

ISED CABid: ES1909  
 Lab. Company Number: 4621A

Test Report No:  
 NIE: 71290RRF.011A1

## Partial Test Report

### USA FCC Part 15.31(h), 15.247, 15.407, 15.209

### CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Automotive infotainment System
(*) Trademark	BMW
(*) Model and /or type reference	MGU FA
Other identification of the product	FCC ID: T8GMGUFA IC: 6434A-MGUFA
(*) Features	USB 2.0 (including support for Apple Devices), Bluetooth, WLAN Module 2.4 / 5 GHz, GNSS, Video-out APIX3, CAN, 100Base-T1 HW version: 3.2 SW version: L18_22w10.5-1
Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY
Test method requested, standard	USA FCC Part 15.31(h) (10-1-21 Edition): Measurement standards. USA FCC Part 15.407 (10-1-21) Edition: Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. USA FCC Part 15.247 (10-1-21) Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-21) Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 Amendment 2 (February 2019). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices. <ul style="list-style-type: none"> <li>• Transmitter out of band radiated emissions with simultaneous transmissions.</li> </ul>
Approved by (name / position & signature)	Rafael López EMC/RF Lab. Manager
Date of issue	2022-11-29
Report template No.	FDT08_24 (*) "Data provided by the client"



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## Competences and guarantees

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DEKRA Testing and Certification is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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## Uncertainty

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Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 1 GHz is:  
Measurement uncertainty  $\leq \pm 5.35$  dB (with factor  $k = 2$ ).

The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 17 GHz is:  
Measurement uncertainty  $\leq \pm 4.32$  dB (with factor  $k = 2$ ).

The total uncertainty of the measurement system for the radiated emissions of EUT from 17 GHz to 40 GHz is:  
Measurement uncertainty  $\leq \pm 5.55$  dB (with factor  $k = 2$ ).

## Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample of the model MGU FA is an Automotive Infotainment System. The main functionalities are: Navigation, DVD/CD, HDD, USB, voice recognition, different interfaces to the car, Bluetooth and WLAN.

The Head-unit provides different interfaces like: Auxiliary input, Video In, Video Out APIX3 (for the connection of an external Display), 3 USB interfaces (including support for Apple devices), CAN and 100Base-T1.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of result.

## Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial No.	Date of Reception	Application
S/01	71290C_37.1	Automotive infotainment System	MGU FQ	B49289N055000036	2022-04-11	Equipment Under Test
S/01	71290C_29.1	Power harness	--	--	2022-04-11	Equipment Under Test
S/01	71290C_31.1	BT/WLAN Antenna	--	--	2022-04-11	Equipment Under Test
S/01	71290C_32.1	BT/WLAN Antenna	--	--	2022-04-11	Equipment Under Test
S/01	71290C_26.1	Power cable DC	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_27.1	Ethernet Cable	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_28.1	OABR_converter board	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_30.1	OABR_converter cable	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_33.1	Adapter Fakra Z jack-SMA Plug	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_34.1	Adapter Fakra Z jack-SMA Plug	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_35.1	SMA Adapter	--	--	2022-04-11	Auxiliary Equipment
S/01	71290C_36.1	SMA Adapter	--	--	2022-04-11	Auxiliary Equipment

Notes referenced to samples during the project:

Id	Type
S/01	Sample for radiated tests.

## Test sample description

Ports.....:	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>		
	BT/WIFI connector – 2X 1 POL ROS 59S2BT-40MA5-1		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	USB1 connector – CONM-SM 4POL ROS D4S20Y-40MA5-B		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	USB2 connector – CONM-SM 4POL ROS D4S20Y-40MA5-C		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	USB3 connector – CONM-SM 4POL ROS D4S20Y-40MA5-E		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
	APIX3 connector – CONM-SM 4+2POL ROS 99S22A-40MA5-D		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Car Main-connector – CONM 16POL TYC 2300483-s		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	AR-CAM connector – CONM 1POL ROS 59S2FT-40MA5-K		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Ethernet BroadR-Reach, 100 BASE-T1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	Ethernet, 1000 BASE-T1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	GNSS connector 1 POL ROS 59S2BT-40MA5-C		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports.....:	-						
Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 13.2 Vdc					
Rated Power.....:	-						
Clock frequencies.....:	-						
Other parameters .....	-						
Software version.....:	490S_22w09.4-1						
Hardware version .....	3.2						
Dimensions in cm (W x H x D) ...:	-						
Mounting position .....	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					

	<input type="checkbox"/>	Floor standing equipment		
	<input type="checkbox"/>	Hand-held equipment		
	<input checked="" type="checkbox"/>	Other: Automotive dashboard		
Modules/parts..... :	Module/parts of test item		Type	Manufacturer
	-			
	-			
	-			
Accessories (not part of the test item) ..... :	Description		Type	Manufacturer
	-			
	-			
	-			
Documents as provided by the applicant..... :	Description		File name	Issue date
	-			
	-			
	-			

<sup>(3)</sup> Only for Medical Equipment

## Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH  
BECKER-GOERING-STR. 16; 76307 KARLSBAD GERMANY

## Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-04-28
Date (finish)	2022-11-25

## Document history

Report number	Date	Description
71290RRF.011	2022-10-14	First release.
71290RRF.011A1	2022-11-29	Second release. Modification of the Co-location mode. This test report cancels and replaces the report: 71290RRF.011

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

## Remarks and comments

The tests have been performed by the technical personnel: Rafael Fernández, Miguel Manuel López.

Used instrumentation:

### Radiated Measurements:

	Last Calibration	Due Calibration
1. Semianechoic Absorber Lined Chamber ETS LINDGREN FACT 3 200 STP	N/A	N/A
2. Shielded Room ETS LINDGREN S101	N/A	N/A
3. Biconical/Log Antenna 30 MHz - 6 GHz ETS LINDGREN 3142E	2020/10	2023/10
4. RF Preamplifier 40 dB, 10 MHz - 6 GHz BONN ELEKTRONIK BLNA 0160-01N	2022/03	2023/03
5. EMI Test Receiver 7 GHz ROHDE AND SCHWARZ ESR7	2020/12	2022/12
6. DC Power Supply 30V/5A, KEYSIGHT TECHNOLOGIES U8002A	N/A	N/A
7. Digital Multimeter, FLUKE 175	2021/11	2022/11
8. Horn Antenna 1-18 GHz SCHWARZBECK MESS-ELEKTRONIK BBHA 9120 D	2019/11	2022/11
9. RF Preamplifier, 40 dB ,1-18 GHz BONN ELEKTRONIK BLMA 0118-1M	2022/07	2023/07
10. Spectrum Analyzer ROHDE AND SCHWARZ FSW50	2022/08	2024/08
11. DC Power Supply, 30V/5A KEYSIGHT TECHNOLOGIES U8002A	N/A	N/A
12. Digital Multimeter FLUKE 175	2021/11	2022/11
13. Attenuator DC, 26.5 GHz, 10 dB, 2W TECHNIVAVE TWSMAG2	2022/05	2023/05
14. EMC/RF Testing SW ROHDE AND SCHWARZ EMC32	N/A	N/A



## Testing verdicts

Not applicable:	N/A
Pass:	P
Fail:	F
Not measured:	N/M

## Summary

FCC PART 15 PARAGRAPH / RSS-247		
Requirement – Test case	Verdict	Remark
FCC 15.31 (h), 15.209 (a), 15.247 (d), 15.407 (b) / RSS-Gen 8.9, RSS-247 5.5, 6.2.1.2, 6.2.4.2: - Emission limitations radiated (Transmitter)	P	(1)
<u>Supplementary information and remarks:</u> (1) Only Co-Location radiated spurious emission test was requested.		

## Appendix A: Test results

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## TEST CONDITIONS

(\*): Declared by the Applicant.

### POWER SUPPLY (\*):

Vnominal: 12 Vdc  
 Type of Power Supply: External DC (vehicle battery).

### ANTENNA (\*):

#### 802.11 Bluetooth EDR SISO:

Type of Antenna: External.  
 Maximum Declared Antenna Gain: -2.5 dBi (Antenna gain plus antenna cable loss).

#### 802.11 bgn20 SISO:

Type of Antenna: External.  
 Maximum Declared Antenna Gain: -2.5 dBi (Antenna gain plus antenna cable loss).

#### 802.11 a20 / n2040 / ac2040 / ac80 SISO:

Type of Antenna: External.  
 Maximum Declared Antenna Gain: -2.8 dBi (Antenna gain plus antenna cable loss).

### RADIOS AND CHANNELS TESTED:

\* Co-location BTEDR, WLAN 2.4 GHz, WLAN 5 GHz band U-NII-3:

BTEDR / FHSS		
Mode:	BTEDR GFSK DH1	
Channel Spacing:	1 MHz	
Frequency Range:	2402 MHz to 2480 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Middle	2441

WLAN 2.4 GHz (IEEE 802.11 b/g/n20) / DTS		
Mode:	802.11 b: 1 Mbps	
Channel Spacing:	20 MHz	
Frequency Range:	2412 MHz to 2472 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Middle: 7	2442

WLAN 5 GHz (IEEE 802.11 a20/n2040/ac204080) / U-NII-1		
Mode:	802.11 n20: index MSC0.	
Frequency Range:	5725 MHz to 5850 MHz	
Channel Spacing:	20 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	High: 48	5240

	WLAN 5 GHz (IEEE 802.11 a20/n2040/ac204080) / U-NII-3	
Mode:	802.11 n20: index MCS0.	
Frequency Range:	5725 MHz to 5850 MHz	
Channel Spacing:	20 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	High: 157	5785

The modulations and channels configured for each technology are the worst-case combinations in terms of spurious emissions, based on preliminary testing.

The test set-up was made in accordance to the general provisions of FCC DTS Measurement 558074 D01 DTS Meas Guidance v05r2 dated April 2, 2019 and FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuous transmission with a modulated carrier at maximum power in all required channels selecting the supported data rates/modulations types.

During transmitter test the EUT was being controlled by the SW tool to operate in a continuous transmit mode on the test channel as required and in each of the different modulation modes.

### Selected Transmission Mode for each Radio:

The following configurations were selected based on preliminary testing that identified those corresponding to the worst-cases:

\* BTEDR: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in GFSK DH1 mode configuration as this mode was found as the worst-case for spurious emissions than all the BTEDR modes.

\* WLAN 2.4 GHz: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in 802.11 b / 1 Mbps mode configuration as this mode was found as the worst-case for spurious emissions than all the other WLAN 2.4 GHz SISO modes.

\* WLAN 5 GHz band U-NII-1: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in 802.11 n / 20 / MCS0 mode configuration as this mode was found as the worst-case for spurious emissions than all the other WLAN 5 GHz band U-NII-3 SISO modes.

\* WLAN 5 GHz band U-NII-3: Transmitter radiated spurious emissions tests were performed with the EUT transmitting in 802.11 n / 20 / MCS0 mode configuration as this mode was found as the worst-case for spurious emissions than all the other WLAN 5 GHz band U-NII-3 SISO modes.

#### TESTED SIMULTANEOUS TRANSMISSION MODES:

- \* **Co-location BTEDR, WLAN 2.4 GHz, WLAN 5 GHz band U-NII-1**, with the EUT configured to simultaneously transmit two signals at maximum output power:  
BTEDR in GFSK DH1, WLAN 2.4 GHz in 802.11 b / 1 Mbps, WLAN 5 GHz band U-NII-1 in 802.11 n / 20 / MCS0.
  
- \* **Co-location BTEDR, WLAN 2.4 GHz, WLAN 5 GHz band U-NII-3**, with the EUT configured to simultaneously transmit two signals at maximum output power:  
BTEDR in GFSK DH1, WLAN 2.4 GHz in 802.11 b / 1 Mbps, WLAN 5 GHz band U-NII-3 in 802.11 n / 20 / MCS0.

**RADIATED MEASUREMENTS:**

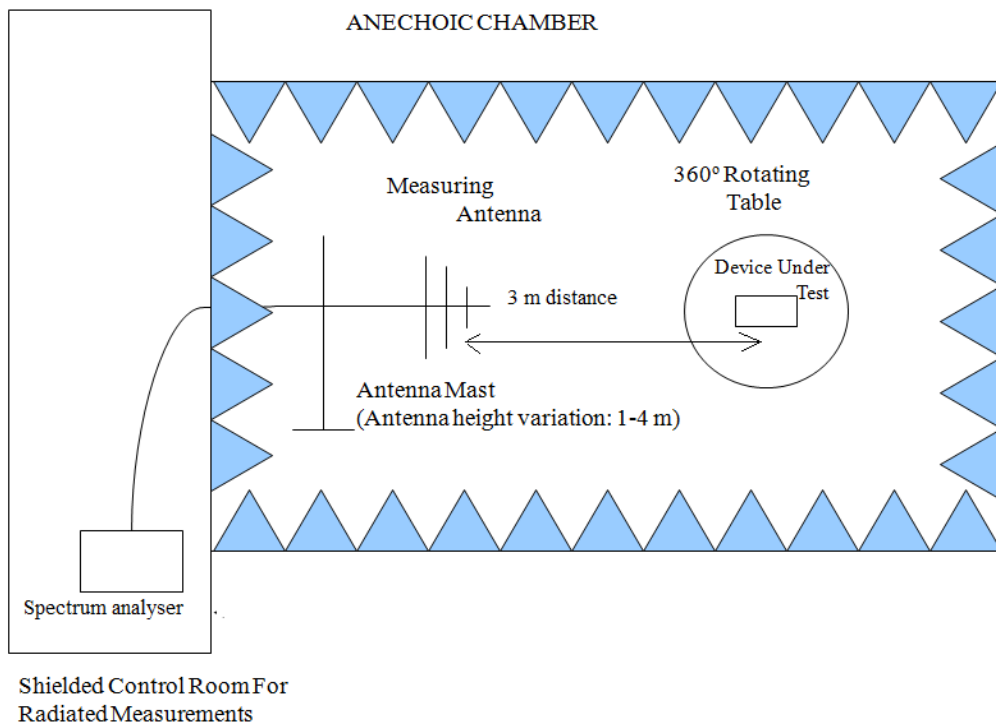
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1 GHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-40 GHz (17 GHz-40 GHz horn antenna).

For radiated emissions in the range 17 GHz-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

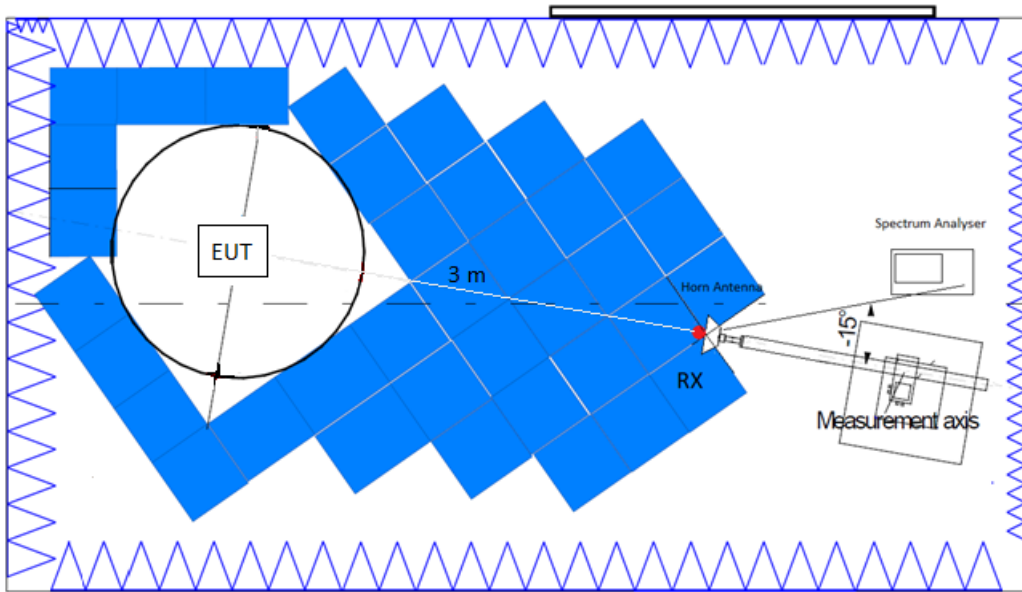
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

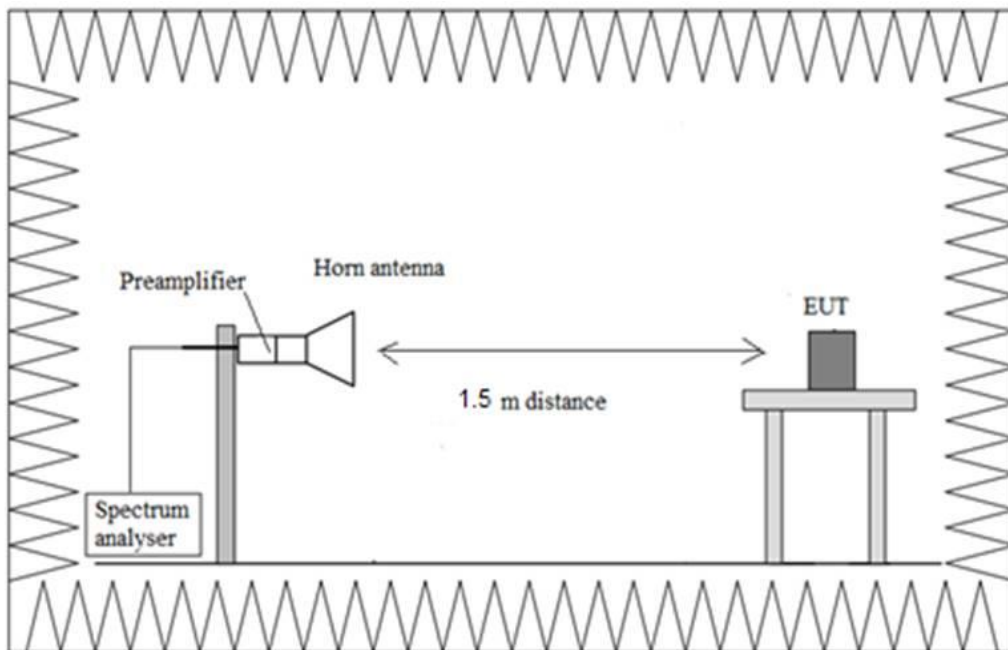
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup  $f > 17$  GHz:





## FCC 15.31 (h), 15.209 (a), 15.247 (d), 15.407 (b) / RSS-Gen 8.9, RSS-247 5.5, 6.2.1.2 & 6.2.4.2 Emission limitations radiated (Transmitter)

### SPECIFICATION:

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), appearing outside of the band 13.110 MHz - 14.010 MHz band must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength ( $\mu\text{V}/\text{m}$ )	Field strength ( $\text{dB}\mu\text{V}/\text{m}$ )	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	29.54	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-17 GHz and at distance of 1 m for the frequency range 17 GHz-40GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Test performed on the following worst-cases in all relevant tests channels:

• **Co-location mode BTEDR, WLAN 2.4 GHz, WLAN 5 GHz U-NII-1:**

BTEDR in GFSK: Middle Channel (2441 MHz) BW: 1MHz DH1.  
 WLAN 2.4 GHz 802.11 b: Middle Channel (2442 MHz). BW: 20 MHz. 1 Mbps.  
 WLAN 5 GHz U-NII-1 802.11 n20: High Channel (5240 MHz). BW: 20 MHz. MCS0.

LIMIT: The spurious frequencies were measured at 3 meter. The limit of the test is determined by:

Frequency Range	Detector	Limit at 3m (dBµV/m)
30 MHz to 88 MHz	Quasi-peak	40 dBµV/m
88 MHz to 216 MHz	Quasi-peak	43.5 dBµV/m
216 MHz to 960 MHz	Quasi-peak	46 dBµV/m
960 MHz to 1 GHz	Quasi-peak	54 dBµV/m
1 GHz to 26 GHz	Peak	74 dBµV/m
26 to 40 GHz	Peak	68.23 dBµV/m (*) OR 74 dBµV/m (**)
1 to 40 GHz	Average	54 dBµV/m (**)

(\*) Radiated emissions which fall in the non-restricted bands.

(\*\*) Radiated emissions which fall in the restricted bands, as defined in §15.205(a).

**Frequency range 30 MHz - 1 GHz:**

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

No spurious frequencies at less than 20 dB below the limit.

Measurement Uncertainty (dB):  $\leq \pm 5.08$

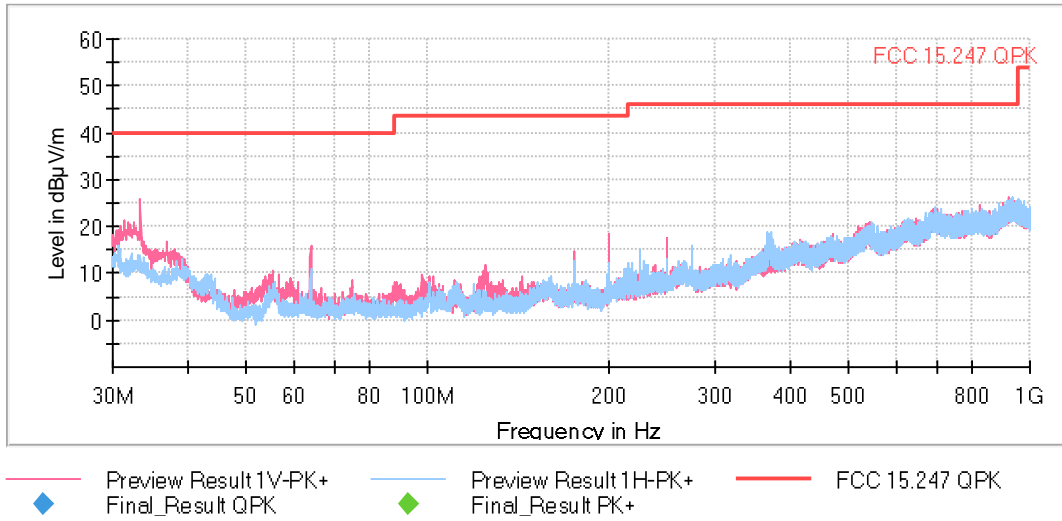
**Frequency range 1 - 40 GHz:**

No spurious frequencies at less than 20 dB below the limit.

Measurement Uncertainty (dB): 1 GHz – 17 GHz  $\leq \pm 5.13$   
 17 GHz – 26.5 GHz  $\leq \pm 4.82$   
 26.5 GHz – 40 GHz  $\leq \pm 5.14$

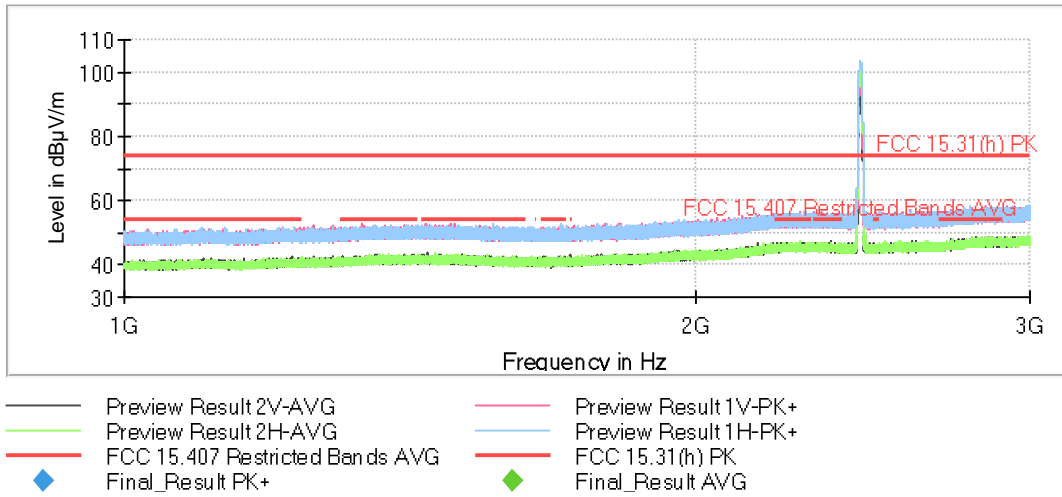
Verdict: PASS

**FREQUENCY RANGE 30 MHz - 1 GHz:**



Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB

**FREQUENCY RANGE 1 - 3 GHz:**

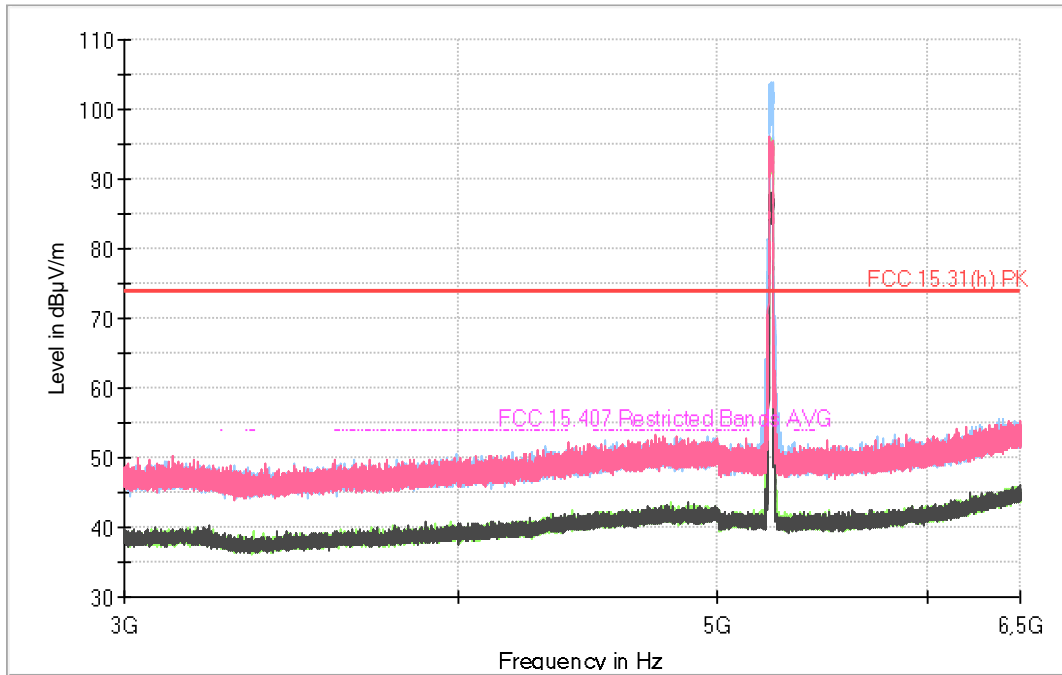


The peaks above the limit is the BTEDR and WLAN 2.4 GHz carrier frequency.

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

**FREQUENCY RANGE 3 – 6.5 GHz:**

Full Spectrum

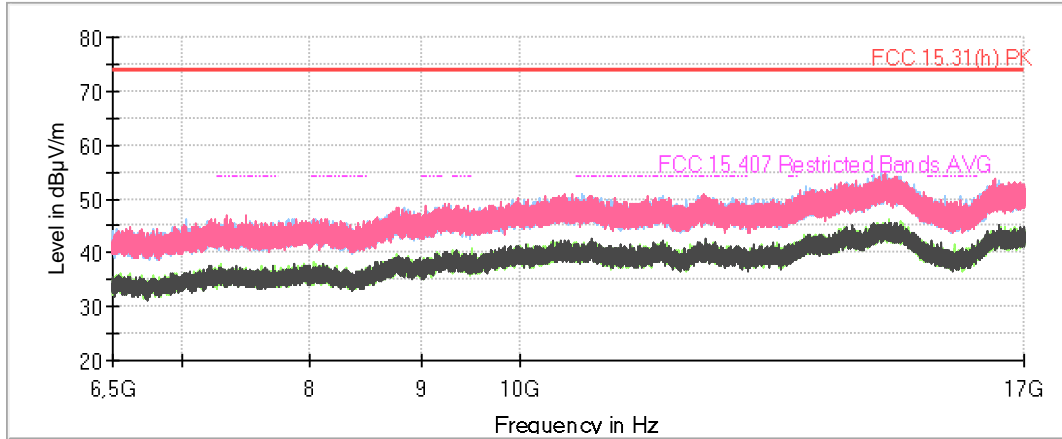


- Preview Result 2H-AVG
- Preview Result 2V-AVG
- FCC 15.31(h) PK
- ◆ Final\_Result PK+
- Preview Result 1H-PK+
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands AVG
- ◆ Final\_Result AVG

The peak above the highest limit is the WLAN 5 GHz band U-NII-1 carrier frequency.

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6,5 GHz	100 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

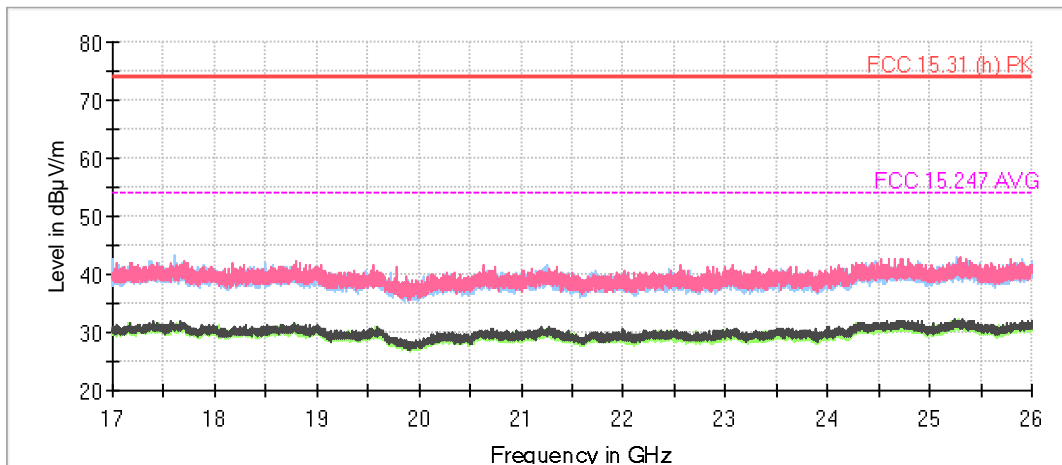
**FREQUENCY RANGE 6.5 - 17 GHz:**



- Preview Result 2H-AVG
- Preview Result 2V-AVG
- Preview Result 1H-PK+
- Preview Result 1V-PK+
- FCC 15.31 (h) PK
- - - FCC 15.407 Restricted Bands AVG
- ◆ Final\_Result PK+
- ◆ Final\_Result AVG

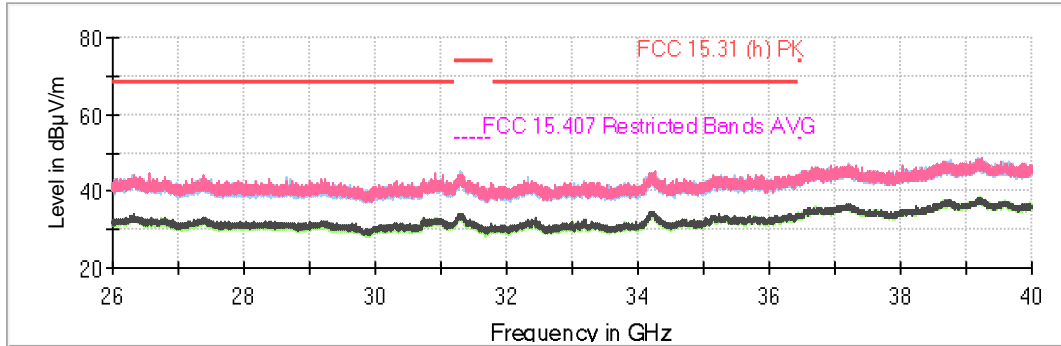
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

**FREQUENCY RANGE 17 - 40 GHz:**



- Preview Result 2H-AVG
- Preview Result 2V-AVG
- Preview Result 1H-PK+
- Preview Result 1V-PK+
- FCC 15.31 (h) PK
- - - FCC 15.247 AVG
- ◆ Final\_Result PK+
- ◆ Final\_Result AVG

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB



- Preview Result 2H-AVG
- Preview Result 1H-PK+
- Preview Result 2V-AVG
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands PK UNII-1 and UNII-2
- - - FCC 15.407 Restricted Bands AVG
- ◆ Final\_Result PK+
- ◆ Final\_Result AVG

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

• **Co-location mode WLAN 2.4 GHz, WLAN 5 GHz U-NII-3:**

BTEDR in GFSK: Middle Channel (2441 MHz) BW: 1MHz DH1.  
 WLAN 2.4 GHz 802.11 b: Middle Channel (2442 MHz). BW: 20 MHz. 1 Mbps.  
 WLAN 5 GHz U-NII-3 802.11 n20: High Channel (5825 MHz). BW: 20 MHz. MCS0.

LIMIT: The spurious frequencies were measured at 3 meter. The limit of the test is determined by:

Frequency Range	Detector	Limit at 3m (dBµV/m)
30 MHz to 88 MHz	Quasi-peak	40 dBµV/m
88 MHz to 216 MHz	Quasi-peak	43.5 dBµV/m
216 MHz to 960 MHz	Quasi-peak	46 dBµV/m
960 MHz to 1 GHz	Quasi-peak	54 dBµV/m
1 GHz to 26 GHz	Peak	74 dBµV/m
26 to 40 GHz	Peak	68.23 dBµV/m (*) OR 74 dBµV/m (**)
1 to 40 GHz	Average	54 dBµV/m (**)

(\*) Radiated emissions which fall in the non-restricted bands.

(\*\*) Radiated emissions which fall in the restricted bands, as defined in §15.205(a).

**Frequency range 30 MHz - 1 GHz:**

The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

No spurious frequencies at less than 20 dB below the limit.

Measurement Uncertainty (dB):  $\leq \pm 5.08$

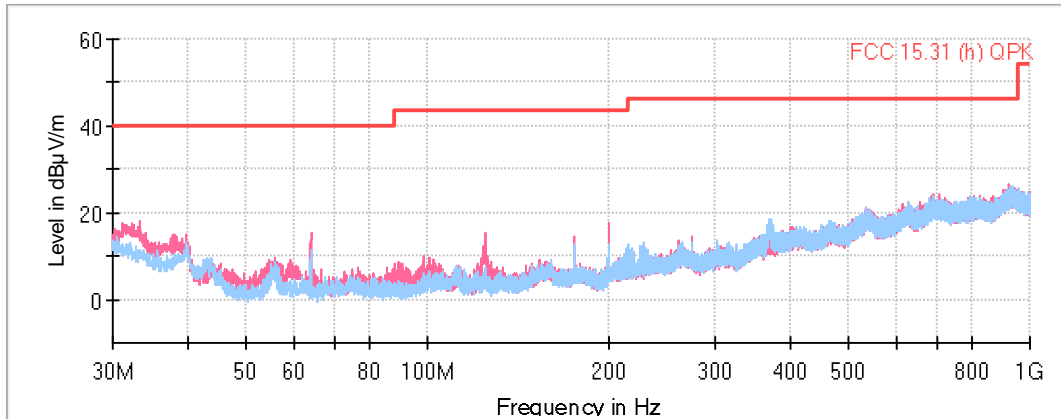
**Frequency range 1 - 40 GHz:**

No spurious frequencies at less than 20 dB below the limit.

Measurement Uncertainty (dB): 1 GHz – 17 GHz  $\leq \pm 5.13$   
 17 GHz – 26.5 GHz  $\leq \pm 4.82$   
 26.5 GHz – 40 GHz  $\leq \pm 5.14$

Verdict: PASS

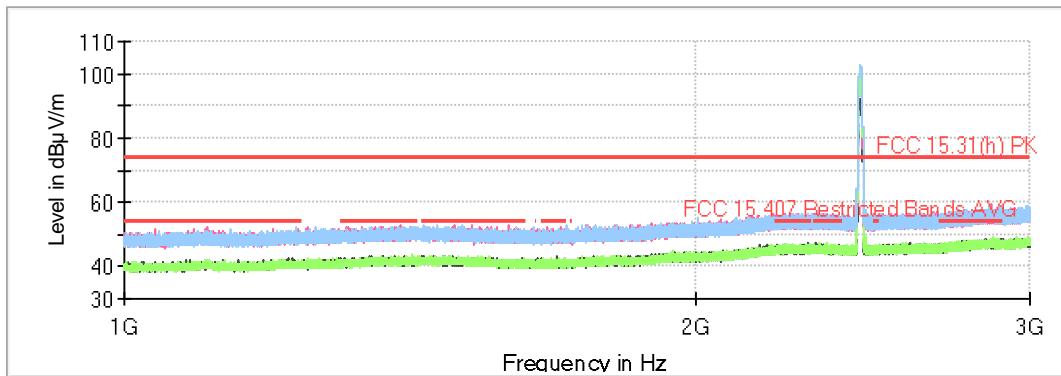
**FREQUENCY RANGE 30 MHz - 1 GHz:**



◆ Preview Result 1V-PK+ Final\_Result QPK    
 ◆ Preview Result 1H-PK+ Final\_Result PK+    
 — FCC 15.247 QPK

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB

**FREQUENCY RANGE 1 - 3 GHz:**



— Preview Result 2V-AVG    
 — Preview Result 1V-PK+    
 — Preview Result 1H-PK+    
 — Preview Result 2H-AVG  
◆ Final\_Result PK+    
◆ Final\_Result AVG

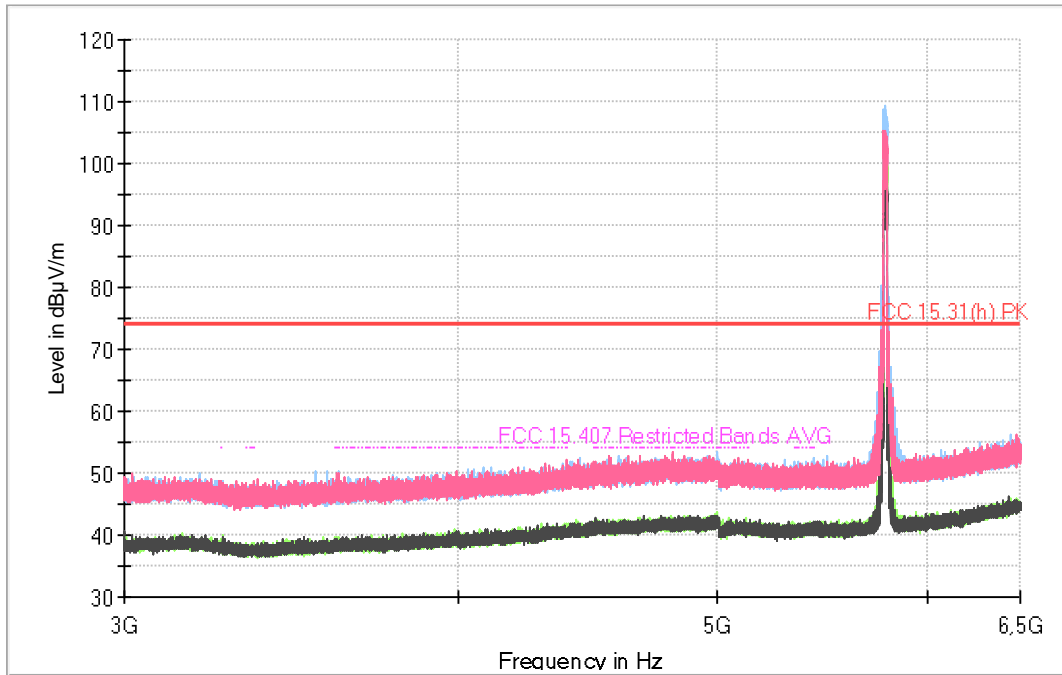
The peaks above the limit is the BTEDR and WLAN 2.4 GHz carrier frequency.

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB



**FREQUENCY RANGE 3 – 6.5 GHz:**

Full Spectrum

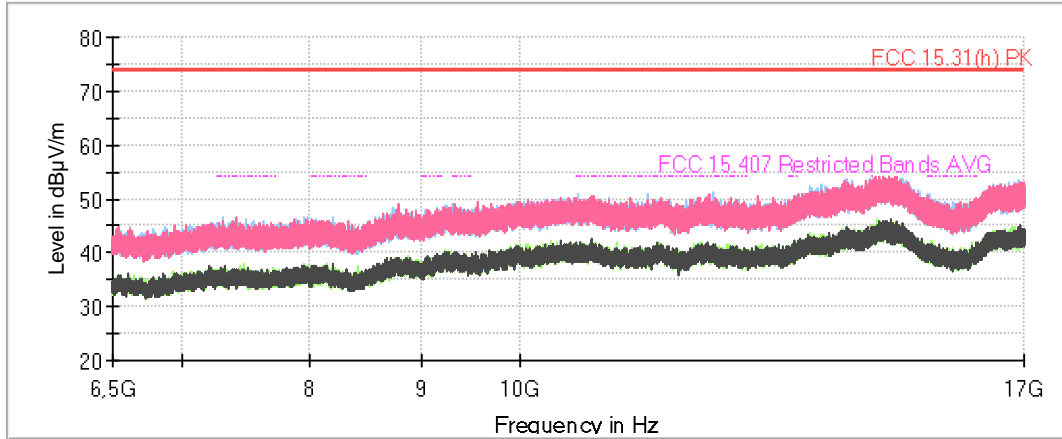


- Preview Result 2H-AVG
- Preview Result 2V-AVG
- FCC 15.31(h) PK
- ◆ Final\_Result PK+
- Preview Result 1H-PK+
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands AVG
- ◆ Final\_Result AVG

The peak above the highest limit is the WLAN 5 GHz band U-NII-3 carrier frequency.

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 6,5 GHz	100 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

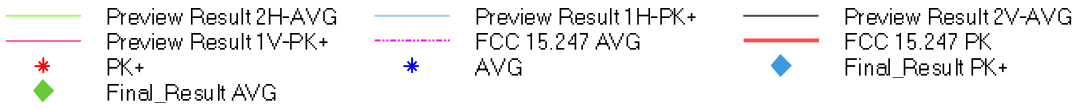
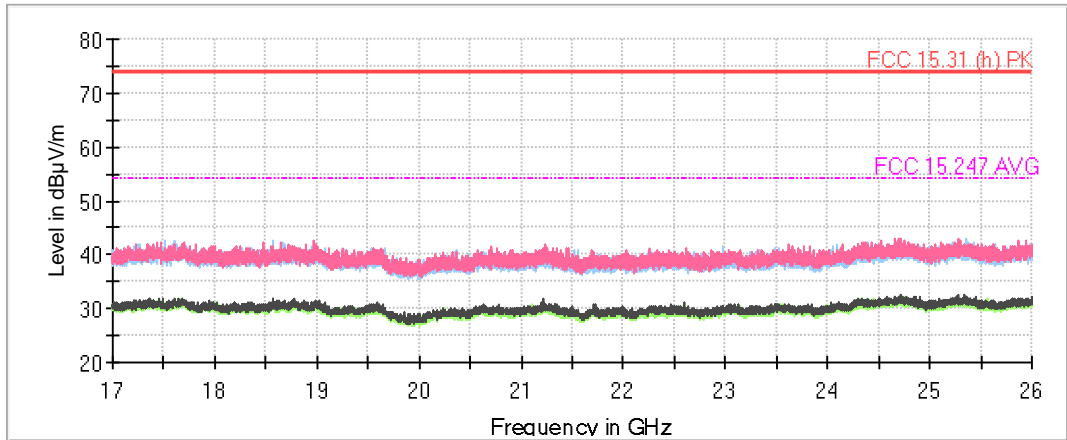
**FREQUENCY RANGE 6.5 - 17 GHz:**



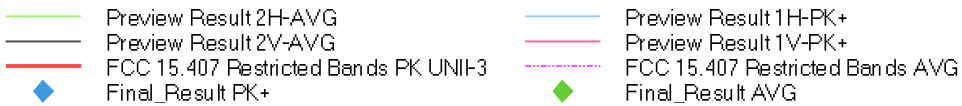
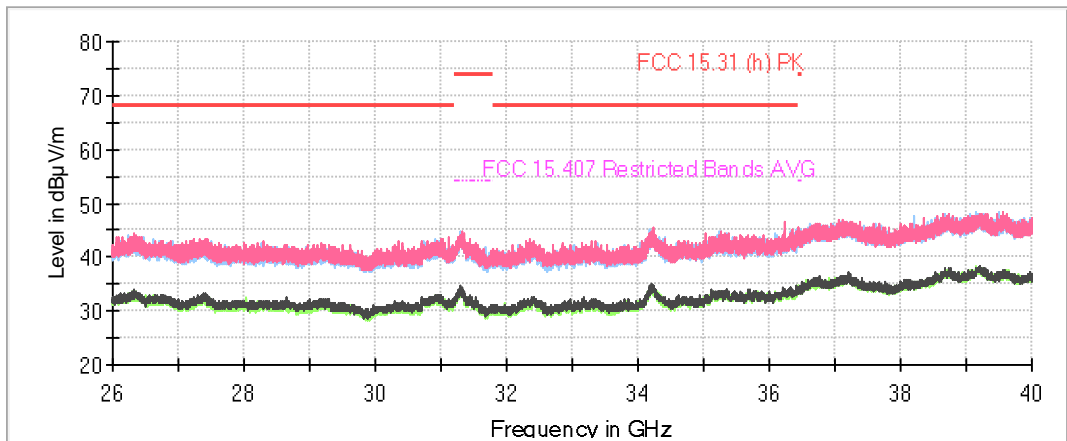
- Preview Result 2H-AVG
- Preview Result 2V-AVG
- FCC 15.31(h) PK
- ◆ Final\_Result PK+
- Preview Result 1H-PK+
- Preview Result 1V-PK+
- FCC 15.407 Restricted Bands AVG
- ◆ Final\_Result AVG

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

**FREQUENCY RANGE 17 - 40 GHz:**



Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB



Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB