

TEST REPORT

of

FCC Part 15 Subpart B&C §15.247/ RSS-210 Issue 7, RSS-Gen Issue 2

FCC ID/IC Certification: BEJC900K / 2703C-C900B

Equipment Under Test : Cellular/PCS GSM/EDGE and WCDMA Phone
with Bluetooth & WLAN
Model Name : LG-C900k, C900k, LG-C900B, C900B
Serial No. : N/A
Applicant : LG Electronics Inc.
Manufacturer : LG Electronics Inc.
Date of Test(s) : 2010.09.27 ~ 2010.10.04
Date of Issue : 2010.10.05

In the configuration tested, the EUT complied with the standards specified above.

Tested By:



Date

2010.10.05

Duke Ko

Approved By



Date

2010.10.05

Charles Kim

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1. General Information

1.1. Testing Laboratory

SGS Testing Korea Co., Ltd.

- 705, Dongchun-Dong Sooji-Gu, Yongin-Shi, Kyungki-Do, South Korea.

- Wireless Div. 2FL, 18-34, Sanbon-dong, Gunpo-si, Gyeonggi-do, Korea 435-040

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Telephone : +82 +31 428 5700

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1.2. Details of Applicant

Applicant : LG Electronics Inc.

Address : 60-39, Gasan-dong, Gumchon-gu, Seoul, 153-023, Korea

Contact Person : Kim, Hyeon Kyun

Phone No. : +82 +2 2033 1113

1.3. Description of EUT

Kind of Product	Cellular/PCS GSM/EDGE and WCDMA Phone with BT & WLAN
Model Name	LG-C900k, C900k, LG-C900B, C900B
Serial Number	N / A
Power Supply	DC 3.7 V (Li-ion Battery)
Frequency Range	2 402 ~ 2 480 MHz
Modulation Technique	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels	79
Antenna Type	Integral Type (PIFA Antenna)
Antenna Gain	0.73 dB i

1.4. Declaration by the manufacturer

- WLAN & BT can not transmit simultaneously.

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1.5. Information about the FHSS characteristics:

1.5.1. Pseudorandom Frequency Hopping Sequence

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels. The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master; the phase in the hopping sequence is determined by the Bluetooth clock of the master. The channel is divided into time slots where each slot corresponds to an RF hop frequency. Consecutive hops correspond to different RF hop frequencies. The nominal hop rate is 1 600 hops/s.

1.5.2. Equal Hopping Frequency Use

All Bluetooth units participating in the piconet are time and hop-synchronized to the channel.

1.5.3. System Receiver Input Bandwidth

Each channel bandwidth is 1 MHz

1.6. Test Equipment List

Equipment	Manufacturer	Model	Cal Due.
Signal Generator	R&S	SMR40	Jul. 15, 2011
Spectrum Analyzer	R&S	FSV30	Mar. 31, 2011
Power Sensor	R&S	NRP-Z81	Aug. 14, 2011
Bluetooth Tester	TESCOM	TC-3000C	Jan. 11, 2011
Directional Coupler	KAYTAR	152613	Jun. 01, 2011
High Pass Filter	Wainwright	WHK3.0/18G-10SS	Sep. 29, 2011
DC power Supply	Agilent	U8002A	Jan. 06, 2011
Preamplifier	H.P.	8447F	Jul. 05, 2011
Preamplifier	Rohde & Schwarz	8449B	Mar. 31, 2011
Test Receiver	R & S	ESU26	Apr. 08, 2011
Bilog Antenna	SCHWARZBECK MESSELEKTRONIK	VULB9163	Jul. 22, 2011
Horn Antenna	Rohde & Schwarz	HF 906	Oct. 08, 2011
Antenna Master	EMCO	1050	N.C.R
Turn Table	Daeil EMC	DI-1500	N.C.R
Anechoic Chamber	SY Corporation	L × W × H (9.6 m × 6.4 m × 6.6 m)	Jan. 27, 2011
Two-Line V-Network	R & S	ENV216	Jan. 06, 2011
Test Receiver	R & S	ESHS10	Jul. 13, 2011
Anechoic Chamber	SY Corporation	L × W × H (6.5 m × 3.5 m × 3.5 m)	N.C.R

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1.7. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD:FCC Part15, RSS-210,RSS-Gen			
Section in FCC 15	Section in RSS-210 RSS-Gen	Test Item	Result
15.205(a) 15.209 15.247(d)	A8.5	Transmitter Radiated Spurious Emissions	Complied
15.109(a)	RSS-Gen 6	Receiver Radiated Spurious Emission	Complied
15.207	RSS-Gen 7.2.2	Transmitter AC Power Line Conducted Emission	Complied
15.107	RSS-Gen 7.2.2	Receiver AC Power Line Conducted Emission	Complied

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1.8. Conclusion of worst-case and operation mode

The EUT has three type of modulation (GFSK, $\pi/4$ DQPSK and 8DPSK). Each output power as following:

Modulation Type	Ouput power(dB m)	Output power(mW)	Symbol rate
GFSK(2 480 MHz)	10.65	11.61	1 Mbps
$\pi/4$ DQPSK(2 480 MHz)	10.79	11.99	2 Mbps
8DPSK(2 480 MHz)	11.03	12.68	3 Mbps

Therefore all applicable requirements were tested to the two type of higher output power modulation (GFSK and 8DPSK) at High channel (2 480 MHz).

The field strength of spurious emission was measured in three orthogonal EUT positions(x-axis, y-axis and z-axis). Worst case is z-axis.

1.9 Test report revision

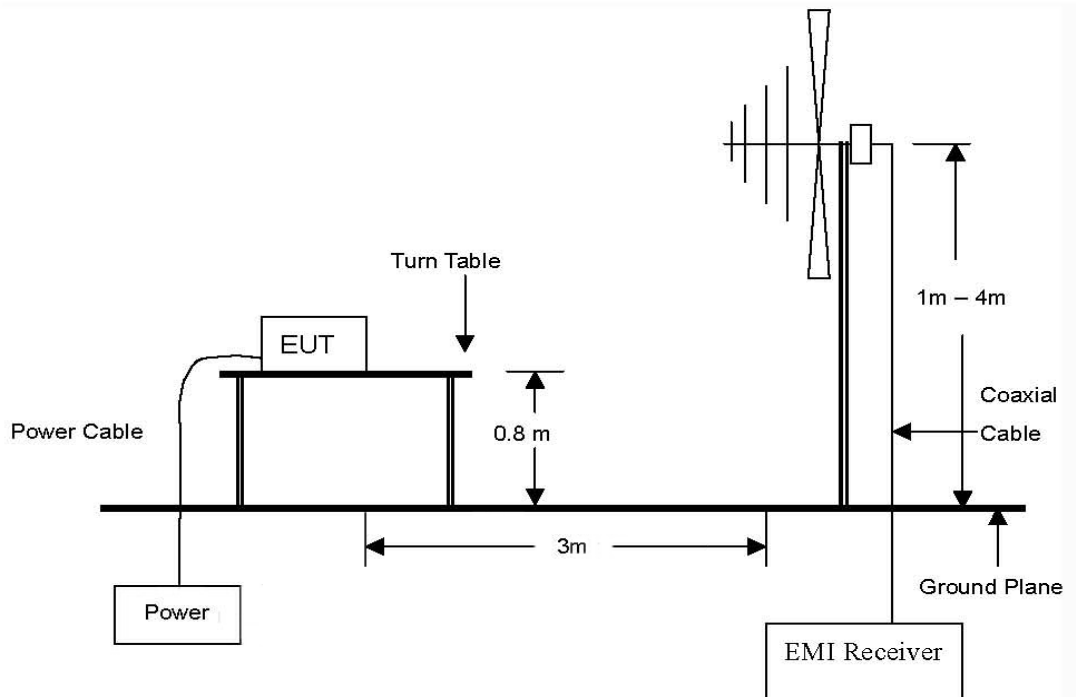
Revision	Report number	Description
0	F690501/RF-RTL004199	Initial

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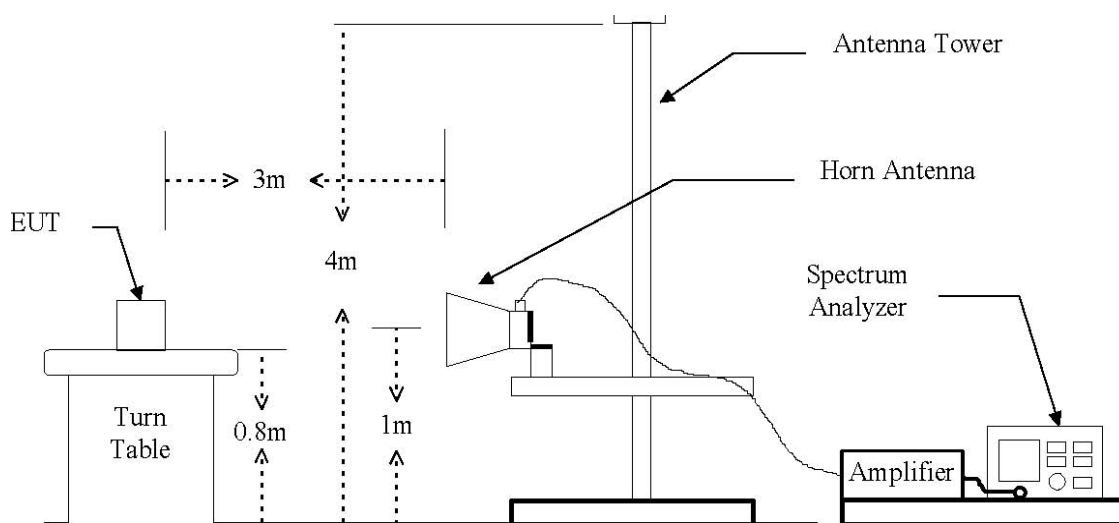
2. Transmitter Radiated Spurious Emissions and Conducted Spurious Emission

2.1. Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 24 GHz Emissions.



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2.2. Limit

According to §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 emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.209(a) (see section §15.205(c))

According to § 15.209(a), Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Distance (Meters)	Field Strength (dB µV/m)	Field Strength (µV/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

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2.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 3 meter away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE ;

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1 GHz.

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2.4. Test Results

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

2.4.1. Spurious Radiated Emission (Worst case configuration_8DPSK mode)

The frequency spectrum from 30 MHz to 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Below 1 000.000	Not detected	-	-	-	-	-	-	-

Remark:

1. All spurious emission at channels are almost the same below 1 GHz, so that middle channel was chosen at representative in final test.
2. Actual = Reading + AF + AMP + CL

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2.4.2. Spurious Radiated Emission

The frequency spectrum above 1 000 MHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB.

Operating Mode: GFSK

A. Low Channel (2 402 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.000	32.18	Peak	V	28.09	4.84	65.11	74.00	8.89
*2 390.000	17.05	Average	V	28.09	4.84	49.98	54.00	4.02

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 805.169	42.42	Peak	V	32.60	-27.78	47.24	74.00	26.76
Above 4 900.000	Not detected	-	-	-	-	-	-	-

B. Middle Channel (2 441 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 882.946	42.84	Peak	V	32.91	-27.56	48.19	74.00	25.81
Above 4 900.000	Not detected	-	-	-	-	-	-	-

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C. High Channel (2 480 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.500	31.95	Peak	V	28.09	4.78	64.82	74.00	9.18
*2 483.500	17.13	Average	V	28.09	4.78	50.00	54.00	4.00

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 961.178	43.14	Peak	V	33.23	-27.42	48.95	74.00	25.05
Above 5 000.000	Not detected	-	-	-	-	-	-	-

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Operating Mode: 8DSPK
A. Low Channel (2 402 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 390.000	32.24	Peak	V	28.09	4.84	65.17	74.00	8.83
*2 390.000	16.86	Average	V	28.09	4.84	49.79	54.00	4.21

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 803.122	42.25	Peak	V	32.59	-27.78	47.06	74.00	26.94
Above 4 900.000	Not detected	-	-	-	-	-	-	-

B. Middle Channel (2 441 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 883.196	43.09	Peak	V	32.91	-27.55	48.45	74.00	25.55
Above 4 900.000	Not detected	-	-	-	-	-	-	-

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C. High Channel (2 480 MHz)

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
*2 483.500	31.59	Peak	V	28.09	4.78	64.46	74.00	9.54
*2 483.500	16.90	Average	V	28.09	4.78	49.77	54.00	4.23

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dB μ V)	Detect Mode	Pol.	AF (dB/m)	AMP+CL (dB)	Actual (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4 960.319	43.30	Peak	V	33.22	-27.41	49.11	74.00	24.89
Above 5 000.000	Not detected	-	-	-	-	-	-	-

Remarks ;

1. "*" means the restricted band.
2. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental Frequency.
3. Radiated emissions measured in frequency above 1 000 MHz were made with an instrument using peak/average detector mode.
4. Average test would be performed if the peak result were greater than the average limit.
5. Actual = Reading + AF + AMP + CL

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3. Receiver Radiated spurious emissions

3.1. Test setup - Same as clause 2.1.

3.1.1. Receiver Radiated Spurious Emissions - Same as clause 2.1.1.

3.2. Limit

According to §15.109(a), Except for Class A digital devices, the field strength of radiated emission from unintentional radiator at a distance of 3 m shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dB μ V/m)	Radiated (μ V/m)
30 - 88	3	40.0	100
88 – 216	3	43.5	150
216 – 960	3	46.0	200
Above 960	3	54.0	500

3.3. Test Procedures - Same as clause 2.3.

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

3.3.1. Test Procedures for Radiated Spurious Emissions- Same as clause 2.3.1.

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3.4. Test Results

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

3.4.1. Spurious Radiated Emission (Worst case configuration_8DPSK mode)

The frequency spectrum from 30 MHz to 26.5 GHz was investigated. Emission levels are not reported much lower than the limits by over 30 dB. All reading values are peak values.

Radiated Emissions			Ant	Correction Factors		Total	FCC Limit	
Frequency (MHz)	Reading (dBμV)	Detect Mode	Pol.	AF (dB/m)	AMP + CL (dB)	Actual (dBμV/m)	Limit (dBμV/m)	Margin (dB)
95.798	35.9	Peak	V	11.63	-27.12	20.4	43.5	23.1
224.000	40.6	Peak	H	11.30	-26.03	25.9	46.0	20.1
Above 300.000	Not detected	-	-	-	-	-	-	-

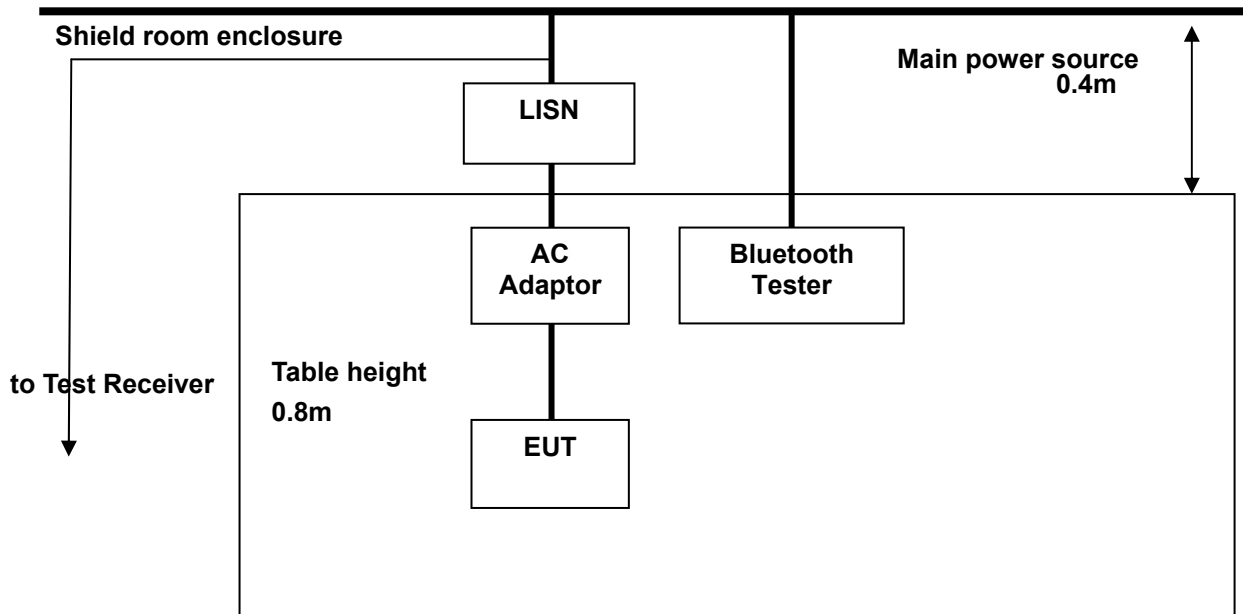
Remark:

1. All spurious emission at channels are almost the same from 30 MHz to 26.5 GHz, so that the middle channel was chosen at representative in final test.
2. Actual = Reading + AF + AMP + CL

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4. Transmitter AC Power Line Conducted Emission

4.1. Test Setup



4.2. Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network(LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dB µV)	
	Quasi-peak	Average
0.15 – 0.50	66 - 56*	56 - 46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

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4.3. Test Procedures

Radiated emissions from the EUT were measured according to the dictates of ANSI C63.4:2003

1. The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

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4.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line.

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.15	43.0	31.8	H	66.0	56.0	23.0	24.2
0.38	40.6	33.0	H	58.3	48.3	17.7	15.3
0.83	41.5	31.2	H	56.0	46.0	14.5	14.8
1.47	39.2	30.1	H	56.0	46.0	16.8	15.9
3.04	36.6	28.0	H	56.0	46.0	19.4	18.0
22.13	27.1	19.6	H	60.0	50.0	32.9	30.4
0.18	41.5	32.0	N	64.5	54.5	23.0	22.5
0.38	41.8	32.4	N	58.3	48.3	16.5	15.9
1.82	33.3	26.5	N	56.0	46.0	22.7	19.5
2.59	31.1	24.4	N	56.0	46.0	24.9	21.6
4.41	27.7	20.9	N	56.0	46.0	28.3	25.1

Note ;

Line (H) : Hot

Line (N) : Neutral

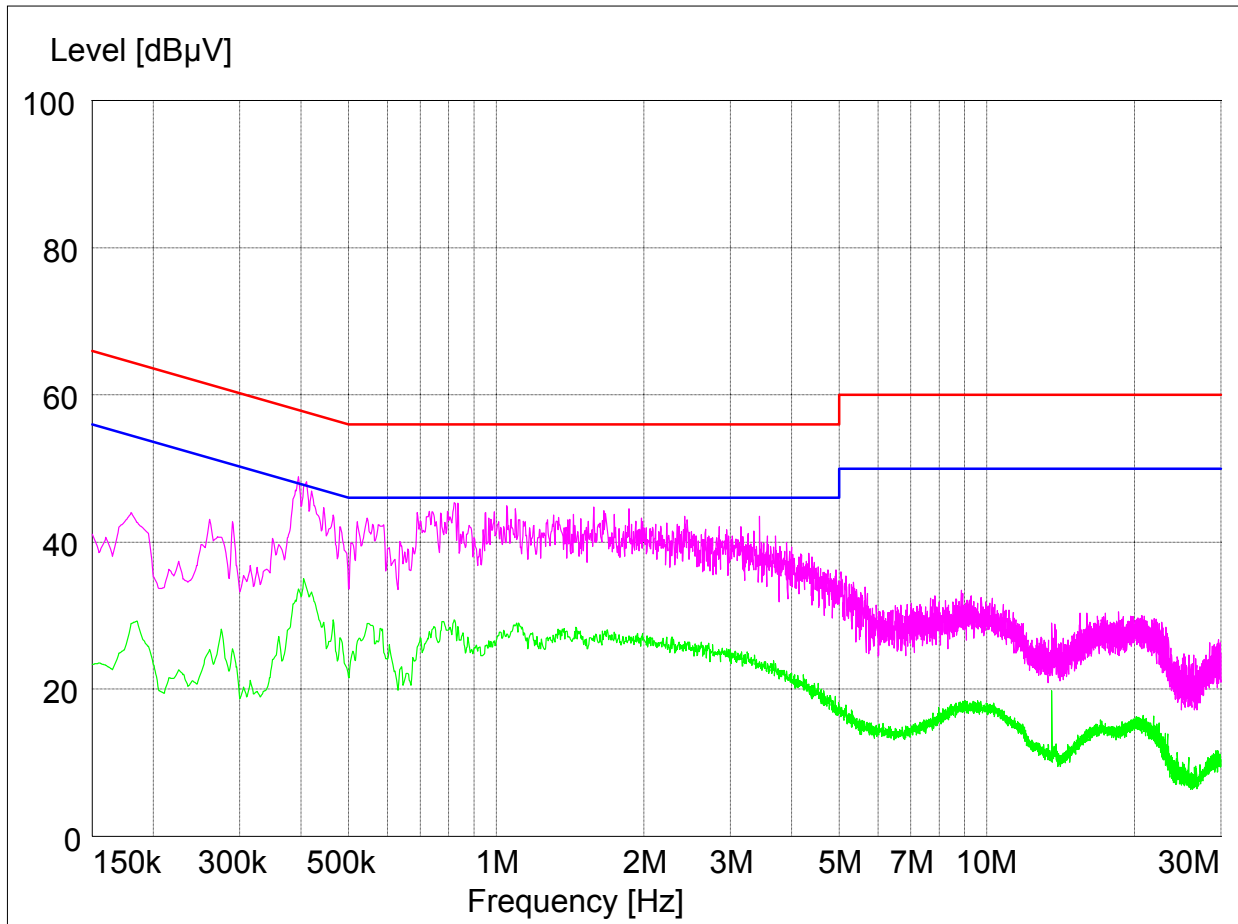
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Plot of Conducted Power line

Test mode : (Hot)

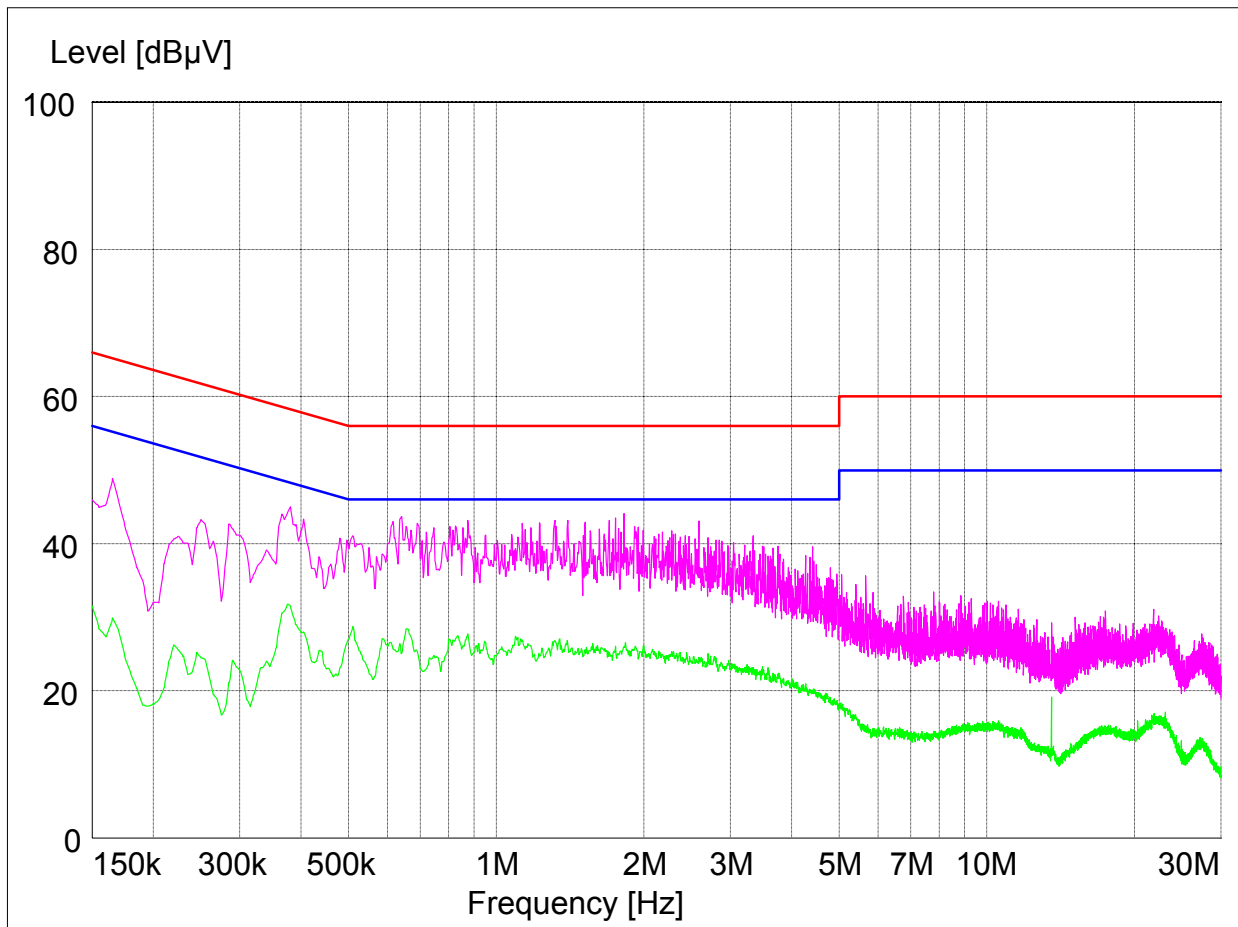


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Test mode : (Neutral)



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5. Receiver AC Power Line Conducted Emission

5.1. Test Setup- Same as clause 9.1.

5.2. Limit

According to §15.107(a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency of Emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.50	66-56*	56-46*
0.50 – 5.00	56	46
5.00 – 30.0	60	50

* Decreases with the logarithm of the frequency.

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5.3. Test Procedures- Same as clause 9.3.

5.4. Test Results

The following table shows the highest levels of conducted emissions on both phase of Hot and Neutral line; Addition,

Ambient temperature : (24 ± 2) °C
Relative humidity : 47 % R.H.

Frequency range : 0.15 MHz – 30 MHz
Measured Bandwidth : 9 kHz

FREQ. (MHz)	LEVEL(dB μ V)		LINE	LIMIT(dB μ V)		MARGIN(dB)	
	Q-Peak	Average		Q-Peak	Average	Q-Peak	Average
0.17	40.9	30.2	H	65.2	55.2	24.3	25.0
0.37	41.7	32.6	H	58.5	48.5	16.8	15.9
0.99	38.7	28.7	H	56.0	46.0	17.3	17.3
1.44	37.2	28.5	H	56.0	46.0	18.8	17.5
13.56	28.3	22.4	H	60.0	50.0	31.7	27.6
22.63	25.8	18.3	H	60.0	50.0	34.2	31.7
0.15	43.5	32.7	N	66.0	56.0	22.5	23.3
0.17	41.2	29.8	N	65.2	55.2	24.0	25.4
0.39	40.2	32.9	N	58.2	48.2	18.0	15.3
1.43	31.7	25.4	N	56.0	46.0	24.3	20.6
10.28	20.8	14.7	N	60.0	50.0	39.2	35.3

Note ;

Line (H) : Hot

Line (N) : Neutral

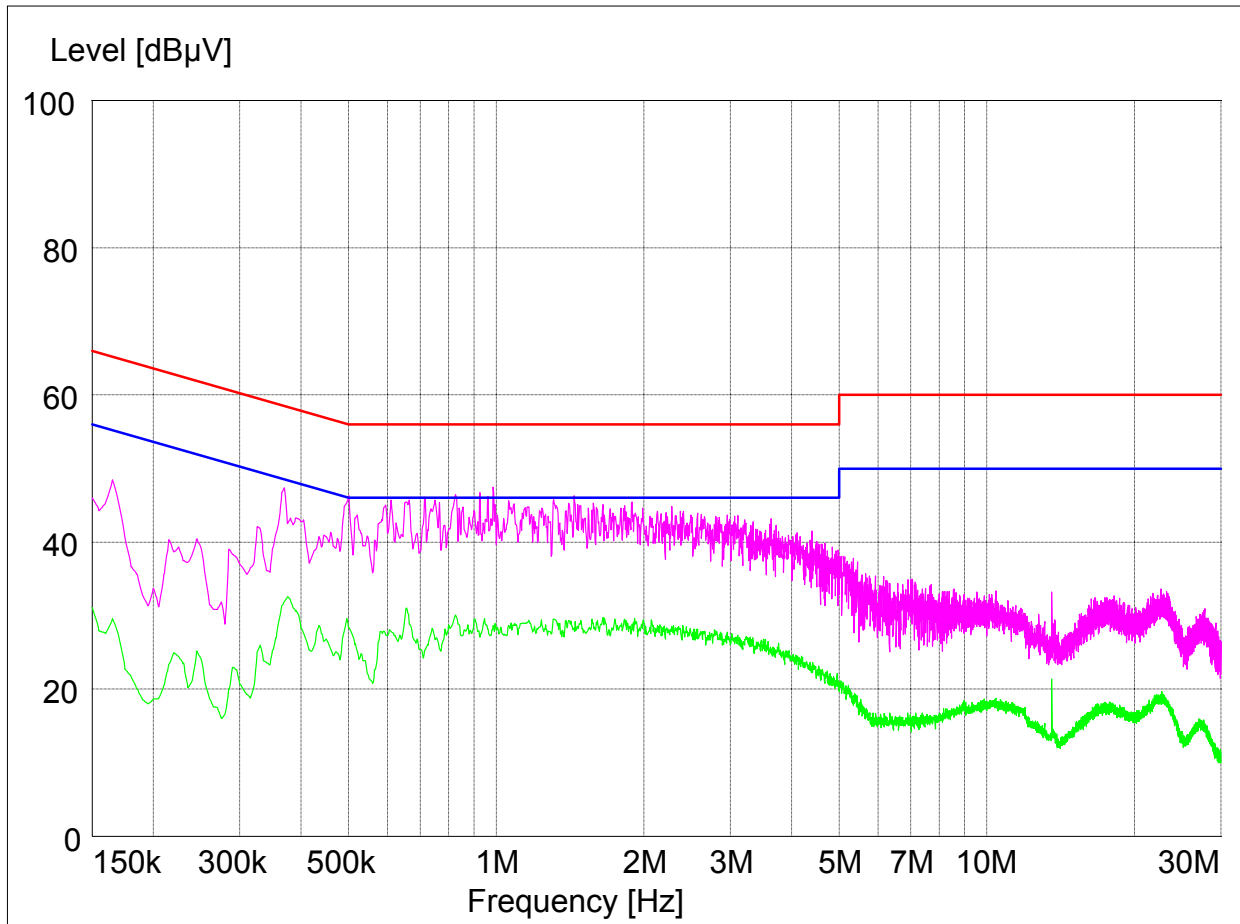
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

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Plot of Conducted Power line

Test mode : (Hot)

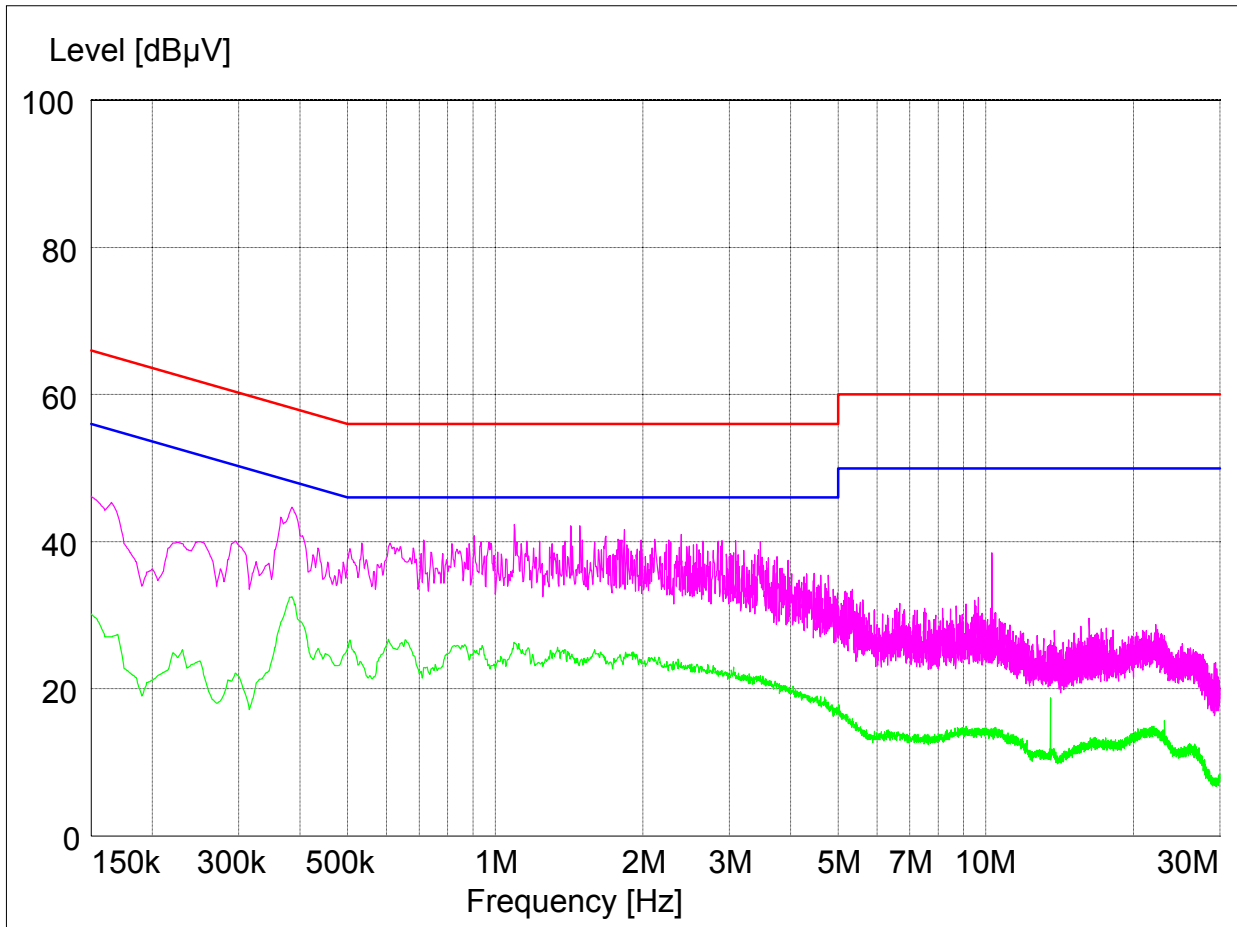


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Test mode : (Neutral)



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6. Antenna Requirement

6.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section §15.247 (b) if transmitting antennas of directional gain greater than 6 dB i are used, the power shall be reduced by the amount in dB that the gain of the antenna exceeds 6 dB i.

6.2. Antenna Connected Construction

Antenna used in this product is Integral type (PIFA Antenna) gain of 0.73 dB i.