TEST REPORT

ETSI EN 300 328 V2.2.2（2019-07）

Report Reference No.......................:	**GTS20240426022-1-15**
Compiled by (position+printed name+signature)..:	File administrators Peter Xiao
Supervised by (position+printed name+signature)..:	Test Engineer Evan Ouyang
Approved by (position+printed name+signature)..:	Manager Jason Hu
Date of issue....................................:	Jun.21, 2024
Testing Laboratory Name ....:	**Shenzhen Global Test Service Co.,Ltd.**
Address ....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong
Applicant's name............................:	**Shenzhen Techtion Smart Electronics Co., Ltd**
Address ....:	Room 902, 8th Floor, Unit 1, Building No. 2, Xintianxia Chengyun Factory District, Vanke City Community, Bantian Street, Longgang District, Shenzhen, China
Test specification ....:	
Standard ....:	**ETSI EN 300 328 V2.2.2（2019-07）**

Test item description ....:	**Outdoor Reflective Display Terminal**
Trade Mark ....:	N/A
Manufacturer ....:	Shenzhen Techtion Smart Electronics Co., Ltd
Model/Type reference.......................:	TS-156PHD
Listed model ....:	TS-780PHD, TS-101PHD, TS-105PHD, TS-133PHD, TS-215PHD, TS-286THD, TS-298THD, TS-280THD, TS-320PHD, TS-362THD, TS-401THD, TS-430PHD, TS-434THD, TS-500THD, TS-550PHD, TS-650THD, TS-750THD, TS-850THD, TS-860THD, TS-980THD, TS-XXXPHD, TS-XXXTHD(X=0-9,X=A-Z)
Modulation Type ....:	GFSK, π/4-DQPSK, 8-DPSK
Operation Frequency.........................:	From 2402MHz to 2480MHz
Ratings ....:	DC 12.0V/4.0A by Adapter
Result...:	**PASS**

T E S T R E P O R T

Test Report No. :	**GTS20240426022-1-15**	Jun. 21, 2024 Date of issue

Equipment under Test	:	Outdoor Reflective Display Terminal
Model /Type	:	TS-156PHD
Listed model	:	TS-780PHD, TS-101PHD, TS-105PHD, TS-133PHD, TS-215PHD, TS-286THD, TS-298THD, TS-280THD, TS-320PHD, TS-362THD, TS-401THD, TS-430PHD, TS-434THD, TS-500THD, TS-550PHD, TS-650THD, TS-750THD, TS-850THD, TS-860THD, TS-980THD, TS-XXXPHD, TS-XXXTHD(X=0-9,X=A-Z)
Applicant	:	**Shenzhen Techtion Smart Electronics Co., Ltd**
Address	:	Room 902, 8th Floor, Unit 1, Building No. 2, Xintianxia Chengyun Factory District, Vanke City Community, Bantian Street, Longgang District, Shenzhen, China
Manufacturer	:	**Shenzhen Techtion Smart Electronics Co., Ltd**
Address	:	Room 902, 8th Floor, Unit 1, Building No. 2, Xintianxia Chengyun Factory District, Vanke City Community, Bantian Street, Longgang District, Shenzhen, China

Test Result:	**PASS**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 300 328 V2.2.2 (2019-07)–Wideband transmission systems;Data transmission equipment operating in the 2,4 GHz band;Harmonised Standard for access to radio spectrum

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	May. 10, 2024
Testing commenced on	:	May. 10, 2024
Testing concluded on	:	Jun. 20, 2024

2.2. Product Description

Product Name:	Outdoor Reflective Display Terminal
Trade Mark:	N/A
Model/Type reference:	TS-156PHD
List Model:	TS-780PHD, TS-101PHD, TS-105PHD, TS-133PHD, TS-215PHD, TS-286THD, TS-298THD, TS-280THD, TS-320PHD, TS-362THD, TS-401THD, TS-430PHD, TS-434THD, TS-500THD, TS-550PHD, TS-650THD, TS-750THD, TS-850THD, TS-860THD, TS-980THD, TS-XXXPHD, TS-XXXTHD(X=0-9,X=A-Z)
Model Declaration	PCB board, structure and internal of these model(s) are the same, Only the model name different , So no additional models were tested.
Power supply:	DC 12.0V/4.0A by Adapter
Hardware Version	N/A
Software Version	N/A
Bluetooth	
Frequency Range	2402MHz ~ 2480MHz
Channel Number	79 channels for Bluetooth (DSS) 40 channels for Bluetooth (DTS)
Channel Spacing	1MHz for Bluetooth (DSS) 2MHz for Bluetooth (DTS)
Modulation Type	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth (DSS) GFSK for Bluetooth (DTS)
2.4GWLAN	
WLAN CE Operation frequency	IEEE 802.11b:2412-2472MHz IEEE 802.11g:2412-2472MHz IEEE 802.11n HT20:2412-2472MHz IEEE 802.11n HT40:2422-2462MHz
WLAN CE Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Channel number:	13 Channel for IEEE 802.11b/g/n (HT20) 9 Channel for IEEE 802.11n (HT40)
Channel separation:	5MHz
WIFI (5G Band)	
WLAN CE Operation frequency	5180-5240MHz
WLAN CE Modulation Type	802.11a/n/ac: OFDM
Channel number:	4 Channels for 20MHz bandwidth(5180-5240MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 1 channels for 80MHz bandwidth(5210MHz)
SRD (5.8G Band)	
WLAN CE Operation frequency	5745-5825MHz

WLAN CE Modulation Type	802.11a/n/ac: OFDM
Channel Number	5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5775MHz)
Antenna Description	Two External antenna respectively. WLAN not support 2*2MIMO technology. ANT0 used for WIFI TX/RX, 2.0 dBi(Max.) for 2.4GWLAN; ANT1 used for BT&WIFI TX/RX, 2.0 dBi(Max.) for BT and 2.0dBi (Max.) for 5GWLAN;

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V/ 50 Hz	○	120V/60Hz
		●	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

DC 12.0V

Description of the test mode

Bluetooth and EDR:79 channels are provided to the EUT.

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	40	2442
01	2403	41	2443
02	2404	42	2444
--	--	--	--
--	--	--	--
37	2439	77	2479
38	2440	78	2480
39	2441		

2.4. Description of the Equipment under Test (EUT)

Reference documents:	Bluetooth® Core Specification
Special test descriptions:	None
Configuration descriptions:	TX tests: were performed with x-DH5 packets and static PRBS patternpayload.
	RX/Standby tests: BT test mode enabled, scan enabled, TX Idle
Test mode:	☒Bluetooth Test mode loop back enabled(EUT is controlled over CBT/CMU)
	☐Special software is used. EUT is transmitting pseudo random data by itself
Bluetooth standard capabilities:	79 channels FHSS
	channel separation 1 MHz
	used freq. range 2402-2480 MHz
	Modulation types: GFSK, π/4-DQPSK, 8-DPSK
	Bandwidth appr. 1MHz, 1,5 MHz, 1.5 MHz for single hop frequency
	number of hopping channels > 15 all the time
	more than 70% of band used with more than 20 channels

2.5. EUT Classification:

Type of equipment:	☒	stand alone equipment
	☐	plug in radio equipment
	☐	combined equipment
Modulation types:	☐	Wide Band Modulation (None Hopping – e.g. DSSS, OFDM)
	☒	Frequency Hopping Spread Spectrum (FHSS)
Adaptive equipment:	☒	Yes, LBT-based
	☐	Yes, non-LBT-based
	☐	Yes (but can be disabled)
	☐	No
Antennas and transmitoperating modes:	☒	Operating mode 1 (single antenna)
		Equipment with 1 antenna, Equipment with 2 diversity antennas operating in switched diversity modeby which at any moment in time only 1 antenna is used, Smart antenna system with 2 or more transmit/receive chains, butoperating in a mode where only 1 transmit/receive chain is used)
	☐	Operating mode 2 (multiple antennas, no beamforming)
		Equipment operating in this mode contains a smart antenna system using two or moretransmit/receive chains simultaneously but without beamforming.
	☐	Operating mode 3 (multiple antennas, with beamforming)
		Equipment operating in this mode contains a smart antenna system using two or moretransmit/receive chains simultaneously with beamforming. In addition to the antenna assembly gain (G), the beamforming gain (Y) may have to be taken into account when performing the measurements.

2.6. EUR Exercise software

The system was configured for testing in a continuous transmits condition and change test channels by software (ADB Mode) provided by application.

2.7. Special Accessories

No.	Equipment	Manufacturer	Model No.	Serial No.	Length	shielded/ unshielded	Notes
1	--	--	--	--	--	--	--

2.8. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

●	Adapter	M/N:	ADP-48D12
		Manufacturer:	Hunan Dajing Technology Co., Ltd
○	PC	M/N:	DESKYOP-EUIVCNR
		Manufacturer:	LENOVO
○	Display	M/N:	LE23CW-D
		Manufacturer:	THTF
○	Keyboard	M/N:	T460S
		Manufacturer:	LENOVO
○	Mouse	M/N:	Howard
		Manufacturer:	LENOVO
○	Earphone	M/N:	MDR-XB550AP
		Manufacturer:	SONY
○	USB flash disk	M/N:	U330
		Manufacturer:	aigo

2.9. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd..
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS (No. CNAS L8169)
Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.
A2LA (Certificate No. 4758.01)
Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.
Industry Canada Registration Number. is 24189.
FCC Designation Number is CN1234.
FCC Registered Test Site Number is165725.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Normal Temperature: 25 °C
High Temperature: 45 °C
Low Temperature: -20 °C
Normal Voltage : DC 12.0V
High Voltage: DC 13.2V
Low Voltage: DC10.8V
Relative Humidity: 55 %
Air Pressure: 989 hPa

3.4. Test Description

3.4.1 Main Terms

Verdict Verdict of each test cases.

3.4.2 Terms used in Condition column

NTCNormal voltage, Normal Temperature
HVHigh voltage, Normal Temperature
LVLow voltage, Normal Temperature
HT High Temperature, Normal voltage
LT Low Temperature, Normal voltage
HTHVHigh voltage, High Temperature
LTHVHigh voltage, Low Temperature
HTLVLow voltage, High Temperature
LTLVLow voltage, Low Temperature
VibVibration

3.4.3 Terms used in Verdict column

PassThis test cases has been tested, and EUT is conformant to the applied standardsin the given frequency band.
FailThis test cases has been tested, but EUT is not conformant to the appliedstandards in the given frequency band.
N/AThis test case is either not required/not applicable in the specified band or is not applicable according to the specific PICS/PIXIT for the EUT.
IncTest case result is ambiguous in the given frequency band.
DeclDeclaration is received from the client to demonstrate the conformity to therelevant specification in the given frequency band.
BRThis test cases is not tested in the given frequency band, but this testcases wastested with pass result for the initial model in the given frequency band.

3.4.4 Sumarry of measurement results

☒**No deviations from the technical specifications were ascertained**

☐There were deviations from the technical specifications ascertained

TestSpecificationClause	Test Case	Test Condition	Mode	Pass	Fail	N/A	NP	Remark
5.4.2	RF output power	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
		LT		☒	☐	☐	☐	
		HT		☒	☐	☐	☐	
5.4.2	Duty Cycle,Tx-sequence,Tx-gap	NTC	---	☐	☐	☒	☐	
5.4.4	Dwell time, minFreq.Occupation andHoppingsequence	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
5.4.5	HoppingSeparation	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
5.4.2	MediumUtilisation	NTC	---	☐	☐	☒	☐	
5.4.6	Adaptivity, ShortControlSignallingTransmissions	NTC	GFSK π/4-DQPSK 8-DPSK	☐	☐	☒	☐	
5.4.7	OccupiedChannelBandwidth	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
5.4.8	Transmitterunwantedemissions in theout-of-banddomain	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
		LT		☒	☐	☐	☐	
		HT		☒	☐	☐	☐	
5.4.9	Transmitterunwantedemissions in thespurious domain(conducted &radiated)	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
5.4.10	Receiver spurious emissions (conducted &radiated)	NTC	GFSK π/4-DQPSK 8-DPSK	☒	☐	☐	☐	
5.4.11	ReceiverBlocking	NTC	----	☒	☐	☐	☐	

Remark: The measurement uncertainty is not included in the test result.

