

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:

80539RRF.006A2

Partial Test Report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	ASOH
(*) Trademark	Nokia
(*) Model and /or type reference	ASOH 476255A
Other identification of the product	FCC ID: 2AD8UASOHWIFI-01 IC: 109D-ASOHWIFI01
(*) Features	Wi-Fi IEEE 802.11B/G/N/A/AC HW version: ASOH A102 SW version: MB_PS_REL_2024_07_0021
Applicant	Nokia Nokia Headquarter Karakaari 7, 02610 Espoo
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 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. 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	2025-01-28
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

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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.

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General conditions

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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

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 ASOH device.

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 Nº	Date of Reception	Application
S/01	80539B_1	Mobile Network Equipment	ASOH 476255A	L1243307851	2024-10-03	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Samples used for Conducted and radiated tests.

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
		LMP RJ45	100m	[X]	[X]	[]	
		-48V PSU connector	-	[X]	[X]	[]	
		EIF1-2 SFP	optical	[]	[X]	[]	
		EIF3 RJ45	100m	[]	[X]	[]	
		SEI SFP	optical	[]	[X]	[]	
		RF1-12 SFP	optical	[]	[X]	[]	
		EAC 19-pin	-	[]	[X]	[]	
		SIN 19-pin	-	[]	[X]	[]	
SOUT 19-pin	-	[]	[X]	[]			
Supplementary information to the ports..... :							
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC: -	[]	[]	[]	[]	[]
	[]	AC: -	[]	[]	[]	[]	[]
	[X]	DC: -49V					
[]	DC: --						
Rated Power	248.55 W						
Clock frequencies.....	-						
Other parameters	-						
Software version	MB_PS_REL_2024_07_0021						
Hardware version	ASOH A102						
Dimensions in cm (W x H x D)	440mm x 365mm x 43.5mm (1U)						
Mounting position	[X]	Table top equipment					
	[X]	Wall/Ceiling mounted equipment					

	☐	Floor standing equipment		
	☐	Hand-held equipment		
	☒	Other: Server rack, mobile tower		
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

Nokia Solutions and Networks GmbH & Co. KG
Lise-Meitner-Straße 7/1-2, 89081 Ulm, Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-11-08
Date (finish)	2024-11-08

Document history

Report number	Date	Description
80539RRF.006	2024-11-14	First release.
80539RRF.006A1	2024-11-22	Second release. Modification due to typos. This modification test report cancels and replaces the test report 80539RRF.006.
80539RRF.006A2	2025-01-28	Third release. Modification due to changes in the antenna specification. This modification test report cancels and replaces the test report 80539RRF.006A1.

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: Sergio Carrasco.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
07445	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	N/A
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	2025-02-14
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	2025-02-02
07193	MULTI-DEVICE CONTROLLER	CO3000	INNCO	N/A
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	N/A
04848	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 PARAGRAPH/ RSS-247			
Requirement – Test case		Verdict	Remark
FCC 15.247 (a)(2) / RSS-247 5.2. (a)	6 dB Bandwidth	N/M	
FCC 15.247 (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	N/M	
FCC 15.247 (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	N/M	
FCC 15.247 (e) / RSS-247 5.2. (b)	Power spectral density	N/M	
FCC 15.247 (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P*	(1)
<u>Supplementary information and remarks:</u>			
1. Spot-check of Radiated Spurious Emission has been requested for worst modulation and channel.			

Appendix A: Test results

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	-48V
Type of Power Supply:	-48V

ANTENNA (*):

Type of Antenna:	Rod Antenna
Maximum Declared Antenna Gain:	3.03 dBi

TEST FREQUENCIES (*):

Modulation	Data rates	High Channel
802.11b:	1 Mbit/s	2462 MHz

Worst modulation and channel determine according to the higher power spectral density testing. 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.

POWER SETTING (*):

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied instructions to configure the EUT. The customer supplied a power setting table with the maximum level for each mode and band:

Mode	POWER SETTING
	CH11
11b	18

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).

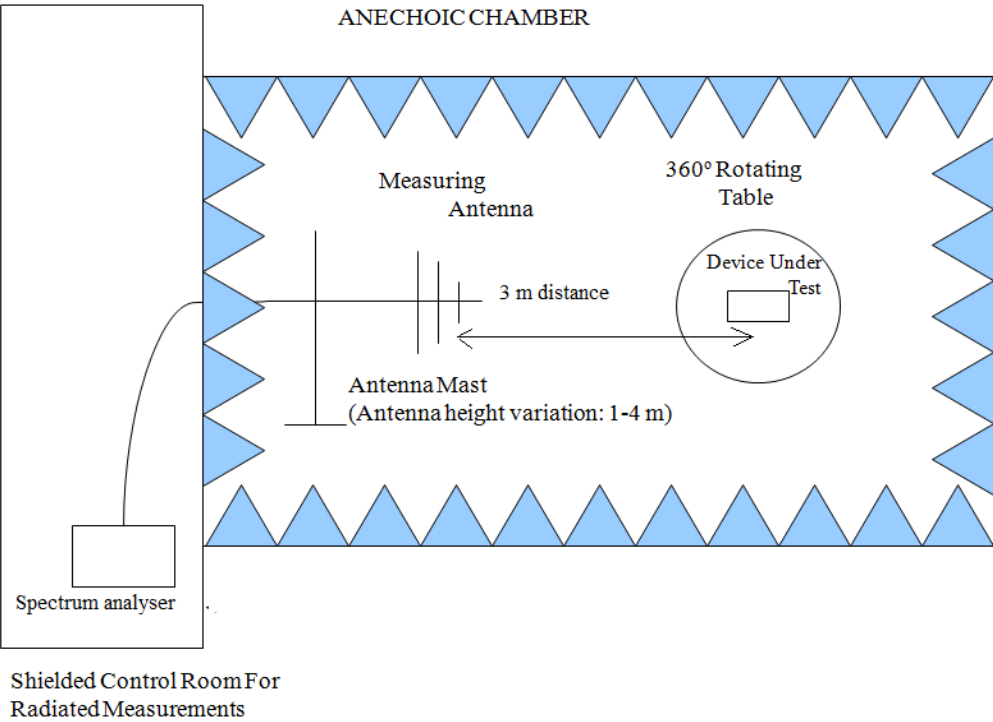
For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

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.

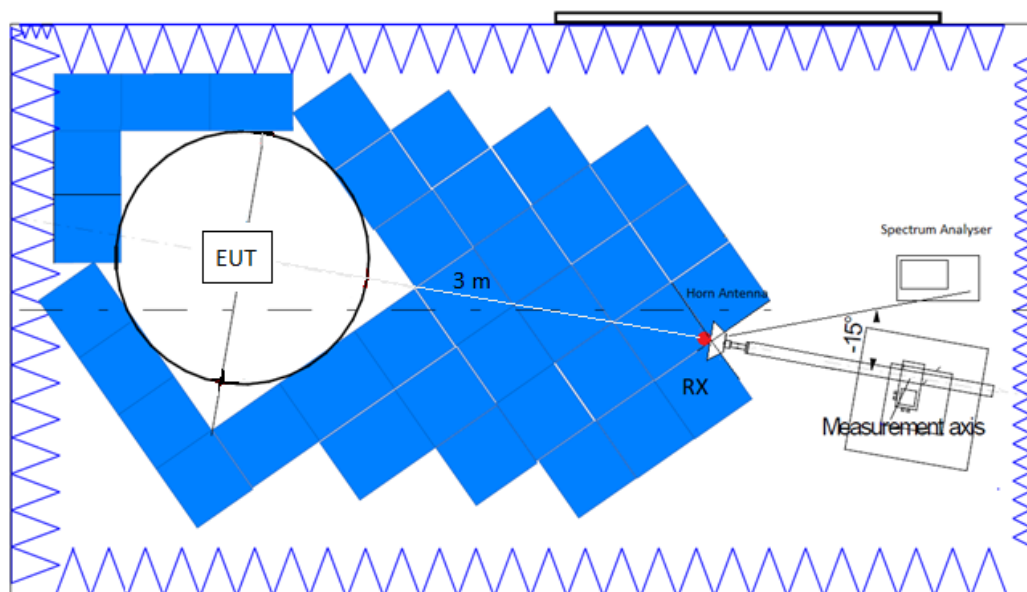
Measurements were made in both horizontal and vertical planes of polarization.

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.

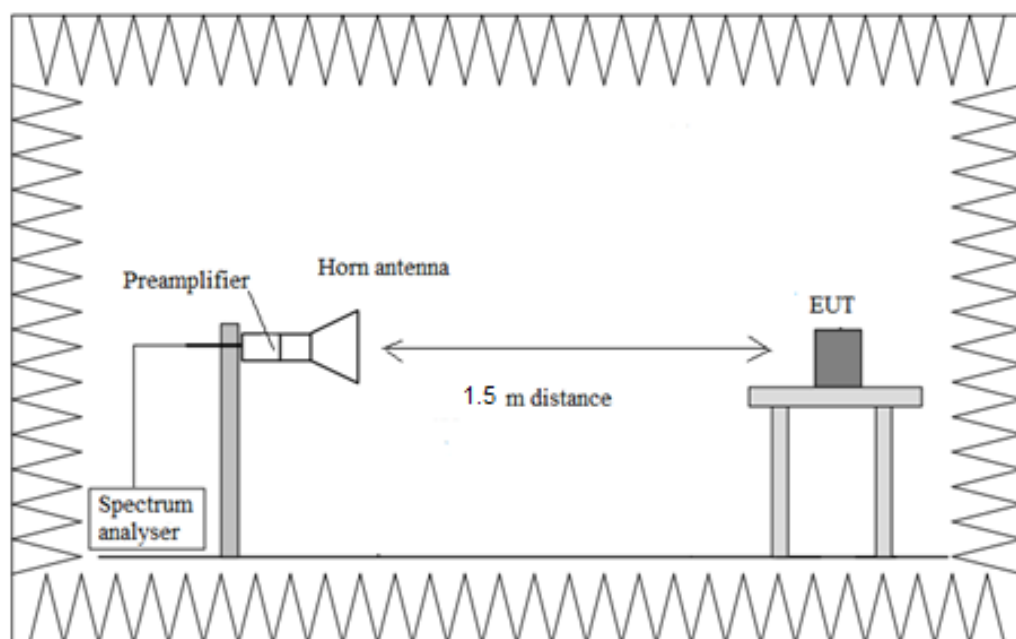
Radiated measurements setup from 30 MHz to 1 GHz:



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 ($\mu\text{V/m}$)	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 is specified when measuring with peak detector function.

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.

Results

Modulation: 802.11b (DSSS 1 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)	2462.00000	1	33.249	35.17	V	PK
				33.249	32.79	V	QP
				124.963	26.42	V	PK
				124.963	24.11	V	QP
				187.480	32.28	V	QP
				187.480	33.25	V	PK
				704.441	34.11	H	QP
				704.441	38.17	H	PK

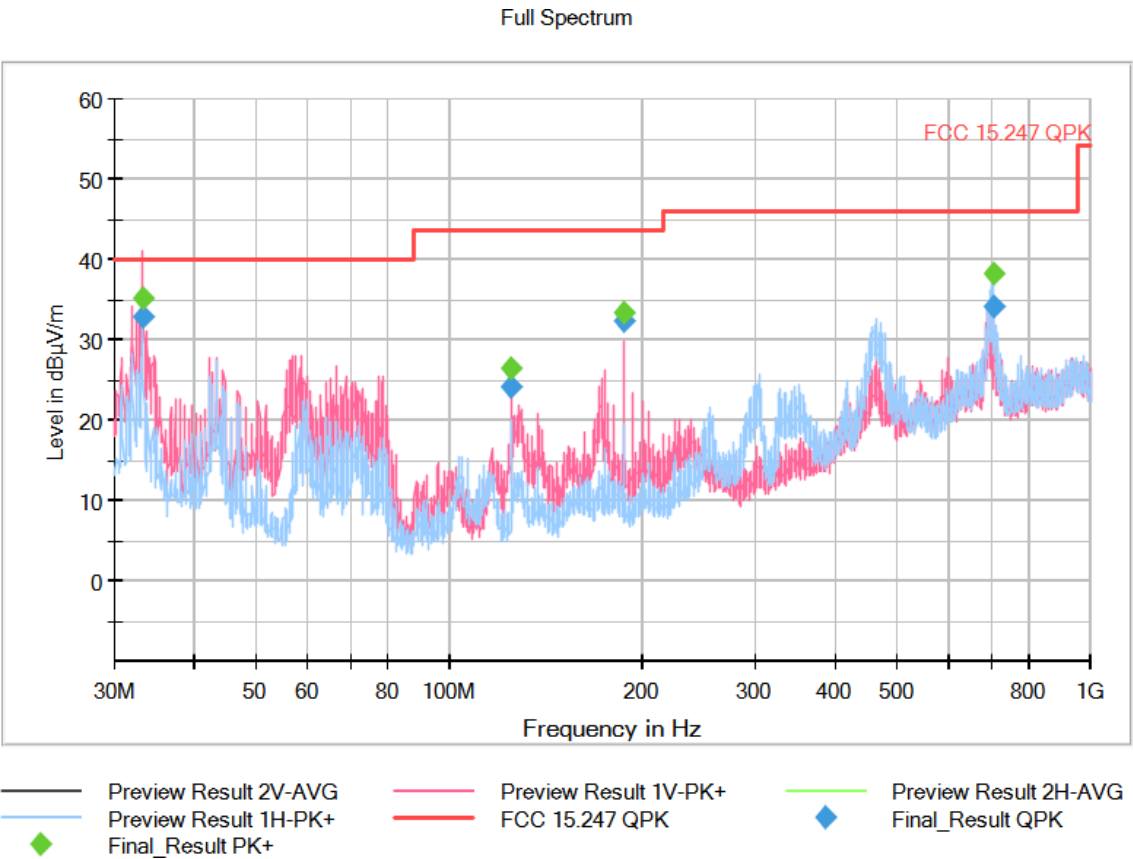
Verdict

Pass

Attachments

Frequency Range GHz = [0.03, 1] Equipment Type = Digital Transmission System (DTS)
Modulation = 802.11b (DSSS 1 Mbit/s) Frequency MHz = 2462.00000
MIMO Mode = SISO Active Port = 1

Images:



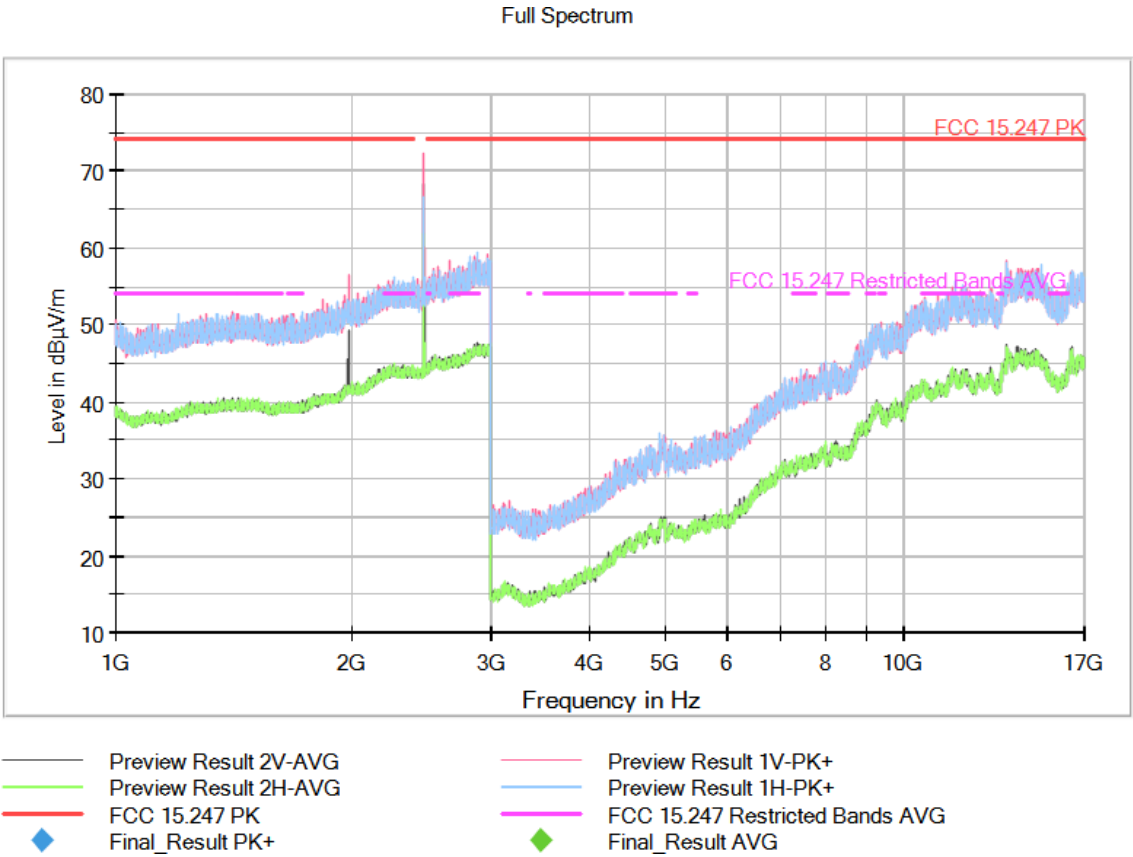
Tables:

Spectrum Analyzer Parameters

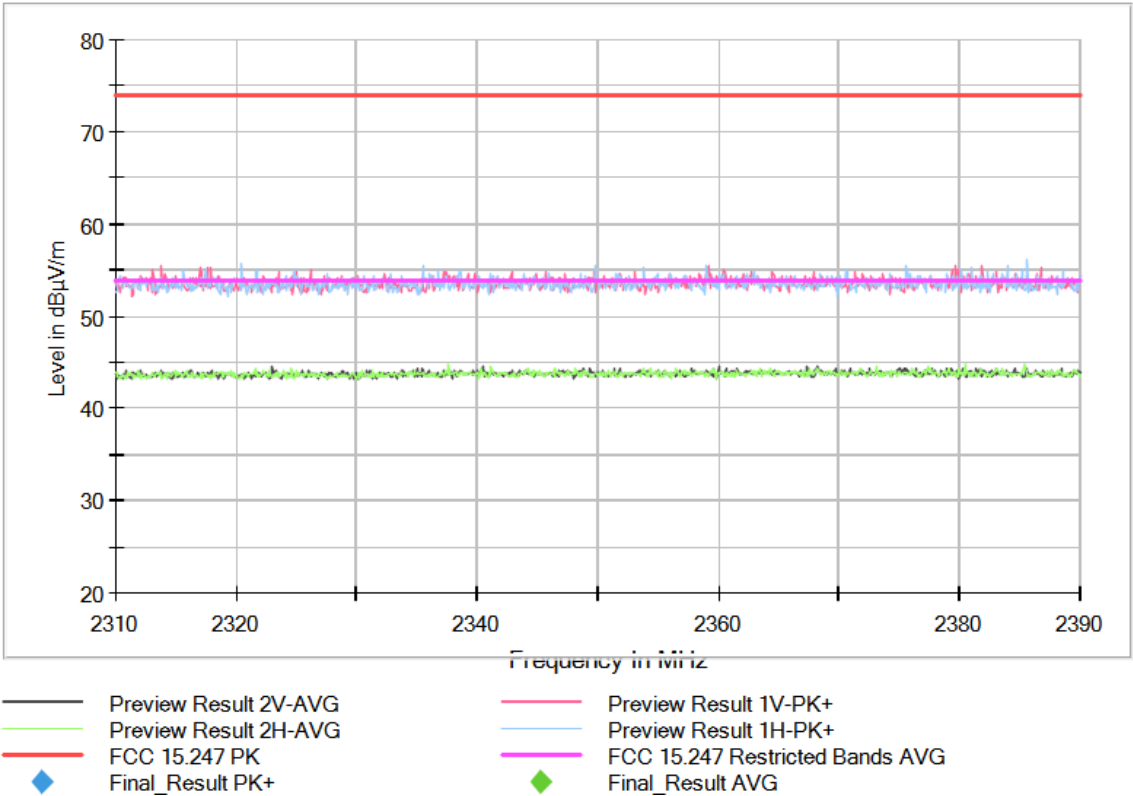
	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	30 MHz - 1 GHz	48,5 kHz	PK+	100 kHz	1 s	0 dB

Frequency Range GHz = [1, 17] Equipment Type = Digital Transmission System (DTS)
Modulation = 802.11b (DSSS 1 Mbit/s) Frequency MHz = 2462.00000
MIMO Mode = SISO Active Port = 1

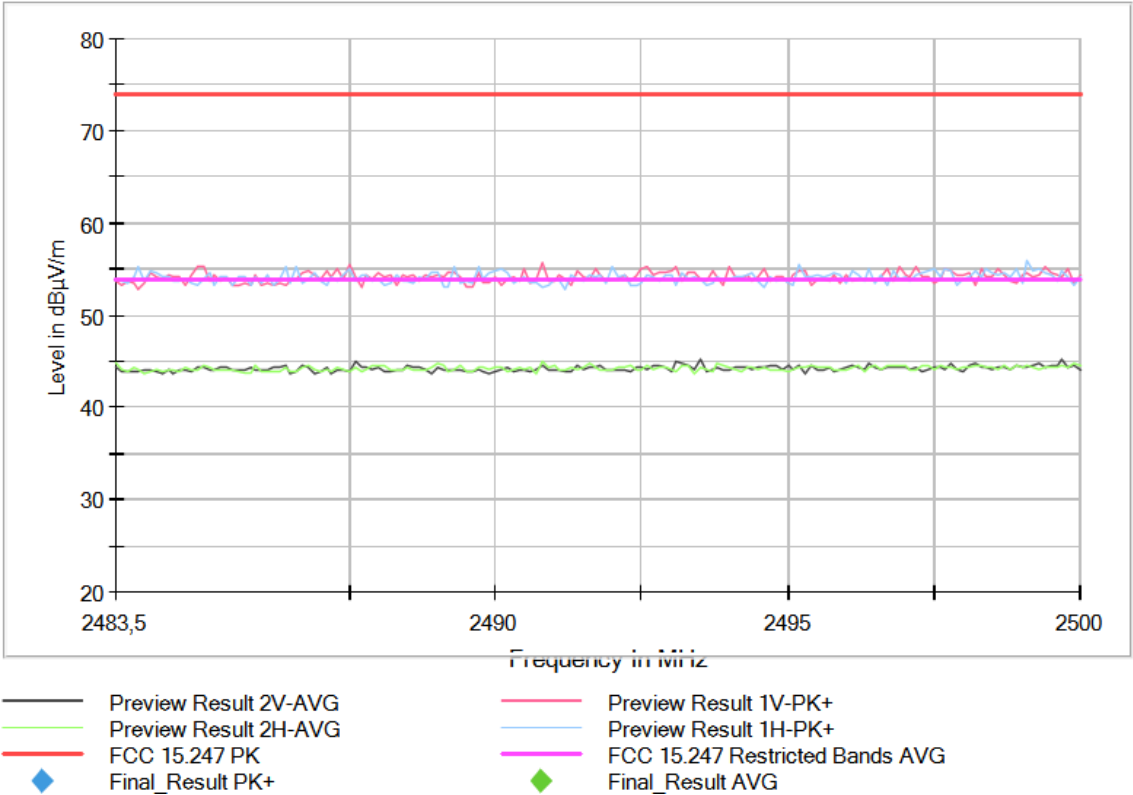
Images:



Full Spectrum



Full Spectrum



Frequency Range GHz = [17, 26] Equipment Type = Digital Transmission System (DTS)
Modulation = 802.11b (DSSS 1 Mbit/s) Frequency MHz = 2462.00000
MIMO Mode = SISO Active Port = 1

Images:

