

RF Exposure Evaluation Declaration

產品名稱(中文): 汽車音響

廠 牌: Mercedes-Benz

型 號: NTG6N HIGH

申 請 者: Harman Becker Automotive Systems GmbH

地 址: Geschäftsanschrift: Becker-Göring-Str. 16,
76307 Karlsbad

樣 品 日 期: Aug. 16, 2019

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本測試報告只針對受測產品有效
本測試報告非經德凱認證同意不可局部複製使用

低功率射頻電機量測報告證明書

報告發行日期：Oct. 23, 2019

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產品名稱(中文)	汽車音響
申請者	Harman Becker Automotive Systems GmbH
地址	Geschäftsanschrift: Becker-Göring-Str. 16, 76307 Karlsbad
製造廠商	Harman Becker Automotive Systems GmbH
地址	(1) Holland Faser 19, 8000 Székesfehérvár, Hungary (2) Schlesische Straße 135 94315 Straubing
待測物電壓	DC 12V
測試電壓	DC 12V
商標或廠牌	Mercedes-Benz
型式號	NTG6N HIGH
試驗標準	低功率射頻電機技術規範 (107 年 01 月 10 日)
測試實驗室	新竹實驗室
地址	新竹縣竹東鎮中興路四段 372-2 號 TEL: +886-3-582-8001 / FAX: +886-3-582-8958
試驗結果	符合

測試工程師	:	林宗賢
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實驗室簽署人	:	徐煒翔
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報 告 發 行 紀 錄

報 告 號 碼	版 本	描 述	報 告 發 行 日
1980233R-RFTWP04V00	V1.0	全新報告	Oct. 23, 2019

1. 測試實驗室資料

1.1. 試驗單位與週遭環境

實驗室環境條件:

項目	測試項目	限制測試條件	實際測試條件	測試場地
溫度 (°C)	峰值輸出功率	15 - 35	23.1	3
濕度 (%RH)		25 - 75	62	

註：測試場地資料參考實驗室基本資料。

實驗室基本資料

德凱認證股份有限公司是家專為無線產品、手機、通訊、電磁相容及安全規範的技術測試暨認證顧問之專業實驗室，實驗室秉持著公正客觀的態度及全套完整測試設備，和本身完善的品質系統，實驗室皆依 ISO/IEC 17025、EN 45001 及 ISO/IEC Guide 25 管理實驗室，並取得各國認證機構之合格證書。

實驗室之詳細地址、位置與聯絡方式，可由德凱認證股份有限公司的網站查詢，網址：

<http://www.dekra.com.tw>

測試實驗室	德凱認證股份有限公司
地址	1. 新竹縣芎林鄉永興村王爺坑3鄰75-2號 2. 新竹縣竹東鎮中興路四段372號 3. 新竹縣竹東鎮中興路四段372-2號
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財團法人全國認證基金會 認證	
認證編號	3024
特定服務計劃	電信設備測試實驗室認證服務計畫
認證有效期限	民國一百零八年十二月二十七日

1.2. 儀器設備明細

峰值輸出功率/ SR10-H

儀器名稱	製造廠商	型號	序號	校正日期	下次校正日
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2018/12/17	2019/12/16
Pulse Power Sensor	Anritsu	MA2411B	1531043	2018/12/17	2019/12/16
Pulse Power Sensor	Anritsu	MA2411B	1531044	2018/12/17	2019/12/16
Power Meter	Keysight	8990B	MY51000248	2019/05/21	2020/05/20
Power Sensor	Keysight	N1923A	MY57240005	2019/05/21	2020/05/20

註：上列儀器之校正周期為一年。

1.3. 量測不確定度

測試項目	量測不確定度
峰值輸出功率	$\pm 1.16\text{dB}$

Note: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2. RF Exposure Evaluation

2.1. 適用標準

According to NCC LP0002 section 5.20 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 5.20.2

職業性/可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3-3.0	614	1.63	*100	6
3-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500	-----	-----	f/300	6
1,500-100,000	-----	-----	5.0	6

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

一般人/不可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3-3.0	614	1.63	*100	30
3-30	1842/f	4.89/f	*180/f ²	30
30-300	27.5	0.073	1.0	30
300-1,500	-----	-----	f/1500	30
1,500-100,000	-----	-----	1.0	30

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

Pd id the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. 量測方法

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

2.3. 測試結果

產品名稱	汽車音響
測試模式	發射器_SISO Mode_Port 1
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 3 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	48.084	0.019
6	2437	65.163	0.026
11	2462	50.350	0.020

IEEE 802.11g (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	36.475	0.014
6	2437	56.624	0.022
11	2462	39.994	0.016

IEEE 802.11n (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	35.318	0.014
6	2437	55.208	0.022
11	2462	39.902	0.016

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²

產品名稱	汽車音響
測試模式	發射器_SISO Mode_Port 4
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 3 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11b (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	36.644	0.015
6	2437	71.450	0.028
11	2462	68.391	0.027

IEEE 802.11g (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	30.761	0.012
6	2437	66.681	0.026
11	2462	35.727	0.014

IEEE 802.11n (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	2412	23.823	0.009
6	2437	63.680	0.025
11	2462	35.400	0.014

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²

產品名稱	汽車音響
測試模式	發射器_SISO Mode_Port 1
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 4.5 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	5.260	0.003
40	5220	5.346	0.003
44	5240	5.420	0.003
149	5745	12.417	0.007
157	5785	11.246	0.006
165	5825	14.093	0.008

IEEE 802.11n (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	5.224	0.003
40	5220	5.521	0.003
44	5240	5.082	0.003
149	5745	12.274	0.007
157	5785	11.272	0.006
165	5825	14.028	0.008

IEEE 802.11n (40MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190	7.430	0.004
46	5230	7.727	0.004
151	5755	22.542	0.013
159	5795	21.577	0.012

IEEE 802.11ac (80MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	10.328	0.006
155	5775	26.485	0.015

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²)

產品名稱	汽車音響
測試模式	發射器_SISO Mode_Port 3 (Core 0)
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 4.5 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	9.795	0.006
40	5220	9.661	0.005
44	5240	9.484	0.005
149	5745	67.608	0.038
157	5785	65.615	0.037
165	5825	55.081	0.031

IEEE 802.11n (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	9.772	0.005
40	5220	9.795	0.006
44	5240	9.908	0.006
149	5745	71.945	0.040
157	5785	69.823	0.039
165	5825	57.544	0.032

IEEE 802.11n (40MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190	12.134	0.007
46	5230	12.190	0.007
151	5755	68.077	0.038
159	5795	67.764	0.038

IEEE 802.11ac (80MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	17.865	0.010
155	5775	28.708	0.016

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²)

產品名稱	汽車音響
測試模式	發射器_SISO Mode_Port 3 (Core 1)
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 4.5 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11a (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	9.550	0.005
40	5220	9.397	0.005
44	5240	9.205	0.005
149	5745	65.615	0.037
157	5785	63.974	0.036
165	5825	54.075	0.030

IEEE 802.11n (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	9.661	0.005
40	5220	9.705	0.005
44	5240	9.772	0.005
149	5745	70.958	0.040
157	5785	69.502	0.039
165	5825	57.016	0.032

IEEE 802.11n (40MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190	11.995	0.007
46	5230	12.050	0.007
151	5755	67.143	0.038
159	5795	66.681	0.037

IEEE 802.11ac (80MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	17.458	0.010
155	5775	28.576	0.016

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²)

產品名稱	汽車音響
測試模式	發射器_MIMO Mode_Port 1+4
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 4.5 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11n (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180	7.043	0.004
40	5220	8.513	0.005
44	5240	8.701	0.005
149	5745	24.674	0.014
157	5785	23.696	0.013
165	5825	22.806	0.013

IEEE 802.11n (40MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
38	5190	11.391	0.006
46	5230	14.496	0.008
151	5755	28.825	0.016
159	5795	26.963	0.015

IEEE 802.11ac (80MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	17.414	0.010
155	5775	39.919	0.022

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²)

產品名稱	汽車音響
測試模式	發射器
Test Condition	RF Exposure Evaluation

Antenna Gain: The maximum Gain is 0.7 dBi

Output Power into Antenna & RF Exposure Evaluation Distance:

BT 2.0 Function			
Modulation: GFSK			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	4.191	0.001
19	2440	4.715	0.001
39	2480	4.040	0.001
Modulation: $\pi/4$ -DQPSK			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	2.608	0.001
19	2440	3.049	0.001
39	2480	2.711	0.001
Modulation: 8-DPSK			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	2.871	0.001
19	2440	3.341	0.001
39	2480	2.992	0.001

Note:

1. The antenna information is from the customer declaration.
2. The results are evaluated using the maximum power.
3. The power density Pd(4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm²)