



CERTIFICATION TEST REPORT

Report Number. : 4790215260-E3V1

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

Model : SM-A135F/DSN

FCC ID : A3LSMA135FDSN

EUT Description : GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC

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

Date Of Issue:

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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>
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION: GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac, and NFC
MODEL NUMBER: SM-A135F/DSN
SERIAL NUMBER: R38RB002TVY, R38RB002VFR (CONDUCTED);
R38RA00PTNW, R38RB01SVER (RADIATED);
DATE TESTED: 2021-12-23 ~ 2022-01-20;

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
UL Korea, Ltd. By:



Seokhwan Hong
Suwon Lab Engineer
UL Korea, Ltd.

Tested By:



Sungeun Lee
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
<input checked="" type="checkbox"/>	Chamber 2
<input checked="" type="checkbox"/>	Chamber 3

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 115:2007.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.
 This test report addresses the DTS (WLAN) operational mode.

WiFi operating mode

Frequency range	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	18.91	77.80
	802.11g SISO	16.39	43.55
	802.11n(HT20) SISO	16.42	43.85

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.**

Bands [MHz]	ANT Gain [dBi]
2 412 ~ 2 472	-5.04

5.4. TESTED CHANNELS LIST

Ch.	Frequency [MHz]	11b [SISO]	11g [SISO]	11n(HT20) [SISO]
1	2 412	O	O	O
2	2 417		O	O
6	2 437	O	O	O
10	2 457		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.

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 for the worst case condition mode.

Test case configuration for 802.11b, g, n HT20 modes: Conducted, Radiated

Ch.	Freq.	SISO Target[dBm]		
		802.11b	802.11g	802.11n HT20
1	2412	18	13	13
2	2417		16	16
6	2437	18	16	16
10	2457		16	16
11	2462	18	15	15
12	2467	18	12	12
13	2472	15	8	8

	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

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37N9Q14289RT3	N/A
Data Cable	SAMSUNG	EP-DN980BWE (GH39-02115A, C to C)	N/A	N/A

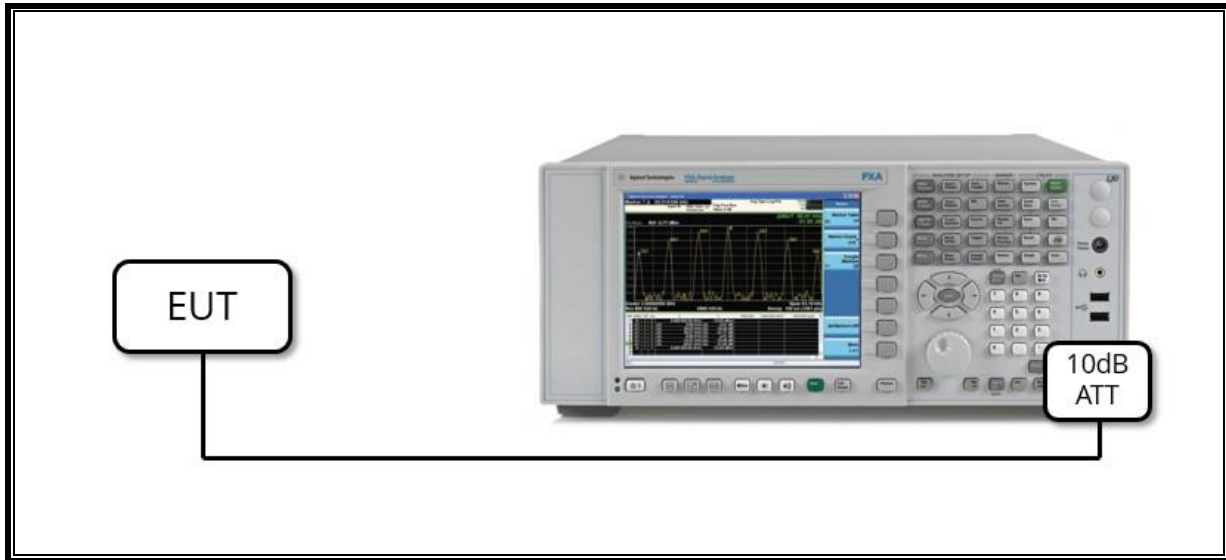
I/O CABLE

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

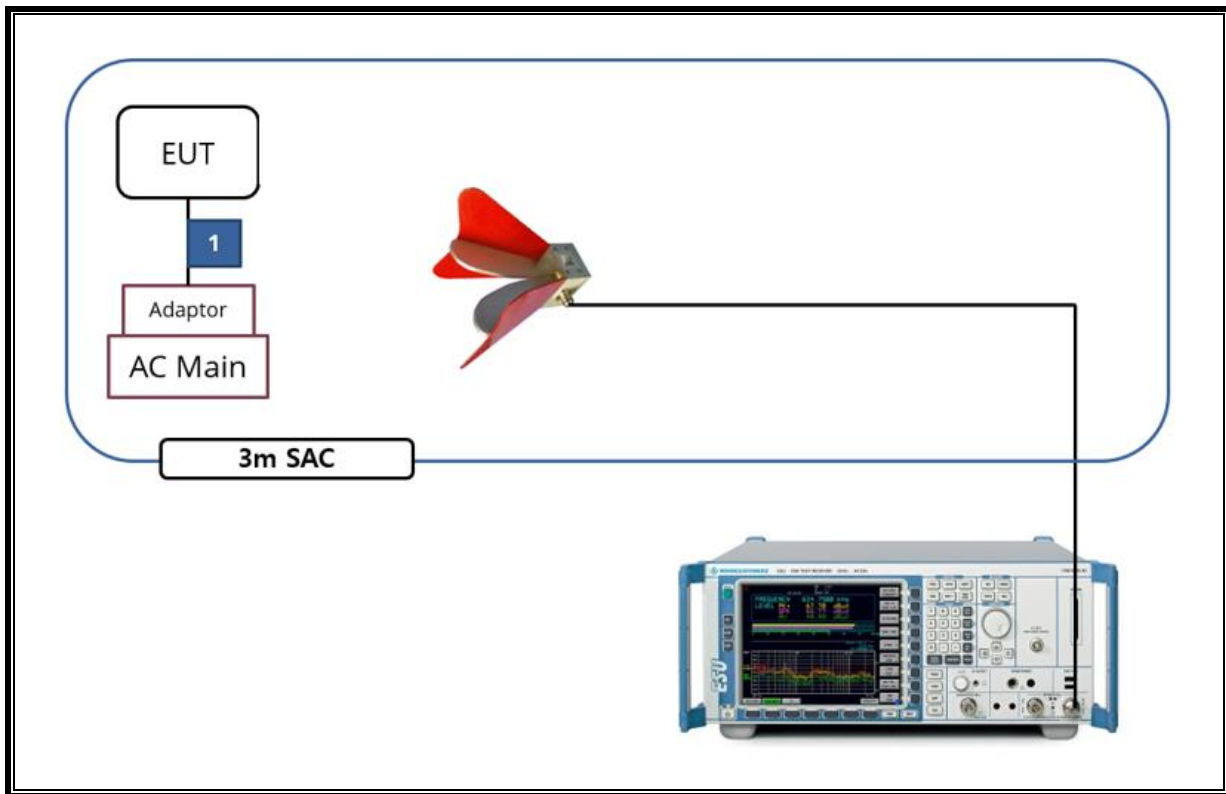
TEST SETUP

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	2022/08/19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	2022/08/13
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	845	2022/08/13
Antenna, Horn, 18 GHz	ETS	3115	00167211	2022/07/27
Antenna, Horn, 18 GHz	ETS	3115	00161451	2022/08/15
Antenna, Horn, 18 GHz	ETS	3117	00168724	2022/07/27
Antenna, Horn, 18 GHz	ETS	3117	00168717	2022/08/15
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2022/08/04
Preamplifier	ETS	3116C-PA	00168841	2022/08/04
Preamplifier, 1000 MHz	Sonoma	310N	341282	2022/08/02
Preamplifier, 1000 MHz	Sonoma	310N	351741	2022/08/02
Preamplifier, 1000 MHz	Sonoma	310N	370599	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1876511	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2022/08/02
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029168	2022/08/02
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2022/08/04
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2022/08/04
Average Power Sensor	Agilent / HP	U2000	MY54270007	2022/08/04
Average Power Sensor	Agilent / HP	U2000	MY54260010	2022/08/04
Attenuator	PASTERNAK	PE7087-10	A001	2022/08/03
Attenuator	PASTERNAK	PE7087-10	A008	2022/08/03
Attenuator	PASTERNAK	PE7004-10	2	2022/08/02
Attenuator	PASTERNAK	PE7087-10	A009	2022/08/03
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2022/08/02
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2022/08/02
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	015	2022/08/02
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	019	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	015	2022/08/02
High Pass Filter 3GHz	Micro-Tronics	HPM17543	020	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	009	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	016	2022/08/02
High Pass Filter 6GHz	Micro-Tronics	HPS17542	020	2022/08/02
LISN	R&S	ENV-216	101837	2022/08/05
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]	1/T Minimum VBW[kHz]
802.11b SISO	16.800	16.910	0.993	99.349	-	0.06
802.11g SISO	3.128	3.244	0.964	96.424	0.16	0.32
802.11n(HT20) SISO	2.908	3.024	0.962	96.164	0.17	0.34

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

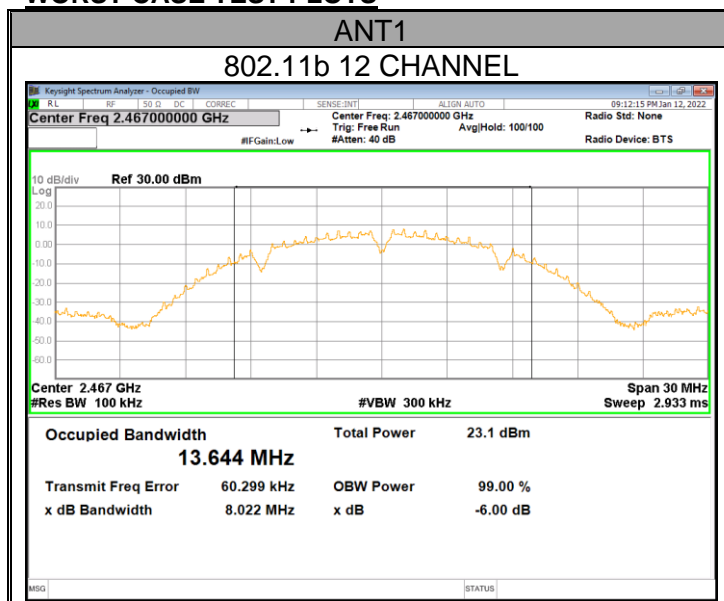
Reference to KDB 558074 D01 15.247 Meas Guidance: The transmitter output is connected to a spectrum analyzer with the RBW set to 100 kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

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	8.556	0.5
6	2 437	8.104	
11	2 462	8.044	
12	2 467	8.022	
13	2 472	8.102	
Worst		8.022	

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	14.430	0.5
2	2 417	15.670	
6	2 437	14.180	
10	2 457	14.440	
11	2 462	13.250	
12	2 467	14.470	
13	2 472	14.430	
Worst		13.250	

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	15.050	0.5
2	2 417	14.110	
6	2 437	14.830	
10	2 457	15.070	
11	2 462	15.450	
12	2 467	17.320	
13	2 472	17.270	
Worst		14.110	

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 mode

Mode	Channel	Frequency [MHz]	Average Power [dBm]	Power Limit [dBm]
802.11b	1	2 412	18.52	30.00
	6	2 437	18.90	
	11	2 462	18.91	
	12	2 467	17.94	
	13	2 472	15.02	
Worst Case			18.91	
802.11g	1	2 412	13.69	
	2	2 417	16.34	
	6	2 437	16.39	
	10	2 457	16.30	
	11	2 462	15.45	
	12	2 467	12.30	
	13	2 472	8.52	
Worst Case			16.39	
802.11n HT20	1	2 412	13.48	
	2	2 417	16.42	
	6	2 437	16.13	
	10	2 457	16.23	
	11	2 462	15.43	
	12	2 467	12.14	
	13	2 472	8.34	
Worst Case			16.42	

- 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

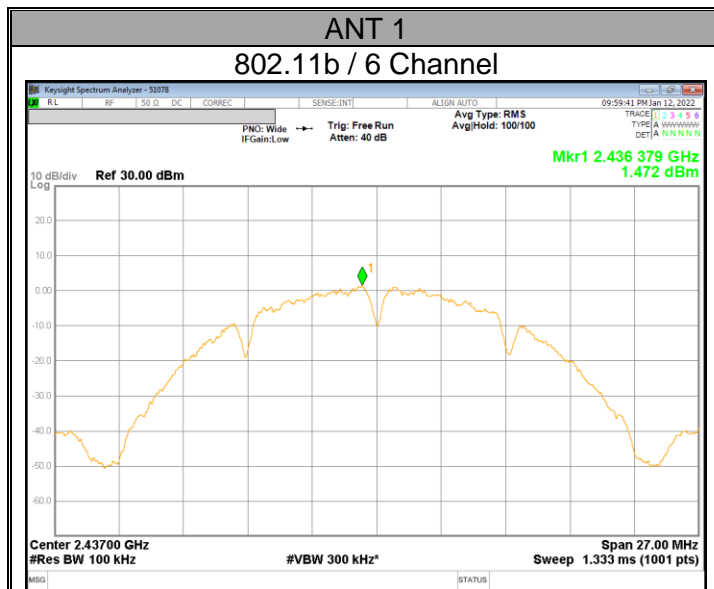
Power Spectral Density was performed utilizing the section 8.4 under KDB558074 D01 15.247 Meas Guidance.

