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TEST REPORT

REFERENCE STANDARD:

FCC Rules and Regulations 47 CFR Part 15.109

FCC Rules and Regulations 47 CFR Part 15.109: Limits and methods of measurements for radio frequency devices. Unintentional radiators

NIE..... : 35012REM.002
 Approved by : Rafael López
 (name / position & signature) : EMC Manager
 Elaboration date : 2012-03-01

Rafael López
Martín
 Firmado digitalmente
 por Rafael López Martín
 Fecha: 2012.03.02
 12:46:41 +01'00'

Identification of item tested : GG864-2.4
 Trademark : Telit
 Model and/or type reference : GG864-2.4
 Other identification of the product : S/N: FKDJ0601307+
 HW Version: Rev2
 SW Version: P4.01.0001_A2.00.06
 FCC ID: RI7GG864
 IC ID: 5131A-GG864
 Features : Gateway GSM/GPRS - 802.15.4
 Description : Gateway GSM/GPRS - 802.15.4

Applicant : TELIT COMMUNICATIONS SPA
 Address : Loc. Sa Illetta, S.S. 195 km 2.300
 09122 – Cagliari – Italy
 CIF/NIF/Passport..... : 03711600266
 Contact person : Gianmarco Melosu
 Telephone / Fax : +39 0704603246
 e-mail : Gianmarco.melosu@telit.com

Test samples supplier	TELIT COMMUNICATIONS SPA
Address	Loc. Sa Illetta, S.S. 195 km 2.300 09122 – Cagliari – Italy
CIF/NIF/Passport.....	03711600266
Contact person	Gianmarco Melosu
Telephone / Fax	+39 0704603246
e-mail	Gianmarco.melosu@telit.com
Manufacturer	TELIT RF TECHNOLOGIES
Address	Rue Evariste Galois – Emerald square Bâtiment D, 06410 Sophia-Antipolis, France
CIF/NIF/Passport.....	FR55 451625289
Contact person	Xavier Tatopoulos
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e-mail	Xavier.tatopoulos@telit.com
Test method requested	
Standard.....	FCC Rules and Regulations 47 CFR Part 15.109
Test procedure.....	PEEM103
Report template No.....	FDT08_12
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Competences and guarantees

This certificate of conformity was issued in accordance with the decision N° 3/2000 of the Joint Committee established under the Agreement on Mutual Recognition between the European Community and the United States of America. By this decision, AT4 wireless can act as Conformity Assessment Body (CAB) on Electromagnetic Compatibility. This Certificate applies to the samples listed at technical reports.

This laboratory is designed by the Federal Communications Commission (ES0004)

AT4 wireless is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance programme 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.

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 following AT4 wireless's internal documents:

1. PODT000: Procedure for the measure uncertainty calculation.

Usage of samples

Samples undergoing test have been selected by: The client.

The sample S/01 is composed of the following elements:

<u>Control N°</u>	<u>Description</u>	<u>Manufacturer / Model</u>	<u>Serial N°</u>	<u>Date of reception</u>
32694/01	Antenna	Telit / ---	---	2011/04/05
32694/03	Antenna	Telit / ---	---	2011/04/05
32694/04	Enclosure of the wireless device	Telit / ---	---	2011/04/05
32694/05	Battery	--- / ---	---	2011/04/05
32694/13	Gateway GSM/GPRS – 802.15.4	Telit / GG864-2.4	S/N: FKDJ0601307+ HW Version: Rev2 SW Version: P4.01.0001_A2.00.06 FCC ID: RI7GG864 IC ID: 5131A-GG864	2011/04/05
32694/16	DC mains cable	--- / ---	---	2011/04/05

Auxiliary elements used with the sample S/01:

<u>Control N°</u>	<u>Description</u>	<u>Manufacturer / Model</u>	<u>Serial N°</u>	<u>Date of reception</u>
32694/02	Antenna	Telit / ---	---	2011/04/05
32694/07	AC/DC Adapter	--- / FBC12050	---	2011/04/05
32694/09	PCB	--- / ZE60-2.4	---	2011/04/05
32694/10	Gateway GSM/GPRS – 802.15.4	Telit / Telit GG864-2.4	S/N: FTIC5000126+ HW Version: Rev2 SW Version: P4.01.0001_A2.00.06 FCC ID: RI7GG864 IC ID: 5131A-GG864	2011/04/05

Samples S/01 has undergone the next test(s):

- Radiated emission, electromagnetic field:
 - Standard: FCC Rules and Regulations 47 CFR Part 15.109
 - Method: FCC Rules and Regulations 47 CFR Part 15, Subpart B (Class B)

Testing period

The performed test started on 2012-01-12 and finished on the 2012-01-13.

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 k Ω
Reference resistance to earth	< 0,5 Ω

In the semianechoic chamber (21 meters x 11 meters x 8 meters), 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 k Ω
Reference resistance to earth	< 0,5 Ω
Normal site attenuation (NSA)	< \pm 4 dB at 10 m distance between item under test and receiver antenna, (30 MHz to 1000 MHz)
Field homogeneity	More than 75% of illuminated surface is between 0 and 6 dB (26 MHz to 1000 MHz).

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 k Ω
Reference resistance to earth	< 0,5 Ω

Summary

Considering the results of the performed test according to standard **FCC Rules and Regulations 47 CFR Part 15.109**, the items under test are **IN COMPLIANCE** with the requested specifications specified in the standard.

NOTE: The results presented in this Test Report apply only to the particular item under test established in page 1 of this document, as presented for test on the date(s) shown in section, "USAGE OF SAMPLES, TESTING PERIOD AND ENVIRONMENTAL CONDITIONS".

Remarks and comments

The tests have been realized by the technical personnel: José Manuel Marquez.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1 GHz is $I = \pm 4,57$ dB for quasi-peak measurements, $I = \pm 4,48$ dB for peak measurements ($k = 2$) and from 1 to 12,75 GHz is $I = \pm 3,43$ dB for average and peak measurements.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 12,75 GHz to 26 GHz is $I = \pm 4,09$ dB for average and peak measurements.

Testing verdicts

Not applicable: NA
Pass.....: P
Fail: F
Not measured.....: NM

APPENDIX A

Test Result

APPENDIX A CONTENT:

DESCRIPTION OF THE OPERATION MODES.....	9
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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.

In the following table appears the operation modes used by the samples tested to that it refers the present test report.

OPERATION MODE	DESCRIPTION
OM#01	EUT ON. Zigbee module in receive mode at channel 26.
OM#02	EUT ON. GSM module in IDLE mode 850MHz.
OM#03	EUT ON. GSM module in IDLE mode 1900MHz.

RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE.

LIMITS:	Product standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B
	Test standard:	FCC RULES AND REGULATIONS 47 CFR PART 15, SUBPART B

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 in the frequency range 30 MHz to 25 GHz, for Class B equipment, which is a transmitter in a band over 500 MHz, was:

Frequency range (MHz)	Limit for 3 m ($\mu\text{V/m}$)	Limit for 3 m (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

TESTED SAMPLES:

S/01

TESTED OPERATION MODES:

OM#01; 02 & 03

TEST RESULTS :

CRmmnn: CR, Radiation Condition; mm: Sample number; nn: Operation mode, xx: Polarisation.

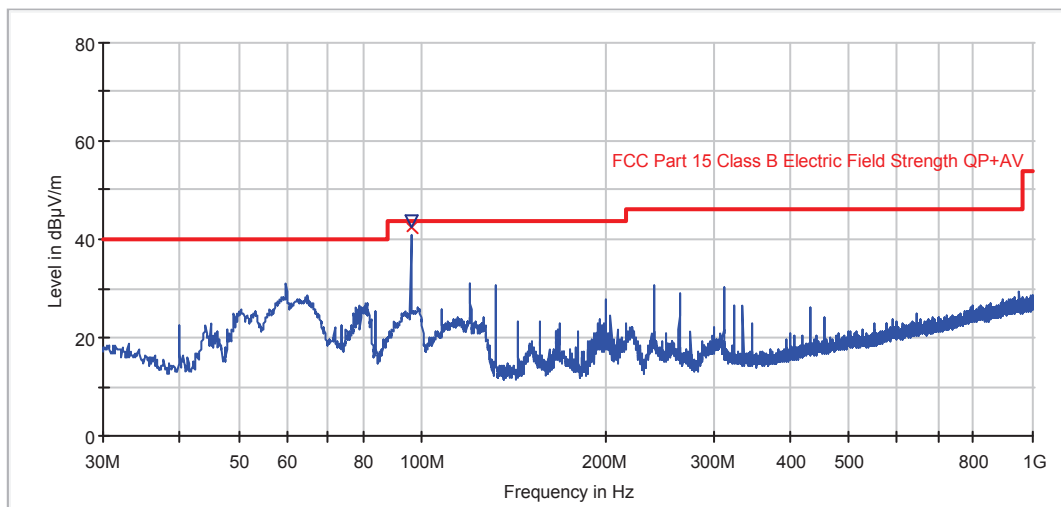
CRmmnn	Description	Result
CR0101	EUT ON. Zigbee module in receive mode at chanel 26. Range 30-1000 MHz. Horizontal / Vertical polarization	P
CR0101_PH	EUT ON. Zigbee module in receive mode at chanel 26. Range 1-18 GHz. Horizontal polarization.	P
CR0101_PV	EUT ON. Zigbee module in receive mode at chanel 26. Range 1-18 GHz. Vertical polarization.	P
CR0101_PH	EUT ON. Zigbee module in receive mode at chanel 26. Range 18-25 GHz. Horizontal polarization.	P
CR0101_PV	EUT ON. Zigbee module in receive mode at chanel 26. Range 18-25 GHz. Vertical polarization.	P
CR0102	EUT ON. GSM module in IDLE mode 850MHz. Range 30-1000 MHz. Horizontal / Vertical polarization	P
CR0102_PH	EUT ON. GSM module in IDLE mode 850MHz. Range 1-18 GHz. Horizontal polarization.	P
CR0102_PV	EUT ON. GSM module in IDLE mode 850MHz. Range 1-18 GHz. Vertical polarization.	P
CR0102_PH	EUT ON. GSM module in IDLE mode 850MHz. Range 18-25 GHz. Horizontal polarization.	P
CR0102_PV	EUT ON. GSM module in IDLE mode 850MHz. Range 18-25 GHz. Vertical polarization.	P

