

Test Report No:
81844RRF.001A1

Test Report

ETSI EN 300 328 v2.2.2 (2019-07)

(*) Identification of item tested	R2EX All-In-One Unit
(*) Trademark	Marelli
(*) Model and /or type reference	HUR2XE10B1
Other identification of the product	N/A
(*) Features	AM/FM/DAB rx, BT 5.0, WLAN 5.8GHz, 2G/3G/4G modem, GNSS rx HW version: PTD3 SW version: R19.2
Manufacturer	Marelli Europe S.p.A. V.le A. Borletti 61/63 - 20011 Corbetta (MI) - ITALY
Test method requested, standard	ETSI EN 300 328 v2.2.2 (2019-07): Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2026-02-09
Report template No	FDT08_25 (*) "Data provided by the client"

INDEX	2
ACRONYMS	3
COMPETENCES AND GUARANTEES	4
GENERAL CONDITIONS	4
UNCERTAINTY	4
DATA PROVIDED BY THE CLIENT	5
USAGE OF SAMPLES	5
TEST SAMPLE DESCRIPTION	7
IDENTIFICATION OF THE CLIENT	8
TESTING PERIOD AND PLACE	8
DOCUMENT HISTORY	8
ENVIRONMENTAL CONDITIONS	8
REMARKS AND COMMENTS	9
TESTING VERDICTS	10
SUMMARY	11
APPENDIX A: APPLICATION FORM FOR TESTING. BLUETOOTH EDR	12
APPENDIX B: TEST RESULTS. BLUETOOTH EDR	22
APPENDIX C: PHOTOGRAPHS	95

Acronyms

Acronym ID	Acronym Description
	Hopping Band Allocation Low Frequency
	Hopping Band Allocation High Frequency
	Hopping Band Allocation
Accum Dwell	Accumulated Dwell Time
BEL	Band Edge Left
BER	Band Edge Right
Blk Freq	Blocking Frequency
Blk Freq Off	Blocking Frequency Offset
Blk Lvl	Blocking Level At DUT
Cat	Receiver Category
Ctr Freq High Ch	Center Frequency High Channel
Ctr Freq Low Ch	Center Frequency Low Channel
DC	Duty Cycle
Freq	Frequency
Freq Occ	Frequency Occupation Time
Freq Rng	Frequency Range
Freq Sep	Frequency Separation
Hop Freq	Hopping Frequencies
Lvl Meas Pk	Level Pre Measurement Peak
MP	Measurement Point
MU	Medium Utilization Factor
Max EIRP	Maximum Burst EIRP
Max RMS	Maximum Burst RMS
Max Tx Seq	Maximum Transmission Sequence Time
Min Tx Gap	Minimum Transmission Gap Time
Mod	Modulation
Occ Ch BW	Occupied Channel Bandwidth
PER	Packet Error Rate
Pol	Polarization
Port	Active Port
T	Temperature
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level
Unwanted Lvl RMS	Unwanted Emissions Level RMS

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.

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.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification S.A.U.

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 12.75 GHz is:
Measurement uncertainty $\leq \pm 4,32$ dB with factor ($k = 2$).

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

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

Accumulated Dwell Time: Measurement uncertainty $\leq \pm 0,16$ %

Minimum Frequency Occupation Time: Measurement uncertainty $\leq \pm 0,53$ %

Occupied Channel Bandwidth: Measurement uncertainty $\leq \pm 1,24$ %

Out-of-Band emissions: Measurement uncertainty $\leq \pm 0,89$ dB

Receiver blocking: Measurement uncertainty $\leq \pm 2,96$ 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 R2EX All-In-One Unit. Automotive All-In-One Unit, including Infotainment and Telematics functions.

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	81844B_80.1	R2EX All-In-One Unit	HUR2XE10B1	1JCGF900267F	2025-08-04	Element Under Test
S/01	81844B_44.1	MAIN Harness	-	-	2025-06-24	Auxiliary Element
S/01	81844B_71.1	Fakra to 4 Fakra Cable	-	-	2025-06-24	Auxiliary Element
S/01	81844B_12.1	Fakra to 4 Fakra Cable	-	-	2025-06-09	Auxiliary Element
S/01	81844B_10.1	Fakra Cable	-	-	2025-06-09	Auxiliary Element
S/01	81844B_16.1	Fakra Cable	-	-	2025-06-09	Auxiliary Element
S/01	81844B_23.1	CANBOX	-	-	2025-06-24	Auxiliary Element
S/01	81844B_28.1	TLS AUDIO	-	-	2025-06-24	Auxiliary Element
S/01	81844B_01.1	DISPLAY R2EX	-	-	2025-06-09	Auxiliary Element
S/01	81844B_05.1	TLS 1	-	-	2025-06-09	Auxiliary Element
S/01	81844B_06.1	TLS 2	-	-	2025-06-09	Auxiliary Element
S/01	81844B_07.1	USB213C	-	-	2025-06-09	Auxiliary Element
S/01	81844B_08.1	USB Cable	-	-	2025-06-09	Auxiliary Element
S/01	81844B_09.1	USB Adapter	-	-	2025-06-09	Auxiliary Element

Id	Control Number	Description	Model	Serial N°	Date of Reception	Application
S/02	81844B_82.1	R2EX All-In-One Unit	HUR2XS10B1	1JCGF901G67F	2025-09-12	Element Under Test
S/02	81844B_17.1	Display R2EX	-	-	2025-06-24	Auxiliary Element
S/02	81844B_23.1	CANBOX	-	-	2025-06-24	Auxiliary Element
S/02	81844B_36.1	Fakra Cable	-	-	2025-06-24	Auxiliary Element
S/02	81844B_37.1	Fakra to SMA Cable	-	-	2025-06-24	Auxiliary Element
S/02	81844B_75.1	USB Adapter	-	-	2025-06-24	Auxiliary Element
S/02	81844B_76.1	USB – Fakra Adapter	-	-	2025-06-24	Auxiliary Element
S/03	81844B_89.1	R2EX All-In-One Unit	HUR2XE10B1	1JVAF9019V8F	2025-10-08	Element Under Test
S/03	81844B_17.1	Display R2EX	-	-	2025-06-24	Auxiliary Element
S/03	81844B_23.1	CANBOX	-	-	2025-06-24	Auxiliary Element
S/03	81844B_36.1	Fakra Cable	-	-	2025-06-24	Auxiliary Element
S/03	81844B_37.1	Fakra to SMA Cable	-	-	2025-06-24	Auxiliary Element
S/03	81844B_75.1	USB Adapter	-	-	2025-06-24	Auxiliary Element
S/03	81844B_76.1	USB – Fakra Adapter	-	-	2025-06-24	Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Samples used for radiated tests
S/02	Samples used for conducted tests except RF output power and Receiver Blocking tests.
S/03	Samples used only for RF output power and Receiver Blocking tests.

Test sample description

Ports..... :	Port name and description Connector A (black, main harness) Connector B (grey, main harness) Connector C (FM/AM, DAB, WIFI/BT ANT1, WIFI/BT ANT2) Connector D (display) Connector E (GNSS, CAM, LTE, GSM) Connector F (USB)	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient⁽³⁾		
		>3	[X]	[]	[]		
		>3	[X]	[]	[]		
		>3	[X]	[X]	[]		
		>3	[X]	[X]	[]		
		>3	[X]	[X]	[]		
		>3	[X]	[X]	[]		
Supplementary information to the ports..... :	the shielding in Connector C and E is intended on each single signal, not on overall connector						
Rated power supply :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 13,5 Vdc (Vmin-Vmax: 9 - 16 Vdc)					
	[]	DC: shielded cables: any voltage inside is <13.5Vdc					
Rated Power :							
Clock frequencies :							
Other parameters..... :							
Software version :	R19.2						
Hardware version..... :	PTD3						
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: automotive interior environment, installation in the dashboard of vehicles					
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

Marelli Europe S.p.A.
V.le A. Borletti 61/63 - 20011 Corbetta (MI) - ITALY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2025-09-29
Date (finish)	2025-10-24

Document history

Report number	Date	Description
81844RRF.001	2026-01-28	First release.
81844RRF.001A1	2026-02-09	Second release. Test report updated due to minor typos (SW version modification). This modified test report cancels and replaces test report 81844RRF.001.

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 %

In the chamber for conducted measurements, 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: Pablo Redondo Reyes, Valentin Andarias Diaz and Álvaro Gutiérrez Naranjo.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
04825	SEMIANECHOIC ABSORBER LINED CHAMBER	FACT 3 200 STP	ETS LINDGREN	N/A
04826	SHIELDED ROOM	S101	ETS LINDGREN	N/A
07547	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2026-04-22
07548	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2026-04-22
04578	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2026-06-01
07611	PREAMPLIFIER BOX	--	INTERNAL	2026-01-23
06165	EMI TEST RECEIVER 9kHz-7GHz	ESR7	ROHDE AND SCHWARZ	2025-12-27
04611	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2026-01-16
05705	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2026-07-23
08835	SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2026-04-15
09555	TWO-CHANNEL POWER SUPPLY, 32V, 10/5A, 188W	HMP2020	ROHDE AND SCHWARZ	N/A
07758	DIGITAL MULTIMETER	175	FLUKE	2026-11-06
06793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	N/A
06611	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2026-04-21
07791	SIGNAL GENERATOR 8kHz-6GHz	SMB100B	ROHDE AND SCHWARZ	2026-03-15
07793	SIGNAL GENERATOR 8kHz-6GHz	SMBV100B	ROHDE AND SCHWARZ	2026-03-11
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2027-06-10
07795	WIRELESS CONNECTIVITY TESTER BW 160 MHz	CMW270	ROHDE AND SCHWARZ	2026-06-06
07796	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2027-01-09

Control No.	Equipment	Model	Manufacturer	Next Calibration
08847	VECTOR SIGNAL GENERATOR 100kHz-7.5GHz	SMW200A	ROHDE AND SCHWARZ	2027-10-23
08848	OPEN SWITCH UNIT UP TO 7.5 GHz	OSP-B157W8 PLUS	ROHDE AND SCHWARZ	2027-01-02
08002	TEMPERATURE CHAMBER MK56 BINDER	MK 56	BINDER	2026-02-12
00922	POWER SUPPLY DC 40 V / 40 A	NGPE 40/40	ROHDE AND SCHWARZ	2027-10-02
05850	DIGITAL MULTIMETER	179	FLUKE	2026-11-06
07798	WMS32	WMS32	ROHDE AND SCHWARZ	N/A

Testing verdicts

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

Summary

Bluetooth EDR

Requirement – Test case	ETSI EN 300 328	Verdict	Remark	Location
4.3.1.2 Transmitter. RF Output Power		P		Location B
4.3.1.3 Transmitter. Duty Cycle, Tx-sequence, Tx-gap		N/A	(1)	
4.3.1.4_1 Hopping Sequence		P		
4.3.1.4_2 Accumulated Transmit Time		P		
4.3.1.4_3 Frequency Occupation		P		
4.3.1.5 Hopping Frequency Separation		P		
4.3.1.6 Medium Utilization (MU) factor		N/A	(1)	
4.3.1.7 Adaptivity (Adaptive FHSS)		N/A	(1)	
4.3.1.8 Occupied Channel Bandwidth		P		
4.3.1.9 Transmitter unwanted emissions in the out-of-band (OOB) domain		P		
4.3.1.10 Transmitter unwanted emissions in the spurious domain		P		
4.3.1.11 Receiver spurious emissions		P		
4.3.1.12 Receiver blocking		P		
4.3.1.13 Geo-Location capability		N/A	(2)	
Supplementary information and remarks: (1) The equipment is declared as non-adaptive, using FHSS modulation. The maximum declared e.i.r.p. RF Output power level is lower than 10 dBm e.i.r.p. (2) The equipment does not implement geo-location capability as defined in clause 4.3.1.13.2.				

Appendix A: Application form for testing. Bluetooth EDR

Information as required by EN 300 328 V2.2.2, clause 5.4.1

In accordance with EN 300 328, clause 5.4.1, the following information is provided by the manufacturer.

a) The type of modulation used by the equipment:

- ☒ FHSS
- ☐ other forms of modulation

b) In case of FHSS modulation:

- In case of non-Adaptive Frequency Hopping equipment:
The number of Hopping Frequencies: 79
- In case of Adaptive Frequency Hopping Equipment:
The maximum number of Hopping Frequencies:
The minimum number of Hopping Frequencies:
- The (average) Dwell Time: 1.875 ms

c) Adaptive / non-adaptive equipment:

- ☒ non-adaptive Equipment
- ☐ adaptive Equipment without the possibility to switch to a non-adaptive mode
- ☐ adaptive Equipment which can also operate in a non-adaptive mode

d) In case of adaptive equipment:

The maximum Channel Occupancy Time implemented by the equipment: ms

☐ The equipment has implemented an LBT based DAA mechanism

- In case of equipment using modulation different from FHSS:

☐ The equipment is Frame Based equipment

☐ The equipment is Load Based equipment

☐ The equipment can switch dynamically between Frame Based and Load Based equipment

The CCA time implemented by the equipment: ms

☐ The equipment has implemented a non-LBT based DAA mechanism

☐ The equipment can operate in more than one adaptive mode

e) In case of non-adaptive Equipment:

The maximum RF Output Power (e.i.r.p.): 9,9 dBm

The maximum (corresponding) Duty Cycle: %

Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and corresponding power levels to be declared):

.....

f) The worst case operational mode for each of the following tests:

- RF Output Power
+6,3dBm
- Power Spectral Density
.....
- Duty cycle, Tx-Sequence, Tx-gap
.....
- Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment)
.....
- Hopping Frequency Separation (only for FHSS equipment)
.....
- Medium Utilization
.....
- Adaptivity & Receiver Blocking
.....
- Nominal Channel Bandwidth
1 MHz
- Transmitter unwanted emissions in the OOB domain
.....
- Transmitter unwanted emissions in the spurious domain
.....
- Receiver spurious emissions
.....

g) The different transmit operating modes (tick all that apply):

- ☒ Operating mode 1: Single Antenna Equipment
- ☒ Equipment with only one antenna
- ☐ Equipment with two diversity antennas but only one antenna active at any moment in time
- ☐ Smart Antenna Systems with two or more antennas, but operating in a (legacy) mode where only one antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
- ☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming
- ☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™[i.3] legacy mode)
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 3
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 4
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 5
- ☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming
- ☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 1
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 2
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 3
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 4
- ☐ High Throughput (> 1 spatial stream) using Nominal Channel Bandwidth 5

h) In case of Smart Antenna Systems:

- The number of Receive chains:
- The number of Transmit chains:
 - ☐ symmetrical power distribution
 - ☐ asymmetrical power distribution

In case of beam forming, the maximum (additional) beam forming gain: dB

NOTE: The additional beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

- Operating Frequency Range 1: 2402 MHz to 2480 MHz
- Operating Frequency Range 2: MHz to MHz
- Operating Frequency Range 3: MHz to MHz
- Operating Frequency Range 4: MHz to MHz
- Operating Frequency Range 5: MHz to MHz

j) Nominal Channel Bandwidth(s):

- Nominal Channel Bandwidth 1: 1 MHz
- Nominal Channel Bandwidth 2: MHz
- Nominal Channel Bandwidth 3: MHz
- Nominal Channel Bandwidth 4: MHz
- Nominal Channel Bandwidth 5: MHz

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

- ☒ Stand-alone
- ☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)
- ☐ Plug-in radio device (Equipment intended for a variety of host systems)
- ☐ Other

l) The normal and the extreme operating conditions that apply to the equipment:

Normal operating conditions (if applicable):

Operating temperature: 20 ° C

Other (please specify if applicable): ° C

Extreme operating conditions:

Operating temperature range: Minimum -35 ° C Maximum 70 ° C

Other (please specify if applicable): Minimum ° C Maximum ° C

Details provided are for the: ☒ stand-alone equipment
☐ combined (or host) equipment
☐ test jig

m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:

- Antenna Type:
- ☒ Integral Antenna (information to be provided in case of conducted measurements)

Chain #	Antenna Gain (dBi)
1	3.6
.....	
.....	
.....	

If applicable, additional beamforming gain (excluding basic antenna gain): dB

- ☒ Temporary RF connector provided
- ☐ No temporary RF connector provided

☐ Dedicated Antennas (equipment with antenna connector)

[] Single power level with corresponding antenna(s)

[] Multiple power settings and corresponding antenna(s)

Number of different Power Levels:

Power Level 1: dBm

Power Level 2: dBm

Power Level 3: dBm

Power Level 4: dBm

Power Level 5: dBm

Power Level 6: dBm

Power Level 7: dBm

Power Level 8: dBm

Power Level 9: dBm

Power Level 10: dBm

NOTE: These power levels are conducted power levels (at antenna connector).

- For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: 6,3 dBm

Number of antenna assemblies provided for this power level: 1

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1	3.6	9.9	
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 2: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 3: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 4: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 5: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 6: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 7: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 8: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 9: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Power Level 10: dBm

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p. (dBm)	Part number or model name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:

Details provided are for the: ☒ stand-alone equipment
☐ combined (or host) equipment
☐ test jig

Supply Voltage ☐ AC mains State AC voltage V
☐ DC State DC voltage 13.5 V

In case of DC, indicate the type of power source

☐ Internal Power Supply
☐ External Power Supply or AC/DC adapter
☒ Battery
☐ Other:

o) Describe the test modes available which can facilitate testing:

.....

p) The equipment type (e.g. Bluetooth[®], IEEE 802.11[™][i.3], IEEE 802.15.4[™][i.4], proprietary, etc.):

Bluetooth, IEEE 802.11 a/b/g/n/ac

q) If applicable, the statistical analysis referred to in clause 5.4.1 q)

(to be provided as separate attachment)

r) If applicable, the statistical analysis referred to in clause 5.4.1 r)

(to be provided as separate attachment)

s) Geo-location capability supported by the equipment:

☐ Yes

☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.

☒ No

Appendix B: Test results. Bluetooth EDR

TEST CONDITIONS	24
PRODUCT INFORMATION	25
TEST CASES DETAILS	26
ETSI EN 300 328	26
4.3.1.2 Transmitter. RF Output Power	26
4.3.1.4_1 Hopping Sequence	27
4.3.1.4_2 Accumulated Transmit Time	33
4.3.1.4_3 Frequency Occupation	42
4.3.1.5 Hopping Frequency Separation	51
4.3.1.8 Occupied Channel Bandwidth	57
4.3.1.9 Transmitter unwanted emissions in the out-of-band (OOB) domain	69
4.3.1.10 (radiated) Transmitter unwanted emissions in the spurious domain	78
4.3.1.11 (radiated) Receiver spurious emissions	89
4.3.1.12 Receiver blocking	94

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 13.5 Vdc
Type of Power Supply: Battery

TEMPERATURE (*):

Tnormal: +15 to +35 °C
Tminimum: -35 °C
Tmaximum: 70 °C

TEST FREQUENCIES (*):

Modulation	Data rates	Low Channel	Middle Channel	High Channel
BTEDR GFSK	1-DH5	2402 MHz	2441 MHz	2480 MHz
BTEDR PI/4 DQPSK	2-DH5	2402 MHz	2441 MHz	2480 MHz
BTEDR 8DPSK	3-DH5	2402 MHz	2441 MHz	2480 MHz

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

PRODUCT INFORMATION

The following information is provided by the supplier, in accordance with clause 5.4.1:

Information	Description
Modulation	FHSS
Number of Hopping Frequencies	79
Dwell time	1.875
Adaptivity	Non adaptive equipment
Maximum RF Output Power (e.i.r.p)	+9,9dBm
Operating mode 1: Single Antenna Equipment	Equipment with only one antenna
Operating Frequency range(s) of the equipment	2402-2480 MHz
Nominal Channel Bandwidth	1 MHz
Extreme operating conditions	
Operating temperature range	From -35 to 70 ^a C
Antenna Type	Integral Antenna
Antenna Gain	+3.6 dBi
Equipment type	Bluetooth
Geo-location capability	No

TEST CASES DETAILS

ETSI EN 300 328

4.3.1.2 Transmitter. RF Output Power

Limits

The RF output power for FHSS equipment shall be equal to or less than 20 dBm.

NOTE: For Non-adaptive FHSS equipment, the manufacturer may have declared a reduced RF Output Power (see Appendix A clause m)) and associated Duty Cycle (see Appendix A clause e)) that will ensure that the equipment meets the requirement for the Medium Utilization (MU) factor further described in clause 4.3.1.6. This is verified by the conformance test referred to in clause 4.3.1.6.4.

For non-adaptive FHSS equipment, where the manufacturer has declared an RF output power lower than 20 dBm e.i.r.p., the RF output power shall be equal to or less than that declared value.

This limit shall apply for any combination of power level and intended antenna assembly.

Modulation: BT (GFSK 1-DH5)

Results

T	Max EIRP (dBm)	Max RMS (dBm)
Nominal	7.06	3.46
Low	8.25	4.65
High	7.35	3.75

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

T	Max EIRP (dBm)	Max RMS (dBm)
Nominal	7.18	3.58
Low	8.25	4.65
High	7.37	3.77

Modulation: BT (8DPSK 3-DH5)

Results

T	Max EIRP (dBm)	Max RMS (dBm)
Nominal	4.43	0.83
Low	5.58	1.98
High	4.44	0.84

Verdict

Pass

4.3.1.4_1 Hopping Sequence

Limits

The Hopping Sequence(s) shall contain at least N hopping frequencies where N is either 5 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

NOTE: See also clause 4.3.1.5.3.1 for the Hopping Frequency Separation applicable to non-adaptive FHSS equipment.

Non-Adaptive FHSS equipment, may blacklist some but not all hopping frequencies. From the N hopping frequencies defined above, the equipment shall transmit on at least one hopping frequency. For the blacklisted frequencies, the equipment has to occupy these frequencies for the duration of the average dwell time (see also definition for blacklisted frequency in clause 3.1).

Modulation: BT (GFSK 1-DH5)

Results

Hop Freq	Hopping Band Allocation (MHz)	Hopping Band Allocation Low Frequency (MHz)	Hopping Band Allocation High Frequency (MHz)
78	79.51	2401.37	2480.88

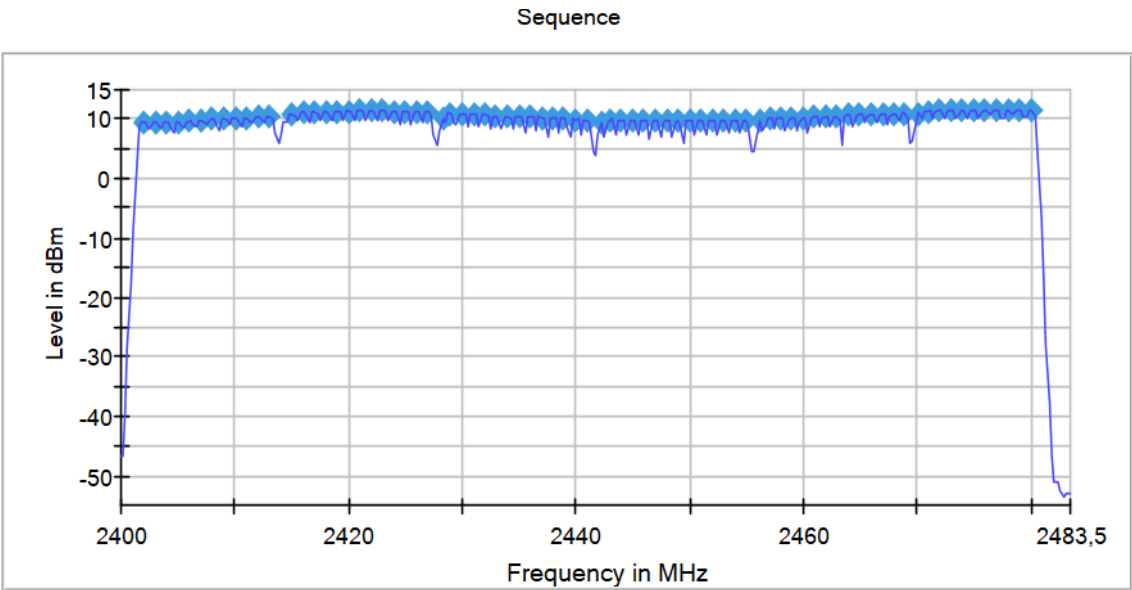
Verdict

Pass

Attachments

Modulation = BT (GFSK 1-DH5)

Images:



Tables:
Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	500.000 kHz	>= 500.000 kHz
VBW	2.000 MHz	>= 1.500 MHz
SweepPoints	335	~ 335
SweepTime	22.755 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	1.00 dB	1.00 dB
Run	29 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.47 dB	1.00 dB

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Hop Freq	Hopping Band Allocation (MHz)	Hopping Band Allocation Low Frequency (MHz)	Hopping Band Allocation High Frequency (MHz)
80	80.26	2400.87	2481.13

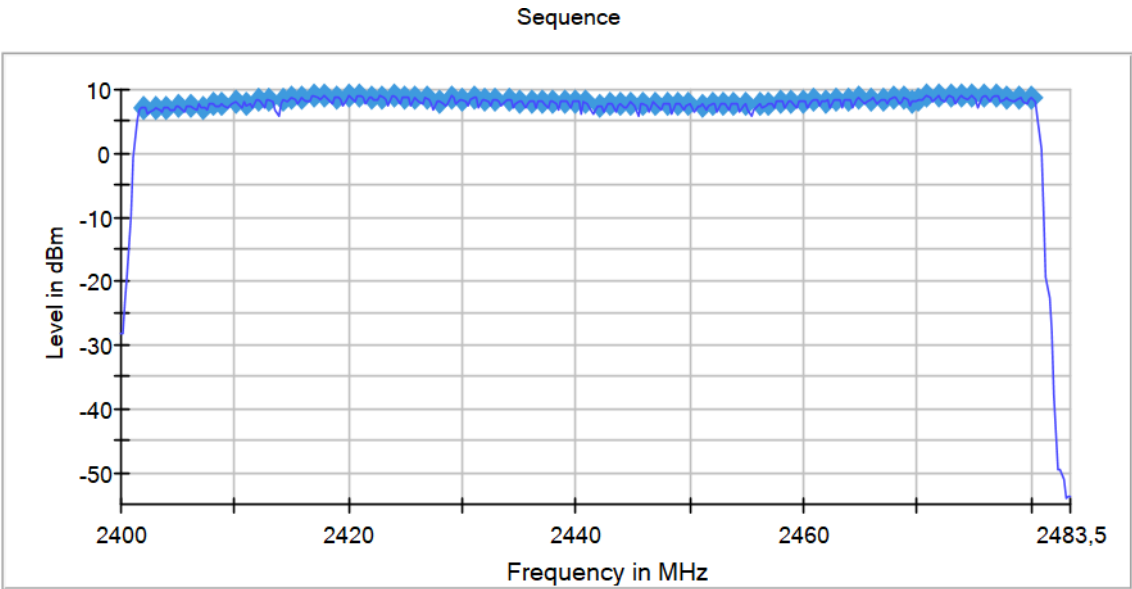
Verdict

Pass

Attachments

Modulation = BT (Pi/4 DQPSK 2-DH5)

Images:



Tables:
 Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	500.000 kHz	>= 500.000 kHz
VBW	2.000 MHz	>= 1.500 MHz
SweepPoints	335	~ 335
SweepTime	22.755 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	1.00 dB	1.00 dB
Run	22 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.58 dB	1.00 dB

Modulation: BT (8DPSK 3-DH5)

Results

Hop Freq	Hopping Band Allocation (MHz)	Hopping Band Allocation Low Frequency (MHz)	Hopping Band Allocation High Frequency (MHz)
86	80.01	2400.87	2480.88

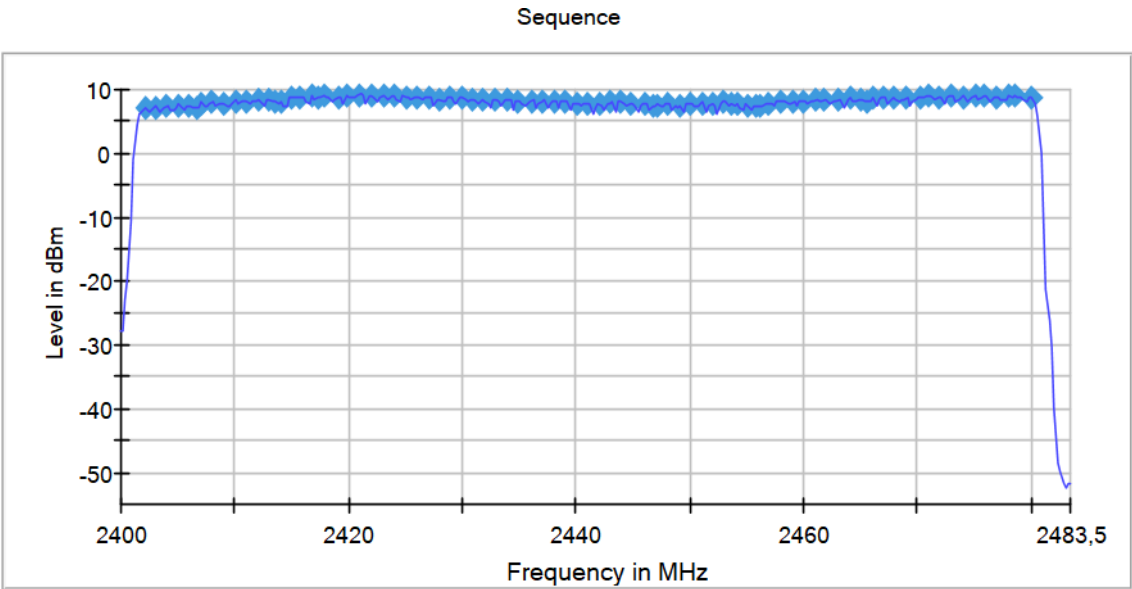
Verdict

Pass

Attachments

Modulation = BT (8DPSK 3-DH5)

Images:



Tables:
 Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Start Frequency	2.40000 GHz	2.40000 GHz
Stop Frequency	2.48350 GHz	2.48350 GHz
Span	83.500 MHz	83.500 MHz
RBW	500.000 kHz	>= 500.000 kHz
VBW	2.000 MHz	>= 1.500 MHz
SweepPoints	335	~ 335
SweepTime	22.755 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	1.00 dB	1.00 dB
Run	30 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.95 dB	1.00 dB

4.3.1.4_2 Accumulated Transmit Time

Limits

The Accumulated Transmit Time on any hopping frequency shall not be greater than 15 ms within any observation period of 15 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Accum Dwell (ms)
2402.00000	1.54
2480.00000	0.77

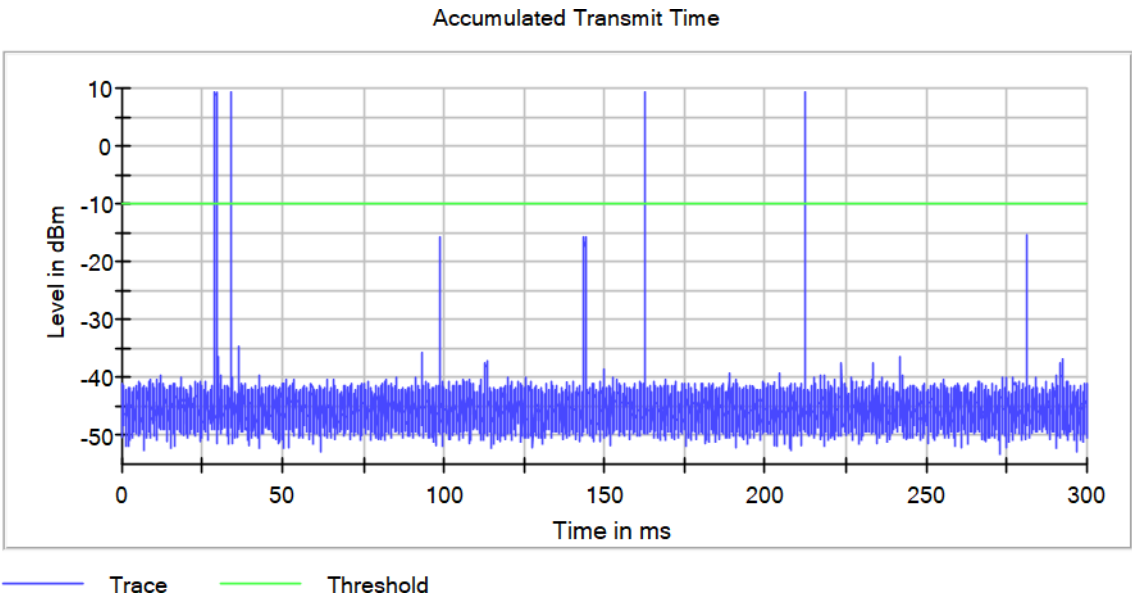
Verdict

Pass

Attachments

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2402.00000

Images:



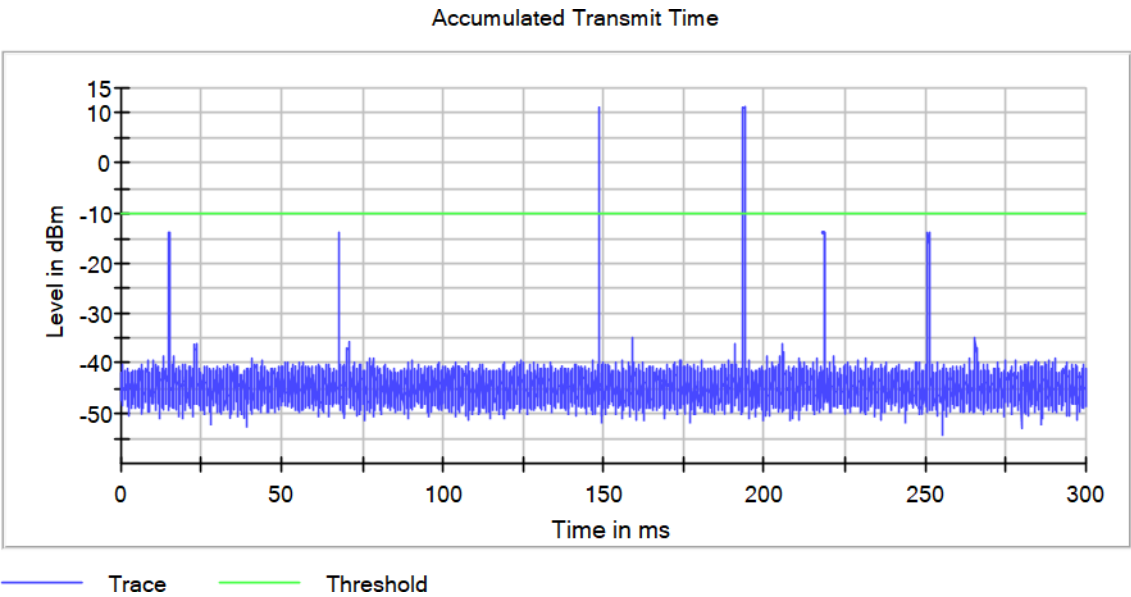
Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	500.000 kHz	>= 500.000 kHz
SweepPoints	30001	~ 30001
SweepTime	300.000 ms	300.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamplifier	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2480.00000

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.48000 GHz	2.48000 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	500.000 kHz	>= 500.000 kHz
SweepPoints	30001	~ 30001
SweepTime	300.000 ms	300.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Freq (MHz)	Accum Dwell (ms)
2402.00000	2.89
2480.00000	3.39

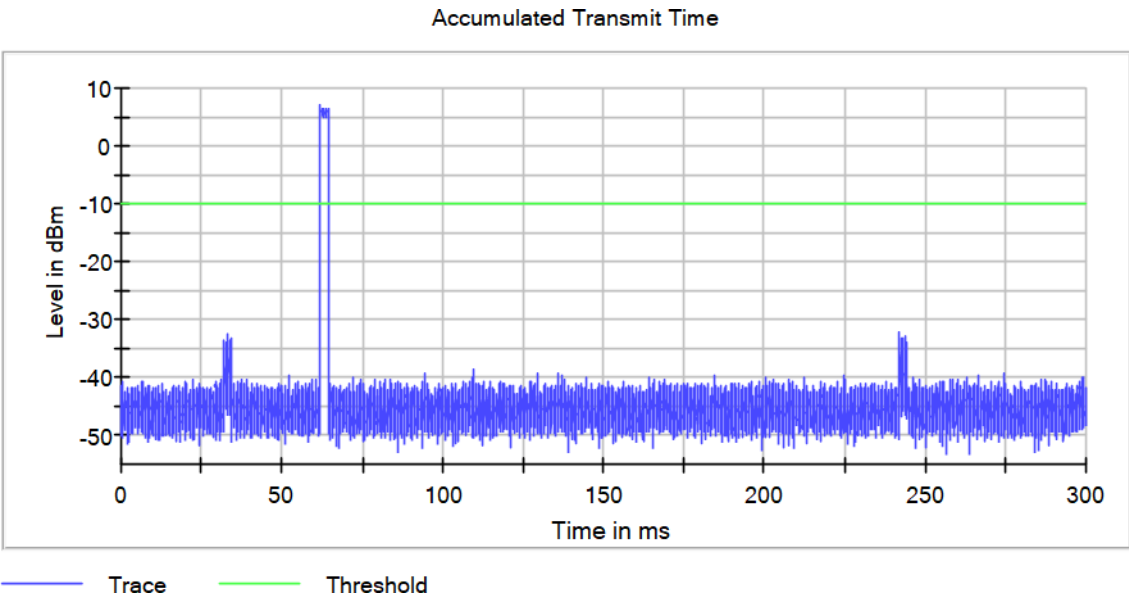
Verdict

Pass

Attachments

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2402.00000

Images:



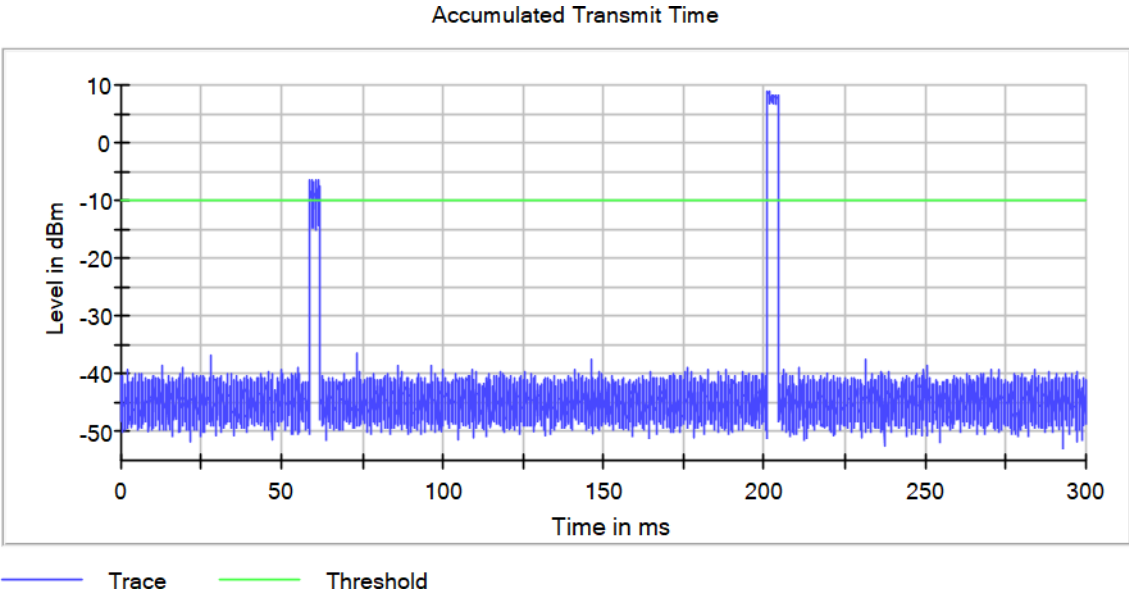
Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	500.000 kHz	>= 500.000 kHz
SweepPoints	30001	~ 30001
SweepTime	300.000 ms	300.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamplifier	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2480.00000

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.48000 GHz	2.48000 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	500.000 kHz	>= 500.000 kHz
SweepPoints	30001	~ 30001
SweepTime	300.000 ms	300.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Accum Dwell (ms)
2402.00000	3.04
2480.00000	0.96

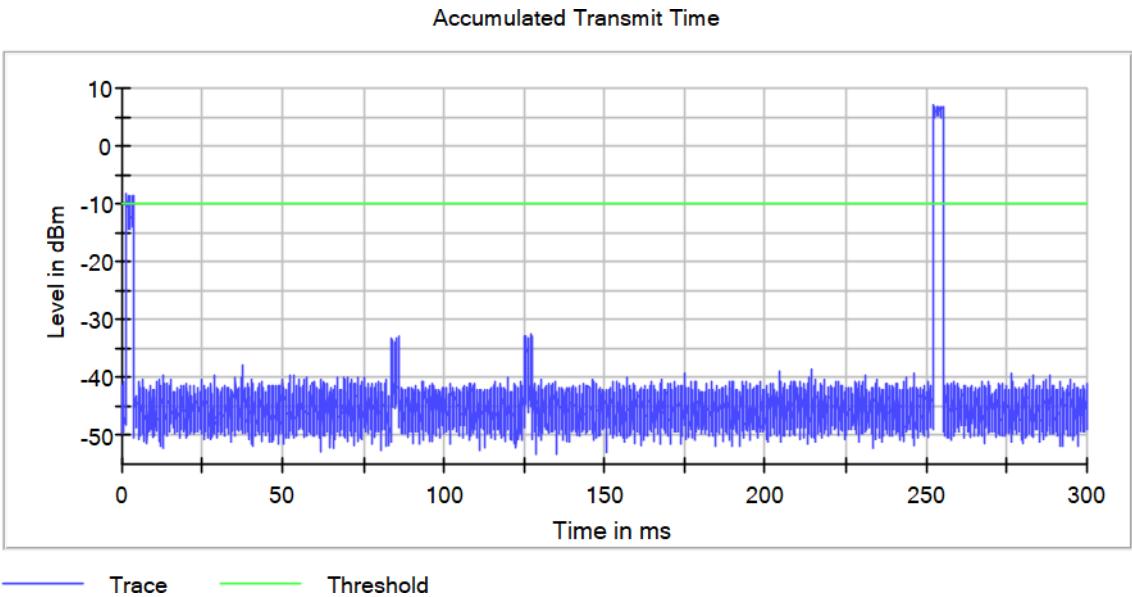
Verdict

Pass

Attachments

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2402.00000

Images:



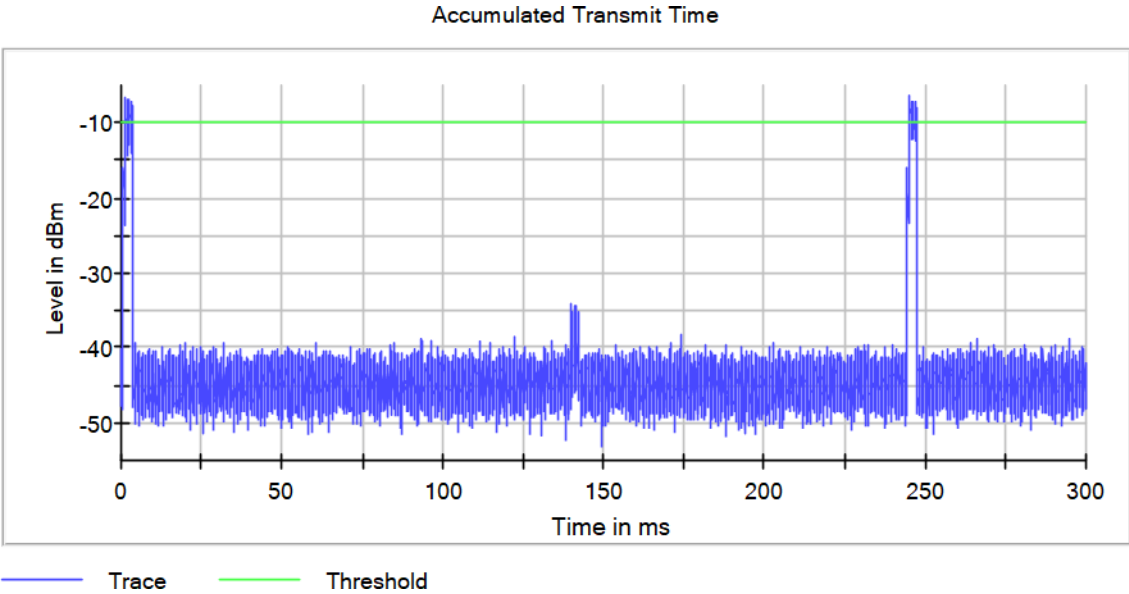
Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	500.000 kHz	>= 500.000 kHz
SweepPoints	30001	~ 30001
SweepTime	300.000 ms	300.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamplifier	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2480.00000

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.48000 GHz	2.48000 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	500.000 kHz	>= 500.000 kHz
SweepPoints	30001	~ 30001
SweepTime	300.000 ms	300.000 ms
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

4.3.1.4_3 Frequency Occupation

Limits

In order for the FHSS equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

Option 1: Each hopping frequency of the Hopping Sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The probability that each hopping frequency is occupied shall be between $((1 / U) \times 25 \%)$ and 77 % where U is the number of hopping frequencies in use.

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Freq Occ (ms)
2402.00000	3.85
2480.00000	4.23

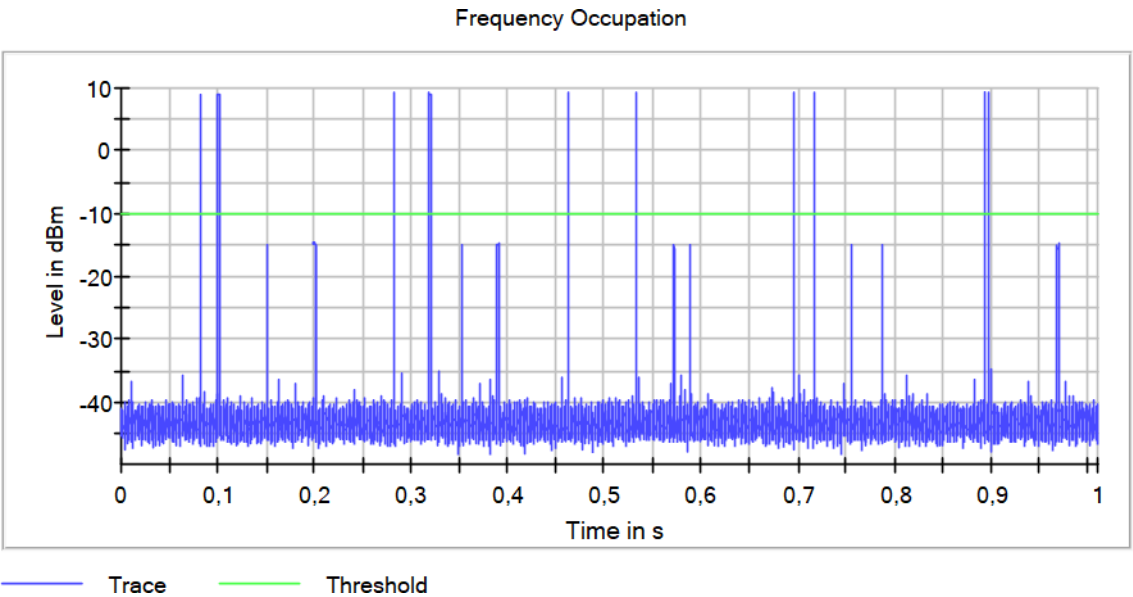
Verdict

Pass

Attachments

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2402.00000

Images:



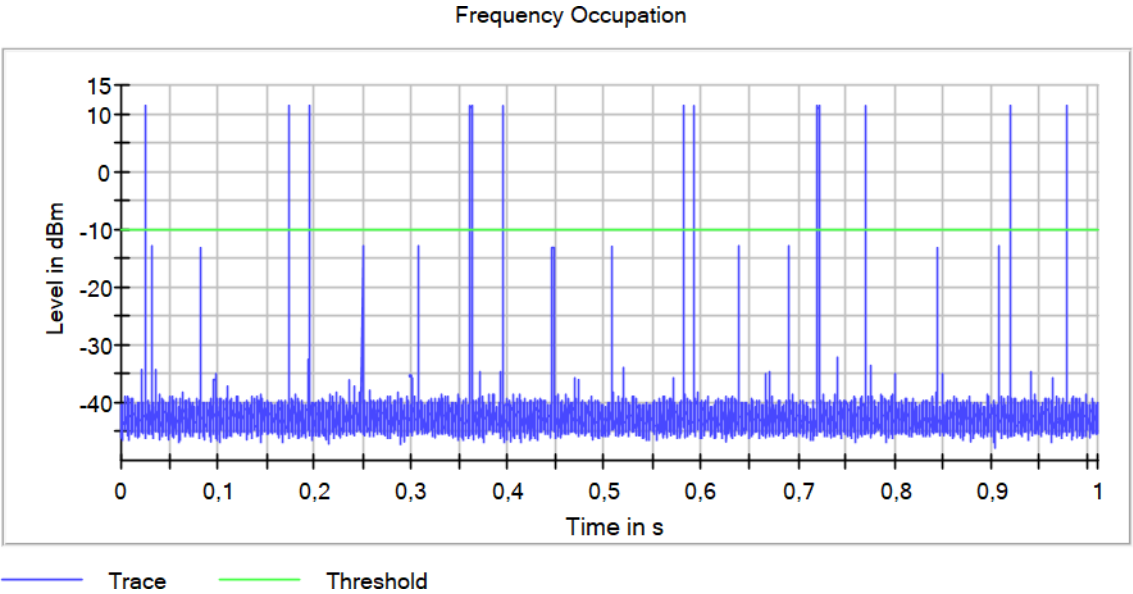
Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	1.000 MHz	~ 1.500 MHz
SweepPoints	30001	~ 30001
SweepTime	1.011 s	1.011 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s
Measurement Time	1.011 s	1.011 s
Tracepoints	1011200	1011200
Time resolution	1.000 µs	1.000 µs
Detector	RMS	RMS

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2480.00000

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.48000 GHz	2.48000 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	1.000 MHz	~ 1.500 MHz
SweepPoints	30001	~ 30001
Sweeptime	1.011 s	1.011 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamplifier	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s
Measurement Time	1.011 s	1.011 s
Tracepoints	1011200	1011200
Time resolution	1.000 µs	1.000 µs
Detector	RMS	RMS

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Freq (MHz)	Freq Occ (ms)
2402.00000	12.02
2480.00000	7.93

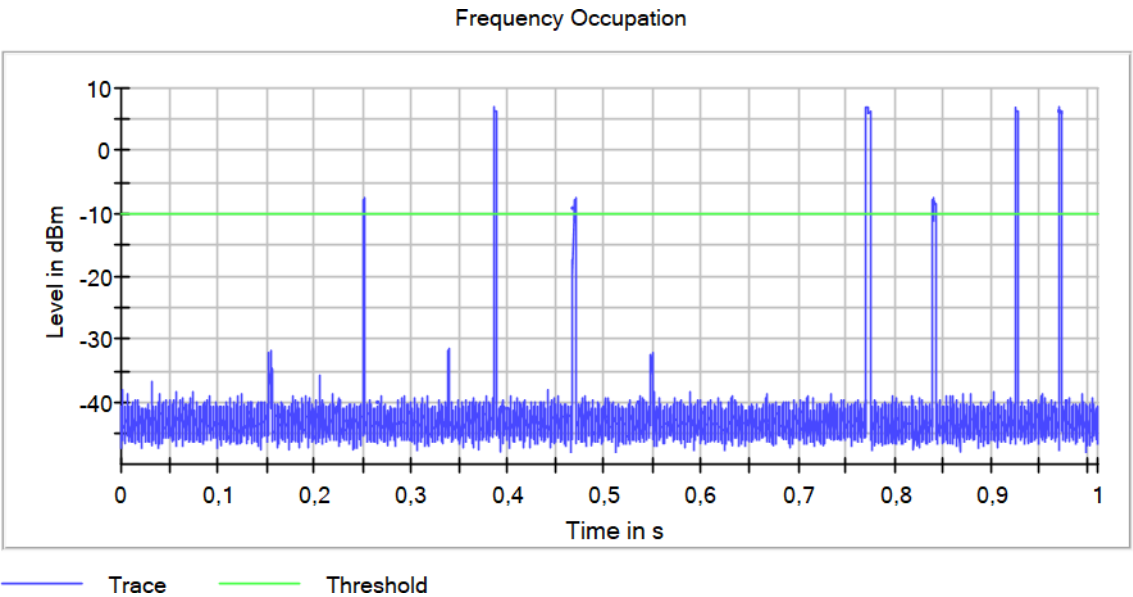
Verdict

Pass

Attachments

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2402.00000

Images:



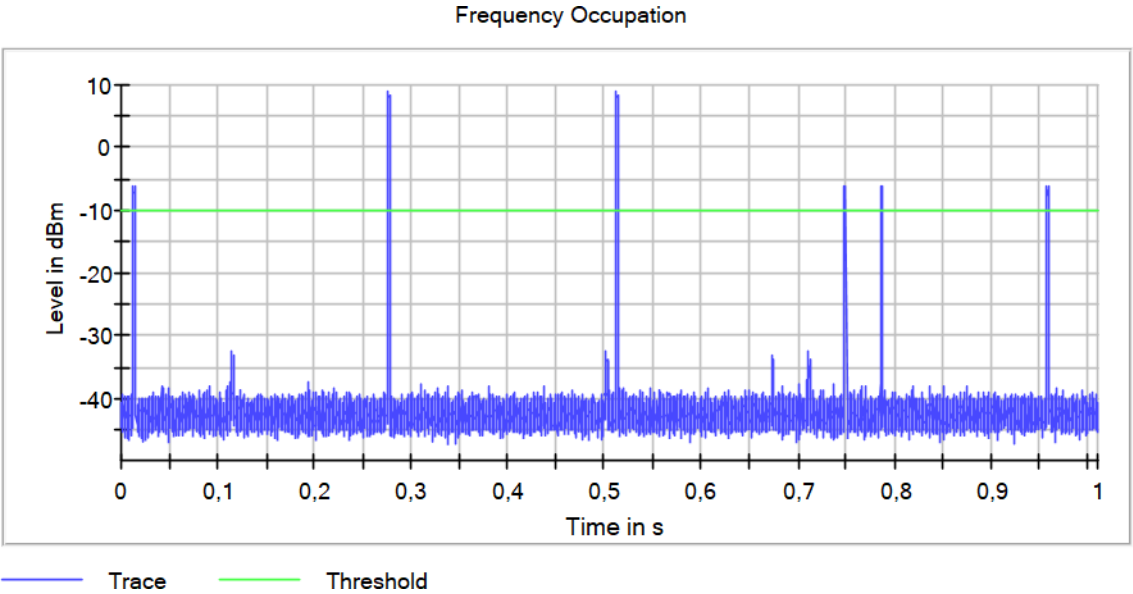
Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	1.000 MHz	~ 1.500 MHz
SweepPoints	30001	~ 30001
Sweeptime	1.011 s	1.011 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s
Measurement Time	1.011 s	1.011 s
Tracepoints	1011200	1011200
Time resolution	1.000 µs	1.000 µs
Detector	RMS	RMS

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2480.00000

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.48000 GHz	2.48000 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	1.000 MHz	~ 1.500 MHz
SweepPoints	30001	~ 30001
SweepTime	1.011 s	1.011 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s
Measurement Time	1.011 s	1.011 s
Tracepoints	1011200	1011200
Time resolution	1.000 µs	1.000 µs
Detector	RMS	RMS

Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Freq Occ (ms)
2402.00000	20.41
2480.00000	4.48

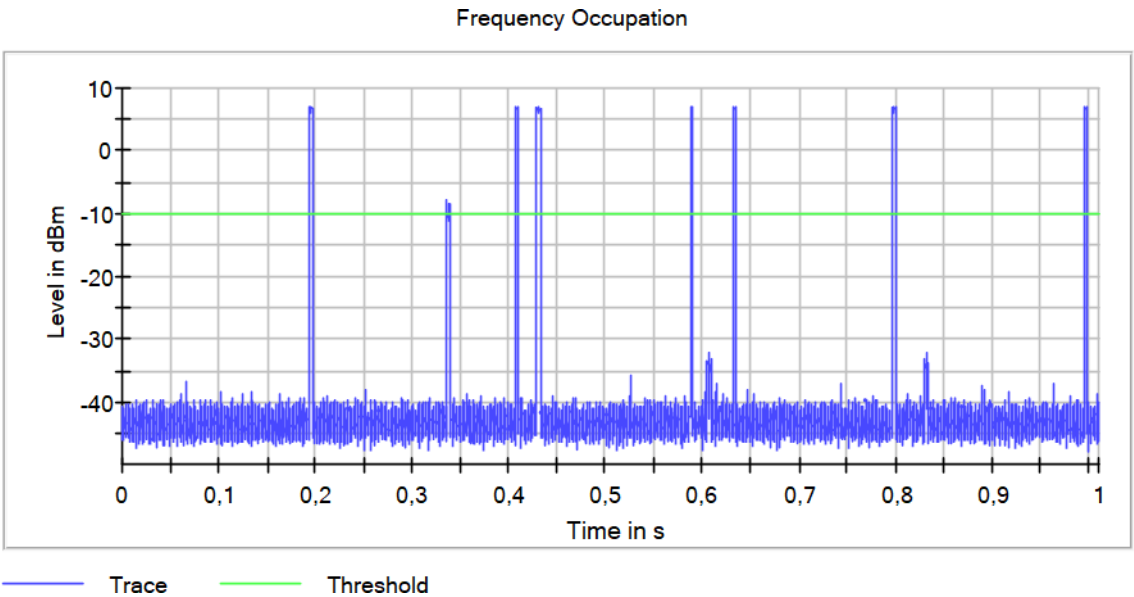
Verdict

Pass

Attachments

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2402.00000

Images:



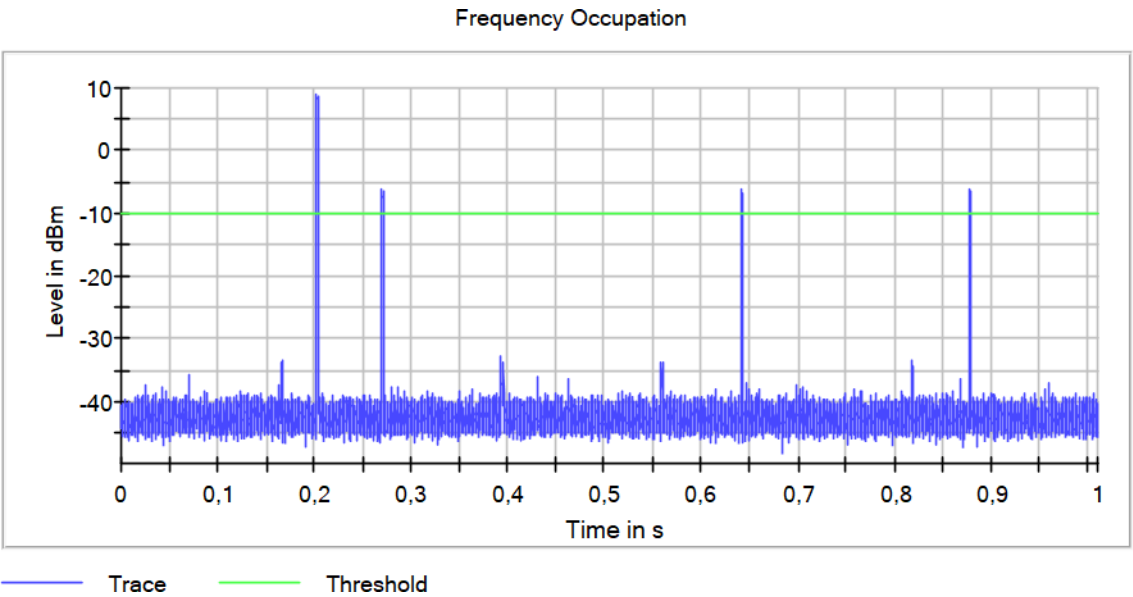
Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	1.000 MHz	~ 1.500 MHz
SweepPoints	30001	~ 30001
Sweeptime	1.011 s	1.011 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s
Measurement Time	1.011 s	1.011 s
Tracepoints	1011200	1011200
Time resolution	1.000 µs	1.000 µs
Detector	RMS	RMS

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2480.00000

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.48000 GHz	2.48000 GHz
Span	ZeroSpan	ZeroSpan
RBW	500.000 kHz	~ 500.000 kHz
VBW	1.000 MHz	~ 1.500 MHz
SweepPoints	30001	~ 30001
Sweeptime	1.011 s	1.011 s
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamplifier	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s
Measurement Time	1.011 s	1.011 s
Tracepoints	1011200	1011200
Time resolution	1.000 µs	1.000 µs
Detector	RMS	RMS

4.3.1.5 Hopping Frequency Separation

Limits

For non-adaptive FHSS equipment, the Hopping Frequency Separation shall be equal to or greater than the Occupied Channel Bandwidth (see clause 4.3.1.8), with a minimum separation of 100 kHz.

For FHSS equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for non-adaptive FHSS equipment operating in a mode where the RF Output power is less than 10 dBm e.i.r.p., the Hopping Frequency Separation shall be equal to or greater than 100 kHz.

Modulation: BT (GFSK 1-DH5)

Results

Freq Sep (MHz)	Ctr Freq Low Ch (MHz)	Ctr Freq High Ch (MHz)
1.01	2441.00	2442.00

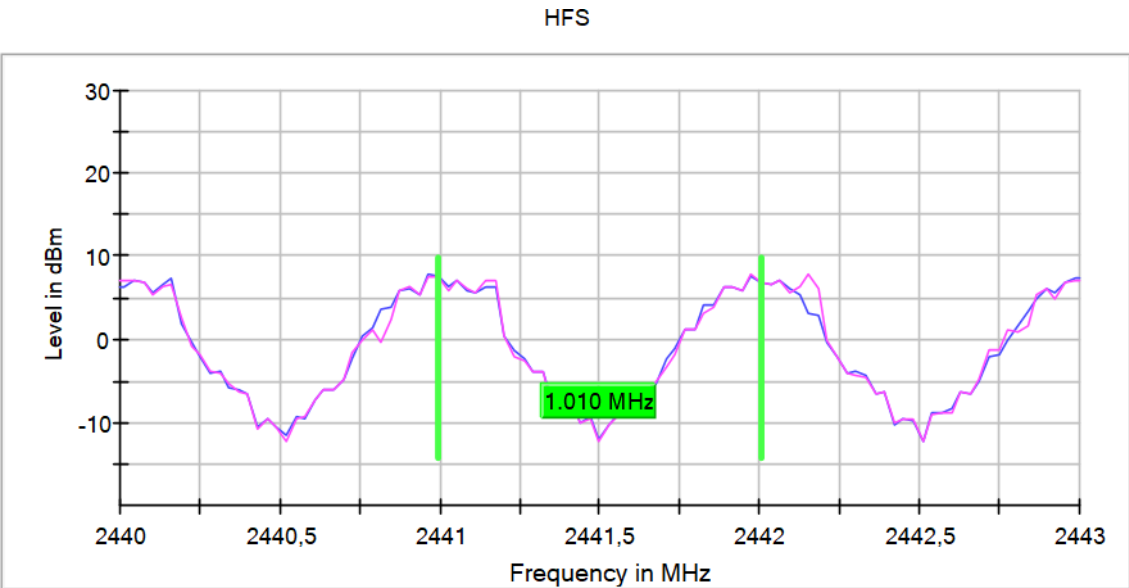
Verdict

Pass

Attachments

Modulation = BT (GFSK 1-DH5)

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Start Frequency	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44300 GHz	2.44300 GHz
Span	3.000 MHz	3.000 MHz
RBW	30.000 kHz	>= 30.000 kHz
VBW	100.000 kHz	>= 90.000 kHz
SweepPoints	101	~ 101
Sweeptime	63.207 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	2000	2000
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	24 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.49 dB	0.50 dB

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Freq Sep (MHz)	Ctr Freq Low Ch (MHz)	Ctr Freq High Ch (MHz)
1.01	2441.00	2442.00

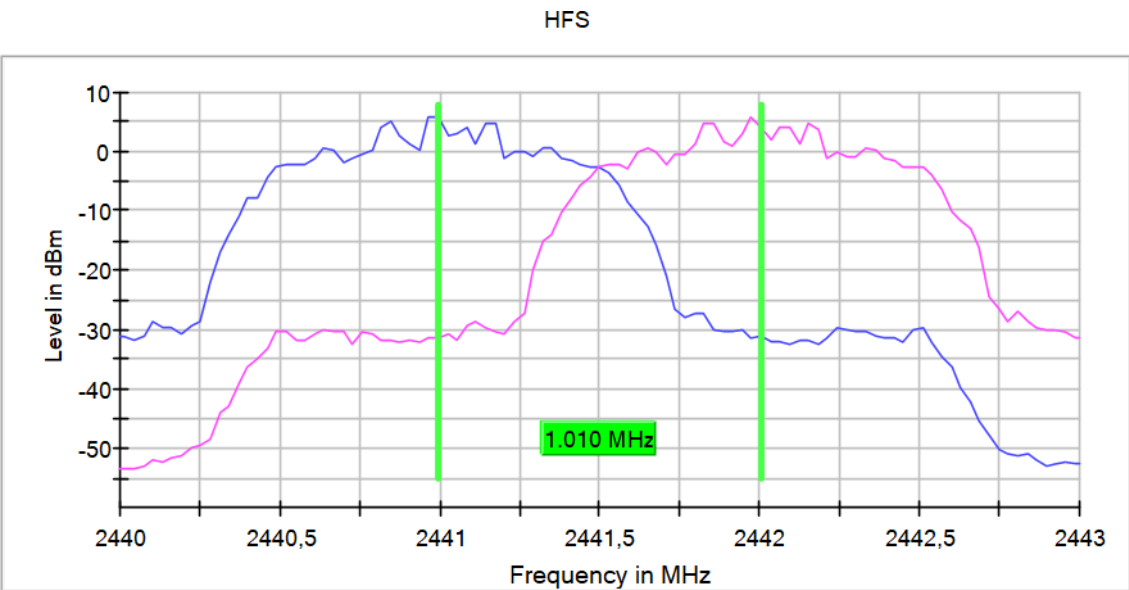
Verdict

Pass

Attachments

Modulation = BT (Pi/4 DQPSK 2-DH5)

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Start Frequency	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44300 GHz	2.44300 GHz
Span	3.000 MHz	3.000 MHz
RBW	30.000 kHz	>= 30.000 kHz
VBW	100.000 kHz	>= 90.000 kHz
SweepPoints	101	~ 101
Sweeptime	63.207 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	2000	2000
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.05 dB	0.50 dB

Modulation: BT (8DPSK 3-DH5)

Results

Freq Sep (MHz)	Ctr Freq Low Ch (MHz)	Ctr Freq High Ch (MHz)
0.98	2441.00	2441.98

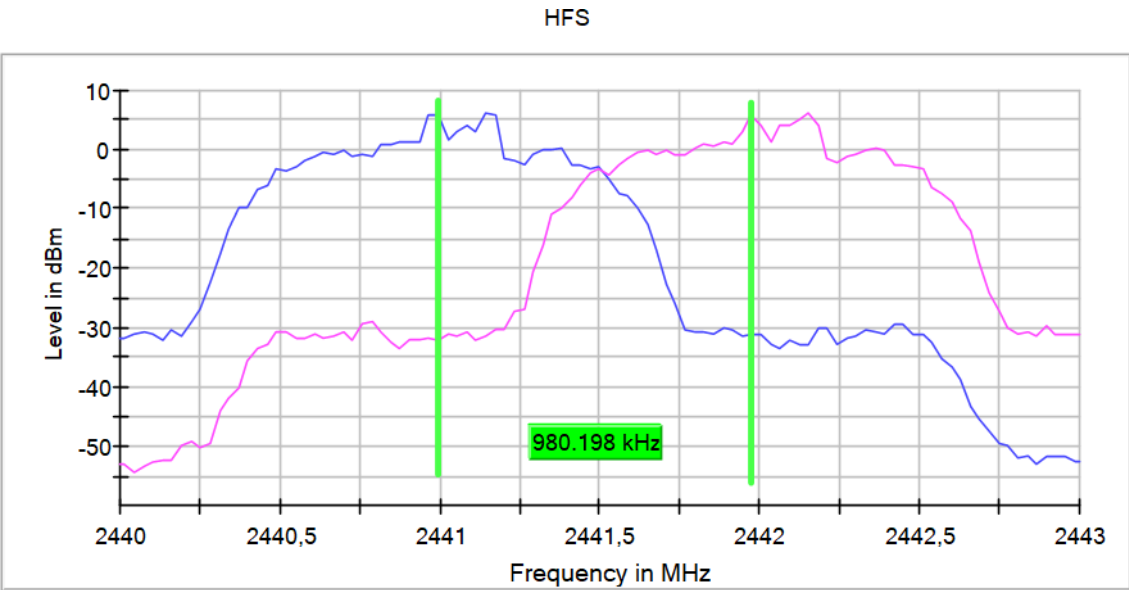
Verdict

Pass

Attachments

Modulation = BT (8DPSK 3-DH5)

Images:



Tables:

Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Start Frequency	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44300 GHz	2.44300 GHz
Span	3.000 MHz	3.000 MHz
RBW	30.000 kHz	>= 30.000 kHz
VBW	100.000 kHz	>= 90.000 kHz
SweepPoints	101	~ 101
Sweeptime	63.207 µs	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	2000	2000
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	4 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.08 dB	0.50 dB

4.3.1.8 Occupied Channel Bandwidth

Limits

The Occupied Channel Bandwidth for each hopping frequency shall be within the band given in the table below.

In addition, for non-adaptive FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than 5 MHz.

	Service frequency bands
Transmit	2400 MHz to 2483.5 MHz
Receive	2400 MHz to 2483.5 MHz

Modulation: BT (GFSK 1-DH5)

Results

Freq (MHz)	Occ Ch BW (MHz)	BEL (MHz)	BER (MHz)
2402.00000	0.876	2401.56	2402.44
2441.00000	0.886	2440.55	2441.44
2480.00000	0.915	2479.54	2480.46

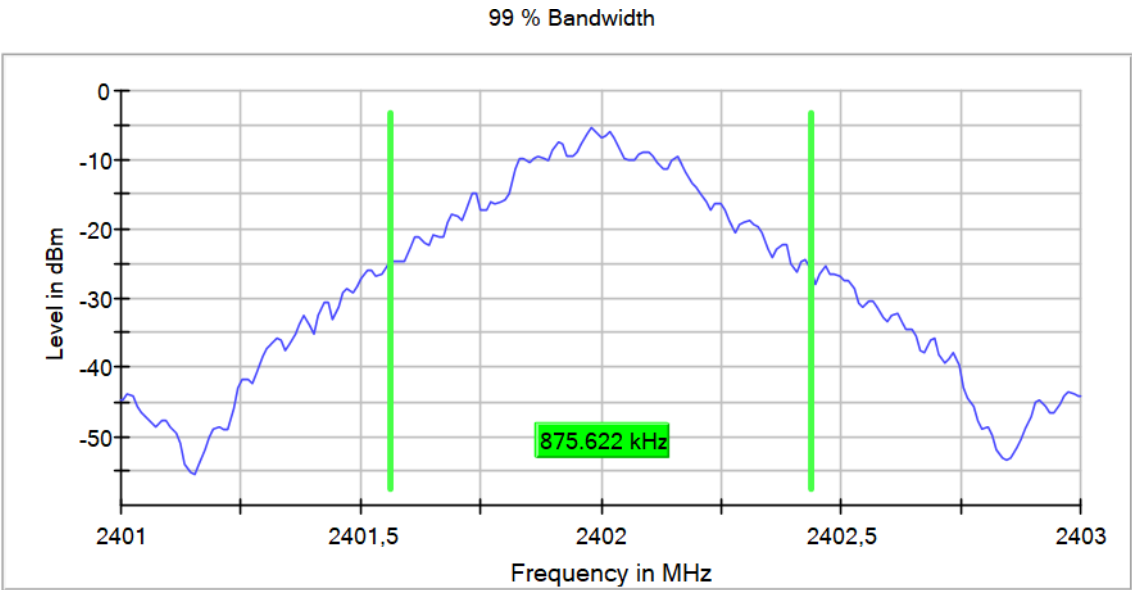
Verdict

Pass

Attachments

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2402.00000

Images:



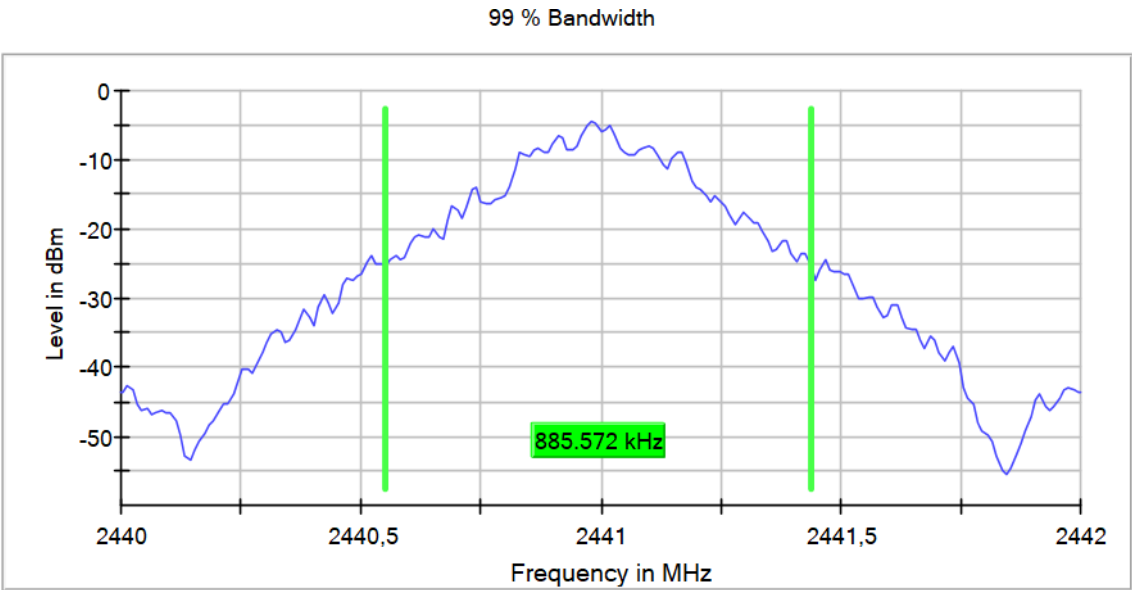
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweeptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.35 dB	0.50 dB

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2441.00000

Images:



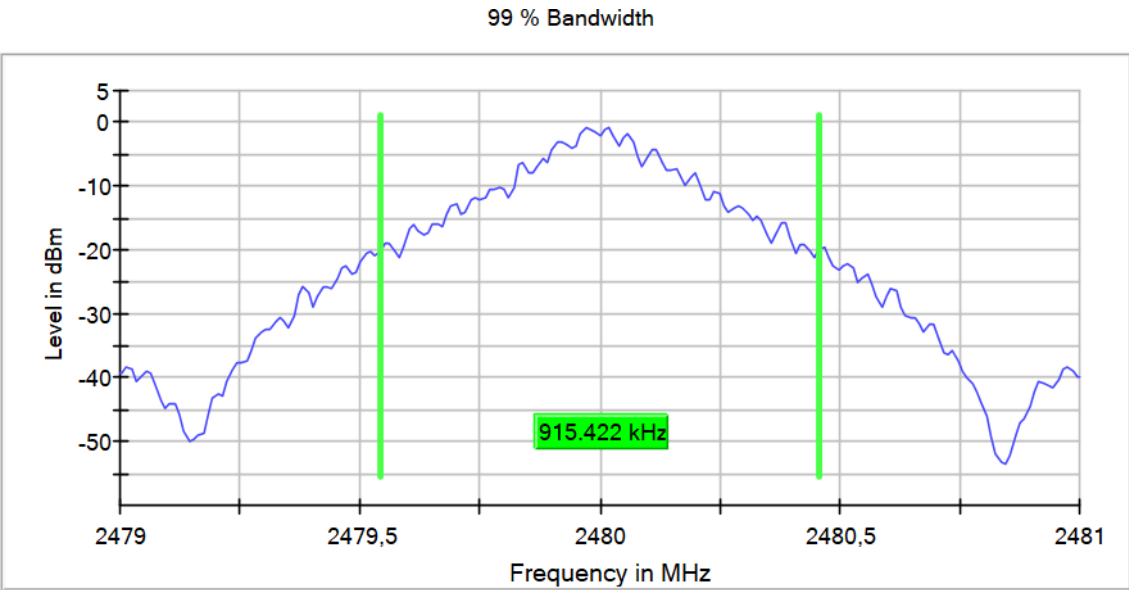
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44200 GHz	2.44200 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.01 dB	0.50 dB

Modulation = BT (GFSK 1-DH5) Frequency MHz = 2480.00000

Images:



Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	16 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.27 dB	0.50 dB

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Freq (MHz)	Occ Ch BW (MHz)	BEL (MHz)	BER (MHz)
2402.00000	1.194	2401.40	2402.60
2441.00000	1.204	2440.40	2441.61
2480.00000	1.194	2479.40	2480.60

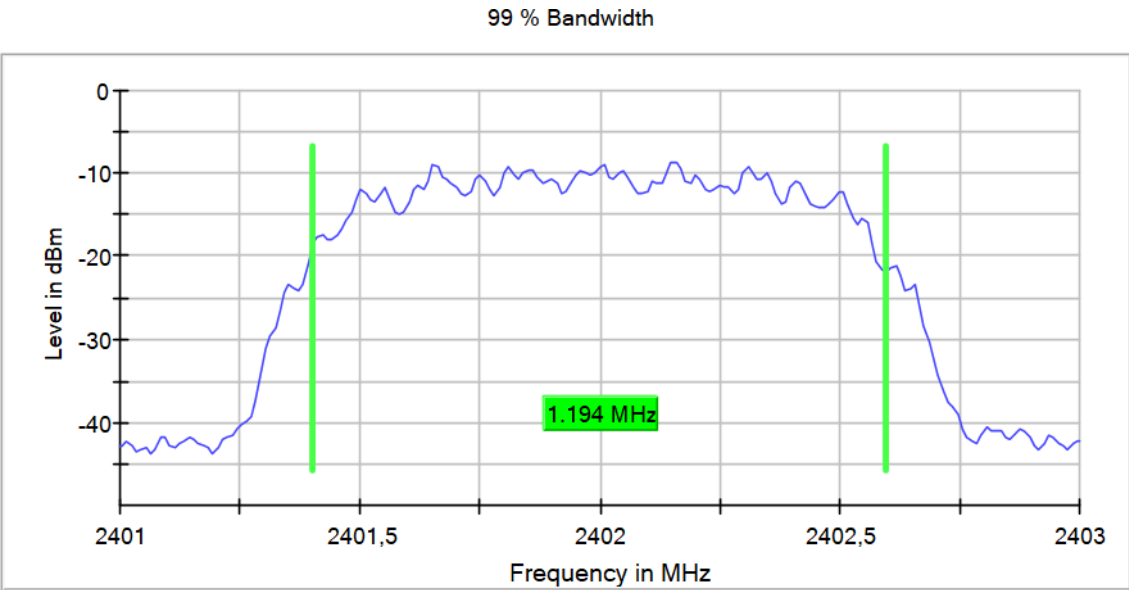
Verdict

Pass

Attachments

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2402.00000

Images:



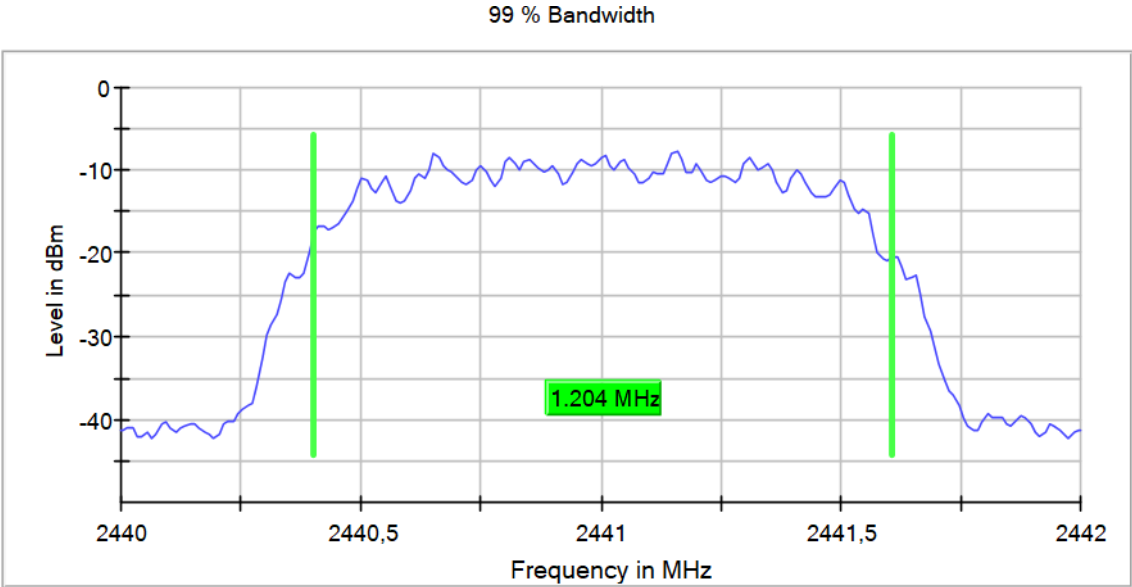
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweeptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.11 dB	0.50 dB

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2441.00000

Images:



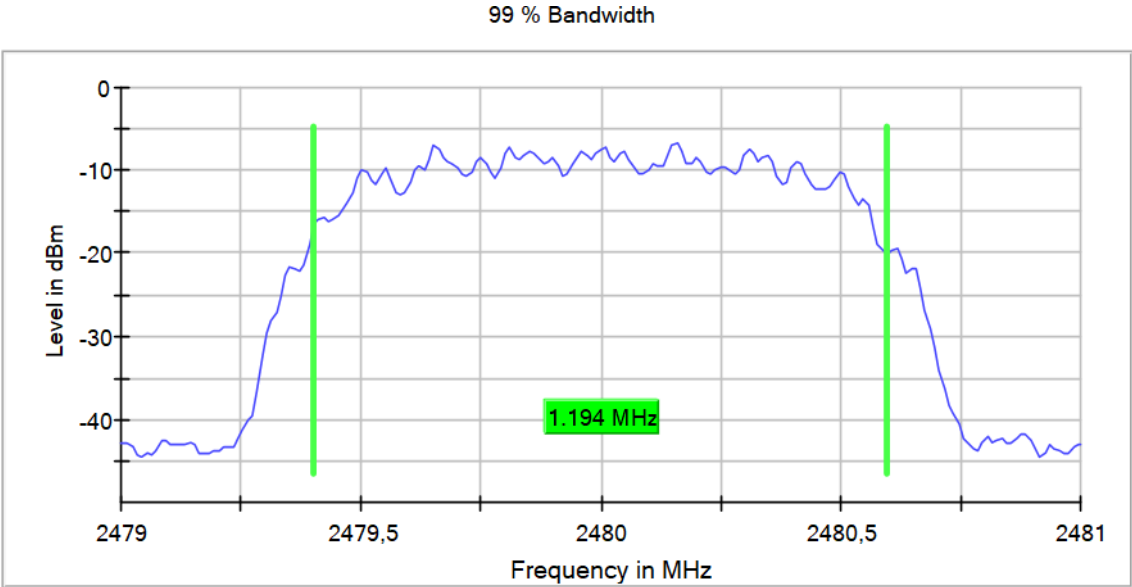
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44200 GHz	2.44200 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	7 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.29 dB	0.50 dB

Modulation = BT (Pi/4 DQPSK 2-DH5) Frequency MHz = 2480.00000

Images:



Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweeptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.39 dB	0.50 dB

Modulation: BT (8DPSK 3-DH5)

Results

Freq (MHz)	Occ Ch BW (MHz)	BEL (MHz)	BER (MHz)
2402.00000	1.214	2401.39	2402.61
2441.00000	1.214	2440.39	2441.61
2480.00000	1.204	2479.39	2480.60

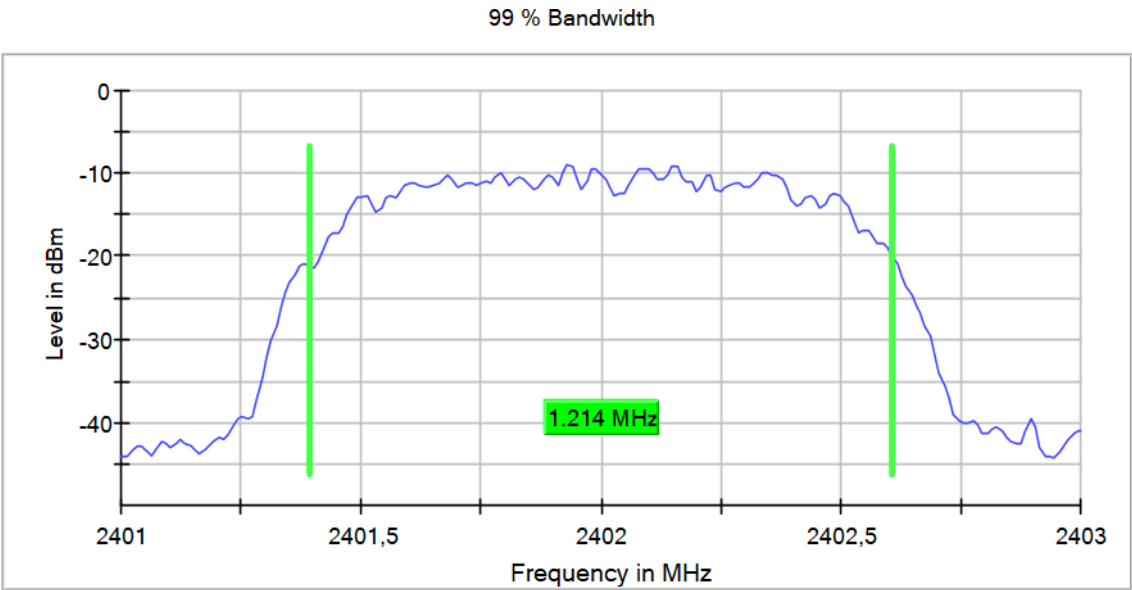
Verdict

Pass

Attachments

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2402.00000

Images:



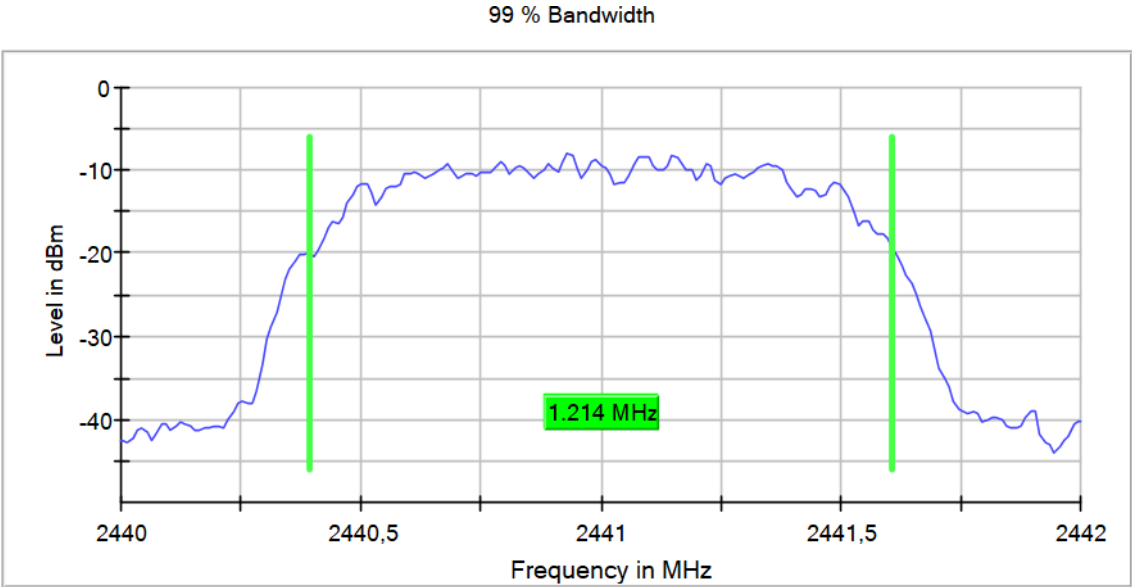
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.40100 GHz	2.40100 GHz
Stop Frequency	2.40300 GHz	2.40300 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweeptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	9 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.27 dB	0.50 dB

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2441.00000

Images:



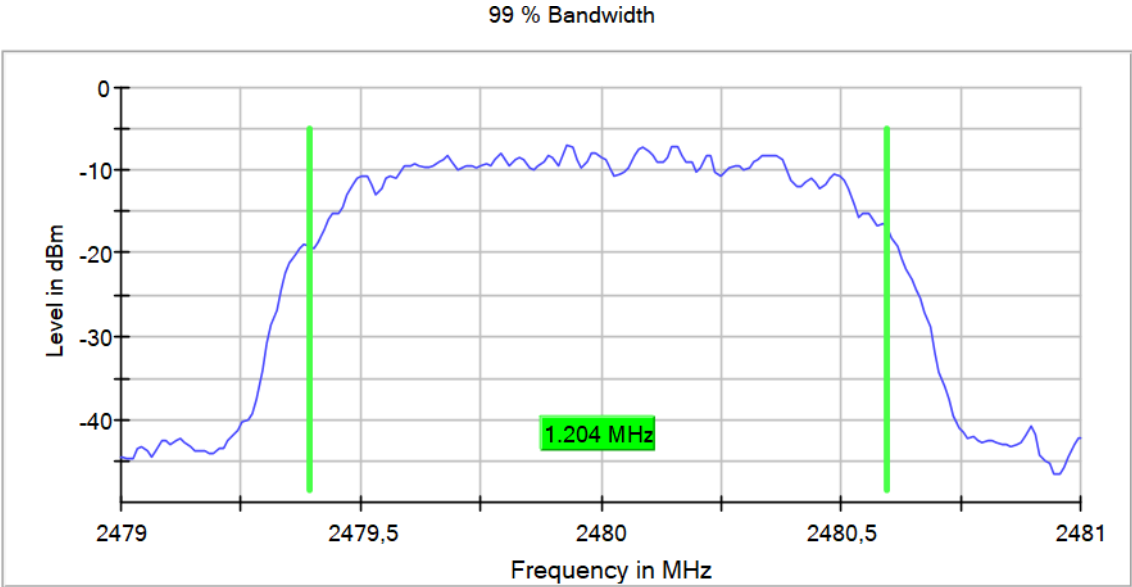
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.44000 GHz	2.44000 GHz
Stop Frequency	2.44200 GHz	2.44200 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweeptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.02 dB	0.50 dB

Modulation = BT (8DPSK 3-DH5) Frequency MHz = 2480.00000

Images:



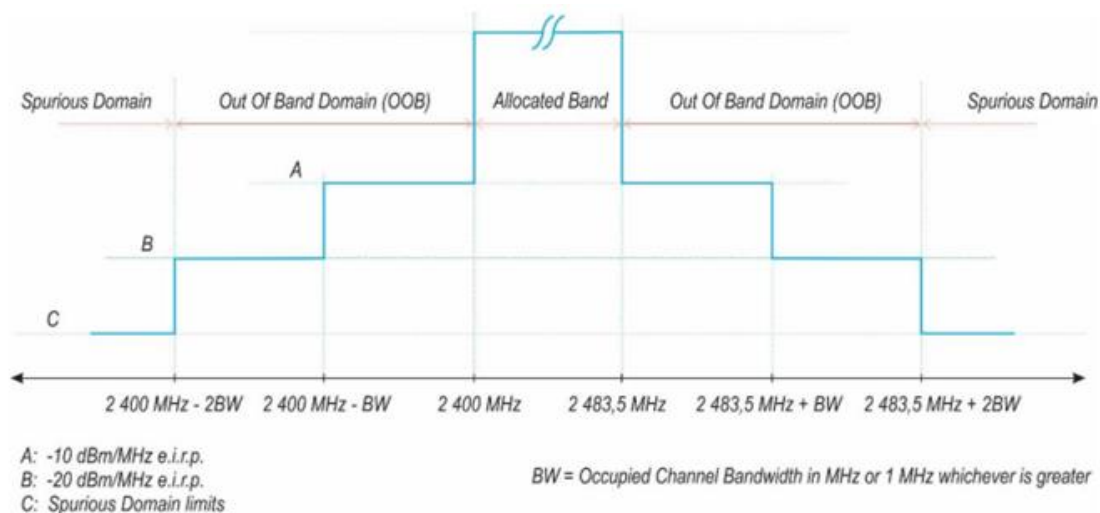
Tables:

OSP Settings

Setting	Instrument Value	Target Value
Start Frequency	2.47900 GHz	2.47900 GHz
Stop Frequency	2.48100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz
RBW	20.000 kHz	>= 20.000 kHz
VBW	100.000 kHz	>= 60.000 kHz
SweepPoints	201	~ 201
Sweptime	1.000 s	1.000 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	6 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.31 dB	0.50 dB

4.3.1.9 Transmitter unwanted emissions in the out-of-band (OOB) domain

Limits



The transmitter unwanted emissions in the out-of-band domain shall not exceed the values provided by the mask in the figure.

Modulation: BT (GFSK 1-DH5)

Results

Unwanted Freq (MHz)	Unwanted Lvl (dBm)
2398.500	-50.34
2399.500	-48.67
2484.000	-46.04
2485.000	-48.08

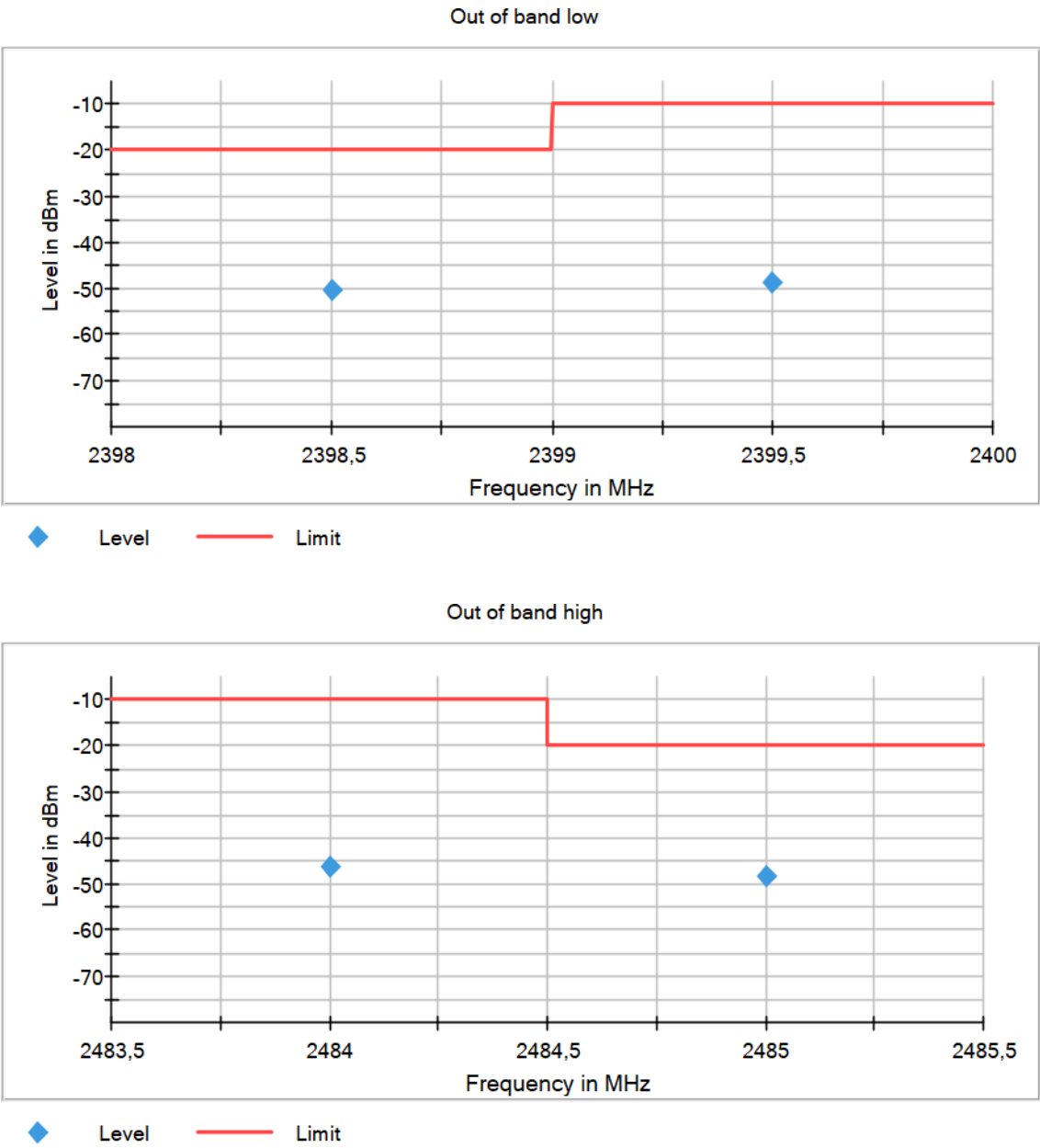
Verdict

Pass

Attachments

Modulation = BT (GFSK 1-DH5)

Images:



Tables:
OSP Settings

Setting	Instrument Value	Target Value
Center Frequency	2.48500 GHz	2.48500 GHz
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	849	~ 849
Sweeptime	849.200 µs	849.200 µs
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	Video	Video
Trigger Mode	up	up
Trigger Level	44.000 %	-1.000 %
Trigger Offset	424.600 µs	424.600 µs

Modulation: BT (Pi/4 DQPSK 2-DH5)

Results

Unwanted Freq (MHz)	Unwanted Lvl (dBm)
2398.092	-50.20
2398.296	-51.90
2399.296	-49.60
2399.500	-50.34
2484.000	-49.92
2484.204	-51.22
2485.204	-53.83
2485.408	-52.68

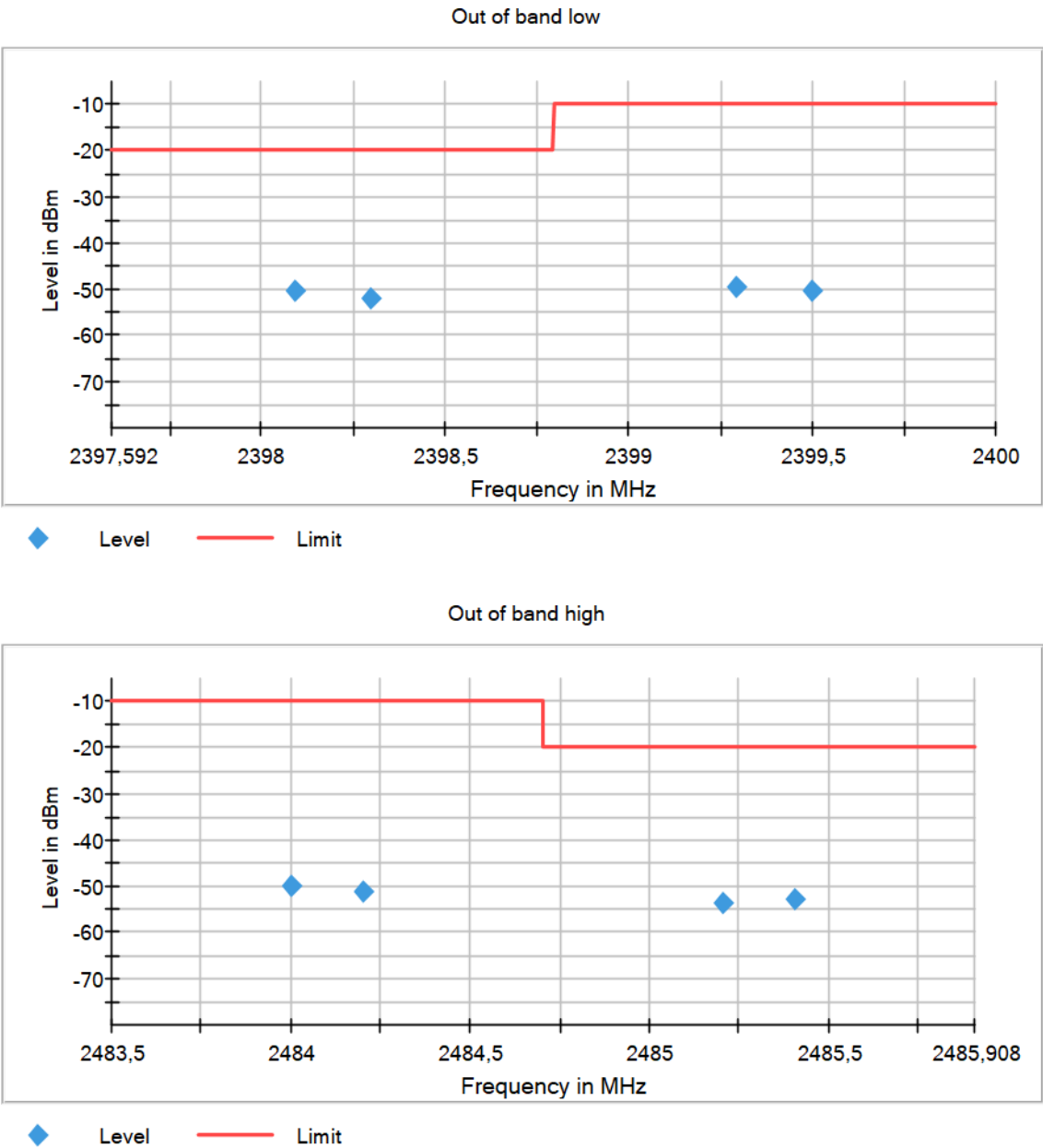
Verdict

Pass

Attachments

Modulation = BT (Pi/4 DQPSK 2-DH5)

Images:



Tables:
OSP Settings

Setting	Instrument Value	Target Value
Center Frequency	2.48541 GHz	2.48541 GHz
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	6365	~ 6365
Sweeptime	6.365 ms	6.365 ms
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	Video	Video
Trigger Mode	up	up
Trigger Level	44.000 %	-1.000 %
Trigger Offset	3.182 ms	3.182 ms

Modulation: BT (8DPSK 3-DH5)

Results

Unwanted Freq (MHz)	Unwanted Lvl (dBm)
2398.072	-47.81
2398.286	-50.41
2399.286	-46.84
2399.500	-48.23
2484.000	-51.48
2484.214	-52.31
2485.214	-51.39
2485.428	-52.48

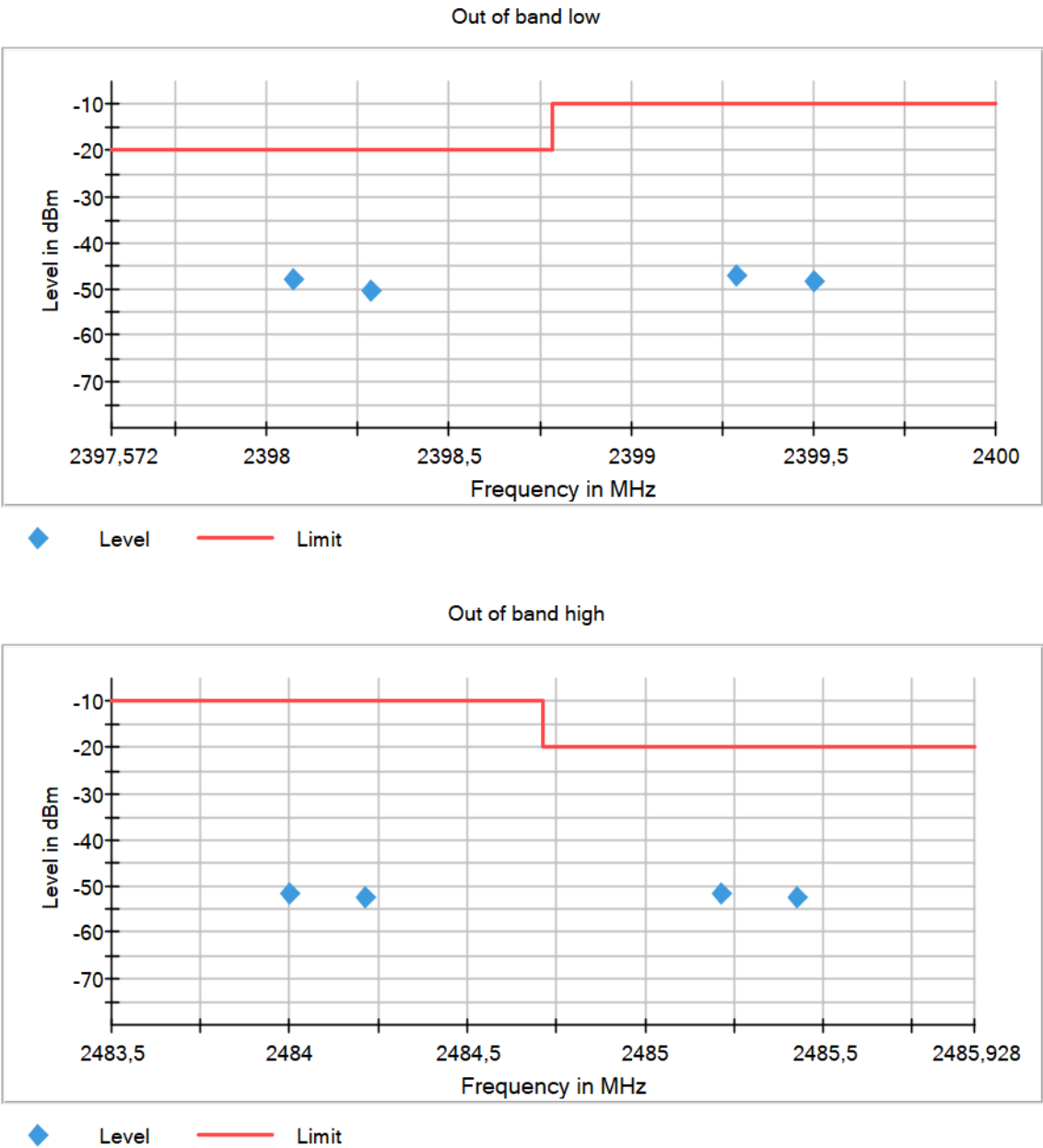
Verdict

Pass

Attachments

Modulation = BT (8DPSK 3-DH5)

Images:



Tables:
OSP Settings

Setting	Instrument Value	Target Value
Center Frequency	2.48543 GHz	2.48543 GHz
Span	ZeroSpan	ZeroSpan
RBW	1.000 MHz	~ 1.000 MHz
VBW	3.000 MHz	~ 3.000 MHz
SweepPoints	6369	~ 6369
Sweeptime	6.369 ms	6.369 ms
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Clear Write	Clear Write
SweepType	Sweep	AUTO
Preamp	off	off
Trigger	Video	Video
Trigger Mode	up	up
Trigger Level	43.000 %	-1.000 %
Trigger Offset	3.185 ms	3.185 ms

4.3.1.10 (radiated) Transmitter unwanted emissions in the spurious domain

Limits

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in the table below.

In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Transmitter limits for spurious emissions

Frequency Range	Maximum Power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

The level of spurious emissions was measured as, either:

their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation); or

their effective radiated power when radiated by cabinet and antenna in case of integral antenna equipment with no antenna connectors.

Modulation: BT (GFSK 1-DH5)

Results

Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl RMS (dBm)	Lvl Meas Pk (dBm)	Pol
[0.03, 1]	2402.00000	761.865	-62.90	-57.53	V
		774.142	-65.04	-60.04	V
		786.448	-64.69	-58.75	V
	2480.00000	761.895	-62.99	-58.56	V
[1, 12.75]	2402.00000	11158.950	-32.85	-21.37	H

Verdict

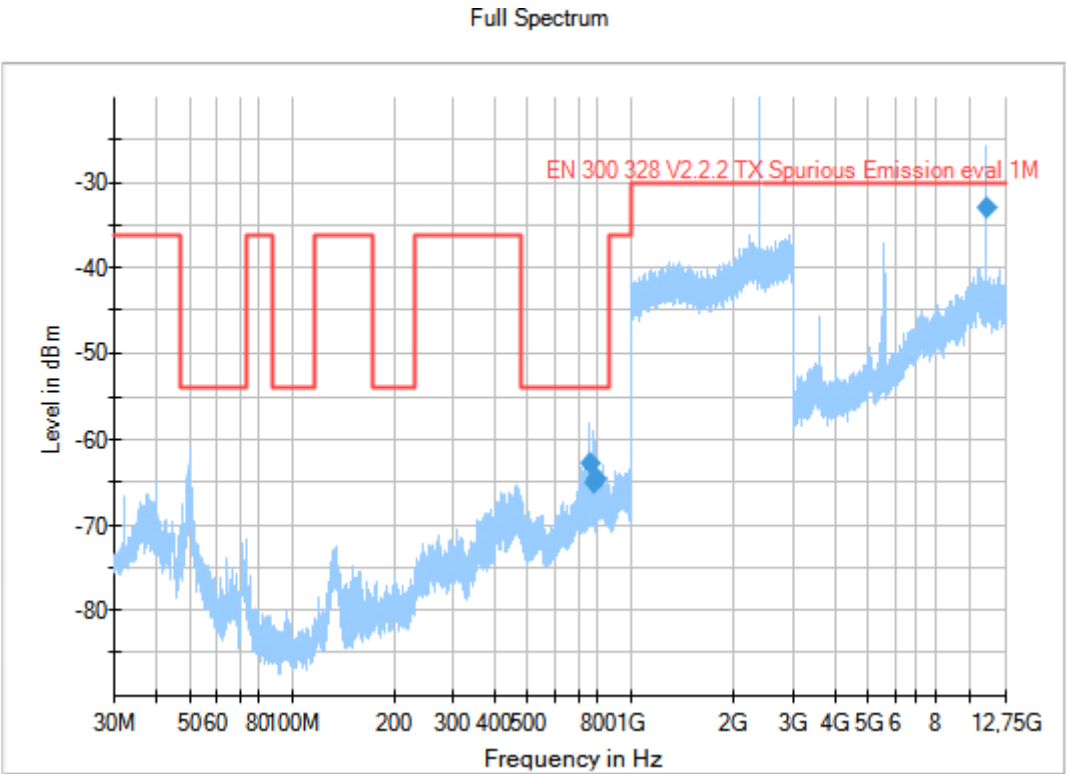
Pass

Attachments

Frequency Range GHz = [0.03, 12.75] Modulation = BT (GFSK 1-DH5)

Frequency MHz = 2402.00000

Images:



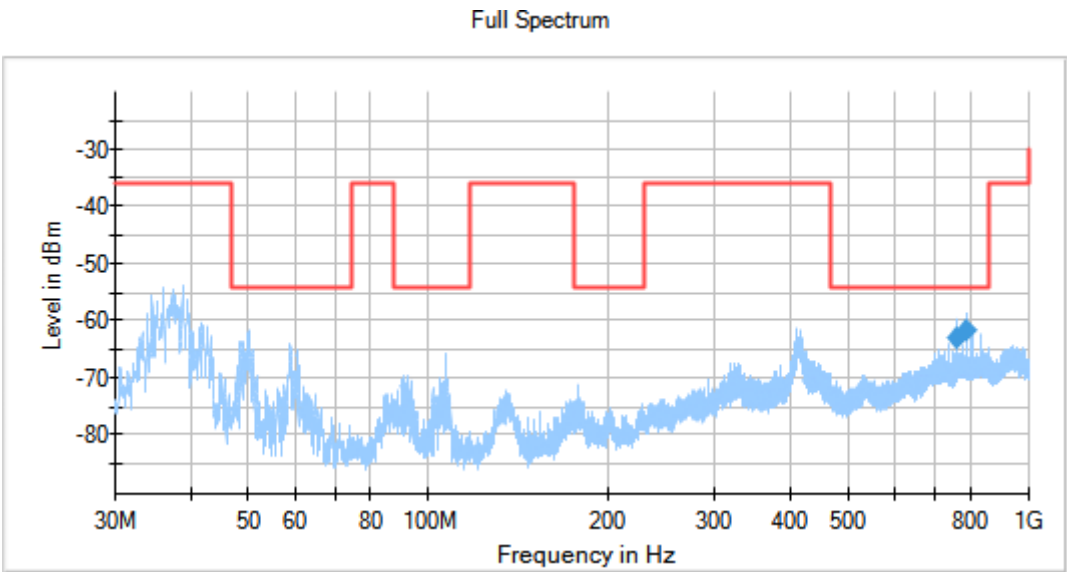
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
1 GHz - 3 GHz	30,769 kHz	PK+	1 MHz	1 s	0 dB
3 GHz - 12,75 GHz	150 kHz	PK+	1 MHz	1 s	0 dB

Frequency Range GHz = [0.03, 1] Modulation = BT (GFSK 1-DH5)
Frequency MHz = 2480.00000

Images:



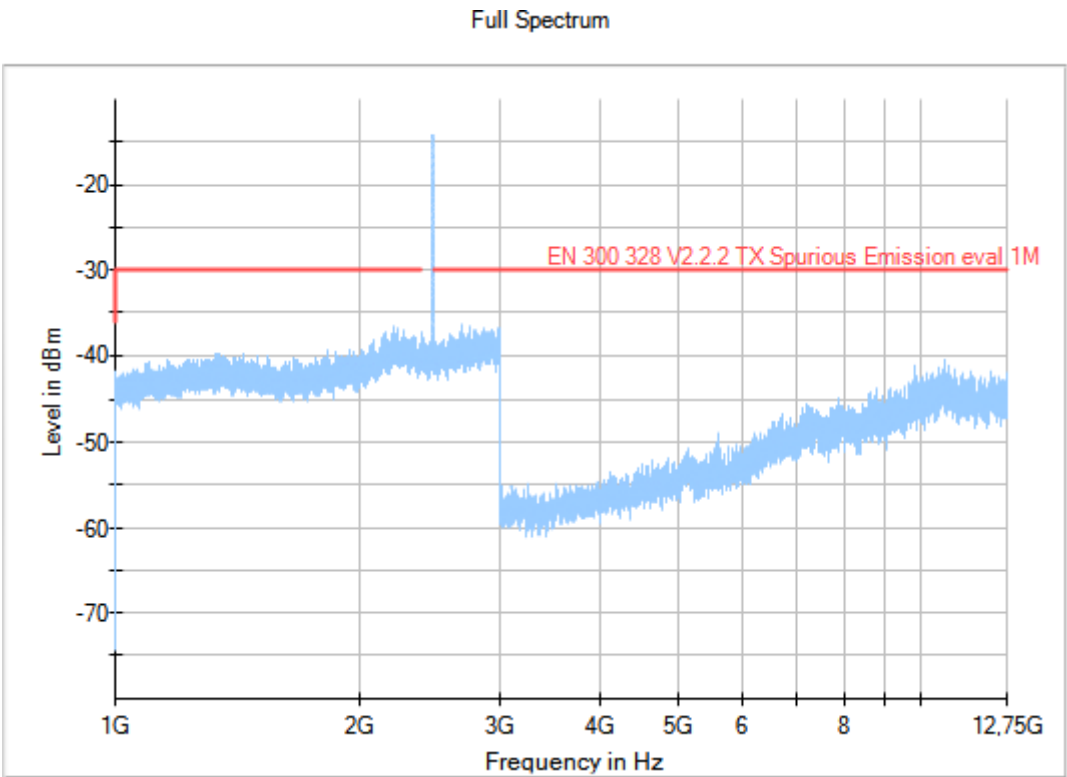
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB

Frequency Range GHz = [1, 12.75] Modulation = BT (GFSK 1-DH5)
Frequency MHz = 2480.00000

Images:



Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 3 GHz	30,769 kHz	PK+	1 MHz	1 s	0 dB
3 GHz - 12,75 GHz	150 kHz	PK+	1 MHz	1 s	0 dB

Modulation: BT (Pi/4 DQPSK 2-DH5)

No spurious frequencies detected at less than 6 dB below the limit.

The spurious frequencies detected do not depend on either the modulation or the operating channel in the range from 30 MHz to 1 GHz.

Verdict

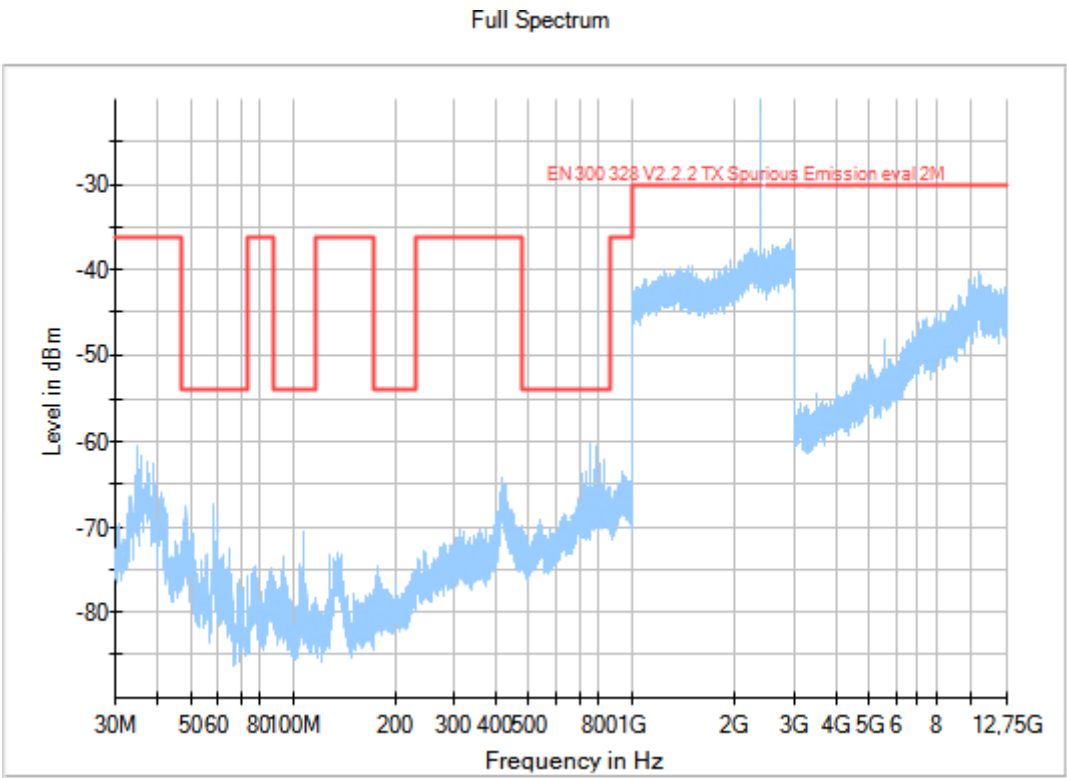
Pass

Attachments

Frequency Range GHz = [0.03, 12.75] Modulation = BT (Pi/4 DQPSK 2-DH5)

Frequency MHz = 2402.00000

Images:



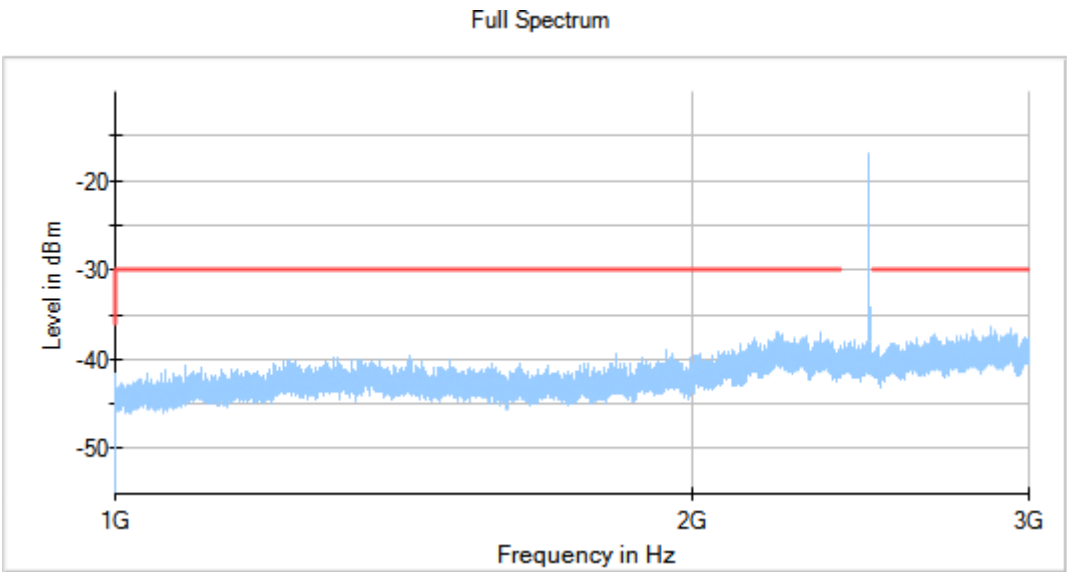
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
1 GHz - 3 GHz	30,769 kHz	PK+	1 MHz	1 s	0 dB
3 GHz - 12,75 GHz	150 kHz	PK+	1 MHz	1 s	0 dB

Frequency Range GHz = [1, 3] Modulation = BT (Pi/4 DQPSK 2-DH5)
Frequency MHz = 2480.00000

Images:



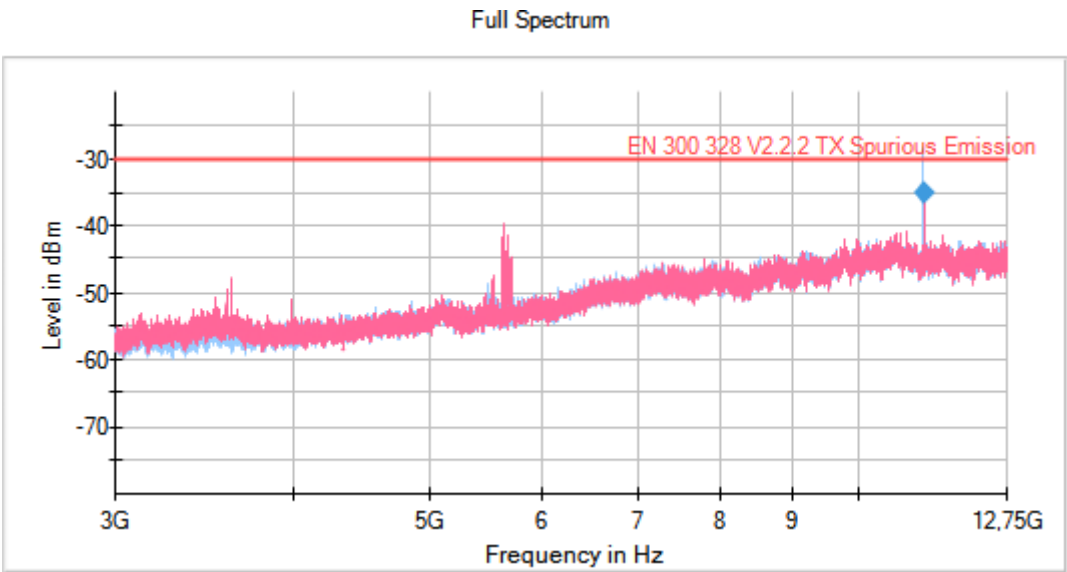
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 3 GHz	30,769 kHz	PK+	1 MHz	1 s	0 dB

Frequency Range GHz = [3, 12.75] Modulation = BT (Pi/4 DQPSK 2-DH5)
Frequency MHz = 2480.00000

Images:



Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
3 GHz - 12,75 GHz	150 kHz	PK+	1 MHz	1 s	0 dB

Modulation: BT (8DPSK 3-DH5)

Results

The spurious frequencies detected do not depend on either the modulation or the operating channel in the range from 30 MHz to 1 GHz.

Spurious frequencies detected at less than 6 dB below the limit:

Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl RMS (dBm)	Lvl Meas Pk (dBm)	Pol
[1, 3]	2402.00000	11146.050	-40.61	-27.30	H
[3, 12.75]		11146.050	-40.61	-27.30	H

Verdict

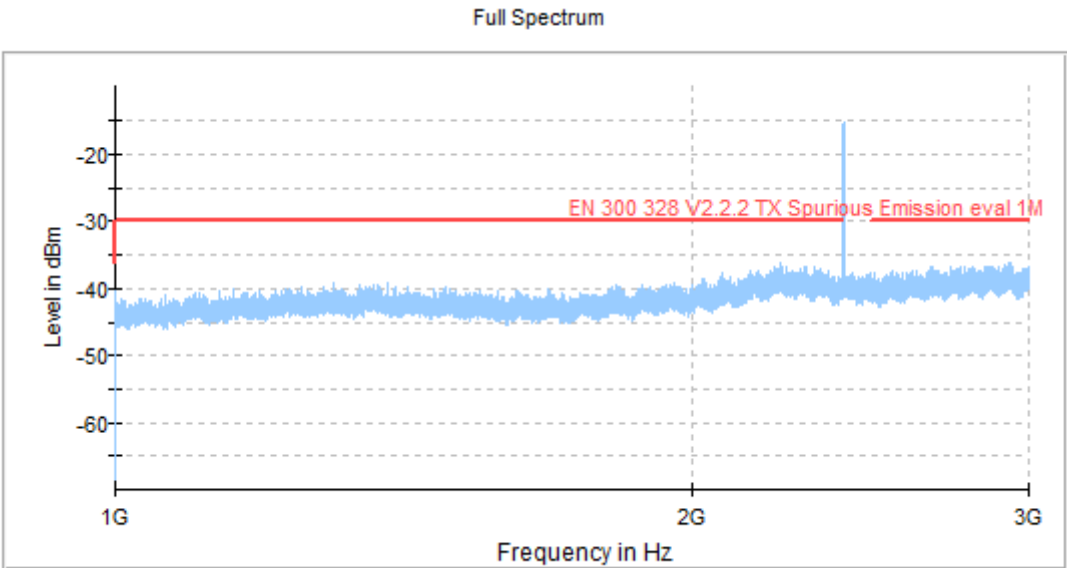
Pass

Attachments

Frequency Range GHz = [1, 3] Modulation = BT (8DPSK 3-DH5)

Frequency MHz = 2402.00000

Images:



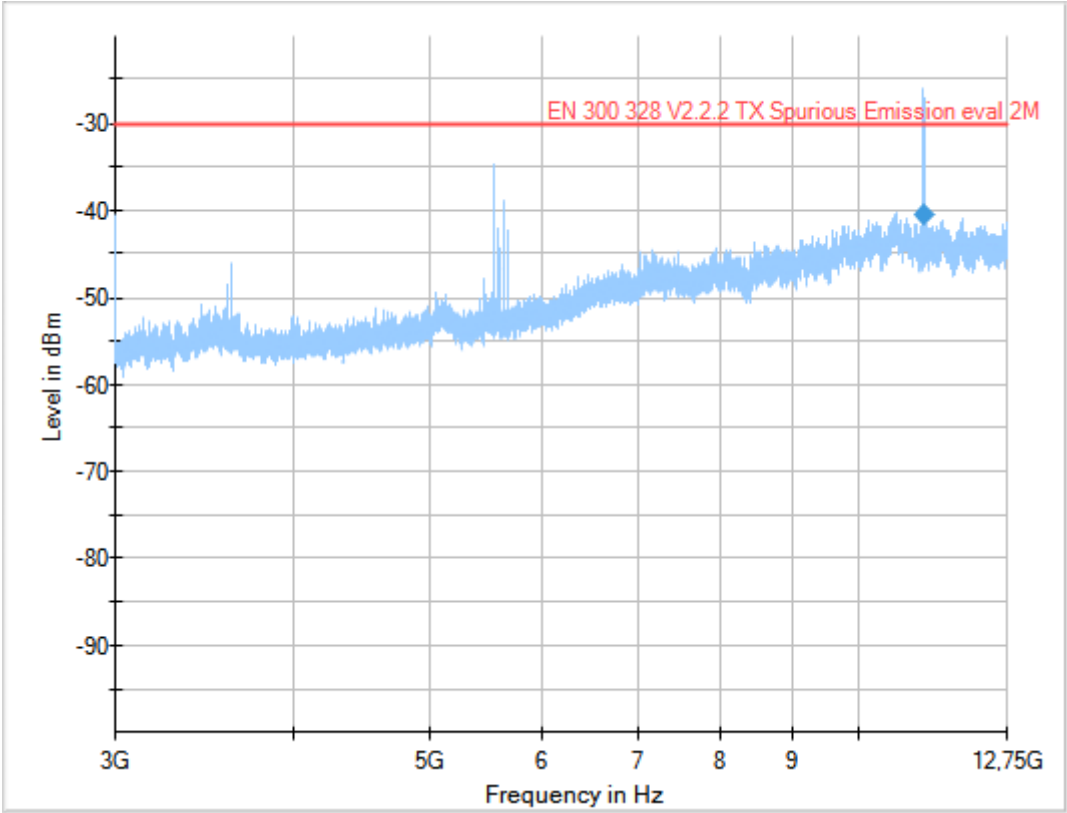
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 3 GHz	30,769 kHz	PK+	1 MHz	1 s	0 dB

Frequency Range GHz = [3, 12.75] Modulation = BT (8DPSK 3-DH5)
Frequency MHz = 2402.00000

Images:



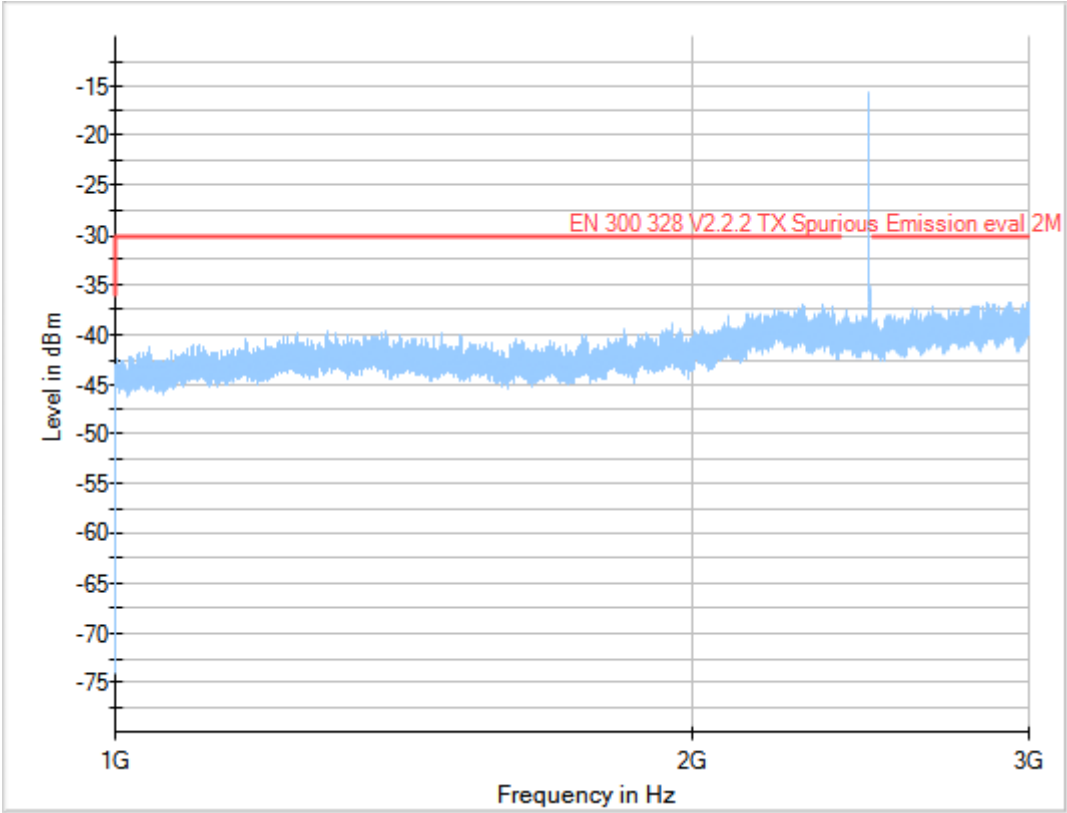
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
3 GHz - 12,75 GHz	150 kHz	PK+	1 MHz	1 s	0 dB

Frequency Range GHz = [3, 12.75] Modulation = BT (GFSK 3-DH5)
Frequency MHz = 2480.00000

Images:



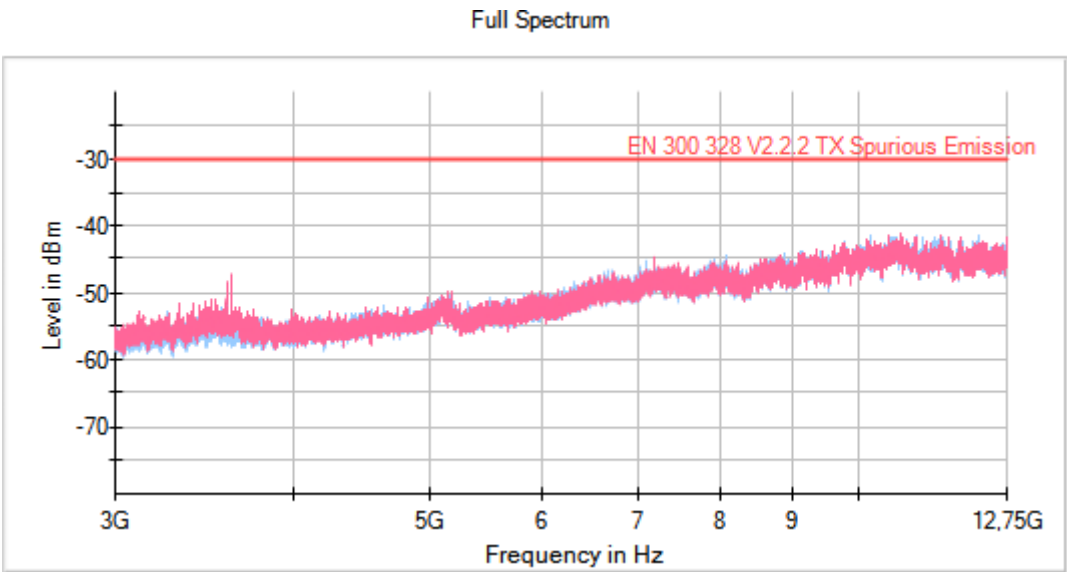
Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 3 GHz	30,769 kHz	PK+	1 MHz	1 s	0 dB

Frequency Range GHz = [3, 12.75] Modulation = BT (GFSK 3-DH5)
Frequency MHz = 2480.00000

Images:



Tables:

TX Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
3 GHz - 12,75 GHz	150 kHz	PK+	1 MHz	1 s	0 dB

4.3.1.11 (radiated) Receiver spurious emissions

Limits

The receiver spurious emissions shall not exceed the values given in the table below.

In case of FHSS equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and e.i.r.p. for emissions above 1 GHz.

Spurious emission limits for receivers

Frequency Range	Maximum Power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

The level of spurious emissions was measured as, either:

their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation); or

their effective radiated power when radiated by cabinet and antenna in case of integral antenna equipment with no antenna connectors.

Modulation: BT (GFSK 1-DH5)

Results

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

Spurious frequencies detected at less than 6 dB below the limit:

Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl RMS (dBm)	Lvl Meas Pk (dBm)	Pol
[0.03, 1]	2402.00000	37.396	-59.30	-56.98	V
		356.344	-64.65	-59.61	V
	2480.00000	37.366	-57.07	-53.98	V
		368.651	-60.08	-55.52	H
		380.958	-65.29	-58.68	V

Verdict

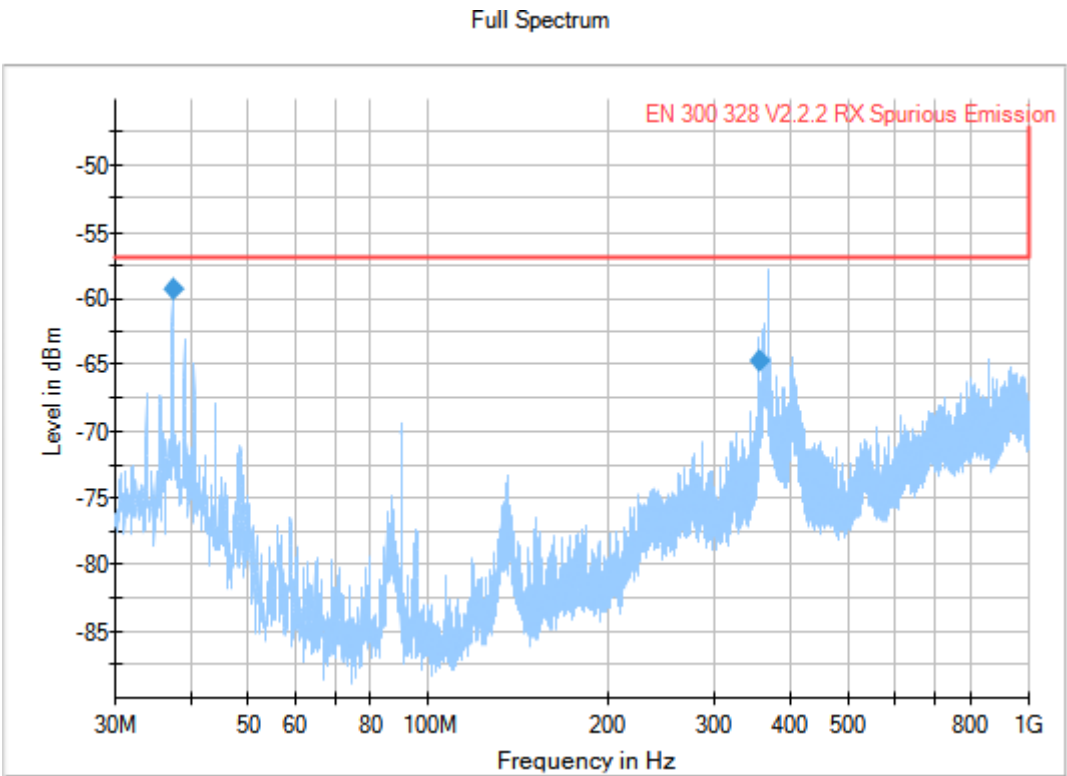
Pass

Attachments

Frequency Range GHz = [0.03, 1] Modulation = BT (GFSK 1-DH5)

Frequency MHz = 2402.00000

Images:



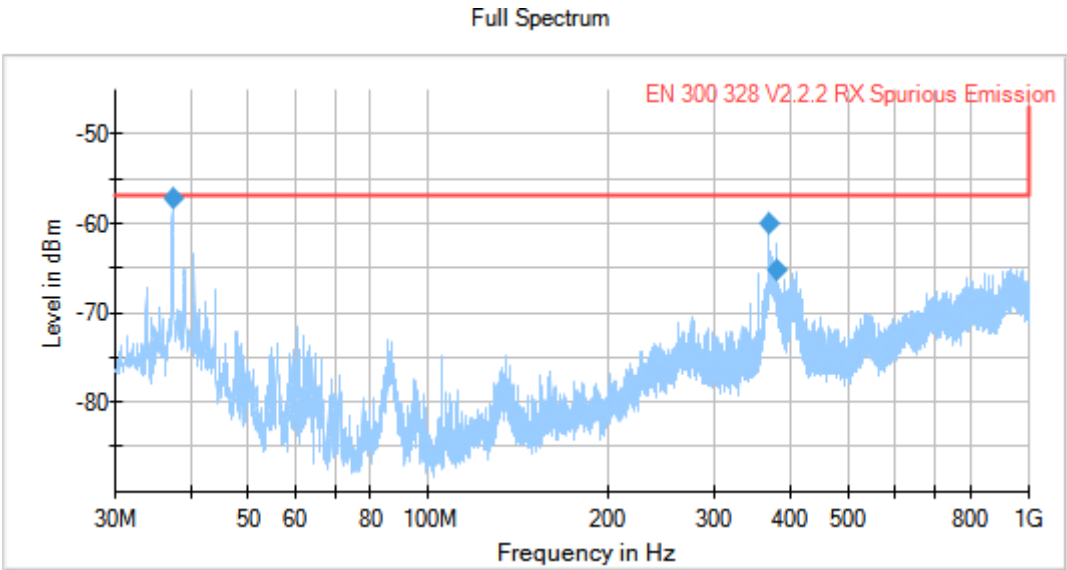
Tables:

RX LR Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	0,05 s	0 dB

Frequency Range GHz = [0.03, 1] Modulation = BT (GFSK 1-DH5)
Frequency MHz = 2480.00000

Images:

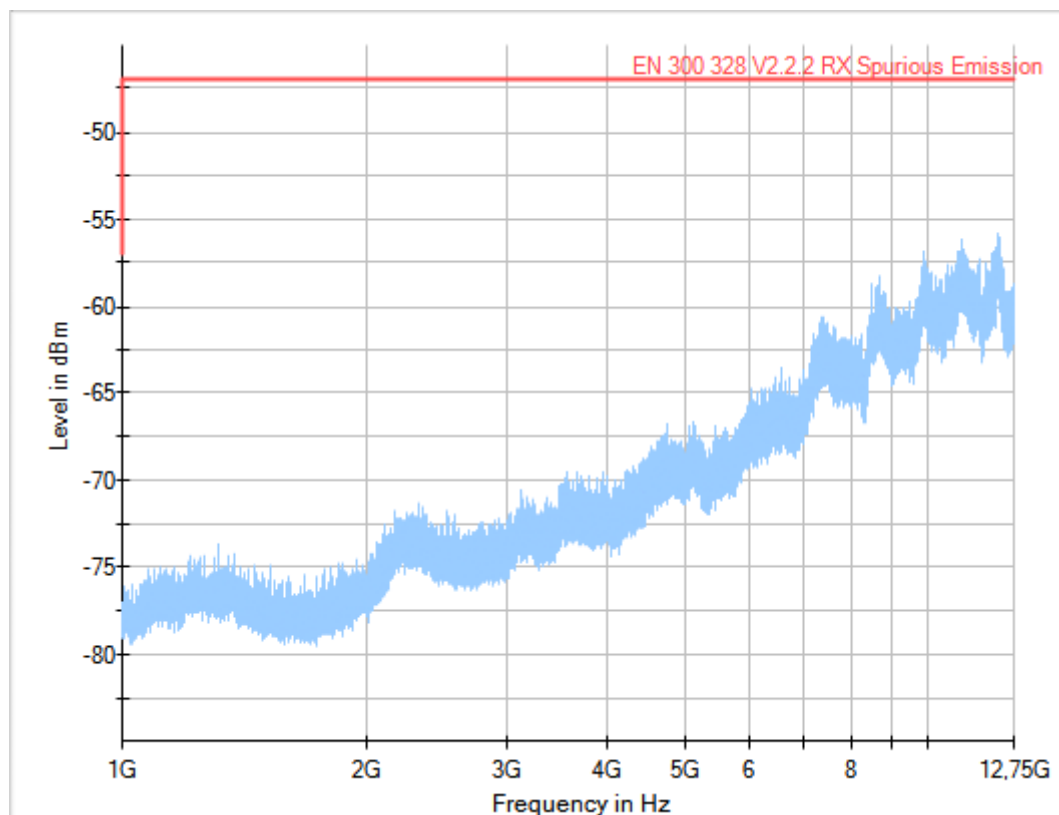


Tables:

RX LR Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	0,05 s	0 dB

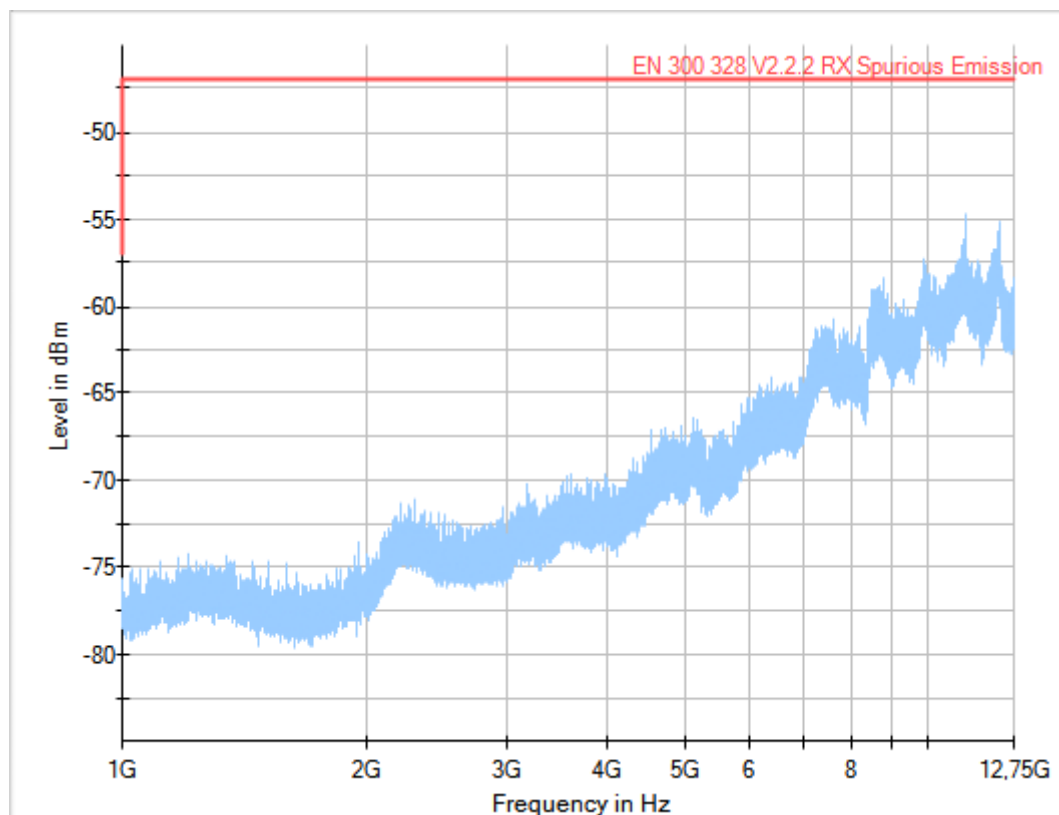
Frequency MHz = 2402.00000



RX HR Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 12,75 GHz	146,875 kHz	PK+	1 MHz	1 s	0 dB

Frequency MHz = 2480.00000



RX HR Spectrum Analyzer Parameters

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
1 GHz - 12,75 GHz	146,875 kHz	PK+	1 MHz	1 s	0 dB

4.3.1.12 Receiver blocking

Limits

While maintaining the minimum performance criteria as defined in clause 4.3.1.12.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in the table below.

Receiver Blocking parameters for Receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 10 \text{ dB})$ or $(-74 \text{ dBm} + 10 \text{ dB})$ whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\min} + 26 \text{ dB}$ where $P_{\min}$ is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Modulation: BT (GFSK 1-DH5)

Results

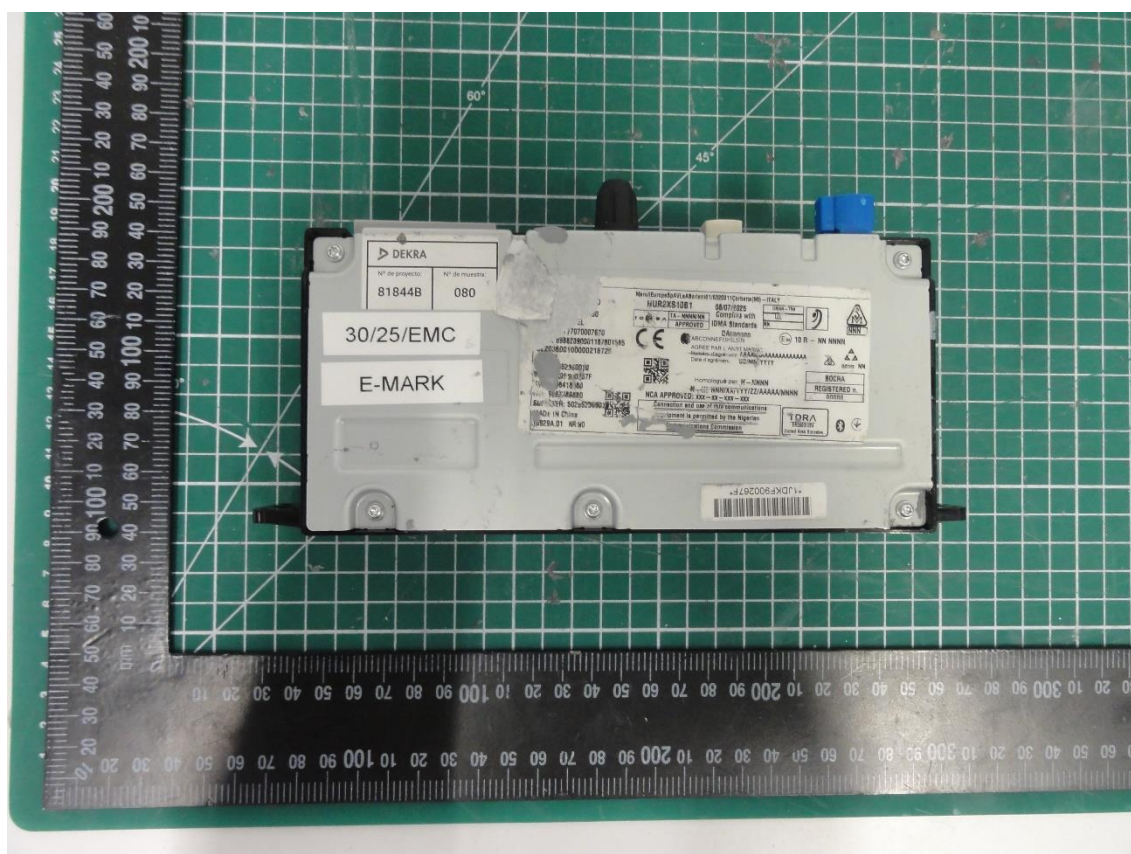
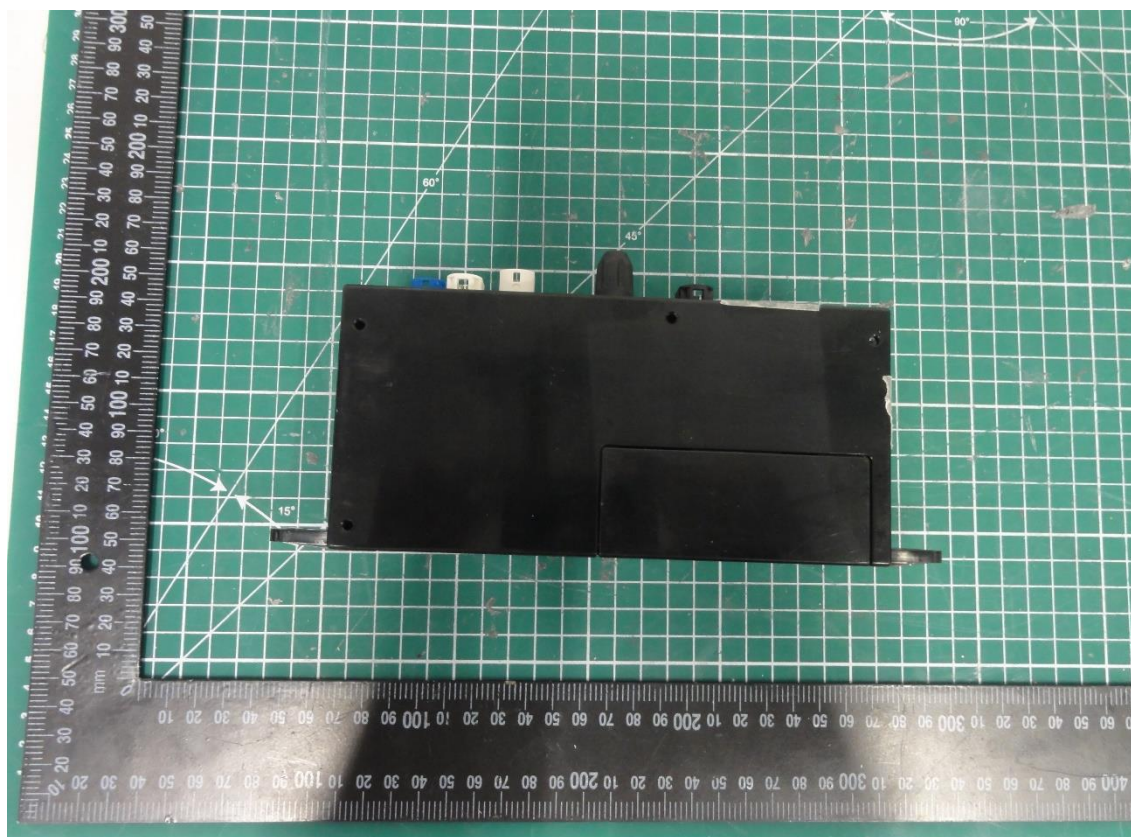
Freq (MHz)	Cat	Blk Freq (MHz)	Blk Freq Off (MHz)	Blk Lvl (dBm)	PER (%)
2402.00000	2	2380.000000	0.000000	-30.40	0.00
		2300.000000	0.000000	-30.40	0.00
2480.00000		2504.000000	0.000000	-30.40	0.00
		2584.000000	0.000000	-30.40	0.00

Verdict

Pass

Appendix C: Photographs

EQUIPMENT VIEW FOR RADIATED TESTS



EQUIPMENT VIEW FOR CONDUCTED TESTS



