



CERTIFICATION TEST REPORT

Report Number. : 4790577225-FR1V2

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	2022-11-23	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:



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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 DTS 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. 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:

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

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 RULE

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 (WLAN) operational mode.

WiFi operating mode

Frequency rage	Mode	ANT 1
2.4GHz (2412 MHz ~ 2472 MHz)	802.11b SISO	TX/RX
	802.11g SISO	TX/RX
	802.11n(HT20) SISO	TX/RX

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range [MHz]	Mode	Output Power [dBm]	Output Power [mW]
2412 - 2472	802.11b SISO	17.48	55.98
	802.11g SISO	15.50	35.48
	802.11n(HT20) SISO	14.48	28.05

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 3.5 dBi.

5.4. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b [SISO]	11g [SISO]	11n(HT20) [SISO]
1	2 412	O	O	O
6	2 437	O	O	O
11	2 462	O	O	O
12	2 467	O	O	O
13	2 472	O	O	O

Note: Tested channels are applied to all test items.

- Target power and test case

SISO Target[dBm]				
Ch.	Freq.	802.11b	802.11g	802.11n HT20
1	2412	17.5	15	14.5
6	2437	17.5	15	14.5
11	2462	17.5	15	14.5
12	2467	10	10	10
13	2472	4.5	5.5	5.5

	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 spurious test of 12&13 channels was replaced with 1 (low), 6 (mid), and 11 (high) channel tests with high target power and density.

5.5. 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

Based on the baseline scan, the worst-case data rates were:

- 802.11b mode: 1 Mbps 1TX
- 802.11g mode: 6 Mbps 1TX
- 802.11n HT20 mode: MCS0 1TX

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

5.6. 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

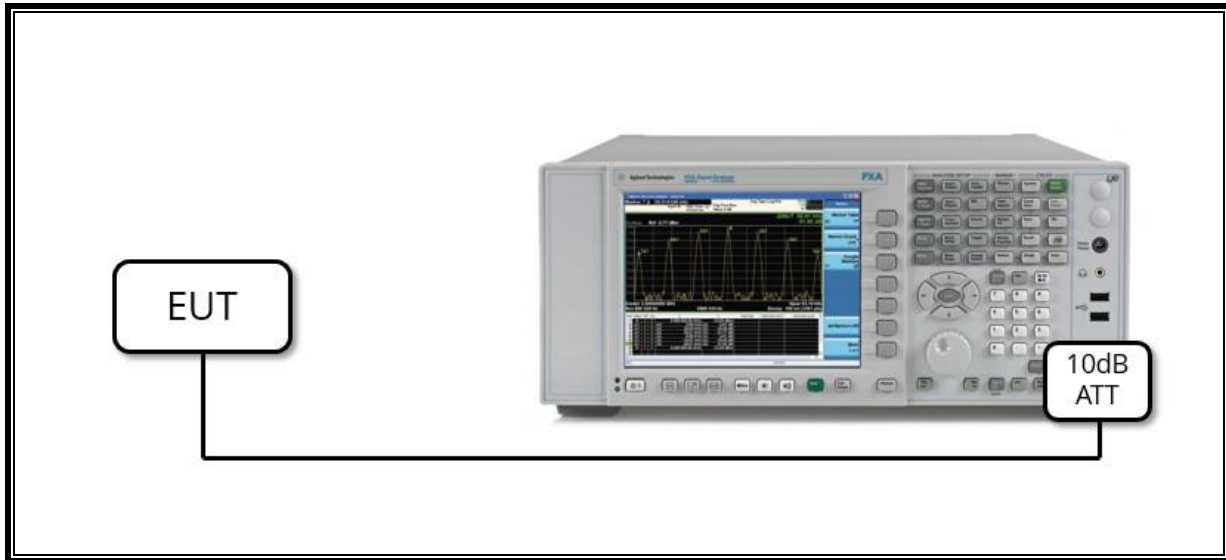
I/O CABLE

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

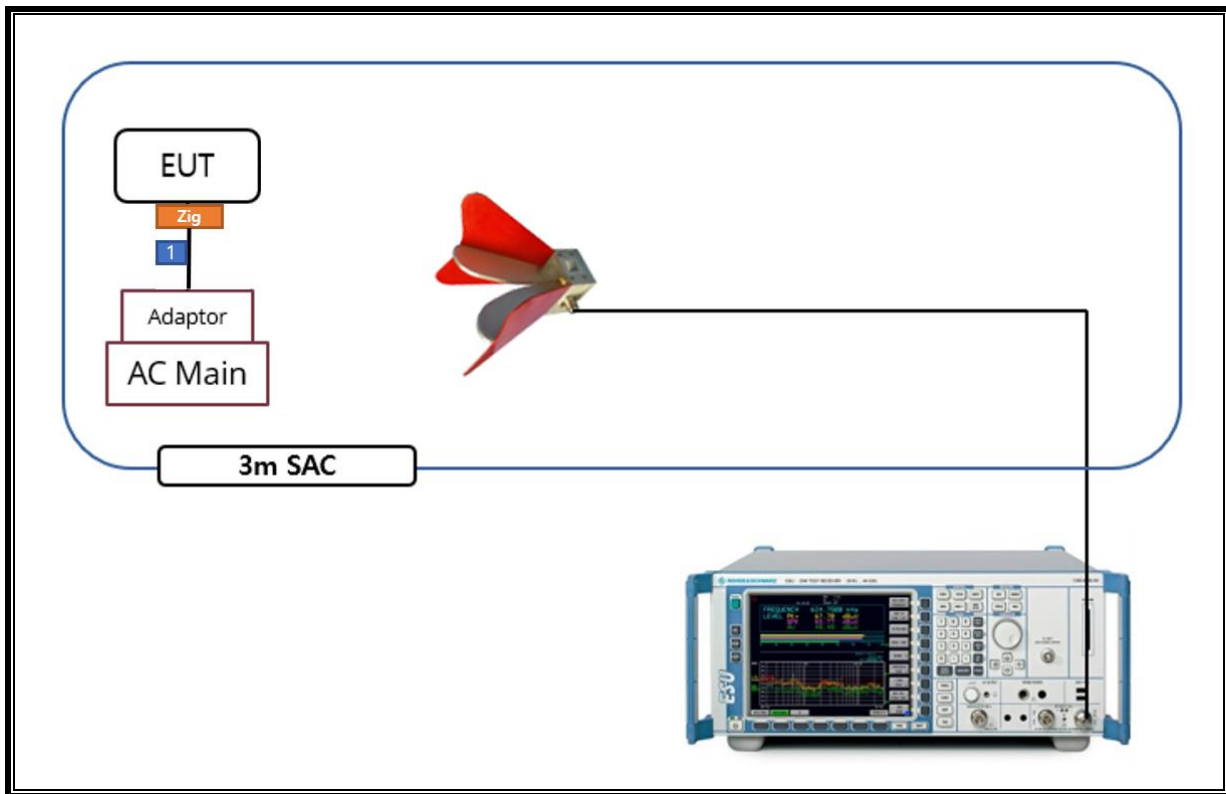
TEST SETUP

The EUT is a stand-alone unit during the tests.
 Test software in hidden menu exercised the EUT to enable DTS 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 11.9.2.3.1 Method AVGPM

POWER SPECTRAL DENSITY : ANSI C63.10-2013, Section 11.10.3 & 11.10.5 Method AVGPSD-1 and Method AVGPSD-2

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. SUMMARY TABLE

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	-30 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

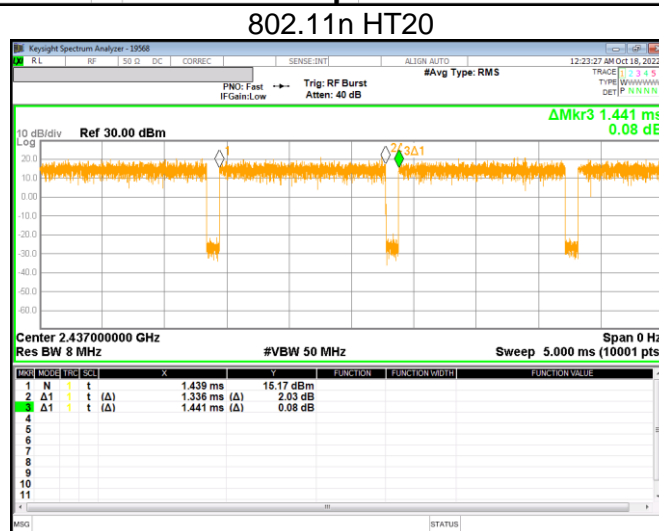
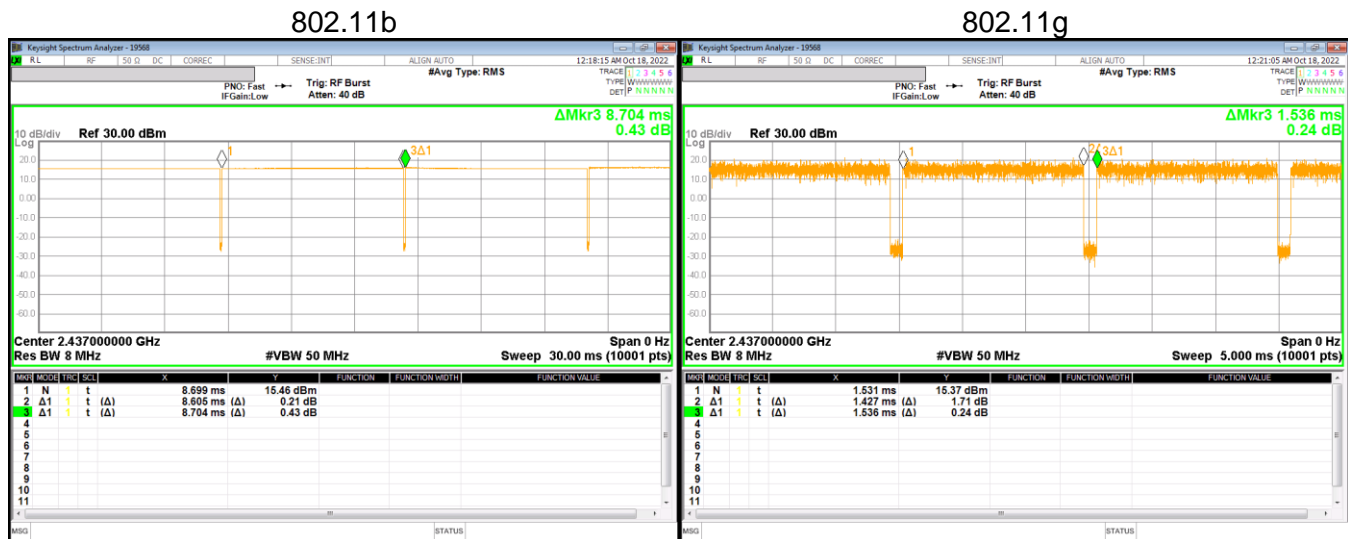
9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]
802.11b SISO	8.605	8.704	0.989	98.863	-
802.11g SISO	1.427	1.536	0.929	92.904	0.32
802.11n(HT20) SISO	1.336	1.441	0.927	92.713	0.33

Note. According to ANSI C63.10 Section 11.6, do not apply the Duty Cycle Correction Factor judging that a duty cycle of greater than or equal to 98% is continuous signal.



