RADIO TEST REPORT

For

MODEL NO.: 1836
FCC ID: C3K1836
IC ID: 3048A-1836

Test Report No. R-TR484-FCCISED-BT-3
Issue Date: Jun 07, 2018

FCC CFR47 Part 15 Subpart C
Innovation, Science and Economic Development
Canada RSS-247 Issue 2

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TESTING CERT #3472.01

1 Record of Revisions

Revision	Date	Section	Page(s)	Summary of Changes	Author/Revised By:
1.0	5/23/2018	All	All	Version 1.0	Andy Shen
2.0	5/30/2018	4	7	Updated MU Table.	Andy Shen
		8.1	14	Added test site specific details for <30MHz testing.	
		9.4 9.5	29 31	Corrected typo on Analyzer settings for VBW.	
		9.9.2	50	Corrected typo on freq range of test.	
		9.9.2	51	Added test setup details for <30MHz testing.	
3.0	06/07/2018	5.6	9	Added section for FW and driver details of the test samples.	Andy Shen

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Test Report Attestation

Microsoft Corporation
Model: 1836
FCC ID: C3K1836
IC ID: 3048A-1836

Applicable Standards

Specification	Test Result
FCC 47CFR Rule Parts 15.207, 15.209, 15.247	Pass
Innovation, Science and Economic Development Canada RSS-247 Issue 2, RSS-GEN Issue 5	Pass

Microsoft EMC Laboratory attests that the product model identified in this report has been tested to and meets the requirements identified in the above standards. The test results in this report solely pertains to the specific sample tested, under the conditions and operating modes as provided by the customer.

This report shall not be used to claim product certification, approval, or endorsement by A2LA or any agency of any Government. Reproduction, duplication or publication of extracts from this test report is prohibited and requires prior written approval of Microsoft EMC Laboratory.

This report replaces the previously issued report #R-TR484-FCCISED-BT-2 issued by Microsoft EMC Labs on 5/30/2018.

Written By: Andy Shen

Radio Test Engineer

Reviewed/ Issued By: Sajay Jose

EMC/RF Compliance Lab Manager

2 Deviations from Standards

None.

3 Facilities and Accreditations

3.1 Test Facility

All test facilities used to collect the test data are located at
Microsoft EMC Laboratory,
17760 NE 67th Ct,
Redmond WA, 98052, USA

3.2 Accreditations

The lab is established and follows procedures as outlined in IEC/ISO 17025 and A2LA accreditation requirements.
A2LA Accredited Testing Certificate Number: 3472.01
FCC Registration Number: US1141
IC Site Registration Numbers: 3048A-3, 3048A-4

3.3 Test Equipment

The site and related equipment are constructed in conformance with the requirements of ANSI C63.4:2014 and other equivalent applicable standards.
Test site requirements for measurements above 1 GHz are in accordance with ANSI C63.4:2014.
ANSI C63.10:2013 and the appropriate KDB test methods were followed.

4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the product, as specified in ETSI TR 100 028. This represents an expanded uncertainty expressed at 95% confidence level using a coverage factor k=2. These levels are for reference only and not included to determine product compliance.
Expanded uncertainty calculations are available upon request.

Test item	Uncertainty	Unit
Radiated disturbance (9 kHz to 30 MHz)	5.45	dB
Radiated disturbance (30 MHz to 1 GHz)	5.99	dB
Radiated disturbance (1 GHz to 18 GHz)	5.12	dB
Radiated disturbance (18 GHz to 26.5 GHz)	5.24	dB
Conducted Disturbance at Mains Port	3.31	dB
Uncertainty for Conducted Power test	1.277	dB
Uncertainty for Conducted Spurious emission test	2.742	dB
Uncertainty for Bandwidth test	4.98	kHz
Uncertainty for DC power test	0.05	%
Uncertainty for test site temperature	0.5	ºC
Uncertainty for test site Humidity	3	%
Uncertainty for time	0.189	%

5 Product Description

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Customer Contact:	Pamela Galvan
Functional Description of the EUT:	Wireless Input Device
Model:	1836
FCC ID:	C3K1836
IC ID:	3048A-1836
Radio under test:	BT (2402- 2480 MHz) Ch. 0-78
Modulation(s):	GFSK, π/4-DQPSK, 8DPSK
Antenna Information:	2.4 GHz Integral Antenna. **Manufacturer declared Peak Antenna Gain:** +4.7 dBi
EUT Classification:	FHSS
Equipment Design State:	Prototype/Production Equivalent
Equipment Condition:	Good

5.1 Test Configurations

Test software "Combo Tool Ver 2.1509.00, Build Date: 2/26/2015" provided by the customer was used to program the EUT to transmit continuously.
The device can operate in GFSK, π/4DQPSK and 8DPSK modulations and all modes were tested and included in this report. Channel numbers 0, 39 and 78 were used as Low, Mid and High Channels respectively.

5.2 Environmental Conditions

Ambient air temperature of the test site was within the range of 10 ºC to 40 ºC (50 ºF to 104 ºF) unless the EUT specified testing over a different temperature range. Humidity levels were in the range of 10% to 90% relative humidity. Testing conditions were within tolerance and any deviations required from the EUT are reported.

5.3 Antenna Requirements

The antennas are permanently attached and there are no provisions for connection to an external antenna.

5.4 Equipment Modifications

No modifications were made during testing.

5.5 Dates of Testing

Testing was performed on February 1 – May 21, 2018.

5.6 Test Sample Details

RF Conducted Test Samples:

SN	Internal Lab ID	Design State
02560000873802	R-473-EV2-05	EV2
02560002607814	R-484-050918-10	DV

RF Radiated Test Samples:

SN	Internal Lab ID	Design State
02560001197814	R-484-041818-01	DV

Radio FW: 4.5.213.0
Radio Driver Version: 0.0.3.40

6 Test Results Summary

Test Description	FCC Rule Part ISED Rule Part	Limit	Test Result (Pass/Fail)
Duty Cycle	Reporting & Measurements	Reporting & Measurements Purposes only	N/A
20dB Bandwidth	15.247 (a)(1)(iii) RSS-247 [5.1]	For reporting purposes only.	Pass
Output Power	15.247 (b)(3) RSS-247 [5.4]	< 125 mW – Conducted < 500 mW - EIRP	Pass
Channel Spacing	15.247 (a)(1) RSS-247 [5.1]	2/3 of 20dB BW or 25 kHz	Pass
Number of Hopping Frequencies	15.247 (a)(1)(iii) RSS-247 [5.1]	> 15 channels	Pass
Dwell Time	15.247 (a)(1)(iii) RSS-247 [5.1]	< 0.4 sec in 31.6 sec period	Pass
Conducted Band Edge/Spurious Emissions	15.247 (d) RSS-247 [5.5]	At least 20dBc	Pass
Radiated Spurious Emissions/ Restricted Band Emissions	15.205, 15.209 RSS-247 [5.5] RSS-Gen [8.9]	FCC CFR 47 15.209 limits RSS-Gen [8.9]	Pass
AC Powerline Conducted Emissions	15.207 RSS-Gen [8.8]	FCC CFR 47 15.207 limits RSS-Gen [8.8]	Pass

7 Test Equipment List

Equipment used for Radiated and Conducted Measurements				
Description	**Manufacturer**	**Model #**	**Asset #**	**Calibration Due**
Spectrum Analyzer	Agilent	N9020A	EMC-054	11/27/2018
EMI Test Receiver	Rohde & Schwarz	ESU40	RF-248	4/9/2019
EMI Test Receiver	Rohde & Schwarz	ESU40	RF-229	4/9/2019
Signal Analyzer	Rohde & Schwarz	FSV40	RF-245	4/10/2019
EMI Test Receiver	Rohde & Schwarz	ESU40	RF-192	4/8/2019
Open Switch and Control Unit	Rohde & Schwarz	OSP130	RF-193	N/A
Open Switch and Control Unit	Rohde & Schwarz	OSP150	RF-194	N/A
Open Switch and Control Unit	Rohde & Schwarz	OSP130	RF-018	N/A
Open Switch and Control Unit	Rohde & Schwarz	OSP150	RF-019	N/A
Antenna - Broadband	Sunol Sciences	JB6	EMC-639	7/17/2018
Antenna - Double-Ridged	ETS-Lindgren	3117	RF-138	6/13/2018
Antenna - Double-Ridged	ETS-Lindgren	3117	RF-139	5/22/2018
Antenna - Standard Gain	ETS-Lindgren	3160-09	RF-179	N/A
ETS-Lindgren	Antenna - Passive Loop	6512	EMC-440	8/31/2018
Custom Filter Bank	Rohde & Schwarz	SFUNIT RX	RF-324	12/20/2018
Custom Filter Bank	Rohde & Schwarz	SFUNIT RX	RF-323	12/6/2018
Preamplifier	Rohde & Schwarz	TS-PR26	RF-199	N/A
RF Cable	Micro-Coax	UFB311A-1-0787-50U50U	EMC-351	N/A
RF Cable	MegaPhase	EMC3-N1N1-394	EMC-1037	N/A
RF Cable	Sucoflex	104PE	RF-430	N/A
RF Cable	Huber & Suhner	Sucoflex 102A	RF-269	N/A

Description	Manufacturer	Model #	Asset #	Calibration Due
RF Cable	Murata	MXHQ87WA3000	RF-591	N/A
RF Cable	Micro- Coax	UFA2105	RF-644	N/A
RF Cable	Murata	MXHQ87WA3000	RF-596	N/A
RF Cable	MegaPhase	EMC3-N1N1-394	EMC-1036	N/A
RF Cable	Huber & Suhner	SucoFlex 100	RF-350	N/A
RF Cable	Teledyne	57500	EMC-1025	N/A
RF Cable	Huber and Suhner	SucoFlex 100	RF-599	N/A
RF Cable	Micro-Coax	UTI Flex	RF-354	N/A
RF Cable	Pasternack	PE304-200CM	RF-446	N/A
RF Cable	Micro-Coax	UTI Flex	RF-359	N/A
THP Monitor	Madge Tech	PRHTemp2000	EMC-681	10/26/2018
THP Monitor	Madge Tech	PRHTemp2000	EMC-170	8/28/2018
THP Monitor	Madge Tech	PRHTemp2000	EMC-680	11/2/2018
Test Software	Rohde-Schwarz	EMC-32 V9.25.00 and V10.01.00	N/A	N/A

Equipment used for AC Line Conducted Emissions Measurement				
Manufacturer	**Description**	**Model #**	**Asset #**	**Calibration Due**
Rohde & Schwarz	EMI Test Receiver	ESR3	EMC-669	4/8/2019
Teseq	LISN	NNB 51	EMC-642	7/28/2018
Fluke	Multimeter	87V	EMC-096	10/23/2018
Madge Tech	THP Monitor	PRHTemp2000	EMC-881	7/17/2018
Chroma	AC Power Source	61602	EMC-055	N/A
Micro-Coax	RF Cable	UFA210A-1-1800-50U50U	EMC-367	8/9/2018
ETS-Lindgren	License Dongle	TILE V7.2.5.7	EMC-985	N/A

Note: Items with Calibration Due data marked as N/A are characterized before test, where applicable.

8 Test Site Description

8.1 Radiated Emissions Test Site

Radiated measurements are performed in a 3m semi-anechoic chamber, which meets NSA requirements for the frequency range of 30MHz to 1000MHz. For measurements above 1 GHz, absorbers are laid out on the ground plane between the receiving antenna and the EUT to meet Site VSWR requirements in accordance with ANSI C63.4:2014.

Testing below 30MHz is also performed in the semi-anechoic chamber. Per KDB 414788, comparison measurements were performed between an open area site and the semi-anechoic chamber and the results from the chamber is higher than those measured from the open area site.

8.1.1 Radiated Measurements in 9kHz- 30 MHz

The EUT is positioned on a turntable at a height of 80cm using a non-conducting table. A loop antenna is positioned at 3m from the EUT periphery at 1m height from the ground. The turntable is rotated 360 degrees to determine the highest emissions. This is repeated for three orientations of the measurement antenna- parallel, perpendicular and ground-parallel. All possible orientations of the EUT were investigated for emissions and the flat orientation was identified as the worst-case configuration.

8.1.2 Radiated Measurements in 30 MHz - 1000 MHz

The EUT is positioned on a turntable at a height of 80cm using a non-conducting table. A linearly polarized broadband antenna is positioned at 3m from the EUT periphery. The turntable is rotated 360 degrees and the antenna height varied from 1m to 4m to determine the highest emissions. This is repeated for both horizontal and vertical polarizations of the measurement antenna. All possible orientations of the EUT were investigated for emissions and the flat orientation was identified as the worst-case configuration.

8.1.3 Radiated Measurements above 1GHz

The EUT is positioned on a Turntable at a height of 1.5m. A Linearly polarized antenna is positioned at 3m from the EUT periphery. Guidelines in ANSI C63.10:2013 were followed with respect to maximizing the emissions. The measurement antenna is set at a fixed 1.5m height while the turntable is rotated 360 degrees and the EUT elevation angle is varied from 0 to 150 degrees in 30 degree increments to determine the highest emissions. This is repeated for both horizontal and vertical Polarizations of the Measurement Antenna. Measurements above 18GHz were performed at a 3m distance. Near field scanning is performed to identify frequencies above 1 GHz.

8.2 Antenna port conducted measurements

All antenna port conducted measurements were performed on a bench-top setup consisting of a spectrum analyzer, power meter (as necessary), splitters/combiners (as necessary), attenuators, and pre-characterized RF cables.

The correction factors between the EUT and the spectrum analyzer were added internally in the analyzer settings, where applicable. The plots displayed takes into account these correction factors.

8.3 Test Setup Diagrams

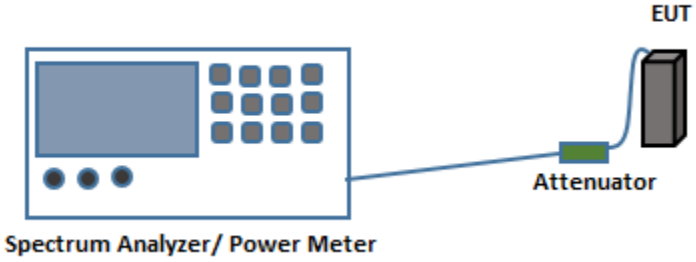


Fig.1. Test Setup for Antenna port conducted measurements

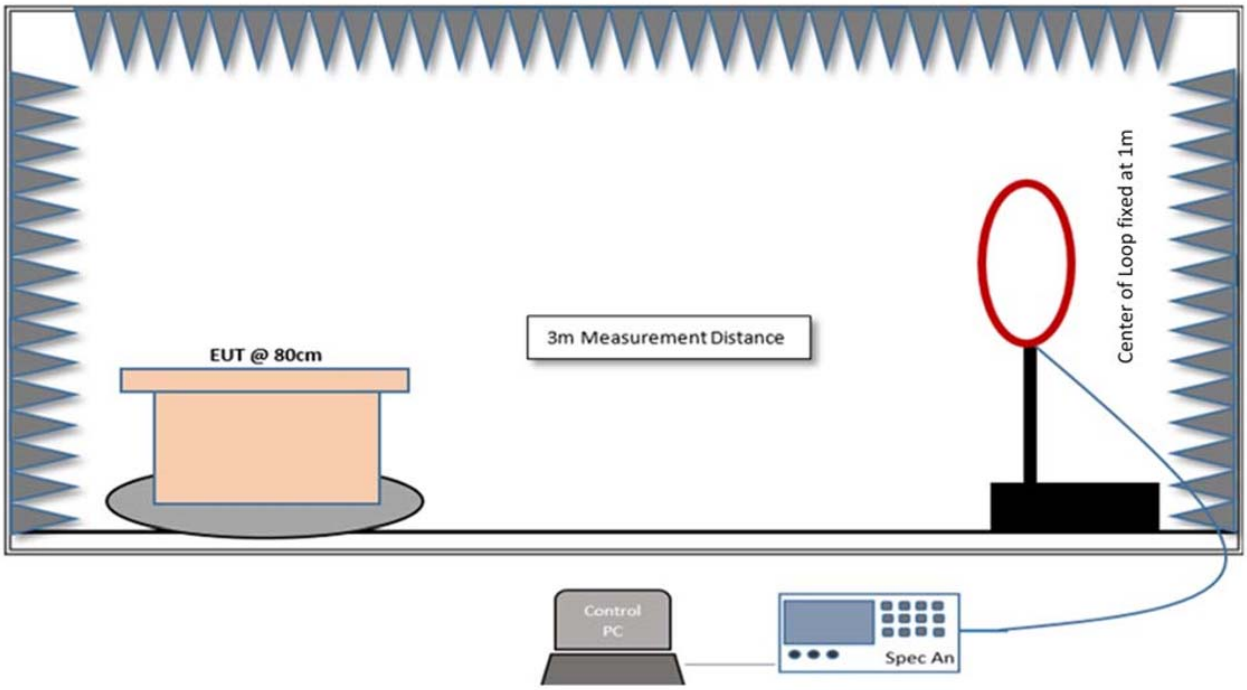


Fig.2. Test Setup for Radiated measurements in 9kHz - 30MHz Range

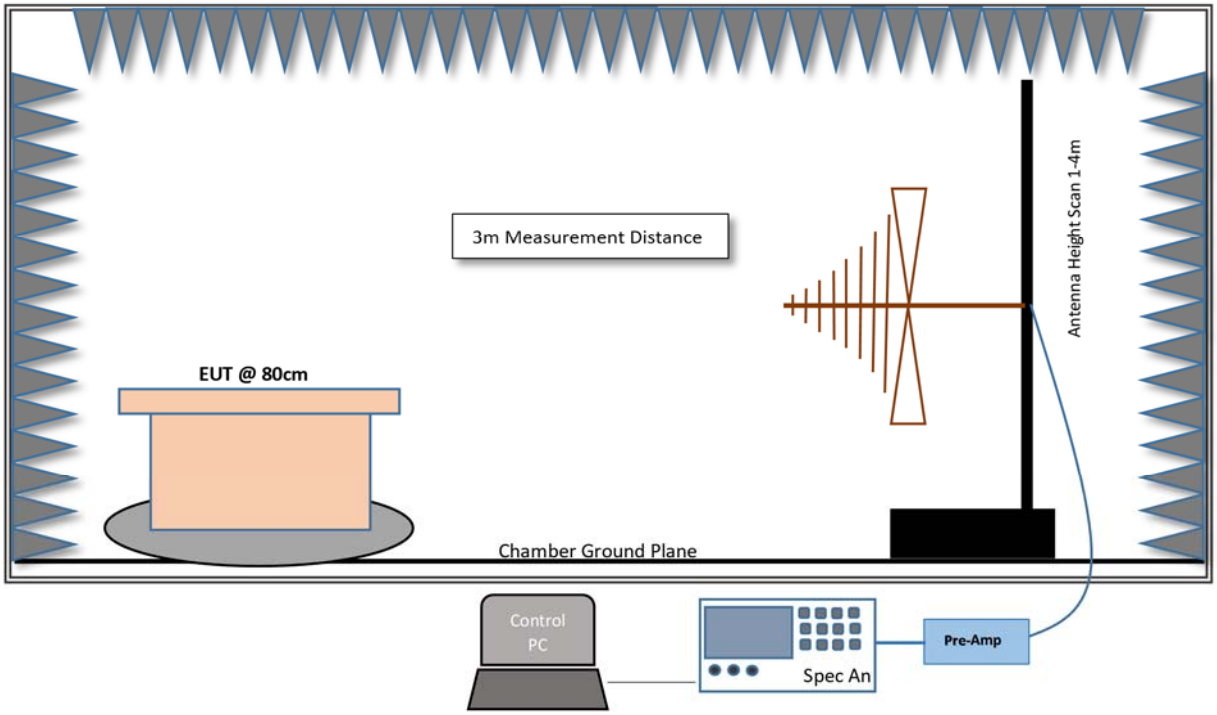


Fig.3. Test Setup for Radiated measurements in 30MHz- 1GHz Range

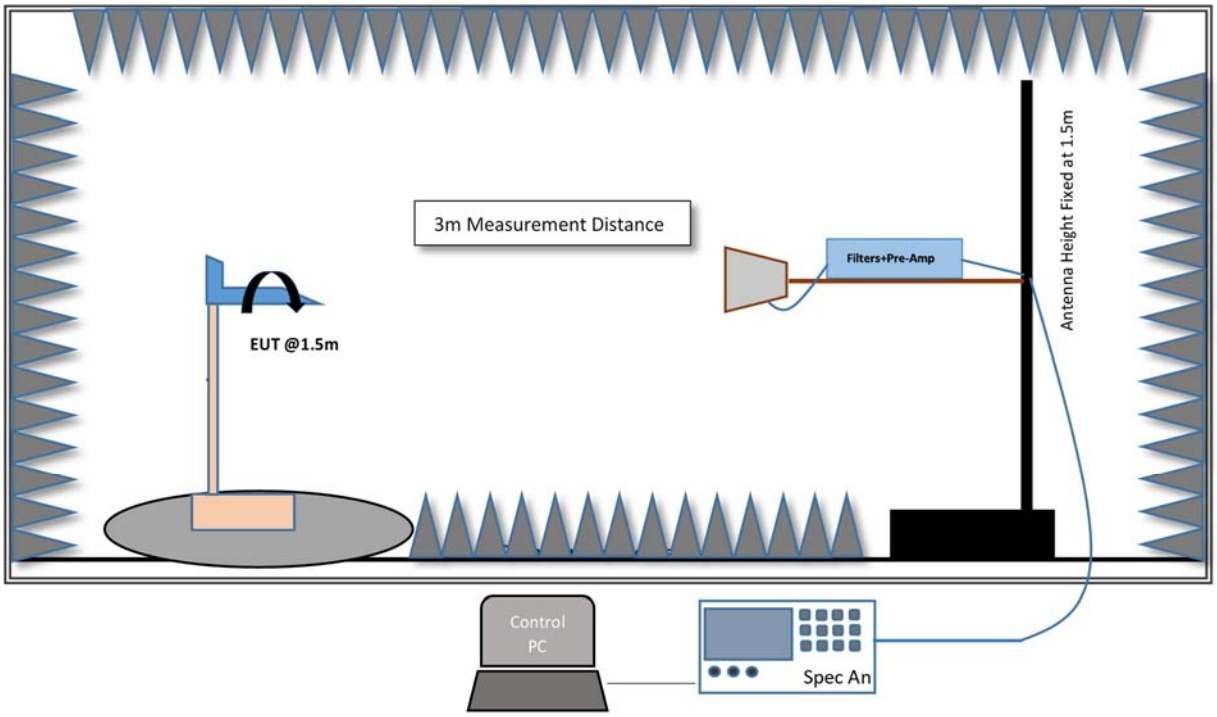


Fig.4. Test Setup for Radiated measurements in 1GHz- 18GHz Range

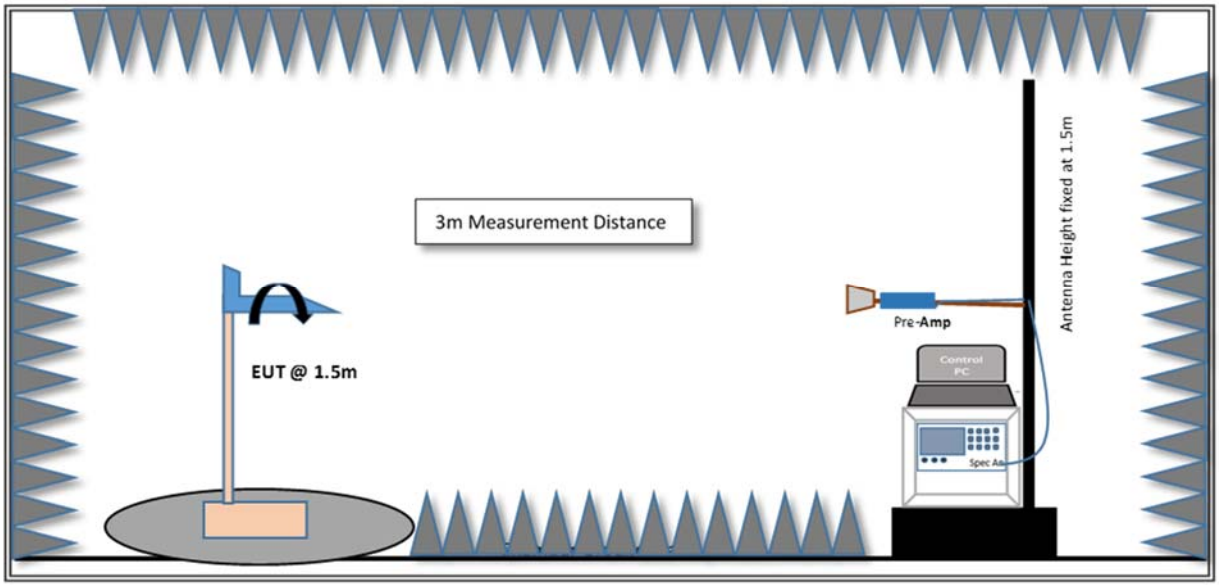


Fig.5. Test Setup for Radiated measurements >18GHz

9 Test Results- Conducted

9.1 Duty Cycle

9.1.1 Test Requirement:

Reporting and measurement purposes only.

9.1.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013.

Spectrum Analyzer Settings:
RBW ≥ Occupied Bandwidth if possible; otherwise, set RBW to the largest available value
VBW ≥ RBW ≥ Signal Period
Detector = Peak
Span = 0 Hz
Sweep points > 100

9.1.3 Limits:

Reporting and measurement purposes only.

9.1.4 Test Results:

Frequency	Data Rate	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
2402	1-DH1	0.332	2.476	13.41	8.73
2402	1-DH3	1.621	2.517	64.40	1.91
2402	1-DH5	2.869	5.003	57.35	2.42

9.1.5 Test Data:

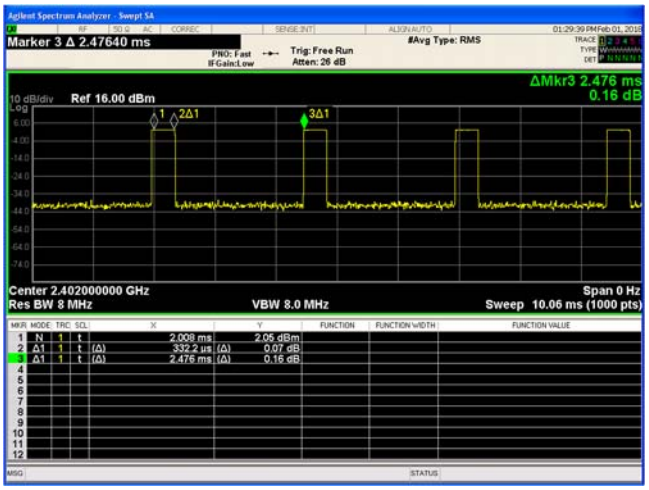


Figure 9-1 Duty Cycle (Ch. 0, 1-DH1)

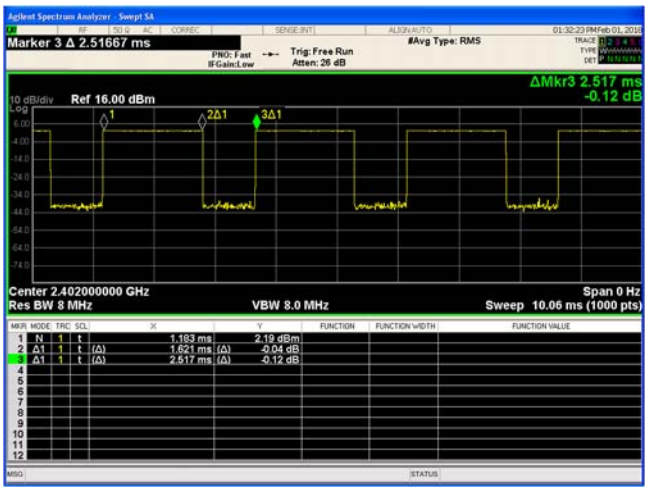


Figure 9-2 Duty Cycle (Ch. 0, 1-DH3)

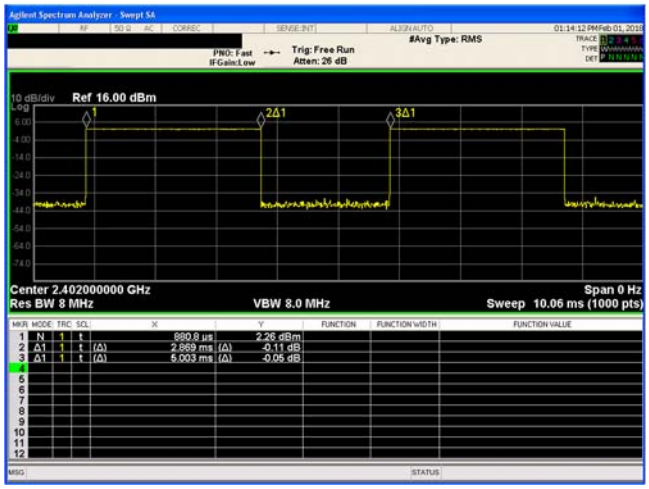


Figure 9-3 Duty Cycle (Ch. 0, 1-DH5)

9.2 20dB and 99% Occupied Bandwidth

9.2.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (a)(1)(iii)

ISED RSS-247 [5.1]

9.2.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 Section 7.8.

Spectrum analyzer settings:
The x dB (-20dB) function on the spectrum analyzer was used to measure 20dB BW with the settings below:
Span = approximately 2 to 3 times the 20 dB or 99% Occupied bandwidth, centered on a hopping channel
RBW ≥ 1 to 5 % of the 20 dB bandwidth= 24kHz
VBW ≥ 3x RBW= 75kHz
Sweep = Auto
Detector function = Peak
Trace = Max Hold
The internal function of the spectrum analyzer is used to measure the 99% bandwidth.

9.2.3 Limits:

N/A- Reporting Purposes only.

9.2.4 Test Results:

Frequency (MHz)	Mode	Data Rate (Mbps)	Channel No.	20 dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
2402	1-DH5	1	0	0.968	0.886
2441	1-DH5	1	39	0.969	0.886
2480	1-DH5	1	78	0.969	0.887
2402	2-DH5	2	0	1.284	1.164
2441	2-DH5	2	39	1.283	1.164
2480	2-DH5	2	78	1.285	1.164
2402	3-DH5	3	0	1.284	1.167
2441	3-DH5	3	39	1.281	1.167
2480	3-DH5	3	78	1.282	1.167

9.2.5 Test Data:

Figure 9-4 20dB Bandwidth (Ch. 0, 1-DH5)

Figure 9-5 20dB Bandwidth (Ch. 39, 1-DH5)

Figure 9-6 20dB Bandwidth (Ch. 78, 1-DH5)

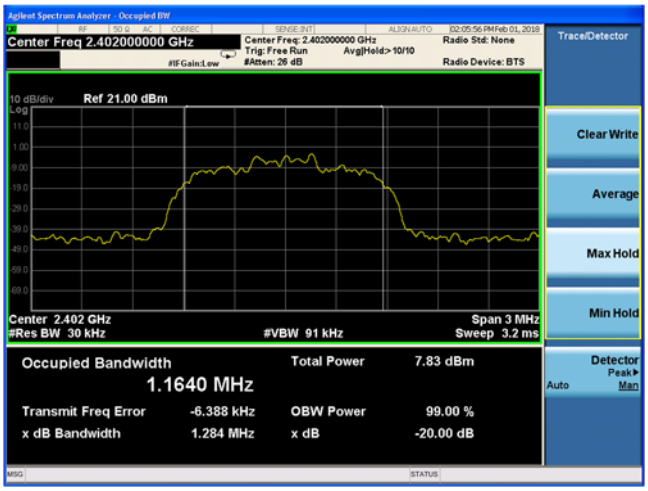


Figure 9-7 20dB Bandwidth (Ch. 0, 2-DH5)

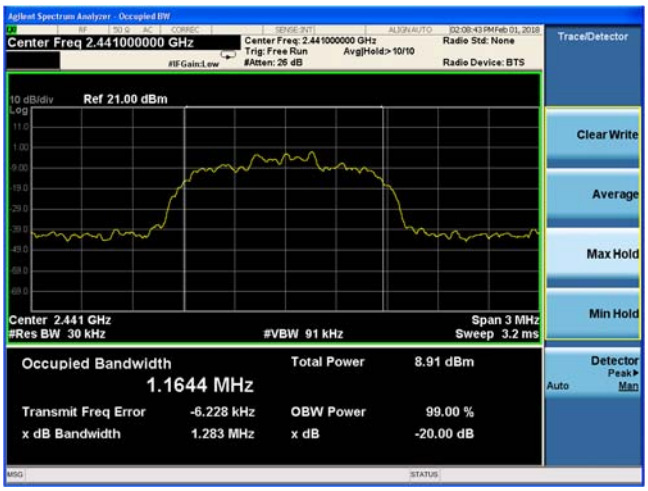


Figure 9-8 20dB Bandwidth (Ch. 39, 2-DH5)

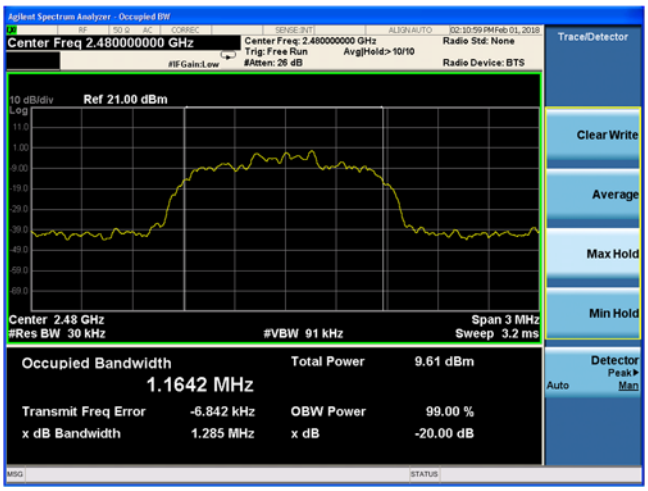


Figure 9-9 20dB Bandwidth (Ch. 78, 2-DH5)

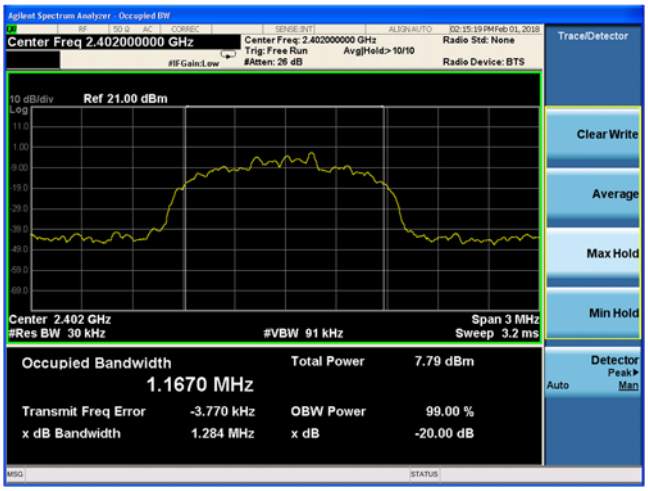


Figure 9-10 20dB Bandwidth (Ch. 0, 3-DH5)

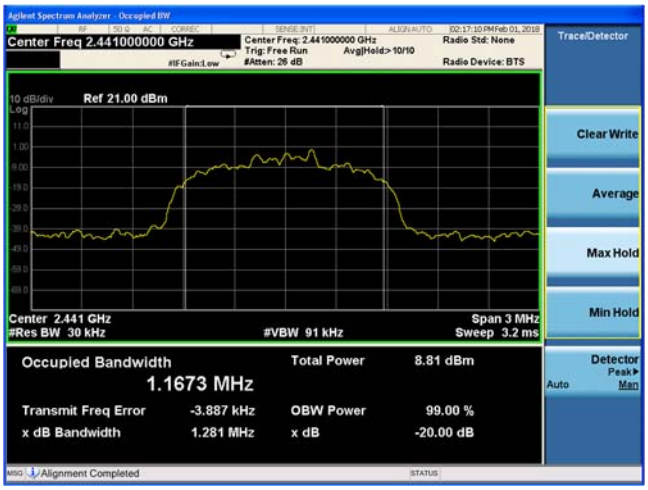


Figure 9-11 20dB Bandwidth (Ch. 39, 3-DH5)

Figure 9-12 20dB Bandwidth (Ch. 78, 3-DH5)

9.3 Output Power

9.3.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (b)(1)

ISED RSS-247 [5.4]

9.3.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 Section 7.8.

Spectrum analyzer settings:

Peak Power Measurements:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel= 5MHz
RBW > the 20 dB bandwidth of the emission being measured= 2MHz
VBW ≥ 3 x RBW= 6MHz
Sweep = Auto
Detector function = Peak
Trace = Max Hold
The trace was allowed to stabilize. A marker was set to the peak of the emission. The indicated level is the peak output power.

9.3.3 Limits:

15.247/RSS-247: 1 Watt (30dBm), if ≥ 75 non-overlapping channels.

Additionally, for EDR modes and devices with ≤ 75 non-overlapping channels (AFH), 21dBm conducted.

RSS-247: 4 W (36dBm) EIRP.

Additionally, for EDR modes and devices with ≤ 75 non-overlapping channels (AFH), 27dBm EIRP.

9.3.4 Test Results:

Frequency (MHz)	Mode	Data Rate (Mbps)	Channel No.	Cond. Peak Power (dBm)	Cond. Limit (dBm)	Margin (dBm)	Results
2402	1-DH5	1	0	6.36	21	-14.64	Pass
2441	1-DH5	1	39	7.38	21	-13.62	Pass
2480	1-DH5	1	78	7.73	21	-13.27	Pass
2402	2-DH5	2	0	5.92	21	-15.08	Pass
2441	2-DH5	2	39	6.93	21	-14.08	Pass
2480	2-DH5	2	78	7.30	21	-13.70	Pass
2402	3-DH5	3	0	6.26	21	-14.74	Pass
2441	3-DH5	3	39	7.33	21	-13.67	Pass
2480	3-DH5	3	78	7.63	21	-13.37	Pass

Frequency (MHz)	Mode	Channel No.	Cond. Peak Power (dBm)	Ant. Gain (dBi)	EIRP (dBm)	ISED EIRP Limit (dBm)	Margin (dBm)	Results
2402	1-DH5	0	6.36	4.70	11.06	36	-24.94	Pass
2441	1-DH5	39	7.38	4.70	12.08	36	-23.92	Pass
2480	1-DH5	78	7.73	4.70	12.43	36	-23.57	Pass
2402	2-DH5	0	5.92	4.70	10.62	26.9	-16.28	Pass
2441	2-DH5	39	6.93	4.70	11.63	26.9	-15.28	Pass
2480	2-DH5	78	7.30	4.70	12.00	26.9	-14.90	Pass
2402	3-DH5	0	6.26	4.70	10.96	26.9	-15.94	Pass
2441	3-DH5	39	7.33	4.70	12.03	26.9	-14.87	Pass
2480	3-DH5	78	7.63	4.70	12.33	26.9	-14.57	Pass

9.3.5 Test Data:

Figure 9-13 Peak Power (Ch. 0, 1-DH5)

Figure 9-14 Peak Power (Ch. 39, 1-DH5)

Figure 9-15 Peak Power (Ch. 78, 1-DH5)

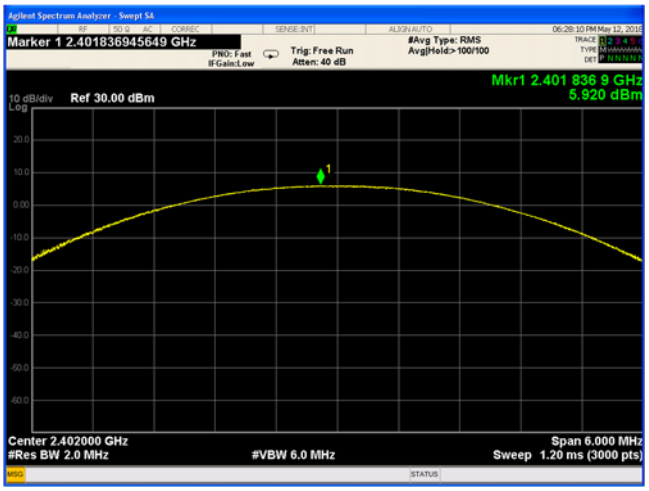


Figure 9-16 Peak Power (Ch. 0, 2-DH5)

Figure 9-17 Peak Power (Ch. 39, 2-DH5)

Figure 9-18 Peak Power (Ch. 78, 2-DH5)

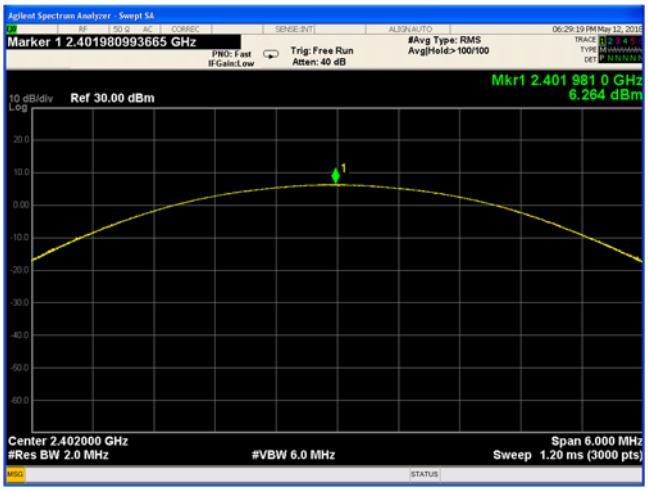


Figure 9-19 Peak Power (Ch. 0, 3-DH5)

Figure 9-20 Peak Power (Ch. 39, 3-DH5)

Figure 9-21 Peak Power (Ch. 78, 3-DH5)

9.4 Channel Spacing

9.4.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (a)(1)

ISED RSS-247 [5.1]

9.4.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 Section 7.8. The EUT was in pseudorandom hopping mode with the separation of two peaks measured using the delta marker.

Spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels
Resolution (or IF) Bandwidth (RBW) = 300 kHz
Video (or Average) Bandwidth (VBW) ≥ RBW= 1 MHz
Sweep = Auto
Detector function = Peak
Trace = Max Hold
The trace(s) was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

9.4.3 Limits:

The channel carrier frequencies must be separated by 25kHz or the 20dB BW of the hopping channel whichever is greater. If the output power is less than 125mW, then the channel separation can be 2/3 of the 20dB bandwidth 623.33kHz or 25kHz whichever is greater.

9.4.4 Test Results:

Pass.
Minimum channel separation= 0.997 MHz in 1-DH5 Mode.

9.4.5 Test Data:

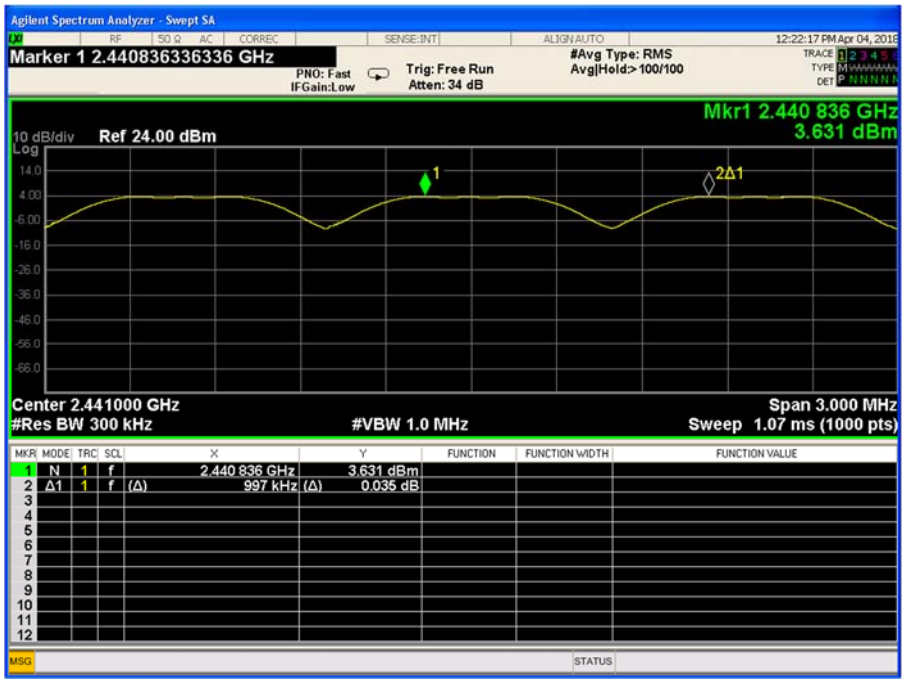


Figure 9-22 Channel Separation

9.5 Number of Hopping Frequencies

9.5.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (a)(1)(iii)

ISED RSS-247 [5.1]

9.5.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 Section 7.8. The EUT had its hopping function enabled.

Spectrum analyzer settings:

Span = the frequency band of operation
RBW < 30% of the OBW= 300 kHz
VBW ≥ RBW = 1 MHz
Sweep = Auto
Detector function = Peak
Trace = Max Hold
The trace was allowed to stabilize, and the number of channels was counted.

9.5.3 Limits:

The minimum number of hopping channels required is 15.

9.5.4 Test Results

Pass.
The EUT utilizes 79 hopping channels in BDR and EDR modes. In AFH mode, the EUT utilizes a minimum of 20 hopping channels.

9.5.5 Test Data:

Figure 9-23 Number of Hopping Channels

9.6 Dwell Time

9.6.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (a)(1)(iii)

ISED RSS-247 [5.1]

9.6.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 American National Standard of Procedure for Compliance Testing of Unlicensed Wireless Devices, Section 7.8. The EUT had its hopping function enabled.

Spectrum analyzer settings:
Span = zero span, centered on a hopping channel
RBW = 100 kHz
VBW ≥ 3 x RBW= 300 kHz
Sweep = as necessary to capture the entire dwell time per hopping channel = 4ms
Detector function = Peak
Trace = Clear Write/ Trigger Mode

Dwell Time is measured with analyzer set to zero span at the channel of test and the trigger set to capture a burst. Spectrum Analyzer trace data was analyzed and the dwell time for emissions greater than 0dBm was summed to obtain the total accumulated dwell time.

9.6.3 Limits:

400 ms within 31.6s (400 ms × 79 Channels)

9.6.4 Test Results:

Pass.

Packet Type	Dwell Time (ms)	Accumulated Dwell Time in 31.6 s period (ms)	Limit (ms)
1-DH1	0.38	182.51	400.00
1-DH3	1.64	369.75	400.00
1-DH5	2.89	285.21	400.00

9.6.5 Test Data:

Figure 9-24 Dwell Time – DH1

Figure 9-25 Dwell Time – DH3

Figure 9-26 Dwell Time - DH5

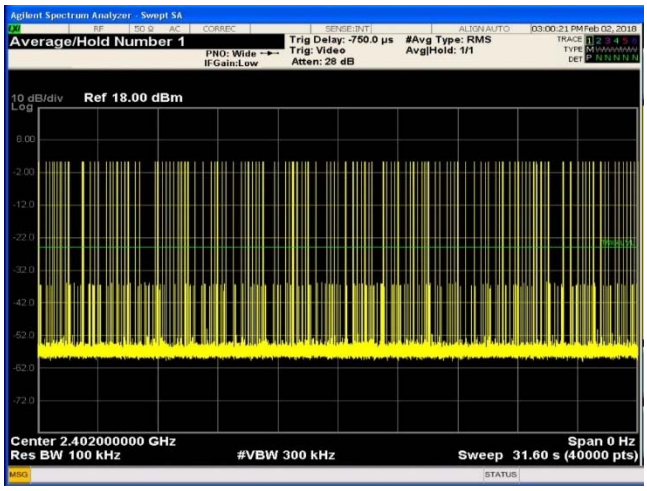


Figure 9-27 Time of Occupancy - DH1

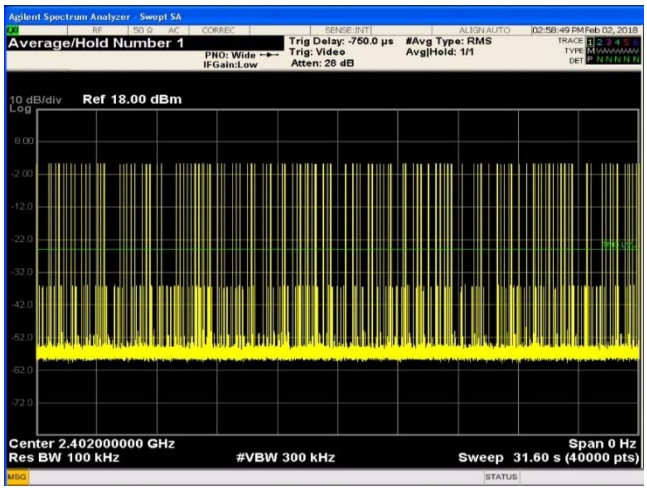


Figure 9-28 Time of Occupancy - DH3

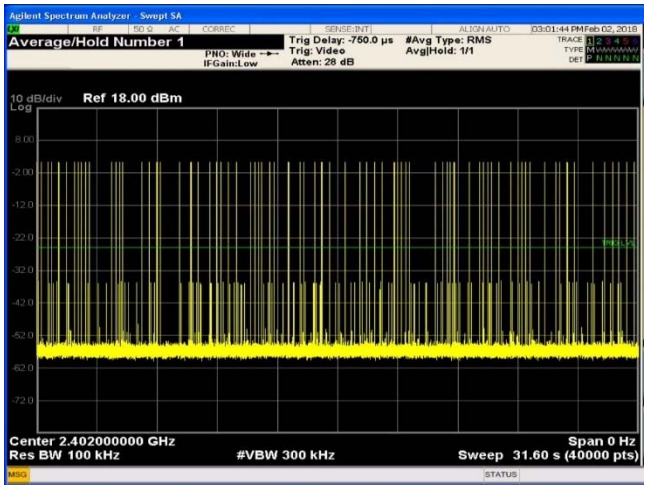


Figure 9-29 Time of Occupancy - DH5

9.7 Band Edge

9.7.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

ISED RSS-247 [5.5]

9.7.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 Section 7.8.

Spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
RBW = 100 kHz
VBW = 300 kHz
Sweep = Auto
Detector function = Peak
Trace = Max Hold
The trace was allowed to stabilize. The marker was set on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. The delta marker function was set and the marker-to-peak function moved to the peak of the in-band emission.

With the same instrument settings, the hopping function of the EUT was enabled and the trace was allowed to stabilize. The same procedure listed above was used to determine if any spurious emissions caused by the hopping function complied with the specified limit.

9.7.3 Limits:

The maximum level is at least 20dBc with measurements taken with the EUT in pseudorandom hopping mode and with hopping mode disabled.

9.7.4 Test Results:

Pass.

9.7.5 Test Data:

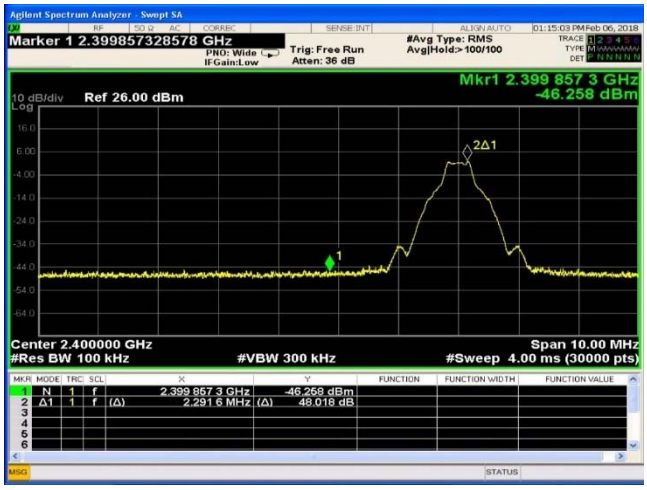


Figure 9-30 Low Channel Band edge: 1-DH5 Mode (Hopping disabled)

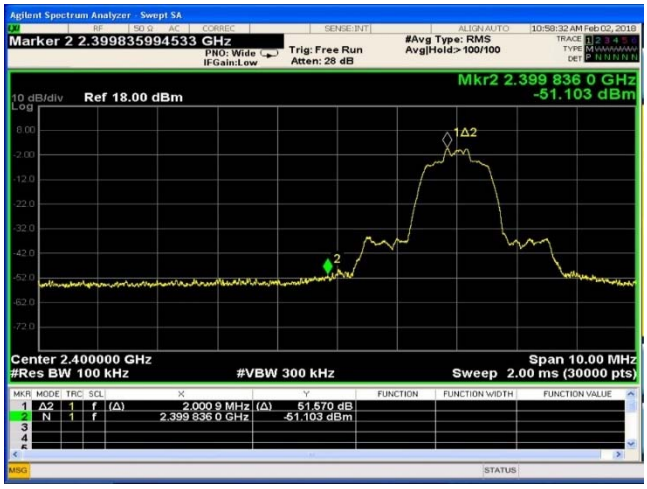


Figure 9-31 Low Channel Band edge: 2-DH5 Mode (Hopping disabled)

Figure 9-32 Low Channel Band edge: 3-DH5 Mode (Hopping disabled)

Figure 9-33 High Channel Band edge: 1-DH5 Mode (Hopping disabled)

Figure 9-34 High Channel Band edge: 2-DH5 Mode (Hopping disabled)

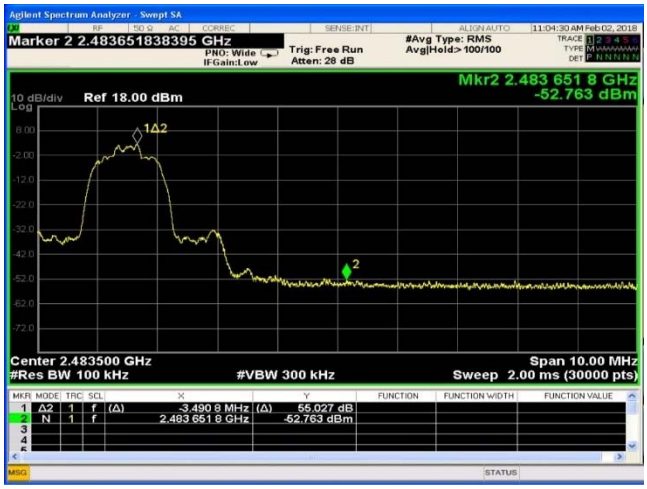


Figure 9-35 High Channel Band edge: 3-DH5 Mode (Hopping disabled)

Figure 9-36 Low Channel Band edge 1-DH5 Mode (Hopping enabled)

Figure 9-37 Low Channel Band edge 2-DH5 Mode (Hopping enabled)

Figure 9-38 Low Channel Band edge 3-DH5 Mode (Hopping enabled)

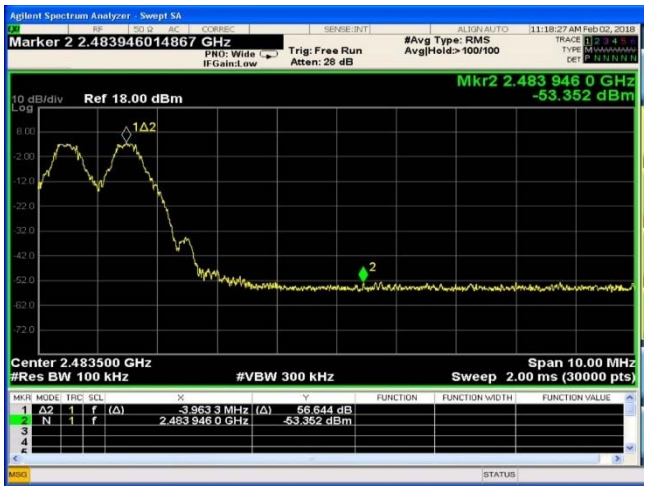


Figure 9-39 High Channel Band 1-DH5 Mode (Hopping enabled)

Figure 9-40 High Channel Band 2-DH5 Mode (Hopping enabled)

Figure 9-41 High Channel Band 3-DH5 Mode (Hopping enabled)

9.8 Conducted Spurious Emissions

9.8.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

ISED RSS-247 [5.5]

9.8.2 Test Method:

Measurements were performed according to the procedure defined in ANSI C63.10:2013 Section 7.8.

Spectrum analyzer settings:
Span = 30 M- 12 GHz; 12 G- 25 GHz
RBW = 1 MHz
VBW = 3 MHz
Sweep Time = Auto
Sweep Points= 30000
Detector function = Peak
Trace = Max Hold
If an emission is found within 3dB of the limit or exceeding the limit, reduce the RBW to 100 kHz for the final measurements.
The trace was allowed to stabilize. The marker was set on the peak of any spurious emission recorded. The level displayed had to comply with the limit specified.

9.8.3 Limits:

The maximum spurious emission shall be at least 20dBc.

9.8.4 Test Results:

Pass

9.8.5 Test Data:

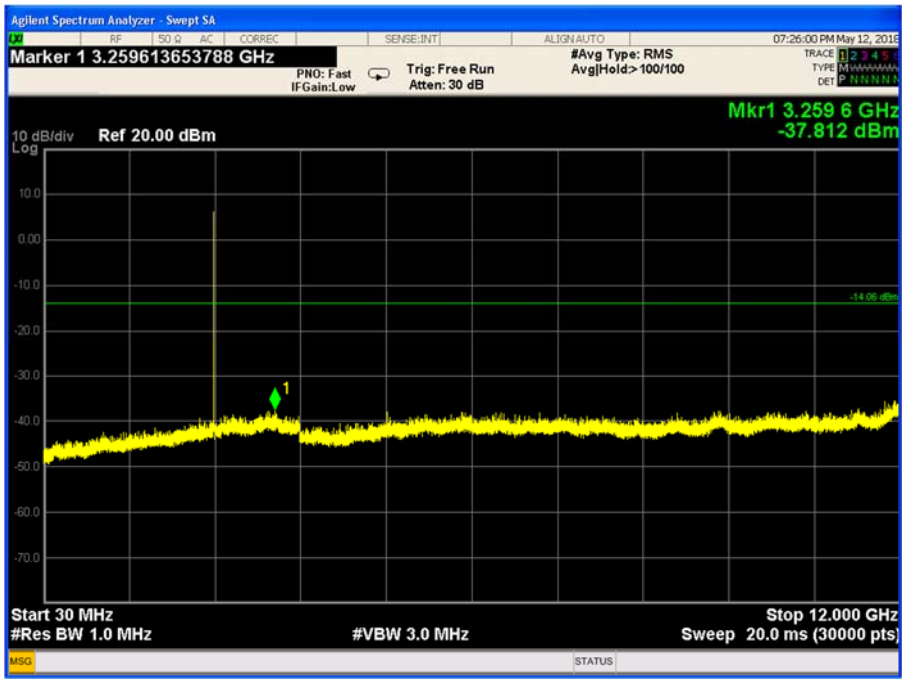


Figure 9-42 Conducted Spurious Emissions 30-12000 MHz: 1-DH5 Mode (Ch. 0)

Figure 9-43 Conducted Spurious Emissions 12-25 GHz: 1-DH5 Mode (Ch. 0)

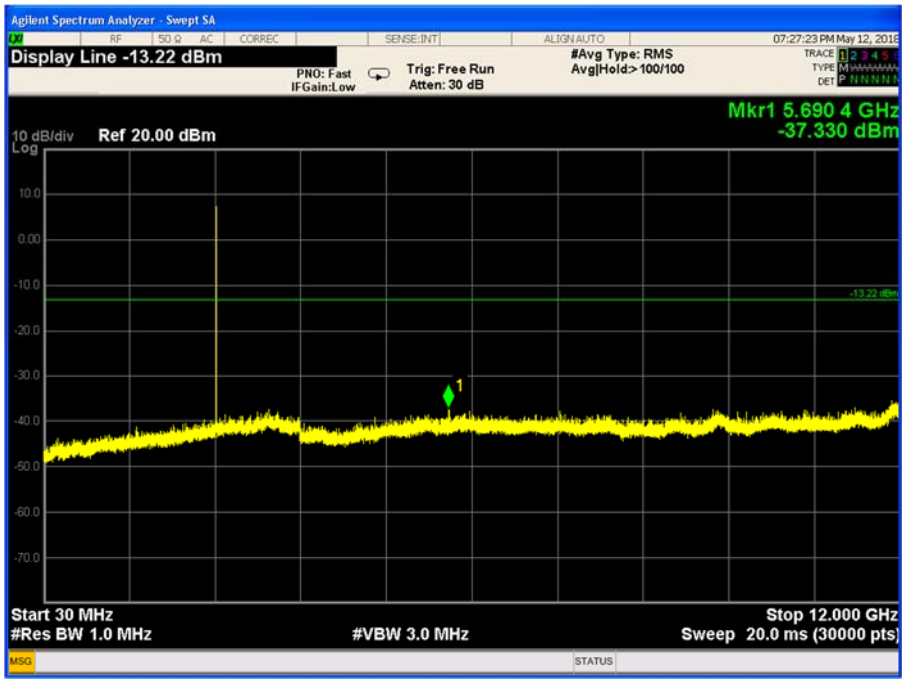


Figure 9-44 Conducted Spurious Emissions 30-12000 MHz: 1-DH5 Mode (Ch. 39)

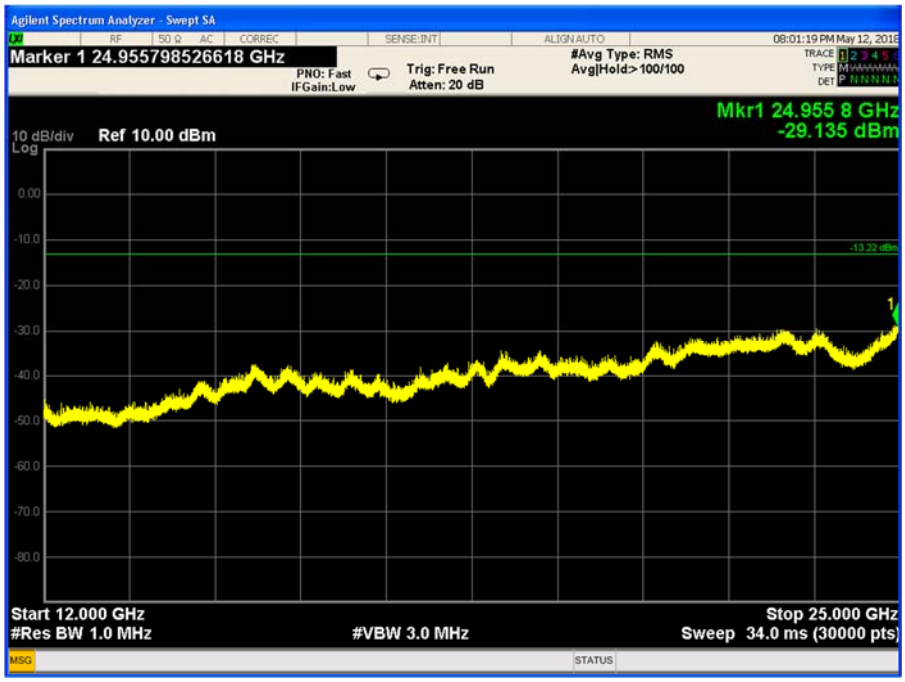


Figure 9-45 Conducted Spurious Emissions 12-25 GHz: 1-DH5 Mode (Ch. 39)

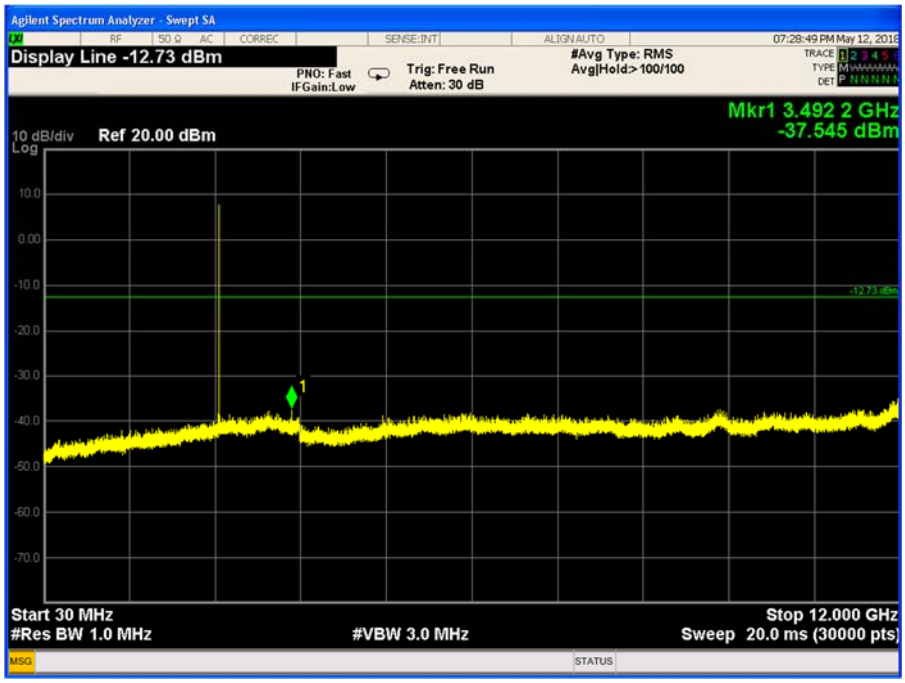


Figure 9-46 Conducted Spurious Emissions 30-12000 MHz: 1-DH5 Mode (Ch. 78)

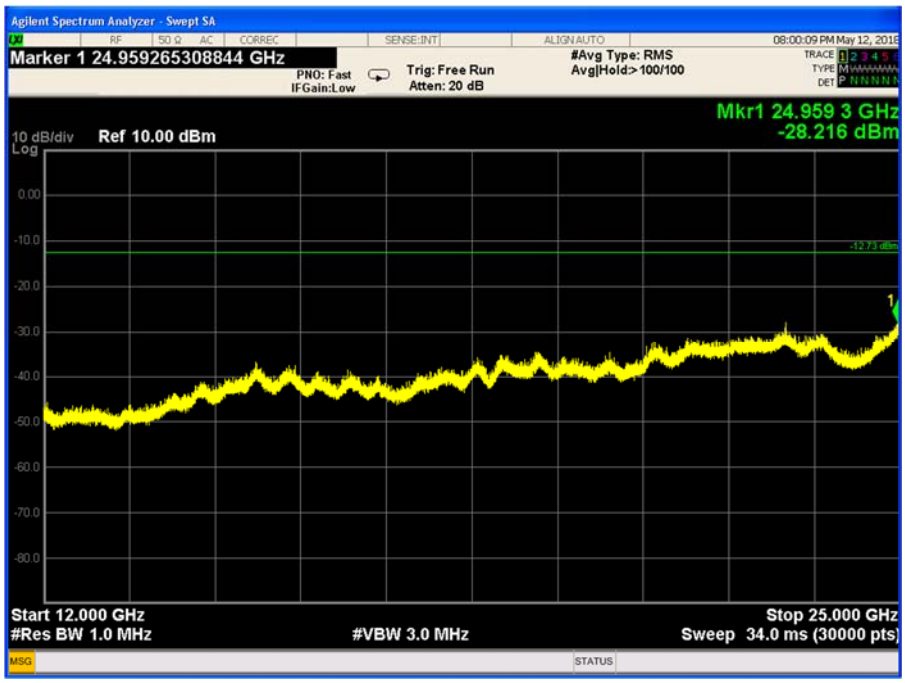


Figure 9-47 Conducted Spurious Emissions 12-25 GHz: 1-DH5 Mode (Ch. 78)

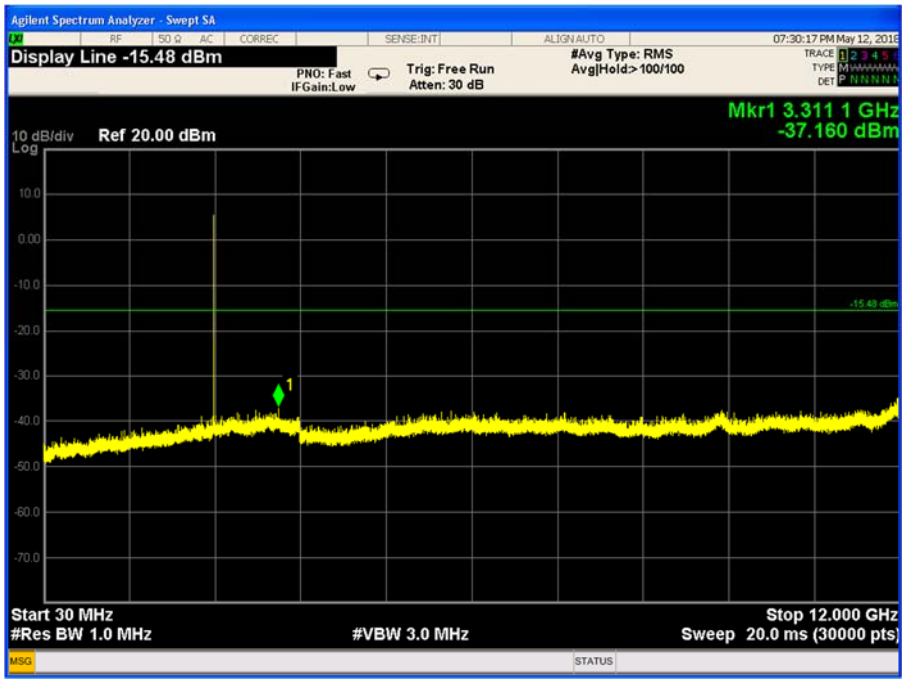


Figure 9-48 Conducted Spurious Emissions 30-12000 MHz: 2-DH5 Mode (Ch. 0)

Figure 9-49 Conducted Spurious Emissions 12-25 GHz: 2-DH5 Mode (Ch. 0)

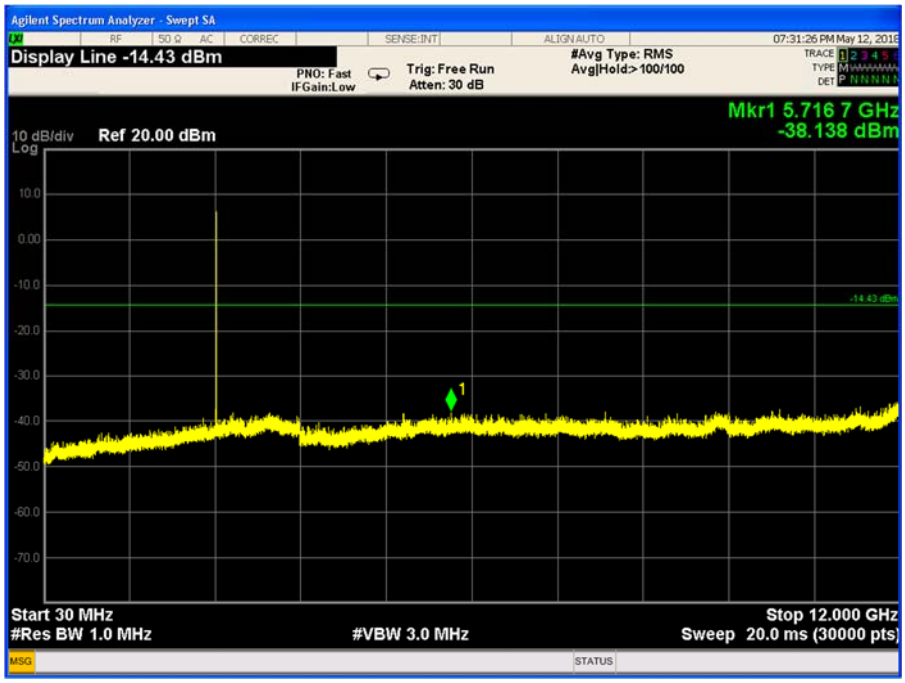


Figure 9-50 Conducted Spurious Emissions 30-12000 MHz: 2-DH5 Mode (Ch. 39)

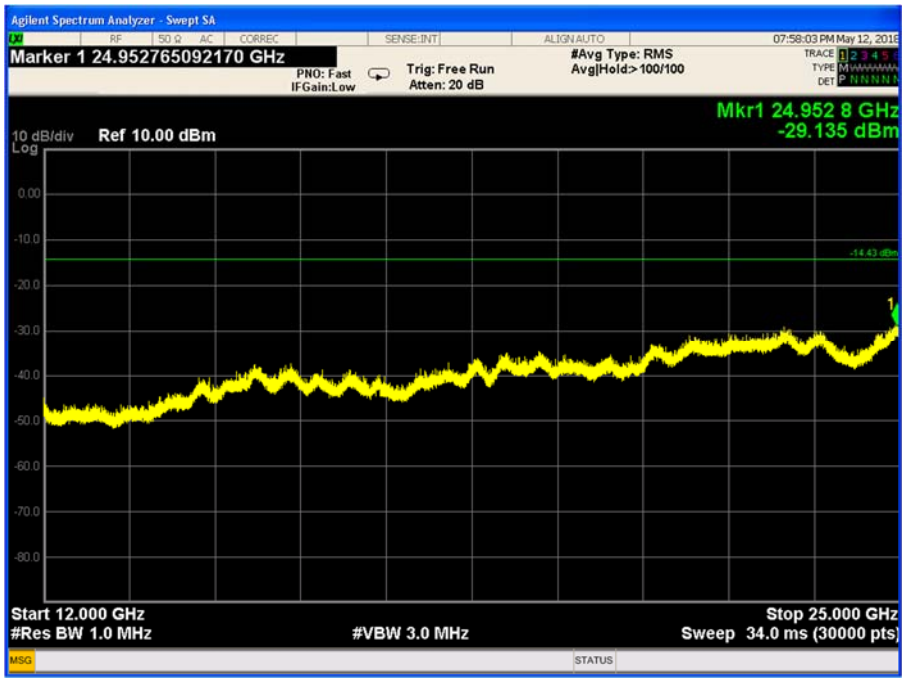


Figure 9-51 Conducted Spurious Emissions 12-25 GHz: 2-DH5 Mode (Ch. 39)

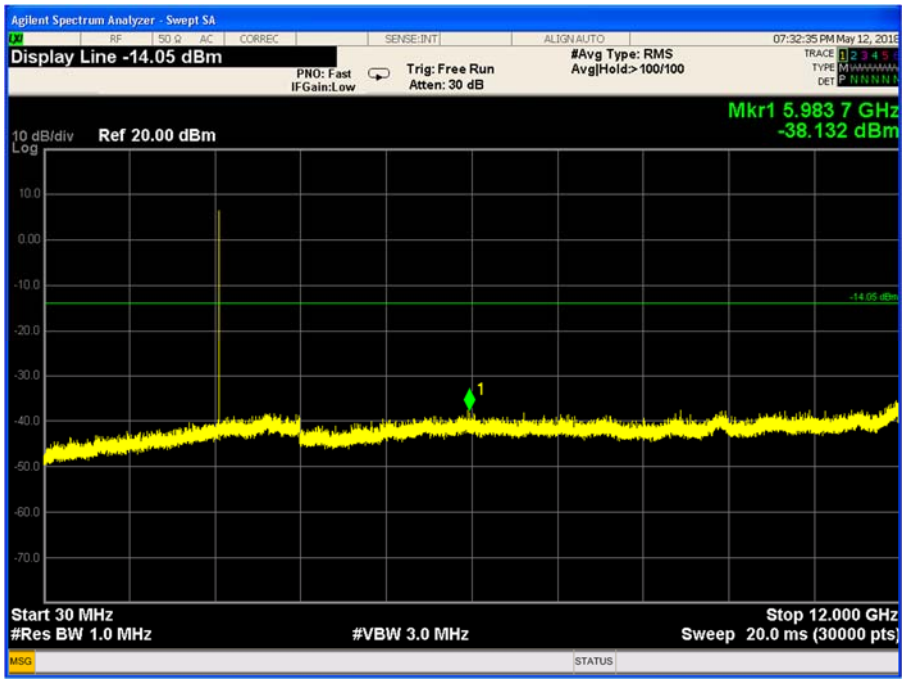


Figure 9-52 Conducted Spurious Emissions 30-12000 MHz: 2-DH5 Mode (Ch. 78)

Figure 9-53 Conducted Spurious Emissions 12-25 GHz: 2-DH5 Mode (Ch. 78)

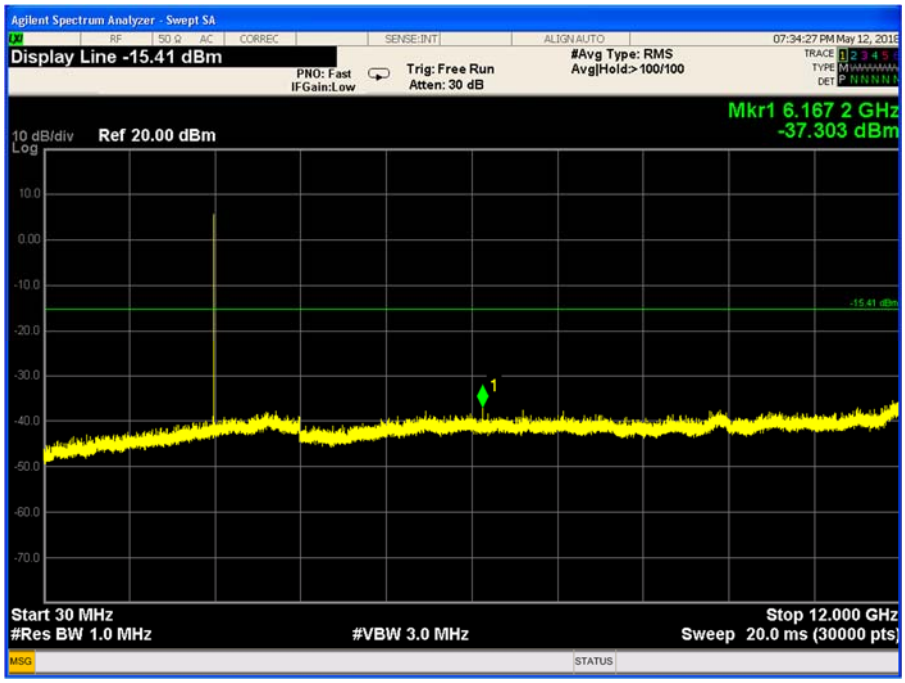


Figure 9-54 Conducted Spurious Emissions 30-12000 MHz: 3-DH5 Mode (Ch. 0)

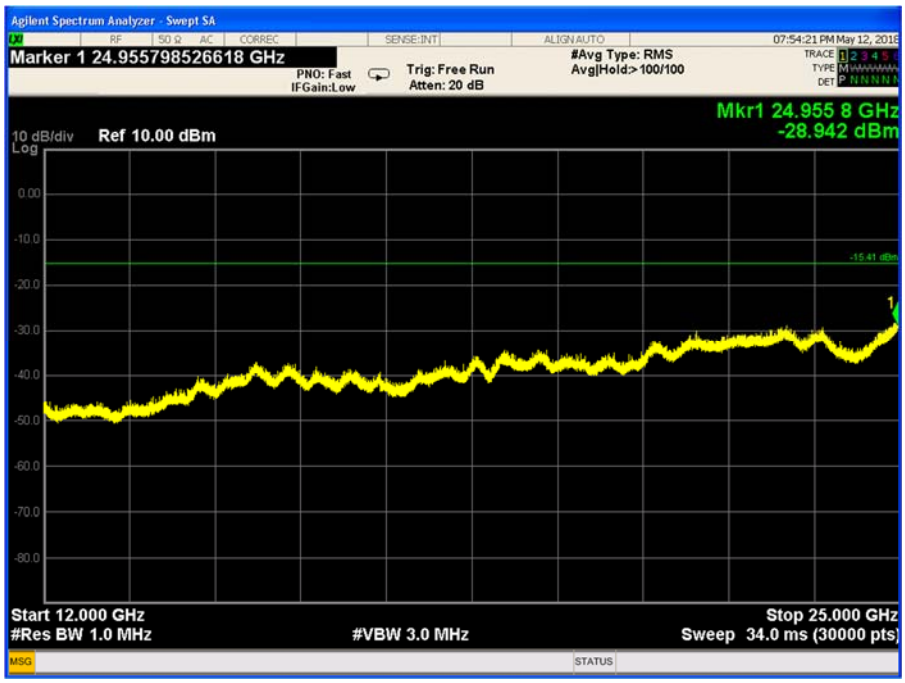


Figure 9-55 Conducted Spurious Emissions 12-25 GHz: 3-DH5 Mode (Ch. 0)

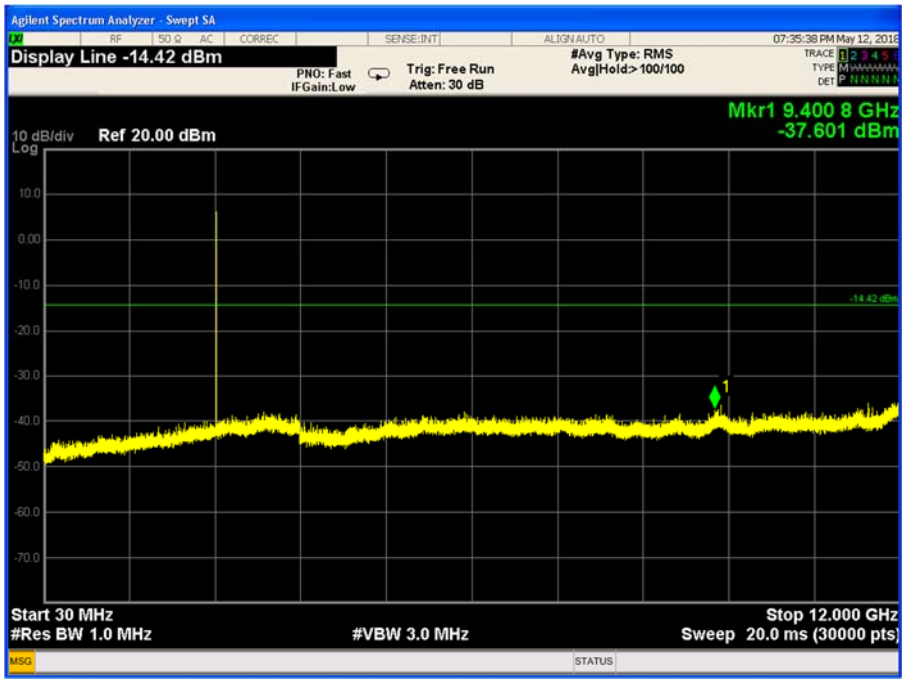


Figure 9-56 Conducted Spurious Emissions 30-12000 MHz: 3-DH5 Mode (Ch. 39)

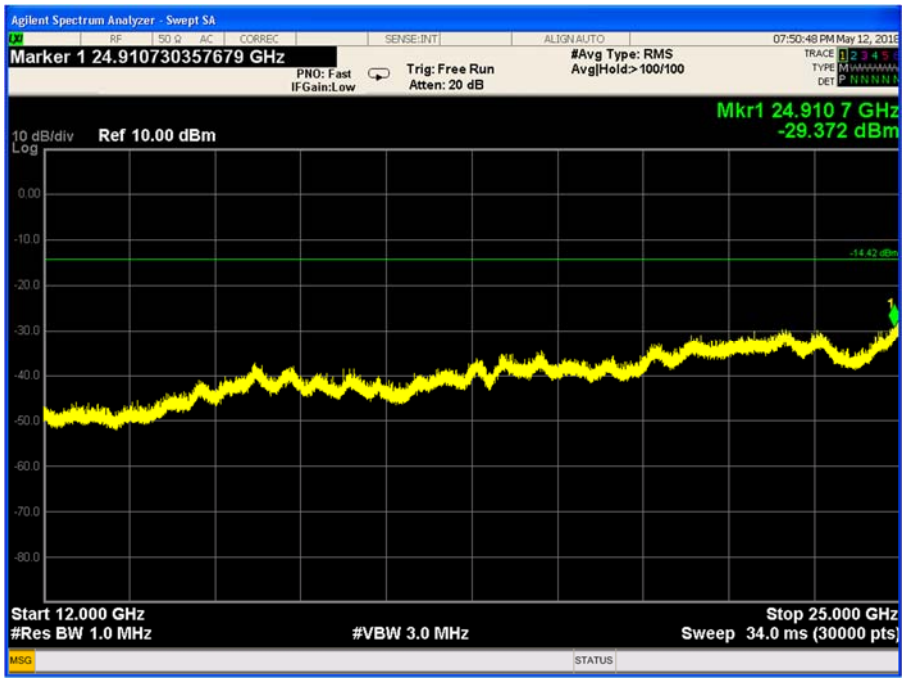


Figure 9-57 Conducted Spurious Emissions 12-25 GHz: 3-DH5 Mode (Ch. 39)

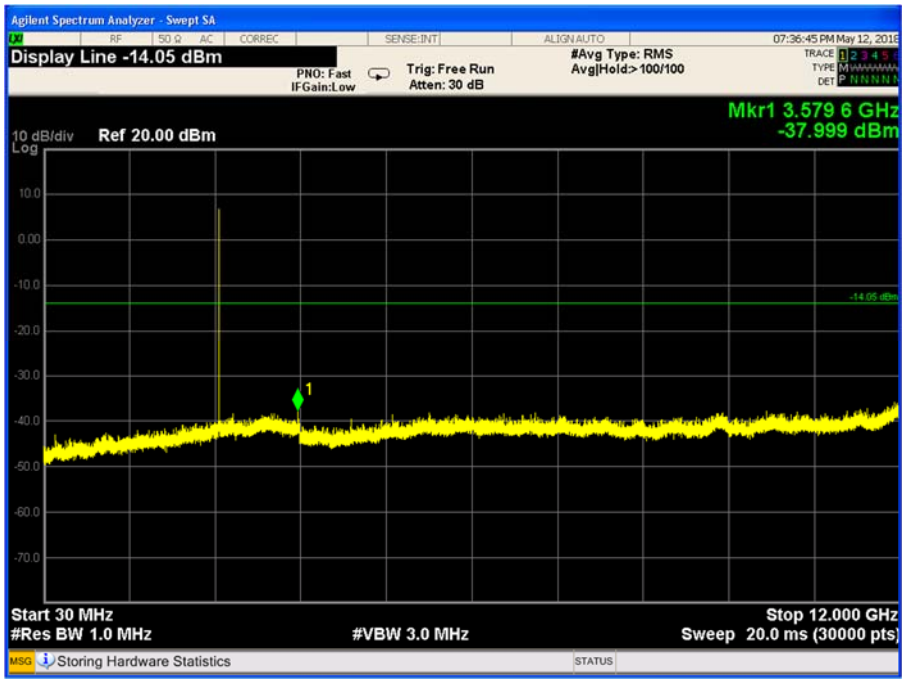


Figure 9-58 Conducted Spurious Emissions 30-12000 MHz: 3-DH5 Mode (Ch. 78)

Figure 9-59 Conducted Spurious Emissions 12-25 GHz: 3-DH5 Mode (Ch. 78)

9.9 Radiated Spurious and Band Edge Emissions

9.9.1 Test Requirement:

FCC CFR 47 Rule Part 15.247 (d)

ISED RSS-247 [5.5] and RSS GEN [8.9]

9.9.2 Test Method:

Measurements were performed according to the procedure defined in KDB 558074 - Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 V04 and ANSI C63.10 2013.

Radiated spurious measurements are made from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The limit for radiated spurious emissions is per 15.209 and RSS-247 [5.5]. Additionally, emissions found in the restricted bands listed in 15.205 and RSS-Gen were tested for compliance per limits in 15.209 and RSS-Gen.

The EUT was tested near the low, middle and high channels of operation in each sub band. Guidelines in ANSI C63.10:2013 were followed with respect to maximizing the emissions.

A pre-amp and a high pass filter were required for this test, in order to provide the measuring system with sufficient sensitivity. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength.

Both horizontal and vertical antenna polarizations were investigated. Worst case maximized data is shown in this test report.

Restricted Band-Edge Emissions
Peak Measurements
Spectrum Analyzer Settings:
RBW= 1 MHz
VBW= 3 MHz
Trace Mode: Peak Detector (Max Hold)
Span= 2310 – 2500 MHz
Sweep Points = 401
Sweep Time = Auto
Average Measurements (Reduced Video Bandwidth Method)
Spectrum Analyzer Settings:
RBW= 1 MHz
VBW= 2 kHz
VBW Mode = Linear
Trace Mode: Peak Detector (Max Hold)
Span= 2310 – 2500 MHz
Sweep Points = 401
Sweep Time = Auto
Sweep Count = 200

Radiated Spurious Emissions

Spectrum Analyzer Settings:

9 kHz- 30 MHz:

RBW= 1 kHz | 10kHz
VBW ≥ 3 X RBW
Trace Mode: Peak Detector (Max Hold). Final measurements performed using QP Detector and RBW's as defined in ANSI C63.2.
Span= 9kHz – 150kHz and 150kHz- 30 MHz
Sweep time= Auto

30 MHz- 1 GHz:

RBW= 120 kHz
VBW ≥ 3 X RBW
Trace Mode: Peak Detector (Max Hold). Final measurements performed using QP Detector.
Span= 30 MHz- 1 GHz
Sweep time= Auto
Sweep points ≥ 2 x Span/RBW

Above 1 GHz:

RBW= 1 MHz
VBW= 3 MHz
Trace Mode: Peak Detector (Max Hold) and RMS Average Detector (Max Hold)
Span= 1- 18 GHz and 18- 26.5 GHz.
Sweep time= Auto
Sweep points ≥ 2 x Span/RBW

Final Measurements above 1 GHz

Peak Measurements

Spectrum Analyzer Settings:

RBW= 1 MHz
VBW= 3 MHz
Trace Mode: Peak Detector (Max Hold)
Span= wide enough to encompass the emission
Sweep Points ≥ 2 × Span/RBW
Sweep Time = Auto

RMS Average Measurements

Spectrum Analyzer Settings:

RBW= 1 MHz
VBW≥ 3 × RBW
Detector= RMS
Span= wide enough to encompass the emission
Sweep points≥ 2 × Span/RBW
Sweep time = auto
Trace= Average at least 100 traces
Trace Averaging Type= power (RMS)
The duty cycle correction factor is added to the emission level.

Sample Calculation:

Field Strength Level: Amplitude (Analyzer level) + AFCL (Antenna Factor and Cable losses) – Amplifier Gain = 50 dBuV + 33 dB – 25 dB = 58dBuV/m.

9.9.3 Limits:

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (meters)	Corrected Field Strength for 3m measurement distance (dBµV/m)
0.009-0.490	2400/F (kHz)	300	48.5- 13.8
0.490-1.705	24000/F (kHz)	30	33.8- 23.0
1.705-30	30	30	29.5
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
960-1000	500	3	54
Above 1000 (Restricted Frequency Bands)	500	3	54 (Average) 74 (Peak)

9.9.4 Test Result:

Pass.

9.9.5 Test Data:

9.9.5.1 Radiated Restricted Band-edge emissions

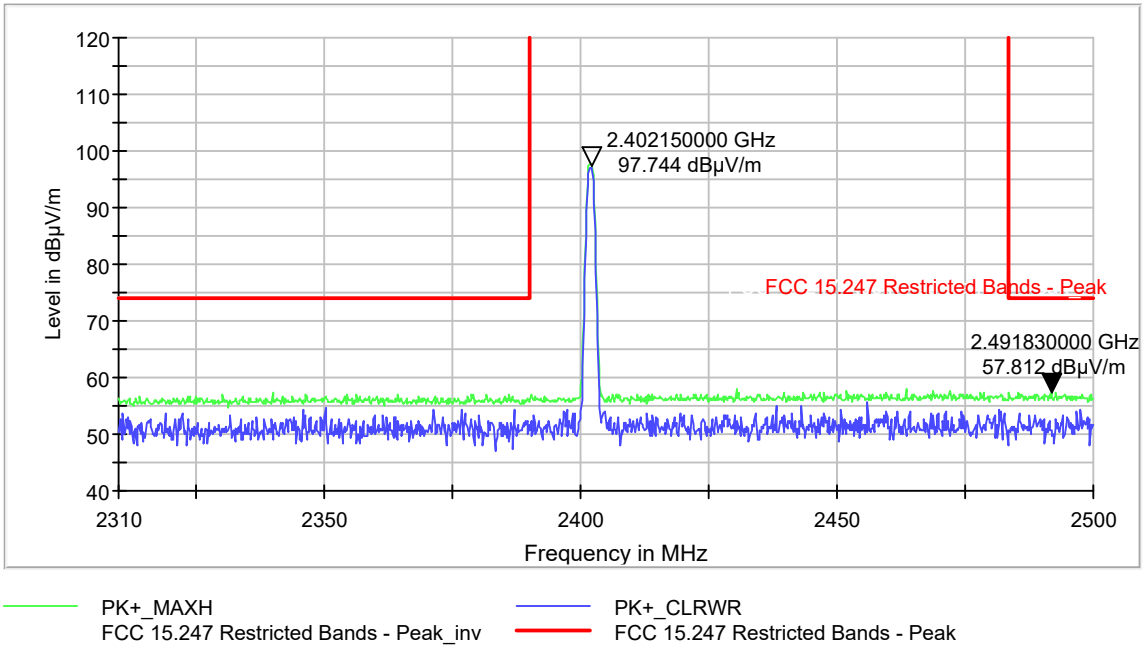


Figure 9-600 Restricted Band Edge 1-DH5 Mode– Ch. 0 (2310-2390MHz) – Peak

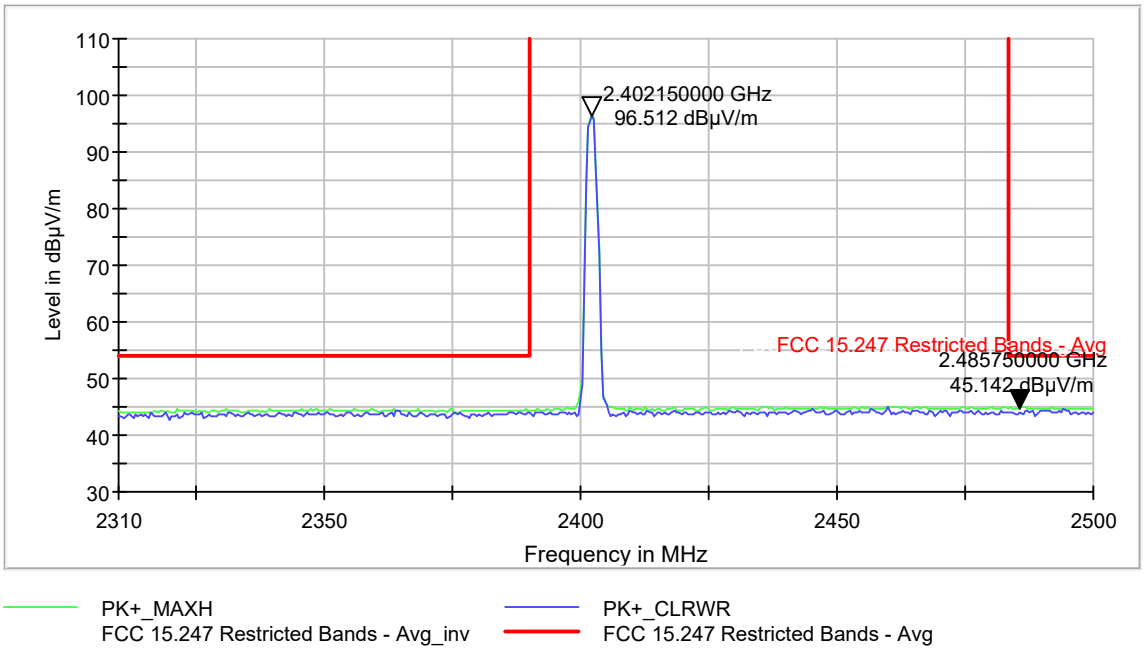


Figure 9-61 Restricted Band Edge 1-DH5 Mode– Ch. 0 (2310-2390MHz) – Average

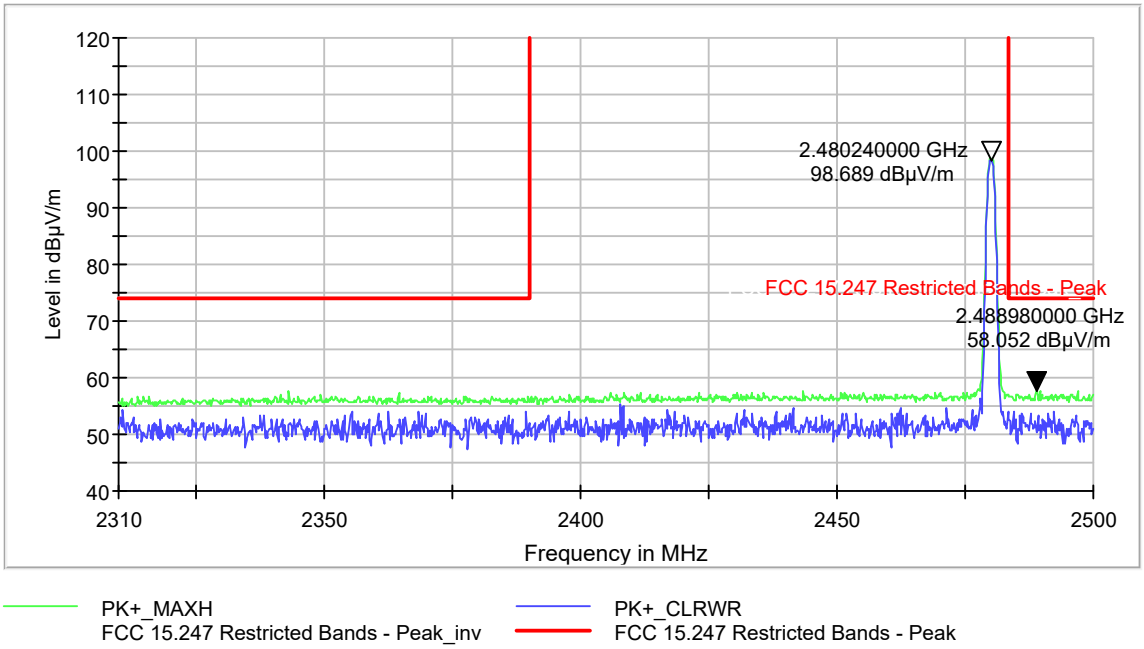


Figure 9-62 Restricted Band Edge 1-DH5 Mode– Ch. 78 (2483.5-2500MHz) – Peak

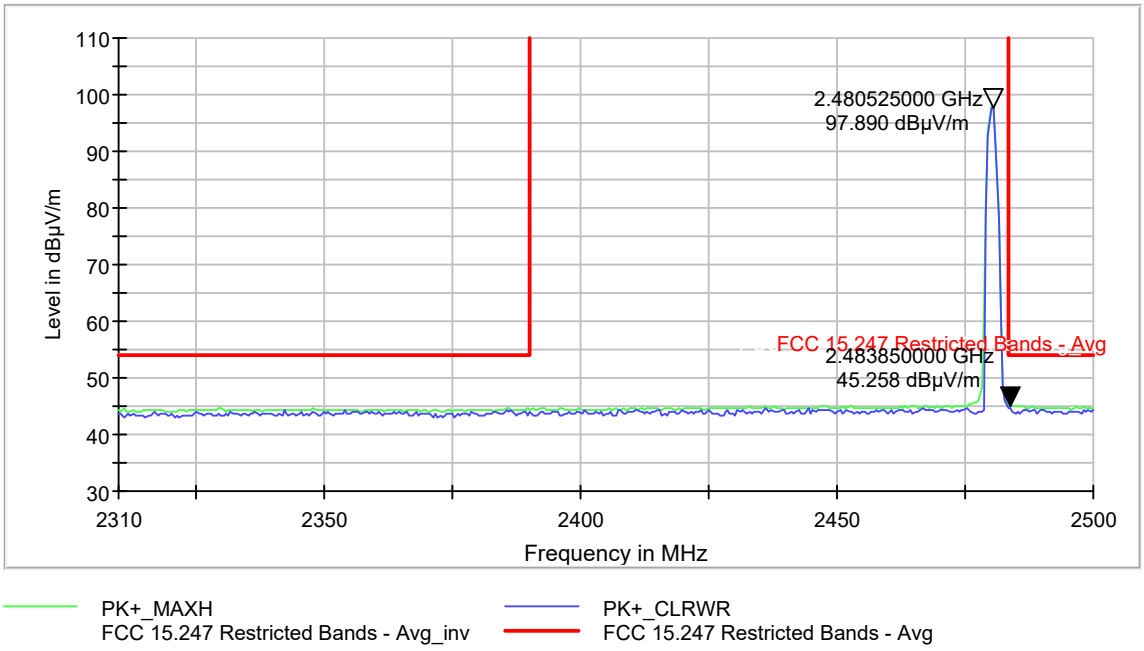


Figure 9-63 Restricted Band Edge 1-DH5 Mode– Ch. 78 (2483.5-2500MHz) – Average

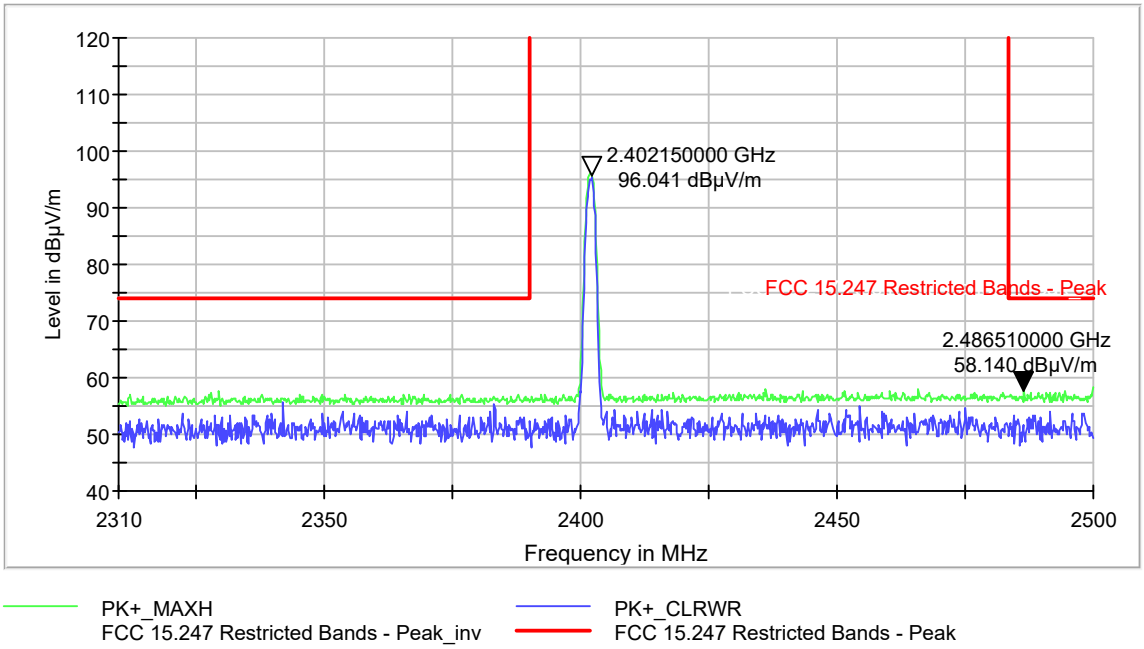


Figure 9-64 Restricted Band Edge 2-DH5 Mode– Ch. 0 (2310-2390MHz) – Peak

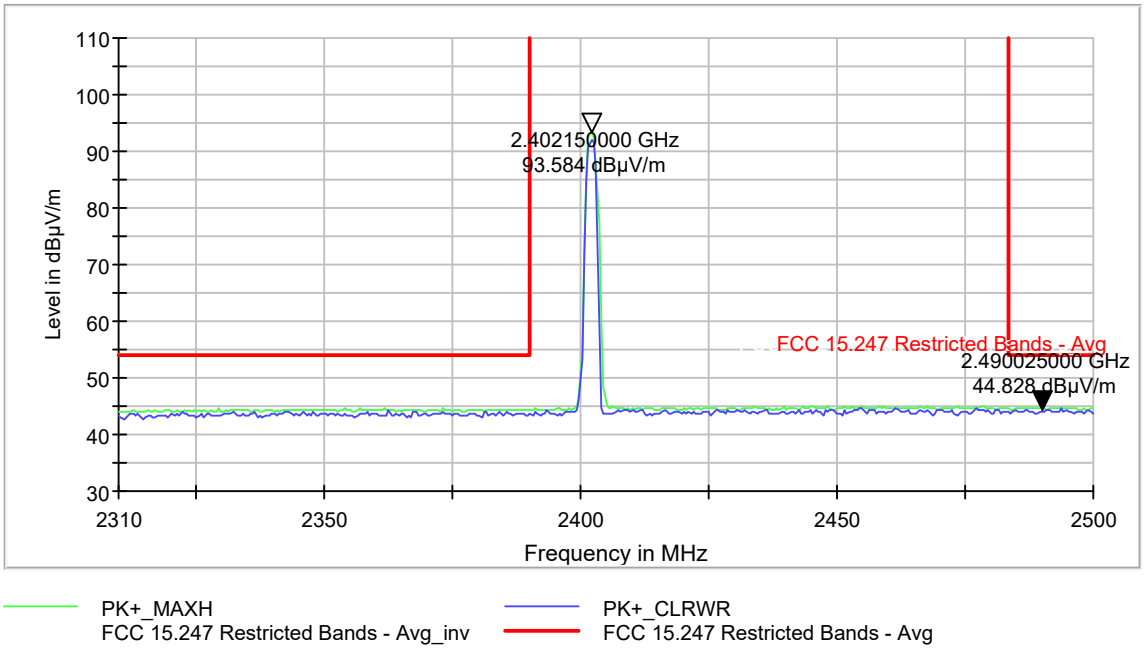


Figure 9-65 Restricted Band Edge 2-DH5 Mode– Ch. 0 (2310-2390MHz) - Average

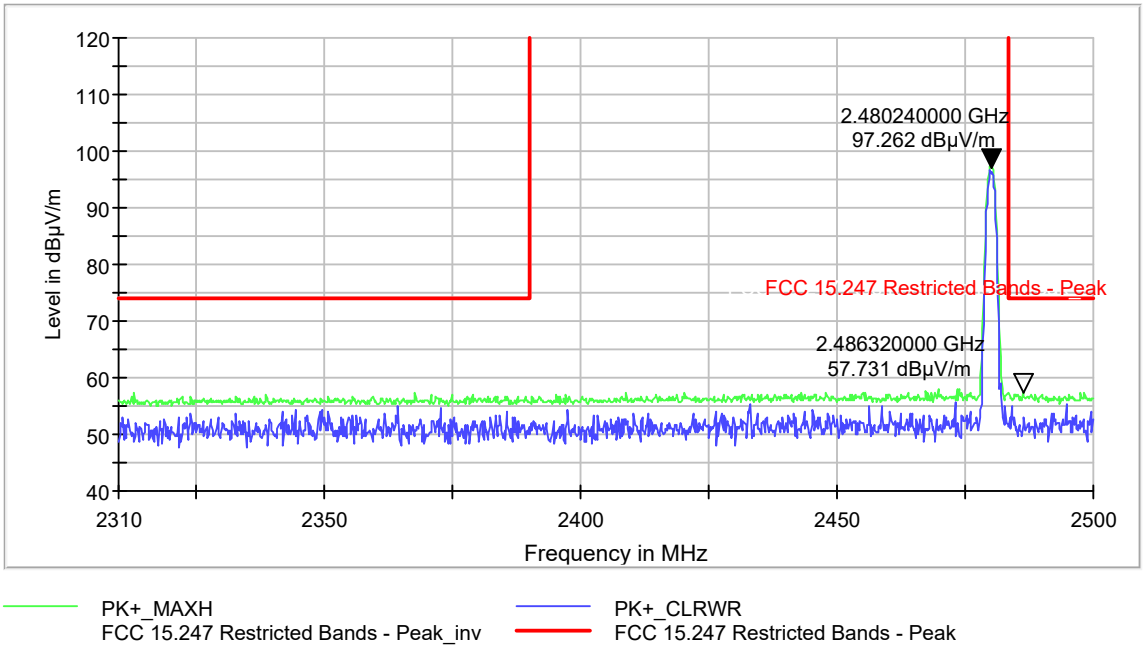


Figure 9-66 Restricted Band Edge 2-DH5 Mode– Ch. 78 (2483.5-2500MHz) – Peak

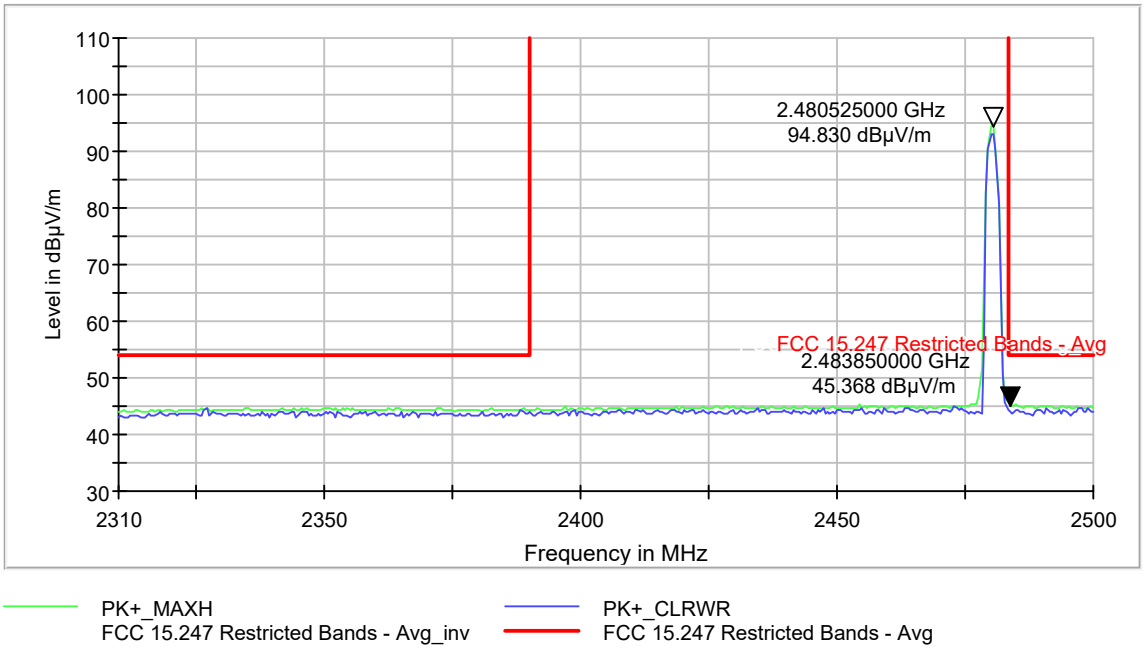


Figure 9-67 Restricted Band Edge 2-DH5 Mode– Ch. 78 (2483.5-2500MHz) – Average

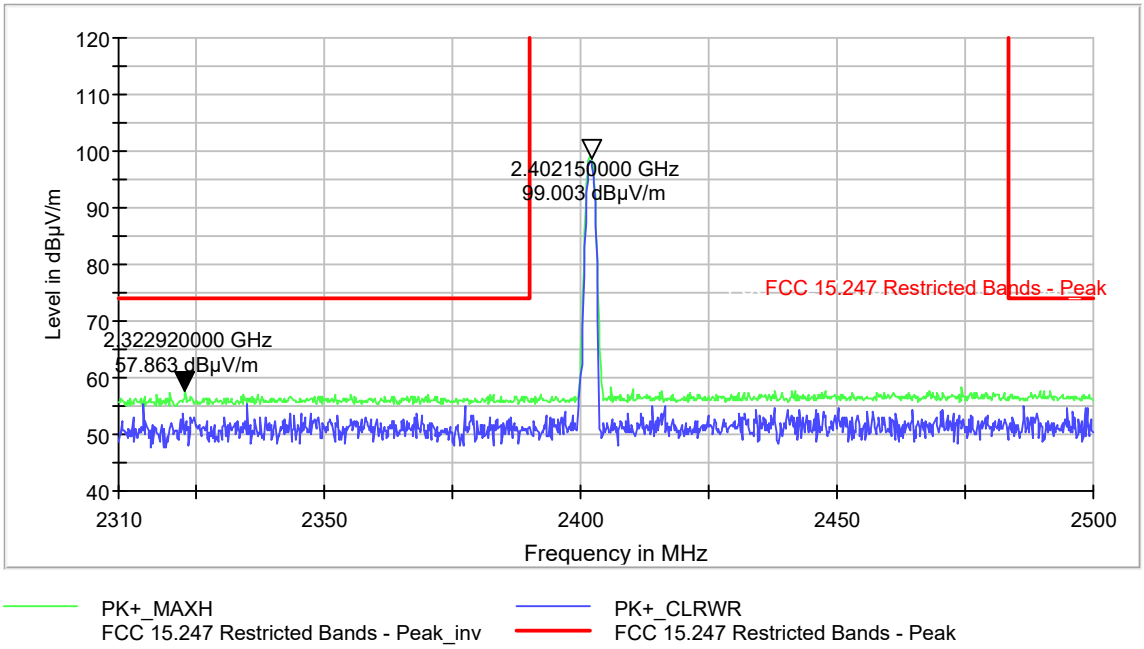


Figure 9-68 Restricted Band Edge 3-DH5 Mode– Ch. 0 (2310-2390MHz) – Peak

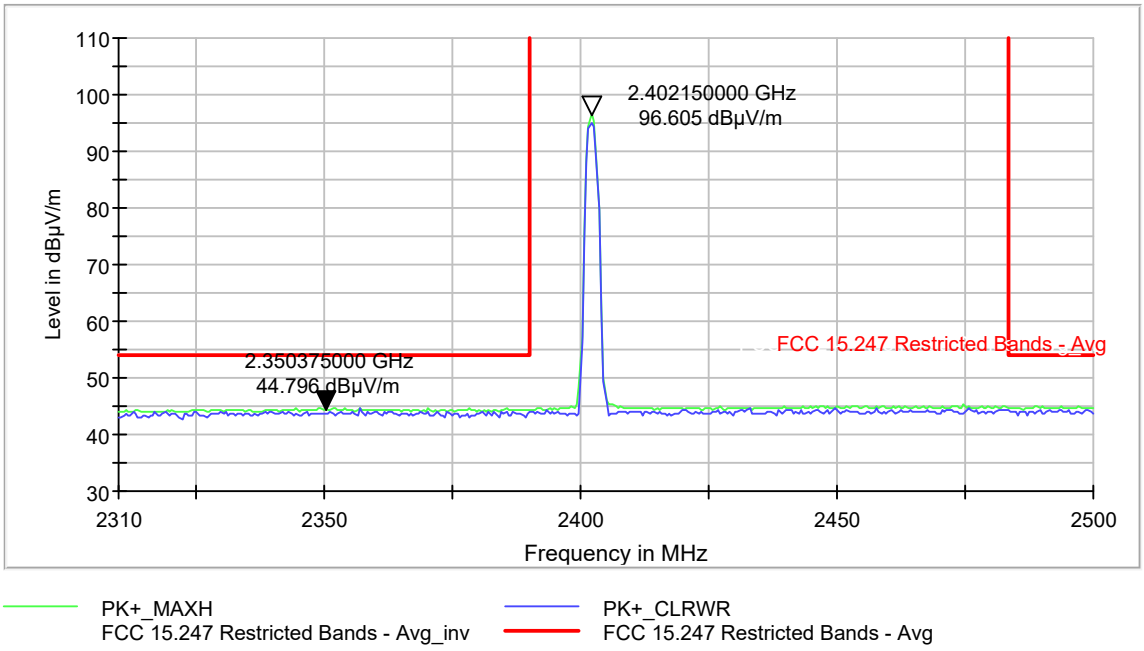


Figure 9-69 Restricted Band Edge 3-DH5 Mode– Ch. 0 (2310-2390MHz) - Average

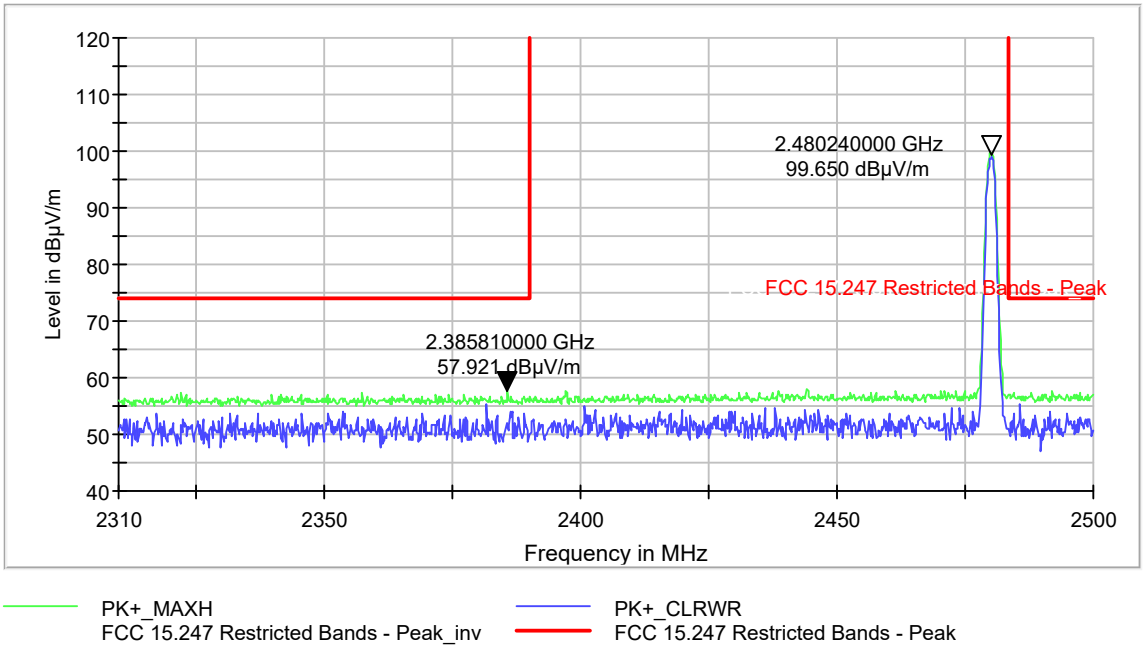


Figure 9-70 Restricted Band Edge 3-DH5 Mode– Ch. 78 (2483.5-2500MHz) – Peak

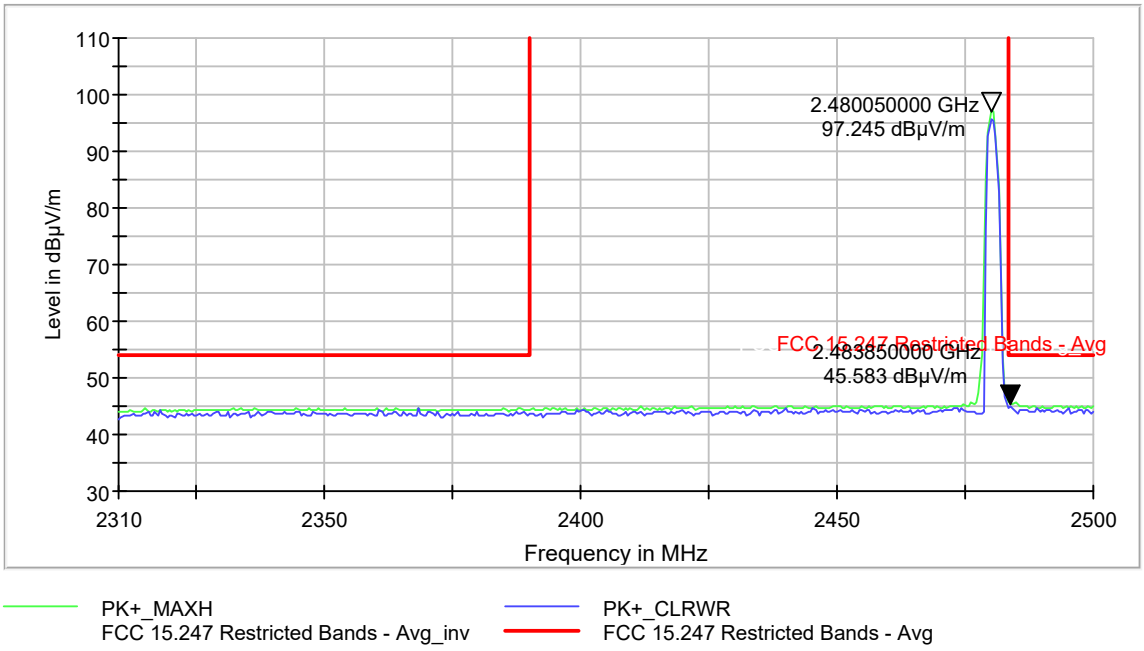


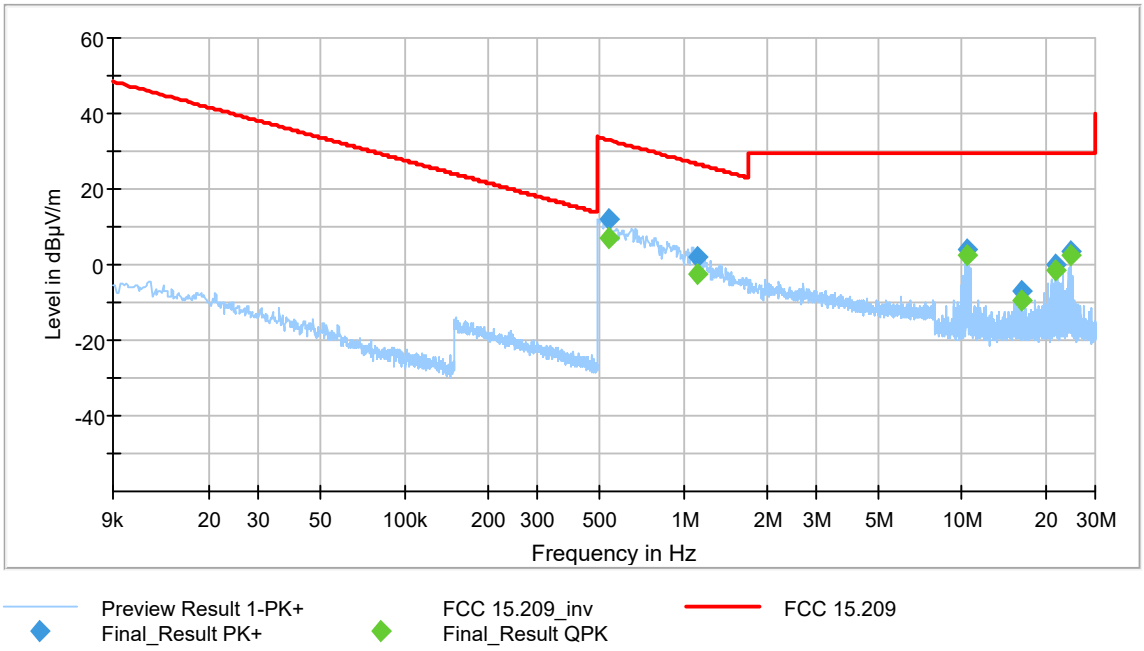
Figure 9-71 Restricted Band Edge 3-DH5 Mode– Ch. 78 (2483.5-2500MHz) - Average

9.9.5.2 Emissions in 9kHz- 30MHz range

All channels and modes of operations were tested and worst-case emissions in 1DH5 mode, Ch 39 shown below.

Where average limits apply, QP data is used to determine compliance.

Carrier Frequency (MHz)	Frequency (MHz)	Raw Quasi-Peak Field Strength (dBµV/m)	Correction Factor (dB)	Corrected Quasi-Peak Field Strength (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)
2441	0.54	-4.40	11.60	7.20	32.99	-25.80
2441	1.12	-8.26	6.00	-2.26	26.65	-28.91
2441	10.49	7.74	-5.00	2.74	29.50	-26.76
2441	16.23	-4.64	-4.90	-9.54	29.50	-39.04
2441	21.66	3.38	-5.10	-1.72	29.50	-31.22
2441	24.35	7.04	-4.70	2.34	29.50	-27.16

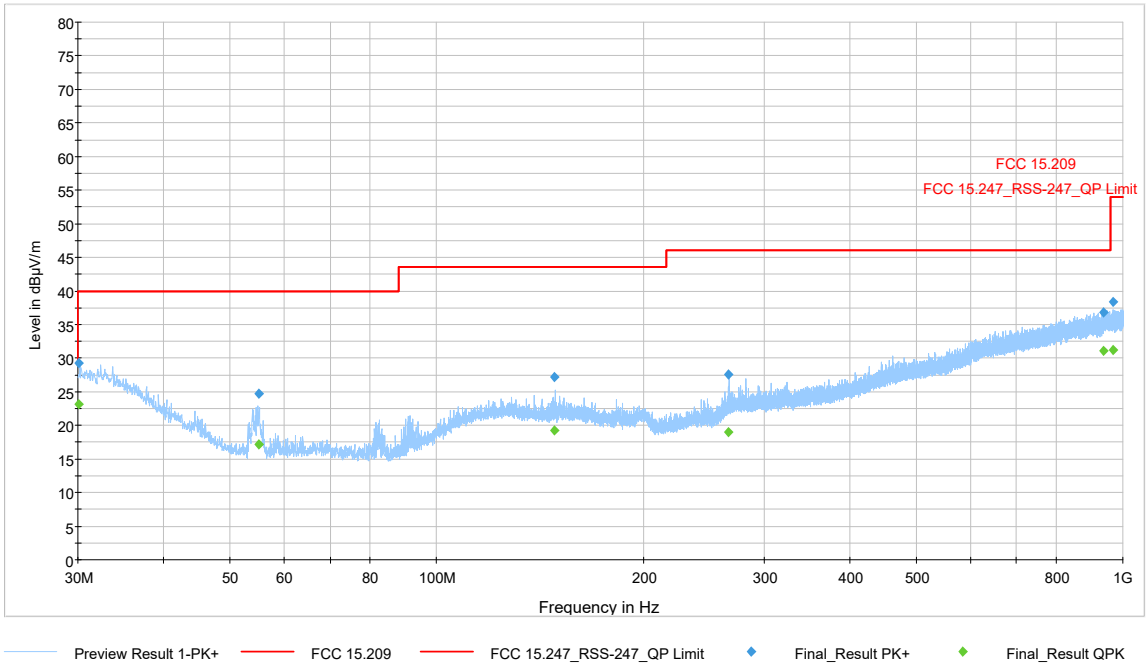


Plot 9-72. Radiated Spurious Emissions (Ch. 39) 1-DH5 (9kHz- 30MHz)

9.9.5.3 Emissions in 30 MHz- 1 GHz range

All channels and modes of operations were tested and worst-case emissions in 3DH5 mode, Ch 78 shown below.

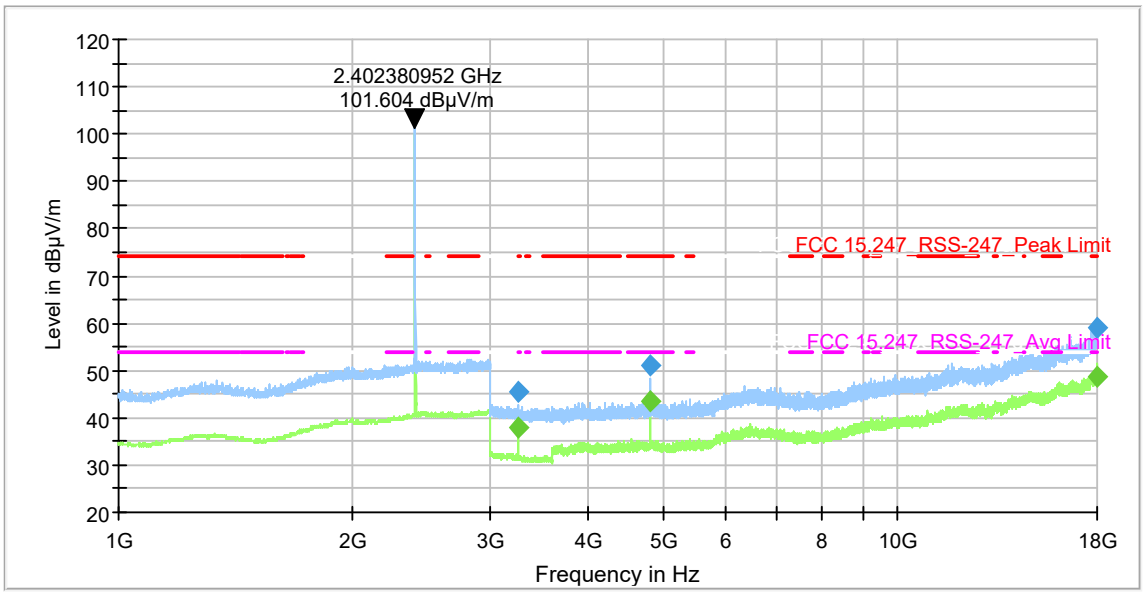
Carrier Frequency (MHz)	Frequency (MHz)	Raw Quasi-Peak Field Strength (dBµV/m)	Correction Factor (dB)	Corrected Quasi-Peak Field Strength (dBµV/m)	QP Limit (dBµV/m)	Margin (dB)
2480	30.08	-2.21	25.40	23.19	40.00	-16.81
2480	55.00	3.22	14.00	17.22	40.00	-22.78
2480	148.38	-0.57	19.80	19.23	43.52	-24.29
2480	266.23	-1.61	20.60	18.99	46.02	-27.03
2480	938.44	-0.85	31.90	31.05	46.02	-14.97
2480	969.37	-0.66	31.90	31.24	54.00	-22.76



Plot 9-73. Radiated Spurious Emissions (Ch. 78) 3-DH5 (30MHz - 1GHz)

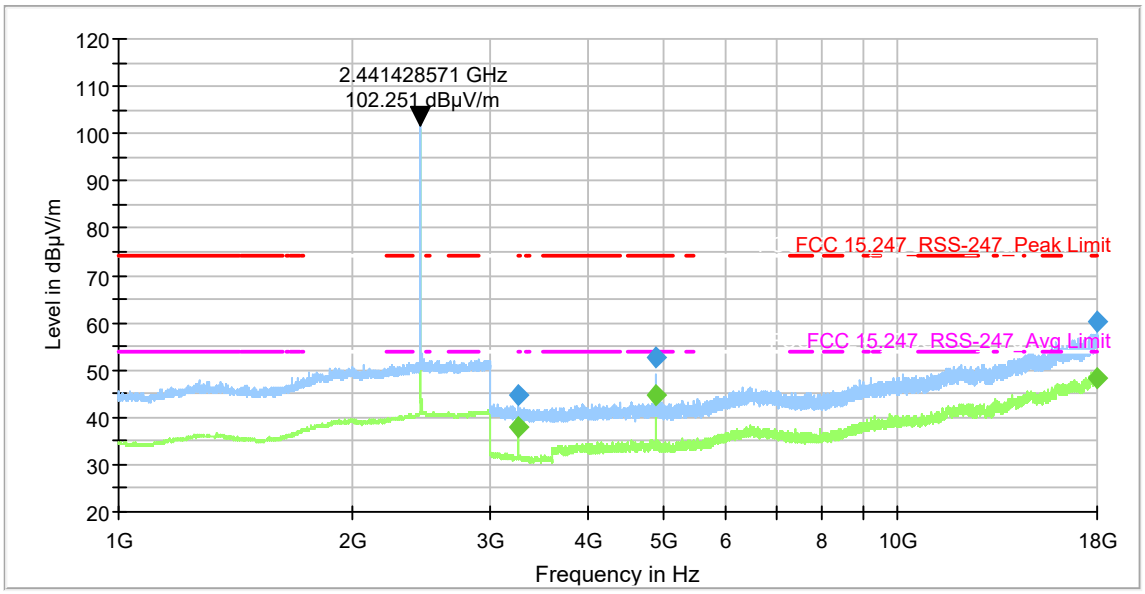
9.9.5.4 Emissions in 1-18 GHz range

RSE 1 - 18GHz Peak/Average Data 1-DH5							
Carrier Frequency (MHz)	**Spurious Emissions Frequency (MHz)**	**System Correction Factor (dB)**	**DC Correction Factor (dB)**	**Corrected Peak Field Strength (dBµV/m)**	**Corrected Avg. Field Strength (dBµV/m)**	**Limit (dBµV/m)**	**Margin (dB)**
2402.00	3256.00	7.50	0	---	37.74	54.00	-16.26
2402.00	3256.00	7.50	---	45.38	---	74.00	-28.62
2402.00	4803.90	9.70	2.30	---	45.72	54.00	-8.28
2402.00	4804.40	9.70	---	51.07	---	74.00	-22.93
2402.00	17989.50	27.30	---	59.09	---	74.00	-14.91
2402.00	18000.00	27.60	0	---	48.57	54.00	-5.43
2441.00	3256.00	7.50	0	---	37.91	54.00	-16.09
2441.00	3256.00	7.50	---	44.76	---	74.00	-29.24
2441.00	4882.00	9.50	2.30	---	47.20	54.00	-6.80
2441.00	4882.30	9.50	---	52.57	---	74.00	-21.43
2441.00	17964.00	26.70	---	60.19	---	74.00	-13.81
2441.00	17996.60	27.50	0	---	48.47	54.00	-5.53
2480.00	3255.90	7.50	---	44.27	---	74.00	-29.73
2480.00	3255.90	7.50	0	---	36.90	54.00	-17.10
2480.00	4959.90	9.50	2.30	---	45.94	54.00	-8.06
2480.00	4960.30	9.50	---	51.43	---	74.00	-22.57
2480.00	17723.00	26.80	---	58.52	---	74.00	-15.48
2480.00	17835.60	26.10	0	---	47.31	54.00	-6.69



Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

Figure 9-614 Radiated Spurious Emissions (Ch. 0) 1-DH5 (1-18 GHz)



Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

Figure 9-625 Radiated Spurious Emissions (Ch. 39) 1-DH5 (1-18 GHz)

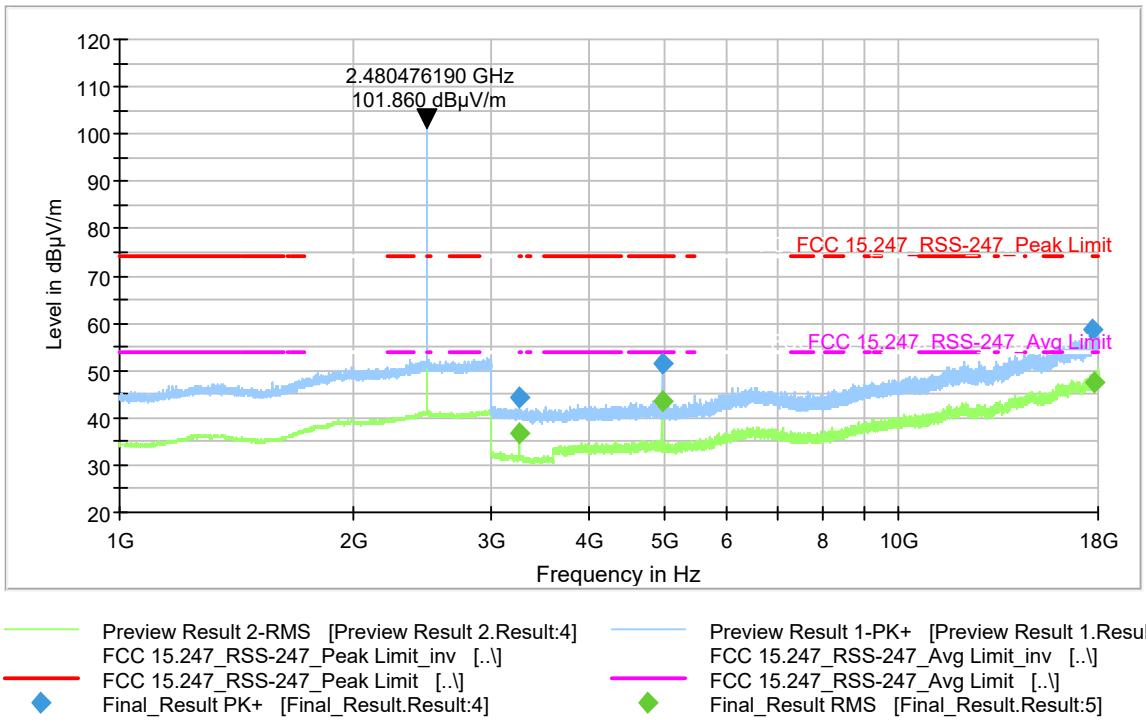
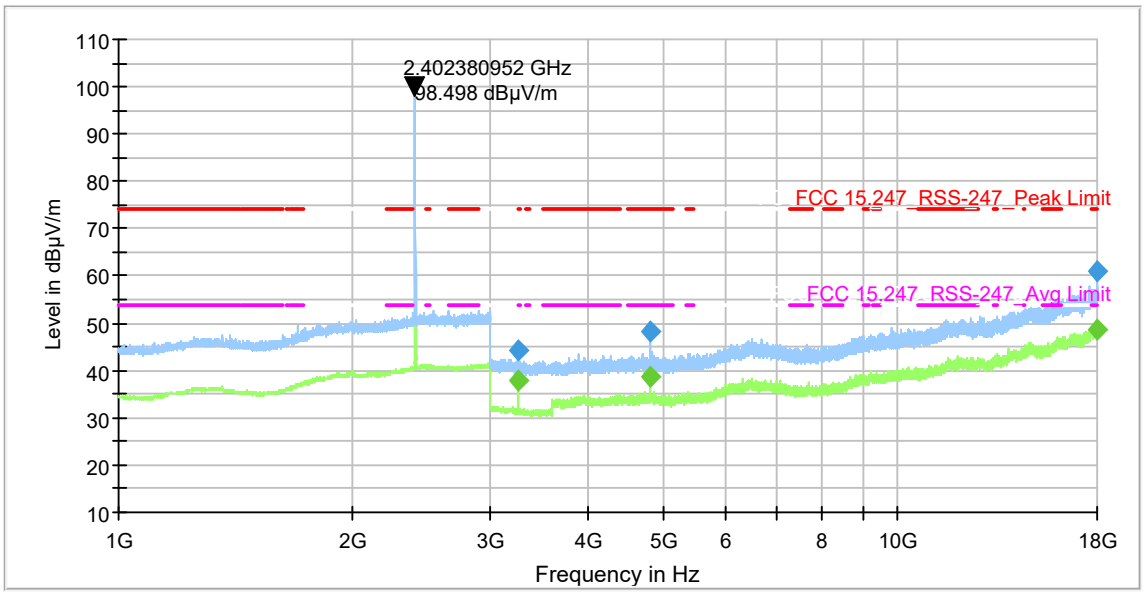


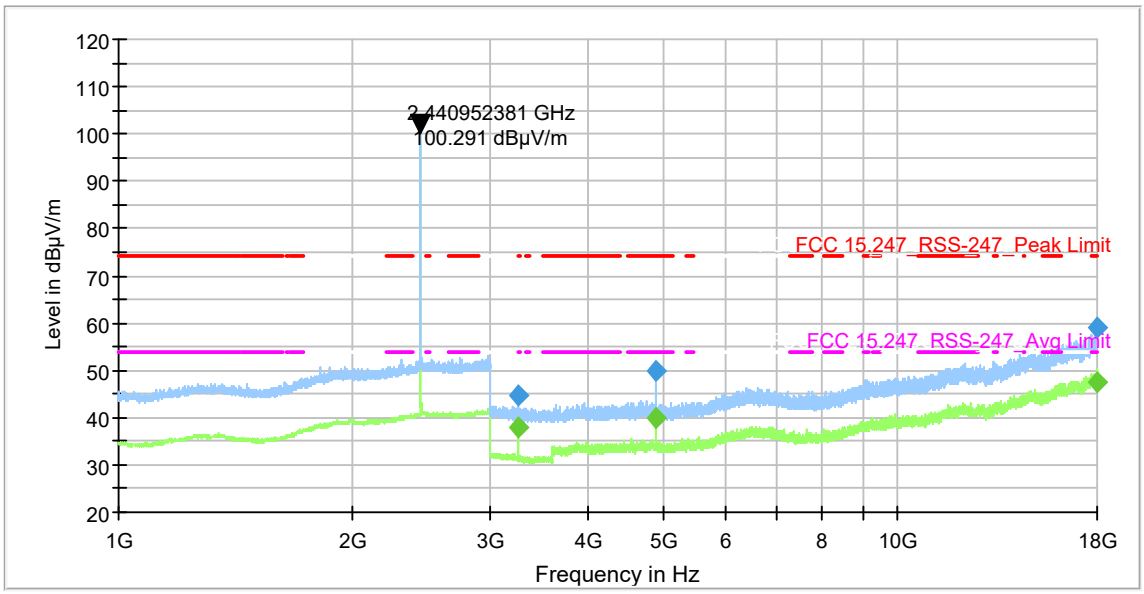
Figure 9-636 Radiated Spurious Emissions (Ch. 78) 1-DH5 (1-18 GHz)

RSE 1 - 18GHz Peak/Average Data 2-DH5							
Carrier Frequency (MHz)	Spurious Emissions Frequency (MHz)	System Correction Factor (dB)	DC Correction Factor (dB)	Corrected Peak Field Strength (dBµV/m)	Corrected Avg. Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402.00	3255.90	7.50	0	---	38.07	54.00	-15.93
2402.00	3256.00	7.50	---	44.45	---	74.00	-29.55
2402.00	4803.90	9.70	2.33	---	41.10	54.00	-12.90
2402.00	4804.30	9.70	---	48.43	---	74.00	-25.57
2402.00	17995.30	27.50	---	60.81	---	74.00	-13.19
2402.00	17999.70	27.60	0	---	48.62	54.00	-5.38
2441.00	3256.00	7.50	0	---	37.87	54.00	-16.13
2441.00	3256.00	7.50	---	44.57	---	74.00	-29.43
2441.00	4881.60	9.50	---	49.75	---	74.00	-24.25
2441.00	4882.00	9.50	2.33	---	42.23	54.00	-11.77
2441.00	17964.80	26.80	0	---	47.65	54.00	-6.35
2441.00	17975.90	26.90	---	58.87	---	74.00	-15.13
2480.00	3255.90	7.50	---	45.36	---	74.00	-28.64
2480.00	3255.90	7.50	0	---	37.52	54.00	-16.48
2480.00	4960.00	9.50	2.33	---	42.03	54.00	-11.97
2480.00	4960.30	9.50	---	50.43	---	74.00	-23.57
2480.00	17700.40	27.00	0	---	47.44	54.00	-6.56
2480.00	17705.00	27.00	---	59.04	---	74.00	-14.96



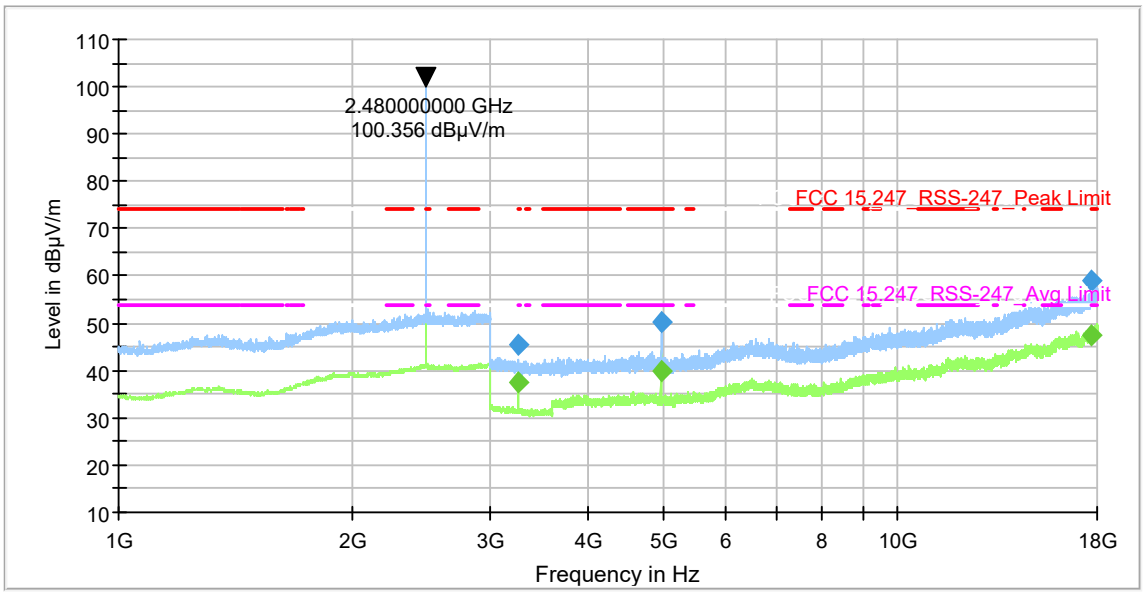
Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

Figure 9-647 Radiated Spurious Emissions (Ch. 0) 2-DH5 (1-18 GHz)



Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

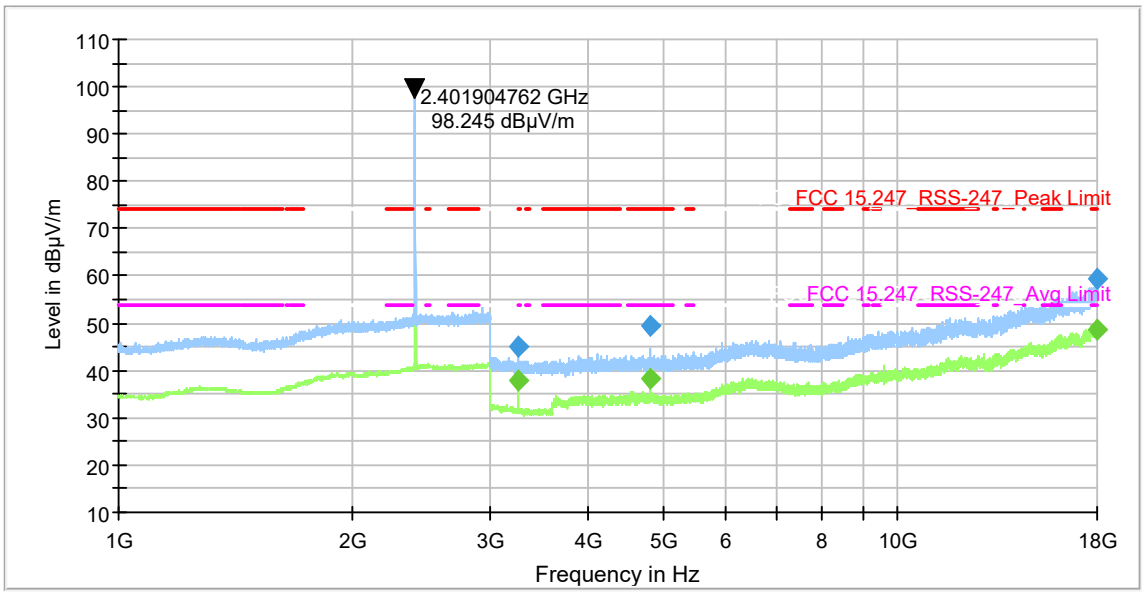
Figure 9-78 Radiated Spurious Emissions (Ch. 39) 2-DH5 (1-18 GHz)



Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

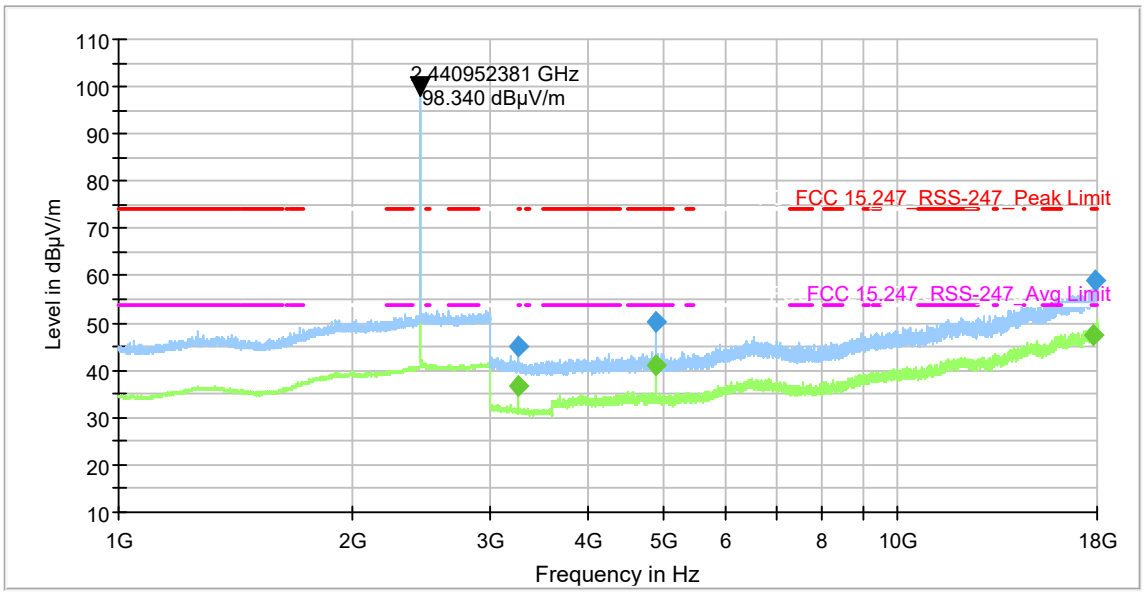
Figure 9-79 Radiated Spurious Emissions (Ch. 78) 2-DH5 (1-18 GHz)

RSE 1 - 18GHz Peak/Average Data 3-DH5							
Carrier Frequency (MHz)	Spurious Emissions Frequency (MHz)	System Correction Factor (dB)	DC Correction Factor (dB)	Corrected Peak Field Strength (dBµV/m)	Corrected Avg. Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402.00	3256.00	7.50	0	---	37.98	54.00	-16.02
2402.00	3256.00	7.50	---	45.03	---	74.00	-28.97
2402.00	4804.00	9.70	2.31	---	40.51	54.00	-13.49
2402.00	4804.30	9.70	---	49.47	---	74.00	-24.53
2402.00	17991.80	27.30	---	59.26	---	74.00	-14.74
2402.00	18000.00	27.60	0	---	48.49	54.00	-5.51
2441.00	3255.90	7.50	0	---	36.83	54.00	-17.17
2441.00	3255.90	7.50	---	45.21	---	74.00	-28.79
2441.00	4882.00	9.50	2.31	---	43.34	54.00	-10.66
2441.00	4882.40	9.50	---	50.24	---	74.00	-23.76
2441.00	17832.10	26.10	0	---	47.30	54.00	-6.70
2441.00	17873.60	26.20	---	58.93	---	74.00	-15.07
2480.00	3255.90	7.50	---	42.31	---	74.00	-31.69
2480.00	3255.90	7.50	0	---	37.94	54.00	-16.06
2480.00	4959.60	9.50	---	45.32	---	74.00	-28.68
2480.00	4960.00	9.50	2.31	---	43.36	54.00	-10.64
2480.00	17647.30	26.60	---	59.00	---	74.00	-15.00
2480.00	17660.50	26.70	0	---	47.19	54.00	-6.81



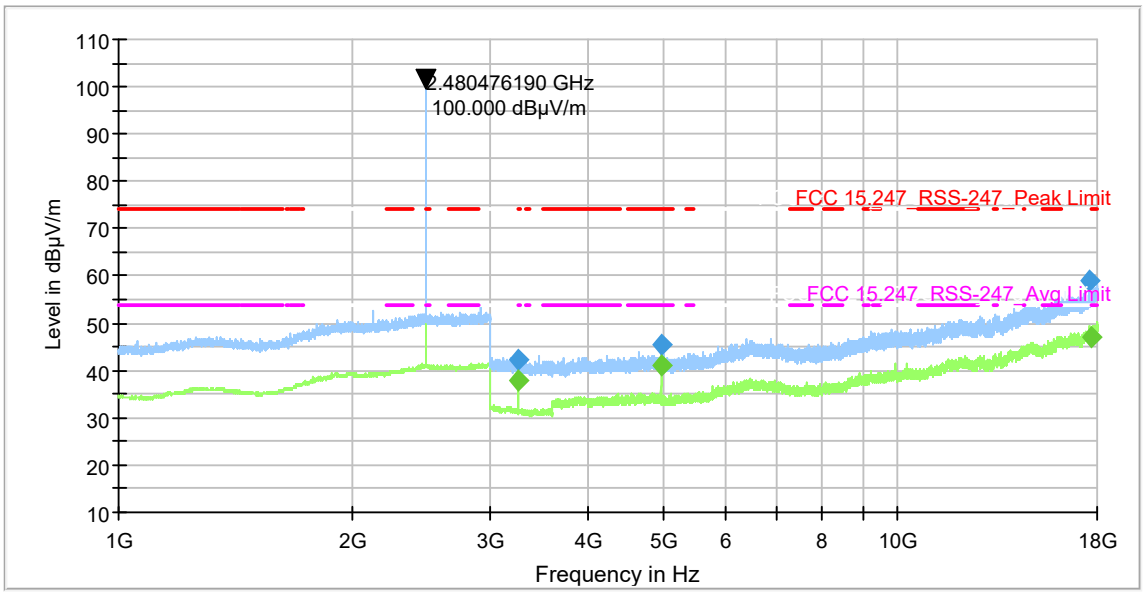
Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

Figure 9-80 Radiated Spurious Emissions (Ch. 0) 3-DH5 (1-18 GHz)



Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

Figure 9-81 Radiated Spurious Emissions (Ch. 39) 3-DH5 (1-18 GHz)



Preview Result 2-RMS [Preview Result 2.Result:4]
FCC 15.247_RSS-247_Peak Limit_inv [..\]
FCC 15.247_RSS-247_Peak Limit [..\]
Final_Result PK+ [Final_Result.Result:4]
Preview Result 1-PK+ [Preview Result 1.Result:2]
FCC 15.247_RSS-247_Avg Limit_inv [..\]
FCC 15.247_RSS-247_Avg Limit [..\]
Final_Result RMS [Final_Result.Result:5]

Figure 9-82 Radiated Spurious Emissions (Ch. 78) 3-DH5 (1-18 GHz)

9.9.5.5 Emissions in 18-26.5 GHz range

All channels and modes of operations were tested and worst case results from 3DH5 mode, Ch 78 shown below. No significant emissions above noise floor and peak signals are below average limit.

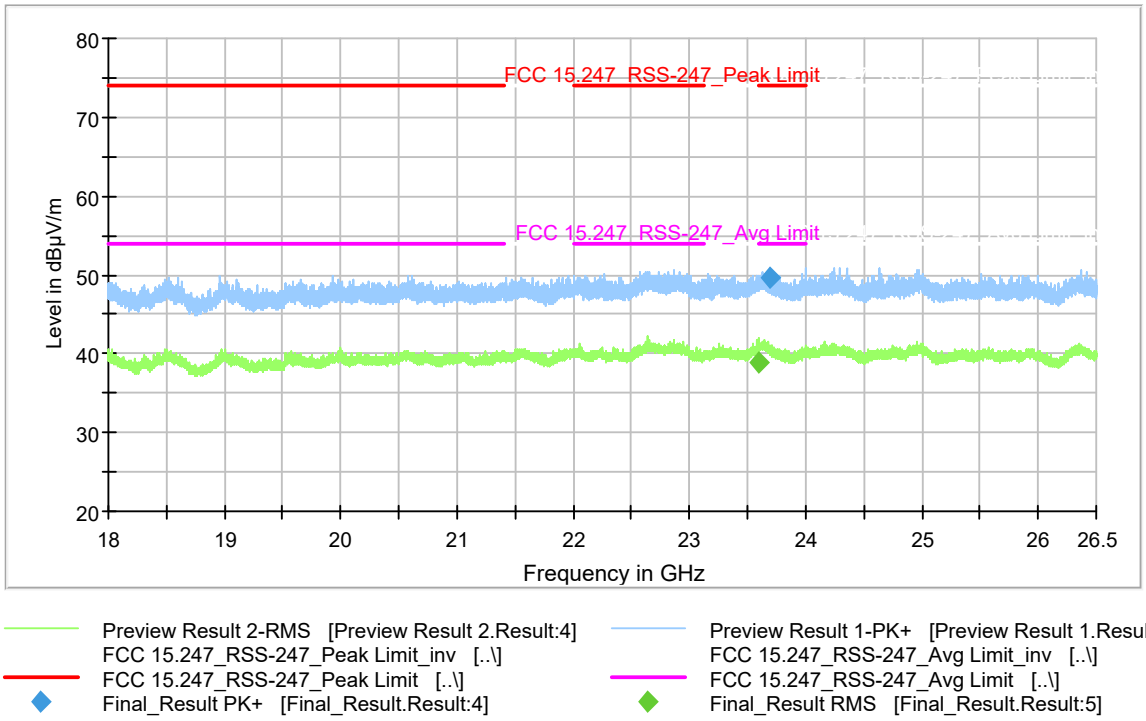


Figure 9-83 Radiated Spurious Emissions (Ch. 78) 3-DH5 (18-26.5 GHz)

9.10 AC Line Conducted Emissions

9.10.1 Test Requirements

FCC CFR 47 Rule Part 15.207 (a)

ISED RSS Gen [8.8]

9.10.2 Test Method

Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the unsymmetric radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with the power cords that are used under normal operating conditions. These measurements are made using a LISN (Line Impedance Stabilization Network). AC powered peripherals are attached to a second LISN with the 50 ohm measuring port terminated by a 50 ohm resistive load.

The EUT is set to continuously transmit on Ch 39, 1-DH5 mode at max power settings. Measurements from the USB-C port reported here.

EMI Receiver Settings:
150 kHz – 30 MHz:
RBW= 9 kHz
VBW ≥ 3 X RBW
Trace Mode: Peak Detector (Max Hold).
Final measurements were performed using Quasi-Peak and Average Detectors.
Span= 150 kHz – 30 MHz
Sweep time= Auto

9.10.3 Limit

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

9.10.4 Test Result:

Pass

9.10.5 Test Data:

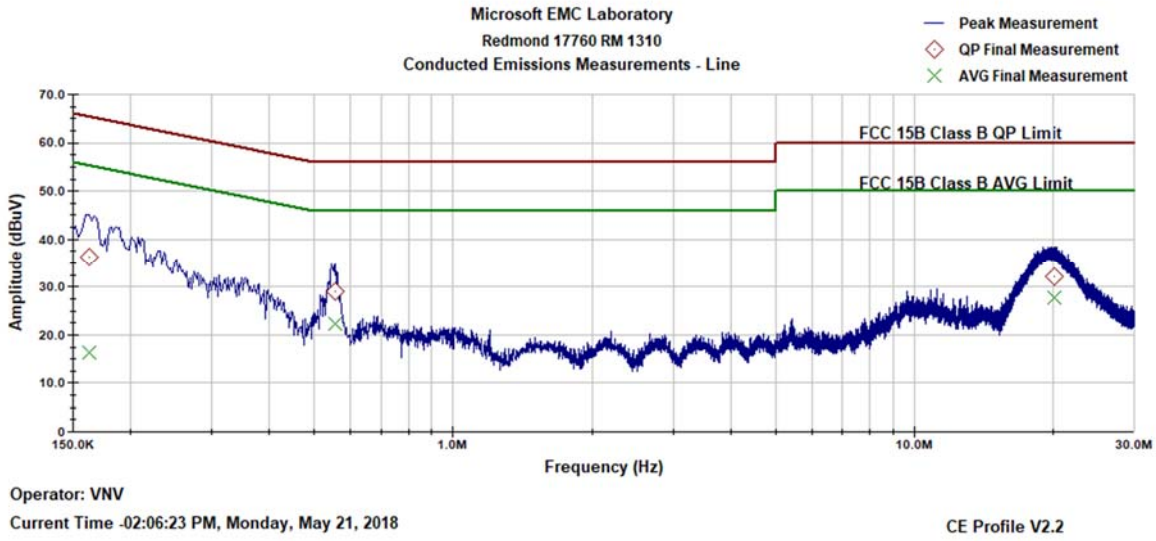


Figure 9-84 AC Line Conducted Emissions- Line (150 kHz- 30 MHz)

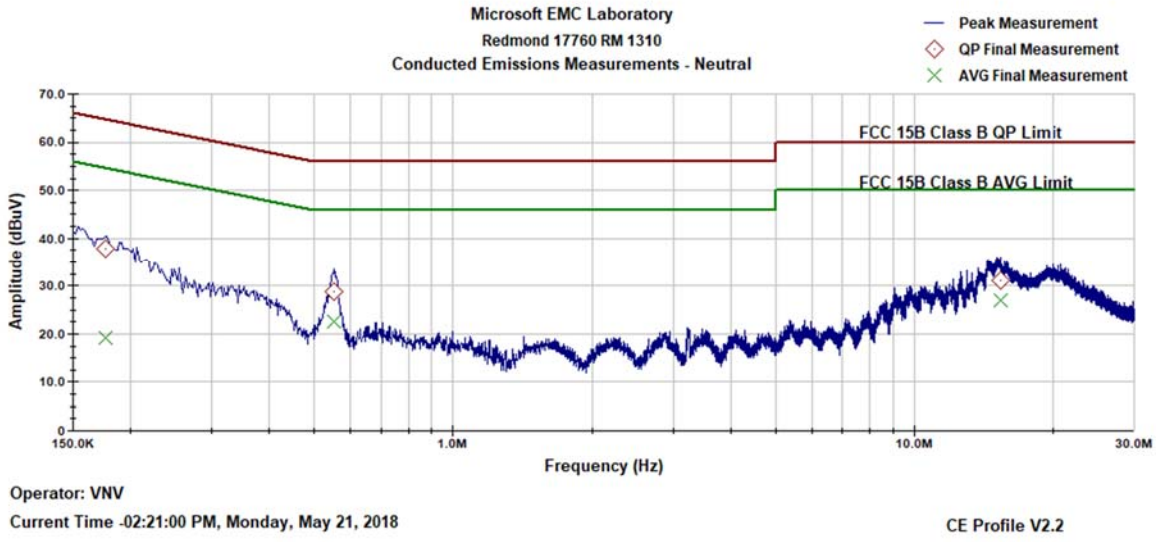


Figure 9-85 AC Line Conducted Emissions- Neutral (150 kHz- 30 MHz)

Frequency (MHz)	Line Tested (L or N)	AVG Amplitude (dBuV)	QP Amplitude (dBuV)	AVG Limit (dBuV)	QP Limit (dBuV)	AVG Margin (dB)	QP Margin (dB)
0.163	L	16.40	36.18	55.63	65.63	-39.23	-29.45
0.554	L	22.16	28.93	46.00	56.00	-23.84	-27.07
20.098	L	27.60	32.24	50.00	60.00	-22.40	-27.76
0.176	N	19.16	37.75	55.25	65.25	-36.09	-27.50
0.552	N	22.58	28.72	46.00	56.00	-23.43	-27.28
15.44	N	26.85	31.21	50.00	60.00	-23.15	-28.79

End of Report