CERTIFICATION TEST REPORT

Report Number. : 4790379967-E3V1

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-A236U, SM-A236U1/DS, SM-S236DL
FCC ID	:	A3LSMA236U
EUT Description	:	GSM/WCDMA/LTE/5G NR 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:
2022-06-24

Prepared by:
UL Korea, Ltd.
26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea

Suwon Test Site: UL Korea, LTD. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: (031) 337-9902
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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2022-06-24	Initial issue	Sungeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD.
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC
MODEL NUMBER:	SM-A236U, SM-A236U1/DS, SM-S236DL
SERIAL NUMBER:	R3CT40ETG0V, R3CT40ETHWJ (CONDUCTED); 6224a6bc82197ece, R3CT50DASKA (RADIATED);
DATE TESTED:	2022-04-18 ~ 2022-06-24;

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 infor mational 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
☒ Chamber 1(3m semi-anechoic chamber)
☒ Chamber 2(3m semi-anechoic chamber)
☒ Chamber 3(3m semi-anechoic chamber)
☐ Chamber 4(3m Full-anechoic chamber)
☐ 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

28.9 dBuV/m = 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB

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.

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5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac and NFC.
This test report addresses the DTS (WLAN) operational mode.

This report covers the Samsung models SM-A236U, SM-A236U1/DS, SM-S236DL.
These models are identical in hardware except SM-A236U1/DS is supported dual SIM tray and SM-A236U has single SIM tray, SM-S236DL is same hardware.

All series model was same hardware thus, SM-A236U was set for final test.

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	20.76	119.12
	802.11g SISO	18.89	77.45
	802.11n(HT20) SISO	18.75	74.99

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.

Frequency	ANT Gain [dBi]
2 412 ~ 2 472	-4.70

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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.

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

SISO Target[dBm]				
Ch.	Freq.	802.11b	802.11g	802.11n HT20
1	2412	20	18	18
6	2437	20	18	18
11	2462	20	18	18
12	2467	7	5	5
13	2472	7	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

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Charger	SAMSUNG	EP-TA800	R37MANQ1E72SE3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02115A BWE	N/A
Earphone	SAMSUNG	GH59-15055A	EHS64AVFWE	N/A

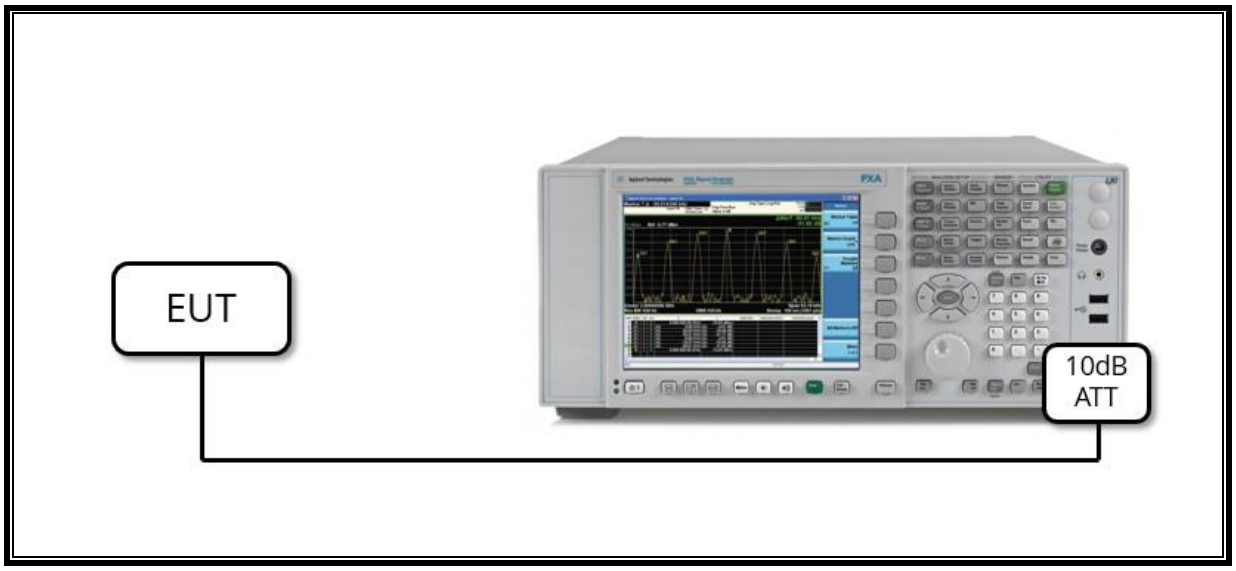
I/O CABLE

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
2	Audio	2	Mini-Jack	Unshielded	0.7 m	N/A

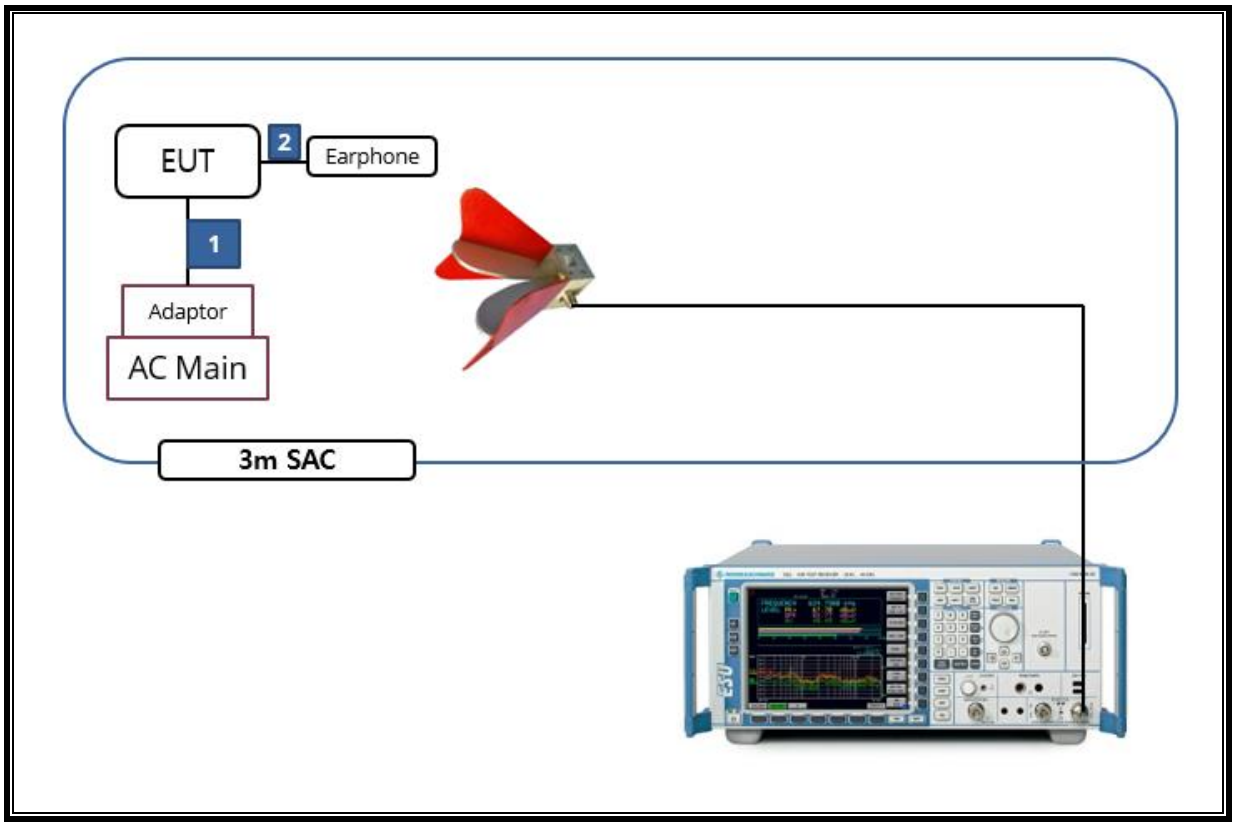
TEST SETUP

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

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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	PASTERNACK	PE7087-10	A001	2022/08/03
Attenuator	PASTERNACK	PE7087-10	A008	2022/08/03
Attenuator	PASTERNACK	PE7004-10	2	2022/08/02
Attenuator	PASTERNACK	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

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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

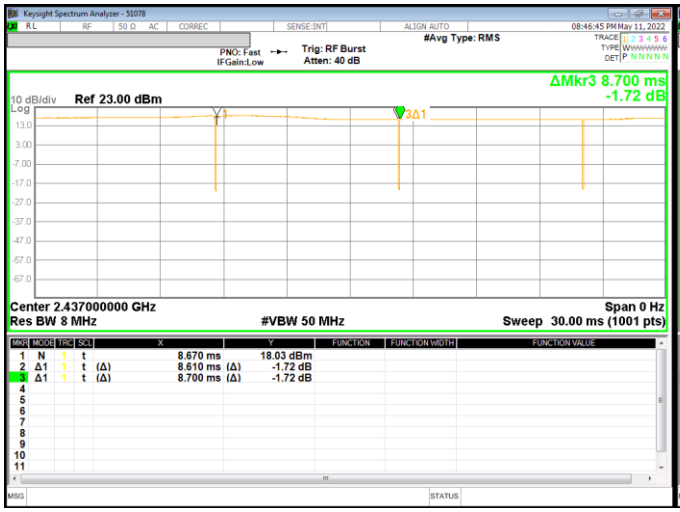
LIMITS

None; for reporting purposes only.

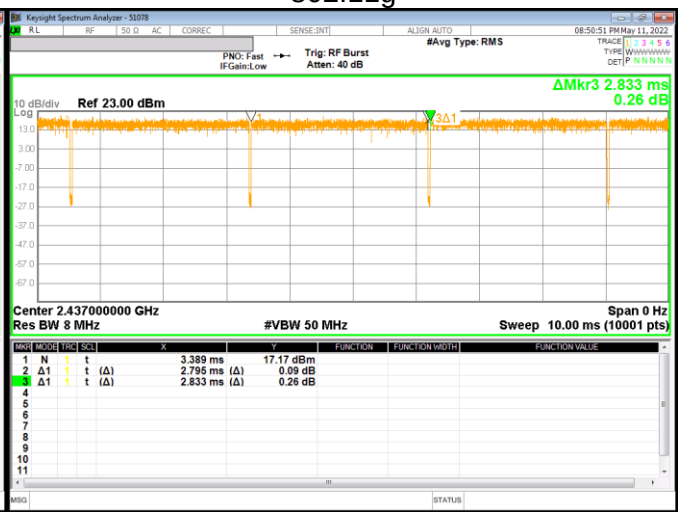
Mode	On Time [ms]	Period [ms]	Duty Cycle X [Linear]	Duty Cycle X [%]	Duty Cycle Correction Factor[dB]	1/T Minimum VBW[kHz]
802.11b SISO	8.610	8.700	0.990	98.966	-	0.116
802.11g SISO	2.795	2.833	0.987	98.659	-	0.358
802.11n(HT20) SISO	5.117	5.155	0.993	99.263	-	0.195

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.