TEST RESULTS :		Cont.
CRmmnn	Description	Result
CR0103	EUT ON. GSM module in IDLE mode 1900MHz. Range 30-1000 MHz. Horizontal / Vertical polarization	P
CR0103_PH	EUT ON. GSM module in IDLE mode 1900MHz. Range 1-18 GHz. Horizontal polarization.	P
CR0103_PV	EUT ON. GSM module in IDLE mode 1900MHz. Range 1-18 GHz. Vertical polarization.	P
CR0103_PH	EUT ON. GSM module in IDLE mode 1900MHz. Range 18-25 GHz. Horizontal polarization.	P
CR0103_PV	EUT ON. GSM module in IDLE mode 1900MHz. Range 18-25 GHz. Vertical polarization.	P

Radiated Emission: CR0101 (30MHz to 1GHz)

Project: 35012REM.002
 Company: TELIT COMMUNICATIONS S.P.A.
 Sample: S/01
 Operation mode: OM#01
 Setup: EMI radiated
 Mode: EUT ON. Zigbee module in receive mode at channel 26.

FCC class B ESPI Bilog Hybrid



— Limit QP — PK Scan × QuasiPeak ▽ MaxPeak

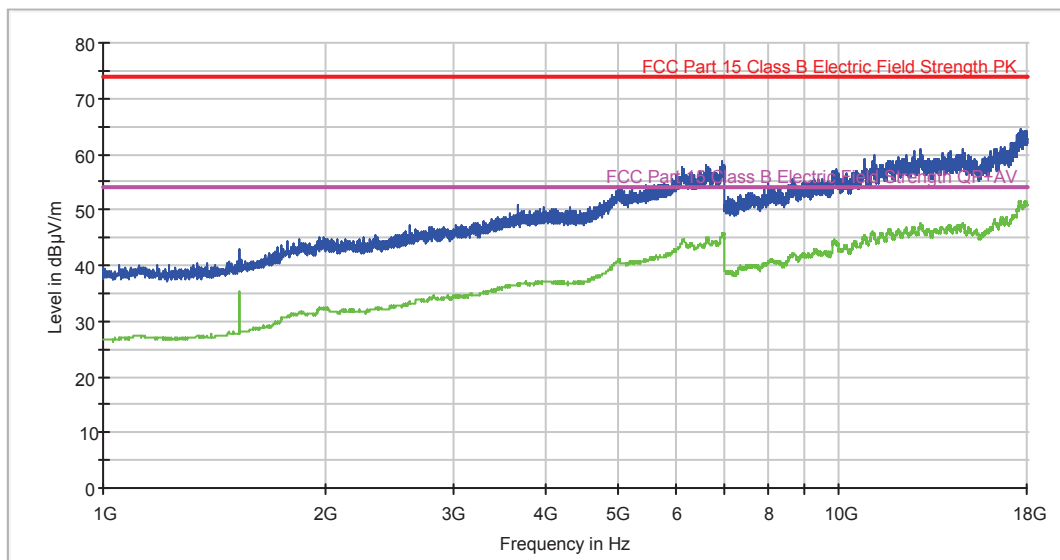
Maximized

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)
95.868000	42.5	43.8	116.00	V	99.0

Radiated Emission: CR0101_PH (1 – 18 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#01
 Date: 2012-01-13 18:01
 Setup: EMI radiated
 Mode: EUT ON. ZigBee module in RX mode. Horizontal polarization.

FCC 1-18GHz class B

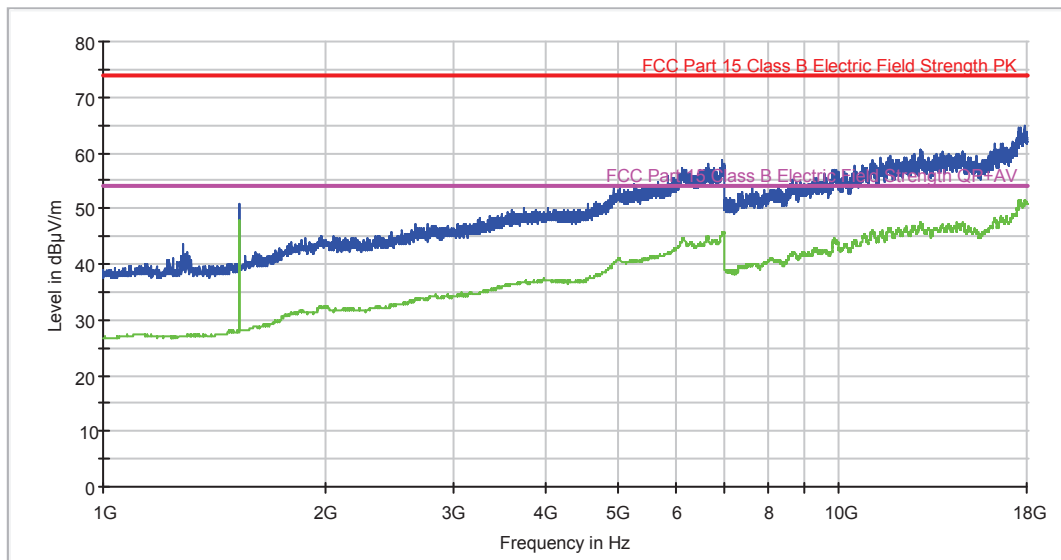


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0101_PV (1 – 18 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#01
 Date: 2012-01-13 18:07
 Setup: EMI radiated
 Mode: EUT ON. ZigBee module in RX mode. Vertical polarization.

FCC 1-18GHz class B

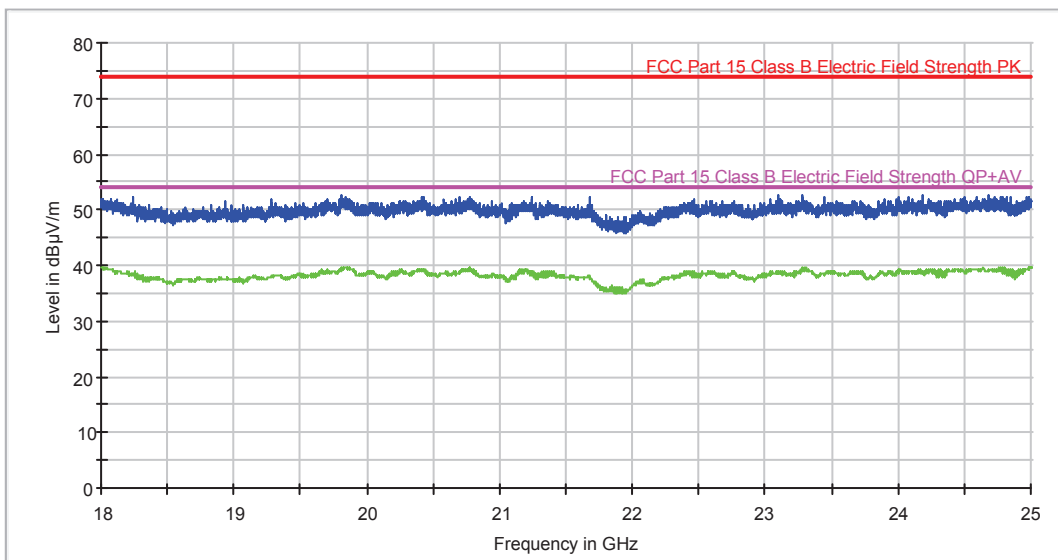


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0101_PH (18 – 25 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#01
 Date: 2012-01-13 19:47
 Setup: EMI radiated
 Mode: EUT ON. ZB module in RX mode. Horizontal polarization.

FCC 18-25GHz class B

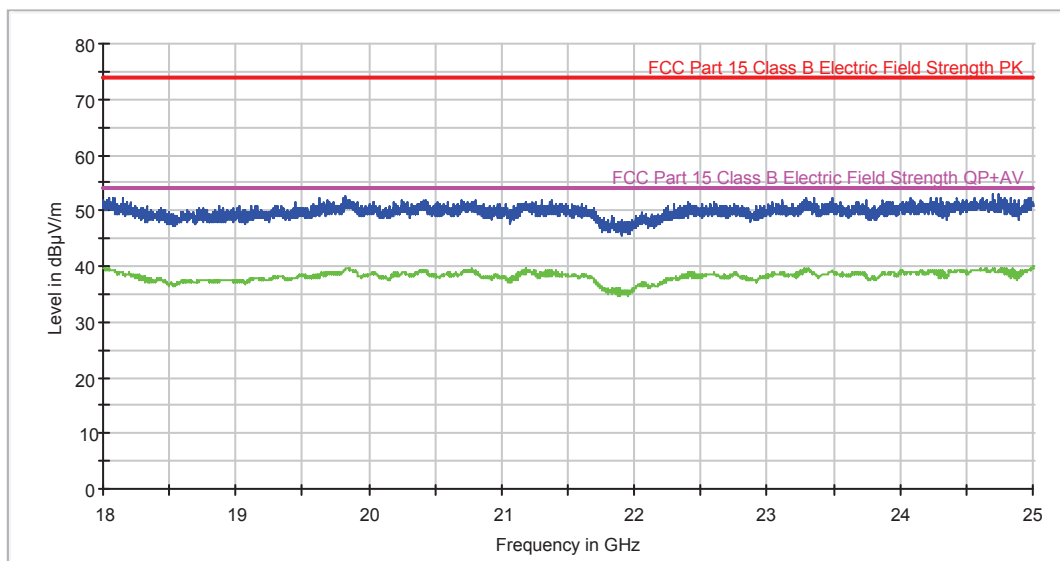


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0101_PV (18 – 25 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#01
 Date: 2012-01-13 20:16
 Setup: EMI radiated
 Mode: EUT ON. ZB module in RX mode. Vertical polarization.

FCC 18-25GHz class B

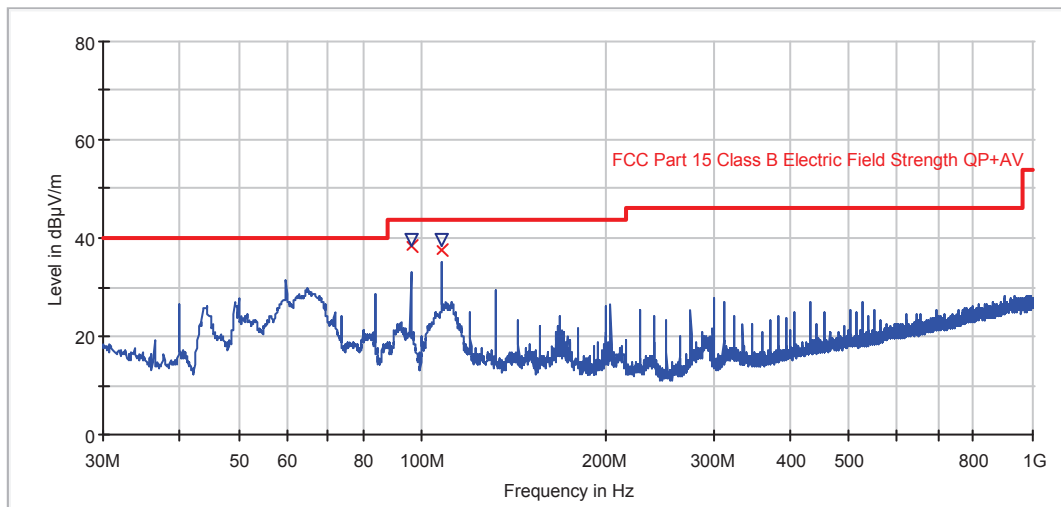


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0102 (30MHz to 1GHz)

Project: 35012REM.002
 Company: TELIT COMMUNICATIONS S.P.A.
 Sample: S/01
 Operation mode: OM#02
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 850MHz.

FCC class B ESPI Bilog Hybrid



— Limit QP — PK Scan × QuasiPeak ▽ MaxPeak

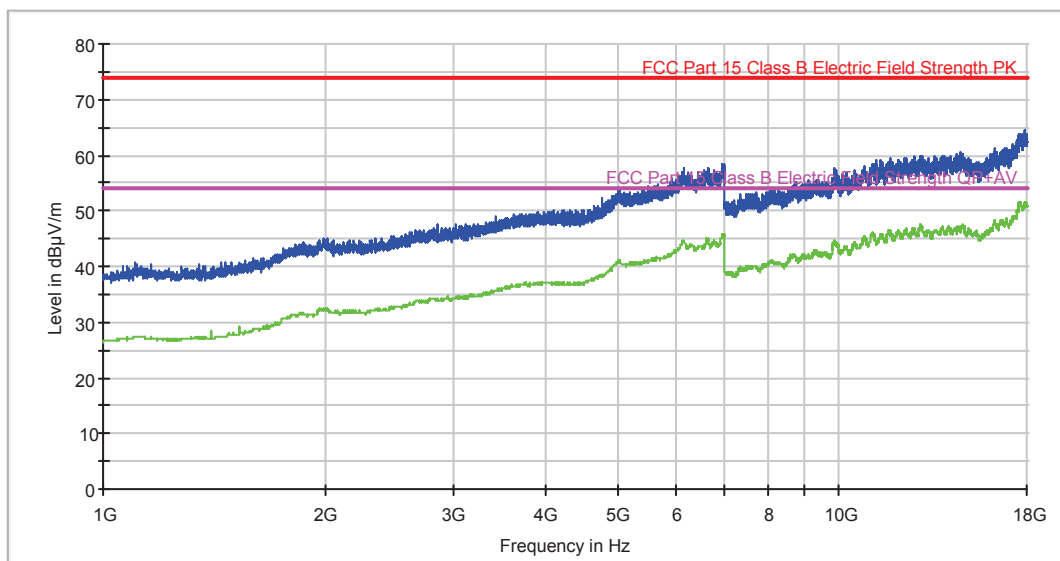
Maximized

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)
95.856000	38.2	39.6	108.00	V	307.0
107.828000	37.6	39.6	98.00	V	115.0

Radiated Emission: CR0102_PH (1 – 18 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#02
 Date: 2012-01-13 17:54
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 850MHz. Horizontal polarization.

FCC 1-18GHz class B

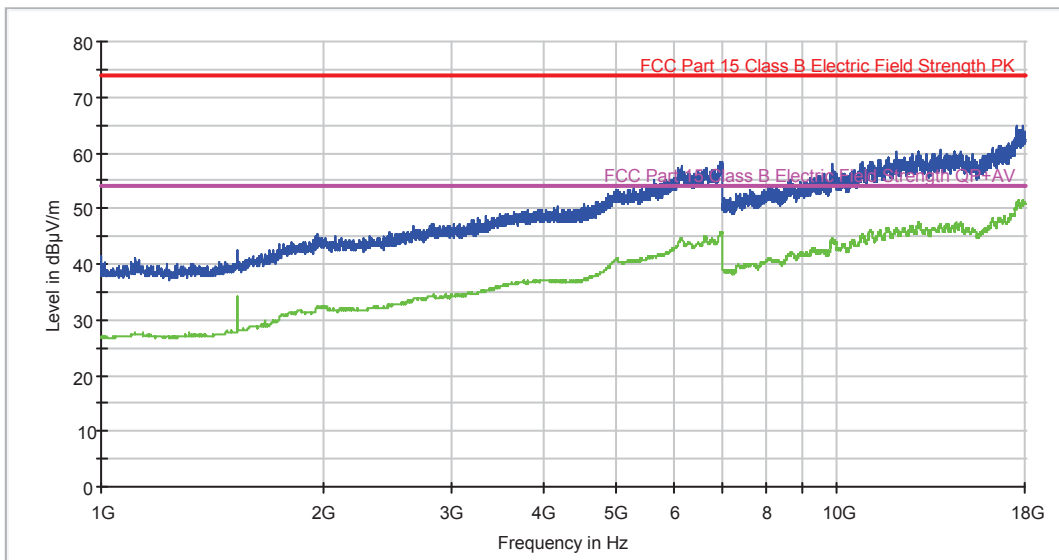


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0102_PV (1 – 18 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#02
 Date: 2012-01-13 17:48
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 850MHz. Vertical polarization.

FCC 1-18GHz class B

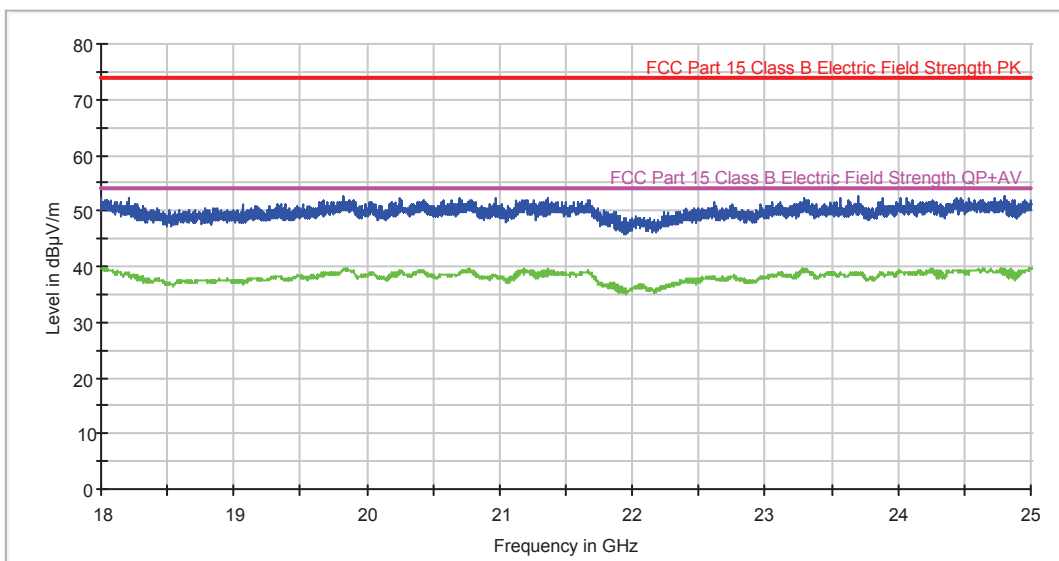


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0102_PH (18 – 25 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#02
 Date: 2012-01-13 19:50
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 850MHz. Horizontal polarization.

FCC 18-25GHz class B

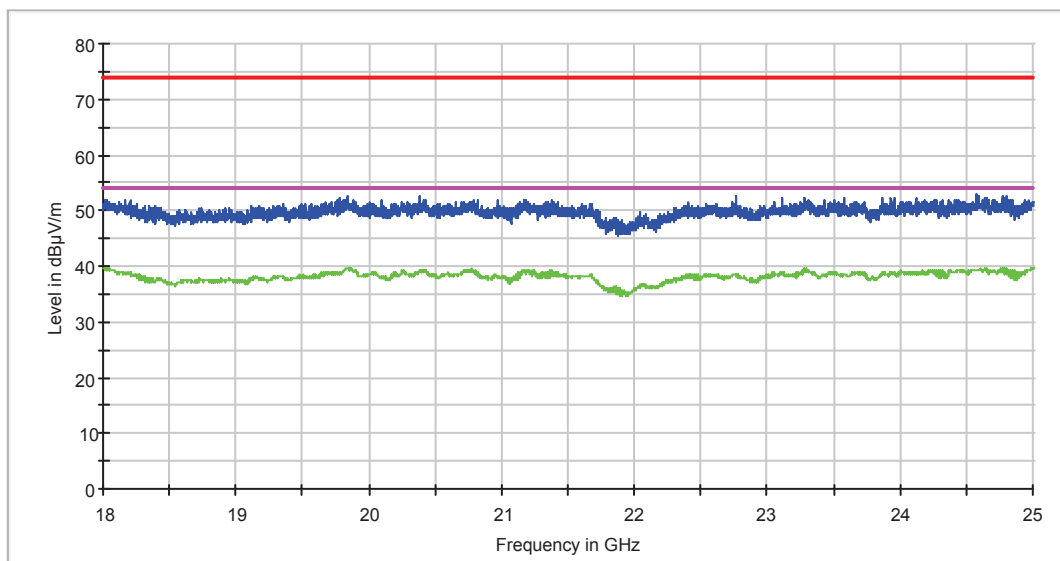


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0102_PV (18 – 25 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#02
 Date: 2012-01-13 20:08
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 850MHz. Vertical polarization.