9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

TEST PROCEDURE

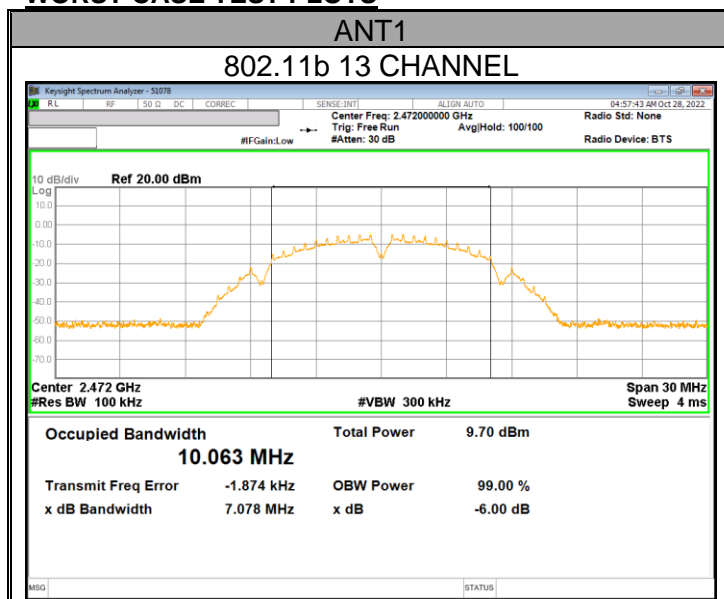
Reference to KDB 558074 D01 15.247 Meas Guidance: The transmitter output is connected to a spectrum analyzer with the RBW set to 100 kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

ANSI C63.10-2013, Section 11.8.1

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



9.2.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
		ANT 1	
1	2 412	7.545	0.5
6	2 437	7.554	
11	2 462	7.568	
12	2 467	7.539	
13	2 472	7.078	
Worst		7.078	

9.2.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
		ANT 1	
1	2 412	15.160	0.5
6	2 437	15.720	
11	2 462	15.700	
12	2 467	16.070	
13	2 472	16.300	
Worst		15.160	

9.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
		ANT 1	
1	2 412	15.160	0.5
6	2 437	16.350	
11	2 462	16.100	
12	2 467	16.660	
13	2 472	17.280	
Worst		15.160	

9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

Measurements perform using a wideband RF frame average power sensor. The cable assembly insertion loss and duty cycle correction factor was entered as an offset in the power sensor to allow for direct reading of power. Output power measurement was performed utilizing the 8.3.2.3 under KDB558074 D01 15.247 Meas Guidance.

ANSI C63.10-2013, Section 11.9.2.3.1 Method AVGPM

9.3.1. TEST RESULTS

- 802.11b,g,n HT20 mode

Mode	Channel	Frequency [MHz]	Average Power [dBm]	Power Limit [dBm]
802.11b	1	2 412	17.40	30.00
	6	2 437	17.22	
	11	2 462	17.48	
	12	2 467	8.70	
	13	2 472	3.50	
Worst Case			17.48	
802.11g	1	2 412	15.25	
	6	2 437	15.13	
	11	2 462	15.50	
	12	2 467	9.45	
	13	2 472	5.01	
Worst Case			15.50	
802.11n HT20	1	2 412	14.38	
	6	2 437	14.24	
	11	2 462	14.48	
	12	2 467	9.12	
	13	2 472	4.70	
Worst Case			14.48	

- Calculation of Output Power result
 Average Power = Meas. Power + Duty Cycle CF

9.4. 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

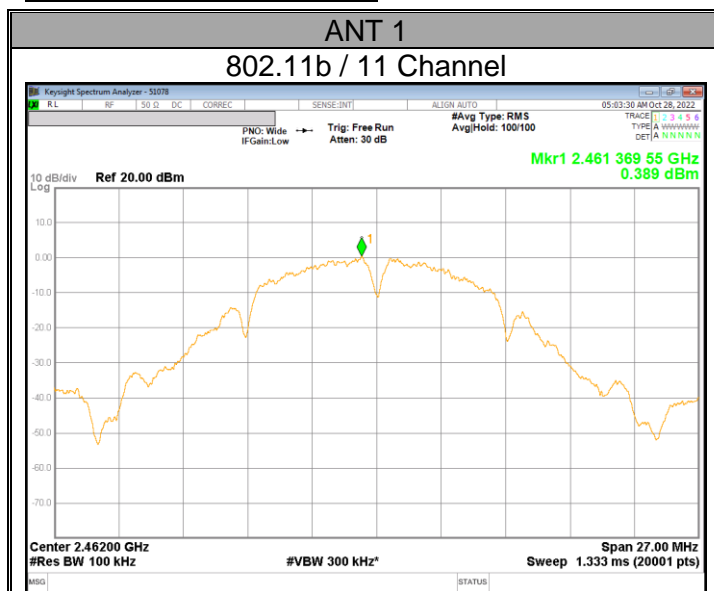
Power Spectral Density was performed utilizing the section 8.4 under KDB558074 D01 15.247 Meas Guidance.

ANSI C63.10-2013, Section 11.10.3 & 11.10.5

RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS



9.4.1. 802.11b/g/n HT20 MODE TEST RESULTS

Mode	Channel	Frequency [MHz]	Meas PSD [dBm/100kHz]	DCCF	Total Corr'd PSD [dBm/100kHz]	PSD Limit [dBm/3kHz]
802.11b	1	2 412	-0.45	0.00	-0.45	8.00 ^{Note}
	6	2 437	0.12	0.00	0.12	
	11	2 462	0.39	0.00	0.39	
	12	2 467	-7.79	0.00	-7.79	
	13	2 472	-12.57	0.00	-12.57	
802.11g	1	2 412	-3.53	0.32	-3.21	
	6	2 437	-4.41	0.32	-4.09	
	11	2 462	-3.48	0.32	-3.16	
	12	2 467	-8.85	0.32	-8.53	
	13	2 472	-13.30	0.32	-12.98	
802.11n HT20	1	2 412	-4.78	0.33	-4.45	
	6	2 437	-5.54	0.33	-5.21	
	11	2 462	-4.50	0.33	-4.17	
	12	2 467	-9.55	0.33	-9.22	
	13	2 472	-13.89	0.33	-13.56	

- Calculation of Output PSD result

- 1TX : Corr'd PSD = Meas PSD + Duty Cycle CF

Note1. RBW 100kHz measurement data is lower than 3kHz limit.

9.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 5.5

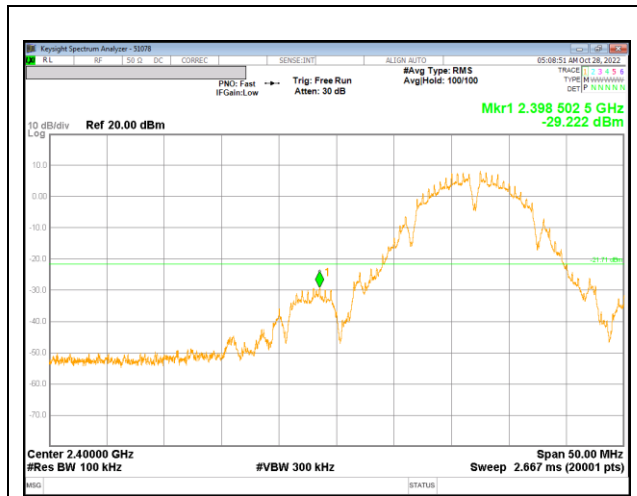
Output power was measured based on the use of average measurement, therefore the required attenuation is 30 dB.

TEST PROCEDURE

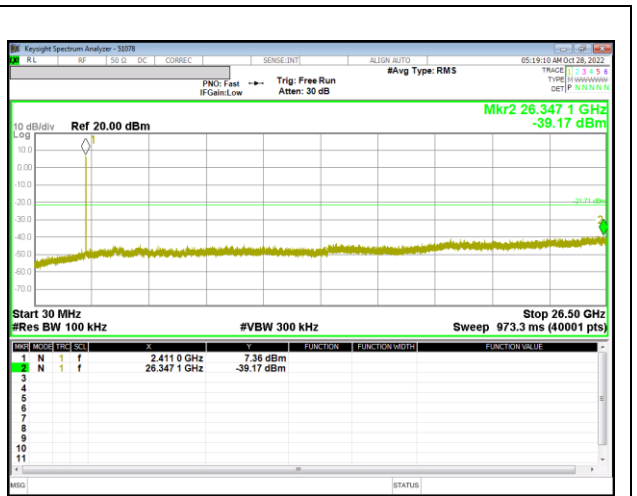
KDB 558074 D01 v05r02, Section 8.5
ANSI C63.10-2013, Section 11.11.3

RESULTS

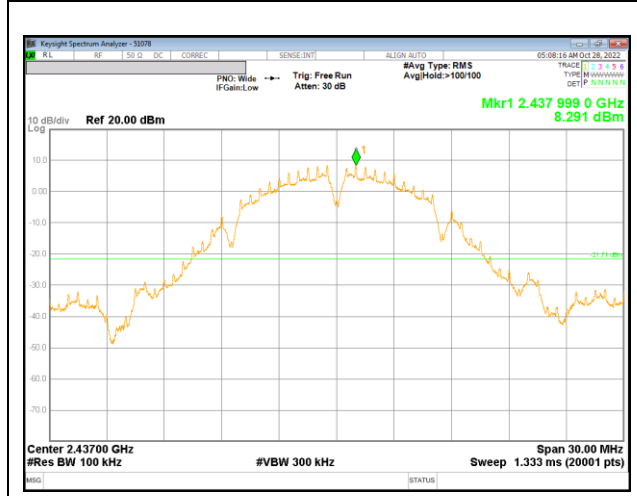
9.5.1. 802.11b MODE



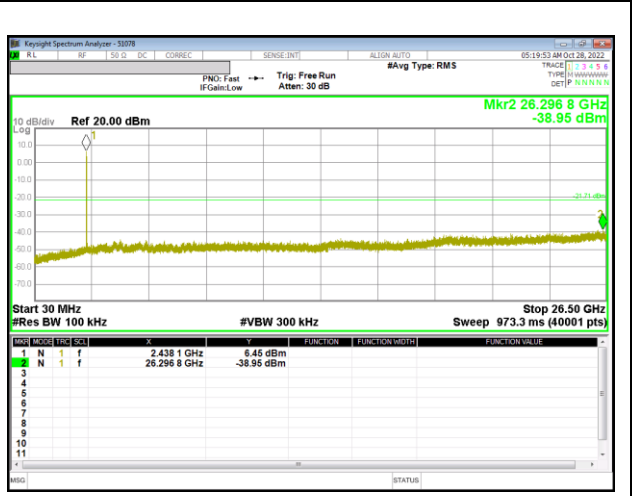
1 Channel Band-edge



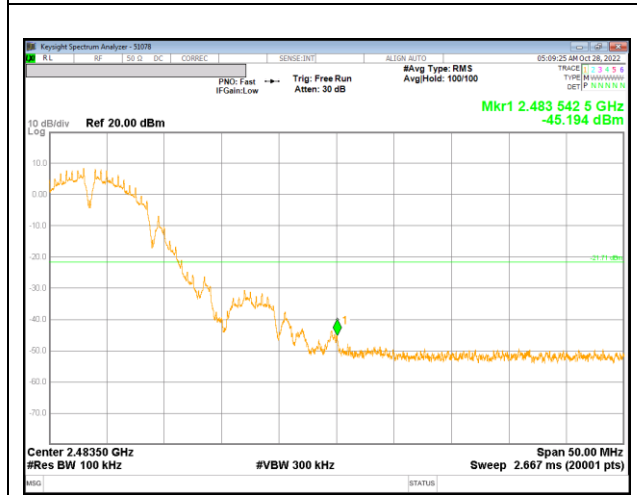
Out-Of-Band 1 Channel



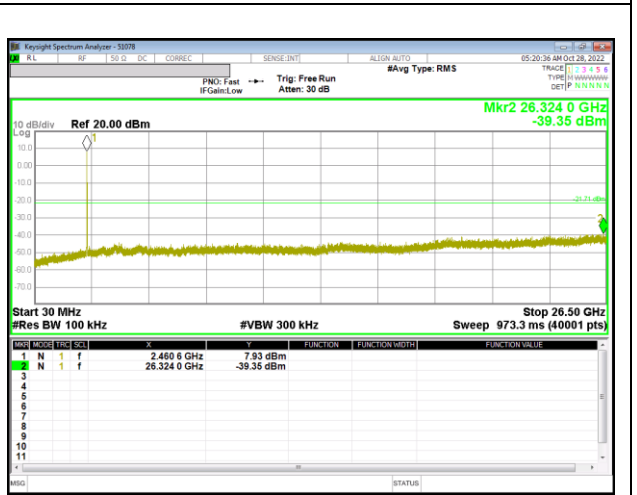
In-Band Reference Level



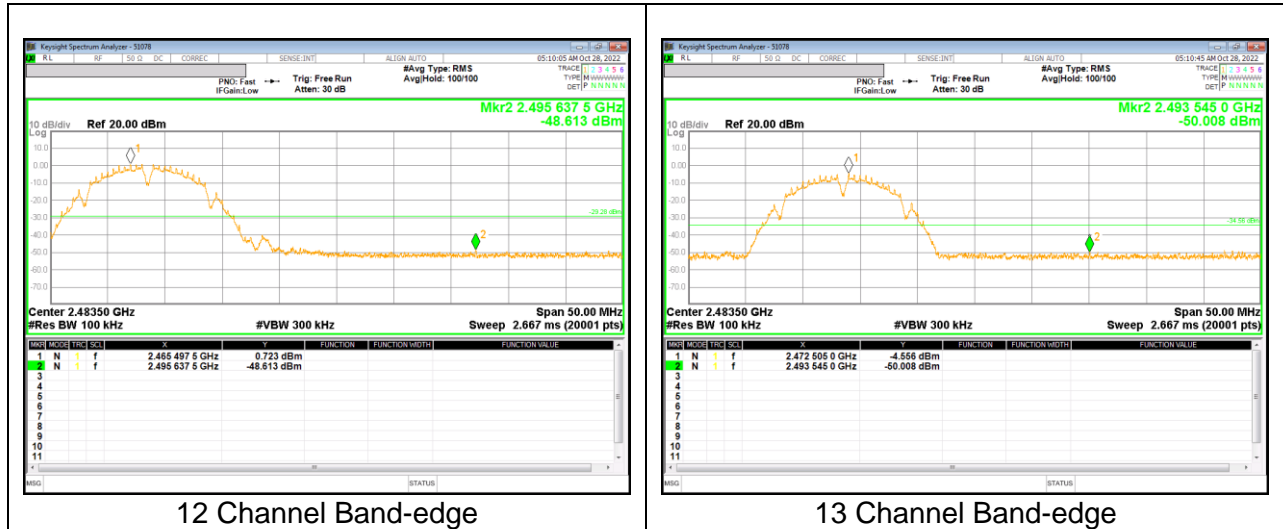
Out-Of-Band 6 Channel



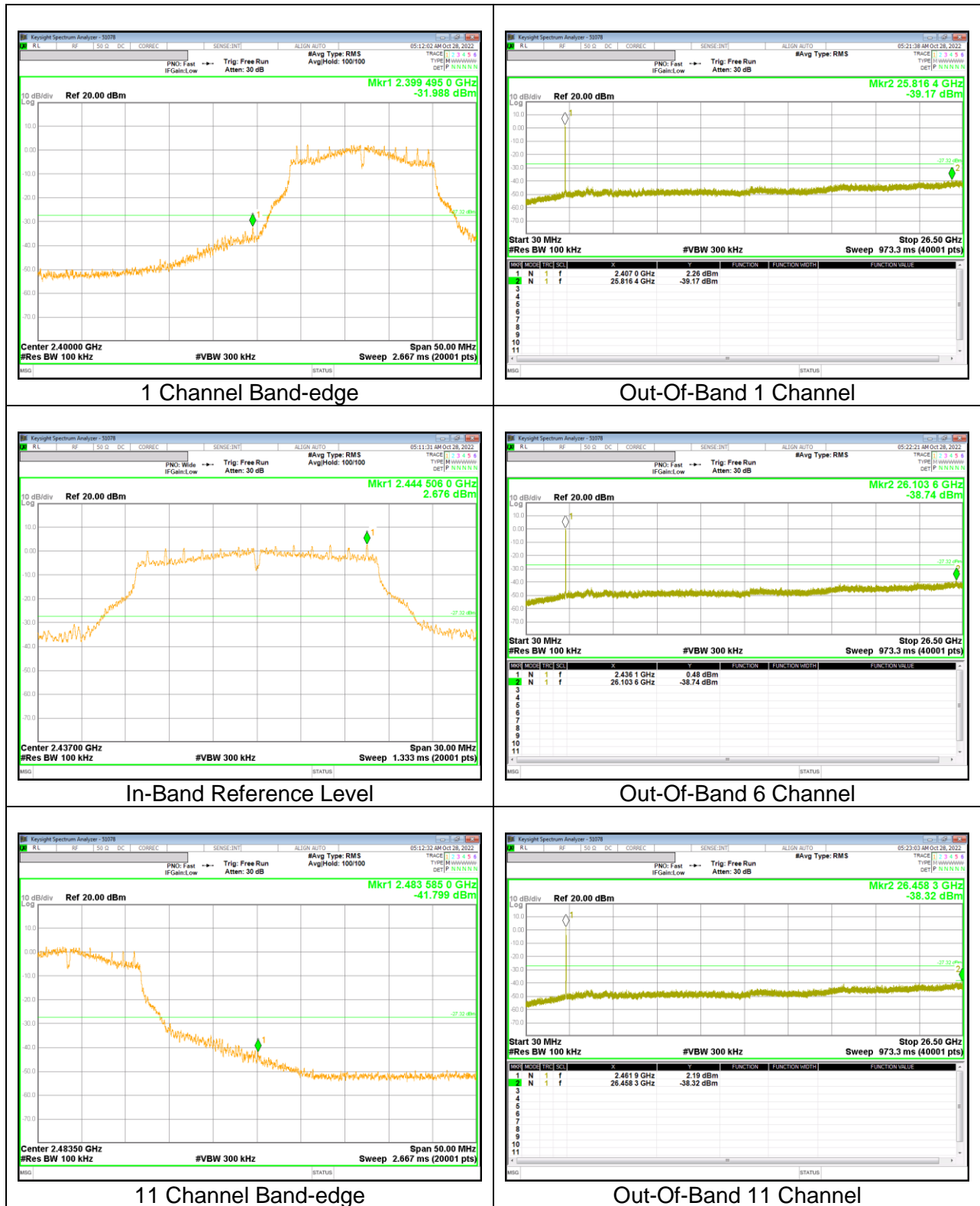
11 Channel Band-edge

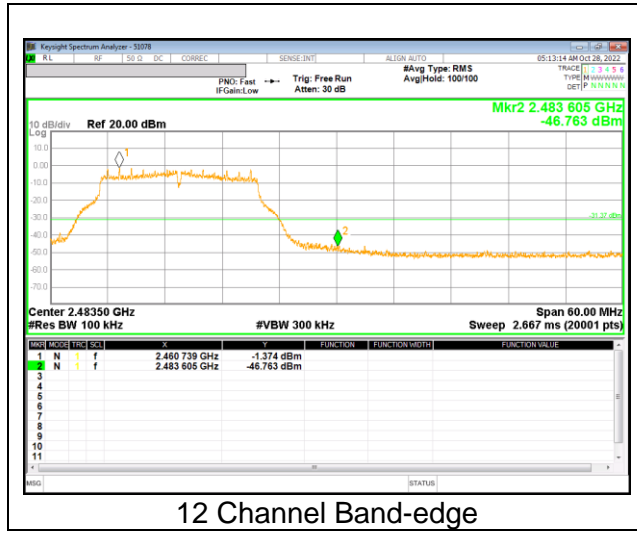


Out-Of-Band 11 Channel

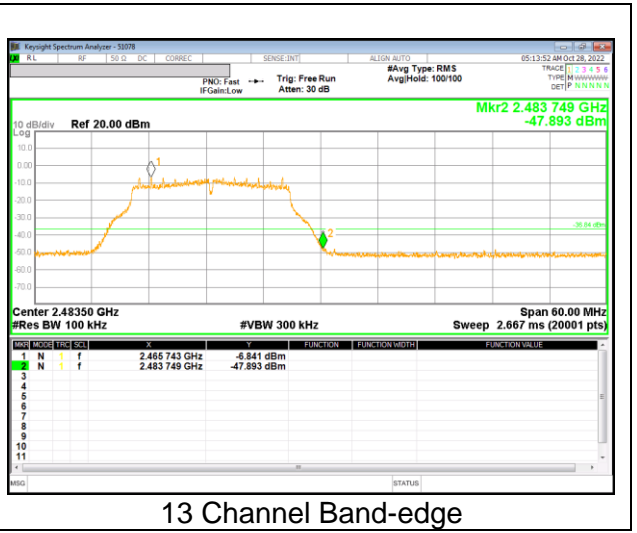


9.5.2. 802.11g MODE





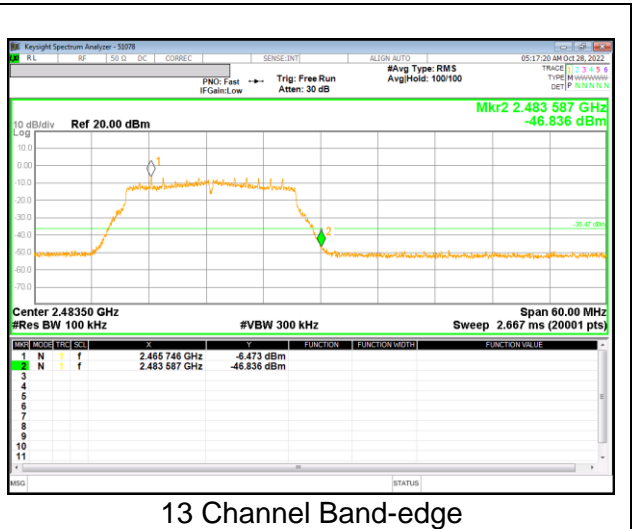
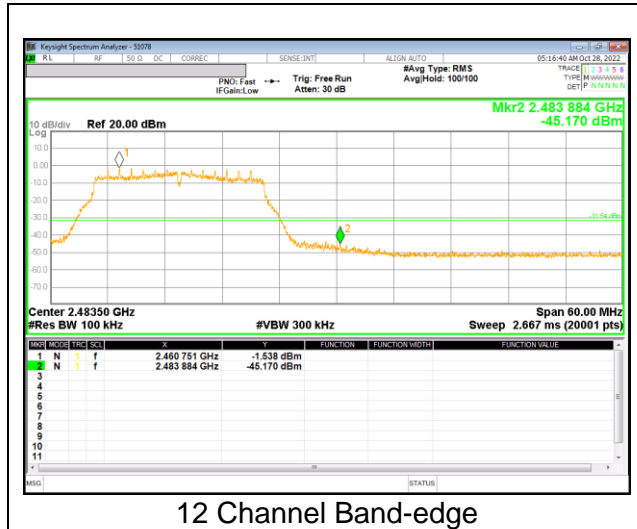
12 Channel Band-edge



13 Channel Band-edge

9.5.3. 802.11n HT20 MODE





10. RADIATED TEST RESULTS

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.

FCC Part 15.205 (a) : Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 – 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 – 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	156.7 ~ 156.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	162.0125 ~	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	167.17	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	167.72 ~ 173.2	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	240 ~ 285	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	322 ~ 335.4	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	399.90 ~ 410	3345.8 ~ 3358		
		608 ~ 614	3600 ~ 4400		
		960 ~ 1240			

▪ FCC Part 15.205(b) : The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1 GHz and 150 cm for above 1 GHz. 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; 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:

802.11b SISO mode = 0.00 dB (duty cycle > 98%);
802.11g SISO mode = 0.32 dB (duty cycle = 92.90%);
802.11n(HT20) SISO mode = 0.33 dB (duty cycle = 92.71%);

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 each applicable 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 9 kHz to 30 MHz; 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.