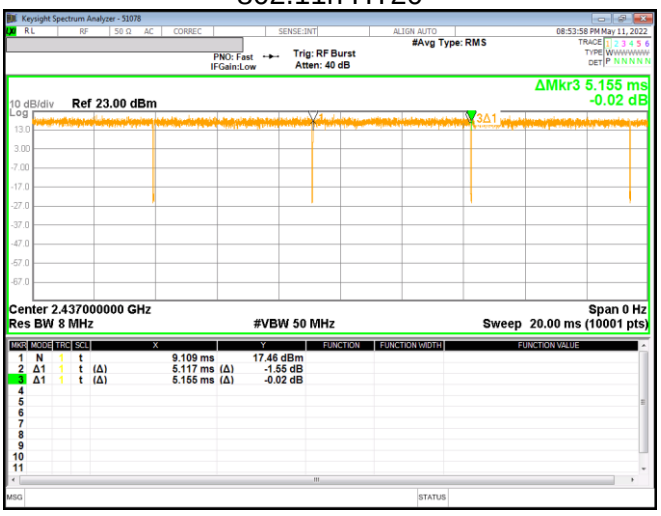
802.11b



802.11g



802.11n HT20



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 to100 kHz, the VBW >= 3 x RBW, peak detector and max hold.

ANSI C63.10-2013, Section 11.8.1

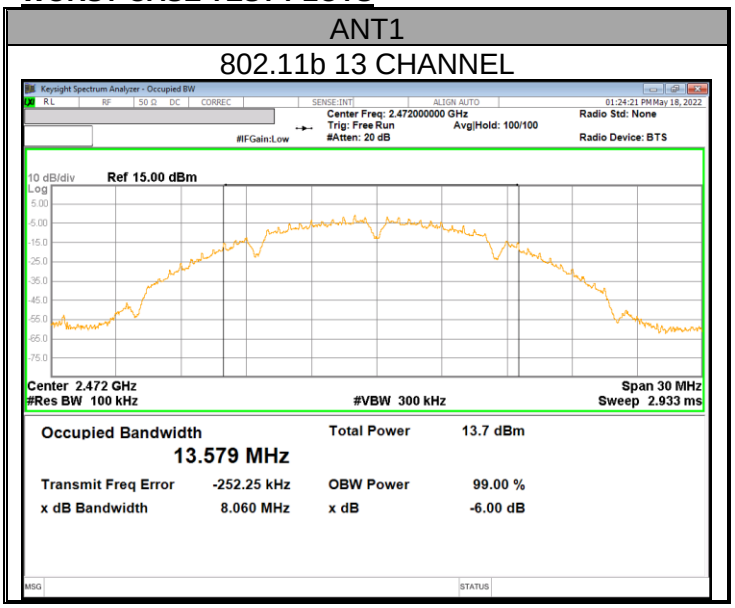
RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS

ANT1

802.11b 13 CHANNEL



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	8.573	0.5
6	2 437	9.036	
11	2 462	8.540	
12	2 467	8.078	
13	2 472	**8.060**	
Worst		**8.060**	

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	11.310	0.5
6	2 437	10.940	
11	2 462	13.760	
12	2 467	10.110	
13	2 472	9.043	
Worst		**9.043**	

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	13.180	0.5
6	2 437	12.510	
11	2 462	17.070	
12	2 467	15.940	
13	2 472	14.010	
Worst		**12.510**	

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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	20.24	30.00
	6	2 437	20.12	
	11	2 462	20.76	
	12	2 467	7.24	
	13	2 472	7.72	
Worst Case			20.76	
802.11g	1	2 412	18.63	
	6	2 437	18.89	
	11	2 462	18.73	
	12	2 467	5.32	
	13	2 472	5.86	
Worst Case			18.89	
802.11n HT20	1	2 412	18.51	
	6	2 437	18.75	
	11	2 462	18.61	
	12	2 467	5.16	
	13	2 472	5.72	
Worst Case			18.75	

- 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 section8.4 under KDB558074 D01 15.247 Meas Guidance.

ANSI C63.10-2013, Section 11.10.3 & 11.10.5

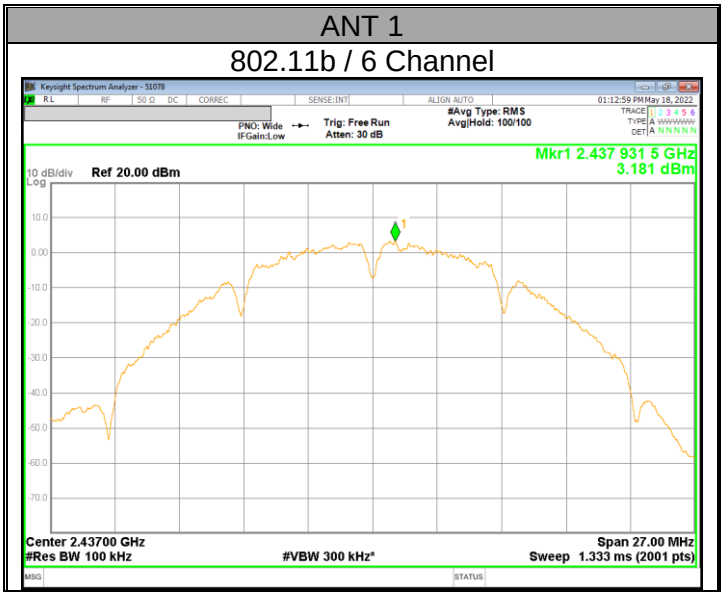
RESULTS

- Please refer to the next page

WORST CASE TEST PLOTS

ANT 1

802.11b / 6 Channel



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	2.851	-	2.851	8.00Note
	6	2 437	3.181	-	**3.181**	
	11	2 462	3.168	-	3.168	
	12	2 467	-8.664	-	-8.664	
	13	2 472	-9.347	-	-9.347	
802.11g	1	2 412	0.373	-	0.373	
	6	2 437	1.075	-	1.075	
	11	2 462	0.513	-	0.513	
	12	2 467	-11.582	-	-11.582	
	13	2 472	-12.297	-	-12.297	
802.11n HT20	1	2 412	0.311	-	0.311	
	6	2 437	-0.135	-	-0.135	
	11	2 462	0.344	-	0.344	
	12	2 467	-11.795	-	-11.795	
	13	2 472	-12.660	-	-12.660	

- Calculation of Output PSD result
- 1TX : Corr'd PSD = Meas PSD + Duty Cycle CF
Note1. RBW 100kHz measurement data is lower than 3kHz limit.

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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.

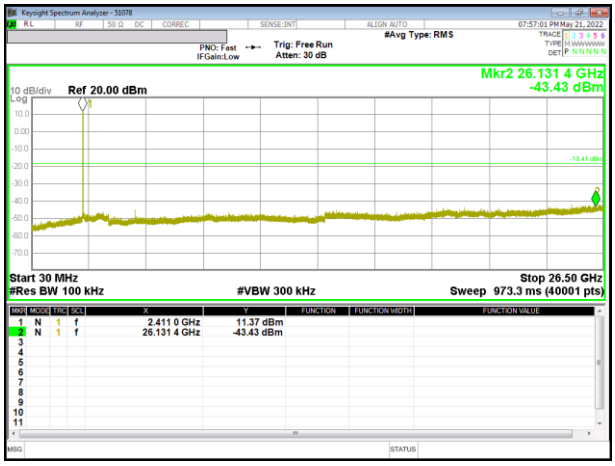
TEST PROCEDURE

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

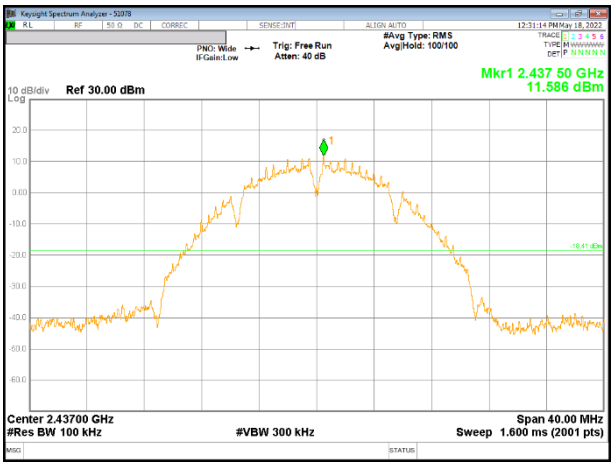
RESULTS

9.5.1. 802.11b MODE

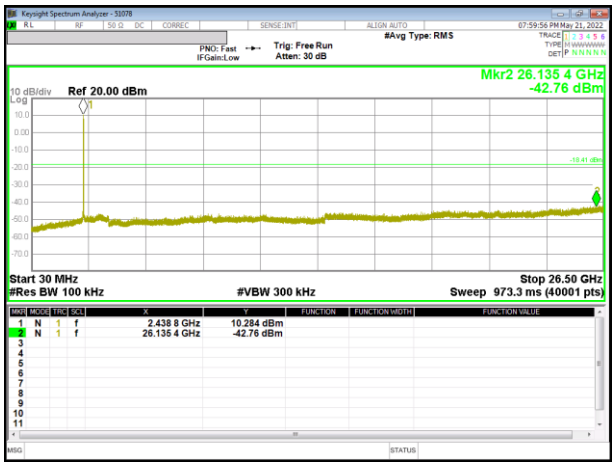
1 Channel Band-edge



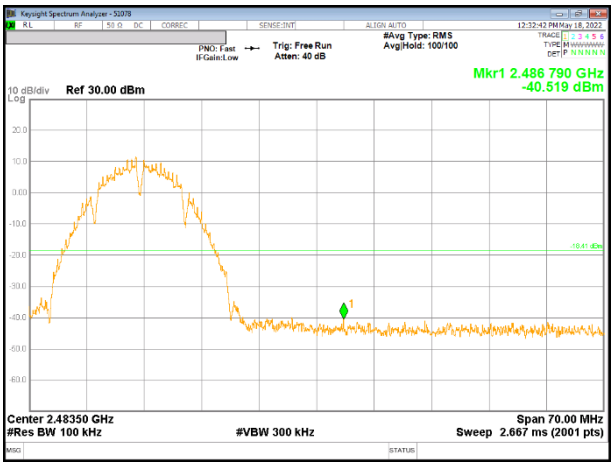
Out-Of-Band 1 Channel



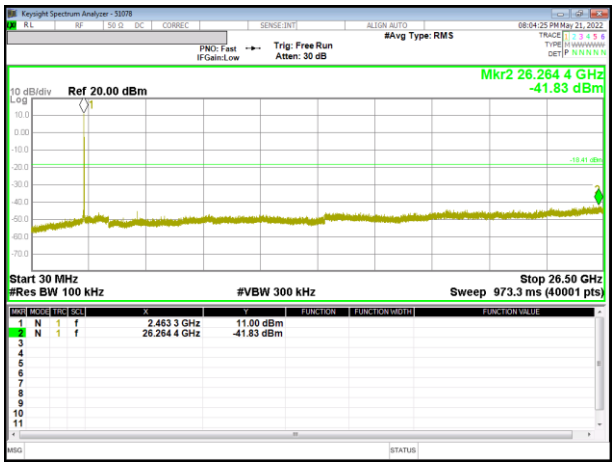
In-Band Reference Level



Out-Of-Band 6 Channel



11 Channel Band-edge



Out-Of-Band 11 Channel

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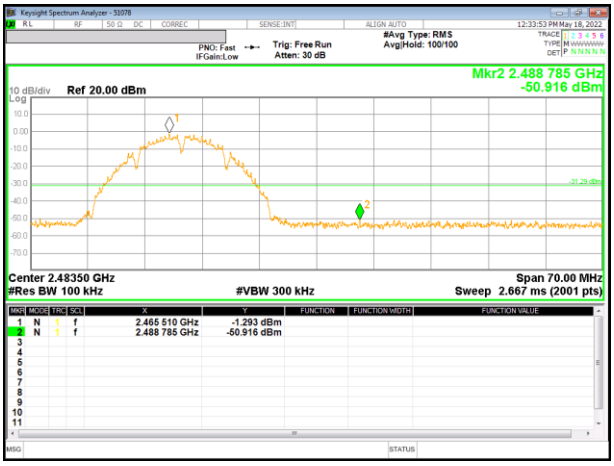
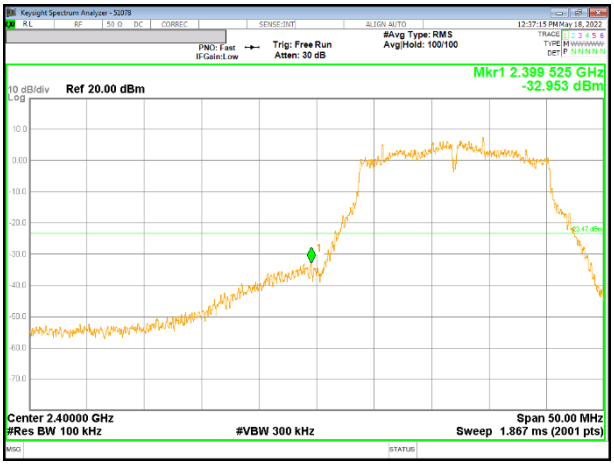


