EUROFINS ETS PRODUCT SERVICE GMBH

TEST - REPORT

FCC RULES PARTS 15.247
IC RADIO STANDARDS RSS-210 Issue 7

FCC ID: JYCC610

Model Name: C610

Test report no.: G5M208010006-P-15

ACCREDITED

Certificate #1983.01

Eurofins ETS Product Service GmbH
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1 General information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.
The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.
Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.
The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.
The test report may only be reproduced or published in full.
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Operator:

Date	Eurofins-Lab.	Name	Signature
22.04.2008		D. Hoppe	

Technical responsibility for area of testing:

Date	Eurofins-Lab	Name	Signature
22.04.2008		K. Damm	

1.2 Testing laboratory

1.2.1 Location

EUROFINS ETS PRODUCT SERVICE GMBH
Storkower Straße 38c
D-15526 Reichenwalde b. Berlin
Germany
Telephone : +49 33631 888 00
Telefax : +49 33631 888 660

1.2.2 Details of accreditation status

DAR ACCREDITED TESTING LABORATORY
DAR-REGISTRATION NUMBER: DAT-P-268/08

RECOGNIZED NOTIFIED BODY EMC
REGISTRATION NUMBER: BNetzA-bS EMV-07/61

RECOGNIZED NOTIFIED BODY R&TTE
REGISTRATION NUMBER: BNetzA-bS-02/51-53

FCC FILED TEST LABORATORY
REG.-NO. 96970

A2LA ACCREDITED TESTING LABORATORY
CERTIFICATE NO. 1983.01

BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)
ACCREDITED BY BLUETOOTH QUALIFICATION REVIEW BOARD

INDUSTRY CANADA FILED TEST LABORATORY
REG. NO. IC 3470

1.3 Details of approval holder

Name	: Pantech Co., Ltd.
Street	: Pantech Bldg, I-2 DMC, Sangam-dong
Town	: Mapo-gu, Seoul
Country	: Korea
Telephone	: +82-2-2030-1320
Contact	: Mr. B.W. Kim
E-Mail	: bwkim@pantech.com

1.4 Application details

Date of receipt of application : 05.02.2008
Date of receipt of test item : 05.02.2008
Date of test : 12.03.2008 – 17.03.2008

1.5 Test item

Description of test item : UMTS GSM phone

Type identification : C610

Serial number : without

Photos : See annex A.

Technical data

Frequency band : 2.4 - 2.4835 GHz
Frequency Ch A : 2402 MHz
Frequency Ch B : 2441 MHz
Frequency Ch C : 2480 MHz

Transmitter		**Vnom**	**Vnom –15 %**	**Vnom +15 %**
Power (ch A)	:	Conducted: 0.27 dBm	Conducted: 0.30 dBm	Conducted: 0.32 dBm
Power (ch B)	:	Conducted: -0.22 dBm	Conducted: -0.10 dBm	Conducted: -0.09 dBm
Power (ch C)	:	Conducted: 0.35 dBm	Conducted: 0.34 dBm	Conducted: 0.32 dBm

Antenna Type : internal antenna
Antenna Gain : -4.2 dBi
Power supply : 3.8 V DC 120 V AC/DC Adapter
Operating mode : duplex
Type of modulation : FHSS
Host device : none

Classification :

Fixed Device	☐
Mobile Device (Human Body distance > 20 cm)	☐
Portable Device (Human Body distance < 20 cm)	☒

Manufacturer:
(if applicable)

Name : Pantech Co., Ltd.
Street : Pantech Bldg, I-2 DMC, Sangam-dong
Town : Mapo-gu, Seoul
Country : Korea

Additional information:

The test sample is designed as Bluetooth device. Its pseudorandom hopping scheme, authentication, receiver parameters, synchronization procedure and other parameters are determined by Bluetooth Core Specification.

According to attached declaration of manufacturer this device don't work in master inquiry mode.
So we have only one frequency hopping system and the hopping sequence of the master inquiry mode is not verified.

1.6 Test standards

Technical standard:	FCC Parts:	15.247
	IC Standards:	RSS 210 Issue 7 Annex 8.1

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 2.5 were ascertained in the course of the tests performed. ☐

2.2 Test environment

Temperature	: 25 ° C			
Relative humidity content	: 20 ... 75 %			
Air pressure	: 86 ... 103 kPa			
Details of power supply	: 3.8 V DC		120 V AC/DC Adapter	
Extreme conditions parameters:	: test voltage - extreme	min.:	3.5 V DC	(Vnom – 15%)
		max:	4.2 V DC	(Vnom + 15%)

2.3 Test equipment utilized

No.	Test equipment	Type	Manufacturer
ETS 0012	Biconical Antenna	HK 116	R & S
ETS 0013	LPD Antenna	HL 223	R & S
ETS 0015	Log Periodical Antenna	HL 025	R & S
ETS 0018	Horn antenna	BBHA 9120 D	Schwarzbeck
ETS 0253	Spectrum Analyzer	FSIQ 26	R & S
ETS 0271	Spectrum Analyzer	FSEK 30	R & S
ETS 0288	Artificial mains	ESH2-Z5	R & S
ETS 0311	Anechoic chamber	AC 4	Frankonia
ETS 0474	EMI Test Receiver	ESCS 30	R&S

2.4 General test procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 5.2 using a 50 µH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-2003 6.4 using a spectrum analyzer. The resolution bandwidth of the spectrum analyzer was 100 kHz for measurements below 1 GHz and RBW 1 MHz was used above 1 GHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

FORMULA OF CONVERSION FACTORS for Field strength: The Field Strength at 3 m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBµV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq. (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dBµV + 10.36 dB + 6 dB = 36.36 dBµV/m @ 3 m

ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES: The UUT was placed on a table 80 cm high and with dimensions of 1 m by 1.5 m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to at least 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.
Measurements were made by Eurofins ETS Product Service GmbH at the registered open field test site located at Storkower Str. 38c, 15526 Reichenwalde, Germany.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1 m to 4 m. The antenna was placed in both the horizontal and vertical planes.

RF Exposure Compliance Requirements
According to FCC OET Bulletin 65 Edition 97-01 Supplement C and RSS-102 § 2.5, this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.
The antenna used for this transceiver must not be co-located or operating in conjunction with any other antenna or transmitter.

ANTENNA & GROUND:
This unit uses internal antenna.

2.5 Test results

☒ 1st test ☐ test after modification ☐ production test

SECT.	TEST CASE	FCC 47CFR PART	IC RSS-	Required	Test passed	Test failed
3	*TRANSMITTER PARAMETERS*					
3.1	RF power output conducted	15.247 (b)	210 A8.4	☒	☒	☐
3.2	RF power output radiated (EIRP)	15.247 (b)	210 A8.4	☐	☐	☐
3.3	20dB bandwidth	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.4	Time of occupancy (dwell time)	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.5	Number of hopping channels	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.6	Carrier frequency separation	15.247 (a)(1)	210 A8.1	☒	☒	☐
3.7	Spurious emission conducted	15.247 (d)	210 A8.5	☐	☐	☐
3.8	Spurious emission radiated	15.247 (d)	210 A8.5	☒	☒	☐
3.9	Band-edge compliance	15.247 (d)	210 A8.5	☒	☒	☐
3.10	AC power line conducted emissions	15.207	Gen 7.2.2	☒	☒	☐
4	*RECEIVER PARAMETERS*					
4.1	Radiated emissions	15.107	Gen 7.2.3	☐	☐	☐

3 Transmitter parameters

3.1 RF power output, conducted

Reference

FCC	47 CFR part 15.247 (b)
IC	RSS-210 A 8.4

Method of measurement

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	1 Watt (30 dBm) for systems with ≥ 75 hopping channels
2400 - 2483.5 MHz	1 Watt (30 dBm) for systems with ≥ 75 non - overlapping hopping channels 0.125 Watt (21 dBm) for all other hopping systems, but at least 15 hopping channels
902 - 928 MHz	1 Watt (30 dBm) for systems with ≥ 50 hopping channels 0.25 Watt (24 dBm) for all other hopping systems, but at least 25 hopping channels

Test results

Test conditions	Channel A	Channel B	Channel C
	[dBm]	[dBm]	[dBm]
T_{nom} = 25 ° C V_{nom} = 3.8 V	0.27	0.30	0.32
T_{nom} = 25 ° C V_{min} = 3.5 V	-0.22	-0.10	-0.09
T_{nom} = 25 ° C V_{max} = 4.2 V	0.35	0.34	0.32
Measurement uncertainty	< 3 dB		

See attached diagrams

Test equipment: ETS 0253, ETS 0271

3.2 RF power output, radiated

Reference

FCC	47 CFR part 15.247 (b)
IC	RSS-210 A8.4

Method of measurement

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	4 Watt (36 dBm) for systems with ≥ 75 hopping channels.
2400 - 2483.5 MHz	4 Watt (36 dBm) for systems with ≥ 75 non – overlapping hopping channels 0.631 Watt (28 dBm) for all other hopping systems, but at least 15 hopping channels
902 - 928 MHz	4 Watt (36 dBm) for systems with ≥ 50 hopping channels 1.585 Watt (32 dBm) for all other hopping systems, but at least 25 hopping channels
FCC	The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
IC	Systems in the 2400 - 2483.5 MHz and 5725 - 5850 MHz which have an e.i.r.p. above 4 W are permitted only for point-to-point systems (i.e. point-to-multipoint systems and multiple co-located transmitters transmitting the same information are prohibited from exceeding 4 W e.i.r.p.). Point-to-point systems in these two bands may use higher e.i.r.p. as necessary for satisfactory operation provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers. However, remote stations of point-to-multipoint systems shall be allowed to operate under the same condition as point-to-point systems.

Test Results

Test conditions	Channel A	Channel B	Channel C
	EIRP [dBm]	EIRP [dBm]	EIRP [dBm]
T_{nom} = 25 ° C V_{nom} = 3.8 V	--	--	--
Measurement uncertainty	< 3 dB		

Test equipment: ETS 0012, ETS, 0013, ETS, 0015, ETS 0018, ETS 0253, ETS 0271, ETS 0311

3.3 20 dB bandwidth

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

The 20 dB bandwidth is measured on the lowest, middle and highest hopping channel.
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400 - 2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≤ 1 MHz
2400 - 2483.5 MHz	≤ carrier frequencies separation for hopping systems with max cond. power of 1 Watt ≤ 1.5 of the carrier frequencies separation for hopping systems with max cond. power of 0.125 Watt
902 - 928 MHz	< 250 kHz for systems with ≥ 50 hopping channels 250 kHz ≤ 500 kHz for all other hopping systems

Test results

Test conditions	Channel A	Channel B	Channel C
	kHz	kHz	kHz
T_{nom} = 25 ° C V_{nom} = 3.8 V	956.678	952.278	934.616
Measurement uncertainty	< 10 Hz		

System receiver input bandwidth:
The manufacturer declares that the receiver input bandwidth matches to the bandwidth of the transmitter signal.

Occupied Bandwidth (99%) – RSS Gen

Test conditions	Channel 0	Channel 22	Channel 44
	MHz	MHz	MHz
T_{nom} = 25 °C V_{nom} = 3.8 V	908.216	912.625	912.625
Measurement uncertainty	< 10 Hz		

See attached diagrams

Test equipment: ETS 0271

3.4 Time of occupancy (dwell time)

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

The EUT has its hopping function enabled.
Spectrum analyzer settings:
Span: zero span, centered on hopping channel
RBW: 1 MHz
VBW: > RBW
Sweep: as necessary to capture the entire dwell time per hopping channel
Detector: peak
Trace: max hold

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≤ 0,4 s at measurement period of 30 seconds
2400 - 2483.5 MHz	≤ 0.4 s multiplied by the number of hopping channels employed
902 - 928 MHz	≤ 0,4 s at measurement period of 20 seconds for max 250 kHz 20 dB BW allowed ≤ 0,4 s at measurement period of 10 seconds for max 500 kHz 20 dB BW allowed

Test results

Test conditions	Operating mode	Measurement period	Time of occupancy
		[s]	[ms]
T_{nom} = 25 ° C V_{nom} = 3.8 V	normal transmitting	31,6	185.792
	inquiry mode	--	--
Measurement uncertainty	< 1 µs		

See attached diagrams

Test equipment: ETS 0271

3.5 Number of hopping channels

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400 - 2483.5 MHz and 5725 - 5850 MHz bands shall use at least 75 hopping frequencies.
According to FCC 00-312 appendix B systems in the 2400 - 2483,5 MHz band may utilize hopping channels whose 20 dB bandwidth is greater than 1 MHz provide the systems use at least 15 non-overlapping channels.

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	≥ 75 hopping channels
2400 - 2483.5 MHz	≥ 75 hopping channels for >0.125 Watt ≥ 15 hopping channels for ≤0.125 Watt
902 - 928 MHz	≥ 50 hopping channels for >0.25 Watt ≥ 25 hopping channels for ≤0.25 Watt

Test results

Test conditions	Operating mode	Number of channel
T_{nom} = 25 ° C V_{nom} = 3.8 V	Normal transmitting	79
	Inquiry mode	--

See attached diagrams

Test equipment: ETS 0271

3.6 Carrier frequency separation

Reference

FCC	CFR part 15.247 (a)(1)
IC	RSS-210 A8.1

Method of measurement

Carrier frequency separation was measured with modulation (declared by manufacturer)

Limits

Frequency band	FCC and IC
5725 - 5850 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater, but ≤ 1 MHz
2400 - 2483.5 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater minimum of 25 kHz or 2/3 of the 20 dB bandwidth of the hopping channel, whichever is greater, for Pout ≤ 0.125 W
902 - 928 MHz	minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater

Test results

Test conditions	Channel B	Channel Separation
	[GHz]	[kHz]
T_{nom} = 25 ° C V_{nom} = 3.8 V	2.441	1014.02
Measurement uncertainty	< 10 Hz	

See attached diagram

Test equipment: ETS 0271

3.7 Spurious emission conducted

Reference

FCC	CFR part 15.247 (d)
IC	RSS-210 A8.5

Method of measurement

The EUT is connected to the spectrum analyzer via a low loss cable. If the EUT is not equipped with and antenna connector, a temporary antenna connector has to be installed. The EUT is switched on, the hopping function is disabled.
The analyzer setting was as following:

Frequency range	RES bandwidth		Video bandwidth	
	Pk	Avg	Pk	Avg
f < 1 GHz	100 kHz	100 kHz	100 kHz	100 kHz
f > 1 GHz	1 MHz	1 MHz	1 MHz	1 MHz

Limits

FCC	20 dB below peak output power
IC	20 dB below peak output power

Test results

Frequency	**Result [dBm]**	**Limit [dBm]**	**Margin [dB]**	**Reference level [dBm]**
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--
--	--	--	--	--

3.8 Spurious emission radiated

Reference

FCC	CFR part 15.247(d), 15.205. 15.209, 15.35
IC	RSS-210 A8.5, RSS-210 2.7

Method of measurement

Spurious emission was measured with modulation (declared by manufacturer).

According to 47 CFR 15, Part 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.
If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Calculation of Limit:

All results are updated by an automatic measuring system in accordance to point 2.3

Limit = max. reading (because peak detector is used)
91.14 dBµV/m

Limit = Max. reading - 20 dB (because average detector is used)
91.14 dBµV/m - 20 dB = 71.14 dBµV/m

Limits for restricted bands

<table>
<tr><td rowspan="8">FCC & IC</td><td colspan="3">20 dB below peak output power, emissions which fall in the restricted bands (15.205(a)) / (RSS-210 2.7) must comply the following limits:
Frequencies below 1GHz:</td></tr>
<tr><td>Frequency of emission</td><td>Field strength</td><td>Field strength</td></tr>
<tr><td>[MHz]</td><td>[µV / m]</td><td>[dBµV / m]</td></tr>
<tr><td>30 - 88</td><td>100</td><td>40.0</td></tr>
<tr><td>88 - 216</td><td>150</td><td>43.5</td></tr>
<tr><td>216 - 960</td><td>200</td><td>46.0</td></tr>
<tr><td>Above 960</td><td>500</td><td>54.0</td></tr>
<tr><td colspan="3">For frequencies above 1 GHz (Avg measurements): 54.0 dBµV / m
For frequencies above 1 GHz (Pk measurements):
Limit + 20 dB = 54.0 dBµV / m + 20 dB = 74 dBµV / m</td></tr>
</table>

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results.

The peak and average spurious emission plots was measured with the average limits.
In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

If in the column‘s correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the “Marker-Delta-Method“ or the „Duty-Cycle Correction Factor“.

15.35 (c) Duty cycle correction average value

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Duty cycle correction = 20 log (dwell time / 100 ms or less)

DA 00-705 Duty cycle correction **peak value**

The analyzer setting was as following:

Frequency range	RES bandwidth		Video bandwidth	
	Pk	Avg	Pk	Avg
f < 1GHz	100 kHz	100 kHz	10 Hz	10 Hz
f > 1GHz	1 MHz	1 MHz	10 Hz	10 Hz

Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20 log (dwell time / 100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Test results

Summary table with radiated data of the test plots

Freq.	Used Ch.	Frequency Marker [GHz]	Polari-zation	Δ correc-tions dB	Max. Field Strength [dBµV/m]	Compliance Limit [dBµV/m]	Detec-tor	BW [MHz]	Margin [dB]
3	H	2.487	V		59.27	74	Peak	1	-14.73
3	H	2.488	V		31.95	54	AV	1	-22.05

Freq. - Frequency Range:
1: 30 – 200 MHz
2: 200 – 1000 MHz
3: 1 – 4 GHz
4: 4 – 8 GHz
5: 8 – 12 GHz
6: 12 – 17 GHz
7: 17 – 26,5 GHz

All other not noted test plots do not contain significant test results in relation to the limits.

See attached diagrams.

Test equipment: ETS 0012, ETS 0013, ETS 0015, ETS 0018, ETS 0271, ETS 0253, ETS 0311

3.9 Band edge compliance

Reference

FCC	CFR part 15.247 (d)
IC	RSS-210 A8.5

Method of measurement
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required.

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Limits

FCC	20 dB below peak output power
IC	20 dB below peak output power

Test results

Test conditions	**Single frequency (hopping disabled)**	
	Lower band-edge	Upper band-edge
T_{nom} = 25 ° C V_{nom} = 3.8 V	45.42 dB	46.02 dB
Measurement uncertainty	< 100 Hz	

Test conditions	**Hopping frequency (hopping enabled)**	
	Lower band-edge	Upper band-edge
T_{nom} = 25 ° C V_{nom} = 3.8 V	44.21 dB	44.37 dB
Measurement uncertainty	< 100 Hz	

See attached diagrams.

Test equipment: ETS 0271

3.10 AC power line conducted emissions

Reference

FCC	CFR part 15.207
IC	RSS-Gen 7.2.2

Method of measurement

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Limits

	Frequency of emission	Conducted limit field strength [dBµV]	
	[MHz]	Quasi Peak	Avg
FCC & IC	0.15 - 0.5	66 to 56	56 - 46
	0.5 - 5	56	46
	5 - 30	60	50

Test results

Frequency	Level	
	Quasi-peak	Average
150 kHz	Lower limit line	Lower limit line

See attached diagrams.

Test equipment: ETS 0288, ETS 0474

4 Receiver parameters

4.1 Radiated emissions

Reference

FCC	Part 15.109
IC	RSS-Gen 7.2.3

Method of measurement

The compliance of the EUT Receiver with the Limits of spurious emissions was performed according to the radiated measurement method.

The spectrum analyzer RBW was set to 100 kHz for measurements below 100 kHz and 1.0 MHz above 1.0 GHz. The measurement results are evaluated according to the procedure described in section 2.4 of this test report.

Limits

	Spurious frequency	Field strength
	MHz	microvolt/m at 3 meter
FCC & IC	30 - 88	100
	88 - 216	150
	216 - 960	200
	above 960	500

Test Results

Device Frequency 2441 MHz	Frequency marker indication [MHz]	Antenna polarization	Worst case emission level [µV/m]	Compliance limit [µV/m]	Results [µV/m]
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Not required.

Test equipment: --

Annex

A	Pictures	11 pages
B	RF power output conducted	9 pages
C	20 dB bandwidth	6 pages
D	Time of occupancy (dwell time)	2 pages
E	Number of hopping frequencies	4 pages
F	Carrier frequency separation	1 page
G	Spurious emission radiated	44 pages
H	Band-edge compliance	4 pages
I	AC power line conducted emissions	2 pages
J	Receiver radiated emissions	-- pages