TEST REPORT

Report Number: 15605547-E1V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-X620
FCC ID	:	A3LSMX620
IC	:	649E-SMX620
EUT Description	:	BT/BLE Tablet + DTS/UNII a/b/g/n/ac/ax and Digitizer
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 3 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
2025-03-03

Prepared by:
UL VERIFICATION SERVICES INC.
47173 Benicia Street
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ACCREDITED
CERT #0751.05

REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-02-25	Initial Issue	---
V2	2025-03-03	Section 10.4 Updated	Henry Lau

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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: BT/BLE Tablet + DTS/UNII a/b/g/n/ac/ax and Digitizer

MODEL: SM-X620

SERIAL NUMBER: Conducted: R32XC0045HM;
Radiated: R32XC0045X8

SAMPLE RECEIPT DATE: 2024-12-13

DATE TESTED: 2025-01-16 TO 2025-02-12

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 3	Complies
ISED RSS-GEN Issue 5 + A1 + A2	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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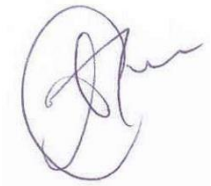
Approved & Released For
UL Verification Services Inc. By:



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Reviewed By:

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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	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 11.6.
See Comment	RSS-GEN 6.7	20dB BW/99% OBW	Reporting purposes only	ANSI C63.10 Sections 6.9.2 and 6.9.3
15.247 (a)(1)	RSS-247 (5.1) (b)	Hopping Frequency Separation	Complies	None.
15.247 (a)(1)(iii)	RSS-247 (5.1) (d)	Number of Hopping Channels	Complies	None.
15.247 (a)(1)(iii)	RSS-247 (5.1) (d)	Average Time of Occupancy	Complies	None.
15.247 (b)(1)	RSS-247 (5.4) (b)	Output Power	Complies	None.
See Comment		Average Power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (d)	RSS-247 (5.5)	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	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
- RSS-247 Issue 3
- RSS-GEN Issue 5 + A1 + A2

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 BT/BLE Tablet + 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	16.09	40.64
2402 - 2480	Enhanced DQPSK	14.52	28.31
2402 - 2480	Enhanced 8PSK	15.00	31.62

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, keyboard and pen attached to the EUT.
Test software exercised the radio card.

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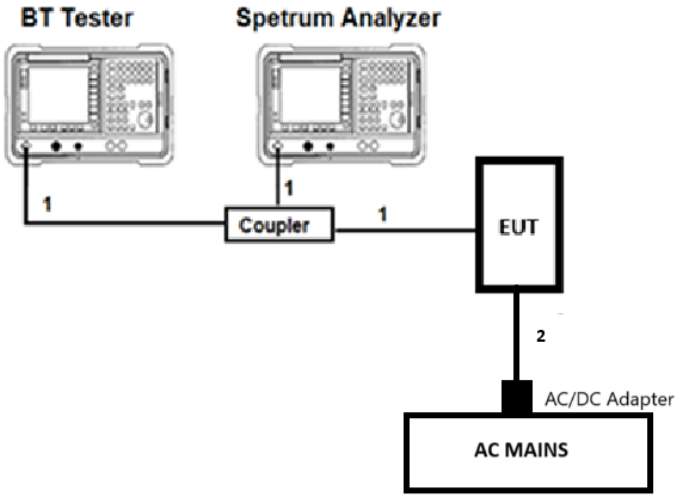
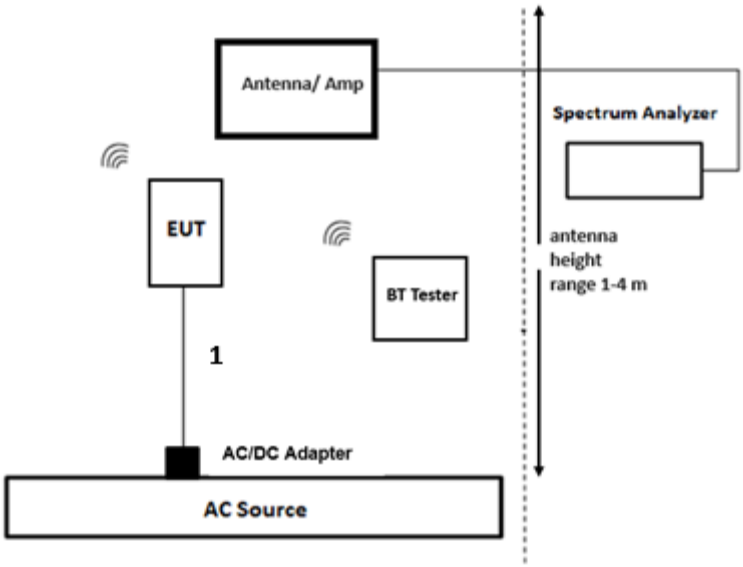
SETUP DIAGRAMS

Conducted Configuration



Radiated Configuration



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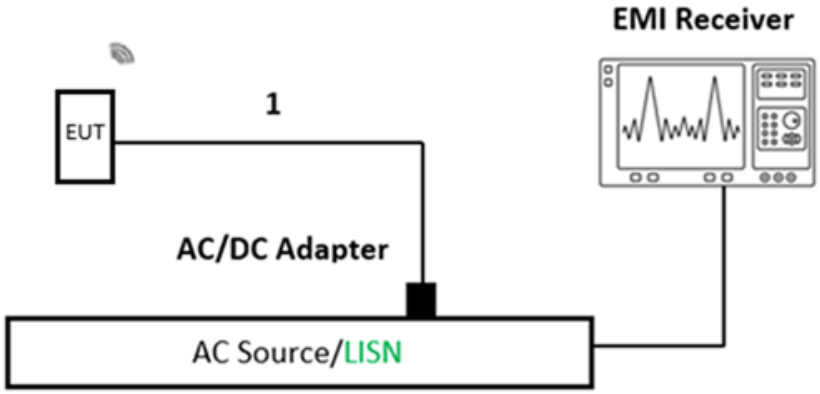
AC Line Conducted Configuration



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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
RF Filter Box, 1-18GHz	UL-FR1	n/a	171875	2025-03-31	2024-03-23
EMI TEST RECEIVER, with B8 option	Rohde & Schwarz	ESW44	245268	2025-02-28	2024-02-15
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	2026-01-31	2025-01-28
EMI TEST RECEIVER	Rohde & Schwarz	ESR	171646	2025-02-28	2024-02-27
Transient Limiter	TE	TBFL1	207996	2025-09-30	2024-09-24
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		

*Tests performed within cal date.

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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	2.88313	3.75227	0.768	76.84	1.14	0.347
Bluetooth 8PSK	2.88913	3.75527	0.769	76.94	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.

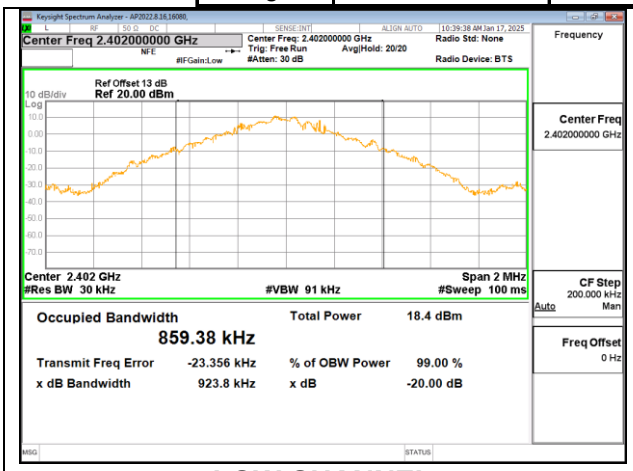
TEST PROCEDURE

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.

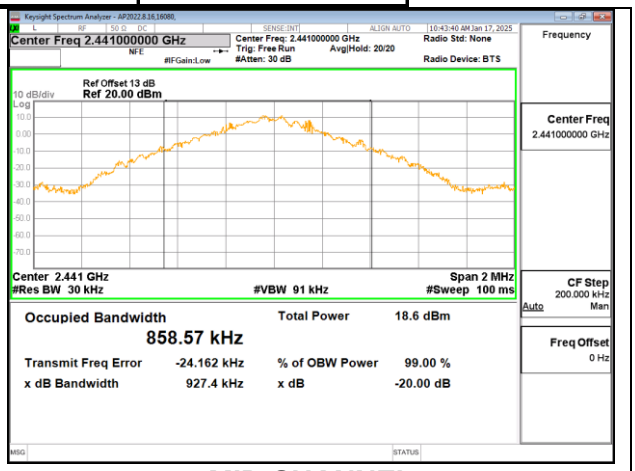
RESULTS

9.2.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

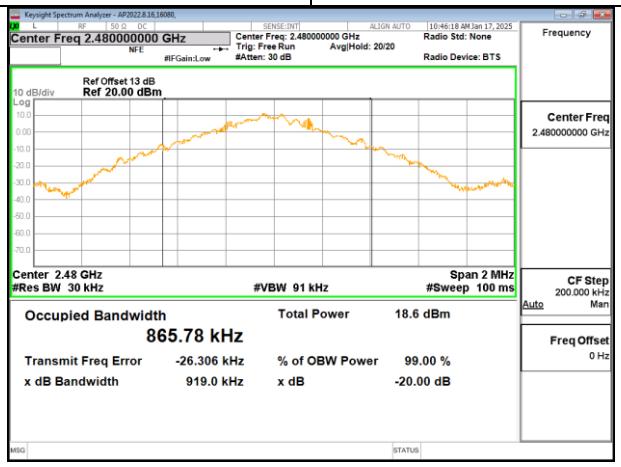
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.9238	0.85938
Mid	2441	0.9274	0.85857
High	2480	0.9190	0.86578



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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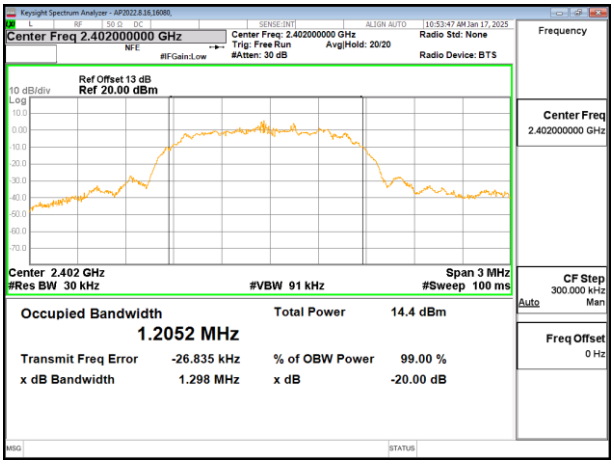
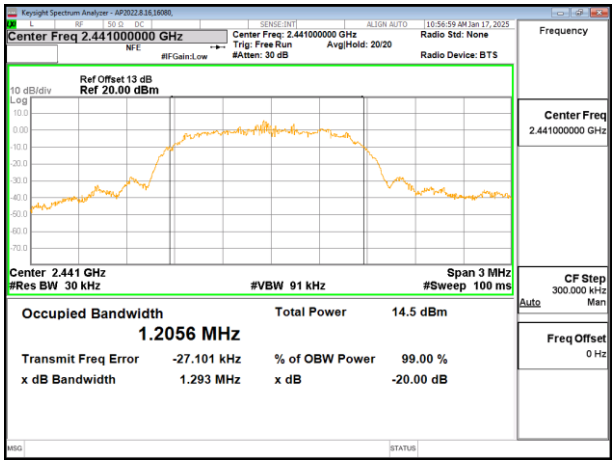
9.2.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.298	1.2052
Mid	2441	1.293	1.2056
High	2480	1.314	1.2062



LOW CHANNEL



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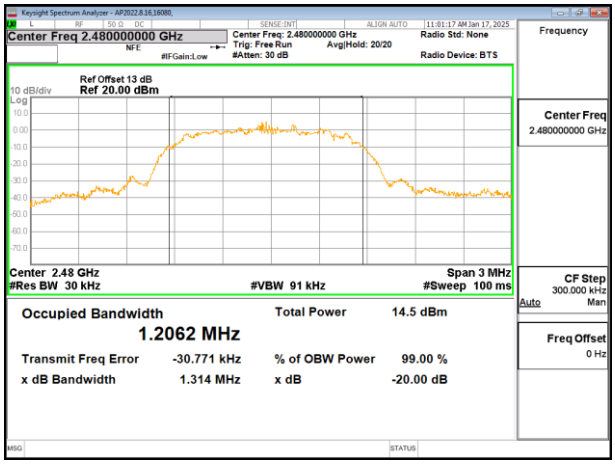

HIGH CHANNEL

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9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (5.1) (b)

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

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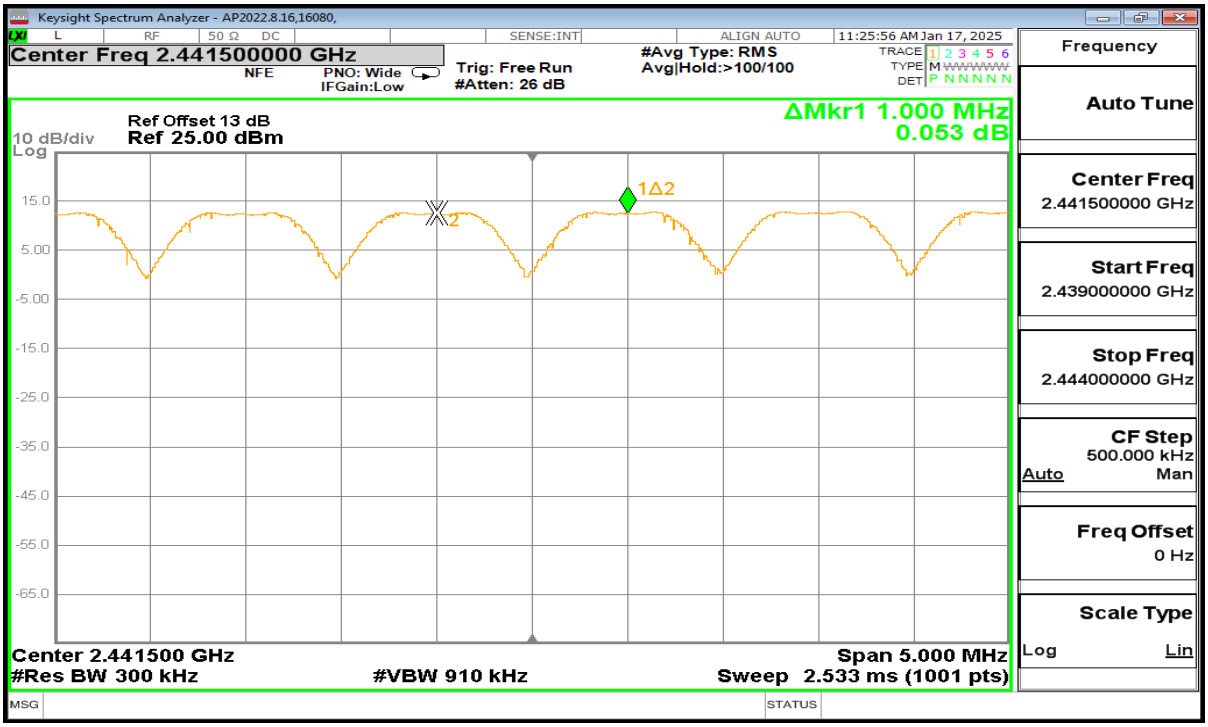
9.3.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



HOPPING FREQUENCY SEPARATION PLOT

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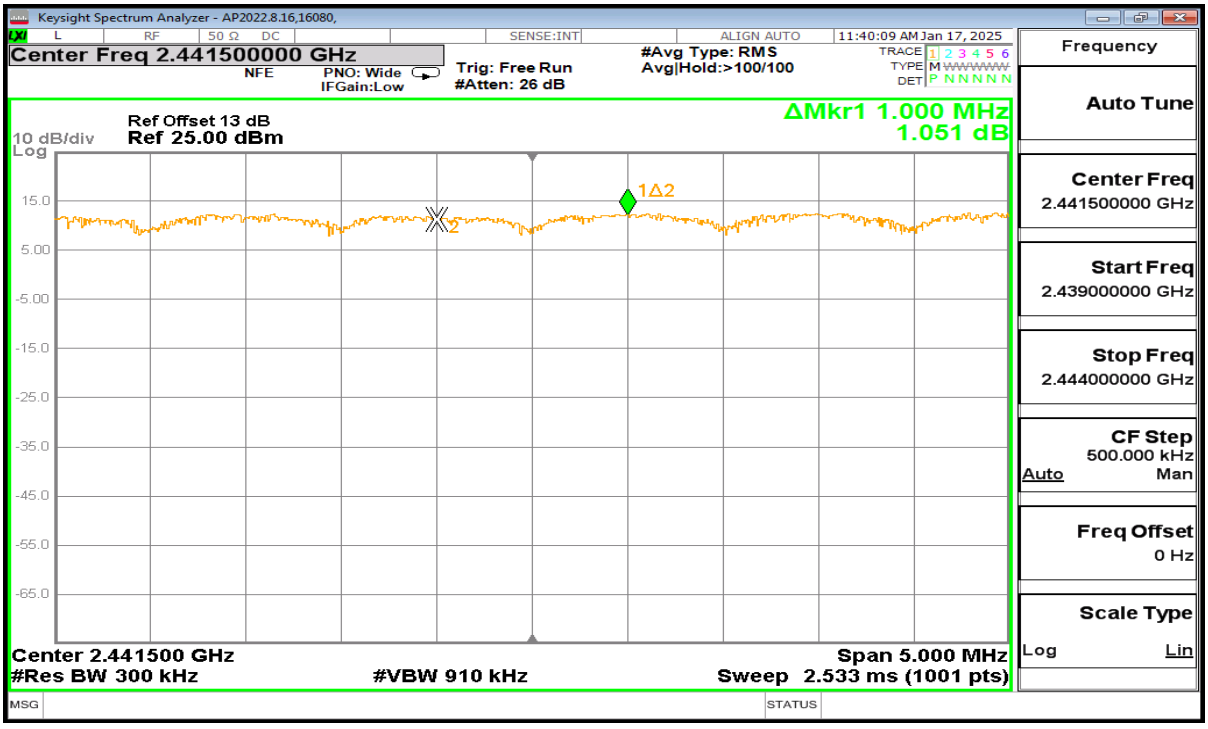
9.3.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION



HOPPING FREQUENCY SEPARATION PLOT

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9.4. NUMBER OF HOPPING CHANNELS

LIMITS

FCC §15.247 (a) (1) (iii)

RSS-247 (5.1) (d)

