

Test report No:
 75461REM.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 Cat1-bis module
(*) Trademark	Sequans Communications
(*) Model and /or type reference	GC02S1-NA2
Other identification of the product	Not provided data
(*) Features	Features: 4G LTE module 3GPP 4G Release 14, LTE Category CAT1_BIS One antenna port Bands supported : 2, 4, 5, 12, 13, 14, 17, 25, B66 [MFBI] is supported : 25[2]/66[4]/12[17]/13/14/5 LGA Module Dual (U)SIM Card Interface SMS over IMS or NAS 10Mbps / 5Mbps DL/UL throughput HW version: Rev1 SW version: LR9.0.1.1-59215 FCC ID: 2AAGMGC02SA IC: 12732A-GC02SA
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
Date of issue	2023-11-08
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
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.
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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 Cat1-bis module. The Calliope 2 GC02S1 modules are based on Sequans's second-generation Calliope 2 silicon and delivers optimized 4G LTE Cat 1 connectivity for IoT, M2M and consumer devices such as wearables and hearables that require voice support and speed higher than LTE-M.

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	75461B_12.1	Antenna cable			2023-07-21	Element Under Test
S/01	75461B_2.1	Antenna	OmniLOG 90200	20200100260	2023-07-21	Element Under Test
S/01	75461B_6.1	Module Circuit Board	GC02S1-NA2		2023-07-21	Element Under Test
S/01	--	Keyboard for ANSI Laptop				Auxiliary Element
S/01	--	AC/DC for ANSIS Laptop				Auxiliary Element
S/01	CTC-6644-Z	Laptop for ANSI setup				Auxiliary Element
S/01	MO-4127-I	Mouse for ANSI Laptop				Auxiliary Element

Note: pre-scan determines that external antenna is the worst case in terms of spurious emissions.

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..... :	Not provided data						
Rated power supply	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
	[X]	DC: 3.2 to 5.5 V					
Rated Power	Not provided data						
Clock frequencies.....	Not provided data						
Other parameters	Not provided data						
Software version	LR9.0.1.1-59215						
Hardware version	Rev1						
Dimensions in cm (W x H x D)	21 x 1.8 x 19.5 mm						
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			
	Not provided data				
Accessories (not part of the test item)	Description		Type	Manufacturer			
	USB Cables		USB			
	Antennas		Antenna			
Documents as provided by the applicant	Description		File name	Issue date			
	Not provided data				

⁽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)	2023-07-21
Date (finish)	2023-07-21

Document history

Report number	Date	Description
75461REM.001	2023-11-08	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: Victor Aguilera.

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
6666	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2024-03-04
6607	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2024-04-18
5779	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2024-04-18
7743	HORN ANTENNA 0,75-18GHz	3115	ETS LINDGREN	2023-09-24
6815	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2025-03-04
7614	SEMIANECHOIC ABSORBER LINED CHAMBER V	FACT 3 200 STP	ETS LINDGREN	--
4848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--
6142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2024-06-28
9360	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2024-07-25

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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PHOTOGRAPHS	¡ERROR! MARCADOR NO DEFINIDO.

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. EUT connected via USB, keyboard and mouse charging ports. 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 12. 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 13. 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 14. 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 17. 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 25. 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 66. 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 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.

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

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

S/	OM	Code	Freq Rng (MHz)	Line	V
01	OM/02	CE01020N	[0.15, 30]	N	P
01	OM/02	CE0102L1	[0.15, 30]	L1	P
01	OM/03	CE01030N	[0.15, 30]	N	P
01	OM/03	CE0103L1	[0.15, 30]	L1	P
01	OM/04	CE01040N	[0.15, 30]	N	P
01	OM/04	CE0104L1	[0.15, 30]	L1	P
01	OM/05	CE01050N	[0.15, 30]	N	P
01	OM/05	CE0105L1	[0.15, 30]	L1	P
01	OM/06	CE01060N	[0.15, 30]	N	P
01	OM/06	CE0106L1	[0.15, 30]	L1	P
01	OM/07	CE01070N	[0.15, 30]	N	P
01	OM/07	CE0107L1	[0.15, 30]	L1	P
01	OM/08	CE01080N	[0.15, 30]	N	P
01	OM/08	CE0108L1	[0.15, 30]	L1	P
01	OM/09	CE01090N	[0.15, 30]	N	P
01	OM/09	CE0109L1	[0.15, 30]	L1	P
01	OM/10	CE01100N	[0.15, 30]	N	P
01	OM/10	CE0110L1	[0.15, 30]	L1	P
01	OM/11	CE01110N	[0.15, 30]	N	P
01	OM/11	CE0111L1	[0.15, 30]	L1	P

Verdict

Pass

Attachments

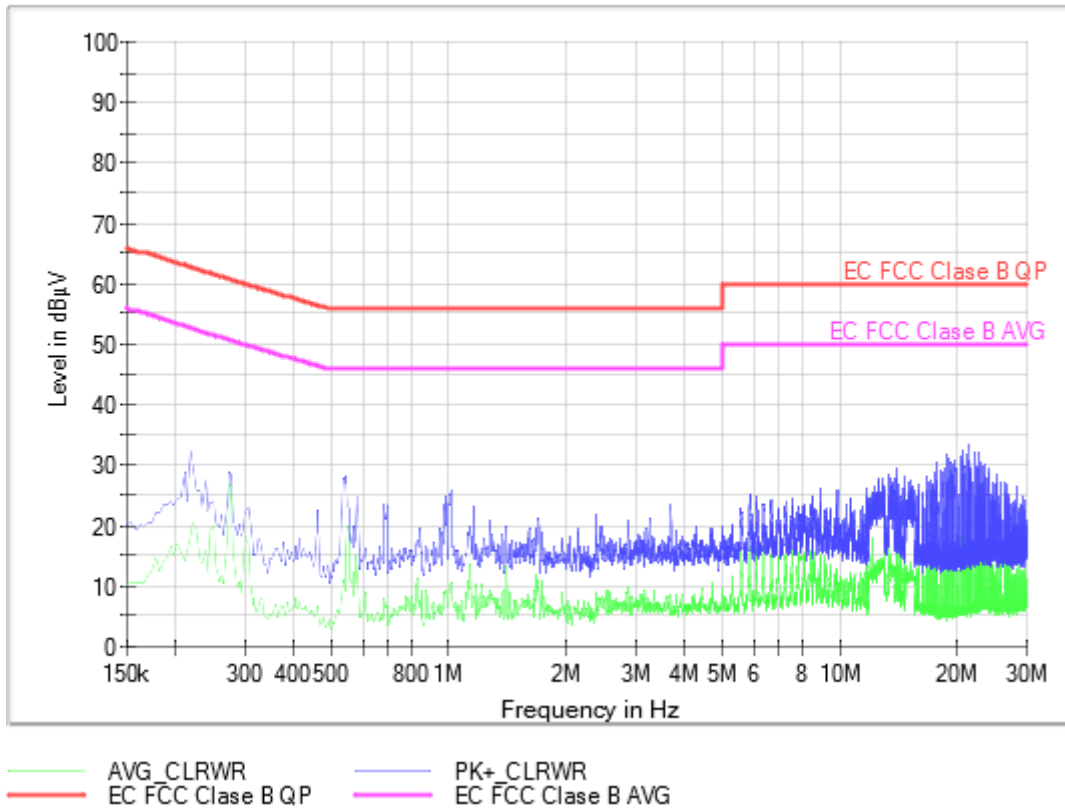
EMC Test Code = CE01020N Frequency Range MHz = [0.15, 30]
 Conducted Emissions - Tested Line = N

Sample ID: S/01

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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.218000	32.3	18.2	N	GND	10.3	
0.274000	28.8	26.8	N	GND	10.3	
0.546000	28.2	16.4	N	GND	10.4	
1.014000	26.0	10.5	N	GND	10.4	
1.706000	21.1	11.0	N	GND	10.4	
2.394000	22.1	8.7	N	GND	10.4	
5.858000	25.5	16.2	N	GND	10.5	
9.006000	26.4	11.3	N	GND	10.6	
13.946000	29.4	17.2	N	GND	10.8	
21.434000	33.4	18.6	N	GND	10.9	

EMC Test Code = CE0102L1

Frequency Range MHz = [0.15, 30]

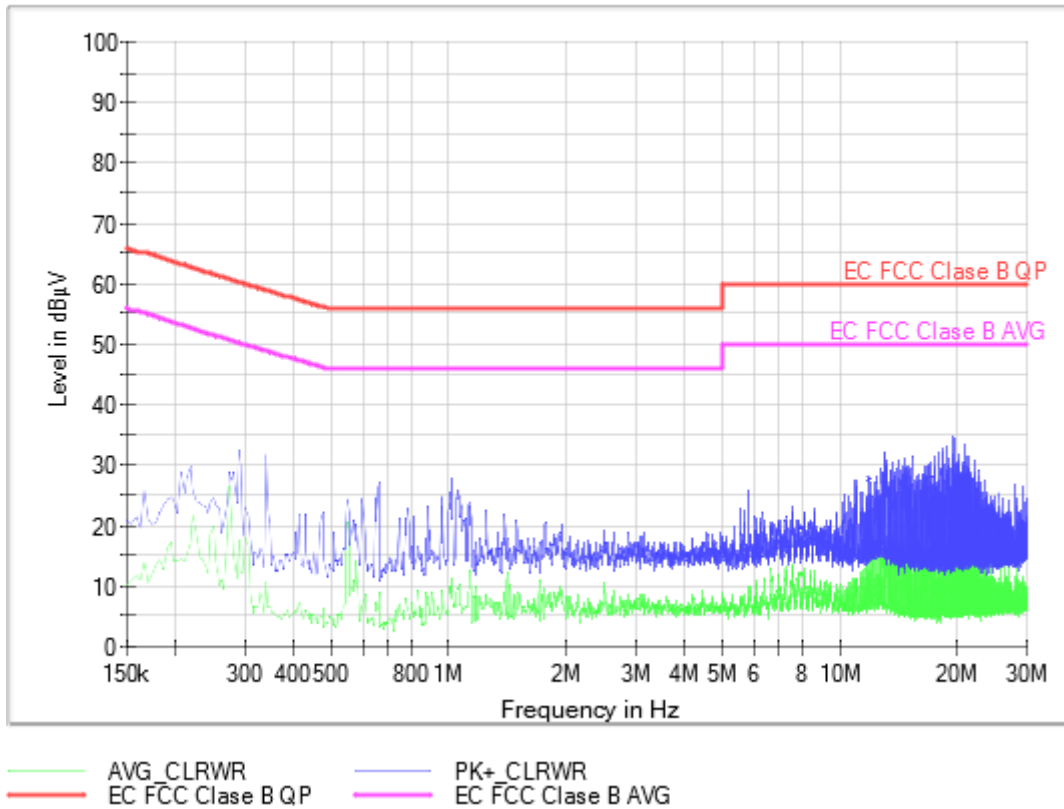
Conducted Emissions - Tested Line = L1

Sample ID: S/01

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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.218000	29.7	17.2	L1	GND	10.2	
0.290000	32.4	17.6	L1	GND	10.2	
0.666000	27.2	8.9	L1	GND	10.2	
1.018000	27.8	11.3	L1	GND	10.2	
1.254000	22.3	8.3	L1	GND	10.2	
2.506000	19.3	10.5	L1	GND	10.3	
5.814000	25.8	9.8	L1	GND	10.4	
10.262000	25.4	9.0	L1	GND	10.4	
13.102000	32.3	15.9	L1	GND	10.5	
19.446000	35.1	16.0	L1	GND	10.7	

