



Informe de ensayo nº:
Test report No:

NIE: 45246REM.004

Test Report

FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition);
ICES-003 ISSUE 5 (2012)

Identificación del objeto ensayado.....: Identification of item tested	DA14580 RANGE EXTENDER
Marca Trade	SmartBond
Modelo y/o referencia tipo Model and /or type reference	QFN40
Otra identificación del producto.....: Other identification of the product	FCC ID: Y82DA14580REXT IC: 9567A-DA14580REXT
Versión final del HW Final HW version	C
Versión final del SW Final SW version	3.0.10
Características Features	Bluetooth Smart stack. Bluetooth Low Energy. Power Amplifier. RF Module. DC Power Supply.
Fabricante Manufacturer	DIALOG SEMICONDUCTOR Het Zuiderkruis 53, 5215 MV's Hertogenbosch. Holland
Método de ensayo solicitado, norma.....: Test method requested, standard	FCC Rules and Regulations 47 CFR Chapter I Part 15 Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)
Resultado.....: Summary	IN COMPLIANCE
Aprobado por (nombre / cargo y firma) Approved by (name / position & signature)	Rafael López Martín LAB EMC Manager
Fecha de realización Date of issue	2015-09-14
Formato de informe No.: Report template No	FDT08_17

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Competences and guarantees

AT4 wireless 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, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless 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 AT4 wireless at the time of performance of the test.

AT4 wireless 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 AT4 wireless.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of AT4 wireless and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the AT4 wireless 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
45246C/021	Test Board	078-56-C	2708/05	2015-09-14
45246C/014	Test Board	---	---	2015-09-14

Test sample description

The sample consist of an DA14580 RANGE EXTENDER model QFN40 and trademark SmartBond.

Identification of the client

DIALOG SEMICONDUCTOR
Het Zuiderkruis 53.
5215 MV's. Hertogenbosch. Holland

Testing period

The performed test started on 2015-09-03 and finished on 2015-09-04.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 80 %
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

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

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω
Normal site attenuation (NSA)	< ±4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Site VSWR	< ±6 dB at 3m distance between item under test and receiver antenna, (1 GHz to 18 GHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 18 GHz).

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 30 °C
Relative humidity	Min. = 45 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar
Shielding effectiveness	> 100 dB
Electric insulation	> 10 kΩ
Reference resistance to earth	< 1 Ω

Remarks and comments

The tests have been performed by the technical personnel: Eduardo del Nogal & Antonio Jurado.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is $I = \pm 4,37$ dB for quasi-peak measurements, $I = \pm 4,28$ 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 26GHz is $I = \pm 2,62$ dB for peaks and average measurements ($k = 2$).

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
1999	EMI Receptor	ROHDE & SCHWARZ	ESIB 26	2015-06-16	2017-06-16
2932	Bilog Hybrid Antenna	SUNOL	JB6	2014-05-11	2017-05-11
4612	Horn Antenna	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120D	2013-12-29	2016-12-29
4658	RF Amplifier	SCHWARZBECK	BBV9743	2015-03-19	2016-03-19
1975	RF Amplifier	MITEQ	JS4	2014-05-22	2016-05-22
3783	RF Amplifier	BONN ELEKTRONIK	BLMA 0118-3A	2015-05-15	2016-05-15

Appendix A – Test result

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. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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 in Rx mode. Power Supply: 3Vdc.

