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TESTING
CNAS L5313

Test report No:
2090798R-RF-CE-P17V01

CE TEST REPORT

Product Name	EZ-BT Module
Trademark	
Model and /or type reference	CYBT-343026-01/CYBT-343151-02 /CYBT-343029-01/CYBT-143038-01
Applicant's name / address	Infineon Technologies AG Am Campeon 1-15, 85579 Neubiberg, Germany
Test method requested, standard	ETSI EN 300328 V2.2.2 (2019-07) AS/NZS 4268:2017
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Kitty Li/ Project Assistant 
Reviewed by (name / position & signature)	Frank He/ Technical Supervisor 
Approved by (name / position & signature)	Jack Zhang/ Supervisor 
Date of issue	2020-10-16
Report template No	Template_EN 300328-RF-V1.0

Note: The report is based on DEKRA report No.: 18B2048R-RF-CE-P17V01, only receiver blocking was tested for compliance of ETSI EN 300328 V2.2.2.

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Sep. 22, 2020
Date (start test)	Sep. 23, 2020
Date (finish test)	Oct. 15, 2020

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2090798R-RF-CE-P17V01	V1.0	Initial issue of report.	2020-10-16

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with ETSI EN 300328 V2.2.2, AS/NZS 4268: 2017.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
 - Chapter 1.1 General Description of the Item(s);
 - Chapter 1.2 Antenna Informaion;
 - Chapter 1.3 Channel List.

USED EQUIPMENT

Receiver Blocking / TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Splitter/Combiner (Qty: 2)	Mini-Circuits	ZAPD-50W 4.2-6.0 GHz	NN256400424	N/A	N/A
10dB Directional Coupler	Agilent	87300C	MY44300299	N/A	N/A
Adaptivity Test Unit	Agilent	N/A	11607310008	N/A	N/A
Rx PER Monitoring Unit	Agilent	N/A	11706190075	N/A	N/A
Wideband Radio Communication Tester	R & S	CMW 500	1201.0002K50- 158243-jb	2020.08.15	2021.08.14
PSG Analog Signal Generator	Agilent	E8257D	MY44321116	2020.08.15	2021.08.14
ESG Vector Signal Generator	Agilent	E4438C	MY49070163	2020.08.25	2021.08.24
Temperature/Humidity Meter	Zhichen	ZC1-2	TR8-TH	2020.09.02	2021.09.01


UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%. The Uncertainties is complice with standard required as below.

Test item	Uncertainty
Occupied Channel Bandwidth	$\pm 5 \%$
RF output power, conducted	$\pm 1,5 \text{ dB}$
Power Spectral Density, conducted	$\pm 3 \text{ dB}$
Unwanted Emissions, conducted	$\pm 3 \text{ dB}$
All emissions, radiated	$\pm 6 \text{ dB}$
Temperature	$\pm 3 \text{ }^\circ\text{C}$
Supply voltages	$\pm 3 \%$
Time	$\pm 5 \%$

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name	EZ-BT Module
Model No.....	CYBT-343026-01/CYBT-343151-02 /CYBT-343029-01/CYBT-143038-01
Trademark.....	
Manufacturer.....	Infineon Technologies AG
Manufacturer Address	Am Campeon 1-15, 85579 Neubiberg, Germany
Model Difference.....	Model CYBT-343029-01 is identical to Model CYBT-343026-01 and CYBT-143038-01 except for whether there is a certified Homekit chip or flash memory inside. Model CYBT-343151-02 shares the same PCB with Model CYBT-343029-01, CYBT-343026-01 and CYBT-143038-01, except that working temperature is changed from -40~85°C to -40~105°C. Part of device P/N has changed to meet the working temperature requirement. The RF character of this new module and original modules is the same.

Wireless specification	Bluetooth
Bluetooth Specification	V3.0
Operating frequency range(s)	2402 ~ 2480 MHz
Type of Modulation	GFSK, Pi/4 DQPSK, 8DPSK
PHYS.....	<input checked="" type="checkbox"/> GFSK <input checked="" type="checkbox"/> Pi/4 DQPSK <input checked="" type="checkbox"/> 8DPSK
Data Rate.....	<input checked="" type="checkbox"/> 1Mbit/s <input checked="" type="checkbox"/> 2Mbit/s <input checked="" type="checkbox"/> 3Mbit/s
Number of channel	79

Rated power supply	Voltage and Frequency	
	<input type="checkbox"/>	AC: 220 – 240 V, 50/60 Hz
	<input type="checkbox"/>	AC: 100 – 240 V, 50/60 Hz
	<input checked="" type="checkbox"/>	2.3 ~ 3.6 Vdc
	<input type="checkbox"/>	Battery:
Mounting position.....	<input type="checkbox"/>	Table top equipment
	<input type="checkbox"/>	Wall/Ceiling mounted equipment
	<input type="checkbox"/>	Floor standing equipment
	<input type="checkbox"/>	Hand-held equipment
	<input checked="" type="checkbox"/>	Other: Module

1.2 Antenna Information

Antenna model / type number	N/A		
Antenna serial number.....	N/A		
Antenna Delivery	<input checked="" type="checkbox"/>	1TX + 1RX	
	<input type="checkbox"/>	2TX + 2RX	
Antenna technology	<input checked="" type="checkbox"/>	SISO	
	<input type="checkbox"/>	MIMO	<input type="checkbox"/> CDD
			<input type="checkbox"/> Beam-forming
Antenna Type	<input type="checkbox"/>	External	<input type="checkbox"/> Dipole
			<input type="checkbox"/> Sectorized
			<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> PCB	
	<input type="checkbox"/>	<input type="checkbox"/> Metal Monopole Antenna	
	<input type="checkbox"/>	<input type="checkbox"/> Others.....	
Antenna Gain	-0.5 dBi		

1.3 Channel List

Bluetooth Working Frequency of Each Channel:							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz	03	2405 MHz
04	2406 MHz	05	2407 MHz	06	2408 MHz	07	2409 MHz
08	2410 MHz	09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz	15	2417 MHz
16	2418 MHz	17	2419 MHz	18	2420 MHz	19	2421 MHz
20	2422 MHz	21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz	27	2429 MHz
28	2430 MHz	29	2431 MHz	30	2432 MHz	31	2433 MHz
32	2434 MHz	33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz	39	2441 MHz
40	2442 MHz	41	2443 MHz	42	2444 MHz	43	2445 MHz
44	2446 MHz	45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz	51	2453 MHz
52	2454 MHz	53	2455 MHz	54	2456 MHz	55	2457 MHz
56	2458 MHz	57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz	63	2465 MHz
64	2466 MHz	65	2467 MHz	66	2468 MHz	67	2469 MHz
68	2470 MHz	69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz	75	2477 MHz
76	2478 MHz	77	2479 MHz	78	2480 MHz	N/A	N/A

Note: The general description of the Item(s), antenna information and channel list in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Operating mode(s) used for tests

During the tests the following operating mode(s) has(have) been used.

Test Mode	Mode 1: Normal operation
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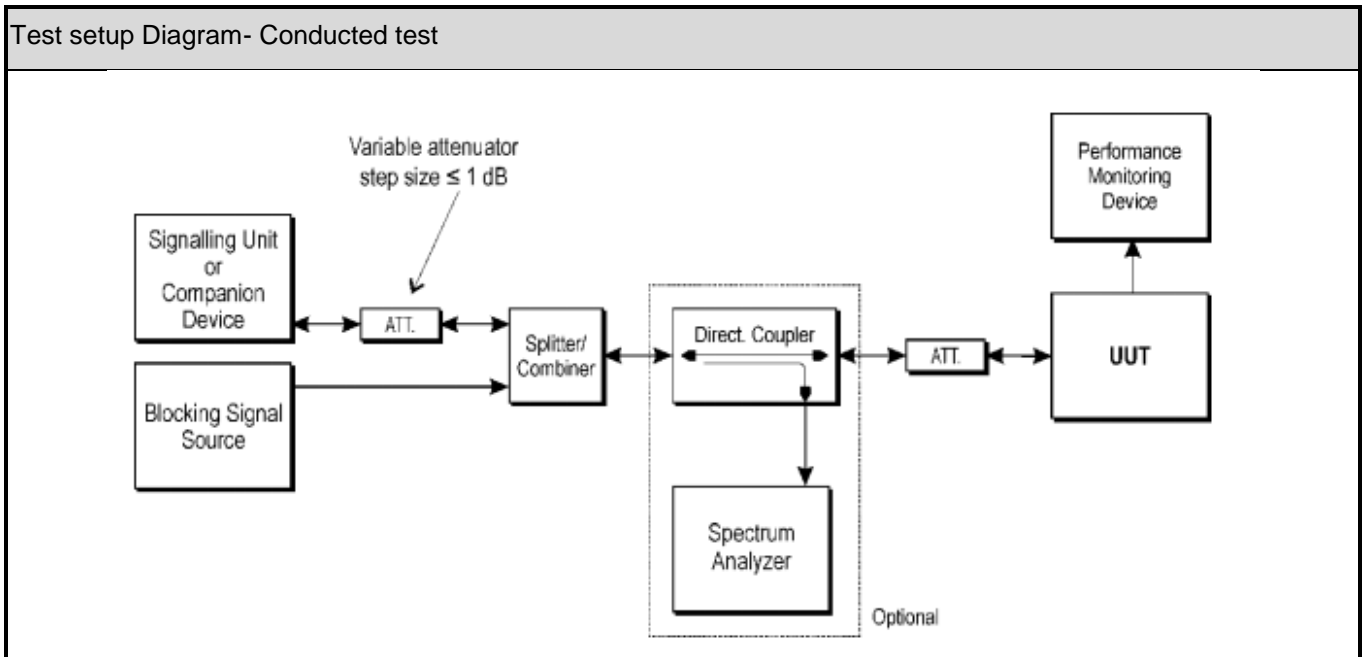
2.2 Accessories Information

Accessories Information	Brand/model name	Cable		
		Length used during test [m]	Attached during test	Shielded
USB – serial port	N/A	0.5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

2.3 Support / Auxiliary equipment / unit / software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
N/A	N/A	N/A	N/A
Software	Type / Version	Manufacturer	Supplied by
N/A	N/A	N/A	N/A

2.4 Test Configuration / Block diagram used for tests



2.5 Testing process

1	Setup the EUT as shown in Section 2.4.
2	Connect the EUT with CMW 500.
3	Verify that the EUT works properly.

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
ETSI EN 300328 V2.2.2	2019	Wideband transmission systems;Data transmission equipment operating in the 2,4 GHz band;Harmonised Standard for access to radio spectrum
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--	--	--
--	--	--

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

No deviation

3.3 Overview of results

Test Item – ETSI EN 300328 V2.2.2							
Performed Test Item	Test Procedure	Adaptive		Non-Adaptive		Verdict	Remark
		(≥10dBm)	(<10dBm)	(≥10dBm)	(<10dBm)		
Receiver Blocking	Claus 5.4.11	N/A	Yes	N/A	N/A	PASS	

4 TEST RESULTS

4.1 Receiver Blocking	VERDICT: PASS
------------------------------	----------------------

4.1.1 Limit			
Standard	ETSI EN 300328 V2.2.2		
<input type="checkbox"/>	Receiver Category 1		
Wanted signal meanpower 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 notes 2)	2 380	-34	CW
	2 504		
(-139 dBm+10×log ₁₀ (OCBW)) or -74 dBm whichever is less (see notes 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.			
<input checked="" type="checkbox"/>	Receiver Category 2		
Wanted signal meanpower 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)+10dB) or (-74 dBm +10dB)whichever is less (see notes 2)	2 380	-34	CW
	2 504		
	2 300		
	2 584		
	2 584		

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

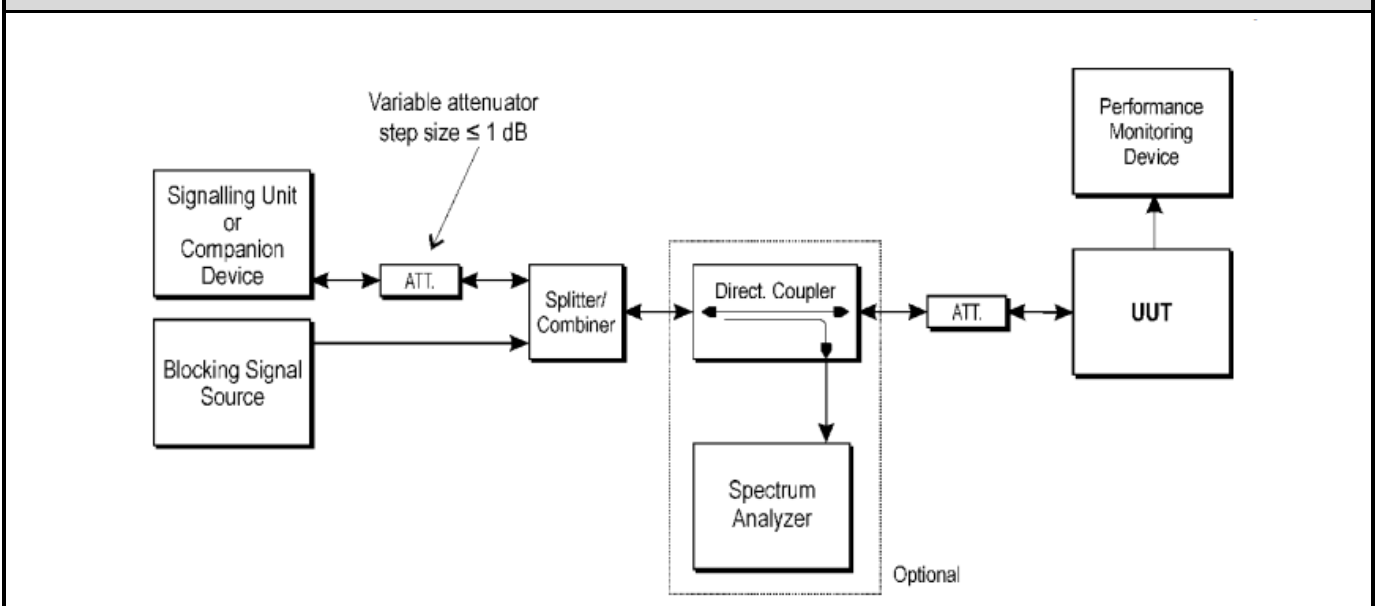
Receiver Category 3			
Wanted signal meanpower from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}) + 20 \text{ dB})$ or $(-74 \text{ dBm} + 20 \text{ dB})$ whichever is less (see notes 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

4.1.2 Test Setup



4.1.3 Procedure			
References Rule	Chapter	Description	
<input checked="" type="checkbox"/> ETSI EN 300328 V2.2.2	5.4.11.2.1	Receiver Blocking	
The different steps below define the procedure to verify the efficiency of the LBT based adaptive mechanism of equipment using wide band modulations other than FHSS. This method can be applied on Load Based Equipment and Frame Based Equipment.			
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			
<p>1, 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.</p> <p>2, 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.</p> <p>2, 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 Pmin. This signal level (Pmin) is increased by the value provided in note 2 of the applicable table corresponding to the receiver category and type of equipment.</p>			
Step 4			
<p>1, The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment.</p> <p>2, 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.</p>			
Step 5			
<p>1, 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:</p> <ul style="list-style-type: none"> - 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. <p>2, 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:</p> <ul style="list-style-type: none"> - 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.
3, 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.
4, 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.

4.1.4 Test Data						
Test Mode	Frequency (MHz)	Wanted signal power (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 1)	PER Measure Value (%)	PER Limit (%)
Mode 1	2402	-69.5	2 380	-34	0.5	≤10
			2 504	-34	0.1	≤10
			2 300	-34	0.2	≤10
			2 584	-34	0.5	≤10
	2480	-69.5	2 380	-34	1.09	≤10
			2 504	-34	0.89	≤10
			2 300	-34	0.79	≤10
			2 584	-34	0.60	≤10

Note 1: 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.

5 SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

_____ The End _____