

Test report No:
75462REM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B
(10-1-21 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	LTE Cat-4
(*) Trademark	Sequans Communications
(*) Model and /or type reference	CA410
Other identification of the product	FCC ID: 2AAGMCA410A IC: 12732A-CA410A
(*) Features	LTE Cat-4 HW version: V1 SW version: LR4.1.6.0-CBRSA-59334
Manufacturer	SEQUANS COMMUNICATIONS 55 Boulevard Charles de Gaulle, 92700 Colombes
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez EMC Consumer & RF Lab. Manager  Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456) Fecha: 2023.10.24 08:52:45 +02'00'
Date of issue	2023-10-24
Report template No	FDT08_24 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
Line	Conducted Emissions - Tested Line
MP	Measurement Point
OM	Operation Mode
S/	Sample
V	Verdict

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.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

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

The total uncertainty of the measurement system for the measured conducted disturbance characteristics of EUT from 150 kHz to 30 MHz is $I = \pm 3,9$ dB for quasi-peak measurements, $I = \pm 3,2$ dB for peak 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 12.75 GHz is $I = \pm 2,6$ dB for peak and average measurements ($k = 2$).

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample consists of a LTE Cat-4. CA410 is ideal for adding LTE connectivity to electronics devices for industrial Internet of Things (IoT), Machine-to-Machine (M2M) and broadband consumer applications. CA410 is compliant with CBRS networks operating on LTE band 48 in USA, with US B8 – known as Anterix band - and with other US MNO bands: bands 2/4/5/12/13/66 as well as Firstnet LTE band 14 and band 26 used in private networks.

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	75462C_10.1	Antena			2023-07-25	Element Under Test
S/01	75462C_15.1	Module	CA410-EVK	FOX-23-26-0660	2023-07-25	Element Under Test
S/01	75462C_20.1	USB Cable	CA410-EVK		2023-07-25	Element Under Test
S/01	75462C_9.1	Antena			2023-07-25	Element Under Test
S/02	75462C_10.1	Antena			2023-07-25	Element Under Test
S/02	75462C_17.1	USB Cable	CA410-EVK		2023-07-25	Element Under Test
S/02	75462C_8.1	Antena			2023-07-25	Element Under Test
S/02	76162_1.1	Testing box	CA410-EVK	FOX-23-34-0682	2023-09-11	Element Under Test
S/01 & S/02	--	AC/DC for ANSIS Laptop				Auxiliary Element
S/01 & S/02	--	Keyboard for ANSI Laptop				Auxiliary Element
S/01 & S/02	CTC-6644-Z	Laptop for ANSI setup				Auxiliary Element
S/01 & S/02	MO-4127-I	Mouse for ANSI Laptop				Auxiliary Element

Notes referenced to samples during the project: none

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	USB	.....	[X]	[]	[]		
			[]	[]	[]		
			[]	[]	[]		
			[]	[]	[]		
			[]	[]	[]		
Supplementary information to the ports..... :	.....						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 3.2V Min, 3.3V Typ, 4.6V Max					
	[]	DC:					
Rated Power .....	.....						
Clock frequencies..... :	.....						
Other parameters .....	.....						
Software version .....	.....						
Hardware version .....	.....						
Dimensions in cm (W x H x D) .....	.....						
Mounting position	[X]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[]	Hand-held equipment					
	[]	Other:					

Modules/parts.....:	Module/parts of test item	Type	Manufacturer
			
			
			
			
Accessories (not part of the test item):	Description	Type	Manufacturer
	USB Cable	USB	.....
	Antenna	Antenna	.....
			
			
			
			
Documents as provided by the applicant.....:	Description	File name	Issue date
			
			
			
			

⁽³⁾ Only for Medical Equipment

Identification of the client

SEQUANS COMMUNICATIONS
55 Boulevard Charles de Gaulle, 92700 Colombes

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2023-08-17
Date (finish)	2023-09-16

Document history

Report number	Date	Description
75462REM.001	2023-10-24	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. = 860mbar Max. = 1060mbar

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. = 860mbar Max. = 1060mbar

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. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Ivan Guerrero González.

Testing verdicts

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

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
8866	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-09-21
6132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2024-04-21
6126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2024-04-21
4612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2024-07-13
5641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2024-09-15
9360	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2024-07-25
6064	SEMIANECHOIC ABSORBER LINED CHAMBER	SAC-3	Frankonia	--
6329	SHIELDED ROOM	--	FRANKONIA	--
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--

Summary

Test Specification	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)	RE Radiated emission. Electromagnetic field measure	P	(1)
	CE Continuous conducted emission	P	---
<u>Supplementary information and remarks:</u> (1) Range: f>12.75 GHz. Test required only to the 5th harmonics of the maximum internal work frequency in the EUT.			

Appendix A: Test results

Appendix A content

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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:

Id	Description
OM/01	EUT ON. Equipment transferring data to an auxiliary laptop via USB. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz.
OM/02	EUT ON. MS in traffic mode. LTE Band 2. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/03	EUT ON. MS in traffic mode. LTE Band 4. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/04	EUT ON. MS in traffic mode. LTE Band 5. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/05	EUT ON. MS in traffic mode. LTE Band 8. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/06	EUT ON. MS in traffic mode. LTE Band 12. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/07	EUT ON. MS in traffic mode. LTE Band 13. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/08	EUT ON. MS in traffic mode. LTE Band 14. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/09	EUT ON. MS in traffic mode. LTE Band 26. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/10	EUT ON. MS in traffic mode. LTE Band 48. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/11	EUT ON. MS in traffic mode. LTE Band 66. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.
OM/12	EUT ON. MS in IDLE mode. LTE Band 2. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Note: preliminary scans determine that there is not differences in terms of conducted emissions for IDLE mode. Only one band is shown and it is representative enough.

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-21 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.
	ANSI C63.4 (2014)	CE Continuous conducted emission

Test Cases Details

FCC 47 CFR Part 15B CE Continuous conducted emission

Limits of interference 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 and C (10-1-21 Edition), Secs. 15.107 and 15.207 & ICES-003 Issue 7 (October 2020), in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range (MHz)	Limit (dBμV)	
	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.

Results

SI	OM	Code	Freq Rng (MHz)	Line	V
02	OM/02	CE03020N	[0.15, 30]	N	P
02	OM/02	CE0302L1	[0.15, 30]	L1	P
02	OM/03	CE03030N	[0.15, 30]	N	P
02	OM/03	CE0303L1	[0.15, 30]	L1	P
02	OM/04	CE03040N	[0.15, 30]	N	P
02	OM/04	CE0304L1	[0.15, 30]	L1	P
02	OM/05	CE03050N	[0.15, 30]	N	P
02	OM/05	CE0305L1	[0.15, 30]	L1	P
02	OM/06	CE03060N	[0.15, 30]	N	P
02	OM/06	CE0306L1	[0.15, 30]	L1	P
02	OM/07	CE03070N	[0.15, 30]	N	P
02	OM/07	CE0307L1	[0.15, 30]	L1	P
02	OM/08	CE03080N	[0.15, 30]	N	P
02	OM/08	CE0308L1	[0.15, 30]	L1	P
02	OM/09	CE03090N	[0.15, 30]	N	P
02	OM/09	CE0309L1	[0.15, 30]	L1	P
02	OM/10	CE03100N	[0.15, 30]	N	P
02	OM/10	CE0310L1	[0.15, 30]	L1	P
02	OM/11	CE03110N	[0.15, 30]	N	P
02	OM/11	CE0311L1	[0.15, 30]	L1	P
02	OM/12	CE03120N	[0.15, 30]	N	P
02	OM/12	CE0312L1	[0.15, 30]	L1	P

Verdict

Pass

Attachments

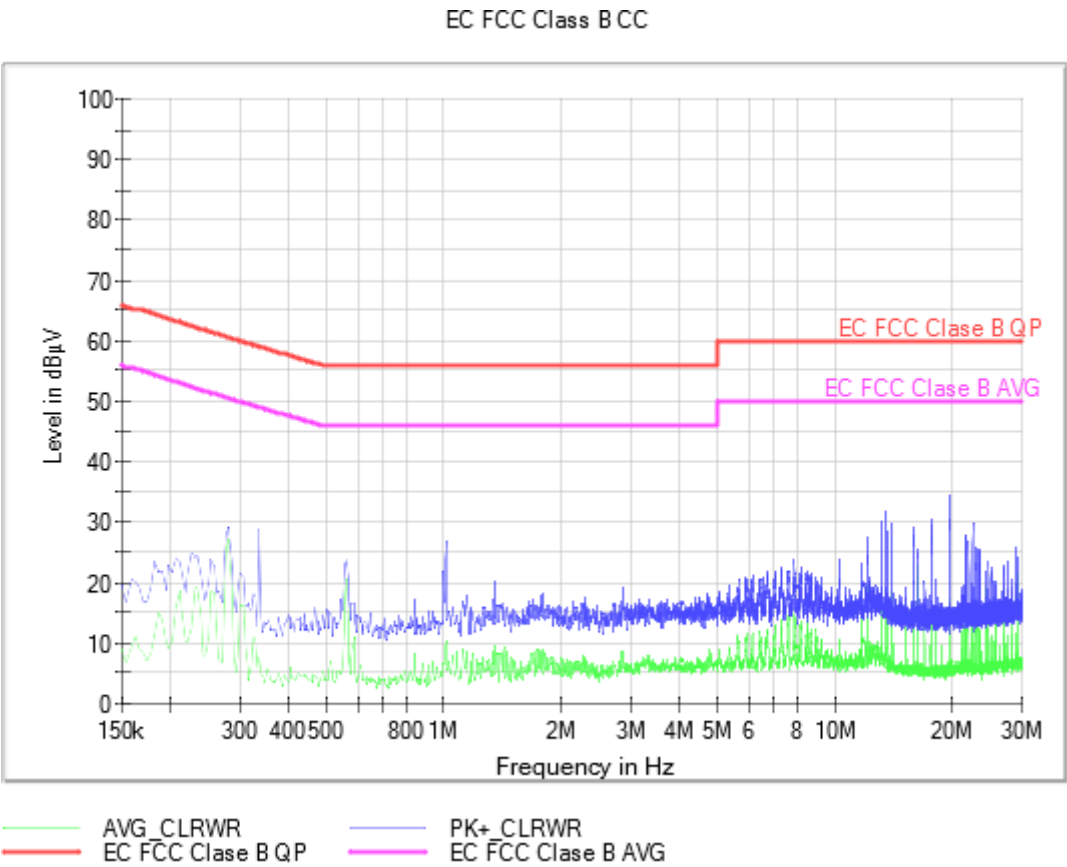
EMC Test Code = CE02020N Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/02. EUT ON. MS in traffic mode. LTE Band 2. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