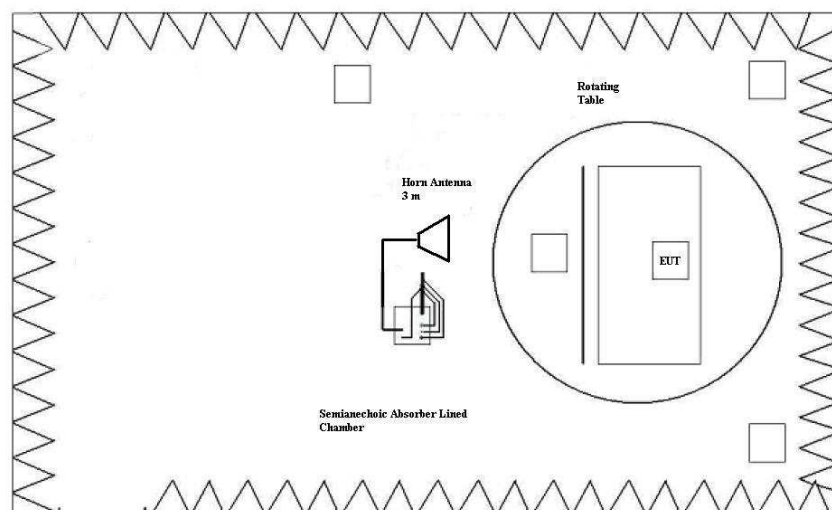
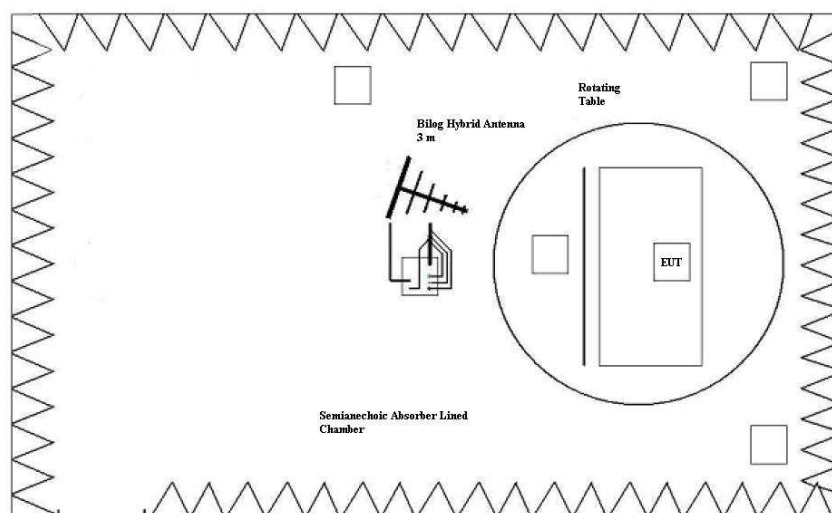
RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B (10-01-13 Edition); ICES-003 ISSUE 5 (2012)

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 15.109, Subpart B (10-01-13 Edition); ICES-003 ISSUE 5 (2012) & ANSI C63.4-2009 in the frequency range 30 MHz to 26 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

Frequency range (MHz)	QP Limit for 3 m ($\mu\text{V/m}$)	QP Limit for 3 m ($\text{dB}\mu\text{V/m}$)
30 to 88	100	40
88 to 216	150	43.52
216 to 960	200	46.02
Above 960	500	53.98
Above 1000	Limit for 3m AVG	Limit for 3m PK
	53.98 $\text{dB}\mu\text{V/m}$	73.98 $\text{dB}\mu\text{V/m}$



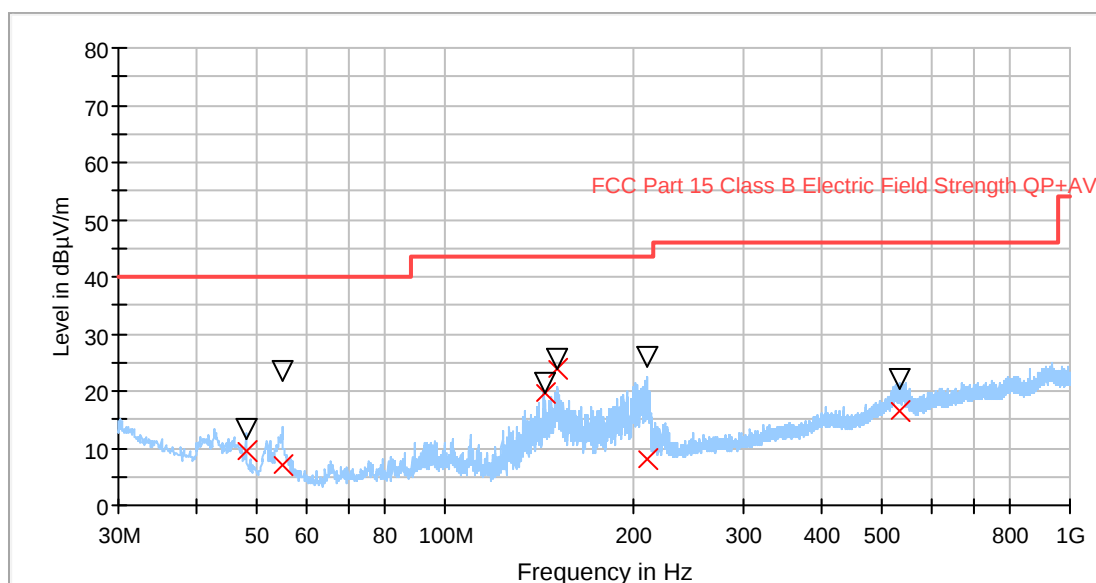
TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	CRmmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode;