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01"Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 1"and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Global Test Service Co.,Ltd.is reported:

Test Items	Measurement Uncertainty	Notes
Frequency error	25 Hz	(1)
Frequency range	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Adjacent and alternate channel power Conducted	1.20 dB	(1)
Conducted spurious emission	1.60 dB	(1)
Radiated spurious emission	2.20 dB	(1)
Intermodulation attenuation	1.00 dB	(1)
Maximum useable receiver sensitivity	2.80 dB	(1)
Co-channel rejection	2.80 dB	(1)
Adjacent channel selectivity	2.80 dB	(1)
Spurious response rejection	2.80 dB	(1)
Intermodulation response rejection	2.80 dB	(1)
Blcking or desensitization	2.80 dB	(1)

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

3.6. Equipments Used during the Test

RF output power&PSD&OOB&OBW &Hoping &Duty Cycle, Tx-sequence, Tx-gap&Adaptively& ReceiverBlocking& Centre frequencies & TPC						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	Spectrum Analyzer	Agilent	N9020A	MY48010425	2023/09/08	2024/09/07
2	Vector Signal generator	Agilent	N5181A	MY49060502	2023/07/13	2024/07/12
3	Signal generator	Agilent	E4421B	3610AO1069	2023/09/08	2024/09/07
4	4 Ch. Simultaneous Sampling 14 Bits 2 MS/s	Agilent	U2531A	TW53323507	2023/09/08	2024/09/07
5	X-series USB Peak and Average Power Sensor	Agilent	U2021XA	MY5365004	2023/09/08	2024/09/07
6	Climate Chamber	ESPEC	EL-10KA	A20120523	2023/09/08	2024/09/07
7	Spectrum Analyzer	R&S	FSV40	100019	2023/07/13	2024/07/12
8	Universal Radio Communication	Rohde&Schwarz	CMU200	114353	2023/09/08	2024/09/07
9	Wireless Commnunication Tester	Rohde&Schwarz	CMW500	125408	2023/07/13	2024/07/12
10	Test Control Unit	Tonscend	JS0806-1	178060067	2023/07/13	2024/07/12
11	Automated filter bank	Tonscend	JS0806-F	19F8060177	2023/07/13	2024/07/12
12	EMI Test software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
13	EMI Test software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/

Transmitter spurious emissions & Receiver spurious emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI 7	101102	2023/09/08	2024/09/07
2	Spectrum Analyzer	Agilent	N9020A	MY480 10425	2023/09/08	2024/09/07
3	Spectrum Analyzer	R&S	FSV40	100019	2023/07/13	2024/07/12
4	By-log Antenna	SCHWARZBECK	VULB9163	000976	2023/07/13	2024/07/12
5	Double Ridged Horn Antenna (1~18GHz)	SCHWARZBECK	BBHA 9120D	01622	2023/09/08	2024/09/07
6	Horn Antenna (18GHz~40GHz)	Schwarzbeck	BBHA9170	791	2023/09/08	2024/09/07
7	Amplifier (30MHz~1GHz)	Schwarzbeck	BBV 9743	#202	2023/07/13	2024/07/12
8	Amplifier (1GHz~18GHz)	Taiwan Chengyi	EMC051845 B	980355	2023/07/13	2024/07/12
9	Amplifier (26.5GHz~40GHz)	Schwarzbeck	BBV9179	9719-025	2023/07/13	2024/07/12
10	High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2023/07/13	2024/07/12
11	High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2023/07/13	2024/07/12
12	High pass filter	Compliance Direction systems	BSU-6	34202	2023/07/13	2024/07/12
13	RF Cable	HUBER+SUHNER	RG214	N/A	2023/07/13	2024/07/12
14	EMI Test software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

The calibration interval is 1 year.

4. TEST CONDITIONS AND RESULTS

4.1. ETSI EN 300 328 REQUIREMENTS

4.1.1. RF Output Power

LIMIT

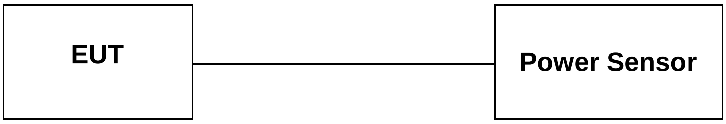
ETSI EN 300 328 Sub-clause 4.3.1.2.3

The RF output power for FHSS equipment shall be equal to or less than 20 dBm.
NOTE: For Non-adaptive FHSS equipment, the manufacturer may have declared a reduced RF Output Power (see clause 5.4.1 m)) and associated Duty Cycle (see clause 5.4.1 e)) that will ensure that the equipment meets the requirement for the Medium Utilization (MU) factor further described in clause 4.3.1.6. This is verified by the conformance test referred to in clause 4.3.1.6.4.

For non-adaptive FHSS equipment, where the manufacturer has declared an RF output power lower than 20 dBm e.i.r.p., the RF output power shall be equal to or less than that declared value.

This limit shall apply for any combination of power level and intended antenna assembly.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause5.4.2.2.1.2
Step 1:
● Use a fast power sensor with a minimum sensitivity of -40 dBm and capable of minimum 1 MS/s.
● Use the following settings:
- Sample speed 1 MS/s or faster.
- The samples shall represent the RMS power of the signal.
- Measurement duration: For non-adaptive equipment: equal to the observation period defined in clause 4.3.1.3.2 or clause 4.3.2.4.2. For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) is captured.
- For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.

Step 2:
● For conducted measurements on devices with one transmit chain:
- Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.

● For conducted measurements on devices with multiple transmit chains:
- Connect one power sensor to each transmit port for a synchronous measurement on all transmit ports.
- Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than 500 ns.
- For each individual sampling point (time domain), sum the coincident power samples of all ports and store them. Use these summed samples as the new stored data set.

Step 3:
● Find the start and stop times of each burst in the stored measurement samples.
The start and stop times are defined as the points where the power is at least 30 dB below the highest value of the stored samples in step 2.
In case of insufficient sensitivity of the power sensor (e.g. in case of radiated measurements), the value of 30 dB may need to be reduced appropriately.

Step 4:
● Between the start and stop times of each individual burst calculate the RMS power over the burst using the formula below. The start and stop points shall be included. Save these Pburst values, as well as the start and stop times for each burst.

$$P_{burst} = \frac{1}{k}\sum_{n=1}^{k} P_{sample}(n)$$

with k being the total number of samples and n the actual sample number.

Step 5:
● The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.

Step 6:

- Add the (stated) antenna assembly gain G in dBi of the individual antenna.
- case of smart antenna systems operating in mode with beamforming (see clause 5.3.2.2.4), add the additional beamforming gain Y in dB.
- If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used.
- The RF Output Power (Pout) shall be calculated using the formula below:

$$P_{out} = A + G + Y$$

- This value, which shall comply with the limit given in clause 4.3.1.2.3 or clause 4.3.2.2.3, shall be recorded in the test report.

EUT DESCRIPTION:

Mode:	Testmode
Hopping:	On
Packet Type:	Longest supported
Modulation:	GFSK, π/4-DQPSK, 8-DPSK

MEASUREMENT DESCRIPTION

Instrument:	Power Meter measuring burst Power(EMS) of a least 10 packets	
Performed:	☒	Conducted
	☐	Radiated (only if no conducted sample is provided)

TEST RESULTS

Test Method: Conducted		Test Mode:GFSK Mode		
Test Condition / Test environmental		Maximum conducted Burst Power in 15 measured Bursts (RMS) [dBm]		
Temperature (℃)	Voltage (V)	Measured Power (dBm)	Antenna Gain(dBi)	EIRP (dBm)
T Nor (25℃)	DC 12.0	-2.23	2.00	-0.23
T min (-20℃)	DC 12.0	-2.18	2.00	-0.18
T Max (+45℃)	DC 12.0	-2.62	2.00	-0.62
Result		Pass		
Limit		20dBm		

Test Method: Conducted		Test Mode: π/4-DQPSK Mode		
Test Condition / Test environmental		Maximum conducted Burst Power in 15 measured Bursts (RMS) [dBm]		
Temperature (℃)	Voltage (V)	Measured Power (dBm)	Antenna Gain(dBi)	EIRP (dBm)
T Nor (25℃)	DC 12.0	-2.08	2.00	-0.08
T min (-20℃)	DC 12.0	-2.38	2.00	-0.38
T Max (+45℃)	DC 12.0	-2.93	2.00	-0.93
Result		Pass		
Limit		20dBm		

Test Method: Conducted		Test Mode:8-DPSK Mode		
Test Condition / Test environmental		Maximum conducted Burst Power in 15 measured Bursts (RMS) [dBm]		
Temperature (℃)	Voltage (V)	Measured Power (dBm)	Antenna Gain(dBi)	EIRP (dBm)
T Nor (25℃)	DC 12.0	-2.11	2.00	-0.11
T min (-20℃)	DC 12.0	-2.80	2.00	-0.80
T Max (+45℃)	DC 12.0	-2.59	2.00	-0.59
Result		Pass		
Limit		20dBm		

Note :1. Measured Power include the cable loss.

4.1.2. Duty Cycle,TX-sequence,TX-gap

LIMIT

ETSI EN 300 328 Sub-clause 4.3.1.3.3
Non-adaptive FHSS equipment shall comply with the following:
• The Duty Cycle shall be equal to or less than the maximum value declared by the manufacturer.
• The maximum Tx-sequence time shall be 5 ms.
• The minimum Tx-gap time shall be 5 ms.
NOTE: For Non-adaptive FHSS equipment, the manufacturer may have declared a reduced RF Output Power (see clause 5.4.1 m)) and associated Duty Cycle (see clause 5.4.1 e)) that will ensure that the equipment meets the requirements for the Medium Utilization (MU) factors further described in clause 4.3.1.6. This is verified by the conformance test referred to in clause 4.3.1.6.4.

These requirements do not apply for equipment with a declared RF Output power of less than 10 dBm e.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause5.4.2.2.1.
The test procedure, which shall only be performed for non-adaptive systems and only to be performed at normal environmental conditions, shall be as follows:
Step 1:
● Use the same stored measurement samples from the procedure described in clause 5.4.2.2.1.2.
● The start and stop times are defined as the points where the power is at least 30 dB below the highest value of the stored samples. In case of insufficient sensitivity of the power sensor (e.g. in case of radiated measurements), the value of 30 dB may need to be reduced appropriately.
Step 2:
● Between the saved start and stop times of each individual burst, calculate the TxOn time. Save these TxOn values.
Step 3:
● Duty Cycle (DC) is the sum of all TxOn times between the end of the first gap (which is the start of the first burst within the observation period) and the start of the last burst (within this observation period) divided by the observation period. The observation period is defined in clause 4.3.1.3.2 or clause 4.3.2.4.2.
Step 4:
● For FHSS equipment using blacklisting, the TxOn time measured for a single (and active) hopping frequency shall be multiplied by the number of blacklisted frequencies. This value shall be added to the sum calculated in step 3 above. If the number of blacklisted frequencies cannot be determined, the minimum number of hopping frequencies (N) as defined in clause 4.3.1.4.3 shall be assumed.
● The calculated value for Duty Cycle (DC) shall be recorded in the test report. This value shall be equal to or less than the maximum value declared by the manufacturer.
Step 5:
● Use the same stored measurement samples from the procedure described in clause 5.4.2.2.1.2.
● Identify any TxOff time that is equal to or greater than the minimum Tx-gap time as defined in clause 4.3.1.3.3 or clause 4.3.2.4.3. These are the potential valid gap times to be further considered in this procedure.
● Starting from the second identified gap, calculate the time from the start of this gap to the end of the preceding gap. This time is the Tx-sequence time for this transmission. Repeat this procedure until the last identified gap within the observation period is reached.
● A combination of consecutive Tx-sequence times and Tx-gap times followed by a Tx-gap time, which is at least as long as the duration of this combination, may be considered as a single Tx-sequence time and in which case it shall comply with the limits defined in clause 4.3.1.3.3 or clause 4.3.2.4.3.
● It shall be noted in the test report whether the UUT complies with the limits for the maximum Tx-sequence time and minimum Tx-gap time as defined in clause 4.3.1.3.3 or clause 4.3.2.4.3.

EUT DESCRIPTION:

Mode:	BT Testmode
Hopping:	On
Packet Type:	Longest supported
Modulation:	GFSK, π/4-DQPSK,8-DPSK

MEASUREMENT DESCRIPTION

Instrument:	Power Meter measuring average burst Power of a least 10 packets	
Performed:	☒	Conducted
	☐	Radiated (only if no conducted sample is provided)

TEST RESULTS

This requirement do not apply for equipment with a maximum declared RF Output power level of less than 10 dBme.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBme.i.r.p. So This requirement do not apply for EUT.

4.1.3. Dwell time, Min. Freq. Occupation and Hopping Sequence

LIMIT

ETSI EN 300 328 Sub-clause 4.3.1.4.3.2

Adaptive frequency hopping systems:
Adaptive Frequency Hopping systems shall be capable of operating over a minimum of 70 % of the band specified in the following Table

	Service frequency bands
Transmit	2 400 MHz to 2 483,5 MHz
Receive	2 400 MHz to 2 483,5 MHz

.

The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

In order for the FHSS equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:
Option 1: Each hopping frequency of the Hopping Sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.
Option 2: The occupation probability for each frequency shall be between ((1 / U) × 25 %) and 77 % where U is the number of hopping frequencies in use.

The Hopping Sequence(s) shall contain at least N hopping frequencies at all times, where N is either 15 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause5.4.4.2.1

These measurements shall only be performed at normal test conditions.
Step 1:
●The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
●The analyzer shall be set as follows:
- Centre Frequency: Equal to the hopping frequency being investigated
- Frequency Span: 0 Hz
- RBW:500KHz(~ 50 % of the Occupied Channel Bandwidth (single hop))
- VBW:500KHz(VBW⩾ RBW)
- Detector Mode: RMS
- Sweep time: Equal to the applicable observation period (see clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2)
- Number of sweep points: 30 000
- Trace mode: Clear / Write
- Trigger: Free Run

Step 2:
●Save the trace data to a file for further analysis by a computing device using an appropriate software application or program.
Step 3:
●Indentify the data points related to the frequency being investigated by applying a threshold.
The data points resulting from transmissions on the hopping frequency being investigated are assumed to have much higher levels compared to data points resulting from transmissions on adjacent hopping frequencies. If a clear determination between these transmissions is not possible, the RBW in step 1 shall be further reduced. In addition, a channel filter may be used.
●Count the number of data points identified as resulting from transmissions on the frequency being investigated and multiply this number by the time difference between two consecutive data points.
Step 4:
●The result in step 3 is the Accumulated Transmit Time which shall comply with the limit provided in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2 and which shall be recorded in the test report.
Step 5:
●Make the following changes on the analyzer and repeat steps 2 and 3.
Sweep time: 4 × Dwell Time × Actual number of hopping frequencies in use
the hopping frequencies occupied by the equipment without having transmissions during the dwell time (blacklisted frequencies) should be taken into account in the actual number of hopping frequencies in use. If

this number cannot be determined (number of blacklisted frequencies unknown) it shall be assumed that the equipment uses the maximum possible number of hopping frequencies.
●The result shall be compared to the limit for the Frequency Occupation defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2. The result of this comparison shall be recorded in the test report.
Step 6:
●Make the following changes on the analyzer:
- Start Frequency: 2 400 MHz
- Stop Frequency: 2 483.5 MHz
- RBW: ~ 500KHz(50 % of the Occupied Channel Bandwidth (single hop))
- VBW:500KHz(VBW⩾ RBW)
- Detector Mode: Peak
- Sweep time: 1 s; this setting may result in long measuring times. To avoid such long measuring times, an FFT analyser may be used
- Trace Mode: Max Hold
- Trigger: Free Run

●Wait for the trace to stabilize. Identify the number of hopping frequencies used by the Hopping Sequence.
●The result shall be compared to the limit (value N) defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2.

For equipment with blacklisted frequencies, it might not be possible to verify the number of hopping frequencies in use. However, they shall comply with the requirement for Accumulated Transmit Time and Frequency Occupation assuming the minimum number of hopping frequencies (N) defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2 is used.

Step 7:
●For adaptive FHSS equipment, it shall be verified whether the equipment uses 70 % of the band specified in following table

	Service frequency bands
Transmit	2 400 MHz to 2 483,5 MHz
Receive	2 400 MHz to 2 483,5 MHz

This verification can be done using the lowest and highest -20 dB points from the total spectrum envelope obtained in step 6. The result shall be recorded in the test report.

<u>EUT DESCRIPTION:</u>

Dwell Time:
Definition: The Dwell Time is the time that a particular hopping frequency would be occupied by the transmitter during a single hop. The equipment itself is not required to transmit on this hopping frequency during the Dwell Time.
Minimum Frequency Occupation Time:
Definition: The Minimum Frequency Occupation Time is the minimum time each hopping frequency shall be occupied within a given period.
Requirement: The Minimum Frequency Occupation Time shall be equal to one dwell time within a period
Hopping Sequence:
Definition: The Hopping Sequence of a Frequency Hopping system is the unrepeated pattern of the hopping frequencies used by the equipment.
Requirement a): The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is 15 or 15 divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.
According to the Bluetooth Core Specification physical channels use at least Nmin = 20 RF channels
Requirement b): Adaptive Frequency Hopping systems shall be capable of operating over a minimum of 70 % of the band.
Bandwidth ISM Band: 83.5 MHz, Used Bandwidth: 79MHz

TEST RESULTS

◆ **Accumulated Dwell Time**

Modulation	Channel	Packet	Accumulated Dwell Time (s)	Limit (second)	Measurement Time(s)	Result
8-DPSK	0	3DH5	0.26	0.40	31.6	Pass
	78		0.32		31.6	

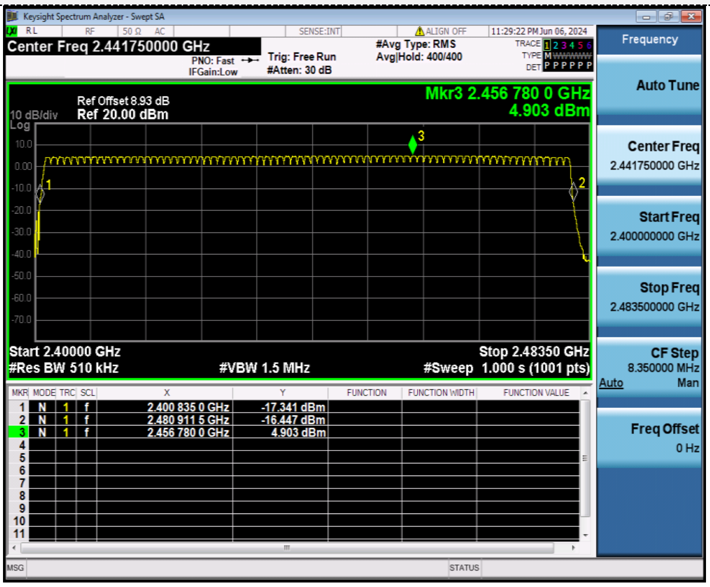
◆ **Minimum frequency occupation**

Modulation	Channel	Packet	Hops in Observed Period	Limit	Measurement Time(ms)	Result
8-DPSK	0	3DH5	3	>1	1185	Pass
	78		5		1185	

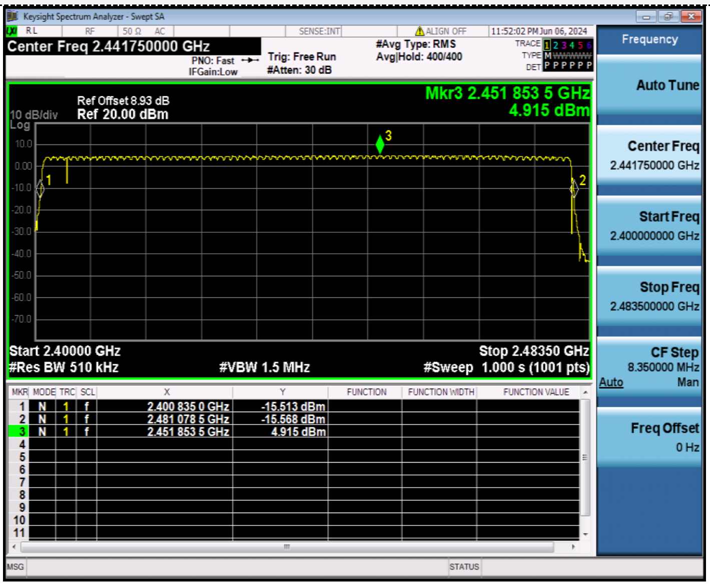
◆ **Hopping Sequence**

Modulation	Number of Hopping Frequencies	Limit	Band Use [%]	Limit [%]	Result
GFSK	79	≥15	95.90	70	Pass
π/4-DQPSK	79	≥15	96.10		
8-DPSK	79	≥15	96.10		

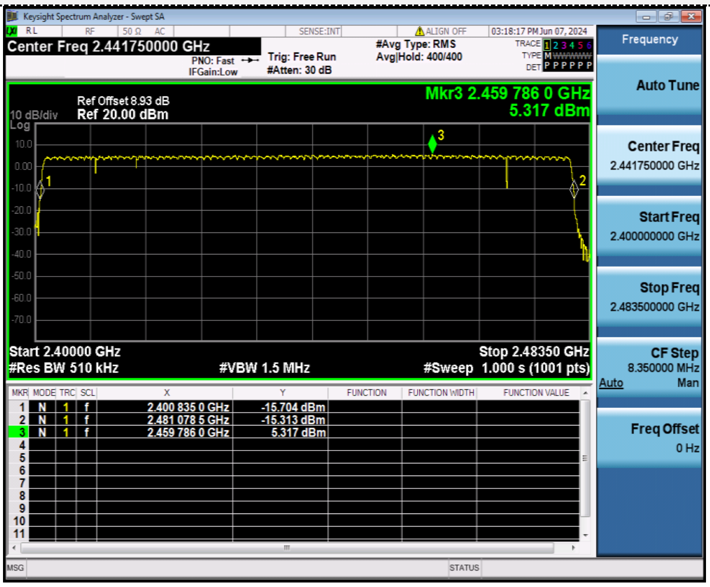
DH1



2DH1



3DH1



4.1.4. Hopping Frequency Separation

LIMIT

ETSI EN 300 328 Sub-clause 4.3.1.5.3.2

For Adaptive frequency hopping systems, The minimum Hopping Frequency Separation shall be 100 kHz.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause5.4.5.2.1
Option 1

Step 1:
●The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
●The analyzer shall be set as follows:
- Centre Frequency: Centre of the two adjacent hopping frequencies
- Frequency Span: Sufficient to see the complete power envelope of both hopping frequencies
- RBW: 30KHz(1 % of the span)
- VBW: 100KHz(3 × RBW)
- Detector Mode: Max Peak
- Trace Mode: Max Hold
- Sweep time: Auto

Step 2:
● Wait for the trace to stabilize.
● Use the marker function of the analyser to define the frequencies corresponding to the lower -20 dBr point and the upper -20 dBr point for both hopping frequencies F1 and F2. This will result in $F1_L$ and $F1_H$ for hopping frequency F1 and in $F2_L$ and $F2_H$ for hopping frequency F2. These values shall be recorded in the report.

Step 3:
●Calculate the centre frequencies $F1_C$ and $F2_C$ for both hopping frequencies using the formulas below. These values shall be recorded in the report.

$$F1_C = \frac{F1_L + F1_H}{2} \quad F2_C = \frac{F2_L + F2_H}{2}$$

●Calculate the Hopping Frequency Separation (F_{HS}) using the formula below. This value shall be recorded in the report.

$$F_{HS} = F2_C - F1_C$$

●Compare the measured Hopping Frequency Separation with the limits defined in clause 4.3.1.5.3.

For adaptive equipment, in case of overlapping channels which prevents the definition of the -20 dBr reference points $F1_H$ and $F2_L$, a higher reference level (e.g. -10 dBr or -6 dBr) may be chosen to define the reference points $F1_L$; $F1_H$; $F2_L$ and $F2_H$.

Alternatively, special test software may be used to:
●force the UUT to hop or transmit on a single Hopping Frequency by which the -20 dBr reference points can be measured separately for the 2 adjacent Hopping Frequencies; and/or
●force the UUT to operate without modulation by which the centre frequencies $F2_C$ and $F2_C$ can be measured directly.

Option 2

Step 1:
●The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
●The analyzer shall be set as follows:
- Centre Frequency: Centre of the two adjacent hopping frequencies
- Frequency Span: Sufficient to see the complete power envelope of both hopping frequencies
- RBW: 30KHz(1 % of the span)
- VBW: 100KHz(3 × RBW)
- Detector Mode: Max Peak
- Trace Mode: Max Hold
- Sweep Time: Auto

Step 2:

●Wait for the trace to stabilize.

●Use the marker-delta function to determine the Hopping Frequency Separation between the centres of the two adjacent hopping frequencies (e.g. by identifying peaks or notches at the centre of the power envelope for the two adjacent signals). This value shall be compared with the limits defined in clause 4.3.1.5.3 and shall be recorded in the test report.

