



Informe de ensayo nº:

Test report No:

NIE: 55958REM.002

Test Report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-15 Edition) & ICES-003 ISSUE 6 (2016)

Identificación del objeto ensayado.....: Identification of item tested	SoC
Marca Trademark	Nordic
Modelo y/o referencia tipo Model and /or type reference	N52840
Otra identificación del producto.....: Other identification of the product	S/N: Not provided data.
FCC ID	N/A
IC	N/A
Versión final del HW Final HW version	QIAA CA0
Versión final del SW Final SW version	NA
Características Features	Not provided data.
Fabricante Manufacturer	NORDIC SEMICONDUCTOR ASA Otto Nielsen veg 12, 7052 Trondheim, Norway.
Método de ensayo solicitado, norma.....: Test method requested, standard	FCC CFR 47, Part 15, Subpart B (10-1-15 Edition) & ICES-003 Issue 6 (2016)
Resultado.....: Summary	IN COMPLIANCE
Aprobado por (nombre / cargo y firma) Approved by (name / position & signature)	Rafael López Martín EMC LAB Manager
Fecha de realización Date of issue	2018-04-05
Formato de informe No.: Report template No	FDT08_20

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Competences and guarantees

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

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

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General conditions

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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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Uncertainty

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

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 number	Reception date
55958/001	SoC	N52840	---	2018-02-19

Auxiliary element used with the sample S/01:

Control N°	Description	Model	Serial number	Reception date
54505/003	Qualification Motherboard	---	#2	2018-01-23
54033/003	Antenna	---	---	2017-07-12

Test sample description

System-on-Chip (SoC) for wireless application, contains CPU, flash and radio interface.

Identification of the client

NORDIC SEMICONDUCTOR ASA
Otto Nielsen veg 12, 7052 Trondheim, Norway.

Testing period

The performed test started on 2018-02-26 and finished on 2018-02-27.
The tests have been performed at DEKRA Testing and Certification, S.A.U.

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 tests have been performed by the technical personnel: David Rubio & Ismael Gamarro.

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 ($k = 2$)

FCC 15.107 conducted emission test is only applicable for equipment designed to be connected to the public utility (AC) power line, so it is not applicable for this DC powered device considered in this report.

Testing verdicts (Legend)

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

List of equipment used during the test					
CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
2942	EMI TEST Receiver	ROHDE & SCHWARZ	ESU40	2016-03-14	2018-03-14
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	2017-05-03	2018-05-03
4656	Horn Antenna	SCHWARZBECK	BBHA 9170	2017-03-24	2020-03-24
4570	Thermohigrometer	HW GROUP	HWg-STE	2017-04-25	2018-04-25
4567	Thermohigrometer	HW GROUP	HWg-STE	2017-04-25	2018-04-25
4522	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---
6121	Preamplifier	BONN ELEKTRONIK	BLNA 0160-01N	2017-07-19	2018-07-19
4729	Preamplifier	BONN ELEKTRONIK	BLMA 1840-1M	2017-12-02	2019-12-02

Appendix A – Test result

APPENDIX A CONTENT

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RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE 10

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. Bluetooth Radio in RX, Zigbee radio in RX [802.15.4] Power supply: 3Vdc.

