

ISED CABid: ES1909

Lab. Company Number: 4621A

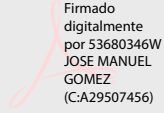
Test Report No:

86261RRF.002A1

Partial Test Report

USA FCC Part 15.247, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Bittium Tough Comnode™
(*) Trademark	Bittium Tough Comnode™
(*) Model and /or type reference	Bittium Tough Comnode™, Product code 9404092, Type Designate TV0201
(*) Derived model not tested	Bittium Tough Field Phone™ 2, Product code 9404768, Type Designate TV0201
Other identification of the product	FCC ID: V27-TV0201 IC: 3282B-TV0201
(*) Features	BT for headset (Hands-Free Profile), WLAN 802.11 bgn (2.4GHz) HW version: 9304516A19 SW version: C2GB_2023w34_d2308
Applicant	Bittium Wireless Oy Ritaharjuntie 1 90590 Oulu
Test method requested, standard	USA FCC Part 15.247 (10-1-23 Edition): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz. USA FCC Part 15.209 (10-1-23 Edition): Radiated emission limits; general requirements. CANADA RSS-247 Issue 4 (July 2025). CANADA RSS-Gen Issue 5 amendment 2 (February 2021). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. ANSI C63.10-2020 + Cor.1-2023 + C63.10a-2024 + Errata to C63.10a-2024: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager 
Date of issue	2026-04-09
Report template No	FDT08_26 (*) "Data provided by the client"

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RSS-247 6.2.3.1 (b) / FCC 15.247 (a) (1) (iii) [DwT] Time of Occupancy (Dwell Time)	15

Acronyms

Acronym ID	Acronym Description
	E.I.R.P.
Avg COT	Average Channel Occupancy Time
Avg Power	Maximum Average Conducted Output Power
Equipment	Equipment Type
Freq	Frequency
Mod	Modulation
NHp	Number of hops over the period
Operation Band	Operation Band
Port	Active Port
RU	Resource Unit

Competences and guarantees

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

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

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

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

- RF Peak Output Power: Measurement uncertainty $\leq \pm 0,80$ dB
- Accumulated Dwell Time: Measurement uncertainty $\leq \pm 0,16$ %
- Minimum Frequency Occupation Time: Measurement uncertainty $\leq \pm 0,53$ %
- Hopping Frequency Separation: Measurement uncertainty $\leq \pm 1,74$ %
- Occupied Channel Bandwidth: Measurement uncertainty $\leq \pm 1,24$ %
- Conducted Band-edge spurious emissions: Measurement uncertainty $\leq \pm 1,76$ dB

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample consists of Bittium Tough Comnode™ is a versatile and rugged terminal and IP communication device for tactical networks. The device fulfils the data transfer needs for mobile troops by functioning for example as a VoIP phone (Voice over IP), an IP router (Internet Protocol), and an SHDSL repeater (Symmetrical High-speed Digital Subscriber Line).

Bittium Tough VoIP Field Phone™ 2 is a robust VoIP phone that has been designed for tactical networks with PTT functionality. It provides IP telecommunication either with Bittium Tough VoIP Service™ or 3rd party SIP servers.

3. Declaration of equivalence between models:

Bittium

Confidential

STATEMENT OF MODEL DIFFERENCES

Model and /or type reference: Bittium Tough Comnode™
Product code 9404092
Type Designate TV0201
HW version: 9304516A19

Derived Model: Bittium Tough VoIP Field Phone™ 2
Product code 9404768
Type Designate TV0201
HW version: 9304516A19

The type designate identifies different product codes (variants) which can be seen as the same product from type approval point of view. The same type designate is used for two or several products when there are no significant functional or performance differences between these variants.

From hardware point of view the models Bittium Tough VoIP Field Phone™ 2 and Bittium Tough Comnode™ are the same. Difference between models are software features.

Bittium Tough Comnode™ is a versatile and rugged terminal and IP communication device for tactical networks. The device fulfils the data transfer needs for mobile troops by functioning for example as a VoIP phone (Voice over IP), an IP router (Internet Protocol), and an SHDSL repeater (Symmetrical Highspeed Digital Subscriber Line).

Bittium Tough VoIP Field Phone™ 2 is a robust VoIP phone that has been designed for tactical networks with PTT functionality. It provides IP telecommunication either with Bittium Tough VoIP Service™ or 3rd party SIP servers.

Tampere 10.11.2023



Jussi-Pekka Pudas
Product Manager

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 N°	Date of Reception	Application
S/01	75900B_3.1	Bittium Tough Comnode CONDUCTED	TV0201	9304516A19-23340023	2023-10-23	Element Under Test
S/01	75900B_5.1	Multi Pin /Loose ends Cable			2023-10-23	Auxiliary Element
S/01	75900B_6.1	Multi Pin / 2 Ethernet Adapter			2023-10-23	Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Conducted

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	Two ITU-T G991.2 (G.SHDSL) interfaces, push-and-release connector		N/A	[X]	[]	[]	
	Two 10BASE-T/100BASE-TX interfaces with PoE 802.3af input		N/A	[X]	[]	[]	
	Power supply port 12-32VDC (tested with 28V)		5m	[X]	[]	[]	
	Audio/serial interface for connecting handset/headset/CNR , incl. two serial ports and push-to-talk signals		0.8m	[X]	[X]	[]	
USBv2.0 host port / USB power input		5m	[]	[]	[]		
Supplementary information to the ports..... :	-						
Rated power supply :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
[X]	DC: 12 - 32 VDC						
Rated Power..... :	Power consumption 7W						
Clock frequencies..... :	20.48 MHz, 25 MHz, 100MHz , 32.768kHz, 26 MHz						
Other parameters :	-						
Software version..... :	C2GB_2023w34_d2308						
Hardware version :	9304516A19						
Dimensions in cm (W x H x D) ... :	180 x 90 x 30 mm (without handset and handset holder)						
Mounting position :	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[X]	Hand-held equipment					
	[X]	Other: Mount kit					
Modules/parts..... :	Module/parts of test item		Type		Manufacturer		
	Bittium Tough Comnode™		9404092/TV 0201		Bittium		
	Bittium Tough VoIP Field Phone™ 2		9404768/TV 0201		Bittium		
	Description		Type		Manufacturer		

Accessories (not part of the test item) :	Handset 9304639A01	H-350/U	CJ Component Products
	Cable DC Powering 5.0m, 5500959A02	Cable	Bittium
	Cable Ethernet 0.4m Dual, 5500961A05	Cable	Bittium
	Cable DC Powering 2.0m, 5500959A02	Cable	Bittium
Documents as provided by the applicant :	Description	File name	Issue date
	-	-	-

⁽³⁾ Only for Medical Equipment

Identification of the client

Bittium Wireless Oy
Ritaharjuntie 1, 90590, Oulu, Finland

Testing period and place

Test Location	DEKRA TESTING AND CERTIFICATION S.A.U. C/ Margarita Salas Boulevard, 26 - Parque Tecnológico de Andalucía; 29590 Campanillas (Málaga) (Location D)
Date (start)	2026-03-24
Date (finish)	2026-03-24

Document history

Report number	Date	Description
86261RRF.001	2026-04-06	First release.
86261RRF.001A1	2026-04-09	Second release. Update of applicable tests. This modification test report cancels and replaces the test report 86261RRF.002s.

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: Karla Castilla Alcalde.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
07040	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2027-08-26
07039	Rohde&Schwarz	OSP-B157W8	ROHDE AND SCHWARZ	2027-08-14
08661	SHIELDED ROOM	-	SIEPEL	--
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2027-06-10
08835	SIGNAL AND SPECTRUM ANALYZER 2Hz-50GHz	FSW50	ROHDE AND SCHWARZ	2027-04-15
07552	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2026-04-23
07798	WMS32	WMS32	ROHDE AND SCHWARZ	--

Testing verdicts

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

Summary

Appendix A: EDR.

FCC PART 15 PARAGRAPH/ RSS-247			
Requirement – Test case	Verdict	Remark	Location
FCC 15.247 (a) (1) / RSS-247 6.2.3.1 (a) 20 dB Bandwidth	N/M	(1)	-
RSS-247 6.2.3.1 (b) / FCC 15.247 (a) (1) (iii) Time of Occupancy (Dwell Time)	P	-	D
FCC 15.247 (b) / RSS-247 6.3.2. Maximum output power	N/M	(1)	-
FCC 15.247 (d) / RSS-247 6.6 Band-edge emissions compliance (Transmitter)	N/M	(1)	-
FCC 15.247 (a) (1) (iii) / RSS-247 6.2.3.1 (b) Number of hopping channels	N/M	(1)	-
FCC 15.247 (d) / RSS-247 6.6. Emission limitations radiated (Transmitter)	N/M	(1)	-
<u>Supplementary information and remarks:</u> (1) Test not performed. Only partial testing requested by the client. See report 78455RRF.001A2 for more details.			

Appendix A: Test results. Bluetooth EDR

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TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 28 Vdc
Type of Power Supply: External DC.

ANTENNA (*):

Type of Antenna: Monopole.
Maximum Declared Antenna Gain: -0.5 dBi

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

CONDUCTED MEASUREMENTS:

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



TEST CASES DETAILS

FCC 47 CFR Part 15.247 / RSS-247

RSS-247 6.2.3.1 (b) / FCC 15.247 (a) (1) (iii) [DwT] Time of Occupancy (Dwell Time)

Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = 0.4 x 79= 31.6 seconds.

Modulation: BT (GFSK 1-DH5) as representative

Results

Equipment	Port	Fq. Channel (MHz)	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	2441	320	125.69
		2480	319	125.30
		2402	320	125.75

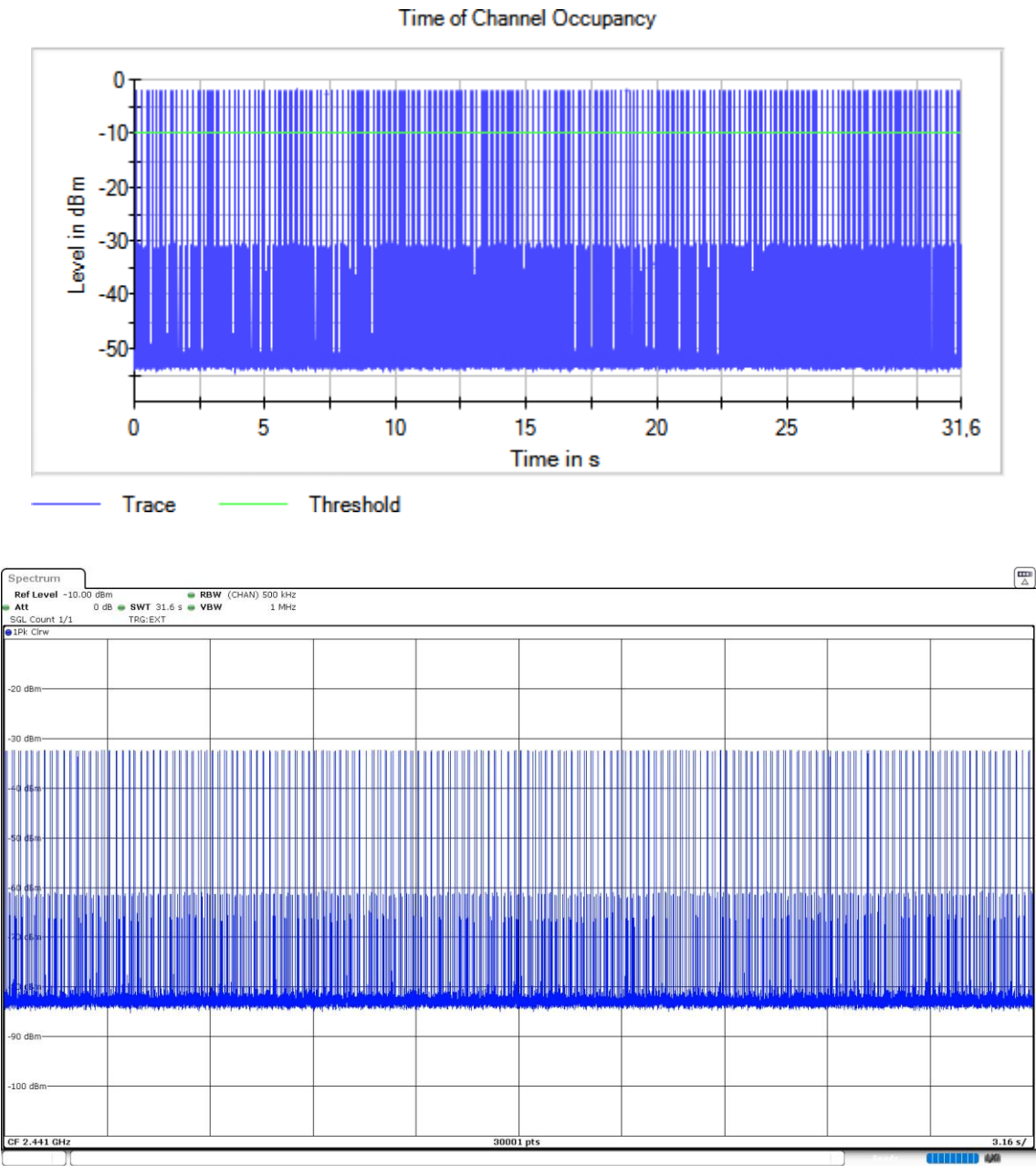
Verdict

Pass

Attachments

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Active Port = 1
Modulation = BT (GFSK 1-DH5)