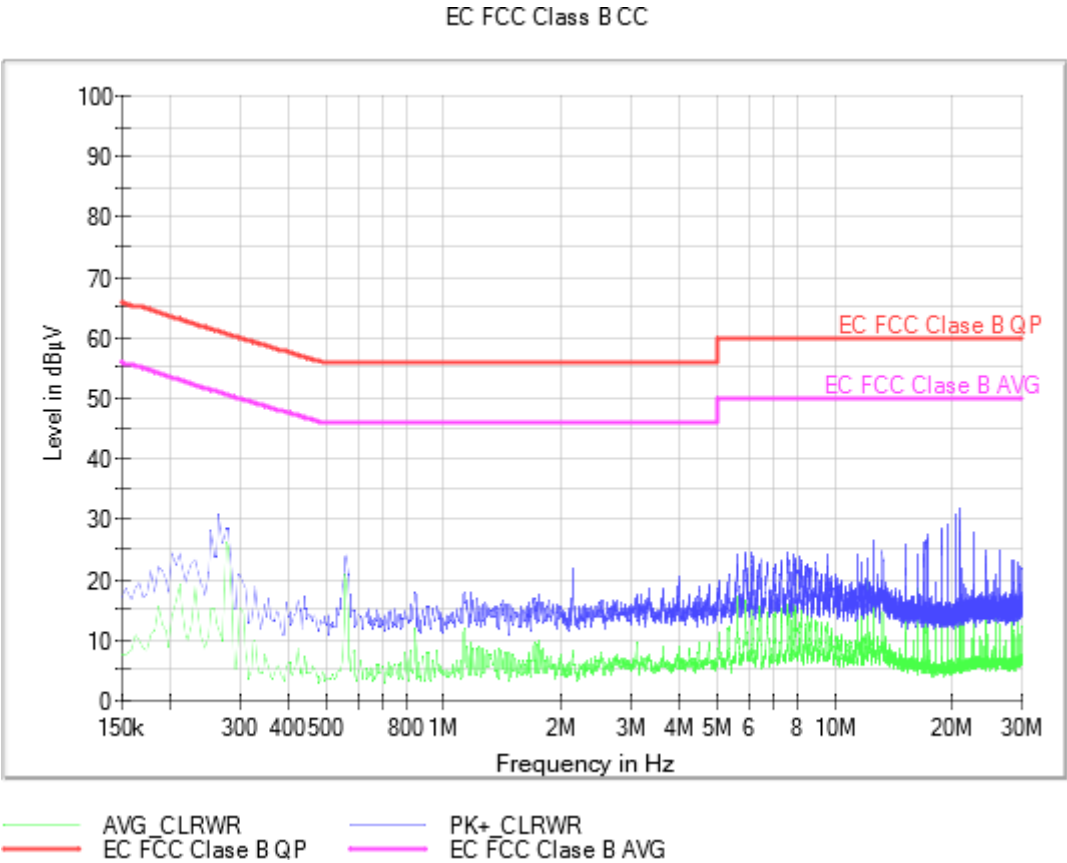
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.226000	24.9	12.6	N	
0.282000	29.3	27.2	N	
0.562000	23.9	20.5	N	
1.014000	26.8	10.2	N	
1.350000	20.1	9.7	N	
2.874000	19.3	7.4	N	
5.898000	20.9	9.9	N	
10.326000	24.1	9.1	N	
13.566000	31.9	15.7	N	
19.642000	34.5	16.0	N	

EMC Test Code = CE0202L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/02. EUT ON. MS in traffic mode. LTE Band 2. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

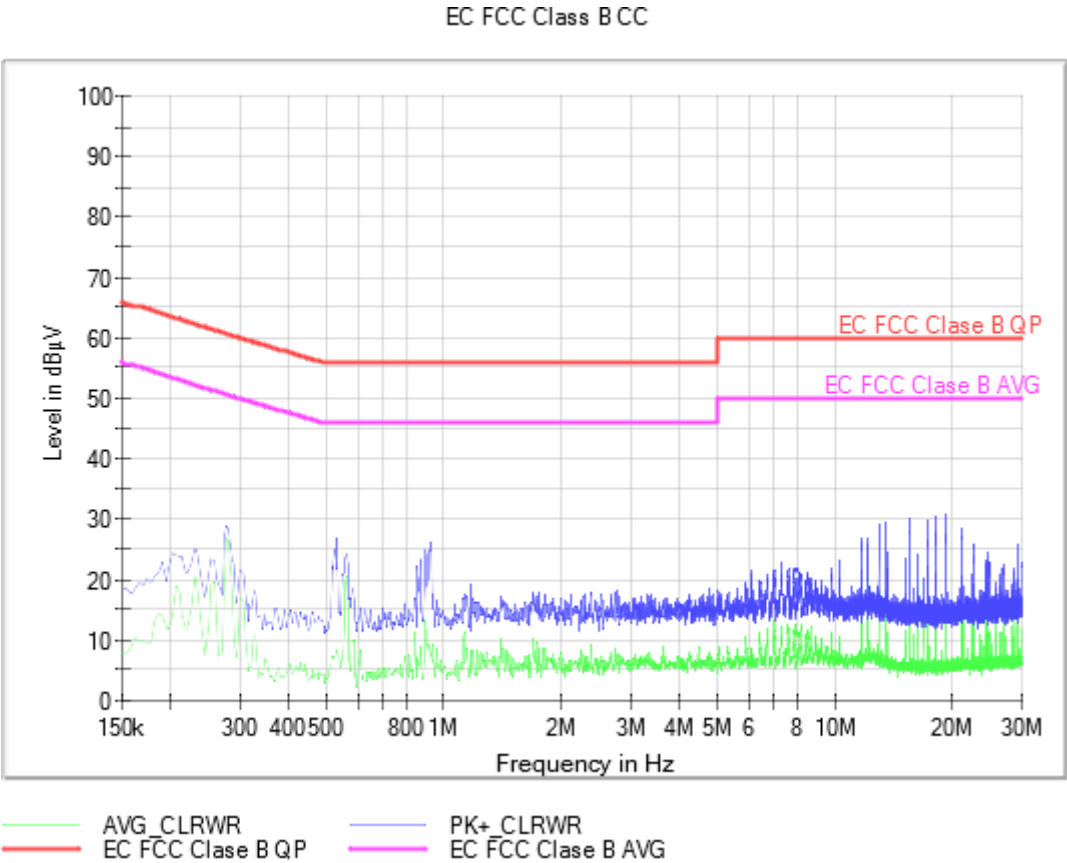
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.254000	28.2	15.0	L1	
0.266000	30.7	11.7	L1	
0.562000	24.0	20.2	L1	
0.838000	18.1	11.6	L1	
1.754000	17.6	9.8	L1	
2.134000	22.2	7.1	L1	
5.874000	24.6	15.3	L1	
6.178000	24.8	14.9	L1	
17.270000	27.6	12.5	L1	
20.886000	32.0	17.4	L1	

EMC Test Code = CE02030N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/03. EUT ON. MS in traffic mode. LTE Band 4. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

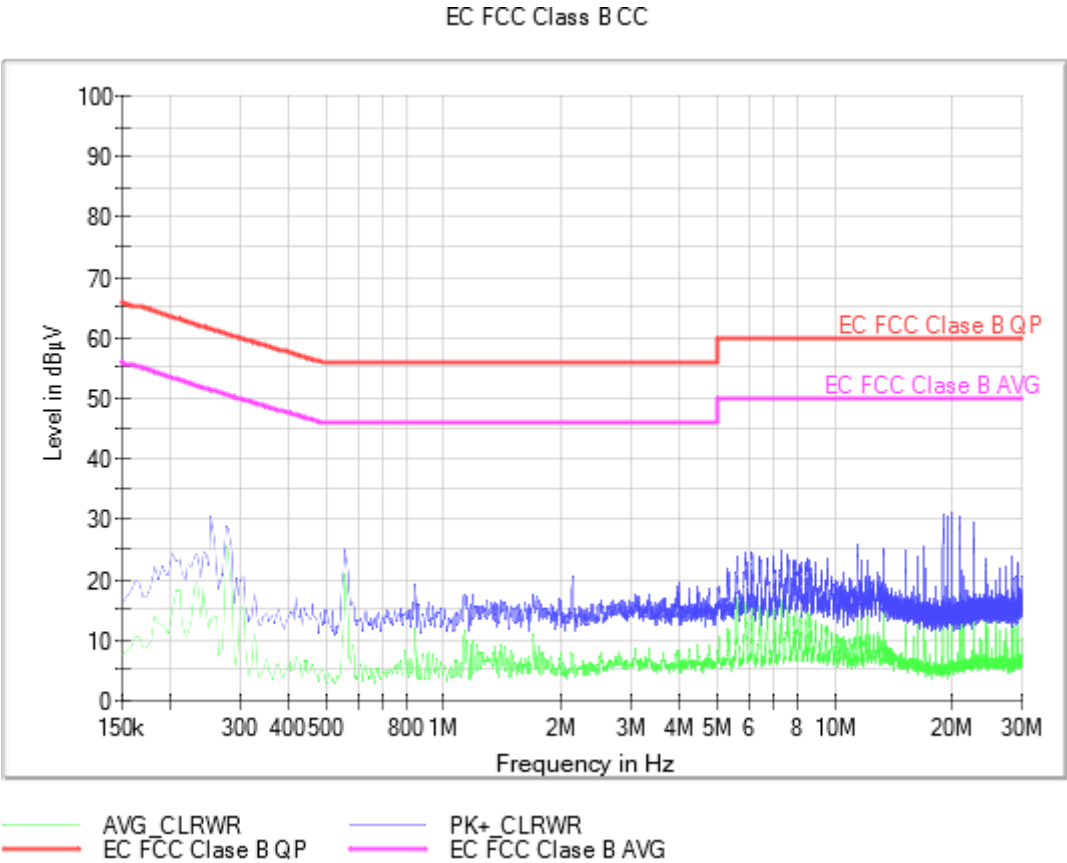
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.230000	25.5	21.0	N	
0.278000	28.7	26.8	N	
0.534000	27.0	8.4	N	
0.930000	26.2	8.2	N	
1.762000	18.3	7.3	N	
2.762000	18.4	7.7	N	
6.114000	21.1	8.7	N	
10.250000	23.5	9.5	N	
15.450000	30.1	13.6	N	
19.182000	30.9	16.4	N	

EMC Test Code = CE0203L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/03. EUT ON. MS in traffic mode. LTE Band 4. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



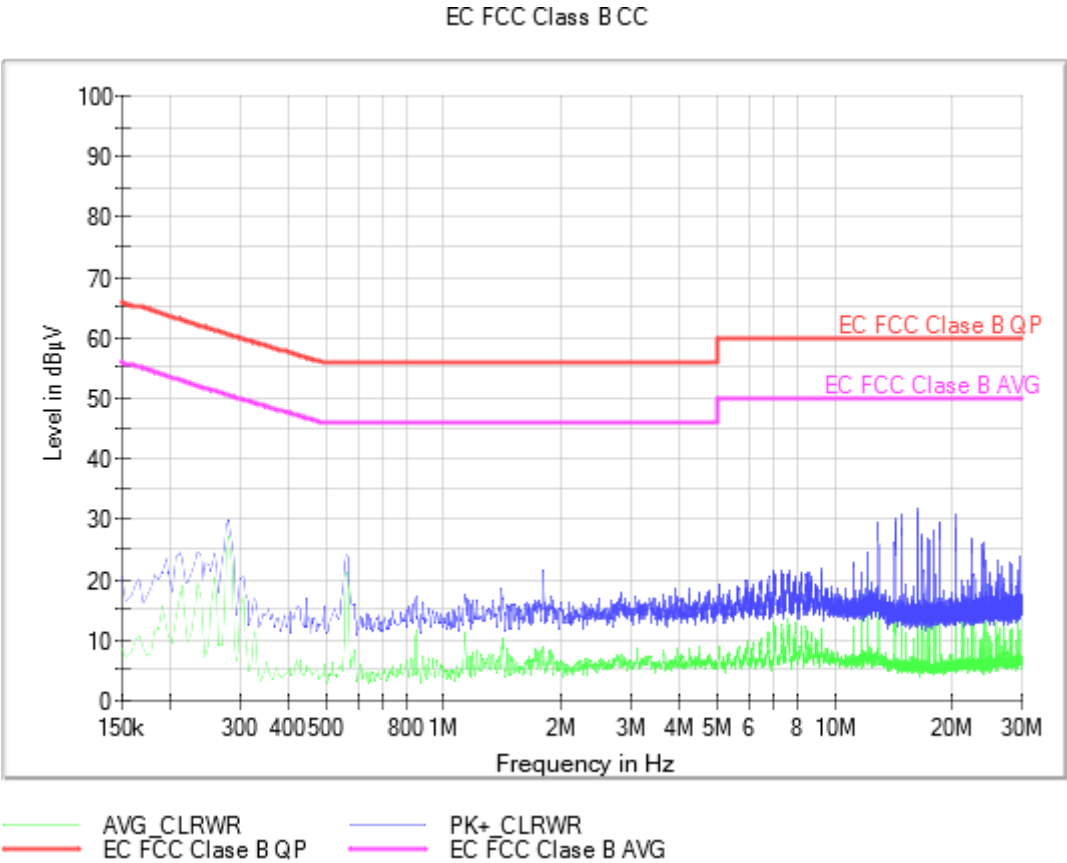
Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.254000	30.4	13.4	L1	
0.278000	28.8	25.7	L1	
0.558000	24.9	20.8	L1	
0.842000	19.1	11.8	L1	
2.118000	18.2	7.4	L1	
2.122000	20.6	7.7	L1	
5.906000	24.7	15.1	L1	
7.290000	25.0	15.3	L1	
11.442000	25.8	13.4	L1	
19.878000	31.3	17.7	L1	

EMC Test Code = CE02040N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02
Operation Mode: OM/04. EUT ON. MS in traffic mode. LTE Band 5. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

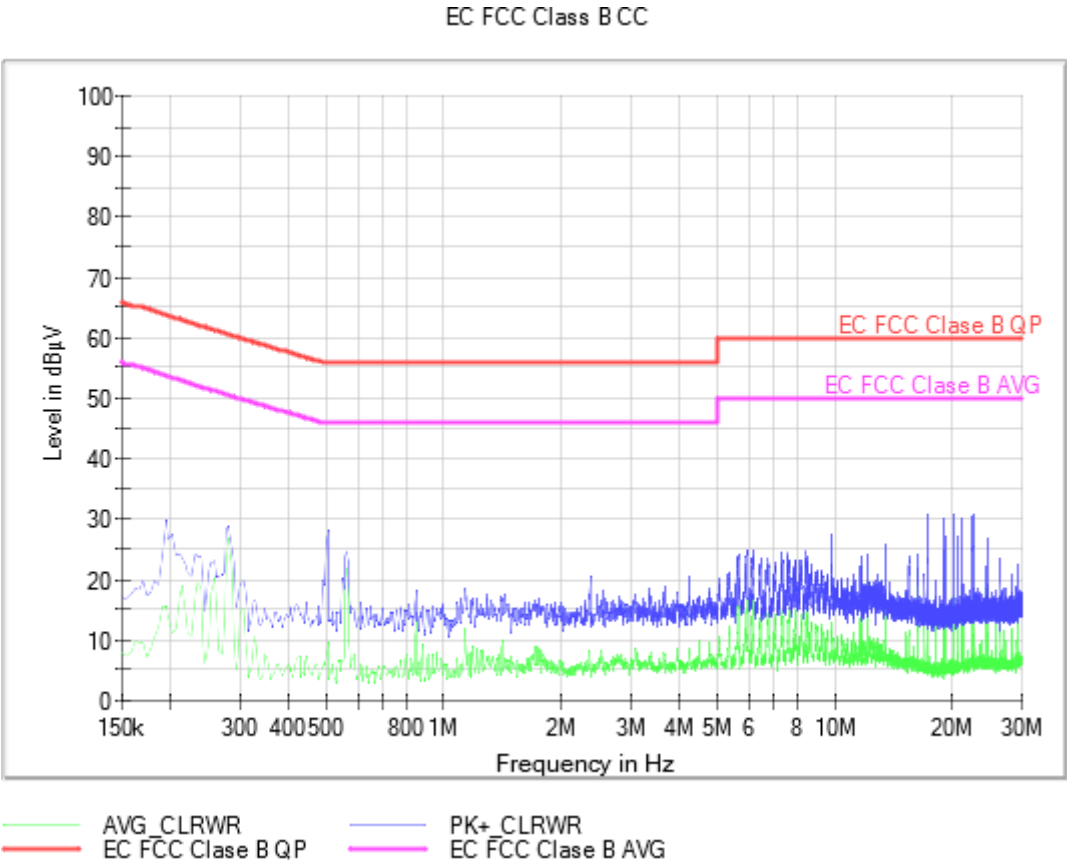
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.234000	24.8	19.7	N	
0.282000	29.7	27.2	N	
0.562000	24.1	21.0	N	
1.126000	17.7	11.4	N	
1.806000	21.3	8.6	N	
2.834000	18.1	7.7	N	
5.934000	20.0	10.1	N	
9.258000	22.1	12.2	N	
16.138000	32.1	16.1	N	
20.454000	31.0	16.4	N	

EMC Test Code = CE0204L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/04. EUT ON. MS in traffic mode. LTE Band 5. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

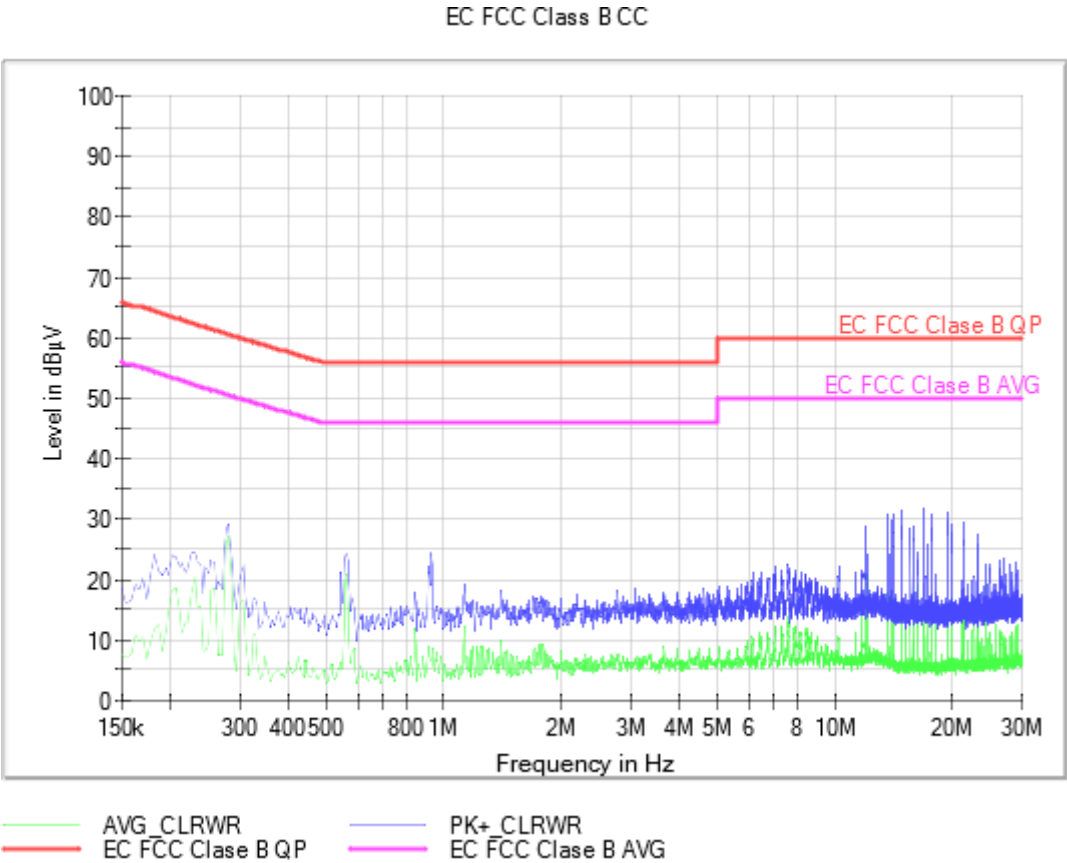
Frequency(MHz)	PK+ _CLRWR(dBµV)	AVG _CLRWR(dBµV)	Line	Comment
0.194000	29.8	15.4	L1	
0.282000	28.7	26.9	L1	
0.506000	28.3	9.7	L1	
1.126000	18.5	12.0	L1	
1.298000	17.7	7.4	L1	
2.378000	20.5	5.7	L1	
5.926000	25.0	15.1	L1	
9.826000	27.7	11.5	L1	
17.294000	30.7	12.7	L1	
20.182000	30.8	17.4	L1	

EMC Test Code = CE02050N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/05. EUT ON. MS in traffic mode. LTE Band 8. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.230000	24.4	20.4	N	
0.282000	29.3	27.1	N	
0.562000	24.3	20.9	N	
0.930000	24.4	6.6	N	
1.406000	18.3	9.8	N	
3.078000	18.6	7.2	N	
5.922000	19.5	10.0	N	
10.226000	22.6	9.4	N	
16.906000	32.0	12.8	N	
19.550000	31.3	15.7	N	

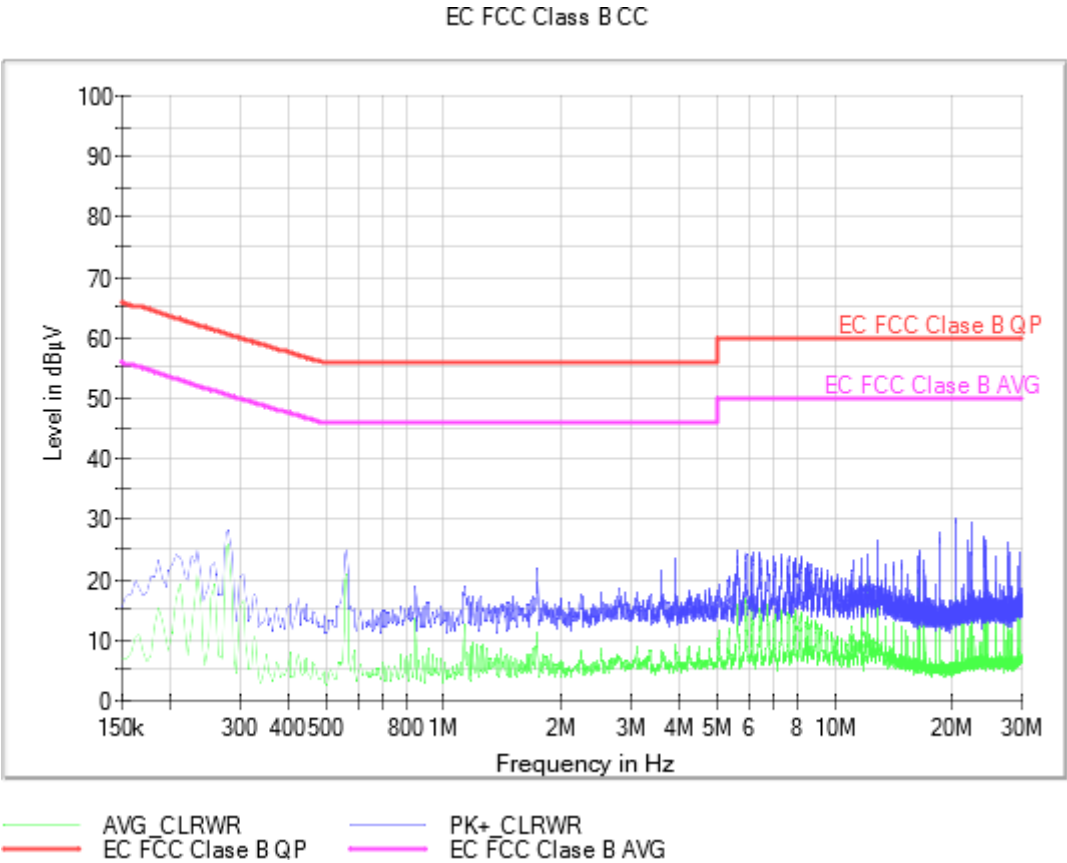
EMC Test Code = CE0205L1 Frequency Range MHz = [0.15, 30]

Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/05. EUT ON. MS in traffic mode. LTE Band 8. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



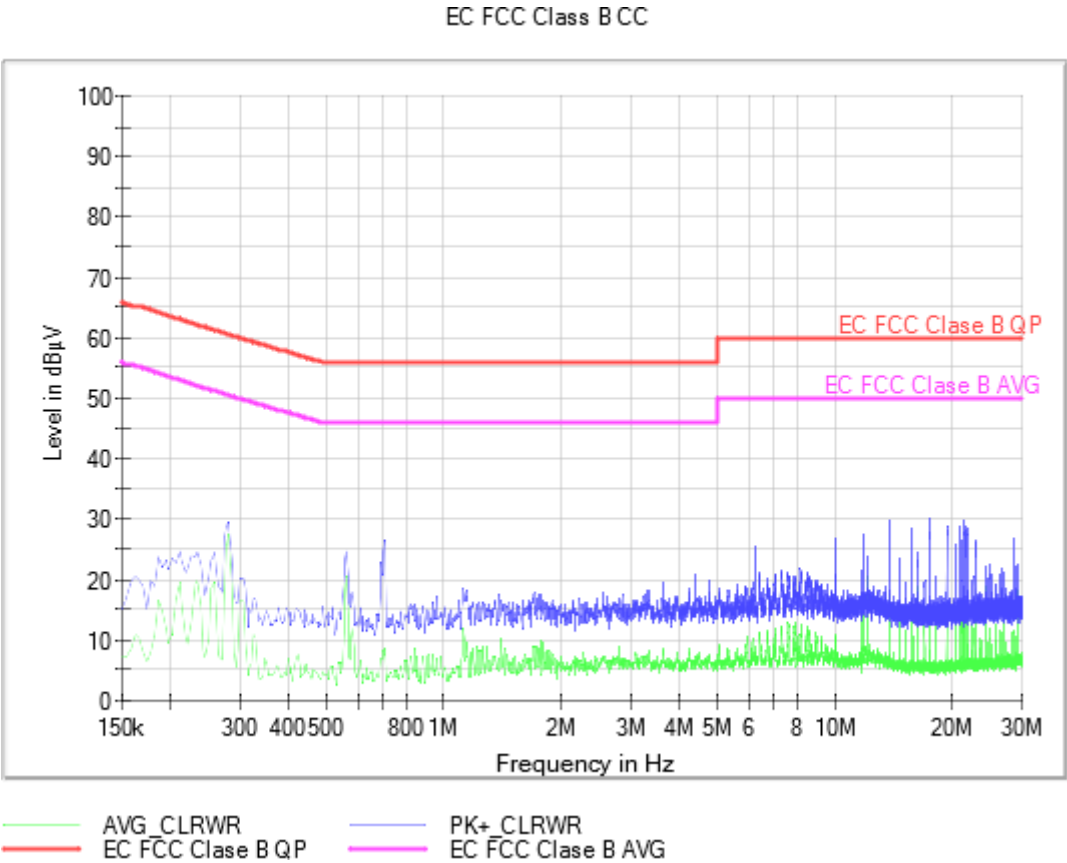
Tables:

Frequency(MHz)	PK+ _CLRWR(dBµV)	AVG _CLRWR(dBµV)	Line	Comment
0.234000	24.9	21.0	L1	
0.282000	28.3	25.9	L1	
0.562000	24.9	20.9	L1	
1.122000	18.9	12.6	L1	
1.746000	21.9	9.0	L1	
2.818000	18.5	7.2	L1	
5.642000	25.0	15.9	L1	
6.202000	24.6	16.4	L1	
12.930000	26.7	16.1	L1	
20.394000	30.2	15.9	L1	

EMC Test Code = CE02060N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02
Operation Mode: OM/06. EUT ON. MS in traffic mode. LTE Band 12. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

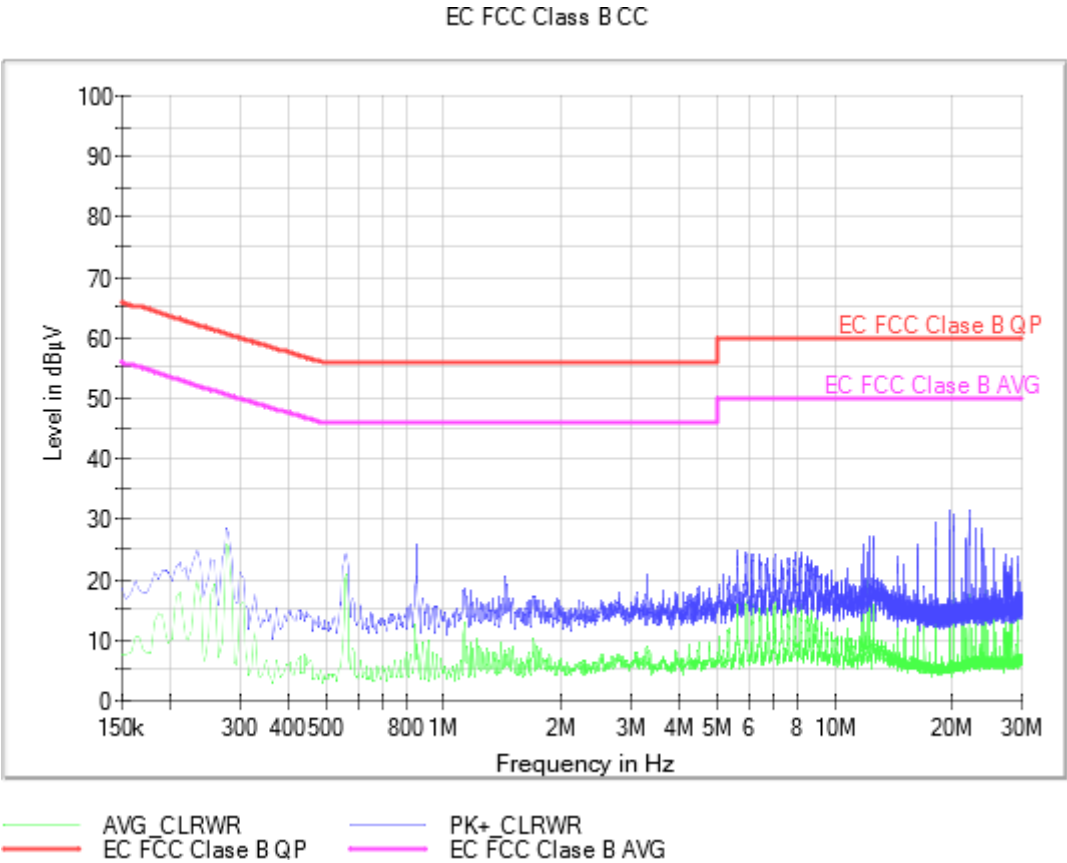
Frequency(MHz)	PK+ _CLRWR(dBµV)	AVG _CLRWR(dBµV)	Line	Comment
0.234000	24.8	20.0	N	
0.282000	29.5	27.5	N	
0.710000	26.6	8.8	N	
1.118000	18.6	11.9	N	
1.710000	18.1	8.9	N	
3.338000	18.3	7.8	N	
4.438000	20.7	7.4	N	
10.050000	26.9	10.7	N	
17.494000	30.2	15.9	N	
21.242000	29.8	16.1	N	

EMC Test Code = CE0206L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/06. EUT ON. MS in traffic mode. LTE Band 12. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

Frequency(MHz)	PK+ CLRWR(dBµV)	AVG CLRWR(dBµV)	Line	Comment
0.234000	25.0	20.0	L1	
0.278000	28.4	26.0	L1	
0.562000	24.4	20.9	L1	
0.858000	26.0	8.2	L1	
1.438000	20.7	7.7	L1	
3.318000	20.8	8.0	L1	
5.618000	24.9	16.1	L1	
7.874000	24.6	15.5	L1	
12.602000	27.3	12.5	L1	
19.690000	31.8	17.7	L1	

EMC Test Code = CE02070N

Frequency Range MHz = [0.15, 30]

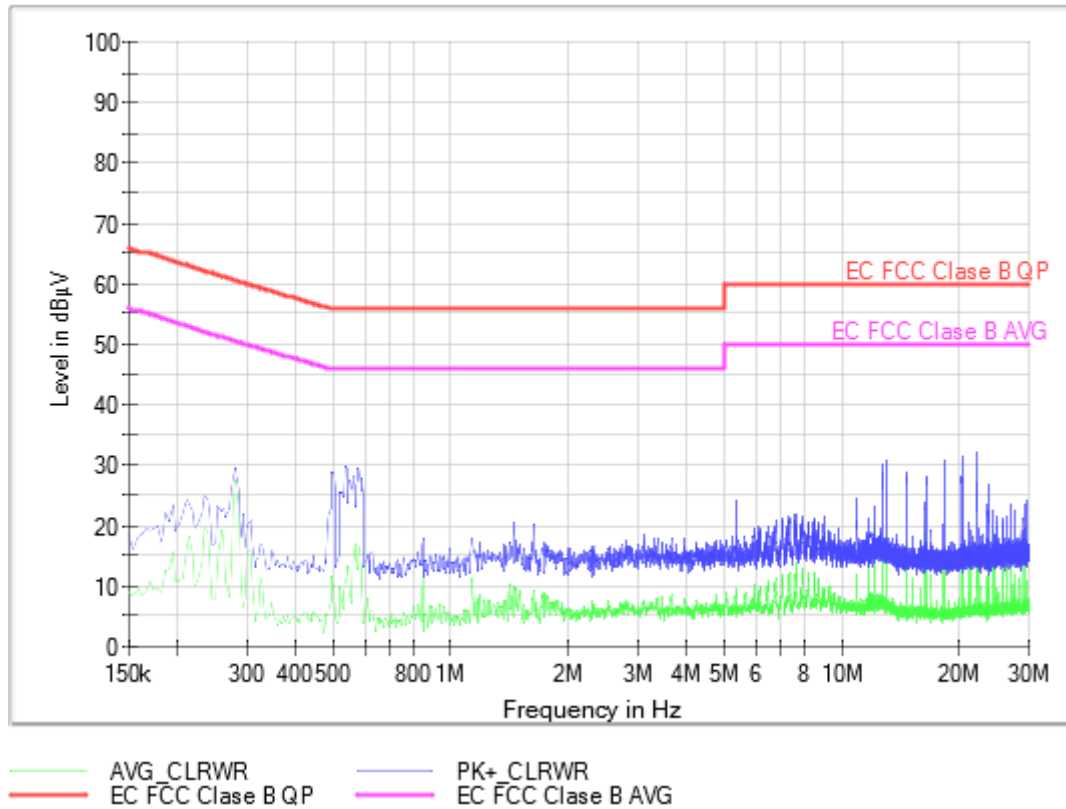
Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/07. EUT ON. MS in traffic mode. LTE Band 13. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:

EC FCC Class B CC

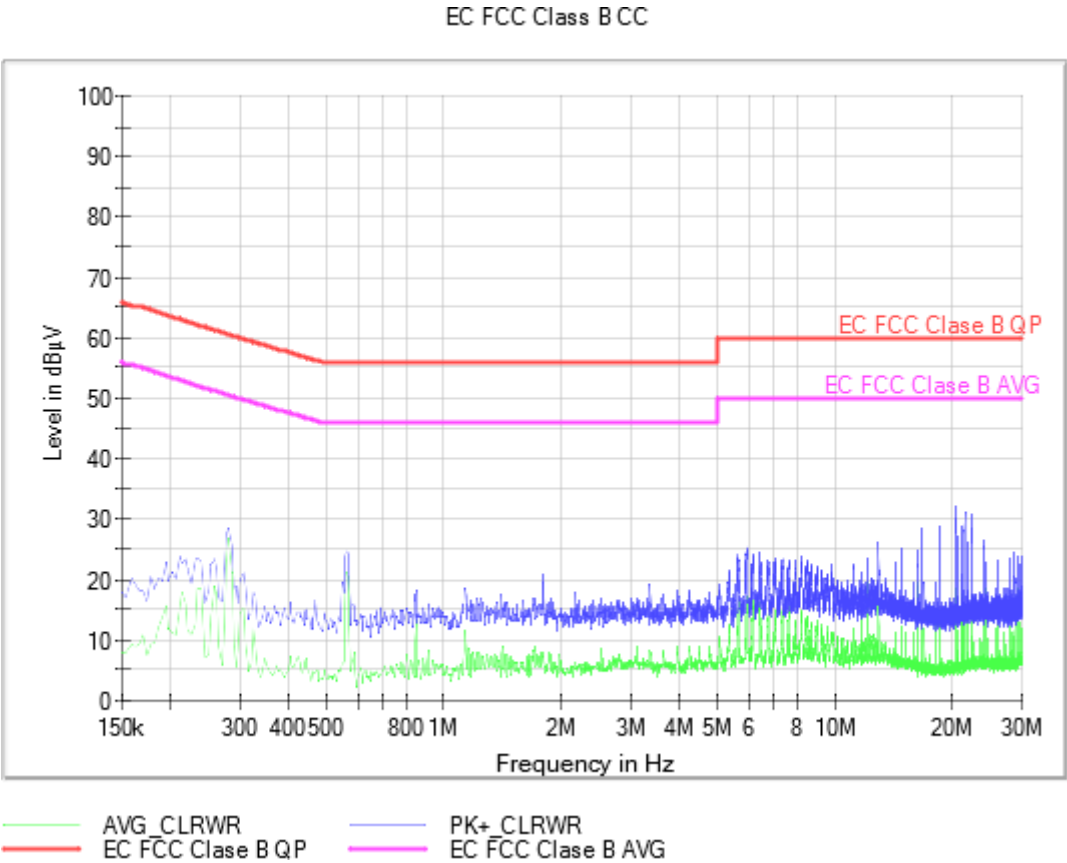


EMC Test Code = CE0207L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/07. EUT ON. MS in traffic mode. LTE Band 13. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

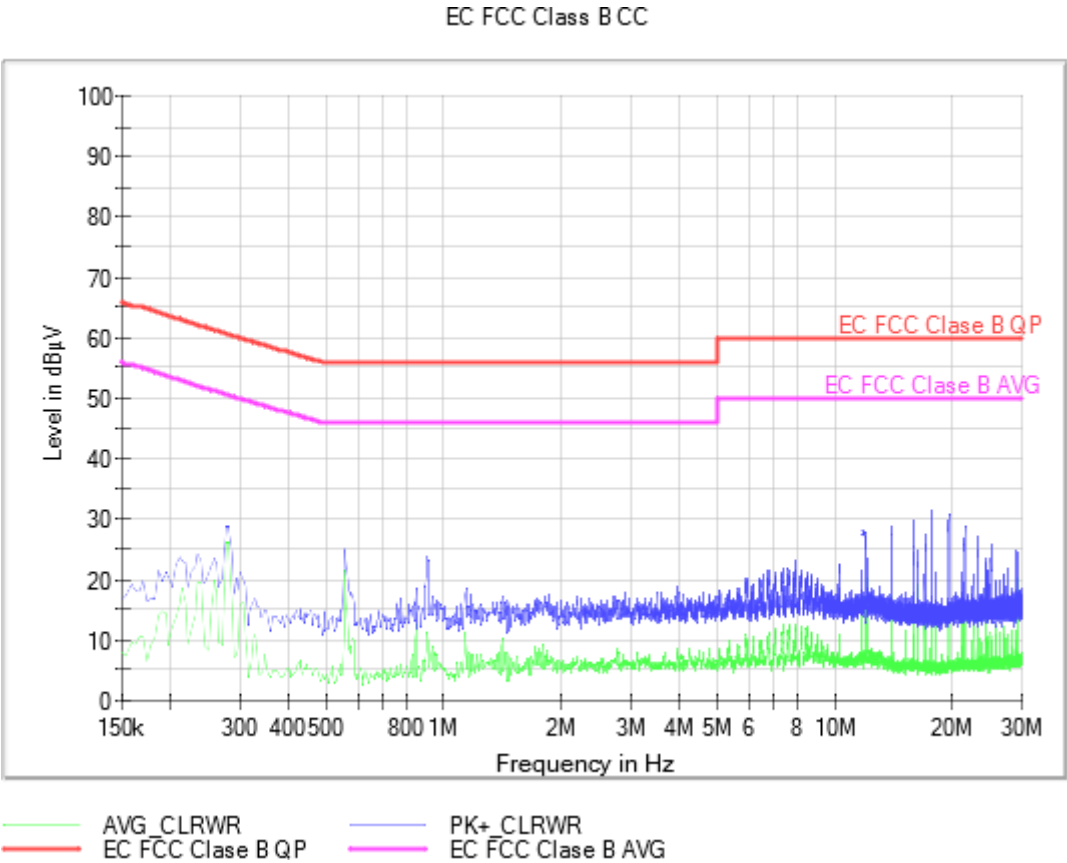
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.210000	23.8	15.3	L1	
0.282000	28.6	26.9	L1	
0.562000	24.5	21.3	L1	
1.130000	18.6	11.1	L1	
1.794000	20.9	7.9	L1	
3.382000	19.2	8.5	L1	
5.918000	25.4	14.5	L1	
6.458000	24.6	14.7	L1	
16.706000	28.6	14.1	L1	
20.446000	32.2	18.6	L1	

EMC Test Code = CE02080N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/08. EUT ON. MS in traffic mode. LTE Band 14. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

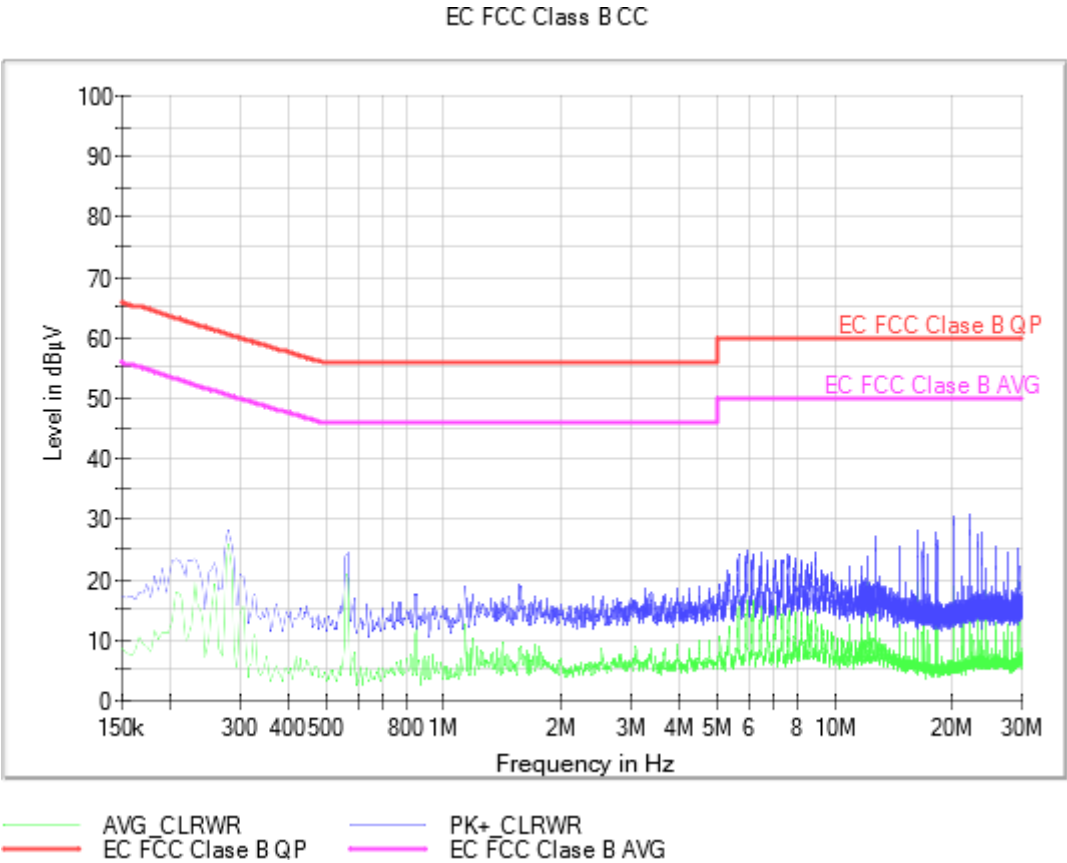
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.234000	24.5	19.7	N	
0.278000	29.0	26.4	N	
0.558000	24.8	21.6	N	
0.910000	23.8	11.3	N	
1.866000	17.7	6.6	N	
3.594000	17.9	6.4	N	
5.946000	20.1	9.1	N	
7.910000	23.3	11.7	N	
15.822000	29.9	15.6	N	
17.706000	31.6	15.9	N	

EMC Test Code = CE0208L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/08. EUT ON. MS in traffic mode. LTE Band 14. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

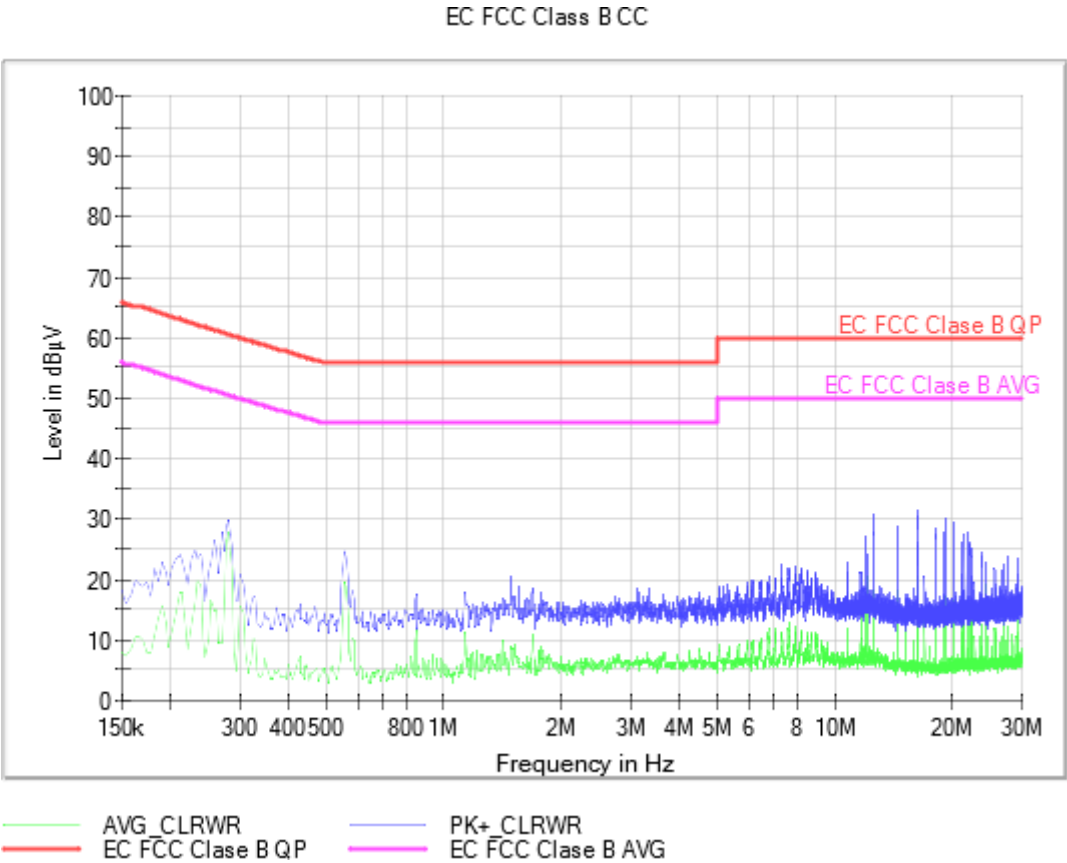
Frequency(MHz)	PK+ _CLRWR(dBµV)	AVG _CLRWR(dBµV)	Line	Comment
0.230000	23.6	19.7	L1	
0.282000	28.3	25.9	L1	
0.566000	24.4	20.0	L1	
1.130000	18.8	12.3	L1	
1.554000	19.4	8.5	L1	
3.294000	18.6	6.7	L1	
5.938000	24.9	17.0	L1	
6.506000	24.8	14.9	L1	
16.466000	28.3	19.0	L1	
22.058000	31.0	16.9	L1	

EMC Test Code = CE02090N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/09. EUT ON. MS in traffic mode. LTE Band 26. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

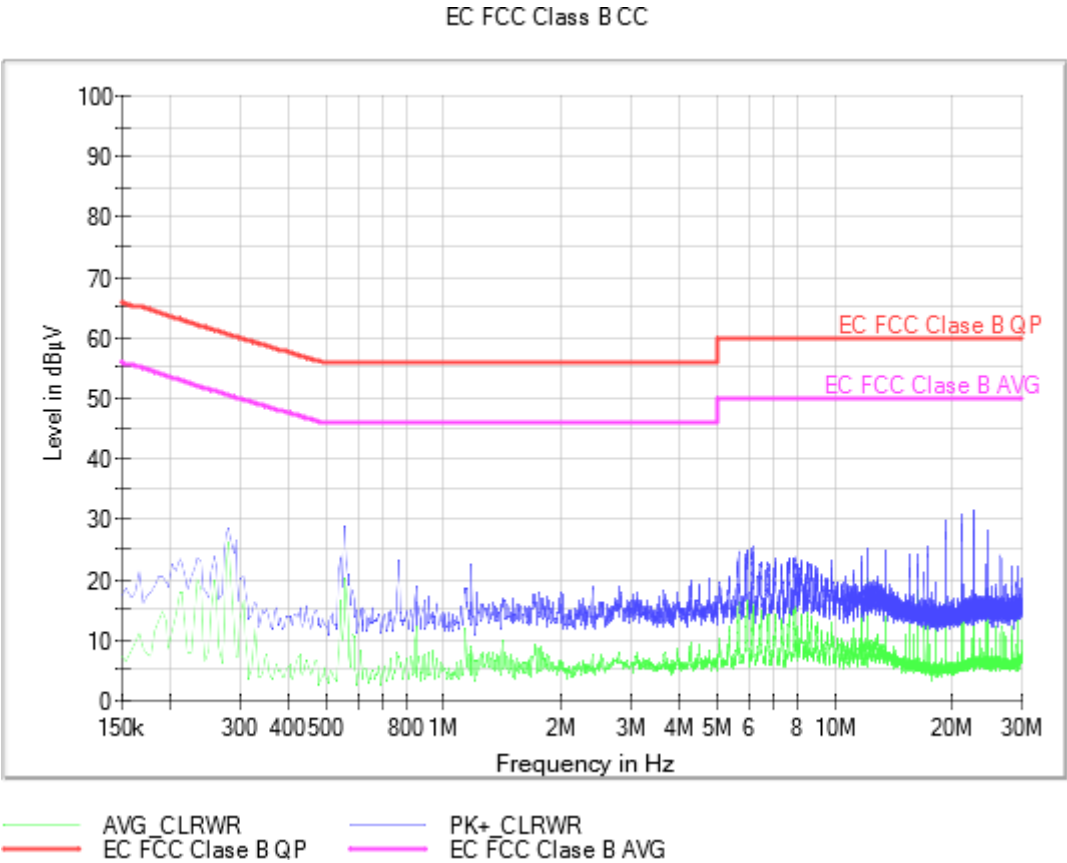
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.230000	25.1	16.4	N	
0.282000	29.7	27.9	N	
0.554000	24.7	19.5	N	
1.126000	17.8	10.5	N	
1.486000	20.6	8.9	N	
3.098000	18.6	7.0	N	
5.954000	19.5	7.5	N	
7.286000	22.6	8.5	N	
16.386000	31.7	16.1	N	
19.146000	30.0	15.0	N	

EMC Test Code = CE0209L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/09. EUT ON. MS in traffic mode. LTE Band 26. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

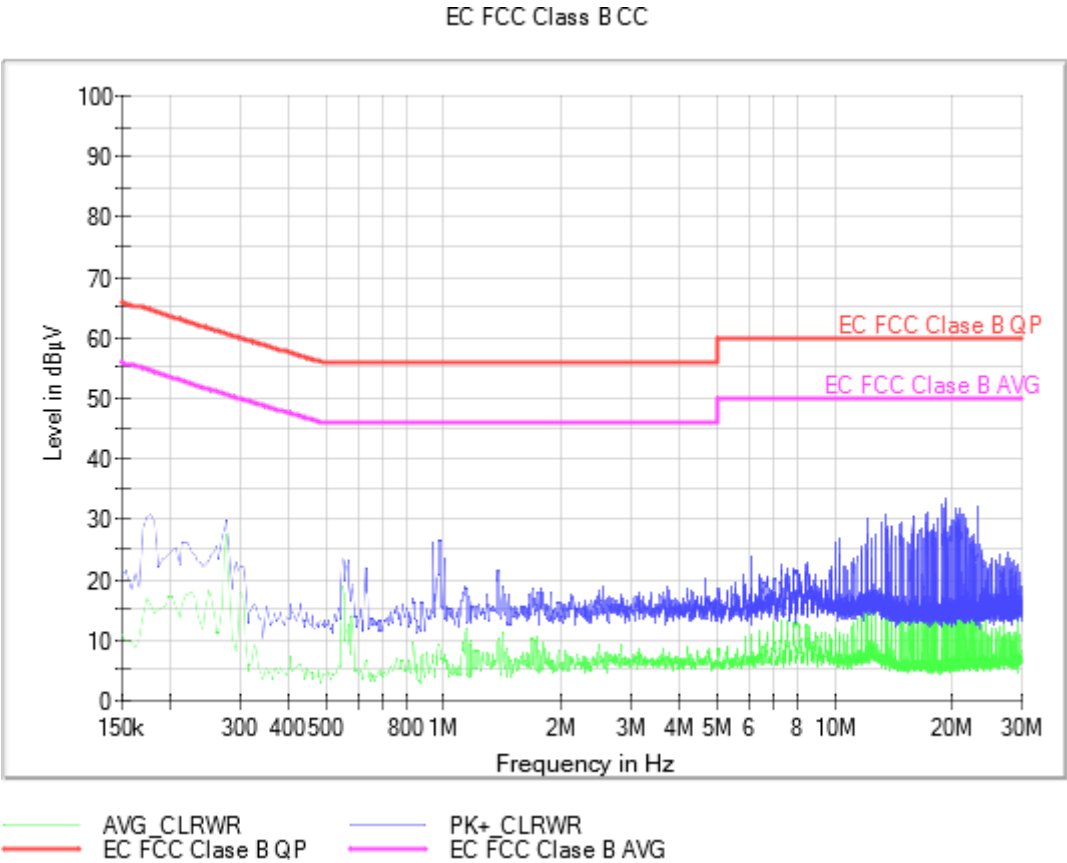
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.234000	23.6	20.2	L1	
0.282000	28.5	26.2	L1	
0.554000	28.8	13.3	L1	
0.766000	23.0	7.5	L1	
1.982000	17.9	6.0	L1	
2.410000	18.8	7.4	L1	
5.942000	24.9	15.6	L1	
6.194000	25.7	16.3	L1	
17.302000	25.6	11.9	L1	
22.894000	31.9	14.1	L1	

EMC Test Code = CE02100N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02

Operation Mode: OM/10. EUT ON. MS in traffic mode. LTE Band 48. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

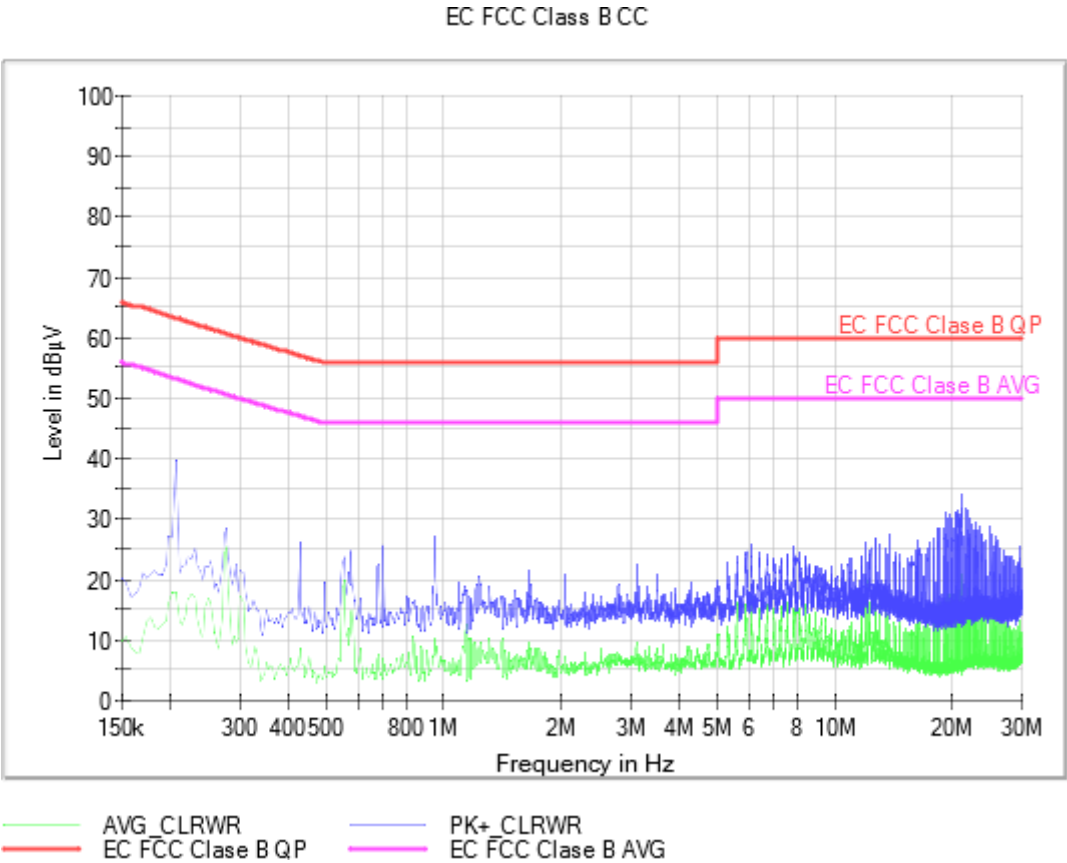
Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.178000	30.7	15.7	N	
0.278000	29.9	27.5	N	
0.550000	23.5	18.9	N	
0.974000	26.5	9.4	N	
1.370000	21.7	8.0	N	
2.562000	19.0	6.9	N	
5.786000	20.8	6.9	N	
10.306000	27.0	9.8	N	
17.426000	31.5	15.8	N	
19.322000	33.7	17.3	N	

EMC Test Code = CE0210L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/10. EUT ON. MS in traffic mode. LTE Band 48. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



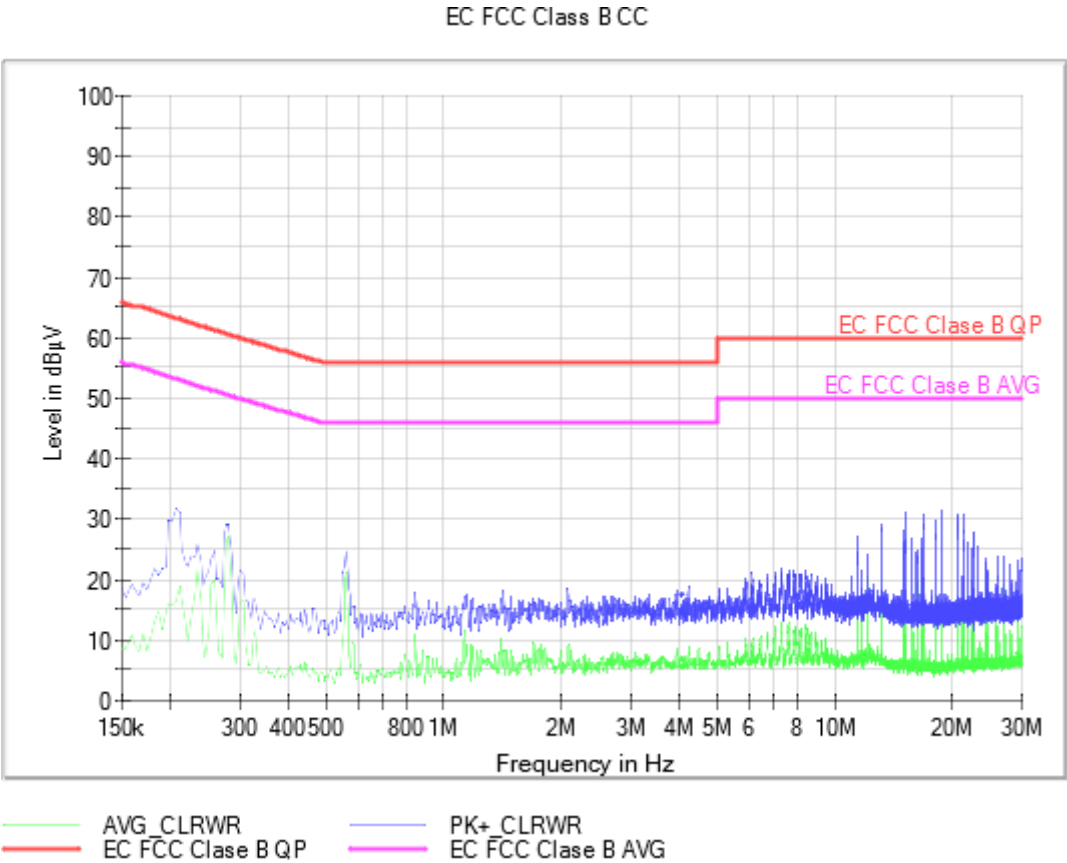
Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.206000	39.8	17.8	L1	
0.278000	28.6	25.3	L1	
0.702000	25.5	7.1	L1	
0.950000	27.3	10.4	L1	
1.650000	21.9	9.0	L1	
3.098000	22.8	9.9	L1	
5.918000	24.6	13.3	L1	
6.166000	25.9	17.8	L1	
13.854000	27.6	12.4	L1	
21.166000	34.3	20.7	L1	

EMC Test Code = CE02110N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02
Operation Mode: OM/11. EUT ON. MS in traffic mode. LTE Band 66. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

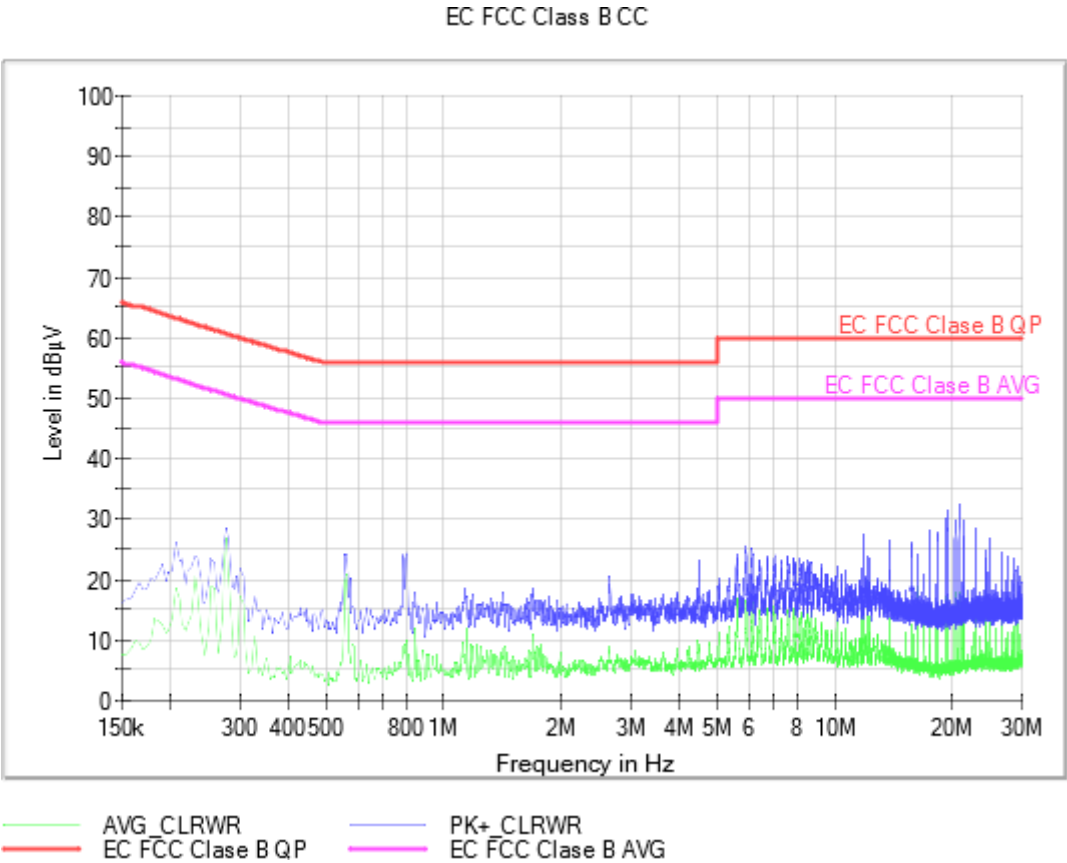
Frequency(MHz)	PK+ _CLRWR(dBµV)	AVG _CLRWR(dBµV)	Line	Comment
0.206000	31.7	16.3	N	
0.282000	29.3	27.1	N	
0.562000	24.6	21.1	N	
0.842000	17.9	10.6	N	
2.066000	18.5	7.7	N	
3.358000	17.5	7.2	N	
5.910000	20.1	10.3	N	
7.322000	22.1	13.2	N	
15.094000	31.3	13.5	N	
18.826000	31.7	16.4	N	

EMC Test Code = CE0211L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02

Operation Mode: OM/11. EUT ON. MS in traffic mode. LTE Band 66. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



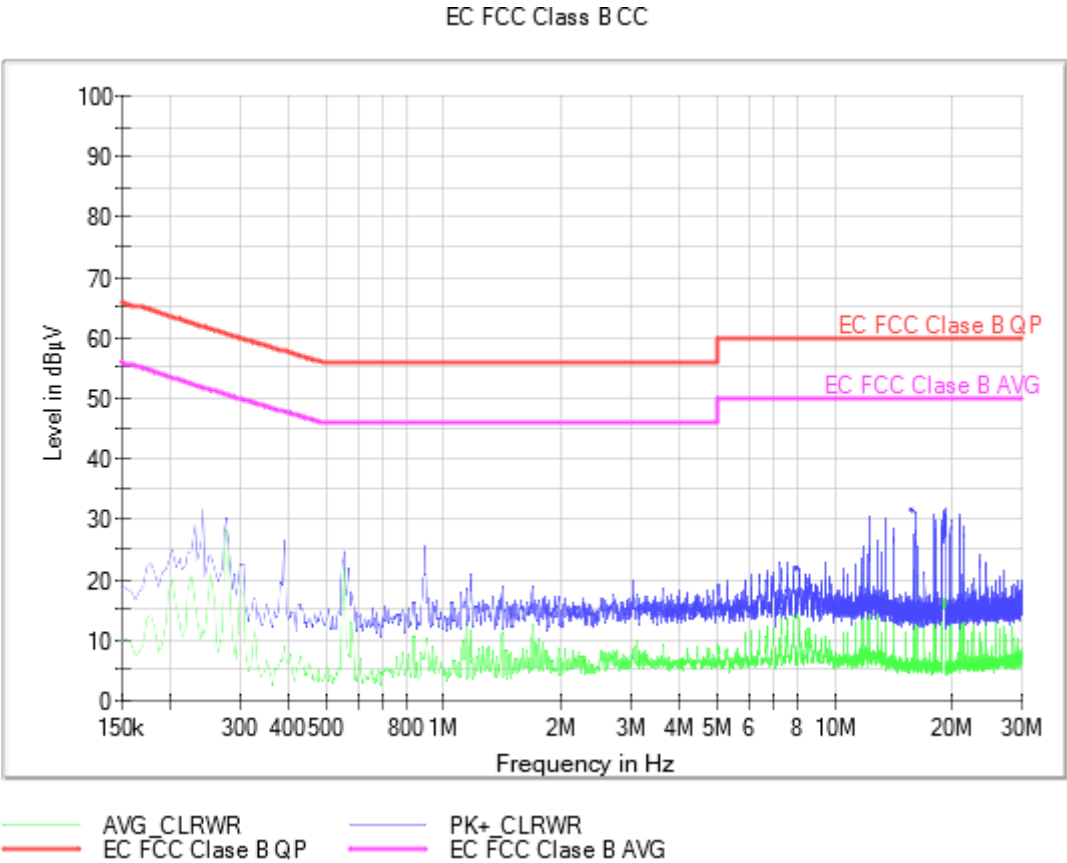
Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.206000	26.2	18.6	L1	
0.278000	28.5	26.8	L1	
0.562000	24.0	20.8	L1	
0.798000	24.3	9.8	L1	
1.694000	18.5	8.1	L1	
2.662000	20.5	8.0	L1	
5.914000	25.5	16.3	L1	
6.186000	25.1	16.3	L1	
17.566000	28.1	14.7	L1	
20.722000	32.7	17.9	L1	

EMC Test Code = CE02120N Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = N

Sample ID: S/02
Operation Mode: OM/12. EUT ON. MS in IDLE mode. LTE Band 2. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