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	0.294	-	0.294	8.00 ^{Note}
	6	2 437	1.472	-	1.472	
	11	2 462	0.554	-	0.554	
	12	2 467	-0.075	-	-0.075	
	13	2 472	-2.001	-	-2.001	
802.11g	1	2 412	-5.100	0.16	-4.940	
	2	2 417	-3.252	0.16	-3.092	
	6	2 437	-6.455	0.16	-6.295	
	10	2 457	-3.816	0.16	-3.656	
	11	2 462	-4.162	0.16	-4.002	
	12	2 467	-6.721	0.16	-6.561	
	13	2 472	-9.899	0.16	-9.739	
802.11n HT20	1	2 412	-4.897	0.17	-4.727	
	2	2 417	-3.618	0.17	-3.448	
	6	2 437	-3.746	0.17	-3.576	
	10	2 457	-6.143	0.17	-5.973	
	11	2 462	-4.683	0.17	-4.513	
	12	2 467	-8.100	0.17	-7.930	
	13	2 472	-12.110	0.17	-11.940	

- 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

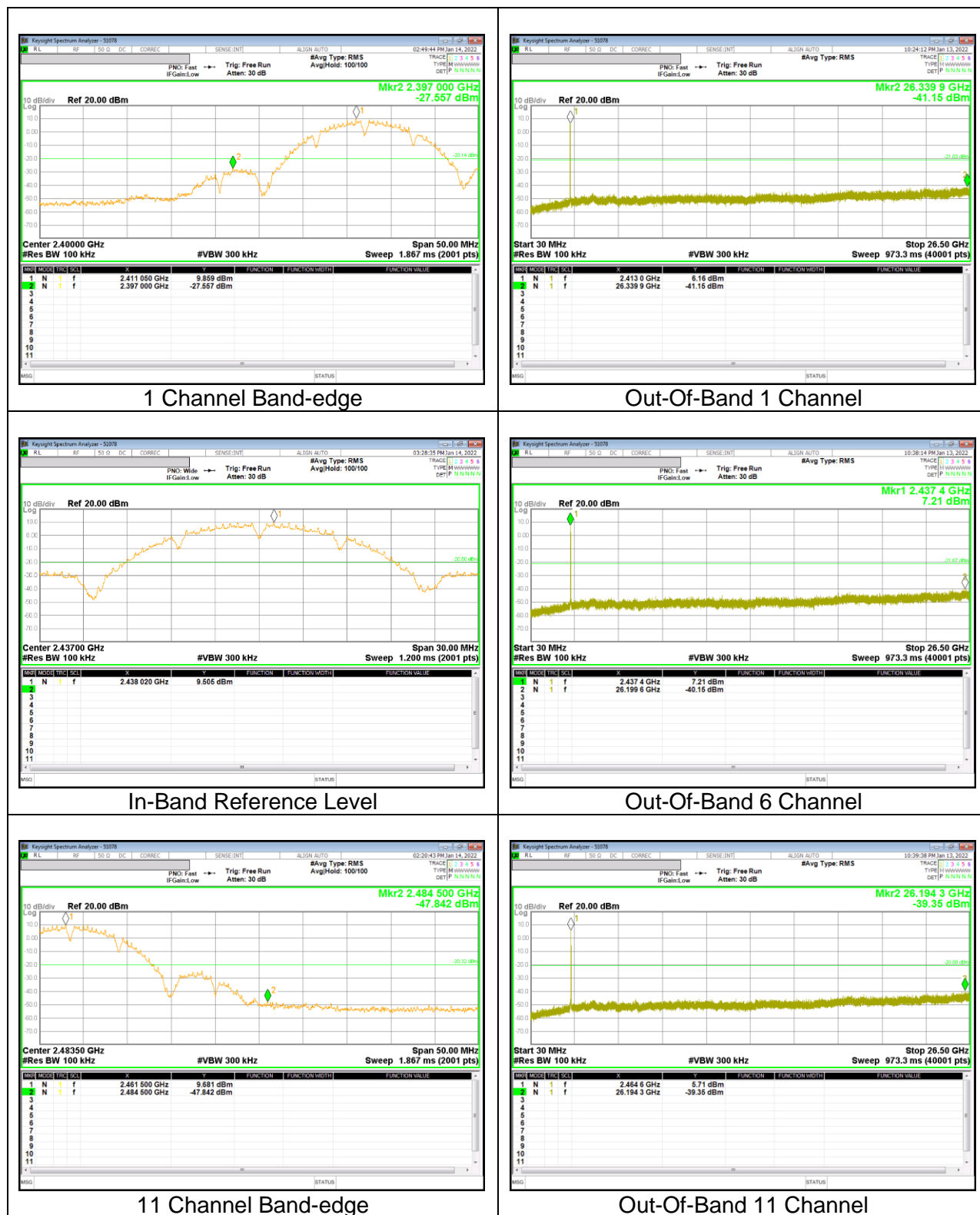
Output power was measured based on the use of average measurement, therefore the required attenuation is 30 dB.

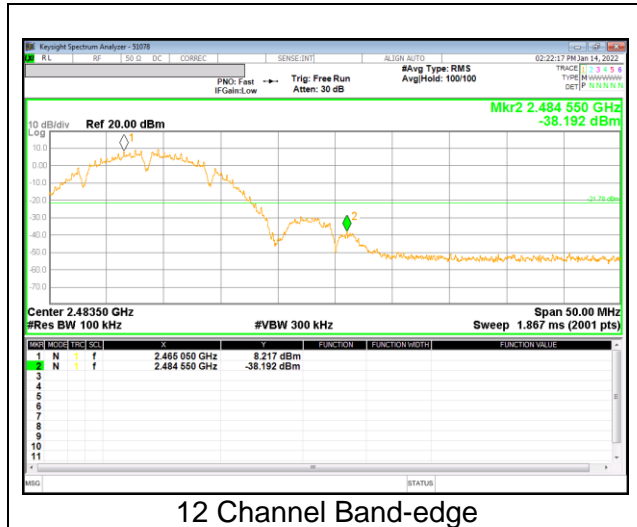
TEST PROCEDURE

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

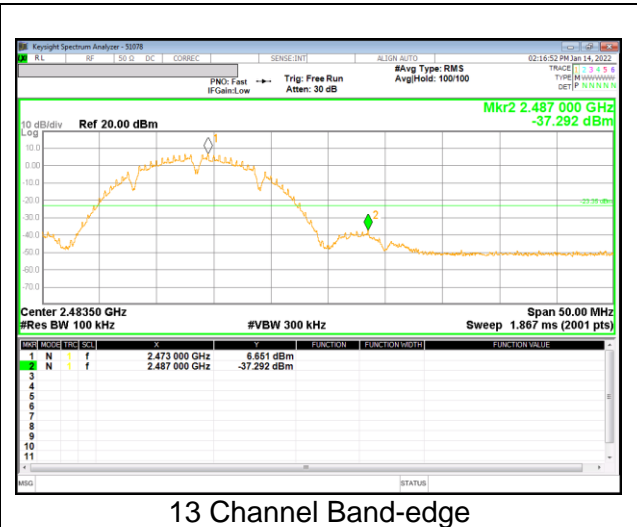
RESULTS

9.5.1. 802.11b MODE



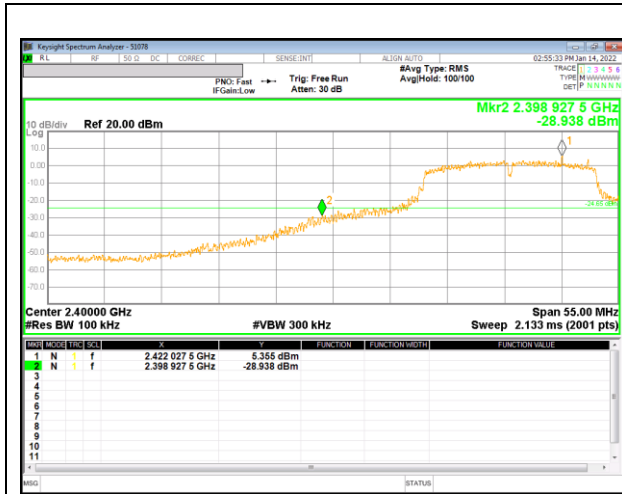


12 Channel Band-edge

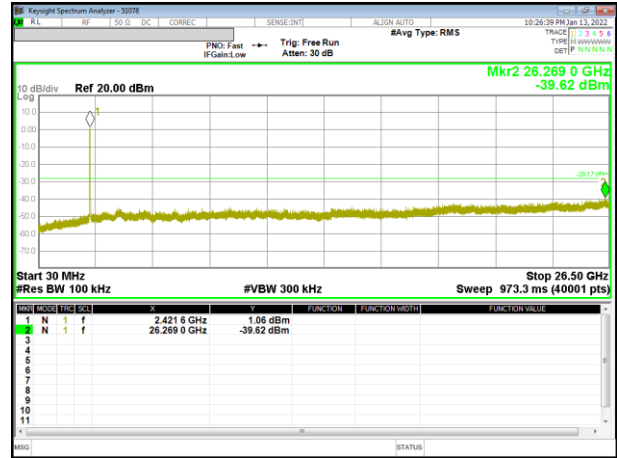


13 Channel Band-edge

9.5.2. 802.11g MODE



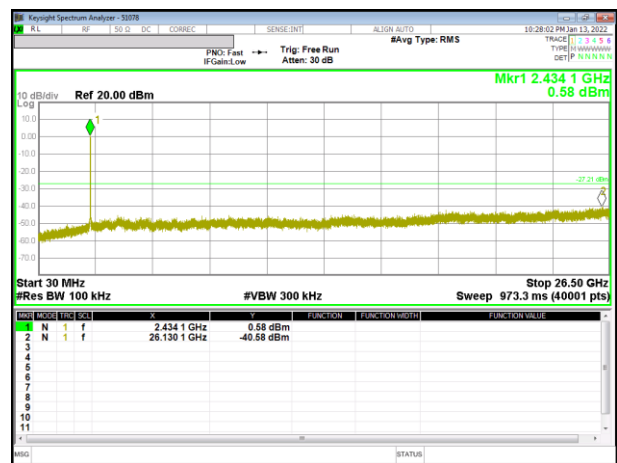
2 Channel Band-edge



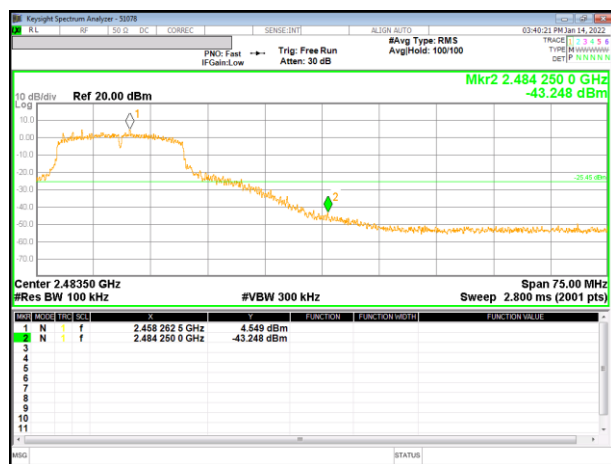
Out-Of-Band 2 Channel



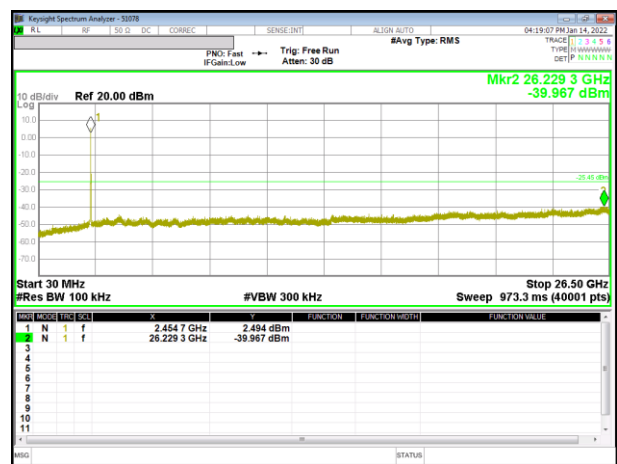
In-Band Reference Level



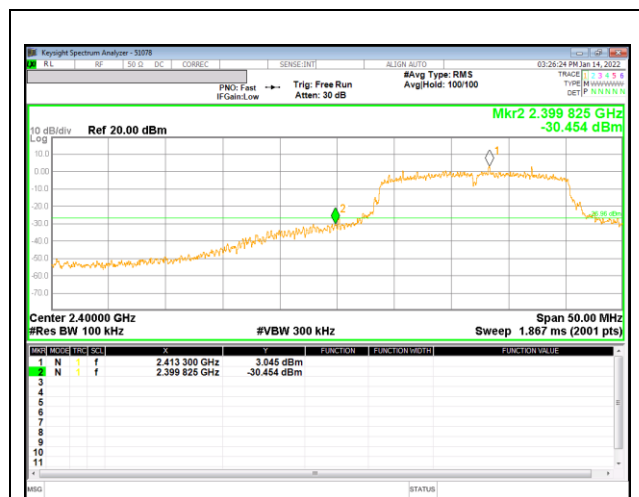
Out-Of-Band 6 Channel



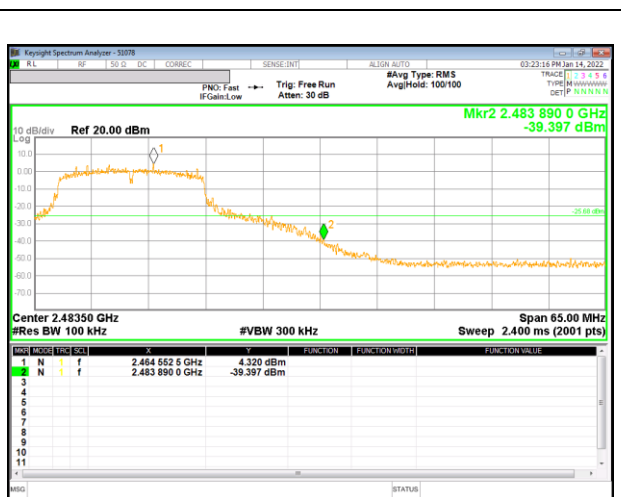
10 Channel Band-edge



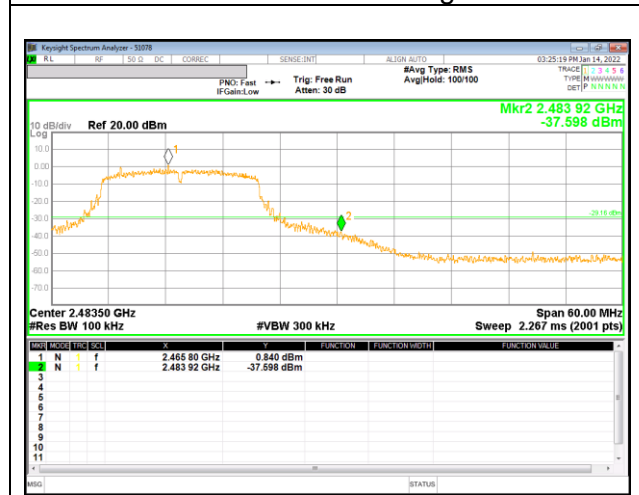
Out-Of-Band 10 Channel



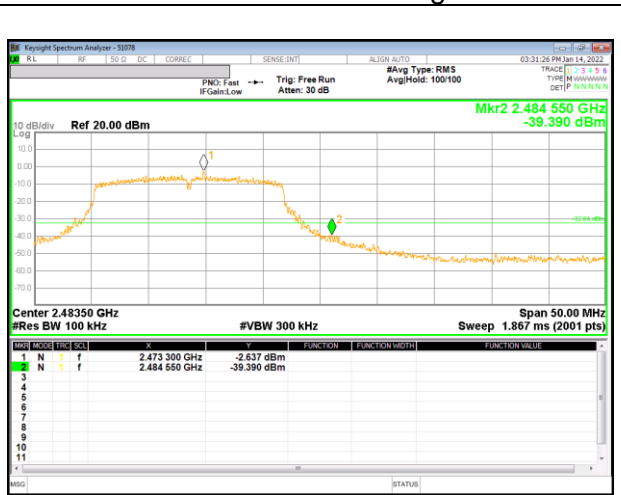
1 Channel Band-edge



11 Channel Band-edge

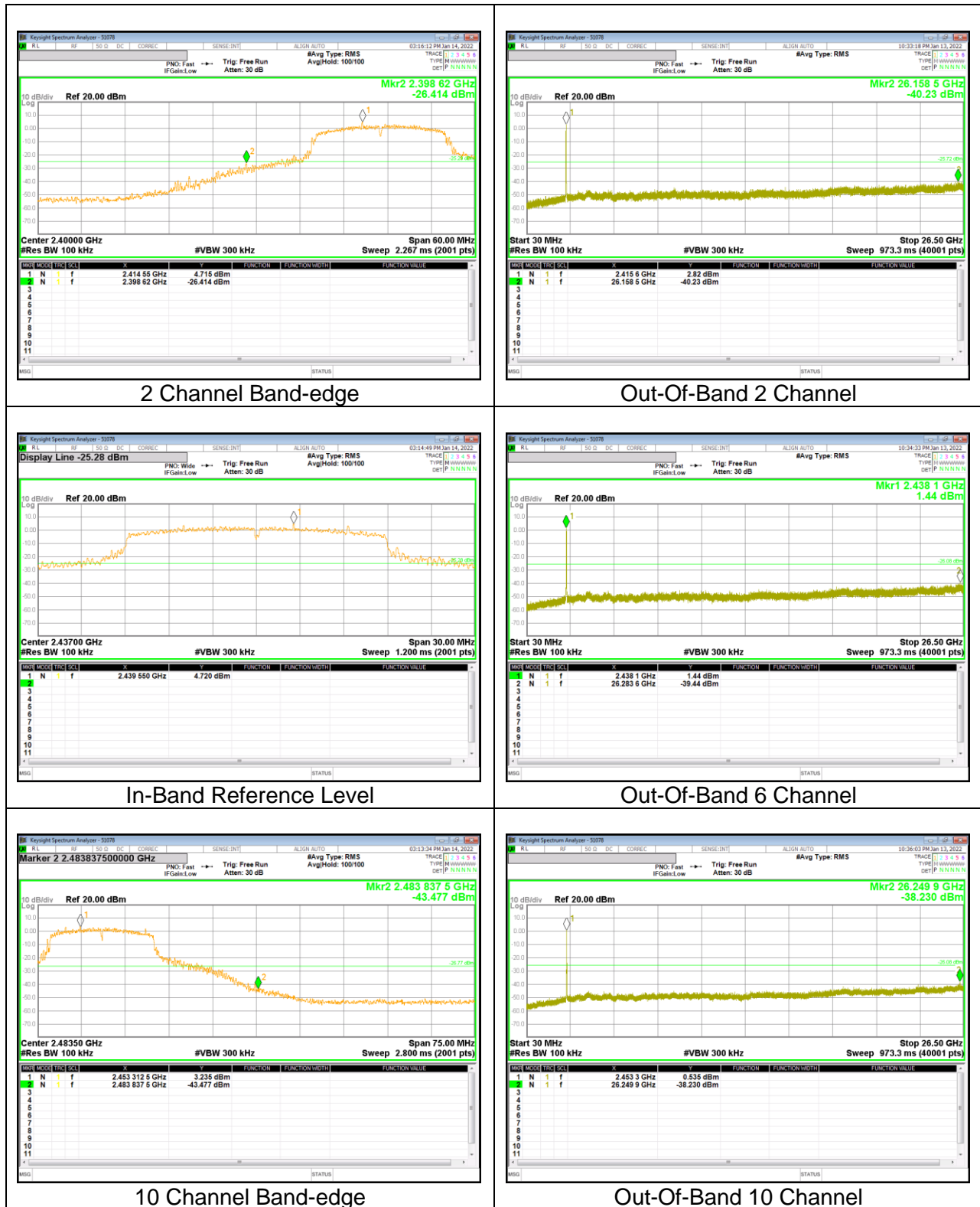


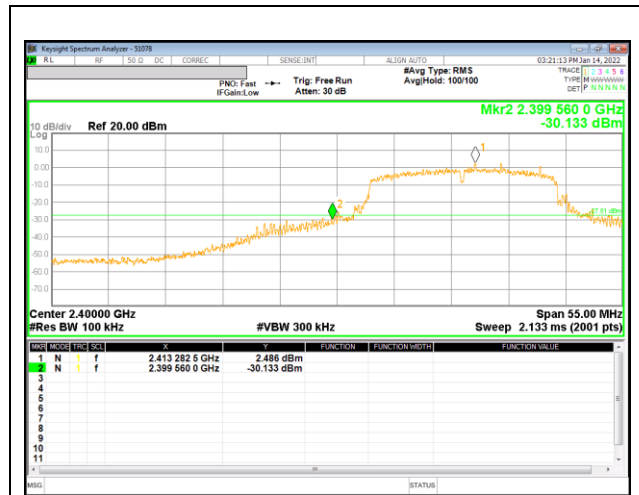
12 Channel Band-edge



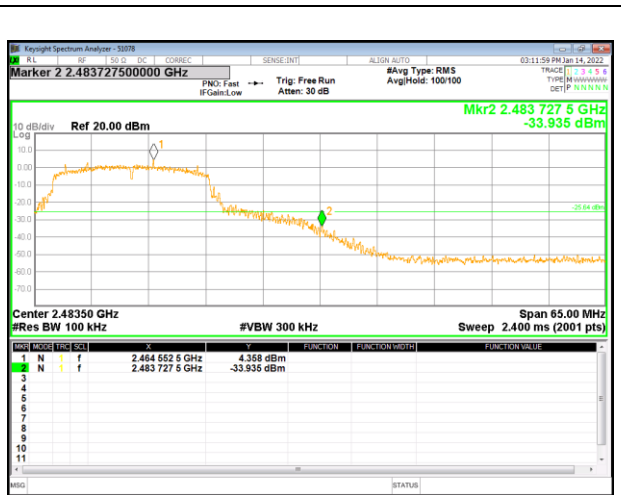
13 Channel Band-edge

9.5.3. 802.11n HT20 MODE

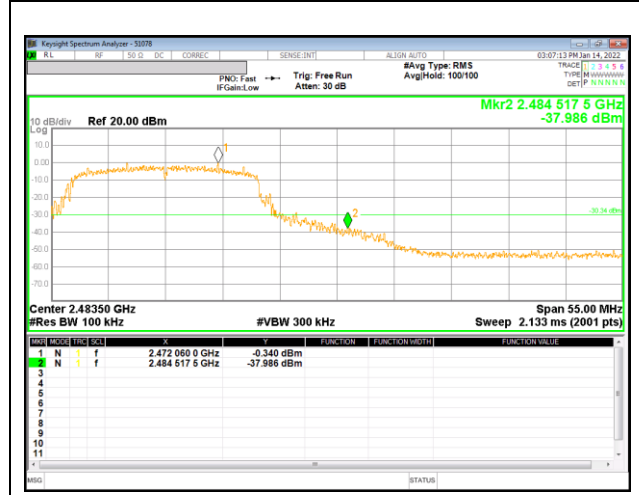




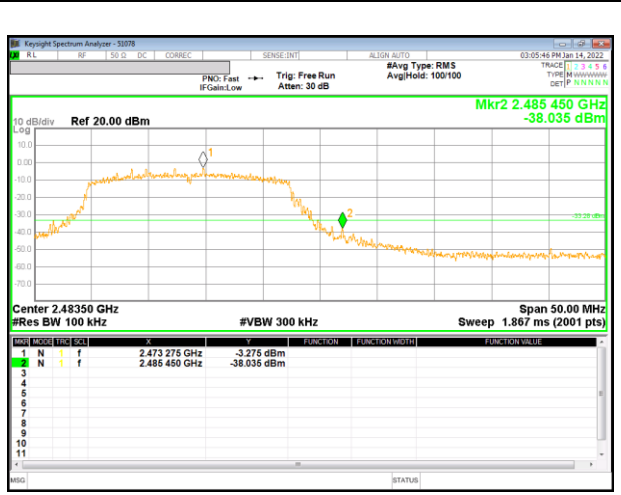
1 Channel Band-edge



11 Channel Band-edge



12 Channel Band-edge



13 Channel Band-edge

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 dB (duty cycle > 98%);
802.11g SISO mode = 0.16 dB (96.42%);
802.11n(HT20) SISO mode = 0.17 dB (96.16%);

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.

