DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29507456

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:
72872RRF.007

Test Report
USA FCC Part 15.247, 15.209
CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Shock sensor MC2.1
(*) Trademark	Verisure
(*) Model and /or type reference	GWL-MC2-SHOCK
Other identification of the product	FCC ID: 2A93W-GWL-MC2-SHOCK IC: Not provided
(*) Features	ISM 915 RF interface communication (Propietary protocol) HW version: 1.0 SW version: 4.8
Applicant	Verisure Sarl Chemin Jean-Baptiste Vandelle 3 1290 Versoix Switzerland
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 15.209 (10-1-21 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.
Summary	IN COMPLIANCE
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	2023-03-23
Report template No	FDT08_24 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
# of Tx Chains	Number of Transmission Chains
Detector	Detector used
Equipment	Equipment Type
Freq	Frequency
Freq Rng	Frequency Range
MP	Measurement Point
Mod	Modulation
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 is a 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 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.

DEKRA Testing and Certification S.A.U. 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.

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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 ≤ ± 5,35 dB with factor (k = 2).

The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 10 GHz is: Measurement uncertainty ≤ ± 4,32 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 ≤ ± 0,80 dB
Power Spectral Density: Measurement uncertainty ≤ ± 0,99 dB
6dB Bandwidth: Measurement uncertainty ≤ ± 2,84 %
Occupied Channel Bandwidth: Measurement uncertainty ≤ ± 1,17 %
Conducted Band-edge spurious emissions: Measurement uncertainty ≤ ± 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 Shock sensor MC2.1. Shock and intrusion detector.

3. Equipment supports frequency sharing techniques.

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	72872C_43.1	Shock sensor MC2.1	GWL-MC2-SHOCK	3N4S HYMP	2022-12-22	Element Under Test
S/02	72872C_40.1	Shock sensor MC2.1 (conducted)	GWL-MC2-SHOCK	3N4S JCFB	2022-12-22	Element Under Test

Notes referenced to samples during the project:

Id	Type
S/01	Test samples used for Radiated testing
S/02	Test samples used for Conducted testing

Test sample description

<table>
<tr><td rowspan="2">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td></td><td>.....</td><td>.....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5">.....</td></tr>
<tr><td rowspan="3">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="4">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>[ ]</td><td>AC: .....</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td><td>[ ]</td></tr>
<tr><td></td><td colspan="6">[X] DC: 2x1.5 VDC (Battery powered device with two AAA batteries)</td></tr>
<tr><td>Rated Power .....:</td><td colspan="6">Maximum 100 mAh</td></tr>
<tr><td>Clock frequencies.....:</td><td colspan="6">39 MHz (TCXO)</td></tr>
<tr><td>Other parameters .....:</td><td colspan="6">.....</td></tr>
<tr><td>Software version .....:</td><td colspan="6">4.8</td></tr>
<tr><td>Hardware version .....:</td><td colspan="6">1.0</td></tr>
<tr><td>Dimensions in cm (W x H x D) ....:</td><td colspan="6">8.94 x 2.44 x 1.62 cm</td></tr>
<tr><td rowspan="5">Mounting position .....:</td><td>[ ]</td><td colspan="5">Table top equipment</td></tr>
<tr><td>[X]</td><td colspan="5">Wall/Ceiling mounted equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Floor standing equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Hand-held equipment</td></tr>
<tr><td>[ ]</td><td colspan="5">Other: .....</td></tr>
<tr><td rowspan="3">Modules/parts.....:</td><td colspan="3">Module/parts of test item</td><td>Type</td><td>Manufacturer</td></tr>
<tr><td colspan="3">Main shock sensor</td><td>Sensor</td><td>Verisure</td></tr>
<tr><td colspan="3">Magnet</td><td>Magnet</td><td>Verisure</td></tr>
<tr><td rowspan="2">Accessories (not part of the test item) .....:</td><td colspan="3">Description</td><td>Type</td><td>Manufacturer</td></tr>
<tr><td colspan="3">.....</td><td>.....</td><td>.....</td></tr>
<tr><td rowspan="2">Documents as provided by the applicant.....:</td><td colspan="3">Description</td><td>File name</td><td>Issue date</td></tr>
<tr><td colspan="3">.....</td><td>.....</td><td>.....</td></tr>
</table>

(3) Only for Medical Equipment

Identification of the client

Verisure Innovation
Nordenskiöldsgatan 11A 211 19 Malmö Sweden

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2023-01-09
Date (finish)	2023-01-20

Document history

Report number	Date	Description
72872RRF.007	2023-02-10	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 semianechoic 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 chamber for conducted measurements, 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: Miguel Manuel López and Rafael Fernández.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
6143	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2023-10-29
6142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2023-06-16
6496	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK	2023-08-24
3783	PRE-AMPLIFIER G>30dB 1GHz-18GHz	BLMA 0118-3A	BONN ELEKTRONIK	2023-12-29
7794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2023-02-26
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-12-30
6791	SEMIANECHOIC ABSORBER LINED CHAMBER	FACT 3 200 STP	ETS LINDGREN	--
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--
0922	DC POWER SUPPLY 40V/40A	NGPE 40/40	ROHDE AND SCHWARZ	--
5880	DC POWER SUPPLY 30V/5A	U8002A	KEYSIGHT TECHNOLOGIES	--
7760	DIGITAL MULTIMETER	175	FLUKE	2023-11-14

Testing verdicts

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

Summary

SRD 915 MHz

FCC PART 15 PARAGRAPH/ RSS-247			
Requirement – Test case		**Verdict**	**Remark**
FCC 15.247 (a)(2) / RSS-247 5.2. (a)	6 dB Bandwidth	P	
FCC 15.247 (b) / RSS-247 5.4. (d)	Maximum output power and antenna gain	P	
FCC 15.247 (d) / RSS-247 5.5.	Band-edge emissions compliance (Transmitter)	P	
FCC 15.247 (e) / RSS-247 5.2. (b)	Power spectral density	P	
FCC 15.247 (d) / RSS-247 5.5.	Emission limitations radiated (Transmitter)	P	
Supplementary information and remarks: None			

Appendix A: Test results

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal:	2 x 1.5 Vdc
Type of Power Supply:	Battery powered device with two AAA batteries

ANTENNA (*):

Type of Antenna:	PCB printed IFA antenna
Maximum Declared Antenna Gain:	+2.3 dBi

TEST FREQUENCIES (*):

Low Channel:	917.5 MHz
High Channel:	925.5 MHz

CONDUCTED MEASUREMENTS:

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

RADIATED MEASUREMENTS:

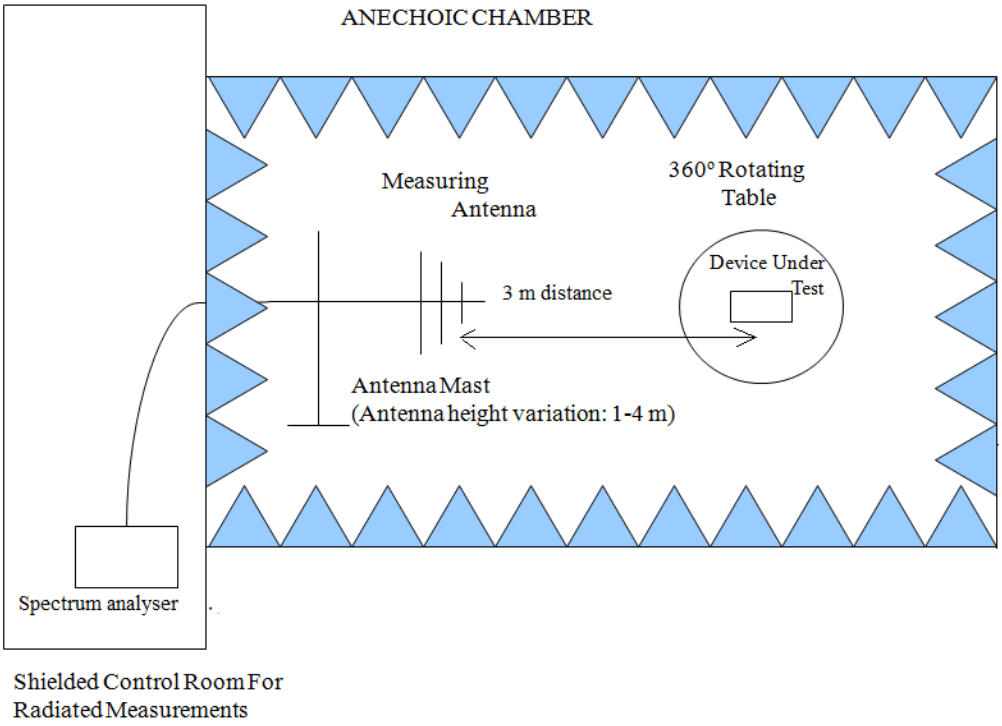
All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-10 GHz Double ridge horn antenna) is situated at a distance of 3 m.

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 360º and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

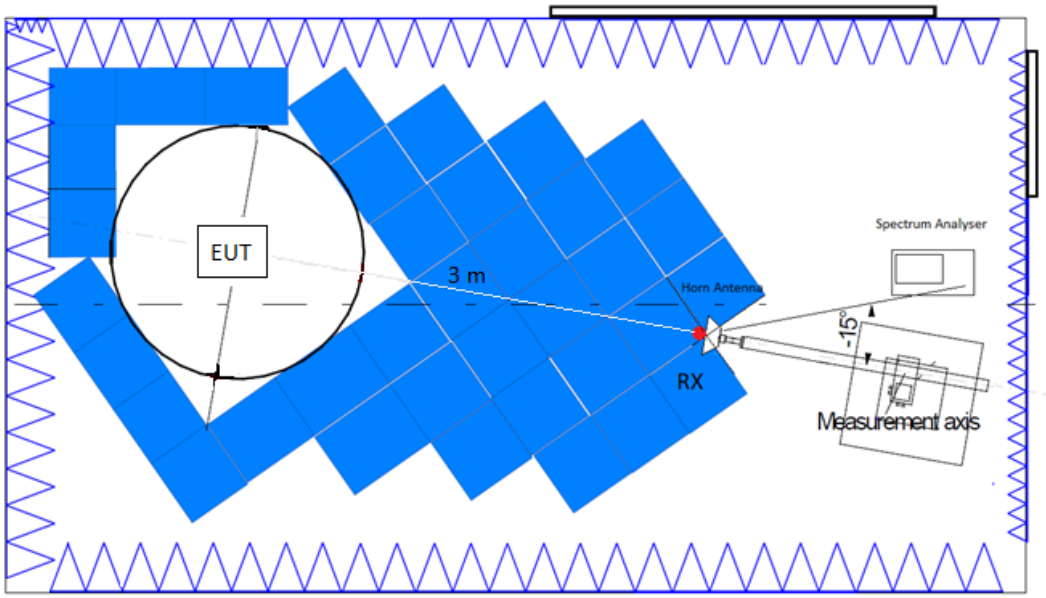
Measurements were made in both horizontal and vertical planes of polarization.

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 10 GHz:



TEST CASES DETAILS

Occupied Bandwidth

Modulation: 2GFSK

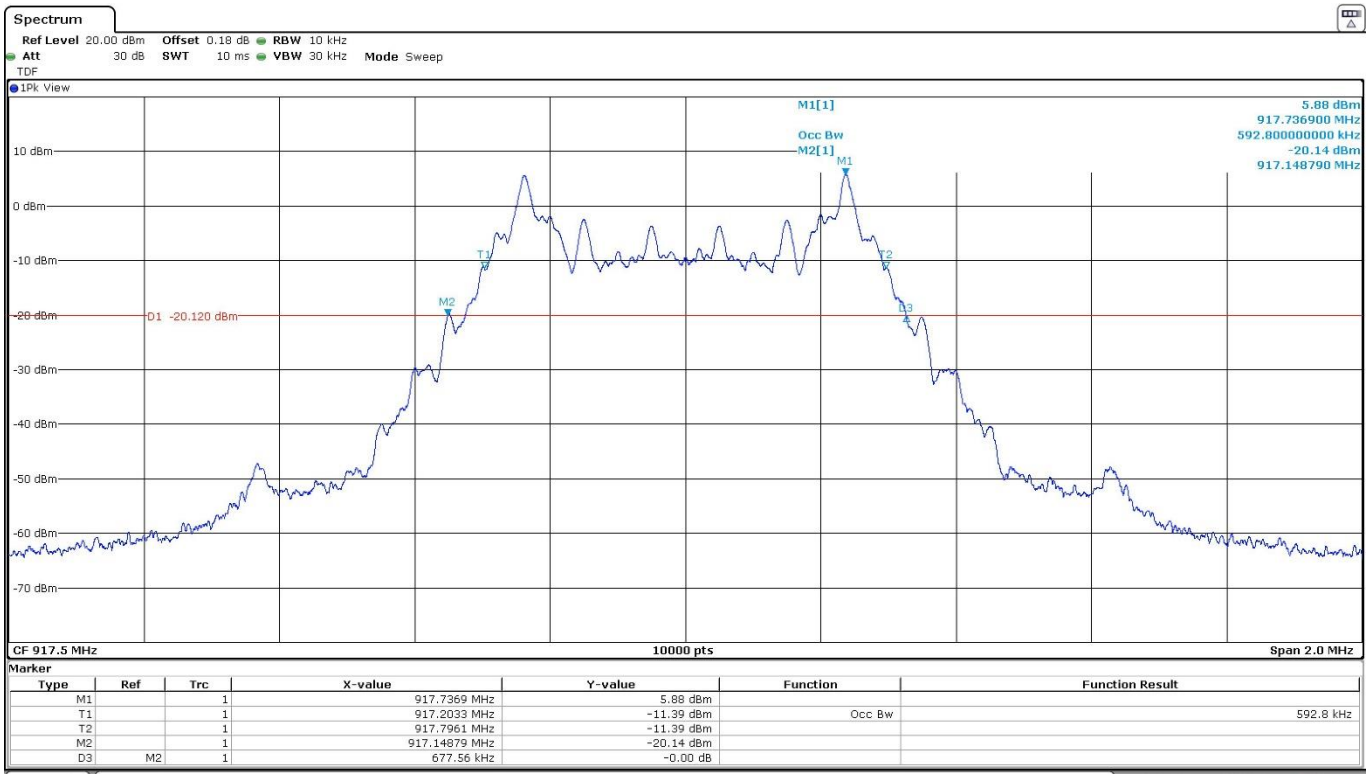
Results

Freq (MHz)	Occ Ch BW (kHz)
917.50	592.80
925.50	591.60

Attachments

Frequency MHz = 917.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

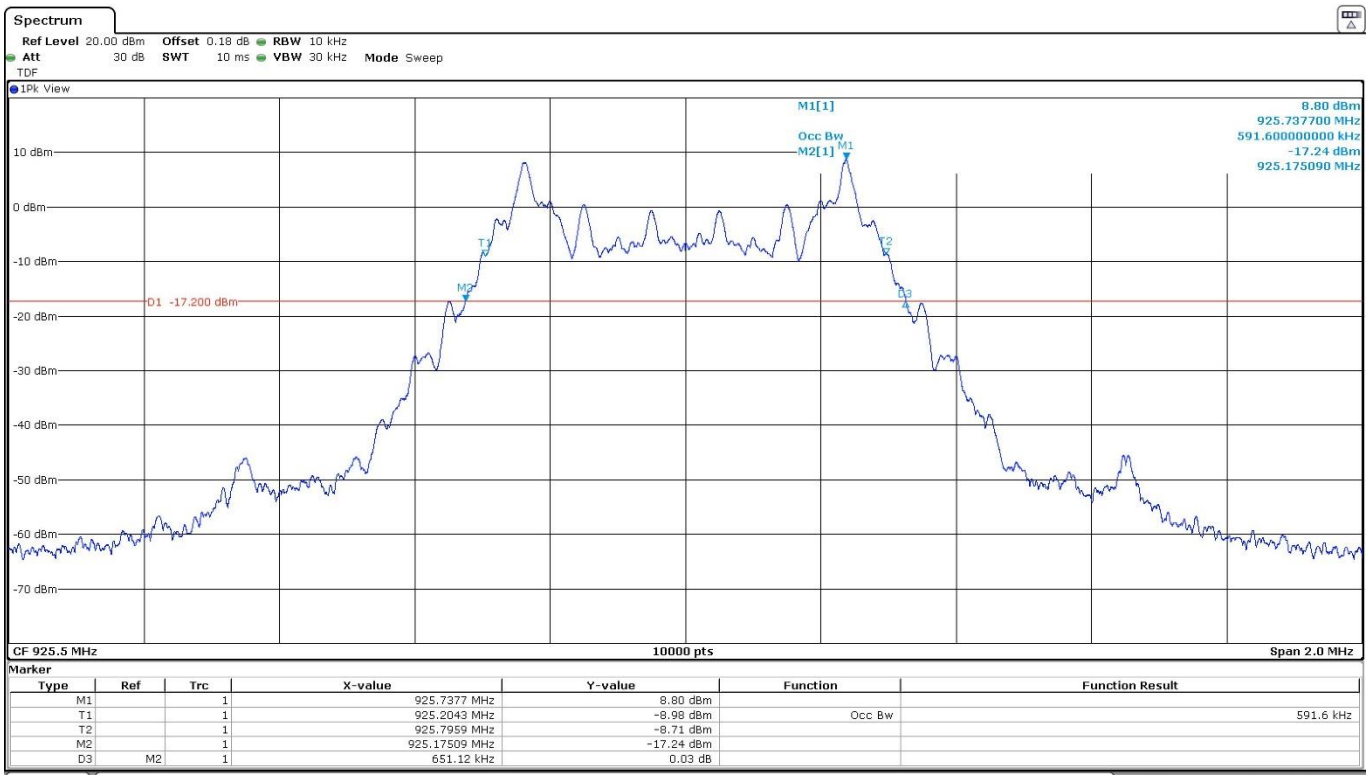
Images:



Attachments

Frequency MHz = 925.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

Images:



FCC 15.247 (a)(2) / RSS-247 5.2. (a) 6 dB Bandwidth

Limits

The minimum 6 dB bandwidth shall be at least 500 kHz.

Modulation: 2GFSK

Results

Freq (MHz)	Ebw (kHz)
917.50	659.61
925.50	659.38

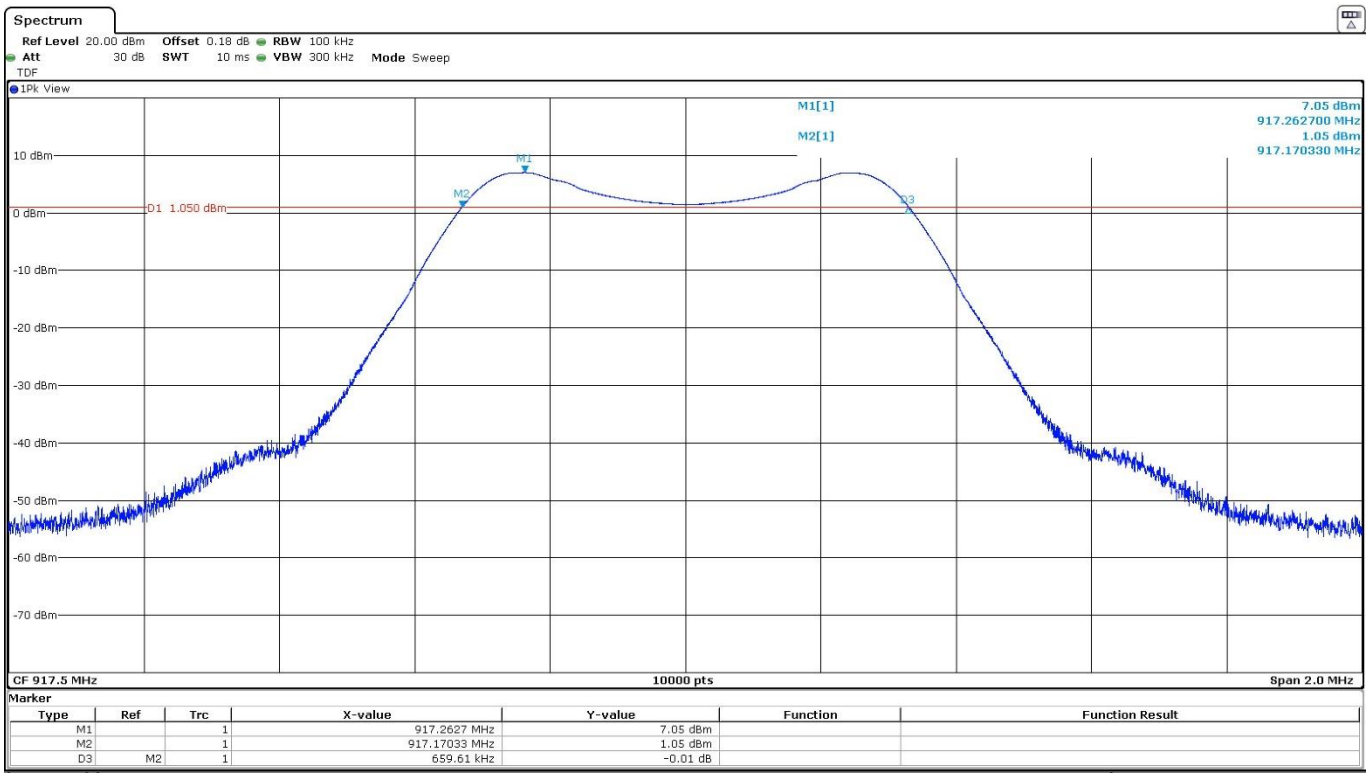
Verdict

Pass

Attachments

Frequency MHz = 917.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

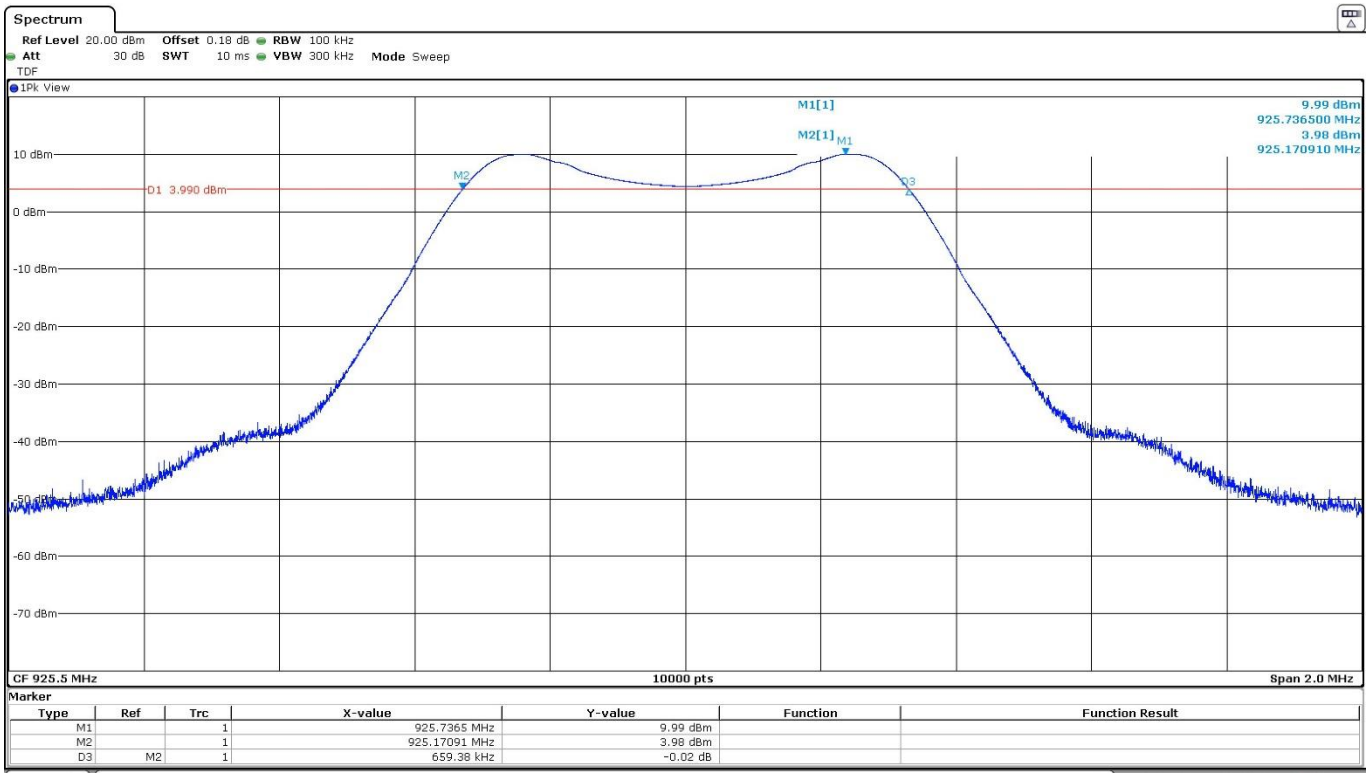
Images:



Attachments

Frequency MHz = 925.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

Images:



FCC 15.247 (b) / RSS-247 5.4. (d) Maximum output power and antenna gain

Limits

For systems using digital modulation in the 902-928 MHz band: 1 watt (30 dBm).
The e.i.r.p. shall not exceed 4 W (36 dBm) (Canada).

Modulation: 2GFSK

Results

The maximum peak conducted output power level was measured using the method according to clause "11.9.1.1. RBW ≥ DTS bandwidth" of ANSI C.63.10-2013.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

Maximum Declared Antenna Gain: +2.3 dBi

The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Freq (MHz)	Peak Power (dBm)	E.I.R.P. (dBm)
917.50	11.96	14.26
925.50	11.92	14.22

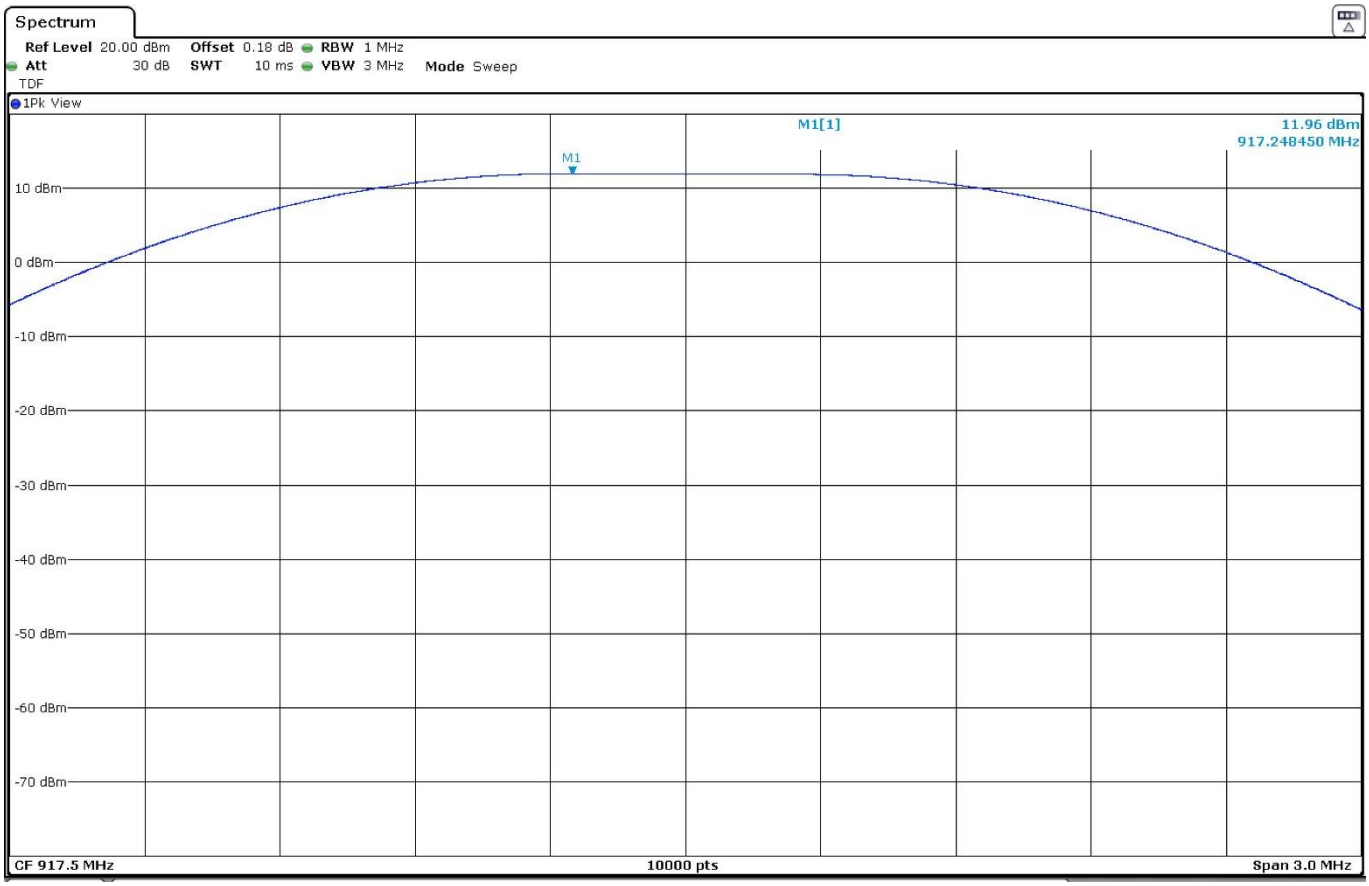
Verdict

Pass

Attachments

Frequency MHz = 917.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

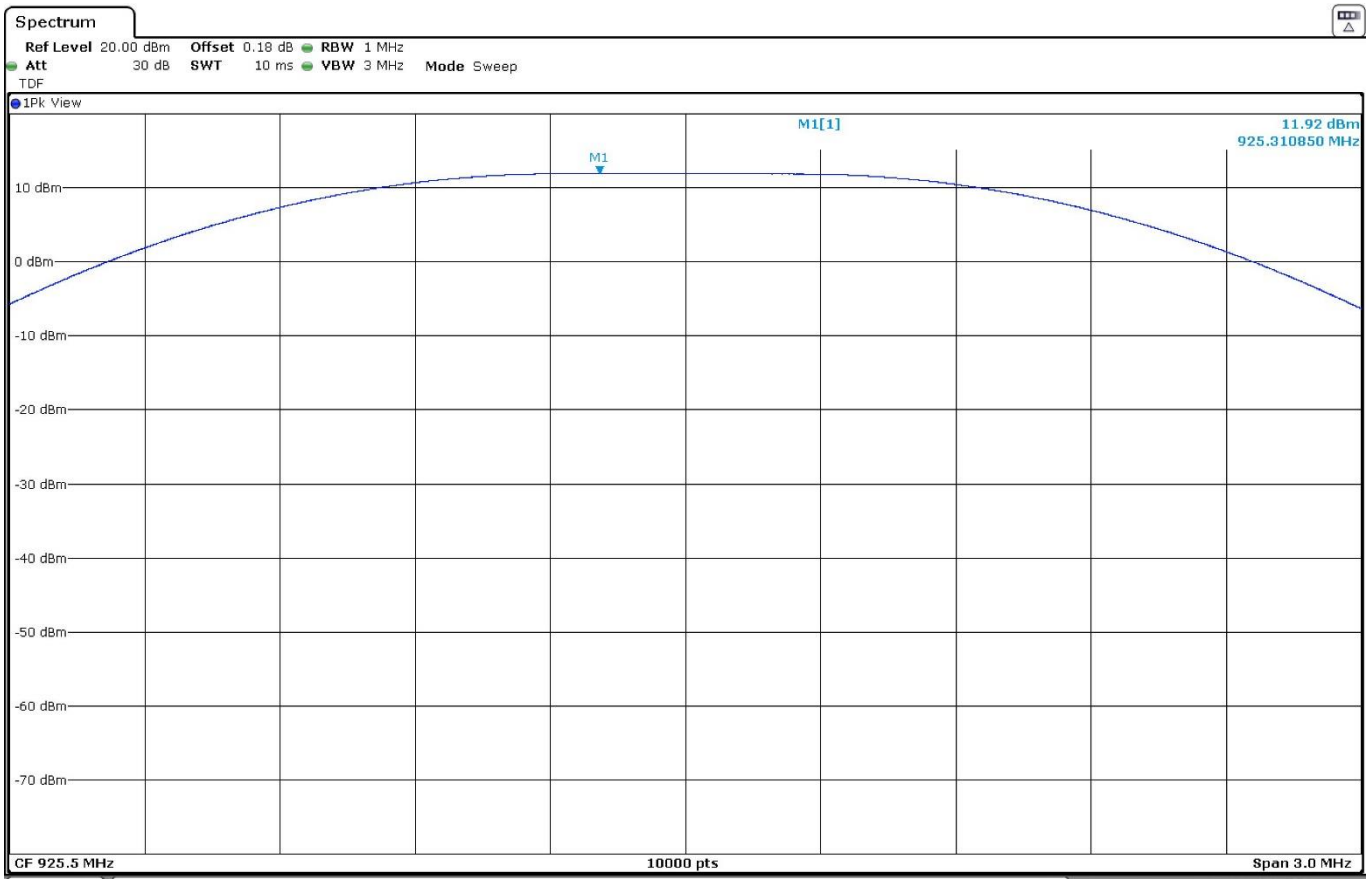
Images:



Attachments

Frequency MHz = 925.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

Images:



FCC 15.247 (d) / RSS-247 5.5. Band-edge emissions compliance (Transmitter)

Limits

In any 100 kHz bandwidths outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

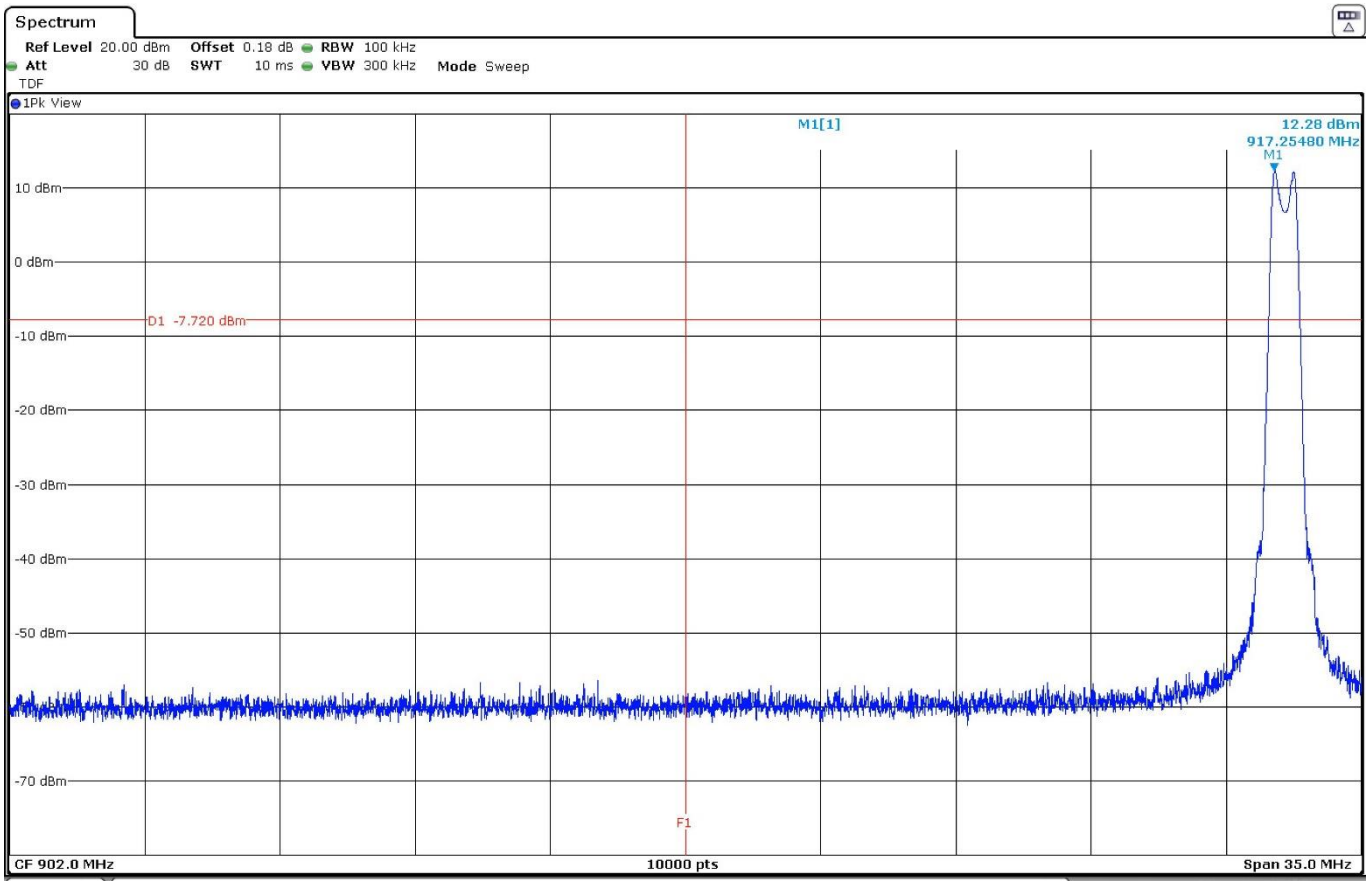
Modulation: 2GFSK

Results

Attachments

Frequency MHz = 917.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

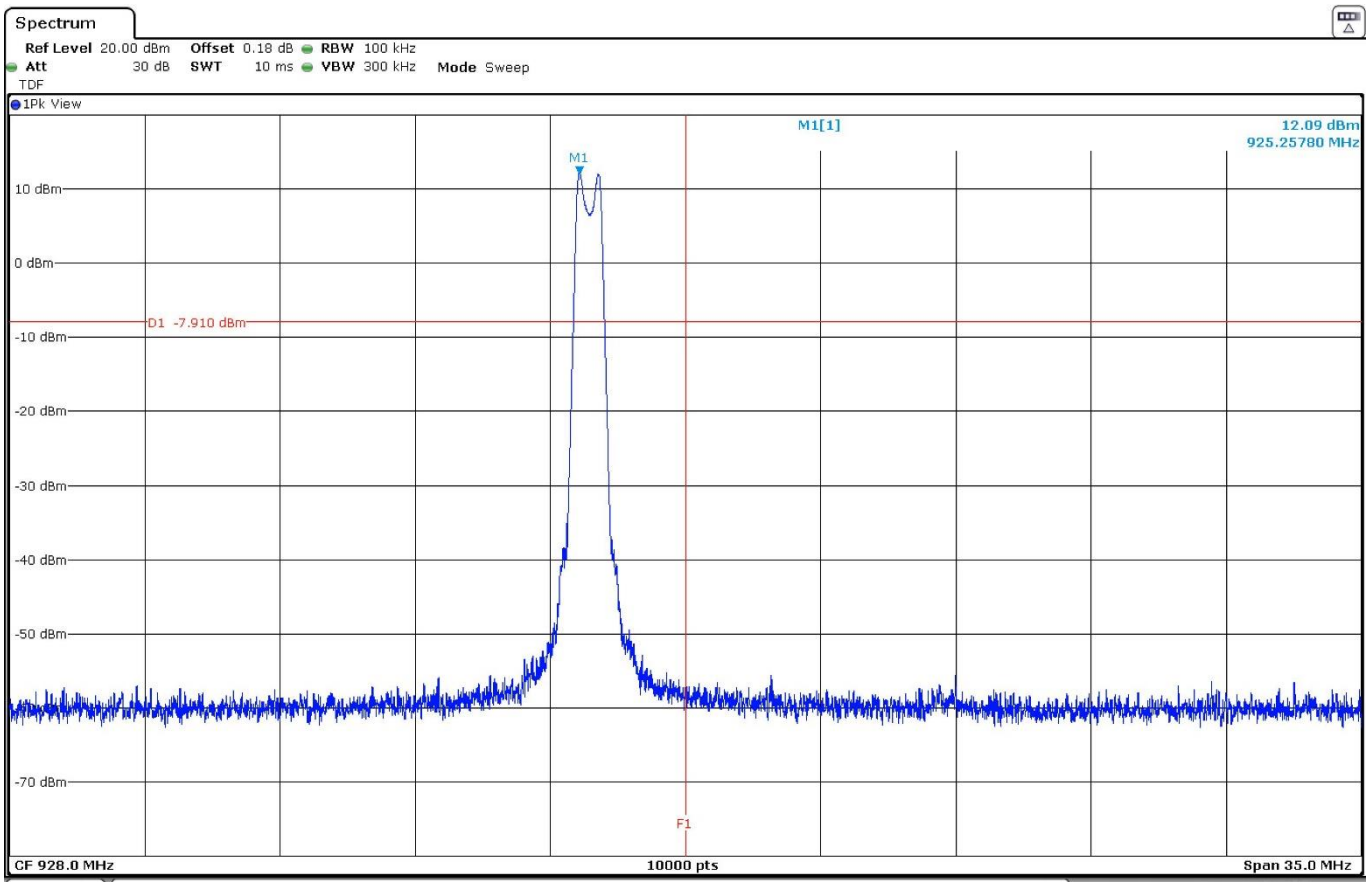
Images:



Attachments

Frequency MHz = 925.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

Images:



Verdict

Pass

FCC 15.247 (e) / RSS-247 5.2. (b) Power spectral density

Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Modulation: 2GFSK

Results

The power spectral density was measured according to clause “11.10.2 Method PKPSD (peak PSD)” of ANSI C.63.10-2013.

Freq (MHz)	Peak PSD (dBm)
917.50	6.35
925.50	6.18

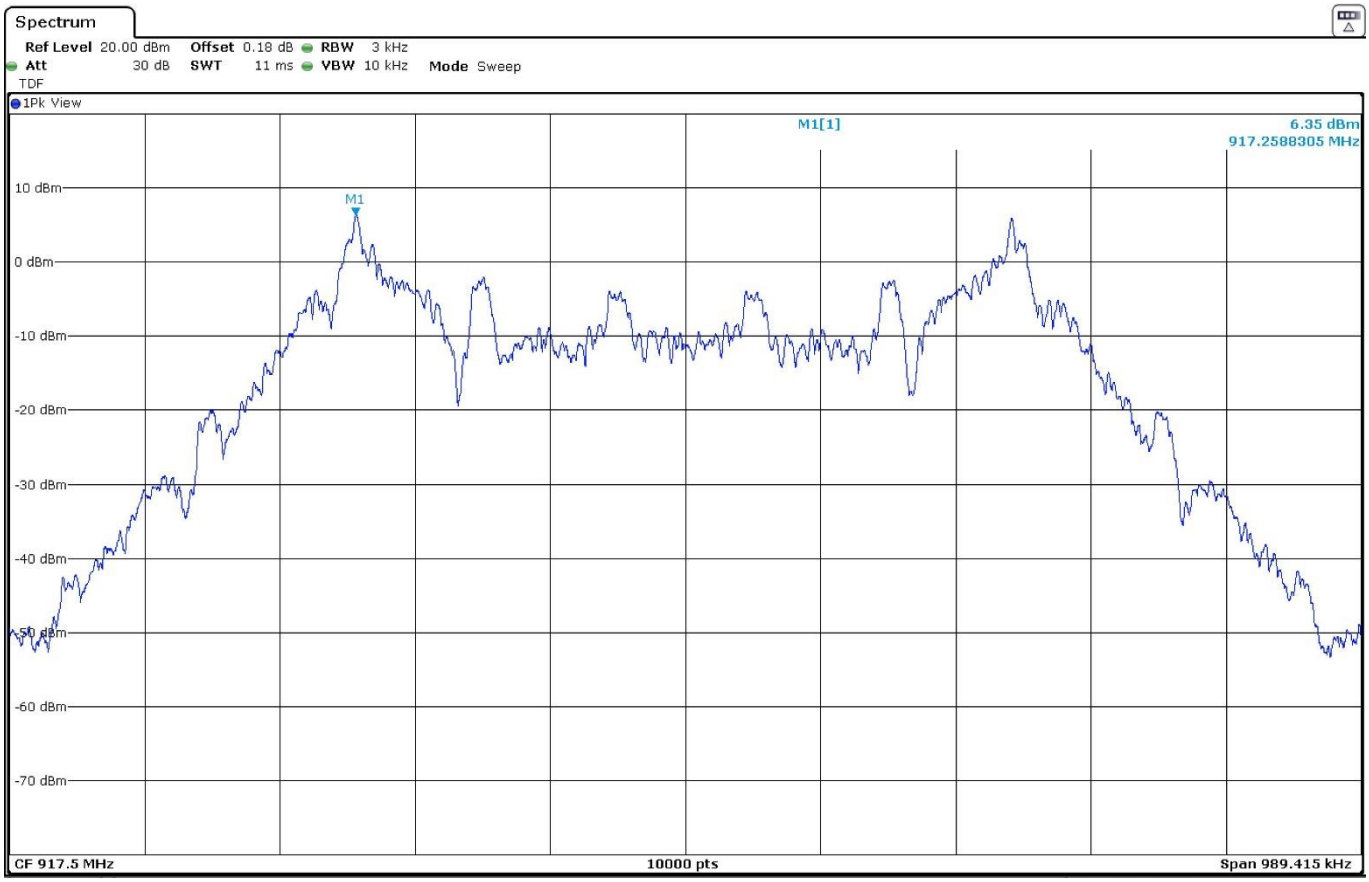
Verdict

Pass

Attachments

Frequency MHz = 917.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

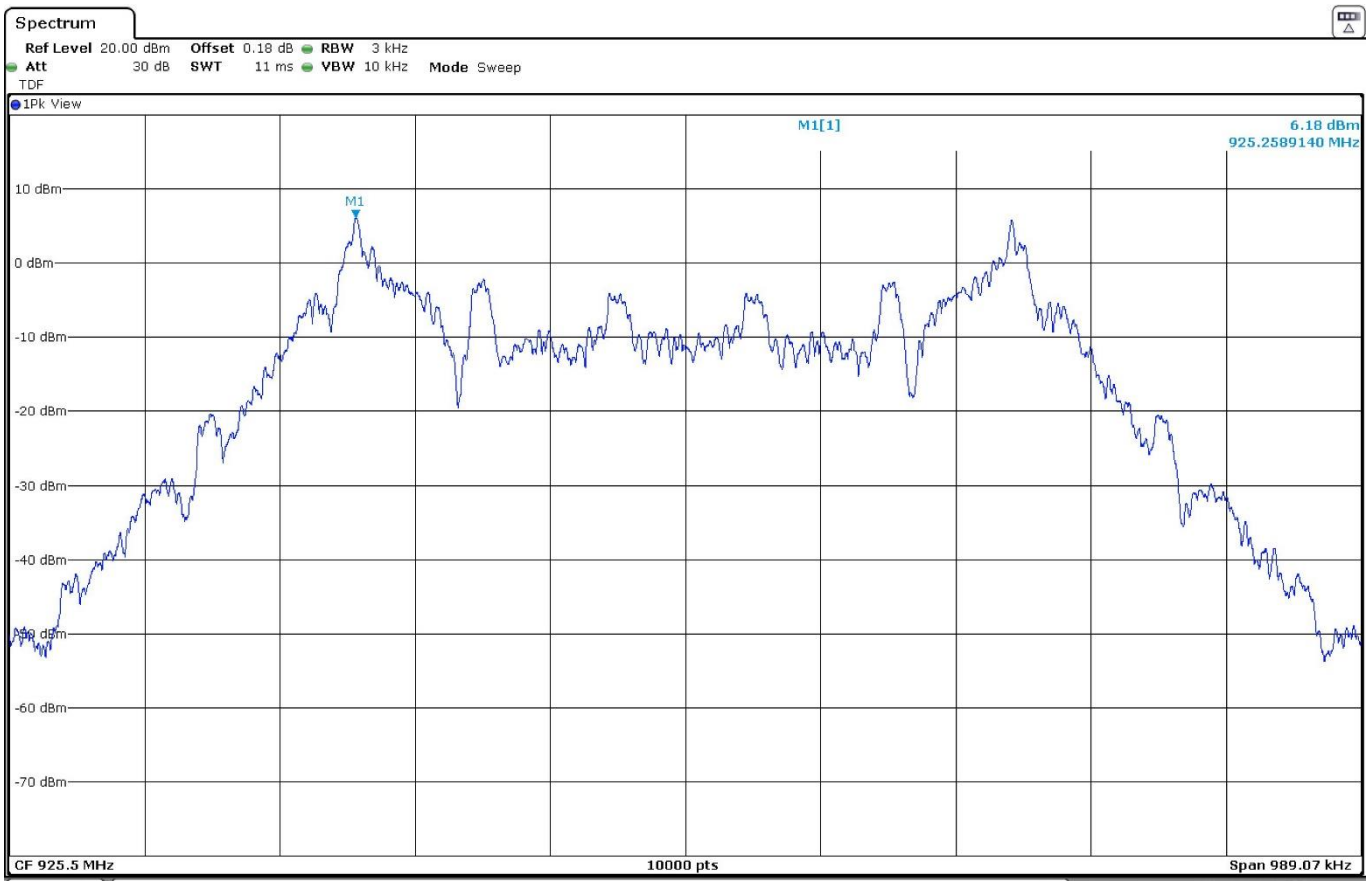
Images:



Attachments

Frequency MHz = 925.5; Equipment Type = Digital Transmission System (DTS); Modulation = 2GFSK.

Images:



RSS-247 5.5 / FCC 15.247 (d) 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 (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 is specified when measuring with peak detector function.

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

Modulation: 2GFSK

Results

Freq (MHz)	Freq Rng (GHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
917.50	[3, 10]	3669.060	46.95	V	PK
		4588.860	48.65		PK
		8259.660	54.74		PK
			44.70		AVG
925.50	[1, 3]	2777.631	55.32		PK
			42.40		AVG
	[3, 10]	3700.980	47.39		PK
		4628.620	50.41		PK
		7403.000	48.07		PK
		8331.340	54.02		PK
			44.22		AVG

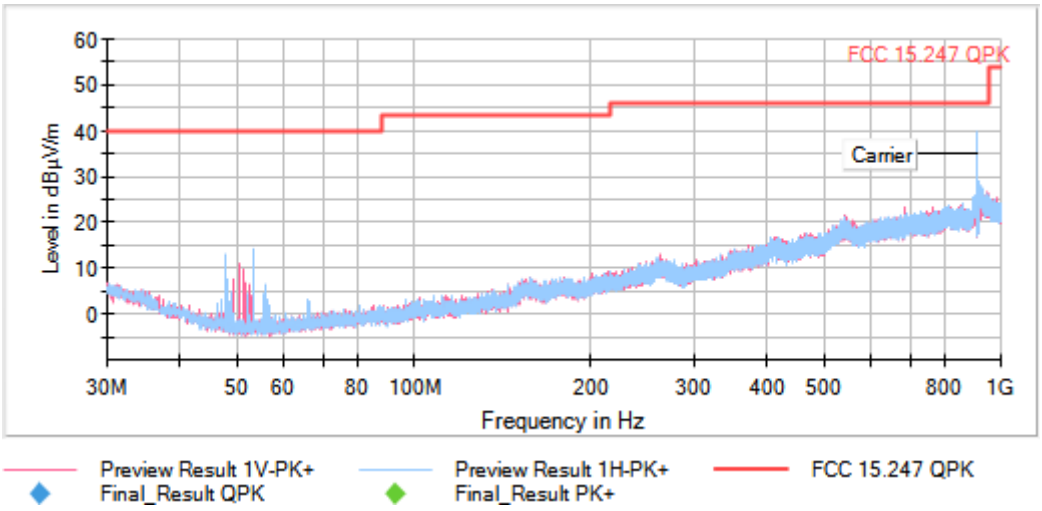
Verdict

Pass

Attachments

Frequency MHz = 917.50000
Equipment Type = Digital Transmission System (DTS)
Modulation = 2GFSK
Frequency Range GHz = [0.03, 1]
Number of Transmission Chains = 1
Measurement Point = 1
Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

	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

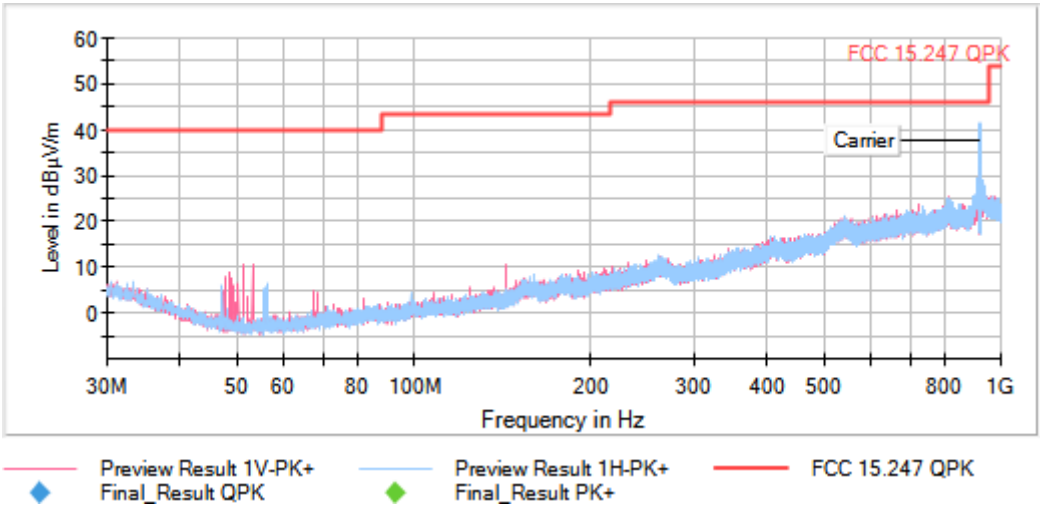
Frequency MHz = 925.50000 Equipment Type = Digital Transmission System (DTS)

Modulation = 2GFSK Frequency Range GHz = [0.03, 1]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

	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

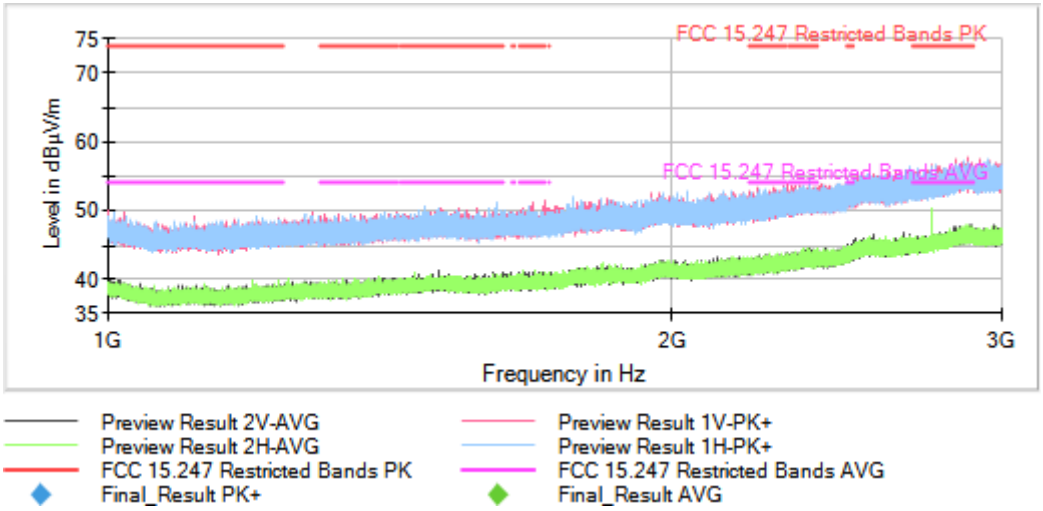
Frequency MHz = 917.50000 Equipment Type = Digital Transmission System (DTS)

Modulation = 2GFSK Frequency Range GHz = [1, 3]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

	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

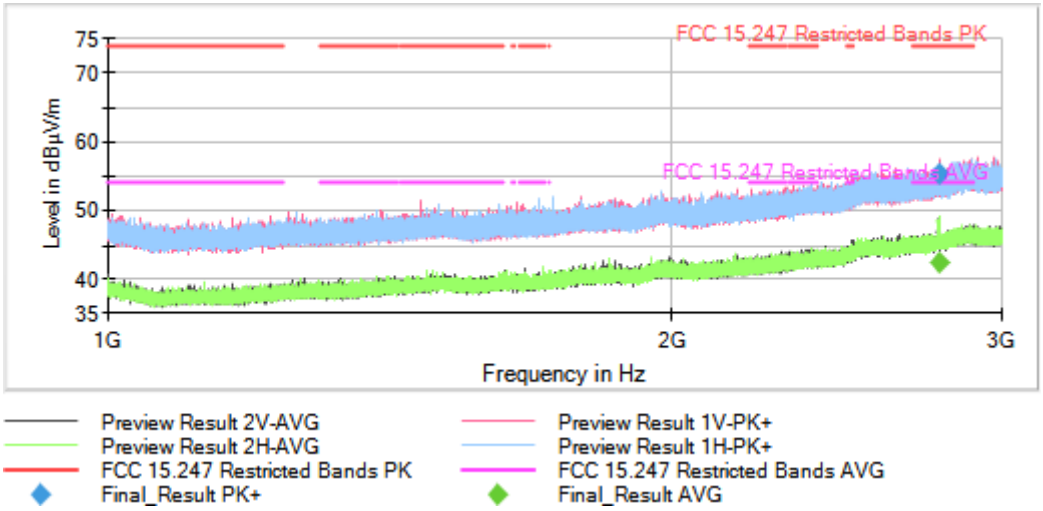
Frequency MHz = 925.50000 Equipment Type = Digital Transmission System (DTS)

Modulation = 2GFSK Frequency Range GHz = [1, 3]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

	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

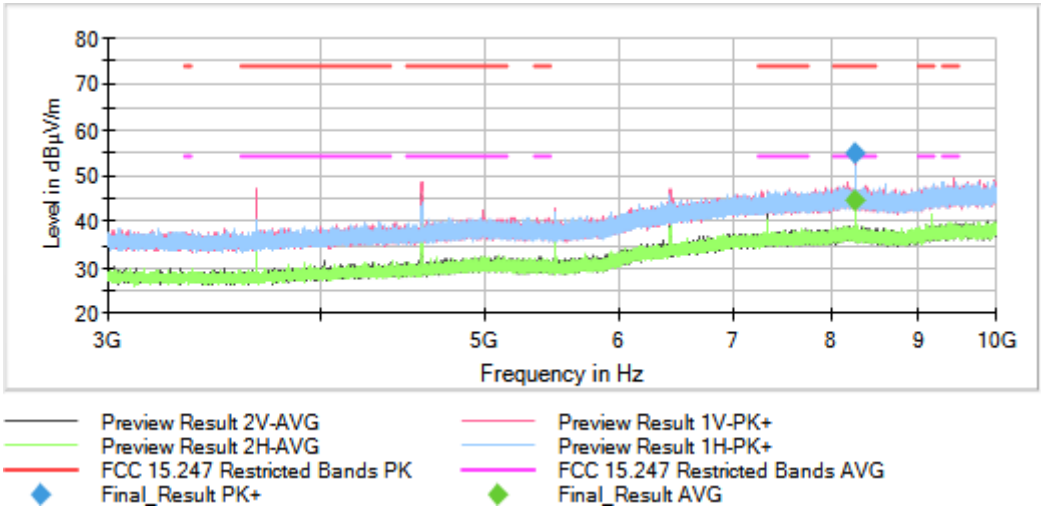
Frequency MHz = 917.50000 Equipment Type = Digital Transmission System (DTS)

Modulation = 2GFSK Frequency Range GHz = [3, 10]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	3 GHz - 10 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

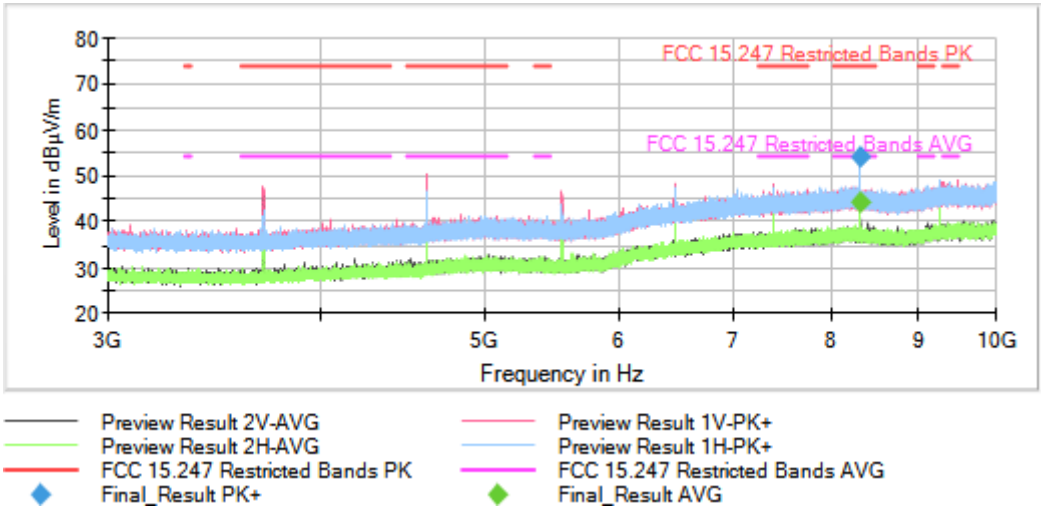
Frequency MHz = 925.50000 Equipment Type = Digital Transmission System (DTS)

Modulation = 2GFSK Frequency Range GHz = [3, 10]

Number of Transmission Chains = 1 Measurement Point = 1

Active Port = 1

Images:



Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	3 GHz - 10 GHz	140 kHz	PK+ ; AVG	1 MHz	1 s	30 dB