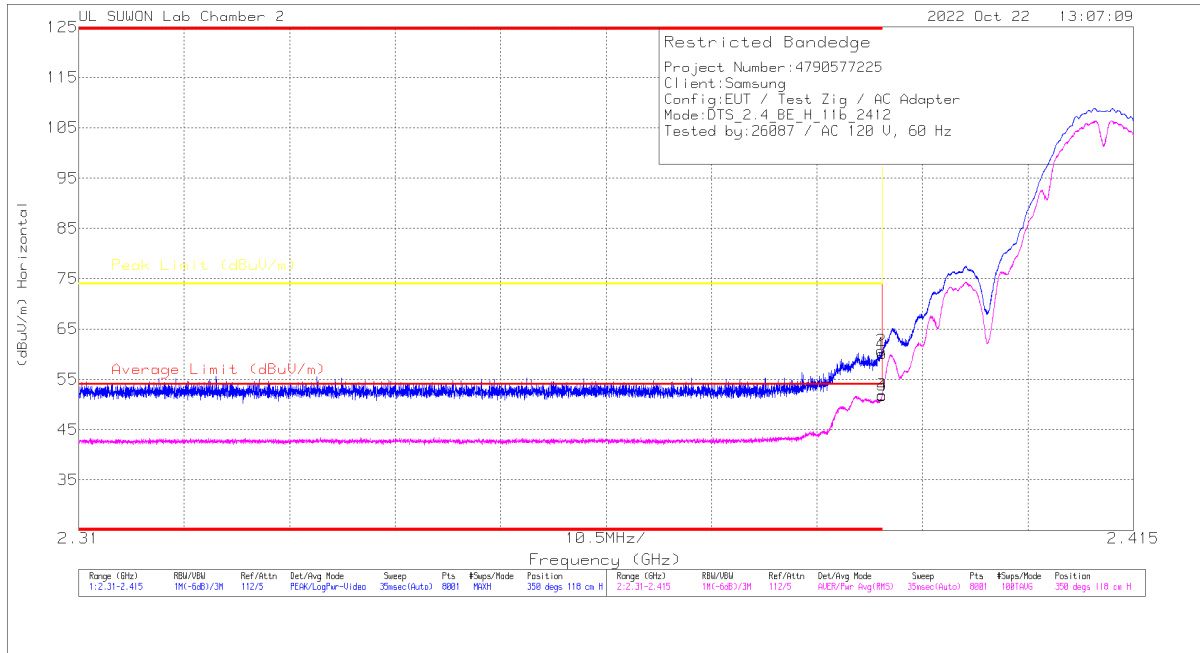
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

BANDEDGE (ANT1 WORST CASE: 1 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	48.07	Pk		-19.7	0	60.07	-	-	74	-13.93	350	118	H
2	* 2.38991	48.72	Pk		-19.7	0	60.72	-	-	74	-13.28	350	118	H
3	* 2.39	39.87	RMS		-19.7	0	51.87	54	-2.13	-	-	350	118	H
4	* 2.38996	39.74	RMS		-19.7	0	51.74	54	-2.26	-	-	350	118	H

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

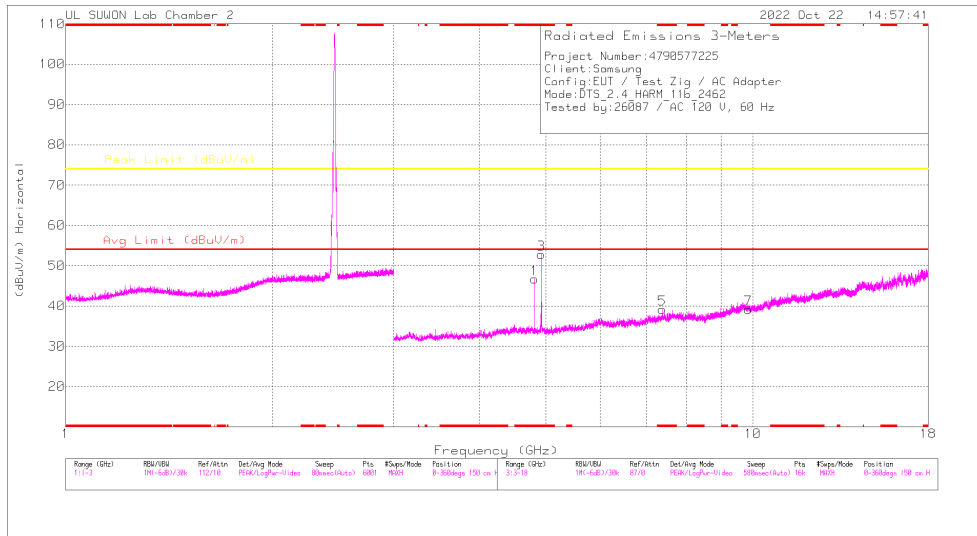
BANEDGE TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 2.39	48.07	Pk	31.70	-19.70	0.00	60.07	-	-	74.00	-13.93	350	118	H	
		* 2.38991	48.72	Pk	31.70	-19.70	0.00	60.72	-	-	74.00	-13.28	350	118	H	
		* 2.39	39.87	RMS	31.70	-19.70	0.00	51.87	54.00	-2.13	-	-	-	350	118	H
		* 2.38996	39.74	RMS	31.70	-19.70	0.00	51.74	54.00	-2.26	-	-	-	350	118	H
		* 2.39	43.30	Pk	31.70	-19.70	0.00	55.30	-	-	-	74.00	-18.70	76	124	V
		* 2.38742	44.07	Pk	31.70	-19.60	0.00	56.17	-	-	-	74.00	-17.83	76	124	V
		* 2.39	33.14	RMS	31.70	-19.70	0.00	45.14	54.00	-8.86	-	-	-	76	124	V
		* 2.38741	33.25	RMS	31.70	-19.60	0.00	45.35	54.00	-8.65	-	-	-	76	124	V
		* 2.48351	45.75	Pk	31.90	-19.60	0.00	58.05	-	-	-	74.00	-15.95	341	155	H
		* 2.48359	46.72	Pk	31.90	-19.60	0.00	59.02	-	-	-	74.00	-14.98	341	155	H
2462	ANT1	* 2.48351	39.47	RMS	31.90	-19.60	0.00	51.77	54.00	-2.23	-	-	341	155	H	
		* 2.48356	38.91	RMS	31.90	-19.60	0.00	51.21	54.00	-2.79	-	-	341	155	H	
		* 2.48351	43.86	Pk	31.90	-19.60	0.00	56.16	-	-	-	74.00	-17.84	78	100	V
		* 2.48356	44.70	Pk	31.90	-19.60	0.00	57.00	-	-	-	74.00	-17.00	78	100	V
		* 2.48351	36.53	RMS	31.90	-19.60	0.00	48.83	54.00	-5.17	-	-	-	78	100	V
		* 2.48352	36.58	RMS	31.90	-19.60	0.00	48.88	54.00	-5.12	-	-	-	78	100	V
		* 2.48351	41.75	Pk	31.90	-19.60	0.00	54.05	-	-	-	74.00	-19.95	346	116	H
		2.543	43.81	Pk	32.00	-19.50	0.00	56.31	-	-	-	74.00	-17.69	346	116	H
2467	ANT1	* 2.48351	31.03	RMS	31.90	-19.60	0.00	43.33	54.00	-10.67	-	-	346	116	H	
		* 2.48379	31.56	RMS	31.90	-19.60	0.00	43.86	54.00	-10.14	-	-	346	116	H	
		* 2.48351	41.31	Pk	31.90	-19.60	0.00	53.61	-	-	-	74.00	-20.39	82	100	V
		2.555	43.86	Pk	32.00	-19.40	0.00	56.46	-	-	-	74.00	-17.54	82	100	V
		* 2.48351	31.20	RMS	31.90	-19.60	0.00	43.50	54.00	-10.50	-	-	-	82	100	V
		2.544	31.44	RMS	32.00	-19.50	0.00	43.94	54.00	-10.06	-	-	-	82	100	V
		* 2.48351	41.96	Pk	31.90	-19.60	0.00	54.26	-	-	-	74.00	-19.74	345	157	H
		2.522	43.93	Pk	31.90	-19.50	0.00	56.33	-	-	-	74.00	-17.67	345	157	H
2472	ANT1	* 2.48351	32.07	RMS	31.90	-19.60	0.00	44.37	54.00	-9.63	-	-	345	157	H	
		* 2.48357	32.65	RMS	31.90	-19.60	0.00	44.95	54.00	-9.05	-	-	345	157	H	
		* 2.48351	40.41	Pk	31.90	-19.60	0.00	52.71	-	-	-	74.00	-21.29	84	100	V
		2.552	43.64	Pk	32.00	-19.50	0.00	56.14	-	-	-	74.00	-17.86	84	100	V
		* 2.48351	30.97	RMS	31.90	-19.60	0.00	43.27	54.00	-10.73	-	-	-	84	100	V
		2.556	31.21	RMS	32.00	-19.30	0.00	43.91	54.00	-10.09	-	-	-	84	100	V

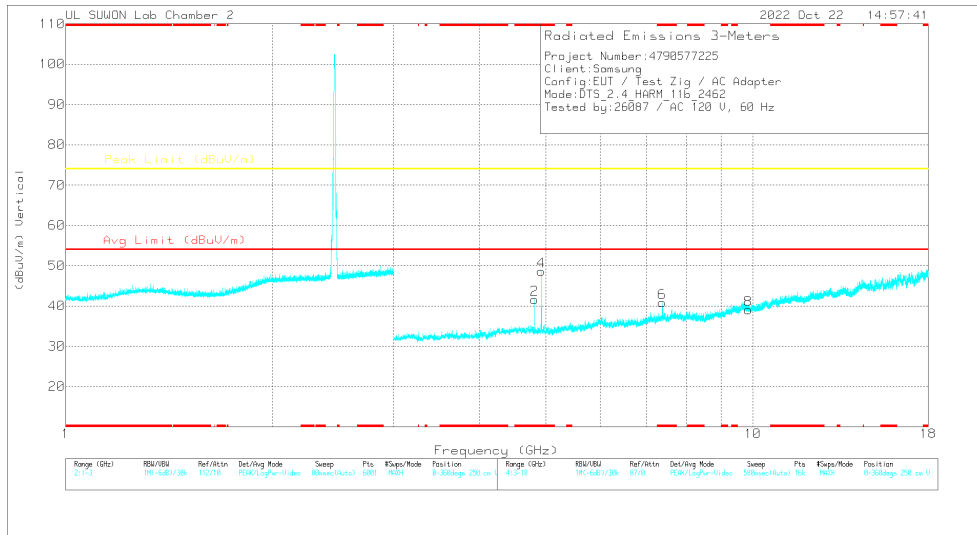
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS (ANT1 WORST CASE: 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
* 4.81269	44.19	PK2	34	-27.7	0	50.49	-	-	74	-23.51	35	120	H
* 4.81265	40.54	MAV1	34	-27.7	0	46.84	54	-7.16	-	-	35	120	H
* 4.81272	41.52	PK2	34	-27.7	0	47.82	-	-	74	-26.18	44	115	V
* 4.81268	35.85	MAV1	34	-27.7	0	42.15	54	-11.85	-	-	44	115	V
* 4.92396	50	PK2	34	-27.2	0	56.8	-	-	74	-17.2	37	145	H
* 4.92404	44.02	MAV1	34	-27.2	0	50.82	54	-3.18	-	-	37	145	H
* 4.92376	46.47	PK2	34	-27.2	0	53.27	-	-	74	-20.73	48	125	V
* 4.92412	42.38	MAV1	34	-27.2	0	49.18	54	-4.82	-	-	48	125	V
* 7.3849	36.73	PK2	35.7	-23.8	0	48.63	-	-	74	-25.37	10	128	H
* 7.38522	25.94	MAV1	35.7	-23.9	0	37.74	54	-16.26	-	-	10	128	H
* 7.38571	37.5	PK2	35.7	-23.9	0	49.3	-	-	74	-24.7	221	104	V
* 7.38531	27.24	MAV1	35.7	-23.9	0	39.04	54	-14.96	-	-	221	104	V
9.85466	33.08	PK2	37.2	-21.5	0	48.78	-	-	74	-25.22	0	100	H
9.83866	32.37	PK2	37.2	-21.5	0	48.07	-	-	74	-25.93	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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity		
2412	ANT1	* 4.81269	43.73	PK2	34.00	-27.70	0.00	50.03	-	-	74.00	-23.97	38	103	H		
		* 4.81266	39.47	MAV1	34.00	-27.70	0.00	45.77	54.00	-8.23	-	-	-	38	103	H	
		* 4.8125	41.61	PK2	34.00	-27.70	0.00	47.91	-	-	74.00	-26.09	-	122	244	V	
		* 4.81266	35.12	MAV1	34.00	-27.70	0.00	41.42	54.00	-12.58	-	-	-	122	244	V	
		* 4.82401	49.69	PK2	34.00	-27.80	0.00	55.89	-	-	74.00	-18.11	-	28	145	H	
		* 4.82406	39.67	MAV1	34.00	-27.80	0.00	45.87	54.00	-8.13	-	-	-	28	145	H	
		* 4.82408	43.55	PK2	34.00	-27.80	0.00	49.75	-	-	74.00	-24.25	-	147	104	V	
		* 4.82408	33.13	MAV1	34.00	-27.80	0.00	39.33	54.00	-14.67	-	-	-	147	104	V	
		7.236	38.04	PK2	35.70	-25.20	0.00	48.54	-	-	74.00	-25.46	-	93	107	H	
		7.236	40.43	PK2	35.70	-25.20	0.00	50.93	-	-	74.00	-23.07	-	212	106	V	
		9.648	32.92	PK2	37.00	-21.00	0.00	48.92	-	-	74.00	-25.08	-	0	100	H	
		9.644	32.75	PK2	37.00	-21.00	0.00	48.75	-	-	74.00	-25.25	-	360	100	V	
		2437	ANT1	* 4.81268	44.10	PK2	34.00	-27.70	0.00	50.40	-	-	74.00	-23.60	37	104	H
				* 4.8127	40.29	MAV1	34.00	-27.70	0.00	46.59	54.00	-7.41	-	-	-	37	104
* 4.81274	41.81			PK2	34.00	-27.70	0.00	48.11	-	-	74.00	-25.89	-	48	102	V	
* 4.81267	36.12			MAV1	34.00	-27.70	0.00	42.42	54.00	-11.58	-	-	-	48	102	V	
* 4.87396	48.51			PK2	34.00	-27.70	0.00	54.81	-	-	74.00	-19.19	-	83	307	H	
* 4.87405	41.70			MAV1	34.00	-27.70	0.00	48.00	54.00	-6.00	-	-	-	83	307	H	
* 4.87402	46.84			PK2	34.00	-27.70	0.00	53.14	-	-	74.00	-20.86	-	50	116	V	
* 4.87409	37.86			MAV1	34.00	-27.70	0.00	44.16	54.00	-9.84	-	-	-	50	116	V	
* 7.3103	37.25			PK2	35.70	-24.60	0.00	48.35	-	-	74.00	-25.65	-	21	109	H	
* 7.30986	25.59			MAV1	35.70	-24.60	0.00	36.69	54.00	-17.31	-	-	-	21	109	H	
* 7.31024	37.58			PK2	35.70	-24.60	0.00	48.68	-	-	74.00	-25.32	-	215	113	V	
* 7.31105	26.94			MAV1	35.70	-24.60	0.00	38.04	54.00	-15.96	-	-	-	215	113	V	
9.747	32.81			PK2	37.10	-20.90	0.00	49.01	-	-	74.00	-24.99	-	0	100	H	
9.748	32.63			PK2	37.10	-20.90	0.00	48.83	-	-	74.00	-25.17	-	0	100	V	
2462	ANT1			* 4.81269	44.19	PK2	34.00	-27.70	0.00	50.49	-	-	74.00	-23.51	35	120	H
				* 4.81265	40.54	MAV1	34.00	-27.70	0.00	46.84	54.00	-7.16	-	-	-	35	120
		* 4.81272	41.52	PK2	34.00	-27.70	0.00	47.82	-	-	74.00	-26.18	-	44	115	V	
		* 4.81268	35.85	MAV1	34.00	-27.70	0.00	42.15	54.00	-11.85	-	-	-	44	115	V	
		* 4.92396	50.00	PK2	34.00	-27.20	0.00	56.80	-	-	74.00	-17.20	-	37	145	H	
		* 4.92404	44.02	MAV1	34.00	-27.20	0.00	50.82	54.00	-3.18	-	-	-	37	145	H	
		* 4.92376	46.47	PK2	34.00	-27.20	0.00	53.27	-	-	74.00	-20.73	-	48	125	V	
		* 4.92412	42.38	MAV1	34.00	-27.20	0.00	49.18	54.00	-4.82	-	-	-	48	125	V	
		* 7.3849	36.73	PK2	35.70	-23.80	0.00	48.63	-	-	74.00	-25.37	-	10	128	H	
		* 7.38522	25.94	MAV1	35.70	-23.90	0.00	37.74	54.00	-16.26	-	-	-	10	128	H	
		* 7.38571	37.50	PK2	35.70	-23.90	0.00	49.30	-	-	74.00	-24.70	-	221	104	V	
		* 7.38531	27.24	MAV1	35.70	-23.90	0.00	39.04	54.00	-14.96	-	-	-	221	104	V	
		9.855	33.08	PK2	37.20	-21.50	0.00	48.78	-	-	74.00	-25.22	-	0	100	H	
		9.839	32.37	PK2	37.20	-21.50	0.00	48.07	-	-	74.00	-25.93	-	0	100	V	

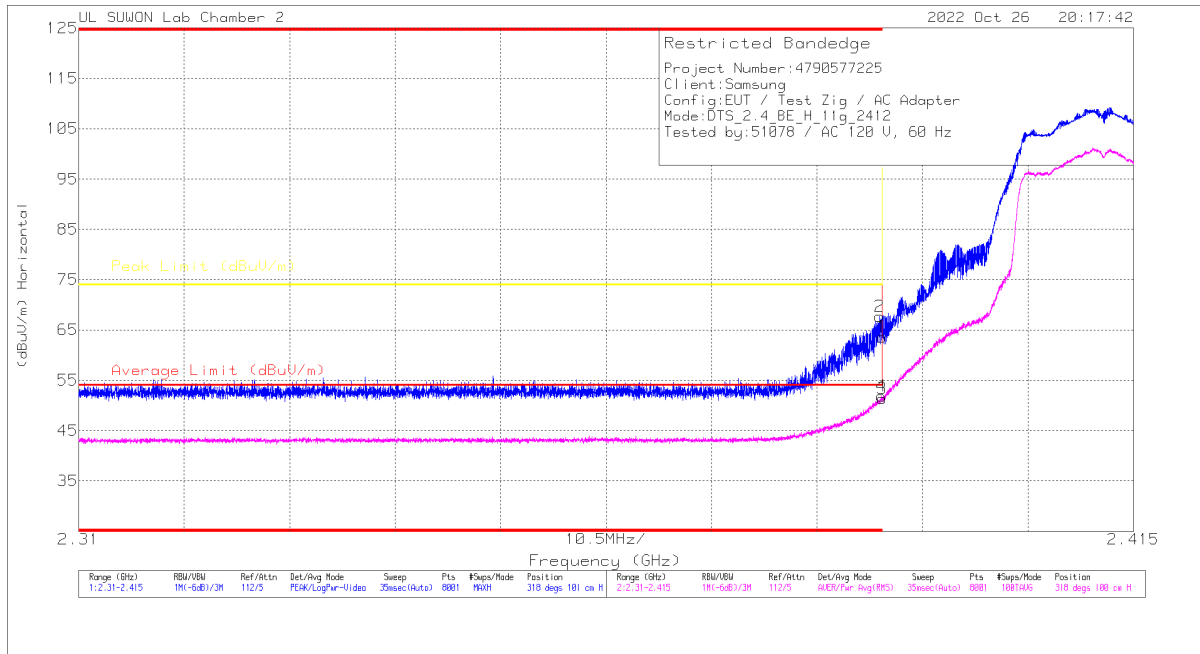
Note1. PK2 - KDB558074 Method: Maximum Peak / MAV1 - KDB558074 Option 1 Maximum RMS Average

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

10.1.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

BANDEDGE (ANT1 WORST CASE: 1 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	51.65	PK		31.7	-19.7	0	63.65	-	74	-10.35	318	101	H
2	* 2.38973	55.71	PK		31.7	-19.7	0	67.71	-	74	-6.29	318	101	H
3	* 2.39	39.06	RMS		31.7	-19.7	-32	51.4	54	-2.6	-	318	100	H
4	* 2.38992	39.58	RMS		31.7	-19.7	-32	51.9	54	-2.1	-	318	100	H

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

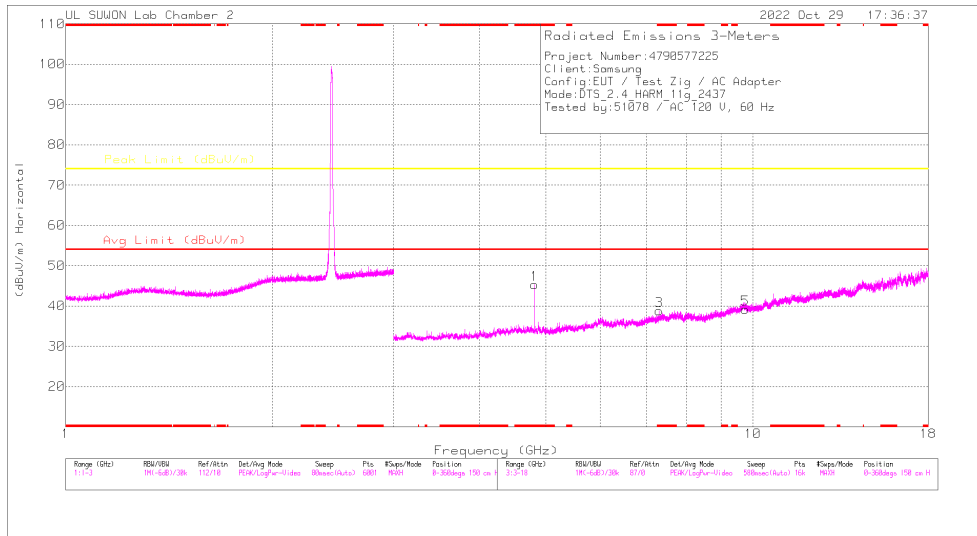
BANEDGE TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 2.39	51.65	Pk	31.70	-19.70	0.00	63.65	-	-	74.00	-10.35	318	101	H	
		* 2.38973	55.71	Pk	31.70	-19.70	0.00	67.71	-	-	74.00	-6.29	318	101	H	
		* 2.39	39.08	RMS	31.70	-19.70	0.32	51.40	54.00	-2.60	-	-	-	318	100	H
		* 2.38992	39.58	RMS	31.70	-19.70	0.32	51.90	54.00	-2.10	-	-	-	318	100	H
		* 2.39	45.30	Pk	31.70	-19.70	0.00	57.30	-	-	74.00	-16.70	75	122	V	
		* 2.38952	48.95	Pk	31.70	-19.70	0.00	60.95	-	-	74.00	-13.05	75	122	V	
		* 2.39	33.17	RMS	31.70	-19.70	0.32	45.49	54.00	-8.51	-	-	-	75	122	V
		* 2.3898	33.87	RMS	31.70	-19.70	0.32	46.19	54.00	-7.81	-	-	-	75	122	V
2462	ANT1	* 2.484	55.89	Pk	31.90	-19.60	0.00	68.19	-	-	74.00	-5.81	318	157	H	
		* 2.49792	43.55	Pk	31.90	-19.50	0.00	55.95	-	-	74.00	-18.05	318	157	H	
		* 2.484	38.66	RMS	31.90	-19.60	0.32	51.28	54.00	-2.72	-	-	-	318	157	H
		* 2.531	30.85	RMS	31.90	-19.50	0.32	43.57	54.00	-10.43	-	-	-	318	157	H
		* 2.48351	49.24	Pk	31.90	-19.60	0.00	61.54	-	-	74.00	-12.46	65	100	V	
		* 2.48352	51.14	Pk	31.90	-19.60	0.00	63.44	-	-	74.00	-10.56	65	100	V	
		* 2.48351	34.47	RMS	31.90	-19.60	0.32	47.09	54.00	-6.91	-	-	-	65	100	V
		* 2.48355	34.93	RMS	31.90	-19.60	0.32	47.55	54.00	-6.45	-	-	-	65	100	V
2467	ANT1	* 2.48351	48.51	Pk	31.90	-19.60	0.00	60.81	-	-	74.00	-13.19	353	116	H	
		* 2.48395	51.58	Pk	31.90	-19.60	0.00	63.88	-	-	74.00	-10.12	353	116	H	
		* 2.48351	38.02	RMS	31.90	-19.60	0.32	50.64	54.00	-3.36	-	-	-	353	116	H
		* 2.48361	38.57	RMS	31.90	-19.60	0.32	51.19	54.00	-2.81	-	-	-	353	116	H
		* 2.48351	44.89	Pk	31.90	-19.60	0.00	57.19	-	-	74.00	-16.81	83	100	V	
		* 2.48419	46.48	Pk	31.90	-19.60	0.00	58.78	-	-	74.00	-15.22	83	100	V	
		* 2.48351	34.44	RMS	31.90	-19.60	0.32	47.06	54.00	-6.94	-	-	-	83	100	V
		* 2.4836	34.18	RMS	31.90	-19.60	0.32	46.80	54.00	-7.20	-	-	-	83	100	V
2472	ANT1	* 2.48351	54.14	Pk	31.90	-19.60	0.00	66.44	-	-	74.00	-7.56	353	116	H	
		* 2.48352	56.74	Pk	31.90	-19.60	0.00	69.04	-	-	74.00	-4.96	353	116	H	
		* 2.48351	38.76	RMS	31.90	-19.60	0.32	51.38	54.00	-2.62	-	-	-	353	116	H
		* 2.48352	39.27	RMS	31.90	-19.60	0.32	51.89	54.00	-2.11	-	-	-	353	116	H
		* 2.48351	51.12	Pk	31.90	-19.60	0.00	63.42	-	-	74.00	-10.58	84	100	V	
		* 2.48354	51.34	Pk	31.90	-19.60	0.00	63.64	-	-	74.00	-10.36	84	100	V	
		* 2.48351	34.83	RMS	31.90	-19.60	0.32	47.45	54.00	-6.55	-	-	-	84	100	V
		* 2.48352	35.49	RMS	31.90	-19.60	0.32	48.11	54.00	-5.89	-	-	-	84	100	V