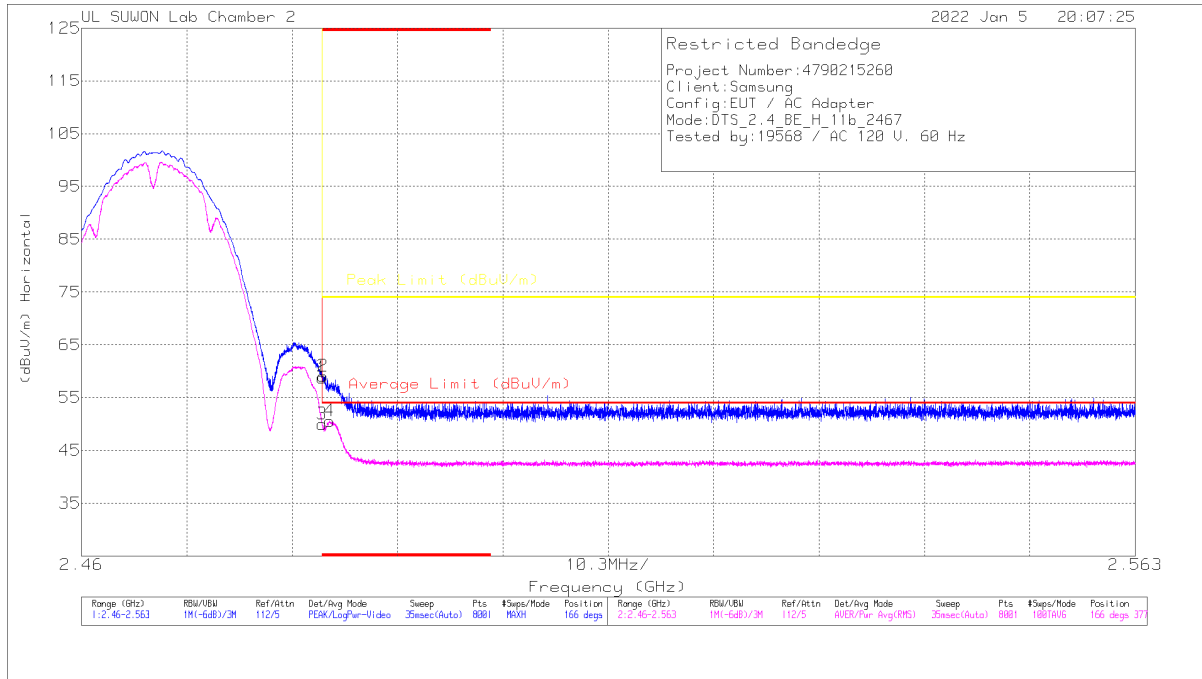
Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field 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: 12 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	47.2	Pk	32	-20.4	0	59.8	-	-	74	-15.2	166	377	H
2	* 2.4836	47.49	Pk	32	-20.4	0	59.09	-	-	74	-14.91	166	377	H
3	* 2.48351	38.39	RMS	32	-20.4	0	49.99	54	-4.01	-	-	166	377	H
4	* 2.48426	38.98	RMS	32	-20.4	0	50.58	54	-3.42	-	-	166	377	H

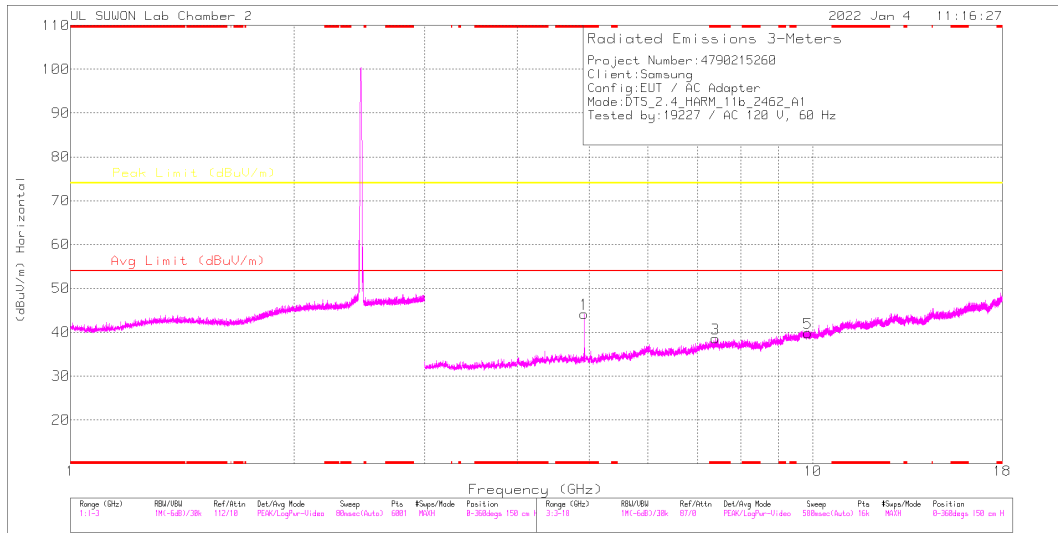
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

BANEDGE TEST DATA

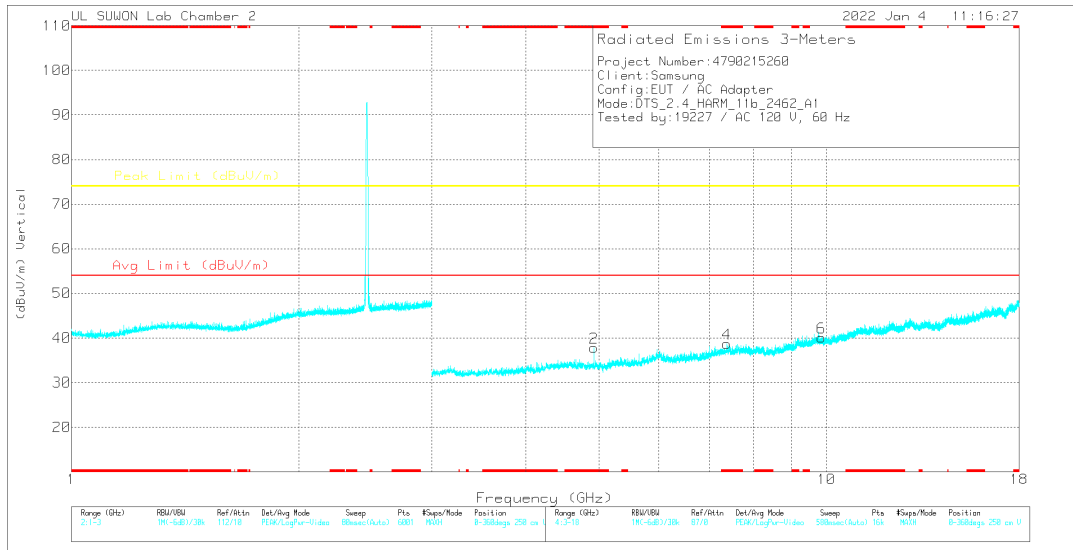
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result dBuV/m	AV Limit dBuV/m	AV Margin [dB]	PK Limit dBuV/m	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 2.39	41.07	Pk	31.90	-20.60	0.00	52.37	-	-	74.00	-21.63	71	100	H	
		* 2.38977	45.36	Pk	31.90	-20.60	0.00	56.66	-	-	74.00	-17.34	71	100	H	
		* 2.39	31.75	RMS	31.90	-20.60	0.00	43.05	54.00	-10.95	-	-	-	71	100	H
		* 2.38715	32.99	RMS	31.90	-20.50	0.00	44.39	54.00	-9.61	-	-	-	71	100	H
		* 2.39	40.45	Pk	31.90	-20.60	0.00	51.75	-	-	74.00	-22.25	207	340	V	
		* 2.38295	43.73	Pk	31.90	-20.60	0.00	55.03	-	-	74.00	-18.97	207	340	V	
		* 2.39	31.05	RMS	31.90	-20.60	0.00	42.35	54.00	-11.65	-	-	-	207	340	V
		* 2.37404	31.47	RMS	31.90	-20.60	0.00	42.77	54.00	-11.23	-	-	-	207	340	V
2462	ANT1	* 2.48351	41.83	Pk	32.00	-20.40	0.00	53.43	-	-	74.00	-20.57	184	144	H	
		* 2.48459	44.05	Pk	32.00	-20.50	0.00	55.55	-	-	74.00	-18.45	184	144	H	
		* 2.48351	32.09	RMS	32.00	-20.40	0.00	43.69	54.00	-10.31	-	-	-	184	144	H
		* 2.48431	32.31	RMS	32.00	-20.40	0.00	43.91	54.00	-10.09	-	-	-	184	144	H
		* 2.48351	41.00	Pk	32.00	-20.40	0.00	52.60	-	-	74.00	-21.40	196	107	V	
		* 2.48354	44.40	Pk	32.00	-20.40	0.00	56.00	-	-	74.00	-18.00	196	107	V	
		* 2.48351	30.76	RMS	32.00	-20.40	0.00	42.36	54.00	-11.64	-	-	-	196	107	V
		* 2.48359	31.69	RMS	32.00	-20.40	0.00	43.29	54.00	-10.71	-	-	-	196	107	V
2467	ANT1	* 2.48351	47.20	Pk	32.00	-20.40	0.00	58.80	-	-	74.00	-15.20	166	377	H	
		* 2.4836	47.49	Pk	32.00	-20.40	0.00	59.09	-	-	74.00	-14.91	166	377	H	
		* 2.48351	38.39	RMS	32.00	-20.40	0.00	49.99	54.00	-4.01	-	-	-	166	377	H
		* 2.48426	38.98	RMS	32.00	-20.40	0.00	50.58	54.00	-3.42	-	-	-	166	377	H
		* 2.48351	45.20	Pk	32.00	-20.40	0.00	56.80	-	-	74.00	-17.20	196	106	V	
		* 2.48356	44.40	Pk	32.00	-20.40	0.00	56.00	-	-	74.00	-18.00	196	106	V	
		* 2.48351	33.79	RMS	32.00	-20.40	0.00	45.39	54.00	-8.61	-	-	-	196	106	V
		* 2.48401	34.38	RMS	32.00	-20.40	0.00	45.98	54.00	-8.02	-	-	-	196	106	V
2472	ANT1	* 2.48351	43.30	Pk	32.00	-20.40	0.00	54.90	-	-	74.00	-19.10	169	377	H	
		* 2.48459	45.84	Pk	32.00	-20.50	0.00	57.34	-	-	74.00	-16.66	169	377	H	
		* 2.48351	33.15	RMS	32.00	-20.40	0.00	44.75	54.00	-9.25	-	-	-	169	377	H
		* 2.4858	36.77	RMS	32.00	-20.50	0.00	48.27	54.00	-5.73	-	-	-	169	377	H
		* 2.48351	40.55	Pk	32.00	-20.40	0.00	52.15	-	-	74.00	-21.85	192	100	V	
		2.521	44.01	Pk	32.10	-20.30	0.00	55.81	-	-	74.00	-18.19	192	100	V	
		* 2.48351	31.66	RMS	32.00	-20.40	0.00	43.26	54.00	-10.74	-	-	-	192	100	V
		* 2.4865	33.90	RMS	32.00	-20.40	0.00	45.50	54.00	-8.50	-	-	-	192	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
* 4.92408	42.85	PK2	34.1	-27.4	0	49.55	-	-	74	-24.45	32	100	H
* 4.92401	38.37	MAv1	34.1	-27.4	0	45.07	54	-8.93	-	-	32	100	H
* 4.92415	39.48	PK2	34.1	-27.4	0	46.18	-	-	74	-27.82	270	109	V
* 4.92401	32.64	MAv1	34.1	-27.4	0	39.34	54	-14.66	-	-	270	109	V
* 7.3871	35.88	PK2	36.1	-24.2	0	47.78	-	-	74	-26.22	118	104	H
* 7.38491	24.57	MAv1	36.1	-24.2	0	36.47	54	-17.53	-	-	118	104	H
* 7.38423	37.71	PK2	36.1	-24.2	0	49.61	-	-	74	-24.39	261	100	V
* 7.38681	27.89	MAv1	36.1	-24.2	0	39.79	54	-14.21	-	-	261	100	V
9.85128	32.86	PK2	37.3	-21.7	0	48.46	-	-	74	-25.54	0	100	H
9.84461	32.5	PK2	37.3	-21.7	0	48.1	-	-	74	-25.9	360	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	* 4.8239	39.35	PK2	34.10	-28.10	0.00	45.35	-	-	74.00	-28.65	88	132	H
		* 4.82403	31.59	MAV1	34.10	-28.10	0.00	37.59	54.00	-16.41	-	-	88	132	H
		* 4.82418	39.21	PK2	34.10	-28.10	0.00	45.21	-	-	74.00	-28.79	264	106	V
		* 4.82399	30.01	MAV1	34.10	-28.10	0.00	36.01	54.00	-17.99	-	-	264	106	V
		7.237	38.81	PK2	36.20	-25.50	0.00	49.51	-	-	74.00	-24.49	319	113	H
		7.238	39.11	PK2	36.20	-25.50	0.00	49.81	-	-	74.00	-24.19	266	102	V
		9.649	32.83	PK2	37.00	-21.50	0.00	48.33	-	-	74.00	-25.67	360	100	H
		9.662	32.33	PK2	37.10	-21.40	0.00	48.03	-	-	74.00	-25.97	360	100	V
2437	ANT1	* 4.87396	43.62	PK2	34.10	-27.90	0.00	49.82	-	-	74.00	-24.18	61	111	H
		* 4.87403	38.64	MAV1	34.10	-27.90	0.00	44.84	54.00	-9.16	-	-	61	111	H
		* 4.87398	39.79	PK2	34.10	-27.90	0.00	45.99	-	-	74.00	-28.01	269	100	V
		* 4.87404	32.36	MAV1	34.10	-27.90	0.00	38.56	54.00	-15.44	-	-	269	100	V
		* 7.31155	39.18	PK2	36.20	-25.00	0.00	50.38	-	-	74.00	-23.62	316	104	H
		* 7.31007	31.47	MAV1	36.20	-25.00	0.00	42.67	54.00	-11.33	-	-	316	104	H
		* 7.30884	39.46	PK2	36.20	-25.00	0.00	50.66	-	-	74.00	-23.34	260	104	V
		* 7.31016	31.74	MAV1	36.20	-25.00	0.00	42.94	54.00	-11.06	-	-	260	104	V
		9.748	32.70	PK2	37.20	-21.40	0.00	48.50	-	-	74.00	-25.50	360	100	H
		9.754	32.79	PK2	37.20	-21.40	0.00	48.59	-	-	74.00	-25.41	360	100	V
2462	ANT1	* 4.92408	42.85	PK2	34.10	-27.40	0.00	49.55	-	-	74.00	-24.45	32	100	H
		* 4.92401	38.37	MAV1	34.10	-27.40	0.00	45.07	54.00	-8.93	-	-	32	100	H
		* 4.92415	39.48	PK2	34.10	-27.40	0.00	46.18	-	-	74.00	-27.82	270	109	V
		* 4.92401	32.64	MAV1	34.10	-27.40	0.00	39.34	54.00	-14.66	-	-	270	109	V
		* 7.3871	35.88	PK2	36.10	-24.20	0.00	47.78	-	-	74.00	-26.22	118	104	H
		* 7.38491	24.57	MAV1	36.10	-24.20	0.00	36.47	54.00	-17.53	-	-	118	104	H
		* 7.38423	37.71	PK2	36.10	-24.20	0.00	49.61	-	-	74.00	-24.39	261	100	V
		* 7.38681	27.89	MAV1	36.10	-24.20	0.00	39.79	54.00	-14.21	-	-	261	100	V
		9.851	32.86	PK2	37.30	-21.70	0.00	48.46	-	-	74.00	-25.54	0	100	H
		9.845	32.50	PK2	37.30	-21.70	0.00	48.10	-	-	74.00	-25.90	360	100	V

