

ISED CABid: ES1909
 Lab. Company Number: 4621A

Test Report No:
 72976RRF.002A2

Partial Test Report

USA FCC Part 15.31(h), 15.209, 15.247

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Connected Instrumentation Cluster for Motorcycles
(*) Trademark	BOSCH
(*) Model and /or type reference	ICC65V2
Other identification of the product	FCC ID: 2AUXS-ICC65V2 IC: 25847-ICC65V2
(*) Features	Bluetooth, Wi-Fi HW version: HW20.04 SW version: 124.008.005
Applicant	Robert Bosch GmbH Robert-Bosch-Strasse 200 31139, Hildesheim Germany
Test method requested, standard	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 15.31(h) (10-1-21 Edition): Measurement standard. 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 1 (Mar. 2019) + Amendment 2 (Feb. 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. 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
Date of issue	2023-04-26
Report template No.	FDT08_24 (* "Data provided by the client")

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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.

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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 $\leq \pm 5.35$ 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 26 GHz is:
Measurement uncertainty $\leq \pm 5.51$ 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 a Connected Instrumentation Cluster for Motorcycles.

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 results.

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	72976B_1.1	Cluster	ICC65V2	--	2022-08-18	Equipment Under Test
S/01	72976B_41.1	Control device Box	--	--	2022-08-18	Auxiliary Equipment
S/01	72976B_42.1	Can-Adapter	--	--	2022-08-18	Auxiliary Equipment

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⁾		
	[]	[]	[]		
	[]	[]	[]		
	[]	[]	[]		
	[]	[]	[]		
	[]	[]	[]		
Supplementary information to the ports..... :						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 9-18V. Nominal 13Vdc by vehicle battery.					
[]	DC:						
Rated Power						
Clock frequencies.....						
Other parameters						
Software version	124.008.005						
Hardware version	HW20.04						
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: Cluster in the motorcycle					
Modules/parts..... :	Module/parts of test item		Type	Manufacturer			
	UGKZ7A2001A		integrated	ALPS			
	UGXZE-304A		integrated	ALPS			
			
			
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

Robert Bosch GmbH
Robert-Bosch-Strasse 200
31139, Hildesheim
Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-09-13
Date (finish)	2023-04-25

Document history

Report number	Date	Description
72976RRF.002	2022-12-15	First release.
72976RRF.002A1	2023-02-16	Second release. Inclusion of SW Version. This modification of test report cancels and replaces the test report 72976RRF.002.
72976RRF.002A2	2023-04-26	Third release. This report is modified due some corrections on the operation mode. This modification of test report cancels and replaces the test report 72976RRF.002A1.

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 semi-anechoic 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: Fernando Chito.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6791	SEMIANECHOIC ABSORBER LINED CHAMBER	FACT 3 200 STP	ETS LINDGREN	N/A
6792	SHIELDED ROOM	S101	ETS LINDGREN	N/A
6143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-10-29
4611	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2026-01-16
4657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2023-05-05
6142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2023-06-16
3783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2023-12-29
8856	PRE-AMPLIFIER G>30dB 17-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2023-11-02
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-12-30
9335	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	N/A
7760	DIGITAL MULTIMETER	175	FLUKE	2023-11-14
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

Summary

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

Appendix A: Test results.

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 13Vdc
 Type of Power Supply: External Power supply / Battery

ANTENNA (*):

Type of Antenna: PCB integrated slot antenna

RADIOS AND CHANNELS TESTED:

* Simultaneous Transmission Bluetooth EDR, WLAN 2.4 GHz.

Bluetooth EDR / FHSS Chipset #1 (BT_0 Antenna)		
Mode:	Enhanced Data Rate (8DPSK)	
Channel Spacing:	1 MHz	
Frequency Range:	2402 MHz to 2480 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Low	2402

WLAN 2.4 GHz (IEEE 802.11 b/g/n20) / DTS Chipset #1 (WLAN_0 Antenna)		
Mode:	802.11g 6 Mbit/s	
Channel Spacing:	20 MHz	
Frequency Range:	2412 MHz to 2462 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Low	2412

Bluetooth EDR / FHSS Chipset #2 (BT_1 Antenna)		
Mode:	Enhanced Data Rate (PI4-DQPSK)	
Channel Spacing:	1 MHz	
Frequency Range:	2402 MHz to 2480 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	High	2480

During transmitter test the EUT was controlled by a SW tool provided by the client to operate in a continuous transmit mode on the test channels as required.

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.

The EUT was tested in the following operating mode:

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

Selected Transmission Mode for each Radio:

The next configurations were selected based on preliminary testing that identified them as being the worst cases:

* Bluetooth EDR (Chipset #1): Transmitter radiated spurious emissions tests were performed with the EUT transmitting in BT EDR / 8DPSK / Low Channel configuration as this mode was found as the worst case in terms of PSD preliminary test, compared with all the other Bluetooth configurations.

* WLAN 2.4 GHz (Chipset #1): Transmitter radiated spurious emissions tests were performed with the EUT transmitting in 802.11g / 6 Mbps / Low Channel configuration as this mode was found as the worst case in terms of PSD preliminary test, compared with all the other WLAN 2.4 GHz configurations.

* Bluetooth EDR (Chipset #2): Transmitter radiated spurious emissions tests were performed with the EUT transmitting in BT EDR / PI4-DQPSK / High Channel configuration as this mode was found as the worst case in terms of PSD preliminary test, compared with all the other Bluetooth configurations.

TESTED SIMULTANEOUS TRANSMISSION MODES:

* **Simultaneous transmission Bluetooth EDR Chipset #1, WLAN 2.4 GHz Chipset #1 and Bluetooth EDR Chipset #2** with the EUT configured to simultaneously transmit three RF signals at maximum output power:

BTEDR #1 in 8DPSK / Low Channel, WLAN 2.4 GHz in 802.11g / 6 Mbps / Low Channel, BTEDR #2 in PI4-DQPSK / High Channel.

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz 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-26 GHz (17 GHz-40 GHz horn antenna).

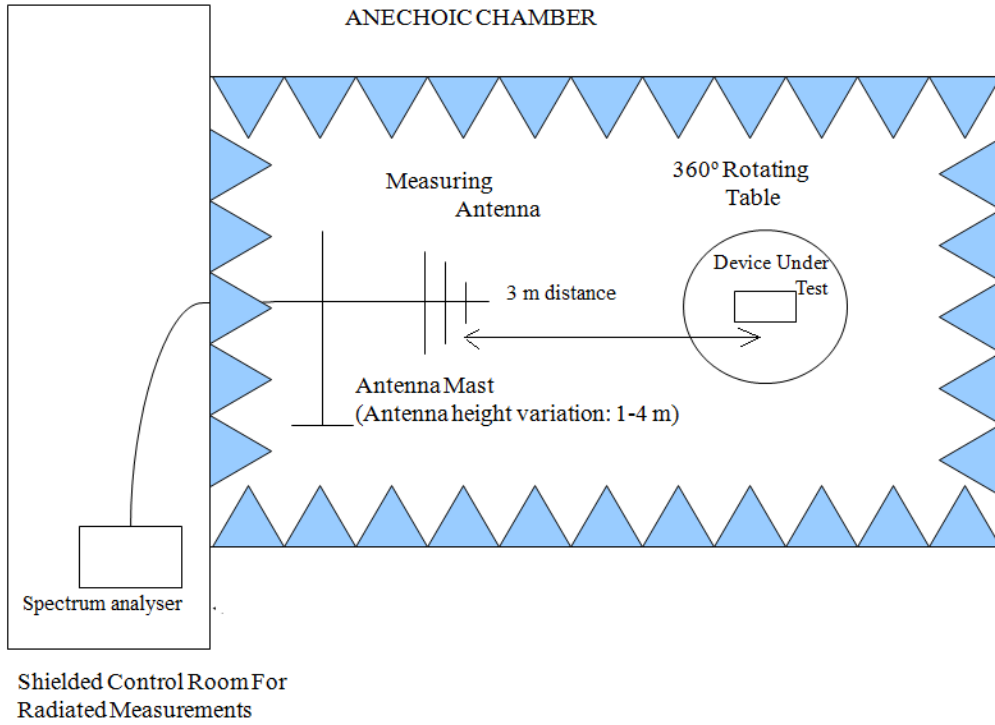
For radiated emissions in the range 17 GHz-26 GHz performed at a distance closer than the distance specified in the standard, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and its situation and orientation were varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters (up to 17 GHz) to find the maximum radiated emission.

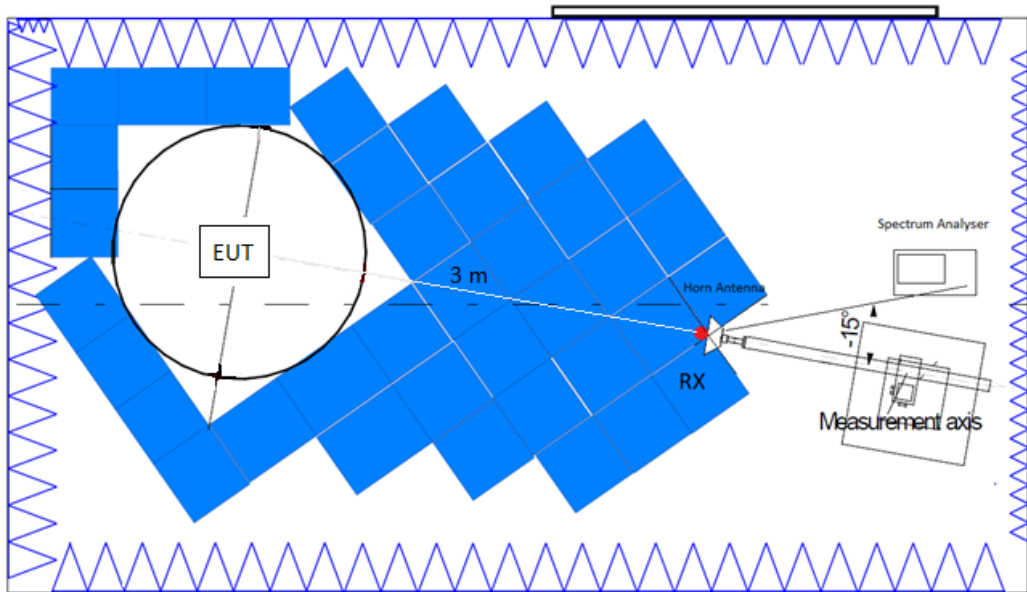
Measurements were made in both horizontal and vertical planes of polarization.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

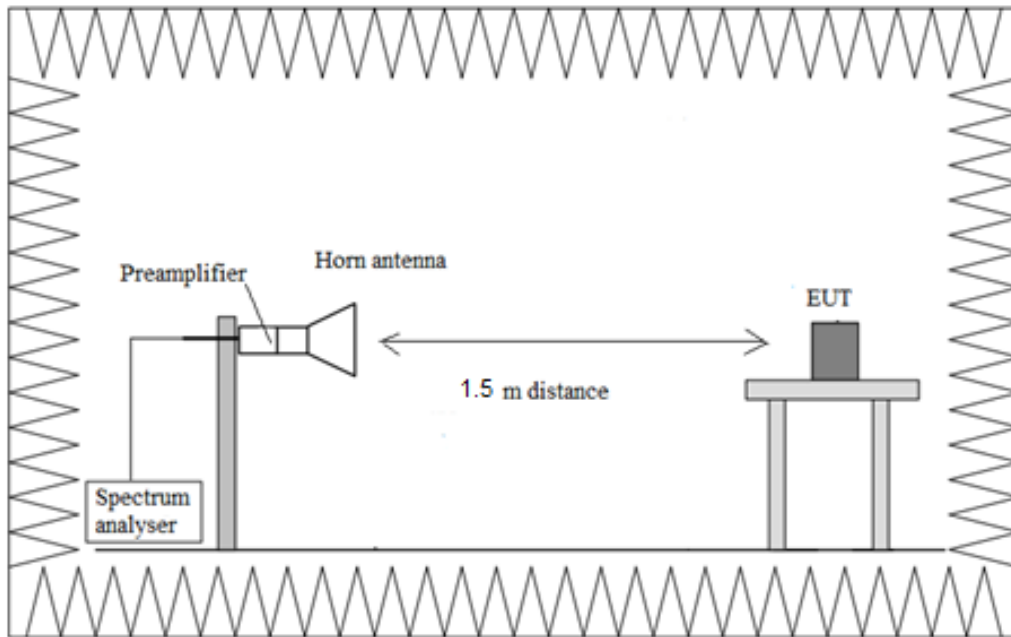
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

Emission limitations radiated (Transmitter)

Limits

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

Frequency Range (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	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
Above 960	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 specified when measuring with peak detector function.

RSS-247:

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

Results

- Simultaneous transmission mode BT EDR Chipset #1, WLAN 2.4 GHz Chipset #1, BT EDR Chipset #2**

Bluetooth EDR 8DPSK (Chipset #1):	Low Channel (2402 MHz).
WLAN 2.4 GHz 802.11g (Chipset #1):	Low Channel (2412 MHz). 6 Mbit/s.
Bluetooth EDR PI4-DQPSK (Chipset #2):	High Channel (2480 MHz).

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
1 GHz to 26 GHz	Average	54 dBµV/m (*)

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

Frequency range 30 MHz – 1 GHz:

Spurious frequencies at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
56.8266	21.13	V	Quasi-Peak
874.9913	28.27	H	Quasi-Peak

Frequency range 1 GHz – 26 GHz:

Spurious frequencies found at less than 20 dB below the limit:

Spurious frequency (MHz)	Emission Level (dBµV/m)	Polarization	Detector
2386.0923	59.05	V	Peak
	47.48		Average
2389.0769	61.05	V	Peak
	49.27		Average
7233.8800	50.71	H	Peak

Verdict

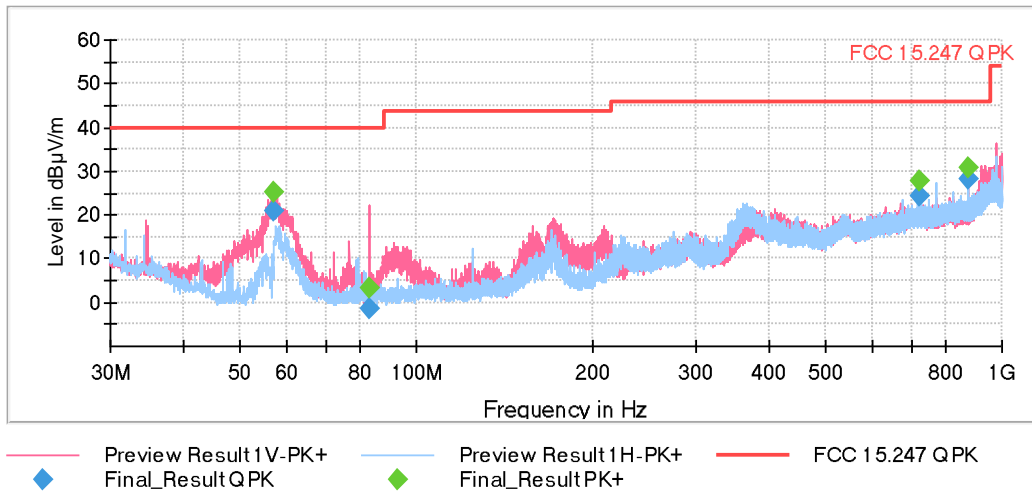
Pass

Attachments

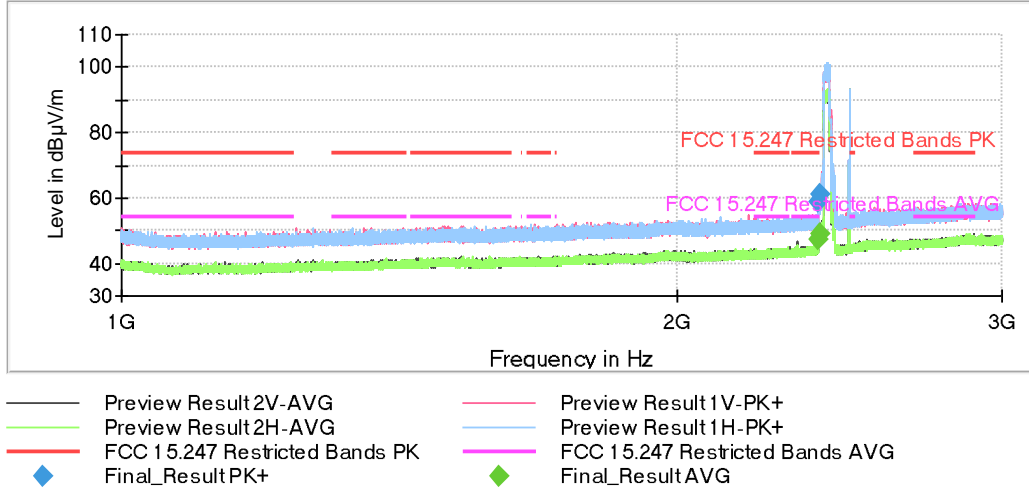
Measurement settings:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 1 GHz - 3 GHz	30,769 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 3 GHz - 17 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 17 GHz - 26 GHz	300 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Frequency Range (GHz) = [0.03, 1]

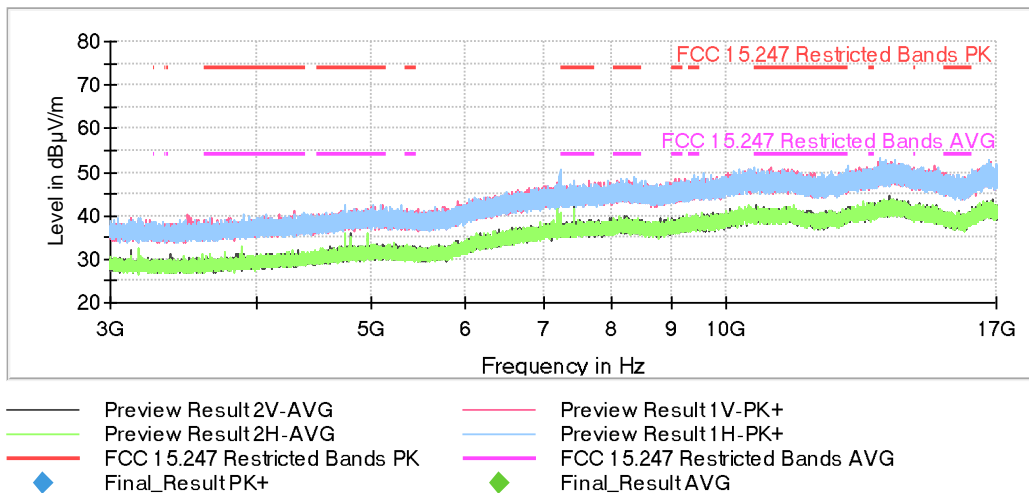


Frequency Range (GHz) = [1, 3]

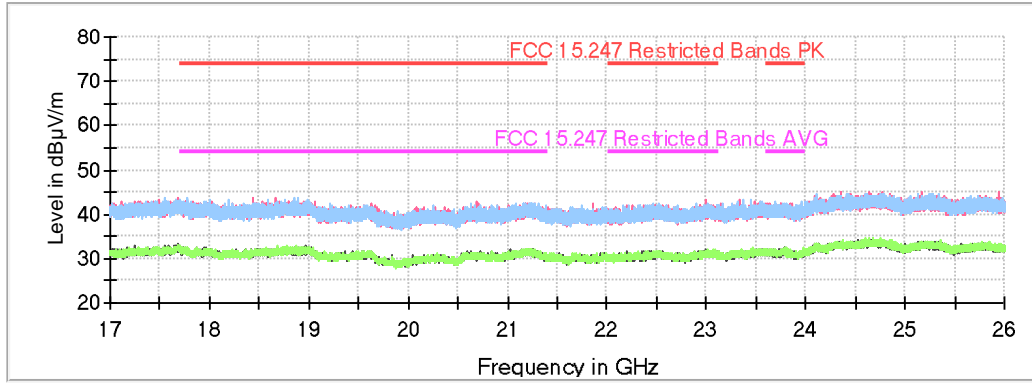


The peaks above the limit are BT EDR Chipset #1, WLAN 2.4 GHz Chipset #1 and BT EDR Chipset #2 carriers.

Frequency Range (GHz) = [3, 17]



Frequency Range (GHz) = [17, 26]



- | | | | |
|---|--------------------------------|---|---------------------------------|
| — | Preview Result 2V-AVG | — | Preview Result 1V-PK+ |
| — | Preview Result 2H-AVG | — | Preview Result 1H-PK+ |
| — | FCC 15.247 Restricted Bands PK | — | FCC 15.247 Restricted Bands AVG |
| ◆ | Final_Result PK+ | ◆ | Final_Result AVG |