CRmmnn	Description	Result
CR0101RB	EUT ON. Bluetooth in Rx mode. Power Supply: 3Vdc. Range: 30 MHz - 1000 MHz.	P
CR0101RA1_PH	EUT ON. Bluetooth in Rx mode. Power Supply: 3Vdc. Range: 1 GHz - 18 GHz. Horizontal Polarization.	P
CR0101RA1_PV	EUT ON. Bluetooth in Rx mode. Power Supply: 3Vdc. Range: 1 GHz - 18 GHz. Vertical Polarization.	P
CR0101RA2_PH	EUT ON. Bluetooth in Rx mode. Power Supply: 3Vdc. Range: 18 GHz - 26 GHz. Horizontal Polarization.	P
CR0101RA2_PV	EUT ON. Bluetooth in Rx mode. Power Supply: 3Vdc. Range: 18 GHz - 26 GHz. Vertical Polarization.	P

Radiated Emission. CR0101RB

Project: 45246REM.004
 Company: DIALOG SEMICONDUCTOR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. RX BTLE . Power supply: 3 VDC.

Full Spectrum



— Preview Result 1-PK+
 — FCC Part 15 Class B Electric Field Strength QP+AV
 X QuasiPeak-QPK
 ▽ MaxPeak-PK+

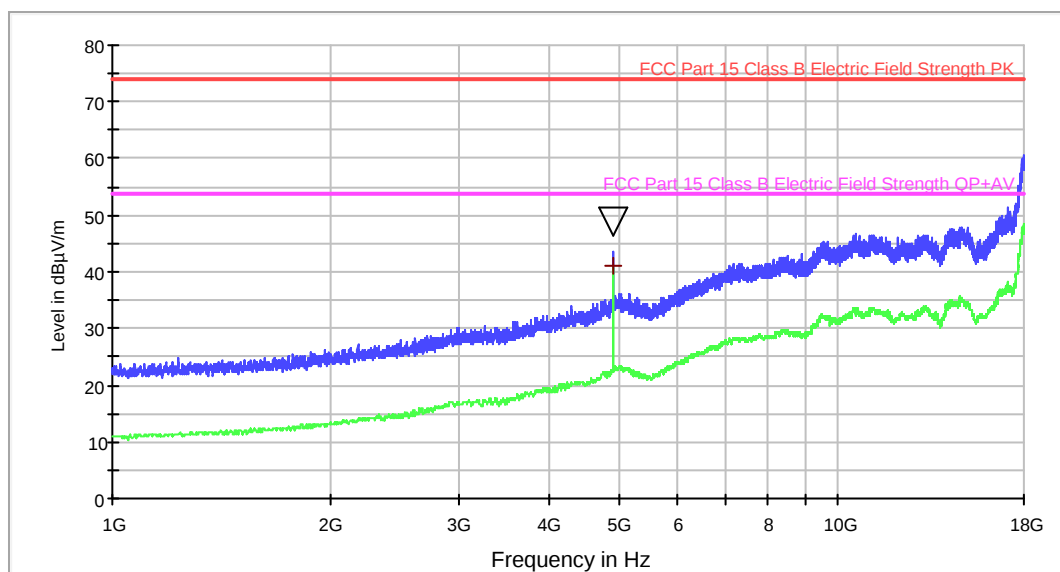
Maximizations

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
48.025974	9.32	13.31	190.0	V	341.0
55.068831	7.13	23.39	291.0	V	320.0
144.305195	19.72	21.52	104.0	V	251.0
151.012987	23.92	25.62	98.0	V	324.0
209.993506	8.21	25.94	355.0	V	119.0
534.474026	16.59	22.19	141.0	H	241.0

Radiated Emission. CR0101RA1_PH

Project: 45246REM.004
 Company: DIALOG SEMICONDUCTOR
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. RX BTLE. Power supply: 3 VDC. Horizontal Polarization.

