

CERTIFICATION TEST REPORT

Report Number. : 4791082054-E7V2

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

Model : SM-A556E, SM-A556E/DS

FCC ID : A3LSMA556E

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

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

Date Of Issue:

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Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	2024-01-12	Initial issue	Dexter(Hyunsik) Yun
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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/ax, and NFC

MODEL: SM-A556E, SM-A556E/DS

SERIAL NUMBER: 7ab3c3a5dc2c7ece, 7ab406b5152c7ece, 7ab40a900e2c7ece (CONDUCTED); R3CWB0A1BAL, R3CWB0FCVHD, R3CWB0A1AYP, R3CWB0A1A3B, R3CWB0A1DBF, R3CWB0A14XD, R3CWB0A14WV (RADIATED);

DATE TESTED: 2023-11-24 ~ 2024-01-12

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
Suwon Lab Engineer
UL KOREA LTD.

Tested By:



Dexter(Hyunsik) Yun
Suwon Lab Engineer
UL KOREA LTD.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

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

3. FACILITIES AND ACCREDITATION

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

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

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

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

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	2.80 dB
Radiated Disturbance, 30 MHz to 1 GHz	3.92 dB
Radiated Disturbance, 1 GHz to 18 GHz	5.06 dB
Radiated Disturbance, 18 GHz to 40 GHz	6.02 dB

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

4.4. DECISION RULES

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

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

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

Representative model	Difference	Derivative model
		SM-A556E/DS
SM-A556E	Hardware	Different SIM tray SM-A556E/DS has dual sim tray
	Software	Same as SM-A556E

Thus, SM-A556E was set for final test.

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	Basic GFSK	Peak	15.370	34.435
		Average	14.924	31.074
	Enhanced Pi/4-DPSK	Peak	12.220	16.672
		Average	9.891	9.751
	Enhanced 8PSK	Peak	12.700	18.621
		Average	9.933	9.847

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: -6.97 dBi

“BT/WIFI #1_2.4GHz, 5GHz (SUB4)” as indicated in antenna specification are written as ANT1 in this report.

5.4. WORST-CASE CONFIGURATION AND MODE

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.

ANT1
X

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 1Tx 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 1Tx mode.

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

GFSK, Pi/4-DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on this mode to showing compliance.

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37W61WENTASEA	N/A
Data Cable	SAMSUNG	EP-DN980	GH39-02117A	N/A

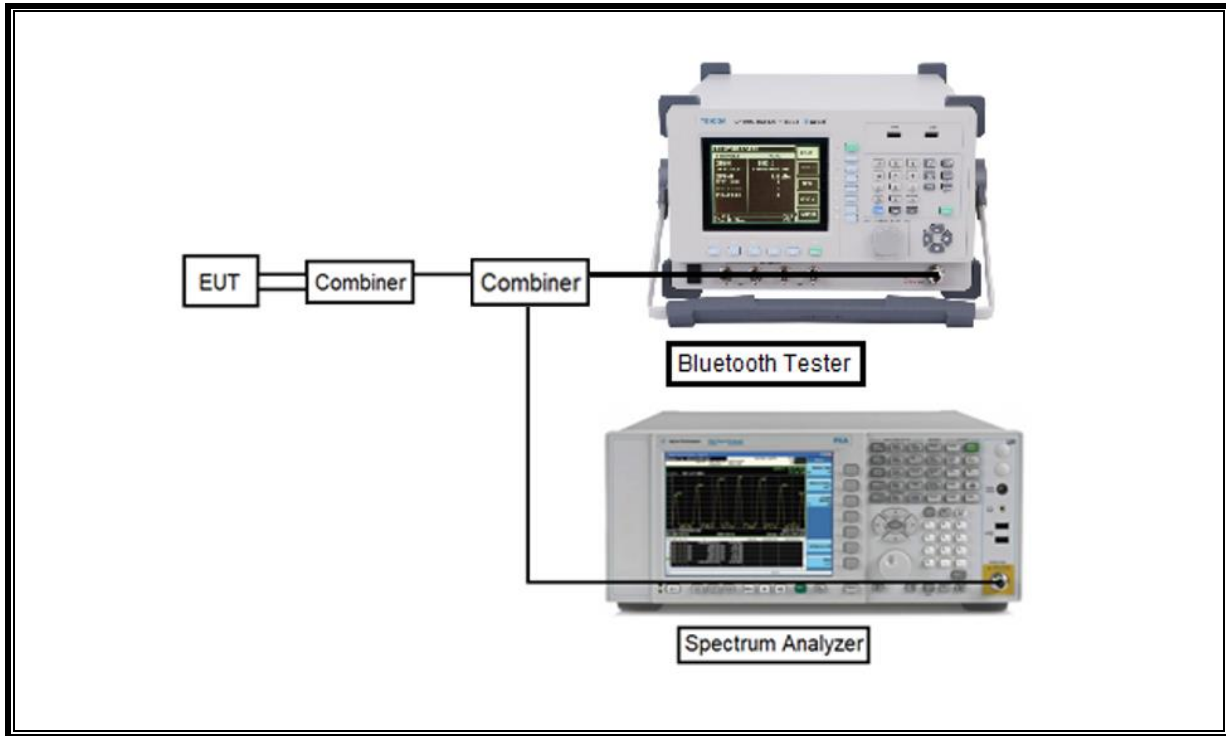
I/O CABLE

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

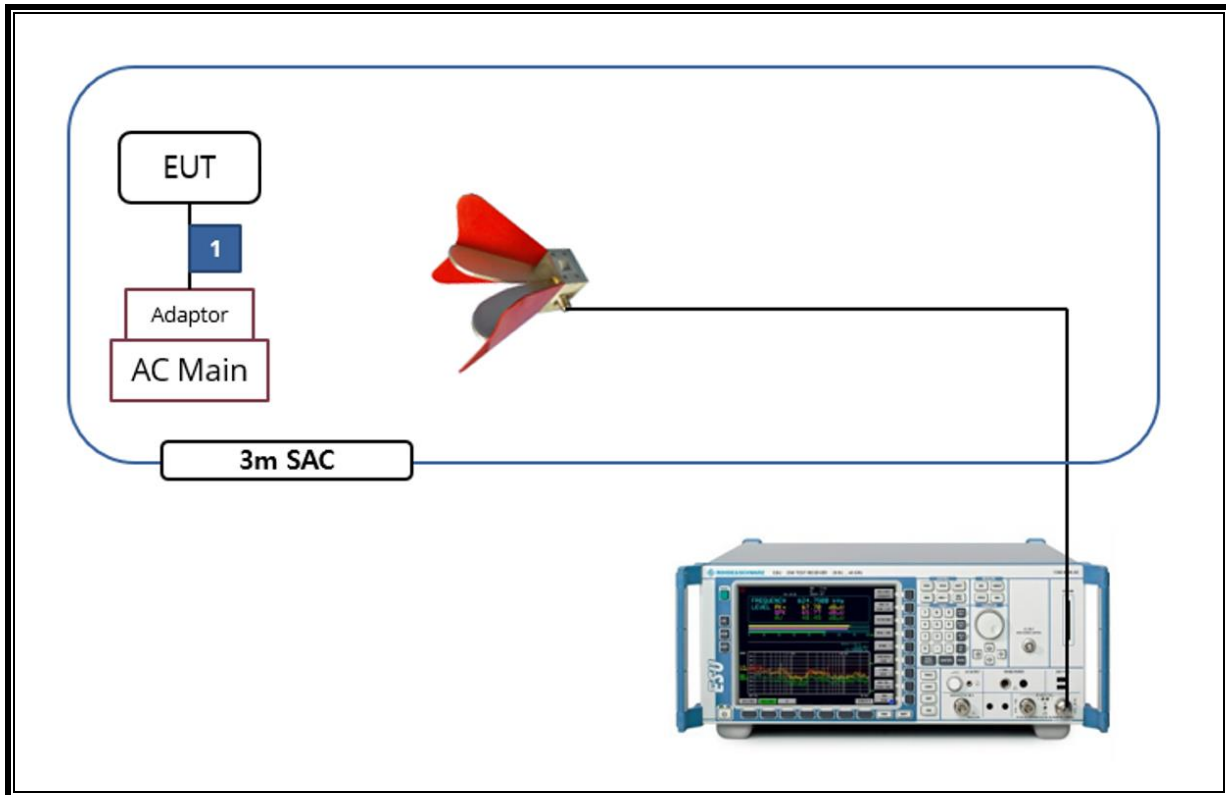
TEST SETUP

The EUT is continuously communicating to the Bluetooth tester during the tests.
Test software enable BT communications.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. 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, Loop, 9kHz-30MHz	R&S	HFH2-Z2	100418	2025-09-06
Antenna, Horn, 18 GHz	ETS	3117	00168724	2024-08-04
Antenna, Horn, 18 GHz	ETS	3117	00168717	2024-08-21
Antenna, Horn, 40 GHz	ETS	3116C	00166155	2024-08-02
Preamplifier	ETS	3115-PA	00167475	2024-07-25
Preamplifier	ETS	3116C-PA	00168841	2024-07-25
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	80108-0004	N/A
Directional Antenna	Cobham	FPA3-0.8-6.0R/1329	110367-0003	N/A
Preamplifier, 1000 MHz	Sonoma	310N	341282	2024-07-24
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	2024-07-25
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	2029169	2024-07-24
Spectrum Analyzer, 44 GHz	KEYSIGHT	N9040B	MY60080268	2025-01-03
Average Power Sensor	Agilent / HP	U2000	MY54270007	2024-07-23
Average Power Sensor	Agilent / HP	U2000	MY54260010	2024-07-24
Bluetooth Tester	TESCOM	TC-3000C	3000C000546	2024-07-24
Power Splitter	MINI-CIRCUITS	WA1534	UL003	2025-01-03
Power Splitter	MINI-CIRCUITS	WA1534	UL004	2025-01-03
Attenuator	PASTERNAK	PE7087-10	A009	2024-07-24
Attenuator	PASTERNAK	PE7087-10	A001	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100439	2024-07-23
EMI Test Receive, 40 GHz	R&S	ESU40	100457	2024-07-24
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	009	2024-07-23
LISN	R&S	ENV-216	101836	2024-07-23
Termination	WEINSCHTEL	M1406A	T09	2024-07-23
UL Software				
Description	Manufacturer	Model	Version	
Radiated software	UL	UL EMC	Ver 9.5	
AC Line Conducted software	UL	UL EMC	Ver 9.5	

7. TEST RESULTS SUMMARY

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1051, 15.247(d)	Band Edge / Conducted Spurious Emission	-20 dBc	Conducted	Complies
15.247 (b)(1)	TX conducted output power	< 21 dBm		Complies
15.247 (a)(1)	Hopping frequency separation	> two-thirds of the 20 dB bandwidth		Complies
15.247 (a)(1)(iii)	Number of Hopping channels	More than 15 non-overlapping channels		Complies
15.247 (a)(1)(iii)	Avg Time of Occupancy	< 8 dBm		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

8. MEASUREMENT METHODS

20dB BW : ANSI C63.10, Section 6.9.2

99% BW : ANSI C63.10, Section 6.9.3

HOPPING FREQUENCY SEPARATION : ANSI C63.10, Section 7.8.2

NUMBER OF HOPPING CHANNELS : ANSI C63.10, Section 7.8.3

AVERAGE TIME OF OCCUPANCY : ANSI C63.10, Section 7.8.4

OUTPUT POWER : ANSI C63.10, Section 7.8.5.

Out-of-band EMISSIONS (Conducted) : ANSI C63.10, Section 7.8.6, 7.8.8

Out-of-band EMISSIONS IN NON-RESTRICTED BANDS: ANSI C63.10, Section 6.

Out-of-band EMISSIONS IN RESTRICTED BANDS : ANSI C63.10, Section 6.

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

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

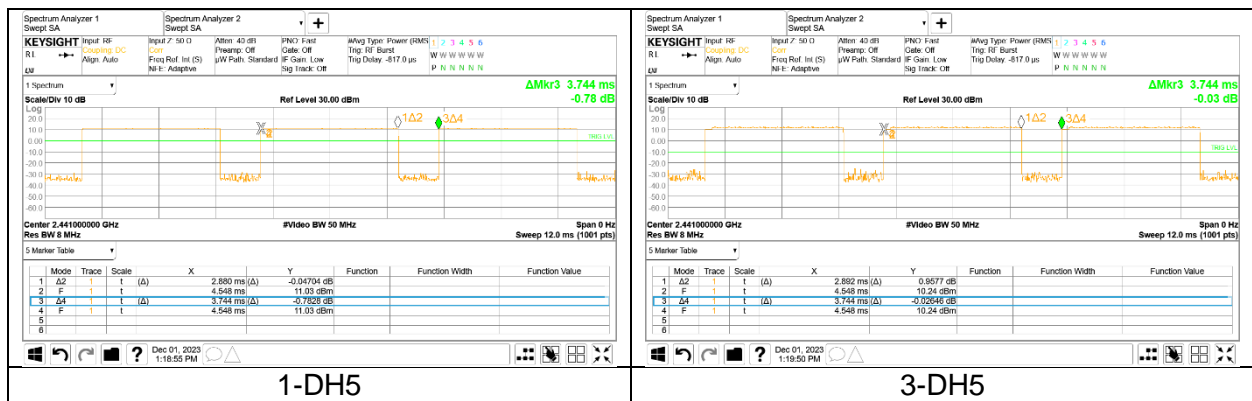
LIMITS

None; for reporting purposes only.

PROCEDURE

ANSI C63.10, Section 11.6 : Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS



Mode	On time [msec]	Period [msec]	Duty Cycle [%]	1/T Minimum VBW [kHz]
2 400 ~ 2 483.5 MHz Band				
BDR	2.880	3.744	76.923	0.347
EDR	2.892	3.744	77.244	0.346

9.2. 20 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement. The sweep time is coupled.