EMC Test Code = CE01030N

Frequency Range MHz = [0.15, 30]

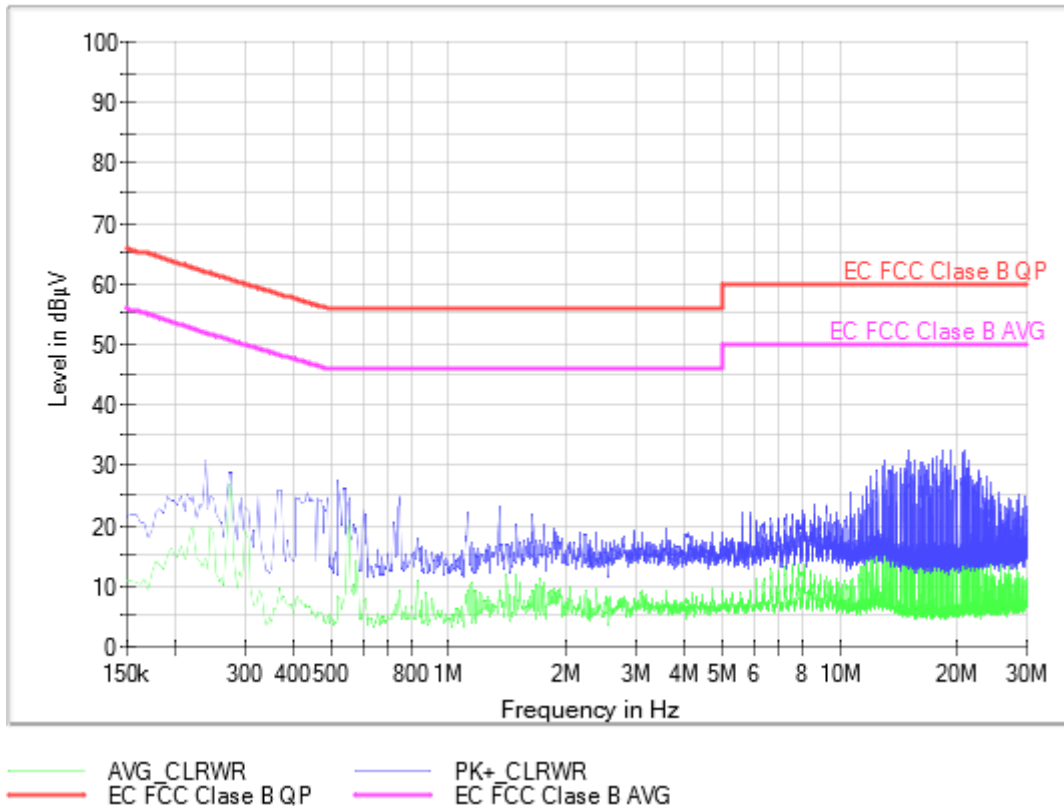
Conducted Emissions - Tested Line = N

Sample ID: S/01

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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.238000	30.9	14.7	N	GND	10.3	
0.278000	28.9	25.9	N	GND	10.3	
0.522000	27.7	8.3	N	GND	10.4	
0.750000	24.7	7.2	N	GND	10.4	
1.346000	23.1	9.4	N	GND	10.4	
2.966000	19.3	8.1	N	GND	10.4	
5.898000	22.6	8.3	N	GND	10.5	
8.646000	23.7	11.1	N	GND	10.6	
14.986000	32.7	13.7	N	GND	10.9	
19.198000	32.8	15.8	N	GND	10.9	

EMC Test Code = CE0103L1

Frequency Range MHz = [0.15, 30]

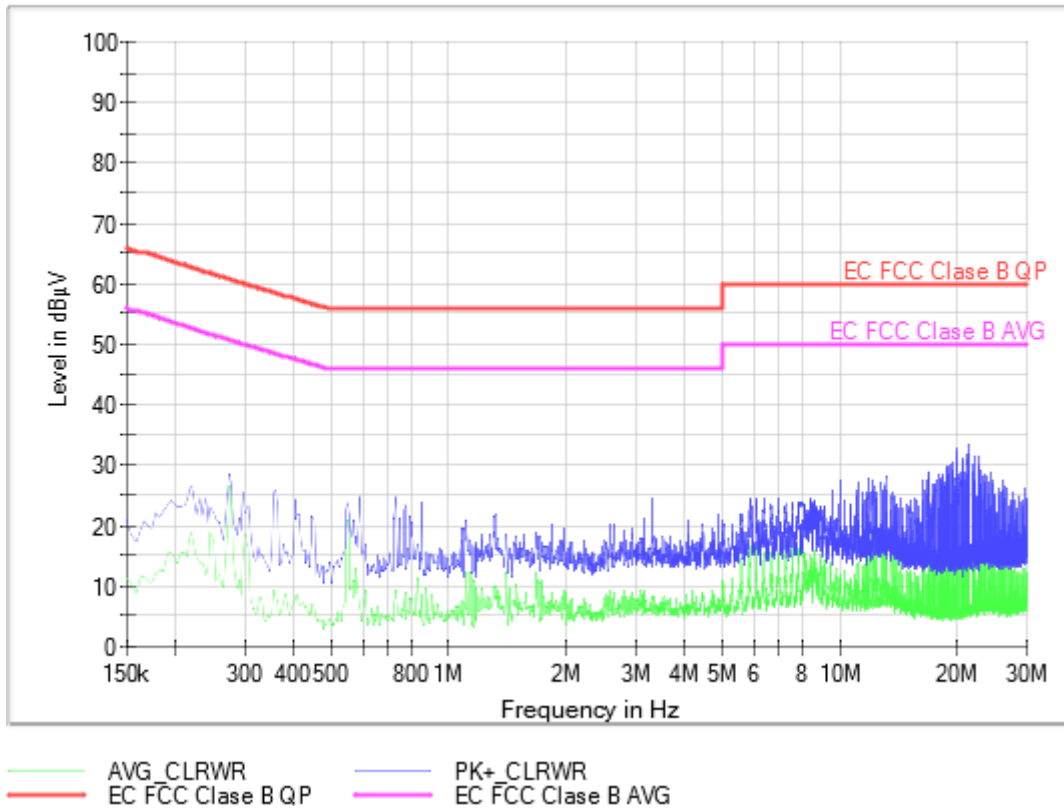
Conducted Emissions - Tested Line = L1

Sample ID: S/01

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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.218000	26.7	19.0	L1	GND	10.2	
0.274000	28.4	26.7	L1	GND	10.2	
0.590000	24.8	6.8	L1	GND	10.2	
0.850000	24.0	8.0	L1	GND	10.2	
1.318000	21.8	10.0	L1	GND	10.2	
3.322000	24.6	8.5	L1	GND	10.3	
5.874000	24.8	15.7	L1	GND	10.4	
10.058000	27.5	12.1	L1	GND	10.4	
17.034000	28.9	13.1	L1	GND	10.6	
21.410000	33.7	18.8	L1	GND	10.7	

EMC Test Code = CE01040N Frequency Range MHz = [0.15, 30]

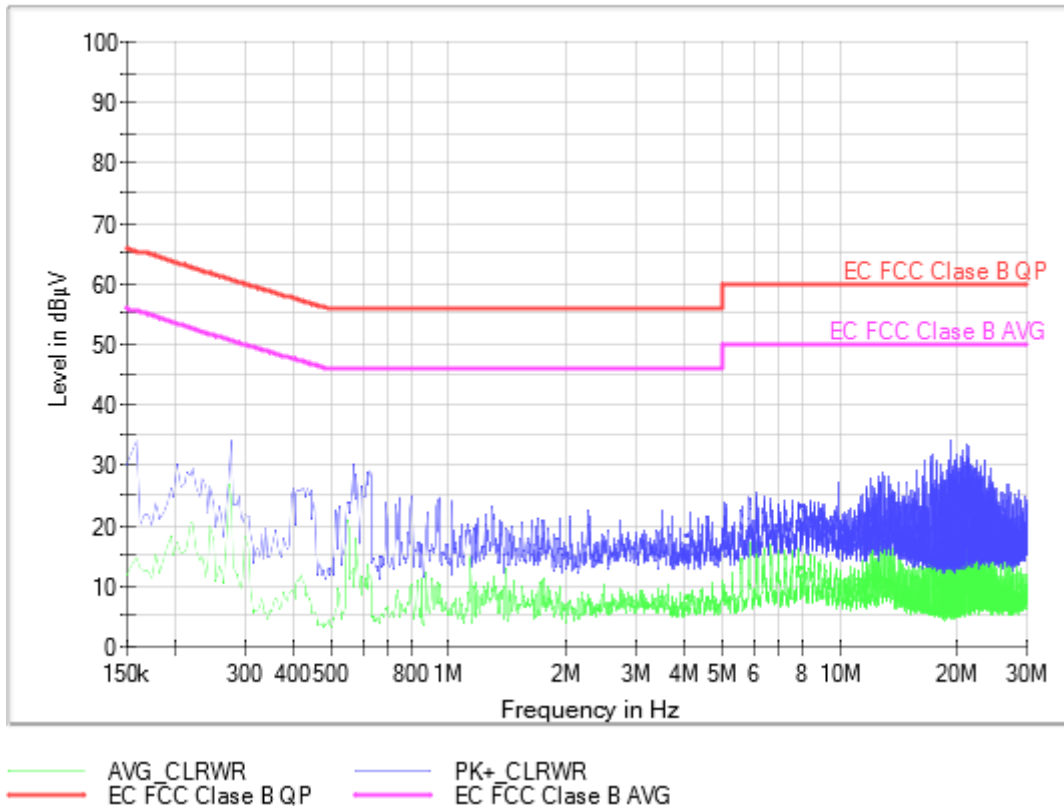
Conducted Emissions - Tested Line = N

Sample ID: S/01

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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.158000	34.0	14.7	N	GND	10.3	
0.278000	34.0	24.5	N	GND	10.3	
0.566000	30.2	13.0	N	GND	10.4	
0.798000	25.1	10.1	N	GND	10.4	
1.298000	23.2	9.2	N	GND	10.4	
3.514000	22.8	9.3	N	GND	10.5	
5.866000	24.6	16.6	N	GND	10.5	
9.938000	27.3	10.1	N	GND	10.6	
17.382000	32.2	14.3	N	GND	10.9	
19.262000	34.2	15.7	N	GND	10.9	

EMC Test Code = CE0104L1

Frequency Range MHz = [0.15, 30]

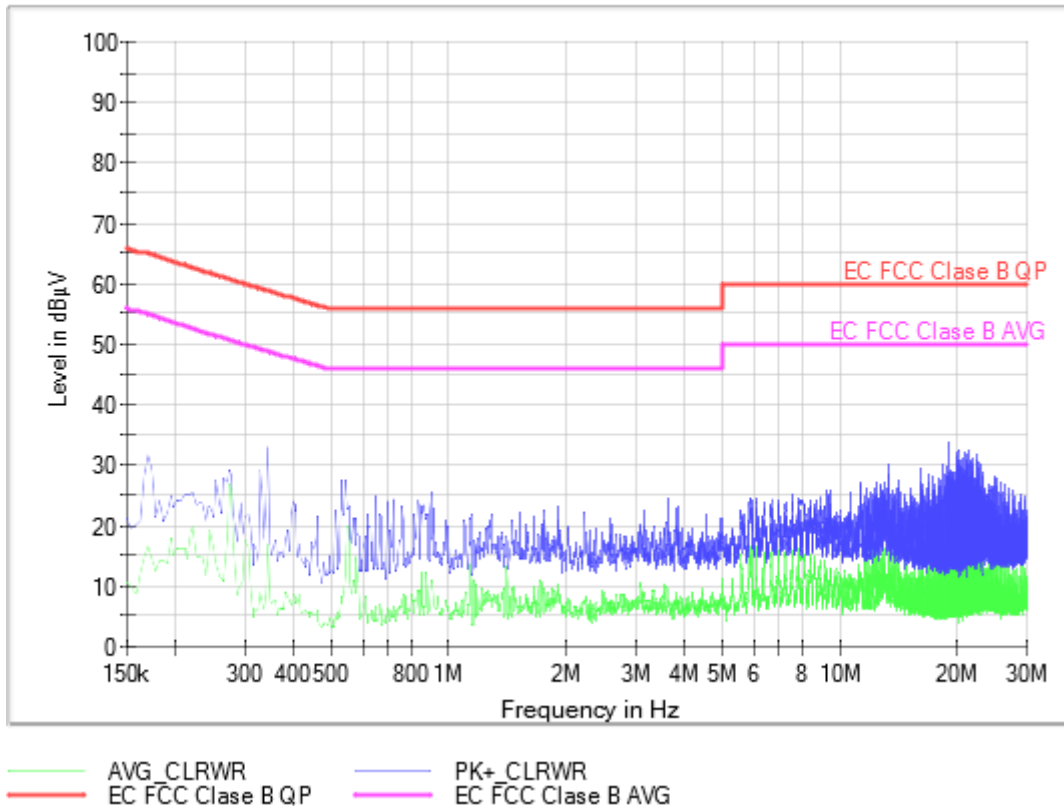
Conducted Emissions - Tested Line = L1

Sample ID: S/01

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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.170000	31.6	16.8	L1	GND	10.2	
0.346000	33.1	17.0	L1	GND	10.2	
0.530000	27.7	8.2	L1	GND	10.2	
0.906000	25.8	10.6	L1	GND	10.2	
1.902000	23.3	10.3	L1	GND	10.3	
3.130000	22.9	8.6	L1	GND	10.3	
5.874000	24.8	16.7	L1	GND	10.4	
9.246000	26.0	13.1	L1	GND	10.4	
13.406000	30.3	12.0	L1	GND	10.5	
19.030000	34.0	15.8	L1	GND	10.7	

EMC Test Code = CE01050N Frequency Range MHz = [0.15, 30]

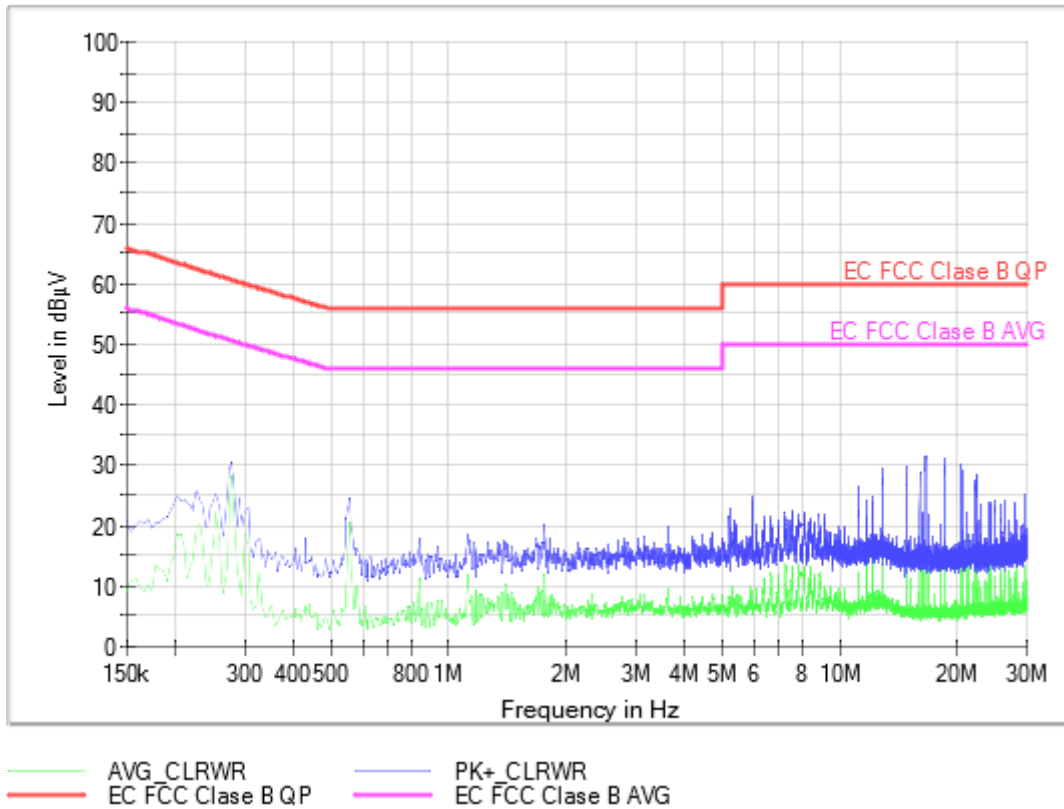
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/05. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.226000	26.1	19.5	N	GND	10.3	
0.278000	30.4	28.3	N	GND	10.3	
0.558000	24.4	20.4	N	GND	10.4	
1.114000	18.4	12.1	N	GND	10.4	
1.762000	20.3	11.2	N	GND	10.4	
3.126000	18.4	6.3	N	GND	10.4	
5.950000	25.1	9.4	N	GND	10.5	
7.522000	22.7	12.4	N	GND	10.6	
16.678000	31.7	16.0	N	GND	10.9	
18.554000	31.3	16.0	N	GND	10.9	

EMC Test Code = CE0105L1

Frequency Range MHz = [0.15, 30]

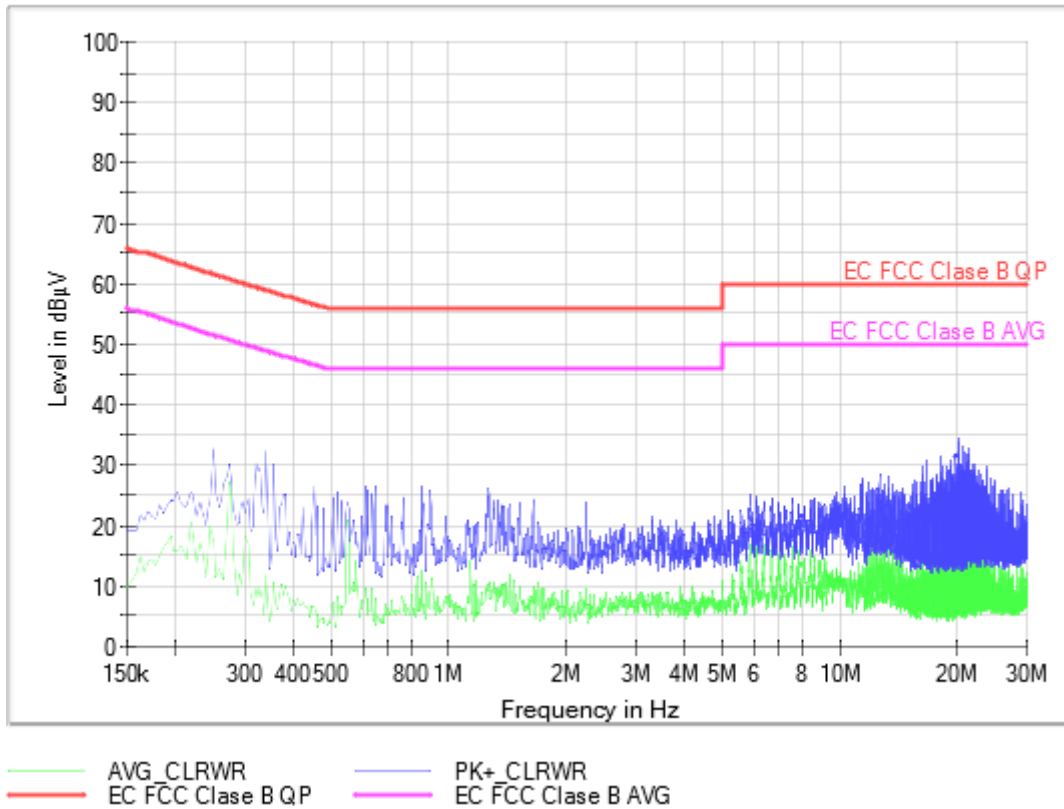
Conducted Emissions - Tested Line = L1

Sample ID: S/01

Operation Mode: OM/05. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.250000	32.7	17.3	L1	GND	10.2	
0.342000	32.2	11.7	L1	GND	10.2	
0.610000	26.7	9.6	L1	GND	10.2	
0.854000	26.5	12.8	L1	GND	10.2	
1.270000	26.4	9.4	L1	GND	10.2	
2.238000	24.2	9.6	L1	GND	10.3	
5.866000	25.4	16.6	L1	GND	10.4	
10.262000	26.6	11.5	L1	GND	10.4	
16.762000	31.2	12.2	L1	GND	10.6	
20.102000	34.5	16.3	L1	GND	10.7	