Images:



Tables:

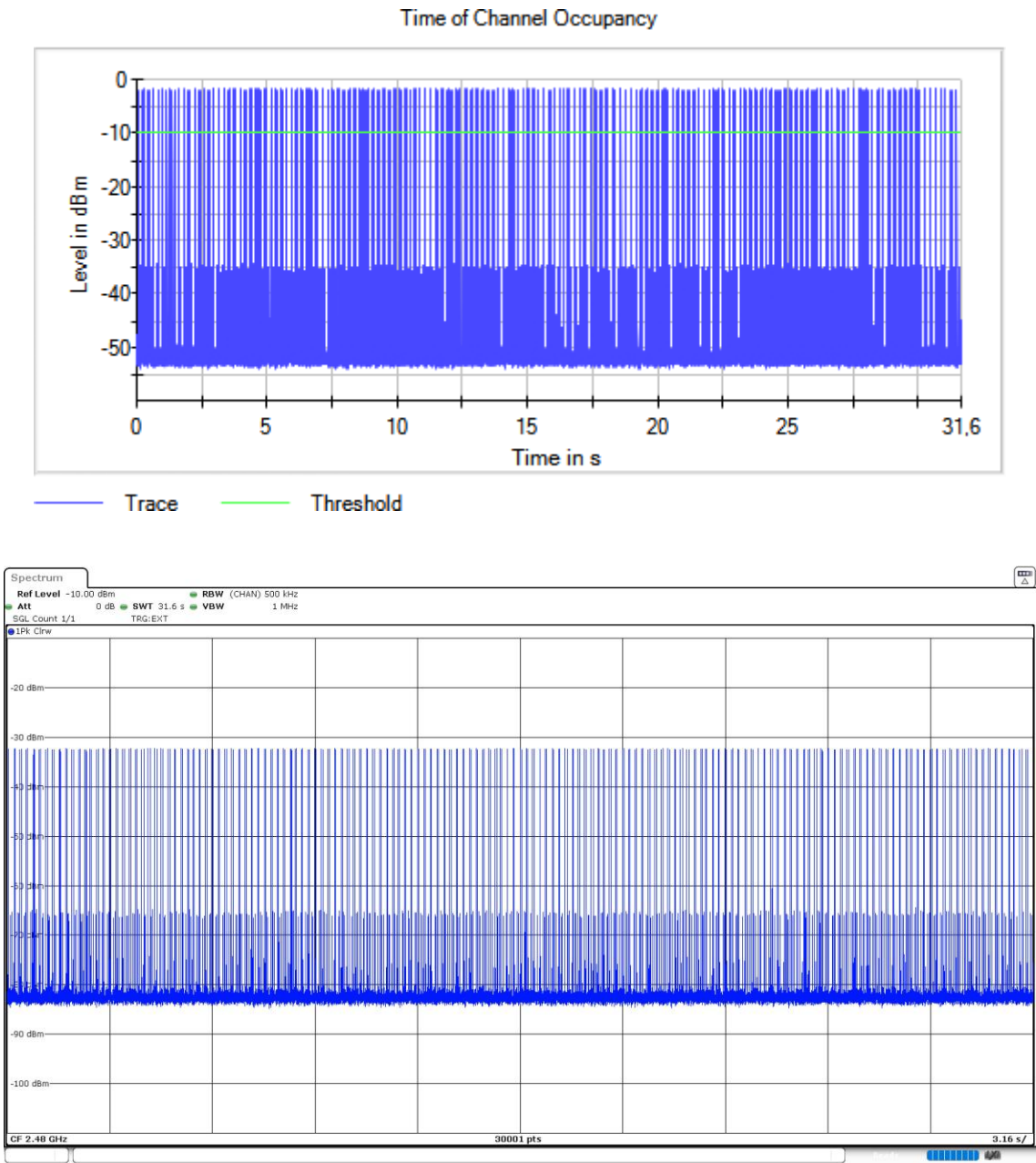
Spectrum Analyzer Parameters

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

Setting	Instrument Value	Target Value
Sweeptime	31.600 s	31.600 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Active Port = 1
Modulation = BT (GFSK 1-DH5)

Images:



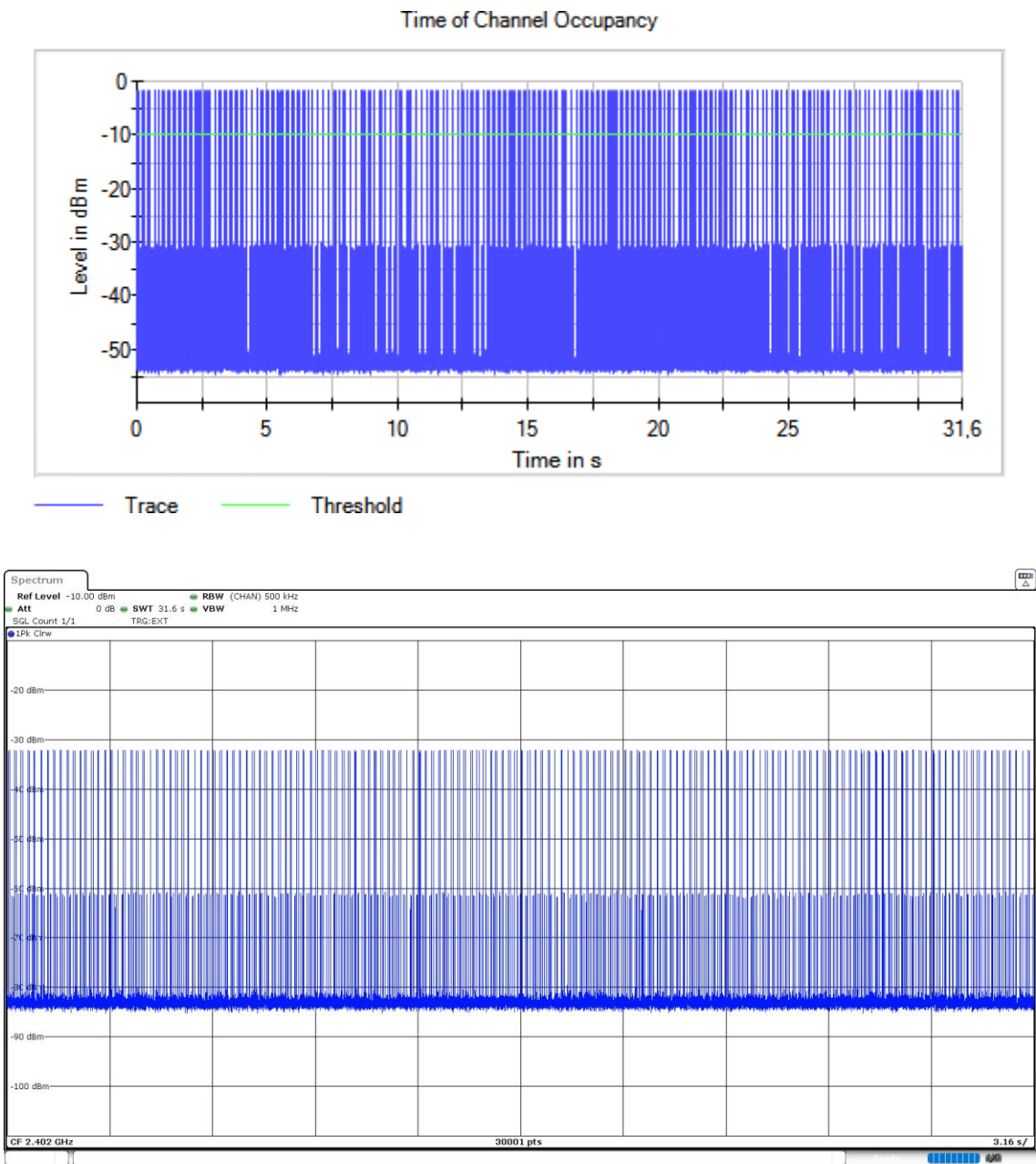
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RBW	500.000 kHz	~ 500.000 kHz
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SweepPoints	30001	~ 30001

Setting	Instrument Value	Target Value
SweepTime	31.600 s	31.600 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamplifier	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s

Equipment Type = Frequency Hopping Spread Spectrum systems (DSS) Active Port = 1
Modulation = BT (GFSK 1-DH5)

Images:



Tables:
Spectrum Analyzer Parameters

Setting	Instrument Value	Target Value
Center Frequency	2.40200 GHz	2.40200 GHz
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Sweeptime	31.600 s	31.600 s
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Attenuation	0.000 dB	0.000 dB
Detector	MaxPeak	MaxPeak
SweepCount	1	1
Filter	Channel	Channel
Trace Mode	Clear Write	Clear Write
Sweeptype	Sweep	AUTO
Preamp	off	off
Trigger	External	External
Trigger Offset	0.000 s	0.000 s