TEST REPORT

Report Number: 15605535-E8V3

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-X626B
FCC ID	:	A3LSMX626B
EUT Description	:	GSM/WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and Digitizer
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C

Date Of Issue:
2025-02-21

Prepared by:
UL VERIFICATION SERVICES INC.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888

ACCREDITED
CERT #0751.05

REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-02-07	Initial Issue	---
V2	2025-02-17	Section 6.5 updated	Gerardo Abrego
V3	2025-02-21	Section 10.4 updated	Glenn Escano

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU SUWON-SI, GYEONGGI-DO, 16677, KOREA
EUT DESCRIPTION:	GSM/WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and Digitizer
MODEL:	SM-X626B
SERIAL NUMBER:	Radiated: R32XC0006AD Conducted: R32XC00055M
SAMPLE RECEIPT DATE:	2024-12-13
DATE TESTED:	2024-12-17 to 2025-01-31

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

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document.

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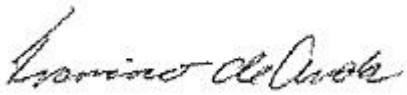
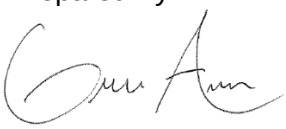
Approved & Released For
UL Verification Services Inc. By:



Francisco de Anda
Staff Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:



Gerardo Abrego
Senior Test Engineer
Consumer Technology Division
UL Verification Services Inc.

Reviewed By:

Henry Lau
Senior Project Engineer
Consumer Technology Division
UL Verification Services Inc.

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2. TEST RESULTS SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:

1) Antenna gain and type (see section 6.3)
2) Cable Loss (see section 6.3)

FCC Clause	Requirement	Result	Comment
See Comment	Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 11.6.
See Comment	20dB BW/99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	Hopping Frequency Separation	Complies	None.
15.247 (a)(1)(iii)	Number of Hopping Channels	Complies	None.
15.247 (a)(1)(iii)	Average Time of Occupancy	Complies	None.
15.247 (b)(1)	Output Power	Complies	None.
See Comment	Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	Radiated Emissions	Complies	None.
15.207	AC Mains Conducted Emissions	Complies	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15
- ANSI C63.10-2020
- KDB 558074 D01 15.247 Meas Guidance
- KDB 414788 D01 Radiated Test Site

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☐	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☐	Building 3: 843 Auburn Court, Fremont, CA 94538, USA			
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☐	Building 5: 47670 Kato Rd, Fremont, CA 94538, USA			

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U_{Lab}
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
RF Power Measurement Direct Method Using Power Meter	1.3 dB (PK) / 0.45 dB (AV)
Unwanted Emissions, Conducted	1.94 dB
Worst Case Conducted Disturbance, 9kHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9kHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Time Domain Measurements	3.39%
Temperature	0.57˚C
Relative Humidity	3.39%
DC Supply Voltages	0.57%

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

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5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE/5G NR Tablet + BT/BLE, DTS/UNII a/b/g/n/ac/ax and Digitizer.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	Basic GFSK	15.50	35.48
2402 - 2480	Enhanced DQPSK	13.68	23.33
2402 - 2480	Enhanced 8PSK	14.81	30.27

Note: GFSK, DQPSK, 8PSK average Power are all investigated, The GFSK & 8PSK Power are the worst case. Testing is based on these modes to show compliance. For average power data please refer to section 9.7.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna(s) gain, type and cable loss, as provided by the manufacturer, are as follows:

The radio utilizes an internal antenna, with a maximum gain of -3.7dBi.
Cable loss: 0.7dB.

6.4. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels for GFSK and 8PSK modes as worst-case.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

Worst-case data rates as provided by the client were:

GFSK mode: DH5
DQPSK mode : 2-DH5
8PSK mode: 3-DH5

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6.5. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID/ DoC**
AC Adapter	Samsung	EP-TA800	R37WBAA004BDKA	N/A
S-Pen	Samsung	N/A	N/A	N/A
Keyboard	Samsung	DX625	N/A	N/A

I/O CABLES (RF CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Antenna	3	RF	Unshielded	0.2	Only BT antenna port used for this test.
2	USB-C	1	USB-C	Shielded	1	EUT to AC Mains

I/O CABLES (RF RADIATED and AC LINE CONDUCTED TEST)						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	USB-C	1	USB-C	Shielded	1	N/A

TEST SETUP

The EUT is a stand-alone device configured and tested in a worst-case setup.
Worst case is using Y orientation with AC charger attached to the EUT.
Test software exercised the radio card.

SETUP DIAGRAMS

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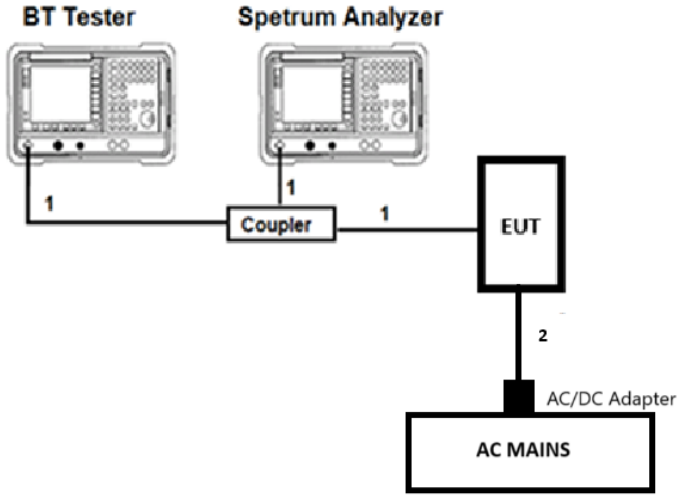
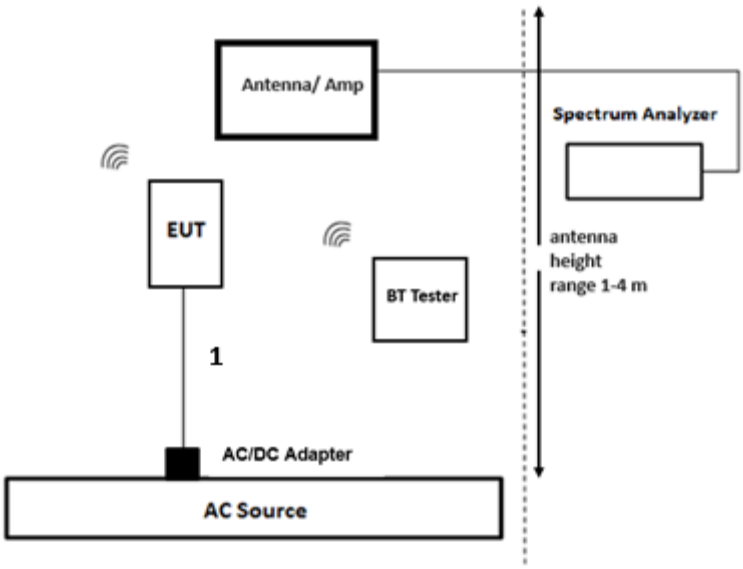
Conducted Configuration



Radiated Configuration



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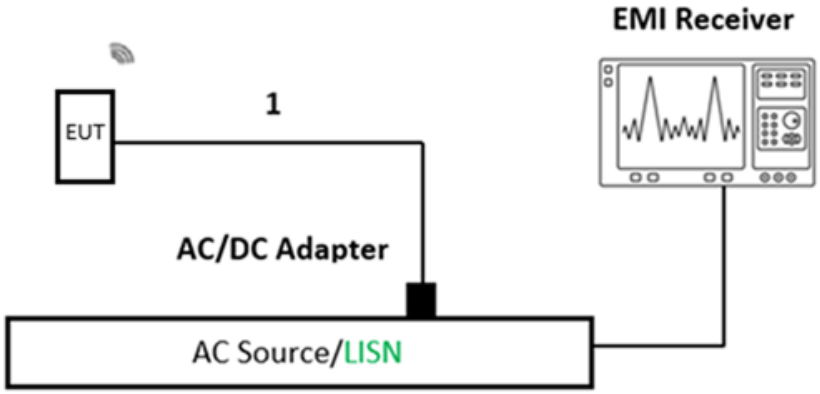
AC Line Conducted Configuration



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7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	219908	2025-05-31	2023-05-31
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	219910	2025-05-31	2023-05-31
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB1	80293	2025-04-30	2023-04-11
Amplifier,9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	170647	2025-03-31	2024-03-25
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80707	2025-06-30	2024-06-07
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	206808	2025-04-30	2024-04-23
RF Filter Box, 1-18GHz	UL-FR1	n/a	171875	2025-03-31	2024-03-23
RF Filter Box, 1-18GHz	UL-FR1	SAC 8 port rf box 1	197920	2025-03-31	2024-03-30
EMI TEST RECEIVER, with B8 option	Rohde & Schwarz	ESW44	245268	2025-02-28	2024-02-15
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	225688	2025-02-28	2024-02-11
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	199658	2025-02-28	2024-02-02
Amplifier 18-26.5GHz, +5Vdc, -54dBm P1dB	AMPLICAL	AMP18G26.5-60	234683	2025-05-31	2024-05-13
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	80396	2025-02-28	2024-02-21
Power Meter, P-series single channel	Keysight Technologies Inc	N1921A	90391	2025-06-30	2024-06-17
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1911A	90754	2025-01-31	2024-01-25
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	236188	Verified Before Use	
Bluetooth Tester	Rohde & Schwarz	CBT	81929	2025-03-31	2024-03-01
Directional Coupler	KRYTAR	152610	254457	2025-10-31	2024-10-31
AC Line Conducted					
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	175765	2025-01-31	2024-01-26
EMI TEST RECEIVER	Rohde & Schwarz	ESR	171646	2025-02-28	2024-02-27
Transient Limiter	TE	TBFL1	207996	2025-01-31	2024-01-23
UL TEST SOFTWARE LIST					
Radiated Software	UL	UL EMC	Ver 2024-08-15, 2023-03, 2023-05-01		
Antenna Port Software	UL	UL RF	Ver 2022-08-16		
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 2023-03		

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8. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10 Section 11.6

Occupied BW (20dB): ANSI C63.10 Section 6.9.2

Occupied BW (99%): ANSI C63.10 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10 Section 7.8.4

Peak Output Power: ANSI C63.10 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10 Section 7.8.7.1

Conducted Band-Edge: ANSI C63.10 Section 7.8.7.2

Radiated Spurious Emissions Below 30MHz: ANSI C63.10 Section 6.4

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10 Section 6.3 and 6.5

Radiated Spurious Emissions above 1GHz: ANSI C63.10 Section 6.3 and 6.6

Radiated Band-edge: ANSI C63.10 Section 6.10.5

AC Power-line conducted emissions: ANSI C63.10 Section 6.2

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

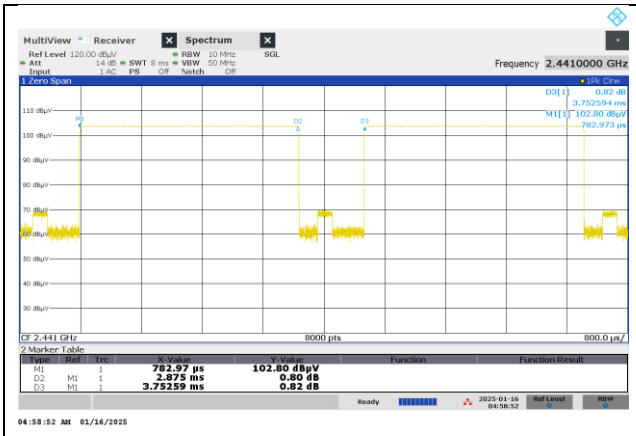
None; for reporting purposes only.

PROCEDURE

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

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time T (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
Bluetooth GFSK	2.88	3.75	0.766	76.61	1.16	0.348
Bluetooth 8PSK	2.89	3.75	0.770	76.99	1.14	0.346



BLUETOOTH GFSK

BLUETOOTH 8PSK

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9.2. 20 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

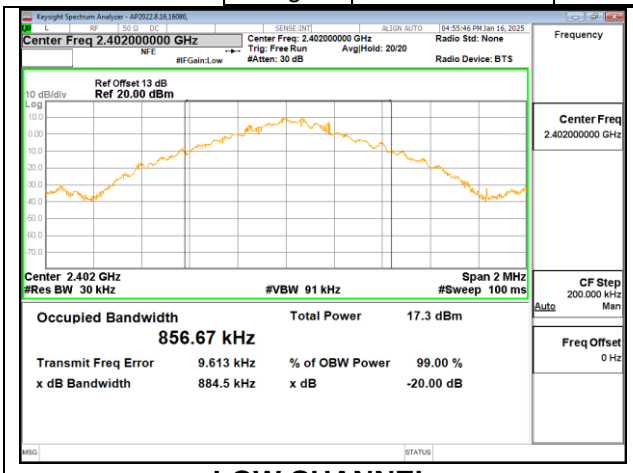
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to ≥ 1% of the 20 dB/ 99% bandwidth. The VBW shall be approximately three times RBW. The sweep time is coupled.

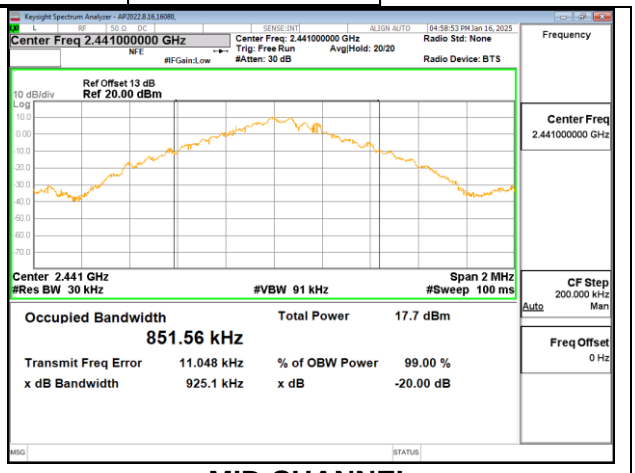
RESULTS

9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

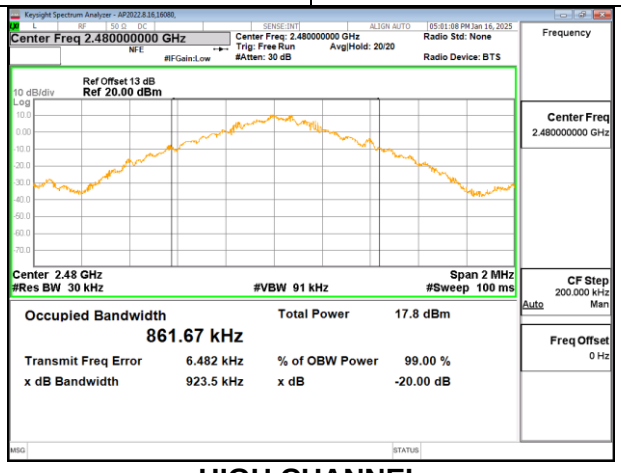
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.8845	0.85667
Mid	2441	0.9251	0.85156
High	2480	0.9235	0.86167



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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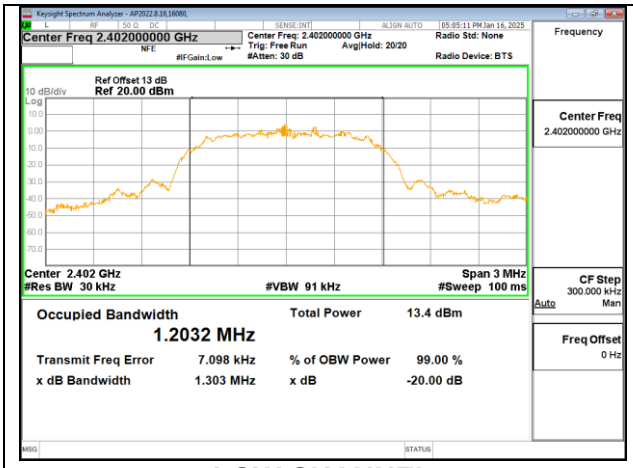
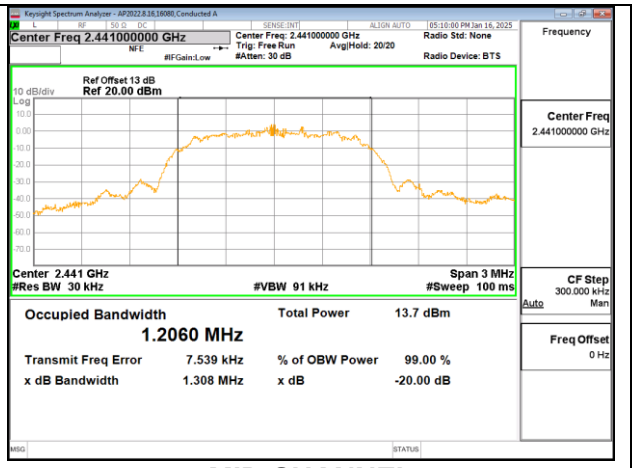
9.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

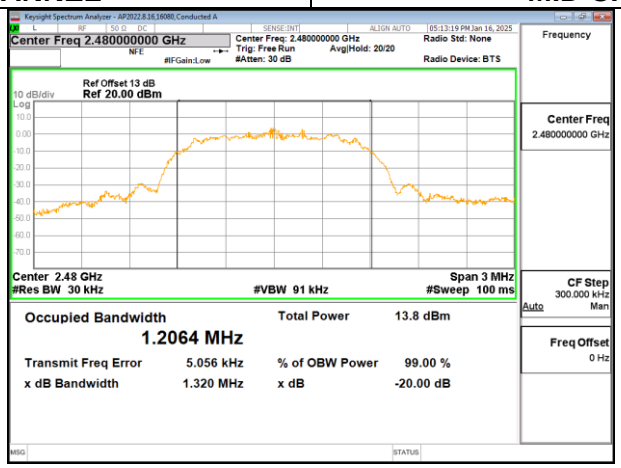
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.303	1.2032
Mid	2441	1.308	1.206
High	2480	1.32	1.2064



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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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 hoping channel, whichever is greater.

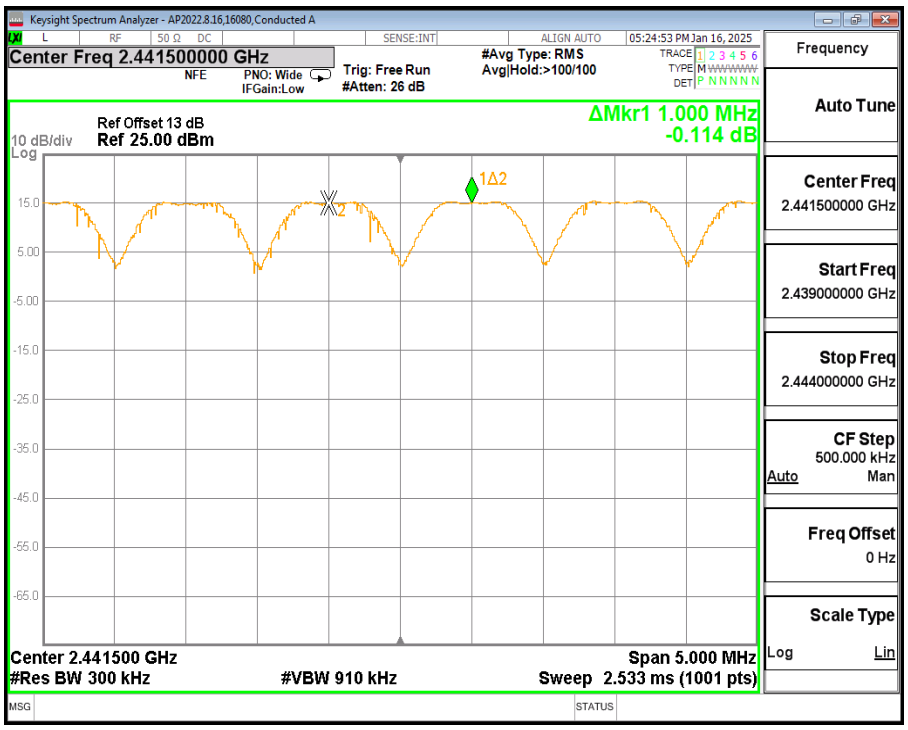
Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to VBW >= RBW. The sweep time is coupled.