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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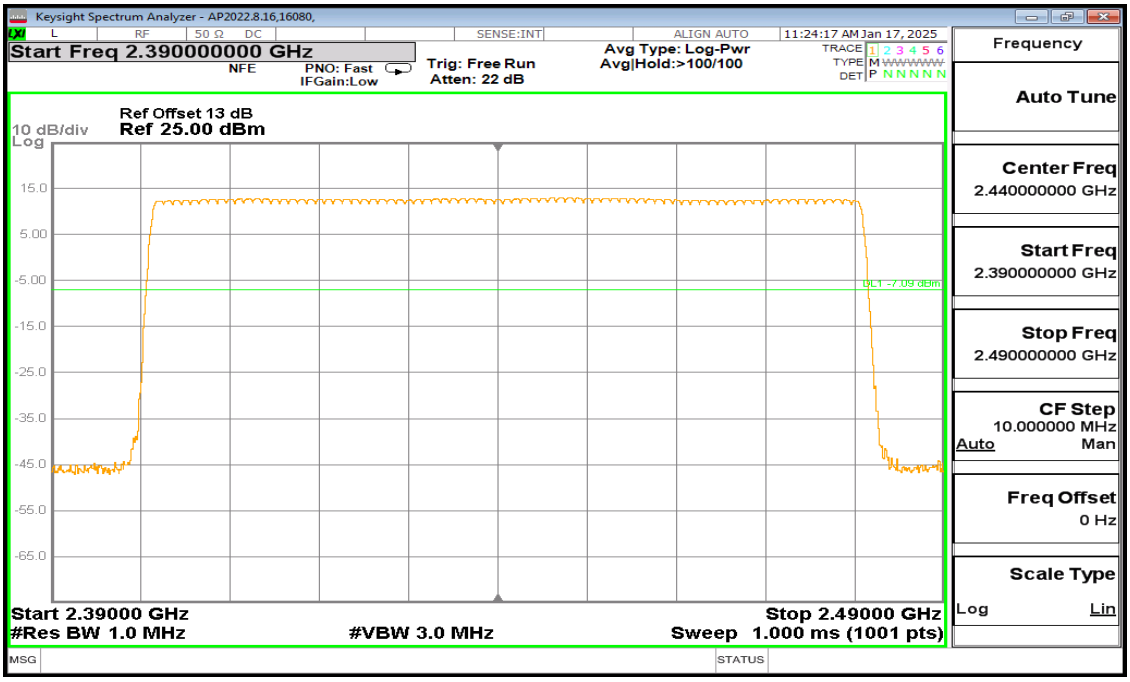
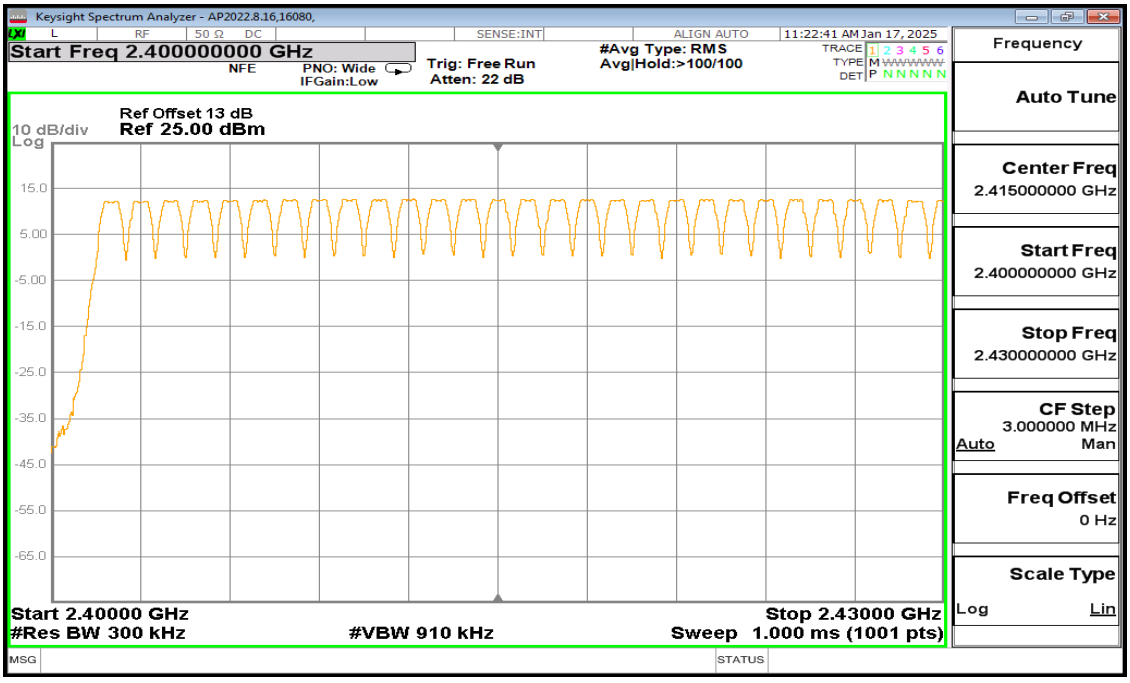
9.4.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION



100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3

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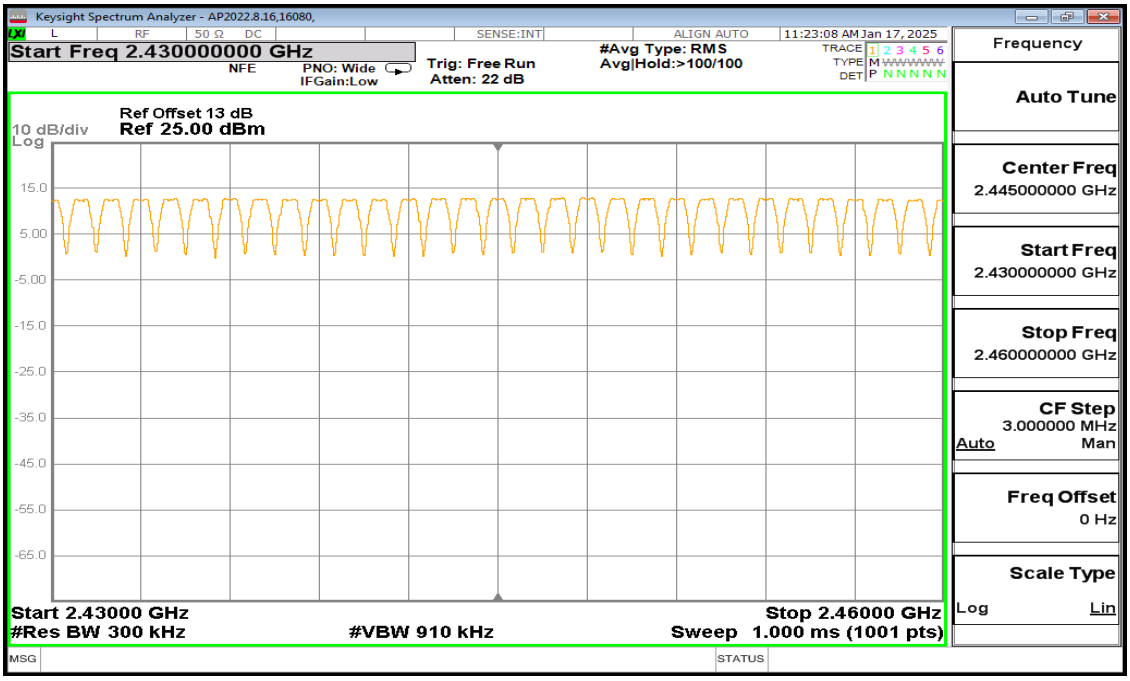
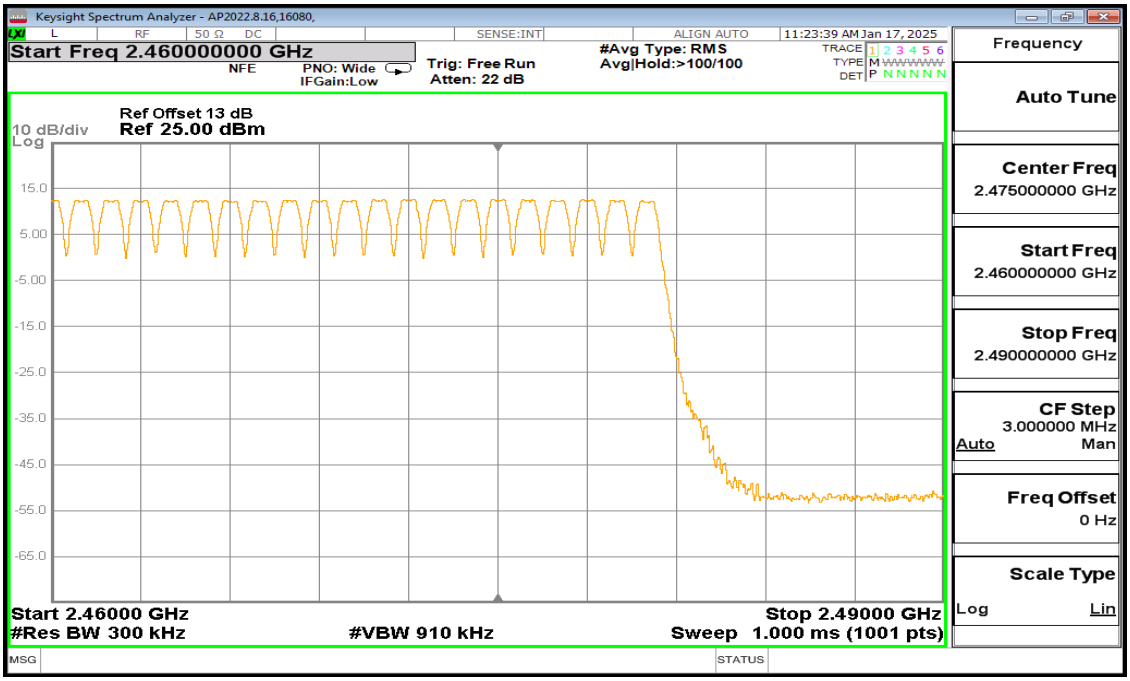


30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

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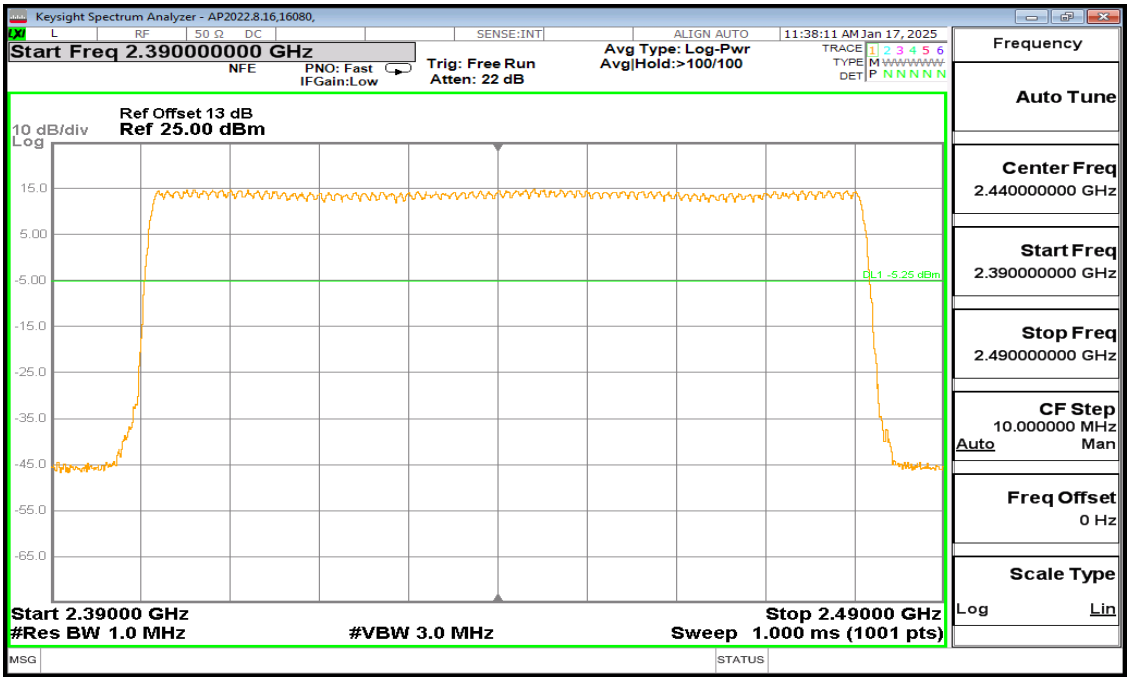
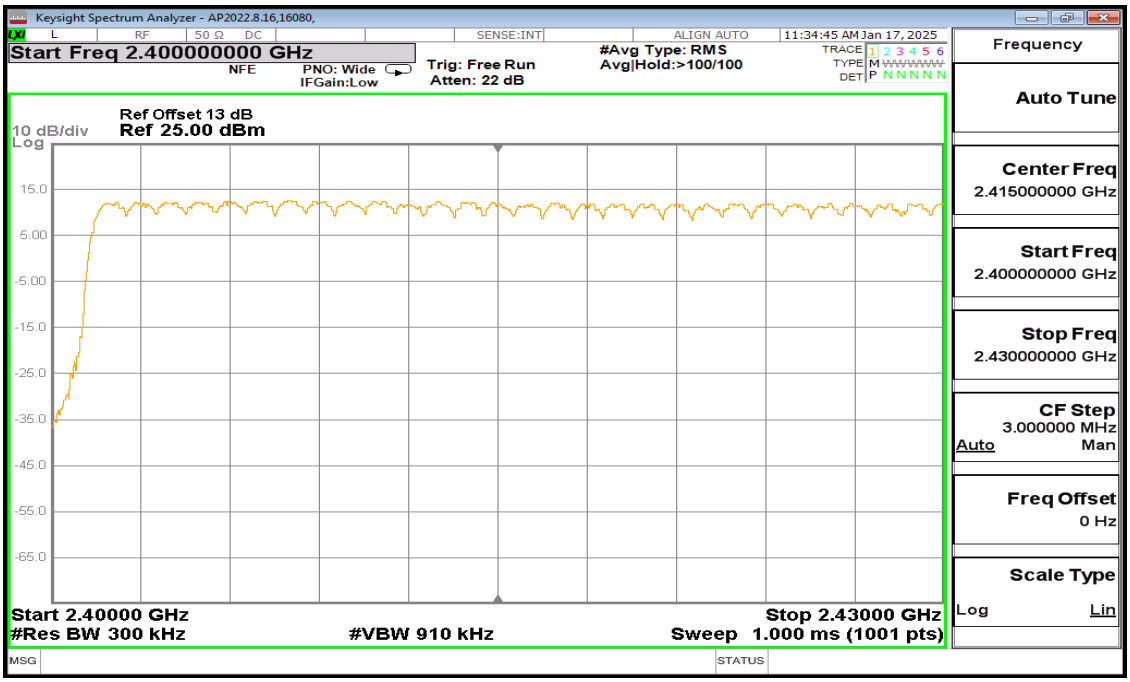
9.4.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

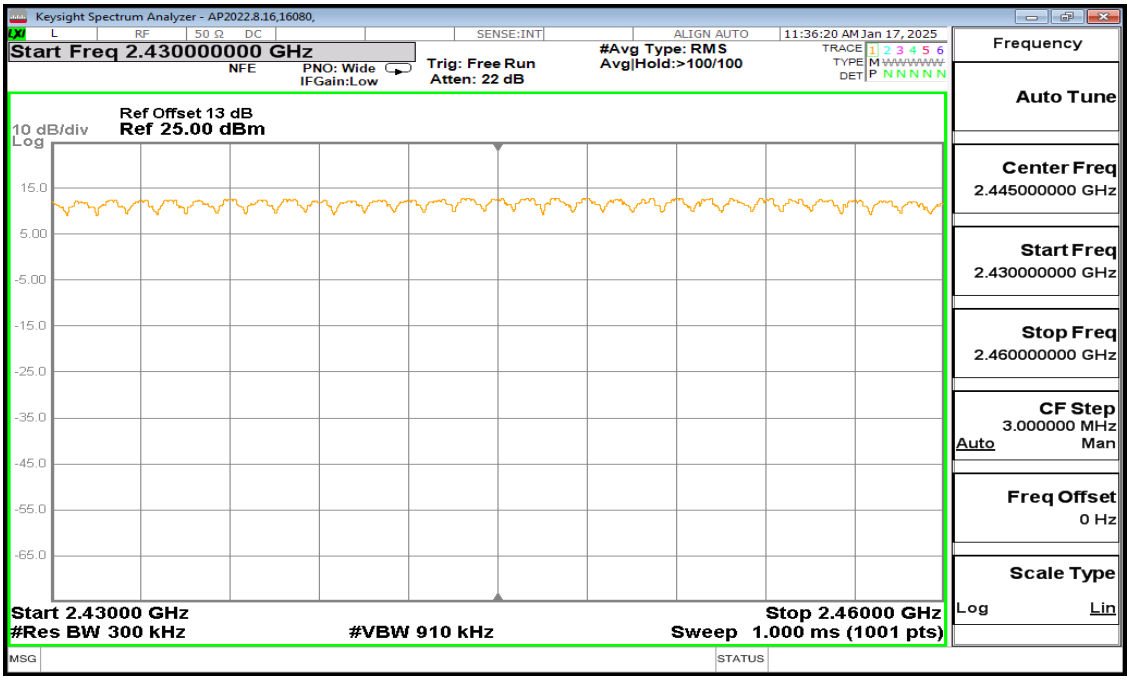


100MHz SPAN

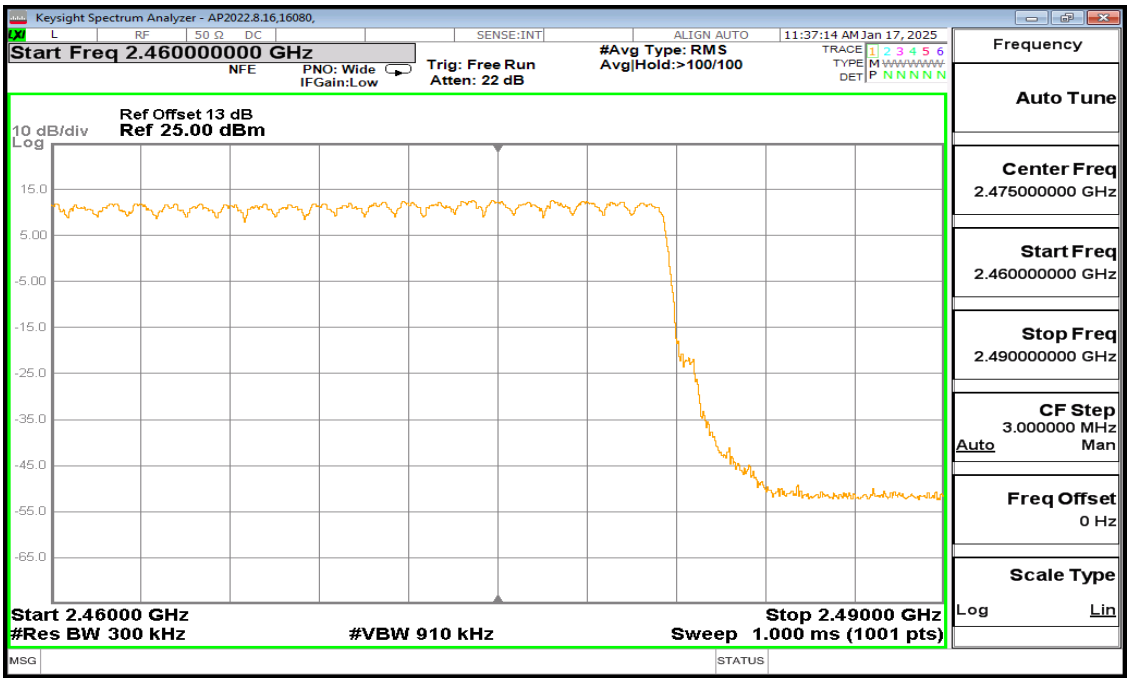


30MHz SPAN, SEGMENT 1 OF 3

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



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)

RSS-247 (5.1) (d)

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	1.632	16	0.2611	0.4	-0.1389
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	1.632	4	0.06528	0.4	-0.3347
DH5	2.872	1.75	0.05026	0.4	-0.3497

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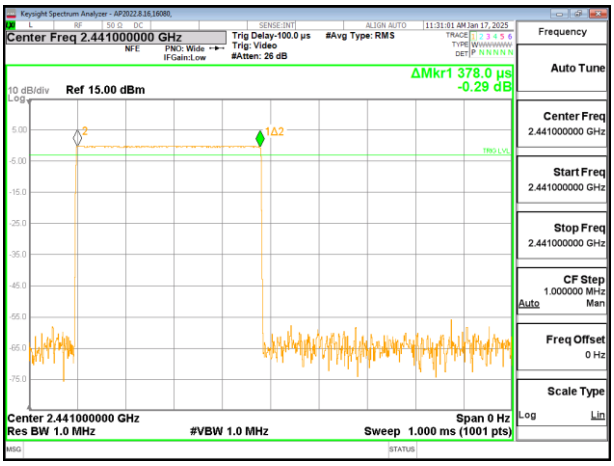
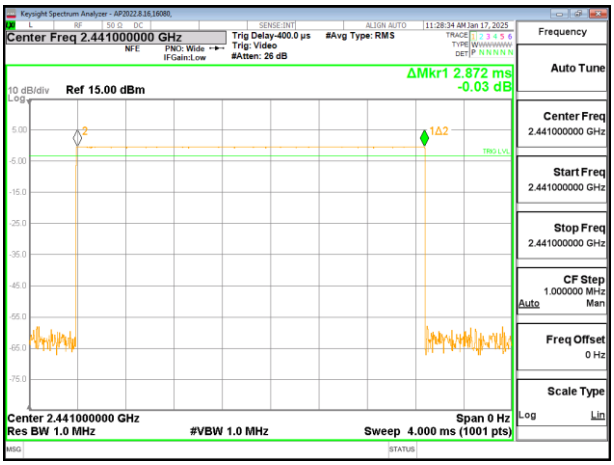
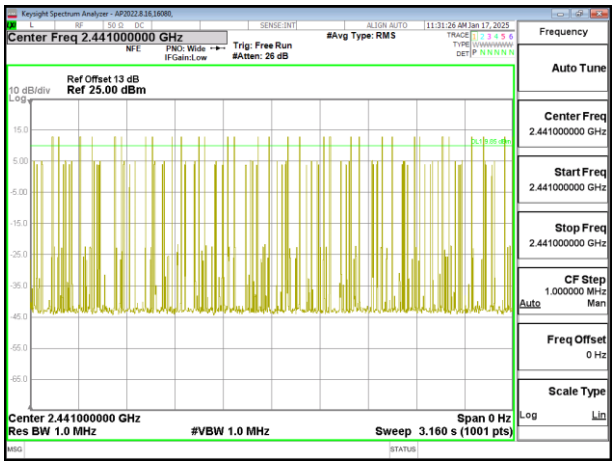


PULSE WIDTH – DH1

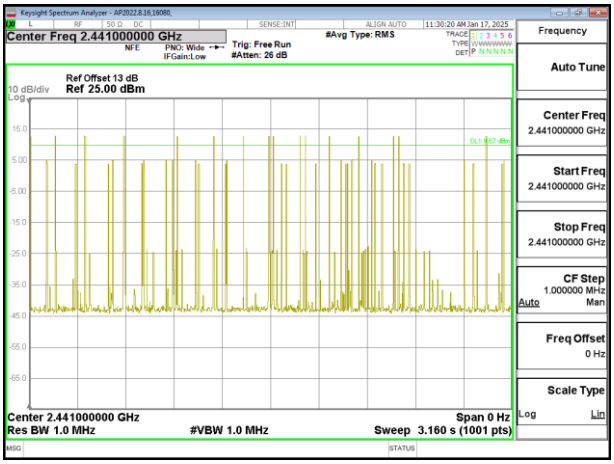
PULSE WIDTH – DH3



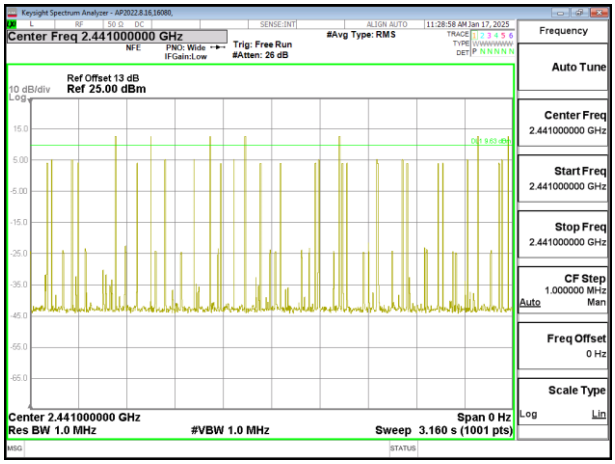
PULSE WIDTH – DH5



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	0.389	32	0.12448	0.4	-0.27552
3DH3	1.636	17	0.27812	0.4	-0.12188
3DH5	2.88	8	0.2304	0.4	-0.1696

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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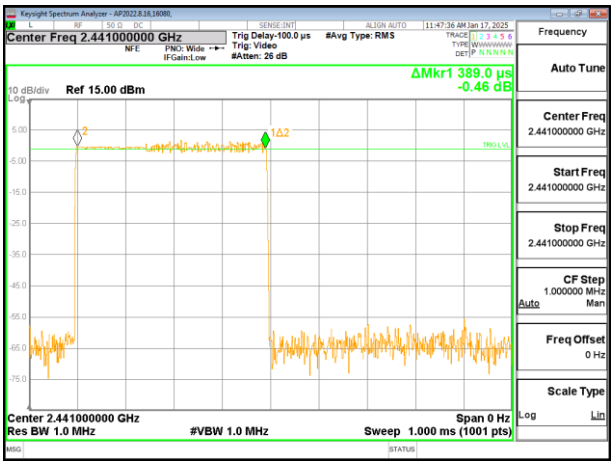
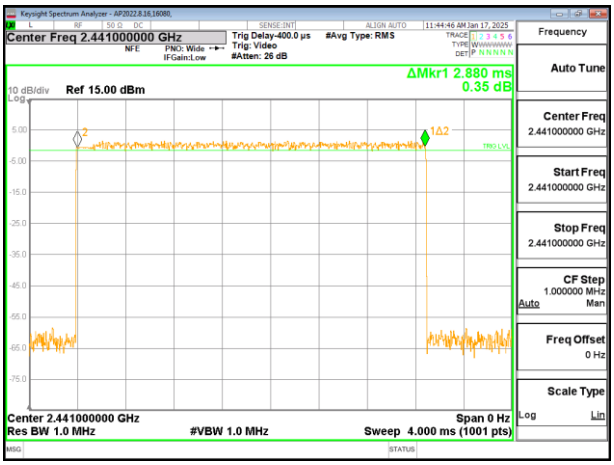
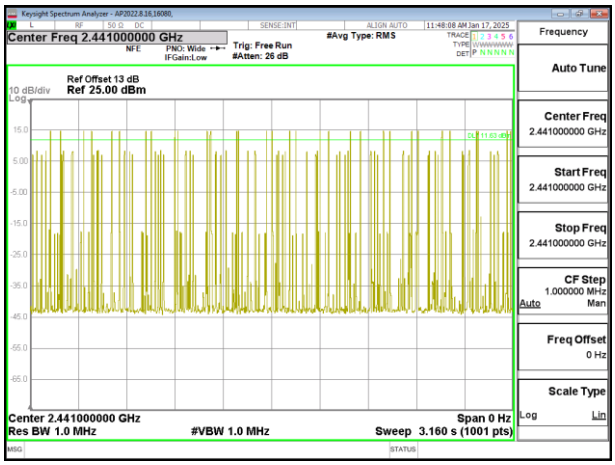


PULSE WIDTH – 3DH1

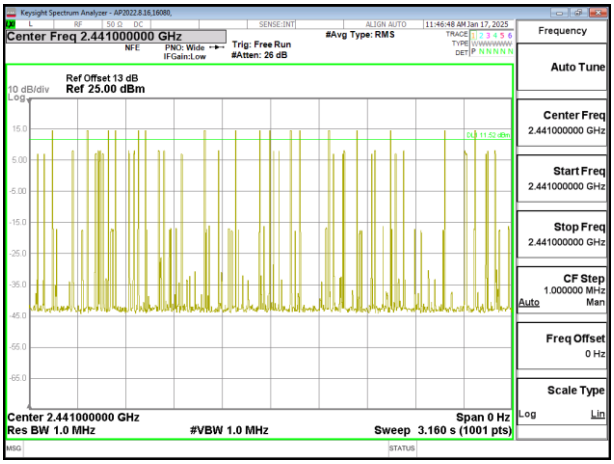
PULSE WIDTH – 3DH3



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)

RSS-247 (5.4) (b)

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:	16080
Date:	2025-01-17

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	15.97	21	-5.03
Middle	2441	16.08	21	-4.92
High	2480	16.09	21	-4.91

9.6.2. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	16080
Date:	2025-01-17

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	14.35	21	-6.65
Middle	2441	14.52	21	-6.48
High	2480	14.39	21	-6.61

9.6.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	16080
Date:	2025-01-17

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	15.00	21	-6
Middle	2441	14.79	21	-6.21
High	2480	14.76	21	-6.24

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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:	16080
Date	2025-01-17

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	15.72
Middle	2441	15.88
High	2480	15.9

9.7.2. BLUETOOTH ENHANCED DATA RATE DQPSK MODULATION

Tested By:	16080
Date	2025-01-17

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	11.52
Middle	2441	11.62
High	2480	11.61

9.7.3. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

Tested By:	16080
Date	2025-01-17

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	11.61
Middle	2441	11.72
High	2480	11.65

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9.8. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

RSS-247 5.5

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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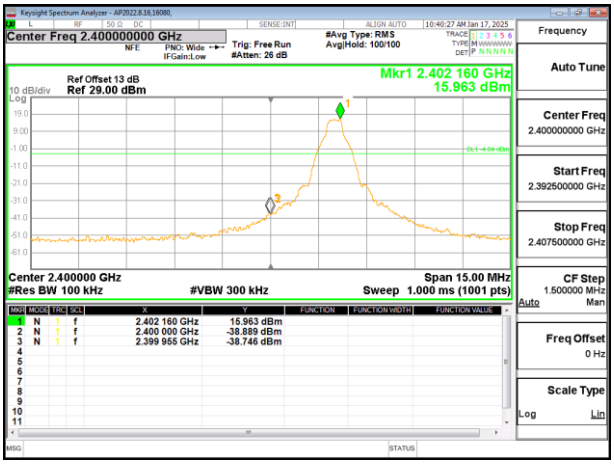
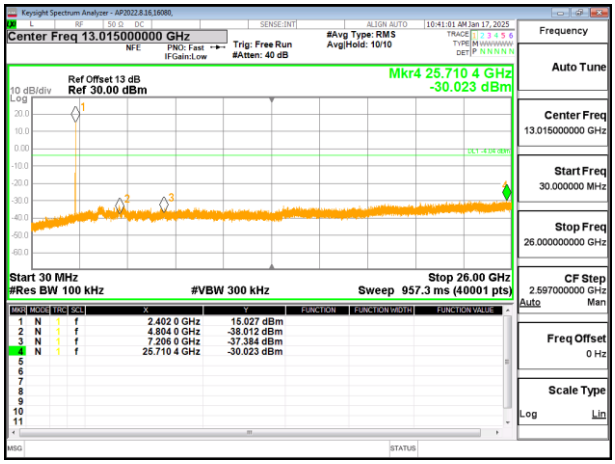
9.8.1. BLUETOOTH BASIC DATA RATE GFSK MODULATION

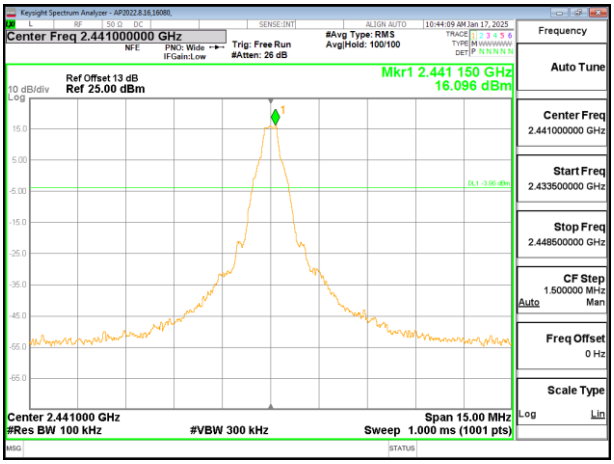
SPURIOUS EMISSIONS, NON-HOPPING



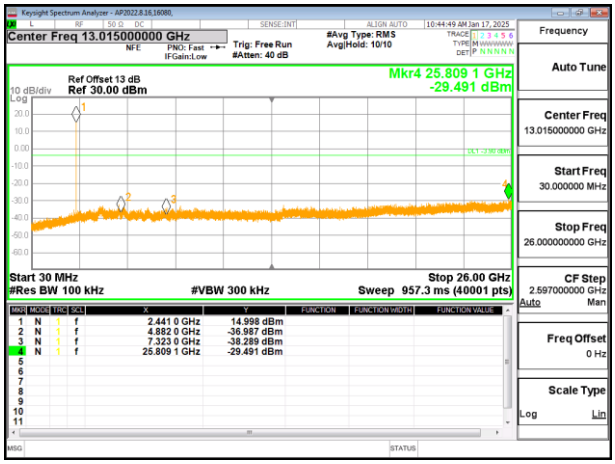
LOW CHANNEL BANDEDGE



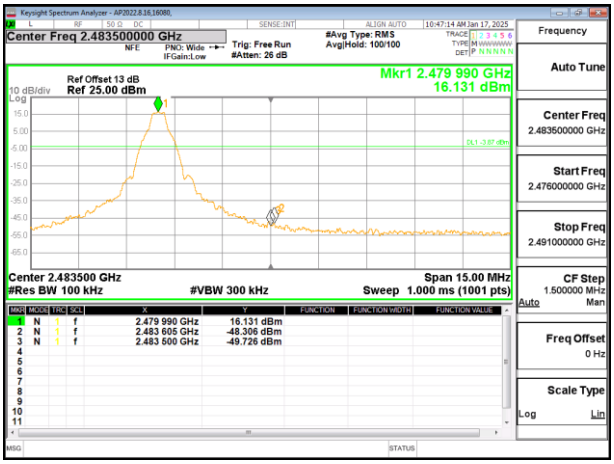
OUT-OF-BAND LOW CHANNEL



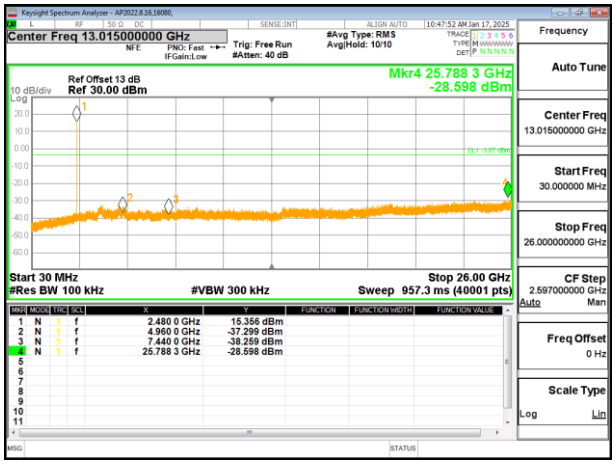
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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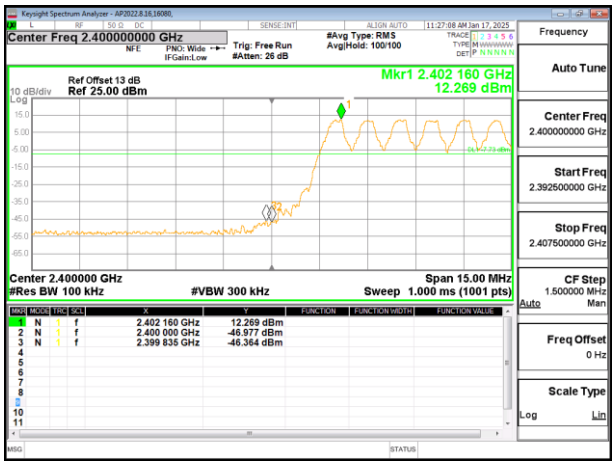
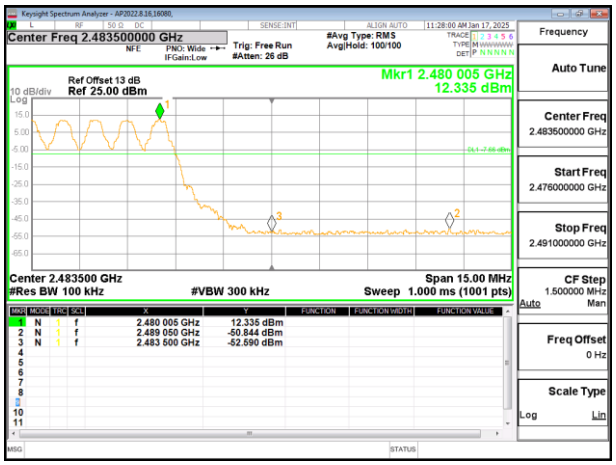
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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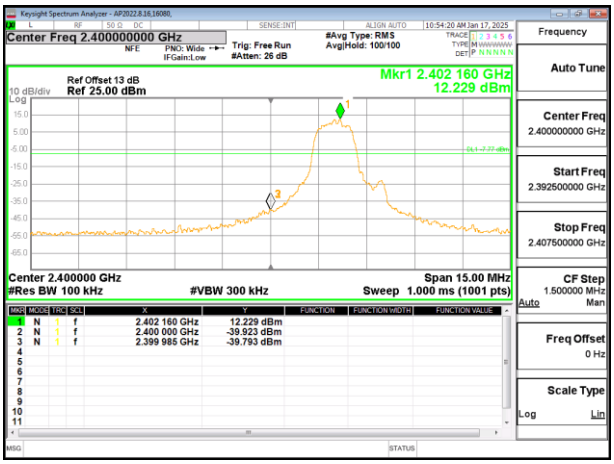
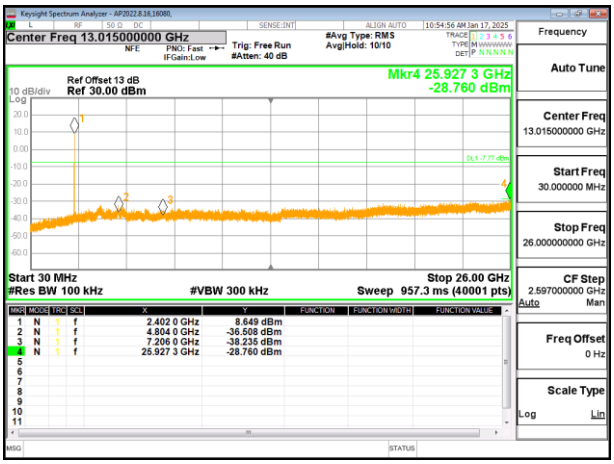
9.8.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