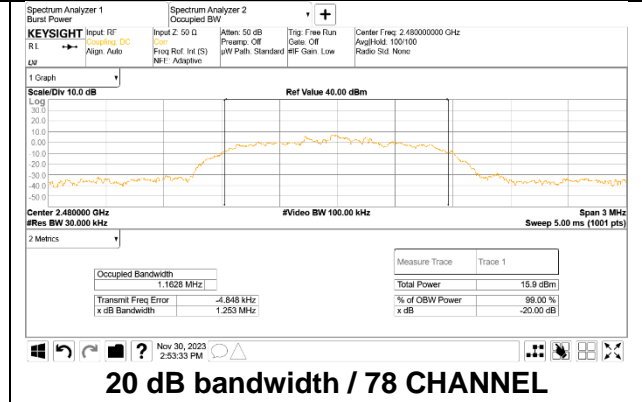
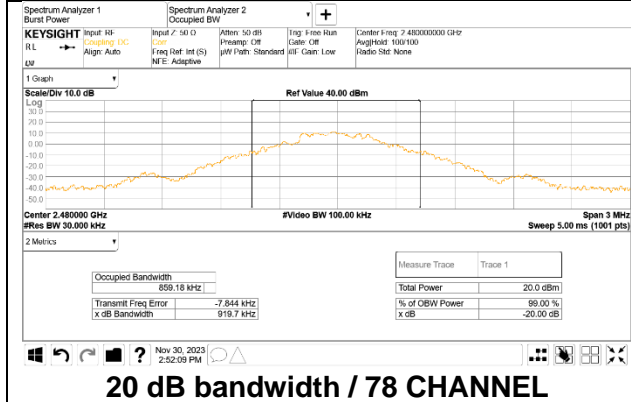
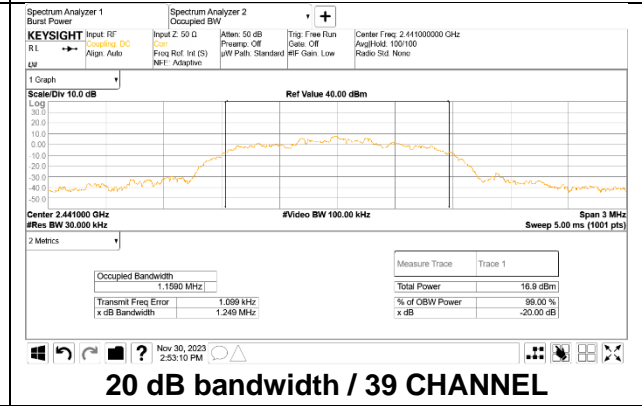
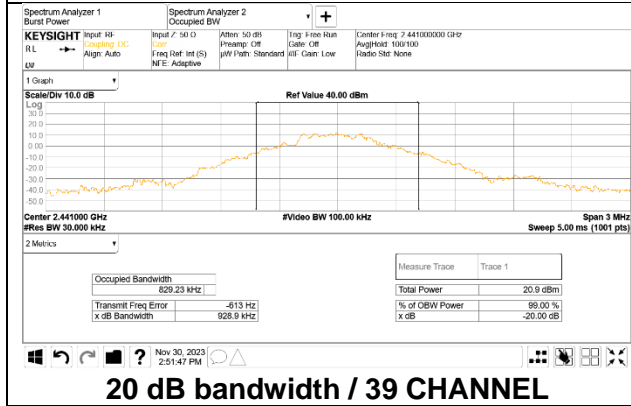
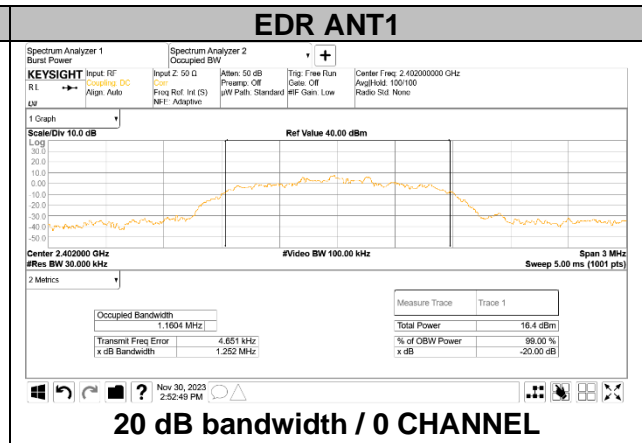
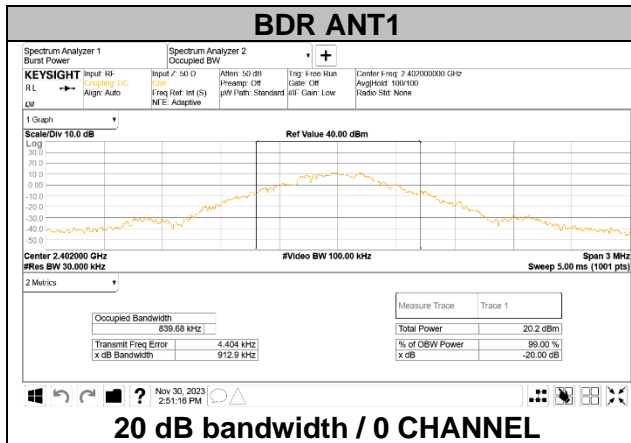
RESULTS

9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Antenna	Channel	Frequency [MHz]	20 dB Bandwidth [kHz]
ANT1	0	2 402	912.9
	39	2 441	928.9
	78	2 480	919.7
Worst			928.9

9.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Channel		Frequency [MHz]	20 dB Bandwidth [kHz]
ANT1	0	2 402	1 252.0
	39	2 441	1 249.0
	78	2 480	1 253.0
Worst			1 253.0



9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

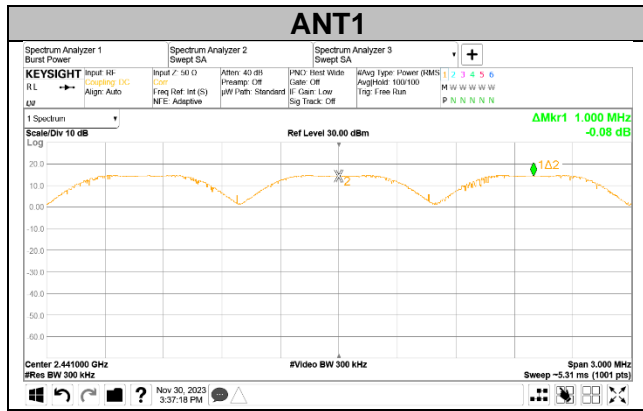
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

TEST PROCEDURE

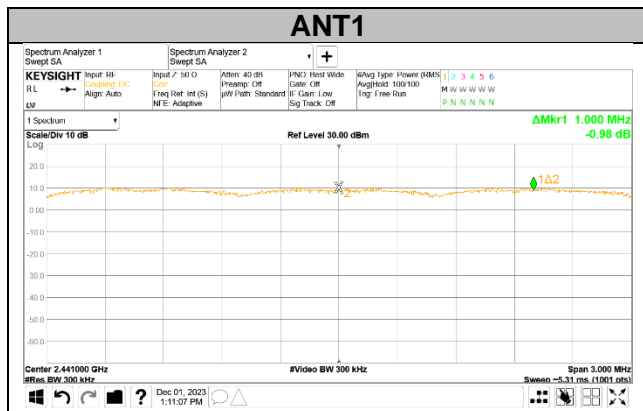
The transmitter output is connected to a spectrum analyzer. Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. The VBW is set to $VBW \geq RBW$. The sweep time is coupled.

RESULTS

9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



9.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

Frequency hopping systems in the 2400 – 2483.5 MHz band shall use at least 15 non-overlapping channels.

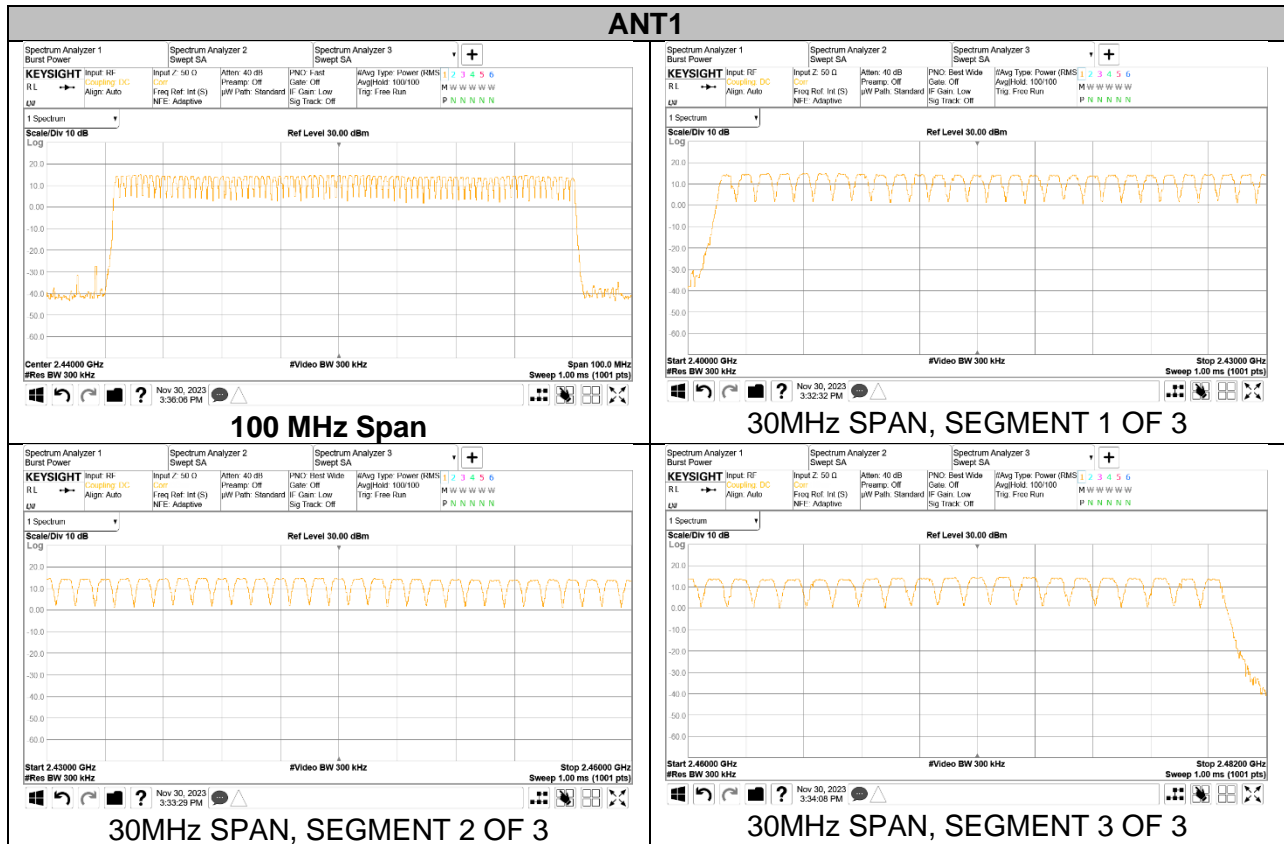
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to cover the entire authorized band, in either a single sweep or in multiple contiguous sweeps. To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. The analyzer is set to Max Hold.

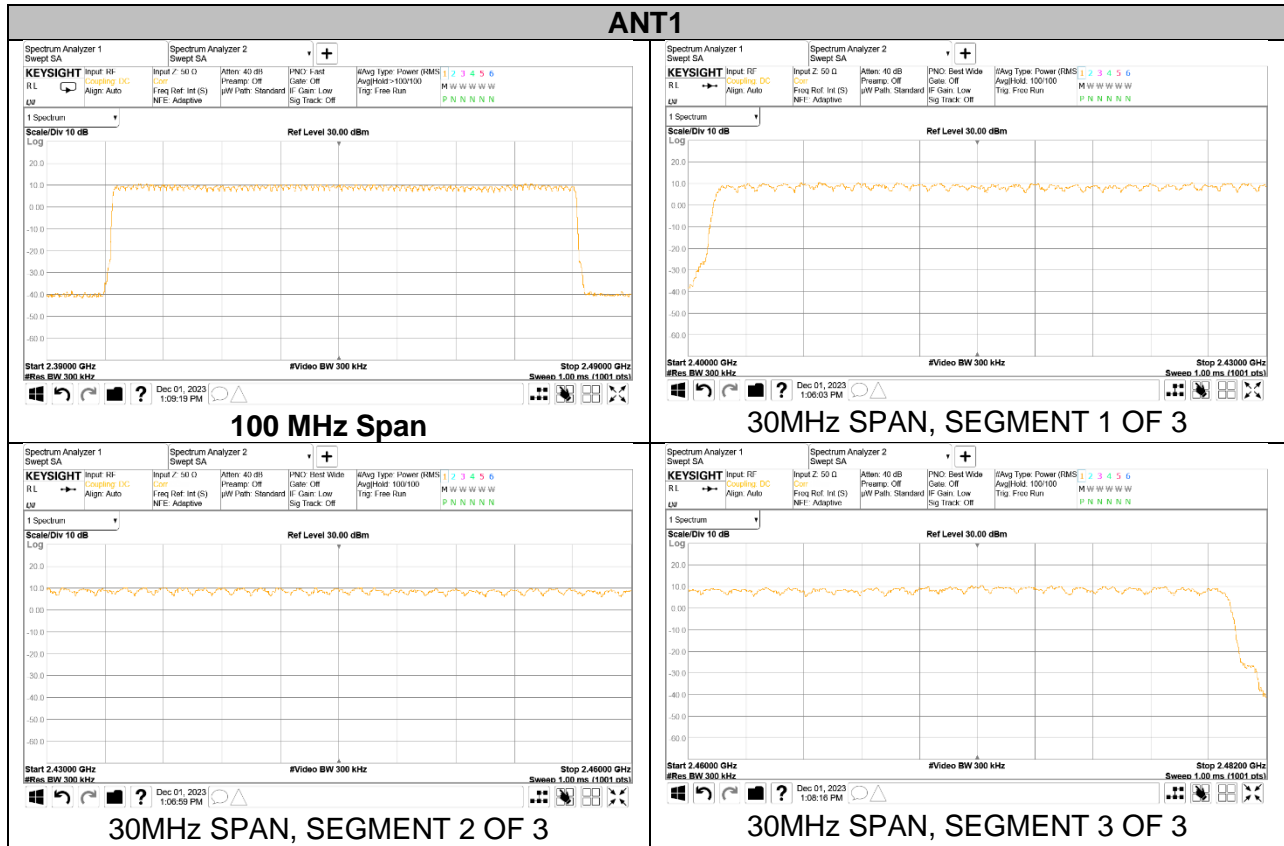
RESULTS

Normal Mode: All Channels Observed

9.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



9.4.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



9.5. AVERAGE TIME OF OCCUPANCY

LIMITS

FCC §15.247 (a) (1) (iii)

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The span is set to 0 Hz, centered on a single, selected hopping channel. The width of a single pulse is measured in a fast scan. The number of pulses is measured in a 3.16 second scan, to enable resolution of each occurrence.