ER EMI FCC 15 Class B AMP_4659 (1-18GHz)



— Peak Scan
— FCC Part 15 Class B Electric Field Strength PK
— Average Scan
— FCC Part 15 Class B Electric Field Strength QP+AV
▽ MaxPeak-PK+ (Single)
+ Average-AVG (Single)

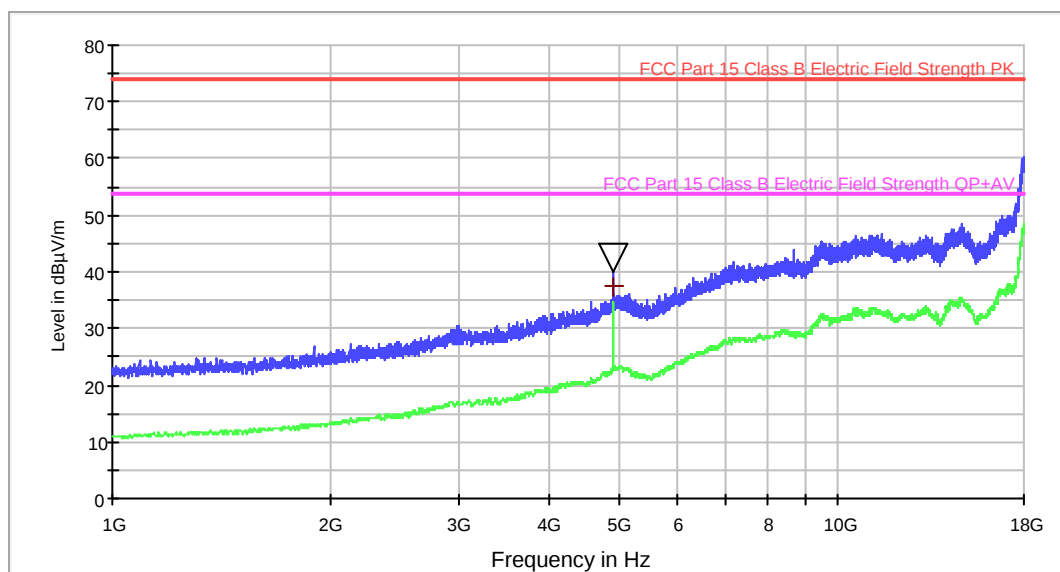
Maximizations

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Polarization
4882.000000	48.7	41.2	H

Radiated Emission. CR0101RA1PV

Project: 45246REM.004
 Company: DIALOG
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. RX BTLE. Power supply: 3 VDC. Vertical Polarization.

ER EMI FCC 15 Class B AMP_4659 (1-18GHz)



— Peak Scan
 — FCC Part 15 Class B Electric Field Strength PK
 ▽ MaxPeak-PK+ (Single)
 — Average Scan
 — FCC Part 15 Class B Electric Field Strength QP+AV
 + Average-AVG (Single)

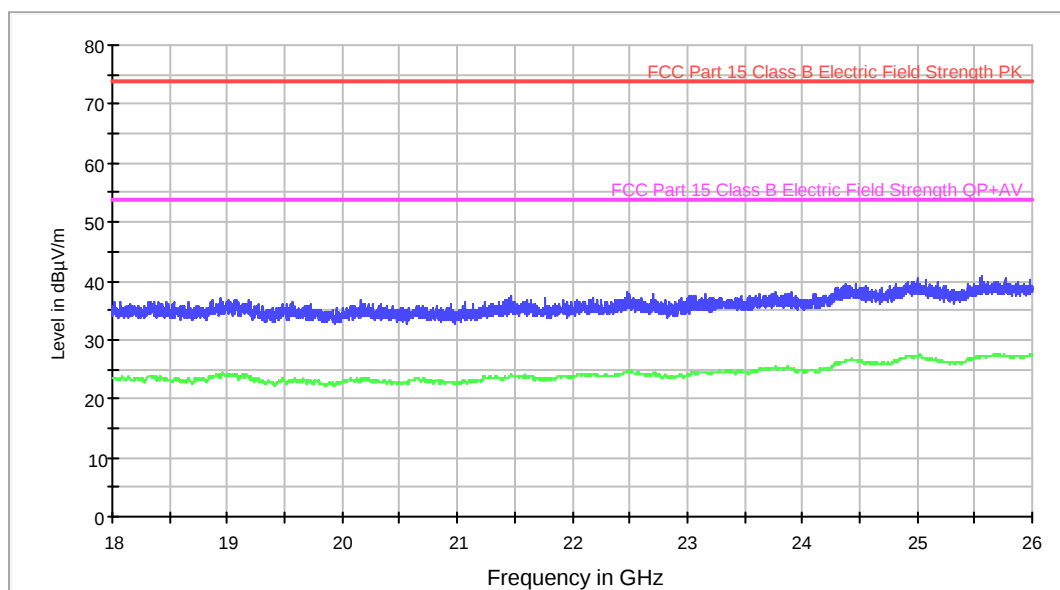
Maximization

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Polarization
4882.000000	42.5	37.6	V