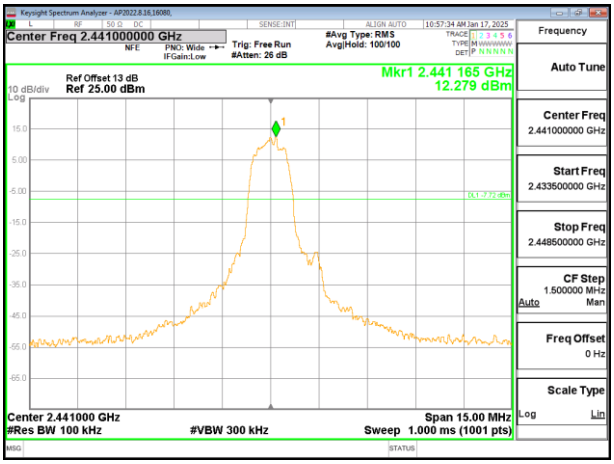
SPURIOUS EMISSIONS, NON-HOPPING



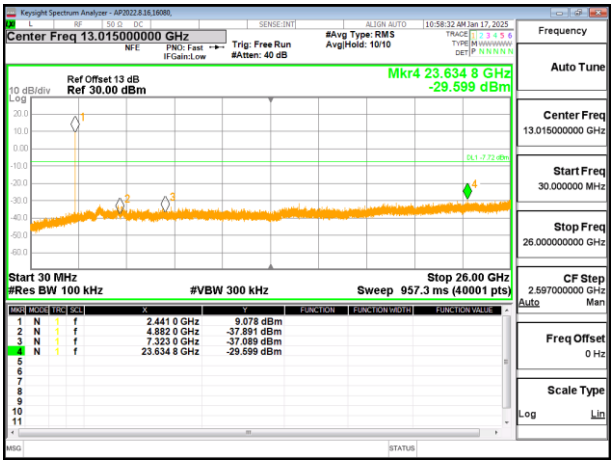
LOW CHANNEL BANDEDGE



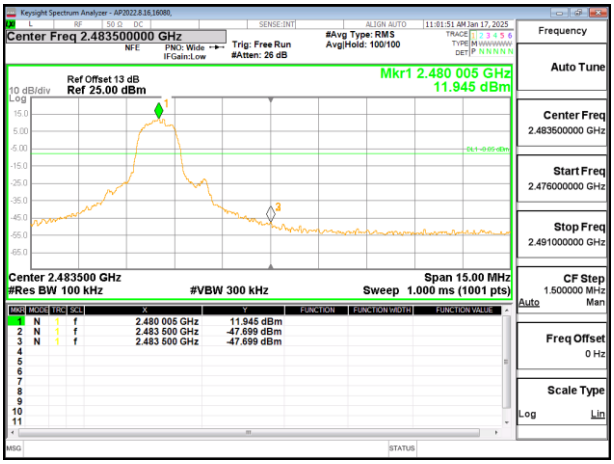
OUT-OF-BAND LOW CHANNEL



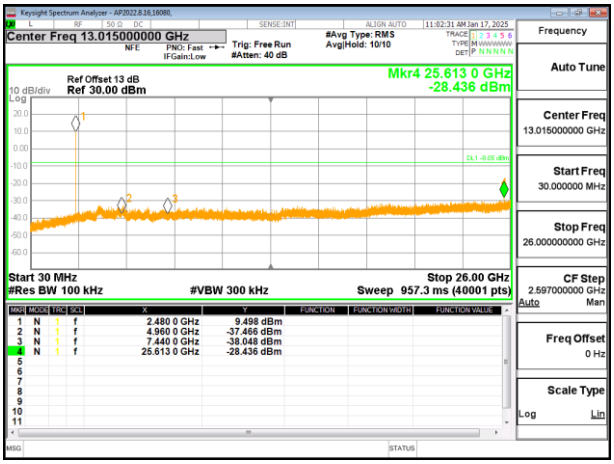
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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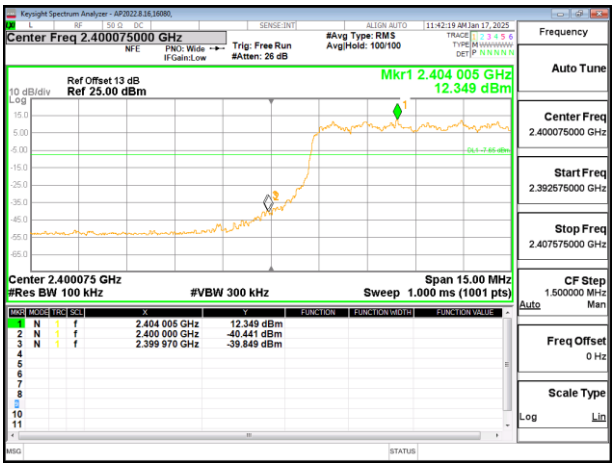
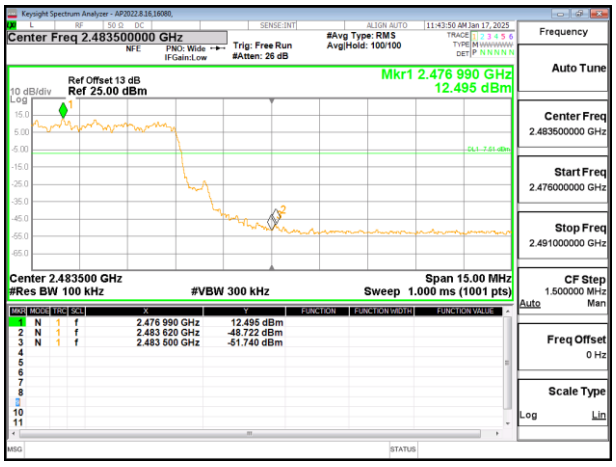
SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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10. RADIATED TEST RESULTS

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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.

NOTE: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example, the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y – 51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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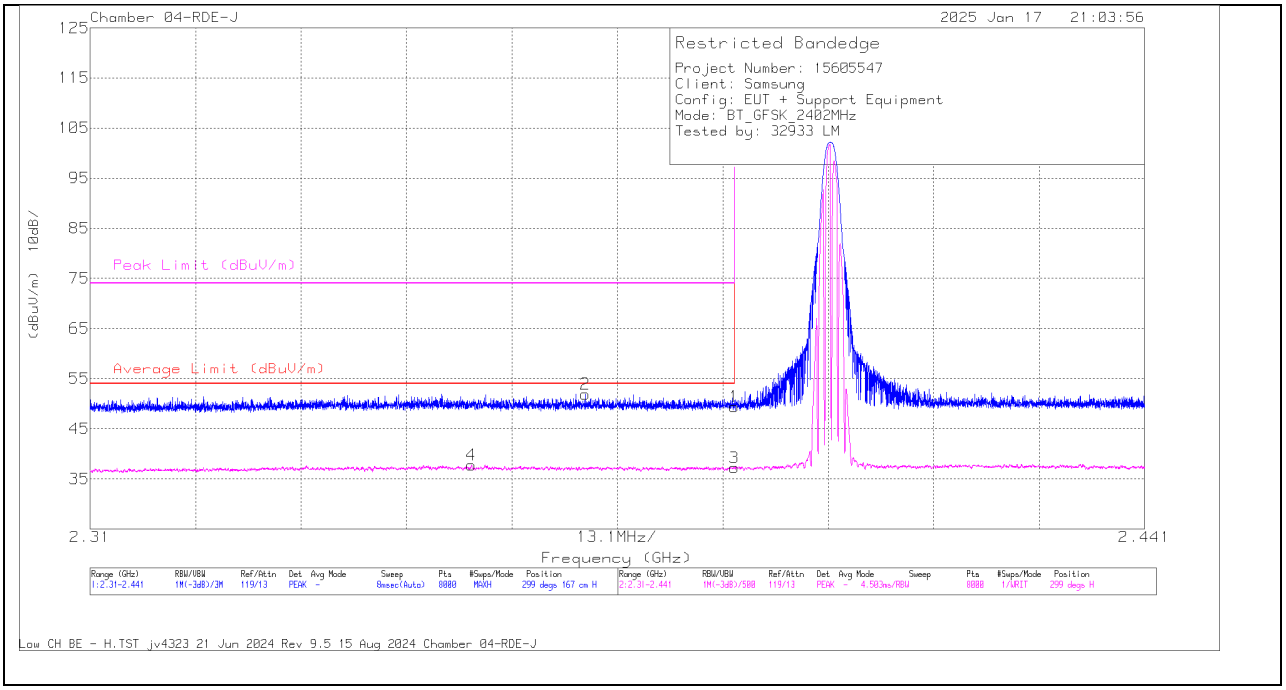
10.1. TRANSMITTER ABOVE 1 GHz

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	53.85	Pk	32.2	-36.7	49.35	-	-	74	-24.65	299	167	H
2	* 2.371496	56.49	Pk	32.1	-36.7	51.89	-	-	74	-22.11	299	167	H
3	* 2.39	41.71	VA1T	32.2	-36.7	37.21	54	-16.79	-	-	299	167	H
4	* 2.357395	42.45	VA1T	32.1	-36.8	37.75	54	-16.25	-	-	299	167	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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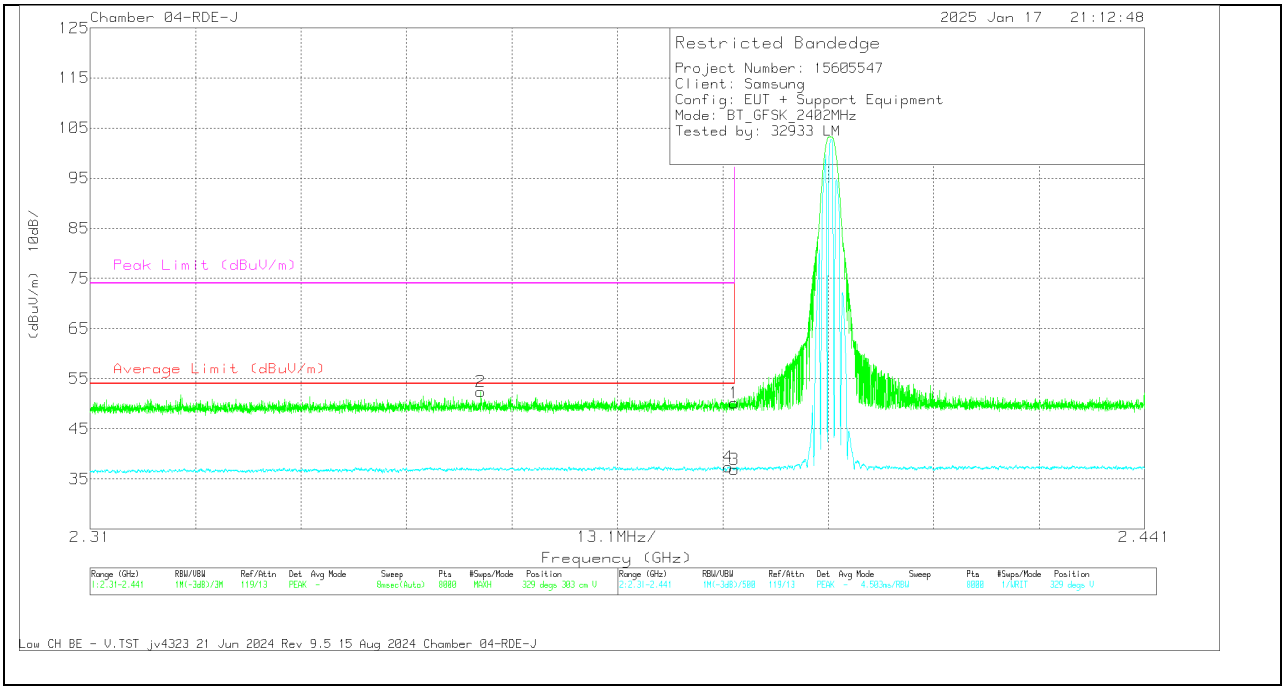
VERTICAL RESULT



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	54.61	Pk	32.2	-36.7	50.11	-	-	74	-23.89	329	303	V
2	* 2.358558	57.13	Pk	32.1	-36.8	52.43	-	-	74	-21.57	329	303	V
3	* 2.39	41.41	VA1T	32.2	-36.7	36.91	54	-17.09	-	-	329	303	V
4	* 2.389297	41.92	VA1T	32.2	-36.7	37.42	54	-16.58	-	-	329	303	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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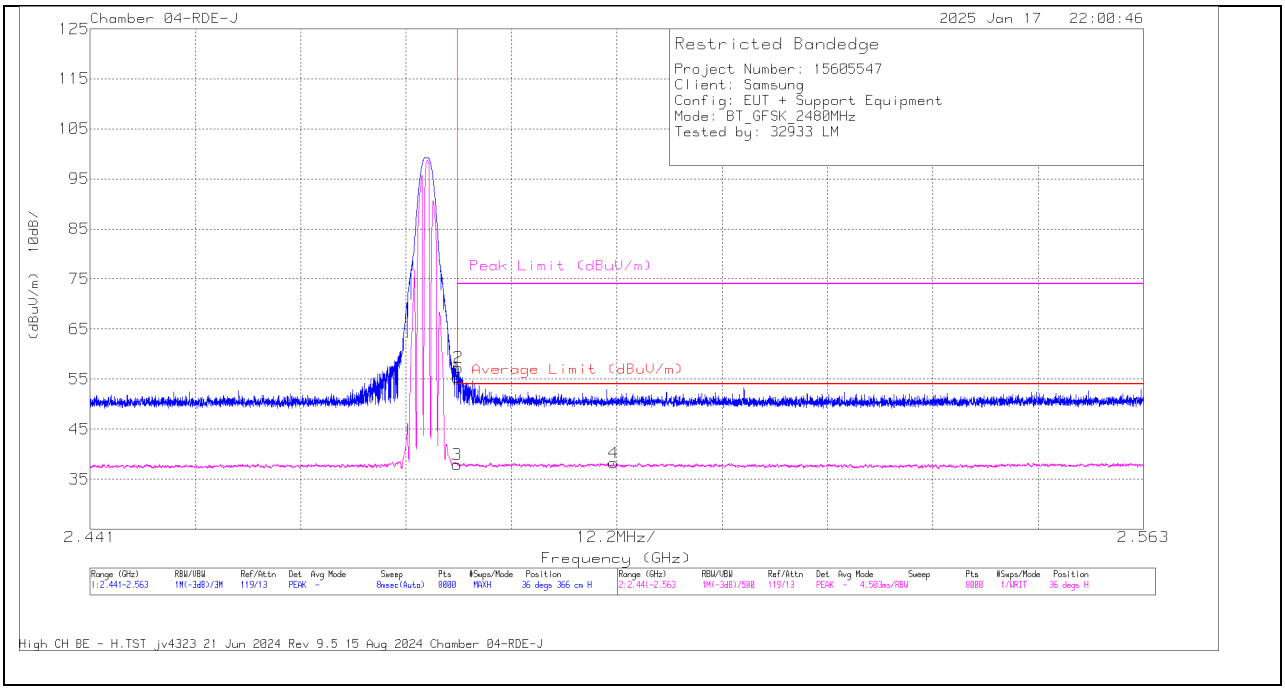
BANDEDGE (HIGH CHANNEL)

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	59.51	Pk	32.4	-36.6	55.31	-	-	74	-18.69	36	366	H
2	* 2.483645	61.48	Pk	32.4	-36.6	57.28	-	-	74	-16.72	36	366	H
3	* 2.4835	42.14	VA1T	32.4	-36.6	37.94	54	-16.06	-	-	36	366	H
4	2.501596	42.31	VA1T	32.5	-36.6	38.21	54	-15.79	-	-	36	366	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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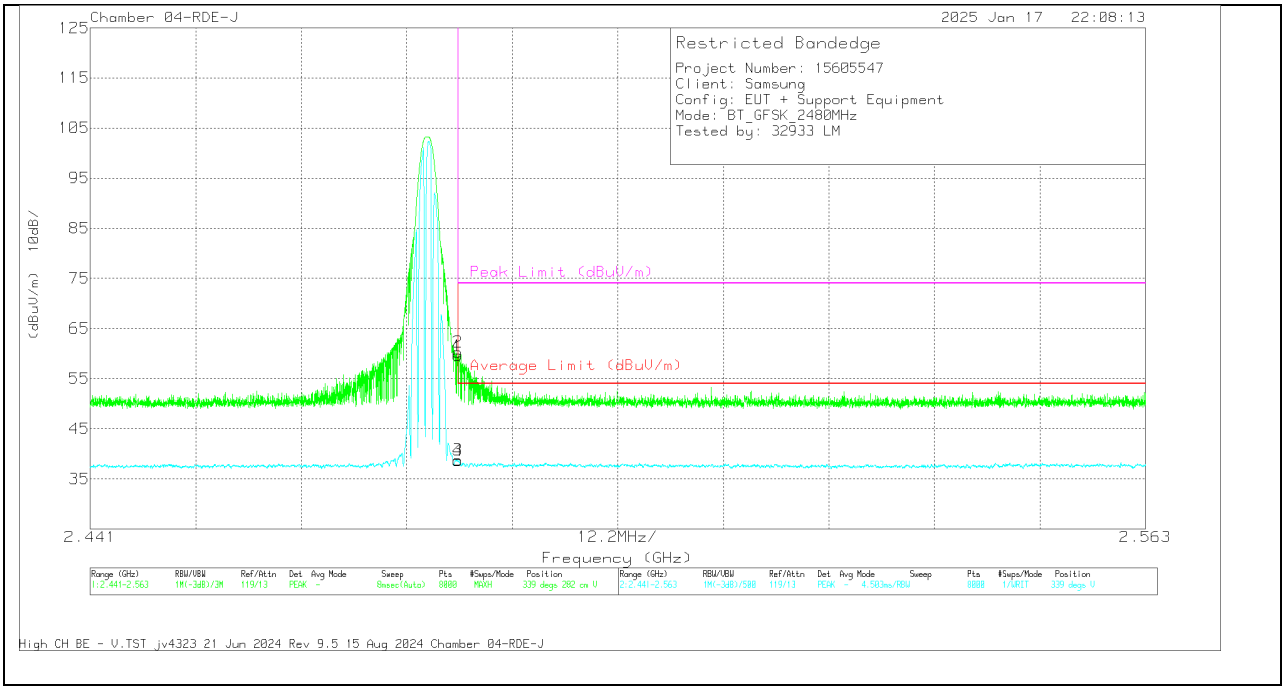
VERTICAL RESULT



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	63.81	Pk	32.4	-36.6	59.61	-	-	74	-14.39	339	282	V
2	* 2.483507	64.47	Pk	32.4	-36.6	60.27	-	-	74	-13.73	339	282	V
3	* 2.4835	42.94	VA1T	32.4	-36.6	38.74	54	-15.26	-	-	339	282	V
4	* 2.483507	42.87	VA1T	32.4	-36.6	38.67	54	-15.33	-	-	339	282	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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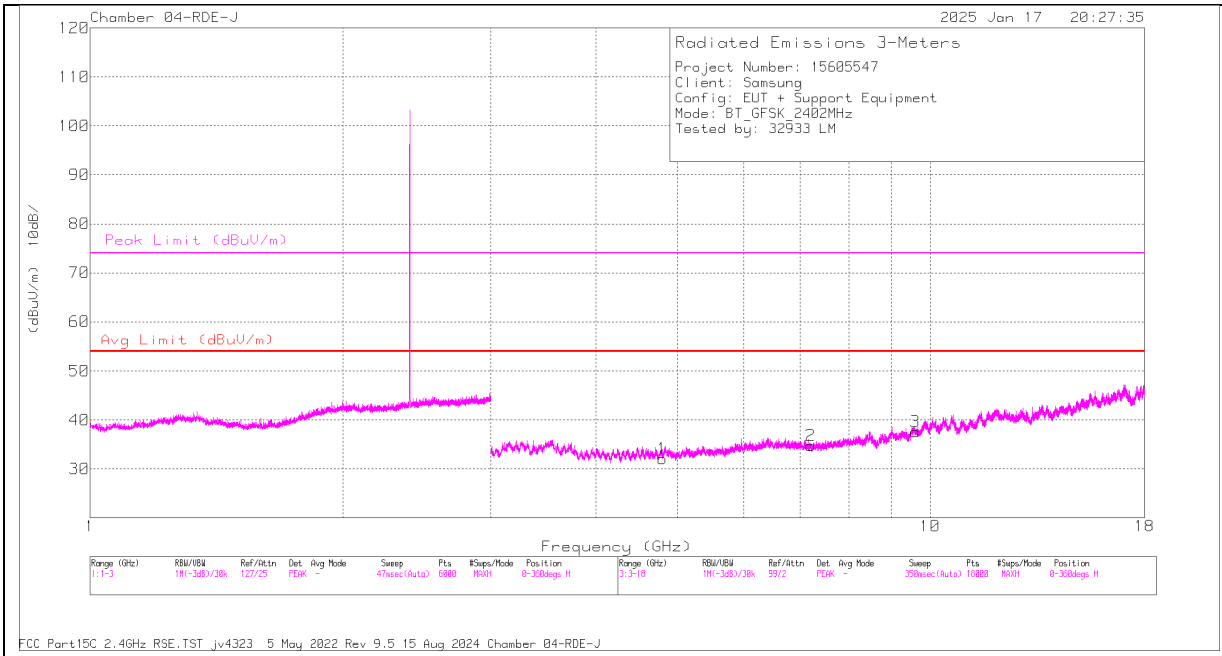
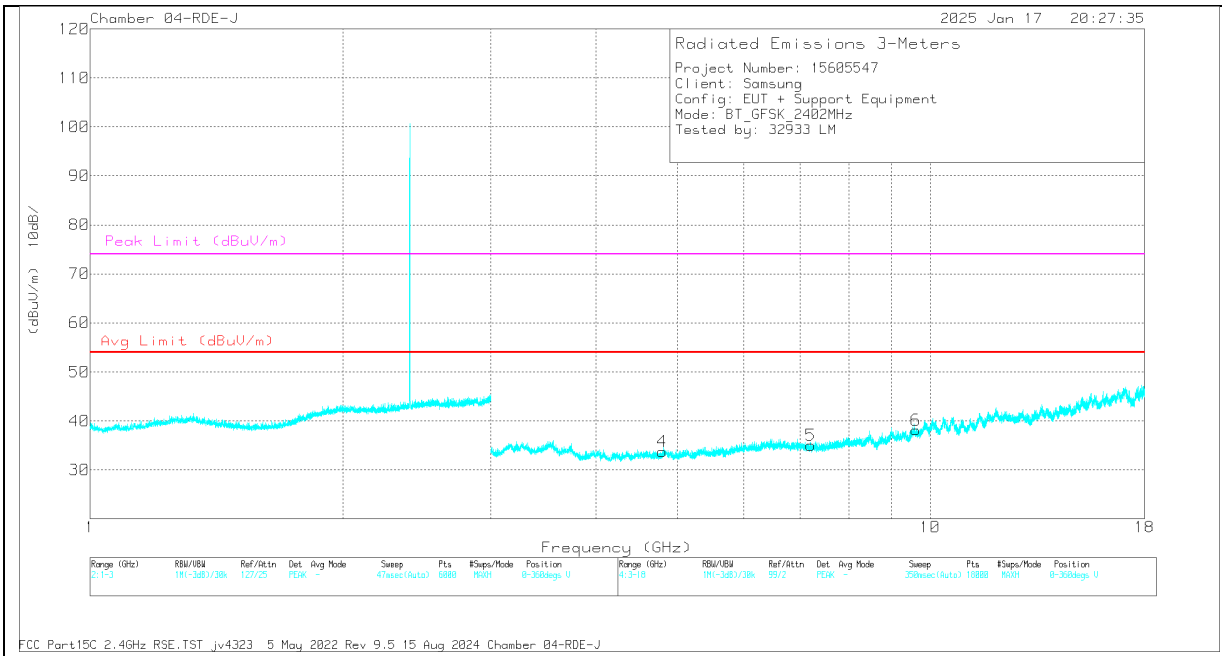
HARMONICS AND SPURIOUS EMISSIONS

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	* 4.786728	52.66	PKFH	34.3	-45.1	41.86	-	-	74	-32.14	141	210	H
	* 4.78279	39.93	VA1T	34.3	-45.1	29.13	54	-24.87	-	-	141	210	H
2	7.199906	51.08	PKFH	35.5	-42.1	44.48	-	-	-	-	302	103	H
3	9.622707	49.96	PKFH	37	-40.3	46.66	-	-	-	-	330	347	H
4	* 4.812195	53.58	PKFH	34.3	-45	42.88	-	-	74	-31.12	87	135	V
	* 4.82	39.55	VA1T	34.3	-45	28.85	54	-25.15	-	-	87	135	V
5	7.205663	50.36	PKFH	35.5	-42.2	43.66	-	-	-	-	240	101	V
6	9.597386	50.19	PKFH	37	-40.3	46.89	-	-	-	-	20	148	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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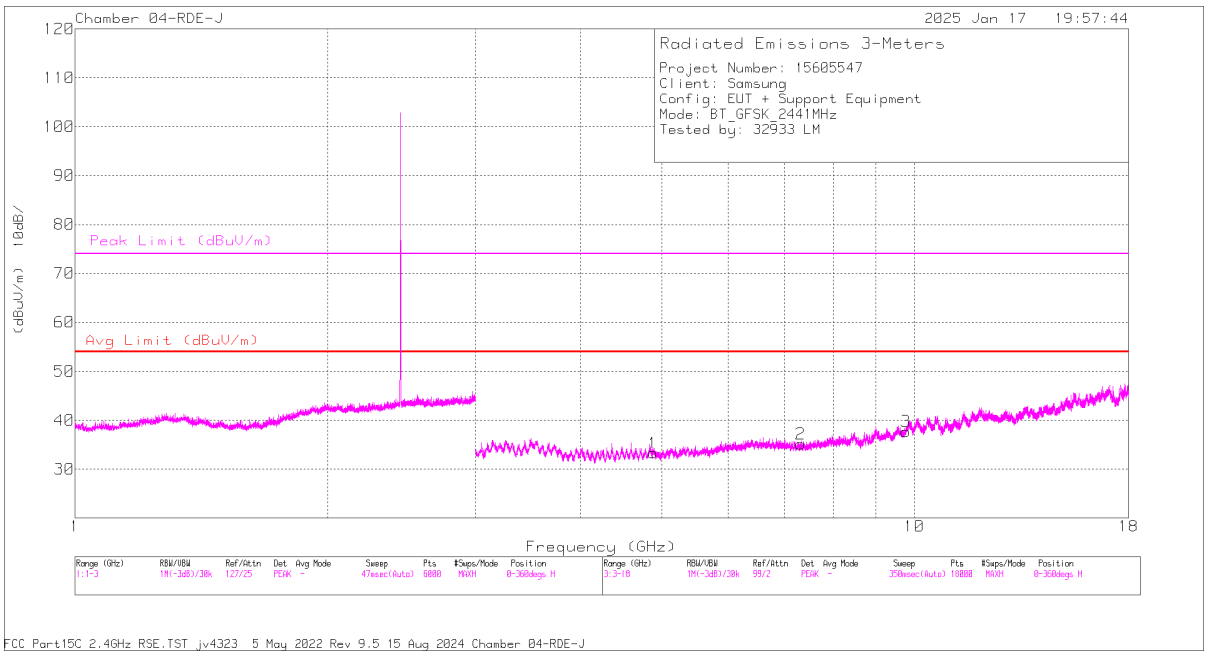
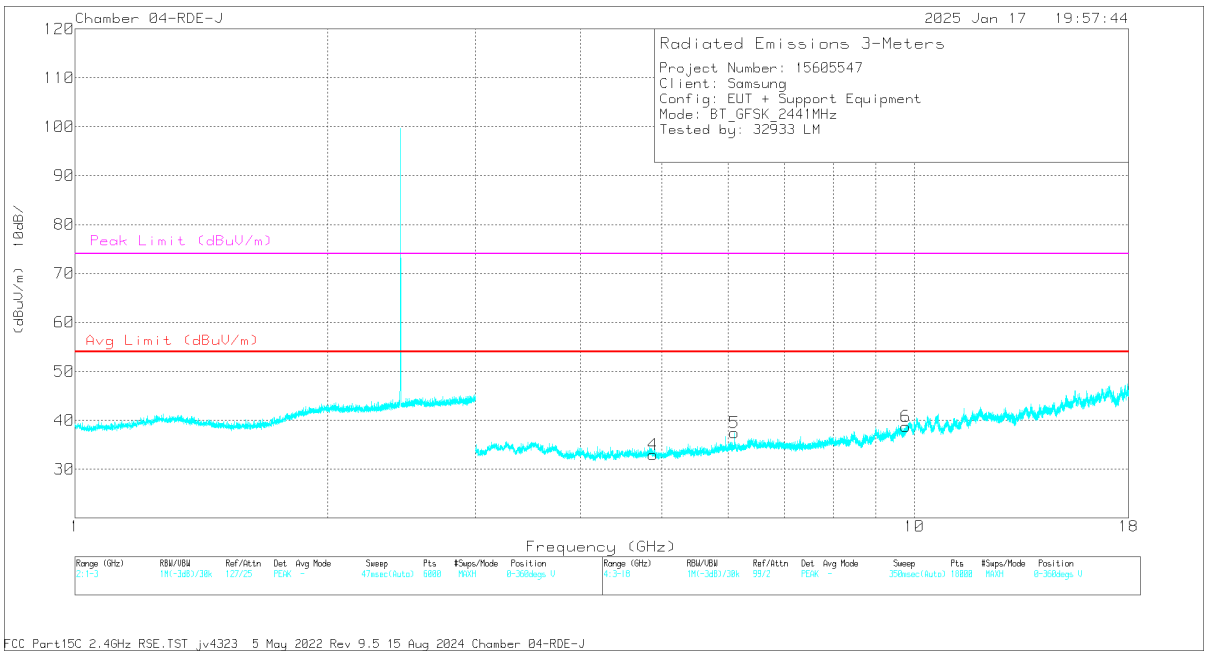
MID CHANNEL RESULTS



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	* 4.900533	52.72	PKFH	34.3	-44.5	42.52	-	-	74	-31.48	54	200	H
	* 4.896213	39.75	VA1T	34.3	-44.6	29.45	54	-24.55	-	-	54	200	H
2	* 7.326565	50.69	PKFH	35.5	-42.3	43.89	-	-	74	-30.11	302	102	H
	* 7.323259	37.69	VA1T	35.5	-42.3	30.89	54	-23.11	-	-	302	102	H
3	9.743288	50.55	PKFH	37.2	-41.1	46.65	-	-	-	-	5	222	H
4	* 4.880522	52.96	PKFH	34.3	-44.6	42.66	-	-	74	-31.34	191	213	V
	* 4.868055	39.19	VA1T	34.3	-44.5	28.99	54	-25.01	-	-	191	213	V
5	6.102399	52.68	PKFH	35.5	-42.1	46.08	-	-	-	-	246	131	V
6	9.760678	50.86	PKFH	37.2	-41	47.06	-	-	-	-	160	230	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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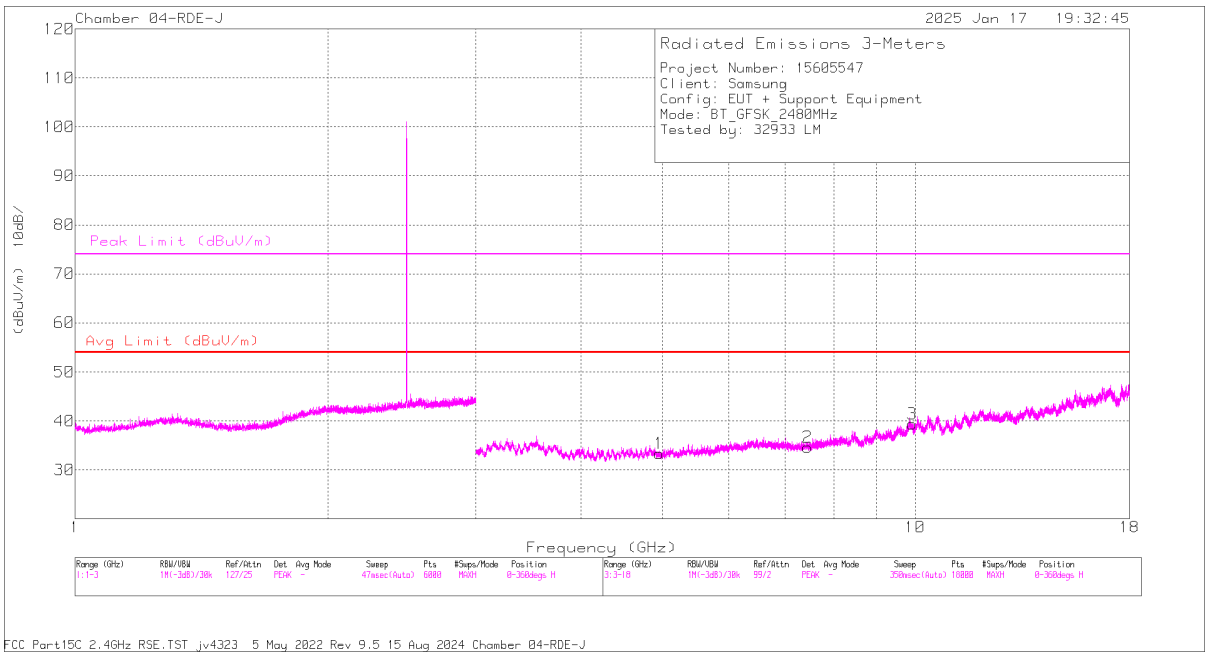
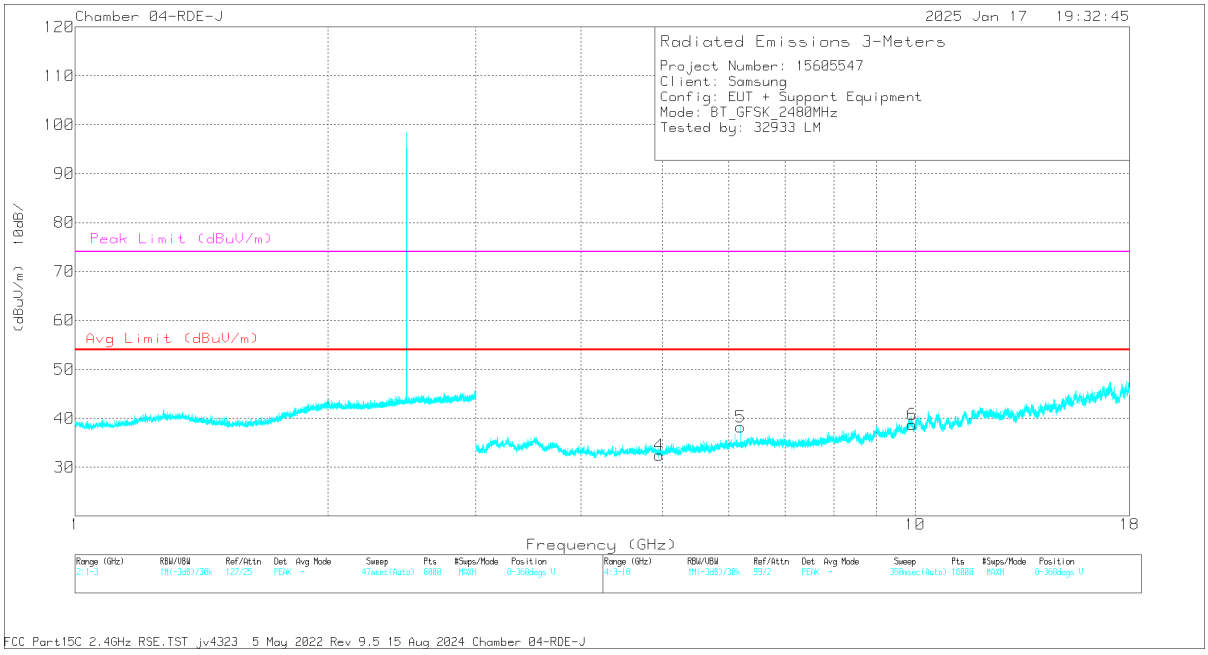
HIGH CHANNEL RESULTS



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	* 4.964275	52.95	PKFH	34.2	-44.7	42.45	-	-	74	-31.55	90	226	H
	* 4.955169	39.43	VA1T	34.2	-44.8	28.83	54	-25.17	-	-	90	226	H
2	* 7.448337	50.22	PKFH	35.6	-42.1	43.72	-	-	74	-30.28	345	103	H
	* 7.436101	37.19	VA1T	35.5	-42.1	30.59	54	-23.41	-	-	345	103	H
3	9.915209	50.81	PKFH	37.5	-39.5	48.81	-	-	-	-	312	107	H
4	* 4.957078	52.33	PKFH	34.2	-44.7	41.83	-	-	74	-32.17	45	177	V
	* 4.958616	39.37	VA1T	34.2	-44.7	28.87	54	-25.13	-	-	45	177	V
5	6.199484	53.42	PKFH	35.6	-42.5	46.52	-	-	-	-	252	121	V
6	9.920506	49.66	PKFH	37.5	-39.6	47.56	-	-	-	-	226	198	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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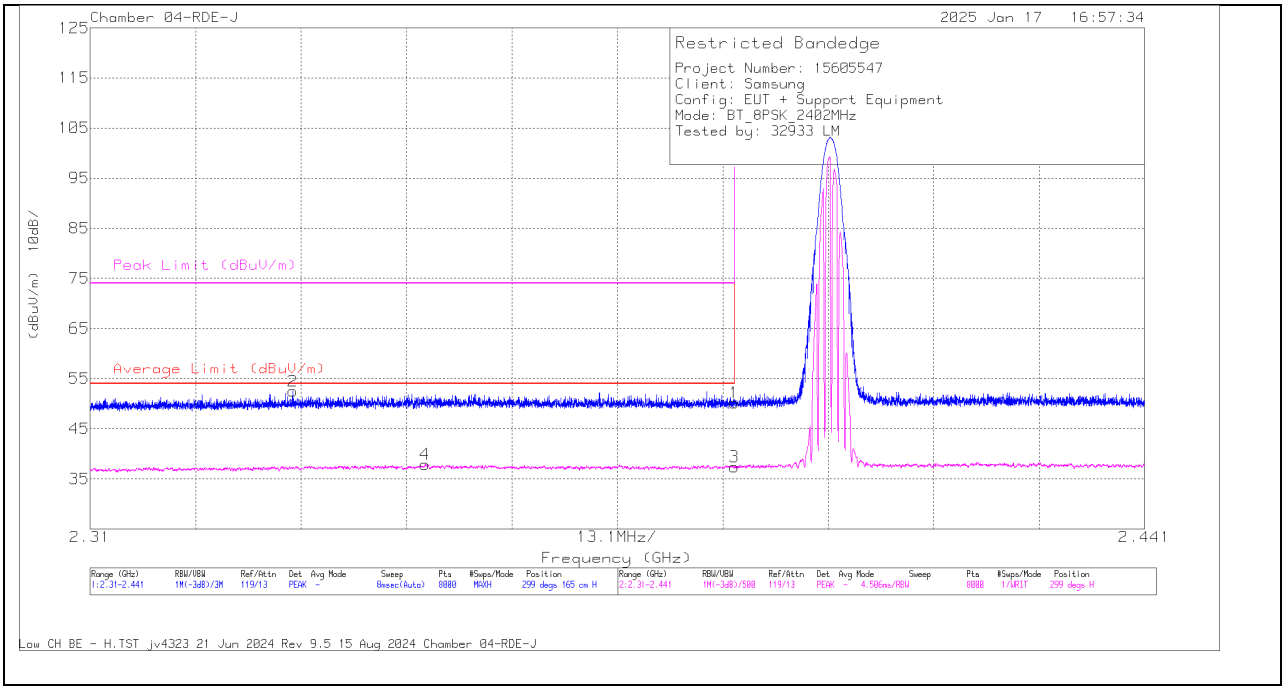
10.1.2. BLUETOOTH ENHANCED DATA RATE 8PSK MODULATION

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
1	* 2.39	54.64	Pk	32.2	-36.7	50.14	-	-	74	-23.86	299	165	H
2	* 2.335188	57.27	Pk	32	-36.8	52.47	-	-	74	-21.53	299	165	H
3	* 2.39	41.84	VA1T	32.2	-36.7	37.34	54	-16.66	-	-	299	165	H
4	* 2.35163	42.56	VA1T	32.1	-36.8	37.86	54	-16.14	-	-	299	165	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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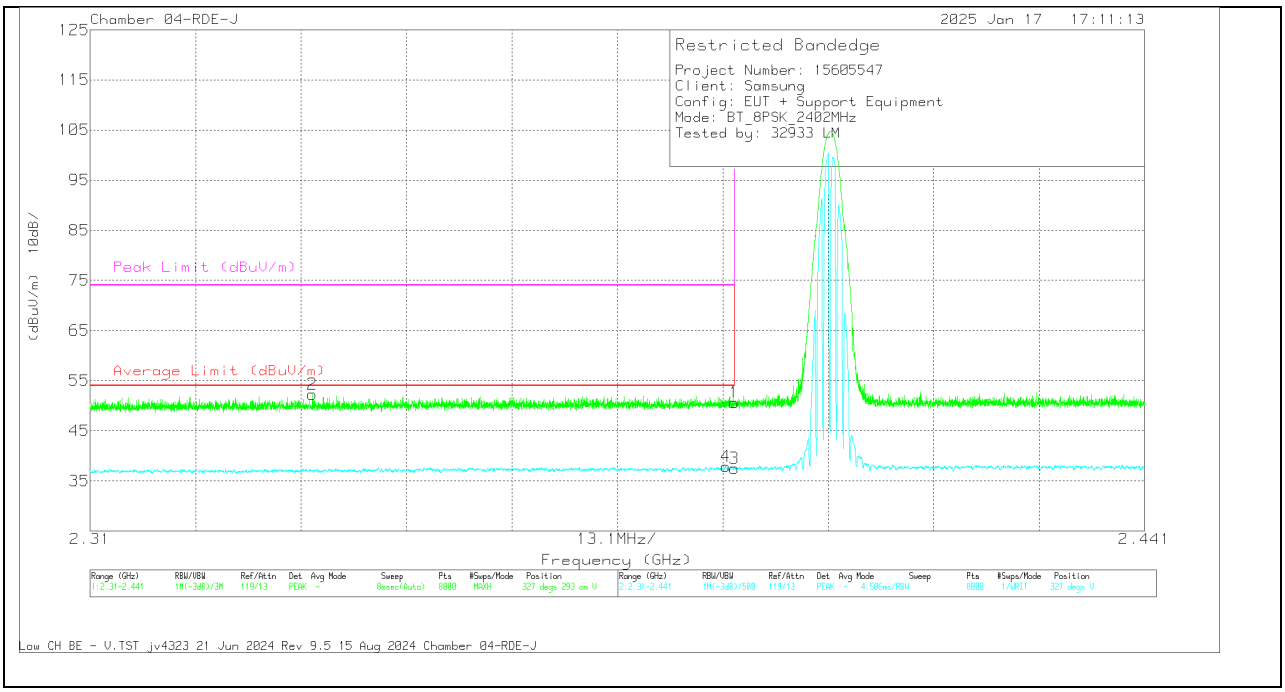
VERTICAL RESULT



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	55.11	Pk	32.2	-36.7	50.61	-	-	74	-23.39	327	293	V
2	* 2.337579	57.07	Pk	32	-36.8	52.27	-	-	74	-21.73	327	293	V
3	* 2.39	41.99	VA1T	32.2	-36.7	37.49	54	-16.51	-	-	327	293	V
4	* 2.388986	42.4	VA1T	32.2	-36.7	37.9	54	-16.1	-	-	327	293	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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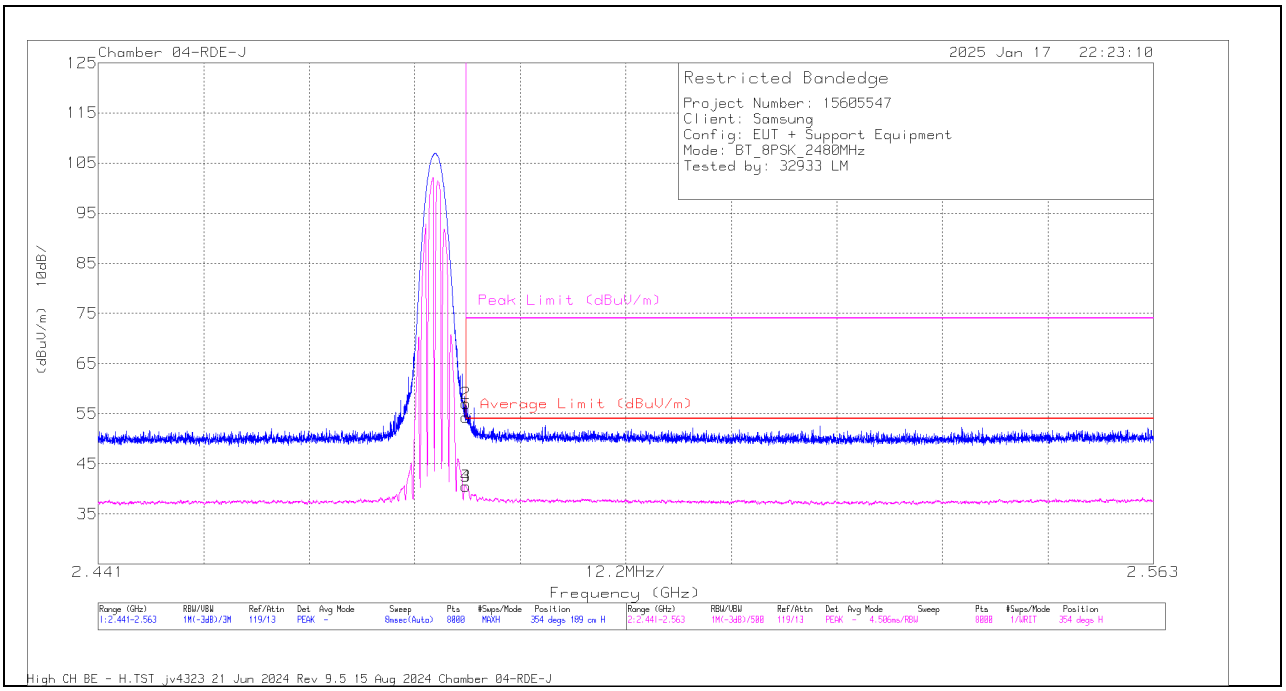
BANDEDGE (HIGH CHANNEL)

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	58.5	Pk	32.4	-36.6	54.3	-	-	74	-19.7	354	189	H
3	* 2.4835	44.7	VA1T	32.4	-36.6	40.5	54	-13.5	-	-	354	189	H
4	* 2.483523	44.72	VA1T	32.4	-36.6	40.52	54	-13.48	-	-	354	189	H
2	* 2.483538	61.23	Pk	32.4	-36.6	57.03	-	-	74	-16.97	354	189	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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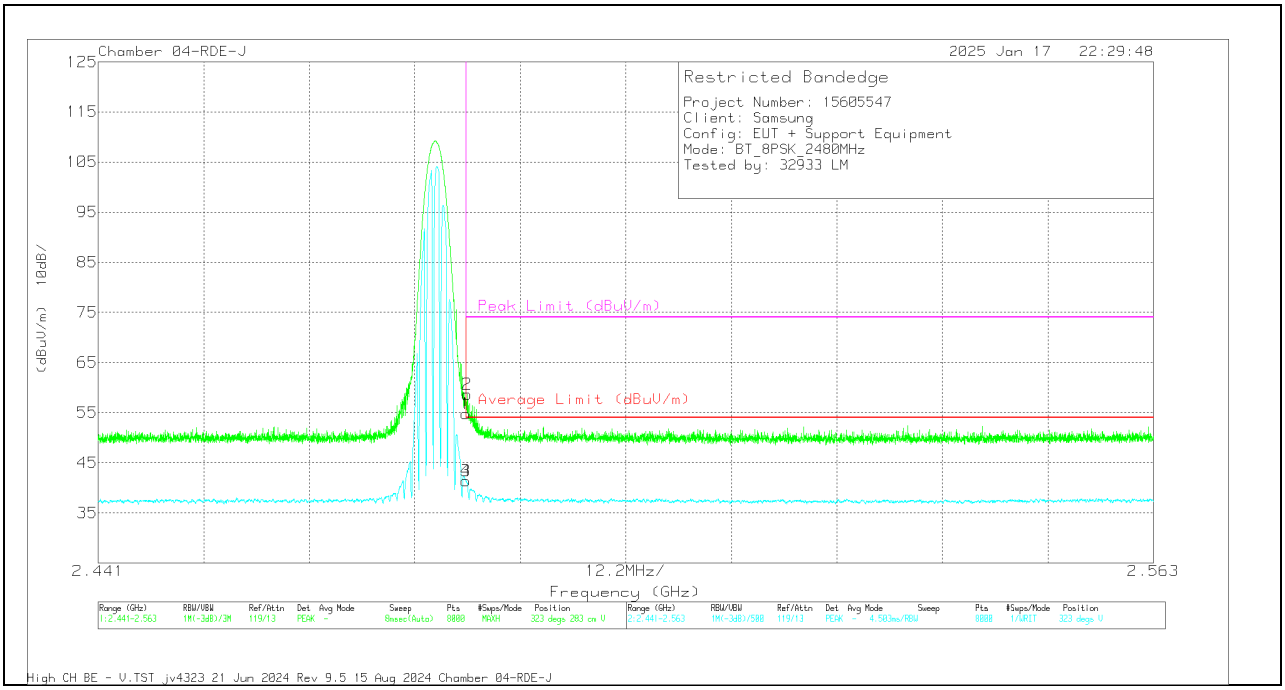
VERTICAL RESULT



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	58.99	Pk	32.4	-36.6	54.79	-	-	74	-19.21	323	283	V
2	* 2.48369	62.82	Pk	32.4	-36.6	58.62	-	-	74	-15.38	323	283	V
3	* 2.4835	45.56	VA1T	32.4	-36.6	41.36	54	-12.64	-	-	323	283	V
4	* 2.483538	45.63	VA1T	32.4	-36.6	41.43	54	-12.57	-	-	323	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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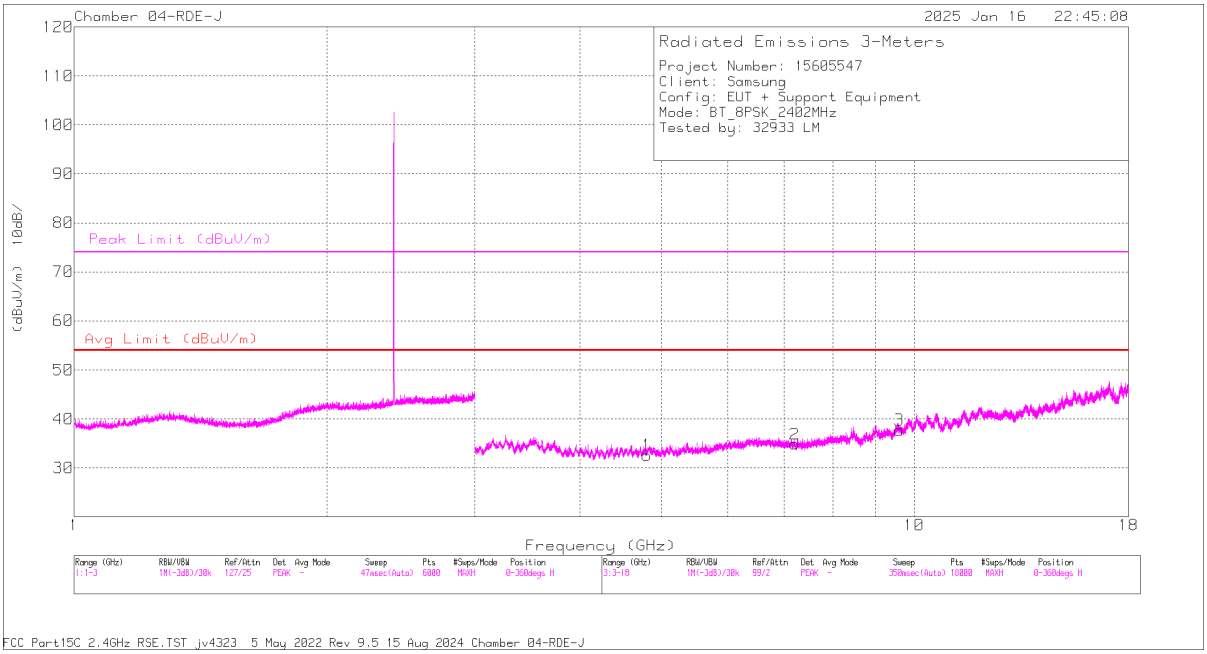
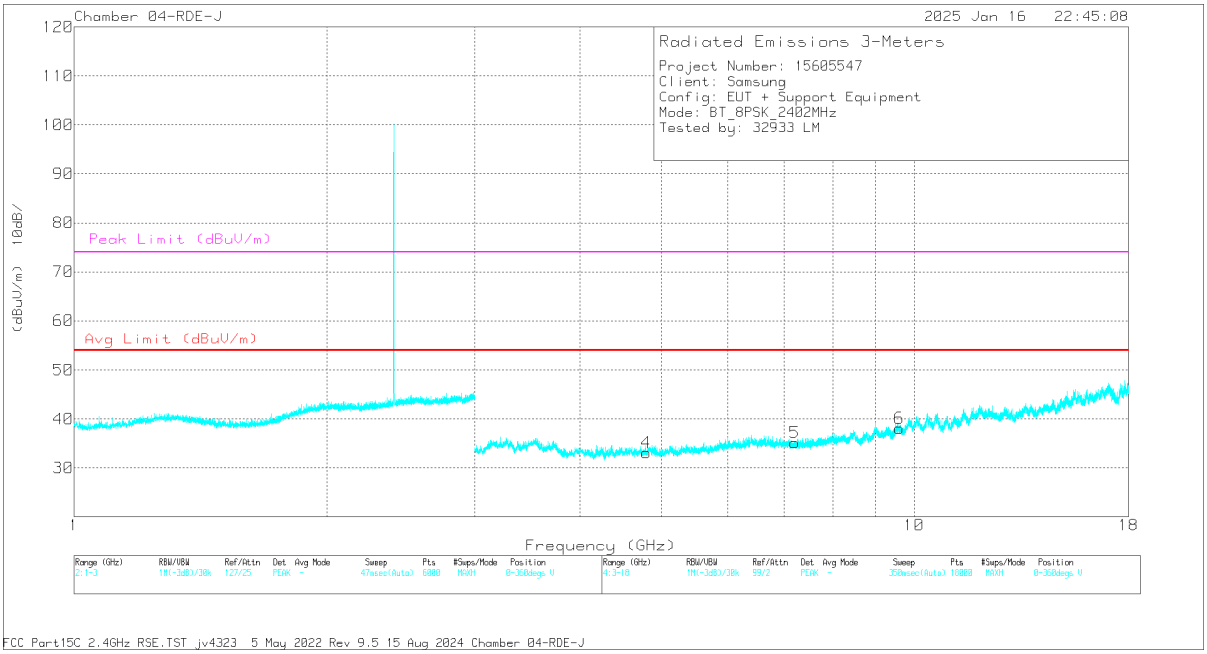
HARMONICS AND SPURIOUS EMISSIONS

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	* 4.813097	53.15	PKFH	34.3	-45	42.45	-	-	74	-31.55	295	101	H
	* 4.813697	40.03	VA1T	34.3	-45	29.33	54	-24.67	-	-	295	101	H
2	7.205875	51.4	PKFH	35.5	-42.2	44.7	-	-	-	-	236	118	V
3	9.588325	50.33	PKFH	36.9	-40.1	47.13	-	-	-	-	4	295	H
4	* 4.805647	53.25	PKFH	34.3	-45	42.55	-	-	74	-31.45	25	223	V
	* 4.795193	39.57	VA1T	34.3	-45.1	28.77	54	-25.23	-	-	25	223	V
5	7.200905	50.72	PKFH	35.5	-42.1	44.12	-	-	-	-	322	101	H
6	9.591313	50.02	PKFH	37	-40.2	46.82	-	-	-	-	182	251	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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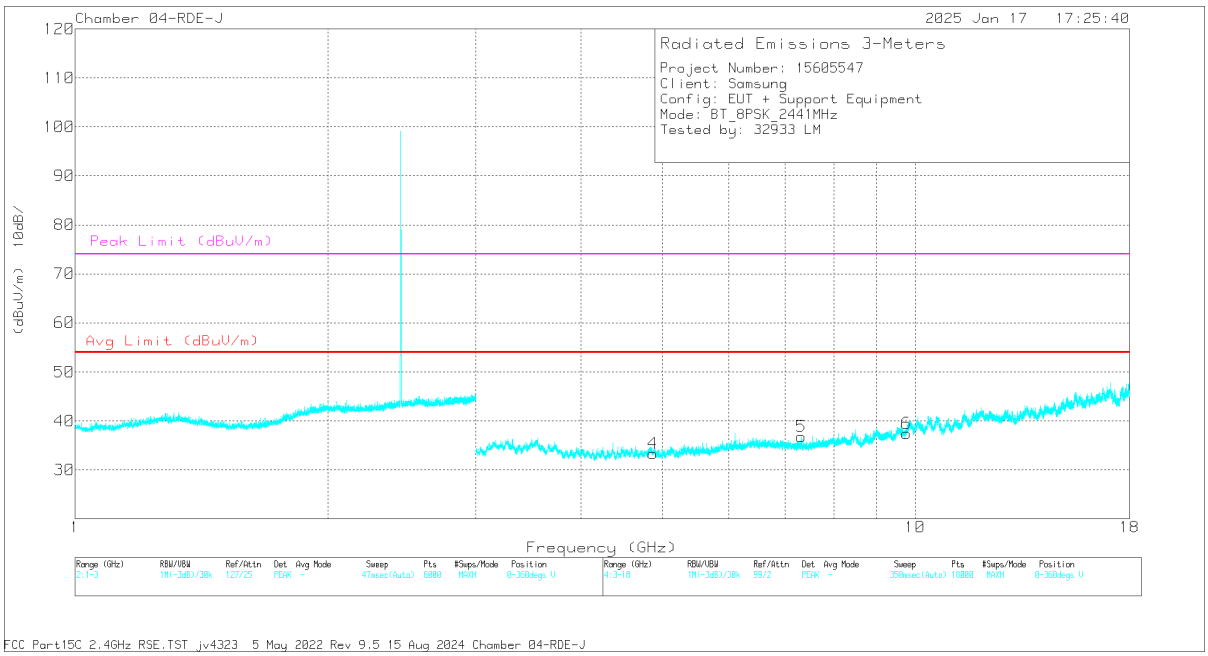
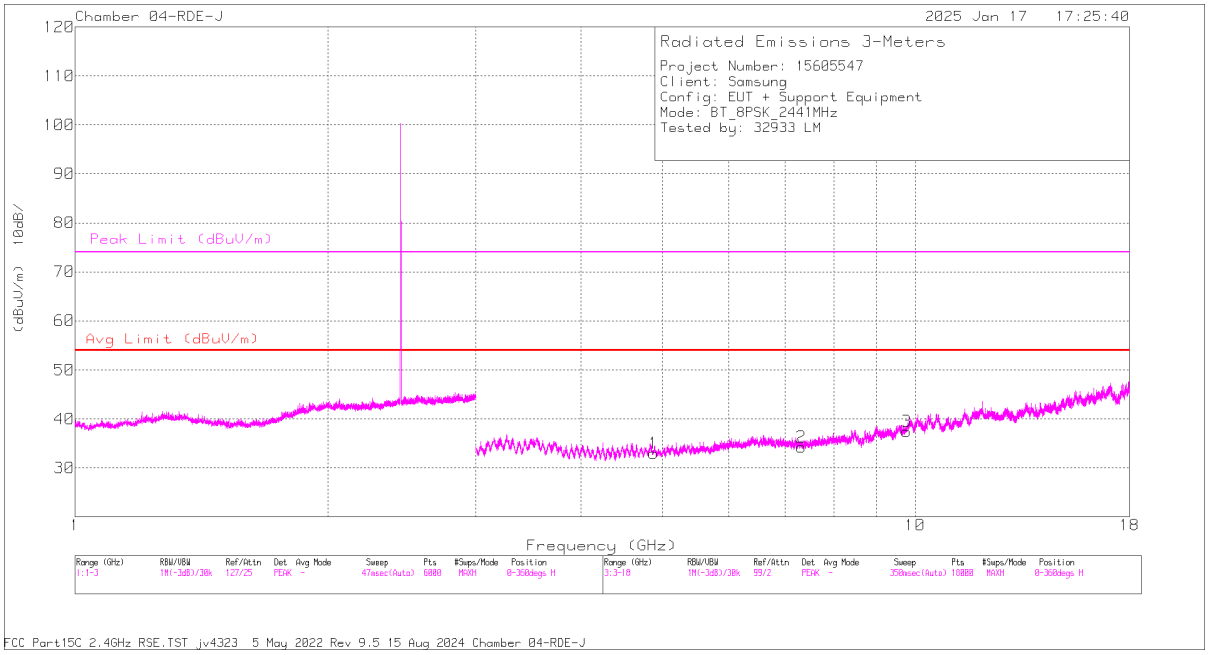
MID CHANNEL RESULTS



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	* 4.897227	53.44	PKFH	34.3	-44.6	43.14	-	-	74	-30.86	106	233	H
	* 4.89804	39.91	VA1T	34.3	-44.5	29.71	54	-24.29	-	-	106	233	H
2	* 7.321253	51.5	PKFH	35.5	-42.2	44.8	-	-	74	-29.2	297	101	H
	* 7.322862	38.08	VA1T	35.5	-42.3	31.28	54	-22.72	-	-	297	101	H
3	9.776265	51.13	PKFH	37.3	-40.7	47.73	-	-	-	-	16	270	H
4	* 4.882401	53.82	PKFH	34.3	-44.6	43.52	-	-	74	-30.48	311	391	V
	* 4.858863	39.9	VA1T	34.3	-44.5	29.7	54	-24.3	-	-	311	391	V
5	* 7.322748	51.95	PKFH	35.5	-42.3	45.15	-	-	74	-28.85	232	119	V
	* 7.322828	41.25	VA1T	35.5	-42.3	34.45	54	-19.55	-	-	232	119	V
6	9.774473	50.3	PKFH	37.3	-40.7	46.9	-	-	-	-	19	216	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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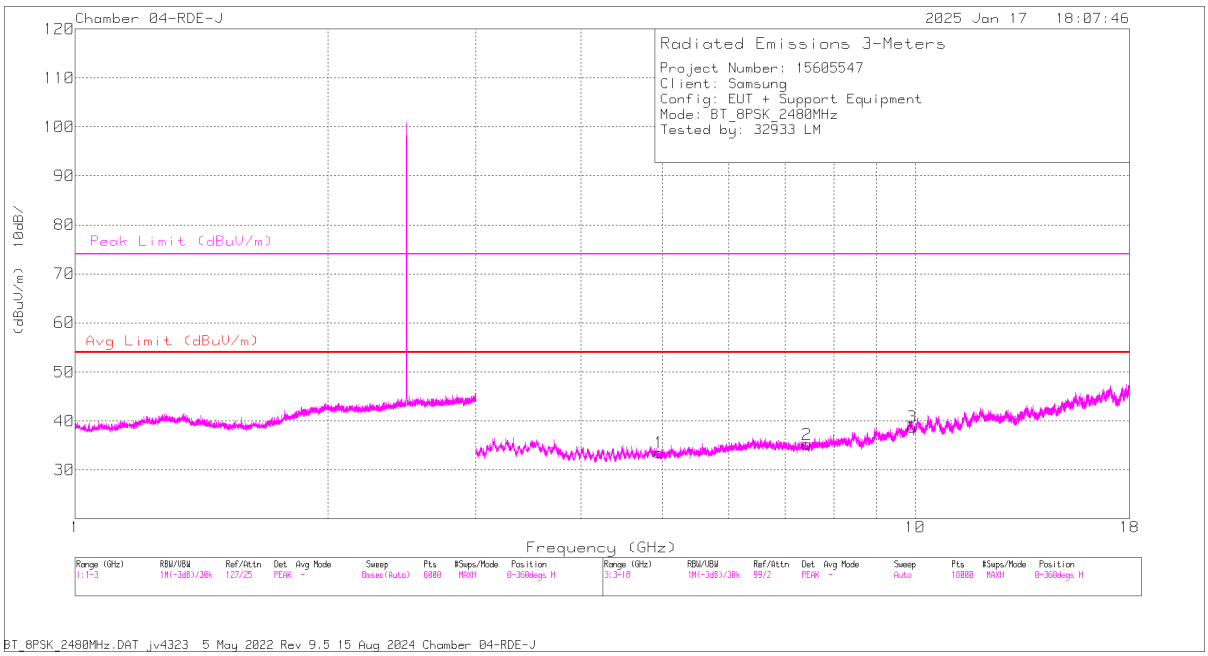
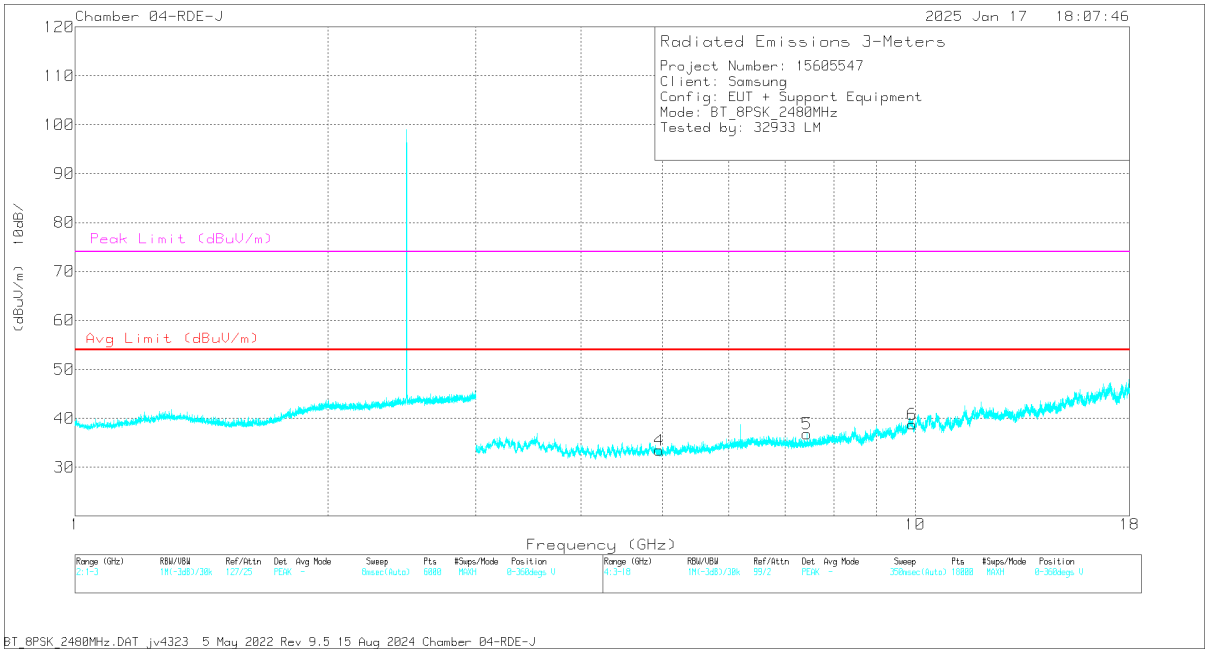
HIGH CHANNEL RESULTS



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	* 4.953326	53	PKFH	34.2	-44.8	42.4	-	-	74	-31.6	24	241	H
	* 4.957704	39.69	VA1T	34.2	-44.7	29.19	54	-24.81	-	-	24	241	H
2	* 7.439562	50.72	PKFH	35.5	-42.1	44.12	-	-	74	-29.88	316	101	H
	* 7.439816	37.77	VA1T	35.5	-42.1	31.17	54	-22.83	-	-	316	101	H
3	9.904406	49.71	PKFH	37.5	-39.4	47.81	-	-	-	-	297	311	H
4	* 4.941998	52.58	PKFH	34.2	-44.6	42.18	-	-	74	-31.82	62	124	V
	* 4.969522	39.06	VA1T	34.2	-44.7	28.56	54	-25.44	-	-	62	124	V
5	* 7.439542	53.36	PKFH	35.5	-42.1	46.76	-	-	74	-27.24	242	101	V
	* 7.439916	40.65	VA1T	35.5	-42.1	34.05	54	-19.95	-	-	242	101	V
6	9.926009	50.56	PKFH	37.6	-39.8	48.36	-	-	-	-	358	101	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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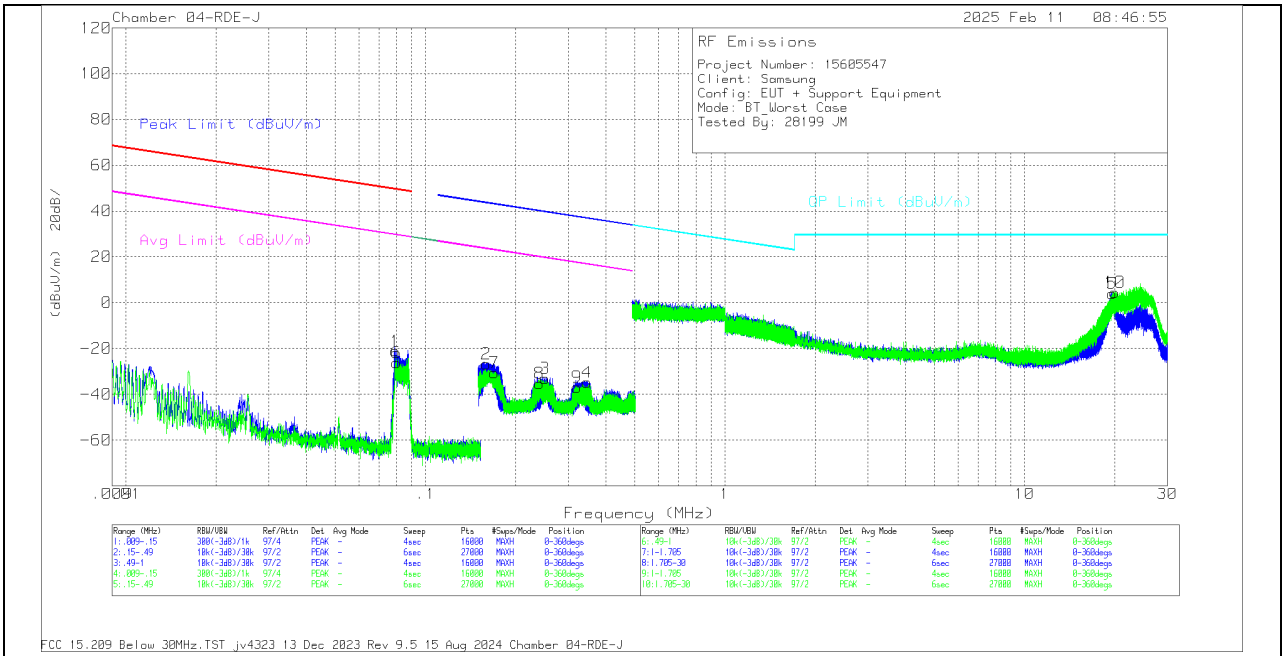
10.2. WORST CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	CBL/AMP (dB)	Dist Corr 300m (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Face
1	.0793	35.75	Pk	55.7	-32.6	-80	-21.15	49.6	-70.75	29.6	-50.75	0-360	On
6	.0802	30.7	Pk	55.7	-32.6	-80	-26.2	49.5	-75.7	29.5	-55.7	0-360	Off
2	.1594	29.67	Pk	56	-32.5	-80	-26.83	43.57	-70.4	23.57	-50.4	0-360	On
7	.1695	25.73	Pk	56.1	-32.5	-80	-30.67	43.04	-73.71	23.04	-53.71	0-360	Off
8	.2407	20.65	Pk	56.3	-32.2	-80	-35.25	39.99	-75.24	19.99	-55.24	0-360	Off
3	.251	22.67	Pk	56.3	-32.1	-80	-33.13	39.62	-72.75	19.62	-52.75	0-360	On
9	.3208	19.02	Pk	56.2	-32.2	-80	-36.98	37.49	-74.47	17.49	-54.47	0-360	Off
4	.3468	21.25	Pk	56.2	-32.3	-80	-34.85	36.81	-71.66	16.81	-51.66	0-360	On

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	CBL/AMP (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Face
5	19.6185	40.95	Pk	34.5	-31.5	-40	3.95	29.5	-25.55	0-360	On
10	19.9811	41.79	Pk	34.5	-31.7	-40	4.59	29.5	-24.91	0-360	Off

Pk - Peak detector

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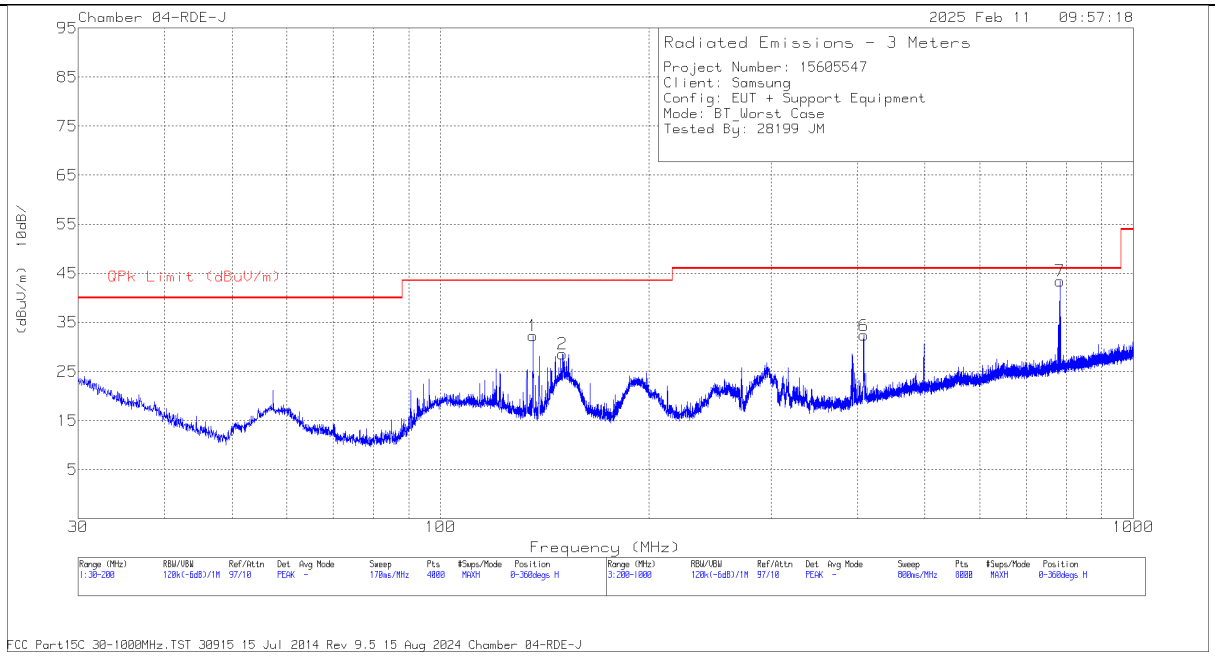
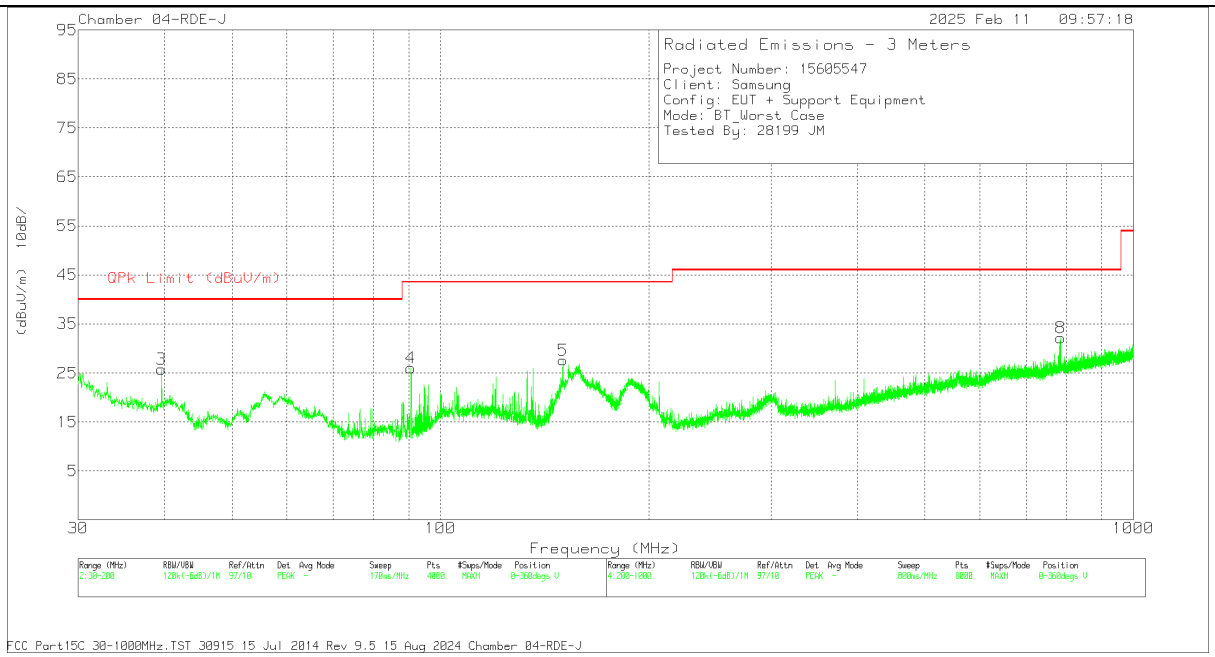
10.3. WORST CASE BELOW 1 GHz

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



HORIZONTAL



VERTICAL

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Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	80293 ACF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 135.98	43.95	Pk	19.5	-31.1	32.35	43.52	-11.17	0-360	398	H
2	150.094	41.21	Pk	18.4	-31	28.61	43.52	-14.91	0-360	298	H
3	39.565	37.45	Pk	20	-31.7	25.75	40	-14.25	0-360	100	V
4	90.6207	43.38	Pk	13.9	-31.3	25.98	43.52	-17.54	0-360	100	V
5	150.221	40.22	Pk	18.4	-31	27.62	43.52	-15.9	0-360	100	V
6	* 408.227	40.66	Pk	21.8	-30.1	32.36	46.02	-13.66	0-360	298	H
7	782.72	35.27	Pk	26.9	-28.8	33.37	46.02	-12.65	19	306	H
8	784.676	34.01	Pk	26.9	-28.7	32.21	46.02	-13.81	0-360	198	V

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

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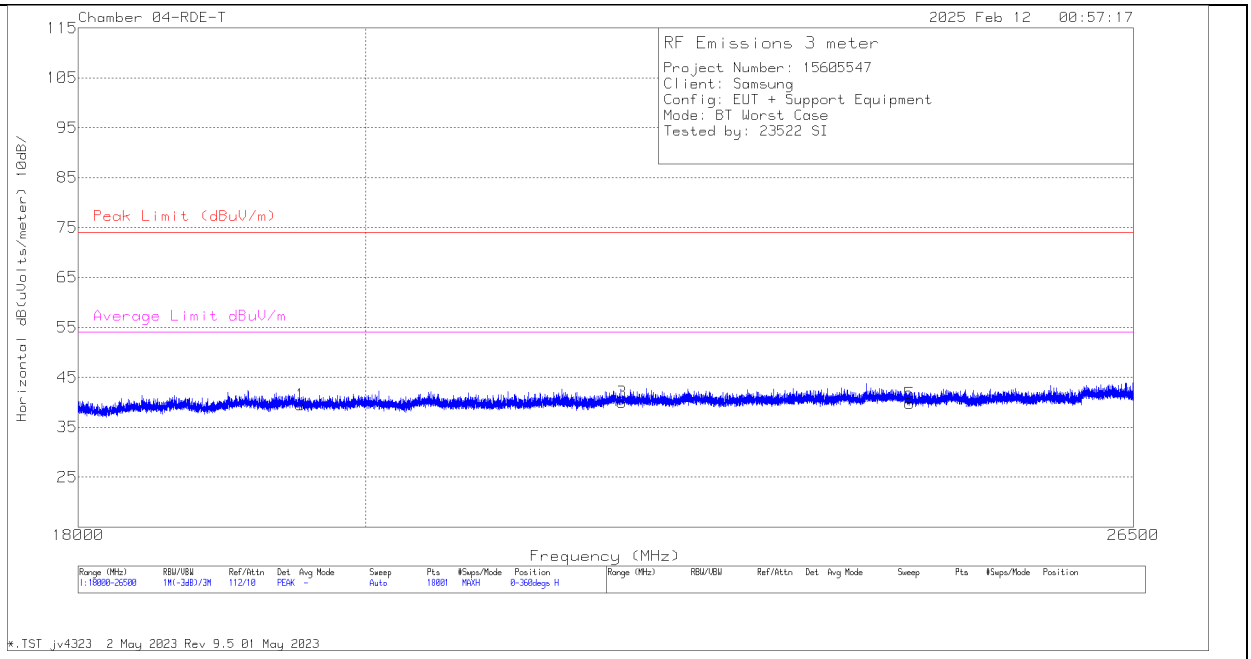
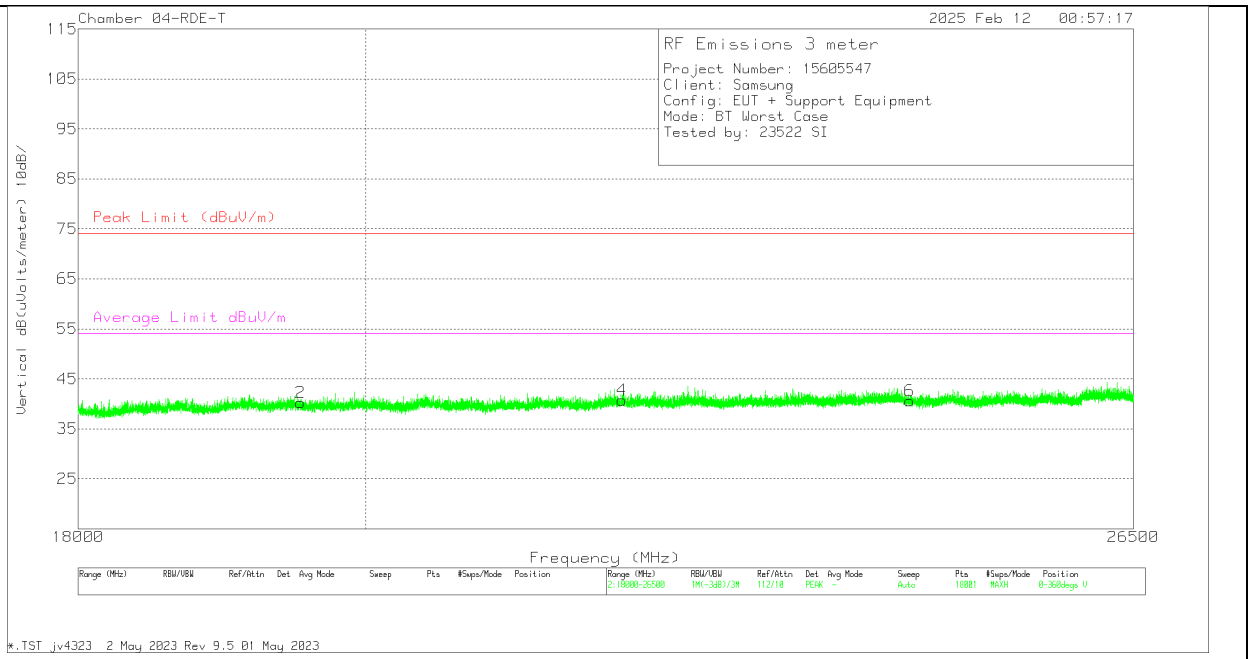
10.4. WORST CASE 18-26 GHz

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 (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit dBuV/m	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 19528.583	54.78	Pk	32.5	-61.9	14.1	39.48	74	-34.52	54	-14.52	0-360	101	H
2	* 19528.583	55.52	Pk	32.5	-61.9	14.1	40.22	74	-33.78	54	-13.78	0-360	101	V
3	21969.498	54.2	Pk	33.1	-62.4	15.1	40	74	-34	54	-14	0-360	200	H
4	21969.498	54.95	Pk	33.1	-62.4	15.1	40.75	74	-33.25	54	-13.25	0-360	101	V
5	24410.886	51.75	Pk	33.7	-61.6	15.9	39.75	74	-34.25	54	-14.25	0-360	101	H
6	24410.886	52.58	Pk	33.7	-61.6	15.9	40.58	74	-33.42	54	-13.42	0-360	200	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)

RSS-Gen 8.8

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

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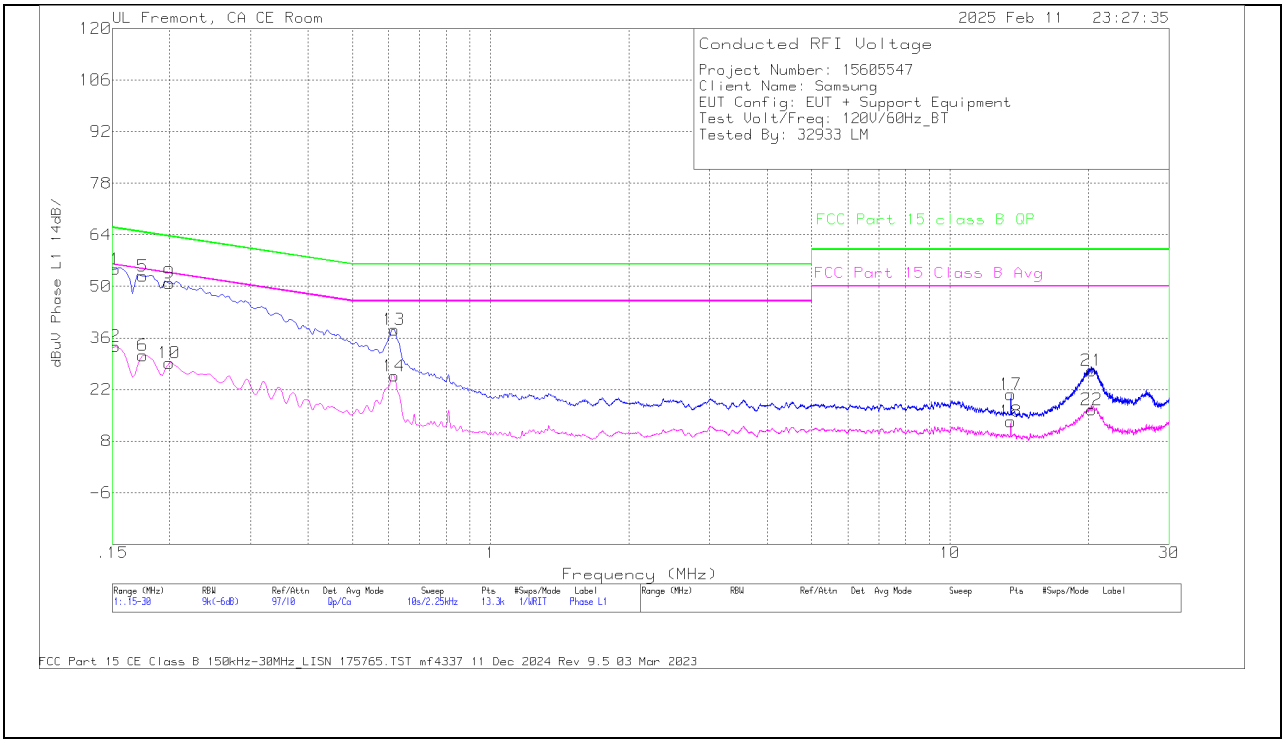
LINE 1 RESULTS



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	.1523	14.64	Ca	.5	.1	8.5	10	33.74	55.88	-22.14	-	-
6	.1748	12.34	Ca	.3	.1	8.5	10	31.24	54.73	-23.49	-	-
10	.1995	10.6	Ca	.1	.1	8.4	10	29.2	53.63	-24.43	-	-
14	.6158	7.36	Ca	0	0	8.3	10	25.66	46	-20.34	-	-
18	13.56	-5.17	Ca	.2	.1	8.2	10	13.33	50	-36.67	-	-
22	20.337	-1.8	Ca	.1	.1	8.1	10	16.5	50	-33.5	-	-
1	.1523	35.53	Qp	.5	.1	8.5	10	54.63	-	-	65.88	-11.25
5	.1748	33.87	Qp	.3	.1	8.5	10	52.77	-	-	64.73	-11.96
9	.1995	32.24	Qp	.1	.1	8.4	10	50.84	-	-	63.63	-12.79
13	.6158	19.93	Qp	0	0	8.3	10	38.23	-	-	56	-17.77
17	13.56	2.16	Qp	.2	.1	8.2	10	20.66	-	-	60	-39.34
21	20.337	8.86	Qp	.1	.1	8.1	10	27.16	-	-	60	-32.84

Qp - Quasi-Peak detector
Ca - CISPR average detection

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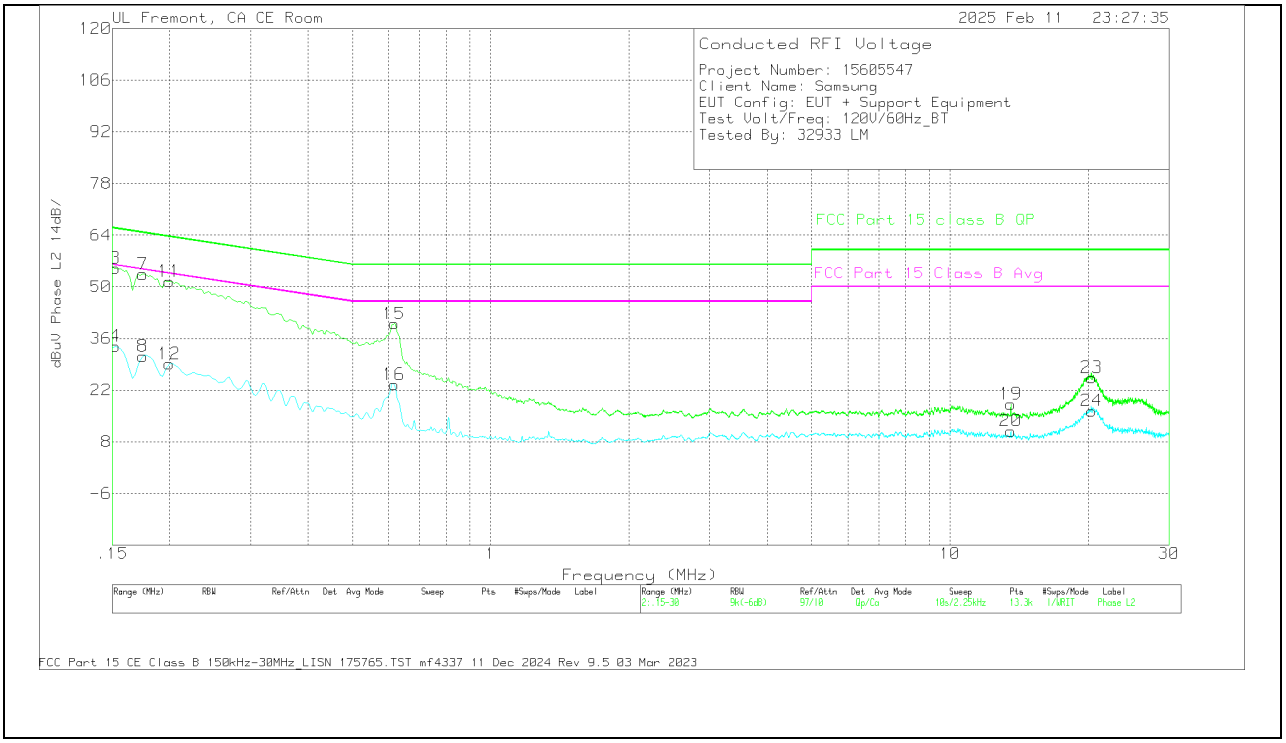
LINE 2 RESULTS



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 15C Avg	Margin (dB)	FCC Part 15C QP	Margin (dB)
4	.1523	14.8	Ca	.5	.1	8.5	10	33.9	55.88	-21.98	-	-
8	.1748	12.38	Ca	.3	0	8.5	10	31.18	54.73	-23.55	-	-
12	.1995	10.6	Ca	.1	0	8.4	10	29.1	53.63	-24.53	-	-
16	.6158	5.19	Ca	0	0	8.3	10	23.49	46	-22.51	-	-
20	13.56	-7.57	Ca	.2	.1	8.2	10	10.93	50	-39.07	-	-
24	20.337	-1.93	Ca	.1	.1	8.1	10	16.37	50	-33.63	-	-
3	.1523	35.96	Qp	.5	.1	8.5	10	55.06	-	-	65.88	-10.82
7	.1748	34.61	Qp	.3	0	8.5	10	53.41	-	-	64.73	-11.32
11	.1995	32.97	Qp	.1	0	8.4	10	51.47	-	-	63.63	-12.16
15	.6158	21.67	Qp	0	0	8.3	10	39.97	-	-	56	-16.03
19	13.56	-.28	Qp	.2	.1	8.2	10	18.22	-	-	60	-41.78
23	20.337	7.08	Qp	.1	.1	8.1	10	25.38	-	-	60	-34.62

Qp - Quasi-Peak detector
Ca - CISPR average detection

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12. SETUP PHOTOS

Please refer to 15605547-EP1 for setup photos

END OF TEST REPORT

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