

ISED CABid: ES1909

Test Report No:
 NIE: 71042RRF.002A1

Partial Test Report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Bluetooth connected shaver
(*) Trademark	Philips
(*) Model and /or type reference	Series S7700 Tested model: S7786 Similar models not tested: S7782, S7787, S7788, S9502 & S9507
Other identification of the product	HW version: 2.0 SW version: 2100 FCC ID: 2AICSS77A IC: 21912-S77
(*) Features	Bluetooth Low Energy (5.1)
Manufacturer	Philips Oliemolenstraat 5, 9203 ZN Drachten The Netherlands
Test method requested, standard	USA FCC Part 15.247 (10-1-20 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-20 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 Amendment 1 (March 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. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab. Manager
Date of issue	2022-04-13
Report template No.	FDT08_23 (*) "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
Mod	Modulation
Pol	Polarization
RSE	Radiated Spurious Emissions
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 is a 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").

The sample consists of a Philips Series S7800 Bluetooth connected shaver which can be connected to a mobile application/App.

In the following page the manufacturer states similar models not tested with minor changes where there is no impact on the EMC/RF performance to be considered.

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.

Drachten (the Netherlands), 8th of April 2022

DECLARATION of EQUIVALENCE

Regarding the registration of the update of the shaver S7700 series in US (FCC ID **2AICSS77A**) and Canada (ISED **IC 21912-S77**) we state the following:

By means of this letter, we, Philips Consumer Lifestyle BV, declare that the following series of shavers are identical in electrical construction. These models have identical RF characteristics and specifications for Bluetooth Low Energy interface on the 2,4GHz band. Except for model name, type marking, cover edge/finishing of the outer bod and shaving system on top, which does not affect the Safety, EMC and Energy test results.

The change concerns a small update in the electronic design regarding the charging circuit. Reason for this is, due to component shortages, to enable a second source supplier for the charging IC. This version will remain on a 15 V charger. Same model numbers apply (S77xx).

For the rest, the design is the same as current S7000 shaver models (so hardware, electronics, dimensions, motor, Bluetooth antenna & protocols, shaving system, accessories etc.)

The devices with their differences are listed below:

Model	Differences
S7782	Colouring/finishing of the hardware/shaver body only
S7786	Colouring/finishing of the hardware/shaver body only
S7787	Colouring/finishing of the hardware/shaver body only
S7788	Colouring/finishing of the hardware/shaver body only
S9502	Colouring/finishing of the hardware/shaver body + shaving system only
S9507	Colouring/finishing of the hardware/shaver body + shaving system only

Please feel free to contact me in case you need any more information,

Yours sincerely,



M.L. PLATZER

Martijn Platzer

Quality Assurance Manager
Philips Consumer Lifestyle
Oliemolenstraat 5, 9203 ZN Drachten, The Netherlands
Email: Martijn.Platzer@philips.com



Usage of samples

Samples under test have been selected by: The client.

Id	Control Number	Description	Model	Serial No.	Date of Reception	Application
S/01	71042_8.1	Shaver	S7786	--	2022-01-31	Element Under Test
S/01	71042_10.1	AC/DC adapter	HQ8505	--	2022-01-31	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Radiated

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	---						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[X]	AC: 110-230 Vac	[X]	[]	[]	[X]	[]
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 3.6 Vdc (Internal battery)					
[]	DC:						
Rated Power	---						
Clock frequencies.....	---						
Other parameters	---						
Software version	2100						
Hardware version	2.0						
Dimensions in cm (W x H x D)	---						
Mounting position	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[X]	Hand-held equipment					
	[]	Other:					
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

Philips
Oliemolenstraat 5, 9203 ZN Drachten
The Netherlands

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-02-15
Date (finish)	2022-02-17

Document history

Report number	Date	Description
71042RRF.002	2022-03-30	First release.
71042RRF.002A1	2022-04-13	First modification. A "Declaration of equivalence" between models provided by the manufacturer is included in the report. This report cancels and replaces the previous 71042RRF.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 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: Daniel Mejías Herrera and Jaime Barranquero Gómez.

Used instrumentation:

Equipment	Model	Manufacturer	Next Calibration
EMI TEST RECEIVER 20Hz-26.5GHz	ESU26	ROHDE AND SCHWARZ	2023-11-05
SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-10-22
ULTRALOG ANTENNA 30MHz-6GHz	HL562E_UPG	ROHDE AND SCHWARZ	2022-10-15
HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2022-11-15
HORN ANTENNA 17-40GHz	BBHA 9170	SCHWARZBECK	2024-03-19
PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2022-06-07
PRE-AMPLIFIER G>30dB 17-40GHz	BLMA 1840-3G	BONN ELEKTRONIK	2023-02-15
TEMPERATURE AND HUMIDITY PROBE	HUMIDIPROBE	PICO TECHNOLOGY	2022-04-07
AC POWER SUPPLY 135/270V 5/10/20/40A	CS-AC35(351SL)	ELGAR	2022-09-19
SOFTWARE	WMS32	ROHDE AND SCHWARZ	--

Testing verdicts

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

Summary

Bluetooth Low Energy 5.1 (1Mbps only)

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. Test not requested.			

Appendix A: Test results. Bluetooth Low Energy 5.1 (1M)

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	110 Vac
Type of Power Supply:	AC/DC adapter

ANTENNA (*):

Type of Antenna:	Integral
Maximum Declared Antenna Gain:	+2.5 dBi

TEST FREQUENCIES (*):

Low Channel:	2402 MHz
Middle Channel:	2440 MHz
High Channel:	2480 MHz

RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range from 30 MHz to 1000 MHz and Double ridge horn antenna for the range from 1 GHz to 17 GHz) 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).

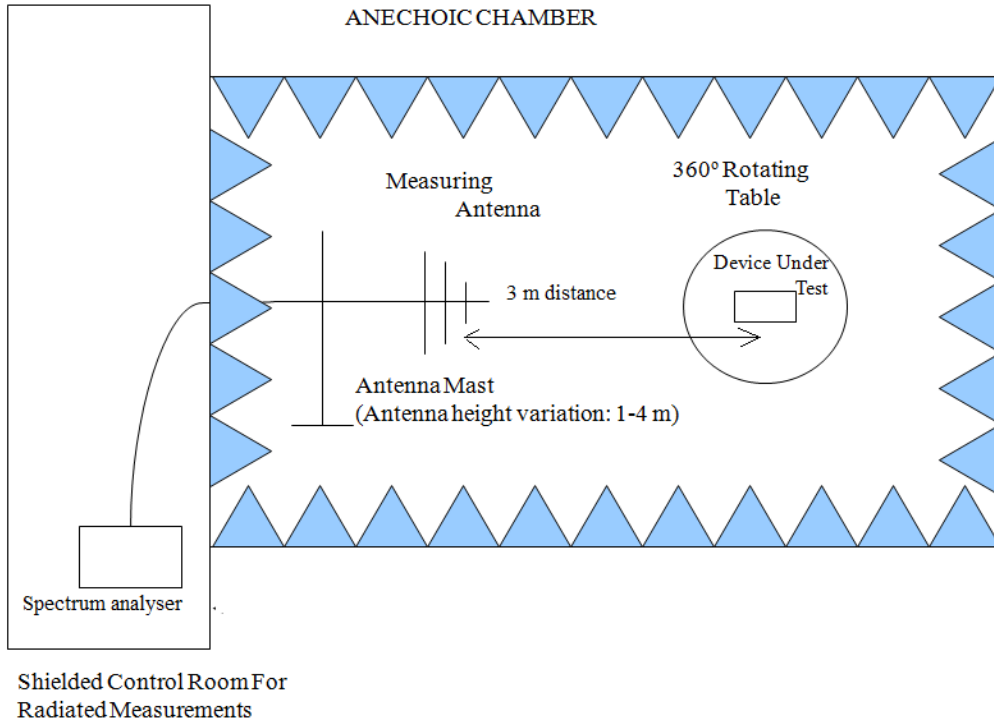
For radiated emissions in the range 17 GHz-26 GHz performed at a distance closer than the distance specified in the standard, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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 (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

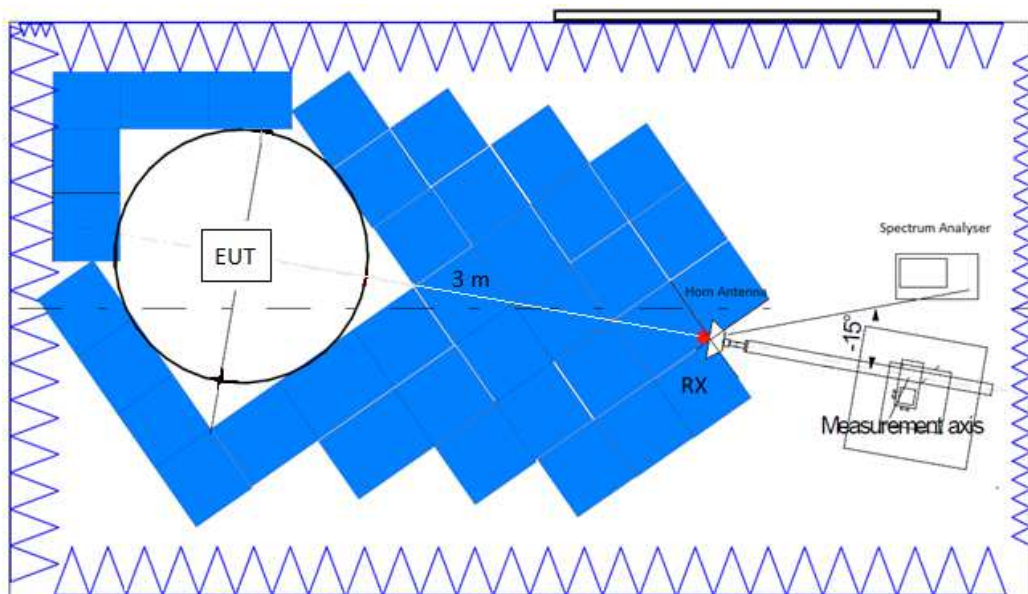
Measurements were made in both horizontal and vertical planes of polarization.

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.