EMC Test Code = CE01060N Frequency Range MHz = [0.15, 30]

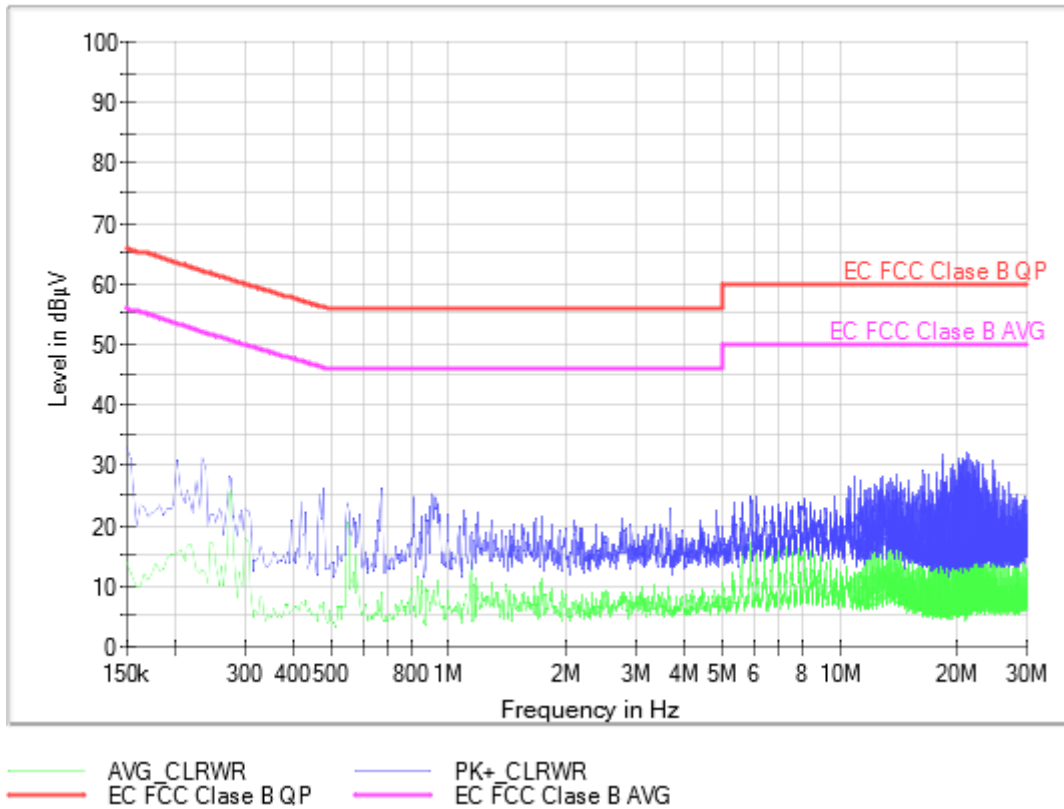
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/06. 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



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.150000	33.1	13.7	N	GND	10.3	
0.274000	28.1	25.2	N	GND	10.3	
0.478000	26.2	7.3	N	GND	10.4	
0.910000	25.3	8.4	N	GND	10.4	
1.738000	21.7	11.2	N	GND	10.4	
2.762000	21.6	9.0	N	GND	10.4	
5.898000	25.1	17.1	N	GND	10.5	
9.698000	25.0	10.5	N	GND	10.6	
16.494000	29.2	13.4	N	GND	10.9	
21.022000	32.2	19.5	N	GND	10.9	

EMC Test Code = CE0106L1 Frequency Range MHz = [0.15, 30]

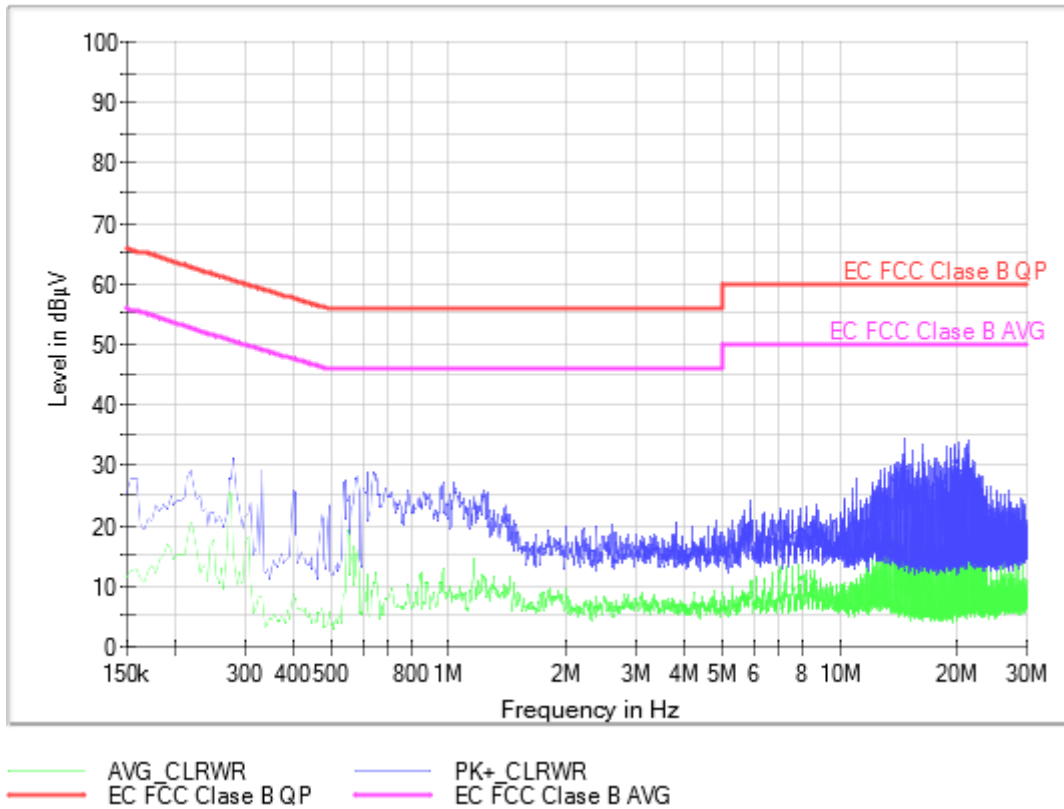
Conducted Emissions - Tested Line = L1

Sample ID: S/01

Operation Mode: OM/06. 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



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.218000	29.2	20.5	L1	GND	10.2	
0.282000	31.2	15.5	L1	GND	10.2	
0.642000	28.9	10.4	L1	GND	10.2	
0.970000	27.3	12.9	L1	GND	10.2	
1.266000	25.5	9.1	L1	GND	10.2	
2.630000	20.1	6.9	L1	GND	10.3	
5.910000	24.5	10.7	L1	GND	10.4	
10.322000	24.7	9.6	L1	GND	10.5	
14.594000	34.7	15.5	L1	GND	10.5	
21.230000	34.3	18.9	L1	GND	10.7	

EMC Test Code = CE01070N Frequency Range MHz = [0.15, 30]

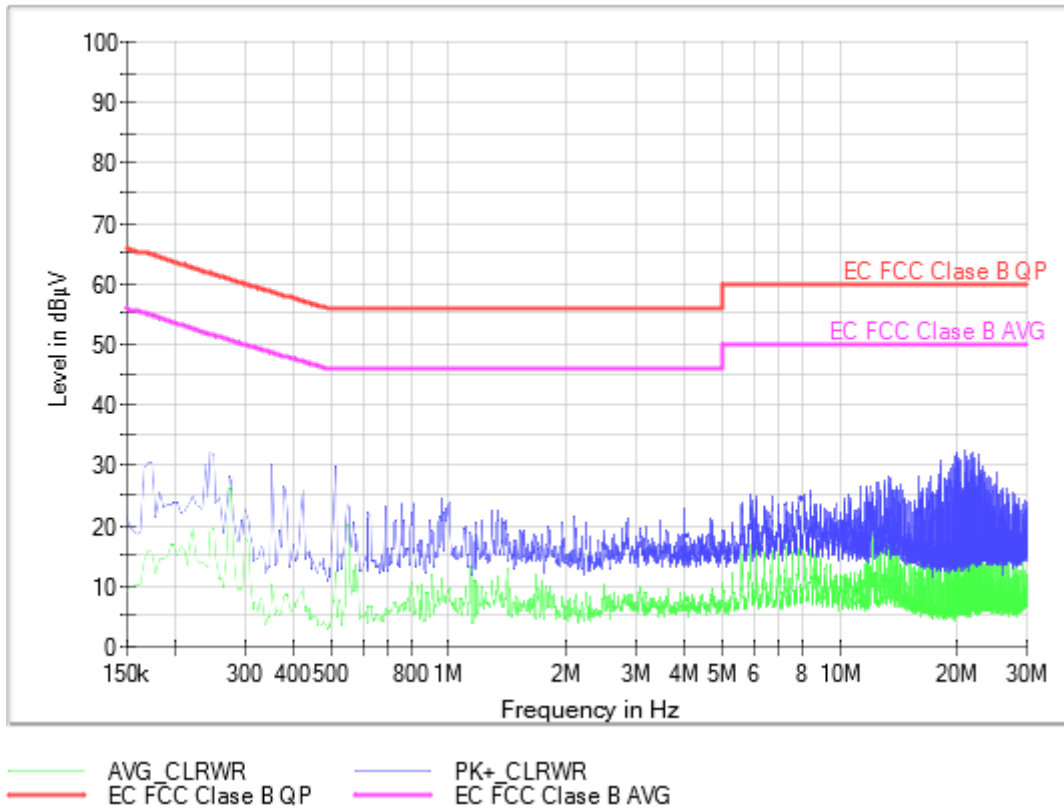
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/07. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.246000	32.1	19.1	N	GND	10.3	
0.354000	30.3	10.3	N	GND	10.3	
0.514000	29.9	12.1	N	GND	10.4	
0.962000	24.7	11.2	N	GND	10.4	
1.338000	22.8	9.9	N	GND	10.4	
3.486000	21.2	7.2	N	GND	10.5	
5.874000	25.3	17.1	N	GND	10.5	
8.402000	26.0	15.9	N	GND	10.6	
15.794000	28.4	13.7	N	GND	10.9	
20.830000	32.6	19.6	N	GND	10.9	