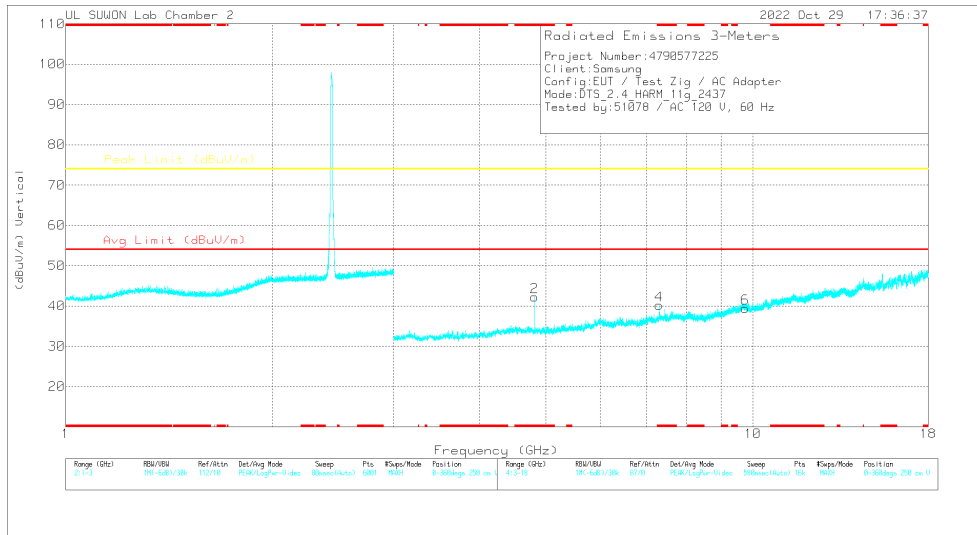
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS (ANT1 WORST CASE: 6 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
* 4.81277	43.49	PK2	34	-27.7	0	49.79	-	-	74	-24.21	34	162	H
* 4.81264	39.85	MAV1	34	-27.7	.32	46.47	54	-7.53	-	-	34	162	H
* 4.81278	42.13	PK2	34	-27.7	0	48.43	-	-	74	-25.57	126	388	V
* 4.81269	37.82	MAV1	34	-27.7	.32	44.44	54	-9.56	-	-	126	388	V
* 7.31058	36.14	PK2	35.7	-24.6	0	47.24	-	-	74	-26.76	13	398	H
* 7.31092	25.53	MAV1	35.7	-24.6	.32	36.95	54	-17.05	-	-	13	398	H
* 7.31074	38.03	PK2	35.7	-24.6	0	49.13	-	-	74	-24.87	209	125	V
* 7.31112	28.44	MAV1	35.7	-24.6	.32	39.86	54	-14.14	-	-	209	125	V
9.74696	32.45	PK2	37.1	-20.9	0	48.65	-	-	74	-25.35	0	100	H
9.74684	32.56	PK2	37.1	-20.9	0	48.76	-	-	74	-25.24	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

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 4.81269	46.16	PK2	34.00	-27.70	0.00	52.46	-	-	74.00	-21.54	35	103	H	
		* 4.81268	39.47	MAV1	34.00	-27.70	0.32	46.09	54.00	-7.91	-	-	-	35	103	H
		* 4.81264	44.40	PK2	34.00	-27.70	0.00	50.70	-	-	-	74.00	-23.30	126	388	V
		* 4.81267	37.53	MAV1	34.00	-27.70	0.32	44.15	54.00	-9.85	-	-	-	126	388	V
		7.236	36.92	PK2	35.70	-25.20	0.00	47.42	-	-	-	74.00	-26.58	0	100	H
		7.237	36.12	PK2	35.70	-25.20	0.00	46.62	-	-	-	74.00	-27.38	0	100	V
		9.647	33.21	PK2	37.00	-21.00	0.00	49.21	-	-	-	74.00	-24.79	0	100	H
		9.649	33.44	PK2	37.00	-21.00	0.00	49.44	-	-	-	74.00	-24.56	0	100	V
		* 4.81277	43.49	PK2	34.00	-27.70	0.00	49.79	-	-	-	74.00	-24.21	34	162	H
* 4.81264	39.85	MAV1	34.00	-27.70	0.32	46.47	54.00	-7.53	-	-	-	34	162	H		
* 4.81278	42.13	PK2	34.00	-27.70	0.00	48.43	-	-	-	74.00	-25.57	126	388	V		
* 4.81269	37.82	MAV1	34.00	-27.70	0.32	44.44	54.00	-9.56	-	-	-	126	388	V		
* 4.81268	36.14	PK2	35.70	-24.60	0.00	47.24	-	-	-	74.00	-26.76	13	398	H		
* 7.31092	25.53	MAV1	35.70	-24.60	0.32	36.95	54.00	-17.05	-	-	-	13	398	H		
* 7.31074	38.03	PK2	35.70	-24.60	0.00	49.13	-	-	-	74.00	-24.87	209	125	V		
* 7.31112	28.44	MAV1	35.70	-24.60	0.32	39.86	54.00	-14.14	-	-	-	209	125	V		
9.747	32.45	PK2	37.10	-20.90	0.00	48.65	-	-	-	74.00	-25.35	0	100	H		
9.747	32.56	PK2	37.10	-20.90	0.00	48.76	-	-	-	74.00	-25.24	0	100	V		
* 4.81271	43.36	PK2	34.00	-27.70	0.00	49.66	-	-	-	74.00	-24.34	33	175	H		
* 4.81265	39.51	MAV1	34.00	-27.70	0.32	46.13	54.00	-7.87	-	-	-	33	175	H		
* 4.81262	41.64	PK2	34.00	-27.70	0.00	47.94	-	-	-	74.00	-26.06	124	337	V		
* 4.81267	36.32	MAV1	34.00	-27.70	0.32	42.94	54.00	-11.06	-	-	-	124	337	V		
* 4.9188	44.90	PK2	34.00	-27.30	0.00	51.60	-	-	-	74.00	-22.40	32	134	H		
* 4.9228	29.15	MAV1	34.00	-27.20	0.32	36.27	54.00	-17.73	-	-	-	32	134	H		
* 4.91775	38.62	PK2	34.00	-27.30	0.00	45.32	-	-	-	74.00	-28.68	197	100	V		
* 4.92285	25.34	MAV1	34.00	-27.20	0.32	32.46	54.00	-21.54	-	-	-	197	100	V		
* 7.38275	35.74	PK2	35.70	-23.90	0.00	47.54	-	-	-	74.00	-26.46	9	100	H		
* 7.38608	25.29	MAV1	35.70	-23.90	0.32	37.41	54.00	-16.59	-	-	-	9	100	H		
* 7.38621	36.77	PK2	35.70	-23.90	0.00	48.57	-	-	-	74.00	-25.43	108	102	V		
* 7.38603	26.80	MAV1	35.70	-23.90	0.32	38.92	54.00	-15.08	-	-	-	108	102	V		
9.850	32.56	PK2	37.20	-21.50	0.00	48.26	-	-	-	74.00	-25.74	0	100	H		
9.848	32.71	PK2	37.20	-21.50	0.00	48.41	-	-	-	74.00	-25.59	0	100	V		

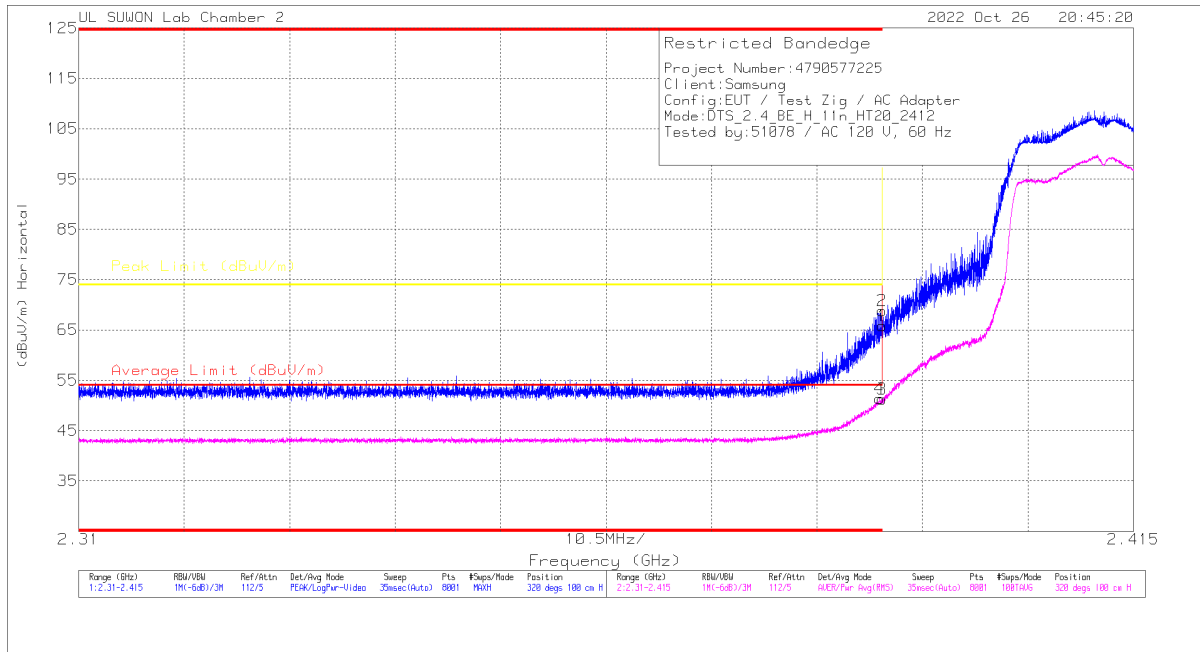
Note1. PK2 - KDB558074 Method: Maximum Peak / MAV1 - KDB558074 Option 1 Maximum RMS Average

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

10.1.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

BANDEDGE (ANT1 WORST CASE: 1 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	53.83	Pk	31.7	-19.7	0	65.83	-	-	74	-8.17	320	100	H
2	* 2.38996	56.84	Pk	31.7	-19.7	0	68.84	-	-	74	-5.16	320	100	H
3	* 2.39	38.92	RMS	31.7	-19.7	.33	51.25	54	-2.75	-	-	320	100	H
4	* 2.38973	39.06	RMS	31.7	-19.7	.33	51.39	54	-2.61	-	-	320	100	H

