

TEST REPORT

Report Reference No...... **HK2510115586-2ER**

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Date of issue 2025/10/16

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Address 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park,
Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Applicant's name Mid Ocean Brands B.V.

Address Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan,
Kowloon, Hong Kong.

Test specification

Standard **ETSI EN 300 328 V2.2.2 (2019-07)**

TRF Originator Shenzhen HUAK Testing Technology Co., Ltd.

Master TRF Dated 2017-12

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context.

Product Name Find my dual tag

Trade Mark N/A

Product Model MO2759

Serial Model N/A

Hardware Version V2.0

Software Version V2.0

Modulation Type GFSK

Operation Frequency From 2402 MHz to 2480 MHz

Ratings DC 3V From Battery

Result **PASS**



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TEST REPORT

Test Report No. :	HK2510115586-2ER	2025/10/16
		Date of issue

Product Name : Find my dual tag

Product Model : MO2759

Serial Model : N/A

Applicant : Mid Ocean Brands B.V.

Address : Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Manufacturer : Mid Ocean Brands B.V.

Address : Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Test Result:

PASS

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test results without the written permission of the test laboratory.



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** Issued History **

Revision	Description	Issued Date	Remark
Revision 1.0	Initial Test Report Release	2025/10/16	Jason Zhou



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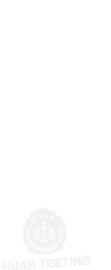
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1. TEST STANDARDS

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	:	2025/10/11
Testing commenced on	:	2025/10/11
Testing concluded on	:	2025/10/16

2.2. Product Description

Name of EUT	Find my dual tag
Model(s) Number	MO2759
List Models	N/A
Difference description	N/A
Hardware version	V2.0
Software version	V2.0
Antenna Type	PCB Antenna
Antenna Gain	0dBi
Note: Antenna gain Refer to the antenna specifications. The cable loss data is obtained from the supplier. The test results in the report only apply to the tested sample.	



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2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/>	230V/ 50 Hz	<input type="radio"/>	120V/60Hz		
		<input type="radio"/>	12 V DC	<input type="radio"/>	24 V DC		
		<input checked="" type="radio"/>	Other (specified in blank below)				

DC 3V From Battery

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Description of the test mode

Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	20	2442
01	2404	21	2444
02	2406	22	2446
03	2408	23	2448
04	2410	24	2450
05	2412	25	2452
06	2414	26	2454
07	2416	27	2456
08	2418	28	2458
09	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	39	2480

Type	Test Frequency					
	Lowest		Middle		Highest	
	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
BLE	00	2402	19	2440	39	2480

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 GFSK modulation. RX/Standby tests: BT test mode enabled, scan enabled, TX Idle
Test mode:	<input type="checkbox"/> Bluetooth Test mode loop back enabled (EUT is controlled over CBT/CMU) <input checked="" type="checkbox"/> Special software is used. EUT is transmitting pseudo random data by itself
Bluetooth standard capabilities:	40 channels channel separation 2 MHz used freq. range 2402-2480 MHz Modulation types: GFSK Bandwidth appr. 2MHz for single

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2.5. EUT Classification:

Type of equipment:	<input checked="" type="checkbox"/> stand alone equipment <input type="checkbox"/> plug in radio equipment <input type="checkbox"/> combined equipment
Modulation types:	<input checked="" type="checkbox"/> Wide Band Modulation (None Hopping – e.g. DSSS, OFDM) <input type="checkbox"/> Frequency Hopping Spread Spectrum (FHSS)
Adaptive equipment:	<input type="checkbox"/> Yes, LBT-based <input type="checkbox"/> Yes, non-LBT-based <input type="checkbox"/> Yes (but can be disabled) <input checked="" type="checkbox"/> No <input type="checkbox"/> COT value <input type="checkbox"/> CCA value(18µs)
Antennas and transmit operating modes:	<p><input checked="" type="checkbox"/> Operating mode 1 (single antenna) <input checked="" type="checkbox"/> Equipment with 1 antenna, <input checked="" type="checkbox"/> Equipment with 2 diversity antennas operating in switched diversity mode by which at any moment in time only 1 antenna is used, <input checked="" type="checkbox"/> Smart antenna system with 2 or more transmit/receive chains, but operating in a mode where only 1 transmit/receive chain is used)</p> <p><input type="checkbox"/> Operating mode 2 (multiple antennas, no beamforming) <input type="checkbox"/> Equipment operating in this mode contains a smart antenna system using two or more transmit/receive chains simultaneously but without beamforming.</p> <p><input type="checkbox"/> Operating mode 3 (multiple antennas, with beamforming) <input type="checkbox"/> Equipment operating in this mode contains a smart antenna system using two or more transmit/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.</p>

2.6. EUT configuration

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

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/

○ Adapter information

NA

2.7. Modifications

No modifications were implemented to meet testing criteria.



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3. TEST ENVIRONMENT

3.1. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.

1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2. Environmental conditions

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

Normal Temperature: 15°C~35°C

High Temperature: 40°C

Low Temperature: -10°C

Normal Voltage: DC 3V

High Voltage: DC 3.3V

Low Voltage: DC 2.7V

Relative Humidity: 55 %

Air Pressure: 989 hPa

3.3. Test Description

3.3.1. Main Terms

Verdict Verdict of each test cases.

Test Case Test cases identification number and description in ETSI specification.

3.3.2. Terms used in Condition column

NTV Normal voltage, Normal Temperature

HTHV High voltage, High Temperature

LTHV High voltage, Low Temperature

HTLV Low voltage, High Temperature

LTLV Low voltage, Low Temperature

3.3.3. Terms used in Verdict column

Pass This test cases has been tested, and EUT is conformant to the applied standards in the given frequency band.

Fail This test cases has been tested, but EUT is not conformant to the applied standards in the given frequency band.

N/A This 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.

Inc Test case result is ambiguous in the given frequency band.

Decl Declaration is received from the client to demonstrate the conformity to the relevant specification in the given frequency band.

BR This test cases is not tested in the given frequency band, but this testcases was tested with pass result for the initial model in the given frequency band.



3.3.4. Summary of measurement results

No deviations from the technical specifications were ascertained
There were deviations from the technical specifications ascertained

There were deviations from the technical specifications ascertained								
Test Specification Clause	Test Case	Test Condition	Mode	Pass	Fail	N/A	NP	Remark
5.4.2	RF output power	NTV	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		LT		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		HT		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.4.2	Duty Cycle, Tx-sequence, Tx-gap	NTV	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.4.4	Dwell time, min Freq.Occupation and Hopping sequence	NTV		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.4.5	Hopping Separation	NTV	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.4.2	Medium Utilisation	NTV	---	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.4.3	Power Spectral Density	NTV		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.4.6	Adaptivity, Short Control Signalling Transmissions	NTV	GFSK	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.4.7	Occupied Channel Bandwidth	NTV	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.4.8	Transmitter unwanted emissions in the out-of-band domain	NTV	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		LT		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
		HT		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5.4.9	Transmitter unwanted emissions in the spurious domain (conducted & radiated)	NTV	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.4.10	Receiver spurious emissions (conducted & radiated)	NTV	GFSK	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5.4.11	Receiver Blocking	NTV	---	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

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

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3.4. 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 ETSI TR 100 028-1 [1], ETSI TS 103 051 [2] and ETSI TS 103 052 [3] and shall correspond to an expansion factor (coverage factor) $k = 1,96$ or $k = 2$ (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). and is documented in the Shenzhen HUAK Testing Technology 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 HUAK Testing Technology Co., Ltd. is reported:

No.	Item	Uncertainty
1	Occupied Channel Bandwidth	$\pm 3.68\%$
2	RF power, conducted	$\pm 0.37\text{dB}$
3	Power Spectral Density, conducted	$\pm 0.78\text{dB}$
4	Unwanted Emissions, conducted	$\pm 2.71\text{dB}$
5	All emissions, radiated	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$
8	DC and low frequency voltages	$\pm 1.5\%$
9	Time	$\pm 1.0\%$
10	Duty Cycle	$\pm 3.0\%$

3.5. Equipment Used during the Test

Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2024/02/21	2026/02/20
Horn antenna	Schwarzbeck	9120D	HKE-013	2024/02/21	2026/02/20
Receiver	R&S	ESR-7	HKE-010	2025/02/19	2026/02/18
Spectrum analyzer	Agilent	N9020A	HKE-025	2025/02/19	2026/02/18
Spectrum analyzer	R&S	FSV3044	HKE-126	2025/02/19	2026/02/18
Preamplifier	EMCI	EMC051845SE	HKE-015	2025/02/19	2026/02/18
Preamplifier	Agilent	83051A	HKE-016	2025/02/19	2026/02/18
High pass filter unit	Tonscend	JS0806-F	HKE-055	2025/02/19	2026/02/18
Signal generator	Agilent	83630A	HKE-028	2025/02/19	2026/02/18
Power Sensor	Agilent	E9304A H18	HKE-164	2025/02/19	2026/02/18
RF automatic control unit	Tonscend	JS0806-2	HKE-060	2025/02/19	2026/02/18
Signal generator	Agilent	N5182A	HKE-029	2025/02/19	2026/02/18
Wireless Communication Test Set	R&S	CMW500	HKE-027	2025/02/19	2026/02/18
RF test software	Tonscend	V3.5.39	HKE-083	N/A	N/A
RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE -184	N/A	N/A

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4. TEST CONDITIONS AND RESULTS

4.1. ETSI EN 300 328 REQUIREMENTS

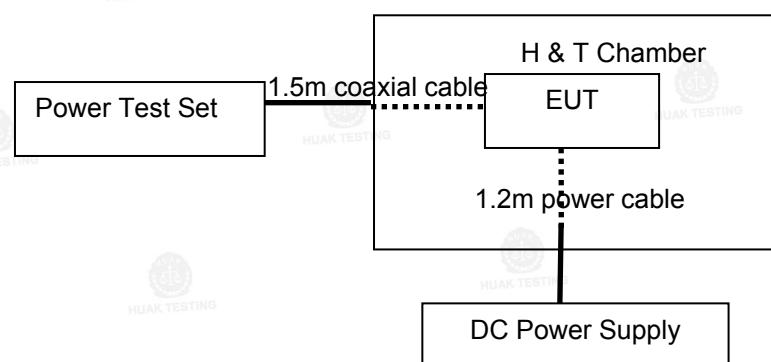
4.1.1. RF Output Power

LIMIT

The RF output power for non-FHSS equipment shall be equal to or less than 20 dBm.

For non-adaptive non-FHSS equipment, where the manufacturer has declared an RF output power of less 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

Step 1:

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.



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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 P_{burst} 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 P_{burst} 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.
- In 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 (P_{out}) 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.



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TEST RESULTS

Test environmental		Maximum conducted Burst Power in 15 measured Bursts (RMS) [dBm]		
Test Mode	Test Condition	Antenna Measured Power (dBm)	EIRP(dBm)	Limit(dBm)
00	NTV	-1.02	-1.02	20
	LT/NV	-1.09	-1.09	20
	HT/NV	-1.13	-1.13	20
19	NTV	-1.21	-1.21	20
	LT/NV	-1.26	-1.26	20
	HT/NV	-1.34	-1.34	20
39	NTV	-2.23	-2.23	20
	LT/NV	-2.35	-2.35	20
	HT/NV	-2.40	-2.40	20
Result		Pass		

Note :Cable loss and antenna gain was combined in the calculated result.





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LIMIT

Non-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 Tx-sequence time shall be equal to or less than 10 ms.
- The minimum Tx-gap time following a Tx-sequence shall be equal to the duration of that proceeding Tx-sequence with a minimum of 3,5 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 requirement for the Medium Utilization (MU) factor further described in clause 4.3.2.5. This is verified by the conformance test referred to in clause 4.3.2.5.4.

TEST PROCEDURE

For systems using wide band modulations other than FHSS, the measurement shall be performed at the lowest, the middle, and the highest channel on which the equipment can operate. These frequencies shall be recorded.

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.

TEST RESULTS

Not applicable

These requirements do not apply for equipment with a 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.

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4.1.3. Medium Utilisation (MU) factor

LIMIT

The maximum Medium Utilization factor for non-adaptive non-FHSS equipment shall be 10 %.

TEST PROCEDURE

Step 1:

- Use the same stored measurement samples from the procedure described in clause 5.4.2.2.1.2.

Step 2:

Step 2:
• For each burst calculate the product of ($P_{burst} / 100 \text{ mW}$) and the TxOn time. P_{burst} 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.

TEST RESULTS

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..



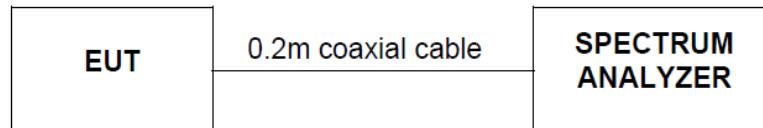
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LIMIT

The maximum Power Spectral Density for non-FHSS equipment is 10 dBm per MHz.

TEST CONFIGURATION



TEST PROCEDURE

The test procedure shall be as follows:

Step 1:

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

- Start Frequency: 2 400 MHz
- Stop Frequency: 2 483,5 MHz
- Resolution BW: 10 kHz
- Video BW: 30 kHz
- Sweep Points: > 8 350; for spectrum analysers not supporting this number of sweep points, the frequency band may be segmented
- Detector: RMS
- Trace Mode: Max Hold
- Sweep time: For non-continuous transmissions: $2 \times \text{Channel Occupancy Time} \times \text{number of sweep Points}$

For non-adaptive equipment use the maximum TX-sequence time in the formula above instead of the Channel Occupancy Time

For continuous transmissions: 10 s; the sweep time may be increased further until a value where the sweep time has no further impact anymore on the RMS value of the signal

For non-continuous signals, wait for the trace to stabilize.

Save the data (trace data) set to a file.

Step 2:

For conducted measurements on smart antenna systems using either operating mode 2 or operating mode 3 (see clause 5.3.2.2), repeat the measurement for each of the transmit ports. For each sampling point (frequency domain), add up the coincident power values (in mW) for the different transmit chains and use this as the new data set.

Step 3:

Add up the values for power for all the samples in the file using the formula below.

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

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

Step 4:

Normalize the individual values for power (in dBm) so that the sum is equal to the RF Output Power (e.i.r.p.) measured in clause 5.4.2 and save the corrected data. The following formulas can be used:

$$C_{Corr} = P_{Sum} - P_{e.i.r.p.}$$

$$P_{Samplecorr}(n) = P_{Sample}(n) - C_{Corr}$$

with being the actual sample number

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Step 5:

Starting from the first sample PSamplecorr(n) (lowest frequency), add up the power (in mW) of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to sample #100). This is the Power Spectral Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded.

Step 6:

Shift the start point of the samples added up in step 5 by one sample and repeat the procedure in step 5 (i.e. sample #2 to sample #101).

Step 7:

Repeat step 6 until the end of the data set and record the Power Spectral Density values for each of the 1 MHz segments.

From all the recorded results, the highest value is the maximum Power Spectral Density (PSD) for the UUT. This value, which shall comply with the limit given in clause 4.3.2.3.3, shall be recorded in the test report.

TEST RESULTS

The Maximum Power Spectral Density				
Test Channel Number	Test Condition	Measured Power Density (dBm/MHz)	EIRP Density (dBm/MHz)	Limit(dBm/MHz)
00	NTV	-1.10	-1.10	10
19	NTV	-1.30	-1.30	10
39	NTV	-2.33	-2.33	10
Result		PASS		

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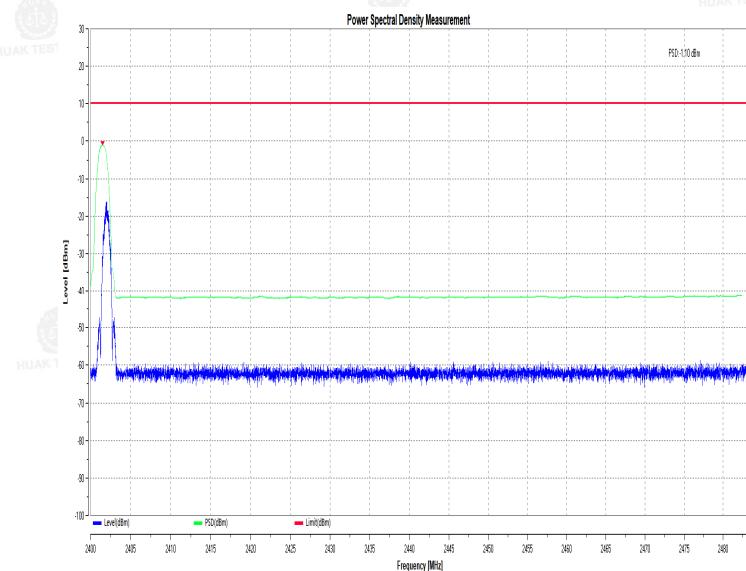
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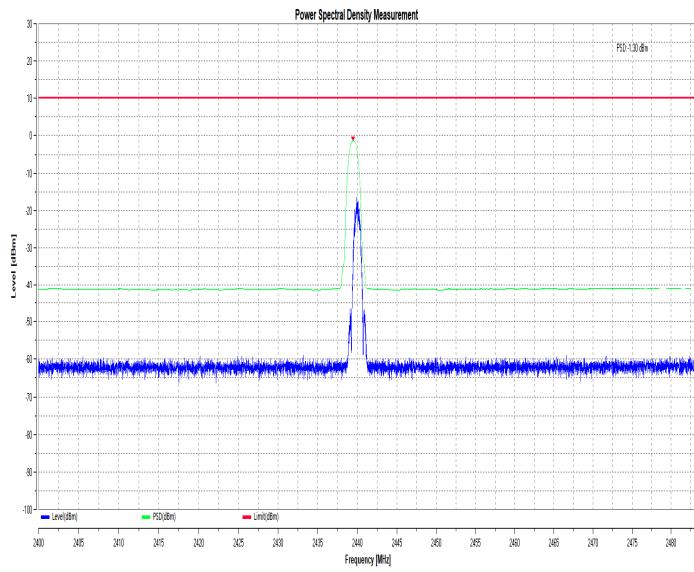
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2402



2440



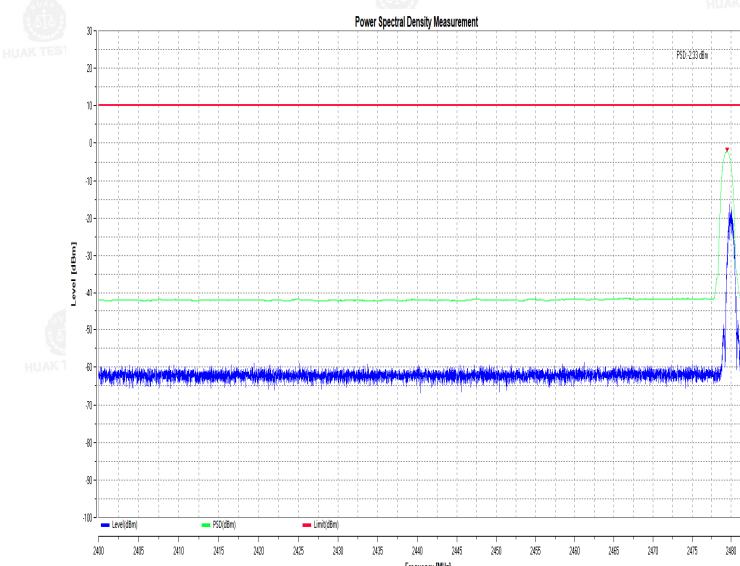
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4.1.5. Adaptivity (Adaptive equipment using modulations other than FHSS)

LIMIT

Requirement	Type	
	Adaptive Frequency Hopping using LBT based DAA	Adaptive Frequency Hopping using other forms of DAA (non-LBT based)
Minimum Clear Channel Assessment (CCA) Time	At least of Max(18 us, 0.2% of COT) (Note 1)	N/A
Maximum Channel Occupancy (COT) Time	2.0ms _{note4} to 60ms/Dwell time (Note 3)	40 ms
Minimum Idle Period	5% of COT and should longer then 100us	At least 5% of COT and 100 μ s
Extended CCA check	(CCA, 5% of COT)	N/A
Short Control Signaling Transmissions	Short Control Signalling Transmissions shall have a maximum TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms or within an observation period equal to the dwell time, whichever is less. (Note 2)	



- The analyser shall be set as follows:
 - RBW: \geq Occupied Channel Bandwidth (if the analyser does not support this setting, the highest available setting shall be used)
 - VBW: $3 \times$ RBW (if the analyser does not support this setting, the highest available setting shall be used)
 - Detector Mode: RMS
 - Centre Frequency: Equal to the centre frequency of the operating channel
 - Span: 0 Hz
 - Sweep time: $>$ maximum Channel Occupancy Time
 - Trace Mode: Clear Write
 - Trigger Mode: Video

Step 2:

- Configure the UUT for normal transmissions with a sufficiently high payload resulting in a minimum transmitter activity ratio ($TxOn / (TxOn + TxOff)$) of 0,3. Where this is not possible, the UUT shall be configured to the maximum payload possible.
- For Frame Based Equipment, using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.2.6.3.2.2, step 3. When measuring the Idle Period of the UUT, only transmissions from the UUT shall be considered.
- For Load Based equipment, using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that the UUT complies with the maximum Channel Occupancy Time and minimum Idle Period defined in clause 4.3.2.6.3.2.3, step 2 and step 3. When measuring the Idle Period of the UUT, only transmissions from the UUT shall be considered.

For the purpose of testing Load Based Equipment referred to in the first paragraph of clause 4.3.2.6.3.2.3 (IEEE 802.11™ [i.3] or IEEE 802.15.4™ [i.4] equipment), the limits to be applied for the minimum Idle Period and the maximum Channel Occupancy Time are the same as defined for other types of Load Based Equipment (see clause 4.3.2.6.3.2.3, step 2 and step 3). The Idle Period is considered to be equal to the CCA or Extended CCA time defined in clause 4.3.2.6.3.2.3, step 1 and step 2.

Step 3: Adding the interference signal

- An interference signal as defined in clause B.7 is injected on the current operating channel of the UUT. The power spectral density level (at the input of the UUT) of this interference signal shall be equal to the detection threshold defined in clause 4.3.2.6.3.2.2, step 5 (frame based equipment) or clause 4.3.2.6.3.2.3, step 5 (load based equipment).

Step 4: Verification of reaction to the interference signal

- The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected operating channel with the interfering signal injected. This may require the spectrum analyser sweep to be triggered by the start of the interfering signal.
- Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that:

i) The UUT shall stop transmissions on the current operating channel.

The UUT is assumed to stop transmissions within a period equal to the maximum Channel Occupancy Time defined in clause 4.3.2.6.3.2.2 (frame based equipment) or clause 4.3.2.6.3.2.3 (load based equipment).

ii) Apart from Short Control Signalling Transmissions, there shall be no subsequent transmissions while the interfering signal is present.

To verify that the UUT is not resuming normal transmissions as long as the interference signal is present, the monitoring time may need to be 60 s or more.

iii) The UUT may continue to have Short Control Signalling Transmissions on the operating channel while the interfering signal is present. These transmissions shall comply with the limits defined in clause 4.3.2.6.4.2.

The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time).

iv) Alternatively, the equipment may switch to a non-adaptive mode.

Step 5: Adding the unwanted signal

- With the interfering signal present, a 100 % duty cycle CW signal is inserted as the unwanted signal. The frequency and the level are provided in table 10 (clause 4.3.2.6.3.2.2) for Frame Based Equipment or in table 11 (clause 4.3.2.6.3.2.3) for Load Based Equipment.
- The spectrum analyser shall be used to monitor the transmissions of the UUT on the selected operating channel. This may require the spectrum analyser sweep to be triggered by the start of the unwanted signal.

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- Using the procedure defined in clause 5.4.6.2.1.5, it shall be verified that:

i) The UUT shall not resume normal transmissions on the current operating channel as long as both the interference and unwanted signals remain present.

To verify that the UUT is not resuming normal transmissions as long as the interference and unwanted signals are present, the monitoring time may need to be 60 s or more.

ii) The UUT may continue to have Short Control Signalling Transmissions on the operating channel while the interfering and unwanted signals are present. These transmissions shall comply with the limits defined in clause 4.3.2.6.4.2.

The verification of the Short Control Signalling transmissions may require the analyser settings to be changed (e.g. sweep time).

Step 6: Removing the interference and unwanted signal

• On removal of the interference and unwanted signals the UUT is allowed to start transmissions again on this channel; however, this is not a requirement and, therefore, does not require testing.

Step 7:

• Step 2 to step 6 shall be repeated for each of the frequencies to be tested.

TEST RESULTS

Not applicable.

This requirement do 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.

4.1.6. Occupied Channel Bandwidth

LIMIT

The Occupied Channel Bandwidth shall be within the band given in table 1.

Table 1: Service frequency bands

	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 non-FHSS equipment with e.i.r.p. greater than 10 dBm, the Occupied Channel Bandwidth shall be equal to or less than 20 MHz.

TEST PROCEDURE

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 × Nominal Channel Bandwidth
- Detector Mode: RMS
- Trace Mode: Max Hold
- Sweep time: 1 s

Step 2:

Wait for the trace to stabilize.

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.

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.



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TEST RESULTS

Test Condition	Test Mode	Test Channel	Ant	OBW [MHz]	FL OBW [MHz]	FH OBW [MHz]	Verdict
TNVN	BLE	2402	Ant1	1.026	2401.486	---	PASS
TNVN	BLE	2480	Ant1	1.021	---	2480.509	PASS

2402



2480



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

LIMIT

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in figure 3.

NOTE: Within the 2 400 MHz to 2 483,5 MHz band, the Out-of-band emissions are fulfilled by compliance with the Occupied Channel Bandwidth requirement in clause 4.3.2.7.

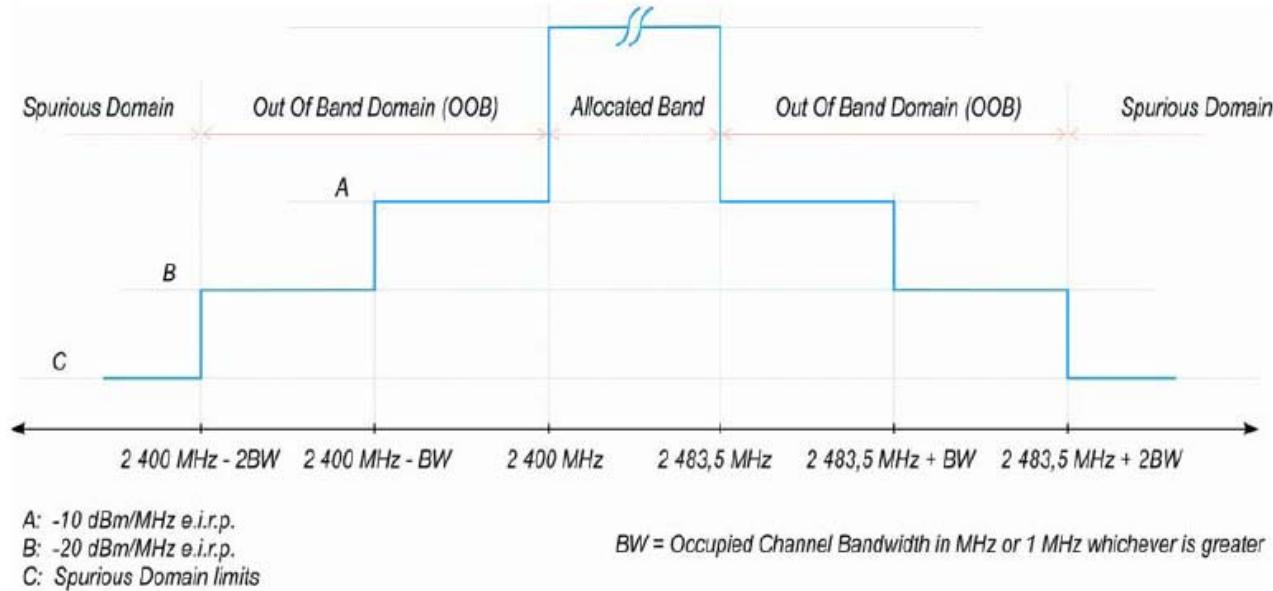


Figure 3: Transmit mask

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.

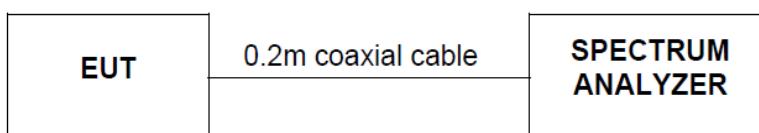
These measurements shall only be performed at normal test conditions.

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 operating channels 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 CONFIGURATION



TEST PROCEDURE

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

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- Filter mode: Channel filter
- Video BW: 3 MHz
- Detector Mode: RMS
- Trace Mode: Max Hold
- Sweep Mode: Single Sweep
- Sweep Points: Sweep time [μ s] / (1 μ s) 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 + 2 BW):

- 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 - 2 BW 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 $10 \times \log_{10}(A_{ch})$ and the additional beamforming gain Y in dB. The results for each of the transmit chains shall be individually compared with these reduced limits.



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TEST RESULTS

Test Condition	Test Mode	Test Channel	Ant	Freq [MHz]	Result [dBm]	Limit [dBm]	Verdict
TNVN	BLE	2402	Ant1	2398.449	-58.50	<=-20	PASS
TNVN	BLE	2402	Ant1	2398.474	-58.49	<=-20	PASS
TNVN	BLE	2402	Ant1	2399.474	-58.09	<=-10	PASS
TNVN	BLE	2402	Ant1	2399.500	-58.07	<=-10	PASS
TNVN	BLE	2402	Ant1	2484.000	-58.51	<=-10	PASS
TNVN	BLE	2402	Ant1	2484.026	-58.51	<=-10	PASS
TNVN	BLE	2402	Ant1	2485.026	-58.50	<=-20	PASS
TNVN	BLE	2402	Ant1	2485.051	-58.49	<=-20	PASS
TNVN	BLE	2480	Ant1	2398.458	-59.08	<=-20	PASS
TNVN	BLE	2480	Ant1	2398.479	-58.90	<=-20	PASS
TNVN	BLE	2480	Ant1	2399.479	-58.91	<=-10	PASS
TNVN	BLE	2480	Ant1	2399.500	-58.91	<=-10	PASS
TNVN	BLE	2480	Ant1	2484.000	-58.28	<=-10	PASS
TNVN	BLE	2480	Ant1	2484.021	-58.28	<=-10	PASS
TNVN	BLE	2480	Ant1	2485.021	-58.32	<=-20	PASS
TNVN	BLE	2480	Ant1	2485.042	-58.31	<=-20	PASS

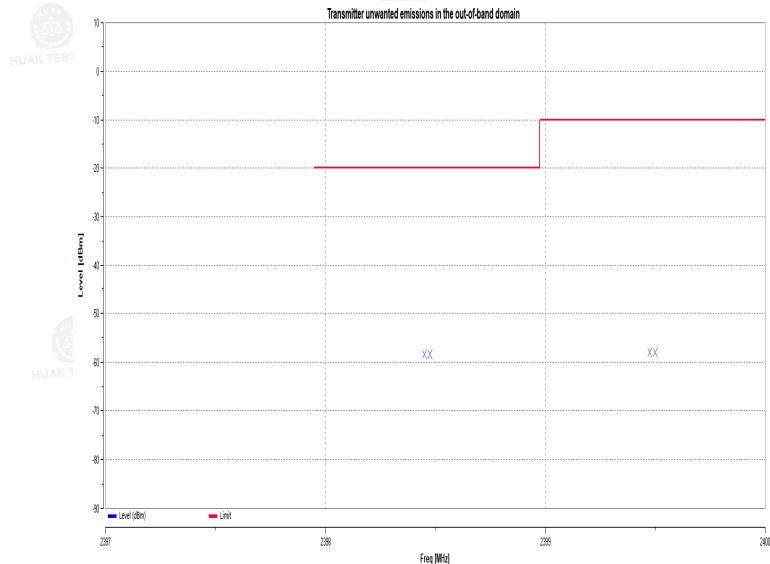
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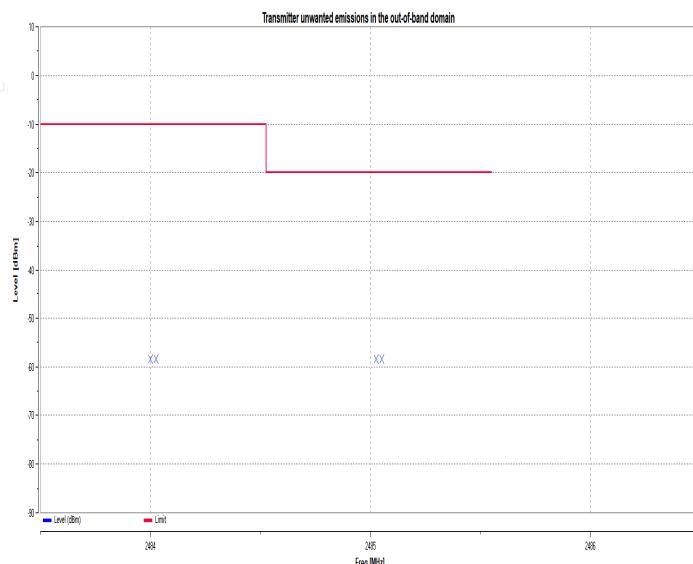
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BLE_2402_Ant1_2400MHz-2BW to 2400MHz



BLE_2402_Ant1_2483.5MHz to 2483.5MHz+2BW



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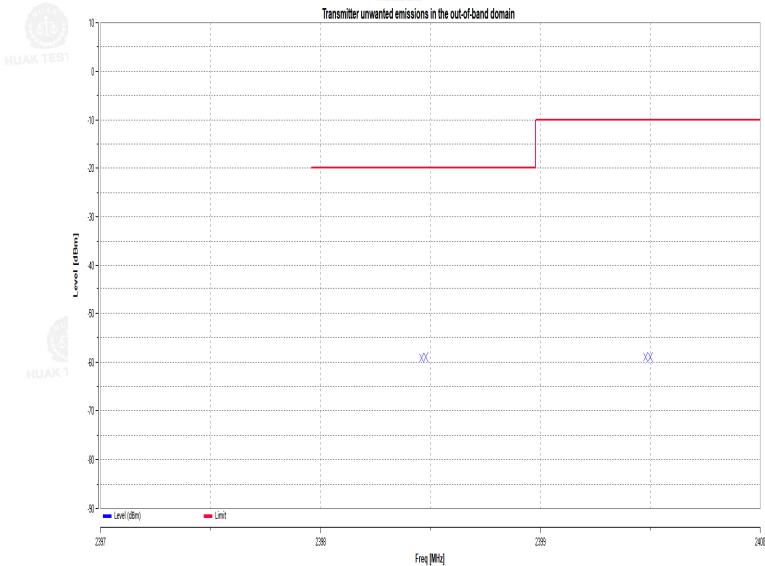
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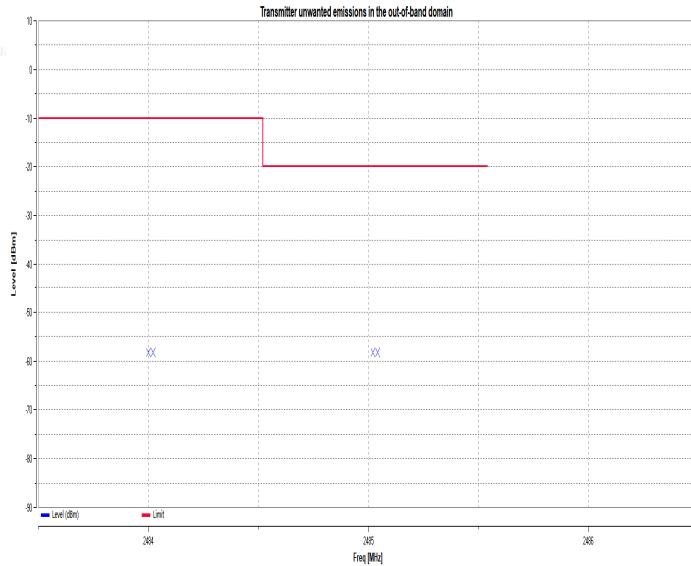
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BLE_2480_Ant1_2400MHz-2BW to 2400MHz



BLE_2480_Ant1_2483.5MHz to 2483.5MHz+2BW



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Limit

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in table 4.

Table 4: Transmitter limits for spurious emissions

Frequency Range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Limit when Standby
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 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

These measurements shall only be performed at normal test conditions.

The level of spurious emissions shall be measured as, either:

- their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment (cabinet radiation); or
- their effective radiated power when radiated by cabinet and antenna in case of Integral antenna equipment with no antenna connectors.

For equipment using FHSS modulation, the measurements may be performed when normal hopping is disabled. In this case measurements need to be performed when operating at the lowest and the highest hopping frequency. When this is not possible, the measurement 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 Nominal Channel Bandwidths (e.g. 20 MHz and 40 MHz), then the equipment shall be configured to operate under its worst case situation with respect to spurious emissions.

Test Procedure

According to ETSI EN 300 328 V2.2.2 (2019-07) §5.4.9.2.2, Radiated measurement.

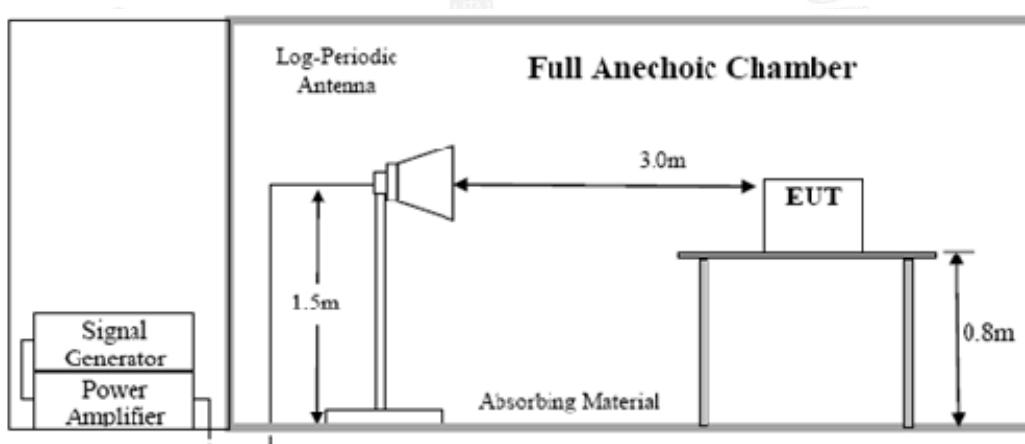
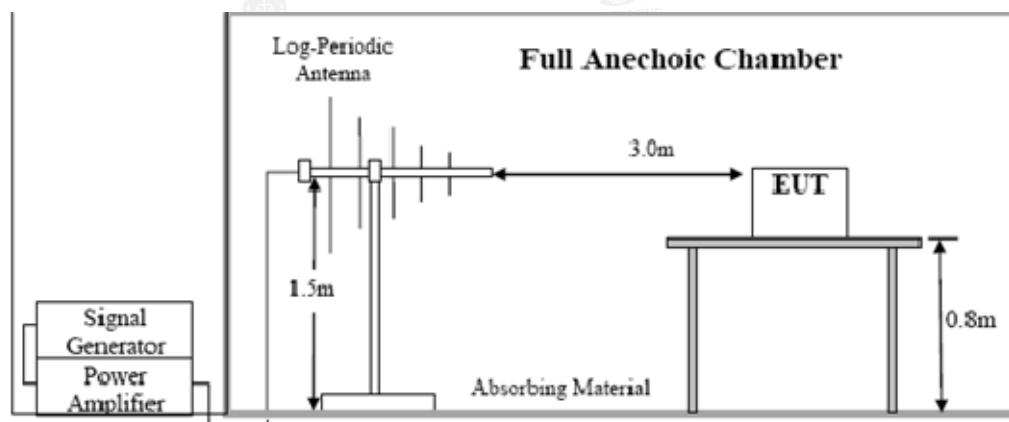
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Test Configuration



Test Results

Remark: We test all modulation type, and recorded the worst case mode for GFSK test.



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Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Below 1GHz:					
168.26	V	-51.27	-36	-15.27	PASS
263.28	V	-55.33	-36	-19.33	PASS
353.16	V	-55.79	-36	-19.79	PASS
422.68	V	-71.26	-36	-35.26	PASS
541.02	V	-75.66	-54	-21.66	PASS
853.91	V	-73.65	-36	-37.65	PASS
200.20	H	-69.68	-36	-33.68	PASS
290.07	H	-62.49	-36	-26.49	PASS
378.39	H	-74.22	-36	-38.22	PASS
466.07	H	-76.27	-54	-22.27	PASS
590.18	H	-67.04	-54	-13.04	PASS
891.31	H	-58.15	-36	-22.15	PASS

Note:

- 1. Cable loss and antenna gain was combined in the calculated result.
- 2. Other point of the measurements are below 20dB from the limit.

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Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Above 1GHz:					
Test Mode: Low Channel					
1783.20	H	-53.51	-30	-23.51	PASS
1896.90	V	-52.76	-30	-22.76	PASS
2978.70	H	-59.41	-30	-29.41	PASS
3221.10	V	-52.70	-30	-22.70	PASS
3804.38	H	-54.90	-30	-24.90	PASS
3934.81	V	-56.11	-30	-26.11	PASS
4438.46	H	-53.14	-30	-23.14	PASS
4458.29	V	-49.21	-30	-19.21	PASS
5267.29	H	-50.63	-30	-20.63	PASS
5022.44	V	-51.40	-30	-21.40	PASS
5985.69	H	-51.97	-30	-21.97	PASS
6298.52	V	-55.47	-30	-25.47	PASS
Test Mode: High Channel					
1915.12	H	-52.11	-30	-22.11	PASS
2241.17	V	-53.67	-30	-23.67	PASS
3145.74	H	-52.49	-30	-22.49	PASS
3321.93	V	-54.25	-30	-24.25	PASS
3948.67	H	-53.21	-30	-23.21	PASS
3902.34	V	-52.48	-30	-22.48	PASS
4823.08	H	-51.03	-30	-21.03	PASS
4767.54	V	-51.60	-30	-21.60	PASS
5235.77	H	-51.98	-30	-21.98	PASS
5150.77	V	-54.64	-30	-24.64	PASS
5949.37	H	-49.39	-30	-19.39	PASS
6073.72	V	-49.04	-30	-19.04	PASS

Note:

- 1. Cable loss and antenna gain was combined in the calculated result.
- 2. Other point of the measurements are below 20dB from the limit.

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4.1.9. Receiver spurious emissions

LIMIT

The spurious emissions of the receiver shall not exceed the values given in table 5.

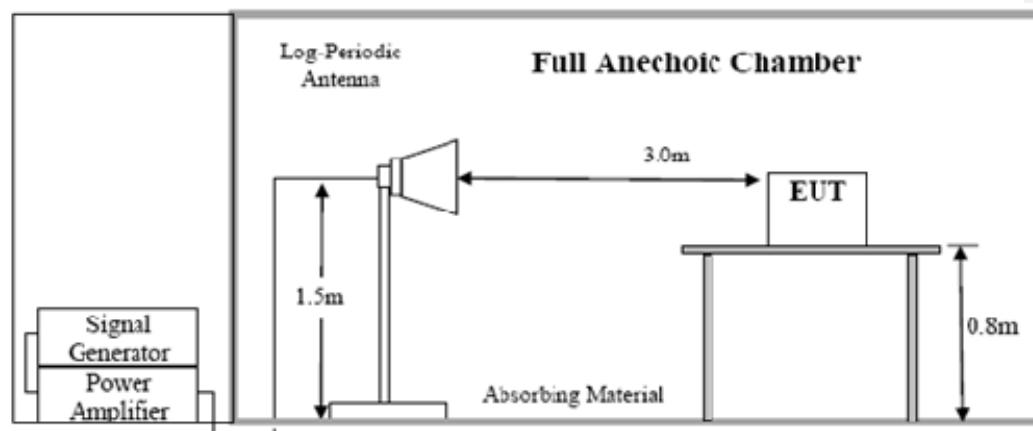
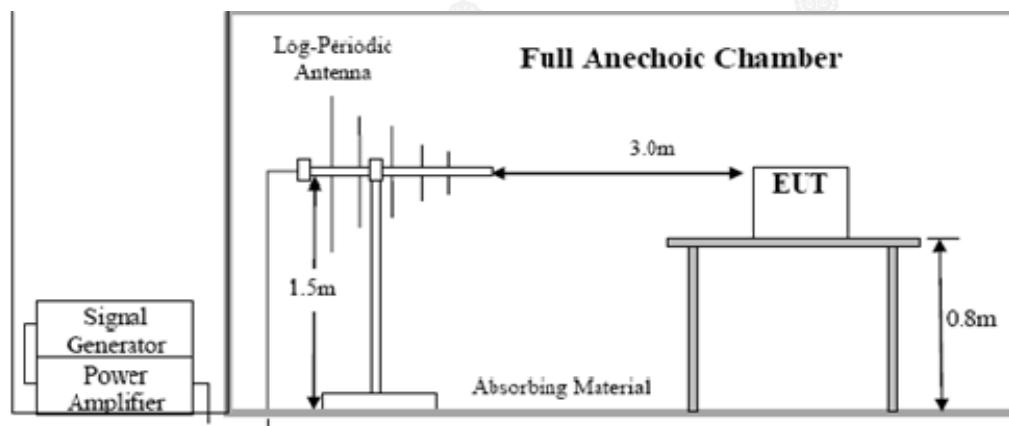
Table 5: spurious emission limits for receivers

Frequency	HUAK TESTING	Maximum power, e.r.p.	Measurement bandwidth
30 MHz to 1 GHz		-57 dBm	100 KHz
1 GHz to 12.75 GHz		-47 dBm	1 MHz

Test Procedure

The same as clause 4.1.8

Test Configuration



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Test Results

Remark: We test all modulation type, and recorded the worst case mode for GFSK test.

Fre. (MHz)	ANT. Pol.	ERP (dBm)	Limit	Margin	Conclusion
Below 1GHz:					
237.39	V	-73.60	-57	-16.60	PASS
264.81	V	-78.99	-57	-21.99	PASS
343.48	V	-74.83	-57	-17.83	PASS
409.26	V	-72.09	-57	-15.09	PASS
479.52	V	-76.09	-57	-19.09	PASS
873.05	V	-77.01	-57	-20.01	PASS
205.69	H	-73.48	-57	-16.48	PASS
354.62	H	-70.17	-57	-13.17	PASS
368.67	H	-71.50	-57	-14.50	PASS
488.44	H	-77.20	-57	-20.20	PASS
618.84	H	-74.01	-57	-17.01	PASS
872.58	H	-74.26	-57	-17.26	PASS
Note:					
1.Cable loss and antenna gain was combined in the calculated result.					
2.Other point of the measurements are below 20dB from the limit.					

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Fre. (MHz)	ANT. Pol.	ERP (dBm)	Limit	Margin	Conclusion
Above 1GHz:					
Test Mode: Lowest frequency					
2177.21	H	-61.19	-47	-14.19	PASS
2180.87	V	-67.82	-47	-20.82	PASS
3186.04	H	-64.83	-47	-17.83	PASS
3022.68	V	-65.58	-47	-18.58	PASS
3289.56	H	-64.94	-47	-17.94	PASS
3346.88	V	-63.93	-47	-16.93	PASS
4165.94	H	-61.76	-47	-14.76	PASS
4107.72	V	-61.81	-47	-14.81	PASS
4661.03	H	-65.84	-47	-18.84	PASS
4977.92	V	-67.81	-47	-20.81	PASS
6358.45	H	-68.34	-47	-21.34	PASS
6329.69	V	-64.52	-47	-17.52	PASS
Test Mode: Highest frequency					
2091.58	H	-61.31	-47	-14.31	PASS
2168.60	V	-63.08	-47	-16.08	PASS
2321.41	H	-63.92	-47	-16.92	PASS
2515.81	V	-68.27	-47	-21.27	PASS
3278.55	H	-67.21	-47	-20.21	PASS
3379.73	V	-67.06	-47	-20.06	PASS
3734.42	H	-63.11	-47	-16.11	PASS
3873.77	V	-64.35	-47	-17.35	PASS
5349.44	H	-63.99	-47	-16.99	PASS
5325.02	V	-64.56	-47	-17.56	PASS
6327.40	H	-64.22	-47	-17.22	PASS
6573.69	V	-63.21	-47	-16.21	PASS
Note:					
1. Cable loss and antenna gain was combined in the calculated result.					
2. Other point of the measurements are below 20dB from the limit.					

4.1.10. Receiver Blocking

LIMIT

While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15 or table 16.

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.

Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

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		
(-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	-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: 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.

Table 15: Receiver Blocking parameters receiver Category 2 equipment

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.

Table 16: Receiver Blocking parameters receiver Category 3 equipment

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 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.



- 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.

- 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. Where the manufacturer has declared the actual antenna gain for each of the applicable blocking frequencies (see clause 5.4.1 m) ii)) this blocking level shall be adjusted for the difference between the in-band antenna assembly gain (G) and the actual antenna gain for the blocking frequency being tested. See also note 5 in table 6, note 4 in table 7 and note 4 in table 8 or note 5 in table 14, note 4 in table 15 and note 4 in table 16. Where the actual antenna gains at the blocking frequencies have not been declared, then the antenna gain at the blocking frequencies shall be assumed identical to the in-band antenna gain. If the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is 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 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.



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TEST RESULTS

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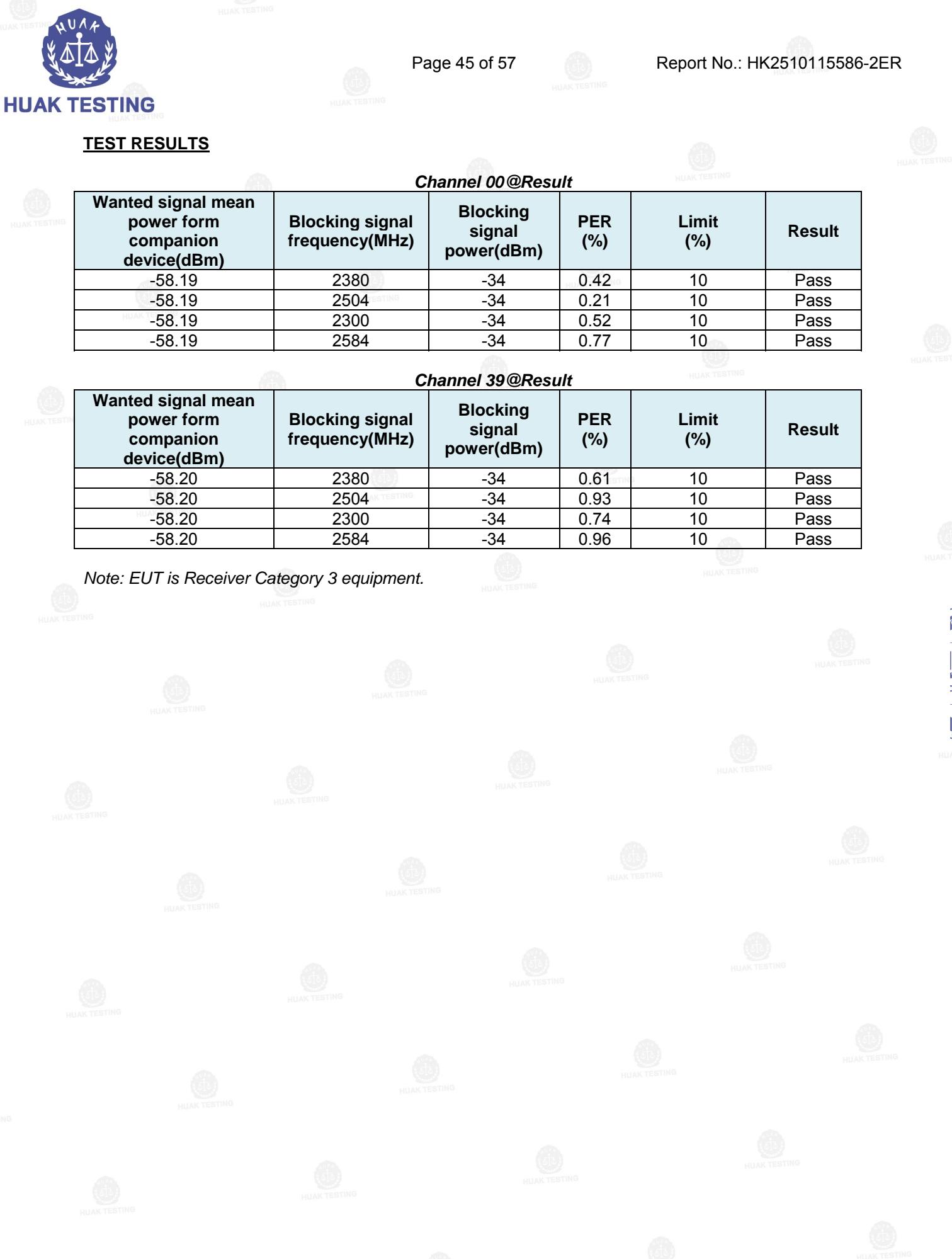
Channel 00@Result

Wanted signal mean power form companion device(dBm)	Blocking signal frequency(MHz)	Blocking signal power(dBm)	PER (%)	Limit (%)	Result
-58.19	2380	-34	0.42	10	Pass
-58.19	2504	-34	0.21	10	Pass
-58.19	2300	-34	0.52	10	Pass
-58.19	2584	-34	0.77	10	Pass

Channel 39@Result

Wanted signal mean power form companion device(dBm)	Blocking signal frequency(MHz)	Blocking signal power(dBm)	PER (%)	Limit (%)	Result
-58.20	2380	-34	0.61	10	Pass
-58.20	2504	-34	0.93	10	Pass
-58.20	2300	-34	0.74	10	Pass
-58.20	2584	-34	0.96	10	Pass

Note: EUT is Receiver Category 3 equipment.



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4.1.11. Geo-location capability

Definition& Requirements

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

TEST RESULTS

This equipment does not support Geo-location.



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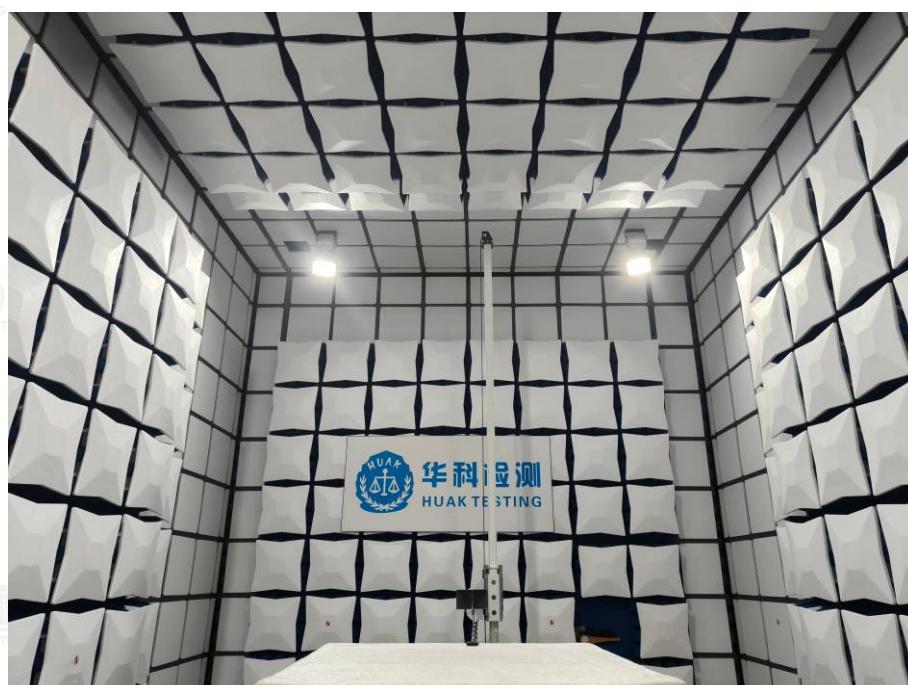
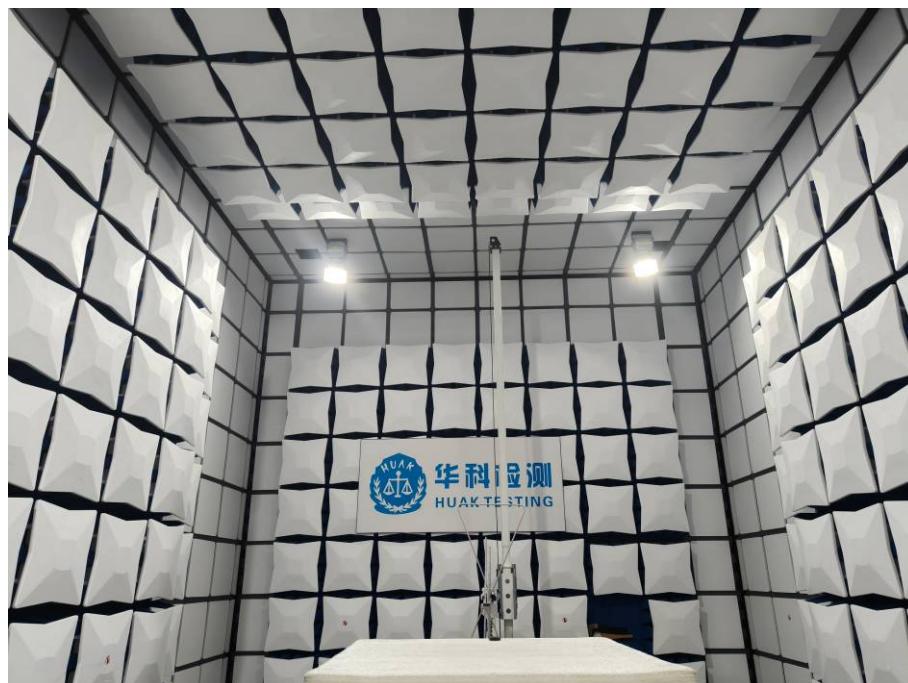
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5. Test Setup Photos of the EUT



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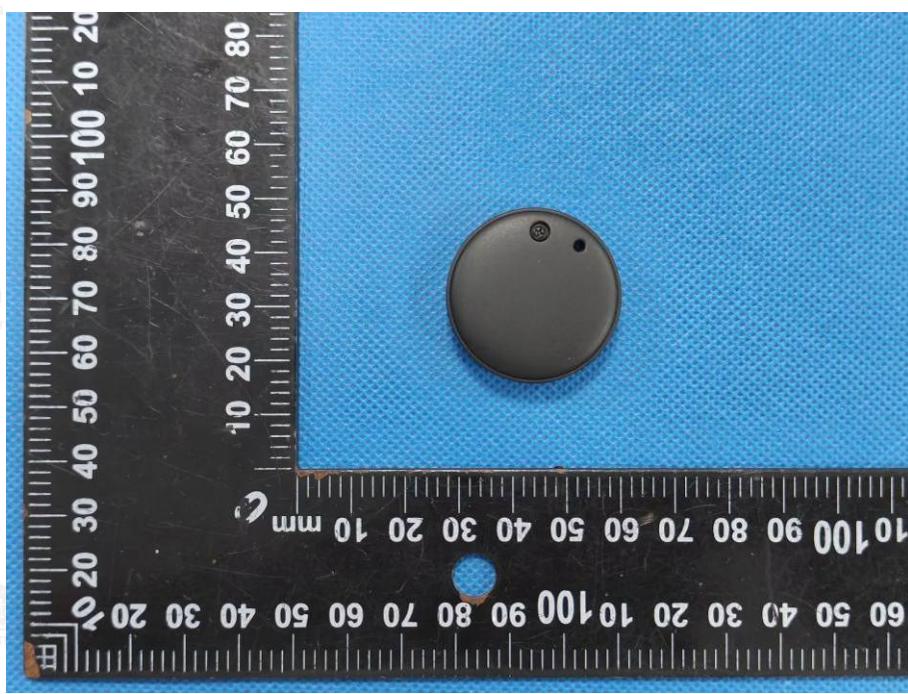
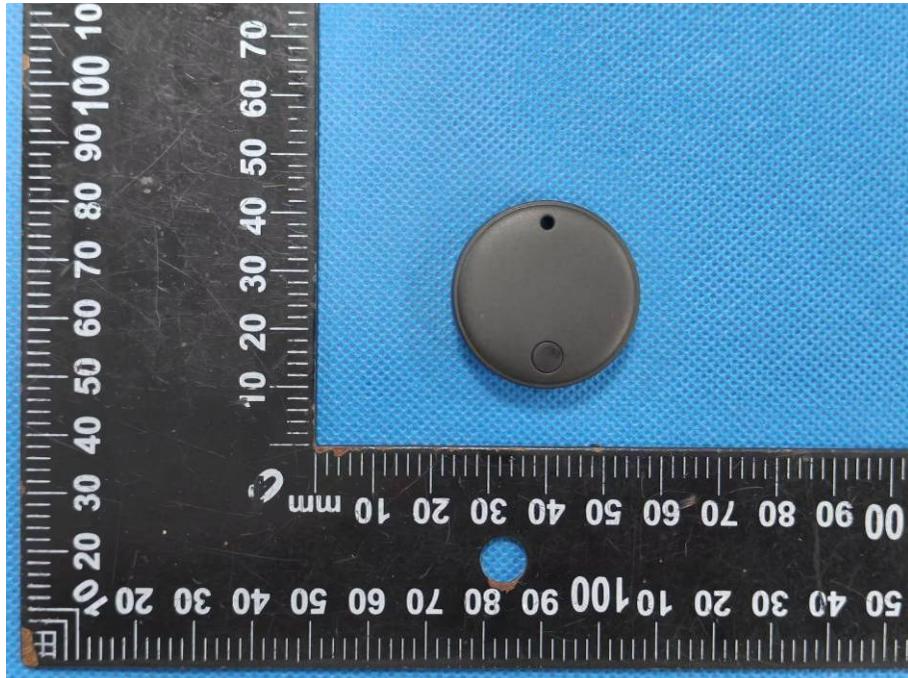
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6. External and Internal Photos of the EUT



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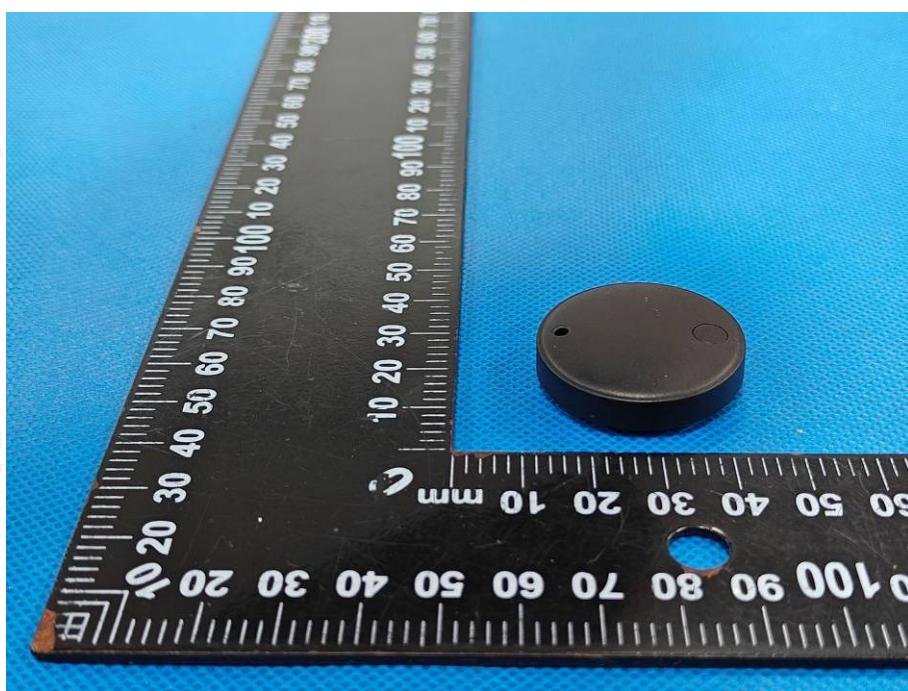
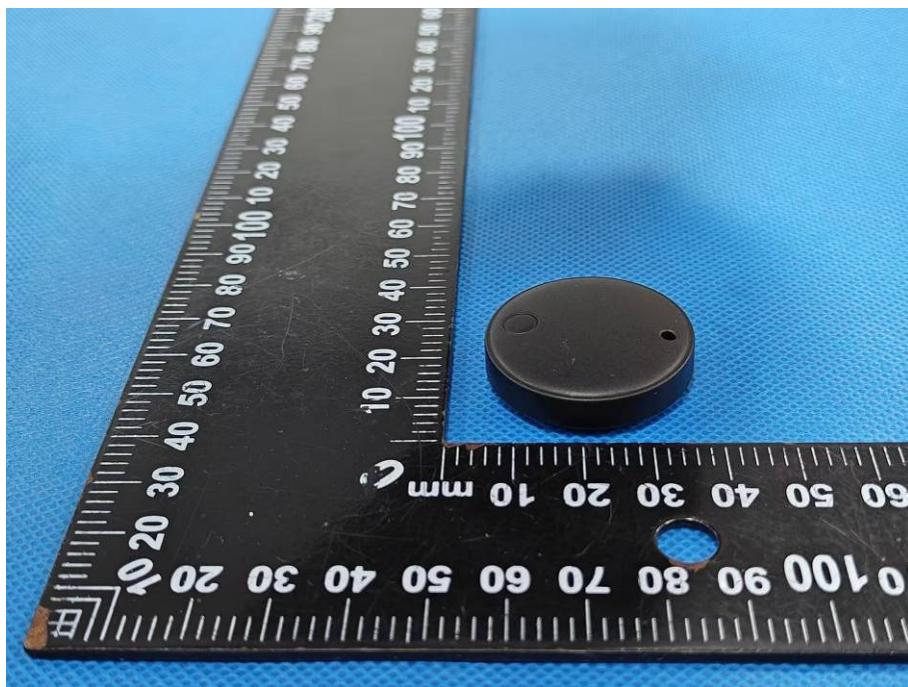


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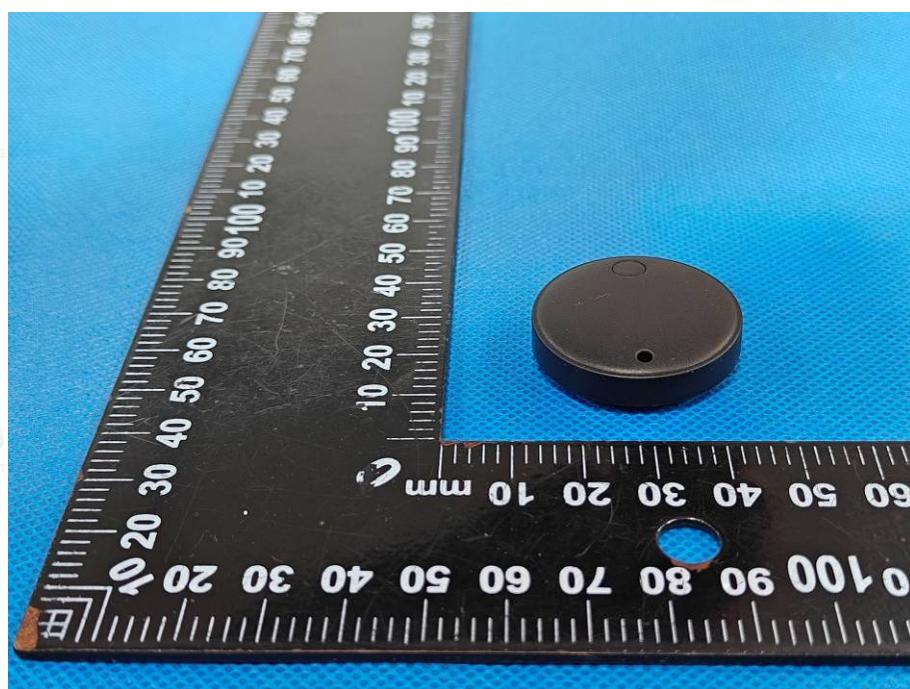
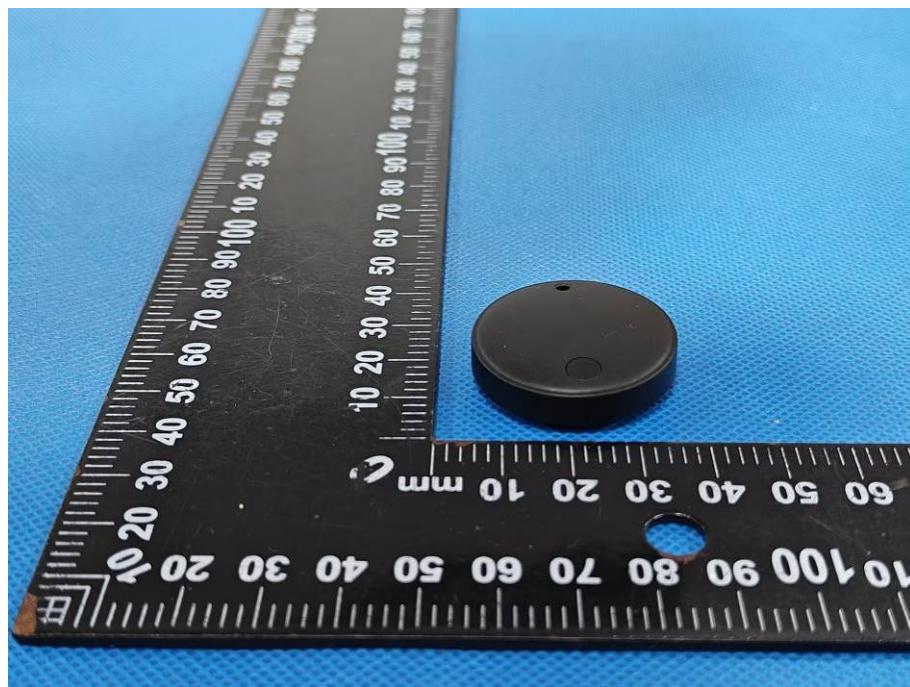
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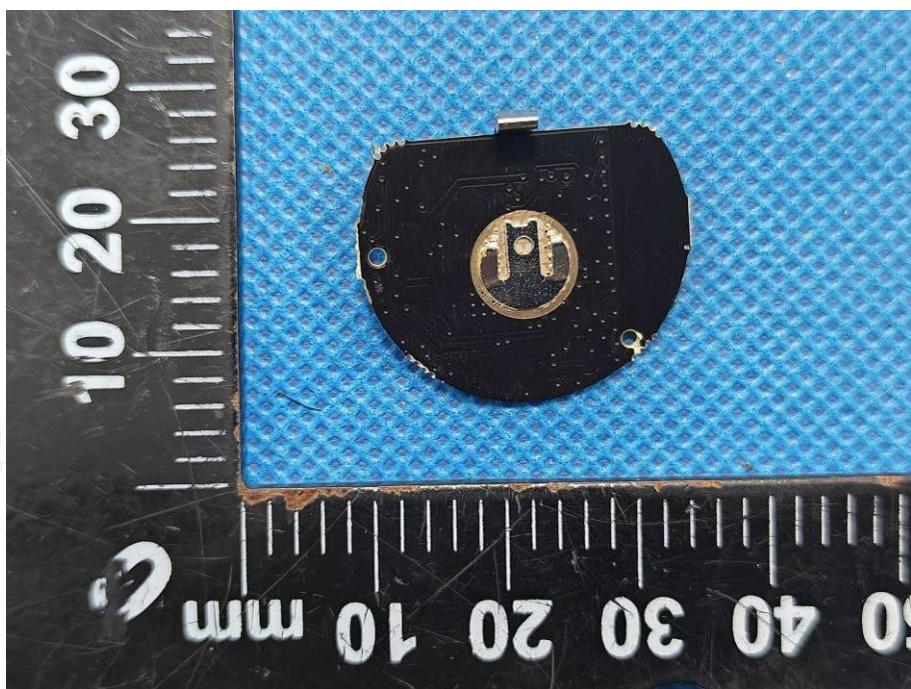
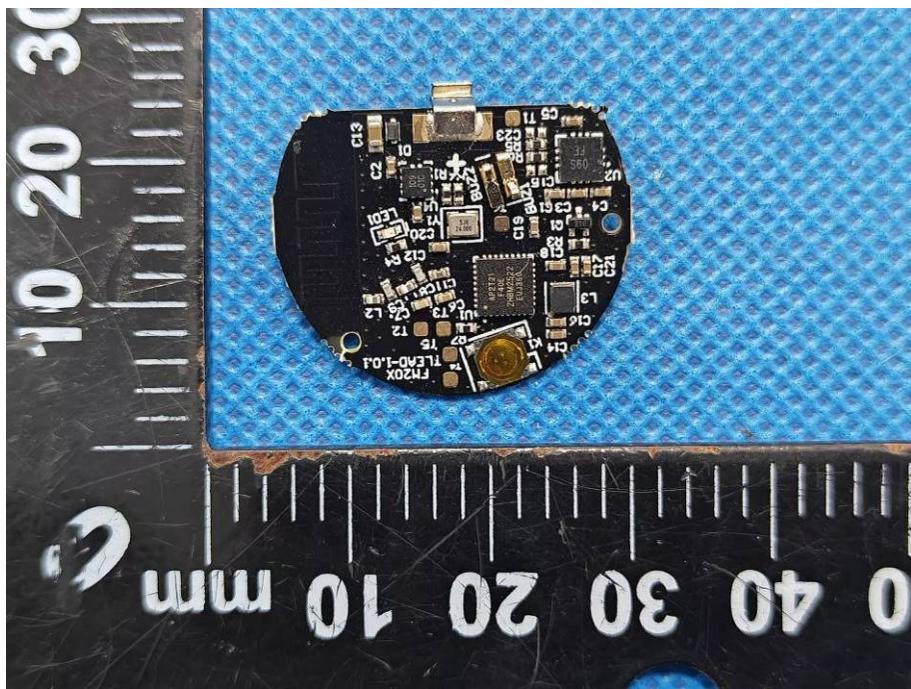


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.....End of Report.....

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g) The different transmit operating modes (tick all that apply):

■ Operating mode 1: Single Antenna Equipment

Equipment with only 1 antenna

Equipment with 2 diversity antennas but only 1 antenna active at any moment in time

Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)

□ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming

Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)

High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1

High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

□ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming

Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)

High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1

High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

h) In case of Smart Antenna Systems:

• The number of Receive chains:

• The number of Transmit chains:

symmetrical power distribution

asymmetrical power distribution

In case of beam forming, the maximum beam forming gain:

NOTE: Beam forming gain does not include the basic gain of a single antenna.

i) Operating Frequency Range(s) of the equipment:

• Operating Frequency Range 1: 2402 MHz to 2480 MHz

• Operating Frequency Range 2: MHz to MHz

NOTE: Add more lines if more Frequency Ranges are supported.

j) Occupied Channel Bandwidth(s):

Occupied Channel Bandwidth 1: 1.026MHz

Occupied Channel Bandwidth 2: MHz

NOTE: Add more lines if more channel bandwidths are supported.

k) Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

■ Stand-alone

Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)

Plug-in radio device (Equipment intended for a variety of host systems)

Other

l) The extreme operating conditions that apply to the equipment:

Operating temperature range: -10° C to 40° C

Operating voltage range: 2.7V to 3.3V AC DC

Details provided are for the: stand-alone equipment

combined (or host) equipment

test jig



In case of DC, indicate the type of power source

- Internal Power Supply
- External Power Supply or AC/DC adapter:
- Battery: DC 3V
- Other:

o) Describe the test modes available which can facilitate testing:

p) The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):

Other: NO FHSS

q) If applicable, the statistical analysis referred to in clause 5.4.1 q)

Not apply

r) If applicable, the statistical analysis referred to in clause 5.4.1 r)

Not apply

s) Geo-location capability supported by the equipment:

Yes

The geographical location determined by the equipment as defined in clause 4.3.1.13.2 or clause 4.3.2.12.2 is not accessible to the user

No

t) Describe the minimum performance criteria that apply to the equipment (see clause 4.3.1.12.3 or clause 4.3.2.11.3):

The minimum performance criterion shall be a PER less than or equal to 10 %.
The intended use of the equipment should be in the normal operation without lost the communication link or no unintentionally operation occurs.



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Test Report No. :

HK2510115586-2EH

Report No.: HK2510115586-2EH

TEST REPORT

Product Name : Find my dual tag

Product Model : MO2759

Serial Model : N/A

Applicant : Mid Ocean Brands B.V.

Address : Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

Manufacturer : Mid Ocean Brands B.V.

Address : Unit 711-716, 7/F., Tower A, 83 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.

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.

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** Issued History **

Revision	Description	Issued Date	Remark
Revision 1.0	Initial Test Report Release	2025/10/16	Jason Zhou



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1. GENERAL INFORMATION

1.1 GENERAL REMARKS

Date of receipt of test sample	:	2025/10/11
Testing commenced on	:	2025/10/11
Testing concluded on	:	2025/10/16

1.2 GENERAL DESCRIPTION OF EUT

Product Name	Find my dual tag								
Product Model	MO2759								
Serial Model	N/A								
Difference description	N/A								
Product Description	<p>The EUT is Find my dual tag.</p> <p>BT-BLE:</p> <table border="1"> <tr> <td>Operation Frequency:</td> <td>2402 MHz ~ 2480 MHz</td> </tr> <tr> <td>Modulation Type:</td> <td>GFSK</td> </tr> <tr> <td>Antenna Designation:</td> <td>PCB Antenna</td> </tr> <tr> <td>Antenna Gain(Peak)</td> <td>0dBi</td> </tr> </table> <p>Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</p>	Operation Frequency:	2402 MHz ~ 2480 MHz	Modulation Type:	GFSK	Antenna Designation:	PCB Antenna	Antenna Gain(Peak)	0dBi
Operation Frequency:	2402 MHz ~ 2480 MHz								
Modulation Type:	GFSK								
Antenna Designation:	PCB Antenna								
Antenna Gain(Peak)	0dBi								
Channel List	Refer to below								
Hardware Version	V2.0								
Software Version	V2.0								
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.								
<p>Note: Antenna gain Refer to the antenna specifications. The cable loss data is obtained from the supplier. The test results in the report only apply to the tested sample.</p>									

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2.EN 62479 & EN 50663 REQUIREMENT

2.1 GENERAL INFORMATION

According to its specifications, the EUT must comply with the requirements of the following standards:

EN 62479:2010 [Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)]

EN 50663:2017 [Generic standard for assessment of low power electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (10 MHz - 300 GHz)]

2.2 LIMIT

A. Typical usage, installation and the physical characteristics of equipment make it inherently compliant with the applicable EMF exposure levels such as those listed in the bibliography. This low-power equipment includes unintentional (or non-intentional) radiators, for example incandescent light bulbs and audio/visual (A/V) equipment, information technology equipment (ITE) and multimedia equipment (MME) that does not contain radio transmitters.

NOTE Equipment is described as A/V equipment, ITE or MME if its main use is playback/recording of music, voice or images, or processing of digital information.

B. The input power level to electrical or electronic components that are capable of radiating electromagnetic energy in the relevant frequency range is so low that the available antenna power and/or the average total radiated power cannot exceed the low-power exclusion level defined in 4.2.

C. The available antenna power and/or the average total radiated power are limited by product standards for transmitters to levels below the low-power exclusion level defined in 4.2.

D. Measurements or calculations show that the available antenna power and/or the average total radiated power are below the low-power exclusion level defined in 4.2.



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3. RESULT

PASS.

BT-BLE:

The available antenna power of this EUT is 0.79mW (-1.02dBm), the power are below the low-power exclusion level defined in 4.2(Pmax: 20mW)."

The power see the test report HK2510115586-2ER.

Report No.: HK2510115586-2EH

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