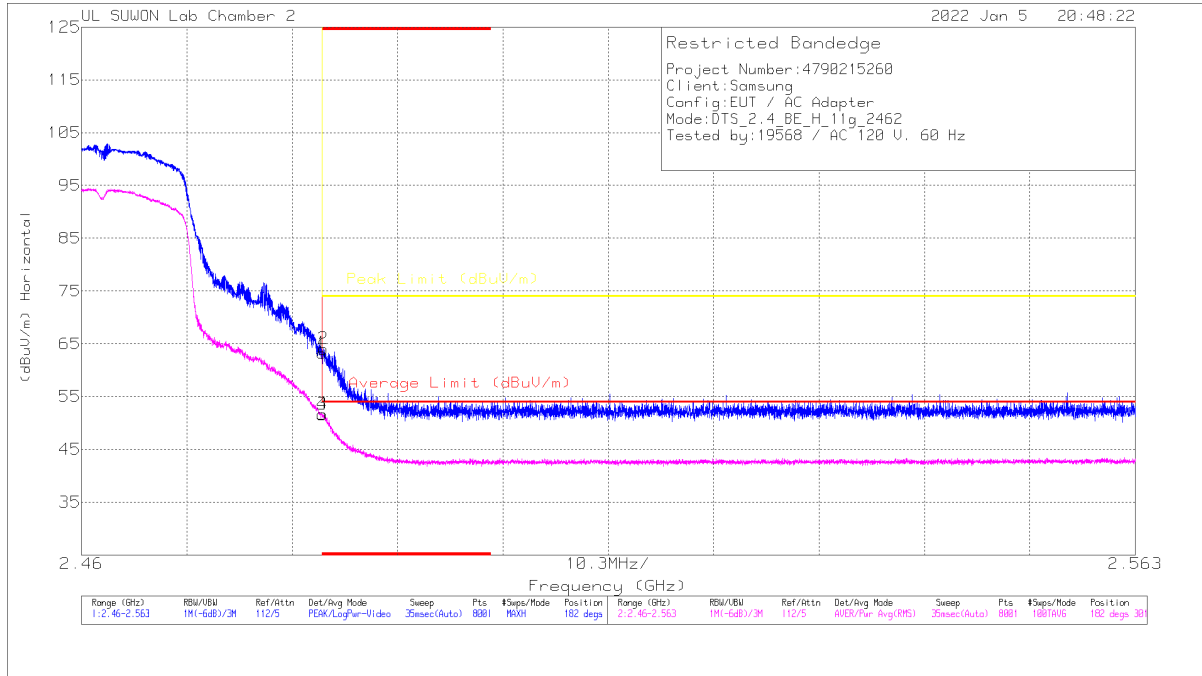
Note1. PK2 - KDB558074 Method: Maximum Peak / MAV1 - KDB558074 Option 1 Maximum RMS Average

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: 11 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	51.64	Pk	32	-20.4	0	63.24	-	-	74	-10.76	182	301	H
2	* 2.48365	52.46	Pk	32	-20.4	0	64.06	-	-	74	-9.94	182	301	H
3	* 2.48351	39.94	RMS	32	-20.4	.16	51.7	54	-2.3	-	-	182	301	H
4	* 2.48354	39.91	RMS	32	-20.4	.16	51.67	54	-2.33	-	-	182	301	H

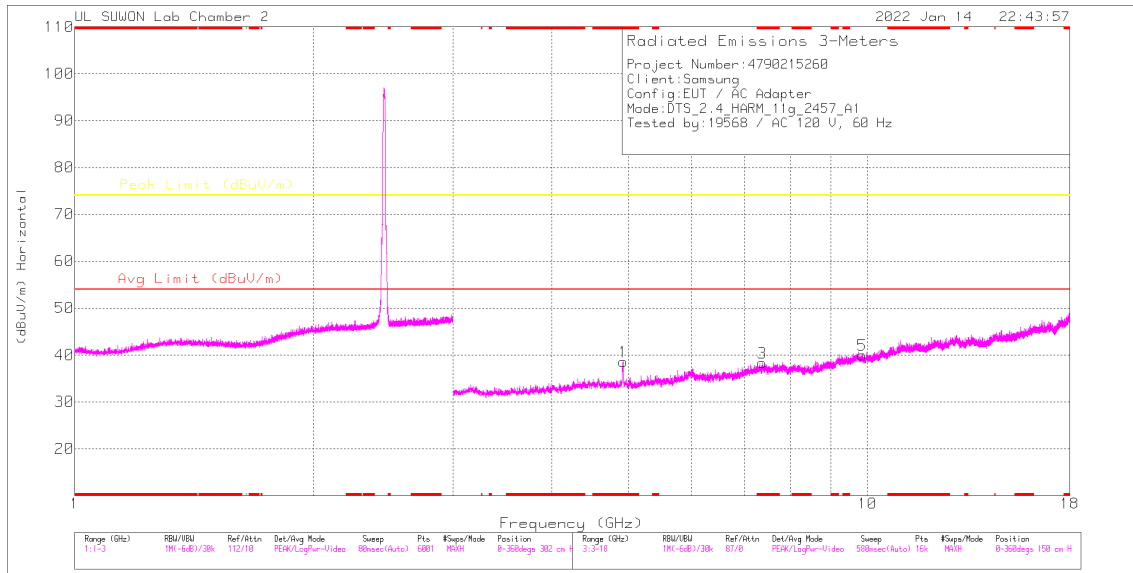
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

