



Test report No:
NIE: 57478REM.005

Test report

FCC Rules and Regulations CFR 47, Part 15,
Subpart B (10-01-16 Edition), Subpart C (10-01-16
Edition) & ICES-003 Issue 6 (Updated 04-2017)

Identification of item tested	Secure Smartphone
Trademark	Bittium
Model and /or type reference	Tough Mobile 2
Other identification of the product	FCC ID: V27SD-61 IC: 3282B-SD61 HW Version: 0302 SW Version: 40.1
Features	LTE: 3GPP Rel12; FDD/TDD Cat13/5; DL 400Mbit/s; UL 75 Mbit/s UMTS/HSPA: 3GPP rel8, HSPA+; DL 42 Mbit/s; UL 5.76 Mbit/s GSM/GPRS/EDGE: Complementary Radios; Wi-Fi 802.11 a/b/g/n/ac (2.4 and 5GHz), 2 x 2 MIMO; BT 5.0; NFC
Manufacturer	BITTIUM WIRELESS OY Ritaharjuntie 1, 90590 Oulu, Finland.
Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-01-17 Edition), Subpart C (10-01-16 Edition) & ICES-003 (Updated 04-2017)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC LAB Manager
Date of issue	2019-04-03
Report template No	FDT08_21

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Competences and guarantees

DEKRA Testing and Certification 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 include testing performed in this test report, FCC designation number ES0004.

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

DEKRA Testing and Certification 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 at the time of performance of the test.

DEKRA Testing and Certification 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.

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.
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 and the Accreditation Bodies.

Uncertainty

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

The total uncertainty of the measurement system for the measured conducted disturbance characteristics of EUT from 150kHz to 30 MHz is $I = \pm 3,9$ dB for quasi-peak measurements, $I = \pm 3,2$ dB for average measurements ($k = 2$)

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,9$ dB for quasi-peak measurements, $I = \pm 4,6$ dB for peak measurements ($k = 2$)

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 26 GHz is $I = \pm 2,6$ dB for peaks and average measurements ($k = 2$)

Data provided by the client

The Tough Mobile 2 is a secure smartphone targeted for professional use where high security is required.

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 under test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
57478C/031	Secure smartphone	Tough Mobile 2	---	2018-11-26
57478C/035	AC/DC adapter	---	---	2018-11-26
57478C/037	USB cable	---	---	2018-11-26
57478C/040	Headphones	---	---	2018-11-26

Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
57478C/031	Secure smartphone	Tough Mobile 2	---	2018-11-26
57478C/037	USB cable	---	---	2018-11-26
57478C/040	Headphones	---	---	2018-11-26

Auxiliary elements used with the sample S/02:

Control N°	Description	Model	Serial N°	Date of reception
*	Mouse/keyboard	---	---	N/A
*	DELL Laptop	---	---	N/A

*Equipments property of DEKRA.

Test sample description

Ports..... :	Port name and description		Cable					
			Specified length [m]	Attached during test	Shielded			
	Not Provided Data			☐	☐			
				☐	☐			
Supplementary information to the ports..... :		Not Provided Data						
Rated power supply	Voltage and Frequency		Reference poles					
			L1	L2	L3	N	PE	
	☒	AC: 115Vac.	☒	☐	☐	☒	☐	
	☐	AC:	☐	☐	☐	☐	☐	
	☐	DC:						
		☐	DC:					
Rated Power		Not provided data.						
Clock frequencies		Not provided data.						
Other parameters..... :		FCC ID: V27SD-61 IC: 3282B-SD61						
Software version		40.1						
Hardware version..... :		0302						
Dimensions in cm (W x H x D).... :		Not provided data.						
Mounting position..... :	☐	Table top equipment						
	☐	Wall/Ceiling mounted equipment						
	☐	Floor standing equipment						
	☒	Hand-held equipment						
	☐	Other:						
Modules/parts	Module/parts of test item	Type			Manufacturer			
	Not Provided Data							
Accessories (not part of the test item)	Description	Type			Manufacturer			
	Not Provided Data							

Documents as provided by the applicant.....:	Description	File name	Issue date
	Not Provided Data		

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.
Date (start)	2018-11-26
Date (finish)	2018-12-05

Document history

Report number	Date	Description
57478REM.005	2019-04-03	First release

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. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

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. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The test have been performed by the technical personnel: Jesús García, Victoria Olmedo, Carlos Haro, Jorge Mora, Verónica García & David Rubio.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Testing verdicts

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

Summary

Emission Test		
Requirement – Test case	Verdict	Remark
Radiated emission. Electromagnetic field measure (30 KHz – 1000 MHz)	P	---
Radiated emission. Electromagnetic field measure (1 GHz – 18 GHz)	P	---
Radiated emission. Electromagnetic field measure (18 GHz – 26 GHz)	P	---
Continuous conducted emission (150 KHz – 30 MHz)	P	---
<u>Supplymentary information and remarks:</u>		

List of equipment used during the test					
CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
4526	EMI TEST Receiver	ROHDE & SCHWARZ	ESU26	2018-02-21	2020-02-21
4578	Bilog Antenna	ETS LINDGREN	3142E	2017-04-03	2020-04-03
4612	Horn Antenna	SCHWARZBECK	BBHA 9120 D	2016-12-19	2019-12-19
3783	Preamplifier	BONN ELEKTRONIK	BLMA 0118-3A	2018-03-28	2019-03-28
4656	Horn Antenna	SCHWARZBECK	BBHA 9170	2017-03-24	2020-03-24
4570	Thermohigrometer	HW GROUP	HWg-STE	2018-04-03	2019-04-03
4567	Thermohigrometer	HW GROUP	HWg-STE	2018-04-04	2019-04-04
4522	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---
6121	Preamplifier	BONN ELEKTRONIK	BLNA 0160-01N	2018-03-20	2019-03-20
4729	Preamplifier	BONN ELEKTRONIK	BLMA 1840-1M	2018-02-23	2020-02-23
6205	Artificial network	PMM	L3-32	2018-09-17	2019-09-17
5151	Pulse Limiter	SCHWARZBECK	VTSD 9561-F	2017-03-09	2019-03-09

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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery. Power Supply: 115 Vac.
OM#02	EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac.
OM#03	EUT ON. MS allocated a channel. GSM 850MHz, Wifi 2,4GHz ON, Bluetooth ON, NFC ON, GPS ON. Charging battery. Power Supply: 115 Vac.
OM#04	EUT ON. MS allocated a channel. GSM 850MHz, Wifi 2,4GHz ON, Bluetooth ON, NFC ON, GPS ON. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac

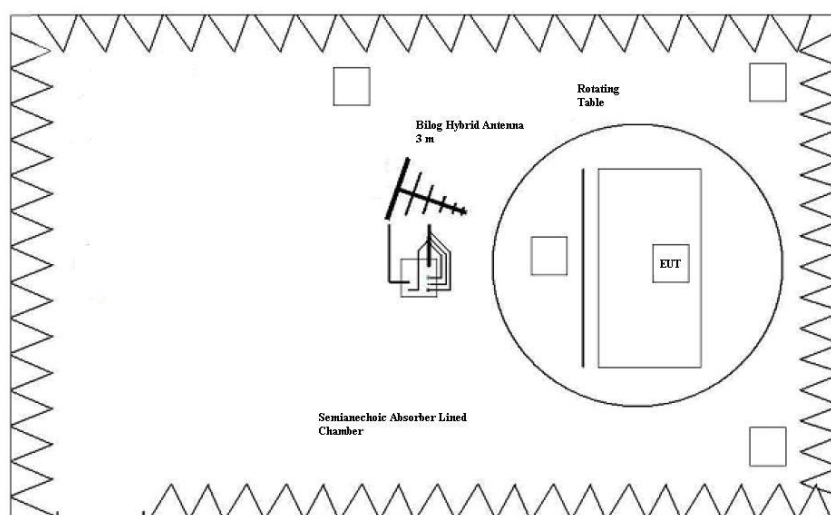
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017)

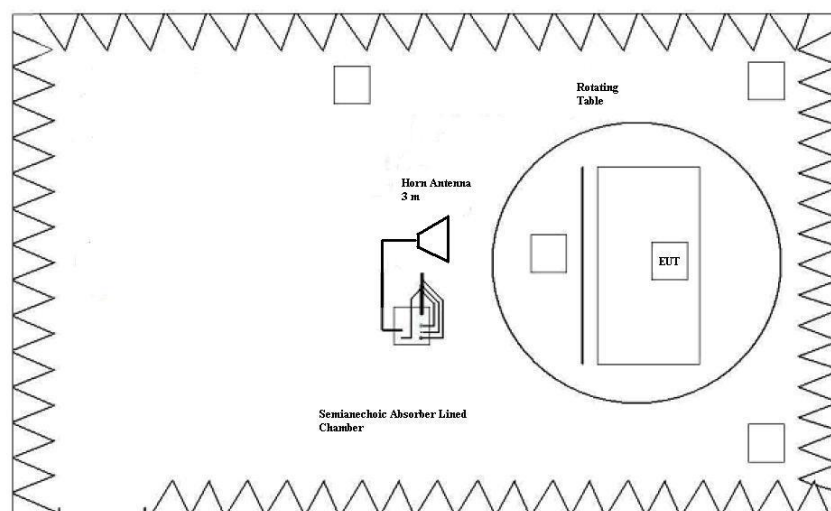
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-16 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2017) in the frequency range 30 MHz to 26 GHz for class B equipment.

Frequency range (MHz)	QP Limit for 3 m		PK Limit for 3 m
	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
30 to 88	100	40	---
88 to 216	150	43.5	---
216 to 960	200	46	---
Above 960	500	54	74



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

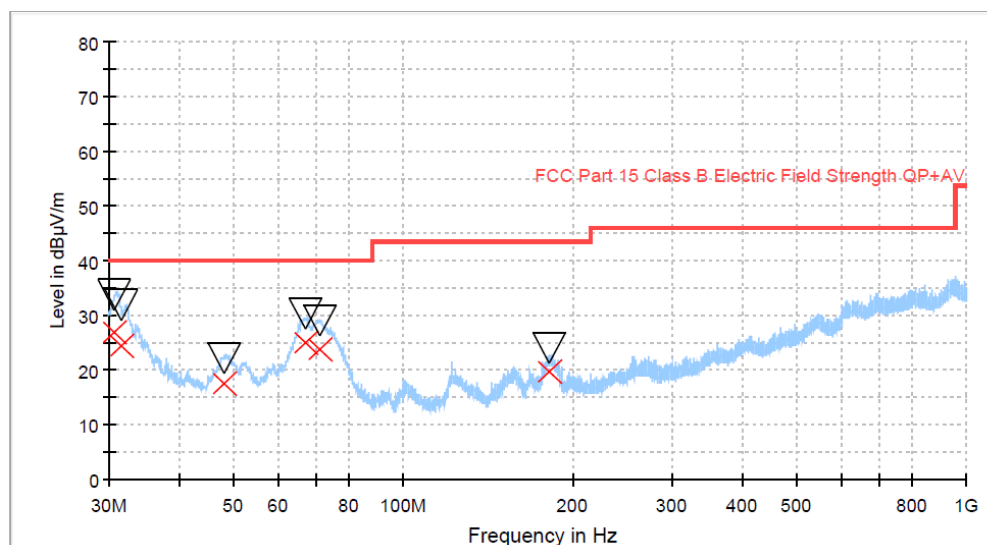
TESTED SAMPLE:	S/01 & S/02
TESTED OPERATION MODES:	OM#01 & OM#02
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR1_H	Range: 1 GHz - 18 GHz. Horizontal polarization.	P
CR0101HR1_V	Range: 1 GHz - 18 GHz. Vertical polarization.	P
CR0101HR2_H	Range: 18 GHz - 26 GHz. Horizontal polarization.	P
CR0101HR2_V	Range: 18 GHz - 26 GHz. Vertical polarization.	P
CR0102LR	Range: 30 MHz - 1000 MHz.	P
CR0102HR1_H	Range: 1 GHz - 18 GHz. Horizontal polarization.	P
CR0102HR1_V	Range: 1 GHz - 18 GHz. Vertical polarization.	P
CR0102HR2_H	Range: 18 GHz - 26 GHz. Horizontal polarization.	P
CR0102HR2_V	Range: 18 GHz - 26 GHz. Vertical polarization.	P

Radiated Emission. CR0101LR

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac.

ER EMI FCC 15 Class B (30-1000MHz)



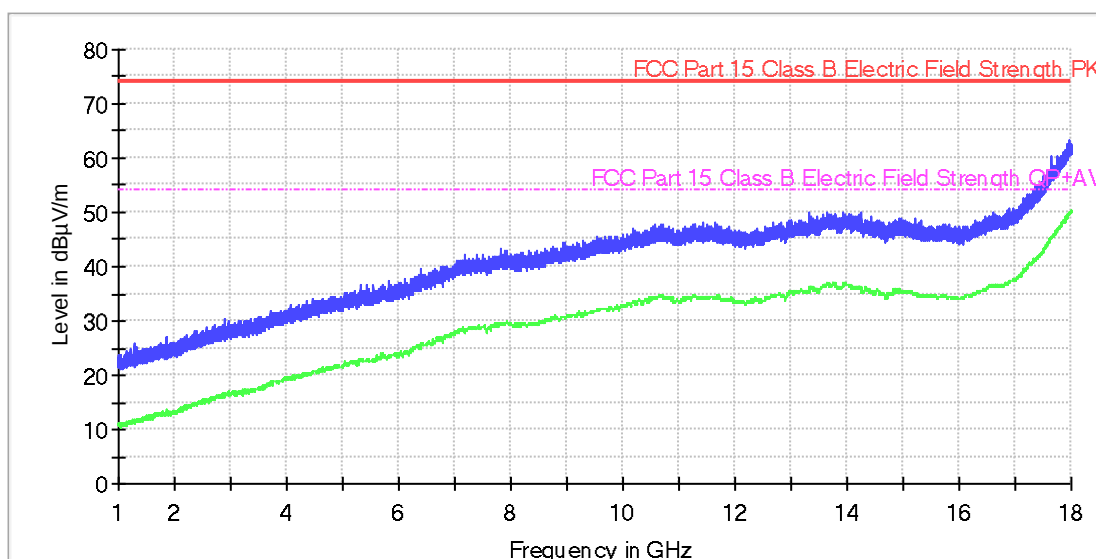
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.670000	26.83	33.62	40.00	13.17	103.0	V	160.0
31.675000	24.38	31.79	40.00	15.62	117.0	V	122.0
48.247500	17.48	22.08	40.00	22.52	117.0	V	-54.0
67.022500	24.95	30.28	40.00	15.05	126.0	V	-75.0
71.200000	23.82	29.01	40.00	16.18	108.0	V	-118.0
182.115000	19.65	24.08	43.50	23.85	379.0	V	95.0

Radiated Emission. CR0101HR1_H

Project: 57478REM005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac. Horizontal polarization.

ER EMI FCC 15 Class B (1-18GHz)



— Average Scan
— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

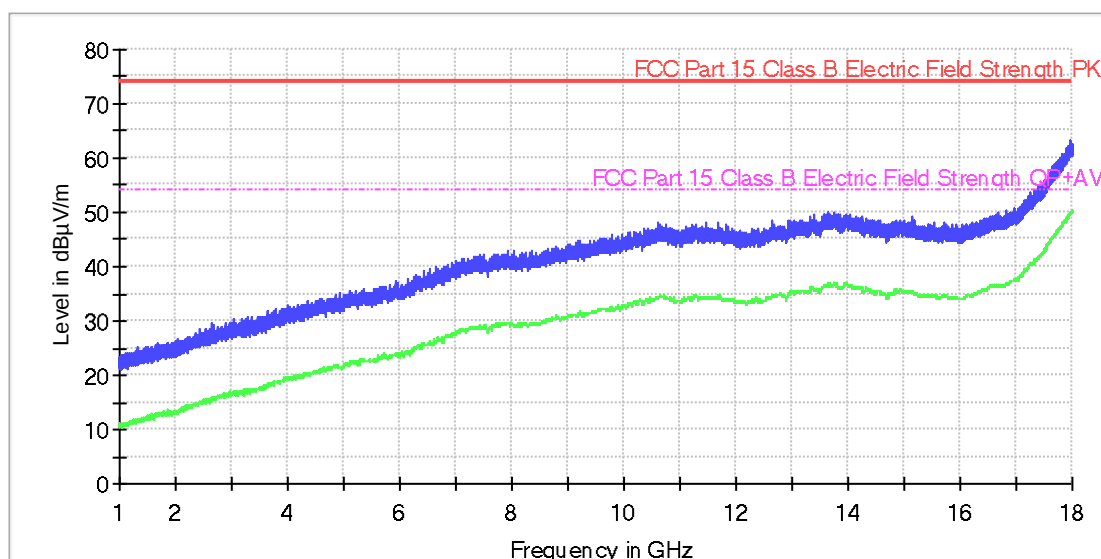
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
2686.000000	29.0	15.8
4362.800000	33.6	20.5
5836.000000	37.6	23.5
7195.200000	42.3	28.2
9495.600000	44.7	31.8
10705.600000	47.9	34.6
12696.000000	48.3	34.6
13648.000000	50.1	36.8
14920.400000	49.0	35.6
17969.600000	63.2	50.0

Radiated Emission. CR0101HR1_V

Project: 57478REM005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac. Vertical polarization.

ER EMI FCC 15 Class B (1-18GHz)



— Average Scan
— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

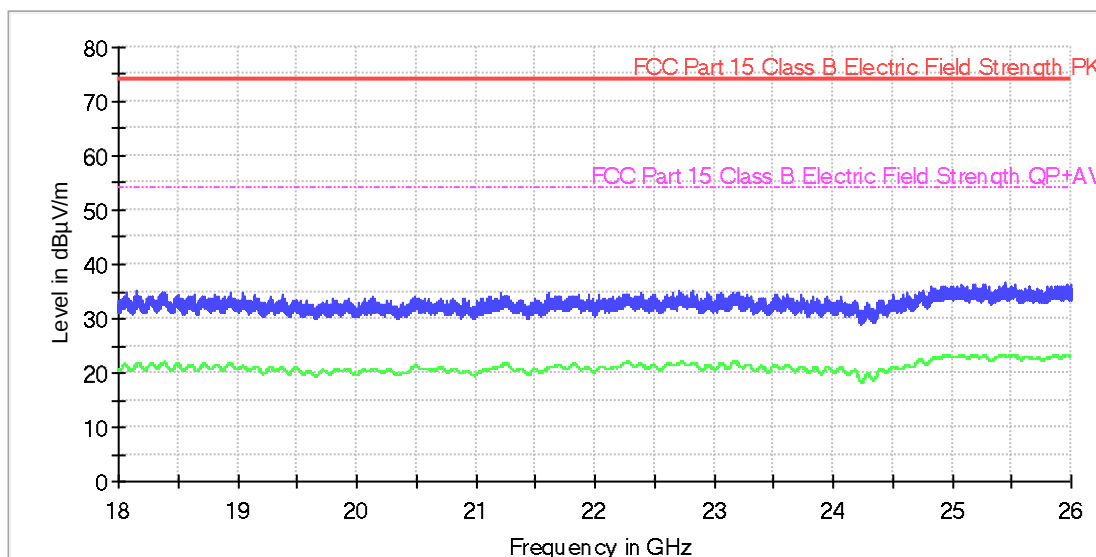
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBμV/m)	AVG CLRWR (dBμV/m)
2638.000000	29.5	15.7
4368.400000	33.9	20.4
5944.800000	37.5	23.9
7716.000000	42.3	29.3
9185.600000	45.0	31.1
10595.200000	48.1	34.4
12656.000000	48.5	34.6
13755.600000	50.0	36.9
15135.600000	49.2	35.3
17948.800000	63.2	49.8

Radiated Emission. CR0101HR2_H

Project: 57478REM005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac. Horizontal polarization.

ER EMI FCC 15 Class B (18-26GHz)



— Average Scan
— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

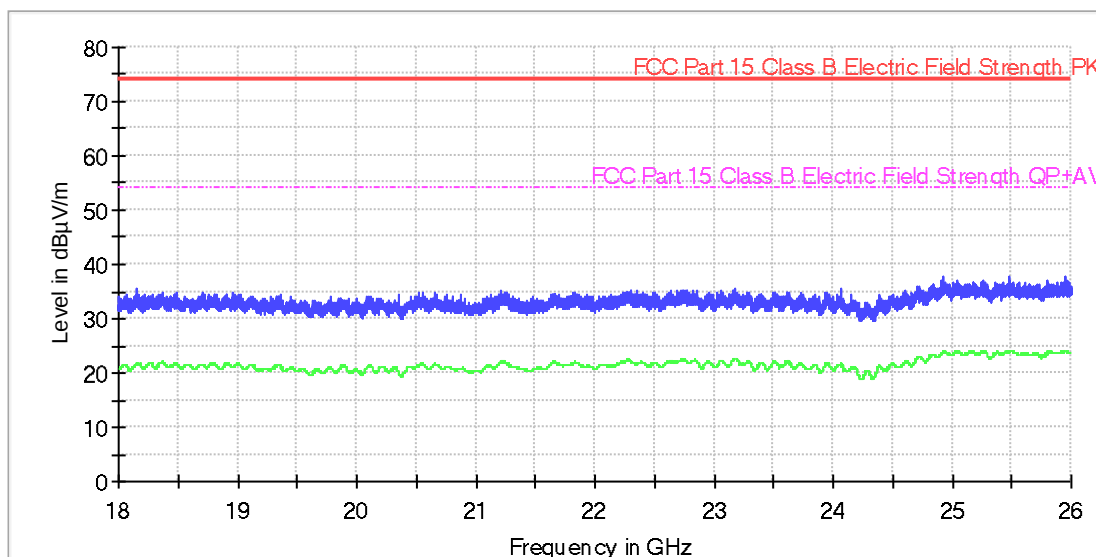
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
18148.000000	35.0	21.4
18933.200000	35.0	21.8
20135.600000	34.0	20.6
21113.200000	34.0	20.8
21614.000000	34.8	21.1
22702.400000	35.2	21.8
22820.000000	35.1	21.7
23615.200000	34.6	21.5
25187.200000	36.4	23.2
25450.800000	36.8	23.0

Radiated Emission. CR0101HR2_V

Project: 57478REM005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac. Vertical polarization.

ER EMI FCC 15 Class B (18-26GHz)



— Average Scan
— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

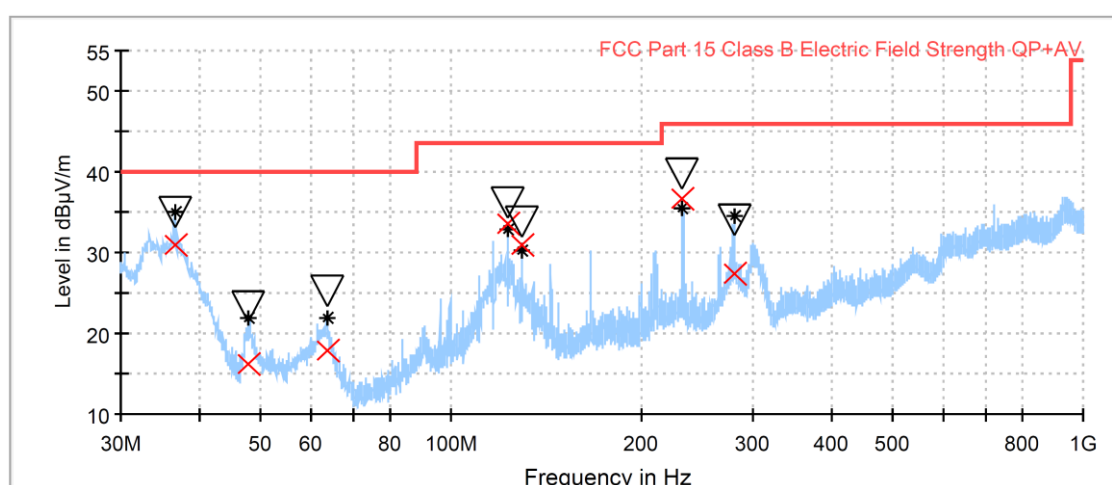
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
18143.600000	35.7	21.5
18954.000000	34.7	21.1
20352.800000	34.3	19.9
20657.200000	34.8	21.6
21202.800000	35.2	21.9
22635.200000	35.3	22.2
23173.200000	35.4	22.6
24066.800000	35.5	21.6
24930.400000	37.8	24.0
25941.600000	37.6	23.9

Radiated Emission. CR0202LR

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac.

ER EMI FCC 15 Class B (30-1000MHz)



- Preview Result 1-PK+
- * MaxPeak-PK+
- FCC Part 15 Class B Electric Field Strength QP+AV
- x QuasiPeak
- v MaxPeak

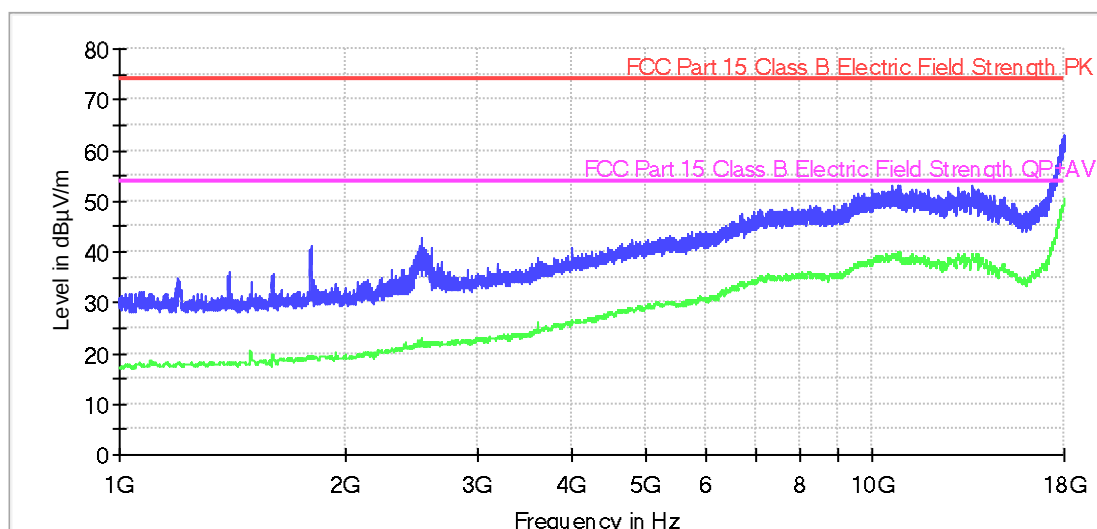
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
36.530000	30.86	35.00	40.00	9.14	101.0	V	0.0
47.830000	16.08	23.24	40.00	23.92	294.0	V	30.0
63.542500	17.96	25.12	40.00	22.04	119.0	V	-156.0
122.870000	33.52	36.26	43.50	9.98	172.0	H	-42.0
129.007500	30.90	33.74	43.50	12.60	154.0	H	-60.0
232.347500	36.56	39.66	46.00	9.44	135.0	H	-100.0
280.775000	27.35	33.96	46.00	18.65	129.0	V	-95.0

Radiated Emission. CR0202HR1_H

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Horizontal polarization.

ER EMI FCC 15 Class B (1-18GHz)



— AVG_CLRWR
— PK+_CLRWR
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

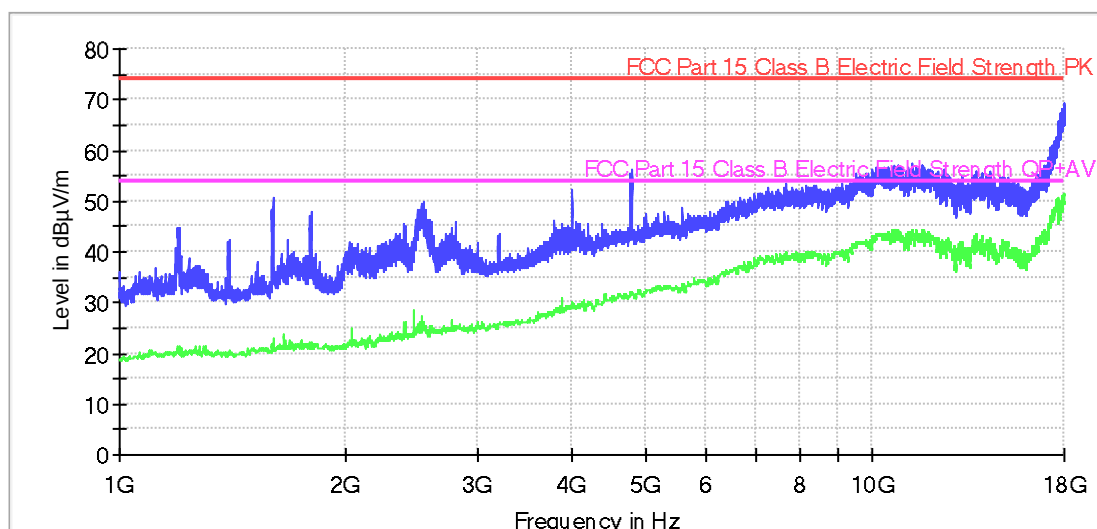
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBμV/m)	AVG CLRWR (dBμV/m)
2521.200000	42.8	22.2
3986.800000	40.8	26.0
5908.400000	44.1	30.9
7104.400000	48.5	35.1
9486.800000	51.2	37.4
10838.400000	53.0	39.4
11436.800000	52.3	39.0
13599.200000	52.9	39.3
14939.200000	50.7	37.6
17995.200000	63.1	50.7

Radiated Emission. CR0202HR1_V

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Vertical polarization.

ER EMI FCC 15 Class B (1-18GHz)



— Average Scan
— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

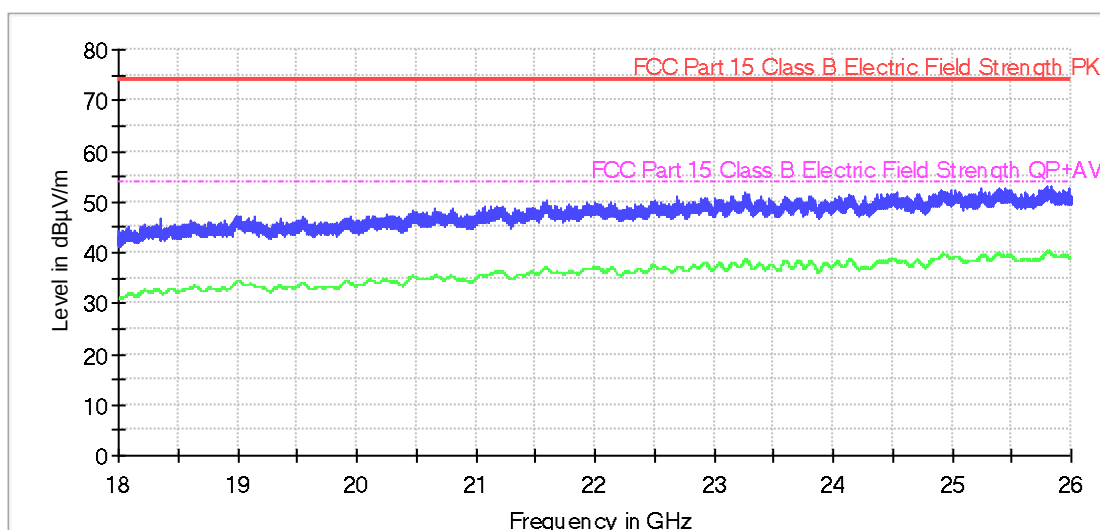
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
2700.000000	41.4	25.0
4400.000000	41.6	30.4
6100.000000	45.0	33.9
7800.000000	50.1	38.8
9500.000000	53.2	41.0
11200.000000	55.1	43.6
12900.000000	47.9	36.4
14600.000000	48.9	38.5
16300.000000	52.4	40.8
18000.000000	68.0	51.5

Radiated Emission. CR0202HR2_H

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Horizontal polarization.

ER EMI FCC 15 Class B (18-26GHz)



— AVG_CLRWR
— PK+_CLRWR
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

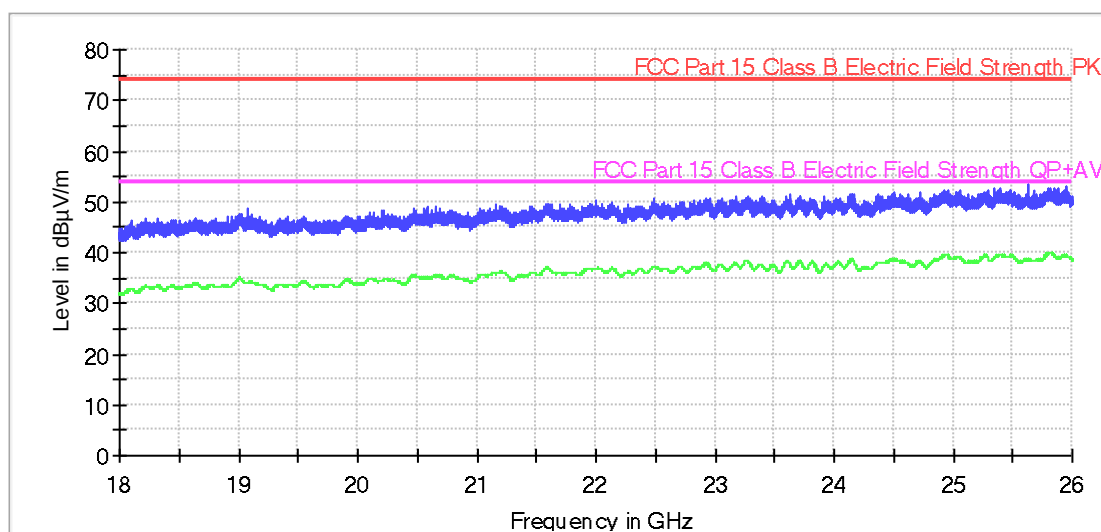
Subrange Maxima

Frequency (MHz)	PK+_CLRWR (dBµV/m)	AVG_CLRWR (dBµV/m)
18349.600000	46.7	32.4
19554.400000	47.3	34.0
20257.200000	47.6	34.4
21177.600000	49.2	36.1
21593.600000	50.2	37.2
22688.800000	51.0	37.1
23268.400000	51.7	38.5
24364.000000	51.6	38.2
25023.600000	52.2	39.1
25797.200000	53.2	40.1

Radiated Emission. CR0202HR2_V

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Vertical polarization.

ER EMI FCC 15 Class B (18-26GHz)



— Average Scan
— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBμV/m)	AVG CLRWR (dBμV/m)
18645.200000	46.8	34.0
19077.200000	48.8	34.1
20211.600000	48.2	34.6
21166.800000	49.4	36.1
21998.000000	50.4	36.9
22481.600000	50.5	37.4
23401.600000	51.1	37.3
23624.000000	51.6	37.7
24951.600000	52.4	39.5
25627.600000	53.6	38.6

CONTINUOUS CONDUCTED EMISSION

LIMITS:	Product standard :	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition) & Subpart C (10-01-2016), Secs. 15.107 & 15.207; ICES-003 Issue 6 (Updated April 2017)
	Test standard :	FCC CFR 47, Part 15, Subpart B (10-1-16 Edition) & Subpart C (10-01-2016) Secs. 15.107 & 15.207; ICES-003 Issue 6 (Updated April 2017)

CLASS B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-16 Edition) & Subpart C (10-01-16), Secs. 15.107 & 15.207, ICES-003 Issue 6 (Updated April 2017), in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	Limit (dB μ V)	
	Quasi-peak	Average
0,15 to 0,5	66-56*	56-46*
0,5 to 5	56	46
5 to 30	60	50

*Decreases with the logarithm of the frequency.

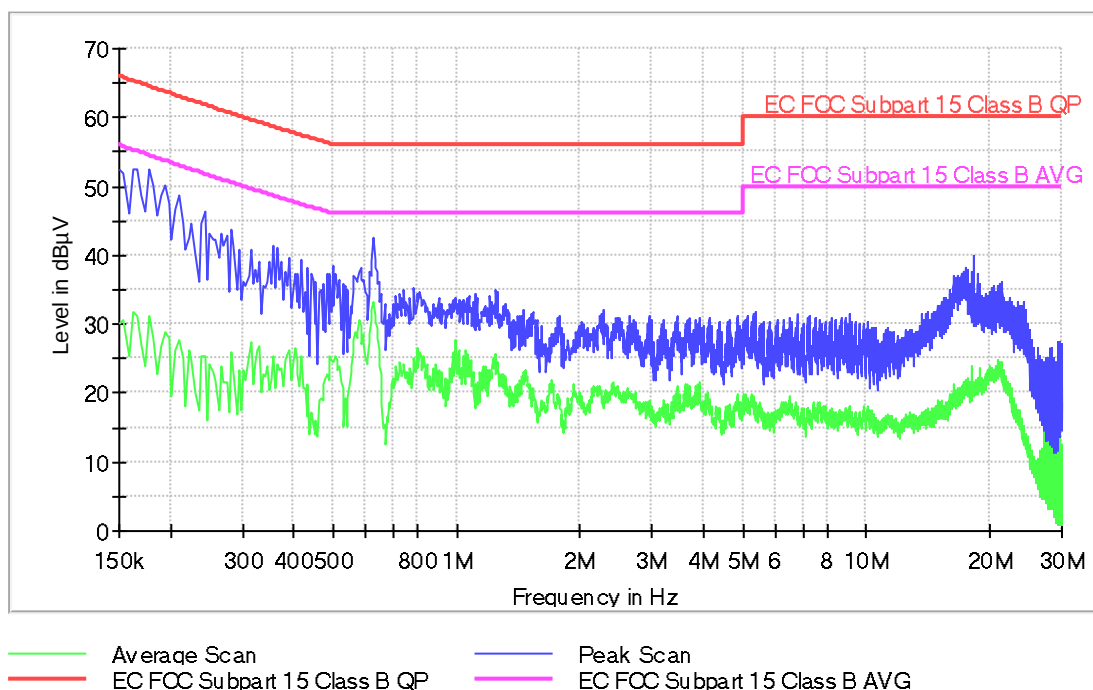
TESTED SAMPLES:	S/01 & S/02
TESTED OPERATION MODES:	OM#01 to OM#04
TEST RESULTS:	CCmmnnhh: CC, Conducted Condition; mm: Sample number; nn: Operation mode; hh: wire

CCmmnnhh	DESCRIPTION	RESULT
CC01010N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0101L1	Range: 150kHz – 30MHz. Phase wire noise.	P
CC02020N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0202L1	Range: 150kHz – 30MHz. Phase wire noise.	P
CC01030N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0103L1	Range: 150kHz – 30MHz. Phase wire noise.	P
CC02040N	Range: 150kHz – 30MHz. Neutral wire noise.	P
CC0204L1	Range: 150kHz – 30MHz. Phase wire noise.	P

Conducted Emission. CC01010N

Project: 57478CREM.005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac.Neutral wire noise.

EMI EC FCC Subpart 15 Class B



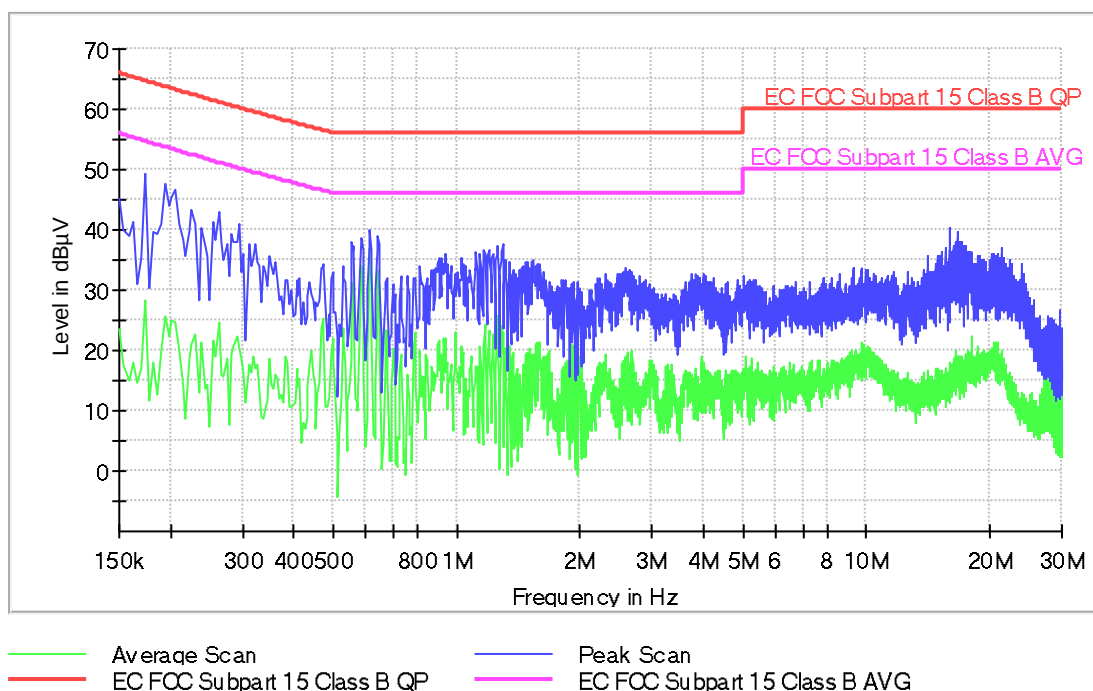
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.166000	52.6	31.2
5.342000	31.7	18.7
6.758000	31.6	17.8
9.146000	31.6	17.9
15.062000	32.8	18.4
17.482000	38.2	21.2
18.234000	40.0	21.2
21.294000	36.0	23.5
24.286000	33.3	14.5
29.582000	27.5	14.6

Conducted Emission. CC0101L1

Project: 57478CREM.005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Charging battery.
Power Supply: 115 Vac. Phase wire noise.

EMI EC FCC Subpart 15 Class B



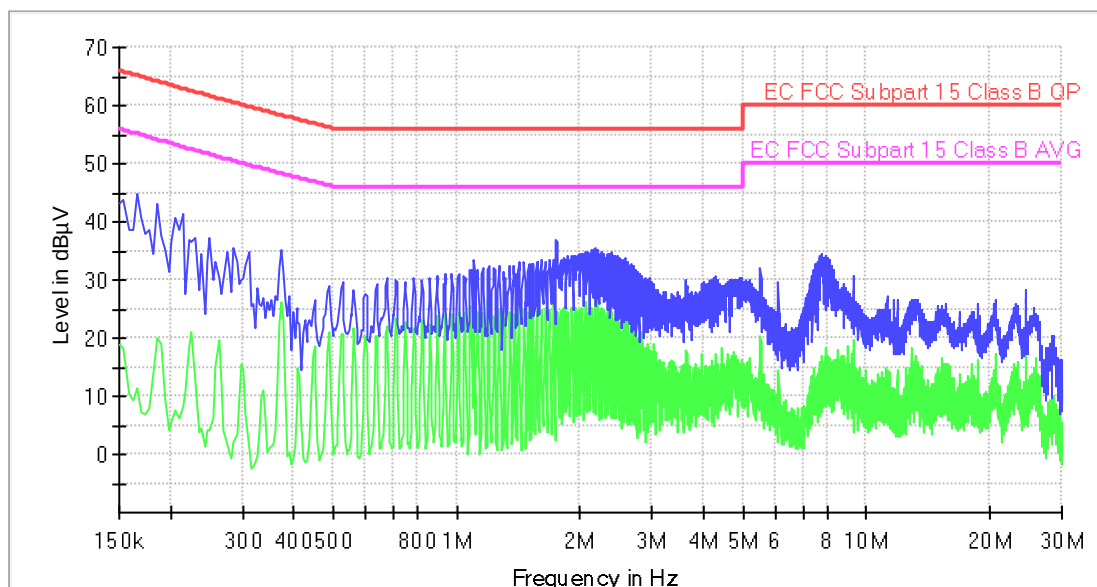
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.174000	49.4	28.2
3.754000	32.6	15.8
8.626000	32.8	13.9
9.686000	33.8	19.5
14.142000	35.7	16.8
15.954000	40.2	18.1
20.514000	36.1	21.0
21.378000	37.1	19.1
24.078000	32.9	11.0
29.778000	26.8	15.3

Conducted Emission. CC02020N

Project: 57478CREM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Neutral wire noise.