EUT DESCRIPTION:

Mode:	BT Testmode
Hopping:	On
Packet Type:	Longest supported
Modulation:	GFSK, π/4-DQPSK, 8-DPSK

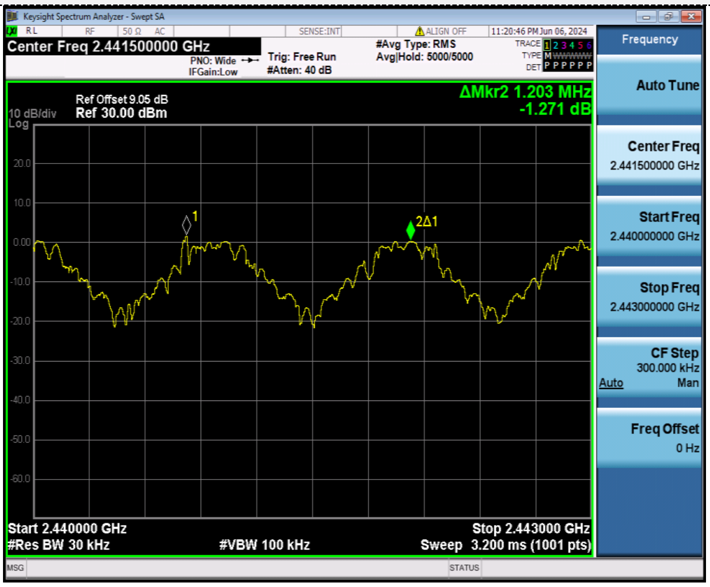
MEASUREMENT DESCRIPTION

Instrument:	Spectrum Analyzer	
Detector:	RMS	
Sweep time:	auto	
Video bandwidth:	30 KHz	
Resolution bandwidth:	100 KHz	
Span:	3 MHz	
Trace:	Max hold	
Performed:	☒	Conducted
	☐	Radiated (only if no conducted sample is provided)

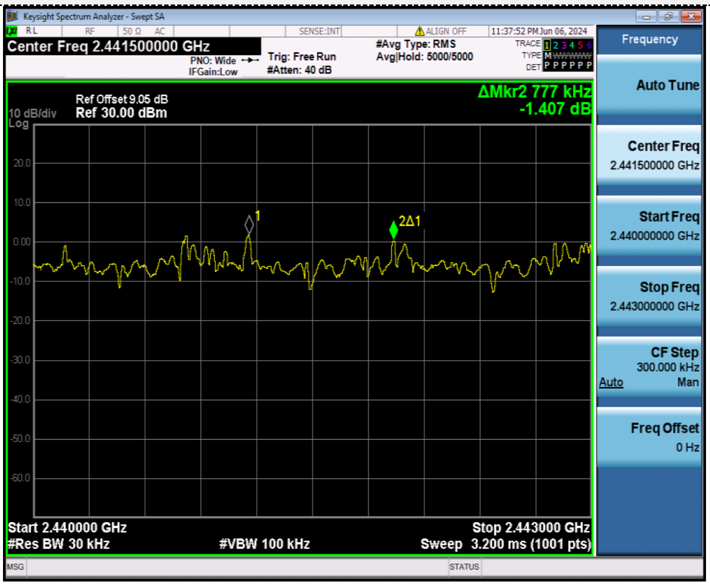
TEST RESULTS

Modulation	Hopping Frequency Separation(MHz)	Limit(MHz)	Result
DH1	1.203	≥0.100000	Pass
2DH1	0.777	≥0.100000	Pass
3DH1	1.014	≥0.100000	Pass

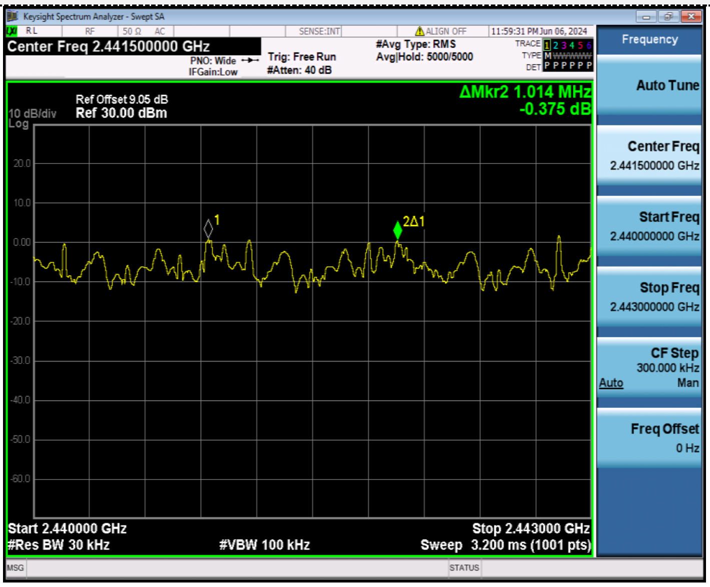
DH1



2DH1



3DH1



4.1.5. Medium Utilisation (MU) factor

LIMIT

ETSI EN 300 328 Sub-clause 4.3.1.6.3
The maximum Medium Utilisation factor for non-adaptive Frequency Hopping equipment shall be 10 %.

This requirement does not apply to adaptive equipment unless operating in a non-adaptive mode.
In addition, this requirement does not apply for equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause 5.4.2.2.1.4

Step 1:
● Use the same stored measurement samples from the procedure described in clause 5.4.2.2.1.2.

Step 2:
● For each burst calculate the product of (P_{burst}/100 mW) and the TxOn time.
NOTE: Pburst is expressed in mW. TxOn time is expressed in ms.

Step 3:
● Medium Utilization is the sum of all these products divided by the observation period (expressed in ms) which is defined in clause 4.3.1.3.2 or clause 4.3.2.4.2. This value, which shall comply with the limit given in clause 4.3.1.6.3 or clause 4.3.2.5.3, shall be recorded in the test report.
● If, in case of FHSS equipment, operation without blacklisted frequencies is not possible, the power of the bursts on blacklisted hopping frequencies (for the calculation of the Medium Utilization) is assumed to be equal to the average value of the RMS power of the bursts on all active hopping frequencies.

MEASUREMENT DESCRIPTION

Instrument:	Power Meter measuring average burst Power of a least 10 packets	
Performed:	☒	Conducted
	☐	Radiated (only if no conducted sample is provided)

TEST RESULTS

This requirement do not apply for equipment with a maximum declared RF Output power level of less than 10 dBme.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBme.i.r.p. So This requirement do not apply for EUT

4.1.6. Adaptivity

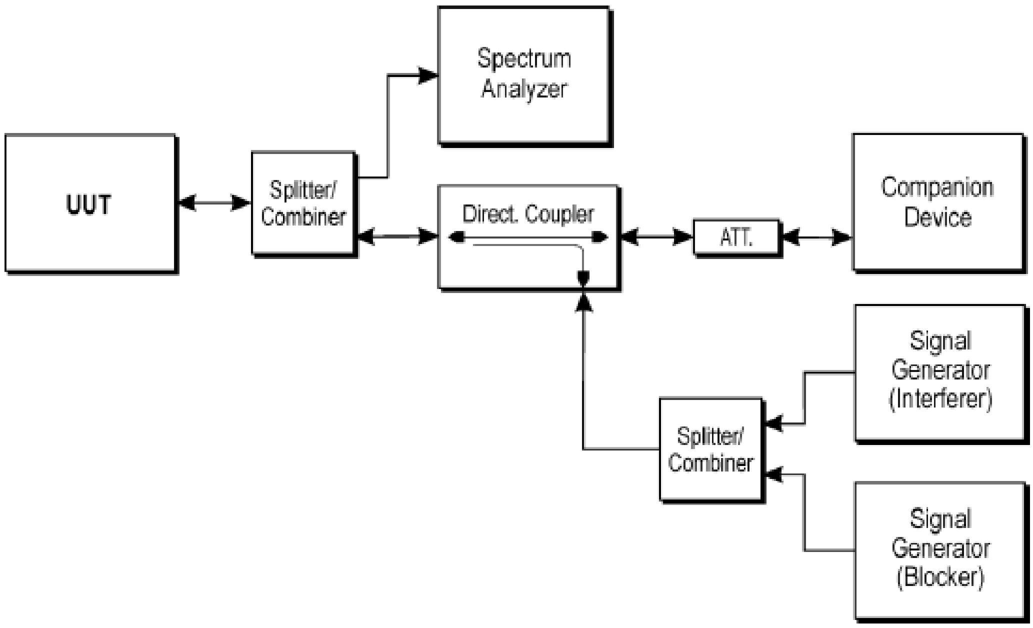
Requirements & Limits

ETSI EN 300 328 Sub-4.3.1.7

This requirement does not apply to non-adaptive FHSS equipment or adaptive FHSS equipment operating in a non-adaptive mode.

In addition, this requirement does not apply for FHSS equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for FHSS equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p.

TEST CONFIGURATION:



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 Sub-clause 5.4.6.2.1 for the measurement method.

   RBW: ⩾ Occupied Channel Bandwidth (if the analyser does not support thissetting, the highest available setting shall be used) (10MHz)
   VBW: 3 × RBW (if the analyser does not support this setting, the highestavailable setting shall be used) (10MHz)
   Detector Mode: RMS
   Centre Frequency: Equal to the centre frequency of the operating channel
   Span: 0 Hz
   Sweep time: > Channel Occupancy Time of the UUT
   Trace Mode: Clear/Write

.

TEST RESULTS

This requirement do not apply for equipment with a maximum declared RF Output power level of less than 10 dBme.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p. So This requirement do not apply for EUT

4.1.7. Occupied Channel Bandwidth

LIMIT

ETSI EN 300 328 Sub-clause 4.3.1.8.3
The Occupied Channel Bandwidth for each hopping frequency shall be within the band given in following Table

	Service frequency bands
Transmit	2 400 MHz to 2 483,5 MHz
Receive	2 400 MHz to 2 483,5 MHz

In addition, for non-adaptive FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than 5 MHz.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause5.4.7.2.1
Step 1:
Connect the UUT to the spectrum analyser and use the following settings:
●Centre Frequency: The centre frequency of the channel under test
●Resolution BW: ~ 1 % of the span without going below 1 %
●Video BW: 3 × RBW
●Frequency Span: 2 × Occupied Channel Bandwidth (e.g. 40 MHz for a 20 MHz channel)
●Detector Mode: RMS
●Trace Mode: Max Hold
● Sweep time: 1 s
Step 2:
Wait until the trace is completed.
Find the peak value of the trace and place the analyser marker on this peak.
Step 3:
Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.
NOTE: Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

EUT DESCRIPTION:

Mode:	BT Testmode
Hopping:	Off
Packet Type:	Longest supported
Modulation:	GFSK, π/4-DQPSK, 8-DPSK

MEASUREMENT DESCRIPTION

Instrument:	Spectrum Analyzer	
Detector:	RMS	
Sweep time:	auto	
Video bandwidth:	100KHz	
Resolution bandwidth:	30KHz	
Span:	3 MHz	
Center:	Transmit channel	
Trace:	Max hold	
Performed:	☒	Conducted
	☐	Radiated (only if no conducted sample is provided)

TEST RESULTS

Modulation	Channel	Occupied Channel Bandwidth (MHz)	FL[MHz]	FH[MHz]	Limit[MHz]	Result
DH1	CH0	0.88808	2401.5457	2402.4338	2400 to 2483.5	Pass
	CH78	0.89154	2479.5337	2480.4252	2400 to 2483.5	
2DH1	CH0	1.1857	2401.3932	2402.5789	2400 to 2483.5	
	CH78	1.1860	2479.3916	2480.5776	2400 to 2483.5	
3DH1	CH0	1.1683	2401.4058	2402.5741	2400 to 2483.5	
	CH78	1.1680	2479.4045	2480.5725	2400 to 2483.5	

Note :We tested the all modes,and recorded the worst case.

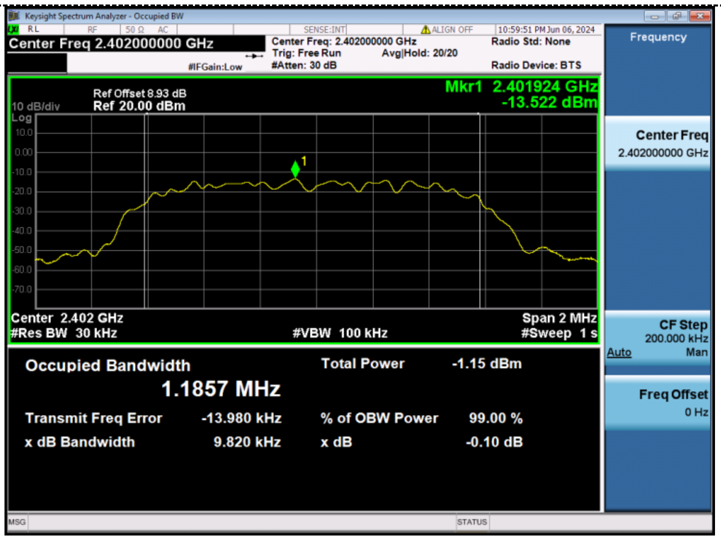
Test plot as follows:

DH1

CH0

CH78

2DH1
CH0



CH78

3DH1
CH0

CH78

4.1.8. Transmitter unwanted emissions in the out-of-band domain

LIMIT

ETSI EN 300 328Sub-clause 4.3.1.9.3
The transmitter unwanted emissions in the out-of-band domain shall not exceed the values provided by the mask in following figure

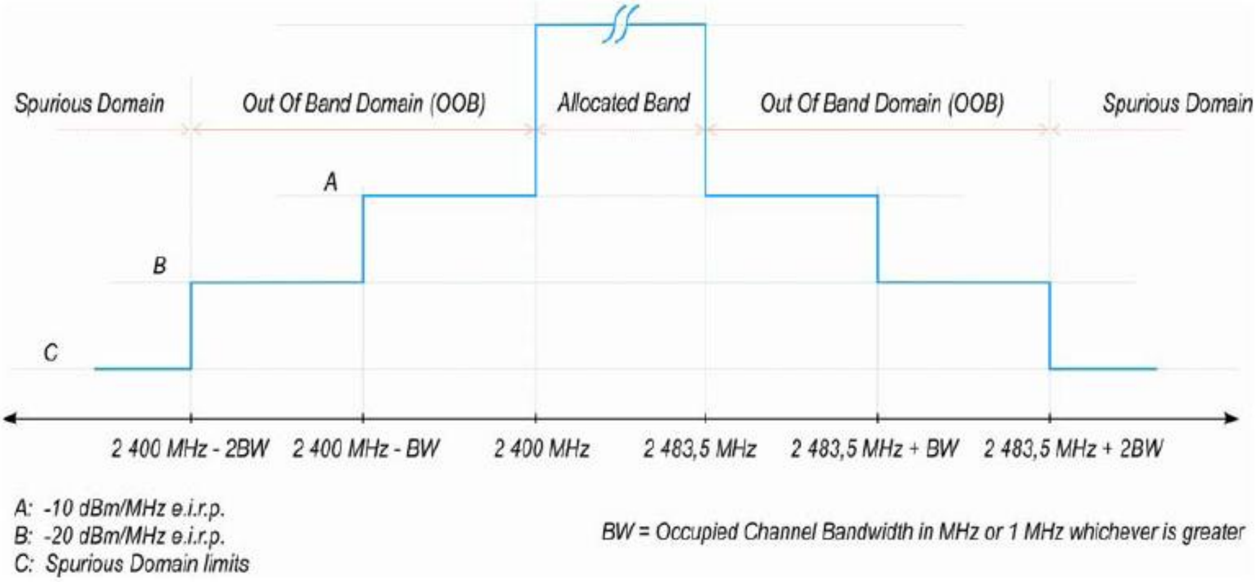


Figure 1: Transmit mask

Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in Transmit mode, on frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious.
These measurements have to be performed at normal environmental conditions and shall be repeated at the extremes of the operating temperature range.
In the case of equipment intended for use with an integral antenna and where no external (temporary) antenna connectors are provided, a test fixture as described in clause B.3 may be used to perform relative measurements at the extremes of the operating temperature range.
For systems using FHSS modulation, the measurements shall be performed during normal operation (hopping).
For systems using wide band modulations other than FHSS, the measurement shall be performed at the lowest and the highest channel on which the equipment can operate. These frequencies shall be recorded.
The equipment shall be configured to operate under its worst case situation with respect to output power.
If the equipment can operate with different Occupied Channel Bandwidths (e.g. 20 MHz and 40 MHz), than each channel bandwidth shall be tested separately.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause 5.4.8.2.1
The Out-of-band emissions within the different horizontal segments of the mask provided in figures 1 and 3 shall be measured using the steps below. This method assumes the spectrum analyser is equipped with the Time Domain Power option.

Step 1:
Connect the UUT to the spectrum analyser and use the following settings:
- Measurement Mode: Time Domain Power
- Centre Frequency: 2 484 MHz
- Span: Zero Span
- Resolution BW: 1 MHz
- Filter mode: Channel filter
- Video BW: 3 MHz
- Detector Mode: RMS
- Trace Mode: Max Hold
- Sweep Mode: Single Sweep
- Sweep Points: Sweep time [µs] / (1 µs) with a maximum of 30 000
- Trigger Mode: Video

- Sweep Time: > 120 % of the duration of the longest burst detected during the measurement of the RF Output Power

Step 2: (segment 2 483,5 MHz to 2 483,5 MHz + BW)

● The measurement shall be performed and repeated while the trigger level is increased until no triggering takes place.

● For FHSS equipment operating in a normal hopping mode, the different hops will result in signal bursts with different power levels. In this case the burst with the highest power level shall be selected.

● Set a window (start and stop lines) to match with the start and end of the burst and in which the RMS power shall be measured using the Time Domain Power function.

● Select RMS power to be measured within the selected window and note the result which is the RMS power within this 1 MHz segment (2 483,5 MHz to 2 484,5 MHz). Compare this value with the applicable limit provided by the mask.

● Increase the centre frequency in steps of 1 MHz and repeat this measurement for every 1 MHz segment within the range 2 483,5 MHz to 2 483,5 MHz + BW. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + BW - 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 3: (segment 2 483,5 MHz + BW to 2 483,5 MHz + 2BW)

● Change the centre frequency of the analyser to 2 484 MHz + BW and perform the measurement for the first 1 MHz segment within range 2 483,5 MHz + BW to 2 483,5 MHz + 2 BW. Increase the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + 2 BW - 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 4: (segment 2 400 MHz - BW to 2 400 MHz)

● Change the centre frequency of the analyser to 2 399,5 MHz and perform the measurement for the first 1 MHz segment within range 2 400 MHz - BW to 2 400 MHz Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - BW + 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 5: (segment 2 400 MHz - 2BW to 2 400 MHz - BW)

● Change the centre frequency of the analyser to 2 399,5 MHz - BW and perform the measurement for the first 1 MHz segment within range 2 400 MHz - 2 BW to 2 400 MHz - BW. Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2 BW + 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

Step 6:

● In case of conducted measurements on equipment with a single transmit chain, the declared antenna assembly gain G in dBi shall be added to the results for each of the 1 MHz segments and compared with the limits provided by the mask given in figure 1 or figure 3. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered.

● In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the measurements need to be repeated for each of the active transmit chains. The declared antenna assembly gain G in dBi for a single antenna shall be added to these results. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered.

Comparison with the applicable limits shall be done using any of the options given below:

- Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added. The additional beamforming gain Y in dB shall be added as well and the resulting values compared with the limits provided by the mask given in figure 1 or figure 3.
- Option 2: the limits provided by the mask given in figure 1 or figure 3 shall be reduced by 10 × log10(Ach) and the additional beamforming gain Y in dB. The results for each of the transmit chains shall be individually compared with these reduced limits.

NOTE: Ach refers to the number of active transmit chains.

EUT DESCRIPTION:

Mode:	BT Testmode
Hopping:	On
Packet Type:	Longest supported
Modulation:	GFSK(worst case), π/4-DQPSK, 8-DPSK
Assumed antenna gain:	2.0 dBi

MEASUREMENT DESCRIPTION

Instrument:	Spectrum Analyzer	
Detector:	RMS	
Sweep time:	depending on packet length	
Video bandwidth:	3MHz	
Resolution bandwidth:	1MHz	
Span:	0Hz	
Center:	fc (see result table)	
Trace:	Trigger to burst	
Sweep points:	5000	
Performed:	☒	Conducted
	☐	Radiated (only if no conducted sample is provided)

TEST RESULTS

Pass

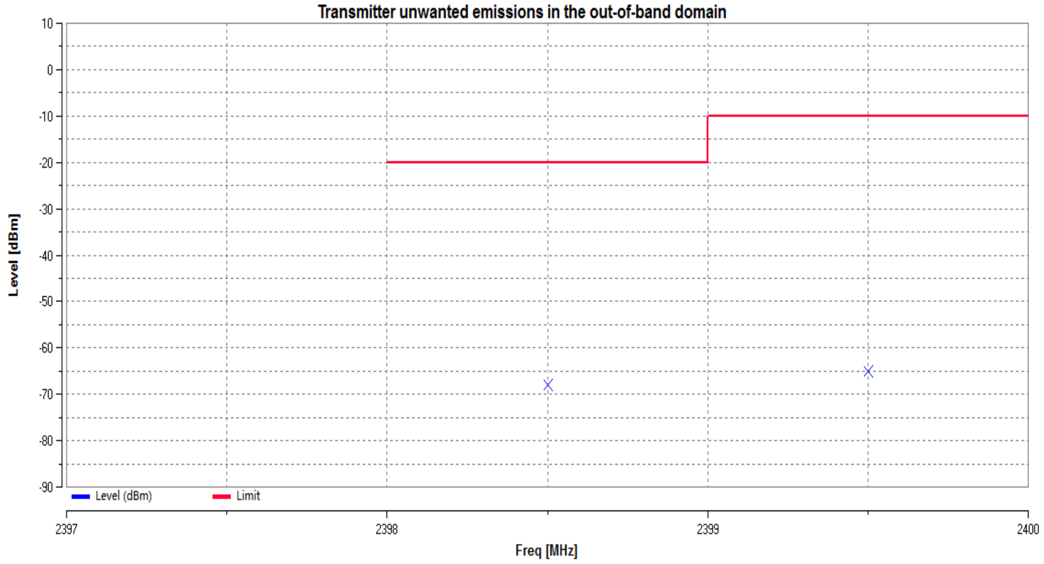
Note :We tested the all modes,and recorded the worst case at the GFSK Mode.

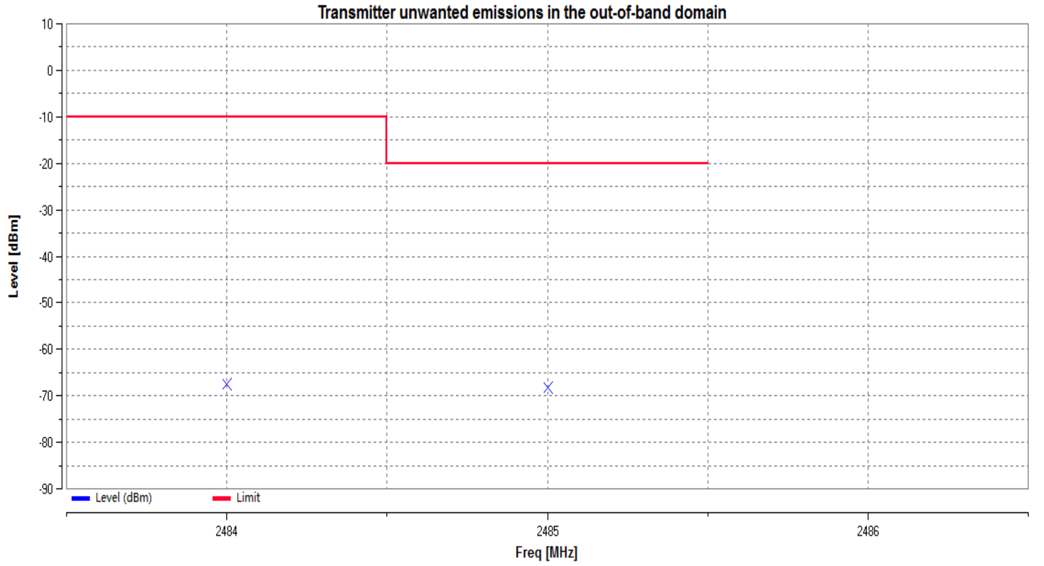
Note:Measured results include the antenna gain

Test plot as follows:

Note:we listed the wort case at normal condition

DH1





4.1.9. Receiver Blocking

Limits

ETSI EN 300 328 Sub-4.3.1.12.4

While maintaining the minimum performance criteria as defined in clause 4.3.1.12.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in in follow

Receiver Category 1

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × $\log_{10}$(OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
(-139 dBm + 10 × $\log_{10}$(OCBW)) or -74 dBm 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 P_{min} + 26 dB where P_{min} 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 P_{min} + 20 dB where P_{min} 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.

Receiver Category 2

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW

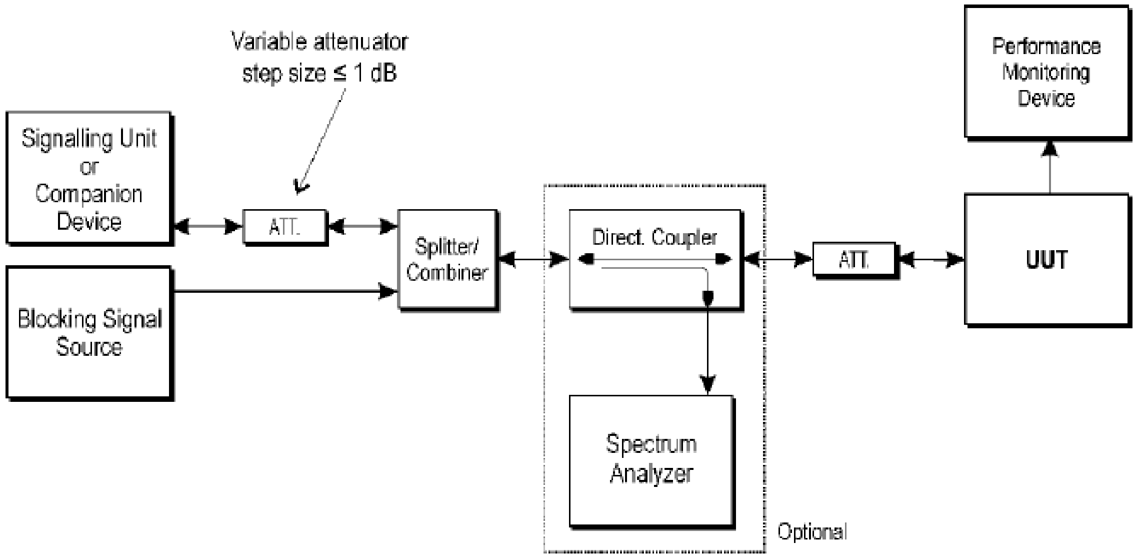
NOTE 1: OCBW is in Hz.
NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 26 dB where P_{min} is the minimum level of wanted signal 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.

Receiver Category 3

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 20 dB) or (-74 dBm + 20 dB) 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 P_{min} + 30 dB where P_{min} 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 CONFIGURATION:



TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause 5.4.11.2.1 for the measurement method..

Step 1:
● For non-FHSS equipment, the UUT shall be set to the lowest operating channel on which the blocking test has to be performed (see clause 5.4.11.1).

Step 2:
● The blocking signal generator is set to the first frequency as defined in the appropriate table corresponding to the receiver category and type of equipment.

Step 3:
● With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup shown in figure 6.
● Unless the option provided in note 2 of the applicable table referred to in clause 5.4.11.2.1 is used, the level of the wanted signal shall be set to the value provided in the table corresponding to the receiver category and type of equipment. The test procedure defined in clause 5.4.2, and more in particular clause 5.4.2.2.1.2, can be used to measure the (conducted) level of the wanted signal however no correction shall be made for antenna gain of the companion device (step 6 in clause 5.4.2.2.1.2 shall be ignored). This level may be measured directly at the output of the companion device and a correction is made for the coupling loss into the UUT. The actual level for the wanted signal shall be recorded in the test report.
● When the option provided in note 2 of the applicable table referred to in clause 5.4.11.2.1 is used, the attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still met. The resulting level for the wanted signal at the input of the UUT is P_{min}. This signal level (P_{min}) is increased by the value provided in note 2 of the applicable table corresponding to the receiver category and type of equipment.

Step 4
● The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment.
● If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 are met then proceed to step 6.

Step 5
● If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is not met, step 3 and step 4 shall be repeated after that the frequency of the blocking signal set in step 2 has been increased with a value equal to the Occupied Channel Bandwidth except:
- For the blocking frequency 2 380 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be increased by 3 dB.
- For the blocking frequency 2 503,5 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be decreased by 3 dB.

● If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still not met, step 3 and step 4 shall be repeated after that the frequency of the blocking signal set in step 2 has been decreased with a value equal to the Occupied Channel Bandwidth except:
- For the blocking frequency 2 380 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be decreased by 3 dB.
- For the blocking frequency 2 503,5 MHz, where this frequency offset shall be less than or equal to 10 MHz. If this frequency offset is more than 7 MHz, the level of the wanted signal shall be increased by 3 dB.

● If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still not met, the UUT fails to comply with the Receiver Blocking requirement and step 6 and step 7 are no longer required.

● It shall be recorded in the test report whether the shift of blocking frequencies as described in the present step was used.

Step 6:

● Repeat step 4 and step 5 for each remaining combination of frequency and level for the blocking signal as provided in the table corresponding to the receiver category and type of equipment.

Step 7:

● For non-FHSS equipment, repeat step 2 to step 6 with the UUT operating at the highest operating channel on which the blocking test has to be performed (see clause 5.4.11.1).

Step 8:

● It shall be assessed and recorded in the test report whether the UUT complies with the Receiver Blocking requirement.

<u>TEST RESULTS</u>

Note :We tested the all modes,and recorded the worst case at the GFSK Mode.

For GFSK

According to Sub 4.2.3,The Power of the EUT is less than 10dB, So it belongs to Receiver category 2

Test Channel Frequency (MHz)	2402MHz	OCBW(Hz)		850000	
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
-139 dBm + 10 × log10(OCBW) +10dB	2380	-34	10%	3%	PASS
	2504	-34	10%	5%	PASS
	2300	-34	10%	5%	PASS
	2584	-34	10%	5%	PASS

Test Channel Frequency (MHz)	2480MHz	OCBW(Hz)		850000	
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Limit(PER)	test value(PER)	Result
-139 dBm + 10 × log10(OCBW) +10dB	2380	-34	10%	4%	PASS
	2504	-34	10%	5%	PASS
	2300	-34	10%	6%	PASS
	2584	-34	10%	3%	PASS

Note:Wanted signal mean power from companion device is -139 dBm + 10 × log10(OCBW) +10dB or -74 dBm+10dB whichever is less.

4.1.10.Geo-location capability

Requirements

ETSI EN 300 328 Sub-clause 4.3.1.13.3
Geo-location capability is a feature of the equipment to determine its geographical location with the purpose to configure itself according to the regulatory requirements applicable at the geographical location where it operates.The geo-location capability may be present in the equipment or in an external device (temporary) associated with the equipment operating at the same geographical location during the initial power up of the equipment. The geographical location may also be available in equipment already installed and operating at the same geographical location

The geographical location determined by the FHSS equipment as defined in clause 4.3.1.13.2 shall not be accessible to the user in a way that would allow the user to alter it.

TEST RESULTS

This item is not applicable for the EUT

4.1.11.Transmitter unwanted emissions in the spurious domain

LIMIT

ETSI EN 300 328 Sub-clause 4.3.1.10.3
The transmitter unwanted emissions in the spurious domain shall not exceed the values given in following table

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
18 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

Note: In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

TEST PROCEDURE

Please refer to ETSI EN 300 328 Sub-clause 5.4.9.2.1 & 5.4.9.2.2
In case of conducted measurements, the radio equipment shall be connected to the measuring equipment via a suitable attenuator.
The spectrum in the spurious domain (see figures 1 or 3) shall be searched for emissions that exceed the limit values given in tables 1 or 4 or that come to within 6 dB below these limits. Each occurrence shall be recorded.

Pre-scan
The test procedure below shall be used to identify potential unwanted emissions of the UUT.

Step 1:
The sensitivity of the measurement set-up should be such that the noise floor is at least 12 dB below the limits given in table 4 or table 12.

Step 2:
The emissions over the range 30 MHz to 1 000 MHz shall be identified.
Spectrum analyser settings:
● Resolution bandwidth: 100 kHz
● Video bandwidth: 300 kHz
● Filter type: 3 dB (Gaussian)
● Detector mode: Peak
● Trace Mode: Max Hold
● Sweep Points: ≥ 19 400; for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented.
● Sweep time:
-For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 100 kHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel.
-For FHSS equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies.
-The above sweep time setting may result in long measuring times in case of FHSS equipment. To avoid such long measuring times, an FFT analyser may be used.

Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.4.9.2.1.3 and compared to the limits given in table 4 or table 12.

Step 3
The emissions over the range 1 GHz to 12,75 GHz shall be identified.
Spectrum analyser settings:
● Resolution bandwidth: 1 MHz
● Video bandwidth: 3 MHz
● Filter type: 3 dB (Gaussian)

● Detector mode: Peak
● Trace Mode: Max Hold
● Sweep Points: ≥ 23 500; for spectrum analysers not supporting this high number of sweep points, the frequency band may be segmented.
● Sweep time:
- For non continuous transmissions (duty cycle less than 100 %), the sweep time shall be sufficiently long, such that for each 1 MHz frequency step, the measurement time is greater than two transmissions of the UUT, on any channel.
- For FHSS equipment operating in a normal operating (hopping not disabled) mode, the sweep time shall be further increased to capture multiple transmissions on any of the hopping frequencies.
- The above sweep time setting may result in long measuring times in case of FHSS equipment. To avoid such long measuring times, an FFT analyser may be used.

Allow the trace to stabilize. Any emissions identified during the sweeps above that fall within the 6 dB range below the applicable limit or above, shall be individually measured using the procedure in clause 5.4.9.2.1.3 and compared to the limits given in table 4 or table 12.

FHSS equipment may generate a block (or several blocks) of spurious emissions anywhere within the spurious domain. If this is the case, only the highest peak of each block of emissions shall be measured using the procedure in clause 5.4.9.2.1.3.

Step 4:
● In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), step 2 and step 3 need to be repeated for each of the active transmit chains (Ach).The limits used to identify emissions during this pre-scan need to be reduced by 10 × $\log_{10}$ (A_{ch})..

Measurement of the emissions identified during the pre-scan
The procedure in step 1 to step 4 below shall be used to accurately measure the individual unwanted emissions identified during the pre-scan measurements above. This method assumes the spectrum analyser has a Time Domain Power function.

Step 1:
The level of the emissions shall be measured using the following spectrum analyser settings:
● Measurement Mode: Time Domain Power
● Centre Frequency: Frequency of the emission identified during the pre-scan
● Resolution Bandwidth: 100 kHz (< 1 GHz) / 1 MHz (> 1 GHz)
● Video Bandwidth: 300 kHz (< 1 GHz) / 3 MHz (> 1 GHz)
● Frequency Span: Zero Span
● Sweep Mode: Single Sweep
● Sweep Time: > 120 % of the duration of the longest burst detected during the measurement of the RF Output Power
● Sweep Points: Sweep time [µs] / (1 µs) with a maximum of 30 000
● Trigger Mode: Video (burst signals) or Manual (continuous signals)
● Detector Mode: RMS

Step 2:
Set a window where the start and stop indicators match the start and end of the burst with the highest level and record the value of the power measured within this window. If the spurious emission to be measured is a continuous transmission, the measurement window shall be set to match the start and stop times of the sweep.

Step 3:
In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), step 2 needs to be repeated for each of the active transmit chains (A_{ch}). Sum the measured power (within the observed window) for each of the active transmit chains.

Step 4:
The value defined in step 3 shall be compared to the limits defined in table 4 or table 12.

EUT DESCRIPTION:

Mode:	BT Testmode
Hopping:	Off, lowest & highest frequency
Packet Type:	Longest supported
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Assumed antenna gain:	2.0 dBi

MEASUREMENT DESCRIPTION

Instrument:	Spectrum Analyzer	
Detector:	Peak for prescan / RMS for emission retest	
Sweep time:	Auto	
Video bandwidth:	Below 1 GHz: 300 kHz / above 3MHz	
Resolution bandwidth:	Below 1 GHz: 100 kHz / above 1MHz	
Trace:	Max hold	
Sweep points:	40001	
Performed:	☒	Conducted
	☒	Radiated (only if no conducted sample is provided)

TEST RESULTS

Pass

Note :We tested the all modes,and recorded the worst case at the GFSK Mode.

Radioation Spurious Emissions

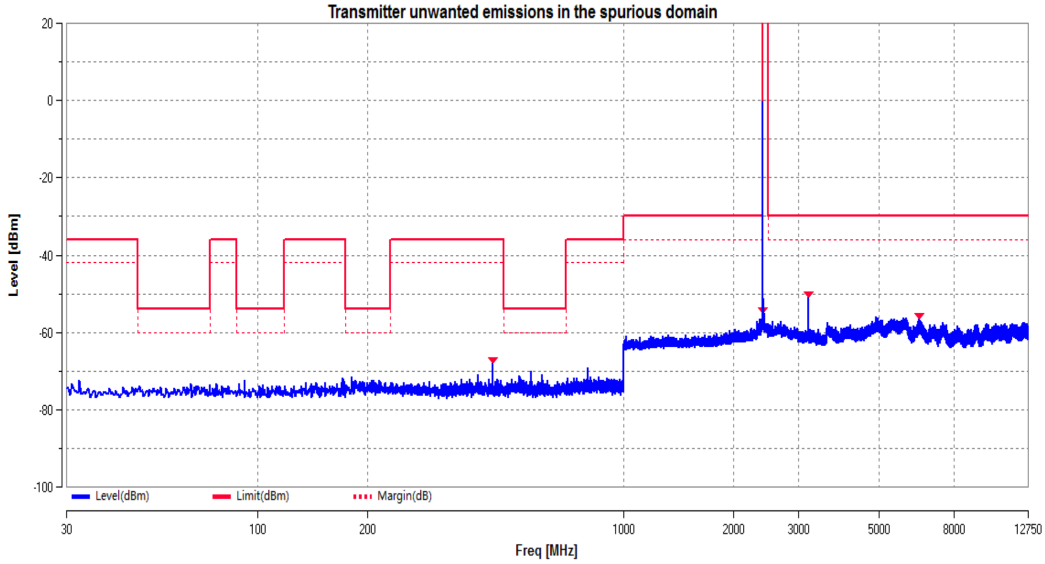
Measured Modulation	☒**GFSK**	☒**π/4-DQPSK**	☒**8-DPSK**

