

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:

81135RRF.002A1

Partial Test Report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Bluetooth Module
(*) Trademark	u-Blox
(*) Model and /or type reference	NINA-B400
Other identification of the product	FCC ID: XPYNINAB4 IC: 8595A-NINAB4
(*) Features	BLE Module HW version: 1004 SW version: 91.02
Applicant	u-Blox AG Zuercherstrasse 68, CH-8800 Thalwil, Switzerland
Test method requested, standard	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 15.209 (10-1-23 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 4 (July 2025). 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. ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 + Errata to C63.10a-2024: 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	2026-03-27
Report template No	FDT08_25 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
Detector	Detector used
Equipment	Equipment Type
Freq	Frequency
Freq Rng	Frequency Range
MP	Measurement Point
Mod	Modulation
Mode	MIMO Mode
Pol	Polarization
Port	Active Port
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

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

DEKRA Testing and Certification S.A.U. 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

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 $\leq \pm 5,35$ 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 ($k = 2$).

The total uncertainty of the measurement system for the conducted testing of EUT is:

RF Peak Output Power: Measurement uncertainty $\leq \pm 0,80$ dB

RF Average Output Power: Measurement uncertainty $\leq \pm 0,99$ dB

Power Spectral Density: Measurement uncertainty $\leq \pm 0,99$ dB

6dB Bandwidth: Measurement uncertainty $\leq \pm 2,84$ %

Occupied Channel Bandwidth: Measurement uncertainty $\leq \pm 1,17$ %

Conducted Band-edge spurious emissions: Measurement uncertainty $\leq \pm 1,76$ dB

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 BLE Module.

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. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/01	74191_40.1	Bluetooth Module	NINA-B400	-	2024-12-11	Element Under Test
S/01	74191_43.1	Antenna	ANT-2.4-WRT-SMA	-	2024-12-11	Element Under Test
S/01	74191_44.1	SMA Cable	-	-	2024-12-11	Element Under Test
S/02	74191_32.1	Module circuit board	NINA-B400	-	2024-12-11	Element Under Test
S/02	74191_42.1	Antenna	FXP74.07.0100A	-	2024-12-11	Element Under Test
S/03	74191_24.1	Module circuit board	-	-	2024-12-11	Element Under Test
S/03	74191_23.1	Handlebar with antenna	D-ANT01	-	2024-12-11	Element Under Test

Notes referenced to samples during the project:

Id	Note
S/01	Testing with Linx antenna, test results in Annex A
S/01	Testing with Taoglas antenna, test results in Annex B
S/01	Testing with D-ANT antenna, test results in Annex C

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded			
	-	-	-	-			
Supplementary information to the ports..... :	-						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N PE	
		AC:					
		AC:					
	X	DC: 3.3					
		DC:					
Rated Power	-						
Clock frequencies..... :	-						
Other parameters	-						
Software version	91.02						
Hardware version	1004						
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: Module					
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			
	-		-	-			

Identification of the client

HILTI ENTWICKLUNGSGESELLSCHAFT GMBH
Hiltistrasse 6, 86916 Kaufering, Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2025-02-25
Date (finish)	2025-02-25

Document history

Report number	Date	Description
81135RRF.002	2025-05-05	First release.
81135RRF.002A1	2026-03-27	Second release. Modification due to typos. This modification cancels and replaces the test report 81135RRF.002

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: Álvaro Gutiérrez Naranjo.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
07445	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	--
07760	DIGITAL MULTIMETER	175	FLUKE	2025-11-07
07817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-07-01
06615	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
06609	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-22
04953	HIGH PASS FILTER 1.1-8GHz	WHK10-990-1100-8000-40SS	WAINWRIGHT INSTRUMENTS	2026-02-14
09029	HIGH PASS FILTER 17-40 GHZ	STHP-17-40G-92	TEMSTRON/TEM WELL	2025-03-29
08770	HIGH PASS FILTER 3-18 GHZ	ST-3GA2833-HS	TEMSTRON/TEM WELL	2025-08-02
06496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2026-12-01
04657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2026-06-12
06143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-01-22
07656	LOW PASS FILTER TEMSTRON/TEMWELL DC - 1 GHZ	ST-1GA3250-LS	TEMSTRON/TEM WELL	2026-02-03
07193	MULTI-DEVICE CONTROLLER	CO3000	INNCO	--
08856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2025-02-27
03783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2025-03-15
06142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2025-07-25
06144	PRE-AMPLIFIER G>40dB 10MHz-6GHz	BLNA 0160-01N	BONN ELEKTRONIK	2025-07-22
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	--
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--

Testing verdicts

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

Summary

Bluetooth Low Energy (2M).

FCC PART 15 PARAGRAPH/ RSS-247			
Requirement – Test case		Verdict	Remark
FCC 15.247 (a)(2) / RSS-247 5.2. (a)	6 dB Bandwidth	N/M	(1)
FCC 15.247 (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	N/M	(1)
FCC 15.247 (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	N/M	(1)
FCC 15.247 (e) / RSS-247 5.2. (b)	Power spectral density	N/M	(1)
FCC 15.247 (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	-
<u>Supplementary information and remarks:</u> (1) Only Emissions limitations radiated (Transmitter) test has been requested.			

Appendix A: Test results. Bluetooth Low Energy (2M). Linx antenna.

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 3.3 V
Type of Power Supply: Internal DC

ANTENNA (*):

Type of Antenna: FXP74.07.0100A; ANT-2.4-WRT-SMA; D-ANT01
Maximum Declared Antenna Gain: 4 dBi (peak); 9.1 dBi (peak); 3.5 dBi (peak)

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel:	Middle Channel	High Channel
BTLE GFSK	2M 2 Mbit/s	2402 MHz	2440 MHz	2480 MHz

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

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

RSS-247 5.5 / FCC 15.247 (d) [RSE] Emission limitations radiated (Transmitter)

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
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

Modulation: BTLE (GFSK 2 Mbit/s)

MIMO Mode: SISO

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[0.03, 1]	Digital Transmission System (DTS)	2402.00000	1	30.922	25.92	V	QP
				30.922	31.34	V	PK
				47.751	19.13	V	QP
				47.751	26.47	V	PK
				54.638	14.53	V	QP
				54.638	20.70	V	PK
				62.592	24.39	V	PK
				62.592	18.57	V	QP
				138.980	25.45	V	PK

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector	
				138.980	19.48	V	QP	
				215.512	18.99	V	QP	
				215.512	27.45	V	PK	
		2440.00000		47.993	27.99	V	PK	
				47.993	19.93	V	QP	
				50.467	21.59	V	QP	
				50.467	29.86	V	PK	
				63.174	21.92	V	QP	
				63.174	26.91	V	PK	
				139.125	20.64	V	QP	
				139.125	25.32	V	PK	
				208.431	26.13	V	PK	
				208.431	20.99	V	QP	
				298.108	18.97	V	QP	
				298.108	26.58	V	PK	
		2480.00000		49.303	21.26	V	QP	
				49.303	28.91	V	PK	
				57.209	21.44	V	PK	
				57.209	14.17	V	QP	
				62.931	19.84	V	QP	
				62.931	25.59	V	PK	
				140.047	18.08	V	QP	
				140.047	21.85	V	PK	
				202.126	24.22	V	PK	
				202.126	15.27	V	QP	
				304.510	17.08	V	QP	
				304.510	24.55	V	PK	

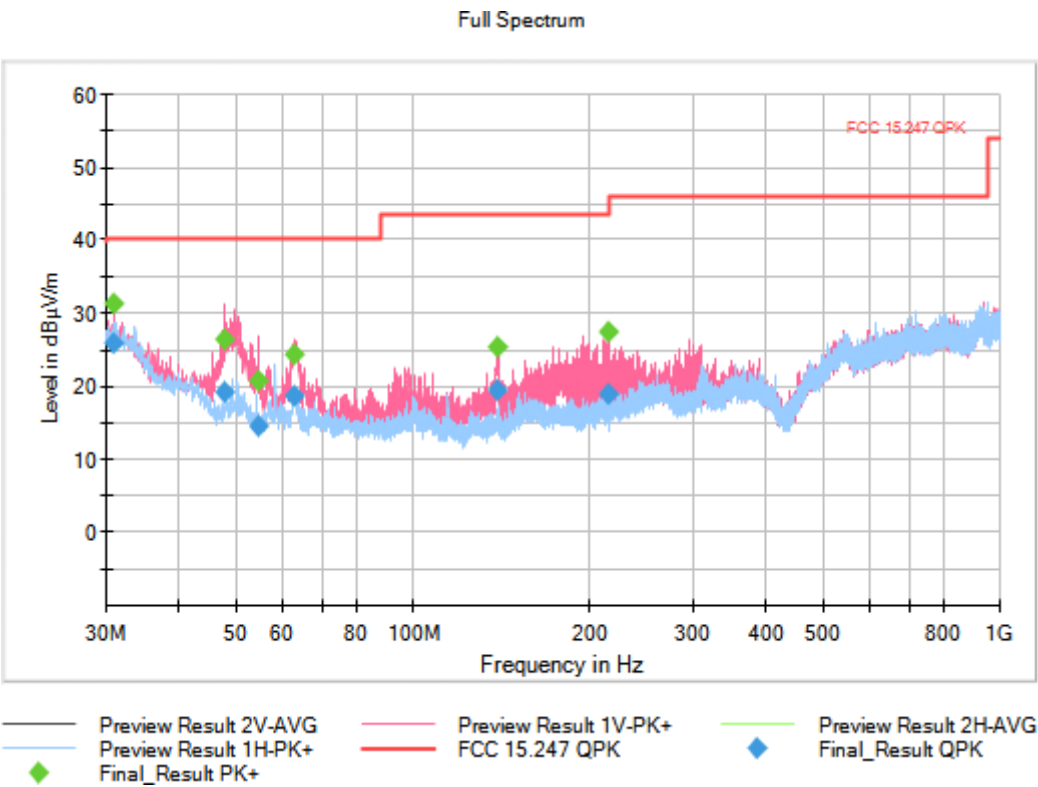
Verdict

Pass

Attachments

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



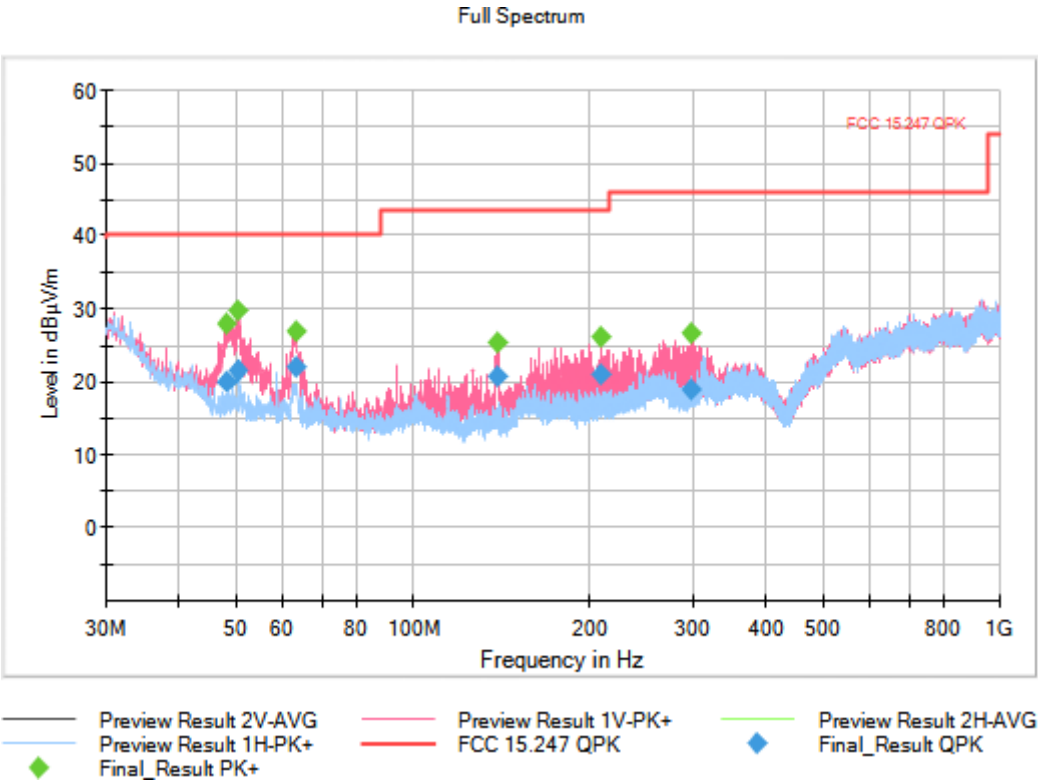
Tables:

Spectrum Analyzer Parameters

	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

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2440.00000
MIMO Mode = SISO Active Port = 1

Images:



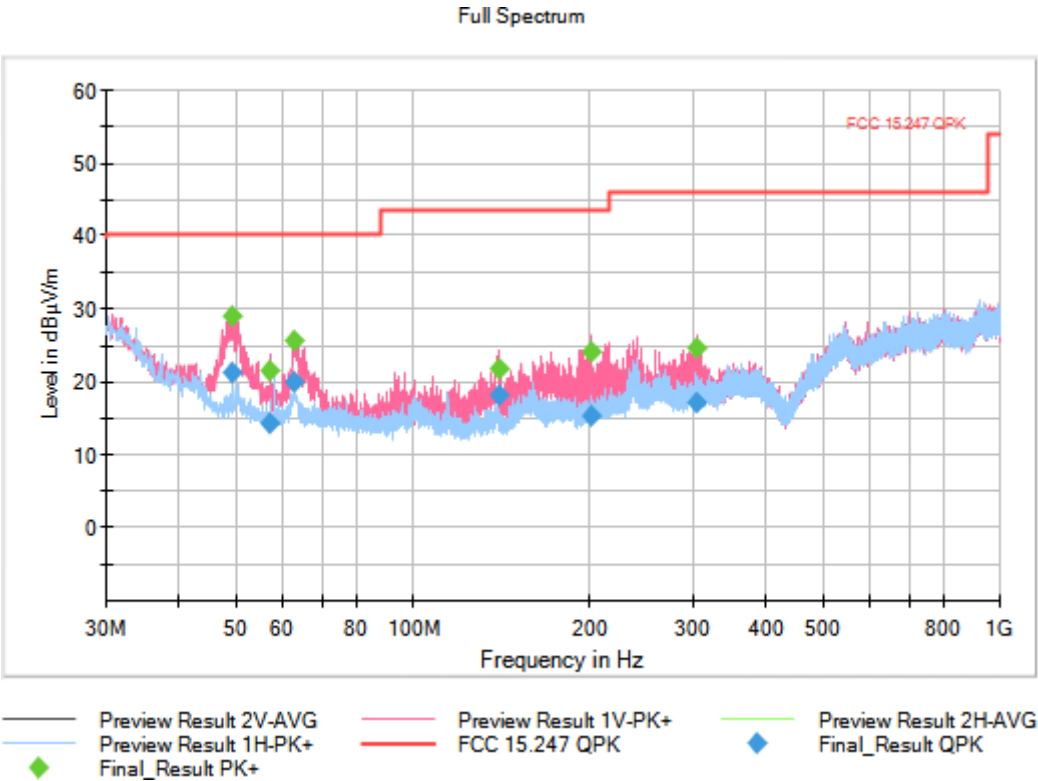
Tables:

Spectrum Analyzer Parameters

	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

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



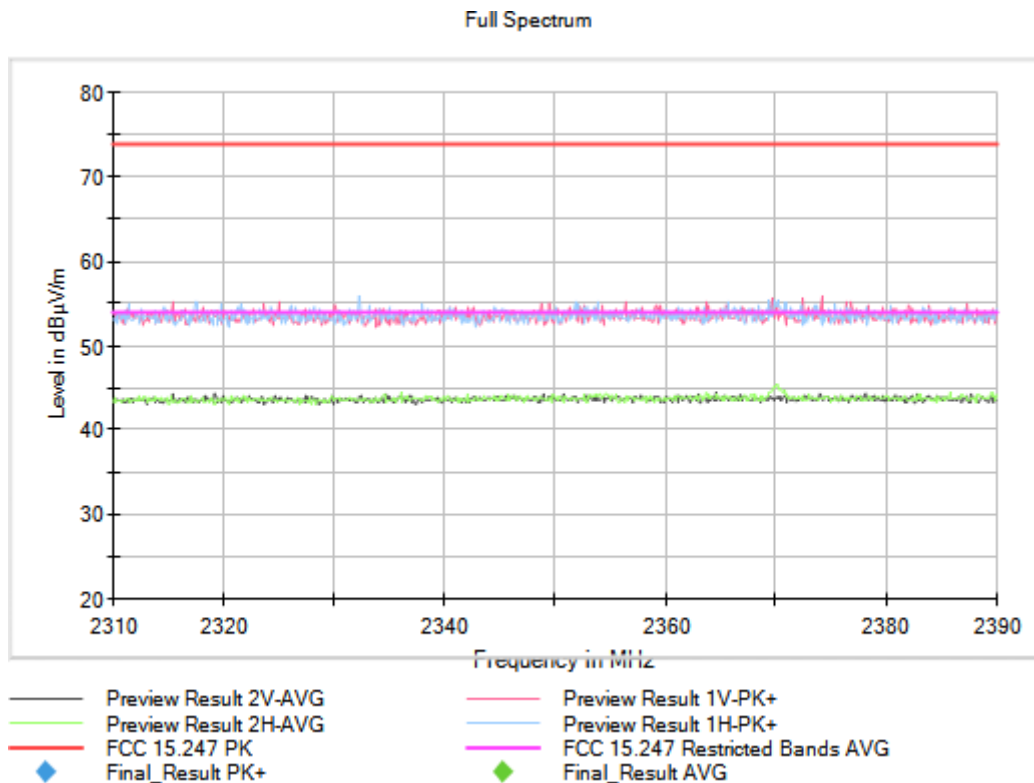
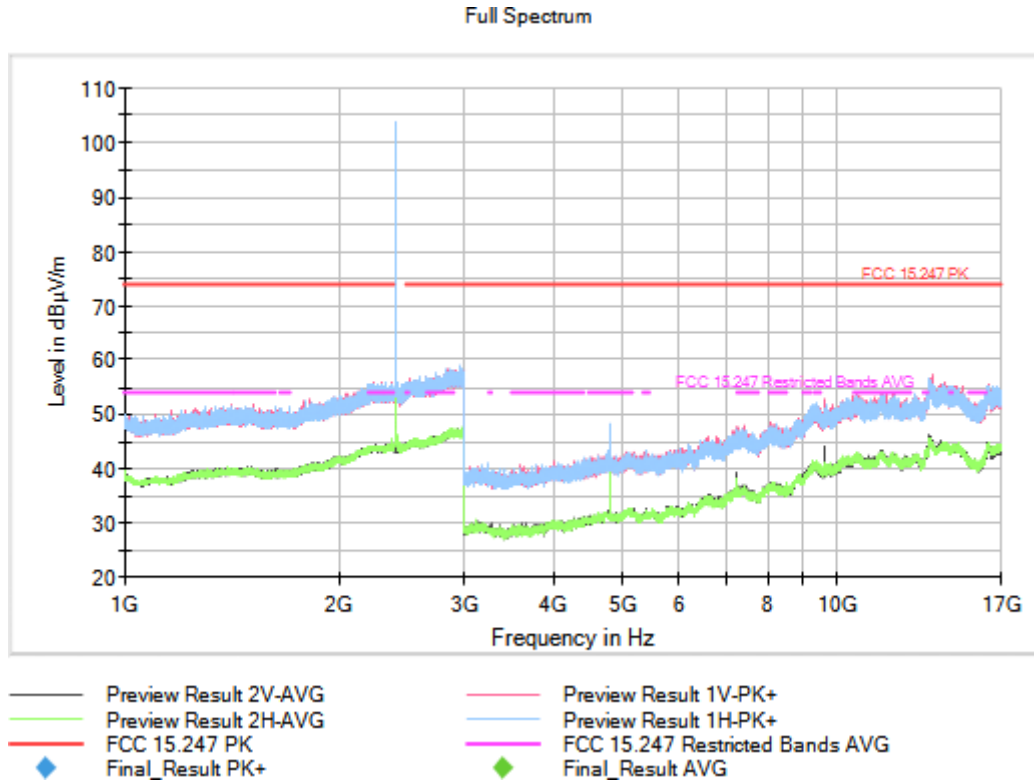
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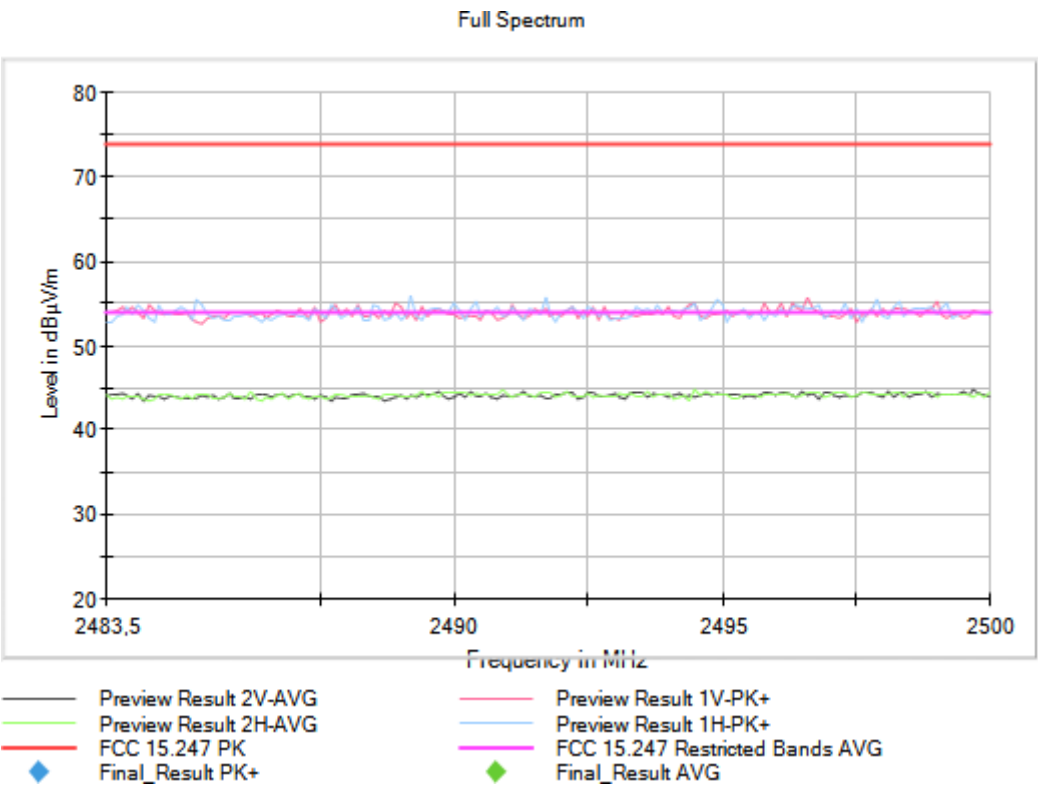
Spectrum Analyzer Parameters

	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

Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
 Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
 MIMO Mode = SISO Active Port = 1

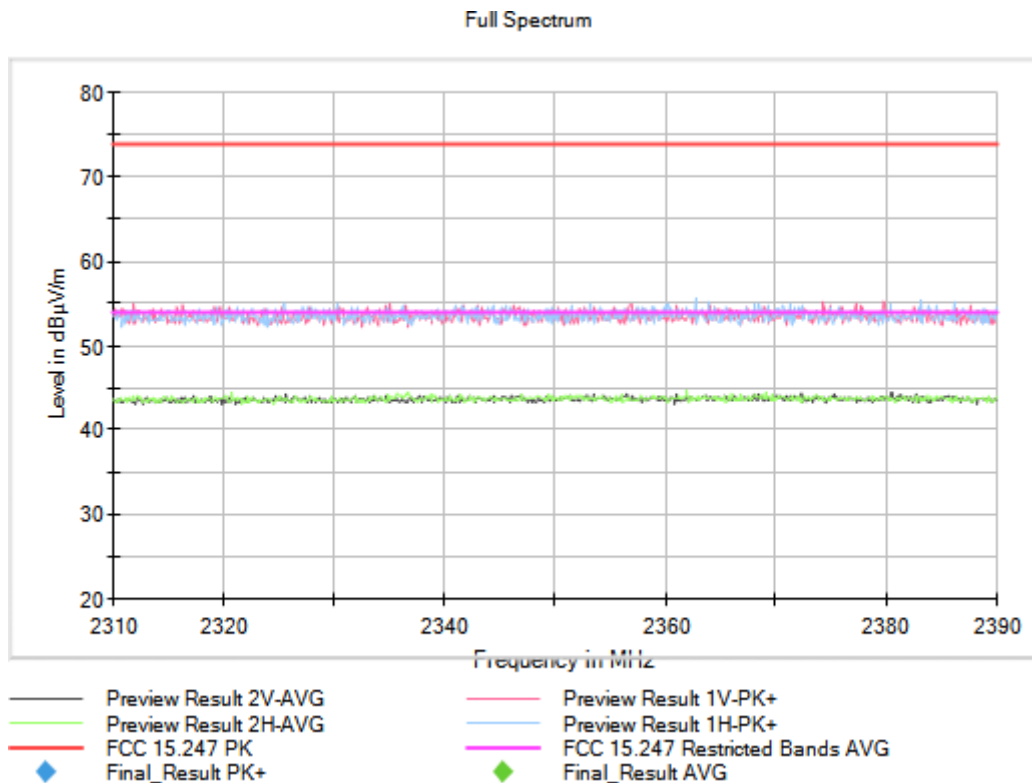
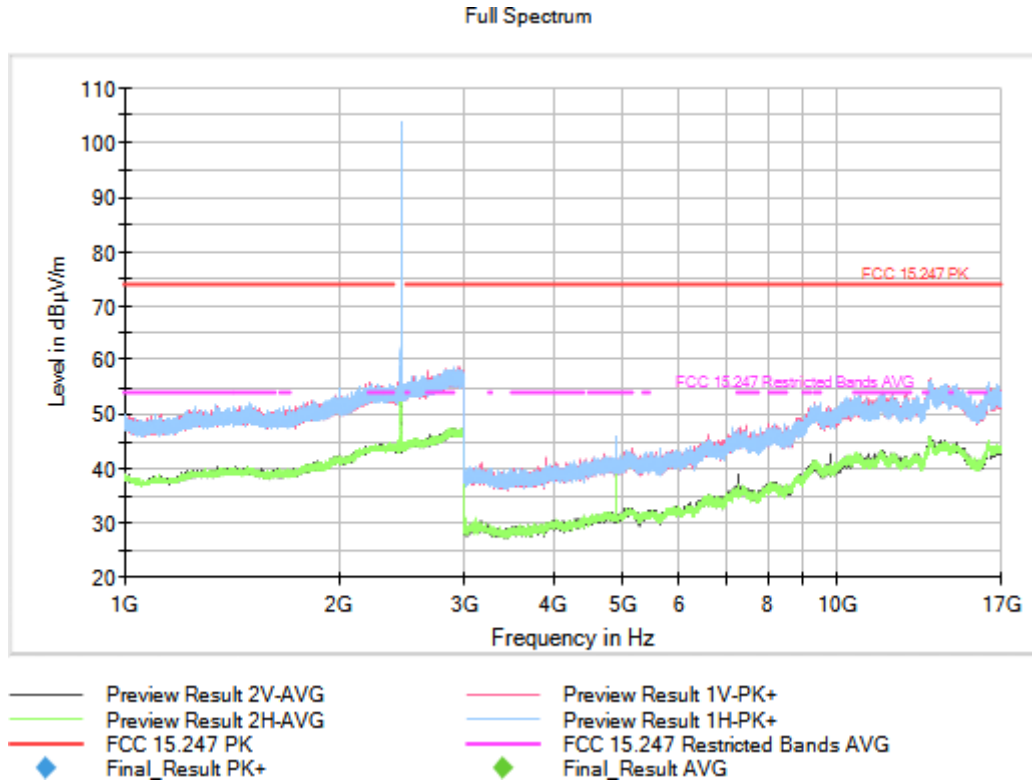
Images:

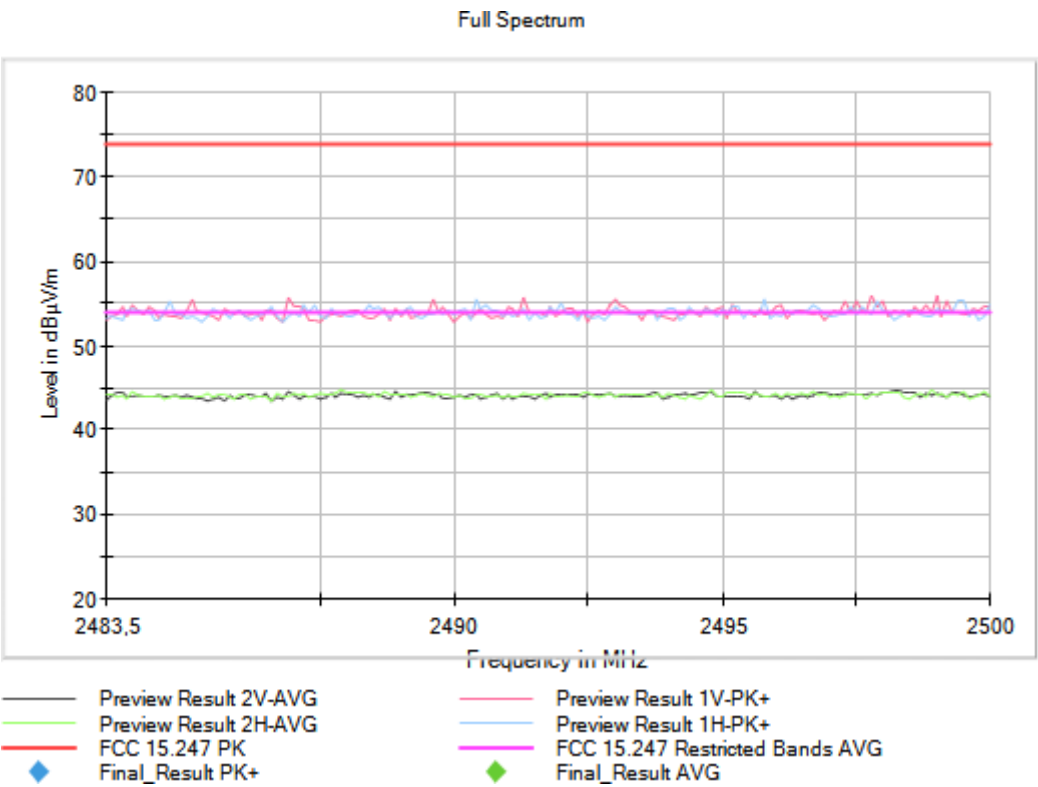




Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2440.00000
MIMO Mode = SISO Active Port = 1

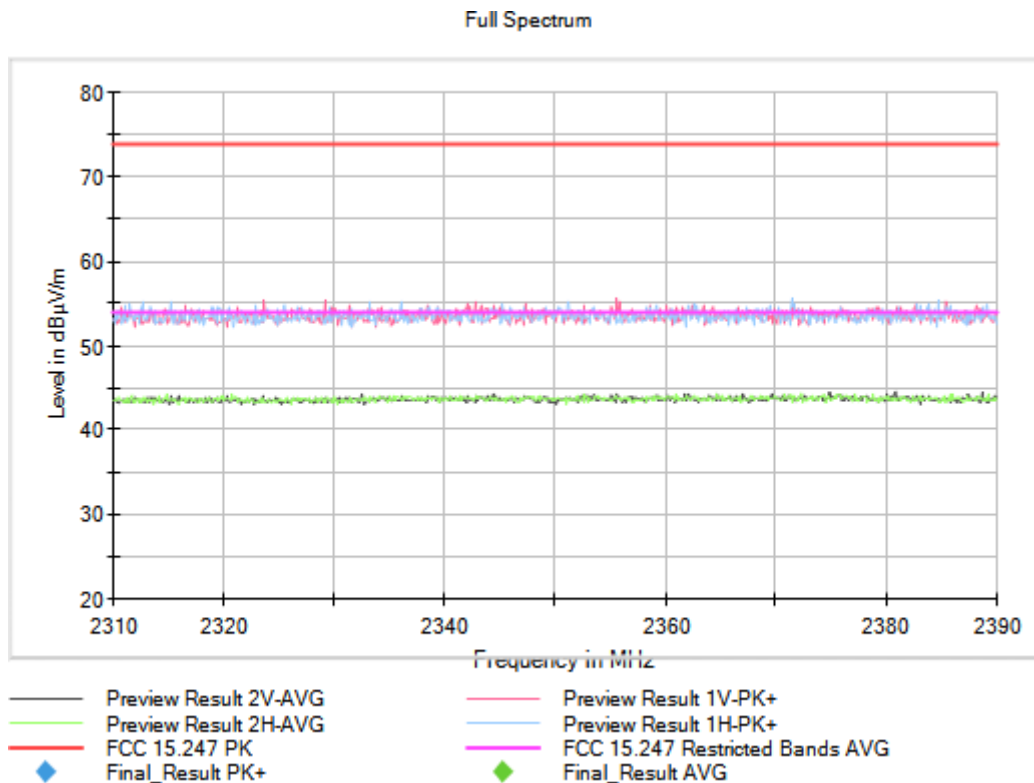
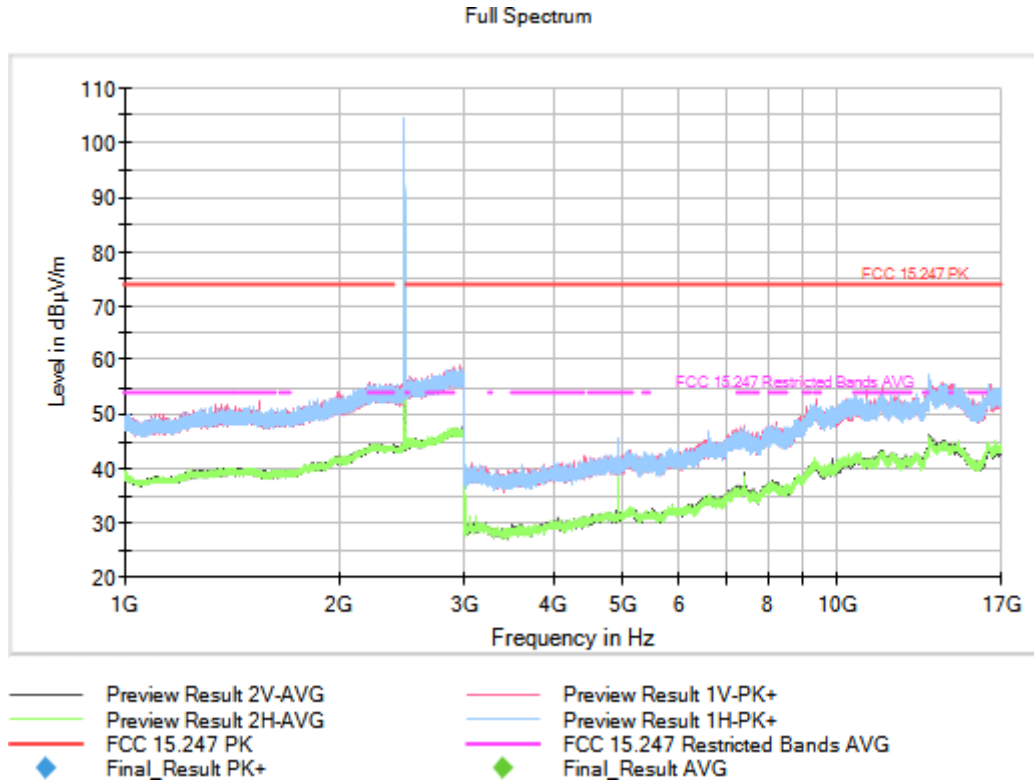
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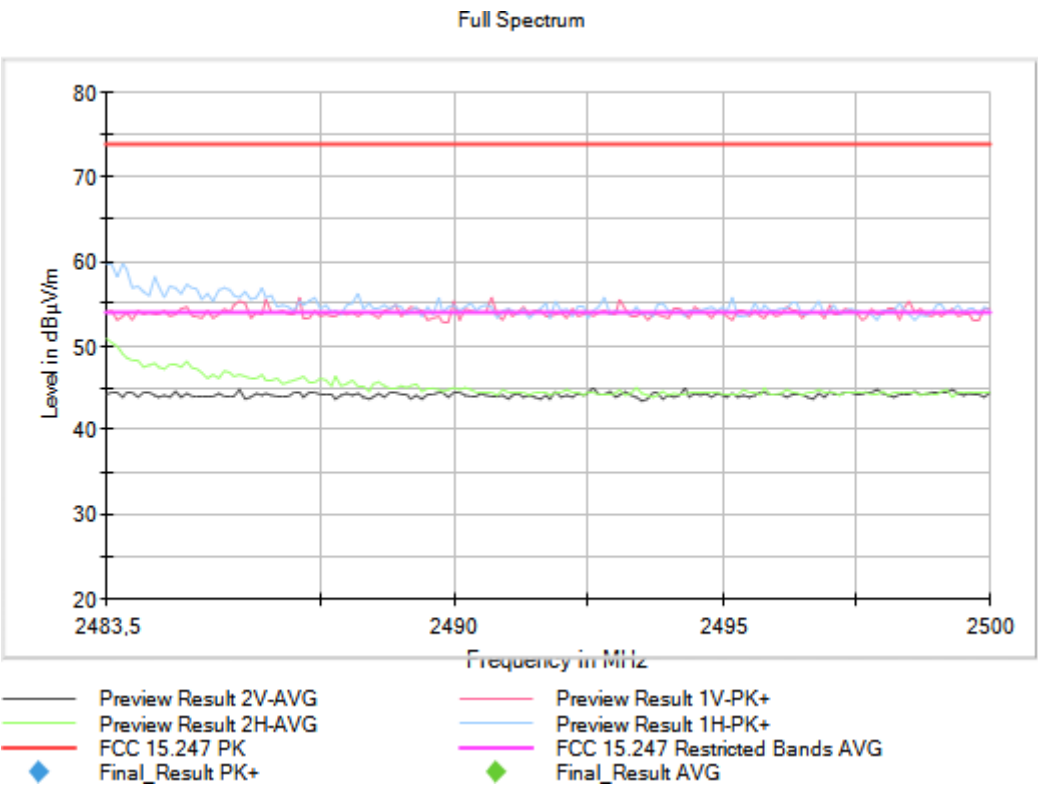




Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

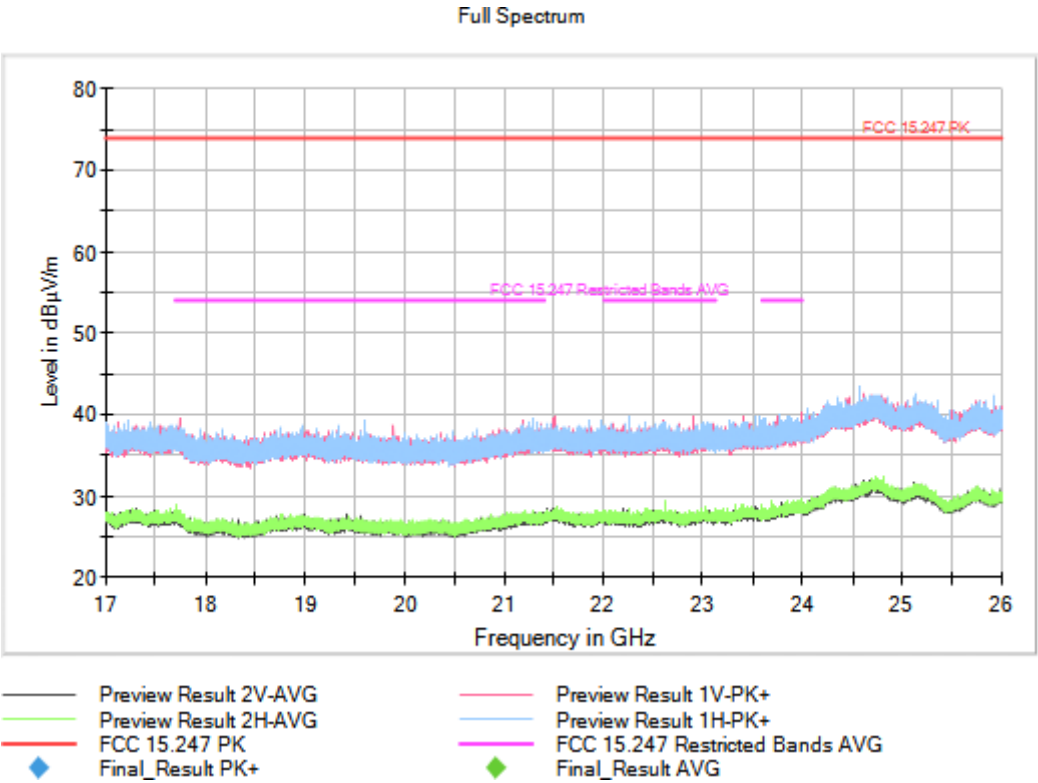
Images:





Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Appendix B: Test results. Bluetooth Low Energy (2M). Taoglas antenna.

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 3.3 V
Type of Power Supply: Internal DC

ANTENNA (*):

Type of Antenna: FXP74.07.0100A; ANT-2.4-WRT-SMA; D-ANT01
Maximum Declared Antenna Gain: 4 dBi (peak); 9.1 dBi (peak); 3. dBi (peak)

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel:	Middle Channel	High Channel
BTLE GFSK	2M 2 Mbit/s	2402 MHz	2440 MHz	2480 MHz

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

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

RSS-247 5.5 / FCC 15.247 (d) [RSE] Emission limitations radiated (Transmitter)

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
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

Modulation: BTLE (GFSK 2 Mbit/s)

MIMO Mode: SISO

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[0.03, 1]	Digital Transmission System (DTS)	2402.00000	1	48.818	26.67	V	PK
				48.818	20.47	V	QP
				68.169	17.16	V	QP
				68.169	24.06	V	PK
				100.616	18.00	V	QP
				100.616	27.03	V	PK
				139.998	20.81	V	QP
				139.998	26.06	V	PK
				194.124	27.23	V	PK

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector	
				194.124	18.57	V	QP	
				303.491	18.12	V	QP	
				303.491	27.59	V	PK	
		2440.00000		50.322	26.52	V	PK	
				50.322	18.54	V	QP	
				62.931	23.37	V	PK	
				62.931	18.00	V	QP	
				68.897	18.24	V	QP	
				68.897	26.19	V	PK	
				139.561	25.38	V	PK	
				139.561	20.54	V	QP	
				171.814	26.93	V	PK	
				171.814	23.07	V	QP	
				197.083	16.90	V	QP	
				197.083	25.82	V	PK	
		2480.00000		50.516	28.73	V	PK	
				50.516	19.91	V	QP	
				67.879	24.29	V	PK	
				67.879	16.77	V	QP	
				100.616	22.68	V	PK	
				100.616	16.01	V	QP	
				139.368	19.20	V	QP	
				139.368	24.43	V	PK	
				182.921	14.66	V	QP	
				182.921	22.89	V	PK	
				194.755	25.14	V	PK	
				194.755	16.84	V	QP	

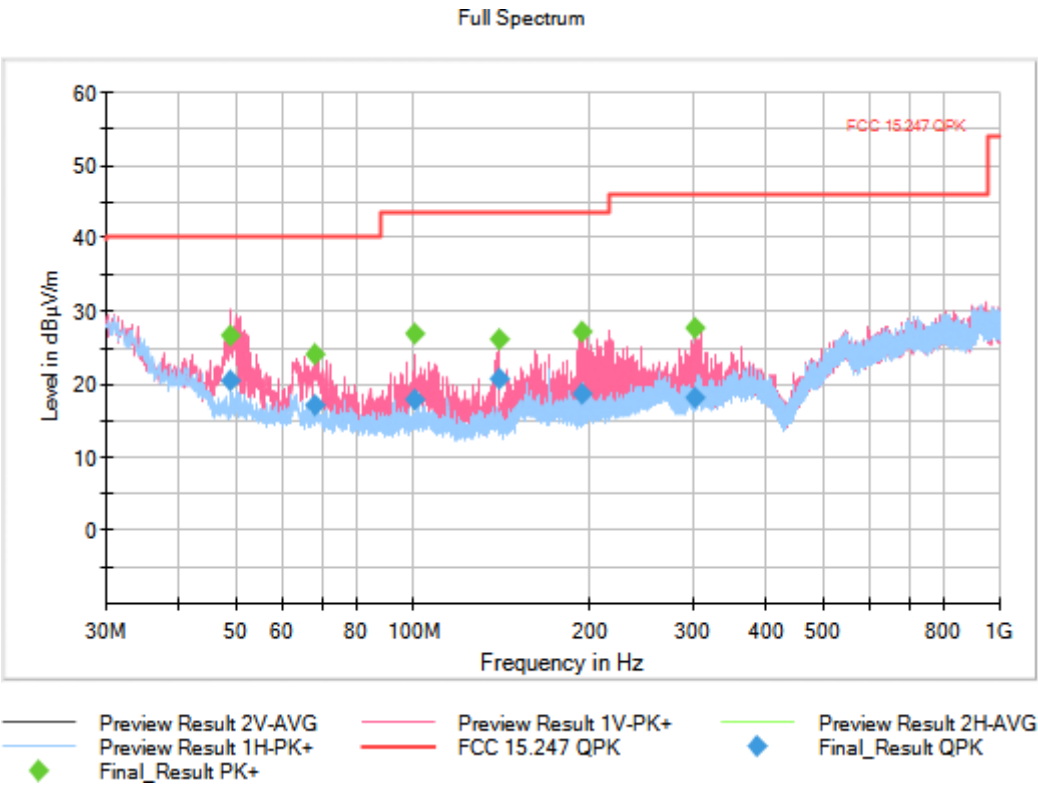
Verdict

Pass

Attachments

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



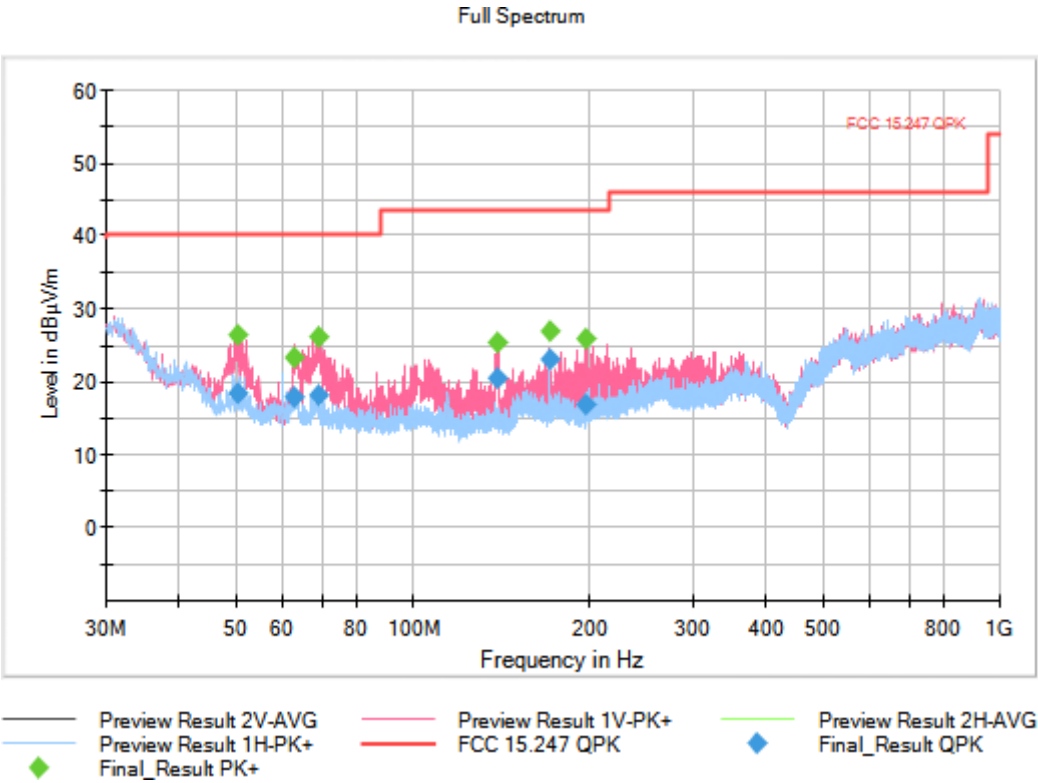
Tables:

Spectrum Analyzer Parameters

	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

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2440.00000
MIMO Mode = SISO Active Port = 1

Images:



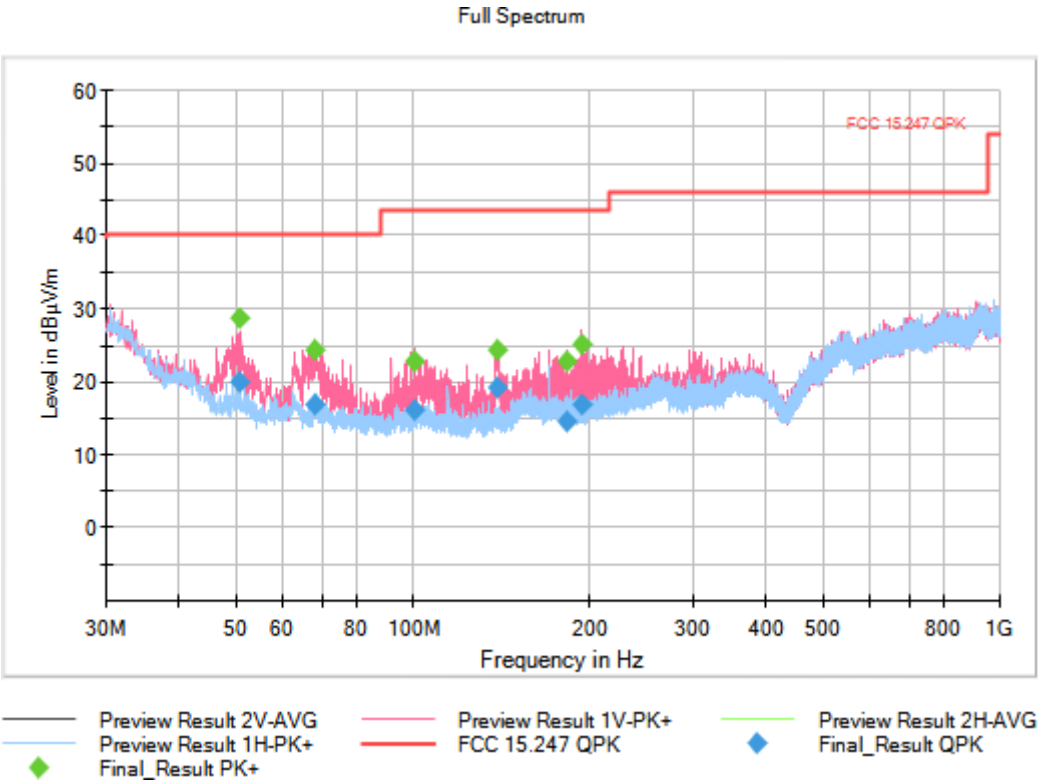
Tables:

Spectrum Analyzer Parameters

	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

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



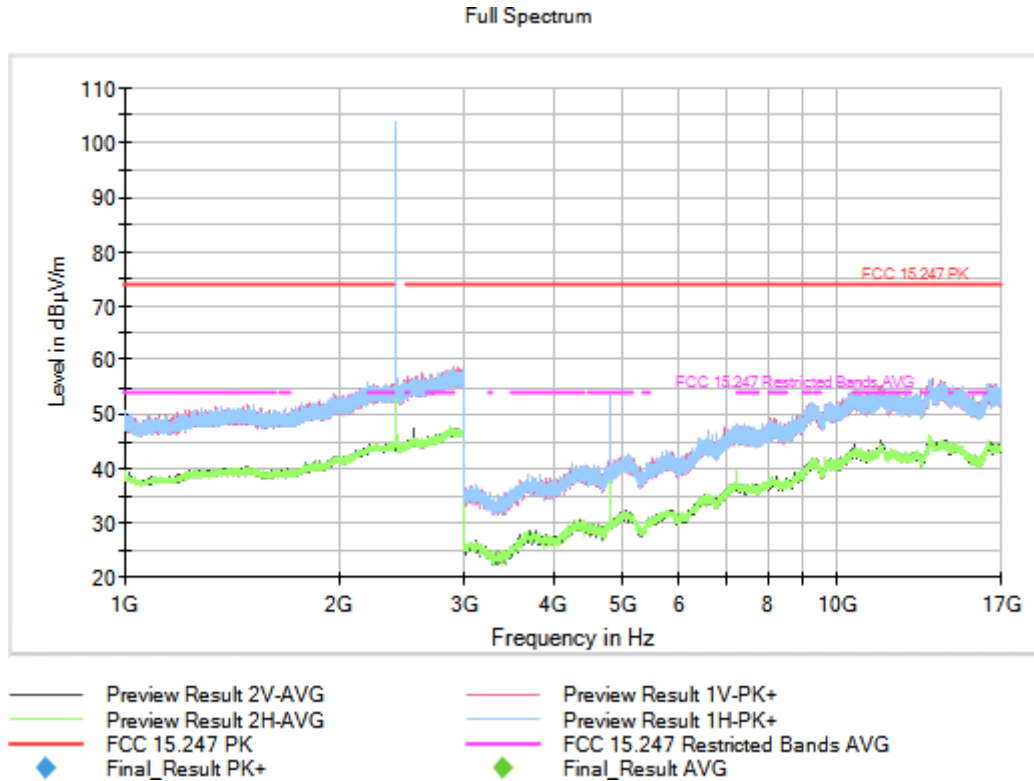
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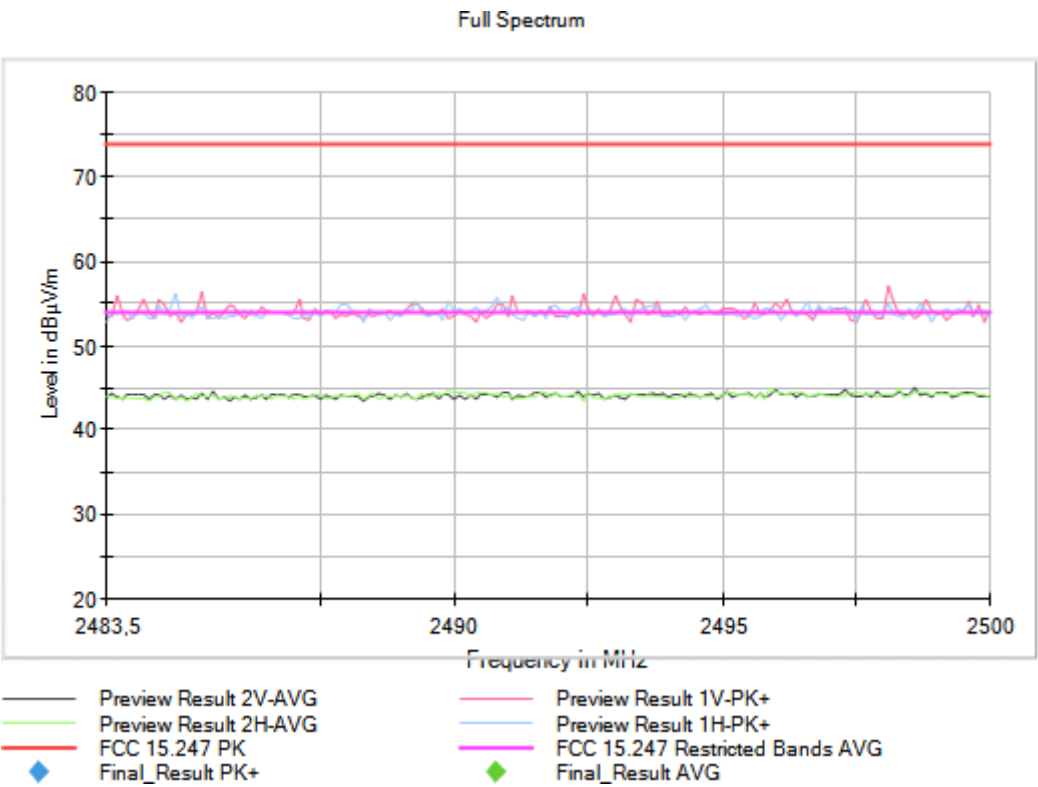
Spectrum Analyzer Parameters

	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

Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

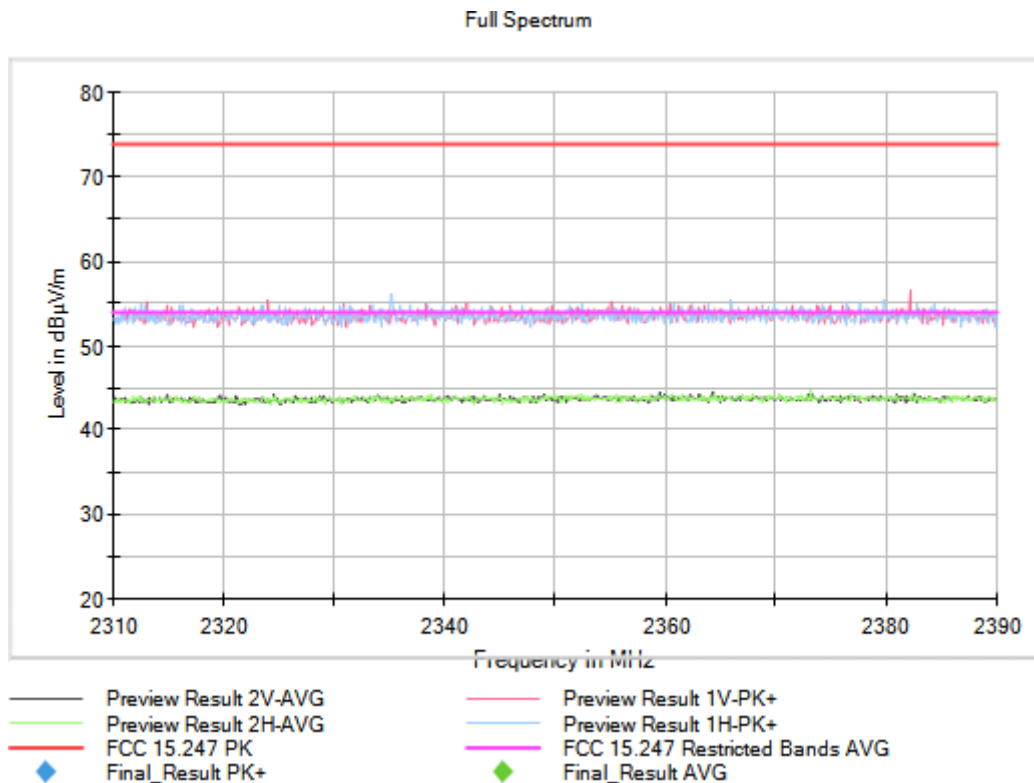
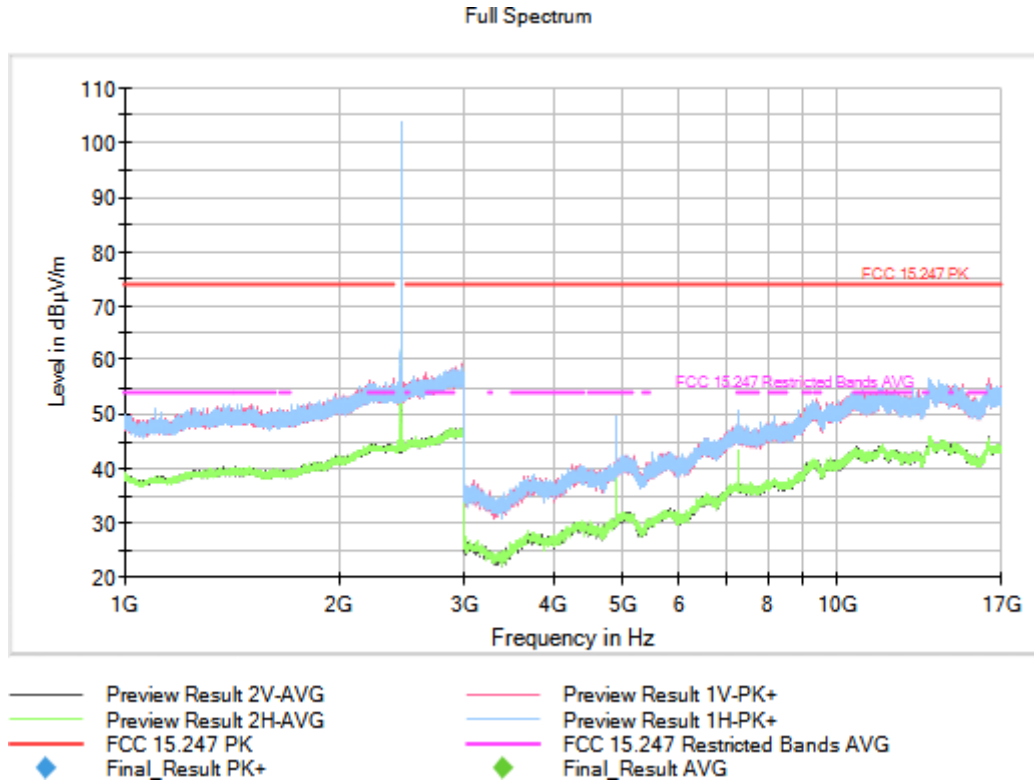
Images:

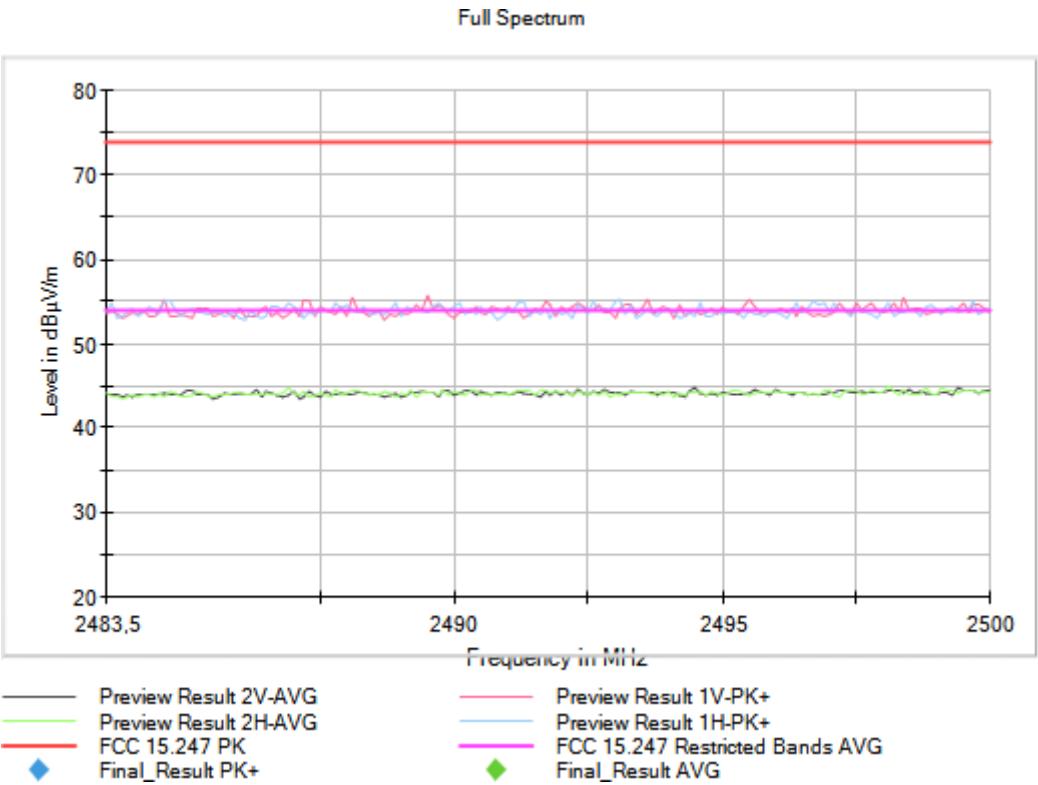




Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2440.00000
MIMO Mode = SISO Active Port = 1

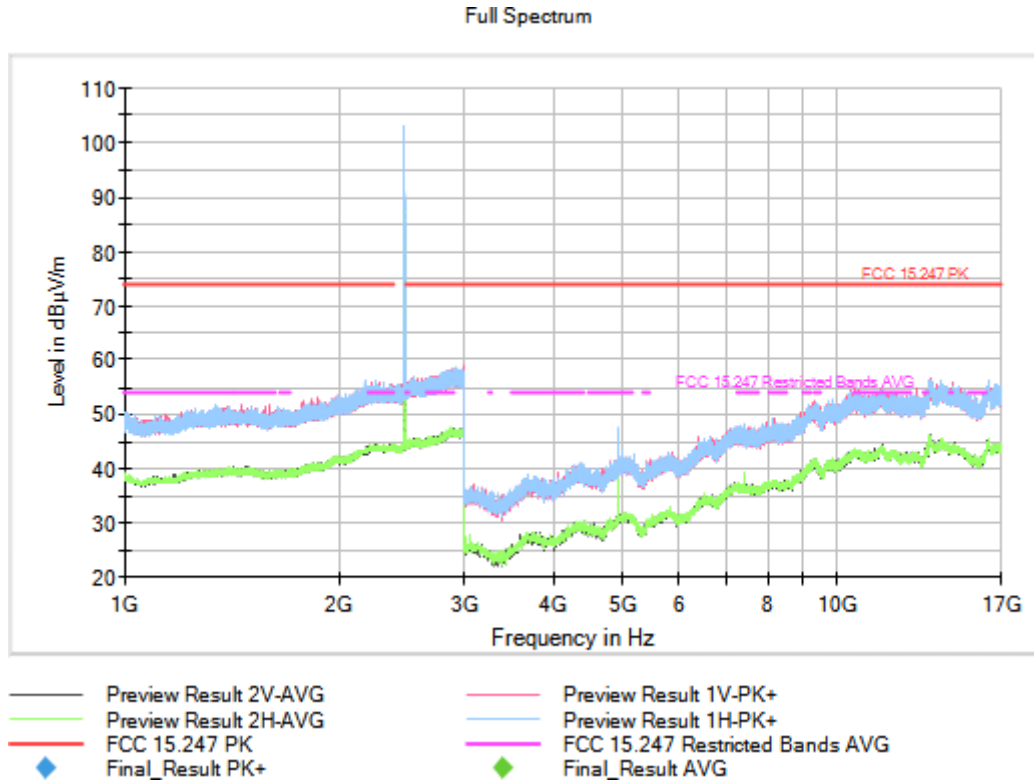
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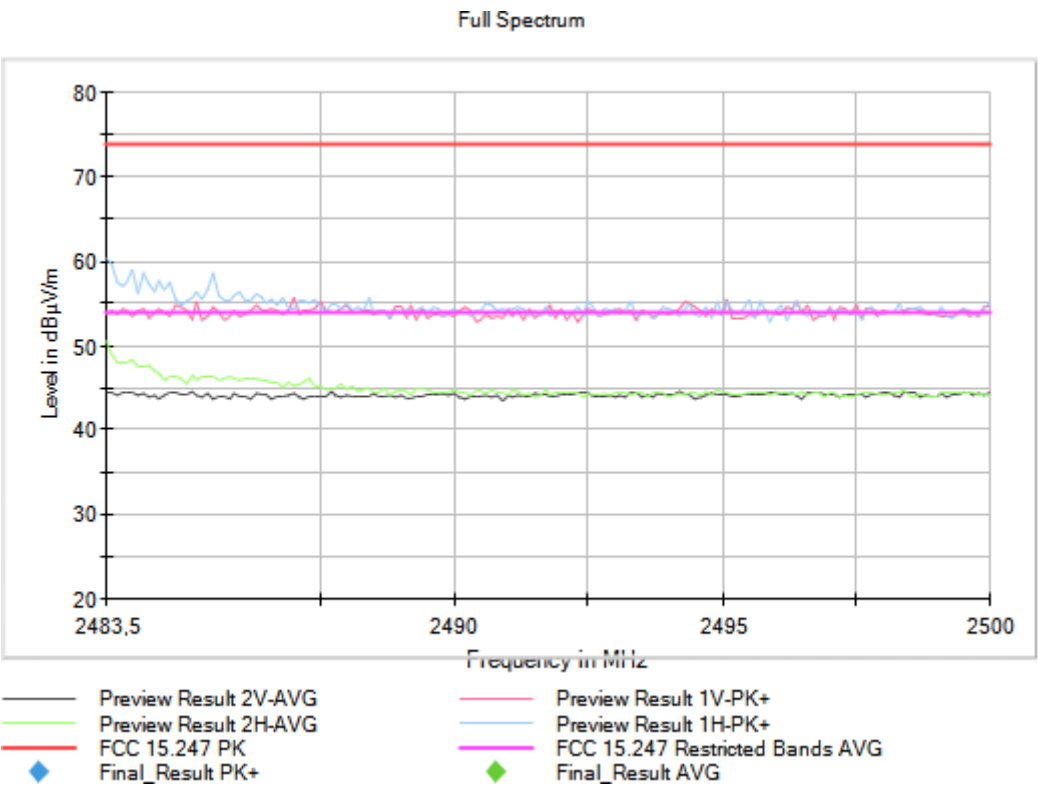




Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
 Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2480.00000
 MIMO Mode = SISO Active Port = 1

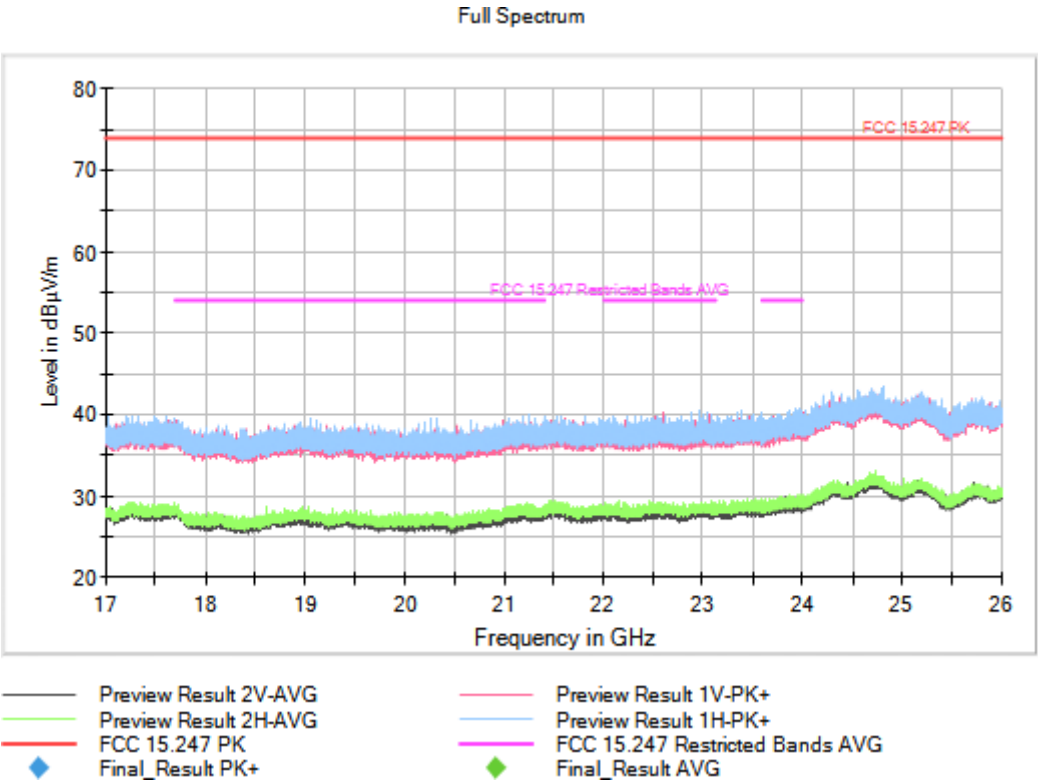
Images:





Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



Appendix C: Test results. Bluetooth Low Energy (2M). D-ANT antenna.

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 3.3 V
Type of Power Supply: Internal DC

ANTENNA (*):

Type of Antenna: FXP74.07.0100A; ANT-2.4-WRT-SMA; D-ANT01
Maximum Declared Antenna Gain: 4 dBi (peak); 9.1 dBi (peak); 3.5 dBi (peak)

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel:	Middle Channel	High Channel
BTLE GFSK	2M 2 Mbit/s	2402 MHz	2440 MHz	2480 MHz

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

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

RSS-247 5.5 / FCC 15.247 (d) [RSE] Emission limitations radiated (Transmitter)

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
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

Modulation: BTLE (GFSK 2 Mbit/s)

MIMO Mode: SISO

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[0.03, 1]	Digital Transmission System (DTS)	2402.00000	1	47.218	26.54	V	PK
				47.218	19.01	V	QP
				57.645	16.59	H	PK
				57.645	11.40	H	QP
				68.849	23.62	V	PK
				68.849	16.80	V	QP
				195.094	27.34	V	PK
				195.094	18.91	V	QP
				299.951	24.80	V	PK

Freq Rng (GHz)	Equipment	Freq (MHz)	Port	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector	
				299.951	16.13	V	QP	
				937.678	31.00	V	PK	
				937.678	25.38	V	QP	
		2440.00000		46.587	26.53	V	PK	
				46.587	19.80	V	QP	
				68.606	15.48	V	QP	
				68.606	20.56	V	PK	
				109.007	19.94	V	PK	
				109.007	12.58	V	QP	
				139.270	23.52	V	PK	
				139.270	18.35	V	QP	
				214.251	14.30	V	QP	
				214.251	22.40	V	PK	
				302.425	23.26	V	PK	
				302.425	15.36	V	QP	
		2480.00000		46.344	27.90	V	PK	
				46.344	20.51	V	QP	
				69.479	15.09	V	QP	
				69.479	22.09	V	PK	
				98.142	15.87	V	QP	
				98.142	23.32	V	PK	
				140.338	19.84	V	QP	
				140.338	25.25	V	PK	
				192.718	18.07	V	QP	
				192.718	26.94	V	PK	
				243.497	25.23	V	PK	
				243.497	16.80	V	QP	

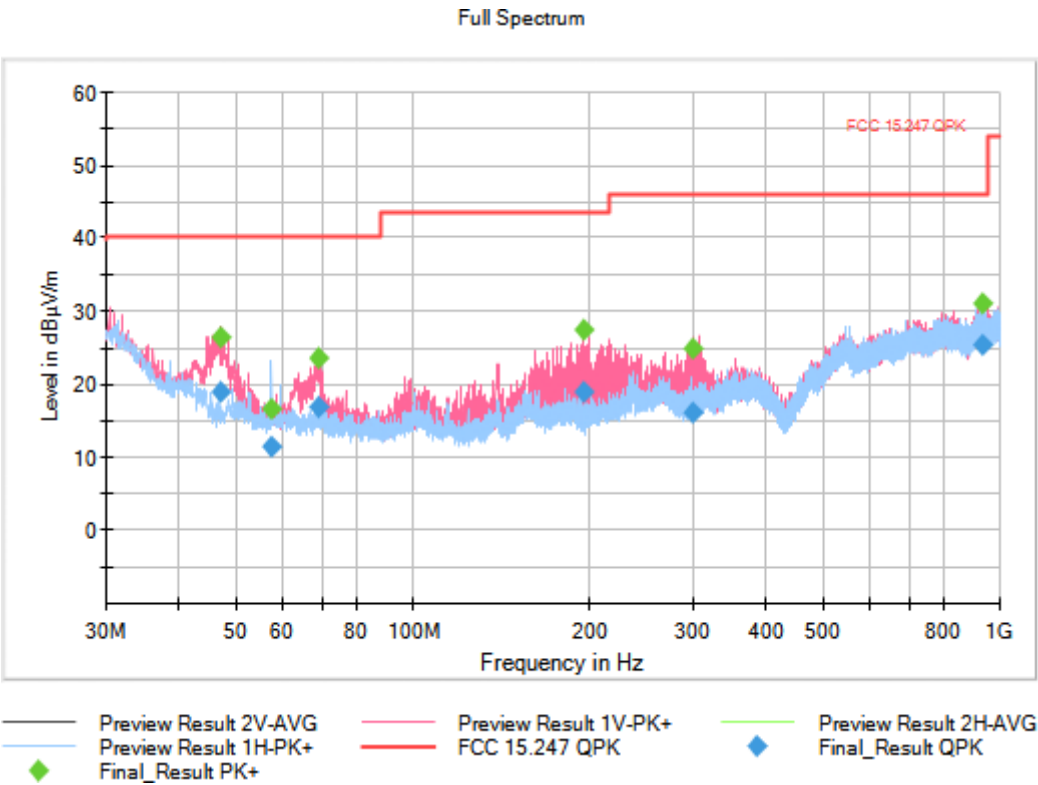
Verdict

Pass

Attachments

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:



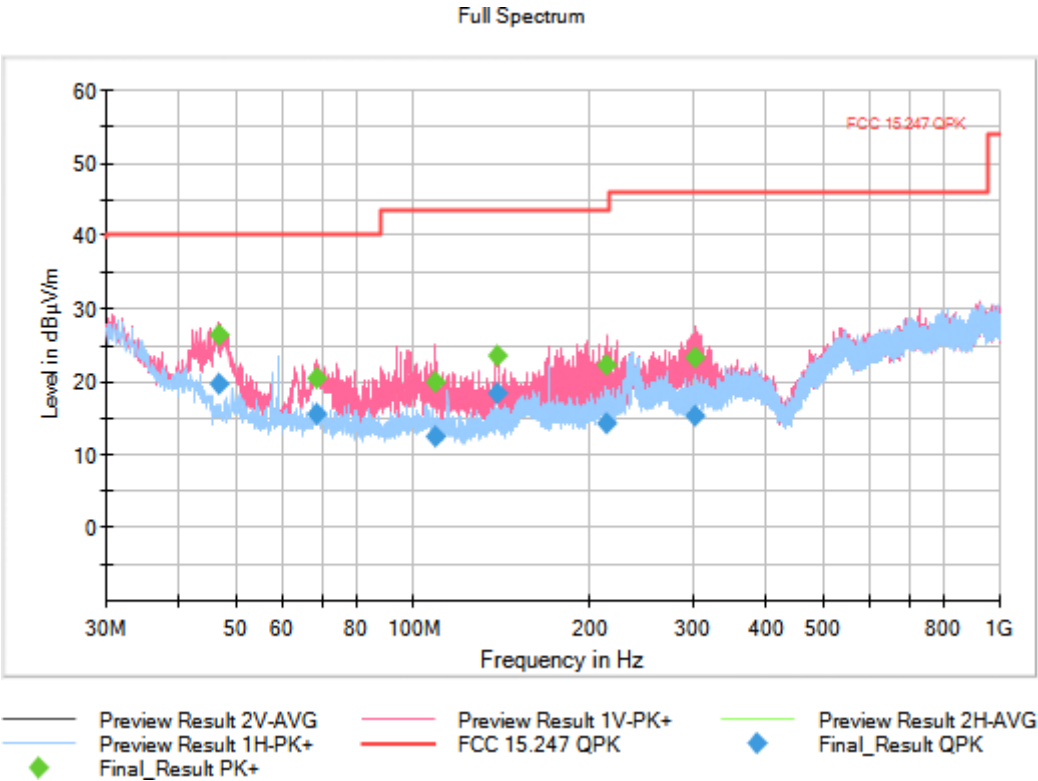
Tables:

Spectrum Analyzer Parameters

	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

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2440.00000
MIMO Mode = SISO Active Port = 1

Images:



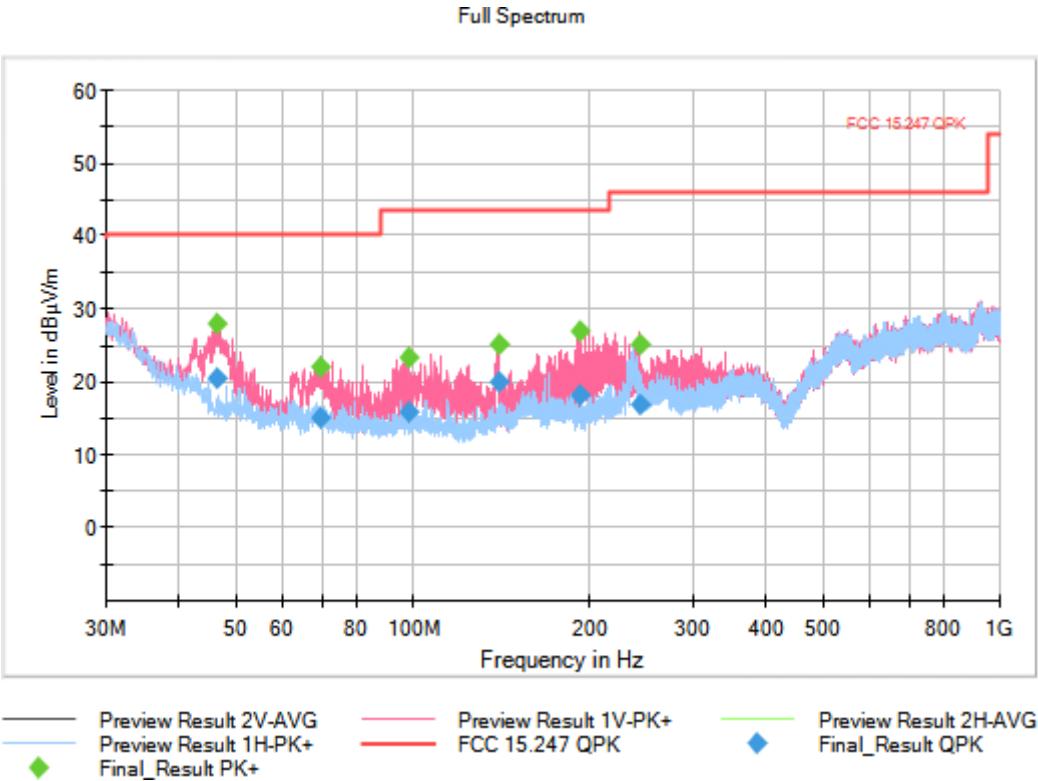
Tables:

Spectrum Analyzer Parameters

	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

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2480.00000
MIMO Mode = SISO Active Port = 1

Images:



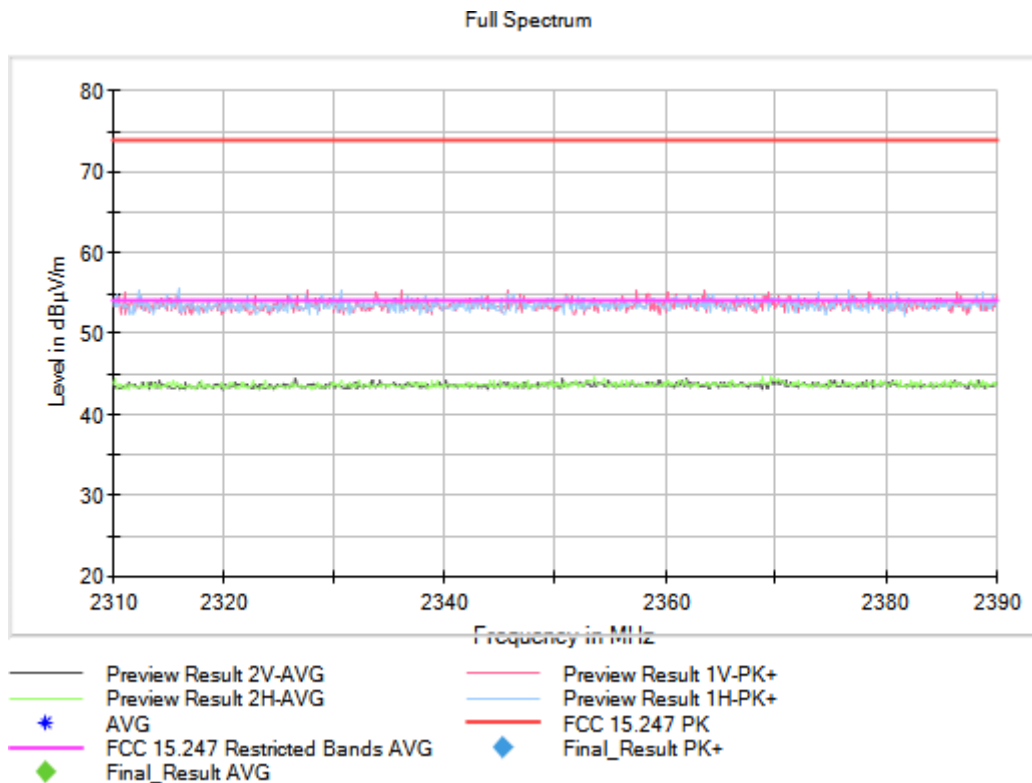
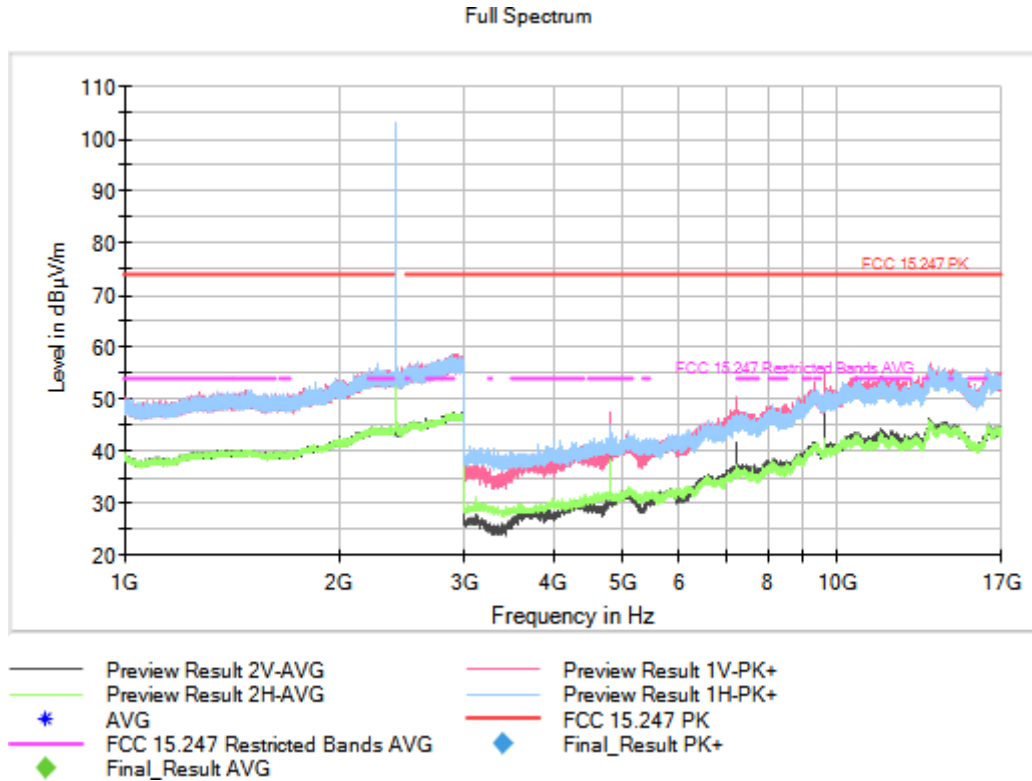
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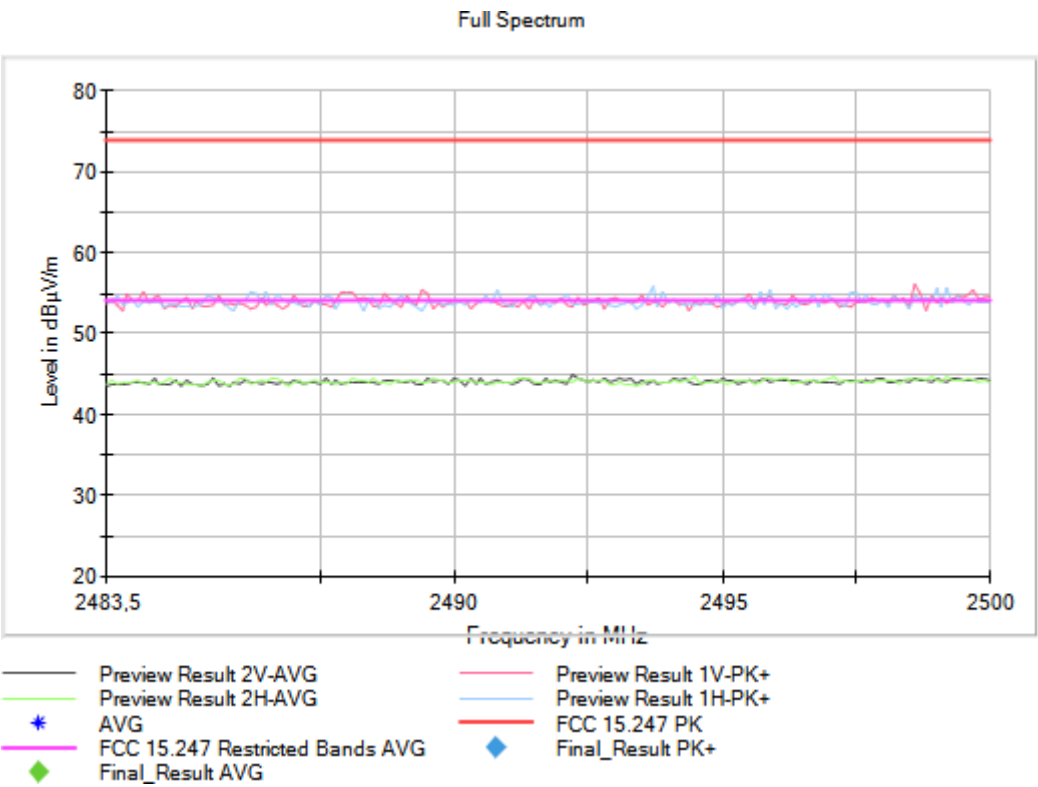
Spectrum Analyzer Parameters

	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

Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
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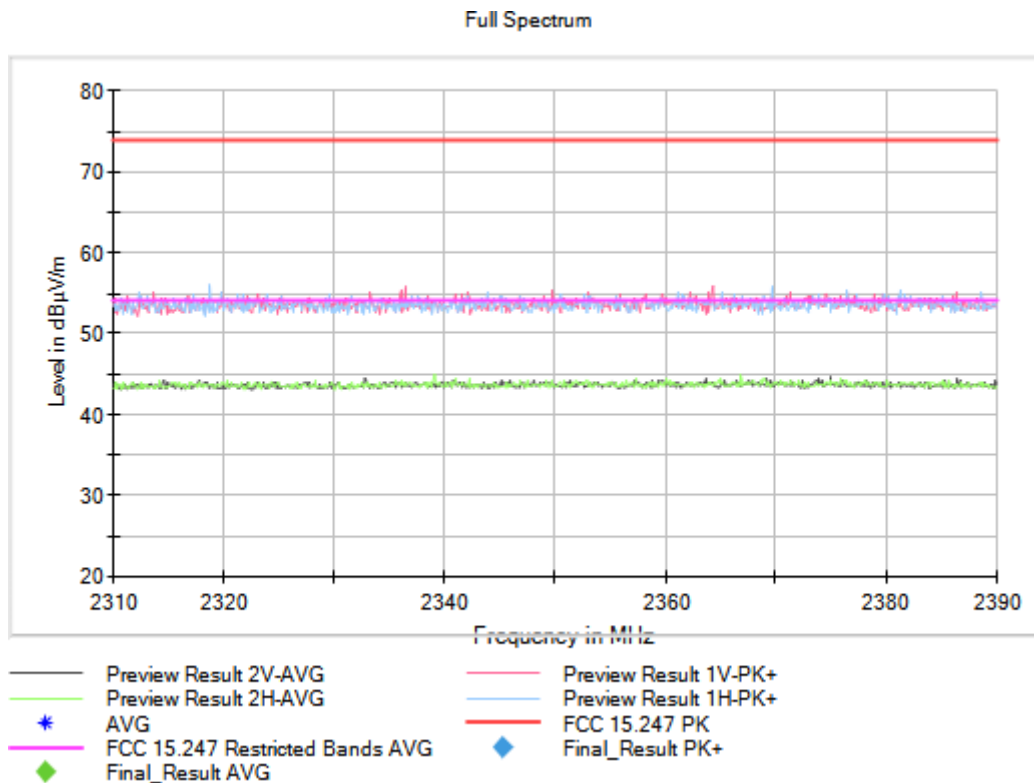
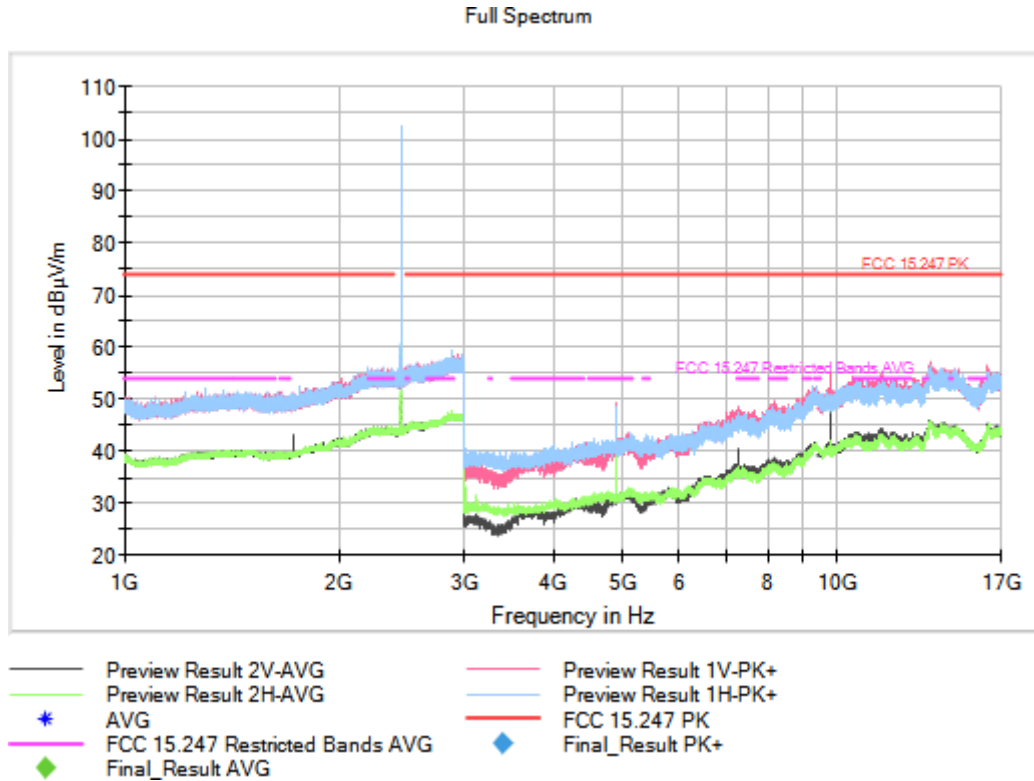
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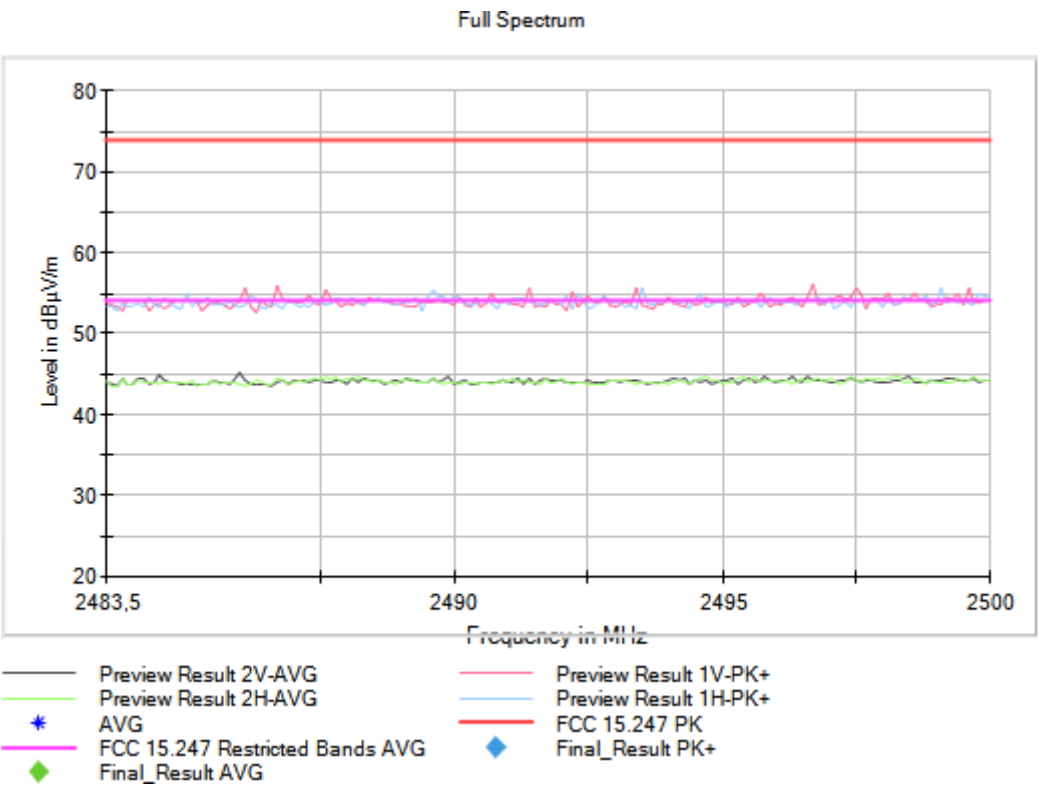




Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
 Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2440.00000
 MIMO Mode = SISO Active Port = 1

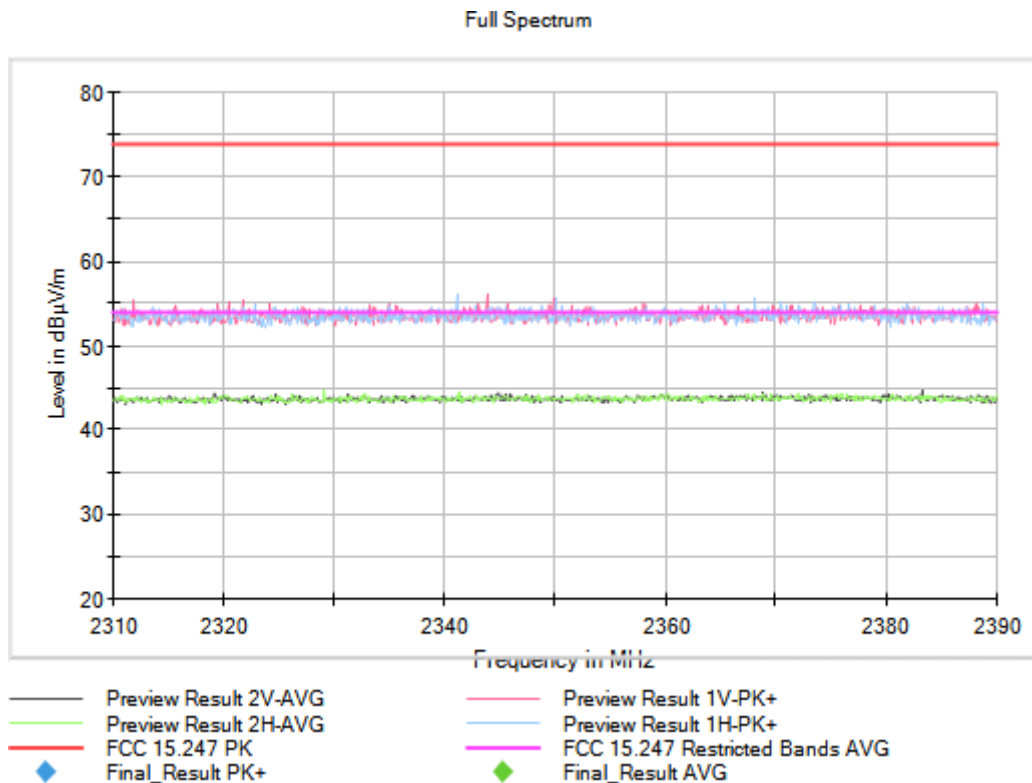
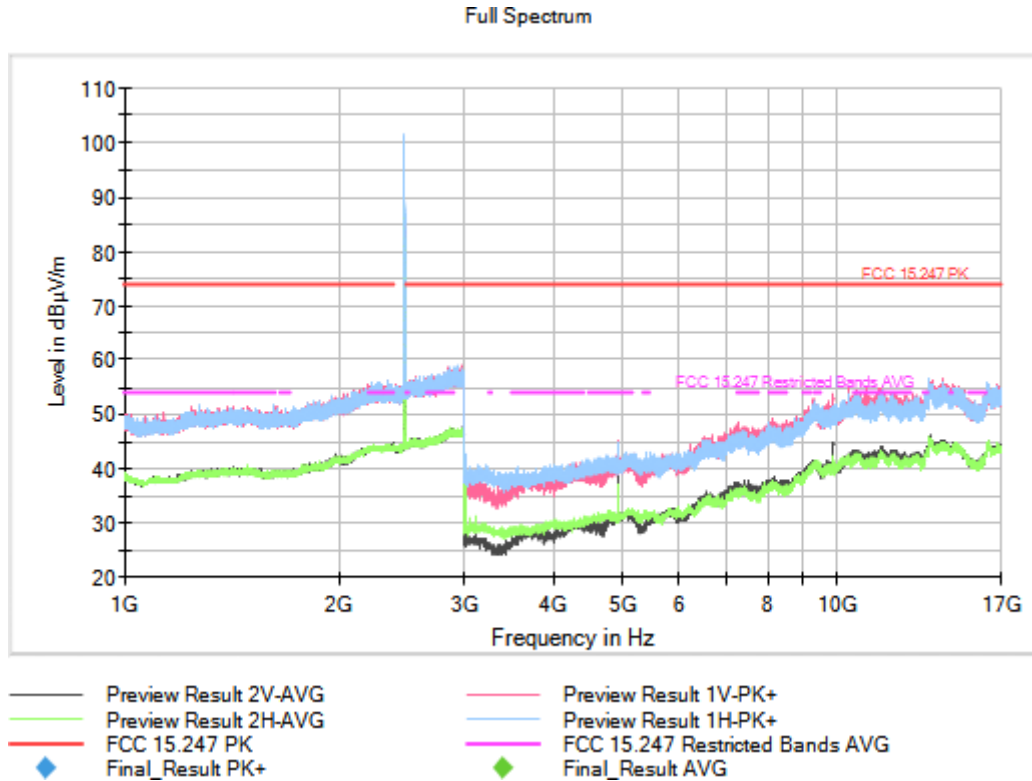
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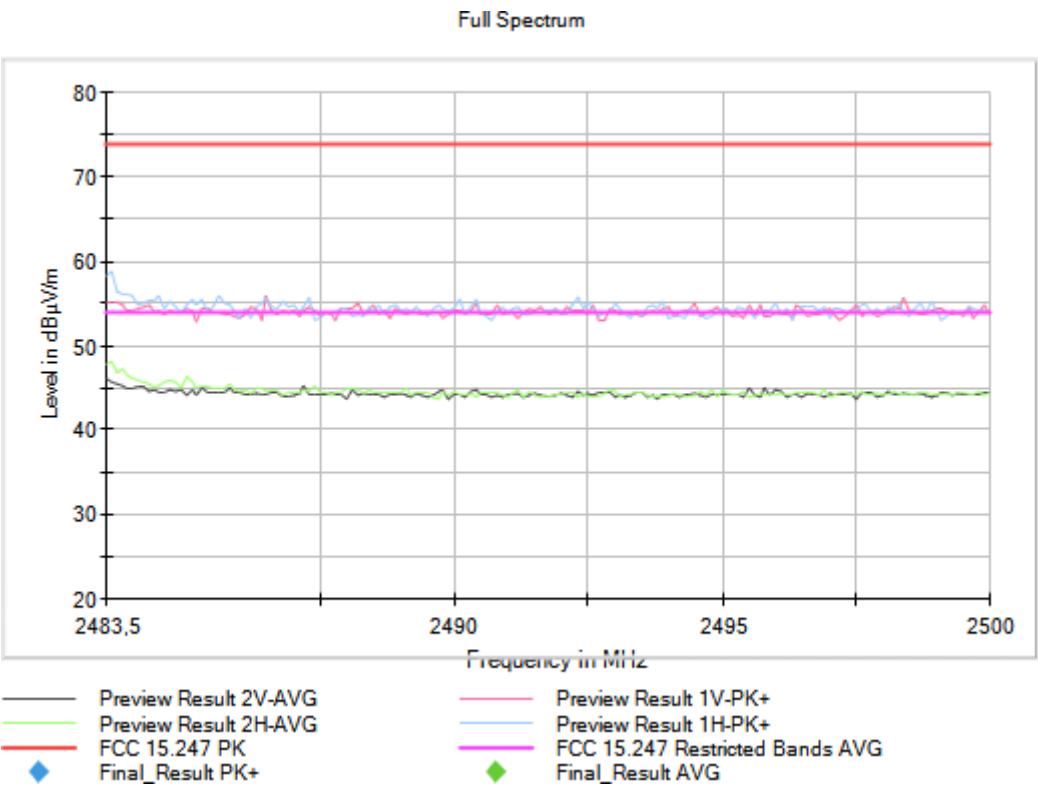




Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
 Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2480.00000
 MIMO Mode = SISO Active Port = 1

Images:





Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)
Modulation = BTLE (GFSK 2 Mbit/s) Frequency MHz = 2402.00000
MIMO Mode = SISO Active Port = 1

Images:

