



FCC PART 15.247 TEST REPORT

For

Telecell Mobile (H.K) Ltd.

RM 801 Metro Ctr II, 21 Lam Hing Street, Kln Bay, Hong Kong

FCC ID: 2ADX3A180

Report Type: Product Type:
Original Report Mobile Phone

Report Number: RSZ170809001-00B

Report Date: 2017-09-18

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TABLE OF CONTENTS

GENERAL INFORMATION	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	
Objective	
RELATED SUBMITTAL(S)/GRANT(S)	
TEST METHODOLOGY	
MEASUREMENT UNCERTAINTY	
TEST FACILITY	
SYSTEM TEST CONFIGURATION	6
DESCRIPTION OF TEST CONFIGURATION	6
EUT Exercise Software	6
SPECIAL ACCESSORIES	6
EQUIPMENT MODIFICATIONS	
SUPPORT EQUIPMENT LIST AND DETAILS	
External I/O Cable	
BLOCK DIAGRAM OF TEST SETUP	7
SUMMARY OF TEST RESULTS	8
TEST EQUIPMENT LIST	9
FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE	
APPLICABLE STANDARD	10
FCC §15.203 – ANTENNA REQUIREMENT	11
APPLICABLE STANDARD	11
ANTENNA CONNECTOR CONSTRUCTION	11
FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS	12
APPLICABLE STANDARD	
EUT SETUP	
EMI TEST RECEIVER SETUP.	
TEST PROCEDURE	
CORRECTED FACTOR & MARGIN CALCULATION	13
TEST RESULTS SUMMARY	13
Test Data	13
FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS	16
APPLICABLE STANDARD	16
EUT Setup	
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	
TEST PROCEDURE	
CORRECTED AMPLITUDE & MARGIN CALCULATION	
TEST RESULTS SUMMARY	
TEST DATA	
FCC §15.247(a) (1)-CHANNEL SEPARATION TEST	
APPLICABLE STANDARD	20
Test Procedure	
Test Data	20

FCC §15.247(a) (1) – 20 dB EMISSION BANDWIDTH	2 7
APPLICABLE STANDARD	27
Test Procedure	
Test Data	
FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST	33
APPLICABLE STANDARD	33
TEST PROCEDURE	
Test Data	
FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)	36
APPLICABLE STANDARD	36
TEST PROCEDURE	
Test Data	
FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT	52
APPLICABLE STANDARD	52
TEST PROCEDURE	
Test Data	52
FCC §15.247(d) - BAND EDGES TESTING	54
APPLICABLE STANDARD	54
Test Procedure	
TEST DATA	5.4

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Telecell Mobile (H.K) Ltd.* 's product, model number: *LINK A180 (FCC ID: 2ADX3A180)* or the "EUT" in this report was a *Mobile Phone*, which was measured approximately: 115 mm (L) \times 47 mm (W) \times 14 mm (H), rated with input voltage: DC 3.7 V battery or DC 5V from adapter.

Report No.: RSZ170809001-00B

Adapter Information: Model: LINK LINK A180

Input: AC 100-240V, 50/60Hz, 0.15A

Output: DC 5.0V, 500 mA

*All measurement and test data in this report was gathered from production sample serial number: 1701900 (Assigned by BACL). The EUT supplied by the applicant was received on 2017-08-09.

Objective

This test report is prepared on behalf of *Telecell Mobile (H.K) Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 22H & 24E PCE and Part 15B JBP submissions with FCC ID: 2ADX3A180.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

FCC Part 15.247 Page 4 of 57

Measurement Uncertainty

Parameter	uncertainty
Occupied Channel Bandwidth	±5%
RF Output Power with Power meter	±0.5dB
RF conducted test with spectrum	±1.5dB
AC Power Lines Conducted Emissions	±1.95dB
All emissions, radiated	±4.88dB
Temperature	±3℃
Humidity	±6%
Supply voltages	±0.4%

Report No.: RSZ170809001-00B

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

FCC Part 15.247 Page 5 of 57

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode.

EUT Exercise Software

No exercise software was made to the EUT tested.

Special Accessories

No special accessory.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
N/A	N/A	N/A	N/A

Report No.: RSZ170809001-00B

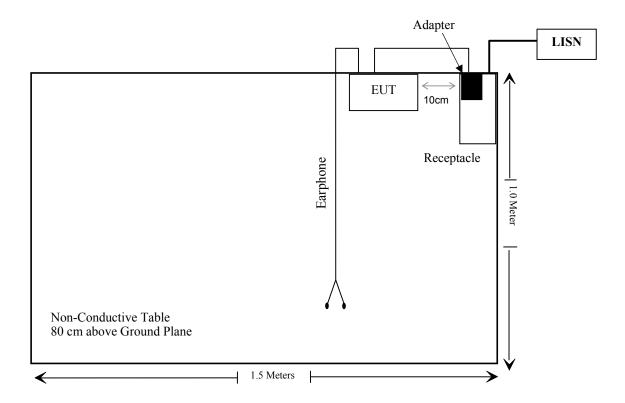
External I/O Cable

Cable Description	Length (m)	From Port	То
Shielding Detachable USB Cable With Magnet Ring	1.0	EUT	Adapter

FCC Part 15.247 Page 6 of 57

Block Diagram of Test Setup

For conducted emission:



FCC Part 15.247 Page 7 of 57

FCC Rules	Description of Test	Result
§15.247 (i), §2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209 & §15.247(d)	Radiated Emissions	Compliance
§15.247(a)(1)	20 dB Emission Bandwidth	Compliance
§15.247(a)(1)	Channel Separation Test	Compliance
§15.247(a)(1)(iii)	Time of Occupancy (Dwell Time)	Compliance
§15.247(a)(1)(iii)	Quantity of hopping channel Test	Compliance
§15.247(b)(1)	Peak Output Power Measurement	Compliance
§15.247(d)	Band edges	Compliance

FCC Part 15.247 Page 8 of 57

Manufacturer	Description	Model	Serial	Calibration	Calibration		
	•		Number	Date	Due Date		
Conducted Emissions Test							
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2016-10-19	2017-10-19		
Rohde & Schwarz	LISN	ENV216	3560.6650.12- 101613-Yb	2016-12-07	2017-12-07		
Rohde & Schwarz	Transient Limiter	ESH3Z2	DE25985	2017-05-21	2017-11-19		
Rohde & Schwarz	CE Test software	EMC 32	V8.53.0	NCR	NCR		
N/A	Conducted Emission Cable	N/A	UF A210B-1- 0720-504504	2017-05-12	2017-11-12		
	Radia	ated Emission T	est				
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28		
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2017-04-24	2018-04-24		
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16		
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14		
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19		
Anritsu	Signal Generator	68369B	004114	2016-12-05	2017-12-05		
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07		
Ducommun Technologies	RF Cable	UFA210A-1- 4724-30050U	MFR64369 223410-001	2017-05-21	2017-11-19		
Ducommun Technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19		
Ducommun Technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19		
Ducommun Technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22		
Ducommun Technologies	Horn Antenna	ARH-4223- 02	1007726-04	2014-12-29	2017-12-28		
Ducommun Technologies	Pre-amplifier	ALN- 22093530-01	991373-01	2017-08-03	2018-08-03		
	RF	Conducted Tes	t				
Agilent	P-Series Power Meter	N1912A	MY5000448	2016-12-05	2017-12-05		
Agilent	Wideband Power Sensor	N1921A	MY54210016	2016-12-05	2017-12-05		
WEINSCHEL	3dB Attenuator	N/A	N/A	2017-05-23	2017-11-22		
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2016-12-05	2017-12-05		
Ducommun Technologies	RF Cable	RG-214	3	2017-05-22	2017-11-22		

FCC Part 15.247 Page 9 of 57

^{*} **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC§15.247 (i), §1.1307 (b) (1) &§2.1093 – RF EXPOSURE

Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

Report No.: RSZ170809001-00B

According to KDB 447498 D01 General RF Exposure Guidance

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances \leq 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] $\cdot [\sqrt{f(GHz)}] \le 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- 1. f(GHz) is the RF channel transmit frequency in GHz.
- 2. Power and distance are rounded to the nearest mW and mm before calculation.
- 3. The result is rounded to one decimal place for comparison.
- 4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

For worst case:

Frequency	Maximum pov		Calculated Distance	Calculated	Threshold	SAR Test	
(MHz)	(dBm)	(mW)	(mm)	value	(1-g SAR)	Exclusion	
2480	0	1	5.0	0.3	3.0	Yes	

Result: No Standalone SAR test is required

FCC Part 15.247 Page 10 of 57

FCC §15.203 – ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Report No.: RSZ170809001-00B

Antenna Connector Construction

The EUT has one internal antenna arrangement, which was permanently attached and the antenna gain is 4.0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC Part 15.247 Page 11 of 57

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

EUT Setup



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

FCC Part 15.247 Page 12 of 57

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

Correction Factor = LISN VDF + Cable Loss + Transient Limiter Attenuation

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Report No.: RSZ170809001-00B

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207,

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_{\rm m} + U_{(L{\rm m})} \leq L_{\rm lim} + U_{\rm cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

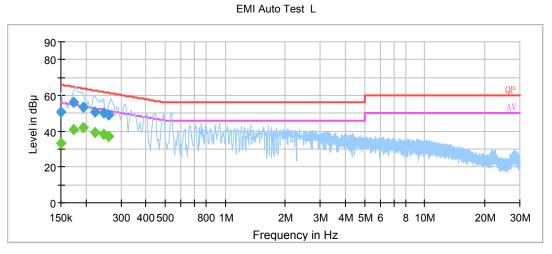
Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong on 2017-08-14.

EUT operation mode: Transmitting

FCC Part 15.247 Page 13 of 57



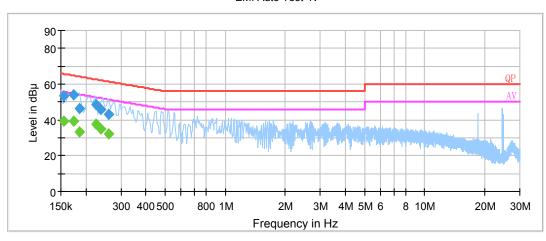
Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.150000	50.8	20.2	66.0	15.2	QP
0.173500	56.3	20.2	64.8	8.5	QP
0.194500	53.5	20.2	63.8	10.3	QP
0.221500	50.5	20.2	62.8	12.2	QP
0.245500	50.5	20.2	61.9	11.5	QP
0.261500	49.2	20.2	61.4	12.2	QP
0.150000	33.2	20.2	56.0	22.8	Ave.
0.173500	40.8	20.2	54.8	14.0	Ave.
0.194500	42.2	20.2	53.8	11.7	Ave.
0.221500	39.3	20.2	52.8	13.5	Ave.
0.245500	38.1	20.2	51.9	13.8	Ave.
0.261500	37.1	20.2	51.4	14.3	Ave.

FCC Part 15.247 Page 14 of 57

AC 120V/60 Hz, Neutral

EMI Auto Test N

Report No.: RSZ170809001-00B



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/Ave./QP)
0.154500	53.4	20.2	65.8	12.4	QP
0.173500	54.3	20.2	64.8	10.5	QP
0.185500	46.6	20.2	64.2	17.7	QP
0.225500	48.4	20.2	62.6	14.2	QP
0.237500	45.6	20.2	62.2	16.6	QP
0.261500	43.0	20.2	61.4	18.4	QP
0.154500	39.3	20.2	55.8	16.5	Ave.
0.173500	39.2	20.2	54.8	15.6	Ave.
0.185500	33.5	20.2	54.2	20.7	Ave.
0.225500	37.7	20.2	52.6	14.9	Ave.
0.237500	34.9	20.2	52.2	17.3	Ave.
0.261500	32.0	20.2	51.4	19.4	Ave.

- Correction Factor =LISN VDF (Voltage Division Factor) + Cable Loss + Transient Limiter Attenuation
 Corrected Amplitude = Reading + Correction Factor
 Margin = Limit Corrected Amplitude

FCC Part 15.247 Page 15 of 57

FCC §15.205, §15.209 & §15.247(d) – RADIATED EMISSIONS

Applicable Standard

FCC §15.205; §15.209; §15.247(d)

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.247 limits.

FCC Part 15.247 Page 16 of 57

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 CHz	1 MHz	3 MHz	/	PK
Above 1 GHz	1 MHz	10 Hz	/	Ave.

Report No.: RSZ170809001-00B

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode for frequency range of 30 MHz -1 GHz and peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

FCC Part 15.247 Page 17 of 57

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level complies with the limit if

$$L_{\rm m} + U_{(L{\rm m})} \le L_{\rm lim} + U_{\rm cispr}$$

Report No.: RSZ170809001-00B

In BACL, $U_{(Lm)}$ is less than U_{cispr} , if L_m is less than L_{lim} , it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong on 2017-08-14.

EUT operation mode: Transmitting

30 MHz - 25 GHz: (Scan with GFSK, $\pi/4$ -DQPSK, 8-DPSK mode, the worst case was 8-DPSK mode)

Frequency	Re	eceiver	Turntable	Rx An	itenna		Corrected		C Part //205/209
(MHz)	Reading (dBµV)	Detector (PK/QP/Ave.)	Degree	Height (m)	Polar (H/V)	Factor (dB)	Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
			Low Ch	annel (2	2402 M	Hz)			
215.98	29.87	QP	114	2.0	Н	-2.60	27.55	46	18.45
2402.00	51.04	PK	86	1.9	Н	33.92	84.96	/	/
2402.00	37.42	Ave.	86	1.9	Н	33.92	71.34	/	/
2402.00	65.83	PK	224	2.4	V	33.92	99.75	/	/
2402.00	51.32	Ave.	224	2.4	V	33.92	85.24	/	/
2353.60	27.31	PK	105	1.5	V	33.92	61.23	74	12.77
2353.60	13.56	Ave.	105	1.5	V	33.92	47.48	54	6.52
2361.78	27.46	PK	46	1.7	V	33.92	61.38	74	12.62
2361.78	13.69	Ave.	46	1.7	V	33.92	47.61	54	6.39
2488.19	27.34	PK	211	2.3	V	34.08	61.42	74	12.58
2488.19	13.57	Ave.	211	2.3	V	34.08	47.65	54	6.35
4804.00	52.92	PK	186	2.4	V	5.84	58.76	74	15.24
4804.00	40.02	Ave.	186	2.4	V	5.84	45.86	54	8.14
7206.00	49.19	PK	328	1.4	V	14.00	63.19	74	10.81
7206.00	38.34	Ave.	328	1.4	V	14.00	52.34	54	1.66

FCC Part 15.247 Page 18 of 57

Note:

Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor Corrected Amplitude = Corrected Factor + Reading

Ave.

Margin = Limit - Corrected. Amplitude

The other spurious emission which is 20dB to the limit was not recorded.

FCC Part 15.247 Page 19 of 57

FCC §15.247(a) (1)-CHANNEL SEPARATION TEST

Applicable Standard

Frequency hopping systems shall have hoping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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 provided the systems operate with an output power no greater than 125 mW.

Report No.: RSZ170809001-00B

Test Procedure

- Set the EUT in transmitting mode, maxhold the channel. Set the adjacent channel of the EUT and maxhold another trace.
- 3. Measure the channel separation.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong on 2017-08-15.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following table and plots

FCC Part 15.247 Page 20 of 57

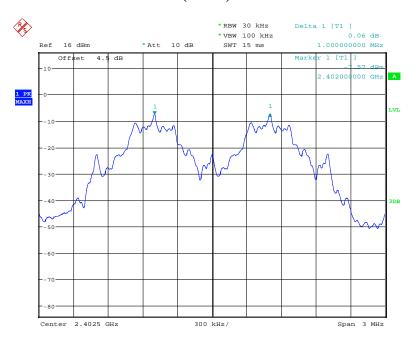
Mode	Channel	Frequency (MHz)	Channel Separation (MHz)	≥Limit (MHz)	Result
	Low	2402	1.000	0.699	Pass
	Adjacent	2403	1.000	0.099	rass
BDR	Middle	2441	1.000	0.600	D
(GFSK)	Adjacent	2442	1.000	0.699	Pass
	High	2480	1.000	0.600	D
	Adjacent	2479	1.000	0.699	Pass
	Low	2402	1.000	0.842	D
	Adjacent	2403	1.000		Pass
EDR	Middle	2441	1.005	0.889	Pass Pass
(π/4-DQPSK)	Adjacent	2442	1.005		
	High	2480			
	Adjacent	2479	1.005	0.842	
	Low	2402	1.000	0.050	D
	Adjacent	2403	1.000	0.859	Pass
EDR (8DPSK)	Middle	2441	1.005	0.863	D
	Adjacent	2442	1.005		Pass
	High	2480	1.005	0.050	D.
	Adjacent	2479	1.005	0.859	Pass

Note: Limit = 20 dB bandwidth *2/3

FCC Part 15.247 Page 21 of 57

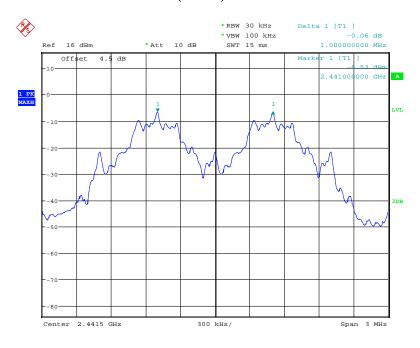
BDR (GFSK): Low Channel

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:17:55

BDR (GFSK): Middle Channel

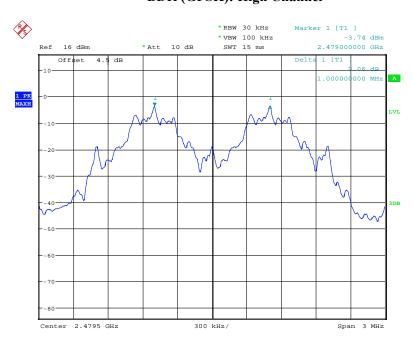


Date: 15.AUG.2017 17:36:00

FCC Part 15.247 Page 22 of 57

BDR (GFSK): High Channel

Report No.: RSZ170809001-00B



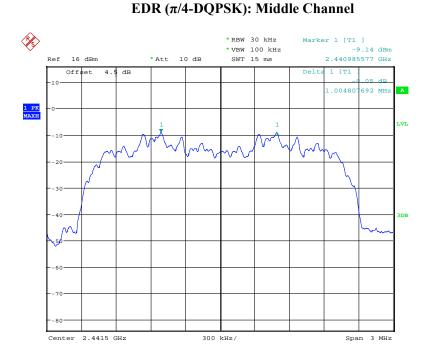
Date: 15.AUG.2017 17:39:17

EDR ($\pi/4$ -DQPSK): Low Channel



Date: 15.AUG.2017 17:21:01

FCC Part 15.247 Page 23 of 57



Date: 15.AUG.2017 17:34:30

EDR ($\pi/4$ -DQPSK): High Channel

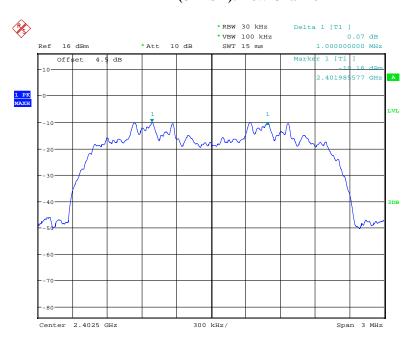


Date: 15.AUG.2017 17:40:31

FCC Part 15.247 Page 24 of 57

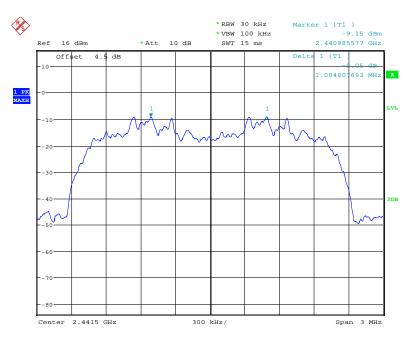
EDR (8DPSK): Low Channel

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:25:22

EDR (8DPSK): Middle Channel

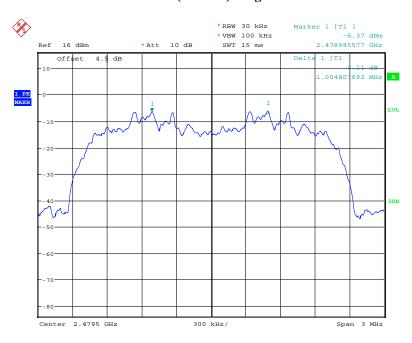


Date: 15.AUG.2017 17:32:30

FCC Part 15.247 Page 25 of 57

EDR (8DPSK): High Channel

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:43:34

FCC Part 15.247 Page 26 of 57

FCC $\S15.247(a)$ (1) – 20 dB EMISSION BANDWIDTH

Applicable Standard

Alternatively, 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, provided the systems operate with an output power no greater than 125 mW.

Report No.: RSZ170809001-00B

Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- 4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong on 2017-08-15.

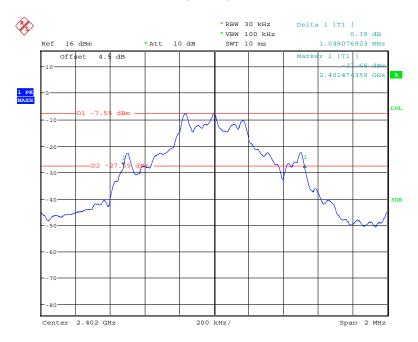
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following table and plots

FCC Part 15.247 Page 27 of 57

Mode	Channel	Frequency (MHz)	20 dB Emission Bandwidth (MHz)
	Low	2402	1.048
BDR (GFSK)	Middle	2441	1.048
(31312)	High	2480	1.048
EDR (π/4-DQPSK)	Low	2402	1.263
	Middle	2441	1.333
(10,12 (21312)	High	2480	1.263
EDR (8DPSK)	Low	2402	1.288
	Middle	2441	1.295
(021011)	High	2480	1.288

BDR (GFSK): Low Channel

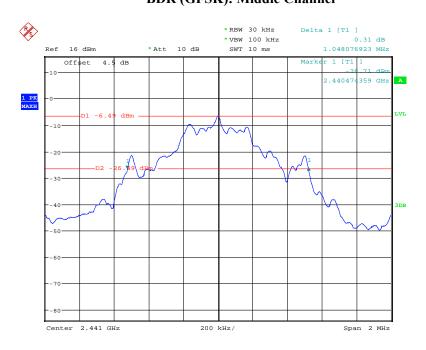


Date: 15.AUG.2017 17:06:43

FCC Part 15.247 Page 28 of 57

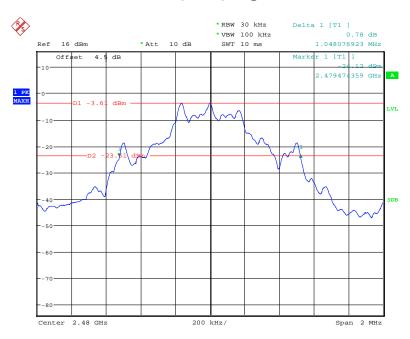
BDR (GFSK): Middle Channel

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:08:07

BDR (GFSK): High Channel

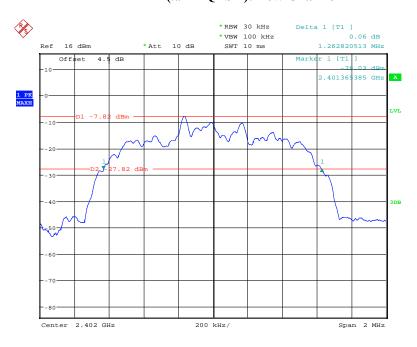


Date: 15.AUG.2017 17:15:08

FCC Part 15.247 Page 29 of 57

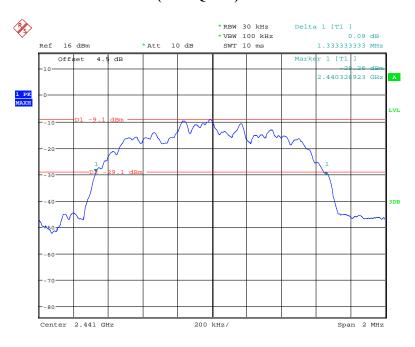
EDR ($\pi/4$ -DQPSK): Low Channel

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:05:07

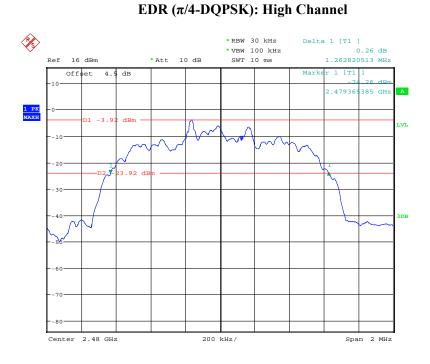
EDR ($\pi/4$ -DQPSK): Middle Channel



Date: 15.AUG.2017 17:09:41

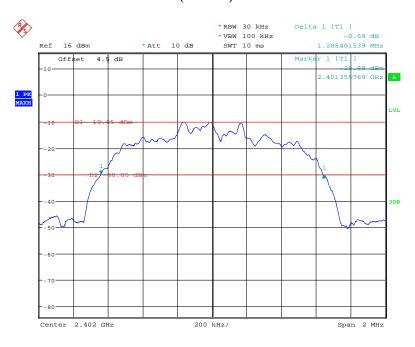
FCC Part 15.247 Page 30 of 57

enzhen) Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:13:43

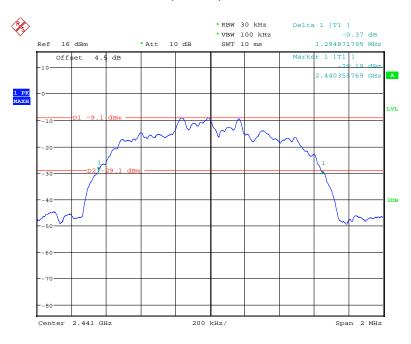
EDR (8DPSK): Low Channel



Date: 15.AUG.2017 17:02:53

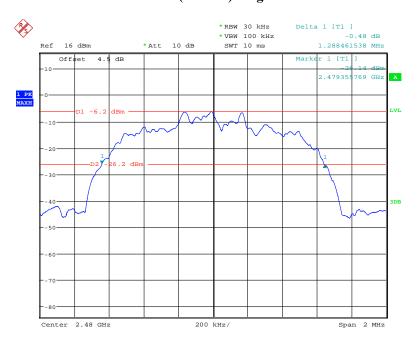
FCC Part 15.247 Page 31 of 57

EDR (8DPSK): Middle Channel



Date: 15.AUG.2017 17:11:06

EDR (8DPSK): High Channel



Date: 15.AUG.2017 17:12:28

FCC Part 15.247 Page 32 of 57

FCC §15.247(a) (1) (iii)-QUANTITY OF HOPPING CHANNEL TEST

Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Report No.: RSZ170809001-00B

Test Procedure

- 1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
- 2. Set the EUT in hopping mode from first channel to last.
- 3. By using the max-hold function record the quantity of the channel.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong on 2017-08-15.

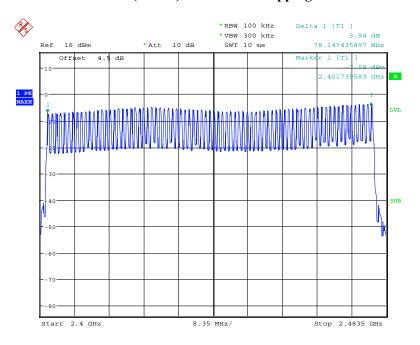
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following table and plots

FCC Part 15.247 Page 33 of 57

Mode	Frequency Range (MHz)	Number of Hopping Channel (CH)	Limit (CH)
BDR (GFSK)	2400-2483.5	79	≥15
EDR (π/4-DQPSK)	2400-2483.5	79	≥15
EDR (8DPSK)	2400-2483.5	79	≥15

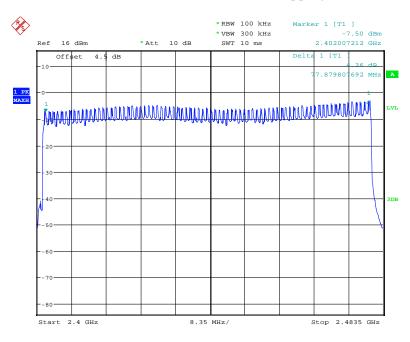
BDR (GFSK): Number of Hopping Channels



Date: 15.AUG.2017 16:43:37

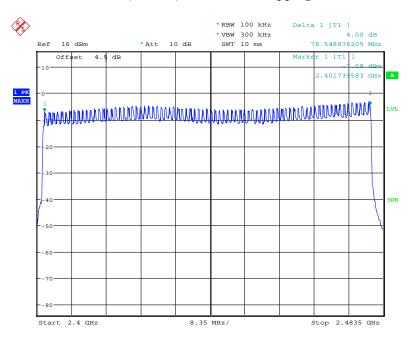
FCC Part 15.247 Page 34 of 57

EDR (π/4-DQPSK): Number of Hopping Channels



Date: 15.AUG.2017 16:47:10

EDR (8DPSK): Number of Hopping Channels



Date: 15.AUG.2017 16:49:20

FCC Part 15.247 Page 35 of 57

FCC §15.247(a) (1) (iii) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Report No.: RSZ170809001-00B

Test Procedure

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. The quantity of pulse was get from single sweep. In addition, the time of single pulses was tested.

Test Data

Environmental Conditions

Temperature:	25 ℃	
Relative Humidity:	56 %	
ATM Pressure:	101.0 kPa	

The testing was performed by Kiki Kong on 2017-08-15.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following table and plots

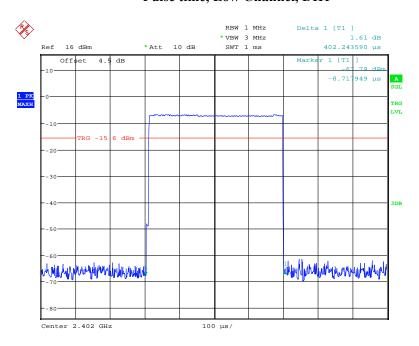
FCC Part 15.247 Page 36 of 57

Mode		Channel	Pulse Width (ms)	Dwell Time (S)	Limit (S)	Result	
		Low	0.402	0.129	0.4	Pass	
	DII 1	Middle	0.404	0.129	0.4	Pass	
	DH 1	High	0.403	0.129	0.4	Pass	
BDR (GFSK)		Note: DH1:Dwell time = Pulse time*(1600/2/79)*31.6S					
	DH 3	Low	1.678	0.268	0.4	Pass	
		Middle	1.673	0.268	0.4	Pass	
		High	1.668	0.267	0.4	Pass	
		Note: DH3:Dwell time = Pulse time*(1600/4/79)*31.6S					
		Low	2.923	0.312	0.4	Pass	
	DIL 5	Middle	2.931	0.313	0.4	Pass	
	DH 5	High	2.923	0.312	0.4	Pass	
		Note: DH5:Dwell time = Pulse time*(1600/6/79)*31.6S					
		Low	0.402	0.129	0.4	Pass	
	-	Middle	0.400	0.128	0.4	Pass	
	2DH 1	High	0.402	0.129	0.4	Pass	
	-	Note: 2DH1:Dwell time = Pulse time*(1600/2/79)*31.6S					
	2DH 3	Low	1.665	0.266	0.4	Pass	
EDR		Middle	1.665	0.266	0.4	Pass	
$(\pi/4\text{-DQPSK})$		High	1.660	0.266	0.4	Pass	
		Note: 2DH3:Dwell time = Pulse time*(1600/4/79)*31.6S					
	2DH 5	Low	2.915	0.311	0.4	Pass	
		Middle	2.923	0.312	0.4	Pass	
		High	2.907	0.310	0.4	Pass	
		Note:2DH5:Dwell time = Pulse time*(1600/6/79)*31.6S					
EDR (8DPSK)	3DH 1	Low	0.400	0.128	0.4	Pass	
		Middle	0.399	0.128	0.4	Pass	
		High	0.399	0.128	0.4	Pass	
		Note: 3DH1:Dwell time = Pulse time*(1600/2/79)*31.6S					
	3DH 3	Low	1.688		0.4	Pass	
		Middle	1.669	0.267	0.4	Pass	
		High	1.670	0.267	0.4	Pass	
		Note: 3DH3:Dwell time = Pulse time*(1600/4/79)*31.6S					
	3DH 5	Low	2.923	0.312	0.4	Pass	
		Middle	2.915	0.311	0.4	Pass	
		High	2.915	0.311	0.4	Pass	
		Note: 3DH5:Dwell time = Pulse time*(1600/6/79)*31.6S					

FCC Part 15.247 Page 37 of 57

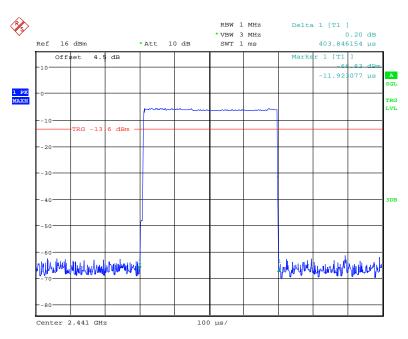
BDR (GFSK): Pulse time, Low Channel, DH1

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 18:08:32

Pulse time, Middle Channel, DH1

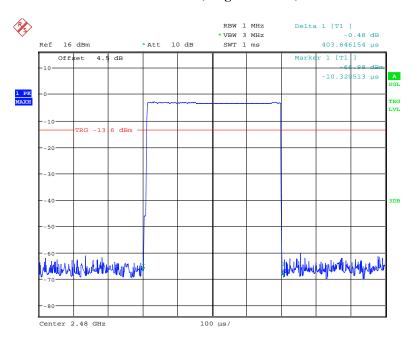


Date: 15.AUG.2017 18:11:09

FCC Part 15.247 Page 38 of 57

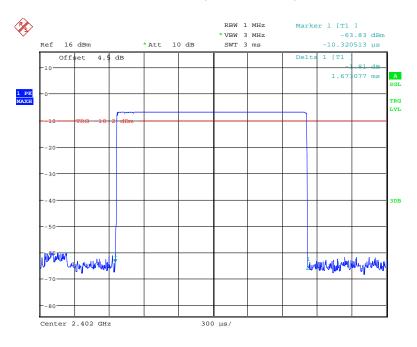
Pulse time, High Channel, DH1

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 18:12:59

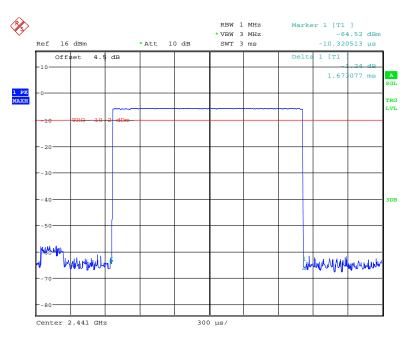
Pulse time, Low Channel, DH3



Date: 15.AUG.2017 18:17:20

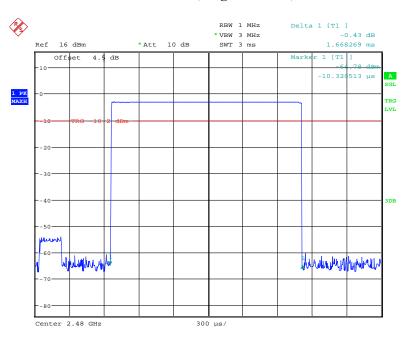
FCC Part 15.247 Page 39 of 57

Pulse time, Middle Channel, DH3



Date: 15.AUG.2017 18:16:47

Pulse time, High Channel, DH3

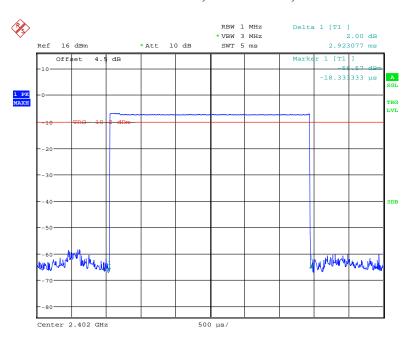


Date: 15.AUG.2017 18:15:56

FCC Part 15.247 Page 40 of 57

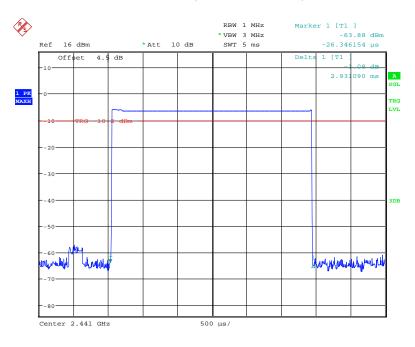
Pulse time, Low Channel, DH5

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 18:18:56

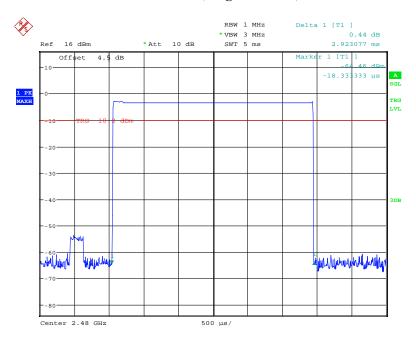
Pulse time, Middle Channel, DH5



Date: 15.AUG.2017 18:19:43

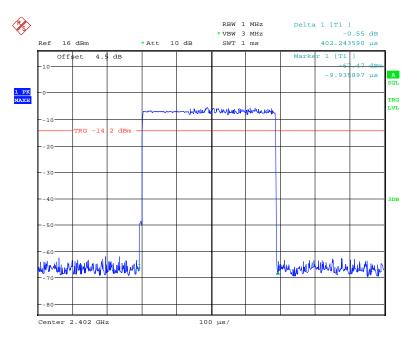
FCC Part 15.247 Page 41 of 57

Pulse time, High Channel, DH5



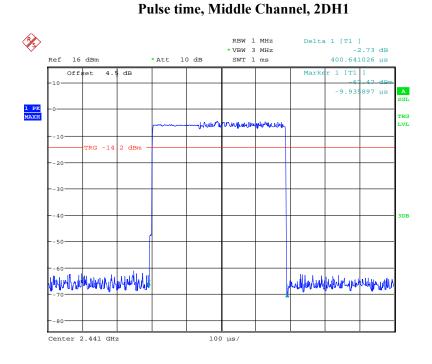
Date: 15.AUG.2017 18:20:20

EDR ($\pi/4$ -DQPSK): Pulse time, Low Channel, 2DH1



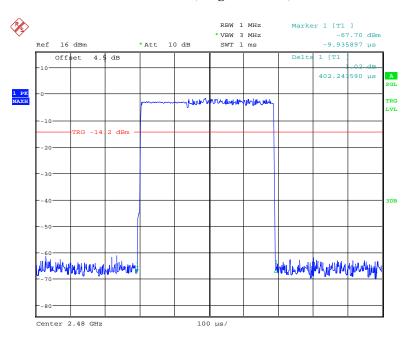
Date: 15.AUG.2017 18:35:02

FCC Part 15.247 Page 42 of 57



Date: 15.AUG.2017 18:37:37

Pulse time, High Channel, 2DH1

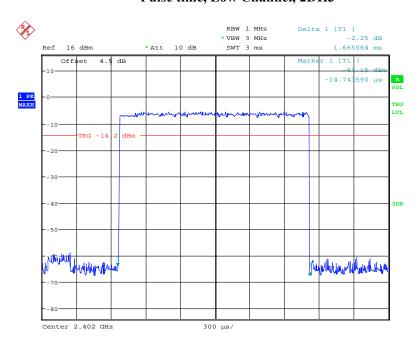


Date: 15.AUG.2017 18:38:22

FCC Part 15.247 Page 43 of 57

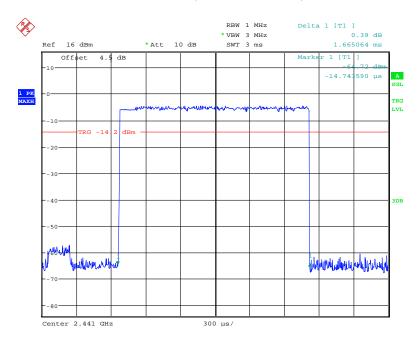
Pulse time, Low Channel, 2DH3

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 18:46:14

Pulse time, Middle Channel, 2DH3

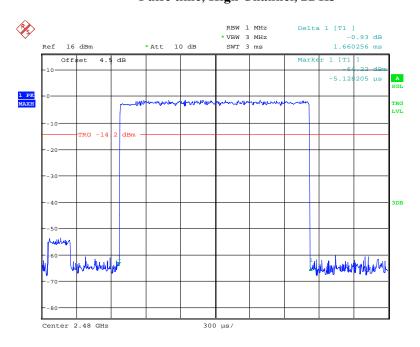


Date: 15.AUG.2017 18:45:41

FCC Part 15.247 Page 44 of 57

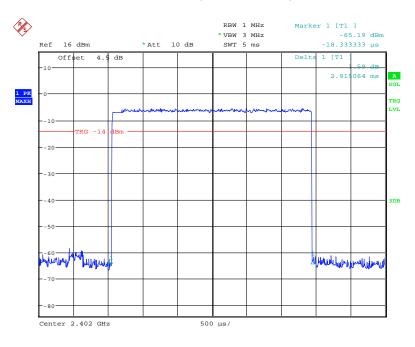
Pulse time, High Channel, 2DH3

Report No.: RSZ170809001-00B



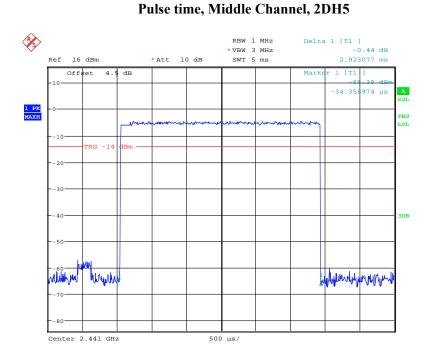
Date: 15.AUG.2017 18:45:03

Pulse time, Low Channel, 2DH5



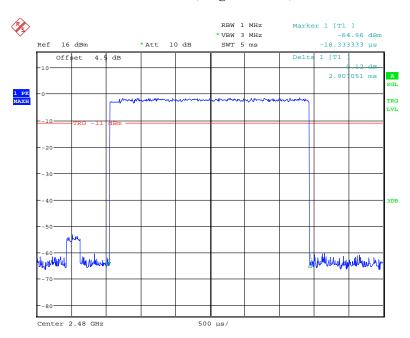
Date: 15.AUG.2017 18:24:35

FCC Part 15.247 Page 45 of 57



Date: 15.AUG.2017 18:23:59

Pulse time, High Channel, 2DH5

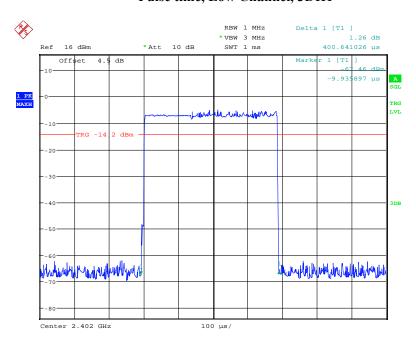


Date: 15.AUG.2017 18:22:40

FCC Part 15.247 Page 46 of 57

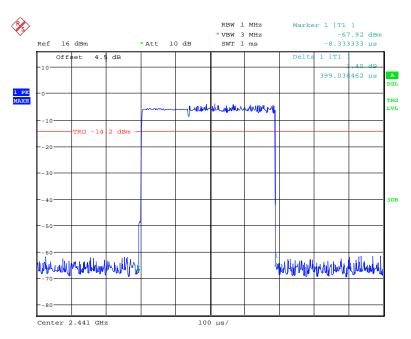
EDR (8DPSK): Pulse time, Low Channel, 3DH1

Report No.: RSZ170809001-00B



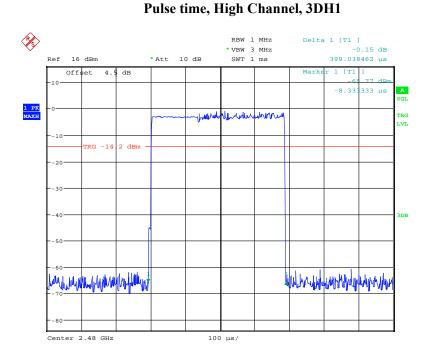
Date: 15.AUG.2017 18:41:26

Pulse time, Middle Channel, 3DH1



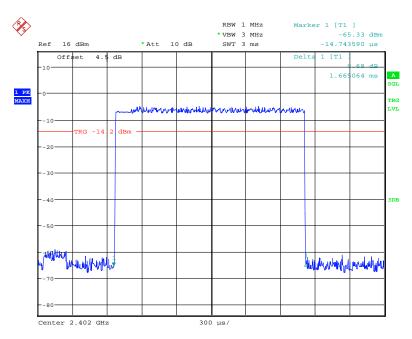
Date: 15.AUG.2017 18:40:53

FCC Part 15.247 Page 47 of 57



Date: 15.AUG.2017 18:40:21

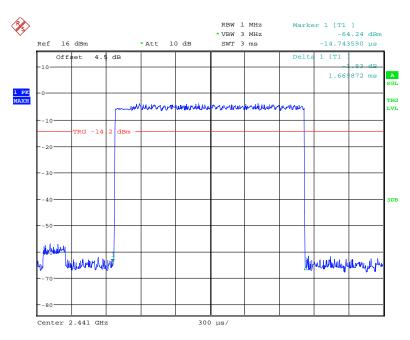
Pulse time, Low Channel, 3DH3



Date: 15.AUG.2017 18:42:40

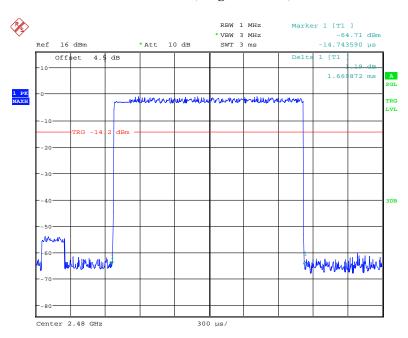
FCC Part 15.247 Page 48 of 57

Pulse time, Middle Channel, 3DH3



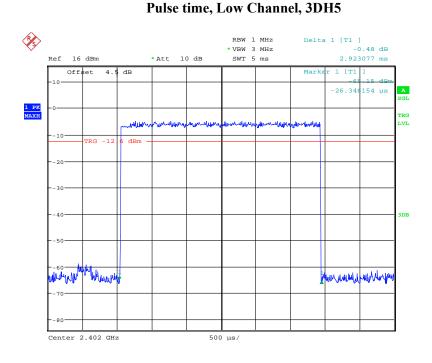
Date: 15.AUG.2017 18:43:20

Pulse time, High Channel, 3DH3



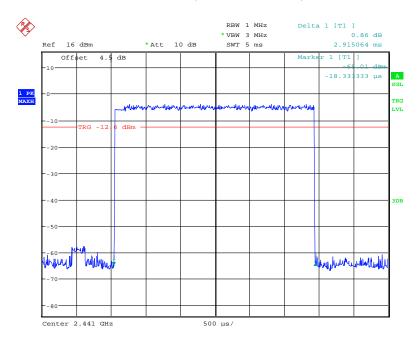
Date: 15.AUG.2017 18:43:57

FCC Part 15.247 Page 49 of 57



Date: 15.AUG.2017 18:25:53

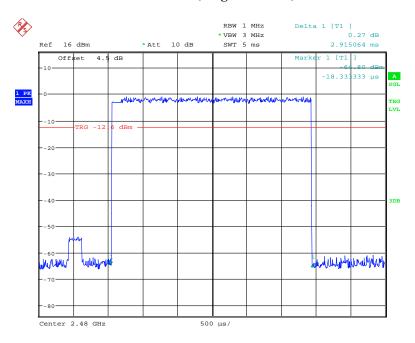
Pulse time, Middle Channel, 3DH5



Date: 15.AUG.2017 18:26:25

FCC Part 15.247 Page 50 of 57

Pulse time, High Channel, 3DH5



Date: 15.AUG.2017 18:26:45

FCC Part 15.247 Page 51 of 57

FCC §15.247(b) (1) - PEAK OUTPUT POWER MEASUREMENT

Applicable Standard

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. And for all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

Report No.: RSZ170809001-00B

Test Procedure

- 1. Place the EUT on a bench and set in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
- 3. Add a correction factor to the display.

Test Data

Environmental Conditions

Temperature:	25 ℃	
Relative Humidity:	56 %	
ATM Pressure:	101.0 kPa	

The testing was performed by Kiki Kong on 2017-08-15.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following table.

FCC Part 15.247 Page 52 of 57

Mode	Channel	Frequency	Peak Output Power		Limit	
1,1340		(MHz)	(dBm)	(mW)	(mW)	
BDR (GFSK)	Low	2402	-6.32	0.23	1000	
	Middle	2441	-5.30	0.30	1000	
	High	2480	-2.40	0.58	1000	
EDR (π/4-DQPSK)	Low	2402	-4.66	0.34	1000	
	Middle	2441	-3.72	0.42	1000	
	High	2480	-0.82	0.83	1000	
EDR (8DPSK)	Low	2402	-4.14	0.39	1000	
	Middle	2441	-3.13	0.49	1000	
	High	2480	-0.32	0.93	1000	

FCC Part 15.247 Page 53 of 57

FCC §15.247(d) - BAND EDGES TESTING

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Report No.: RSZ170809001-00B

Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to a EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.
- 3. Set RBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- 5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

Temperature:	23-25 ℃	
Relative Humidity:	52-56 %	
ATM Pressure:	100.0-101.0 kPa	

The testing was performed by Kiki Kong on 2017-08-15 and 2017-09-18.

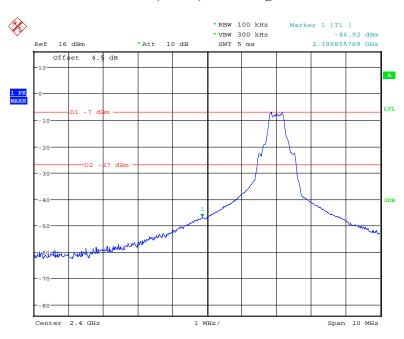
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to following plots.

FCC Part 15.247 Page 54 of 57

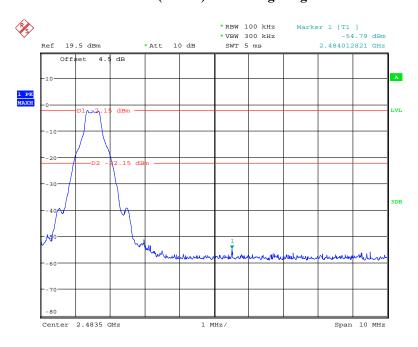
BDR (GFSK): Band Edge-Left Side

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:53:36

BDR (GFSK): Band Edge-Right Side

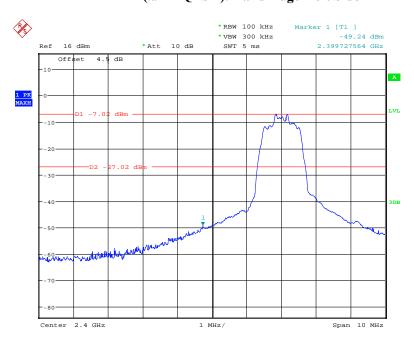


Date: 18.SEP.2017 15:52:21

FCC Part 15.247 Page 55 of 57

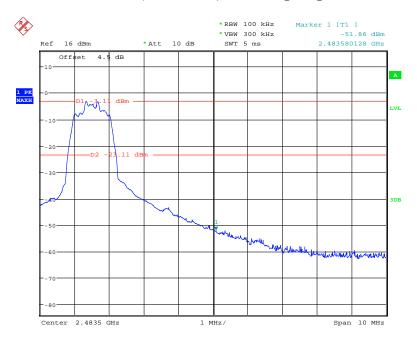
EDR (π /4-DQPSK): Band Edge-Left Side

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:52:04

EDR (π/4-DQPSK): Band Edge-Right Side

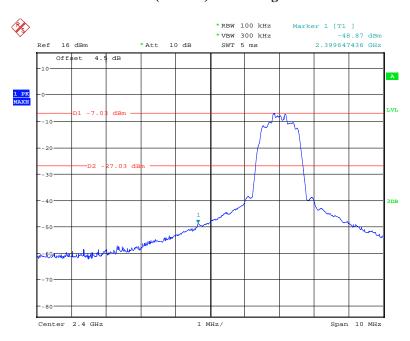


Date: 15.AUG.2017 17:56:20

FCC Part 15.247 Page 56 of 57

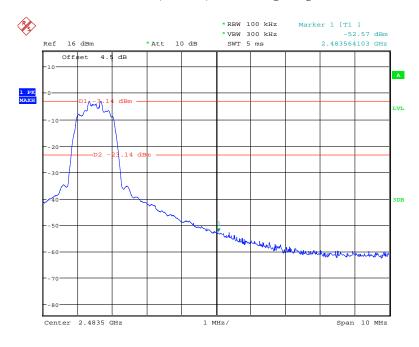
EDR (8DPSK): Band Edge-Left Side

Report No.: RSZ170809001-00B



Date: 15.AUG.2017 17:49:58

BDR (8DPSK): Band Edge-Right Side



Date: 15.AUG.2017 17:59:22

***** END OF REPORT *****

FCC Part 15.247 Page 57 of 57