

CERTIFICATION TEST REPORT

Report Number. : 4791196575-E8V2

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

Model : SM-F956U, SM-F956U1

FCC ID : A3LSMF956U

EUT Description : GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax,
NFC, WPT and UWB

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

Date Of Issue:

2024-05-04

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2024-04-22	Initial issue	Dexter(Hyunsik) Yun
V2	2024-05-04	Updated to address TCB's question	Dexter(Hyunsik) Yun

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. DECISION RULES AND MEASUREMENT UNCERTAINTY	7
4.1. METROLOGICAL TRACEABILITY.....	7
4.2. SAMPLE CALCULATION.....	7
4.3. MEASUREMENT UNCERTAINTY	7
4.4. DECISION RULES.....	7
5. EQUIPMENT UNDER TEST.....	8
5.1. EUT DESCRIPTION.....	8
5.2. MAXIMUM OUTPUT POWER.....	8
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	9
5.4. WORST-CASE CONFIGURATION AND MODE	10
5.5. DESCRIPTION OF TEST SETUP.....	12
6. MEASUREMENT METHOD.....	14
7. TEST AND MEASUREMENT EQUIPMENT	15
8. TEST RESULTS SUMMARY.....	16
9. ANTENNA PORT TEST RESULTS.....	17
9.1. ON TIME AND DUTY CYCLE	17
9.2. 6 dB BANDWIDTH.....	18
9.2.1. Test data.....	18
9.2.2. 6 dB BANDWIDTH PLOTS	19
9.3. OUTPUT POWER.....	21
9.3.1. DIVERSITY MODE TEST DATA.....	21
9.3.2. DUAL MODE TEST DATA.....	22
9.3.3. PEAK POWER PLOTS.....	23
9.4. AVERAGE POWER	27
9.4.1. DIVERSITY MODE TEST DATA.....	27
9.4.2. DUAL MODE TEST DATA.....	28
9.5. POWER SPECTRAL DENSITY	29
9.5.1. Test data.....	29
9.5.2. PSD TEST PLOTS	30
9.6. CONDUCTED SPURIOUS EMISSIONS.....	33

9.6.1. Test plot.....	34
10. RADIATED TEST RESULTS	38
10.1. LIMITS AND PROCEDURE	38
10.2. TRANSMITTER ABOVE 1 GHz	40
10.2.1. TX ABOVE 1 GHz BLUETOOTH LE 1 Mbps	40
10.2.2. TX ABOVE 1 GHz BLUETOOTH LE 2 Mbps	44
10.3. WORST CASE BELOW 1 GHz	48
11. AC POWER LINE CONDUCTED EMISSIONS	49
11.1. AC Power Line	50

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/ax, NFC, WPT and UWB

MODEL NUMBER: SM-F956U, SM-F956U1

SERIAL NUMBER: 7b456b5547507ece, 7b456b5517507ece (CONDUCTED); R3CX10W6K4M, R3CX309QRBH (RADIATED);

DATE TESTED: 2024-02-20 ~ 2024-04-22

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

UL KOREA LTD. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL KOREA LTD. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL KOREA LTD. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL KOREA LTD. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For
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Seokhwan Hong
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Tested By:



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Suwon Lab Engineer
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2. TEST METHODOLOGY

1. FCC 47 CFR Part 2.
2. FCC 47 CFR Part 15.
3. KDB 558074 D01 15.247 Meas Guidance v05r02.
4. KDB 662911 D01 v02r01
5. ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
<input checked="" type="checkbox"/>	Chamber 1(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 2(3m semi-anechoic chamber)
<input checked="" type="checkbox"/>	Chamber 3(3m semi-anechoic chamber)
<input type="checkbox"/>	Chamber 4(3m Full-anechoic chamber)
<input type="checkbox"/>	Chamber 5(3m Full-anechoic chamber)

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

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

$$\begin{aligned} \text{AC Corrected Reading (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Extension Cord} \\ &\text{Loss (dB)} + \text{Cable Loss (dB)} \\ 44.72 \text{ dBuV} &= 34.72 \text{ dBuV} + 9.9 \text{ dB} + 0.1 \text{ dB} \end{aligned}$$

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	2.79 dB
Radiated Disturbance, 9 kHz to 30 MHz	1.69 dB
Radiated Disturbance, 30 MHz to 1 GHz	4.07 dB
Radiated Disturbance, 1 GHz to 18 GHz	4.99 dB
Radiated Disturbance, Above 18 GHz	5.96 dB

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

4.4. DECISION RULES

Decision rule for statement(s) of conformity is based on Clause 4.4.3 in IEC Guide 115:2023.

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/ax, NFC, WPT and UWB. This test report addresses the DTS (BLE) operational mode.

Representative model	Difference	Derivative model
		SM-F956U1
SM-F956U	Hardware	Same
	Software	The UI has changed according to Service Provider

The model SM-F956U was used for final testing and is representative of the test results in this report.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range[MHz]	Mode	Power Mode	Output Power [dBm]	Output Power [mW]
2 402 ~ 2 480	1 Mbps (255 pkt)	Peak	19.420	87.498
		Average	19.071	80.742
	2Mbps (255 pkt)	Peak	19.860	96.828
		Average	19.155	82.319

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

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

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

The radio utilizes a internal antenna, with a maximum gain of:

Frequency Band[MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain[dBi]
DTS 2400 – 2483.5	-2.22	-1.78	1.01

Directional gain for the MIMO operations is determined using KDB 662911 D01 Multiple Transmitter Output section F (2)(d)(1) for *Unequal antenna gains, with equal transmit powers*. The gain is calculated using the formula for correlated transmissions across the two transmit antennas.

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}]$ dBi.

Sample calculation for this device with $N_{ANT} = 2$

Directional gain = $10 \log[(10^{-2.22/20} + 10^{-1.78/20})^2 / 2] = 1.01$ dBi

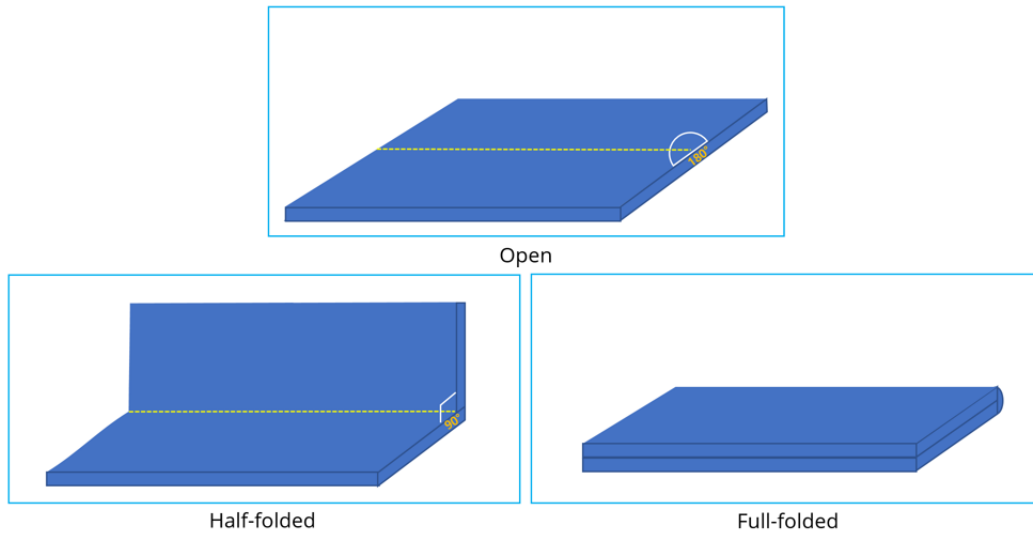
“SUB4” and “SUB3” as indicated in antenna specification are written as ANT1 and ANT2 in this report.

5.4. WORST-CASE CONFIGURATION AND MODE

Both Bluetooth LE Diversity mode and DUAL mode have been investigated and confirmed.

The fundamentals of the EUT were investigated in three orthogonal orientations X, Y and Z. It was determined that below table's orientation was the worst-case orientation.

Worst-case	ANT1	ANT2	DUAL
Axis	X	Y	Y
Foldable condition	Half-folded	Open	Open



For conducted power test, both Diversity and DUAL mode were verified and reported. In DUAL mode, except power test, no noticeable data was found. Tests was performed on Diversity mode.

Radiated and power line conducted tests were performed with EUT connected to AC power adapter as the worst-case configuration. Radiated harmonics spurious 1~18 GHz Low/Mid/High channels, 18-26GHz were performed with the EUT set at the Diversity and DUAL 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.

For Radiated band-edge and spurious test, tests were performed on Diversity and DUAL mode.

Due to modulation characteristics, 125 kbps data is worse than 1Mbps in the RBW 3kHz PSD setting. However, based on the RBW (1MHz) when measuring radiated spurious, the PSD of 1Mbps is higher, so 1Mbps was selected as the worst case to suit the radiation test environment. All radiated and power line conducted tests were performed attached with travel adapter for the worst-case condition mode.

Power verification

The Output Power of all data rate are all investigated, the 1 Mbps(255 pkt) and 2 Mbps(255 pkt) power is the worst case for symbol rate. All tests were performed in these two modes.

Symbol Rate [Ms/s]	Mode	Freq. [MHz]	Conducted Burst Avg [dBm]	Symbol Rate [Ms/s]	Mode	Freq. [MHz]	Conducted Burst Avg [dBm]
1	1 Mbps 37 pkt ANT1	2 402	18.665	2	2 Mbps 37 pkt ANT1	2 404	18.982
		2 440	18.786			2 440	18.660
		2 480	17.710			2 478	17.685
	1 Mbps 37 pkt ANT2	2 402	18.430		2 Mbps 37 pkt ANT2	2 404	18.393
		2 440	18.972			2 440	19.027
		2 480	17.359			2 478	17.838
	1 Mbps 255 pkt ANT1	2 402	19.009		2 Mbps 255 pkt ANT1	2 404	19.103
		2 440	18.711			2 440	18.743
		2 480	17.433			2 478	17.501
	1 Mbps 255 pkt ANT2	2 402	18.293		2 Mbps 255 pkt ANT2	2 404	18.354
		2 440	19.071			2 440	19.155
		2 480	17.138			2 478	17.670
1 Coded S=8	125 kbps 37 pkt ANT1	2 402	10.256	1 Coded S=2	500 kbps 37 pkt ANT1	2 402	10.370
		2 440	9.944			2 440	10.035
		2 480	9.784			2 480	9.823
	125 kbps 37 pkt ANT2	2 402	10.618		500 kbps 37 pkt ANT2	2 402	10.620
		2 440	10.891			2 440	10.930
		2 480	9.743			2 480	9.801
	125 kbps 255 pkt ANT1	2 402	10.292		500 kbps 255 pkt ANT1	2 402	10.303
		2 440	9.863			2 440	9.964
		2 480	9.775			2 480	9.839
	125 kbps 255 pkt ANT2	2 402	10.577		500 kbps 255 pkt ANT2	2 402	10.638
		2 440	10.851			2 440	10.908
		2 480	9.703			2 480	9.762

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37N9QP6H39DK3	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02111A	N/A

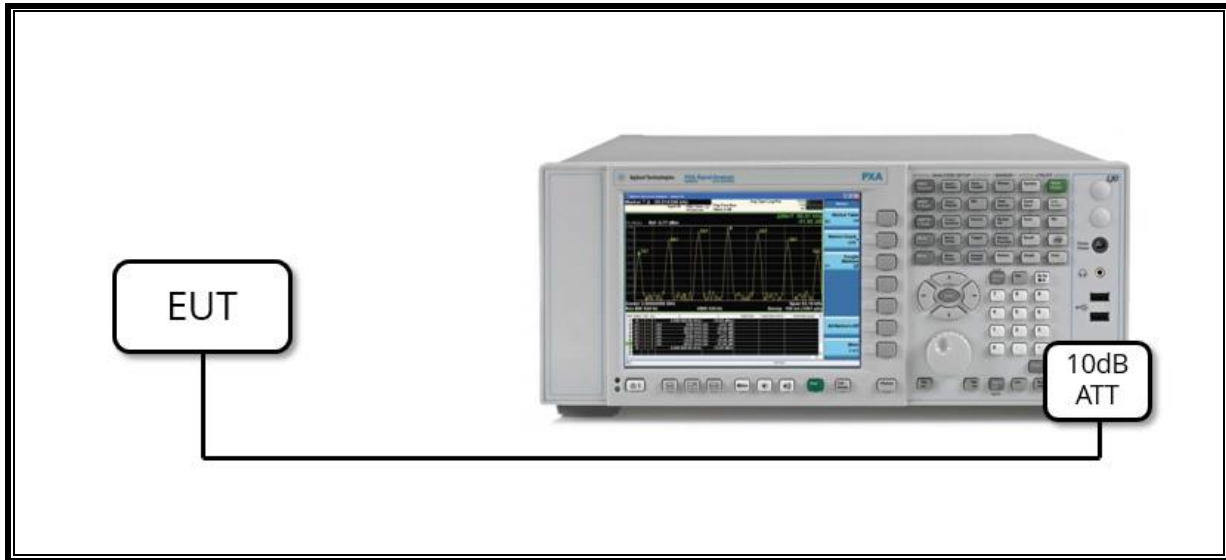
I/O CABLE

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

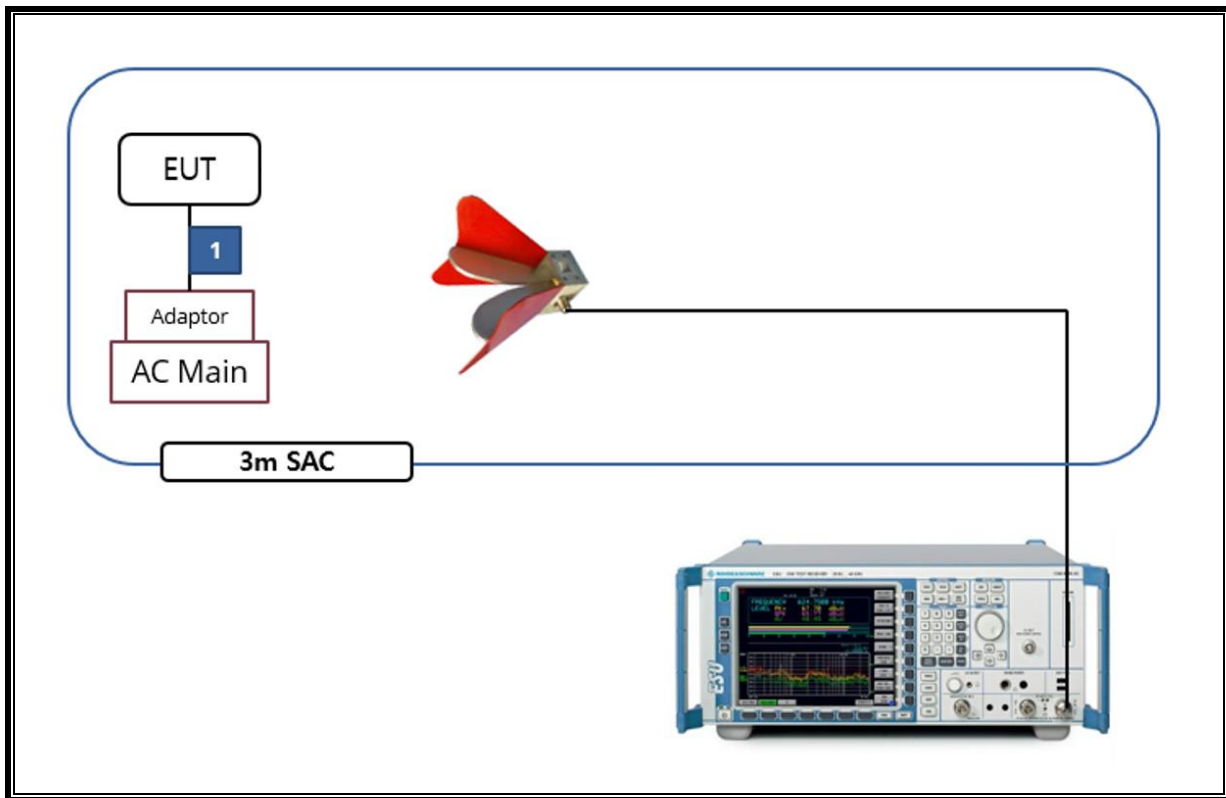
TEST SETUP

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

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. MEASUREMENT METHOD

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

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

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

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

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

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

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

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	750	2024-08-15
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3116C-PA	00168841	2024-07-25
Preamplifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2024-07-24
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54170614	2024-07-25
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	2024-07-24
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2025-01-03
Average Power Sensor	Agilent / HP	U2000A	MY54270007	2024-07-23
Average Power Sensor	Agilent / HP	U2000A	MY54260010	2024-07-24
Attenuator	PASTERNAK	PE7087-10	A001	2024-07-23
Attenuator	PASTERNAK	PE7087-10	A008	2024-07-27
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2024-07-24
EMI Test Receive, 3 GHz	R&S	ESR3	101832	2024-07-23
Low Pass Filter 5GHz	Micro-Tronics	LPS17541	009	2024-07-23
High Pass Filter 3GHz	Micro-Tronics	HPM17543	010	2024-07-23
High Pass Filter 6GHz	Micro-Tronics	HPS17542	021	2024-07-24
LISN	R&S	ENV-216	101837	2024-07-23
Antenna, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

8. TEST RESULTS SUMMARY

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

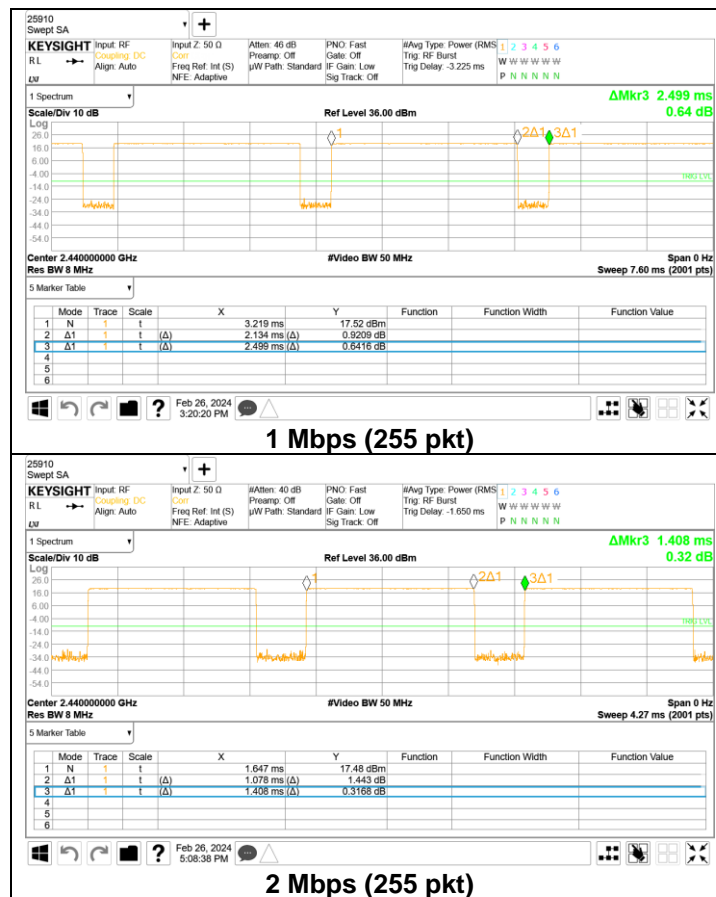
9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

Mode	On time [msec]	Period [msec]	Duty cycle x [Linear]	Duty Cycle [%]	Duty Cycle Correction Factor [dB]	1/T Minimum VBW [kHz]
2 400 ~ 2 483.5 MHz Bands						
1 Mbps [255 pkt]	2.134	2.499	0.854	85.394	0.69	0.47
2 Mbps [255 pkt]	1.078	1.408	0.766	76.563	1.16	0.93



9.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

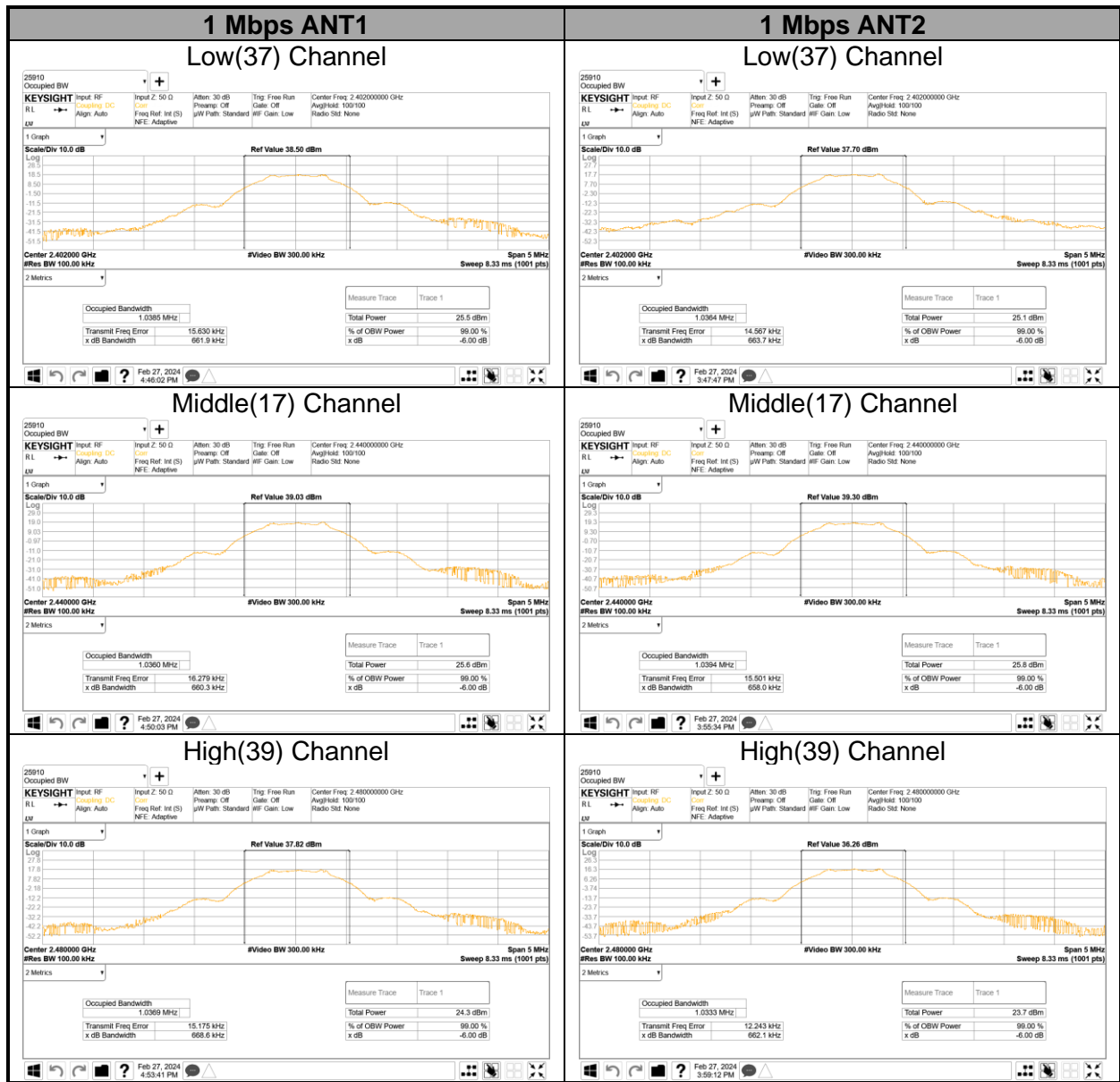
The minimum 6 dB bandwidth shall be at least 500 kHz.

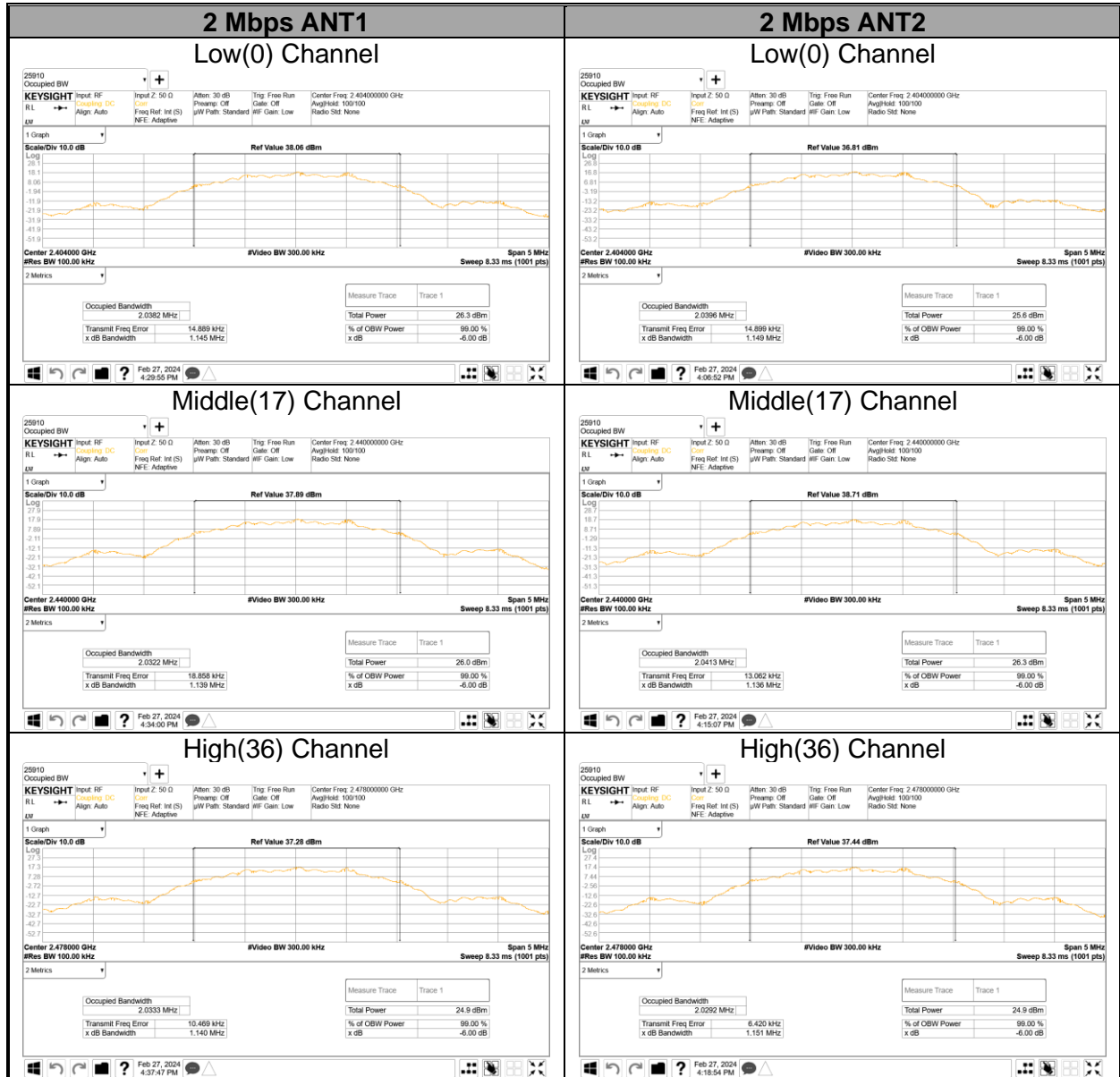
RESULTS

9.2.1. Test data

Mode	Antenna	Channel	Frequency [MHz]	6 dB Bandwidth [kHz]	Minimum Limit [kHz]
1 Mbps (255pkt)	ANT1	37	2 402	661.9	500.0
		17	2 440	660.3	
		39	2 480	668.6	
	ANT2	37	2 402	663.7	
		17	2 440	658.0	
		39	2 480	662.1	
2 Mbps (255pkt)	ANT1	0	2 404	1 145.0	
		17	2 440	1 139.0	
		36	2 478	1 140.0	
	ANT2	0	2 404	1 149.0	
		17	2 440	1 136.0	
		36	2 478	1 151.0	
Worst				658.0	500.0

9.2.2. 6 dB BANDWIDTH PLOTS





9.3. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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

TEST PROCEDURE

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

RESULTS

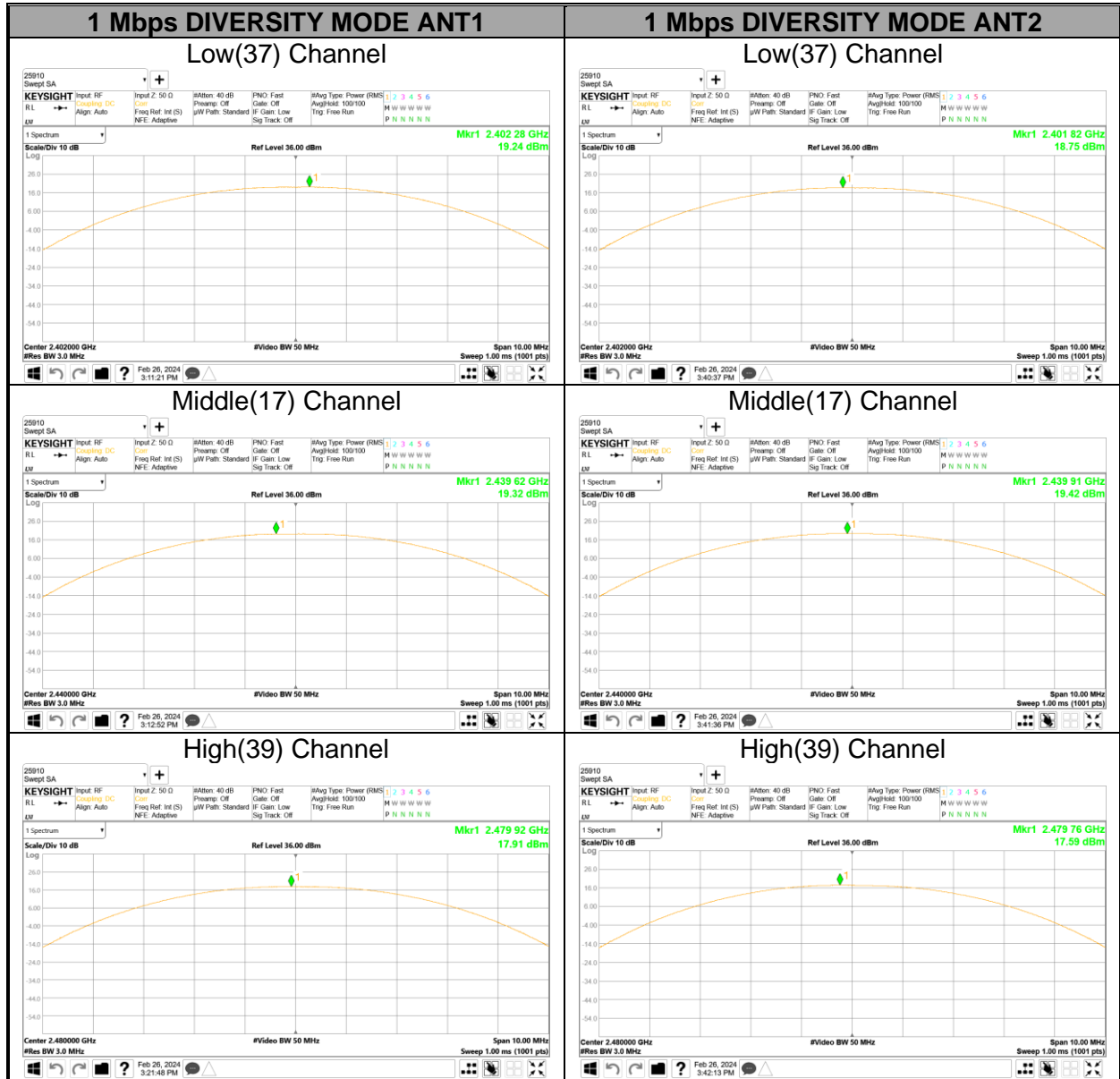
9.3.1. DIVERSITY MODE TEST DATA

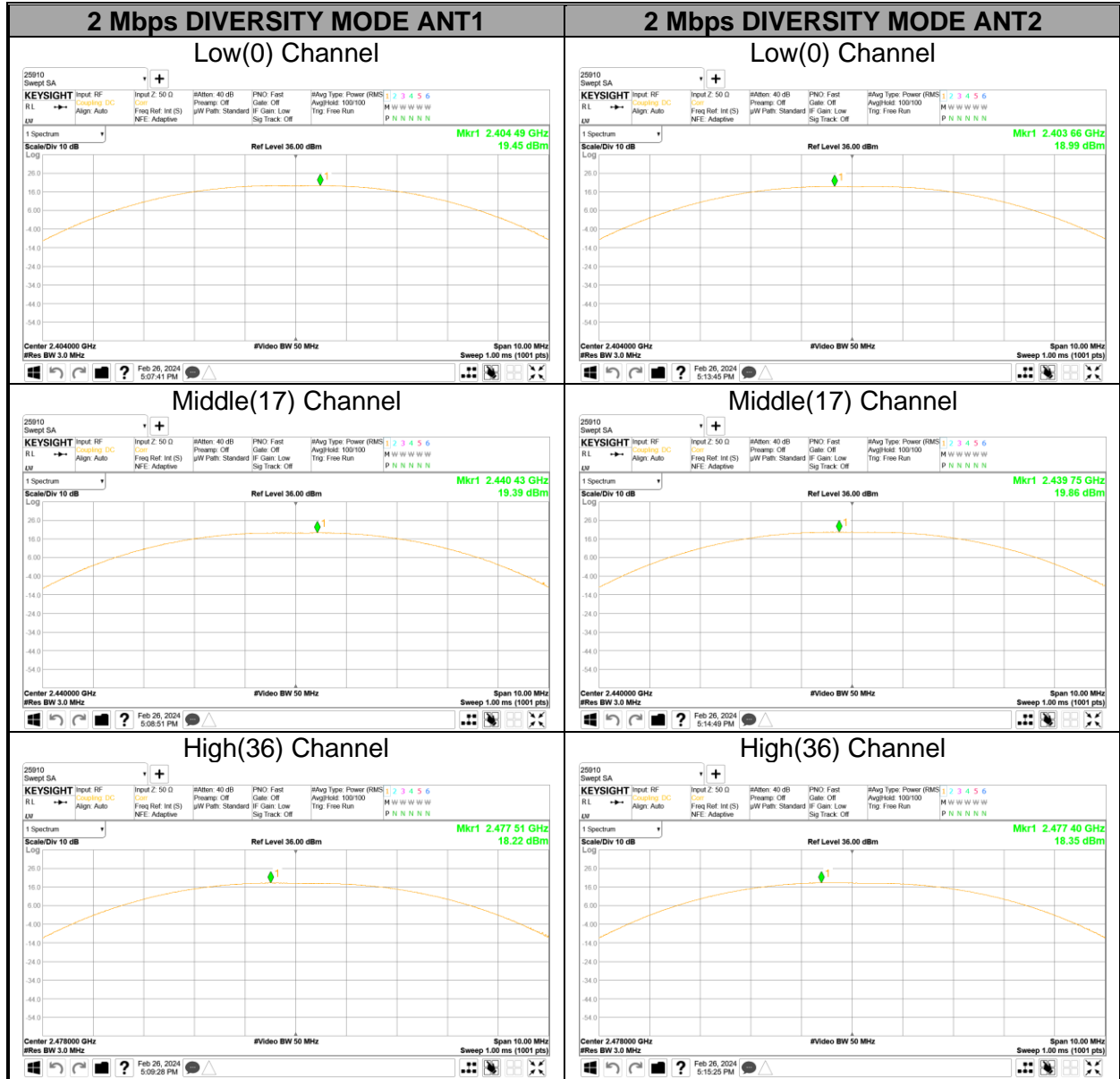
Mode	Antenna	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
1 Mbps (255 pkt)	ANT1	37	2 402	19.240	30.000	-10.76
		17	2 440	19.320		-10.68
		39	2 480	17.910		-12.09
	ANT2	37	2 402	18.750		-11.25
		17	2 440	19.420		-10.58
		39	2 480	17.590		-12.41
2 Mbps (255 pkt)	ANT1	0	2 404	19.450	30.000	-10.55
		17	2 440	19.390		-10.61
		36	2 478	18.220		-11.78
	ANT2	0	2 404	18.990		-11.01
		17	2 440	19.860		-10.14
		36	2 478	18.350		-11.65
Worst				19.860		-10.14

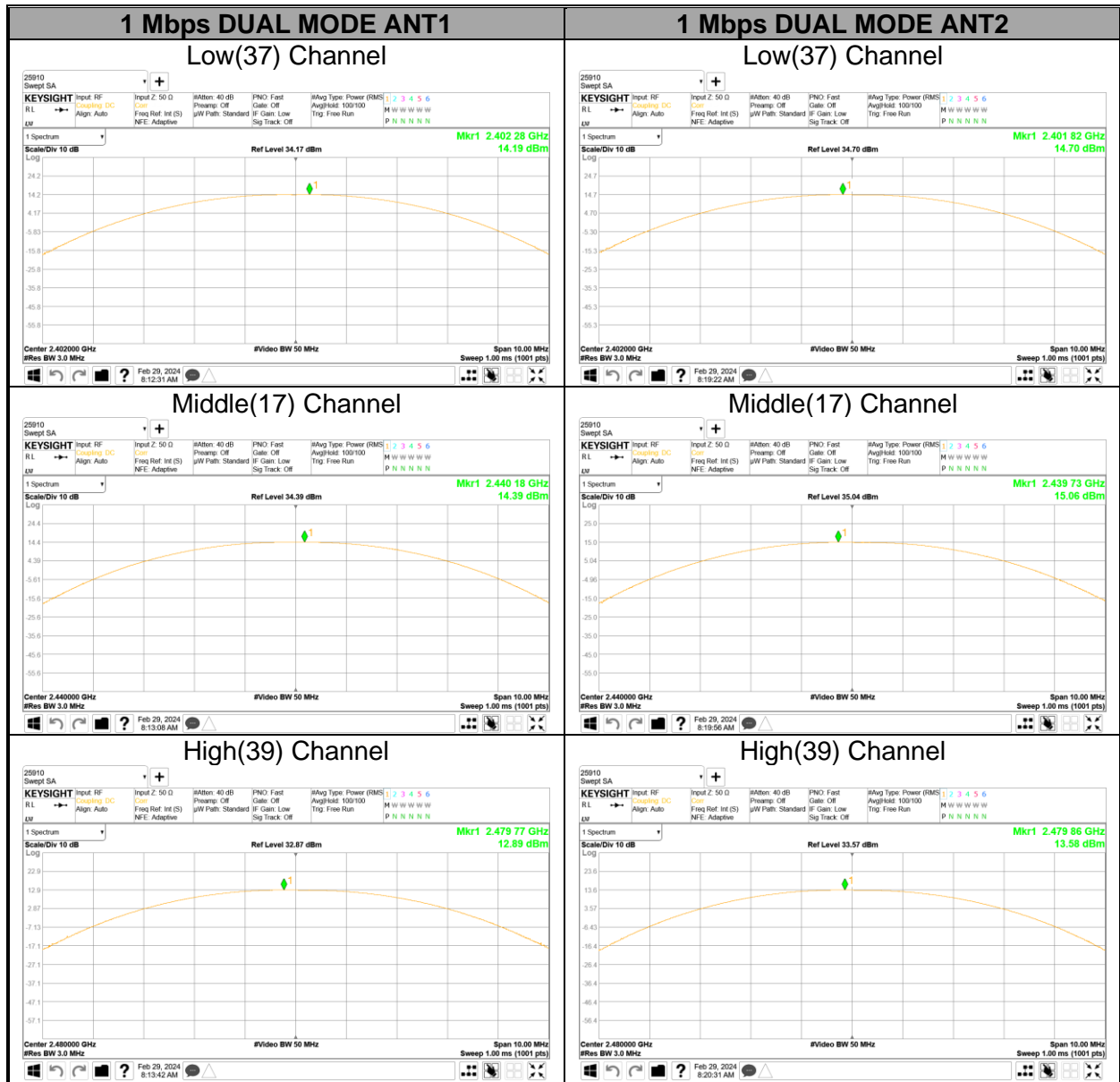
9.3.2. DUAL MODE TEST DATA

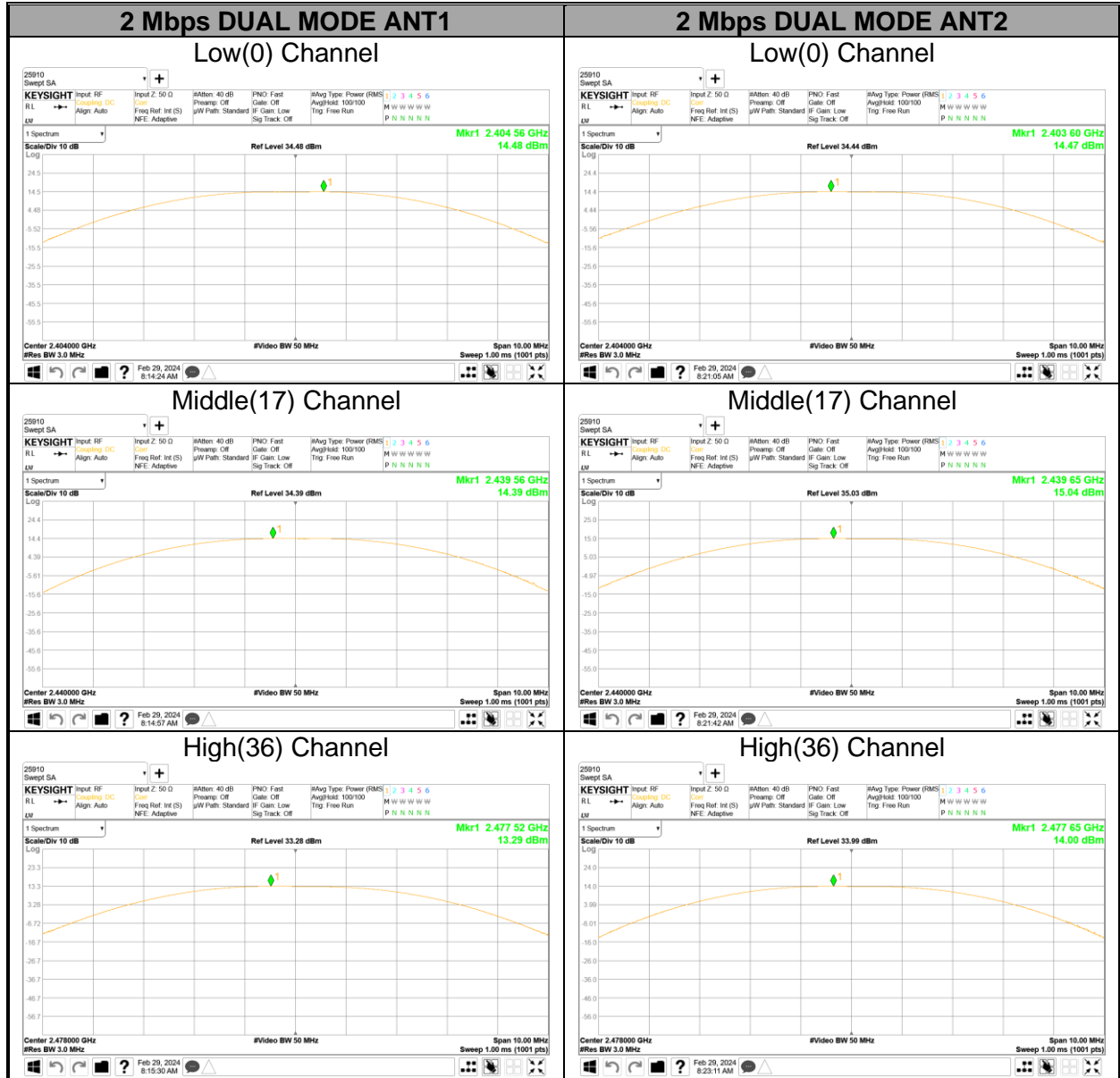
Mode	Antenna	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]	
1 Mbps (255 pkt)	DUAL ANT1	37	2 402	14.190	30.000		
		17	2 440	14.390			
		39	2 480	12.890			
	DUAL ANT2	37	2 402	14.700			
		17	2 440	15.060			
		39	2 480	13.580			
	DUAL ANT1+2	37	2 402	17.460			-12.54
		17	2 440	17.750			-12.25
		39	2 480	16.260			-13.74
2 Mbps (255 pkt)	DUAL ANT1	0	2 404	14.480	30.000		
		17	2 440	14.390			
		36	2 478	13.290			
	DUAL ANT2	0	2 404	14.470			
		17	2 440	15.040			
		36	2 478	14.000			
	DUAL ANT1+2	0	2 404	17.490			-12.51
		17	2 440	17.740			-12.26
		36	2 478	16.670			-13.33
Worst				17.750		-12.25	

9.3.3. PEAK POWER PLOTS









9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

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

RESULTS

9.4.1. DIVERSITY MODE TEST DATA

Mode	Antenna	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
1 Mbps (255 pkt)	ANT1	37	2 402	19.009	79.598
		17	2 440	18.711	74.319
		39	2 480	17.433	55.373
	ANT2	37	2 402	18.293	67.499
		17	2 440	19.071	80.742
		39	2 480	17.138	51.737
2 Mbps (255 pkt)	ANT1	0	2 404	19.103	81.339
		17	2 440	18.743	74.869
		36	2 478	17.501	56.247
	ANT2	0	2 404	18.354	68.454
		17	2 440	19.155	82.319
		36	2 478	17.670	58.479

9.4.2. DUAL MODE TEST DATA

Mode	Antenna	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
1 Mbps (255 pkt)	DUAL ANT1	37	2 402	13.971	
		17	2 440	14.241	
		39	2 480	12.613	
	DUAL ANT2	37	2 402	14.411	
		17	2 440	14.824	
		39	2 480	13.334	
	DUAL ANT1+2	37	2 402	17.210	52.602
		17	2 440	17.550	56.885
		39	2 480	16.000	39.811
2 Mbps (255 pkt)	DUAL ANT1	0	2 404	14.081	
		17	2 440	14.067	
		36	2 478	12.817	
	DUAL ANT2	0	2 404	14.071	
		17	2 440	14.653	
		36	2 478	13.542	
	DUAL ANT1+2	0	2 404	17.090	51.168
		17	2 440	17.380	54.702
		36	2 478	16.200	41.687

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

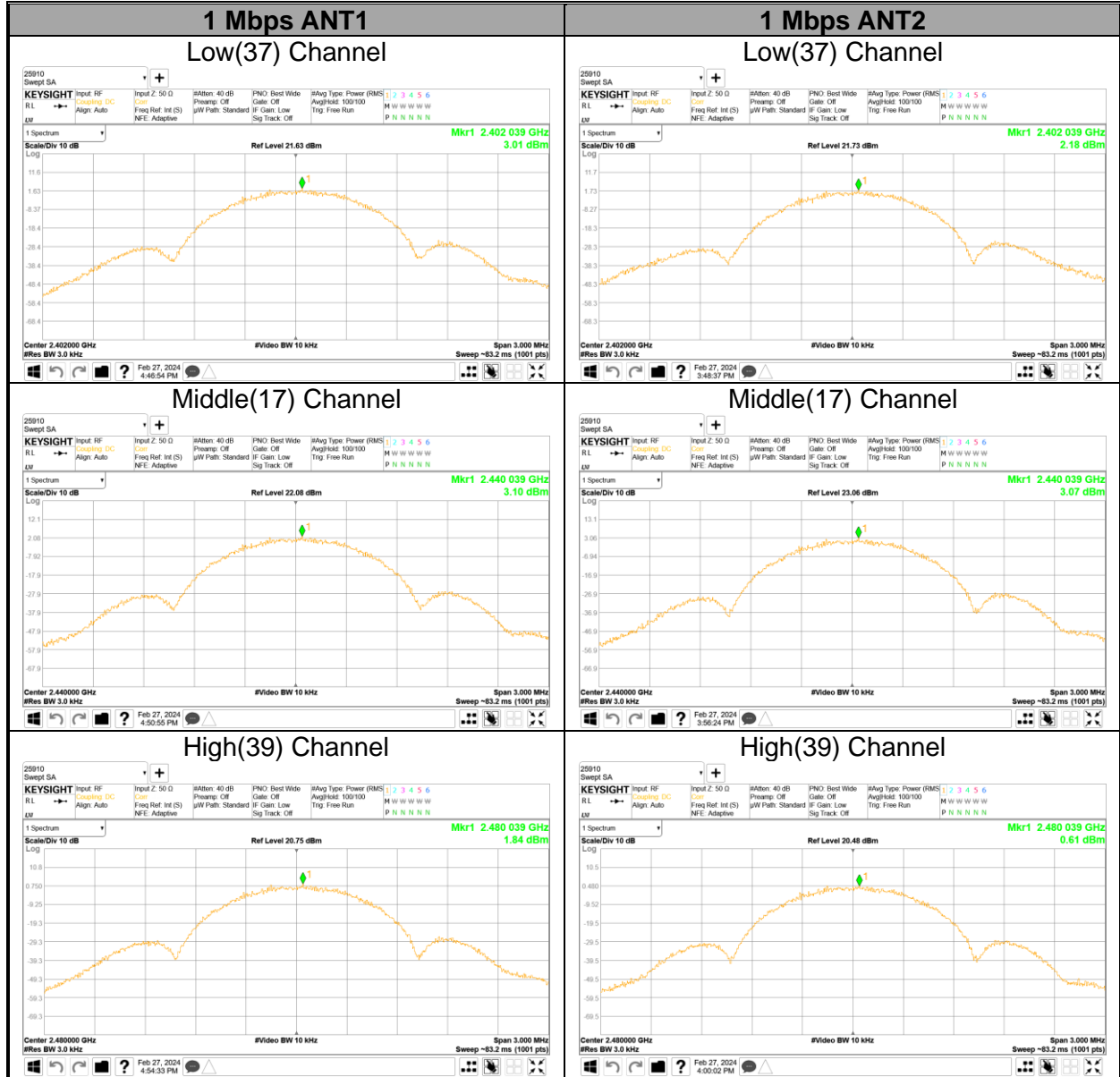
ANSI C63.10-2013, Section 11.10.2 Method PKPSD (peak PSD)

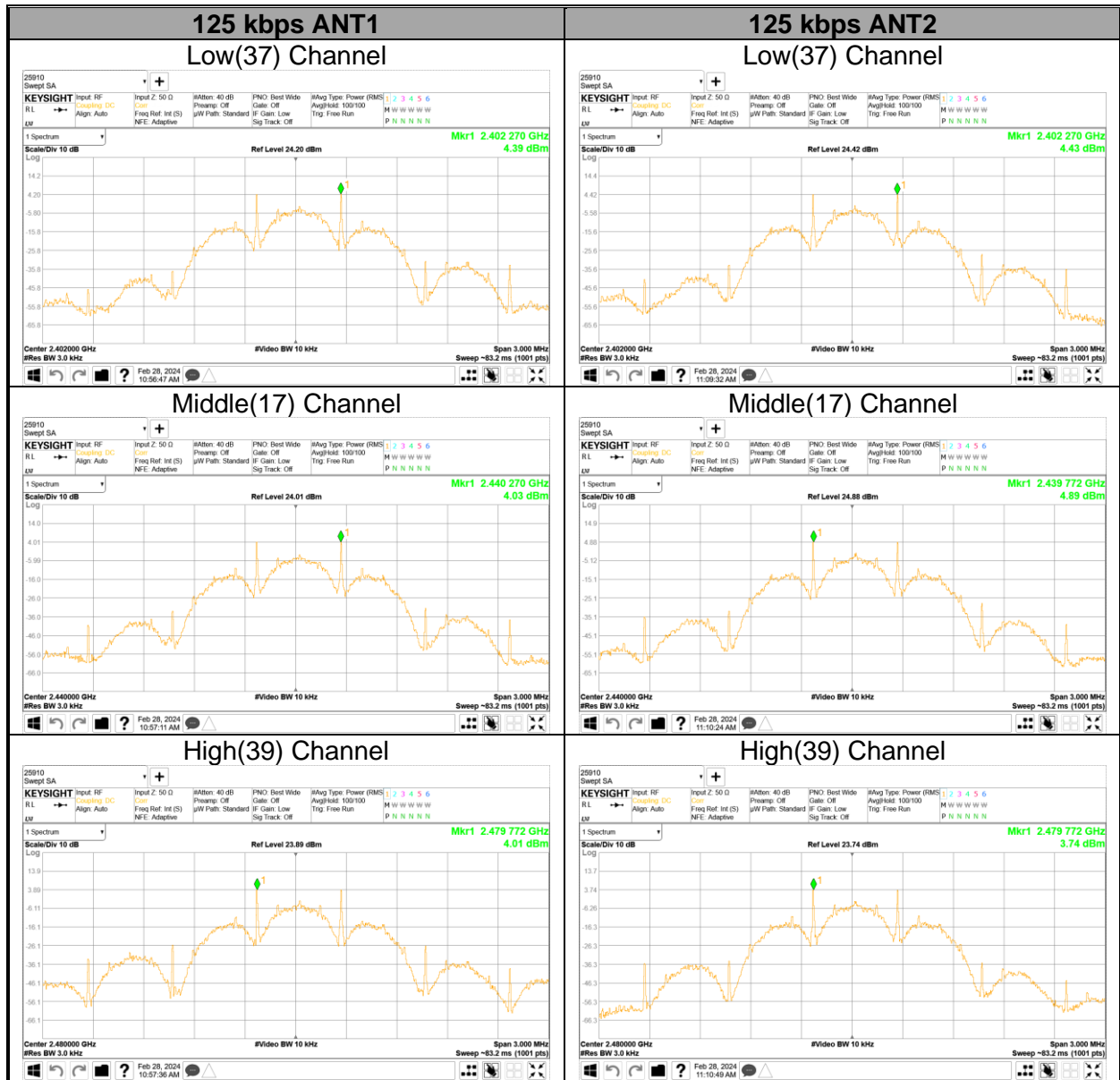
RESULTS

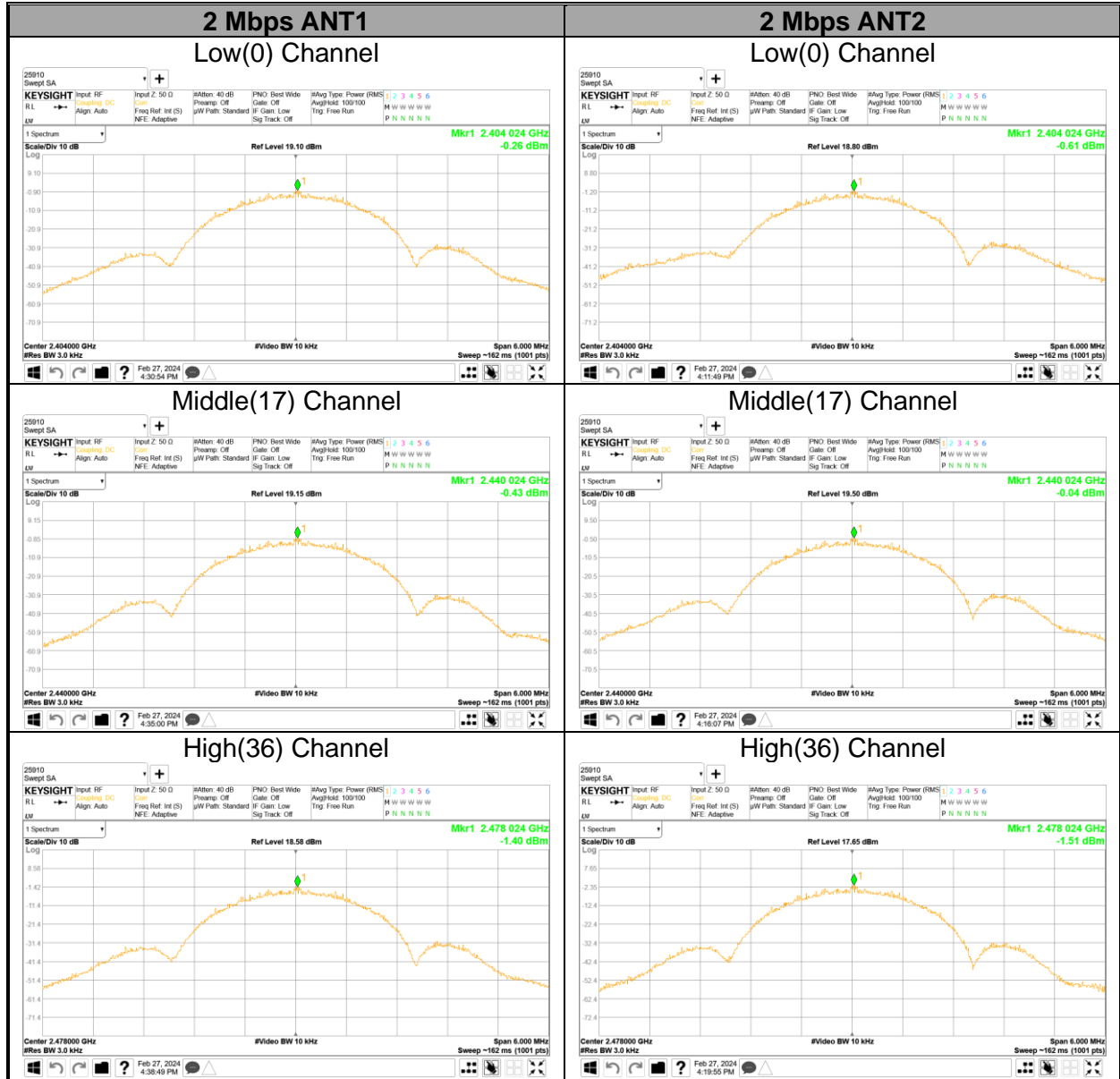
9.5.1. Test data

Mode	Antenna	Channel	Frequency [MHz]	PSD [dBm/3kHz]	Limit [dBm/3kHz]	Margin [dB]
1 Mbps (255pkt)	ANT1	37	2 402	3.01	8.00	-4.99
		17	2 440	3.10		-4.90
		39	2 480	1.84		-6.16
	ANT2	37	2 402	2.18		-5.82
		17	2 440	3.07		-4.93
		39	2 480	0.61		-7.39
125 kbps (255pkt)	ANT1	37	2 402	4.39		-3.61
		17	2 440	4.03		-3.97
		39	2 480	4.01		-3.99
	ANT2	37	2 402	4.43	-3.57	
		17	2 440	4.89	-3.11	
		39	2 480	3.74	-4.26	
2 Mbps (255 pkt)	ANT1	0	2 404	-0.26	-8.26	
		17	2 440	-0.43	-8.43	
		36	2 478	-1.40	-9.40	
	ANT2	0	2 404	-0.61	-8.61	
		17	2 440	-0.04	-8.04	
		36	2 478	-1.51	-9.51	
Worst				4.43	-3.57	

9.5.2. PSD TEST PLOTS







9.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

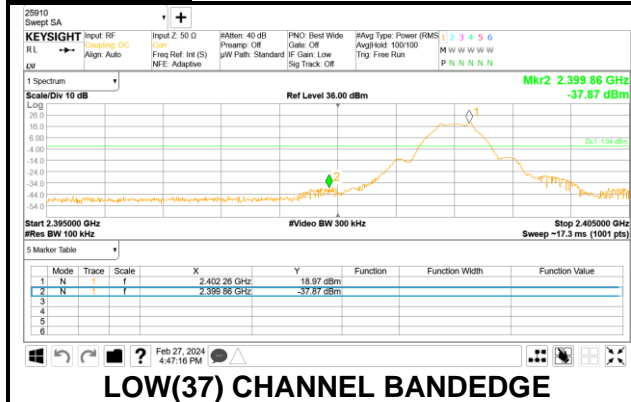
FCC §15.247 (d)

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

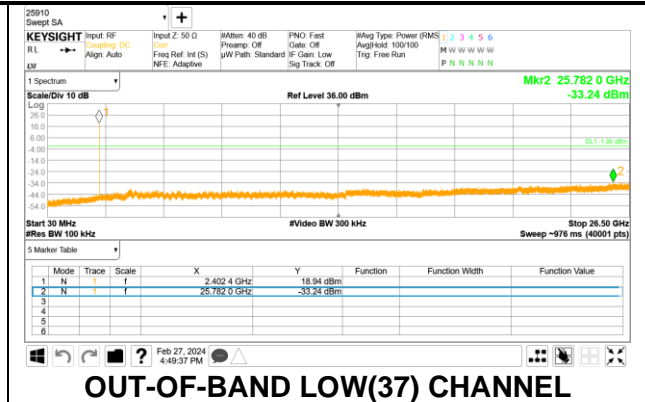
RESULTS

9.6.1. Test plot

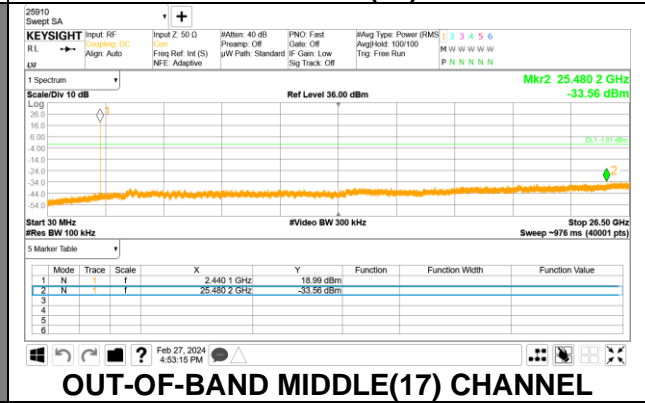
1 Mbps ANT1



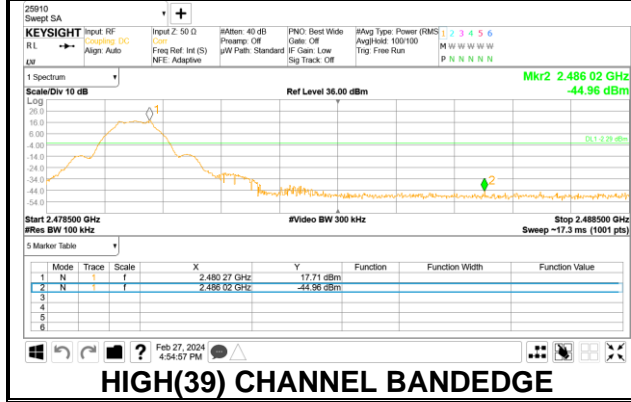
LOW(37) CHANNEL BANDEDGE



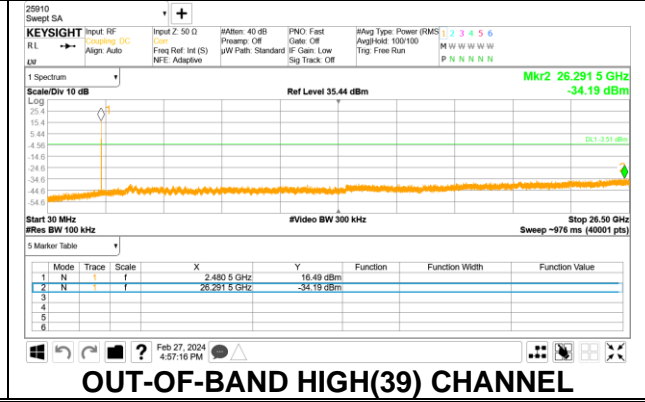
OUT-OF-BAND LOW(37) CHANNEL



OUT-OF-BAND MIDDLE(17) CHANNEL

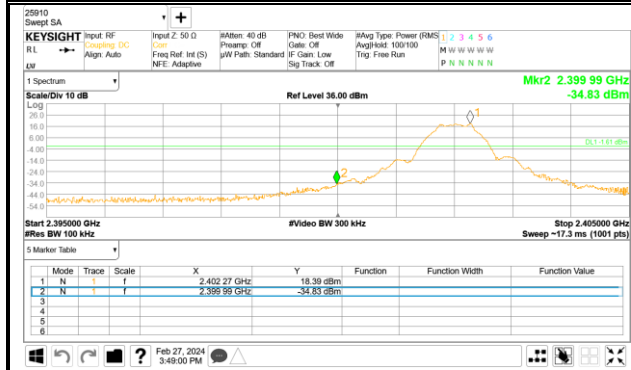


HIGH(39) CHANNEL BANDEDGE

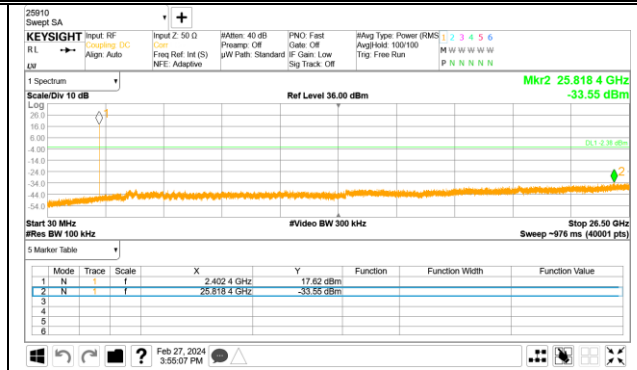


OUT-OF-BAND HIGH(39) CHANNEL

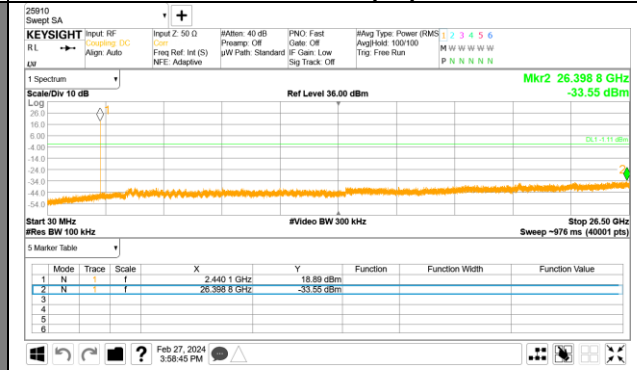
1 Mbps ANT2



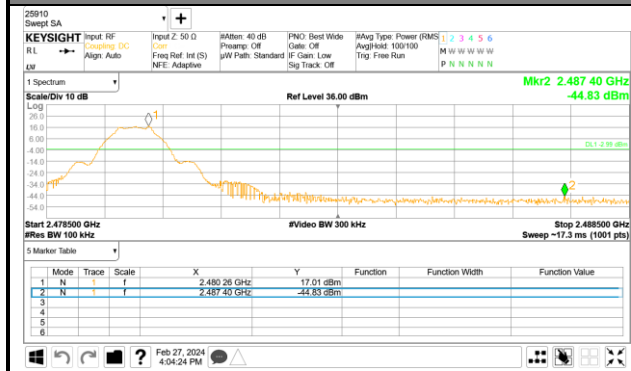
LOW(37) CHANNEL BANDEDGE



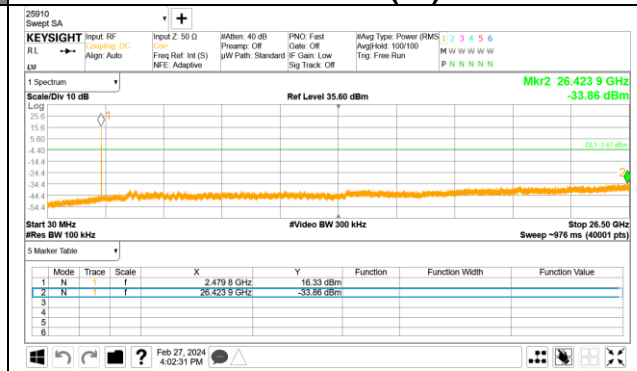
OUT-OF-BAND LOW(37) CHANNEL



OUT-OF-BAND MIDDLE(17) CHANNEL

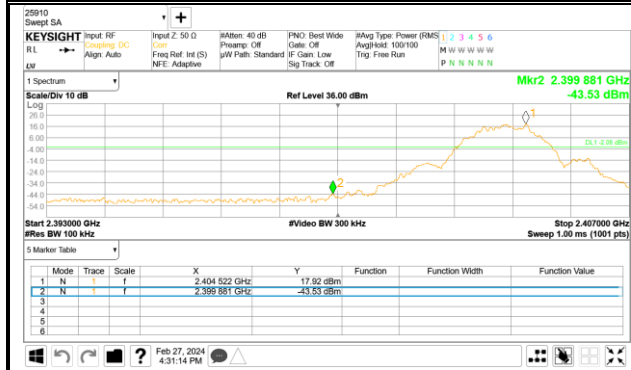


HIGH(39) CHANNEL BANDEDGE

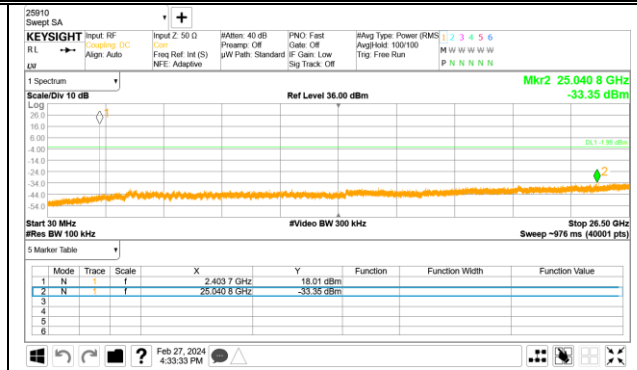


OUT-OF-BAND HIGH(39) CHANNEL

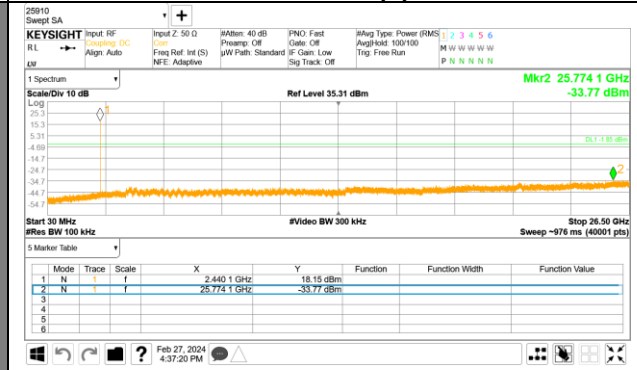
2 Mbps ANT1



LOW(0) CHANNEL BANDEDGE



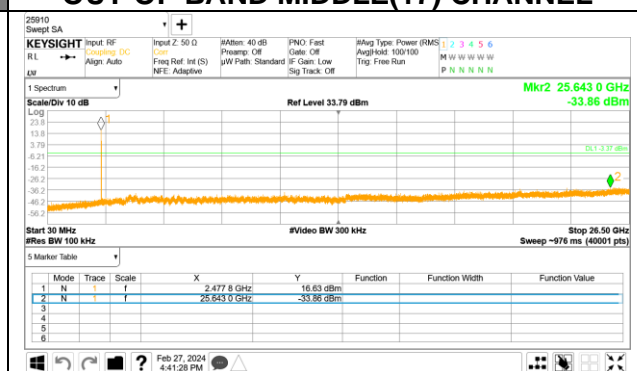
OUT-OF-BAND LOW(0) CHANNEL



OUT-OF-BAND MIDDLE(17) CHANNEL

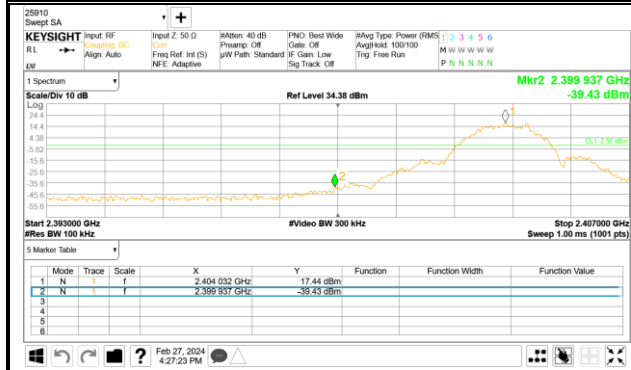


HIGH(36) CHANNEL BANDEDGE

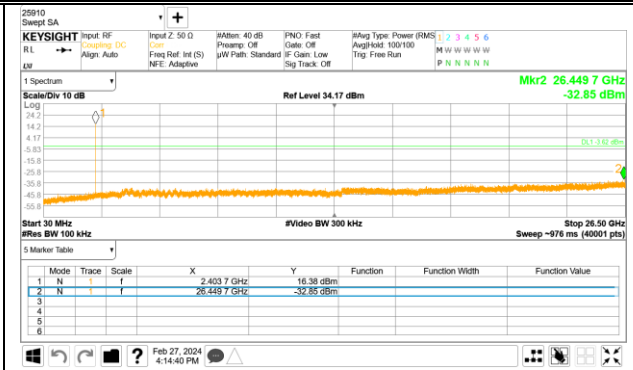


OUT-OF-BAND HIGH(36) CHANNEL

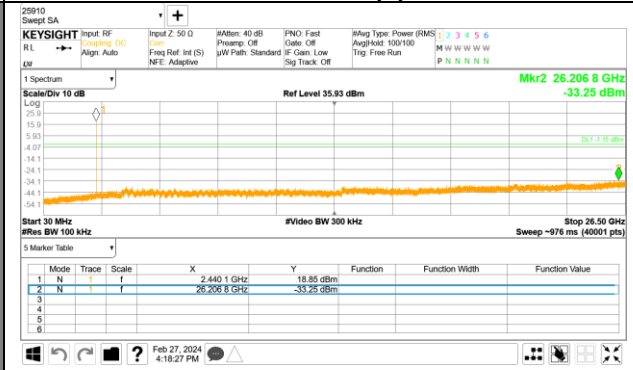
2 Mbps ANT2



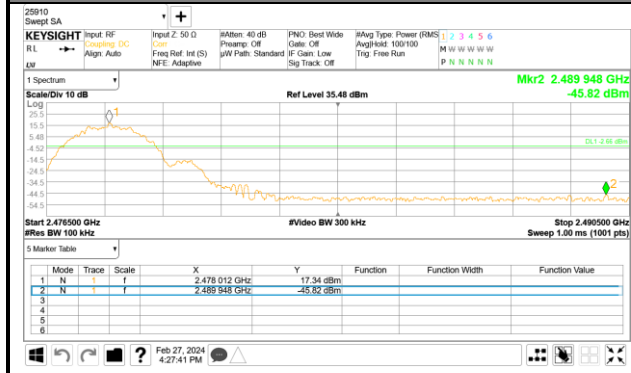
LOW(0) CHANNEL BANDEDGE



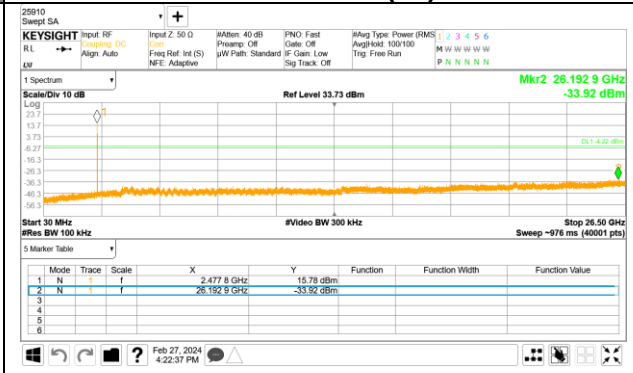
OUT-OF-BAND LOW(0) CHANNEL



OUT-OF-BAND MIDDLE(17) CHANNEL



HIGH(36) CHANNEL BANDEDGE



OUT-OF-BAND HIGH(36) CHANNEL

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted band-edge, Final detection of spurious harmonic emissions)
Duty cycle factor = $10 \log(1/x)$. For this sample: For 1 Mbps, DCF = $10\log(1/0.854)=0.686$ dB (Spectrum Analyzer round it up to 0.69 dB) and for 2 Mbps, DCF = $10\log(1/0.766)=1.160$ dB (Spectrum Analyzer round it up to 1.16 dB).

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

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

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

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

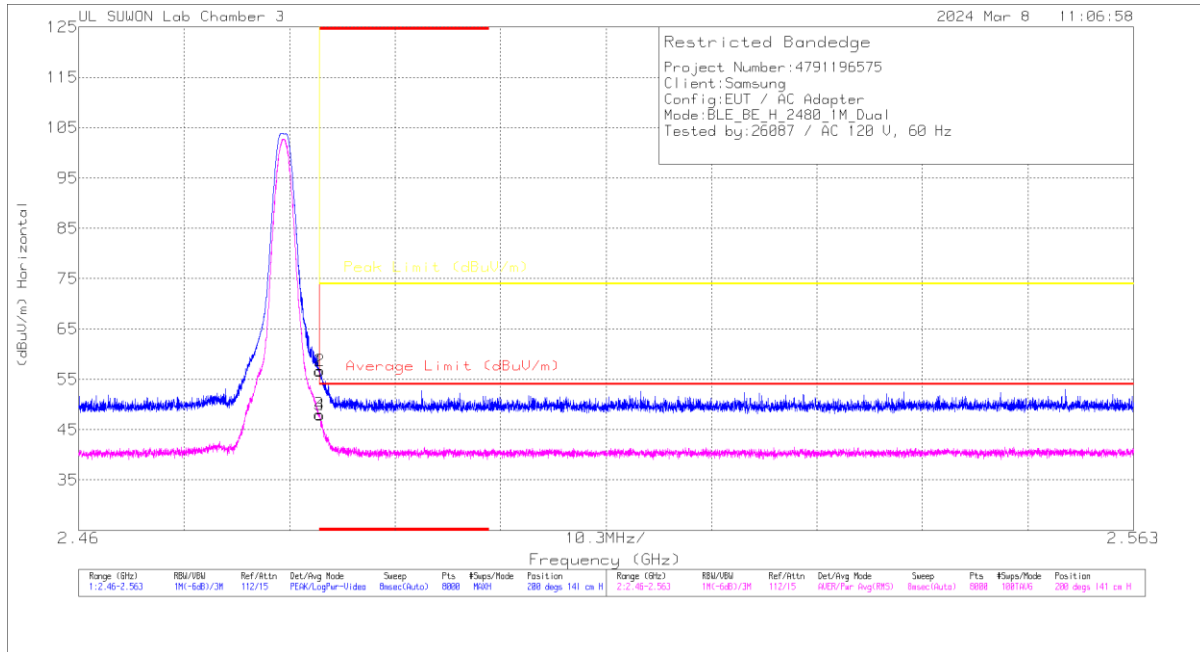
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. TX ABOVE 1 GHz BLUETOOTH LE 1 Mbps

BANDEDGE (WORST CASE: 2480 MHz, DUAL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor (dBm)	10dB_Path Loss(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	* 2.4835	49.03	PK	32.4	-24.8	0	56.63	-	-	74	-17.37	200	141	H
2	* 2.48358	49.11	PK	32.4	-24.8	0	56.71	-	-	74	-17.29	200	141	H
3	* 2.4835	39.78	RMS	32.4	-24.8	.69	48.07	54	-5.93	-	-	200	141	H
4	* 2.48355	39.56	RMS	32.4	-24.8	.69	47.85	54	-6.15	-	-	200	141	H

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

BANDEDGE TEST DATA

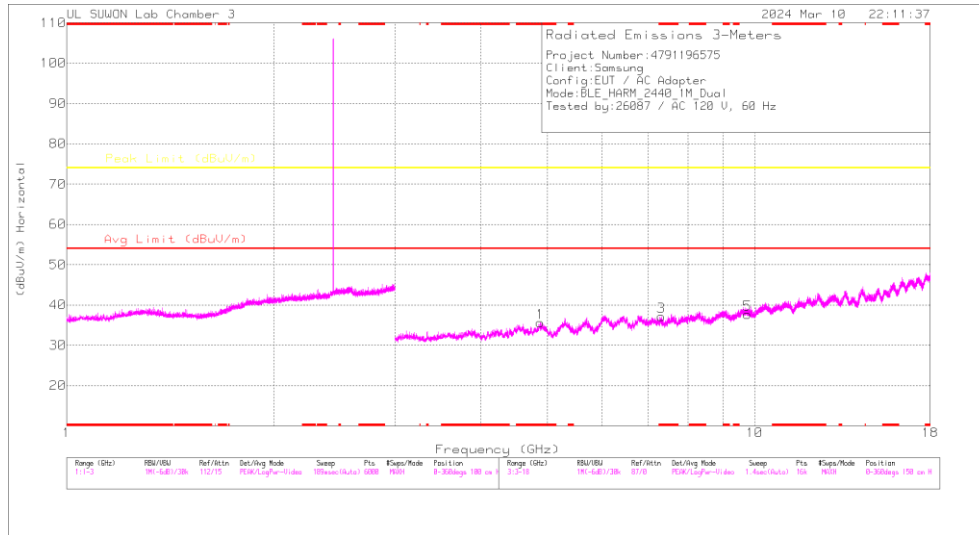
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2402	ANT1	* 2.39	41.92	Pk	32.10	-24.80	0.00	49.22	-	-	74.00	-24.78	240	335	H	
		* 2.32202	44.58	Pk	31.90	-24.80	0.00	51.68	-	-	74.00	-22.32	240	335	H	
		* 2.39	32.24	RMS	32.10	-24.80	0.69	40.23	54.00	-13.77	-	-	-	240	335	H
		* 2.38854	33.19	RMS	32.10	-24.80	0.69	41.18	54.00	-12.82	-	-	-	240	335	H
		* 2.39	42.03	Pk	32.10	-24.80	0.00	49.33	-	-	74.00	-24.67	198	348	V	
		* 2.37918	44.68	Pk	32.10	-24.90	0.00	51.88	-	-	74.00	-22.12	198	348	V	
		* 2.39	31.50	RMS	32.10	-24.80	0.69	39.49	54.00	-14.51	-	-	-	198	348	V
		* 2.34447	33.23	RMS	32.00	-24.90	0.69	41.02	54.00	-12.98	-	-	-	198	348	V
		* 2.4835	48.92	Pk	32.40	-24.80	0.00	56.52	-	-	74.00	-17.48	240	353	H	
		* 2.48355	51.37	Pk	32.40	-24.80	0.00	58.97	-	-	74.00	-15.03	240	353	H	
2480	ANT1	* 2.4835	33.76	RMS	32.40	-24.80	0.69	42.05	54.00	-11.95	-	-	240	353	H	
		* 2.48367	34.07	RMS	32.40	-24.80	0.69	42.36	54.00	-11.64	-	-	240	353	H	
		* 2.4835	43.30	Pk	32.40	-24.80	0.00	50.90	-	-	74.00	-23.10	200	372	V	
		2.514	44.89	Pk	32.40	-24.60	0.00	52.69	-	-	74.00	-21.31	200	372	V	
		* 2.4835	32.56	RMS	32.40	-24.80	0.69	40.85	54.00	-13.15	-	-	200	372	V	
		2.555	32.97	RMS	32.40	-24.60	0.69	41.46	54.00	-12.54	-	-	200	372	V	
		* 2.39	41.30	Pk	32.10	-24.80	0.00	48.60	-	-	74.00	-25.40	135	360	H	
		* 2.35618	44.81	Pk	32.00	-24.90	0.00	51.91	-	-	74.00	-22.09	135	360	H	
		* 2.39	32.44	RMS	32.10	-24.80	0.69	40.43	54.00	-13.57	-	-	135	360	H	
		* 2.32196	33.54	RMS	31.90	-24.80	0.69	41.33	54.00	-12.67	-	-	135	360	H	
2402	ANT2	* 2.39	41.89	Pk	32.10	-24.80	0.00	49.19	-	-	74.00	-24.81	237	304	V	
		* 2.31075	44.84	Pk	31.80	-24.80	0.00	51.84	-	-	74.00	-22.16	237	304	V	
		* 2.39	31.88	RMS	32.10	-24.80	0.69	39.87	54.00	-14.13	-	-	237	304	V	
		* 2.3827	33.38	RMS	32.10	-24.90	0.69	41.27	54.00	-12.73	-	-	237	304	V	
		* 2.4835	44.43	Pk	32.40	-24.80	0.00	52.03	-	-	74.00	-21.97	155	376	H	
		* 2.48354	48.90	Pk	32.40	-24.80	0.00	56.50	-	-	74.00	-17.50	155	376	H	
		* 2.4835	32.71	RMS	32.40	-24.80	0.69	41.00	54.00	-13.00	-	-	155	376	H	
		* 2.48369	33.47	RMS	32.40	-24.80	0.69	41.76	54.00	-12.24	-	-	155	376	H	
		* 2.4835	52.29	Pk	32.40	-24.80	0.00	59.89	-	-	74.00	-14.11	235	285	V	
		* 2.48367	52.19	Pk	32.40	-24.80	0.00	59.79	-	-	74.00	-14.21	235	285	V	
2480	ANT2	* 2.4835	33.66	RMS	32.40	-24.80	0.69	41.95	54.00	-12.05	-	-	235	285	V	
		* 2.48389	33.82	RMS	32.40	-24.80	0.69	42.11	54.00	-11.89	-	-	235	285	V	
		* 2.39	41.25	Pk	32.10	-24.80	0.00	48.55	-	-	74.00	-25.45	201	275	H	
		* 2.35269	45.05	Pk	32.00	-24.80	0.00	52.25	-	-	74.00	-21.75	201	275	H	
		* 2.39	32.43	RMS	32.10	-24.80	0.69	40.42	54.00	-13.58	-	-	201	275	H	
		* 2.32313	33.23	RMS	31.90	-24.80	0.69	41.02	54.00	-12.98	-	-	201	275	H	
		* 2.39	41.57	Pk	32.10	-24.80	0.00	48.87	-	-	74.00	-25.13	226	276	V	
		* 2.3799	44.91	Pk	32.10	-24.90	0.00	52.11	-	-	74.00	-21.89	226	276	V	
		* 2.39	32.32	RMS	32.10	-24.80	0.69	40.31	54.00	-13.69	-	-	226	276	V	
		* 2.38224	33.16	RMS	32.10	-24.90	0.69	41.05	54.00	-12.95	-	-	226	276	V	
2480	DUAL	* 2.4835	49.03	Pk	32.40	-24.80	0.00	56.63	-	-	74.00	-17.37	200	141	H	
		* 2.48358	49.11	Pk	32.40	-24.80	0.00	56.71	-	-	74.00	-17.29	200	141	H	
		* 2.4835	39.78	RMS	32.40	-24.80	0.69	48.07	54.00	-5.93	-	-	200	141	H	
		* 2.48355	39.56	RMS	32.40	-24.80	0.69	47.85	54.00	-6.15	-	-	200	141	H	
		* 2.4835	45.48	Pk	32.40	-24.80	0.00	53.08	-	-	74.00	-20.92	178	128	V	
		* 2.48354	45.99	Pk	32.40	-24.80	0.00	53.59	-	-	74.00	-20.41	178	128	V	
		* 2.4835	35.39	RMS	32.40	-24.80	0.69	43.68	54.00	-10.32	-	-	178	128	V	
		* 2.48351	35.86	RMS	32.40	-24.80	0.69	44.15	54.00	-9.85	-	-	178	128	V	

Note1. Pk - Peak detector, RMS - RMS detector

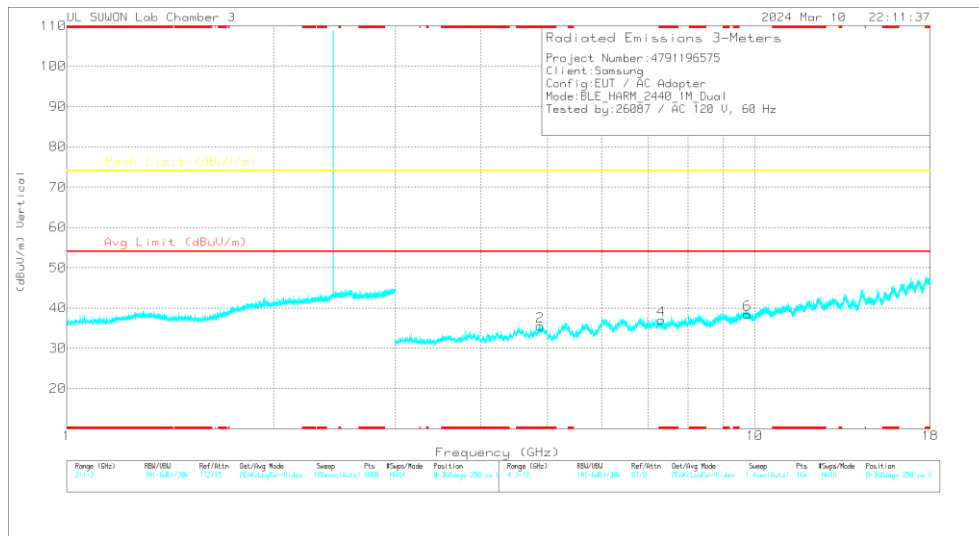
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 2440 MHz, DUAL)

2440 MHz 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	Antenna_957_Factor(dB/m)	3GHz_HP_Pat h Loss(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
* 4.88059	40.18	PK2	34.2	-29.9	0	44.48	-	-	74	-29.52	0	100	H
* 4.8764	40.68	PK2	34.2	-29.9	0	44.98	-	-	74	-29.02	0	100	V
* 7.32008	35.81	PK2	35.8	-25.5	0	46.11	-	-	74	-27.89	234	101	H
* 7.32057	25.04	MAV1	35.8	-25.5	.69	36.03	54	-17.97	-	-	234	101	H
* 7.32076	36.27	PK2	35.8	-25.5	0	46.57	-	-	74	-27.43	0	251	V
* 7.31933	25.66	MAV1	35.8	-25.5	.69	36.65	54	-17.35	-	-	0	251	V
9.75862	32.93	PK2	36.9	-21.5	0	48.33	-	-	74	-25.67	0	100	H
9.75704	32.43	PK2	36.9	-21.5	0	47.83	-	-	74	-26.17	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 [dB/m]	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
2402	ANT1	* 4.80455	40.68	PK2	34.30	-30.10	0.00	44.88	-	-	74.00	-29.12	313	122	H
		* 4.80379	29.91	MAv1	34.30	-30.10	0.69	34.80	54.00	-19.20	-	-	313	122	H
		* 4.80415	40.66	PK2	34.30	-30.10	0.00	44.86	-	-	74.00	-29.14	190	288	V
		* 4.804	30.53	MAv1	34.30	-30.10	0.69	35.42	54.00	-18.58	-	-	190	288	V
		7.204	36.04	PK2	35.80	-25.80	0.00	46.04	-	-	74.00	-27.96	0	100	H
		7.211	36.03	PK2	35.80	-25.90	0.00	45.93	-	-	74.00	-28.07	0	100	V
		9.606	32.69	PK2	36.70	-21.80	0.00	47.59	-	-	74.00	-26.41	0	100	H
		9.607	32.70	PK2	36.70	-21.80	0.00	47.60	-	-	74.00	-26.40	0	100	V
		* 4.88015	41.15	PK2	34.20	-29.90	0.00	45.45	-	-	74.00	-28.55	318	106	H
		* 4.87984	29.91	MAv1	34.20	-29.90	0.69	34.90	54.00	-19.10	-	-	318	106	H
* 4.87998	40.12	PK2	34.20	-29.90	0.00	44.42	-	-	74.00	-29.58	253	137	V		
* 4.88001	29.06	MAv1	34.20	-29.90	0.69	34.05	54.00	-19.95	-	-	253	137	V		
* 7.31607	35.20	PK2	35.80	-25.50	0.00	45.50	-	-	74.00	-28.50	0	100	H		
* 7.31892	34.89	PK2	35.80	-25.40	0.00	45.29	-	-	74.00	-28.71	0	100	V		
9.756	32.49	PK2	36.90	-21.60	0.00	47.79	-	-	74.00	-26.21	0	100	H		
9.760	31.97	PK2	36.90	-21.50	0.00	47.37	-	-	74.00	-26.63	0	100	V		
* 4.95961	40.45	PK2	34.30	-30.00	0.00	44.75	-	-	74.00	-29.25	312	100	H		
* 4.9604	30.07	MAv1	34.30	-30.00	0.69	35.06	54.00	-18.94	-	-	312	100	H		
* 4.95933	39.72	PK2	34.30	-30.00	0.00	44.02	-	-	74.00	-29.98	249	100	V		
* 4.96008	28.79	MAv1	34.30	-30.00	0.69	33.78	54.00	-20.22	-	-	249	100	V		
* 7.43919	35.42	PK2	35.70	-25.20	0.00	45.92	-	-	74.00	-28.08	0	100	H		
* 7.43991	34.95	PK2	35.70	-25.20	0.00	45.45	-	-	74.00	-28.55	75	139	V		
* 7.43958	23.71	MAv1	35.70	-25.20	0.69	34.90	54.00	-19.10	-	-	75	139	V		
9.920	32.35	PK2	37.10	-21.40	0.00	48.05	-	-	74.00	-25.95	0	100	H		
9.922	31.49	PK2	37.10	-21.30	0.00	47.29	-	-	74.00	-26.71	0	100	V		
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	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
2402	ANT2	* 4.80415	39.46	PK2	34.30	-30.10	0.00	43.66	-	-	74.00	-30.34	55	110	H
		* 4.80403	28.96	MAv1	34.30	-30.10	0.69	33.85	54.00	-20.15	-	55	110	H	
		* 4.803	39.91	PK2	34.30	-30.10	0.00	44.11	-	-	74.00	-29.89	163	279	V
		* 4.80428	28.89	MAv1	34.30	-30.10	0.69	33.78	54.00	-20.22	-	-	163	279	V
		7.208	35.42	PK2	35.80	-25.90	0.00	45.32	-	-	74.00	-28.68	0	100	H
		7.209	35.71	PK2	35.80	-25.90	0.00	45.61	-	-	74.00	-28.39	0	100	V
		9.609	32.75	PK2	36.70	-21.70	0.00	47.75	-	-	74.00	-26.25	0	100	H
		9.611	32.68	PK2	36.70	-21.80	0.00	47.58	-	-	74.00	-26.42	0	100	V
		* 4.88074	29.53	PK	34.20	-29.90	0.00	33.83	-	-	74.00	-40.17	0-360	150	H
		* 7.32027	24.89	PK	35.80	-25.50	0.00	35.19	-	-	74.00	-38.81	0-360	150	H
9.761	21.79	PK	36.90	-21.50	0.00	37.19	-	-	74.00	-36.81	0-360	150	H		
* 4.88074	30.33	PK	34.20	-29.90	0.00	34.63	-	-	74.00	-39.37	0-360	250	V		
* 7.32027	24.11	PK	35.80	-25.50	0.00	34.41	-	-	74.00	-39.59	0-360	250	V		
9.761	22.20	PK	36.90	-21.50	0.00	37.60	-	-	74.00	-36.40	0-360	250	V		
* 4.95954	39.67	PK2	34.30	-30.00	0.00	43.97	-	-	74.00	-30.03	61	103	H		
* 4.96142	27.98	MAv1	34.30	-30.10	0.69	32.87	54.00	-21.13	-	-	61	103	H		
* 4.96205	39.94	PK2	34.30	-30.10	0.00	44.14	-	-	74.00	-29.86	162	110	V		
* 4.96357	28.12	MAv1	34.30	-30.10	0.69	33.01	54.00	-20.99	-	-	162	110	V		
* 7.43534	34.99	PK2	35.70	-25.20	0.00	45.49	-	-	74.00	-28.51	0	100	H		
* 7.44254	35.09	PK2	35.70	-25.20	0.00	45.59	-	-	74.00	-28.41	0	100	V		
9.918	31.11	PK2	37.10	-21.30	0.00	46.91	-	-	74.00	-27.09	0	100	H		
9.919	32.03	PK2	37.10	-21.30	0.00	47.83	-	-	74.00	-26.17	0	100	V		
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	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
2402	DUAL	* 4.80568	40.53	PK2	34.30	-30.10	0.00	44.73	-	-	74.00	-29.27	0	100	H
		* 4.80335	40.11	PK2	34.30	-30.10	0.00	44.31	-	-	74.00	-29.69	0	100	V
		7.207	38.39	PK2	35.80	-25.90	0.00	48.29	-	-	74.00	-25.71	156	184	H
		7.207	39.10	PK2	35.80	-25.90	0.00	49.00	-	-	74.00	-25.00	190	171	V
		9.607	33.48	PK2	36.70	-21.80	0.00	48.38	-	-	74.00	-25.62	0	100	H
		9.605	33.09	PK2	36.70	-21.70	0.00	48.09	-	-	74.00	-25.91	0	100	V
* 4.88059	40.18	PK2	34.20	-29.90	0.00	44.48	-	-	74.00	-29.52	0	100	H		
* 4.8764	40.68	PK2	34.20	-29.90	0.00	44.98	-	-	74.00	-29.02	0	100	V		
* 7.32008	35.81	PK2	35.80	-25.50	0.00	46.11	-	-	74.00	-27.89	234	101	H		
* 7.32057	25.04	MAv1	35.80	-25.50	0.69	36.03	54.00	-17.97	-	-	234	101	H		
* 7.32076	36.27	PK2	35.80	-25.50	0.00	46.57	-	-	74.00	-27.43	0	251	V		
* 7.31933	25.66	MAv1	35.80	-25.50	0.69	36.65	54.00	-17.35	-	-	0	251	V		
9.759	32.93	PK2	36.90	-21.50	0.00	48.33	-	-	74.00	-25.67	0	100	H		
9.757	32.43	PK2	36.90	-21.50	0.00	47.83	-	-	74.00	-26.17	0	100	V		
* 4.96215	39.69	PK2	34.30	-30.10	0.00	43.89	-	-	74.00	-30.11	0	100	H		
* 4.95618	40.27	PK2	34.30	-30.10	0.00	44.47	-	-	74.00	-29.53	0	100	V		
* 7.44097	35.77	PK2	35.70	-25.20	0.00	46.27	-	-	74.00	-27.73	232	102	H		
* 7.43932	24.44	MAv1	35.70	-25.20	0.69	35.63	54.00	-18.37	-	-	232	102	H		
* 7.43916	37.30	PK2	35.70	-25.20	0.00	47.80	-	-	74.00	-26.20	176	148	V		
* 7.44089	24.74	MAv1	35.70	-25.20	0.69	35.93	54.00	-18.07	-	-	176	148	V		
9.923	31.65	PK2	37.10	-21.30	0.00	47.45	-	-	74.00	-26.55	0	100	H		
9.922	32.03	PK2	37.10	-21.30	0.00	47.83	-	-	74.00	-26.17	0	100	V		