RESULTS

9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



HOPPING FREQUENCY SEPARATION PLOT

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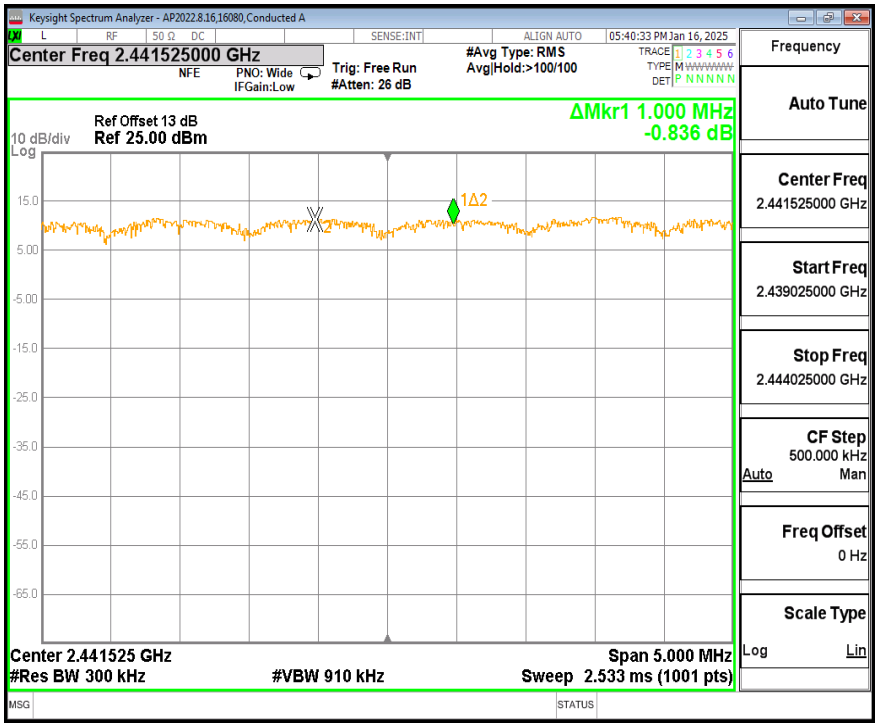
9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



HOPPING FREQUENCY SEPARATION PLOT

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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. The RBW is set to a maximum of 1 % of the span. The analyzer is set to Max Hold.

RESULTS

Normal Mode: 79 Channels Observed

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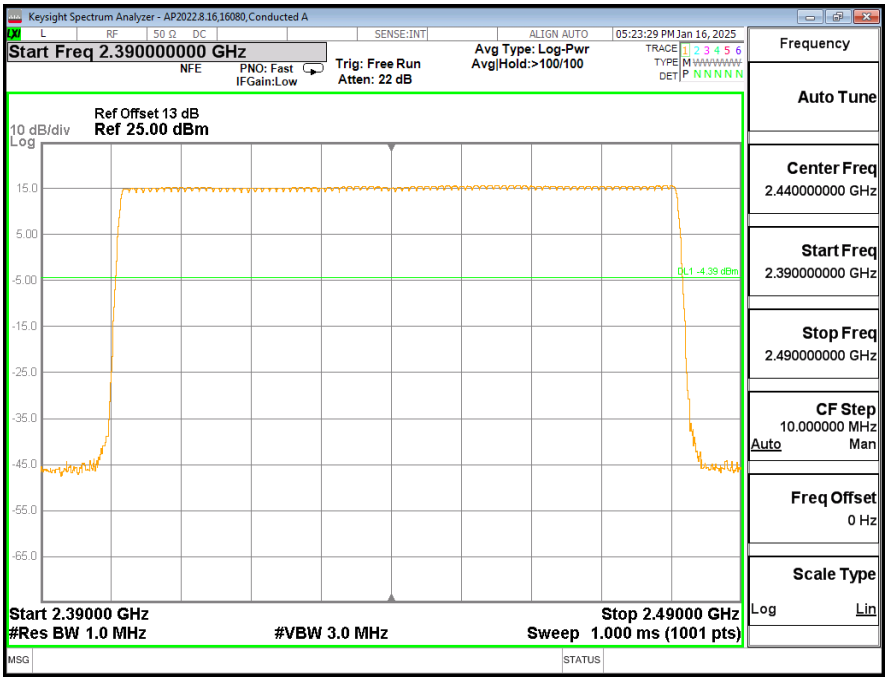
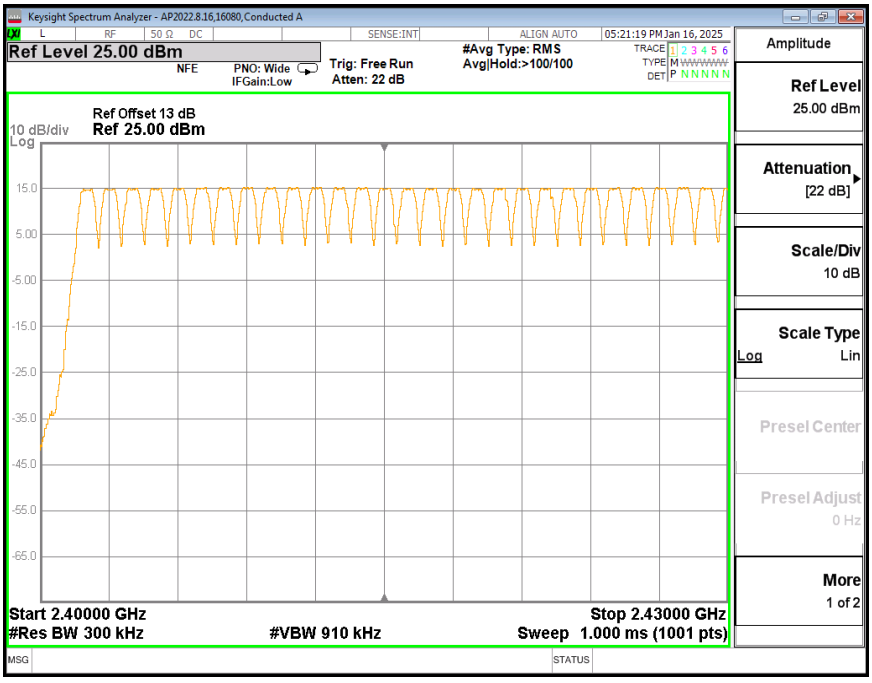
9.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

UL VERIFICATION SERVICES INC.
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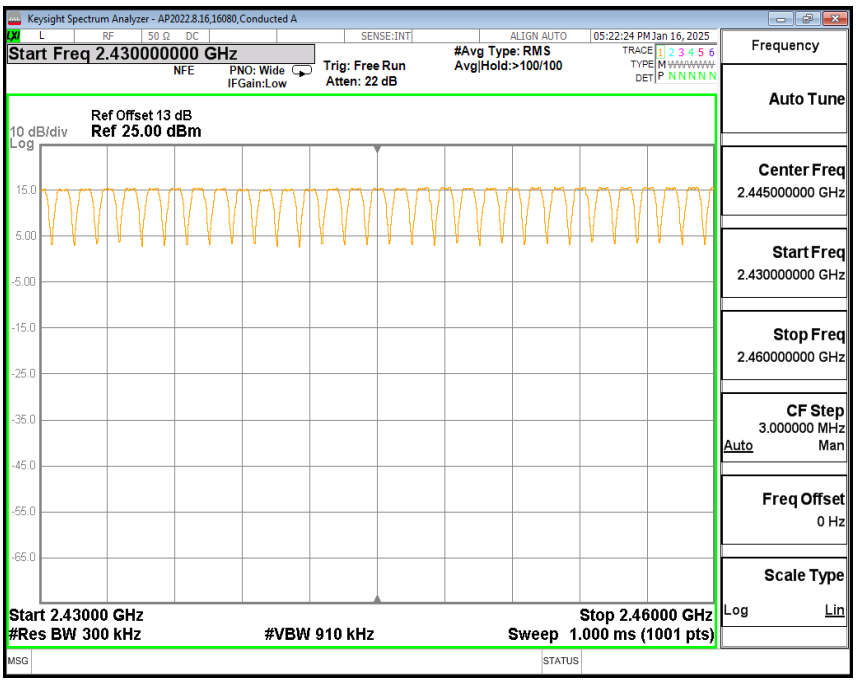
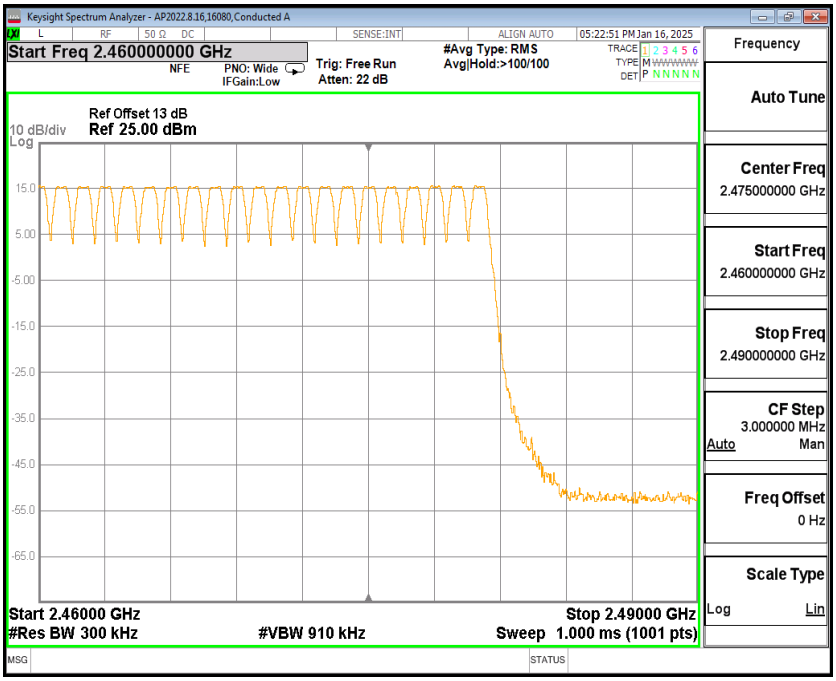


30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

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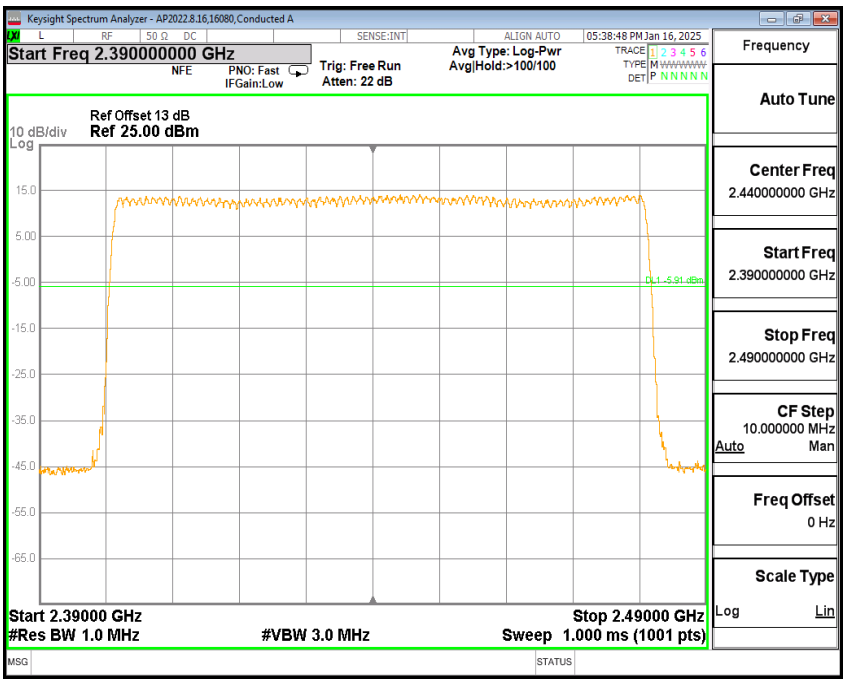
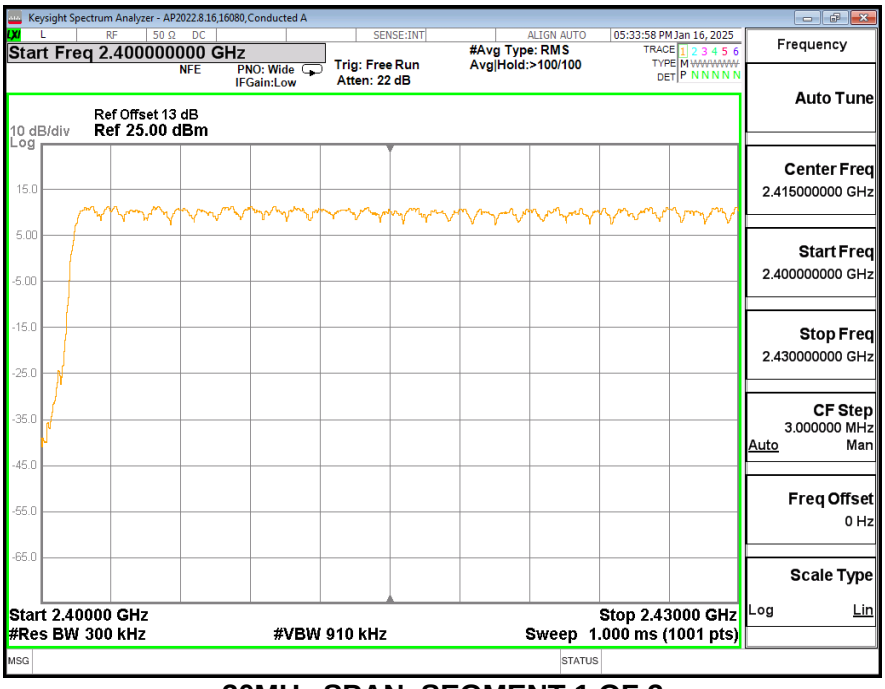
47173 Benicia Street, Fremont, CA 94538, USA TEL:(510) 319-4000 FAX:(510) 661-0888

9.4.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

UL VERIFICATION SERVICES INC.
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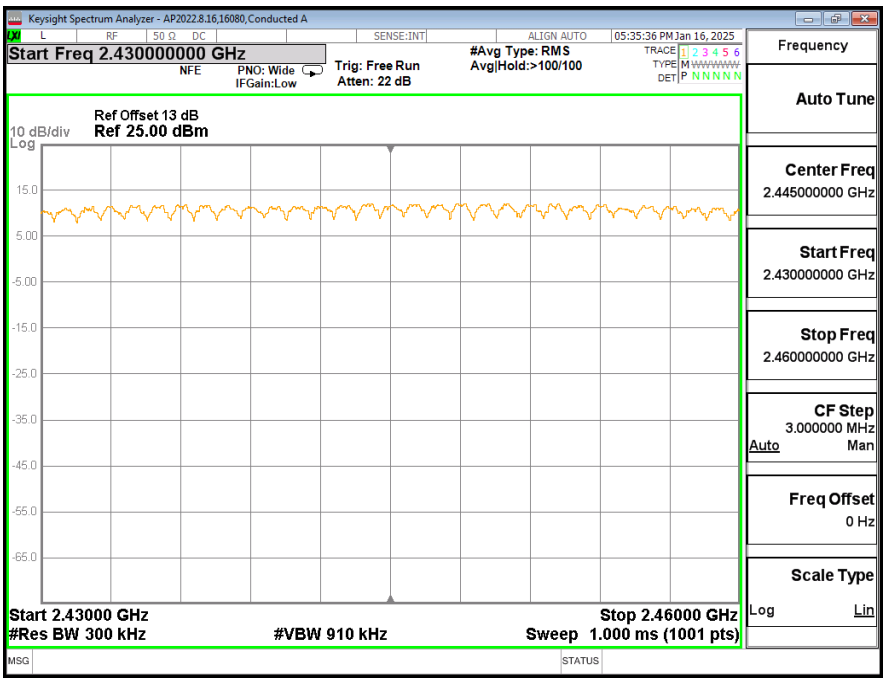
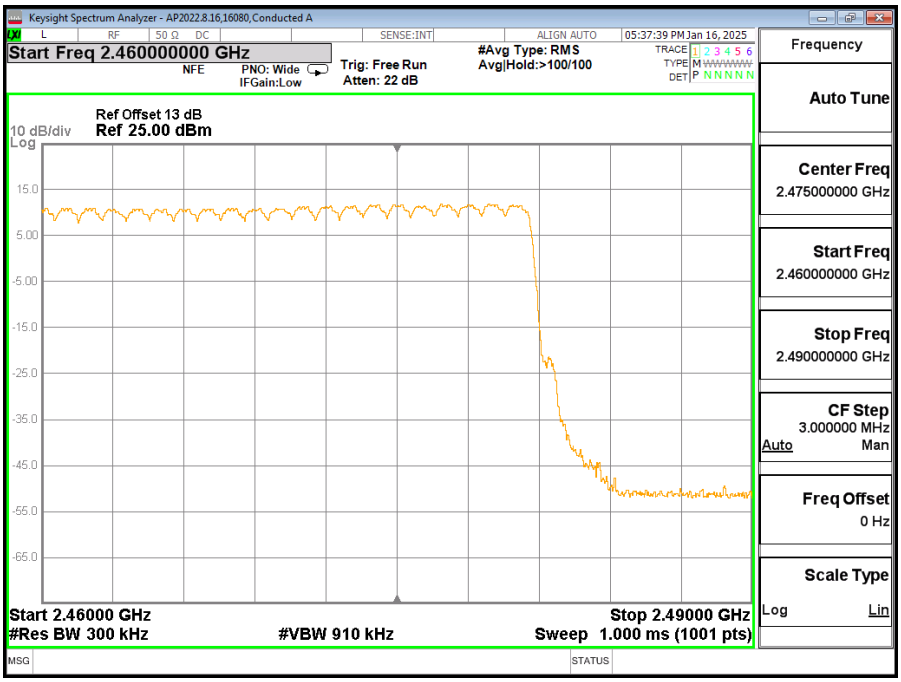


30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

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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 * (# of pulses in 3.16 s) * 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 * (# of pulses in 0.8 s) * pulse width.