BANDEDGE TEST DATA

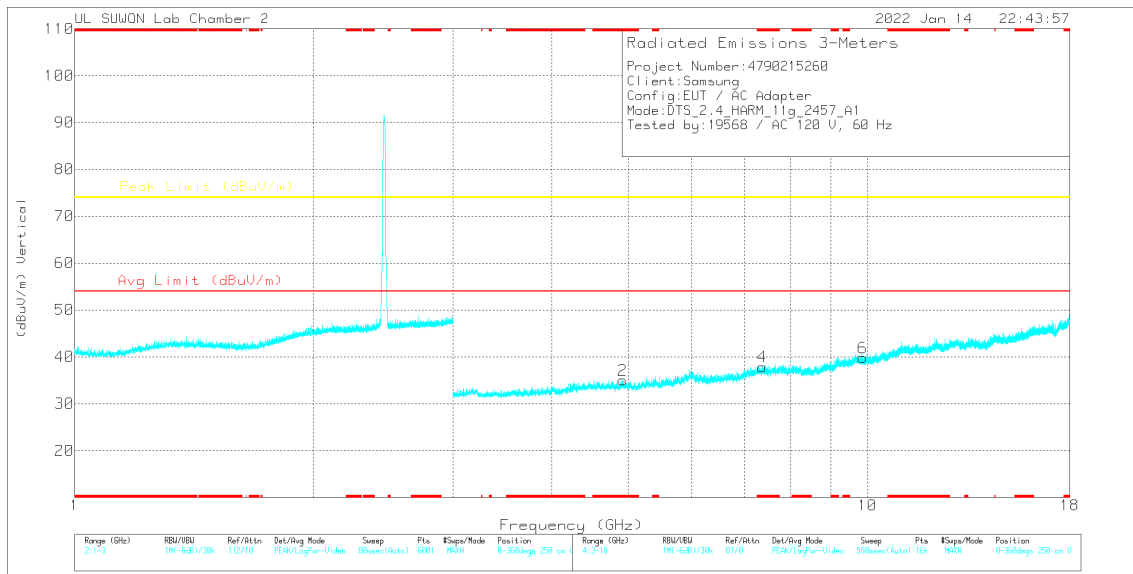
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 2.39	52.10	Pk	31.90	-20.60	0.00	63.40	-	-	74.00	-10.60	164	360	H	
		* 2.38981	52.95	Pk	31.90	-20.60	0.00	64.25	-	-	74.00	-9.75	164	360	H	
		* 2.39	39.57	RMS	31.90	-20.60	0.16	51.03	54.00	-2.97	-	-	-	164	360	H
		* 2.38996	39.77	RMS	31.90	-20.60	0.16	51.23	54.00	-2.77	-	-	-	164	360	H
		* 2.39	49.06	Pk	31.90	-20.60	0.00	60.36	-	-	74.00	-13.64	192	100	V	
		* 2.38983	49.42	Pk	31.90	-20.60	0.00	60.72	-	-	74.00	-13.28	192	100	V	
		* 2.39	35.45	RMS	31.90	-20.60	0.16	46.91	54.00	-7.09	-	-	-	192	100	V
		* 2.38988	35.89	RMS	31.90	-20.60	0.16	47.35	54.00	-6.65	-	-	-	192	100	V
2417	ANT1	* 2.39	47.19	Pk	31.90	-20.60	0.00	58.49	-	-	74.00	-15.51	181	355	H	
		* 2.38997	48.27	Pk	31.90	-20.60	0.00	59.57	-	-	74.00	-14.43	181	355	H	
		* 2.39	34.83	RMS	31.90	-20.60	0.16	46.29	54.00	-7.71	-	-	-	181	355	H
		* 2.38992	35.37	RMS	31.90	-20.60	0.16	46.83	54.00	-7.17	-	-	-	181	355	H
		* 2.39	43.30	Pk	31.90	-20.60	0.00	54.60	-	-	74.00	-19.40	198	103	V	
		* 2.3261	44.38	Pk	31.80	-20.70	0.00	55.48	-	-	74.00	-18.52	198	103	V	
		* 2.39	32.12	RMS	31.90	-20.60	0.16	43.58	54.00	-10.42	-	-	-	198	103	V
		* 2.38951	32.40	RMS	31.90	-20.60	0.16	43.86	54.00	-10.14	-	-	-	198	103	V
2457	ANT1	* 2.48351	46.45	Pk	32.00	-20.40	0.00	58.05	-	-	74.00	-15.95	175	244	H	
		* 2.48421	46.64	Pk	32.00	-20.40	0.00	58.24	-	-	74.00	-15.76	175	244	H	
		* 2.48351	34.48	RMS	32.00	-20.40	0.16	46.24	54.00	-7.76	-	-	-	175	244	H
		* 2.48374	34.68	RMS	32.00	-20.40	0.16	46.44	54.00	-7.56	-	-	-	175	244	H
		* 2.48351	43.00	Pk	32.00	-20.40	0.00	54.60	-	-	74.00	-19.40	206	383	V	
		* 2.48428	46.04	Pk	32.00	-20.40	0.00	57.64	-	-	74.00	-16.36	206	383	V	
		* 2.48351	33.38	RMS	32.00	-20.40	0.16	45.14	54.00	-8.86	-	-	-	206	383	V
		* 2.48374	33.67	RMS	32.00	-20.40	0.16	45.43	54.00	-8.57	-	-	-	206	383	V
2462	ANT1	* 2.48351	51.64	Pk	32.00	-20.40	0.00	63.24	-	-	74.00	-10.76	182	301	H	
		* 2.48365	52.46	Pk	32.00	-20.40	0.00	64.06	-	-	74.00	-9.94	182	301	H	
		* 2.48351	39.94	RMS	32.00	-20.40	0.16	51.70	54.00	-2.30	-	-	-	182	301	H
		* 2.48354	39.91	RMS	32.00	-20.40	0.16	51.67	54.00	-2.33	-	-	-	182	301	H
		* 2.48351	46.76	Pk	32.00	-20.40	0.00	58.36	-	-	74.00	-15.64	194	106	V	
		* 2.48359	48.28	Pk	32.00	-20.40	0.00	59.88	-	-	74.00	-14.12	194	106	V	
		* 2.48351	35.51	RMS	32.00	-20.40	0.16	47.27	54.00	-6.73	-	-	-	194	106	V
		* 2.4837	35.79	RMS	32.00	-20.40	0.16	47.55	54.00	-6.45	-	-	-	194	106	V
2467	ANT1	* 2.48351	50.42	Pk	32.00	-20.40	0.00	62.02	-	-	74.00	-11.98	184	267	H	
		* 2.48508	52.23	Pk	32.00	-20.50	0.00	63.73	-	-	74.00	-10.27	184	267	H	
		* 2.48351	39.08	RMS	32.00	-20.40	0.16	50.84	54.00	-3.16	-	-	-	184	267	H
		* 2.48366	39.65	RMS	32.00	-20.40	0.16	51.41	54.00	-2.59	-	-	-	184	267	H
		* 2.48351	48.64	Pk	32.00	-20.40	0.00	60.24	-	-	74.00	-13.76	194	104	V	
		* 2.48494	50.36	Pk	32.00	-20.50	0.00	61.86	-	-	74.00	-12.14	194	104	V	
		* 2.48351	37.04	RMS	32.00	-20.40	0.16	48.80	54.00	-5.20	-	-	-	194	104	V
		* 2.48355	37.19	RMS	32.00	-20.40	0.16	48.95	54.00	-5.05	-	-	-	194	104	V
2472	ANT1	* 2.48351	54.88	Pk	32.00	-20.40	0.00	66.48	-	-	74.00	-7.52	132	116	H	
		* 2.48352	54.97	Pk	32.00	-20.40	0.00	66.57	-	-	74.00	-7.43	132	116	H	
		* 2.48351	39.40	RMS	32.00	-20.40	0.16	51.16	54.00	-2.84	-	-	-	132	116	H
		* 2.48368	39.56	RMS	32.00	-20.40	0.16	51.32	54.00	-2.68	-	-	-	132	116	H
		* 2.48351	51.59	Pk	32.00	-20.40	0.00	63.19	-	-	74.00	-10.81	191	100	V	
		* 2.48354	53.37	Pk	32.00	-20.40	0.00	64.97	-	-	74.00	-9.03	191	100	V	
		* 2.48351	37.32	RMS	32.00	-20.40	0.16	49.08	54.00	-4.92	-	-	-	191	100	V
		* 2.4837	37.72	RMS	32.00	-20.40	0.16	49.48	54.00	-4.52	-	-	-	191	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: 10 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
* 4.91882	42.05	PK2	34.1	-27.4	0	48.75	-	-	74	-25.25	59	127	H
* 4.91396	29.9	MAv1	34.1	-27.5	.16	36.66	54	-17.34	-	-	59	127	H
* 4.91631	38.13	PK2	34.1	-27.4	0	44.83	-	-	74	-29.17	254	110	V
* 4.91396	25.74	MAv1	34.1	-27.5	.16	32.5	54	-21.5	-	-	254	110	V
* 7.36869	35.08	PK2	36.1	-24.3	0	46.88	-	-	74	-27.12	360	100	H
* 7.36945	35.53	PK2	36.1	-24.3	0	47.33	-	-	74	-26.67	360	100	V
9.8593	32.73	PK2	37.3	-21.7	0	48.33	-	-	74	-25.67	360	100	H
9.85609	32.6	PK2	37.3	-21.7	0	48.2	-	-	74	-25.8	360	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
2417	ANT1	* 4.83665	38.02	PK2	34.10	-28.10	0.00	44.02	-	-	74.00	-29.98	0	100	H
		* 4.83164	37.28	PK2	34.10	-28.10	0.00	43.28	-	-	74.00	-30.72	0	100	V
		* 7.36148	35.18	PK2	36.10	-24.40	0.00	46.88	-	-	74.00	-27.12	0	100	H
		* 7.38867	34.95	PK2	36.10	-24.20	0.00	46.85	-	-	74.00	-27.15	0	100	V
		9.671	32.97	PK2	37.10	-21.30	0.00	48.77	-	-	74.00	-25.23	194	132	H
		9.668	33.28	PK2	37.10	-21.30	0.00	49.08	-	-	74.00	-24.92	9	104	V
2437	ANT1	* 4.87167	37.85	PK2	34.10	-27.90	0.00	44.05	-	-	74.00	-29.95	360	100	H
		* 4.8763	36.67	PK2	34.10	-27.90	0.00	42.87	-	-	74.00	-31.13	360	100	V
		* 7.316	35.52	PK2	36.10	-24.90	0.00	46.72	-	-	74.00	-27.28	360	100	H
		* 7.30945	35.75	PK2	36.20	-25.00	0.00	46.95	-	-	74.00	-27.05	360	100	V
		9.741	32.54	PK2	37.10	-21.30	0.00	48.34	-	-	74.00	-25.66	360	100	H
		9.749	32.38	PK2	37.20	-21.40	0.00	48.18	-	-	74.00	-25.82	360	100	V
2457	ANT1	* 4.91882	42.05	PK2	34.10	-27.40	0.00	48.75	-	-	74.00	-25.25	59	127	H
		* 4.91396	29.90	MAV1	34.10	-27.50	0.16	36.66	54.00	-17.34	-	-	59	127	H
		* 4.91631	38.13	PK2	34.10	-27.40	0.00	44.83	-	-	74.00	-29.17	254	110	V
		* 4.91396	25.74	MAV1	34.10	-27.50	0.16	32.50	54.00	-21.50	-	-	254	110	V
		* 7.36869	35.08	PK2	36.10	-24.30	0.00	46.88	-	-	74.00	-27.12	360	100	H
		* 7.36945	35.53	PK2	36.10	-24.30	0.00	47.33	-	-	74.00	-26.67	360	100	V
		9.859	32.73	PK2	37.30	-21.70	0.00	48.33	-	-	74.00	-25.67	360	100	H
		9.856	32.60	PK2	37.30	-21.70	0.00	48.20	-	-	74.00	-25.80	360	100	V

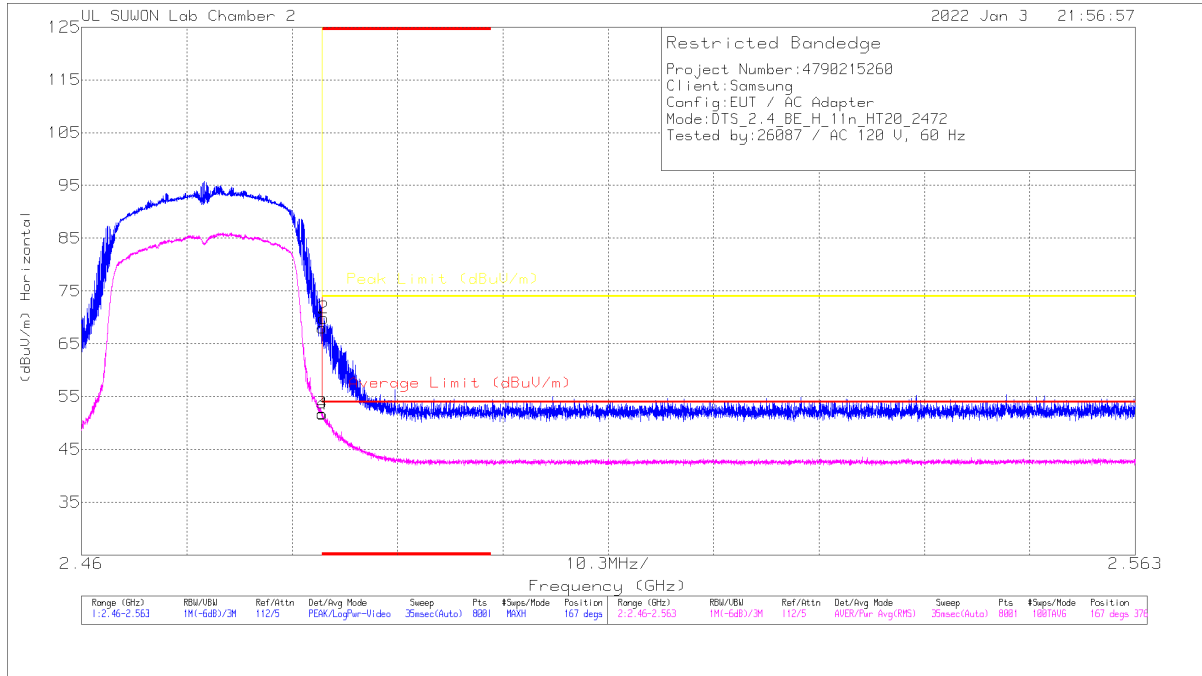
Note1. PK2 - KDB558074 Method: Maximum Peak / MAV1 - KDB558074 Option 1 Maximum RMS Average

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: 13 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	56.46	Pk	32	-20.4	0	69.06	-	-	74	-5.94	167	376	H
2	* 2.48368	58.29	Pk	32	-20.4	0	69.89	-	-	74	-4.11	167	376	H
3	* 2.48351	40.09	RMS	32	-20.4	.17	51.86	54	-2.14	-	-	167	376	H
4	* 2.48355	39.95	RMS	32	-20.4	.17	51.72	54	-2.28	-	-	167	376	H

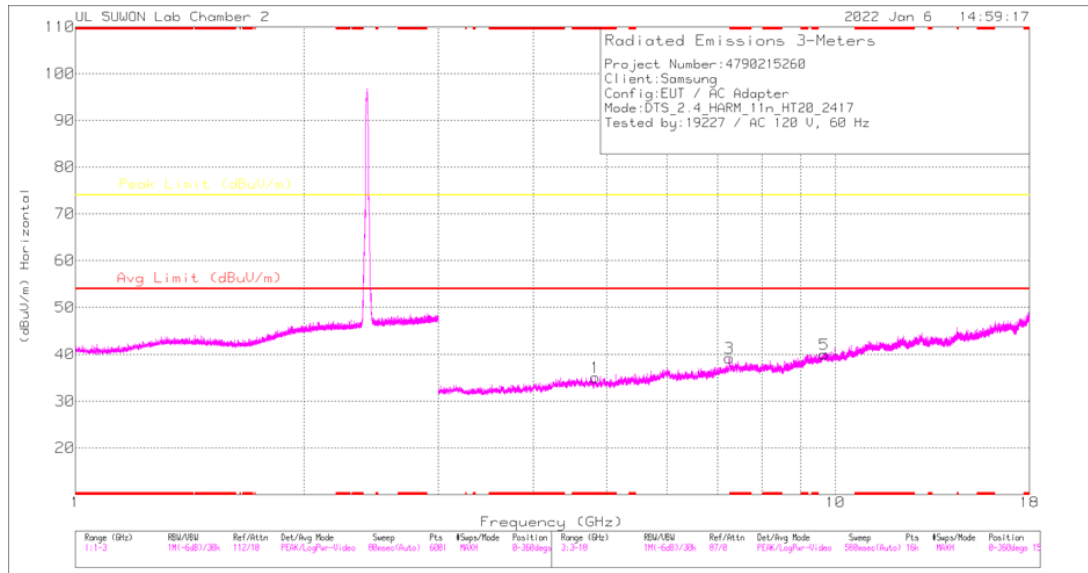
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 RMS - RMS detection

BANEDGE TEST DATA

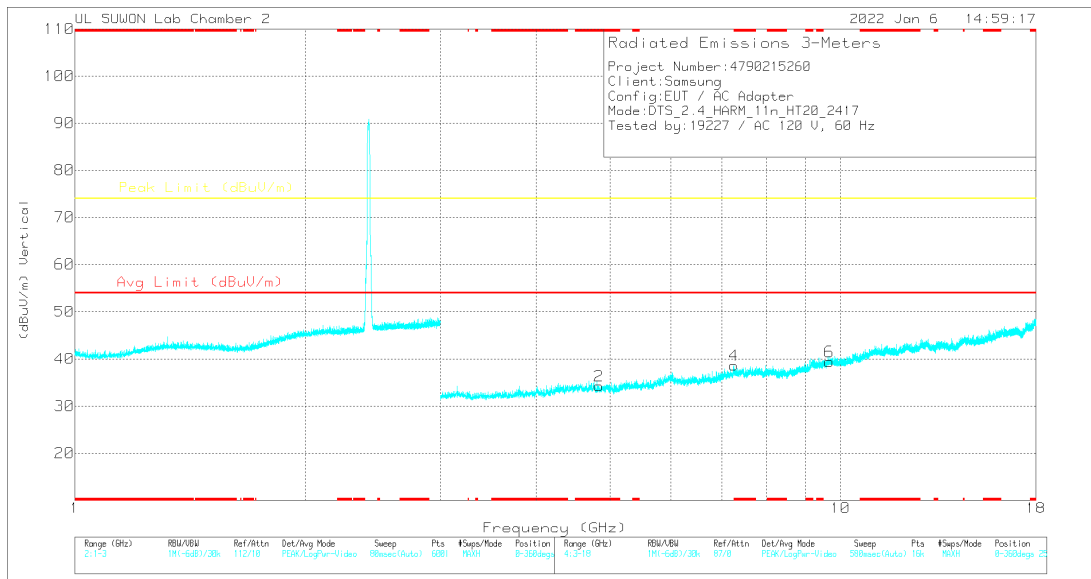
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2412	ANT1	* 2.39	57.32	Pk	31.90	-20.60	0.00	68.62	-	-	74.00	-5.38	184	204	H	
		* 2.38981	56.92	Pk	31.90	-20.60	0.00	68.22	-	-	74.00	-5.78	184	204	H	
		* 2.39	38.52	RMS	31.90	-20.60	0.17	49.99	54.00	-4.01	-	-	-	184	204	H
		* 2.38996	38.98	RMS	31.90	-20.60	0.17	50.45	54.00	-3.55	-	-	-	184	204	H
		* 2.39	46.80	Pk	31.90	-20.60	0.00	58.10	-	-	74.00	-15.90	188	100	V	
		* 2.38997	54.15	Pk	31.90	-20.60	0.00	65.45	-	-	74.00	-8.55	188	100	V	
		* 2.39	36.54	RMS	31.90	-20.60	0.17	48.01	54.00	-5.99	-	-	-	188	100	V
		* 2.38996	37.28	RMS	31.90	-20.60	0.17	48.75	54.00	-5.25	-	-	-	188	100	V
2417	ANT1	* 2.39	46.06	Pk	31.90	-20.60	0.00	57.36	-	-	74.00	-16.64	137	100	H	
		* 2.38984	55.79	Pk	31.90	-20.60	0.00	67.09	-	-	74.00	-6.91	137	100	H	
		* 2.39	33.42	RMS	31.90	-20.60	0.17	44.89	54.00	-9.11	-	-	-	137	100	H
		* 2.38994	34.02	RMS	31.90	-20.60	0.17	45.49	54.00	-8.51	-	-	-	137	100	H
		* 2.39	47.15	Pk	31.90	-20.60	0.00	58.45	-	-	74.00	-15.55	207	115	V	
		* 2.38984	53.08	Pk	31.90	-20.60	0.00	64.38	-	-	74.00	-9.62	207	115	V	
		* 2.39	33.11	RMS	31.90	-20.60	0.17	44.58	54.00	-9.42	-	-	-	207	115	V
		* 2.38984	33.17	RMS	31.90	-20.60	0.17	44.64	54.00	-9.36	-	-	-	207	115	V
2457	ANT1	* 2.48351	45.27	Pk	32.00	-20.40	0.00	56.87	-	-	74.00	-17.13	177	171	H	
		* 2.48379	53.14	Pk	32.00	-20.40	0.00	64.74	-	-	74.00	-9.26	177	171	H	
		* 2.48351	34.54	RMS	32.00	-20.40	0.17	46.31	54.00	-7.69	-	-	-	177	171	H
		* 2.48352	35.06	RMS	32.00	-20.40	0.17	46.83	54.00	-7.17	-	-	-	177	171	H
		* 2.48351	42.51	Pk	32.00	-20.40	0.00	54.11	-	-	74.00	-19.89	344	100	V	
		* 2.48355	48.30	Pk	32.00	-20.40	0.00	59.90	-	-	74.00	-14.10	344	100	V	
		* 2.48351	32.12	RMS	32.00	-20.40	0.17	43.89	54.00	-10.11	-	-	-	344	100	V
		* 2.48364	32.30	RMS	32.00	-20.40	0.17	44.07	54.00	-9.93	-	-	-	344	100	V
2462	ANT1	* 2.48351	52.22	Pk	32.00	-20.40	0.00	63.82	-	-	74.00	-10.18	184	143	H	
		* 2.4836	57.71	Pk	32.00	-20.40	0.00	69.31	-	-	74.00	-4.69	184	143	H	
		* 2.48351	39.28	RMS	32.00	-20.40	0.17	51.05	54.00	-2.95	-	-	-	184	143	H
		* 2.48373	39.41	RMS	32.00	-20.40	0.17	51.18	54.00	-2.82	-	-	-	184	143	H
		* 2.48351	48.05	Pk	32.00	-20.40	0.00	59.65	-	-	74.00	-14.35	194	106	V	
		* 2.48392	52.84	Pk	32.00	-20.40	0.00	64.44	-	-	74.00	-9.56	194	106	V	
		* 2.48351	36.59	RMS	32.00	-20.40	0.17	48.36	54.00	-5.64	-	-	-	194	106	V
		* 2.48374	36.59	RMS	32.00	-20.40	0.17	48.36	54.00	-5.64	-	-	-	194	106	V
2467	ANT1	* 2.48351	51.22	Pk	32.00	-20.40	0.00	62.82	-	-	74.00	-11.18	166	378	H	
		* 2.48478	54.44	Pk	32.00	-20.50	0.00	65.94	-	-	74.00	-8.06	166	378	H	
		* 2.48351	39.86	RMS	32.00	-20.40	0.17	51.63	54.00	-2.37	-	-	-	166	378	H
		* 2.48369	39.62	RMS	32.00	-20.40	0.17	51.39	54.00	-2.61	-	-	-	166	378	H
		* 2.48351	49.33	Pk	32.00	-20.40	0.00	60.93	-	-	74.00	-13.07	192	100	V	
		* 2.48489	49.91	Pk	32.00	-20.50	0.00	61.41	-	-	74.00	-12.59	192	100	V	
		* 2.48351	35.98	RMS	32.00	-20.40	0.17	47.75	54.00	-6.25	-	-	-	192	100	V
		* 2.48363	36.05	RMS	32.00	-20.40	0.17	47.82	54.00	-6.18	-	-	-	192	100	V
2472	ANT1	* 2.48351	56.46	Pk	32.00	-20.40	0.00	68.06	-	-	74.00	-5.94	167	376	H	
		* 2.48368	58.29	Pk	32.00	-20.40	0.00	69.89	-	-	74.00	-4.11	167	376	H	
		* 2.48351	40.09	RMS	32.00	-20.40	0.17	51.86	54.00	-2.14	-	-	-	167	376	H
		* 2.48355	39.95	RMS	32.00	-20.40	0.17	51.72	54.00	-2.28	-	-	-	167	376	H
		* 2.48351	52.73	Pk	32.00	-20.40	0.00	64.33	-	-	74.00	-9.67	192	100	V	
		* 2.48365	54.83	Pk	32.00	-20.40	0.00	66.43	-	-	74.00	-7.57	192	100	V	
		* 2.48351	35.72	RMS	32.00	-20.40	0.17	47.49	54.00	-6.51	-	-	-	192	100	V
		* 2.48361	36.81	RMS	32.00	-20.40	0.17	48.58	54.00	-5.42	-	-	-	192	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
* 4.82705	37.71	PK2	34.1	-28.1	0	43.71	-	-	74	-30.29	360	100	H
* 4.83185	37.5	PK2	34.1	-28.1	0	43.5	-	-	74	-30.5	360	100	V
7.24635	39.31	PK2	36.2	-25.5	0	50.01	-	-	74	-23.99	309	119	H
* 7.25395	26.2	MAV1	36.2	-25.5	.17	37.07	54	-16.93	-	-	309	119	H
* 7.25483	39.28	PK2	36.2	-25.5	0	49.98	-	-	74	-24.02	273	100	V
* 7.25102	27.04	MAV1	36.2	-25.5	.17	37.91	54	-16.09	-	-	273	100	V
9.67692	32.78	PK2	37.1	-21.3	0	48.58	-	-	74	-25.42	360	100	H
9.66163	32.55	PK2	37.1	-21.4	0	48.25	-	-	74	-25.75	360	100	V

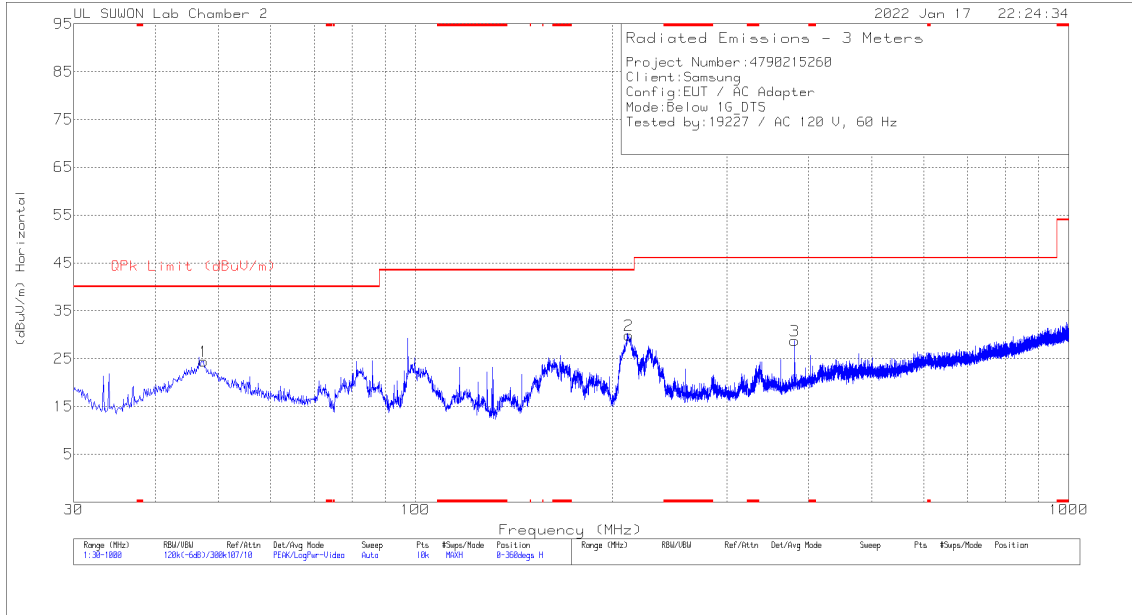
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