EMC Test Code = CE0107L1

Frequency Range MHz = [0.15, 30]

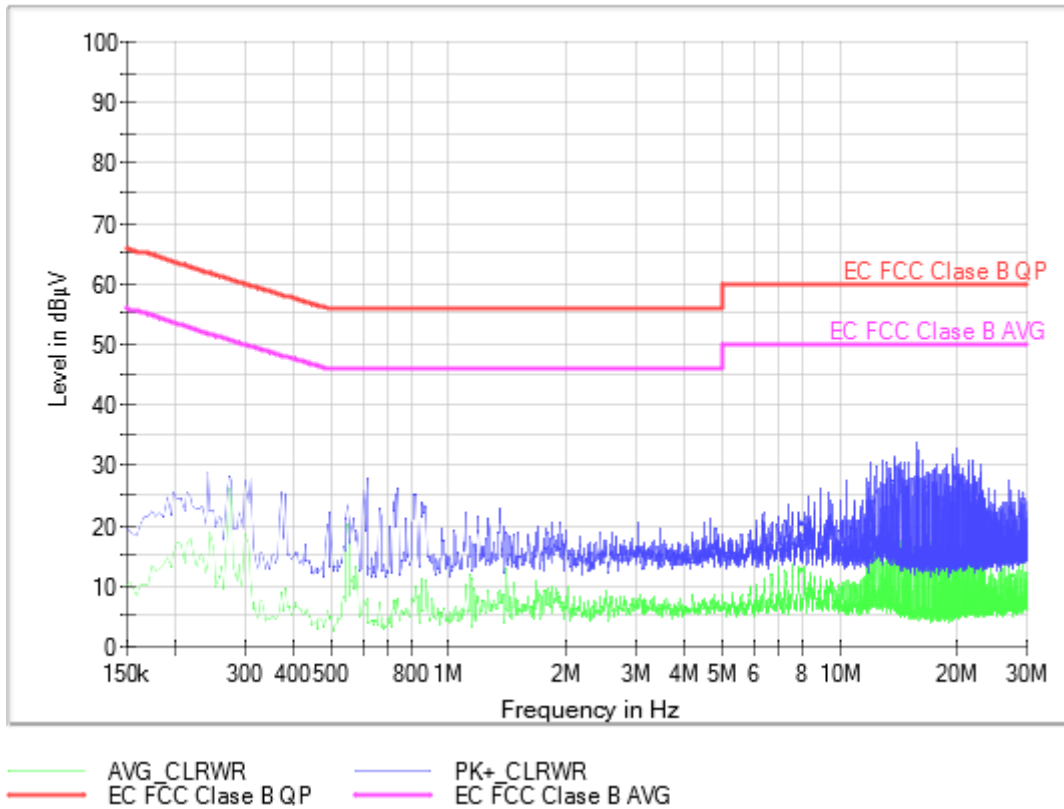
Conducted Emissions - Tested Line = L1

Sample ID: S/01

Operation Mode: OM/07. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.242000	28.9	13.9	L1	GND	10.2	
0.274000	28.3	26.2	L1	GND	10.2	
0.614000	28.0	8.0	L1	GND	10.2	
0.738000	26.0	6.7	L1	GND	10.2	
1.350000	22.9	9.0	L1	GND	10.2	
3.042000	20.5	7.3	L1	GND	10.3	
4.682000	21.6	7.7	L1	GND	10.3	
8.970000	26.3	11.2	L1	GND	10.4	
15.750000	33.9	15.4	L1	GND	10.6	
19.814000	33.0	15.9	L1	GND	10.7	

EMC Test Code = CE01080N Frequency Range MHz = [0.15, 30]

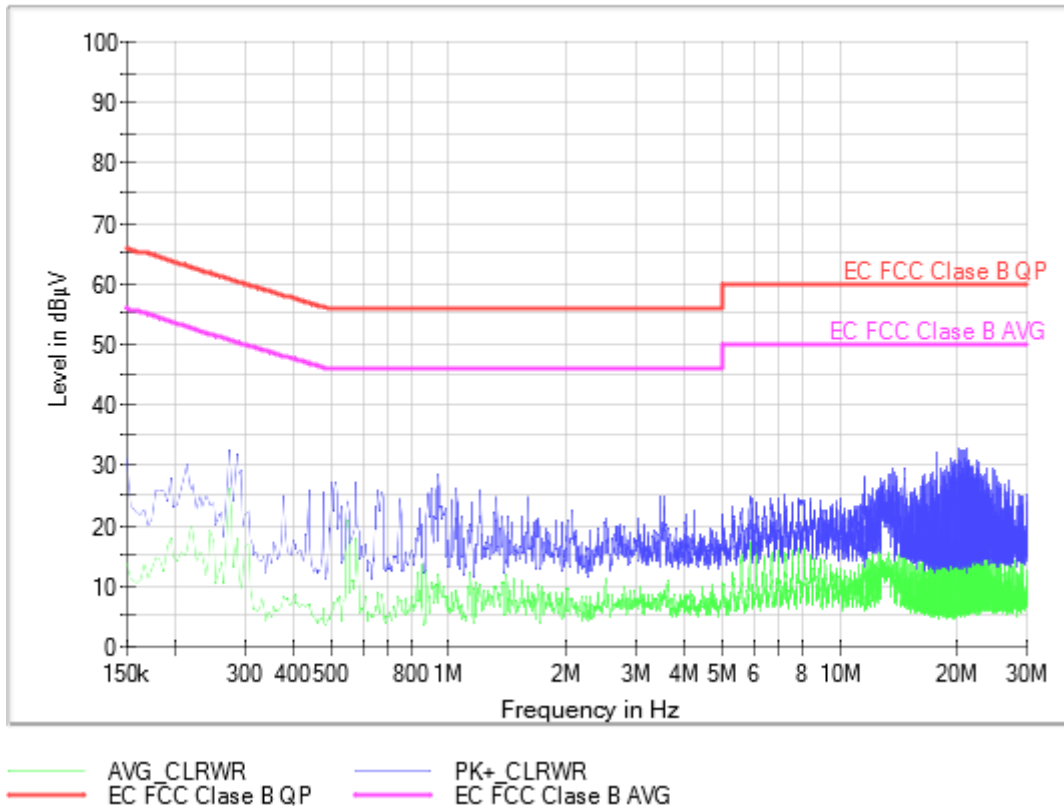
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/08. EUT ON. MS in traffic mode. LTE Band 17. 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



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.150000	31.1	13.7	N	GND	10.3	
0.274000	32.3	26.2	N	GND	10.3	
0.578000	27.3	17.9	N	GND	10.4	
0.942000	28.5	11.9	N	GND	10.4	
1.326000	24.8	9.5	N	GND	10.4	
3.558000	25.1	9.2	N	GND	10.5	
5.866000	24.9	17.3	N	GND	10.5	
7.250000	25.2	15.6	N	GND	10.6	
13.714000	29.6	12.5	N	GND	10.8	
20.962000	33.1	18.2	N	GND	10.9	

EMC Test Code = CE0108L1

Frequency Range MHz = [0.15, 30]

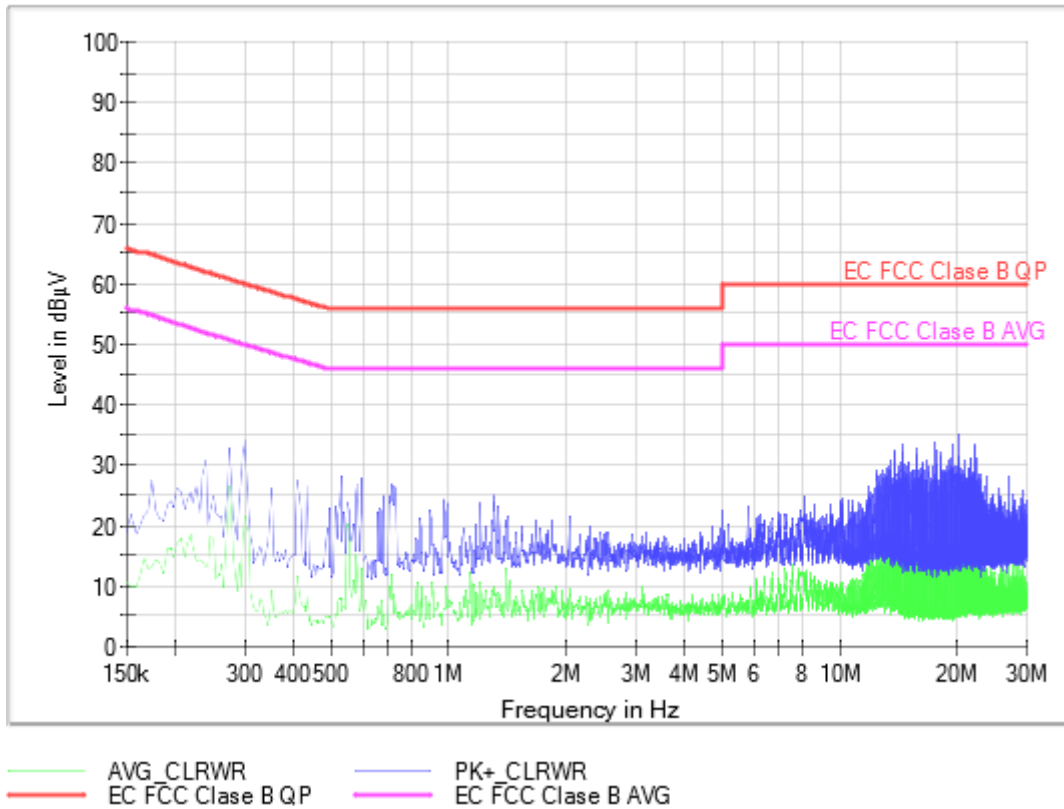
Conducted Emissions - Tested Line = L1

Sample ID: S/01

Operation Mode: OM/08. EUT ON. MS in traffic mode. LTE Band 17. 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