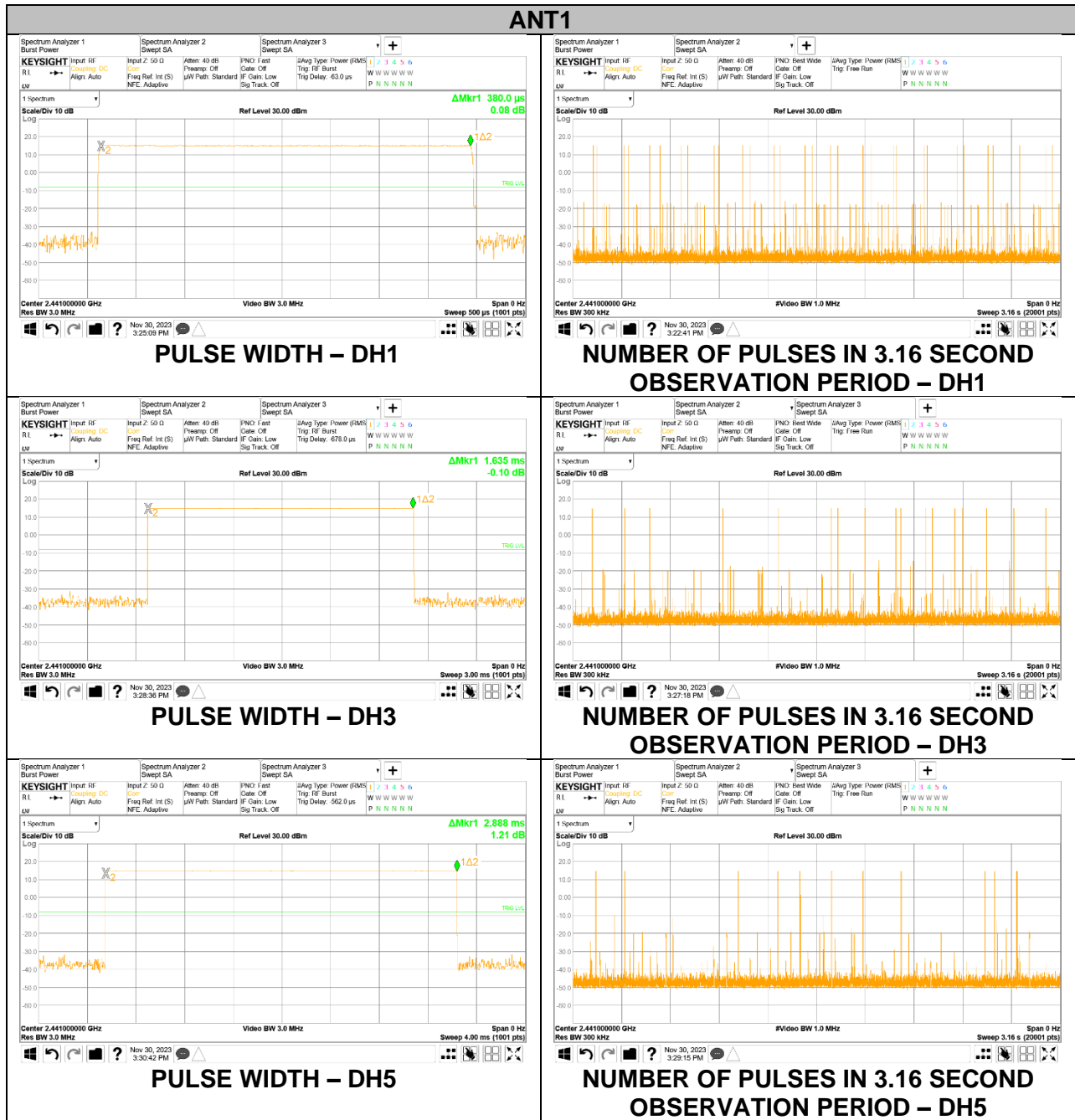
The average time of occupancy in the specified 3.16 second period (79 channels * 0.4 s) is equal to $10 * (\# \text{ of pulses in } 3.16 \text{ s}) * \text{ pulse width}$.

For AFH mode, the average time of occupancy in the specified 8 second period (20 channels * 0.4 seconds) is equal to $10 * (\# \text{ of pulses in } 0.8 \text{ s}) * \text{ pulse width}$.

RESULTS

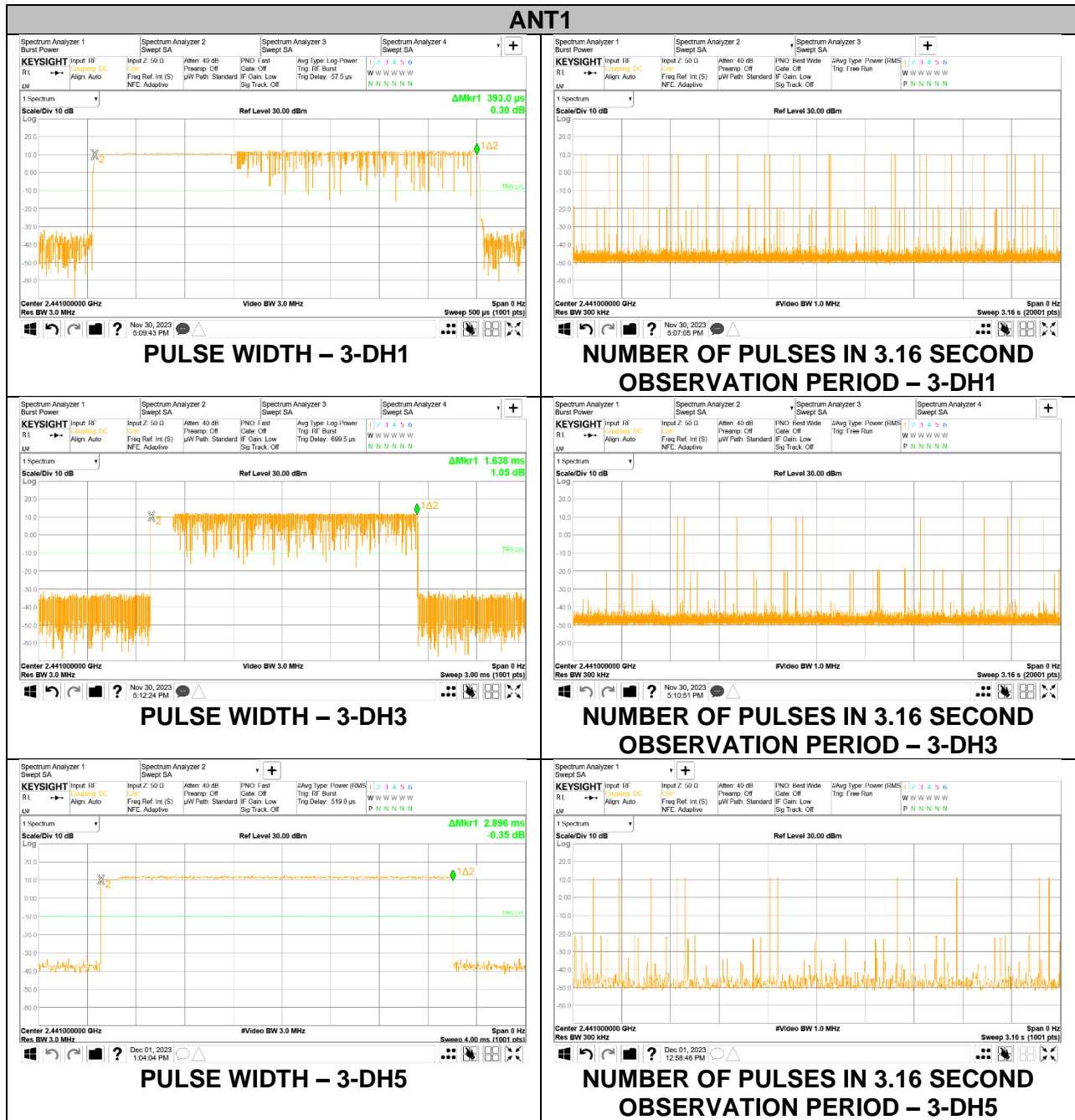
9.5.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

DH Packet	Pulse Width [msec]	Number of Pulses in 3.16 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK Normal ANT1					
DH1	0.380	32	0.122	0.4	-0.278
DH3	1.635	17	0.277	0.4	-0.123
DH5	2.888	11	0.318	0.4	-0.082
GFSK AFH ANT1					
DH Packet	Pulse Width [msec]	Number of Pulses in 0.8 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
GFSK AFH ANT1					
DH1	0.380	8	0.030	0.4	-0.370
DH3	1.635	4.25	0.065	0.4	-0.335
DH5	2.888	2.75	0.087	0.4	-0.313



9.5.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

DH Packet	Pulse Width [msec]	Number of Pulses in 3.16 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
8PSK Normal ANT1					
DH1	0.393	32	0.126	0.4	-0.274
DH3	1.638	15	0.246	0.4	-0.154
DH5	2.896	11	0.319	0.4	-0.081
DH Packet	Pulse Width [msec]	Number of Pulses in 0.8 seconds	Average Time of Occupancy [sec]	Limit [sec]	Margin [sec]
8PSK AFH ANT1					
DH1	0.393	8	0.031	0.4	-0.369
DH3	1.638	3.75	0.066	0.4	-0.334
DH5	2.896	2.75	0.087	0.4	-0.313



9.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)

The correlated maximum antenna gain + Beamforming gain is less than 6 dBi, therefore the limit is 21 dBm.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer the analyzer bandwidth is set to a value greater than the 20 dB bandwidth of the EUT.

RESULTS

9.6.1. BASIC DATA RATE GFSK MODULATION

Antenna	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
ANT1	0	2 402	14.92	21.00	-6.08
	39	2 441	15.37		-5.63
	78	2 480	14.13		-6.87
Worst			15.37		-5.63

9.6.2. ENHANCED DATA RATE Pi/4-DPSK MODULATION

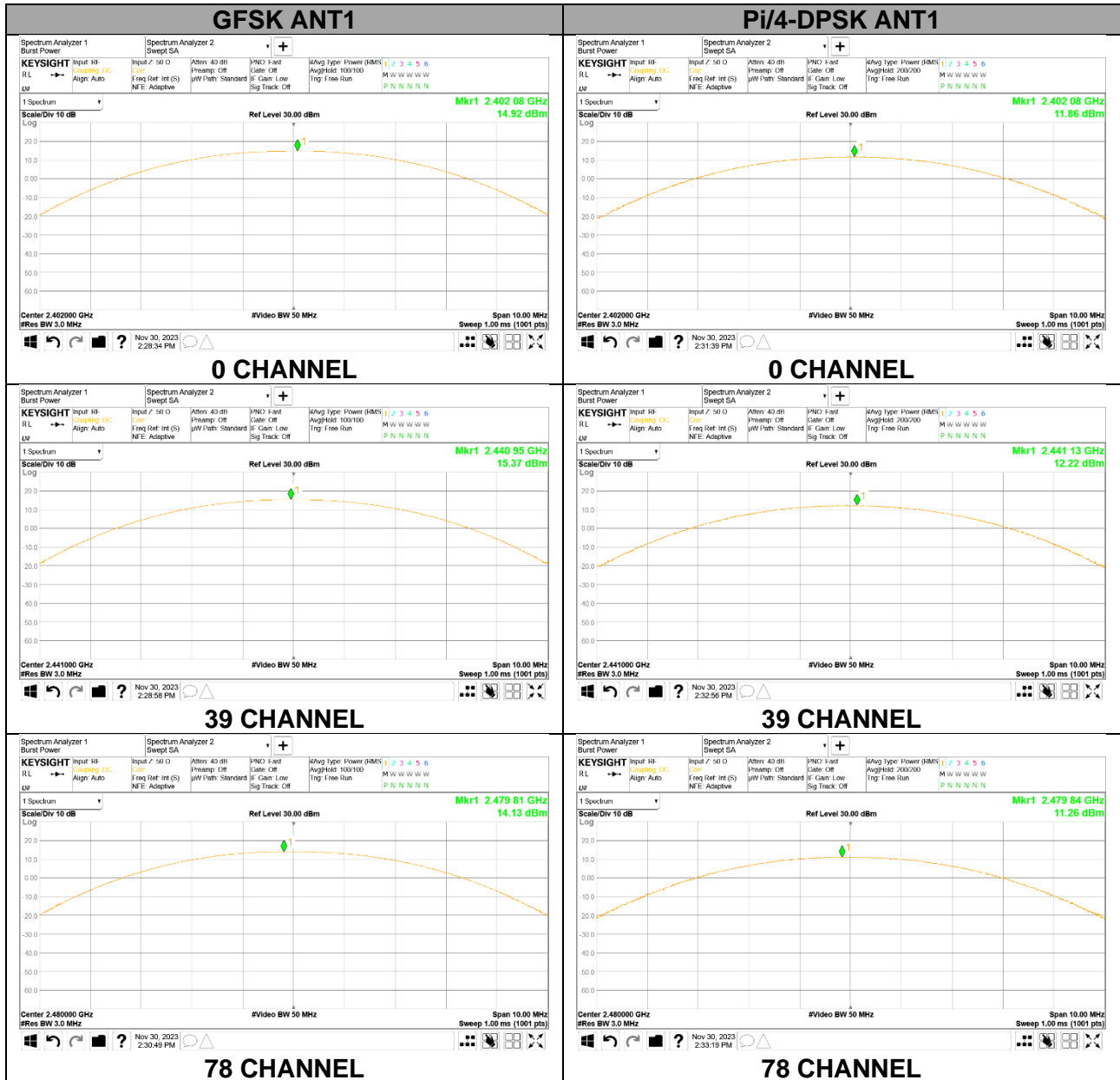
Antenna	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
ANT1	0	2 402	11.86	21.00	-9.14
	39	2 441	12.22		-8.78
	78	2 480	11.26		-9.74
Worst			12.22		-8.78

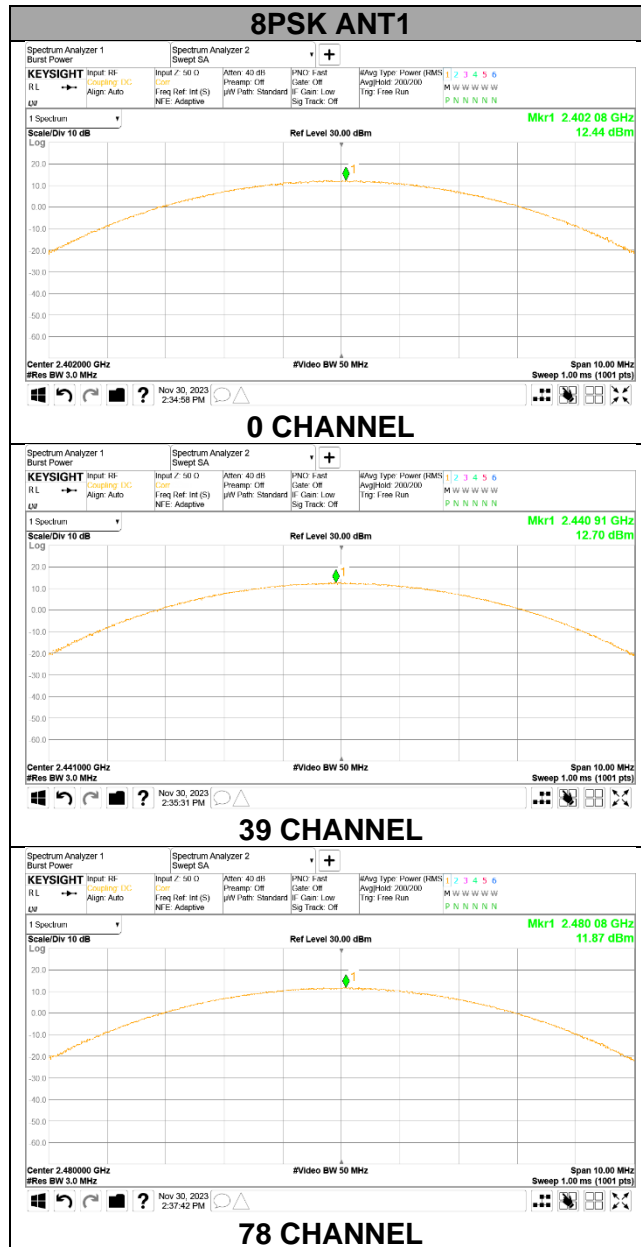
9.6.3. ENHANCED DATA RATE 8PSK MODULATION