Radiated Emission. CR0101RA2_PH

Project: 45246REM.004
 Company: DIALOG
 Sample: S/01
 Operation mode: OM#01
 Description: EUT ON. RX BTLE. Power supply: 3 VDC. Horizontal Polarization.

ER EMI FCC 15 Class B AMP_4729 (18-26GHz)



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

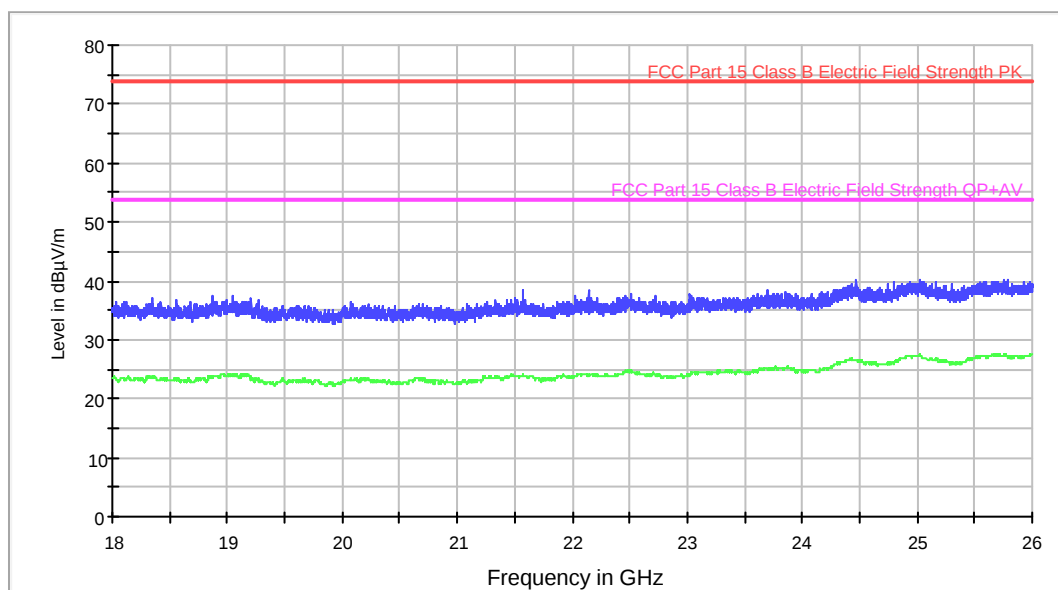
Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Polarization
18014.000000	36.5	23.6	H
18942.000000	37.2	24.0	H
19575.000000	36.4	23.2	H
20159.000000	36.8	23.0	H
21476.000000	37.4	24.0	H
21770.000000	37.0	23.2	H
22478.000000	38.1	24.7	H
23902.000000	38.3	25.0	H
24998.000000	40.5	27.2	H
25568.000000	40.7	27.2	H

Radiated Emission. CR0101RA2_PV

Project: 45246REM.004
Company: DIALOG
Sample: S/01
Operation mode: OM#01
Description: EUT ON. RX BTLE. Power supply: 3 VDC. Vertical Polarization.

ER EMI FCC 15 Class B AMP_4729 (18-26GHz)



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

Subrange Maxima

Frequency (MHz)	MaxPeak-ClearWrite (dBµV/m)	Average-ClearWrite (dBµV/m)	Polarization
18345.000000	37.1	23.6	V
19044.000000	37.4	24.0	V
20074.000000	36.3	23.1	V
20673.000000	36.2	23.1	V
21579.000000	38.4	23.9	V
22140.000000	38.5	23.9	V
22514.000000	37.9	24.8	V
23707.000000	38.3	24.9	V
25031.000000	40.1	27.3	V
25788.000000	40.1	27.2	V

Appendix B - Photographs

