

RF Exposure Evaluation Declaration

產品名稱(中文): 汽車音響

廠 牌: Panasonic

型 號: MIB3E_MQB_BTWIFI

申 請 者: Panasonic Automotive Systems Europe GmbH

地 址: Robert-Bosch-Straße 27 -29, 63225 Langen (Hessen)

樣 品 日 期: Mar. 14, 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: Jun. 27, 2019

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申請者	Panasonic Automotive Systems Europe GmbH
地址	Robert-Bosch-Straße 27 -29, 63225 Langen (Hessen)
製造廠商	Panasonic Automotive Systems Europe GmbH
地址	Robert-Bosch-Straße 27 -29, 63225 Langen (Hessen)
待測物電壓	DC 12V
測試電壓	DC 12V
商標或廠牌	Panasonic
型式號	MIB3E_MQB_BTWIFI
試驗標準	低功率射頻電機技術規範 (107 年 01 月 10 日)
試驗結果	符合

註：本測試報告只針對受測產品有效



徐煒翔 / 副理



林宗賢 / 工程師

本測試報告非經德凱認證同意不可局部複製使用

1. RF Exposure Evaluation

1.1. Limits

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.

1.2. Test Procedure

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

The temperature and related humidity: 18°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

WiFi

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

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.4 dBi or 1.10dBi in linear scale.

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	55.719	0.0122
6	2437	55.976	0.0122
11	2462	52.966	0.0116

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	115.345	0.0252
6	2437	114.288	0.0250
11	2462	112.461	0.0246

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	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

5G Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.7dBi or 1.17 in linear scale.

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	7.244	0.002
40	5220	6.180	0.001
44	5240	5.309	0.001

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)
149	5745	5.848	0.001
157	5785	6.683	0.002
165	5825	7.328	0.002

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	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

5G (Low band) Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.546 dBi or 1.80 dBi in linear scale.

5G (High band) Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.721 dBi or 1.87 dBi in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (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	6.855	0.002
40	5220	5.970	0.001
44	5240	4.909	0.001

IEEE 802.11ac (20MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745	5.875	0.001
157	5785	6.592	0.002
165	5825	7.295	0.002

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	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

5G (Low band) Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.546 dBi or 1.80 dBi in linear scale.

5G (High band) Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.721 dBi or 1.87 dBi in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

IEEE 802.11ac (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	5.272	0.001
46	5230	4.188	0.001

IEEE 802.11ac (40MHz) (ANT 0)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
151	5755	4.416	0.001
159	5795	4.613	0.001

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	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

5G (Low band) Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.546 dBi or 1.80 dBi in linear scale.

5G (High band) Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.721 dBi or 1.87 dBi in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

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	7.278	0.002

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)
155	5775	4.571	0.001

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.

BT 2.0

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

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.4 dBi or 1.10dBi in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

GFSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	0.828	0.0002
39	2441	0.861	0.0002
78	2480	0.929	0.0002

$\pi/4$ DQPSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	0.828	0.0002
39	2441	0.875	0.0002
78	2480	0.933	0.0002

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	Transmit
Test Condition	RF Exposure Evaluation

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.4 dBi or 1.10dBi in linear scale.

Output Power into Antenna & RF Exposure Evaluation Distance:

8DQPSK			
Bluetooth Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
00	2402	0.820	0.0002
39	2441	0.851	0.0002
78	2480	0.914	0.0002

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.