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

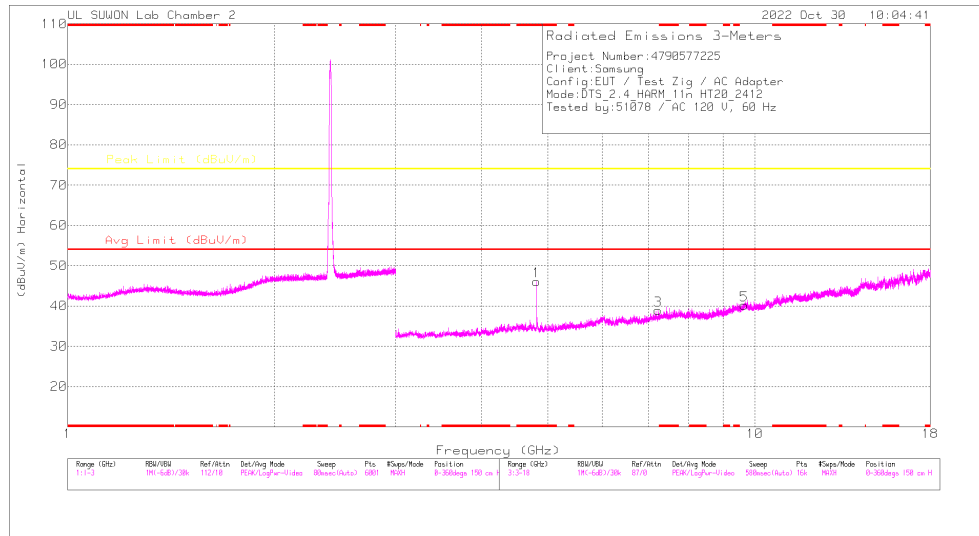
BANEDGE TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 2.39	53.83	Pk	31.70	-19.70	0.00	65.83	-	-	74.00	-8.17	320	100	H	
		* 2.38996	56.84	Pk	31.70	-19.70	0.00	68.84	-	-	74.00	-5.16	320	100	H	
		* 2.39	38.92	RMS	31.70	-19.70	0.33	51.25	54.00	-2.75	-	-	-	320	100	H
		* 2.38973	39.06	RMS	31.70	-19.70	0.33	51.39	54.00	-2.61	-	-	-	320	100	H
		* 2.39	44.48	Pk	31.70	-19.70	0.00	56.48	-	-	74.00	-17.52	61	108	V	
		* 2.38931	48.40	Pk	31.70	-19.70	0.00	60.40	-	-	74.00	-13.60	61	108	V	
		* 2.39	33.31	RMS	31.70	-19.70	0.33	45.64	54.00	-8.36	-	-	-	61	108	V
		* 2.38976	33.32	RMS	31.70	-19.70	0.33	45.65	54.00	-8.35	-	-	-	61	108	V
2462	ANT1	* 2.48351	56.70	Pk	31.90	-19.60	0.00	69.00	-	-	74.00	-5.00	317	117	H	
		* 2.48377	58.05	Pk	31.90	-19.60	0.00	70.35	-	-	74.00	-3.65	317	117	H	
		* 2.48351	38.65	RMS	31.90	-19.60	0.33	51.28	54.00	-2.72	-	-	-	317	117	H
		* 2.48361	38.45	RMS	31.90	-19.60	0.33	51.08	54.00	-2.92	-	-	-	317	117	H
		* 2.48351	48.95	Pk	31.90	-19.60	0.00	61.25	-	-	74.00	-12.75	61	100	V	
		* 2.48382	49.51	Pk	31.90	-19.60	0.00	61.81	-	-	74.00	-12.19	61	100	V	
		* 2.48351	33.11	RMS	31.90	-19.60	0.33	45.74	54.00	-8.26	-	-	-	61	100	V
		* 2.48364	33.57	RMS	31.90	-19.60	0.33	46.20	54.00	-7.80	-	-	-	61	100	V
2467	ANT1	* 2.48351	48.61	Pk	31.90	-19.60	0.00	60.91	-	-	74.00	-13.09	341	202	H	
		* 2.48352	55.26	Pk	31.90	-19.60	0.00	67.56	-	-	74.00	-6.44	341	202	H	
		* 2.48351	36.90	RMS	31.90	-19.60	0.33	49.53	54.00	-4.47	-	-	-	341	202	H
		* 2.48352	36.93	RMS	31.90	-19.60	0.33	49.56	54.00	-4.44	-	-	-	341	202	H
		* 2.48351	45.91	Pk	31.90	-19.60	0.00	58.21	-	-	74.00	-15.79	82	100	V	
		* 2.48431	48.56	Pk	31.90	-19.60	0.00	60.86	-	-	74.00	-13.14	82	100	V	
		* 2.48351	34.01	RMS	31.90	-19.60	0.33	46.64	54.00	-7.36	-	-	-	82	100	V
		* 2.48363	34.20	RMS	31.90	-19.60	0.33	46.83	54.00	-7.17	-	-	-	82	100	V
2472	ANT1	* 2.48351	56.01	Pk	31.90	-19.60	0.00	68.31	-	-	74.00	-5.69	343	203	H	
		* 2.48352	56.95	Pk	31.90	-19.60	0.00	69.25	-	-	74.00	-4.75	343	203	H	
		* 2.48351	38.51	RMS	31.90	-19.60	0.33	51.14	54.00	-2.86	-	-	-	343	203	H
		* 2.48352	38.68	RMS	31.90	-19.60	0.33	51.31	54.00	-2.69	-	-	-	343	203	H
		* 2.48351	51.61	Pk	31.90	-19.60	0.00	63.91	-	-	74.00	-10.09	84	100	V	
		* 2.48352	52.46	Pk	31.90	-19.60	0.00	64.76	-	-	74.00	-9.24	84	100	V	
		* 2.48351	35.47	RMS	31.90	-19.60	0.33	48.10	54.00	-5.90	-	-	-	84	100	V
		* 2.48355	35.00	RMS	31.90	-19.60	0.33	47.63	54.00	-6.37	-	-	-	84	100	V

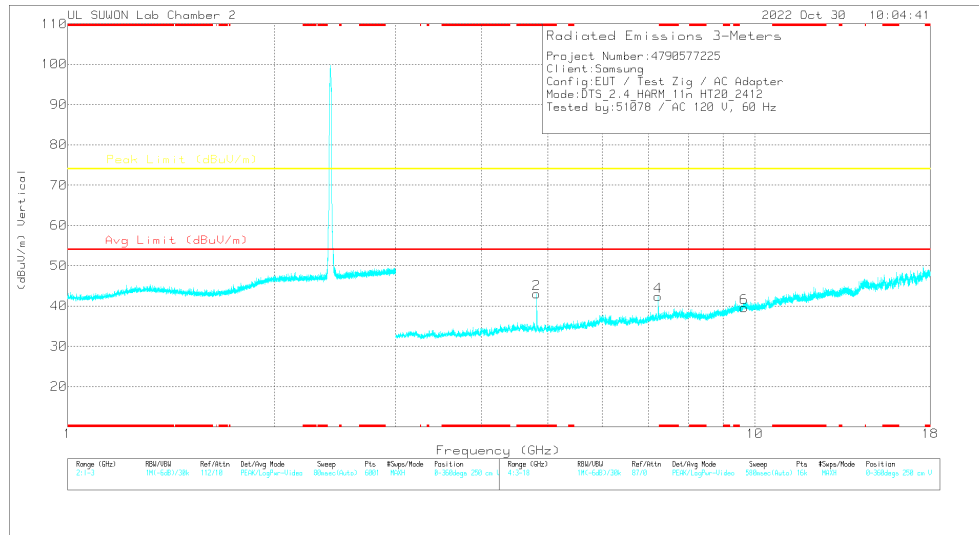
Note1. Pk - Peak detector, RMS - RMS detector

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS (ANT1 WORST CASE: 1 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
* 4.81276	45.76	PK2	34	-27.7	0	52.06	-	-	74	-21.94	28	161	H
* 4.81267	39.93	MAV1	34	-27.7	.33	46.56	54	-7.44	-	-	28	161	H
* 4.81272	40.62	PK2	34	-27.7	0	46.92	-	-	74	-27.08	43	103	V
* 4.81269	33.78	MAV1	34	-27.7	.33	40.41	54	-13.59	-	-	43	103	V
7.23603	37.55	PK2	35	-25.2	0	48.05	-	-	74	-25.95	3	109	H
7.23585	40.03	PK2	35	-25.2	0	50.53	-	-	74	-23.47	208	118	V
9.64638	32.89	PK2	37	-21	0	48.89	-	-	74	-25.11	0	100	H
9.64891	32.73	PK2	37	-21	0	48.73	-	-	74	-25.27	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

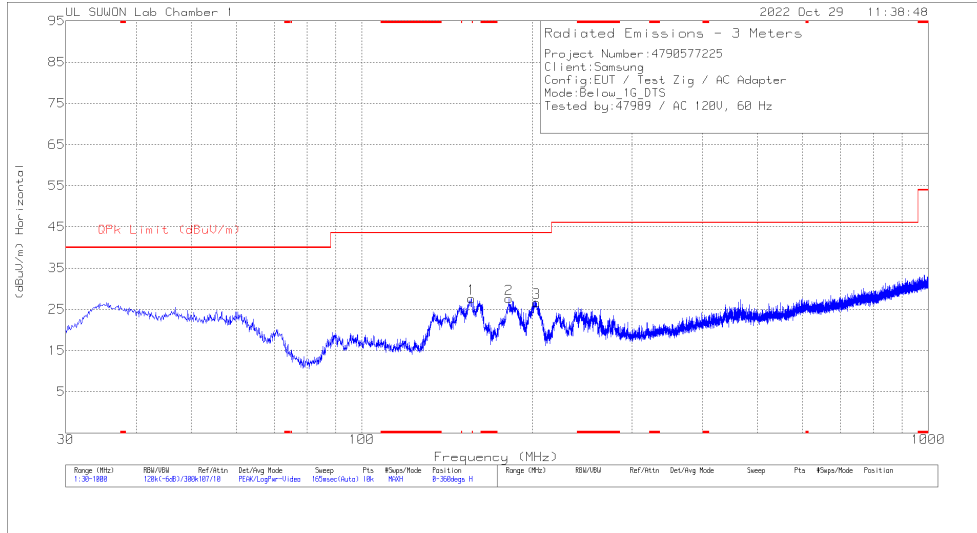
HARMONICS AND SPURIOUS EMISSIONS TEST DATA

Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT1	* 4.81276	45.76	PK2	34.00	-27.70	0.00	52.06	-	-	74.00	-21.94	28	161	H
		* 4.81267	39.93	MAV1	34.00	-27.70	0.33	46.56	54.00	-7.44	-	-	28	161	H
		* 4.81272	40.62	PK2	34.00	-27.70	0.00	46.92	-	-	74.00	-27.08	43	103	V
		* 4.81269	33.78	MAV1	34.00	-27.70	0.33	40.41	54.00	-13.59	-	-	43	103	V
		7.236	37.55	PK2	35.70	-25.20	0.00	48.05	-	-	74.00	-25.95	3	109	H
		7.236	40.03	PK2	35.70	-25.20	0.00	50.53	-	-	74.00	-23.47	208	118	V
		9.646	32.89	PK2	37.00	-21.00	0.00	48.89	-	-	74.00	-25.11	0	100	H
		9.649	32.73	PK2	37.00	-21.00	0.00	48.73	-	-	74.00	-25.27	0	100	V
		2437	ANT1	* 4.81257	43.45	PK2	34.00	-27.70	0.00	49.75	-	-	74.00	-24.25	27
* 4.81267	39.27			MAV1	34.00	-27.70	0.33	45.90	54.00	-8.10	-	-	27	159	H
* 4.81273	39.93			PK2	34.00	-27.70	0.00	46.23	-	-	74.00	-27.77	45	102	V
* 4.81271	33.53			MAV1	34.00	-27.70	0.33	40.16	54.00	-13.84	-	-	45	102	V
* 7.31096	36.15			PK2	35.70	-24.60	0.00	47.25	-	-	74.00	-26.75	3	113	H
* 7.31101	26.27			MAV1	35.70	-24.60	0.33	37.70	54.00	-16.30	-	-	3	113	H
* 7.31095	37.60			PK2	35.70	-24.60	0.00	48.70	-	-	74.00	-25.30	212	109	V
* 7.311	28.51			MAV1	35.70	-24.60	0.33	39.94	54.00	-14.06	-	-	212	109	V
9.747	33.03			PK2	37.10	-20.90	0.00	49.23	-	-	74.00	-24.77	0	100	H
9.748	32.53	PK2	37.10	-20.90	0.00	48.73	-	-	74.00	-25.27	0	100	V		
2462	ANT1	* 4.81272	43.38	PK2	34.00	-27.70	0.00	49.68	-	-	74.00	-24.32	27	161	H
		* 4.8127	39.38	MAV1	34.00	-27.70	0.33	46.01	54.00	-7.99	-	-	27	161	H
		* 4.8127	39.59	PK2	34.00	-27.70	0.00	45.89	-	-	74.00	-28.11	56	134	V
		* 4.81267	32.30	MAV1	34.00	-27.70	0.33	38.93	54.00	-15.07	-	-	56	134	V
		* 4.91866	43.69	PK2	34.00	-27.30	0.00	50.39	-	-	74.00	-23.61	29	257	H
		* 4.92278	28.73	MAV1	34.00	-27.20	0.33	35.86	54.00	-18.14	-	-	29	257	H
		* 4.92061	38.65	PK2	34.00	-27.30	0.00	45.35	-	-	74.00	-28.65	275	104	V
		* 4.92259	25.20	MAV1	34.00	-27.30	0.33	32.23	54.00	-21.77	-	-	275	104	V
		* 7.38636	35.89	PK2	35.70	-23.90	0.00	47.69	-	-	74.00	-26.31	1	110	H
		* 7.38599	25.75	MAV1	35.70	-23.90	0.33	37.88	54.00	-16.12	-	-	1	110	H
		* 7.38631	37.24	PK2	35.70	-23.90	0.00	49.04	-	-	74.00	-24.96	216	104	V
		* 7.38605	27.81	MAV1	35.70	-23.90	0.33	39.94	54.00	-14.06	-	-	216	104	V
		9.848	32.24	PK2	37.20	-21.50	0.00	47.94	-	-	74.00	-26.06	0	100	H
9.850	32.40	PK2	37.20	-21.50	0.00	48.10	-	-	74.00	-25.90	0	100	V		

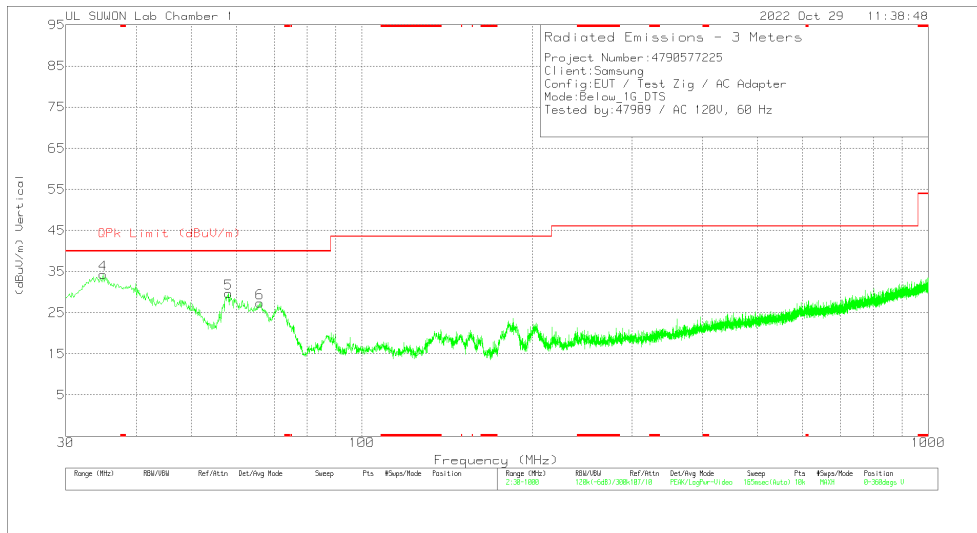
Note1. PK2 - KDB558074 Method: Maximum Peak / MAV1 - KDB558074 Option 1 Maximum RMS Average

Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

10.2. WORST CASE BELOW 1 GHz



HORIZONTAL



VERTICAL

Trace Markers

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	156.1	43.27	Pk	14.1	-29.7	27.67	43.52	-15.85	0-360	200	H
2	181.805	41.65	Pk	15.4	-29.4	27.65	43.52	-15.87	0-360	100	H
3	203.436	39.67	Pk	16.3	-29.3	26.67	43.52	-16.85	0-360	100	H
4	34.947	48.79	Pk	16.5	-30.9	34.39	40	-5.61	0-360	200	V
5	58.227	41.76	Pk	18.7	-30.7	29.76	40	-10.24	0-360	200	V
6	66.084	41.61	Pk	16.5	-30.7	27.41	40	-12.59	0-360	300	V

Pk - Peak detector

Radiated Emissions

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
34.4019	45.02	Qp	16.3	-31.5	29.82	40	-10.18	49	100	V

Qp - Quasi-Peak detector

11. 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.

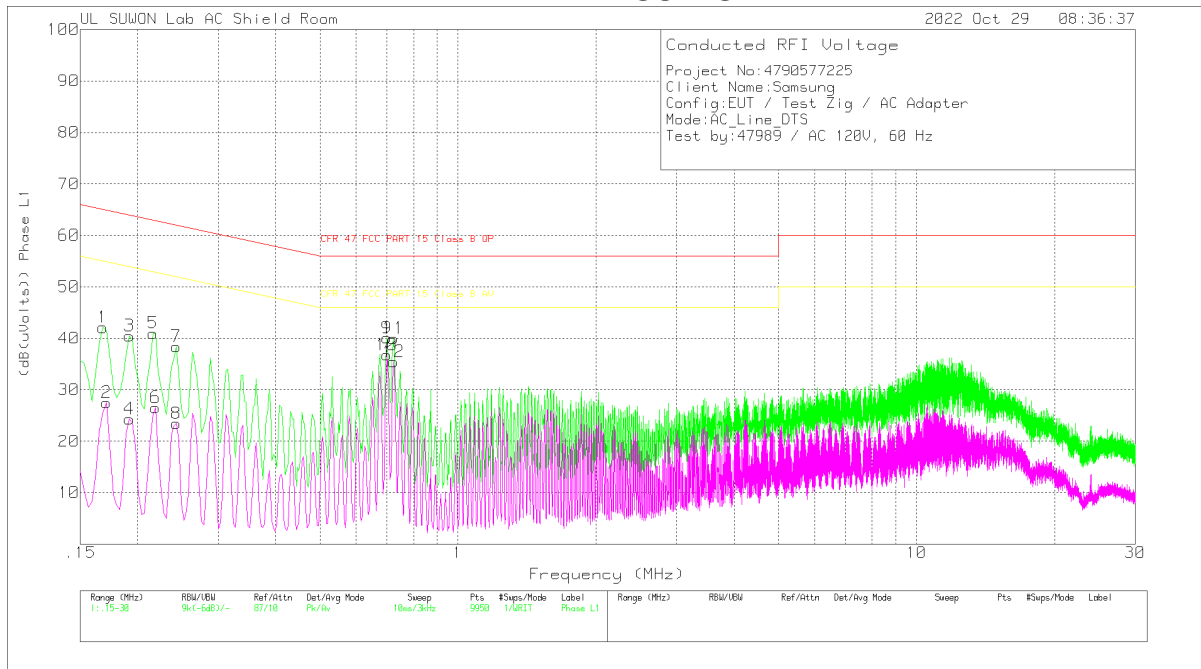
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. AC Power Line

LINE 1 RESULTS



Trace Markers

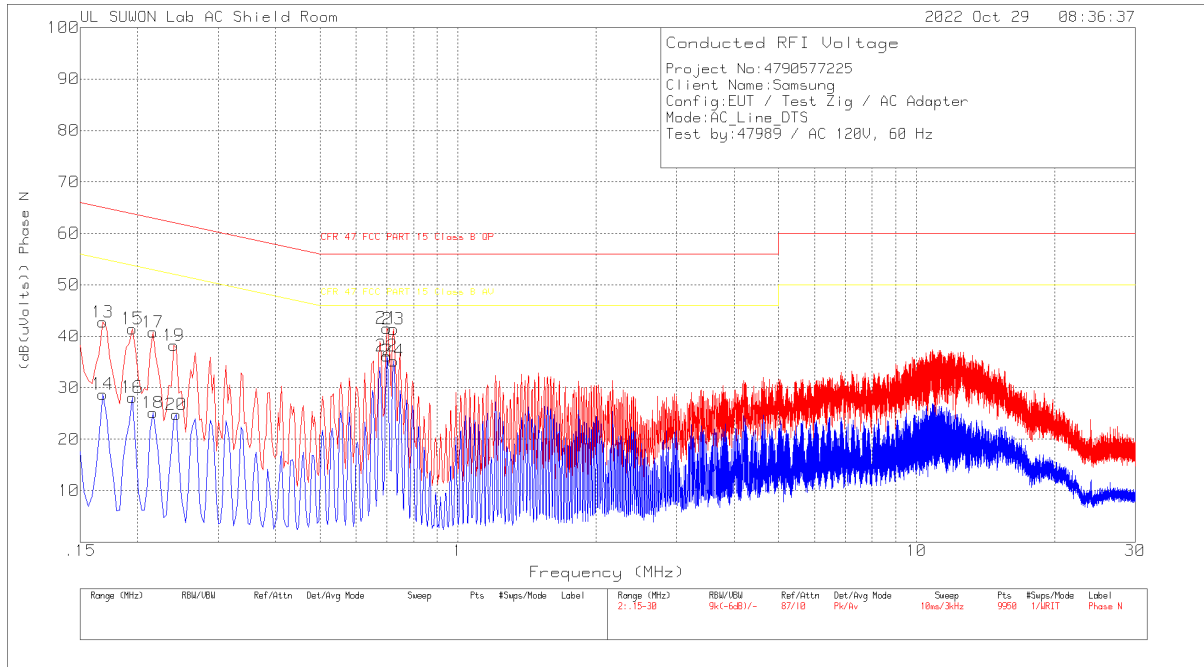
Range 1: Phase L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With 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	32.01	Pk	10	.1	42.11	65.06	-22.95	-	-
2	.171	17.29	Av	10	.2	27.49	-	-	54.91	-27.42
3	.192	30.39	Pk	9.9	.2	40.49	63.95	-23.46	-	-
4	.192	14.24	Av	9.9	.2	24.34	-	-	53.95	-29.61
5	.216	30.99	Pk	9.8	.2	40.99	62.97	-21.98	-	-
6	.219	16.64	Av	9.7	.2	26.54	-	-	52.86	-26.32
7	.243	28.59	Pk	9.6	.2	38.39	61.99	-23.6	-	-
8	.243	13.64	Av	9.6	.2	23.44	-	-	51.99	-28.55
9	.699	30.05	Pk	9.8	.2	40.05	56	-15.95	-	-
10	.699	26.76	Av	9.8	.2	36.76	-	-	46	-9.24
11	.723	30	Pk	9.8	.2	40	56	-16	-	-
12	.723	25.44	Av	9.8	.2	35.44	-	-	46	-10.56

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_With EX_N[dB]	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	.168	32.66	Pk	10	.1	42.76	65.06	-22.3	-	-
14	.168	18.65	Av	10	.1	28.75	-	-	55.06	-26.31
15	.195	31.35	Pk	9.9	.2	41.45	63.82	-22.37	-	-
16	.195	18.02	Av	9.9	.2	28.12	-	-	53.82	-25.7
17	.216	30.8	Pk	9.8	.2	40.8	62.97	-22.17	-	-
18	.216	15.13	Av	9.8	.2	25.13	-	-	52.97	-27.84
19	.24	28.33	Pk	9.7	.2	38.23	62.1	-23.87	-	-
20	.243	14.97	Av	9.6	.2	24.77	-	-	51.99	-27.22
21	.699	31.59	Pk	9.8	.2	41.59	56	-14.41	-	-
22	.699	26.17	Av	9.8	.2	36.17	-	-	46	-9.83
23	.723	31.39	Pk	9.8	.2	41.39	56	-14.61	-	-
24	.723	25.21	Av	9.8	.2	35.21	-	-	46	-10.79

PK - Peak detector
 Av - Average detection

END OF TEST REPORT