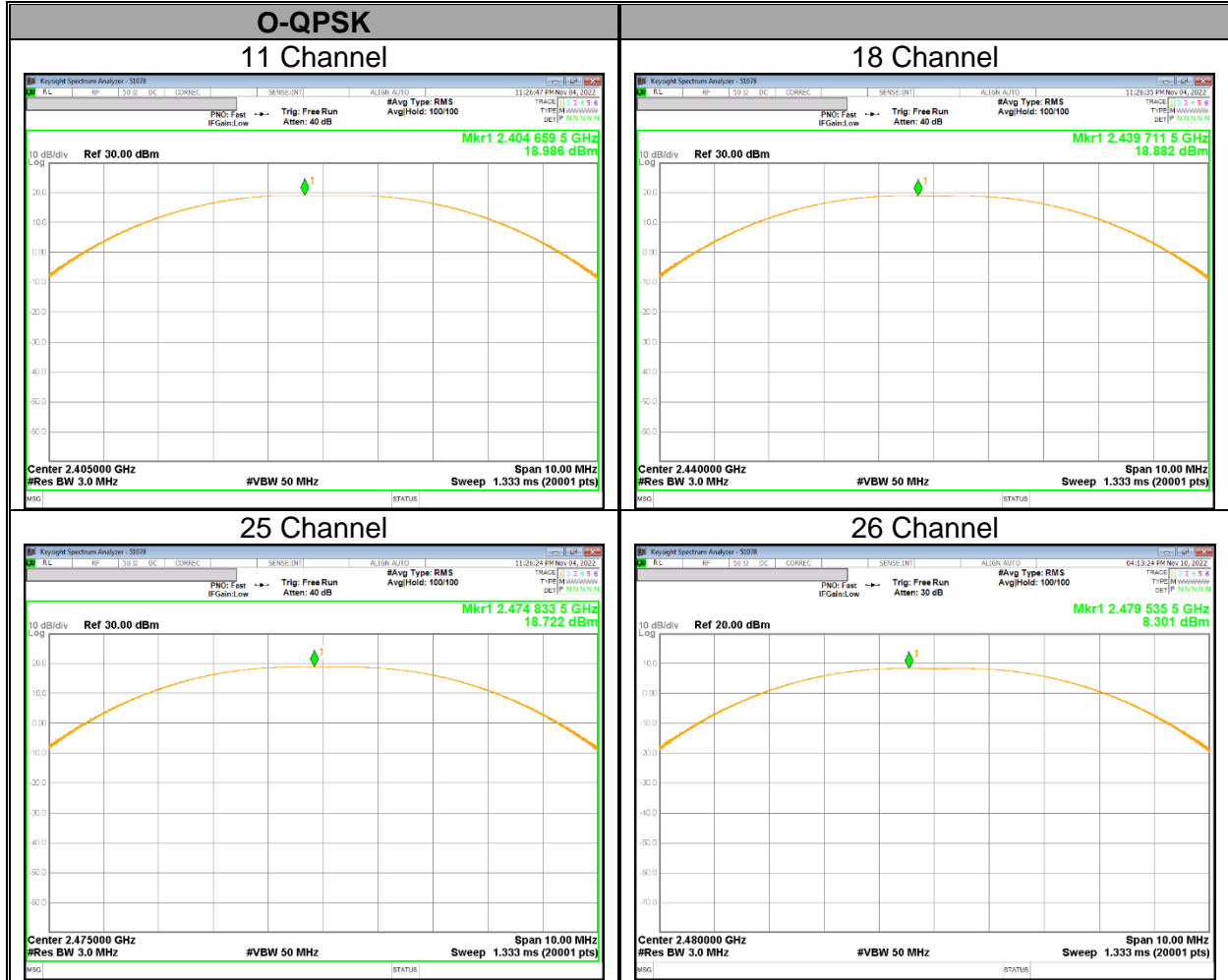
Peak power is measured using ANSI C63.10(2013) under section 11.9.1.1 utilizing spectrum analyzer(RBW  $\cong$  DTS bandwidth).

#### RESULTS

##### 9.3.1. Test data

Mode	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
O-QPSK	11	2 402	18.986	30.000	-11.014
	18	2 440	18.882		-11.118
	25	2 475	18.722		-11.278
	26	2 480	8.301		-21.699
Worst			<b>18.986</b>		<b>-11.014</b>

### 9.3.2. PEAK POWER PLOTS



## 9.4. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST PROCEDURE

Measurements perform using a wideband RF frame average power sensor. The cable assembly insertion loss and duty cycle correction factor were entered as an offset in the power meter to allow for direct reading of power.

### RESULTS

#### 9.4.1. Test data

Mode	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
O-QPSK	11	2 405	18.820	76.208
	18	2 440	18.880	77.268
	25	2 475	18.720	74.473
	26	2 480	8.490	7.063

## 9.5. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

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

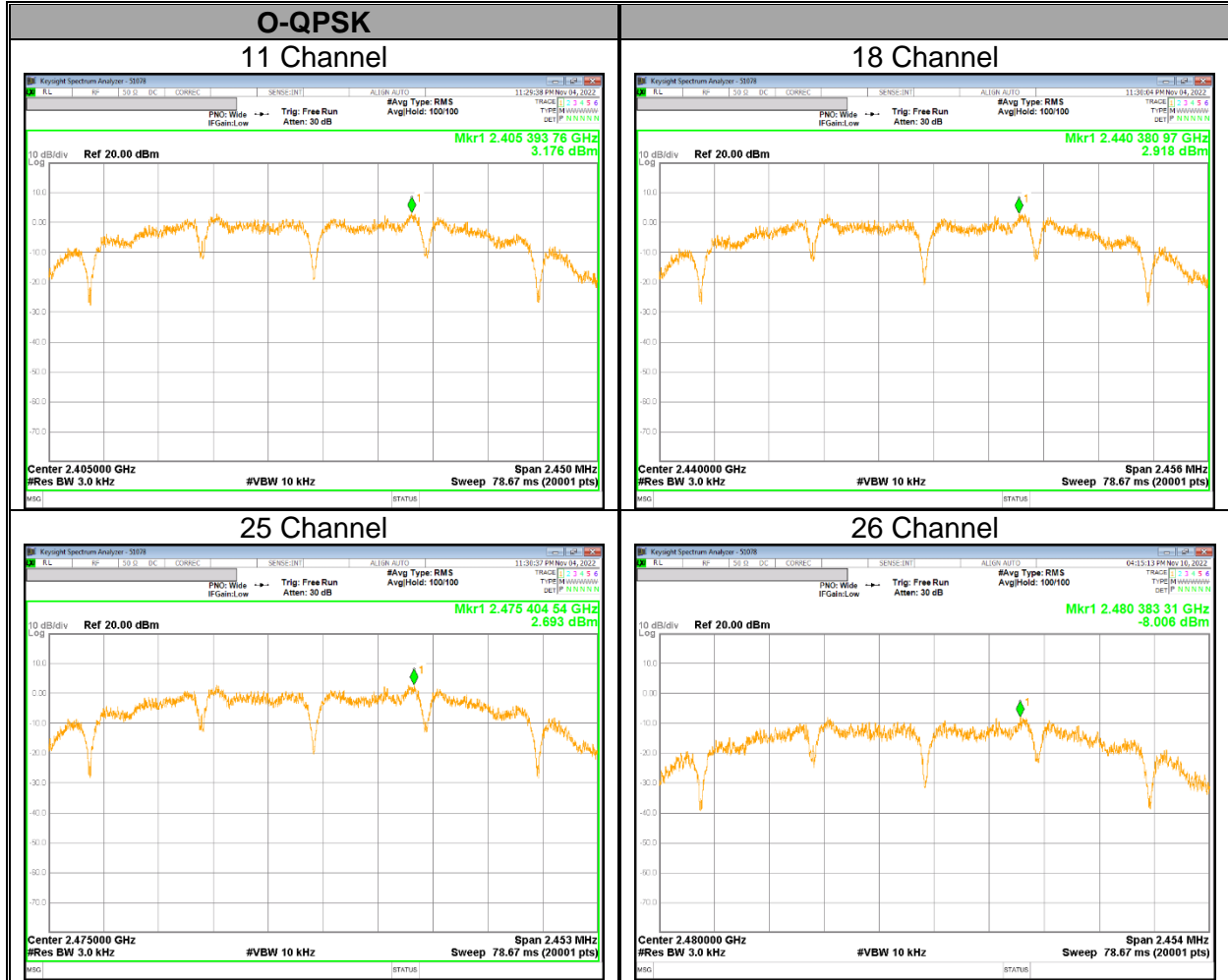
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

