ETSI EN 300328 V1.9.1: 2015 MEASURMENT AND TEST REPORT

For

Shenzhen Fenda Technology Co., Ltd.

Fenda Hi-Tech Park, Zhoushi Road, Shiyan Town, Baoan District, Shenzhen City, Guangdong, China

E.U.T.: 2.1 Multimedia Speaker

Model Name: F210X, AL2109 Plus, F210U, F210BT, F210F, F210

Brand Name: F&D

Report Number: NTC1604348E

Test Date(s): April 28, 2016 to May 17, 2016

Report Date(s): May 17, 2016

Prepared by

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Prepared By	Approved & Authorized Signer
Rose Hu / Engineer	Iori Fan / Authorized signatory

Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Dongguan Nore Testing Center Co., Ltd. The test results referenced from this report are relevant only to the sample tested.

TABLE OF CONTENTS

1. GENERAL INFORMATION 4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST 4
2. DESCRIPTION OF TEST MODES AND TEST FREQUENCIES 6
3. TEST FREQUENCIES AND SOFTWARE 6
4. OBJECTIVE 6
5. TEST METHODOLOGY 6
6. TEST FACILITY 7
7. MEASUREMENT UNCERTAINTY 7
8. SUPPORT EQUIPMENT 7
9. RF OUTPUT POWER 8
10. DWELL TIME, MINIMUM FREQUENCY OCCUPATION AND 10
HOPPING SEQUENCE 10
11. OCCUPIED CHANNEL BANDWIDTH 23
12. HOPPING FREQUENCY SEPARATION 27
13. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF BAND DOMAIN 31
14. TRANSIMITTER SPURIOUS EMISSIONS 34
15. RECEIVER SPURIOUS EMISSIONS 37
16. TEST EQUIPMENT LIST 39
APPENDIX I 40
INFORMATION AS REQUIRED BY EN 300 328 V1.9.1, CLAUSE 5.3.1 40
APPENDIX II 46
PHOTOGRPHS OF TEST SETUP 46

Revision History of This Test Report

Report Number	Description	Issued Date
NTC1604348E	Initial Issue	2016-05-17

1. GENERAL INFORMATION

PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST

Manufacturer & Factory	:	Same as the applicant
Model Name	:	F210X, AL2109 Plus, F210U, F210BT, F210F, F210 (All tests were carried on model F210X.)
Model difference	:	These models have the same circuitry, electrical mechanical, PCB layout and physical construction. Their differences in model name for trading purpose.
Power Supply	:	AC 220-240V 50/60Hz
Adapter	:	None
Test Voltage	:	AC 230V 50Hz
Operating Temperature Range	:	0°C to 45°C (Declaration by manufacturer)
Adaptive/Non-Adaptive Equipment	:	Adaptive equipment

Item	BT2.1+EDR
Frequency	2402-2480MHz
Modulation	GFSK, π/4-DQPSK
Number of Channel	79
Channel space	1MHz
Antenna Type	PCB antenna
Antenna Gain	0 dBi (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 note
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 note
4.3.1.7 / 4.3.2.6	Adaptivity	N/A see note
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	N/A see note

Note: 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.

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	FCCAssist_1.4	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 R&TTE Directive.

The objective is to determine compliance with ETSI EN 300328 V1.9.1 (2015-02).

5. TEST METHODOLOGY

All measurements contained in this report were conducted with ETSI EN 300328 V1.9.1 (2015-02).

6. TEST FACILITY

Site Description

EMC Lab : Listed by FCC, July 03, 2014
The Certificate Number is 665078.

Listed by Industry Canada, June 18, 2014
The Certificate Registration Number. Is 46405-9743

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

Site Location : Building D, Gaosheng Science & Technology Park, Zhouxi Longxi Road, Nancheng District, Dongguan City, Guangdong Province, China

7. MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Occupied Channel Bandiwdth	±1.42 x10^{-4}%
RF output power, conducted	±1.06dB
Power Spectral Density, conducted	±1.06dB
Unwanted Emissions, conducted	±2.51dB
All emissions, radiated	±3.70dB
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. RF OUTPUT POWER

Limits

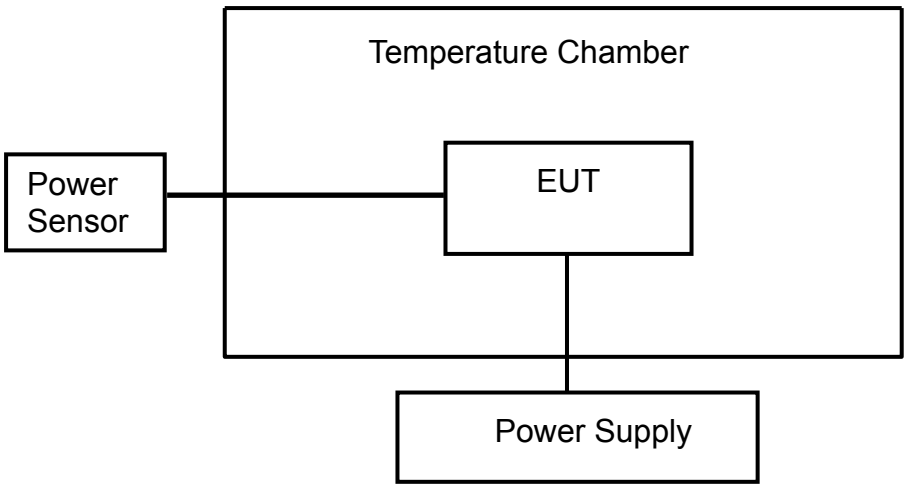
Frequency Band	Limit
2400 ~ 2483.5 MHz	Equivalent isotropic radiated power (e.i.r.p.) ≤20 dBm

Test Method

1. Please refer to ETSI EN 300328 ($V_{1.9.1}$) clause 5.3.2.2.1 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.

GFSK				
Humidity :	52 %	Temperature :		22 ℃
Test Result:	PASS	Test By:		Sance
Antenna Assembly Gain:				0dBi
Cable Loss=				1.5dB
Number of Burst				>20
Hopping Mode				
Temperature (℃)	Voltage	Reading dBm	EIRP dBm	Limit dBm
25	AC 230V	-6.08	-4.58	20
0	AC 230V	-6.53	-5.03	20
45	AC 230V	-7.35	-5.85	20

Note: Calculated Power(dBm)=Output Power(dBm)+Cable Loss(dB)+Antenna Gain(dBi)

π/4-DQPSK				
Humidity :	52 %	Temperature :		22 ℃
Test Result:	PASS	Test By:		Sance
Antenna Assembly Gain:				0dBi
Cable Loss=				1.5dB
Number of Burst				>20
Hopping Mode				
Temperature (℃)	Voltage	Reading dBm	EIRP dBm	Limit dBm
25	AC 230V	-4.31	-2.81	20
0	AC 230V	-4.77	-3.27	20
45	AC 230V	-5.60	-4.10	20

Note: Calculated Power(dBm)=Output Power(dBm)+Cable Loss(dB)+Antenna Gain(dBi)

10. 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 ($V_{1.9.1}$) clause 5.3.4.2.1 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.

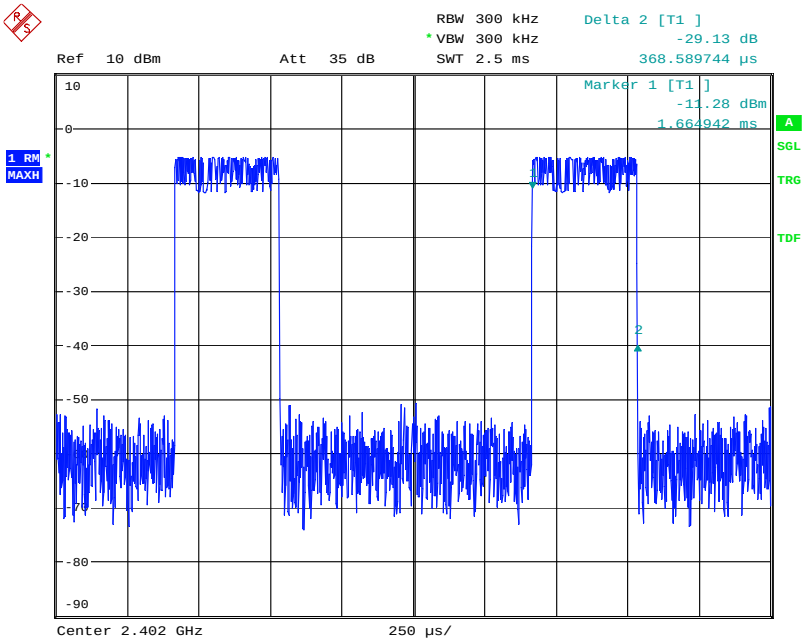
Temperature :	22 ℃	Humidity :	53%
Test Date :	May 10, 2016	Test Result:	PASS
Test By:	Sance		

Hopping Sequence						
Hopping Channels	Hopping Channels Limits	F_l 20dB (MHz)	F_h 20dB (MHz)	Min. Hopping Range (%)	Min. Hopping Range Limit(%)	Result
GFSK						
79	15	2401.204	2480.689	95.19	70.00%	PASS
π/4-DQPSK						
79	15	2401.071	2480.958	95.67	70.00%	PASS

Dwell Time									
Mode	Number of Hopping Channel	Number of transmission in a period (channel number *0.4sec				Length of transmission time (ms)	Dwell Time	Limit (ms)	Result
		Period (Sec)	Sweep time (Sec)	Times in a sweep	Times in a period				
GFSK									
DH1	79	31.6	4	38	300.2	0.369	110.8	400	PASS
DH3	79	31.6	4	21	165.9	1.627	269.9	400	PASS
DH5	79	31.6	4	13	102.7	2.861	293.8	400	PASS
π/4-DQPSK									
DH1	79	31.6	4	40	316.0	0.381	120.4	400	PASS
DH3	79	31.6	4	27	213.3	1.627	347.0	400	PASS
DH5	79	31.6	4	13	102.7	2.867	294.4	400	PASS

Minimum Frequency Occupation						
Mode	Number of Hopping Channel	Number of transmission in a period of 4*Dwell time*number of hopping channel	Length of transmission time (ms)	Result (ms)	Minimum Limit (ms)	Result (Pass/ Fail)
GFSK						
DH1	79	2	0.369	0.738	0.369	PASS
DH3	79	6	1.627	9.762	1.627	PASS
DH5	79	5	2.861	14.305	2.861	PASS
π/4-DQPSK						
DH1	79	1	0.381	0.381	0.381	PASS
DH3	79	4	1.627	6.508	1.627	PASS
DH5	79	4	2.867	11.468	2.867	PASS

GFSK DH1



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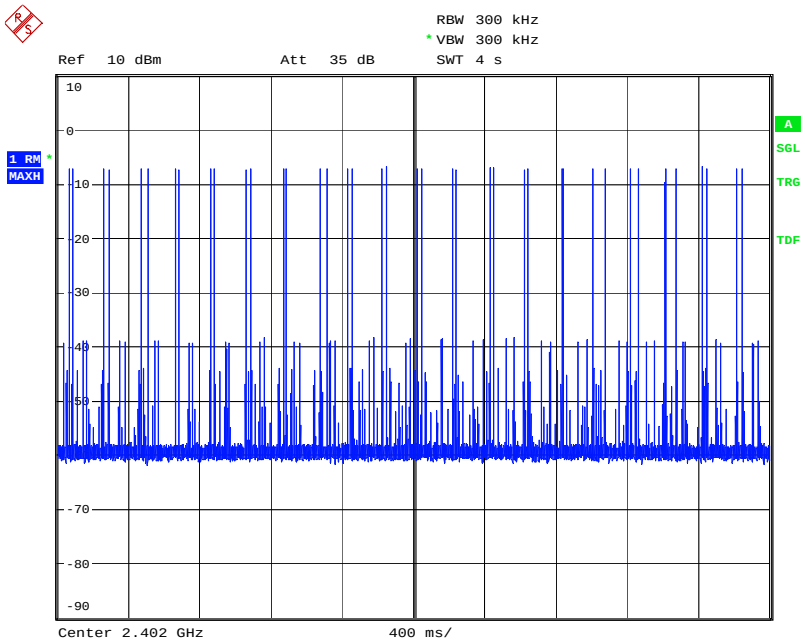

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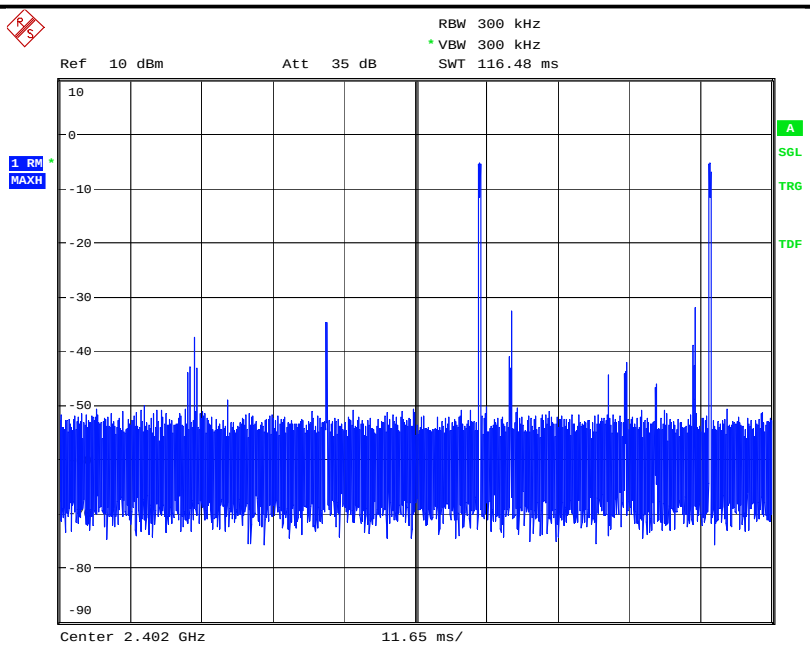

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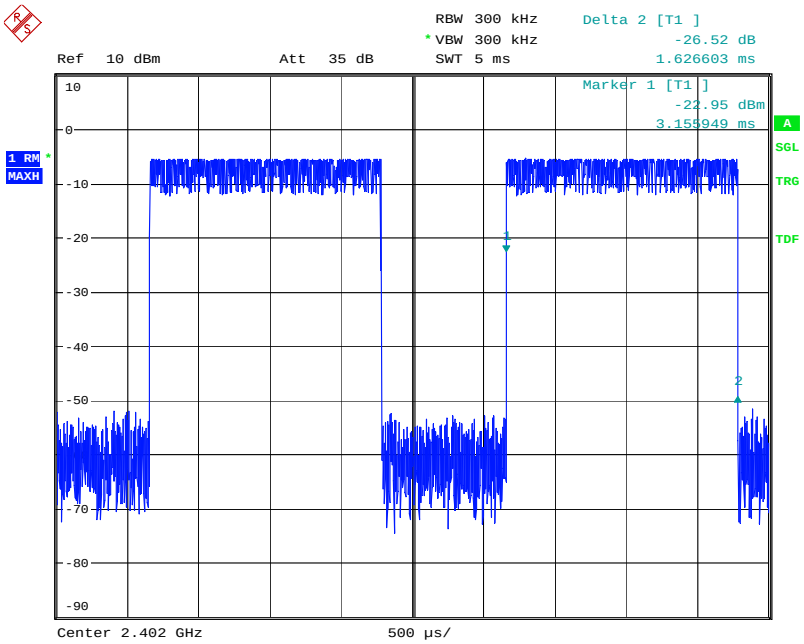
GFSK DH3



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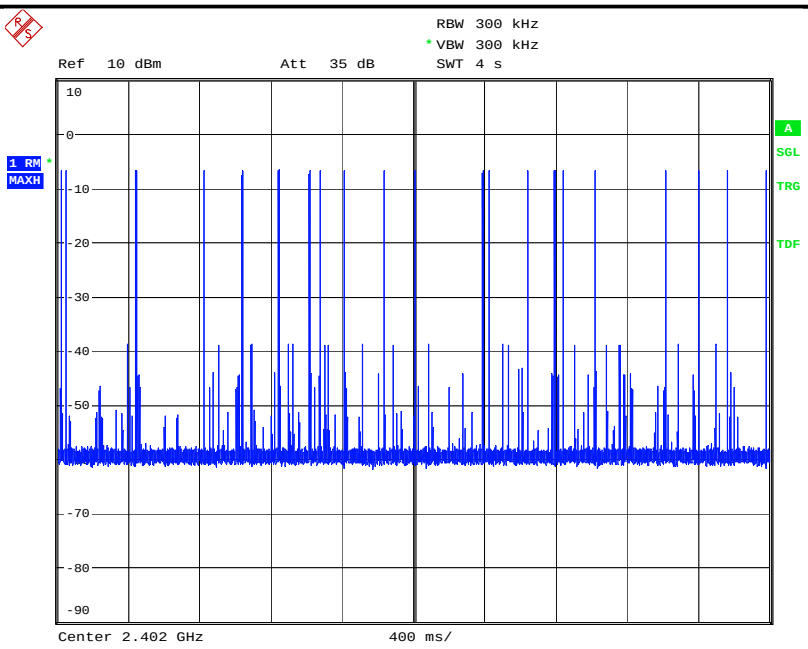

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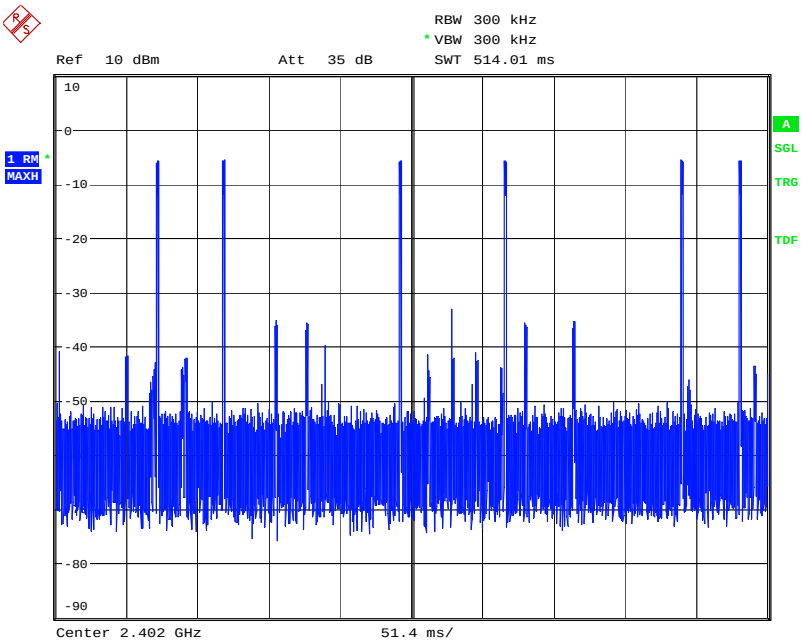

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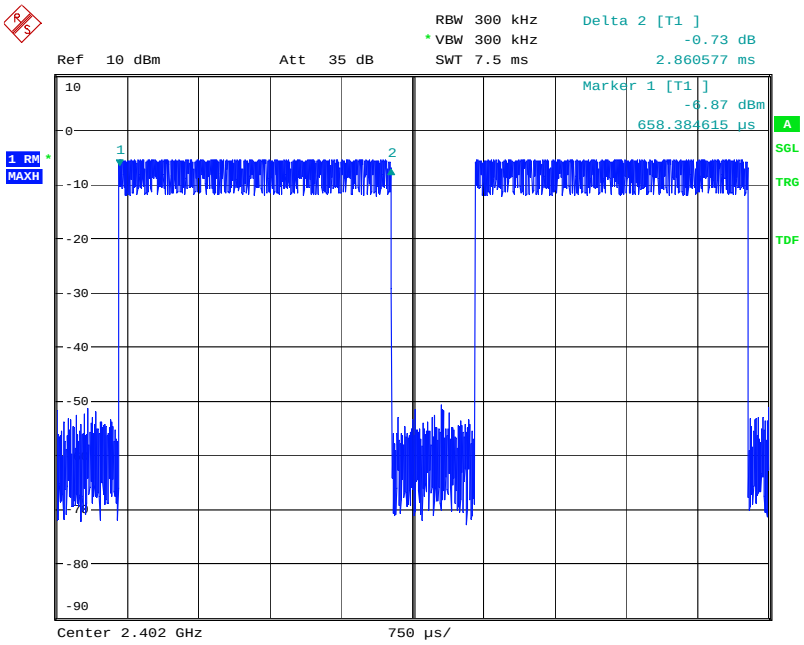
GFSK DH5