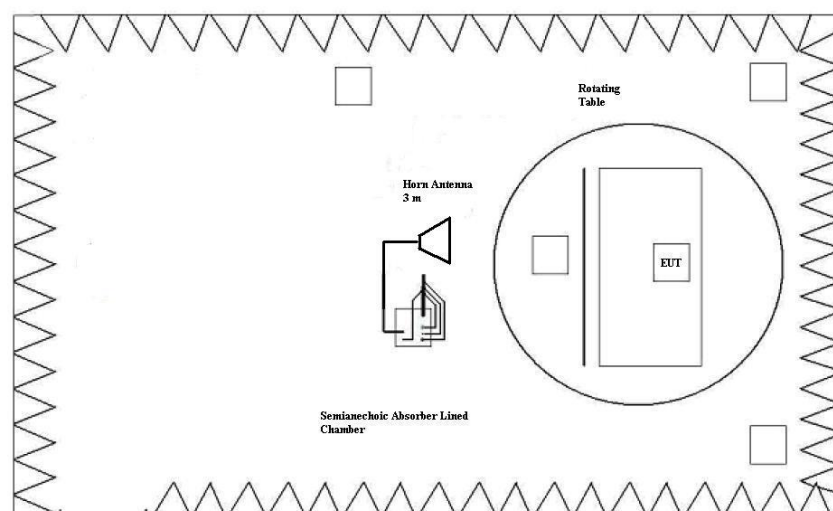
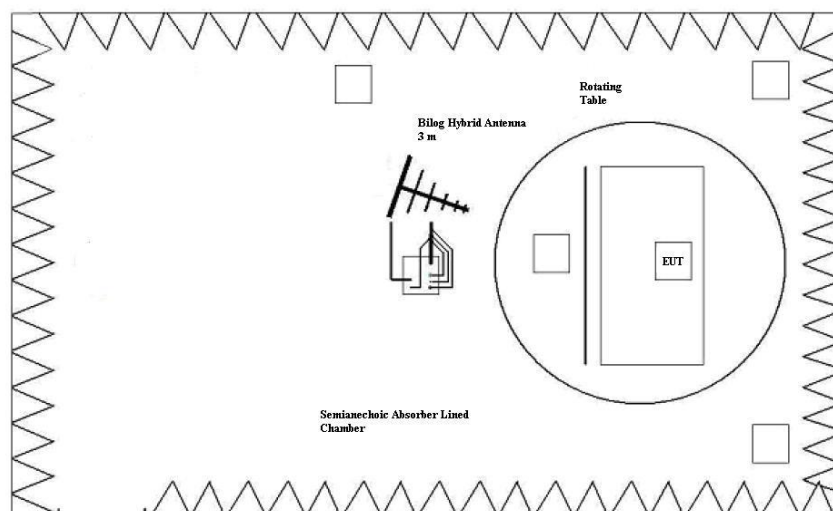
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-15 Edition), Secs. 15.109 & ICES-003 Issue 6 (2016)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-15 Edition), Secs. 15.109 & ICES-003 Issue 6 (2016)

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 (10-01-15 Edition), Secs. 15.109 & ICES-003 Issue 6 (2016) in the frequency range 30 MHz to 26 GHz for class B equipments.

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

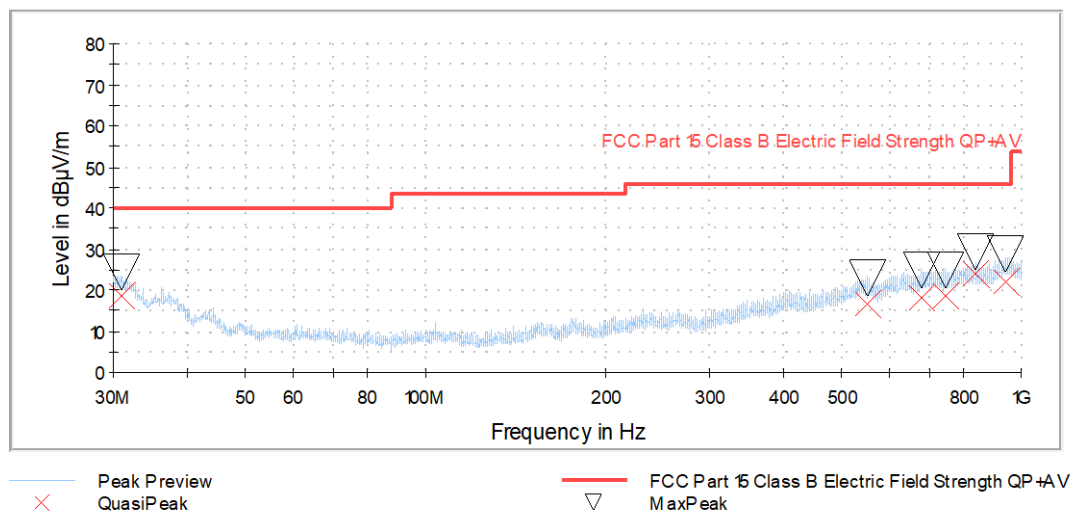


TESTED SAMPLE:	S#01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnnRRPP: CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Polarization.

CRmmnnRRPP	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz.	P
CR0101HR1_PH	Range: 1 GHz - 18 GHz. Horizontal Polarization.	P
CR0101HR1_PV	Range: 1 GHz - 18 GHz. Vertical Polarization.	P
CR0101HR2_PH	Range: 18 GHz - 26 GHz. Horizontal Polarization.	P
CR0101HR2_PV	Range: 18 GHz - 26 GHz. Vertical Polarization.	P

Radiated Emission: CR0101LR

Project: 55958REM.002
Company: NORDIC SEMICONDUCTOR ASA.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth Radio in RX, Zigbee radio in RX [802.15.4]
Power Supply: 3 Vdc.



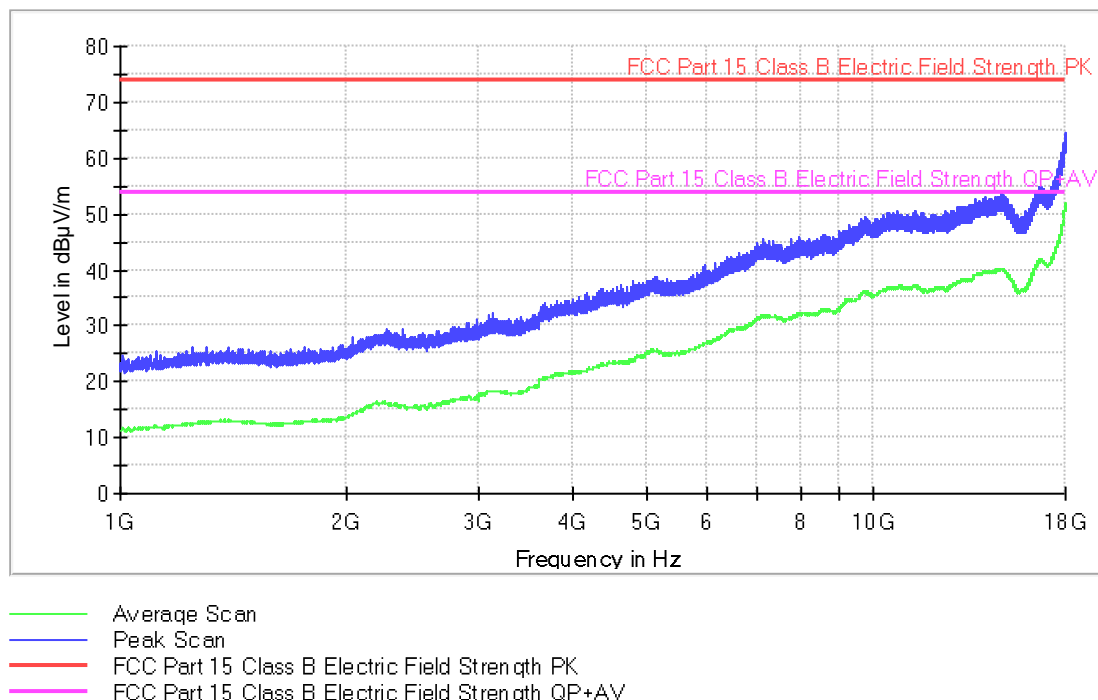
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
30.860000	18.78	24.51	226.0	V	177.0
551.320000	16.59	23.16	294.0	V	-178.0
680.550000	18.20	25.08	180.0	V	87.0
743.640000	18.50	24.96	216.0	V	-11.0
840.000000	23.87	29.06	107.0	H	68.0
939.710000	21.90	28.89	298.0	V	50.0

Radiated Emission: CR0101HR1_PH

Project: 55958REM.002
Company: NORDIC SEMICONDUCTOR ASA.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth Radio in RX, Zigbee radio in RX [802.15.4]
Power Supply: 3 Vdc. Horizontal Polarization.