RESULTS

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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 Mode					
DH1	0.378	32	0.1210	0.4	-0.2790
DH3	1.63	17	0.2771	0.4	-0.1229
DH5	2.872	7	0.2010	0.4	-0.1990
DH Packet	Pulse Width (msec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.378	8	0.03024	0.4	-0.3698
DH3	1.63	4.25	0.06928	0.4	-0.3307
DH5	2.872	1.75	0.05026	0.4	-0.3497

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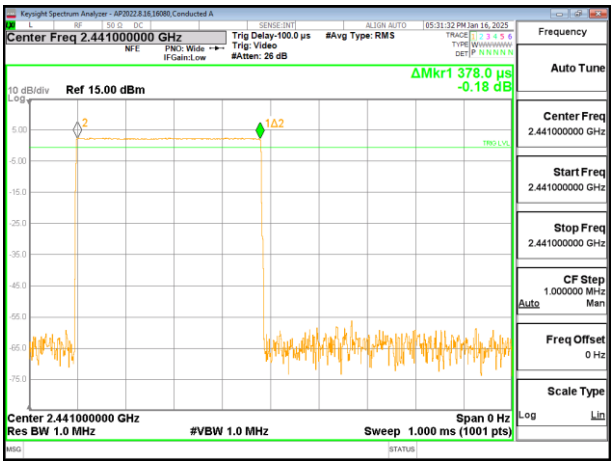
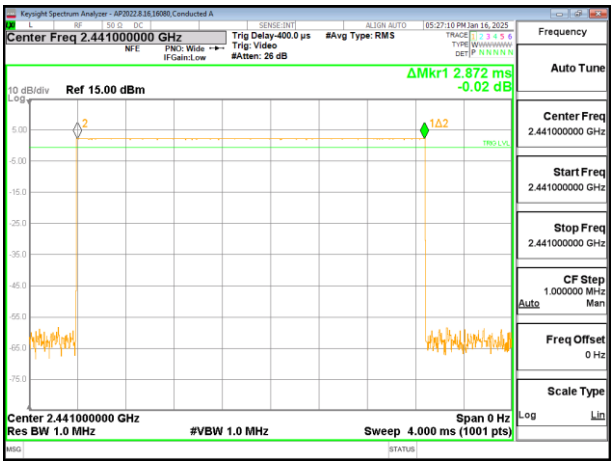
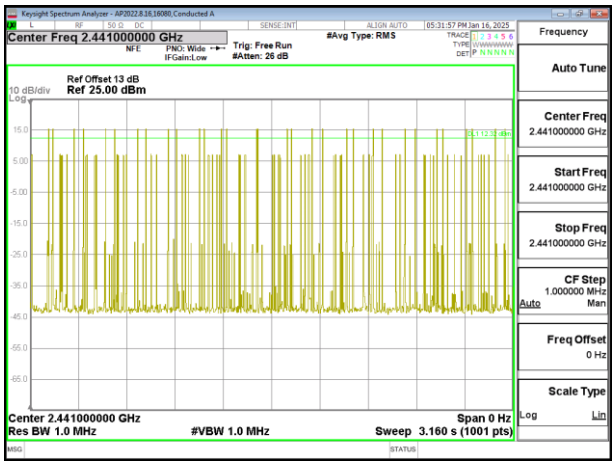


PULSE WIDTH – DH1

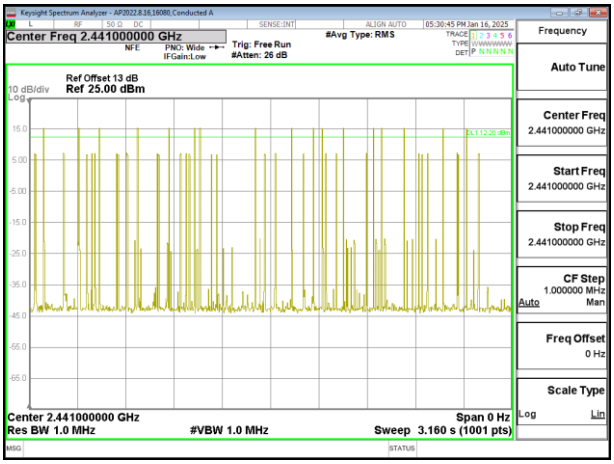
PULSE WIDTH – DH3



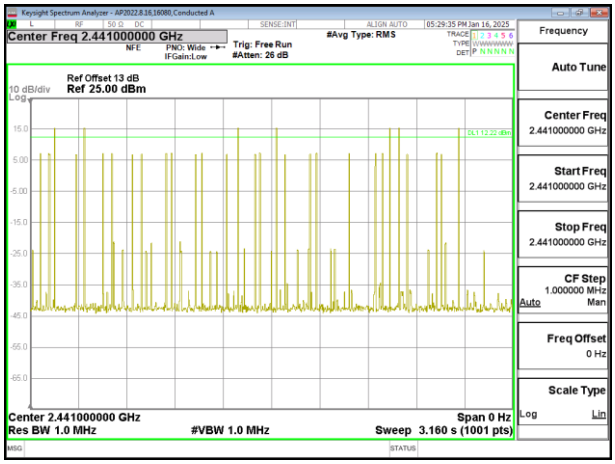
PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

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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 Mode					
3DH1	0.39	31	0.1209	0.4	-0.2791
3DH3	1.636	17	0.27812	0.4	-0.12188
3DH5	2.884	12	0.34608	0.4	-0.05392

Note: for AFH(8PSK) mode, please refer to the results of AFH(GFSK) mode; the channel selection and hopping rate are the same for both EDR and Basic Rate operation, data for Basic Rate demonstrates compliance with channel occupancy when AFH is employed.

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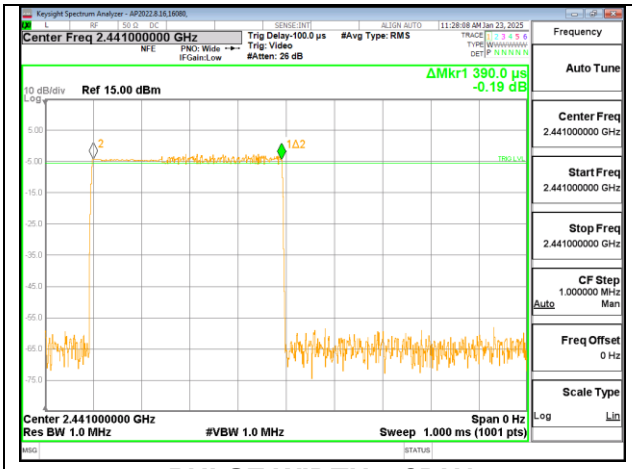
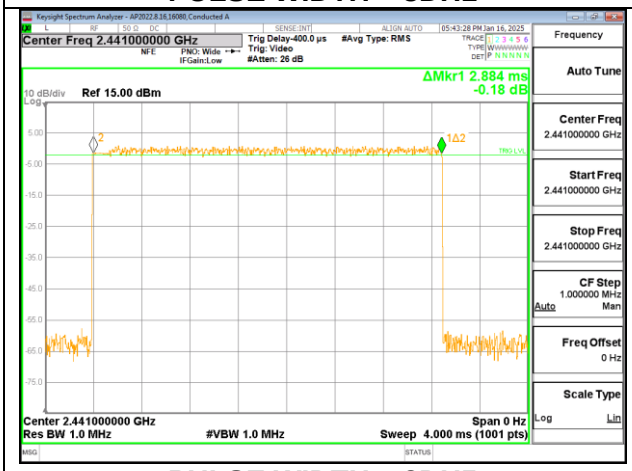
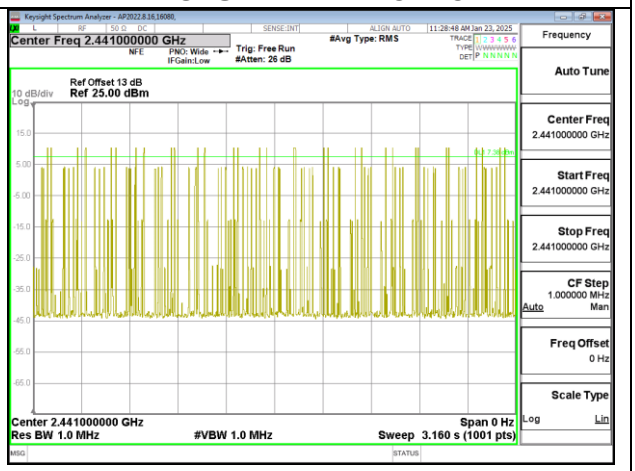


PULSE WIDTH – 3DH1

PULSE WIDTH – 3DH3

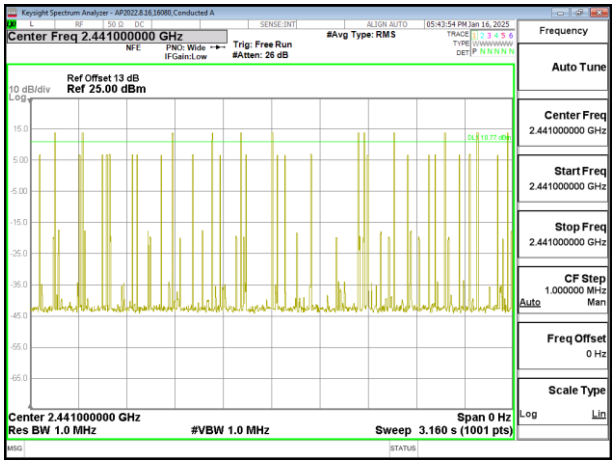


PULSE WIDTH – 3DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH1

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – 3DH5

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9.6. OUTPUT POWER

LIMITS

§15.247 (b) (1)

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

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Peak output power was read directly from power meter.

RESULTS

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9.6.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	ZS 16080
Date:	2025-01-16

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.94	21	-6.06
Middle	2441	15.13	21	-5.87
High	2480	15.5	21	-5.5

9.6.2. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	ZS 16080
Date:	2025-01-16

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	13.23	21	-7.77
Middle	2441	13.55	21	-7.45
High	2480	13.68	21	-7.32

9.6.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	ZS 16080
Date:	2025-01-16

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.19	21	-6.81
Middle	2441	14.25	21	-6.75
High	2480	14.81	21	-6.19

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9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband power sensor. Gated average output power was read directly from power meter.

RESULTS

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9.7.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

Tested By:	ZS 16080
Date	2025-01-16

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	14.65
Middle	2441	14.87
High	2480	15.27

9.7.2. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	ZS 16080
Date	2025-01-16

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	10.31
Middle	2441	10.68
High	2480	10.54

9.7.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	ZS 16080
Date	2025-01-16

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	10.42
Middle	2441	10.74
High	2480	10.89

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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

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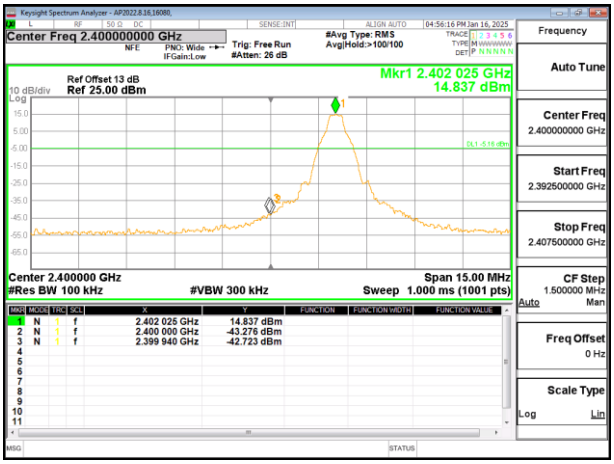
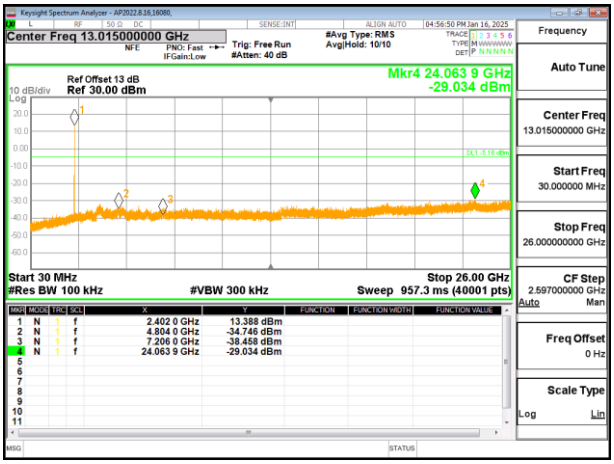
9.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

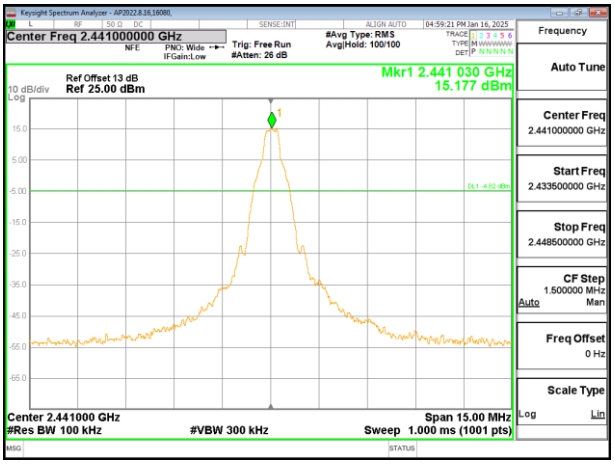
SPURIOUS EMISSIONS, NON-HOPPING



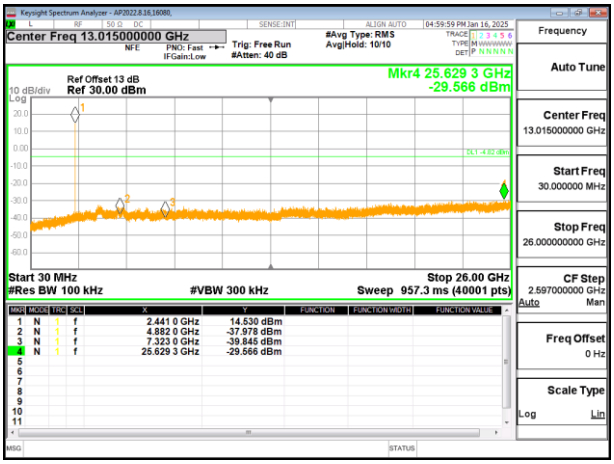
LOW CHANNEL BANDEDGE



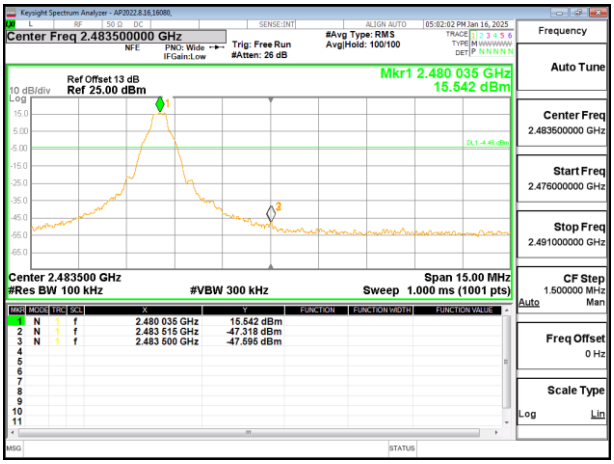
OUT-OF-BAND LOW CHANNEL



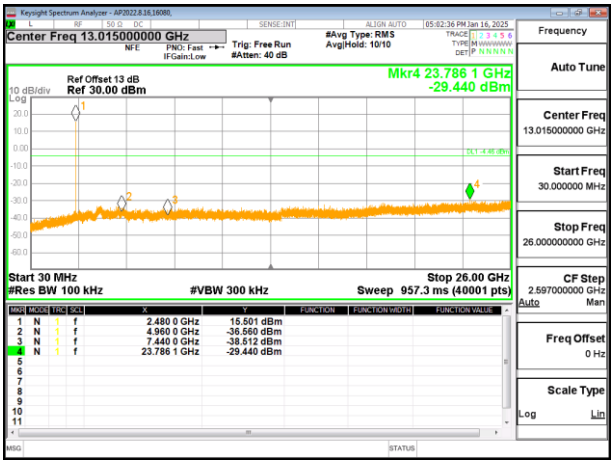
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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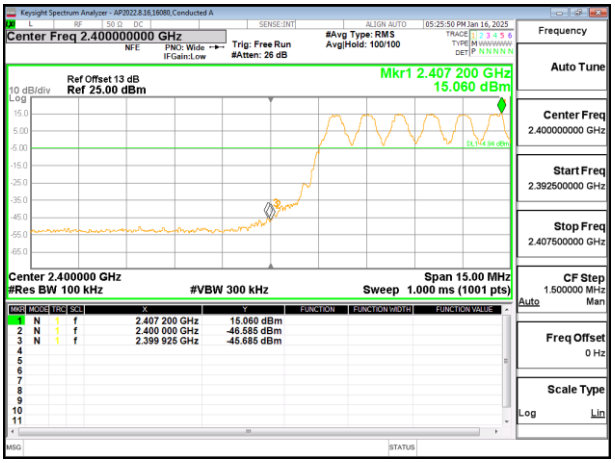
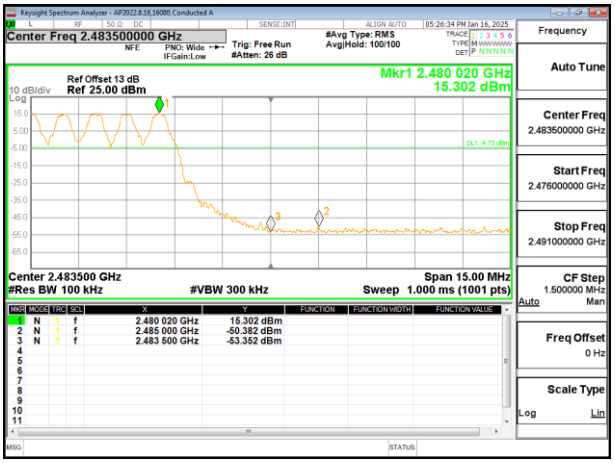
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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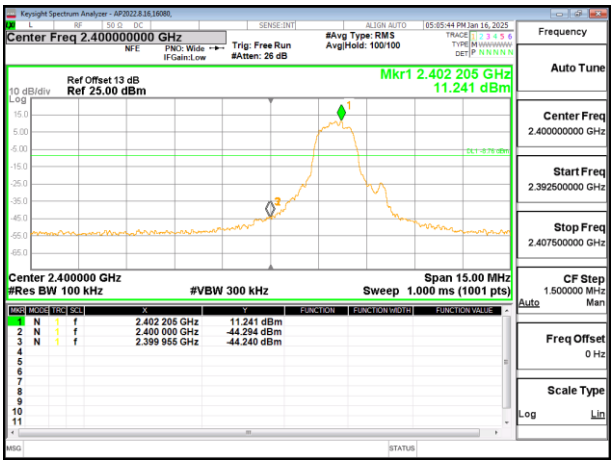
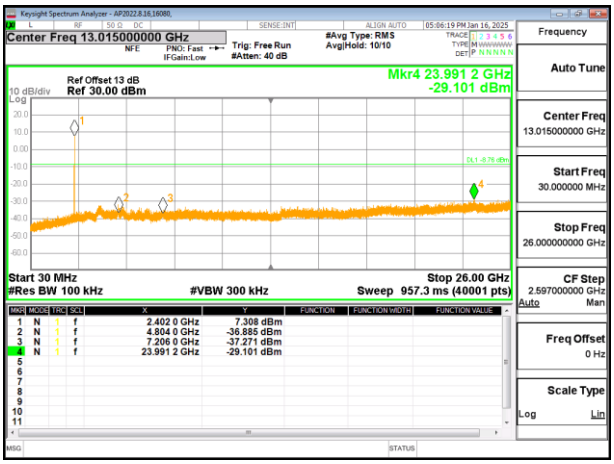
9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

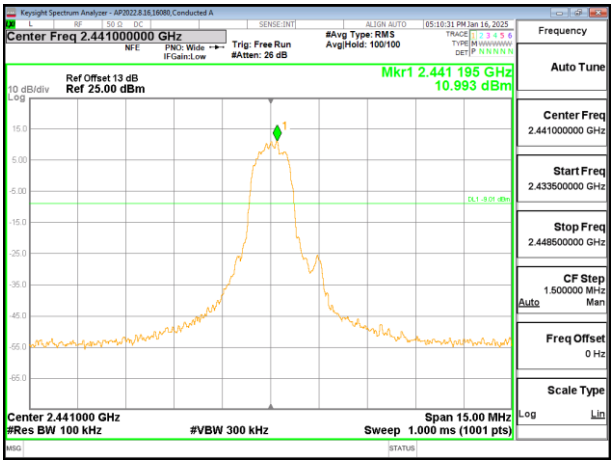
Antenna 1 SPURIOUS EMISSIONS, NON-HOPPING



