

RF TEST REPORT

for Bluetooth

Product Name : GSM/GPRS Module

Model No. : SIM800

Prepared for:

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Report No. : UL15820170414RED007-2

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Notes :

The test results only relate to these samples which have been tested.
Partly using this report will not be admitted unless been allowed by Unilab.
Unilab is only responsible for the complete report with the reported stamp of Unilab.

Applicant: Shanghai Simcom Wireless Solutions Co., Ltd.
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Manufacturer: Shanghai Simcom Wireless Solutions Co., Ltd.
BuildingA , SIM Technology Building , No. 633, Jinzhong Road,
Changning District, Shanghai, P.R.China.

Product Name: GSM / GPRS Module

Brand Name: SIMCom

Model Name: SIM800

Serial Number: N/A

Technical Data: MIN: 3.4V, NOR: 3.8V, MAX: 4.2V

Date of Receipt: 04-14-2017

Test Standard: ETSI EN300328 V2.1.1

Test Result: Complied

Date of Test 04-20-2017~04-30-2017

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1. GENERAL INFORMATION

1.1 EUT DESCRIPTION

Product Name:	GSM/GPRS Module
Model Name:	SIM800
Hardware Version:	V2.01
Software Version:	SIM800 R13.08
RF Exposure Environment:	Uncontrolled
Bluetooth	
Frequency Range:	2402MHz~2480MHz
Type of Modulation:	GFSK $\pi/4$ -DQPSK 8-DPSK
Channel Separation:	1MHz
Channel Number:	79
Antenna Type:	External whip antenna (SMA connector)
Antenna Peak Gain:	2 dBi

Antenna information: Frequency Range: 2.4 GHz ~2.5GHz &5.15 GHz ~5.825 GHz
Impedance: 50 Ohms nominal
VSWR: ≤ 1.92
Gain: 2.0dBi
Admitted power radiation: 1W
Radiation: Omni
Polarization: Vertical
Connector Type: SMA P/S
Manufacturer: Suzhou Guozhixin

1.2 TEST MODE

Unilab has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Bluetooth (GFSK)
Mode 2: Bluetooth ($\pi/4$ -DQPSK)
Mode 3: Bluetooth (8-DPSK)

Normal: the Temperature is +22 °C, the humidity is 53%, the voltage is 3.8V;

TL: the Temperature is -30 °C;

TH: the Temperature is +80°C;

VL: the voltage is 3.4V DC;

VH: the voltage is 4.2V DC;

There is only show typical and worst test plots in this report.

2. TECHNIACL SUMMARY

2.1 SUMMARY OF STANDARDS AND TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below:

Transmitter Parameters		
Test Item	Standard	Result
Hopping Frequency Separation	ETSI EN 300328 V2.1.1	P
Dwell Time, Minimum Frequency Occupation and Hopping Sequence	ETSI EN 300328 V2.1.1	P
RF Output Power	ETSI EN 300328 V2.1.1	P
Spurious Emissions(Conduction)	ETSI EN 300328 V2.1.1	P
Spurious Emissions (Radiation)	ETSI EN 300328 V2.1.1	P
Occupied Bandwidth	ETSI EN 300328 V2.1.1	P
Adaptivity	ETSI EN 300328 V2.1.1	N/A
Duty Cycle	ETSI EN 300328 V2.1.1	N/A
Transmitter unwanted emission in the out-of-band domain	ETSI EN 300328 V2.1.1	P
Spurious Emissions For Receiver(Radiation)	ETSI EN 300328 V2.1.1	P
Receiver Blocking	ETSI EN 300328 V2.1.1	P

Note: P means pass, F means failure, N/A means not applicable.

2.2 TEST UNCERTAINTY

Where relevant, the following test uncertainty levels has been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Parameter	Uncertainty
RF output power, conducted	$\pm 1,5$ dB
Power density, conducted	± 3 dB
Unwanted Emissions, conducted	± 3 dB
All emissions, radiated	± 6 dB
Duty Cycle	± 5 %

2.3 TEST EQUIPMENT LIST

Equipment	Manufacturer	Model	Serial No.	Due Date
Receiver	Agilent	N9038A	MY51210142	11/05/2017
ESG Vector Signal Generator	Agilent	E4438C	MY42081708	09/22/2017
3m Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	CT-0000336	12/11/2017
Microwave Preamplifier	EM Electronics	EM30180	3008A02425	02/25/2018
Power Splitter	Agilent	11667C/ 52401	MY53806148	02/25/2018
Cold-heat climate test chamber	Weiss-Voetsch Environmental Testing Instruments(Taichung) Co., Ltd.	C, 180, -40	54686002620010	06/21/2017
DC Power Supply	Agilent	6612C	MY43002989	01/12/2018
Bilog Antenna	Schwarzbeck	VULB9160	9160-3316	09/08/2017
VHF-UHF-Biconical Antenna	Schwarzbeck	VUBA9117	9117-263	09/08/2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-942	09/08/2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-943	09/08/2017
Spectrum Analyzer	Agilent	N9020A	MY53420615	05/08/2018
Vector Signal Generator	Agilent	E8257D	MY54300659	05/10/2018
Signal Generator	Agilent	N5182B	MY53050940	05/10/2018
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-30	103118	07/07/2017
Vector Signal Generator	ROHDE&SCHWARZ	SMBV100A	177746	07/07/2017
Signal Generator	ROHDE&SCHWARZ	SMB100A	260592	07/18/2017
Switch Unit with OSP-B157	ROHDE&SCHWARZ	OSP120	101270	07/20/2017
Wireless Connectivity Tester	R&S	CMW270	1201.0002K75-100497-rK	07/14/2018

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and has been calibrated by accredited calibration laboratories.

For this test, we have use the software EMC32 Version 9.15.01/1.15.32 with OSP120.

2.4 TEST FACILITY

All test facilities used to collect the test data are located at Floor 1, No. 1350, Lianxi Rd. Pudong New District, Shanghai, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards. The laboratory is compliance with the requirements of the ISO/IEC/EN 17025.

2.5 TEST SETUP CONFIGURATION

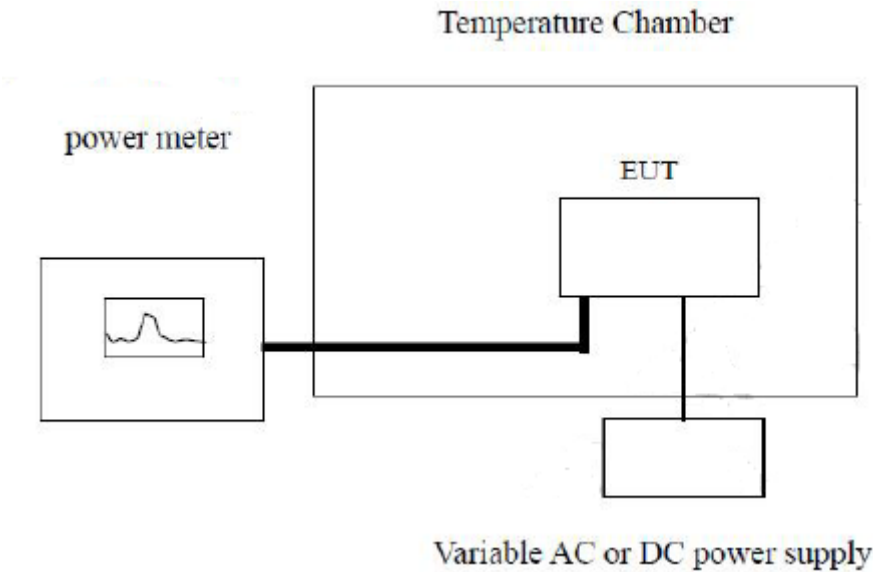
The information contained within this report is intended to show verification of compliance of the EUT to the requirements of ETSI EN 300328.

Unilab has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

1. Setup EUT and communication antenna.
2. Power on EUT and establish Bluetooth by the simulator SG.
3. Perform test. TEST Mode Bluetooth (keeping the EUT data transmission with SG)

3. RF OUTPUT POWER (CONDUCTION)

3.1 TEST SETUP



3.2 LIMITS

Limits	$\leq 20.00\text{dBm}$
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3.3 TEST PROCEDURE

Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.2.2.

3.4 RESULTS & PERFORMANCE

GFSK:

Test Conditions		Power Level (dBm)	Limit
TN	VN	-8.2	20.00
TL	VN	-8.1	20.00
TH	VN	-8.0	20.00
Note: P=A+G			

$\pi/4$ -DQPSK:

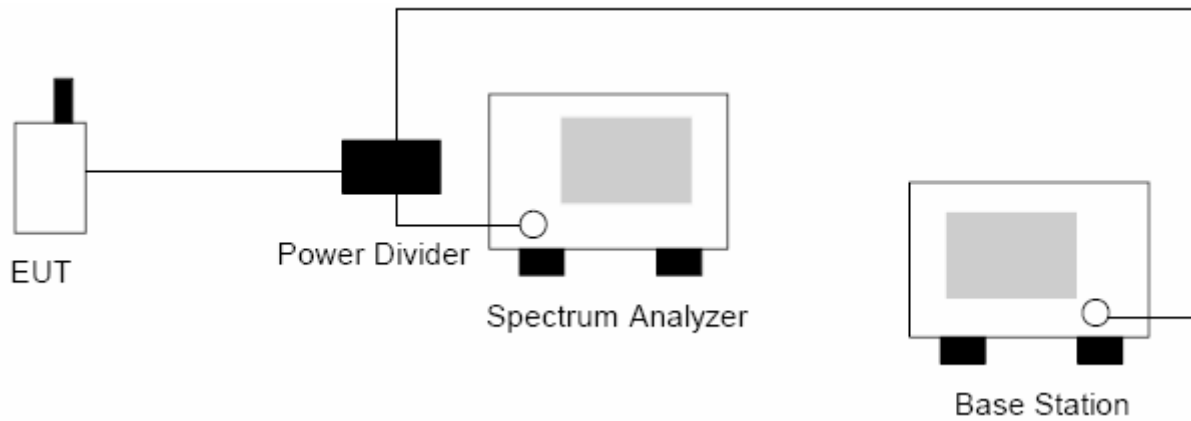
Test Conditions		Power Level (dBm)	Limit
TN	VN	-10.7	20.00
TL	VN	-10.5	20.00
TH	VN	-10.6	20.00
Note: P=A+G			

8-DPSK:

Test Conditions		Power Level (dBm)	Limit
TN	VN	-10.7	20.00
TL	VN	-10.3	20.00
TH	VN	-10.7	20.00
Note: P=A+G			

4. ACCUMULATED TRANSMIT TIME, FREQUENCY OCCUPATION AND HOPPING SEQUENCE

4.1 TEST SETUP



4.2 LIMITS

Please refer to ETSI EN 300 328 V2.1.1 in clause 4.3.1.3.2.1

4.3 TEST PROCEDURE

Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.4.2

4.4 TEST RESULTS

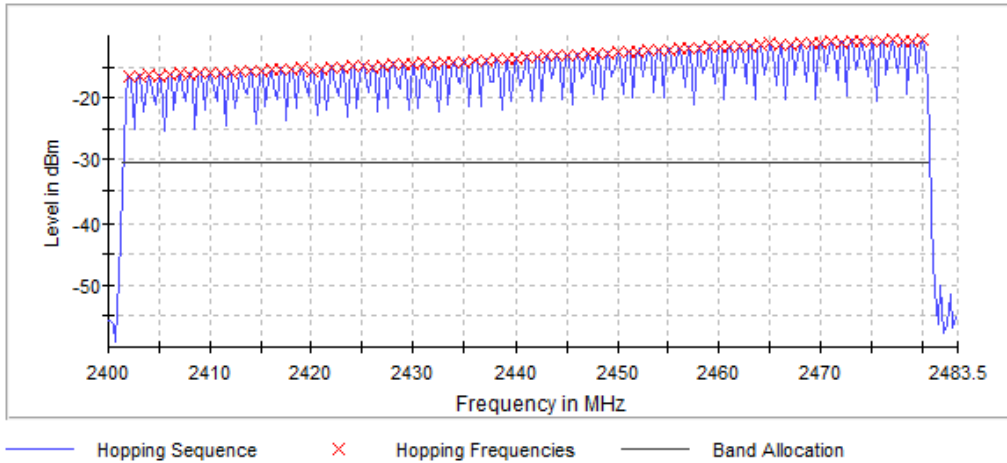
Project	Result
Accumulated Transmit Time	PASS
Frequency Occupation	PASS
Hopping sequence	PASS

F (MHz)		Accumulated Transmit Time (ms)	Frequency Occupation (ms)
2402	GFSK	48.002	36.025
	$\pi/4$ -DQPSK	49.602	35.077
	8-DPSK	41.601	32.707

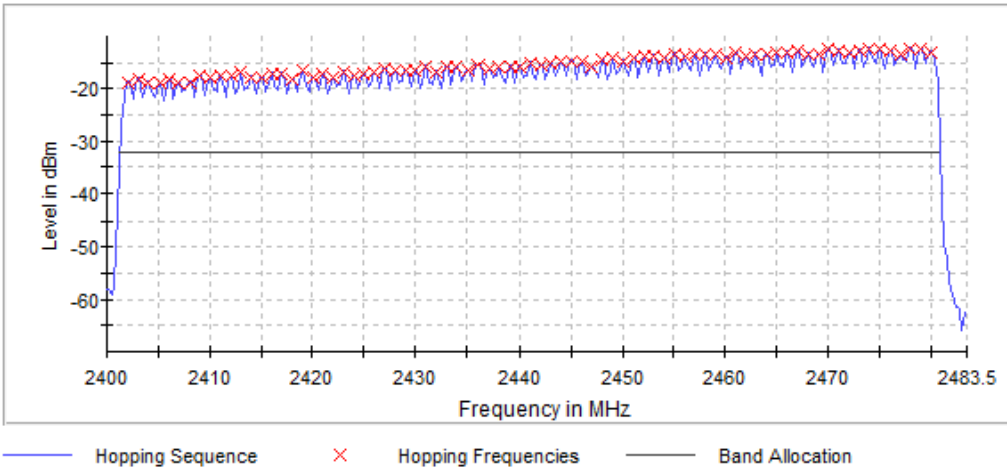
F (MHz)		Accumulated Transmit Time (ms)	Frequency Occupation (ms)
2480	GFSK	58.402	30.179
	$\pi/4$ -DQPSK	30.601	36.025
	8-DPSK	42.801	36.183

Frequency Band(MHz)	Number of Hopping Frequency	
2400-2483.5	79	
	-20dB Points Occupied Bandwith	
	GFSK	79MHz
	$\pi/4$ -DQPSK	79MHz
	8-DPSK	79MHz

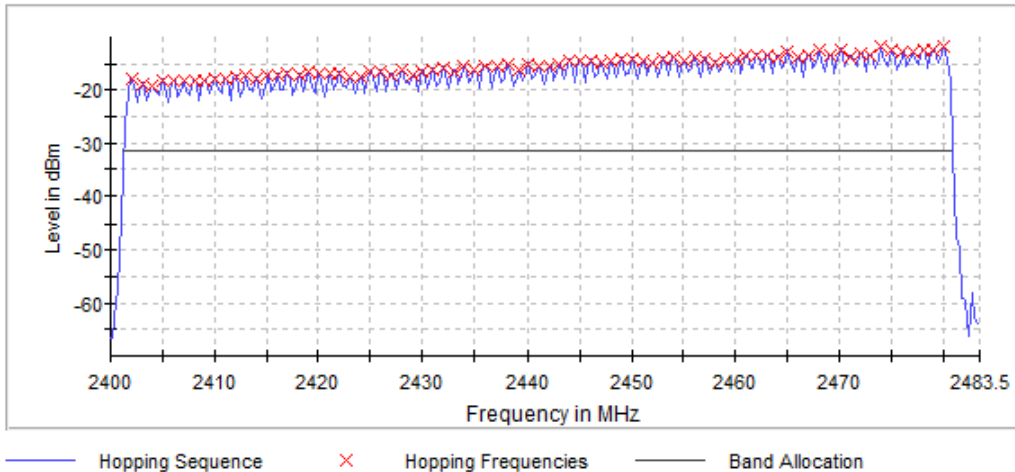
For the Hopping Sequence Data:
GFSK
Hopping Channel: 79 channels



$\pi/4$ -DQPSK
Hopping Channel: 79 channels

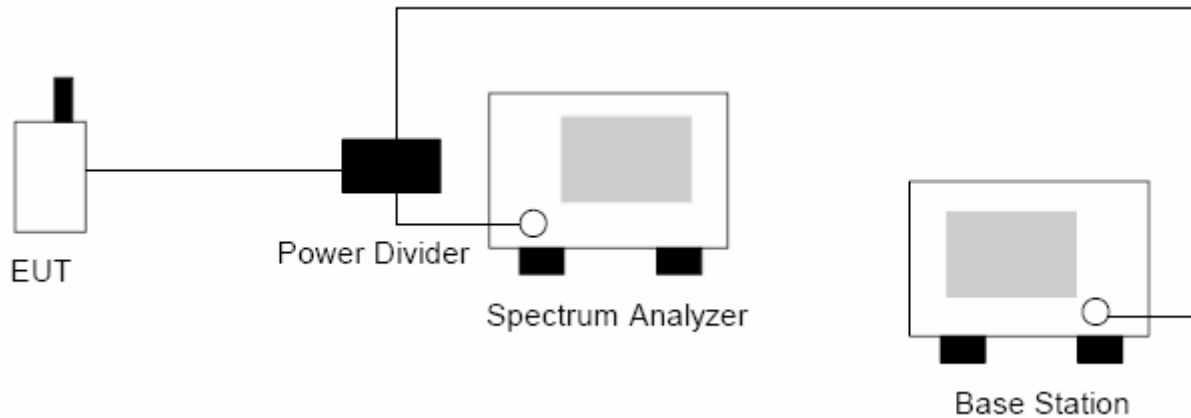


8-DPSK
Hopping Channel: 79 channels



5. HOPPING FREQUENCY SEPARATION

5.1 TEST SETUP



5.2 LIMITS

The minimum Hopping Frequency Separation shall be equal to Occupied Channel Bandwidth of a single hop, with a minimum separation of 100 kHz.

5.3 TEST PROCEDURE

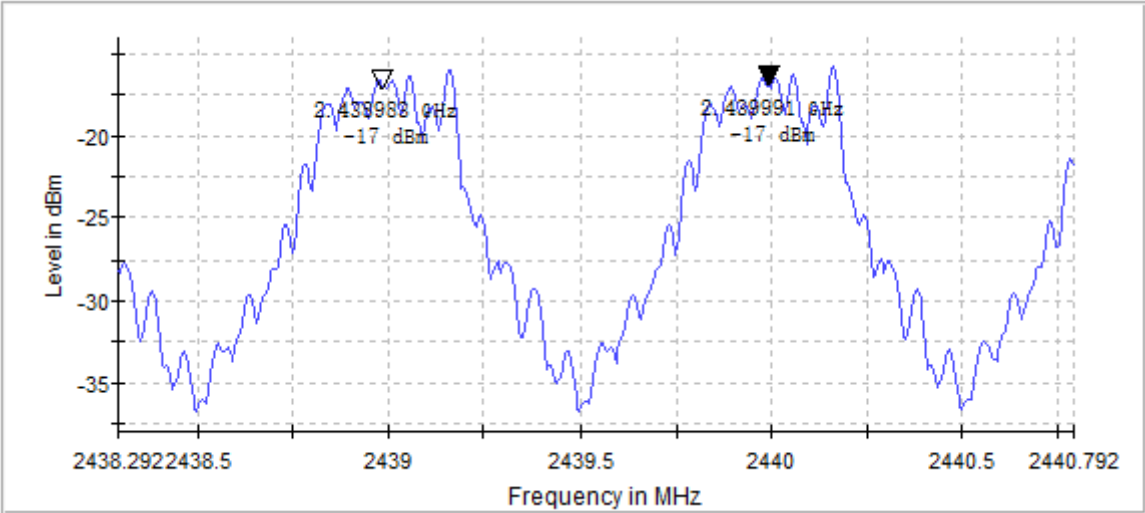
Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.5.2.1.2
For this test, we set the RBW as 30kHz and VBW as 100kHz

5.4 TEST RESULTS

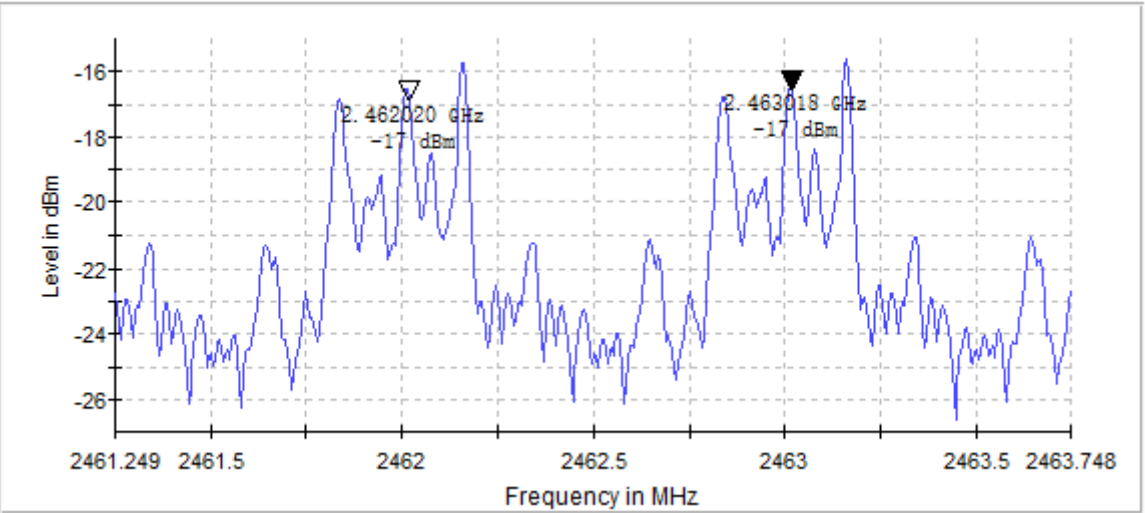
PASS

Type of Modulation	Center Frequency of Separation	Hopping Frequency Separation	Result
GFSK	2439.49 MHz	1.0104 MHz	Pass
$\pi/4$ -DQPSK	2462.52 MHz	0.9976 MHz	Pass
8-DPSK	2429.50 MHz	0.9981 MHz	Pass

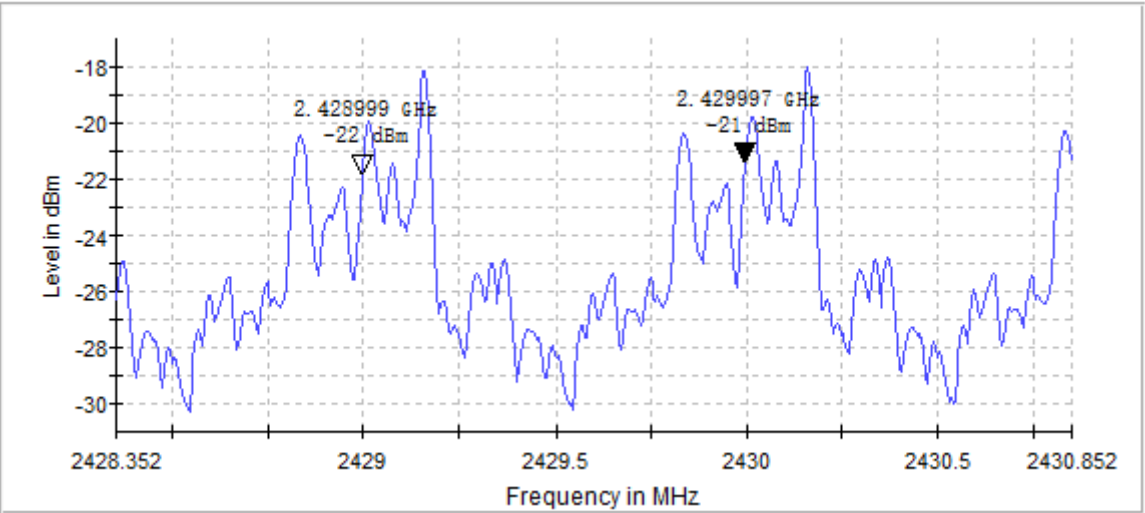
GFSK



$\pi/4$ -DQPSK

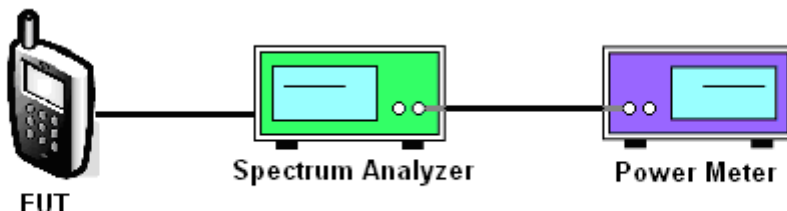


8-DPSK



6. OCCUPIED CHANNEL BANDWIDTH

6.1 TEST SETUP



6.2 LIMITS

Limits	<5MHz
--------	-------

6.3 TEST PROCEDURE

These measurements shall only be performed at normal test conditions.

In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains) measurements need only to be performed on one of the active transmit chains (antenna outputs).

For systems using FHSS modulation and which have overlapping channels, special software might be required to force the UUT to hop or transmit on a single Hopping Frequency.

The measurement shall be performed only on the lowest and the highest frequency within the stated frequency range. The frequencies on which the test were performed shall be recorded. The measurement procedure shall be as follows:

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: 20KHz
- Video BW: 62KHz
- Frequency Span: 2MHz
- Detector Mode: RMS
- Trace Mode: Max Hold

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.

6.4 TEST RESULTS & PERFORMANCE

PASS

GFSK

Channel No.	Frequency (MHz)	99% Occupied Bandwidth (kHz)
0	2402	814.21
78	2480	800.24

$\pi/4$ -DQPSK

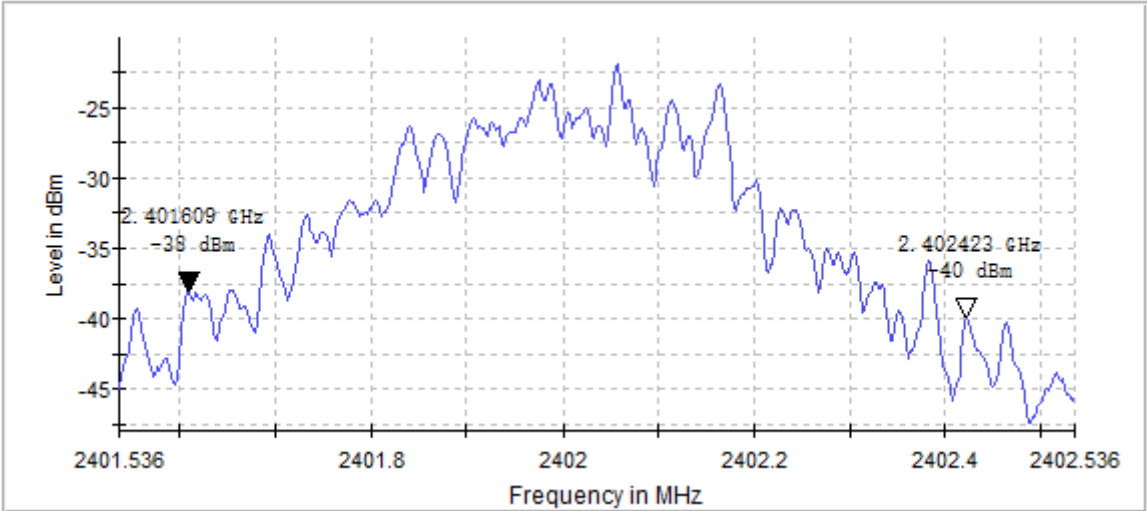
Channel No.	Frequency (MHz)	99% Occupied Bandwidth (KHz)
0	2402	978.89
78	2480	980.88

8-DPSK

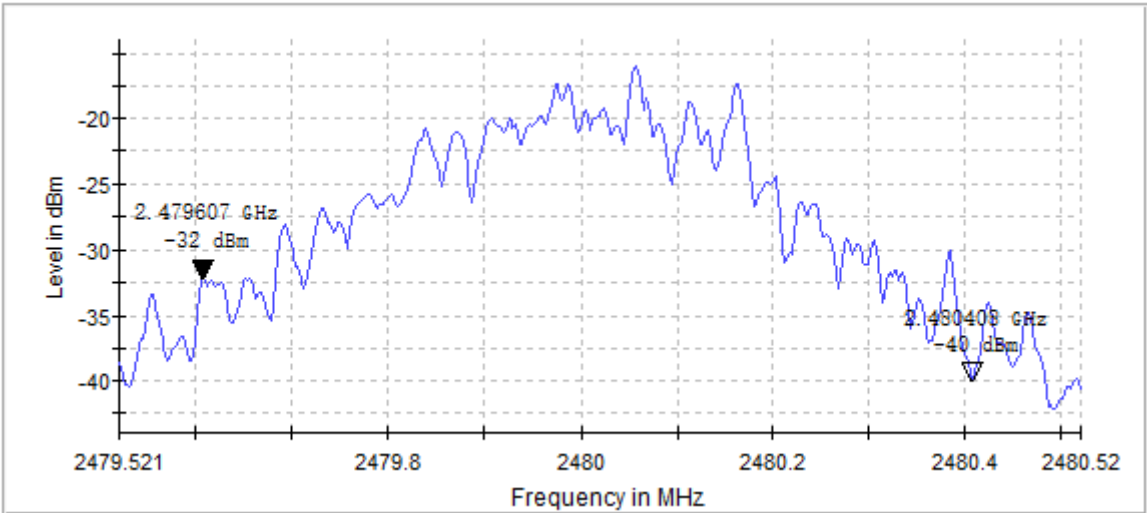
Channel No.	Frequency (MHz)	99% Occupied Bandwidth (kHz)
0	2402	968.14
78	2480	964.15

GFSK

Low Frequency

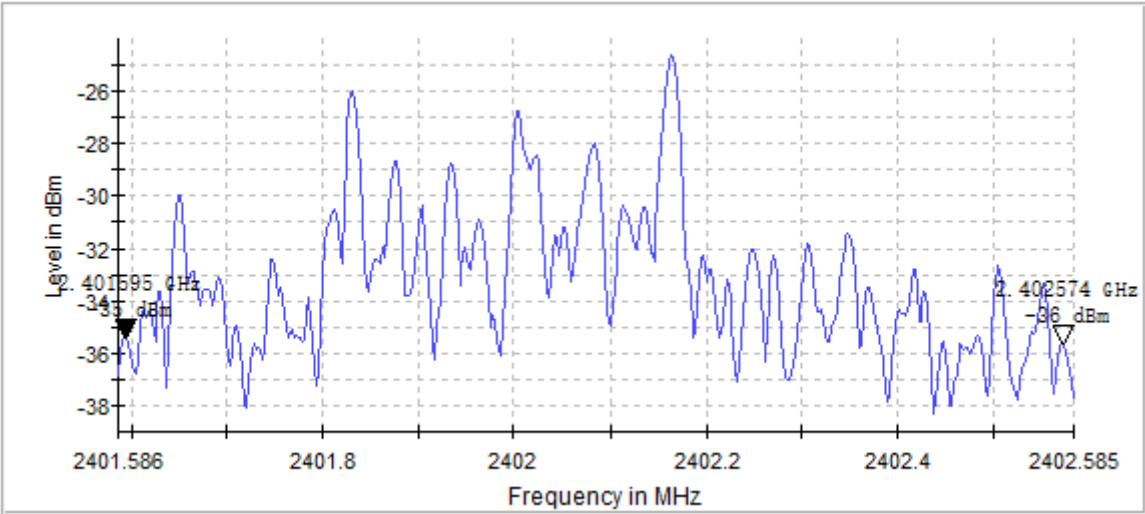


High Frequency

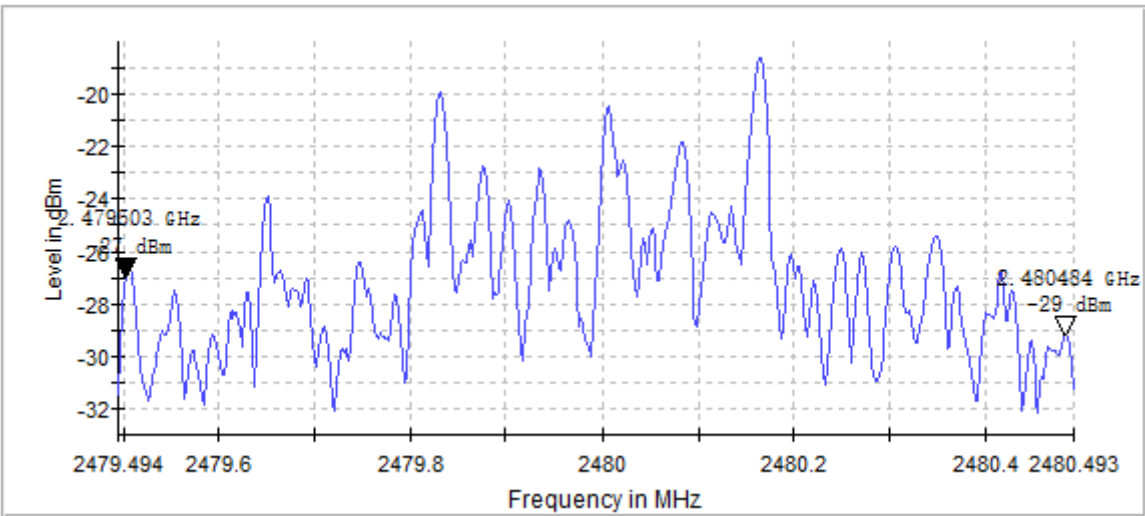


$\pi/4$ -DQPSK

Low Frequency

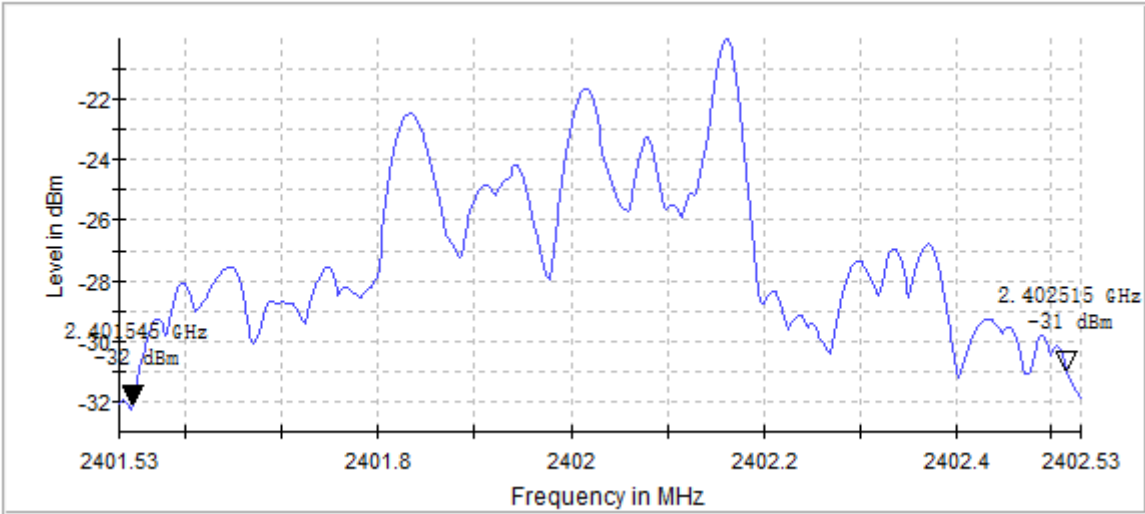


High Frequency

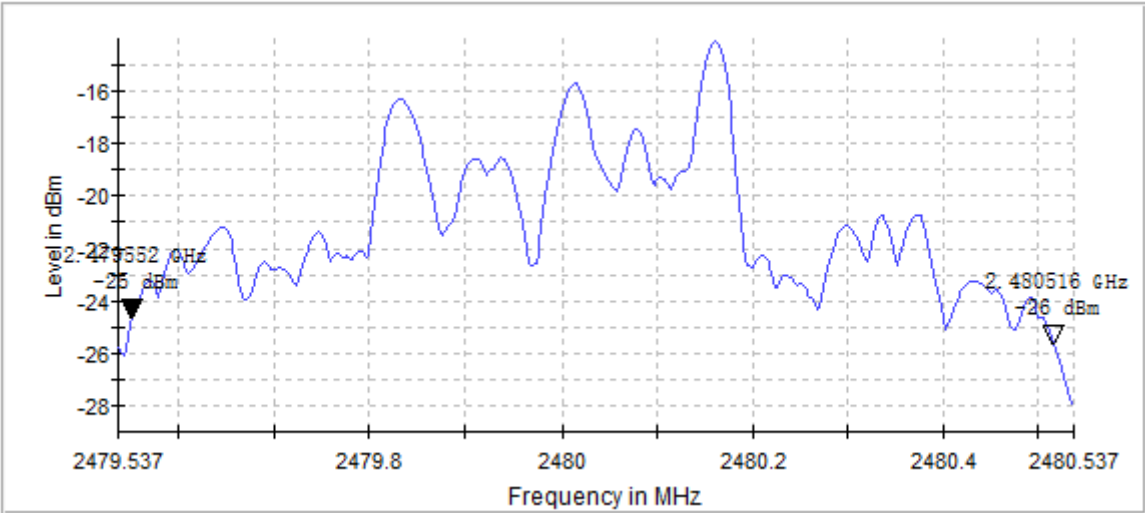


8-DPSK

Low Frequency

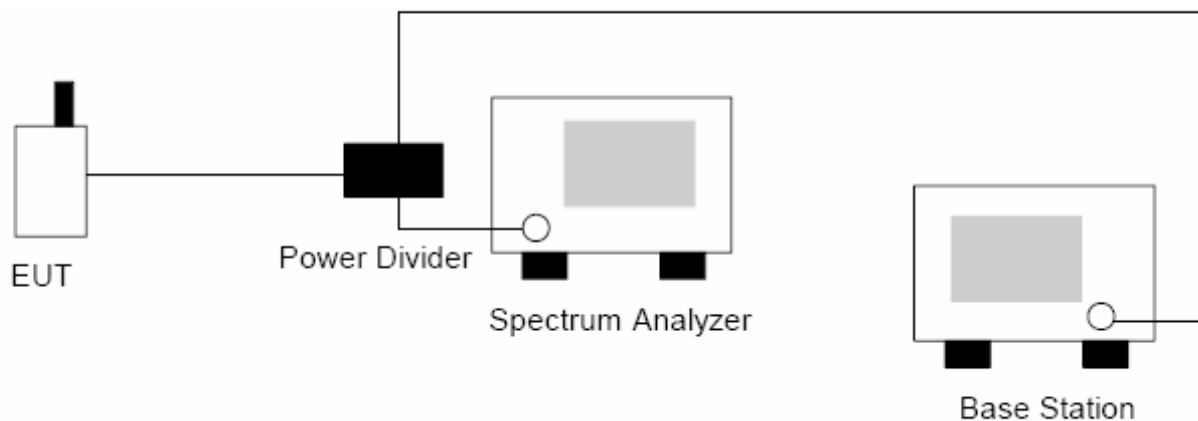


High Frequency

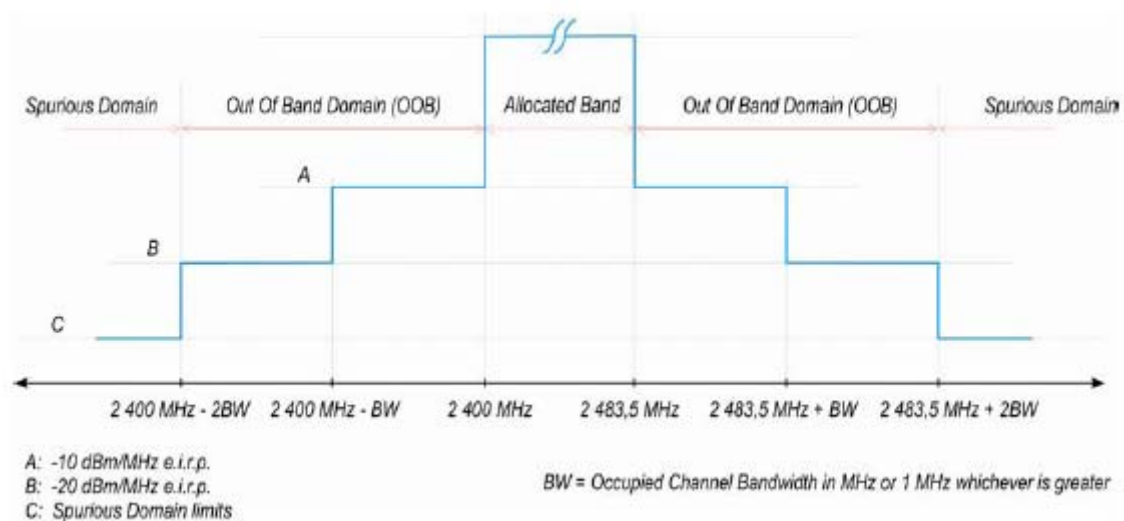


7. SPURIOUS EMISSIONS IN THE OUT-OF-BAND DOMAIN

7.1 TEST SETUP



7.2 LIMITS



7.3 TEST PROCEDURE

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.

Step 1:

Connect the UUT to the spectrum analyser and use the following settings:

- Centre Frequency: 2 484 MHz
- Span: 0 Hz
- Resolution BW: 1 MHz
- Filter mode: Channel filter
- Video BW: 3 MHz
- Detector Mode: RMS
- Trace Mode: Clear / Write
- Sweep Mode: Continuous
- Sweep Points: 5 000
- Trigger Mode: Video trigger

NOTE 1: In case video triggering is not possible, an external trigger source may be used.

- Sweep Time: Suitable to capture one transmission burst

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

- Adjust the trigger level to select the transmissions with the highest power level.
- For frequency hopping 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 + 2BW. 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.

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 - 2BW + 0,5 MHz.

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 - 2BW 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 - 2BW + 0,5 MHz.

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 figures 1 or 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 figures 1 or 3.
 - Option 2: the limits provided by the mask given in figures 1 or 3 shall be reduced by $10 \times \log_{10}(A_{ch})$ 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 2: A_{ch} refers to the number of active transmit chains.

7.4 TEST RESULT

GFSK

Frequency(MHz)	Limit(dBm/MHz)	Maximum test values	Result
2400-2BW~2400-BW	-20	-71.2	Pass
2400-BW~2400	-10	-70.5	Pass
2483.5~2483.5+BW	-10	-70.1	Pass
2483.5+BW~2483.5+2BW	-20	-69.9	Pass

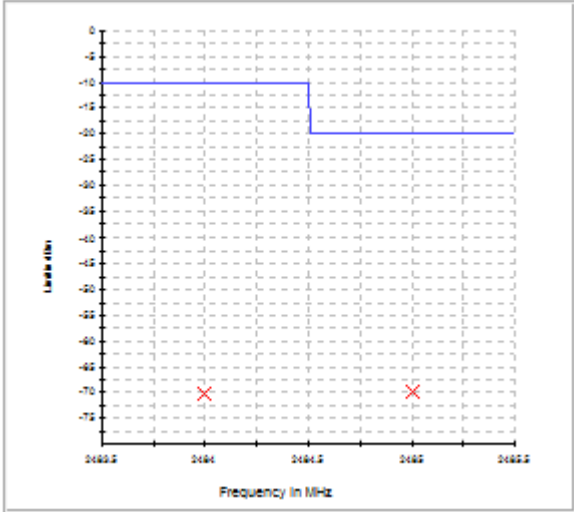
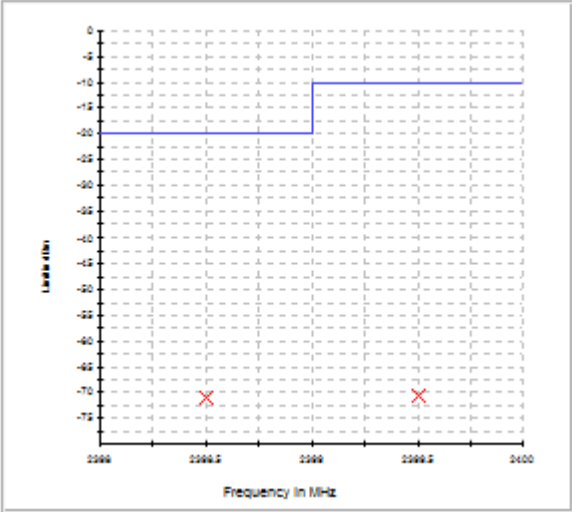
8-DPSK

Frequency(MHz)	Limit(dBm/MHz)	Maximum test values	Result
2400-2BW~2400-BW	-20	-71.1	Pass
2400-BW~2400	-10	-70.5	Pass
2483.5~2483.5+BW	-10	-69.8	Pass
2483.5+BW~2483.5+2BW	-20	-70.3	Pass

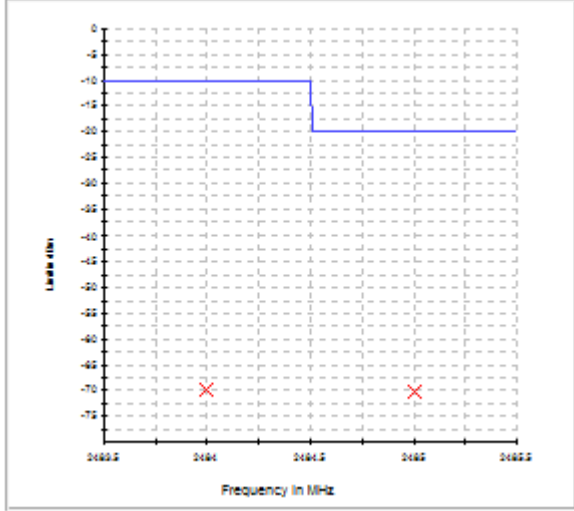
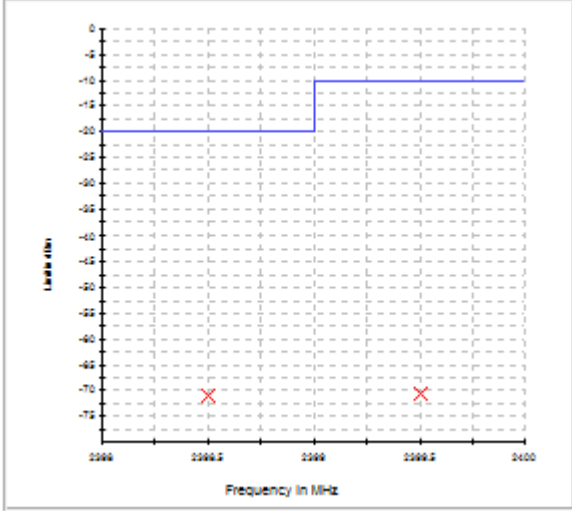
$\pi/4$ -DQPSK

Frequency(MHz)	Limit(dBm/MHz)	Maximum test values	Result
2400-2BW~2400-BW	-20	-71.5	Pass
2400-BW~2400	-10	-70.6	Pass
2483.5~2483.5+BW	-10	-70.6	Pass
2483.5+BW~2483.5+2BW	-20	-70.2	Pass

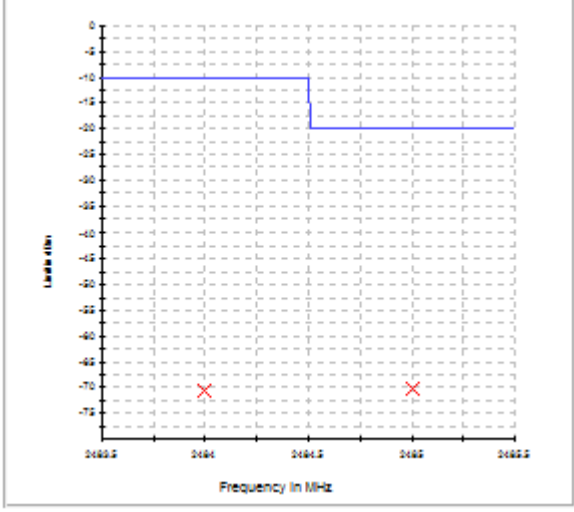
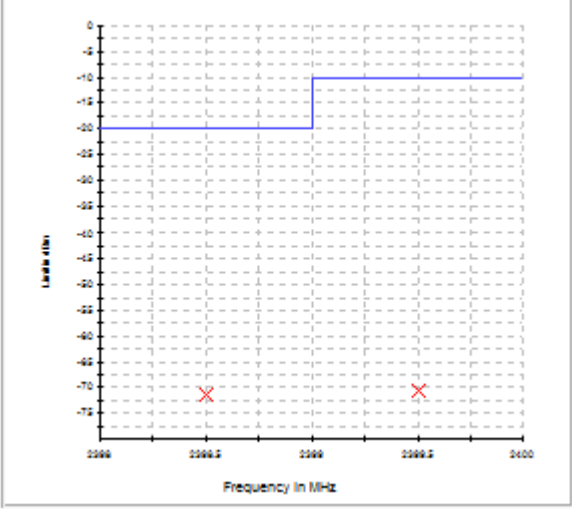
GFSK



$\pi/4$ -DQPSK

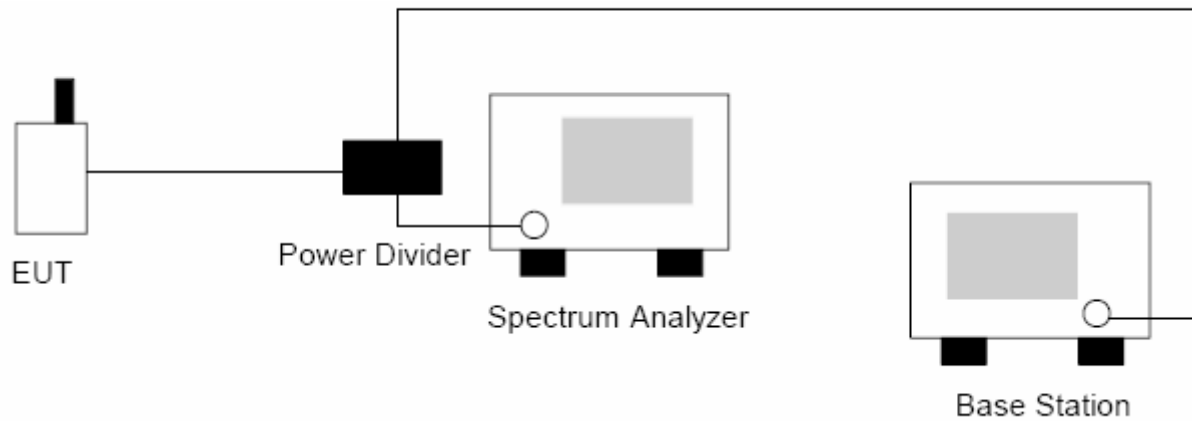


8-DPSK



8. SPURIOUS EMISSIONS (CONDUCTION)

8.1 TEST SETUP



8.2 LIMITS

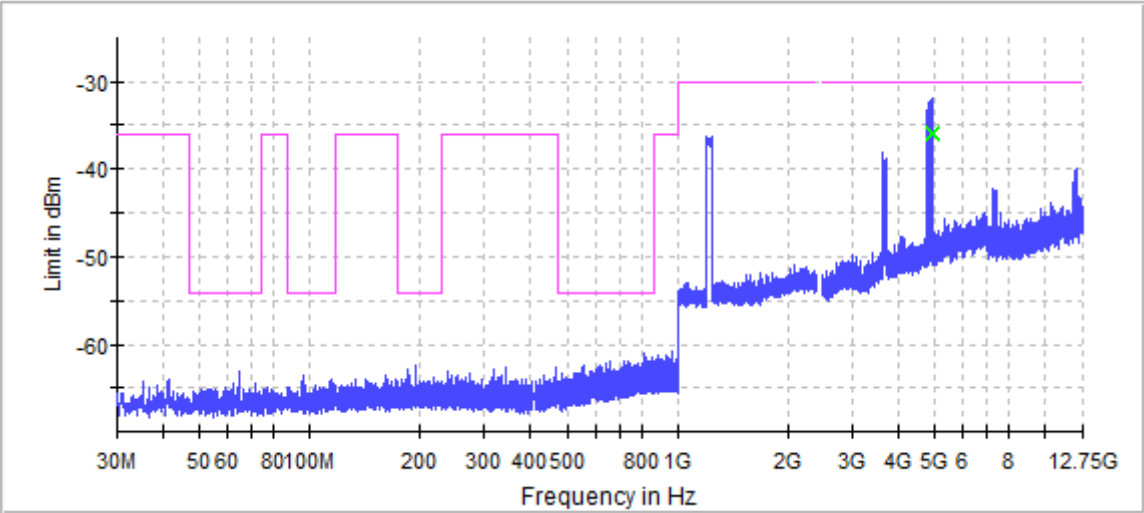
Frequency range	Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

8.3 TEST PROCEDURE

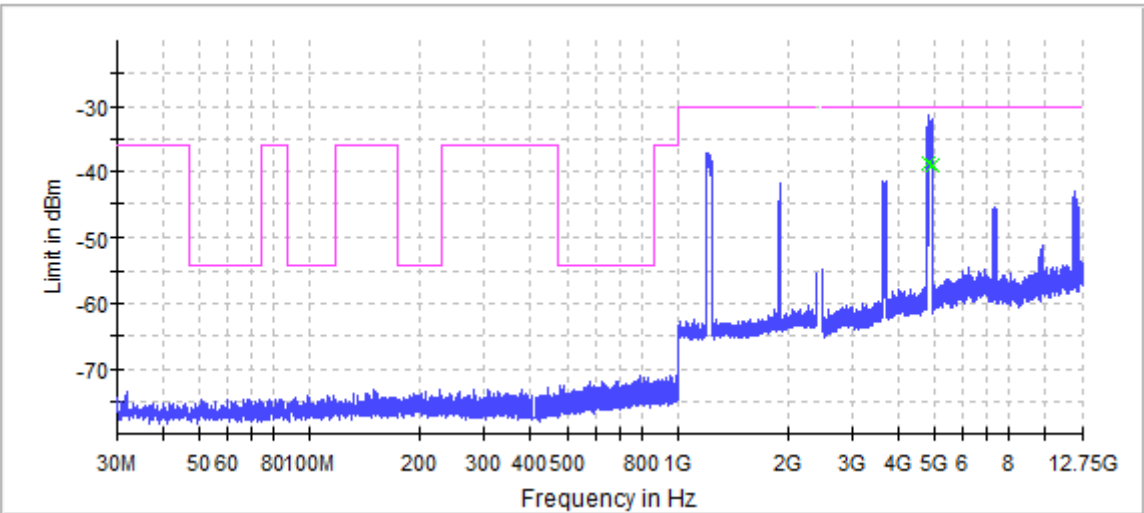
Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.10.2.1

8.4 RESULTS & PERFORMANCE

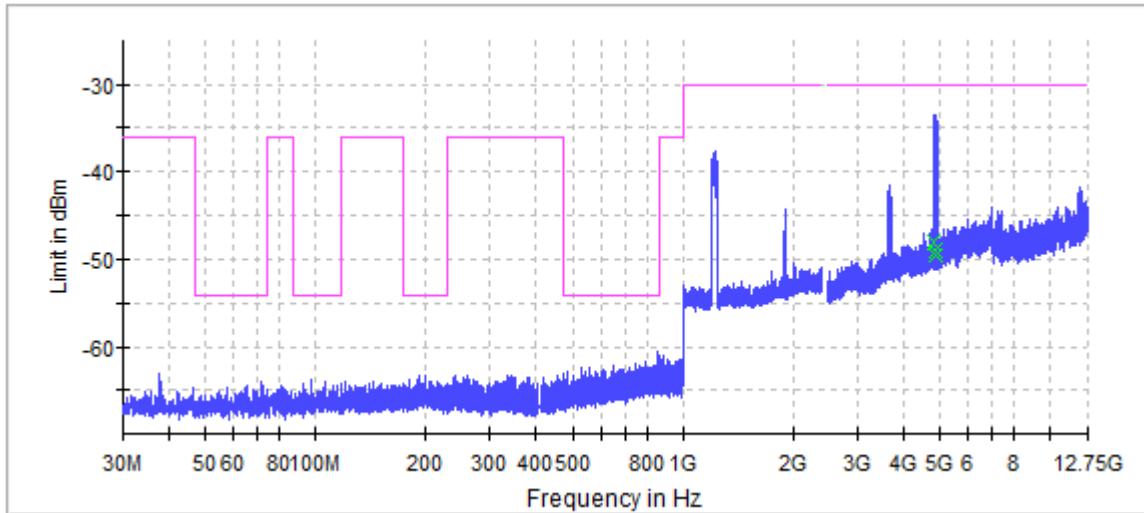
GFSK



$\pi/4$ -DQPSK

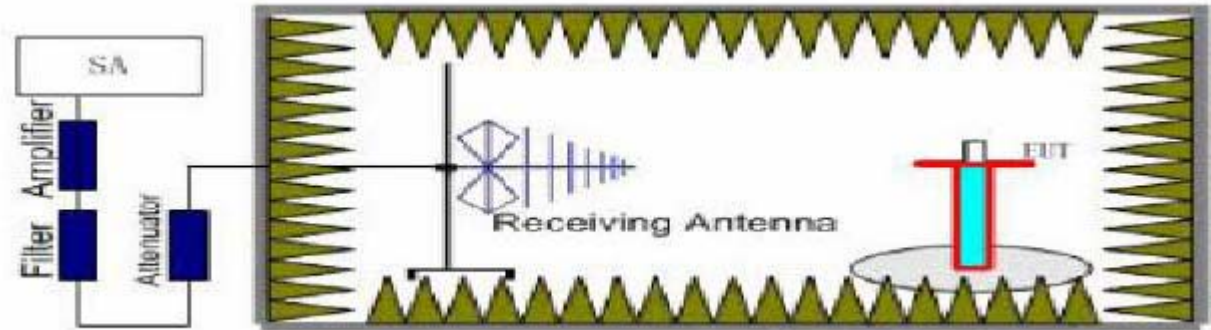


8-DPSK:



9. SPURIOUS EMISSIONS FOR RECEIVER(CONDUCTION)

9.1 TEST SETUP



9.2 LIMITS

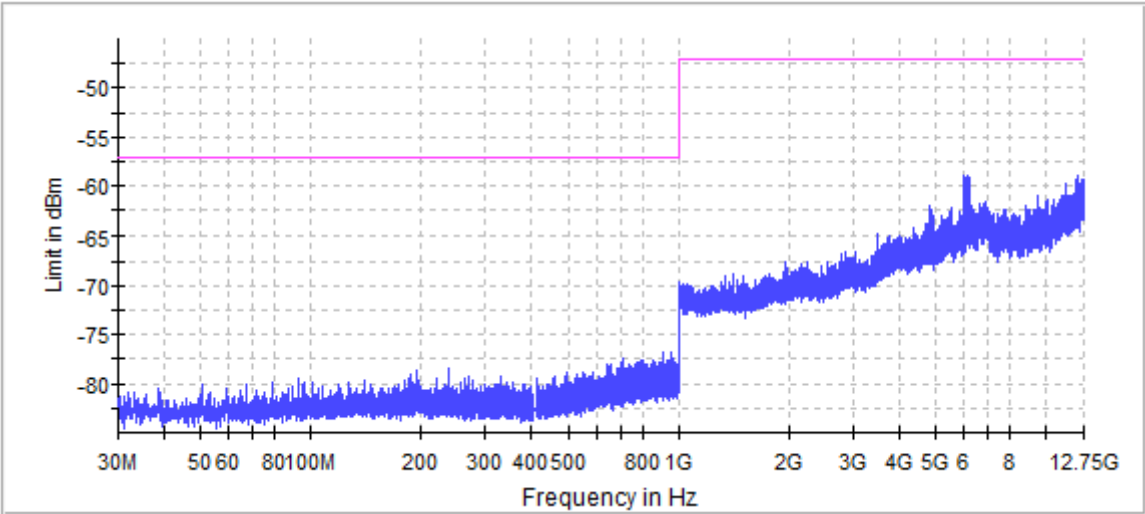
Frequency (MHz)	Limits (dBm)	Measured distance (m)
30~1000	-57	3
1000~12750	-47	

9.3 TEST PROCEDURE

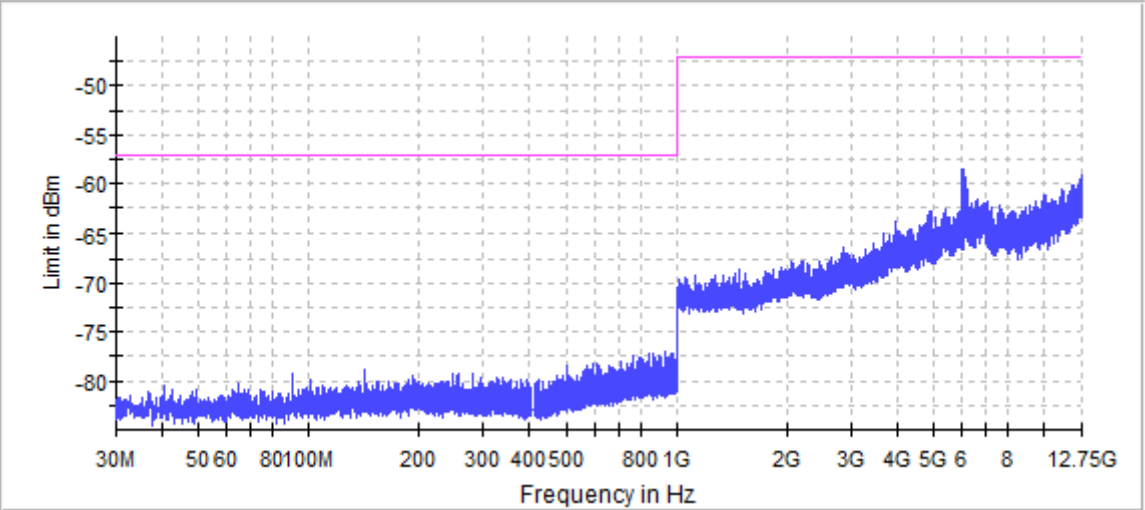
Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.11.2.2

9.4 RESULTS & PERFORMANCE

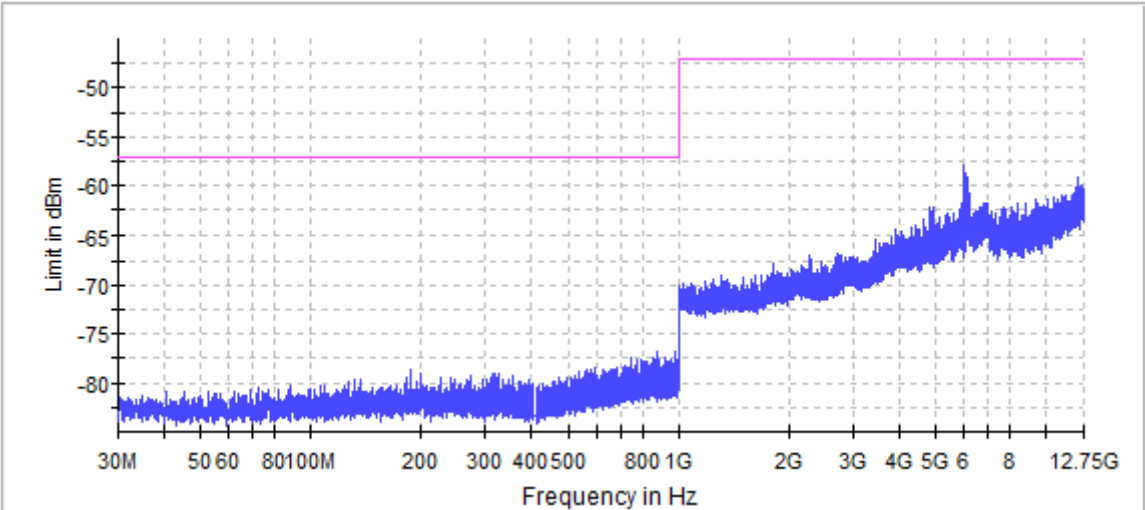
GFSK:



$\pi/4$ -DQPSK:

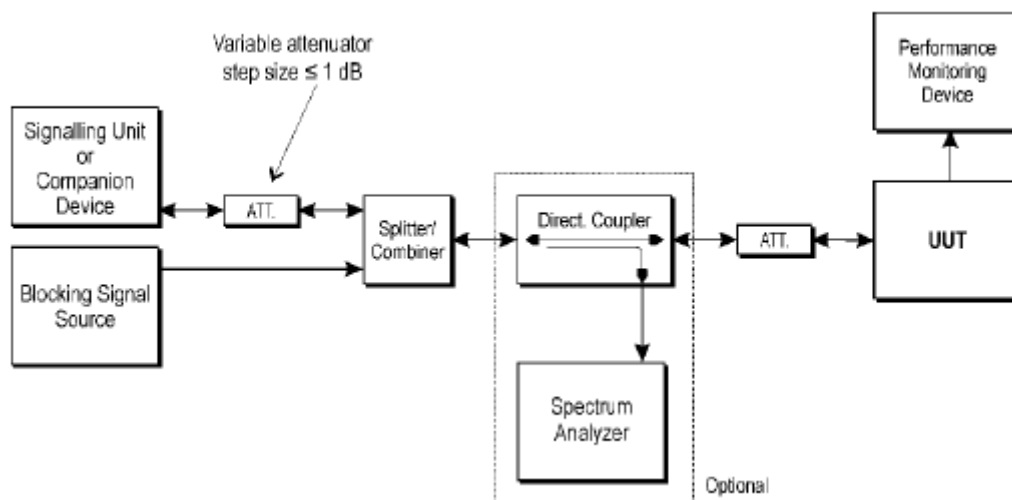


8-DPSK:



10. RECEIVER BLOCKING

10.1 TEST SETUP



10.2 LIMITS

Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
$P_{min} + 6$ dB	2 380 2 503,5	-53	CW
$P_{min} + 6$ dB	2 300 2 330 2 360	-47	CW
$P_{min} + 6$ dB	2 523,5 2 553,5 2 583,5 2 613,5 2 643,5 2 673,5	-47	CW

NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

Receiver Blocking parameters for Receiver Category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
$P_{min} + 6$ dB	2 380 2 503,5	-57	CW
$P_{min} + 6$ dB	2 300 2 583,5	-47	CW

NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

Receiver Blocking parameters for Receiver Category 3 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
$P_{min} + 12$ dB	2 380 2 503,5	-57	CW
$P_{min} + 12$ dB	2 300 2 583,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.			
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.			

10.3 TEST PROCEDURE

Please refer to ETSI EN 300 328 V2.1.1 in clause 5.4.11.2

10.4 RESULTS & PERFORMANCE

The test of P_{min} :

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. 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} .

The screenshot displays the CMW (Master) test software interface. The top bar shows 'BER' and 'BER Search' tabs. The main area is divided into several sections:

- Bit Errors:** BER [%] is 2.89838 (highlighted in red), and Bit Errors is 78604.
- NAK:** NAK Rate [%] is 100.00.
- Packet Errors:**
 - PER [%] is 8.22
 - Missing Packets Rate [%] is 0.29
 - HEC Error Rate [%] is 0.00
 - CRC Error Rate [%] is 0.29
 - Wrong Packet Type [%] is 3.82
 - Wrong Payload Length [%] is 3.82
- Packets Received:** A progress bar shows 1000 / 1000 packets received. Below it, 'Packets to be received by CMW' is 1000, and 'Payload bits to be received' is 2712000.
- General Setup:**
 - Operating Mode: RF Test
 - Burst Type: Basic Rate
 - Test Mode: Loopback Test
- RF Setup:**
 - Channel: Rx (EUT) 0, Tx (EUT) 0
 - Frequency: 2402.0 MHz
 - Hopping: ☒
 - Tx Level (CMW): -70.00 dBm
 - Exp. Nom. Power: 10.00 dBm
 - Auto Ranging: ☐
 - Dirty Tx: ☐
- Signal Characteristics:**
 - Packet Type: DH5
 - Payload Length: 339 byte(s)
 - Pattern Type: 10101010
 - Whitening: ☐

The bottom status bar shows 'CMW (Master) Signaling', 'CONNECTED TESTMODE', 'EUT for Paging', and the EUT ID '123456789A1E'.

Hopping mode

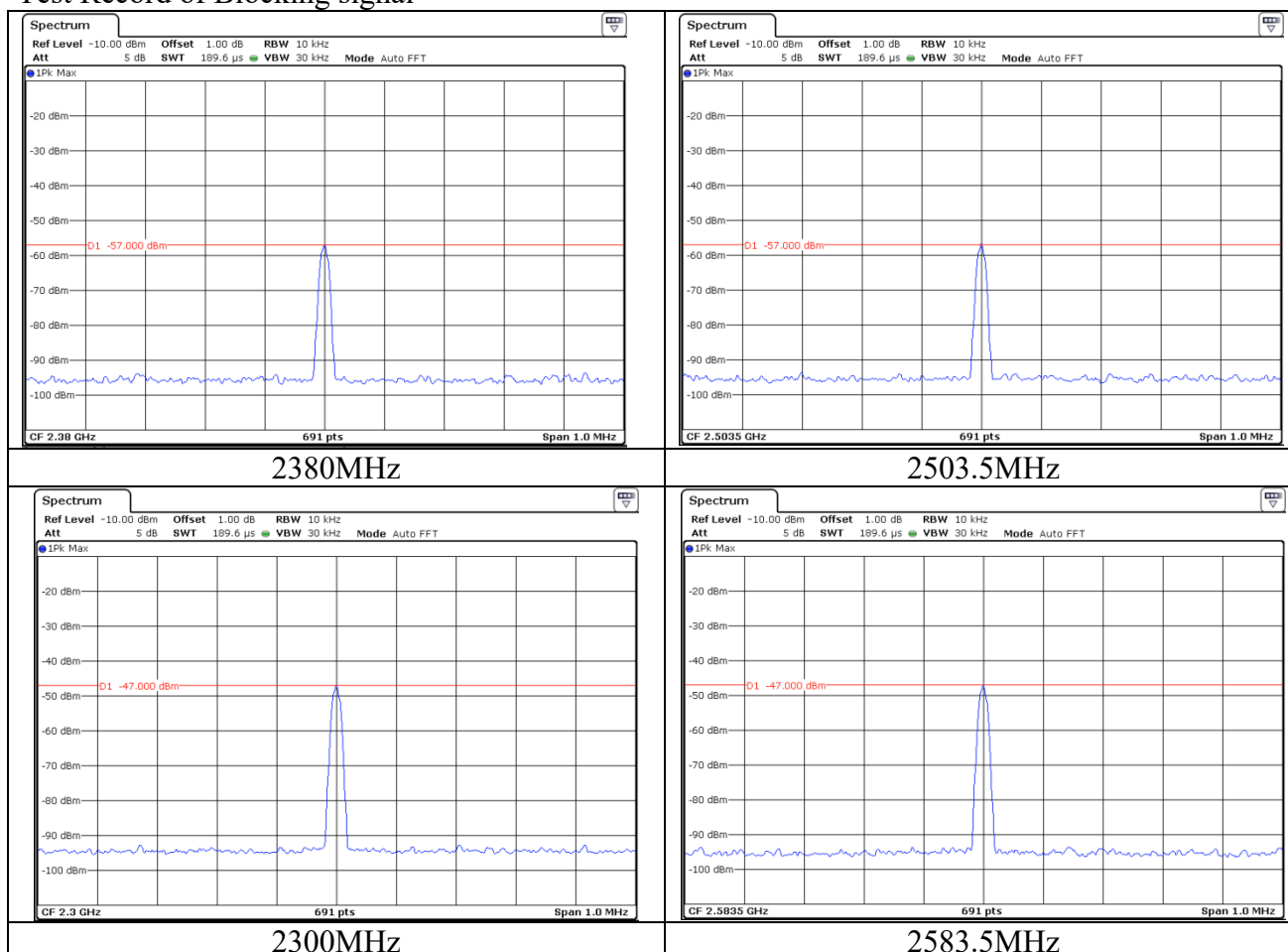
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power(dBm) CW	PER (%)	Limit (%)	Results
-58.00 (Pmin+12dBm)	2 380 2 503,5	-57	0.00	10	PASS
	2 300 2 583,5	-47	0.00	10	PASS

NOTE:

- (1)The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1.t)).
- (2) Manufacturer is declared PER, can be used is greater -70dBm.

NOTE: All of the EUT Configure Mode were tested and found GFSK mode is the worst mode, the worst case is recorded in this report.

Test Record of Blocking signal



BER

BER Search

Bit Errors

BER [%]0.00000

Bit Errors0

NAK

NAK Rate [%]0.00

Packet Errors

PER [%]0.00

Missing Packets Rate [%]0.00

HEC Error Rate [%]0.00

CRC Error Rate [%]0.00

Wrong Packet Type [%]0.00

Wrong Payload Length [%]0.00

Packets Received

1000 / 1000

Packets to be received by CMW

1000

Payload bits to be received

2712000

General Setup

Operating ModeRF Test

Burst TypeBasic Rate

Test ModeLoopback Test

RF Setup

Rx (EUT)

0

Tx (EUT)

Channel

Frequency2402.0 MHz

Hopping2402.0 MHz

Hopping☒

Tx Level (CMW)-58.00

Exp. Nom. Power10.00

Auto Ranging☐

Dirty Tx☐

Signal Characteristics

Packet TypeDH5

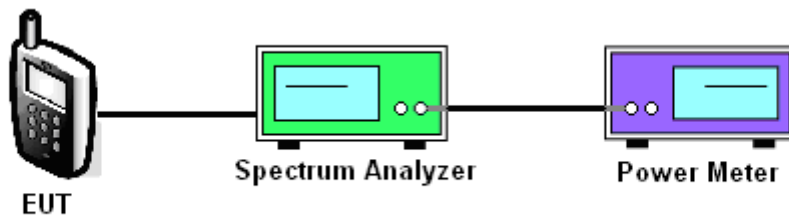
Payload Length339 byte(s)

Pattern Type10101010

Whitening☐

11. DUTY CYCLE, TX-SEQUENCE, TX-GAP

11.1 TEST SETUP



11.2 LIMITS

Limits	Duty cycle \leq the maximum value declared by the supplier, Max. sequence time=Min.gap time=5ms,
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11.3 TEST PROCEDURE

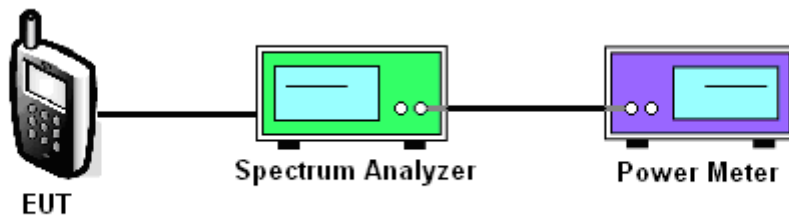
Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.2.2.1.2

11.4 RESULTS & PERFORMANCE

These requirements apply to non-adaptive equipment or to adaptive equipment when operating in a non-adaptive mode. But this equipment applies to adaptivity, so the requirement do not apply for it.

12. MEDIUM UTILISATION FACTOR

12.1 TEST SETUP



12.2 LIMITS

Limits	$\leq 10\%$
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12.3 TEST PROCEDURE

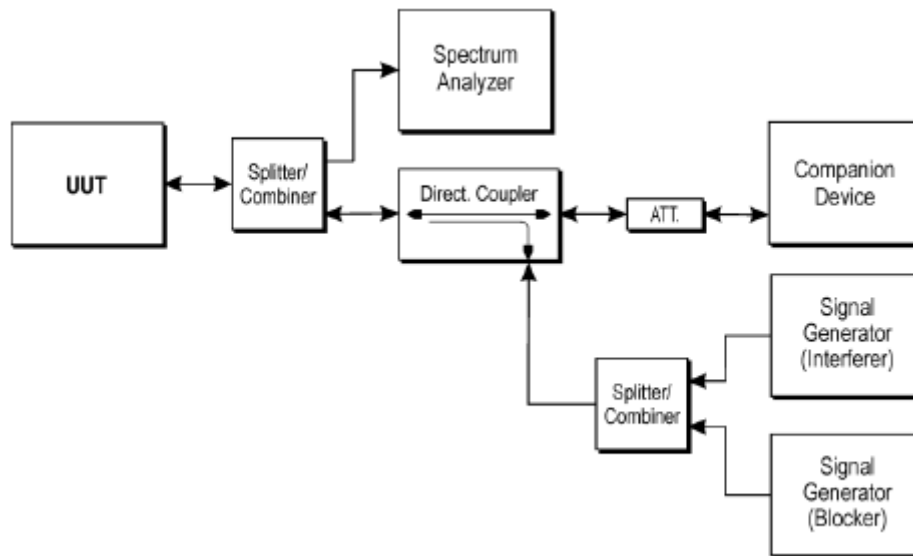
Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.2.2.1.3

12.4 RESULTS & PERFORMANCE

These requirements apply to non-adaptive equipment or to adaptive equipment when operating in a non-adaptive mode. But this equipment applies to adaptivity, so the requirement do not apply for it.

13. ADAPTIVITY

13.1 TEST SETUP



13.2 LIMITS

Please refer to ETSI EN 300 328 V2.1.1 in clause 4.3.1.6.2

13.3 TEST PROCEDURE

Please refer to ETSI EN 300 328 V2.1.1 in clause 5.3.7.2.1.2

13.4 RESULTS & PERFORMANCE

The transmission power of this equipment is less than 10dBm, so the requirement do not apply for it.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

Please refer to the file named “RF Test Setup Photos”.

APPENDIX 2 PHOTOGRAPHS OF EUT

Please refer to the file named “EUT Photos”.

----End of the report----