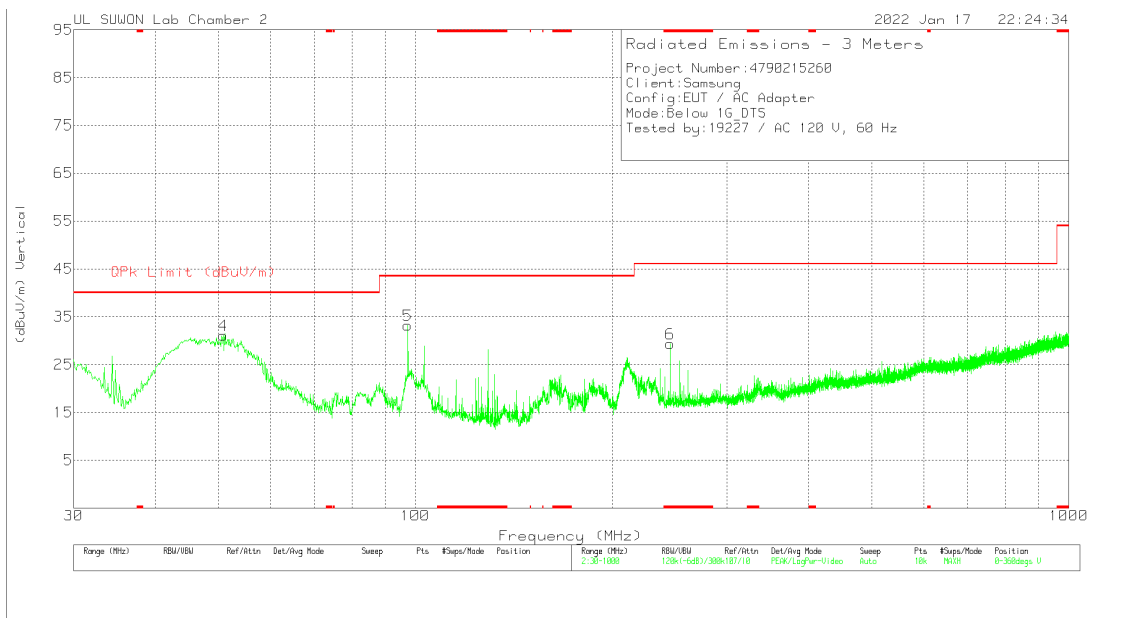
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2417	ANT1	* 4.82705	37.71	PK2	34.10	-28.10	0.00	43.71	-	-	74.00	-30.29	360	100	H	
		* 4.83185	37.50	PK2	34.10	-28.10	0.00	43.50	-	-	74.00	-30.50	360	100	V	
		7.246	39.31	PK2	36.20	-25.50	0.00	50.01	-	-	74.00	-23.99	309	119	H	
		* 7.25395	26.20	MAV1	36.20	-25.50	0.17	37.07	54.00	-16.93	-	-	-	309	119	H
		* 7.25483	39.28	PK2	36.20	-25.50	0.00	49.98	-	-	74.00	-24.02	273	100	V	
		* 7.25102	27.04	MAV1	36.20	-25.50	0.17	37.91	54.00	-16.09	-	-	-	273	100	V
		9.677	32.78	PK2	37.10	-21.30	0.00	48.58	-	-	74.00	-25.42	360	100	H	
		9.662	32.55	PK2	37.10	-21.40	0.00	48.25	-	-	74.00	-25.75	360	100	V	
		* 4.88095	37.19	PK2	34.10	-27.80	0.00	43.49	-	-	74.00	-30.51	360	100	H	
2437	ANT1	* 7.30998	35.68	PK2	36.20	-25.00	0.00	46.88	-	-	74.00	-27.12	360	100	H	
		9.754	32.66	PK2	37.20	-21.40	0.00	48.46	-	-	74.00	-25.54	360	100	H	
		* 4.88234	38.17	PK2	34.10	-27.80	0.00	44.47	-	-	74.00	-29.53	360	100	V	
		* 7.31983	37.11	PK2	36.10	-24.90	0.00	48.31	-	-	74.00	-25.69	360	100	V	
		9.745	32.52	PK2	37.20	-21.40	0.00	48.32	-	-	74.00	-25.68	360	100	V	
		* 4.91603	40.78	PK2	34.10	-27.40	0.00	47.48	-	-	74.00	-26.52	39	100	H	
2457	ANT1	* 4.91375	28.19	MAV1	34.10	-27.50	0.17	34.96	54.00	-19.04	-	-	39	100	H	
		* 4.92052	37.81	PK2	34.10	-27.40	0.00	44.51	-	-	74.00	-29.49	178	113	V	
		* 4.91026	25.51	MAV1	34.10	-27.50	0.17	32.28	54.00	-21.72	-	-	178	113	V	
		* 7.36099	35.02	PK2	36.10	-24.40	0.00	46.72	-	-	74.00	-27.28	0	100	H	
		* 7.38347	35.92	PK2	36.10	-24.20	0.00	47.82	-	-	74.00	-26.18	0	100	V	
		9.833	32.86	PK2	37.30	-21.80	0.00	48.36	-	-	74.00	-25.64	0	100	H	
		9.830	33.02	PK2	37.30	-21.80	0.00	48.52	-	-	74.00	-25.48	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_749	Below 1G(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	47.46	36.31	Pk	19.8	-31.7	0	24.41	40	-15.59	0-360	200	H
2	212.263	43.9	Pk	16.7	-30.7	0	29.9	43.52	-13.62	0-360	100	H
3	380.655	37.71	Pk	21	-30	0	28.71	46.02	-17.31	0-360	100	H
4	50.855	43.11	Pk	19.8	-31.8	0	31.11	40	-8.89	0-360	100	V
5	97.415	47.49	Pk	17.1	-31.4	0	33.19	43.52	-10.33	0-360	100	V
6	* 245.437	41.45	Pk	18.4	-30.5	0	29.35	46.02	-16.67	0-360	100	V

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

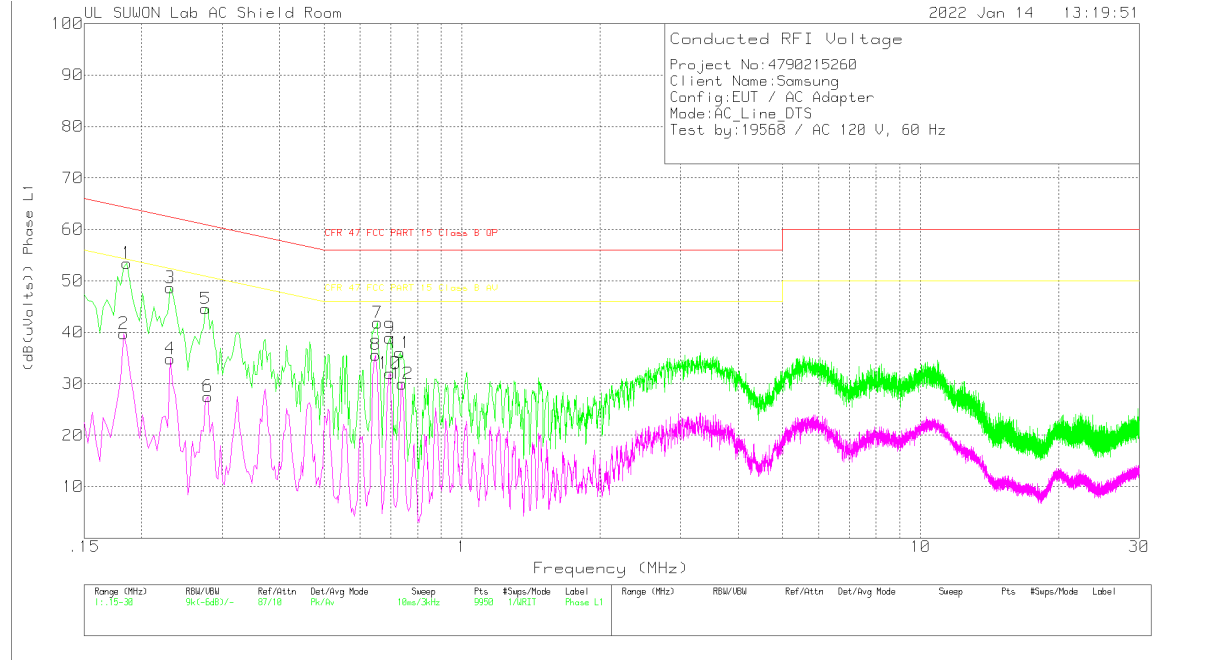
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1.1. AC Power Line

LINE 1 RESULTS



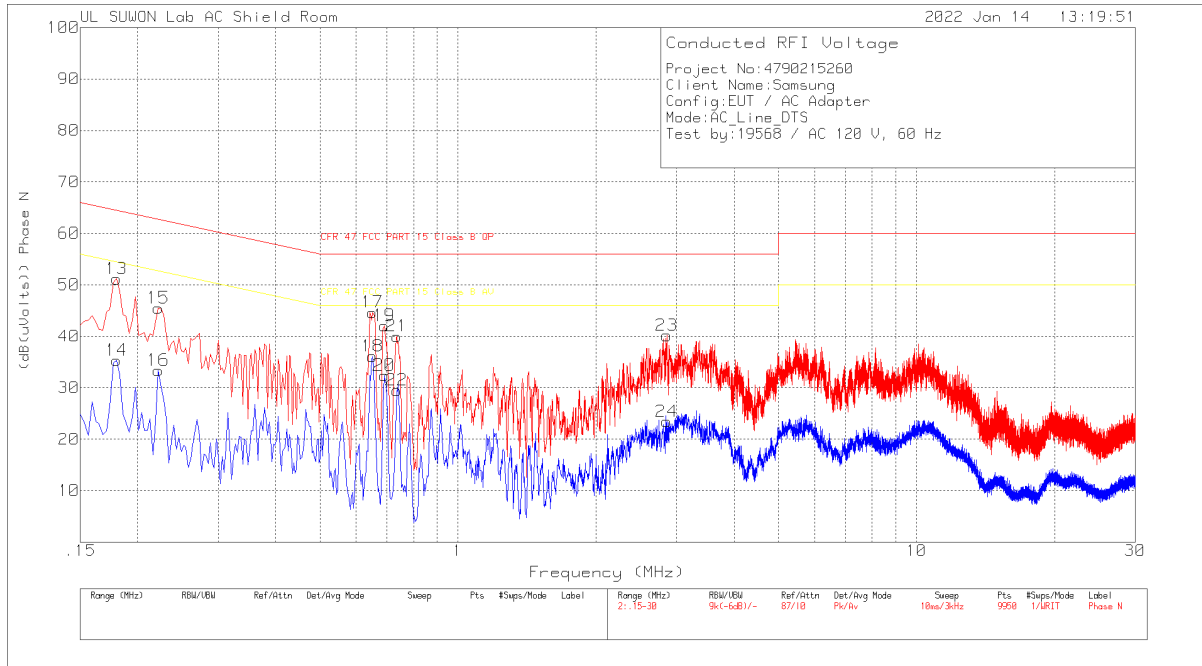
Trace Markers

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 OP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.186	43.32	Pk	9.9	.2	53.42	64.21	-10.79	-	-
2	.183	29.64	Av	9.9	.2	39.74	-	-	54.35	-14.61
3	.231	38.74	Pk	9.7	.2	48.64	62.41	-13.77	-	-
4	.231	24.97	Av	9.7	.2	34.87	-	-	52.41	-17.54
5	.276	34.68	Pk	9.7	.2	44.58	60.94	-16.36	-	-
6	.279	17.62	Av	9.7	.2	27.52	-	-	50.85	-23.33
7	.654	31.87	Pk	9.8	.2	41.87	56	-14.13	-	-
8	.648	25.62	Av	9.8	.2	35.62	-	-	46	-10.38
9	.696	28.94	Pk	9.8	.2	38.94	56	-17.06	-	-
10	.696	22.03	Av	9.8	.2	32.03	-	-	46	-13.97
11	.732	26.02	Pk	9.8	.2	36.02	56	-19.98	-	-
12	.741	20.01	Av	9.8	.2	30.01	-	-	46	-15.99

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	.18	41.07	Pk	9.9	.2	51.17	64.49	-13.32	-	-
14	.18	25.22	Av	9.9	.2	35.32	-	-	54.49	-19.17
15	.222	35.58	Pk	9.7	.2	45.48	62.74	-17.26	-	-
16	.222	23.5	Av	9.7	.2	33.4	-	-	52.74	-19.34
17	.651	34.66	Pk	9.8	.2	44.66	56	-11.34	-	-
18	.651	26.11	Av	9.8	.2	36.11	-	-	46	-9.89
19	.69	32.05	Pk	9.8	.2	42.05	56	-13.95	-	-
20	.69	22.39	Av	9.8	.2	32.39	-	-	46	-13.61
21	.735	30.01	Pk	9.8	.2	40.01	56	-15.99	-	-
22	.735	19.51	Av	9.8	.2	29.51	-	-	46	-16.49
23	2.853	30.15	Pk	9.7	.3	40.15	56	-15.85	-	-
24	2.853	13.45	Av	9.7	.3	23.45	-	-	46	-22.55

Pk - Peak detector
 Av - Average detection

END OF TEST REPORT