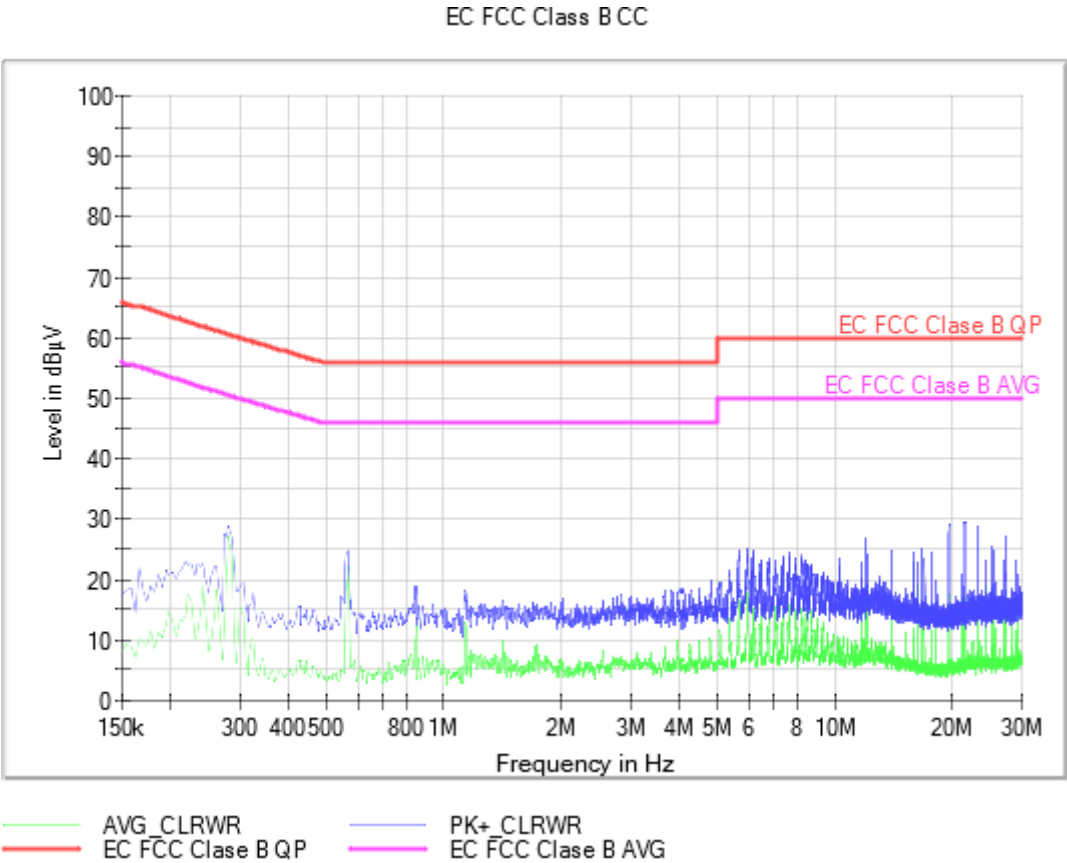
Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.242000	31.7	11.7	N	
0.278000	30.1	28.4	N	
0.554000	24.6	21.8	N	
0.902000	25.7	7.5	N	
1.410000	19.0	11.2	N	
3.042000	20.0	7.7	N	
5.322000	19.9	8.3	N	
9.482000	23.1	9.9	N	
16.070000	31.0	12.8	N	
19.142000	32.0	16.6	N	

EMC Test Code = CE0212L1 Frequency Range MHz = [0.15, 30]
Conducted Emissions - Tested Line = L1

Sample ID: S/02
Operation Mode: OM/12. EUT ON. MS in IDLE mode. LTE Band 2. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz. Test arrangement for conducted emissions of tabletop equipment.

Images:



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	Comment
0.218000	23.0	14.2	L1	
0.282000	28.7	27.1	L1	
0.566000	24.6	22.0	L1	
0.838000	19.0	8.5	L1	
2.022000	16.9	6.3	L1	
2.850000	17.6	7.0	L1	
5.946000	25.4	16.3	L1	
6.246000	25.1	14.6	L1	
12.110000	26.8	15.0	L1	
21.434000	29.5	16.5	L1	

RE Radiated emission. Electromagnetic field measure

Limits

The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-21 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(μ V/m)	(dB μ V/m)	(μ V/m)	(dB μ V/m)	(dB μ V/m)	(dB μ V/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

Limits according to FCC Part 15B, equal to o more stringent than those of ICES-003 Issue 7.

Results

SI	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR	[1000, 12750]	P

Verdict

Pass

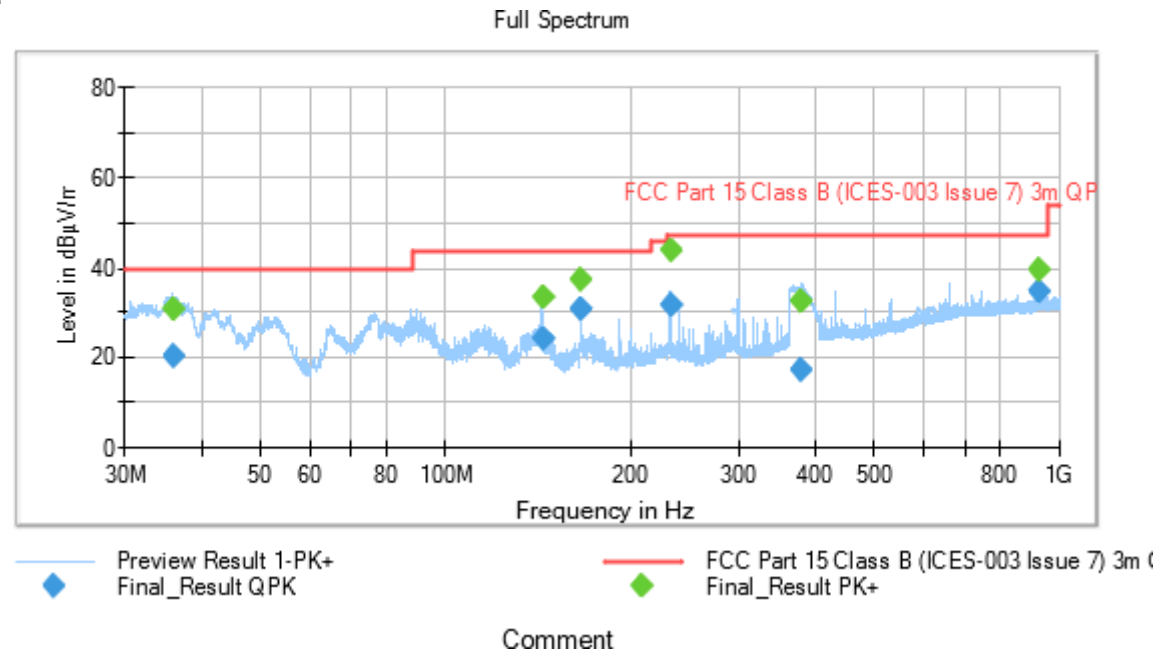
Attachments

EMC Test Code = RE0101LR Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Equipment transferring data to an auxiliary laptop via USB. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz.

Images:



Tables:

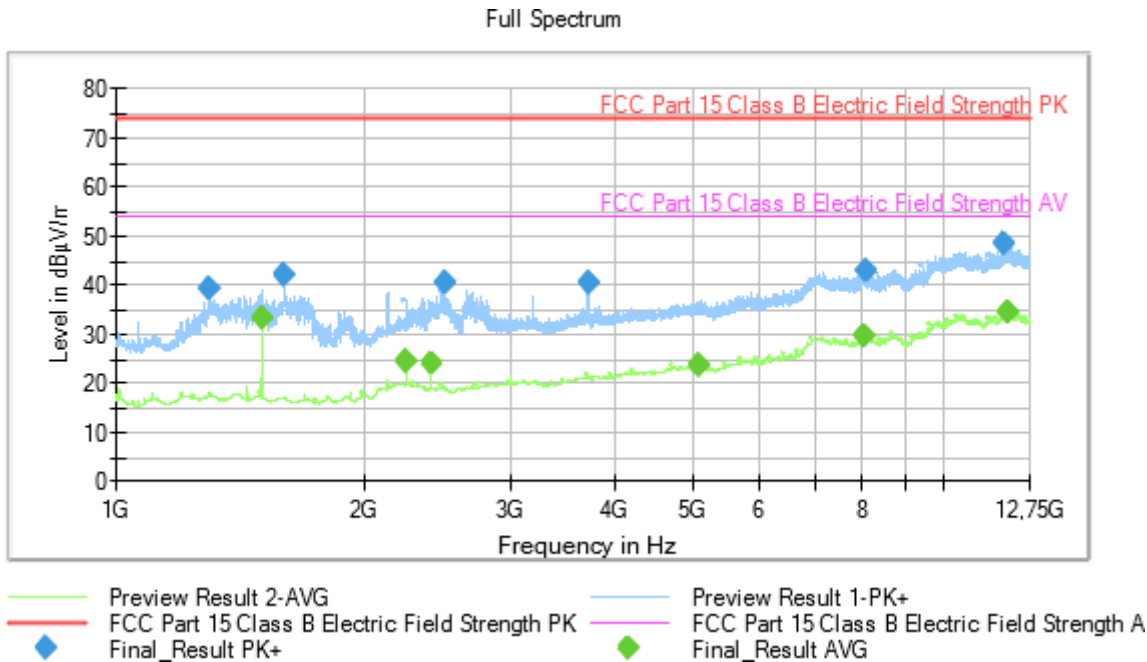
Frequency(MHz)	QuasiPeak(dBµV/m)	MaxPeak(dBµV/m)	Limit(dBµV/m)	Margin(dB)	Height(cm)	Po l	Azimuth(deg)
35.952000	---	30.52	---	---	129.0	V	124.0
35.952000	20.03	---	40.00	19.97	129.0	V	124.0
144.019000	24.18	---	43.52	19.34	162.0	H	76.0
144.019000	---	33.14	---	---	162.0	H	76.0
166.273000	---	37.08	---	---	132.0	H	61.0
166.273000	30.71	---	43.52	12.81	132.0	H	61.0
232.798000	---	43.80	---	---	184.0	H	66.0
232.798000	31.43	---	47.00	15.57	184.0	H	66.0
381.542000	---	32.42	---	---	118.0	H	-106.0
381.542000	17.06	---	47.00	29.94	118.0	H	-106.0
927.542000	34.61	---	47.00	12.39	161.0	V	-80.0
927.542000	---	39.48	---	---	161.0	V	-80.0

EMC Test Code = RE0101HR Frequency Range MHz = [1000, 12750]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. Equipment transferring data to an auxiliary laptop via USB. Power supply of EUT: 5Vdc (through USB port). Laptop power supply: 115Vac, 60Hz.

Images:



Tables:

Frequency(MHz)	MaxPeak(dBµV/m)	Average(dBµV/m)	Limit(dBµV/m)	Margin(dB)
1291.750000	39.20	---	73.97	34.77
1500.000000	---	33.07	53.97	20.90
1595.250000	42.18	---	73.97	31.79
2240.750000	---	24.24	53.97	29.73
2400.000000	---	23.96	53.97	30.01
2496.750000	40.59	---	73.97	33.38
3724.750000	40.59	---	73.97	33.38
5059.250000	---	23.53	53.97	30.44
8056.250000	---	29.79	53.97	24.18
8065.250000	42.80	---	73.97	31.17
11899.750000	48.49	---	73.97	25.48
12019.750000	---	34.55	53.97	19.42