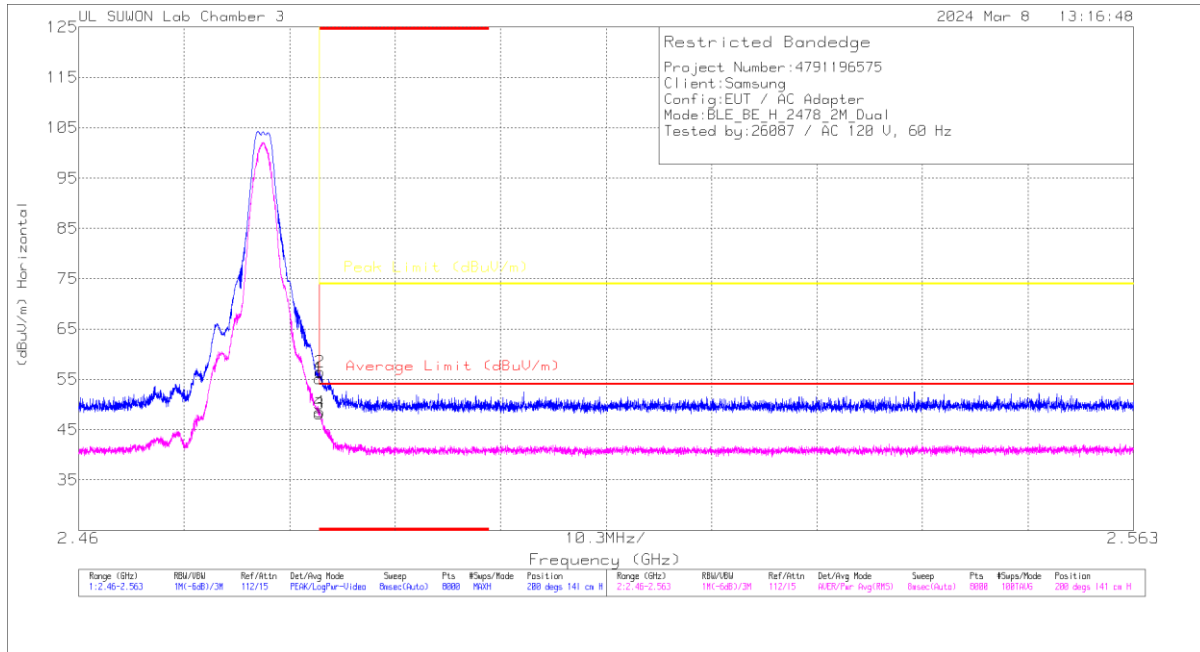
Note1. PK2 - KDB558074 Method: Maximum Peak / MAv1 - KDB558074 Option 1 Maximum RMS Average

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

10.2.2. TX ABOVE 1 GHz BLUETOOTH LE 2 Mbps

BANDEDGE (WORST CASE: 2478 MHz, DUAL)

HORIZONTAL RESULT



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_567_Factor (dBm)	10dB_Path Loss(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	* 2.4835	47.58	Pk	32.4	-24.8	0	55.18	-	-	74	-18.82	200	141	H
2	* 2.48354	48.87	Pk	32.4	-24.8	0	56.47	-	-	74	-17.53	200	141	H
3	* 2.4835	39.36	RMS	32.4	-24.8	1.16	48.12	54	-5.88	-	-	200	141	H
4	* 2.48353	39.73	RMS	32.4	-24.8	1.16	48.49	54	-5.51	-	-	200	141	H

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

BANEDGE TEST DATA

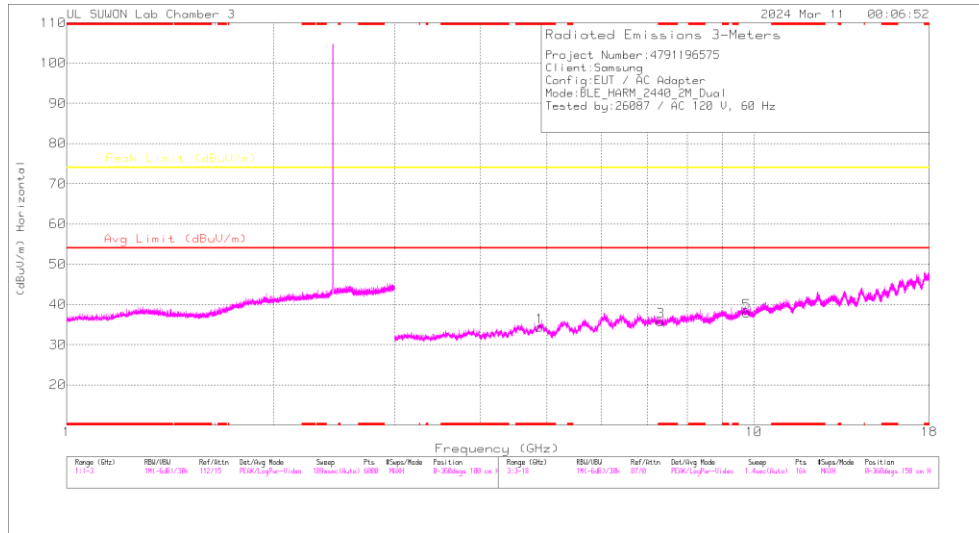
Freq. [MHz]	Antenna	Frequency [GHz]	Reading [dBuV]	Detector Mode	ANT Factor [dB/m]	Loss [dB]	DC Corr [dB]	Result [dBuV/m]	AV Limit [dBuV/m]	AV Margin [dB]	PK Limit [dBuV/m]	PK Margin [dB]	Azimuth [Degs]	Height [cm]	Polarity	
2404	ANT1	* 2.39	41.19	Pk	32.10	-24.80	0.00	48.49	-	-	74.00	-25.51	242	333	H	
		* 2.35017	44.38	Pk	32.00	-24.90	0.00	51.48	-	-	74.00	-22.52	242	333	H	
		* 2.39	31.57	RMS	32.10	-24.80	1.16	40.03	54.00	-13.97	-	-	-	242	333	H
		* 2.33066	33.11	RMS	31.90	-24.80	1.16	41.37	54.00	-12.63	-	-	-	242	333	H
		* 2.39	41.51	Pk	32.10	-24.80	0.00	48.81	-	-	74.00	-25.19	89	111	V	
		* 2.35438	44.59	Pk	32.00	-24.80	0.00	51.79	-	-	74.00	-22.21	89	111	V	
		* 2.39	31.60	RMS	32.10	-24.80	1.16	40.06	54.00	-13.94	-	-	-	89	111	V
		* 2.33625	33.54	RMS	31.90	-24.90	1.16	41.70	54.00	-12.30	-	-	-	89	111	V
		* 2.4835	49.15	Pk	32.40	-24.80	0.00	56.75	-	-	74.00	-17.25	240	354	H	
		* 2.4836	51.11	Pk	32.40	-24.80	0.00	58.71	-	-	74.00	-15.29	240	354	H	
2478	ANT1	* 2.4835	33.46	RMS	32.40	-24.80	1.16	42.22	54.00	-11.78	-	-	240	354	H	
		* 2.48364	34.19	RMS	32.40	-24.80	1.16	42.95	54.00	-11.05	-	-	240	354	H	
		* 2.4835	42.66	Pk	32.40	-24.80	0.00	50.26	-	-	74.00	-23.74	139	106	V	
		* 2.549	44.48	Pk	32.40	-24.70	0.00	52.18	-	-	74.00	-21.82	139	106	V	
		* 2.4835	32.91	RMS	32.40	-24.80	1.16	41.67	54.00	-12.33	-	-	139	106	V	
		* 2.506	33.25	RMS	32.40	-24.60	1.16	42.21	54.00	-11.79	-	-	139	106	V	
		* 2.39	41.30	Pk	32.10	-24.80	0.00	48.60	-	-	74.00	-25.40	153	359	H	
		* 2.36482	44.83	Pk	32.00	-24.90	0.00	51.93	-	-	74.00	-22.07	153	359	H	
		* 2.39	32.63	RMS	32.10	-24.80	1.16	41.09	54.00	-12.91	-	-	-	153	359	H
		* 2.3577	33.26	RMS	32.00	-24.80	1.16	41.62	54.00	-12.38	-	-	-	153	359	H
2404	ANT2	* 2.39	42.58	Pk	32.10	-24.80	0.00	49.88	-	-	74.00	-24.12	238	304	V	
		* 2.37072	44.69	Pk	32.10	-24.90	0.00	51.89	-	-	74.00	-22.11	238	304	V	
		* 2.39	31.78	RMS	32.10	-24.80	1.16	40.24	54.00	-13.76	-	-	238	304	V	
		* 2.38396	33.24	RMS	32.10	-24.90	1.16	41.60	54.00	-12.40	-	-	238	304	V	
		* 2.4835	42.07	Pk	32.40	-24.80	0.00	49.67	-	-	74.00	-24.33	156	375	H	
		* 2.48355	44.83	Pk	32.40	-24.80	0.00	52.43	-	-	74.00	-21.57	156	375	H	
		* 2.4835	32.40	RMS	32.40	-24.80	1.16	41.16	54.00	-12.94	-	-	156	375	H	
		* 2.503	33.42	RMS	32.40	-24.80	1.16	42.18	54.00	-11.82	-	-	156	375	H	
		* 2.4835	45.80	Pk	32.40	-24.80	0.00	53.40	-	-	74.00	-20.60	238	286	V	
		* 2.48368	47.41	Pk	32.40	-24.80	0.00	55.01	-	-	74.00	-18.99	238	286	V	
2478	ANT2	* 2.4835	32.07	RMS	32.40	-24.80	1.16	40.83	54.00	-13.17	-	-	238	286	V	
		* 2.48394	33.49	RMS	32.40	-24.80	1.16	42.25	54.00	-11.75	-	-	238	286	V	
		* 2.39	41.53	Pk	32.10	-24.80	0.00	48.83	-	-	74.00	-25.17	201	242	H	
		* 2.35731	44.98	Pk	32.00	-24.80	0.00	52.18	-	-	74.00	-21.82	201	242	H	
		* 2.39	31.68	RMS	32.10	-24.80	1.16	40.14	54.00	-13.86	-	-	201	242	H	
		* 2.33456	33.32	RMS	31.90	-24.80	1.16	41.58	54.00	-12.42	-	-	201	242	H	
		* 2.39	42.34	Pk	32.10	-24.80	0.00	49.64	-	-	74.00	-24.36	226	275	V	
		* 2.3131	44.90	Pk	31.90	-24.80	0.00	52.00	-	-	74.00	-22.00	226	275	V	
		* 2.39	32.18	RMS	32.10	-24.80	1.16	40.64	54.00	-13.36	-	-	226	275	V	
		* 2.38952	33.01	RMS	32.10	-24.80	1.16	41.47	54.00	-12.53	-	-	226	275	V	
2478	DUAL	* 2.4835	47.58	Pk	32.40	-24.80	0.00	55.18	-	-	74.00	-18.82	200	141	H	
		* 2.48354	48.87	Pk	32.40	-24.80	0.00	56.47	-	-	74.00	-17.53	200	141	H	
		* 2.4835	39.36	RMS	32.40	-24.80	1.16	48.12	54.00	-5.88	-	-	200	141	H	
		* 2.48353	39.73	RMS	32.40	-24.80	1.16	48.49	54.00	-5.51	-	-	200	141	H	
		* 2.4835	47.44	Pk	32.40	-24.80	0.00	55.04	-	-	74.00	-18.96	164	262	V	
		* 2.4836	46.93	Pk	32.40	-24.80	0.00	54.53	-	-	74.00	-19.47	164	262	V	
		* 2.4835	37.80	RMS	32.40	-24.80	1.16	46.56	54.00	-7.44	-	-	164	262	V	
		* 2.48351	38.46	RMS	32.40	-24.80	1.16	47.22	54.00	-6.78	-	-	164	262	V	

Note1. Pk - Peak detector, RMS - RMS detector

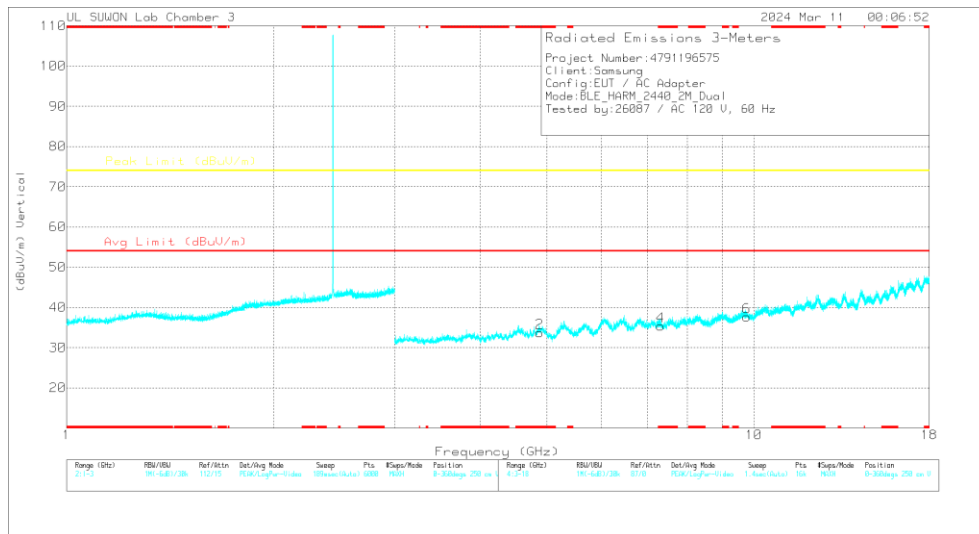
Note2. * - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

HARMONICS AND SPURIOUS EMISSIONS(WORST CASE: 2440 MHz, DUAL)

2440 MHz 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.

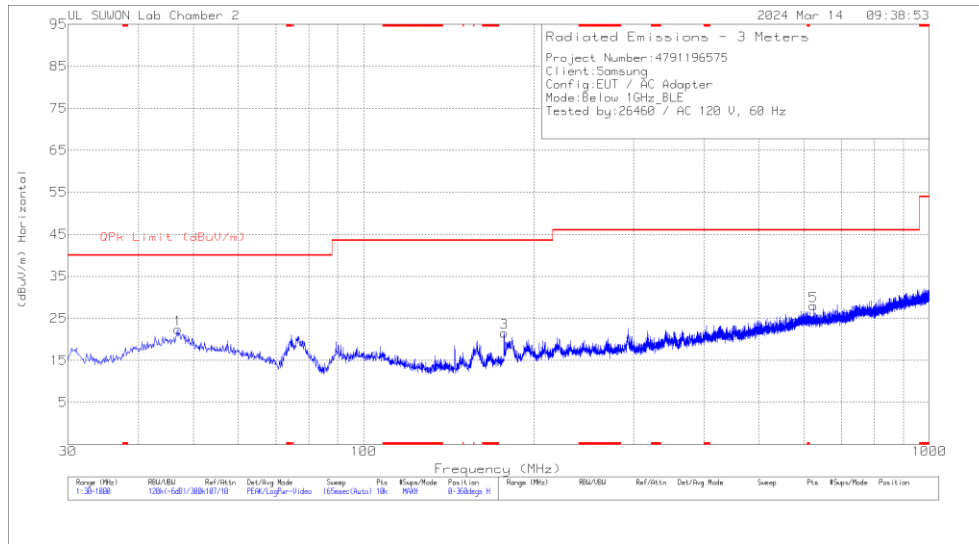
Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna_957_Factor(dB/m)	3GHz_HP_Pat h Loss(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
* 4.87708	39.78	PK2	34.2	-29.9	0	44.08	-	-	74	-29.92	0	100	H
* 4.88292	40.37	PK2	34.2	-30	0	44.57	-	-	74	-29.43	0	100	V
* 7.31841	36.07	PK2	35.8	-25.4	0	46.47	-	-	74	-27.53	116	127	H
* 7.31849	24.29	MAV1	35.8	-25.4	1.16	35.85	54	-18.15	-	-	116	127	H
* 7.31855	36.99	PK2	35.8	-25.4	0	47.39	-	-	74	-26.61	1	252	V
* 7.31895	24.92	MAV1	35.8	-25.4	1.16	36.48	54	-17.52	-	-	1	252	V
9.76167	32.72	PK2	36.9	-21.5	0	48.12	-	-	74	-25.88	0	100	H
9.7603	32.53	PK2	36.9	-21.5	0	47.93	-	-	74	-26.07	0	100	V

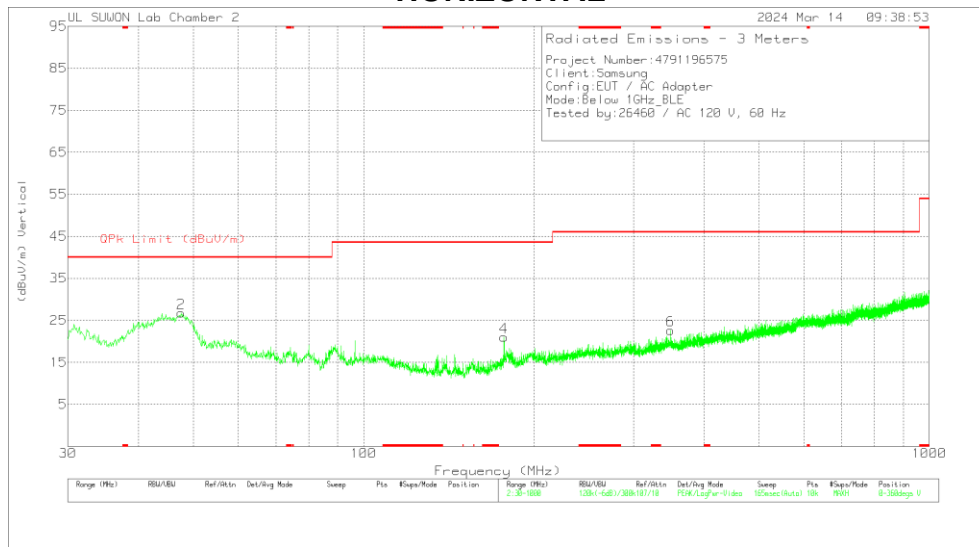
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 MAV1 - KDB558074 Option 1 Maximum RMS Average

10.3. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Antenna_749_Factor(dB/m)	Below_1G_Path Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	46.975	34.05	Pk	20	-31.7	0	22.35	40	-17.65	0-360	200	H
3	177.246	37.16	Pk	15.1	-30.7	0	21.56	43.52	-21.96	0-360	100	H
5	624.319	32.07	Pk	25	-29.1	0	27.97	46.02	-18.05	0-360	100	H
2	47.557	38.28	Pk	20.1	-31.6	0	26.78	40	-13.22	0-360	100	V
4	177.149	36.63	Pk	15.1	-30.7	0	21.03	43.52	-22.49	0-360	100	V
6	348.839	31.76	Pk	20.8	-29.9	0	22.66	46.02	-23.36	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.

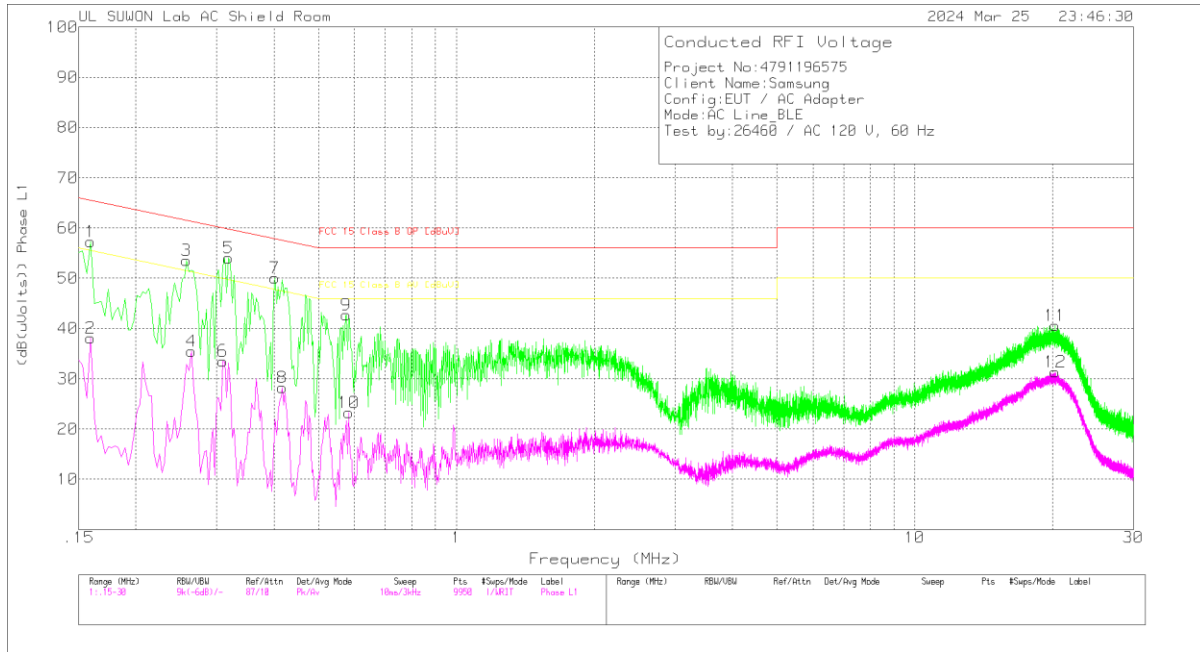
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
1	.159	47.34	Pk	9.8	.1	57.24	65.52	-8.28	-	-
2	.159	28.14	Av	9.8	.1	38.04	-	-	55.52	-17.48
3	.258	43.79	Pk	9.6	.1	53.49	61.5	-8.01	-	-
4	.264	25.72	Av	9.6	.1	35.42	-	-	51.3	-15.88
5	.318	44.24	Pk	9.7	.1	54.04	59.76	-5.72	-	-
6	.309	23.74	Av	9.7	.1	33.54	-	-	50	-16.46
7	.402	40.11	Pk	9.8	.1	50.01	57.81	-7.8	-	-
8	.417	18.34	Av	9.8	.1	28.24	-	-	47.51	-19.27
9	.576	32.83	Pk	9.8	.1	42.73	56	-13.27	-	-
10	.582	13.32	Av	9.8	.1	23.22	-	-	46	-22.78
11	20.262	30.07	Pk	10.2	.3	40.57	60	-19.43	-	-
12	20.268	20.85	Av	10.2	.3	31.35	-	-	50	-18.65

Pk - Peak detector

Av - Average detection

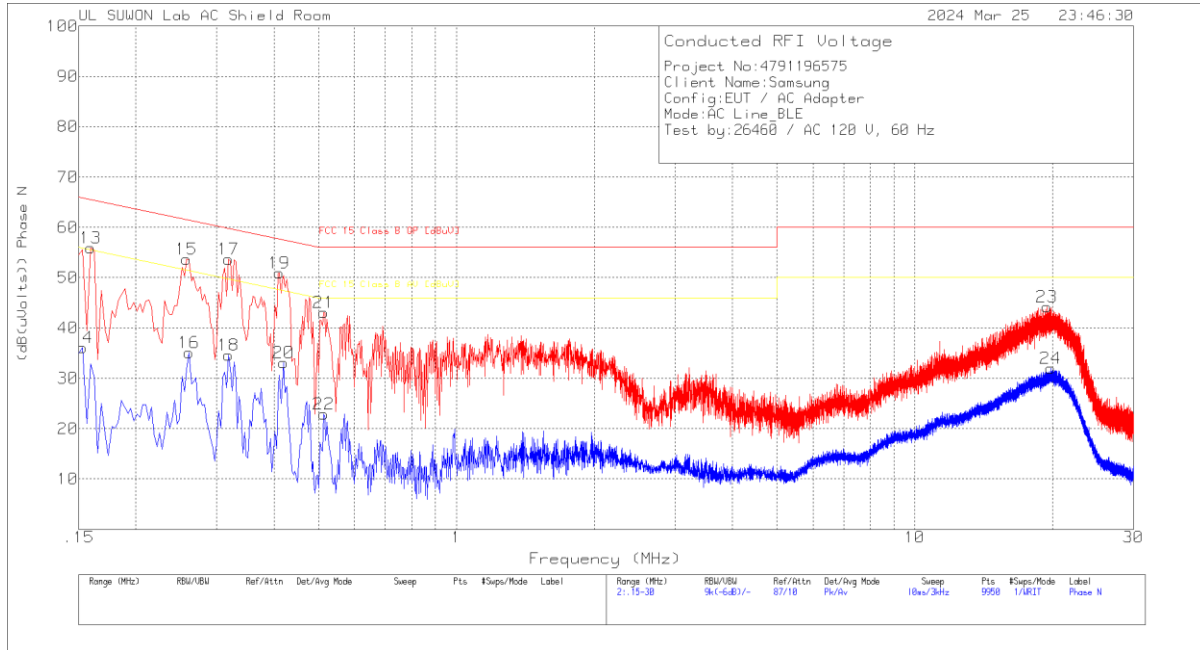
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_L1 [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.15975	41.86	Qp	9.8	.1	51.76	65.48	-13.72	-	-
.25875	40.6	Qp	9.6	.1	50.3	61.47	-11.17	-	-
.31875	40.84	Qp	9.7	.1	50.64	59.74	-9.1	-	-
.40275	24.71	Qp	9.8	.1	34.61	57.8	-23.19	-	-

Qp - Quasi-Peak detector

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_N [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
13	.159	46.02	Pk	9.8	.1	55.92	65.52	-9.6	-	-
14	.153	26.2	Av	9.8	.1	36.1	-	-	55.84	-19.74
15	.258	43.92	Pk	9.6	.1	53.62	61.5	-7.88	-	-
16	.261	25.41	Av	9.6	.1	35.11	-	-	51.4	-16.29
17	.318	43.88	Pk	9.7	.1	53.68	59.76	-6.08	-	-
18	.318	24.85	Av	9.7	.1	34.65	-	-	49.76	-15.11
19	.411	41	Pk	9.8	.1	50.9	57.63	-6.73	-	-
20	.42	23.21	Av	9.8	.1	33.11	-	-	47.45	-14.34
21	.513	33.08	Pk	9.9	.1	43.08	56	-12.92	-	-
22	.513	12.92	Av	9.9	.1	22.92	-	-	46	-23.08
23	19.425	33.74	Pk	10.2	.3	44.24	60	-15.76	-	-
24	19.794	21.39	Av	10.3	.3	31.99	-	-	50	-18.01

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_With EX_N [dB]	Cable Loss [dB]	Corrected Reading (dBuVolts)	FCC 15 Class B QP [dBuV]	Margin (dB)	FCC 15 Class B AV [dBuV]	Margin (dB)
.15825	43.19	Qp	9.8	.1	53.09	65.56	-12.47	-	-
.25875	40.77	Qp	9.6	.1	50.47	61.47	-11	-	-
.31875	39.13	Qp	9.7	.1	48.93	59.74	-10.81	-	-
.41175	35.66	Qp	9.8	.1	45.56	57.61	-12.05	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT