TEST REPORT

Report Number. : 13573771 E1V2

Applicant	:	APPLE INC. 1 APPLE PARK WAY CUPERTINO, CA 95104, U.S.A
Model	:	A2484 (Parent Model, Full Test) A2641, A2643, A2644, A2645 (Variant Models)
Brand	:	APPLE
FCC ID	:	BCG-E4003A (Parent Model) BCG-E4005A, BCG-E4035A, BCG-E4036A (Variant Models)
IC	:	579C-E4003A (Parent Model) 579C-E4005A, 579C-E4035A, 579C-E4036A (Variant Models)
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5 + A1 + A2

Date Of Issue:
August 05, 2021

Prepared by:
UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
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ACCREDITED
CERT #0751.05

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	7/30/2021	Initial Issue	Chin Pang
V2	8/5/2021	Address TCB's Questions on page 18, 20, 33 and 35	Chin Pang

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TABLE OF CONTENTS

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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:	SMARTPHONE
MODEL:	A2484 (PARENT MODEL) A2641, A2643, A2644, A2645 (VARIANT MODELS)
BRAND:	APPLE
FCC IC:	BCG-E4003A (PARENT MODEL) BCG-E4005A, BCG-E4035A, BCG-E4036A (VARIANT MODELS)
IC ID:	579C-E4003A (PARENT MODEL) 579C-E4005A, 579C-E4035A, 579C-E4036A (VARIANT MODELS)
SERIAL NUMBER:	C070407005S0G3H1, Q7X92R9C06
SAMPLE RECEIPT DATE:	11/05/2020, 6/28/2021
DATE TESTED:	DECEMBER 01, 2020 – JULY 29, 2021

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN ISSUE 5 + A1 + A2	Complies

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

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

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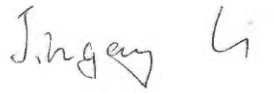
Approved & Released For
UL Verification Services Inc. By:

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

Prepared By:



Jingang Li
Test Engineer
Consumer Technology Division
UL Verification Services Inc.

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2. TEST RESULTS SUMMARY

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

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 C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, KDB 662911, RSS-GEN Issue 5 + A1+ A2, and RSS-247 Issue 2.

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	208313
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA	US0104	22541	208313
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA	US0104	2324B	208313

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U_{Lab}
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

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 multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, 5G, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wideband, GPS and NFC. All models support at least one UICC based SIM. The second SIM is either an UICC based p-SIM (physical SIM) or e-SIM (electronic SIM). The device supports a built-in inductive charging transmitter and receiver. The rechargeable battery is not user accessible.

Testing was performed on the parent model and is used to support the application for the parent and variants identified in this report based on the test plan submitted and approved via KDB inquiry by the FCC and by ISED-Canada.

The Model and FCC/IC ID covered by this report includes:

Parent Model: A2484; FCC ID: BCG-E4003A, IC ID: 579C-E4003A

Variant Models: A2641; FCC ID: BCG-E4005A, IC ID: 579C-E4005A
A2643; FCC ID: BCG-E4035A, IC ID: 579C-E4035A
A2644; FCC ID: BCG-E4036A, IC ID: 579C-E4036A
A2645; FCC ID: BCG-E4036A, IC ID: 579C-E4036A

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	19.53	89.74
		2402 - 2480	QPSK	18.59	72.28
		2402 - 2480	Enhanced 8PSK	18.62	72.78
	Low Power	2402 - 2480	Basic GFSK	11.16	13.06
		2402 - 2480	QPSK	11.39	13.77
		2402 - 2480	Enhanced 8PSK	11.63	14.55
Ant 3	High Power	2402 - 2480	Basic GFSK	20.14	103.28
		2402 - 2480	QPSK	18.62	72.78
		2402 - 2480	Enhanced 8PSK	18.63	72.95
	Low Power	2402 - 2480	Basic GFSK	11.18	13.12
		2402 - 2480	QPSK	11.36	13.68
		2402 - 2480	Enhanced 8PSK	11.61	14.49
BF, Ant 4 + Ant 3	High Power	2402 - 2480	Basic GFSK TxBF	20.20	104.71
		2402 - 2480	QPSK TxBF	19.49	88.92
		2402 - 2480	Enhanced 8PSK TxBF	19.52	89.54
	Low Power	2402 - 2480	Basic GFSK TxBF	14.19	26.24
		2402 - 2480	QPSK TxBF	14.64	29.11
		2402 - 2480	Enhanced 8PSK TxBF	14.66	29.24

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

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6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antennas gain and IFA type as provided by the manufacturer' are as follows:

Frequency Range (GHz)	ANT 4 (dBi)	ANT 3 (dBi)
2.4	0.1	-0.6

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 19.1.309.2612

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) was the worst-case orientation for ANT 4 and 2TX Beamforming. And for ANT 3, the worst case was Y (Landscape) orientation.

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 1GHz tests EUT was connected to AC power adapter 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 channel.

For Radiated band edge, GFSK, 8PSK and TXBF modulations were all investigated on low and high power setting.

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There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

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	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Shielded	1.0	N/A
3	Antenna	1	SMA	Un-shielded	0.2	To spectrum Analyzer
I/O CABLES (RF RADIATED 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	Un-shielded	1	N/A

TEST SETUP

The EUT is connected to a test laptop during the tests. Test software exercised the radio card

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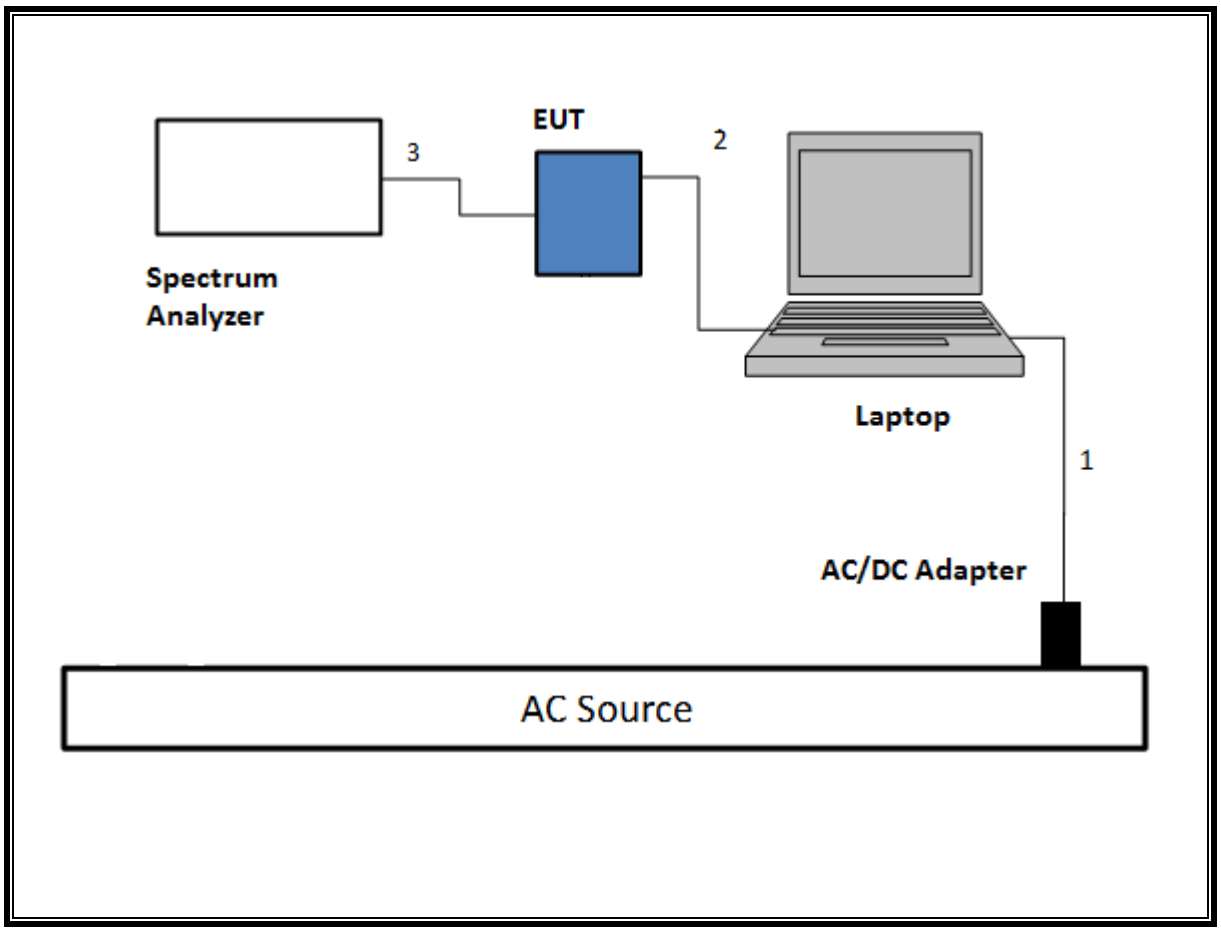
SETUP DIAGRAM FOR CONDUCTED TESTS



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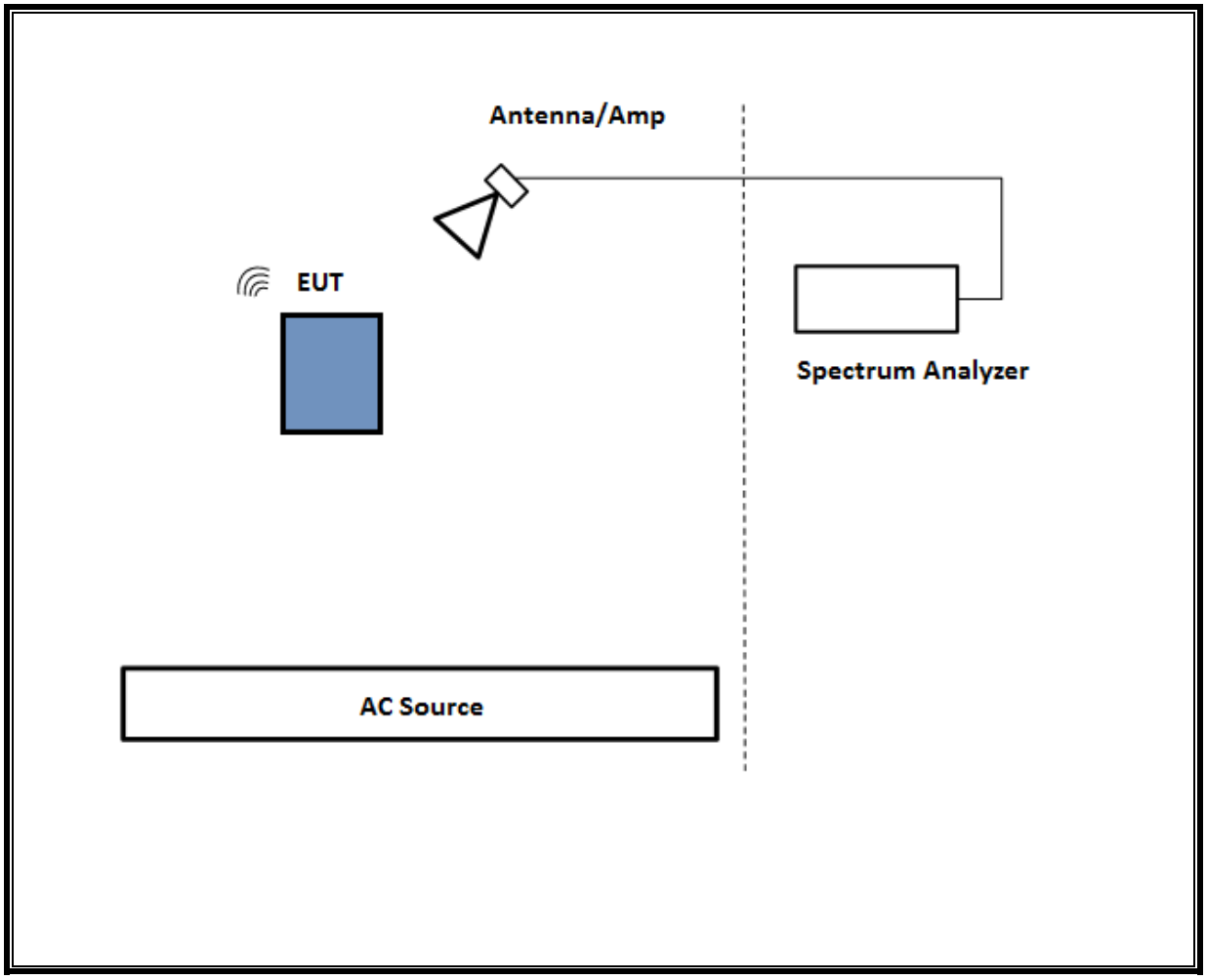
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



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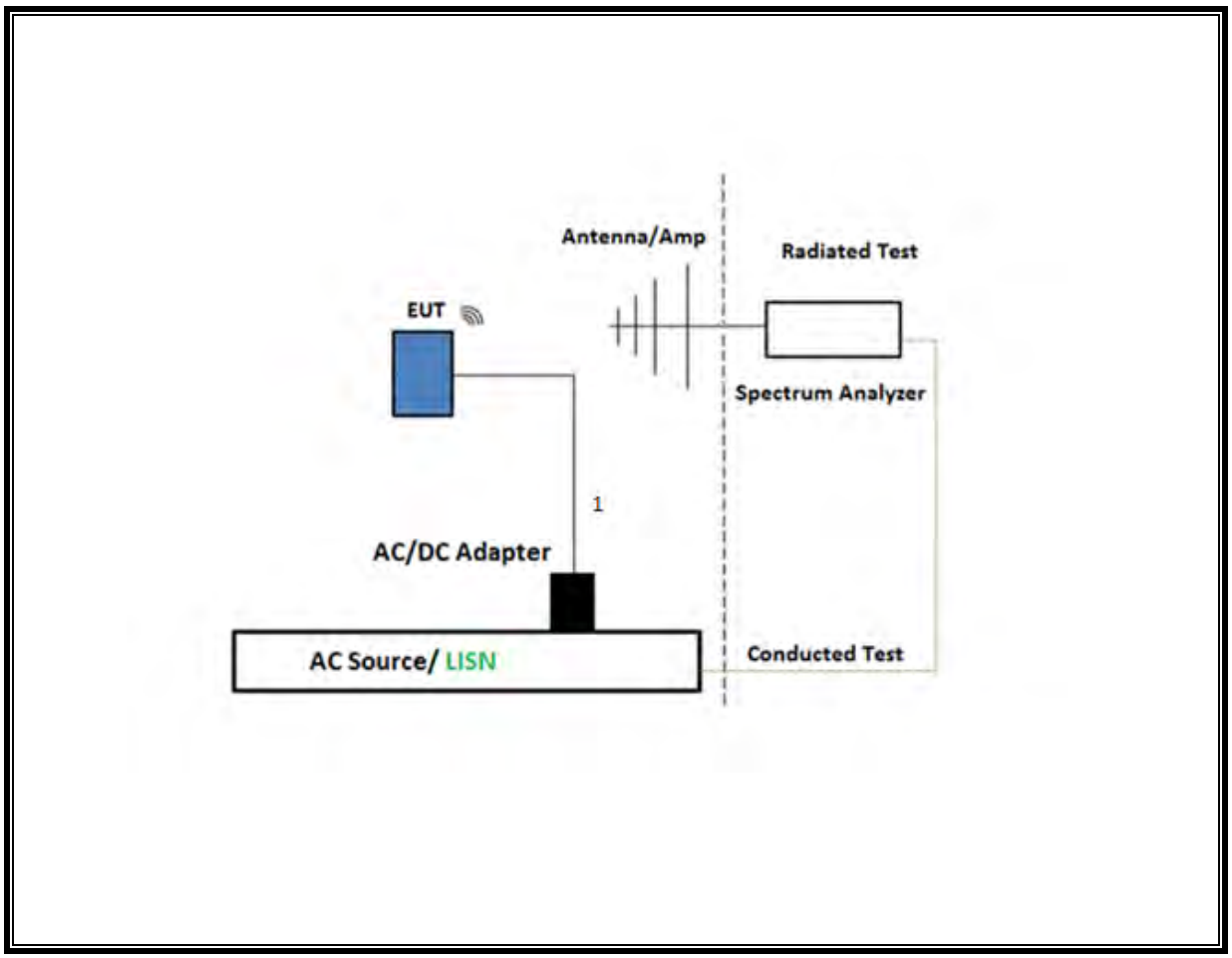
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



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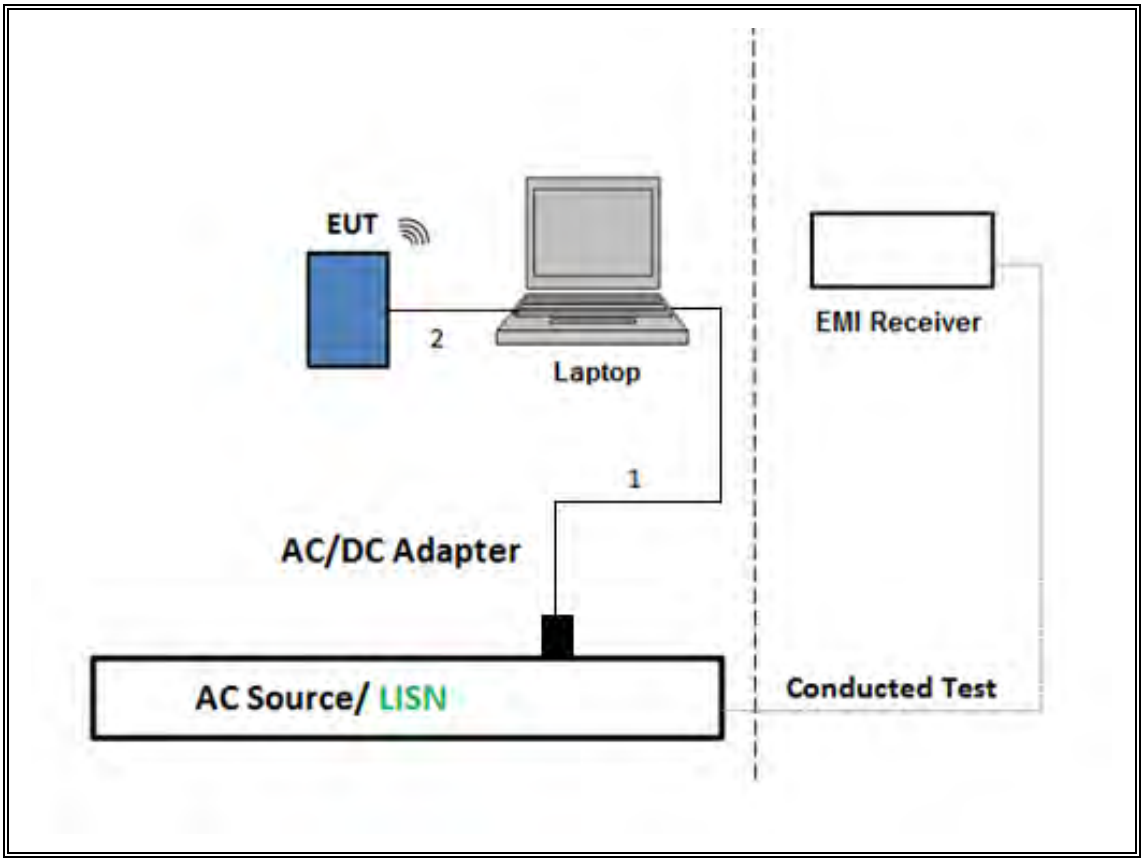
TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



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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 Num**	**Cal Due**	**Last Cal**
Antenna, Horn 1-18GHz	ETS Lindgren	3117	PRE0078107	03/01/2022	03/01/2021
Amplifier, 1 to 18GHz	Amplical	AMP0.1G18-47-20	PRE0183207	06/10/2021	06/10/2020
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB1	202329	10/27/2021	10/27/2020
Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T447	09/24/2021	09/24/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	PRE0100034	09/15/2021	09/15/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1571	08/20/2021	08/20/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	200896	08/20/2021	08/20/2020
EMI Receiver	Rohde & Schwarz	ESW44	201497	02/25/2022	02/25/2021
RF Amplifier, 1-18GHz	AMPLICAL	AMP0.1G18-47-20	172123	01/23/2022	01/23/2021
EMI Test Receiver	Rohde & Schwarz	ESW44	PRE0179522	02/19/2022	02/19/2021
EMI Receiver	Rohde & Schwarz	ESW44	201501	02/23/2022	02/23/2021
Antenna, BroadBand Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	202329	10/27/2021	10/27/2020
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	202989	12/03/2021	12/03/2020
Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T447	09/24/2021	09/24/2020
*Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	04/08/2021	04/08/2020
Spectrum Analyzer, PXA, 3Hz to 44GH	Agilent (Keysight) Technologies	N9030A	T1454	01/27/2022	01/27/2021
Power Meter, P-series single channel	Keysight	N1912A	T1244	01/25/2022	01/25/2021
Power Sensor	Keysight	N1921A	T1224	01/25/2022	01/25/2021
Antenna, Active Loop 9KHz to 30MHz	ETS-Lindgren	6502	T757	11/12/2021	11/12/2020
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T906	07/20/2021	07/20/2020

AC Line Conducted					
Description	**Manufacturer**	**Model**	**ID Num**	**Cal Due**	**Last Cal**
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	T1436	02/19/2022	02/19/2021
Power Cable, Line Conducted Emissions	UL	PR1	T861	10/27/2021	10/27/2020
LISN for Conducted Emissions CISPR-16	FISCHER CUSTOM COMMUNICATIONS	FCC-LISN-50/250-25-2-01	PRE0186446	01/20/2022	01/20/2021
UL AUTOMATION SOFTWARE					
Radiated Software	UL	UL EMC	Ver 9.5, Mar 6, 2020		
Conducted Software	UL	UL EMC	2020.2.26		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, February 21, 2020		

Note: *Testing is completed before equipment expiration date.

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8. MEASUREMENT METHODS

On Time and Duty Cycle: ANSI C63.10-2013 Section 11.6

Occupied BW (20dB): ANSI C63.10-2013 Section 6.9.2

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Carrier Frequency Separation: ANSI C63.10-2013 Section 7.8.2

Number of Hopping Frequencies: ANSI C63.10-2013 Section 7.8.3

Time of Occupancy (Dwell Time): ANSI C63.10-2013 Section 7.8.4

Peak Output Power: ANSI C63.10-2013 Section 7.8.5

Conducted Spurious Emissions: ANSI C63.10-2013 Section 7.8.8

Conducted Band-Edge: ANSI C63.10-2013 Section 6.10.4

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4 & 13

Radiated Spurious Emissions 30-1000MHz: ANSI C63.10-2013 Section 6.3, 6.5 & 13

Radiated Spurious Emissions above 1GHz: ANSI C63.10-2013 Section 6.3, 6.6 & 13

Radiated Band-edge: ANSI C63.10-2013 Section 6.10.5 & 13

AC Power-line conducted emissions: ANSI C63.10-2013, 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	2.15	2.15	1.000	100.0%	0.00	0.010
Bluetooth 8PSK	1.70	1.70	1.000	100.0%	0.00	0.010
Bluetooth GFSK TxBF	1.42	1.42	1.000	100.0%	0.00	0.010
Bluetooth 8PSK TxBF	1.42	1.422	1.000	100.0%	0.00	0.010

Note: Low power duty cycle is same as high power

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DUTY CYCLE PLOTS

HIGH POWER GFSK

HIGH POWER 8PSK

BLUETOOTH GFSK

BLUETOOTH 8PSK

Note: Low power duty cycle is same as high power

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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 3x RBW. 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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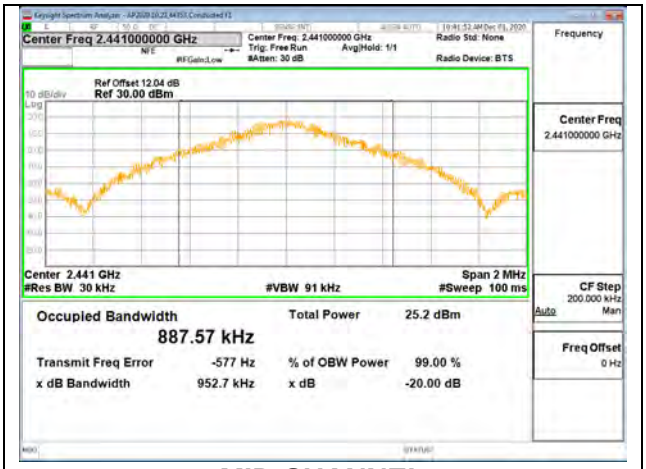
9.2.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 3

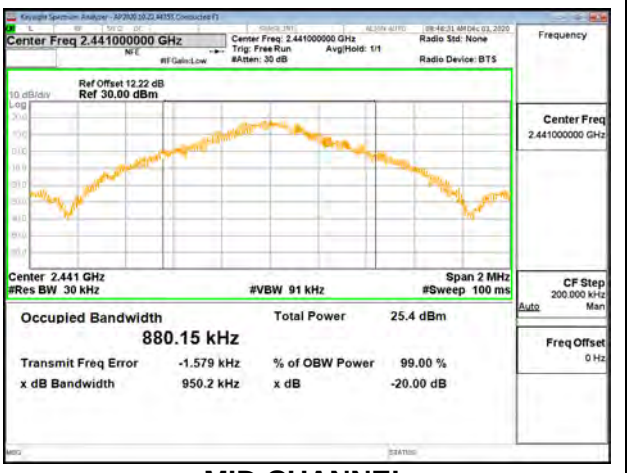
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.952	0.889
Mid	2441	0.953	0.888
High	2480	0.941	0.886



MID CHANNEL

ANT 3

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	0.941	0.890
Mid	2441	0.950	0.880
High	2480	0.942	0.879



MID CHANNEL

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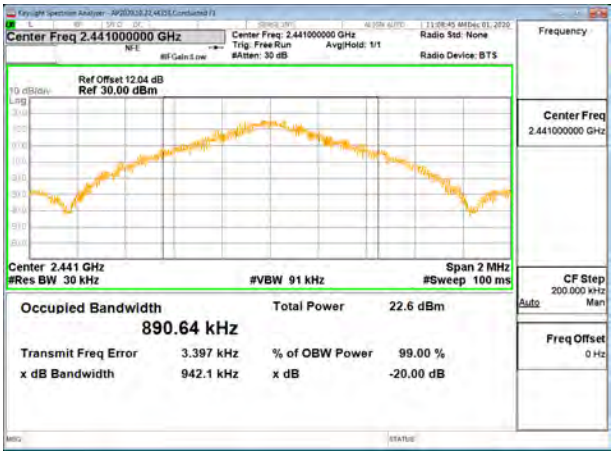
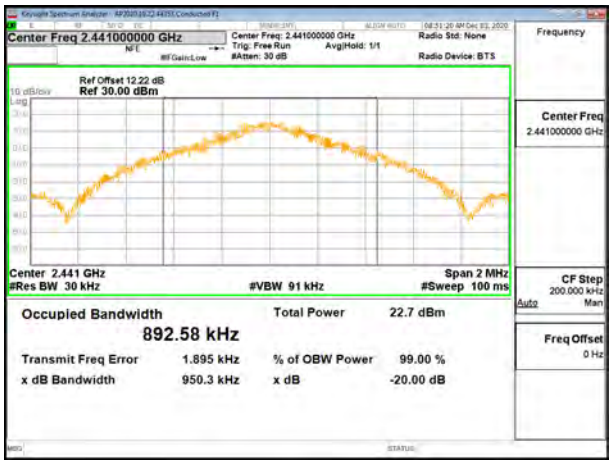
9.2.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

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	0.942	0.953	0.890	0.887
Mid	2441	0.942	0.950	0.891	0.893
High	2480	0.942	0.942	0.894	0.880

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



MID CHANNEL ANT 4



MID CHANNEL ANT 3

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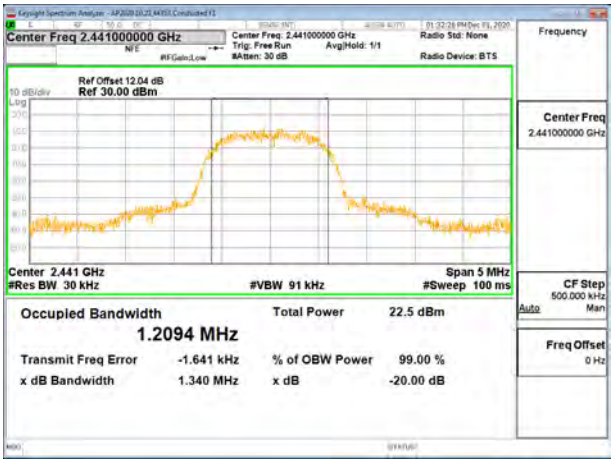
9.2.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.335	1.208
Mid	2441	1.340	1.209
High	2480	1.350	1.207



MID CHANNEL

ANT 3

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low	2402	1.348	1.201
Mid	2441	1.349	1.209
High	2480	1.352	1.212

MID CHANNEL

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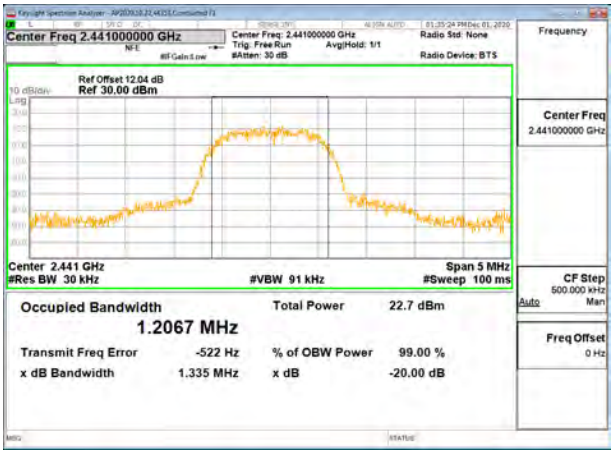
9.2.4. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

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	1.337	1.335	1.204	1.206
Mid	2441	1.335	1.348	1.207	1.205
High	2480	1.348	1.336	1.203	1.210



MID CHANNEL ANT 4

MID CHANNEL ANT 3

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9.3. HOPPING FREQUENCY SEPARATION

LIMITS

FCC §15.247 (a) (1)

RSS-247 (5.1) (b)

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

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 300 kHz and the VBW is set to VBW >= 3xRBW. The sweep time is coupled.

RESULTS

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

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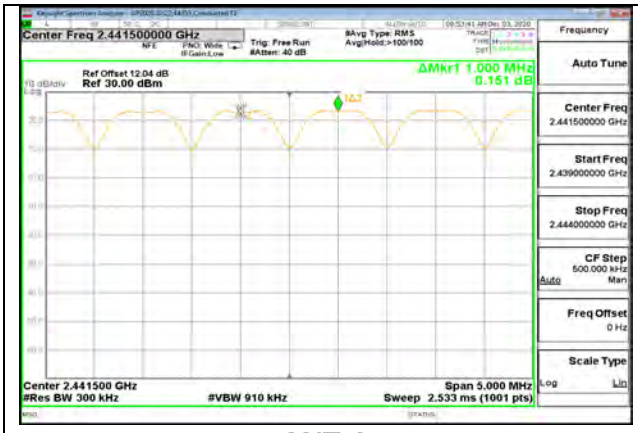
9.3.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

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 exact same channel plan

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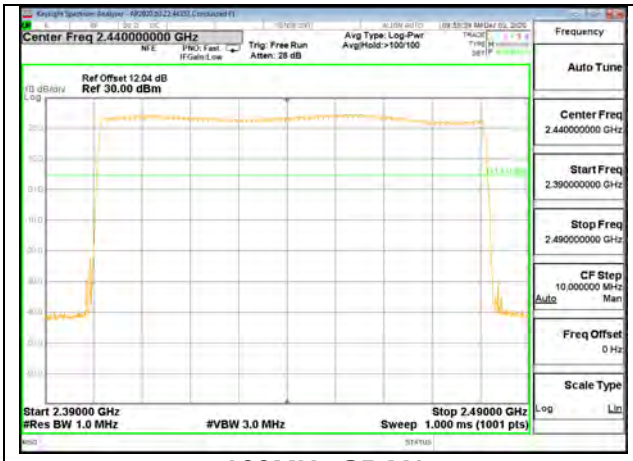
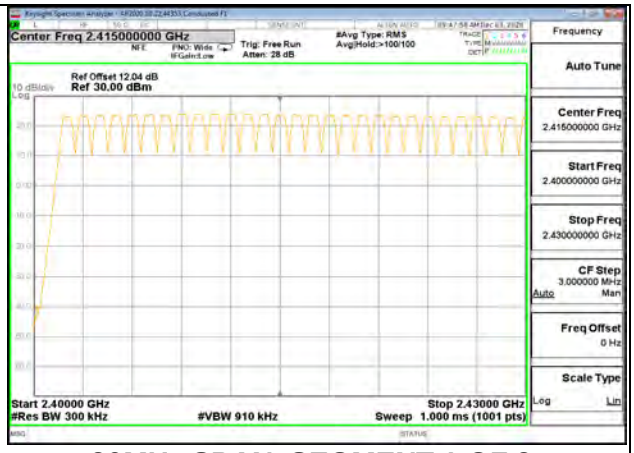
9.4.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

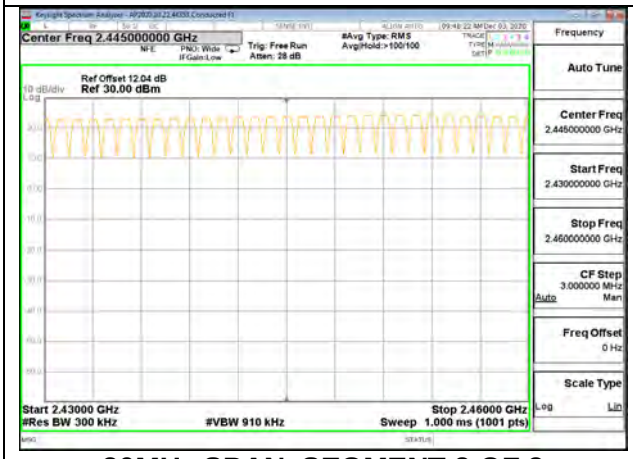
ANT 4



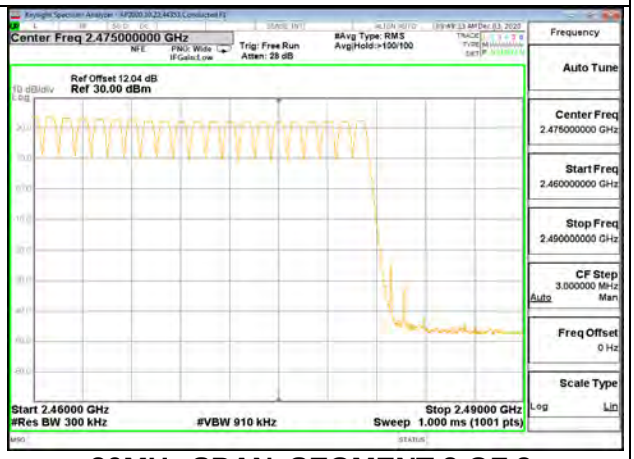
100MHz SPAN



30MHz SPAN, SEGMENT 1 OF 3



30MHz SPAN, SEGMENT 2 OF 3



30MHz SPAN, SEGMENT 3 OF 3

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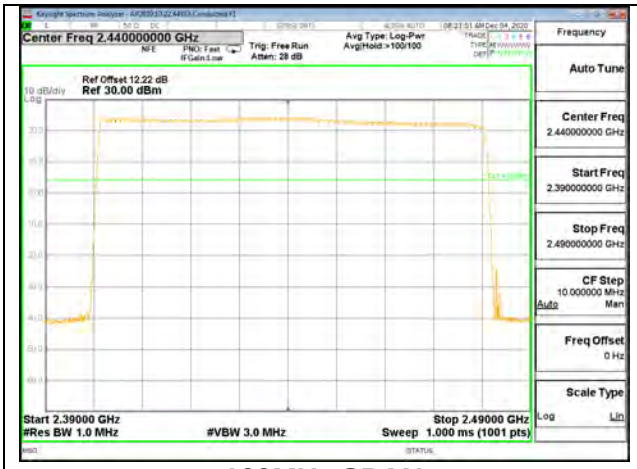
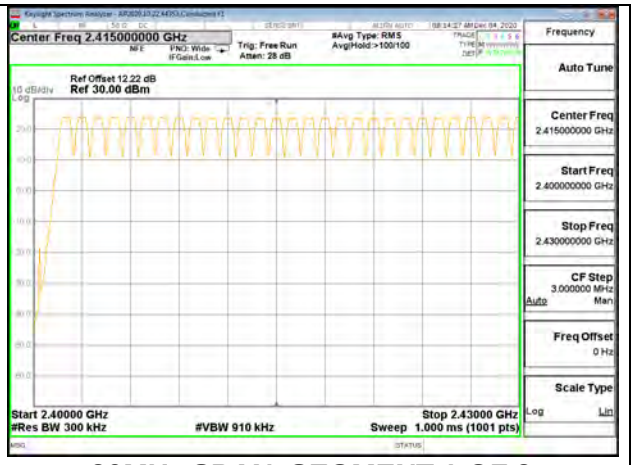
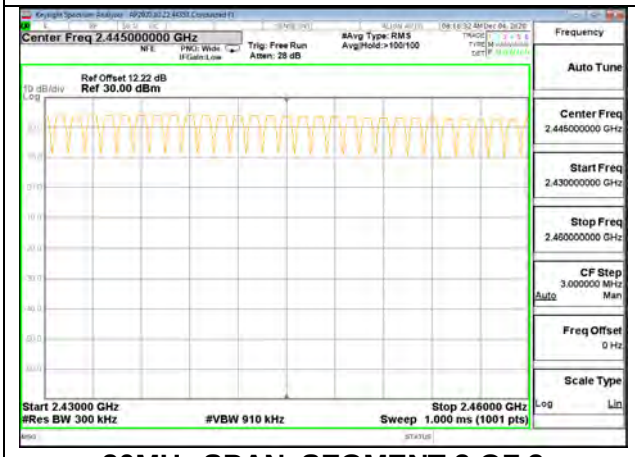
ANT 3



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	0.377	32	0.1206	0.4	-0.2794
DH3	1.63	16	0.2608	0.4	-0.1392
DH5	2.876	10	0.2876	0.4	-0.1124
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	0.03016	0.4	-0.3698
DH3	1.63	4	0.06520	0.4	-0.3348
DH5	2.876	2.5	0.07190	0.4	-0.3281

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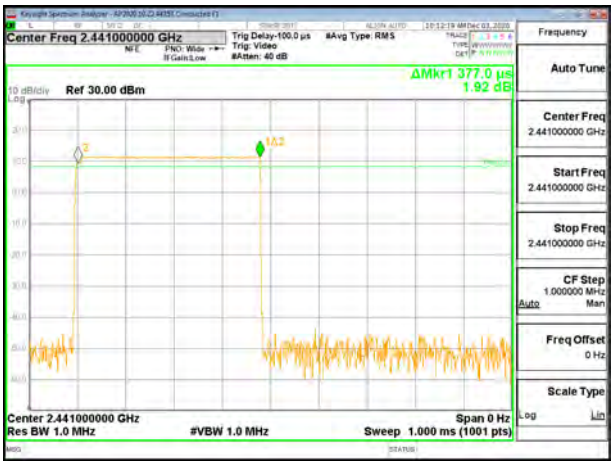
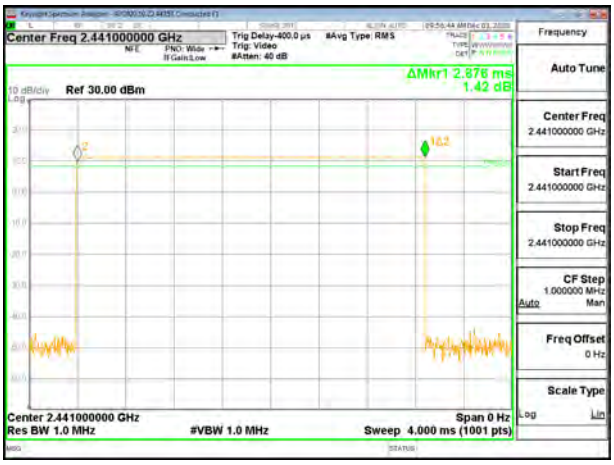
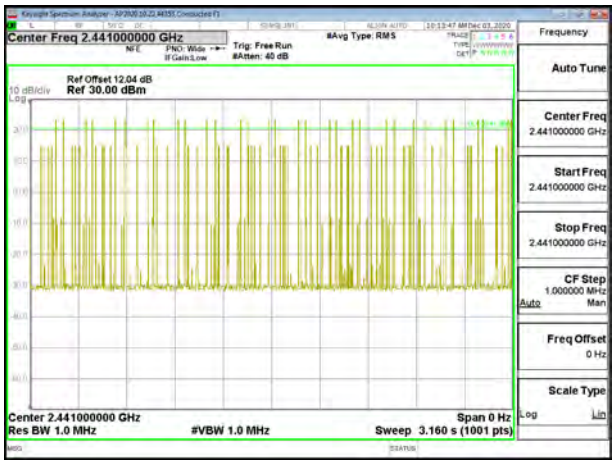


PULSE WIDTH – DH1

PULSE WIDTH – DH3

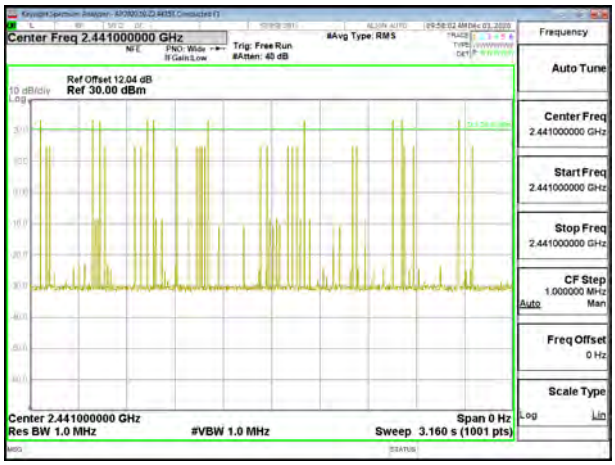


PULSE WIDTH – DH5



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3



NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

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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	0.1206	0.4	-0.2794
DH3	1.63	16	0.2608	0.4	-0.1392
DH5	2.872	11	0.3159	0.4	-0.0841
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	0.03016	0.4	-0.3698
DH3	1.63	4	0.06520	0.4	-0.3348
DH5	2.872	2.75	0.07898	0.4	-0.3210

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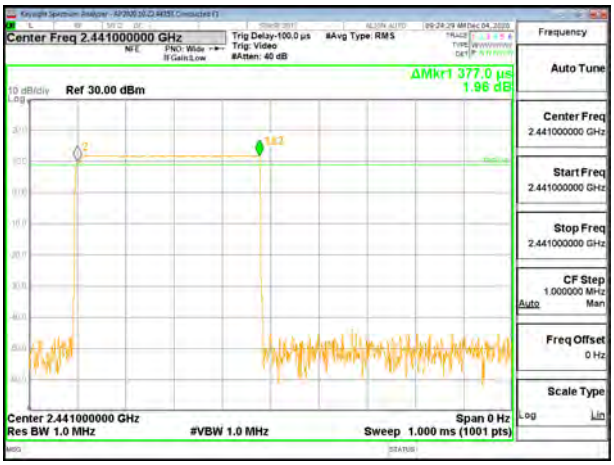
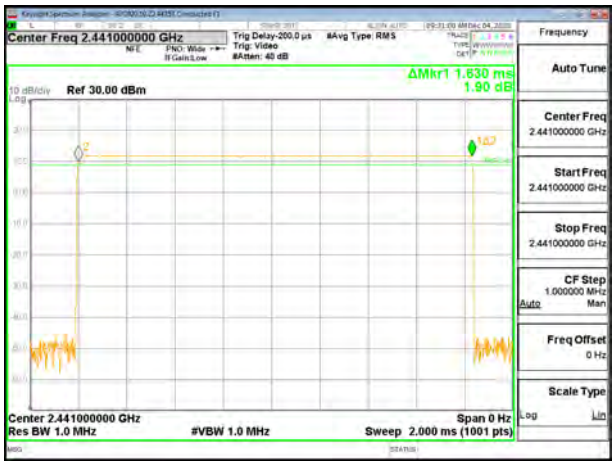
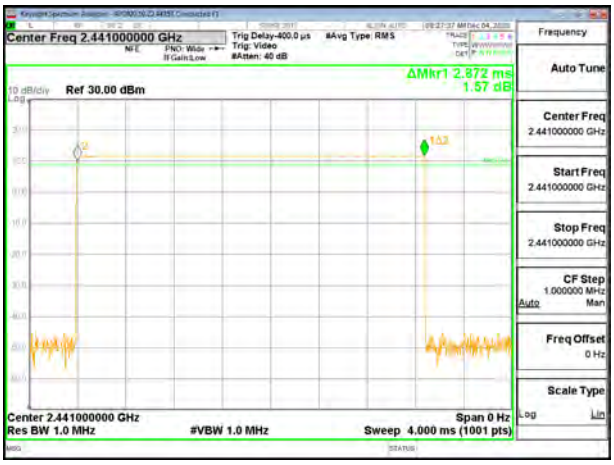


PULSE WIDTH – DH1



PULSE WIDTH – DH3



PULSE WIDTH – DH5

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH1

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH3

NUMBER OF PULSES IN 3.16 SECOND OBSERVATION PERIOD – DH5

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9.6. 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 was perform using a power meter with wideband peak power sensor.

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	0.10	-0.60	-0.24	2.77

RESULTS

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9.6.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	19.50	21	-1.5
Middle	2441	19.53	21	-1.47
High	2480	19.49	21	-1.51

ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	20.01	21	-0.99
Middle	2441	20.14	21	-0.86
High	2480	20.09	21	-0.91

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9.6.2. HIGH POWER ENHANCED DATA RATE QPSK MODULATION

ANT 4

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	18.49	21	-2.51
Middle	2441	18.51	21	-2.49
High	2480	18.59	21	-2.41

ANT 3

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	18.58	21	-2.42
Middle	2441	18.62	21	-2.38
High	2480	18.60	21	-2.4

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9.6.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	18.51	21	-2.49
Middle	2441	18.52	21	-2.48
High	2480	18.62	21	-2.38

ANT 3

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	18.60	21	-2.4
Middle	2441	18.63	21	-2.37
High	2480	18.63	21	-2.37

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9.6.4. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.13	21	-9.87
Middle	2441	11.16	21	-9.84
High	2480	11.12	21	-9.88

ANT 3

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.18	21	-9.82
Middle	2441	11.14	21	-9.86
High	2480	11.12	21	-9.88

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9.6.5. LOW POWER ENHANCED DATA RATE QPSK MODULATION

ANT 4

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.28	21	-9.72
Middle	2441	11.39	21	-9.61
High	2480	11.25	21	-9.75

ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.27	21	-9.73
Middle	2441	11.36	21	-9.64
High	2480	11.30	21	-9.7

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9.6.6. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.45	21	-9.55
Middle	2441	11.63	21	-9.37
High	2480	11.49	21	-9.51

ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.52	21	-9.48
Middle	2441	11.61	21	-9.39
High	2480	11.53	21	-9.47

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9.6.7. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	17.01	17.10	20.07	21	-0.93
Middle	2441	17.15	17.23	20.20	21	-0.80
High	2480	17.11	17.20	20.17	21	-0.83

9.6.8. HIGH POWER ENHANCED DATA RATE TXBF QPSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.37	16.45	19.42	21	-1.58
Middle	2441	16.45	16.51	19.49	21	-1.51
High	2480	16.42	16.47	19.46	21	-1.54

9.6.9. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	16.43	16.46	19.46	21	-1.54
Middle	2441	16.50	16.51	19.52	21	-1.48
High	2480	16.45	16.49	19.48	21	-1.52

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9.6.10. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	44353
Date:	7/29/2021

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.12	11.15	14.15	21	-6.85
Middle	2441	11.16	11.19	14.19	21	-6.81
High	2480	11.13	11.16	14.16	21	-6.84

9.6.11. LOW POWER ENHANCED DATA RATE TXBF QPSK MODULATION

ANT 4 + ANT 3

Tested By:	12492
Date:	12/11/2020

Channel	Frequency (MHz)	Output Power ANT 4 (dBm)	Output Power ANT 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.57	11.58	14.59	21	-6.41
Middle	2441	11.63	11.62	14.64	21	-6.36
High	2480	11.54	11.52	14.54	21	-6.46

9.6.12. LOW POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Output Power Antenna 1 (dBm)	Output Power Antenna 2 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	11.59	11.61	14.61	21	-6.39
Middle	2441	11.65	11.64	14.66	21	-6.34
High	2480	11.57	11.55	14.57	21	-6.43

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9.7. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

Measurements was performed using a power meter with wideband average power sensor

RESULTS

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9.7.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	19.18
Middle	2441	19.20
High	2480	19.19

ANT 3

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	19.60
Middle	2441	19.77
High	2480	19.69

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9.7.2. HIGH POWER ENHANCED DATA RATE QPSK MODULATION

ANT 4

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.23
Middle	2441	16.26
High	2480	16.30

ANT 3

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.26
Middle	2441	16.31
High	2480	16.29

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9.7.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.24
Middle	2441	16.28
High	2480	16.33

ANT 3

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	16.27
Middle	2441	16.32
High	2480	16.31

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9.7.4. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	10.71
Middle	2441	10.73
High	2480	10.70

ANT 3

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	10.78
Middle	2441	10.72
High	2480	10.71

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9.7.5. LOW POWER ENHANCED DATA RATE QPSK MODULATION

ANT 4

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.37
Middle	2441	8.45
High	2480	8.41

ANT 3

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.38
Middle	2441	8.44
High	2480	8.43

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9.7.6. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.37
Middle	2441	8.45
High	2480	8.41

ANT 3

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	8.41
Middle	2441	8.44
High	2480	8.38

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9.7.7. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Average Power (dBm)
Low	2402	16.61	16.7	19.67
Middle	2441	16.76	16.84	19.81
High	2480	16.71	16.80	19.77

9.7.8. HIGH POWER BASIC DATA RATE TXBF QPSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	13.32	13.37	16.36
Middle	2441	13.40	13.43	16.43
High	2480	13.35	13.40	16.39

9.7.9. HIGH POWER ENHANCED DATA TXBF RATE 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Average Power (dBm)
Low	2402	13.35	13.41	16.39
Middle	2441	13.42	13.46	16.45
High	2480	13.37	13.43	16.41

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9.7.10. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 + ANT 3

Tested By:	44353
Date	7/29/2021

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Average Power (dBm)
Low	2402	10.73	10.75	13.75
Middle	2441	10.76	10.80	13.79
High	2480	10.72	10.76	13.75

9.7.11. LOW POWER BASIC DATA RATE TXBF QPSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date:	7/8/2021

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Power (dBm)
Low	2402	8.42	8.43	11.44
Middle	2441	8.45	8.45	11.46
High	2480	8.39	8.37	11.39

9.7.12. LOW POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

ANT 4 + ANT 3

Tested By:	39919
Date	7/8/2021

Channel	Frequency (MHz)	Average Power ANT 4 (dBm)	Average Power ANT 3 (dBm)	Total Average Power (dBm)
Low	2402	8.45	8.41	11.44
Middle	2441	8.48	8.49	11.50
High	2480	8.43	8.44	11.45

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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 bandedges at 2.4 and 2.4835 GHz are investigated with the transmitter set to the normal hopping mode.

RESULTS

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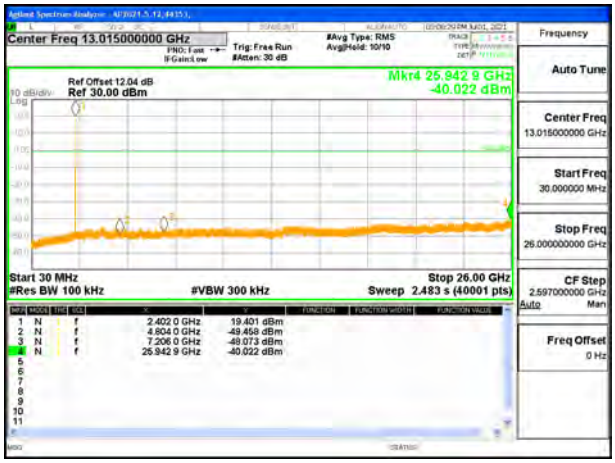
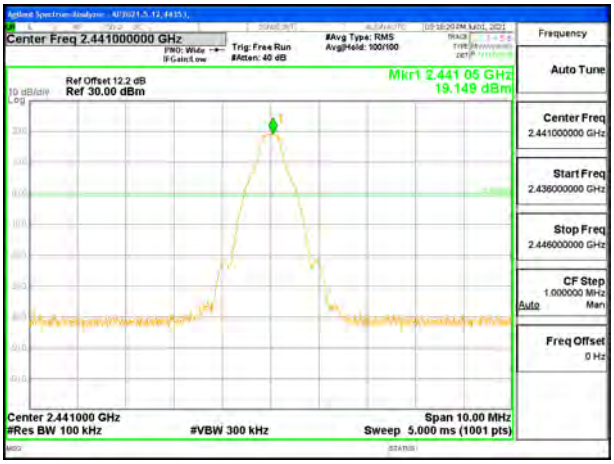
9.8.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE



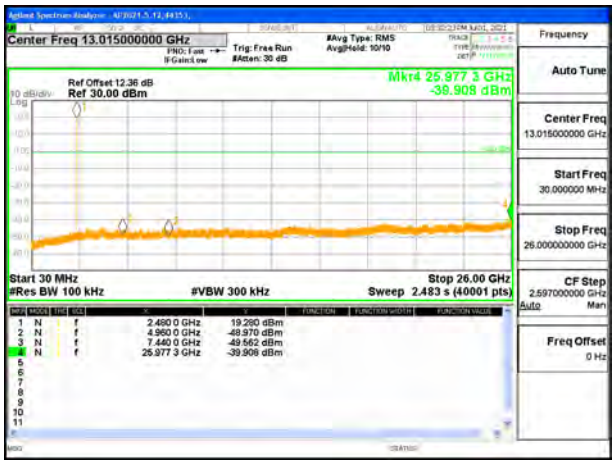
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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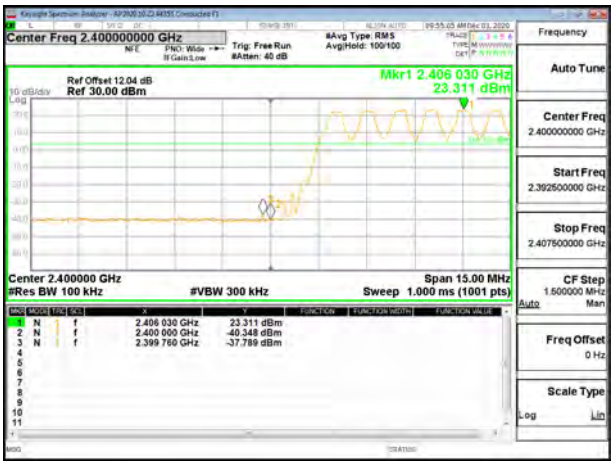
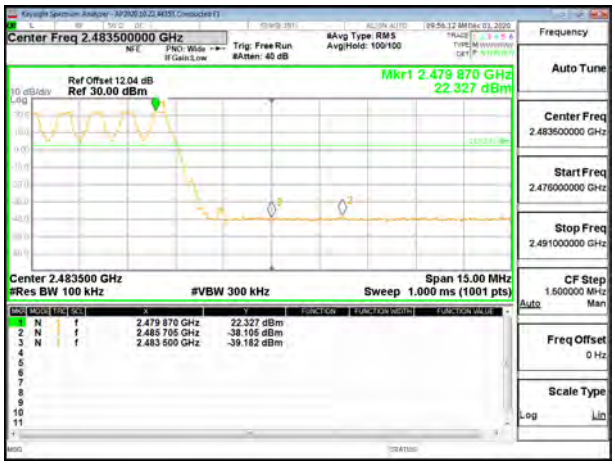
ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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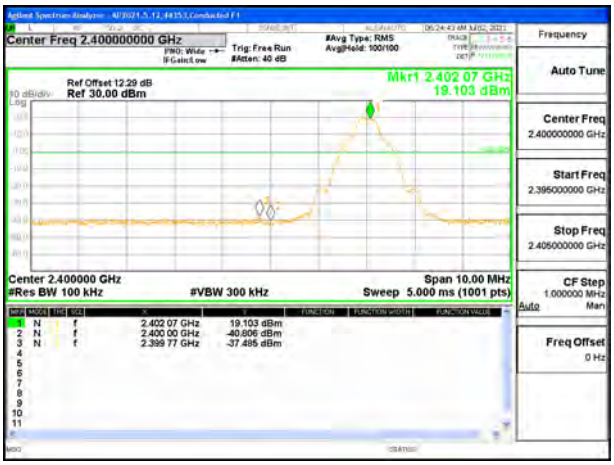
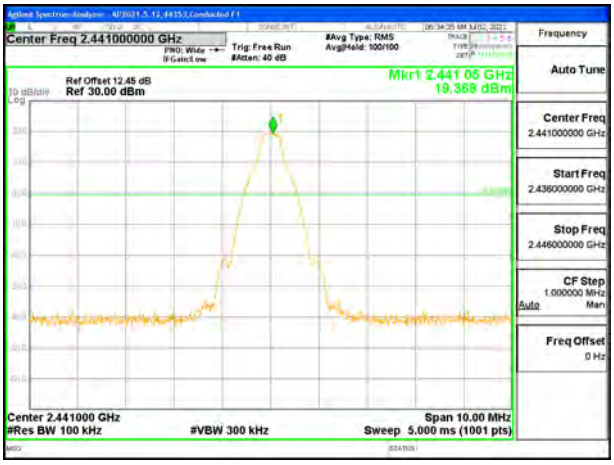
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



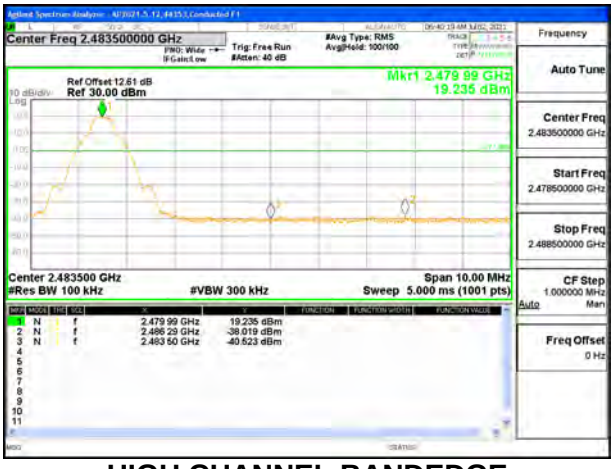
LOW CHANNEL BANDEDGE

OUT-OF-BAND LOW CHANNEL

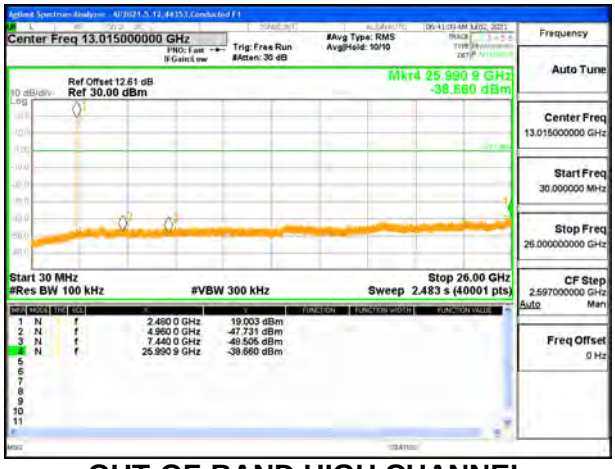


IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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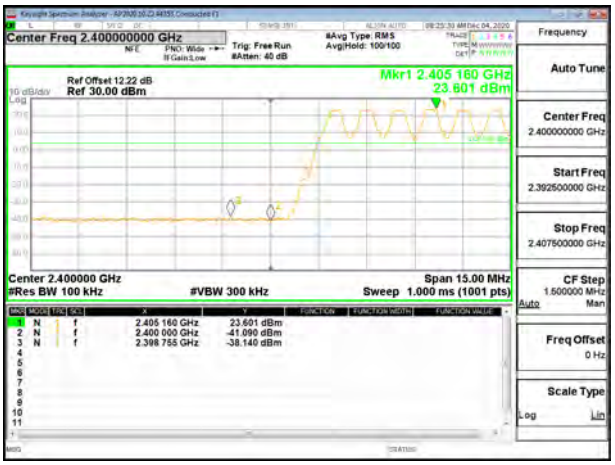
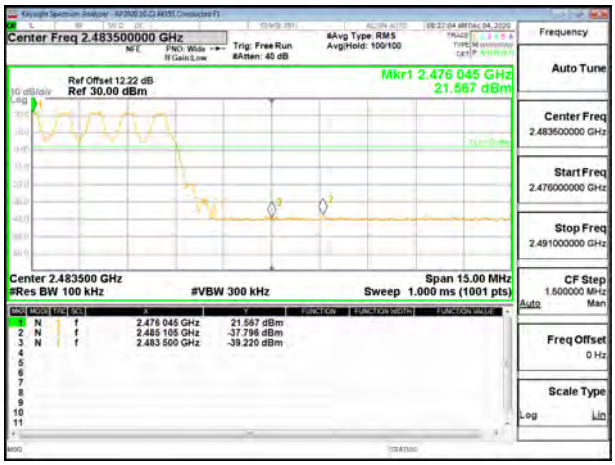
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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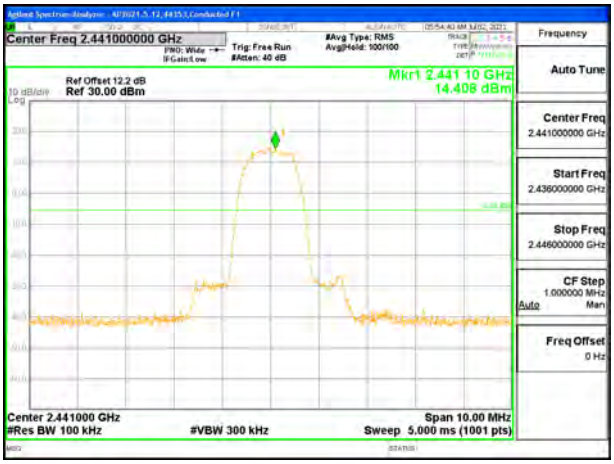
9.8.2. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE

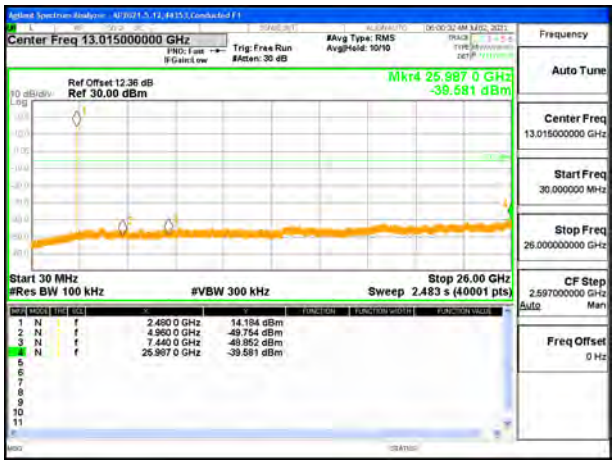
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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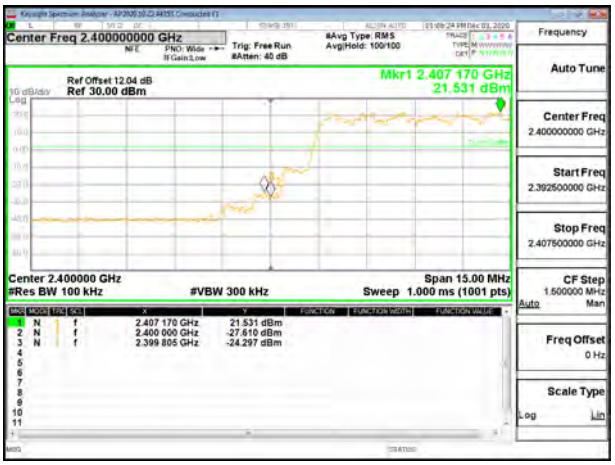
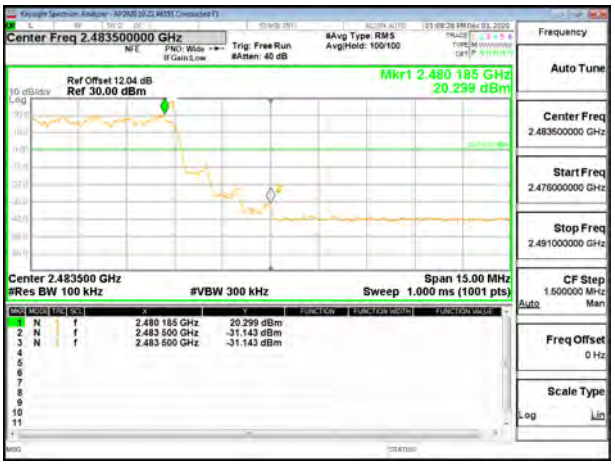
ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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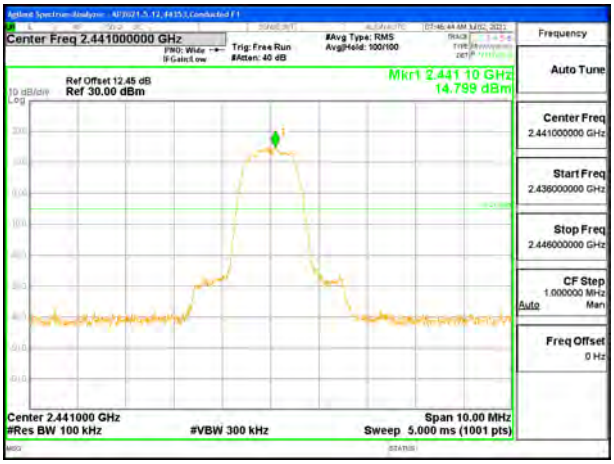
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING

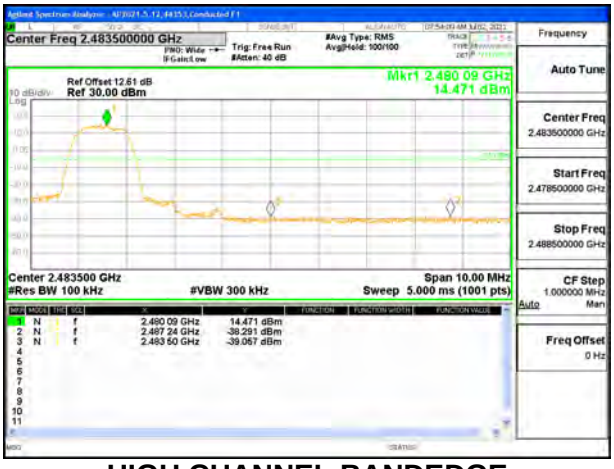
LOW CHANNEL BANDEDGE

OUT-OF-BAND LOW CHANNEL

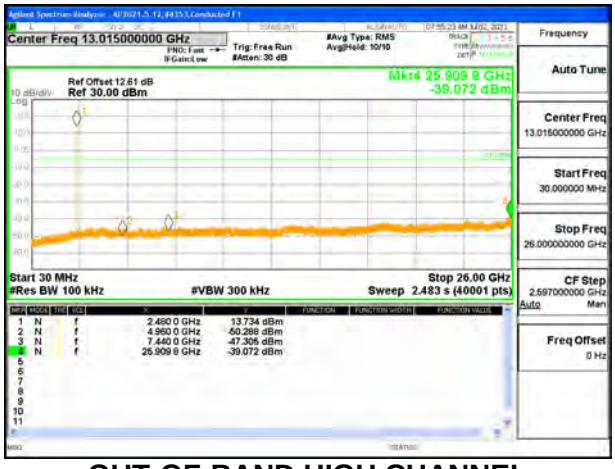


IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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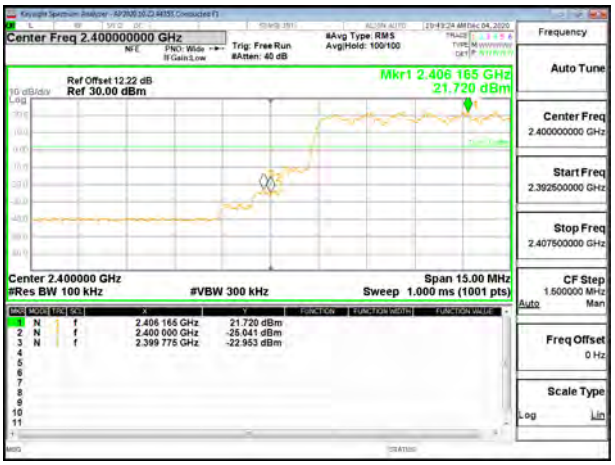
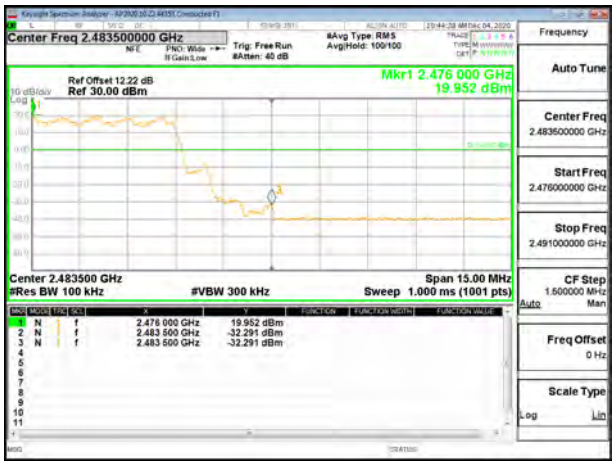
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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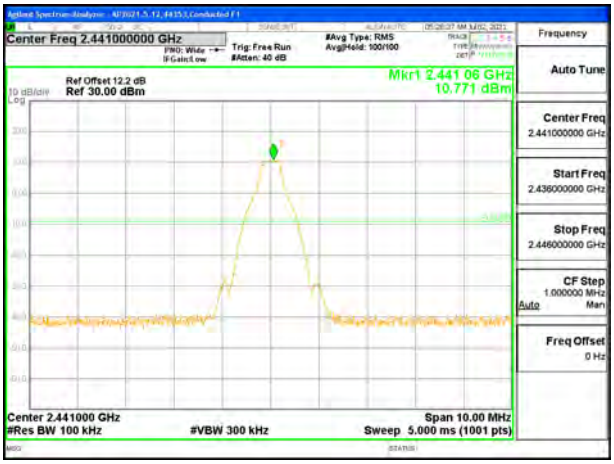
9.8.3. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE

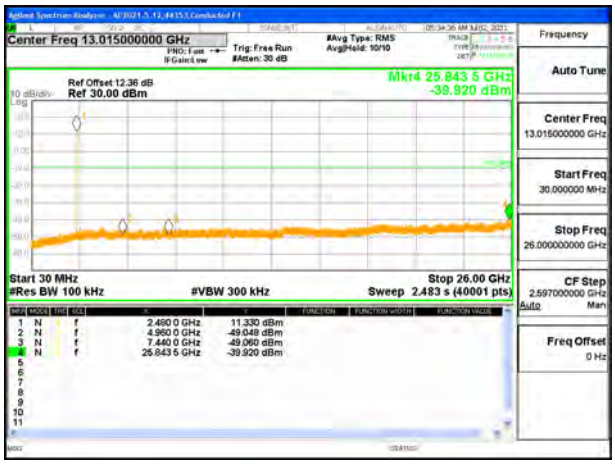
OUT-OF-BAND LOW CHANNEL



IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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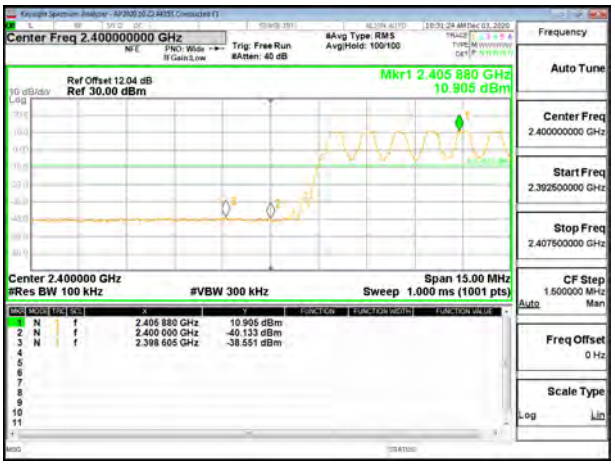
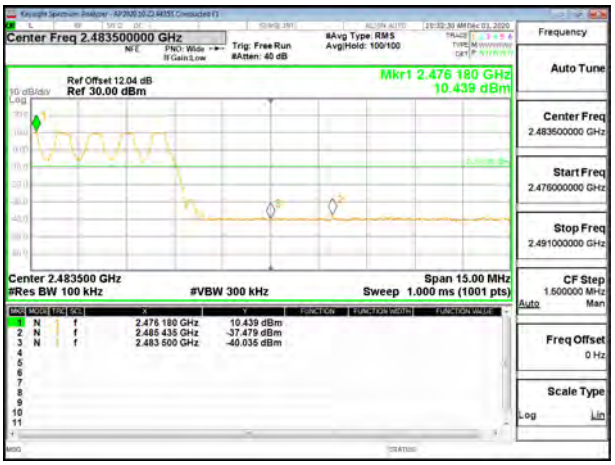
ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



HIGH BANDEDGE

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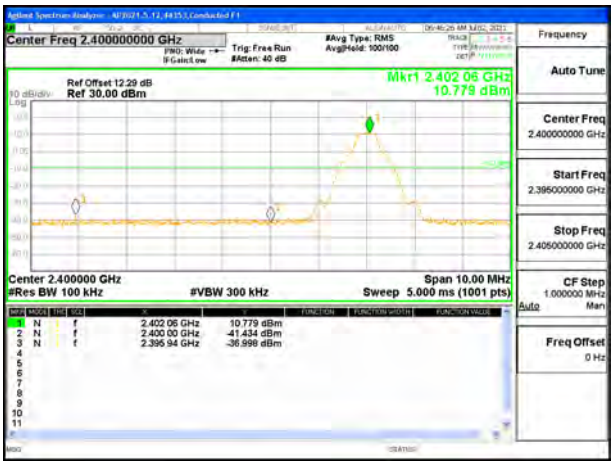
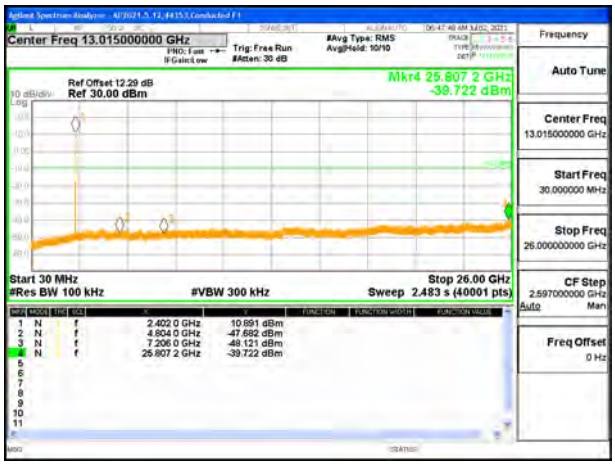
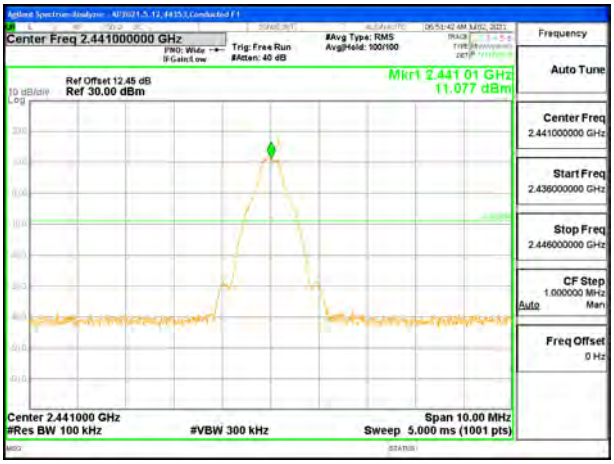
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



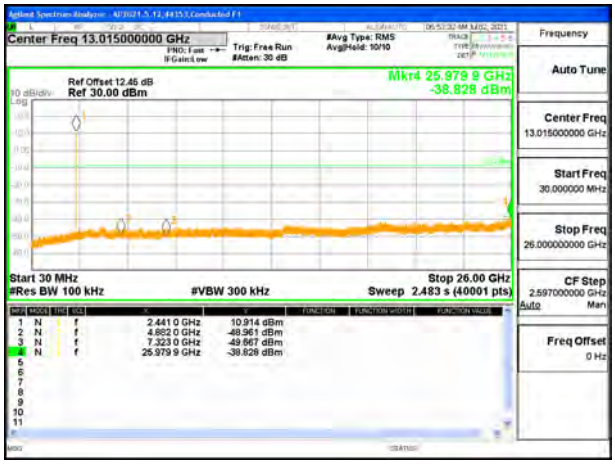
LOW CHANNEL BANDEDGE



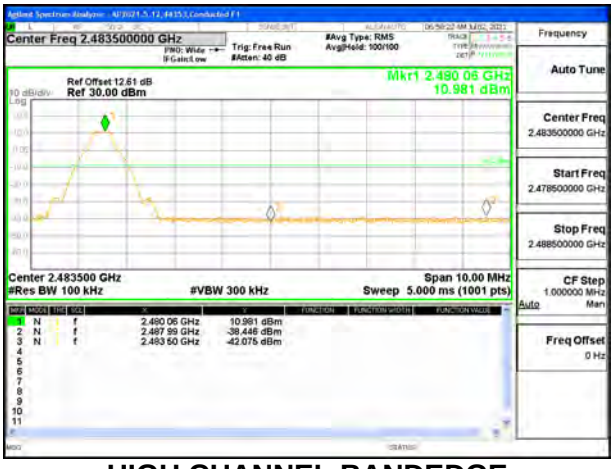
OUT-OF-BAND LOW CHANNEL



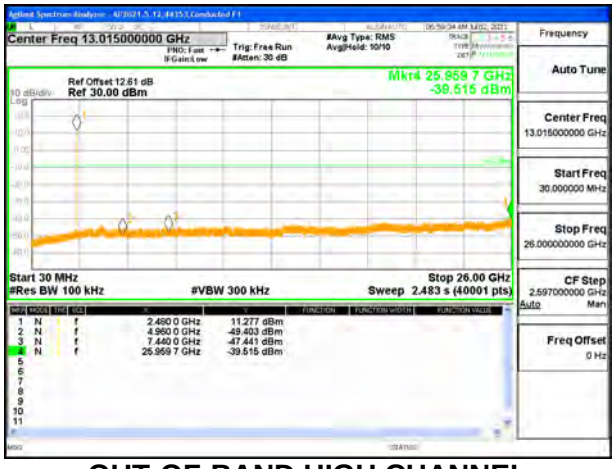
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

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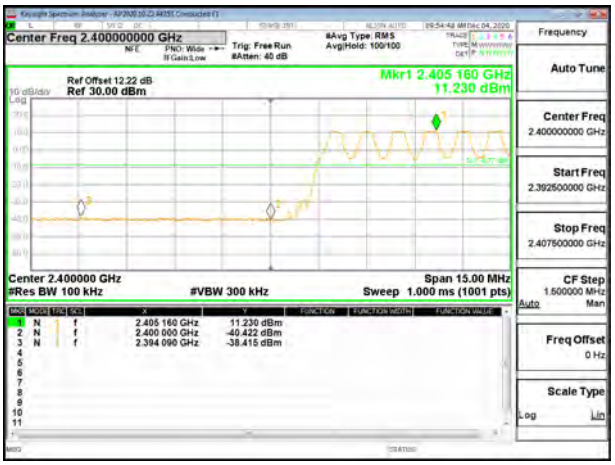
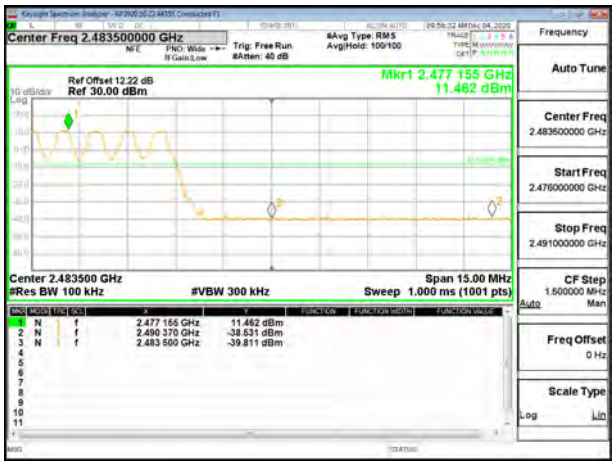
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



LOW BANDEDGE



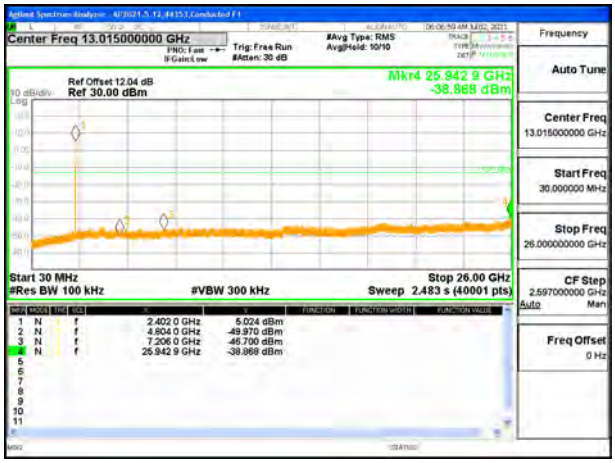
HIGH BANDEDGE

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

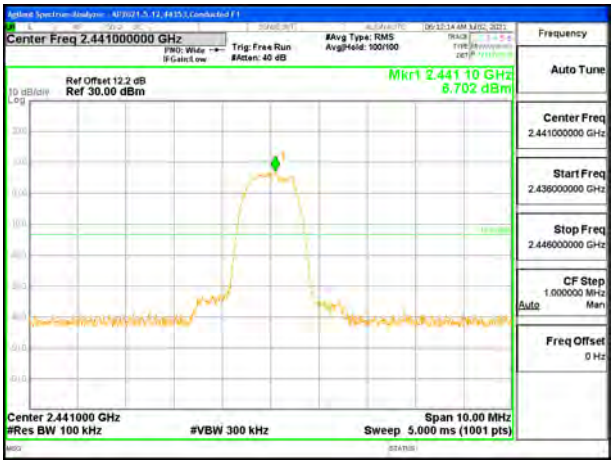
9.8.4. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

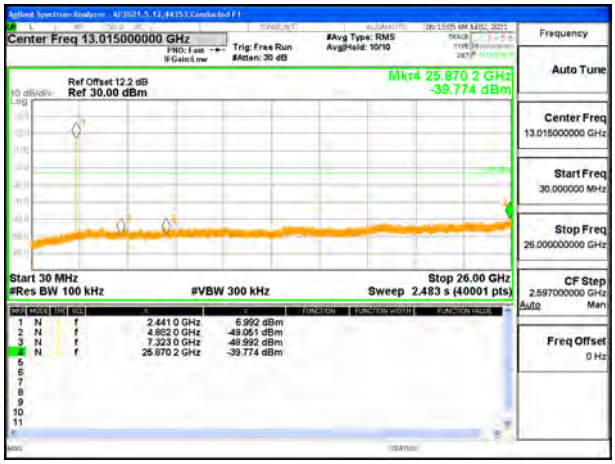
LOW CHANNEL BANDEDGE



OUT-OF-BAND LOW CHANNEL

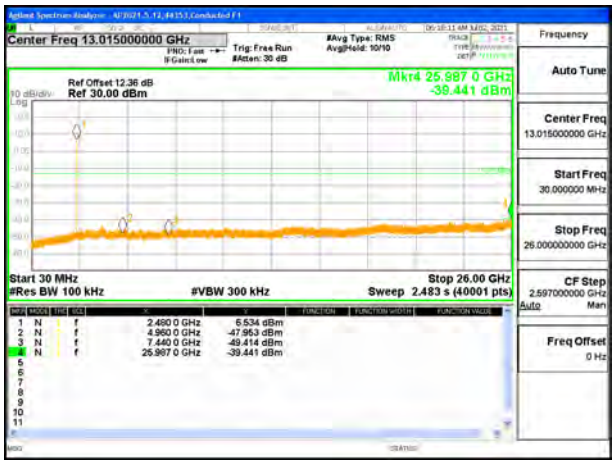


IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

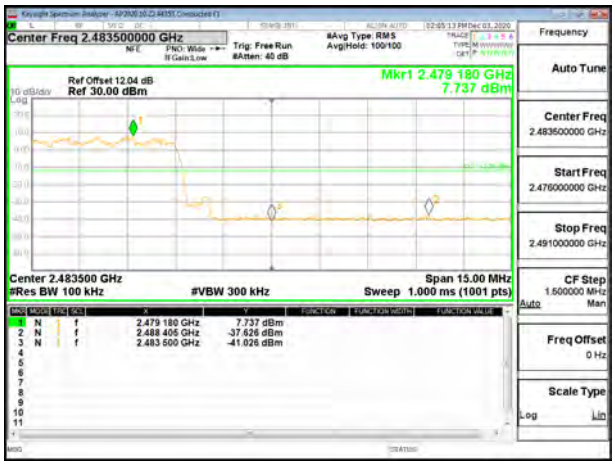


OUT-OF-BAND HIGH CHANNEL

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

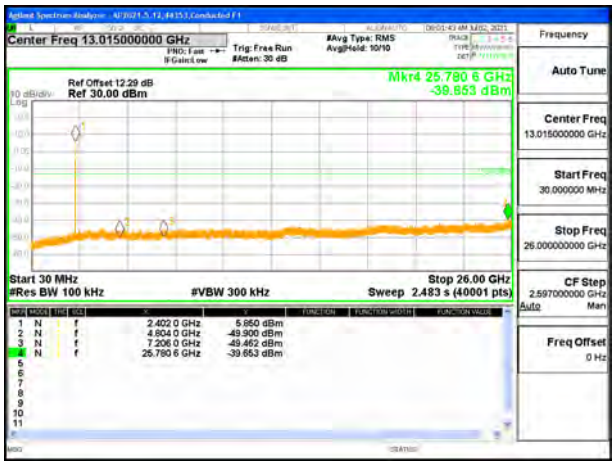


HIGH BANDEDGE

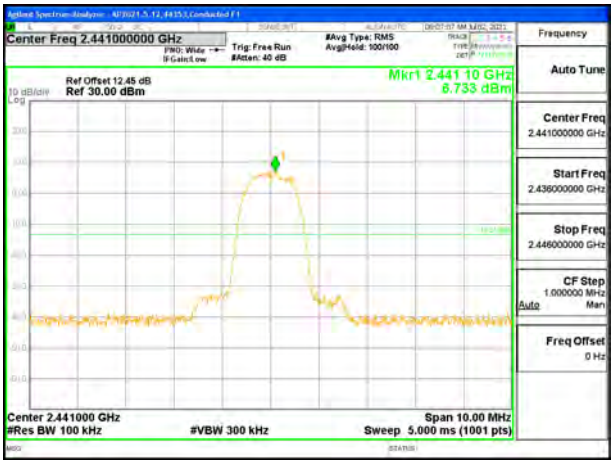
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

ANT 3 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE

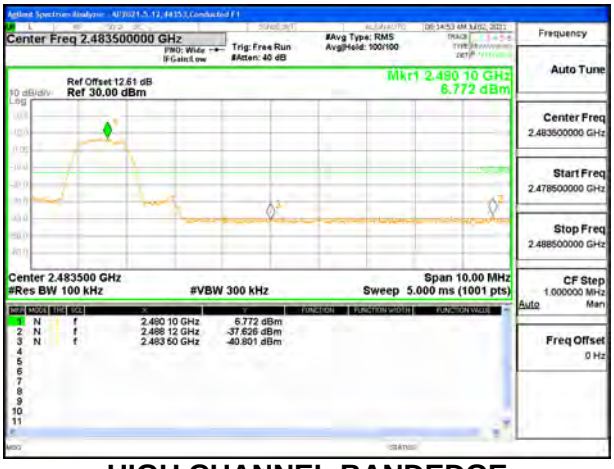


OUT-OF-BAND LOW CHANNEL

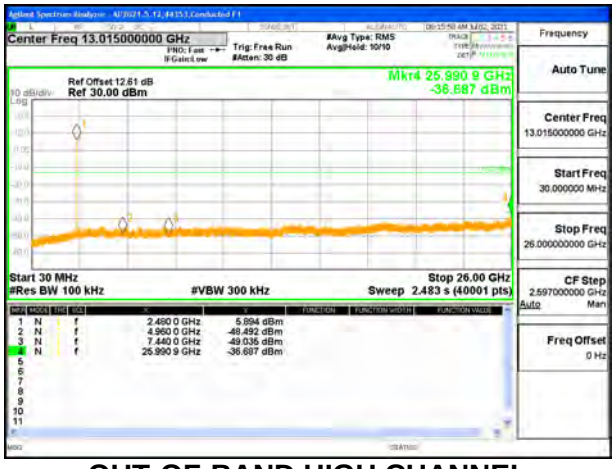


IN-BAND REFERENCE LEVEL

OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE

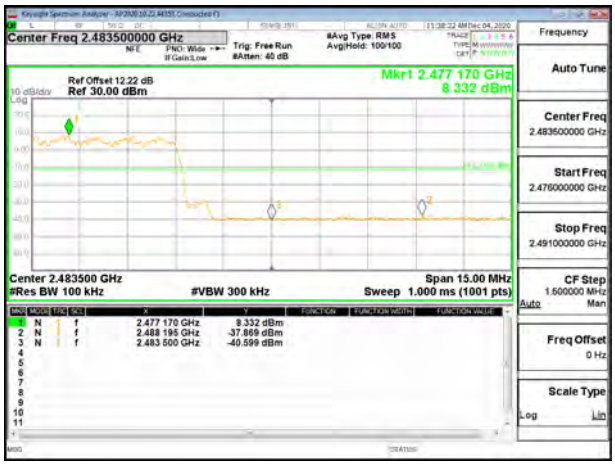


OUT-OF-BAND HIGH CHANNEL

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

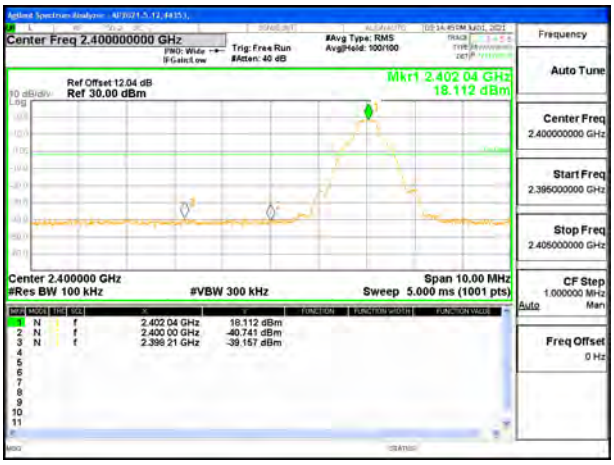


HIGH BANDEDGE

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

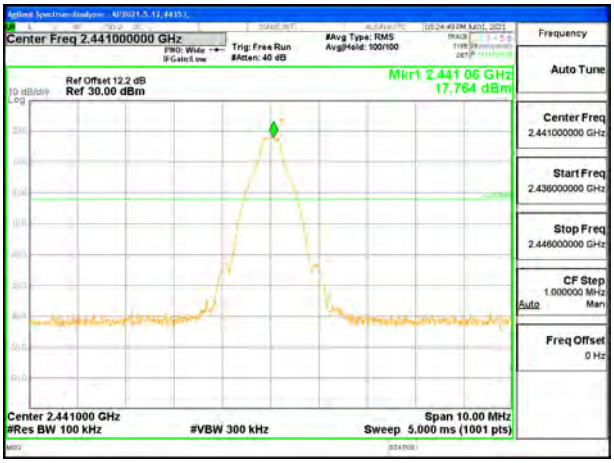
9.8.5. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE

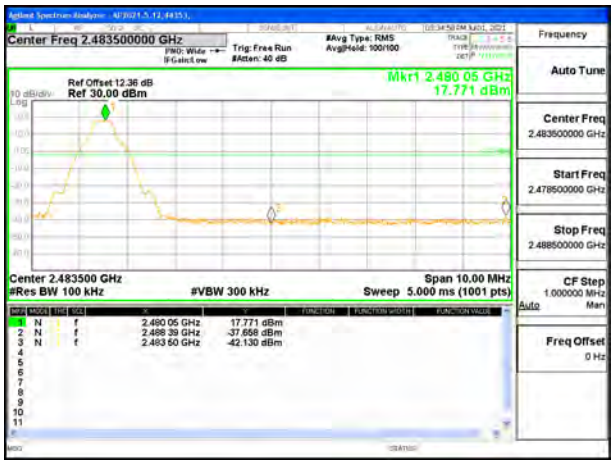
OUT-OF-BAND LOW CHANNEL



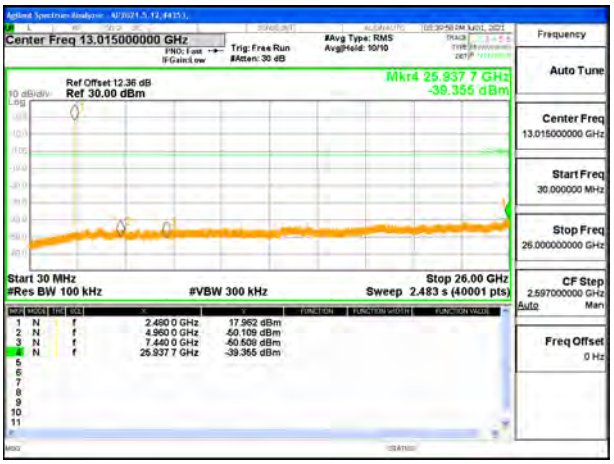
MID CHANNEL BANDEDGE

OUT-OF-BAND MID CHANNEL

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



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

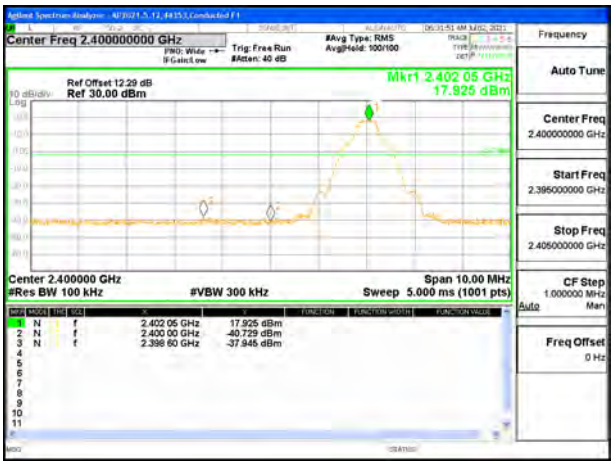
ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE

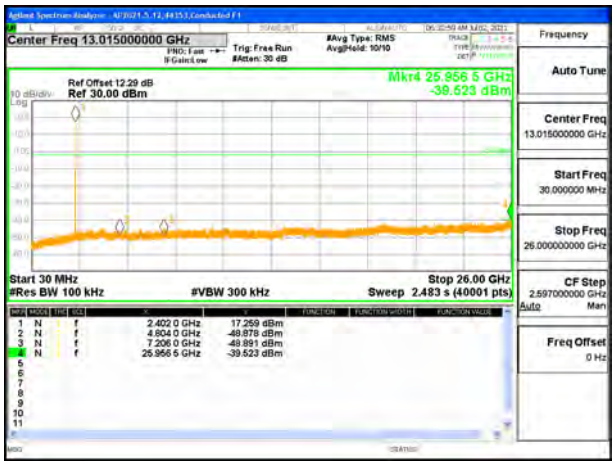
HIGH BANDEDGE

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

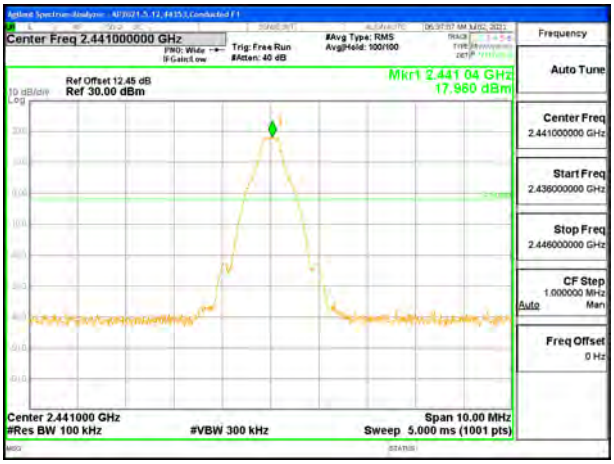
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE



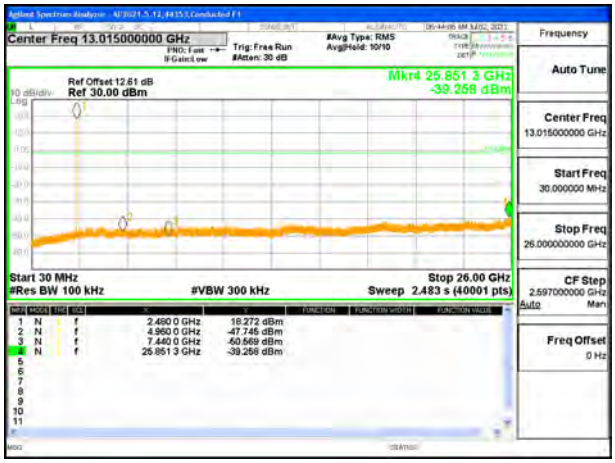
OUT-OF-BAND LOW CHANNEL



MID CHAANEL BANDEDGE

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

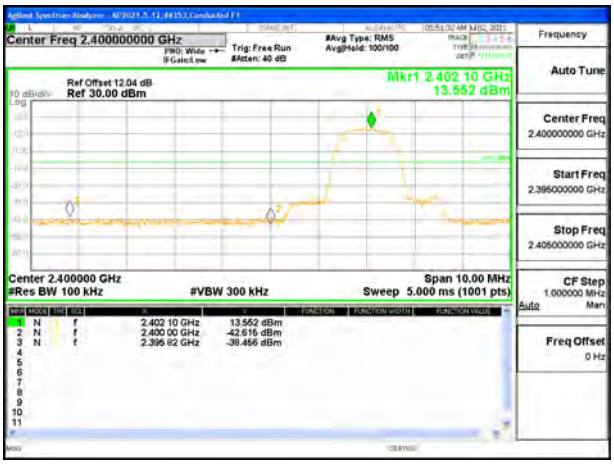
LOW BANDEDGE

HIGH BANDEDGE

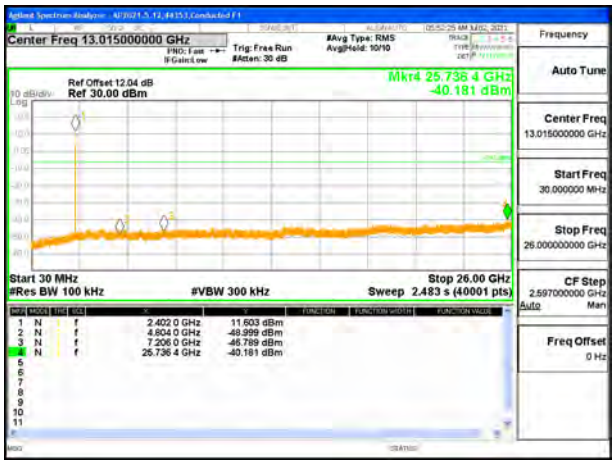
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

9.8.6. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

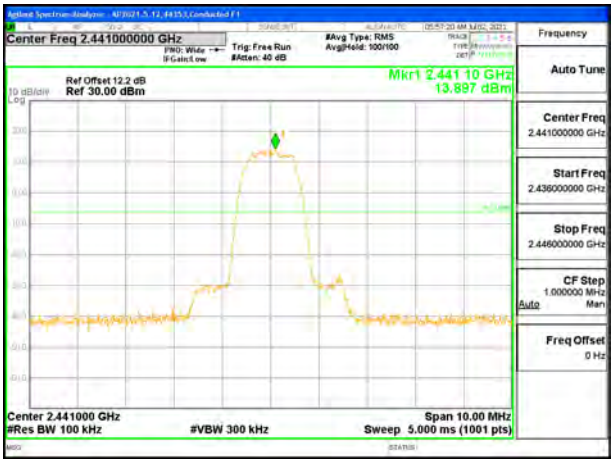
ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE



OUT-OF-BAND LOW CHANNEL

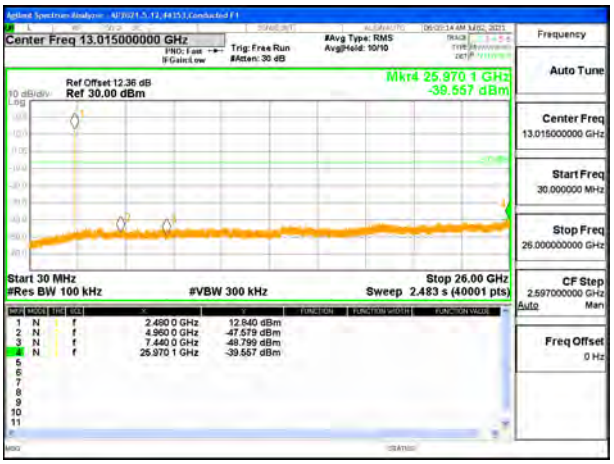


MID CHANNEL BANDEDGE

OUT-OF-BAND MID CHANNEL

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

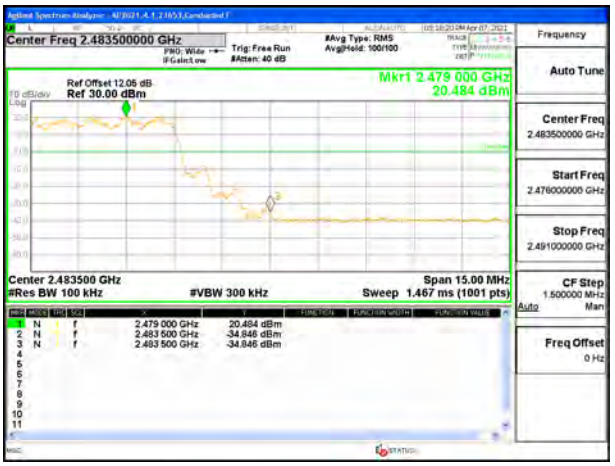
HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

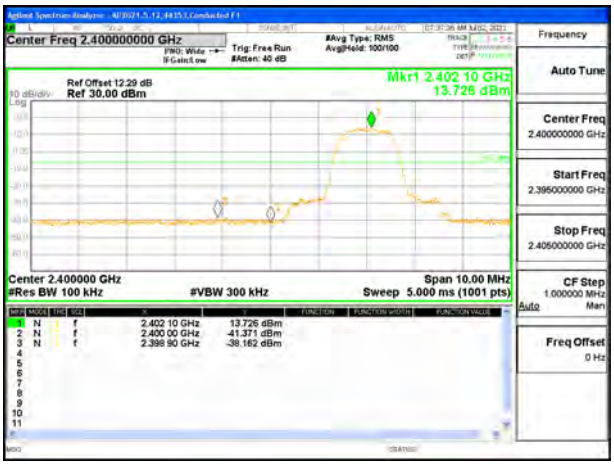
LOW BANDEDGE



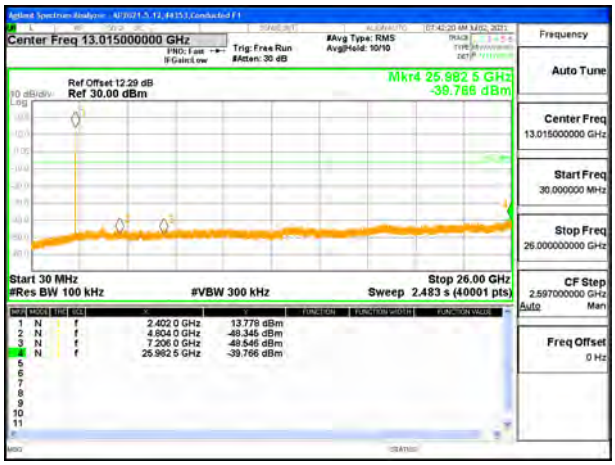
HIGH BANDEDGE

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

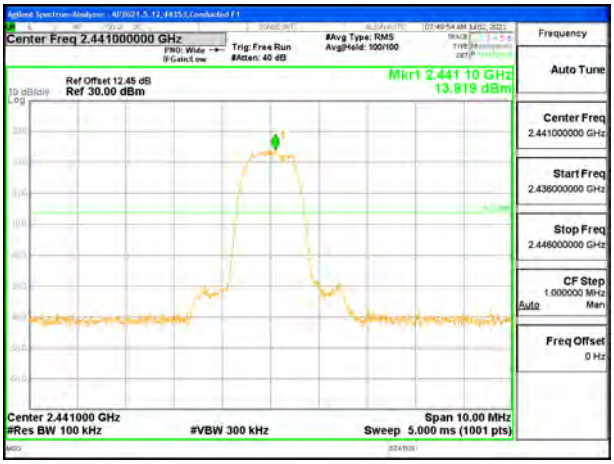
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING



LOW CHANNEL BANDEDGE

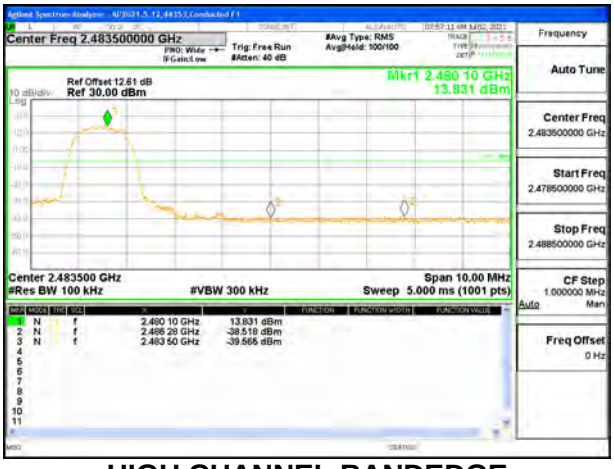


OUT-OF-BAND LOW CHANNEL

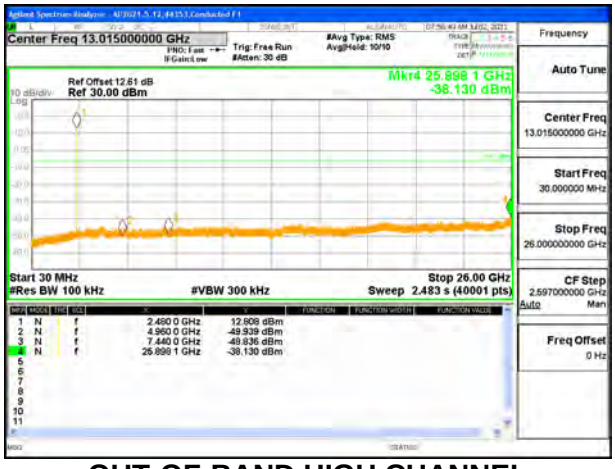


MID CHANNEL BANDEDGE

OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE

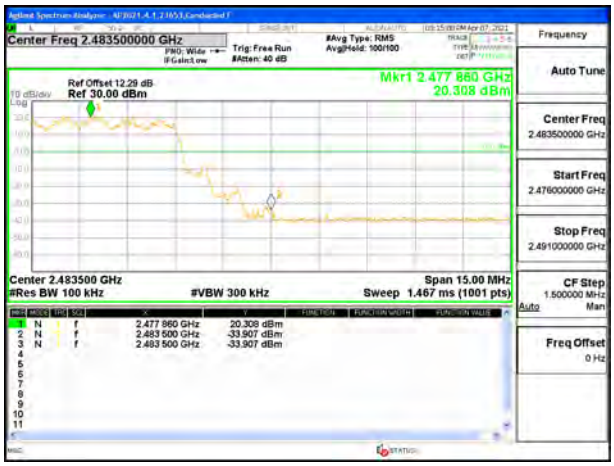


OUT-OF-BAND HIGH CHANNEL

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

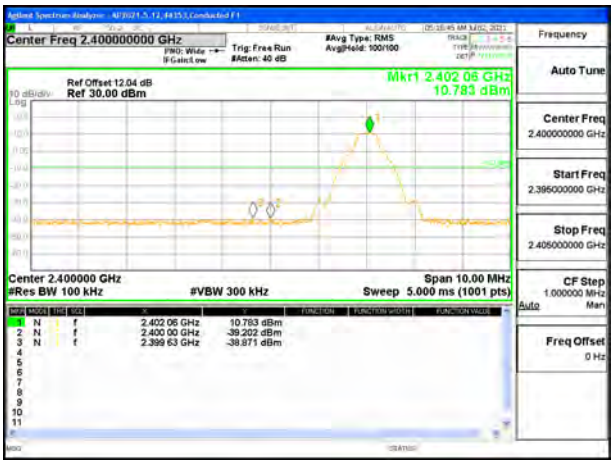


HIGH BANDEDGE

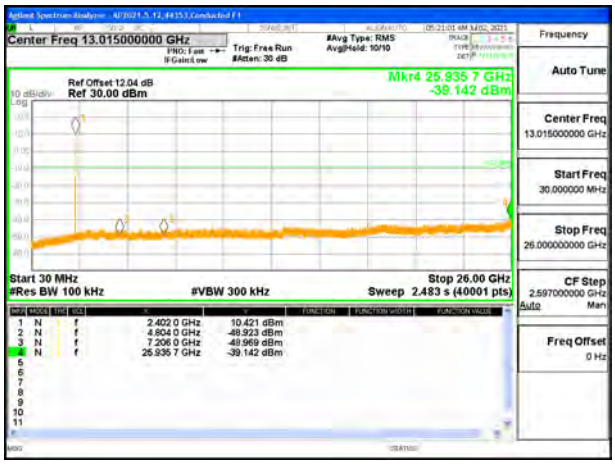
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

9.8.7. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

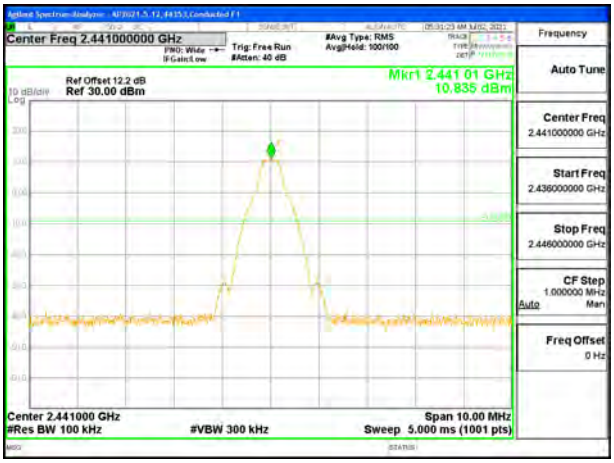
ANT 4 SPURIOUS EMISSIONS, NON-HOPPING



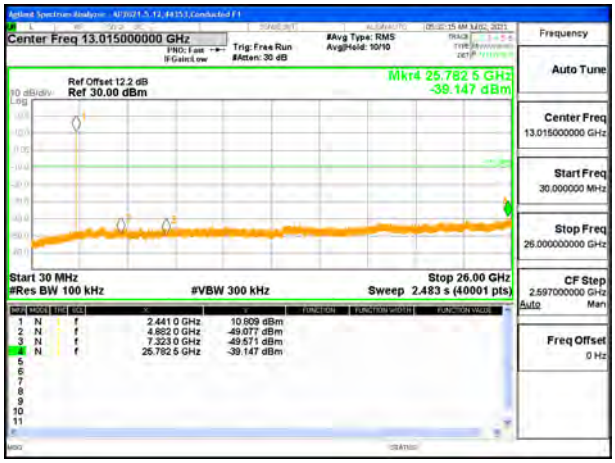
LOW CHANNEL BANDEDGE



OUT-OF-BAND LOW CHANNEL

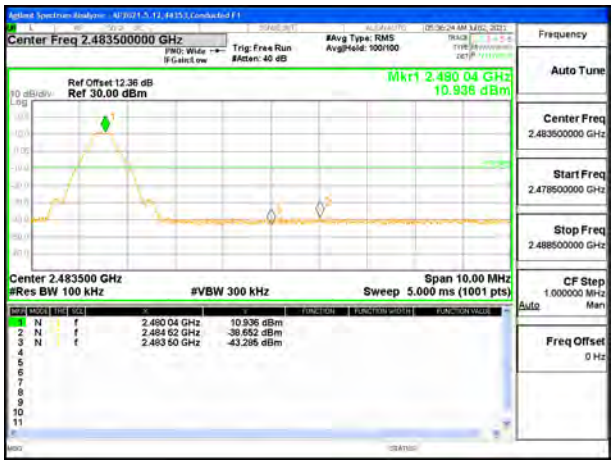


MID CHANNEL BANDEDGE

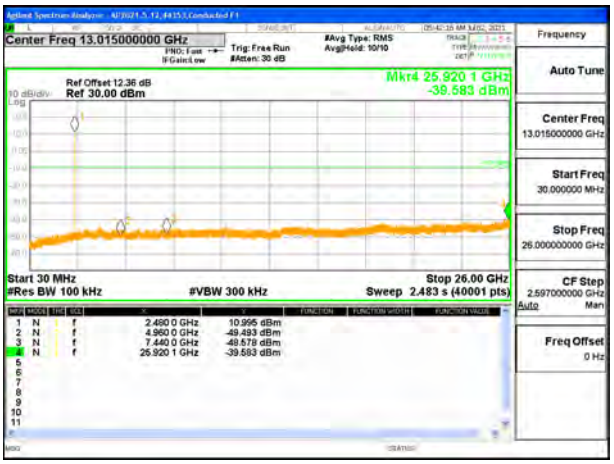


OUT-OF-BAND MID CHANNEL

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



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

LOW BANDEDGE

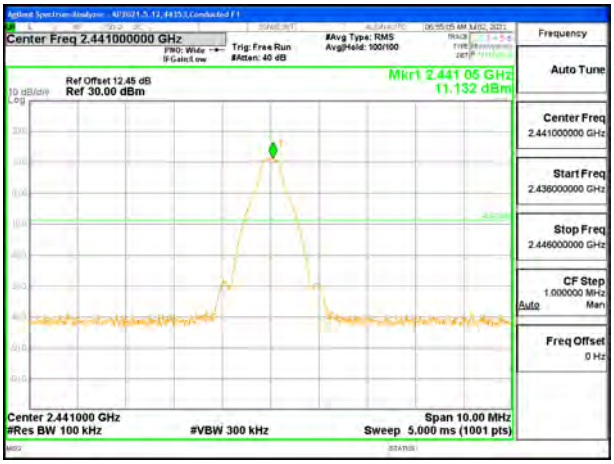
HIGH BANDEDGE

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

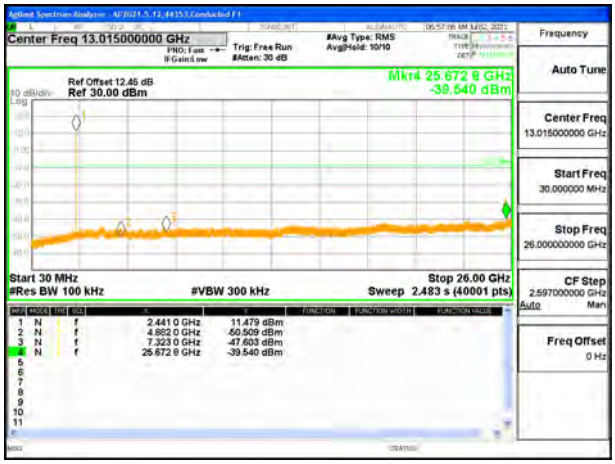
ANT 3 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE

OUT-OF-BAND LOW CHANNEL

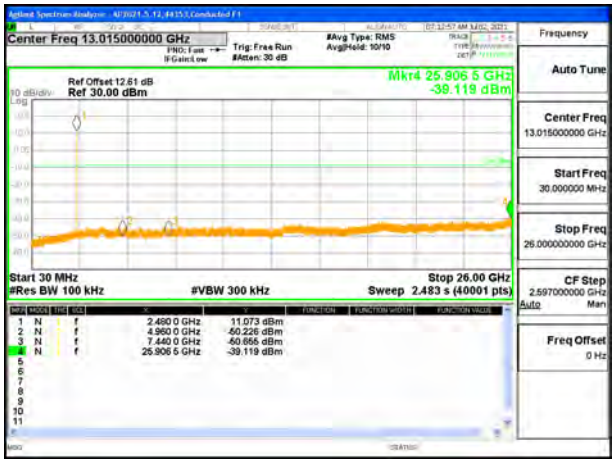


MID CHANNEL BANDEDGE



OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

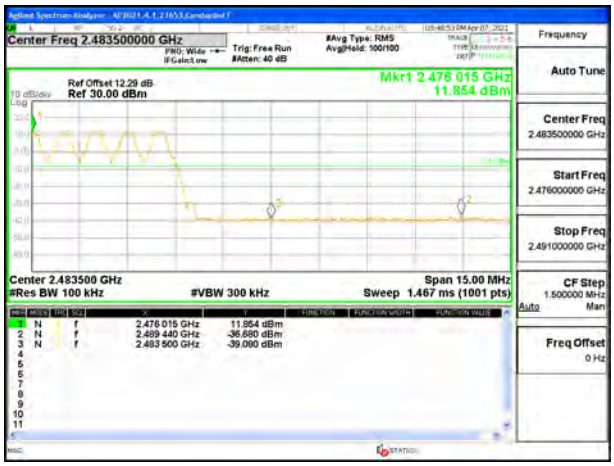


OUT-OF-BAND HIGH CHANNEL

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



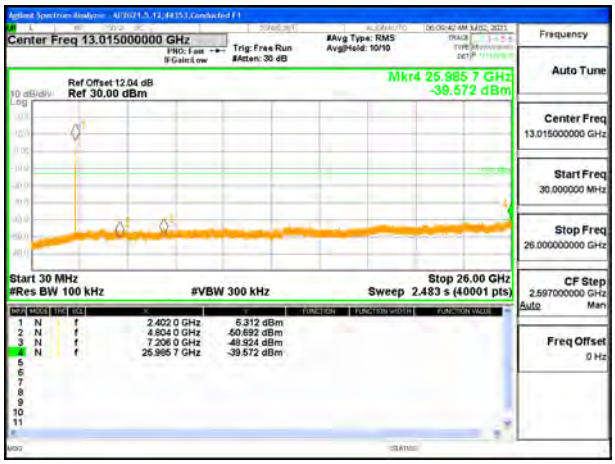
HIGH BANDEDGE

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

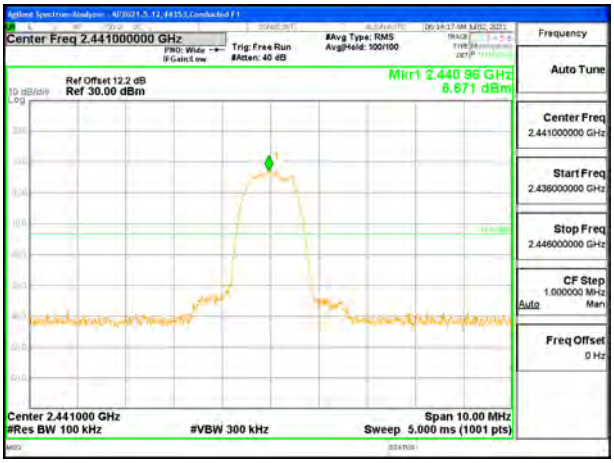
9.8.8. LOW POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

ANT 4 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE



OUT-OF-BAND LOW CHANNEL

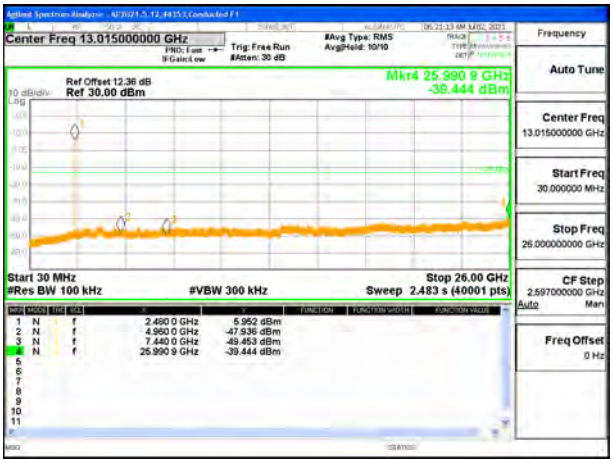


MID CHANNEL BANDEDGE

OUT-OF-BAND MID CHANNEL

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

HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

ANT 4 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON

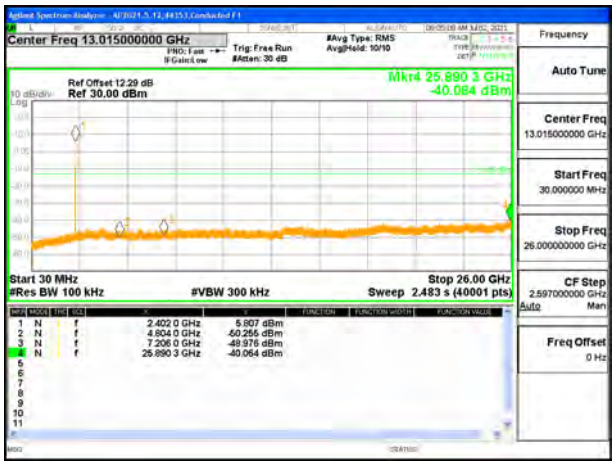
LOW BANDEDGE

HIGH BANDEDGE

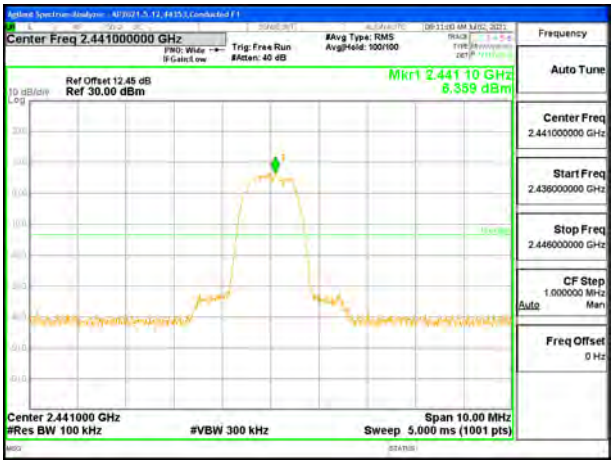
UL VERIFICATION SERVICES INC.
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

ANT 3 SPURIOUS EMISSIONS, NON-HOPPING

LOW CHANNEL BANDEDGE



OUT-OF-BAND LOW CHANNEL



MID CHANNEL BANDEDGE

OUT-OF-BAND MID CHANNEL

HIGH CHANNEL BANDEDGE

OUT-OF-BAND HIGH CHANNEL

UL VERIFICATION SERVICES INC.
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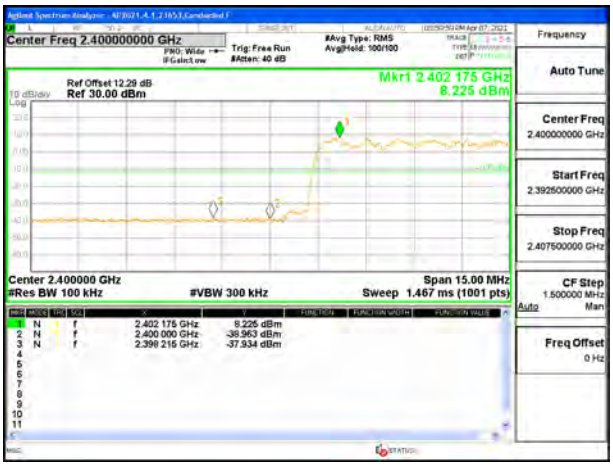
ANT 3 SPURIOUS BANDEDGE EMISSIONS WITH HOPPING ON



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

The 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.

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KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

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.

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.

Results

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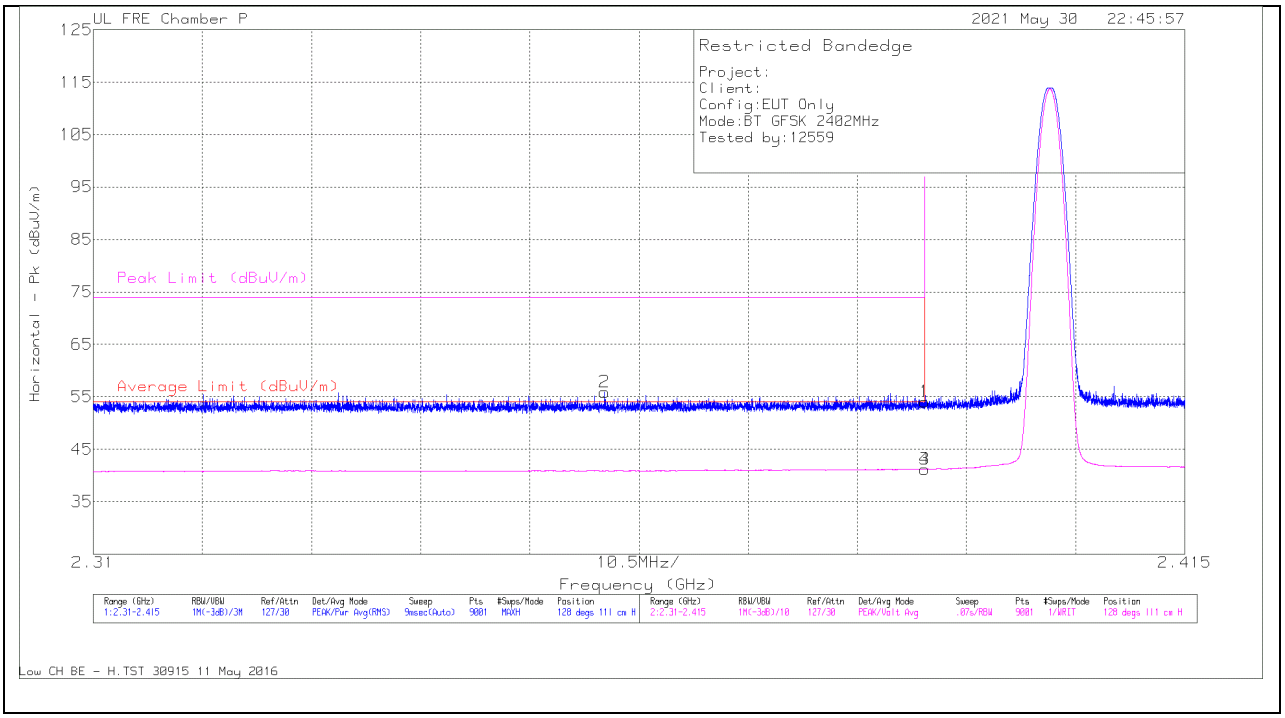
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. HIGH POWER BASIC DATA RATE GFSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.35919	58.28	Pk	31.8	-34.2	55.88	-	-	74	-18.12	128	111	H
4	2.38995	43.42	VA1T	31.9	-34.1	41.22	54	-12.78	-	-	128	111	H
1	2.38999	56.19	Pk	31.9	-34.1	53.99	-	-	74	-20.01	128	111	H
3	2.38999	43.41	VA1T	31.9	-34.1	41.21	54	-12.79	-	-	128	111	H

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

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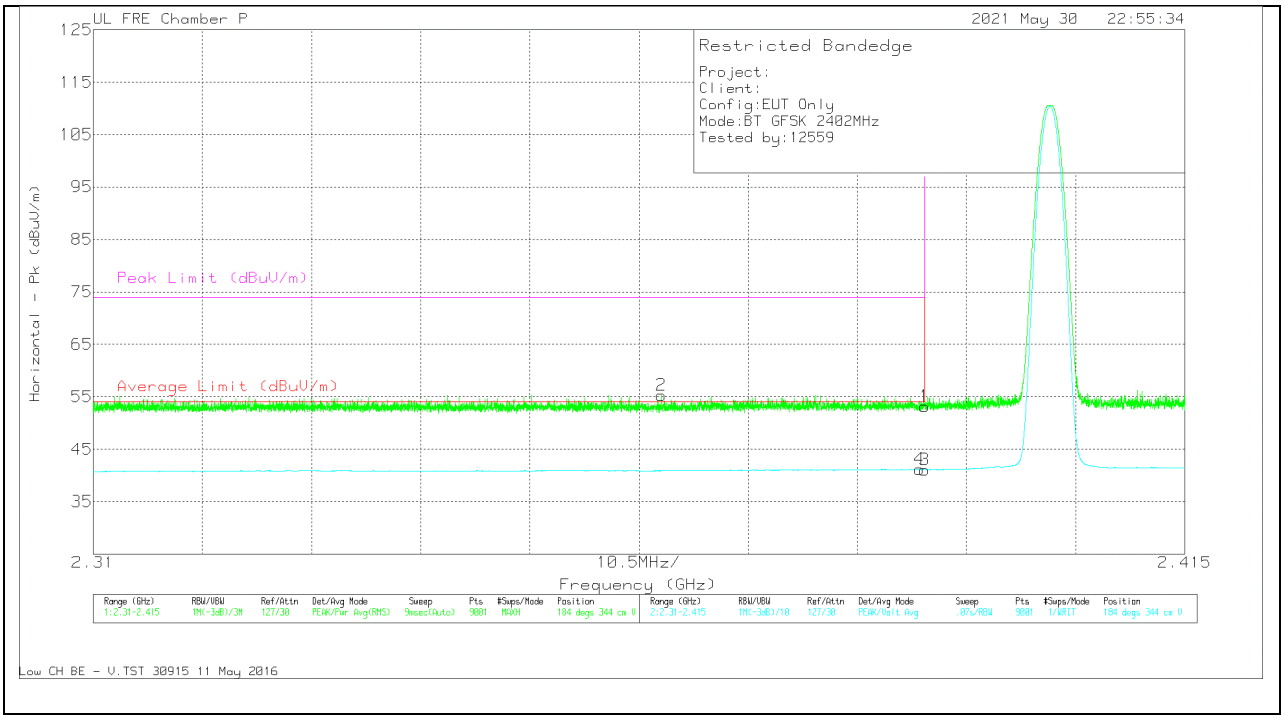
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.36464	57.63	Pk	31.8	-34.1	55.33	-	-	74	-18.67	184	344	V
4	2.38949	43.37	VA1T	31.9	-34.1	41.17	54	-12.83	-	-	184	344	V
1	2.38999	55.41	Pk	31.9	-34.1	53.21	-	-	74	-20.79	184	344	V
3	2.38999	43.29	VA1T	31.9	-34.1	41.09	54	-12.91	-	-	184	344	V

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

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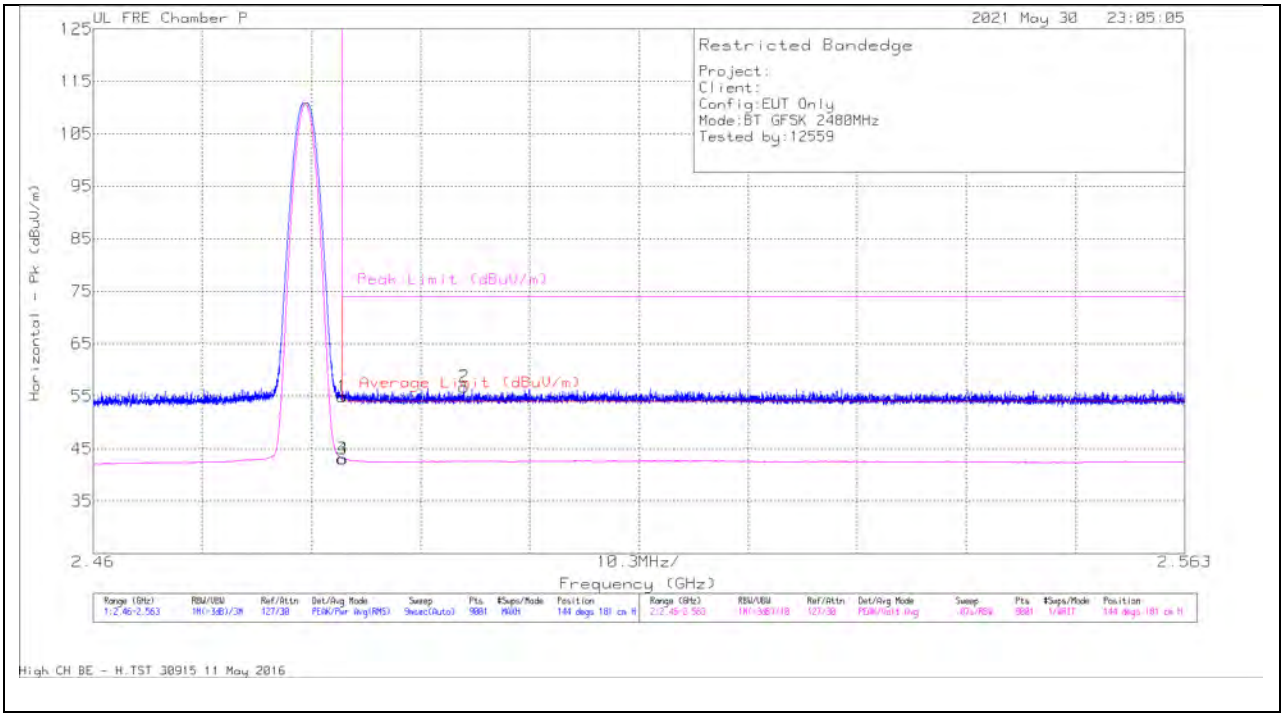
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	56.39	Pk	32.5	-34	54.89	-	-	74	-19.11	144	181	H
3	2.48351	44.58	VA1T	32.5	-34	43.08	54	-10.92	-	-	144	181	H
4	2.48353	44.58	VA1T	32.5	-34	43.08	54	-10.92	-	-	144	181	H
2	2.49497	58.13	Pk	32.6	-34	56.73	-	-	74	-17.27	144	181	H

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

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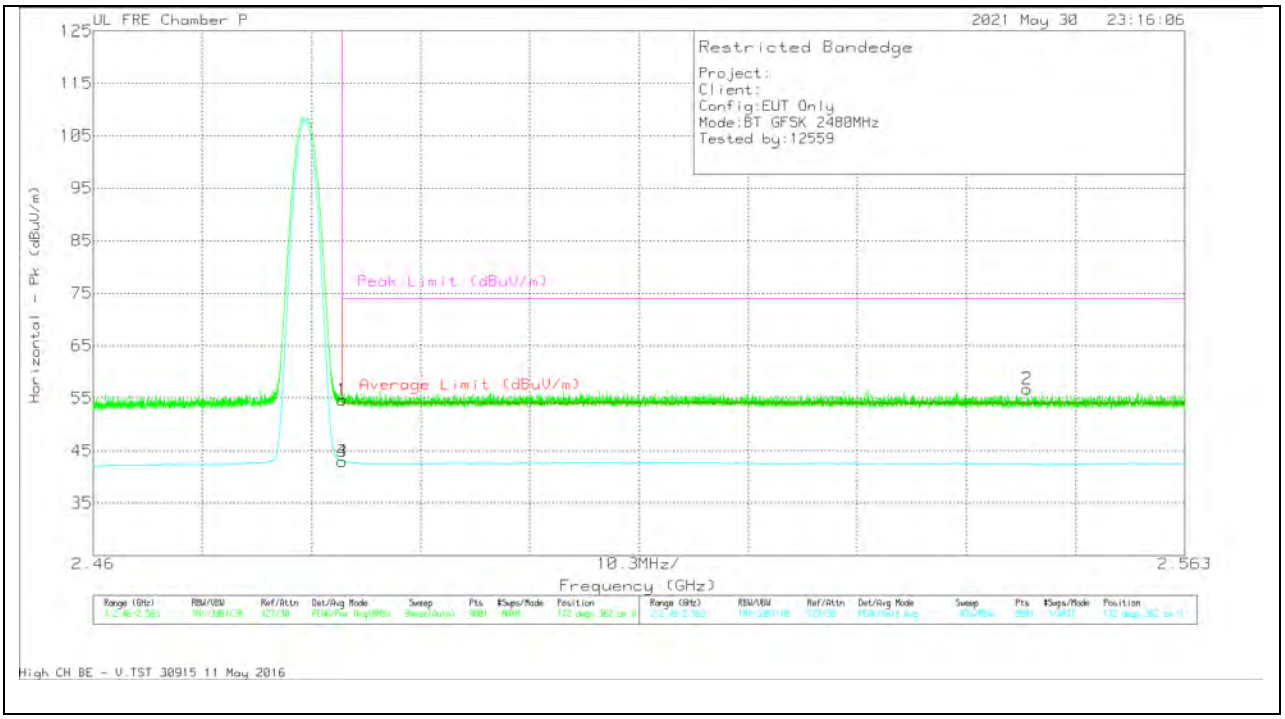
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	56.18	Pk	32.5	-34	54.68	-	-	74	-19.32	172	362	V
3	2.48351	44.45	VA1T	32.5	-34	42.95	54	-11.05	-	-	172	362	V
4	2.48352	44.45	VA1T	32.5	-34	42.95	54	-11.05	-	-	172	362	V
2	2.54811	58.19	Pk	32.4	-33.8	56.79	-	-	74	-17.21	172	362	V

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

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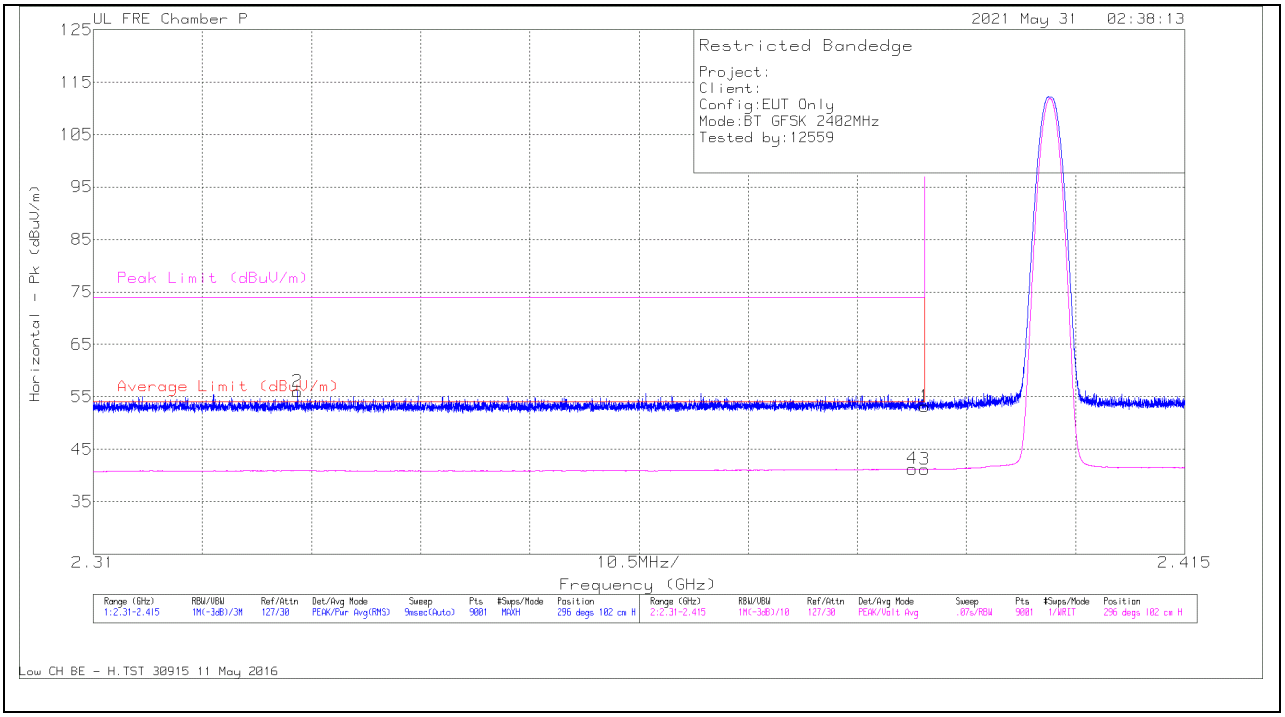
ANT 3

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.32964	58.26	Pk	31.9	-34.1	56.06	-	-	74	-17.94	296	102	H
4	2.38881	43.44	VA1T	31.9	-34.1	41.24	54	-12.76	-	-	296	102	H
1	2.38999	55.32	Pk	31.9	-34.1	53.12	-	-	74	-20.88	296	102	H
3	2.38999	43.36	VA1T	31.9	-34.1	41.16	54	-12.84	-	-	296	102	H

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

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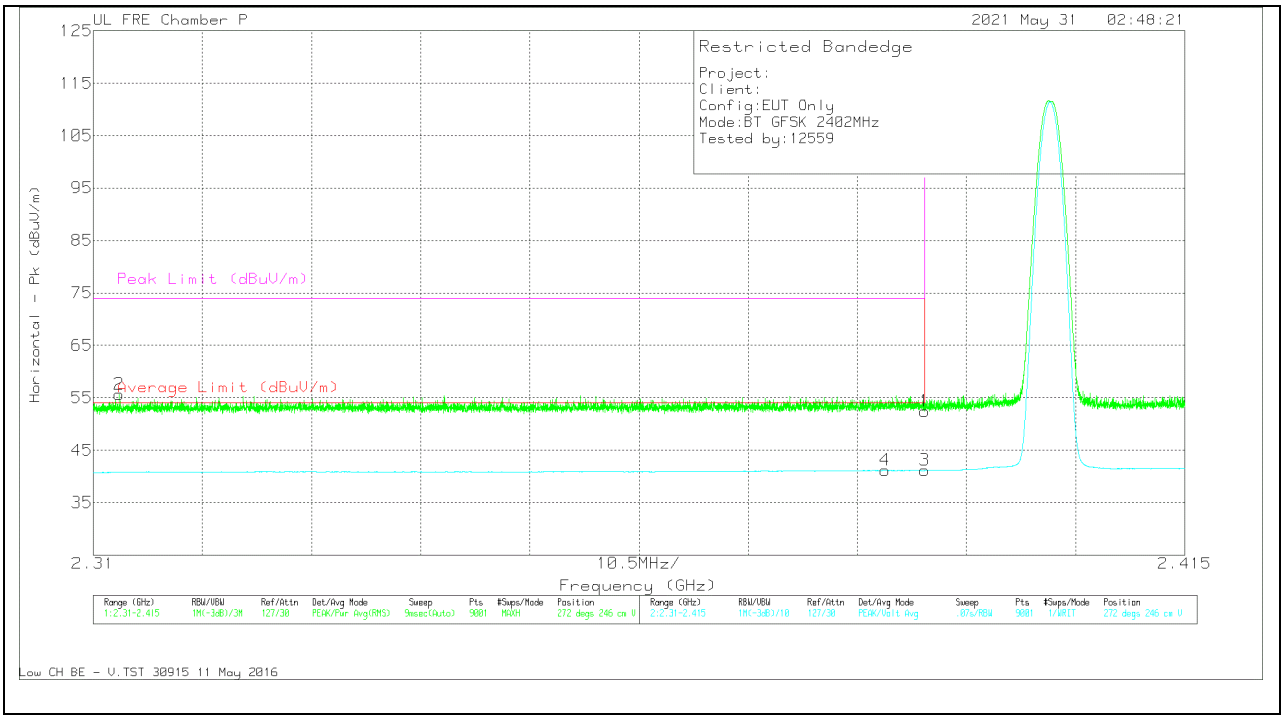
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.31249	57.93	Pk	31.8	-34.1	55.63	-	-	74	-18.37	272	246	V
4	2.3862	43.39	VA1T	31.9	-34.1	41.19	54	-12.81	-	-	272	246	V
1	2.38999	54.62	Pk	31.9	-34.1	52.42	-	-	74	-21.58	272	246	V
3	2.38999	43.32	VA1T	31.9	-34.1	41.12	54	-12.88	-	-	272	246	V

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

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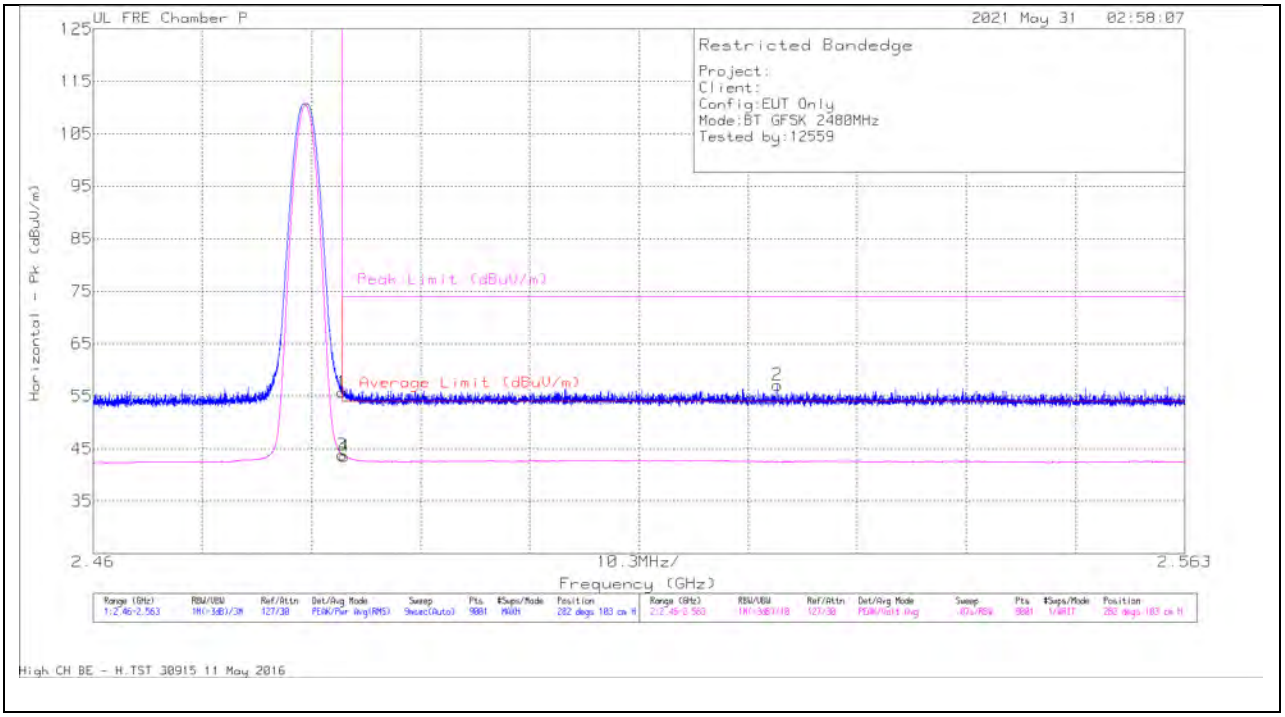
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	57.32	Pk	32.5	-34	55.82	-	-	74	-18.18	282	103	H
3	2.48351	45.28	VA1T	32.5	-34	43.78	54	-10.22	-	-	282	103	H
4	2.48368	45.07	VA1T	32.5	-34	43.57	54	-10.43	-	-	282	103	H
2	2.52459	58.5	Pk	32.6	-34	57.1	-	-	74	-16.9	282	103	H

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

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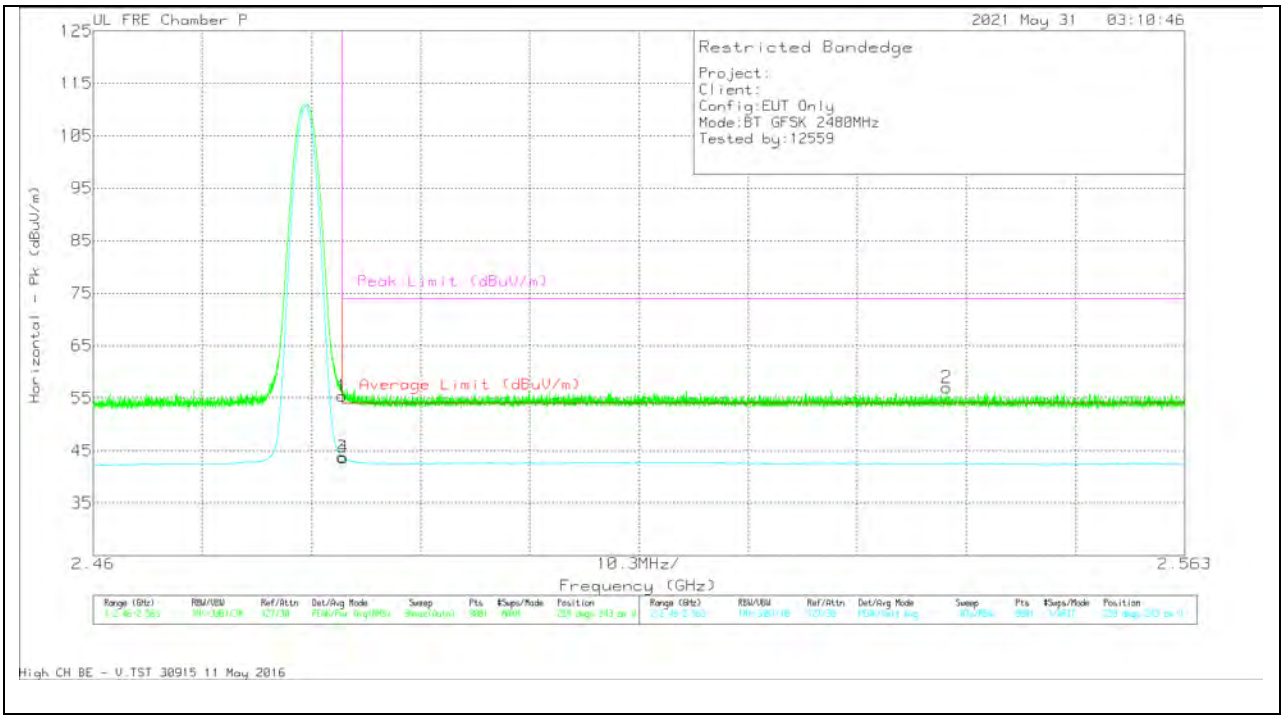
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	56.94	Pk	32.5	-34	55.44	-	-	74	-18.56	259	243	V
3	2.48351	45.31	VA1T	32.5	-34	43.81	54	-10.19	-	-	259	243	V
4	2.48363	45.1	VA1T	32.5	-34	43.6	54	-10.4	-	-	259	243	V
2	2.54052	58.31	Pk	32.5	-33.8	57.01	-	-	74	-16.99	259	243	V

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

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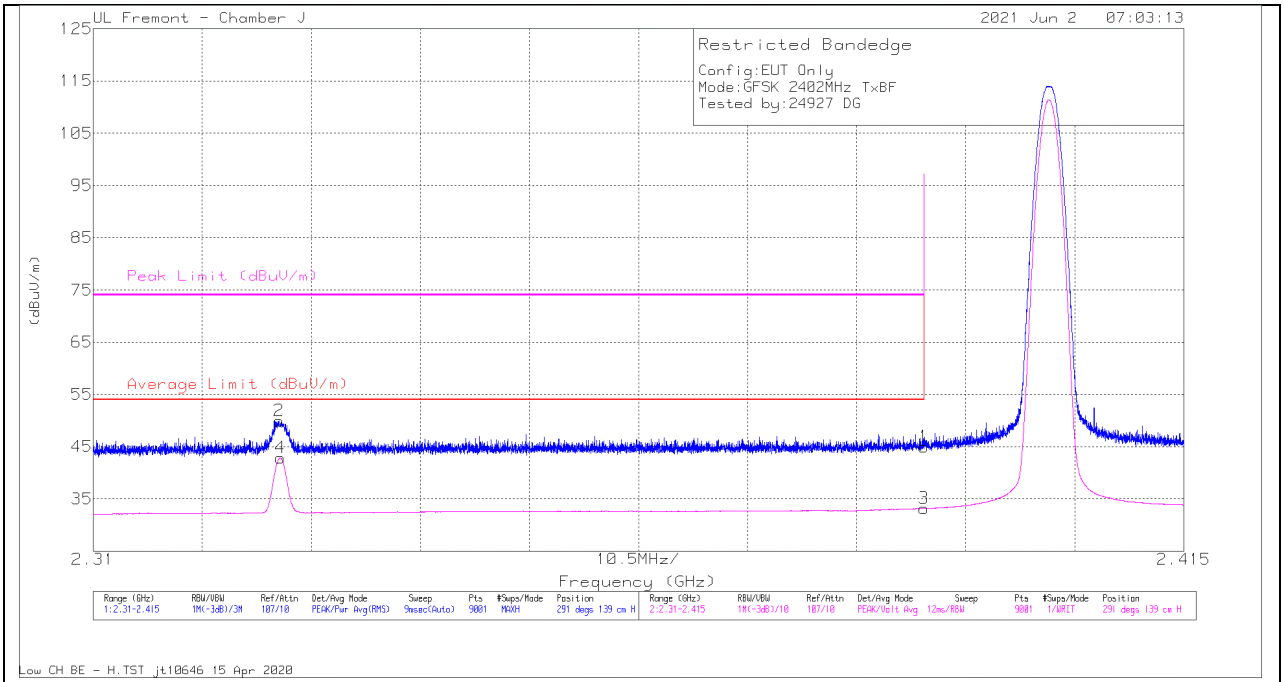
10.1.2. HIGH POWER BASIC DATA RATE TXBF GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	38.04	Pk	32.1	-25.2	44.94	-	-	74	-29.06	291	139	H
2	* 2.32787	43.46	Pk	31.8	-25.3	49.96	-	-	74	-24.04	291	139	H
3	* 2.38999	26.23	VA1T	32.1	-25.2	33.13	54	-20.87	-	-	291	139	H
4	* 2.32803	36.34	VA1T	31.8	-25.3	42.84	54	-11.16	-	-	291	139	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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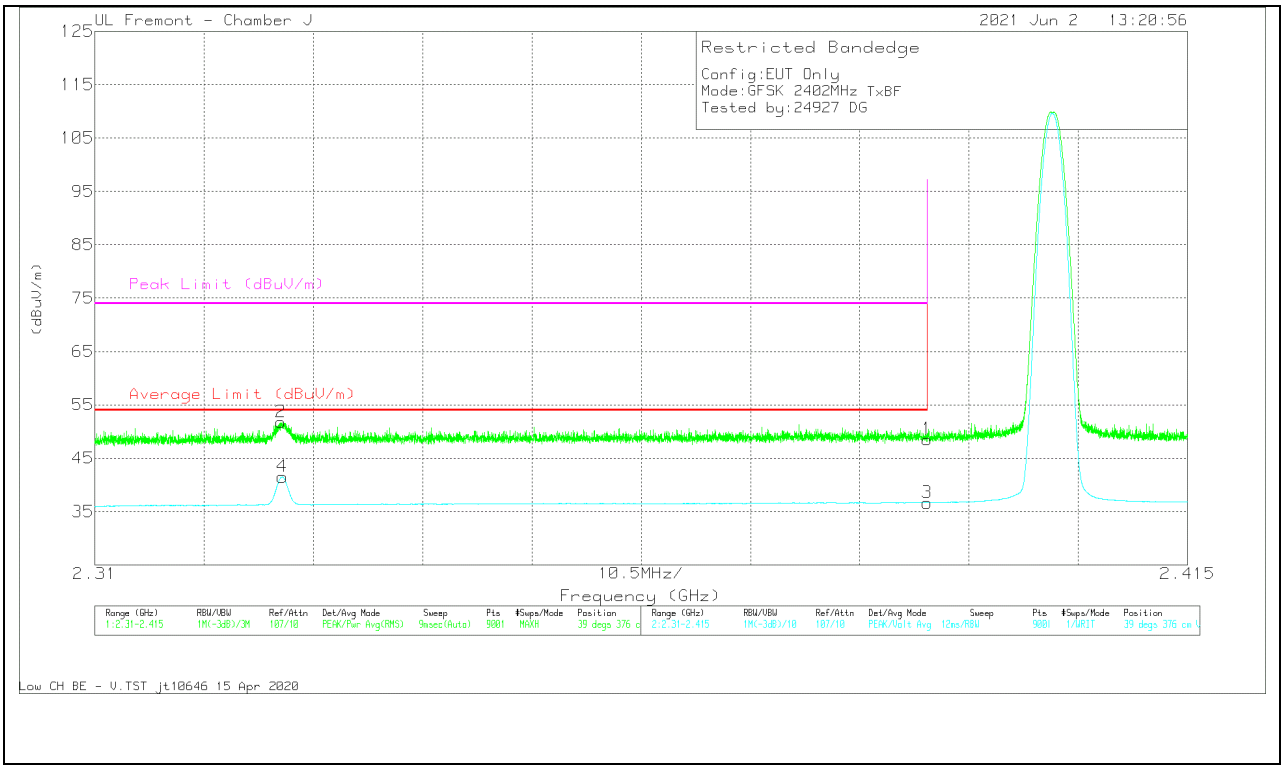
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	41.62	Pk	32.1	-25.2	48.52	-	-	74	-25.48	39	376	V
2	* 2.32789	45.26	Pk	31.8	-25.3	51.76	-	-	74	-22.24	39	376	V
3	* 2.38999	29.74	VA1T	32.1	-25.2	36.64	54	-17.36	-	-	39	376	V
4	* 2.32803	35	VA1T	31.8	-25.3	41.5	54	-12.5	-	-	39	376	V

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

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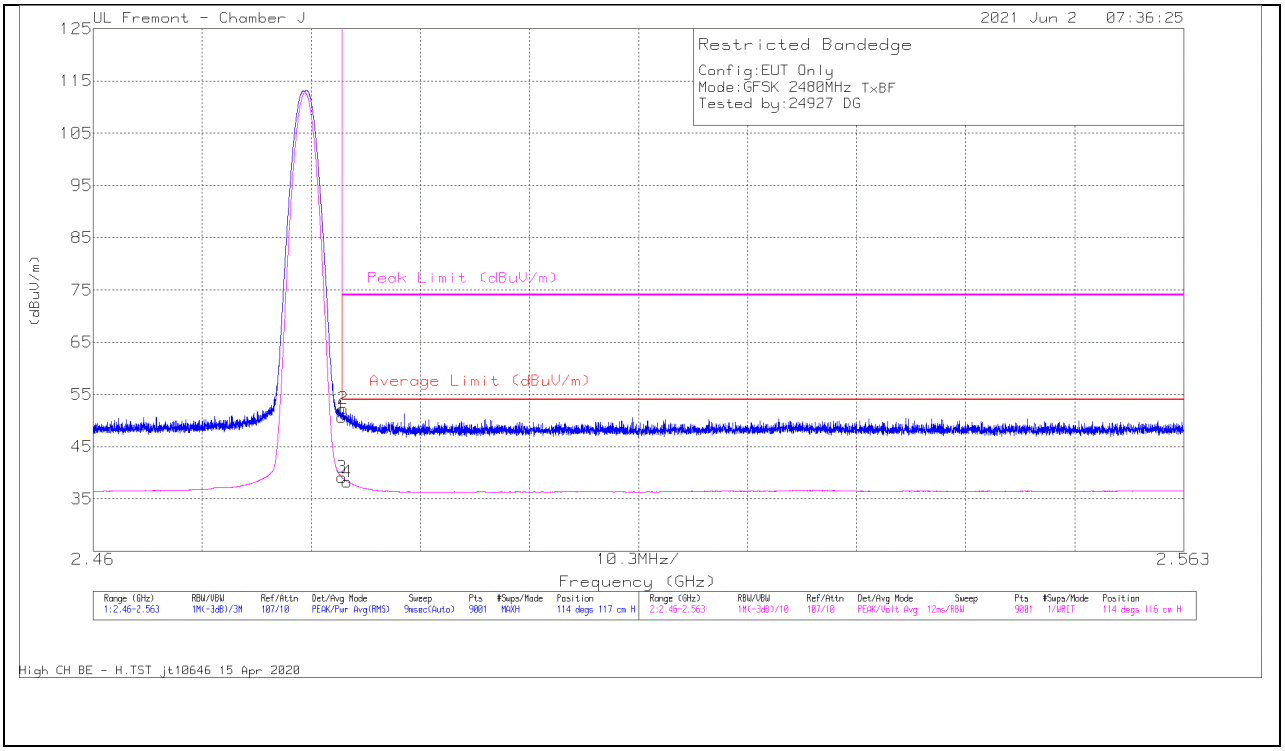
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	43.4	Pk	32.5	-25.2	50.7	-	-	74	-23.3	114	117	H
2	* 2.48362	44.94	Pk	32.5	-25.2	52.24	-	-	74	-21.76	114	117	H
3	* 2.48351	31.78	VA1T	32.5	-25.2	39.08	54	-14.92	-	-	114	116	H
4	* 2.48401	30.97	VA1T	32.5	-25.2	38.27	54	-15.73	-	-	114	116	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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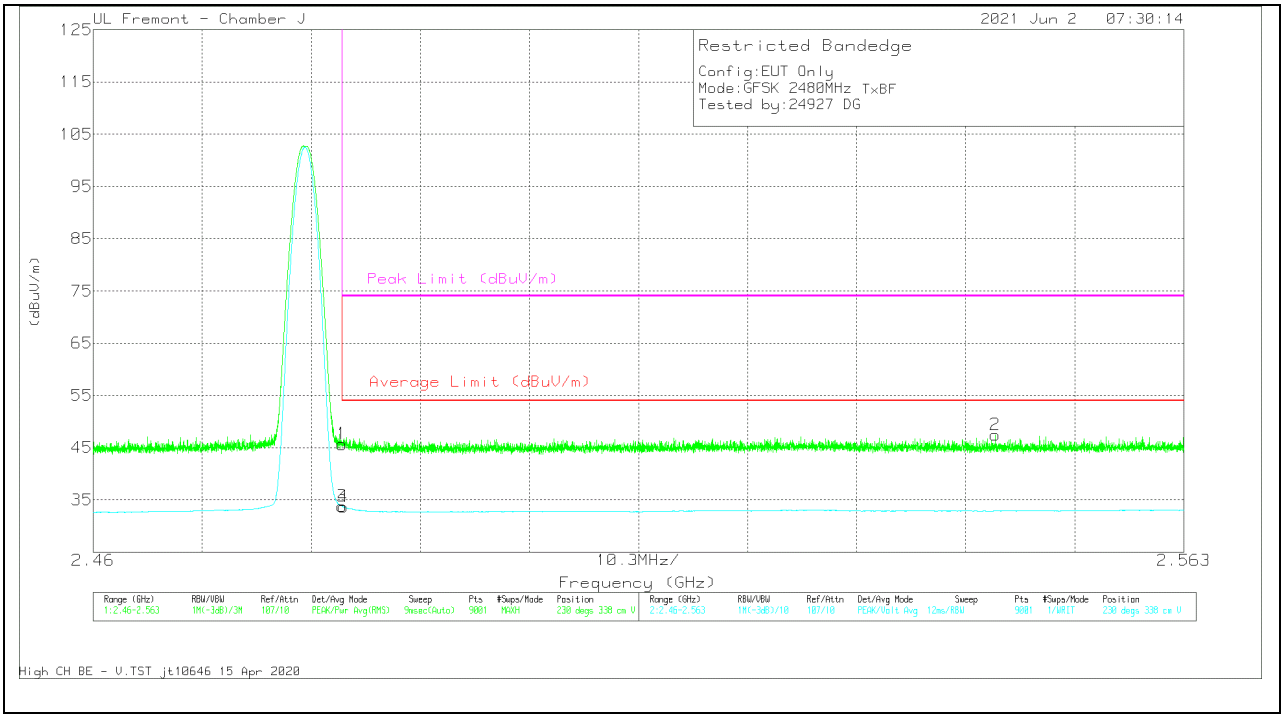
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	38.34	Pk	32.5	-25.2	45.64	-	-	74	-28.36	230	338	V
2	2.54518	39.83	Pk	32.7	-25.1	47.43	-	-	74	-26.57	230	338	V
3	* 2.48351	26.49	VA1T	32.5	-25.2	33.79	54	-20.21	-	-	230	338	V
4	* 2.48363	26.35	VA1T	32.5	-25.2	33.65	54	-20.35	-	-	230	338	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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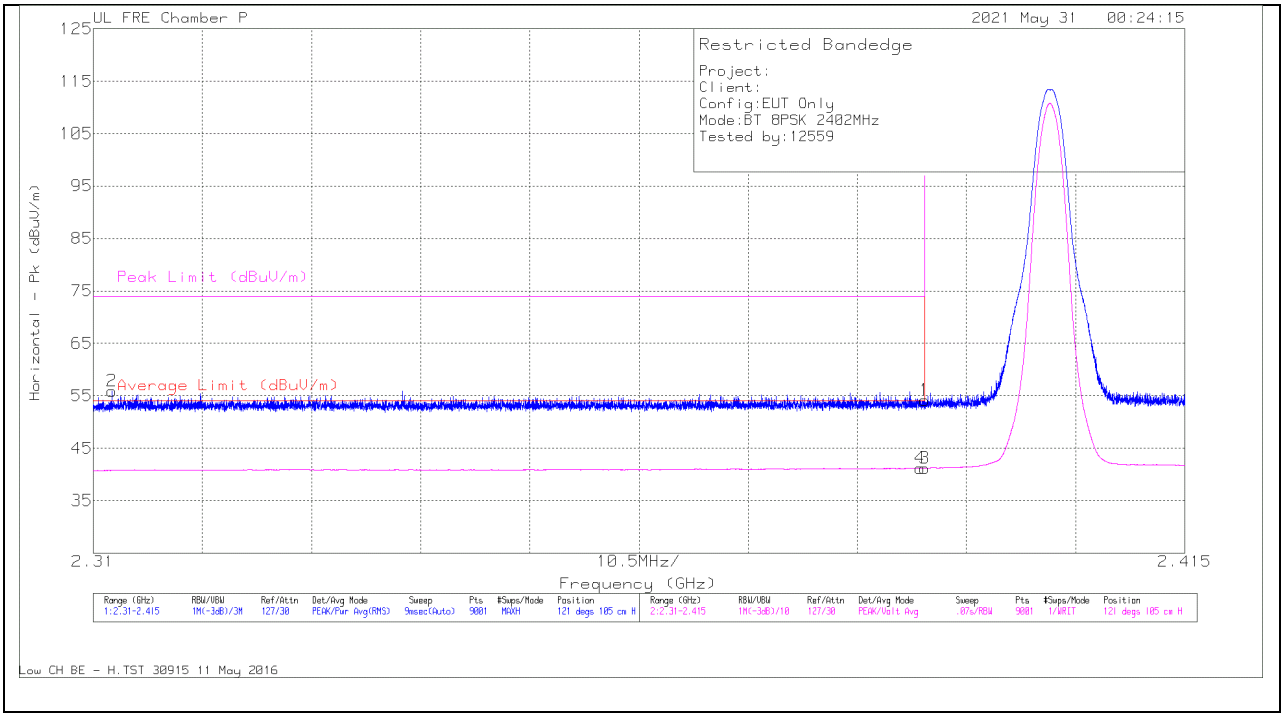
10.1.3. HIGH POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.3118	58.24	Pk	31.8	-34.1	55.94	-	-	74	-18.06	121	105	H
4	2.38956	43.42	VA1T	31.9	-34.1	41.22	54	-12.78	-	-	121	105	H
1	2.38999	56.36	Pk	31.9	-34.1	54.16	-	-	74	-19.84	121	105	H
3	2.38999	43.39	VA1T	31.9	-34.1	41.19	54	-12.81	-	-	121	105	H

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

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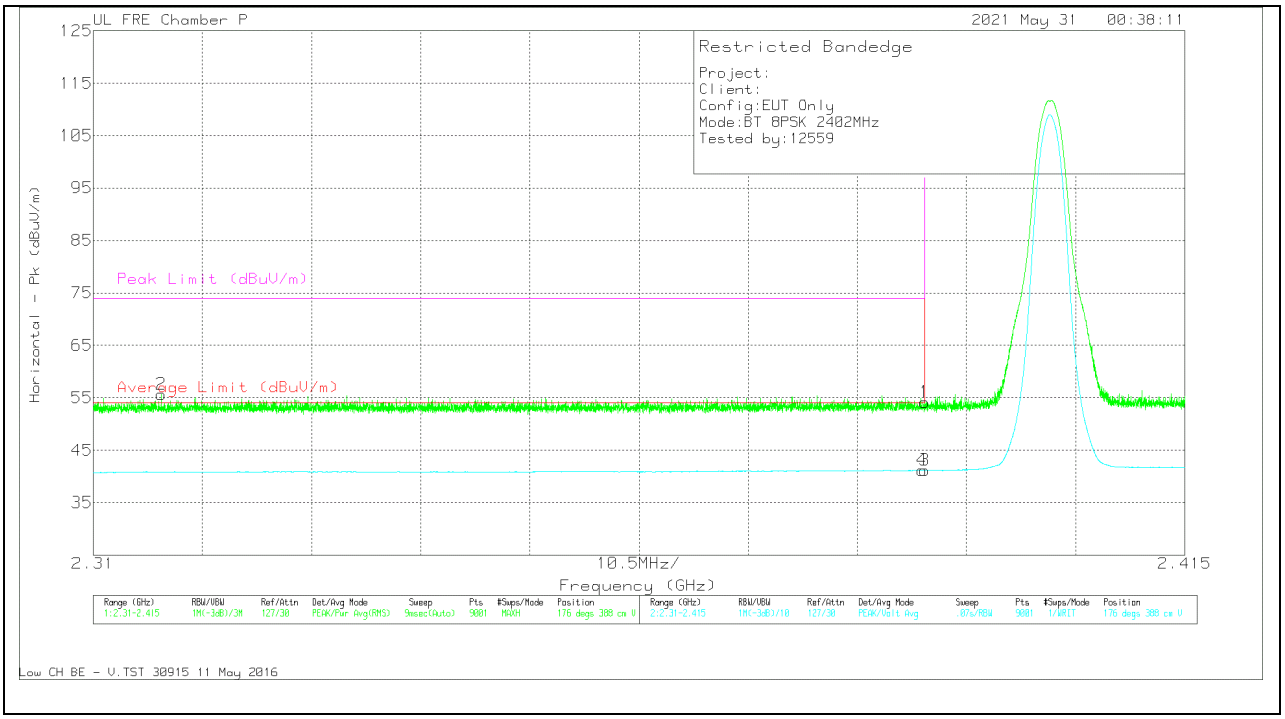
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	2.31655	58.03	Pk	31.8	-34.2	55.63	-	-	74	-18.37	176	388	V
4	2.38972	43.37	VA1T	31.9	-34.1	41.17	54	-12.83	-	-	176	388	V
1	2.38999	56.4	Pk	31.9	-34.1	54.2	-	-	74	-19.8	176	388	V
3	2.38999	43.35	VA1T	31.9	-34.1	41.15	54	-12.85	-	-	176	388	V

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

UL VERIFICATION SERVICES INC.
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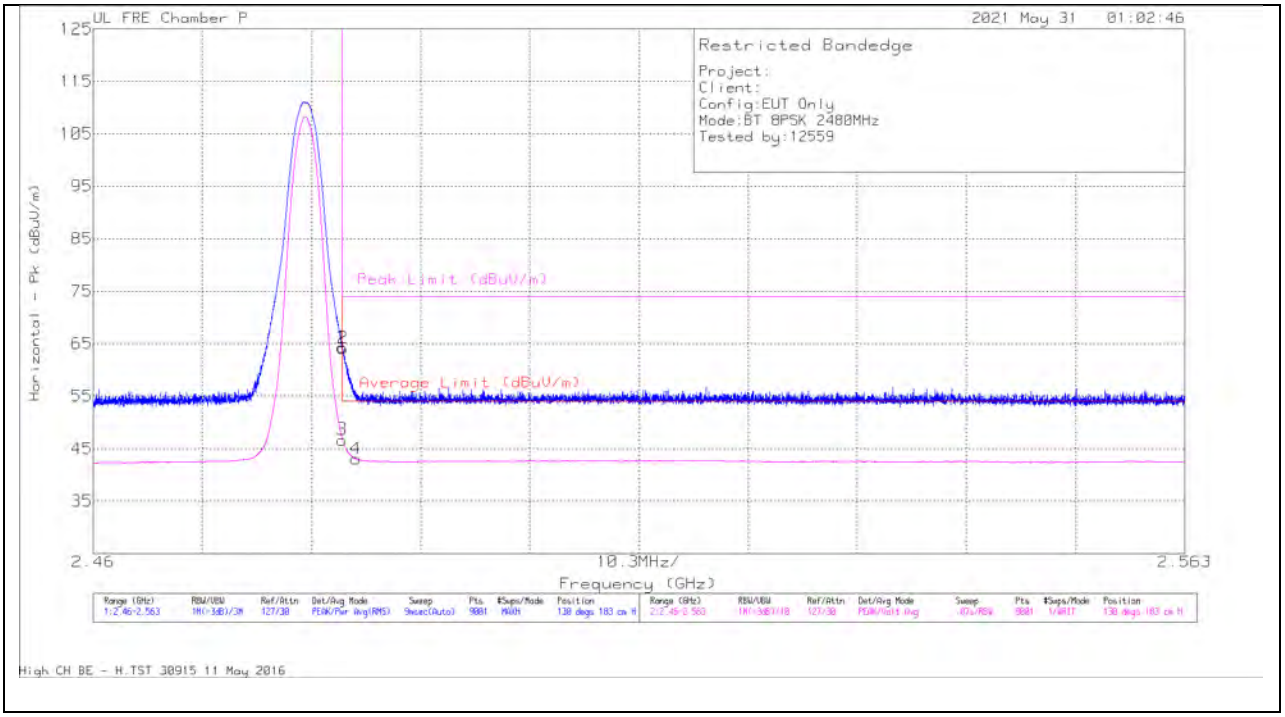
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	65.77	Pk	32.5	-34	64.27	-	-	74	-9.73	130	183	H
3	2.48351	48.18	VA1T	32.5	-34	46.68	54	-7.32	-	-	130	183	H
2	2.48355	65.62	Pk	32.5	-34	64.12	-	-	74	-9.88	130	183	H
4	2.48475	44.51	VA1T	32.5	-34	43.01	54	-10.99	-	-	130	183	H

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

UL VERIFICATION SERVICES INC.
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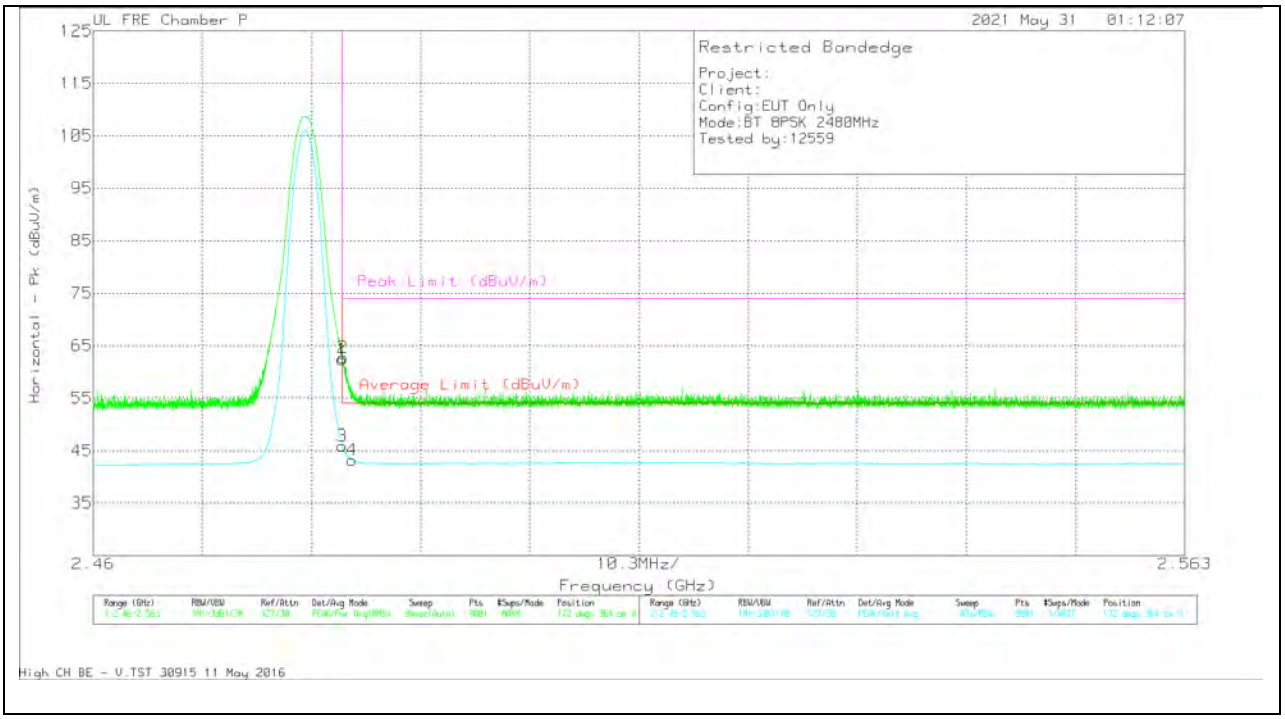
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF 200896 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.48351	63.86	Pk	32.5	-34	62.36	-	-	74	-11.64	172	364	V
3	2.48351	47.37	VA1T	32.5	-34	45.87	54	-8.13	-	-	172	364	V
2	2.48355	64.25	Pk	32.5	-34	62.75	-	-	74	-11.25	172	364	V
4	2.4844	44.7	VA1T	32.5	-34	43.2	54	-10.8	-	-	172	364	V

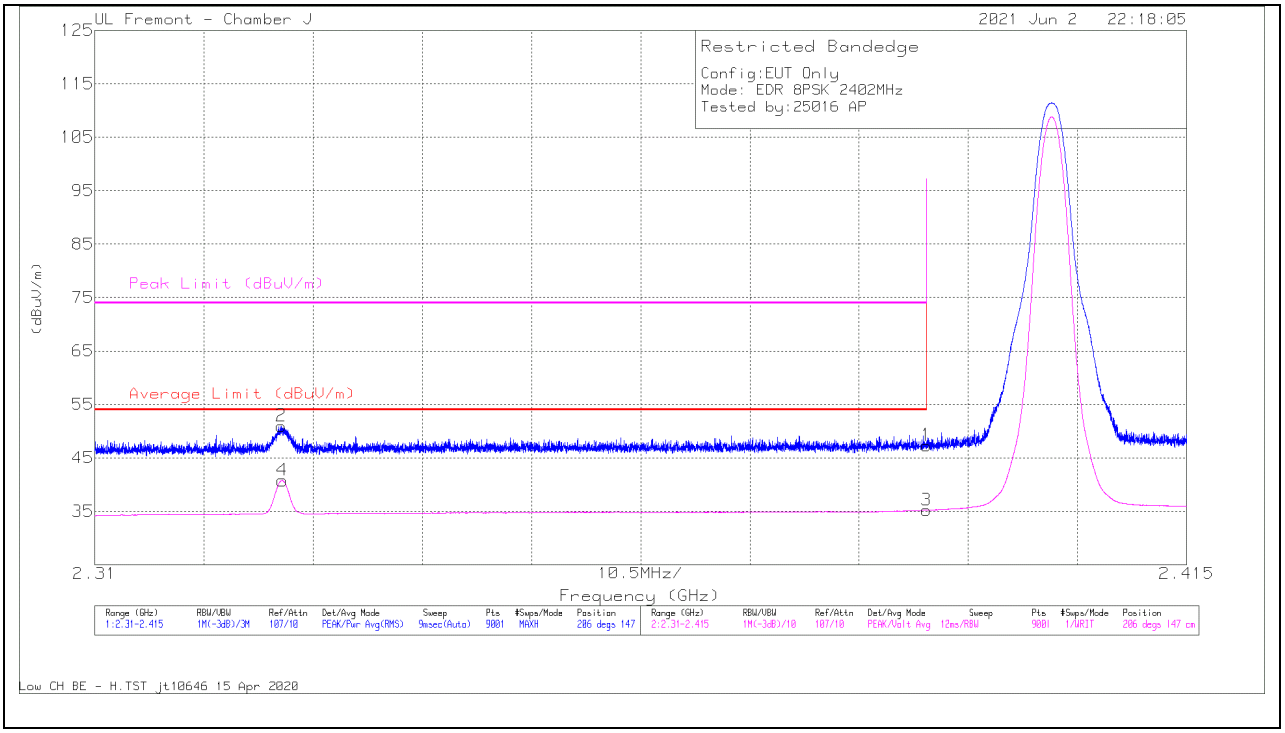
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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

ANT 3

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0100034 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	40.42	Pk	32.1	-25.2	47.32	-	-	74	-26.68	206	147	H
2	* 2.32794	44.47	Pk	31.8	-25.3	50.97	-	-	74	-23.03	206	147	H
3	* 2.38999	28.3	VA1T	32.1	-25.2	35.2	54	-18.8	-	-	206	147	H
4	* 2.32804	34.28	VA1T	31.8	-25.3	40.78	54	-13.22	-	-	206	147	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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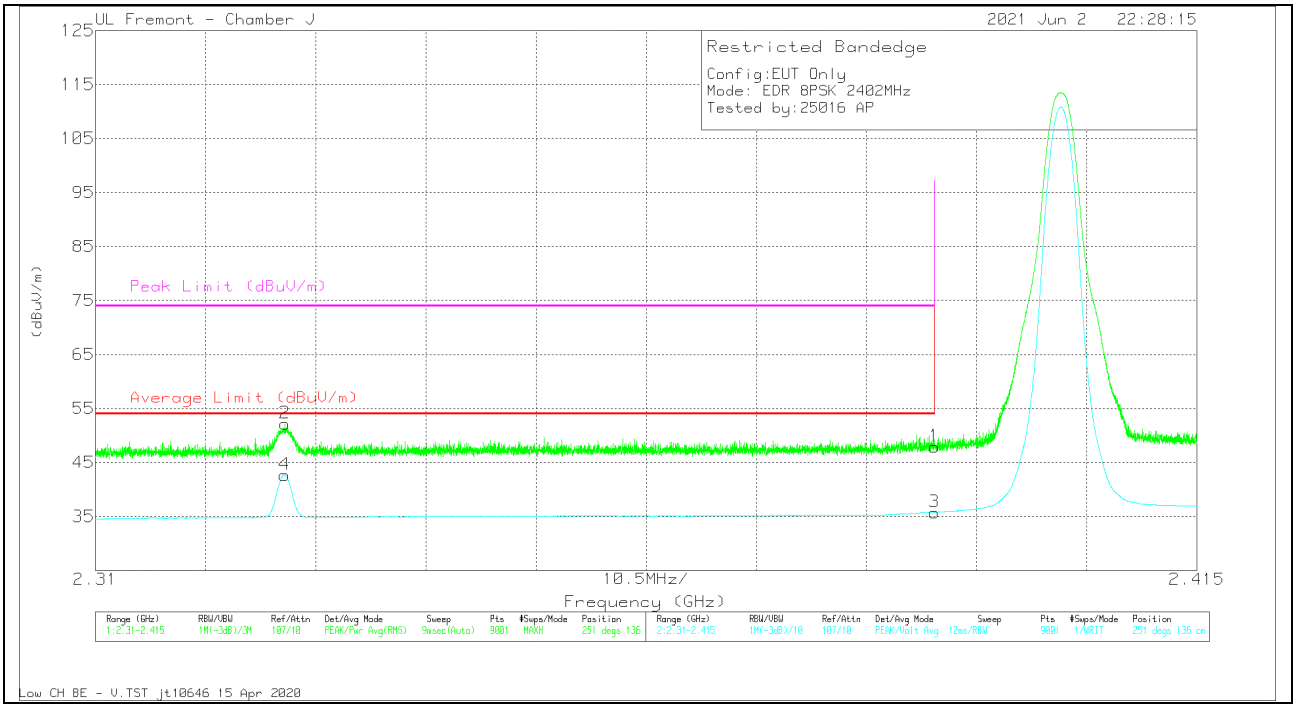
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	41.04	Pk	32.1	-25.2	47.94	-	-	74	-26.06	251	136	V
2	* 2.32805	45.71	Pk	31.8	-25.3	52.21	-	-	74	-21.79	251	136	V
3	* 2.38999	28.86	VA1T	32.1	-25.2	35.76	54	-18.24	-	-	251	136	V
4	* 2.32804	36.2	VA1T	31.8	-25.3	42.7	54	-11.3	-	-	251	136	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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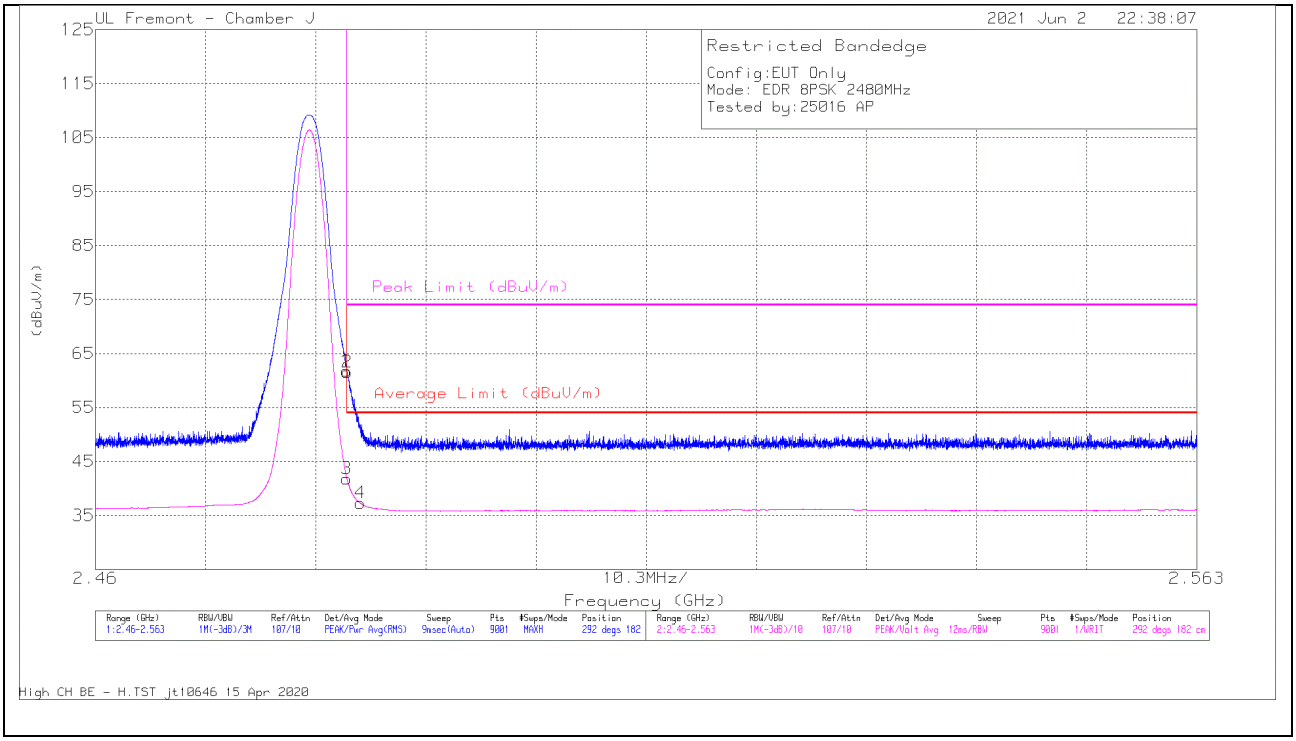
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	54.46	Pk	32.5	-25.2	61.76	-	-	74	-12.24	292	182	H
2	* 2.48353	54.21	Pk	32.5	-25.2	61.51	-	-	74	-12.49	292	182	H
3	* 2.48351	34.47	VA1T	32.5	-25.2	41.77	54	-12.23	-	-	292	182	H
4	* 2.48476	29.96	VA1T	32.5	-25.2	37.26	54	-16.74	-	-	292	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

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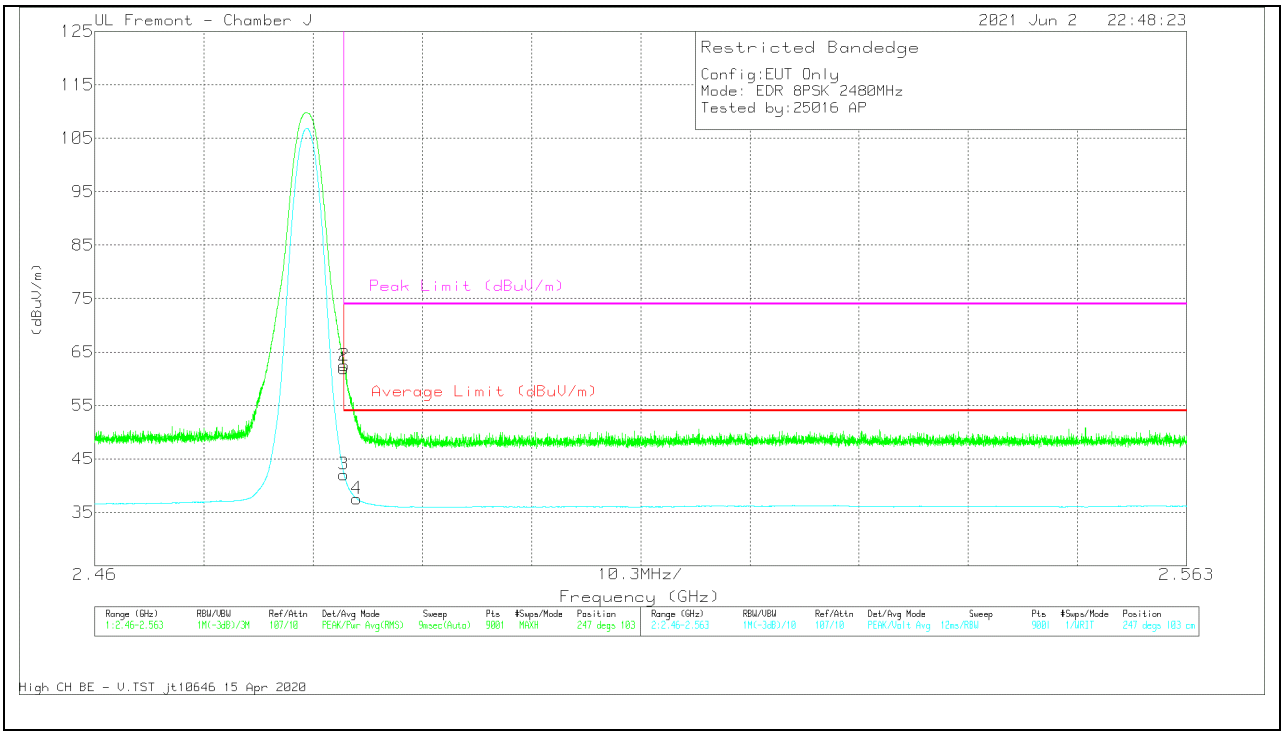
47173 Benicia Street, Fremont, CA 94538; USA TEL:(510) 319-4000 FAX:(510) 661-0888

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	54.56	Pk	32.5	-25.2	61.86	-	-	74	-12.14	247	103	V
2	* 2.48352	55.18	Pk	32.5	-25.2	62.48	-	-	74	-11.52	247	103	V
3	* 2.48351	34.8	VA1T	32.5	-25.2	42.1	54	-11.9	-	-	247	103	V
4	* 2.48473	30.24	VA1T	32.5	-25.2	37.54	54	-16.46	-	-	247	103	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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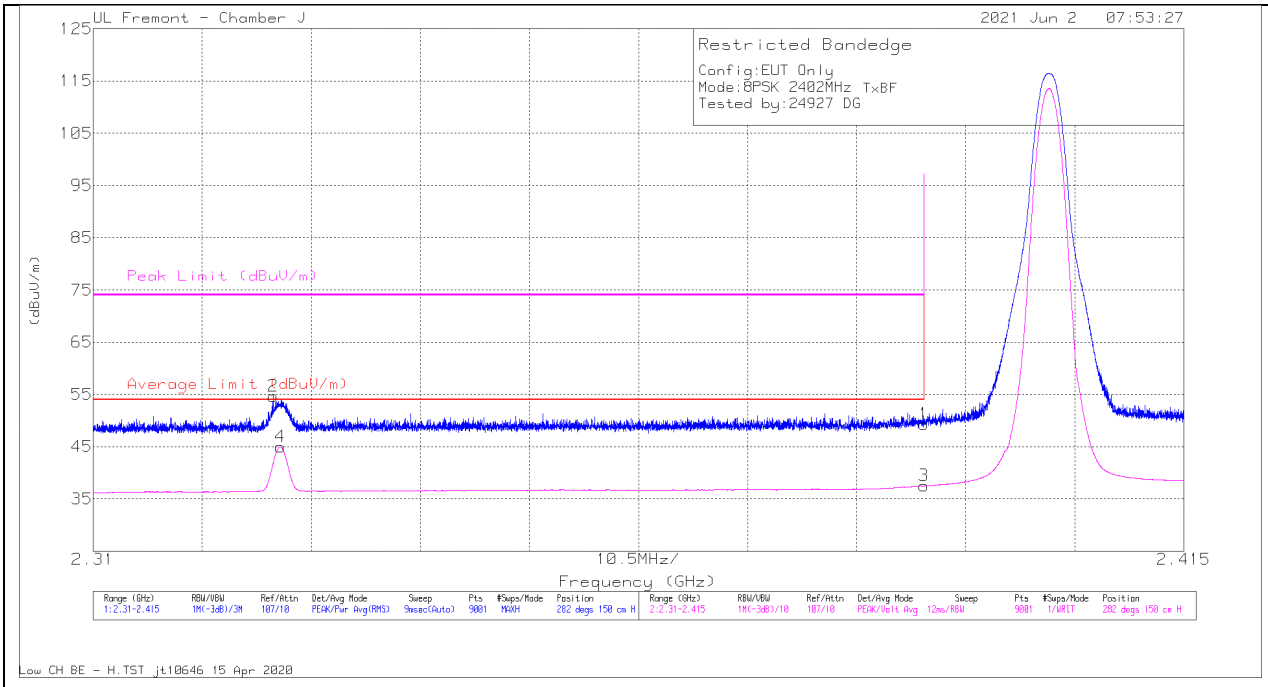
10.1.4. HIGH POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

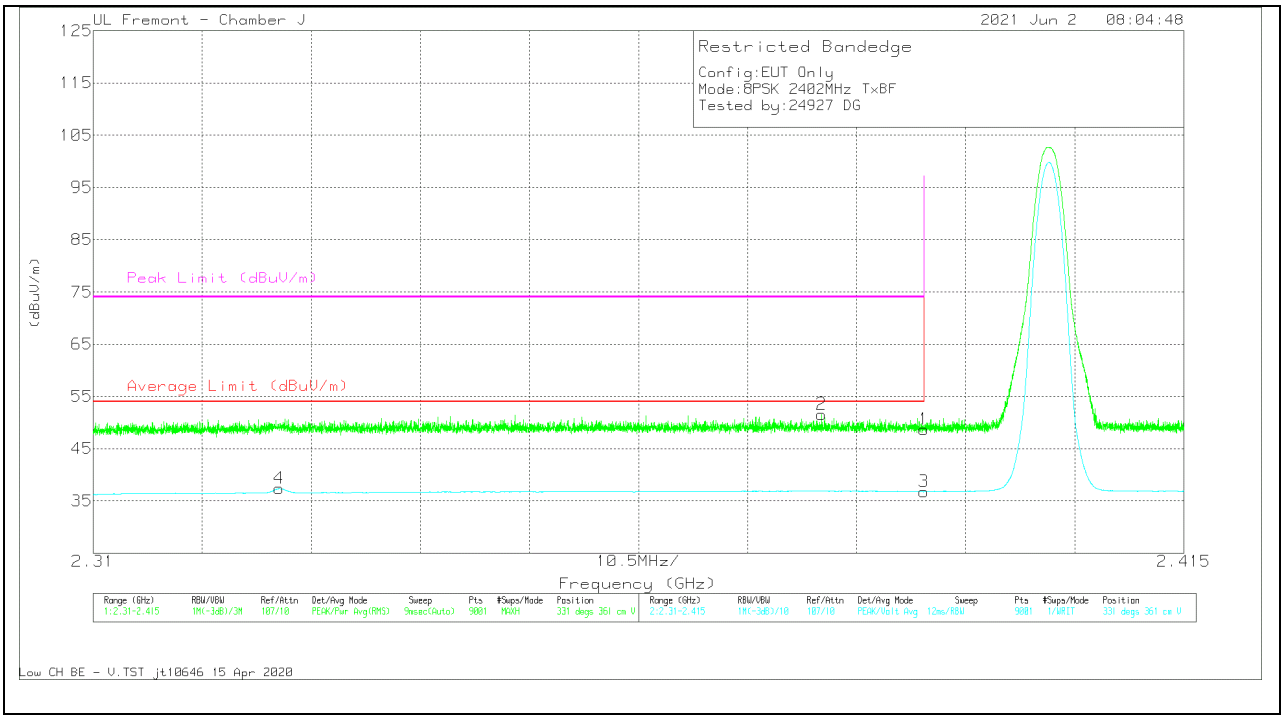


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	42.38	Pk	32.1	-25.2	49.28	-	-	74	-24.72	282	150	H
2	* 2.32735	48.1	Pk	31.8	-25.3	54.6	-	-	74	-19.4	282	150	H
3	* 2.38999	30.55	VA1T	32.1	-25.2	37.45	54	-16.55	-	-	282	150	H
4	* 2.32803	38.45	VA1T	31.8	-25.3	44.95	54	-9.05	-	-	282	150	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 (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	41.76	Pk	32.1	-25.2	48.66	-	-	74	-25.34	331	361	V
2	* 2.38014	44.69	Pk	32.1	-25.2	51.59	-	-	74	-22.41	331	361	V
3	* 2.38999	29.84	VA1T	32.1	-25.2	36.74	54	-17.26	-	-	331	361	V
4	* 2.3279	30.85	VA1T	31.8	-25.3	37.35	54	-16.65	-	-	331	361	V

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

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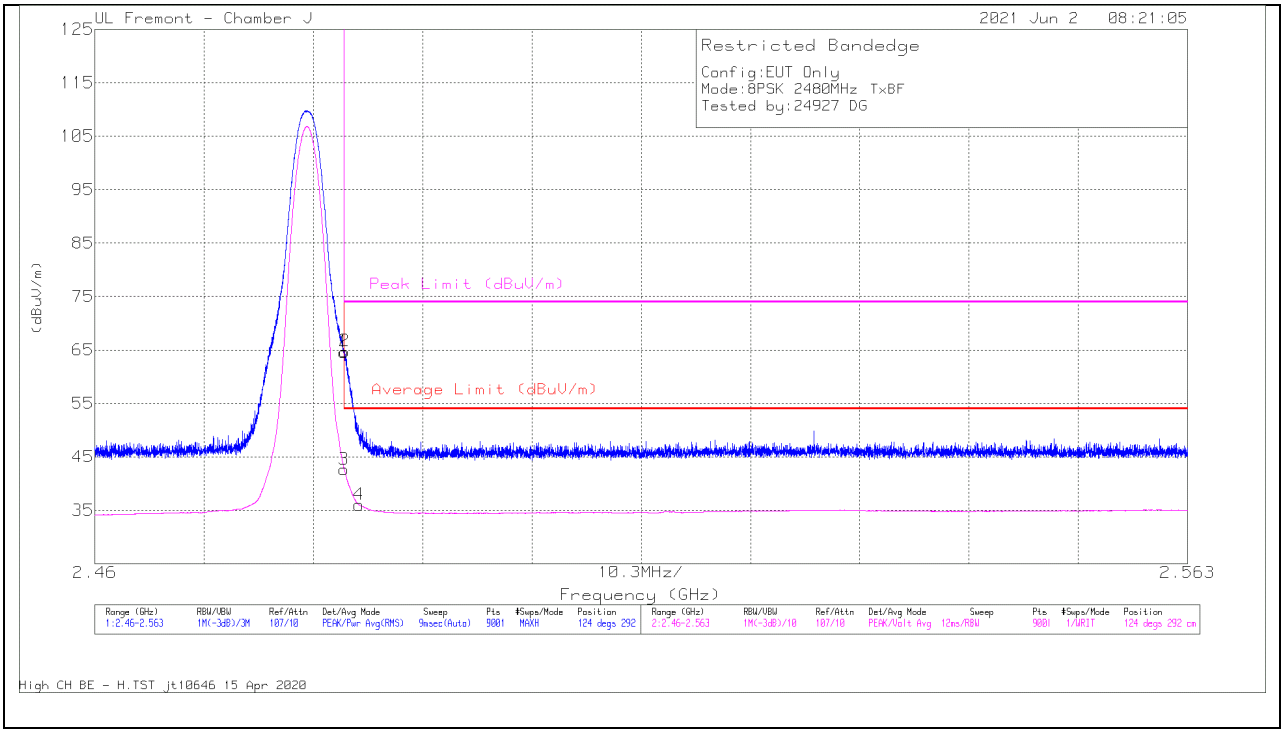
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

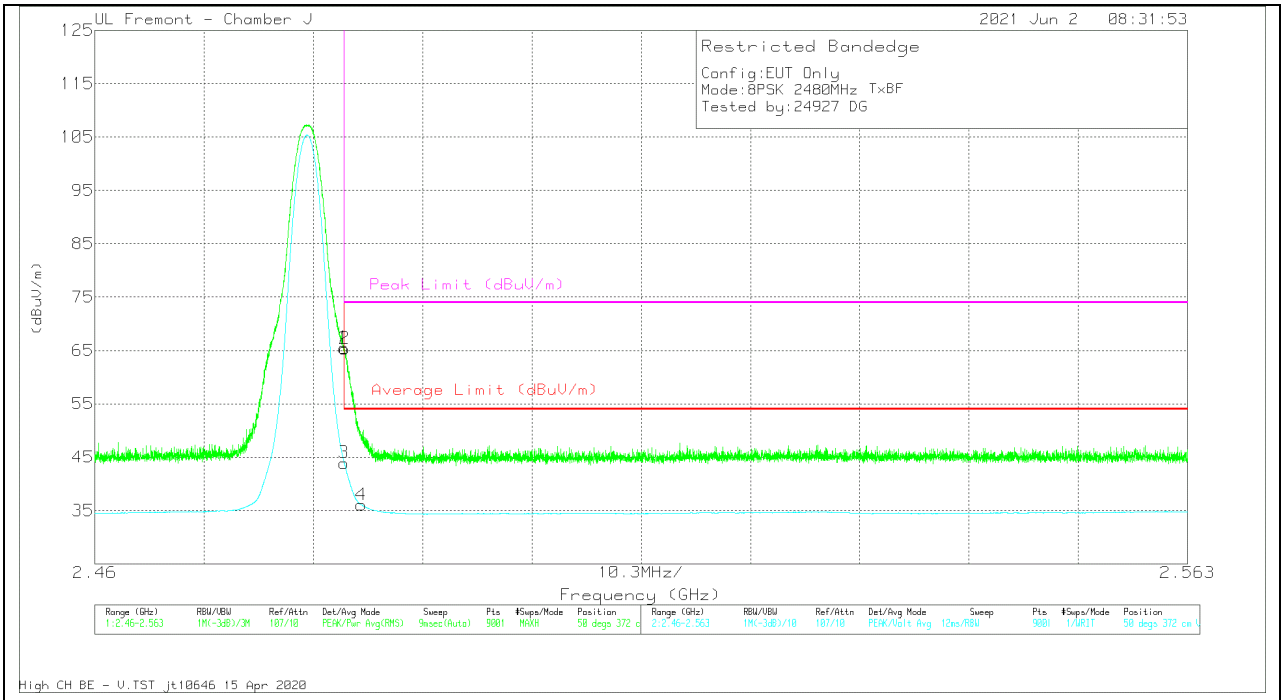


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0100034 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	57.29	Pk	32.5	-25.2	64.59	-	-	74	-9.41	124	292	H
2	* 2.48353	57.45	Pk	32.5	-25.2	64.75	-	-	74	-9.25	124	292	H
3	* 2.48351	35.33	VA1T	32.5	-25.2	42.63	54	-11.37	-	-	124	292	H
4	* 2.48489	28.73	VA1T	32.5	-25.2	36.03	54	-17.97	-	-	124	292	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 (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	58.19	Pk	32.5	-25.2	65.49	-	-	74	-8.51	50	372	V
2	* 2.48354	58.04	Pk	32.5	-25.2	65.34	-	-	74	-8.66	50	372	V
3	* 2.48351	36.62	VA1T	32.5	-25.2	43.92	54	-10.08	-	-	50	372	V
4	* 2.48511	28.76	VA1T	32.5	-25.2	36.06	54	-17.94	-	-	50	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

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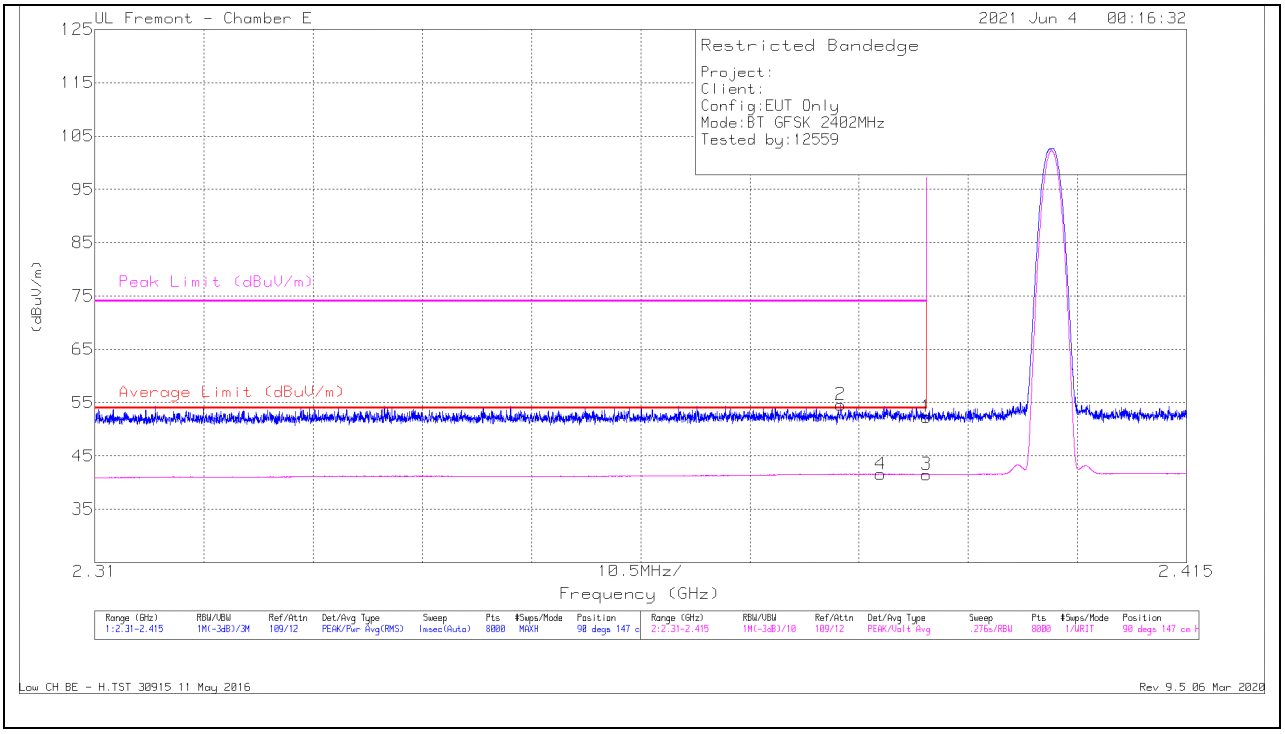
10.1.5. LOW POWER BASIC DATA RATE GFSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT

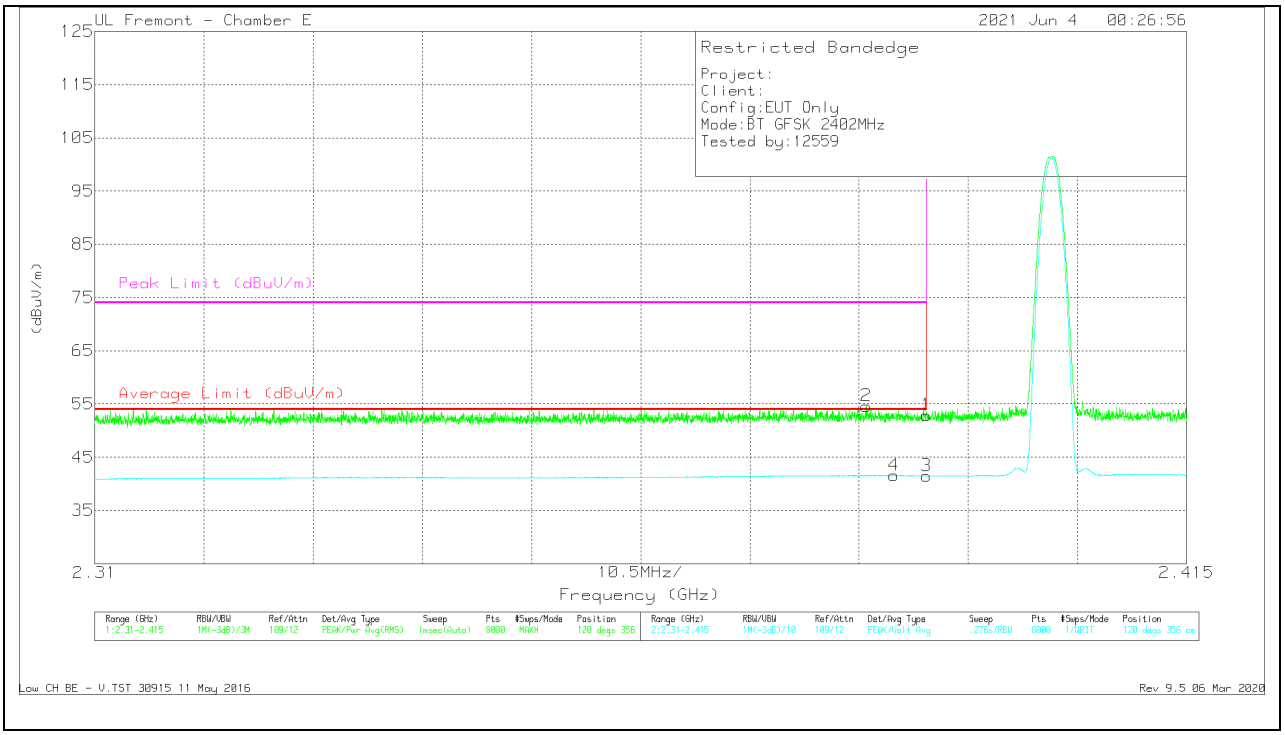


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.72	Pk	32.2	-17.6	52.32	-	-	74	-21.68	90	147	H
2	* 2.38173	40.01	Pk	32.2	-17.6	54.61	-	-	74	-19.39	90	147	H
3	* 2.39	26.93	VA1T	32.2	-17.6	41.53	54	-12.47	-	-	90	147	H
4	* 2.38557	27	VA1T	32.2	-17.6	41.6	54	-12.4	-	-	90	147	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 (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.27	Pk	32.2	-17.6	52.87	-	-	74	-21.13	120	356	V
2	* 2.38419	40.02	Pk	32.2	-17.6	54.62	-	-	74	-19.38	120	356	V
3	* 2.39	26.9	VA1T	32.2	-17.6	41.5	54	-12.5	-	-	120	356	V
4	* 2.38687	26.99	VA1T	32.2	-17.6	41.59	54	-12.41	-	-	120	356	V

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

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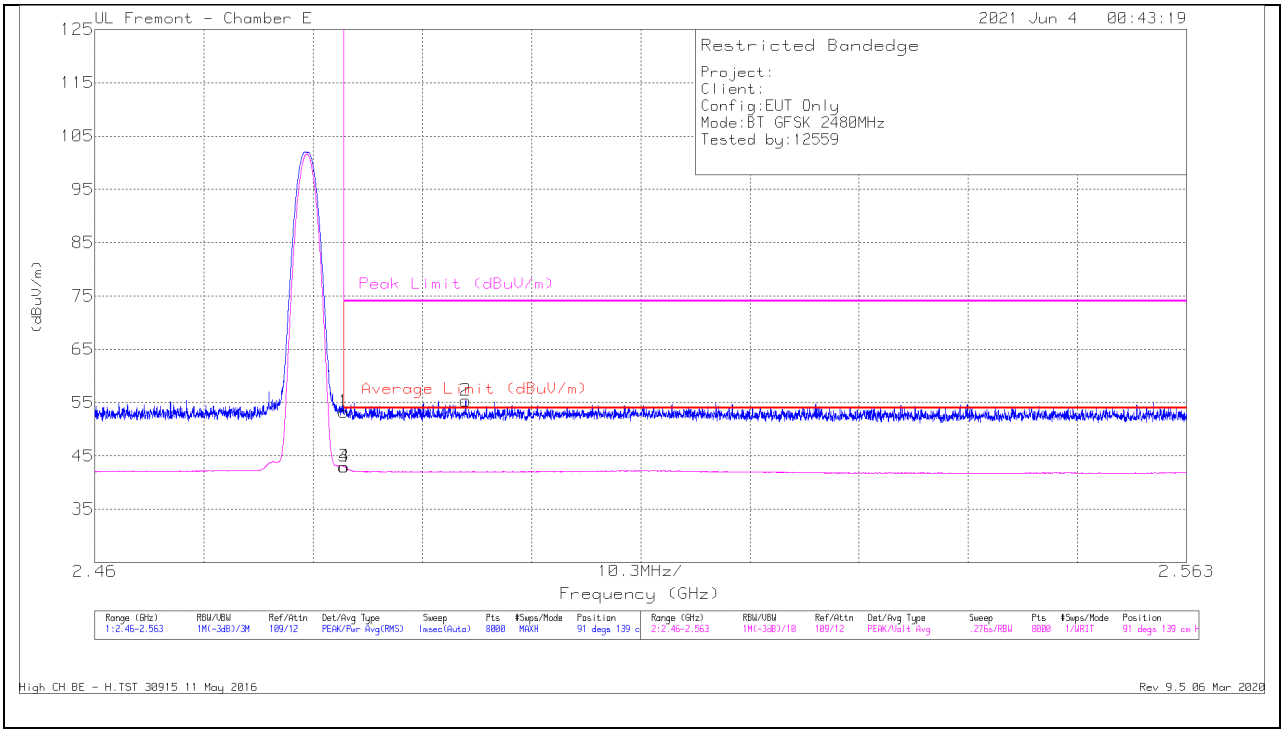
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT

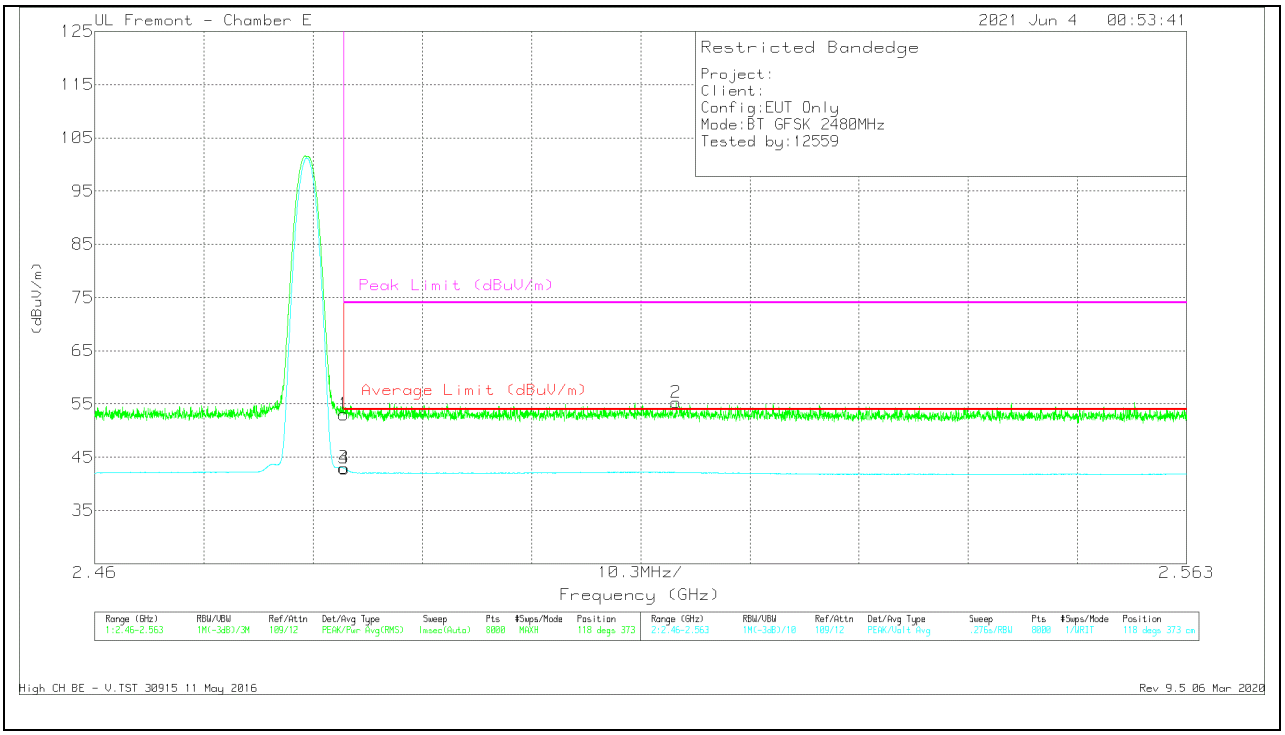


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	38.38	Pk	32.6	-17.7	53.28	-	-	74	-20.72	91	139	H
3	* 2.4835	28.11	VA1T	32.6	-17.7	43.01	54	-10.99	-	-	91	139	H
4	* 2.48354	28.06	VA1T	32.6	-17.7	42.96	54	-11.04	-	-	91	139	H
2	* 2.49499	40.47	Pk	32.7	-17.8	55.37	-	-	74	-18.63	91	139	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 (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	38.15	Pk	32.6	-17.7	53.05	-	-	74	-20.95	118	373	V
3	* 2.4835	28.08	VA1T	32.6	-17.7	42.98	54	-11.02	-	-	118	373	V
4	* 2.48356	28.01	VA1T	32.6	-17.7	42.91	54	-11.09	-	-	118	373	V
2	2.51484	40.18	Pk	32.7	-17.6	55.28	-	-	74	-18.72	118	373	V

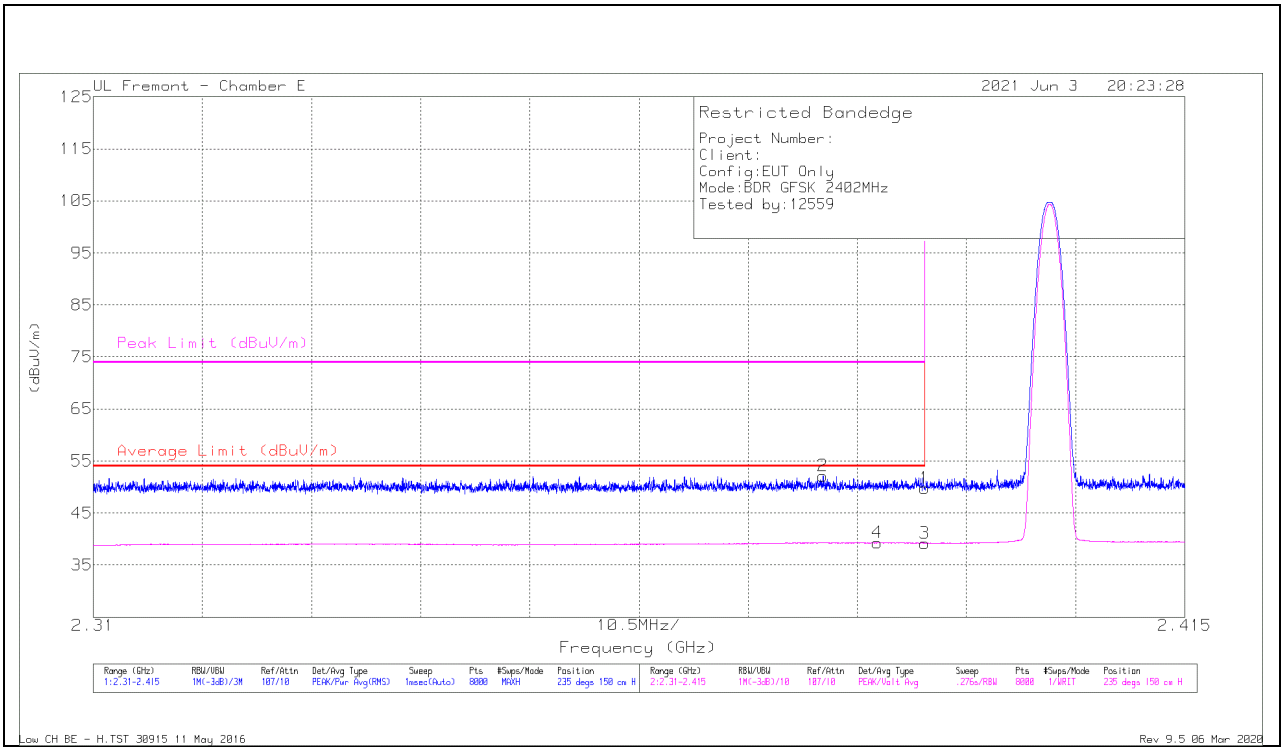
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
VA1T - FHSS: Linear Voltage Average VB=1/Ton where: Ton is transmit duration

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

ANT 3

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.3802	45.36	Pk	32.2	-25.4	52.16	-	-	74	-21.84	235	150	H
4	* 2.38543	32.51	VA1T	32.2	-25.4	39.31	54	-14.69	-	-	235	150	H
1	* 2.39	42.96	Pk	32.2	-25.4	49.76	-	-	74	-24.24	235	150	H
3	* 2.39	32.39	VA1T	32.2	-25.4	39.19	54	-14.81	-	-	235	150	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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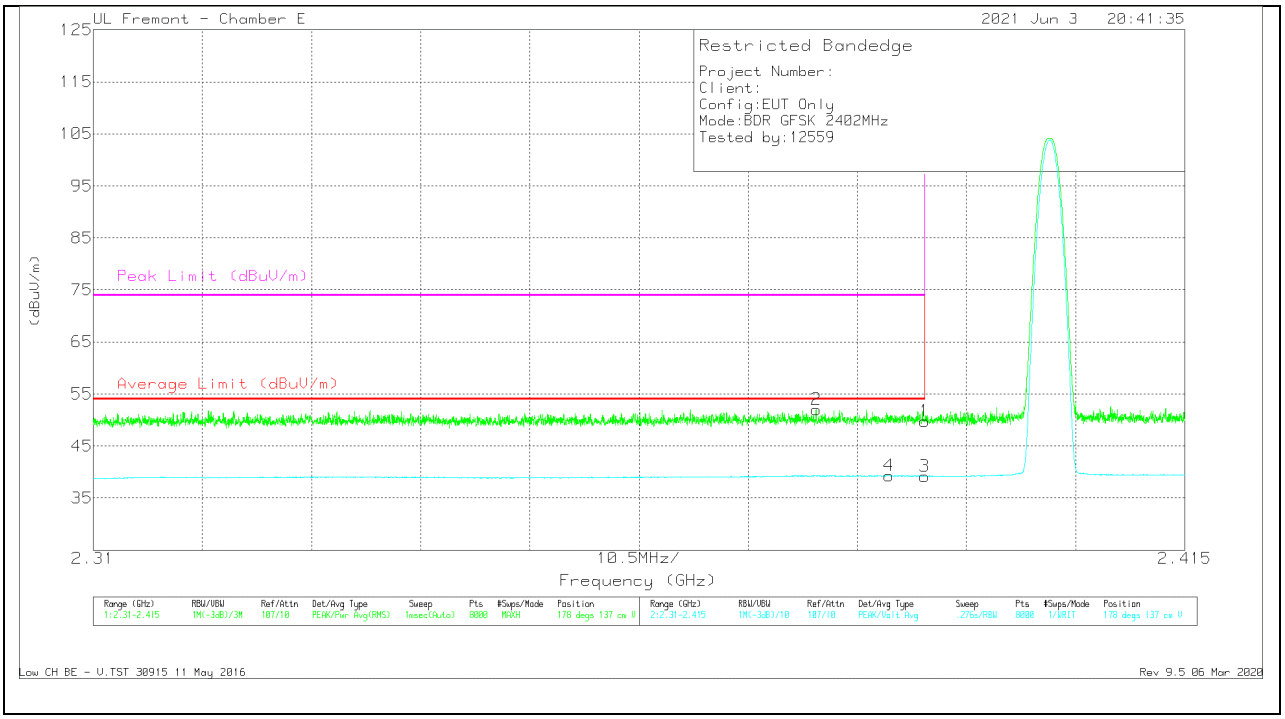
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fi tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.97	Pk	32.2	-25.4	49.77	-	-	74	-24.23	178	137	V
2	* 2.37953	45.19	Pk	32.2	-25.4	51.99	-	-	74	-22.01	178	137	V
3	* 2.39	32.4	VA1T	32.2	-25.4	39.2	54	-14.8	-	-	178	137	V
4	* 2.38653	32.5	VA1T	32.2	-25.4	39.3	54	-14.7	-	-	178	137	V

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

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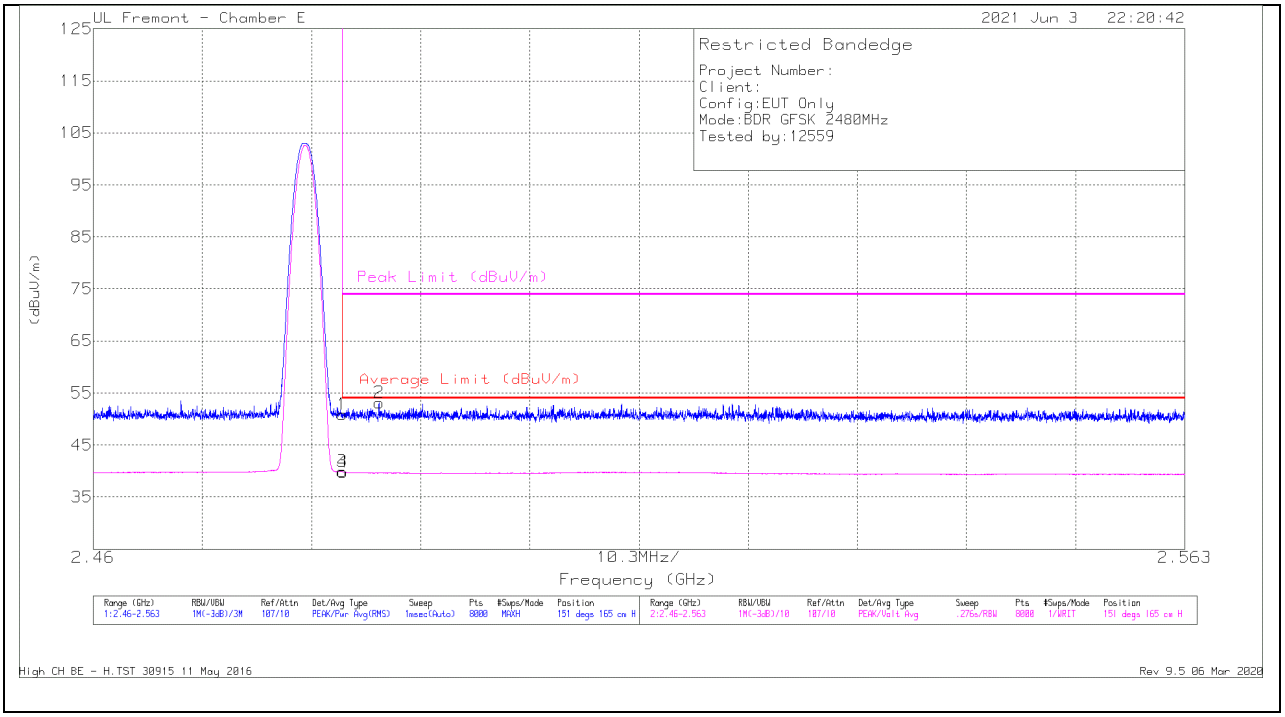
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	43.65	Pk	32.6	-25.4	50.85	-	-	74	-23.15	151	165	H
2	* 2.48696	45.9	Pk	32.6	-25.4	53.1	-	-	74	-20.9	151	165	H
3	* 2.4835	32.67	VA1T	32.6	-25.4	39.87	54	-14.13	-	-	151	165	H
4	* 2.48354	32.63	VA1T	32.6	-25.4	39.83	54	-14.17	-	-	151	165	H

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

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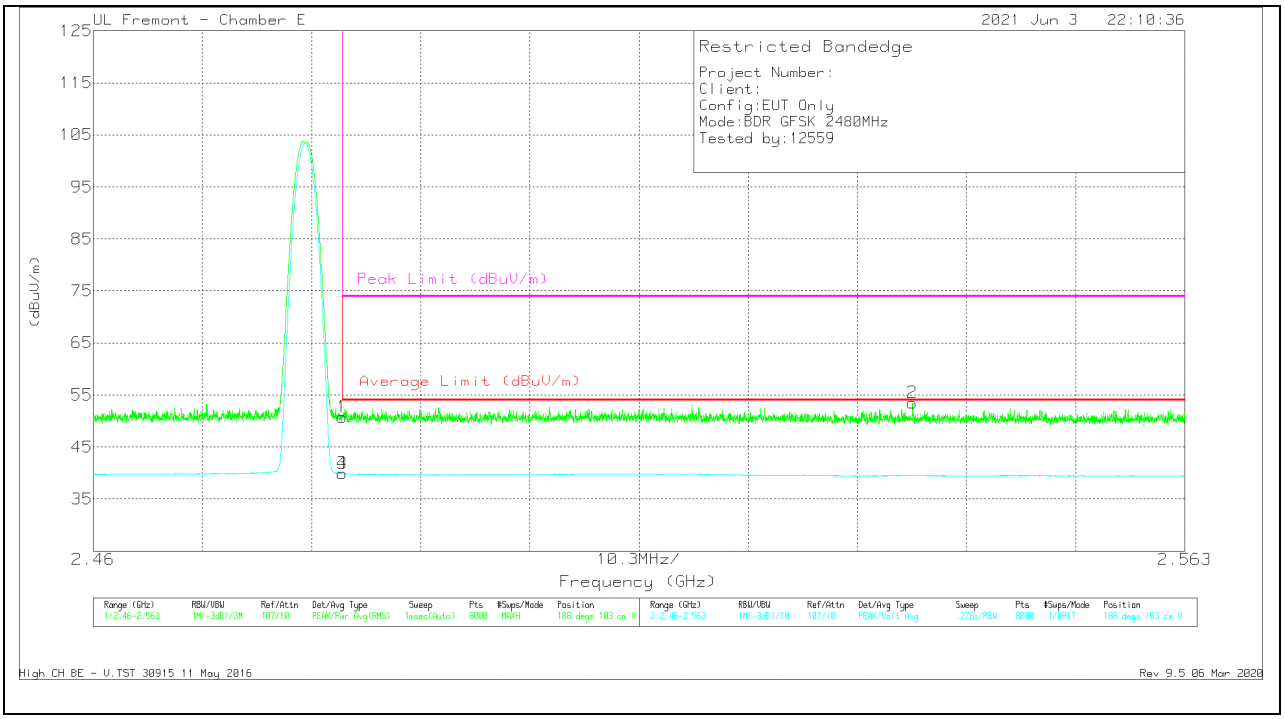
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	43.52	Pk	32.6	-25.4	50.72	-	-	74	-23.28	188	103	V
3	* 2.4835	32.71	VA1T	32.6	-25.4	39.91	54	-14.09	-	-	188	103	V
4	* 2.48351	32.71	VA1T	32.6	-25.4	39.91	54	-14.09	-	-	188	103	V
2	2.53731	46.35	Pk	32.5	-25.4	53.45	-	-	74	-20.55	188	103	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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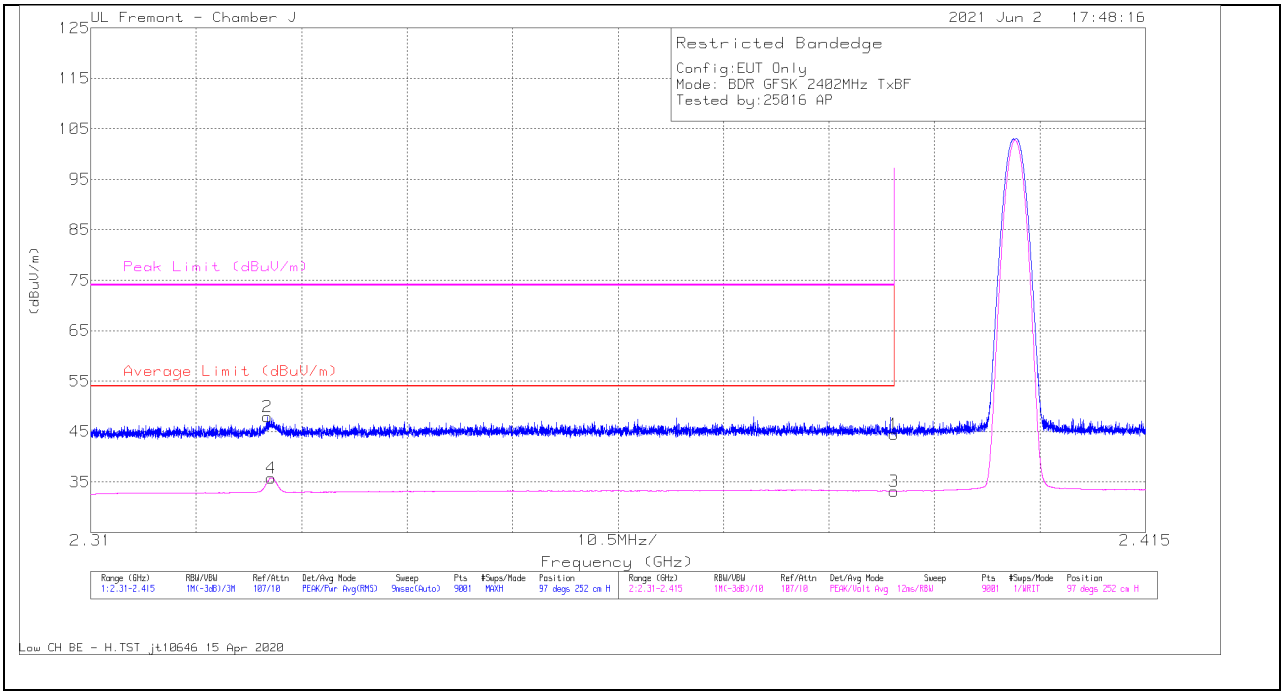
10.1.6. LOW POWER BASIC DATA RATE TXBF GFSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	37.56	Pk	32.1	-25.2	44.46	-	-	74	-29.54	97	252	H
2	* 2.32762	41.43	Pk	31.8	-25.3	47.93	-	-	74	-26.07	97	252	H
3	* 2.38999	26.25	VA1T	32.1	-25.2	33.15	54	-20.85	-	-	97	252	H
4	* 2.32799	29.27	VA1T	31.8	-25.3	35.77	54	-18.23	-	-	97	252	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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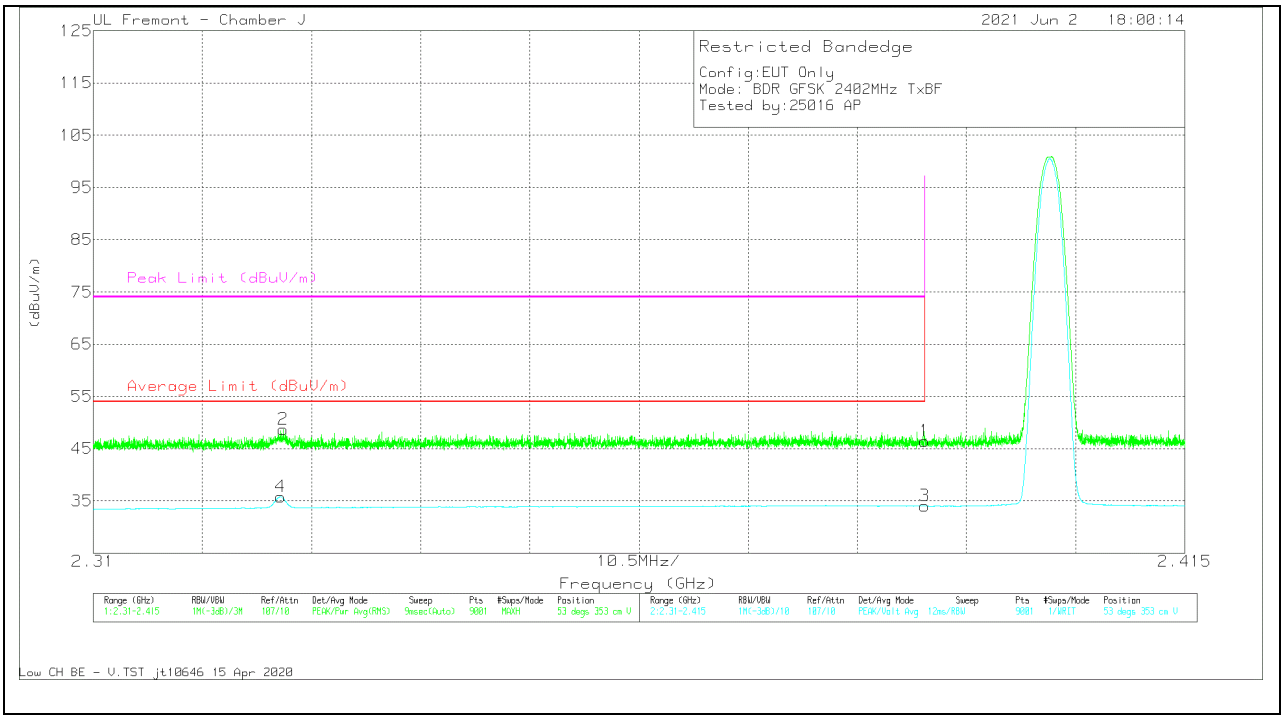
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	39.49	Pk	32.1	-25.2	46.39	-	-	74	-27.61	53	353	V
2	* 2.32828	42.17	Pk	31.8	-25.3	48.67	-	-	74	-25.33	53	353	V
3	* 2.38999	27.09	VA1T	32.1	-25.2	33.99	54	-20.01	-	-	53	353	V
4	* 2.32804	29.24	VA1T	31.8	-25.3	35.74	54	-18.26	-	-	53	353	V

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

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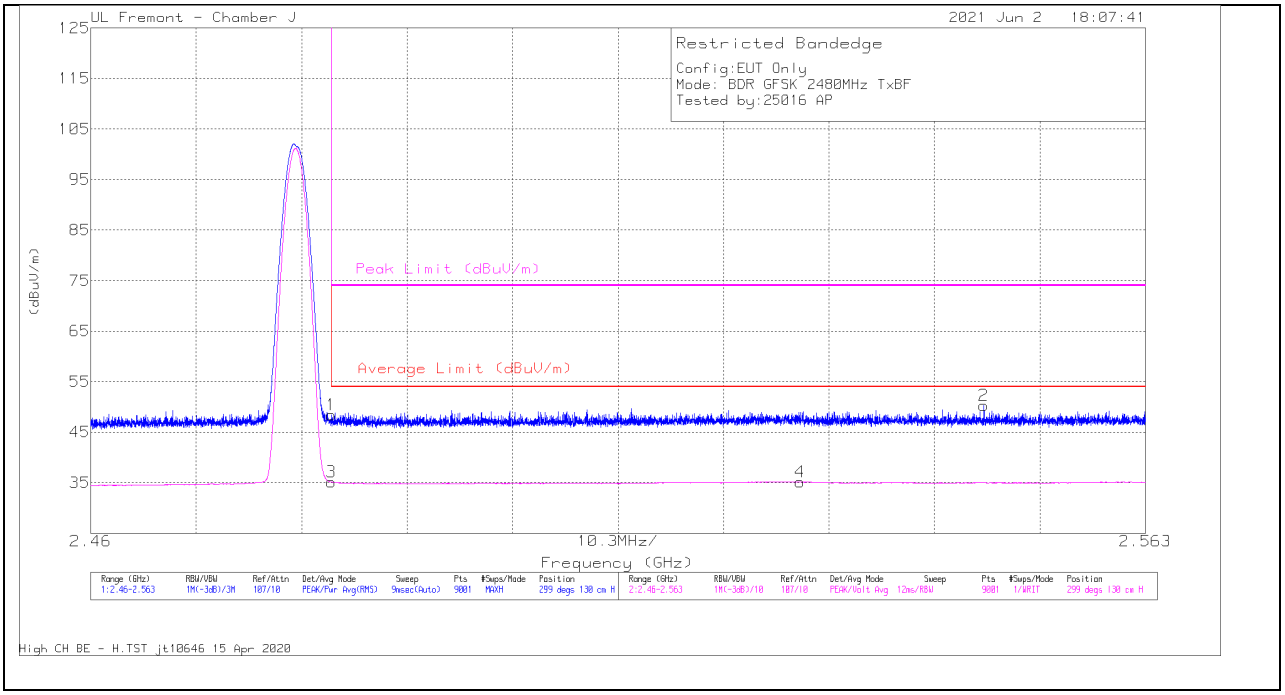
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	41.14	Pk	32.5	-25.2	48.44	-	-	74	-25.56	299	130	H
2	2.54723	42.82	Pk	32.6	-25.1	50.32	-	-	74	-23.68	299	130	H
3	* 2.48351	27.81	VA1T	32.5	-25.2	35.11	54	-18.89	-	-	299	130	H
4	2.52929	27.47	VA1T	32.8	-25.1	35.17	54	-18.83	-	-	299	130	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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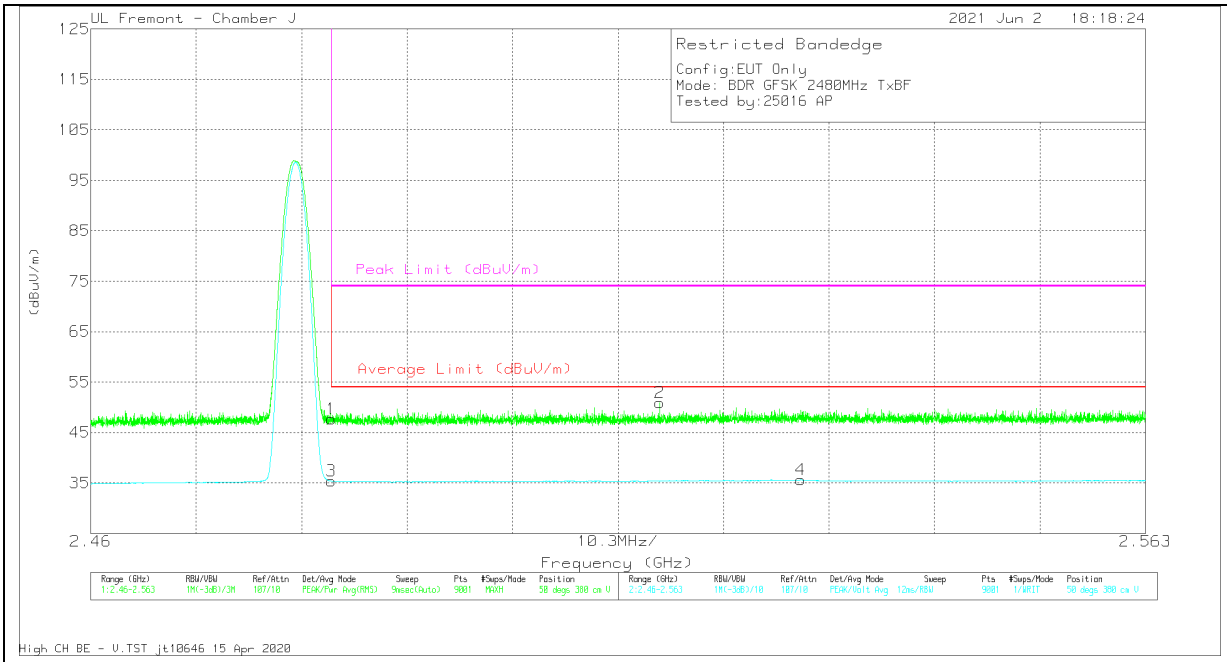
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	40.4	Pk	32.5	-25.2	47.7	-	-	74	-26.3	50	380	V
2	2.51555	43.36	Pk	32.7	-25.2	50.86	-	-	74	-23.14	50	380	V
3	* 2.48351	28.05	VA1T	32.5	-25.2	35.35	54	-18.65	-	-	50	380	V
4	2.52934	27.92	VA1T	32.8	-25.1	35.62	54	-18.38	-	-	50	380	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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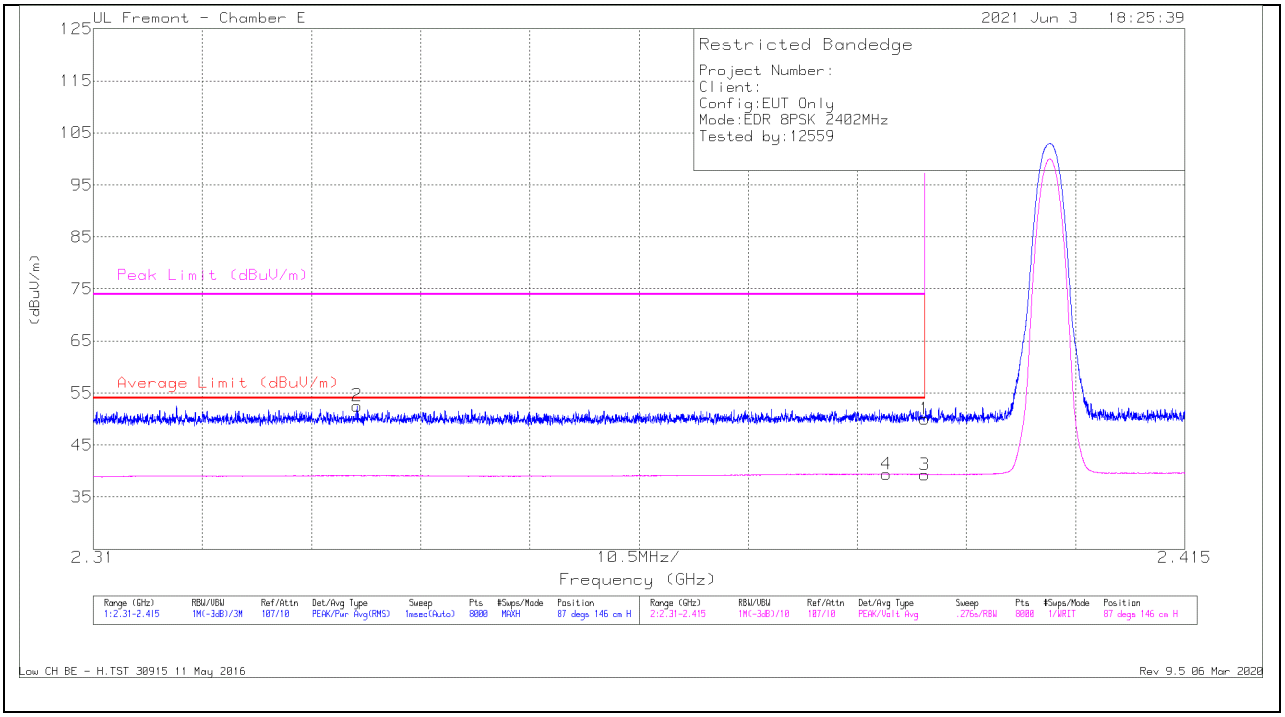
10.1.7. LOW POWER ENHANCED DATA RATE 8PSK MODULATION

ANT 4

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fi tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.33537	45.96	Pk	32.1	-25.5	52.56	-	-	74	-21.44	87	146	H
4	* 2.38628	32.62	VA1T	32.2	-25.4	39.42	54	-14.58	-	-	87	146	H
1	* 2.39	43.26	Pk	32.2	-25.4	50.06	-	-	74	-23.94	87	146	H
3	* 2.39	32.53	VA1T	32.2	-25.4	39.33	54	-14.67	-	-	87	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

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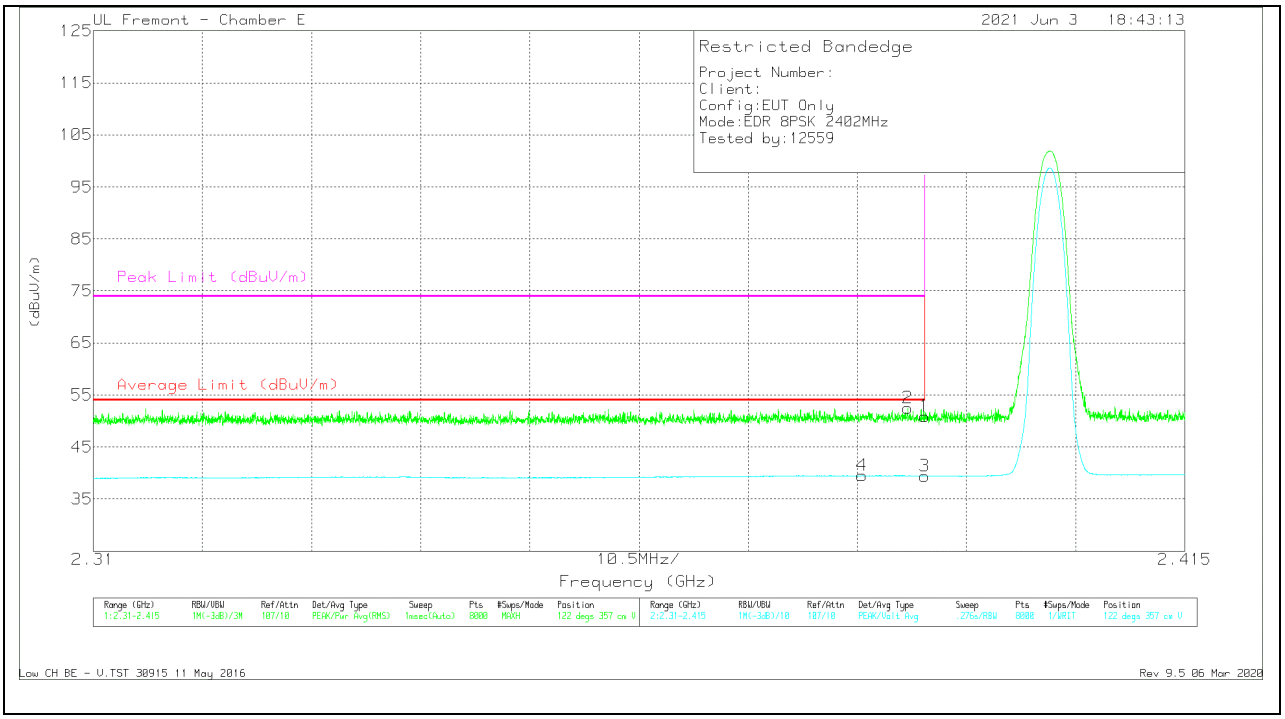
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fl tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.38396	32.82	VA1T	32.2	-25.5	39.52	54	-14.48	-	-	122	357	V
2	* 2.38837	45.69	Pk	32.2	-25.4	52.49	-	-	74	-21.51	122	357	V
1	* 2.39	44.14	Pk	32.2	-25.4	50.94	-	-	74	-23.06	122	357	V
3	* 2.39	32.63	VA1T	32.2	-25.4	39.43	54	-14.57	-	-	122	357	V

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

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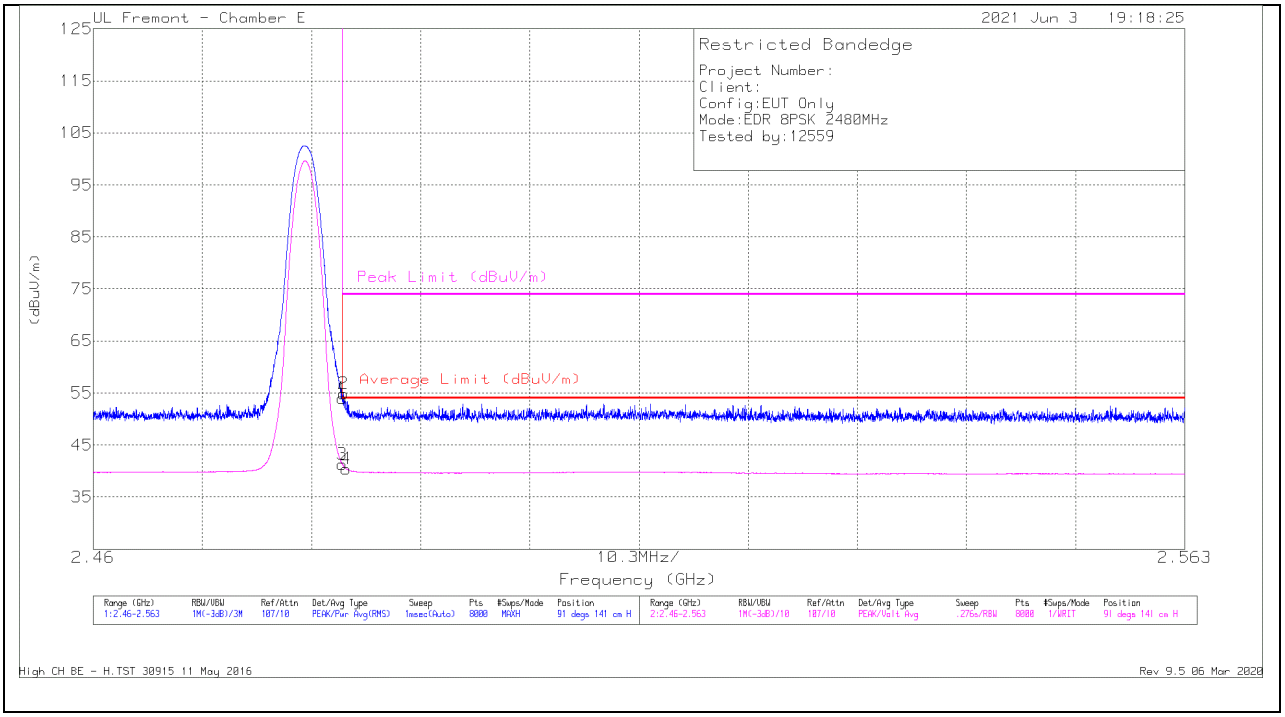
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	46.77	Pk	32.6	-25.4	53.97	-	-	74	-20.03	91	141	H
2	* 2.48363	47.61	Pk	32.6	-25.4	54.81	-	-	74	-19.19	91	141	H
3	* 2.4835	34.1	VA1T	32.6	-25.4	41.3	54	-12.7	-	-	91	141	H
4	* 2.48385	33.26	VA1T	32.6	-25.4	40.46	54	-13.54	-	-	91	141	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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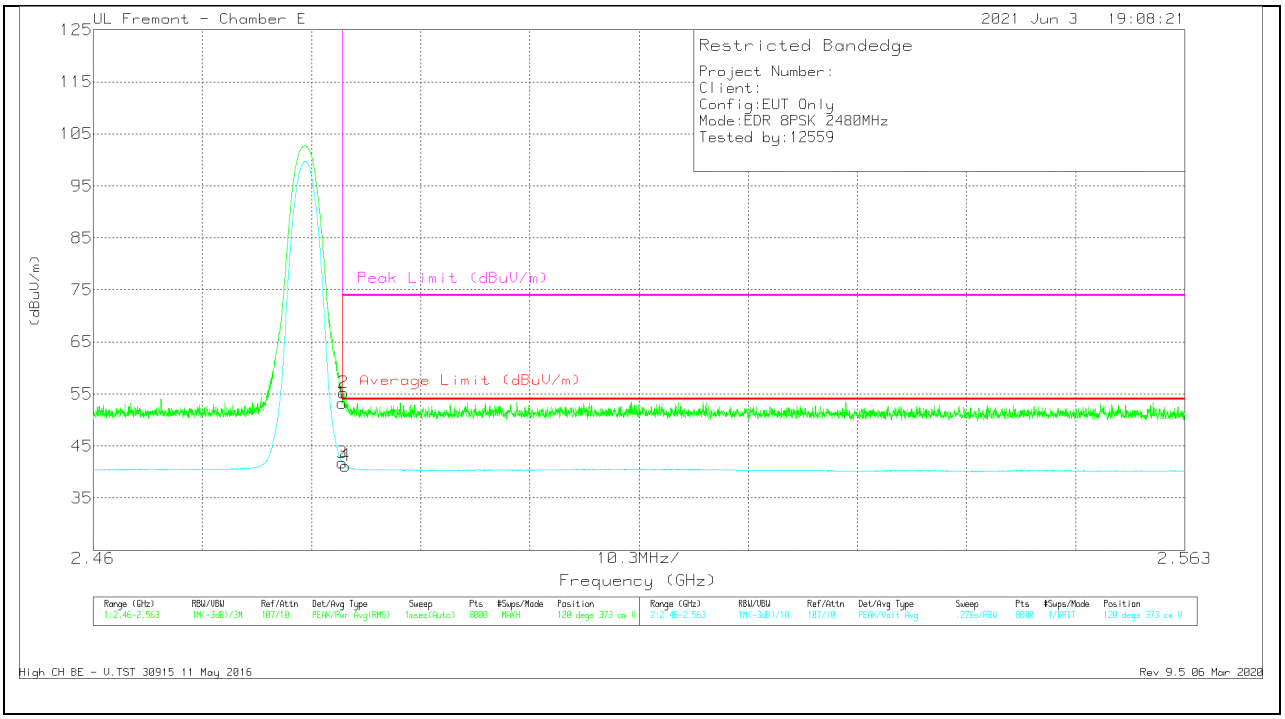
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Fi tr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	46.06	Pk	32.6	-25.4	53.26	-	-	74	-20.74	120	373	V
3	* 2.4835	34.56	VA1T	32.6	-25.4	41.76	54	-12.24	-	-	120	373	V
2	* 2.4836	48.05	Pk	32.6	-25.4	55.25	-	-	74	-18.75	120	373	V
4	* 2.48381	34.02	VA1T	32.6	-25.4	41.22	54	-12.78	-	-	120	373	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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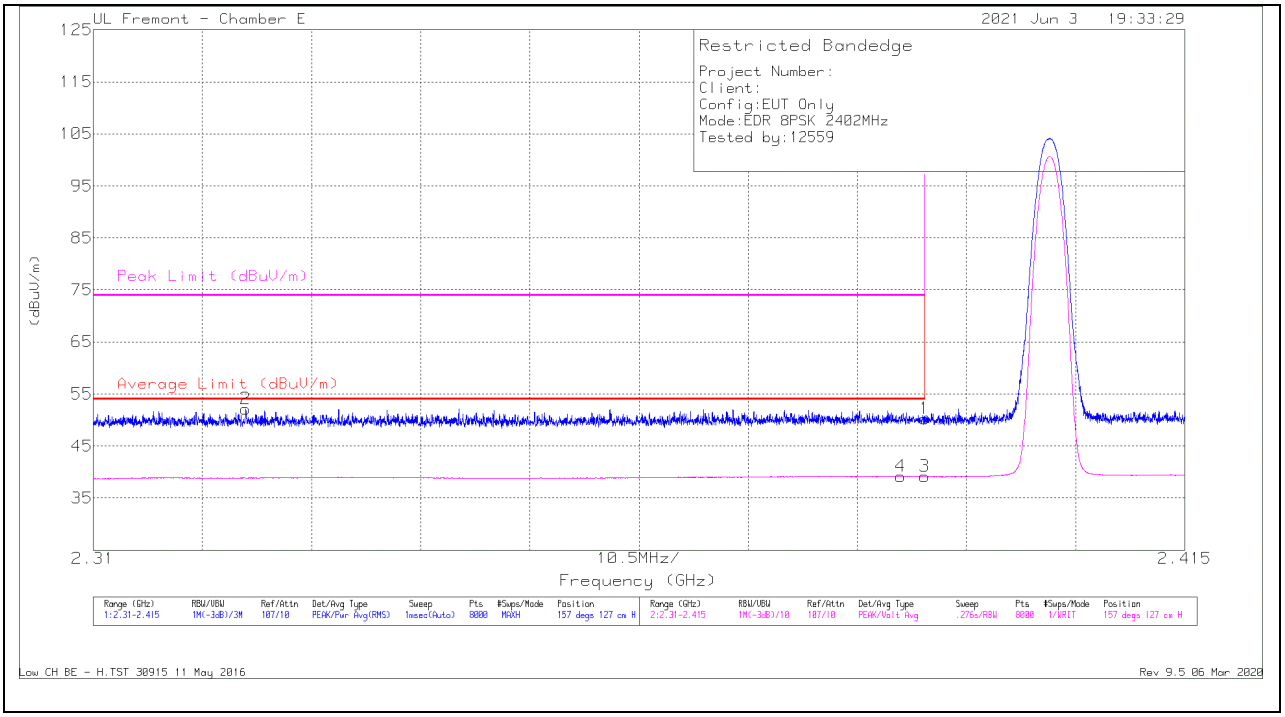
ANT 3

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007 8107 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.43	Pk	32.2	-25.4	50.23	-	-	74	-23.77	157	127	H
2	* 2.32466	45.73	Pk	31.9	-25.5	52.13	-	-	74	-21.87	157	127	H
3	* 2.39	32.35	VA1T	32.2	-25.4	39.15	54	-14.85	-	-	157	127	H
4	* 2.38766	32.42	VA1T	32.2	-25.4	39.22	54	-14.78	-	-	157	127	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

Low CH BE - H.TST 30915 11 May 2016
Rev 9.5 06 Mar 2020

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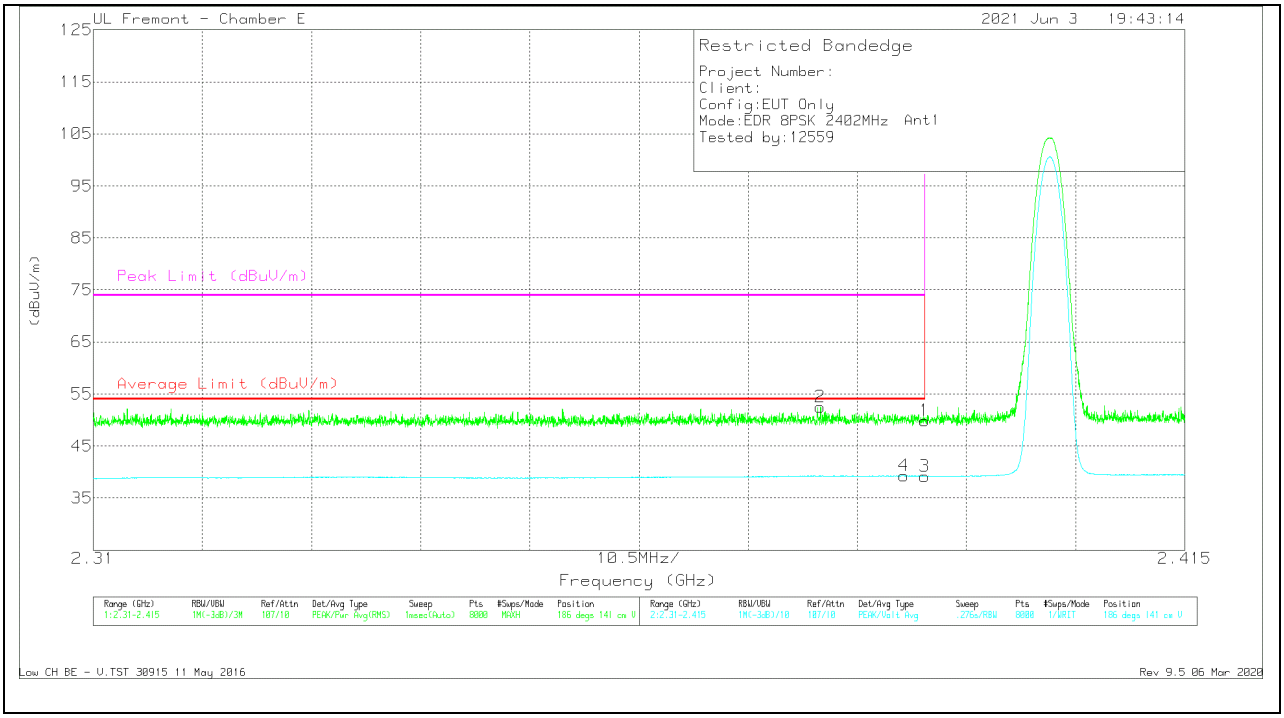
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007 8107 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.09	Pk	32.2	-25.4	49.89	-	-	74	-24.11	186	141	V
2	* 2.37995	45.66	Pk	32.2	-25.4	52.46	-	-	74	-21.54	186	141	V
3	* 2.39	32.41	VA1T	32.2	-25.4	39.21	54	-14.79	-	-	186	141	V
4	* 2.38796	32.48	VA1T	32.2	-25.4	39.28	54	-14.72	-	-	186	141	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

Low CH BE - V.TST 30915 11 May 2016
Rev 9.5 06 Mar 2020

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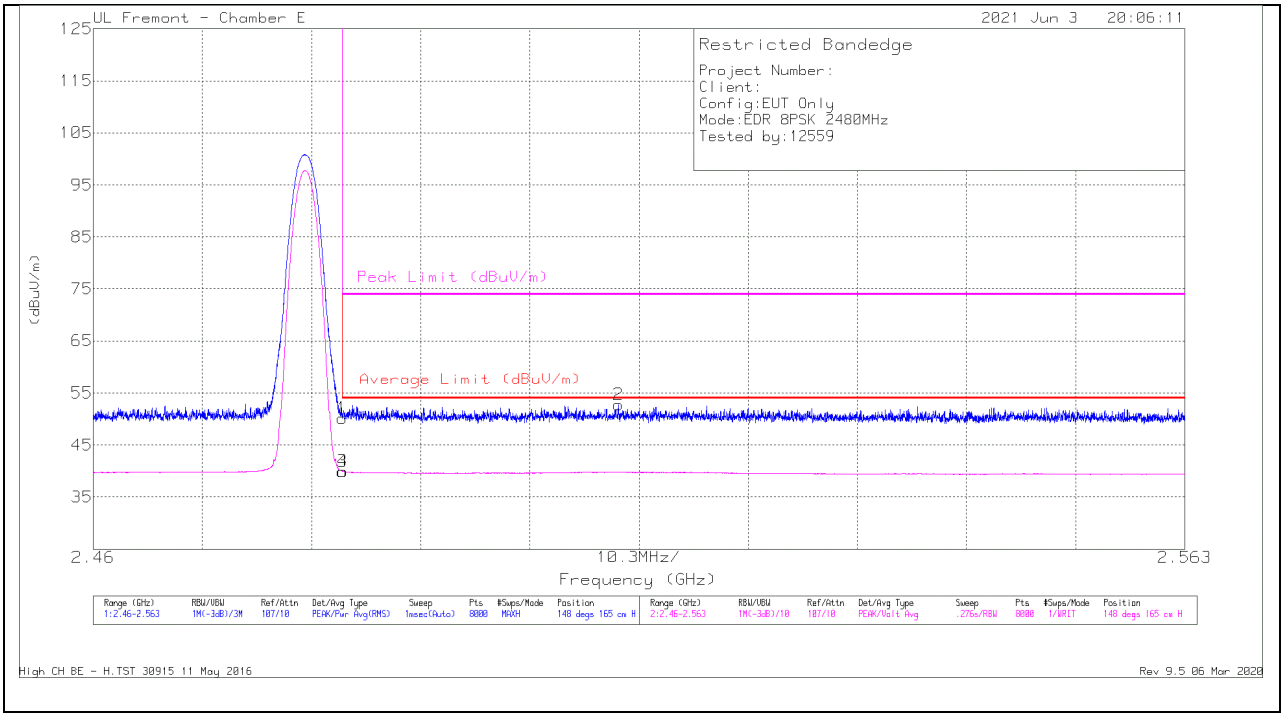
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007 8107 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	42.93	Pk	32.6	-25.4	50.13	-	-	74	-23.87	148	165	H
3	* 2.4835	32.75	VA1T	32.6	-25.4	39.95	54	-14.05	-	-	148	165	H
4	* 2.48354	32.72	VA1T	32.6	-25.4	39.92	54	-14.08	-	-	148	165	H
2	2.50955	45.49	Pk	32.7	-25.4	52.79	-	-	74	-21.21	148	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

High CH BE - H.TST 30915 11 May 2016
Rev 9.5 06 Mar 2020

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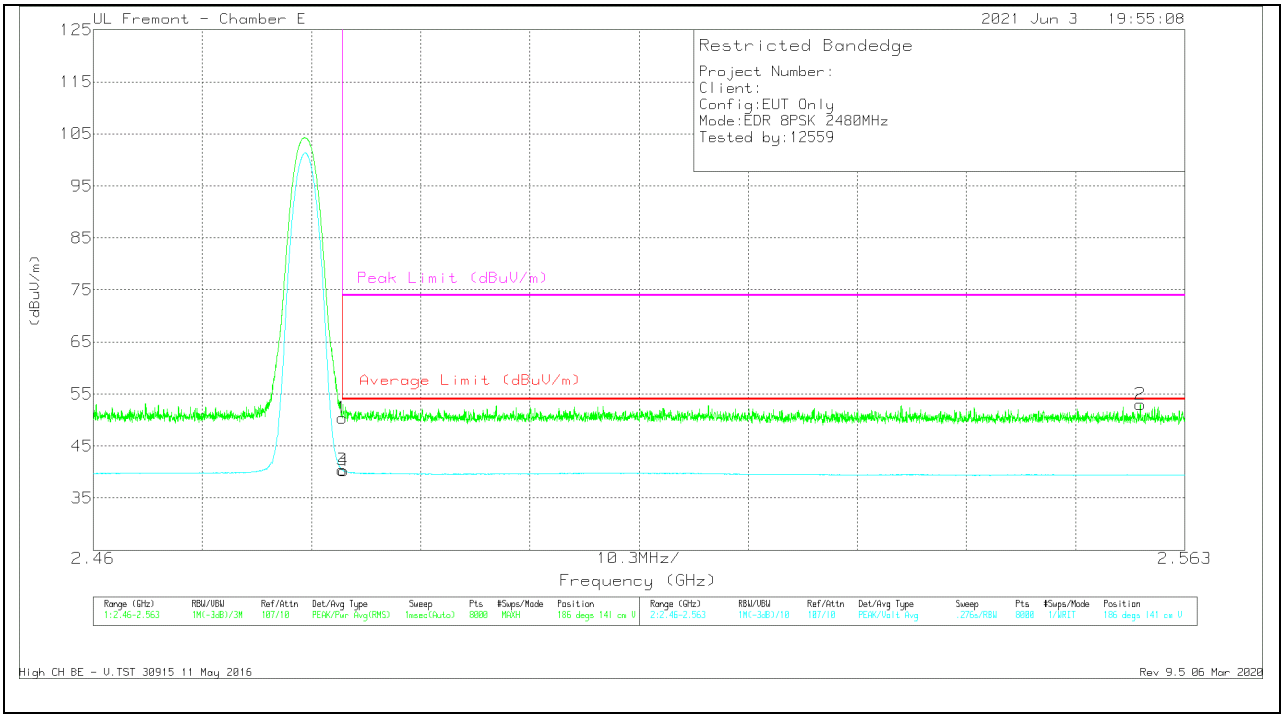
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007 8107 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	43.2	Pk	32.6	-25.4	50.4	-	-	74	-23.6	186	141	V
3	* 2.4835	33.18	VA1T	32.6	-25.4	40.38	54	-13.62	-	-	186	141	V
4	* 2.48359	33.04	VA1T	32.6	-25.4	40.24	54	-13.76	-	-	186	141	V
2	2.55881	45.98	Pk	32.4	-25.4	52.98	-	-	74	-21.02	186	141	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

High CH BE - V.TST 30915 11 May 2016
Rev 9.5 06 Mar 2020

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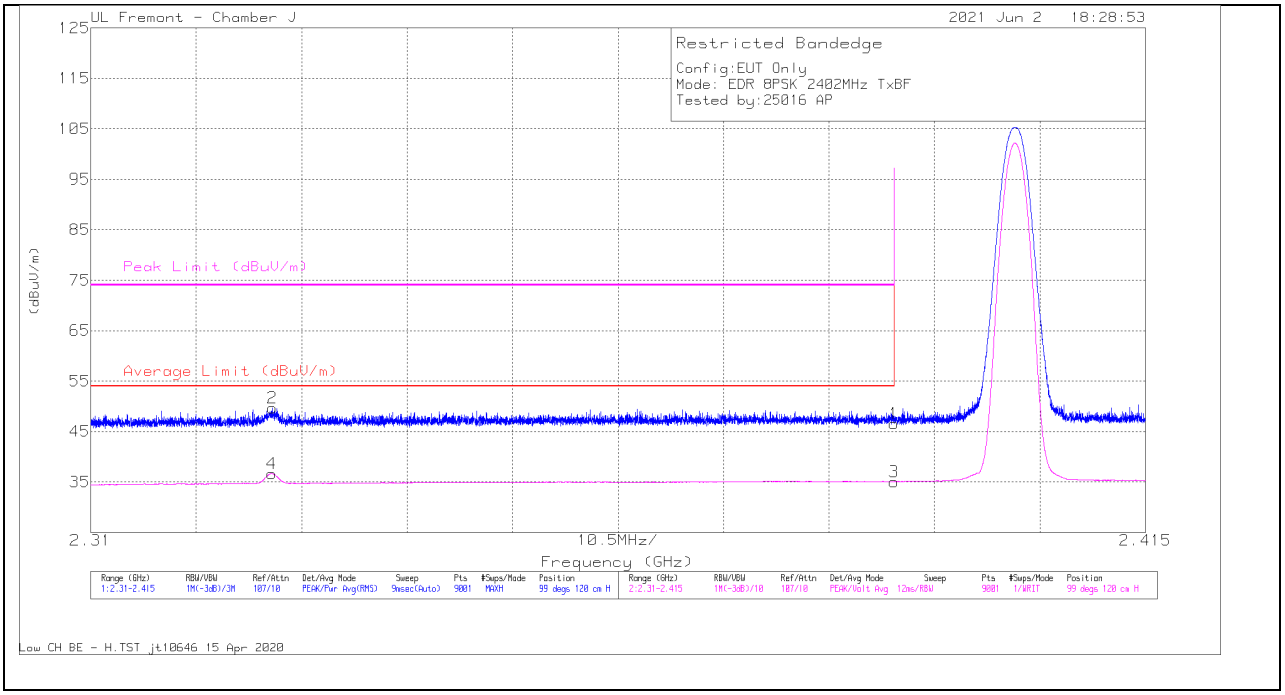
10.1.8. LOW POWER ENHANCED DATA RATE TXBF 8PSK MODULATION

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	39.66	Pk	32.1	-25.2	46.56	-	-	74	-27.44	99	120	H
2	* 2.32807	43.12	Pk	31.8	-25.3	49.62	-	-	74	-24.38	99	120	H
3	* 2.38999	28.16	VA1T	32.1	-25.2	35.06	54	-18.94	-	-	99	120	H
4	* 2.32801	30.14	VA1T	31.8	-25.3	36.64	54	-17.36	-	-	99	120	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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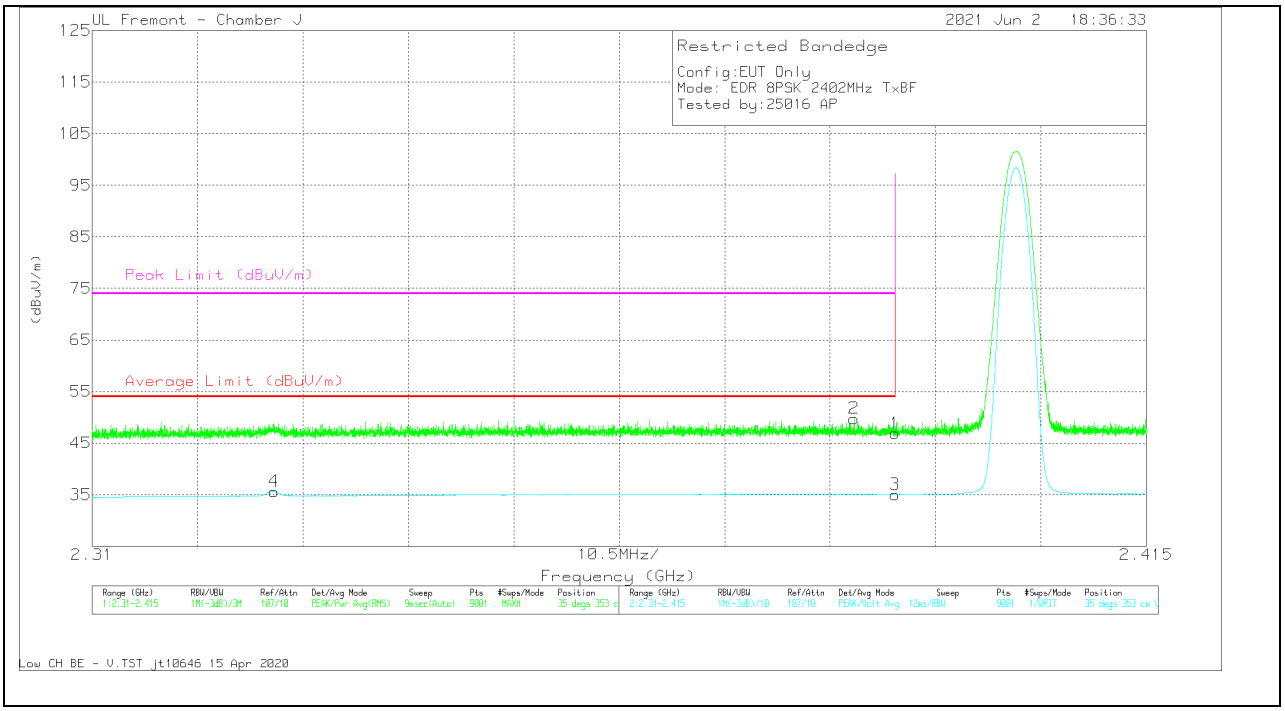
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	39.99	Pk	32.1	-25.2	46.89	-	-	74	-27.11	35	353	V
2	* 2.38588	42.87	Pk	32.1	-25.2	49.77	-	-	74	-24.23	35	353	V
3	* 2.38999	28.12	VA1T	32.1	-25.2	35.02	54	-18.98	-	-	35	353	V
4	* 2.32811	29.12	VA1T	31.8	-25.3	35.62	54	-18.38	-	-	35	353	V

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

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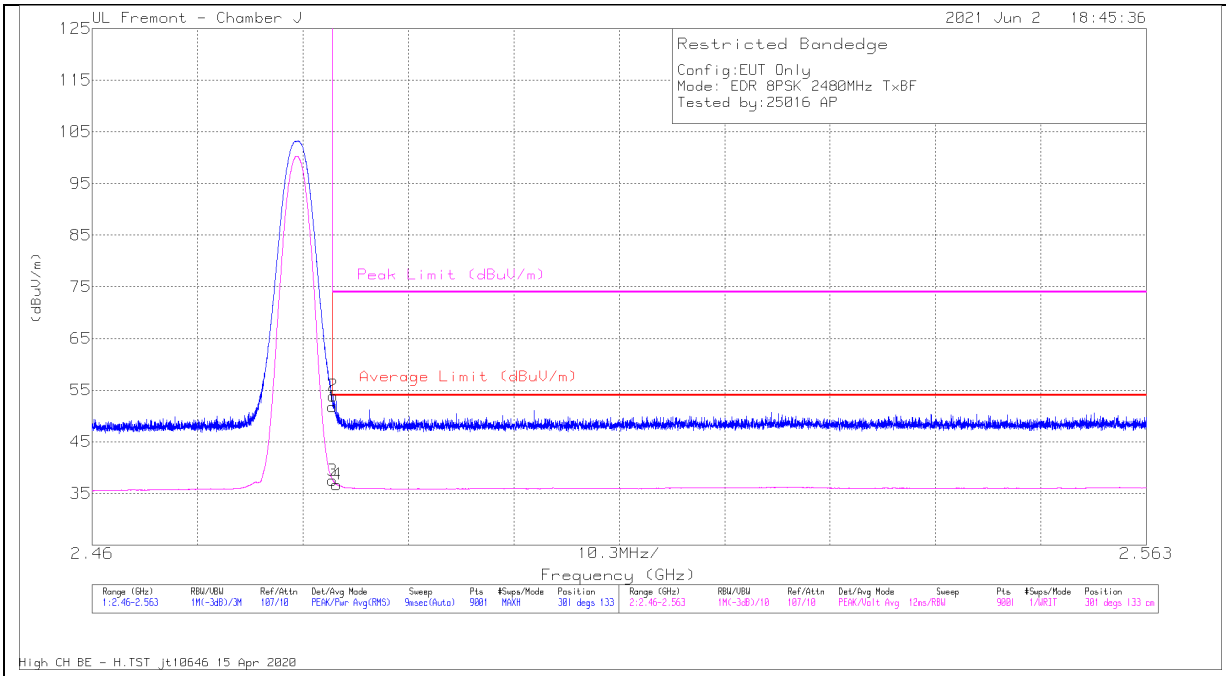
BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE010 0034 (dB/m)	Amp/Cbl /Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	44.47	Pk	32.5	-25.2	51.77	-	-	74	-22.23	301	133	H
2	* 2.48353	46.61	Pk	32.5	-25.2	53.91	-	-	74	-20.09	301	133	H
3	* 2.48351	30.22	VA1T	32.5	-25.2	37.52	54	-16.48	-	-	301	133	H
4	* 2.48388	29.43	VA1T	32.5	-25.2	36.73	54	-17.27	-	-	301	133	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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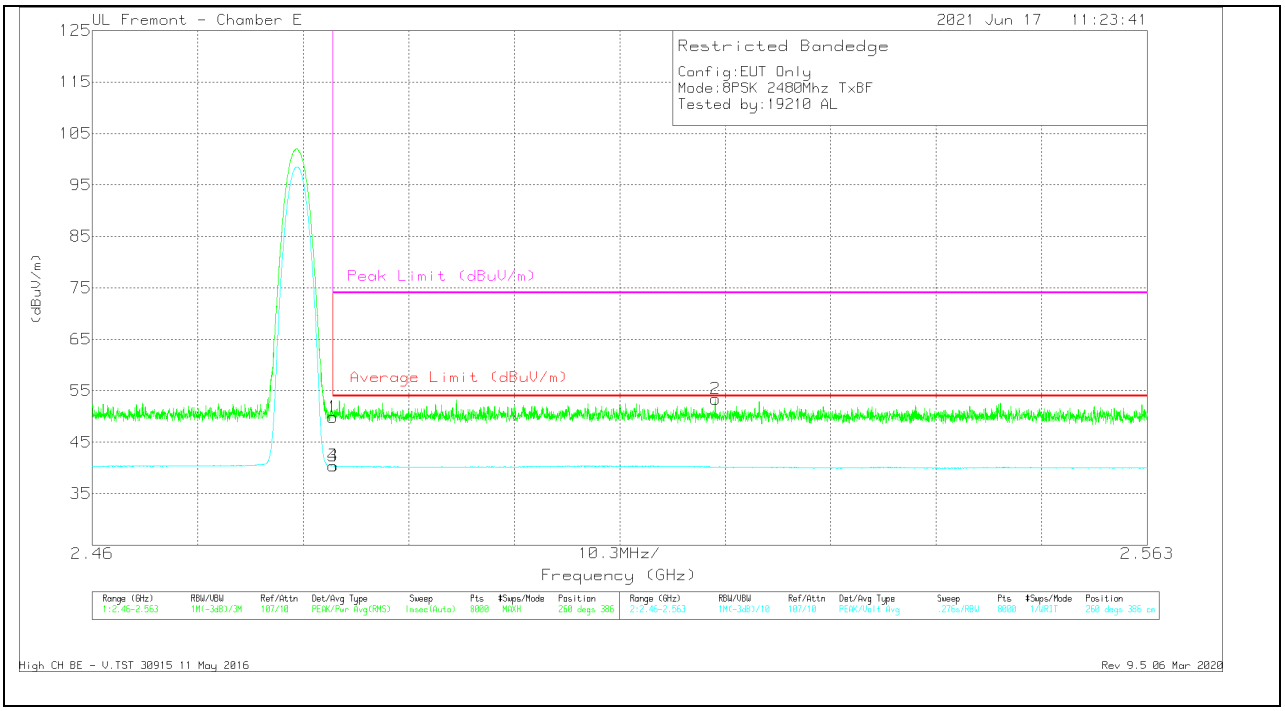
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE007810 7 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	42.68	Pk	32.6	-25.4	49.88	-	-	74	-24.12	260	386	V
3	* 2.4835	33.2	VA1T	32.6	-25.4	40.4	54	-13.6	-	-	260	386	V
4	* 2.48351	33.2	VA1T	32.6	-25.4	40.4	54	-13.6	-	-	260	386	V
2	2.52083	46.22	Pk	32.6	-25.4	53.42	-	-	74	-20.58	260	386	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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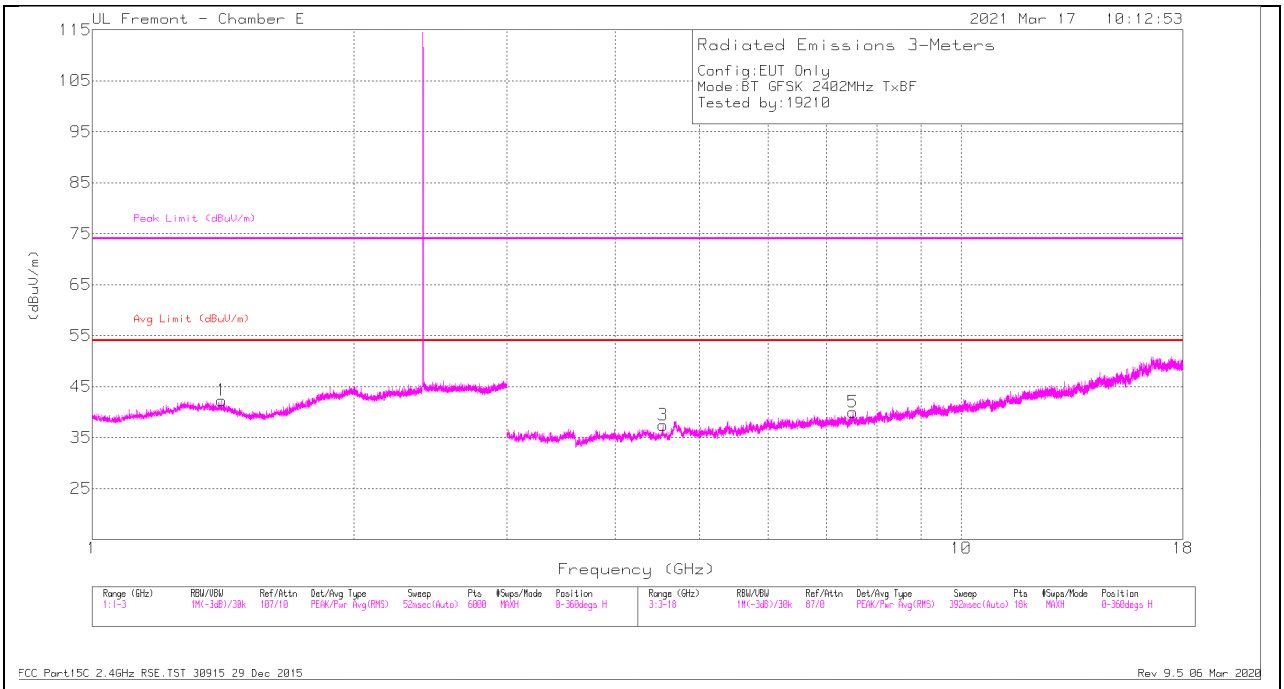
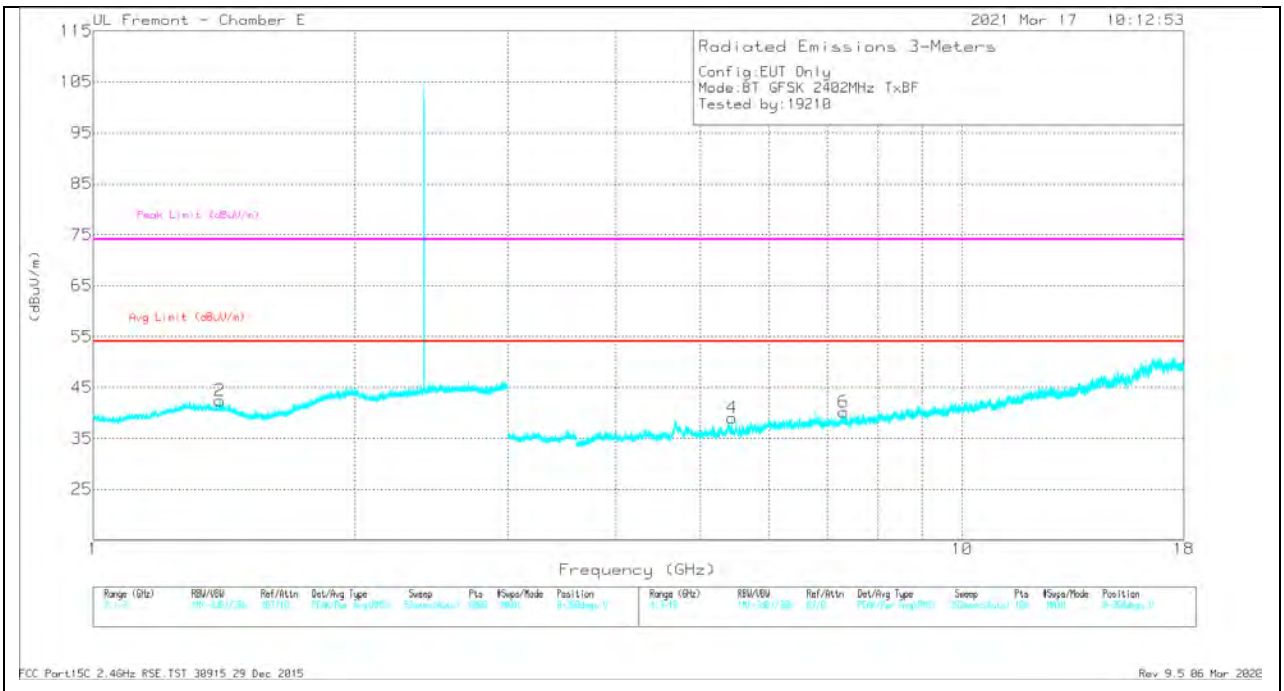
10.1.9. HIGH POWER TXBF HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0078107 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.4117	44.31	PKFH	29.4	-26.4	47.31	-	-	74	-26.69	292	210	H
* 1.41161	32.49	VA1T	29.4	-26.4	35.49	54	-18.51	-	-	292	210	H
* 1.39713	44.07	PKFH	29.3	-26.4	46.97	-	-	74	-27.03	351	268	V
* 1.39769	32.17	VA1T	29.3	-26.4	35.07	54	-18.93	-	-	351	268	V
* 4.53737	39.61	PKFH	34	-32.3	41.31	-	-	74	-32.69	247	395	H
* 4.53926	28.07	VA1T	34.1	-32.2	29.97	54	-24.03	-	-	247	395	H
* 7.50612	37.02	PKFH	35.8	-27.6	45.22	-	-	74	-28.78	20	137	H
* 7.50694	24.89	VA1T	35.8	-27.6	33.09	54	-20.91	-	-	20	137	H
* 5.43681	39.89	PKFH	34.7	-30.8	43.79	-	-	74	-30.21	107	219	V
* 5.43848	27.34	VA1T	34.7	-30.8	31.24	54	-22.76	-	-	107	219	V
* 7.30441	37.01	PKFH	35.6	-28	44.61	-	-	74	-29.39	84	381	V
* 7.30358	24.45	VA1T	35.6	-28	32.05	54	-21.95	-	-	84	381	V

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

FCC Part15C 2.4GHz RSE.TST 30915 29 Dec 2015
Rev 9.5 06 Mar 2020

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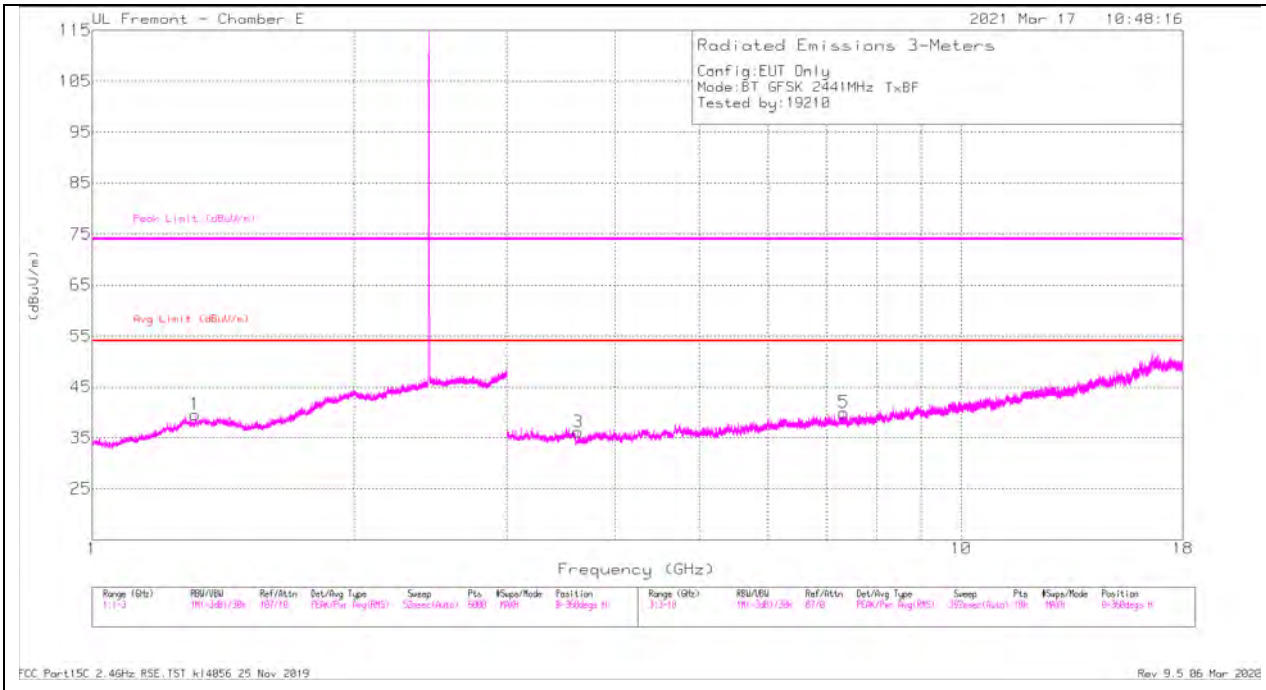
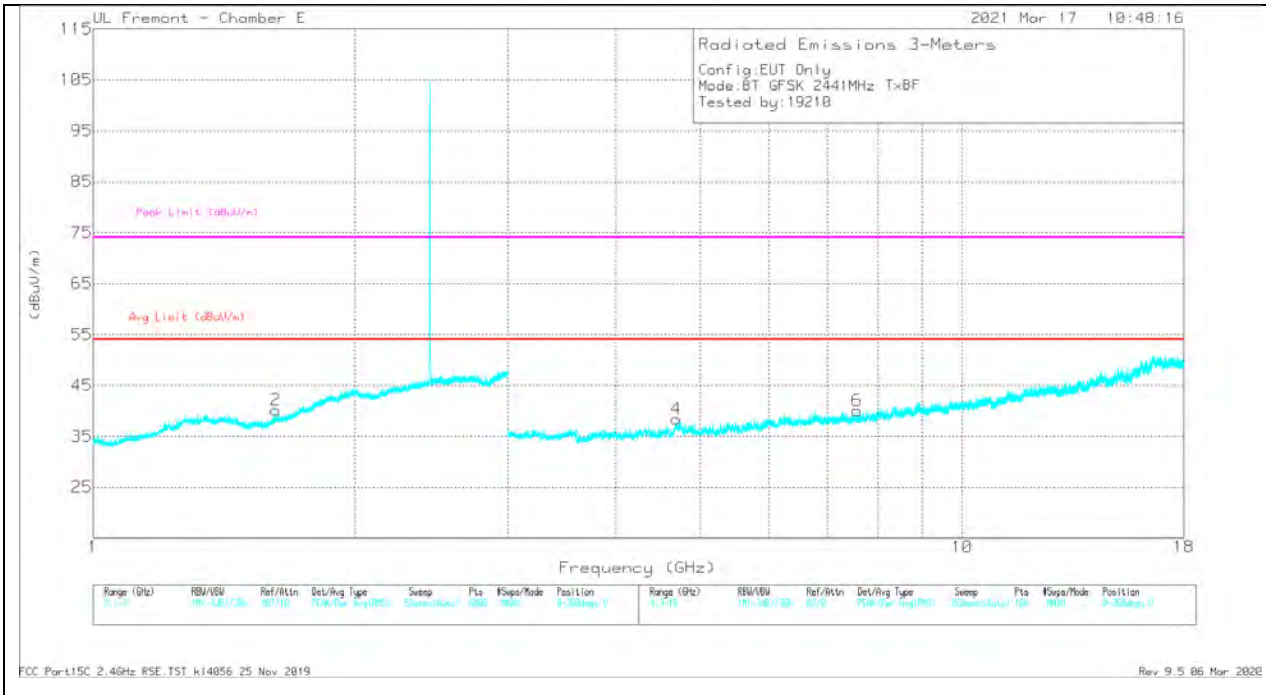
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0078107 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.31359	35.2	PKFH	29.6	-20.6	44.2	-	-	74	-29.8	45	338	H
* 1.31657	23.27	VA1T	29.7	-20.7	32.27	54	-21.73	-	-	45	338	H
* 1.62309	35.86	PKFH	28.2	-19.5	44.56	-	-	74	-29.44	186	129	V
* 1.62463	23.64	VA1T	28.2	-19.6	32.24	54	-21.76	-	-	186	129	V
* 3.62448	41.71	PKFH	33.3	-33.7	41.31	-	-	74	-32.69	233	189	H
* 3.62504	29.77	VA1T	33.3	-33.7	29.37	54	-24.63	-	-	233	189	H
* 7.33363	36.57	PKFH	35.8	-28.2	44.17	-	-	74	-29.83	257	340	H
* 7.33169	24.52	VA1T	35.8	-28.3	32.02	54	-21.98	-	-	257	340	H
* 4.69085	39.94	PKFH	34.4	-32	42.34	-	-	74	-31.66	214	140	V
* 4.69254	27.98	VA1T	34.4	-32	30.38	54	-23.62	-	-	214	140	V
* 7.57508	36.94	PKFH	35.7	-27.6	45.04	-	-	74	-28.96	353	218	V
* 7.57538	25.1	VA1T	35.7	-27.6	33.2	54	-20.8	-	-	353	218	V

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

FCC Part15C 2.4GHz RSE.TST kl4056 25 Nov 2019
Rev 9.5 06 Mar 2020

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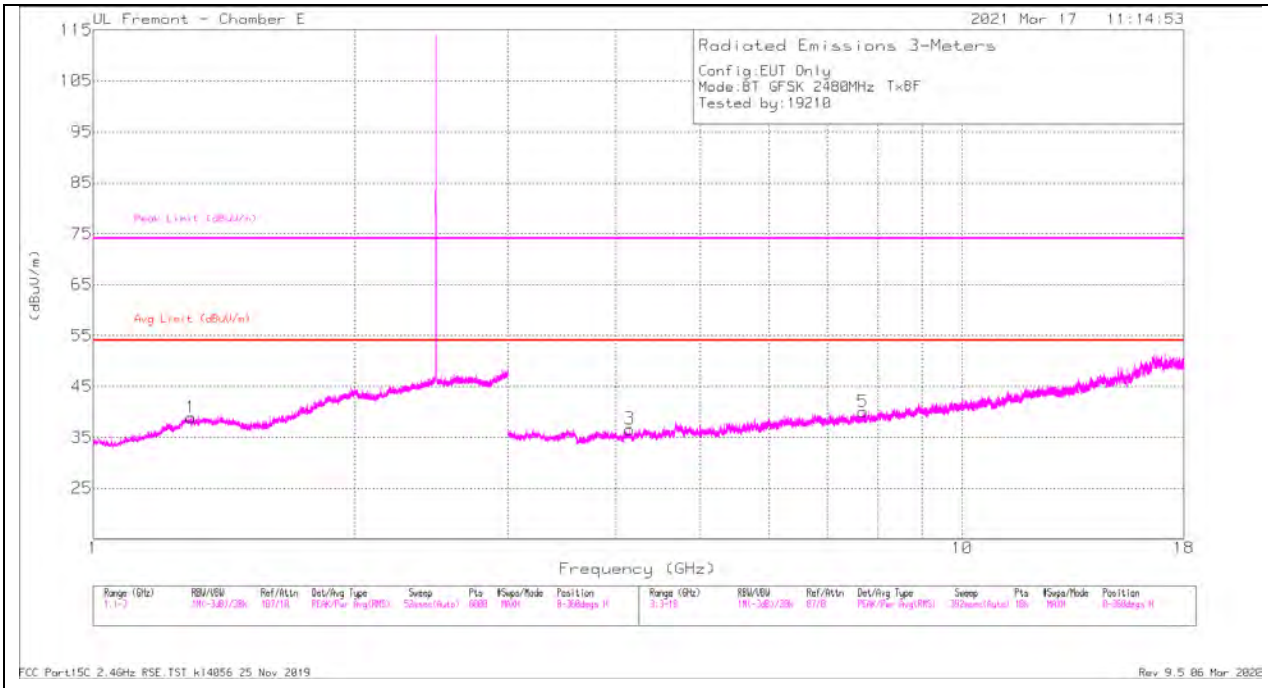
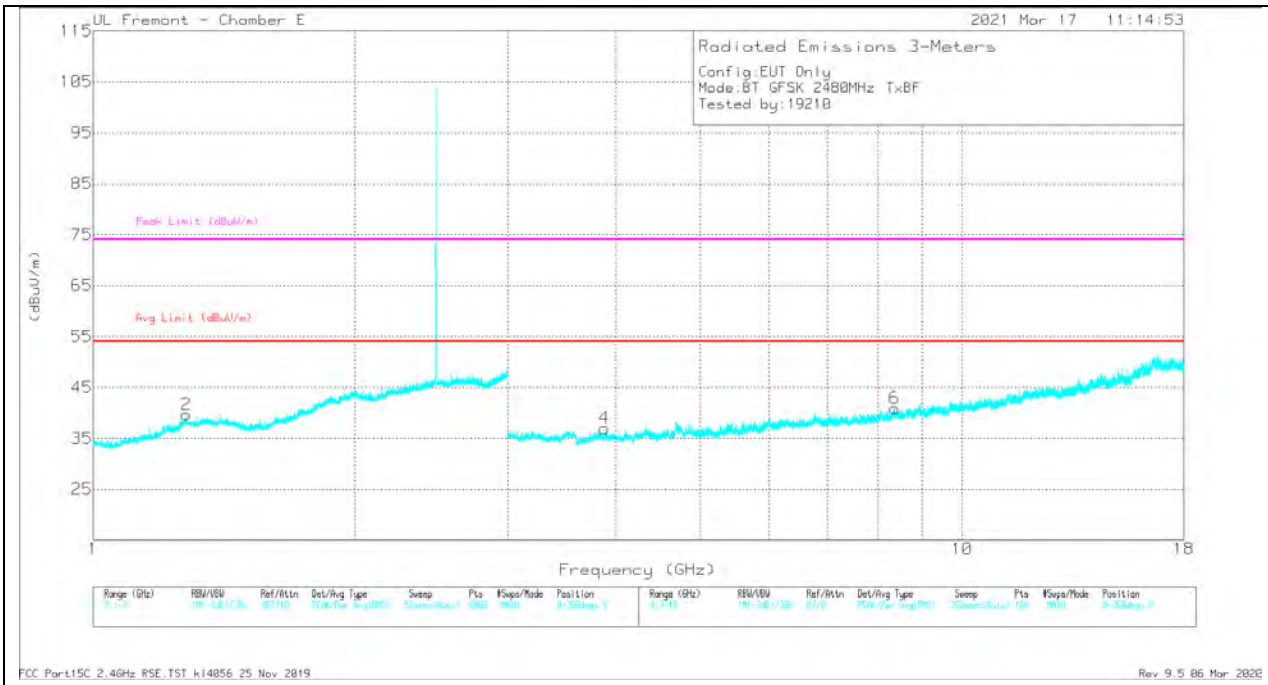
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0078107 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.29812	35.4	PKFH	29.6	-20.7	44.3	-	-	74	-29.7	300	133	H
* 1.29536	23.26	VA1T	29.6	-20.7	32.16	54	-21.84	-	-	300	133	H
* 1.28113	35.82	PKFH	29.8	-20.8	44.82	-	-	74	-29.18	153	381	V
* 1.27933	23.61	VA1T	29.8	-20.8	32.61	54	-21.39	-	-	153	381	V
* 4.14382	39.74	PKFH	33.7	-32.1	41.34	-	-	74	-32.66	191	241	H
* 4.14353	27.69	VA1T	33.7	-32.1	29.29	54	-24.71	-	-	191	241	H
* 7.69874	36.95	PKFH	35.9	-28.2	44.65	-	-	74	-29.35	337	161	H
* 7.69777	25.26	VA1T	35.9	-28.2	32.96	54	-21.04	-	-	337	161	H
* 3.87936	39.81	PKFH	33.4	-32.3	40.91	-	-	74	-33.09	259	116	V
* 3.87728	28.33	VA1T	33.4	-32.3	29.43	54	-24.57	-	-	259	116	V
* 8.36341	35.82	PKFH	35.8	-26.2	45.42	-	-	74	-28.58	251	107	V
* 8.36086	24.29	VA1T	35.8	-26.2	33.89	54	-20.11	-	-	251	107	V

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

FCC Part15C 2.4GHz RSE.TST kl4056 25 Nov 2019
Rev 9.5 06 Mar 2020

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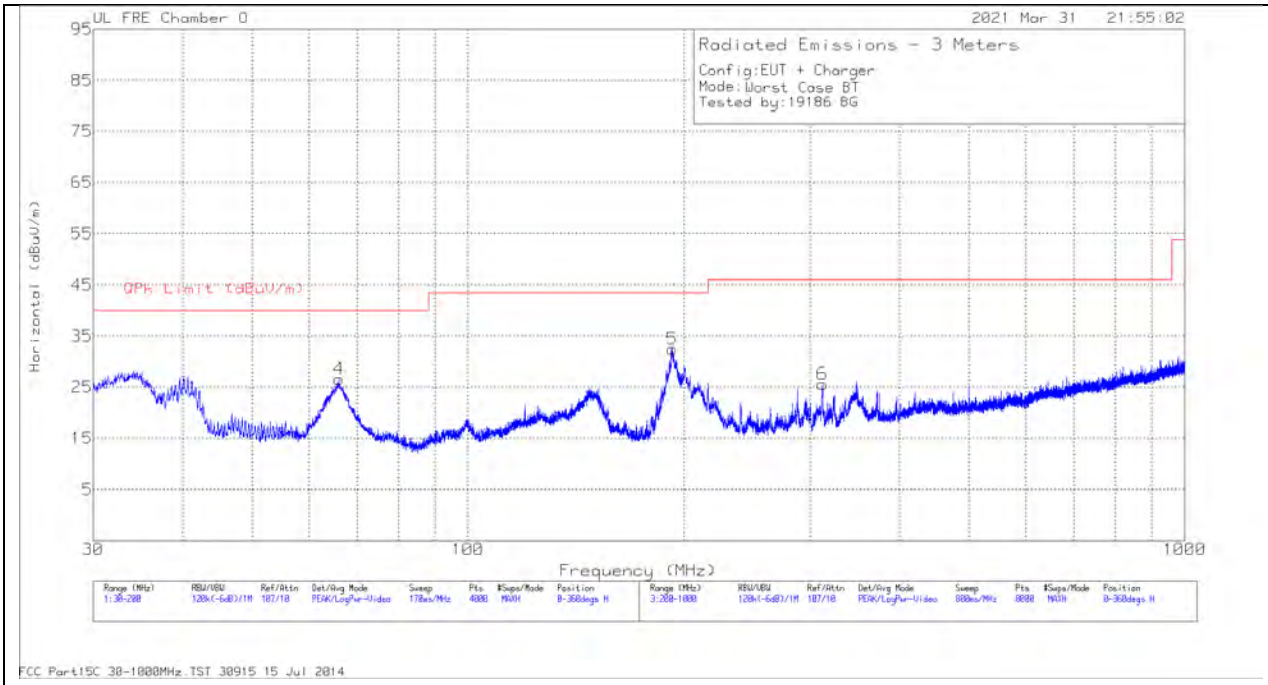
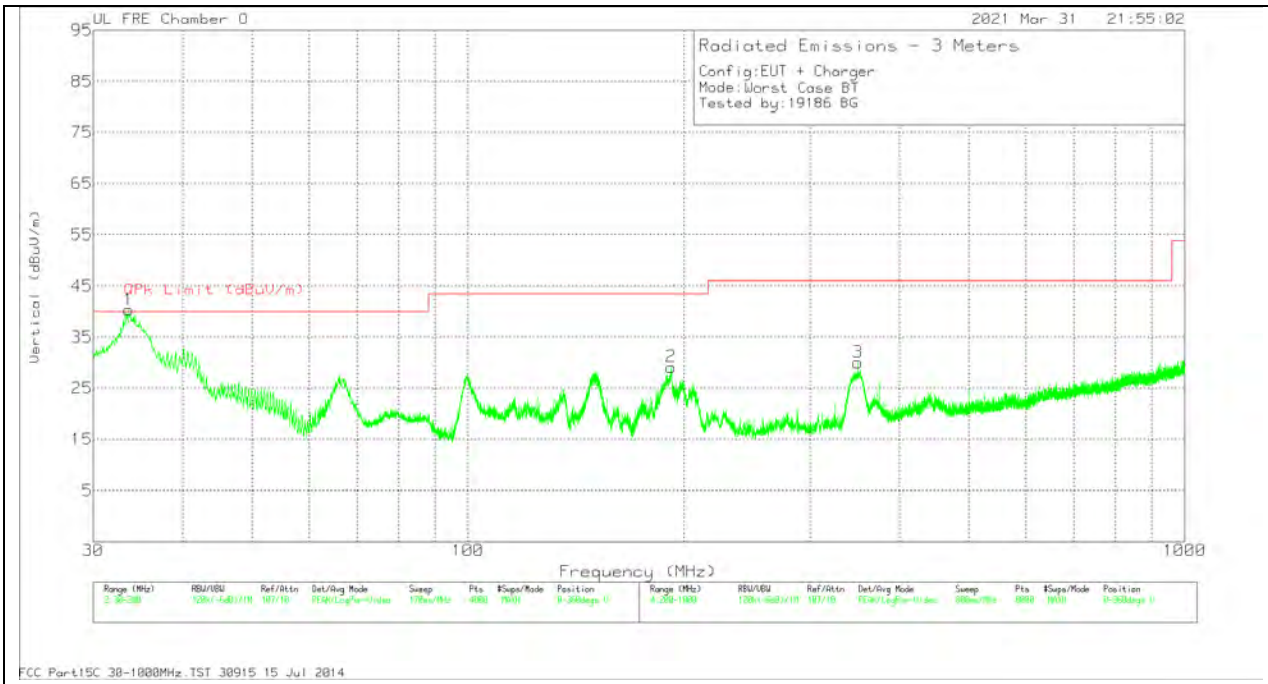
10.2. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

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Below 1GHz Data

Range 1: Horizontal 30 - 200MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	AF 202329 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
65.8779	42.93	Qp	13.8	-32.2	24.53	40	-15.47	272	234	H
192.5088	40.94	Qp	17.2	-31.5	26.64	43.52	-16.88	42	186	H

Range 2: Vertical 30 - 200MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	AF 202329 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
33.4365	39.94	Qp	24.7	-32.5	32.14	40	-7.86	337	107	V
192.037	34.43	Qp	17.1	-31.5	20.03	43.52	-23.49	66	121	V

Range 3: Horizontal 200 - 1000MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	AF 202329 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
312.5266	31.51	Qp	19.6	-31	20.11	46.02	-25.91	12	107	H

Range 4: Vertical 200 - 1000MHz

Frequency (MHz)	Meter Reading (dBuV)	Det	AF 202329 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
350.0229	39.43	Qp	20.1	-30.9	28.63	46.02	-17.39	74	217	V

Qp - Quasi-Peak detector

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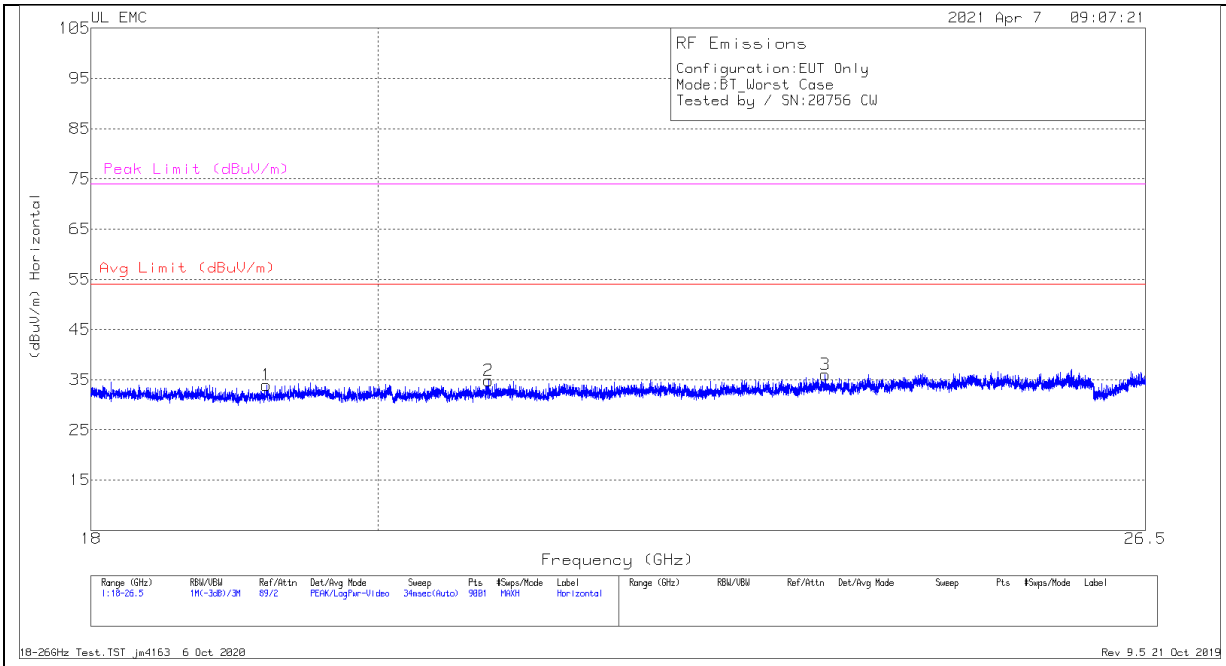
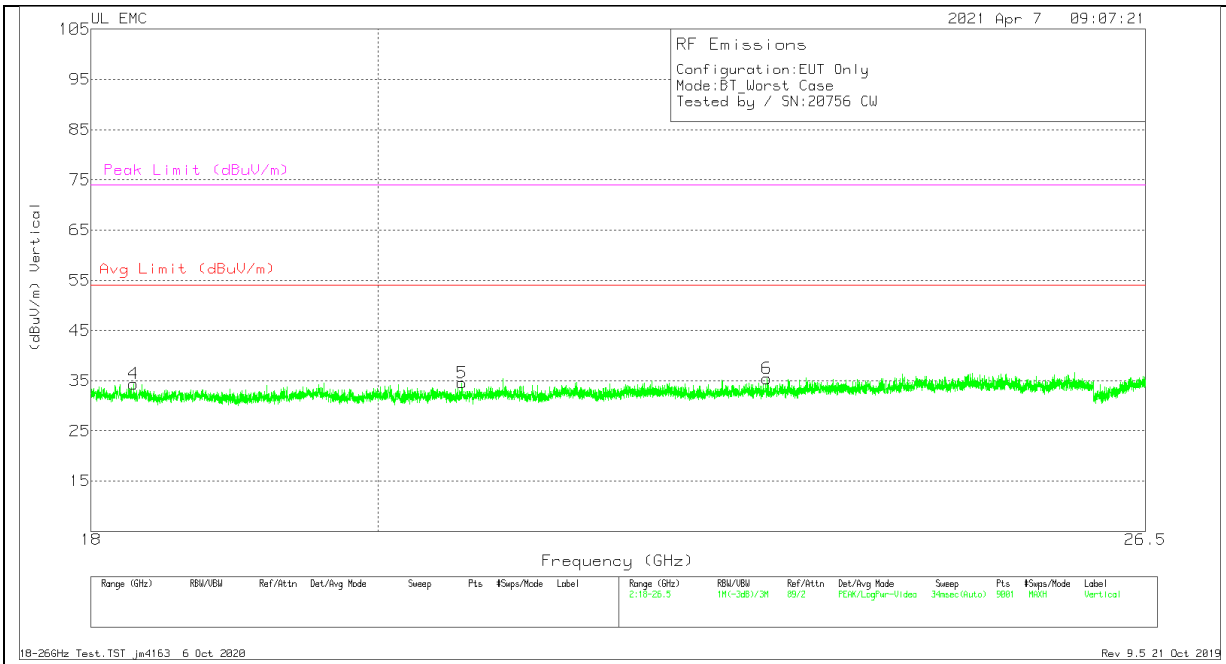
10.3. WORST CASE 18-26 GHZ

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



HORIZONTAL



VERTICAL

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18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.19567	68.15	Pk	32.7	-57.4	-9.5	33.95	54	-20.05	74	-40.05
2	20.82578	68.2	Pk	33.1	-57	-9.5	34.8	54	-19.2	74	-39.2
3	23.56278	68.31	Pk	34.2	-57	-9.5	36.01	54	-17.99	74	-37.99
4	18.28239	71.29	Pk	32.3	-59.7	-9.5	34.39	54	-19.61	74	-39.61
5	20.62178	68.28	Pk	33.1	-57.3	-9.5	34.58	54	-19.42	74	-39.42
6	23.06411	68.44	Pk	33.8	-57.3	-9.5	35.44	54	-18.56	74	-38.56

Pk - Peak detector

18-26GHz Test.TST jm4163 6 Oct 2020
Rev 9.5 21 Oct 2019

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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 (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

UL VERIFICATION SERVICES INC.
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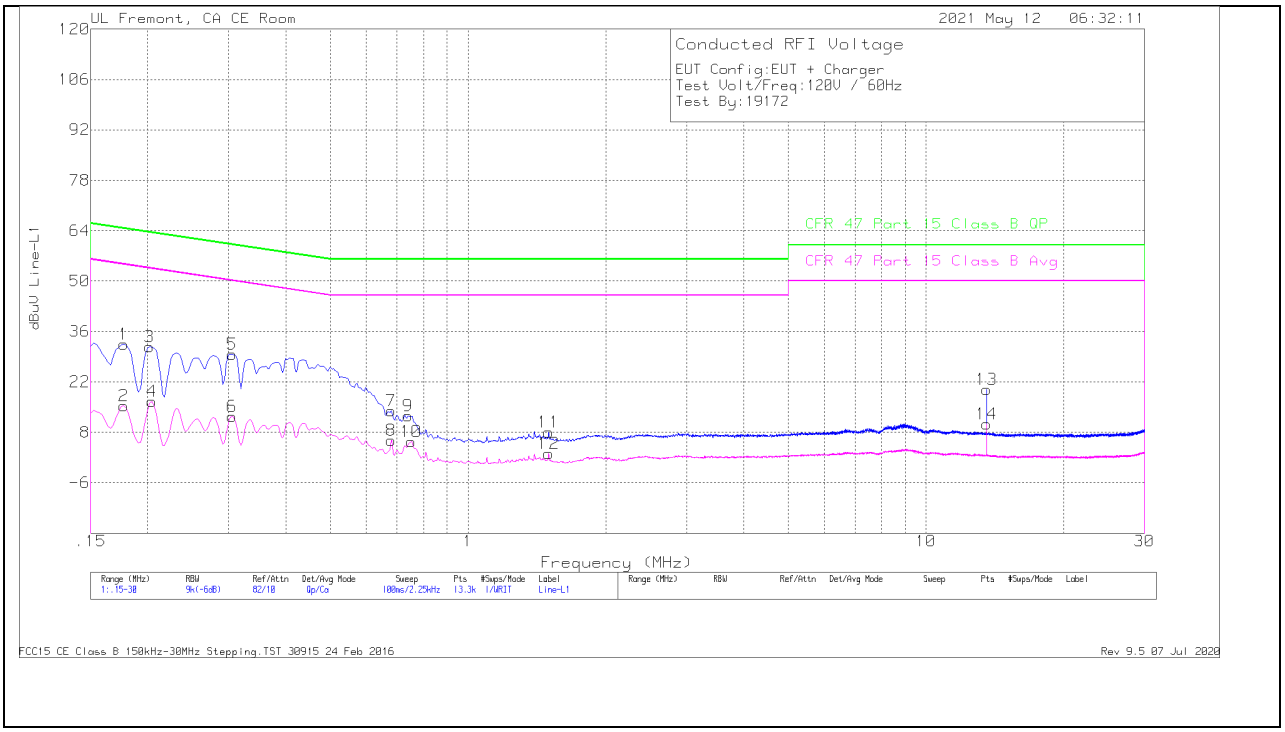
11.1. AC POWER LINE WITH AC/DC ADAPTER

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 L1	LC Cables C1&C3 dB	Limiter	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.177	22.29	Qp	0	0	10.1	32.39	64.63	-32.24	-	-
2	.177	5.32	Ca	0	0	10.1	15.42	-	-	54.63	-39.21
3	.20175	21.6	Qp	0	0	10.1	31.7	63.54	-31.84	-	-
4	.204	6.48	Ca	0	0	10.1	16.58	-	-	53.45	-36.87
5	.30525	19.59	Qp	0	0	10.1	29.69	60.1	-30.41	-	-
6	.30525	2.31	Ca	0	0	10.1	12.41	-	-	50.1	-37.69
7	.67875	3.9	Qp	0	0	10.1	14	56	-42	-	-
8	.67875	-4.27	Ca	0	0	10.1	5.83	-	-	46	-40.17
9	.7395	2.44	Qp	0	0	10.1	12.54	56	-43.46	-	-
10	.75075	-4.77	Ca	0	.1	10.1	5.43	-	-	46	-40.57
11	1.5	-2.25	Qp	0	.1	10.1	7.95	56	-48.05	-	-
12	1.5	-8.03	Ca	0	.1	10.1	2.17	-	-	46	-43.83
*13	13.56	9.41	Qp	.1	.2	10.2	19.91	60	-40.09	-	-
*14	13.56	-.16	Ca	.1	.2	10.2	10.34	-	-	50	-39.66

Qp - Quasi-Peak detector
Ca - CISPR average detection
*Indicates UL RFID Signal. Not from device.

FCC15 CE Class B 150kHz-30MHz Stepping.TST 30915 24 Feb 2016
Rev 9.5 07 Jul 2020

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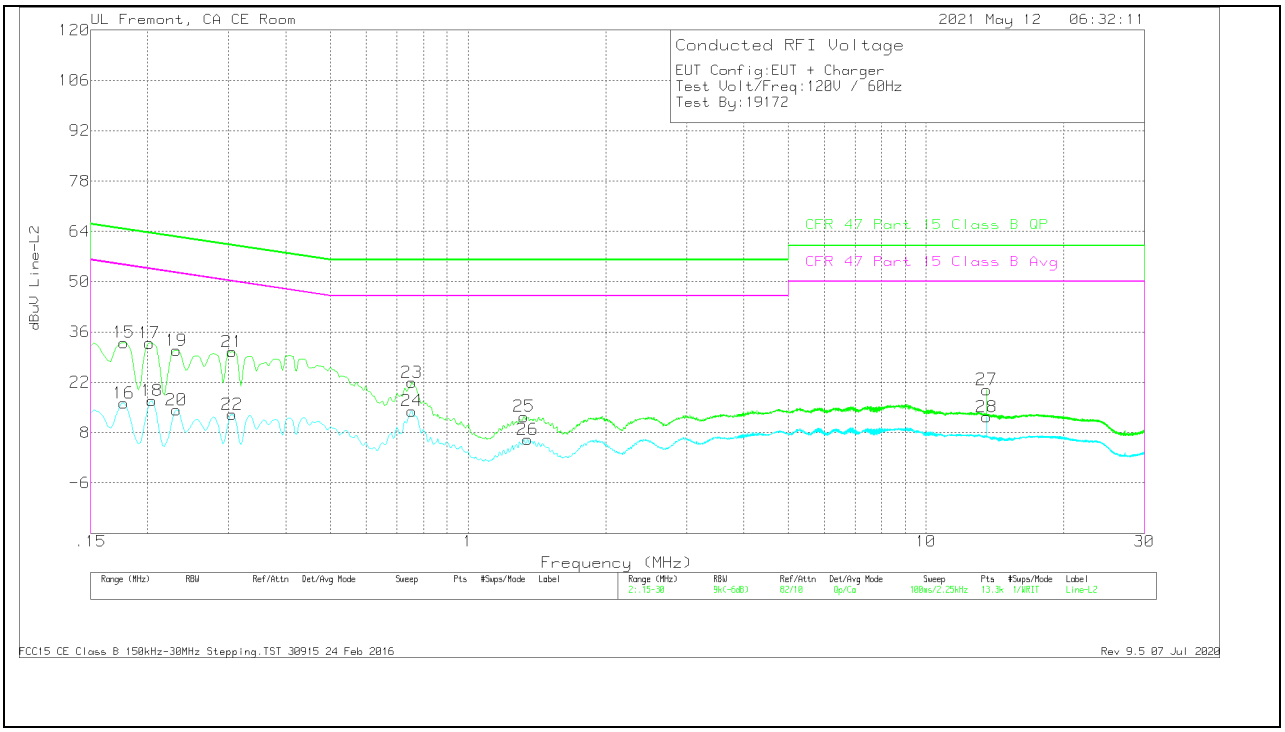
LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 L2	LC Cables C2&C3 dB	Limiter	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
15	.177	22.97	Qp	0	0	10.1	33.07	64.63	-31.56	-	-
16	.177	6.15	Ca	0	0	10.1	16.25	-	-	54.63	-38.38
17	.20175	22.8	Qp	0	0	10.1	32.9	63.54	-30.64	-	-
18	.204	6.82	Ca	0	0	10.1	16.92	-	-	53.45	-36.53
19	.231	20.83	Qp	0	0	10.1	30.93	62.41	-31.48	-	-
20	.231	4.28	Ca	0	0	10.1	14.38	-	-	52.41	-38.03
21	.30525	20.39	Qp	0	0	10.1	30.49	60.1	-29.61	-	-
22	.30525	2.99	Ca	0	0	10.1	13.09	-	-	50.1	-37.01
23	.753	11.91	Qp	0	0	10.1	22.01	56	-33.99	-	-
24	.753	3.95	Ca	0	0	10.1	14.05	-	-	46	-31.95
25	1.3245	2.28	Qp	0	.1	10.1	12.48	56	-43.52	-	-
26	1.3515	-4.13	Ca	0	.1	10.1	6.07	-	-	46	-39.93
*27	13.56	9.48	Qp	.1	.2	10.2	19.98	60	-40.02	-	-
*28	13.56	1.85	Ca	.1	.2	10.2	12.35	-	-	50	-37.65

Qp - Quasi-Peak detector
Ca - CISPR average detection
*Indicates UL RFID Signal. Not from device.

FCC15 CE Class B 150kHz-30MHz Stepping.TST 30915 24 Feb 2016
Rev 9.5 07 Jul 2020

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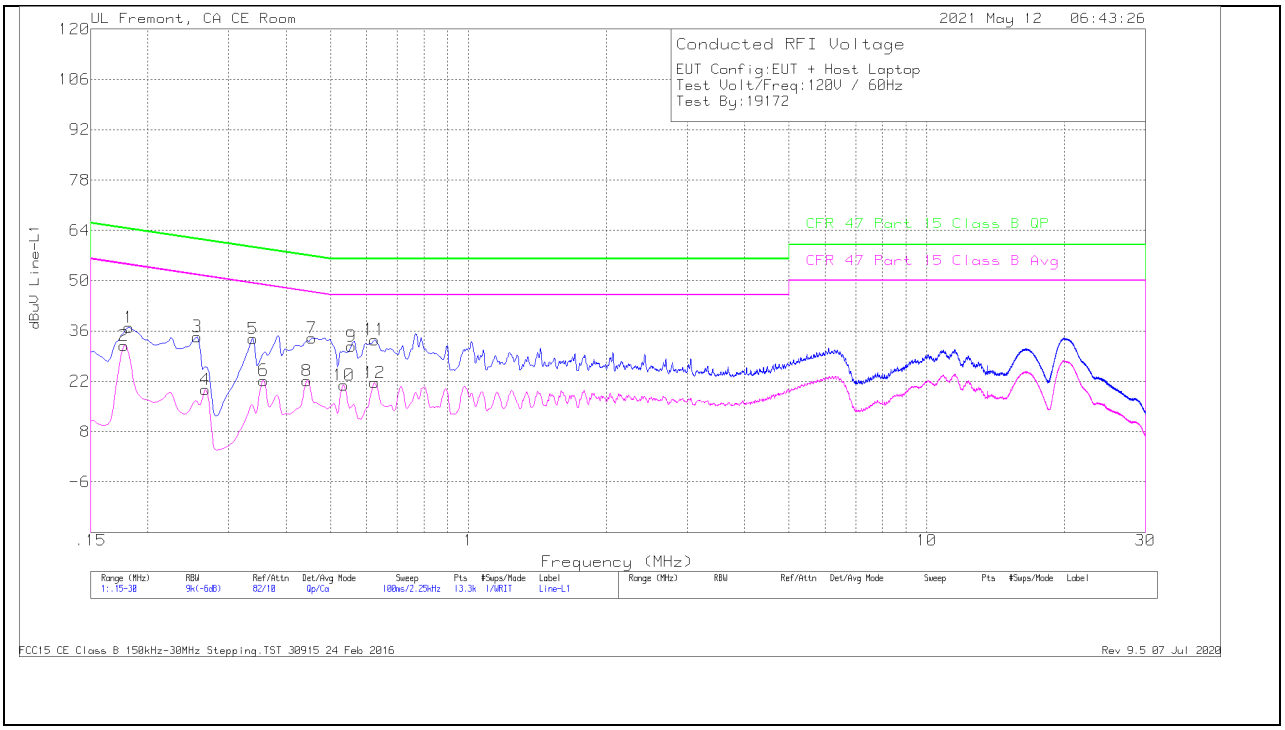
11.2. AC POWER LINE WITH LAPTOP

LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 L1	LC Cables C1&C3 dB	Limiter	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.1815	26.92	Qp	0	0	10.1	37.02	64.42	-27.4	-	-
2	.177	21.82	Ca	0	0	10.1	31.92	-	-	54.63	-22.71
3	.25575	24.36	Qp	0	0	10.1	34.46	61.57	-27.11	-	-
4	.267	9.69	Ca	0	0	10.1	19.79	-	-	51.21	-31.42
5	.339	23.78	Qp	0	0	10.1	33.88	59.23	-25.35	-	-
6	.357	12.15	Ca	0	0	10.1	22.25	-	-	48.8	-26.55
7	.456	23.93	Qp	0	0	10.1	34.03	56.77	-22.74	-	-
8	.44475	12.1	Ca	0	0	10.1	22.2	-	-	46.97	-24.77
9	.555	21.67	Qp	0	0	10.1	31.77	56	-24.23	-	-
10	.53475	10.83	Ca	0	0	10.1	20.93	-	-	46	-25.07
11	.62475	23.49	Qp	0	0	10.1	33.59	56	-22.41	-	-
12	.62475	11.49	Ca	0	0	10.1	21.59	-	-	46	-24.41

Qp - Quasi-Peak detector
Ca - CISPR average detection

FCC15 CE Class B 150kHz-30MHz Stepping.TST 30915 24 Feb 2016
Rev 9.5 07 Jul 2020

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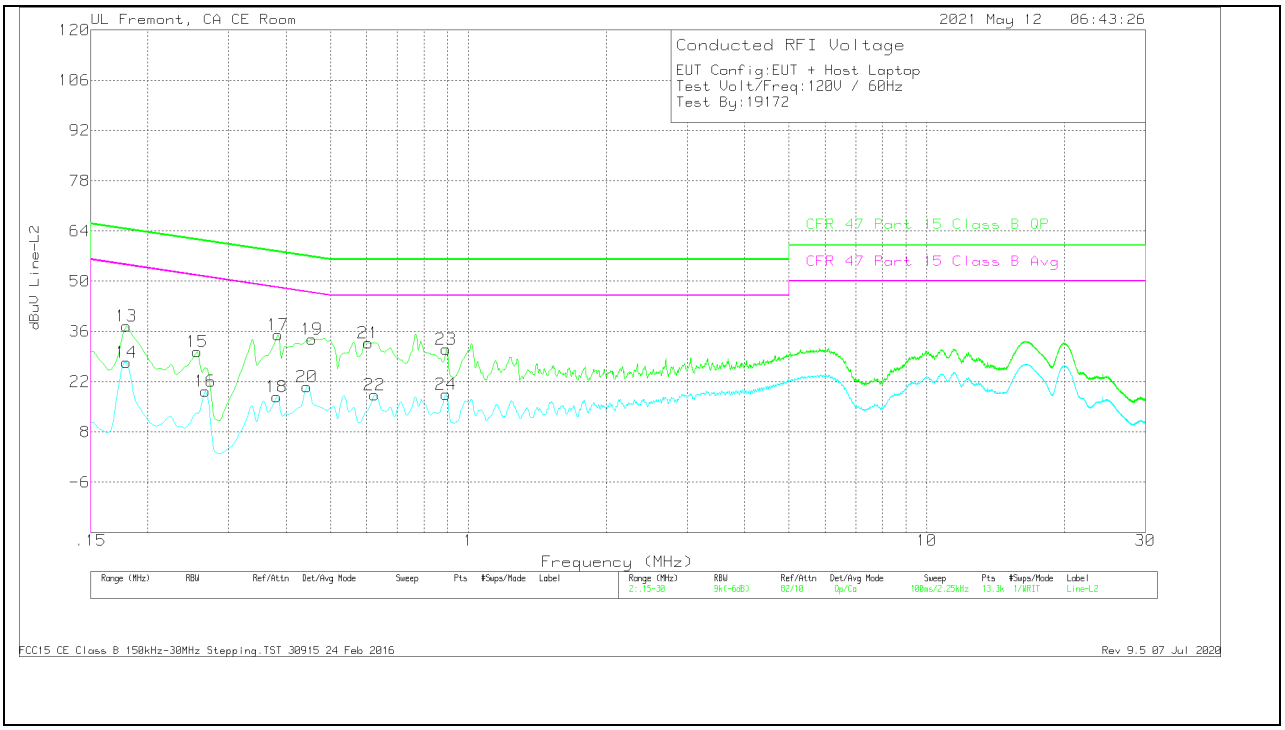
LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE0186446 L2	LC Cables C2&C3 dB	Limiter	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.17925	27.34	Qp	0	0	10.1	37.44	64.52	-27.08	-	-
14	.17925	17.33	Ca	0	0	10.1	27.43	-	-	54.52	-27.09
15	.25575	20.27	Qp	0	0	10.1	30.37	61.57	-31.2	-	-
16	.267	9.32	Ca	0	0	10.1	19.42	-	-	51.21	-31.79
17	.384	24.98	Qp	0	0	10.1	35.08	58.19	-23.11	-	-
18	.38175	7.71	Ca	0	0	10.1	17.81	-	-	48.24	-30.43
19	.456	23.78	Qp	0	0	10.1	33.88	56.77	-22.89	-	-
20	.44475	10.51	Ca	0	0	10.1	20.61	-	-	46.97	-26.36
21	.6045	22.75	Qp	0	0	10.1	32.85	56	-23.15	-	-
22	.62475	8.24	Ca	0	0	10.1	18.34	-	-	46	-27.66
23	.89475	20.8	Qp	0	.1	10.1	31	56	-25	-	-
24	.89475	8.22	Ca	0	.1	10.1	18.42	-	-	46	-27.58

Qp - Quasi-Peak detector
Ca - CISPR average detection

FCC15 CE Class B 150kHz-30MHz Stepping.TST 30915 24 Feb 2016
Rev 9.5 07 Jul 2020

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12. SETUP PHOTOS

Please refer to 13573771-EP1V1 for setup photos

END OF TEST REPORT

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