FCC TEST REPORT

FOR

AZUMI S.A

Mobile phone

Model No.: Extend Akaru 55 QL

Additional Model No.: Please refer to page 6

Prepared for Address	:	AZUMI S.A Avenida Aquilino de la Guardia con Calle 47, PH Ocean Plaza, Piso 16 of. 16-01, Marbella, Ciudad de Panama
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China
Tel	:	(+86)755-82591330
Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	March 29, 2017
Number of tested samples	:	1
Serial number	:	Prototype
Date of Test	:	March 29, 2017~May 24, 2017
Date of Report	:	May 24, 2017

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FCC TEST REPORT			
FCC CFR 47 PART 15 C(15.247)			
Report Reference No	: LCS170329037AE		
Date of Issue	: May 24, 2017		
Testing Laboratory Name	: Shenzhen LCS Compliance Testing Laboratory Ltd.		
	. : 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China		
Testing Location/ Procedure	 Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □ 		
Applicant's Name	: AZUMI S.A		
Address	: Avenida Aquilino de la Guardia con Calle 47, PH Ocean Plaza, Piso 16 of. 16-01, Marbella, Ciudad de Panama		
Test Specification			
Standard	: FCC CFR 47 PART 15 C(15.247)		
Test Report Form No	: LCSEMC-1.0		
TRF Originator	: Shenzhen LCS Compliance Testing Laboratory Ltd.		
Master TRF	: Dated 2011-03		
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Test Item Description.	: Mobile phone		
Trade Mark	· AZUMI		

Trade Mark:	AZUMI
Model/ Type reference	Extend Akaru 55 QL
Ratings :	DC 3.7V, 4000mAh Charging parameter: AC Input: 100~240V, 50/60Hz, 0.3A; Output: DC 5V, 1.5A
Result	Positive

Compiled by:

Supervised by:

25m

Approved by:

Kyle Yin/ File administrators

'n

Glin Lu/ Technique principal

Gavin Liang/ Manager

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FCC -- TEST REPORT

Test Report No. :	LCS170329037AE	<u>May 24, 2017</u> Date of issue	
EUT	: Mobile phone		
Type / Model	: Extend Akaru 55 QL		
Applicant	: AZUMI S.A		
Address	: Avenida Aquilino de la 16 of. 16-01, Marbella,	Guardia con Calle 47, PH Ocean Plaza, Piso Ciudad de Panama	
Telephone			
Fax	: /		
Manufacturer	: AZUMI HK LTD		
Address	: FLAT/RM 18 BLK 1 14/F GOLDEN INDUSTRIAL BUILDING 16-26 KWAI TAK STREET KWAI CHUNG,HK		
Telephone	: /		
Fax	: /		
Factory	: LWIN HK CO.,LIMITEI)	
Address			
Telephone			
Fax	: /		

|--|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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Revision History

Revision	Issue Date	Revisions	Revised By
00	2017-05-24	Initial Issue	Gavin Liang

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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

Name of EUT	Mobile phone
Model Number	Extend Akaru 55 QL
Modulation Type	GMSK for GSM/GPRS, 8-PSK for EDGE,QPSK for UMTS, QPSK, 16QAM for LTE
Antenna Gain	-1.08dBi (max.) For GSM 850; -0.6dBi (max.) For GSM 900; -0.2dBi (max.) For DCS 1800; 0.1dBi (max.) For PCS 1900; 0.1dBi (max.) For WCDMA Band II -1.08dBi (max.) For WCDMA Band V 0.1dBi (max.) For LTE FDD Band 2; -0.4dBi (max.) For LTE FDD Band 4; 0.8dBi (max.) For LTE FDD Band 7; 0.5dBi (max.) For BT and WLAN
Hardware version	
Software version	/
GSM/EDGE/GPRS Operation Frequency Band	GSM850/PCS1900/GPRS850/GPRS1900/EDGE850/EDGE1900
UMTS Operation Frequency Band	UMTS FDD Band II/V
LTE Operation Frequency Band	LTE FDD band 2, FDD band 4, FDD band 7
GSM/EDGE/GPRS	Supported GSM/GPRS/EDGE
GSM Release Version	R99
GSM/EDGE/GPRS Power Class	GSM850:Power Class 4/ PCS1900:Power Class 1
GPRS/EDGE Multislot Class	GPRS/EDGE: Multi-slot Class 12
GPRS operation mode	Class B
WCDMA Release Version	R99
HSDPA Release Version	Release 10
HSUPA Release Version	Release 6
DC-HSUPA Release Version	Not Supported
LTE Release Version	R8
LTE/UMTS Power Class	Level 3
WLAN FCC Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
WLAN FCC Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz IEEE 802.11n HT40:2412-2462MHz
Antenna Type	Integral Antenna
BT Modulation Type	GFSK,8DPSK,π/4DQPSK(BT V4.0)
Extreme temp. Tolerance	-30°C to +50°C
GPS function	Support and only RX
NFC Function	Not Support
Extreme vol. Limits	3.40VDC to 4.2VDC (nominal: 3.70VDC)

1.2. Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	Certificate
AZUMI S.A	Power Adapter	TPA-46050150UU		FCC VoC

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1.3. External I/O Cable

I/O Port Description	Quantity	Cable
USB	1	N/A
Earphone	1	N/A

1.4. Description of Test Facility

CNAS Registration Number. is L4595. FCC Registration Number. is 899208. Industry Canada Registration Number. is 9642A-1. VCCI Registration Number. is C-4260 and R-3804. ESMD Registration Number. is ARCB0108. UL Registration Number. is 100571-492. TUV SUD Registration Number. is SCN1081. TUV RH Registration Number. is UA 50296516-001

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

1.5. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.6. Measurement Uncertainty

Test Item		Frequency Range	Uncertainty	Note
		9KHz~30MHz	±3.10dB	(1)
		30MHz~200MHz	±2.96dB	(1)
Radiation Uncertainty	:	200MHz~1000MHz	±3.10dB	(1)
		1GHz~26.5GHz	±3.80dB	(1)
		26.5GHz~40GHz	±3.90dB	(1)
Conduction Uncertainty	:	150kHz~30MHz	±1.63dB	(1)
Power disturbance	:	30MHz~300MHz	±1.60dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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1.7 Description of Test Modes

Bluetooth operates in the unlicensed ISM Band at 2.4GHz. With basic data rate feature, the data rates can be up to 1 Mb/s by modulating the RF carrier using GFSK techniques. The EUT works in the X-axis, Y-axis, Z-axis. The following operating modes were applied for the related test items. All test modes were tested, only the result of the worst case was recorded in the report.

Mode of Operations	Frequency Range (MHz)	Data Rate (Mbps)		
	2402	1/2/3		
BT V 3.0	2441	1/2/3		
	2480	1/2/3		
For Conducted Emission				
Test Mode		TX Mode		
For Radiated Emission				
Test Mode	-	TX Mode		

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power that was determined to be TX (1Mbps).

Worst-case mode and channel used for 9kHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be TX(1Mbps-Low Channel).

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/50Hz modes, recorded worst case;

AC conducted emission pre-test at both at power adapter and power from PC modes, recorded worst case;

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR PART 15C 15.207, 15.209, 15.247 and DA 00-705.

2.1 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.

2.2 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, 15.247 under the FCC Rules Part 15 Subpart C.

2.3 General Test Procedures

2.3.1 Conducted Emissions

The EUT is placed on a table, which is directly placed on the ground. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

2.3.2 Radiated Emissions

The EUT is placed on a turntable, which is directly placed on the ground. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The system was configured for testing in a continuous transmits condition.

3.2 EUT Exercise Software

The sample will control by special test software (RF Test Tool) to control sample change channel, modulation provided by application;

3.3 Special Accessories

No.	Equipment	Manufactur er	Model No.	Serial No.	Length	shielded/ unshielded	Notes
1	PC	Lenovo	Ideapad	A131101550	/	/	DOC
2	Power adapter	Lenovo	CPA-A090	36200414	1.00m	unshielded	DOC

3.4 Block Diagram/Schematics

Please refer to the related document.

3.5 Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

3.6 Test Setup

Please refer to the test setup photo.

4. SUMMARY OF TEST RESULTS

	Applied Standard: FCC Part 15 Subpart C	
FCC Rules	Description of Test	Result
§15.247(b)(1)	Maximum Conducted Output Power	Compliant
§15.247(c)	Frequency Separation And 20 dB Bandwidth	Compliant
§15.247(a)(1)(ii)	.247(a)(1)(ii) Number Of Hopping Frequency	
§15.247(a)(1)(iii)	§15.247(a)(1)(iii) Time Of Occupancy (Dwell Time)	
§15.209, §15.205	Conducted Spurious Emissions and Band Edges Test	Compliant
§15.209, §15.247(d)	Radiated and Conducted Spurious Emissions	Compliant
§15.205	Emissions at Restricted Band	Compliant
§15.207(a)	Conducted Emissions	Compliant
§15.203	Antenna Requirements	Compliant
§15.247(i)§2.1093	RF Exposure	Compliant

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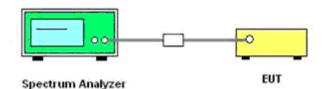
5. SUMMARY OF TEST EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1	Power Sensor	R&S	NRV-Z51	100458	2016-06-18	2017-06-17
2	Power Sensor	R&S	NRV-Z32	10057	2016-06-18	2017-06-17
3	Power Meter	R&S	NRVS	100444	2016-06-18	2017-06-17
4	DC Filter	MPE	23872C	N/A	2016-06-18	2017-06-17
5	RF Cable	Harbour Industries	1452	N/A	2016-06-18	2017-06-17
6	SMA Connector	Harbour Industries	9625	N/A	2016-06-18	2017-06-17
7	Spectrum Analyzer	Agilent	N9020A	MY50510140	2016-10-27	2017-10-26
8	Signal analyzer	Agilent	E4448A(Exter nal mixers to 40GHz)	US44300469	2016-06-16	2017-06-15
9	RF Cable	Hubersuhne	Sucoflex104	FP2RX2	2016-06-18	2017-06-17
10	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	2016-06-18	2017-06-17
11	Amplifier	SCHAFFNER	COA9231A	18667	2016-06-18	2017-06-17
12	Amplifier	Agilent	8449B	3008A02120	2016-06-16	2017-06-15
13	Amplifier	MITEQ	AMF-6F-2604 00	9121372	2016-06-16	2017-06-15
14	Loop Antenna	R&S	HFH2-Z2	860004/001	2016-06-18	2017-06-17
15	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2016-06-10	2017-06-09
16	Horn Antenna	EMCO	3115	6741	2016-06-10	2017-06-09
17	Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	2016-06-10	2017-06-09
18	RF Cable-R03m	Jye Bao	RG142	CB021	2016-06-18	2017-06-17
19	RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	2016-06-18	2017-06-17
20	EMI Test Receiver	R&S	ESCI	101142	2016-06-18	2017-06-17
21	Artificial Mains	R&S	ENV216	101288	2016-06-18	2017-06-17
22	EMI Test Software	AUDIX	E3	N/A	2016-06-18	2017-06-17

6. ANTENNA PORT MEASUREMENT

6.1 Peak Power

6.1.1 Block Diagram of Test Setup



6.1.2 Limit

According to §15.247(b)(1), 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 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

6.1.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured

 $\mathsf{VBW} \geq \mathsf{RBW}$

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

6.1.4 Test Results

Test Mode	Channel	Frequency (MHz)	Measured Maximum Power (dBm)	Limits (dBm)	Verdict
	0	2402	3.490		
GFSK	39	2441	3.415	30.00	PASS
	78	2480	3.819		
	0	2402	2.620		
π/4DQPSK	39	2441	2.631	30.00	PASS
	78	2480	2.952		
	0	2402	2.730		
8DPSK	39	2441	2.731	30.00	PASS
	78	2480	3.040		

Remark:

- 1. Test results including cable loss;
- 2. Measured output power at difference Packet Type for each mode and recorded worst case for each mode.
- 3. Worst case data at DH1 for GFSK, 2DH1 for π /4DQPSK, 3DH1 for 8DPSK modulation type;

Peak Output Power

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SHENZHEN LCS COMPLIANCE TESTING LABORA	TORY LTD.	FCC ID: QRP-AZUM	AIAKARU55Q	Report No.: LCS17	<u>0329037AE</u>
GFSK			π/ 4-D Q	PSK	
Addem Spectram Analyzer - Swept SA ■ F 500 AC H2 Marker 1 2.402138000000 GH2 P00: Exat Trig: Free Run Avg Type: Leg-Parr P00: Exat Trig: Free Run Avg Type: Leg-Parr Trig: Free Run Avg Type: Leg-Parr	Apr 14,2017 1 2 3 4 5 6 Mutana and a search	Agilent Spectrum Analyzer - Swept SA Δ RF S0 Ω AC Marker 1 2.4018400000000 GH	Z	ALIGN OFF 03:11:41 PM Apr 1 Avg Type: Log-Pwr TRACE [12 Avg Hold>100/100 TYPE MM DET P N	4,2017 3 4 5 6 Peak Search
IFGaintLow Atten: 20 dB Det Mkr1 2.402 13	38 GHz Next P	eal Ref Offset 0.5 dB	12 0: Fast 🕞 Trig: Free Run ain:Low Atten: 20 dB	Mkr1 2.401 84	GHz NextPea
10 dB/div Ref 10.00 dBm 3.49	0 dBm	10 dB/div Ref 10.00 dBm		2.620	
0.00	Next Pk Ri	igh 0.00			Next Pk Rig
10.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Next Pk I	Lef _20.0		and the second s	Next Pk Le
30.0		-30.0			Nan-2,4
40.0	Marker D	-40.0			Marker Del
50.0	Mkr_	-cr -50.0			Mkr_C
60.0		-60.0			
700	Mkr→Ref				Mkr→RefL
80.0		- 480.0			Mbi 1 of
Center 2.402000 GHz Span 3. #Res BW 1.0 MHz #VBW 1.0 MHz Sweep 1.000 ms (1 wsol isransi		of Center 2.402000 GHz #Res BW 3.0 MHz	#VBW 3.0 MHz	Span 10.00 Sweep 1.000 ms (100 status	WITIZ
Channel 0 / 2402 MHz			hannel 0 / 2		
Agilent Spectrum Analyzer - Swept SA		Agilent Spectrum Analyzer - Swept SA	SENSE:INT	ALIGN OFF 03:10:37 PM Apr 1 Avg Type: Log-Pwr TRACE 12	4,2017 2.4.5.6 Peak Search
Image: Press of the state of the	Apr 14,2017 1 2 3 4 5 6 P NNNNN P NNNNN	IFG	Z 0: Fast 🖵 Trig: Free Run ain:Low Atten: 20 dB	Avg Type: Log-Pwr Avg Hold>100/100 Type MW Det P N Mkr1 2.440 86	NNNN N
Ref Offset 0.5 dB Mkr1 2.441 14 10 dB/div Ref 10.00 dBm 3.41	41 GHz Next P 5 dBm	e Ref Offset 0.5 dB 10 dB/div Ref 10.00 dBm	1	MIKFI 2.440 86 2.631	GHZ
	Next Pk Ri	i 0.00			Next Pk Rig
100		-10.0			Next Pk Le
20.0	Next Pk I	L -20.0			
30.0	Marker D	-30.0			Marker Del
40.0		-40.0			
50.0	Mkr-	-60.0			MkrC
700	Mkr→Ref	-70.0			Mkr→RefL
80.0		-80.0			Mpi
Center 2.441000 GHz Span 3.	000 MHz 1	Center 2.441000 GHz #Res BW 3.0 MHz	#VBW 3.0 MHz	Span 10.00 Sweep 1.000 ms (100	MHz ^{1 of}
#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 1.000 ms (1		MSG		STATUS	
Channel 39 / 2441 MHz		Ch	annel 39 /	2441 MHz	
Agitent Spectrum Analyzer - Swept SA III RF 50 Q AC SENSE:INT ALIGN OFF 03:08:39 PM /	Apr 14, 2017 Peak Search	Agilent Spectrum Analyzer - Swept SA	SENSE:INT	ALIGN OFF 03:10:06 PM Apr 1	4,2017 2 4 5 6 Peak Search
IFGain:Low Atten: 20 dB DET	PNNNN	Marker 1 2.47 9880000000 GH PN IFG	Z 0: Fast 🎧 Trig: Free Run ain:Low Atten: 20 dB	Avg Type: Log-Pwr Avg Hold>100/100 TYPE MW DET P N	NNNN
Ref Offset 0.5 dB Mkr1 2.479 83 10 dB/div Ref 10.00 dBm 3.81	9 dBm	Ref Offset 0.5 dB 10 dB/div Ref 10.00 dBm		Mkr1 2.479 86 2.952	GHZ
0.00	Next Pk Ri	igh 0.00			Next Pk Rig
-10.0		-10.0			Novi Dir U
-20.0	Next Pk I	-20.0			Next Pk Le
	Marker D				 Marker Del
40.0		-40.0			
600	Mkr_	-CF			Mkr-C
70.0	Mkr→Ref	fLv -70.0			Mkr→RefL
80.0		-80.0			
Center 2.480000 GHz Span 3.4 #Res BW 1.0 MHz #VBW 1.0 MHz Sweep 1.000 ms (1	000 MHz 1	lore of Center 2.480000 GHz #Res BW 3.0 MHz	#VBW 3.0 MHz	Span 10.00 Sweep 1.000 ms (100	Mbi MHz ^{1 of}
MSG STATUS		MSG		STATUS	, p. 9)
Channel 78 / 2480 MHz		Ch	annel 78 /	2480 MHz	

 Peak Output Power

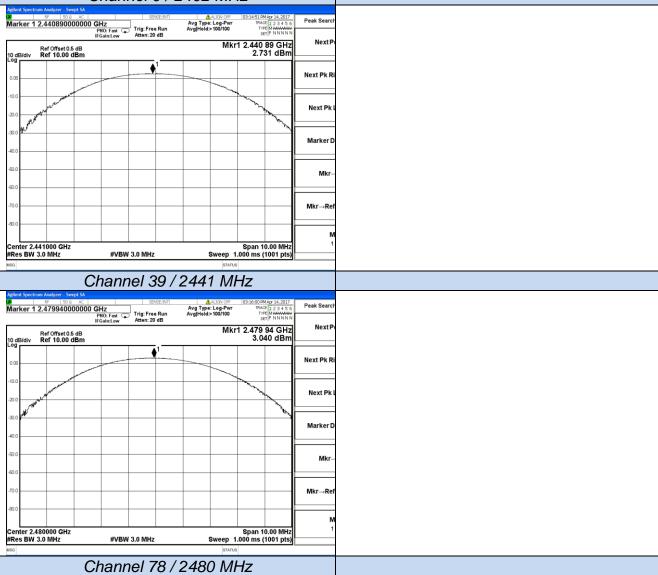
 8DPSK

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r 	Peak Search	03:15:25 PM Apr 14, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	ALIGN OFF Avg Type: Log-Pwr Avg Hold>100/100	Trig: Free Run Atten: 20 dB	90000000 GHz PN0: Fast IFGain:Low		arker 1
eak	NextPe	1 2.401 89 GHz 2.730 dBm	Mkr		set 0.5 dB	Ref Offset 0.5 Ref 10.00 d	dB/div
ight	Next Pk Ri			•			
L.eft	Next Pk L				North Contraction	and a second second	1.0
elta	Marker D						
CF	Mkr-						.0
LvI	Mkr→Ref						0.0
lore							0.0
of 2	1:	Span 10.00 MHz .000 ms (1001 pts)	Sweep 1	W 3.0 MHz		.402000 GHz / 3.0 MHz	
			STATUS				a

Channel 0 / 2402 MHz



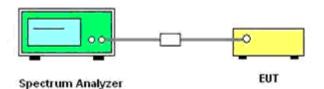
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6.2 Frequency Separation and 20 dB Bandwidth

6.2.1 Limit

According to §15.247(c) or A8.1(a), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired 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 in15.209(a).

6.2.2 Block Diagram of Test Setup



6.2.3 Test Procedure

Frequency separation test procedure :

1). Place the EUT on the table and set it in transmitting mode.

2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.

3). Set center frequency of Spectrum Analyzer = middle of hopping channel.

4). Set the Spectrum Analyzer as RBW = 100 KHz, VBW = 300 KHz, Span = wide enough to capture the peaks of two adjacent channels, Sweep = auto.

5). Max hold, mark 2 peaks of hopping channel and record the 2 peaks frequency.

20dB bandwidth test procedure :

1). Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel.

2). RBW = 30 KHz, VBW = 100 KHz.

- 3). Detector function = peak.
- 4). Trace = max hold.

6.2.4 Test Results

6.2.4.1 20dB Bandwidth

Test Mode	Channel	Frequency	Measured Ba	ndwidth (KHz)	Limits	Verdict
Test Mode	Channer	(MHz)	99%	20dB	(KHz)	veruici
GFSK	0	2402	836.27	744.10		
	39	2441	837.38	823.70	No Limits	PASS
	78	2480	838.57	825.50		
	0	2402	1061.40	1113.00		
π/4DQPSK	39	2441	1062.20	1111.00	No Limits	PASS
	78	2480	1065.50	1117.00		
	0	2402	1103.50	1163.00		
8DPSK	39	2441	1106.00	1163.00	No Limits	PASS
	78	2480	1104.00	1164.00		

Remark:

1. Test results including cable loss;

2. Measured output power at difference Packet Type for each mode and recorded worst case for each mode.

3. Worst case data at DH1 for GFSK, 2DH1 for π /4DQPSK, 3DH1 for 8DPSK modulation type;

4. Please refer following test plots;

20dB Bandw	∕idth ai	nd 99% Bandwidth	
GFSK		π/4DQPSK	
Agilent Spectrum Analyzer - Occupied BW		Agilent Spectrum Analyzer - Occupied BW	
IF So.g. AC SSGER/IT Autign (FF G36659FMArr 14, 2017 VBW 100.00 kHz Center Free; 24000000 GHz Radie Std: None #/FGain:Low rijf: Free Run Avg Hold>10/10 Radie Std: None #//FGain:Low rijf: Free Run Avg Hold>10/10 Radie Device: BTS	Trace/Detect	Image: State State State State State State State State State State TraceII Image: State State Image: State State State State State State State State TraceII TraceII TraceII TraceII TraceII TraceIII TraceII	Detecto
10 dB/div Ref 10.00 dBm		10 dB/div Ref 10.00 dBm	
	ClearW		ear W
	Aver		Avera
	MaxH		Max H
Center 2.402 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms	Min H	Center 2.402 GHz Span 3 MHz #Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms	Min H
Occupied Bandwidth Total Power 9.83 dBm		Occupied Bandwidth Total Power 8.97 dBm	
836.27 kHz Transmit Freq Error -1.359 kHz OBW Power 99.00 % x dB Bandwidth 744.1 kHz x dB -20.00 dB	Dete: Pe Auto	tr Transmit Freq Error 144 Hz OBW Power 99.00 % Auto x dB Bandwidth 1.113 MHz x dB -20.00 dB	Detec Pea
Channel 0 / 2402 MHz		Less Example 1 (1997) International Internat	_
Agilent Spectrum Analyzer - Occupied BW		Agilent Spectrum Analyzer - Occupied BW	
BF 50.0 AC SPREENT April 91 (PF 0507/35 March 14, 2017 Center Freq 2.441000000 GHz Center Freq: 2.441000000 GHz Center Freq: 2.441000000 GHz Radio Std: None #IF-Gaint.ow #IF-Gaint.ow #Attain: 20 dB Radio Device: BTS	Trace/Detect	Image: Processing of the system Analysis of the system Tracell Tracell Tracell Tracell Analysis of the system Analysis of the system Tracell Tracell Tracell Analysis of the system Analysis of the system Tracell Tracell Tracell Tracell Analysis of the system Analysis of the system Tracell	Detecto
10 dB/div Ref 10.00 dBm		10 dB/div Ref 10.00 dBm	_
0.00	ClearW	it	earW
			_
	Aver		Aver
70.0	MaxH		MaxH
Center 2.441 GHz Span 3 MHz	ļ	Center 2.441 GHz Span 3 MHz	
#Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms		#Pec BW 30 kHz #VBW 100 kHz Sween 3.2 me	Min H
Occupied Bandwidth Total Power 9.77 dBm 837.38 kHz	Dete	Occupied Bandwidth Total Power 9.10 dBm	Dete
Transmit Freq Error -1.798 kHz OBW Power 99.00 %	Pe Auto	Auto Auto Auto	Pe
x dB Bandwidth 823.7 kHz x dB -20.00 dB		x dB Bandwidth 1.111 MHz x dB -20.00 dB	
MSG STATUS		MSO STATUS	
Channel 39 / 2441 MHz		Channel 39 / 2441 MHz	
Adjent Spectrum Analyzer - Occupied BW 87 59 0.9 AC SPINE:INT ALLISIO OFF 10308:55 PM Agr 14, 2017 Canter Free: 2.480000000 GHz Radio Stati None	Trace/Detect	Aglent Spectrum Analyzer - Occupied BW Spectrum Analyzer - Occupied BW Image: Prime State St	Detect
#IFGain:Lew #Atten: 20 dB Avg Hold>10/10 Radio Device: BTS	1	Tig: Free Run Avg Hold>10/10 #IFGeintLaw Tig: Sree Run Avg Hold>10/10	
10 dB/div Ref 10.00 dBm		10 dB/div Ref 10.00 dBm	_
0.00	ClearW	it	earW
			_
	Aver		Aver
400	MaxH		MaxH
R00 Center 2.48 GHz Span 3 MHz		Center 2.48 GHz Span 3 MHz	
#Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms		of#Res BW 30 kHz #VBW 100 kHz Sweep 3.2 ms	Min H
Occupied Bandwidth Total Power 10.2 dBm 838.57 kHz Transmit Freg Error -2.857 kHz OBW Power 99.00 %	Dete: Pe	ak	Dete
x dB Bandwidth 825.5 kHz x dB -20.00 dB	Auto	Image:	
Channel 78 / 2480 MHz		Channel 78 / 2480 MHz	

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20dB Bandwidth and 99% Bandwidth 8DPSK Center Freq: 2.40200000 GHz Trig: Free Run Avg|Hold>10/10 03:12:37 PM Apr 14, 2017 Radio Std: None Trace/Detect enter Freq 2.402000000 GHz Radio Device: BTS #IFGain:Lo Ref 10.00 dBm Clear W Ave ~ Max enter 2.402 GHz Res BW 30 kHz Span 3 MH Sweep 3.2 m #VBW 100 kHz Min Total Power 8.49 dBm Occupied Bandwidth 1.1035 MHz Dete -1.170 kHz OBW Power 99.00 % Transmit Freg Error x dB Bandwidth 1.163 MHz x dB -20.00 dB Channel 0 / 2402 MHz LIGN C Center Freq: 2.441000000 GHz Trig: Free Run Avg|Hold>10/10 w #Atten: 20 dB 03:13:00 PM Apr 14, 2017 Radio Std: None ALIGN OFF Trace/Detec Center Freq 2.441000000 GHz Radio Device: BTS #IFGain:Low Ref 10.00 dBm Clear W Ave Max Center 2.441 GHz #Res BW 30 kHz Span 3 MH Sweep 3.2 m #VBW 100 kHz Min Total Power 8.58 dBm Occupied Bandwidth 1.1060 MHz Dete Transmit Freq Error -593 Hz OBW Power 99.00 % x dB Bandwidth 1.163 MHz x dB -20.00 dB Channel 39 / 2441 MHz 03:16:23 PM Apr 14, 2 Radio Std: None Center Freq: 2.4 Trig: Free Run #Atten: 20 dB Trace/Detec Center Freq 2.480000000 GHz 000 GHz Avg|Hold>10/10 Radio Device: BTS #IFGain:Low Ref 10.00 dBr Clear W Ave Max Center 2.48 GHz #Res BW 30 kHz Span 3 MH #VBW 100 kHz Sweep 3.2 ms Min Occupied Bandwidth Total Power 8.93 dBm 1.1040 MHz Det OBW Power Transmit Freq Error -1.656 kHz 99.00 % x dB Bandwidth 1.164 MHz -20.00 dB x dB Channel 78 / 2480 MHz

6.2.4.2 Frequency Separation

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Т	he Measurement Re	sult With 1Mbps For	GFSK Modulation	
Channel	20dB Bandwidth (KHz)	Channel Separation (MHz)	Limit (KHz)	Result
Low	744.10		744.10	Pass
Middle	823.70	1.000	823.70	Pass
High	825.50		825.50	Pass
The	Measurement Resul	t With 2Mbps For $\pi/4$	-DQPSK Modulati	on
Channel	nel 20dB Bandwidth Channel Separation (KHz) (MHz)		Limit (KHz)	Result
Low	1113.00	, <i>,</i>	742.00	Pass
Middle	1111.00	1.000	740.67	Pass
High	1117.00		744.67	Pass
Th	e Measurement Res	ult With 3Mbps For 8	-DPSK Modulatior	ı
Channel	20dB Bandwidth (KHz)	Channel Separation (MHz)	Limit (KHz)	Result
Low	1163.00		775.33	Pass
Middle	1163.00	1.000	775.33	Pass
High	1164.00		776.00	Pass

Remark:

- Test results including cable loss;
 Please refer to following plots;
- 3. Measured at difference Packet Type for each mode and recorded worst case for each mode.
- 4. Worst case data at DH1 for GFSK, 2DH1 for $\pi/4$ -DQPSK, 3DH1 for 8DPSK modulation type;

Frequency	Separation
GFSK	π/4DQPSK

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Agtient Spectrum Analyzer - Swept SA	Marker	Agilent Spectrum Analyzer - Swept SA B 59 [90 a.C.] SB/SE-B/T] Δ/4.13V/OFF 04/01/23 PM Agr 14, 2017 Marker 1 Δ 1.000000000 MHz Avg Type: Log-Pwr TMAE[]/2.34.5.6 TracelD	etector
Marker 1 Δ 1.00000000 MHz Avg Type: Log-Pwr Trig: Free Run Avg Type: Log-Pwr Trig: Free Run Avg Hoid> 100/100 T	Select Mar	PNO: Wide C Trig: Free Run Avg Hold>100/100 IVE WWWWWW	Trace
10 dB/div Ref 10.00 dBm -0.065 dB		10 dB/div Ref 10.00 dBm 0.093 dB	-
	No		ar Writ
-000		100 Trace	Averag
300			
400	Fix		ax Hol
60.0			lin Hol
500	Proper		Blank ace On
80.0		800	Mor
Start 2.401500 GHz Stop 2.403500 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 1.000 ms (1001 pts)		" Start 2.401500 GHz Stop 2.403500 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 1.000 ms (1001 pts)	1 of
Mag Channel 0 / 2402 MHz		Channel 0 / 2402 MHz	
Agilent Spectrum Analyzer - Swept SA D RF SD 0, AC SENSE:INT At ALIGN OFF 03:44:53 PM Apr 14, 2017		Agilent Spectrum Analyzer - Swept SA	
Marker 1 Δ 1.000000000 MHz FRo: Wide Trig: Free Run Avg Type: Log-Pvr NMCE [12:34:56 PNO: Wide Avg Type: Log-Pvr NMCE [12:34:56 PNO: Wide Avg Type: Log-Pvr NMCE [12:34:56 Avg Type: Log-Pvr NMCE [12:34:56	Trace/Detec	Marker 1 Δ 1.000000000 MHz PN0: Wide Trig: Free Run Avg Hold>100/100 TRACE [123456 TYPE NO: Wide Trig: Free Run Avg Hold>100/100 Trace/L	etector Trace
Ref Offset 0.5 dB ΔMkr1 1.000 MHz 10 dB/div Ref 10.00 dBm -0.010 dB		ΔMkr1 1.000 MHz 10 dB/div Ref 10.00 dBm -0.002 dB	1
	ClearV	1Δ2	ar Writ
	Trace Ave		Averad
300			
40.0	Max		ax Hol
	Min		lin Hol
40.0 70.0	View Bla Trace		Blank ace On
80.0			Mor
Start 2.440500 GHz Stop 2.442500 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 1.000 ms (1001 pts)		Start 2.440500 GHz #Res BW 100 kHz Sweep 1.000 ms (1001 pts)	1 of
			_
Channel 39 / 2441 MHz Agiteri Spectrum Analyzer - Swept SA Image: Spectrum Analyzer - Swept SA Image: Spectrum Analyzer - Swept SA Image: Spectrum Analyzer - Swept SA	_	Channel 39 / 2441 MHz Applient Spectrum Analyzer - Swept SA K6 ISD 9 AC SERGEENTI Aut 201 OFF ISD 46:32 PMAge 14; 2017 Transfil	
Marker 1 ∆ 1.00000000 MHz Avg Type: Log-Pwr Trig: Free Run Avg Type: Log-Pwr Trig: State Run PN0: Wide If Gaint.ow Trig: Free Run Avg Hoid> 100/100 Trig: State Run State Run Trig: State Run State Run Trig: State Run State Run <td< td=""><td></td><td>Marker 1 Δ 1.000000000 MHz Avg Type: Log-Pwr Tracel [] ≥ 3 4 5 6 Tracel [] ≥ 3 4 5 6 PNO: Wide Trig: Free Run Avg Type: Log-Pwr Tracel [] ≥ 3 4 5 6 Tracel [] ≥ 3 4 5 6 e IFGaintow Tracel Run Avg Hold>100/100 Tracel [] ≥ 3 4 5 6 Tracel [] ≥ 3 4 5 6</td><td>etector Trace</td></td<>		Marker 1 Δ 1.000000000 MHz Avg Type: Log-Pwr Tracel [] ≥ 3 4 5 6 Tracel [] ≥ 3 4 5 6 PNO: Wide Trig: Free Run Avg Type: Log-Pwr Tracel [] ≥ 3 4 5 6 Tracel [] ≥ 3 4 5 6 e IFGaintow Tracel Run Avg Hold>100/100 Tracel [] ≥ 3 4 5 6 Tracel [] ≥ 3 4 5 6	etector Trace
Ref Offset 0.5 dB ΔMkr1 1.000 MHz 10 dB/div Ref 10.00 dBm -0.087 dB		1 Ref Offset 0.5 dB ΔMkr1 1.000 MHz 10 dB/div Ref 10.00 dBm 0.050 dB	1
	ClearV	122	ar Writ
	Trace Ave		Averag
300		30.0	
-60.0	Max		ax Hol
40.0	Min		lin Hol
40.0 .70.0	View Bla Trace		Blank ace On
-0.0	Irace		Nor
Start 2.478500 GHz Stop 2.480500 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 1.000 ms (1001 pts)		* Start 2.478500 GHz #Res BW 100 kHz #VBW 100 kHz Sweep 1.000 ms (1001 pts)	1 of
Channel 78 / 2480 MHz		Channel 78 / 2480 MHz	

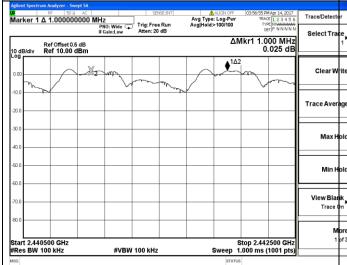
Frequency Separation

8DPSK

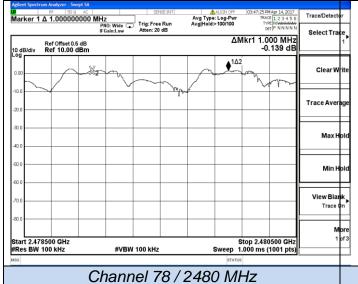
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gilent Spectrum Analyzer - Swept S/						
RF 50 Ω AC		SENSE:INT Trig: Free Run Atten: 20 dB	Avg Type: Log- Avg Hold>100/	Pwr TRACE 1 2 3 4 5 6		-
Ref Offset 0.5 dB 0 dB/div Ref 10.00 dBm				ΔMkr1 1.000 MHz 0.107 dB	Select Tra	10
•g	**	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		122	ClearW	v ri
0.0					Trace Aver	ra
0.0					MaxH	H
0.0					Min H	H
0.0					View Bla Trace	
tart 2.401500 GHz				Stop 2.403500 GHz	M 1	/1
Res BW 100 kHz	#VBW	100 kHz	Swee			

Channel 0 / 2402 MHz



Channel 39 / 2441 MHz



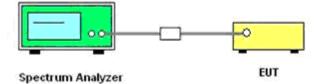
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6.3 Number of Hopping Frequency

6.3.1 Limit

According to §15.247(a)(1)(ii) or A8.1 (d), Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.

6.3.2 Block Diagram of Test Setup



6.3.3 Test Procedure

1). Place the EUT on the table and set it in transmitting mode.

2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.

- 3). Set Spectrum Analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
- 4). Set the Spectrum Analyzer as RBW = 1 MHz, VBW=1MHz.
- 5). Max hold, view and count how many channel in the band.

6.3.4 Test Results

Test Mode	Measurement Result (No. of Channels)	Limit (No. of Channels)	Result
GFSK	79	≥15	PASS
π/4DQPSK	79	≥15	PASS
8DPSK	79	≥15	PASS

Remark:

- 1. Test results including cable loss;
- 2. Measured output power at difference Packet Type for each mode and recorded worst case for each mode.
- 3. Worst case data at DH1 for GFSK, 2DH1 for π /4DQPSK, 3DH1 for 8DPSK modulation type;
- 4. Record test plots only for GFSK;
- 5. Please refer following test plots;

	Analyzer - Swept SA RF 50 Ω AC 78.000000000) MHz PNO: Fast G	Trig: Free F Atten: 20 d	Avg Ty tun Avg Ho	ALIGN OFF pe: Log-Pwr Id>100/100	04:41:54 PM A		Trace/Detector Select Trace	Frequency
dB/div R	ef Offset 0.5 dB ef 10.00 dBm				ΔMkr	1 78.000 0.4	0 MHz 460 dB	1	
" "				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~		~~~^^2	Clear Write	
								Trace Average	
0.0								Max Hold	
1.0							\	Min Hold	
0.0								View Blank Trace On	
0.0								More	
art 2.4000 Res BW 1.0		#VBV	/ 1.0 MHz		Sweep 1	Stop 2.483		1 of 3	

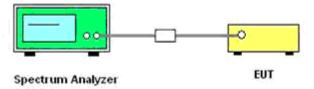
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6.4 Time of Occupancy (Dwell Time)

6.4.1 Limit

According to §15.247(a)(1)(iii) or A8.1 (d), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

6.4.2 Block Diagram of Test Setup



6.4.3 Test Procedure

- 1). Place the EUT on the table and set it in transmitting mode.
- 2). Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Spectrum Analyzer.
- 3). Set center frequency of Spectrum Analyzer = operating frequency.
- 4). Set the Spectrum Analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
- 5). Repeat above procedures until all frequency measured was complete.

6.4.4 Test Results

The Dwell Time=Burst Width*Total Hops. The detailed calculations are showed as follows:

The duration for dwell time calculation: 0.4[s]*hopping number=0.4[s]*79[ch]=31.6[s*ch];

The burst width [ms/hop/ch], which is directly measured, refers to the duration on one channel hop. The hops per second for all channels: The selected EUT Conf uses a slot type of 5-Tx&1-Rx and a hopping

rate of 1600 [ch*hop/s] for all channels. So the final hopping rate for all channels is 1600/6=266.67 [ch*hop/s] The hops per second on one channel: 266.67 [ch*hops/s]/79 [ch]=3.38 [hop/s];

The total hops for all channels within the dwell time calculation duration: 3.38 [hop/s]*31.6[s*ch]=106.67 [hop*ch];

The dwell time for all channels hopping: 106.67 [hop*ch]*Burst Width [ms/hop/ch].

Mode	Frequency (MHz)	Burst Type	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Verdict
GFSK	2441	DH1	0.369	0.1181	0.4	PASS
		DH3	1.625	0.2600	0.4	PASS
		DH5	2.873	0.3065	0.4	PASS
π/4-DQPSK	2441	2DH1	0.375	0.1200	0.4	PASS
		2DH3	1.628	0.2605	0.4	PASS
		2DH5	2.875	0.3067	0.4	PASS
8DPSK	2441	3DH1	0.377	0.1206	0.4	PASS
		3DH3	1.627	0.2603	0.4	PASS
		3DH5	2.876	0.3068	0.4	PASS

Remark:

- 1. Test results including cable loss;
- 2. Please refer to following plots;
- 3. Measured at difference Packet Type for each mode and recorded worst case for each mode.
- 4. Dwell Time Calculate formula: DH1: Dwell time=Pulse time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second DH3: Dwell time=Pulse time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second DH5: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second
- 5. Measured at low, middle and high channel, recorded worst at middle channel;

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	Dwel	l time			
GFSK	π/4-DQPSK				
Adient Spectrum Analyzer Swegt SA ■ 55 50 0 AC ■ 55 500 0 AC	Trace/Detecto	Asland Spectrum Analyzer - Swight SA	Trace/Detector		
IFGain:Low Atten: 20 dB DET N N N N N	Select Trac	PN0: Fast → Trig: Free Run Trie! Www.www. e IFGain:Low Atten: 20 dB CET N NNNN	Select Trace		
Ref Offset 0.5 dB △Mkr3 1,250 ms 10 dB/div -0.08 dB 0.9 -0.08 dB		1 Ref 076405 dB ΔΙΝΚΤΟ 1.25 HTS 10 dB/div Ref 10.00 dBm 0.28 dB □0-9			
	ClearWi		Clear Writ		
200					
	Trace Avera	99 400	Trace Average		
60.0 -70.0 als.m Holji dan maningka utilizati plan menti kanyati taka tipla utilizati a sati	Max He	eoo Je Al Andread Tillion en White Antonia and the standard and a	Max Ho		
800 FM F F F F F F F F F F F F F F F F F		800 THE HAND AND A STORE AND A			
Res BW 1.0 MHz #VBW 1.0 MHz Sweep 5.000 ms (10001 pts)	Min He	Construction Structure	Min Ho		
1 Δ2 1 t Δ0 3885 sus (Δ) -1.22 dB	View Blan	1 Δ2 1 t (Δ) 375.0 μs (Δ) -0.85 dB 2 F 1 t 3.391 ms 2.64 dBm 4 1 t (Δ) 125 t ms (Δ) -0.28 dB	View Blank		
4 F 1 t 1.492 ms 3.80 dBm 5 6 7	Trace C		Trace Or		
9 9 10	Mc 1.0	rd 8	M p 1 pt		
11		111 × × × × × × × × × × × × × × × × × ×			
Channel 39 / 2441 MHz – DH1		Channel 39 / 2441 MHz - 2DH1			
Agilent Spectrum Analyzer - Swept SA 0 RF 50 g AC SENSEINT ALIGN OFF 05:19:57 PM Agr 14, 2017	Trace/Detecto	Aglient Spectrum Analyzer - Swept SA	Trace/Detector		
Marker 3 ∆ 2.50050 ms PN0: Fost → Trig: Free Run IFGainLow Atten: 20 dB	Select Trac	Marker 3 ∆ 2.50050 ms PN0: Fast → IFGainLow Trig: Free Run Atten: 20 dB	Select Trace		
Ref 0ffset 0.5 dB ΔMkr3 2.501 ms 10 dB/div Ref 10.00 dBm 0.22 dB 0 sg № √10.2 ¥244		Ref0ffset0.5 dB ΔMkr3 2.501 ms 10 dB/div Ref 10.00 dBm 0.37 dB 0 og 0.40 dBm 0.37 dB	1		
	Clear Wi		Clear Writ		
300		300			
400	Trace Avera	400	Trace Averag		
800 700 da desa tratita de la desa tratita de la desa de la d	MaxH	700 40 40 40 40 40 40 40 40 40 40 40 40 4	Max Ho		
	Max H		Max Hu		
Center 2.441000000 GHz Span 0 Hz Res BW 1.0 MHz #VBW 1.0 MHz Sweep 5.000 ms (10001 pts)	Min H	Center 2.441000000 GHz Span 0 Hz Res BW 1.0 MHz #VBW 1.0 MHz Sweep 5.000 ms (10001 pts)	Min Ho		
Ltdl Ltdl X Y RuleTion Full	View Blan	Image locg fin2 (61) X Y RANGION RANGION ADDITION 1 Δ2 Γ 1 (Δ) 1.022 NS 0.088 0.088 0.088 0.012 0	View Blank		
4 F 1 L <thl< th=""> <thl< th=""> <thl< th=""> <thl< th=""></thl<></thl<></thl<></thl<>	Trace C	4 F 1 L Los Los L <thl< th=""> L L L<td>Trace Or</td></thl<>	Trace Or		
	M	7	Mo		
			1 of		
Channel 39 / 2441 MHz – DH3		Channel 39 / 2441 MHz - 2DH3			
Agilent Spectrum Analyzer - Swept SA 20 RF 50.0, AC SENSE:INT ALIGN OFF 05:21:47 PM Acr 14, 2017	Trace/Detecto	Agilent Spectrum Analyzer - Swept SA 20 8F 51.0 a.C SPRSE-INT ALLIGN.CEF (05/23/29.PM arc 14, 2017)	Trace/Detector		
Marker 3 ∆ 3.75100 ms PNO: Fast → Trig: Free Run FFGaint.tow Atten: 20 dB PNO: Fast → Cell PNNNNN Atten: 20 dB	Select Trac	Marker 3 ∆ 3.75000 ms PNO: Fast → Trig: Free Run HFGaint.tow HFGaint.tow	Select Trace		
Ref0ffset0.5.dB ΔMkr3 3.751 ms 10 dB/div Ref 10.00 dBm		Ref0/ffset0.5.dB	1		
Log ΛΔ2 ΥλΔ4 000	Clear Wi		ClearWrit		
300		300			
400	Trace Avera	400	Trace Averaç		
-200 -200 	Max H	200 500 700 takauhankilar 700 takauhankilar	Maylia		
	wax fi		Max Ho		
Center 2.441000000 GHz Span 0 Hz Res BW 1.0 MHz #VBW 1.0 MHz Sweep 5.000 ms (10001 pts)	Min H	Center 2.44 1000000 GHz Span 0 Hz Res BW 1.0 MHz #VBW 1.0 MHz Sweep 5.000 ms (10001 pts)	Min Ho		
Νοτ. ΕΧ Υ Ελικείου Function Function <td></td> <td>More those sets × × × × ≠</td> <td>V</td>		More those sets × × × × ≠	V		
3 Δ4 1 t Δ3.751 ms (Δ) 0.45 dB 4 F 1 t 532.0 μs 3.34 dBm 5	View Blan Trace C	Bit Δ4 1 t (Δ) 3.750 ms (Δ) 9.33 dB 4 F 1 t 666.0 μs 2.72 dBm 5	View Blank Trace Or		
	M	6	Mo		
	1		1 51		
MSG STATUS		MSG STATUS			
Channel 39 / 2441 MHz – DH5	Channel 39 / 2441 MHz - 2DH5				

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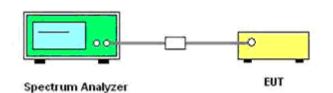
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6.5 Conducted Spurious Emissions and Band Edges Test

6.5.1 Limit

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. Attenuation below the general limits specified in Section 15.209(a) is not required.

6.5.2 Block Diagram of Test Setup



6.5.3 Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 300 KHz.

Measurements are made over the 9 KHz to 26.5GHz range with the transmitter set to the lowest, middle, and highest channels

6.5.4 Test Results of Conducted Spurious Emissions

No non-compliance noted. Only record the worst test result (TX-GFSK) in this report. The test data refer to the following page.

Test Mode	Channel	Frequency (MHz)	Spurious RF Conducted Emission (dBc)	Limits (dBc)	Verdict
	0	2402	<-20		
GFSK	39	2441	<-20	-20	PASS
	78	2480	<-20		
	0	2402	<-20		PASS
π/4-DQPSK	39	2441	<-20	-20	
	78	2480	<-20		
8DPSK	0	2402	<-20		
	39	2441	<-20	-20	PASS
	78	2480	<-20		

Remark:

1. Test results including cable loss;

- 2. Please refer to following plots;
- 3. Measured at difference Packet Type for each mode and recorded worst case for each mode.
- 4. Worst case data at DH1 for GFSK, 2DH1 for π /4-DQPSK, 3DH1 for 8DPSK modulation type;

RF Conducted Spurious Emissions

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SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. FCC ID: QRP-AZUMIAKARU55Q Report No.: LCS170329037AE GFSK - Channel 0 / 2402 MHz Asthere prover # 50 0 AC | Marker 1 2.401570684375 GHz PN0: Efseint.evv IFGeint.evv Avg Type: Log-Pw Avg|Hold>100/100 Trace/Detect Avg Type: Log-Pwr Avg|Hold: 4/100 Peak Sea Display Line -15.75 dBm PNO: Wide Trig: Free Run Atten: 20 dB Select Tr Mkr1 2.401 841 GHz 4.255 dBm Next Mkr1 2.401 6 GHz 4.230 dBm Ref Offset 0.5 dB Ref 10.00 dBn Ref Offset 0.5 dB Ref 10.00 dBn Clea Next Pk -15.75 d -15.75 c Trace Ave Next Pk Мах Marker Start 9 kHz #Res BW 100 kHz Stop 26.50 GHz Sweep 2.533 s (40001 pts #VBW 300 kHz Min Mkr 1 N 1 f 2 N 1 f 2.401 6 GHz 4.803 8 GHz 4.230 dBr -52.279 dBr View Bla Mkr→Re Trace ore Center 2.402000 GHz #Res BW 100 kHz Span 3.000 MHz Sweep 1.000 ms (1001 pts) #VBW 300 kHz ed: Accy unspec'd < 10MH 2399.5 - 2404.5 MHz 9 KHz - 26.5 GHz GFSK – Channel 39 / 2441 MHz rker 1 2.440658171100 GHz PR0: Fast IFGaint.ow Trig: Free Run Atten: 20 dB Display Line -15.91 dBm Avg Type: Log-Pwi Avg[Hold>100/100 Trace/Dete Avg Type: Log-Pwr Avg|Hold: 5/100 Peak Sear PNO: Wide Trig: Free Run IFGain:Low Atten: 20 dB DET P N N N N DET P N N N N Select Tr Mkr1 2.440 841 GHz 4.095 dBm Mkr1 2.440 7 GHz 4.044 dBm Ref Offset 0.5 dB Ref 10.00 dBm Ref Offset 0.5 dB Ref 10.00 dBm ****1 Clear Next Pk R -15.91 d Trace Av Next Pk Max Marker Start 9 kHz #Res BW 100 kHz Stop 26.50 GHz Sweep 2.533 s (40001 pts) #VBW 300 kHz Min Mkr 1 N 1 f 2 N 1 f 2.440 7 GHz 4.882 0 GHz 4.044 dBn -52.927 dBn View Blank Trace enter 2.441000 GHz Span 3.000 MH Sweep 1.000 ms (1001 pts 10 11 #Res BW 100 kHz #VBW 300 kHz pec'd < 10M⊦ AC coupled: Accv i 9 KHz - 26.5 GHz 2438.5 - 2443.5 MHz GFSK – Channel 78 / 2480 MHz M RF 50 Ω AC Marker 1 2.479745657825 GHz PN0: Fast IrGaint.ow Atten: 20 dB Display Line -15.27 dBm Trace/Detector Avg Type: Log-Pwi Avg|Hold: 11/100 Peak Sear Avg Type: Log-Pwr Avg|Hold>100/100 PNO: Wide Trig: Free Run TYPE MWWWWA DET P N N N N Select Tr Mkr1 2.479 841 GHz 4.735 dBm Next ak Mkr1 2.479 7 GHz 4.660 dBm Ref Offset 0.5 dB Ref 10.00 dBm Ref Offset 0.5 dB Ref 10.00 dBm Clea Next Pk F aht 15.27 d -15.27 c Next Pl Max Marker tart 9 kHz Res BW 100 kHz Stop 26.50 GHz Sweep 2.533 s (40001 pts) #VBW 300 kHz Min I Mkr 1 N 1 f 2 N 1 f 2.479 7 GHz 864.6 MHz 4.660 dBn View Blank →R Trace Center 2.480000 GHz #Res BW 100 kHz Span 3.000 MH: Sweep 1.000 ms (1001 pts

2477.5 – 2482.5 MHz **RF** Conducted Spurious Emissions

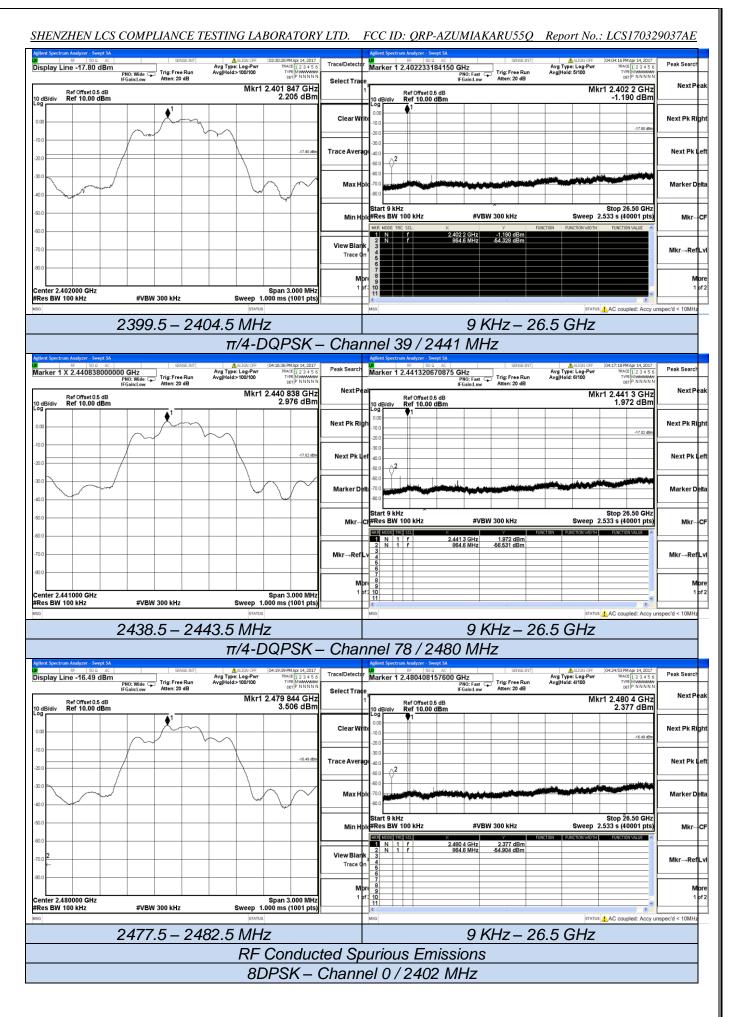
#VBW 300 kHz

9 KHz - 26.5 GHz

TATUS AC coupled: Accy unspec'd < 10M

π/4-DQPSK – Channel 0 / 2402 MHz

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