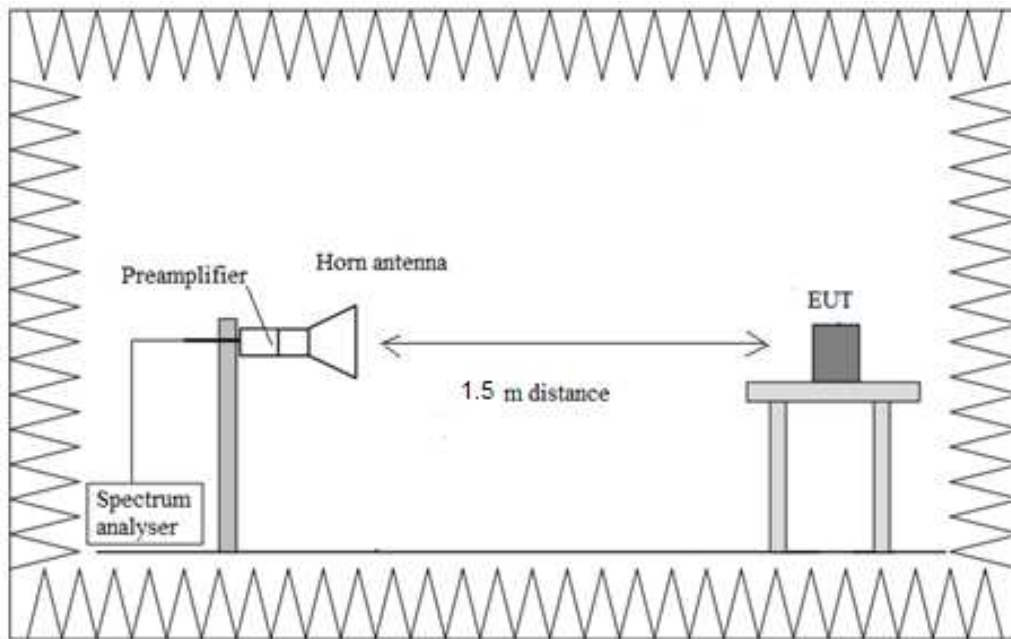
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

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 Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength ($\mu\text{V}/\text{m}$)	Field strength (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	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 specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.

RSS-247:

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

Modulation: BTLE 5.0 (GFSK 1 Mbit/s)

Results

Frequency range 30 MHz – 1 GHz:

The spurious frequencies detected do not depend on the operating channel.

Operation Band (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dB $\mu\text{V}/\text{m}$)	Pol	Detector
[2400, 2483.5]	Digital Transmission System (DTS)	[0.03, 1]	73.2135	21.55	V	QP
			76.8510	26.18	V	QP

Frequency range 1 GHz – 26 GHz:

Spurious frequencies with peak levels above the average limit (54 dB μ V/m at 3 m) are measured with average detector for compliance checking with the average limit.

Spurious emissions detected at 20 dB below the limit:

Operation Band (MHz)	Freq (MHz)	Equipment	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dB μ V/m)	Pol	Detector
[2400, 2483.5]	2402.00000	Digital Transmission System (DTS)	[3, 17]	4804.0000	41.32	H	PK

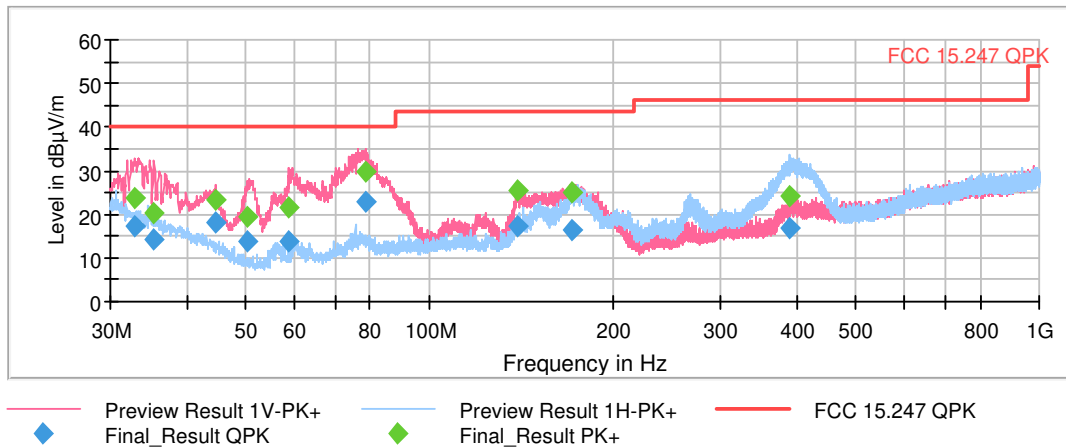
Verdict

Pass

Attachments

Operation Band (MHz) = [2400, 2483.5], Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [0.03, 1]

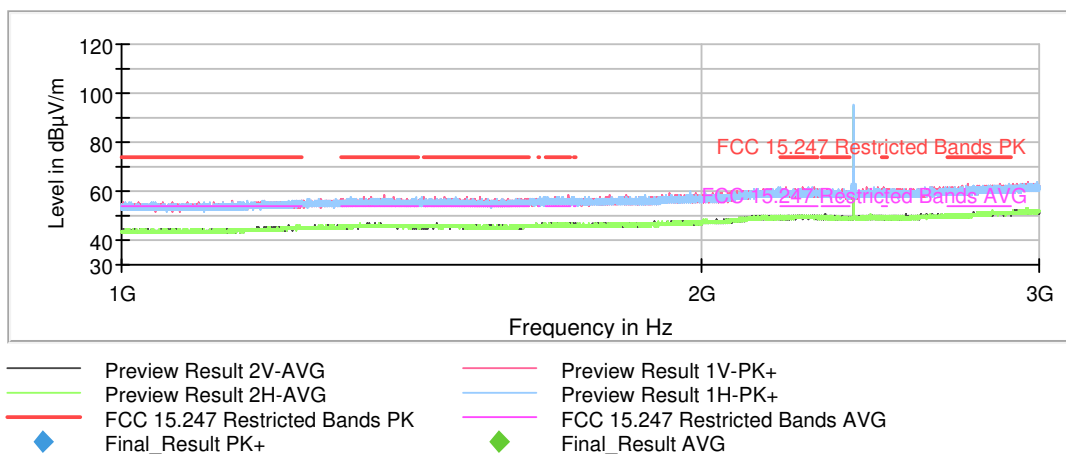
Plots:



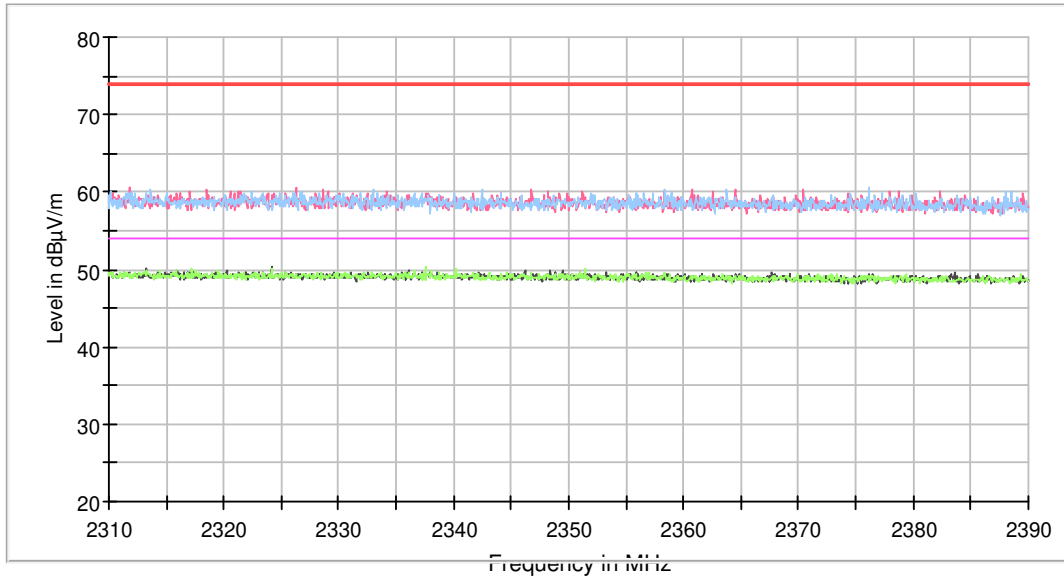
This plot is valid for Low, Middle and High Channels.

Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00000, Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [1, 3]

Plots:

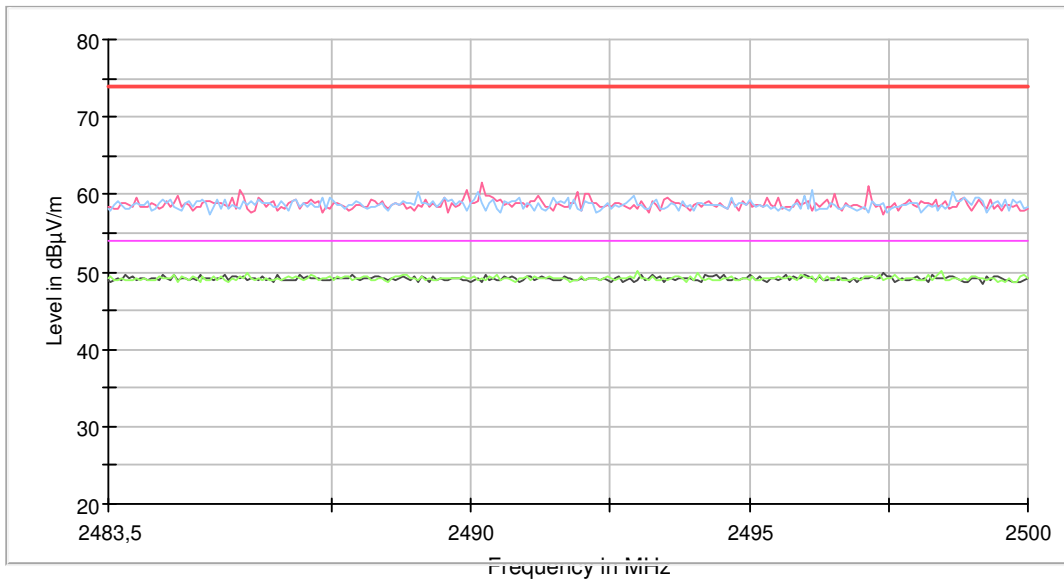


Full Spectrum



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

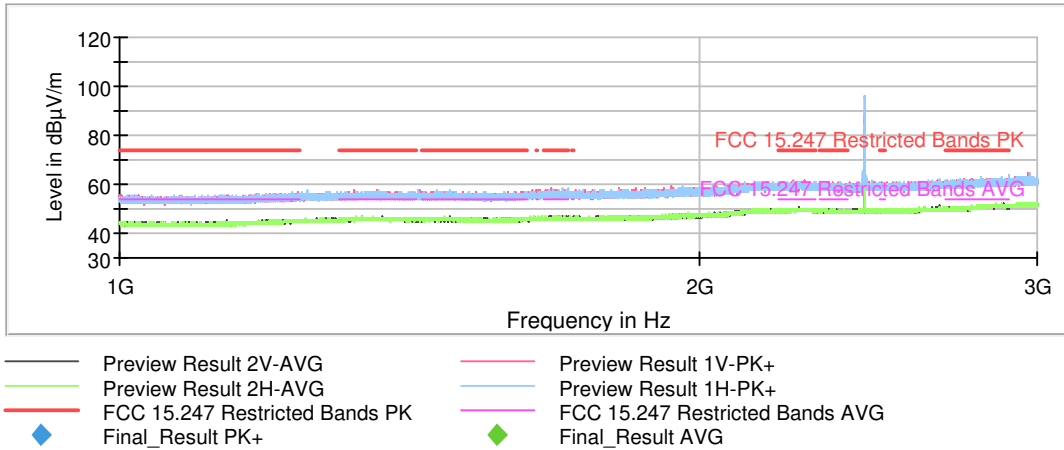
Full Spectrum



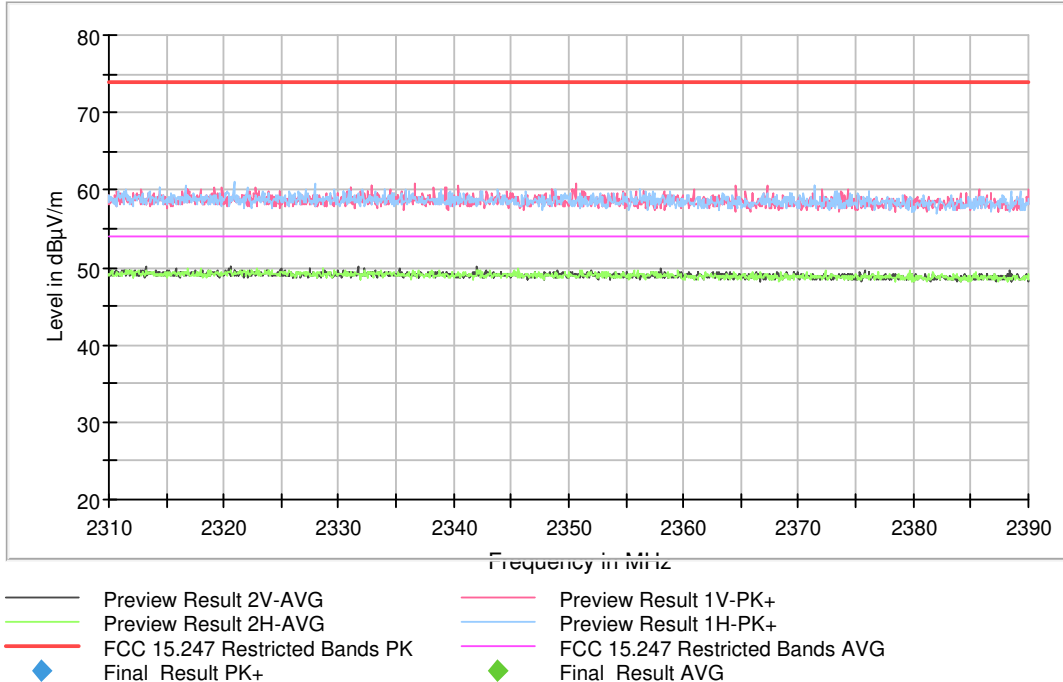
- Preview Result 2V-AVG
- Preview Result 2H-AVG
- FCC 15.247 Restricted Bands PK
- ◆ Final_Result PK+
- Preview Result 1V-PK+
- Preview Result 1H-PK+
- FCC 15.247 Restricted Bands AVG
- ◆ Final_Result AVG

Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2440.00000, Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [1, 3]

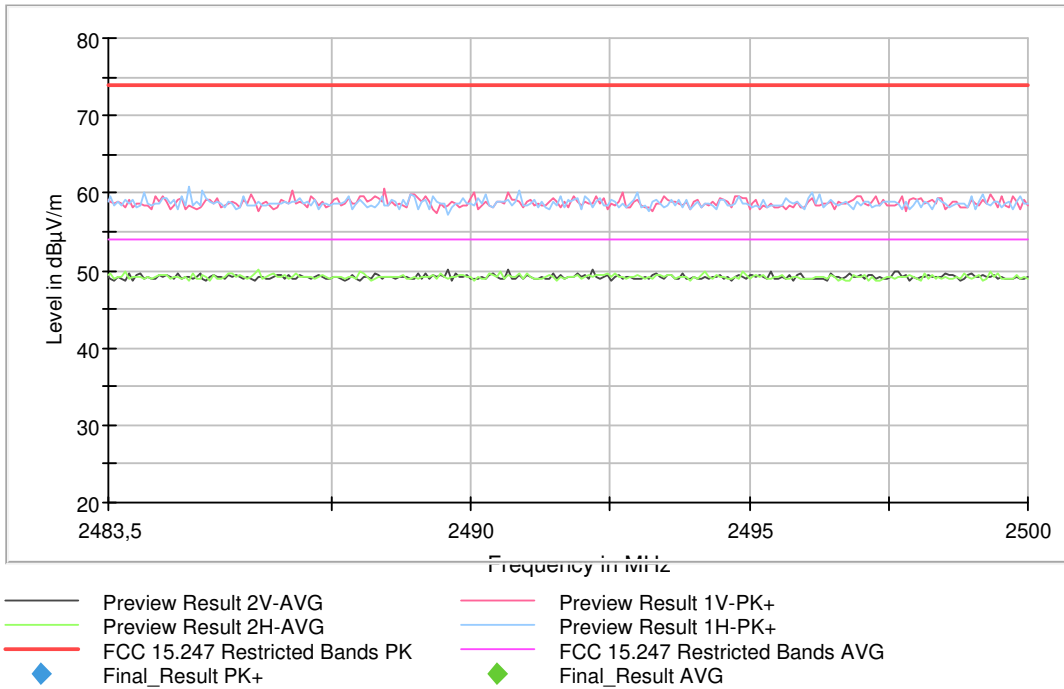
Plots:



Full Spectrum

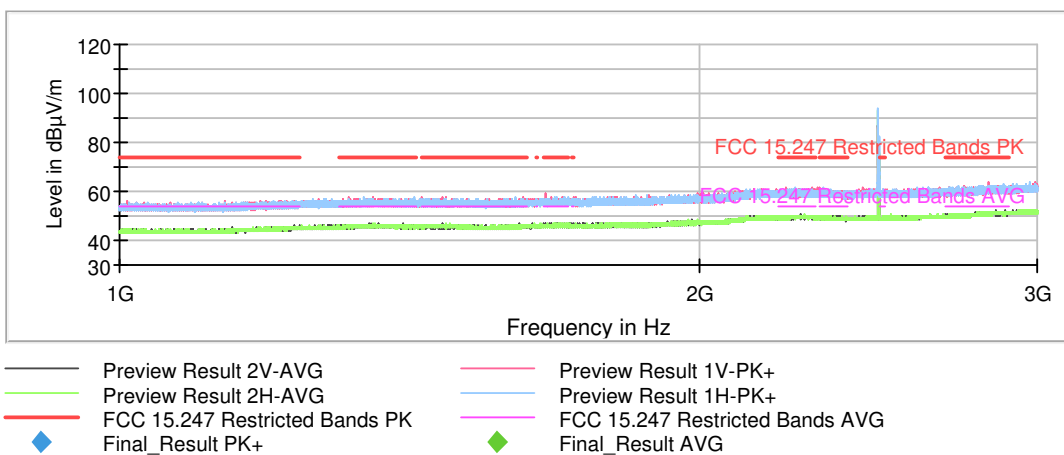


Full Spectrum

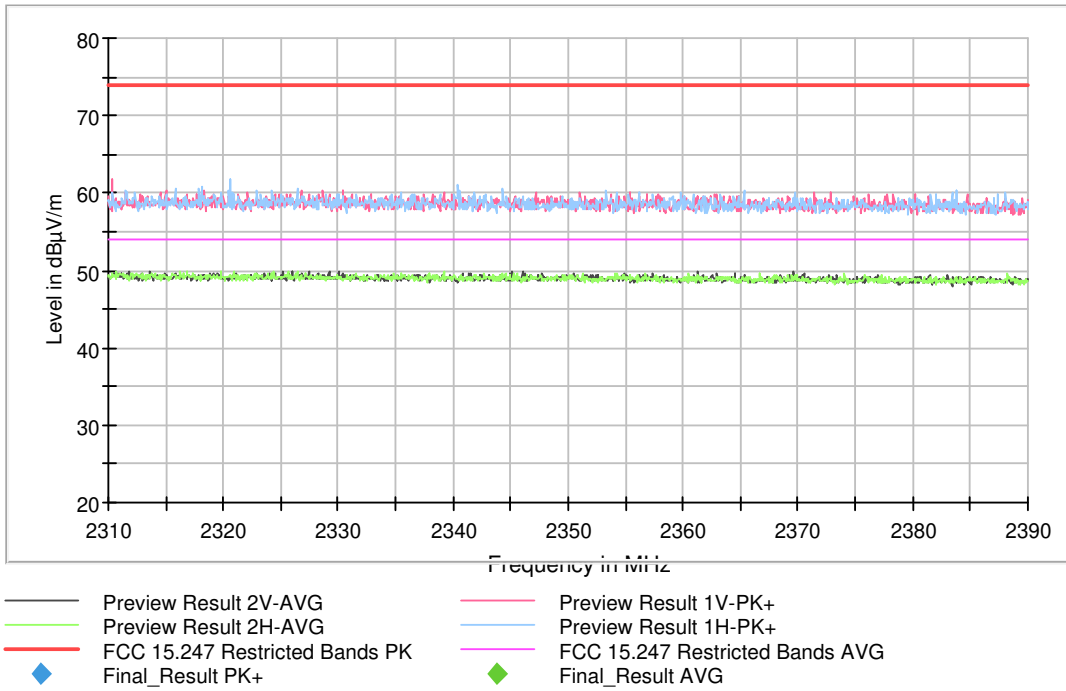


Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00000, Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [1, 3]

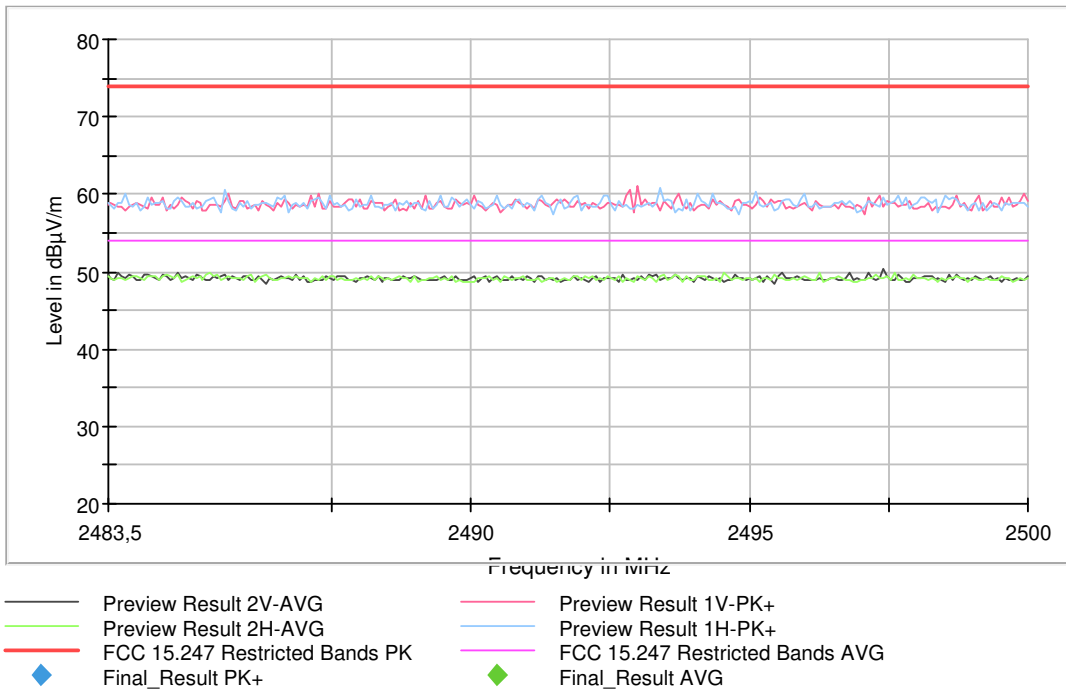
Plots:



Full Spectrum

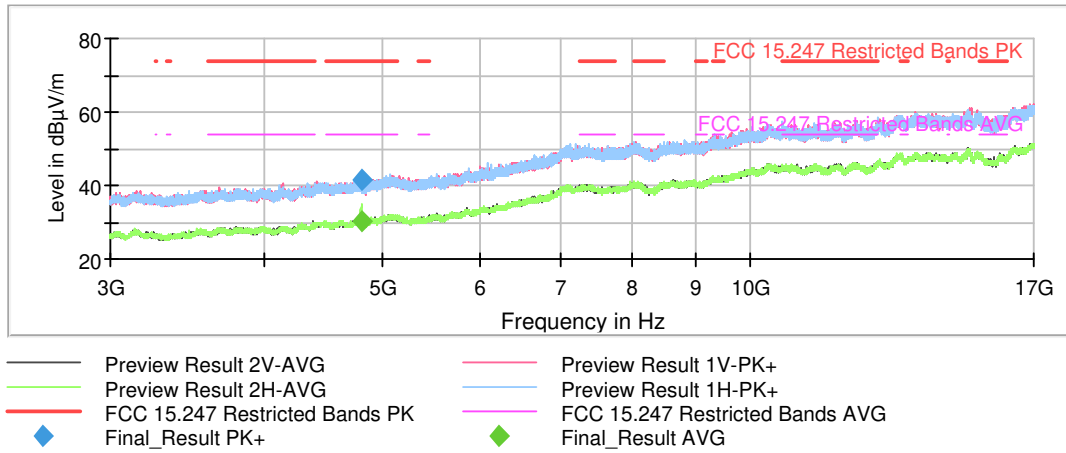


Full Spectrum



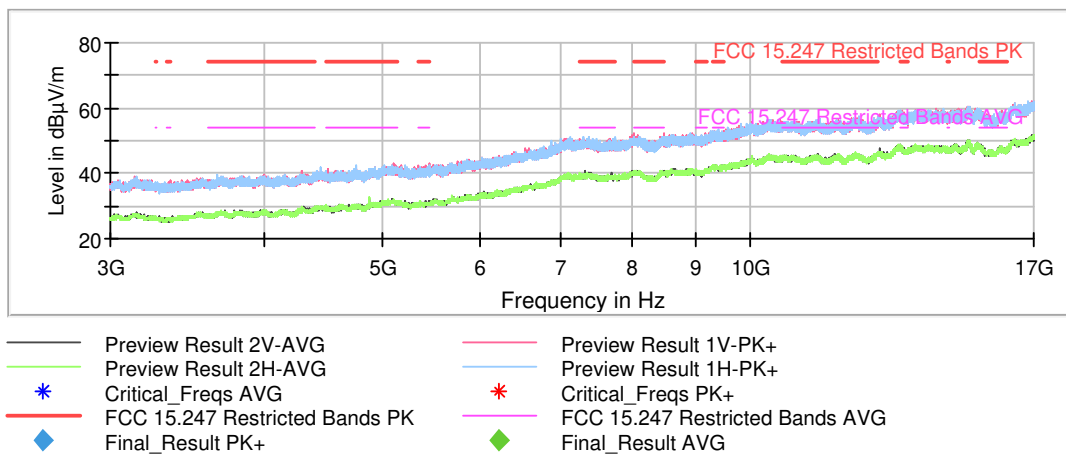
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2402.00000, Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [3, 17]

Plots:



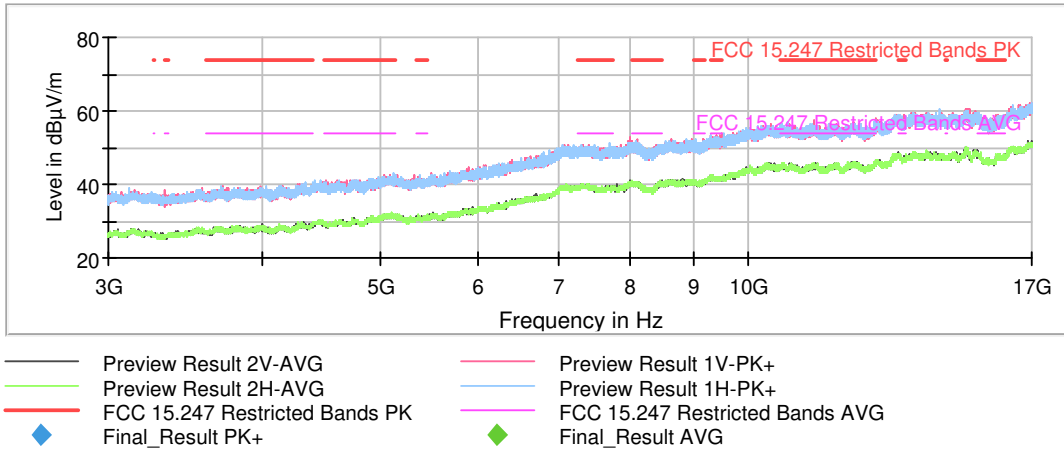
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2440.00000, Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [3, 17]

Plots:



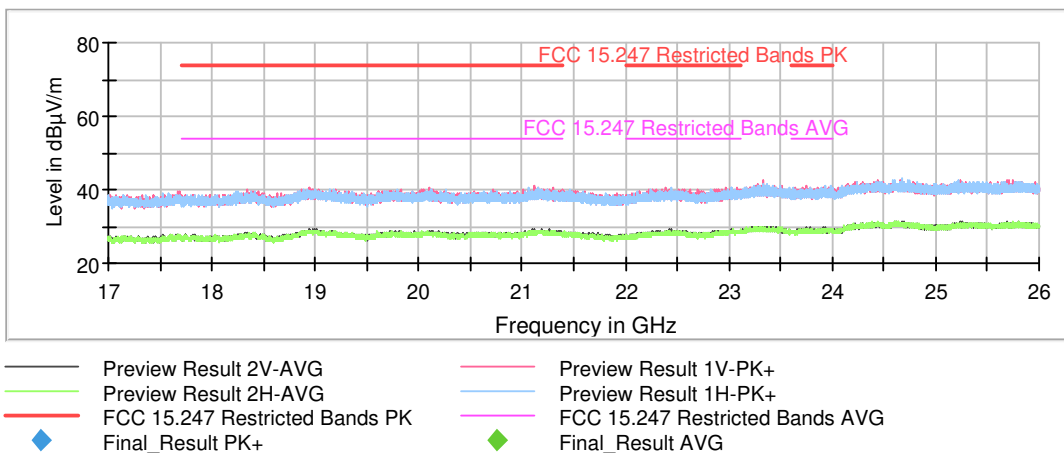
Operation Band (MHz) = [2400, 2483.5], Frequency (MHz) = 2480.00000, Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [3, 17]

Plots:



Operation Band (MHz) = [2400, 2483.5], Equipment Type: Digital Transmission System (DTS), Modulation: BTLE 5.0 (GFSK 1 Mbit/s), Frequency Range (GHz) = [17, 26]

Plots:



This plot is valid for Low, Middle and High Channels.