RF TEST REPORT

The device described below is tested by Dongguan Nore Testing Center Co., Ltd. to determine the maximum emission levels emanating from the device, the severe levels which the device can endure and E.U.T.'s performance criterion. The test results, data evaluation, test procedures, and equipment of configurations shown in this report were made in accordance with the RED directive 2014/53/EU.

Applicant	:	SHENZHEN FENDA TECHNOLOGY CO., LTD.
Address	:	Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China
Manufacturer/Factory	:	SHENZHEN FENDA TECHNOLOGY CO., LTD.
Address	:	Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China
E.U.T.	:	2.0 Multimedia Speaker
Brand Name	:	F&D
Model No.	:	R60BT, R50BT, R60BT II, R60BT V2, R70, T-60X II, T-60 plus (For model difference refer to section 1)
Measurement Standard	:	ETSI EN 300328 V2.2.2: 2019
Date of Receiver	:	May 14, 2020
Date of Test	:	May 14, 2020 to June 10, 2020
Date of Report	:	July 07, 2020

This Test Report is Issued Under the Authority of :

Prepared by

Alina Guo / Engineer

Approved & Authorized Signer

Iori Fan / Authorized Signatory

This test report is for the customer shown above and their specific product only. This report applies to above tested sample only and shall not be reproduced in part without written approval of Dongguan Nore Testing Center Co., Ltd.

TEL: +86-769-22022444 FAX: +86-769-22022799 Web: www.ntc-c.com
Address: Building D, Gaosheng Science and Technology park, Hongtu road, Nancheng district, Dongguan city, Guangdong province, China

TABLE OF CONTENTS

Revision History of This Test Report

Report Number	Description	Issued Date
NTC2005084EV00	Initial Issue	2020-07-07

1. GENERAL INFORMATION

PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST

E.U.T.	:	2.0 Multimedia Speaker
Main Model Number	:	R60BT
Additional Model Number	:	R50BT, R60BT II, R60BT V2, R70, T-60X II, T-60 plus
Brand Name	:	F&D
Rating	:	AC 100-240V 50/60Hz
Adapter	:	N/A
Test Voltage	:	AC 230V 50Hz
Cable	:	AC Mains: 1.5m unshielded Speaker Line: 2.0m unshielded Audio Line 1 to 1: 1.60m unshielded
Operating Temperature Range	:	0°C to 35°C (Declaration by manufacturer)
HW	:	V1.0
SW	:	V1.0
Description of Model Difference	:	These models have the same circuit schematic, construction and critical components. The difference in model number due to trading purpose.
Note	:	According to the model difference, all tests were performed on model R60BT.

Technical parameters (Bluetooth function)

Bluetooth Version	:	BT5.0 (BDR+EDR)
Frequency Range	:	2402-2480MHz
Modulation	:	GFSK, π/4-DQPSK, 8DPSK
Number of Channel	:	79
Channel space	:	1MHz
Antenna Type	:	PCB antenna
Antenna Gain	:	0.5dBi (declared by manufacturer)

SUMMARY OF TEST RESULTS		
Section (ETSI EN 300328)	**Description of Test**	**TEST RESULT**
4.3.1.2/4.3.2.2	**RF Output Power**	**Compliant**
4.3.2.3	**Power Spectral Density (Modulations other than FHSS equipment)**	**N/A**
4.3.1.3/4.3.2.4	**Duty cycle, Tx-Sequence, Tx-gap (Non-adaptive equipment)**	**N/A** see note1
4.3.1.4	**Dwell time, Minimum Frequency Occupation & Hopping Sequence (FHSS equipment)**	**Compliant**
4.3.1.5	**Hopping Frequency Separation (FHSS equipment)**	**Compliant**
4.3.1.6/ 4.3.2.5	**Medium Utilisation (Non-adaptive equipment)**	**N/A** see note2
4.3.1.7/4.3.2.6	**Adaptivity**	**N/A** see note2
4.3.1.8/4.3.2.7	**Occupied Channel Bandwidth**	**Compliant**
4.3.1.9/4.3.2.8	**Transmitter unwanted emission in the OOB domain**	**Compliant**
4.3.1.10/4.3.2.9	**Transmitter unwanted emissions in the spurious domain**	**Compliant**
4.3.1.11/4.3.2.10	**Receiver spurious emissions**	**Compliant**
4.3.1.12/4.3.2.11	**Receiver Blocking**	**Compliant**
4.3.1.13/4.3.2.12	**Geo-location capability**	**N/A** see note 3

Note
1. These requirements apply to non-adaptive frequency hopping equipment or to adaptive frequency hopping equipment operating in a non-adaptive mode. This EUT only works in adaptive mode, these tests are not applicable this EUT.

2. These requirements do not apply for equipment with a maximum declared RF Output power of less than 10dBm EIRP or for equipment when operating in a mode where the RF Output power is less than 10dBm EIRP.

3. Only for equipment with geo-location capability

2. DESCRIPTION OF TEST MODES AND TEST FREQUENCIES

The EUT has been tested under Normal Operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed. All data rate and modulation type were tested, only the worst-case record in this report.

3. TEST FREQUENCIES AND SOFTWARE

Channel	Frequency MHz
0	2402
39	2441
78	2480

Test Item	Software	Description
Conducted RF Testing and Radiated testing	BT FCC Tool V2.2.1	Set the EUT to different modulation and channel

4. OBJECTIVE

Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating in the 2.4GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the RED Directive.
The objective is to determine compliance with ETSI EN 300328 V2.2.2 (2019-07).

5. TEST METHODOLOGY

All measurements contained in this report were conducted with ETSI 300328 V2.2.2: 2019.

6. TEST FACILITY

Site Description

EMC Lab : Listed by CNAS, August 13, 2018
The certificate is valid until August 13, 2024
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01
The Certificate Registration Number is L5795.

Listed by A2LA, November 01, 2017
The certificate is valid until December 31, 2021
The Laboratory has been assessed and proved to be in compliance with ISO17025
The Certificate Registration Number is 4429.01

Listed by FCC, November 06, 2017
The Designation Number is CN1214
Test Firm Registration Number: 907417

Listed by Industry Canada, June 08, 2017
The Certificate Registration Number. Is 46405-974343A

Name of Firm : Dongguan Nore Testing Center Co., Ltd.
(Dongguan NTC Co., Ltd.)

Site Location : Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

7. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Occupied Channel Bandwidth	±1.42 x10^{-4}%
RF output power, conducted	±1.06dB
Power Spectral Density, conducted	±1.06dB
Unwanted Emissions, conducted	±2.52dB
All emissions, radiated	±4.60dB(Below 1GHz) ±5.02dB(Above 1GHz)
Temperature	±0.8℃
Humidity	±3.2%
DC and low frequency voltages	±0.1%
Time	±5%
Duty cycle	±5%

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

8. SUPPORT EQUIPMENT

Notebook PC	:	Manufacturer: IBM Corporation M/N: R50e S/N: L3-HZNGO P/N: 1834KDC
Adapter	:	Manufacturer: IBM Corporation M/N: 08K8210 Input: AC100-240V 50/60Hz 0.5-1.0A Output: DC 16V 4.5A

9. DEVIATIONS AND ABNORMALITIES FROM STANDARD CONDITIONS

No additions, deviations and exclusions from the standard.

10. RF OUTPUT POWER

Limits

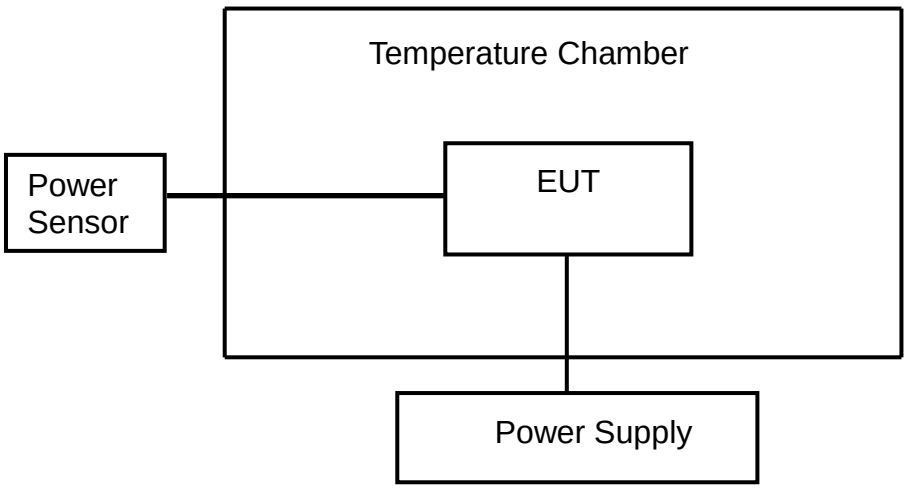
Frequency Band	Limit
2400 ~ 2483.5 MHz	Equivalent isotropic radiated power (e.i.r.p.) ≤20 dBm

Test Method

1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.2.2.1 for conducted measurement method.
2. The measurements shall be performed at both normal environmental conditions and at The extremes of the operating temperature range.

Test Configuration

Temperature and Voltage Measurement



Test Result

Pass.

Please refer to following data tables.

Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Antenna Gain: 0.5 dBi		Cable Loss= 1.5dB
Number of Burst >20		
Test Mode: TX (Hopping)		

GFSK				
Temperature (℃)	Power Supplied	Reading dBm	EIRP dBm	Limit dBm
25	AC 230V	1.82	3.82	20
0	AC 230V	1.42	3.42	20
35	AC 230V	1.54	3.54	20
8DPSK				
Temperature (℃)	Power Supplied	Reading dBm	EIRP dBm	Limit dBm
25	AC 230V	2.34	4.34	20
0	AC 230V	1.87	3.87	20
35	AC 230V	1.84	3.84	20

Sample of data calculate:
EIRP(dBm)= Reading Output Power(dBm)+Cable Loss(dB)+Antenna Gain(dBi)

11.DWELL TIME, MINIMUM FREQUENCY OCCUPATION AND HOPPING SEQUENCE

Limits

Dwell Time	
Test Condition	**Limit**
Non-adaptive frequency hopping systems	≤ 15 ms
Adaptive frequency hopping systems	≤ 400 ms

Minimum Frequency Occupation Time	
Test Condition	**Limit**
Non-adaptive frequency hopping systems	Equal to one dwell time within a period not exceeding four times the product of the dwell time per hop and the number of hopping frequencies in use.
Adaptive frequency hopping systems	

Hopping sequence(s)	
Test Condition	**Limit**
Non-adaptive frequency hopping systems	≥15 hopping frequencies or 15/minimum Hopping Frequency Separation in MHz , whichever is the greater.
Adaptive frequency hopping systems	Operating frequency band ≥58.45MHz (Operating over a minimum of 70 % of the operating in the band 2,4 GHz to 2,4835 GHz)
	≥15 hopping frequencies or 15/minimum Hopping Frequency Separation in MHz , whichever is the greater.

Test Method

1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.4.2.1 for conducted measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Test Result

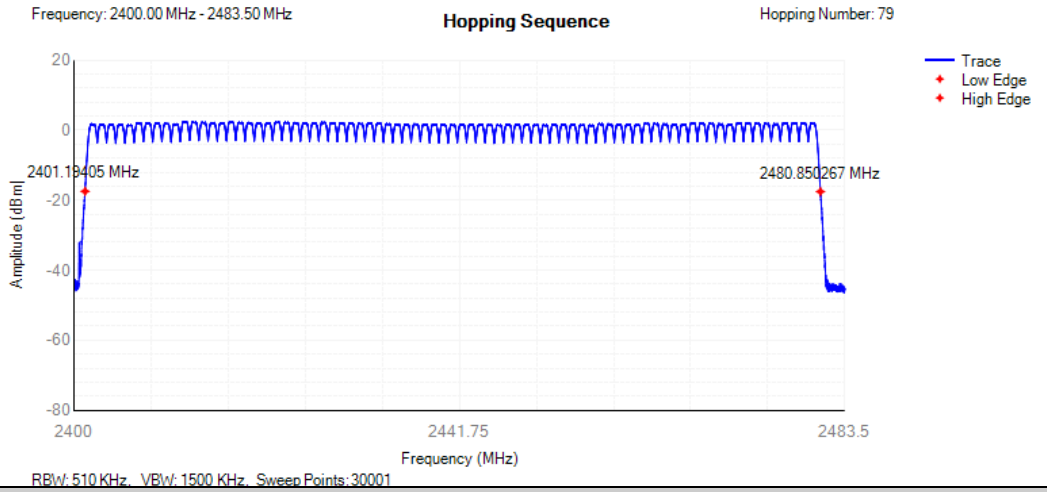
Pass.

Please refer to following data tables and test plots.

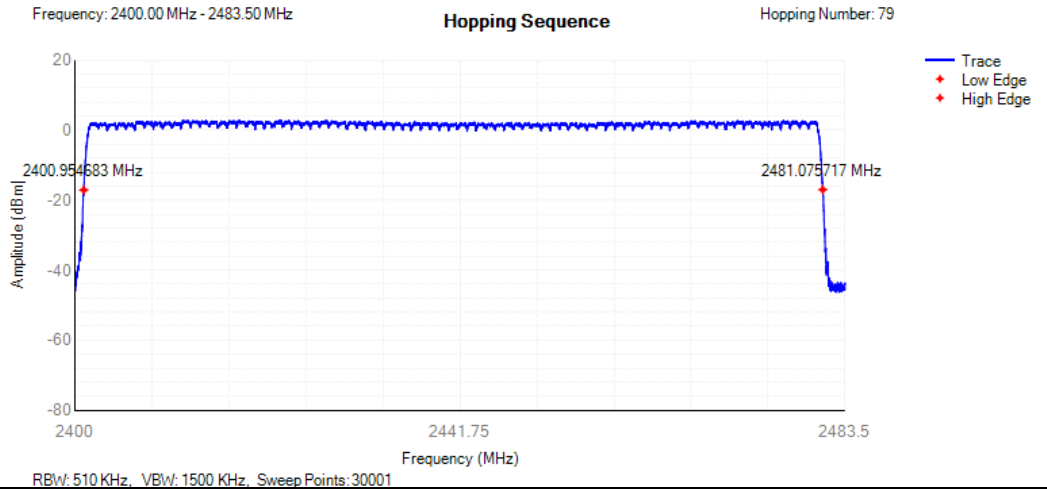
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX(Hopping)		

Hopping Sequence

Hopping Channels	Hopping Channels Limits	Min. Hopping Range (%)	Min. Hopping Range Limit(%)	Result
GFSK				
79	15	95.39	70.00%	PASS



8DPSK				
79	15	95.95	70.00%	PASS



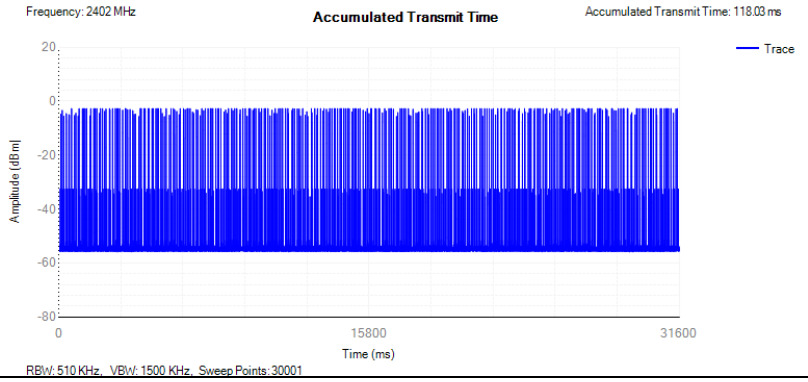
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX(Hopping)		

Dwell Time

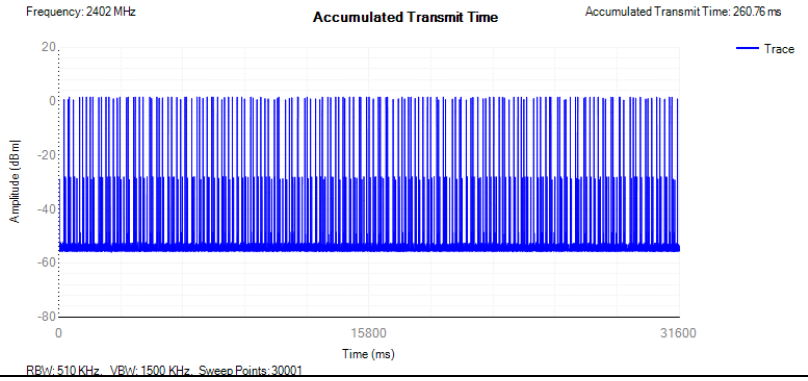
Mode	Number of Hopping Channel	Number of transmission in a period (channel number *0.4sec Period (Sec)	Dwell Time	Limit (ms)	Result
GFSK					
DH1	79	31.6	118.03	400	PASS
DH3	79	31.6	260.76	400	PASS
DH5	79	31.6	309.23	400	PASS

Test Photo

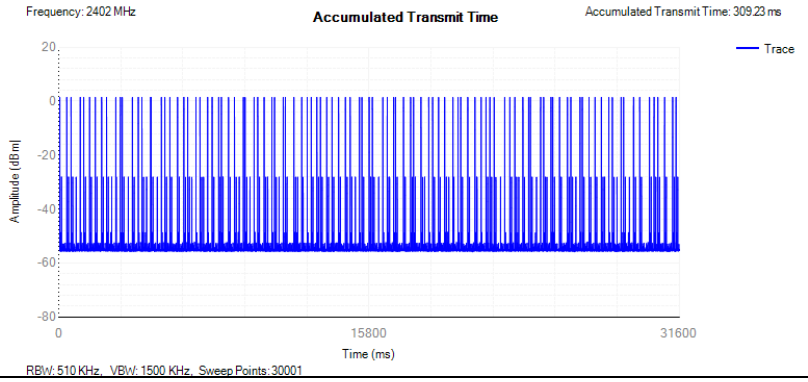
DH1



DH3



DH5



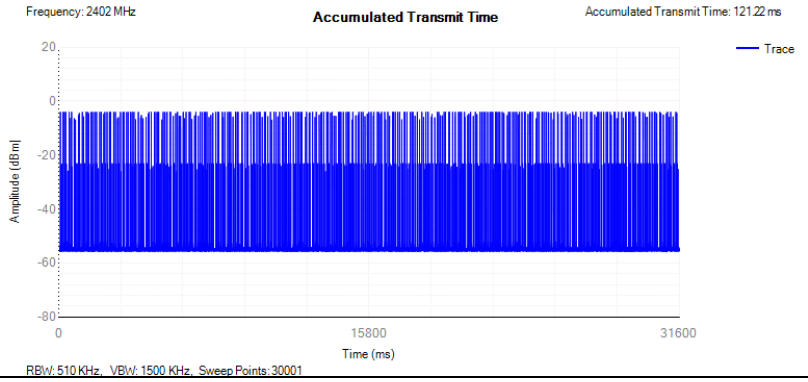
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX(Hopping)		

Dwell Time

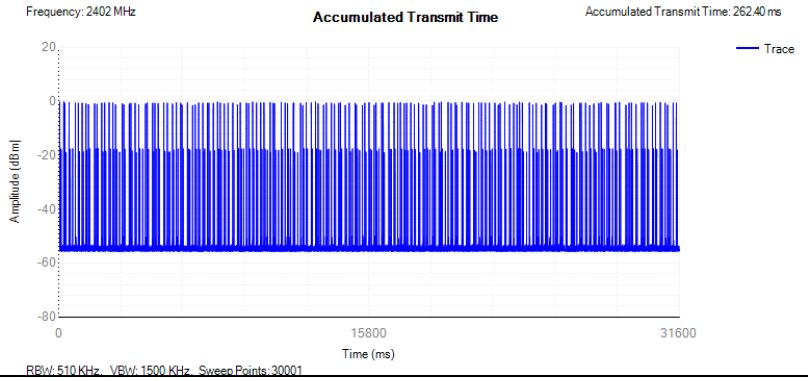
Mode	Number of Hopping Channel	Number of transmission in a period (channel number *0.4sec Period (Sec)	Dwell Time	Limit (ms)	Result
8DPSK					
3-DH1	79	31.6	121.22	400	PASS
3-DH3	79	31.6	262.40	400	PASS
3-DH5	79	31.6	308.16	400	PASS

Test Photo

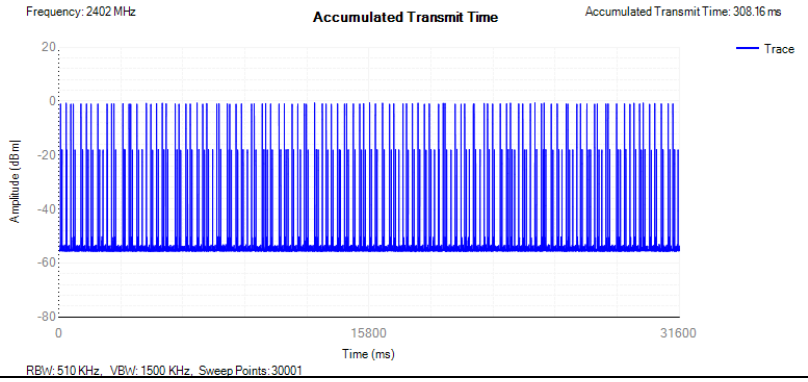
3-DH1



3-DH3



3-DH5



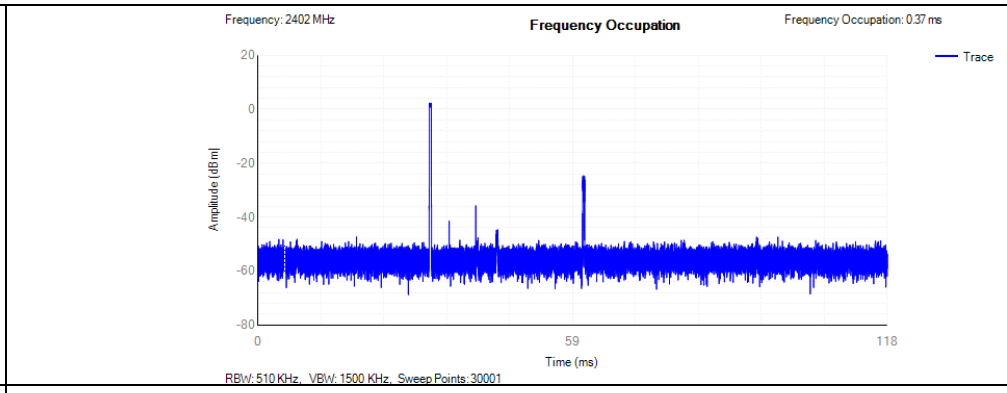
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX(Hopping)		

Minimum Frequency Occupation

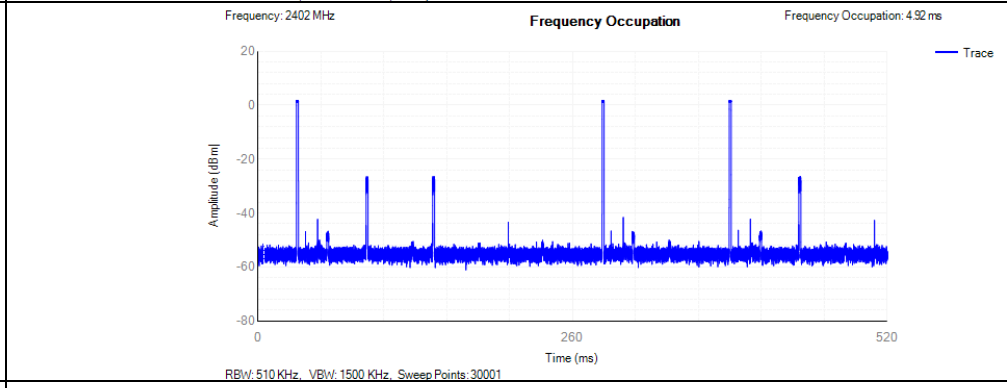
Mode	Number of Hopping Channel	Number of times (hopping frequency of hopping sequence)	Minimum Limit	Result (Pass/Fail)
GFSK				
DH1	79	1	≥1	PASS
DH3	79	3	≥1	PASS
DH5	79	3	≥1	PASS

Test Photo

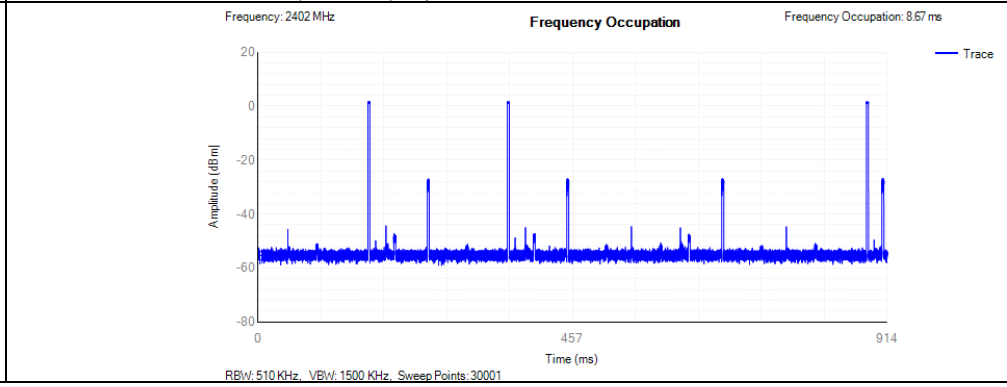
DH1



DH3



DH5



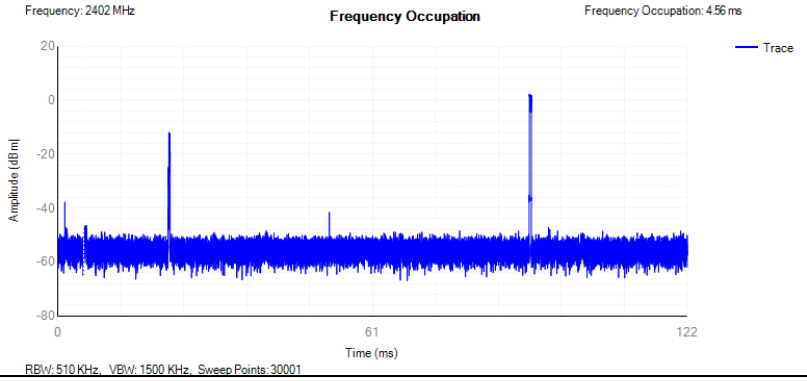
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX(Hopping)		

Minimum Frequency Occupation

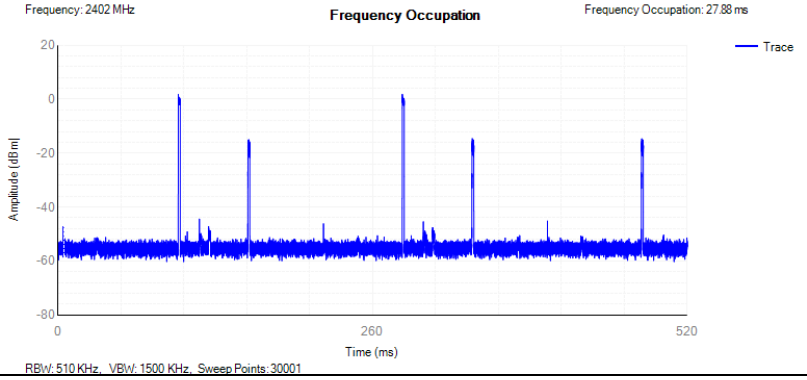
Mode	Number of Hopping Channel	Number of times (hopping frequency of hopping sequence)	Minimum Limit	Result (Pass/Fail)
8DPSK				
3-DH1	79	1	≥1	PASS
3-DH3	79	2	≥1	PASS
3-DH5	79	3	≥1	PASS

Test Photo

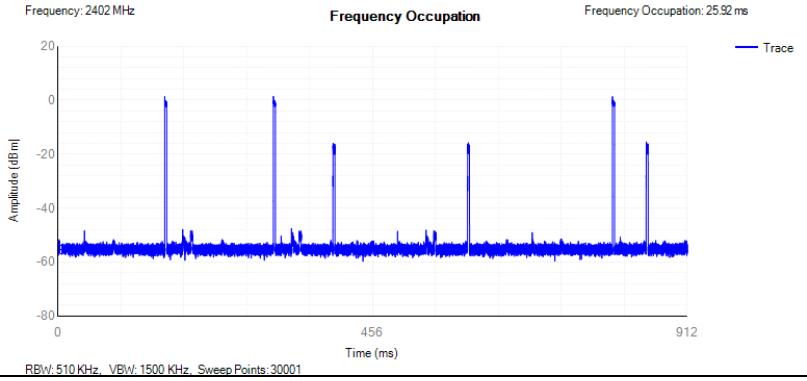
3-DH1



3-DH3



3-DH5



12. OCCUPIED CHANNEL BANDWIDTH

Limits

Condition	Limit
All types of equipment	Shall fall completely within the band 2400 to 2483.5 MHz
For non-adaptive using wide band modulations other than FHSS system and e.i.r.p > 10dBm	Less than 20MHz
For non-adaptive Frequency Hopping system and e.i.r.p > 10dBm	Less than 5MHz

Test Method

1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.7.2.1 for conducted measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Test Result

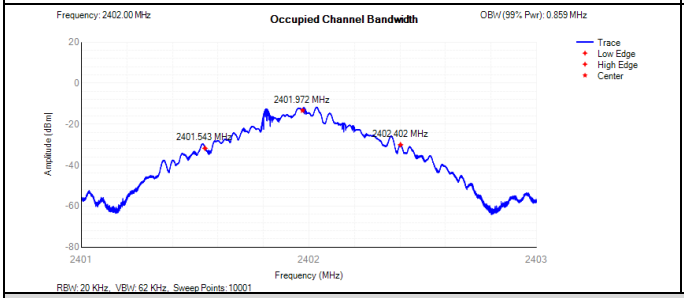
Pass.

Please refer to following data tables and test plots.

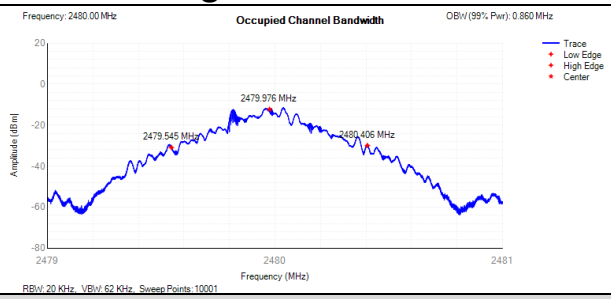
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX		

Channel frequency (MHz)	99% Bandwidth (KHz)	FL at 99% BW (MHz)	FH at 99% BW (MHz)	Limit	Result
GFSK					
2402	859	2401.543	2402.402	FL > 2.4 GHz and FH < 2.4835 GHz	Pass
2480	860	2479.545	2480.406		Pass

Lowest Channel

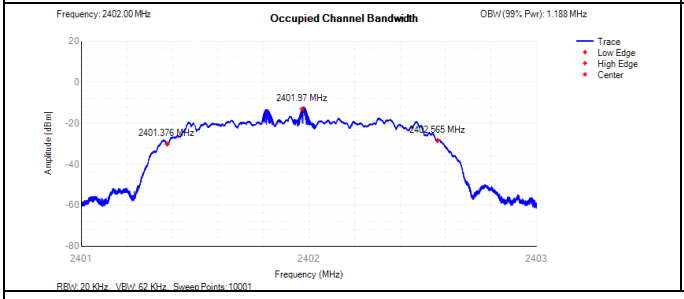


Highest Channel

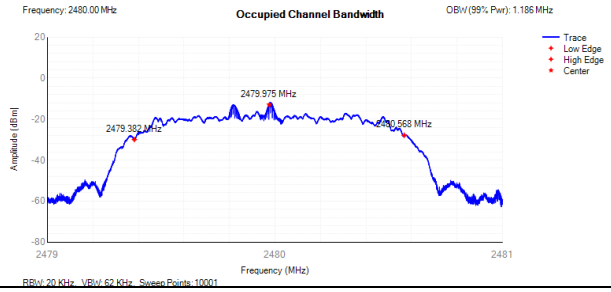


8DPSK					
2402	1188	2401.376	2402.565	FL > 2.4 GHz and FH < 2.4835 GHz	Pass
2480	1186	2479.382	2480.568		Pass

Lowest Channel



Highest Channel



Note: FL is the lowest frequency of the 99% occupied bandwidth of power envelope.
FH is the highest frequency of the 99% occupied bandwidth of power envelope.

13. HOPPING FREQUENCY SEPARATION

Limits

Condition	Limit
Nom-adaptive frequency hopping systems	The minimum Hopping Frequency Separation shall be equal to Occupied Channel Bandwidth of a single hop, with a minimum separation of 100 kHz.
Adaptive frequency hopping systems	The minimum Hopping Frequency Separation shall be 100 kHz.

Test Method

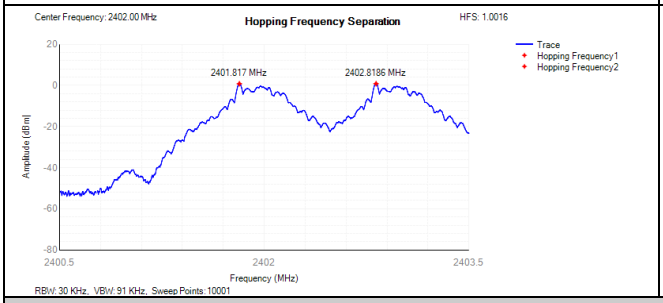
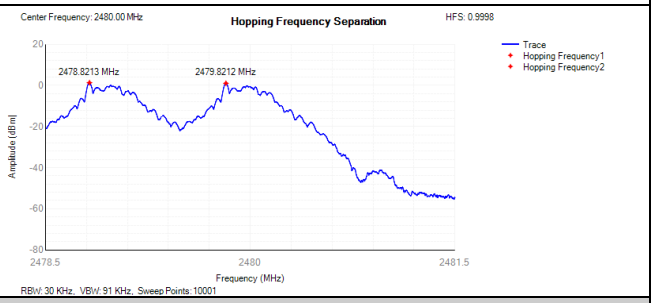
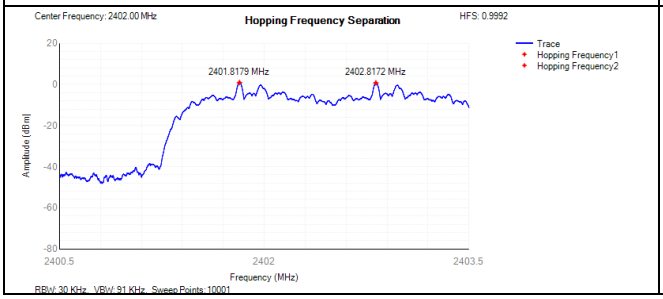
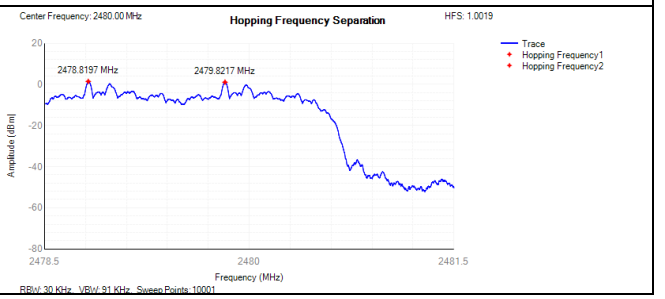
1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.5.2.1 for conducted measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Test Result

Pass.

Please refer to following data tables and test plots.

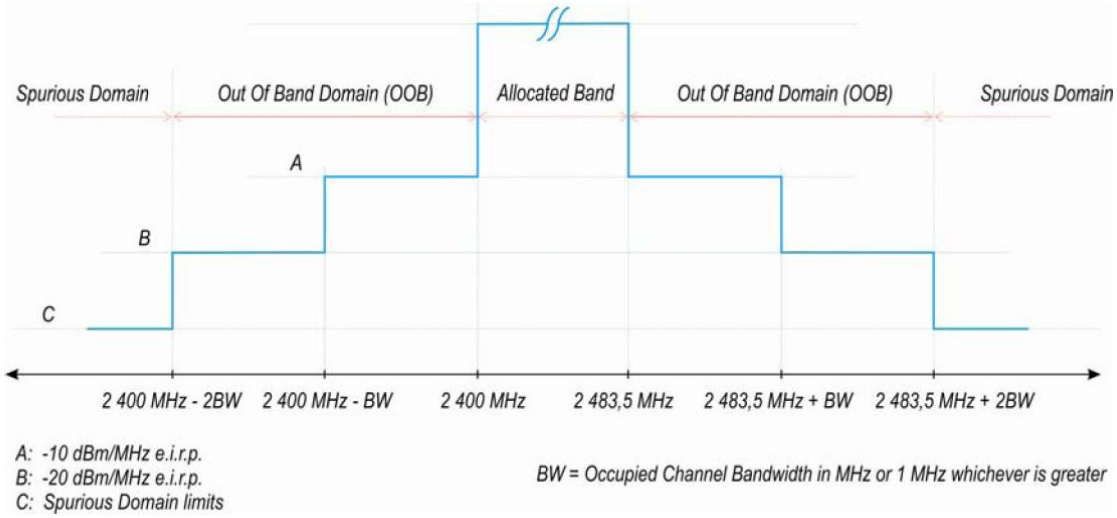
Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020	
Test Result: PASS		Test By: Lee	
Test Mode: TX			
Channel frequency (MHz)	**Channel Separation (KHz)**	**Limit (MHz) Minimum**	**Result**
GFSK			
2402	1001.6	0.1	Pass
2480	999.8	0.1	Pass
Lowest Channel		Highest Channel	
			
8DPSK			
2402	999.2	0.1	Pass
2480	1001.9	0.1	Pass
Lowest Channel		Highest Channel	
			

14. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF BAND DOMAIN

Limits

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask

Transmit mask

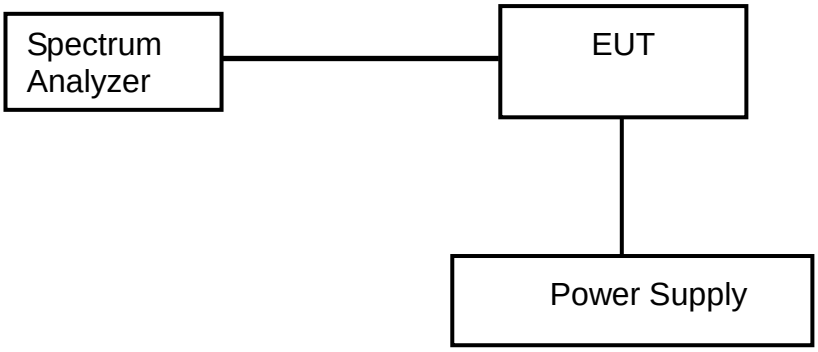


Test Method

1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.8.2.1 for conducted measurement method.
2. The measurements shall be performed at both normal environmental conditions.

Test Configuration

Temperature and Voltage Measurement



Test Result

Pass.

Please refer to following data tables.

Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX		

Condition	2400-BW~2400 / 2483.5+BW ~2483.5 (dBm/MHz)	Limit (dBm/MHz)	2400-2*BW~2400-BW / 2483.5+2*BW ~2483.5+BW (dBm/MHz)	Limit (dBm/MHz)	Result
GFSK (Hopping)					
AC 230V	-55.70	-10	-60.64	-20	PASS
8DPSK (Hopping)					
AC 230V	-53.33	-10	-58.44	-20	PASS

15. TRANSIMITTER SPURIOUS EMISSIONS AND RECEIVER SPURIOUS EMISSIONS

Limits:

Limits for EN 300 328: Clause 4.3.1.10.3, Table 4: Transmitter limits for spurious emissions

Frequency Range	Maximum power	Bandwidth
30 MHz to 47MHz	-36 dBm	100KHz
47 MHz to 74MHz	-54 dBm	100KHz
74 MHz to 87.5MHz	-36 dBm	100KHz
87.5 MHz to 118MHz	-54 dBm	100KHz
118 MHz to 174MHz	-36 dBm	100KHz
174 MHz to 230MHz	-54 dBm	100KHz
230 MHz to 470MHz	-36 dBm	100KHz
470 MHz to 694MHz	-54 dBm	100KHz
694 MHz to 1GHz	-36 dBm	100KHz
1GHz to 12.75GHz	-30 dBm	1MHz

Limits for EN 300 328: Clause 4.3.1.11.3, Table 5: Spurious emission limits for receivers

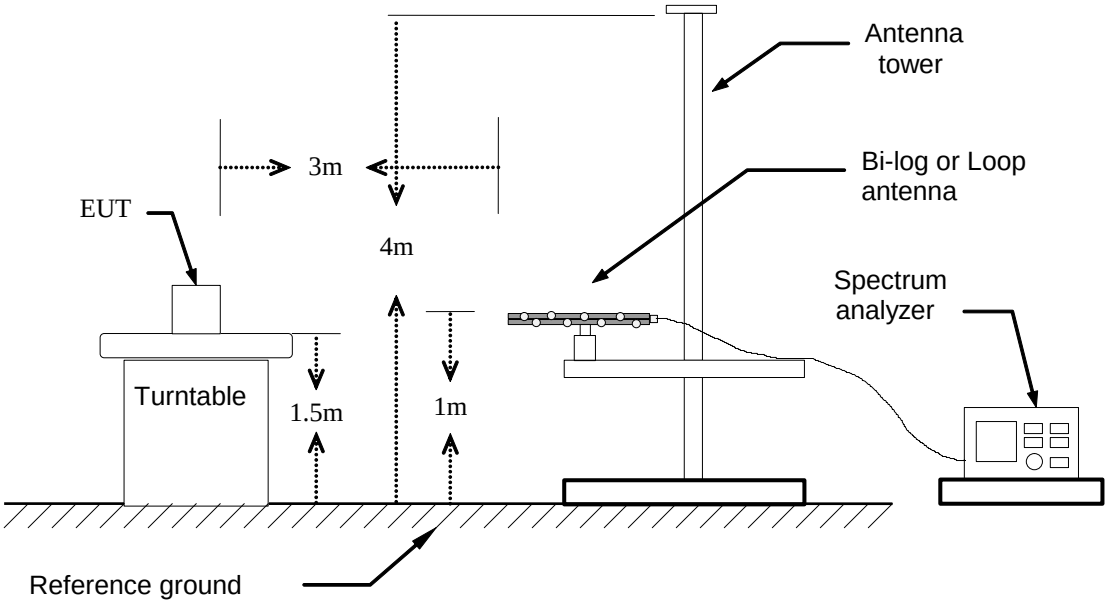
Frequency Range	Maximum power	Bandwidth
30 MHz to 1GHz	-57 dBm	100KHz
1GHz to 12.75GHz	-47 dBm	1MHz

Test Method

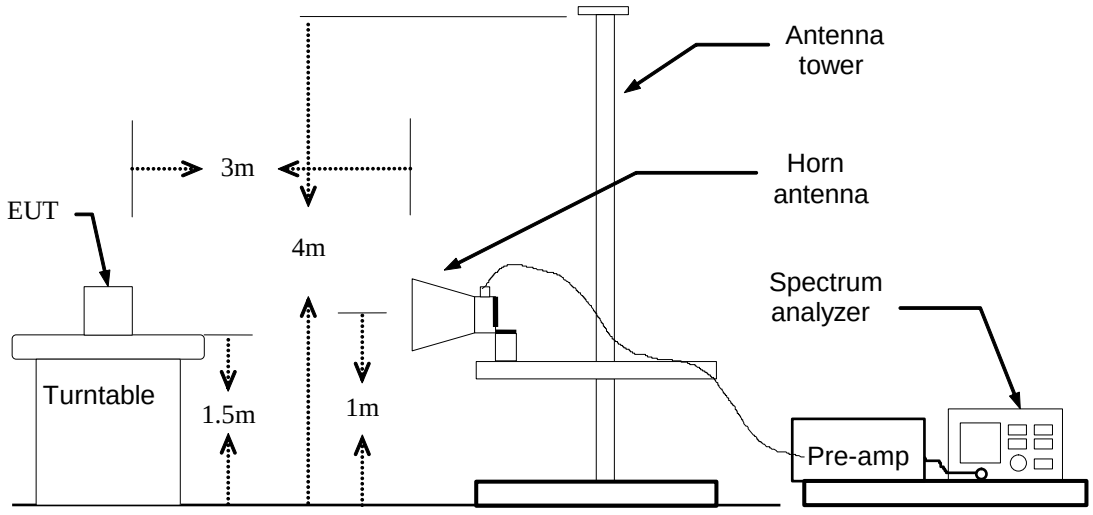
1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.9.2.2 and ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.10.2.2 for radiated measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Below 1GHz



Above 1GHz



Test Result

Pass.

Please refer to following data tables (The worst case: 8DPSK)

Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: TX		

Below 1GHz Low Channel				
Frequency (MHz)	**Antenna Polarization**	**Emission level (dBm)**	**Limit (dBm)**	**Margin (dB)**
54.2500	Vertical	-64.31	-54.00	-10.31
103.7200	Vertical	-73.72	-54.00	-19.72

53.2800	Horizontal	-69.21	-54.00	-15.21
103.7200	Horizontal	-69.45	-54.00	-15.45
Below 1GHz High Channel				
60.0700	Vertical	-64.81	-54.00	-10.81
103.7200	Vertical	-71.89	-54.00	-17.89

590.6599	Horizontal	-68.98	-54.00	-14.98
763.3200	Horizontal	-67.14	-36.00	-31.14
Above 1GHz Low Channel				
4804	Vertical	-39.81	-30.00	-9.81
7206	Vertical	-40.17	-30.00	-10.17

4804	Horizontal	-42.09	-30.00	-12.09
7206	Horizontal	-40.48	-30.00	-10.48
Above 1GHz High Channel				
4960	Vertical	-38.43	-30.00	-8.43
7440	Vertical	-39.70	-30.00	-9.70

4960	Horizontal	-40.29	-30.00	-10.29
7440	Horizontal	-39.56	-30.00	-9.56

Note:
1. Emission Level (dBm) = Reading level (dBm)+Correction Factor (dB)
2. Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
3. The Test frequency range is 30MHz to12.75GHz.

Humidity: 50 %	Temperature : 23 ℃	Test Date: May 21, 2020
Test Result: PASS		Test By: Lee
Test Mode: RX		

Below 1GHz Low Channel				
Frequency (MHz)	**Antenna** Polarization	**Emission level (dBm)**	**Limit (dBm)**	**Margin (dB)**
30.0000	Vertical	-61.23	-57.00	-4.23
36.7900	Vertical	-63.13	-57.00	-6.13

572.2300	Horizontal	-68.70	-57.00	-11.70
896.2100	Horizontal	-64.35	-57.00	-7.35
Below 1GHz High Channel				
36.7900	Vertical	-60.15	-57.00	-3.15
53.2800	Vertical	-65.08	-57.00	-8.08

857.4100	Horizontal	-64.75	-57.00	-7.75
929.1900	Horizontal	-64.35	-57.00	-7.35
Above 1GHz Low Channel				
2402	Vertical	-61.22	-47.00	-14.22

2402	Horizontal	-60.33	-47.00	-13.33
Above 1GHz High Channel				
2480	Vertical	-61.41	-47.00	-14.41

2480	Horizontal	-61.20	-47.00	-14.20

Note:
1. Emission Level (dBm) = Reading level (dBm)+Correction Factor (dB)
2. Data of measurement within this frequency range shown " ---" in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits.
3. The Test frequency range is 30MHz to12.75GHz.

16. RECEIVER BLOCKING

Limits

Adaptive equipment using wide band modulations, shall comply with the requirements defined in clauses 4.3.2.11.3 and clauses 4.3.2.11.4 in the presence of a blocking signal with characteristics as below table.

(1) Receiver Blocking parameters for Receiver Category 1 equipment

Receiver Category 1 Equipment			
Wanted signal mean power from companion device (dBm)(See note 1 and 4)	**Blocking Signal Frequency (MHz)**	**Blocking Signal Power (dBm) (See note 4)**	**Type of blocking signal**
(-133dBm+10x$\log_{10}$(OCBW) Or -68dBm whichever is less (See note 2)	2 380 2 504	-34	CW
(-139dBm+10x$\log_{10}$(OCBW) Or -74dBm whichever is less (See note 3)	2 300 2 330 2 360 2 524 2 584 2 674		
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 20 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

(2) Receiver Blocking parameters receiver category 2 equipment

Receiver Category 2 Equipment			
Wanted signal mean power from companion device (dBm)(See note 1 and 3)	**Blocking Signal Frequency (MHz)**	**Blocking Signal Power (dBm) (See note 3)**	**Type of blocking signal**
(-139dBm+10x$\log_{10}$(OCBW)+10dB) Or -74dBm+10dB) whichever is less(See note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to Pmin + 26 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

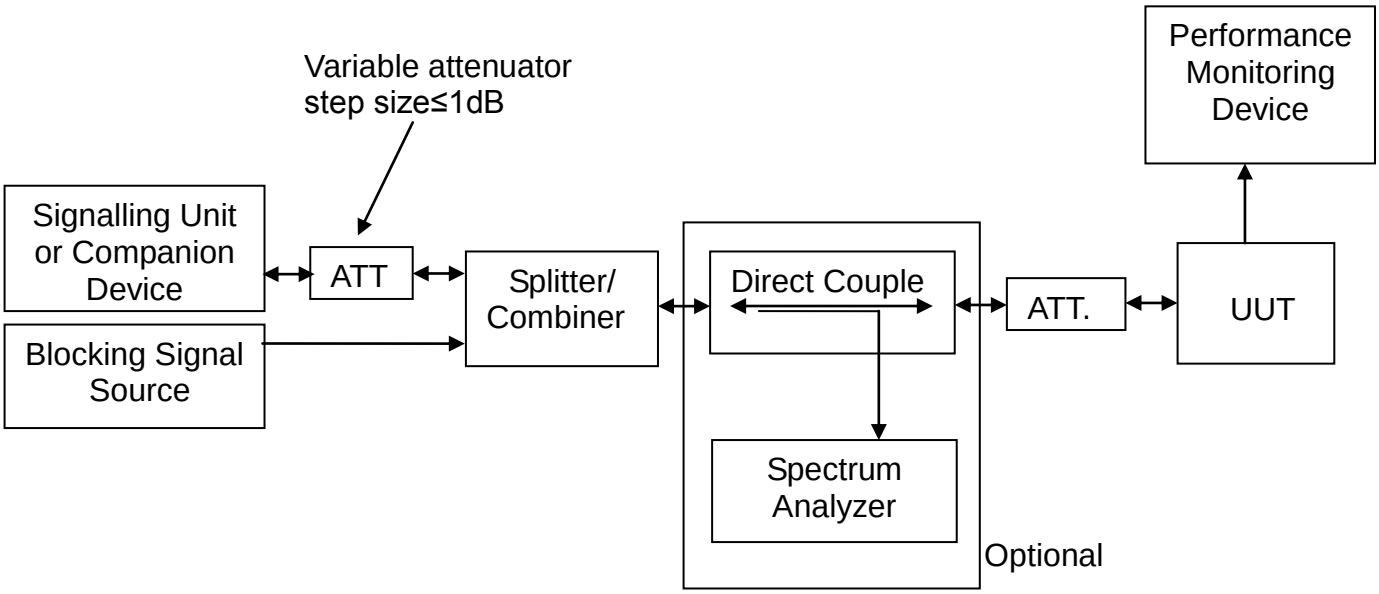
(3) Receiver Blocking parameters receiver category 3 equipment

Receiver Category 3 Equipment			
Wanted signal mean power from companion device (dBm) (See note 1 and 3)	**Blocking Signal Frequency (MHz)**	**Blocking Signal Power (dBm) (See note 3)**	**Type of blocking signal**
(-139dBm+10x$\log_{10}$(OCBW)+20dB) Or -74dBm+20dB) whichever is less(See note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative the test may be performed using a wanted signal up to Pmin + 30 dB where Pmin is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Test Method

1. Please refer to ETSI EN 300328 ($V_{2.2.2}$) clause 5.4.11.2.1 for conducted measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration



Test Result

Pass.

Please refer to following data tables.

Humidity :	53 %	Temperature :	20 ℃
Test Result:	PASS	Test By	Lee
Antenna Assembly Gain:			2 dBi
☐ category 1	☒ category 2	☐ category 3	

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	PER(%)	PER Limit (%)
GFSK Low channel				
OCBWmin:0.859MHz				
-74	2380	-34	3.04	10
	2300		2.56	10
GFSK High channel				
OCBWmin:0.860MHz				
-74	2504	-34	3.05	10
	2584		1.70	10
8DPSK Low channel				
OCBWmin:1.188MHz				
-74	2380	-34	3.04	10
	2300		2.56	10
8DPSK High channel				
OCBWmin:1.186MHz				
-74	2504	-34	3.05	10
	2584		1.70	10

17. TEST EQUIPMENT LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2020	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2020	1 Year
3.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2020	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2020	1 Year
5.	Signal Generator	Agilent	E4421B	MY41000708	Mar. 13, 2020	1 Year
6.	Signal Generator	Agilent	N5182A	MY48180739	Mar. 13, 2020	1 Year
7.	Power Sensor	DARE	RPR3006W	15I00041SNO64	Mar. 13, 2020	1 Year
8.	Communicati on Tester	Rohde & Schwarz	CMW500	149004	Mar. 13, 2020	1 Year
9.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2020	1 Year
10.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2020	1 Year
11.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2020	1 Year
12.	Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	Mar. 13, 2020	1 Year
13.	DC Source	Maynuo	MY8811	N/A	Mar. 13, 2020	1 Year
14.	Chamber	SAEMC	9*7*7m	N/A	Jun. 20, 2019	2 Year
15.	Test Software	EZ	EZ_EMC	N/A	N/A	N/A
16.	Test Software	MWRF	MWRF_V1.0	N/A	N/A	N/A

APPENDIX I

INFORMATION AS REQUIRED BY EN 300 328 V2.2.2, CLAUSE 5.4.1

In accordance with EN 300 328, clause 5.4.1, the following information is provided by the supplier.

a) The type of modulation used by the equipment:	☒ FHSS ☐ other forms of modulation
b) In case of FHSS modulation:	• In case of non-Adaptive Frequency Hopping equipment: The number of Hopping Frequencies: _____
	• In case of Adaptive Frequency Hopping Equipment: The maximum number of Hopping Frequencies: 79 The minimum number of Hopping Frequencies: _____
	• The (Average) Dwell Time: 308.695ms
c) Adaptive / non-adaptive equipment:	☐ non-adaptive Equipment ☒ adaptive Equipment without the possibility to switch to a non-adaptive mode ☐ adaptive Equipment which can also operate in a non-adaptive mode
d) In case of adaptive equipment:	The maximum Channel Occupancy Time implemented by the equipment: _____ ms ☒ The equipment has implemented an LBT based DAA mechanism
	•In case of equipment using modulation different from FHSS: ☐ The equipment is Frame Based equipment ☐ The equipment is Load Based equipment ☐ The equipment can switch dynamically between Frame Based and Load Based equipment
	The CCA time implemented by the equipment: _____ µs
	☐ The equipment has implemented an non-LBT based DAA mechanism ☐The equipment can operate in more than one adaptive mode
e) In case of non-adaptive Equipment:	The maximum RF Output Power (e.i.r.p.): _____dBm
	The maximum (corresponding) Duty Cycle: _____ %
	Equipment with dynamic behaviour, that behaviour is described here. (e.g. the different combinations of duty cycle and orresponding power levels to be declared):
f) The worst case operational mode for each of the following tests:	• RF Output Power 8DPSK
	• Power Spectral Density N/A
	• Duty cycle, Tx-Sequence, Tx-gap N/A
	• Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment) GFSK
	• Hopping Frequency Separation (only for FHSS equipment) 8DPSK
	• Medium Utilisation N/A
	• Adaptivity & Receiver Blocking GFSK
	• Nominal Channel Bandwidth 8DPSK
	• Transmitter unwanted emissions in the OOB domain 8DPSK
	• Transmitter unwanted emissions in the spurious domain 8DPSK
	• Receiver spurious emissions 8DPSK

g) The different transmit operating modes (tick all that apply):	☒ Operating mode 1: Single Antenna Equipment ☒ Equipment with only 1 antenna ☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time ☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)
	☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming ☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode) ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1 ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2 NOTE: Add more lines if more channel bandwidths are supported.
	☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming ☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode) ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1 ☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2 NOTE: Add more lines if more channel bandwidths are supported.
h) In case of Smart Antenna Systems:	•The number of Receive chains: _____
	•The number of Transmit chains: _____ ☐ symmetrical power distribution ☐ asymmetrical power distribution
	In case of beam forming, the maximum beam forming gain: _____ NOTE: Beam forming gain does not include the basic gain of a single antenna.
i) Operating Frequency Range(s) of the equipment:	•Operating Frequency Range 1: 2402 MHz to 2480 MHz •Operating Frequency Range 2: _____ MHz to _____ MHz NOTE: Add more lines if more Frequency Ranges are supported.
j) Nominal Channel Bandwidth(s):	•Nominal Channel Bandwidth 1: 860 KHz •Nominal Channel Bandwidth 2: 1188 KHz NOTE: Add more lines if more channel bandwidths are supported.
k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.): Stand-alone	☒ Stand-alone ☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment) ☐ Plug-in radio device (Equipment intended for a variety of host systems) ☐ Other _____

l) The normal and the extreme operating conditions that apply to the equipment:	Normal operating conditions (if applicable): Operating temperature range: 25 ° C Other (please specify if applicable): Extreme operating conditions: Operating temperature range: Minimum: 0 ° C Maximum: 35 ° C Other (please specify if applicable): Minimum: ____ ° C Maximum: ____ ° C
	Details provided are for the: ☒ stand-alone equipment ☐ combined (or host) equipment ☐ test jig
m) The intended combination(s) of the radio equipment power settings and one or more antenna assemblies and their corresponding e.i.r.p levels:	•Antenna Type: ☒ PCB Antenna: Antenna Gain: 0.5 dBi If applicable, additional beamforming gain (excluding basic antenna gain): ____ dB ☐ Temporary RF connector provided ☐ No temporary RF connector provided
	☐ Dedicated Antennas (equipment with antenna connector) ☐ Single power level with corresponding antenna(s) ☐ Multiple power settings and corresponding antenna(s) Number of different Power Levels: ____ Power Level 1: ____ dBm Power Level 2: ____ dBm Power Level 3: ____ dBm NOTE 1: Add more lines in case the equipment has more power levels.. NOTE 2: These power levels are conducted power levels (at antenna connector). • For each of the Power Levels, provide the intended antenna assemblies, their corresponding gains (G) and the resulting e.i.r.p. levels also taking into account the beamforming gain (Y) if applicable

Power Level 1: ____

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p.(dBm)	Part number or model name
1			
2			
3			
4			

Note: Add more rows in case more antenna assemblies are supported for this power level.

Power Level 2: ____

Number of antenna assemblies provided for this power level:

Assembly #	Gain (dBi)	e.i.r.p.(dBm)	Part number or model name
1			
2			
3			
4			

Note: Add more rows in case more antenna assemblies are supported for this

<table>
<tr><td></td><td>power level.

Power Level 3:_____
Number of antenna assemblies provided for this power level:
<table>
<tr><th>Assembly #</th><th>Gain (dBi)</th><th>e.i.r.p.(dBm)</th><th>Part number or model name</th></tr>
<tr><td>1</td><td></td><td></td><td></td></tr>
<tr><td>2</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td></td><td></td><td></td></tr>
<tr><td>4</td><td></td><td></td><td></td></tr>
</table>
Note: Add more rows in case more antenna assemblies are supported for this power level.</td></tr>
<tr><td>n) The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:</td><td>Details provided are for the: ☒ stand-alone equipment
☐ combined (or host) equipment
☐ test jig
Supply Voltage ☒ AC mains State AC voltage AC 100-240V V
☐ DC State DC voltage ____V
In case of DC, indicate the type of power source
☐ Internal Power Supply
☒ External Power Supply or AC/DC adapter
☐ Battery
☐ Other: _____</td></tr>
<tr><td>o) Describe the test modes available which can facilitate testing:</td><td>The EUT provides TX Mode to control RF signal transmission</td></tr>
<tr><td>p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):</td><td>Bluetooth®</td></tr>
<tr><td>q) If applicable, the statistical analysis referred to in clause 5.4.1 q)</td><td>(to be provided as separate attachment)</td></tr>
<tr><td>r) If applicable, the statistical analysis referred to in clause 5.4.1 r)</td><td>(to be provided as separate attachment)</td></tr>
<tr><td>s) Geo-location capability supported by the equipment:</td><td>☐ Yes
☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user
☐ No</td></tr>
<tr><td>i) Describe the minimum performance criteria that apply to the equipment (see clause 4.3.1.12.3 or clause 4.3.2.11.3):</td><td></td></tr>
</table>

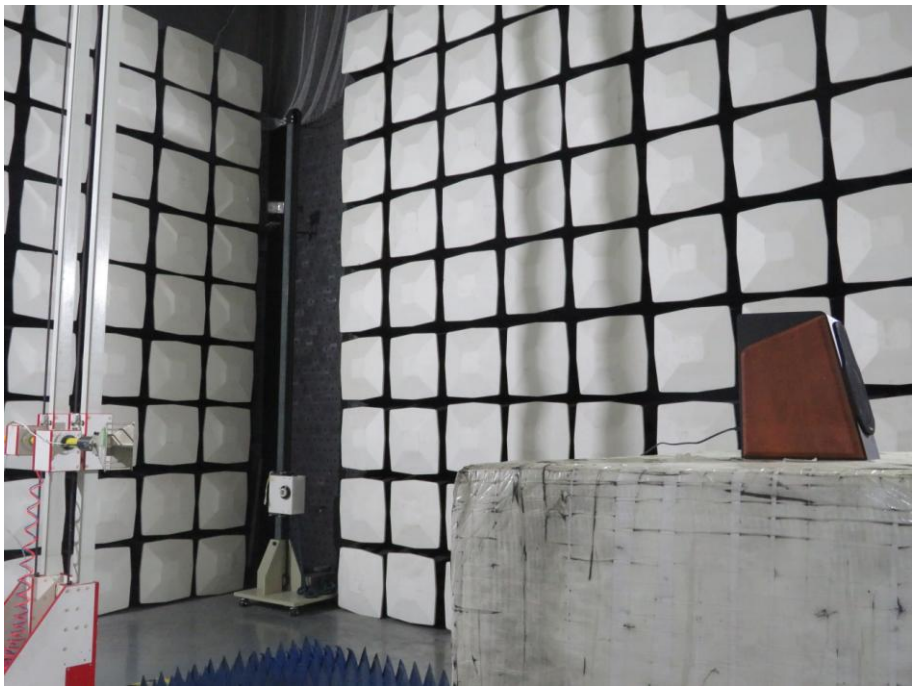
E.3 Combination for testing	Highest overall e.i.r.p. value: 3.22 dBm
	Corresponding Antenna assembly gain: 0.5 dBi
	Corresponding conducted power setting: (also the power level to be used for testing) _____ dBm
	Antenna Assembly #_____
	Listed as Power Setting #: _____
E.4 Additional information provided by the applicant	
E.4.1 Modulation:	ITU Class(es) of emission: FHSS Can the transmitter operate unmodulated? ☒ yes ☐ no
E.4.2 Duty Cycle	The transmitter is intended for: ☐ Continuous duty ☐ Intermittent duty ☒ Continuous operation possible for testing purposes
E.4.3 About the UUT	☒ The equipment submitted are representative production models ☐ If not, the equipment submitted are pre-production models? ☐ If pre-production equipment are submitted, the final production equipment will be identical in all respects with the equipment tested ☐ If not, supply full details
E.4.4 Additional items and/or supporting equipment provided	☐ Spare batteries (e.g. for portable equipment) ☐ Battery charging device ☐ External Power Supply or AC/DC adapter ☐ Test Jig or interface box ☐ RF test fixture (for equipment with integrated antennas) ☐ Host System Manufacturer:_____ Model #:_____ Model name:_____ ☐Combined equipment Manufacturer:_____ Model #:_____ Model name:_____ ☒ User Manual ☒ Technical documentation (Handbook and circuit diagrams)

APPENDIX II

PHOTOGRPHS OF TEST SETUP

Radiated Emission Below 1 GHz

Radiated Emission Above 1 GHz



---End---