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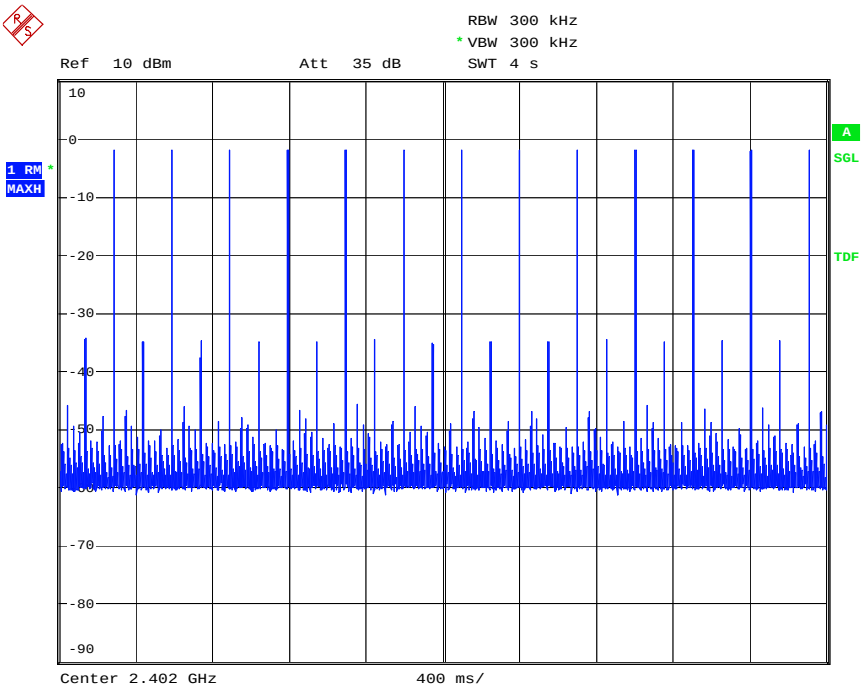

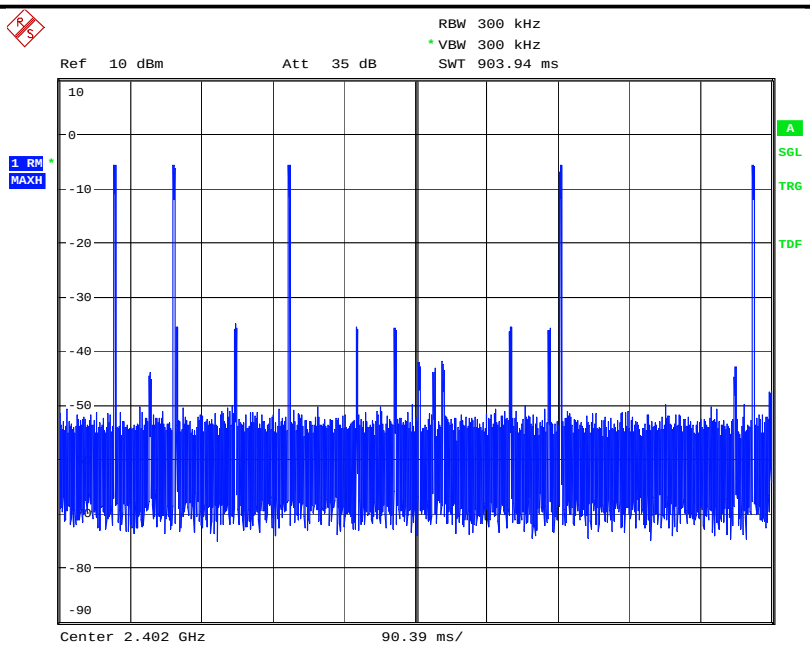

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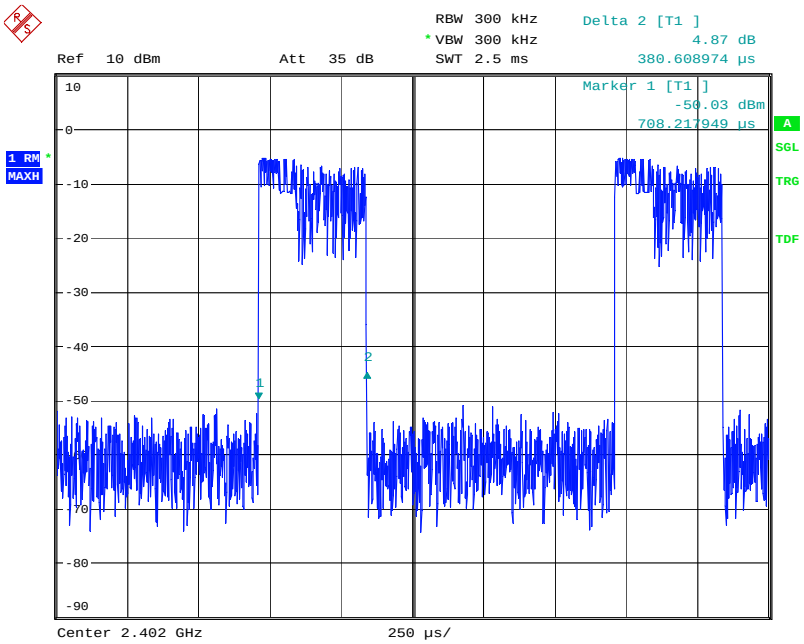
π/4-DQPSK 3-DH1



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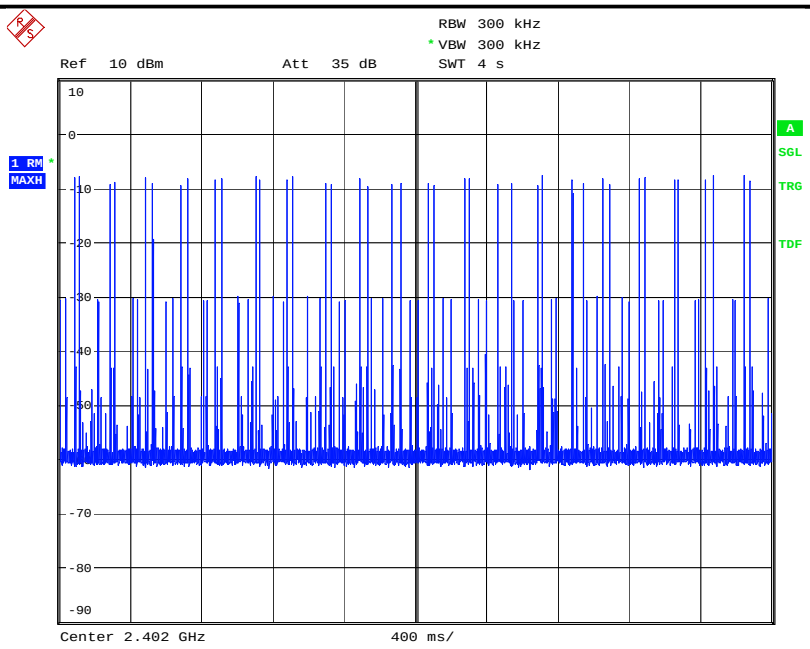

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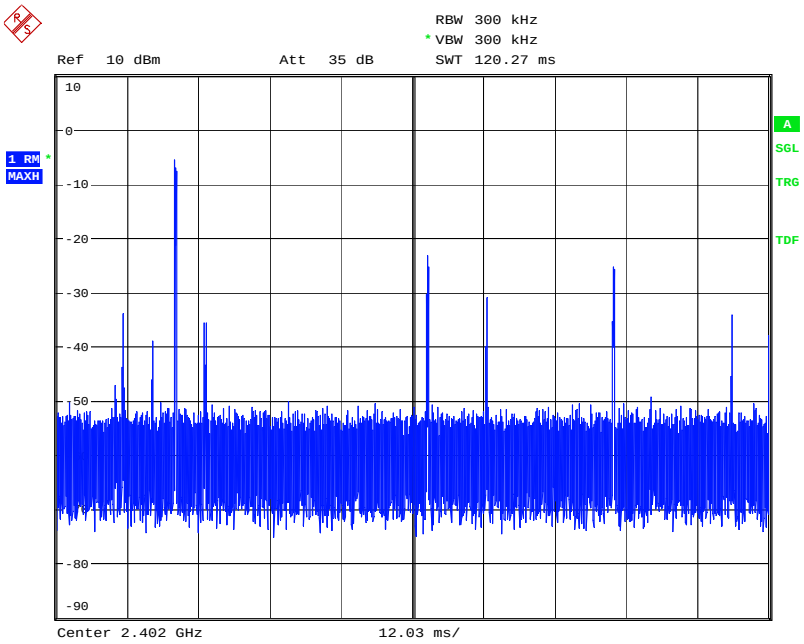

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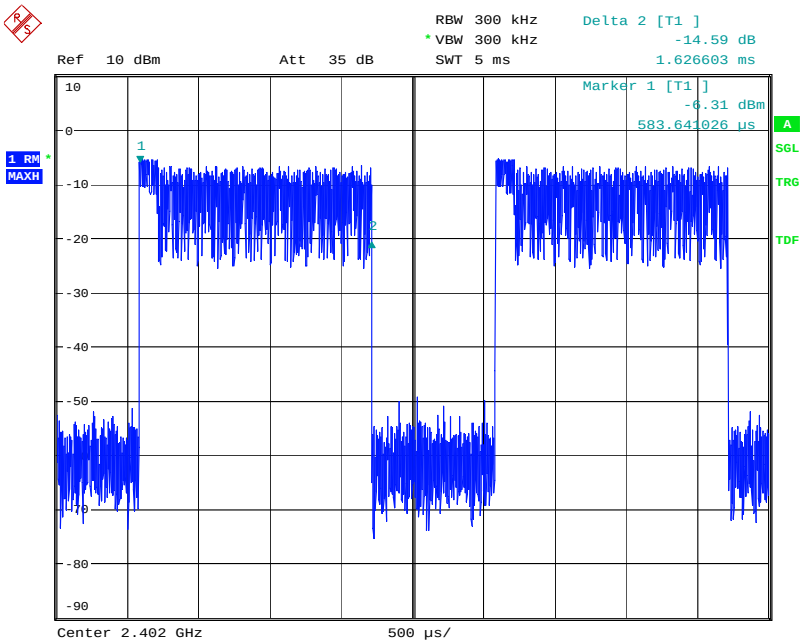

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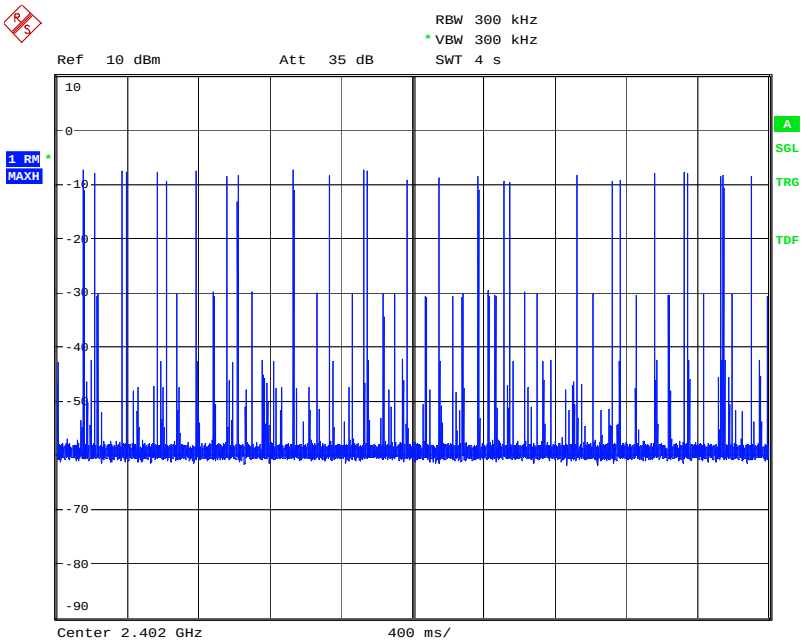

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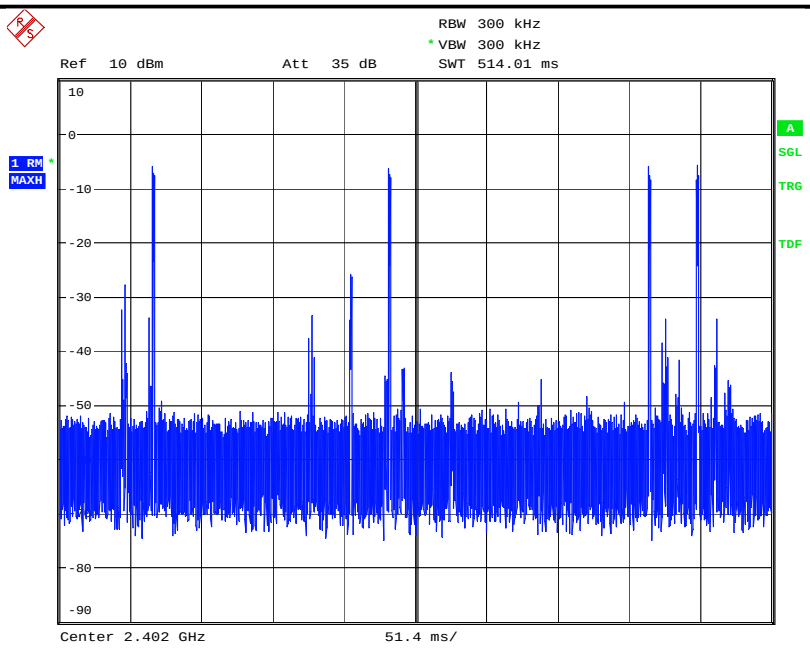

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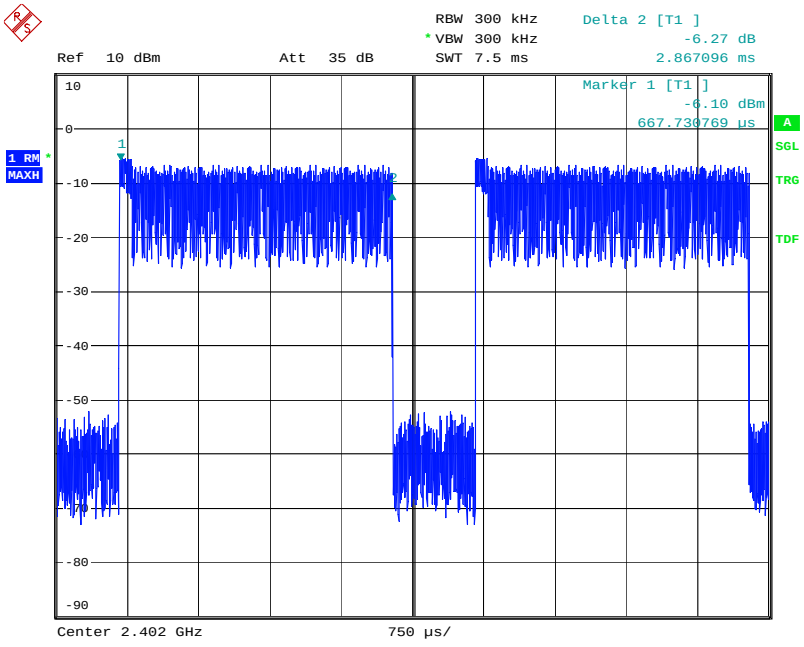

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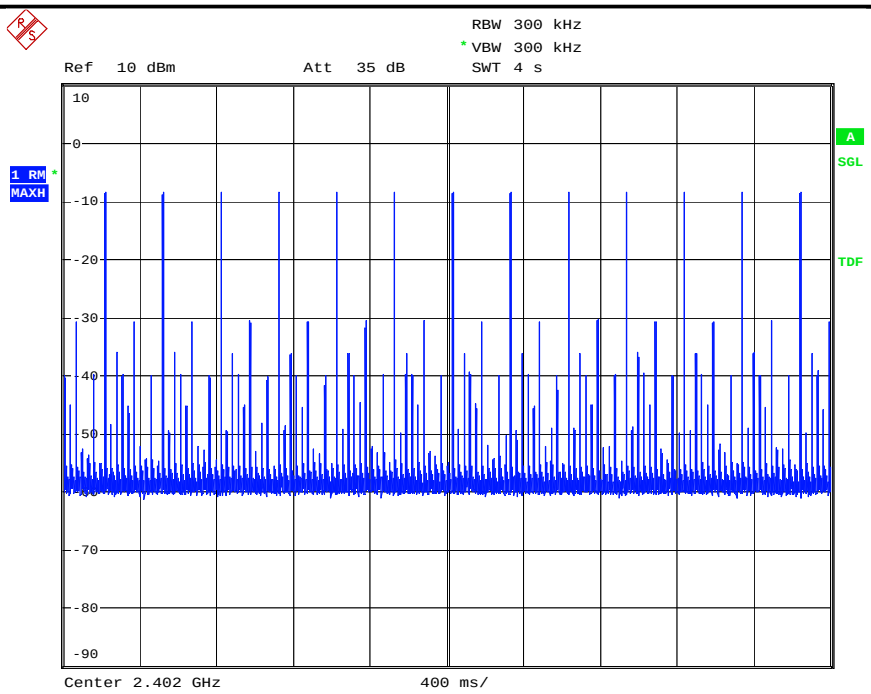

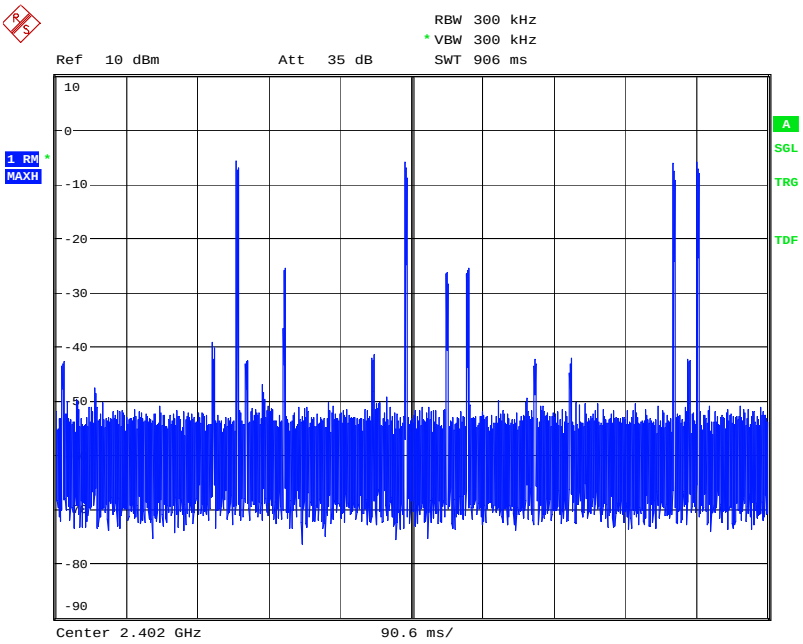

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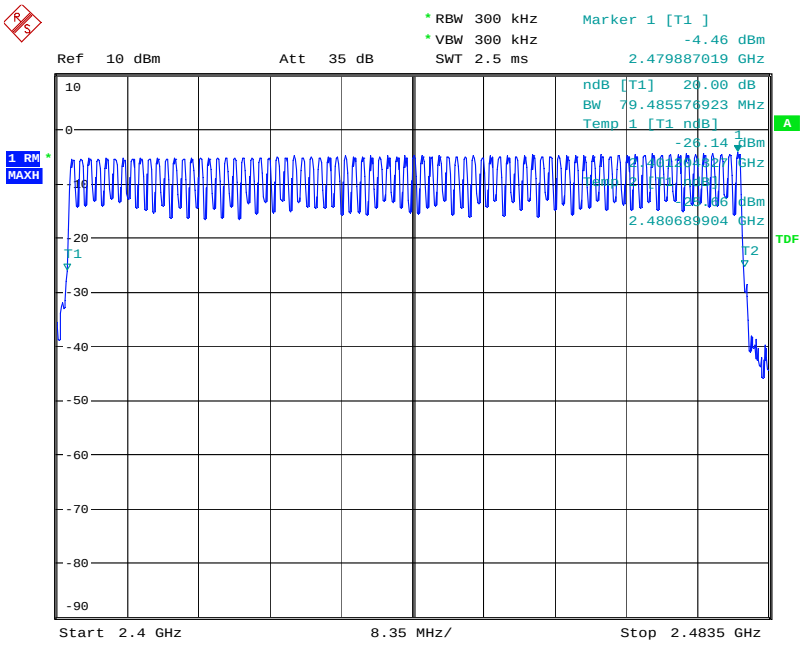
Hopping Sequence

GFSK



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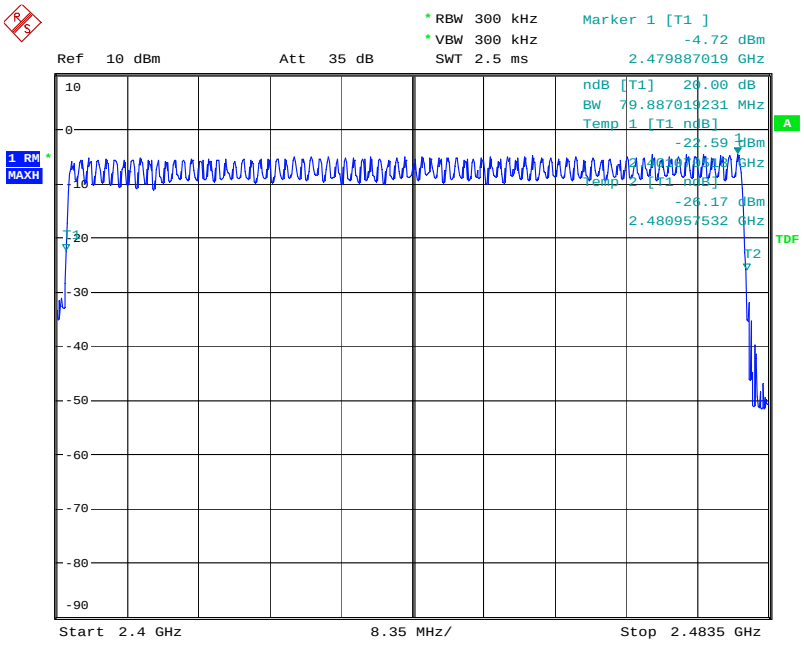
π/4-DQPSK



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11. 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 ($V_{1.9.1}$) clause 5.3.8.2.1 for conducted measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Test Result

Pass.

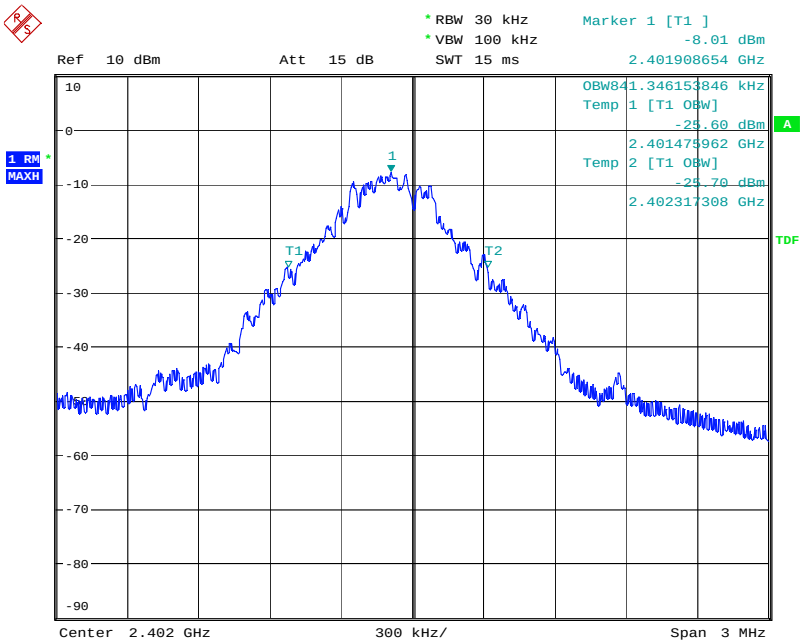
Please refer to following data tables and test plots.

Temperature :	22 ℃	Humidity :	53%
Test Date :	May 10, 2016	Test Result:	PASS
Test By:	Sance		

Channel frequency (MHz)	99% Bandwidth (KHz)	FL at 99% BW (MHz)	FH at 99% BW (MHz)	Limit	Result
GFSK					
2402	841	2401.480	2402.317	FL > 2.4 GHz and FH < 2.4835 GHz	Pass
2480	846	2479.471	2480.317		Pass
4π/4-DQPSK					
2402	1188	2401.303	2402.490	FL > 2.4 GHz and FH < 2.4835 GHz	Pass
2480	1192	2479.298	2480.490		Pass

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.

GFSK Lowest Channel



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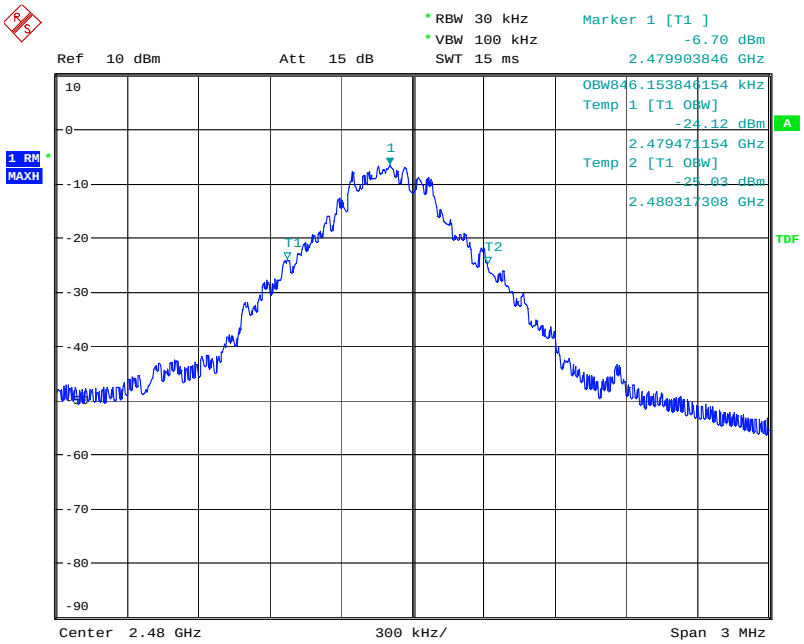
GFSK Highest Channel



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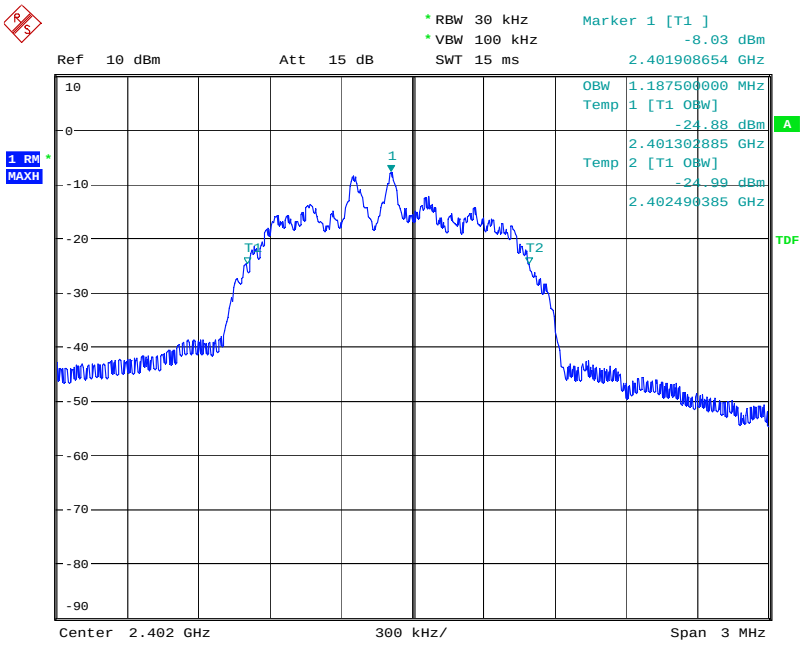
π/4-DQPSK Lowest Channel



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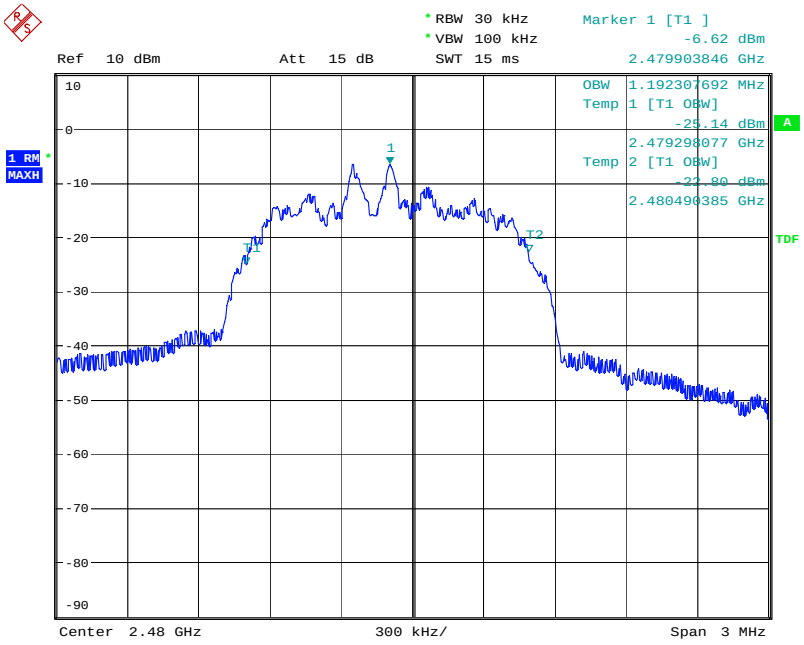
π/4-DQPSK Highest Channel



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12. 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 ($V_{1.9.1}$) clause 5.3.5.2.1 for conducted measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Test Result

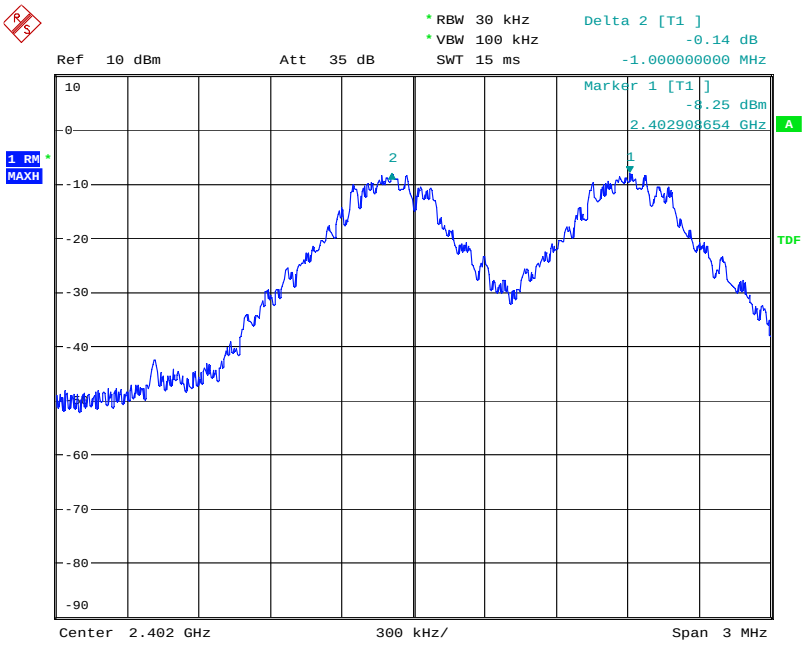
Pass.

Please refer to following data tables and test plots.

Temperature :	22 ℃	Humidity :	53%
Test Date :	May 10, 2016	Test Result:	PASS
Test By:	Sance		

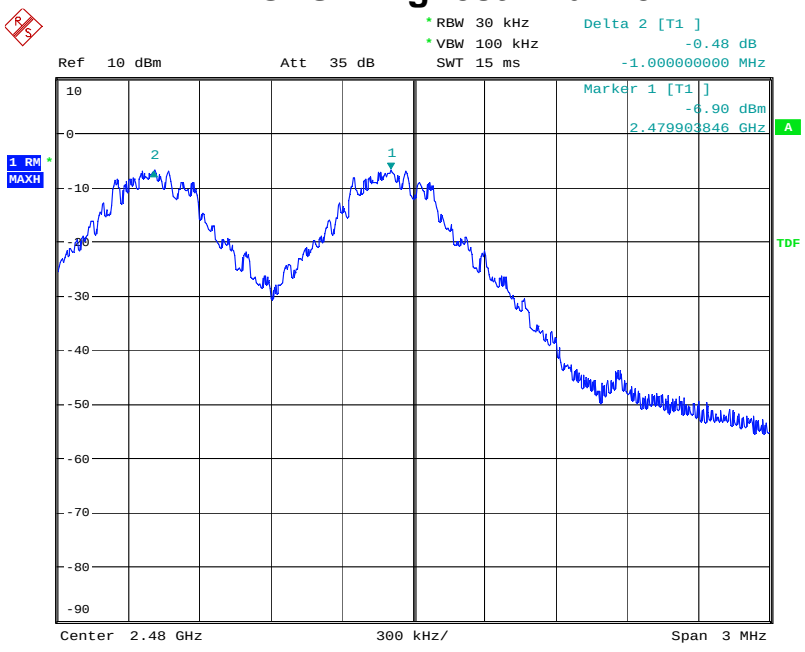
Channel frequency (MHz)	Channel Separation (KHz)	Limit (MHz) Minimum	Result
GFSK			
2402	1000	0.1	Pass
2480	1000	0.1	Pass
π/4-DQPSK			
2402	1000	0.1	Pass
2480	1005	0.1	Pass

GFSK Lowest Channel



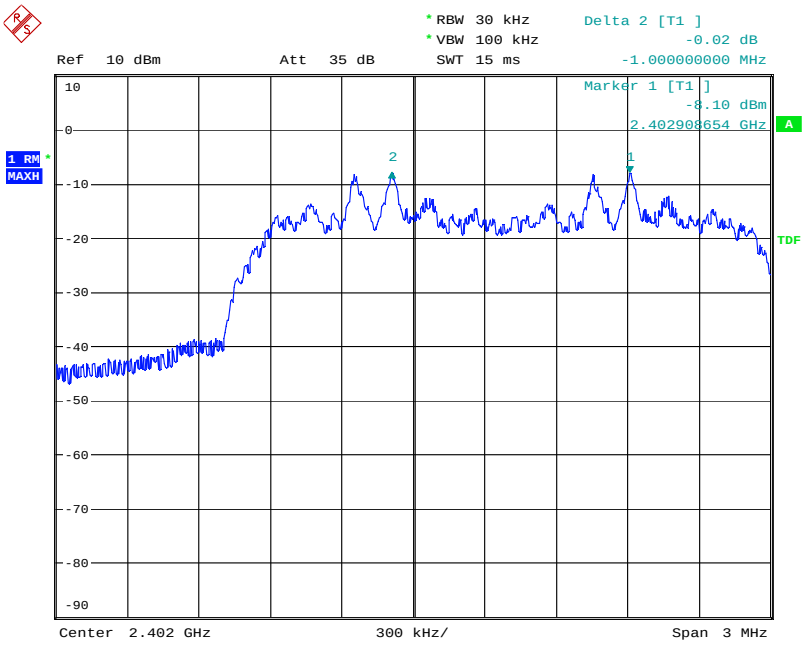
Date: 10.MAY.2016 14:34:35

GFSK Highest Channel



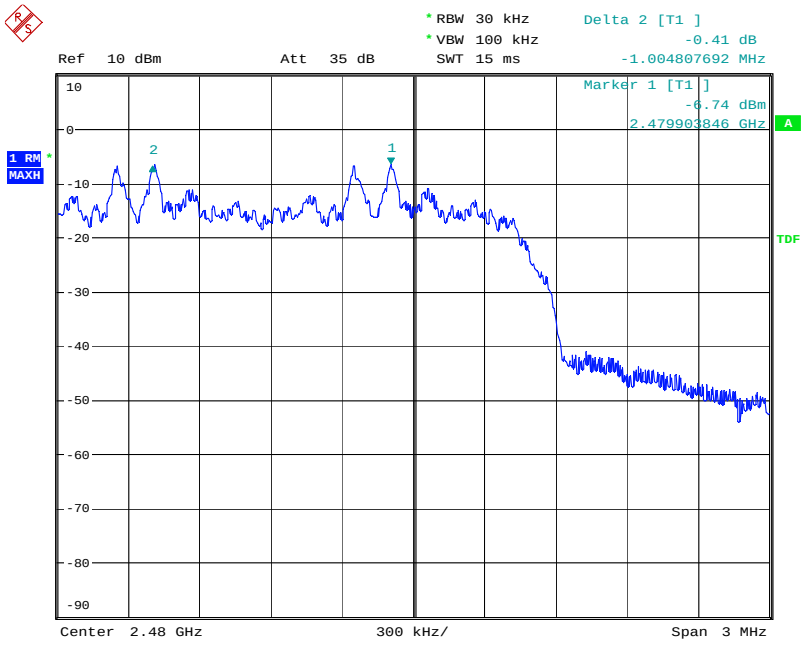
Date: 10.MAY.2016 14:37:29

π/4-DQPSK Lowest Channel



Date: 10.MAY.2016 14:38:37

π/4-DQPSK Highest Channel



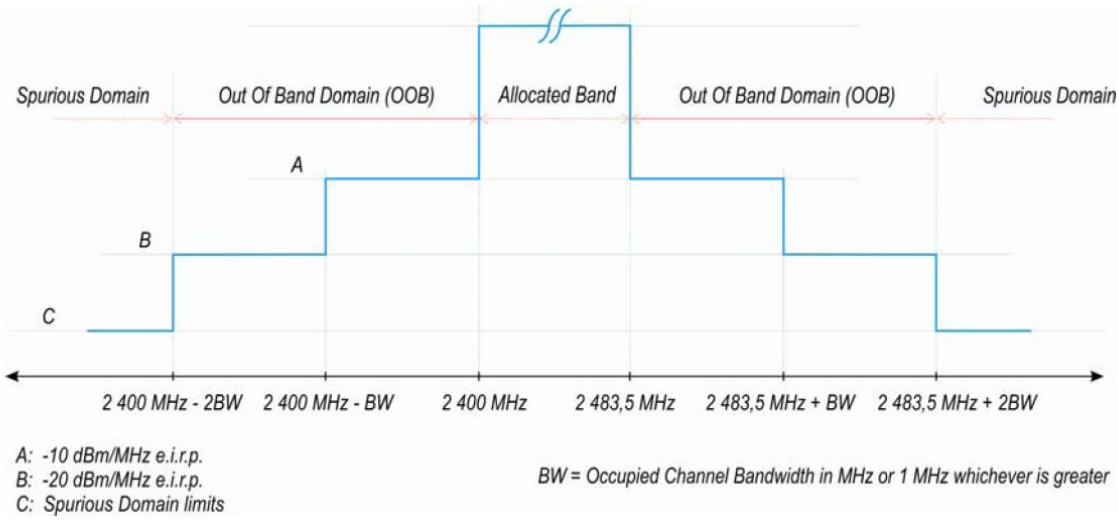
Date: 10.MAY.2016 14:41:36

13. 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

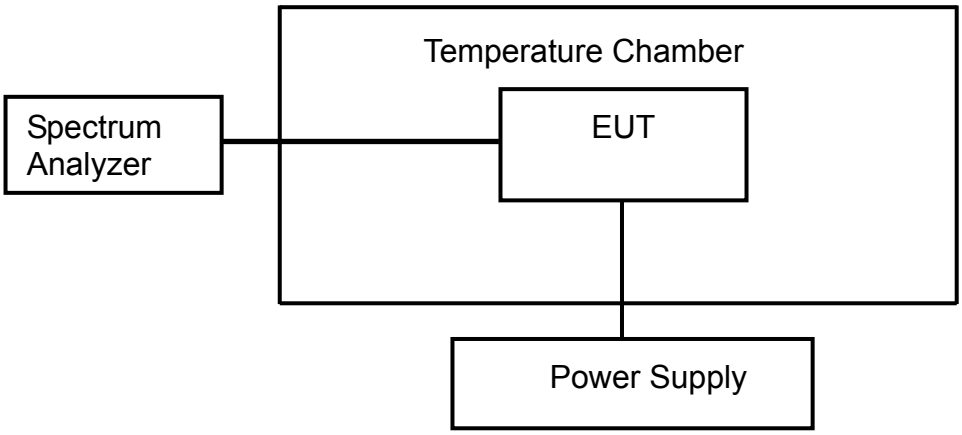


Test Method

1. Please refer to ETSI EN 300328 ($V_{1.9.1}$) clause 5.3.9.2.1 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.

Temperature : 22 ℃ Humidity : 53%
Test Date : May 10, 2016 Test Result: PASS
Test By: Sance

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
Temperature (℃)	Voltage V					
GFSK (2402MHz)						
25	AC230V	-24.20	-10	-27.55	-20	PASS
0	AC230V	-24.24	-10	-27.28	-20	PASS
45	AC230V	-24.21	-10	-27.60	-20	PASS
GFSK (2480MHz)						
25	AC230V	-37.20	-10	-41.36	-20	PASS
0	AC230V	-37.66	-10	-41.42	-20	PASS
45	AC230V	-37.43	-10	-41.58	-20	PASS
π/4-DQPSK (2402MHz)						
25	AC230V	-21.45	-10	-27.36	-20	PASS
0	AC230V	-21.00	-10	-27.37	-20	PASS
45	AC230V	-21.61	-10	-27.16	-20	PASS
π/4-DQPSK (2402MHz)						
25	AC230V	-42.46	-10	-46.23	-20	PASS
0	AC230V	-42.55	-10	-46.25	-20	PASS
45	AC230V	-42.45	-10	-46.23	-20	PASS

14. TRANSIMITTER SPURIOUS EMISSIONS

Limits:

The transmitter unwanted emissions in the spurious domain shall not exceed the values.

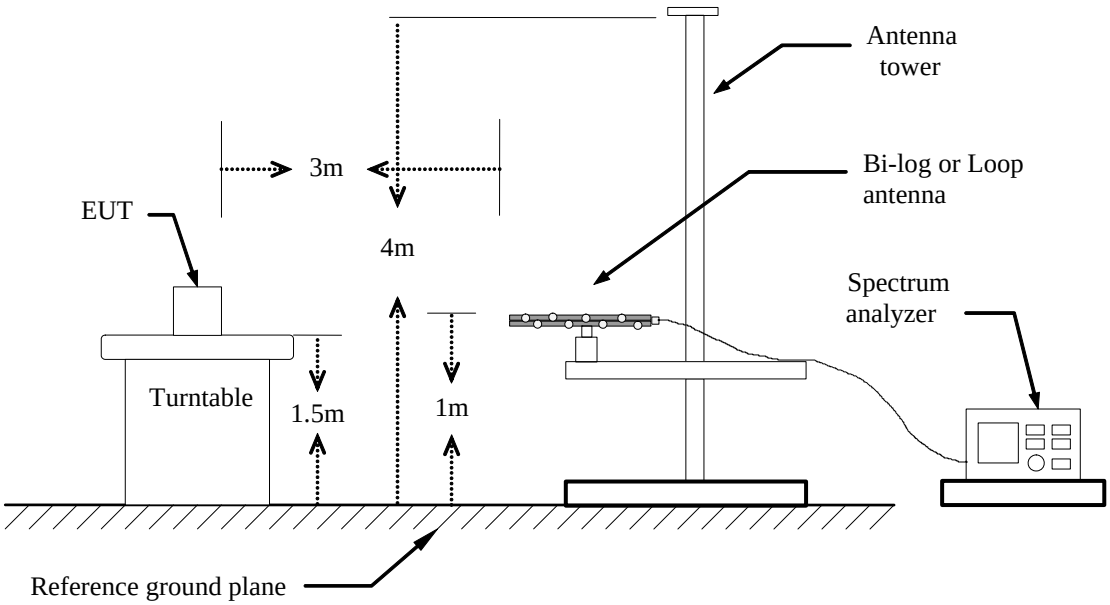
Frequency Range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47MHz	-36 dBm	100KHz
47 MHz to 74MHz	-54 dBm	100KHz
74 MHz to 87.5MHz	-36 dBm	100KHz
87.5 MHz to 118MHz	-54 dBm	100KHz
118 MHz to 174MHz	-36 dBm	100KHz
174 MHz to 230MHz	-54 dBm	100KHz
230 MHz to 470MHz	-36 dBm	100KHz
470 MHz to 862MHz	-54 dBm	100KHz
862 MHz to 1GHz	-36 dBm	100KHz
1GHz to 12.75GHz	-30 dBm	1MHz

Test Method

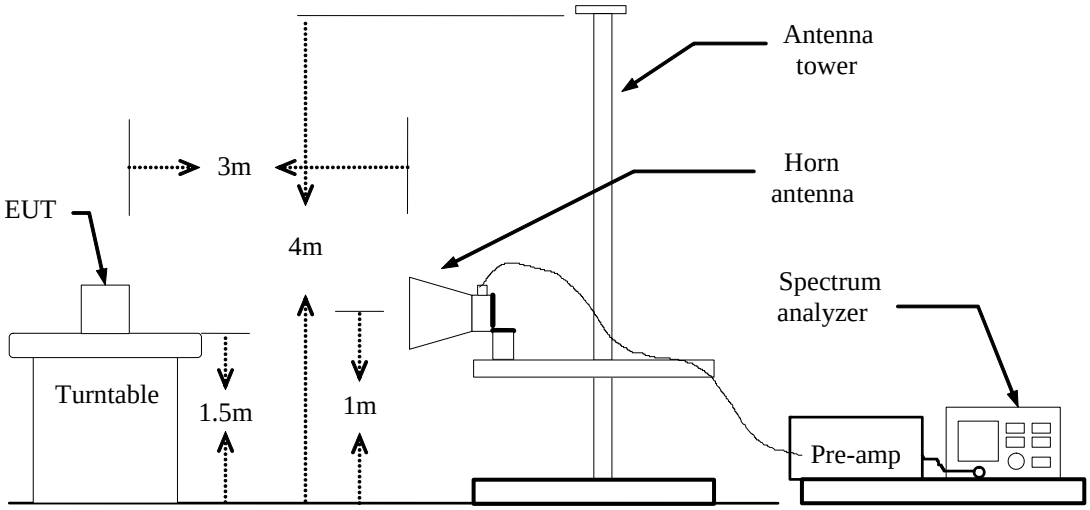
1. Please refer to ETSI EN 300328 ($V_{1.9.1}$) clause 5.3.10.2.2 for radiated measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Below 1GHz



Above 1GHz



Test Result

Pass.

Please refer to following data tables (The worst case π/4-DQPSK)

Below 1GHz Hopping				
Humidity : 50 %		Temperature : 23 ℃		
Test Result: PASS		Test By: Sance		
Test Mode: TX				
Frequency (MHz)	**Antenna Polarization**	**Emission level (dBm)**	**Limit (dBm)**	**Margin (dB)**
480.0799	Vertical	-59.57	-54.00	-5.57
512.0900	Vertical	-58.84	-54.00	-4.84
576.1100	Vertical	-64.50	-54.00	-10.50
640.1299	Vertical	-62.10	-54.00	-8.10

480.0800	Horizontal	-60.76	-54.00	-6.76
512.0900	Horizontal	-61.92	-54.00	-7.92
640.1299	Horizontal	-63.05	-54.00	-9.05
768.1699	Horizontal	-64.13	-54.00	-10.13

Above 1GHz Hopping				
Humidity : 50 %		Temperature : 23 ℃		
Test Result: PASS		Test By: Sance		
Test Mode: TX				
Frequency (MHz)	**Antenna Polarization**	**Emission level (dBm)**	**Limit (dBm)**	**Margin (dB)**
4804	Vertical	-43.22	-30	-13.22
4960	Vertical	-40.19	-30	-10.19

4804	Horizontal	-43.29	-30	-13.29
4960	Horizontal	-39.86	-30	-9.86

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.

15. RECEIVER SPURIOUS EMISSIONS

Limits

Frequency Range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 1GHz	-57 dBm	100KHz
1GHz to 12.75GHz	-47 dBm	1MHz

Test Method

1. Please refer to ETSI EN 300328 ($V_{1.9.1}$) clause 5.3.11.2.2 for radiated measurement method.
2. The measurements shall be performed at normal environmental condition.

Test Configuration

Same as section 14 in this test report.

Test Result

Pass.

Please refer to following data tables (the worst case π/4-DQPSK).

Below 1GHz Hopping				
Humidity : 50 %		Temperature : 23 ℃		
Test Result: PASS		Test By: Sance		
Test Mode: RX				
Frequency (MHz)	**Antenna** Polarization	**Emission level (dBm)**	**Limit (dBm)**	**Margin (dB)**
480.0799	Vertical	-62.29	-57.00	-5.29
512.0900	Vertical	-61.49	-57.00	-4.49
640.1299	Vertical	-61.88	-57.00	-4.88

384.0500	Horizontal	-68.04	-57.00	-11.04
512.0900	Horizontal	-71.01	-57.00	-14.01
576.1100	Horizontal	-68.89	-57.00	-11.89
720.6399	Horizontal	-64.31	-57.00	-7.31

Above 1GHz Hopping				
Humidity : 50 %		Temperature : 23 ℃		
Test Result: PASS		Test By: Sance		
Test Mode: RX				
Frequency (MHz)	**Antenna** Polarization	**Emission level (dBm)**	**Limit (dBm)**	**Margin (dB)**
4804	Vertical	-55.52	-47	-8.52
4960	Vertical	-52.44	-47	-5.44

4804	Horizontal	-54.68	-47	-7.68
4960	Horizontal	-51.47	-47	-4.47

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. TEST EQUIPMENT LIST

Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
Receiver	Rohde & Schwarz	ESCI7	100837	Nov.24, 2015	Nov.23, 2016
DC Power Source	HUA YI	HY5003-2	N/A	Nov.03, 2015	Nov.02, 2016
Temperature & Humidity Chamber	HAIDA	DH-225T	N/A	Nov.05, 2015	Nov.04, 2016
Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Sep.01, 2015	Aug. 31, 2016
Horn Antenna	COM-Power	AH-118	071078	Nov.05, 2015	Nov.04, 2016
Pre-Amplifier	COM-Power	PAM-118	443007	Nov.05, 2015	Nov.04, 2016
Horn Antenna	Schwarzbeck	BBHA9170	9170-372	Oct.23, 2015	Oct.22, 2016
Broadband Antenna	Schwarzbeck	VULB9162	9162-010	Nov. 27, 2015	Nov. 26, 2016
Pre-Amplifier	Agilent	8449B	3008A02964	Nov.03, 2015	Nov.02, 2016
Pre-Amplifier	HP	HP 8447D	1145A00203	Nov.07, 2015	Nov.06, 2016
TS 8997	Rohde & Schwarz	N/A	N/A	N/A	N/A
Switch Unit with OSP-B157	Rohde & Schwarz	OSP120	101309	Oct, 20, 2015	Oct,19, 2016
Spectrum Analyzer	Rohde & Schwarz	FSV-30	103173	Oct, 05, 2015	Oct, 04, 2016
Cable	Huber+Suhner	CIL02	N/A	Nov.08, 2015	Nov.07, 2016

APPENDIX I

INFORMATION AS REQUIRED BY EN 300 328 V1.9.1, CLAUSE 5.3.1

In accordance with EN 300 328, clause 5.3.1, 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: 15
	• The (Average) Dwell Time: 294.1ms
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 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 π/4-DQPSK Hopping
	• 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) GFSK
	• Medium Utilisation N/A
	• Adaptivity & Receiver Blocking N/A
	• Nominal Channel Bandwidth π/4-DQPSK
	• Transmitter unwanted emissions in the OOB domain GFSK
	• Transmitter unwanted emissions in the spurious domain π/4-DQPSK
	• Receiver spurious emissions π/4-DQPSK

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) Occupied Channel Bandwidth(s):	•Nominal Channel Bandwidth 1: 846 KHz •Nominal Channel Bandwidth 2: 1192 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 extreme operating conditions that apply to the equipment:	Operating temperature range: 0 ° C to 45 ° 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 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 power level.

<table>
<tr><td></td><td>

Power Level 3:_____

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.
</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 230 V
☐ DC State DC voltage 12 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® BT2.1+EDR</td></tr>
<tr><td>**q) If applicable, the statistical analysis referred to in clause 5.3.1 q)**</td><td>(to be provided as separate attachment)</td></tr>
<tr><td>**r) If applicable, the statistical analysis referred to in clause 5.3.1 r)**</td><td>(to be provided as separate attachment)</td></tr>
<tr><td>**s) Geo-location capability supported by the equipment:**</td><td>

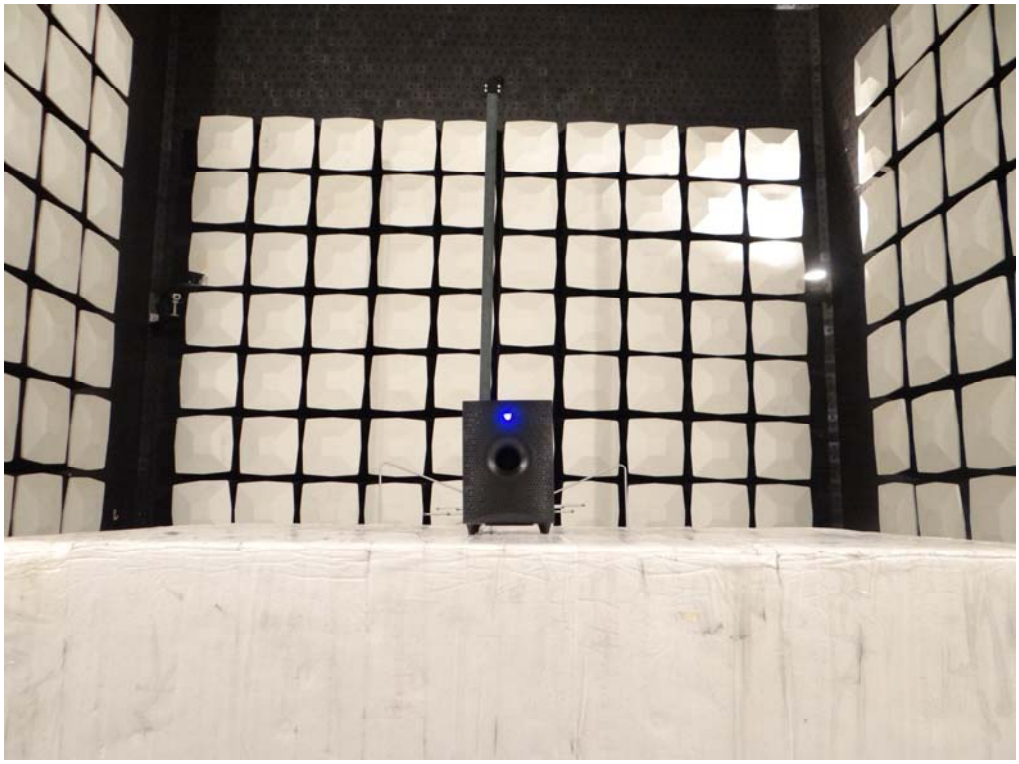
☐ Yes
☐ The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user.
☐ No
</td></tr>
</table>

E.2 Combination for testing	Highest overall e.i.r.p. value: ___-2.81___dBm
	Corresponding Antenna assembly gain: __0___dBi
	Corresponding conducted power setting: (also the power level to be used for testing) _____ dBm
	Antenna Assembly #_____
	Listed as Power Setting #: _____
E.3 Additional information provided by the applicant	
E.3.1 Modulation:	ITU Class(es) of emission: __FHSS____ Can the transmitter operate unmodulated? ☒ yes ☐ no
E.3.2 Duty Cycle	The transmitter is intended for: ☐ Continuous duty ☐ Intermittent duty ☒ Continuous operation possible for testing purposes
E.3.3 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 ☒ The equipment submitted is CE marked ☒ In addition to the CE mark, the Class-II identifier (Alert Sign) is affixed.
E.3.4 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)

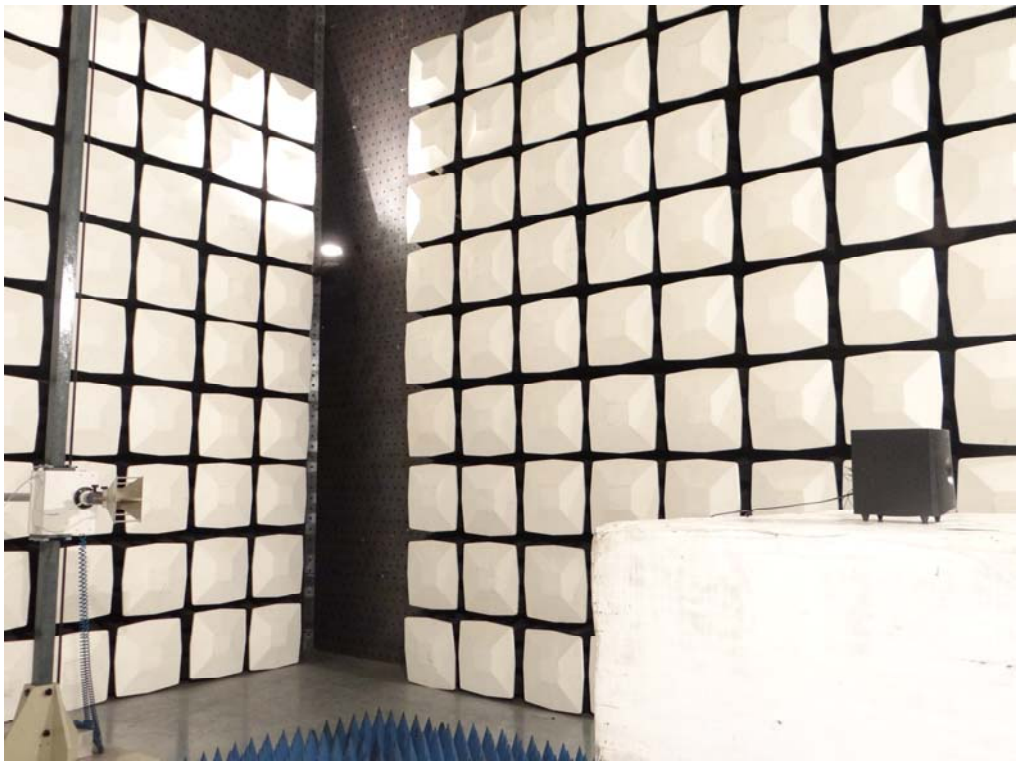
APPENDIX II

PHOTOGRPHS OF TEST SETUP

Radiated Emission Below 1 GHz



Radiated Emission Above 1 GHz



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