

FCC BT REPORT

FCC Certification

Applicant Name:

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

Address:

1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: June 25, 2018 Test Site/Location: HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majangmyeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA Report No.: HCT-RF-1806-FC010

FCC ID: ZNFX210JM

APPLICANT:

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

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : ZNFX210EM report.

Model:	LM-X210JM
Additional Model(s):	LMX210JM, X210JM
EUT Type:	GSM/WCDMA/LTE Phone with Bluetooth4.2LE, WIFI802.11 b/g/n
Max. RF Output Power:	10.017 dBm (10.04 mW)
Frequency Range:	2402 MHz - 2480 MHz (Bluetooth)
Modulation type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter
FCC Rule Part(s):	Part 15 subpart C 15.247

The measurements shown in this report were made in accordance with the procedures specified in §2.947. 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)

Engineer of Telecommunication testing center

Report prepared by : Jung Ki Lim

Approved by : Yong Hyun Lee Manager of Telecommunication testing center

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.



<u>Version</u>

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1806-FC010	June 25, 2018	- First Approval Report



Table of Contents

1.	GENERAL INFORMATION								
2.	EUT DES	SCRIPTION							
3.	TEST ME	THODOLOGY							
	3.1	EUT CONFIGURATION							
	3.2	EUT EXERCISE							
	3.3	GENERAL TEST PROCEDURES							
	3.4	DESCRIPTION OF TEST MODES							
4.	INSTRU	MENT CALIBRATION							
5.	FACILITI	ES AND ACCREDITATIONS							
	5.1	FACILITIES							
	5.2	EQUIPMENT							
6.	ANTENN	A REQUIREMENTS							
7.	MEASUF	REMENT UNCERTAINTY							
8.	SUMMA	RY OF TEST RESULTS							
9.	TEST RE	SULT9							
	9.1	PEAK POWER9							
	9.2	BAND EDGES							
	9.3	FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (99% BW) 24							
	9.4	NUMBER OF HOPPING FREQUENCY							
	9.5	TIME OF OCCUPANCY (DWELL TIME)							
	9.6	SPURIOUS EMISSIONS							
	9.6.1	CONDUCTED SPURIOUS EMISSIONS							
	9.6.2	RADIATED SPURIOUS EMISSIONS							
	9.6.3	RADIATED RESTRICTED BAND EDGES71							
	9.7	POWERLINE CONDUCTED EMISSIONS							
10.		LIST OF TEST EQUIPMENT							
	10.1	LIST OF TEST EQUIPMENT(Conducted Test) 88							
	10.2 LIST OF TEST EQUIPMENT(Radiated Test)								



1. GENERAL INFORMATION

Applicant:	LG Electronics MobileComm U.S.A., Inc.
Address:	1000 Sylvan Avenue, Englewood Cliffs NJ 07632
FCC ID:	ZNFX210JM
EUT Type:	GSM/WCDMA/LTE Phone with Bluetooth4.2LE, WIFI802.11 b/g/n
Model:	LM-X210JM
Additional Model(s):	LMX210JM, X210JM
Date(s) of Tests:	February 14, 2018 ~ February 23, 2018, March 2, 2018
Place of Tests	HCT Co., Ltd.
FIACE OF 16315.	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea

2. EUT DESCRIPTION

Model	LM-X210JM
Additional Model(s)	LMX210JM, X210JM
EUT Type	GSM/WCDMA/LTE Phone with Bluetooth4.2LE, WIFI802.11 b/g/n
Power Supply	DC 3.85 V
Detter unformation	Model: EAC63321601
Battery information	Type: Li-ion Battery
Frequency Range	2402 MHz - 2480 MHz (Bluetooth)
Max. RF Output Power:	10.017 dBm (10.04 mW)
BT Operating Mode	Normal, EDR, AFH
Modulation Type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
Modulation Technique	FHSS
Number of Channels	79Channels, Minimum 20 Channels(AFH)
	Manufacturer: AT&C
Antenna Specification	Antenna type: INTERNAL ANTENNA
	Peak Gain : 1.82 dBi

*** 15.247 Requirements for Bluetooth transmitter**

• This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

1) This system is hopping pseudo-randomly.

2) Each frequency is used equally on the average by each transmitter.

3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters

4) The receiver shifts frequencies in synchronization with the transmitted signals.

• 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.

• 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.



3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) is used in the measurement of the test device.

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 3.75 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). To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector with a reduced VBW setting(RBW = 1 MHz, VBW = 1/T Hz, where T = Pulse width).

Conducted Antenna Terminal

See Section from 7.8.2 to 7.8.8.(ANSI 63.10-2013)



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.

Espectially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

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. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10:2013.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71



Report No.: HCT-RF-1806-FC010

8. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
20 dB Bandwidth	§15.247(a)(1)(ii) or (iii)	N/A		PASS
Occupied Bandwidth	N/A	N/A		N/A
Conducted Maximum Peak Output Power	§15.247(b)(1)	< 1 W if ≥ 75 non- overlapping hopping channels used < 0.125 W if < 75 non- overlapping hopping channels used		PASS
Carrier Frequency Separation	\$15.247(a)(1) >25 kHz or >2/3 of the 20dB BW		CONDUCTED	PASS
Number of Hopping Frequencies	§15.247(a)(1)(iii)	≥ 15		PASS
Time of Occupancy	§15.247(a)(1)(iii)	<400 ms		PASS
Conducted Spurious Emissions	§15.247(d)	> 20 dB for all out-of band emissions		PASS
Band Edge(Out of Band Emissions)	§15.247(d)	> 20 dB for all out-of band emissions		PASS
AC Power line Conducted Emissions	Power line Conducted §15.207(a)			PASS
Radiated Spurious Emissions	§15.247(d), 15.205, 15.209	cf. Section 9.6.2	BADIATED	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 9.6.3	RADIATED	PASS



9. TEST RESULT

9.1 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

- For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 W. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 W.
- 2. The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.5 in ANSI 63.10-2013)

- 1) Span: approximately 5 times the 20 dB bandwidth, centered on a hopping channel
- 2) RBW > the 20 dB bandwidth of the emission being measured
- 3) VBW ≥ RBW
- 4) Sweep = Auto
- 5) Detector = Peak
- 6) Trace = Max hold

SAMPLE CALCULATION

Output Power = Spectrum Reading Power + Power Splitter loss + Cable loss(2 ea)

= 10 dBm + 6 dB + 1.5 dB = 17.5 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 splitter and cable combination.
- 2. Spectrum offset = Power Splitter loss + Cable loss



3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the splitter and cable combination is 7.36 dB at 2402 MHz and is 7.44 dB at 2480 MHz.

So, 7.4 dB is offset. And the offset gap in the 2.4 GHz range do not affect the conducted peak power final result.

TEST RESULTS

No non-compliance noted

Test Data

Channel	Frequency	Output (GF	t Power SK)	Limit	Result	
	(MHZ)	(dBm)	(mW)	(mvv)		
Low	2402	7.748	5.95		PASS	
Mid	2441	7.616	5.78	125	PASS	
High	2480	6.913	4.91		PASS	

Channel	Frequency	Output Power (8DPSK)		Output (π/4D0	Power QPSK)	Limit	Result	
	(MHZ)	(dBm)	(mW)	(dBm)	(mW)	(mvv)		
Low	2402	10.017	10.04	9.662	9.25		PASS	
Mid	2441	9.891	9.75	9.537	8.99	125	PASS	
High	2480	9.189	8.30	8.848	7.67		PASS	



Test Plots (GFSK) Peak Power (CH.0)

Agilent Spectr	rum Analyzer - Swept SA							
Center F	reg 2.402000000	GHz	SENSE:INT	#Avg Type	RMS	08:45:10 PM TRACE	Feb 22, 2018	Frequency
		PNO: Fast ++ IFGain:Low	Trig: Free Run Atten: 24 dB	Avg Hold:	1/1 Mkr1	DET	PPPPPP 9 GHz	Auto Tune
10 dB/div	Ref Offset 7.4 dB Ref 20.00 dBm					7.74	8 dBm	
10.0			<mark>1</mark>					Center Freq 2.402000000 GHz
-10.0								Start Freq 2.399569491 GHz
-20.0								Stop Freq 2.404430509 GHz
-40.0							_	CF Step 486.102 kHz <u>Auto</u> Man
-50.0								
-60.0								Freq Offset 0 Hz
-70.0								
Center 2.4	402000 GHz 3.0 MHz	#VBW	50 MHz		Sweep 1	Span 4.	861 MHz 001 pts)	
MSG		<i>"•</i>			STATUS			

Test Plots (GFSK) Peak Power (CH.39)





Test Plots (GFSK) Peak Power (CH.78)

Agilent Spectrum Analyzer - S	wept SA				
Center Freg 2.4800	R AC	SENSE:INT	#Avg Type: RMS	0 08:45:33 PMFeb 22, 2018 TRACE 2 3 4 5 6	Frequency
	PNO: Fast 🔸 IFGain:Low	Trig: Free Run Atten: 24 dB	Avg Hold: 1/1		Auto Tune
Ref Offset 7 10 dB/div Ref 20.00	.4 dB dBm		IVIN	6.913 dBm	
10.0		1			Center Freq 2.48000000 GHz
0.00					
-10.0					Start Freq 2.477574881 GHz
-20.0					Stop Freq 2.482425119 GHz
-40.0					CF Step 485.024 kHz Auto Man
-50.0					
-60.0					Freq Offset 0 Hz
-70.0					
Center 2.480000 GHz #Res BW 3.0 MHz	z #VBW	50 MHz	Sweep	Span 4.850 MHz 1.000 ms (1001 pts)	
MSG			STA	ATUS	-

Test Plots (8DPSK) Peak Power (CH.0)





Test Plots (8DPSK) Peak Power (CH.39)

Agilent Spectr	um Analyzer - Swept SA							
Center F	RF 50 Ω AC	GHz	SENSE:INT	#Avg Type:	LIGN AUTO	08:46:33 PM TRACE	Feb 22, 2018	Frequency
		PNO: Fast	Trig: Free Run Atten: 24 dB	Avg Hold: 1	1/1	TYPE DET	PPPPP	
	Ref Offeet 7.4 dR	II GUILLON		N	1kr1 2.44	40 980 4	47 GHz	Auto Tune
10 dB/div	Ref 20.00 dBm					9,89	1 dBm	
			1					Center Freq
10.0								2.441000000 GHz
0.00								Start Fred
.10.0								2.437745000 GHz
-10,0								
-20.0								Stop Freg
								2.444255000 GHz
-30.0								
-40.0								CF Step
								651.000 kHz Auto Man
-50.0								
								Freg Offset
-60.0								0 Hz
-70.0								
Center 2.4	441000 GHz					Span 6.	510 MHz	
#Res BW	3.0 MHz	#VBW	50 MHz	S	weep 1.0	000 ms (1	001 pts)	
MSG					STATUS			

Test Plots (8DPSK) Peak Power (CH.78)





Test Plots (π/4DQPSK) Peak Power (CH.0)

Agilent Spectr	rum Analyzer - Swept SA					
Center F	reg 2.402000000	GHz	SENSE:INT	#Avg Type: RMS	08:45:46 PMFeb 22, 2018 TRACE 1 2 3 4 5 6	Frequency
	Ref Offset 7.4 dB	PNO: Fast	Trig: Free Run Atten: 24 dB	Avg Hold: 1/1 Mkr1 2.	402 173 88 GHz	Auto Tune
10 dB/div Log	Ref 20.00 dBm				3.002 uBiii	
10.0			↓ ¹			Center Freq 2.402000000 GHz
-10.0						Start Freq 2.398780000 GHz
-20.0						Stop Freq
-30.0						2.405220000 GHz
-40.0						CF Step 644.000 kHz <u>Auto</u> Man
-60.0						Freq Offset
						0 Hz
-70.0						
Center 2.4 #Res BW	402000 GHz 3.0 MHz	#VBW	50 MHz	Sweep	Span 6.440 MHz 1.000 ms (1001 pts)	
MSG				STAT	US	

Test Plots (π/4DQPSK) Peak Power (CH.39)





Test Plots (π/4DQPSK) Peak Power (CH.78)

Agilent Spectr	rum Analyzer - Swept SA							
Center F	req 2.480000000	GHz	SENSE:IN	#Avg Type	alignauto	08:46:09 PN TRAC	4Feb 22, 2018 E 1 2 3 4 5 6	Frequency
	Ref Offset 7.4 dB	PNO: Fast +++ IFGain:Low	Atten: 24 dB	Avginoia:	Mkr1	2.479 8	95 GHz	Auto Tune
10 dB/div Log	Ref 20.00 dBm					0.0	40 UBIII	
10.0								Center Freq 2.480000000 GHz
-10.0								Start Freq 2.476707500 GHz
-20.0								
-30.0								Stop Freq 2.483292500 GHz
-40.0								CF Step 658.500 kHz <u>Auto</u> Man
-50.0								
-60.0								Freq Offset 0 Hz
-70.0								
Center 2.4	480000 GHz	#\/D\//	50 MIL-			Span 6	.585 MHz	
#Res BW	3.0 WHZ	#VBW	SUIMHZ		sweep	1.000 ms (Toor pts)	
Mag					STATU	5		-



9.2 BAND EDGES

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration



TEST PROCEDURE

This test is performed with hopping off and hopping on.

The Spectrum Analyzer is set to (6.10.4 in ANSI 63.10-2013)

- 1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
- Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
- 3) Attenuation: Auto (at least 10 dB preferred).
- 4) Sweep time: Coupled.
- 5) RBW: 100 kHz
- 6) VBW: 300 kHz
- 7) Detector: Peak
- 8) Trace: Max hold



TEST RESULTS

See attached.

Note :

- 1. The results in plot is already including the actual values of loss for the splitter and cable combination.
- 2. Spectrum offset = Power Splitter loss + Cable loss
- 3. We apply to the offset in the 2.4 GHz range that was rounded off to the closest tenth dB. Actual value of loss for the splitter and cable combination is 7.36 dB at 2402 MHz and is 7.44 dB at 2480 MHz. So, 7.4 dB is offset. And the offset gap in the 2.4 GHz range do not affect the band edge measurement final result.

Test Data

- Without hopping

Outside	GFSK 8DPSK π/4DQPSK		π/4DQPSK	Limit				
	(dP)	(dP)	(dP)	(dRc)	GFSK	8DPSK	π/4DQPSK	Result
Frequency Banu	(ав)	(UB)	(UB)	(UDC)	(dBc)	(dBc)	(dBc)	
Lower	57.443	57.740	56.638	20	37.44	37.74	36.64	PASS
Upper	63.802	64.346	64.622	20	43.80	44.35	44.62	PASS

- With hopping

Outside Frequency Band	GFSK	8DPSK	π/4DQPSK	Limit		Margin		
					GFSK	8DPSK	π/4DQPSK	Result
	(UD)	(UB)	(UD)	(UBC)	(dBc)	(dBc)	(dBc)	
Lower	62.355	60.253	58.979	20	42.36	40.25	38.98	PASS
Upper	65.061	64.682	65.308	20	45.06	44.68	45.31	PASS



Test Plots without hopping (GFSK) Band Edges (CH.0)



Test Plots without hopping (GFSK) Band Edges (CH.78)





Test Plots without hopping (8DPSK) Band Edges (CH.0)



Test Plots without hopping (8DPSK) Band Edges (CH.78)





Test Plots without hopping (π /4DQPSK) Band Edges (CH.0)



Test Plots without hopping (π /4DQPSK) Band Edges (CH.78)





Test Plots with hopping (GFSK) Band Edges (CH.0)



Test Plots with hopping (GFSK) Band Edges (CH.78)





Test Plots with hopping (8DPSK)

Band Edges (CH.0)



Test Plots with hopping (8DPSK) Band Edges (CH.78)





Test Plots with hopping (π /4DQPSK) Band Edges (CH.0)



Test Plots with hopping (π /4DQPSK) Band Edges (CH.78)





9.3 FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (99% BW)

LIMIT

According to §15.247(a)(1), Frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Test Configuration



TEST PROCEDURE

The Channel Separation test is performed with hopping on. And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.2 in ANSI 63.10-2013)

- 1) Span: Wide enough to capture the peaks of two adjacent channels
- 2) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
- 3) VBW ≥ RBW
- 4) Sweep: Auto
- 5) Detector: Peak
- 6) Trace: Max hold
- 7) All the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

TEST RESULTS

No non-compliance noted



Test Data

Cha	annel Sepa (kHz)	aration		20dB Bar	Limit	Result		
GFSK	8DPSK	π/4DQPSK	Channel	GFSK	8DPSK	π/4DQPSK	(KПZ)	
			Low CH	972.2	1302	1288	>25 or	
994	1001	998	Middle CH	974.8	1302	1289	>2/3 of the	Pass
			High CH	970.0	1301	1317	20dB BW	

Occupied Bandwidth (99% BW)

99% BW (kHz)										
Channel	GFSK	8DPSK	π/4DQPSK							
CH.0	898.33	1173.1	1172.0							
CH.39	900.89	1172.6	1167.8							
CH.78	897.36	1173.1	1172.8							

Note : We can not know what use channel in AFH mode. So, we can not test in AFH mode. Also, if the test performs some channel in AFH mode, the test result is not different with normal mode.



Test Plots (GFSK)

Channel Separation

gilent Spectrum Analyzer - Swept SA				
RL RF 50 Ω AC Center Freq 2.44100000	0 GHz PN0: Far ↔ Trig: Free Run	ALIGNAUTO #Avg Type: Pwr(RMS) Avg Hold: 1/1	02:00:47 PM Mar 02, 2018 TRACE 2 3 4 5 TYPE M WARANANANANANANANANANANANANANANANANANANA	Frequency
Ref Offset 7.4 dB	IFGain:Low #Atten: 20 dB	ΔΜ	kr3 1.001 MHz -0.013 dB	Auto Tune
- 0 g 7.40 2.60 12.6	1Δ2 	m	304	Center Freq 2.441000000 GHz
22.6 32.6 42.6				Start Freq 2.439500000 GHz
52.6 62.6 				Stop Freq 2.442500000 GHz
Center 2.441000 GHz #Res BW 30 kHz	#VBW 100 kHz	Sweep	Span 3.000 MHz 3.18 ms (900 pts)	CF Step 300.000 kHz
MKR MODE TRC SCL X	994 kHz (Δ) 0.036 dB	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	Auto Man
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	40 014 GHz 4.951 dBm 1.001 MHz (Δ) -0.013 dB 41 008 GHz 4.987 dBm			Freq Offset 0 Hz
7 8 9 10				
12		STATUS		

Test Plots (8DPSK) Channel Separation

Agilent Spectre	um Analyzer - Swept SA	0112							
Center Fr	RF 50 R AC req 2.44100000		SENSE:IN	#Avg Avg	ALIGNAUTO Type: Pwr(RMS) Hold: 1/1	02:02:03 P TRAC TYP	M Mar 02, 2018 E 2345 E Manual Ala	Frequenc	зy
10 dB/div	Ref Offset 7.4 dB Ref 17.40 dBm	IFGain:Low	#Atten: 20 dB		ΔM	kr3 1.0	01 MHz 023 dB	Auto	Tun
7.40 -2.60	~~X2~~		~X ^{1Δ2}	h	~~~~~	304		Center 2.44100000	Free 0 GH
-22.6 -32.6 -42.6								Start 2.43950000	Fre 0 GH
-52.6 -62.6 -72.6								Stop 2.44250000	Fre 0 GH
Center 2.4 #Res BW	41000 GHz 30 kHz	#VBW	100 kHz	DINCTION	Sweep	Span 3 3.18 ms	.000 MHz (900 pts)	CF 300.00	Stej 0 kH
1 Δ2 1 2 F 1 3 Δ4 1 4 F 1 5 6	$\begin{array}{c c} f & (\Delta) \\ f & 2.4 \\ f & (\Delta) \\ f & 2.4 \\ \end{array}$	1.001 MHz (Δ) 39 981 GHz 1.001 MHz (Δ) 40 982 GHz	0.000 dB 4.777 dBm 0.023 dB 4.777 dBm	PONCHON	PONCTION WIDTH	PONCIO	IN VALUE	FreqC	offse 0 H
7 8 9 10 11 12									



Test Plots (π /4DQPSK)

Channel Separation

Agilent Spect	rum Analyz RE	er - Swep	AC AC		SEN	E-INT		ALIGNALITO	02:01:251	M Mar 02, 2018	-	
Center F	req 2.	44100	0000 GH	IO: Far	Trig: Free #Atten: 20	Run	#Avg Avg I	Type: Pwr(RMS) Hold: 1/1	TRA TY D		Freque	incy
10 dB/div	Ref Of	fset 7.4 7.40 di	dB Bm					ΔM	kr3 1.0 0	01 MHz .049 dB	Aut	o Tune
7.40 -2.60	~~~	X2	1	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~Å	ΙΔ2 ŧ	~~~~		304		Cent 2.441000	er Fred 000 GH:
-22.6 -32.6 -42.6											Sta 2.439500	ITTFred 000 GH:
-52.6 -62.6 -72.6											Sto 2.442500	o p Frec 000 GH:
Center 2. #Res BW	441000 30 kHz	GHz		#VBW	100 kHz			Sweep	Span 3 3.18 ms	.000 MHz (900 pts)	C 300	F Step
MKR MODE T	RC SCL)	× 999	B kHz (Δ)	Y -0.004 d	FU	NCTION	FUNCTION WIDTH	FUNCTI	ON VALUE	Auto	Mar
3 ∆4 4 F 5 6	1 f (Δ 1 f)	2.440 982 2.440 982	MHz (Δ) GHz	0.049 c 4.782 dB	m					Fred	Offse 0 Ha
9 9 10 11												
MSG								STATUS				



Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (CH.0)



Test Plots (GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)





Test Plots (GFSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)



Test Plots (8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)





Test Plots (8DPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.39)



Test Plots (8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)





Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.0)



Test Plots (π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)





Test Plots (π/4DQPSK)

20 dB Bandwidth & Occupied Bandwidth (CH.78)