Antenna	Channel	Frequency [MHz]	Peak Output Power [dBm]	Limit [dBm]	Margin [dB]
ANT1	0	2 402	12.44	21.00	-8.56
	39	2 441	12.70		-8.30
	78	2 480	11.87		-9.13
Worst			12.70		-8.30

9.6.4. OUTPUT POWER PLOTS

PEAK OUTPUT POWER





9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements perform using a wideband gated RF power meter.
 The cable assembly insertion loss was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

9.7.1. BASIC DATA RATE GFSK MODULATION

Antenna	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
ANT1	0	2 402	14.680	29.376
	39	2 441	14.924	31.074
	78	2 480	13.932	24.729

9.7.2. ENHANCED DATA RATE PI/4-DQPSK MODULATION

Antenna	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
ANT1	0	2 402	9.455	8.820
	39	2 441	9.891	9.751
	78	2 480	9.000	7.944

9.7.3. ENHANCED DATA RATE 8PSK MODULATION

Antenna	Channel	Frequency [MHz]	Average Output Power [dBm]	Average Output Power [mW]
ANT1	0	2 402	9.460	8.832
	39	2 441	9.933	9.847
	78	2 480	9.024	7.988

9.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

Limit = -20 dBc

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

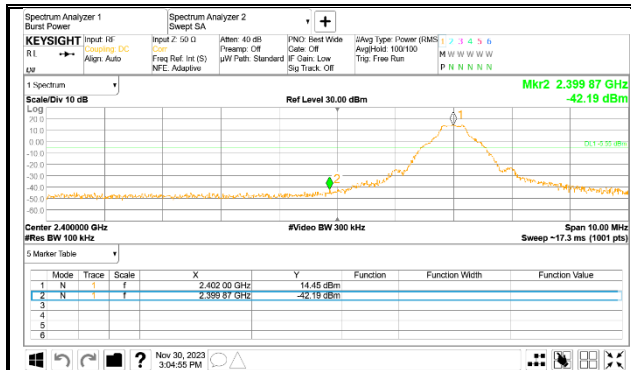
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The band-edges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

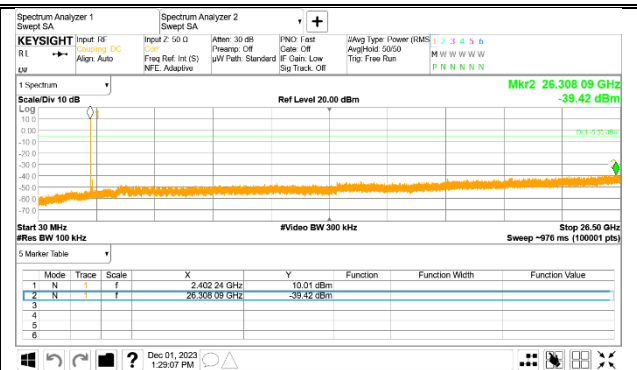
RESULTS

9.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

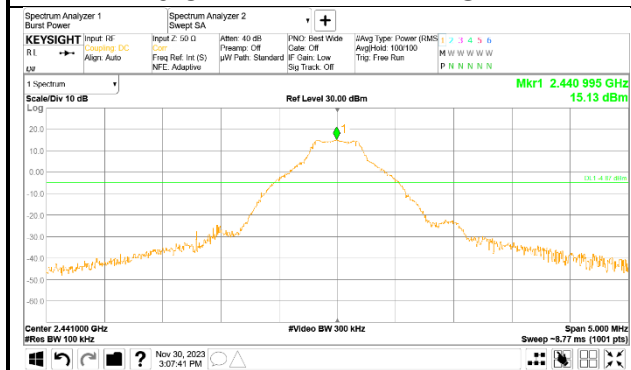
SPURIOUS EMISSIONS, NON-HOPPING – ANT1



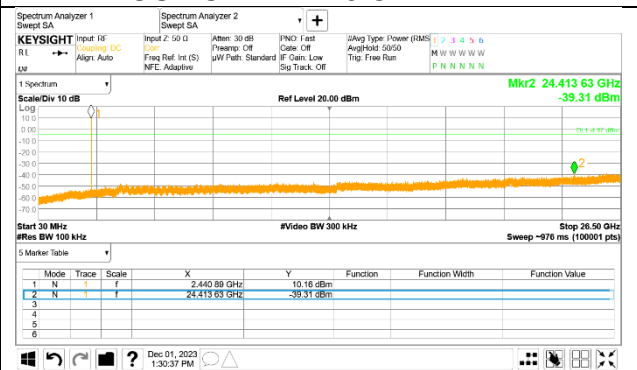
0 CHANNEL BANDEDGE



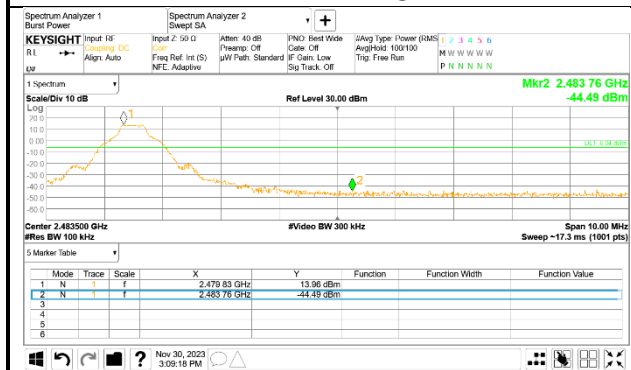
OUT-OF-BAND 0 CHANNEL



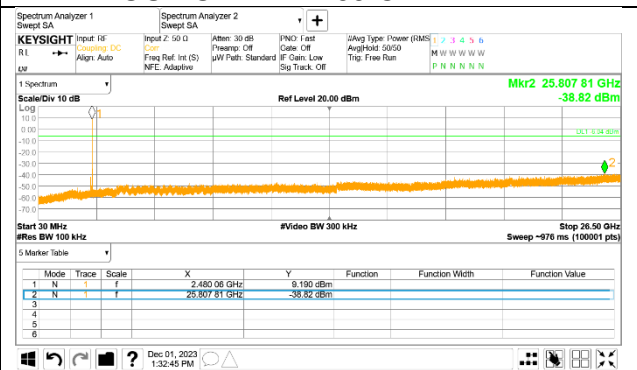
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 39 CHANNEL

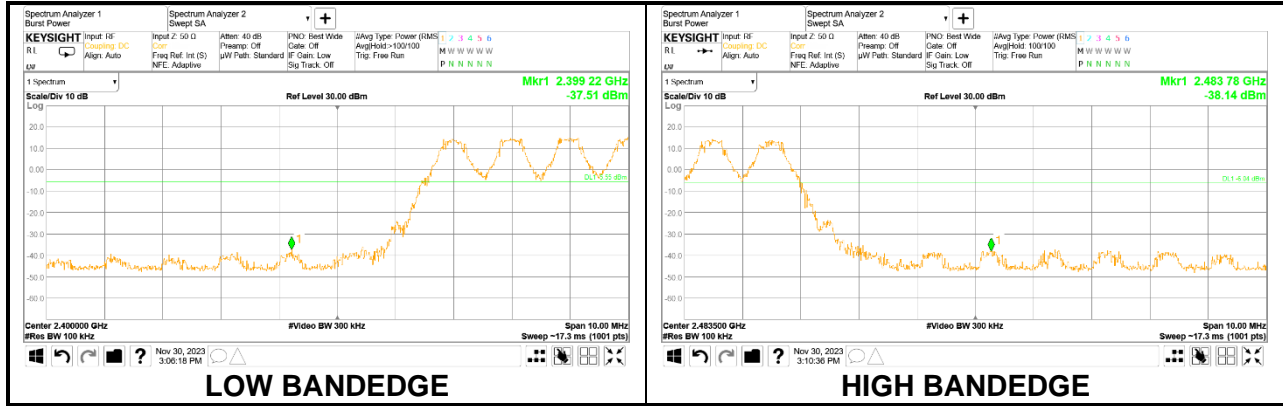


78 CHANNEL BANDEDGE



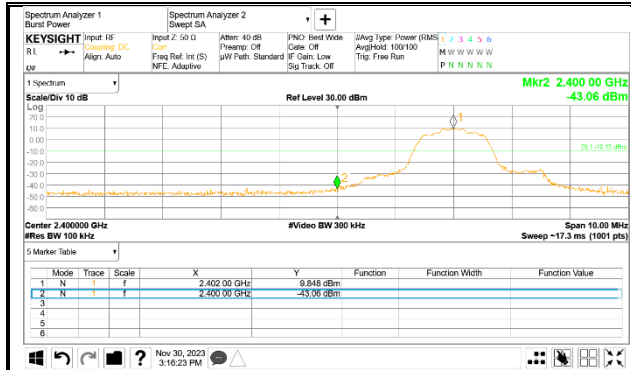
OUT-OF-BAND 78 CHANNEL

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON – ANT1

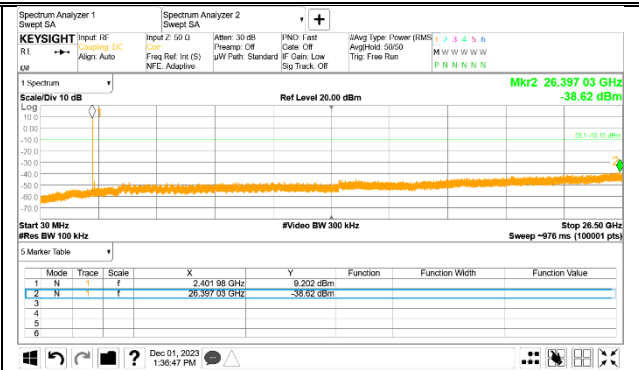


9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

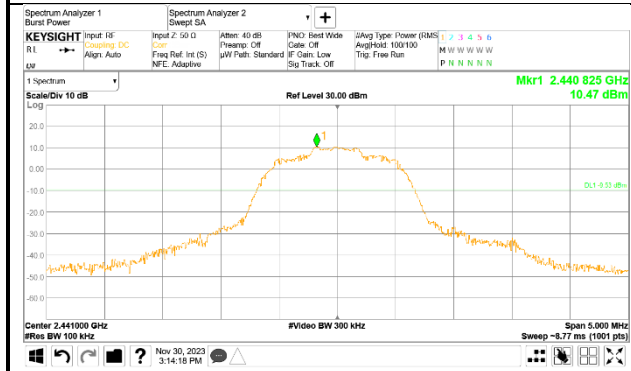
SPURIOUS EMISSIONS, NON-HOPPING – ANT1



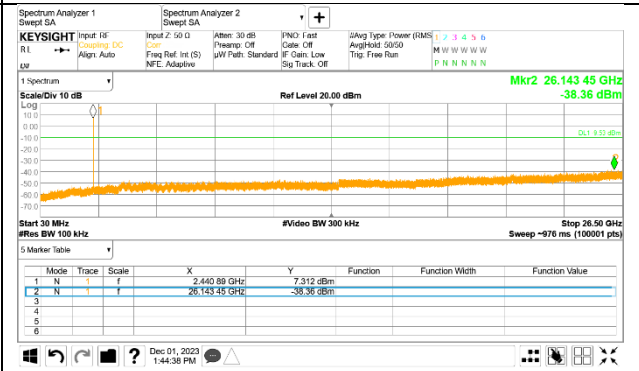
0 CHANNEL BANDEDGE



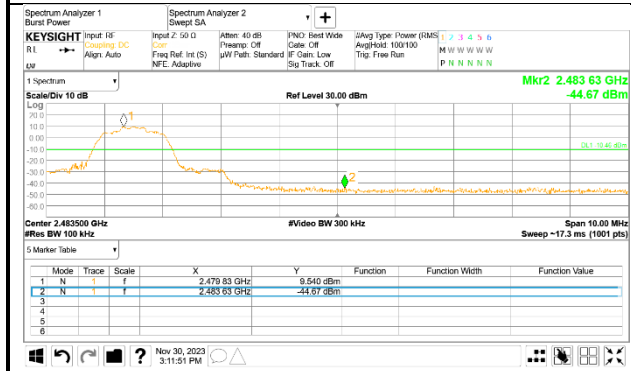
OUT-OF-BAND 0 CHANNEL



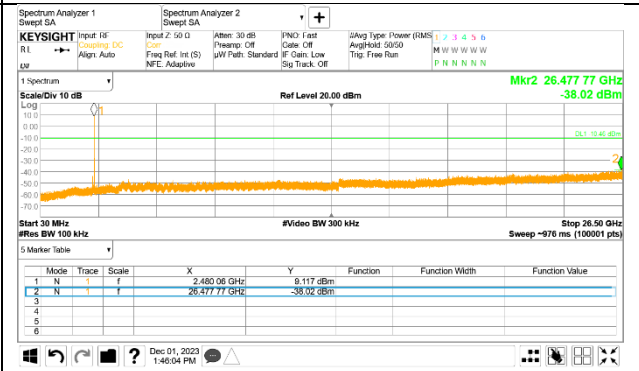
IN-BAND REFERENCE LEVEL



OUT-OF-BAND 39 CHANNEL

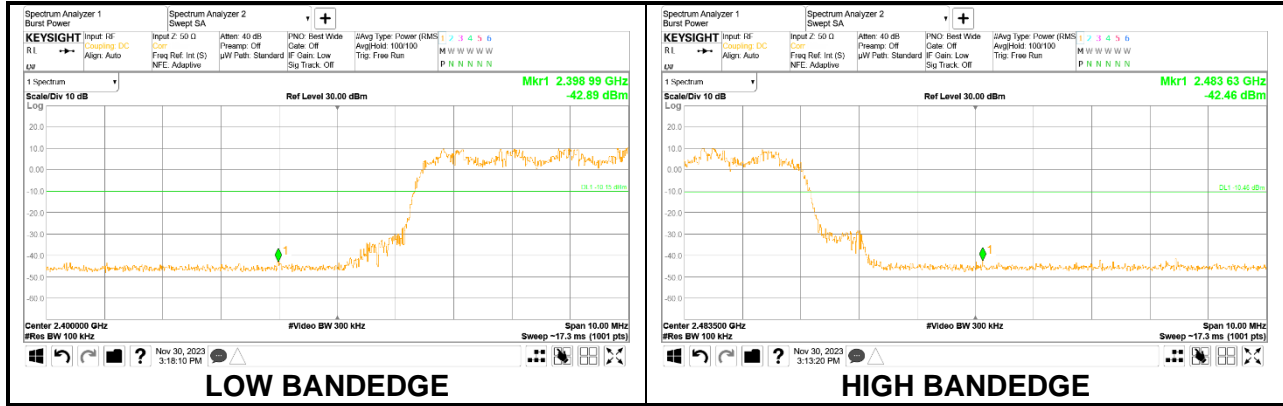


78 CHANNEL BANDEDGE



OUT-OF-BAND 78 CHANNEL

SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON – ANT1



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 1GHz and 150 cm for above 1GHz. 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. (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.)

For band edge 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 1/T (on time) for average measurement.

$$\text{GFSK} = 1/T = 1 / 0.00288\text{s} = 347\text{Hz}.$$

The minimum VBW was 347Hz, but test receiver(ESU40) couldn't set value 347Hz. Due to this reason, testing VBW was set to 500Hz(Worst cases).

The spectrum from 1GHz 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.

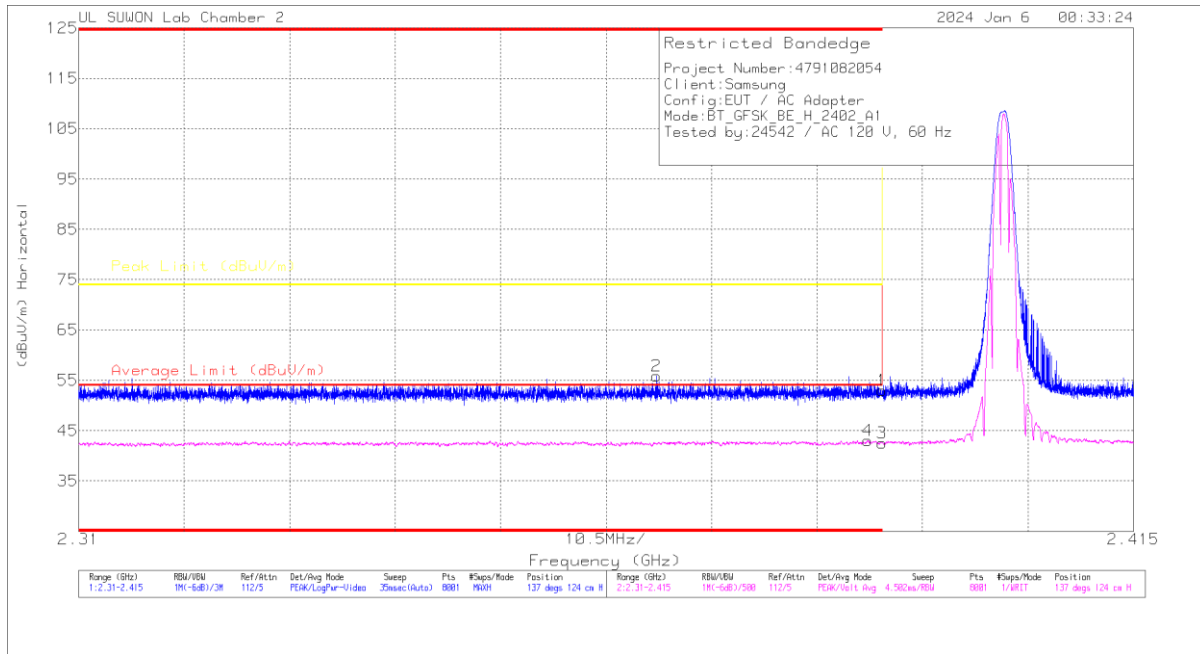
Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field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

10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

ANT1
 BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

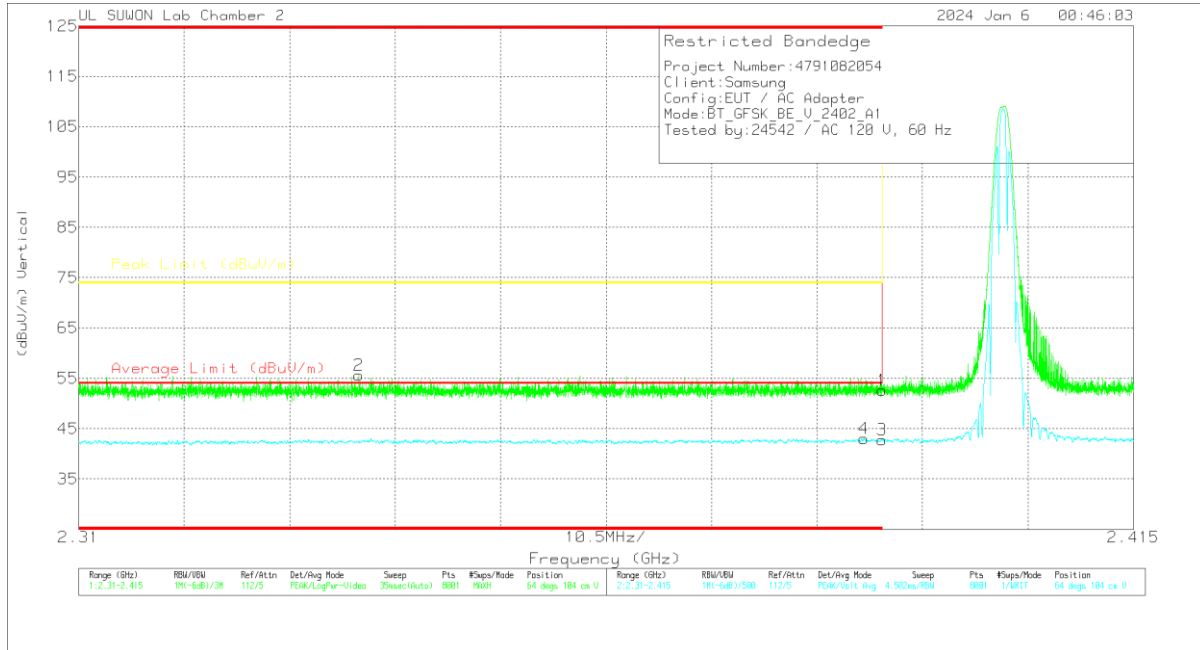


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.87	Pk	31.7	-19.6	52.97	-	-	74	-21.03	137	124	H
2	* 2.36754	43.79	Pk	31.7	-19.6	55.89	-	-	74	-18.11	137	124	H
3	* 2.39	30.46	VA1T	31.7	-19.6	42.56	54	-11.44	-	-	137	124	H
4	* 2.38855	30.83	VA1T	31.7	-19.5	43.03	54	-10.97	-	-	137	124	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



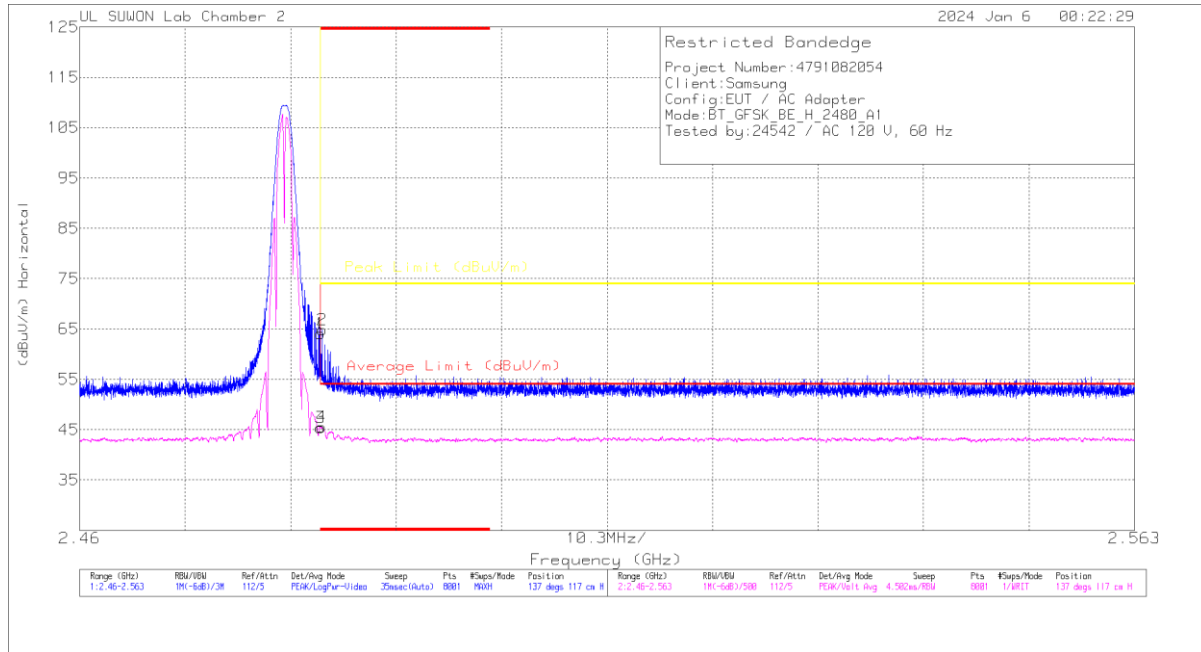
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.58	Pk	31.7	-19.6	52.68	-	-	74	-21.32	64	104	V
2	* 2.3379	43.76	Pk	31.6	-19.7	55.66	-	-	74	-18.34	64	104	V
3	* 2.39	30.71	VA1T	31.7	-19.6	42.81	54	-11.19	-	-	64	104	V
4	* 2.3882	30.8	VA1T	31.7	-19.5	43	54	-11	-	-	64	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT

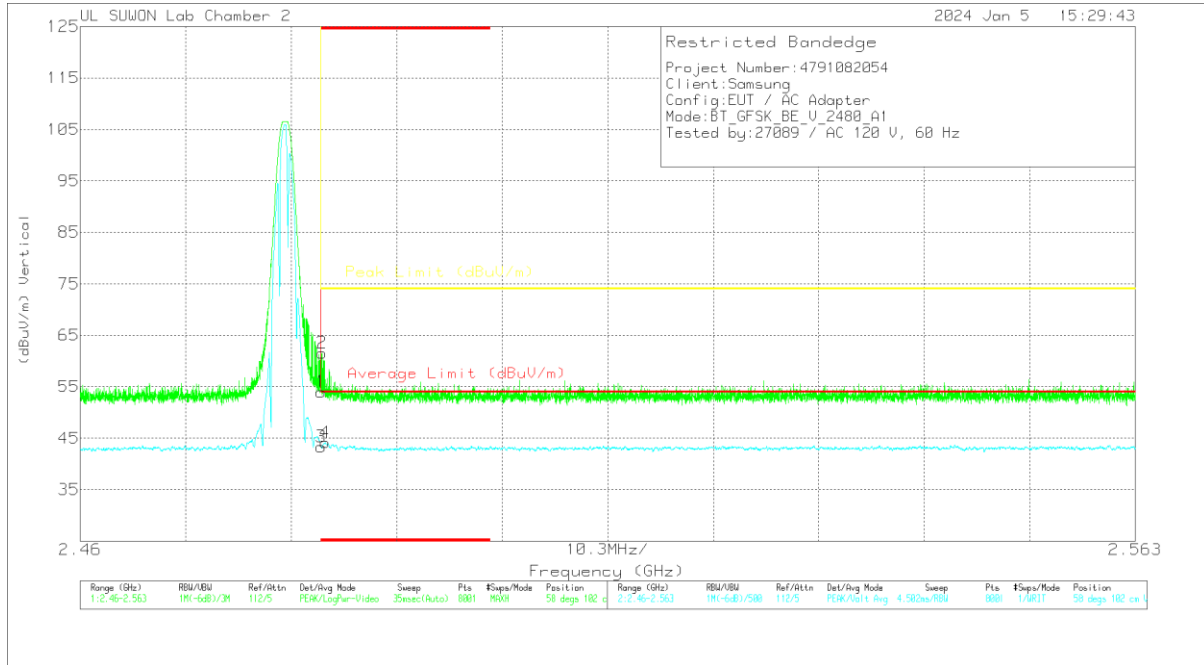


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (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	51.53	Pk	31.9	-19.3	64.13	-	-	74	-9.87	137	117	H
2	* 2.48365	52.25	Pk	31.9	-19.3	64.85	-	-	74	-9.15	137	117	H
3	* 2.48351	32.81	VA1T	31.9	-19.3	45.41	54	-8.59	-	-	137	117	H
4	* 2.48361	32.88	VA1T	31.9	-19.3	45.48	54	-8.52	-	-	137	117	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



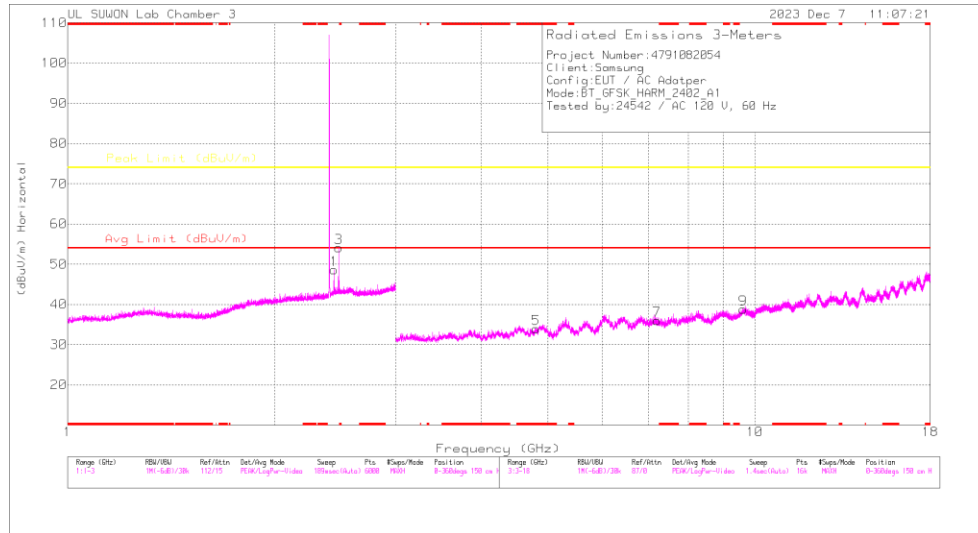
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.41	Pk	-31.9	-19.3	54.01	-	-	74	-19.99	58	102	V
2	* 2.4836	48.97	Pk	-31.9	-19.3	61.57	-	-	74	-12.43	58	102	V
3	* 2.48351	30.73	VA1T	-31.9	-19.3	43.33	54	-10.67	-	-	58	102	V
4	* 2.48391	31.54	VA1T	-31.9	-19.3	44.14	54	-9.86	-	-	58	102	V

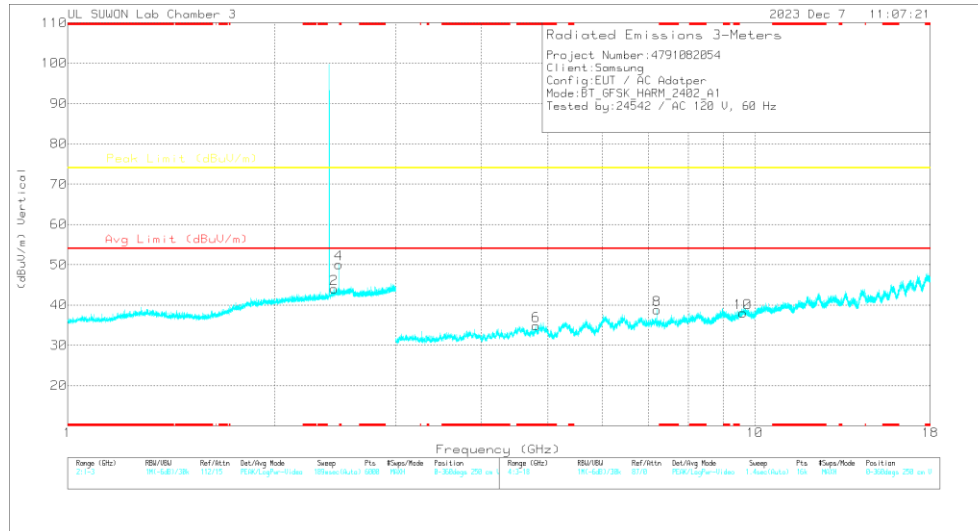
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

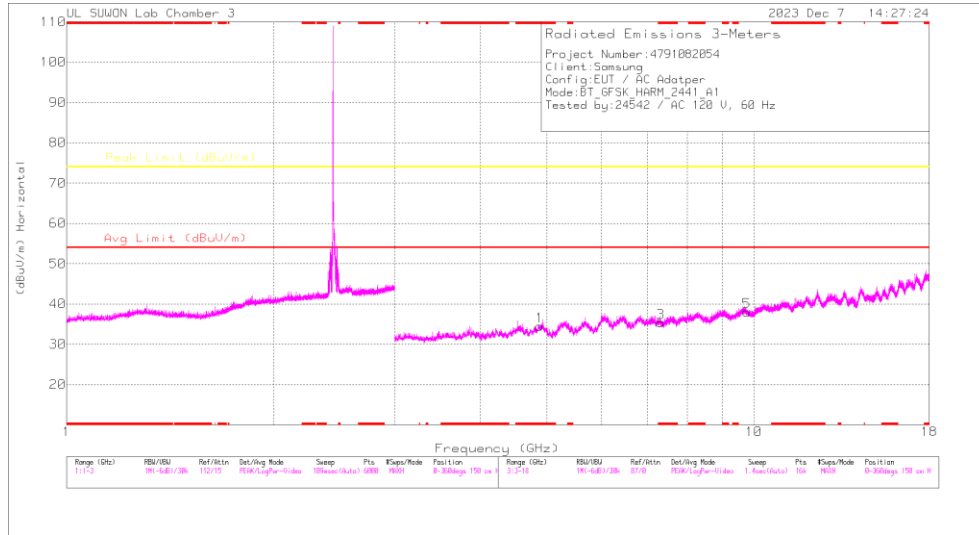
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

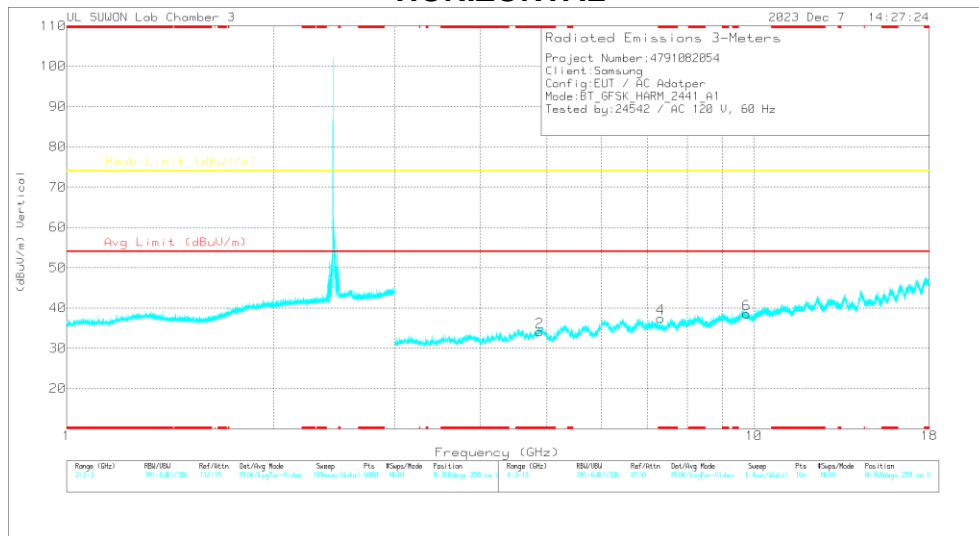
Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dBm)	Loss(dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.80449	37.92	PKFH	34.3	-30.1	42.12	-	-	74	-31.88	329	106	H
* 4.804	27.78	VA1T	34.3	-30.1	31.98	54	-22.02	-	-	329	106	H
* 4.80361	41.02	PKFH	34.3	-30.1	45.22	-	-	74	-28.78	280	399	V
* 4.80404	30.34	VA1T	34.3	-30.1	34.54	54	-19.46	-	-	280	399	V
7.20634	35.1	PKFH	35.8	-25.9	45	-	-	74	-29	311	100	H
7.20631	36.14	PKFH	35.8	-25.9	46.04	-	-	74	-27.96	258	127	V
9.60613	31.31	PKFH	36.7	-21.8	46.21	-	-	74	-27.79	0	100	H
9.60591	31.7	PKFH	36.7	-21.8	46.6	-	-	74	-27.4	131	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

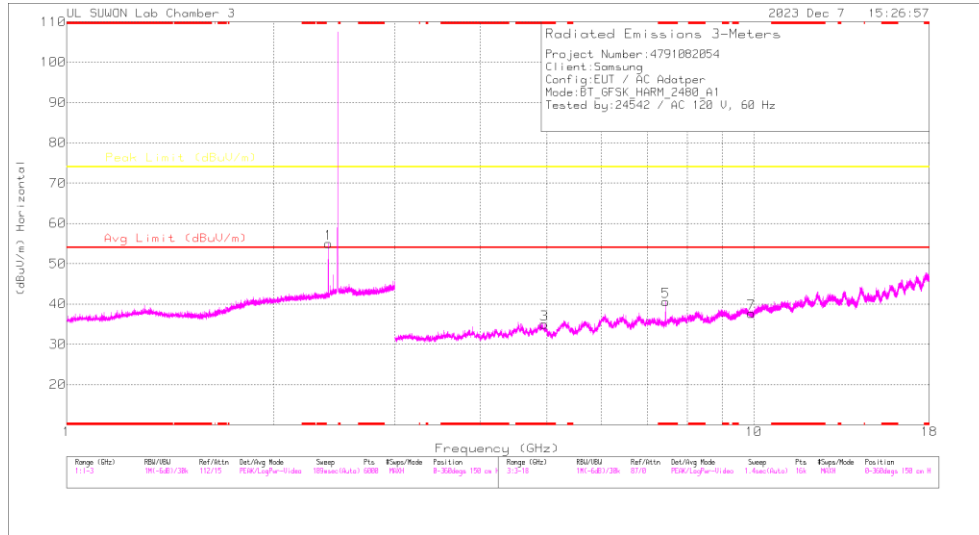
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

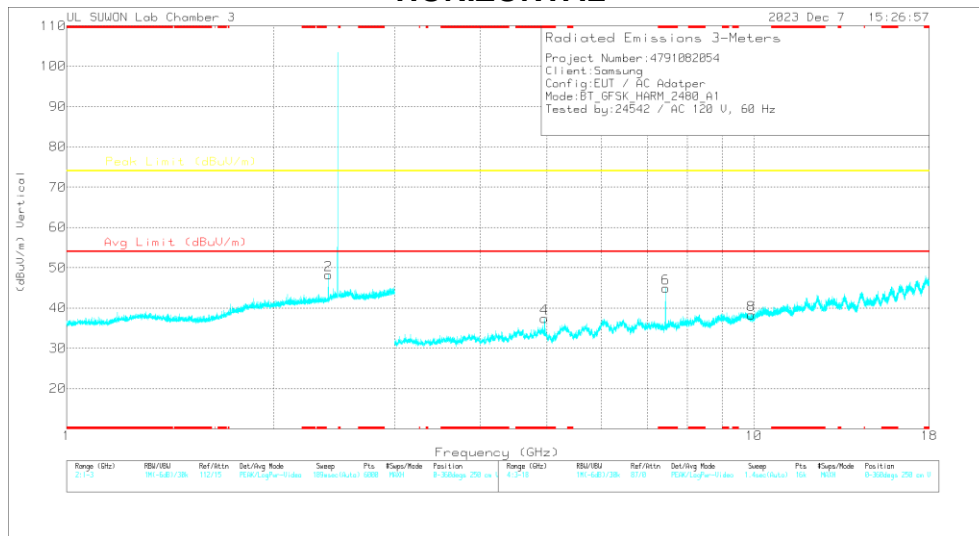
Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88221	38.43	PKFH	34.2	-30	42.63	-	-	74	-31.37	325	118	H
* 4.88186	26.94	VA1T	34.2	-30	31.14	54	-22.86	-	-	325	118	H
* 4.88205	38.05	PKFH	34.2	-30	42.25	-	-	74	-31.75	0	100	V
* 7.3231	33.92	PKFH	35.8	-25.5	44.22	-	-	74	-29.78	307	108	H
* 7.3229	21.5	VA1T	35.8	-25.5	31.8	54	-22.2	-	-	307	108	H
* 7.32329	34.95	PKFH	35.8	-25.5	45.25	-	-	74	-28.75	264	106	V
* 7.32306	24.47	VA1T	35.8	-25.5	34.77	54	-19.23	-	-	264	106	V
* 7.32474	33.05	PKFH	35.8	-25.5	43.35	-	-	74	-30.65	307	108	H
* 7.32455	20.58	VA1T	35.8	-25.5	30.88	54	-23.12	-	-	307	108	H
9.76317	30.79	PKFH	36.9	-21.5	46.19	-	-	74	-27.81	0	100	H
9.76572	31.99	PKFH	36.9	-21.5	47.39	-	-	74	-26.61	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

78 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	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.96025	39.11	PKFH	34.3	-30	43.41	-	-	74	-30.59	313	113	H
* 4.96011	28.02	VA1T	34.3	-30	32.32	54	-21.68	-	-	313	113	H
* 4.95962	40.34	PKFH	34.3	-30	44.64	-	-	74	-29.36	263	349	V
* 4.96015	31.83	VA1T	34.3	-30	36.13	54	-17.87	-	-	263	349	V
* 7.43958	36.5	PKFH	35.7	-25.2	47	-	-	74	-27	185	335	H
* 7.44	27.53	VA1T	35.7	-25.2	38.03	54	-15.97	-	-	185	335	H
* 7.44071	39.28	PKFH	35.7	-25.2	49.78	-	-	74	-24.22	264	115	V
* 7.44011	32.66	VA1T	35.7	-25.2	43.16	54	-10.84	-	-	264	115	V
9.91937	30.66	PKFH	37.1	-21.4	46.36	-	-	74	-27.64	0	100	H
9.91959	32.14	PKFH	37.1	-21.4	47.84	-	-	74	-26.16	123	106	V

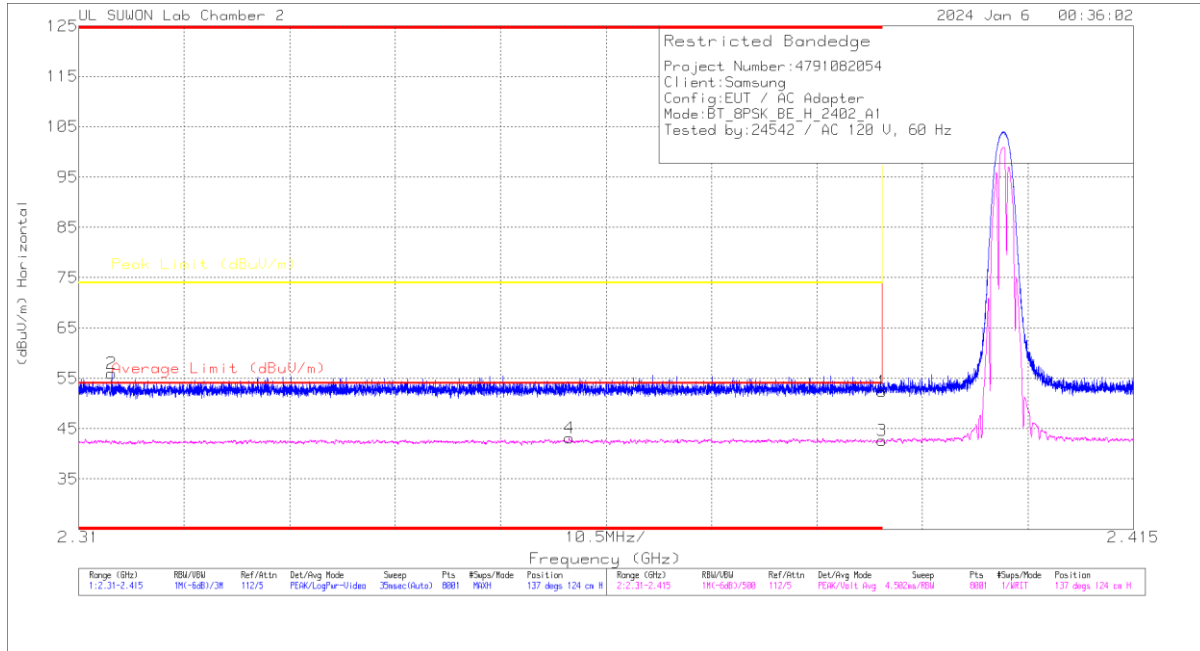
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

ANT1
 BANDEDGE (0 CHANNEL)

HORIZONTAL RESULT

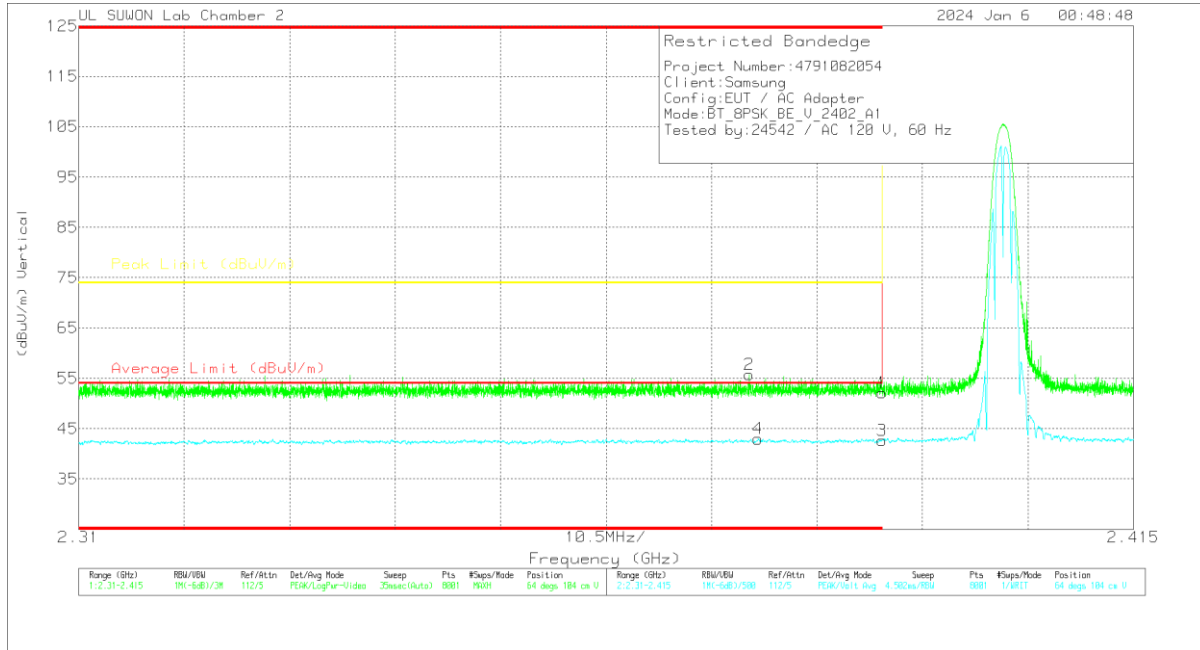


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.25	Pk	31.7	-19.6	52.35	-	-	74	-21.65	137	124	H
2	* 2.31327	44.06	Pk	31.6	-19.7	55.96	-	-	74	-18.04	137	124	H
3	* 2.39	30.56	VA1T	31.7	-19.6	42.66	54	-11.34	-	-	137	124	H
4	* 2.35883	31.11	VA1T	31.6	-19.6	43.11	54	-10.89	-	-	137	124	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