Radioation Spurious Emissions

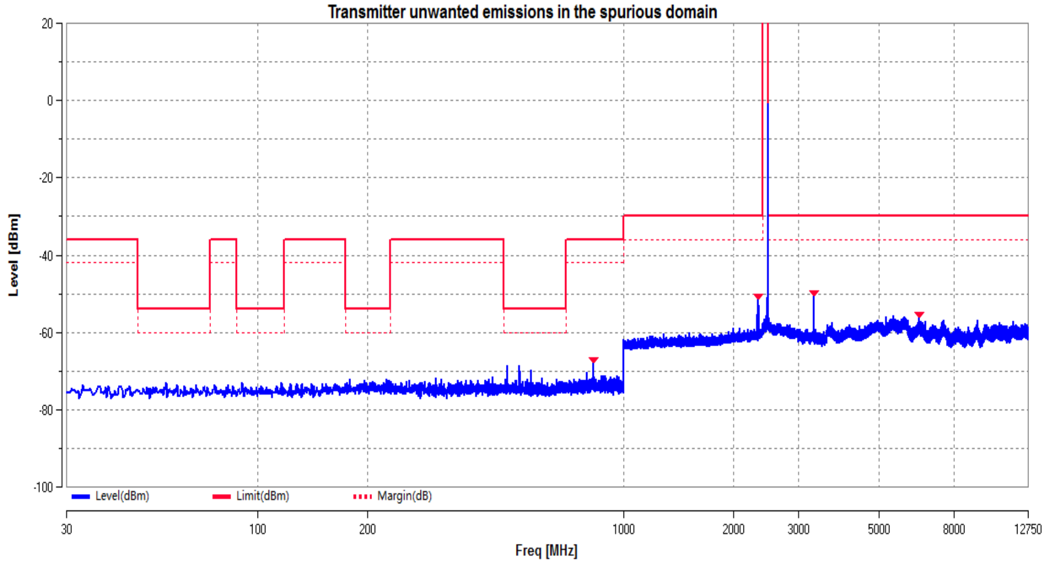
Frequency (MHz)	Polarization (H/V)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector
Channel 0 (2402MHz)					
421.45	H	-46.48	-36.00	-10.48	PK
864.95	V	-46.59	-36.00	-10.59	PK
865.93	H	-46.17	-36.00	-10.17	PK
904.53	V	-46.20	-36.00	-10.20	PK
1733.11	H	-42.20	-30.00	-12.20	PK
4959.90	V	-40.33	-30.00	-10.33	PK
7437.98	H	-40.38	-30.00	-10.38	PK
7441.78	V	-39.81	-30.00	-9.81	PK
Channel 78 (2480MHz)					
238.49	H	-47.63	-36.00	-11.63	PK
253.16	V	-50.71	-36.00	-14.71	PK
842.94	H	-47.83	-36.00	-11.83	PK
827.01	V	-49.24	-36.00	-13.24	PK
4958.21	H	-41.50	-30.00	-11.50	PK
4959.32	V	-41.88	-30.00	-11.88	PK
7441.21	H	-43.62	-30.00	-13.62	PK
7441.78	V	-42.12	-30.00	-12.12	PK

Conducted Spurious Emissions

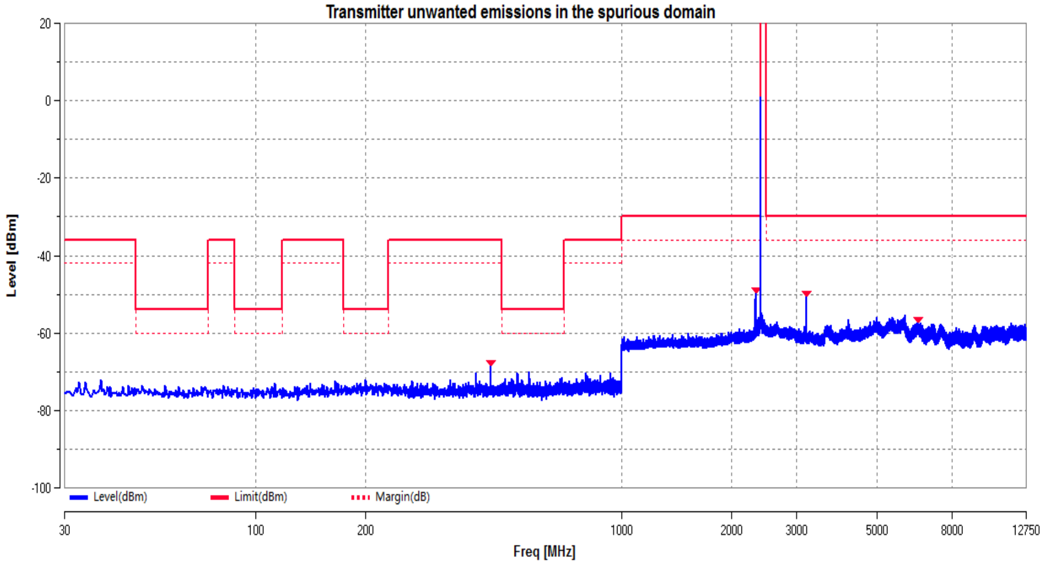
GFSK
CH00



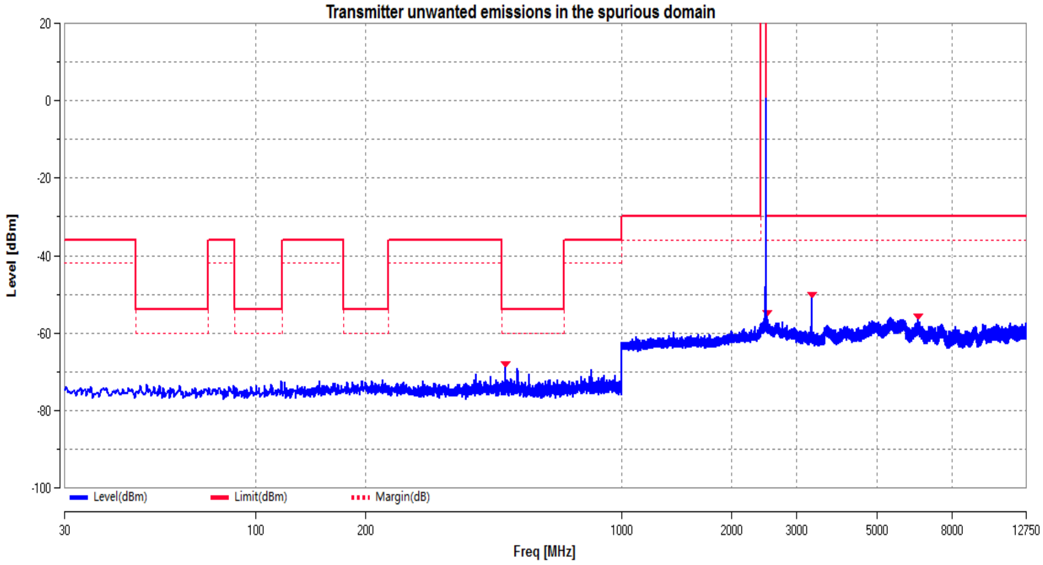
CH78



π/4-DQPSK
CH00

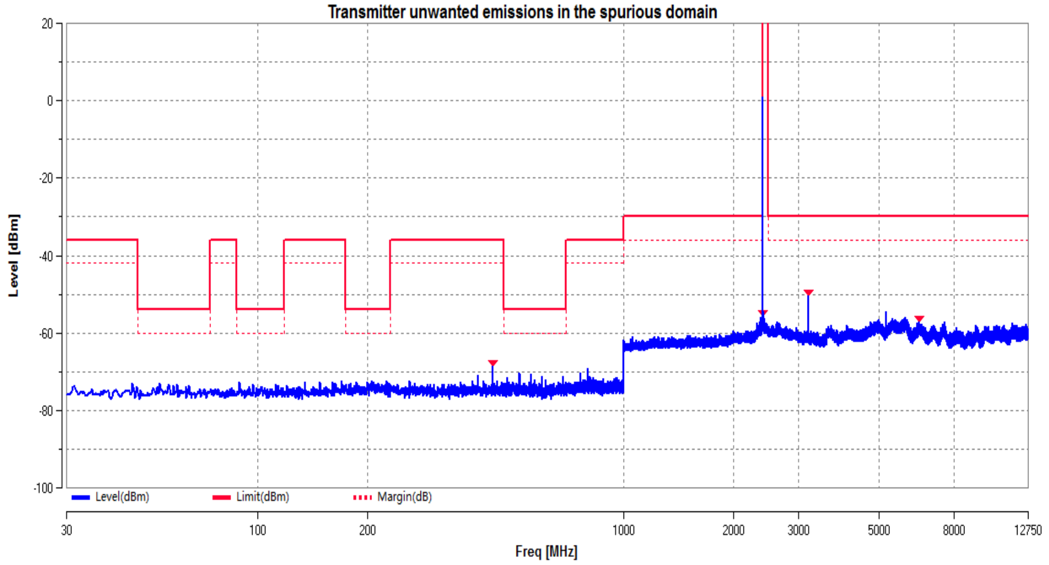


CH78

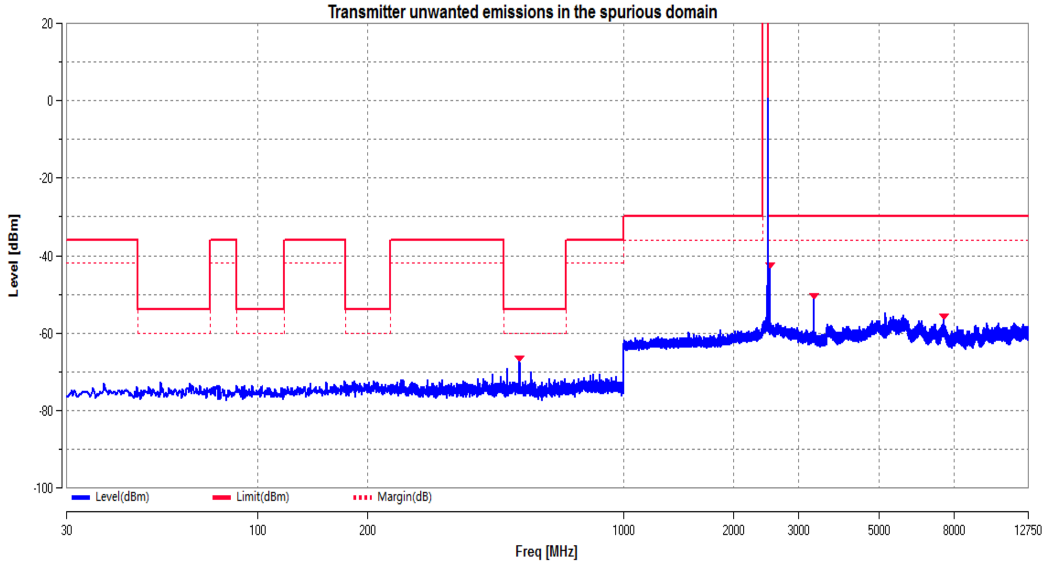


8-DPSK

CH00



CH78



4.1.12.Receiver spurious emissions

LIMIT

ETSI EN 300 328Sub-clause 4.3.1.11.3
The spurious emissions of the receiver shall not exceed the values given in following table.

Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

Note: In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

TEST CONFIGURATION

The same as described in section 4.1.11

TEST PROCEDURE

The same as described in section 4.1.11

EUT DESCRIPTION:

Mode:	BT Receiver/Idle Mode
Hopping:	Off, lowest & highest frequency
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Assumed antenna gain:	2.0 dBi

MEASUREMENT DESCRIPTION

Instrument:	Spectrum Analyzer	
Detector:	Peak for prescan / RMS for emission retest	
Sweep time:	Auto	
Video bandwidth:	Below 1 GHz: 300 kHz / above 3MHz	
Resolution bandwidth:	Below 1 GHz: 100 kHz / above 1MHz	
Trace:	Max hold	
Sweep points:	40001	
Performed:	☒	Conducted
	☒	Radiated (only if no conducted sample is provided)

TEST RESULTS

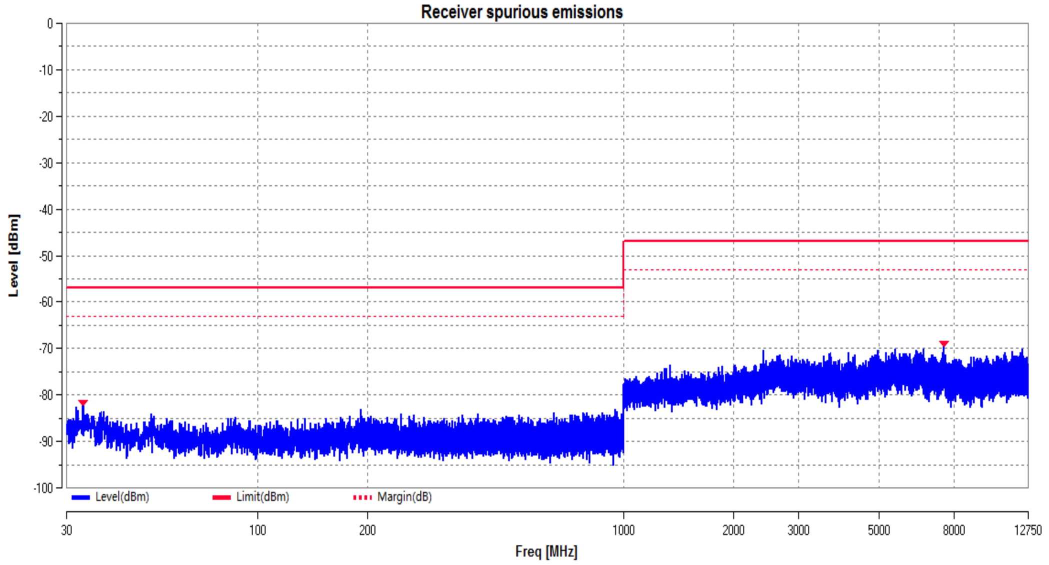
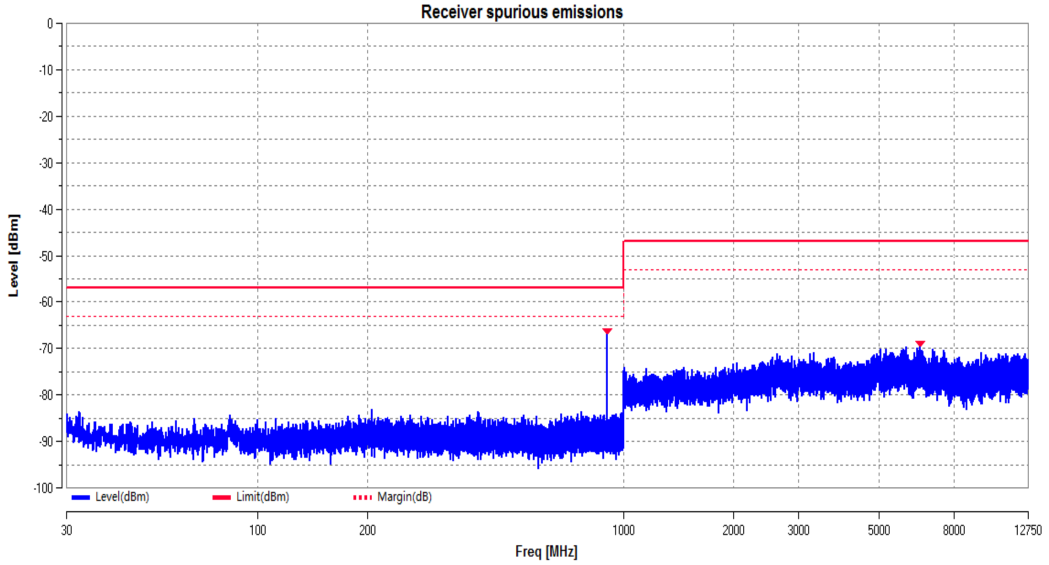
Pass
Note :We tested the all modes,and recorded the worst case at the GFSK Mode.

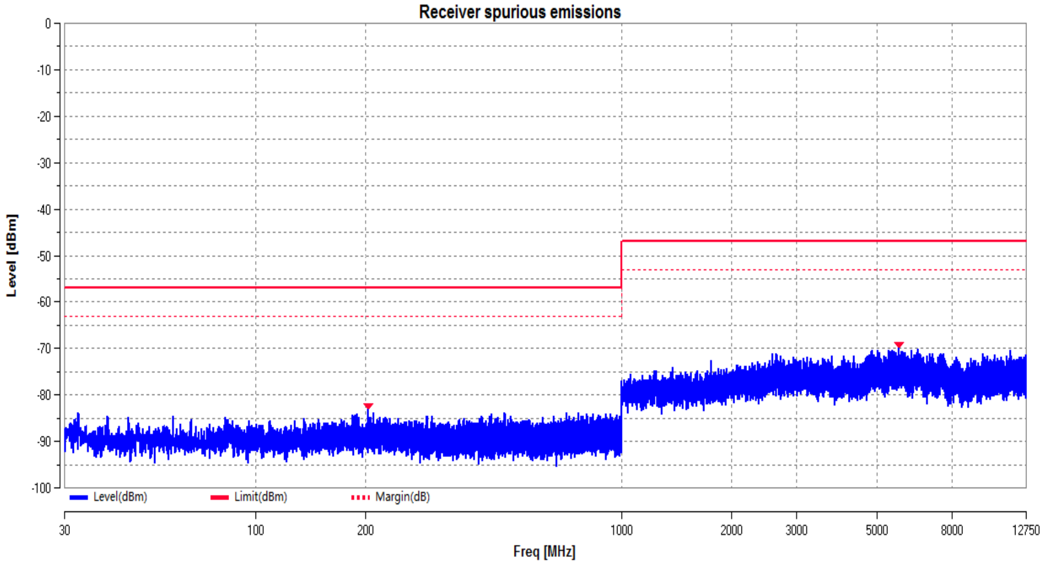
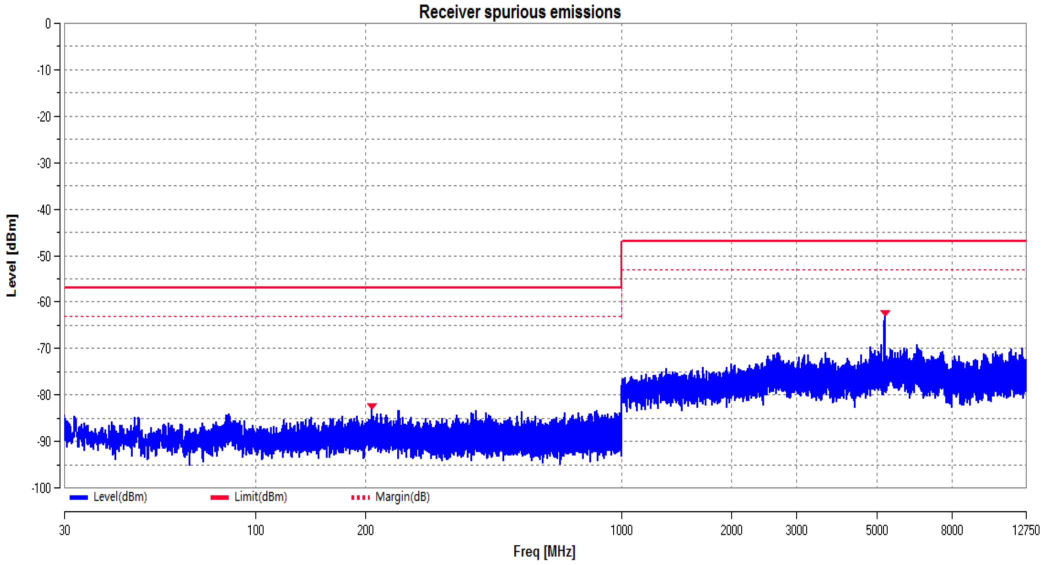
Radioation Spurious Emissions

Measured Modulation	☒**GFSK**	☒**π/4-DQPSK**	☒**8-DPSK**

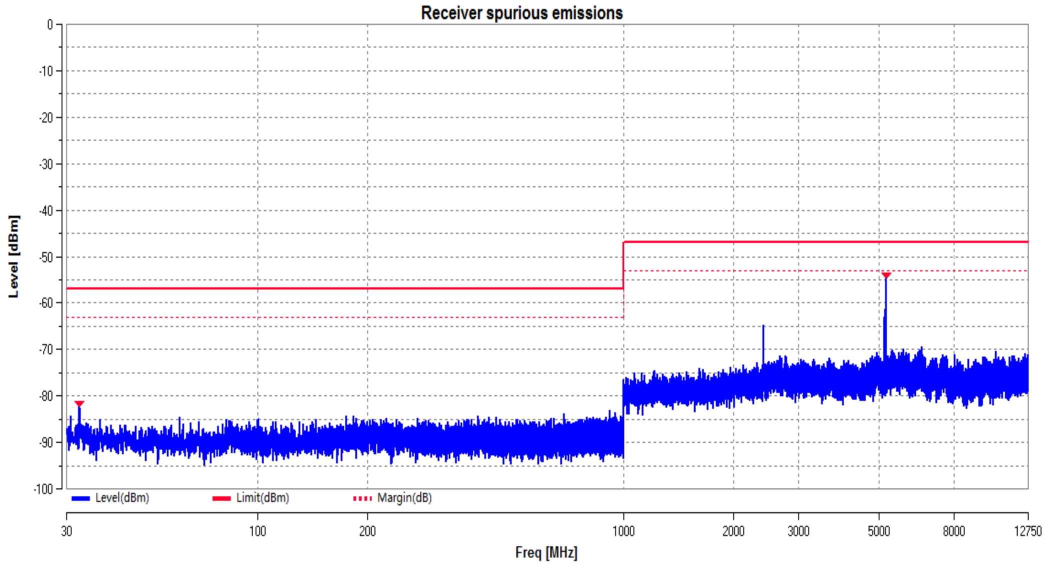
.

Conducted Spurious Emissions

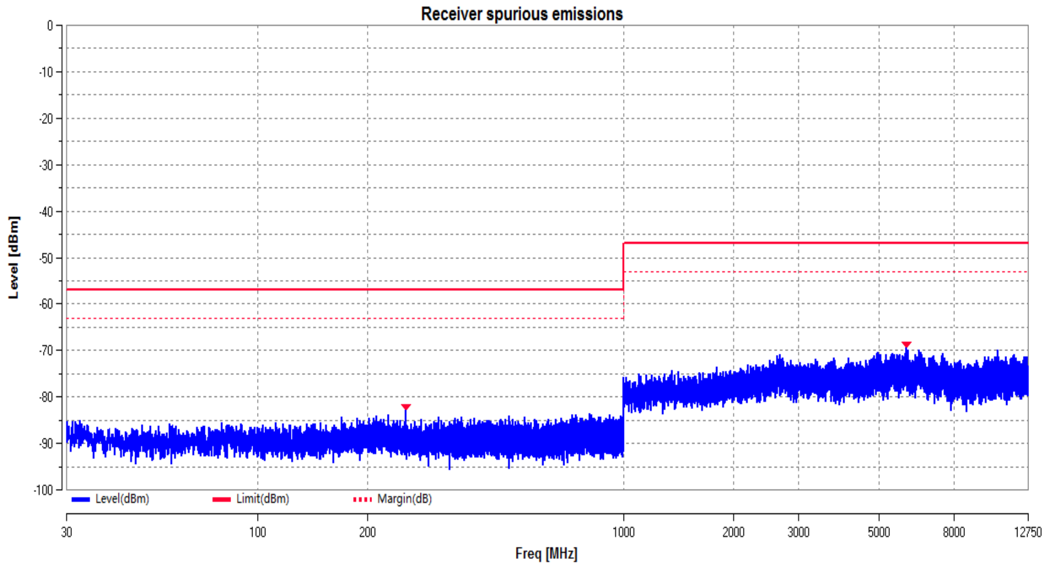
GFSK
CH00

CH78


π/4-DQPSK
CH00

CH78


8-DPSK
CH00



CH78



Radioation Spurious Emissions

Frequency (MHz)	Polarization (H/V)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector
Channel 0 (2402MHz)					
215.69	H	-69.56	-57.00	-12.56	PK
183.43	V	-68.09	-57.00	-11.09	PK
889.22	H	-67.79	-57.00	-10.79	PK
894.10	V	-69.38	-57.00	-12.38	PK
1828.01	H	-60.00	-47.00	-13.00	PK
1303.00	V	-56.65	-47.00	-9.65	PK
2202.82	H	-61.46	-47.00	-14.46	PK
2328.56	V	-59.05	-47.00	-12.05	PK
Channel 78 (2480MHz)					
217.14	H	-70.39	-57.00	-13.39	PK
183.02	V	-68.52	-57.00	-11.52	PK
890.43	H	-67.38	-57.00	-10.38	PK
893.91	V	-67.56	-57.00	-10.56	PK
1828.33	H	-59.58	-47.00	-12.58	PK
1301.97	V	-57.09	-47.00	-10.09	PK
2204.86	H	-63.31	-47.00	-16.31	PK
2328.54	V	-57.92	-47.00	-10.92	PK

5. TEST SETUP PHOTOS OF THE EUT

Reference to the test report No. **GTS20240426022-1-14.**

6. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Reference to the test report No. **GTS20240426022-1-14.**

.......................End of Report........................