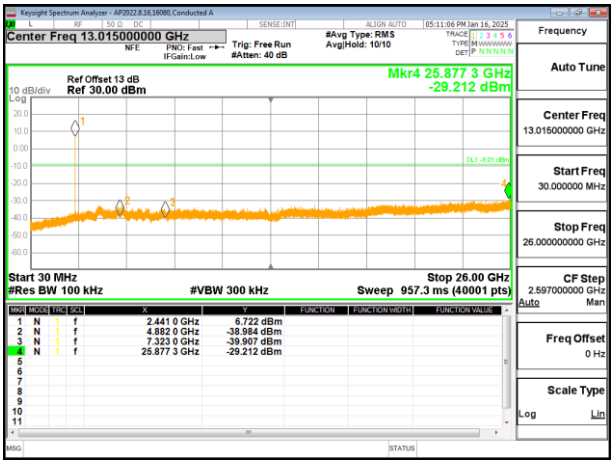
LOW CHANNEL BANDEDGE



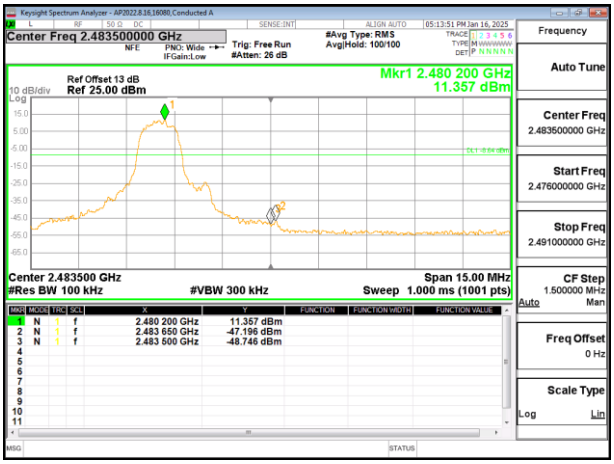
OUT-OF-BAND LOW CHANNEL



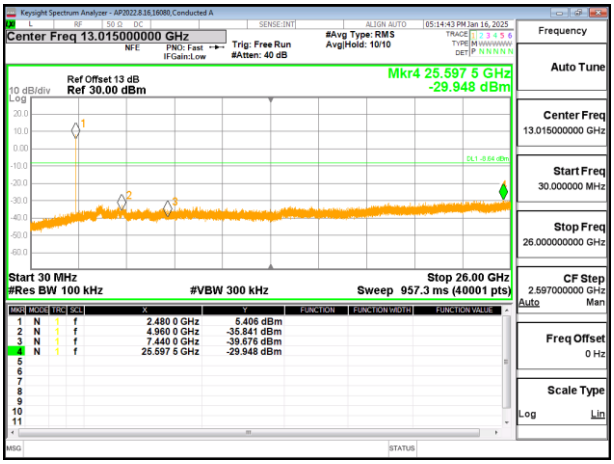
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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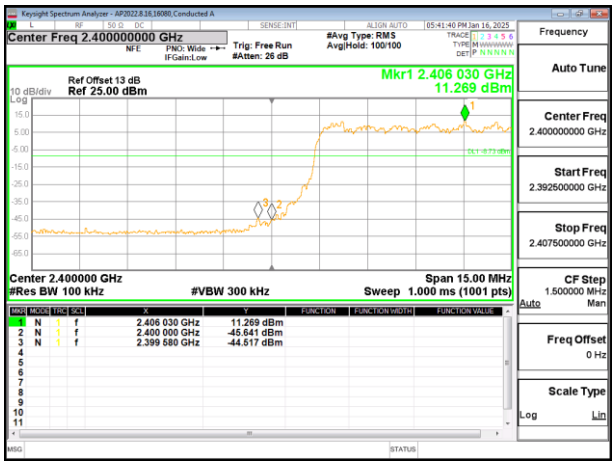
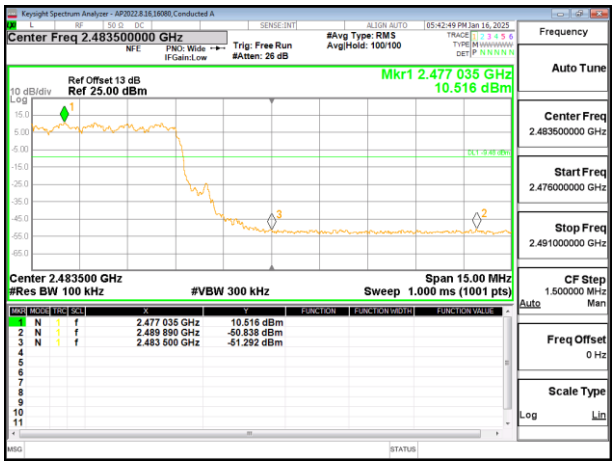
Antenna 1 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement 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 in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 kHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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.

For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

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Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification
OFS and chamber correlation testing had been performed and chamber measured test result is the worst-case test result.

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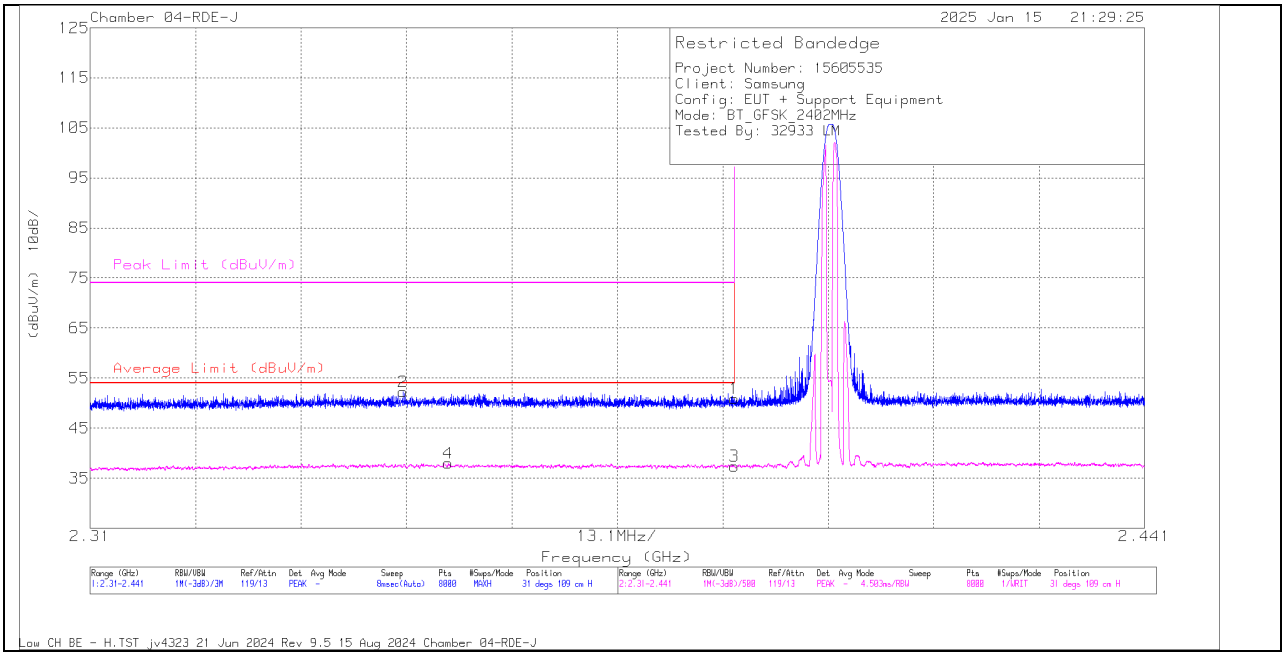
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (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	55.38	Pk	32.2	-36.7	50.88	-	-	74	-23.12	31	109	H
2	* 2.348895	57.02	Pk	32	-36.8	52.22	-	-	74	-21.78	31	109	H
3	* 2.39	41.91	VA1T	32.2	-36.7	37.41	54	-16.59	-	-	31	109	H
4	* 2.354513	42.66	VA1T	32.1	-36.8	37.96	54	-16.04	-	-	31	109	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

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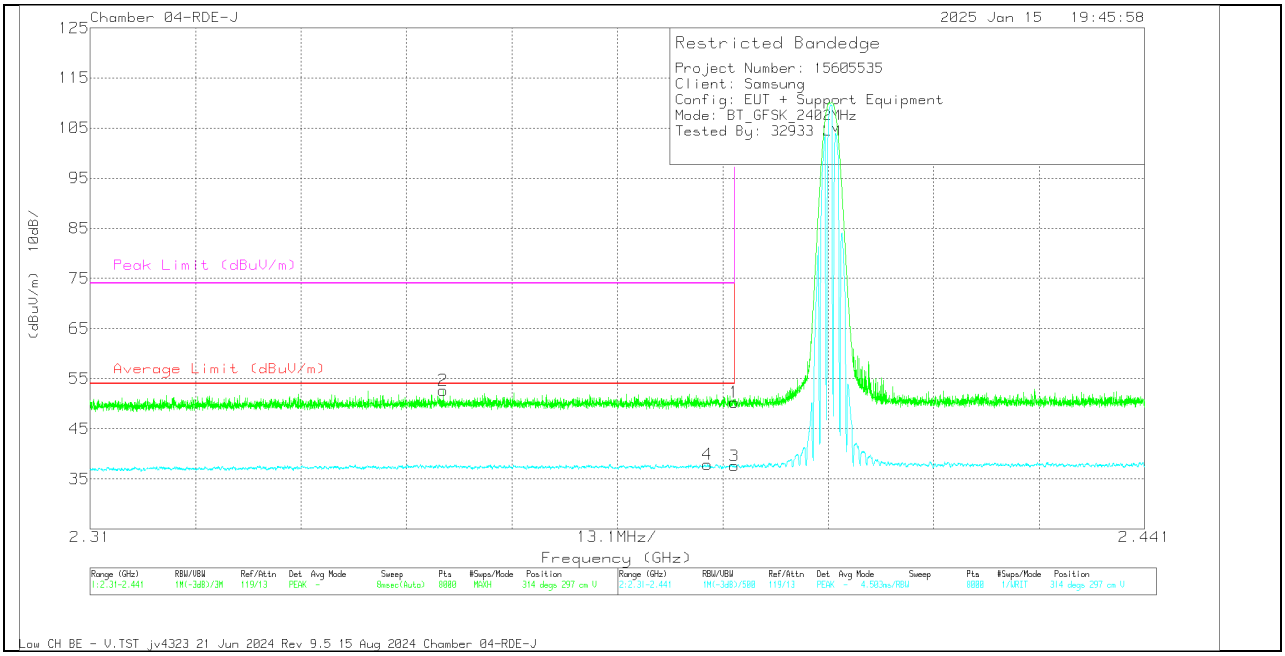
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.353874	57.36	Pk	32.1	-36.8	52.66	-	-	74	-21.34	314	297	V
4	* 2.386726	42.41	VA1T	32.2	-36.7	37.91	54	-16.09	-	-	314	297	V
1	* 2.39	54.8	Pk	32.2	-36.7	50.3	-	-	74	-23.7	314	297	V
3	* 2.39	42.08	VA1T	32.2	-36.7	37.58	54	-16.42	-	-	314	297	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

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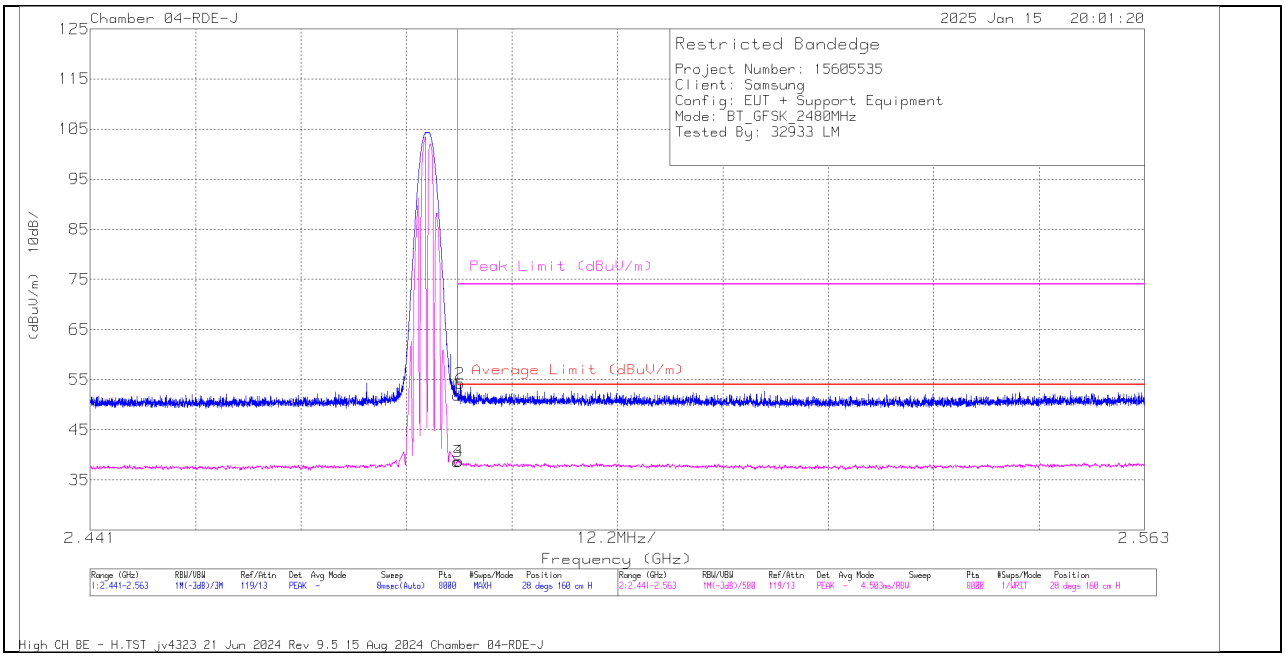
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (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	56.15	Pk	32.4	-36.6	51.95	-	-	74	-22.05	28	160	H
2	* 2.483828	58.42	Pk	32.4	-36.6	54.22	-	-	74	-19.78	28	160	H
3	* 2.4835	42.88	VA1T	32.4	-36.6	38.68	54	-15.32	-	-	28	160	H
4	* 2.483645	43	VA1T	32.4	-36.6	38.8	54	-15.2	-	-	28	160	H

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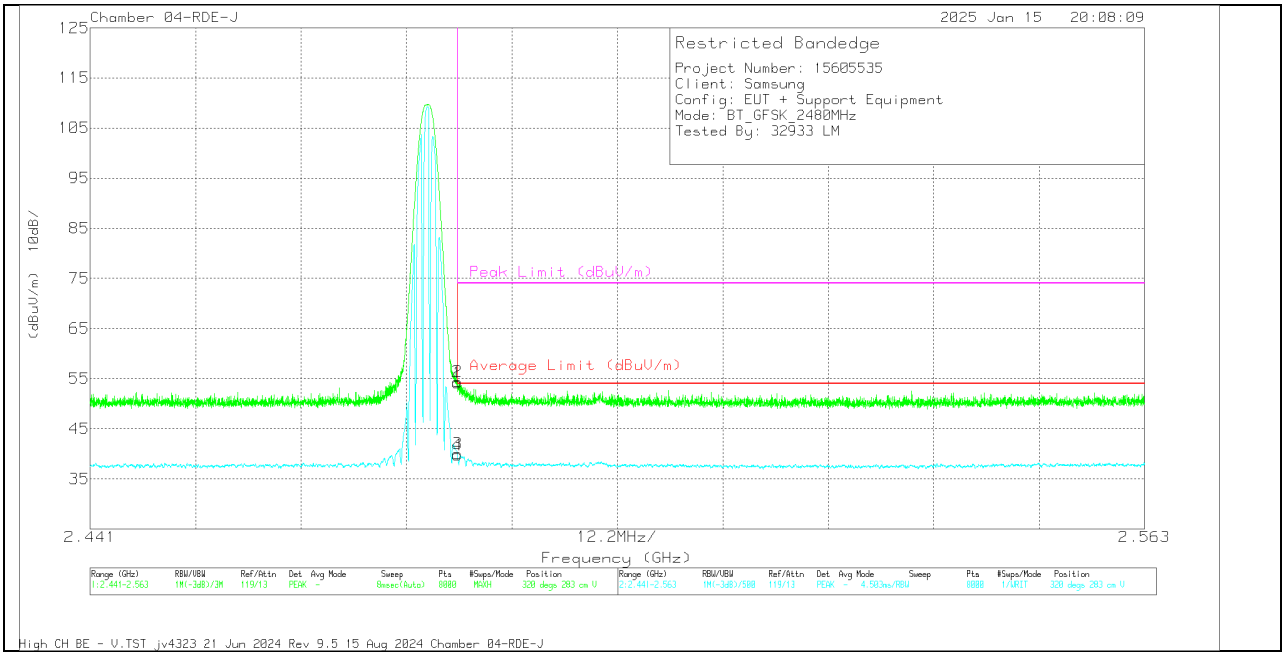
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (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	58.32	Pk	32.4	-36.6	54.12	-	-	74	-19.88	320	283	V
2	* 2.483523	58.61	Pk	32.4	-36.6	54.41	-	-	74	-19.59	320	283	V
3	* 2.4835	44.2	VA1T	32.4	-36.6	40	54	-14	-	-	320	283	V
4	* 2.483507	43.94	VA1T	32.4	-36.6	39.74	54	-14.26	-	-	320	283	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