FCC 18-25GHz class B

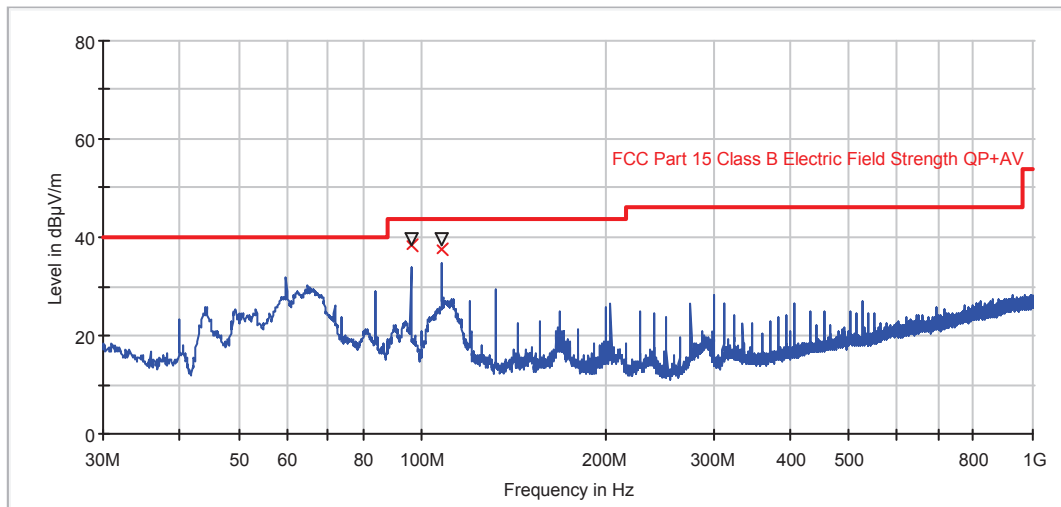


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0103 (30MHz to 1GHz)

Project: 35012REM.002
 Company: TELIT COMMUNICATIONS S.P.A.
 Sample: S/01
 Operation mode: OM#03
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 1900MHz.

FCC class B ESPI Bilog Hybrid



— Limit QP — PK Scan × QuasiPeak ▽ MaxPeak

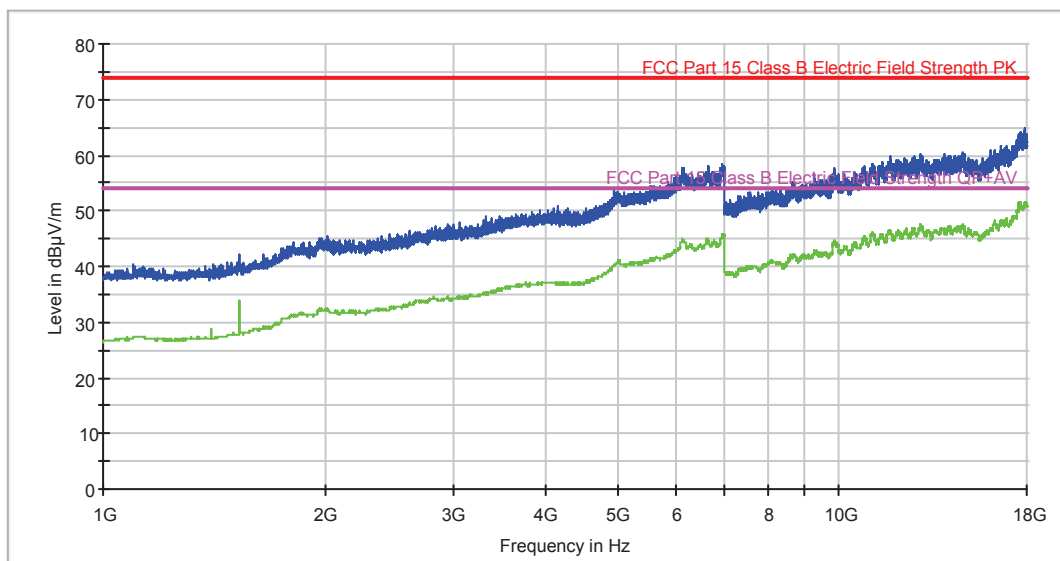
Maximized

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Antenna height (cm)	Polarity	Turntable position (deg)
95.854600	38.1	39.7	108.00	V	302.0
107.912154	37.5	39.8	105.00	V	120.0

Radiated Emission: CR0103_PH (1 – 18 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#03
 Date: 2012-01-13 17:26
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 1900MHz. Horizontal polarization.

FCC 1-18GHz class B

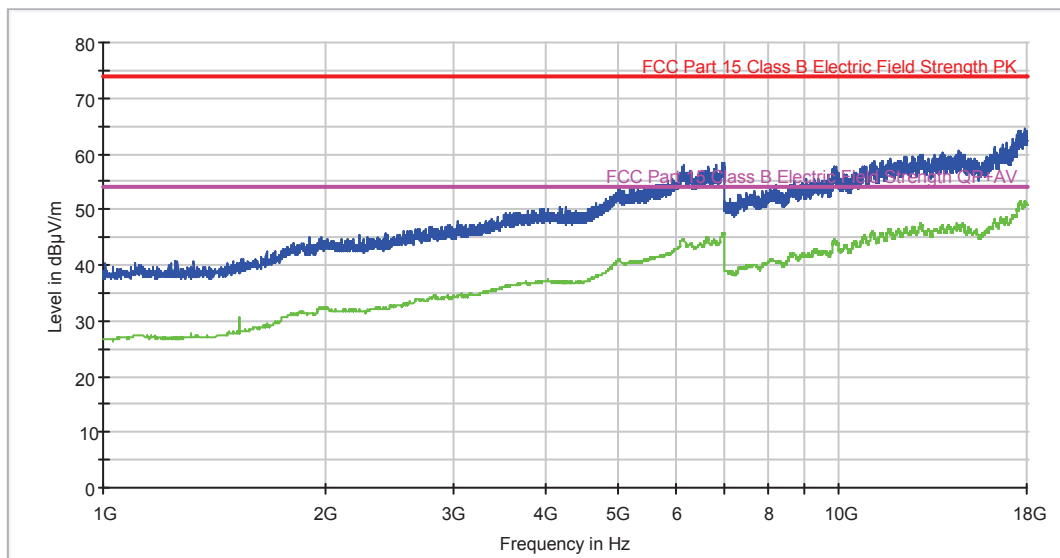


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0103_PV (1 – 18 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#03
 Date: 2012-01-13 17:20
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 1900MHz. Vertical polarization.

FCC 1-18GHz class B

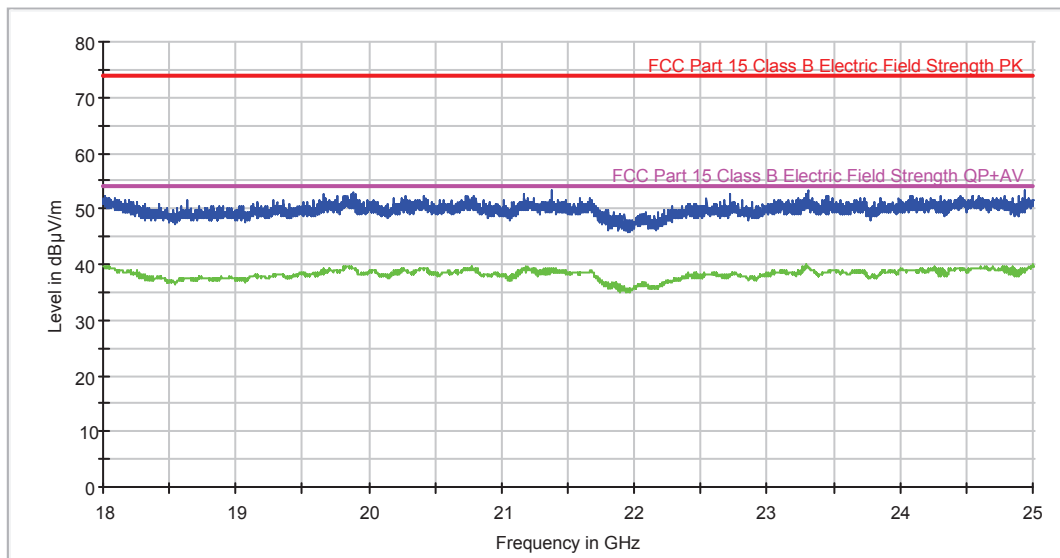


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0103_PH (18 – 25 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#03
 Date: 2012-01-13 19:53
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 1900MHz. Horizontal polarization.

FCC 18-25GHz class B

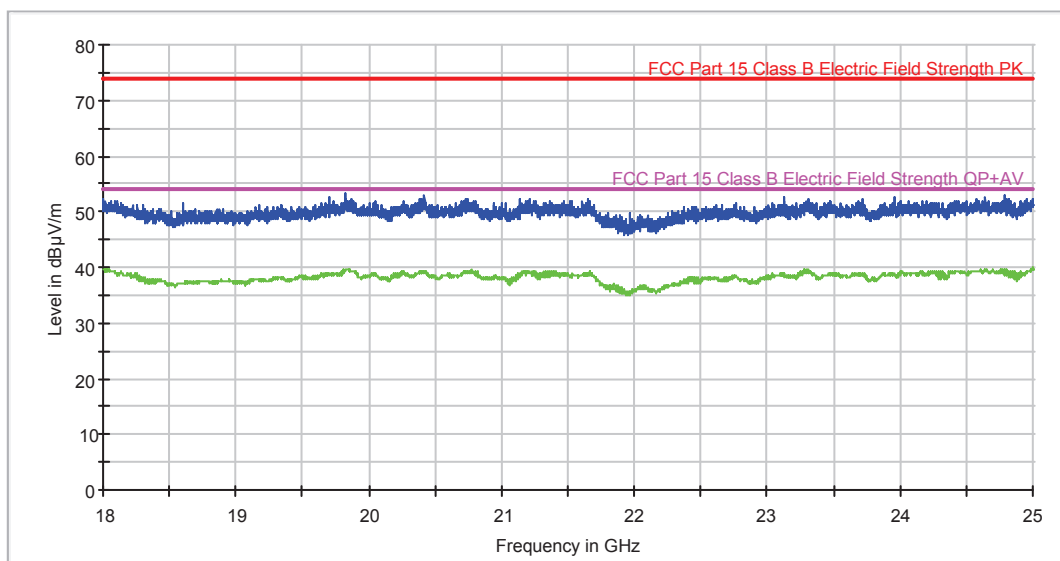


- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Radiated Emission: CR0103_PV (18 – 25 GHz)

Project: 35012REM.002
 Company: TELIT
 Sample: S/01
 Operation mode: OM#03
 Date: 2012-01-13 19:56
 Setup: EMI radiated
 Mode: EUT ON. GSM module in Idle mode 1900MHz. Vertical polarization.

FCC 18-25GHz class B



- MaxPeak-ClearWrite
- Average-ClearWrite
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV