DEKRA Testing and Certification, S.A.U.
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C.I.F. A29507456

ISED CABid: ES1909
Lab. Company Number: 4621A

Test Report No:
80708RRF.008

Partial Test Report
USA FCC 15.31(h), 15.209, 15.247, 15.407
CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Headunit with Display and TP, USB, BT and WLAN
(*) Trademark	HARMAN
(*) Model and /or type reference	SPACE 4 BASE 1.1A
Other identification of the product	FCC ID: T8GSPACE4B11 IC: 6434A-SPACE4B11
(*) Features	Bluetooth, WLAN HW version: DV2 SW version: R11
Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH Becker-Goering-Str. 16 76307, Karlsbad, GERMANY
Test method requested, standard	USA FCC Part 15.31(h) (10-1-23 Edition): Measurement standard. USA FCC Part 15.209 (10-1-23 Edition): Radiated emission limits; general requirements. USA FCC Part 15.247 (10-1-23 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.407 (10-1-23 Edition): Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. Band U-NII-3 (5725 MHz – 5850 MHz). CANADA RSS-247 Issue 3 (August 2023). CANADA RSS-Gen Issue 5 Amendment 2 (February 2021). 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.
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2024-12-11
Report template No.	FDT08_25 (*) "Data provided by the client"

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Competences and guarantees

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 has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification 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 at the time of performance of the test.

DEKRA Testing and Certification is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

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

General conditions

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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

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 ≤ ± 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 ≤ ± 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 ≤ ± 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 consists of an Headunit with Display and TP, USB, BT and WLAN.

3. Declaration of similarity for SW version:

HARMAN AUTOMOTIVE DIVISION
HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STRASSE 16
76307 KARLSBAD, GERMANY
E-MAIL: STEFAN.BLASCHEK@HARMAN.COM

Harman Becker Automotive Systems GmbH | Postfach 2280 | 76303 Karlsbad

To whom it may concern

Karlsbad, 27.11.2024

SW-Declaration for model: SPACE 4 BASE 1.1A

Dear Ladies and Gentlemen,

we, Harman Becker Automotive Systems GmbH herewith confirm, that the product used for RED/FCC testing had the following HW/SW configuration:

Model: SPACE 4 BASE 1.1A
HW: DV2
SW: R11

Hint: On the product label you can find the SW version "SW: RB09.1.1" – this was printed in the production, but before doing the measurements the units have been updated.

In case of any question please do not hesitate and contact us. Thank you

Regards

Stefan Blaschek
Regulatory Compliance Management

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76307 Karlsbad
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Web: www.harman.com

Sitz der Gesellschaft: Karlsbad | Amtsgericht Mannheim: HRB-Nr. 361395

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	76426_14.1	Headunit	SPACE 4 BASE 1.1A	Z0681A000041379321A0694E0012	2024-09-30	Element Under Test
S/01	76426_15.1	PCB board	--	--	2024-09-30	Auxiliary Element
S/01	76426_16.1	USB cable	--	--	2024-09-30	Auxiliary Element
S/01	76426_17.1	Harness	--	--	2024-09-30	Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Sample used for radiated tests

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)		
	Main Connector	2m	[X]	[ ]	[ ]		
	USB Connector		[X]	[X]	[ ]		
	GPS/FVC/RVC		[X]	[X]	[ ]		
	--						
Supplementary information to the ports..... :							
Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[X]	DC: 12V car battery /attenuator (9,5-15,5v normal operation)					
Rated Power .....:	--						
Clock frequencies.....:	--						
Other parameters .....:	--						
Software version .....:	R11						
Hardware version .....:	DV2						
Dimensions in cm (W x H x D) ....:	--						
Mounting position .....:	[ ]	Table top equipment					
	[ ]	Wall/Ceiling mounted equipment					
	[ ]	Floor standing equipment					
	[ ]	Hand-held equipment					
	[X]	Other: automotive					
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	
	--						

(3) 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)	2024-11-04
Date (finish)	2024-11-04

Document history

Report number	Date	Description
80708RRF.008	2024-12-11	First release.

Environmental conditions

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

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

In the semi-anechoic chamber, the following limits were not exceeded during the test.

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

Remarks and comments

The tests have been performed by the technical personnel: Sergio Carrasco.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06609	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-22
06615	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
07817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-07-01
06143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-01-22
06142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2025-07-25
06496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2026-12-01
03783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2025-03-15
04657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2026-06-12
08856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2025-02-27
07445	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	N/A
07760	DIGITAL MULTIMETER	175	FLUKE	2025-11-07
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A

Testing verdicts

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

Summary

FCC 15, 22, 24, 27 / CANADA RSS-132, RSS-133, RSS-199, RSS-247, RSS-Gen PARAGRAPH			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.31 (h), 15.209 (a), 15.247 (d), 15.407 (b), RSS-247 5.5, 6.2.1.2 and 6.2.2.2, RSS-Gen 8.9	Emission limitations radiated (Transmitter)	P	(1)
Supplementary information and remarks: (1) Only simultaneous transmission radiated spurious emission test was requested.			

Appendix A: Test results

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TEST CONDITIONS

(*): Data provided by the Applicant.

POWER SUPPLY (*):

Vnominal:	12Vdc
Type of Power Supply:	Car battery / alternator

ANTENNA (*):

Technologies	Antenna Gain	Type of Antenna
BT EDR (ANT 1)	+0.34 dBi	Integral
BT EDR (ANT 2)	-0.40 dBi	Integral
BT EDR (ANT 3)	+1.37 dBi	Integral
WLAN 2.4 GHz	-0.40 dBi	Integral
WLAN 5 GHz	+5.70 dBi	Integral

TEST FREQUENCIES:

Technologies	Modulations
Bluetooth EDR (ANT 1)	Bluetooth EDR (GFSK, Pi/4-DQPSK, 8DPSK)
Bluetooth EDR (ANT 2)	Bluetooth EDR (GFSK, Pi/4-DQPSK, 8DPSK)
Bluetooth EDR (ANT 3)	Bluetooth EDR (GFSK, Pi/4-DQPSK, 8DPSK)
WLAN 2.4 GHz	WLAN 2.4 GHz (802.11 bgn20)
Wi-Fi 5 GHz UNII-1	WLAN 5 GHz (a, ac, n)
Wi-Fi 5 GHz U-NII-3	WLAN 5 GHz (a, ac, n)

TEST FREQUENCIES FOR SIMULTANEOUS TRANSMISSION MODE RADIATED TESTS:

The EUT was tested in the following operating mode during the transmitter tests:

The EUT was configured to simultaneously transmit the following signals at maximum output power:

- **Operation Mode 1**

Simultaneous transmission mode BT EDR (ANT 1), BT EDR (ANT 3), WLAN 2.4 GHz:

BT EDR (ANT 1):	Low Channel (2402 MHz). GFSK.
BT EDR (ANT 3):	High Channel (2480 MHz). GFSK.
WLAN 2.4 GHz:	Middle Channel (2437 MHz). 802.11 g. BW: 20 MHz.

- **Operation Mode 2**

Simultaneous transmission mode BT EDR (ANT 1), BT EDR (ANT 2), BT EDR (ANT 3), WLAN 5 GHz U-NII-3:

BT EDR (ANT 1):	Low Channel (2402 MHz). GFSK.
BT EDR (ANT 2):	Middle Channel (2441 MHz). GFSK.
BT EDR (ANT 3):	High Channel (2480 MHz). GFSK.
WLAN 5 GHz U-NII-1:	Middle Channel (5785 MHz). 802.11 a20. BW: 20 MHz.

Radiated emissions

Limits:

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

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/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	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	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 specified when measuring with peak detector function corresponding to 20 dB above the indicated values in the table above.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz (68.23 dBµV/m at 3 m distance) at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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

Frequency range tested for Radiated emissions:

Start frequency: no radiofrequency signal generated in the device found below 10th sub-harmonic, no further investigation required.
Stop frequency: it has been performed the radiated spurious emissions until 10th harmonic.

Method:

The measurement was performed with the EUT inside a semi-anechoic chamber.

The spectrum was scanned from 30 MHz to at least the 10th harmonic of the highest frequency of the co-located radios up to 40 GHz.

The EUT was placed on a non-conductive stand at a 3-meter distance from the measuring antenna for measurements up to 17 GHz and at 1.5-meter distance for measurements above 17 GHz.

Detected emissions were maximized at each frequency by rotating the EUT and adjusting the measuring antenna height and polarization. The maximum meter reading was recorded. Measurements were made in both horizontal and vertical planes of polarization.

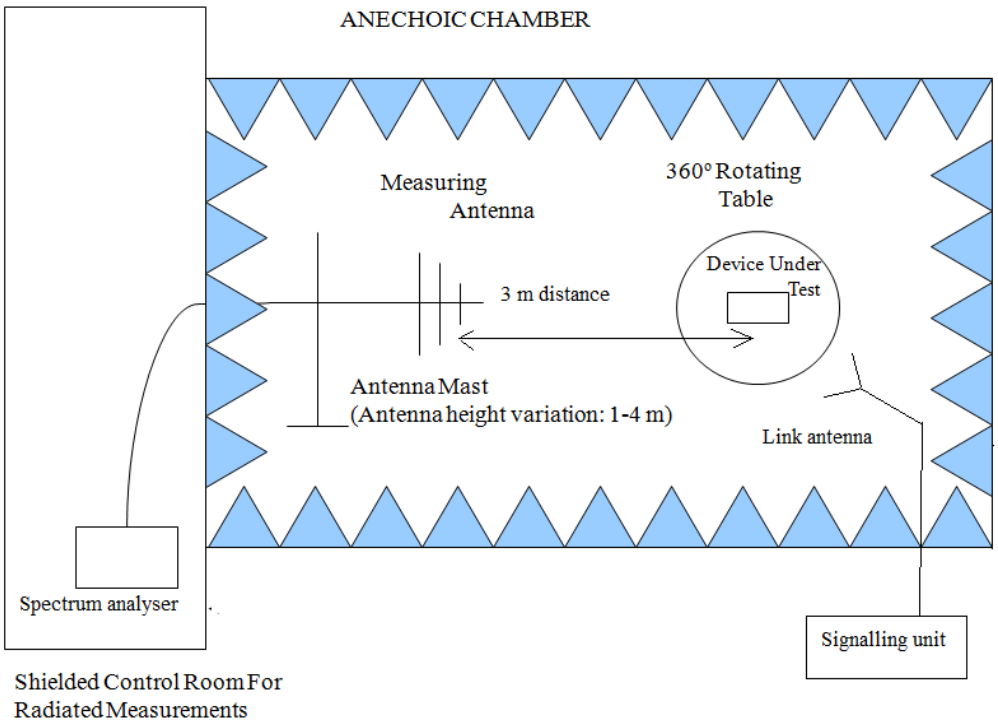
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

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

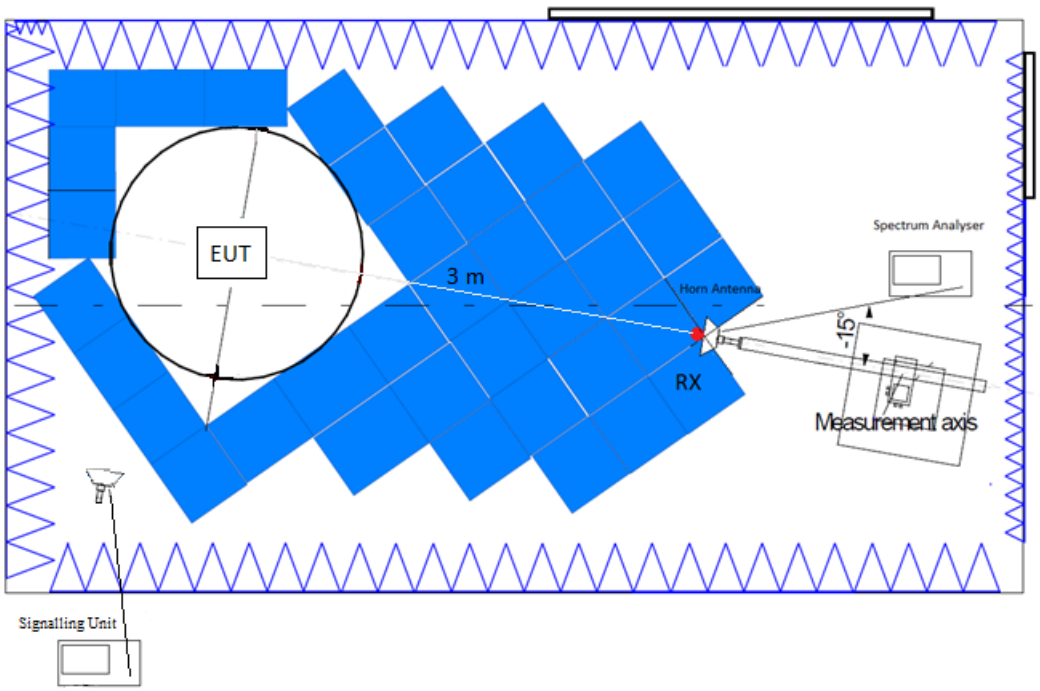
These measurements have been performed in order to check the impact of the Co-Location of all radio interfaces (that can transmit simultaneously).

Test setup:

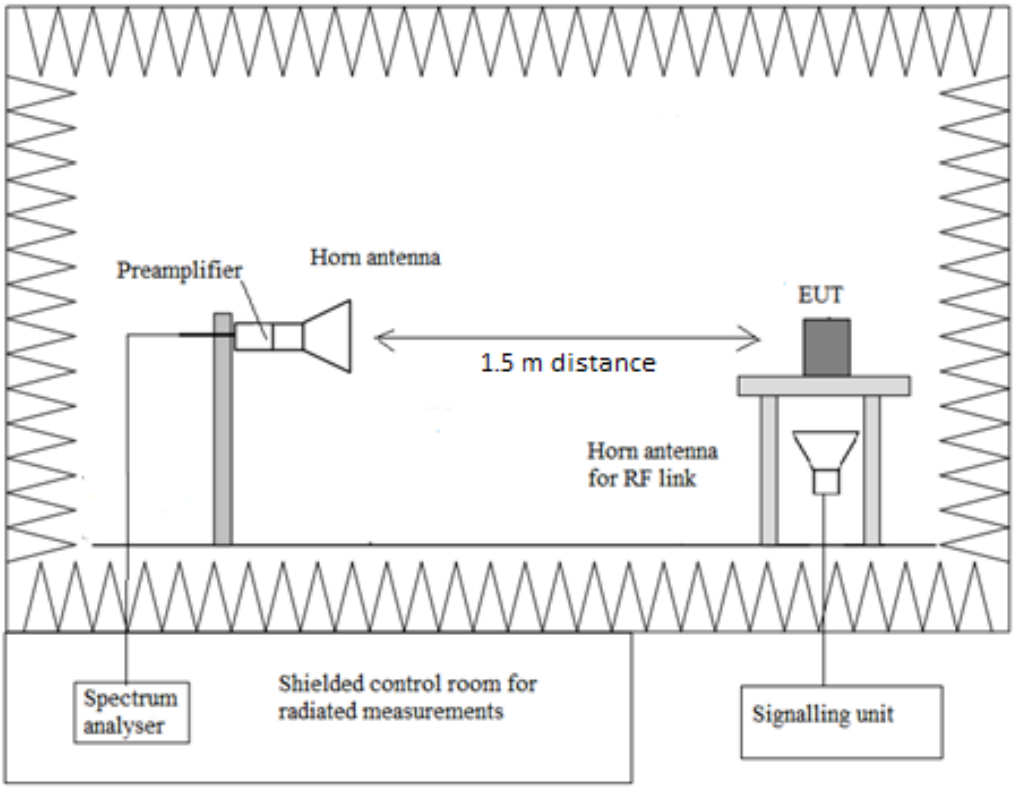
Radiated measurements below 1 GHz.



Radiated measurements between 1 GHz and 17 GHz.



Radiated measurements above 17 GHz.



Results:

- **Operation Mode 1**

Spurious frequencies at less than 20 dB below the limit:

Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[0.03, 1]	44.598	11.48	V	PK
		4.28	V	QP
	57.063	14.04	V	PK
		8.54	V	QP
	85.678	9.81	V	PK
		4.49	V	QP
	172.735	16.99	H	PK
		5.46	H	QP
	327.353	14.39	V	PK
		8.62	V	QP
	710.746	23.98	H	PK
		18.06	H	QP
[1, 17]	2360.000	58.78	H	PK
		47.38	H	AVG

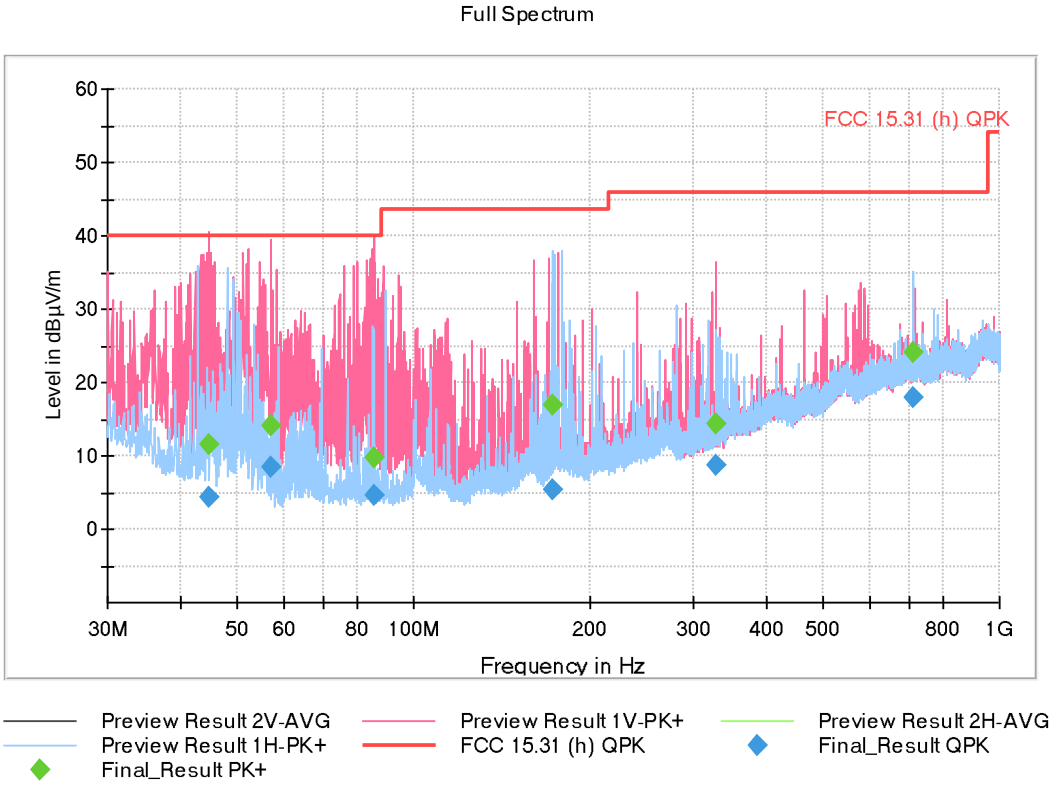
Verdict

Pass

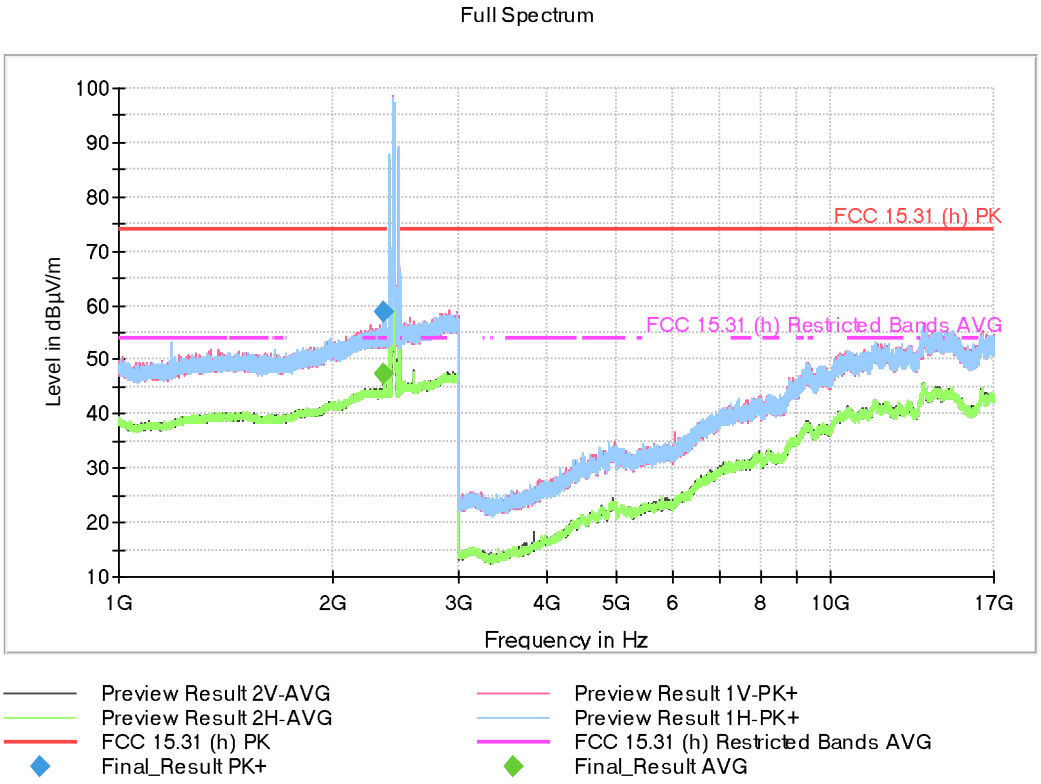
The setting for each range of frequency is indicated in the following tables:

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	40 kHz	PK+	100 kHz	0,01 s	0 dB
1 GHz - 2,39 GHz	400 kHz	PK+	1 MHz	0,01 s	0 dB
2,39 GHz - 2,484 GHz	40 kHz	PK+	100 kHz	0,01 s	0 dB
2,484 GHz - 3 GHz	400 kHz	PK+	1 MHz	0,01 s	0 dB
3 GHz - 17 GHz	400 kHz	PK+	1 MHz	0,01 s	0 dB
17 GHz - 26 GHz	400 kHz	PK+	1 MHz	0,01 s	0 dB

FREQUENCY RANGE 30 MHz - 1 GHz

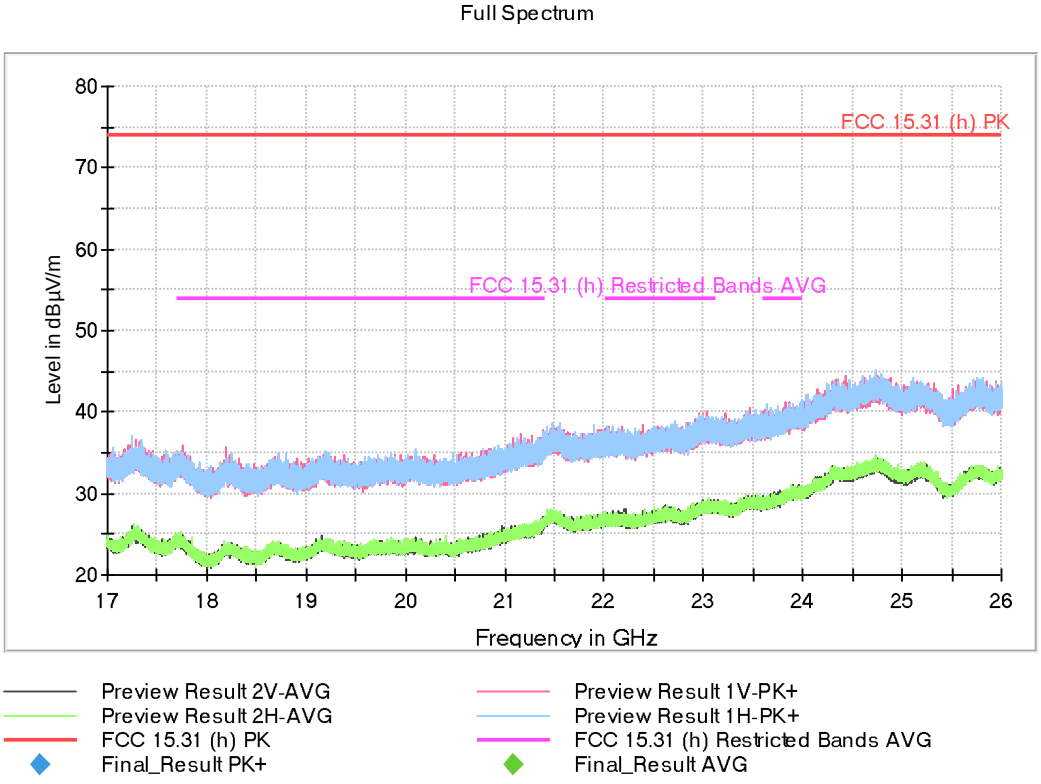


FREQUENCY RANGE 1 - 17 GHz



The peaks above the limit are the BT EDR and WLAN 2.4 GHz carrier frequency.

FREQUENCY RANGE 17 - 26 GHz



- **Operation Mode 2**

Spurious frequencies at less than 20 dB below the limit:

Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[0.03, 1]	42.416	30.41	V	PK
		9.28	V	QP
	53.183	17.96	V	PK
		10.95	V	QP
	68.654	16.72	V	PK
		10.26	V	QP
	77.239	17.75	V	PK
		11.90	V	QP
	98.434	17.97	V	PK
		11.66	V	QP
	345.735	22.34	H	PK
		16.32	H	QP

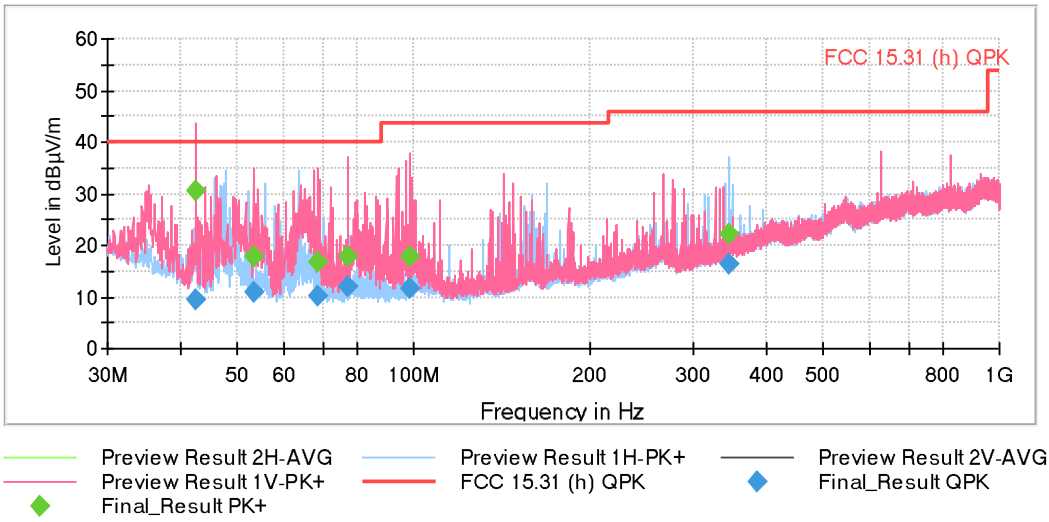
Verdict

Pass

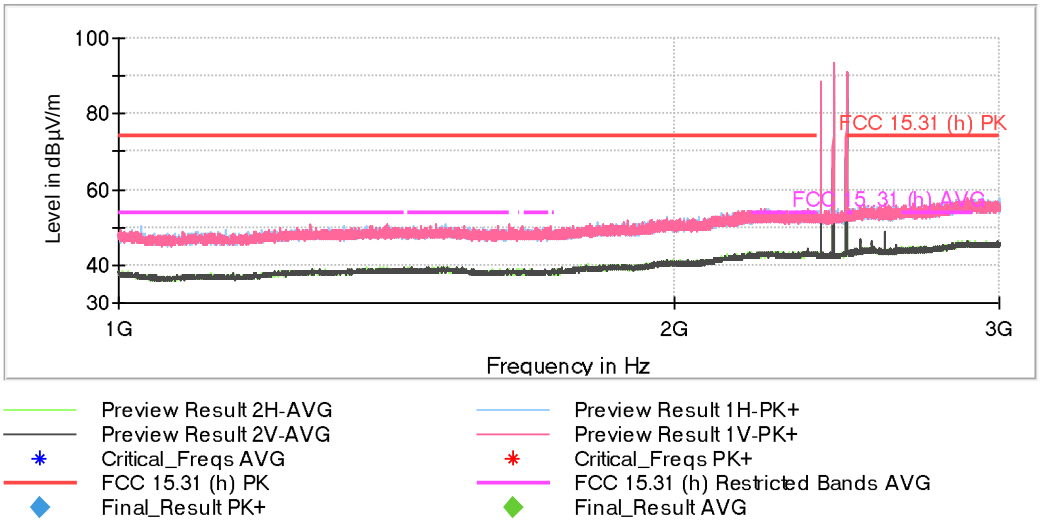
The setting for each range of frequency is indicated in the following tables:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44]					
30 MHz - 1 GHz	48,5 kHz	PK+	100 kHz	1 s	0 dB
1 GHz - 6,5 GHz	275 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
6,5 GHz - 17 GHz	525 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

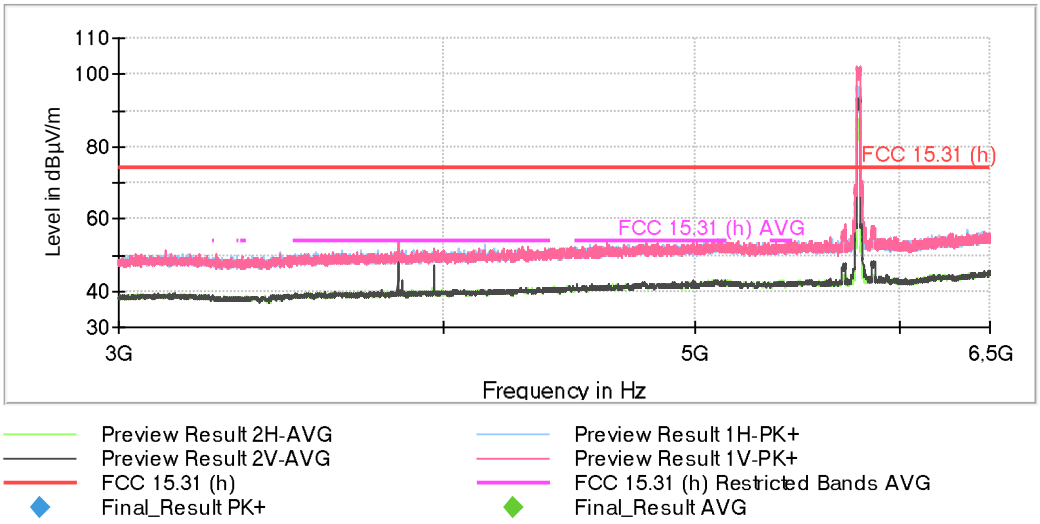
FREQUENCY RANGE 30 MHz - 1 GHz



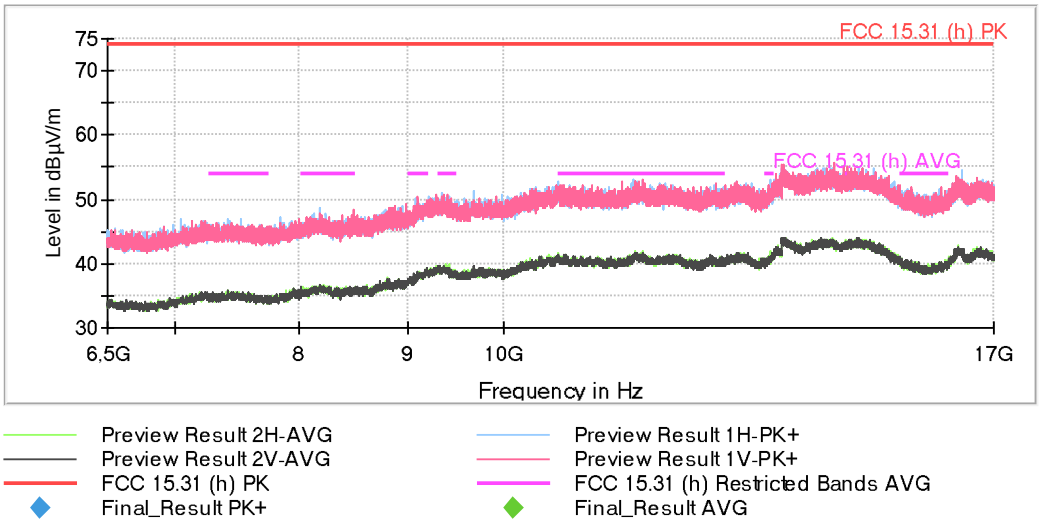
FREQUENCY RANGE 1 - 17 GHz



The peaks above the limit are the BT EDR carrier frequencies.



The peak above the limit is the WLAN 5 GHz carrier frequency.



FREQUENCY RANGE 17 - 40 GHz