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FCC BT LE REPORT

FCC Certification

Applicant Name:

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

Address:

1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: February 05, 2016 Test Site/Location: HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majangmyeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA Report No.: HCT-R-1602-F008 HCT FRN: 0005866421

IC Recognition No.: 5944A-5

FCC ID : ZNFK520 APPLICANT : LG Electronics MobileComm U.S.A., Inc.

Model(s):	LG-K520
Additional Model(s):	LGK520, K520
EUT Type:	GSM/WCDMA/LTE Phone with Bluetooth4.1LE, WIFI802.11 b/g/n(2.4GHz), NFC, VoIP, Hotspot support
RF Avg. Output Power:	-0.440 dBm (0.904 mW)
Frequency Range:	2402 MHz -2480 MHz
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 : Seul Ki Lee 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-1602-F008	February 05, 2016	- First Approval Report



Model: LG-K520

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1. GENERAL INFORMATION

Applicant:	LG Electronics MobileComm U.S.A., Inc.
Address:	1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID:	ZNFK520
EUT Type:	GSM/WCDMA/LTE Phone with Bluetooth4.1LE, WIFI802.11 b/g/n(2.4GHz), NFC, VoIP, Hotspot support
Model name(s):	LG-K520
Additional Model name(s):	LGK520, K520
Date(s) of Tests:	January 26, 2016 ~ February 04, 2016
Place of Tests:	HCT Co., Ltd. 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea (IC Recognition No. : 5944A-5)

2. EUT DESCRIPTION

Model Name	LG-K520	LG-K520			
Additional Model name(s):	LGK520, K520				
EUT Type	GSM/WCDMA/LTE	Phone with Bluetooth4.1LE, WIFI802.11 b/g/n(2.4GHz), NFC, VoIP, Hotspot support			
Power Supply	DC 3.85 V				
Detter unformation	Model: BL-45B1F	=			
Battery Infomation	Type: Li-ion Batte	ery			
Frequency Range	TX: 2402 MHz ~ 3	TX: 2402 MHz ~ 2480 MHz			
	RX: 2402 MHz ~ 2480 MHz				
May DE Outrut Dawar	Peak	-0.440 dBm (0.904 mW)			
Max. RF Output Power	Average	-0.706dBm (0.850 mW)			
BT Operating Mode	BT_Low Energy	BT_Low Energy Mode			
Modulation Type	GFSK	GFSK			
Number of Channels	40 Channels	40 Channels			
	Manufacturer: IM	Manufacturer: IM-TECH			
Antenna Specification	Antenna type: IN	Antenna type: INTERNAL ANTENNA			
	Peak Gain : - 0.5	Peak Gain : - 0.52 dBi			



3. TEST METHODOLOGY

FCC KDB 558074 D01 DTS Meas Guidance v03r04 dated January 7, 2016 entitled "Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) and the measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) 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 6.2 of ANSI C63.10. (Version :2013) 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 below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. 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 8 of ANSI C63.10. (Version: 2013)

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.

All equipments(spectrum, antenna, accessory, etc.) for measurement is calibrated in accordance with the requirements of C63.5 (latest edition).

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 :2014) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (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	BADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.6.2	NAUNIEU	PASS

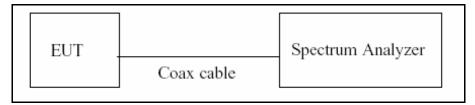


8. TEST RESULT 8.1 DUTY CYCLE

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 01/07/2016)

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 = $10^{10}(1/Duty Cycle)$

LE Mode	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor
	0.3914	0.6257	0.6255	2.04



Model: LG-K520

RESULT PLOTS

Agilent Spectrum Analyzer - Swept SA			
X RL RF 50Ω AC Center Freq 2.402000000		#Ava Type: Pwr(RMS) TRACE 122456	Frequency
	PNO: Fast +++ Trig: Free Run IFGain:Low Atten: 16 dB	TYPE WWWWWW DET P N N N N N	
Ref Offset 10.7 dB 10 dB/div Ref 15.00 dBm		ΔMkr3 625.7 μs 3.15 dB	Auto Tune
5.00			Center Freq
-5.00	X		2.402000000 GHz
-15.0			
-25.0			Start Freq
-35.0			2.402000000 GHz
-45.0	-handrighter	Marchander January and March	
-65.0			Stop Freq
-75.0			2.402000000 GHz
Center 2.402000000 GHz Res BW 8 MHz	#VBW 8.0 MHz	Span 0 Hz Sweep 1.267 ms (1001 pts)	CF Step
MKR MODE TRC SCL X	Y	FUNCTION FUNCTION WIDTH FUNCTION VALUE	8.000000 MHz <u>Auto</u> Man
1 $\Delta 2$ 1 t (Δ) 2 F 1 t	391.4 μs (Δ) 3.91 dB 471.2 μs -4.91 dBm		
3 Δ4 1 t (Δ) 4 F 1 t	625.7 μs (Δ) 3.15 dB 471.2 μs -4.91 dBm		Freq Offset
5			0 Hz
7			
9			
11			
MSG		STATUS	



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 (Procedure 8.1 in KDB 558074, issued 01/07/2016)

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.