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



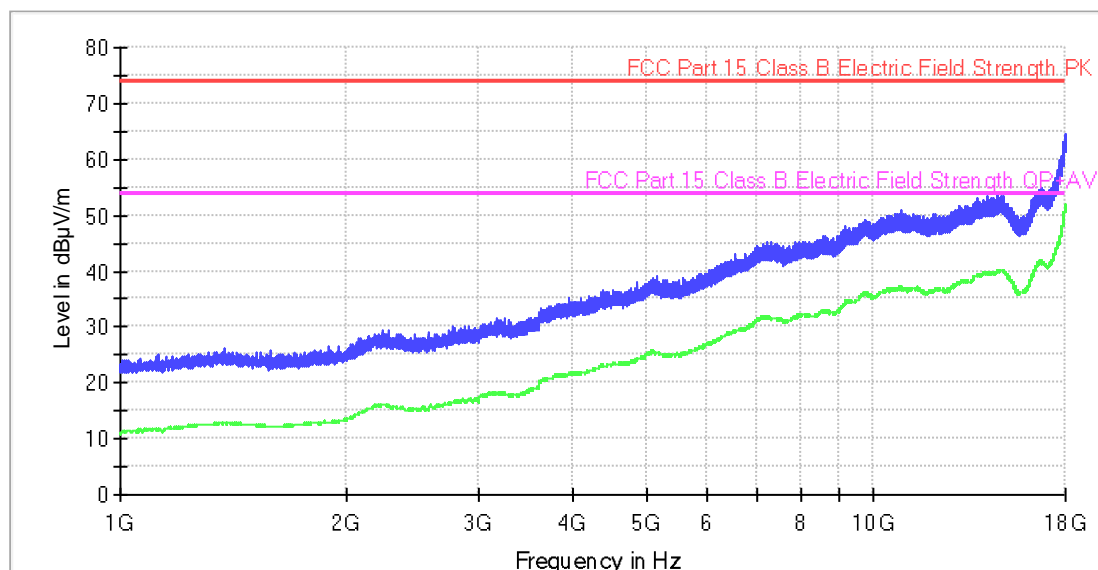
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBμV/m)	AVG CLRWR (dBμV/m)
2260.800000	29.5	16.2
4350.400000	36.6	23.2
5973.200000	40.8	26.9
7797.600000	45.5	31.7
9314.000000	47.9	34.5
10786.800000	50.5	37.1
12893.600000	50.8	37.8
14060.800000	53.2	39.5
14776.800000	53.7	40.2
17988.000000	64.5	51.6

Radiated Emission: CR0101HR1_PV

Project: 55958REM.002
Company: NORDIC SEMICONDUCTOR ASA.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth Radio in RX, Zigbee radio in RX [802.15.4]
Power Supply: 3 Vdc. 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

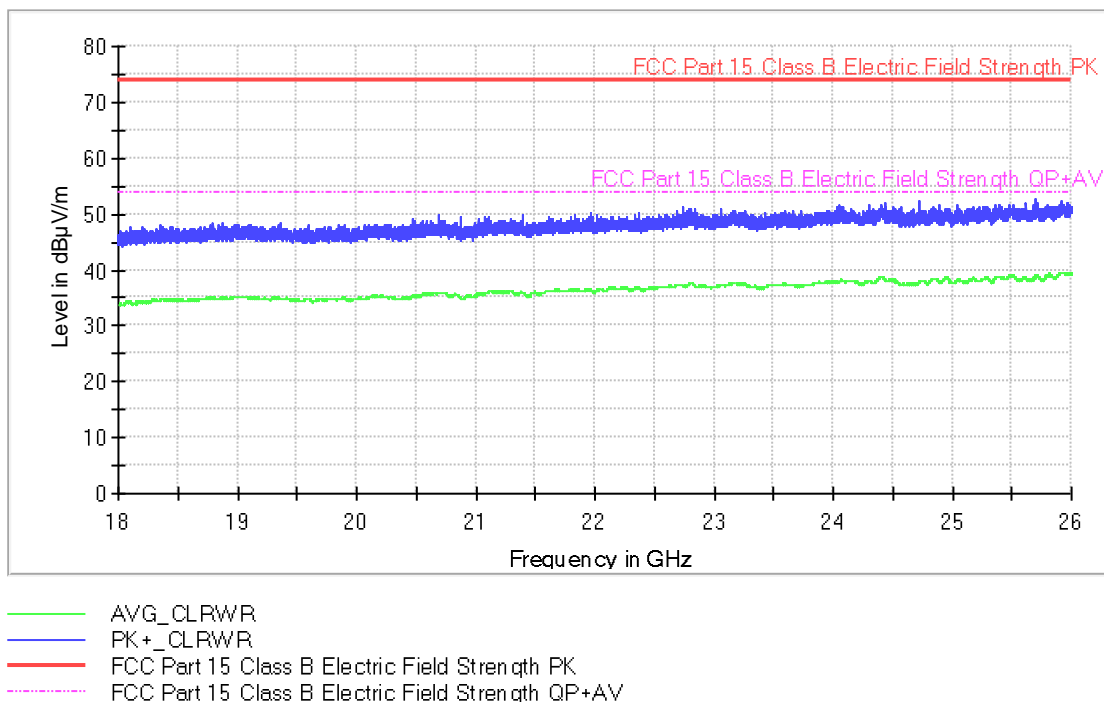
Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBµV/m)	AVG CLRWR (dBµV/m)
2228.400000	29.4	16.1
4370.400000	36.6	23.1
6096.400000	40.3	27.1
7229.200000	45.3	31.7
9204.000000	48.2	34.6
10900.400000	50.8	36.9
12843.200000	50.8	37.6
14207.600000	53.6	39.6
14601.600000	53.9	40.0
17997.600000	64.4	51.9

Radiated Emission: CR0101HR2_PH

Project: 55958REM.002
Company: NORDIC SEMICONDUCTOR ASA.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth Radio in RX, Zigbee radio in RX [802.15.4]
Power Supply: 3 Vdc. Horizontal Polarization.