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.238000	30.6	13.0	L1	GND	10.2	
0.302000	34.1	21.6	L1	GND	10.2	
0.530000	28.1	7.9	L1	GND	10.2	
0.970000	24.4	6.0	L1	GND	10.2	
1.314000	24.9	8.7	L1	GND	10.2	
2.278000	19.7	8.1	L1	GND	10.3	
5.782000	23.0	7.1	L1	GND	10.4	
8.074000	24.9	11.4	L1	GND	10.4	
17.482000	34.0	12.3	L1	GND	10.6	
20.202000	35.3	17.4	L1	GND	10.7	

EMC Test Code = CE01090N Frequency Range MHz = [0.15, 30]

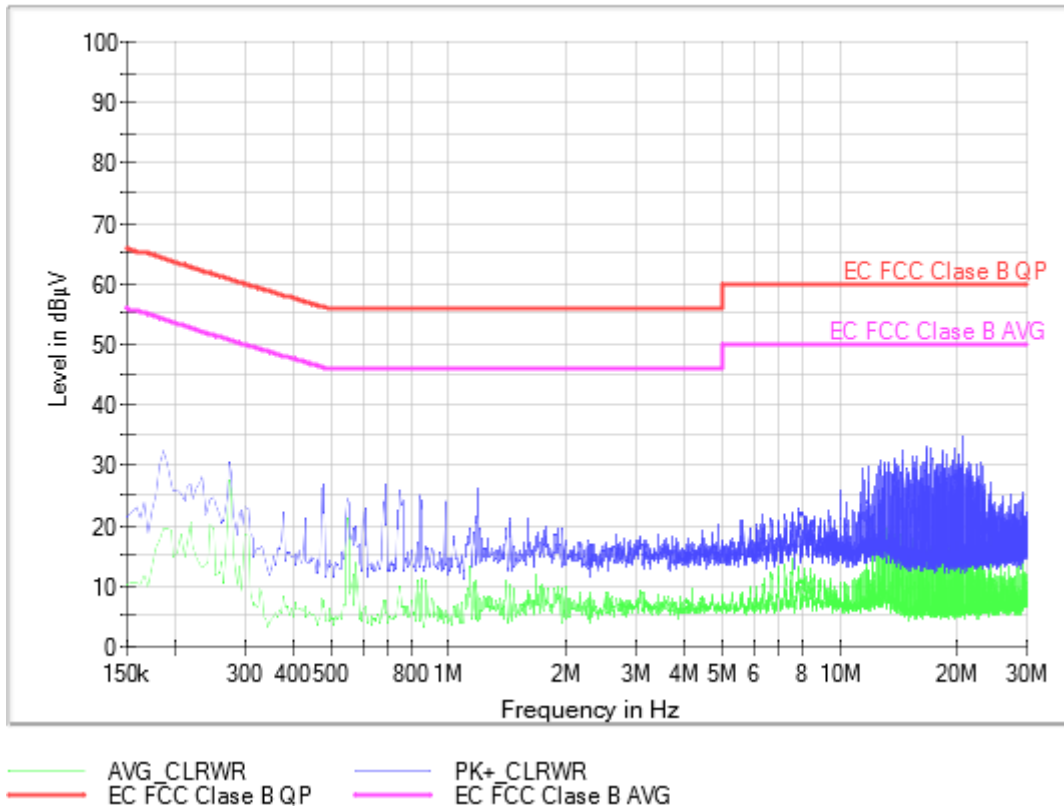
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/09. EUT ON. MS in traffic mode. LTE Band 25. 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



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.186000	32.2	19.5	N	GND	10.3	
0.274000	30.3	27.7	N	GND	10.3	
0.694000	26.9	7.8	N	GND	10.4	
1.194000	26.4	7.4	N	GND	10.4	
1.590000	21.6	9.7	N	GND	10.4	
3.434000	18.5	7.2	N	GND	10.5	
5.570000	20.8	8.1	N	GND	10.5	
10.074000	26.0	10.3	N	GND	10.6	
16.822000	33.2	16.1	N	GND	10.9	
20.546000	34.9	17.3	N	GND	10.9	

EMC Test Code = CE0109L1

Frequency Range MHz = [0.15, 30]

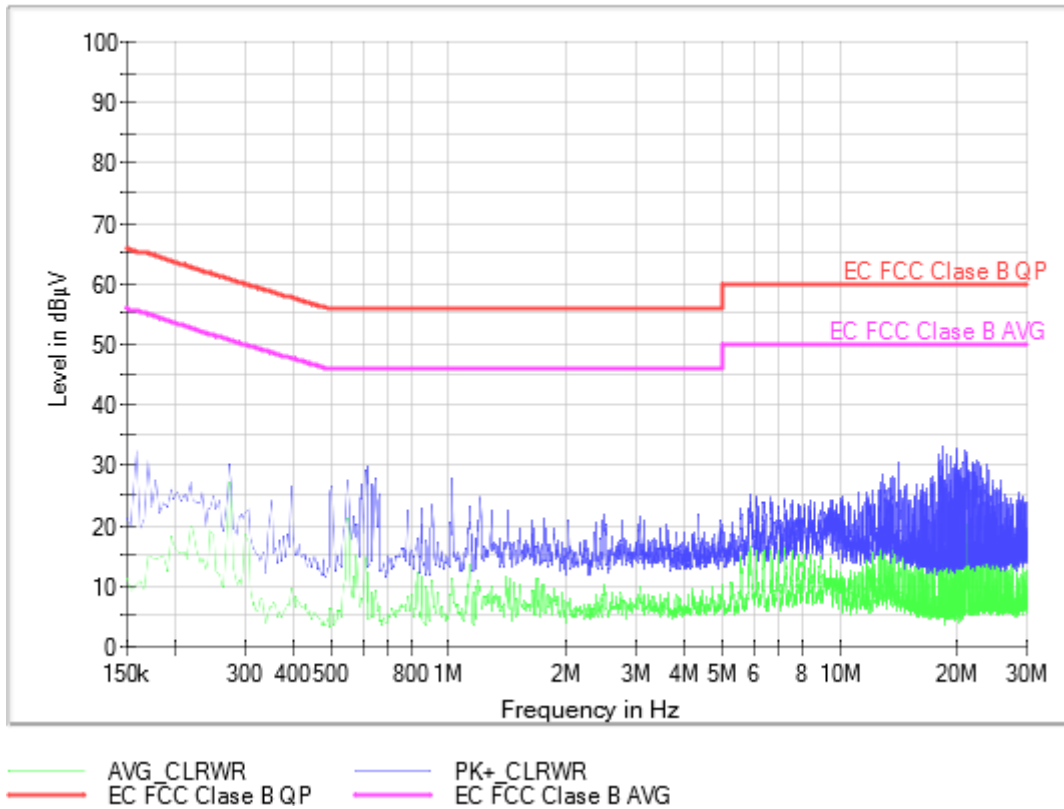
Conducted Emissions - Tested Line = L1

Sample ID: S/01

Operation Mode: OM/09. EUT ON. MS in traffic mode. LTE Band 25. 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



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.158000	32.3	10.1	L1	GND	10.2	
0.274000	30.3	27.1	L1	GND	10.2	
0.622000	29.7	12.7	L1	GND	10.2	
1.022000	28.0	11.1	L1	GND	10.2	
1.290000	22.8	9.1	L1	GND	10.2	
2.502000	22.1	10.0	L1	GND	10.3	
5.862000	25.3	16.2	L1	GND	10.4	
6.134000	25.1	16.7	L1	GND	10.4	
14.122000	30.4	16.2	L1	GND	10.5	
18.310000	33.2	15.4	L1	GND	10.7	

EMC Test Code = CE01100N Frequency Range MHz = [0.15, 30]

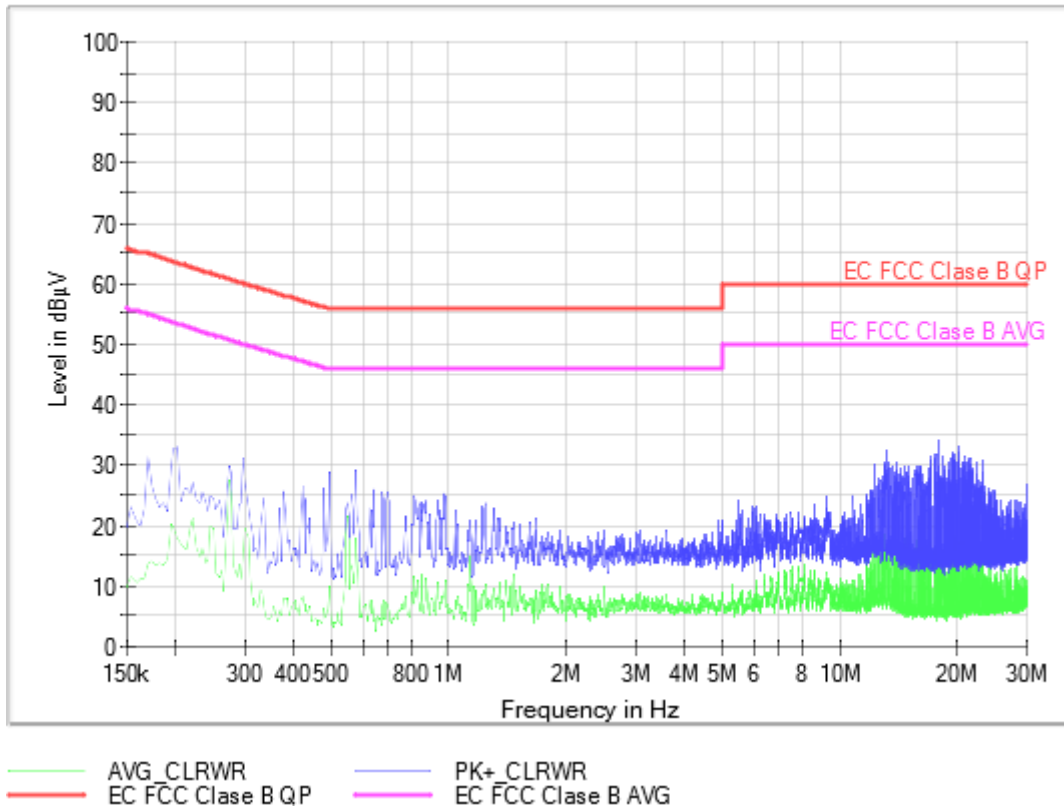
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/10. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.202000	33.1	17.8	N	GND	10.3	
0.298000	31.1	14.4	N	GND	10.3	
0.578000	29.3	18.0	N	GND	10.4	
0.970000	25.3	8.5	N	GND	10.4	
1.302000	22.9	9.2	N	GND	10.4	
3.078000	19.2	8.5	N	GND	10.4	
5.494000	24.4	7.1	N	GND	10.5	
9.246000	24.9	11.2	N	GND	10.6	
13.138000	32.6	15.6	N	GND	10.8	
17.898000	34.4	15.7	N	GND	10.9	

EMC Test Code = CE0110L1

Frequency Range MHz = [0.15, 30]

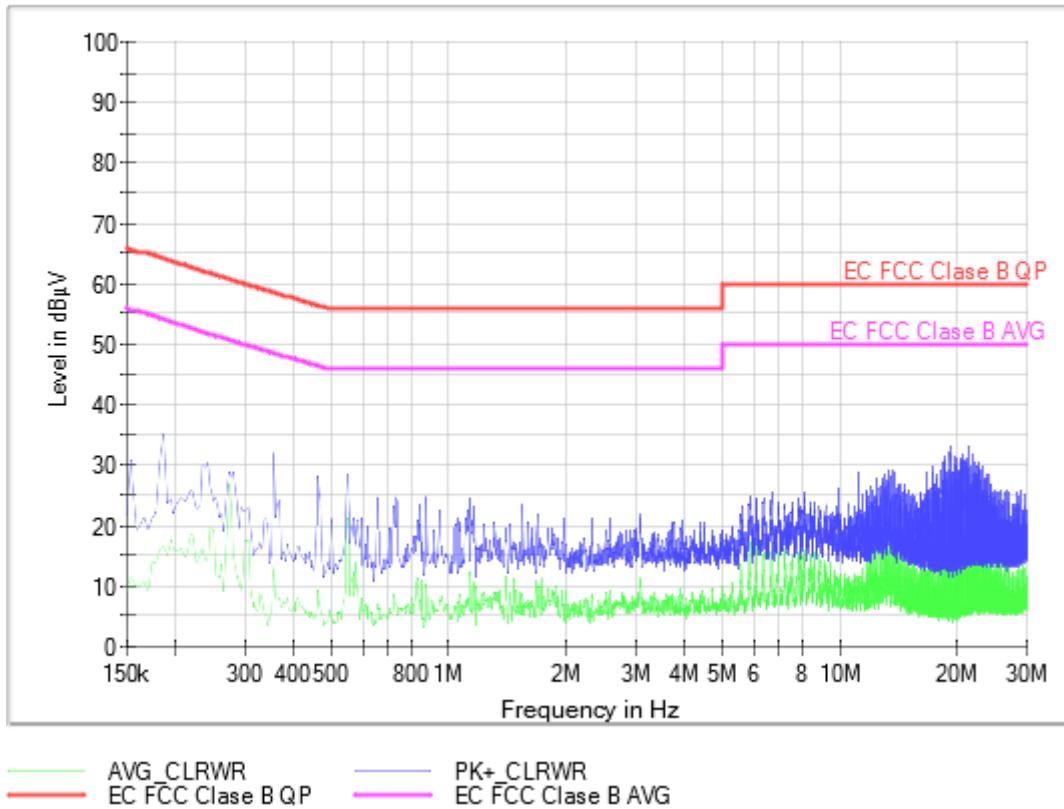
Conducted Emissions - Tested Line = L1

Sample ID: S/01

Operation Mode: OM/10. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.186000	35.4	16.8	L1	GND	10.2	
0.358000	32.1	12.7	L1	GND	10.2	
0.550000	28.5	21.2	L1	GND	10.2	
0.882000	24.8	10.3	L1	GND	10.2	
1.538000	23.4	8.7	L1	GND	10.2	
3.070000	22.2	10.4	L1	GND	10.3	
5.854000	25.0	17.2	L1	GND	10.4	
9.914000	26.4	9.8	L1	GND	10.4	
17.274000	29.9	12.5	L1	GND	10.6	
21.374000	33.3	17.4	L1	GND	10.7	

EMC Test Code = CE01110N Frequency Range MHz = [0.15, 30]

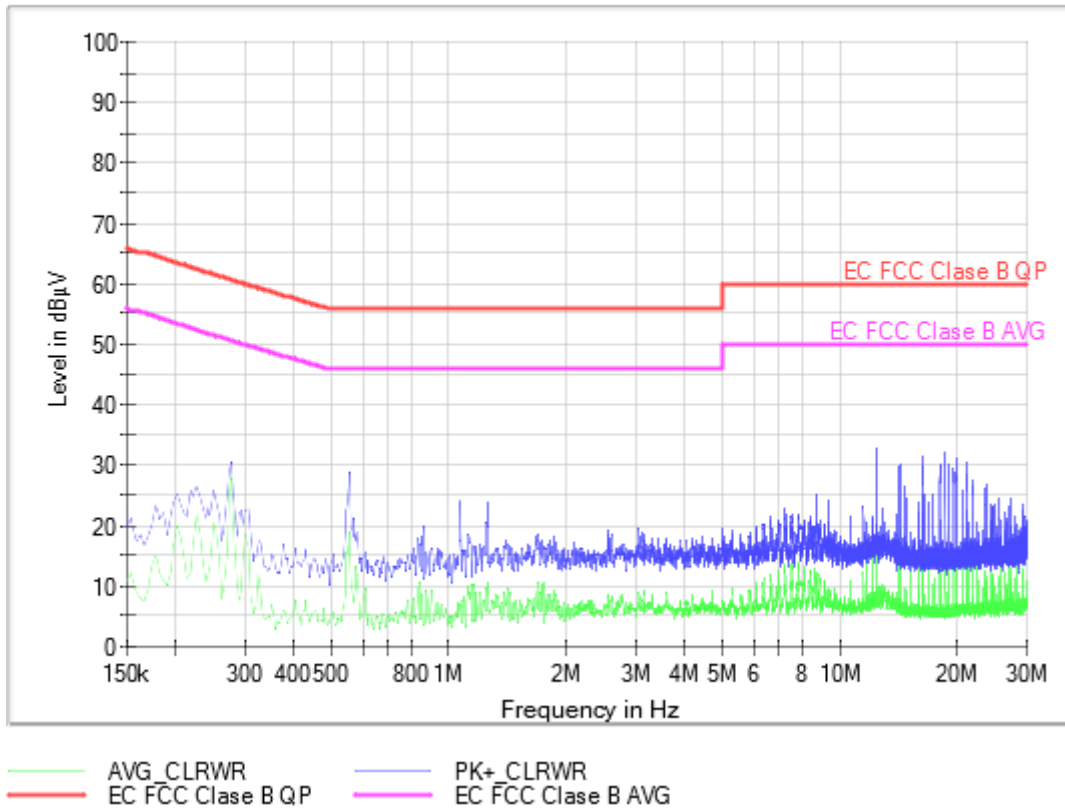
Conducted Emissions - Tested Line = N

Sample ID: S/01

Operation Mode: OM/11. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.226000	26.6	21.8	N	GND	10.3	
0.278000	30.4	27.9	N	GND	10.3	
0.554000	28.7	19.0	N	GND	10.4	
1.070000	24.1	7.1	N	GND	10.4	
1.262000	24.0	10.7	N	GND	10.4	
3.054000	19.5	9.1	N	GND	10.4	
6.114000	20.0	9.1	N	GND	10.5	
8.734000	25.5	10.7	N	GND	10.6	
12.458000	33.0	15.4	N	GND	10.8	
18.690000	32.2	15.6	N	GND	10.9	

EMC Test Code = CE0311L1

Frequency Range MHz = [0.15, 30]

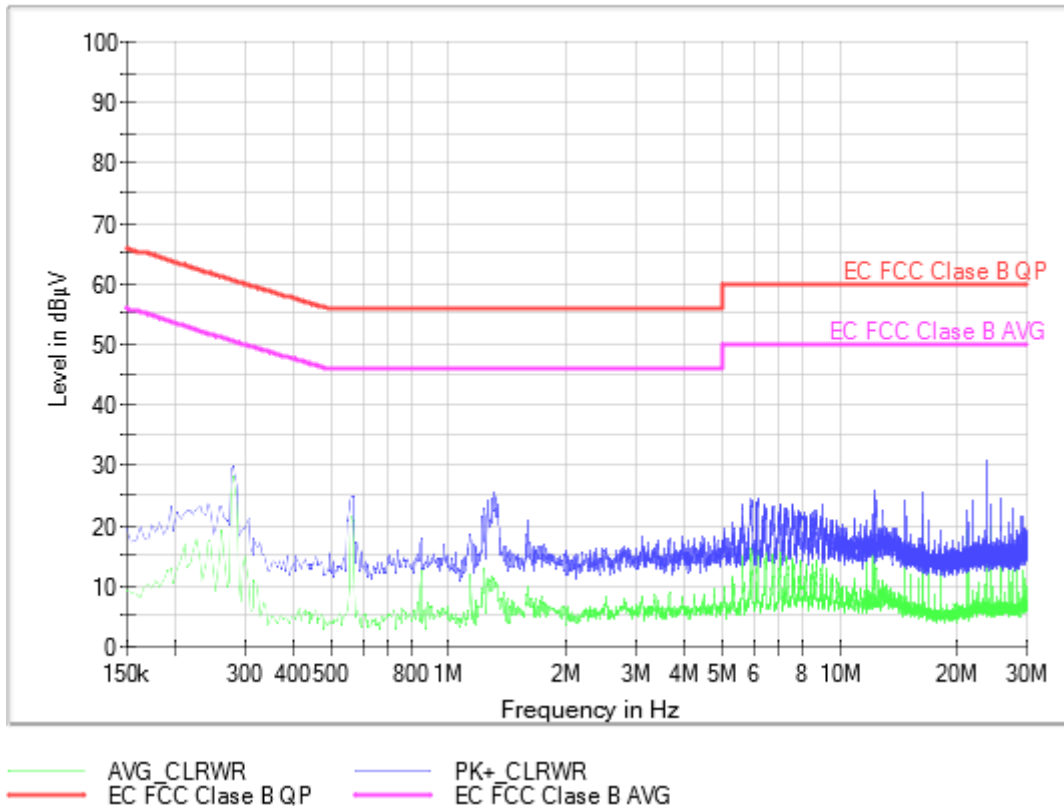
Conducted Emissions - Tested Line = L1

Sample ID: S/03

Operation Mode: OM/11. 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:

EC FCC Class B CC



Tables:

Frequency(MHz)	PK+_CLRWR(dBµV)	AVG_CLRWR(dBµV)	Line	PE	Corr.(dB)	Comment
0.242000	23.8	17.4	L1	GND	10.2	
0.282000	29.7	28.1	L1	GND	10.2	
0.562000	24.7	21.5	L1	GND	10.2	
1.238000	22.9	12.8	L1	GND	10.2	
1.302000	25.7	9.5	L1	GND	10.2	
3.102000	18.1	8.7	L1	GND	10.3	
5.922000	24.3	15.6	L1	GND	10.4	
6.210000	24.8	16.0	L1	GND	10.4	
12.358000	26.0	16.2	L1	GND	10.5	
23.994000	30.6	13.1	L1	GND	10.7	

FCC 47 CFR Part 15B

RE Radiated emission. Electromagnetic field measure

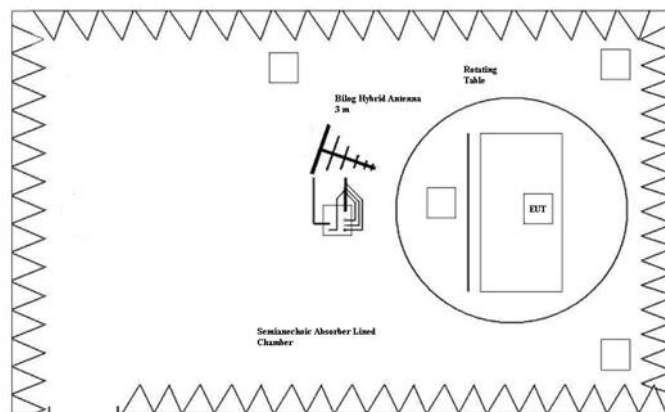
Limits of interference Class B

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)

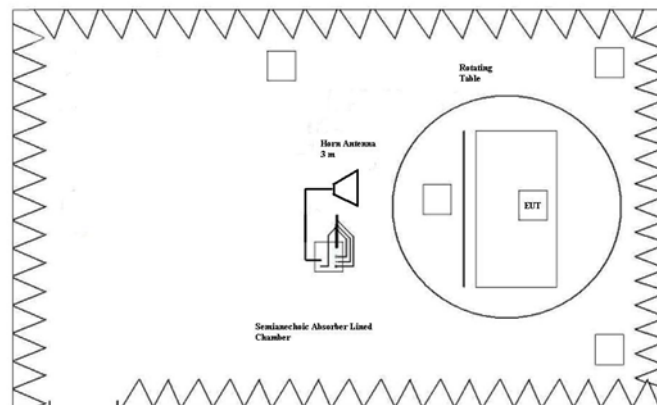
Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)	($\text{dB}\mu\text{V/m}$)
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, are equal or more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

S/	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR	[1000, 17000]	P

Verdict

Pass

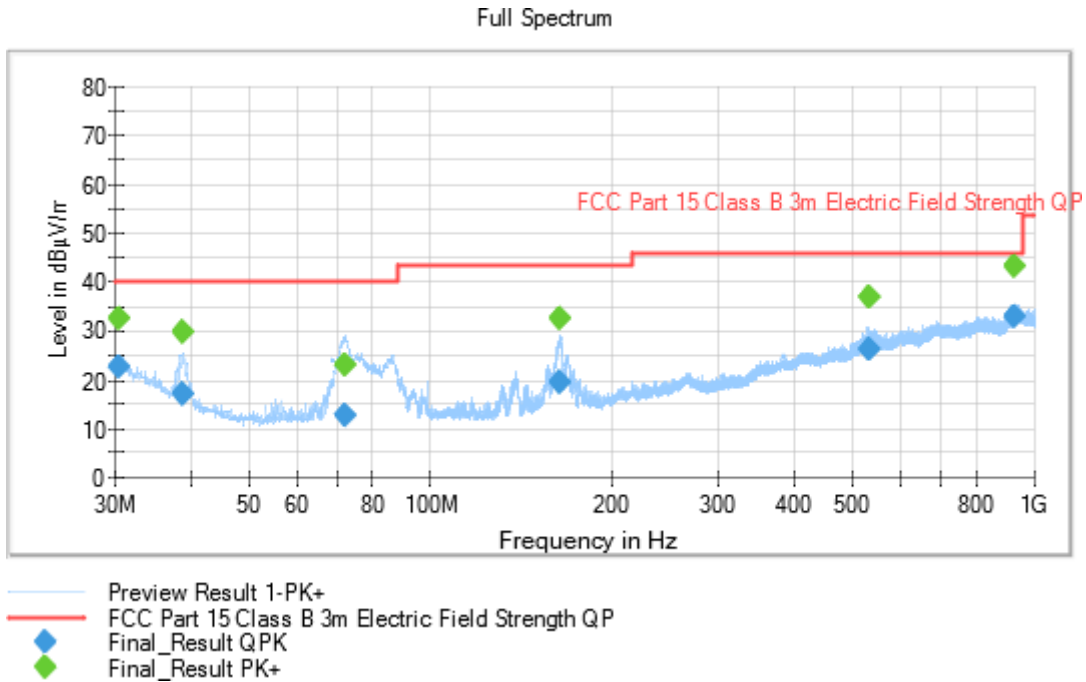
Attachments

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

Sample ID: S/01

Operation Mode: OM/01. EUT ON. EUT conected via USB, keyboard and mouse charging ports.

Images:



Tables:

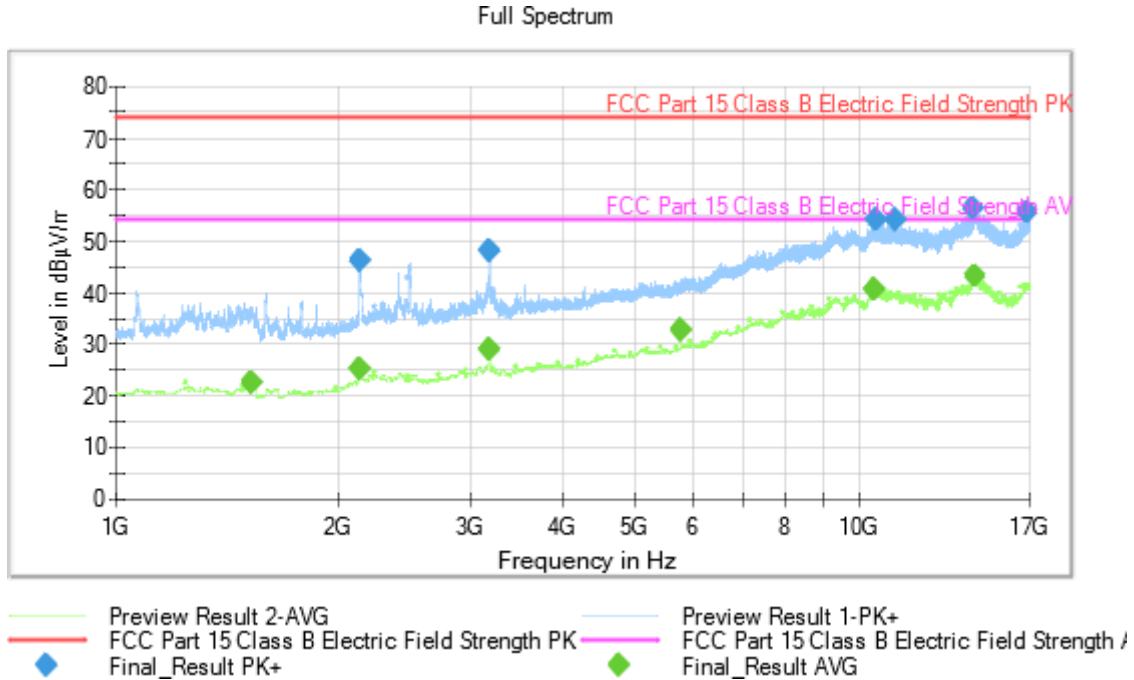
Frequency(MHz)	QuasiPeak(dBµV/m)	MaxPeak(dBµV/m)	Limit(dBµV/m)	Margin(dB)	Height(cm)	Po l	Azimuth(deg)
30.408000	22.75	---	40.00	17.25	388.0	V	0.0
30.408000	---	32.38	---	---	388.0	V	0.0
38.755000	---	29.75	---	---	100.0	V	59.0
38.755000	16.86	---	40.00	23.14	100.0	V	59.0
72.421000	12.78	---	40.00	27.22	336.0	V	351.0
72.421000	---	23.12	---	---	336.0	V	351.0
163.982000	19.27	---	43.52	24.25	140.0	H	49.0
163.982000	---	32.62	---	---	140.0	H	49.0
534.033000	---	37.02	---	---	372.0	V	5.0
534.033000	26.11	---	46.00	19.89	372.0	V	5.0
929.299000	32.98	---	46.00	13.02	207.0	V	193.0
929.299000	---	43.16	---	---	207.0	V	193.0

EMC Test Code = RE0101HR Frequency Range MHz = [1000, 17000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. EUT conected via USB, keyboard and mouse charging ports.

Images:



Tables:

Frequency(MHz)	MaxPeak(dBµV/m)	Average(dBµV/m)	Limit(dBµV/m)	Margin(dB)	Corr.(dB/m)
1523.000000	---	22.50	53.97	31.47	-13.7
2127.500000	46.20	---	73.97	27.77	-11.3
2132.000000	---	25.22	53.97	28.75	-11.2
3190.750000	---	29.03	53.97	24.94	-9.7
3191.250000	48.04	---	73.97	25.93	-9.7
5759.750000	---	32.75	53.97	21.22	-5.4
10530.500000	---	40.62	53.97	13.35	6.4
10563.750000	53.91	---	73.97	20.06	6.4
11212.750000	54.07	---	73.97	19.90	6.7
14294.500000	56.26	---	73.97	17.71	9.3
14349.000000	---	43.14	53.97	10.83	9.4
16848.500000	55.53	---	73.97	18.44	8.4