### RESULTS

#### 9.5.1. Test data

Mode	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
O-QPSK	11	2 405	<b>3.176</b>	8.00	<b>-4.824</b>
	18	2 440	2.918		-5.082
	25	2 475	2.693		-5.307
	26	2 480	-8.006		-16.006
Worst			<b>3.176</b>		<b>-4.824</b>

### 9.5.2. PSD TEST PLOTS



## 9.6. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.247 (d)

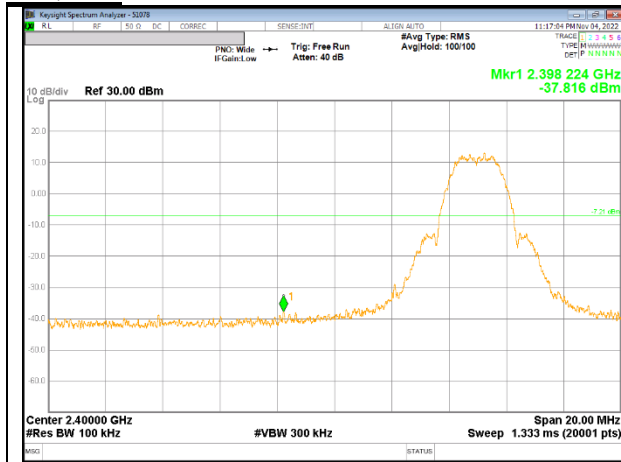
RSS-247 5.5

Output power was measured based on the use of a peak measurement.  
Therefore, spurious emissions are required to be 20 dBc.

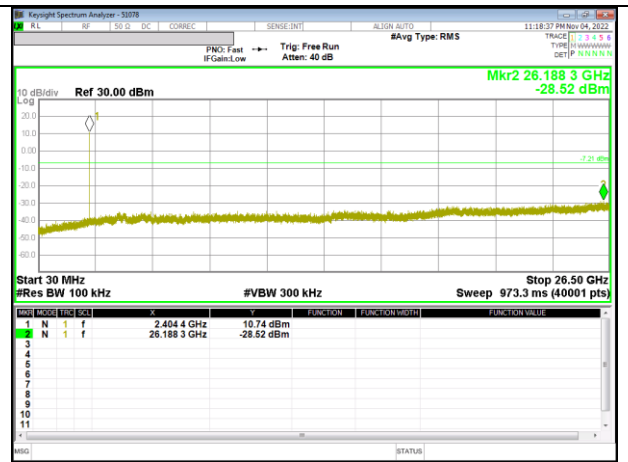
### RESULTS

### 9.6.1. Test plot

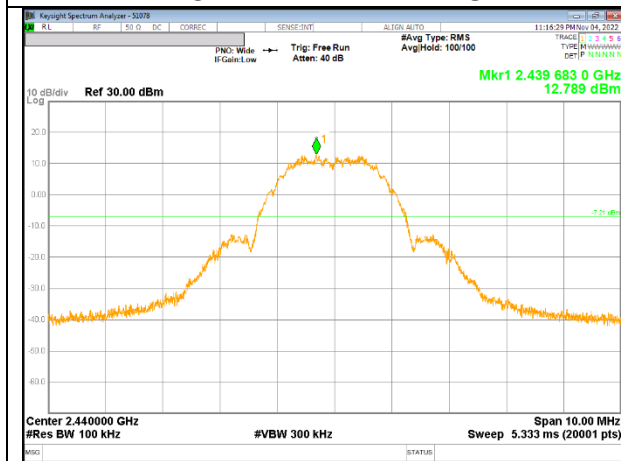
#### O-QPSK



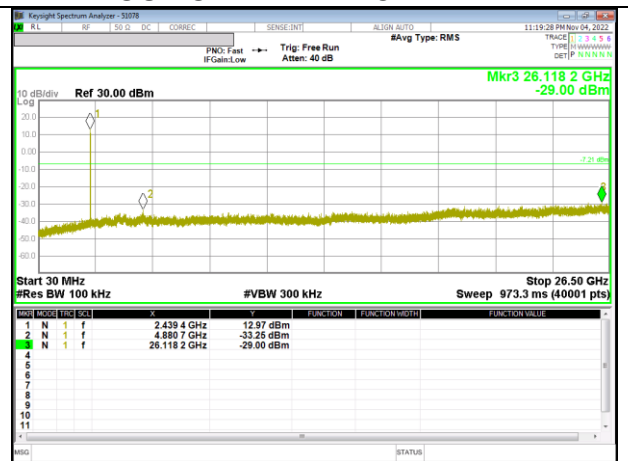
**11 CHANNEL BANDEDGE**



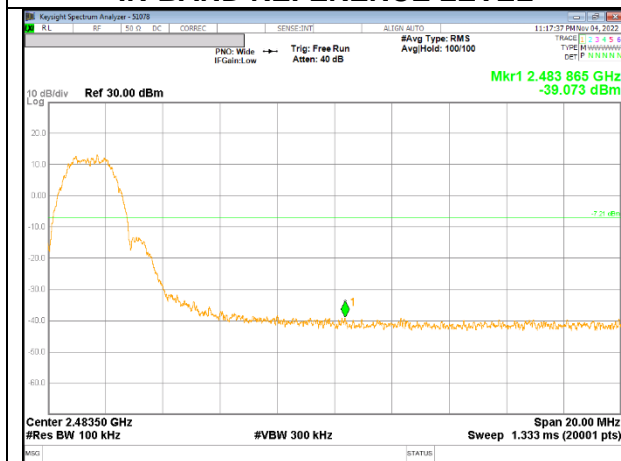
**OUT-OF-BAND 11 CHANNEL**



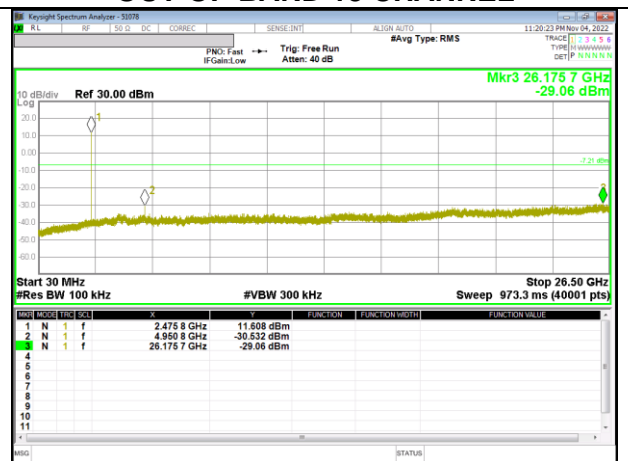
**IN-BAND REFERENCE LEVEL**



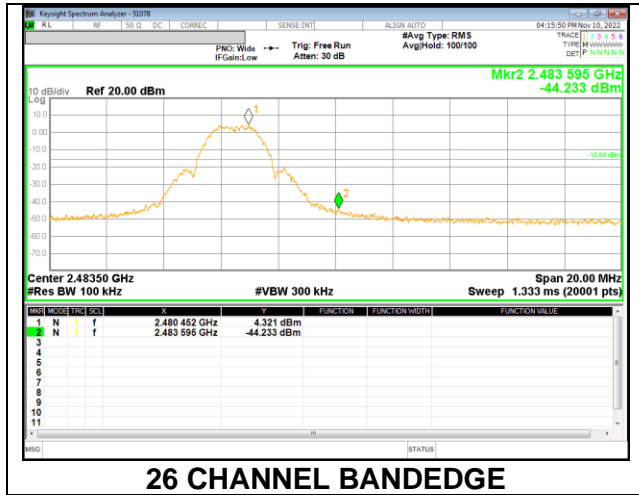
**OUT-OF-BAND 18 CHANNEL**



**25 CHANNEL BANDEDGE**



**OUT-OF-BAND 25 CHANNEL**





## 10. RADIATED TEST RESULTS

### 10.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits ( $\mu\text{V/m}$ )	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 band-edge, Final detection of spurious harmonic emissions)  
Duty cycle factor = 0.00(100%)

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.

Note : Emission was pre-scanned from 9kHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).  
Per FCC part 15.31(o), test results were not reported.

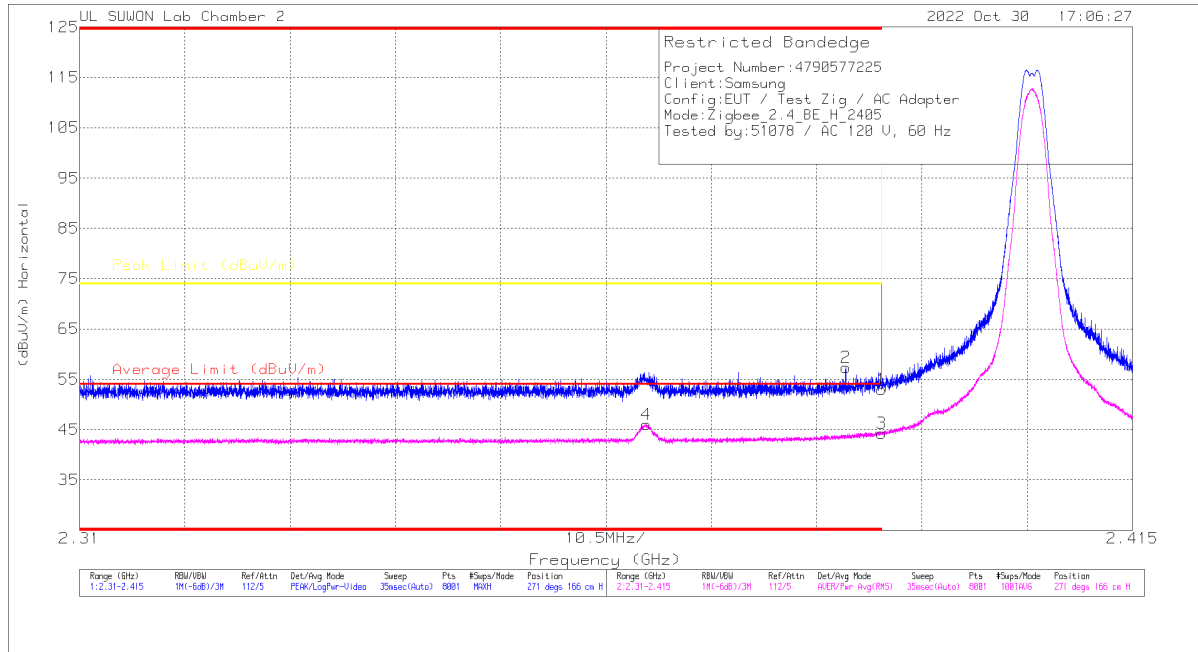
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.  
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

## 10.2. TRANSMITTER ABOVE 1 GHz

### 10.2.1. O-QPSK

#### BANDEDGE (11 CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

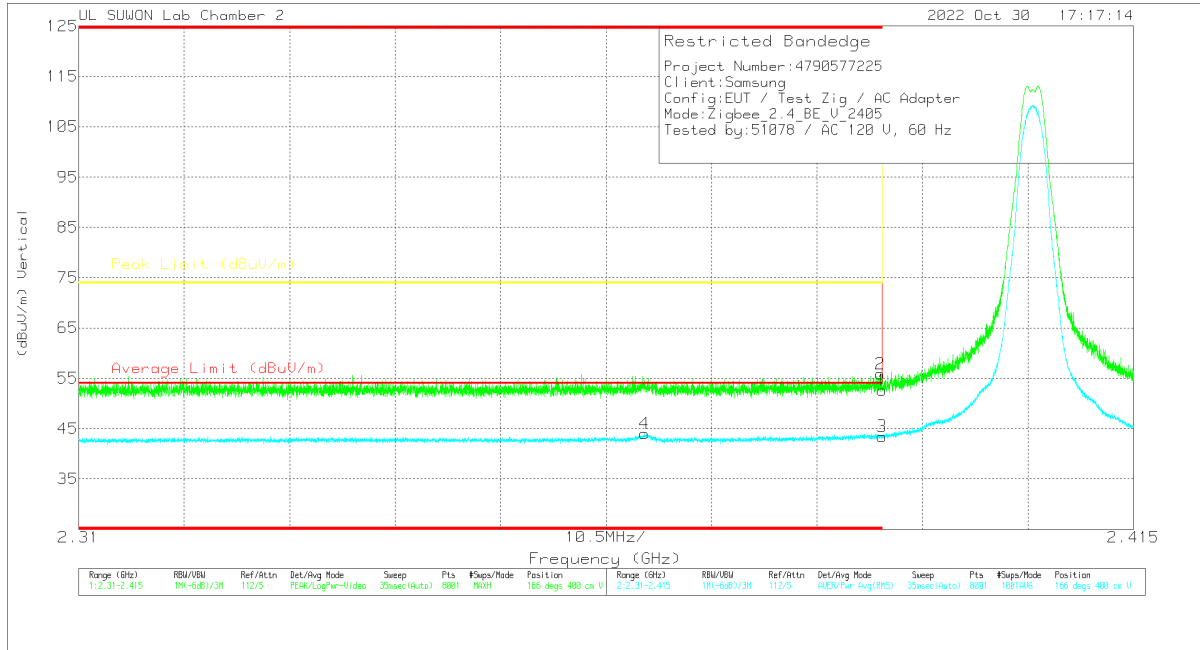
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.05	PK	31.7	-19.7	0	53.05	-	-	74	-20.95	271	166	H
2	* 2.3854	45.26	PK	31.7	-19.6	0	57.36	-	-	74	-16.64	271	166	H
3	* 2.39	32.27	RMS	31.7	-19.7	0	44.27	54	-9.73	-	-	271	166	H
4	* 2.36652	34.03	RMS	31.7	-19.7	0	46.03	54	-7.97	-	-	271	166	H

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

PK - Peak detector

RMS - RMS detection

### VERTICAL RESULT



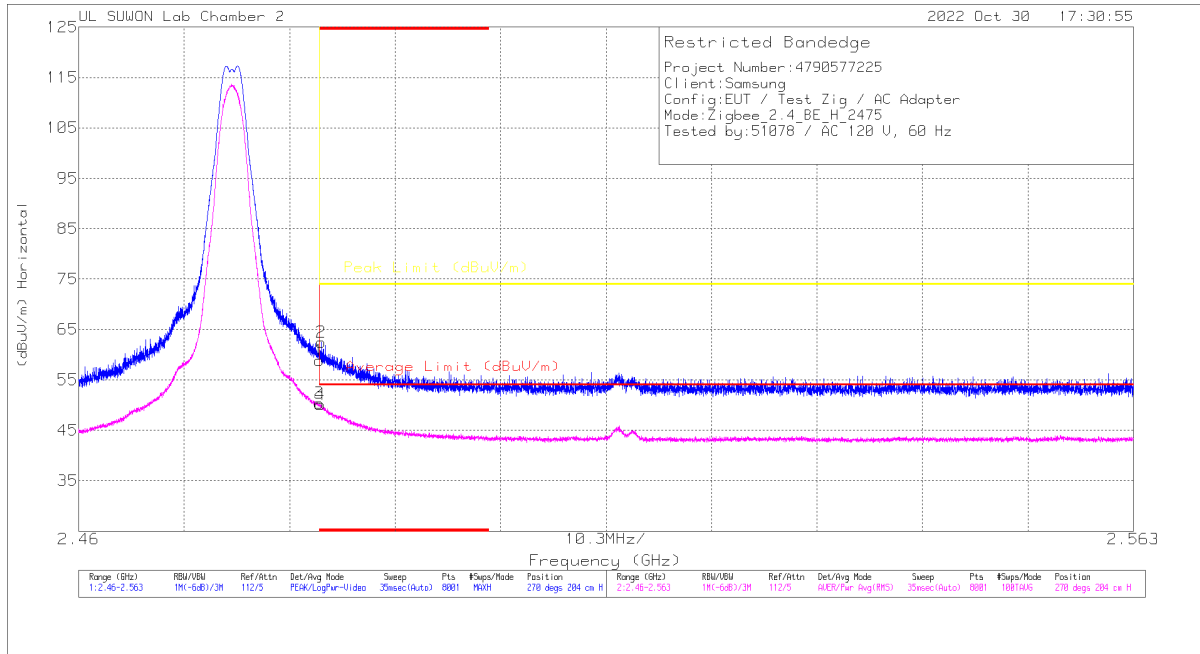
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Cor (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	40.65	Pk	31.7	-19.7	0	52.65	-	-	74	-21.35	166	400	V
2	* 2.38981	43.87	Pk	31.7	-19.7	0	55.87	-	-	74	-18.13	166	400	V
3	* 2.39	31.46	RMS	31.7	-19.7	0	43.46	54	-10.54	-	-	166	400	V
4	* 2.36636	32.02	RMS	31.7	-19.7	0	44.02	54	-9.98	-	-	166	400	V

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

**BANDEDGE (25 CHANNEL)**

**HORIZONTAL RESULT**

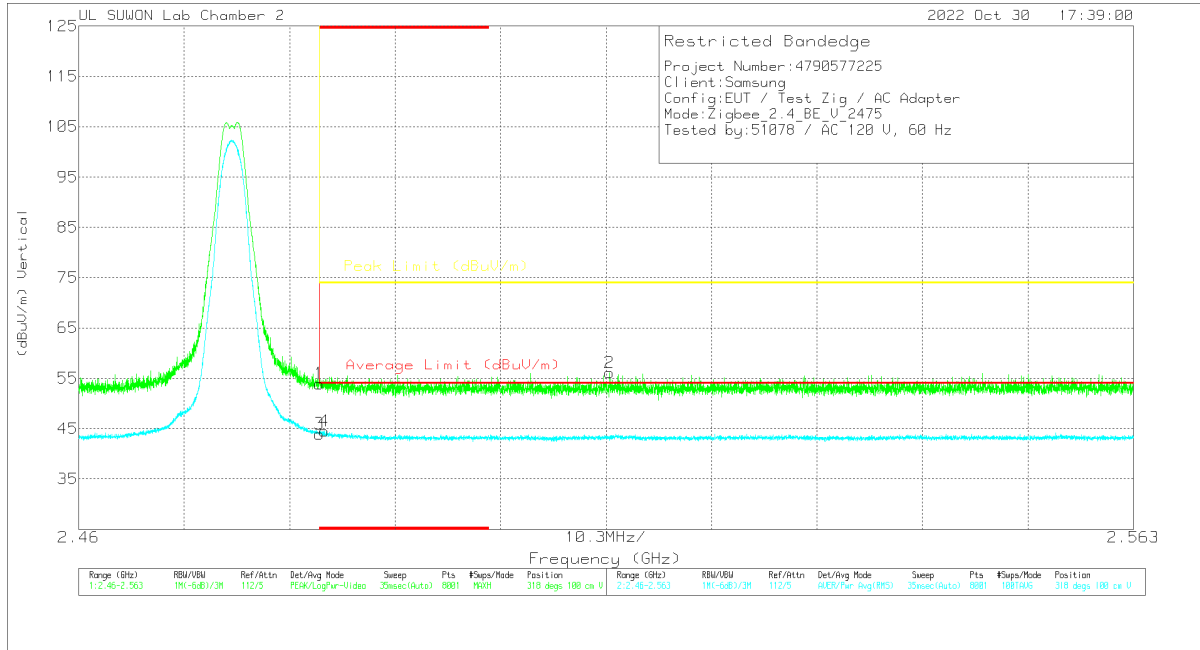


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBu/m)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBu/m)	Average Limit (dBu/m)	Margin (dB)	Peak Limit (dBu/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	49.58	Pk	31.9	-19.6	0	69.98	-	-	74	-15.12	270	204	H
2	* 2.48368	50.17	Pk	31.9	-19.6	0	62.47	-	-	74	-11.53	270	204	H
3	* 2.48351	38.04	RMS	31.9	-19.6	0	50.34	54	-3.66	-	-	270	204	H
4	* 2.48359	37.86	RMS	31.9	-19.6	0	50.16	54	-3.84	-	-	270	204	H

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

### VERTICAL RESULT



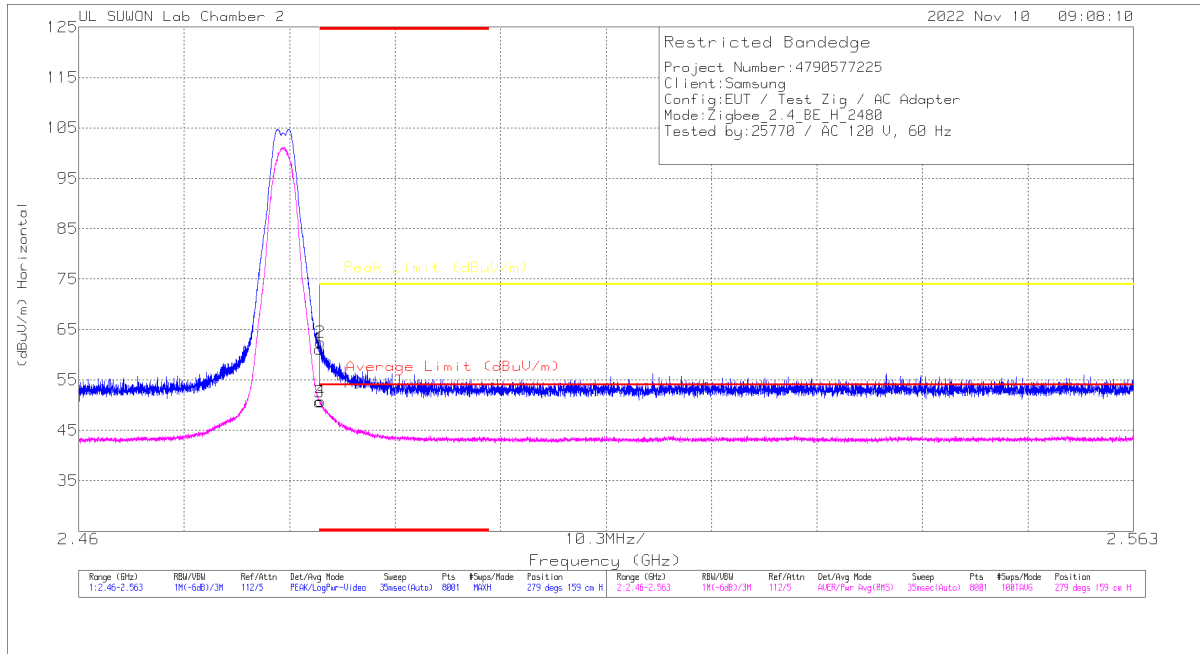
### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	* 2.48351	41.63	Pk	31.9	-19.6	0	53.93	-	-	74	-20.07	318	100	V
2	2.51181	43.66	Pk	31.9	-19.5	0	56.06	-	-	74	-17.94	318	100	V
3	* 2.48351	31.66	RMS	31.9	-19.6	0	43.96	54	-10.04	-	-	318	100	V
4	* 2.48399	32.25	RMS	31.9	-19.6	0	44.55	54	-9.45	-	-	318	100	V

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

**BANDEDGE (26 CHANNEL)**

**HORIZONTAL RESULT**

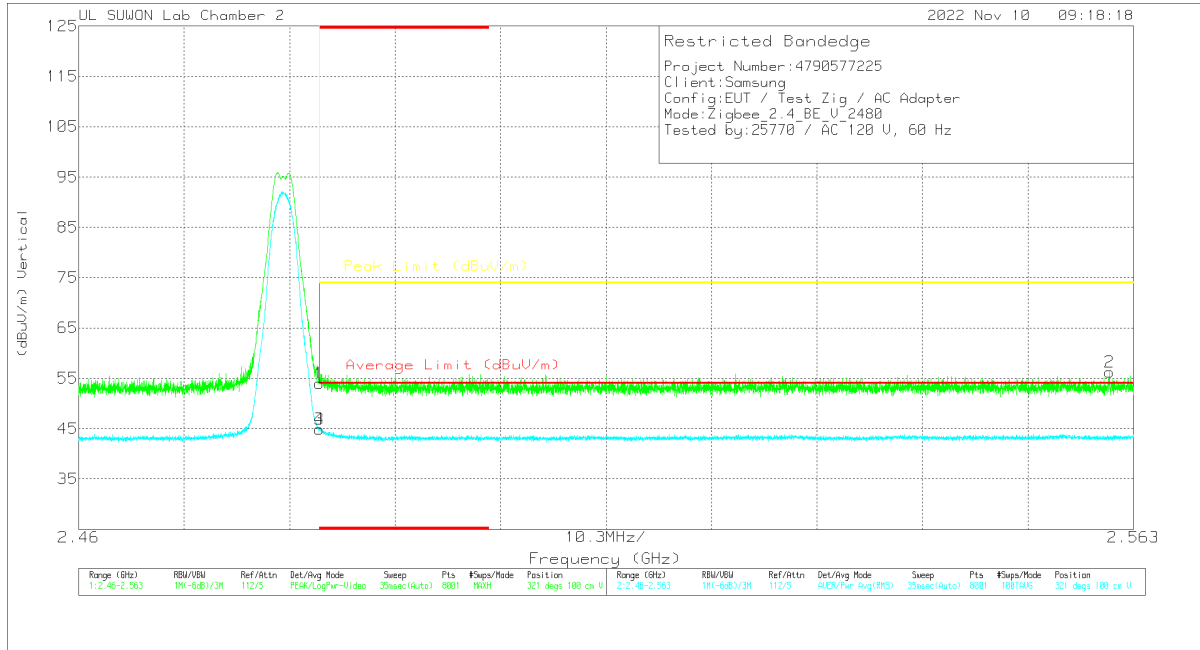


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[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	* 2.48351	49.86	Pk	31.9	-19.6	0	61.16	-	-	74	-12.84	279	159	H
2	* 2.4836	50.14	Pk	31.9	-19.6	0	62.44	-	-	74	-11.56	279	159	H
3	* 2.48351	38.29	RMS	31.9	-19.6	0	50.59	54	-3.41	-	-	279	159	H
4	* 2.48364	38.46	RMS	31.9	-19.6	0	50.76	54	-3.24	-	-	279	159	H

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

### VERTICAL RESULT



### Trace Markers

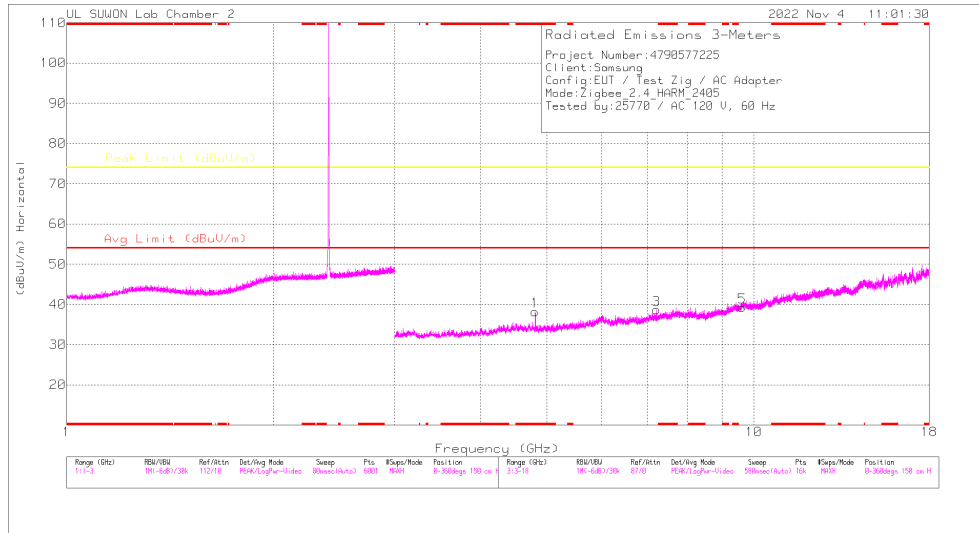
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.73	Pk	31.9	-19.6	0	54.03	-	-	74	-19.97	321	100	V
2	2.56066	43.79	Pk	32	-19.5	0	56.29	-	-	74	-17.71	321	100	V
3	* 2.48351	32.55	RMS	31.9	-19.6	0	44.85	54	-9.15	-	-	321	100	V
4	* 2.48352	32.65	RMS	31.9	-19.6	0	44.95	54	-9.05	-	-	321	100	V

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

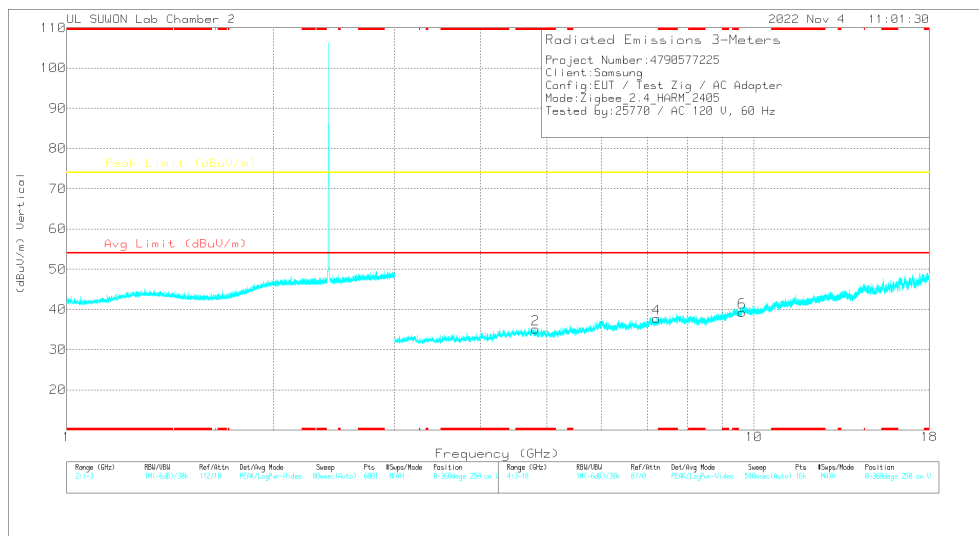


# HARMONICS AND SPURIOUS EMISSIONS

## 11 CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

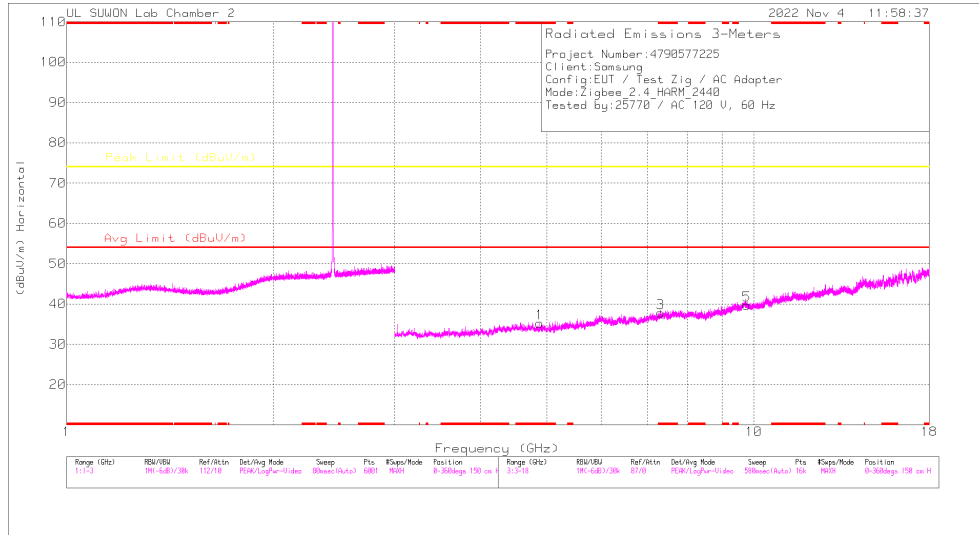
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

### Radiated Emissions

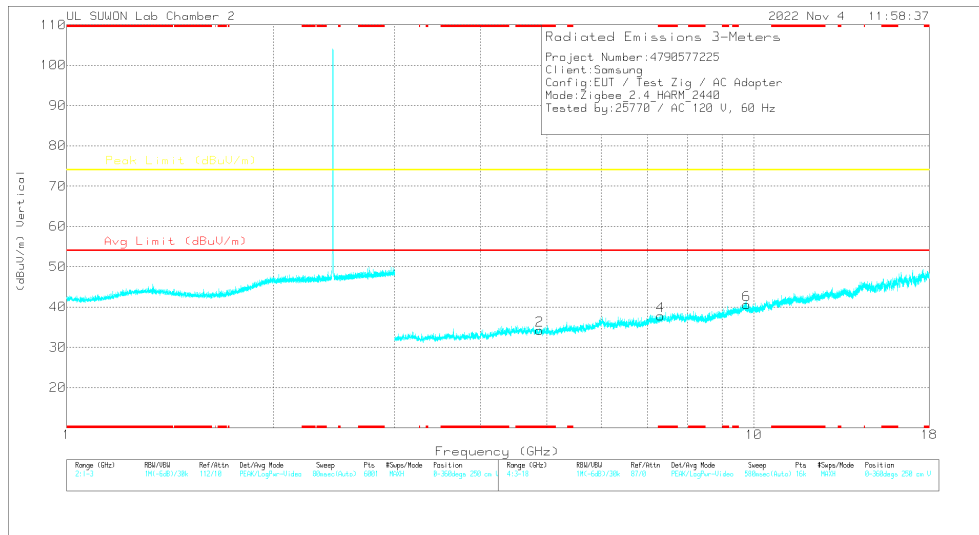
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80882	34.02	PK2	34	-27.7	0	40.32	-	-	74	-33.68	31	258	H
* 4.80892	29.54	MAV1	34	-27.7	0	35.84	54	-18.16	-	-	31	258	H
* 4.80897	38.31	PK2	34	-27.7	0	44.61	-	-	74	-29.39	42	100	V
* 4.81106	26.49	MAV1	34	-27.7	0	32.79	54	-21.21	-	-	42	100	V
7.21647	36.46	PK2	35.7	-25.1	0	47.06	-	-	74	-26.94	299	116	H
7.21647	36.42	PK2	35.7	-25.1	0	47.02	-	-	74	-26.98	48	118	V
9.62096	32.84	PK2	36.9	-21.2	0	48.54	-	-	74	-25.46	0	100	H
9.61781	33.11	PK2	36.9	-21.1	0	48.91	-	-	74	-25.09	0	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak  
 MAV1 - KDB558074 Option 1 Maximum RMS Average

### 18 CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

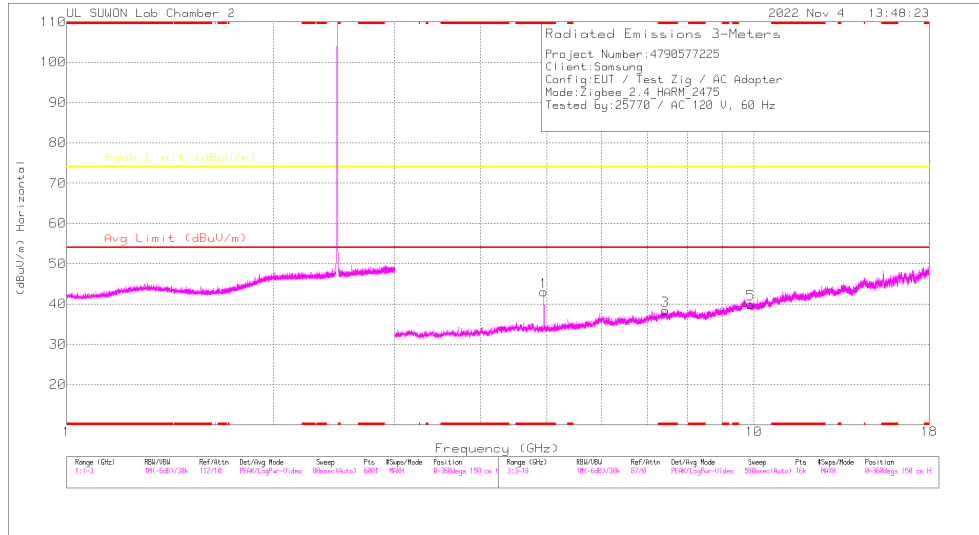
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

### Radiated Emissions

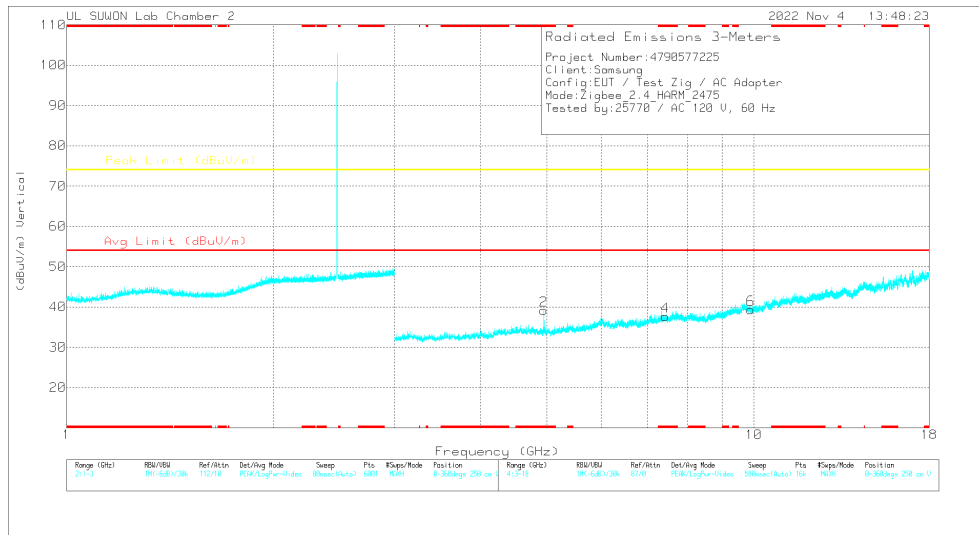
Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872_4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88096	39.84	PK2	34	-27.6	0	46.24	-	-	74	-27.76	38	123	H
* 4.88088	28.58	MAV1	34	-27.6	0	34.98	54	-19.02	-	-	38	123	H
* 4.88085	37.72	PK2	34	-27.6	0	44.12	-	-	74	-29.88	184	349	V
* 4.88093	26.42	MAV1	34	-27.6	0	32.82	54	-21.18	-	-	184	349	V
* 7.31875	36.76	PK2	35.7	-24.6	0	47.86	-	-	74	-26.14	285	380	H
* 7.31815	25.39	MAV1	35.7	-24.6	0	36.49	54	-17.51	-	-	285	380	H
* 7.31869	36.09	PK2	35.7	-24.6	0	47.19	-	-	74	-26.81	51	106	V
* 7.31819	24.98	MAV1	35.7	-24.6	0	36.08	54	-17.92	-	-	51	106	V
9.75921	32.44	PK2	37.1	-20.9	0	48.64	-	-	74	-25.36	0	100	H
9.76108	32.54	PK2	37.1	-21	0	48.64	-	-	74	-25.36	0	100	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak  
 MAV1 - KDB558074 Option 1 Maximum RMS Average

### 25 CHANNEL RESULTS



### HORIZONTAL



### 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.

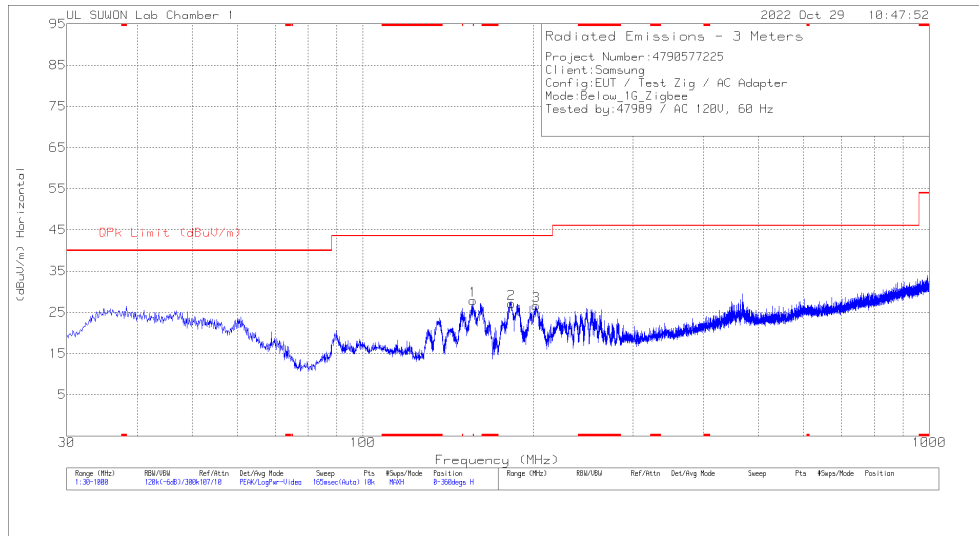
### Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	3117_0016872 4	3GHz_HP[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.9488	43.17	PK2	34	-27.1	0	50.07	-	-	74	-23.93	34	142	H
* 4.95094	35.39	MAv1	34	-27.1	0	42.29	54	-11.71	-	-	34	142	H
* 4.94873	41.29	PK2	34	-27.1	0	48.19	-	-	74	-25.81	53	396	V
* 4.95093	32.44	MAv1	34	-27.1	0	39.34	54	-14.66	-	-	53	396	V
* 7.42658	35.25	PK2	35.7	-23.6	0	47.35	-	-	74	-26.65	281	312	H
* 7.42648	24.36	MAv1	35.7	-23.6	0	36.46	54	-17.54	-	-	281	312	H
* 7.42862	34.49	PK2	35.7	-23.7	0	46.49	-	-	74	-27.51	0	100	V
9.90152	32.48	PK2	37.3	-21.2	0	48.58	-	-	74	-25.42	0	100	H
9.9007	32.29	PK2	37.3	-21.2	0	48.39	-	-	74	-25.61	0	100	V

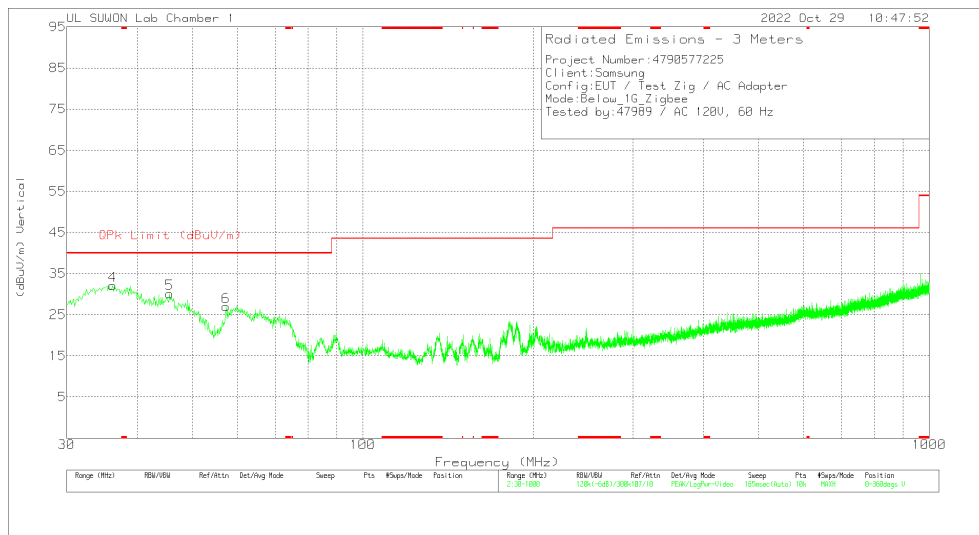
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak  
 MAv1 - KDB558074 Option 1 Maximum RMS Average

### 10.3. WORST CASE BELOW 1 GHz

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



**HORIZONTAL**



**VERTICAL**

#### Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_750	Below_1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	156.391	43.47	Pk	14.1	-29.7	27.87	43.52	-15.65	0-360	100	H
2	182.969	40.91	Pk	15.5	-29.3	27.11	43.52	-16.41	0-360	100	H
3	202.272	39.61	Pk	16.3	-29.3	26.61	43.52	-16.91	0-360	100	H
4	36.208	46.33	Pk	17	-31.2	32.13	40	-7.87	0-360	200	V
5	45.617	41.66	Pk	19.6	-31.1	30.16	40	-9.84	0-360	200	V
6	57.354	39.02	Pk	18.8	-30.8	27.02	40	-12.98	0-360	200	V

Pk - Peak detector

## 11. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> 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.

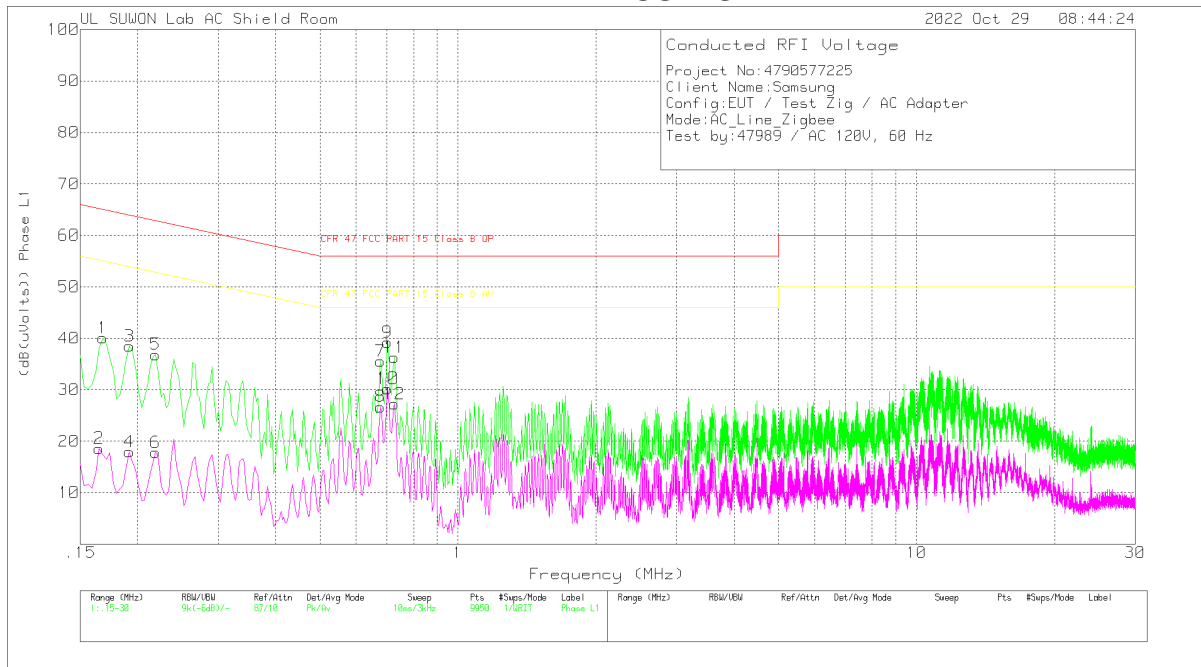
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

### RESULTS

### 11.1. AC Power Line

#### LINE 1 RESULTS



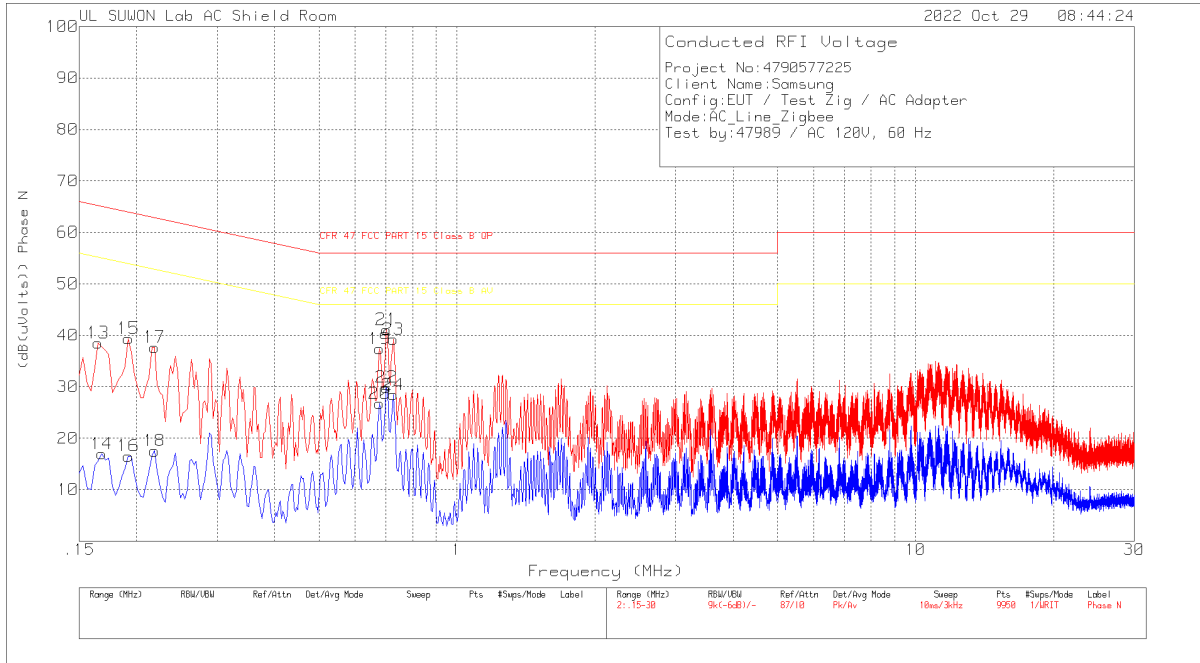
#### Trace Markers

Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_L1[dB]	CABLELOS S(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	.168	29.95	Pk	10	.1	40.05	65.06	-25.01	-	-
2	.165	8.57	Av	9.9	.1	18.57	-	-	55.21	-36.64
3	.192	28.36	Pk	9.9	.2	38.46	63.95	-25.49	-	-
4	.192	7.85	Av	9.9	.2	17.95	-	-	53.95	-36
5	.219	26.93	Pk	9.7	.2	36.83	62.86	-26.03	-	-
6	.219	7.9	Av	9.7	.2	17.8	-	-	52.86	-35.06
7	.678	25.55	Pk	9.8	.2	35.55	56	-20.45	-	-
8	.678	16.68	Av	9.8	.2	26.68	-	-	46	-19.32
9	.702	29.2	Pk	9.8	.2	39.2	56	-16.8	-	-
10	.702	20.2	Av	9.8	.2	30.2	-	-	46	-15.8
11	.726	26.28	Pk	9.8	.2	36.28	56	-19.72	-	-
12	.726	17.24	Av	9.8	.2	27.24	-	-	46	-18.76

Pk - Peak detector  
 Av - Average detection

### LINE 2 RESULTS



#### Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_Wit h EX_N[dB]	CABLELOS S(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	.165	28.5	Pk	9.9	.1	38.5	65.21	-26.71	-	-
14	.168	6.84	Av	10	.1	16.94	-	-	55.06	-38.12
15	.192	29.25	Pk	9.9	.2	39.35	63.95	-24.6	-	-
16	.192	6.44	Av	9.9	.2	16.54	-	-	53.95	-37.41
17	.219	27.65	Pk	9.8	.2	37.65	62.86	-25.21	-	-
18	.219	7.54	Av	9.8	.2	17.54	-	-	52.86	-35.32
19	.678	27.36	Pk	9.8	.2	37.36	56	-18.64	-	-
20	.678	16.75	Av	9.8	.2	26.75	-	-	46	-19.25
21	.702	31.07	Pk	9.8	.2	41.07	56	-14.93	-	-
22	.702	19.86	Av	9.8	.2	29.86	-	-	46	-16.14
23	.726	29.22	Pk	9.8	.2	39.22	56	-16.78	-	-
24	.726	18.44	Av	9.8	.2	28.44	-	-	46	-17.56

Pk - Peak detector  
 Av - Average detection

## END OF TEST REPORT