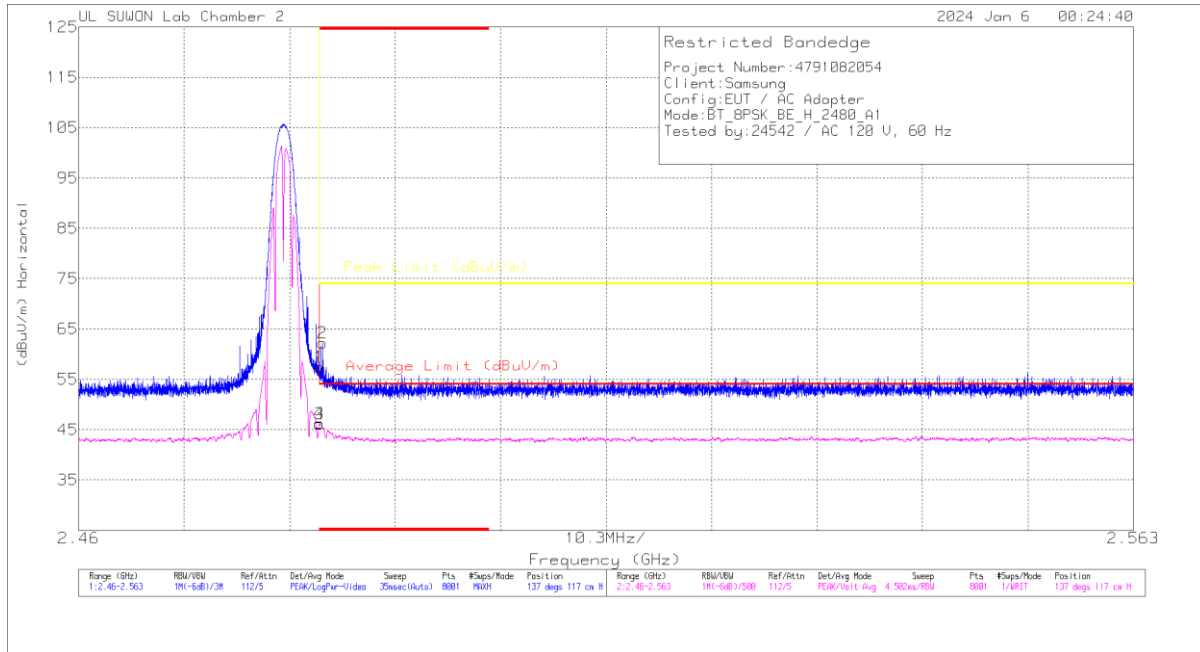
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor(dB/m)	Loss(dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.03	Pk	31.7	-19.6	52.13	-	-	74	-21.87	64	104	V
2	* 2.37673	43.53	Pk	31.7	-19.5	55.73	-	-	74	-18.27	64	104	V
3	* 2.39	30.58	VA1T	31.7	-19.6	42.68	54	-11.32	-	-	64	104	V
4	* 2.37762	30.77	VA1T	31.7	-19.5	42.97	54	-11.03	-	-	64	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE (78 CHANNEL)

HORIZONTAL RESULT

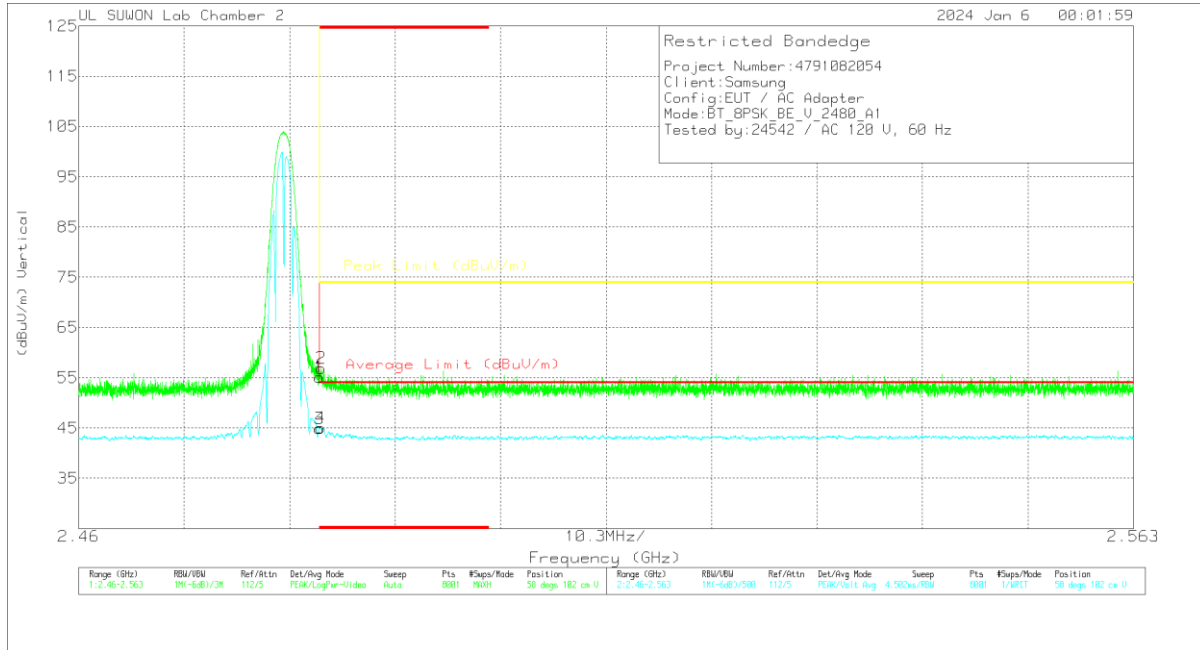


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (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	44.87	Pk	31.9	-19.3	57.47	-	-	74	-16.53	137	117	H
2	* 2.48382	49.62	Pk	31.9	-19.3	62.22	-	-	74	-11.78	137	117	H
3	* 2.48351	33.54	VA1T	31.9	-19.3	46.14	54	-7.86	-	-	137	117	H
4	* 2.48352	33.63	VA1T	31.9	-19.3	46.23	54	-7.77	-	-	137	117	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



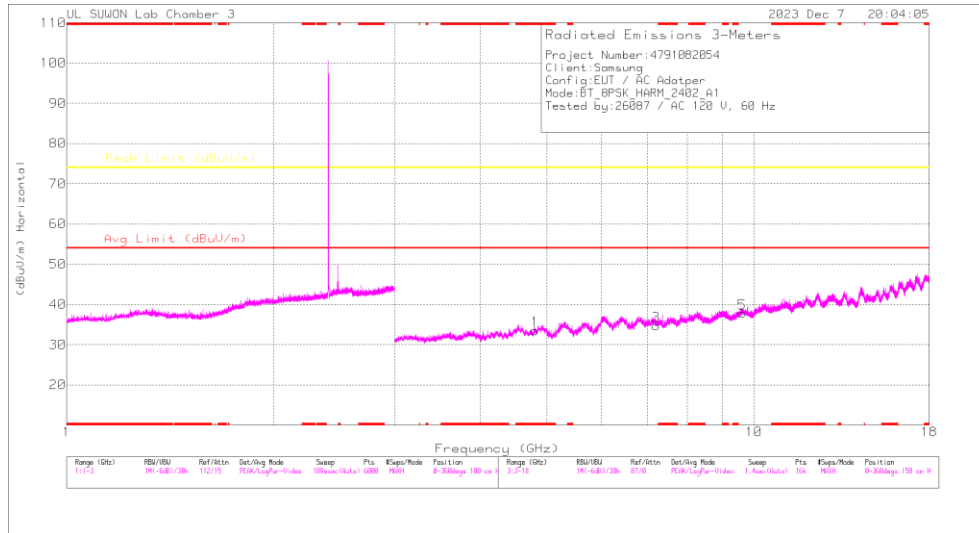
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (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	42.46	Pk	31.9	-19.3	55.06	-	-	74	-18.94	58	102	V
2	* 2.48366	44.32	Pk	31.9	-19.3	56.92	-	-	74	-17.08	58	102	V
3	* 2.48351	32.3	VA1T	31.9	-19.3	44.9	54	-9.1	-	-	58	102	V
4	* 2.48364	32.45	VA1T	31.9	-19.3	45.05	54	-8.95	-	-	58	102	V

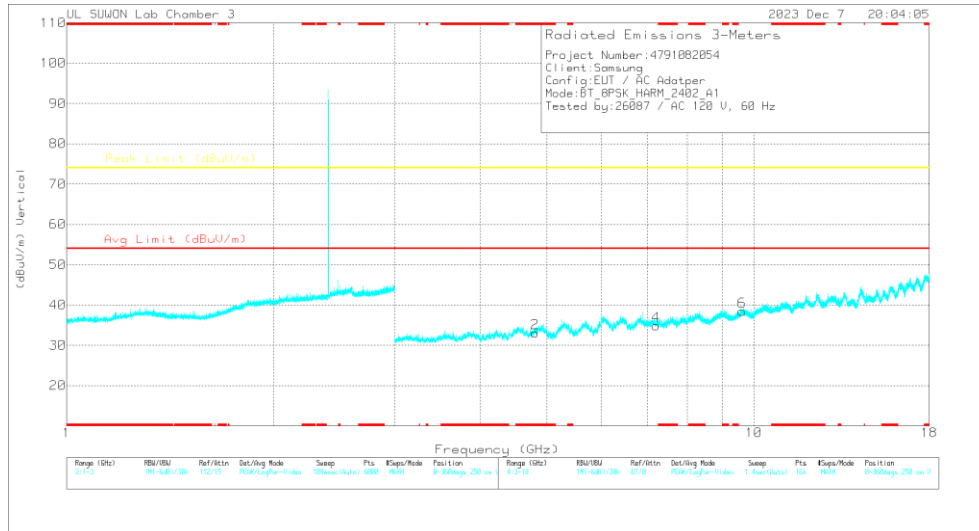
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

HARMONICS AND SPURIOUS EMISSIONS

0 CHANNEL RESULTS



HORIZONTAL



VERTICAL

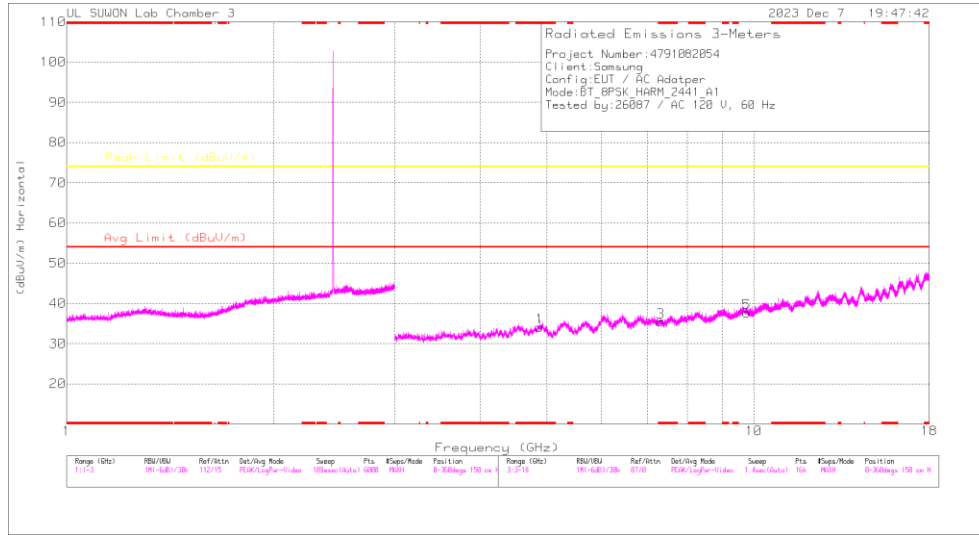
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

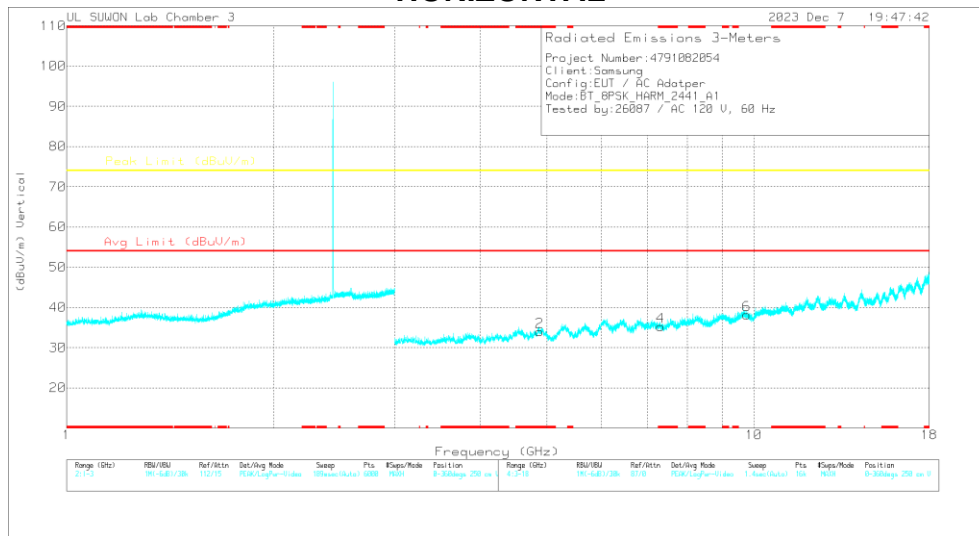
Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.8043	38.24	PKFH	34.3	-30.1	42.44	-	-	74	-31.56	329	106	H
* 4.80424	25.36	VA1T	34.3	-30.1	29.56	54	-24.44	-	-	329	106	H
* 4.80454	38.02	PKFH	34.3	-30.1	42.22	-	-	74	-31.78	280	399	V
* 4.80391	25.97	VA1T	34.3	-30.1	30.17	54	-23.83	-	-	280	399	V
7.20355	33.34	PKFH	35.8	-25.8	43.34	-	-	74	-30.66	311	100	H
7.21073	34.3	PKFH	35.8	-25.9	44.2	-	-	74	-29.8	258	127	V
9.61354	31.64	PKFH	36.7	-21.7	46.64	-	-	74	-27.36	0	100	H
9.61006	30.77	PKFH	36.7	-21.7	45.77	-	-	74	-28.23	131	104	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

