Prüfbericht-Nr.: *Test Report No.*:	**10052796 002**	**Auftrags-Nr.:** *Order No.*:	114063612	**Seite 1 von 16** *Page 1 of 16*
Kunden-Referenz-Nr.: *Client Reference No.*:	N/A	**Auftragsdatum:** *Order date*:	20-Mar-2017	
Auftraggeber: *Client*:	Microchip Technology Inc., 2355 West Chandler Blvd. Chandler, Arizona 85224-6199, United States.			
Prüfgegenstand: *Test item*:	Bluetooth module			
Bezeichnung / Typ-Nr.: *Identification / Type No.*:	BM78abcdefgh, RN4678, BM78SPPS5MC2, BM78SPPS5NC2 (a, b, c, d, e, f, g and h= 0-9, A-Z)			
Auftrags-Inhalt: *Order content*:	Test Report for CE compliance, Directive 2014/53/EU (BLE)			
Prüfgrundlage: *Test specification*:	EN 300 328 V 2.1.1 Refer to section 1.1 Test Specifications for more details.			

Wareneingangsdatum: *Date of receipt*:	07-Apr-2017
Prüfmuster-Nr.: *Test sample No.*:	A000528373-001
Prüfzeitraum: *Testing period*:	27-Apr-2017
Ort der Prüfung: *Place of testing*:	EMC/RF Laboratory Taipei
Prüflaboratorium: *Testing laboratory*:	TUV Rheinland Taiwan Ltd.
Prüfergebnis*: *Test result**:	Pass

geprüft von / *tested by*:			**kontrolliert von /** *reviewed by*:		
2017-05-26	Amy S.R.Hsu /Engineer		2017-05-26	Ryan W. T. Chen / Project Manager	
Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*

Sonstiges / *Other*:
According to 2014/53/EU ,this test report evaluate the Receiver Blocking test item to compliant the EN300 328 v 2.1.1. All other test items in v1.9.1 are equivalent to the version V2.1.1. please refer to 10052796 001 (v1.9.1) report for the detail information.
BM78SPPS5MC2, BM78SPPS5NC2 and RN4678 are electrically identical to BM78abcdefgh (a, b, c, d, e, f, g and h= 0-9, A-Z) - different Part no. is due to Market strategy.

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
Legend:	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V04

TEST SUMMARY

4.1.1 RECEIVER BLOCKING

RESULT: *PASS*

4.1.2 GEO-LOCATION CAPABILITY

RESULT: *N/A*

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix P: IUT Photos

(File Name: 10052796 ; 10052797 AppendixP)

Table 1: Applied Standard and Test Levels

Radio
EN 300 328 V 2.1.1

2 Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

11F, No.758, Sec. 4, Bade Rd.,
Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manu-facturer	Type	S/N	Last Calibration	Next Calibration
Embedded Attenuator	Keysight	AD211	TW5451121	N/A	N/A
EXG-B RF Analog Signal Generator	Agilent	N5171B	MY53050377	2017/03/08	2018/03/07
Bluetooth Tester	R&S	CBT	100866	2017/03/09	2018/03/08

2.3 Measurement Uncertainty

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	± 5 %
RF power, conducted	± 1.5 dB
RF power density, conducted	± 3 dB
unwanted emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
Temperature	± 1 ºC
Humidity	± 5 %
DC and low frequency voltages	± 3 %
Time	± 5 %
Duty Cycle	± 5 %

General Product Information

2.4 Product Function and Intended Use

The EUT is a Bluetooth module. It contains a Bluetooth 4.2 (BLE/BR/EDR) compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

2.5 System Details

Table 4: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	Bluetooth module
Operating Frequency	2402~2480 MHz
Channel Spacing	2 MHz
Channel number	40
Extreme Temperature Range	-20~70 ºC
Operation Voltage	3.3 V ~ 4.2V (Tested at 3.3V)
Modulation	GFSK
Antenna gain	1.63 dBi

2.6 Independent Operation Modes

Testing was performed at the lowest operating frequency (2402MHz), at the operating frequency in the middle of the specified frequency band (2440MHz) and at the highest operating frequency (2480MHz).

The basic operation modes are:

A. EUT transmits (TX mode), with full power, at lowest channel (2402MHz), a continuous modulated signal streaming with 100% duty cycle.

B. EUT transmits (TX mode), with full power, at middlest channel (2440MHz), a continuous modulated signal streaming with 100% duty cycle.

C. EUT transmits (TX mode), with full power, at highest channel (2480MHz), a continuous modulated signal streaming with 100% duty cycle.

D. EUT receives (RX mode), at lowest channel (2402MHz), continuously.

E. EUT receives (RX mode), at highest channel (2480MHz), continuously.

F. Transmitter is in stand-by.

G. EUT link operation in pseudo-random sequence on all channels (hopping mode)

H. EUT in link mode, at lowest channel (2402MHz)

I. EUT in link mode, at highest channel (2480MHz)

2.7 Noise Suppressing Parts

Nothing mentioned explicitly.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Radio: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

3.2 Test Operation and Test Software

Software used for testing: Test samples are provided with a data interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 2.6 as appropriate.

3.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Description	Manufacturer	Model No.	Serial No.
Notebook(EMC-06)	Lenovo	TP00048A	PB-0F8B2

4 Test Results RADIO

4.1 Conformance Requirements

4.1.1 Receiver Blocking

RESULT: **PASS**

Date of testing:	27-Apr-2017
Atmospheric pressure:	100-103 kPa
Test requirement:	EN 300 328 V 2.1.1, clause 4.3.2.11
Test procedure:	EN 300 328 V 2.1.1, clause 5.4.11
Test modes applied:	H, I

Limit:

While maintaining the minimum performance criteria as defined in EN300328 v2.1.1 clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15, table 16.

Receiver category 1:
Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.

Receiver category 2:
Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.

Receiver category 3:
Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with amaximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.

Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 6 dB	2 380 2 503,5	-53	CW
P_{min} + 6 dB	2 300 2 330 2 360	-47	CW
P_{min} + 6 dB	2 523,5 2 553,5 2 583,5 2 613,5 2 643,5 2 673,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in 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.			

Table 15: Receiver Blocking parameters 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
P_{min} + 6 dB	2 380 2 503,5	-57	CW
P_{min} + 6 dB	2 300 2 583,5	-47	CW
NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in 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.			

Table 16: Receiver Blocking parameters receiver category 3 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
P_{min} + 12 dB	2 380 2 503,5	-57	CW
P_{min} + 12 dB	2 300 2 583,5	-47	CW

NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in 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.

Receiver Blocking Test Result :

According to 10052796 001 (v1.9.1) report this device maximum RF output power less than or equal to 10dBm e.i.r.p. shall be considered as receiver category 2 equipment.

BLE (2402MHz)

Receiver Blocking				
Wanted signal mean power from Companion Device(dBm)	Blocking Signal Frequency(MHz)	Blocking Level (dBm)	Packet Error Rate (%)	Limit (%)
			BLE	
Pmin + 6 dB	2380	-57	0.13333	< 10
	2503.5	-57	0	
Pmin + 6 dB	2300	-47	0	
	2583.5	-47	0	

Remark : During evaluation we found the minimum Pmin level of wanted signal is -91 dBm.

BLE (2480MHz)

Receiver Blocking				
Wanted signal mean power from Companion Device(dBm)	Blocking Signal Frequency(MHz)	Blocking Level (dBm)	Packet Error Rate (%)	Limit (%)
			BLE	
Pmin + 6 dB	2380	-57	0	< 10
	2503.5	-57	0	
Pmin + 6 dB	2300	-47	0.26667	
	2583.5	-47	0.06667	

Remark : During evaluation we found the minimum Pmin level of wanted signal is -91 dBm.

4.1.2 Geo-location capability

RESULT: **N/A**

Requirement: EN 300 328 V2.1.1, clause 4.3.2.12

Note:

N/A for equipments that is not supports the geo-location capability.

5 List of Tables