EMI EC FCC Subpart 15 Class B



— Average Scan — Peak Scan
— EC FCC Subpart 15 Class B QP — EC FCC Subpart 15 Class B AVG

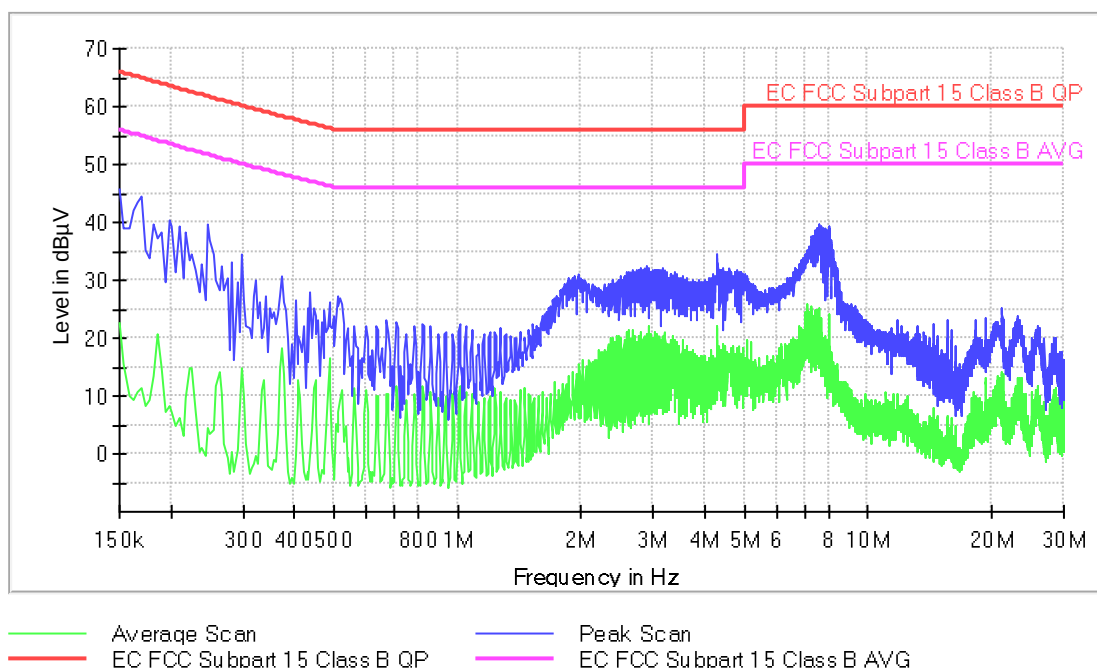
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.166000	44.8	11.2
5.514000	32.1	20.4
7.762000	34.4	16.3
9.322000	30.8	19.5
12.918000	26.7	14.4
15.618000	25.7	10.0
20.674000	26.6	16.7
23.130000	26.0	14.7
24.506000	28.2	16.7
28.602000	20.4	10.1

Conducted Emission. CC0202L1

Project: 57478CREM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#02
Description: EUT ON. Airplane mode (GSM/UMTS/LTE OFF, Wifi OFF, Bluetooth OFF, NFC OFF, GPS/Glonass/Galileo OFF). Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Phase wire noise.

EMI EC FCC Subpart 15 Class B



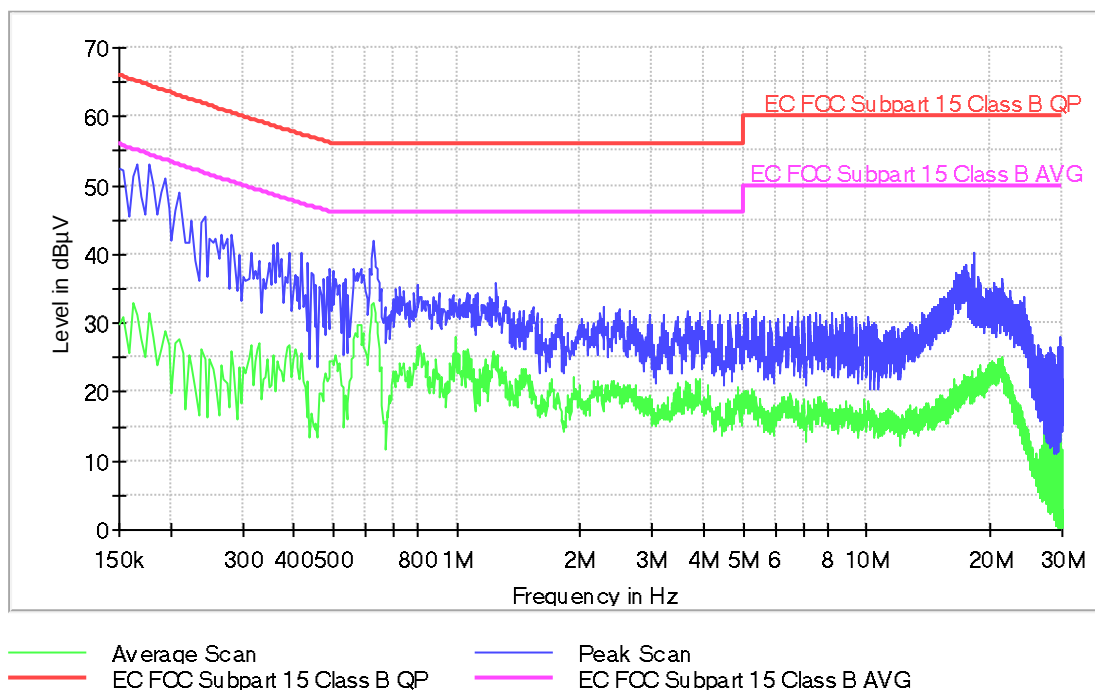
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.150000	45.9	22.6
4.294000	34.6	22.2
7.614000	39.5	20.1
9.274000	25.4	5.9
14.434000	22.2	6.4
15.578000	22.9	6.6
19.394000	23.4	13.2
21.282000	25.0	13.5
25.910000	21.9	9.0
28.398000	20.0	10.9

Conducted Emission. CC01030N

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#03
Description: EUT ON. MS allocated a channel. GSM 850MHz, Wifi 2,4GHz ON, Bluetooth ON, NFC ON, GPS ON. Charging battery. Power Supply: 115 Vac. Neutral wire noise.

EMI EC FCC Subpart 15 Class B



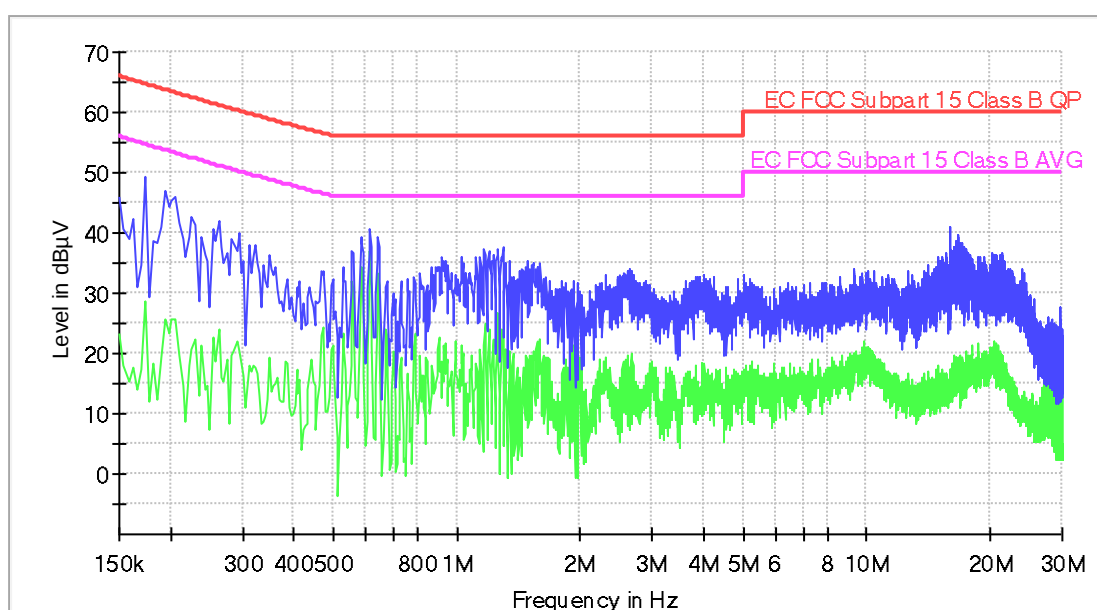
Subrange Maxima

Frequency (MHz)	PK+ _CLRWR (dBµV)	AVG _CLRWR (dBµV)
0.166000	53.1	31.3
0.626000	42.1	33.0
1.250000	35.8	23.4
2.290000	32.4	19.6
5.342000	31.7	19.2
18.234000	40.3	20.4

Conducted Emission. CC0103L1

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/01
Operation mode: OM#03
Description: EUT ON. MS allocated a channel. GSM 850MHz, Wifi 2,4GHz ON, Bluetooth ON, NFC ON, GPS ON. Charging battery. Power Supply: 115 Vac. Phase wire noise.

EMI EC FCC Subpart 15 Class B



— Average Scan — Peak Scan
— EC FCC Subpart 15 Class B QP — EC FCC Subpart 15 Class B AVG

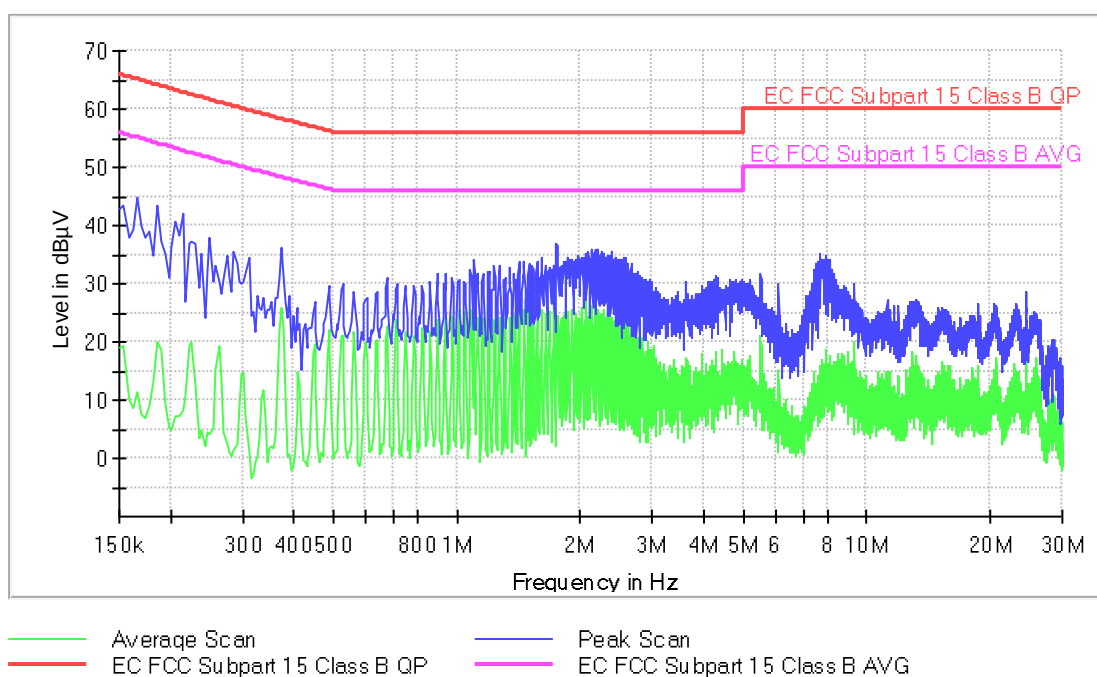
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.174000	49.4	28.6
0.614000	40.7	37.0
1.294000	37.8	22.3
2.638000	33.8	17.1
9.306000	33.9	17.8
15.954000	40.8	17.4

Conducted Emission. CC02040N

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#04
Description: EUT ON. MS allocated a channel. GSM 850MHz, Wifi 2,4GHz ON, Bluetooth ON, NFC ON, GPS ON. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Neutral wire noise.

EMI EC FCC Subpart 15 Class B



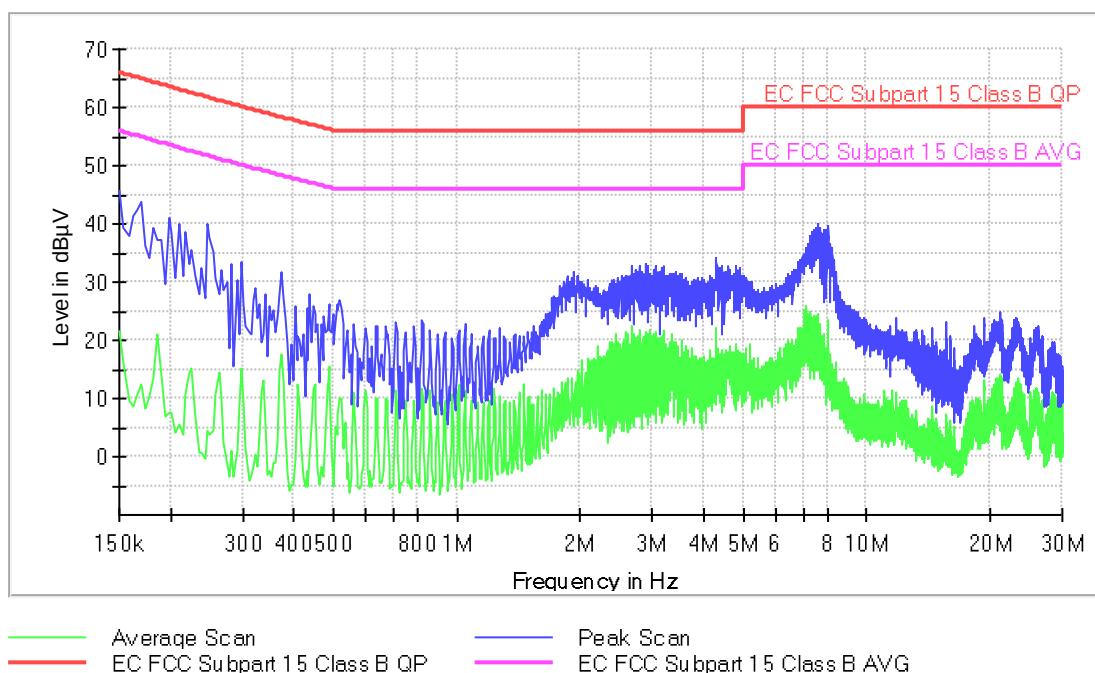
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV)	AVG CLRWR (dBµV)
0.166000	45.0	11.4
0.374000	36.3	25.8
1.750000	36.8	22.9
2.170000	36.0	27.0
7.726000	35.1	15.9
24.506000	28.7	16.7

Conducted Emission. CC0204L1

Project: 57478REM.005
Company: BITTIUM WIRELESS OY
Sample: S/02
Operation mode: OM#04
Description: EUT ON. MS allocated a channel. GSM 850MHz, Wifi 2,4GHz ON, Bluetooth ON, NFC ON, GPS ON. Transferring data via USB. Equipment charging batteries. Power supply: 5Vdc. (By USB port). Auxiliary laptop powered 115Vac. Phase wire noise.

EMI EC FCC Subpart 15 Class B



Subrange Maxima

Frequency (MHz)	PK+ _CLRWR (dBµV)	AVG _CLRWR (dBµV)
0.150000	45.7	21.8
0.374000	31.6	17.8
1.930000	31.7	7.8
4.286000	34.0	22.1
7.642000	39.9	21.2
21.282000	24.8	13.6