39 CHANNEL RESULTS



HORIZONTAL



VERTICAL

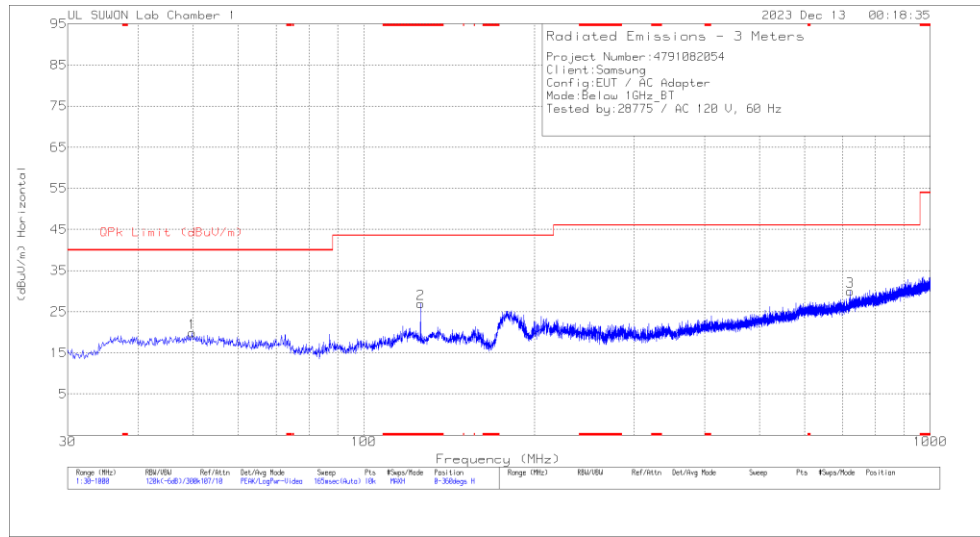
Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

Radiated Emissions

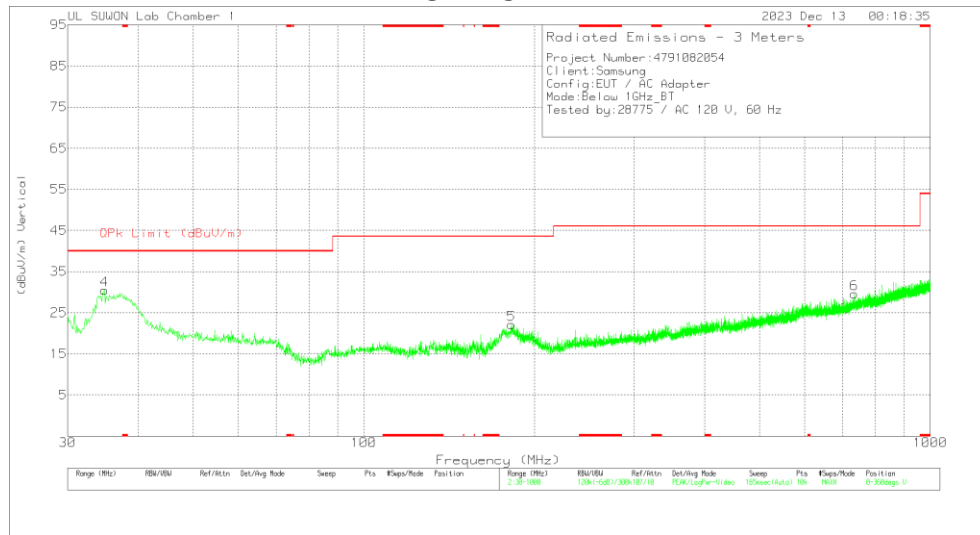
Frequency (GHz)	Meter Reading (dBuV)	Det	Antenna Correction Factor (dB/m)	Loss (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.88306	37.88	PKFH	34.2	-29.9	42.18	-	-	74	-31.82	325	118	H
* 4.88279	25.41	VA1T	34.2	-30	29.61	54	-24.39	-	-	325	118	H
* 4.88306	37.55	PKFH	34.2	-29.9	41.85	-	-	74	-32.15	0	100	V
* 7.32474	33.05	PKFH	35.8	-25.5	43.35	-	-	74	-30.65	307	108	H
* 7.32455	20.58	VA1T	35.8	-25.5	30.88	54	-23.12	-	-	307	108	H
* 7.32193	34.51	PKFH	35.8	-25.5	44.81	-	-	74	-29.19	264	106	V
* 7.31829	20.4	VA1T	35.8	-25.4	30.8	54	-23.2	-	-	264	106	V
9.76364	32.14	PKFH	36.9	-21.5	47.54	-	-	74	-26.46	0	100	H
9.76191	31.14	PKFH	36.9	-21.5	46.54	-	-	74	-27.46	0	100	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PKFH FHSS/BT RB=100k for Frequencies<1GHz / RB=1MHz for Frequencies>1GHz, VB=3 x RB, Peak
 VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

10.2. 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 Correction Factor(dB/m)	Loss(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	49.788	31.07	Pk	19.6	-30.8	0	19.87	40	-20.13	0-360	100	H
2	* 125.933	42.21	Pk	14.8	-30	0	27.01	43.52	-16.51	0-360	100	H
3	721.998	31.6	Pk	25.1	-26.7	0	30	46.02	-16.02	0-360	100	H
4	34.85	45.3	Pk	16.4	-31.2	0	30.5	40	-9.5	0-360	200	V
5	182.096	36.1	Pk	15.4	-29.4	0	22.1	43.52	-21.42	0-360	200	V
6	735.287	30.65	Pk	25.5	-26.6	0	29.55	46.02	-16.47	0-360	200	V

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

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10:2013.

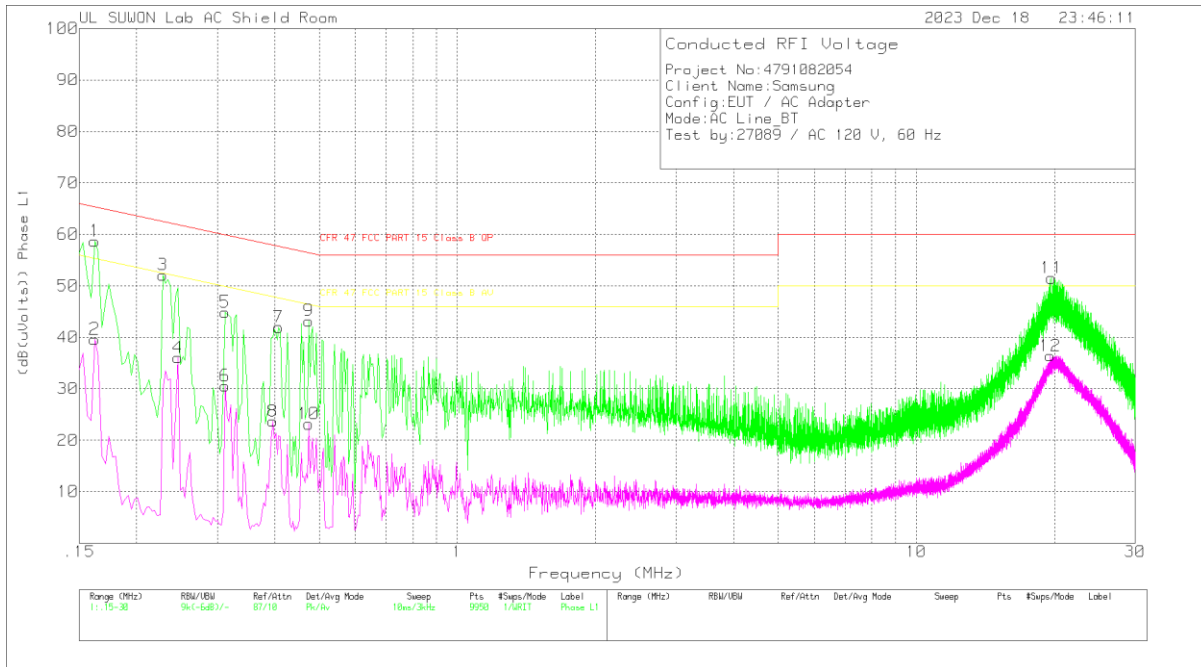
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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_AU TO_With EX_L1[dB]	CABLELOS S[dB]	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP (dB(uVolts))	Margin (dB)	CFR 47 FCC PART 15 Class B AV (dB(uVolts))	Margin (dB)
1	.162	49.09	Pk	9.5	.1	58.69	65.36	-6.67	-	-
2	.162	30	Av	9.5	.1	39.6	-	-	55.36	-15.76
3	.228	42.42	Pk	9.5	.2	52.12	62.52	-10.4	-	-
4	.246	26.32	Av	9.5	.2	36.02	-	-	51.89	-15.87
5	.312	35.16	Pk	9.5	.2	44.86	59.92	-15.06	-	-
6	.312	20.85	Av	9.5	.2	30.55	-	-	49.92	-19.37
7	.408	32.28	Pk	9.5	.2	41.98	57.69	-15.71	-	-
8	.396	13.98	Av	9.5	.2	23.68	-	-	47.94	-24.26
9	.474	33.49	Pk	9.5	.2	43.19	56.44	-13.25	-	-
10	.474	13.47	Av	9.5	.2	23.17	-	-	46.44	-23.27
11	19.731	41.52	Pk	9.6	.4	51.52	60	-8.48	-	-
12	19.593	26.4	Av	9.6	.4	36.4	-	-	50	-13.6

Pk - Peak detector

Av - Average detection

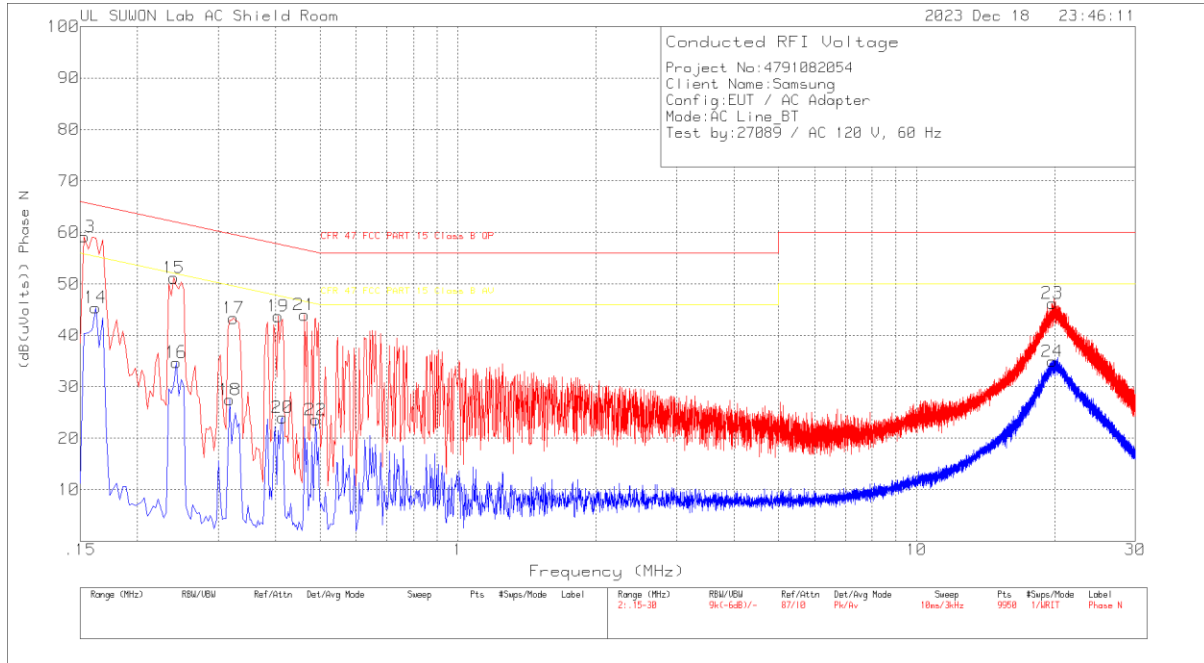
Quasi-Peak Emissions

Range 1: Phase L1 .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AU TO_With EX_L1[dB]	CABLELOS S[dB]	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP (dB(uVolts))	Margin (dB)	CFR 47 FCC PART 15 Class B AV (dB(uVolts))	Margin (dB)
.16125	45.29	Qp	9.5	.1	54.89	65.4	-10.51	-	-
19.7312	33.36	Qp	9.6	.4	43.36	60	-16.64	-	-

Quasi-Peak detector

LINE 2 RESULTS



Trace Markers

Range 2: Phase N .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AU TO_With EX_N[dB]	CABLELOS S[dB]	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP (dB(uVolts))	Margin (dB)	CFR 47 FCC PART 15 Class B AV (dB(uVolts))	Margin (dB)
13	.153	49.55	Pk	9.5	.1	59.15	65.84	-6.69	-	-
14	.162	35.78	Av	9.5	.1	45.38	-	-	55.36	-9.98
15	.24	41.47	Pk	9.5	.2	51.17	62.1	-10.93	-	-
16	.243	25.01	Av	9.5	.2	34.71	-	-	51.99	-17.28
17	.324	33.64	Pk	9.5	.2	43.34	59.6	-16.26	-	-
18	.318	17.76	Av	9.5	.2	27.46	-	-	49.76	-22.3
19	.405	34	Pk	9.5	.2	43.7	57.75	-14.05	-	-
20	.414	14.31	Av	9.5	.2	24.01	-	-	47.57	-23.56
21	.462	34.24	Pk	9.5	.2	43.94	56.66	-12.72	-	-
22	.489	13.85	Av	9.5	.2	23.55	-	-	46.18	-22.63
23	19.773	36.24	Pk	9.6	.4	46.24	60	-13.76	-	-
24	19.773	24.92	Av	9.6	.4	34.92	-	-	50	-15.08

Pk - Peak detector

Av - Average detection

Quasi-Peak Emissions

Range 2: Phase N .15 - 30MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	101836_AU TO_With EX_N[dB]	CABLELOS S[dB]	Corrected Reading (dB(uVolts))	CFR 47 FCC PART 15 Class B QP (dB(uVolts))	Margin (dB)	CFR 47 FCC PART 15 Class B AV (dB(uVolts))	Margin (dB)
.15375	43.31	Qp	9.5	.1	52.91	65.79	-12.88	-	-
.16125	43.35	Qp	9.5	.1	52.95	65.4	-12.45	-	-

Qp - Quasi-Peak detector

END OF TEST REPORT