TEST REPORT

Report Number: 15175342-E1V3

Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S. A
Model	:	A3212 (PARENT MODEL) A3408, A3409, A3410 (VARIANT MODELS)
Brand	:	APPLE
FCC ID	:	BCG-E8725A (PARENT MODEL) BCG-E8726A, BCG-E8727A, BCG-E8728A (VARIANT MODELS)
IC	:	579C-E8725A (PARENT MODEL) 579C-E8726A, 579C-E8727A, 579C-E8728A (VARIANT MODELS)
EUT Description	:	SMART PHONE
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:
2024/11/22

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

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2024/11/11	Initial Issue	Chin Pang
V2	2024/11/14	Address TCB questions section 6 and 10 and add section 12	Everardo Torres
V3	2024/11/22	Removed green and yellow highlights.	Chin Pang

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

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

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A

EUT DESCRIPTION: SMART PHONE

MODEL: A3212 (PARENT MODEL)
A3408, A3409, A3410 (VARIANT MODELS)

BRAND: APPLE

SERIAL NUMBER: Parent Model: KQFN75JXKL, JRY1Q7C9QQ (CONDUCTED)
H7035YC39N (RADIATED)
Variant Model Conducted**:** J970CHYF9P (A3408), LHXH14D1WF (A3409) KYFJV03QL6 (A3410)
Variant Model Radiated**:** LKQVT2W2YG (A3408), QV6H6WR6YR (A3409), R0QQVMMXH7 (A3410)

SAMPLE RECEIPT DATE: 2024/07/16, 2024/11/13

DATE TESTED: 2024/07/27 – 2024/11/20

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 can demonstrate 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 considered 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 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. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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

Approved & Released For
UL Verification Services Inc. By:

Chin Pang
Senior lab Engineer
Consumer Technology Division
UL Verification Services Inc.

Prepared By:

Everardo H. Torres
Lead Test Engineer
Consumer Technology Division
UL Verification Services Inc.

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

2. TEST SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

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 v05r02, KDB 414788 D01 Radiated Test Site v01r01, KDB 662911, KDB 484596 D01 V02r03, RSS-GEN Issue 5 + A1 + A2, and RSS-247 Issue 3.

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4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #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			

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 considered when stating conformity with a specified requirement.)

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5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{LAB}
Conducted Antenna Port Emission Measurement	1.94dB
Time Domain Measurements Using SA	3.39dB
RF Power Measurement Direct Method Using Power Meter	1.3dB (Peak), 0.45dB (Ave)
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
Carrier Frequency Separation	19.70Hz
Number of Hopping Frequencies	0.000dB
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51dB

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

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 Apple iPhone is a smartphone with GSM, GPRS, EGPRS, WCDMA, LTE, 5GNR1, IEEE 802.11a/b/g/n/ac/ax, Bluetooth (BT), Global Positioning System (GPS), Near-Field Communication (NFC), and Mobile Satellite Service (MSS) technologies. The rechargeable battery is not user accessible. This device is not user-serviceable and requires special tools to disassemble.

6.2. MAXIMUM OUTPUT POWER

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

Antenna	Config	Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
ANT 4	High Power	2402 - 2480	Basic GFSK	20.24	105.68
		2402 - 2480	DQPSK	19.13	81.85
		2402 - 2480	Enhanced 8PSK	19.31	85.31
	Low Power	2402 - 2480	Basic GFSK	12.77	18.92
		2402 - 2480	DQPSK	11.14	13.00
		2402 - 2480	Enhanced 8PSK	11.33	13.58
ANT 3	High Power	2402 - 2480	Basic GFSK	20.25	105.93
		2402 - 2480	DQPSK	19.13	81.85
		2402 - 2480	Enhanced 8PSK	19.30	85.11
	Low Power	2402 - 2480	Basic GFSK	11.79	15.10
		2402 - 2480	DQPSK	11.12	12.94
		2402 - 2480	Enhanced 8PSK	11.33	13.58
BF, ANT 4 + ANT 3	High Power	2402 - 2480	Basic GFSK TxBF	20.24	105.68
		2402 - 2480	DQPSK TxBF	19.13	81.85
		2402 - 2480	Enhanced 8PSK TxBF	19.32	85.51
	Low Power	2402 - 2480	Basic GFSK TxBF	15.32	34.04
		2402 - 2480	DQPSK TxBF	14.14	25.94
		2402 - 2480	Enhanced 8PSK TxBF	14.34	27.16

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.

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6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) type is IFA type.
The antenna(s) gains, as provided by the manufacturer, are as follows:

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	-1.90	-1.20

SMA Cable used for RF conducted testing has a loss as follows:

Cable Loss used for Antenna 4 is 1.7 dB
Cable Loss used for Antenna 3 is 1.8 dB

The cables were used for RF antenna port tests that had been offset to the test equipment during testing.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware and Software version installed during testing was 22.1.74.243

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y and Z on ANT 4, ANT 3 and 2TX beamforming. It was determined that X (Flatbed) orientation was the worst-case orientation for ANT 4 and beamforming 2TX and Z (Portrait) for ANT 4.

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT was set to transmit at highest power on Low/Middle/High channels.

Radiated emissions below 1GHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario. There were no emissions found below 30MHz within 20dB of the limit.

For below 30MHz, 30-1000MHz emissions spurious tests EUT was connected to AC power adapter and set at X orientation as the worst case; and for above 1GHz, the worst-case configuration reported was tested with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop.

For simultaneous transmission of multiple channels in the 2.4GHz BT and 5GHz bands, No noticeable emission was found.

GFSK, DQPSK, 8PSK average power are all investigated, The GFSK & 8PSK power are the worst case. For average power data please refer to section 9.7.

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

GFSK mode : DH5
8PSK mode : 3-DH5
Beamforming: GFSK (DH5), 8PSK (3-DH5)

For radiated harmonic spurious emissions test, high power beamforming GFSK mode is set to maximum power per chain to cover both SISO and MIMO modes to complies with radiated spurious emissions limits in the restricted bands between 1GHz and 18GHz Low/Mid/High channels.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT					
Description	**Manufacturer**	**Model**	**Serial Number**		**FCC ID/ DoC**
Laptop	Apple	Macbook Pro	C02VD7SAHV22		BCGA1708
Laptop AC/DC adapter	Liteon Technology	A1424	NSW25679		DoC
EUT AC/DC adapter	Apple	A1720	C3D8417A7R93KVPA8		DoC
I/O CABLES (RF CONDUCTED TEST)					
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	SMA	1	SMA	Shielded	0.75	To spectrum Analyzer
2	Antenna	2	SMA	Un-shielded	0.2	To Conducted Switch Box
3	USB-C	1	USB-C	Shielded	1.0	N/A
4	AC	1	AC	Un-shielded	2	N/A
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	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Shielded	1	N/A

TEST SETUP

The EUT setup is shown as below. Test software exercised the radio card.

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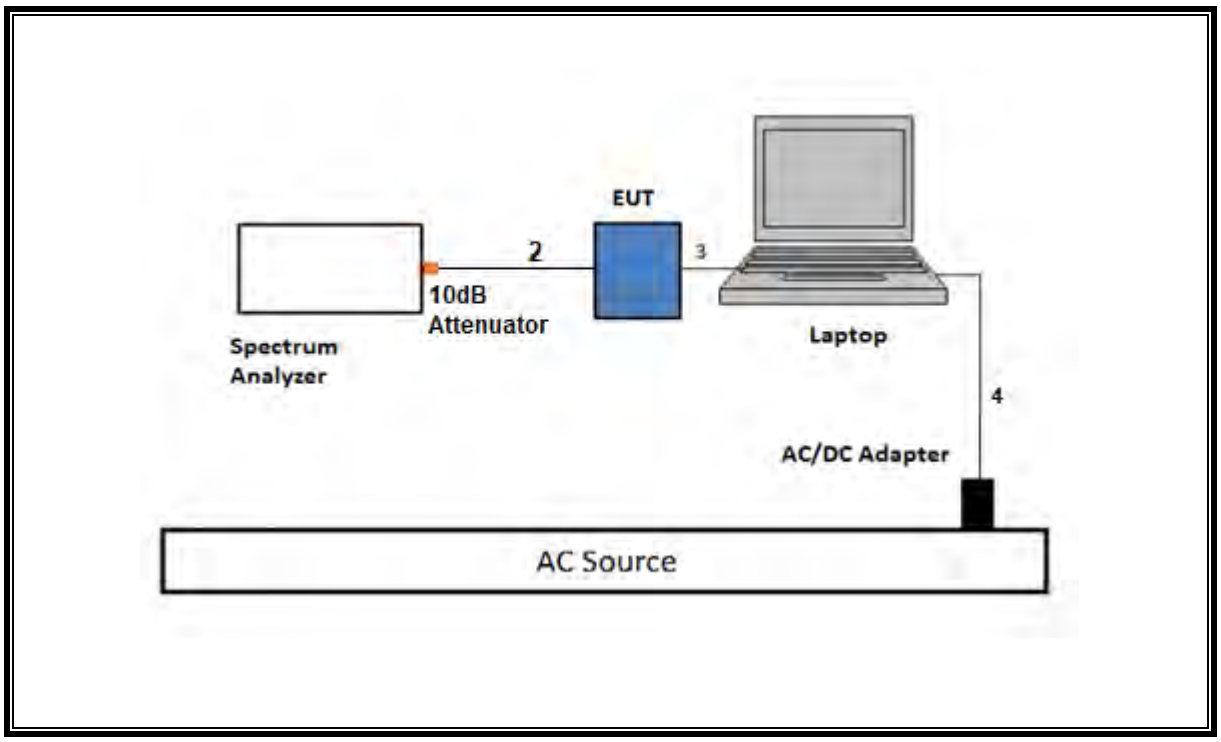
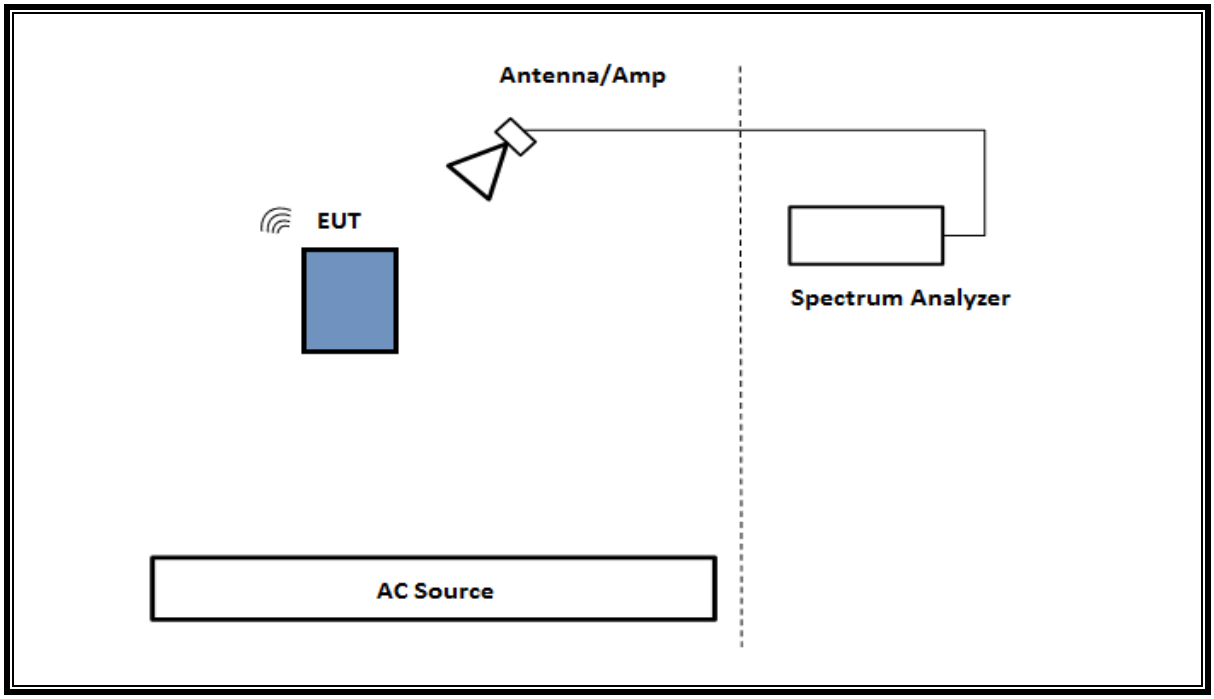
SETUP DIAGRAM FOR CONDUCTED TESTS



SETUP DIAGRAM FOR RADIATED EMISSIONS 1 GHz - 26 GHz



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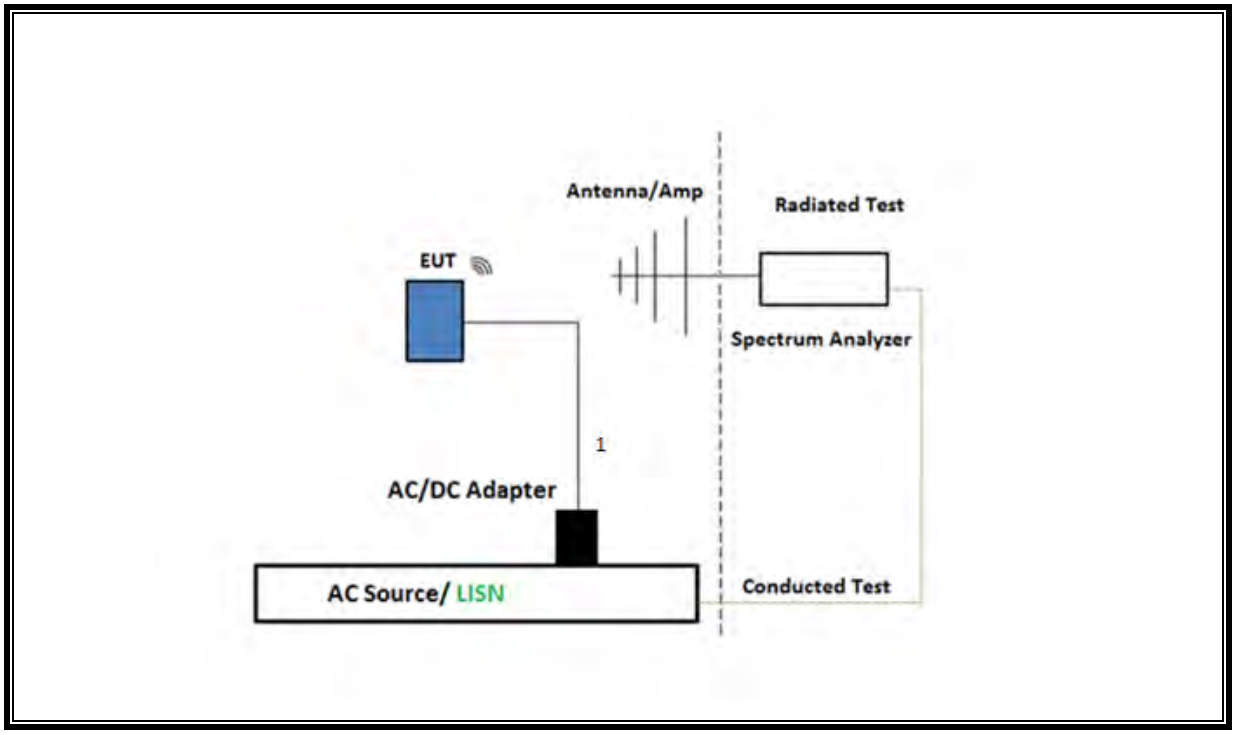
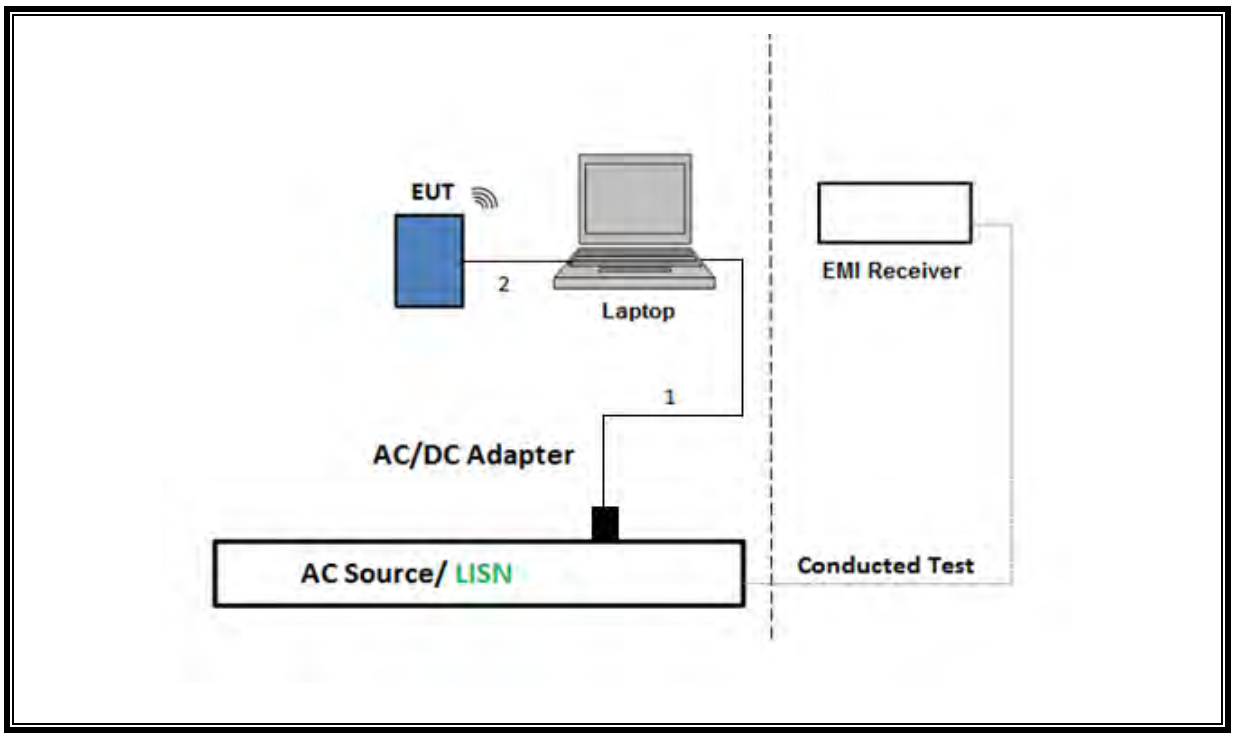
SETUP DIAGRAM FOR RADIATED EMISSIONS 30 MHz - 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP 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 Number**	**Cal Due**
Horn Antenna 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80404	2025/08/31
RF Filter Box, 1-18GHz, 12 Port.	UL-FR1	Frankenstein	231874	2025/07/31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	179372	2025/02/28
Antenna, Horn 18 to 26.5GHz	A.R.A.	MWH-1826/B	172354	2025/11/30
Link File, RF Amplifier Assembly, 18-26.5GHz, 60dB Gain	AMPLICAL	AMP18G26.5-60	221832	2025/03/31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201497	2025/02/28
Horn Antenna 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	222740	2025/08/31
RF Filter Box, 1-18GHz	UL-FR1	NA	171389	2025/03/31
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	204045	2025/04/30
Amplifier 9 KHz - 1 GHz	SONOMA INSTRUMENT	310N	230307	2025/05/30
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	F3A	243707	2025/02/28
*Horn Antenna 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	223083	2024/10/31
ESW, EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169927	2025/02/28
Horn Antenna 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	80402	2025/07/31
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	-	216812	2025/01/30
ESW, EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230548	2025/02/28
Horn Antenna 1-18GHz	ETS-Lindgren (Cedar Park, Texas)	3117	79834	2025/07/31
RF Filter Box, 1-18GHz, 17 Ports	UL-FR1	F2A	237597	2025/10/31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169935	2025/02/28
Antenna, Passive Loop 30Hz to 1MHz	Electro-Metrics	EM-6871	170013	2025/07/31
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO-METRICS	EM-6872	170015	2025/07/31
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	178557	Verified Before Use
10dB Fixed Attenuator	Pasternack Enterprises	PE7087-10	178558	Verified Before Use
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	82174	2025/01/31
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	81319	2025/01/31
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A-544	87738	2025/01/31
Spectrum Analyzer, PXA, 3Hz to 50GHz w/Ext. Mixer	Keysight Technologies Inc	N9030A	80400	2025/02/28

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AC Line Conducted				
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	93091	2025/02/28
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01-480V	175765	2025/01/31
*Transient Limiter	TE	TBFL1	207996	2024/08/31
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, May 1, 2023	
Conducted Software	UL	UL EMC	2023.2.23	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, Mar 3, 2023	

*Testing was completed before equipment calibration date

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8. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2020 Section 11.6

Occupied BW (20dB): ANSI C63.10-2020 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2020 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10-2020 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2020 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2020 Section 7.8.4

Peak Output Power: ANSI C63.10-2020 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2020 Section 7.8.8

Conducted Band-Edge: ANSI C63.10-2020 Section 6.10.4

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2020 Section 6.4 & 13

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2020 Section 6.3, 6.5 & 13

Radiated Spurious Emissions above 1GHz: ANSI C63.10-2020 Section 6.3, 6.6 & 13

Radiated Band-edge: ANSI C63.10-2020 Section 6.10.5 & 13

AC Power-line conducted emissions: ANSI C63.10-2020, 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 B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
Bluetooth GFSK	2.30	2.30	1.000	100.0%	0.00	0.010
Bluetooth 8PSK	2.22	2.22	1.000	100.0%	0.00	0.010

Note: There is the same DC factor on 1TX and 2TX.

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DUTY CYCLE PLOTS

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 bandwidth. The VBW is set to ≥ 3xRBW. The sweep time is coupled.

RESULTS

Only High-Power modes result is reported, it covers all Low Power modes. Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

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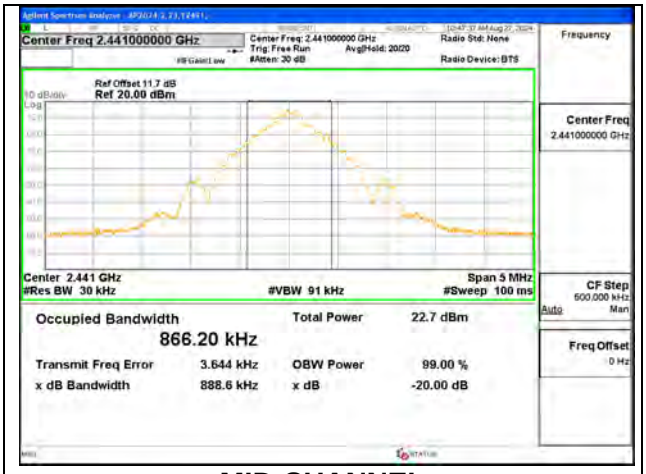
9.2.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

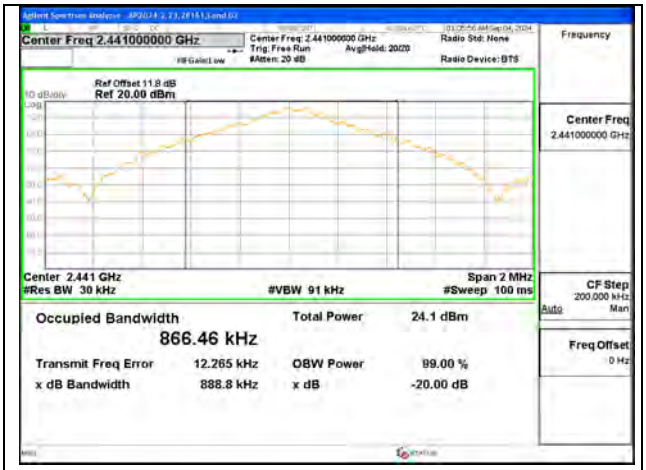
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.88960	0.86533
Mid	2441	0.88860	0.86620
High	2480	0.88910	0.86754



MID CHANNEL

ANT 3

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.88650	0.86762
Mid	2441	0.88880	0.86646
High	2480	0.88730	0.86883

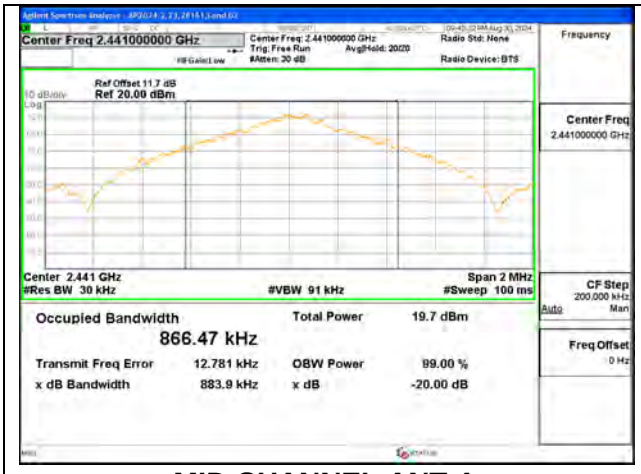


MID CHANNEL

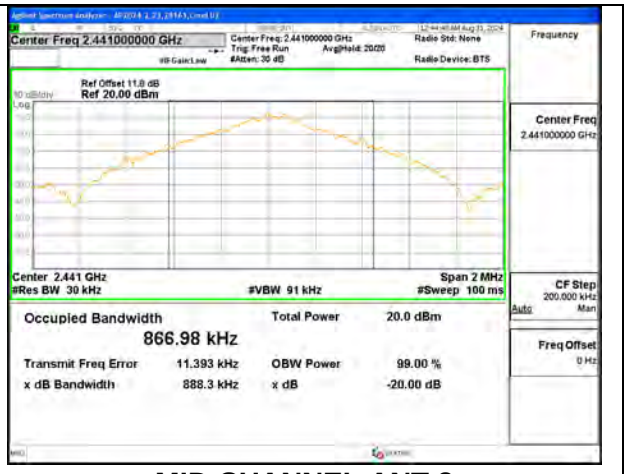
9.2.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth ANT 4 (MHz)	20dB Bandwidth ANT 3 (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low	2402	0.88710	0.92230	0.86572	0.86791
Mid	2441	0.88390	0.88830	0.86647	0.86698
High	2480	0.88880	0.88560	0.86668	0.87234

Note: Test procedures and setting on beamforming mode are same as BT basic and EDR mode



MID CHANNEL ANT 4

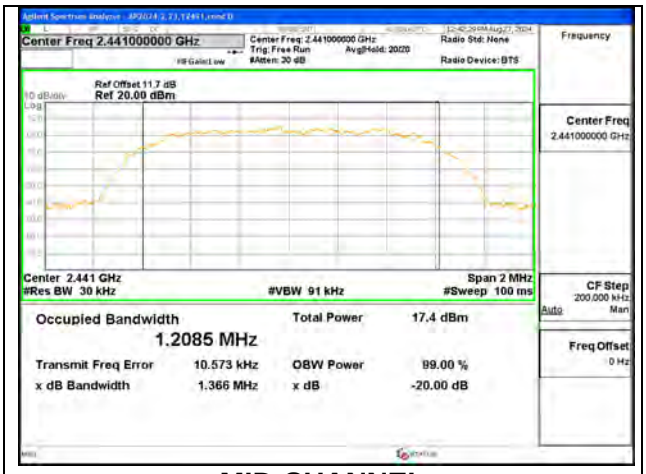


MID CHANNEL ANT 3

9.2.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

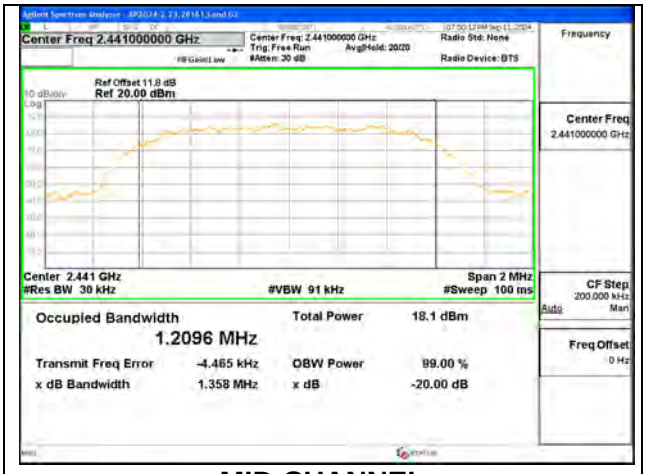
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.3680	1.2088
Mid	2441	1.3660	1.2085
High	2480	1.3680	1.2105



MID CHANNEL

ANT 3

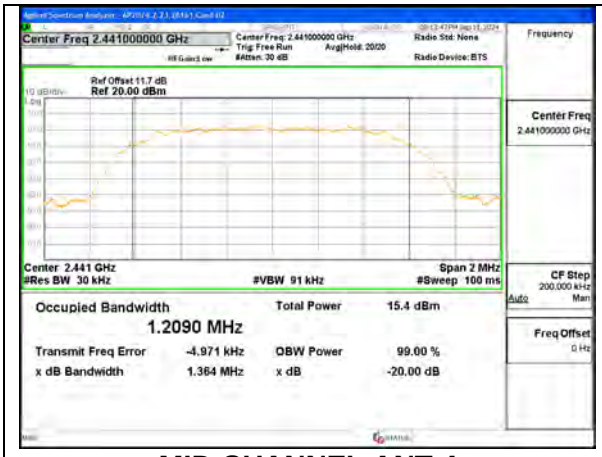
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.3630	1.2098
Mid	2441	1.3580	1.2096
High	2480	1.3640	1.2107



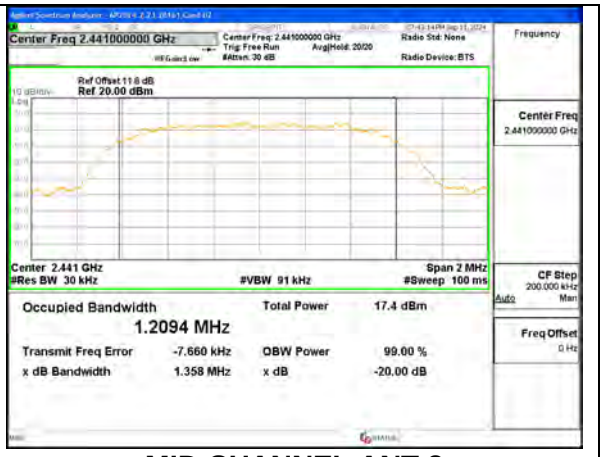
MID CHANNEL

9.2.4. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

Channel	Frequency (MHz)	20dB Bandwidth ANT 4 (MHz)	20dB Bandwidth ANT 3 (MHz)	99% Bandwidth ANT 4 (MHz)	99% Bandwidth ANT 3 (MHz)
Low	2402	1.3680	1.3650	1.2086	1.2104
Mid	2441	1.3640	1.3580	1.2090	1.2094
High	2480	1.3640	1.3650	1.2091	1.2108



MID CHANNEL ANT 4



MID CHANNEL ANT 3

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 >= 3xRBW. The sweep time is coupled.

RESULTS

Only High-Power GFSK mode result is reported since EDR (QPSK/8PSK) has exactly same channel plan.

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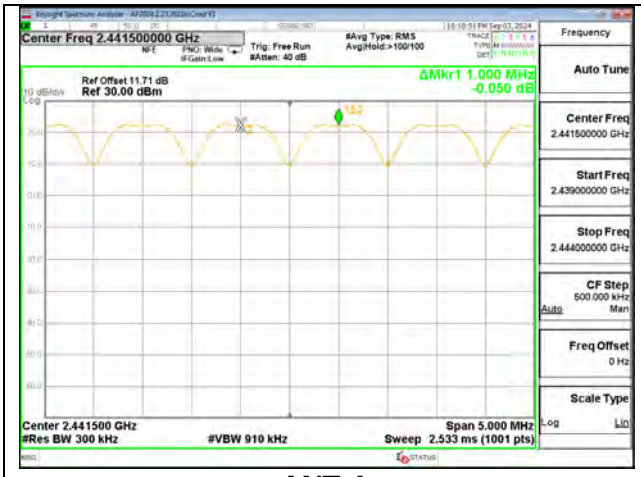
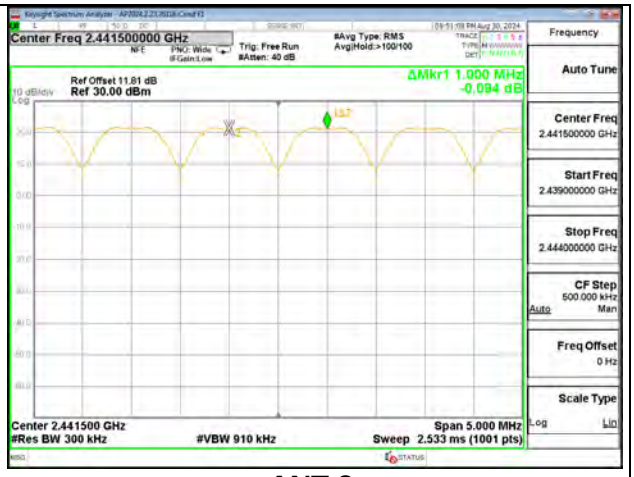
9.3.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

HOPPING FREQUENCY SEPARATION



ANT 4



ANT 3

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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. Only High-Power GFSK mode result is reported since EDR (QPSK/8PSK) has exactly same channel plan.

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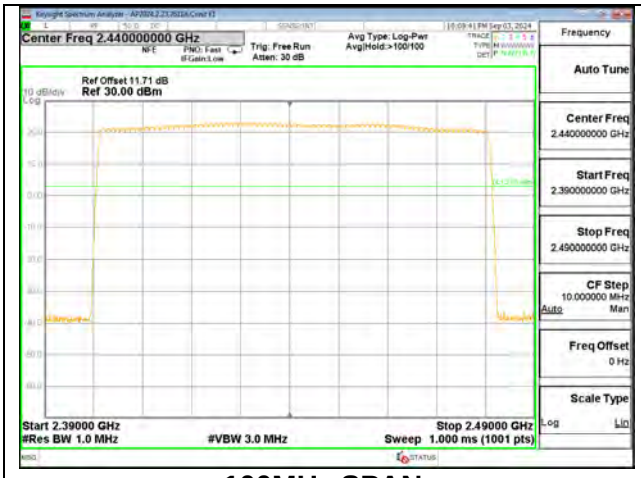
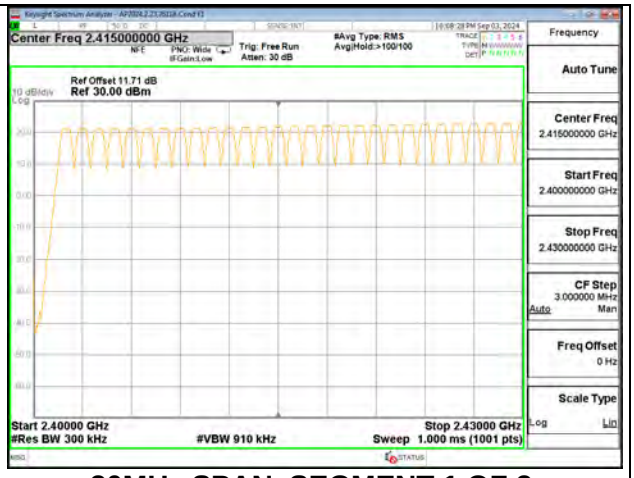
9.4.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

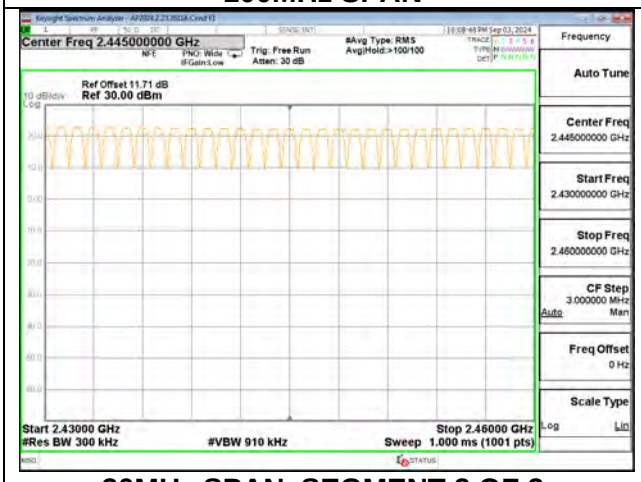
ANT 4



100MHz SPAN



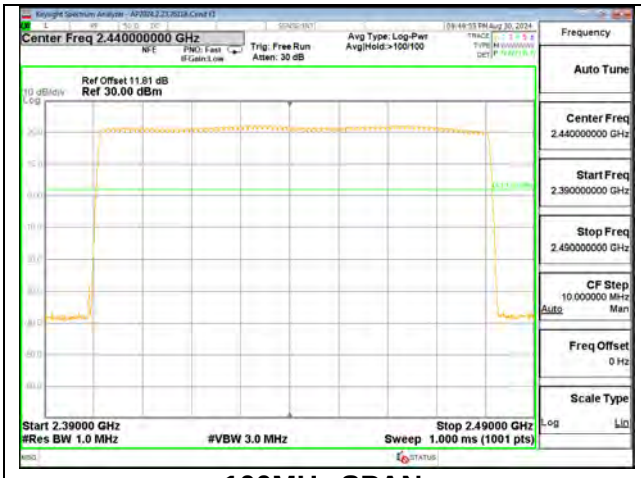
30MHz SPAN, SEGMENT 1 OF 3



30MHz SPAN, SEGMENT 2 OF 3

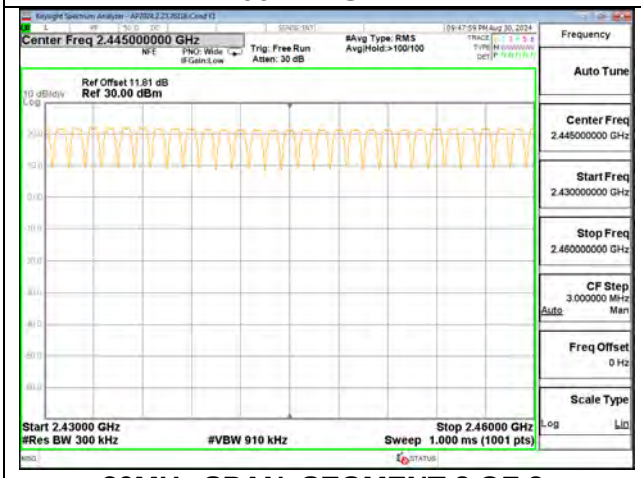
30MHz SPAN, SEGMENT 3 OF 3

ANT 3

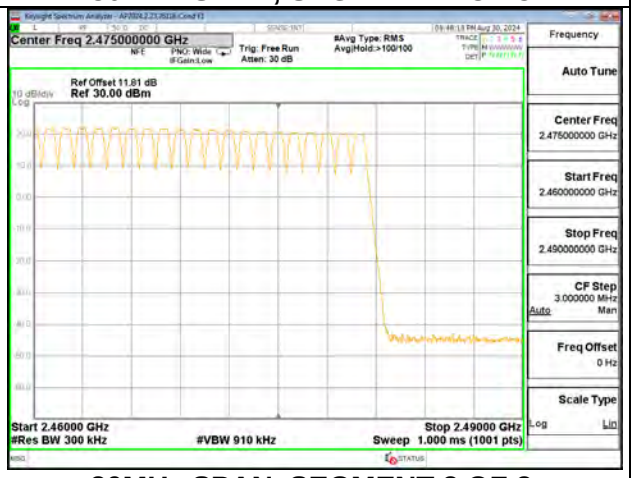


100MHz SPAN

30MHz SPAN, SEGMENT 1 OF 3



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

Only High-Power GFSK mode result is reported since EDR (QPSK/8PSK) has exact same timing.

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9.5.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

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	0.379	32	0.121	0.4	-0.279
DH3	1.632	15	0.245	0.4	-0.155
DH5	2.872	12	0.345	0.4	-0.055
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.379	8	0.030	0.4	-0.370
DH3	1.632	3.75	0.061	0.4	-0.339
DH5	2.872	3	0.086	0.4	-0.314

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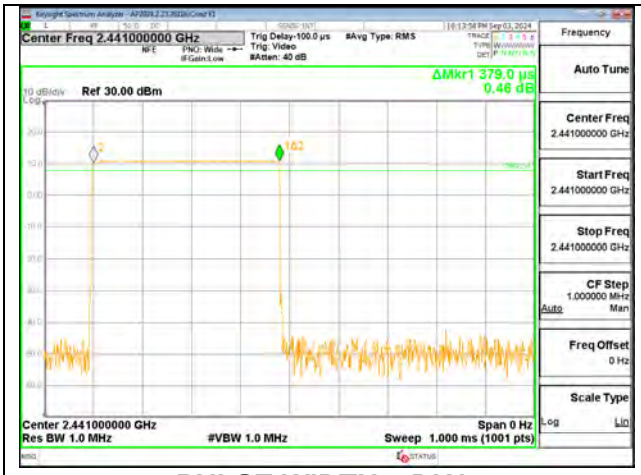
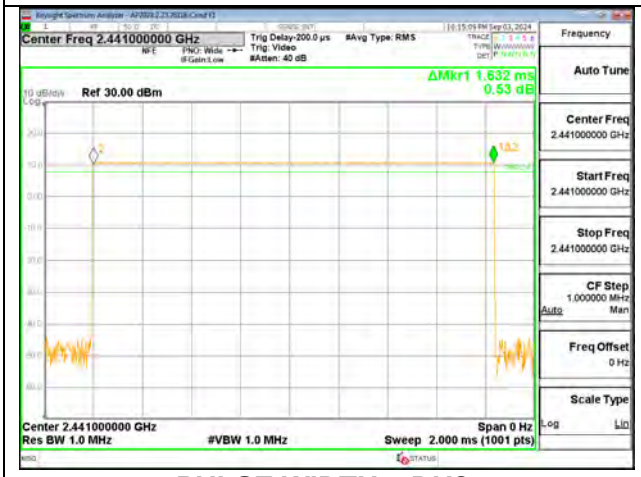
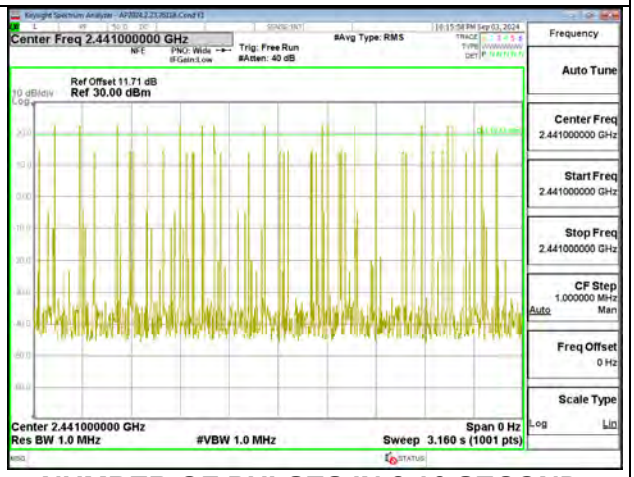


PULSE WIDTH – DH1

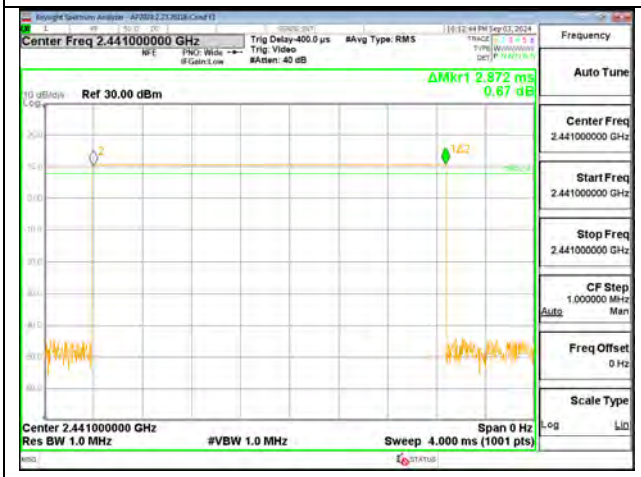
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



PULSE WIDTH – DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



PULSE WIDTH – DH5

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

ANT 3

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	0.377	32	0.121	0.4	-0.279
DH3	1.63	17	0.277	0.4	-0.123
DH5	2.864	10	0.286	0.4	-0.114
DH Packet	Pulse Width (sec)	Number of Pulses in 0.8 seconds	Average Time of Occupancy (sec)	Limit (sec)	Margin (sec)
GFSK AFH Mode					
DH1	0.377	8	0.030	0.4	-0.370
DH3	1.63	4.25	0.069	0.4	-0.331
DH5	2.864	2.5	0.072	0.4	-0.328

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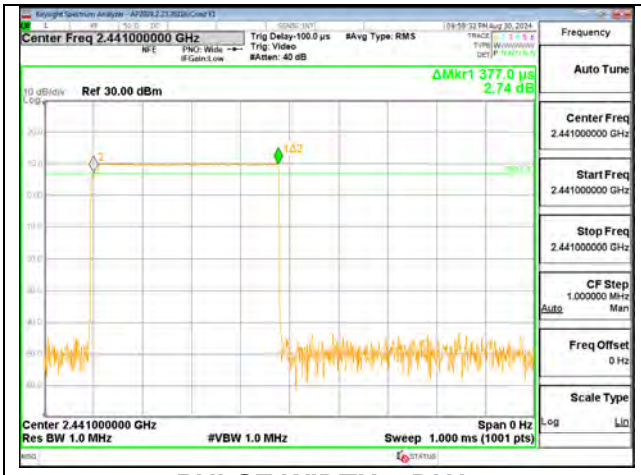
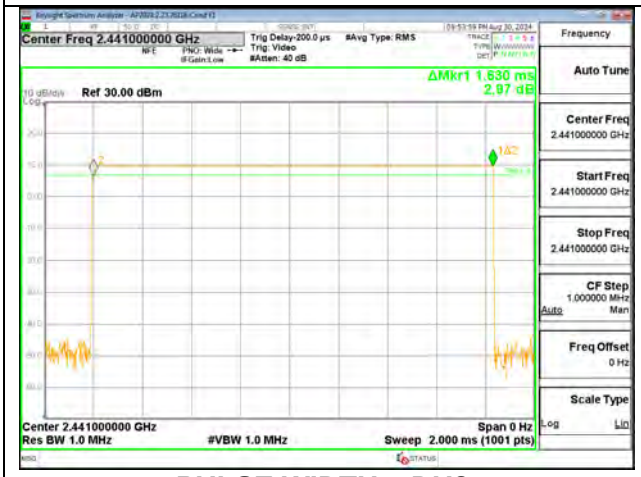


PULSE WIDTH – DH1

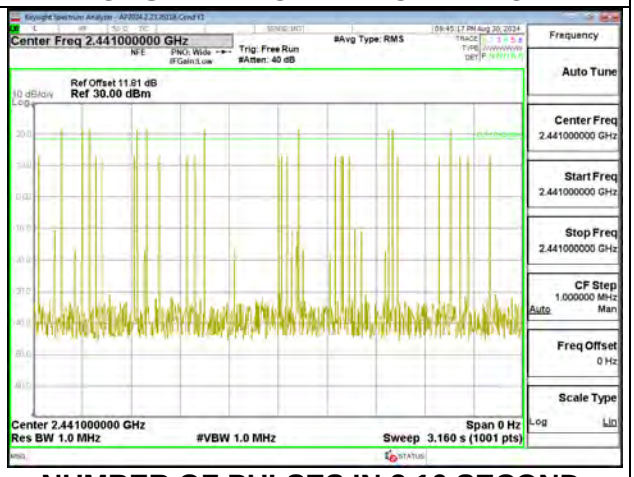
NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1



PULSE WIDTH – DH3

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3

PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

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

Measurements were performed using a wideband RF 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 peak power sensor. Peak output power was read directly from the power meter.

DIRECTIONAL ANTENNA GAIN

For 1 TX:
There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:

Tx chains are correlated for power due to the device supporting Beamforming. The directional gains are as follows:

Band (GHz)	ANT 4 Antenna Gain (dBi)	ANT 3 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	-1.90	-1.20	-1.54	1.47

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DIRECTIONAL GAIN CALCULATION:

ANSI C63.10-2020 section 14.6.3

Uncorrelated directional gain=10*LOG((10^(Ant4/10)+10^(Ant3/10))/2)
Correlated directional Gain=10*LOG(((10^(Ant4/20)+10^(Ant3/20))^2)/2)

Sample Calculation:

Ant4=-1.90, Ant3=-1.20

Uncorrelated Antenna gain=10log[(10^(-1.90/10)+10^(-1.20/10))/2]= -1.54dBi

Correlated Antenna gain=10log[(10^(-1.90/20)+10^(-1.20/20))^2)/2]= 1.47dBi

RESULTS

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9.6.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	20.19	21	-0.81
Middle	2441	20.24	21	-0.76
High	2480	20.20	21	-0.8

ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	20.25	21	-0.75
Middle	2441	20.20	21	-0.8
High	2480	20.24	21	-0.76

9.6.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	17.21	17.18	20.21	21	-0.79
Middle	2441	17.26	17.20	20.24	21	-0.76
High	2480	17.17	17.28	20.24	21	-0.76

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9.6.3. HIGH POWER ENHANCED DATA RATE DQPSK MODULATION

ANT 4

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	19.11	21	-1.89
Middle	2441	19.08	21	-1.92
High	2480	19.13	21	-1.87

ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	19.13	21	-1.87
Middle	2441	19.11	21	-1.89
High	2480	19.09	21	-1.91

9.6.4. HIGH POWER ENHANCED DATA RATE TXBF DQPSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.11	16.07	19.10	21	-1.90
Middle	2441	16.13	16.10	19.13	21	-1.87
High	2480	15.98	16.08	19.04	21	-1.96

9.6.5. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	19.28	21	-1.72
Middle	2441	19.31	21	-1.69
High	2480	19.30	21	-1.7

ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	19.30	21	-1.7
Middle	2441	19.26	21	-1.74
High	2480	19.28	21	-1.72

9.6.6. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.28	16.31	19.31	21	-1.69
Middle	2441	16.27	16.33	19.31	21	-1.69
High	2480	16.32	16.30	19.32	21	-1.68

9.6.7. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	12.72	21	-8.28
Middle	2441	12.75	21	-8.25
High	2480	12.77	21	-8.23

ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.74	21	-9.26
Middle	2441	11.72	21	-9.28
High	2480	11.79	21	-9.21

9.6.8. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	12.77	11.79	15.32	21	-5.68
Middle	2441	12.74	11.76	15.29	21	-5.71
High	2480	12.78	11.73	15.30	21	-5.70

9.6.9. LOW POWER ENHANCED DATA RATE DQPSK MODULATION

ANT 4

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.08	21	-9.92
Middle	2441	11.14	21	-9.86
High	2480	11.11	21	-9.89

ANT 3

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.06	21	-9.94
Middle	2441	11.11	21	-9.89
High	2480	11.12	21	-9.88

9.6.10. LOW POWER ENHANCED DATA RATE TXBF DQPSK MODULATION

ANT 4 + ANT 3

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.11	11.09	14.11	21	-6.89
Middle	2441	11.13	11.12	14.14	21	-6.86
High	2480	11.12	11.13	14.14	21	-6.86

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9.6.11. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.29	21	-9.71
Middle	2441	11.28	21	-9.72
High	2480	11.33	21	-9.67

ANT 3

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.26	21	-9.74
Middle	2441	11.33	21	-9.67
High	2480	11.25	21	-9.75

9.6.12. LOW POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.32	11.34	14.34	21	-6.66
Middle	2441	11.34	11.31	14.34	21	-6.66
High	2480	11.33	11.27	14.31	21	-6.69

9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements were performed using a wideband RF 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 average power sensor. Gated average output power was read directly from the power meter.

RESULTS

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9.7.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	19.89
Middle	2441	19.91
High	2480	19.87

ANT 3

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	19.92
Middle	2441	19.87
High	2480	19.91

9.7.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	16.88	16.84	19.87
Middle	2441	16.92	16.87	19.91
High	2480	16.84	16.94	19.90

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9.7.3. HIGH POWER ENHANCED DATA RATE DQPSK MODULATION

ANT 4

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.41
Middle	2441	16.38
High	2480	16.44

ANT 3

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.44
Middle	2441	16.41
High	2480	16.39

9.7.4. HIGH POWER BASIC DATA RATE TXBF DQPSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	13.41	13.37	16.40
Middle	2441	13.44	13.42	16.44
High	2480	13.29	13.39	16.35

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9.7.5. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.41
Middle	2441	16.44
High	2480	16.43

ANT 3

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.42
Middle	2441	16.39
High	2480	16.41

9.7.6. HIGH POWER BASIC DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	13.41	13.44	16.44
Middle	2441	13.39	13.45	16.43
High	2480	13.44	13.42	16.44

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9.7.7. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	12.39
Middle	2441	12.41
High	2480	12.44

ANT 3

Tested By:	28161
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	11.41
Middle	2441	11.39
High	2480	11.45

9.7.8. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	28161
Date:	2024-08-27

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	12.41	11.44	14.96
Middle	2441	12.39	11.41	14.94
High	2480	12.45	11.39	14.96

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9.7.9. LOW POWER ENHANCED DATA RATE DQPSK MODULATION

ANT 4

Tested By:	26118
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.39
Middle	2441	8.44
High	2480	8.41

ANT 3

Tested By:	26118
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.37
Middle	2441	8.41
High	2480	8.42

9.7.10. LOW POWER BASIC DATA RATE TXBF DQPSK MODULATION

ANT 4 + ANT 3

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	8.41	8.39	11.41
Middle	2441	8.44	8.42	11.44
High	2480	8.42	8.44	11.44

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9.7.11. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	26118
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.41
Middle	2441	8.39
High	2480	8.45

ANT 3

Tested By:	26118
Date	2024-08-27

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.39
Middle	2441	8.45
High	2480	8.37

9.7.12. LOW POWER BASIC DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	26118
Date:	2024-08-27

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	8.44	8.46	11.46
Middle	2441	8.47	8.44	11.47
High	2480	8.45	8.39	11.43

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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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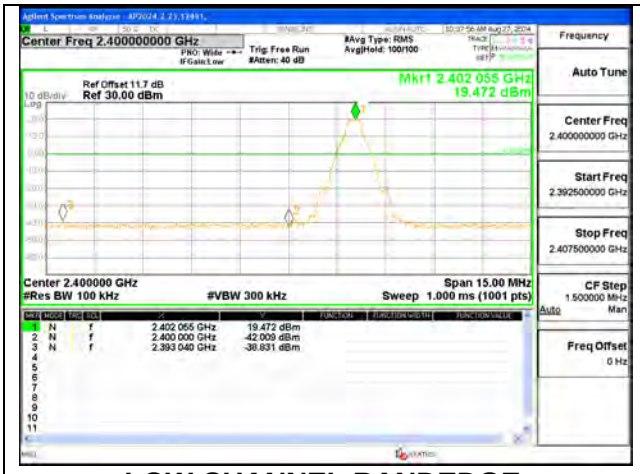
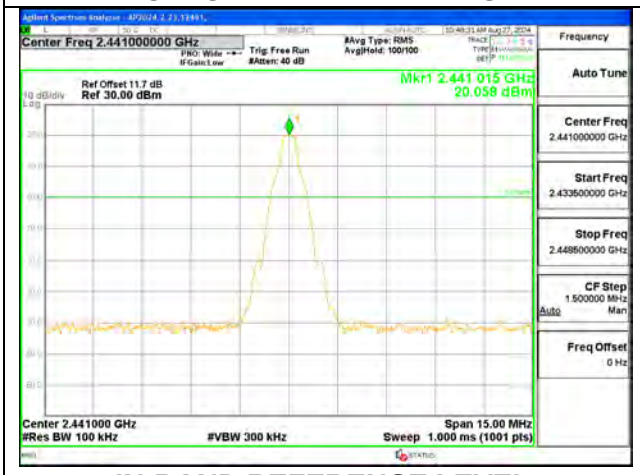
9.8.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



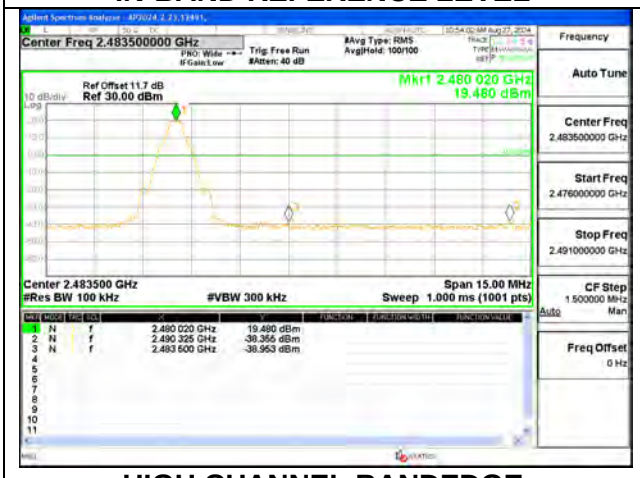
LOW CHANNEL BANDEDGE

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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ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE

HIGH BANDEDGE

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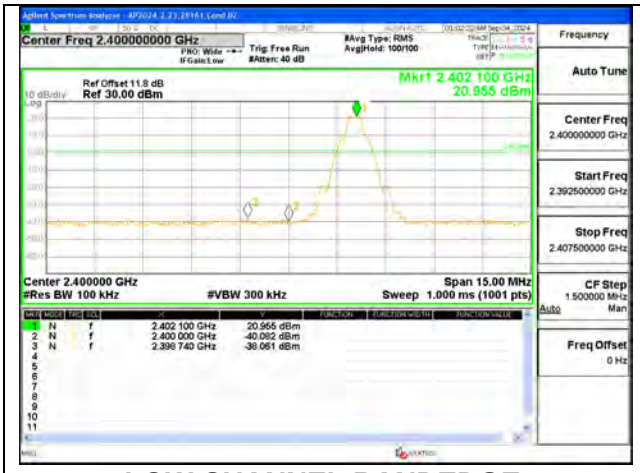
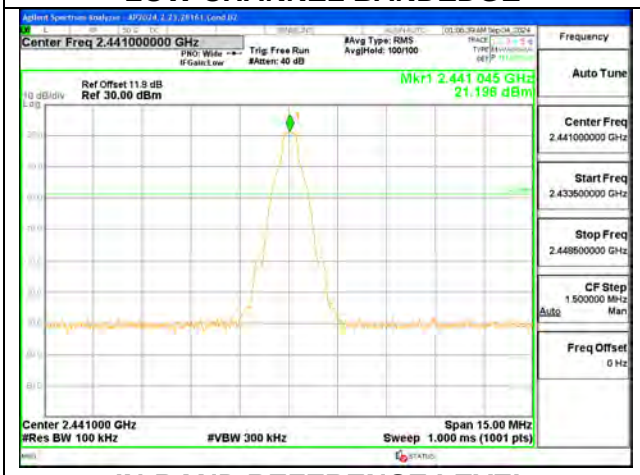
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



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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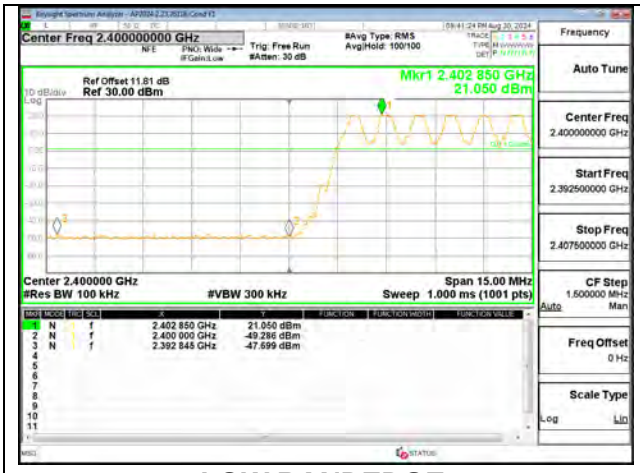
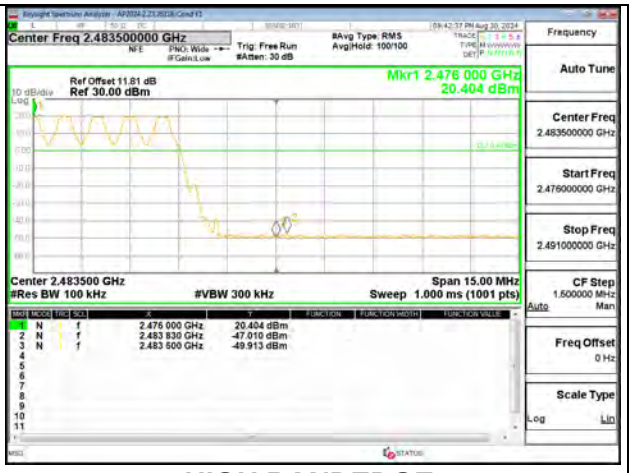
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE

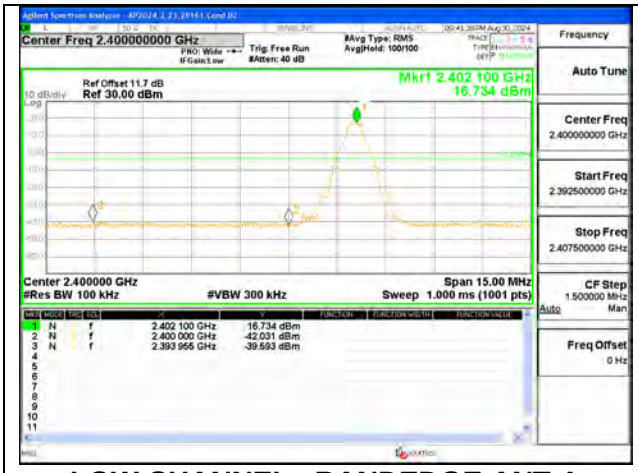


HIGH BANDEDGE

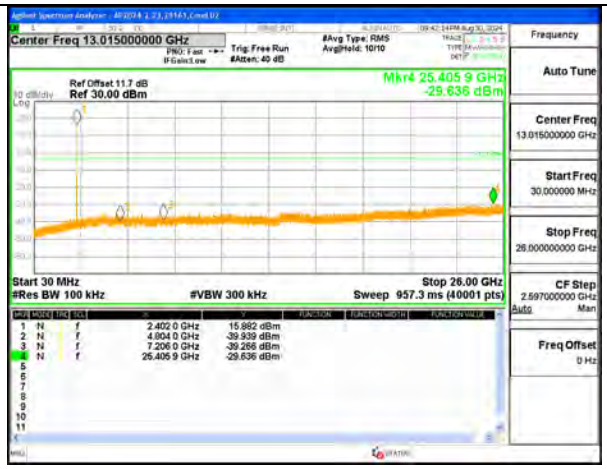
9.8.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

Note: Test procedure on beamforming mode is same as BT basic and EDR mode

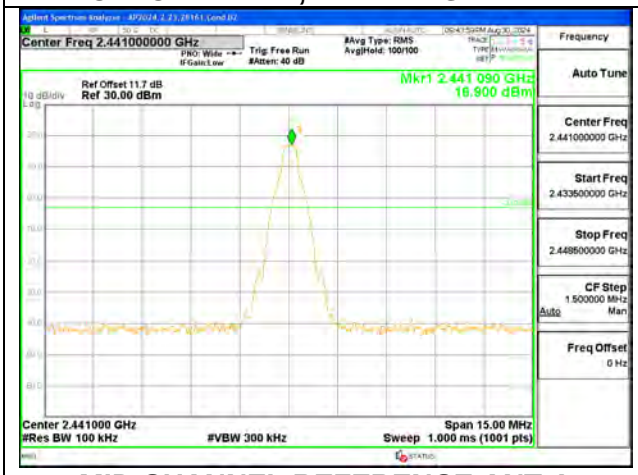
ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL , BANDEDGE ANT 4

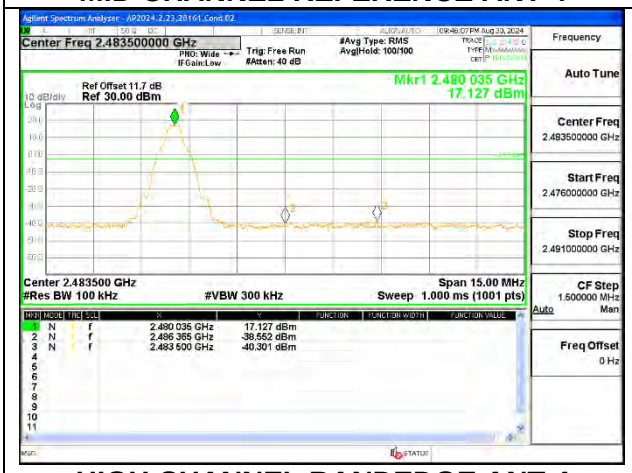


LOW CHANNEL OUT-OF-BAND ANT 4

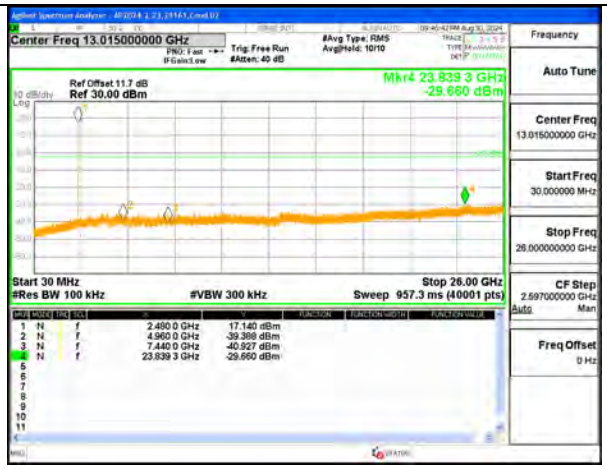


MID CHANNEL REFERENCE ANT 4

MID CHANNEL OUT-OF-BAND ANT 4



HIGH CHANNEL BANDEDGE ANT 4



HIGH CHANNEL OUT-OF-BAND ANT 4

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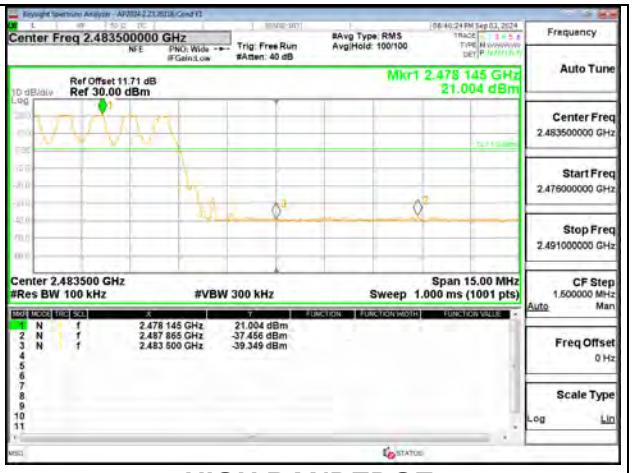
ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE



HIGH BANDEDGE

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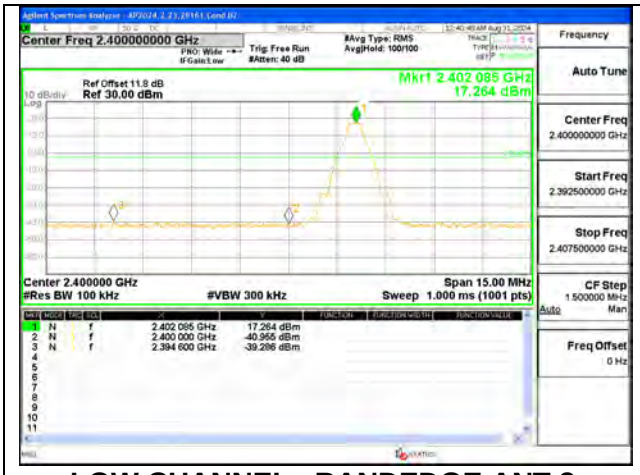
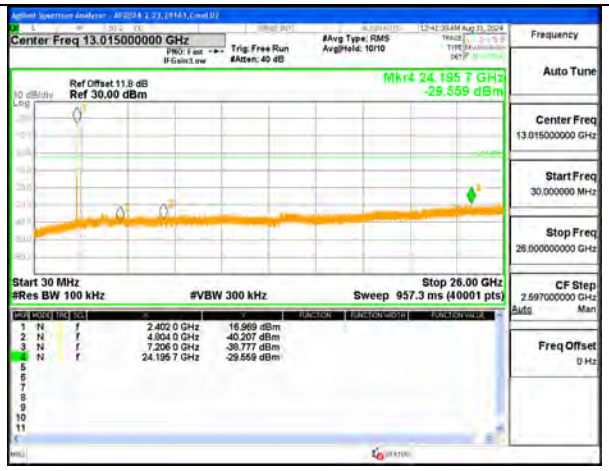
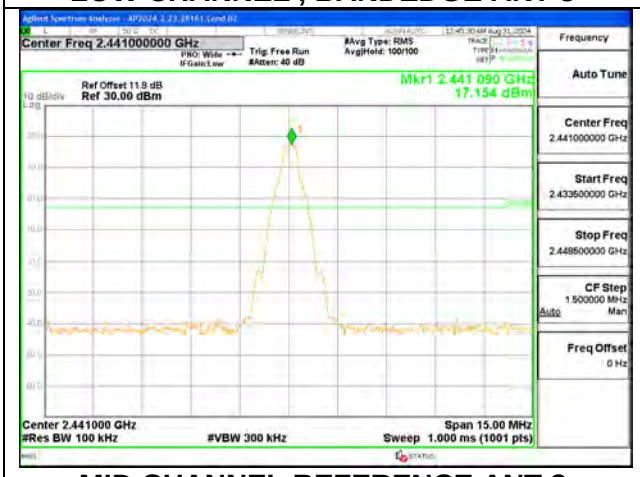
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



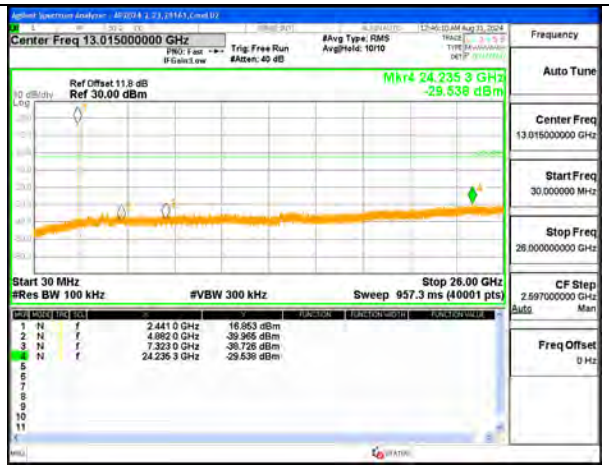
LOW CHANNEL , BANDEDGE ANT 3



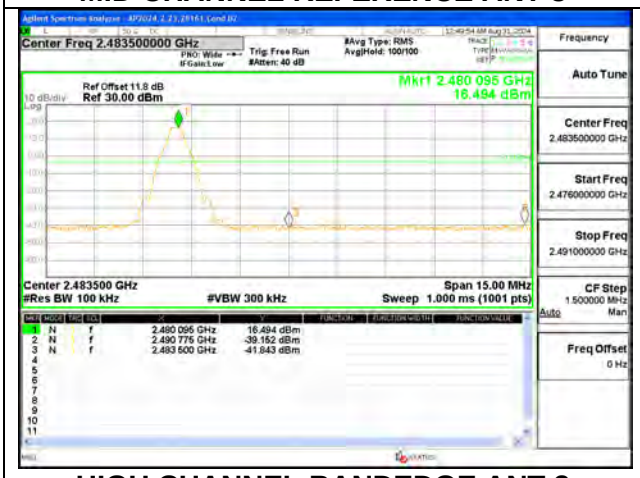
LOW CHANNEL OUT-OF-BAND ANT 3



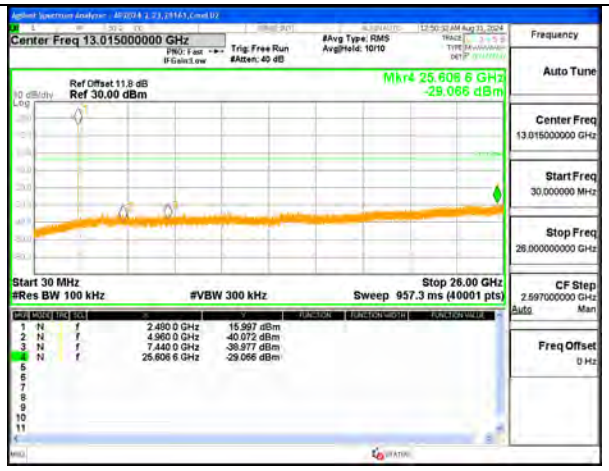
MID CHANNEL REFERENCE ANT 3



MID CHANNEL OUT-OF-BAND ANT 3

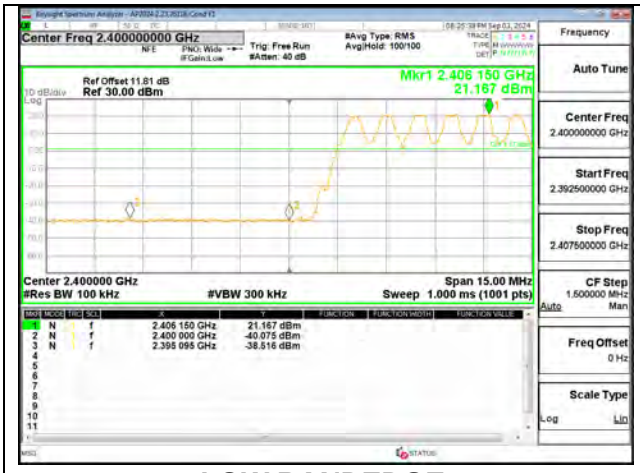


HIGH CHANNEL BANDEDGE ANT 3

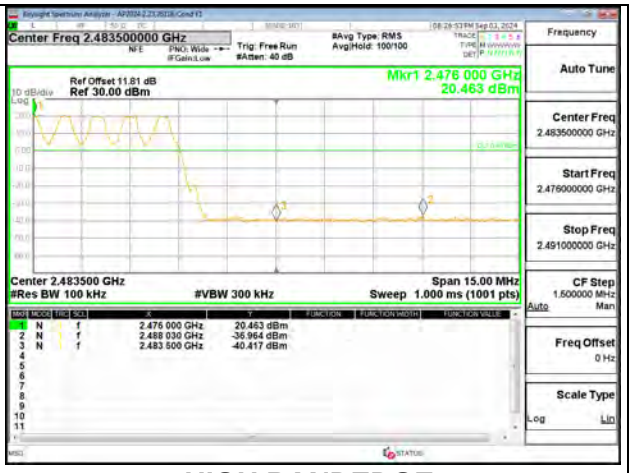


HIGH CHANNEL OUT-OF-BAND ANT 3

ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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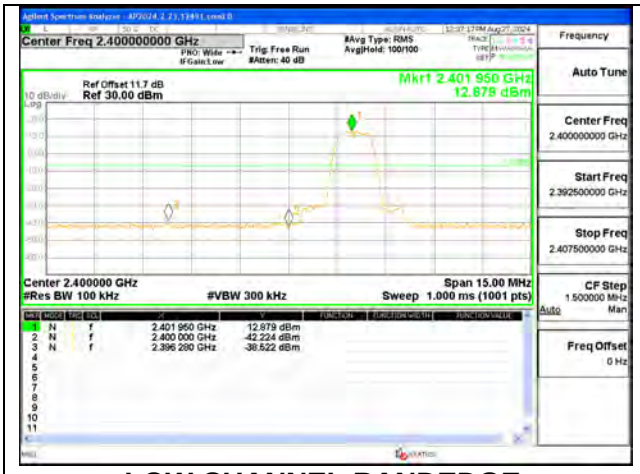
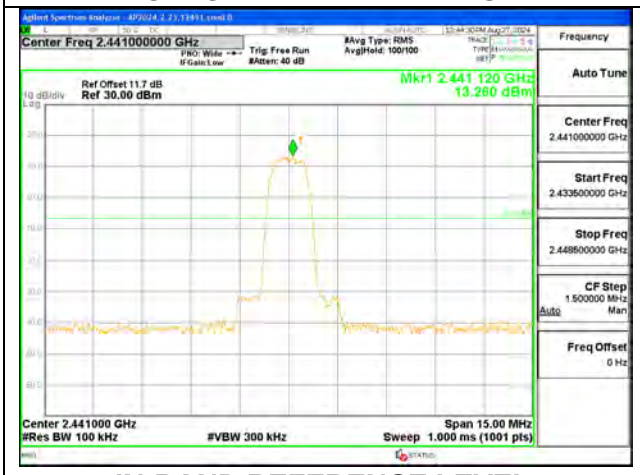
9.8.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

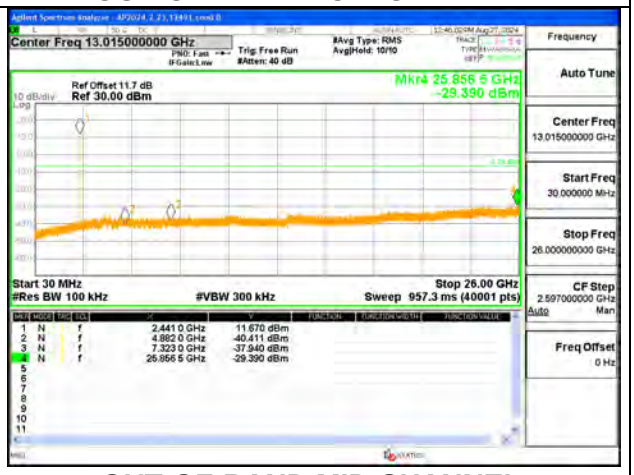


LOW CHANNEL BANDEDGE

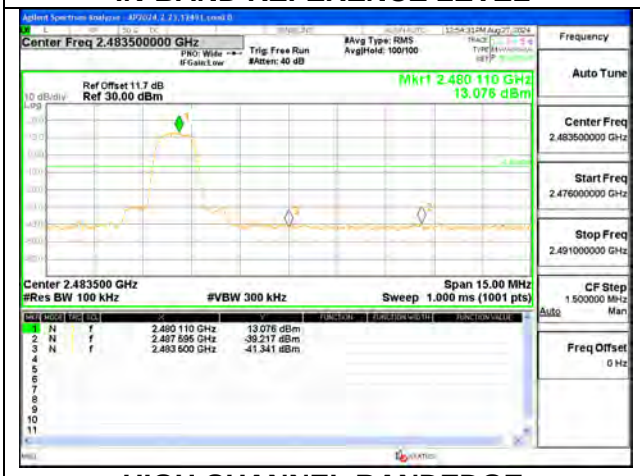
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE

OUT-OF-BAND HIGH CHANNEL

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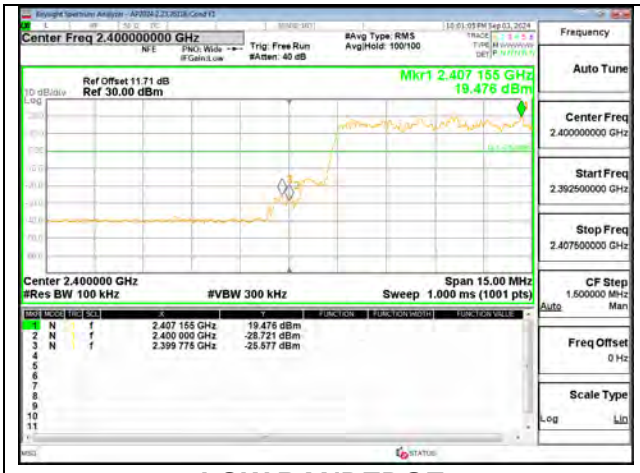
ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE

HIGH BANDEDGE

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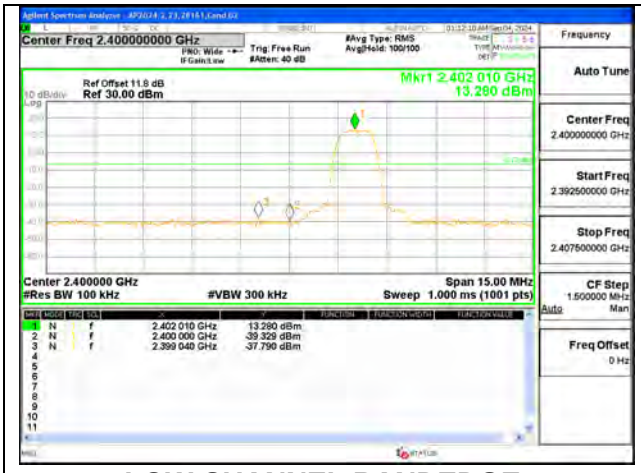
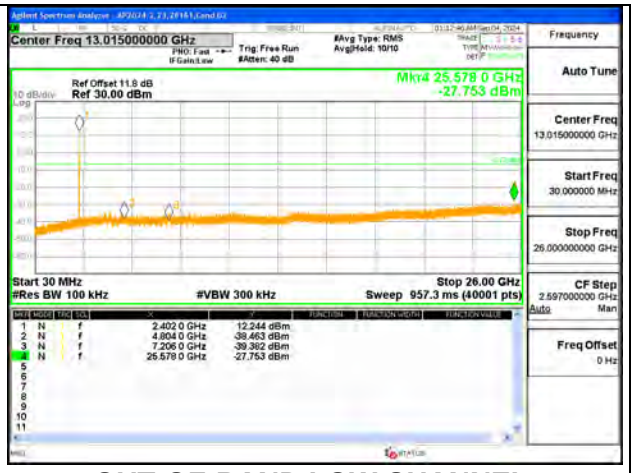
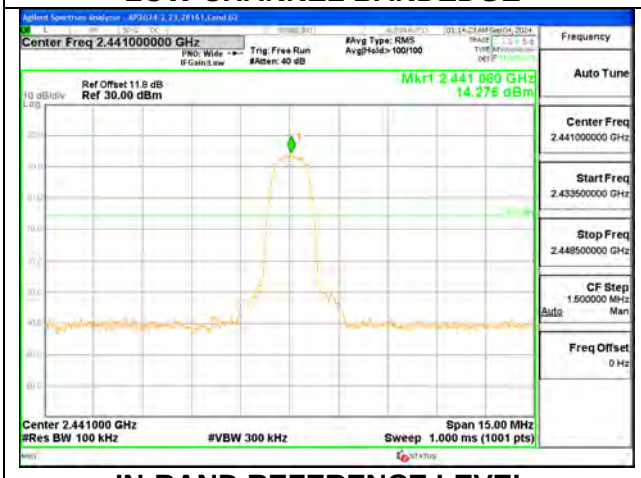
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



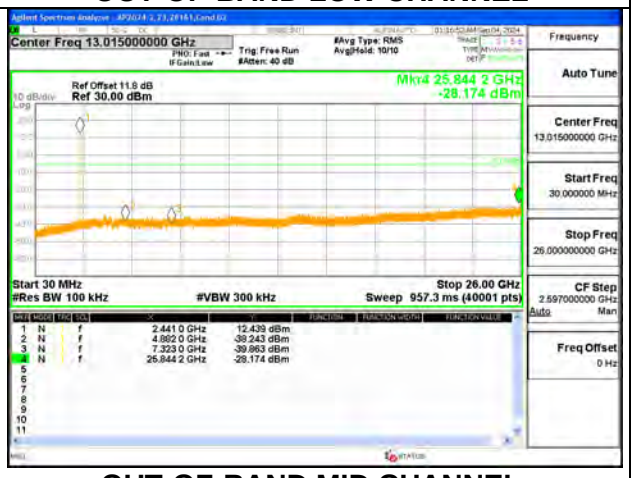
LOW CHANNEL BANDEDGE



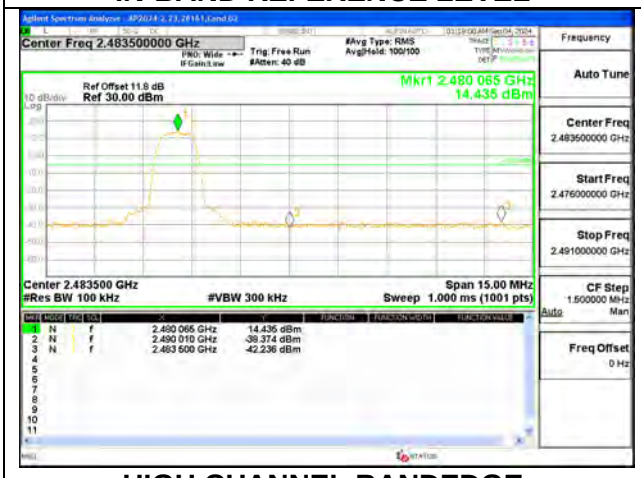
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE

OUT-OF-BAND HIGH CHANNEL

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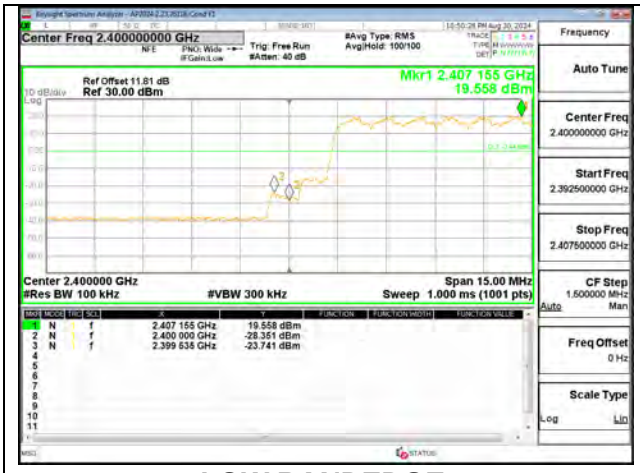
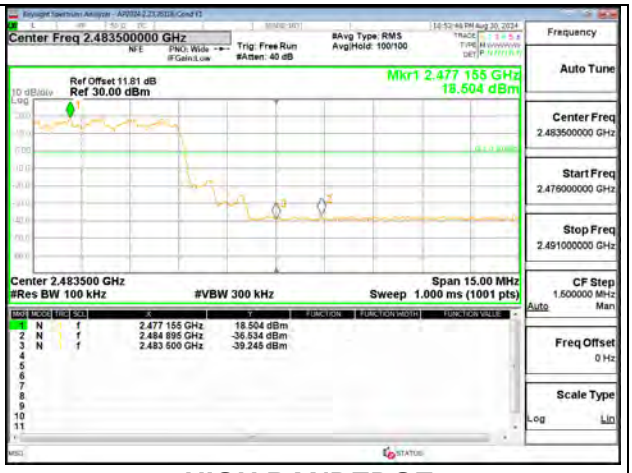
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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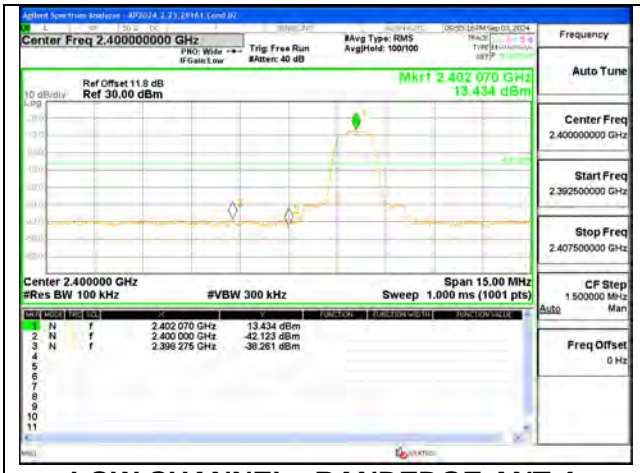
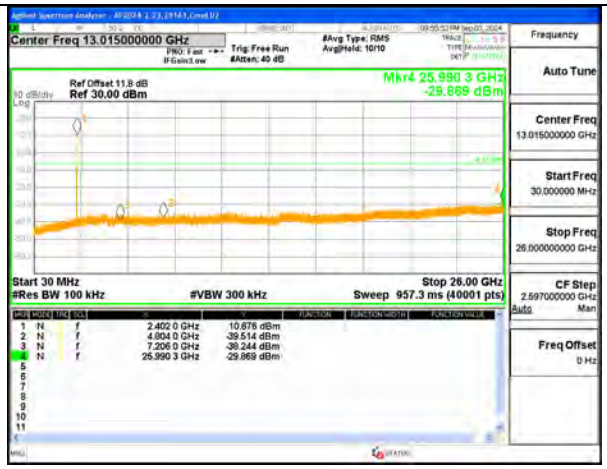
9.8.4. HIGH POWER TXBF ENHANCED DATA RATE 8PSK MODULATION

Note: Test procedure on beamforming mode is same as BT basic and EDR mode

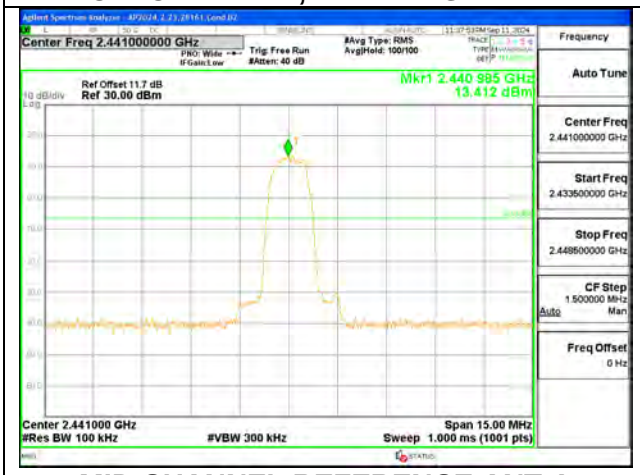
ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL , BANDEDGE ANT 4

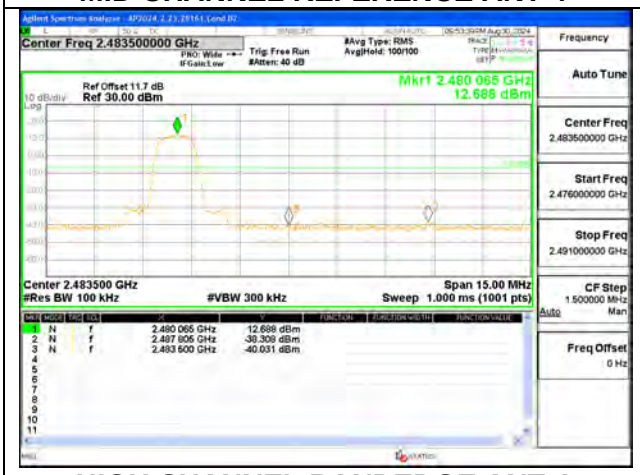


LOW CHANNEL OUT-OF-BAND ANT 4

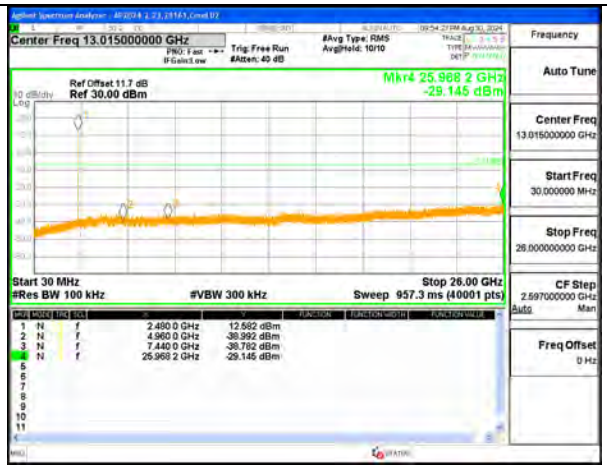


MID CHANNEL REFERENCE ANT 4

MID CHANNEL OUT-OF-BAND ANT 4



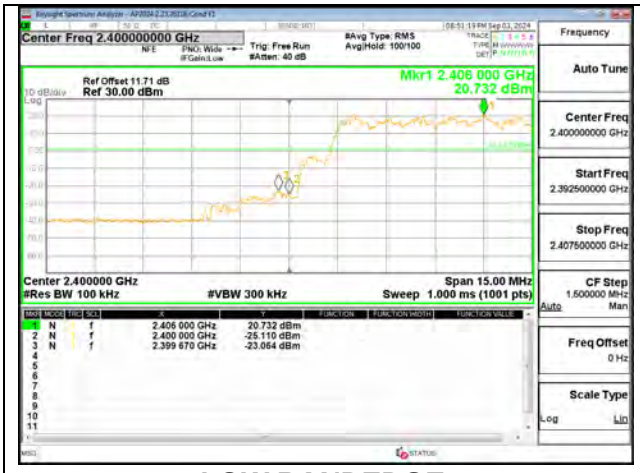
HIGH CHANNEL BANDEDGE ANT 4



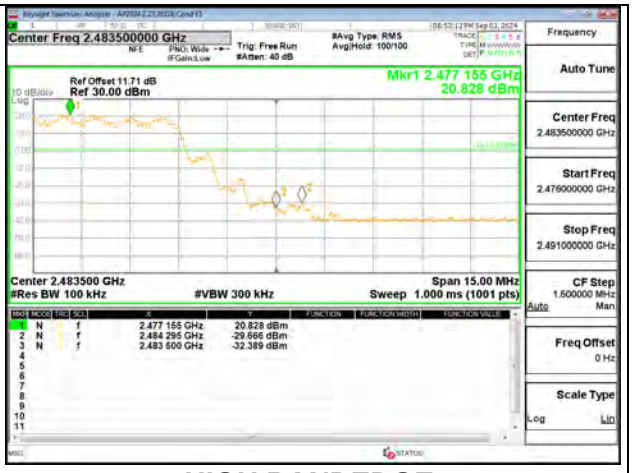
HIGH CHANNEL OUT-OF-BAND ANT 4

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

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



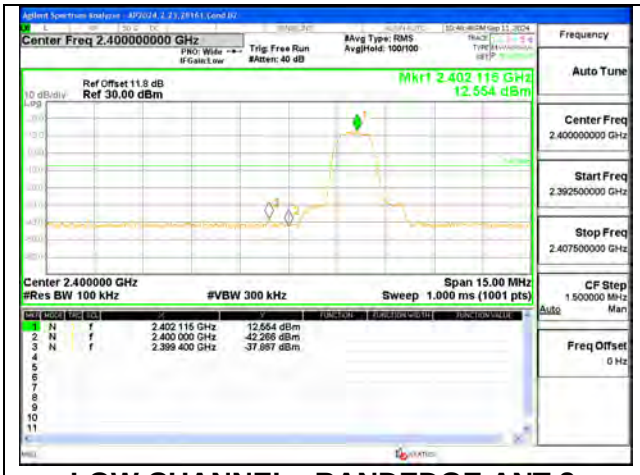
LOW BANDEDGE



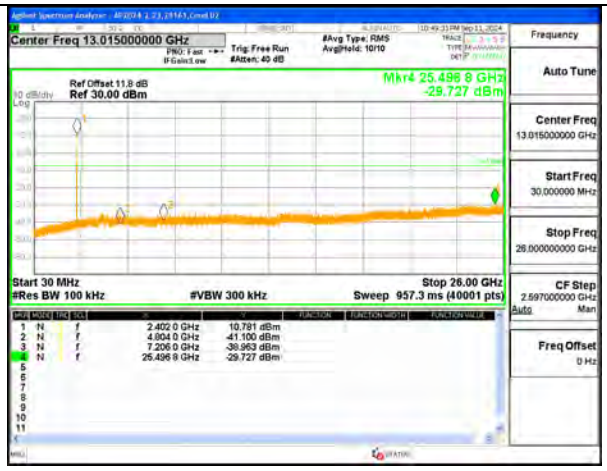
HIGH BANDEDGE

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

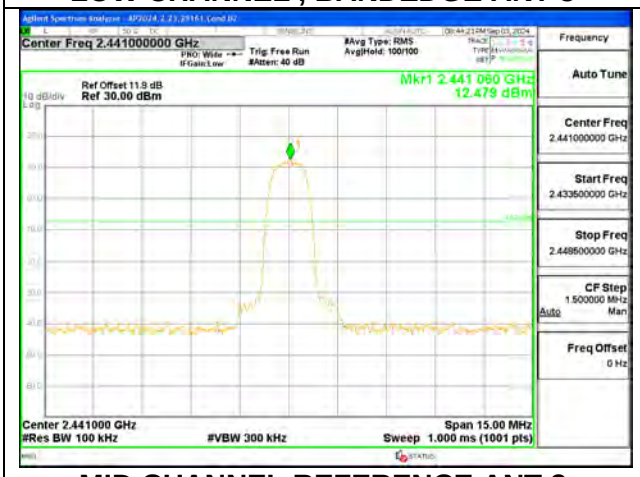
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL , BANDEDGE ANT 3

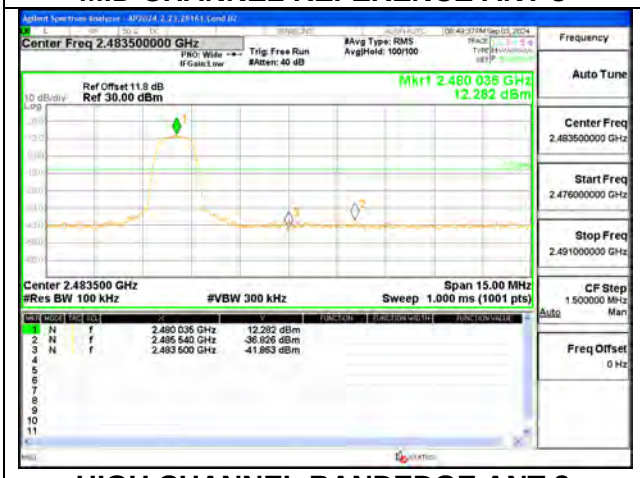


LOW CHANNEL OUT-OF-BAND ANT 3

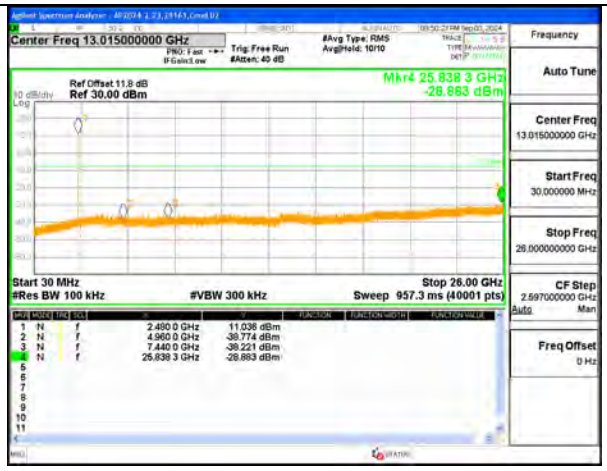


MID CHANNEL REFERENCE ANT 3

MID CHANNEL OUT-OF-BAND ANT 3

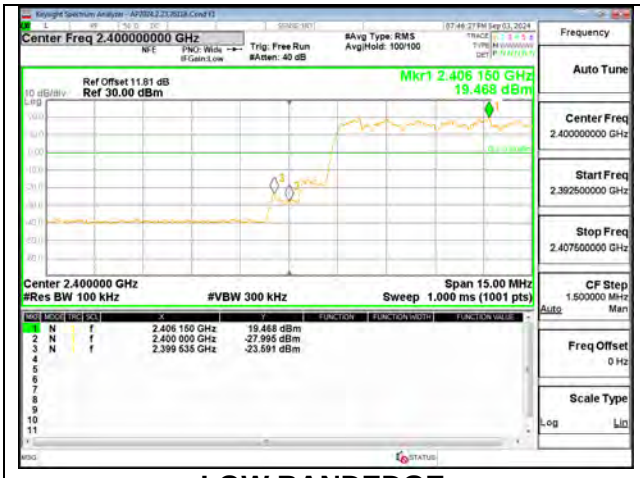


HIGH CHANNEL BANDEDGE ANT 3

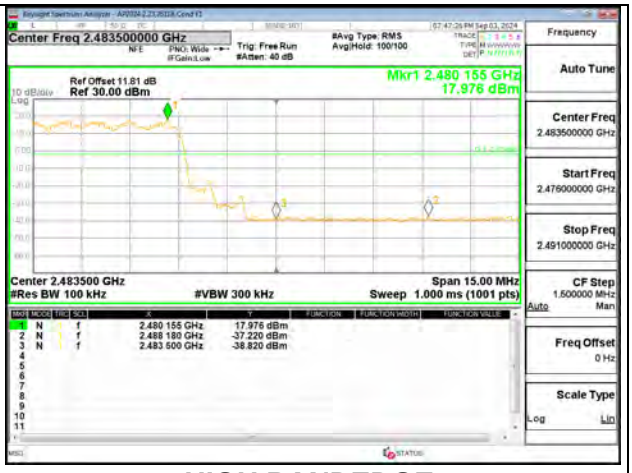


HIGH CHANNEL OUT-OF-BAND ANT 3

ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE

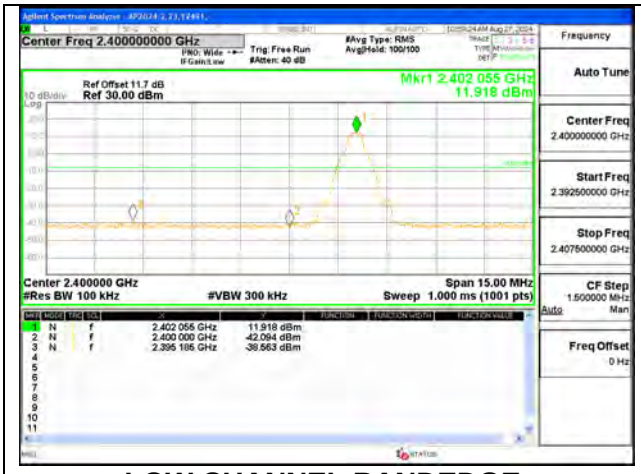


HIGH BANDEDGE

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

9.8.5. LOW POWER BASIC DATA RATE GFSK MODULATION

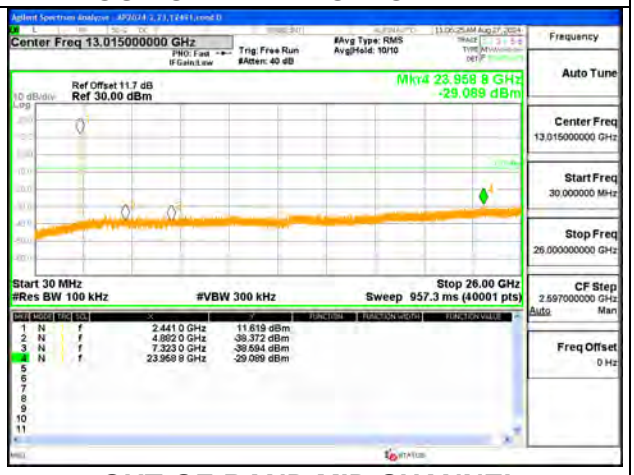
ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE

OUT-OF-BAND LOW CHANNEL

IN-BAND REFERENCE LEVEL



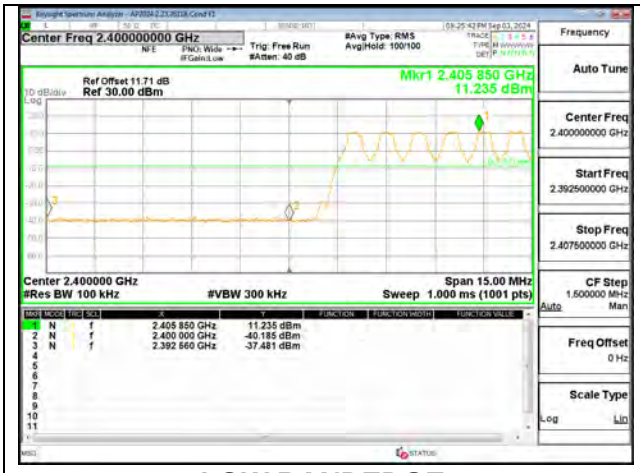
OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

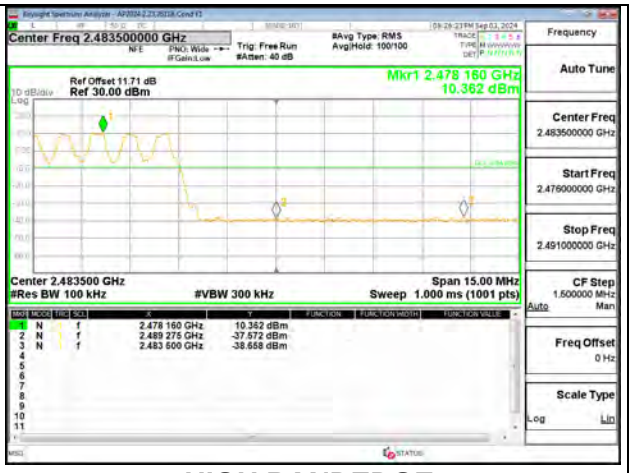
OUT-OF-BAND HIGH CHANNEL

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

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



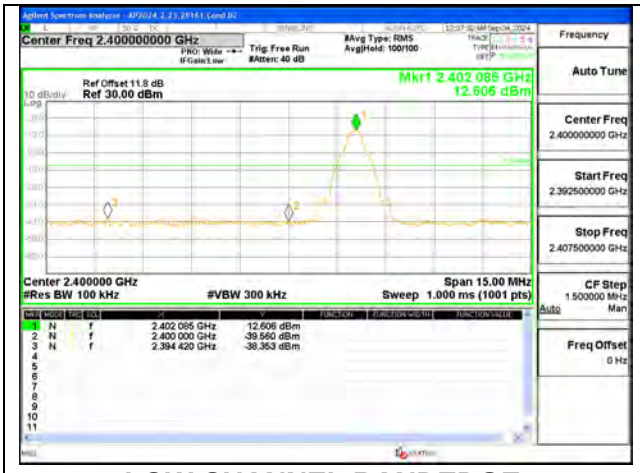
LOW BANDEDGE



HIGH BANDEDGE

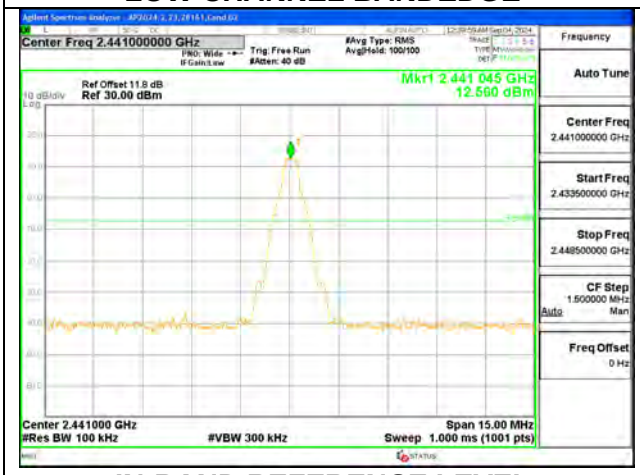
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE

OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL

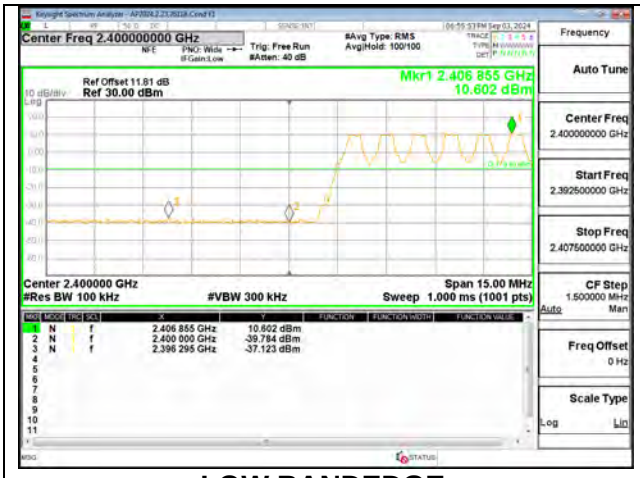
OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

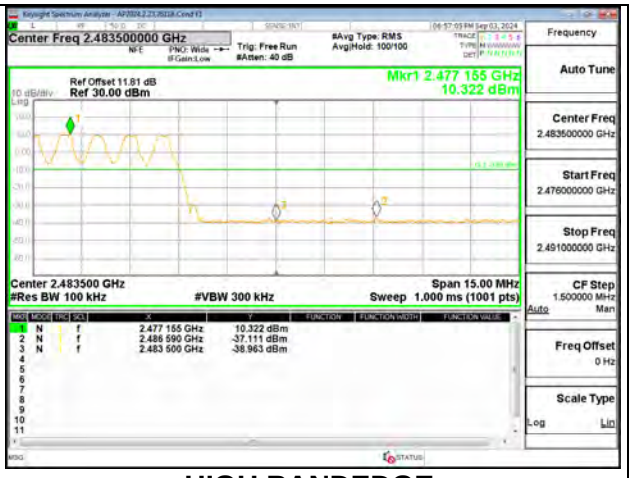
OUT-OF-BAND HIGH CHANNEL

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

ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

UL VERIFICATION SERVICES INC.
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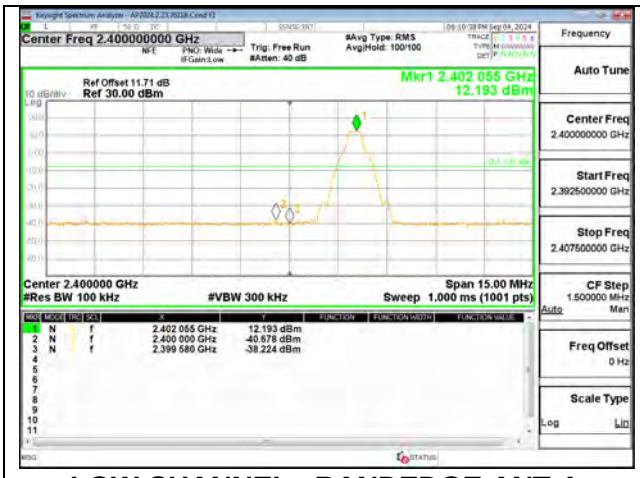
9.8.6. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

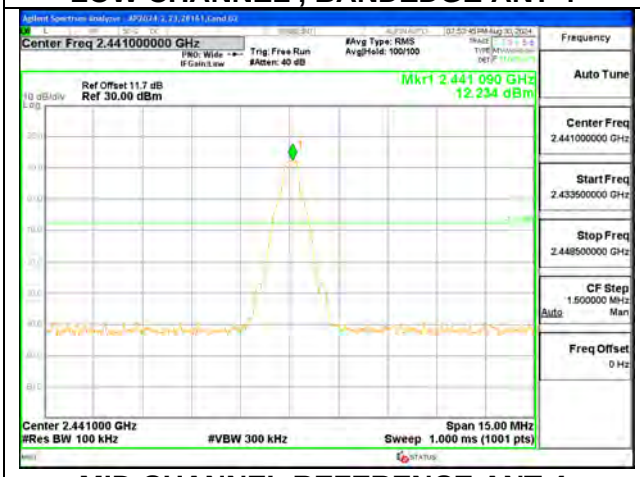
Note: Test procedure on beamforming mode is same as BT basic and EDR mode

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

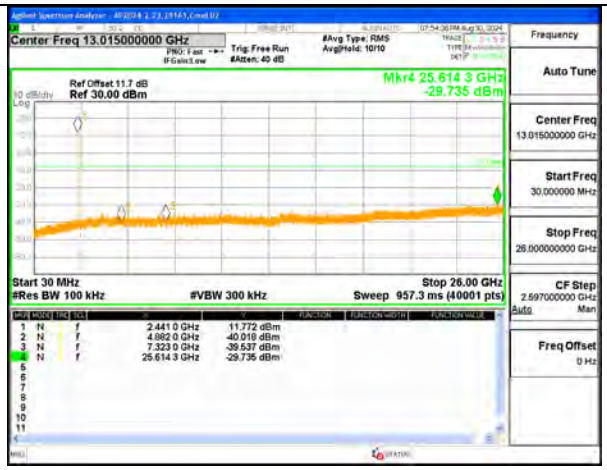


LOW CHANNEL , BANDEDGE ANT 4

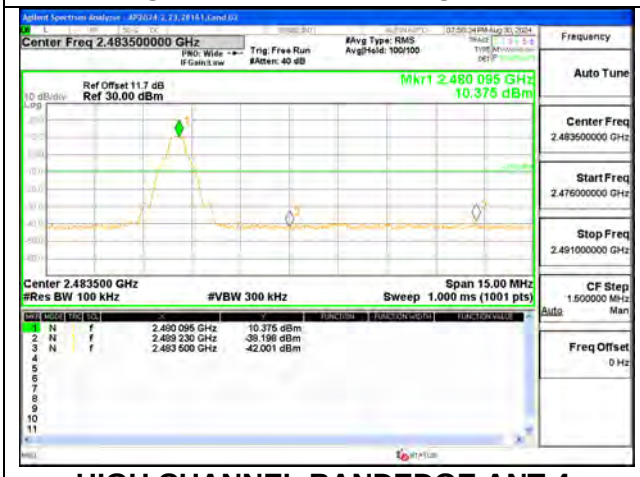
LOW CHANNEL OUT-OF-BAND ANT 4



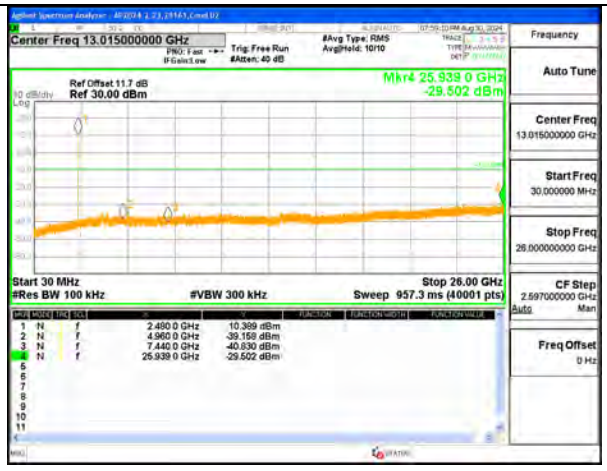
MID CHANNEL REFERENCE ANT 4



MID CHANNEL OUT-OF-BAND ANT 4

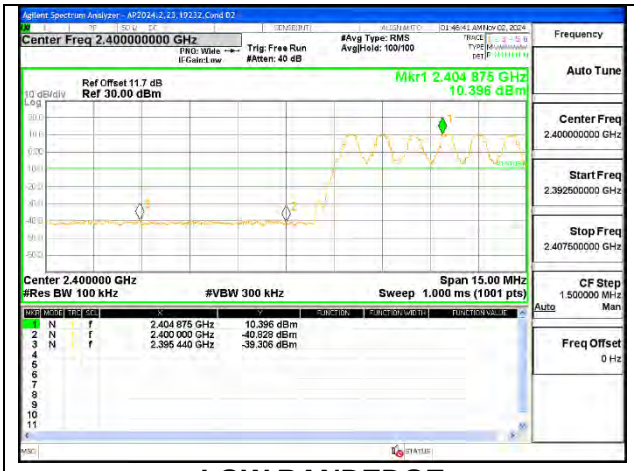


HIGH CHANNEL BANDEDGE ANT 4

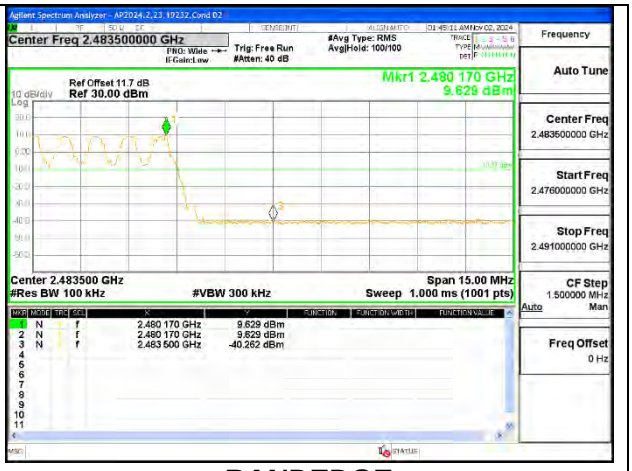


HIGH CHANNEL OUT-OF-BAND ANT 4

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



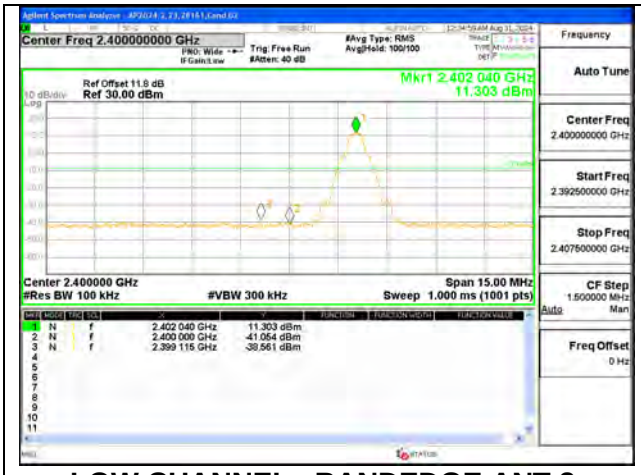
LOW BANDEDGE



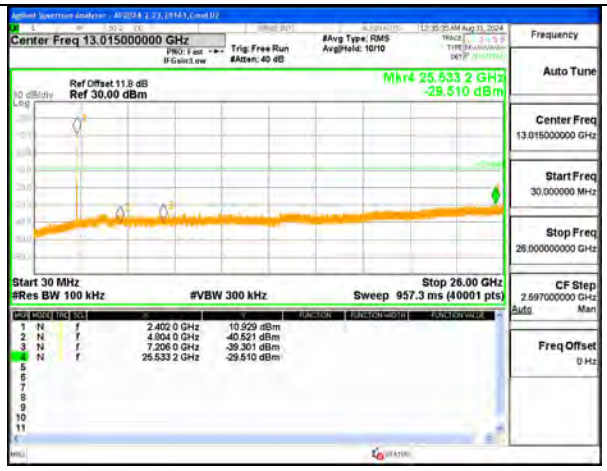
BANDEDGE

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

ANT 3 SPURIOUS EMISSIONS, NON-HOPPING

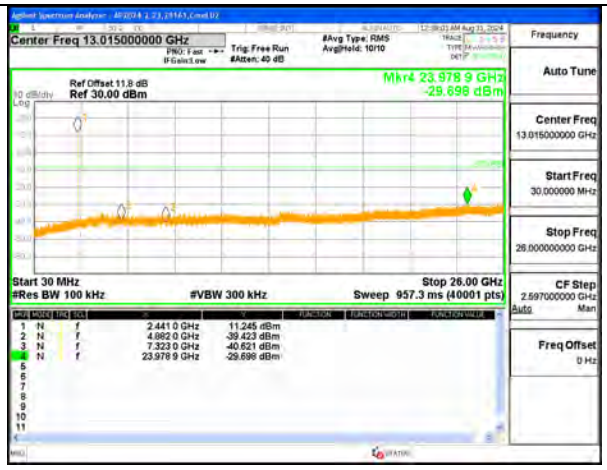


LOW CHANNEL , BANDEDGE ANT 3

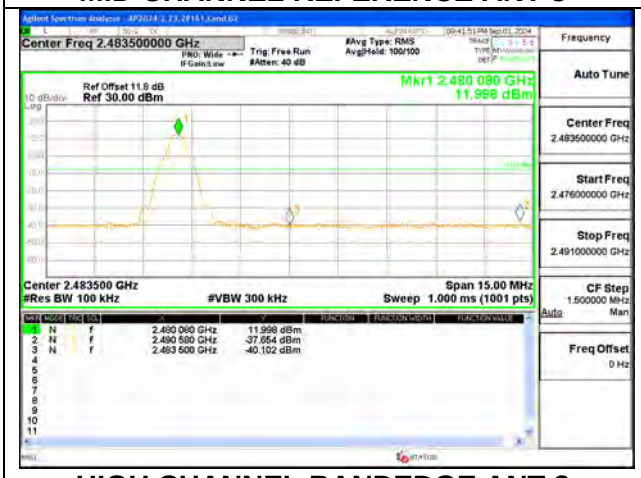


LOW CHANNEL OUT-OF-BAND ANT 3

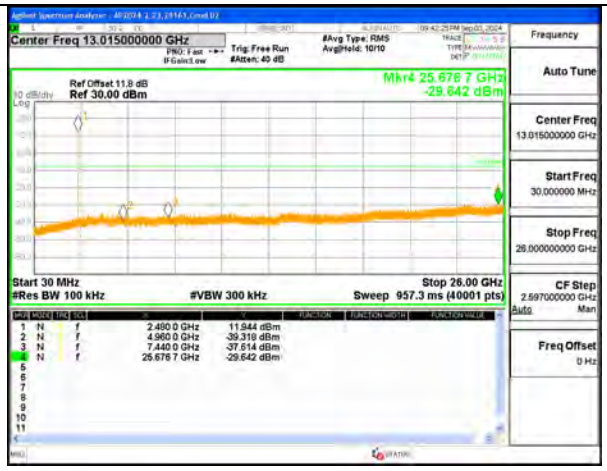
MID CHANNEL REFERENCE ANT 3



MID CHANNEL OUT-OF-BAND ANT 3



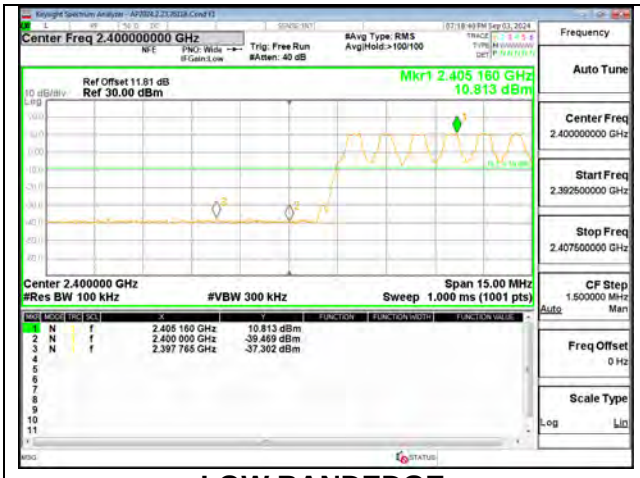
HIGH CHANNEL BANDEDGE ANT 3



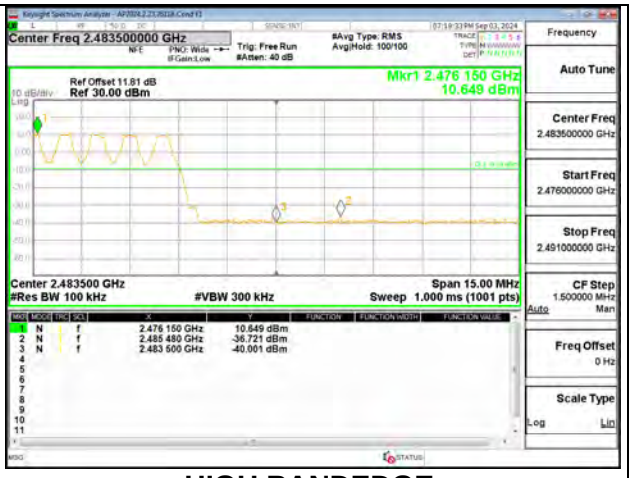
HIGH CHANNEL OUT-OF-BAND ANT 3

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

ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

UL VERIFICATION SERVICES INC.
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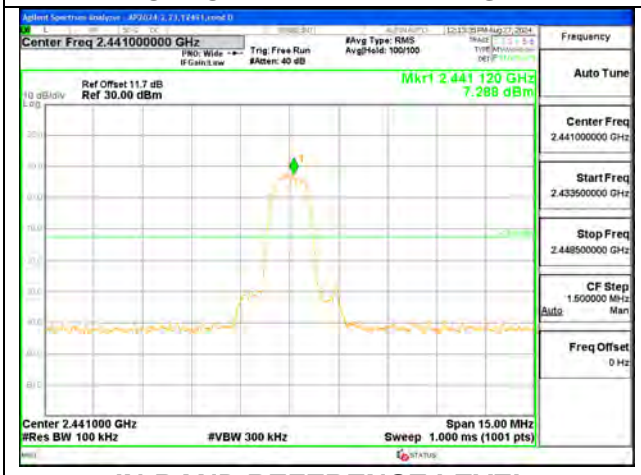
9.8.7. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE

OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL

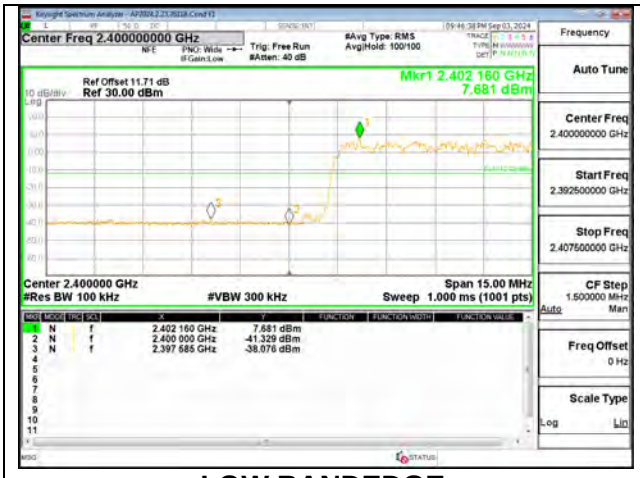
OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

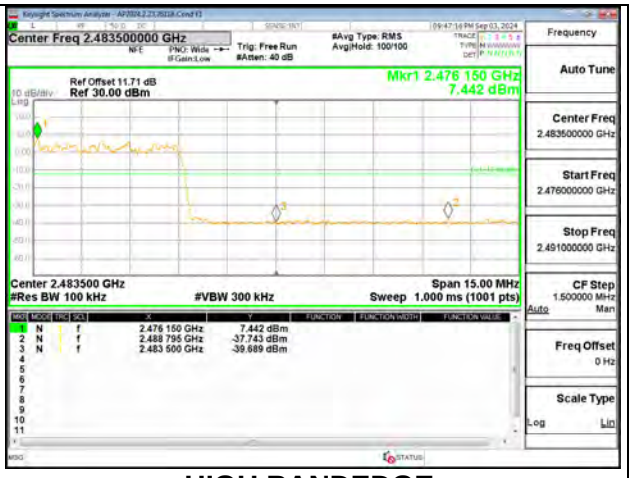
OUT-OF-BAND HIGH CHANNEL

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

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



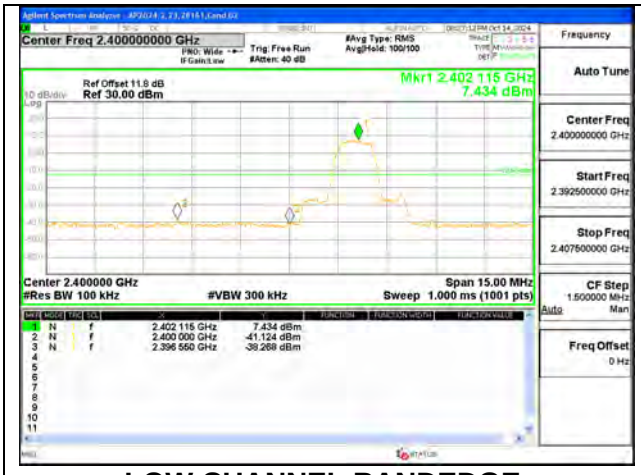
LOW BANDEDGE



HIGH BANDEDGE

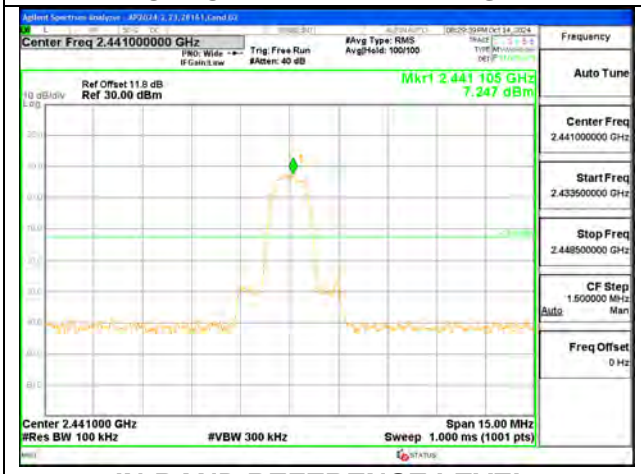
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE

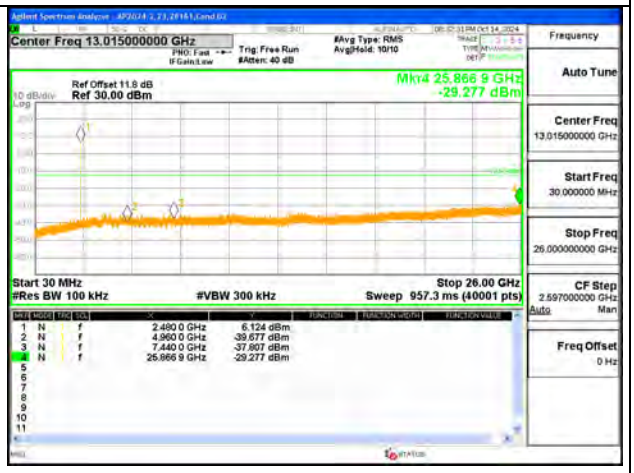
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

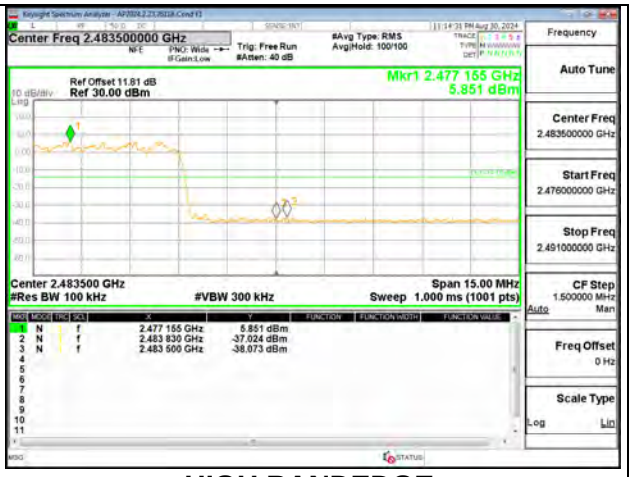


OUT-OF-BAND HIGH CHANNEL

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

ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE



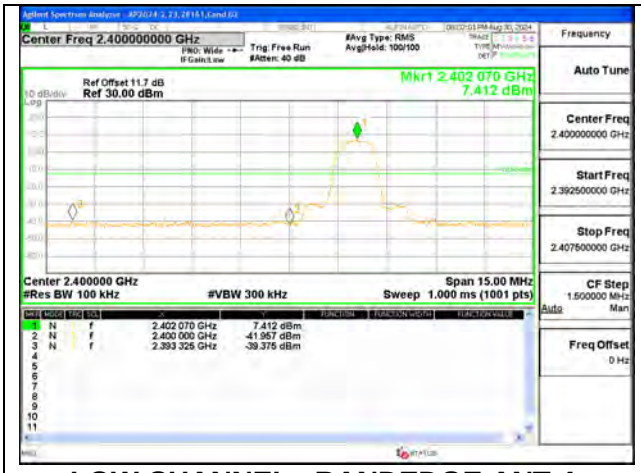
HIGH BANDEDGE

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

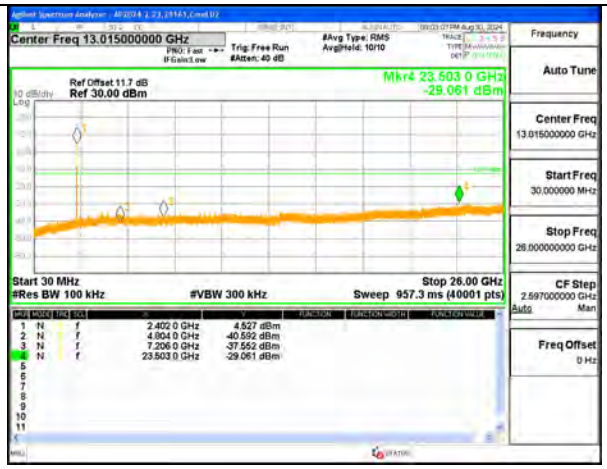
9.8.8. LOW POWER TXBF ENHANCED DATA RATE 8PSK MODULATION

Note: Test procedure on beamforming mode is same as BT basic and EDR mode

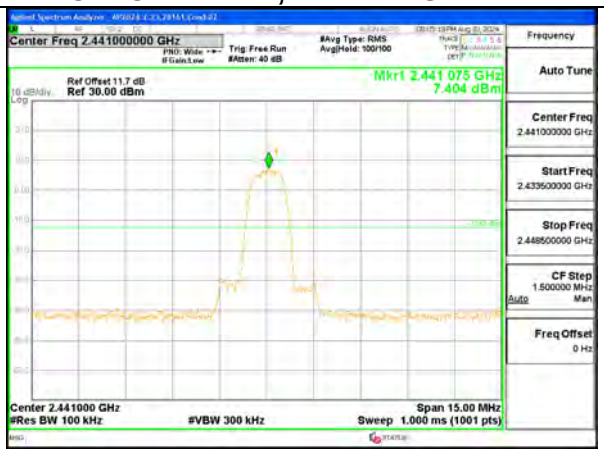
ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL , BANDEDGE ANT 4



LOW CHANNEL OUT-OF-BAND ANT 4



MID CHANNEL REFERENCE ANT 4

MID CHANNEL OUT-OF-BAND ANT 4

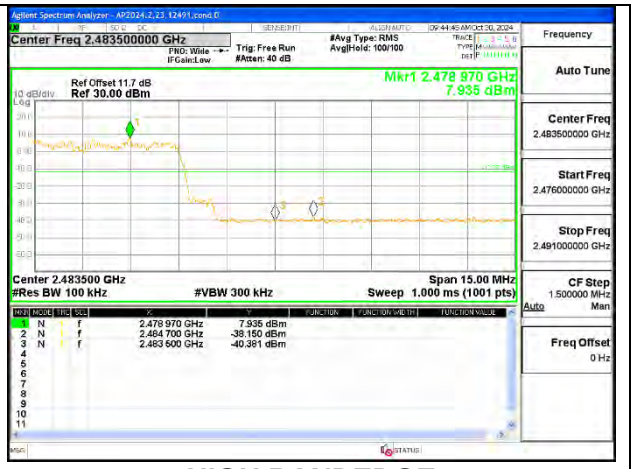
HIGH CHANNEL BANDEDGE ANT 4

HIGH CHANNEL OUT-OF-BAND ANT 4

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

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

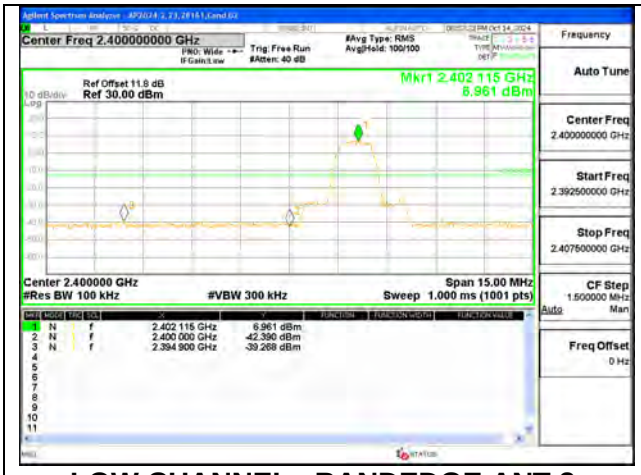
LOW BANDEDGE



HIGH BANDEDGE

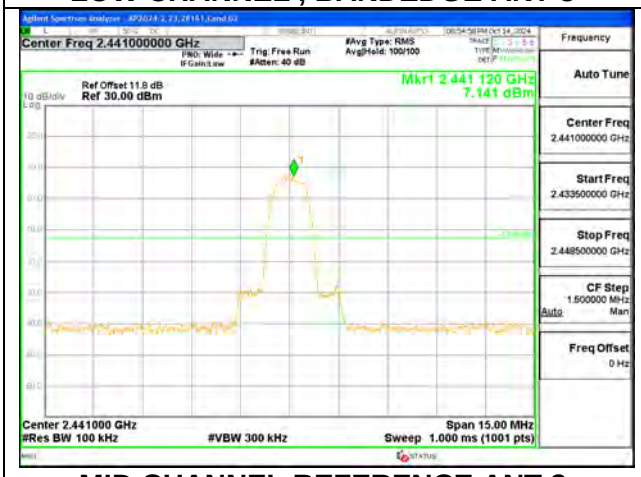
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL , BANDEDGE ANT 3

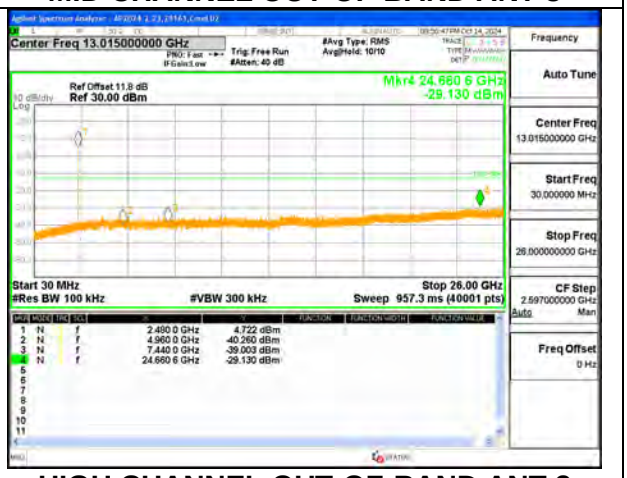
LOW CHANNEL OUT-OF-BAND ANT 3



MID CHANNEL REFERENCE ANT 3

MID CHANNEL OUT-OF-BAND ANT 3

HIGH CHANNEL BANDEDGE ANT 3



HIGH CHANNEL OUT-OF-BAND ANT 3

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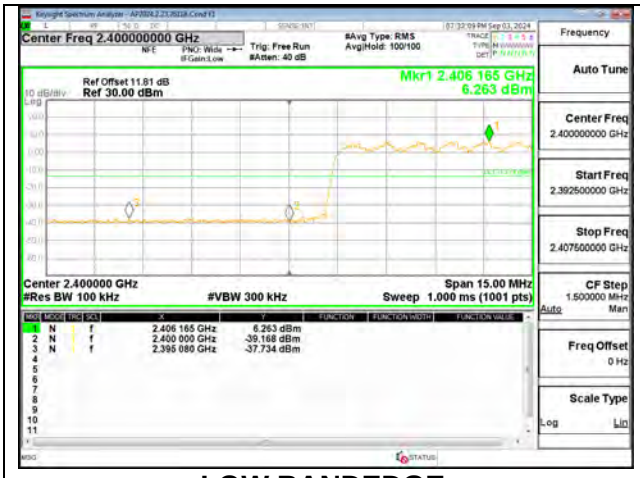
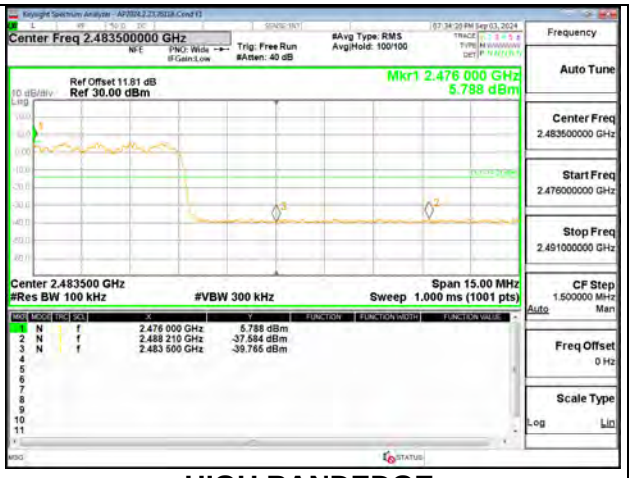
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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. Peak detection is used unless otherwise noted as quasi-peak.

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 scans above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T (10 Hz) 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.

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 report in the table) using 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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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.

KDB 558074 D01 15.247 Meas Guidance v05r02

Use of a duty cycle correction factor (DCCF) is permitted for calculating average radiated field strength emission levels for an FHSS device in 15.247. This DCCF can be applied when the field strength limit (e.g., within a Government Restricted band) and the conditions specified in Section 15.35(c) can be satisfied. The average radiated field strength is calculated by subtracting the DCCF from the maximum radiated field strength level as determined through measurement. The maximum radiated field strength level represents the worst-case (maximum amplitude) RMS measurement of the emission(s) during continuous transmission (i.e., not including any time intervals during which the transmitter is off or is transmitting at a reduced power level). It is also acceptable to apply the DCCF to a measurement performed with a peak detector instead of the specified RMS power averaging detector. Note that Section 15.35(c) specifies that the DCCF shall represent the worst-case (greatest duty cycle) over any 100 msec transmission period.

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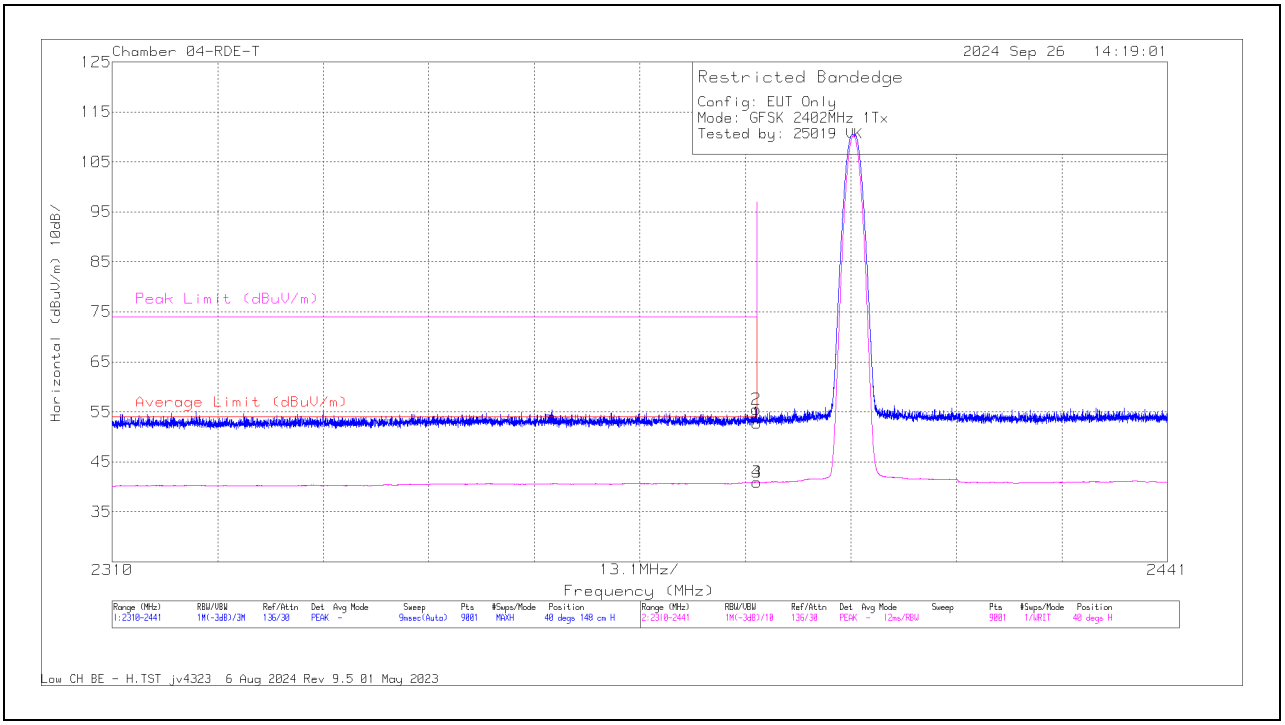
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

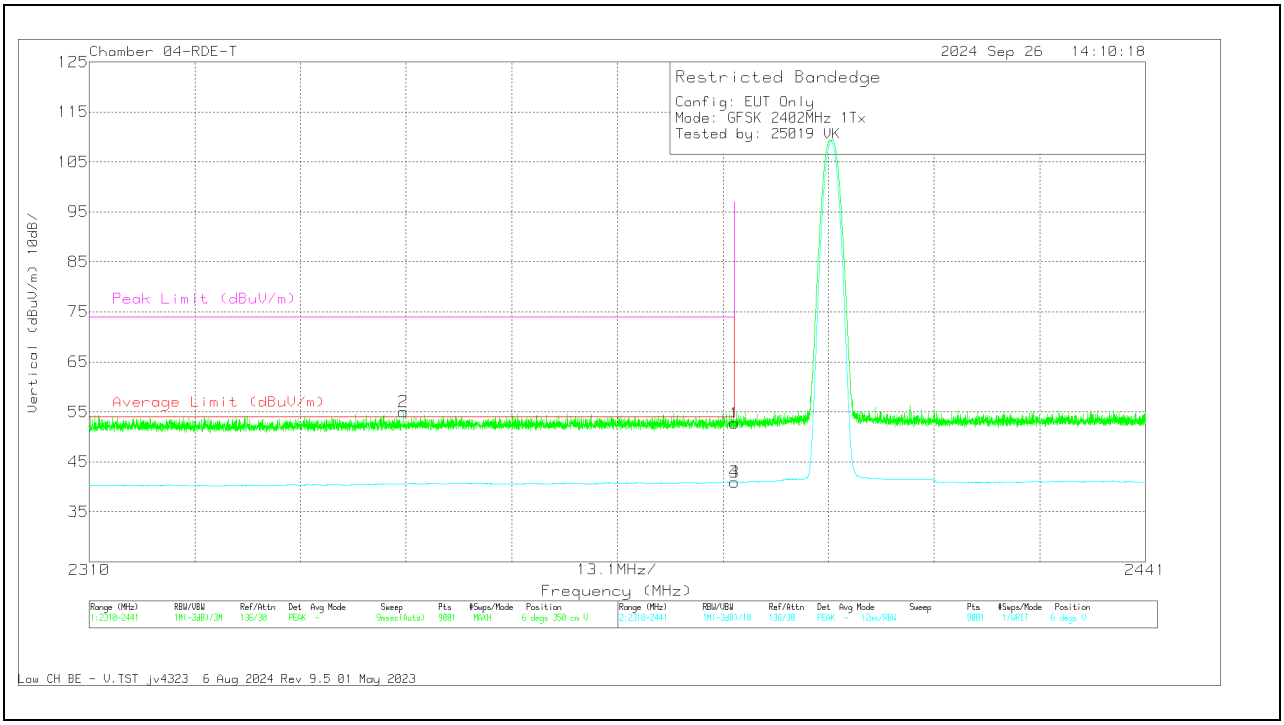
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	59.84	Pk	32	-39.05	52.79	-	-	74	-21.21	40	148	H
2	* 2389.927	62.56	Pk	32	-39.05	55.51	-	-	74	-18.49	40	148	H
3	* 2390	47.98	VA1T	32	-39.05	40.93	54	-13.07	-	-	40	148	H
4	* 2390	47.98	VA1T	32	-39.05	40.93	54	-13.07	-	-	40	148	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	59.75	Pk	32	-39.05	52.7	-	-	74	-21.3	6	350	V
2	* 2348.981	62.34	Pk	31.8	-39.14	55	-	-	74	-19	6	350	V
3	* 2390	48.04	VA1T	32	-39.05	40.99	54	-13.01	-	-	6	350	V
4	* 2390	48.04	VA1T	32	-39.05	40.99	54	-13.01	-	-	6	350	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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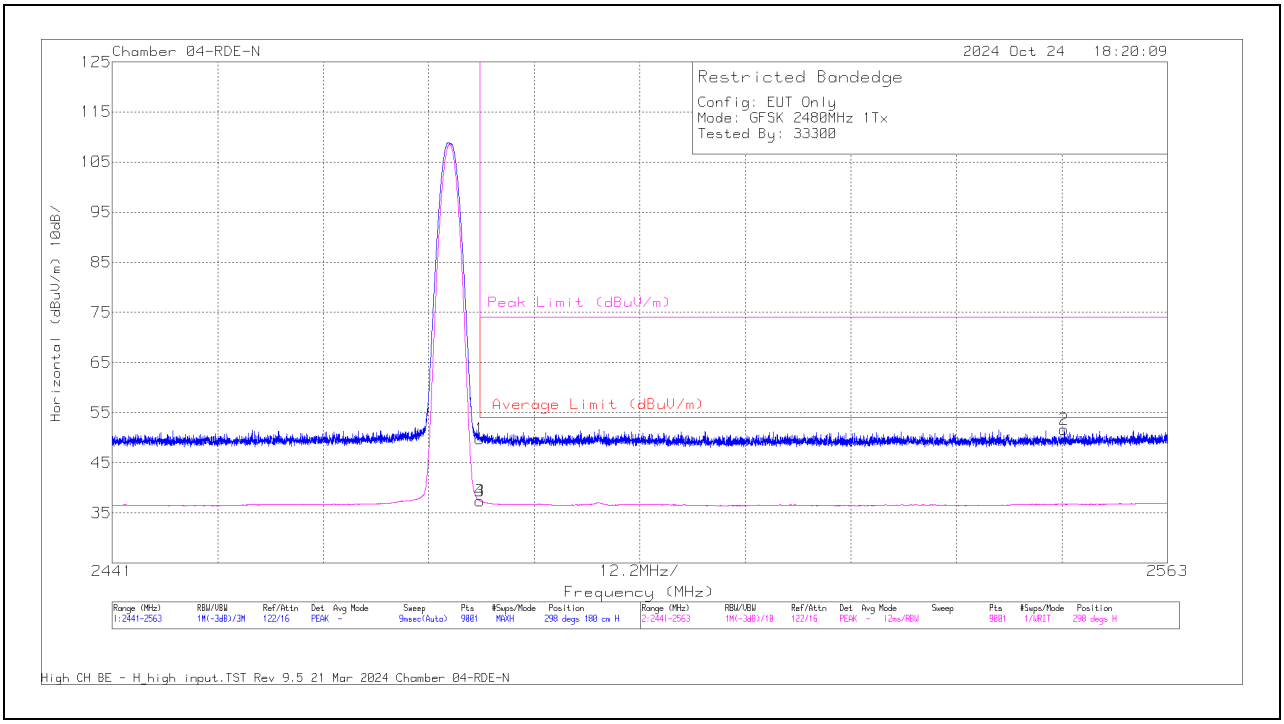
BANDEDGE (HIGH CHANNEL)

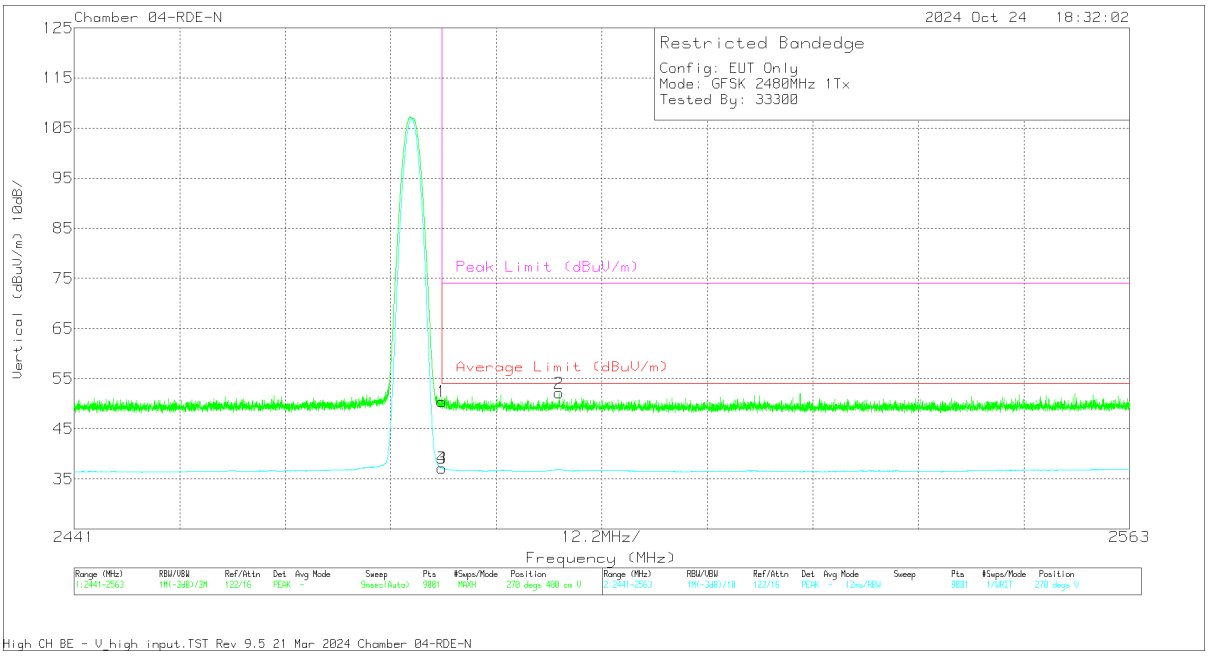
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2483.5	44.59	Pk	32.2	-27	49.79	-	-	74	-24.21	298	180	H
3	2483.5	32.19	VA1T	32.2	-27	37.39	54	-16.61	-	-	298	180	H
4	2483.512	32.18	VA1T	32.2	-27	37.38	54	-16.62	-	-	298	180	H
2	2551.075	46.27	Pk	32.2	-26.8	51.67	-	-	74	-22.33	298	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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2483.5	45.2	Pk	32.2	-27	50.4	-	-	74	-23.6	270	400	V
3	2483.5	31.92	VA1T	32.2	-27	37.12	54	-16.88	-	-	270	400	V
4	2483.512	31.91	VA1T	32.2	-27	37.11	54	-16.89	-	-	270	400	V
2	2497.095	46.86	Pk	32.2	-26.97	52.09	-	-	74	-21.91	270	400	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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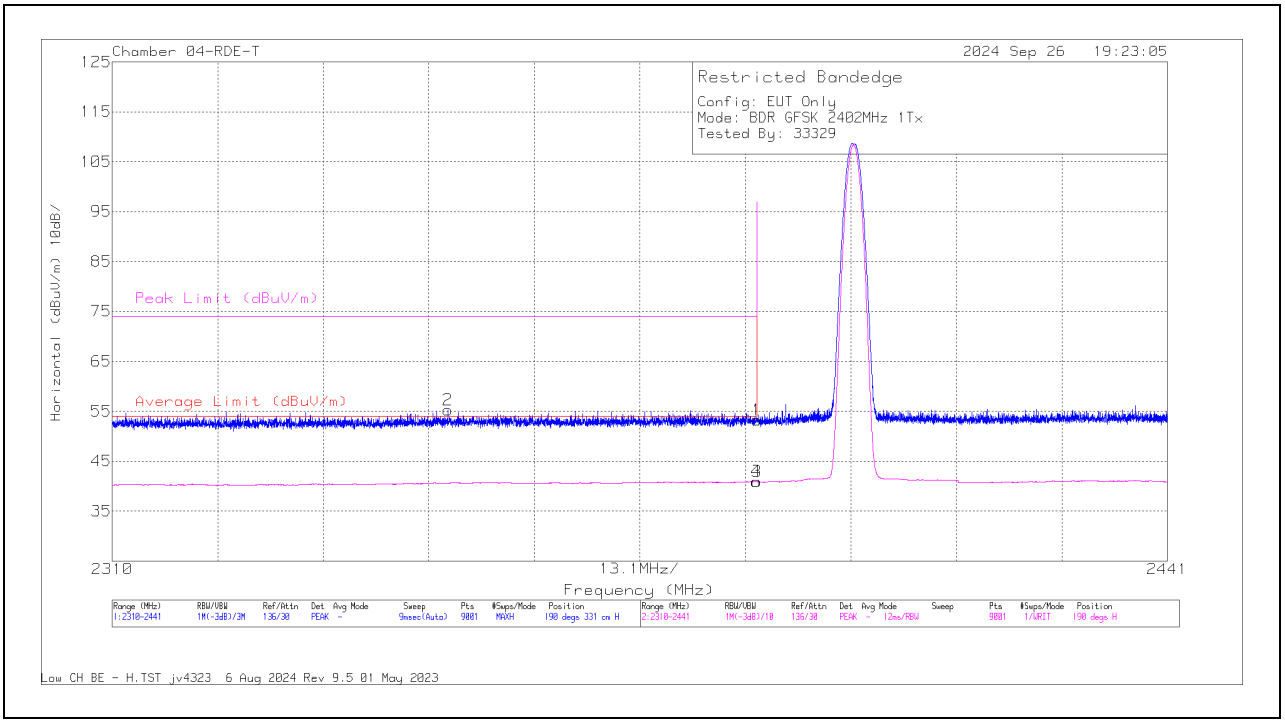
ANT 3

BANDEDGE (LOW CHANNEL)

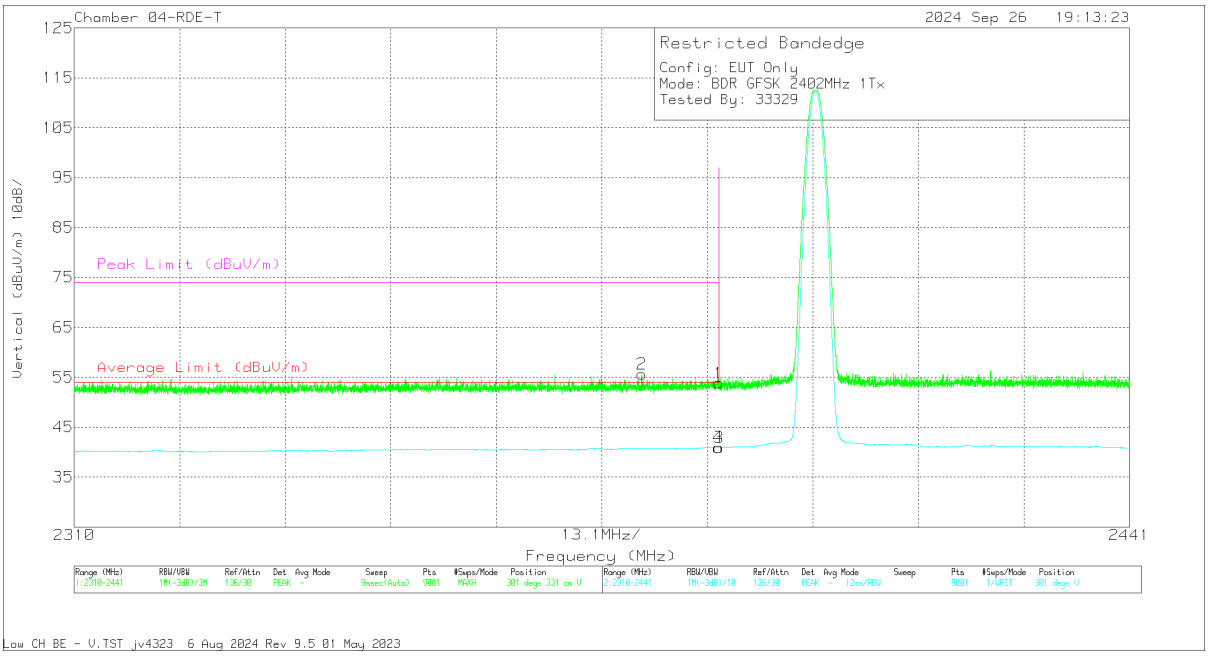
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.35	Pk	32	0	-39.05	53.3	-	-	74	-20.7	190	331	H
2	* 2351.703	62.55	Pk	31.8	0	-39.08	55.27	-	-	74	-18.73	190	331	H
3	* 2390	47.98	VA1T	32	0	-39.05	40.93	54	-13.07	-	-	190	331	H
4	* 2389.956	48	VA1T	32	0	-39.05	40.95	54	-13.05	-	-	190	331	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.88	Pk	32	0	-39.05	53.83	-	-	74	-20.17	301	331	V
2	* 2380.436	62.58	Pk	32	0	-38.98	55.6	-	-	74	-18.4	301	331	V
3	* 2390	48.01	VA1T	32	0	-39.05	40.96	54	-13.04	-	-	301	331	V
4	* 2389.956	48.03	VA1T	32	0	-39.05	40.98	54	-13.02	-	-	301	331	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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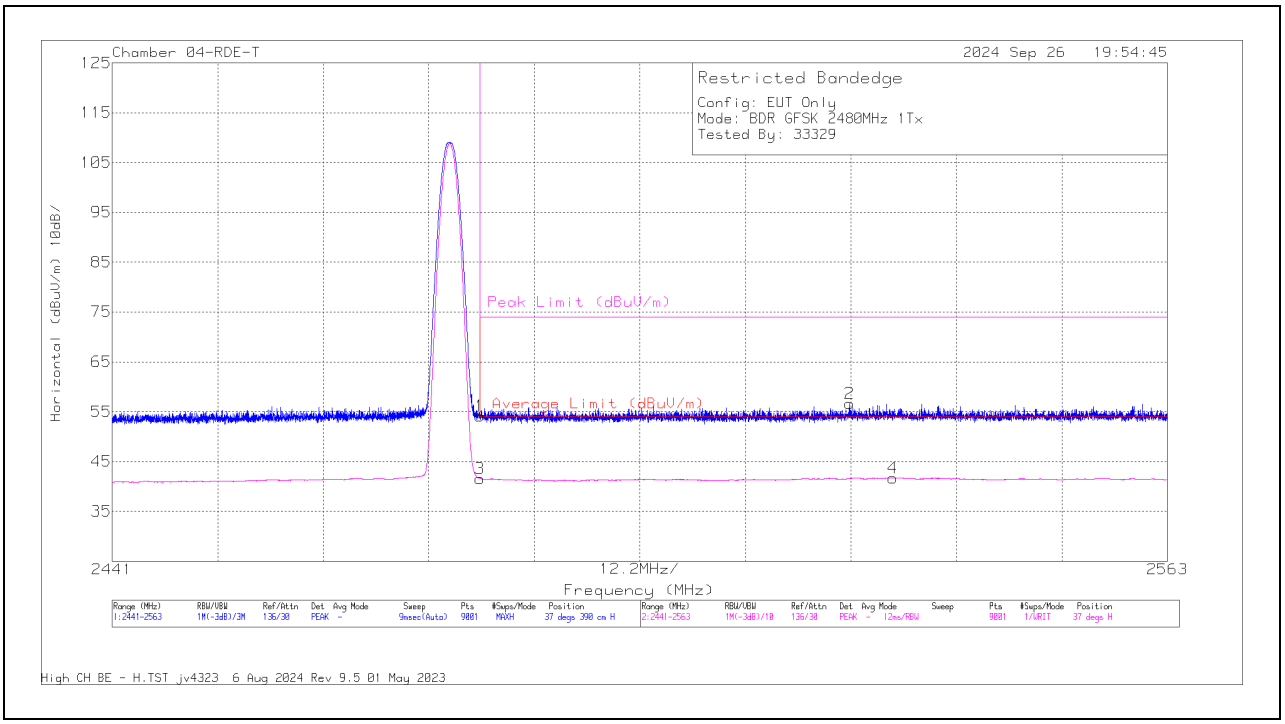
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	60.78	Pk	32.2	0	-38.87	54.11	-	-	74	-19.89	37	390	H
3	* 2483.5	48.29	VA1T	32.2	0	-38.87	41.62	54	-12.38	-	-	37	390	H
2	2526.267	62.75	Pk	32.4	0	-38.49	56.66	-	-	74	-17.34	37	390	H
4	2531.256	47.68	VA1T	32.4	0	-38.34	41.74	54	-12.26	-	-	37	390	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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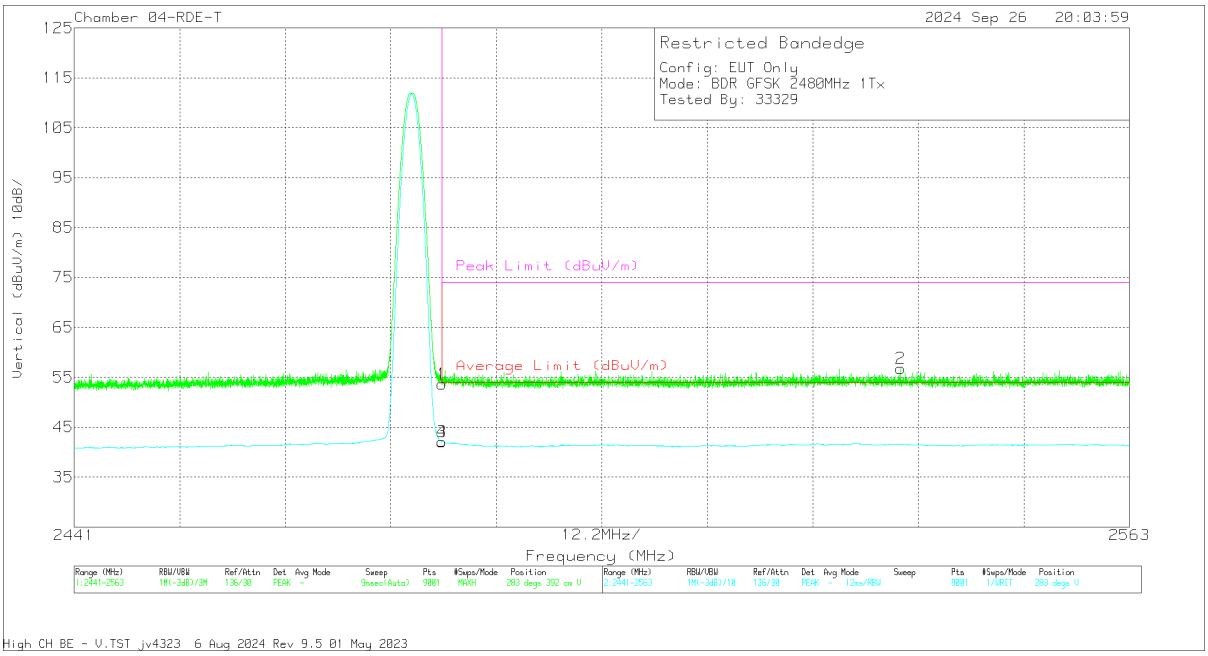
VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	60.29	Pk	32.2	0	-38.87	53.62	-	-	74	-20.38	283	392	V
3	* 2483.5	48.8	VA1T	32.2	0	-38.87	42.13	54	-11.87	-	-	283	392	V
4	* 2483.512	48.79	VA1T	32.2	0	-38.87	42.12	54	-11.88	-	-	283	392	V
2	2536.57	62.85	Pk	32.4	0	-38.44	56.81	-	-	74	-17.19	283	392	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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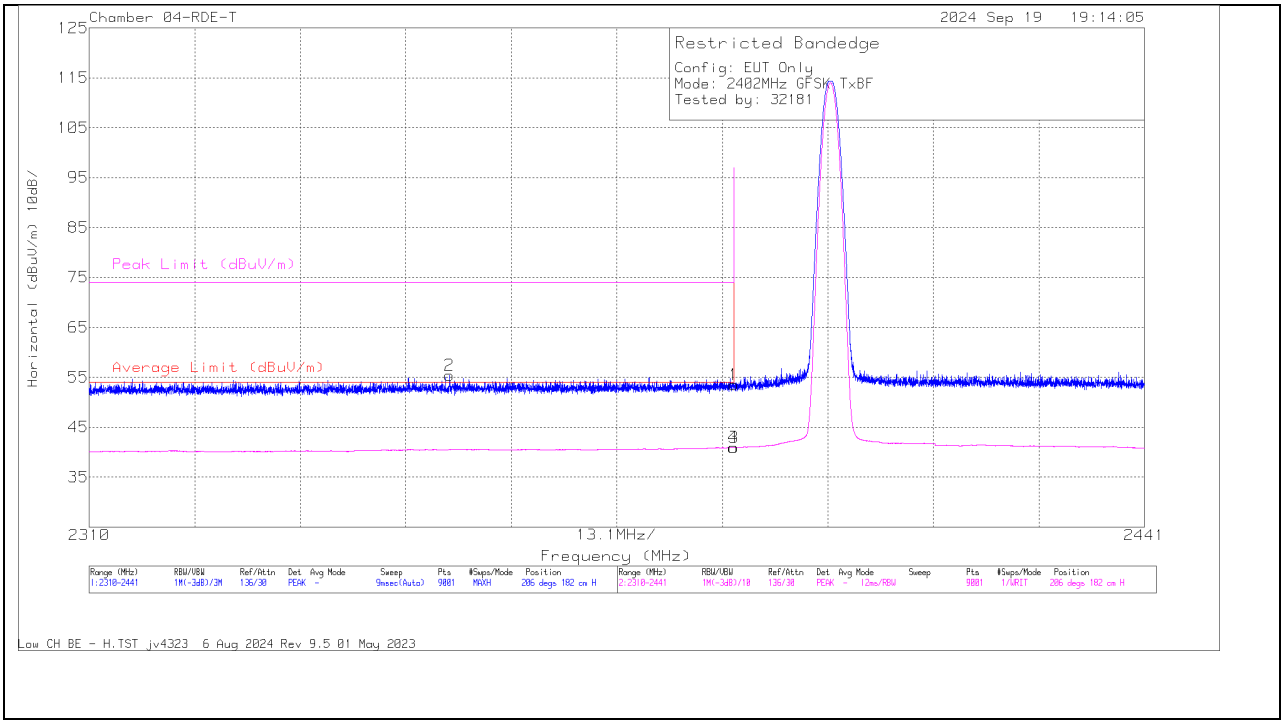
10.1.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

BANDEDGE (LOW CHANNEL)

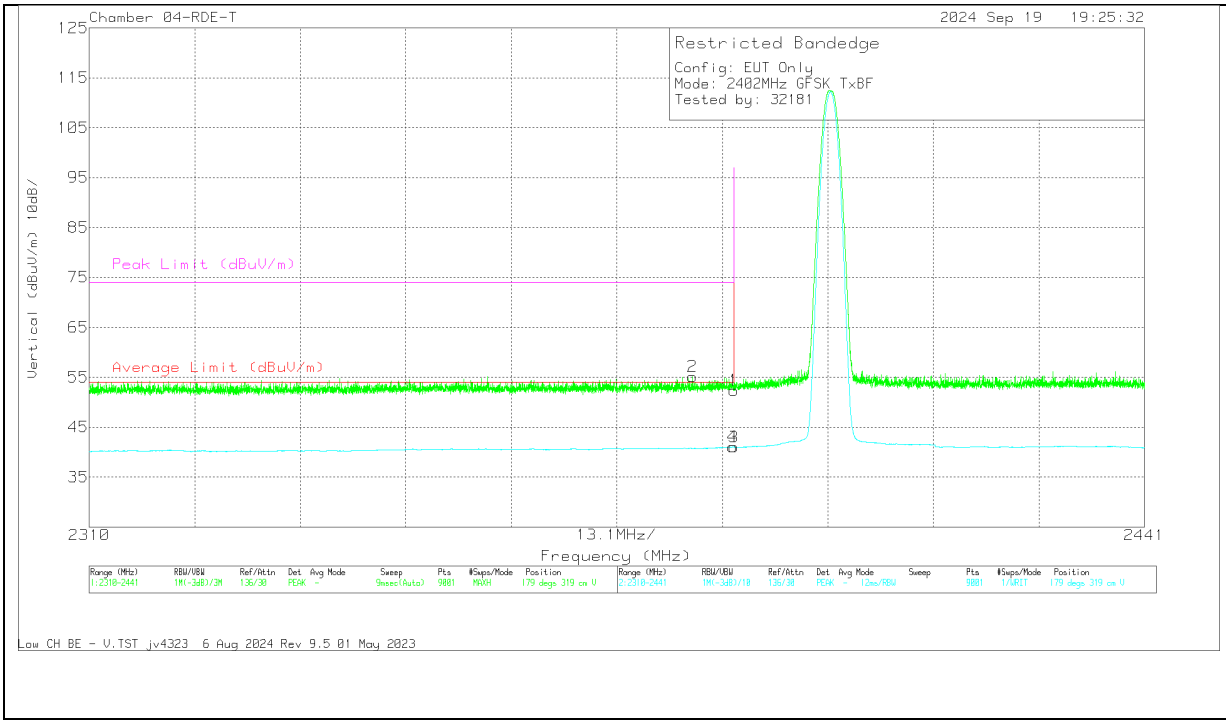
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.58	Pk	32	0	-39.05	53.53	-	-	74	-20.47	206	182	H
2	* 2354.745	62.66	Pk	31.8	0	-39.05	55.41	-	-	74	-18.59	206	182	H
3	* 2390	48	VA1T	32	0	-39.05	40.95	54	-13.05	-	-	206	182	H
4	* 2389.956	48.02	VA1T	32	0	-39.05	40.97	54	-13.03	-	-	206	182	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2384.905	62.19	Pk	32	0	-39.03	55.16	-	-	74	-18.84	179	319	V
4	* 2389.869	48.08	VA1T	32	0	-39.05	41.03	54	-12.97	-	-	179	319	V
1	* 2390	59.47	Pk	32	0	-39.05	52.42	-	-	74	-21.58	179	319	V
3	* 2390	48.06	VA1T	32	0	-39.05	41.01	54	-12.99	-	-	179	319	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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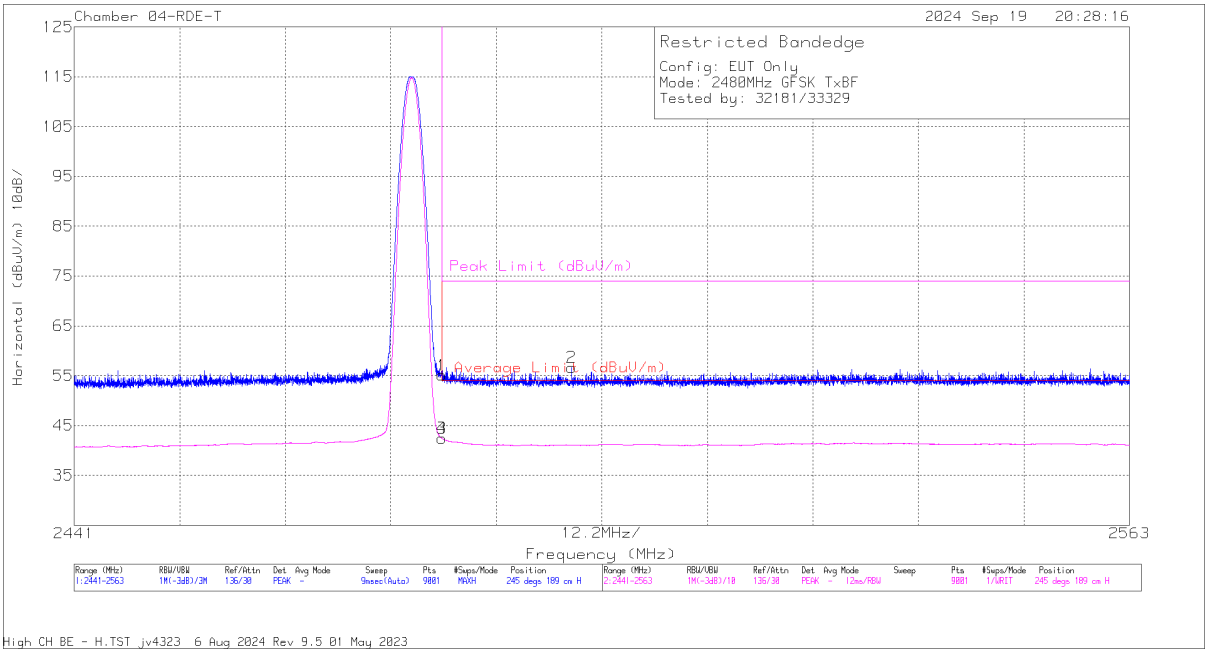
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	61.76	Pk	32.2	0	-38.87	55.09	-	-	74	-18.91	245	189	H
2	* 2498.491	63.1	Pk	32.3	0	-38.7	56.7	-	-	74	-17.3	245	189	H
3	* 2483.5	49.09	VA1T	32.2	0	-38.87	42.42	54	-11.58	-	-	245	189	H
4	* 2483.512	49.08	VA1T	32.2	0	-38.87	42.41	54	-11.59	-	-	245	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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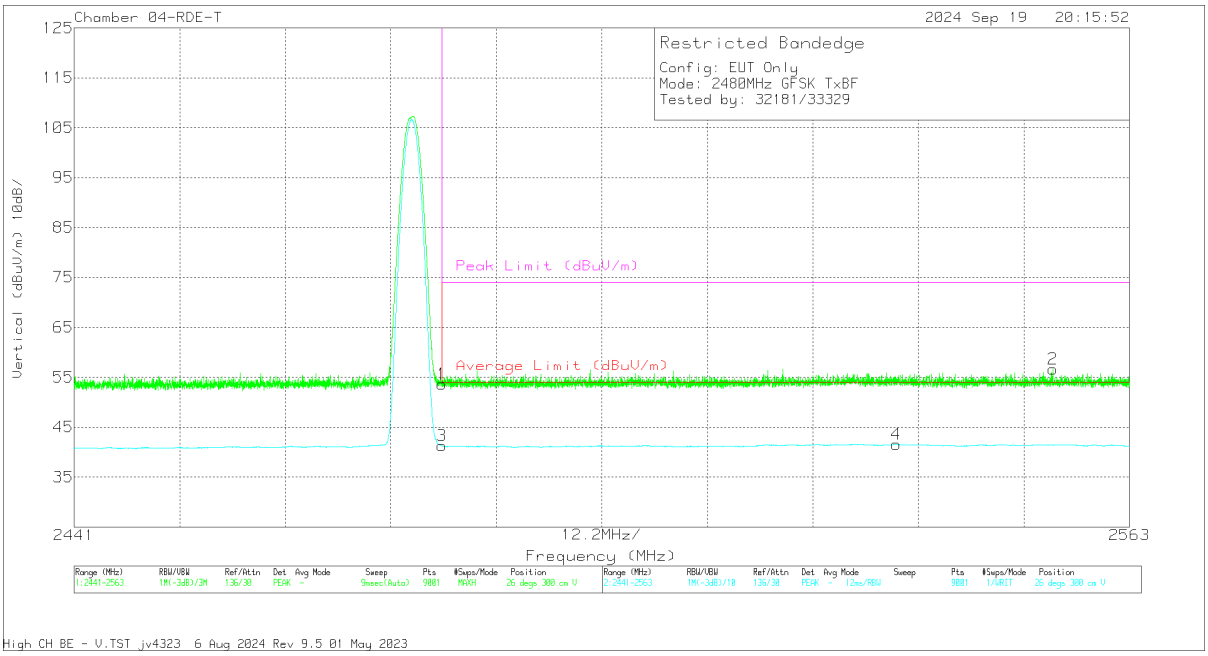
VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	60.3	Pk	32.2	0	-38.87	53.63	-	-	74	-20.37	26	300	V
3	* 2483.5	47.95	VA1T	32.2	0	-38.87	41.28	54	-12.72	-	-	26	300	V
4	2536.055	47.6	VA1T	32.4	0	-38.41	41.59	54	-12.41	-	-	26	300	V
2	2554.125	62.72	Pk	32.4	0	-38.43	56.69	-	-	74	-17.31	26	300	V

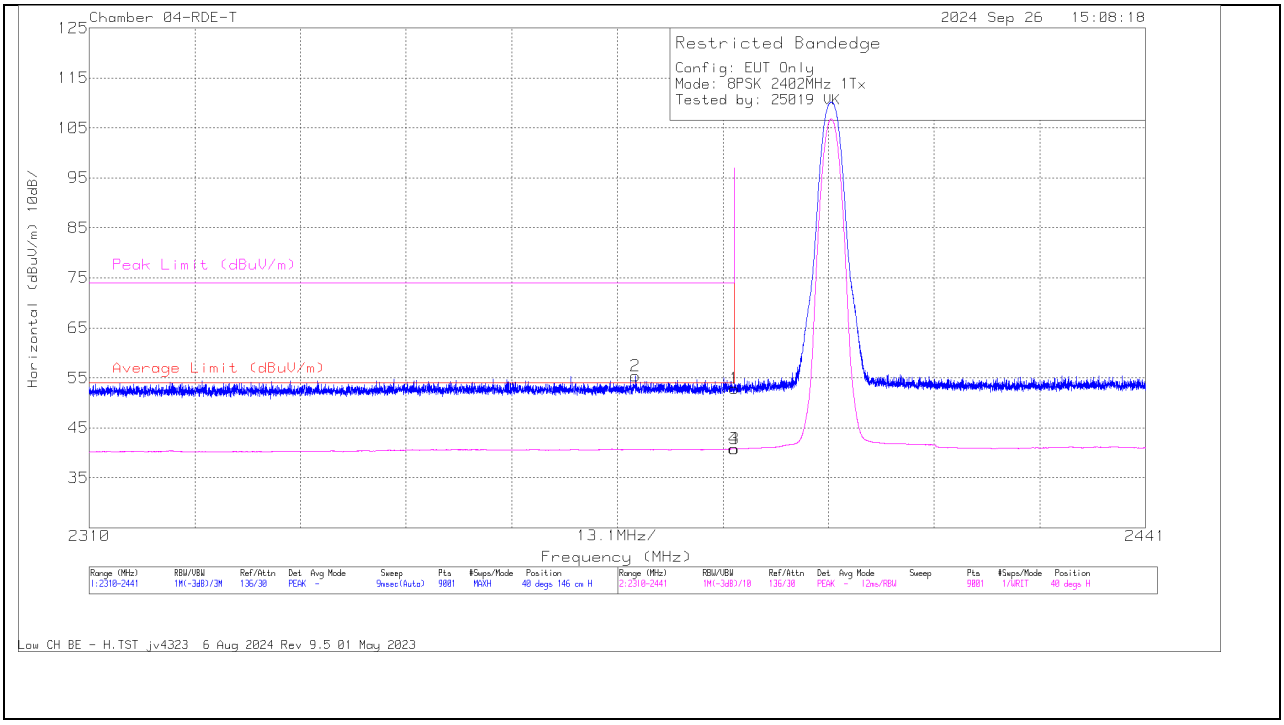
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

10.1.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

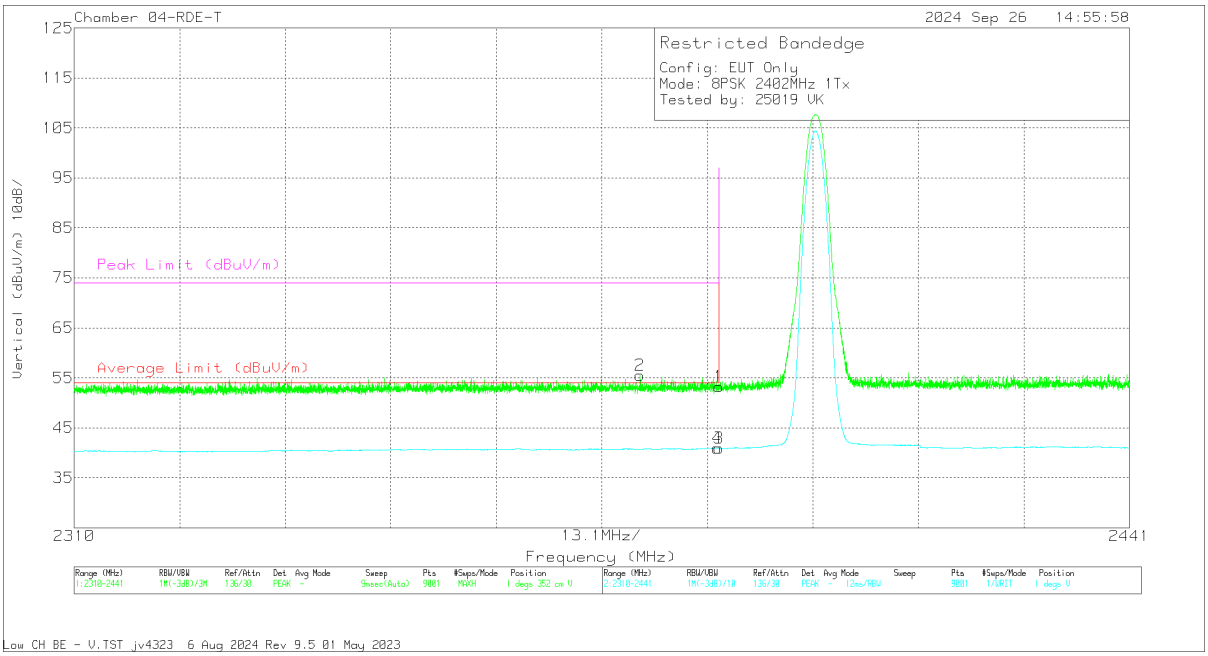
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	59.88	Pk	32	-39.05	52.83	-	-	74	-21.17	40	146	H
2	* 2377.758	62.39	Pk	32	-38.99	55.4	-	-	74	-18.6	40	146	H
3	* 2390	47.87	VA1T	32	-39.05	40.82	54	-13.18	-	-	40	146	H
4	* 2389.956	47.89	VA1T	32	-39.05	40.84	54	-13.16	-	-	40	146	H

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

VERTICAL RESULT

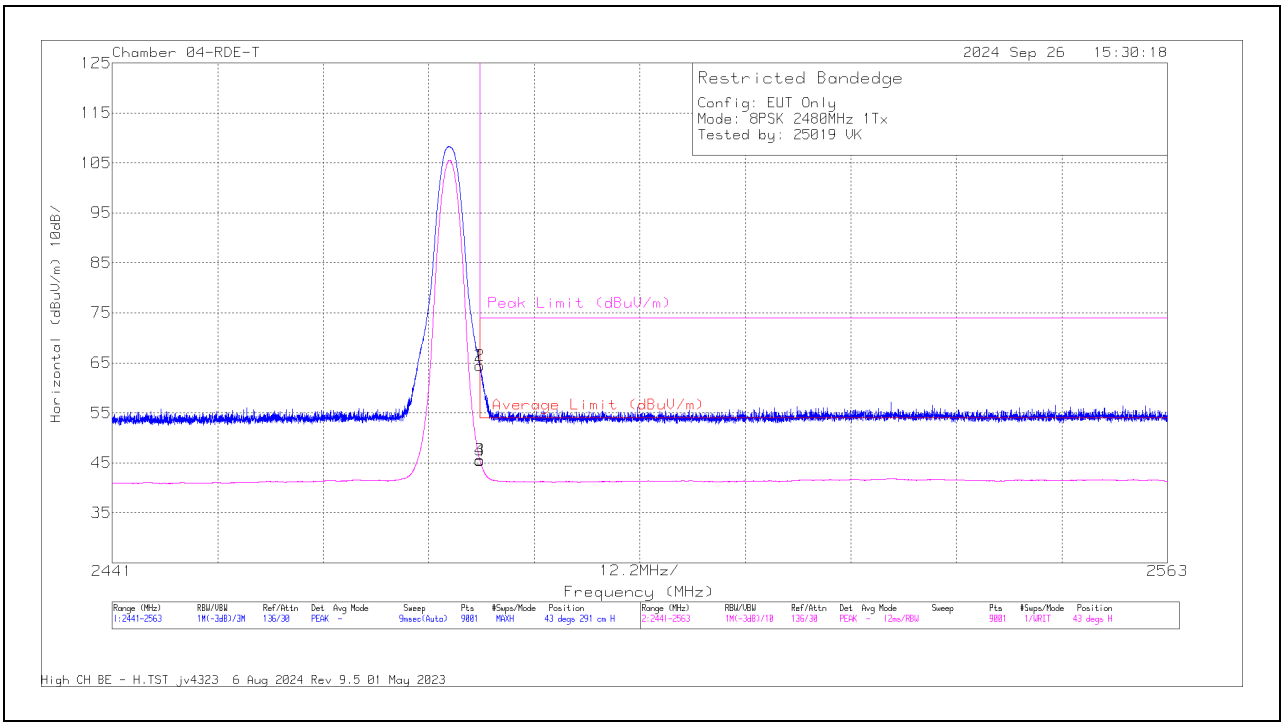


Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.34	Pk	32	-39.05	53.29	-	-	74	-20.71	1	352	V
2	* 2380.262	62.5	Pk	32	-38.99	55.51	-	-	74	-18.49	1	352	V
3	* 2390	47.97	VA1T	32	-39.05	40.92	54	-13.08	-	-	1	352	V
4	* 2389.84	48	VA1T	32	-39.05	40.95	54	-13.05	-	-	1	352	V

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

BANDEDGE (HIGH CHANNEL)

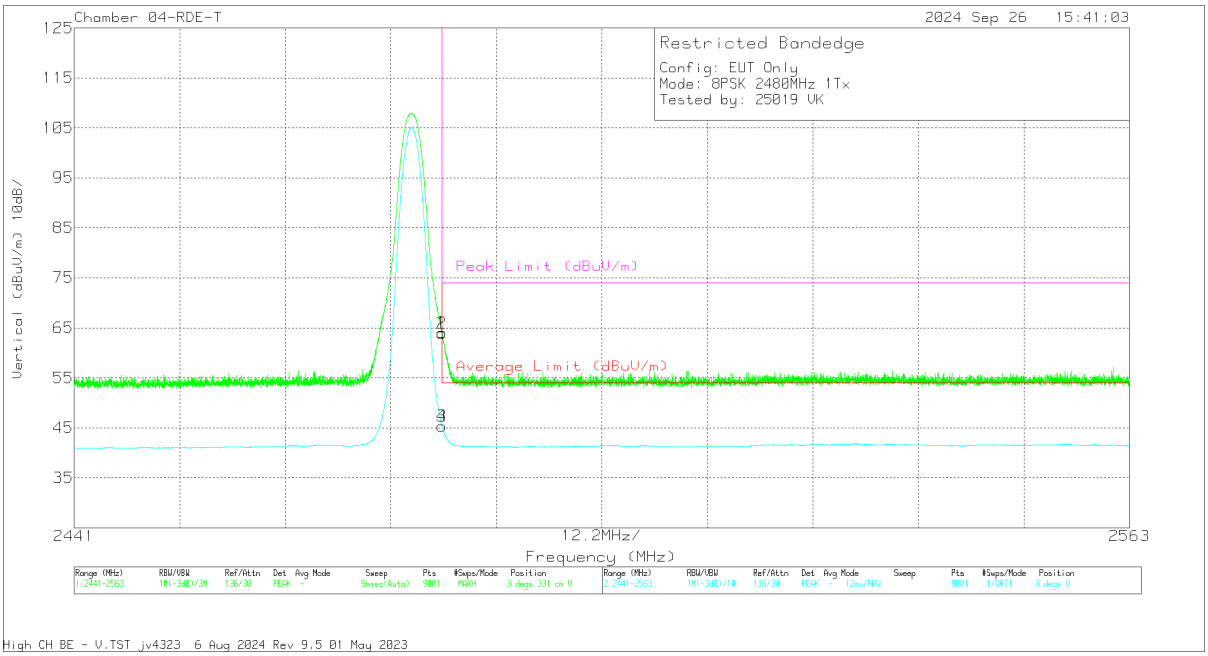
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	71.05	Pk	32.2	-38.87	64.38	-	-	74	-9.62	43	291	H
2	* 2483.539	71.07	Pk	32.2	-38.87	64.4	-	-	74	-9.6	43	291	H
3	* 2483.5	52.22	VA1T	32.2	-38.87	45.55	54	-8.45	-	-	43	291	H
4	* 2483.512	52.17	VA1T	32.2	-38.87	45.5	54	-8.5	-	-	43	291	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	70.75	Pk	32.2	-38.87	64.08	-	-	74	-9.92	3	331	V
2	* 2483.539	70.63	Pk	32.2	-38.87	63.96	-	-	74	-10.04	3	331	V
3	* 2483.5	52.03	VA1T	32.2	-38.87	45.36	54	-8.64	-	-	3	331	V
4	* 2483.512	51.98	VA1T	32.2	-38.87	45.31	54	-8.69	-	-	3	331	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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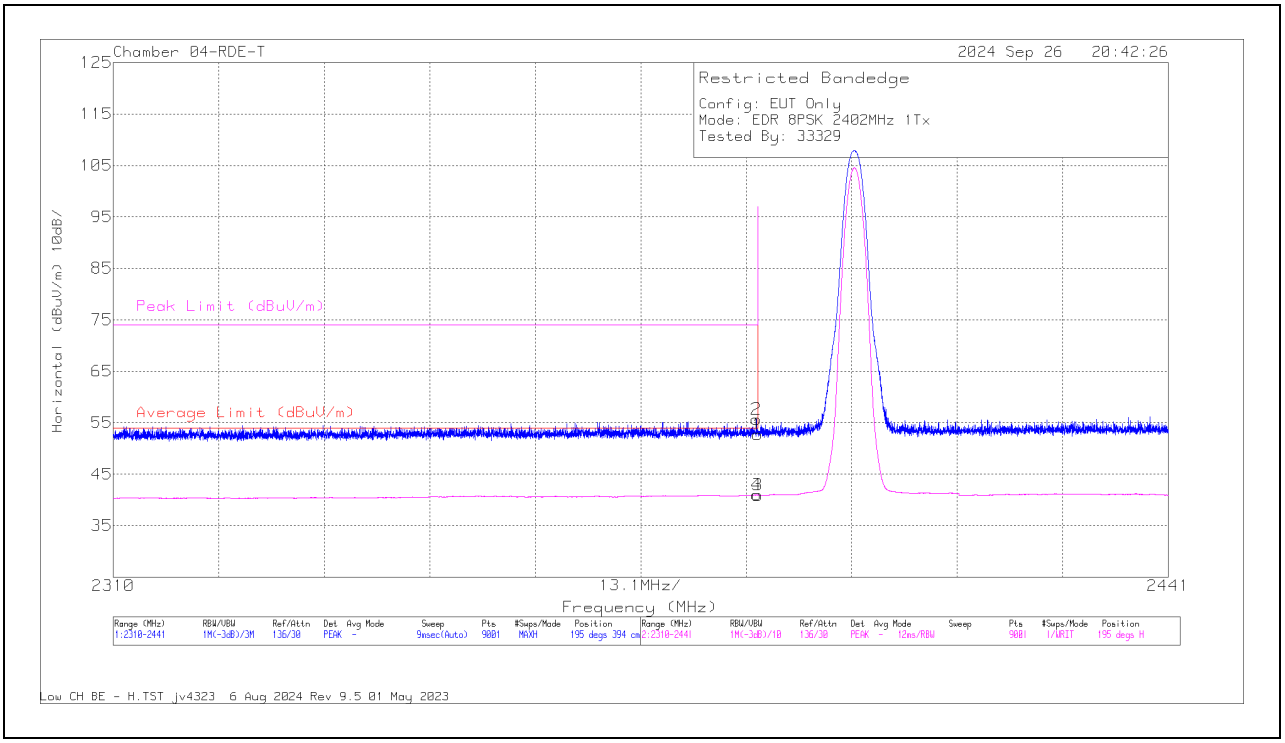
ANT 3

BANDEDGE (LOW CHANNEL)

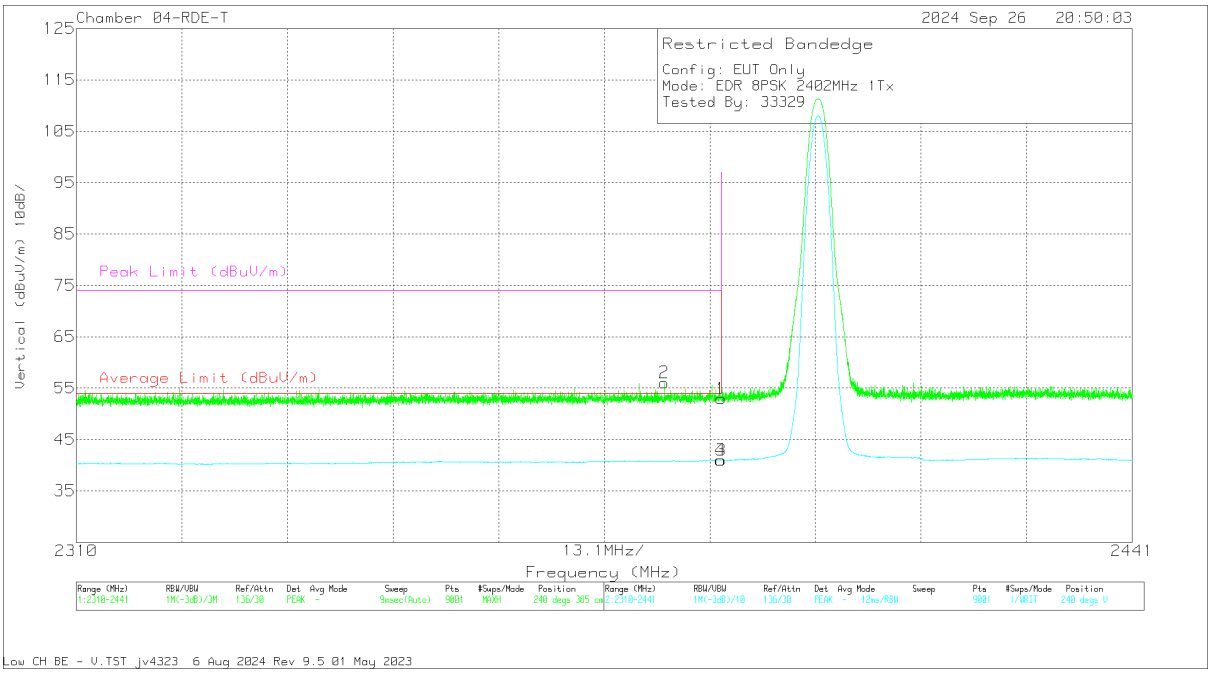
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	59.76	Pk	32	0	-39.05	52.71	-	-	74	-21.29	195	394	H
2	* 2389.854	62.72	Pk	32	0	-39.05	55.67	-	-	74	-18.33	195	394	H
3	* 2390	47.99	VA1T	32	0	-39.05	40.94	54	-13.06	-	-	195	394	H
4	* 2389.869	48.02	VA1T	32	0	-39.05	40.97	54	-13.03	-	-	195	394	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.02	Pk	32	0	-39.05	52.97	-	-	74	-21.03	240	385	V
2	* 2382.94	63.03	Pk	32	0	-38.96	56.07	-	-	74	-17.93	240	385	V
3	* 2390	48.04	VA1T	32	0	-39.05	40.99	54	-13.01	-	-	240	385	V
4	* 2389.927	48.07	VA1T	32	0	-39.05	41.02	54	-12.98	-	-	240	385	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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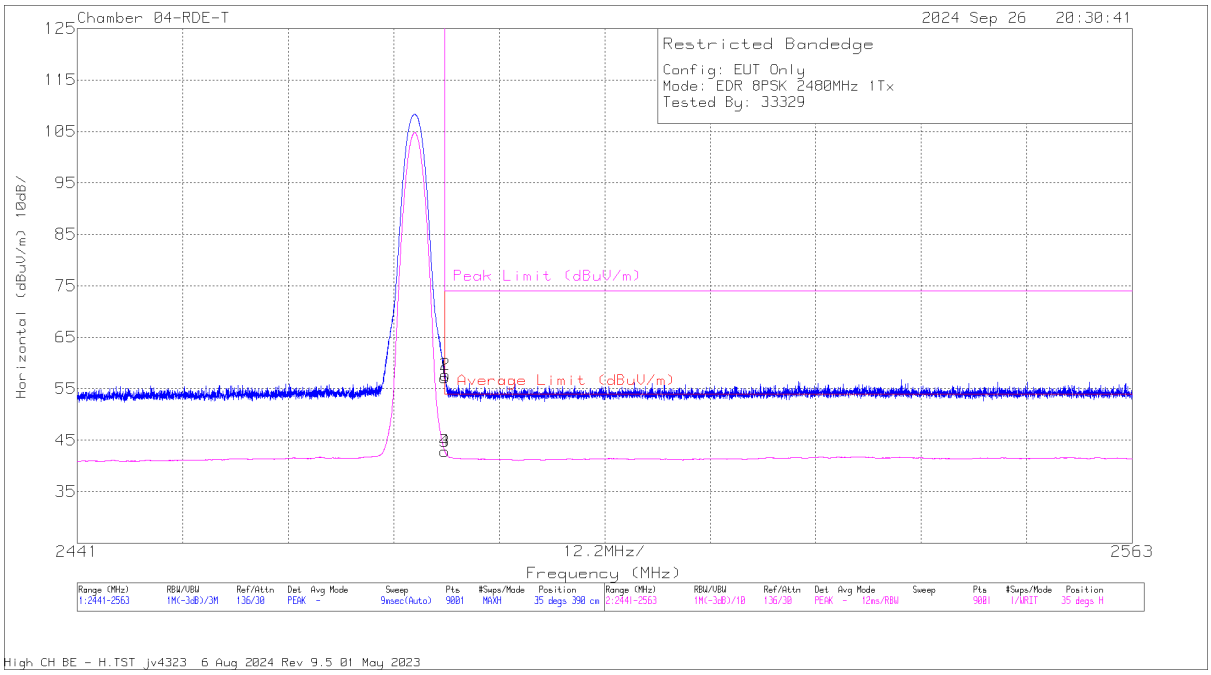
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

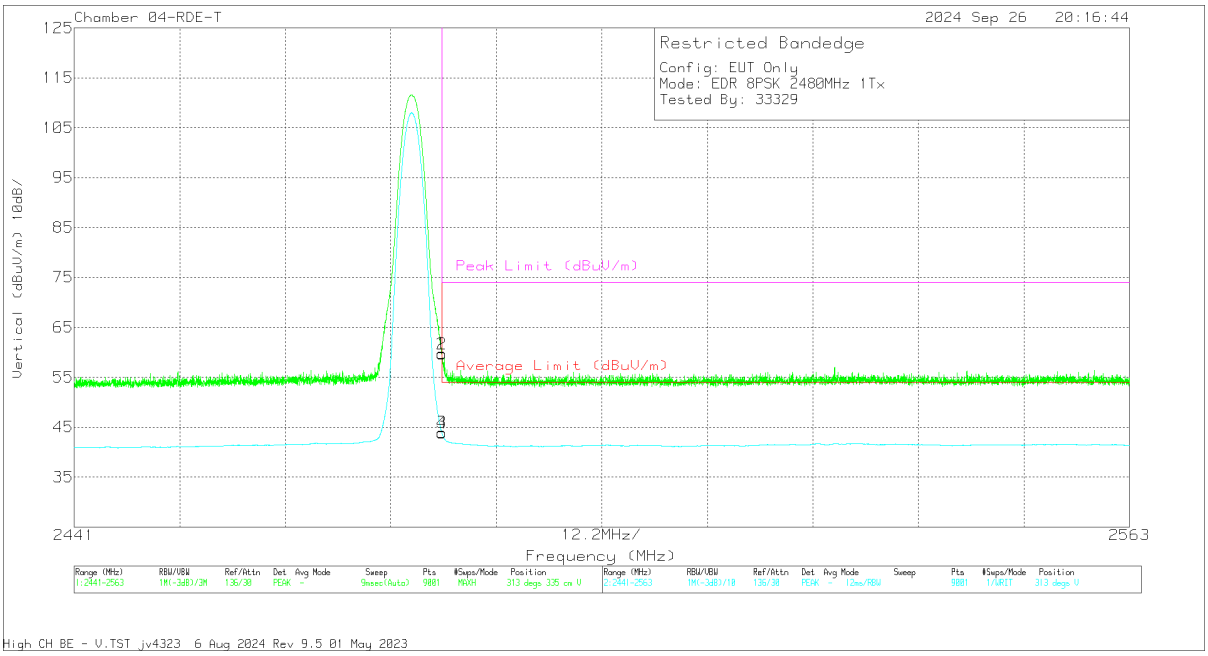


Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	63.82	Pk	32.2	0	-38.87	57.15	-	-	74	-16.85	35	390	H
2	* 2483.552	64.36	Pk	32.2	0	-38.87	57.69	-	-	74	-16.31	35	390	H
3	* 2483.5	49.5	VA1T	32.2	0	-38.87	42.83	54	-11.17	-	-	35	390	H
4	* 2483.512	49.47	VA1T	32.2	0	-38.87	42.8	54	-11.2	-	-	35	390	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

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

VERTICAL RESULT



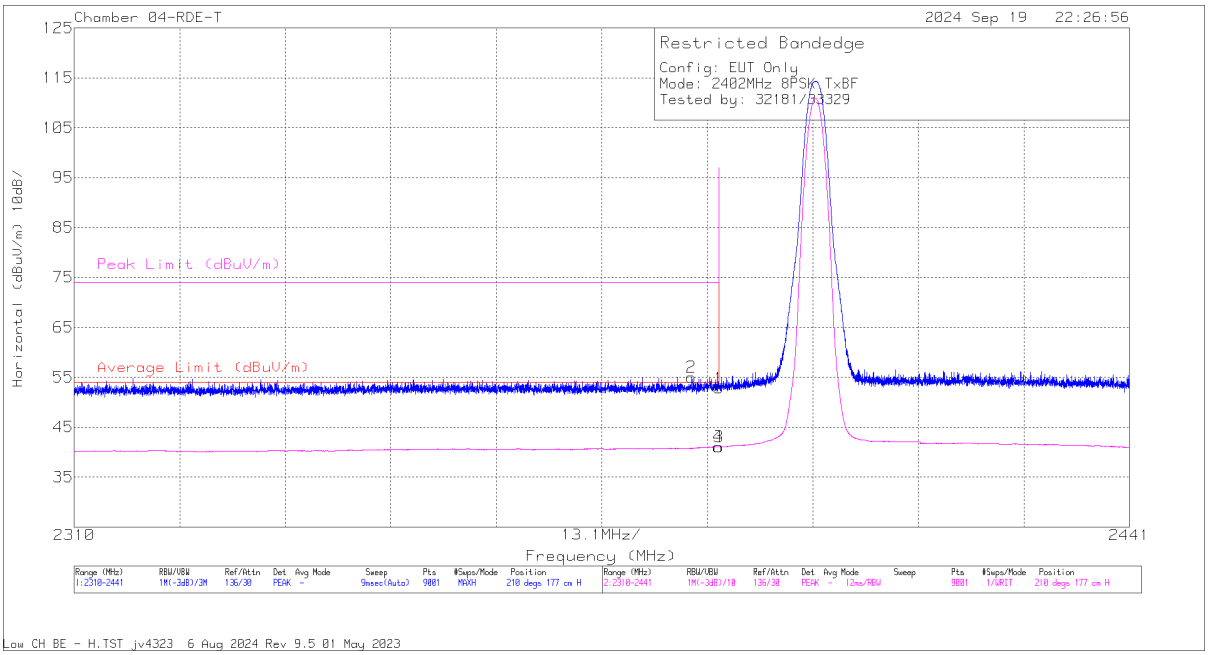
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	66.49	Pk	32.2	0	-38.87	59.82	-	-	74	-14.18	313	335	V
2	* 2483.512	66.37	Pk	32.2	0	-38.87	59.7	-	-	74	-14.3	313	335	V
3	* 2483.5	50.6	VA1T	32.2	0	-38.87	43.93	54	-10.07	-	-	313	335	V
4	* 2483.512	50.55	VA1T	32.2	0	-38.87	43.88	54	-10.12	-	-	313	335	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

10.1.4. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

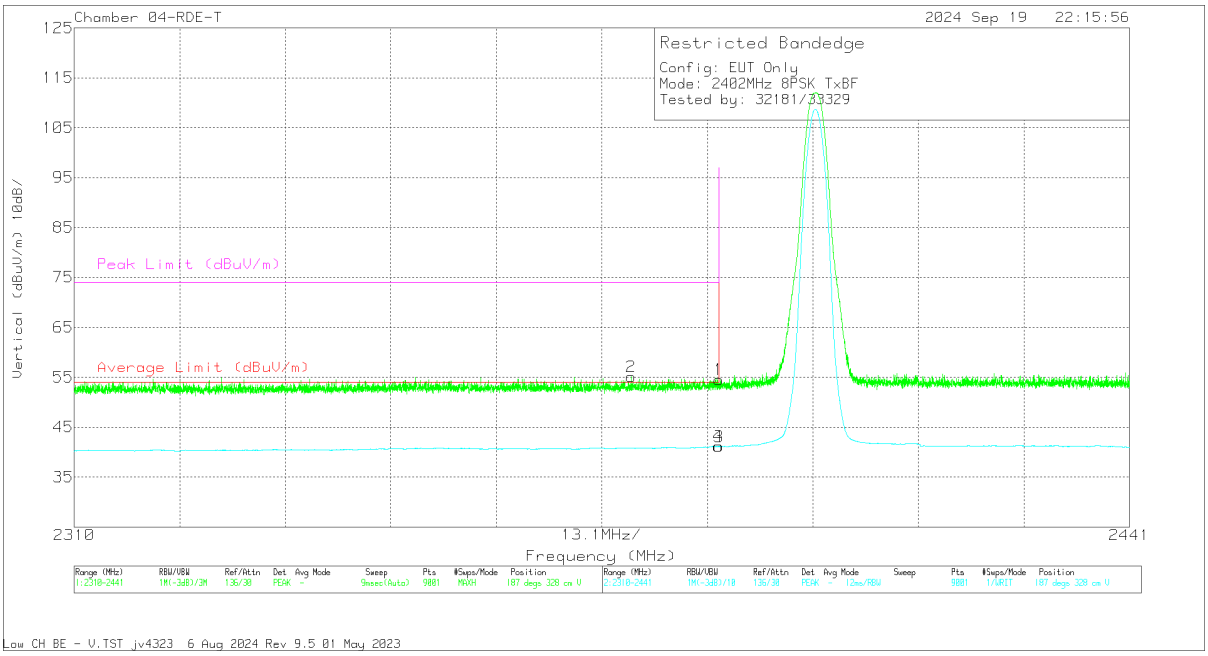
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	59.88	Pk	32	0	-39.05	52.83	-	-	74	-21.17	210	177	H
2	* 2386.637	62.13	Pk	32	0	-39.11	55.02	-	-	74	-18.98	210	177	H
3	* 2390	48.15	VA1T	32	0	-39.05	41.1	54	-12.9	-	-	210	177	H
4	* 2389.985	48.16	VA1T	32	0	-39.05	41.11	54	-12.89	-	-	210	177	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	61.61	Pk	32	0	-39.05	54.56	-	-	74	-19.44	187	328	V
2	* 2379.17	62.07	Pk	32	0	-38.98	55.09	-	-	74	-18.91	187	328	V
3	* 2390	48.18	VA1T	32	0	-39.05	41.13	54	-12.87	-	-	187	328	V
4	* 2389.985	48.19	VA1T	32	0	-39.05	41.14	54	-12.86	-	-	187	328	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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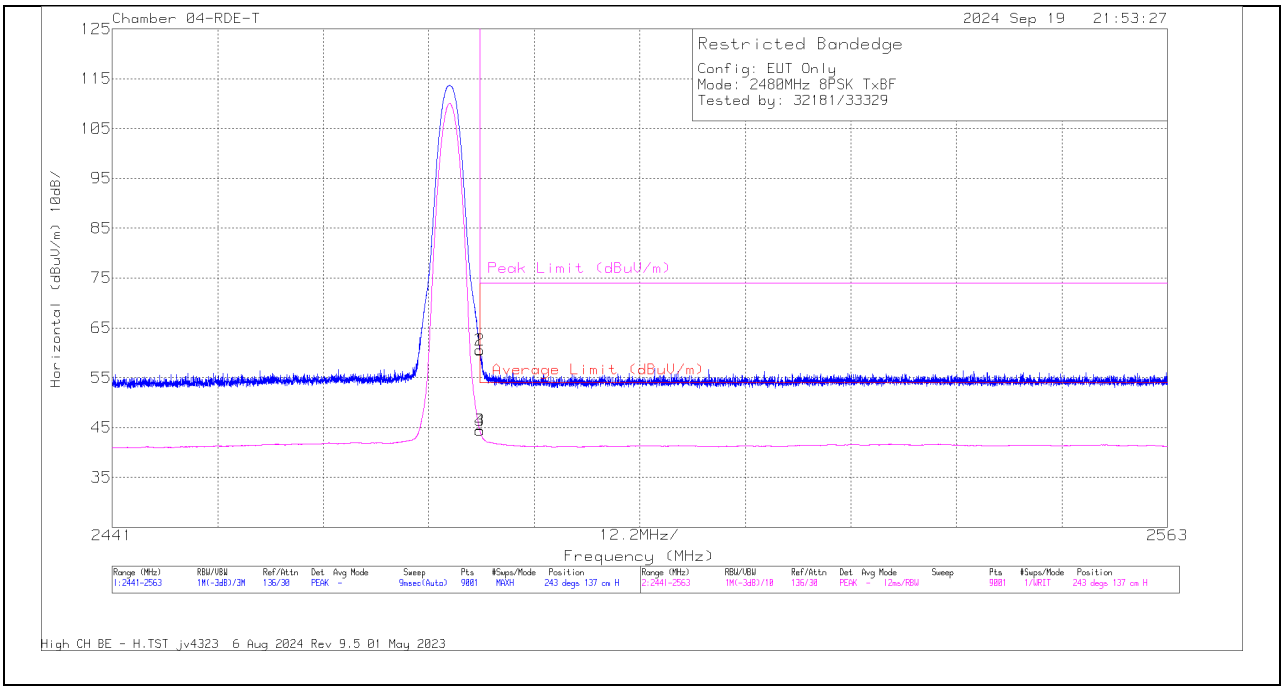
BANDEDGE (HIGH CHANNEL)

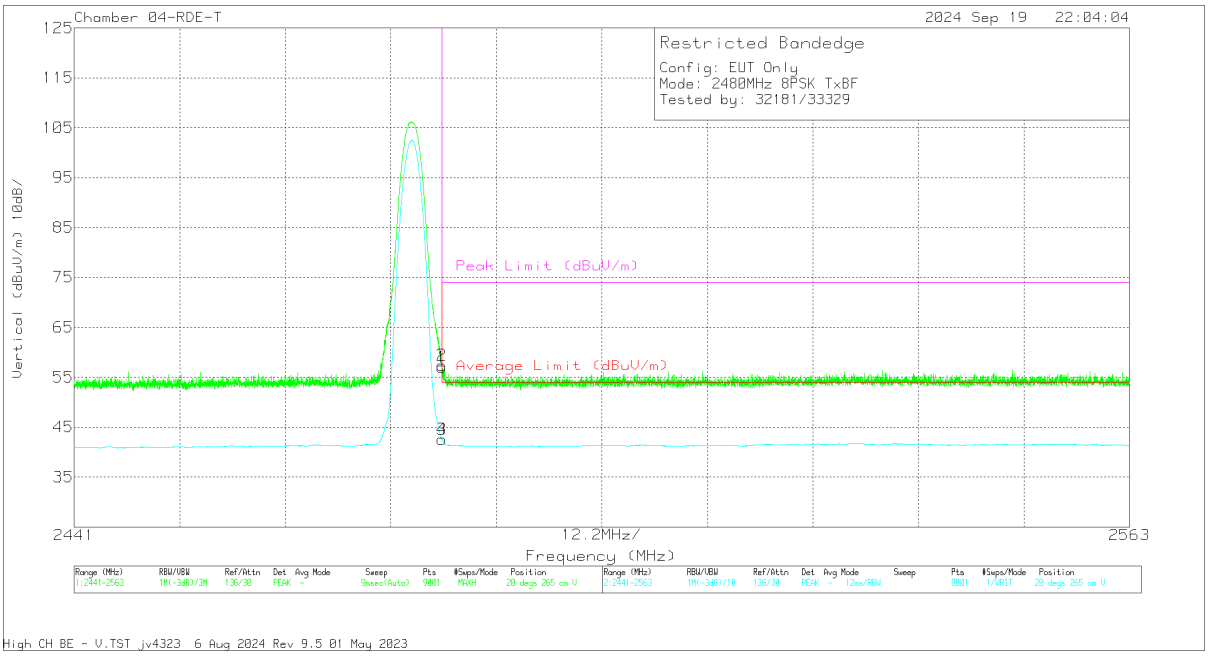
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	67.27	Pk	32.2	0	-38.87	60.6	-	-	74	-13.4	243	137	H
2	* 2483.525	67.19	Pk	32.2	0	-38.87	60.52	-	-	74	-13.48	243	137	H
3	* 2483.5	51.12	VA1T	32.2	0	-38.87	44.45	54	-9.55	-	-	243	137	H
4	* 2483.512	51.06	VA1T	32.2	0	-38.87	44.39	54	-9.61	-	-	243	137	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	63.71	Pk	32.2	-38.87	57.04	-	-	74	-16.96	20	265	V
2	* 2483.512	64.04	Pk	32.2	-38.87	57.37	-	-	74	-16.63	20	265	V
3	* 2483.5	49.27	VA1T	32.2	-38.87	42.6	54	-11.4	-	-	20	265	V
4	* 2483.512	49.24	VA1T	32.2	-38.87	42.57	54	-11.43	-	-	20	265	V

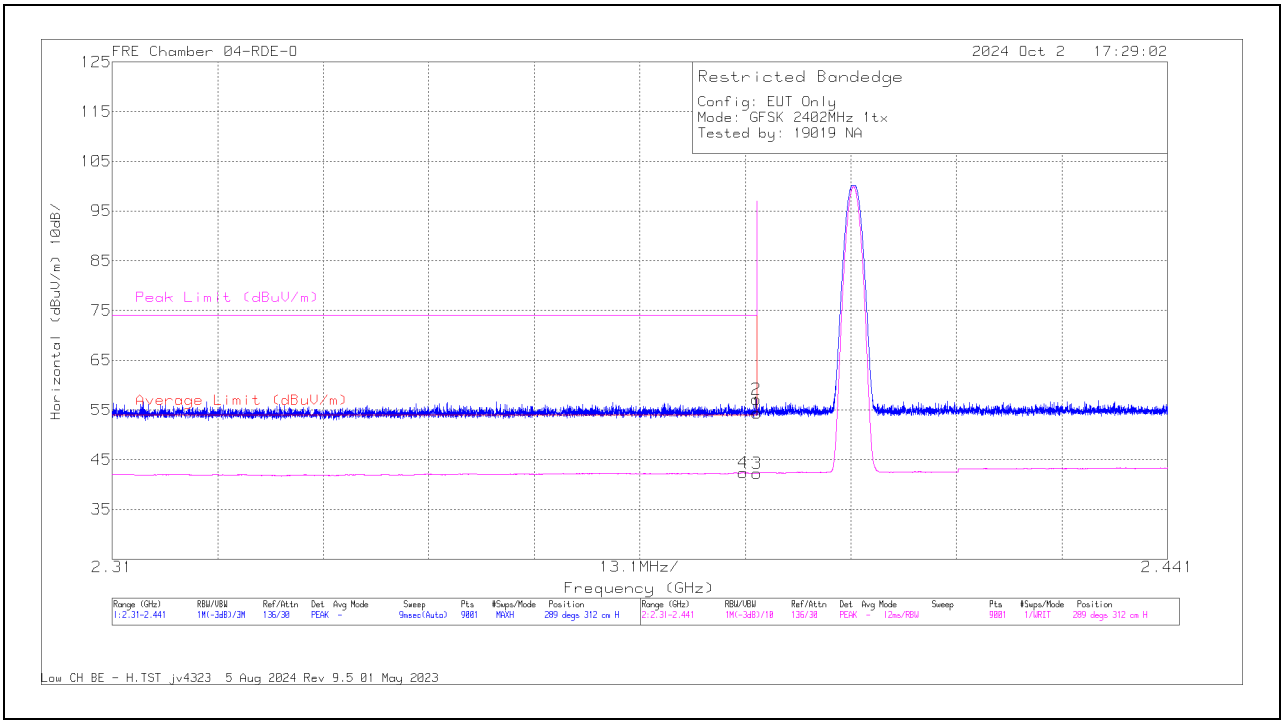
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

10.1.5. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

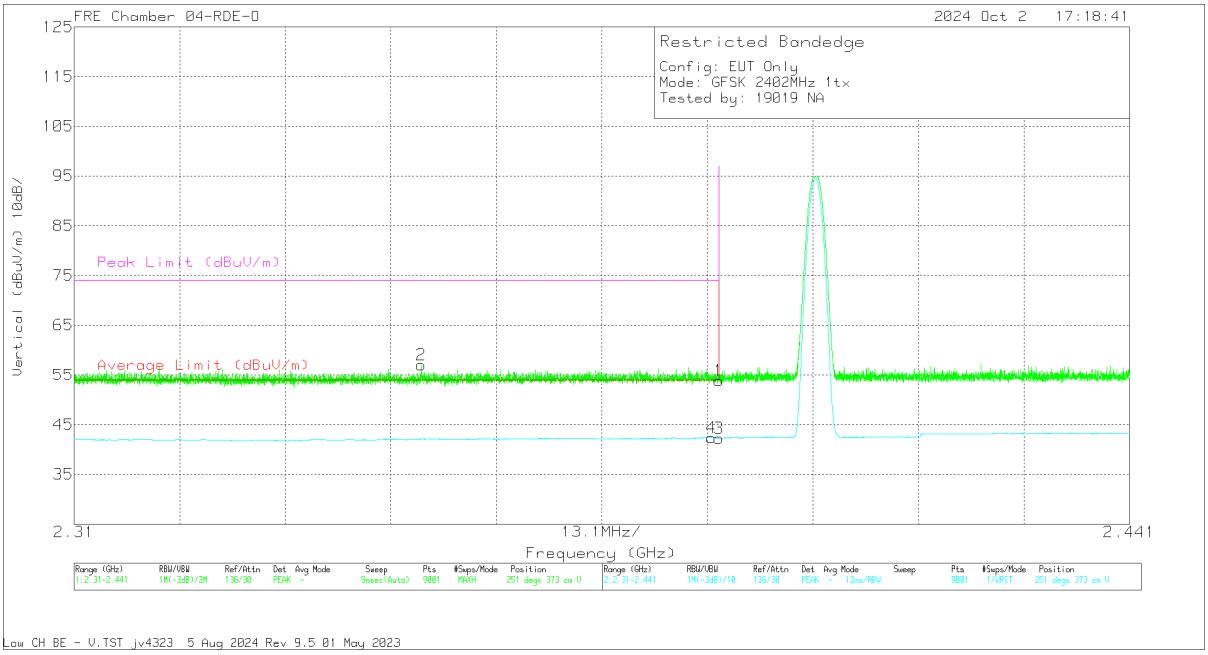
HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.388297	47.75	VA1T	32.1	-37.5	42.35	54	-11.65	-	-	289	312	H
2	2.389927	62.67	Pk	32.1	-37.59	57.18	-	-	74	-16.82	289	312	H
1	2.39	59.84	Pk	32.1	-37.6	54.34	-	-	74	-19.66	289	312	H
3	2.39	47.75	VA1T	32.1	-37.6	42.25	54	-11.75	-	-	289	312	H

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.353115	62.47	Pk	31.9	-37.4	56.97	-	-	74	-17.03	251	373	V
4	2.389083	47.79	VA1T	32.1	-37.51	42.38	54	-11.62	-	-	251	373	V
1	2.39	59.35	Pk	32.1	-37.6	53.85	-	-	74	-20.15	251	373	V
3	2.39	47.75	VA1T	32.1	-37.6	42.25	54	-11.75	-	-	251	373	V

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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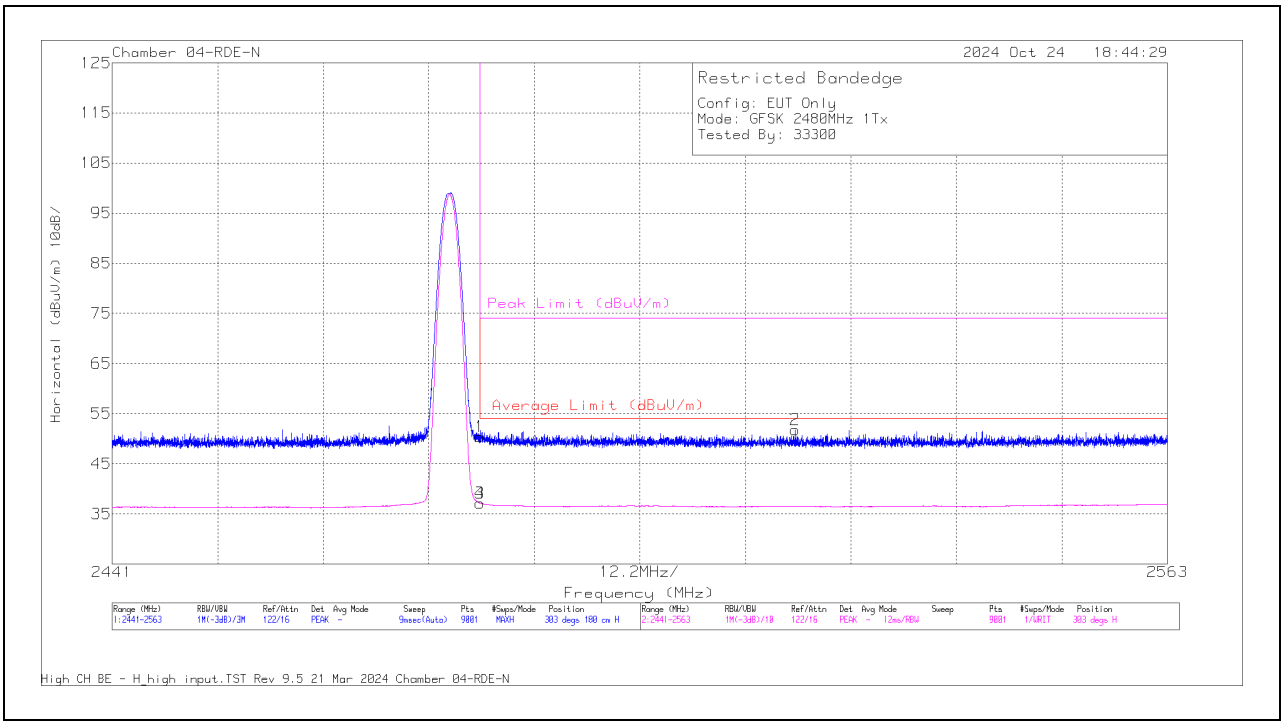
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2483.5	45.25	Pk	32.2	-27	50.45	-	-	74	-23.55	303	180	H
3	2483.5	31.95	VA1T	32.2	-27	37.15	54	-16.85	-	-	303	180	H
4	2483.512	31.94	VA1T	32.2	-27	37.14	54	-16.86	-	-	303	180	H
2	2519.937	46.46	Pk	32.2	-26.86	51.8	-	-	74	-22.2	303	180	H

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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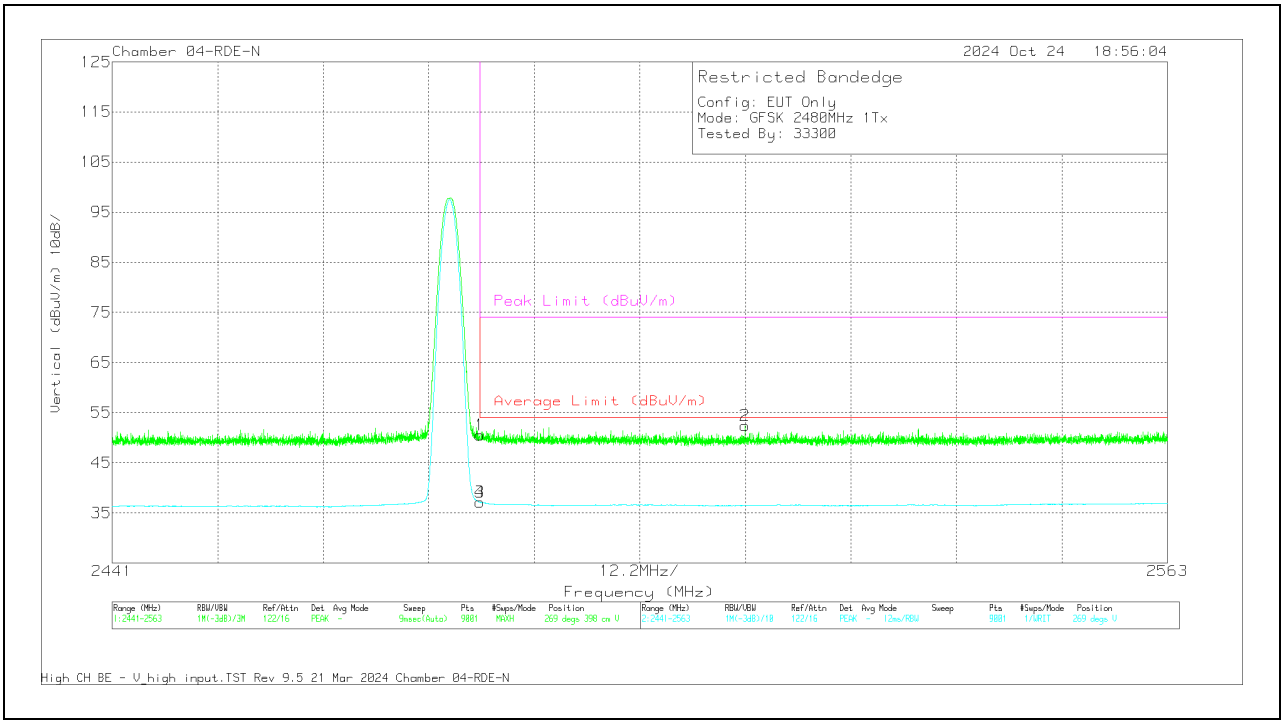
VERTICAL RESULT



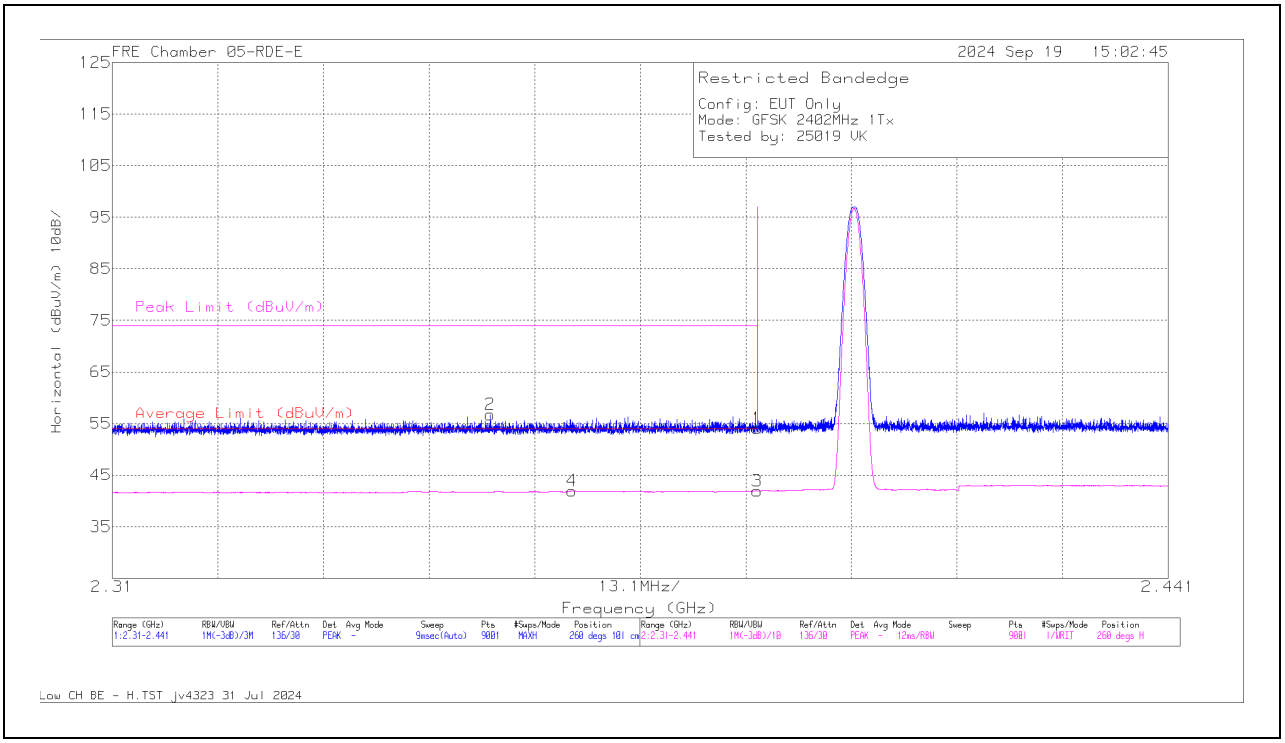
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	223083 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2483.5	45.35	Pk	32.2	-27	50.55	-	-	74	-23.45	269	398	V
3	2483.5	31.97	VA1T	32.2	-27	37.17	54	-16.83	-	-	269	398	V
4	2483.512	31.96	VA1T	32.2	-27	37.16	54	-16.84	-	-	269	398	V
2	2514.175	47.12	Pk	32.2	-26.95	52.37	-	-	74	-21.63	269	398	V

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

ANT 3

BANDEDGE (LOW CHANNEL)

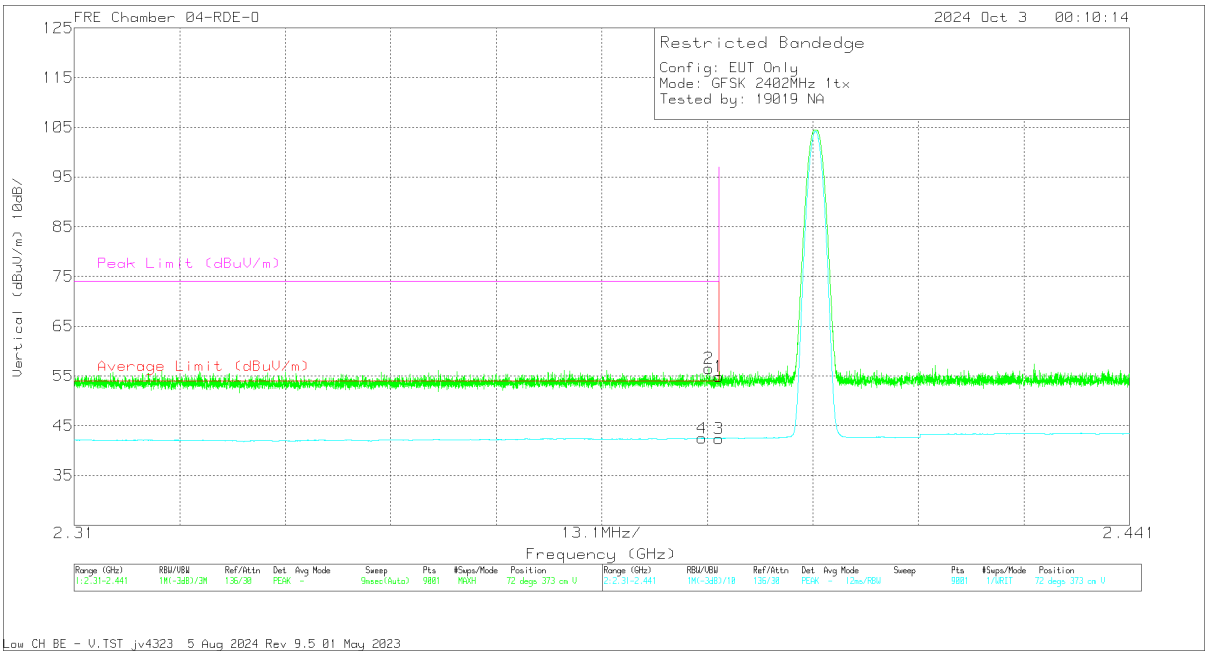
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80404 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	60.18	Pk	32	-38.1	54.08	-	-	74	-19.92	260	101	H
2	* 2.356899	62.92	Pk	31.9	-38.1	56.72	-	-	74	-17.28	260	101	H
3	* 2.39	47.99	VA1T	32	-38.1	41.89	54	-12.11	-	-	260	101	H
4	* 2.367045	47.93	VA1T	32	-38	41.93	54	-12.07	-	-	260	101	H

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

VERTICAL RESULT

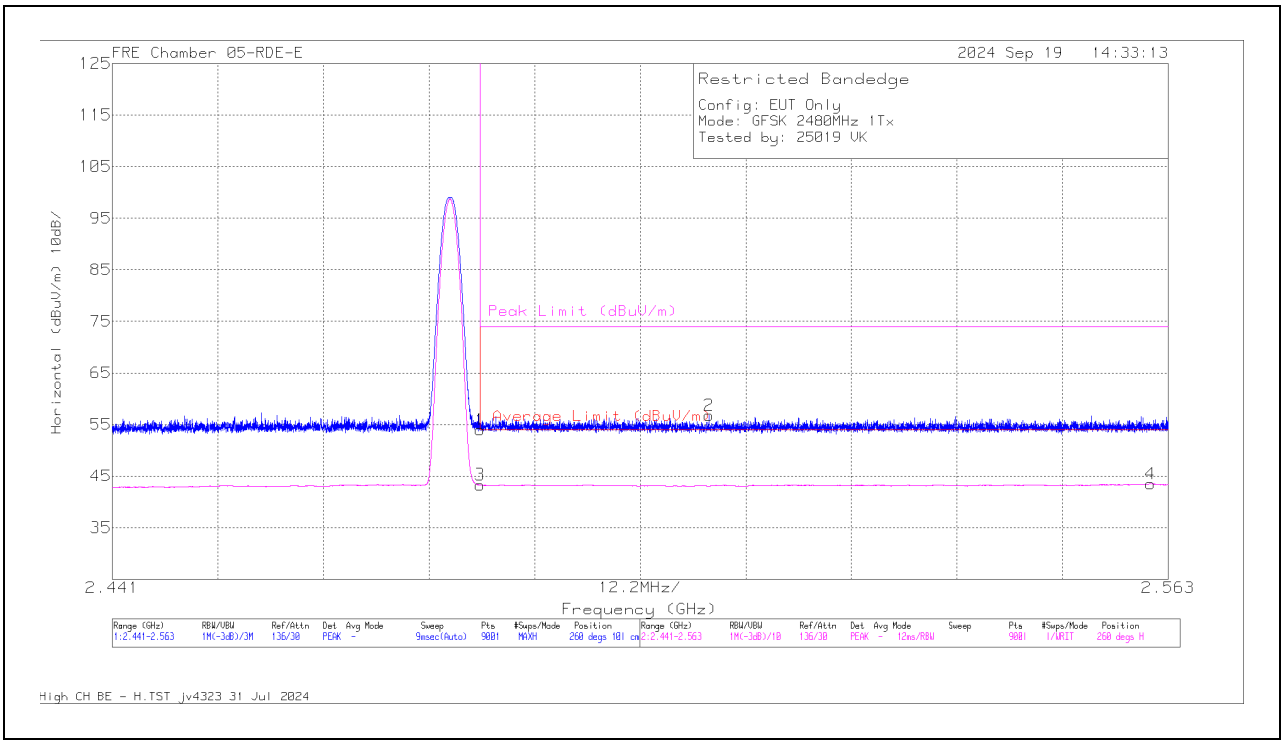


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	2.387933	47.86	VA1T	32.1	-37.5	42.46	54	-11.54	-	-	72	373	V
2	2.388806	61.9	Pk	32.1	-37.5	56.5	-	-	74	-17.5	72	373	V
1	2.39	60.33	Pk	32.1	-37.6	54.83	-	-	74	-19.17	72	373	V
3	2.39	47.9	VA1T	32.1	-37.6	42.4	54	-11.6	-	-	72	373	V

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

BANDEDGE (HIGH CHANNEL)

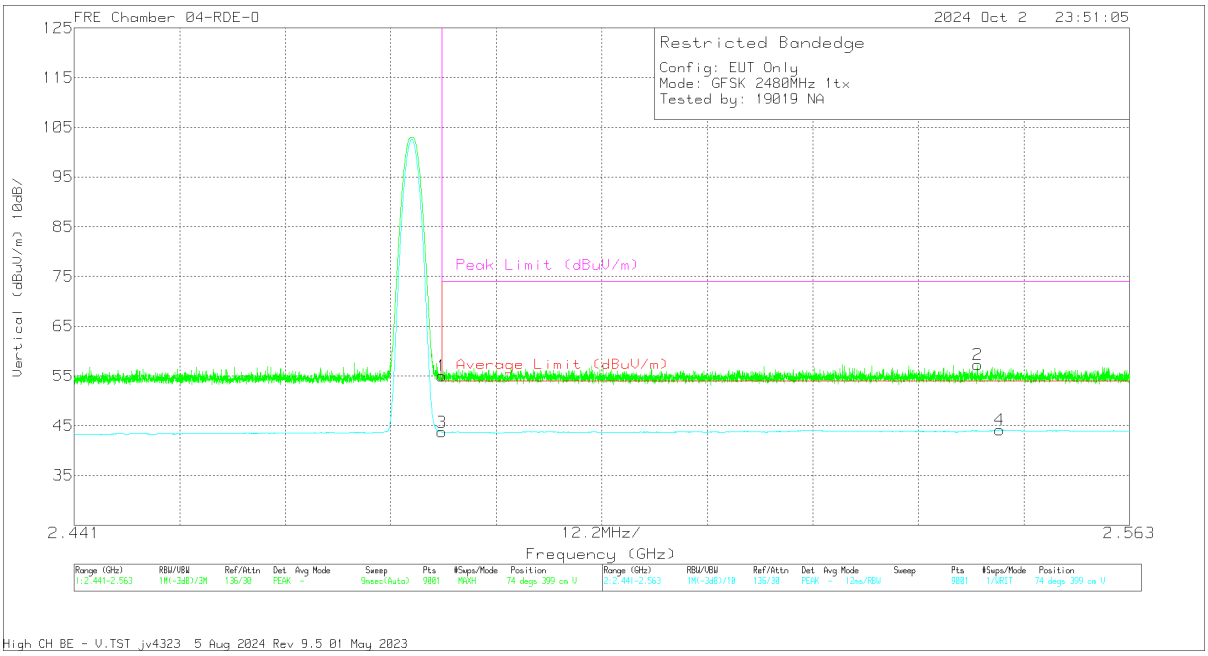
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	80404 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	59.57	Pk	32.4	-38	53.97	-	-	74	-20.03	260	101	H
3	* 2.4835	48.89	VA1T	32.4	-38	43.29	54	-10.71	-	-	260	101	H
2	2.509959	62.37	Pk	32.4	-38	56.77	-	-	74	-17.23	260	101	H
4	2.560971	48.89	VA1T	32.4	-37.8	43.49	54	-10.51	-	-	260	101	H

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

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4835	59.96	Pk	32.3	-37.3	54.96	-	-	74	-19.04	74	399	V
3	2.4835	48.71	VA1T	32.3	-37.3	43.71	54	-10.29	-	-	74	399	V
2	2.545476	61.95	Pk	32.4	-37.1	57.25	-	-	74	-16.75	74	399	V
4	2.547984	48.61	VA1T	32.4	-36.9	44.11	54	-9.89	-	-	74	399	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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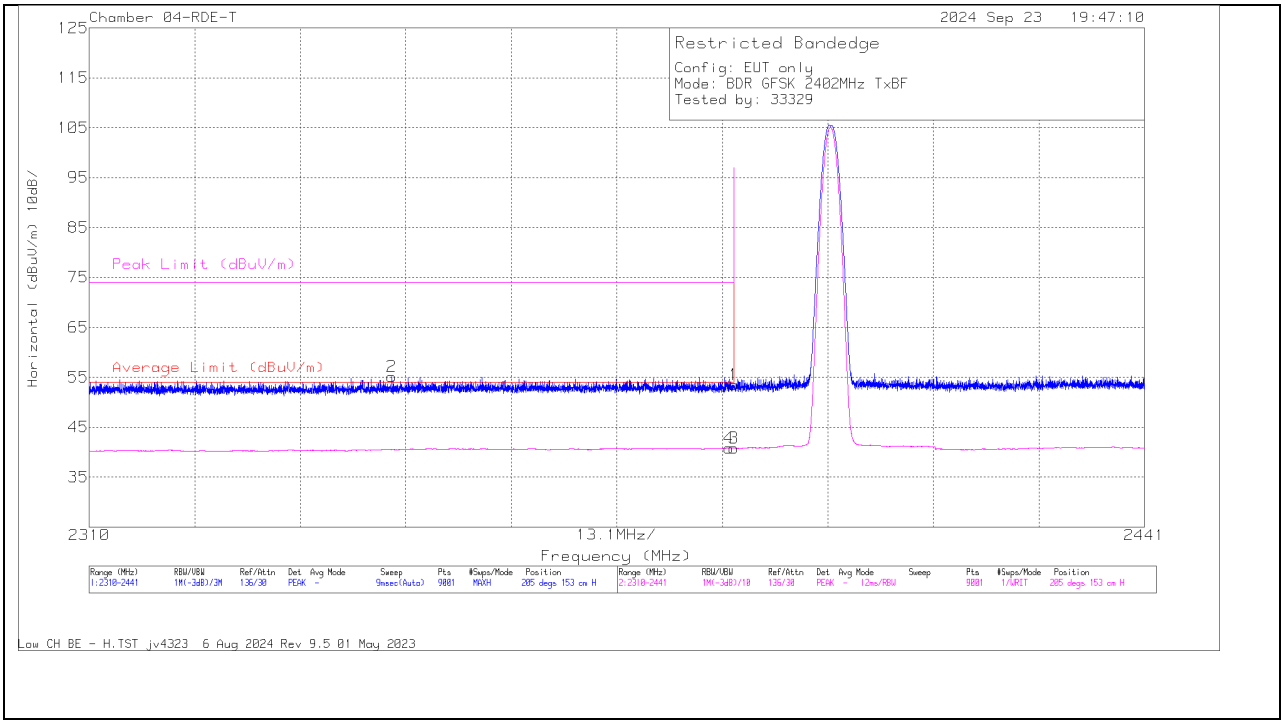
10.1.6. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

BANDEDGE (LOW CHANNEL)

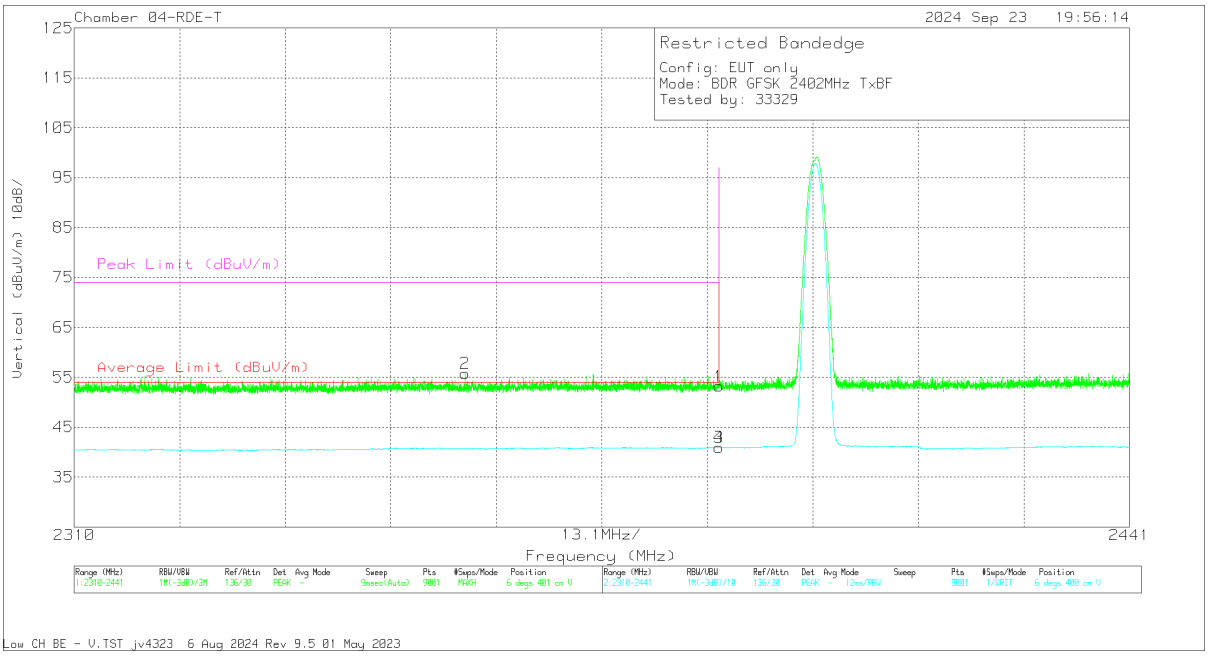
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.53	Pk	32	0	-39.05	53.48	-	-	74	-20.52	205	153	H
2	* 2347.569	62.52	Pk	31.8	0	-39.14	55.18	-	-	74	-18.82	205	153	H
3	* 2390	47.83	VA1T	32	0	-39.05	40.78	54	-13.22	-	-	205	153	H
4	* 2389.447	47.88	VA1T	32	0	-39.07	40.81	54	-13.19	-	-	205	153	H

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

VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.25	Pk	32	0	-39.05	53.2	-	-	74	-20.8	6	401	V
2	* 2358.544	63.04	Pk	31.8	0	-39.04	55.8	-	-	74	-18.2	6	401	V
3	* 2390	47.99	VA1T	32	0	-39.05	40.94	54	-13.06	-	-	6	400	V
4	* 2390	47.99	VA1T	32	0	-39.05	40.94	54	-13.06	-	-	6	400	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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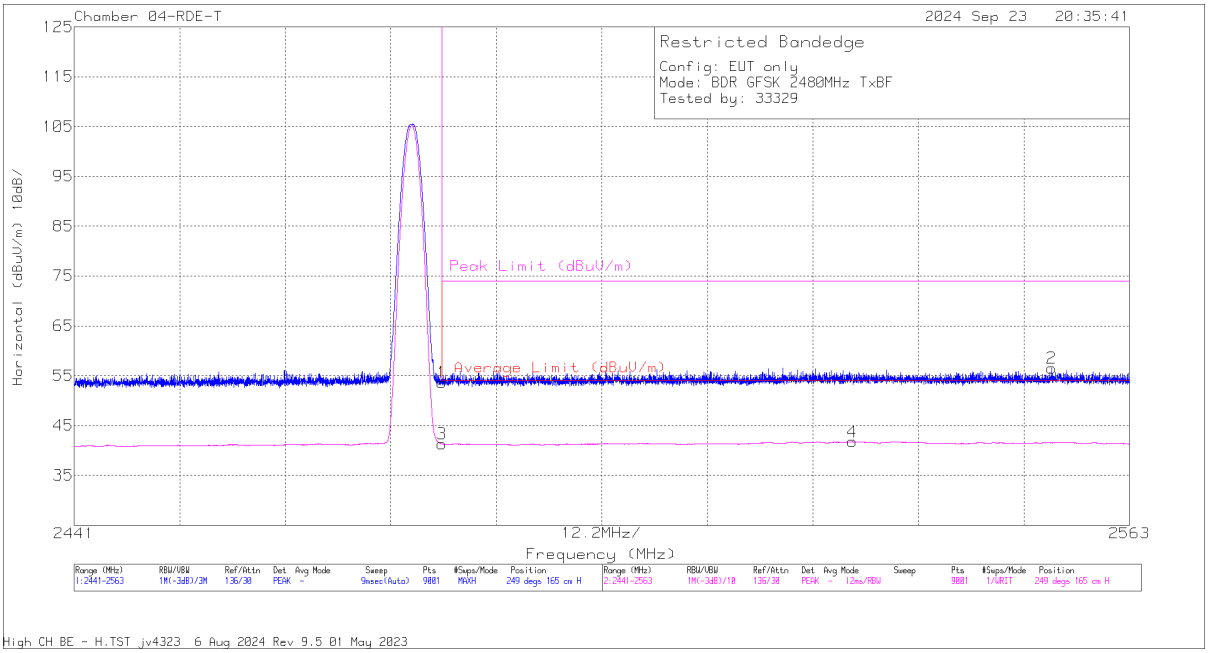
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	60.33	Pk	32.2	0	-38.87	53.66	-	-	74	-20.34	249	165	H
3	* 2483.5	47.96	VA1T	32.2	0	-38.87	41.29	54	-12.71	-	-	249	165	H
4	2530.985	47.68	VA1T	32.4	0	-38.32	41.76	54	-12.24	-	-	249	165	H
2	2554.043	62.6	Pk	32.4	0	-38.44	56.56	-	-	74	-17.44	249	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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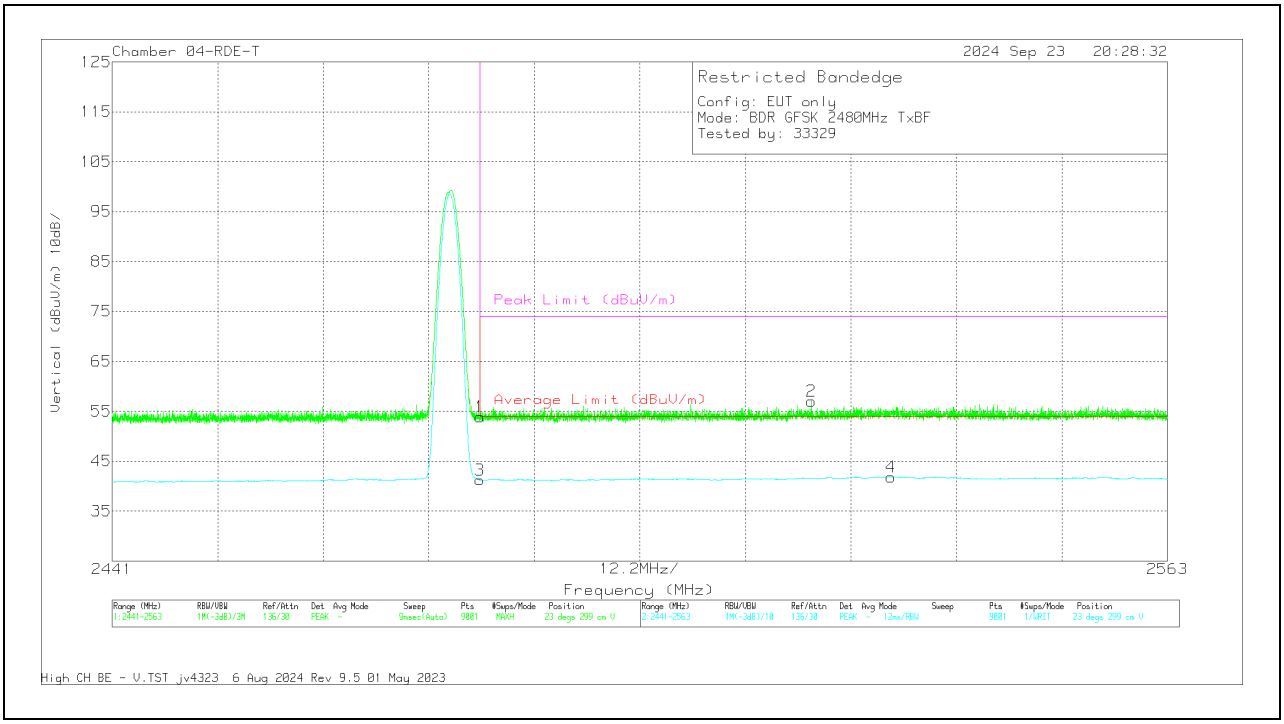
VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	60.58	Pk	32.2	0	-38.87	53.91	-	-	74	-20.09	23	299	V
3	* 2483.5	47.92	VA1T	32.2	0	-38.87	41.25	54	-12.75	-	-	23	299	V
2	2521.848	63.15	Pk	32.4	0	-38.56	56.99	-	-	74	-17.01	23	299	V
4	2531.012	47.77	VA1T	32.4	0	-38.32	41.85	54	-12.15	-	-	23	299	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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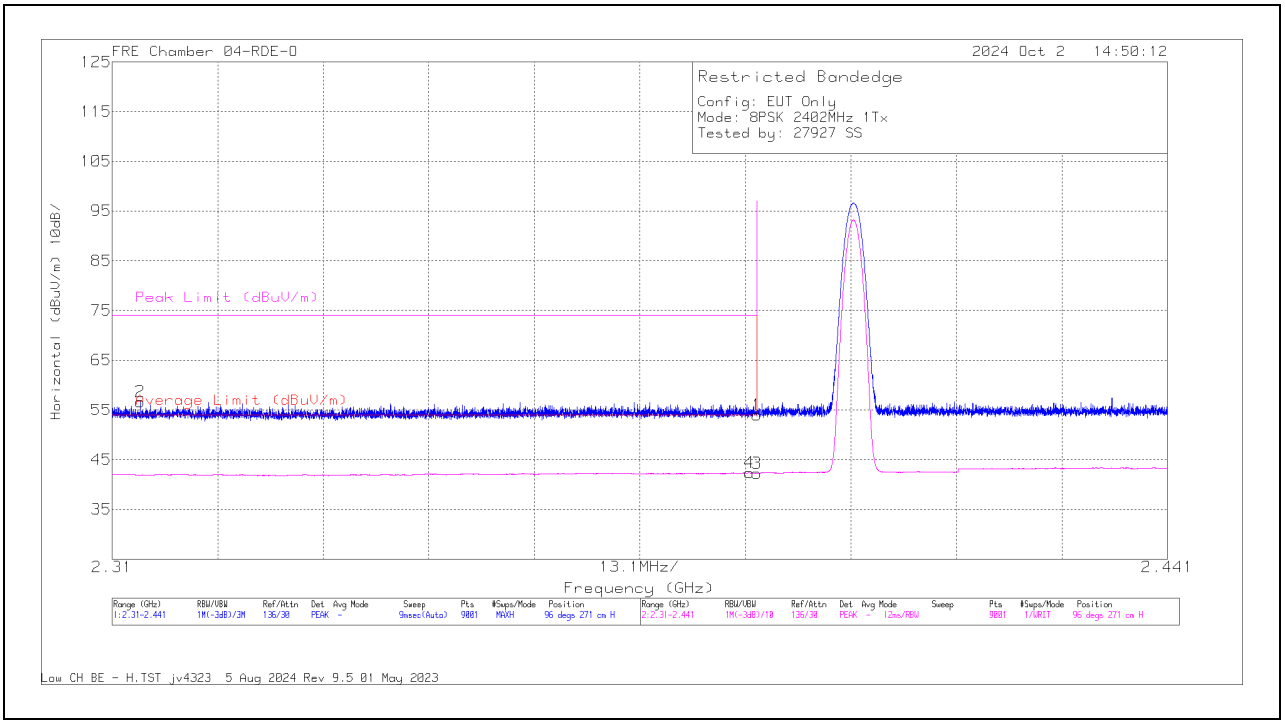
10.1.7. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

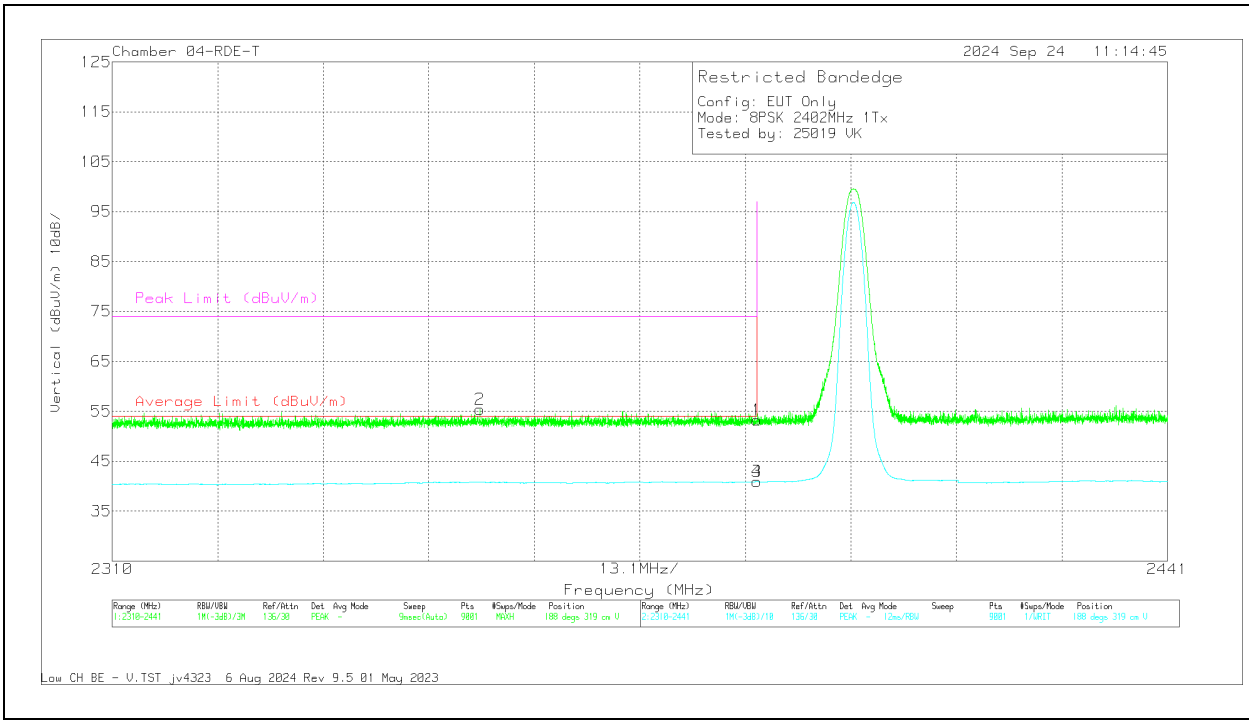
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.313479	62.32	Pk	31.8	-37.5	56.62	-	-	74	-17.38	96	271	H
4	2.389068	47.75	VA1T	32.1	-37.51	42.34	54	-11.66	-	-	96	271	H
1	2.39	59.54	Pk	32.1	-37.6	54.04	-	-	74	-19.96	96	271	H
3	2.39	47.74	VA1T	32.1	-37.6	42.24	54	-11.76	-	-	96	271	H

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT

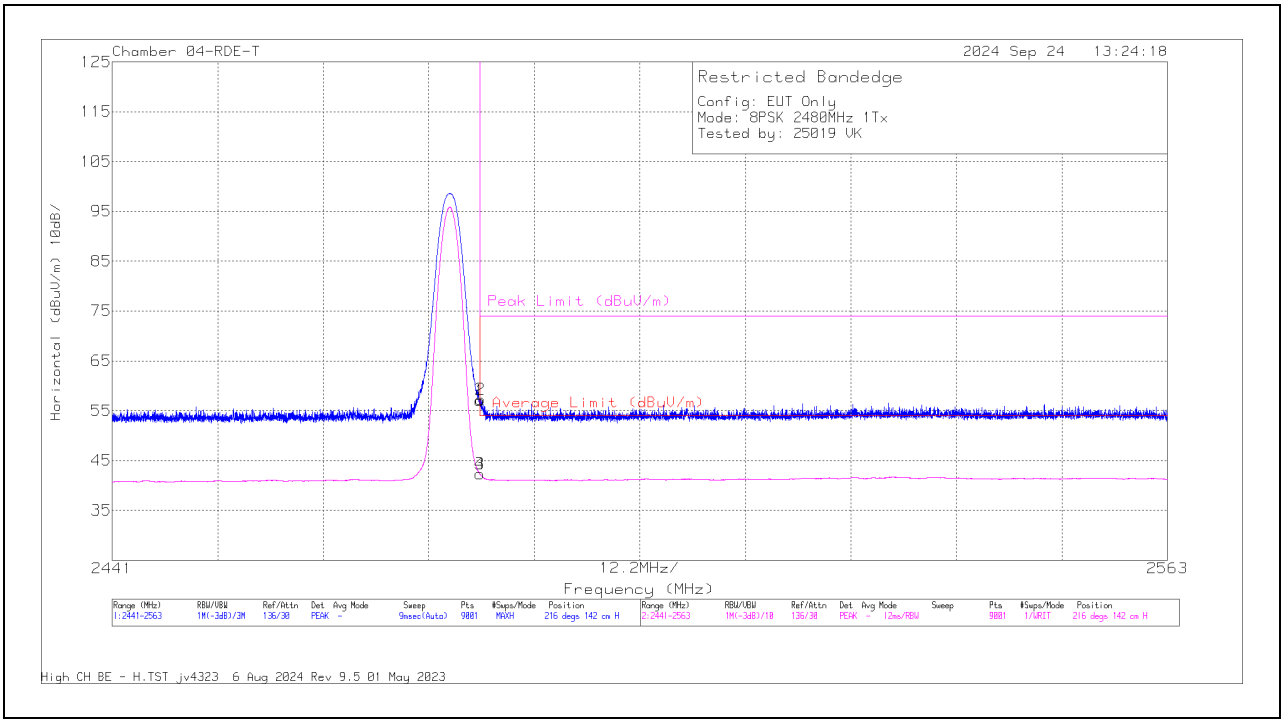


Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2390	60.28	Pk	32	-39.05	53.23	-	-	74	-20.77	188	319	V
2	* 2355.633	62.61	Pk	31.8	-39.04	55.37	-	-	74	-18.63	188	319	V
3	* 2390	47.96	VA1T	32	-39.05	40.91	54	-13.09	-	-	188	319	V
4	* 2390	47.96	VA1T	32	-39.05	40.91	54	-13.09	-	-	188	319	V

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

BANDEDGE (HIGH CHANNEL)

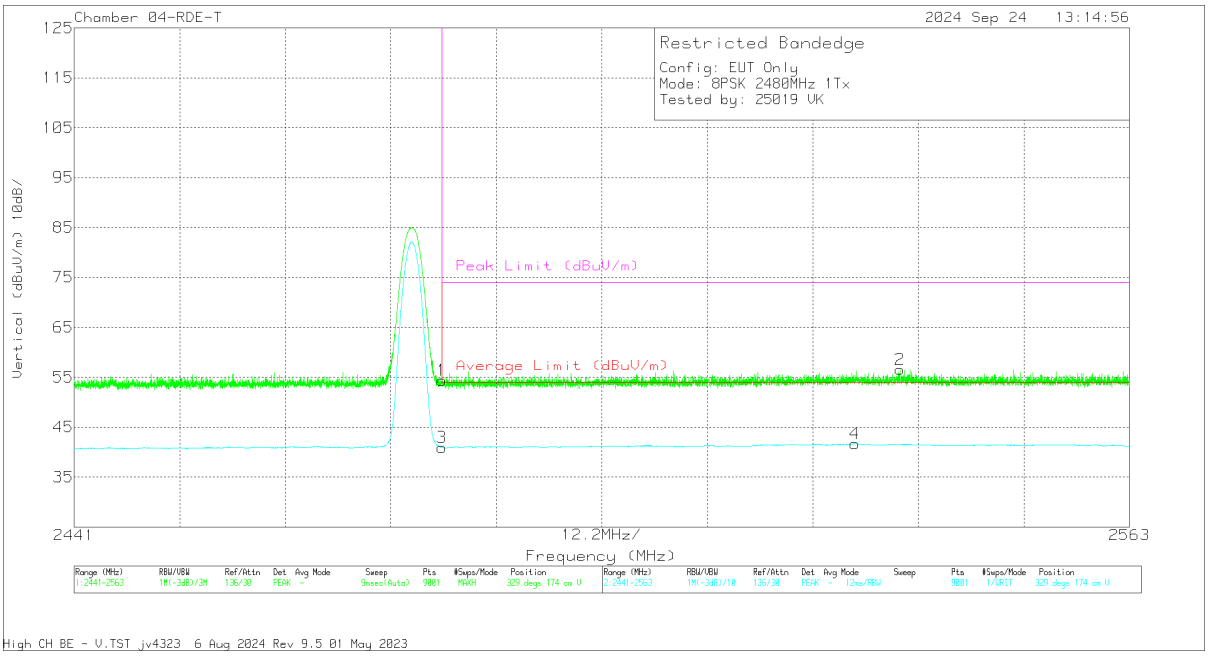
HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	63.7	Pk	32.2	-38.87	57.03	-	-	74	-16.97	216	142	H
2	* 2483.593	63.92	Pk	32.2	-38.88	57.24	-	-	74	-16.76	216	142	H
3	* 2483.5	48.98	VA1T	32.2	-38.87	42.31	54	-11.69	-	-	216	142	H
4	* 2483.512	48.96	VA1T	32.2	-38.87	42.29	54	-11.71	-	-	216	142	H

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

VERTICAL RESULT



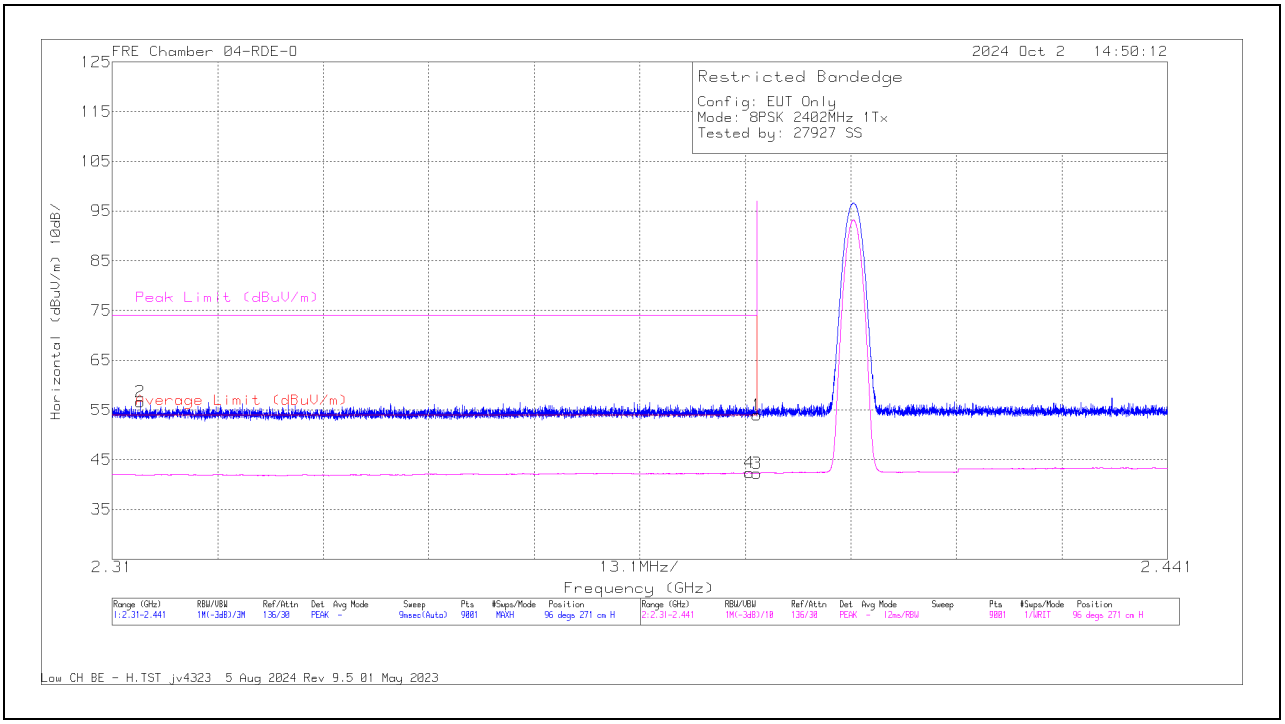
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	61.05	Pk	32.2	-38.87	54.38	-	-	74	-19.62	329	174	V
3	* 2483.5	47.61	VA1T	32.2	-38.87	40.94	54	-13.06	-	-	329	174	V
4	2531.283	47.62	VA1T	32.4	-38.34	41.68	54	-12.32	-	-	329	174	V
2	2536.461	62.62	Pk	32.4	-38.44	56.58	-	-	74	-17.42	329	174	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

ANT 3

BANDEDGE (LOW CHANNEL)

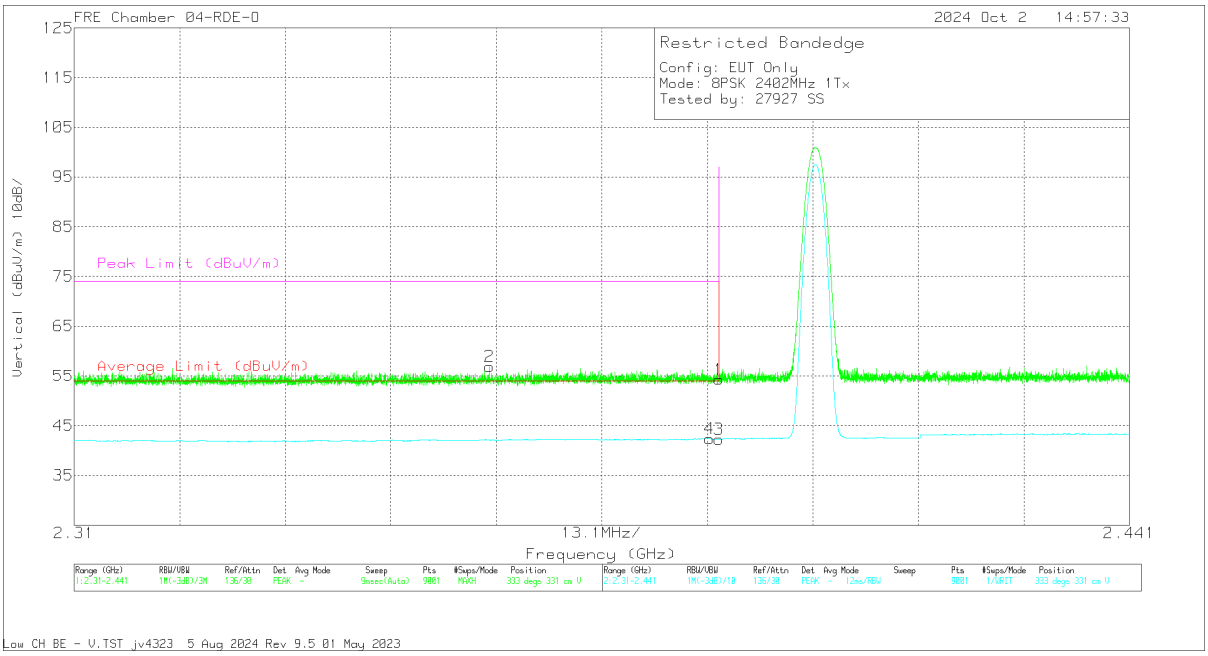
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.313479	62.32	Pk	31.8	-37.5	56.62	-	-	74	-17.38	96	271	H
4	2.389068	47.75	VA1T	32.1	-37.51	42.34	54	-11.66	-	-	96	271	H
1	2.39	59.54	Pk	32.1	-37.6	54.04	-	-	74	-19.96	96	271	H
3	2.39	47.74	VA1T	32.1	-37.6	42.24	54	-11.76	-	-	96	271	H

Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

VERTICAL RESULT

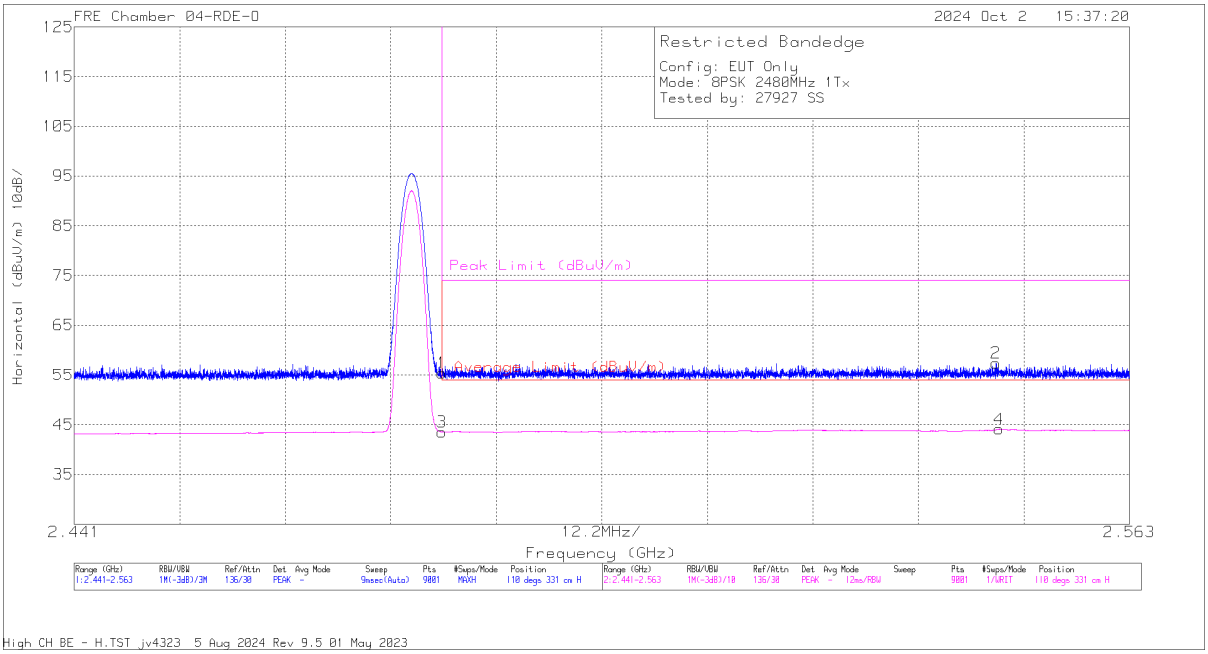


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.361557	62.42	Pk	31.9	-37.46	56.86	-	-	74	-17.14	333	331	V
4	2.388864	47.78	VA1T	32.1	-37.5	42.38	54	-11.62	-	-	333	331	V
1	2.39	59.8	Pk	32.1	-37.6	54.3	-	-	74	-19.7	333	331	V
3	2.39	47.78	VA1T	32.1	-37.6	42.28	54	-11.72	-	-	333	331	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4835	60.4	Pk	32.3	-37.3	55.4	-	-	74	-18.6	110	331	H
3	2.4835	48.54	VA1T	32.3	-37.3	43.54	54	-10.46	-	-	110	331	H
2	2.547577	61.95	Pk	32.4	-36.98	57.37	-	-	74	-16.63	110	331	H
4	2.54793	48.6	VA1T	32.4	-36.91	44.09	54	-9.91	-	-	110	331	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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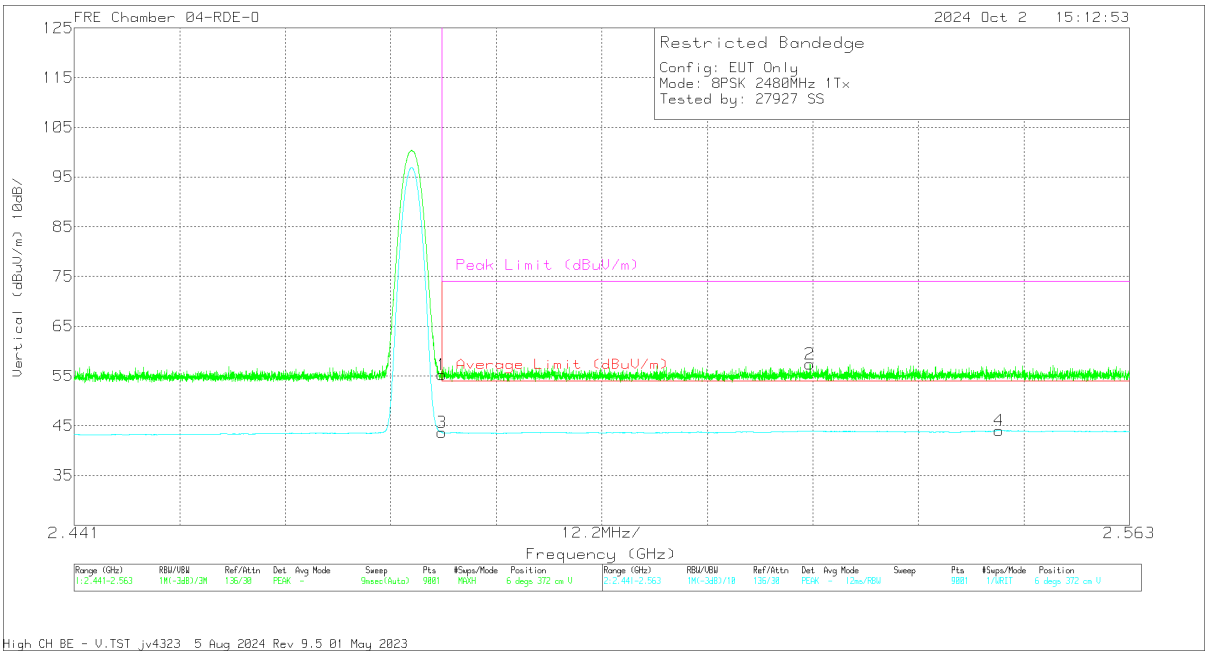
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.4835	60.29	Pk	32.3	-37.3	55.29	-	-	74	-18.71	6	372	V
3	2.4835	48.62	VA1T	32.3	-37.3	43.62	54	-10.38	-	-	6	372	V
2	2.526023	62.06	Pk	32.4	-37.1	57.36	-	-	74	-16.64	6	372	V
4	2.54793	48.54	VA1T	32.4	-36.91	44.03	54	-9.97	-	-	6	372	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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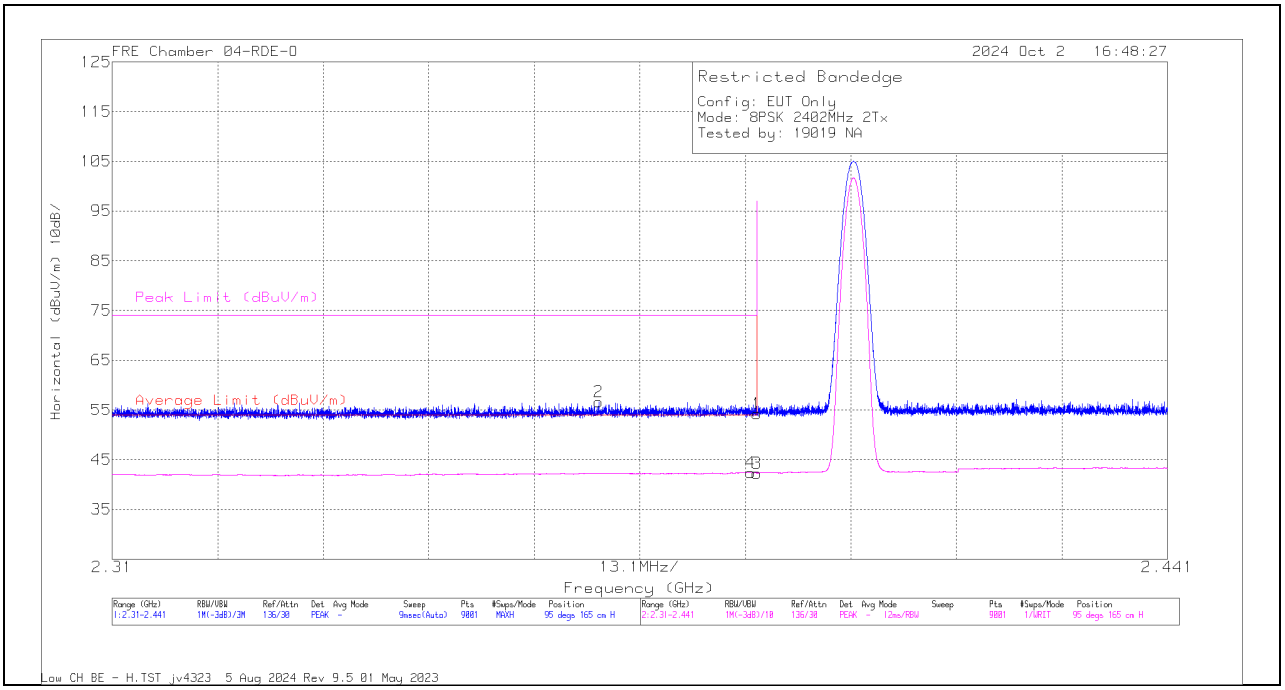
10.1.8. LOW POWER BASIC DATA RATE TXBF 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

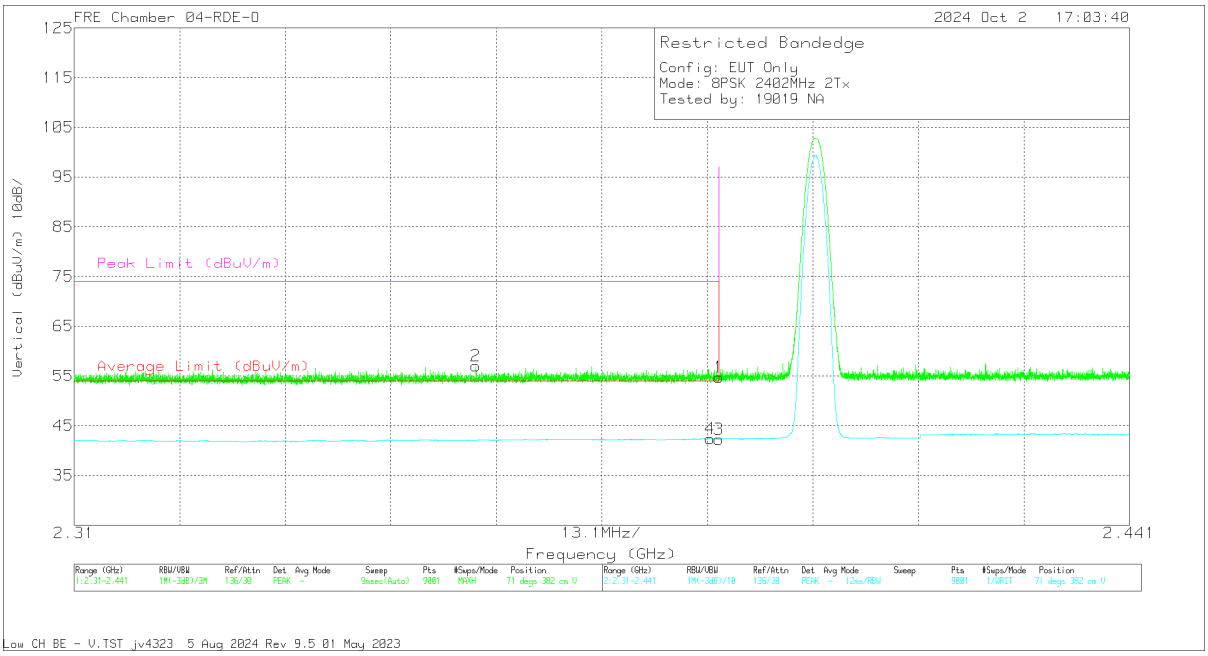
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.370393	61.99	Pk	32	-37.4	56.59	-	-	74	-17.41	95	165	H
4	2.389272	47.8	VA1T	32.1	-37.53	42.37	54	-11.63	-	-	95	165	H
1	2.39	59.78	Pk	32.1	-37.6	54.28	-	-	74	-19.72	95	165	H
3	2.39	47.79	VA1T	32.1	-37.6	42.29	54	-11.71	-	-	95	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

VERTICAL RESULT

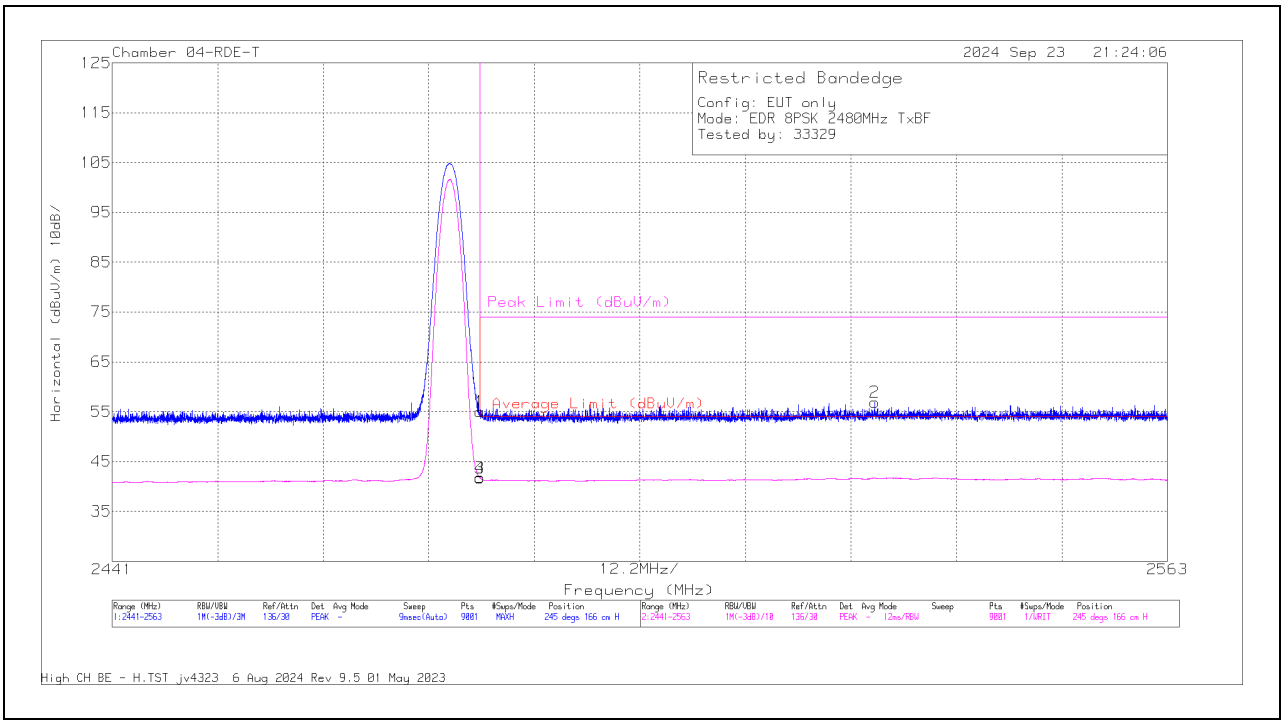


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 80402 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.359869	62.66	Pk	31.9	-37.5	57.06	-	-	74	-16.94	71	382	V
4	2.388937	47.78	VA1T	32.1	-37.5	42.38	54	-11.62	-	-	71	382	V
1	2.39	60.23	Pk	32.1	-37.6	54.73	-	-	74	-19.27	71	382	V
3	2.39	47.77	VA1T	32.1	-37.6	42.27	54	-11.73	-	-	71	382	V

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

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	61.72	Pk	32.2	0	-38.87	55.05	-	-	74	-18.95	245	166	H
3	* 2483.5	48.43	VA1T	32.2	0	-38.87	41.76	54	-12.24	-	-	245	166	H
4	* 2483.512	48.41	VA1T	32.2	0	-38.87	41.74	54	-12.26	-	-	245	166	H
2	2529.168	62.94	Pk	32.4	0	-38.41	56.93	-	-	74	-17.07	245	166	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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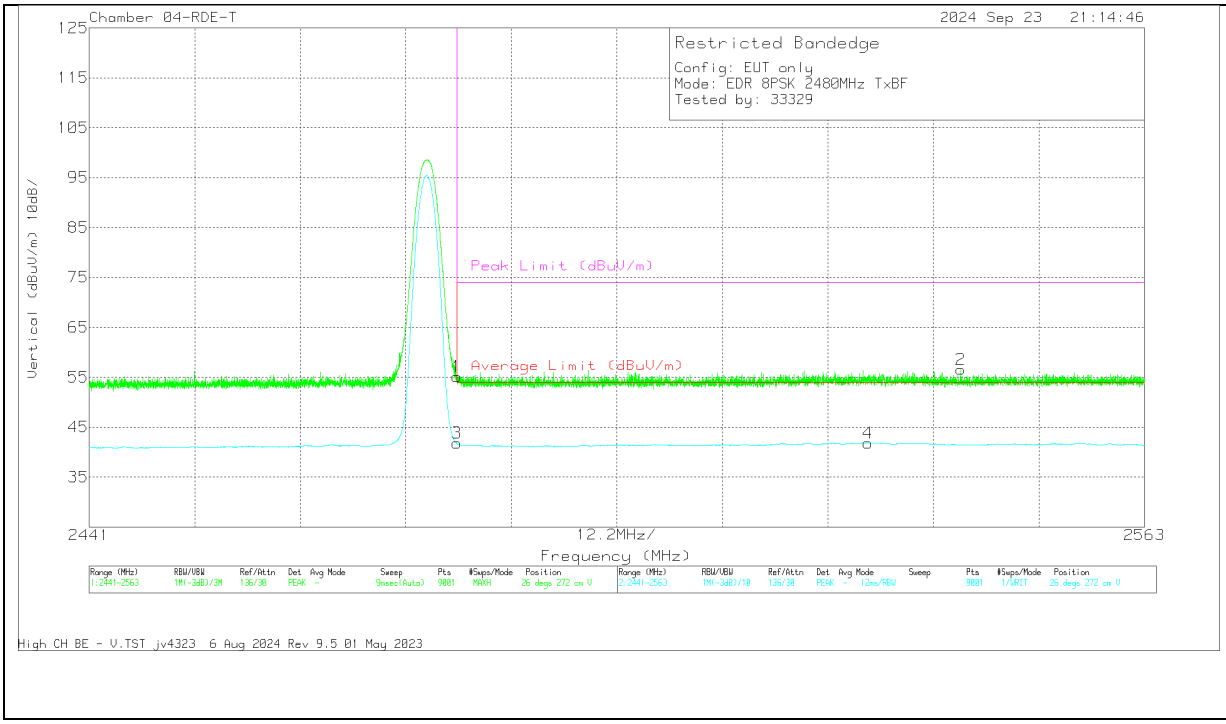
VERTICAL RESULT



Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	79834 ACF (dB/m)	DCCF (dB)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2483.5	61.83	Pk	32.2	0	-38.87	55.16	-	-	74	-18.84	26	272	V
3	* 2483.5	48.46	VA1T	32.2	0	-38.87	41.79	54	-12.21	-	-	26	272	V
4	2531.012	47.79	VA1T	32.4	0	-38.32	41.87	54	-12.13	-	-	26	272	V
2	2541.735	62.84	Pk	32.4	0	-38.66	56.58	-	-	74	-17.42	26	272	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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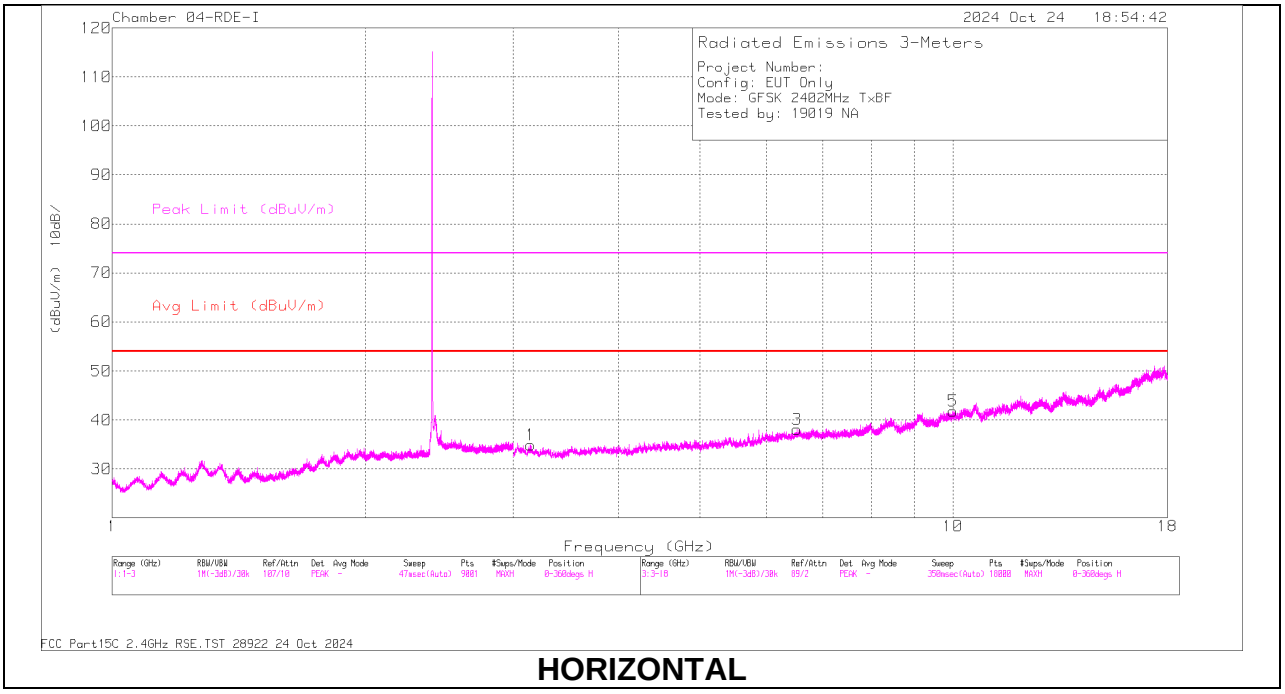
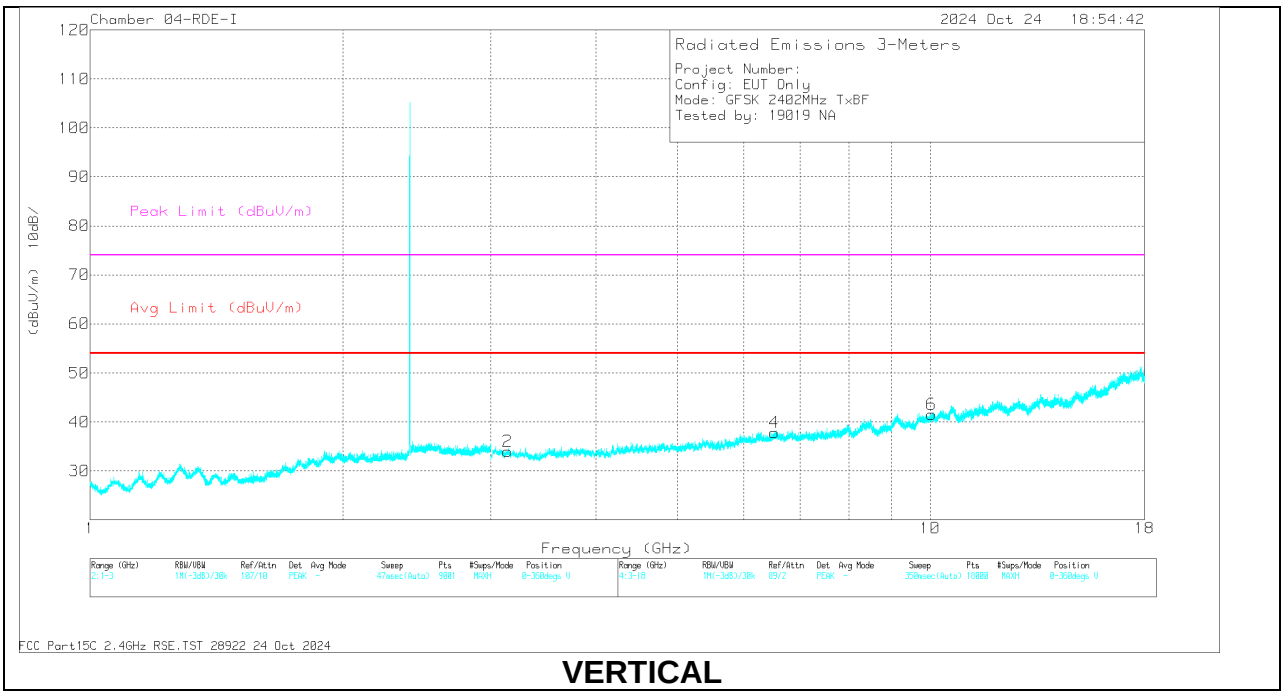
10.1.9. WORST CASE HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	222740 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	3.141769	39.05	PKFH	33.1	-28.3	43.85	74	-30.15			24	192	V
2	3.140802	24.58	VA1T	33.1	-28.3	29.38			54	-24.62	24	192	V
1	3.143886	38.19	PKFH	33.1	-28.3	42.99	74	-31.01			302	161	H
1	3.144487	24.58	VA1T	33.1	-28.3	29.38			54	--24.62	302	161	H
3	6.525297	34.37	PKFH	35.7	-24.1	45.97	74	-28.03			159	116	H
3	6.523344	20.91	VA1T	35.7	-24.2	32.41			54	-21.59	159	116	H
4	6.528414	34.34	PKFH	35.7	-24.1	45.94	74	-28.06			24	105	V
4	6.525292	20.91	VA1T	35.7	-24.1	32.51			54	-21.49	24	105	V
5	10.014767	32.73	PKFH	37.3	-20	50.03	74	-23.97			87	126	H
5	10.01184	19.08	VA1T	37.3	-20	36.38			54	-17.62	87	126	H
6	10.044356	32.66	PKFH	37.3	-19.8	50.16	74	-23.84			114	182	V
6	10.042785	18.9	VA1T	37.3	-19.8	36.4			54	-17.6	114	182	V

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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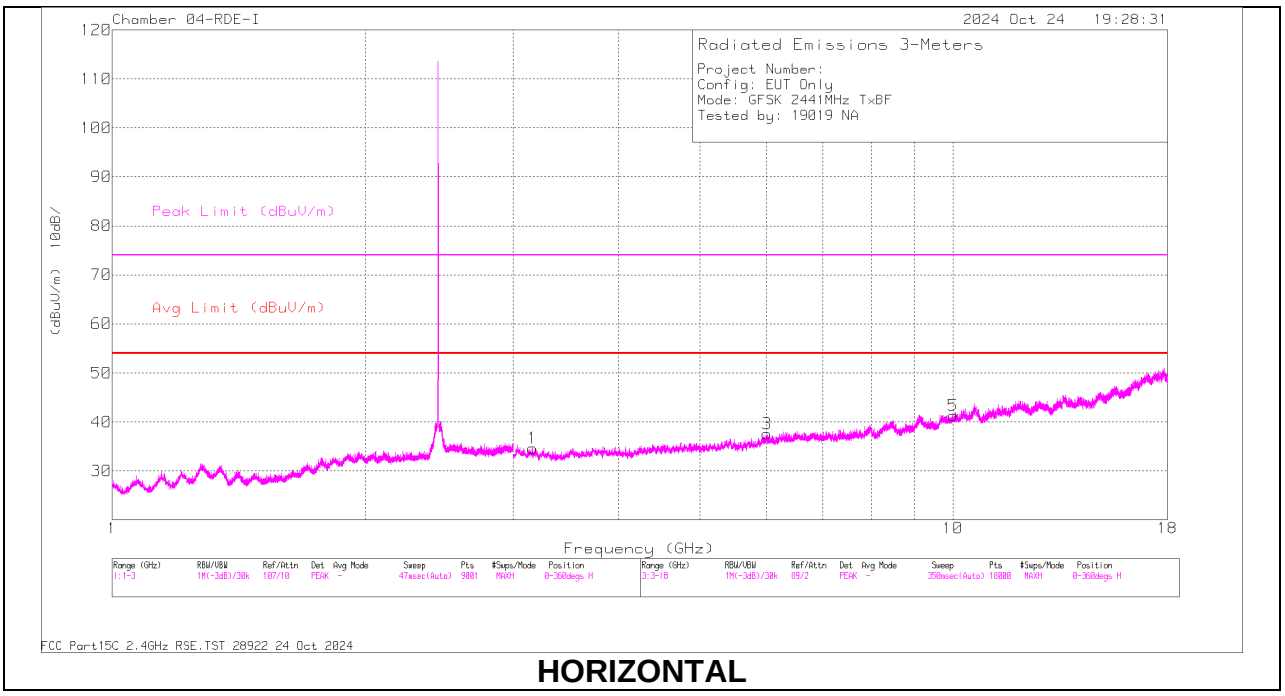
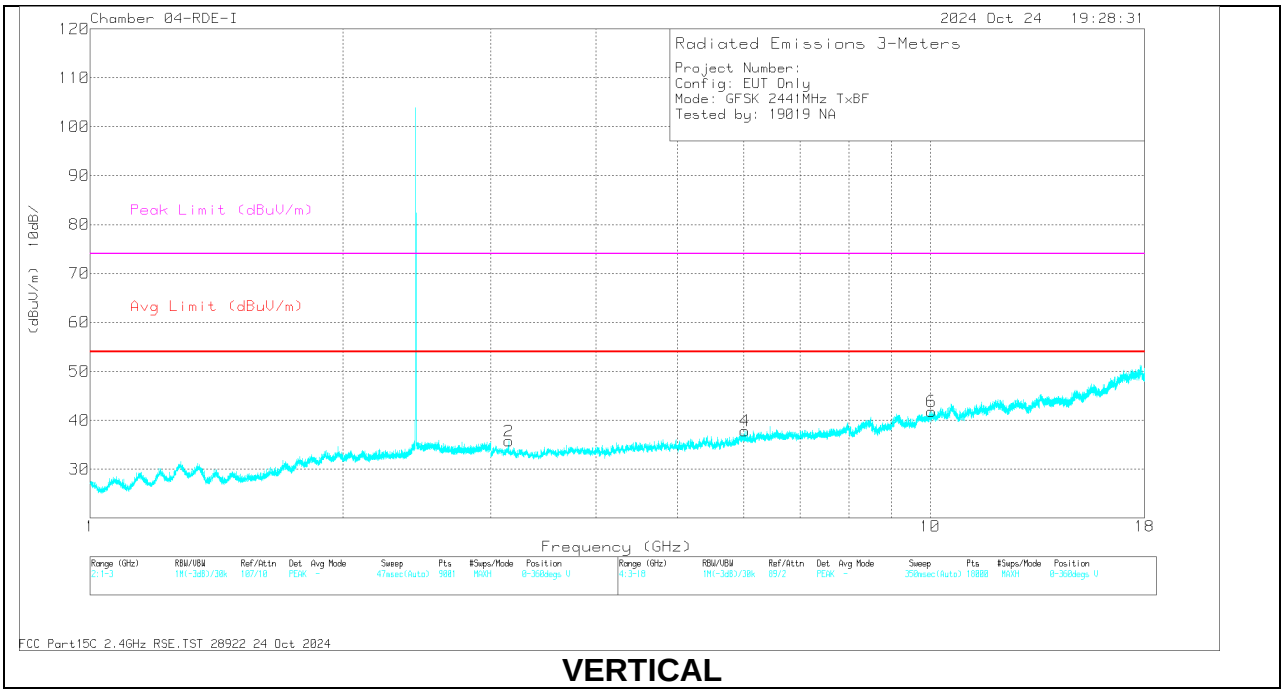
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	222740 ACF (dB)	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
* 3.82025	34.84	PKFH	33.2	-27.8	40.24	-	-	74	-33.76	320	105	H
* 3.81661	21.89	VA1T	33.2	-27.8	27.29	54	-26.71	-	-	320	105	H
* 8.310282	32.76	PKFH	35.9	-22.8	45.86	-	-	74	-28.14	193	161	H
* 8.310666	18.95	VA1T	35.9	-22.8	32.05	54	-21.95	-	-	193	161	H
* 17.908835	29.82	PKFH	41.6	-14.5	56.92	-	-	74	-17.08	205	228	H
* 17.90926	16.56	VA1T	41.6	-14.5	43.66	54	-10.34	-	-	205	228	H
* 3.802567	35.07	PKFH	33.2	-27.6	40.67	-	-	74	-33.33	174	178	V
* 3.801469	21.87	VA1T	33.2	-27.6	27.47	54	-26.53	-	-	174	178	V
* 8.28076	32.49	PKFH	35.9	-22.5	45.89	-	-	74	-28.11	141	129	V
* 8.2806	18.88	VA1T	35.9	-22.5	32.28	54	-21.72	-	-	141	129	V
* 17.859478	29.5	PKFH	41.7	-14.1	57.1	-	-	74	-16.9	86	179	V
* 17.860227	16.34	VA1T	41.7	-14.2	43.84	54	-10.16	-	-	86	179	V

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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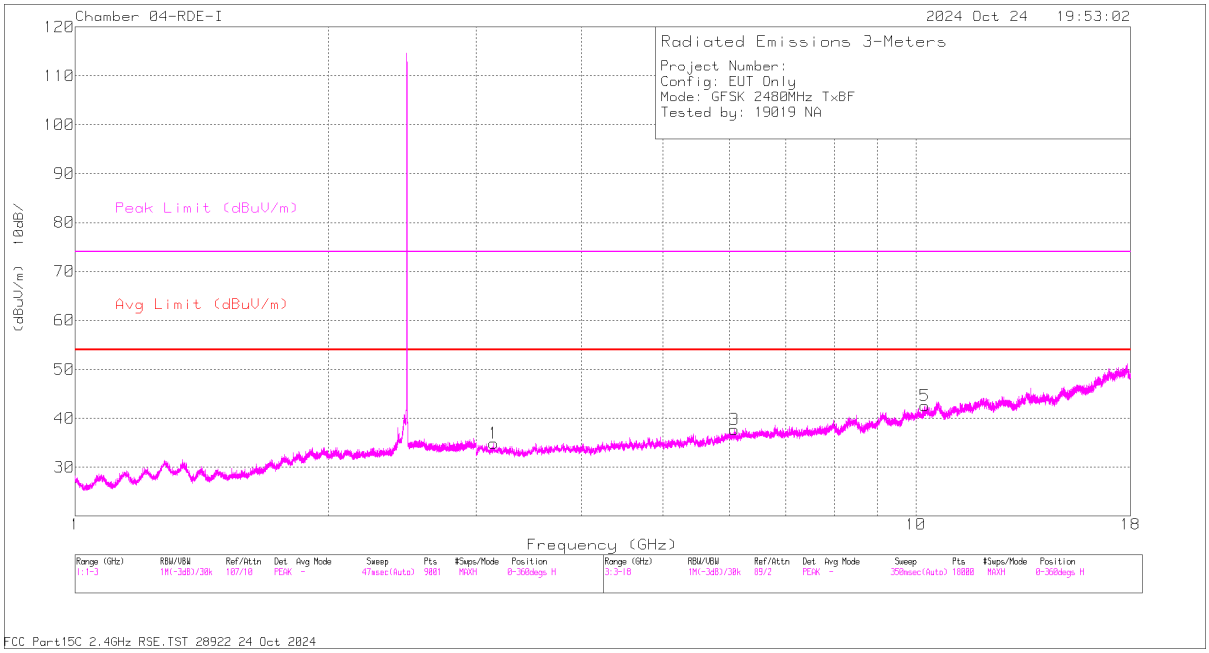
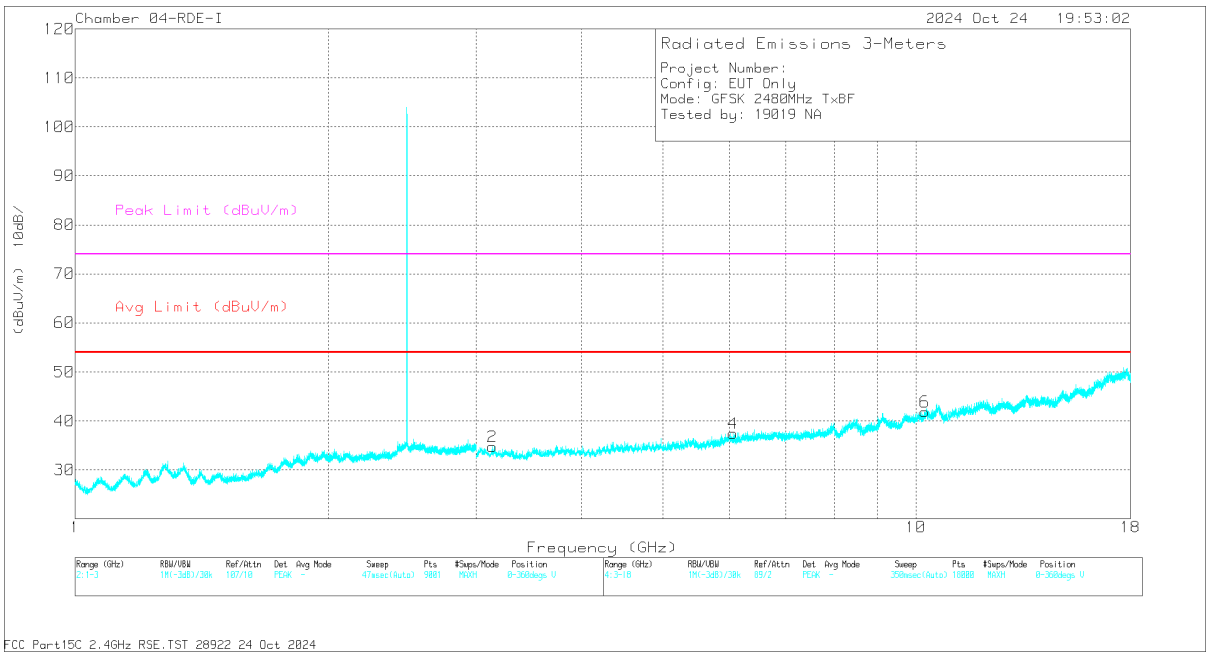
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	222740 ACF (dB/m)	Amp/Cbl/Fltr (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	3.131415	37.81	PKFH	33.1	-28.4	42.51	74	-31.49			137	185	V
2	3.13463	24.36	VA1T	33.1	-28.3	29.16			54	-24.84	137	185	V
1	3.144953	37.86	PKFH	33.1	-28.3	42.66	74	-31.34			223	133	H
1	3.143291	24.5	VA1T	33.1	-28.3	29.3			54	-24.7	223	133	H
4	6.062386	35.05	PKFH	35.3	-25.5	44.85	74	-29.15			63	134	V
4	6.062247	21.89	VA1T	35.3	-25.5	31.69			54	-22.31	63	134	V
3	6.0816	36.46	PKFH	35.4	-25.7	46.16	74	-27.84			132	169	H
3	6.083273	22.06	VA1T	35.4	-25.7	31.76			54	-22.24	132	169	H
6	10.240949	32.43	PKFH	37.4	-20	49.83	74	-24.17			2	182	V
6	10.242818	19.28	VA1T	37.4	-20	36.68			54	-17.32	2	182	V
5	10.256392	32.2	PKFH	37.4	-20.2	49.4	74	-24.6			45	116	H
5	10.25388	19.27	VA1T	37.4	-20.2	36.47			54	-17.53	45	116	H

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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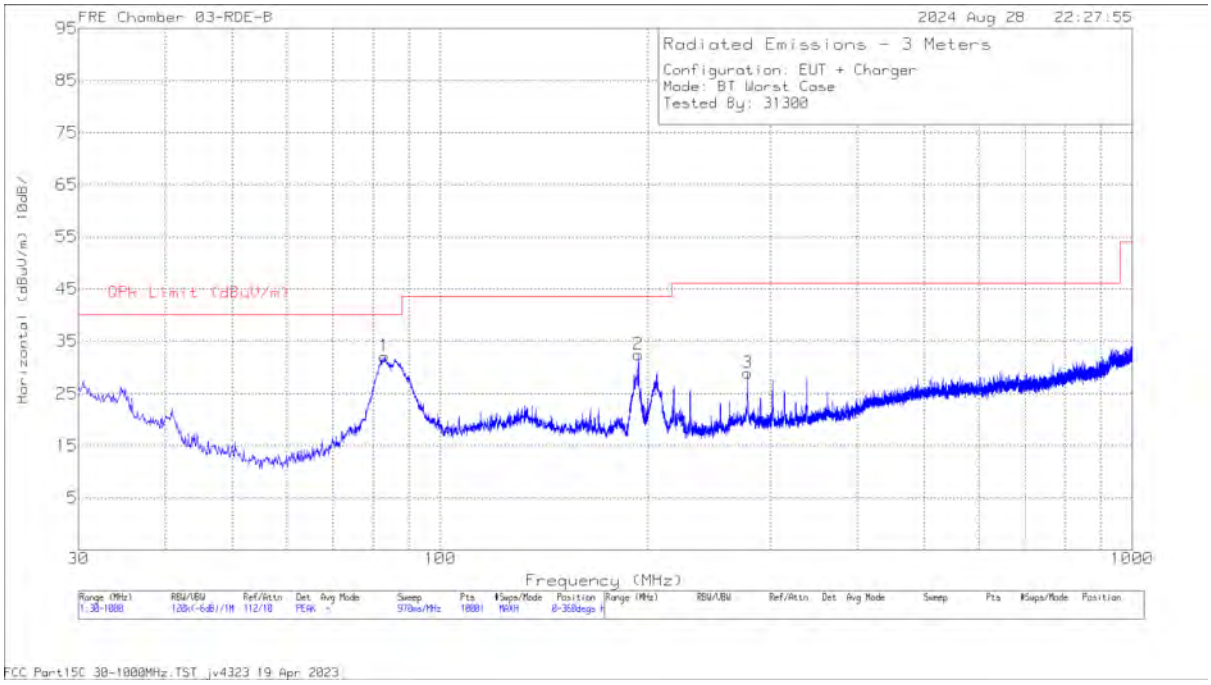
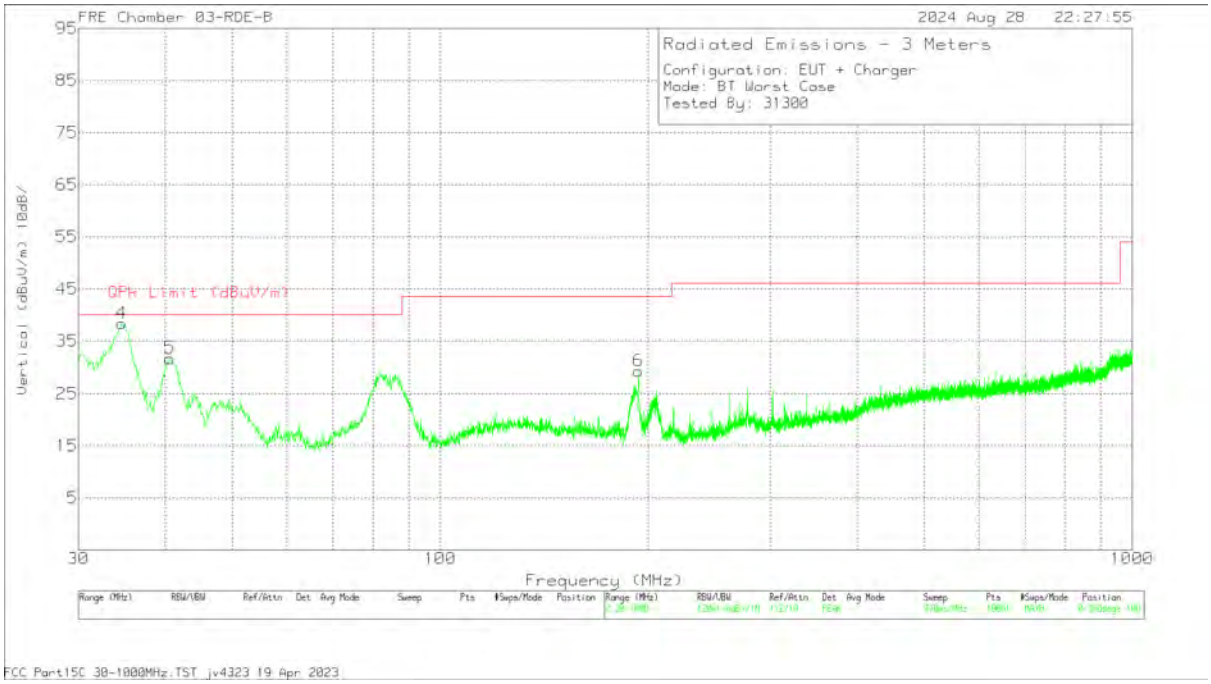
10.2. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

Below 1GHz Data

Frequency (MHz)	Meter Reading (dBuV)	Det	204045 ACF (dB/m)	CBL AMP (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 278.275	35.93	Qp	19.2	-28.9	26.23	46.02	-19.79	358	124	H
34.5748	44.14	Qp	23.4	-31	36.54	40	-3.46	311	100	V
41.0222	40.91	Qp	18.8	-30.9	28.81	40	-11.19	302	105	V
83.3799	47.12	Qp	13.4	-30.3	30.22	40	-9.78	342	227	H
193.467	42.3	Qp	17.7	-29.5	30.5	43.52	-13.02	139	181	H
193.571	39.98	Qp	17.8	-29.5	28.28	43.52	-15.24	93	115	V

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

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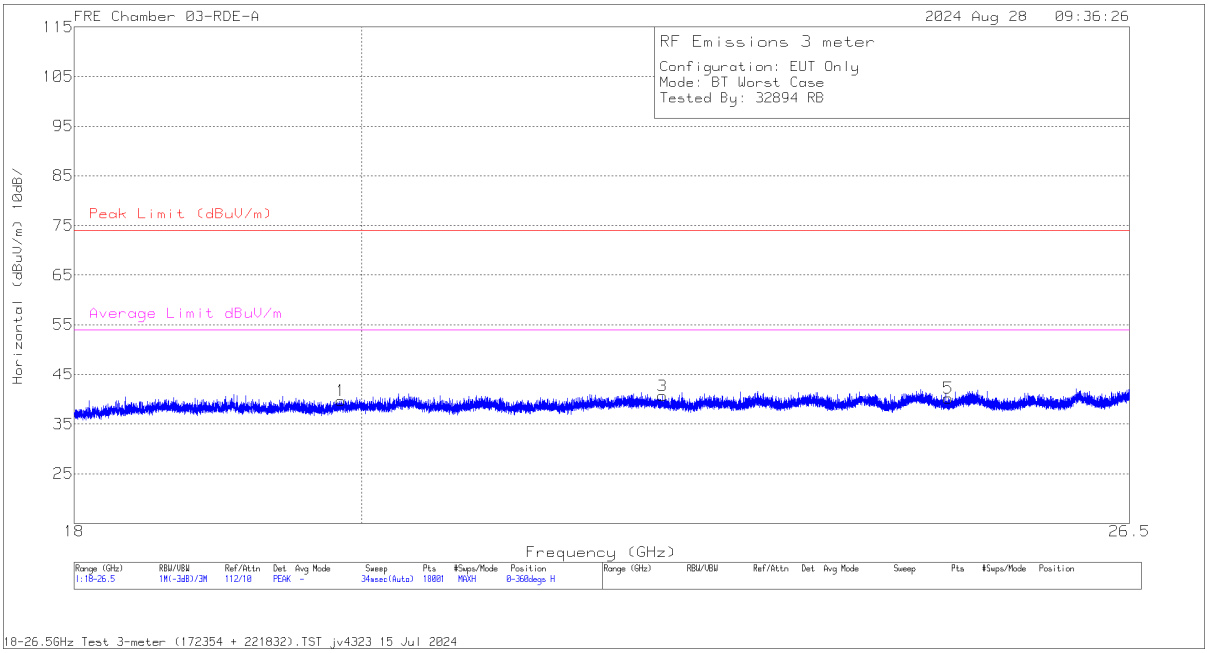
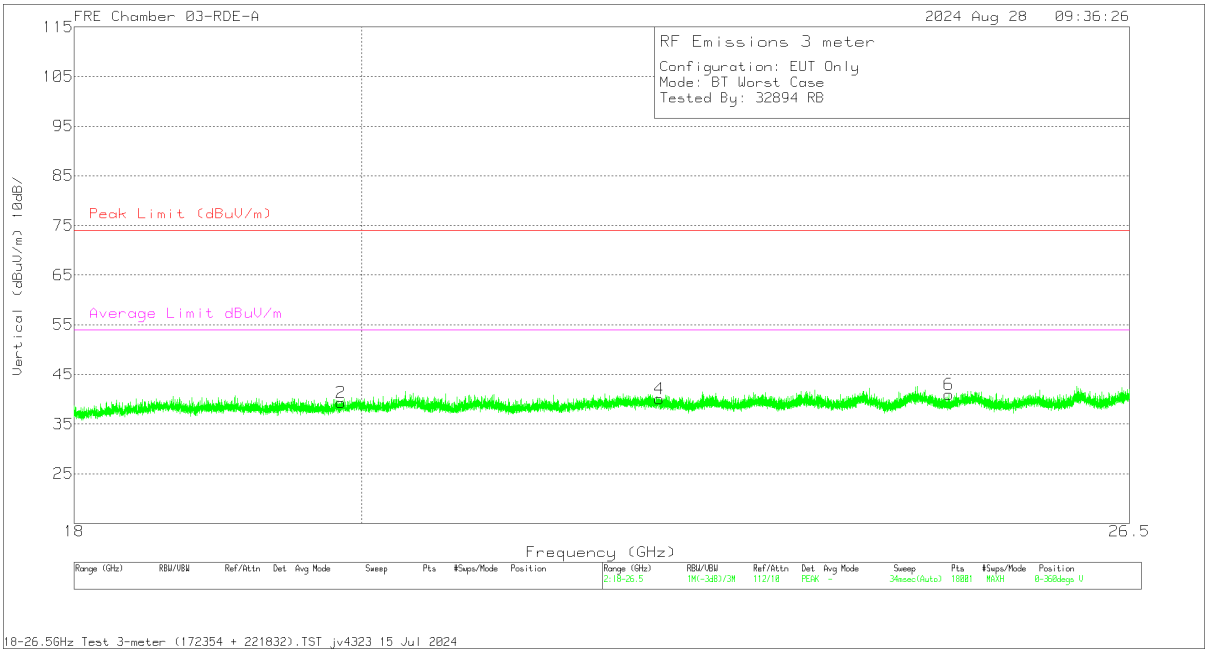
10.3. WORST CASE 18-26 GHZ

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



HORIZONTAL



VERTICAL

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18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 172354 (dB/m)	221832 Amp (dB)	Cbl/Switch (dB)	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	PK Margin (dB)	Average Limit dBuV/m	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 19.847332	55.65	Pk	32.5	-62.5	14.1	39.75	74	-34.25	54	-14.25	0-360	200	H
3	* 22.333581	55.05	Pk	33.1	-62.2	14.7	40.65	74	-33.35	54	-13.35	0-360	101	H
2	* 19.850638	55.26	Pk	32.5	-62.5	14.1	39.36	74	-34.64	54	-14.64	0-360	200	V
4	* 22.306192	54.34	Pk	33.1	-62.1	14.7	40.04	74	-33.96	54	-13.96	0-360	200	V
5	24.799997	53.08	Pk	33.8	-62.2	15.5	40.18	74	-33.82	54	-13.82	0-360	101	H
6	24.803775	53.82	Pk	33.8	-62.2	15.5	40.92	74	-33.08	54	-13.08	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)

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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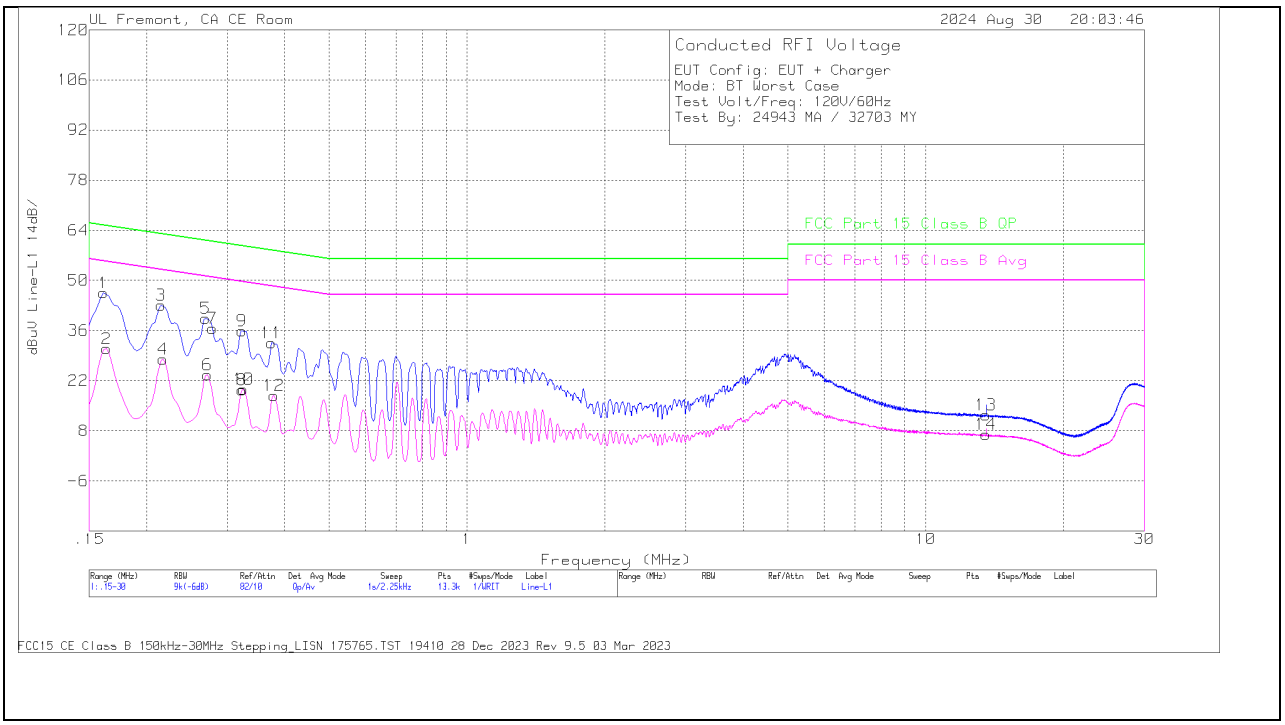
11.1. AC POWER LINE WITH AC/DC ADAPTER

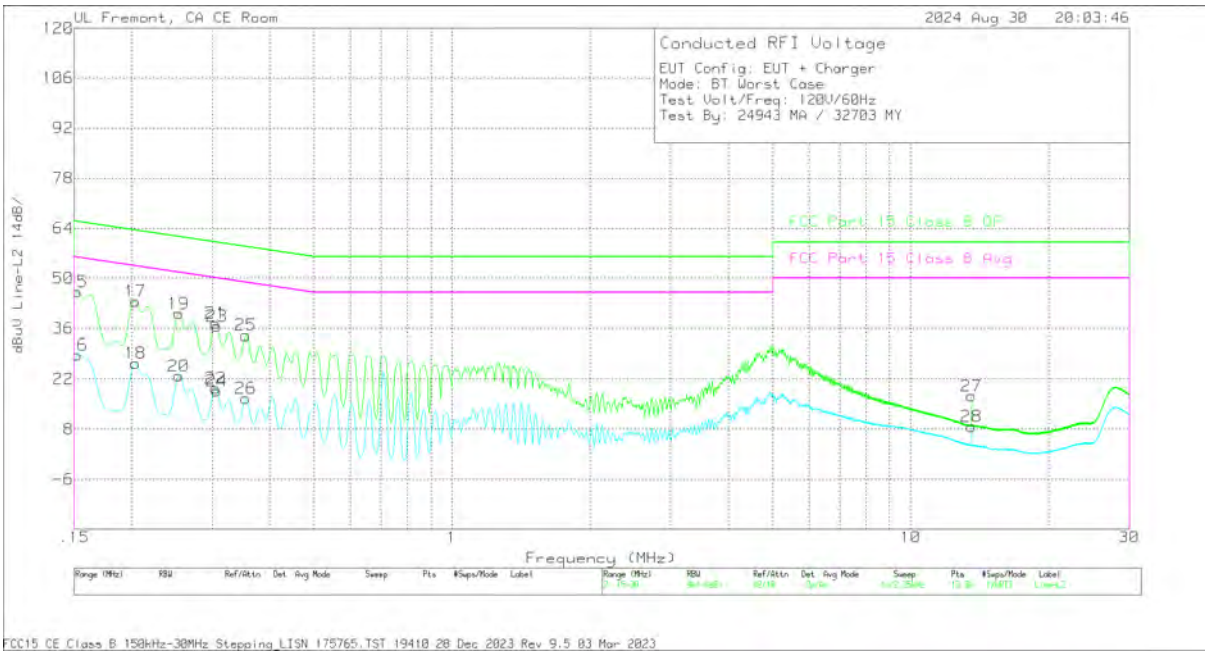
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	Corrected Reading dBuV	FCC Part 15 Class B QP dBuV	QP Margin (dB)	FCC Part 15 Class B Avg dBuV	Av Margin (dB)
2	.1635	21.3	Av	.1	0	9.5	30.9	-	-	55.28	-24.38
4	.2175	18.44	Av	0	.1	9.4	27.94	-	-	52.91	-24.97
6	.2715	14.28	Av	0	0	9.4	23.68	-	-	51.07	-27.39
8	.3233	9.92	Av	0	.1	9.4	19.42	-	-	49.62	-30.2
10	.3255	10.15	Av	0	0	9.4	19.55	-	-	49.57	-30.02
12	.3795	8.38	Av	0	0	9.4	17.78	-	-	48.29	-30.51
14	13.5353	-2.99	Av	.1	.3	9.5	6.91	-	-	50	-43.09
1	.1613	36.9	Qp	.1	0	9.5	46.5	65.4	-18.9	-	-
3	.2153	33.62	Qp	0	.1	9.4	43.12	63	-19.88	-	-
5	.2693	30.03	Qp	0	0	9.4	39.43	61.14	-21.71	-	-
7	.2783	27.16	Qp	0	.1	9.4	36.66	60.87	-24.21	-	-
9	.3233	26.4	Qp	0	.1	9.4	35.9	59.62	-23.72	-	-
11	.375	23.11	Qp	0	0	9.4	32.51	58.39	-25.88	-	-
13	13.5263	2.54	Qp	.1	.3	9.5	12.44	60	-47.56	-	-

Qp - Quasi-Peak detector
Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	Corrected Reading dBuV	FCC Part 15 Class B QP dBuV	QP Margin (dB)	FCC Part 15 Class B Avg dBuV	Av Margin (dB)
16	.1523	19.14	Av	.1	0	9.5	28.74	-	-	55.88	-27.14
18	.204	16.88	Av	0	.1	9.4	26.38	-	-	53.45	-27.07
20	.2535	13.44	Av	0	0	9.4	22.84	-	-	51.64	-28.8
22	.3053	9.96	Av	0	.1	9.4	19.46	-	-	50.1	-30.64
24	.3075	9.15	Av	0	.1	9.4	18.65	-	-	50.04	-31.39
26	.3548	7.13	Av	0	.1	9.4	16.63	-	-	48.85	-32.22
28	13.56	-1.04	Av	.1	.2	9.5	8.76	-	-	50	-41.24
15	.1523	36.6	Qp	.1	0	9.5	46.2	65.88	-19.68	-	-
17	.204	34.13	Qp	0	.1	9.4	43.63	63.45	-19.82	-	-
19	.2535	30.78	Qp	0	0	9.4	40.18	61.64	-21.46	-	-
21	.3053	27.93	Qp	0	.1	9.4	37.43	60.1	-22.67	-	-
23	.3075	27.04	Qp	0	.1	9.4	36.54	60.04	-23.5	-	-
25	.3548	24.57	Qp	0	.1	9.4	34.07	58.85	-24.78	-	-
27	13.56	7.43	Qp	.1	.2	9.5	17.23	60	-42.77	-	-

Qp - Quasi-Peak detector
Av - Average detection

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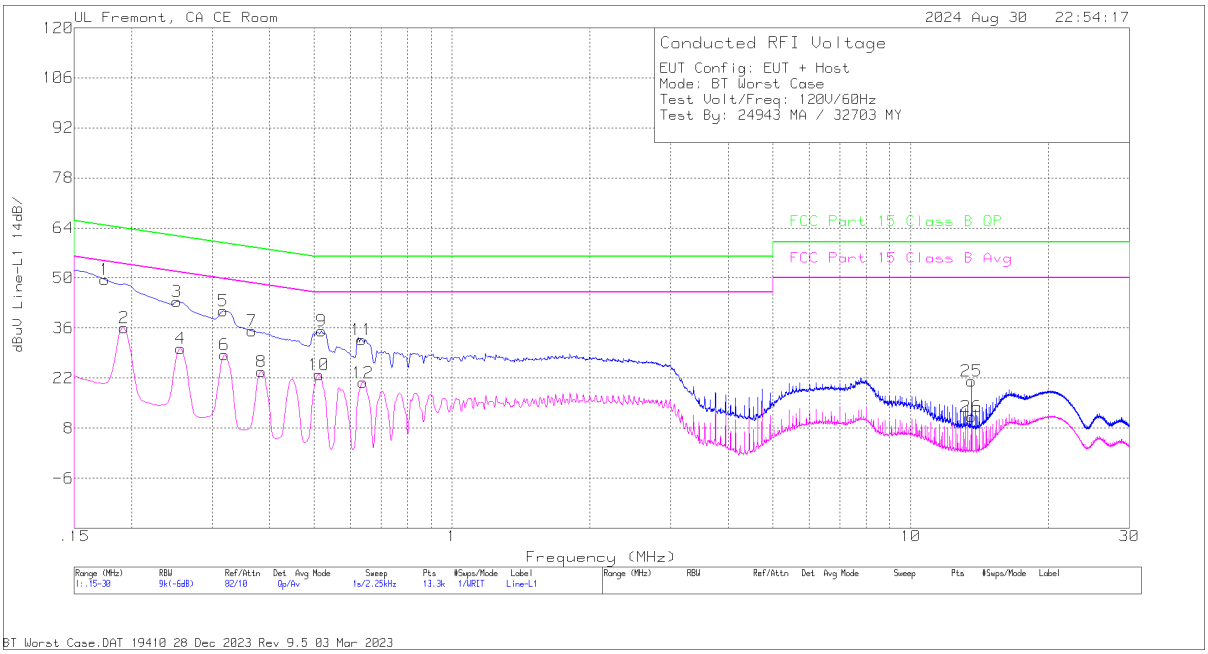
11.2. AC POWER LINE WITH LAPTOP

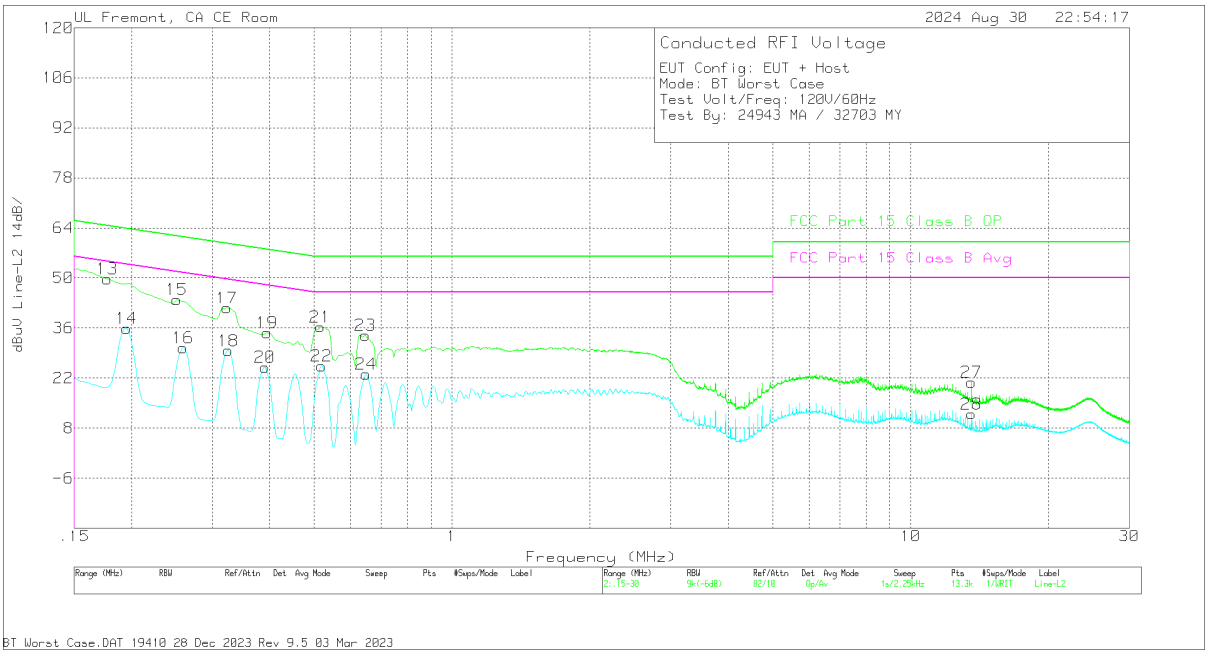
LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	Corrected Reading dBuV	FCC Part 15 Class B QP dBuV	QP Margin (dB)	FCC Part 15 Class B Avg dBuV	Av Margin (dB)
2	.1928	26.42	Av	.1	.1	9.4	36.02	-	-	53.92	-17.9
4	.2558	20.87	Av	0	0	9.4	30.27	-	-	51.57	-21.3
6	.3188	19.04	Av	0	.1	9.4	28.54	-	-	49.74	-21.2
8	.384	14.43	Av	0	0	9.4	23.83	-	-	48.19	-24.36
10	.5123	13.63	Av	0	0	9.3	22.93	-	-	46	-23.07
12	.6394	11.23	Av	0	.1	9.4	20.73	-	-	46	-25.27
26	13.56	1.22	Av	.1	.3	9.5	11.12	-	-	50	-38.88
1	.1748	39.98	Qp	.1	0	9.5	49.58	64.73	-15.15	-	-
3	.2513	33.96	Qp	0	0	9.4	43.36	61.72	-18.36	-	-
5	.3165	31.33	Qp	0	.1	9.4	40.83	59.8	-18.97	-	-
7	.366	25.86	Qp	0	0	9.4	35.26	58.59	-23.33	-	-
9	.519	25.95	Qp	0	0	9.3	35.25	56	-20.75	-	-
11	.636	23.27	Qp	0	.1	9.4	32.77	56	-23.23	-	-
25	13.56	11.25	Qp	.1	.3	9.5	21.15	60	-38.85	-	-

Qp - Quasi-Peak detector
Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN (dB)	Cbl (dB)	Trns Limiter (dB)	Corrected Reading dBuV	FCC Part 15 Class B QP dBuV	QP Margin (dB)	FCC Part 15 Class B Avg dBuV	Av Margin (dB)
14	.195	26.46	Av	0	.1	9.4	35.96	-	-	53.82	-17.86
16	.2591	21.02	Av	0	0	9.4	30.42	-	-	51.46	-21.04
18	.3255	20.17	Av	0	.1	9.4	29.67	-	-	49.57	-19.9
20	.3908	15.52	Av	0	.1	9.4	25.02	-	-	48.05	-23.03
22	.519	16.09	Av	0	0	9.3	25.39	-	-	46	-20.61
24	.6495	13.55	Av	0	.1	9.4	23.05	-	-	46	-22.95
28	13.56	2.16	Av	.1	.2	9.5	11.96	-	-	50	-38.04
13	.177	40.22	Qp	0	.1	9.4	49.72	64.63	-14.91	-	-
15	.2513	34.57	Qp	0	0	9.4	43.97	61.72	-17.75	-	-
17	.3233	32.1	Qp	0	.1	9.4	41.6	59.62	-18.02	-	-
19	.3953	25.17	Qp	0	.1	9.4	34.67	57.95	-23.28	-	-
21	.5168	27.02	Qp	0	0	9.3	36.32	56	-19.68	-	-
23	.6473	24.47	Qp	0	.1	9.4	33.97	56	-22.03	-	-
27	13.56	11.04	Qp	.1	.2	9.5	20.84	60	-39.16	-	-

Qp - Quasi-Peak detector
Av - Average detection

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12. SPOT CHECK EVALUATION

12.1. MODEL DIFFERENCES

The manufacturer hereby declares the following for models A3212, A3408, A3409 and A3410.

A3212, A3408, A3409 and A3410 are highly similar, with the only difference being the supported cellular bands.

Model	FCC ID	IC ID	B14/29/71	MCC B53/n53	Sim Support	Reference Model
A3212	BCG-E8725A	579C-E8725A	Yes	Yes	eSIM	-
A3408	BCG-E8726A	579C-E8726A	Yes	Yes	eSIM+pSIM	A3212
A3409	BCG-E8727A	579C-E8727A	No	Yes	eSIM+pSIM	
A3410	BCG-E8728A	579C-E8728A	No	No	pSIM+pSIM	

Note:

_ All models have the same PCB layout, circuit design, common components, antennas and antenna locations across their respective reference model table above. The cellular modem, Wi-Fi, BT, NFC and MSS transmitters are identical.

_Remove of LTE/NR (B14/29/53/71) and MSS bands is done by de-population of directly related components.

The spot check plan, approved by the FCC inquiry, allows for data reuse from the reference model where the variant model data meets the limits and has not changed by more than the criteria from KDB 484596 D01 v02r03 equation (2).

$$d_{dB} = |V_{dB} - R_{dB}| \le (3 + M_{dB}/20)\ \text{dB} \quad \text{, for } 0 \le M_{dB} \le 60\ \text{dB}$$
$$d_{dB} = |V_{dB} - R_{dB}| = 6\ \text{dB} \quad \text{, for } M_{dB} > 60\ \text{dB} \qquad (2)$$

Where: d_{dB} deviation from Reference data, V_{dB} variant spot check level, *and* R_{dB} measurement level

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

12.2. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3408

A3408 SPOT CHECK RESULTS											
Equipment Class	Frequency (GHz)	Mode	Data Rate	Test Item	Channel	Measured Frequency (GHz)	Original Model: A3212 FCC ID : BCG-E8725A IC : 579C-E8725A	Sub Model: A3408 FCC ID : BCG-E8726A IC : 579C-E8726A	Delta (dB)	Margin	Remarks
DSS	2.4	GFSK	1Mbps	Avg Power (dBm)	Mid	Fundamental	19.92	19.56	-0.36	-1.08	Note 1
		8PSK	3Mbps	Radiated Bandedge (dBuV/m)	High	Horizontal High Bandedge	45.55	44.82	-0.73	-8.45	Note 1
		GFSK	1Mbps	RSE (dBuV/m)	Mid	1 to 18	43.84	44.22	0.38	-10.16	Note 1

Note 1: Deviation from reference to variant within the value allowed by equation (2) in KDB 484596. Additional tests not required.
Note 2: Deviation from reference to variant exceeds the value allowed by equation (2) in KDB 484596. Additional tests performed on second channel.

12.3. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3409

A3409 SPOT CHECK RESULTS											
Equipment Class	Frequency (GHz)	Mode	Data Rate	Test Item	Channel	Measured Frequency (GHz)	Original Model: A3212 FCC ID : BCG-E8725A IC : 579C-E8725A	Sub Model: A3409 FCC ID : BCG-E8727A IC : 579C-E8727A	Delta (dB)	Margin	Remarks
DSS	2.4	GFSK	1Mbps	Avg Power (dBm)	Mid	Fundamental	19.92	19.61	-0.31	-10.08	Note 1
		8PSK	3Mbps	Radiated Bandedge (dBuV/m)	High	Horizontal High Bandedge	45.55	45.52	-0.03	-8.45	Note 1
		GFSK	1Mbps	RSE (dBuV/m)	Mid	1 to 18	43.84	45.15	1.31	-10.16	Note 1

Note 1: Deviation from reference to variant within the value allowed by equation (2) in KDB 484596. Additional tests not required.
Note 2: Deviation from reference to variant exceeds the value allowed by equation (2) in KDB 484596. Additional tests performed on second channel.

12.4. SPOT CHECK VERIFICATION RESULTS SUMMARY FOR A3410

A3410 SPOT CHECK RESULTS											
Equipment Class	Frequency (GHz)	Mode	Data Rate	Test Item	Channel	Measured Frequency (GHz)	Original Model: A3212 FCC ID : BCG-E8728A IC : 579C-E8728A	Sub Model: A3410 FCC ID : BCG-E8728A IC : 579C-E8728A	Delta (dB)	Margin	Remarks
DSS	2.4	GFSK	1Mbps	Avg Power (dBm)	Mid	Fundamental	19.92	19.91	-0.01	-10.08	Note 1
		8PSK	3Mbps	Radiated Bandedge (dBuV/m)	High	Horizontal High Bandedge	45.55	45.50	-0.05	-8.45	Note 1
		GFSK	1Mbps	RSE (dBuV/m)	Mid	1 to 18	43.84	43.76	-0.08	-10.16	Note 1

Note 1: Deviation from reference to variant within the value allowed by equation (2) in KDB 484596. Additional tests not required.
Note 2: Deviation from reference to variant exceeds the value allowed by equation (2) in KDB 484596. Additional tests performed on second channel.

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

13. SETUP PHOTOS

Please refer to setup photos 15175342-EP1V1

END OF TEST REPORT

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