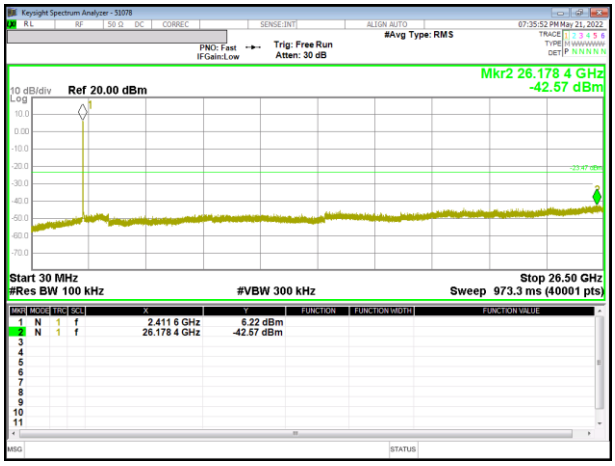
12 Channel Band-edge

13 Channel Band-edge

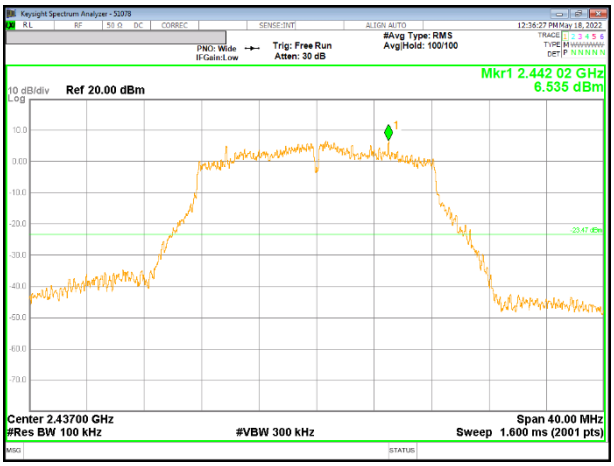
9.5.2. 802.11g MODE



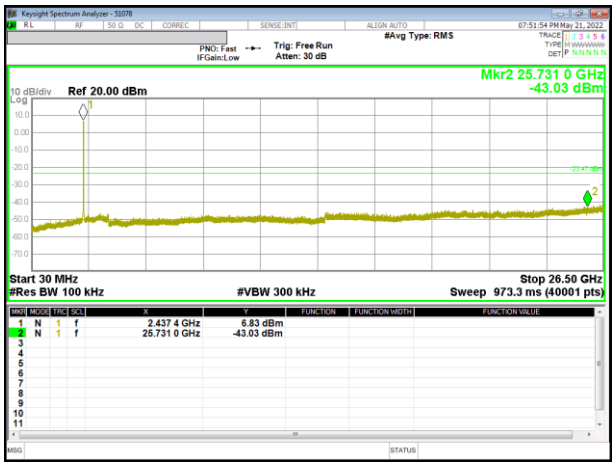
1 Channel Band-edge



Out-Of-Band 1 Channel

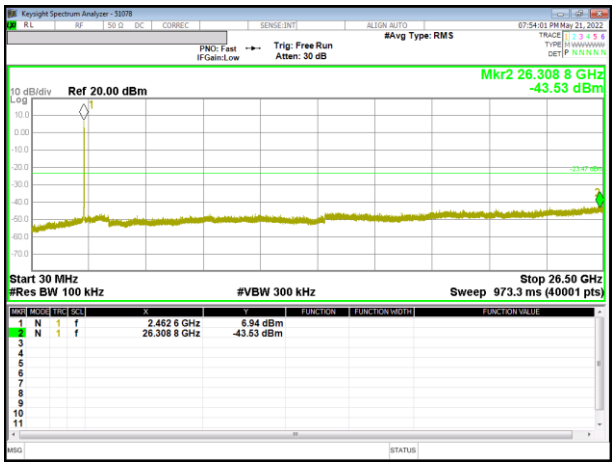


In-Band Reference Level



Out-Of-Band 6 Channel

11 Channel Band-edge

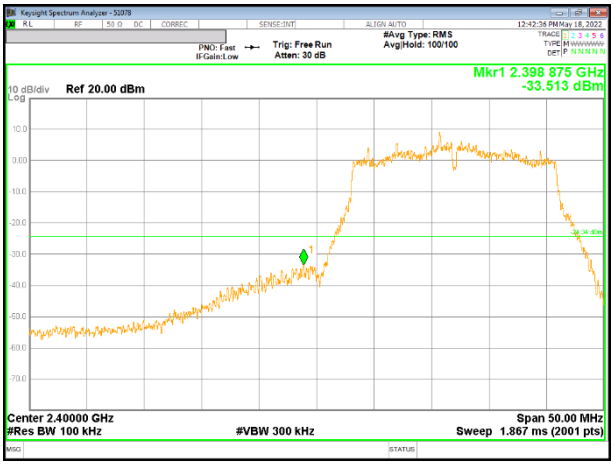


Out-Of-Band 11 Channel

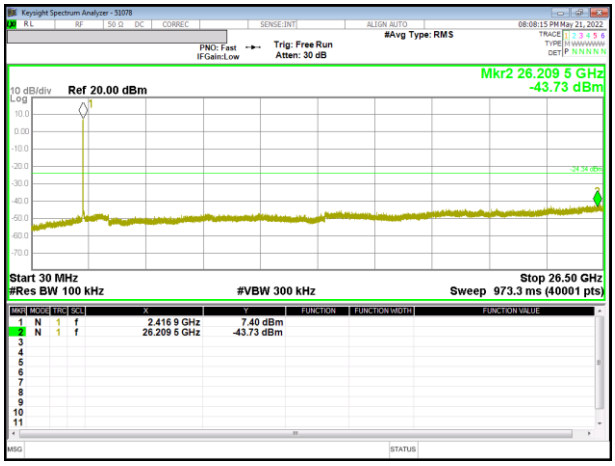
12 Channel Band-edge

13 Channel Band-edge

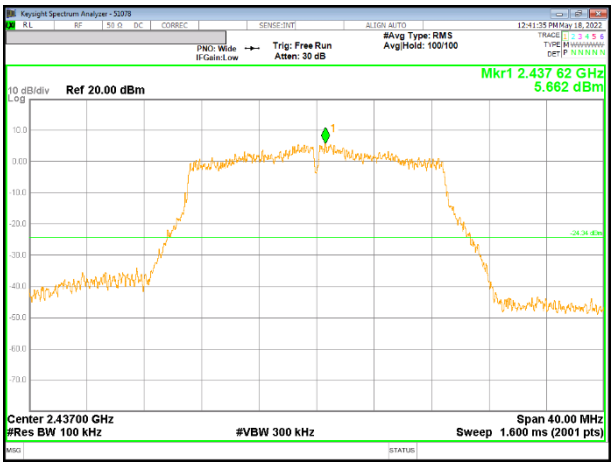
9.5.3. 802.11n HT20 MODE



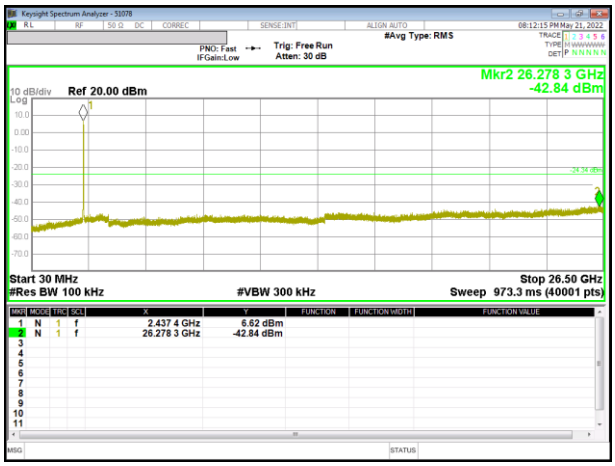
1 Channel Band-edge



Out-Of-Band 1 Channel

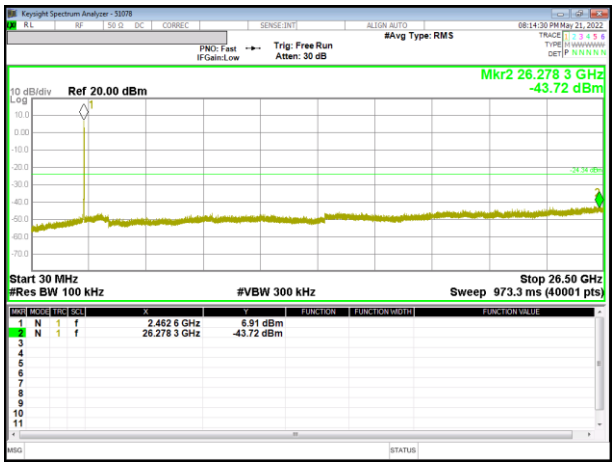


In-Band Reference Level



Out-Of-Band 6 Channel

11 Channel Band-edge



Out-Of-Band 11 Channel

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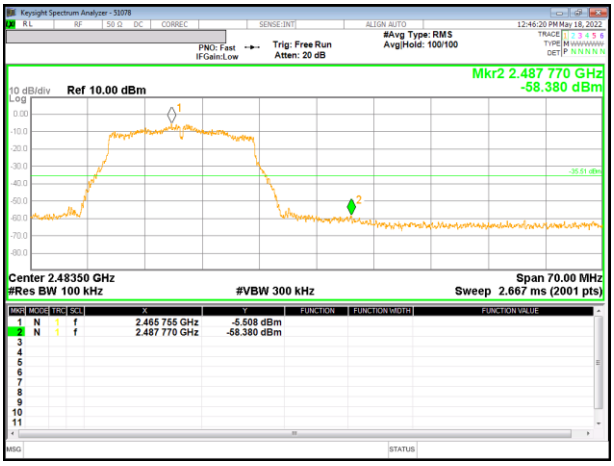

12 Channel Band-edge

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.
(Restriced bandedge, Final detection of spurious harmonic emissions)

Duty cycle factor = 10log (1/x) For this sample:

802.11b SISO mode = 0 dB (duty cycle > 98%);
802.11g SISO mode = 0 dB (duty cycle > 98%);
802.11n(HT20) SISO mode = 0 dB (duty cycle > 98%);

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.

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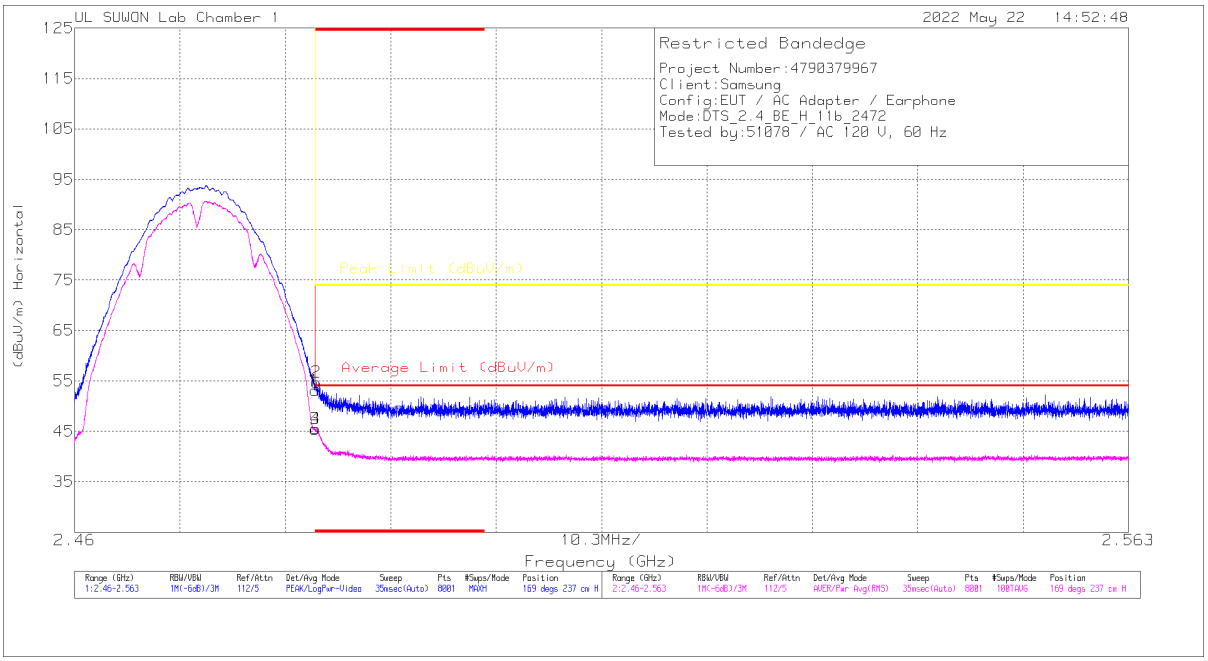
10.1. TRANSMITTER ABOVE 1 GHz

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

BANDEDGE (ANT1 WORST CASE: 13 CHANNEL)

Horizontal RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	46.08	Pk	32	-25	0	53.08	-	-	74	-20.92	169	237	H
2	* 2.48363	47.69	Pk	32	-25	0	54.69	-	-	74	-19.31	169	237	H
3	* 2.48351	38.46	RMS	32	-25	0	45.46	54	-8.54	-	-	169	237	H
4	* 2.48356	38.56	RMS	32	-25	0	45.56	54	-8.44	-	-	169	237	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	42.34	Pk	31.80	-25.20	0.00	48.94	-	-	74.00	-25.06	178	353	H
		* 2.387	45.95	Pk	31.80	-25.20	0.00	52.55	-	-	74.00	-21.45	178	353	H
		* 2.39	32.66	RMS	31.80	-25.20	0.00	39.26	54.00	-14.74	-	-	178	353	H
		* 2.38615	34.12	RMS	31.80	-25.20	0.00	40.72	54.00	-13.28	-	-	178	353	H
		* 2.39	42.67	Pk	31.80	-25.20	0.00	49.27	-	-	74.00	-24.73	189	100	V
		* 2.36366	46.28	Pk	31.70	-25.40	0.00	52.58	-	-	74.00	-21.42	189	100	V
		* 2.39	32.71	RMS	31.80	-25.20	0.00	39.31	54.00	-14.69	-	-	189	100	V
		* 2.38555	33.77	RMS	31.80	-25.20	0.00	40.37	54.00	-13.63	-	-	189	100	V
2462	ANT1	* 2.48351	46.12	Pk	32.00	-25.00	0.00	53.12	-	-	74.00	-20.88	170	302	H
		* 2.48576	47.32	Pk	32.00	-25.00	0.00	54.32	-	-	74.00	-19.68	170	302	H
		* 2.48351	34.42	RMS	32.00	-25.00	0.00	41.42	54.00	-12.58	-	-	170	302	H
		* 2.48597	35.57	RMS	32.00	-25.00	0.00	42.57	54.00	-11.43	-	-	170	302	H
		* 2.48351	42.92	Pk	32.00	-25.00	0.00	49.92	-	-	74.00	-24.08	208	309	V
		2.502	45.33	Pk	32.00	-24.90	0.00	52.43	-	-	74.00	-21.57	208	309	V
		* 2.48351	32.82	RMS	32.00	-25.00	0.00	39.82	54.00	-14.18	-	-	208	309	V
		* 2.48612	33.42	RMS	32.00	-25.00	0.00	40.42	54.00	-13.58	-	-	208	309	V
2467	ANT1	* 2.48351	44.13	Pk	32.00	-25.00	0.00	51.13	-	-	74.00	-22.87	176	241	H
		* 2.48372	45.64	Pk	32.00	-25.00	0.00	52.64	-	-	74.00	-21.36	176	241	H
		* 2.48351	33.17	RMS	32.00	-25.00	0.00	40.17	54.00	-13.83	-	-	176	241	H
		* 2.48379	33.66	RMS	32.00	-25.00	0.00	40.66	54.00	-13.34	-	-	176	241	H
		* 2.48351	42.90	Pk	32.00	-25.00	0.00	49.90	-	-	74.00	-24.10	209	306	V
		2.534	45.66	Pk	32.00	-24.90	0.00	52.76	-	-	74.00	-21.24	209	306	V
		* 2.48351	32.30	RMS	32.00	-25.00	0.00	39.30	54.00	-14.70	-	-	209	306	V
		2.532	33.23	RMS	32.00	-24.90	0.00	40.33	54.00	-13.67	-	-	209	306	V
2472	ANT1	* 2.48351	46.08	Pk	32.00	-25.00	0.00	53.08	-	-	74.00	-20.92	169	237	H
		* 2.48363	47.69	Pk	32.00	-25.00	0.00	54.69	-	-	74.00	**-19.31**	169	237	H
		* 2.48351	38.46	RMS	32.00	-25.00	0.00	45.46	54.00	-8.54	-	-	169	237	H
		* 2.48356	38.56	RMS	32.00	-25.00	0.00	45.56	54.00	**-8.44**	-	-	169	237	H
		* 2.48351	43.54	Pk	32.00	-25.00	0.00	50.54	-	-	74.00	-23.46	155	302	V
		* 2.48356	46.16	Pk	32.00	-25.00	0.00	53.16	-	-	74.00	-20.84	155	302	V
		* 2.48351	34.31	RMS	32.00	-25.00	0.00	41.31	54.00	-12.69	-	-	155	302	V
		* 2.48366	34.85	RMS	32.00	-25.00	0.00	41.85	54.00	-12.15	-	-	155	302	V

Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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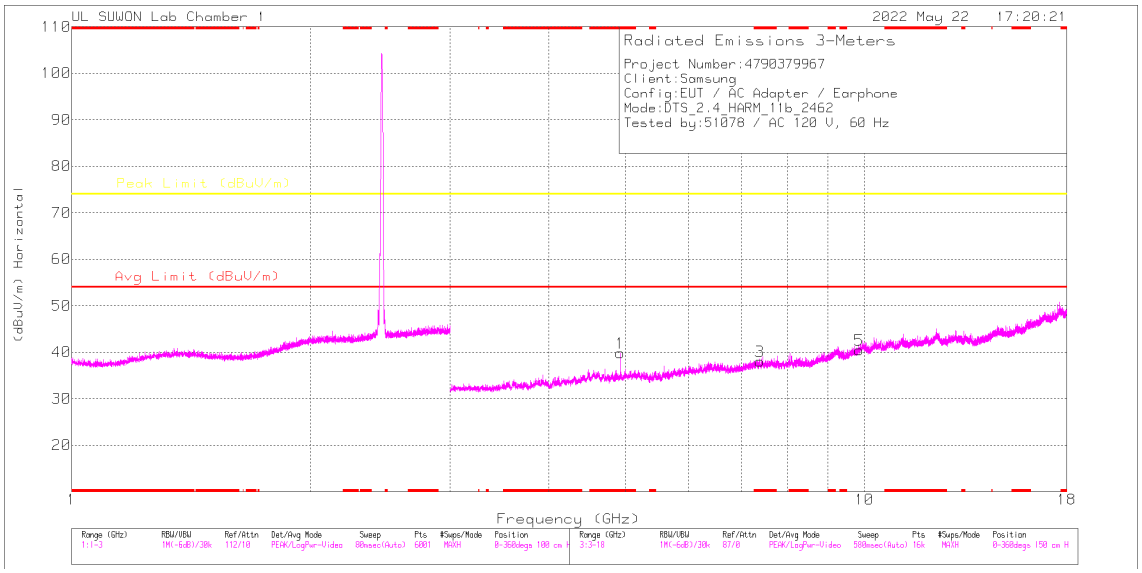
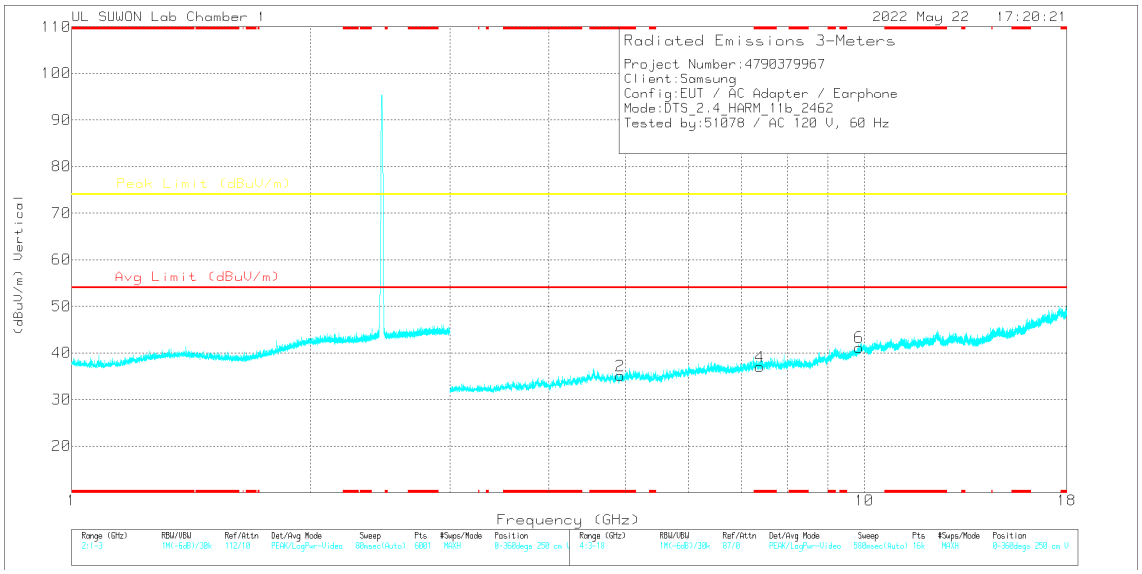
HARMONICS AND SPURIOUS EMISSIONS (ANT1 WORST CASE: 11 CHANNEL)

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_0016871 7	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
* 4.92376	44.34	PK2	34.1	-31.3	0	47.14	-	-	74	-26.86	3	142	H
* 4.92398	37.4	MAv1	34.1	-31.3	0	40.2	54	-13.8	-	-	3	142	H
* 4.92411	41.87	PK2	34.1	-31.3	0	44.67	-	-	74	-29.33	109	114	V
* 4.92401	32.24	MAv1	34.1	-31.3	0	35.04	54	-18.96	-	-	109	114	V
* 7.39391	38.36	PK2	35.8	-26.8	0	47.36	-	-	74	-26.64	0	100	H
* 7.37877	37.72	PK2	35.8	-26.8	0	46.72	-	-	74	-27.28	0	100	V
9.84093	35.4	PK2	37.6	-23	0	50	-	-	74	-24	0	100	H
9.85681	35.25	PK2	37.6	-22.8	0	50.05	-	-	74	-23.95	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

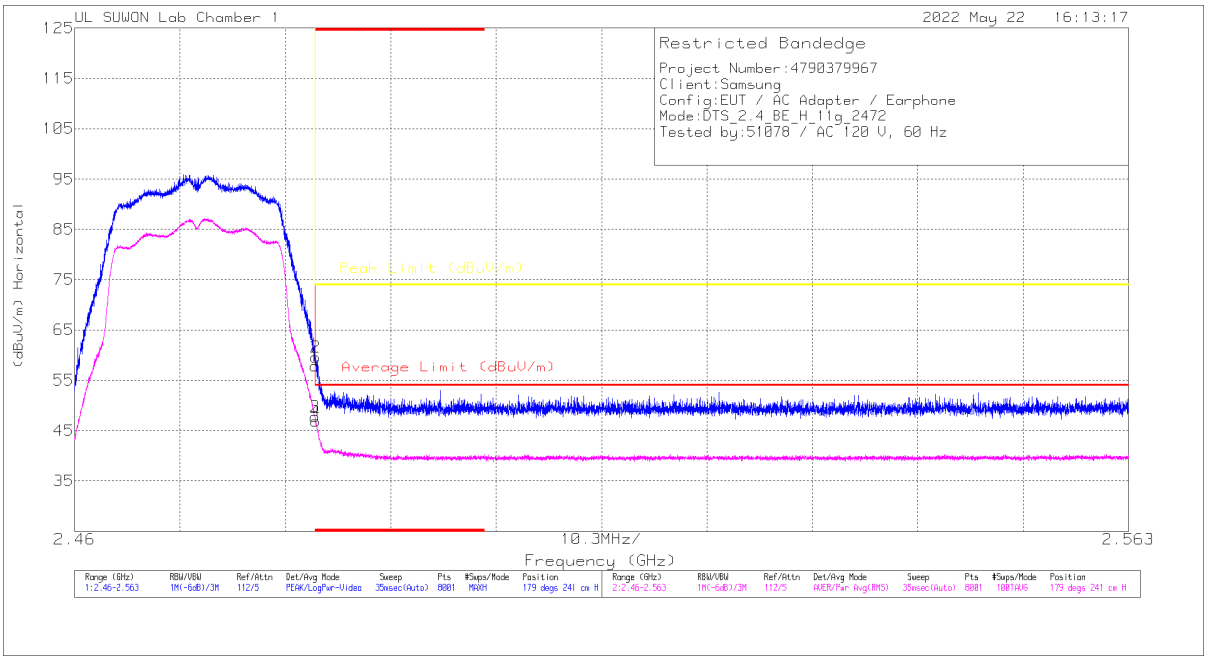
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT1	* 4.8239	43.10	PK2	34.10	-31.10	0.00	46.10	-	-	74.00	-27.90	20	101	H
		* 4.82396	35.90	MAv1	34.10	-31.10	0.00	38.90	54.00	-15.10	-	-	20	101	H
		* 4.82402	42.17	PK2	34.10	-31.10	0.00	45.17	-	-	74.00	-28.83	142	101	V
		* 4.82394	31.39	MAv1	34.10	-31.10	0.00	34.39	54.00	-19.61	-	-	142	101	V
		7.245	38.01	PK2	35.80	-27.50	0.00	46.31	-	-	74.00	-27.69	0	100	H
		7.231	37.94	PK2	35.90	-27.40	0.00	46.44	-	-	74.00	-27.56	0	100	V
		9.641	34.71	PK2	37.20	-23.00	0.00	48.91	-	-	74.00	-25.09	0	100	H
		9.656	34.88	PK2	37.20	-23.00	0.00	49.08	-	-	74.00	-24.92	0	100	V
2437	ANT1	* 4.87405	38.61	PK2	34.10	-27.70	0.00	45.01	-	-	74.00	-28.99	0	116	H
		* 4.87393	30.96	MAv1	34.10	-27.70	0.00	37.36	54.00	-16.64	-	-	0	116	H
		* 4.87307	37.35	PK2	34.10	-27.70	0.00	43.75	-	-	74.00	-30.25	0	100	V
		* 7.31065	35.84	PK2	36.20	-24.60	0.00	47.44	-	-	74.00	-26.56	0	100	H
		* 7.30835	36.18	PK2	36.20	-24.60	0.00	47.78	-	-	74.00	-26.22	0	100	V
		9.753	33.42	PK2	37.20	-20.90	0.00	49.72	-	-	74.00	-24.28	0	100	H
		9.747	32.70	PK2	37.20	-20.90	0.00	49.00	-	-	74.00	-25.00	0	100	V
2462	ANT1	* 4.92376	44.34	PK2	34.10	-31.30	0.00	47.14	-	-	74.00	-26.86	3	142	H
		* 4.92398	37.40	MAv1	34.10	-31.30	0.00	40.20	54.00	**-13.80**	-	-	3	142	H
		* 4.92411	41.87	PK2	34.10	-31.30	0.00	44.67	-	-	74.00	-29.33	109	114	V
		* 4.92401	32.24	MAv1	34.10	-31.30	0.00	35.04	54.00	-18.96	-	-	109	114	V
		* 7.39391	38.36	PK2	35.80	-26.80	0.00	47.36	-	-	74.00	-26.64	0	100	H
		* 7.37877	37.72	PK2	35.80	-26.80	0.00	46.72	-	-	74.00	-27.28	0	100	V
		9.841	35.40	PK2	37.60	-23.00	0.00	50.00	-	-	74.00	-24.00	0	100	H
		9.857	35.25	PK2	37.60	-22.80	0.00	50.05	-	-	74.00	**-23.95**	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: 13 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	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	50.82	Pk	32	-25	0	57.82	-	-	74	-16.18	179	241	H
2	* 2.48356	52.58	Pk	32	-25	0	59.58	-	-	74	-14.42	179	241	H
3	* 2.48351	40.76	RMS	32	-25	0	47.76	54	-6.24	-	-	179	241	H
4	* 2.48354	39.89	RMS	32	-25	0	46.89	54	-7.11	-	-	179	241	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	52.96	Pk	31.80	-25.20	0.00	59.56	-	-	74.00	-14.44	172	319	H
		* 2.38955	55.15	Pk	31.80	-25.20	0.00	61.75	-	-	74.00	**-12.25**	172	319	H
		* 2.39	39.33	RMS	31.80	-25.20	0.00	45.93	54.00	-8.07	-	-	172	319	H
		* 2.38998	39.72	RMS	31.80	-25.20	0.00	46.32	54.00	-7.68	-	-	172	319	H
		* 2.39	44.70	Pk	31.80	-25.20	0.00	51.30	-	-	74.00	-22.70	191	100	V
		* 2.38962	46.80	Pk	31.80	-25.20	0.00	53.40	-	-	74.00	-20.60	191	100	V
		* 2.39	34.89	RMS	31.80	-25.20	0.00	41.49	54.00	-12.51	-	-	191	100	V
		* 2.38992	34.92	RMS	31.80	-25.20	0.00	41.52	54.00	-12.48	-	-	191	100	V
2462	ANT1	* 2.48351	47.11	Pk	32.00	-25.00	0.00	54.11	-	-	74.00	-19.89	168	301	H
		* 2.48503	49.48	Pk	32.00	-25.00	0.00	56.48	-	-	74.00	-17.52	168	301	H
		* 2.48351	37.72	RMS	32.00	-25.00	0.00	44.72	54.00	-9.28	-	-	168	301	H
		* 2.48355	37.62	RMS	32.00	-25.00	0.00	44.62	54.00	-9.38	-	-	168	301	H
		* 2.48351	43.98	Pk	32.00	-25.00	0.00	50.98	-	-	74.00	-23.02	191	100	V
		* 2.48356	45.62	Pk	32.00	-25.00	0.00	52.62	-	-	74.00	-21.38	191	100	V
		* 2.48351	34.44	RMS	32.00	-25.00	0.00	41.44	54.00	-12.56	-	-	191	100	V
		* 2.48387	34.76	RMS	32.00	-25.00	0.00	41.76	54.00	-12.24	-	-	191	100	V
2467	ANT1	* 2.48351	42.43	Pk	32.00	-25.00	0.00	49.43	-	-	74.00	-24.57	166	240	H
		2.501	45.58	Pk	32.00	-24.90	0.00	52.68	-	-	74.00	-21.32	166	240	H
		* 2.48351	33.34	RMS	32.00	-25.00	0.00	40.34	54.00	-13.66	-	-	166	240	H
		* 2.48414	33.87	RMS	32.00	-25.00	0.00	40.87	54.00	-13.13	-	-	166	240	H
		* 2.48351	41.50	Pk	32.00	-25.00	0.00	48.50	-	-	74.00	-25.50	204	340	V
		2.505	45.21	Pk	32.00	-24.90	0.00	52.31	-	-	74.00	-21.69	204	340	V
		* 2.48351	32.62	RMS	32.00	-25.00	0.00	39.62	54.00	-14.38	-	-	204	340	V
		2.515	33.26	RMS	32.00	-24.90	0.00	40.36	54.00	-13.64	-	-	204	340	V
2472	ANT1	* 2.48351	50.82	Pk	32.00	-25.00	0.00	57.82	-	-	74.00	-16.18	179	241	H
		* 2.48356	52.58	Pk	32.00	-25.00	0.00	59.58	-	-	74.00	-14.42	179	241	H
		* 2.48351	40.76	RMS	32.00	-25.00	0.00	47.76	54.00	**-6.24**	-	-	179	241	H
		* 2.48354	39.89	RMS	32.00	-25.00	0.00	46.89	54.00	-7.11	-	-	179	241	H
		* 2.48351	47.01	Pk	32.00	-25.00	0.00	54.01	-	-	74.00	-19.99	157	301	V
		* 2.48355	47.41	Pk	32.00	-25.00	0.00	54.41	-	-	74.00	-19.59	157	301	V
		* 2.48351	36.67	RMS	32.00	-25.00	0.00	43.67	54.00	-10.33	-	-	157	301	V
		* 2.48356	35.95	RMS	32.00	-25.00	0.00	42.95	54.00	-11.05	-	-	157	301	V

Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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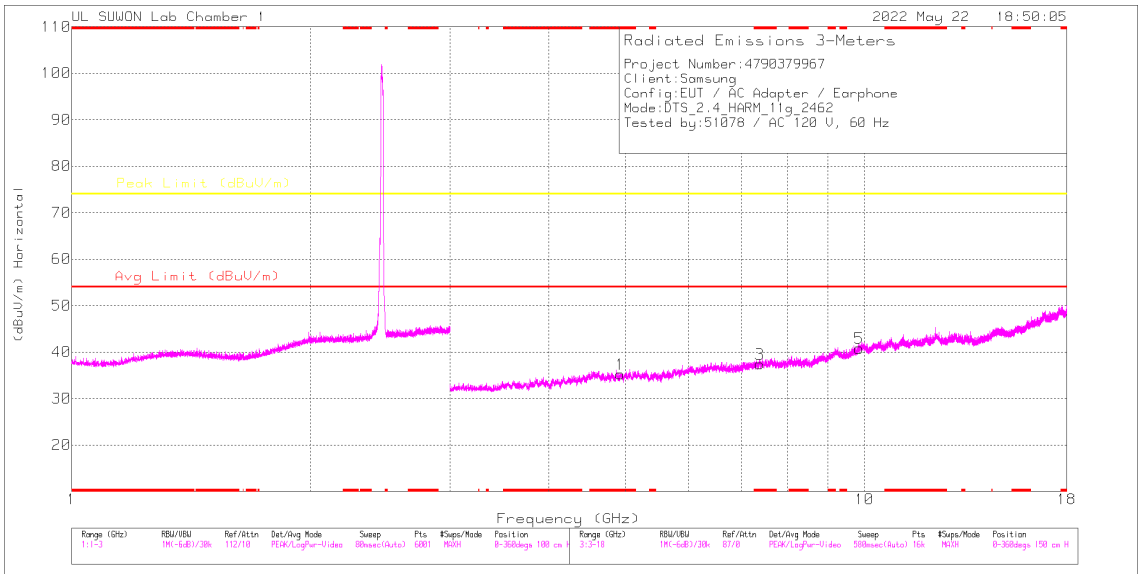
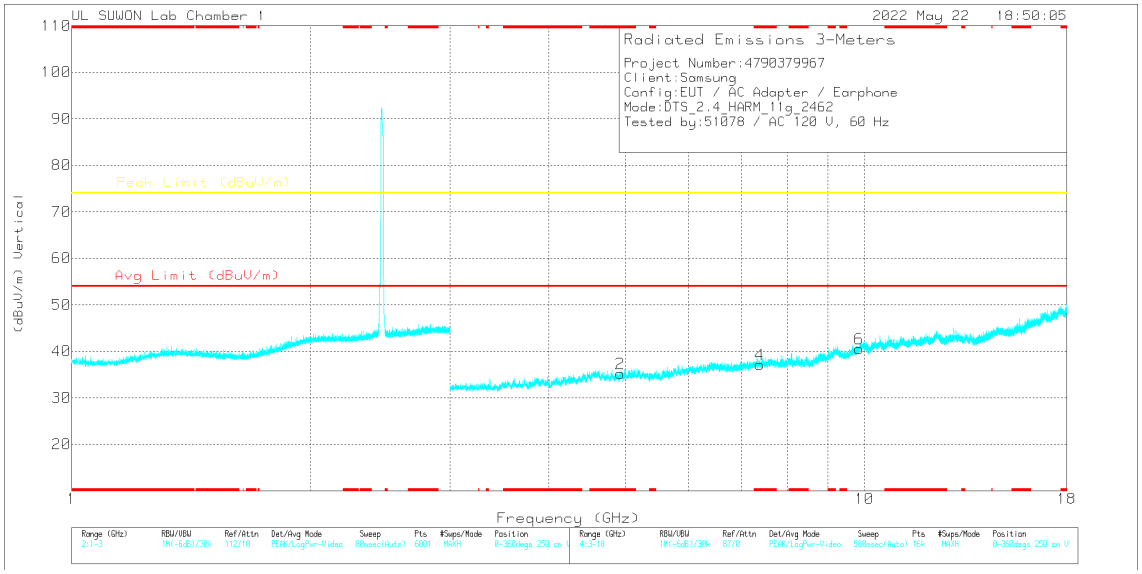
HARMONICS AND SPURIOUS EMISSIONS (ANT1 WORST CASE: 11 CHANNEL)

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_00168717	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
* 4.93302	42.43	PK2	34.1	-31.4	0	45.13	-	-	74	-28.87	0	100	H
* 4.92913	41.41	PK2	34.1	-31.4	0	44.11	-	-	74	-29.89	0	100	V
* 7.37768	38.06	PK2	35.8	-26.8	0	47.06	-	-	74	-26.94	0	100	H
* 7.3803	37.88	PK2	35.8	-26.8	0	46.88	-	-	74	-27.12	0	100	V
9.84678	34.4	PK2	37.6	-23	0	49	-	-	74	-25	0	100	H
9.84012	34.74	PK2	37.6	-23	0	49.34	-	-	74	-24.66	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

HARMONICS AND SPURIOUS EMISSIONS TEST DATA

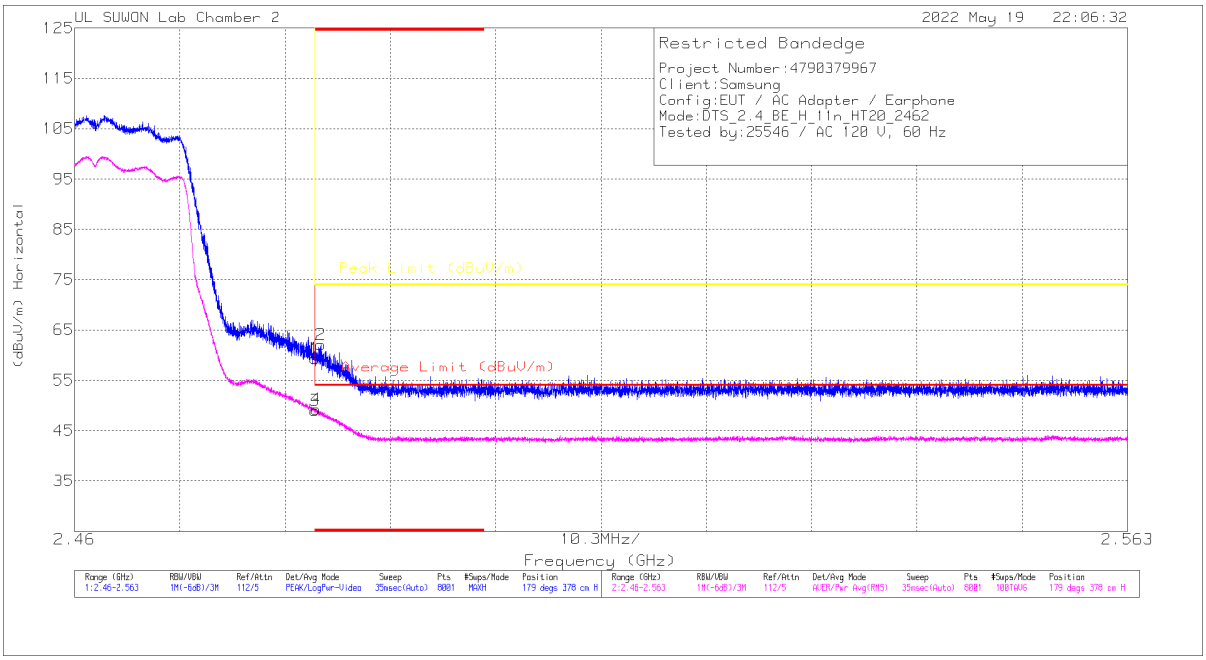
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity
2412	ANT1	* 4.824	41.46	PK2	34.10	-31.10	0.00	44.46	-	-	74.00	-29.54	0	100	**H**
		* 4.82203	41.09	PK2	34.10	-31.10	0.00	44.09	-	-	74.00	-29.91	0	100	**V**
		7.241	38.17	PK2	35.80	-27.50	0.00	46.47	-	-	74.00	-27.53	0	100	**H**
		7.242	37.76	PK2	35.80	-27.50	0.00	46.06	-	-	74.00	-27.94	0	100	**V**
		9.652	34.54	PK2	37.20	-23.00	0.00	48.74	-	-	74.00	-25.26	0	100	**H**
		9.648	34.73	PK2	37.20	-22.90	0.00	49.03	-	-	74.00	-24.97	0	100	**V**
2437	ANT1	* 4.87323	42.42	PK2	34.10	-31.30	0.00	45.22	-	-	74.00	-28.78	0	100	**H**
		* 4.87833	42.14	PK2	34.10	-31.30	0.00	44.94	-	-	74.00	-29.06	0	100	**V**
		* 7.31823	37.76	PK2	35.80	-27.20	0.00	46.36	-	-	74.00	-27.64	0	100	**H**
		* 7.30869	38.48	PK2	35.80	-27.30	0.00	46.98	-	-	74.00	-27.02	0	100	**V**
		9.741	35.07	PK2	37.40	-23.60	0.00	48.87	-	-	74.00	-25.13	0	100	**H**
		9.748	35.48	PK2	37.40	-23.60	0.00	49.28	-	-	74.00	-24.72	0	100	**V**
2462	ANT1	* 4.93302	42.43	PK2	34.10	-31.40	0.00	45.13	-	-	74.00	-28.87	0	100	**H**
		* 4.92913	41.41	PK2	34.10	-31.40	0.00	44.11	-	-	74.00	-29.89	0	100	**V**
		* 7.37768	38.06	PK2	35.80	-26.80	0.00	47.06	-	-	74.00	-26.94	0	100	**H**
		* 7.3803	37.88	PK2	35.80	-26.80	0.00	46.88	-	-	74.00	-27.12	0	100	**V**
		9.847	34.40	PK2	37.60	-23.00	0.00	49.00	-	-	74.00	-25.00	0	100	**H**
		9.840	34.74	PK2	37.60	-23.00	0.00	49.34	-	-	74.00	**-24.66**	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: 11 CHANNEL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB_ATT[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	46.94	Pk	32	-19.6	0	59.34	-	-	74	-14.66	179	378	H
2	* 2.48408	49.68	Pk	32	-19.6	0	62.08	-	-	74	-11.92	179	378	H
3	* 2.48351	36.61	RMS	32	-19.6	0	49.01	54	-4.99	-	-	179	378	H
4	* 2.48361	36.91	RMS	32	-19.6	0	49.31	54	-4.69	-	-	179	378	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	46.02	Pk	31.90	-19.70	0.00	58.22	-	-	74.00	-15.78	29	239	H
		* 2.38983	49.44	Pk	31.90	-19.70	0.00	61.64	-	-	74.00	-12.36	29	239	H
		* 2.39	35.87	RMS	31.90	-19.70	0.00	48.07	54.00	-5.93	-	-	29	239	H
		* 2.38989	36.08	RMS	31.90	-19.70	0.00	48.28	54.00	-5.72	-	-	29	239	H
		* 2.39	44.44	Pk	31.90	-19.70	0.00	56.64	-	-	74.00	-17.36	190	100	V
		* 2.38979	46.76	Pk	31.90	-19.70	0.00	58.96	-	-	74.00	-15.04	190	100	V
		* 2.39	33.40	RMS	31.90	-19.70	0.00	45.60	54.00	-8.40	-	-	190	100	V
		* 2.38996	33.89	RMS	31.90	-19.70	0.00	46.09	54.00	-7.91	-	-	190	100	V
2462	ANT1	* 2.48351	46.94	Pk	32.00	-19.60	0.00	59.34	-	-	74.00	-14.66	179	378	H
		* 2.48408	49.68	Pk	32.00	-19.60	0.00	62.08	-	-	74.00	**-11.92**	179	378	H
		* 2.48351	36.61	RMS	32.00	-19.60	0.00	49.01	54.00	-4.99	-	-	179	378	H
		* 2.48361	36.91	RMS	32.00	-19.60	0.00	49.31	54.00	**-4.69**	-	-	179	378	H
		* 2.48351	42.60	Pk	32.00	-19.60	0.00	55.00	-	-	74.00	-19.00	173	100	V
		2.506	44.60	Pk	32.10	-19.70	0.00	57.00	-	-	74.00	-17.00	173	100	V
		* 2.48351	33.03	RMS	32.00	-19.60	0.00	45.43	54.00	-8.57	-	-	173	100	V
		* 2.48368	32.94	RMS	32.00	-19.60	0.00	45.34	54.00	-8.66	-	-	173	100	V
2467	ANT1	* 2.48351	40.78	Pk	32.00	-19.60	0.00	53.18	-	-	74.00	-20.82	180	334	H
		* 2.48476	43.91	Pk	32.00	-19.60	0.00	56.31	-	-	74.00	-17.69	180	334	H
		* 2.48351	31.06	RMS	32.00	-19.60	0.00	43.46	54.00	-10.54	-	-	180	334	H
		2.546	31.54	RMS	32.10	-19.50	0.00	44.14	54.00	-9.86	-	-	180	334	H
		* 2.48351	41.18	Pk	32.00	-19.60	0.00	53.58	-	-	74.00	-20.42	47	138	V
		2.523	43.75	Pk	32.10	-19.50	0.00	56.35	-	-	74.00	-17.65	47	138	V
		* 2.48351	31.06	RMS	32.00	-19.60	0.00	43.46	54.00	-10.54	-	-	47	138	V
		2.530	31.32	RMS	32.10	-19.30	0.00	44.12	54.00	-9.88	-	-	47	138	V
2472	ANT1	* 2.48351	46.18	Pk	32.00	-19.60	0.00	58.58	-	-	74.00	-15.42	169	296	H
		* 2.48354	47.63	Pk	32.00	-19.60	0.00	60.03	-	-	74.00	-13.97	169	296	H
		* 2.48351	34.59	RMS	32.00	-19.60	0.00	46.99	54.00	-7.01	-	-	169	296	H
		* 2.48354	34.67	RMS	32.00	-19.60	0.00	47.07	54.00	-6.93	-	-	169	296	H
		* 2.48351	42.15	Pk	32.00	-19.60	0.00	54.55	-	-	74.00	-19.45	174	100	V
		2.505	44.89	Pk	32.10	-19.60	0.00	57.39	-	-	74.00	-16.61	174	100	V
		* 2.48351	31.69	RMS	32.00	-19.60	0.00	44.09	54.00	-9.91	-	-	174	100	V
		* 2.48352	32.31	RMS	32.00	-19.60	0.00	44.71	54.00	-9.29	-	-	174	100	V

Note1. Pk - Peak detector, RMS - RMS detectior
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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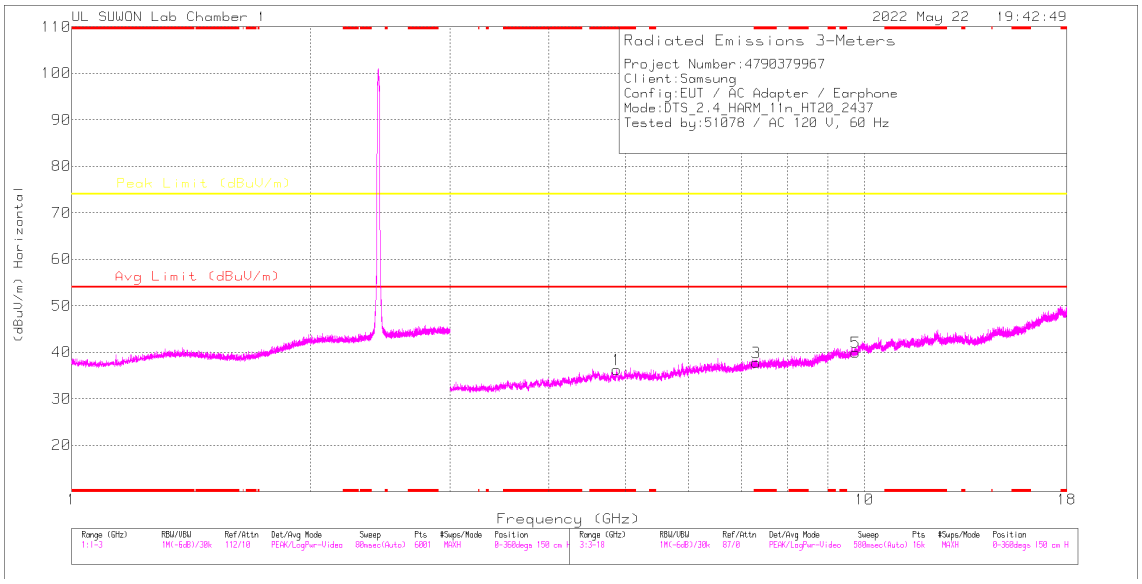
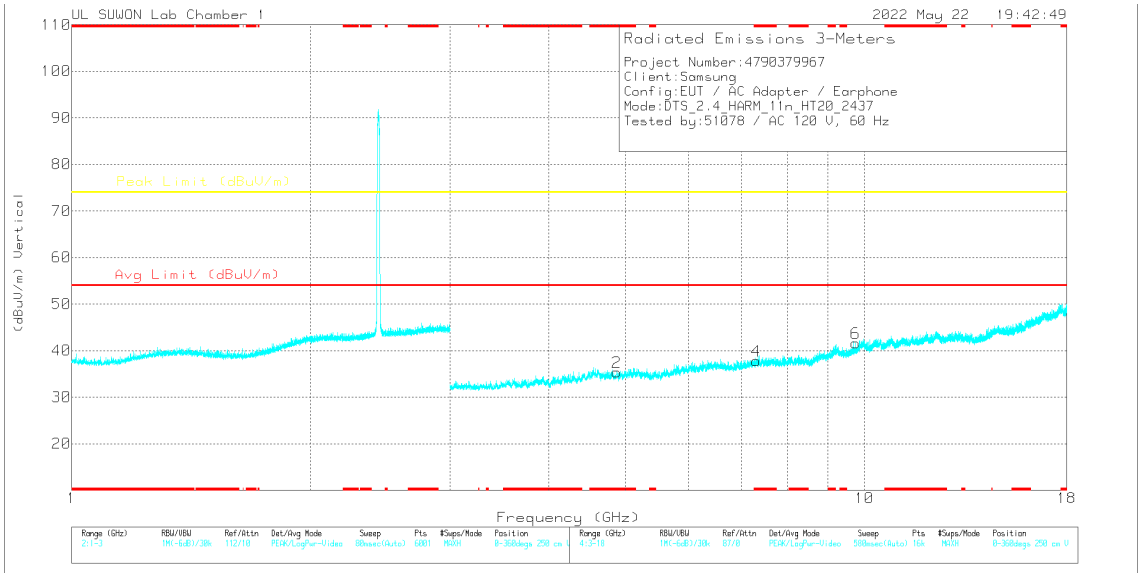
HARMONICS AND SPURIOUS EMISSIONS (ANT1 WORST CASE: 6 CHANNEL)

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_00168717	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
* 4.87186	41.53	PK2	34.1	-31.2	0	44.43	-	-	74	-29.57	0	100	H
* 4.87511	41.96	PK2	34.1	-31.3	0	44.76	-	-	74	-29.24	0	100	V
* 7.30994	38.54	PK2	35.8	-27.3	0	47.04	-	-	74	-26.96	0	100	H
* 7.30683	38.27	PK2	35.8	-27.3	0	46.77	-	-	74	-27.23	0	100	V
9.74395	35.58	PK2	37.4	-23.6	0	49.38	-	-	74	-24.62	0	100	H
9.74215	35.14	PK2	37.4	-23.6	0	48.94	-	-	74	-25.06	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
PK2 - KDB558074 Method: Maximum Peak

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	* 4.81669	41.63	PK2	34.10	-31.10	0.00	44.63	-	-	74.00	-29.37	0	100	H
		* 4.81612	40.93	PK2	34.10	-31.10	0.00	43.93	-	-	74.00	-30.07	0	100	V
		* 7.26916	37.68	PK2	35.80	-27.40	0.00	46.08	-	-	74.00	-27.92	0	100	H
		* 7.26373	37.92	PK2	35.80	-27.40	0.00	46.32	-	-	74.00	-27.68	0	100	V
		9.642	34.61	PK2	37.20	-23.00	0.00	48.81	-	-	74.00	-25.19	0	100	H
		9.654	34.98	PK2	37.20	-23.00	0.00	49.18	-	-	74.00	-24.82	0	100	V
2437	ANT1	* 4.87186	41.53	PK2	34.10	-31.20	0.00	44.43	-	-	74.00	-29.57	0	100	H
		* 4.87511	41.96	PK2	34.10	-31.30	0.00	44.76	-	-	74.00	-29.24	0	100	V
		* 7.30994	38.54	PK2	35.80	-27.30	0.00	47.04	-	-	74.00	-26.96	0	100	H
		* 7.30683	38.27	PK2	35.80	-27.30	0.00	46.77	-	-	74.00	-27.23	0	100	V
		9.744	35.58	PK2	37.40	-23.60	0.00	49.38	-	-	74.00	**-24.62**	0	100	H
		9.742	35.14	PK2	37.40	-23.60	0.00	48.94	-	-	74.00	-25.06	0	100	V
2457	ANT1	* 4.92745	42.26	PK2	34.10	-31.30	0.00	45.06	-	-	74.00	-28.94	0	100	H
		* 7.38629	24.42	Avg	35.80	-26.80	0.00	33.42	-	-	74.00	-40.58	0	100	H
		9.848	21.14	Avg	37.60	-22.90	0.00	35.84	-	-	74.00	-38.16	0	100	H
		* 4.92683	41.51	PK2	34.10	-31.30	0.00	44.31	-	-	74.00	-29.69	0	100	V
		* 7.39089	38.25	PK2	35.80	-26.80	0.00	47.25	-	-	74.00	-26.75	0	100	V
		9.848	22.22	Avg	37.60	-22.90	0.00	36.92	-	-	74.00	-37.08	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

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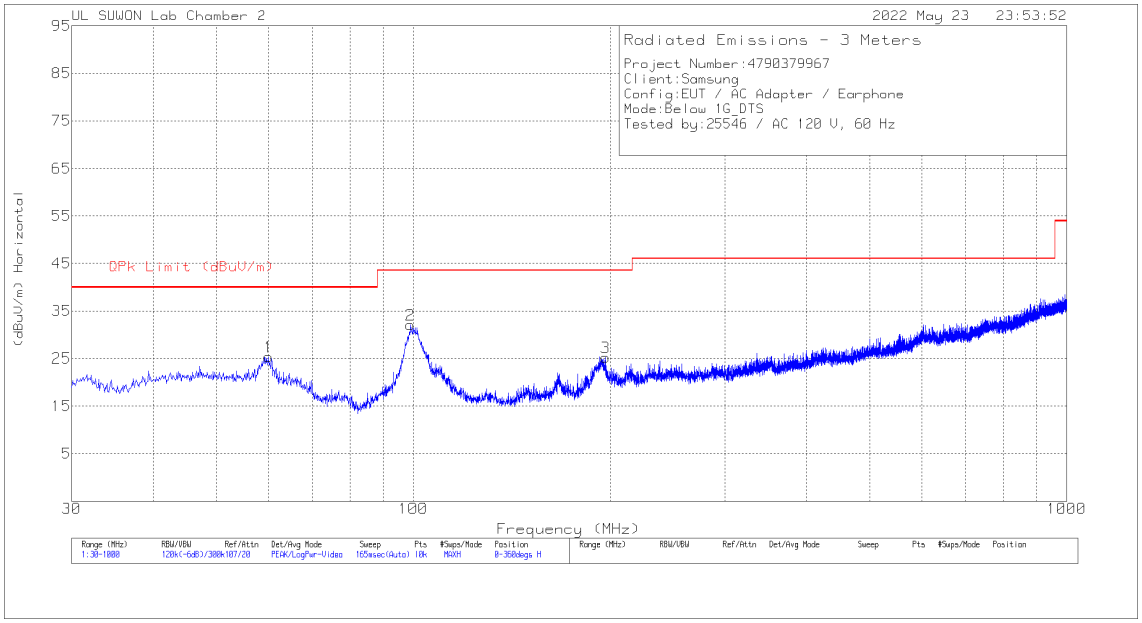
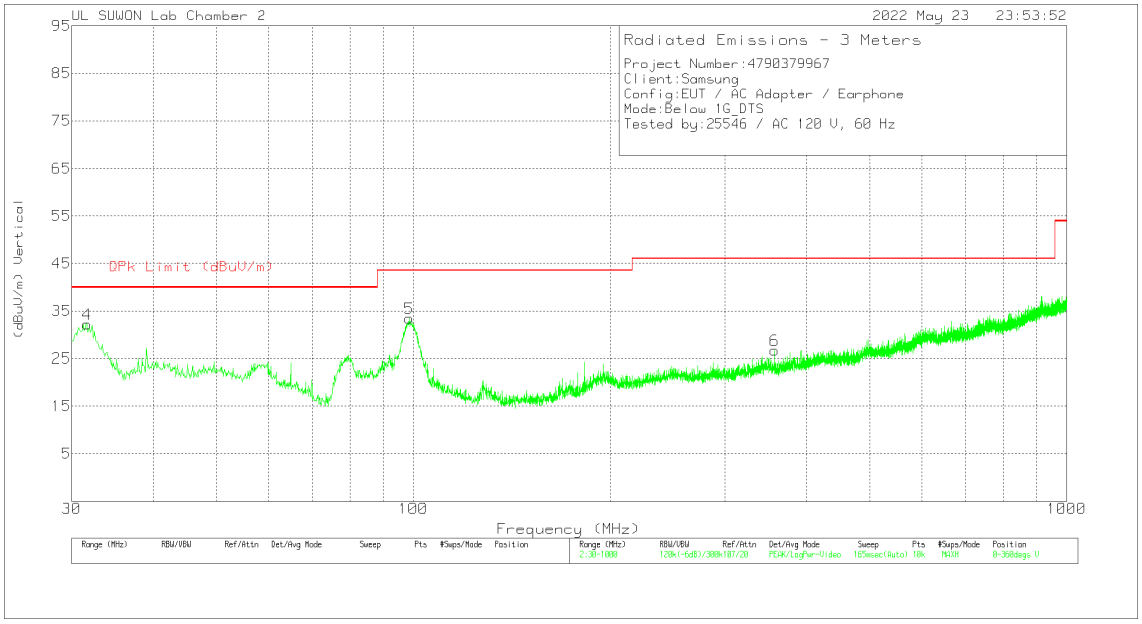
10.2. WORST CASE BELOW 1 GHz



HORIZONTAL



VERTICAL

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	VULB9163_749	Below 1G[dB]	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	60.07	38.48	Pk	18.5	-31.6	25.38	40	-14.62	0-360	300	H
2	99.064	45.66	Pk	17.7	-31.3	32.06	43.52	-11.46	0-360	200	H
3	196.743	37.69	Pk	18.3	-30.7	25.29	43.52	-18.23	0-360	100	H
4	31.649	48.67	Pk	15.5	-31.9	32.27	40	-7.73	0-360	100	V
5	98.482	47.17	Pk	17.7	-31.4	33.47	43.52	-10.05	0-360	100	V
6	357.472	36.39	Pk	20.4	-30.1	26.69	46.02	-19.33	0-360	100	V

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.

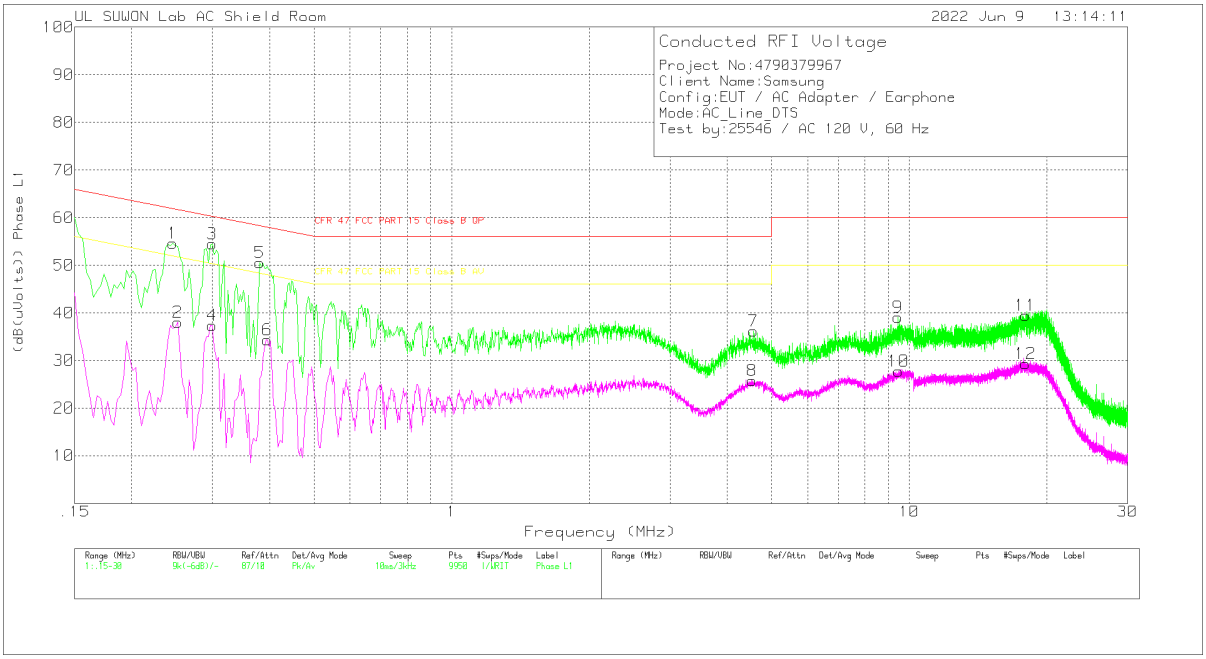
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

11.1. 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]	CABLELOSS(dB)	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP	Margin (dB)	CFR 47 FCC PART 15 Class B AV	Margin (dB)
1	.246	44.86	Pk	9.6	.2	54.66	61.89	-7.23	-	-
2	.252	28.27	Av	9.6	.2	38.07	-	-	51.69	-13.62
3	.3	44.54	Pk	9.7	.2	54.44	60.24	-5.8	-	-
4	.3	27.48	Av	9.7	.2	37.38	-	-	50.24	-12.86
5	.381	40.5	Pk	9.8	.2	50.5	58.26	-7.76	-	-
6	.396	24.29	Av	9.8	.2	34.29	-	-	47.94	-13.65
7	4.569	26.2	Pk	9.7	.3	36.2	56	-19.8	-	-
8	4.536	15.74	Av	9.7	.3	25.74	-	-	46	-20.26
9	9.456	28.87	Pk	9.8	.4	39.07	60	-20.93	-	-
10	9.474	17.59	Av	9.8	.4	27.79	-	-	50	-22.21
11	17.979	29.02	Pk	10.1	.4	39.52	60	-20.48	-	-
12	17.967	18.88	Av	10.1	.4	29.38	-	-	50	-20.62

Pk - Peak detector
Qp - Quasi-Peak detector
Av - Average detection

Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1[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)
.246	29.92	Qp	9.6	.2	39.72	61.89	-22.17	-	-
.3	22.47	Qp	9.7	.2	32.37	60.24	-27.87	-	-
.381	37.43	Qp	9.8	.2	47.43	58.26	-10.83	-	-

Qp - Quasi-Peak detector

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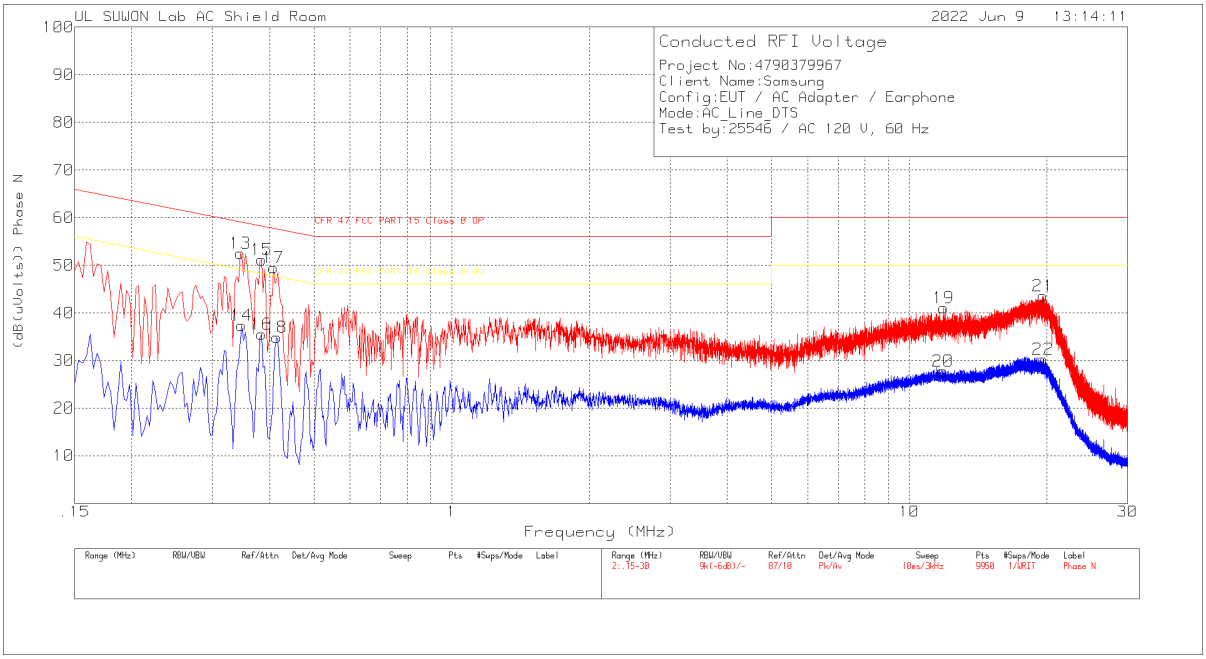
LINE 2 RESULTS



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	.345	42.54	Pk	9.8	.2	52.54	59.08	-6.54	-	-
14	.348	27.42	Av	9.8	.2	37.42	-	-	49.01	-11.59
15	.384	41.13	Pk	9.8	.2	51.13	58.19	-7.06	-	-
16	.384	25.57	Av	9.8	.2	35.57	-	-	48.19	-12.62
17	.408	39.47	Pk	9.8	.2	49.47	57.69	-8.22	-	-
18	.414	24.88	Av	9.8	.2	34.88	-	-	47.57	-12.69
19	11.874	30.79	Pk	10	.3	41.09	60	-18.91	-	-
20	11.841	17.56	Av	9.9	.3	27.76	-	-	50	-22.24
21	19.629	32.92	Pk	10.2	.4	43.52	60	-16.48	-	-
22	19.632	19.71	Av	10.2	.4	30.31	-	-	50	-19.69

Pk - Peak detector
Qp - Quasi-Peak detector
Av - Average detection

Range 2: Phase N .15 - 30MHz

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)
.345	38.11	Qp	9.8	.2	48.11	59.08	-10.97	-	-
.384	38.51	Qp	9.8	.2	48.51	58.19	-9.68	-	-
.408	33.77	Qp	9.8	.2	43.77	57.69	-13.92	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT

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