
RF Test Report

Report No.: AGC12440230905ER02

PRODUCT DESIGNATION : Wireless speaker
BRAND NAME : N/A
MODEL NAME : M08726
APPLICANT : Mid Ocean Brands B.V.
DATE OF ISSUE : Oct. 10, 2023
STANDARD(S) : ETSI EN 300 328 V2.2.2 (2019-07)
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 10, 2023	Valid	Initial Release

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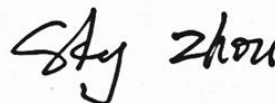
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1. VERIFICATION OF CONFORMITY

Applicant	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Manufacturer	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Factory	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Product Designation	Wireless speaker
Brand Name	N/A
Test Model	MO8726
Series Model	N/A
Difference Description	N/A
Date of receipt of test item	Sep. 25, 2023
Date of test	Sep. 25, 2023 to Oct. 09, 2021
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-EC-BR/RF

We (AGC), Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the European Standard ETSI EN 300 328 V2.2.2. The results of test in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Prepared By



Sky Zhou
(Project Engineer)

Oct. 10, 2023

Reviewed By



Calvin Liu
(Reviewer)

Oct. 10, 2023

Approved By



Max Zhang
(Authorized Officer)

Oct. 10, 2023

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2. GENERAL INFORMATION

2.1. EUT DESCRIPTION

Operating Frequency Range(s)	2402MHz~2480MHz
The type of the equipment	FHSS adaptive equipment with only one antenna
The number of Hopping Frequencies	79
Modulation	BR <input checked="" type="checkbox"/> GFSK 1Mbps; EDR <input checked="" type="checkbox"/> π /4-DQPSK 2Mbps <input checked="" type="checkbox"/> 8DPSK 3Mbps
Bluetooth Version	V5.3
Hardware Version	V2.0
Software Version	ac696n_soundbox_sdk_v1.6.0
The maximum RF Output Power	-2.38dBm
Antenna designation	PCB Antenna
Antenna Gain	1.2dBi
Power Supply	DC 3.7V by battery or DC 5V by adapter
The extreme operating conditions	Lowest temperature range (LT): 0°C Normal temperature range (NT): 25°C Highest temperature range (HT): 40°C
Geo-location capability	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Note:

1. The above information was declared by the manufacturer.
2. The equipment submitted representative production models.
3. The EUT cannot operated unmodulated.
4. The EUT provides Bluetooth wireless interface operating at 2.4G ISM band (2402MHz-2480MHz).
5. Only the Bluetooth was tested according the standard requirement.
6. The EUT is a stand-alone and portable equipment according to ETSI EN 300 328 V2.2.2.
7. For more details, please refer to the User's manual of the EUT.

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2.2. SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
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2.3. DESCRIPTION OF TEST MODES

Test Mode	Description
BR_TX_2402_1Mbps	Bluetooth BR Transmitting mode (Channel: 2402, Rate: 1Mbps)
BR_TX_2480_1Mbps	Bluetooth BR Transmitting mode (Channel: 2480, Rate: 1Mbps)
EDR_TX_2402_2Mbps	Bluetooth EDR Transmitting mode (Channel: 2402, Rate: 2Mbps)
EDR_TX_2480_2Mbps	Bluetooth EDR Transmitting mode (Channel: 2480, Rate: 2Mbps)
EDR_TX_2402_3Mbps	Bluetooth EDR Transmitting mode (Channel: 2402, Rate: 3Mbps)
EDR_TX_2480_3Mbps	Bluetooth EDR Transmitting mode (Channel: 2480, Rate: 3Mbps)
BR_HOP_NA_1Mbps	Bluetooth BR Hopping mode (Rate: 1Mbps)
EDR_HOP_NA_2Mbps	Bluetooth EDR Hopping mode (Rate: 2Mbps)
EDR_HOP_NA_3Mbps	Bluetooth EDR Hopping mode (Rate: 3Mbps)
BR_RX_2402_1Mbps	Bluetooth BR Receiving mode (Channel: 2402, Rate: 1Mbps)
BR_RX_2480_1Mbps	Bluetooth BR Receiving mode (Channel: 2480, Rate: 1Mbps)
EDR_RX_2402_2Mbps	Bluetooth EDR Receiving mode (Channel: 2402, Rate: 2Mbps)
EDR_RX_2480_2Mbps	Bluetooth EDR Receiving mode (Channel: 2480, Rate: 2Mbps)
EDR_RX_2402_3Mbps	Bluetooth EDR Receiving mode (Channel: 2402, Rate: 3Mbps)
EDR_RX_2480_3Mbps	Bluetooth EDR Receiving mode (Channel: 2480, Rate: 3Mbps)

Note:

- All modes have been tested and the worst mode test data recording in the test report, if no any other data.

2.4. OBJECTIVE

Perform Radio Spectrum tests for CE Marking according to the provisions of article 3.2 of the Radio Equipment Directive (2014/53/EU) for the BT function of the EUT.

2.5. TEST ITEMS AND THE RESULTS

The EUT has been tested according to ETSI EN 300 328 V2.2.2(2019-07).

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
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Test items and the results are as bellow:

No.	Basic Standard	Test Type	Result
1	ETSI EN 300 328 4.3.1.2	RF Output Power	Pass
2	ETSI EN 300 328 4.3.1.3	Duty Cycle, Tx-sequence, Tx-gap	N/A
3	ETSI EN 300 328 4.3.1.4	Accumulated transmit time, Frequency Occupation and hopping sequence	Pass
4	ETSI EN 300 328 4.3.1.5	Hopping Frequency Separation	Pass
5	ETSI EN 300 328 4.3.1.6	Medium Utilisation (MU) factor	N/A
6	ETSI EN 300 328 4.3.1.7	Adaptivity (Adaptive Frequency Hopping)	N/A
7	ETSI EN 300 328 4.3.1.8	Occupied Channel Bandwidth	Pass
8	ETSI EN 300 328 4.3.1.9	Transmitter unwanted emission in the out of band domain	Pass
9	ETSI EN 300 328 4.3.1.10	Transmitter unwanted emission in the spurious domain	Pass
10	ETSI EN 300 328 4.3.1.11	Receiver Spurious emissions	Pass
11	ETSI EN 300 328 4.3.1.12	Receiver Blocking	Pass

Note:

1. N/A means it's not applicable to this item.
2. Owing to the maximum declared RF Output power (e.i.r.p.) less than 10 dBm, so the item 2, 5, 6 are not applicable.

2.6. ENVIRONMENTAL CONDITIONS

- Temperature: 15-35°C
- Relative Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

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3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

Item	Measurement Uncertainty
Uncertainty of Radio Frequency	$U_c = \pm 1 \times 10^{-7}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2.7 \text{ dB}$
Uncertainty of spurious emissions, radiated	$U_c = \pm 5.4 \text{ dB}$
Uncertainty of Temperature	$U_c = 0.5^\circ \text{ C}$
Uncertainty of Humidity	$U_c = \pm 1 \%$
Uncertainty of DC and low frequency voltages	$U_c = \pm 2 \%$

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4. IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd.
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

LIST OF EQUIPMENTS USED

Description	Manufacturer	Model No.	S/N	Cal. Date	Cal. Due
MXG X-Series Vector Signal Generator	Agilent	N5182B	MY53050647	Mar. 03, 2023	Mar. 02, 2024
Signal Generator	Agilent	N5171B	MY53050474	Jun. 01, 2023	May 31, 2024
EXA Signal Analyzer	Agilent	N9020A	MY49100060	Jun. 03, 2023	Jun. 02, 2024
USB Wideband Power Sensor	Agilent	U2021XA	MY54110007	May 11, 2021	May 10, 2025
USB Wideband Power Sensor	Agilent	U2021XA	MY54110009	May 11, 2021	May 10, 2025
RF Communication Tester	R&S	CMW270	101933	Jun. 02, 2023	Jun. 01, 2024
Attenuator	Warriors	W13	11324	N/A	N/A
Power splitter	Mini-Circuits	ZFRSC-183-s	3122	N/A	N/A
2.4G Band Fliter	EM Electronics	2400-2500	N/A	Mar. 22, 2022	Mar. 21, 2024
Small environment tester	ESPEC	SH-242	N/A	Aug. 03, 2022	Aug. 02, 2024
AMPLIFIER	ETS-LINDGREN	3117PA	00225134	Sep. 02, 2022	Sep. 01, 2024
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025
Biconilog Antenna	ETS-LINDGREN	3142C	00060447	N/A	N/A
HORN ANTENNA	ETS-LINDGREN	3117	00154520	Jun. 03, 2023	Jun. 02, 2024
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00034609	Mar. 23, 2023	Mar. 22, 2024
RF Cable	Harbour	SHWCB-3000-N	N/A	Nov. 11, 2022	Nov. 10, 2024

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5. ETSI EN 300 328 REQUIREMENTS

5.1. RF OUTPUT POWER

5.1.1 LIMIT

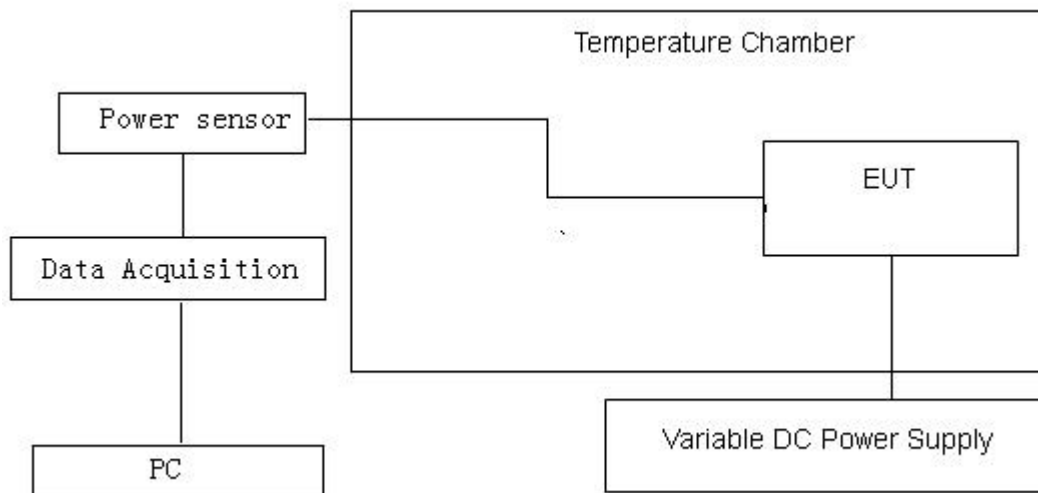
RF Output Power \leq 100mW (20dBm) over Normal and Extreme conditions.

5.1.2 MEASUREMENT PROCEDURE

- 1) Use a fast power sensor and set the samples speed 1MS/s or faster.
- 2) Connect one power sensor to each transmit port, Trigger the power sensors so that they start sampling at the same time. For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps.
- 3) Find the start and stop times of each burst in the stored measurement samples.
- 4) Between the start and stop times of each individual burst calculate the RMS power over the burst. Save these P burst values, as well as the start and stop times for each burst.
- 5) The highest of all P burst values (Value "A" in dBm) will be used for maximum e.i.r.p calculations.
- 6) The cable loss and attenuator factor shall be considered to the value "A".
- 6) Add the (stated) antenna assembly gain "G" in dBi of the individual antenna. If applicable, add the additional beamforming gain "Y" in dB.
- 7) The RF output power (P) shall be calculated using the formula: $P=A+G+Y$

5.1.3 TEST CONFIGURATION

Temperature and Voltage Measurement (under normal and extreme test conditions)



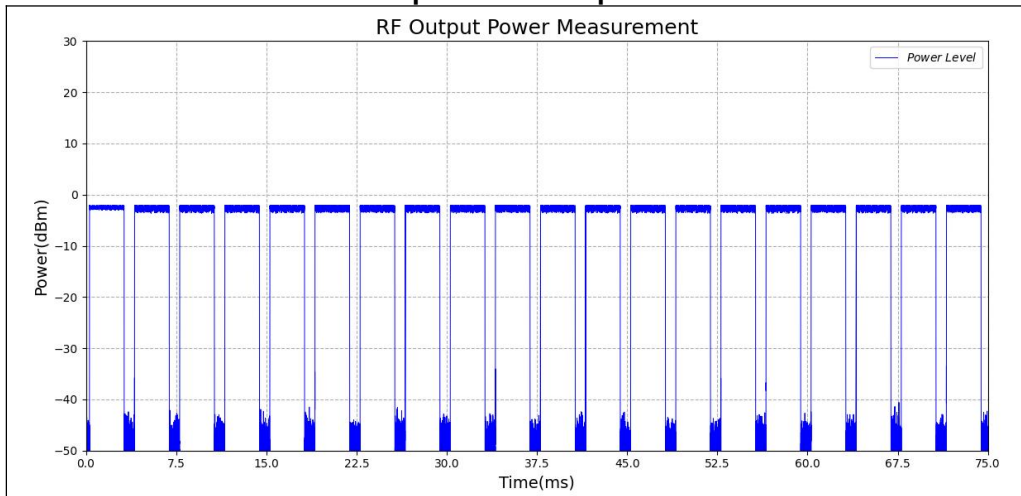
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5.1.4 MEASUREMENT RESULTS

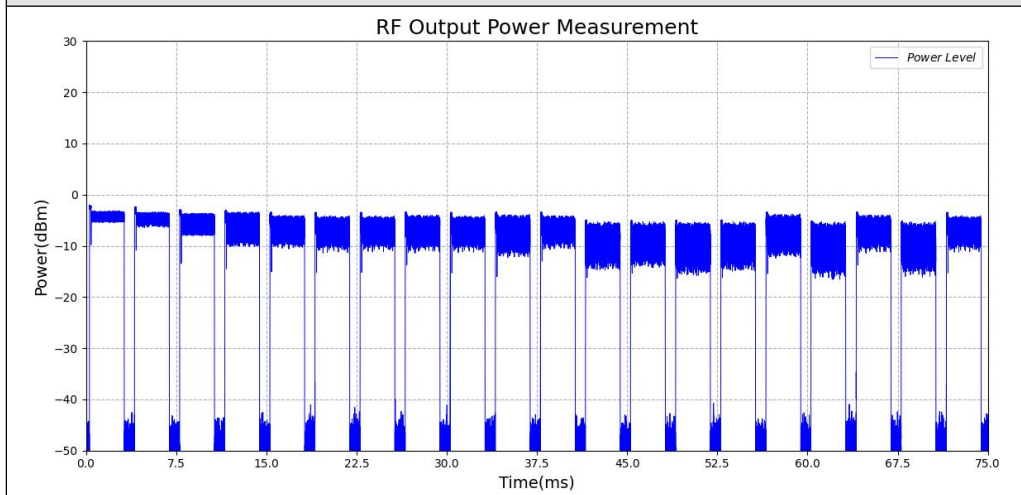
Test Data of RF Output Power					
Test Mode	RF Output Power [dBm]			Limit [dBm]	Verdict
	NT	LT	HT		
BR_HOP_NA_1Mbps	-2.38	-2.41	-2.42	20	Pass
EDR_HOP_NA_2Mbps	-4.13	-4.26	-4.14	20	Pass
EDR_HOP_NA_3Mbps	-4.15	-4.44	-4.24	20	Pass

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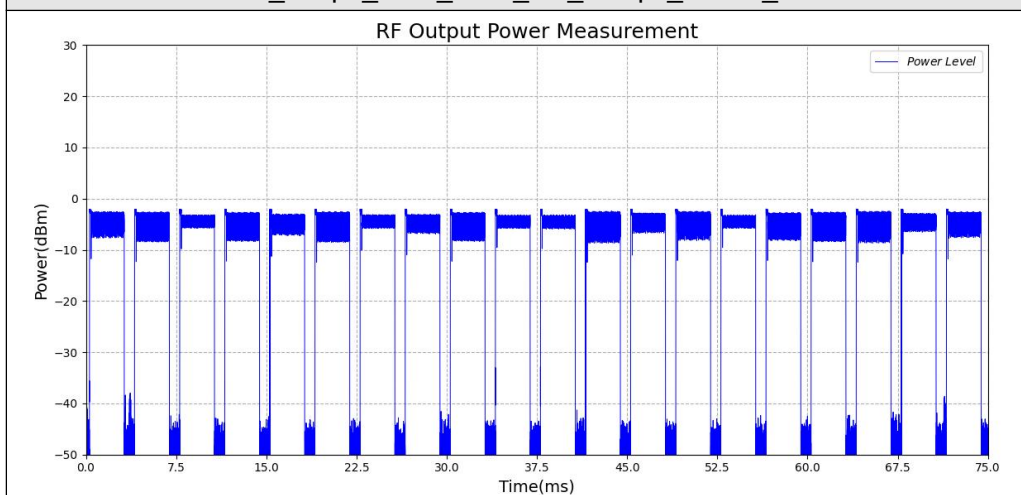
Test Graphs of RF Output Power



Test_Graph_BR_HOP_NA_1Mbps_Power_NT



Test_Graph_EDR_HOP_NA_2Mbps_Power_NT



Test_Graph_EDR_HOP_NA_3Mbps_Power_NT

Note: Only the data of worst case is reported as above.

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5.2. ACCUMULATED TRANSMIT TIME, FREQUENCY OCCUPIATION AND HOPPING SEQUENCE

5.2.1 LIMIT

ACCUMULATED TRANSMIT TIME	
CONDITION	LIMIT
<input type="checkbox"/> Non-adaptive frequency hopping systems	≤ 15 ms
<input checked="" type="checkbox"/> Adaptive frequency hopping systems	≤ 400 ms

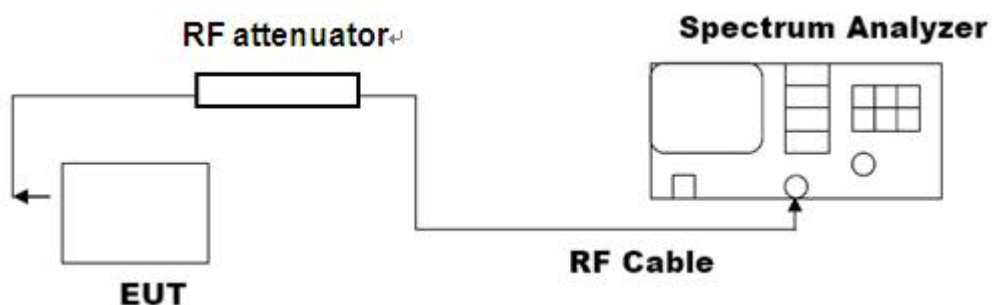
FREQUENCY OCCUPATION	
CONDITION	LIMIT (OPTION 1)
<input type="checkbox"/> Non-adaptive frequency hopping systems	Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.
<input checked="" type="checkbox"/> Adaptive frequency hopping systems	

HOPPING SEQUENCE(S)	
CONDITION	LIMIT
<input type="checkbox"/> Non-adaptive frequency hopping systems	≥5 hopping frequencies or 5/minimum Hopping Frequency Separation in MHz, whichever is the greater.
<input checked="" type="checkbox"/> Adaptive frequency hopping systems	Operating frequency band ≥58.45MHz (Operating over a minimum of 70 % of the operating in the band 2,4 GHz to 2,4835 GHz)
	≥15 hopping frequencies or 15/minimum Hopping Frequency Separation in MHz, whichever is the greater.

5.2.2 TEST PROCEDURE

Please refer to ETSI EN300328 V2.2.2 Section 5.4.4

5.2.3 TEST CONFIGURATION



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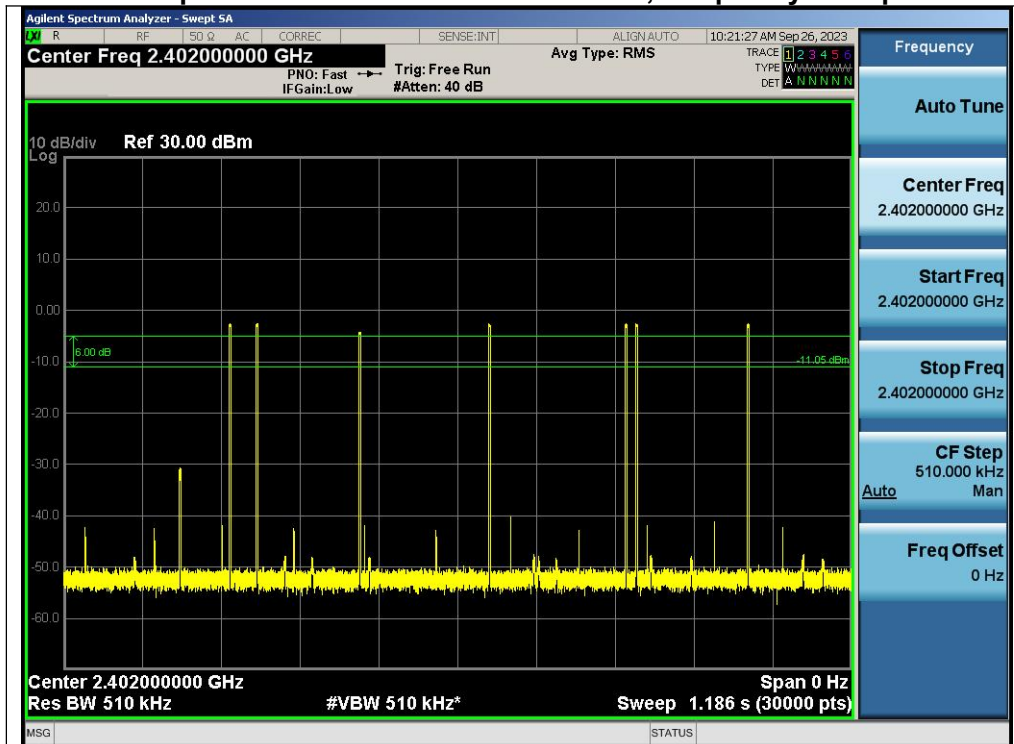
5.2.4 TEST RESULTS

Test Data of Accumulated Transmit Time, Frequency Occupation						
Test Mode	Channel (MHz)	Accumulated transmit time (ms)	Limit (ms)	Frequency Occupation (pcs)	Limit (pcs)	Verdict
BR_HOP_NA_1Mbps	2402	296.434	≤400	7	≥1	Pass
	2480	316.580	≤400	2	≥1	Pass

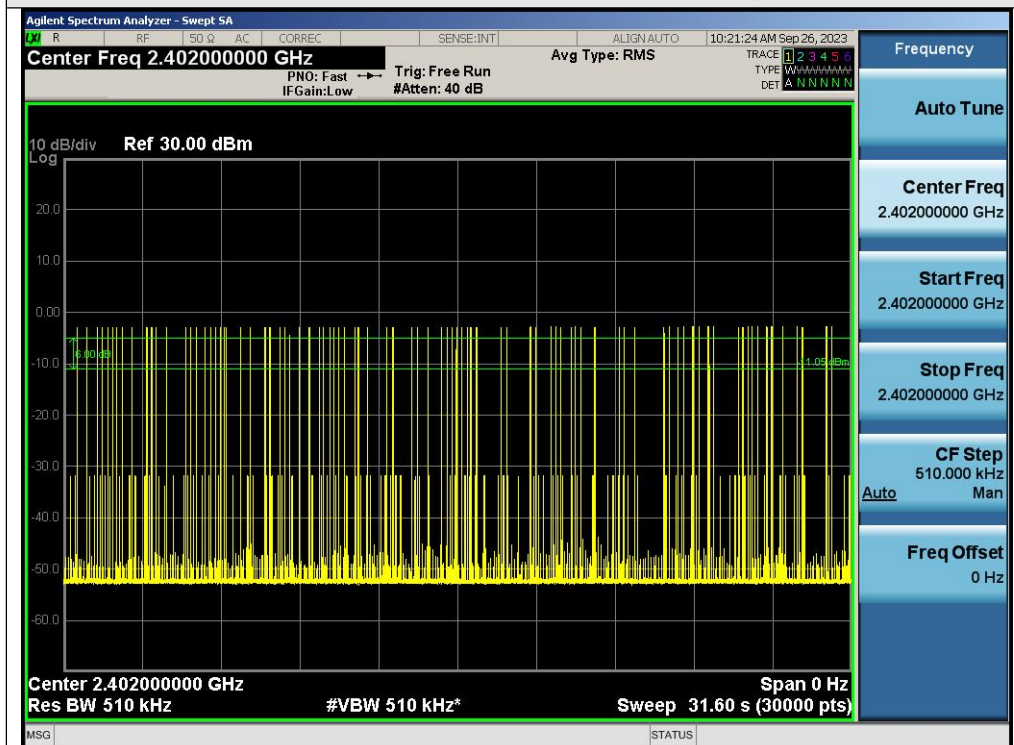
- Note:** 1) All the modes had been tested, but only the worst data recorded in the report.
 2) The Accumulated transmit time and Dwell Time are calculated by a computing device using an appropriate software application or program.
 3) Sweep time for Frequency Occupation= Dwell Time*4*79.

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Test Graphs of Accumulated Transmit Time, Frequency Occupation

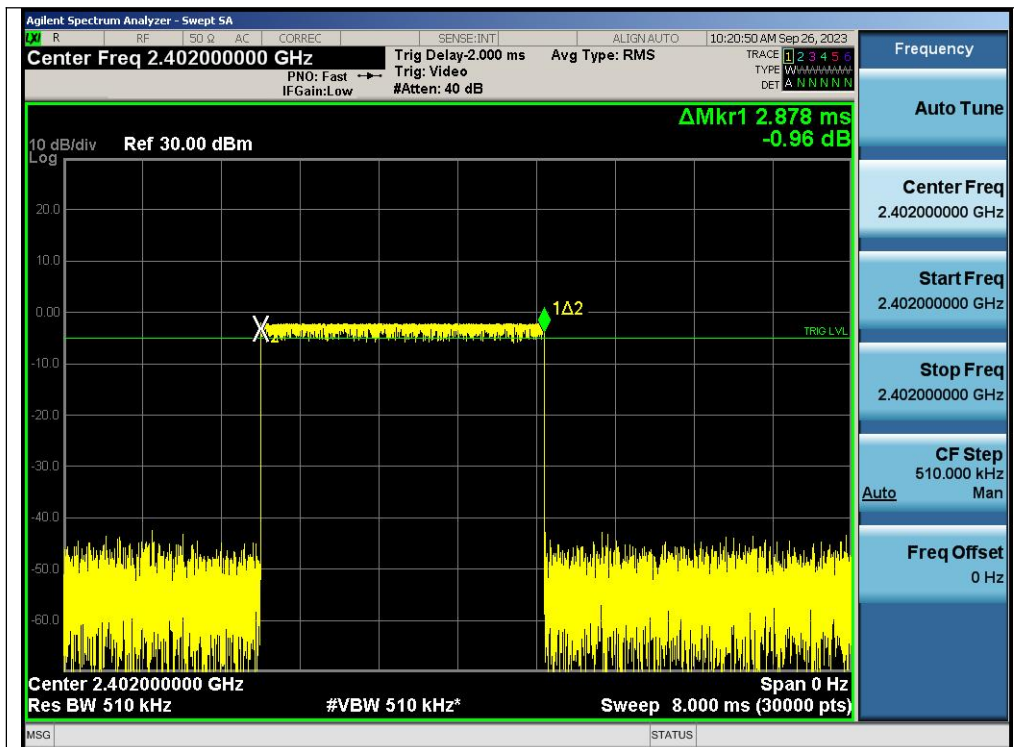


Test_Graph_BR_HOP_NA_1Mbps_2402_Frequency Occupation

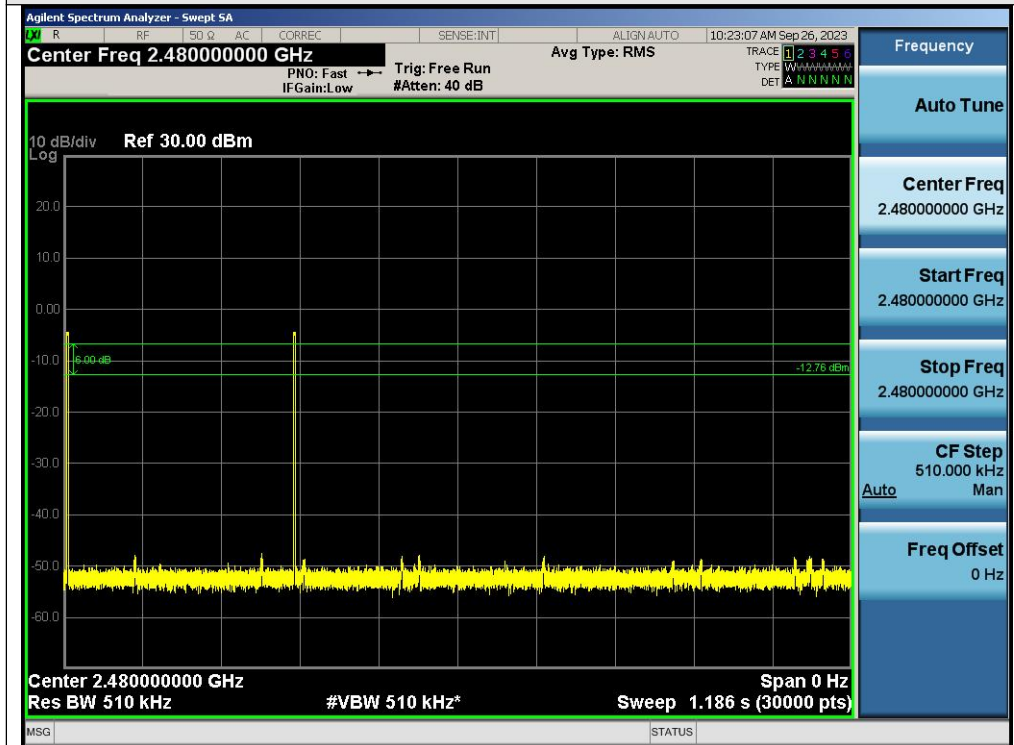


Test_Graph_BR_HOP_NA_1Mbps_2402_Accumulated Transmit Time

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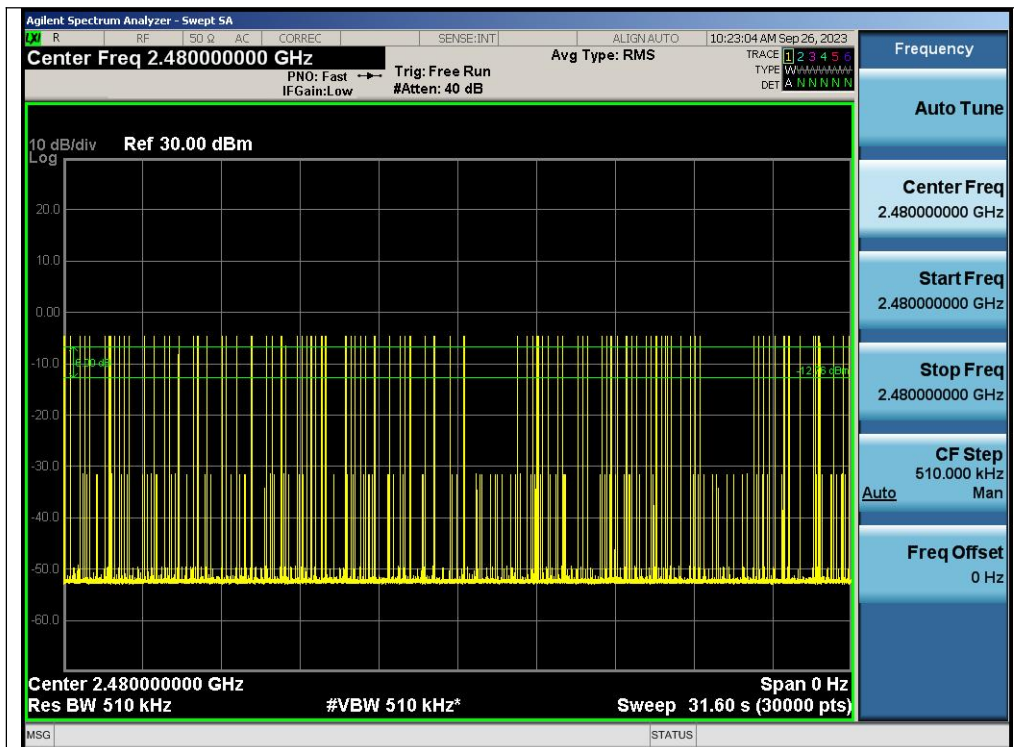


Test_Graph_BR_HOP_NA_1Mbps_2402_Burst Time

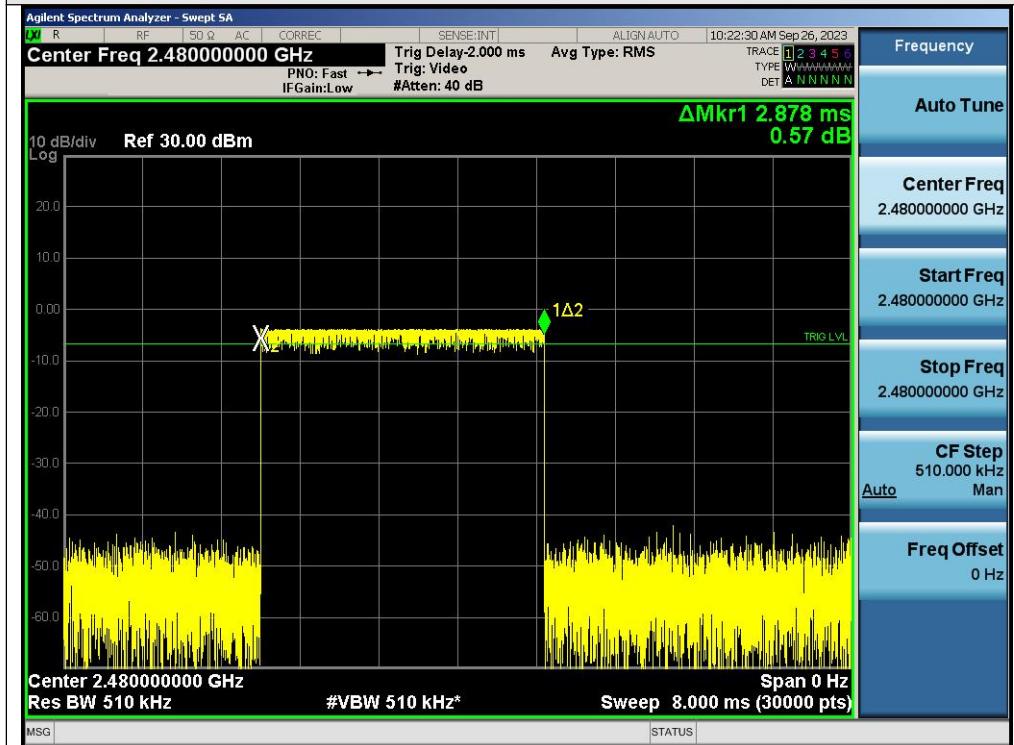


Test_Graph_BR_HOP_NA_1Mbps_2480_Frequency Occupation

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Test_Graph_BR_HOP_NA_1Mbps_2480_Accumulated Transmit Time



Test_Graph_BR_HOP_NA_1Mbps_2480_Burst Time

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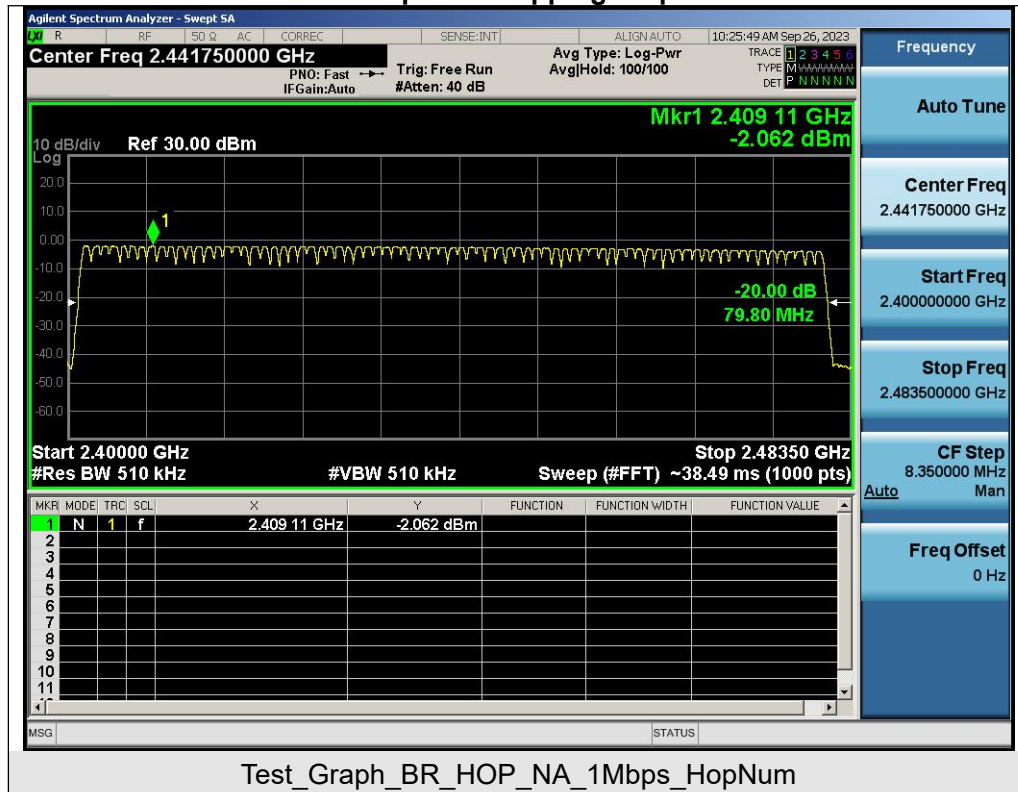
TEST RESULT FOR HOPPING SEQUENCE

Channel	Frequency (GHz)	Channel	Frequency (GHz)
01	2.402	42	2.443
02	2.403	43	2.444
03	2.404	44	2.445
04	2.405	45	2.446
05	2.406	46	2.447
06	2.407	47	2.448
07	2.408	48	2.449
08	2.409	49	2.450
09	2.410	50	2.451
10	2.411	51	2.452
11	2.412	52	2.453
12	2.413	53	2.454
13	2.414	54	2.455
14	2.415	55	2.456
15	2.416	56	2.457
16	2.417	57	2.458
17	2.418	58	2.459
18	2.419	59	2.460
19	2.420	60	2.461
20	2.421	61	2.462
21	2.422	62	2.463
22	2.423	63	2.464
23	2.424	64	2.465
24	2.420	65	2.466
25	2.426	66	2.467
26	2.427	67	2.468
27	2.428	68	2.469
28	2.429	69	2.470
29	2.430	70	2.471
30	2.431	71	2.472
31	2.432	72	2.473
32	2.433	73	2.474
33	2.434	74	2.475
34	2.435	75	2.476
35	2.436	76	2.477
36	2.437	77	2.478
37	2.438	78	2.479
38	2.439	79	2.480
39	2.440		
40	2.441		
41	2.442		

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Test Data of Hopping Sequence					
Test Mode	Number of hopping frequencies	Limit	-20dBc Hopping BW [MHz]	Limit [MHz]	Verdict
BR_HOP_NA_1Mbps	79	≥15	79.796	≥58.45	Pass

Test Graphs of Hopping Sequence



Test_Graph_BR_HOP_NA_1Mbps_HopNum

Note: The modulation used during test is GFSK and this is the worst case.

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5.3. HOPPING FREQUENCY SEPARATION

5.3.1 LIMIT

For Non-adaptive frequency hopping systems:

The minimum Hopping Frequency Separation shall be equal to Occupied Channel Bandwidth (see clause 4.3.1.7) of a single hop, with a minimum separation of 100 kHz.

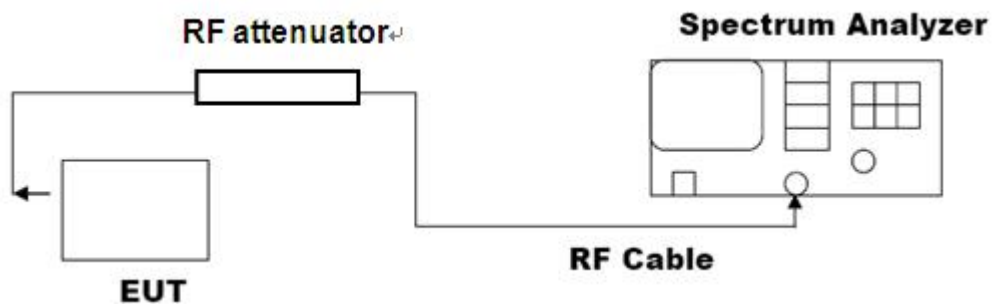
For Adaptive frequency hopping systems:

The minimum Hopping Frequency Separation shall be 100 kHz.

5.2.2 TEST PROCEDURE

Please refer to ETSI EN300328 V2.2.2 Section 5.4.5

5.2.3 TEST CONFIGURATION



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5.3.4 TEST RESULTS

Test Data of Hopping Frequency Separation			
Test Mode	Hopping Frequency Separation [MHz]	Limit [MHz]	Verdict
BR_HOP_NA_1Mbps	1.025	≥0.1	Pass

Test Graphs of Hopping Sequence



Test_Graph_BR_HOP_NA_1Mbps_HopSep

Note: The modulation used during test is GFSK and this is the worst case.

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5.4. OCCUPIED CHANNEL BANDWIDTH

5.4.1 LIMIT

The Occupied Channel Bandwidth shall fall completely within the band 2400MHz to 2483.5MHz.

5.4.2 TEST PROCEDURE

1) The spectrum analyser shall be used 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

Span: 2×OBW

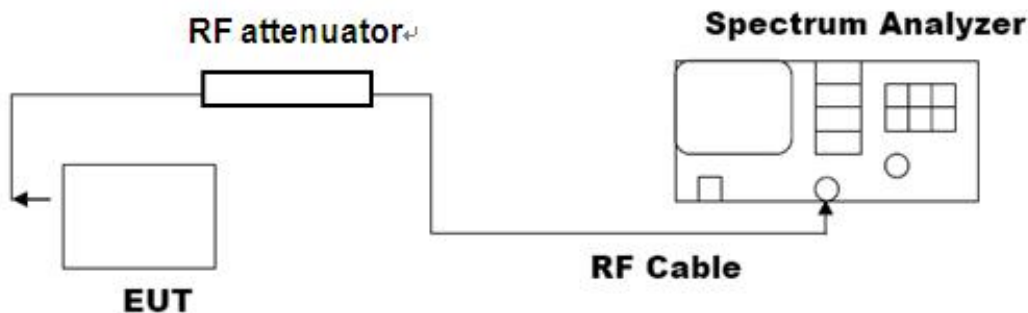
Detector: RMS

Trace mode: Max Hold

2) Wait until the trace is completed, find the peak value of the trace and place the analyser marker on this peak.

3) Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

5.4.3 TEST CONFIGURATION



5.4.4 TEST RESULTS

Test Data of Occupied Channel Bandwidth					
Test Mode	Occupied Channel Bandwidth [MHz]			Limit [MHz]	Verdict
	OCB	FL	FH		
BR_2402_1Mbps	0.990	2401.520	2402.509	2400 to 2483.5	Pass
BR_2480_1Mbps	1.004	2479.511	2480.515	2400 to 2483.5	Pass
EDR_2402_2Mbps	1.247	2401.392	2402.639	2400 to 2483.5	Pass
EDR_2480_2Mbps	1.281	2479.374	2480.655	2400 to 2483.5	Pass
EDR_2402_3Mbps	1.250	2401.381	2402.631	2400 to 2483.5	Pass
EDR_2480_3Mbps	1.267	2479.374	2480.641	2400 to 2483.5	Pass

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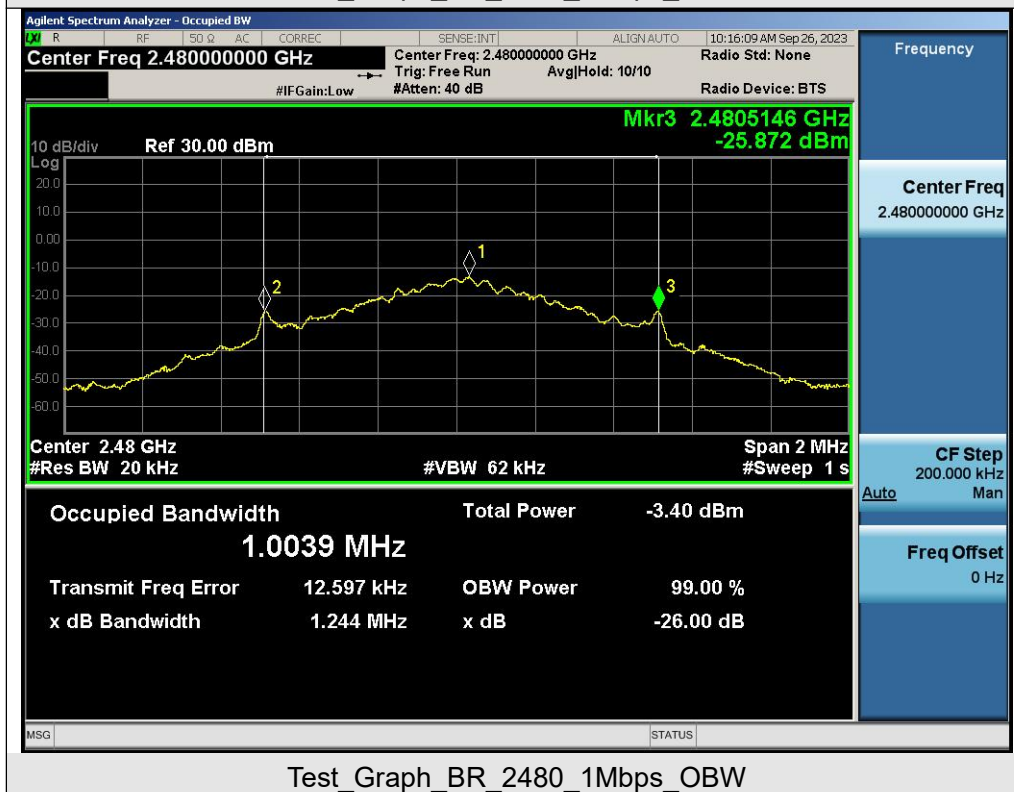
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Test Graphs of Occupied Channel Bandwidth

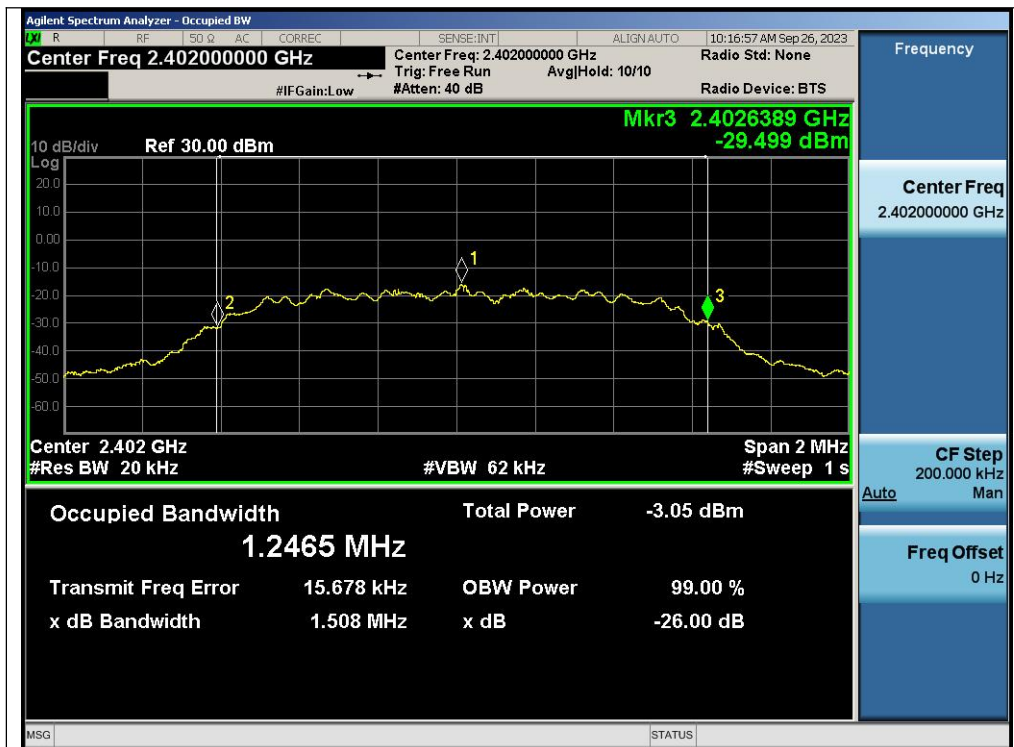


Test_Graph_BR_2402_1Mbps_OBW

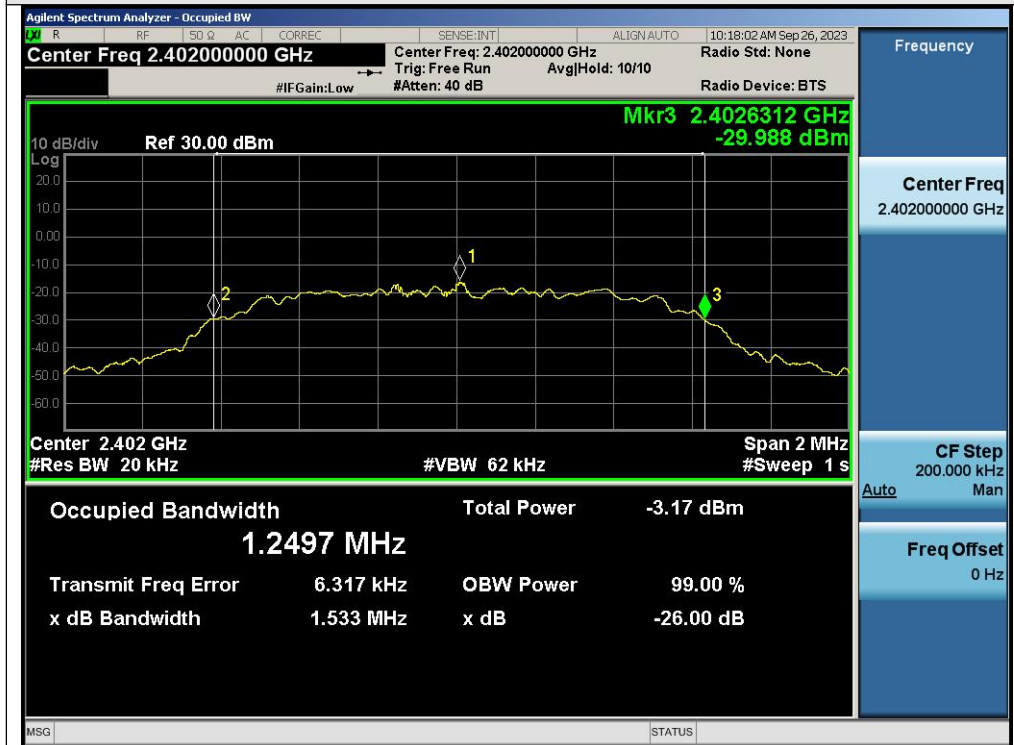


Test_Graph_BR_2480_1Mbps_OBW

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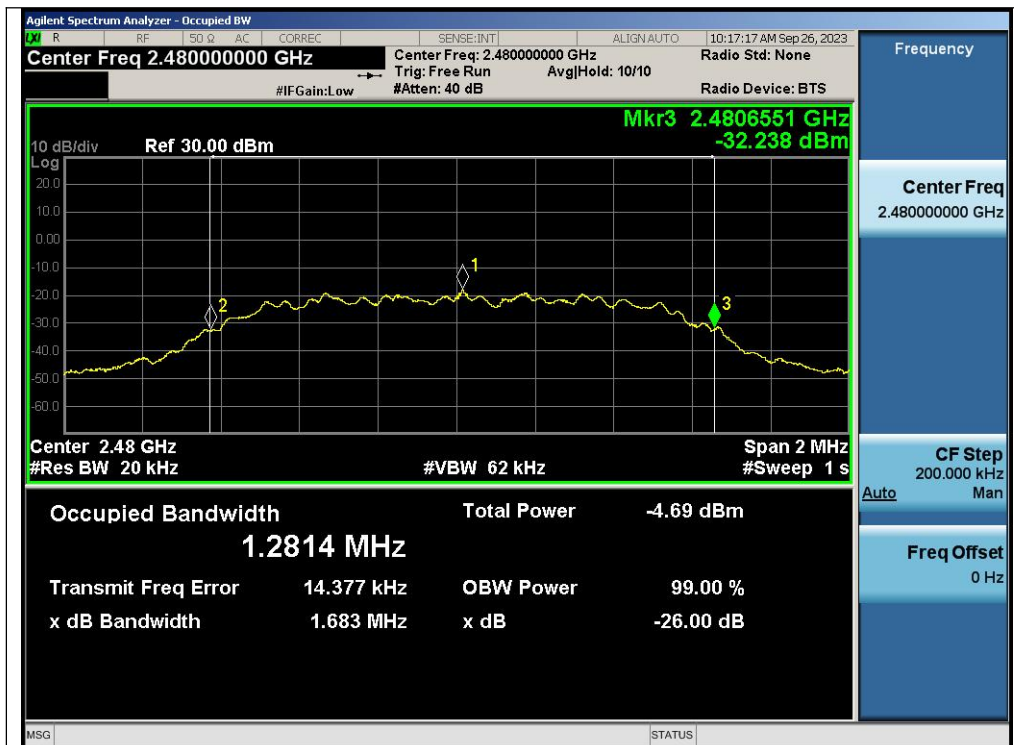


Test_Graph_EDR_2402_2Mbps_OBW

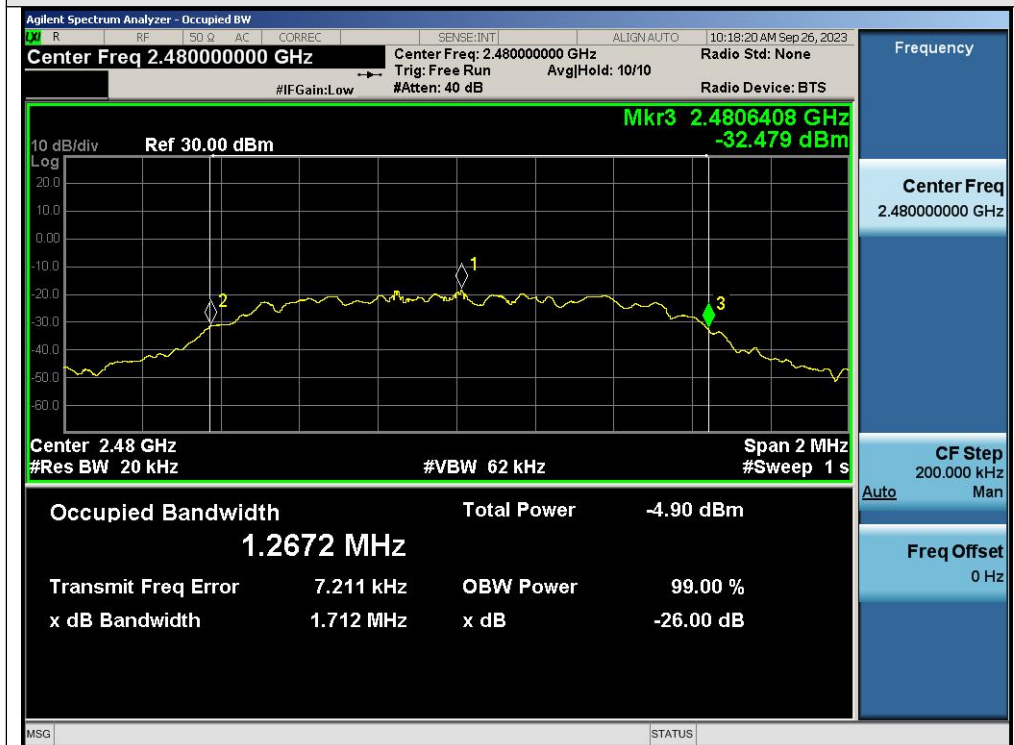


Test_Graph_EDR_2402_3Mbps_OBW

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Test_Graph_EDR_2480_2Mbps_OBW



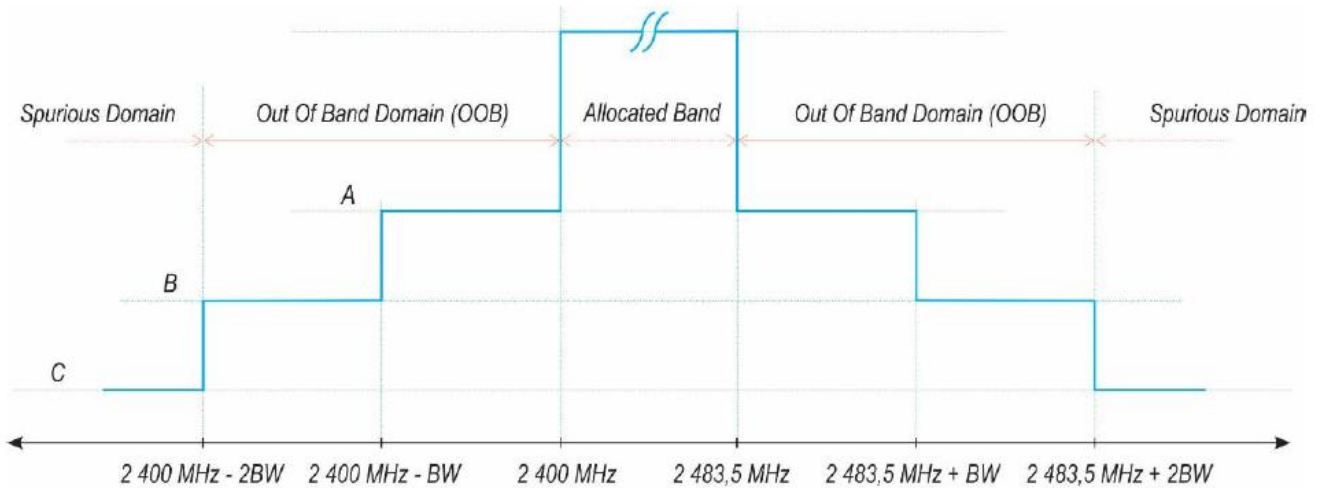
Test_Graph_EDR_2480_3Mbps_OBW

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5.5. TRANSMITTER UNWANTED EMISSIONS IN THE OUT OF BAND DOMAIN

5.5.1 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.



A: -10 dBm/MHz e.i.r.p.
B: -20 dBm/MHz e.i.r.p.
C: Spurious Domain limits

BW = Occupied Channel Bandwidth in MHz or 1 MHz whichever is greater

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5.5.2 TEST PROCEDURE

1) The spectrum analyser shall be used the following settings:

Centre Frequency: 2484MHz

Resolution BW: 1MHz; Video BW: 3MHz; Span: 0Hz; Detector: RMS

Trace mode: Max Hold; Sweep Points: 5000

2) (segment 2 483.5 MHz to 2 483.5 MHz + BW)

Adjust the trigger level to select the transmissions with the highest power level.

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.

3)Segment 2 483.5 MHz + BW to 2 483.5 MHz + 2BW

Change the centre frequency of the analyser to 2 484 MHz + BW and perform the measurement for the first 1 MHz segment within range 2 483.5 MHz + BW to 2 483.5 MHz + 2BW. Increase the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 483,5 MHz + 2 BW – 0.5 MHz.

4)Segment 2 400 MHz - BW to 2 400 MHz

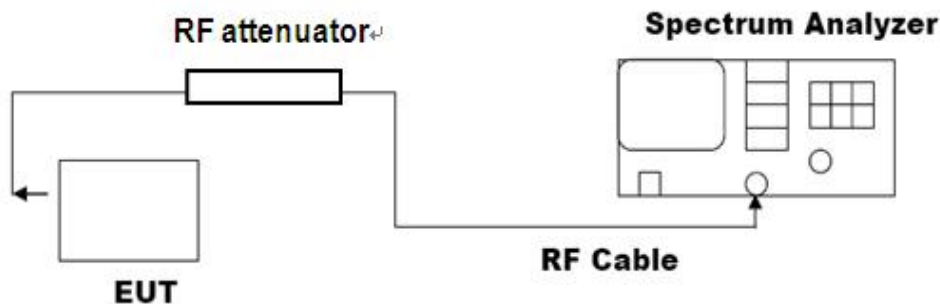
Change the centre frequency of the analyser to 2 399.5 MHz and perform the measurement for the first 1 MHz segment within range 2 400 MHz - BW to 2 400 MHz Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0.5 MHz.

5)Segment 2 400 MHz - 2BW to 2 400 MHz - BW

Change the centre frequency of the analyser to 2 399,5 MHz - BW and perform the measurement for the first 1 MHz segment within range 2 400 MHz - 2BW to 2 400 MHz - BW. Reduce the centre frequency in 1 MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2 400 MHz - 2BW + 0.5 MHz.

6)The cable loss and attenuator factor shall be considered to the test result.

5.5.3 TEST CONFIGURATION

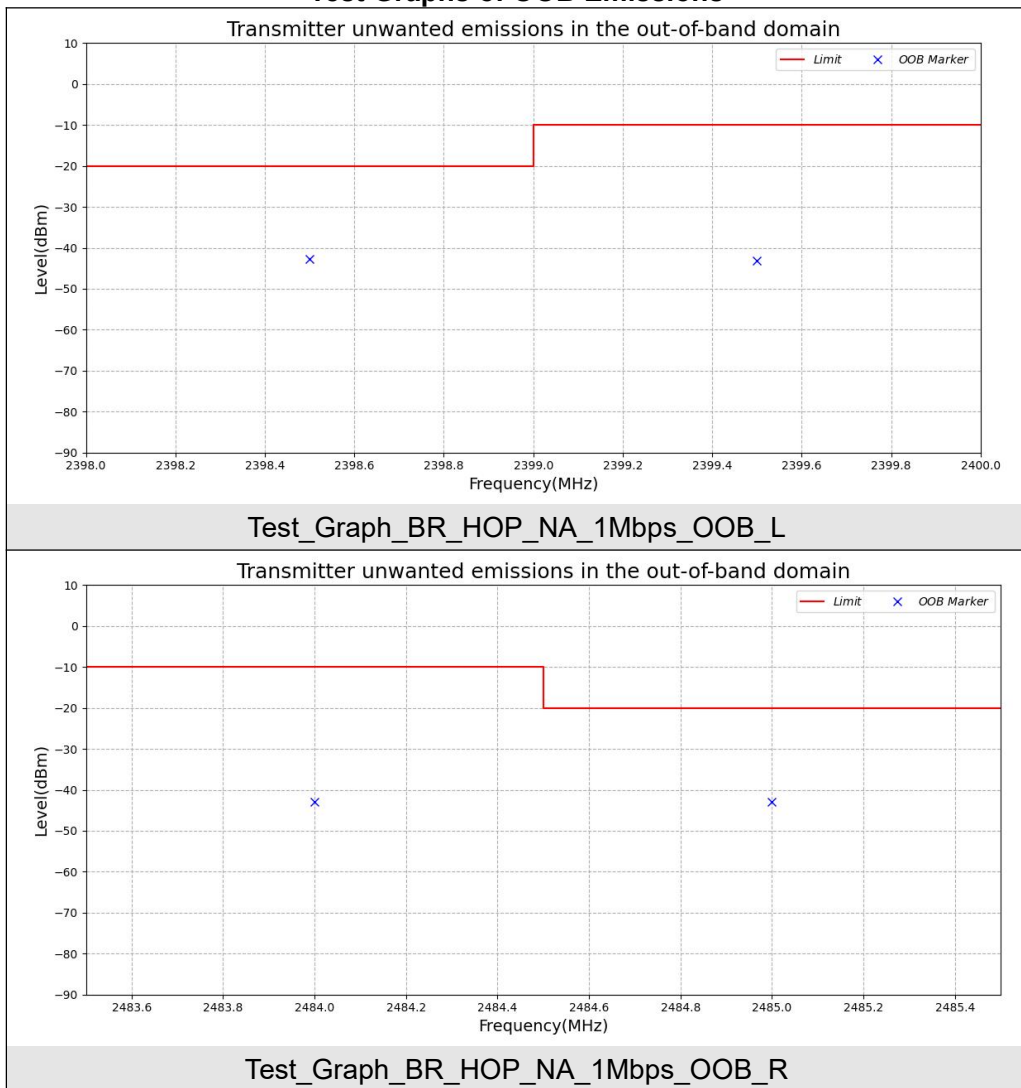


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5.5.4 TEST RESULT

Test Data of OOB Emissions				
Test Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Verdict
BR_HOP_NA_1Mbps	2399.500	-43.15	-10	Pass
	2398.500	-42.74	-20	Pass
	2484.000	-42.96	-10	Pass
	2485.000	-43.01	-20	Pass

Test Graphs of OOB Emissions



Note: All the modes had been tested, but only the worst data recorded in the report.

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5.6. TRANSMITTER SPURIOUS EMISSIONS

5.6.1 LIMIT

The spurious emissions of the transmitter shall not exceed the values in tables in the indicated bands:

Frequency Range	Maximum Power e.r.p(<=1GHz)/e.i.r.p(>1GHz)	Bandwidth
30 MHz to 47 MHz	-36dBm	100kHz
47 MHz to 74 MHz	-54dBm	100kHz
74 MHz to 87.5 MHz	-36dBm	100kHz
87.5 MHz to 118 MHz	-54dBm	100kHz
118 MHz to 174 MHz	-36dBm	100kHz
174 MHz to 230 MHz	-54dBm	100kHz
230 MHz to 470 MHz	-36dBm	100kHz
470 MHz to 694 MHz	-54dBm	100kHz
694 MHz to 1GHz	-36dBm	100kHz
1 GHz to 12.75 GHz	-30dBm	1MHz

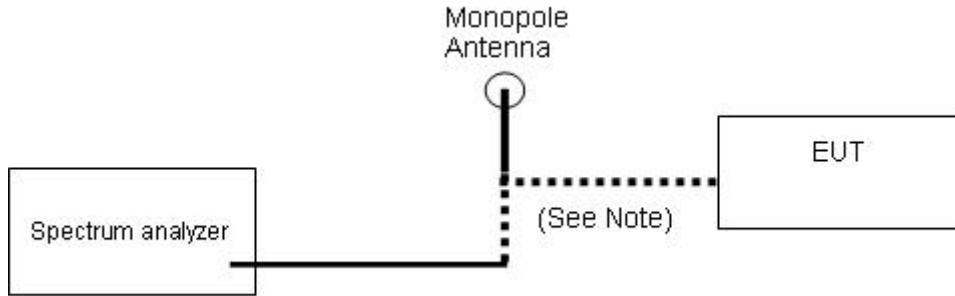
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5.6.2 TEST PROCEDURE

- 1) The emissions over the range 30 MHz to 1 000 MHz shall be identified.
- 2) Spectrum analyzer settings:
 - Resolution bandwidth: 100 kHz
 - Video bandwidth: 300 kHz
 - Detector mode: Peak
 - Sweep Points: $\geq 19\,400$
 - Trace Mode: Max Hold
- 3) Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits.
- 4) The emissions over the range 1 GHz to 12,75 GHz shall be identified.
- 5) Resolution bandwidth: 1 MHz
 - Video bandwidth: 3 MHz
 - Detector mode: Peak
 - Trace Mode: Max Hold
 - Sweep Points: $\geq 23\,500$
- 6) Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits.
- 7) For radiated method, the applicable measurement procedures as described in the EN 300 328 V2.2.2 annex C.2 and C.4 are used.

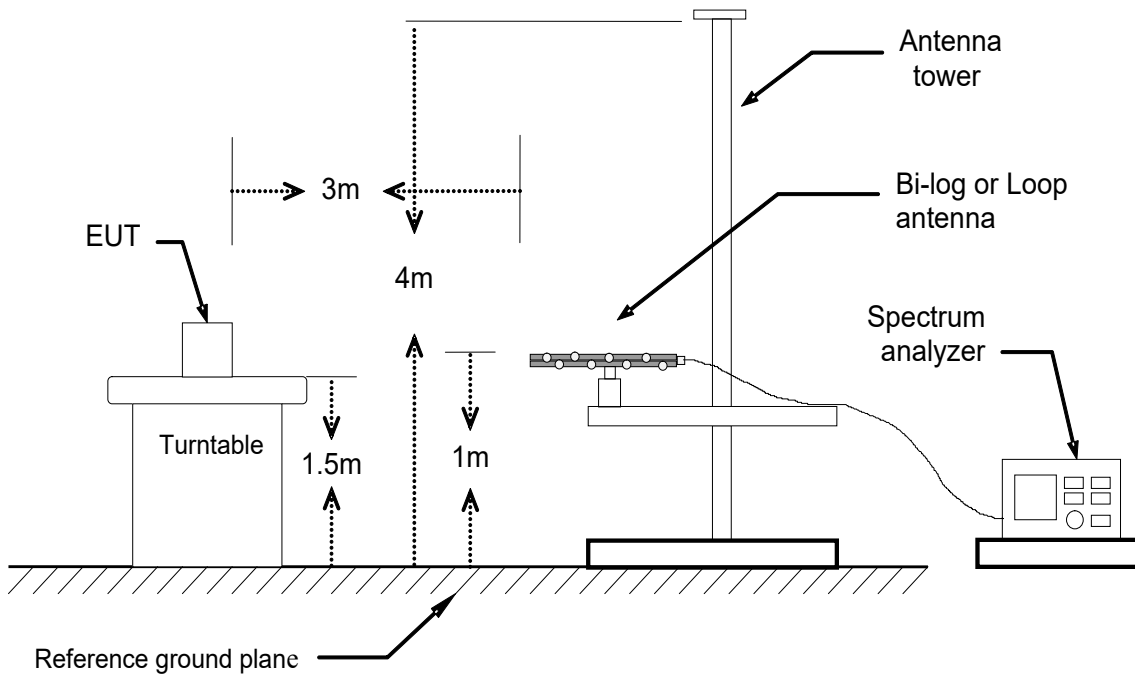
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5.6.3 TEST CONFIGURATION



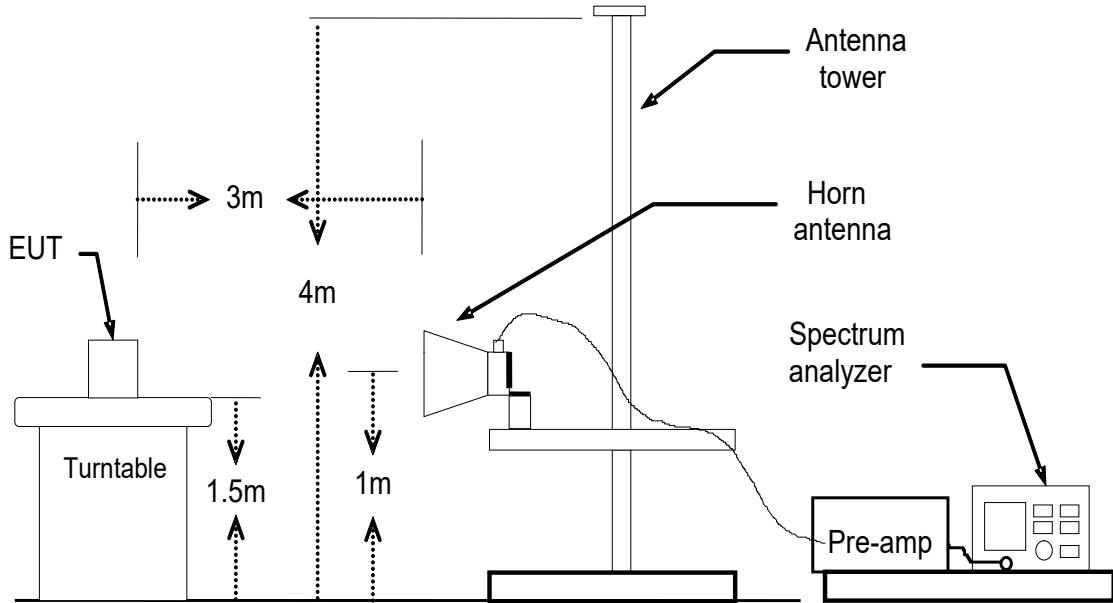
Conducted Method

Below 1GHz



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Above 1GHz



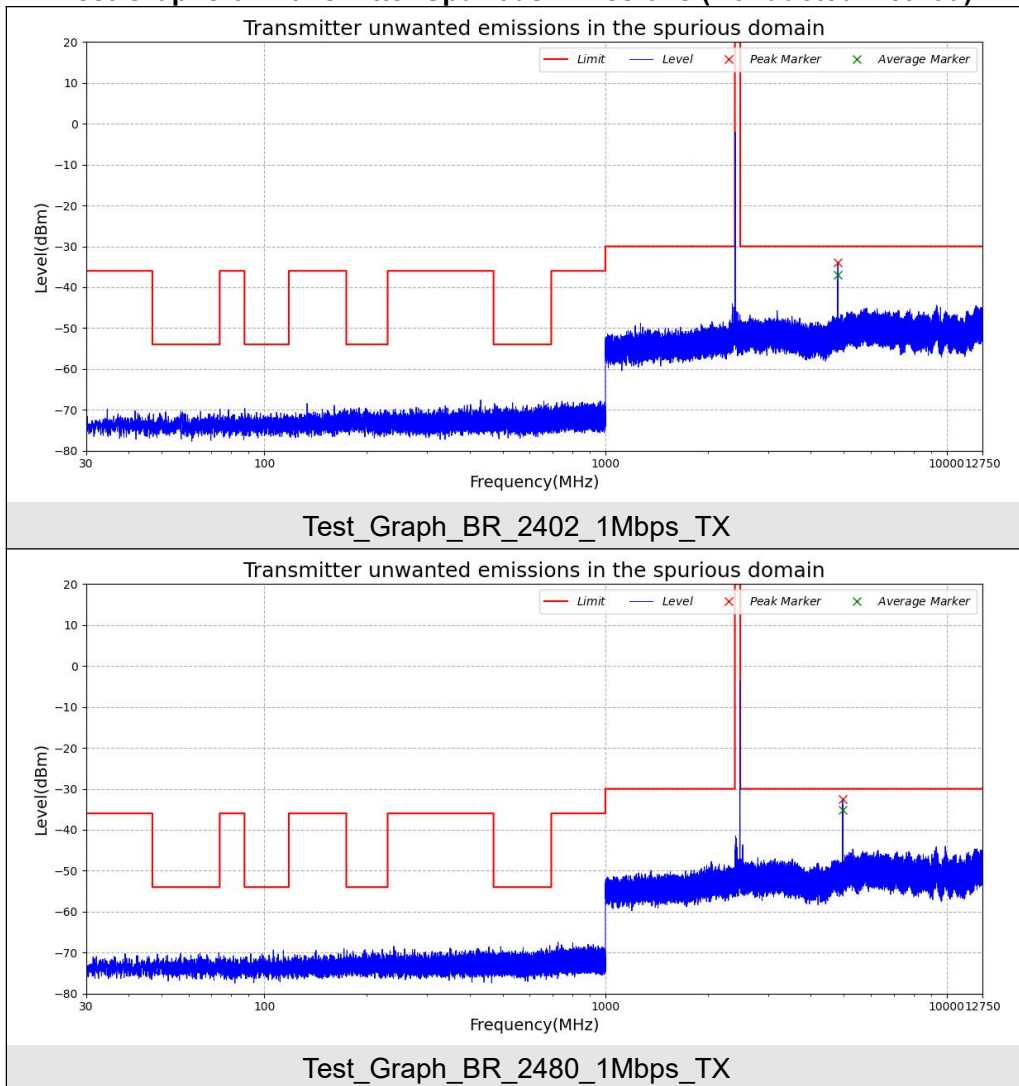
Radiated Method

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5.6.4 TEST RESULT

Test Data of Transmitter Spurious Emissions (Conducted Method)					
Test Mode	Detector	Frequency [MHz]	Level [dBm]	Limit [dBm]	Verdict
BR_2402_1Mbps	Peak	4803.993	-33.99	-30.00	Pass
	Average	4803.993	-36.89	-30.00	Pass
BR_2480_1Mbps	Peak	4959.882	-32.57	-30.00	Pass
	Average	4959.882	-35.07	-30.00	Pass

Test Graphs of Transmitter Spurious Emissions (Conducted Method)



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Radiated Method:

(Worst Case: Low channel)

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
76.25	31.16	V	-60.17	0.04	-0.90	-61.11	-36.00	25.11
158.03	28.07	V	-65.76	0.06	1.00	-64.82	-36.00	28.82
355.31	30.82	V	-67.57	0.25	6.15	-61.68	-36.00	25.68
426.73	26.21	V	-73.88	0.33	6.98	-67.24	-36.00	31.24
628.48	28.48	V	-71.19	0.51	7.22	-64.48	-54.00	10.48
760.02	27.91	V	-71.16	0.61	6.60	-65.17	-36.00	29.17
Other(30-1000)	--	V	--	--	--	--	-36.00/-54.00	--
83.41	30.45	H	-62.65	0.04	0.38	-62.31	-36.00	26.31
155.66	26.42	H	-67.40	0.06	0.70	-66.76	-36.00	30.76
348.79	29.90	H	-69.21	0.24	5.54	-63.91	-36.00	27.91
432.05	27.12	H	-72.80	0.34	6.76	-66.38	-36.00	30.38
633.62	28.81	H	-70.94	0.52	7.24	-64.22	-54.00	10.22
730.79	28.48	H	-70.35	0.59	6.80	-64.14	-36.00	28.14
Other(30-1000)	--	H	--	--	--	--	-36.00/-54.00	--

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Transmitter Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
4804	51.98	V	-48.89	2.65	9.34	-42.20	-30.00	12.20
7206	47.19	V	-55.18	3.13	11.32	-46.99	-30.00	16.99
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
Other(1000-12750)	--	V	--	--	--	--	-30.00	--
4804	51.71	H	-48.59	2.65	9.34	-41.90	-30.00	11.90
7206	44.22	H	-57.38	3.13	11.32	-49.19	-30.00	19.19
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
Other(1000-12750)	--	H	--	--	--	--	-30.00	--

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

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(Worst Case: High channel)

Transmitter Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
79.53	32.24	V	-61.62	0.04	-0.30	-61.96	-36.00	25.96
160.85	27.51	V	-67.59	0.06	1.20	-66.45	-36.00	30.45
354.47	31.04	V	-68.60	0.25	6.02	-62.83	-36.00	26.83
427.10	26.97	V	-72.39	0.33	6.96	-65.76	-36.00	29.76
629.33	29.19	V	-70.76	0.51	7.26	-64.01	-54.00	10.01
757.67	28.69	V	-69.68	0.61	6.45	-63.84	-36.00	27.84
Other(30-1000)	--	V	--	--	--	--	-36.00/-54.00	--
88.09	31.61	H	-62.66	0.04	1.12	-61.58	-54.00	7.58
156.58	26.76	H	-67.07	0.06	0.80	-66.33	-36.00	30.33
352.00	29.32	H	-69.49	0.25	5.63	-64.11	-36.00	28.11
432.28	27.26	H	-72.18	0.34	6.76	-65.77	-36.00	29.77
632.24	29.01	H	-71.01	0.52	7.26	-64.27	-54.00	10.27
730.12	27.97	H	-70.88	0.59	6.80	-64.67	-36.00	28.67
Other(30-1000)	--	H	--	--	--	--	-36.00/-54.00	--

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Transmitter Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
4960	52.23	V	-48.34	2.65	9.34	-41.65	-30.00	11.65
7440	46.91	V	-54.72	3.13	11.32	-46.53	-30.00	16.53
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
Other(1000-12750)	--	V	--	--	--	--	-30.00	--
4960	51.96	H	-47.46	2.65	9.34	-40.77	-30.00	10.77
7440	43.89	H	-57.88	3.13	11.32	-49.69	-30.00	19.69
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
Other(1000-12750)	--	H	--	--	--	--	-30.00	--

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

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5.7. RECEIVER SPURIOUS EMISSIONS

5.7.1 LIMIT

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode. The spurious emissions of the receiver shall not exceed the values given in table.

Frequency Range	Maximum Power e.r.p(<=1GHz)/e.i.r.p(>1GHz)	Measurement Bandwidth
30 MHz to 1000 MHz	-57dBm	100kHz
1 GHz to 12.75 GHz	-47dBm	1MHz

5.7.2 TEST PROCEDURE

1)The emissions over the range 30 MHz to 1 000 MHz shall be identified.

2)Spectrum analyzer settings:

Resolution bandwidth: 100 kHz

Video bandwidth: 300 kHz

Detector mode: Peak

Sweep Points: $\geq 19\ 400$

Trace Mode: Max Hold

3)Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits given in 5.7.1.

4) The emissions over the range 1 GHz to 12.75 GHz shall be identified.

5) Resolution bandwidth: 1 MHz

Video bandwidth: 3 MHz

Detector mode: Peak

Trace Mode: Max Hold

Sweep Points: ≥ 23200

6) Allow the trace to stabilize. Any emissions identified during the sweeps above and that fall within the 6 dB range below the applicable limit or above, shall be individually measured using RMS detector and compared to the limits given in 5.7.1.

7) For radiated method, the applicable measurement procedures as described in the EN 300 328 V2.2.2 annex C.2 and C.4 are used.

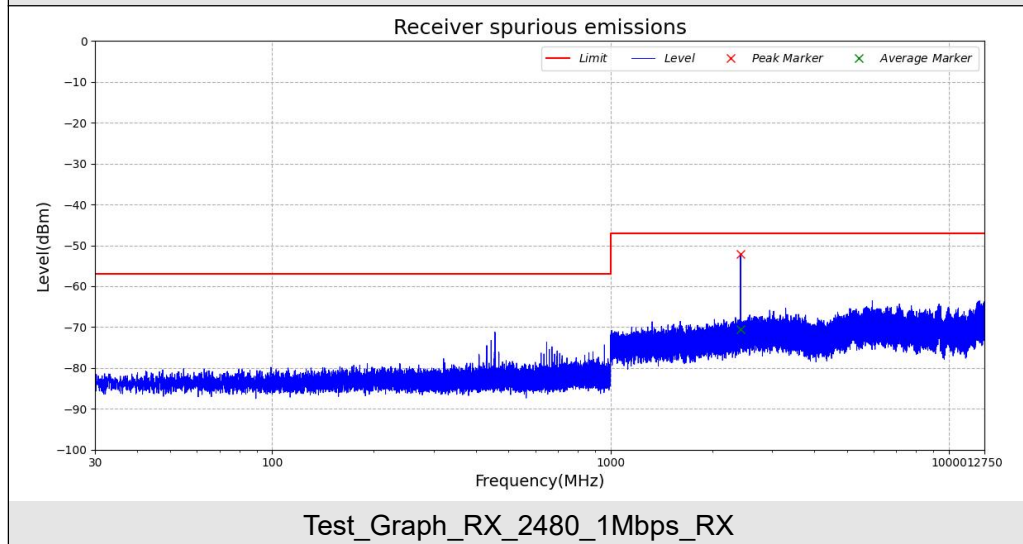
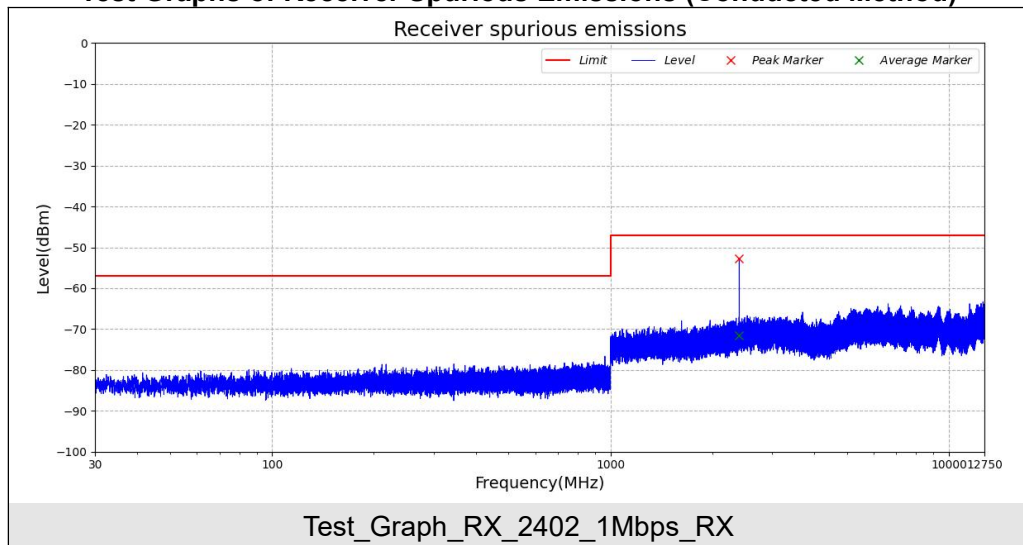
5.7.3 TEST CONFIGURATION

Refer to 5.6.3

5.7.4 TEST RESULT

Test Data of Receiver Spurious Emissions (Conducted Method)					
Test Mode	Detector	Frequency [MHz]	Level [dBm]	Limit [dBm]	Verdict
RX_2402_1Mbps	Peak	2402.213	-52.77	-47.00	Pass
	Average	2402.213	-71.48	-47.00	Pass
RX_2480_1Mbps	Peak	2425.714	-52.04	-47.00	Pass
	Average	2425.714	-70.52	-47.00	Pass

Test Graphs of Receiver Spurious Emissions (Conducted Method)



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Radiated Method:

(Worst Case: Low channel)

Receiver Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
93.06	27.90	V	-67.47	0.04	1.64	-65.87	-57.00	8.87
160.44	29.94	V	-65.15	0.06	1.20	-64.01	-57.00	7.01
360.98	28.27	V	-71.75	0.26	6.80	-65.21	-57.00	8.21
533.44	27.96	V	-72.39	0.44	6.78	-66.06	-57.00	9.06
676.20	30.93	V	-68.25	0.55	6.56	-62.24	-57.00	5.24
832.12	31.00	V	-68.73	0.66	6.44	-62.95	-57.00	5.95
Other(30-1000)	--	V	--	--	--	--	-57.00	--
134.28	28.67	H	-63.79	0.05	0.02	-63.82	-57.00	6.82
164.08	29.93	H	-65.43	0.06	1.52	-63.97	-57.00	6.97
342.29	30.63	H	-68.39	0.24	5.66	-62.97	-57.00	5.97
540.19	28.65	H	-71.13	0.45	7.20	-64.38	-57.00	7.38
674.26	28.20	H	-71.09	0.55	6.64	-64.99	-57.00	7.99
827.69	27.22	H	-71.18	0.66	6.45	-65.39	-57.00	8.39
Other(30-1000)	--	H	--	--	--	--	-57.00	--

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Receiver Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
1792.02	32.23	V	-67.86	1.22	6.84	-62.24	-47.00	15.24
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
Other(1000-12750)	--	V	--	--	--	--	-47.00	--
1680.34	33.21	H	-67.21	1.19	6.67	-61.73	-47.00	14.73
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
Other(1000-12750)	--	H	--	--	--	--	-47.00	--

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

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(Worst Case: High channel)

Receiver Spurious Emission below 1GHz (30MHz-1GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
95.31	26.62	V	-68.88	0.04	1.80	-67.12	-57.00	10.12
160.13	28.80	V	-64.73	0.06	1.20	-63.59	-57.00	6.59
356.16	29.51	V	-70.53	0.25	6.28	-64.50	-57.00	7.50
531.50	26.35	V	-73.91	0.44	6.66	-67.69	-57.00	10.69
674.73	30.19	V	-68.55	0.55	6.64	-62.45	-57.00	5.45
833.10	29.46	V	-69.77	0.66	6.51	-63.92	-57.00	6.92
Other(30-1000)	--	V	--	--	--	--	-57.00	--
138.50	28.93	H	-64.05	0.05	0.00	-64.10	-57.00	7.10
161.25	28.35	H	-65.81	0.06	1.28	-64.59	-57.00	7.59
339.25	30.07	H	-68.23	0.23	5.74	-62.72	-57.00	5.72
537.82	27.61	H	-71.35	0.45	7.02	-64.78	-57.00	7.78
677.14	29.16	H	-70.30	0.55	6.52	-64.33	-57.00	7.33
828.74	27.09	H	-70.94	0.66	6.40	-65.20	-57.00	8.20
Other(30-1000)	--	H	--	--	--	--	-57.00	--

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Receiver Spurious Emission above 1GHz (1GHz-12.75GHz)

Frequency	Reading Level	Antenna	S.G.	Cable Loss	Ant.Gain	Emission Level	Limit	Margin
(MHz)	(dBuV/m)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
1795.08	32.33	V	-67.42	1.22	6.84	-61.80	-47.00	14.80
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
--	--	V	--	--	--	--	--	--
Other(1000-12750)	--	V	--	--	--	--	-47.00	--
1677.40	32.44	H	-67.79	1.19	6.67	-62.31	-47.00	15.31
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
--	--	H	--	--	--	--	--	--
Other(1000-12750)	--	H	--	--	--	--	-47.00	--

Note: 1. The margins of the other spectrum are not exceeding the minimum value of margin, and this part of the results without recording in the test report.

2. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "--" remark, if no specific emission from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

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5.8. RECEIVER BLOCKING

5.8.1 LIMIT

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	-34	CW
	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		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min} + 26$ dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min} + 20$ dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

Receiver Blocking parameters for 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	-34	CW
	2 504		
	2 300		
	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 Blocking parameters for 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	-34	CW
	2 504		
	2 300		
	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} + 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.

5.8.2 TEST PROCEDURE

For non-FHSS equipment, having more than one operating channel, the operating channels on which the testing has to be performed shall be selected as follows:

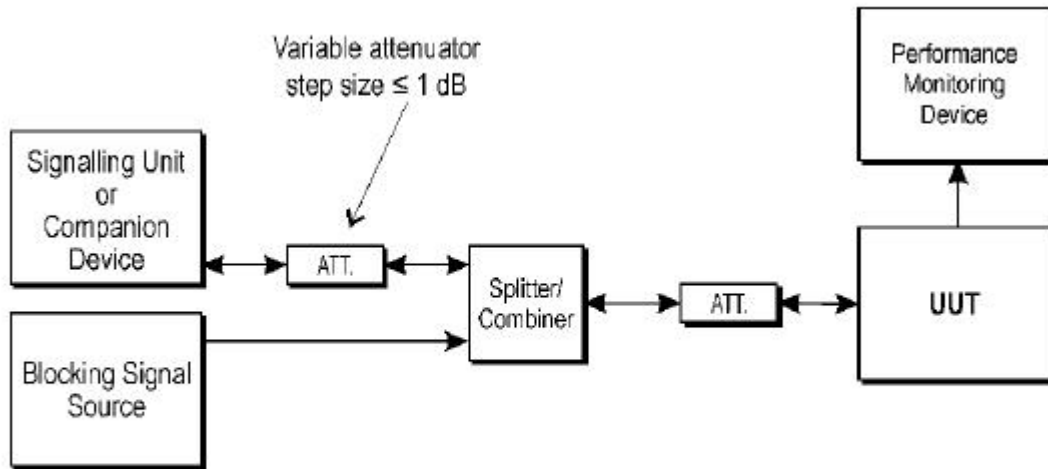
- For testing blocking frequencies less than 2 400 MHz, the equipment shall operate on the lowest operating channel.
- For testing blocking frequencies greater than 2 500 MHz, the equipment shall operate on the highest operating channel.

The simplified conducted measure procedures are as follows:

- 1) For non-FHSS equipment, the UUT shall be set to the lowest operating channel on which the blocking test has to be performed.
- 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.
- 3) With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup. 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. 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.
- 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. It shall be verified and recorded in the test report that the performance criteria is met.
- 5) Repeat step 4 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.
- 6) Repeat step 2 to step 5 with the UUT operating at the highest operating channel.

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5.8.3 TEST CONFIGURATION



Test Set-up for receiver blocking

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5.8.4 TEST RESULTS

Test Data of Receiver Spurious Emissions						
Test Condition	Blocking Signal Frequency (MHz)	Blocking Signal Power(dBm)	Wanted signal mean power from companion device(dBm)	Performance PER	Limit PER	Result
GFSK Hopping Mode	2 300	-32.80	-57.84	1.41%	10%	Pass
	2 380	-32.80	-57.84	0.77%	10%	Pass
	2 504	-32.80	-57.78	2.91%	10%	Pass
	2 584	-32.80	-57.78	1.58%	10%	Pass

Test Data of Receiver Spurious Emissions						
Test Condition	Blocking Signal Frequency (MHz)	Blocking Signal Power(dBm)	Wanted signal mean power from companion device(dBm)	Performance PER	Limit PER	Result
π /4-DQPSK Hopping Mode	2 300	-32.80	-56.84	0.48%	10%	Pass
	2 380	-32.80	-56.84	1.61%	10%	Pass
	2 504	-32.80	-56.72	0.56%	10%	Pass
	2 584	-32.80	-56.72	1.46%	10%	Pass

Test Data of Receiver Spurious Emissions						
Test Condition	Blocking Signal Frequency (MHz)	Blocking Signal Power(dBm)	Wanted signal mean power from companion device(dBm)	Performance PER	Limit PER	Result
8DPSK Hopping Mode	2 300	-32.80	-56.83	1.29%	10%	Pass
	2 380	-32.80	-56.83	0.89%	10%	Pass
	2 504	-32.80	-56.77	2.66%	10%	Pass
	2 584	-32.80	-56.77	1.98%	10%	Pass

Note: The levels of the blocking signal and wanted signal have to be corrected for the (in-band) antenna assembly gain.

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APPENDIX A: PHOTOGRAPHS OF THE TEST SETUP

RADIATED SPURIOUS EMISSION TEST SETUP

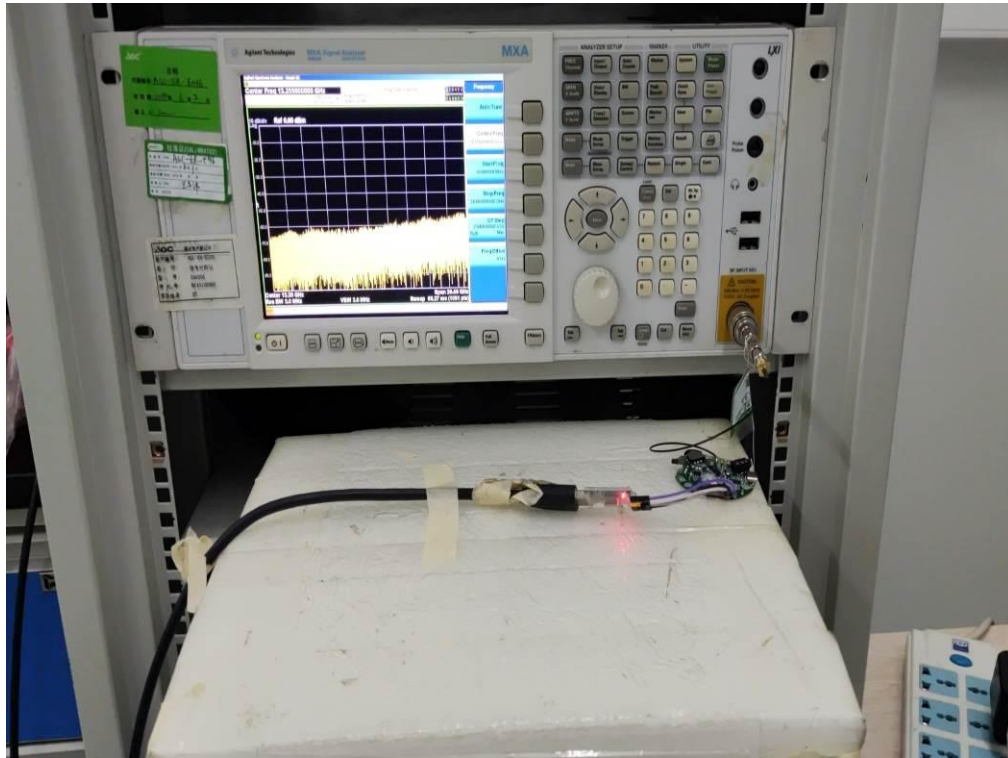


RADIATED SPURIOUS EMISSION ABOVE 1G TEST SETUP



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CONDUCTED TEST SETUP



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APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.: AGC12440230905AP01

----END OF REPORT----

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Conditions of Issuance of Test Reports

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RF Test Report

Report No.: AGC12440230905ER03

PRODUCT DESIGNATION : Wireless speaker

BRAND NAME : N/A

TEST MODEL : M08726

APPLICANT : Mid Ocean Brands B.V.

DATE OF ISSUE : Oct. 10, 2023

STANDARD(S) : ETSI EN 303 345-1 V1.1.1: 2019-06
: ETSI EN 303 345-3 V1.1.1: 2021-06

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 10, 2023	Valid	Initial release

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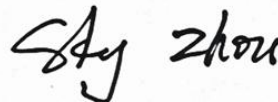
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1. VERIFICATION OF CONFORMITY

Applicant	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Manufacturer	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Factory	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Product Designation	Wireless speaker
Brand Name	N/A
Test Model	MO8726
Series Model	N/A
Difference Description	N/A
Date of receipt of test item	Sep. 25, 2023
Date of test	Sep. 25, 2023 to Oct. 09, 2021
Deviation	None any deviation from the test method.
Test Result	Pass

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the European Standard ETSI EN 303 345-3. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Prepared By



Sky Zhou
(Project Engineer)

Oct. 10, 2023

Reviewed By



Calvin Liu
(Reviewer)

Oct. 10, 2023

Approved By



Max Zhang
(Authorized Officer)

Oct. 10, 2023

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2. TECHNICAL INFORMATION

2.1. EUT DESCRIPTION

Details of technical specification refer to the description in follows:

Hardware Version	V2.0
Software Version	ac696n_soundbox_sdk_v1.6.0
Modulation method	Frequency modulation (FM)
Frequency band	VHF band II: 87.5 MHz to 108 MHz
Antenna Type	<input checked="" type="checkbox"/> Integral antenna <input type="checkbox"/> Built-in antenna <input type="checkbox"/> External antenna
Power Supply	DC 3.7V by battery or DC 5V by adapter

NOTE: For more information, please refer to User's Manual.

2.2. OBJECTIVE

Perform Radio Spectrum tests for CE Marking according to the provisions of article 3.2 of the Radio Equipment Directive (2014/53/EU) for the broadcast sound receivers.

2.3. TEST SIGNAL CONFIGURATIONS

The generated FM signals (wanted and unwanted) and the blocking signal shall be in accordance with table The configuration is based on Recommendation ITU-R BS.641.

Parameter	FM signals		AM signal
	Wanted	Unwanted	Blocking
Audio modulation	1 kHz tone	Weighted noise Recommendation ITU-R BS.559-2, clause 1, band limited to 15 kHz (See note 1)	1 kHz tone
Other modulation parameters	±60,8 kHz peak deviation	15,9 kHz RMS deviation (See note 2)	80 % depth
Pilot tone	None	None	None

Note 1: The filter shall have a cut-off frequency of 15 kHz and a minimum roll-off of 60 dB/octave.

Note 2: This is equivalent to a quasi-peak deviation of 34,8 kHz and has pre-emphasis enabled.

The quasi-peak level measurement is defined by Recommendation ITU-R BS.641, clause 5; with pre-emphasis disabled the quasi-peak deviation is 32 kHz (14,5 kHz RMS).

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Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/

2.4. TEST ITEMS AND THE RESULTS

Test items and the results are as bellow:

Basic Standard	Test Type	Result
EN 303 345-3 Clause 4.2	Sensitivity	Pass
EN 303 345-3 Clause 4.3	Adjacent channel selectivity and blocking	Pass
EN 303 345-3 Clause 4.4	Unwanted emissions in the spurious domain	Pass

2.5. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	FM receiving mode at 98MHz

2.6. ENVIRONMENTAL CONDITIONS

- Temperature: 15-35°C
- Relative Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

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3. TEST FACILITY

Test Site:	Attestation of Global Compliance (Shenzhen) Co., Ltd.
Address:	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

4. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by ISO.

- Uncertainty of Sensitivity, $U_c = \pm 3.8\text{dB}$
- Uncertainty of Adjacent channel selectivity and blocking, $U_c = \pm 3.9\text{ dB}$

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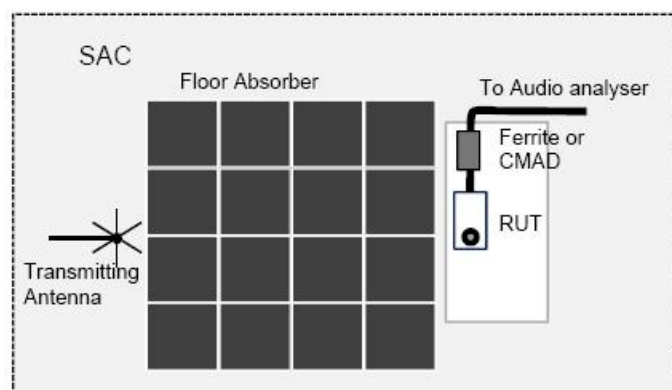
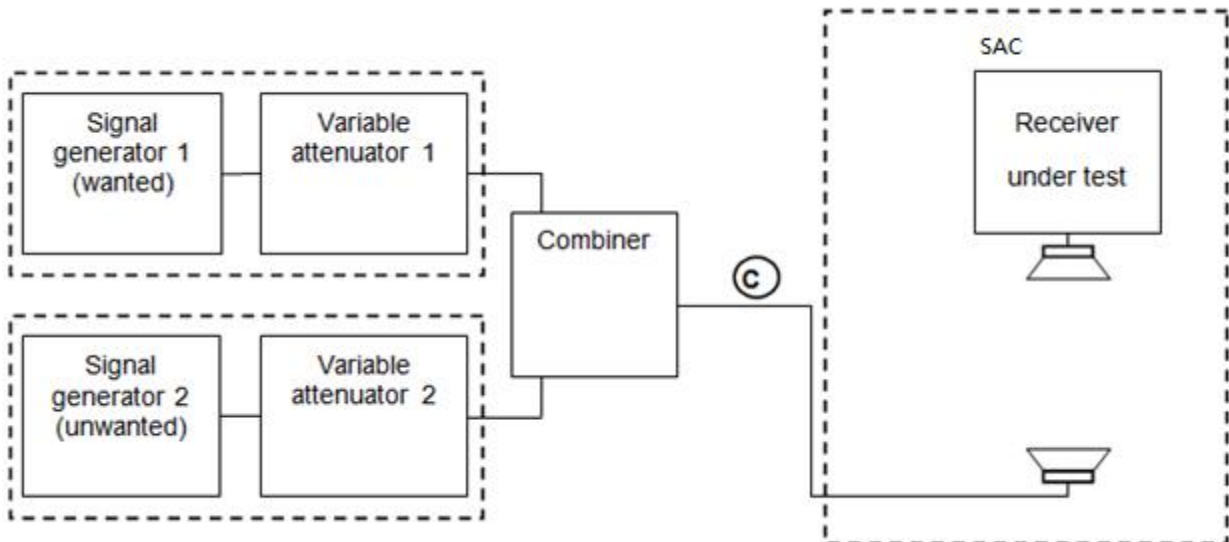
5. TECHNICAL REQUIREMENTS

5.1 SENSITIVITY

5.1.1 MEASUREMENT EQUIPMENT USED:

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
MXG X-Series Vector Signal Generator	Agilent	N5182B	MY53050647	Mar. 03, 2023	Mar. 02, 2024
MXG X-Series Vector Signal Generator	Agilent	N5182A	MY50140530	Feb. 17, 2023	Feb. 16, 2024
Audio Analyzer	R&S	UPV	101349	Jun. 02, 2023	Jun. 01, 2025
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025

5.1.2 TEST SETUP:



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5.1.3 TEST LIMITS:

The limits for sensitivity specified in the table shall apply. Each figure quoted is the required level of wanted signal which provides a given level of audio quality. The audio impairment criteria relevant for these tests is that the audio SNR ≥ 40 dBQ ref $\pm 60,8$ kHz deviation, and that there shall be 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).

FM sensitivity requirements

De-modulation	Tuned frequency band	Wanted signal Centre frequency (MHz)	Required sensitivity limit	
			Conducted (dBm)	Radiated (dB μ V/m)
FM	VHF band II	98	-90	50 (see note)
NOTE: For products with an integral antenna, the requirement is relaxed to 67 dB μ V/m.				

5.1.4 TEST PROCEDURE:

1. For radiated testing, the EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.
2. The 'unwanted' signal generator remains switched off for the duration of the test.
3. The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at \odot , specified plus 30 dB.
4. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.
5. The level of the 'wanted' signal generator is adjusted to provide the level, as measured at \odot
6. The audio output, measured using the measurement device, is recorded as the signal level, S.
7. The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.
8. If the impairment criteria given are met then the receiver has passed the test.

5.1.5 TEST RESULTS:

FM VHF band II 98MHz (<input checked="" type="checkbox"/> Integral antenna <input type="checkbox"/> Built-in antenna <input type="checkbox"/> External antenna)					
Wanted Signal Level at \odot (dB μ V/m)	S (mV)	N (mV)	SNR (dBQ)	Limit (dBQ)	Result
67	52.31	0.07	57.47	≥ 40	Pass

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5.2 ADJACENT CHANNEL SELECTIVITY AND BLOCKING

5.2.1 MEASUREMENT EQUIPMENT USED:

Same as 5.1.1

5.2.2 TEST SETUP:

Same as 5.1.2

5.2.3 TEST LIMITS:

The limits for selectivity and blocking specified in the first table shall apply with the channel spacings given in the second table. Each figure quoted is the minimum acceptable level of unwanted signal, relative to that of the wanted signal, which provides a given level of audio quality. The audio impairment criteria relevant for these tests is that the audio SNR ≥ 40 dBQ ref $\pm 60,8$ kHz deviation, and that there shall be 10 seconds of audio with no subjective impairments (e.g. clicks resulting from FM threshold effects).

Channel spacing for adjacent channel selectivity and blocking

Demodulation	Tuned frequency band	Unwanted frequency (N = 2, 3, 4)	Unwanted frequency (blocking)
FM	VHF band II	$\pm N \times 100$ kHz	± 800 kHz

Adjacent channel selectivity and blocking requirements

Demodulation (see note 1)	Tuned frequency band	C Wanted signal centre frequency (MHz)	C Wanted signal level		Required I/C ratio (see notes 2 and 3)			
			Conducted (dBm)	Radiated (dB μ V/m)	N = 2 (dB)	N = 3 (dB)	N = 4 (dB)	Blocking (dB)
FM (built-in or integral antenna)	VHF band II	98	n/a	56 (see note 4)	-15	-3	8	20
FM (external antenna)	VHF band II	98	-84	n/a	3	17	30	30

NOTE 1: The ACS and blocking requirements are currently separated into different limits for radiated and conducted testing methods. These limits are likely to be unified in a future revision of the present document. Users of the present document should consult frequently the latest list published in the Official Journal of the European Union.

NOTE 2: The frequency of the interferer shall be calculated using the channel spacing data in table 3 for each of the 6 defined adjacent channels $N = \{-4, -3, -2, +2, +3, +4\}$ and the two blocking offsets. Each row of table 4 thus defines 8 individual tests.

NOTE 3: The minimum level of I for the relevant level of impairment is calculated by adding the I/C ratio to the wanted C level.

NOTE 4: The wanted signal level for receivers with integral antenna is 73 dB μ V/m.

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5.2.4 TEST PROCEDURE:

1. For radiated testing, the EUT is placed in semi anechoic chamber (SAC). The field strength generated by the signal generator applying to the EUT at 3 meters distance from the antenna is pre-calibrated before testing.
2. The 'wanted' signal generator is set to the required modulation method and test configuration as specified, and to the frequency specified. The signal level is adjusted to provide the level, as measured at ©, specified in above table, with the 'unwanted' generator switched off
3. The receiver (EUT) is tuned to the frequency of the 'wanted' signal generator. The audio level shall be set so as to provide clean 1 kHz audio tone at the audio output (that is less than 10 % total harmonic distortion) but of sufficient level to drive the measurement device.
4. The 'unwanted' signal generator is set to the required modulation method and test configuration as specified. and to the frequency calculated from the wanted signal centre frequency and the required offset specified in above Table. The signal level is adjusted to provide the level, as measured at ©, specified in above Table, with the 'wanted' generator switched off. For the blocking test only, the audio modulation of the 'unwanted' signal shall be removed whilst measuring the level at ©.
5. The 'wanted' signal generator is switched back on.
6. The audio output, measured using the measurement device, is recorded as the signal level, S.
7. The modulating audio signal for the 'wanted' signal generator is removed. The audio output, measured using the measurement device, is recorded as the noise level, N.
8. If the impairment criteria given are met then the receiver has passed the test.

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5.2.5 TEST RESULTS:

FM VHF band II 98MHz (<input checked="" type="checkbox"/> Integral antenna <input type="checkbox"/> Built-in antenna <input type="checkbox"/> External antenna)								
Adjacency and Blocking	C Wanted signal level at © (dBµV/m)	I Unwanted Signal Level at © (dBµV/m)	Required I/C ratio(dB)	S (mV)	N (mV)	SNR (dBQ)	Limit (dBQ)	Result
97.8 MHz	73	58	-15	28.61	0.07	52.23	≥ 40	Pass
98.2 MHz	73	58	-15	28.61	0.07	52.23	≥ 40	Pass
97.7 MHz	73	70	-3	28.61	0.07	52.23	≥ 40	Pass
98.3 MHz	73	70	-3	28.61	0.07	52.23	≥ 40	Pass
97.6 MHz	73	81	8	28.61	0.07	52.23	≥ 40	Pass
98.4 MHz	73	81	8	28.61	0.07	52.23	≥ 40	Pass
97.2 MHz	73	93	20	28.61	0.07	52.23	≥ 40	Pass
98.8 MHz	73	93	20	28.61	0.07	52.23	≥ 40	Pass

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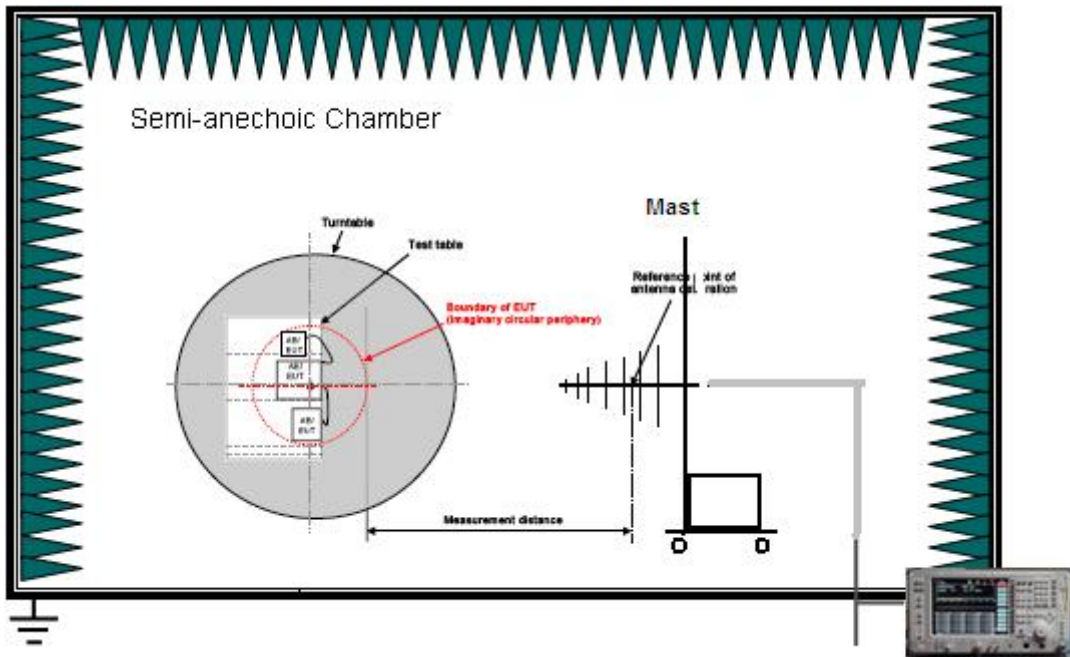
5.3 UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN**5.3.1 MEASUREMENT EQUIPMENT USED:**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Feb. 18, 2023	Feb. 17, 2024
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Jun. 01, 2023	May 31, 2024
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00034609	Mar. 23, 2023	Mar. 22, 2024
Broadband Preamplifier	ETS-LINDGREN	3117PA	00225134	Aug. 03, 2022	Aug. 02, 2024
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025

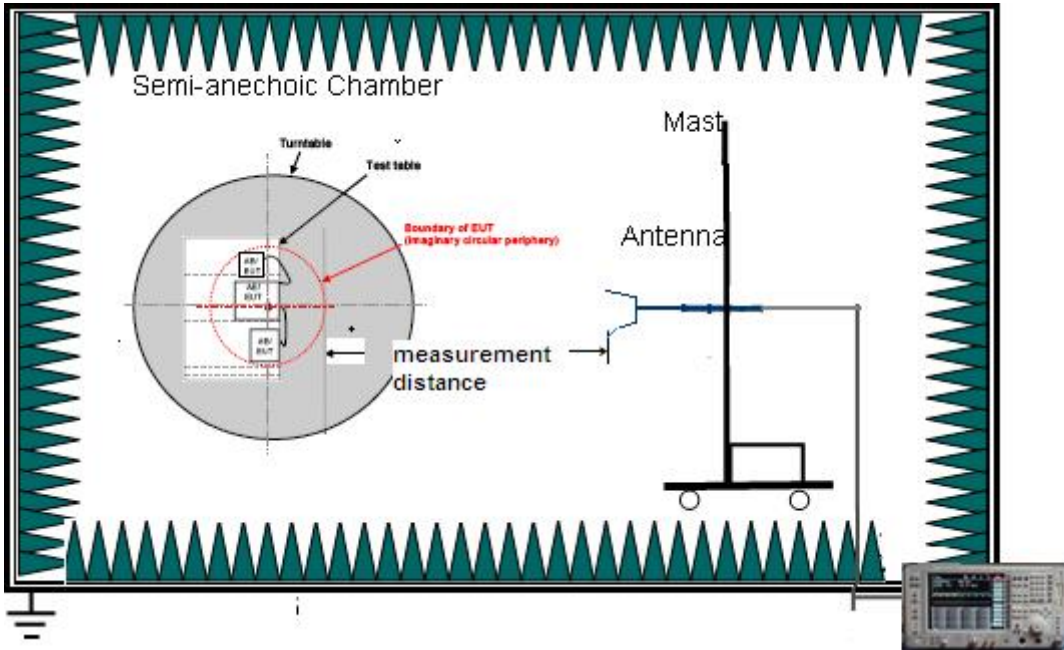
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5.3.2 TEST SETUP:

Radiated emission below 1GHz



Radiated emission Above 1GHz



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5.3.3 TEST LIMITS:

Limits for radiated emission 30MHz to 1 GHz at a measurement distance of 3 m

Frequency range (MHz)	Class B limits dB(μ V/m)
30 to 230	40
230 to 1000	47

Limits for radiated emission above 1 GHz at a measurement distance of 3 m

Frequency (MHz)	Class B limits dB(μ V/m)	
	Peak	Average
1000 to 3000	70	50
3000 to 6000	74	54

Limits for radiated emission from FM receivers at a measurement distance of 3 m

Frequency (MHz)	Class B limits dB(μ V/m)	
	Fundamental	Harmonics
30 to 230	60	52
230 to 300		52
300 to 1 000		56

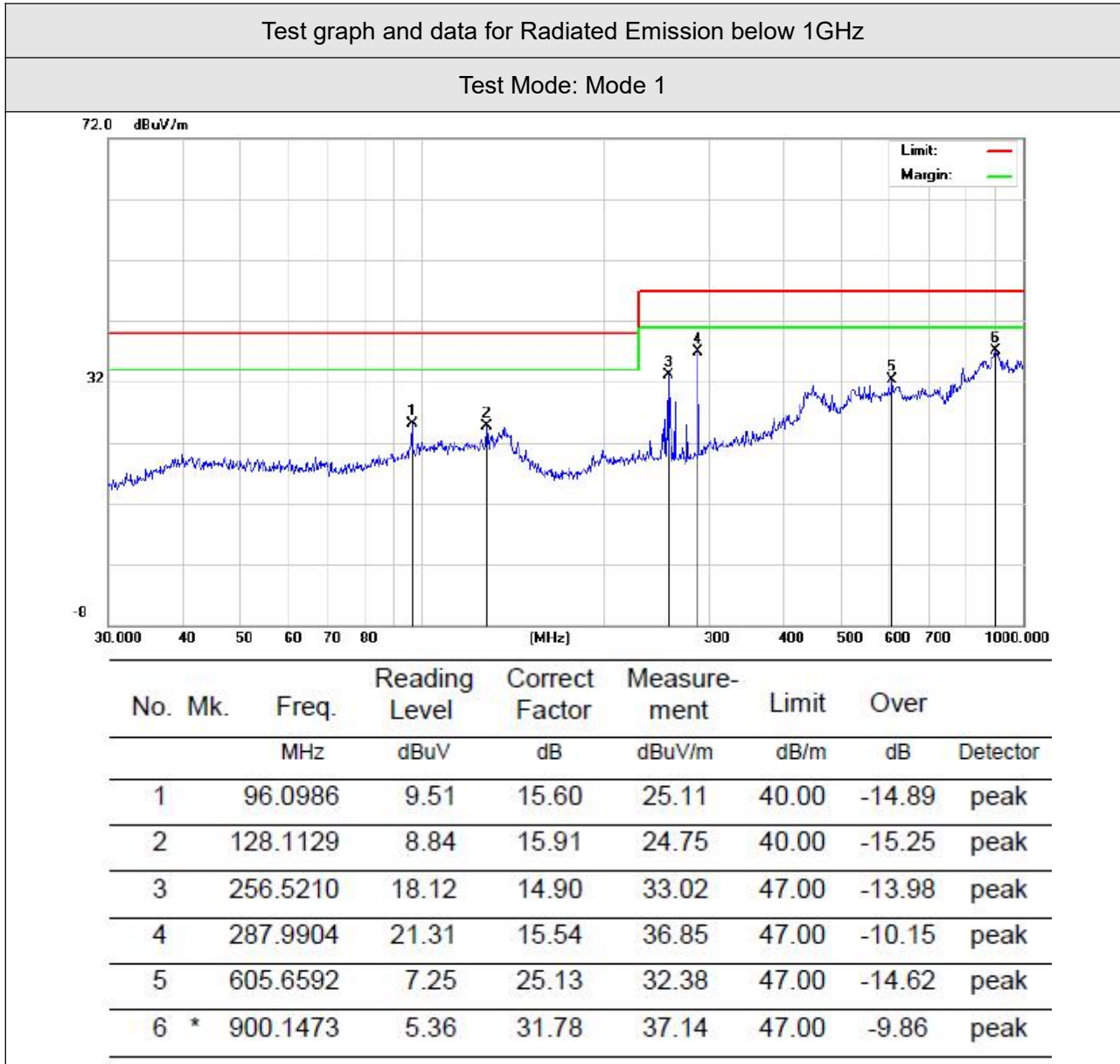
Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits given in the above tables.

5.3.4 TEST PROCEDURE:

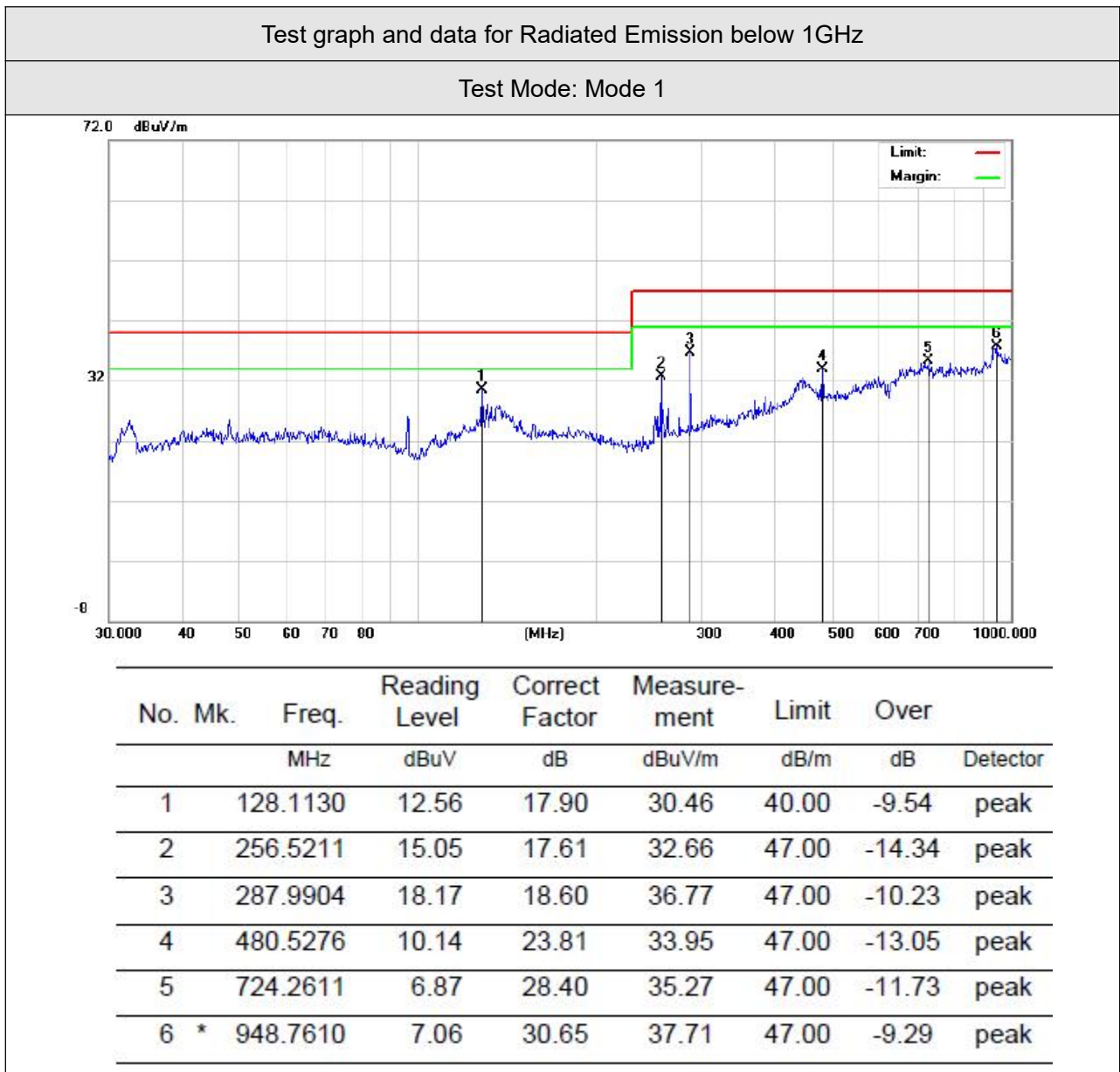
- (1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per EN 55032 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 10cm non-conductive covering to insulate the EUT from the ground plane.
- (2) Support equipment, if needed, was placed as per EN 55032.
- (3) All I/O cables were positioned to simulate typical actual usage as per EN 55032.
- (4) The EUT was operated in the selected mode(s) while the ports are exercised in accordance with Clause 2.
- (5) The antenna was placed at 3 meters away from the EUT as stated in EN 55032. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
- (6) The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- (7) The test mode(s) were scanned during the test:
- (8) Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P./Peak reading is presented.

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5.3.5 TEST RESULTS:



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Result: Pass

Note:

1. Over = Measurement - Limit; Factor = Cable Loss + Antenna Factor.
2. The highest internal frequency of EUT is not more than 108MHz, so the highest measured frequency is 1GHz for radiated emission.

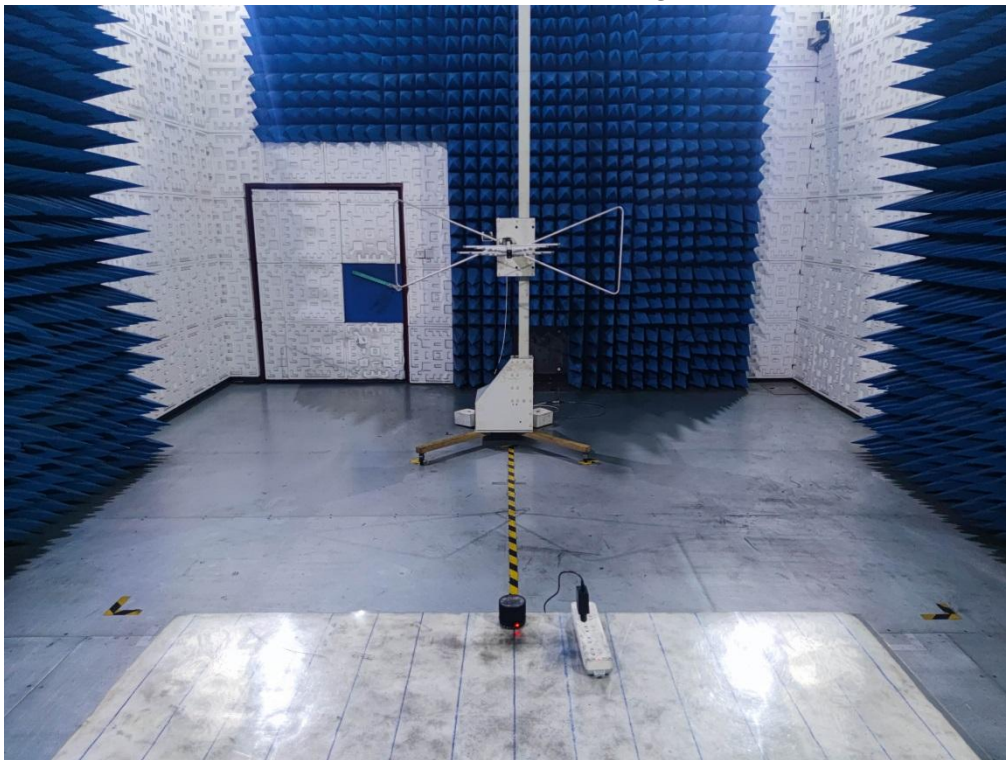
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APPENDIX I: PHOTOGRAPHS OF TEST SETUP

Sensitivity, Adjacent channel selectivity and blocking



Radiated Emission below 1GHz



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APPENDIX II: PHOTOGRAPHS OF THE EUT

Refer to the Report No.: AGC12440230905AP01

----END OF REPORT----

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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the “Company”) solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the “Clients”).
2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
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8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

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Health Test Report

Report No.: AGC12440230905EH01

PRODUCT DESIGNATION : Wireless speaker
BRAND NAME : N/A
MODEL NAME : M08726
APPLICANT : Mid Ocean Brands B.V.
DATE OF ISSUE : Oct. 10, 2023
STANDARD(S) : EN 62479:2010
: EN 50663:2017
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Oct. 10, 2023	Valid	Initial release

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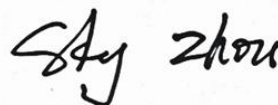
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1. GENERAL INFORMATION

Applicant	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Manufacturer	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Factory	Mid Ocean Brands B.V.
Address	7/F., King Tower, 111King Lam Street, Cheung ShaWan, Kowloon, HongKong.
Product Designation	Wireless speaker
Brand Name	N/A
Test Model	MO8726
Series Model	N/A
Declaration Difference	N/A
Date of receipt of test item	Sep. 25, 2023
Date of test	Sep. 25, 2023 to Oct. 09, 2021
Test Result	Pass

We (AGC), Attestation of Global Compliance (Shenzhen) Co., Ltd. for compliance with the requirements set forth in the European Standard EN 62479:2010. The results of testing in this report apply to the product/system which was tested only.

Prepared By



Sky Zhou
(Project Engineer) Oct. 10, 2023

Reviewed By



Calvin Liu
(Reviewer) Oct. 10, 2023

Approved By



Max Zhang
(Authorized Officer) Oct. 10, 2023

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2. TECHNICAL INFORMATION

The following data is based on the information by the manufacturer.

Product Designation	Wireless speaker
Brand Name	N/A
Test Model	MO8726
Hardware Version	V2.0
Software Version	ac696n_soundbox_sdk_v1.6.0
Operating Frequency	2.402 GHz to 2.480GHz
Bluetooth Version	V5.3
Modulation type	BR <input checked="" type="checkbox"/> GFSK_1Mbps ; EDR <input checked="" type="checkbox"/> π /4-DQPSK_2Mbps <input checked="" type="checkbox"/> 8DPSK_3Mbps BLE <input type="checkbox"/> GFSK 1Mbps <input type="checkbox"/> GFSK 2Mbps
Antenna Type	<input checked="" type="checkbox"/> PCB Antenna(Temporary RF connector provided by manufacturer) <input type="checkbox"/> Dedicated Antenna
Antenna gain	1.2dBi
Power Supply	DC 3.7V by battery or DC 5V by adapter

Note: For more details, please refer to the user's manual of the EUT.

3. TEST RESULT

The maximum output power of Bluetooth is **-2.38dBm (0.58mW which is less than 20mW)**. Please refer to ETSI EN 300 328 (V2.2.2) Test report (AGC12440230905ER02) for the result of Maximum Transmit Power, which deemed to comply with the basic restrictions without testing.

4. CONCLUSION

Remark: EUT meets the basic requirements in the standard.

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