
RF Test Report

Report No.: AGC03507190403EE04B

PRODUCT DESIGNATION : Bluetooth speaker
BRAND NAME : N/A
MODEL NAME : M09062, M08906
APPLICANT : Mid Ocean Brands B.V.
DATE OF ISSUE : Sep. 16, 2019
STANDARD(S) : EN 300 328 V2.1.1(2016-11)
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	/	Sep. 16, 2019	Valid	Extension Report

Note:

The original test report Ref.No. AGC03507190403EE04 dated Apr. 17, 2019 was modified on Sep. 16, 2019 to include the following changes:

Add the series model



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1. TEST RESULT CERTIFICATION

Applicant	Mid Ocean Brands B.V.
Address	7/F.,King Tower,111King Lam Street, Cheung Sha Wan, Kowloon, HongKong
Manufacturer	Mid Ocean Brands B.V.
Address	7/F.,King Tower,111King Lam Street, Cheung Sha Wan, Kowloon, HongKong
Factory	Mid Ocean Brands B.V.
Address	7/F.,King Tower,111King Lam Street, Cheung Sha Wan, Kowloon, HongKong
Product Designation	Bluetooth speaker
Brand Name	N/A
Test Model	MO9062
Series Model	MO8906
Difference description	All the same except for the model name
Date of test	Apr. 04, 2019 to Apr. 16, 2019
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 V2.1.1. 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.

Tested By



Calvin Liu(Liu Junchen)

Apr. 16, 2019

Reviewed By



Max Zhang(Zhang Yi)

Sep. 16, 2019

Approved By



Forrest Lei(Lei Yonggang)
Authorized Officer

Sep. 16, 2019



2. TECHNICAL INFORMATION

2.1 EUT DESCRIPTION

Operating Frequency Range(s)	2402MHz~2480MHz
Modulation type	FHSS
Modulation	GFSK, π /4-DQPSK
Bluetooth Version	V 5.0(BR/EDR)
Adaptive / non-adaptive equipment	Adaptive Equipment
The number of Hopping Frequencies	79
The maximum RF Output Power (e.i.r.p.)	3.48dBm
Hardware Version	LTW-S08U-2019.03.01
Software Version	5.0
Antenna designation	PCB antenna
Antenna gain	1.2dBi
Nominal voltages	DC 3.7V
The extreme operating conditions	Operating temperature range: -10°C~40°C

Note:

1. The above information was declared by the applicant.
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). The EUT use Frequency Hopping Spread Spectrum (FHSS) modulation.
5. Only the Bluetooth was tested according the standard requirement.
6. The EUT is a multi-radio equipment and hand-portable station according to ETSI EN 300 328 v2.1.1.
7. For more details, please refer to the User's manual of the EUT.
8. The maximum temperature of 40 is not a standard requirement and is measured according to the maximum service temperature stated by the manufacturer.

2.2 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	--	--	--	--

2.3 DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal Hopping
5	Low channel (Receiver Mode)
6	Middle channel (Receiver Mode)
7	High channel (Receiver Mode)

Note:

1. All the transmit mode would tested with each modulation (GFSK, $\pi/4$ -DQPSK).
2. All modes have been tested and the worst mode test data recording in the test report, if no any other data.



A) 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.

B) TEST STANDARDS AND RESULTS

The EUT has been tested according to ETSI EN 300 328 V2.1.1

ETSI EN 300 328 V2.1.1 (2016-11)	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
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TEST ITEMS AND THE RESULTS ARE AS BELLOW:

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

3. DETAILS OF TEST

3.1 IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Company Name:	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

3.2 LIST OF TEST EQUIPMENTS

Description	Manufacturer	Model No.	S/N	Calibration Date	Calibration Due.
Signal Analyzer	AGILENT	N9020A	MY49100060	Nov. 09, 2018	Nov. 08, 2019
Signal Generator	AGILENT	N5182A	MY50140530	Oct. 16, 2018	Oct. 15, 2019
Signal Generator	AGILENT	E8257D	MY45141029	Oct. 16, 2018	Oct. 15, 2019
USB Wideband Power Sensor	AGILENT	U2021XA	MY54110007	Oct. 16, 2018	Oct. 15, 2019
USB Wideband Power Sensor	AGILENT	U2021XA	MY54110009	Oct. 16, 2018	Oct. 15, 2019
USB Wideband Power Sensor	AGILENT	U2021XA	MY54110014	Oct. 16, 2018	Oct. 15, 2019
USB Wideband Power Sensor	AGILENT	U2021XA	MY54110012	Oct. 16, 2018	Oct. 15, 2019
USB Simultaneous Sampling Multifunction DAQ	AGILENT	U2531A	MY5211038	Oct. 16, 2018	Oct. 15, 2019
2.4 GHz Filter	MICRO-TRONICS	BRM50702	017	Mar. 01, 2019	Feb. 28, 2020
Spectrum Analyzer	AGILENT	E4440A	US41421290	July. 13, 2018	July. 12, 2019
Wideband Frequency Antenna	SCHWARZBECK	VULB9168	VULB9168-494	Mar. 12, 2019	Mar. 11, 2020
Horn Antenna	EM	EM-AH-10180	67	Mar. 01, 2019	Feb. 28, 2020
Amplifier	EM	EM30180	060552	Mar. 01, 2019	Feb. 28, 2020
Bluetooth Tester	R&S	CMW270	1201.0002K75-10052 8-Tu WIRELESSCONNECTER	Oct. 10, 2018	Oct. 09, 2019
Signal generator	R&S	SMBV100A	ST113247Z	Oct. 10, 2018	Oct. 09, 2019
Attenuator	Warriors	W13	11324	N/A	N/A
Power splitter	Mini-Circuits	ZFRSC-183-S	3122	N/A	N/A



Small environmental tester	ESPEC	SH-242	--	Mar. 01, 2019	Feb. 28, 2020
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3.3 ENVIRONMENTAL CONDITIONS

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

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

3.4 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 Radio Frequency, $U_c = \pm 1 \times 10^{-5}$
- Uncertainty of total RF power, conducted, $U_c = \pm 1.5\text{dB}$
- Uncertainty of RF power density, conducted, $U_c = \pm 3\text{dB}$
- Uncertainty of spurious emissions, conducted, $U_c = \pm 3\text{dB}$
- Uncertainty of all emissions, radiated, $U_c = \pm 6\text{dB}$
- Uncertainty of Temperature: $\pm 1^\circ\text{C}$
- Uncertainty of Humidity: $\pm 5\%$
- Uncertainty of DC and low frequency voltages: $\pm 3\%$



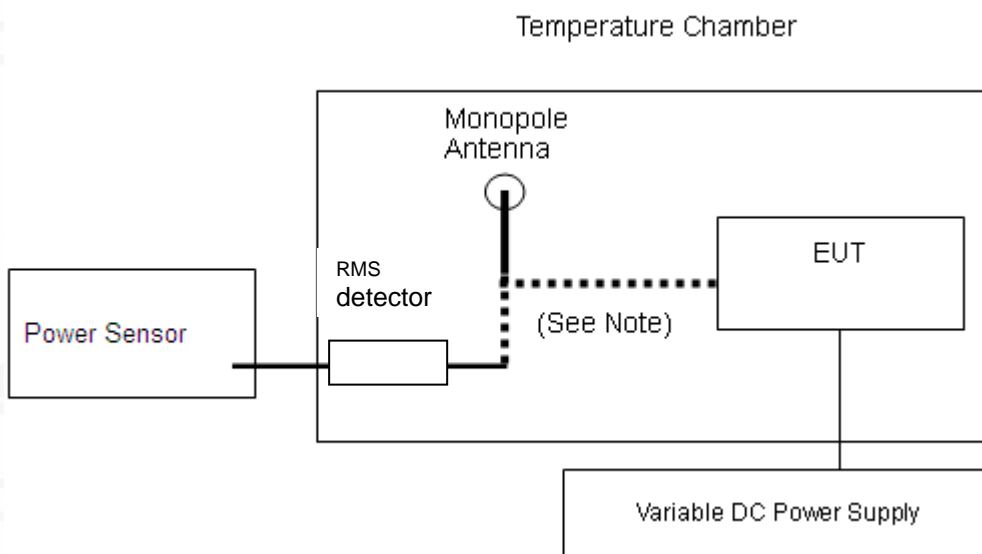
4. ETSI EN 300 328 REQUIREMENTS

4.1 RF OUTPUT POWER

EN 300 328 Clause 4.3.1.2

The maximum RF output power for adaptive Frequency Hopping equipment shall be equal to or less than 20 dBm. The maximum RF output power for non-adaptive Frequency Hopping equipment, shall be declared by the supplier. See clause 5.3.1 m). The maximum RF output power for this equipment shall be equal to or less than the value declared by the supplier. This declared value shall be equal to or less than 20 dBm.

Test Configuration



Remarks:

EUT was direct connected to test equipment through coupling device.



TEST PROCEDURE

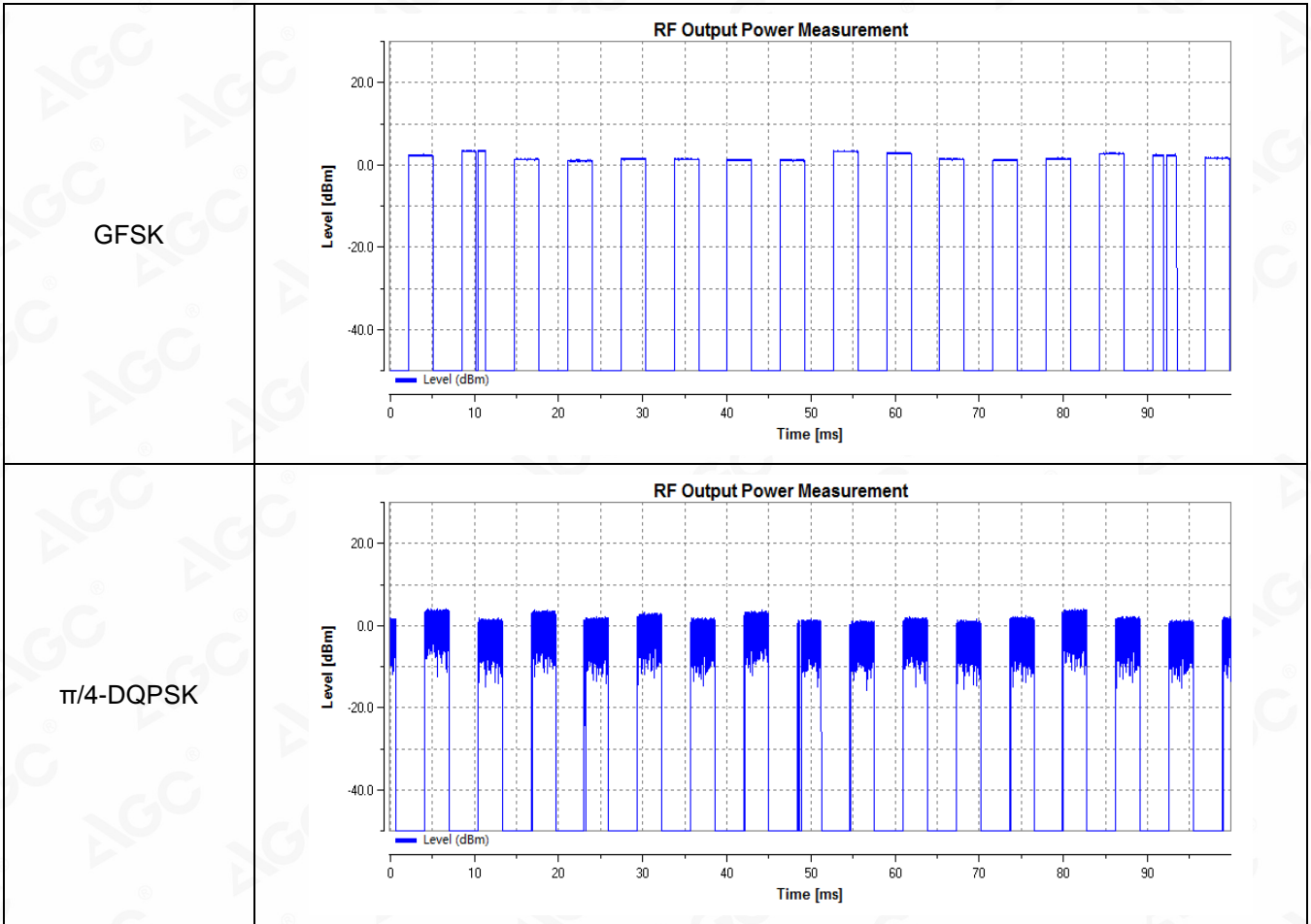
1. Please refer to ETSI EN 300 328 (V2.1.1) clause 5.4.2.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.1.1) clause 5.4.2.2.1 for the measurement method.

TEST RESULTS

Operation Mode:	Hopping mode	Test Date:	Apr. 09, 2019
Temperature:	25°C	Tested by:	Calvin
Humidity:	55 % RH		
Number of Burst	= 10		
Measurement Time	= 41.02ms		

TEST CONDITIONS	RF OUTPUT POWER MEASUREMENT RESULT (dBm)		
	Temp (25)°C	Temp (-10)°C	Temp (40)°C
FOR GFSK MOUDULATION	3.48	3.35	3.42
Π/4-DQPSK MOUDULATION	3.16	3.11	3.03
Limit	20dBm		





Note: Result=Reading+ Ant. Gain
Only the worst case recorded in the test report.

Conclusion: PASS



4.2 ACCUMULATED TRANSMIT TIME, FREQUENCY OCCUPIATION AND HOPPING SEQUENCE

ETSI EN 300 328 SUBCLAUSE 4.3.1.4

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.

TEST CONFIGURATION



TEST PROCEDURE

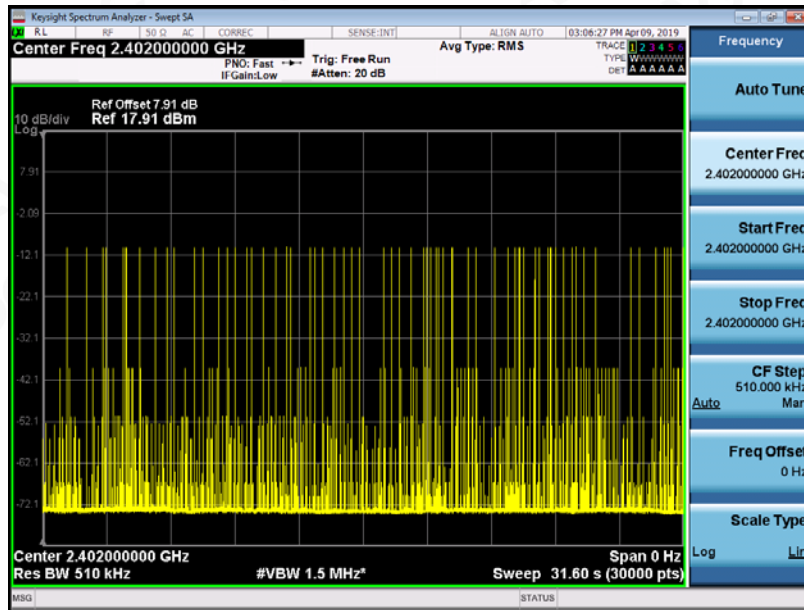
Please refer to ETSI EN300328 V2.1.1 Section 5.4.4



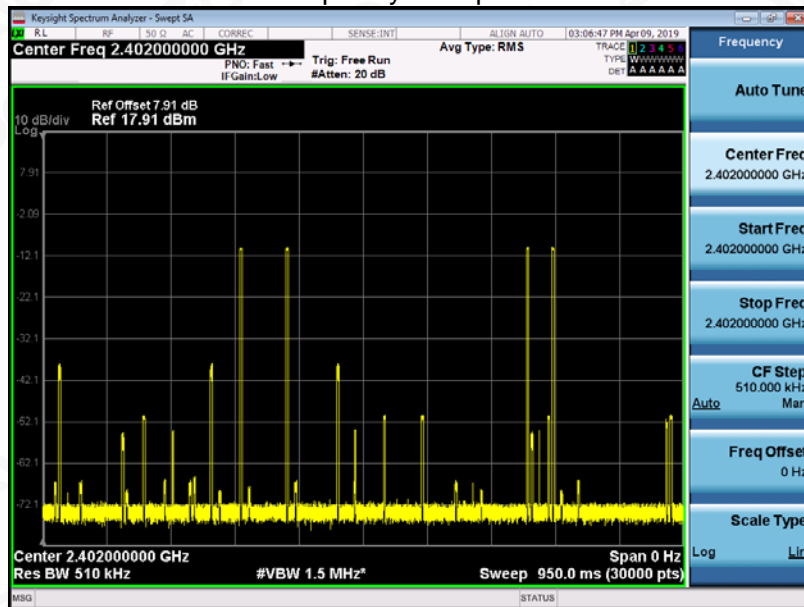
Bluetooth 2Mbps (DH5) Test Result

Channel	Accumulated transmit time (ms)	Limit (ms)	Frequency Occupation (pcs)	Limit (pcs)
Low	220.147	≤400	4	≥1

Accumulated transmit time



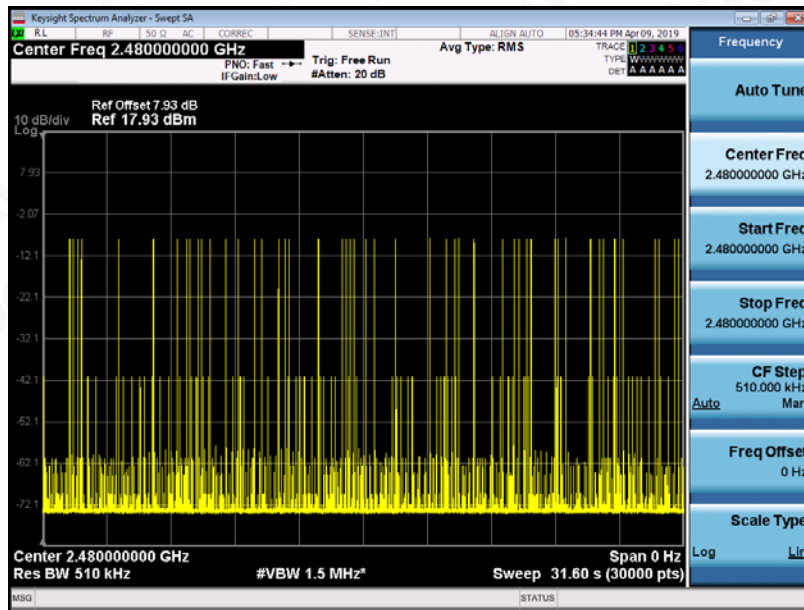
Frequency Occupation



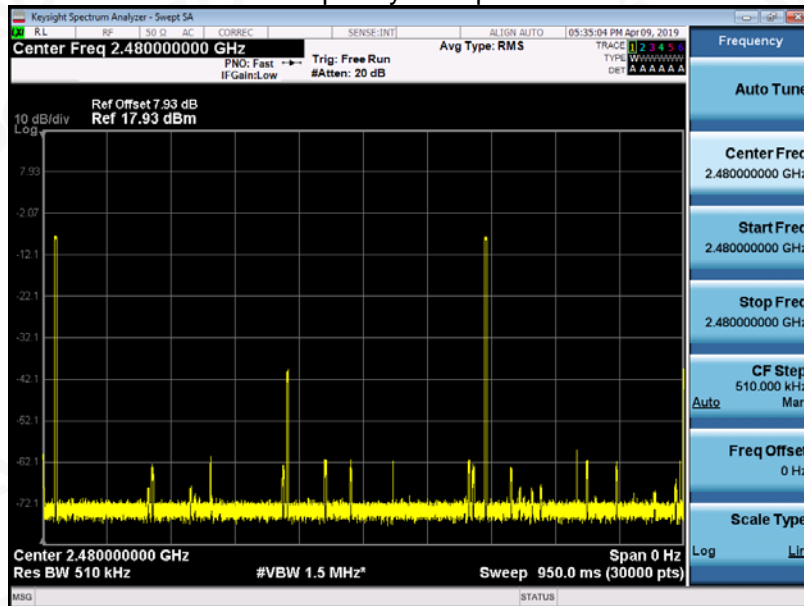
Bluetooth 2Mbps (DH5) Test Result

Channel	Accumulated transmit time (ms)	Limit (ms)	Frequency Occupation (pcs)	Limit (pcs)
High	176.960	≤400	2	≥1

Accumulated transmit time



Frequency Occupation



- 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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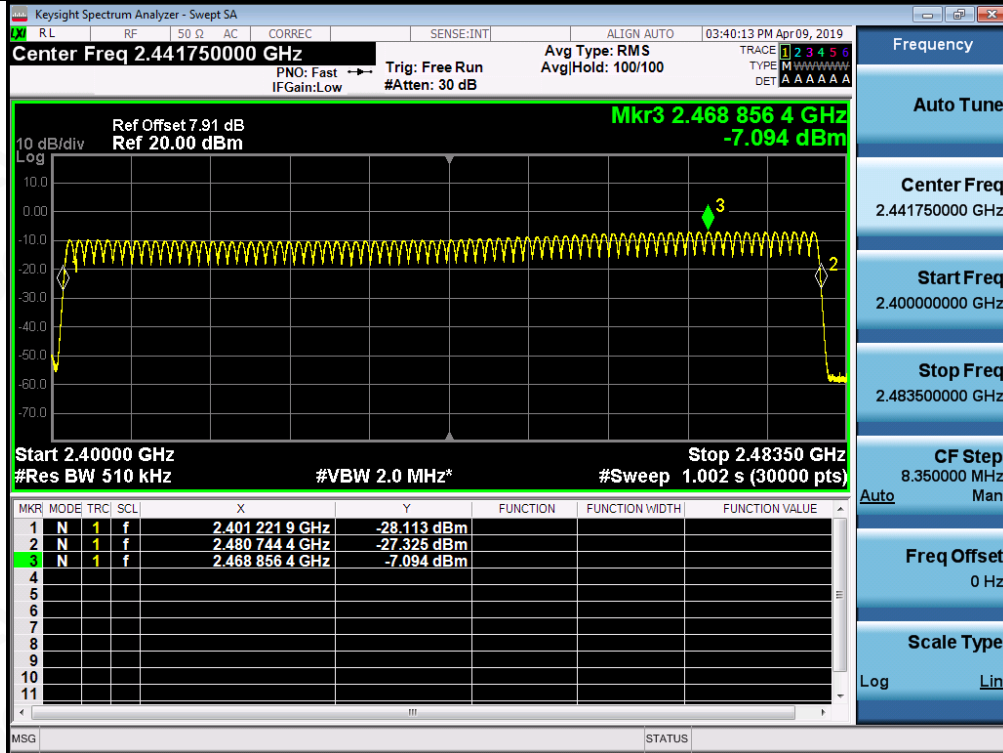
TEST RESULT FOR HOPPING SEQUENCE

Channel	Frequency (GHz)	Channel	Frequency (GHz)
01	2.40202	42	2.44302
02	2.40302	43	2.44402
03	2.40402	44	2.44502
04	2.40502	45	2.44602
05	2.40602	46	2.44702
06	2.40702	47	2.44802
07	2.40802	48	2.44902
08	2.40902	49	2.45002
09	2.41002	50	2.45102
10	2.41102	51	2.45202
11	2.41202	52	2.45302
12	2.41302	53	2.45402
13	2.41402	54	2.45502
14	2.41502	55	2.45602
15	2.41602	56	2.45702
16	2.41702	57	2.45802
17	2.41802	58	2.45902
18	2.41902	59	2.46002
19	2.42002	60	2.46102
20	2.42102	61	2.46202
21	2.42202	62	2.46302
22	2.42302	63	2.46402
23	2.42402	64	2.46502
24	2.42002	65	2.46602
25	2.42602	66	2.46702
26	2.42702	67	2.46802
27	2.42802	68	2.46902
28	2.42902	69	2.47002
29	2.43002	70	2.47102
30	2.43102	71	2.47202
31	2.43202	72	2.47302
32	2.43302	73	2.47402
33	2.43402	74	2.47502
34	2.43502	75	2.47602
35	2.43602	76	2.47702
36	2.43702	77	2.47802
37	2.43802	78	2.47902
38	2.43902	79	2.48002
39	2.44002		
40	2.44102		
41	2.44202		



Hopping Channel Test Plot

Hopping Sequence (MHz)	79.52
Hopping Number	79



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4.3 HOPPING FREQUENCY SEPARATION

ETSI EN 300 328 SUBCLAUSE 4.3.1.5

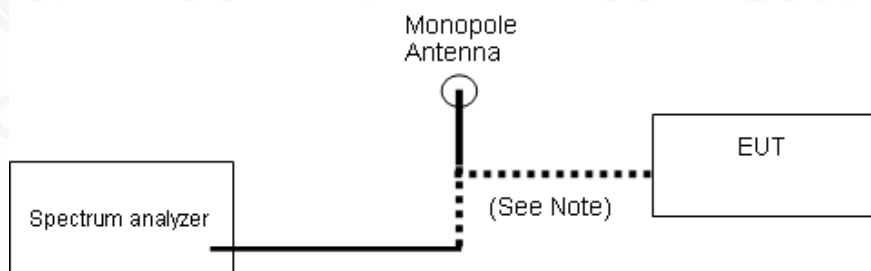
For Non-adaptive frequency hopping systems:

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.

CONFIGURATION



TEST PROCEDURE

Test Procedure please refer to clause 5.4.5.2.1

TEST RESULT

Hopping Frequency Separation 1.000



Note: The modulation used during test is $\pi/4$ -DQPSK and this is the worst case.

Conclusion: PASS



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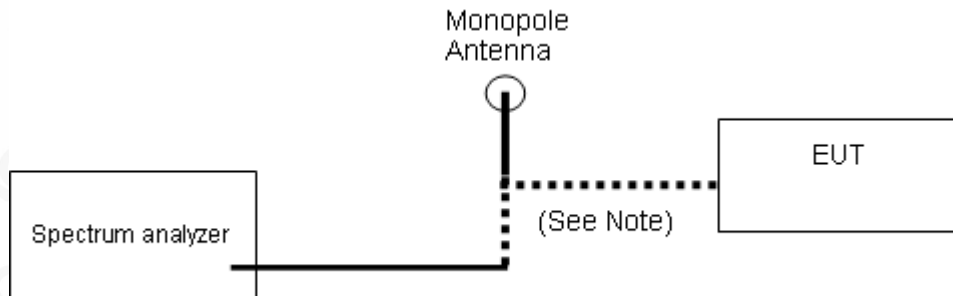
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4.4 OCCUPIED CHANNEL BANDWIDTH

EN300328 4.3.1.4 OCCUPIED CHANNEL BANDWIDTH

The Occupied Channel Bandwidth is the bandwidth that contains 99 % of the power of the signal.

CONFIGURATION



TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V2.1.1) clause 5.4.7.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.1.1) clause 5.4.7.2 the measurement method.
3. The Test equipment information as following
 Centre frequency: 2402MHz,2480MHz
 Resolution bandwidth: 20kHz
 Video bandwidth: 62kHz
 Detector mode :RMS
 Trace mode :Max Hold

TEST RESULTS

Modulation	Channel	OBW [MHz]	FL@OBW	FH@OBW	Verdict
GFSK	LCH	0.86419	2401.526	---	PASS
GFSK	HCH	0.86387	---	2480.389	PASS
$\pi/4$ DQPSK	LCH	1.2042	2401.360	---	PASS
$\pi/4$ DQPSK	HCH	1.2060	---	2480.566	PASS



Graphs

GFSK/LCH



GFSK/HCH



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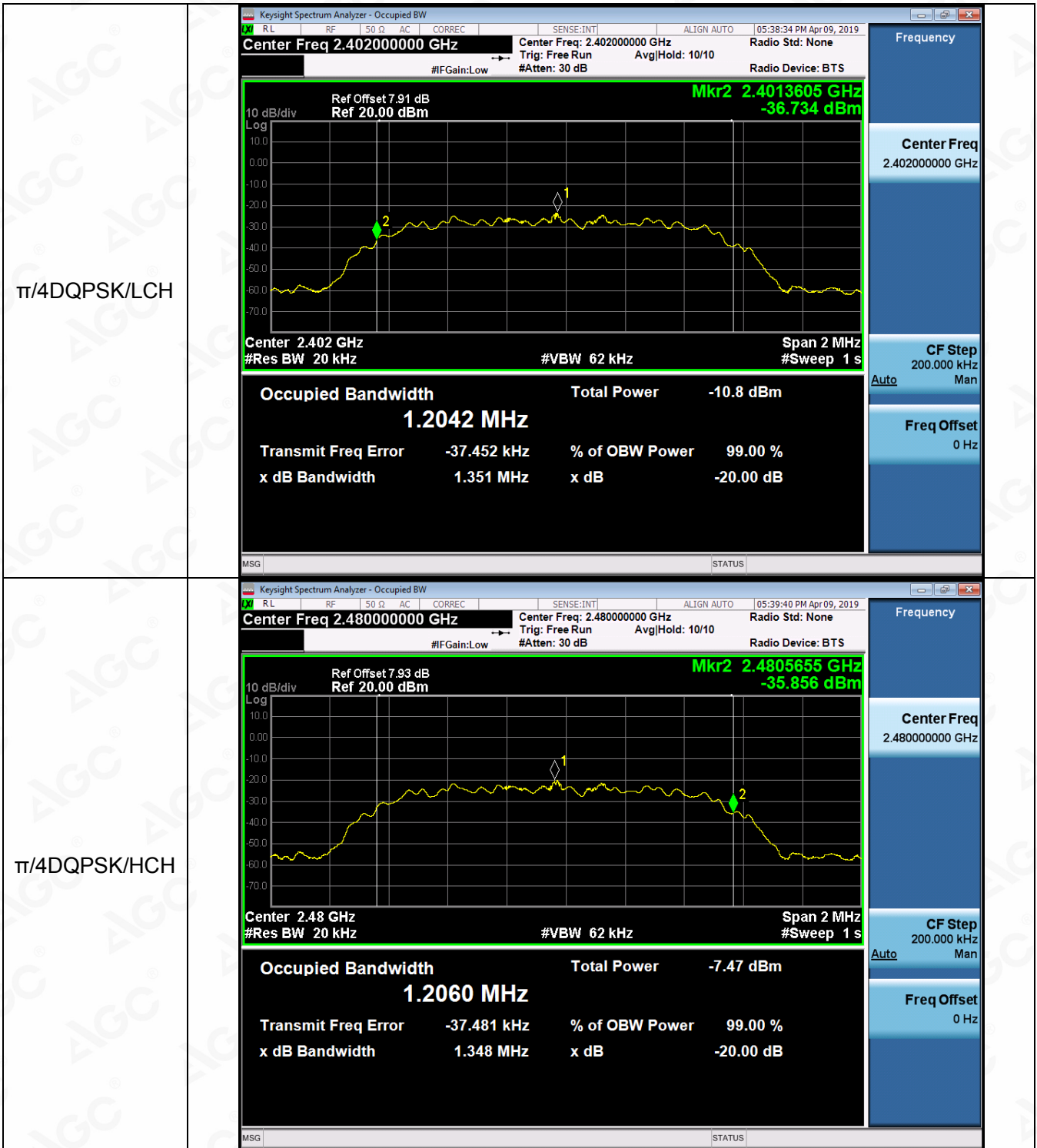
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4.5 TRANSMITTER UNWANTED EMISSIONS IN THE OUT OF BAND DOMAIN

EN300328 4.3.1.9 TRANSMITTER UNWANTED EMISSIONS IN THE OUT OF BAND DOMAIN

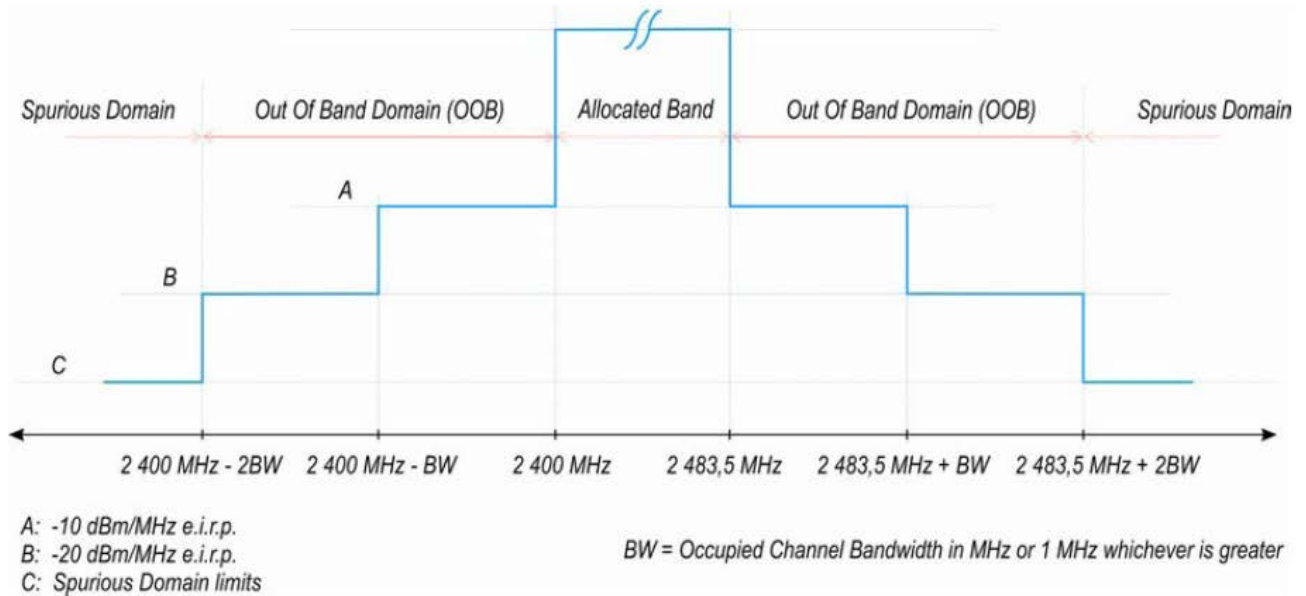
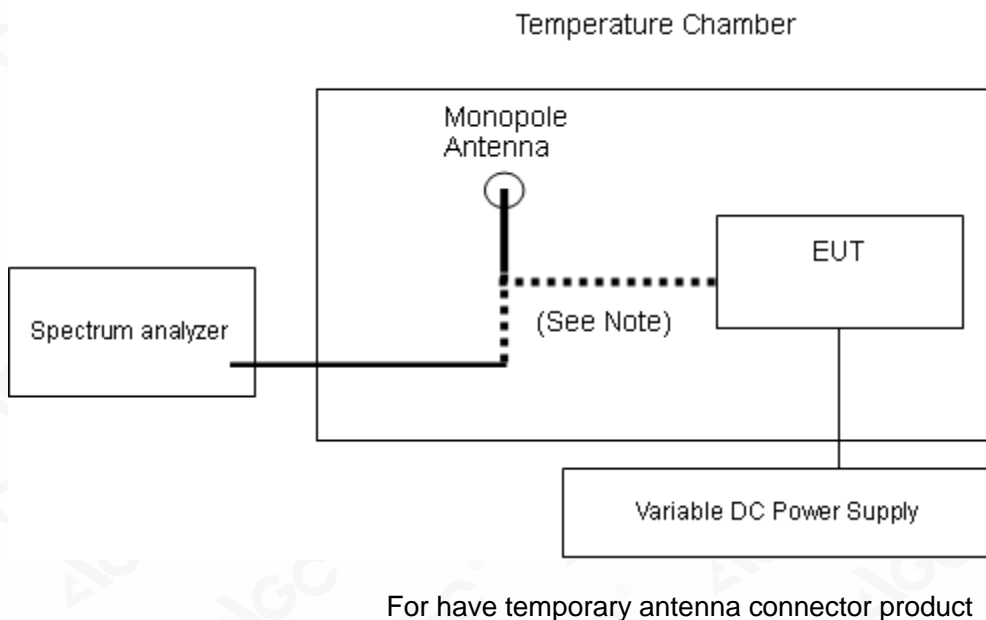


Figure 1: Transmit mask

TEST CONFIGURATION



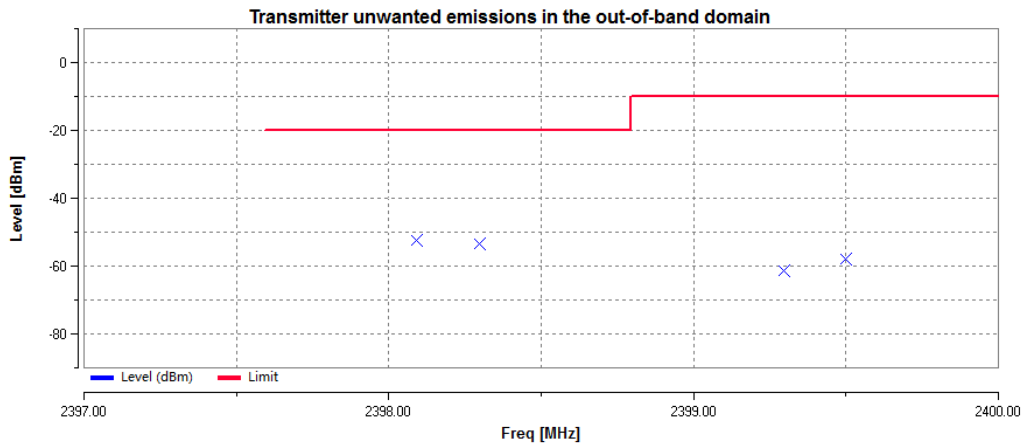
TEST PROCEDURE

Test Procedure Please refer to ETSI EN 300 328 (V2.1.1) Clause 5.4.8.2.1

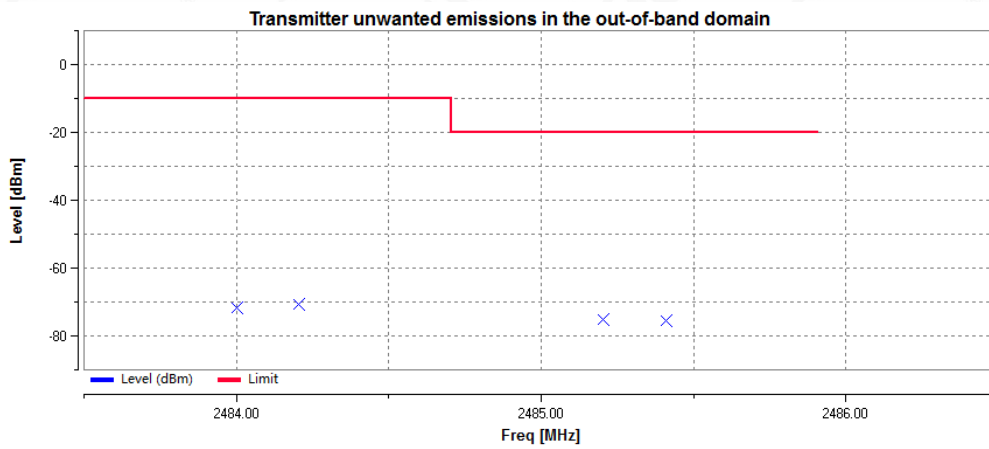
TEST RESULT

TEST CONDITIONS	Hopping mode		
	Temp (25)°C	Temp (-10)°C	Temp (40)°C
GFSK MOUDULATION	PASS	PASS	PASS
Π/4-DQPSK MOUDULATION	PASS	PASS	PASS

Π/4-DQPSK -LOW BAND



Π/4-DQPSK -HIGH BAND



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

Conclusion: PASS



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4.6 TRANSMITTER SPURIOUS EMISSIONS

Spurious emissions are emissions outside the frequency range(s) of the equipment as defined in Clause 4.3.1.10.

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the out-of-band domain as indicated in figure 1 when the equipment is in Transmit mode.

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

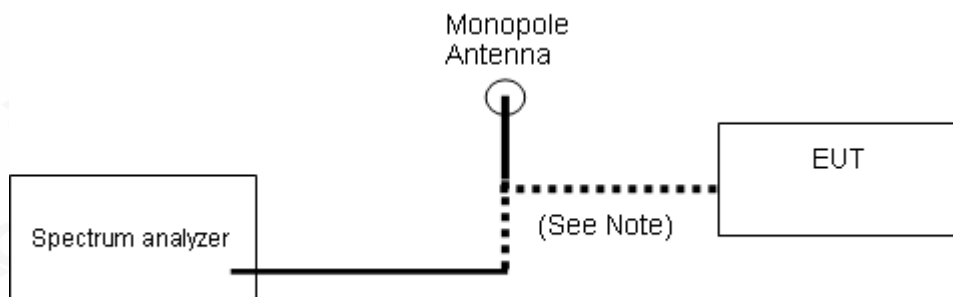
Frequency Range	Maximum Power e.r.p(<=1GHz)/e.i.r.p(>1GHz)	Bandwidth
30MHZ to 47MHZ	-36dBm	100kHz
47MHZ to 74MHZ	-54dBm	100kHz
74MHZ to 87.5MHZ	-36dBm	100kHz
87.5MHZ to 118MHZ	-54dBm	100kHz
118MHZ to 174MHZ	-36dBm	100kHz
174 MHZ to 230MHZ	-54dBm	100kHz
230 MHZ to 470MHZ	-36dBm	100kHz
470 MHZ to 862MHZ	-54dBm	100kHz
862 MHZ to 1GHZ	-36dBm	100kHz
1 GHZ to 12.75GHZ	-30dBm	1MHz



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.

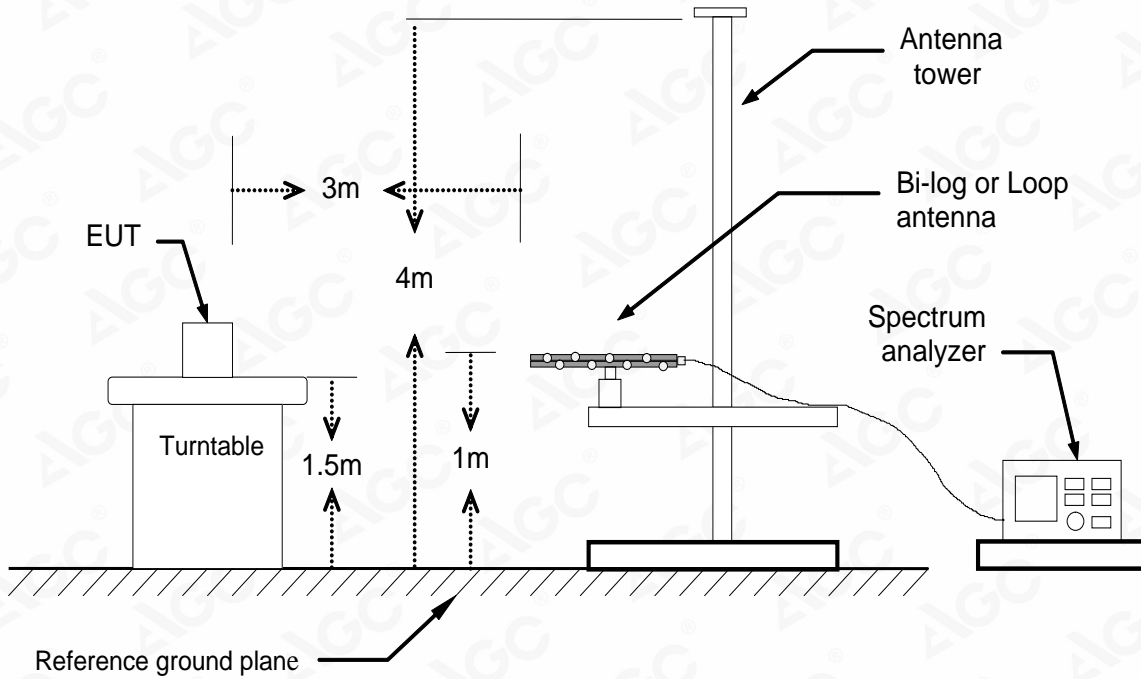
Test Configuration



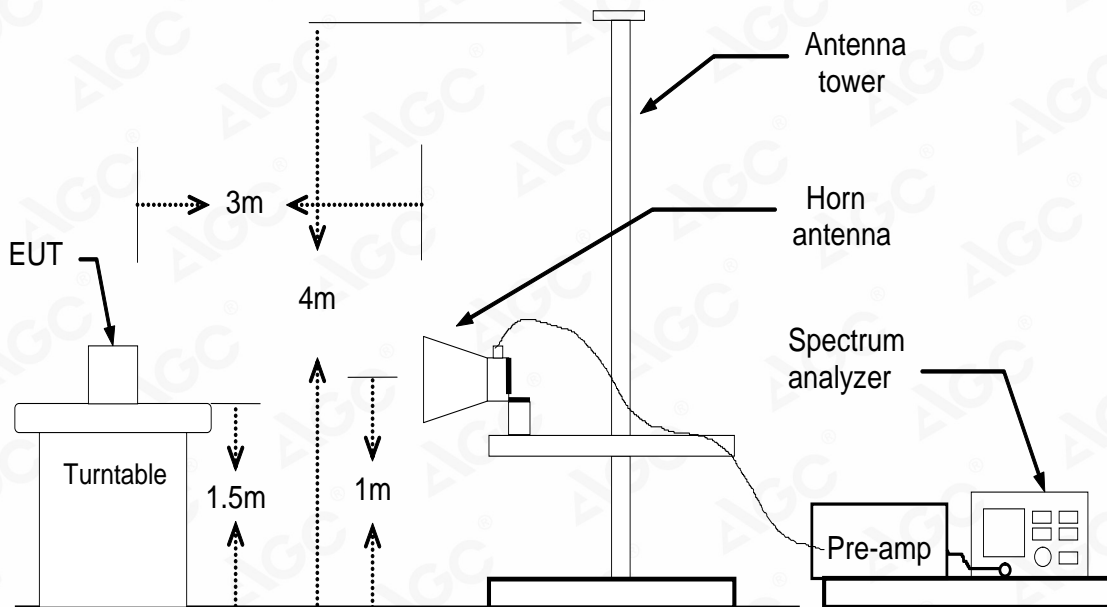
Conducted Method



Below 1GHz



Above 1GHz

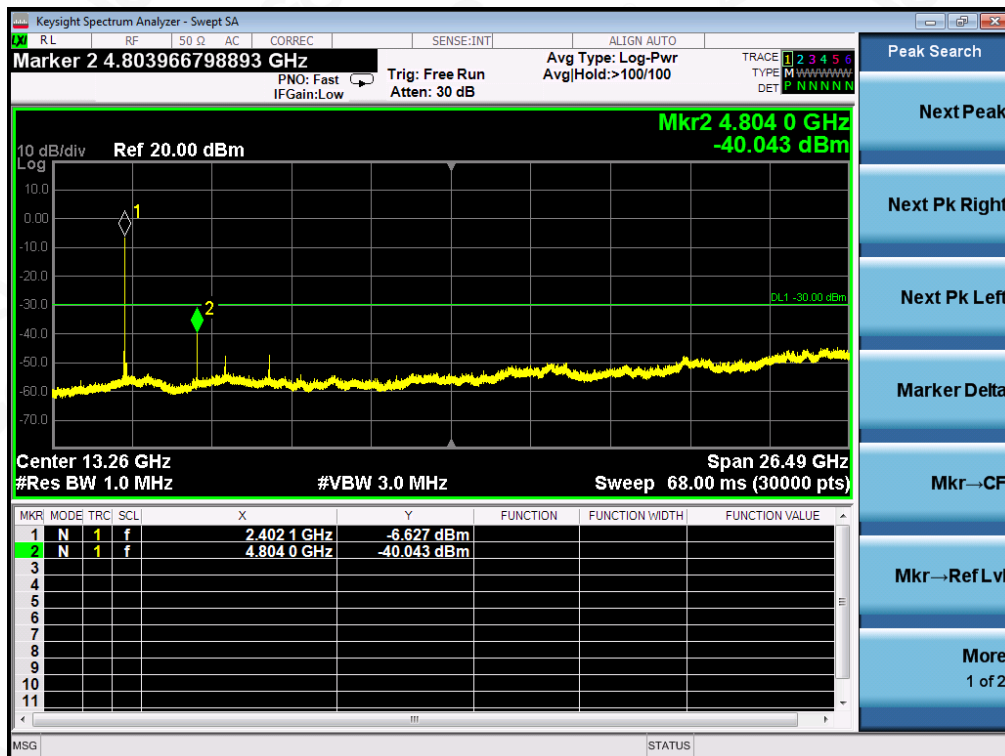
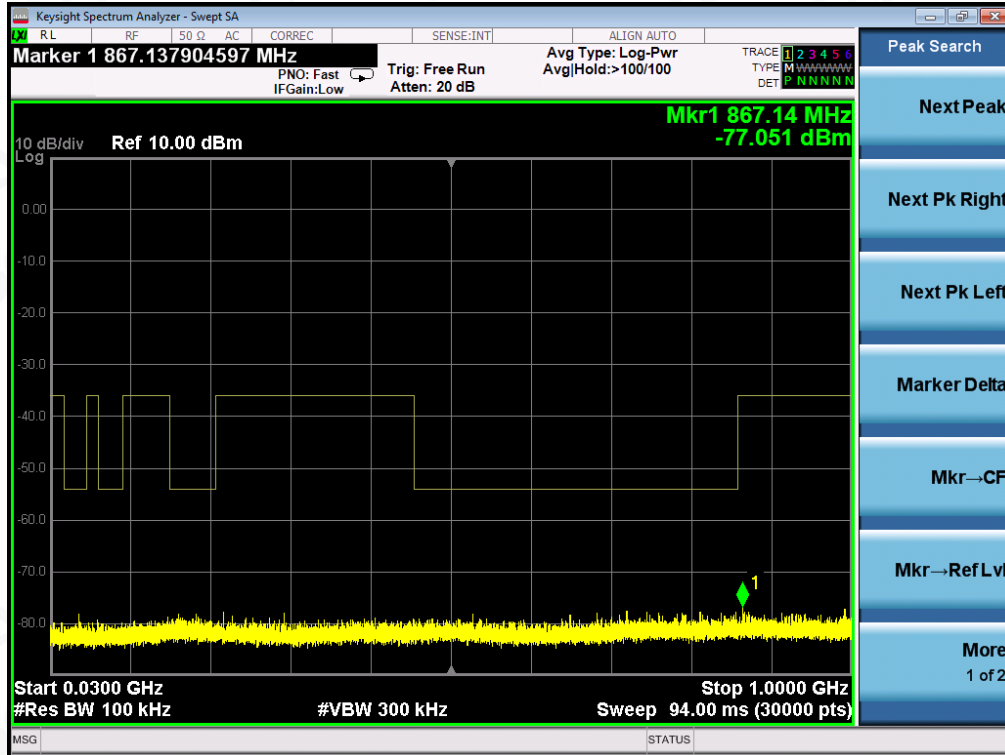


Radiated Method



CONDUCTED RESULTS:

(Worst Case: Low channel, 2Mbps)



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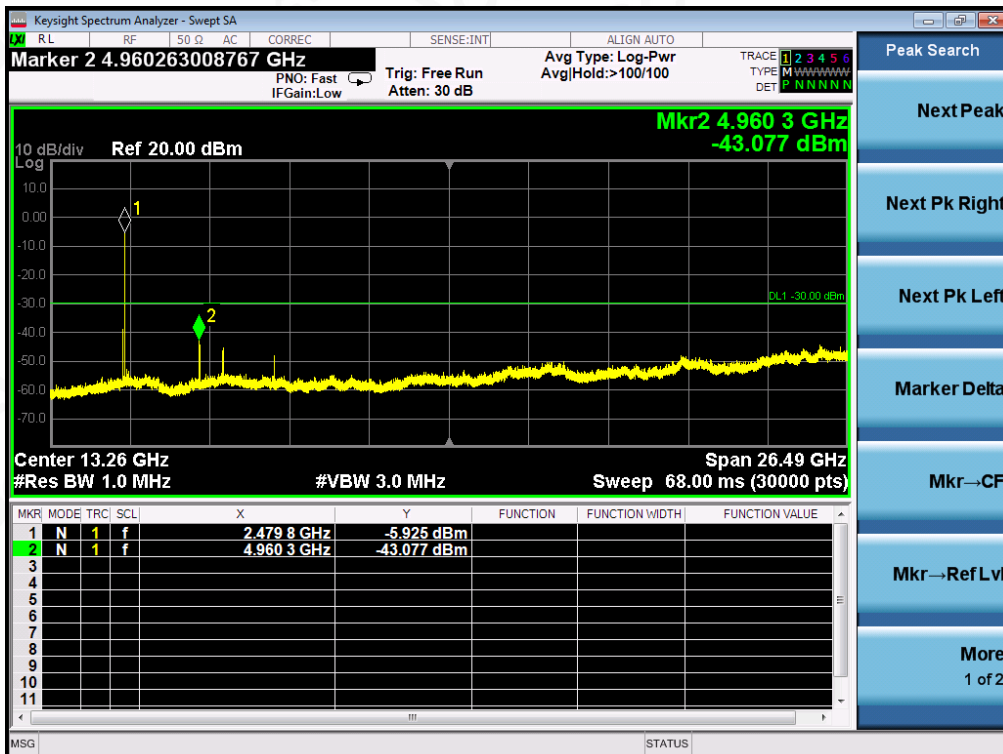
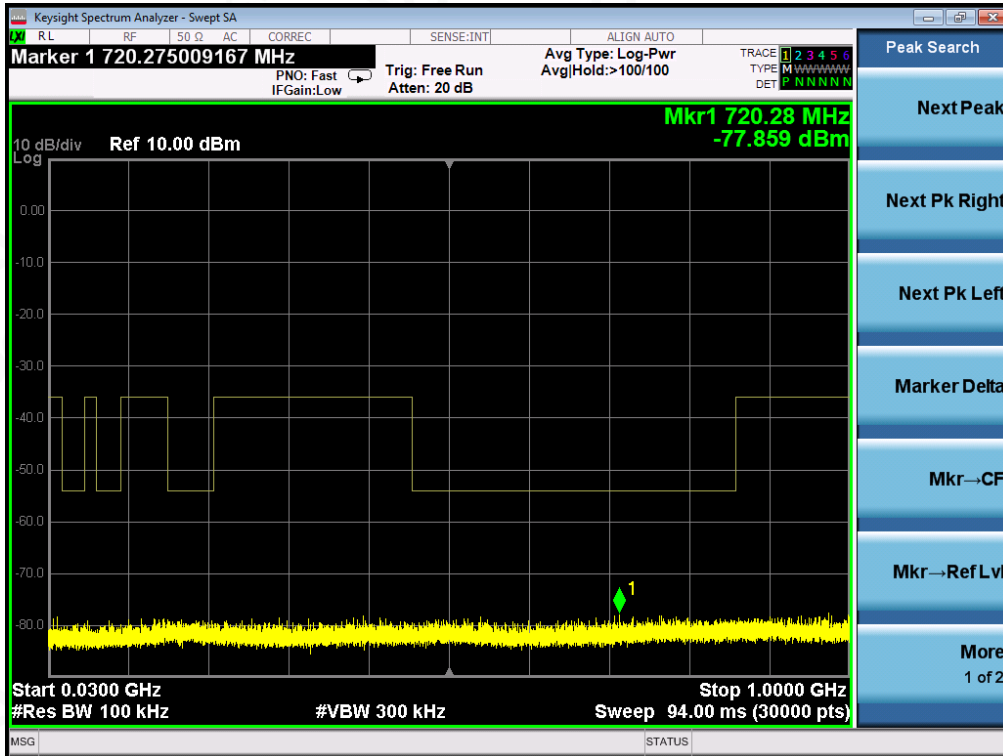
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Tel: +86-755 2523 4088

E-mail: agc@agc-cert.com

Service Hotline: 400 089 2118

(Worst Case: High channel, 2Mbps)



Note: 1. All the modes had been test but only the worst data record in the report.
2. The 2.4G fundamental frequency is not considered to compare with the limit.

**RADIATED RESULTS:
(Worst Case: Low channel, 2Mbps)**

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)
84.81	30.33	V	-61.13	0.48	0.54	-61.07	-36.00	25.07
130.51	30.57	V	-58.90	0.49	0.10	-59.29	-36.00	23.29
240.14	31.06	V	-67.53	0.52	6.60	-61.45	-36.00	25.45
326.12	30.30	V	-66.76	0.53	6.10	-61.19	-36.00	25.19
334.79	30.97	V	-64.73	0.53	5.94	-59.32	-36.00	23.32
827.85	32.00	V	-66.43	0.66	6.45	-60.63	-54.00	6.63
Other(30-1000)	--	V	--	--	--	--	-36.00/-54.00	--
83.55	32.34	H	-57.03	0.48	0.38	-57.13	-36.00	21.13
131.33	30.71	H	-59.85	0.49	0.08	-60.26	-36.00	24.26
243.26	29.78	H	-67.97	0.52	6.78	-61.71	-36.00	25.71
325.75	31.01	H	-64.70	0.53	6.10	-59.13	-36.00	23.13
735.21	31.33	H	-67.44	0.59	6.60	-61.43	-54.00	7.43
827.44	30.85	H	-67.40	0.66	6.45	-61.61	-54.00	7.61
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)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
4804.20	45.58	V	-48.91	2.64	9.30	-42.24	-30.00	12.24
7328.87	31.36	V	-57.16	3.11	11.45	-48.82	-30.00	18.82
Other(1000-12750)	--	V	--	--	--	--	-30.00	--
4804.07	41.21	H	-48.88	2.64	9.30	-42.21	-30.00	12.21
7247.15	30.79	H	-58.58	3.13	11.34	-50.38	-30.00	20.38
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.



(Worst Case: High channel, 2Mbps)

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)
93.17	30.47	V	-60.54	0.48	1.64	-59.38	-54.00	5.38
145.57	30.28	V	-59.67	0.49	0.30	-59.86	-36.00	23.86
243.27	30.90	V	-65.08	0.52	6.78	-58.82	-36.00	22.82
344.09	30.41	V	-64.46	0.53	5.62	-59.37	-36.00	23.37
385.63	30.84	V	-64.99	0.54	6.45	-59.08	-36.00	23.08
864.71	31.67	V	-65.88	0.68	5.72	-60.85	-36.00	24.85
Other(30-1000)	--	V	--	--	--	--	-36.00/-54.00	--
92.66	31.95	H	-61.05	0.48	1.56	-59.97	-54.00	5.97
146.12	30.66	H	-62.06	0.49	0.38	-62.17	-36.00	26.17
253.47	30.08	H	-65.61	0.52	7.22	-58.91	-36.00	22.91
335.89	30.92	H	-64.92	0.53	5.90	-59.55	-36.00	23.55
647.69	30.83	H	-68.80	0.59	7.17	-62.22	-54.00	8.22
720.08	30.53	H	-67.94	0.58	6.30	-62.22	-54.00	8.22
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)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
4960.05	45.81	V	-49.49	2.75	9.62	-42.62	-30.00	12.62
7328.73	31.42	V	-66.63	3.11	11.45	-58.29	-30.00	28.29
Other(1000-12750)	--	V	--	--	--	--	-30.00	--
4960.36	41.25	H	-47.77	2.75	9.62	-40.90	-30.00	10.90
7246.32	30.90	H	-66.54	3.13	11.34	-58.33	-30.00	28.33
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.

Conclusion: PASS



4.7 RECEIVER SPURIOUS EMISSIONS

ETSI EN300328 SUBCLAUSE 4.3.1.11

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 5.

Table 5: Spurious emission limits for receivers

Frequency range	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 Configuration

Same as 4.6.

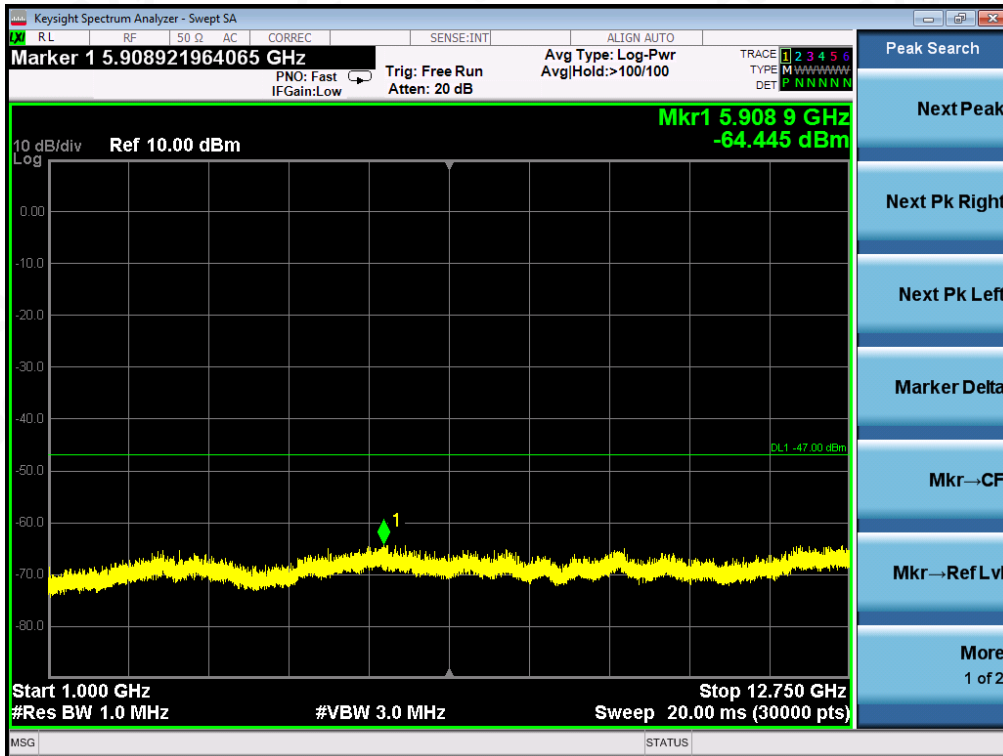
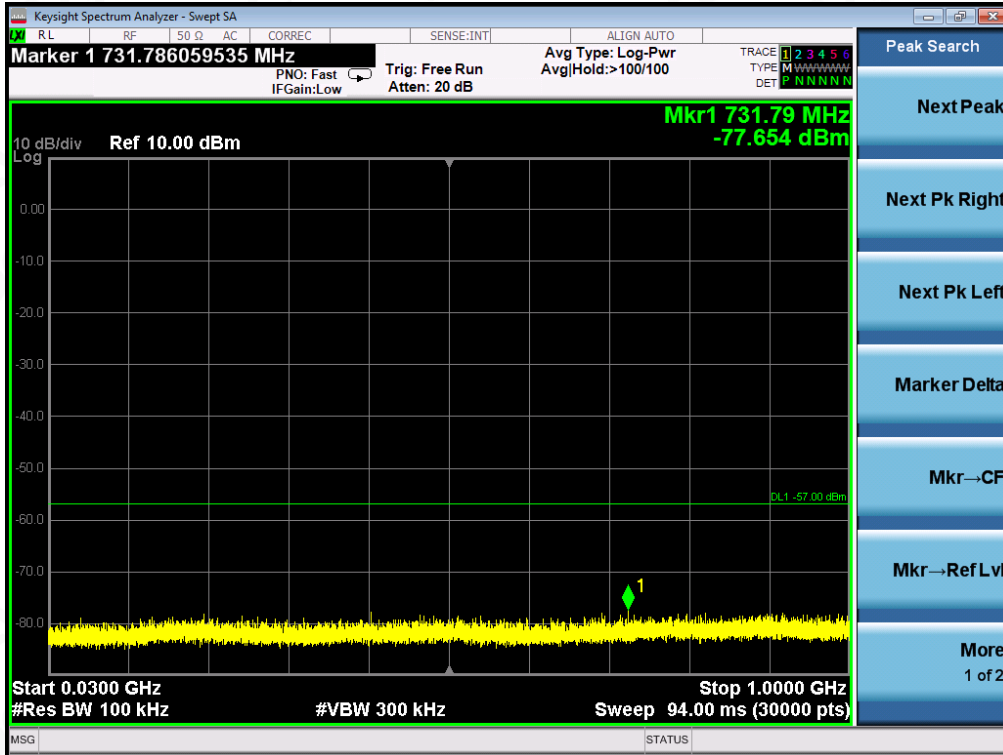
TEST PROCEDURE

- 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..



TEST RESULTS FOR CONDUCTED METHOD

RECEIVER MODE (Worst Case: Low channel, 2Mbps)



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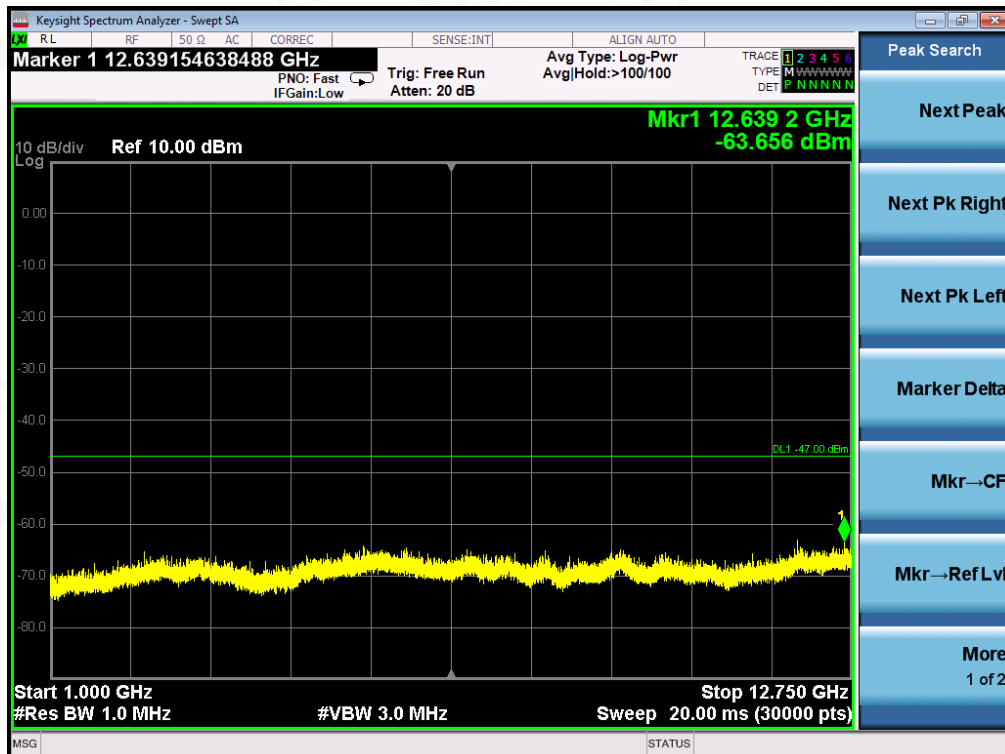
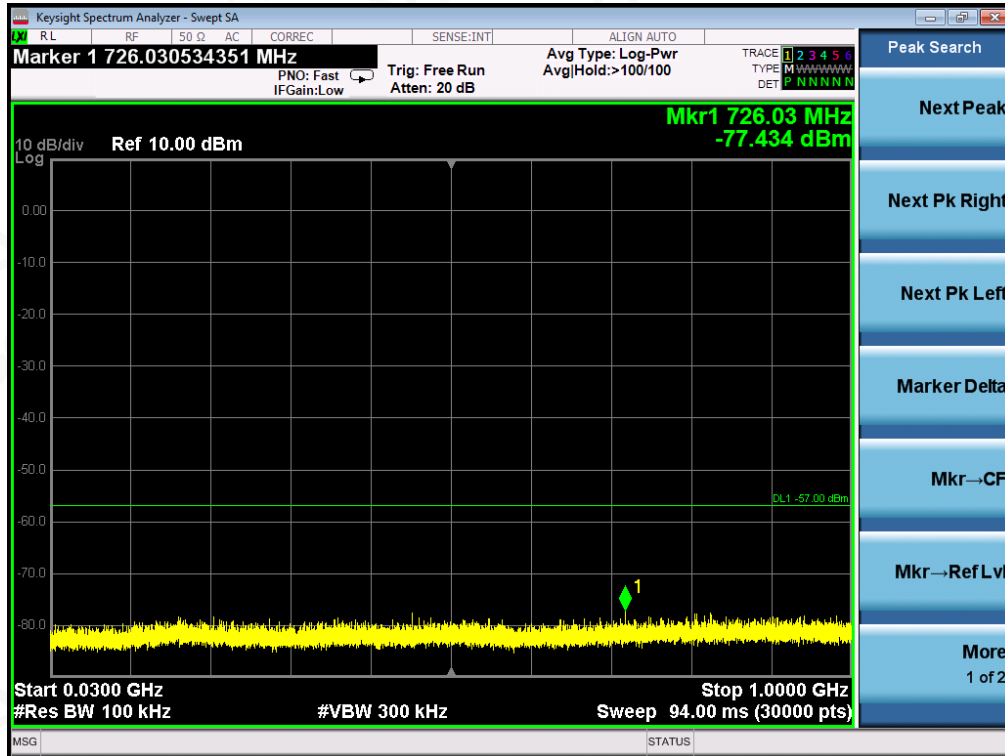
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(Worst Case: High channel, 2Mbps)



Note: 1. All the modes had been test but only the worst data record in the report.



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**TEST RESULTS FOR RADIATED METHOD
(Worst Case: Low channel, 2Mbps)**

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)
114.46	31.13	V	-72.12	0.48	1.40	-71.20	-57.00	14.20
177.11	31.85	V	-73.65	0.51	3.06	-71.10	-57.00	14.10
229.76	30.06	V	-77.30	0.52	6.84	-70.98	-57.00	13.98
496.02	30.37	V	-77.63	0.56	7.04	-71.15	-57.00	14.15
664.60	30.48	V	-77.12	0.59	6.98	-70.73	-57.00	13.73
879.94	31.01	V	-75.93	0.69	5.87	-70.75	-57.00	13.75
Other(30-1000)	--	V	--	--	--	--	-57.00	--
84.11	32.24	H	-71.13	0.48	0.54	-71.07	-57.00	14.07
110.17	30.43	H	-72.07	0.48	1.40	-71.15	-57.00	14.15
218.84	31.11	H	-77.82	0.52	7.46	-70.88	-57.00	13.88
485.38	30.93	H	-77.23	0.56	7.00	-70.79	-57.00	13.79
554.38	31.12	H	-80.46	0.57	6.78	-74.25	-57.00	17.25
635.13	30.62	H	-78.71	0.58	7.20	-72.09	-57.00	15.09
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)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
4948.04	29.19	V	-70.67	2.74	9.58	-63.83	-47.00	16.83
--	--	V	--	--	--	--	--	--
Other(1000-12750)	--	V	--	--	--	--	-47.00	--
4952.63	30.02	H	-69.22	2.74	9.60	-62.37	-47.00	15.37
--	--	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.



(Worst Case: High channel, 2Mbps)

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)
85.15	31.66	V	-70.56	0.48	0.70	-70.34	-57.00	13.34
154.53	31.95	V	-70.57	0.50	0.70	-70.37	-57.00	13.37
248.53	32.02	V	-76.16	0.52	7.02	-69.66	-57.00	12.66
394.36	30.94	V	-76.16	0.54	6.48	-70.22	-57.00	13.22
483.90	29.37	V	-76.90	0.56	6.96	-70.50	-57.00	13.50
894.93	30.43	V	-75.61	0.70	6.18	-70.13	-57.00	13.13
Other(30-1000)	--	V	--	--	--	--	-57.00	--
110.01	30.66	H	-70.55	0.48	1.40	-69.63	-57.00	12.63
187.91	31.26	H	-74.76	0.51	4.62	-70.65	-57.00	13.65
225.43	31.28	H	-79.25	0.52	7.80	-71.97	-57.00	14.97
472.54	30.74	H	-76.23	0.55	6.82	-69.96	-57.00	12.96
502.09	31.06	H	-77.18	0.56	6.94	-70.80	-57.00	13.80
725.37	31.03	H	-76.71	0.59	6.55	-70.75	-57.00	13.75
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)	Polarization	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
4979.99	29.85	V	-70.04	2.76	9.64	-63.16	-47.00	16.16
--	--	V	--	--	--	--	--	--
Other(1000-12750)	--	V	--	--	--	--	-47.00	--
4914.15	30.44	H	-68.50	2.72	9.52	-61.70	-47.00	14.70
--	--	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.

Conclusion: PASS



4.8. RECEIVER BLOCKING

Receiver Blocking parameters for Receiver Category 2 equipment

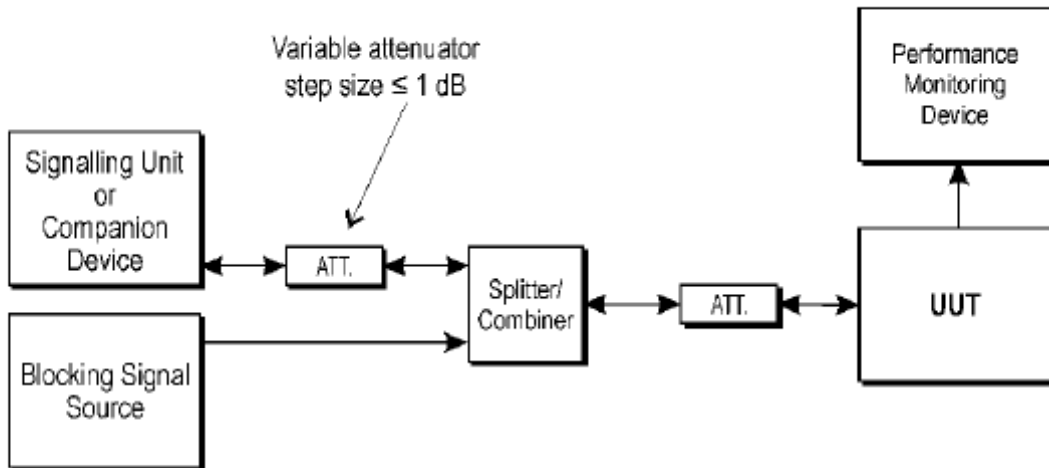
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
Pmin + 6 dB	2 380 2 503,5	-57	CW
Pmin + 6 dB	2 300 2 583.5	-47	CW

NOTE 1: Pmin is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in EN 300 328 V2.1.1 clause 4.3.2.11.3 in the absence of any blocking signal.

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



TEST CONFIGURATION



Test Set-up for receiver blocking

TEST PROCEDURE

- 1) The UUT shall be set to the lowest operating channel.
- 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 shown in the Test Set-up. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria 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 the table corresponding to the receiver category and type of equipment.
- 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.



TEST RESULT

Receiver Category 2 equipment(GFSK Hopping mode)

Wanted Signal Power (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Test Result (PER)	Limit (PER)	Result
P ₍₋₈₂₎ +6dB	2380	-57	2.05%	10%	Pass
P ₍₋₈₂₎ +6dB	2503.5	-57	1.15%	10%	Pass
P ₍₋₈₂₎ +6dB	2300	-47	2.37%	10%	Pass
P ₍₋₈₂₎ +6dB	2583.5	-47	0.82%	10%	Pass

Receiver Category 2 equipment ($\pi/4$ -DQPSK Hopping mode)

Wanted Signal Power (MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Test Result (PER)	Limit (PER)	Result
P ₍₋₈₂₎ +6dB	2380	-57	1.39%	10%	Pass
P ₍₋₈₂₎ +6dB	2503.5	-57	2.34%	10%	Pass
P ₍₋₈₂₎ +6dB	2300	-47	1.52%	10%	Pass
P ₍₋₈₂₎ +6dB	2583.5	-47	2.64%	10%	Pass

Receiver Category 2 equipment (8-DPSK Hopping mode)

Wanted Signal Power (MHz)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Test Result (PER)	Limit (PER)	Result
P ₍₋₈₂₎ +6dB	2380	-57	2.47%	10%	Pass
P ₍₋₈₂₎ +6dB	2503.5	-57	0.66%	10%	Pass
P ₍₋₈₂₎ +6dB	2300	-47	1.81%	10%	Pass
P ₍₋₈₂₎ +6dB	2583.5	-47	1.67%	10%	Pass



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED SPURIOUS EMISSION TEST SETUP



RADIATED SPURIOUS EMISSION-ABOVE 1G TEST SETUP



----END OF REPORT----



Health Test Report

Report No.: AGC03507190403EH02B

PRODUCT DESIGNATION : Bluetooth speaker
BRAND NAME : N/A
MODEL NAME : M09062, M08906
APPLICANT : Mid Ocean Brands B.V.
DATE OF ISSUE : Sep. 16, 2019
STANDARD(S) : EN 62479:2010
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

CAUTION:

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Sep. 16, 2019	Valid	Extension Report

Note:

The original test report Ref.No. AGC03507190403EH02 dated Apr. 17, 2019 was modified on Sep. 16, 2019 to include the following changes:

Add the series model



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1. TEST REPORT CERTIFICATION	4
2. GENERAL INFORMATION	5
2.1. DESCRIPTION OF EUT	5
3. TEST RESULT	6



1. TEST REPORT CERTIFICATION

Applicant	Mid Ocean Brands B.V.
Address	7/F.,King Tower,111King Lam Street, Cheung Sha Wan, Kowloon, HongKong
Manufacturer	Mid Ocean Brands B.V.
Address	7/F.,King Tower,111King Lam Street, Cheung Sha Wan, Kowloon, HongKong
Factory	Mid Ocean Brands B.V.
Address	7/F.,King Tower,111King Lam Street, Cheung Sha Wan, Kowloon, HongKong
Product Designation	Bluetooth speaker
Brand Name	N/A
Test Model	MO9062
Series Model	MO8906
Difference description	All the same except for the model name
Date of test	Apr. 04, 2019 to Apr. 16, 2019
Deviation	None
Condition of Test Sample	Normal

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

Tested By



Calvin Liu(Liu Junchen)

Apr. 16, 2019

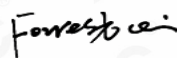
Reviewed By



Max Zhang(Zhang Yi)

Sep. 16, 2019

Approved By



Forrest Lei(Lei Yonggang)
Authorized Officer

Sep. 16, 2019



2. GENERAL INFORMATION

2.1. DESCRIPTION OF EUT

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

Operating Frequency	2.402 GHz~2.480GHz
Bluetooth Version	V5.0 (BR/EDR)
Modulation	GFSK, $\pi/4$ -DQPSK
Hardware Version	LTW-S08U-2019.03.01
Software Version	5.0
Antenna Type	PCB Antenna
Number of channels	79 for BR/EDR
Antenna Gain	1.2dBi
Power Supply	DC 3.7V by battery

Note:

1. The EUT provides Bluetooth wireless interface operating at 2.4G ISM band (2402MHz-2480MHz).
2. Please refer to the User's manual of the EUT.
3. The EUT doesn't support 8DPSK and BLE.



3. TEST RESULT

The maximum output power for BR/EDR is **3.48dBm (2.23mW which is less than 20mW)**. Please refer to ETSI EN 300 328 (V2.1.1) Test report (AGC03507190403EE04) for the result of Maximum Transmit Power, which deemed to comply with the basic restrictions without testing.