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



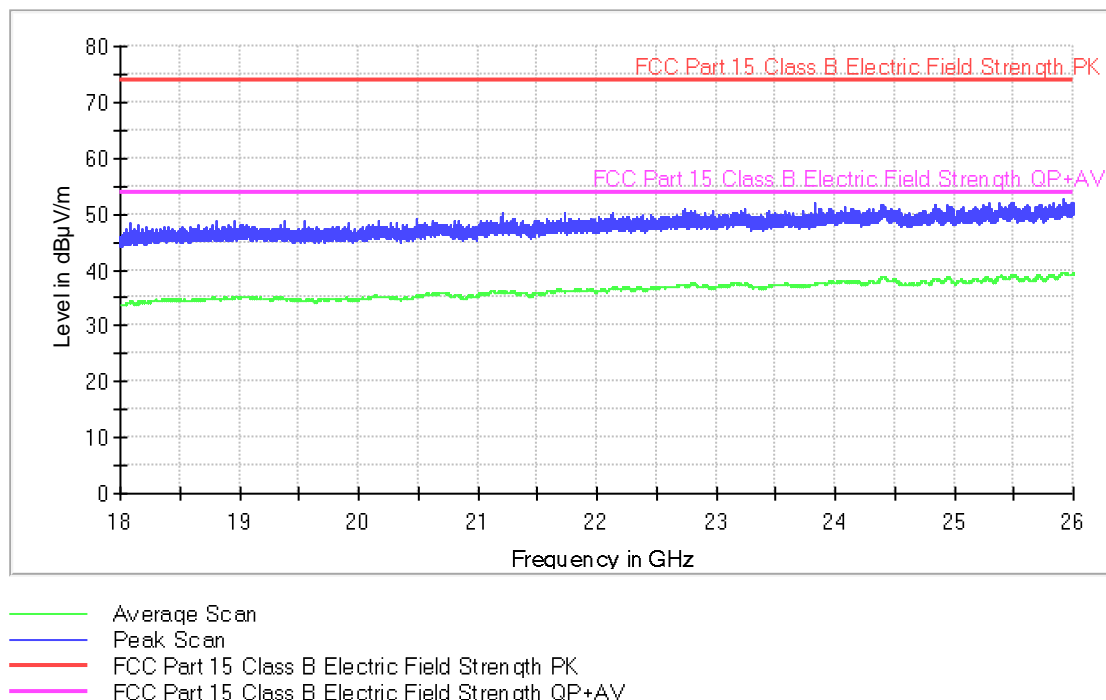
Subrange Maxima

Frequency (MHz)	PK+_CLRWR (dBμV/m)	AVG_CLRWR (dBμV/m)
18798.000000	48.3	34.9
18878.400000	48.5	35.0
20176.000000	48.2	35.2
20685.600000	50.0	35.9
21964.800000	50.1	36.3
22744.800000	51.3	37.1
22806.800000	51.1	37.5
24396.400000	51.6	38.8
24728.000000	52.3	37.9
25702.800000	52.7	39.0

Radiated Emission: CR0101HR2_PV

Project: 55958REM.002
Company: NORDIC SEMICONDUCTOR ASA.
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Bluetooth RX, Zigbee RX. Power Supply: 3 Vdc. Vertical Polarization.

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



Subrange Maxima

Frequency (MHz)	PK+ CLRWR (dBμV/m)	AVG CLRWR (dBμV/m)
18086.800000	48.5	34.2
19553.200000	48.8	34.4
20164.000000	48.8	35.3
21190.800000	49.5	36.0
21730.400000	50.3	36.0
22738.800000	51.0	37.2
23244.000000	50.9	37.5
23835.600000	52.1	37.5
24935.600000	51.7	38.4
25917.200000	52.7	39.5