

# FCC PART 15C TEST REPORT No. I16Z40645-SRD02

for

**Reliance Communications, LLC** 

GSM/WCDMA/LTE Android phone

Model Name: RC500L

FCC ID: 2ABGH-RC500L

IC: 20994-RC500L

with

Hardware Version: RC500L

Software Version: Orbic-rc500L\_v1.0.5

Issued Date: Jun 7th, 2016



#### Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

#### Test Laboratory:

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# **REPORT HISTORY**

Report Number	Revision	Description	Issue Date
I16Z40645-SRD02	Rev.0	1st edition	2016-06-02
I16Z40645-SRD02	Rev.1	2nd edition	2016-06-07



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# 1. Test Laboratory

### 1.1. Testing Location

Location 1:CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China100191

Location 2:CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road, Haidian District, Beijing, P. R. China100191

### 1.2. Testing Environment

Normal Temperature:	<b>15-35</b> ℃
Extreme Temperature:	<b>-20/+55°</b> ℃
Relative Humidity:	20-75%

### 1.3. Project data

Testing Start Date:	2016-03-25
Testing End Date:	2016-05-31

# 1.4. Signature

3-)-

Sun Zhenyu (Prepared this test report)



Li Zhuofang (Reviewed this test report)

AGT.

Lv Songdong (Approved this test report)



# 2. Client Information

# 2.1. Applicant Information

Company Name:	Reliance Communications, LLC		
Address /Post:	555 Wireless Blvd Hauppauge, NY		
City:	Hauppauge, NY		
Postal Code:	/		
Country:	China		
Telephone:	631-240-8396		
Fax:	/		

## 2.2. Manufacturer Information

Company Name:	Reliance Communications, LLC		
Address /Post:	555 Wireless Blvd Hauppauge, NY		
City:	Hauppauge, NY		
Postal Code:	/		
Country:	China		
Telephone:	619-890-5729		
Fax:	/		



# 3. Equipment UnderTest (EUT) and Ancillary Equipment (AE)

### 3.1. About EUT

Description	GSM/WCDMA/LTE Android phone
Model Name	RC500L
FCC ID	2ABGH-RC500L
IC:	20994-RC500L
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/π/4 DQPSK/8DPSK
Number of Channels	79
Power Supply	3.8V DC by Battery

### 3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	<b>Receive Date</b>
EUT1	868536029000116	RC500L	Orbic-rc500L_v1.0.5	2016-03-25

\*EUT ID: is used to identify the test sample in the lab internally.

### 3.3. Internal Identification of AE

AE ID*	Description		
AE1	Battery	Orbic-RC500L	Inbuilt
AE2	Charger	WTA0501000USA1	/

\*AE ID: is used to identify the test sample in the lab internally.

### 3.4. Normal Accessory setting

Fully charged battery should be used during the test.

### 3.5. General Description

The Equipment Under Test (EUT) is a model of GSM/WCDMA/LTE Android phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.



# 4. Reference Documents

### 4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### 4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version	
	FCC CFR 47, Part 15, Subpart C:		
	15.205 Restricted bands of operation;		
FCC Part15	15.209 Radiated emission limits, general requirements;	2015	
	15.247 Operation within the bands 902–928MHz,		
	2400–2483.5 MHz, and 5725–5850 MHz.		
	American National Standard of Procedures for	June,2013	
ANSI 663.10	Compliance Testing of Unlicensed Wireless Devices		
	Spectrum Management and Telecommunications Radio		
DSS Con	Standards Specification	lssue4	
100 - Gell	General Requirements for Compliance of Radio	Nov 2014	
	Apparatus		
	Digital Transmission Systems (DTSs), Frequency	lagua 1	
RSS-247	Hopping Systems (FHSs) and Licence-Exempt Local	Nev 2015	
	Area Network (LE-LAN) Devices	iviay, 2015	



# 5. Test Results

### 5.1. Summary of Test Results

Abbreviations used in this clause:

- **P** Pass, The EUT complies with the essential requirements in the standard.
- F Fail, The EUT does not comply with the essential requirements in the standard
- NA Not Applicable, The test was not applicable
- NP Not Performed, The test was not performed by CTTL

SUMMARY OF MEASUREMENT RESULTS	Sub-clause	Sub-clause of IC	Verdict
Peak Output Power - Conducted	15.247 (b)(1)	Chapter 5	Р
Frequency Band Edges	15.247 (d)	Chapter 5	Р
Conducted Emission	15.247 (d)	Chapter 5	Р
Radiated Emission	15.247, 15.205, 15.209	Chapter 5	Р
Time of Occupancy (Dwell Time)	15.247 (a) (1)(iii)	Chapter 5	P
20dB Bandwidth	15.247 (a)(1)	Chapter 5	NA
Carrier Frequency Separation	15.247 (a)(1)	Chapter 5	Р
Number of hopping channels	15.247 (a)(b)(iii)	Chapter 5	Р
Occupied Bandwidth	/	RSS-Gen	NA
AC Powerline Conducted Emission	15.107, 15.207	RSS-Gen	Р

Please refer to **ANNEX A** for detail.

The measurement is made according to ANSI C63.10.

### 5.2. Statements

CTTL has evaluated the test cases requested by the applicant /manufacturer as listed in section 5.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2



# 6. <u>Test Facilities Utilized</u>

### Conducted test system

No.	Equipment	Model Ser Num	Serial	Manufacturer	Calibration	Calibration
			Number		Period	Due date
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	1 year	2017-03-21
2	Bluetooth Tester	CBT32	100584	Rohde & Schwarz	1 year	2017-01-09
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2016-07-07
4	Test Receiver	ESCI	100701	Rohde & Schwarz	1 year	2016-08-10

# Radiated emission test system

No	Equipmont	Madal	Serial	Mapufaaturar	Calibration	Calibration
NO.	Equipment	Moder	Number	Manufacturer	Period	Due date
1	Test Receiver	ESCI 7	100948	Rohde & Schwarz	1 year	2016-07-16
0	Loop optoppo		829324/00	Dobdo 8 Cobworz	Queer	0017 10 10
2	Loop antenna	пгп2-22	7	Ronde & Schwarz	3 year	2017-12-16
3	BiLog Antenna	VULB9163	234	Schwarzbeck	3 year	2016-09-15
	Dual-Ridge					
4	Waveguide Horn	3115	6914	EMCO	3 year	2017-12-15
	Antenna					
	Dual-Ridge					
5	Waveguide Horn	3116	2661	ETS-Lindgren	3 year	2017-06-30
	Antenna					
6	Vector Signal	FSV	101047	Robdo & Sobwarz	1 yoar	2016 07 02
0	Analyzer	130	101047	HUNDE & SCHWAIZ	i year	2010-07-03
7	Semi-anechoic	1	CT000332	Frankonia	/	/
/	chamber	/	-1074	German	1	/
8	Bluetooth Tester	CBT	100153	Rohde & Schwarz	1 year	2016-09-18



# ANNEX A: Detailed Test Results

## A.1. Measurement Method

### A.1.1. Conducted Measurements

The measurement is made according to ANSI C63.10.

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).
- 3). Set the EUT to the required channel.
- 4). Set the EUT hopping mode (hopping or hopping off).
- 5). Set the spectrum analyzer to start measurement.
- 6). Record the values. Vector Signal Analyzer



### A.1.2. Radiated Emission Measurements

The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz; Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 1MHz;





### A.2. Peak Output Power – Conducted

#### Method of Measurement: See ANSI C63.10-clause 7.8.5

a) Use the following spectrum analyzer settings:

- Span: 5MHz
- RBW: 3MHz
- VBW: 3MHz
- Sweep time: auto couple.
- Detector function: peak
- Trace: max hold
- b) Allow trace to stabilize.
- c) Use the marker-to-peak function to set the marker to the peak of the emission.
- d) The indicated level is the peak output power.

#### **Measurement Limit:**

Standard	Limit
FCC Part 15.247(b)(1) & RSS-247 section 5.4	0.125W

#### Measurement Results:

#### For GFSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted				
Output Power	-0.22	-0.46	-0.55	Р
(dBm)				

#### Form/4 DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	-0.92	-0.93	-0.97	Р

#### For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted				
Output Power	-0.80	-0.93	-1.06	Р
(dBm)				

**Conclusion: PASS** 



# A.3. Frequency Band Edges – Conducted

#### Method of Measurement: See ANSI C63.10-clause 7.8.6

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: 10 MHz
- Resolution Bandwidth: 100 kHz
- Video Bandwidth: 300 kHz
- Sweep Time: Coupled
- Detector: Peak
- Trace: max hold

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not an absolute field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.

#### **Measurement Limit:**

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.1	< -20

#### Measurement Result:

#### For GFSK

Channel	Hopping	Band Edge Power ( dBc)		Conclusion
0	Hopping OFF	Fig.1	-41.09	Р
0	Hopping ON	Fig.2	-39.06	Р
70	Hopping OFF	Fig.3	-36.90	Р
/8	Hopping ON	Fig.4	-40.35	Р

#### Forπ/4 DQPSK

Channel	Hopping	Band Edge Power ( dBc)		Conclusion
0	Hopping OFF	Fig.5	-40.43	Р
	Hopping ON	Fig.6	-40.31	Р
70	Hopping OFF	Fig.7	-39.88	Р
78	Hopping ON	Fig.8	-39.23	Р

For 8DPSK

Channel	Hopping	Band Edge Power ( dBc)		Conclusion
0	Hopping OFF	Fig.9	-40.13	Р
	Hopping ON	Fig.10	-38.81	Р



79	Hopping OFF	Fig.11	-40.47	Р
70	Hopping ON	Fig.12	-39.33	Р

#### **Conclusion: PASS**

#### Test graphs as below



#### Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off



Fig.2. Frequency Band Edges: GFSK, Channel 0, Hopping On

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Date: 25.MAY.2016 14:50:19



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Date: 25.MAY.2016 14:58:05





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### A.4. Conducted Emission

#### Method of Measurement: See ANSI C63.10-clause 7.8.8

Measurement Procedure – Reference Level

- 1. Set the RBW = 100 kHz.
- 2. Set the VBW = 300 kHz.
- 3. Set the span to 5-30 % greater than the EBW.
- 4. Detector = peak.
- 5. Sweep time = auto couple.
- 6. Trace mode = max hold.
- 7. Allow trace to fully stabilize.

8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW. Next, determine the power in 100 kHz band segments outside of the authorized frequency band using the following measurement:

Measurement Procedure - Unwanted Emissions

- 1. Set RBW = 100 kHz.
- 2. Set VBW = 300 kHz.
- 3. Set span to encompass the spectrum to be examined.
- 4. Detector = peak.
- 5. Trace Mode = max hold.
- 6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified above.

#### **Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247 (d) & RSS-247	20dB below peak output power in 100 kHz
section 5.1	bandwidth

### Measurement Results:

#### For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0	Center Frequency	Fig.13	Р



2402 MHz	30 MHz-3GHz	Fig.14	Р
	3GHz-18GHz	Fig.15	Р
01-00	Center Frequency	Fig.16	Р
Ch 39 2441 MHz	30 MHz-3GHz	Fig.17	Р
	3GHz-18GHz	Fig.18	Р
01. 70	Center Frequency	Fig.19	Р
Ch 78	30 MHz-3GHz	Fig.20	Р
	3GHz-18GHz	Fig.21	Р

#### For $\pi/4$ DQPSK

Channel	Frequency Range	Test Results	Conclusion
	Center Frequency	Fig.22	Р
Cn U 2402 MH <del>7</del>	30 MHz-3GHz	Fig.23	Р
2402 1011 12	3GHz-18GHz	Fig.24	Р
	Center Frequency	Fig.25	Р
Ch 39 2441 MHz	30 MHz-3GHz	Fig.26	Р
	3GHz-18GHz	Fig.27	Р
Ch 78 2480 MHz	Center Frequency	Fig.28	Р
	30 MHz-3GHz	Fig.29	Р
	3GHz-18GHz	Fig.30	Р

#### For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
	Center Frequency	Fig.31	Р
Cn U 2402 MH <del>7</del>	30 MHz-3GHz	Fig.32	Р
	3GHz-18GHz	Fig.33	Р
01.00	Center Frequency	Fig.34	Р
Ch 39 2441 MHz	30 MHz-3GHz	Fig.35	Р
	3GHz-18GHz	Fig.36	Р
01. 70	Center Frequency	Fig.37	Р
Cn 78 2480 MHz	30 MHz-3GHz	Fig.38	Р
2400 1011 12	3GHz-18GHz	Fig.39	Р
All Channel	18GHz-26GHz	Fig.40	Р

**Conclusion: PASS** 

Test graphs as below

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Spectrum									
Ref Level Att TDF	10.00 dBm 20 dB	<b>SWT</b> 15	● RBN Dms ● VBN	₩ 100 kHz ₩ 300 kHz	Mode Au	to Sweep			
⊖1Pk Max									
					м	1[1]		- 16	41.20 dBm 5.7950 GHz
0 dBm									
-10 dBm					0				
-20 dBm	D1 -21.110	dBm							
-30 dBm									
-40 dBm									M1
-50 dethur	monume	morry	At Manaraba	mound	man million and	unklorbythe	work and work work	Ventellout	and they
-60 dBm									
-70 dBm									
-80 dBm									
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Fig.16. Conducted Spurious Emission (GFSK, Ch39, 2.441GHz)

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Ref Level	10.00 dBm		😑 R	BW 100 kHz	1001 1. 11				
Att	20 dB	SWT 2	9.7 ms 👄 V	BW 300 KHz	Mode Au	uto Sweep			
1PK Max									
					M	1[1]			-1.83 dBr
						I		M1	2.44120 GH
dom								IT	
10.10									
10 dBm									
20 dBm-	01 -21.270	dBm	_	_					_
30 dBm									_
40 dBm									
to abili									
			1						
	1 . Mumber	american produce	Mererbulan	he he have	rentempers	headerstand	willing	Maria	enunulintun
- an Manufrenthan	Arrest and								
60 dBm			-	-					
70 dBm									
80 dBm									
ee aem									
Start 30.0 M	MHz			691	pts			S	top 3.0 GHz
					Mea	suring		444	25.05.2016

Fig.17. Conducted Spurious Emission (GFSK, Ch39, 30 MHz-3 GHz)





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Date: 25.MAY.2016 15:08:19

Fig.21. Conducted Spurious Emission (GFSK, Ch78, 3GHz-18 GHz)





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Ref Level 10.00 dBm    • RBW 100 kHz      Att    20 dB    SWT 29.7 ms    • VBW 300 kHz    Mode Auto Sweep      TDF    • IPk Max    • • • • • • • • • • • • • • • • • • •	
Mile  Mile    Differ  Mile    0 dBm  Mile    10 dBm  Mile    20 dBm  Mile    10 dBm  Mile	
1Pk Max  M1[1]  -4.9    1 dBm  2.4022    10 dBm  M1    20 dBm  D1 -22.070 dBm    30 dBm  0    40 dBm  0    50 dBm  0    10 dBm  0	
M1[1]  -4.9    0 dBm	
الك المركب المر	8 dBi
10 dBm	u ui
10 dBm 01 -22.070 dBm 01 - 22.070 d	
20 dBm 01 -22.070 dBm 01 - 22.070 d	
20 dBm	
30 dBm	
40 dBm	
40 dBm	
50 dBm	
50 dBm	
	more
60 dBm	
80 dBm	
itart 30.0 MHz 691 pts Stop 3.0	) GHz
Measuring 1 25.05.2	016

Fig.23. Conducted Spurious Emission (π /4 DQPSK, Ch0, 30 MHz-3 GHz)





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Fig.25. Conducted Spurious Emission (π /4 DQPSK, Ch39, 2.441GHz)



Fig.26. Conducted Spurious Emission (π /4 DQPSK, Ch39, 30 MHz-3 GHz)

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Fig.27. Conducted Spurious Emission (π /4 DQPSK, Ch39, 3GHz-18 GHz)



Fig.28. Conducted Spurious Emission (π/4 DQPSK, Ch78, 2.480GHz)

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Fig.29. Conducted Spurious Emission (π /4 DQPSK, Ch78, 30 MHz-3 GHz)





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Spectrum									
Ref Level Att TDF	10.00 dBm 20 dB	SWT	😑 RI 150 ms 👄 V	BW 100 kHz BW 300 kHz	Mode Au	ito Sweep			
●1Pk Max									
					M	1[1]			39.45 dBm
0 dBm								1	7.8370 GH2
-10 dBm				-					
-20 dBm	01 -21.990	dBm							
-30 dBm									
-40 dBm									M1
150 dBm	Mannahan	mound	untur	municipality	nonenter	Mercellenson	allow other	Conder and the	
-60 dBm									
-70 dBm									
-80 dBm									
Start 3.0 G	47			691	nts			Stor	18.0.047
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Fig.34. Conducted Spurious Emission (8DPSK, Ch39, 2.441GHz)

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spectrum									[
Ref Level	10.00 dBm	C	RI	3W 100 kHz	1001 1. 11				
Att	20 dB	SWT 29	1.7 ms 👄 🗸	<b>BW</b> 300 kHz	Mode A	uto Sweep			
				1		1511			E 01 d0 -
						1[1]			2.44080 GH
0 dBm				-		+		M1	
								Y	
-10 dBm									
20 dBm									
[	01 -21.010	dBm							
20 dBm									
-30 ubiii									
-40 dBm									
27.92.00 J.22.00			5						
-50 dBm	L.L Mark	Unh promound	un manuer	Malden Maline Martin	monstrate	monorthuna	hoollyweeterme	and the second	hand and a second
wannen	Marine Con								
-60 dBm									
-70 dBm									
-80 dBm									
Start 30.0 M	MHz			691	pts				Stop 3.0 GHz
	)(				Mea	suring			25.05.2016
						suring			15:19:43

Fig.35. Conducted Spurious Emission (8DPSK, Ch39, 30 MHz-3 GHz)





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- p - f t			- 00	100 101-					( v
Ref Leve	1 10.00 aBm			W 100 KHZ	and a second				
TDE	20 UE	SWI.	LSU MS 🖶 🕶	W 300 KH2	MOUE AU	ito sweep			
1Pk Max									
					M	1[1]			-40.90 dBr
								1	7.9020 GH
) dBm			-		2 2				+
10 dBm									
20 dBm									
	D1 -21.930	dBm							
30 dBm									
SO GDIII									
10 10-									I I
40 aBm								Landel .	the mound
Mar	upublic underess	malorwell	week drawn	the wordsta	May Much and al	anon the level	was presented	munder of	
50 dBm-	ľ	,4	Palletter 2 Auguster				-		
60 dBm			-						-
-70 dBm					-				
-80 dBm									
start 3.0 (	GHz		4	691	pts			Stor	18.0 GHz
	71				Mai	suring (		4440	25.05.2016
						is aring			15:20:49





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### A.5. Radiated Emission

#### **Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peek output power
& RSS-247 section 5.1	200B below peak output power

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 § 15.209(a) (see § 15.205(c)).

The measurement is made according to ANSI C63.10

#### Limit in restricted band:

Frequency of emission	Field strength(uV/m)	Field strength(dBuV/m)
(MHz)		
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

#### **Test Condition**

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission	RBW/VBW	Sweep Time(s)	
(MHz)			
30-1000	100KHz/300KHz	5	
1000-4000	1MHz/1MHz	15	
4000-18000	1MHz/1MHz	40	
18000-26500	1MHz/1MHz	20	

#### **Measurement Results:**

Mode	Channel	Frequency Range	Test Results	Conclusion
	0	1 GHz ~ 18 GHz	Fig.41	Р
		9 kHz ~30 MHz	Fig.42	Р
	39	30 MHz ~1 GHz	Fig.43	Р
GFSK		1 GHz ~ 18 GHz	Fig.44	Р
	78	1 GHz ~ 18 GHz	Fig.45	Р
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.46	Р
	Power(CH78)	2.45 GHz ~ 2.5 GHz	Fig.47	Р
π /4 DQPSK	0	1 GHz ~ 18 GHz	Fig.48	Р
		9 kHz ~30 MHz	Fig.49	Р
	39	30 MHz ~1 GHz	Fig.50	Р
		1 GHz ~ 18 GHz	Fig.51	Р
	78	1 GHz ~ 18 GHz	Fig.52	P



	Power(CH0	2.38 GHz ~ 2.45 GHz	Fig.53	Р
	Power(CH78)	2.45 GHz ~ 2.5 GHz	Fig.54	Р
	0	1 GHz ~ 18 GHz	Fig.55	Р
		9 kHz ~30 MHz	Fig.56	Р
8DPSK	39	30 MHz ~1 GHz	Fig.57	Р
		1 GHz ~ 18 GHz	Fig.58	Р
	78	1 GHz ~ 18 GHz	Fig.59	Р
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.60	Р
	Power(CH78)	2.45 GHz ~ 2.5 GHz	Fig.61	Р
/	All channels	18 GHz~ 26.5 GHz	Fig.62	Р

#### GFSK CH0 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14531.500000	59.0	Н	13.7	15.0	74.0
15161.000000	58.6	Н	14.3	15.4	74.0
15683.500000	61.5	V	14.4	12.5	74.0
16282.000000	61.4	V	15.1	12.6	74.0
16863.500000	62.2	V	16.1	11.8	74.0
17411.500000	62.0	V	16.2	12.0	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14172.500000	46.6	Н	13.3	7.4	54.0
15179.500000	47.7	Н	14.3	6.3	54.0
15676.000000	48.8	Н	14.4	5.2	54.0
16212.500000	49.4	Н	14.9	4.6	54.0
16785.000000	50.1	Н	15.7	3.9	54.0
17404.500000	49.8	Н	16.2	4.2	54.0

### GFSK CH39 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14099.500000	58.4	Н	13.1	15.6	74.0
14784.000000	58.9	V	13.9	15.1	74.0
15684.000000	60.8	Н	14.4	13.2	74.0
16243.000000	61.0	Н	14.9	13.0	74.0
16845.000000	62.3	V	16.0	11.7	74.0
17425.500000	62.4	Н	16.2	11.6	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
7322.500000	48.5	V	8.5	5.5	54.0

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15174.500000	47.4	Н	14.3	6.6	54.0
15686.000000	48.8	Н	14.4	5.2	54.0
16207.500000	49.6	Н	14.9	4.4	54.0
16783.500000	50.1	V	15.6	3.9	54.0
17414.000000	49.7	V	16.2	4.3	54.0

### GFSK CH78 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14083.000000	58.4	Н	13.1	15.6	74.0
15175.000000	59.1	V	14.3	14.9	74.0
15744.500000	60.3	V	14.4	13.7	74.0
16187.000000	61.2	V	15.0	12.8	74.0
16826.000000	61.3	V	15.9	12.7	74.0
17411.000000	62.1	Н	16.2	11.9	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14537.500000	46.5	V	13.7	7.5	54.0
15174.000000	47.6	V	14.3	6.4	54.0
15676.000000	48.7	V	14.4	5.3	54.0
16198.000000	49.3	V	15.0	4.7	54.0
16810.500000	49.9	V	15.8	4.1	54.0
17404.000000	49.6	V	16.2	4.4	54.0

### $\pi$ /4 DQPSK CH0 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14150.000000	58.4	V	13.3	15.6	74.0
15155.500000	60.1	Н	14.3	13.9	74.0
15695.000000	60.7	V	14.4	13.3	74.0
16175.500000	61.7	Н	15.0	12.3	74.0
16780.000000	61.6	V	15.6	12.4	74.0
17443.500000	61.8	Н	16.1	12.2	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14153.500000	46.6	V	13.3	7.4	54.0
15170.500000	47.6	V	14.3	6.4	54.0
15679.000000	48.9	V	14.4	5.1	54.0
16185.500000	49.4	V	15.0	4.6	54.0
16838.000000	49.9	V	15.9	4.1	54.0
17371.500000	49.6	Н	16.0	4.4	54.0

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### $\pi$ /4 DQPSK CH39 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14526.500000	58.5	Н	13.7	15.5	74.0
15161.000000	59.6	Н	14.3	14.4	74.0
15650.000000	60.2	V	14.4	13.8	74.0
16334.000000	61.4	Н	15.4	12.6	74.0
16777.500000	62.1	Н	15.6	11.9	74.0
17348.500000	62.0	V	15.9	12.0	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14157.500000	46.6	V	13.3	7.4	54.0
15168.500000	47.6	Н	14.3	6.4	54.0
15666.000000	48.9	Н	14.4	5.1	54.0
16189.000000	49.5	Н	15.0	4.5	54.0
16840.000000	50.0	Н	16.0	4.0	54.0
17413.500000	49.7	V	16.2	4.3	54.0

### $\pi$ /4 DQPSK CH78 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14326.500000	58.6	Н	13.4	15.4	74.0
15153.500000	59.3	Н	14.3	14.7	74.0
15775.500000	60.6	V	14.5	13.4	74.0
16191.500000	61.3	Н	15.0	12.7	74.0
16799.000000	61.7	Н	15.7	12.3	74.0
17473.500000	61.7	V	16.1	12.3	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14174.000000	46.5	Н	13.3	7.5	54.0
15179.500000	47.4	Н	14.3	6.6	54.0
15678.000000	48.6	Н	14.4	5.4	54.0
16211.500000	49.3	Н	14.9	4.7	54.0
16780.500000	50.1	Н	15.6	3.9	54.0
17390.000000	49.6	V	16.1	4.4	54.0

### 8DPSK CH0 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14173.500000	59.0	V	13.3	15.0	74.0
15150.500000	59.5	Н	14.3	14.5	74.0

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15730.500000	60.4	V	14.4	13.6	74.0
16202.000000	61.3	V	15.0	12.7	74.0
16835.500000	61.6	Н	15.9	12.4	74.0
17296.500000	61.2	V	15.6	12.8	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14545.500000	46.7	V	13.7	7.3	54.0
15167.500000	47.9	Н	14.3	6.1	54.0
15672.500000	48.7	V	14.4	5.3	54.0
16192.500000	49.2	V	15.0	4.8	54.0
16867.000000	49.8	V	16.1	4.2	54.0
17358.500000	49.5	Н	16.0	4.5	54.0

### 8DPSK CH39 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14091.500000	58.1	Н	13.1	15.9	74.0
15151.000000	59.7	Н	14.3	14.3	74.0
15694.000000	60.1	V	14.4	13.9	74.0
16208.500000	61.6	V	14.9	12.4	74.0
16849.500000	61.2	V	16.0	12.8	74.0
17423.500000	61.0	V	16.2	13.0	74.0

Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14552.000000	46.7	V	13.8	7.3	54.0
15143.000000	47.8	Н	14.3	6.2	54.0
15662.000000	48.7	Н	14.4	5.3	54.0
16205.500000	49.0	Н	14.9	5.0	54.0
16794.500000	49.4	V	15.7	4.6	54.0
17353.000000	49.2	V	15.9	4.8	54.0

### 8DPSK CH78 (1-18GHz)

Frequency	MaxPeak-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14047.500000	58.7	V	12.9	15.3	74.0
15112.500000	59.7	Н	14.2	14.3	74.0
15670.000000	61.1	Н	14.4	12.9	74.0
16277.000000	62.9	V	15.1	11.1	74.0
16877.500000	61.5	V	16.2	12.5	74.0
17433.000000	61.4	V	16.2	12.6	74.0

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Frequency	Average-ClearWrite	Polarizati	Corr.	Margin	Limit
(MHz)	(dBµV/m)	on	(dB)	(dB)	(dBµV/m)
14552.000000	46.6	V	13.8	7.4	54.0
15166.500000	47.8	Н	14.3	6.2	54.0
15645.000000	48.7	Н	14.4	5.3	54.0
16208.500000	49.1	Н	14.9	4.9	54.0
16843.500000	49.5	V	16.0	4.5	54.0
17397.000000	49.3	Н	16.1	4.7	54.0

### **Conclusion: PASS**

Test graphs as below:



FCC-RE2-1-18GHz

Fig.41. Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz)

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Fig.42. Radiated Spurious Emission (GFSK, Ch39, 9 kHz ~30 MHz)



Fig.43. Radiated Spurious Emission (GFSK, Ch39, 30 MHz ~1 GHz)

### FCC-RE1-30MHz-1GHz

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FCC-RE2-1-18GHz



Fig.44. Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz)



Fig.45. Radiated Spurious Emission (GFSK, Ch78, 1 GHz ~18 GHz)

FCC-RE2-1-18GHz

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FCC-RE2-Power-2.38GHz-2.43GHz



Fig.46. Radiated Emission Power (GFSK, Ch0, 2380GHz~2450GHz)



#### FCC-RE2-Power-2.45GHz-2.50GHz

Fig.47. Radiated Emission Power (GFSK, Ch78, 2450GHz~2500GHz)

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FCC-RE2-1-18GHz



Fig.48. Radiated Spurious Emission ( $\pi$  /4 DQPSK, Ch0, 1 GHz ~18 GHz)



Fig.49. Radiated Spurious Emission ( $\pi$  /4 DQPSK, Ch39, 9 kHz ~30 MHz)

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FCC-RE1-30MHz-1GHz



Fig.50. Radiated Spurious Emission ( $\pi$  /4 DQPSK, Ch39, 30 MHz ~1 GHz)



Fig.51. Radiated Spurious Emission ( $\pi$  /4 DQPSK, Ch39, 1 GHz ~18 GHz)

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FCC-RE2-1-18GHz



Fig.52. Radiated Spurious Emission ( $\pi$  /4 DQPSK, Ch78, 1 GHz ~18 GHz)



FCC-RE2-Power-2.38GHz-2.43GHz

Fig.53. Radiated Emission Power (π /4 DQPSK, Ch0, 2380GHz~2450GHz)



FCC-RE2-Power-2.45GHz-2.50GHz



Fig.54. Radiated Emission Power (π /4 DQPSK, Ch78, 2450GHz~2500GHz)



Fig.55. Radiated Spurious Emission (8DPSK, Ch0, 1 GHz ~18 GHz)

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Fig.56. Radiated Spurious Emission (8DPSK, Ch39, 9 kHz ~30 MHz)



Fig.57. Radiated Spurious Emission (8DPSK, Ch39, 30 MHz ~1 GHz)



FCC-RE2-1-18GHz



Fig.58. Radiated Spurious Emission (8DPSK, Ch39, 1 GHz ~18 GHz)



Fig.59. Radiated Spurious Emission (8DPSK, Ch78, 1 GHz ~18 GHz)

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FCC-RE2-Power-2.38GHz-2.43GHz



Fig.60. Radiated Emission Power (8DPSK, Ch0, 2380GHz~2450GHz)



FCC-RE2-Power-2.45GHz-2.50GHz

Fig.61. Radiated Emission Power (8DPSK, Ch78, 2450GHz~2500GHz)



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FCC-RE4-18-26.5GHz



Fig.62. Radiated Spurious Emission (All channel, 18 GHz ~26.5 GHz)



### A.6. Time of Occupancy (Dwell Time)

### Method of Measurement: See ANSI C63.10-clause 7.8.4

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = zero span, centered on a hopping channel
- RBW = 100kHz
- VBW ≥ RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

#### **Measurement Limit:**

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii) & RSS-247 section 5.1	< 400

### **Measurement Result:**

### For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
20		Fig.63	169.6	Р
39		Fig.64	100.0	Г

#### For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)		Conclusion	
20		Fig.65	175.0	D	
39	DHO	Fig.66	175.2	Г	

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
20		Fig.67	171.0	D
39	DHS	Fig.68	171.5	F

**Conclusion: PASS** 

Test graphs as below:

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Spectrum	٦								
Ref Level 10.0	0 dBm		-	RBW 100 kHz					
Att	30 dB	SWT 10	) ms 😑 '	<b>VBW</b> 300 kHz					
TRG: VID TDF									
⊜1Pk Max									
					D	2[1]			-2.07 dB
									2.8841 ms
0 dBm					1 Marshare	f June	Max Productor		-3.33 dBm
					10.0.00	1910 - M.A.	- 10 · ··· 54	≤ <b>0</b>	.0000000 s
-10 dBm TRG	-10.000	) dBm							
-20 dBm									
-30 dBm									
-50 0511									
-40 dBm	a den dat	a character	ALC DUCK	and the second sec				Inc. advantant	م بالمرب الم
Maran manufad	aller a-lap-	mannan	prom	www.www.www.u.w	1			an der strandour An	งเป็นหางหมู่หาง
-50 dBm									
-60 dBm									
70 d0m									
-/o ubiii									
-80 dBm									
CE 2.441 GHz				691	nts				1.0 ms/
				0,71	wait f	n Trigger			25.05.2016
					wait to	r rrigger			17:17:51

Date: 25.MAY.2016 17:17:51





Date: 25.MAY.2016 17:17:12

Fig.64. Number of Transmissions Measurement: Channel 39, Packet DH5

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Spectrum		
Ref Level 10.00 dBm 🛛 👄	RBW 100 kHz	
Att 30 dB 👄 SWT 10 ms 👄	VBW 300 kHz	
TRG: VID TDF		
●1Pk Max		
	D2[1]	-6.51 dB
		2.8841 ms
0 dBm	M1 M1[1]	-4.34 dBm
	1	0.0000000 s
10 dBm TDC 18 998 dBm	march shall be	Alu A. Alu A. Alu 2
-10 dbm -1RG -10.000 dBm		
-20 dBm		
-30 dBm		
1997 - 19		
-40 dBm	and the second	n
alough have a support of the second of the second	La Manager Maria	an mound be a copped a conse
-50 dBm		
60 dbm		
-60 UBIN		
-70 dBm		
-80 dBm		
oo dom		
CF 2.441 GHz	691 pts	1.0 ms/
1 T	Measuring	25.05.2016
	Preasuring	17:18:09

Date: 25.MAY.2016 17:18:09





Fig.66. Number of Transmissions Measurement: Channel 39, Packet 2-DH5

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Spectrum	
Ref Level 10.00 dBm 🛛 👄 RBW 100 kHz	
Att 30 dB 👄 SWT 10 ms 👄 VBW 300 kHz	
TRG: VID TDF	
●1Pk Max	
	D2[1] -4.88 dB
	2.8841 ms
0 dBm	1 -4.04 dBm
	0.0000000 s
	WARMAN MATINA AND AND AND AND AND AND AND AND AND A
	na alla shia shia shia shii
-20 dBm	
-30 dBm	
10 40-	
	at as strategiller for the second
ՠՠՠՠֈՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠՠ	-burle resultered by Arabi
-50 dBm	
-60 dBm	
-00 4511	
-70 dBm	
-80 dBm	
CF 2.441 GHz 691	pts 1.0 ms/
	Wait for Trigger
	17:13:38

Date: 25.MAY.2016 17:13:38





Fig.68. Number of Transmissions Measurement: Channel 39, Packet 3-DH5



### A.7. 20dB Bandwidth

#### Method of Measurement: See ANSI C63.10-clause 6.9.2

Measurement Procedure - Unwanted Emissions

- 1. Set RBW = 100kHz.
- 2. Set VBW = 300 kHz.
- 3. Set span to 5MHz
- 4. Detector = peak.
- 5. Trace Mode = max hold.
- 6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

#### **Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247(a)(1) & RSS-247 section 5.1	NA *

Use NdB Down function of the SA to measure the 20dB Bandwidth

\* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for "carrier frequency separation" test case, in Annex A.8.

### Measurement Results:

#### For GFSK

Channel	20dB Band	Conclusion	
0	Fig.69 1136.0		NA
39	Fig.70	1128.8	NA
78	Fig.71	1136.0	NA

Form/4 DQPSK

Channel	20dB Band	Conclusion			
0	Fig.72 1353.1		NA		
39	Fig.73	1353.1	NA		
78	Fig.74	1356.6	NA		

#### For 8DPSK

Channel	20dB Band	Conclusion	
0	Fig.75	1363.8	NA
39	Fig.76	1363.8	NA
78	Fig.77	1371.0	NA

Conclusion: NA

Test graphs as below:

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Date: 25.MAY.2016 15:48:13





Date: 25.MAY.2016 15:53:00

Fig.70. 20dB Bandwidth: GFSK, Channel 39

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Date: 25.MAY.2016 15:53:13





Date: 25.MAY.2016 15:53:48

Fig.72. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 0

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Date: 25.MAY.2016 15:54:38





Date: 25.MAY.2016 15:55:02

Fig.74. 20dB Bandwidth: π/4 DQPSK, Channel 78

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Date: 25.MAY.2016 15:55:24





Date: 25.MAY.2016 15:55:40

Fig.76. 20dB Bandwidth: 8DPSK, Channel 39

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Date: 25.MAY.2016 15:55:52

Fig.77. 20dB Bandwidth: 8DPSK, Channel 78



### A.8. Carrier Frequency Separation

### Method of Measurement: See ANSI C63.10-clause 7.8.2

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = 5MHz
- RBW=300kHz
- VBW=300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.

\* Comment: This limit should be over 25 kHz or (2/3) \* 20dB bandwidth, whichever is greater.

#### **Measurement Limit:**

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	$a_{\rm V}$ or $(2/2) * 20 dP$ handwidth
&RSS-247 section 5.1	$\frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{i=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^$

### **Measurement Result:**

#### For GFSK

Channel	Carrier frequency	Conclusion	
39	Fig.78 1005.8		Р

#### For $\pi/4$ DQPSK

Channel	Carrier frequency	Conclusion	
39	Fig.79	1005.8	Р

#### For 8DPSK

Channel	Carrier frequency	Conclusion	
39	Fig.80	1005.8	Р

**Conclusion: PASS** 

Test graphs as below:

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Fig.79. Carrier frequency separation measurement:  $\pi/4$  DQPSK, Channel 39

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Spectrum									
RefLevel 10 Att TDF	0.00 dBm 30 dB	<b>SWT</b> 6.3	● RBW µs ● VBW	300 kHz 300 kHz	Mode Auto	FFT			
1Pk Max									
					D	2[1]			-0.08 dB
		- D2			M	1[1]	~~~	-2.43	-1.85 dBm
-10 dBm			6.7				+	F	
-20 dBm									
-30 dBm					_				
-40 dBm		-							
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
CF 2.441 GH	z			69	1 pts			Spa	n 5.0 MHz
					Mea	suring		444	25.05.2016 17:11:22
te: 25.MAY	.2016 15	7:11:22							

Fig.80. Carrier frequency separation measurement: 8DPSK, Channel 39



### A.9. Number of Hopping Channels

### Method of Measurement: See ANSI C63.10-clause 7.8.3

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = the frequency band of operation
- RBW = 300kHz
- VBW = 300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

#### **Measurement Limit:**

Standard	Limit	
FCC 47 CFR Part 15.247(a) (1)(iii)	At least 15 per overlepping channels	
& RSS-247 section 5.1	At least 15 non-ovenapping channels	

### Measurement Result:

### For GFSK

Channel	Number of hop	Conclusion		
0~39	Fig.81	70	Р	
40~78	Fig.82	79		

#### Form/4 DQPSK

Channel	Number of hop	Conclusion		
0~39	Fig.83	70	D	
40~78	Fig.84	79	P	

#### For 8DPSK

Channel	Number of hop	Conclusion	
0~39	Fig.85	70	Р
40~78	Fig.86	79	

**Conclusion: PASS** 

Test graphs as below:

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Date: 25.MAY.2016 17:09:12

Fig.82. Number of hopping frequencies: GFSK, Channel 40 - 78

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Date: 25.MAY.2016 17:07:22

Fig.84. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 40 - 78

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Spectrum	r )								
Ref Level	10.00 dBm	1.3079.474.89 - 54	🖷 RBW 🗄	300 kHz					
Att	30 dB	<b>SWT</b> 1 m	s 👄 VBW 🔅	300 kHz 🛛 🕅	lode Auto S	Sweep			
TDF									
●1Pk Max									
0 dBm	m	m	mm	mm	non	mm	mm	www	www
-10 dBm					-				
-20 dBm									
-30 dBm									
للر -40 dBm									
-50 dBm									
-60 dBm									
-70 dBm									
-80 dBm									
Start 2.4 G	iHz	1		691	pts	1		Stop 2	2.441 GHz
_	][]				Mea	suring		<b>440</b> 2	5.05.2016 17:05:50







Date: 25.MAY.2016 17:06:37





### A.10. Occupied Bandwidth

#### Method of Measurement: See ANSI C63.10-clause 6.9.3

Measurement Procedure - Unwanted Emissions

- 1. Set RBW = 100kHz.
- 2. Set VBW = 300 kHz.
- 3. Set span to 5MHz
- 4. Detector = peak.
- 5. Trace Mode = max hold.
- 6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

#### Measurement Limit:

Standard	Limit
RSS-Gen Issue4 6.6	NA *

### Measurement Results:

#### For GFSK

Channel	Occupied Ba	Conclusion	
0	Fig.87	998.6	NA
39	Fig.88	998.6	NA
78	Fig.89	998.6	NA

#### Forπ/4 DQPSK

Channel	Occupied Ba	Conclusion	
0	Fig.90	1193.9	NA
39	Fig.91	1193.9	NA
78	Fig.92	1201.2	NA

#### For 8DPSK

Channel	Occupied Bar	Conclusion	
0	Fig.93	1215.6	NA
39	Fig.94	1208.4	NA
78	Fig.95	1215.6	NA

**Conclusion: NA** 

Test graphs as below:

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Fig.88. Occupied Bandwidth: GFSK, Channel 39

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Fig.90. Occupied Bandwidth:  $\pi/4$  DQPSK, Channel 0

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Date: 25.MAY.2016 16:59:01

Fig.94. Occupied Bandwidth: 8DPSK, Channel 39

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Fig.95. Occupied Bandwidth: 8DPSK, Channel 78



### A.11. AC Powerline Conducted Emission

#### **Test Condition**

Voltage (V)	Frequency (Hz)
120	60

#### **Measurement Result and limit:**

#### Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBµV)	Conclusion
0.15 to 0.5	66 to 56	
0.5 to 5	56	Р
5 to 30	60	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

### **Bluetooth (Average Limit)**

Frequency range (MHz)	Average Limit (dBµV)	Conclusion
0.15 to 0.5	56 to 46	
0.5 to 5	46	Р
5 to 30	50	
NOTE: The limit decreases linearly wit	h the logarithm of the frequency	in the range 0.15 MHz to
0.5 MHz.		

The measurement is made according to ANSI C63.10

#### **Conclusion: PASS**

Test graphs as below:



Traffic:



# **Final Result 1**

Frequency	QuasiPeak	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.174000	42.0	GND	Ν	10.1	22.8	64.8
0.198000	43.1	GND	Ν	10.1	20.6	63.7
0.286000	41.8	GND	L1	10.0	18.9	60.6
0.410000	40.4	GND	L1	10.0	17.2	57.6
0.570000	40.6	GND	L1	10.1	15.4	56.0
1.286000	34.2	GND	L1	10.1	21.8	56.0

## **Final Result 2**

Frequency	Average	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.310000	30.6	GND	L1	10.0	19.3	50.0
0.426000	30.3	GND	L1	10.0	17.0	47.3
0.570000	32.0	GND	L1	10.1	14.0	46.0
0.694000	25.7	GND	L1	10.0	20.3	46.0
1.110000	26.3	GND	L1	10.1	19.7	46.0
1.222000	27.2	GND	L1	10.1	18.8	46.0



Idle:



## Final Result 1

Frequency	QuasiPeak	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.198000	43.2	GND	Ν	10.1	20.5	63.7
0.298000	42.2	GND	Ν	10.1	18.0	60.3
0.414000	40.2	GND	Ν	10.1	17.3	57.6
0.482000	32.4	GND	L1	10.0	23.9	56.3
0.566000	37.9	GND	Ν	10.1	18.1	56.0
1.186000	31.8	GND	L1	10.0	24.2	56.0

## **Final Result 2**

Frequency	Average	PE	Line	Corr.	Margin	Limit
(MHz)	(dBuV)			(dB)	(dB)	(dBuV)
0.298000	28.7	GND	L1	10.0	21.6	50.3
0.414000	28.6	GND	L1	10.0	19.0	47.6
0.566000	28.7	GND	L1	10.1	17.3	46.0
0.706000	22.2	GND	L1	10.0	23.8	46.0
1.206000	24.1	GND	L1	10.1	21.9	46.0
2.066000	21.1	GND	L1	10.1	24.9	46.0



# **ANNEX B: Accreditation Certificate**

China National Accorditation Service for Confermity Accorditation
China National Accreditation Service for Conformity Assessment
LABORATORY ACCREDITATION CERTIFICATE
(No. CNAS L0570 )
Telecommunication Technology Labs,
Academy of Telecommunication Research, MIIT
No.52, Huayuan North Road, Haidian District, Beijing, China
No.51, Xueyuan Road, Haidian District, Beijing, China
to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing and calibration. The scope of accreditation is detailed in the attached schedule bearing the same accreditation number as above. The schedule forms an integral part of this certificate.
Date of Issue: 2014-10-29 Date of Expiry: 2017-06-19 Date of Initial Accreditation: 1998-07-03
Signed on behalf of China National Accreditation Service for Conformity Assessment
China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).
No.CNAS AL 2 0011149
***END OF REPORT***

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