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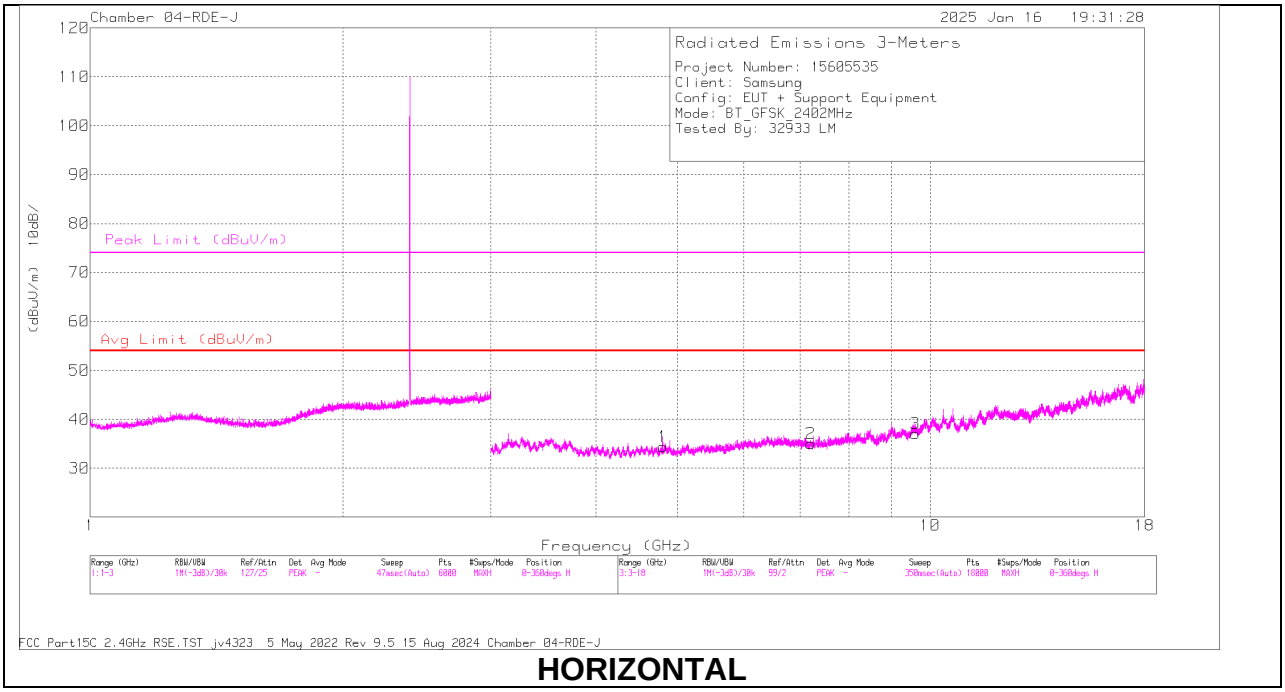
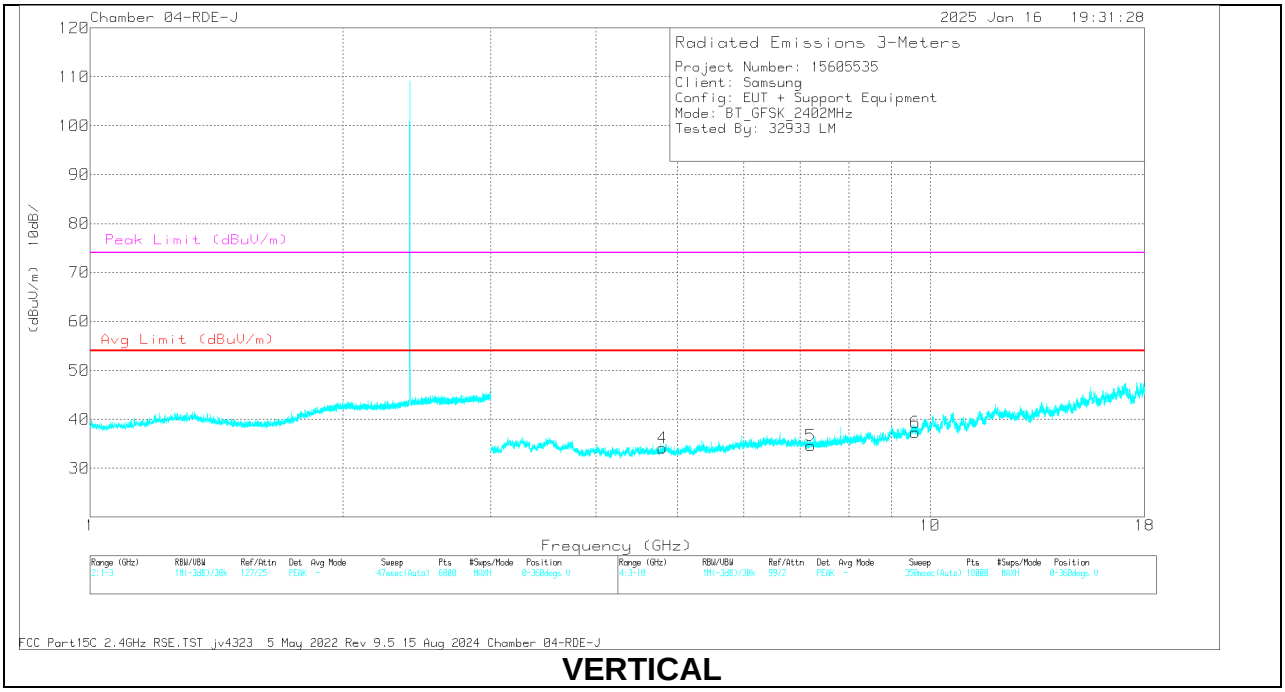
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.810534	53.91	PKFH	34.3	-45	43.21	-	-	74	-30.79	0	396	H
	* 4.819143	40.34	VA1T	34.3	-45	29.64	54	-24.36	-	-	0	396	H
2	7.195592	50.79	PKFH	35.5	-42.2	44.09	-	-	-	-	213	247	H
3	9.613564	50.01	PKFH	37	-40.4	46.61	-	-	-	-	233	228	H
4	* 4.806525	53.18	PKFH	34.3	-45	42.48	-	-	74	-31.52	213	121	V
	* 4.819378	39.91	VA1T	34.3	-45	29.21	54	-24.79	-	-	213	121	V
5	7.209016	50.93	PKFH	35.5	-42.2	44.23	-	-	-	-	78	152	V
6	9.617249	49.84	PKFH	37	-40.4	46.44	-	-	-	-	153	244	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

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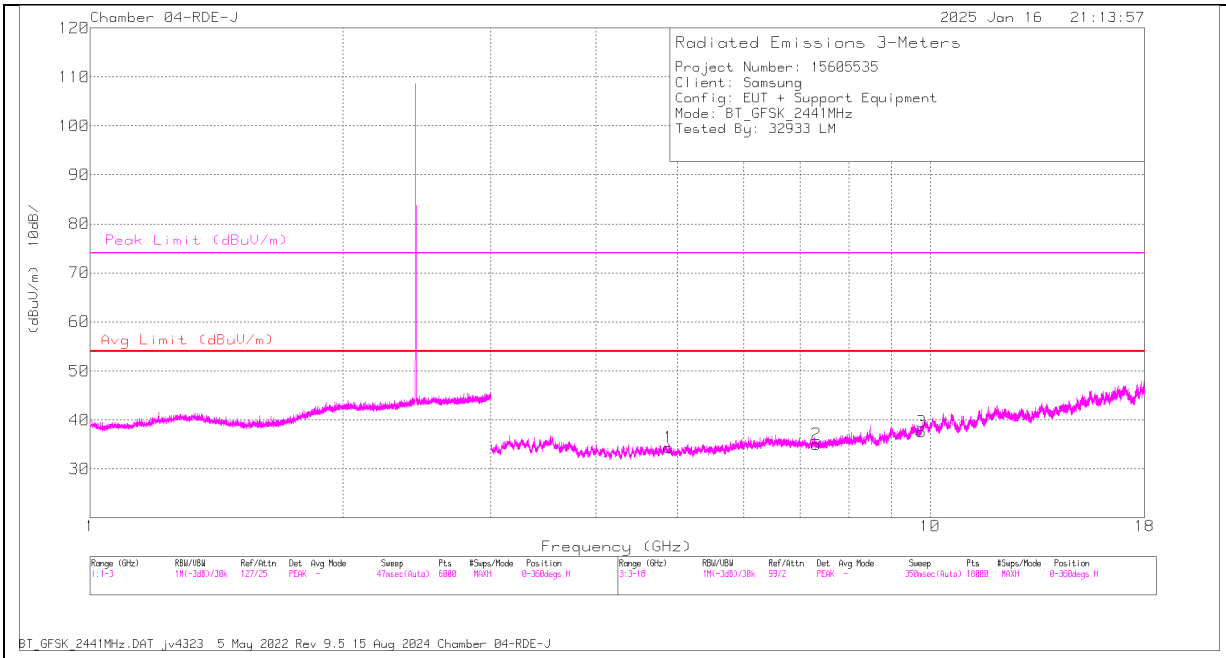
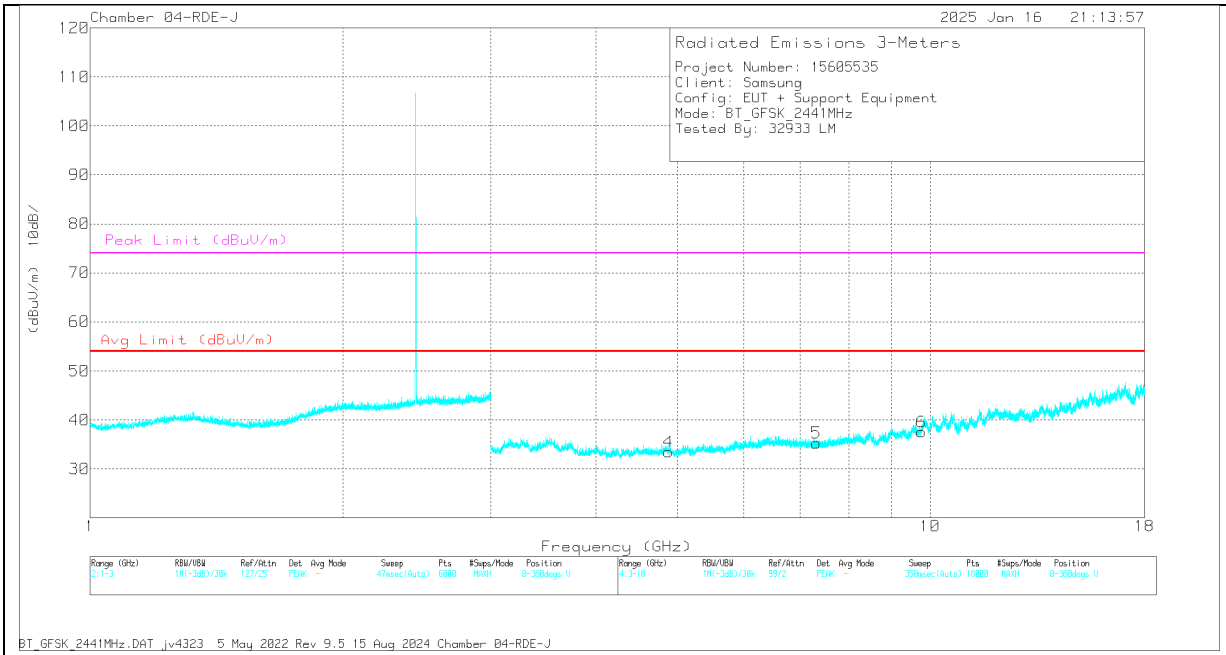
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.874402	52.8	PKFH	34.3	-44.6	42.5	-	-	74	-31.5	217	213	H
	* 4.888082	39.7	VA1T	34.3	-44.6	29.4	54	-24.6	-	-	217	213	H
2	* 7.341597	51.15	PKFH	35.5	-42.3	44.35	-	-	74	-29.65	94	101	H
	* 7.320535	37.49	VA1T	35.5	-42.2	30.79	54	-23.21	-	-	94	101	H
3	9.775272	50.43	PKFH	37.3	-40.7	47.03	-	-	-	-	341	186	H
4	* 4.860821	52.59	PKFH	34.3	-44.5	42.39	-	-	74	-31.61	238	116	V
	* 4.860208	39.58	VA1T	34.3	-44.5	29.38	54	-24.62	-	-	238	116	V
5	* 7.338011	50.81	PKFH	35.5	-42.3	44.01	-	-	74	-29.99	265	115	V
	* 7.327824	37.32	VA1T	35.5	-42.3	30.52	54	-23.48	-	-	265	115	V
6	9.765806	50.18	PKFH	37.2	-40.9	46.48	-	-	-	-	89	157	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

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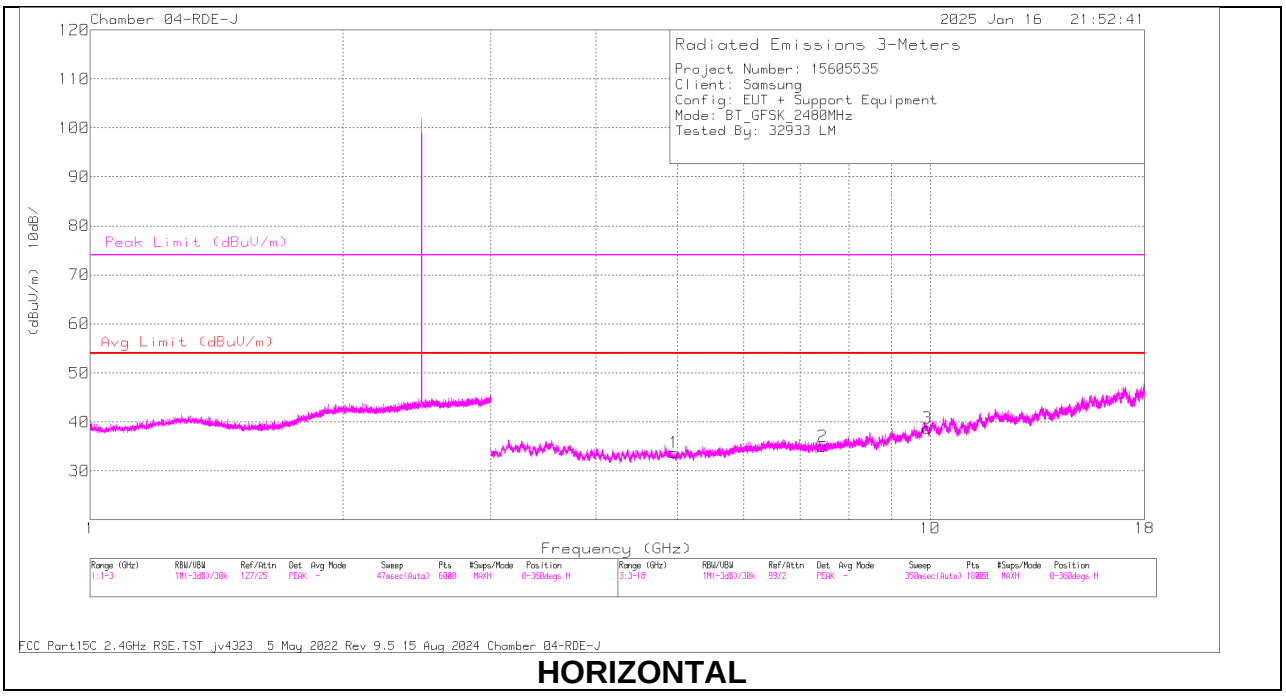
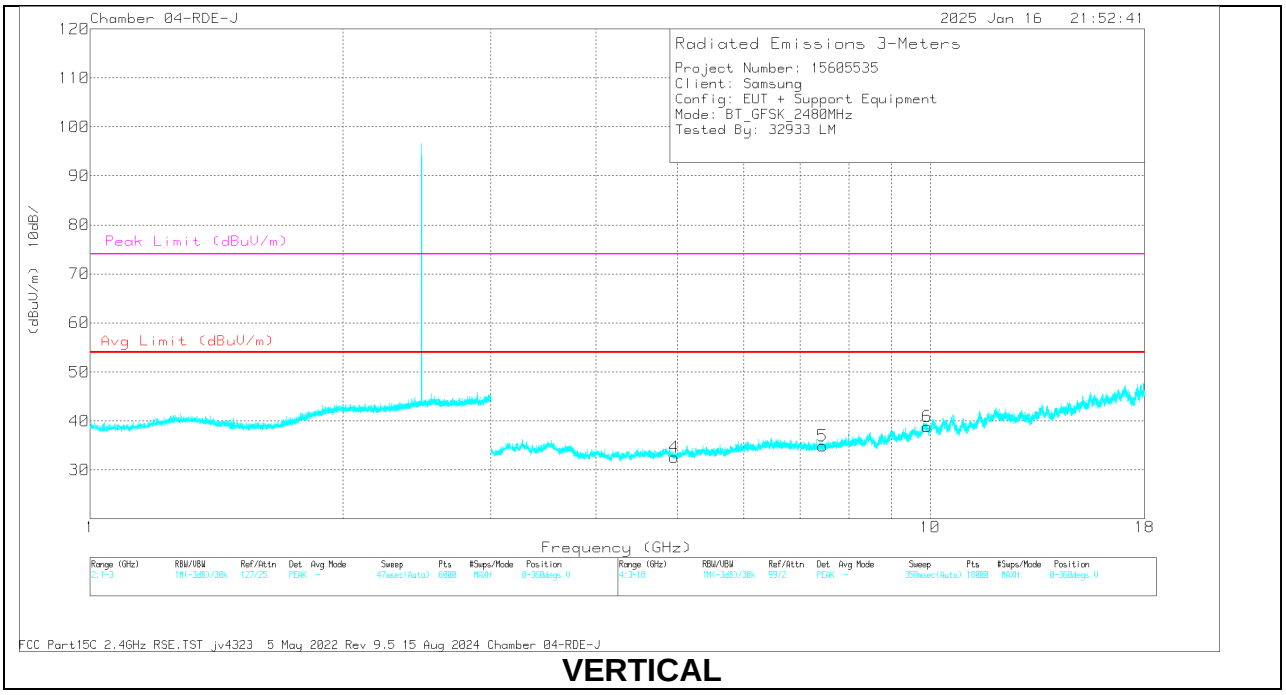
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.955015	52.08	PKFH	34.2	-44.8	41.48	-	-	74	-32.52	281	221	H
	* 4.963175	39.3	VA1T	34.2	-44.7	28.8	54	-25.2	-	-	281	221	H
2	* 7.428244	49.89	PKFH	35.5	-42.1	43.29	-	-	74	-30.71	281	225	H
	* 7.435	37.05	VA1T	35.5	-42.1	30.45	54	-23.55	-	-	281	225	H
3	9.933881	49.44	PKFH	37.6	-40.1	46.94	-	-	-	-	82	287	H
4	* 4.953927	52.23	PKFH	34.2	-44.8	41.63	-	-	74	-32.37	298	101	V
	* 4.944451	39.23	VA1T	34.2	-44.7	28.73	54	-25.27	-	-	298	101	V
5	* 7.431632	50.33	PKFH	35.5	-42.1	43.73	-	-	74	-30.27	222	214	V
	* 7.431232	37.01	VA1T	35.5	-42.1	30.41	54	-23.59	-	-	222	214	V
6	9.937822	49.65	PKFH	37.6	-40.2	47.05	-	-	-	-	144	342	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

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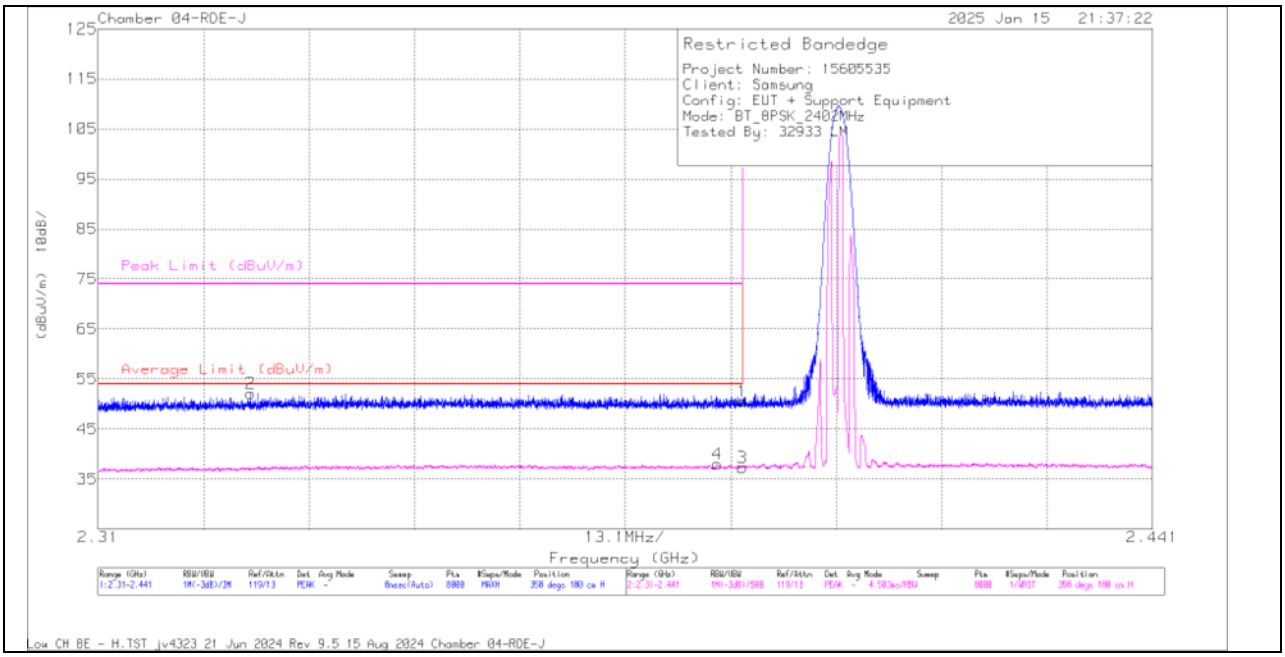
10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.328965	57.08	Pk	31.9	-36.8	52.18	-	-	74	-21.82	358	180	H
4	* 2.38689	42.51	VA1T	32.2	-36.7	38.01	54	-15.99	-	-	358	180	H
1	* 2.39	54.99	Pk	32.2	-36.7	50.49	-	-	74	-23.51	358	180	H
3	* 2.39	41.78	VA1T	32.2	-36.7	37.28	54	-16.72	-	-	358	180	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

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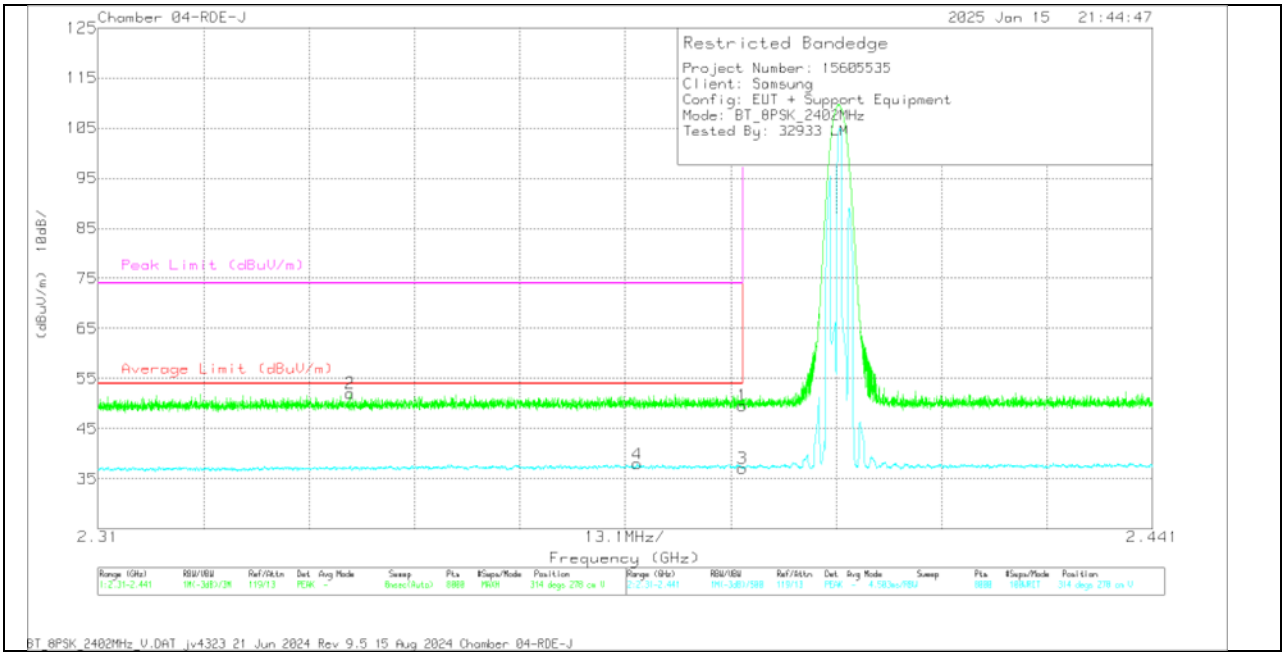
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (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	54.19	Pk	32.2	-36.7	49.69	-	-	74	-24.31	314	278	V
2	* 2.341296	56.83	Pk	32	-36.8	52.03	-	-	74	-21.97	314	278	V
3	* 2.39	41.6	VA1T	32.2	-36.7	37.1	54	-16.9	-	-	314	278	V
4	* 2.376982	42.45	VA1T	32.2	-36.7	37.95	54	-16.05	-	-	314	278	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

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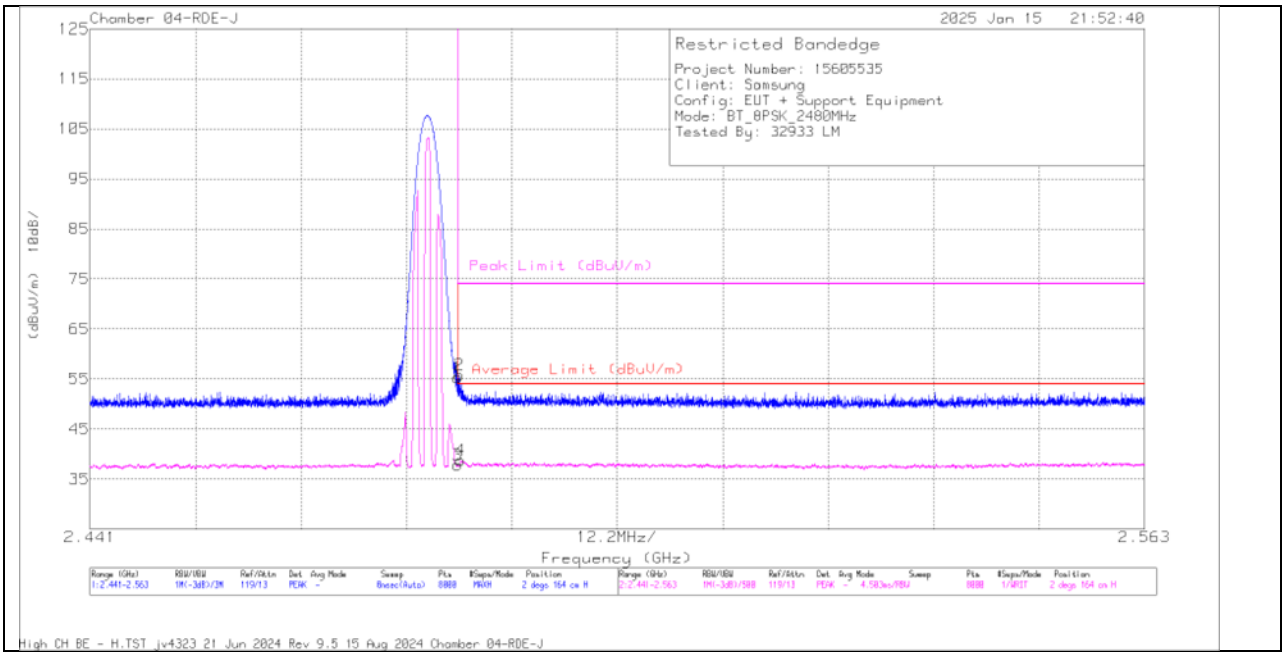
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (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	59.48	Pk	32.4	-36.6	55.28	-	-	74	-18.72	2	164	H
2	* 2.483751	60	Pk	32.4	-36.6	55.8	-	-	74	-18.2	2	164	H
3	* 2.4835	42.02	VA1T	32.4	-36.6	37.82	54	-16.18	-	-	2	164	H
4	* 2.483889	42.94	VA1T	32.4	-36.6	38.74	54	-15.26	-	-	2	164	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

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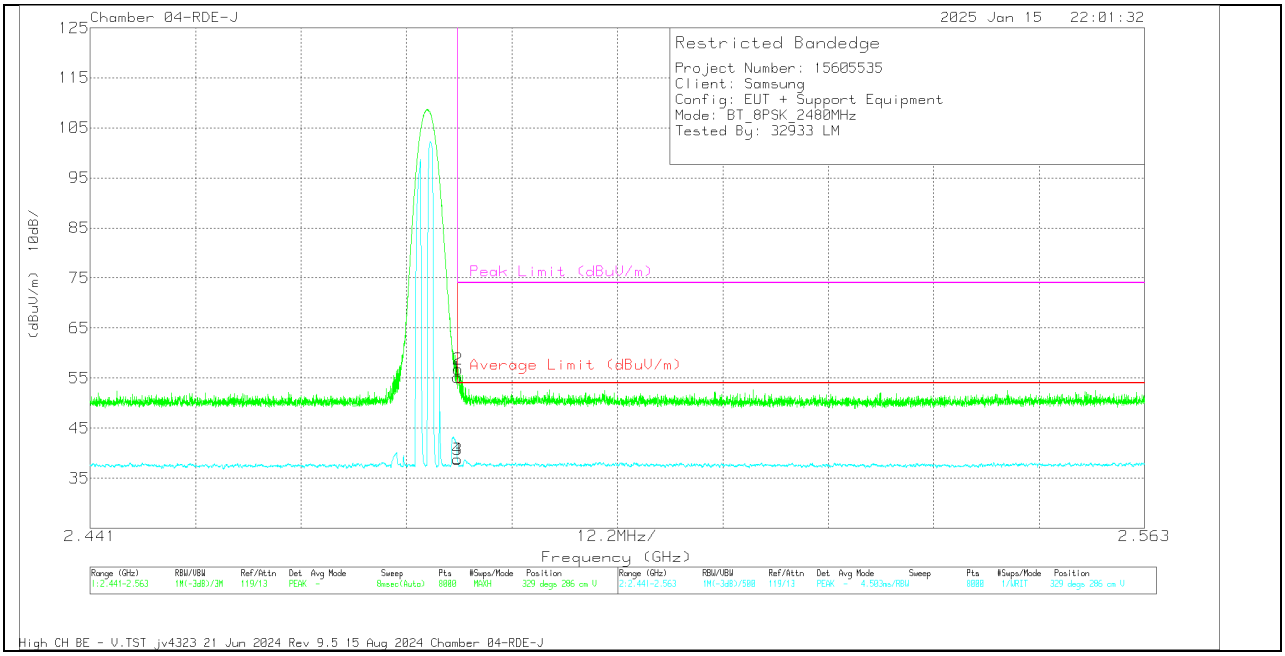
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Pad (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	59.35	Pk	32.4	-36.6	55.15	-	-	74	-18.85	329	286	V
2	* 2.483614	61.01	Pk	32.4	-36.6	56.81	-	-	74	-17.19	329	286	V
3	* 2.4835	43.02	VA1T	32.4	-36.6	38.82	54	-15.18	-	-	329	286	V
4	* 2.483507	42.94	VA1T	32.4	-36.6	38.74	54	-15.26	-	-	329	286	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

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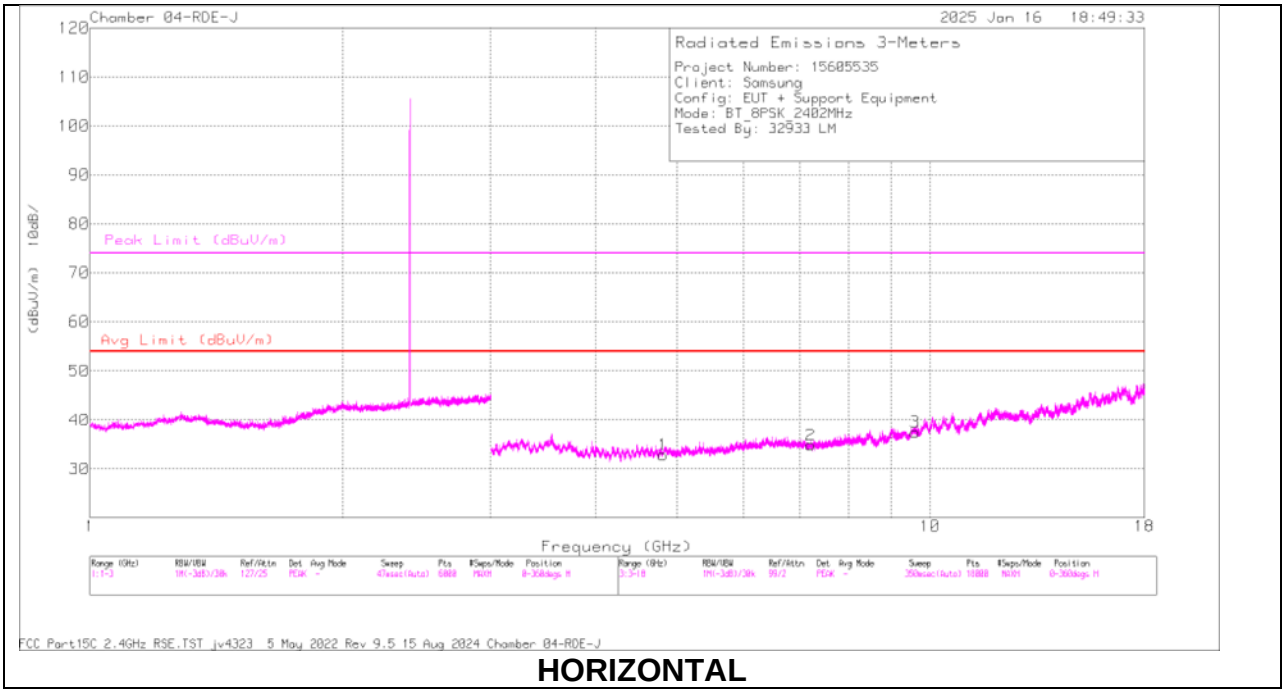
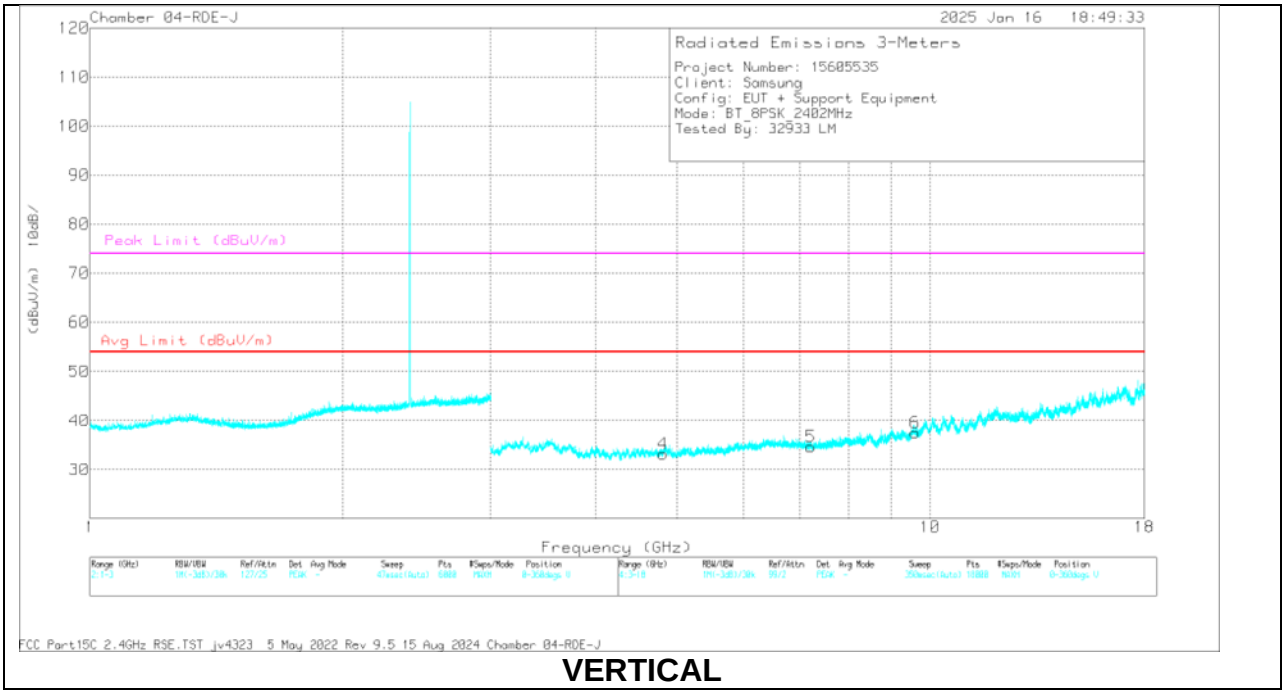
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.785244	55.66	PKFH	34.3	-45.1	44.86	-	-	74	-29.14	276	110	H
	* 4.783338	40.43	VA1T	34.3	-45.1	29.63	54	-24.37	-	-	276	110	H
2	7.199148	51.22	PKFH	35.5	-42.1	44.62	-	-	-	-	234	240	H
3	9.618423	50.65	PKFH	37	-40.4	47.25	-	-	-	-	66	252	H
4	* 4.797101	53.52	PKFH	34.3	-45.1	42.72	-	-	74	-31.28	264	242	V
	* 4.818421	39.88	VA1T	34.3	-45	29.18	54	-24.82	-	-	264	242	V
5	7.214799	51.28	PKFH	35.5	-42.2	44.58	-	-	-	-	270	124	V
6	9.611242	49.64	PKFH	37	-40.4	46.24	-	-	-	-	157	164	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

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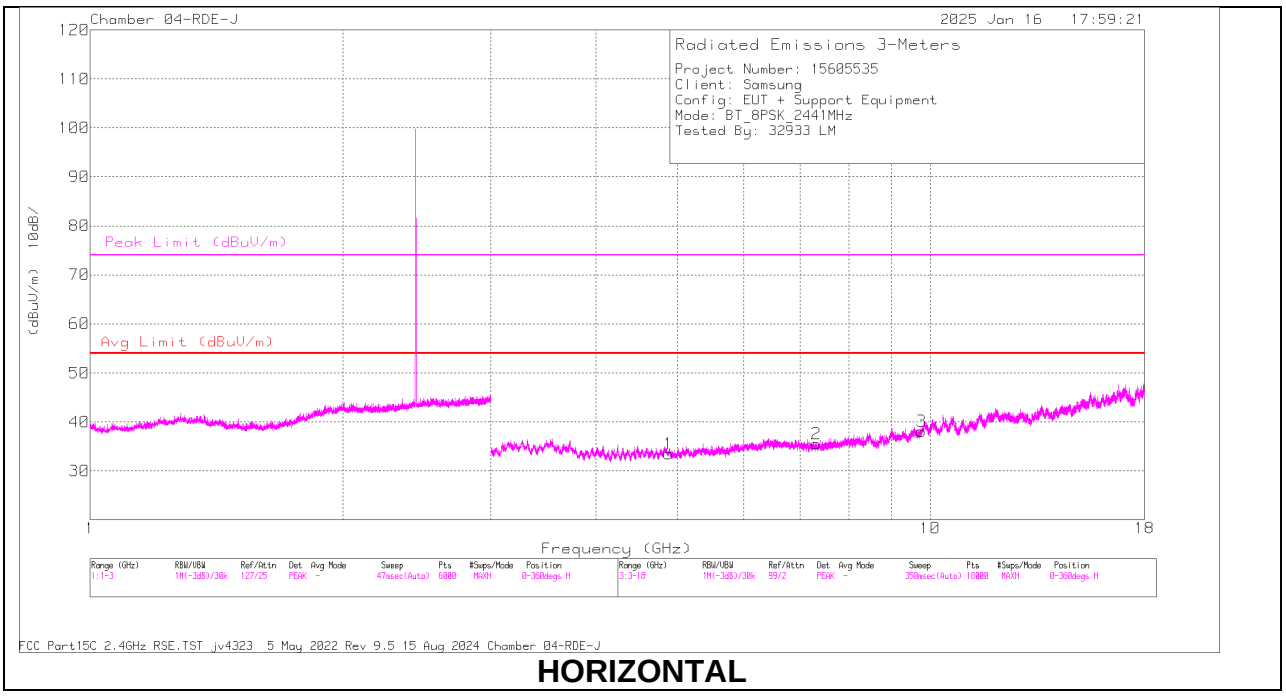
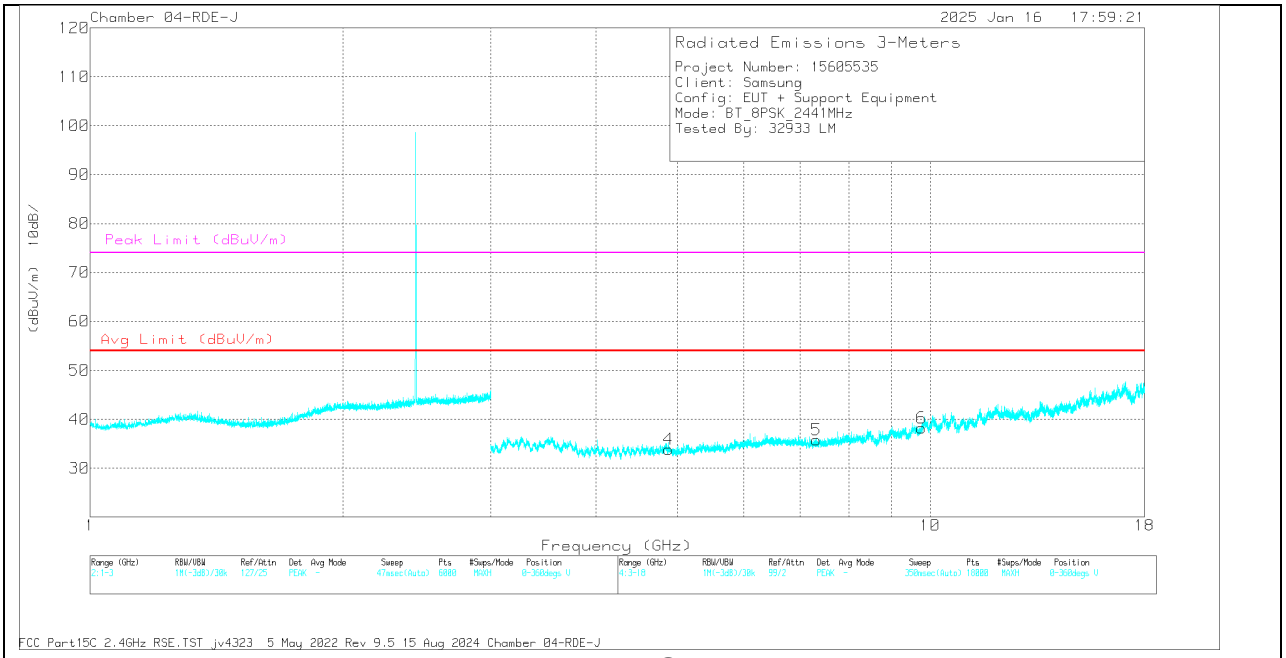
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538, USA TEL:(510) 319-4000 FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.899721	53.19	PKFH	34.3	-44.5	42.99	-	-	74	-31.01	252	117	H
	* 4.870886	39.78	VA1T	34.3	-44.5	29.58	54	-24.42	-	-	252	117	H
2	* 7.323552	51.19	PKFH	35.5	-42.2	44.49	-	-	74	-29.51	220	102	H
	* 7.322432	38.16	VA1T	35.5	-42.2	31.46	54	-22.54	-	-	220	102	H
3	9.777431	50.74	PKFH	37.3	-40.7	47.34	-	-	-	-	6	108	H
4	* 4.885033	53.58	PKFH	34.3	-44.6	43.28	-	-	74	-30.72	286	108	V
	* 4.881051	39.87	VA1T	34.3	-44.6	29.57	54	-24.43	-	-	286	108	V
5	* 7.333798	51.51	PKFH	35.5	-42.3	44.71	-	-	74	-29.29	264	123	V
	* 7.323034	40.28	VA1T	35.5	-42.3	33.48	54	-20.52	-	-	264	123	V
6	9.765756	50.68	PKFH	37.2	-40.9	46.98	-	-	-	-	290	243	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

UL VERIFICATION SERVICES INC.
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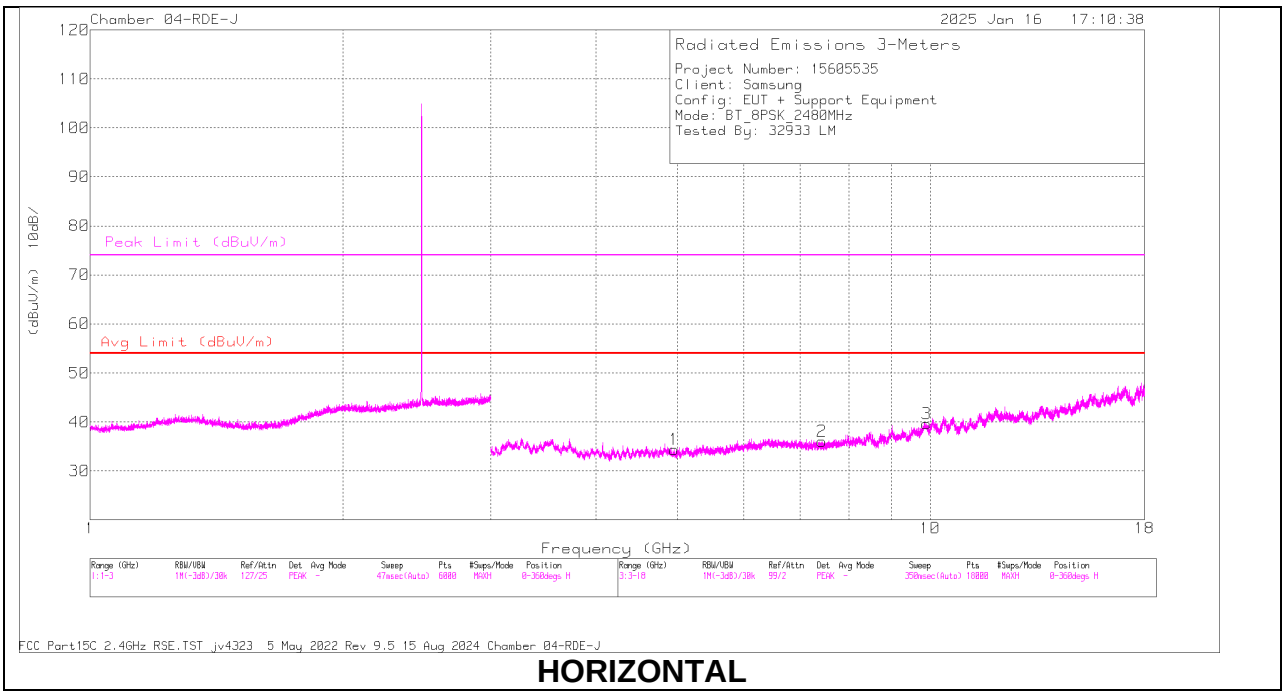
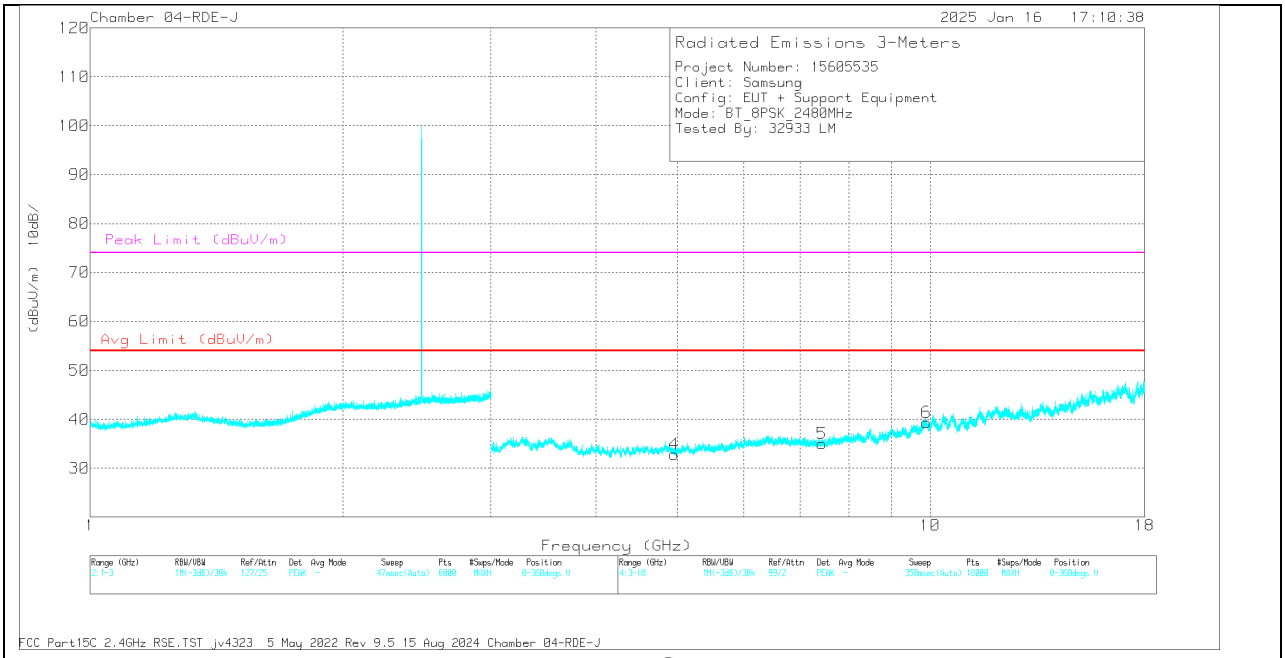
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538, USA TEL:(510) 319-4000 FAX:(510) 661-0888

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80707 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.95068	53.25	PKFH	34.2	-44.7	42.75	-	-	74	-31.25	95	185	H
	* 4.961817	39.91	VA1T	34.2	-44.7	29.41	54	-24.59	-	-	95	185	H
2	* 7.448847	51.12	PKFH	35.6	-42.1	44.62	-	-	74	-29.38	1	232	H
	* 7.435807	37.43	VA1T	35.5	-42.1	30.83	54	-23.17	-	-	1	232	H
3	9.915703	49.56	PKFH	37.5	-39.5	47.56	-	-	-	-	110	191	H
4	* 4.958228	53.37	PKFH	34.2	-44.7	42.87	-	-	74	-31.13	99	170	V
	* 4.969824	39.6	VA1T	34.2	-44.7	29.1	54	-24.9	-	-	99	170	V
5	* 7.439965	50.26	PKFH	35.5	-42.1	43.66	-	-	74	-30.34	304	219	V
	* 7.425379	37.29	VA1T	35.5	-42.1	30.69	54	-23.31	-	-	304	219	V
6	9.901199	49.78	PKFH	37.5	-39.5	47.78	-	-	-	-	0	317	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

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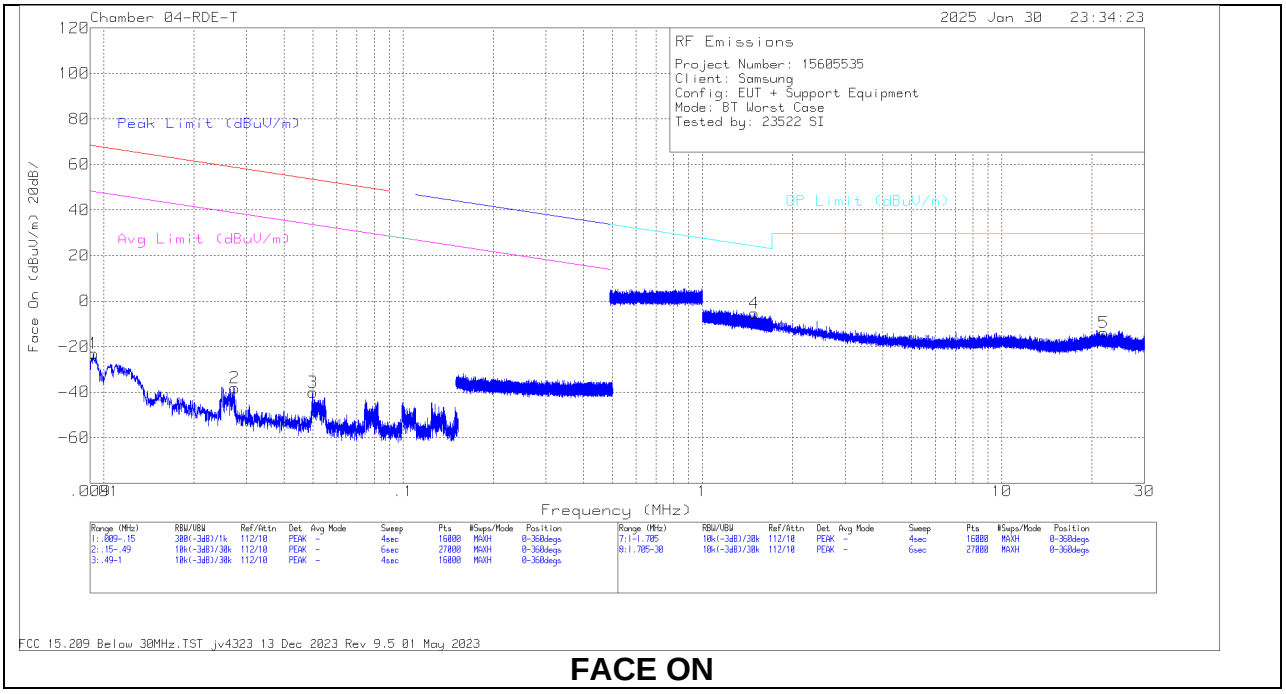
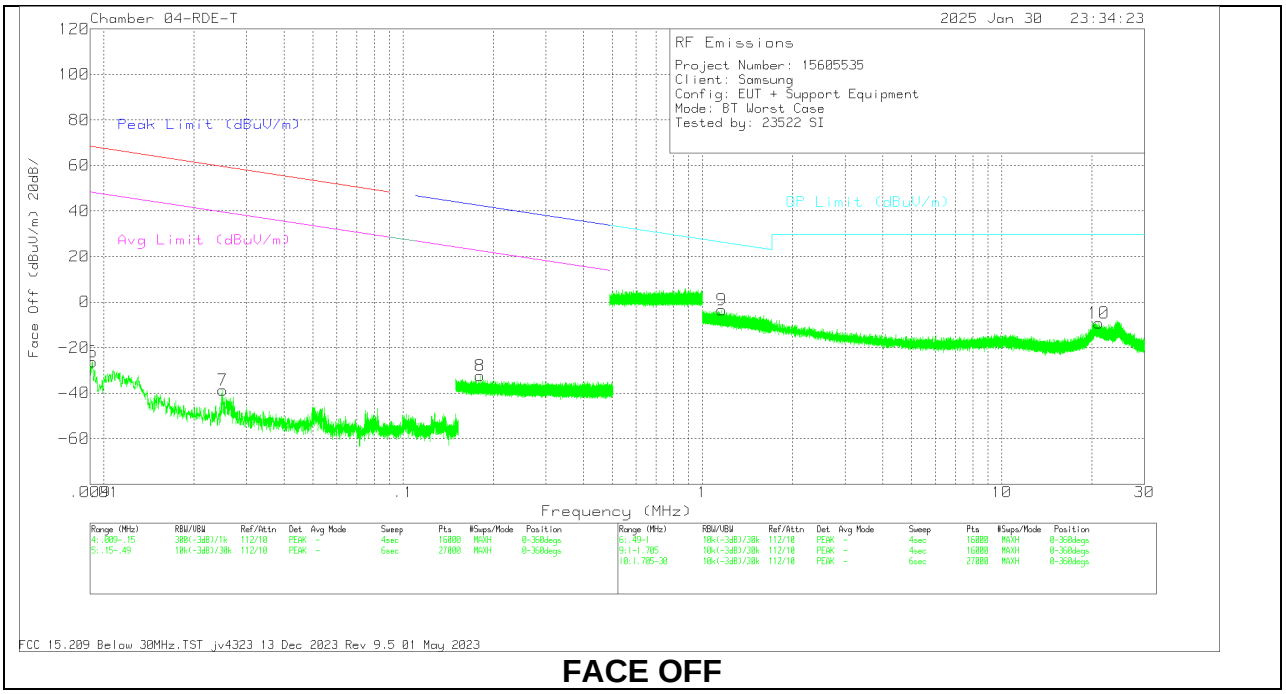
10.2. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



FACE ON



FACE OFF

UL VERIFICATION SERVICES INC.
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Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Face
6	.0091	23.76	Pk	61.2	-31.3	-80	-26.34	68.36	-94.7	48.36	-74.7	-	-	-	-	0-360	Off
1	.0092	27.15	Pk	61.1	-31.3	-80	-23.05	68.28	-91.33	48.28	-71.33	-	-	-	-	0-360	On
7	.025	14.69	Pk	58.5	-31.8	-80	-38.61	59.64	-98.25	39.64	-78.25	-	-	-	-	0-360	Off
2	.0273	15.33	Pk	58.3	-31.8	-80	-38.17	58.85	-97.02	38.85	-77.02	-	-	-	-	0-360	On
3	.05	14.96	Pk	57.1	-32.2	-80	-40.14	53.61	-93.75	33.61	-73.75	-	-	-	-	0-360	On
8	.1804	23.84	Pk	56.2	-32.5	-80	-32.46	-	-	-	-	42.49	-74.95	22.49	-54.95	0-360	Off

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Amp/Cbl (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Face
9	1.1602	23.05	Pk	45.9	-32.4	-40	-3.45	26.33	-29.78	0-360	Off
4	1.4935	22.73	Pk	44.2	-32.3	-40	-5.37	24.15	-29.52	0-360	On
10	21.0961	28.44	Pk	34.3	-31.9	-40	-9.16	29.5	-38.66	0-360	Off
5	21.9031	23.83	Pk	34.3	-31.9	-40	-13.77	29.5	-43.27	0-360	On

Pk - Peak detector

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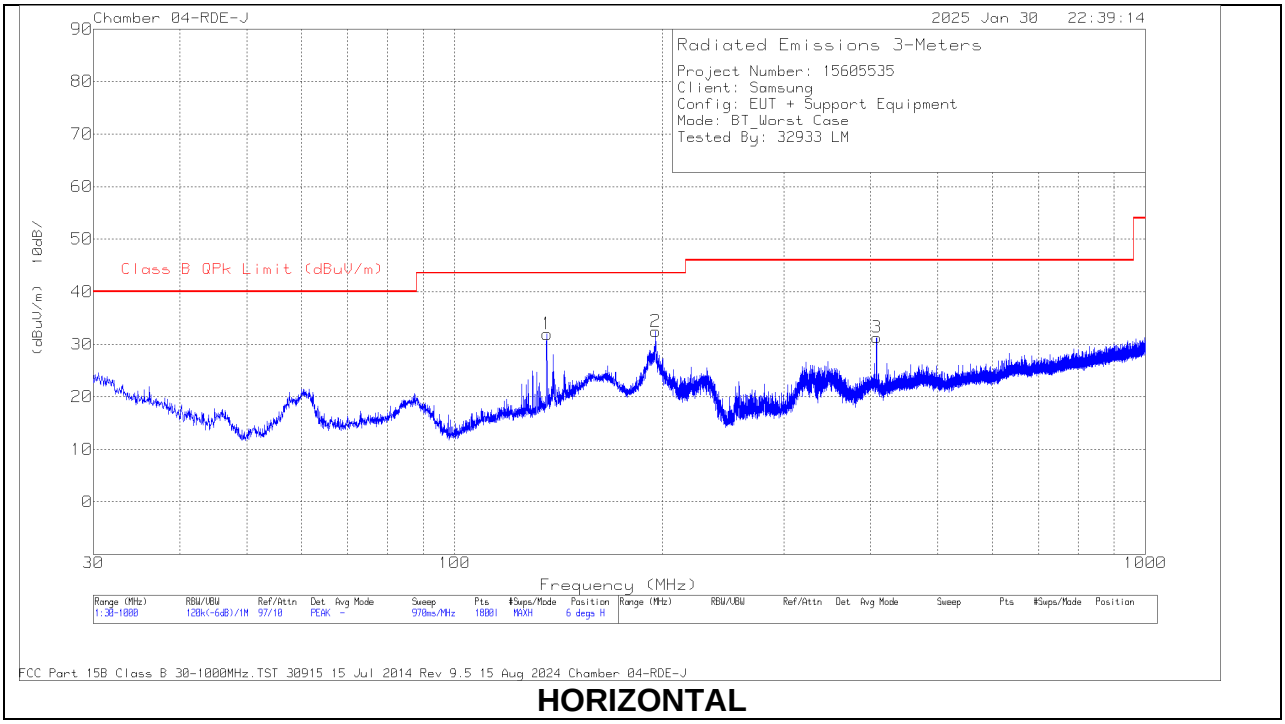
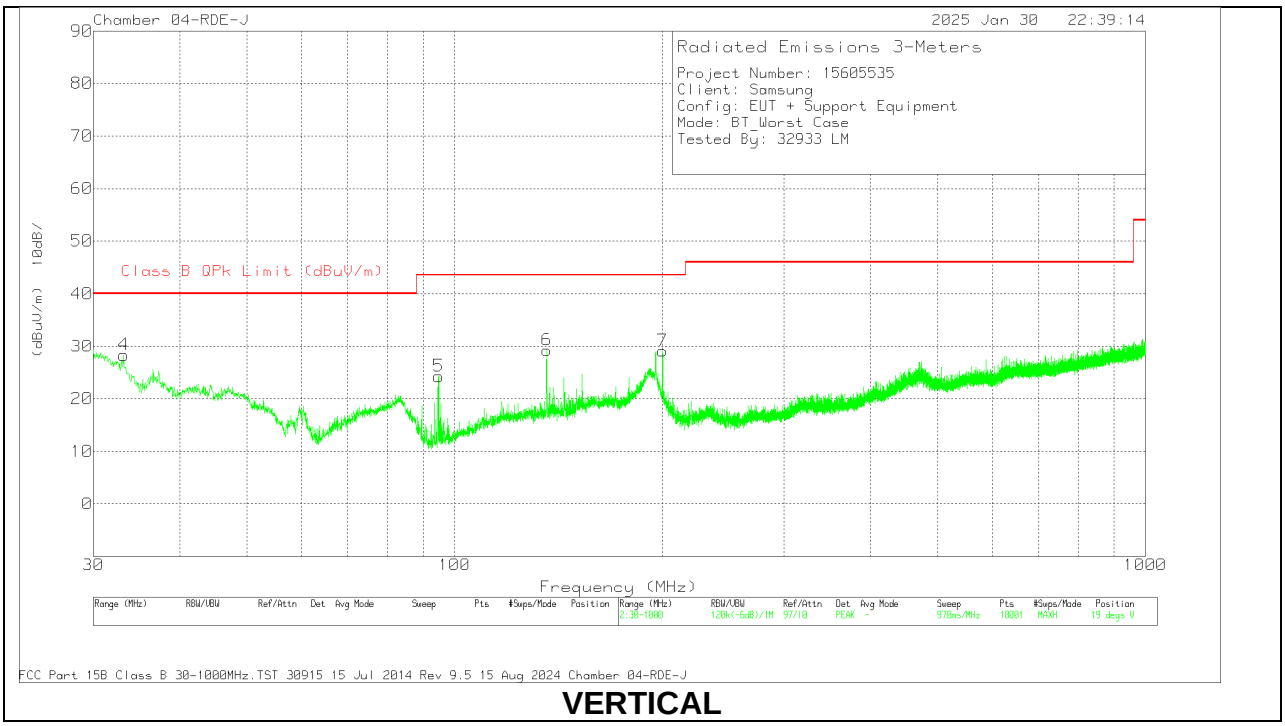
10.3. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

UL VERIFICATION SERVICES INC.
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Below 1GHz Data

Radiated Emissions

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80293 ACF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Class B QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	136.107	43.55	Pk	19.5	-31.1	31.95	43.52	-11.57	0-360	198	H
2	195.415	44.31	Qp	17.8	-30.8	31.31	43.52	-12.21	80	120	H
3	408.355	39.6	Pk	21.8	-30.1	31.3	46.02	-14.72	0-360	298	H
4	33.1795	35.53	Pk	24.6	-31.8	28.33	40	-11.67	0-360	98	V
5	94.8285	40.79	Pk	14.8	-31.3	24.29	43.52	-19.23	0-360	98	V
6	135.946	40.86	Pk	19.5	-31.1	29.26	43.52	-14.26	0-360	98	V
7	199.966	41.69	Pk	18.2	-30.8	29.09	43.52	-14.43	0-360	298	V

Pk - Peak detector
Qp - Quasi-Peak detector

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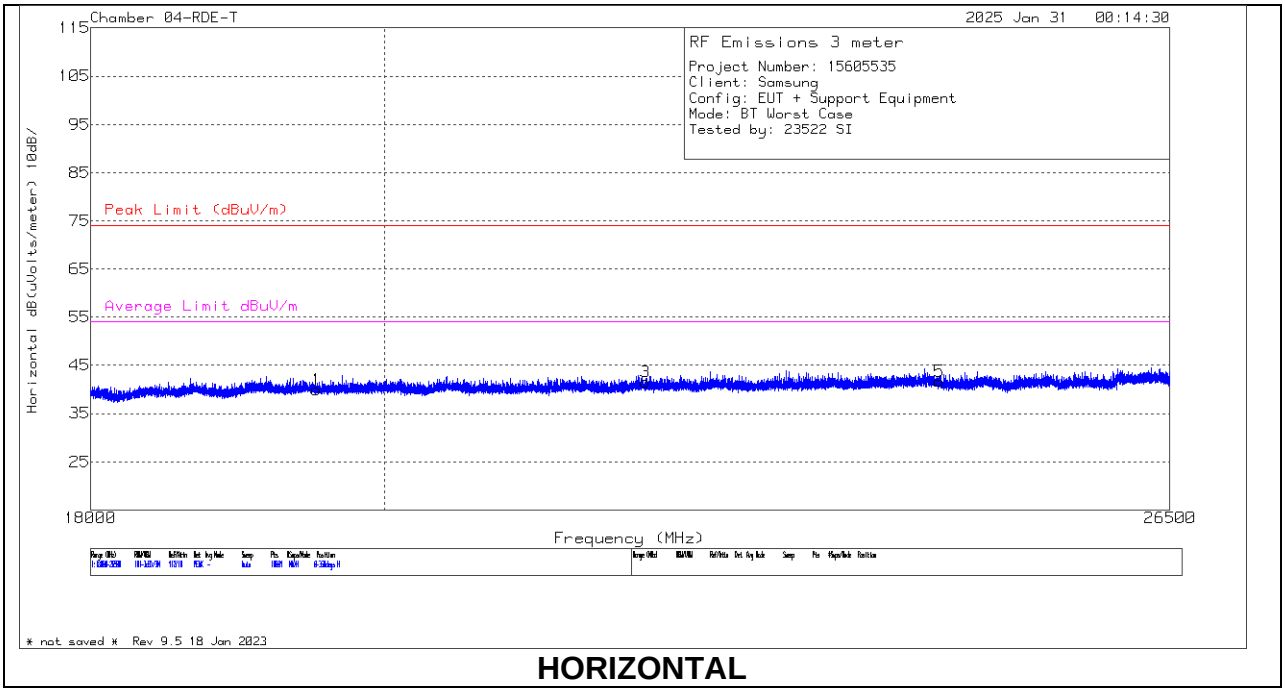
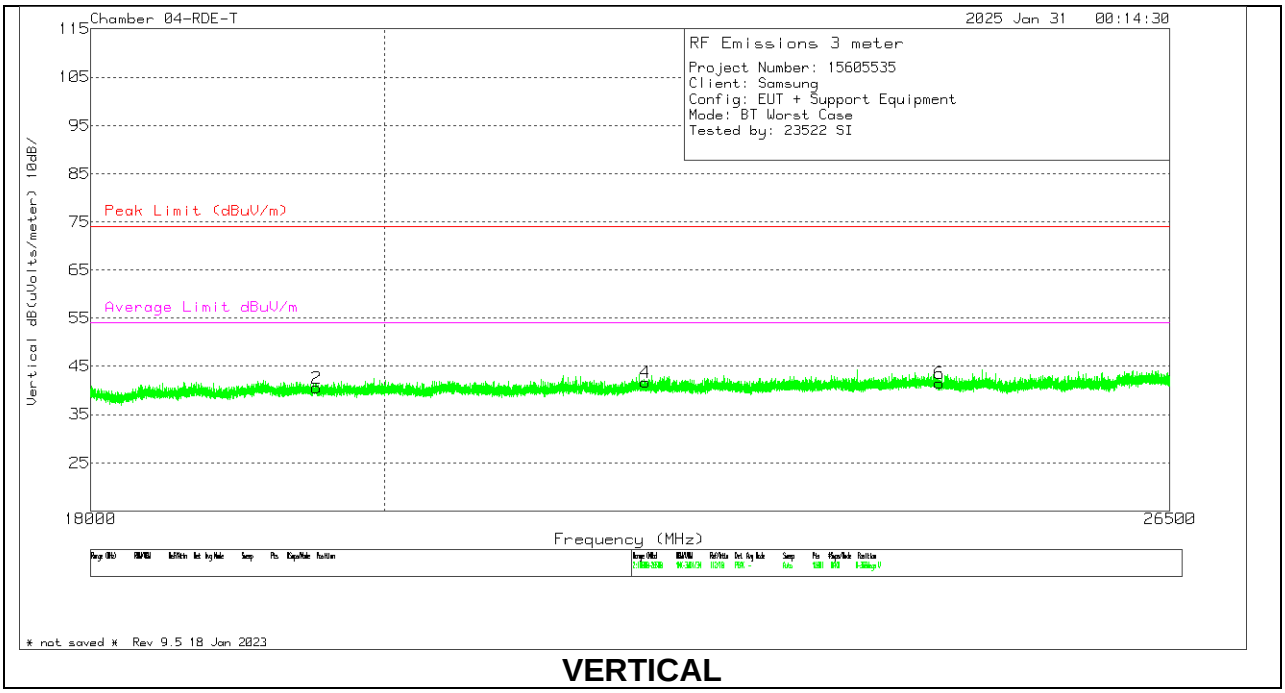
10.4. WORST CASE 18-26 GHz

SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

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18 – 26GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	199658 ACF (dB/m)	amp/cbl (dB)	Cables (dB)	Corrected Reading dB(uVolts/meter)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit dBuV/m	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 19520.083	55.27	Pk	32.5	-61.9	14.1	39.97	74	-34.03	-	-	0-360	101	H
2	* 19520.083	55.84	Pk	32.5	-61.9	14.1	40.54	74	-33.46	-	-	0-360	200	V
3	21960.054	55.78	Pk	33.1	-62.4	15.1	41.58	74	-32.42	-	-	0-360	101	H
4	21960.054	55.89	Pk	33.1	-62.4	15.1	41.69	74	-32.31	-	-	0-360	200	V
5	24400.497	53.63	Pk	33.7	-61.6	15.9	41.63	74	-32.37	-	-	0-360	199	H
6	24400.497	53.46	Pk	33.7	-61.6	15.9	41.46	74	-32.54	-	-	0-360	101	V

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

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11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	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

UL VERIFICATION SERVICES INC.
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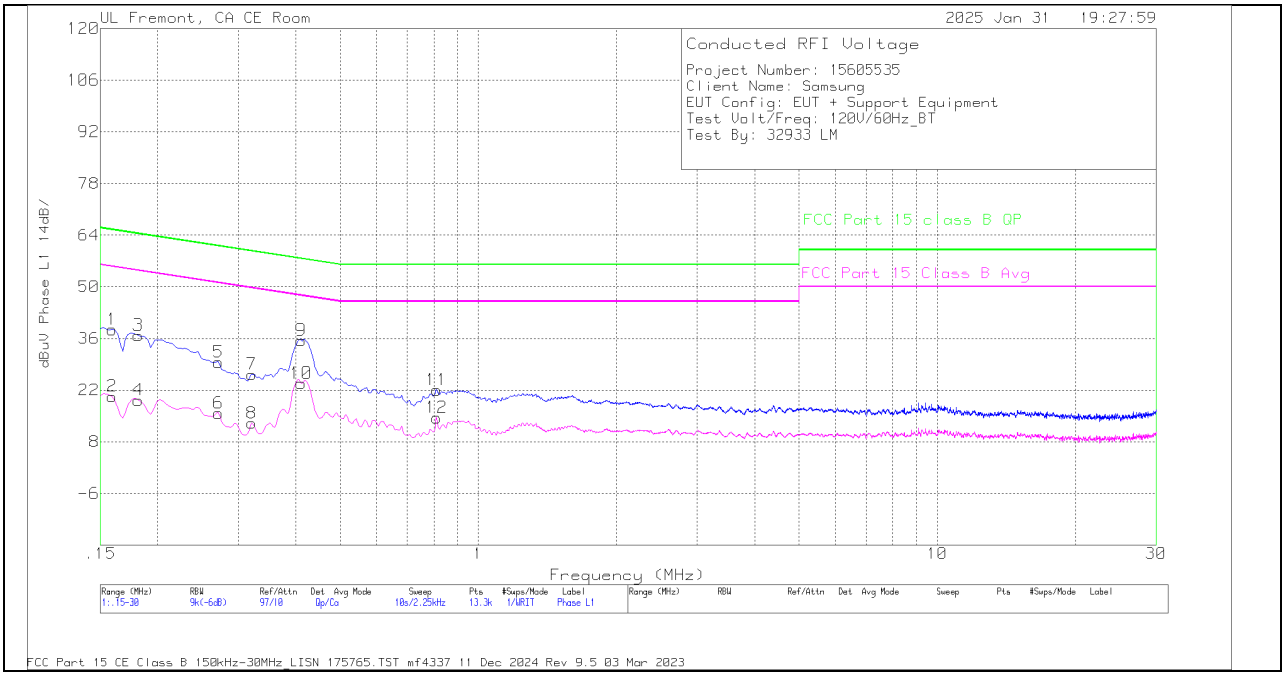
LINE 1 RESULTS



Range 1: Phase L1 .15 - 30MHz												
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	CBL(dB)	LISN (dB)	CBL(dB)	10dB Atten (dB)	Corrected Reading dBuV	FCC Part 15C Avg	Margin (dB)	FCC Part 15C QP	Margin (dB)
2	.159	1.31	Ca	.4	.1	8.5	10	20.31	55.52	-35.21	-	-
4	.1815	.58	Ca	.2	.1	8.4	10	19.28	54.42	-35.14	-	-
6	.2715	-2.27	Ca	-.1	0	8.1	10	15.73	51.07	-35.34	-	-
8	.321	-4.98	Ca	-.2	0	8.2	10	13.02	49.68	-36.66	-	-
10	.411	5.71	Ca	-.3	0	8.4	10	23.81	47.63	-23.82	-	-
12	.8115	-3.48	Ca	.1	0	7.9	10	14.52	46	-31.48	-	-
1	.159	19.42	Qp	.4	.1	8.5	10	38.42	-	-	65.52	-27.1
3	.1815	18.13	Qp	.2	.1	8.4	10	36.83	-	-	64.42	-27.59
5	.2715	11.54	Qp	-.1	0	8.1	10	29.54	-	-	61.07	-31.53
7	.321	8.27	Qp	-.2	0	8.2	10	26.27	-	-	59.68	-33.41
9	.411	17.33	Qp	-.3	0	8.4	10	35.43	-	-	57.63	-22.2
11	.8115	4.05	Qp	.1	0	7.9	10	22.05	-	-	56	-33.95

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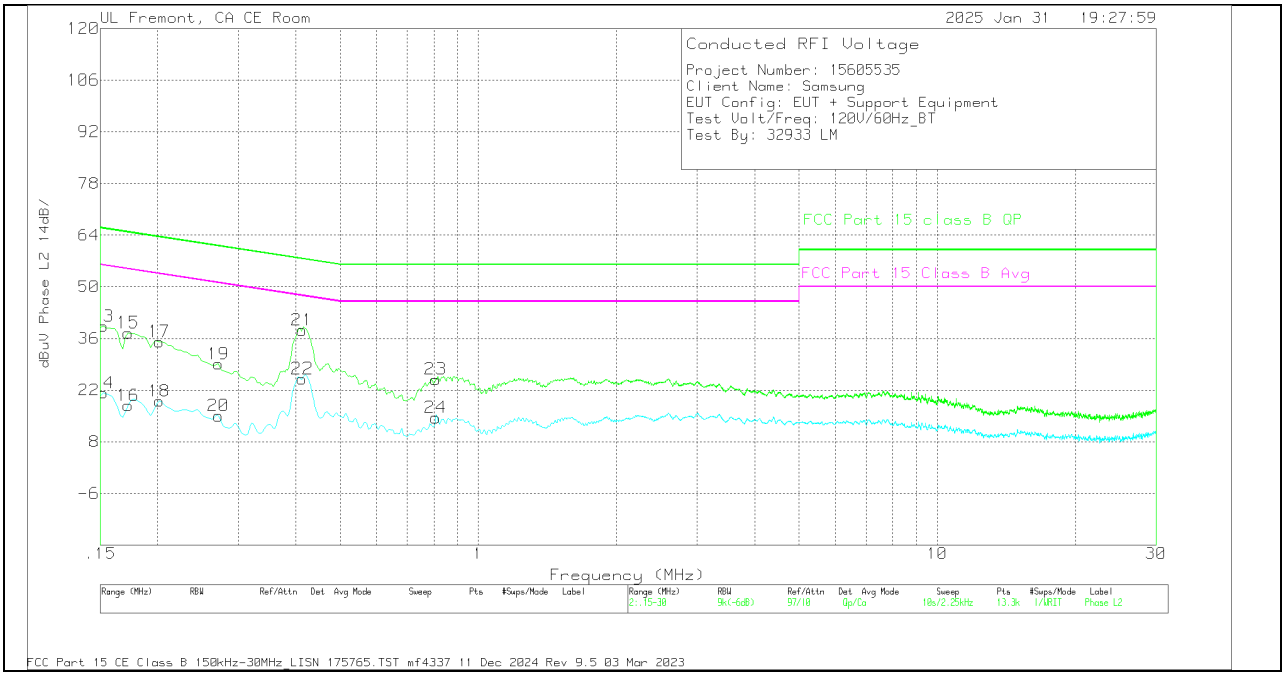
LINE 2 RESULTS



Range 2: Phase L2 .15 - 30MHz												
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	CBL(dB)	LISN (dB)	CBL(dB)	10dB Atten (dB)	Corrected Reading dBuV	FCC Part 15 Class B Avg	Margin (dB)	FCC Part 15 class B QP	Margin (dB)
14	.1523	2.1	Ca	.5	.1	8.5	10	21.2	55.88	-34.68	-	-
16	.1725	-.98	Ca	.3	0	8.5	10	17.82	54.84	-37.02	-	-
18	.2018	.51	Ca	.1	0	8.4	10	19.01	53.54	-34.53	-	-
20	.2715	-2.97	Ca	-.1	0	8.1	10	15.03	51.07	-36.04	-	-
22	.4133	6.82	Ca	-.3	0	8.5	10	25.02	47.58	-22.56	-	-
24	.807	-3.58	Ca	.2	0	7.9	10	14.52	46	-31.48	-	-
13	.1523	20.19	Qp	.5	.1	8.5	10	39.29	-	-	65.88	-26.59
15	.1725	18.71	Qp	.3	0	8.5	10	37.51	-	-	64.84	-27.33
17	.2018	16.6	Qp	.1	0	8.4	10	35.1	-	-	63.54	-28.44
19	.2715	11.05	Qp	-.1	0	8.1	10	29.05	-	-	61.07	-32.02
21	.4133	20.04	Qp	-.3	0	8.5	10	38.24	-	-	57.58	-19.34
23	.807	6.8	Qp	.2	0	7.9	10	24.9	-	-	56	-31.1

UL VERIFICATION SERVICES INC.
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12. SETUP PHOTOS

Please refer to 15605535-EP1 for setup photos

END OF TEST REPORT

UL VERIFICATION SERVICES INC.
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