

HCT CO., LTD.

CERTIFICATE OF COMPLIANCE

FCC Certification

Applicant Name:

LG Electronics MobileComm U.S.A., Inc.

Address:

1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: August 22, 2014 Test Site/Location: HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majangmyeon, Icheon-si, Gyeonggi-do, Korea Report No.: HCT-R-1408-F014

HCT FRN: 0005866421

FCC ID

: ZNFD390

APPLICANT : LG Electronics MobileComm U.S.A., Inc.

FCC Model(s): Additional FCC Model(s): EUT Type:	LG-D390 LGD390, D390 , LG-D392d, LGD392d, D392d GSM/WCDMA/LTE phone with Bluetooth/WLAN
Peak RF Output Power:	0.639 dBm (1.159 mW)
Frequency Range:	2402 MHz -2480 MHz(BT 4.0_Low Energy Mode)
Modulation type	GFSK
FCC Classification:	Digital Transmission System(DTS)
FCC Rule Part(s):	Part 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Report prepared by : Kyung Soo Kang Test Engineer of RF Team

Approved by [/] : Kyoung Houn Seo Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1408-F014	August 22, 2014	- First Approval Report



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Model: LG-D390

1. GENERAL INFORMATION

Applicant:	LG Electronics MobileComm U.S.A., Inc.
Address:	1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID:	ZNFD390
EUT Type:	GSM/WCDMA/LTE phone with Bluetooth/WLAN
Model name(s):	LG-D390
Additional Model name(s):	LGD390, D390 , LG-D392d, LGD392d, D392d
Date(s) of Tests:	August 06, 2014 ~ August 21, 2014
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
	(IC Recognition No. : 5944A-3)

2. EUT DESCRIPTION

FCC Model Name	LG-D390				
Additional FCC Model Name	LGD390, D390,	LGD390, D390 , LG-D392d, LGD392d, D392d			
EUT Type	GSM/WCDMA/L	E phone with Bluetooth/WLAN			
Power Supply	DC 3.8 V				
Battery type	Li-ion Battery(Sta	andard)			
Frequency Range	TX: 2402 MHz ~ 2480 MHz				
	RX: 2402 MHz ~ 2480 MHz				
Max. RF Output Power	Peak 0.639 dBm (1.159 mW)				
	Average -0.060 dBm (0.986 mW)				
BT Operating Mode	BT 4.0_Low Energy Mode				
Modulation Type	GFSK				
Number of Channels	40 Channels				
Antenna Specification	Manufacturer: Ace Technology				
	Antenna type:PIF Peak Gain : 0.12				



3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v03r02 dated June 05, 2014 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices(ANSI C63.4-2003) Operating Under §15.247" were used in the measurement.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version :2003) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4. (Version: 2003)

Conducted Antenna Terminal

See Section from 9.1 to 9.2.(KDB 558074)

3.4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel low, mid and high with highest data rate (worst case) is chosen for full testing.



4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated February 28, 2014 (Registration Number: 90661)

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

*The E.U.T Complies with the requirement of §15.203



7. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§15.247(a)(2)	> 500 kHz		PASS
Conducted Maximum Peak Output Power	§15.247(b)(3)	< 1 Watt		PASS
Power Spectral Density	§15.247(e)	< 8 dBm / 3 kHz Band	CONDUCTED	PASS
Band Edge(Out of Band Emissions)	§15.247(d)	Conducted > 20 dBc		PASS
AC Power line Conducted Emissions	§15.207	cf. Section 8.7		PASS
Radiated Spurious Emissions	§15.205, 15.209	cf. Section 8.6.1	RADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.6.2	RADIATED	PASS

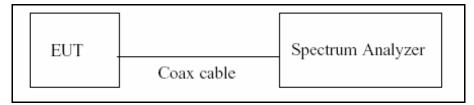


8. TEST RESULT 8.1 DUTY CYCLE

TEST PROCEDURE

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW \geq OBW if possible; otherwise, set RBW to the largest available value. Set VBW \geq RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T \leq 16.7 microseconds.)

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We tested accroding to the zerospan measurement method, 6.0)b) in KDB 558074(issued 06/05/2014)

The largest available value of RBW is 8 MHz and VBW is 50 MHz. The zero-span method of measuring duty cycle shall not be used if T \leq 6.25 microseconds. (50/6.25 = 8)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are > 50/T.

- 1. RBW = 8 MHz (the largest available value)
- 2. VBW = 8 MHz (≥ RBW)
- 3. SPAN = 0 Hz
- 4. Detector = Peak
- 5. Number of points in sweep > 100
- 6. Trace mode = Clear write
- 7. Measure T_{total} and T_{on}
- 8. Calculate Duty Cycle = T_{on}/T_{total} and Duty Cycle Factor = 10*log(1/Duty Cycle)

LE Mode	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor	
	0.3904	0.6240	0.6256	2.04	



Model: LG-D390

8.2 6dB BANDWIDTH MEASUREMENT

Test Requirements and limit, §15.247(a)(2)

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies.

The minimum permissible 6dB bandwidth is 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer.

The Spectrum Analyzer is set to (Page 5 in KDB 558074, issued 06/05/2014)

RBW = 100 kHz VBW ≥ 3 x RBW Detector = Peak Trace mode = max hold Sweep = auto couple Allow the trace to stabilize

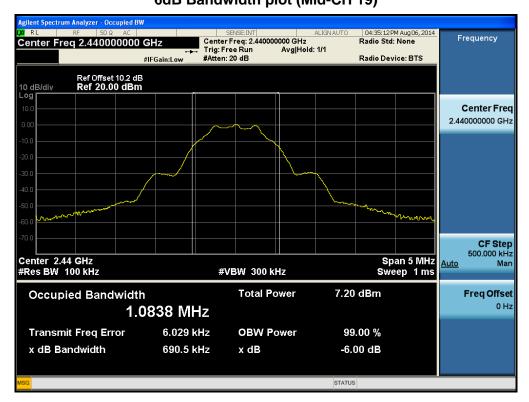
Note : We tested 6 dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer. X dB is set 6 dB.



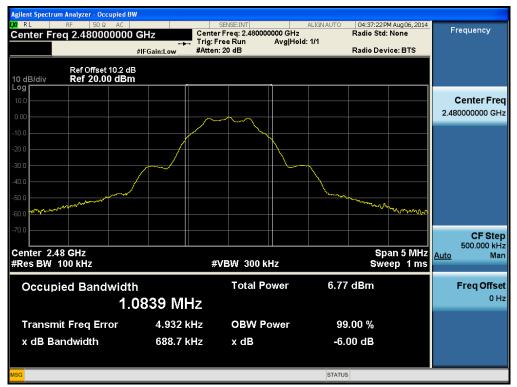
RESULT PLOTS



6dB Bandwidth plot (Mid-CH 19)







6dB Bandwidth plot (High-CH 39)



8.3 OUTPUT POWER MEASUREMENT

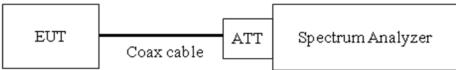
Test Requirements and limit, §15.247(b)(3)

A transmitter antenna terminal of EUT is connected to the input of a Spectrum Analyzer.

Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

The maximum permissible conducted output power is 1 Watt.

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. We use the spectrum analyzer's integrated band power measurement function.

This EUT TX condition is actual operating mode by BT LE mode test program.

The Spectrum Analyzer is set to

- Peak Power (Procedure 9.1.1 in KDB 558074, issued 06/05/2014)
 - RBW ≥ DTS Bandwidth
 - VBW ≥ 3 x RBW
 - SPAN \ge 3 x RBW
 - Detector Mode = Peak
 - Sweep = auto couple
 - Trace Mode = max hold
 - Allow trace to fully stabilize.
 - Use peak marker function to determine the peak amplitude level
- Average Power (Procedure 9.2.2.4 in KDB 558074, issued 06/05/2014)

Measure the duty cycle

Set span to at least 1.5 times the OBW

RBW = 1-5 % of the OBW, not to exceed 1 MHz.

VBW \geq 3 x RBW.

Number of points in sweep $\ge 2 \times \text{span} / \text{RBW}$. (This gives bin-to-bin spacing $\le \text{RBW}/2$,

so that narrowband signals are not lost between frequency bins.)

Sweep time = auto.

Detector = RMS(i.e., power averaging)

Do not use sweep triggering. Allow the sweep to "free run".



Model: LG-D390

Trace average at least 100 traces in power averaging(RMS) mode.

Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.

Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

Output Power = Reading Value + ATT loss + Cable loss(1 ea) + Duty Cycle Factor Output Power = 10 dBm + 10 dB + 0.8 dB + 0.2 dB = 21.0 dBm

Note :

- 1. Spectrum reading values are not plot data. The power results in plot is already including the actual values of loss for the attenuator and cable combination.
- 2. Spectrum offset = Attenuator loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.2 dB is offset for 2.4 GHz Band.



TEST RESULTS-Peak

Conducted Output Power Measurements

LE Me	ode	Measured	Limit
Frequency[MHz]	Channel No.	Power(dBm)	(dBm)
2402	0	-0.166	30
2440	19	0.639	30
2480	39	0.230	30

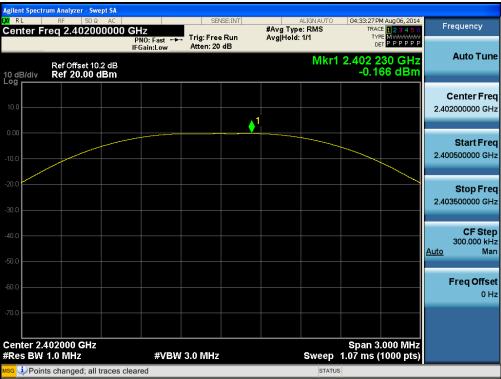
TEST RESULTS-Average

Conducted Output Power Measurements

LE Mode				Measured		
Frequency[MHz]	Channel No.	Measured Power(dBm)	Duty Cycle Factor	Power(dBm) + Duty Cycle Factor	Limit (dBm)	
2402	0	-2.41	2.04	-0.37	30	
2440	19	-2.15	2.04	-0.11	30	
2480	39	-2.10	2.04	-0.06	30	



RESULT PLOTS-Peak



Conducted Output Power (Low-CH 0)

Conducted Output Power (Mid-CH 19)





Agilent Spectr	r <mark>um Analyzer - Swept SA</mark> RF 50 Ω AC		CEN	SE:INT		ALIGN AUTO	04:07:05 0	M Aug 06, 2014	
	req 2.480000000	GHz PNO: Fast ↔	.		#Avg Type Avg Hold:	: RMS	TRAC	E 123456 E M WWWWW	Frequency
		IFGain:Low	Atten: 20					TPPPPP	Auto Tune
10 dB/div Log	Ref Offset 10.2 dB Ref 20.00 dBm					Mkr1	2.479 7	49 GHz 30 dBm	Auto Tune
10.0			.1						Center Freq 2.480000000 GHz
0.00			♦ '						Start Freq 2.478500000 GHz
-20.0									Stop Freq 2.481500000 GHz
-40.0									CF Step 300.000 kHz <u>Auto</u> Man
-60.0									Freq Offset 0 Hz
	480000 GHz							.000 MHz	
#Res BW	1.0 MHz ts changed; all traces of		/ 3.0 MHz			Sweep	`	1000 pts)	
Poin	is changed; all traces (sieareu				STATUS			

Conducted Output Power (High-CH 39)

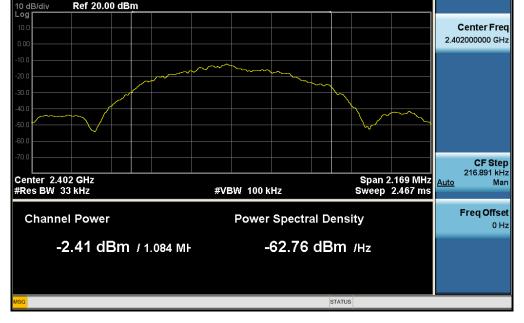


Frequency

RESULT PLOTS-Average

RL

Conducted Output Power (Low-CH 0) gilent Spectrum Analyzer - Channel Power ALIGN A 04:33:40 PM Aug 06, 2014 Radio Std: None Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hold #Atten: 20 dB Center Freq 2.402000000 GHz Avg|Hold: 100/100 Radio Device: BTS #IFGain:Low Ref Offset 10.2 dB Ref 20.00 dBm



Conducted Output Power (Mid-CH 19)







Conducted Output Power (High-CH 39)



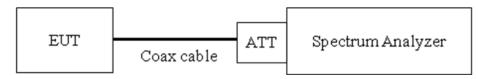
8.4 POWER SPECTRAL DENSITY

Test Requirements and limit, §15.247(e)

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

Minimum Standard – The transmitter power density average over 1-second interval shall not be greater than 8dBm in any 3kHz BW.

TEST CONFIGURATION



TEST PROCEDURE

We tested according to Procedure 10.2 in KDB 558074, issued 06/05/2014

The spectrum analyzer is set to :

Set analyzer center frequency to DTS channel center frequency.

Span = 1.5 times the DTS channel bandwidth.

 $RBW = 3 kHz \le RBW \le 100 kHz.$

VBW \geq 3 x RBW.

Sweep = auto couple

Detector = peak

Trace Mode = max hold

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Sample Calculation

PSD = Reading Value + ATT loss + Cable loss(1 ea) Output Power = -5 dBm + 10 dB + 0.8 dB = 5.8 dBm Note :

- 1. Spectrum reading values are not plot data. The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
- 2. Spectrum offset = Attenuator loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So,10.2 dB is offset for 2.4 GHz Band.



TEST RESULTS

······································						
Frequency Channel		Test Result				
Frequency (MHz)	No.	Mode	PSD	Limit	Pass/	
(11112)			(dBm)	(dBm)	Fail	
2402	0		-15.388	8	Pass	
2440	19	LE	-14.585	8	Pass	
2480	39		-14.908	8	Pass	

Conducted Power Density Measurements



RESULT PLOTS

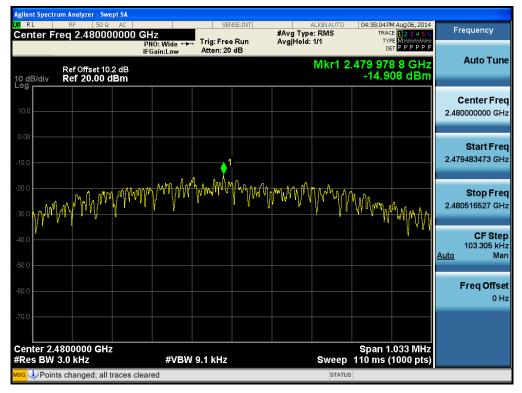


Power Spectral Density (Low-CH 0)

Power Spectral Density (Mid-CH 19)







Power Spectral Density (High-CH 39)

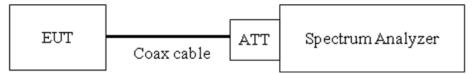


8.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS Test Requirements and limit, §15.247(d)

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 § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.205(c)).

Limit : 20 dBc

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. (Procedure 11.0 in KDB 558074, issued 06/05/2014)

RBW = 100 kHz

 $VBW \ge 3 \times RBW$

Set span to encompass the spectrum to be examined

Detector = Peak

Trace Mode = max hold

Sweep time = auto couple

Ensure that the number of measurement points \geq 2*Span/RBW

Allow trace to fully stabilize.

Use peak marker function to determine the maximum amplitude level.

Measurements are made over the 30 MHz to 10th harmonic range with the transmitter set to the lowest, middle, and highest channels.

Note :

1. The band edge results in plot is already including the actual values of loss for the attenuator and cable combination.



- 2. Spectrum offset = Attenuator loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. So, 10.2 dB is offset for 2.4 GHz Band.
- 4. In case of conducted spurious emissions test, please check factors blow table.
- 5. In order to simplify the report, attached plots were only the worst case channel and data rate.

FACTORS FOR FREQUENCY

Freq(MHz)	Factor(dB)
30	9.95
100	10.01
200	10.03
300	10.04
400	10.05
500	10.04
600	10.03
700	10.09
800	10.10
900	10.08
1000	10.11
2000	10.25
2400*	10.19
2500*	10.26
3000	10.27
4000	10.22
5000	10.48
5700*	10.42
5800*	10.48
6000	10.48
7000	10.57
8000	10.45
9000	10.50
10000	10.64
11000	10.69
12000	10.75
13000	10.92
14000	11.90



Model: LG-D390

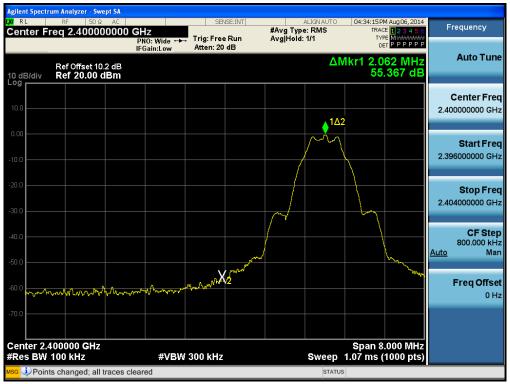
15000	11.00
16000	11.03
17000	10.93
18000	10.96
19000	10.85
20000	12.11
21000	11.17
22000	10.99
23000	11.12
24000	11.10
25000	11.42

Note : 1. '*' is fundamental frequency range.

2. Factor = Cable loss + Attenuator loss

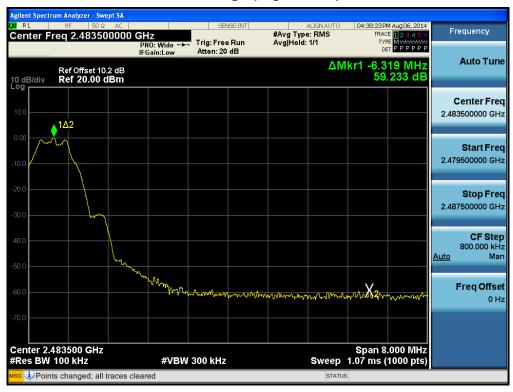


RESULT PLOTS



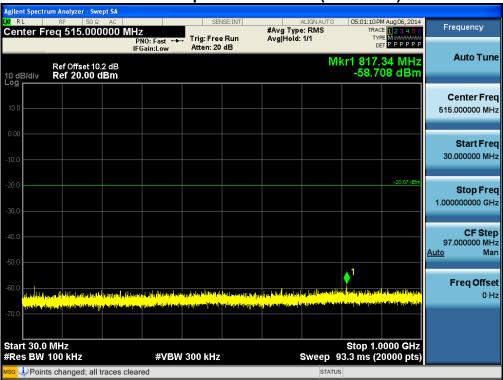
BandEdge (Low-CH 0)

BandEdge (High-CH 39)





30 MHz ~ 1 GHz



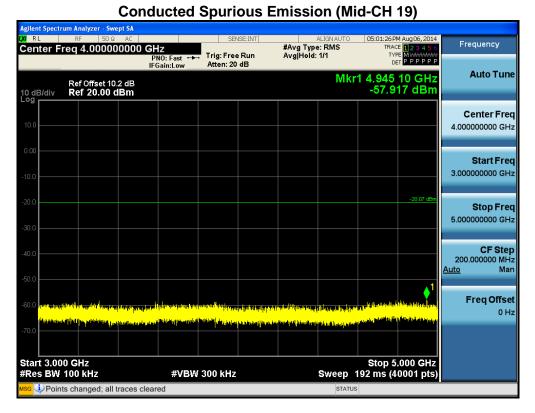
Conducted Spurious Emission (Mid-CH 19)

1 GHz ~ 3 GHz

Agilent Spectr	um Analyzer - Swept S	SA							
Center Fi	RF 50 Ω A req 2.0000000	000 GHz PN0: Fast ↔	SENS	Run	#Avg Type Avg Hold:		TRAC	Aug 06, 2014 E 1 2 3 4 5 6 E M WWWWW T P P P P P P	Frequency
10 dB/div	Ref Offset 10.2 d Ref 20.00 dBr		Atten: 20 d	В		Mkr	1 2.670		Auto Tune
10.0									Center Freq 2.000000000 GHz
-10.0									Start Freq 1.000000000 GHz
-20.0								-20.07 dBm	Stop Freq 3.00000000 GHz
-40.0									CF Step 200.000000 MHz <u>Auto</u> Man
-50.0	share all all print to an all the all p	a dan san an a		e në meret të në të			1 Hill Hallarian Marina Justa	(Jacobild Control P Strate State (State State)	Freq Offset 0 Hz
-70.0		nan ya kalish ya ka ya ka ka sa ka sa ka ya ya ka ka ka ka ka ka ya ya ka						.000 GHz	
#Res BW	100 kHz		300 kHz				192 ms (4		
MSG 🥹 Point	s changed; all trac	ces cleared				STATUS			



$3 \text{ GHz} \sim 5 \text{ GHz}$



5 GHz ~ 7 GHz

Agilent Spectr	um Analyzer - Swe	pt SA								
Center F	RF 50 Ω req 6.00000	0000 GH	lz N0: Fast ↔►		ISE:INT	#Avg Type Avg Hold:		TRAC	M Aug 06, 2014 E 1 2 3 4 5 6 PE M WWWWWW	Frequency
10 dB/div Log	Ref Offset 10. Ref 20.00 d	IF 2 dB	Gain:Low	Atten: 20				1 5.367	ТРРРРР	Auto Tune
10.0										Center Freq 6.000000000 GHz
-10.0										Start Freq 5.00000000 GHz
-20.0									-20.07 dBm	Stop Freq 7.000000000 GHz
-40.0										CF Step 200.000000 MHz <u>Auto</u> Man
-50.0			lit, o, destalation					the first states of the	1 A 4	Freq Offset 0 Hz
-70.0			ng bilanti per netari pen di		atel in firm, i plant in		a a sha a			
Start 5.00 #Res BW			#VBW	300 kHz			Sweep		.000 GHz 0001 pts)	
<mark>мsg</mark> 🗼 Poin	ts changed; all t	races clear	ed				STATUS	6		



7 GHz ~ 9 GHz

gilent Spectrum Center Freq 8.000000000 GHz PN0: Fast →→ IFGain:Low 05:01:5 PM Aug 06, 2014 Frequency #Avg Type: RMS Avg|Hold: 1/1 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P P Trig: Free Run Atten: 20 dB Auto Tune Mkr1 7.203 50 GHz -57.612 dBm Ref Offset 10.2 dB Ref 20.00 dBm 10 dB/div Log **Center Freq** 8.00000000 GHz Start Freq 7.00000000 GHz Stop Freq 9.000000000 GHz **CF Step** 200.000000 MHz <u>ito</u> Man <u>Auto</u> **Freq Offset** 0 Hz Stop 9.000 GHz Sweep 192 ms (40001 pts) Start 7.000 GHz #Res BW 100 kHz #VBW 300 kHz Points changed; all traces cleared

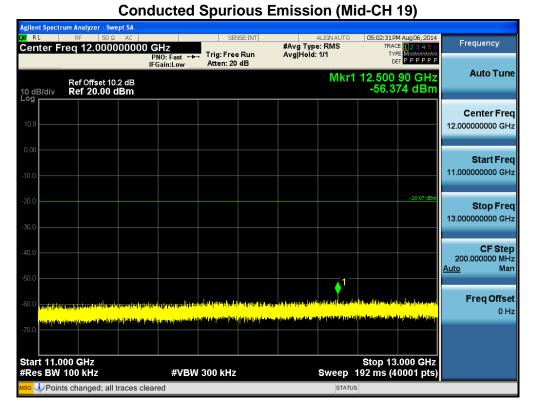
Conducted Spurious Emission (Mid-CH 19)

9 GHz ~ 11 GHz

Agilent Spectrum Analyzer - Swept SA					
LXIRL RF 50Ω AC		SENSE:INT	ALIGNAUTO	05:02:14 PM Aug 06, 2014	Frequency
Center Freq 10.000000		Trig: Free Run	#Avg Type: RMS Avg Hold: 1/1		ricqueriey
	PNO: Fast +++	Atten: 20 dB	Arginala. In	TYPE MWWWWW DET PPPPP	
	II Gainizow		Miland	40.000.25.011-	Auto Tune
Ref Offset 10.2 dE			IVIKE	10.066 35 GHz	
10 dB/div Ref 20.00 dBm				-58.002 dBm	
Log					
					Center Freq
10.0					10.00000000 GHz
0.00					
					Start Freq
					9.000000000 GHz
-10.0					
-20.0				-20.07 dBm	Stop Freq
-30.0					11.00000000 GHz
00.0					
					CF Step
-40.0					200.000000 MHz
					Auto Man
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		_ 1			
-60.0		.			Freq Offset
-60.0 Preserves and preserves and a preserve and a second second	the beat public to be the first back	<mark>in the light of the left provided and the light of the l</mark>	يربل والمنابعين فطله وظرناها لمرتجد وي	A REAL PROFESSION AND A REAL PROFESSION OF A REAL PROFESSION OF A REAL PROFESSION OF A REAL PROFESSION OF A REA	0 Hz
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-70.0	'			· · · · ·	
Start 9.000 GHz				Stop 11.000 GHz	
#Res BW 100 kHz	#VBW 3	300 kHz	Sweep	192 ms (40001 pts)	
мsg 🗼 Points changed; all trace	s cleared		STATU	S	



11 GHz ~ 13 GHz

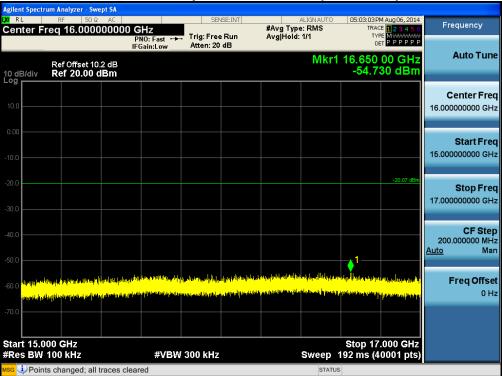


13 GHz ~ 15 GHz

	um Analyzer - Swe									
Center F	RF 50Ω req 14.0000		iHz		ISE:INT	#Avg Type	ALIGNAUTO	TRAC	M Aug 06, 2014 E 1 2 3 4 5 6	Frequency
		PI	NO: Fast 🔸 Gain:Low	Trig: Free Atten: 20		Avg[Hold:	1/1	TYI Di	E MWWWWW T P P P P P P	
	Ref Offset 10.	2 dB					Mkr1	14.921	55 GHz	Auto Tune
10 dB/div Log	Ref 20.00 d							-56.0	97 dBm	
9										Center Freg
10.0										14.000000000 GHz
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-10.0										13.00000000 GHz
									-20.07 dBm	
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-30.0										15.00000000 GHz
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-70.0										
Start 13.0	00 CH-							Stop 15	.000 GHz	
#Res BW			#VBW	300 kHz			Sweep	192 ms (4		
<mark>мsg</mark> 🔱 Poin	ts changed; all t	races clear	ed				STATU	S		



15 GHz ~ 17 GHz



Conducted Spurious Emission (Mid-CH 19)

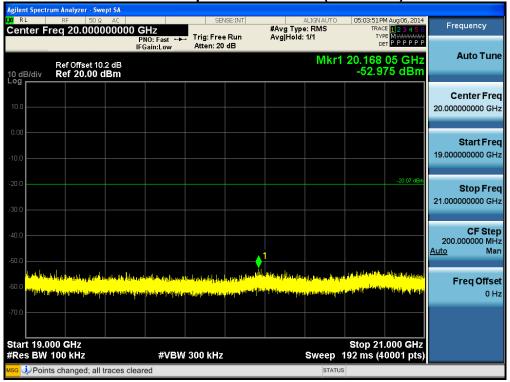
17 GHz ~ 19 GHz

Agilent Spect	trum Analyzer - Swe	pt SA								
Center F	RF 50 Ω Freq 18.0000	00000 G	Hz N0: Fast ↔►		ISE:INT	#Avg Type Avg Hold:		TRAC	M Aug 06, 2014 CE 1 2 3 4 5 6 PE M M M M M M	Frequency
10 dB/div	Ref Offset 10. Ref 20.00 d	IFC 2 dB	Gain:Low	Atten: 20				18.785	TPPPPP	Auto Tune
10.0										Center Freq 18.000000000 GHz
-10.0										Start Freq 17.00000000 GHz
-20.0									-20.07 dBm	Stop Freq 19.00000000 GHz
-40.0									1	CF Step 200.000000 MHz <u>Auto</u> Man
-50.0	an an fal ^d aichean an fala an Martairean an tartairean an tarta	ini mili a dagbibi <mark>Ani mangadarana sa</mark>	httalpaticking gesaggesteresti	a Miliforda de Jedi Likada preda de J	unanan _{ba} lahan pelakat Manangan dari ang	a pader i pisperiere Priveler i serenier	UlalUdebulde _{Allen} arjadoren	destabilization of the second s	ully Algebra a Spatchen etc. George Benne spectre State,	Freq Offset 0 Hz
-70.0									.000 GHz	
#Res BW	100 kHz			300 kHz			Sweep		0001 pts)	
MSG 🗼 Poir	nts changed; all t	races clear	ed				STATUS	S		



19 GHz ~ 21 GHz

Conducted Spurious Emission (Mid-CH 19)



21 GHz ~ 23 GHz

		ım Analyzer - Sw									
(XIR) Cen		RF 50Ω eq 22.0000		SHz	SEN	ISE:INT	#Avg Type		TRAC	M Aug 06, 2014 E 1 2 3 4 5 6	Frequency
			P	NO: Fast ↔ Gain:Low	. Trig: Free Atten: 20		Avg Hold:		De		Auto Tune
10 di Log	B/div	Ref Offset 10 Ref 20.00						IVIKTI	-51.4	90 GHz 58 dBm	
10.0											Center Freq 22.000000000 GHz
											22.000000000 GHZ
0.00											Start Freq
-10.0											21.000000000 GHz
-20.0										-20.07 dBm	Stop Freq
-30.0											23.000000000 GHz
-40.0											CF Step
-50.0		1									200.000000 MHz <u>Auto</u> Man
	<mark>na sinja sent</mark>	na jihan kanina kuta kut	hand the stand of the		<mark>til en skalter bleve</mark>		an Willia de milda.		a dependent of the last	diretti kang <mark>bayakan kur</mark> t	Freg Offset
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-70.0											
04-	+ 24 04								Oton 22		
		00 GHz 100 kHz		#VBW	/ 300 kHz			Sweep		.000 GHz 0001 pts)	
MSG 🤇	Point:	s changed; all	traces clea	red				STATU	5		



$23 \text{ GHz} \sim 25 \text{ GHz}$

Agilent Spectr	um Analyzer - Swe	pt SA							<u>,</u>	
LXI RL	RF 50 Ω			SEN	NSE:INT		ALIGN AUTO		M Aug 06, 2014	Frequency
Center F	req 24.0000		iHz NO: Fast ↔	Trig: Free	Run	#Avg Type Avg Hold:		TY	CE 123456 PE MWWWWW	riequency
			NU: Fast 🚥 Gain:Low	Atten: 20				D	ET P P P P P P	
							Mkr1	24.632	40 GHz	Auto Tune
10 dB/div	Ref Offset 10. Ref 20.00 d								51 dBm	
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10.0										24.000000000 GHz
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0.00										
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										23.000000000 GHz
-10.0										23.000000000 GH2
-20.0									-20.07 dBm	Stop Freq
										25.000000000 GHz
-30.0										23.000000000 GHZ
-40.0										CF Step
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										0112
-70.0										
Start 23.0				000				Stop 25	.000 GHz	
#Res BW	100 KHZ		#VBW	300 kHz			sweep	192 ms (4	0001 pts)	
мsg 🧼 Point	ts changed; all t	races clear	ed				STATU	s		



8.6 RADIATED MEASUREMENT.

8.6.1 RADIATED SPURIOUS EMISSIONS.

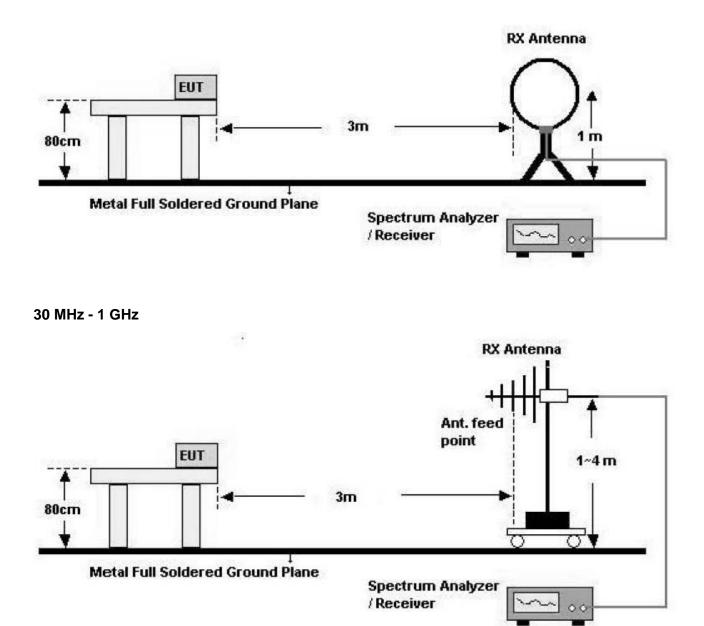
Test Requirements and limit, §15.205, §15.209

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3



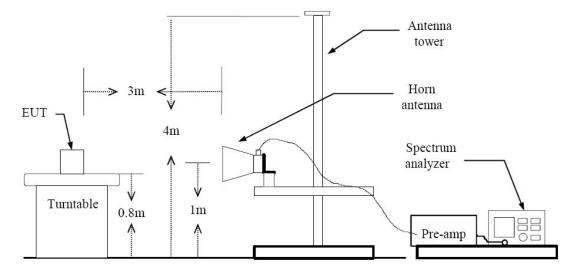
Test Configuration

Below 30 MHz





Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074, issued 06/05/2014

Spectrum Setting

- Peak

Peak emission levels are measured by setting the instrument as follows:

RBW = cf. Table 1.

VBW \geq 3 x RBW.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Allow sweeps to continue until the trace stabilizes.

(Note that the required measurement time may be longer for low duty cycle applications).

	nequency
Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

Table 1 — RBW as a function of frequency

.



- Average

Set RBW = 1 MHz

Set VBW \geq 1/T.(at least 100 times less than the resolution bandwidth, but no less than 10 Hz.)

Select spectrum analyzer linear display mode.

Detector = Peak.

Sweep time = auto.

Trace mode = max hold.

Note :

1. We are performed the RSE and radiated band edge using standard radiated method.

2. The actual setting value of VBW for BT LE mode.

BT LE Mode	T _{on} (ms)	T _{total} (ms)	Duty Cycle (%)	VBW(1/T) (Hz)	The actual setting value of VBW (Hz)
	0.3904	0.6240	62.56	2561	3000



TEST RESULTS

9 kHz – 30MHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin	
MHz	dBµN/m	dBm /m	dBm	(H/V)	dBµN/m	dBµN/m	dB	
	No Critical peaks found							

- 1. Measuring frequencies from 9 kHz to the 30MHz.
- 2. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
- 3. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
- 4. Limit line = specific Limits (dBuV) + Distance extrapolation factor
- 5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



TEST RESULTS

Below 1 GHz

Operation Mode: Normal Mode

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBµN/m	dBm /m	dBm	(H/V)	dBµN/m	dBµN/m	dB
No Critical peaks found							

- 1. Measuring frequencies from 30 MHz to the 1 GHz.
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.
- 3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



Model: LG-D390

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Above 1 GHz

Operation Mode: CH Low(LE Mode)

Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4804	51.11	-4.32	V	46.79	73.98	27.19	PK
4804	38.46	-4.32	V	34.14	53.98	19.84	AV
7206	52.05	5.18	V	57.23	73.98	16.75	PK
7206	38.05	5.18	V	43.23	53.98	10.75	AV
4804	51.04	-4.32	Н	46.72	73.98	27.26	PK
4804	38.23	-4.32	Н	33.91	53.98	20.07	AV
7206	51.89	5.18	Н	57.07	73.98	16.91	PK
7206	37.95	5.18	Н	43.13	53.98	10.85	AV

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain
- 5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4880	52.71	-3.95	V	48.76	73.98	25.22	PK
4880	38.11	-3.95	V	34.16	53.98	19.82	AV
7320	51.10	5.46	V	56.56	73.98	17.43	PK
7320	37.69	5.46	V	43.15	53.98	10.84	AV
4880	52.16	-3.95	Н	48.21	73.98	25.77	PK
4880	38.04	-3.95	Н	34.09	53.98	19.89	AV
7320	51.21	5.46	Н	56.67	73.98	17.32	PK
7320	37.45	5.46	Н	42.91	53.98	11.08	AV

Operation Mode: CH Mid(LE Mode)

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain
- 5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



Model: LG-D390

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Frequency	Reading	AN.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4960	51.85	-3.49	V	48.36	73.98	25.62	PK
4960	37.96	-3.49	V	34.47	53.98	19.51	AV
7440	51.29	5.10	V	56.39	73.98	17.59	PK
7440	37.57	5.10	V	42.67	53.98	11.31	AV
4960	51.71	-3.49	Н	48.22	73.98	25.76	PK
4960	37.68	-3.49	Н	34.19	53.98	19.79	AV
7440	51.16	5.10	Н	56.26	73.98	17.72	PK
7440	37.26	5.10	Н	42.36	53.98	11.62	AV

Operation Mode: CH High(LE Mode)

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 2. Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
- 3. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.
- 4. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain
- 5. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



8.6.2 RADIATED RESTRICTED BAND EDGES

Test Requirements and limit, §15.247(d) §15.205, §15.209

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. 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)).

BT 4.0_LE
2402 MHz
0 Ch

Frequency	Reading	A.F.+CL	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	26.56	33.90	Н	60.46	73.98	13.52	PK
2390.0	14.54	33.90	Н	48.44	53.98	5.54	AV
2390.0	26.42	33.90	V	60.32	73.98	13.66	PK
2390.0	14.25	33.90	V	48.15	53.98	5.83	AV

- 1. Frequency range of measurement = 2310 MHz ~ 2390 MHz
- 2. Total = Reading Value + Antenna Factor + Cable Loss
- 3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
- 4. The radiated restricted band edge measurements are measured with a spectrum analyzer connected to the receive antenna while the EUT is transmitting.



Operation Mode	BT 4.0_LE
Operating Frequency	2480 MHz
Channel No	39 Ch

Frequency	Reading	A.F.+CL	Ant. Pol.	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2483.5	26.30	33.99	н	60.29	73.98	13.69	PK
2483.5	14.98	33.99	н	48.97	53.98	5.01	AV
2483.5	26.18	33.99	V	60.17	73.98	13.81	PK
2483.5	14.89	33.99	V	48.88	53.98	5.11	AV

Notes:

- 1. Frequency range of measurement = 2483.5 MHz ~ 2500 MHz
- 2. Total = Reading Value + Antenna Factor + Cable Loss
- 3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
- 4. The radiated restricted band edge measurements are measured with a spectrum analyzer connected to the receive antenna while the EUT is transmitting.

8.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207



Model: LG-D390

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 power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range (MHz) 0.15 to 0.50	Limits (dBµV)					
Frequency Range (MHZ)	Quasi-peak	Average				
0.15 to 0.50	66 to 56	56 to 46				
0.50 to 5	56	46				
5 to 30	60	50				

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

- 1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
- 2. The EUT is connected via LISN to a test power supply.
- 3. The measurement results are obtained as described below:
- 4. Detectors Quasi Peak and Average Detector.
- 5. We are performed the AC Power Line Conducted Emission test for Ch.19 on BT 4.0 LE mode. Because Ch.39 on BT 4.0 LE mode is worst case.

RESULT PLOTS Conducted Emissions (Line 1)



Model: LG-D390

1/2 EMI Auto Test(2) **HCT TEST Report Common Information** LG-D390 EUT: LG SHIELD ROOM BT_LE MODE KH-SEO Manufacturer: Test Site: Operating Conditions: Operator Name: FCC CLASS B 907 80-70-60-Level in dBµV 50-40-30-20-10 0 -10 3M 4M 5M 6 8 10M 20M 30M 150k 300 400500 800 1 M 2M Frequency in Hz Preview Result 1-PK+ FCC CLASS B_QP FCCCLASS B_ AV Final Result 2-CAV X Preview Result 2-AVG × Final Result 1-QPK

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	(dBµV)
0.366000	42.5	9.000	Off	L1	9.7	16.1	58.6
0.379500	47.2	9.000	Off	L1	9.7	11.1	58.3
0.518000	44.3	9.000	Off	L1	9.7	11.7	56.0
0.567500	45.2	9.000	Off	L1	9.6	10.8	56.0
0.756500	47.3	9.000	Off	L1	9.7	8.7	56.0
0.801500	43.7	9.000	Off	L1	9.7	12.3	56.0
0.945500	45.6	9.000	Off	L1	9.7	10.4	56.0
0.990500	44.3	9.000	Off	L1	9.7	11.7	56.0
1.418000	44.4	9.000	Off	L1	9.7	11.6	56.0
1.557500	45.8	9.000	Off	L1	9.8	10.2	56.0
1.607000	46.0	9.000	Off	L1	9.8	10.0	56.0
1.652000	44.8	9,000	Off	L1	9.8	11.2	56.0
5,432000	34.2	9,000	Off	L1	9.9	25.8	60.0
5.531000		9,000	Off	L1	9.9	30.2	60.0
5.571500		9.000	Off	L1	9.9	26.4	60.0
5.625500			Off	L1	9.9	29.0	60.0

8/20/2014

10:58:51



2/2

EMI Auto Test(2)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
5,720000	27.5	9.000	Off	L1	9.9	32.5	60.0
5.814500	29.8	9.000	Off	L1	9.9	30.2	60.0

Final Result 2

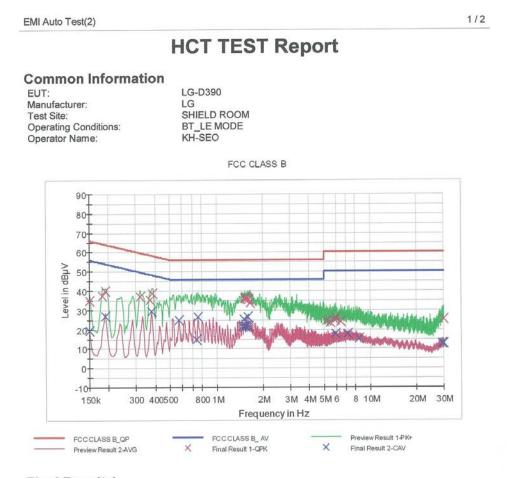
Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.379500	39.3	9.000	Off	L1	9.7	9.0	48.3
0.518000	34.1	9.000	Off	L1	9.7	11.9	46.0
0.567500	35.4	9.000	Off	L1	9.6	10.6	46.0
0.711500	32.3	9.000	Off	L1	9.7	13.7	46.0
0.756500	35.9	9.000	Off	L1	9.7	10.1	46.0
0.801500	33.8	9.000	Off	L1	9.7	12.2	46.0
0.945500	34.1	9.000	Off	L1	9.7	11.9	46.0
0.990500	33.8	9.000	Off	L1	9.7	12.2	46.0
1.557500	34.3	9,000	Off	L1	9.8	11.7	46.0
1.607000	34.6	9.000	Off	L1	9.8	11.4	46.0
1,652000	33.4	9.000	Off	L1	9.8	12.6	46.0
2,457500	32.0	9.000	Off	L1	9.8	14.0	46.0
5,432000	20,8	9.000	Off	L1	9.9	29.2	50.0
5.531000	18.9	9.000	Off	L1	9.9	31.1	50.0
5,571500	20.7	9.000	Off	L1	9.9	29.3	50.0
5.720000	17.3	9,000	Off	L1	9.9	32.7	50.0
5.814500	17.9	9,000	Off	L1	9.9	32.1	50.0
6.899000	17.4	9,000	Off	L1	10.0	32.6	50.0

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Conducted Emissions (Line 2)



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	35.0	9.000	Off	N	9.6	31.0	66.0
0.181500	37.6	9.000	Off	N	9.7	26.8	64.4
0.190500	39.8	9.000	Off	N	9.7	24.2	64.0
0.321000	37.3	9.000	Off	N	9.7	22.4	59.7
0.370500	35.2	9.000	Off	N	9.7	23.3	58.5
0.384000	38.5	9.000	Off	N	9.7	19.7	58.2
1.521500	35.9	9.000	Off	N	9.8	20.1	56.0
1.530500	36.6	9.000	Off	N	9.8	19.4	56.0
1.562000	36.0	9.000	Off	N	9.8	20.0	56.0
1.602500	35.4	9.000	Off	N	9.8	20.6	56.0
1.611500	35.8	9.000	Off	N	9.8	20.2	56.0
1.647500	33.6	9.000	Off	N	9.8	22.4	56.0
5,193500	24.3	9.000	Off	N	9.9	35.7	60.0
5.490500	23.8	9.000	Off	N	9.9	36.2	60.0
5.895500	24.9	9.000	Off	N	9.9	35.1	60.0
5,954000	26.2	9.000	Off	N	9.9	33.8	60.0

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EMI Auto Test(2)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
6.408500	23.9	9.000	Off	N	9.9	36.1	60.0
29.934500	25.2	9.000	Off	N	10.5	34.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	19.4	9.000	Off	N	9.6	36.6	56.0
0.190500	26.9	9.000	Off	N	9.7	27.1	54.0
0.379500	29.4	9.000	Off	N	9.7	18.9	48.3
0.572000	24.9	9.000	Off	N	9.6	21.1	46.0
0.738500	14.7	9.000	Off	N	9.7	31.3	46.0
0.756500	26.4	9.000	Off	N	9.7	19.6	46.0
1.481000	21.6	9.000	Off	N	9.8	24.4	46.0
1.512500	25.2	9.000	Off	N	9.8	20.8	46.0
1.526000	21.5	9.000	Off	N	9.8	24.5	46.0
1.571000	21.4	9.000	Off	N	9.8	24.6	46.0
1.607000	26.5	9.000	Off	N	9.8	19.5	46.0
1.625000	21.7	9.000	Off	N	9.8	24.3	46.0
5.954000	17.6	9.000	Off	N	9.9	32.4	50.0
7.092500	17.6	9.000	Off	N	10.0	32.4	50.0
8.469500	15.4	9.000	Off	N	10.0	34.6	50.0
29.250500	12.8	9.000	Off	N	10.5	37.2	50.0
29.309000	12.8	9.000	Off	N	10.5	37.2	50.0
29.934500	12.5	9.000	Off	N	10.5	37.5	50.0

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9. LIST OF TEST EQUIPMENT 9.1 LIST OF TEST EQUIPMENT(Conducted Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Calibration Due	Serial No.
Rohde & Schwarz	ENV216/ LISN	01/29/2014	Annual	01/29/2015	100073
Agilent	E4440A/ Spectrum Analyzer	04/09/2014	Annual	04/09/2015	US45303008
Agilent	N9020A/ SIGNAL ANALYZER	05/23/2014	Annual	05/23/2015	MY51110063
Agilent	N1911A/Power Meter	01/24/2014	Annual	01/24/2015	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2014	Annual	07/09/2015	MY45241059
Hewlett Packard	11636B/Power Divider	10/22/2013	Annual	10/22/2014	11377
Agilent	87300B/Directional Coupler	12/18/2013	Annual	12/18/2014	3116A03621
Hewlett Packard	11667B / Power Splitter	01/27/2014	Annual	01/27/2015	10545
DIGITAL	EP-3010 /DC POWER SUPPLY	10/29/2013	Annual	10/29/2014	3110117
ITECH	IT6720 / DC POWER SUPPLY	11/05/2013	Annual	11/05/2014	0100021562870011 99
TESCOM	TC-3000C / BLUETOOTH TESTER	04/11/2014	Annual	04/11/2015	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	05/07/2015	100422
Agilent	8493C / Attenuator(10 dB)	07/21/2014	Annual	07/21/2015	76649
WEINSCHEL	2-3 / Attenuator(3 dB)	10/28/2013	Annual	10/28/2014	BR0617



9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufactures	Madel / Environment	Calibration	Calibration	Calibration	Operation No.
Manufacturer	Model / Equipment	Date	Interval	Due	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	12/17/2012	Biennial	12/17/2014	3150
Rohde & Schwarz	ESCI / EMI TEST RECEIVER	01/24/2014	Annual	01/24/2015	100584
HD	MA240/ Antenna Position Tower	N/A	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	N/A	12
Rohde & Schwarz	SCU-18/ Signal Conditioning Unit	09/10/2013	Annual	09/10/2014	10094
CERNEX	CBL18265035 / POWER AMP	07/23/2014	Annual	07/23/2015	22966
CERNEX	CBL26405040 / POWER AMP	04/04/2014	Annual	04/04/2015	19660
Schwarzbeck	BBHA 9120D/ Horn Antenna	07/05/2013	Biennial	07/05/2015	1151
O shune with a sch	BBHA9170 / Horn Antenna(15 GHz ~ 40	10/20/2012	Diannial	10/30/2014	
Schwarzbeck	GHz)	10/30/2012	Biennial		BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	01/24/2014	Annual	01/24/2015	839117/011
Wainwright		02/03/2014	Annual	02/03/2015	F6
Instrument	WHF3.0/18G-10EF / High Pass Filter	02/03/2014	Annual	02/03/2015	FO
Wainwright	WHNX6.0/26.5G-6SS / High Pass Filter	04/09/2014	Annual	04/09/2015	1
Instrument	WT INA0.0/20.30-033 / Tight Pass Tiller	04/09/2014	Annual	04/09/2013	I
Wainwright	WHNX7.0/18G-8SS / High Pass Filter	04/04/2014	Annual	04/04/2015	29
Instrument		107/2017	Annual	04/04/2013	23
Wainwright	WRCJ2400/2483.5-2370/2520-60/14SS	06/17/2014	Annual	06/17/2015	1
Instrument	/ Band Reject Filter	00/11/2014	/ under	00/11/2010	•
TESCOM	TC-3000C / BLUETOOTH TESTER	04/11/2014	Annual	04/11/2015	3000C000276
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/07/2014	Annual	05/07/2015	100422
Rohde & Schwarz	LOOP ANTENNA	05/19/2014	Biennial	05/19/2016	1513-175
CERNEX	CBL06185030 / POWER AMP	07/21/2014	Annual	07/21/2015	22965
CERNEX	CBLU1183540 / POWER AMP	07/21/2014	Annual	07/21/2015	22964