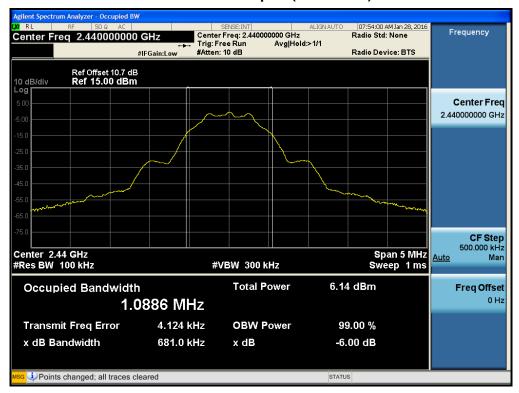


RESULT PLOTS

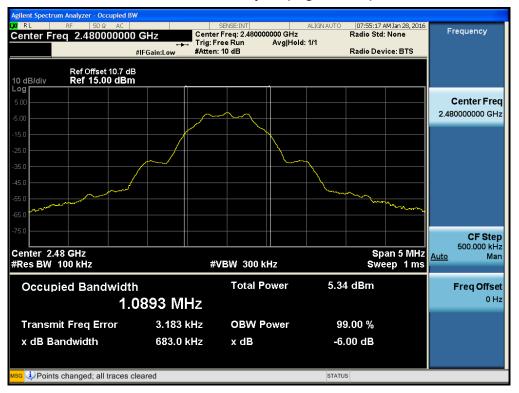
gilent Spectrum Analyzer - Occupied BW RL Center Freq: 2.402000000 GHz Trig: Free Run Avg|Hold #Atten: 10 dB ALIGN 07:52:30 AM Jan 28, 2016 Radio Std: None Frequency Center Freq 2.402000000 GHz Avg|Hold: 1/1 Radio Device: BTS #IFGain:Low Ref Offset 10.7 dB Ref 15.00 dBm 10 dB/div _og **Center Freq** 2.402000000 GHz CF Step 500.000 kHz Center 2.402 GHz #Res BW 100 kHz Span 5 MHz Sweep 1 ms <u>Auto</u> Man #VBW 300 kHz **Total Power** 5.56 dBm **Occupied Bandwidth** Freq Offset 0 Hz 1.0892 MHz **Transmit Freq Error** 5.472 kHz **OBW Power** 99.00 % x dB Bandwidth 679.5 kHz x dB -6.00 dB Points changed; all traces cleared STATUS

6dB Bandwidth plot (Low-CH 0)

6dB Bandwidth plot (Mid-CH 19)







6dB Bandwidth plot (High-CH 39)



8.3 OUTPUT POWER MEASUREMENT

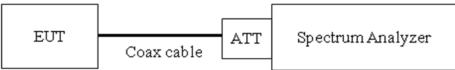
Test Requirements and limit, §15.247(b)(3)

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 01/07/2016)
 - RBW ≥ DTS Bandwidth
 - VBW ≥ 3 x RBW
 - SPAN ≥ 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 01/07/2016)

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".



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, 10.7 dB is offset for 2.4 GHz Band.



TEST RESULTS-Peak

Conducted Output Power Measurements

LE Mode		Measured	Limit
Frequency[MHz] Channel No.		Power(dBm)	(dBm)
2402	0	-1.015	30
2440	19	-0.440	30
2480	39	-1.227	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	-3.267	2.04	-1.229	30	
2440	19	-2.744	2.04	-0.706	30	
2480	39	-3.571	2.04	-1.533	30	



RESULT PLOTS-Peak

gilent Spectrum Analyzer - Swept SA RL Center Freq 2.402000000 GHz PN0: Fast →-IFGain:Low ALIGN AUTO #Avg Type: Pwr(RMS) Avg|Hold:>1/1 Jan 28, 2016 Frequency TRACE 1 2 3 4 5 6 TYPE M Trig: Free Run Atten: 10 dB Auto Tune Mkr1 2.401 998 GHz -1.015 dBm Ref Offset 10.7 dB Ref 10.70 dBm 10 dB/div Log **Center Freq** 2.402000000 GHz Start Freq 2.400500000 GHz Stop Freq 2.403500000 GHz CF Step 300.000 kHz Man <u>Auto</u> **Freq Offset** 0 Hz Center 2.402000 GHz #Res BW 1.0 MHz Span 3.000 MHz Sweep 1.07 ms (1000 pts) #VBW 3.0 MHz Points changed; all traces cleared

Conducted Output Power (Low-CH 0)

Conducted Output Power (Mid-CH 19)

	um Analyzer - Swept SA					
Center Fi	RF 50 Ω AC req 2.440000000) GHz PNO: Fast ↔ IFGain:Low	SENSE:INT Trig: Free Run Atten: 10 dB	ALIGNAUTO #Avg Type: Pwr(RMS) Avg Hold: 1/1	07:54:09 AM Jan 28, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P P P P P	Frequency
10 dB/div	Ref Offset 10.7 dB Ref 10.70 dBm	. Sameon		Mkr1	2.439 983 GHz -0.440 dBm	Auto Tune
0.700			1			Center Freq 2.440000000 GHz
-9.30						Start Freq 2.438500000 GHz
-29.3						Stop Freq 2.441500000 GHz
-49.3						CF Step 300.000 kHz <u>Auto</u> Man
-69.3						Freq Offset 0 Hz
-79.3 Center 2.4	140000 GHz				Span 3.000 MHz	
#Res BW	1.0 MHz		3.0 MHz		1.07 ms (1000 pts)	
Mad V Point	ts changed; all traces of	cleared		STATUS		

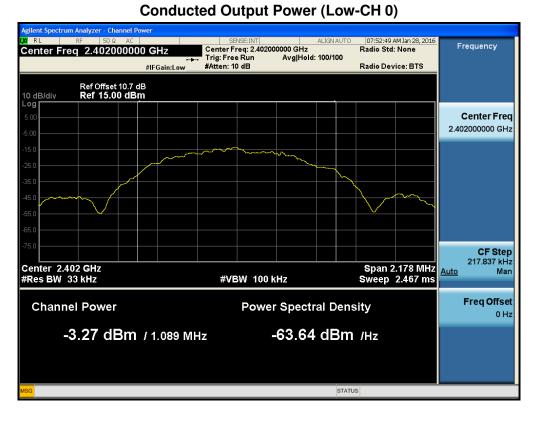




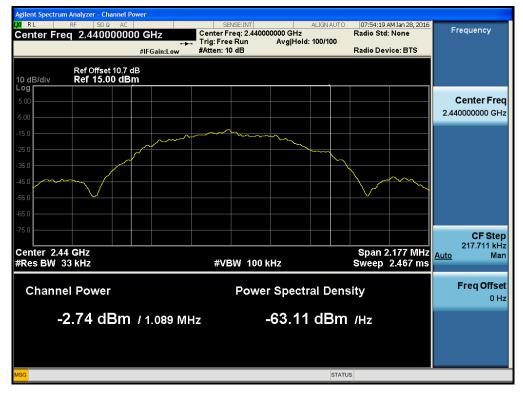
Conducted Output Power (High-CH 39)



RESULT PLOTS-Average



Conducted Output Power (Mid-CH 19)







Conducted Output Power (High-CH 39)



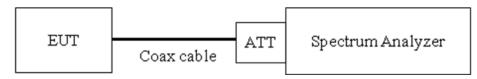
8.4 POWER SPECTRAL DENSITY

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 01/07/2016

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,10.7 dB is offset for 2.4 GHz Band.



Model: LG-K520

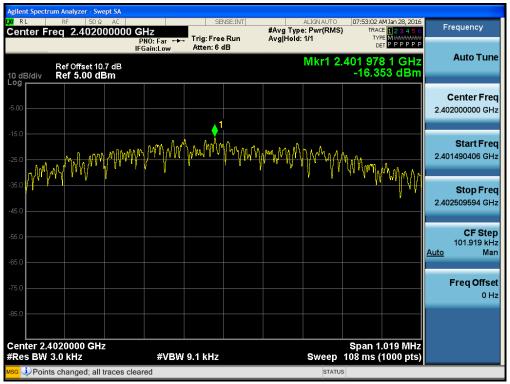
TEST RESULTS

Frequency	Channel		Test Result			
(MHz)	No.	Mode	PSD	Limit	Pass/	
		(dBm)	(dBm)	Fail		
2402	0		-16.353	8	Pass	
2440	19	LE	-15.652	8	Pass	
2480	39		-16.501	8	Pass	

Conducted Power Density Measurements



RESULT PLOTS

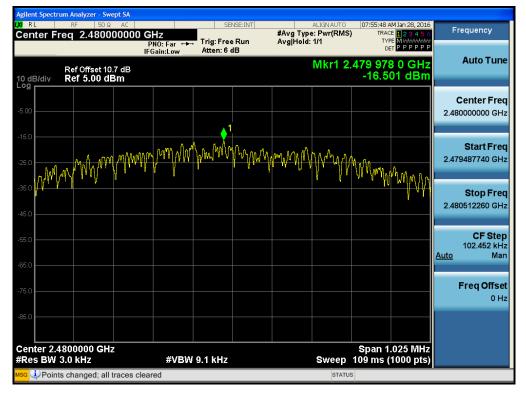


Power Spectral Density (Low-CH 0)

Power Spectral Density (Mid-CH 19)







Power Spectral Density (High-CH 39)

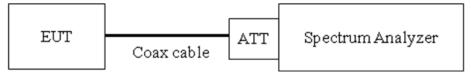


8.5 OUT OF BAND EMISSIONS AT THE BAND EDGE/ CONDUCTED SPURIOUS EMISSIONS Test Requirements and limit, §15.247(d)

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 01/07/2016)

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, 10.7 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	11.30
100	9.83
200	10.19
300	10.13
400	10.23
500	10.25
600	10.32
700	10.35
800	10.35
900	10.34
1000	10.39
2000	10.64
2400*	10.65
2500*	10.67
3000	10.68
4000	10.89
5000	11.07
6000	11.06
7000	11.35
8000	11.32
9000	11.48
10000	11.56
11000	11.56
12000	11.68
13000	11.83
14000	11.90
15000	11.98
16000	12.04



Model: LG-K520

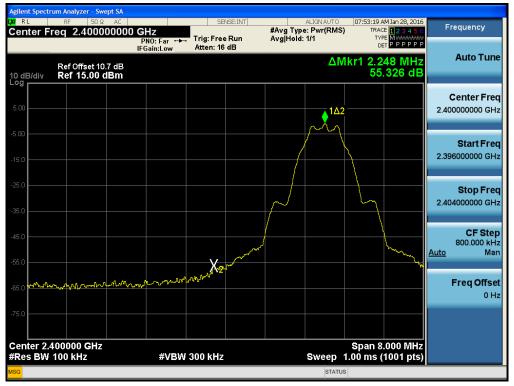
17000	12.02
18000	12.08
19000	12.07
20000	12.14
21000	12.17
22000	12.31
23000	12.60
24000	12.34
25000	12.53

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

2. Factor = Cable loss + Attenuator loss

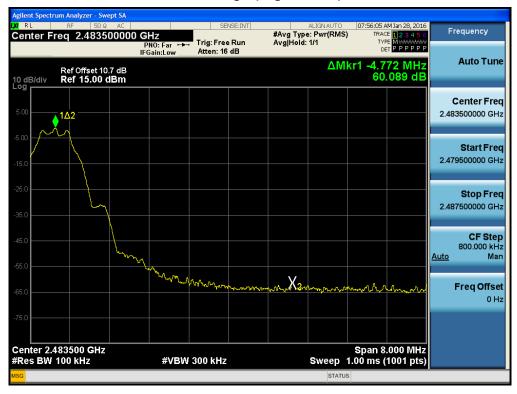


RESULT PLOTS



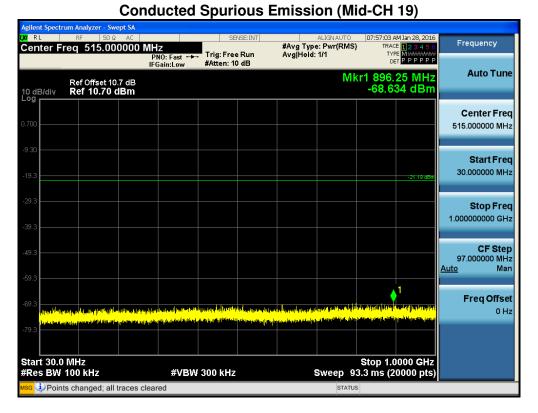
BandEdge (Low-CH 0)

BandEdge (High-CH 39)





30 MHz ~ 1 GHz

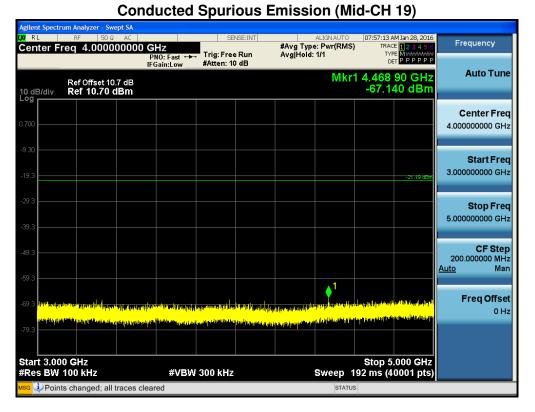


$1 \text{ GHz} \sim 3 \text{ GHz}$

XI RL	um Analyzer - Swept 9	IC	SENSE:INT	ALIGN AU" #Avg Type: Pwr(R	VIS) TRACE 123456	Frequency
10 dB/div	Ref Offset 10.7 d Ref 10.70 dBr	PNO: Fast ↔ IFGain:Low	- Trig: Free Run #Atten: 10 dB	Avg Hold: 1/1	кr1 2.665 35 GHz -66.150 dBm	Auto Tune
						Center Freq 2.000000000 GHz
-9.30					-21:19 dBm	Start Freq 1.000000000 GHz
-29.3						Stop Freq 3.000000000 GHz
49.3 59.3						CF Step 200.000000 MH <u>Auto</u> Mar
69.3 1000-000 79.3	a y se ny kanana ang panana kanana kanana kanana ny panganana kanana	y teo by teo and to a before the	<mark>a fan far fan de sen fan sen f Fil fan fin fan fan fan fan fan fan sen fan sen</mark>	gilili aregani ugani da tang	al na fai de fan in de algebiek gant is de seg Angegegen in de se sen in segen algebiek fan in segen Angegegen in de segen in segen algebiek	Freq Offset 0 Hz
Start 1.00 #Res BW	0 GHz		/ 300 kHz		Stop 3.000 GHz 192 ms (40001 pts)	
	100 KHZ ts changed; all trac		1 300 KHZ		192 ms (40001 pts) atus	



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



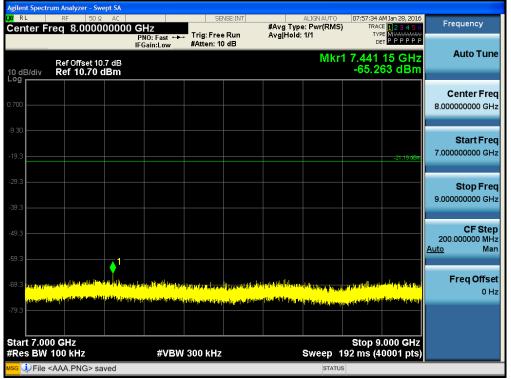
$5 \text{ GHz} \sim 7 \text{ GHz}$

	Spectrum	Analyzer - Sw									
Cento	er Fre	RF 50Ω q 6.0000	AC 00000 G	Hz		NSE:INT		ALIGNAUTO e: Pwr(RMS)	TRA	AM Jan 28, 2016 CE 1 2 3 4 5 6 PE M WWWWWW	Frequency
				NO: Fast ↔⊷ Gain:Low	#Atten: 10		Avg[Hold:	101	D	ET PPPPP	
10 dB/		tef Offset 10 tef 10.70 (Mkr1		45 GHz 70 dBm	Auto Tune
Log											Center Freq
0.700 -											6.000000000 GHz
-9.30 -											
-9.30											Start Freq
-19.3										-21:19 dBm	5.00000000 GHz
-29.3 -											
											Stop Freq 7.00000000 GHz
-39.3 —											
-49.3											CF Step 200.000000 MHz
-59.3 -											Auto Man
-39.3			↓ ¹								
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	5.000									.000 GHz	
_	BW 10			#VBW	300 kHz			Sweep 1	``	.0001 pts)	
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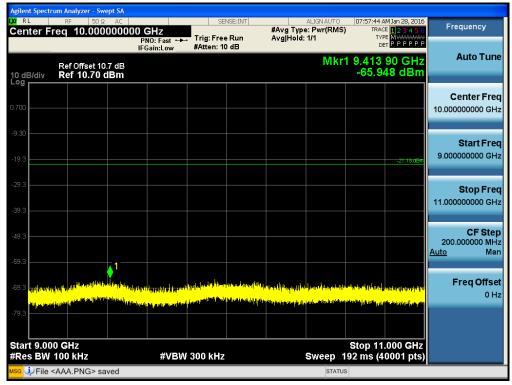


7 GHz ~ 9 GHz

Conducted Spurious Emission (Mid-CH 19)

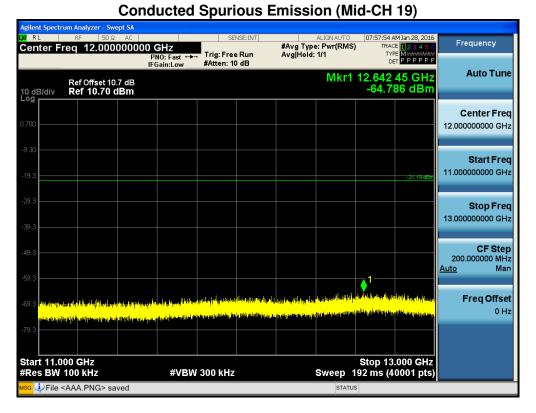


9 GHz ~ 11 GHz





11 GHz ~ 13 GHz

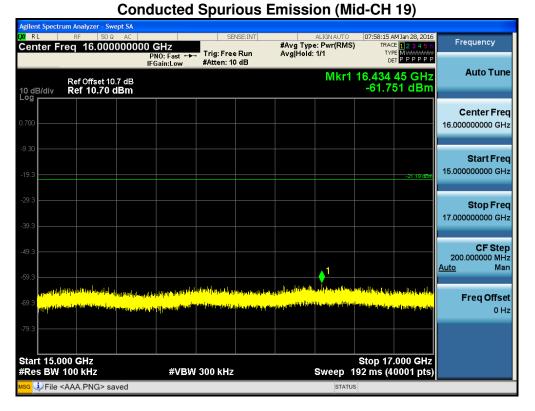


13 GHz ~ 15 GHz

	um Analyzer - Swep									
Center F	RF 50Ω req 14.0000	AC 00000	GHz		NSE:INT		ALIGNAUTO : Pwr(RMS)	TRA	AM Jan 28, 2016 CE 12 3 4 5 6	Frequency
		PI	IO: Fast ↔ Gain:Low	Trig: Free #Atten: 10		Avg Hold:	1/1	TY D	PE MWWWWW ET P P P P P P	
	Ref Offset 10.7	7 dB					Mkr1		05 GHz	Auto Tune
10 dB/div Log	Ref 10.70 dl							-64.1	09 dBm	
										Center Freq
0.700										14.000000000 GHz
-9.30										
-0.30										Start Freq
-19.3									-21.19 dBm	13.00000000 GHz
20.0										
-29.3										Stop Freq
-39.3										15.00000000 GHz
										CF Step
-49.3										200.000000 MHz
-59.3										<u>Auto</u> Man
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#Res BW			#VBW	300 kHz			Sweep 1		.000 GH2 0001 pts)	
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15 GHz ~ 17 GHz

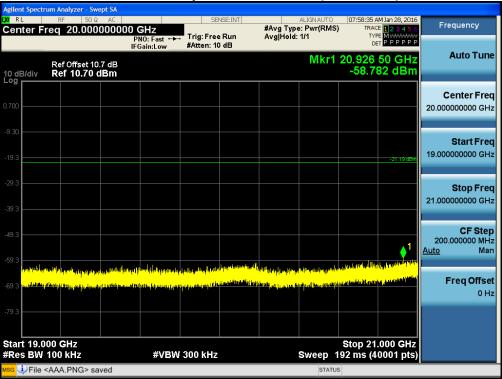


17 GHz ~ 19 GHz

Agilent Spectrum .	Analyzer - Swept RF 50 Ω			05			07.50.05		
Center Fred		00000 G	0: Fast ↔		#Avg Type Avg Hold:	ALIGNAUTO e: Pwr(RMS 1/1) TRAC TYI	AM Jan 28, 2016 E 2 3 4 5 6 E M WWWWWW T P P P P P P P	Frequency
10 dB/div	ef Offset 10.7 ef 10.70 dE	dB	ain:Low	#Atten: It		Mkr1	18.966	05 GHz 11 dBm	Auto Tune
0.700									Center Freq 18.00000000 GHz
-9.30								-21:19 dBm	Start Freq 17.000000000 GHz
-29.3									Stop Freq 19.000000000 GHz
-49.3									CF Step 200.000000 MHz <u>Auto</u> Man
-69.3	Manakata ke ka atap ^{Mana} kata ke ka atap						histore have a fillen and a start of the second		Freq Offset 0 Hz
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19 GHz ~ 21 GHz



Conducted Spurious Emission (Mid-CH 19)

$21 \ \text{GHz} \sim 23 \ \text{GHz}$

Agilent Spectrum										
LXI RL	RF 50 Ω			SEI	NSE:INT		ALIGNAUTO		M Jan 28, 2016	Frequency
Center Fre	eq 22.0000	F	GHZ NO: Fast +++ Gain:Low	Trig: Free #Atten: 10		#Avg Type Avg Hold:	e: Pwr(RMS) 1/1	TYP	E 1 2 3 4 5 6 E M WWWW T P P P P P P	
	Ref Offset 10. Ref 10.70 d						Mkr1		20 GHz 23 dBm	Auto Tune
0.700										Center Freq 22.000000000 GHz
-9.30									-21.19 dBm	Start Freq 21.00000000 GHz
-29.3										Stop Freq 23.00000000 GHz
-49.3										CF Step 200.000000 MHz <u>Auto</u> Man
-59.3 1998 1999	n de la parti de la desembra de la En la desembra de la d	aliye yaka di kara <mark>Karya da kutata</mark>	n alakina senjet Alakina senjet	n fa ha	enny let de anita. Angentige "moudt	en ar for the former of the second	n finski sjene statio Gradina je se se station	n na statute San ang na statute San ang na statute	en (1749 et en talles <mark>per mattes pluk, tant</mark>	Freq Offset 0 Hz
-79.3 Start 21.000 #Res BW 1			#\/B\M	300 kHz			Sweep 1		.000 GHz	
	AA.PNG> sa	ved	#VDVV	300 KHZ			Sweep T		ooo r pisj	



23 GHz ~ 25 GHz

Agilent Spect	trum Analyzer - Swept	t SA		<u>,</u>	,	
LXI RL		AC	SENSE:INT	ALIGN AUTO	07:58:56 AM Jan 28, 2016	
Center F	req 24.0000	PNO: Fast	Trig: Free Run #Atten: 10 dB	#Avg Type: Pwr(RMS) Avg Hold: 1/1	TRACE 123456 TYPE MWWWW DET PPPPP	Frequency
10 dB/div	Ref Offset 10.7 Ref 10.70 dE			Mkr1	24.990 65 GHz -55.918 dBm	Auto Tune
0.700						Center Freq 24.000000000 GHz
-9.30					-21:19 dBm	Start Freq 23.000000000 GHz
-29.3						Stop Freq 25.000000000 GHz
-49.3				ntan esset en deltas the fle	n in the state of the Back Market	CF Step 200.000000 MHz <u>Auto</u> Man
-69.3 <mark>(Manaka</mark>	a laga di na shindhi nabihi bina 19 Gangar paring da walana mayak	leanan minikin kirin a dan pakin pisio pangan dan mini pakin sa basar dan sa di	and and an international states and	n _{the second state of the stat}	ingenissed fragenise bereine in der engenissen Ender information in der eine eine fragenise	Freq Offset 0 Hz
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Start 23.0 #Res BW	100 kHz		300 kHz		Stop 25.000 GHz 92 ms (40001 pts)	
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8.6 RADIATED MEASUREMENT. 8.6.1 RADIATED SPURIOUS EMISSIONS.

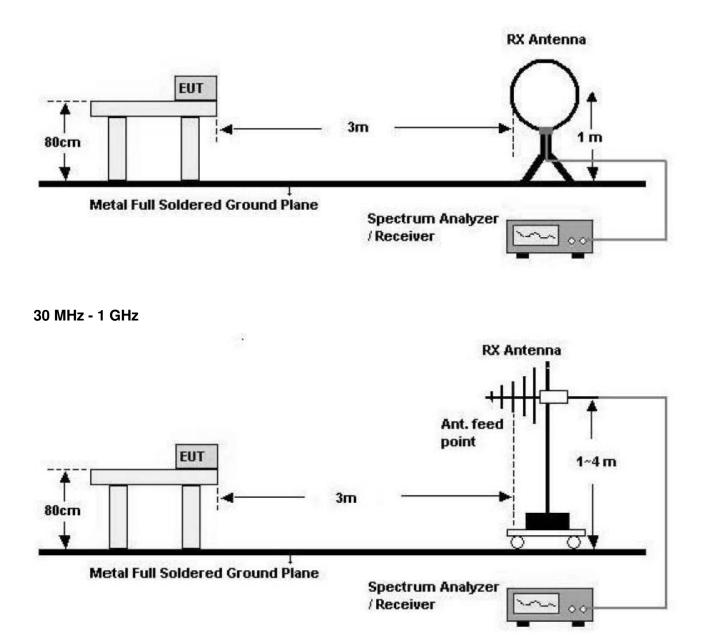
Test Requirements and limit, §15.205, §15.209

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

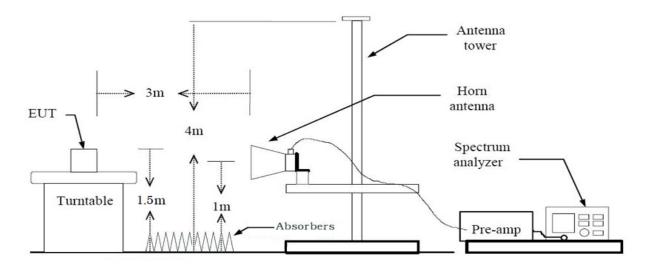
Below 30 MHz





Model: LG-K520

Above 1 GHz



TEST PROCEDURE USED

Method 12.1 in KDB 558074, issued 01/07/2016

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).

	Table I — RBW as a function of frequency					
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 (duty cycle < 98%, duty cycle variations are less than ±2%)
Set RBW = 1 MHz
Set VBW ≥ 3 x RBW
Detector = RMS.
Averaging type = power (*i.e.*, RMS).
Sweep time = auto.

Trace mode = average (at least 100 traces).

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.



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-K520

Above 1 GHz

Operation Mode: CH Low(LE Mode)

Frequency	Reading	A.F.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4804	49.75	-2.96	V	46.79	73.98	27.19	PK
4804	37.27	-2.96	V	34.31	53.98	19.67	AV
7206	46.18	6.88	V	53.06	73.98	20.92	PK
7206	33.89	6.88	V	40.77	53.98	13.21	AV
4804	49.81	-2.96	Н	46.85	73.98	27.13	PK
4804	37.41	-2.96	Н	34.45	53.98	19.53	AV
7206	46.31	6.88	Н	53.19	73.98	20.79	PK
7206	33.94	6.88	Н	40.82	53.98	13.16	AV

Notes:

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. The Reading values are already added value of the duty cycle factor.
- 5. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain
- 6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



Frequency	Reading	A.F.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4882	50.59	-2.60	V	47.99	73.98	25.99	PK
4882	37.86	-2.60	V	35.26	53.98	18.72	AV
7323	46.76	6.11	V	52.87	73.98	21.11	PK
7323	34.01	6.11	V	40.12	53.98	13.86	AV
4882	50.65	-2.60	Н	48.05	73.98	25.93	PK
4882	37.91	-2.60	Н	35.31	53.98	18.67	AV
7323	46.83	6.11	Н	52.94	73.98	21.04	PK
7323	34.05	6.11	Н	40.16	53.98	13.82	AV

Operation Mode: CH Mid(LE Mode)

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 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. The Reading values are already added value of the duty cycle factor.
- 5. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain
- 6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.



Frequency	Reading	A.F.+CL-AMP G	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
4960	50.12	-2.53	V	47.59	73.98	26.39	PK
4960	37.43	-2.53	V	34.90	53.98	19.08	AV
7440	46.62	5.73	V	52.35	73.98	21.63	PK
7440	34.07	5.73	V	39.80	53.98	14.18	AV
4960	50.21	-2.53	Н	47.68	73.98	26.30	PK
4960	37.51	-2.53	Н	34.98	53.98	19.00	AV
7440	46.73	5.73	Н	52.46	73.98	21.52	PK
7440	34.12	5.73	Н	39.85	53.98	14.13	AV

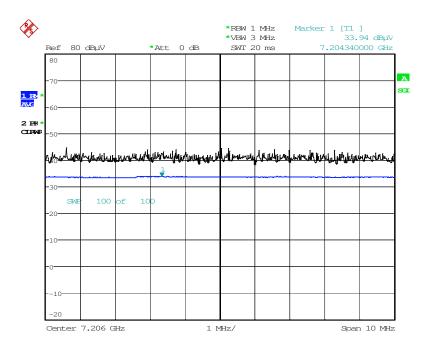
Operation Mode: CH High(LE Mode)

- 1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 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. The Reading values are already added value of the duty cycle factor.
- 5. Total = Reading Value + Antenna Factor + Cable Loss Amp Gain
- 6. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.

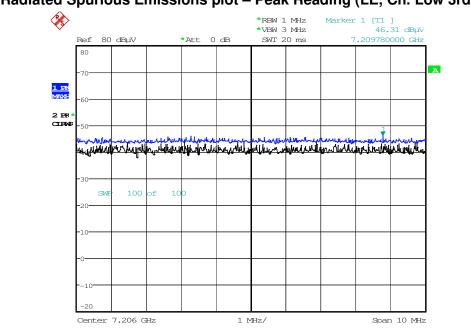


RESULT PLOTS





Date: 28.JAN.2016 18:56:13



Radiated Spurious Emissions plot – Peak Reading (LE, Ch. Low 3rd Harmonic)

Note : Only the worst case plots for Radiated Spurious Emissions.

Date: 28.JAN.2016 18:55:53



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)).

Operation Mode	BT_LE
Operating Frequency	2402 MHz
Channel No	0 Ch

Frequency	Reading	A.F.+CL	Ant. Pol.	Total	Limit		Measurement
[MHz]	[dBuV/m]	[dBm]	[H/V]	[dBuV/m]	[dBuV/m]	[dB]	Туре
2390.0	27.64	31.31	Н	58.95	73.98	15.03	PK
2390.0	16.14	31.31	Н	47.45	53.98	6.53	AV
2390.0	27.78	31.31	V	59.09	73.98	14.89	PK
2390.0	16.17	31.31	V	47.48	53.98	6.50	AV

- 1. Frequency range of measurement = 2310 MHz ~ 2390 MHz
- 2. The Reading values are already added value of the duty cycle factor.
- 3. Total = Reading Value + Antenna Factor + Cable Loss
- 4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
- 5. 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_LE
Operating Frequency	2480 MHz
Channel No	39 Ch

Frequency [MHz]	Reading [dBuV/m]	A.F.+CL [dBm]	Ant. Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
2483.5	28.11	31.37	Н	59.48	73.98	14.50	PK
2483.5	16.47	31.37	Н	47.84	53.98	6.14	AV
2483.5	28.09	31.37	V	59.46	73.98	14.52	PK
2483.5	16.43	31.37	V	47.80	53.98	6.18	AV

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



RESULT PLOTS

Radiated Restricted Band Edges plot – Average Reading (LE, High Ch.)



Radiated Restricted Band Edges plot – Peak Reading (LE, High Ch.)

tart Fre	RF 50 Ω AC q 2.483500000				#Avg Typ Avg Hold	ALIGN AUTO e: Pwr(RMS) : 100/100	06:16:01 PM Jan 28, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N	Frequency
) dB/div	Ref 80.00 dBµ\					Mkr1 2.4	190 941 5 GH₂ 28.107 dBμ∖	Auto Tur
0.0								Center Fr 2.491750000 GI
).0								Start Fr 2.483500000 G
0.0			↓ 1					Stop Fr 2.500000000 G
	lente la stran and an	۵-۵۱۹۹۹ (۱۹۹۹) ۲۹۹۹ (۱۹۹۹) ۲۹۹۹ (۱۹۹۹) ۱۹۹۹ - ۲۰۰۹ (۱۹۹۹) ۲۹۹۹ - ۲۰۰۹ (۱۹۹۹)	-1	6,7\$}}*}	hiya Yanyin Abiriyin (he	┶╸ᡧᠧᡀᡏᢁᡷᡘᡃᢩᢑᡘᡀᠻᠬ᠇ᠶ᠈᠈ᢦᡬ	ปปกทางในแห่งสามารถเป็นการ	CF St 1.650000 M <u>Auto</u> M
00								Freq Offs 0
tart 2.48	3500 GHz					St	op 2.500000 GHz	
Res BW		#VBM	/ 3.0 MHz			Sweep 1	.00 ms (1001 pts)	

Note : Only the worst case plots for Radiated Restricted Band Edges.



8.7 POWERLINE CONDUCTED EMISSIONS

Test Requirements and limit, §15.207

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:

	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

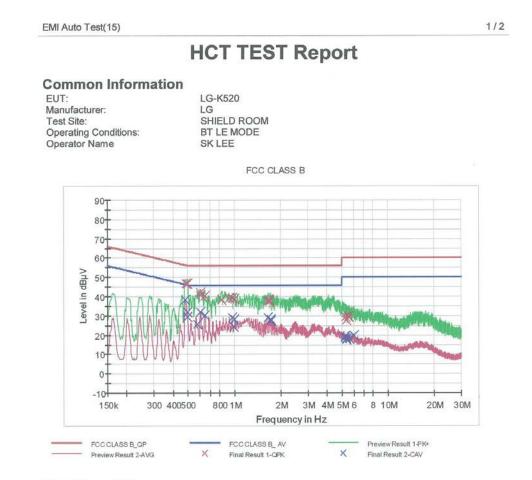
- 1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
- 2. The EUT is connected via LISN to a test power supply.
- 3. The measurement results are obtained as described below:
- 4. Detectors Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor



RESULT PLOTSConducted Emissions (Line 1)



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.488000	46.7	9.000	Off	N	9.6	9.5	56.2
0.498000	46.9	9.000	Off	N	9.6	9.1	56.0
0.602000	40.8	9.000	Off	N	9.6	15.2	56.0
0.606000	42.0	9.000	Off	N	9.6	14.0	56.0
0.644000	40.4	9.000	Off	N	9.6	15.6	56.0
0.832000	38.3	9.000	Off	N	9.7	17.7	56.0
0.930000	39.1	9.000	Off	N	9.7	16.9	56.0
0.970000	39.2	9.000	Off	N	9.7	16.8	56.0
1.010000	38.6	9.000	Off	N	9.7	17.4	56.0
1.654000	37.7	9.000	Off	N	9.7	18.3	56.0
1.692000	37.5	9.000	Off	N	9.7	18.5	56.0
1.696000	38.5	9.000	Off	N	9.7	17.5	56.0
5.298000	29.7	9.000	Off	N	9.8	30.3	60.0
5.346000	27.7	9.000	Off	N	9.8	32.3	60.0
5.386000	27.8	9.000	Off	N	9.8	32.2	60.0
5.398000	27.8	9.000	Off	N	9.8	32.2	60.0

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EMI Auto Test(15)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
5.530000	29.5	9.000	Off	N	9.8	30.5	60.0
5.574000	30.0	9.000	Off	N	9.9	30.0	60.0

Final Result 2

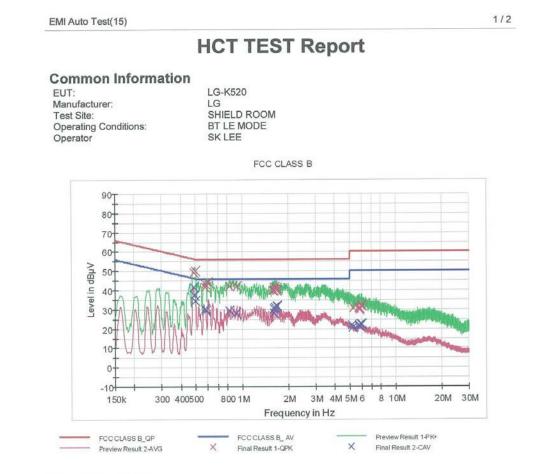
Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.484000	38.3	9.000	Off	N	9.6	8.0	46.3
0.496000	32.1	9.000	Off	N	9.6	14.0	46.1
0.500000	29.7	9.000	Off	N	9.6	16.3	46.0
0.580000	25.8	9.000	Off	N	9.6	20.2	46.0
0.606000	32.2	9.000	Off	N	9.6	13.8	46.0
0.644000	30.5	9.000	Off	N	9.6	15.5	46.0
0.968000	29.0	9.000	Off	N	9.7	17.0	46.0
0.998000	24.3	9.000	Off	N	9.7	21.7	46.0
1.010000	28.4	9.000	Off	N	9.7	17.6	46.0
1.654000	28.9	9.000	Off	N	9.7	17.1	46.0
1.736000	28.1	9.000	Off	N	9.7	17.9	46.0
1.740000	27.3	9.000	Off	N	9.7	18.7	46.0
5.244000	18.7	9.000	Off	N	9.8	31.3	50.0
5.256000	19.3	9.000	Off	N	9.8	30.7	50.0
5.346000	18.0	9.000	Off	N	9.8	32.0	50.0
5.398000	17.8	9.000	Off	N	9.8	32.2	50.0
5.588000	18.0	9.000	Off	N	9.9	32.0	50.0
5.980000	19.7	9.000	Off	N	9.9	30.3	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)
0.486000	49.2	9.000	Off	L1	9.7	7.0	56.2
0.496000	50.1	9.000	Off	L1	9.7	6.0	56.1
0.576000	41.7	9.000	Off	L1	9.7	14.3	56.0
0.580000	43.4	9.000	Off	L1	9.7	12.6	56.0
0.602000	44.2	9.000	Off	L1	9.7	11.8	56.0
0.830000	42.2	9.000	Off	L1	9.7	13.8	56.0
0.924000	42.1	9.000	Off	L1	9.7	13.9	56.0
1.576000	40.0	9.000	Off	L1	9.7	16.0	56.0
1.620000	40.1	9.000	Off	L1	9.7	15.9	56.0
1.644000	41.6	9.000	Off	L1	9.7	14.4	56.0
1.682000	40.1	9.000	Off	L1	9.7	15.9	56.0
1.688000	41.3	9.000	Off	L1	9.7	14.7	56.0
5.308000	30.8	9.000	Off	L1	9.9	29.2	60.0
5.738000	30.8	9.000	Off	L1	9.9	29.2	60.0
5.782000	30.9	9.000	Off	L1	9.9	29.1	60.0
5.806000	30.1	9.000	Off	L1	9.9	29.9	60.0

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EMI Auto Test(15)

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
5.942000	31.9	9.000	Off	L1	9.9	28.1	60.0
5.984000	32.2	9.000	Off	L1	9.9	27.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.486000	41.7	9.000	Off	L1	9.7	4.5	46.2
0.494000	37.3	9.000	Off	L1	9.7	8.8	46.1
0.500000	34.5	9.000	Off	L1	9.7	11.5	46.0
0.578000	30.4	9.000	Off	L1	9.7	15.6	46.0
0.582000	29.4	9.000	Off	L1	9.7	16.6	46.0
0.828000	29.4	9.000	Off	L1	9.7	16.6	46.0
0.914000	28.4	9.000	Off	L1	9.7	17.6	46.0
1.620000	30.1	9.000	Off	L1	9.7	15.9	46.0
1.624000	28.2	9.000	Off	L1	9.7	17.8	46.0
1.644000	31.1	9.000	Off	L1	9.7	14.9	46.0
1.686000	31.5	9.000	Off	L1	9.7	14.5	46.0
1.690000	32.0	9.000	Off	L1	9.7	14.0	46.0
5.178000	21.8	9.000	Off	L1	9.9	28.2	50.0
5.246000	20.5	9.000	Off	L1	9.9	29.5	50.0
5.738000	21.7	9.000	Off	L1	9.9	28.3	50.0
5.782000	21.6	9.000	Off	L1	9.9	28.4	50.0
5.942000	22.3	9.000	Off	L1	9.9	27.7	50.0
5.984000	22.2	9.000	Off	L1	9.9	27.8	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	Serial No.
Rohde & Schwarz	ENV216/ LISN	12/28/2015	Annual	100073
Agilent	E4440A/ Spectrum Analyzer	03/18/2015	Annual	US45303008
Agilent	N9020A / SIGNAL ANALYZER	06/30/2015	Annual	MY51110085
Agilent	N9020A / SIGNAL ANALYZER	07/02/2015	Annual	MY50510304
Agilent	N1911A/Power Meter	07/09/2015	Annual	MY45100523
Agilent	N1921A /POWER SENSOR	07/09/2015	Annual	MY45241059
Agilent	87300B/Directional Coupler	11/30/2015	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	06/15/2015	Annual	5001
Hewlett Packard	E3632A / DC POWER SUPPLY	03/11/2015	Annual	KR75303962
Agilent	8493C / Attenuator(10 dB)	07/23/2015	Annual	07560
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/11/2015	Annual	100422



9.2 LIST OF TEST EQUIPMENT(Radiated Test)

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Schwarzbeck	VULB 9160/ TRILOG Antenna	10/10/2014	Biennial	3368
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12
CERNEX	CBL18265035 / POWER AMP	07/27/2015	Annual	22966
Schwarzbeck	BBHA 9120D/ Horn Antenna	05/07/2015	Biennial	937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/30/2015	Biennial	BBHA9170124
Rohde & Schwarz	FSP / Spectrum Analyzer	01/15/2016	Annual	839117/011
Wainwright Instrument	WHF3.0/18G-10EF / High Pass Filter	06/29/2015	Annual	8
Wainwright Instrument	WRCJ2400/2483.5-2370/2520-60/14SS / Band Reject Filter	06/15/2015	Annual	1
Rohde & Schwarz	LOOP ANTENNA	02/18/2014	Biennial	100179
CERNEX	CBL06185030 / POWER AMP	07/21/2015	Annual	22965
CERNEX	CBLU1183540 / POWER AMP	07/21/2015	Annual	22964
Rohde & Schwarz	CBT / BLUETOOTH TESTER	05/11/2015	Annual	100422