



Test Lab  
Cert 2764.01

FCC LISTED, REGISTRATION  
NUMBER: 2764.01

ISED LISTED REGISTRATION  
NUMBER: 23595-1

Test report No:  
**2271ERM.006A1**

## Test report

**USA FCC Part 15.247, 15.209  
CANADA RSS-247, RSS-Gen**

**Radio Frequency Devices. Operation within the bands 902 - 928 MHz,  
2400 -2483.5 MHz, and 5725 - 5850 MHz.**

**Digital Transmission Systems (DTSs), Frequency Hopping Systems  
(FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.**

Identification of item tested	Head unit with radio and Bluetooth
Trademark	Panasonic
Model and /or type reference	MIB3E_MQB_BTWIFI
Other identification of the product	FCC ID: WUQ-MIB3HBTWIFI IC: 216R-MIB3HBTWIFI PN: 654.035.869.B HW Version: X31 SW Version: X450
Features	Bluetooth, WLAN, FM, AM, DAB, USB.
Manufacturer	PANASONIC AUTOMOTIVE SYSTEMS EUROPE GMBH Robert Bosch Str. 27-29-63225 Langen- Germany
Test method requested, standard	USA FCC Part 15.247, 10-1-18 Edition: Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.209, 10-1-18 Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 2 (February 2017). CANADA RSS-Gen Issue 5 (April 2018). Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 558074 D01 DTS Meas. Guidance v04 dated 05/04/2017. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager  <small>Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2019.02.21 19:57:23 -05'00'</small>
Date of issue	02-21-2019
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## Competences and guarantees

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DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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## General conditions

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1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

## Uncertainty

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Uncertainty (factor  $k=2$ ) was calculated according to the DEKRA Certification internal document PODT000.

Frequency (MHz)	U(k=2)	Units
0,009 - 30	2.69	dB
30-180	3.82	dB
180-1000	2.61	dB
1000-18000	2.92	dB
18000-40000	2.15	dB

## Data provided by the client

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Automotive head unit to be installed in cars with the following features: Bluetooth, WLAN, FM, AM, DAB, USB

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

## Usage of samples

Samples undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
2271.048	Car Radio	MIB3E_MQB_BTWIFI	04S PM6- 00124.08.18413E0026	12/21/2018
2271.037	Power Cable	-	-	12/21/2018

1. Sample S/01 has undergone following test(s):

All conducted tests indicated in appendix A and B.

Sample S/02 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
2271.047	Car Radio	MIB3E_MQB_BTWIFI	04S PM6- 00124.08.18413E0167	12/21/2018
2271.019	Antenna	-	380	10/02/2018
2271.038	Power Cable	-	-	12/21/2018
2271.052	BNC to FAKRA RF cable			12/28/2018
2271.053	SMA to FAKRA RF cable			12/28/2018
2271.054	BNC to FAKRA RF cable	-	-	12/28/2018
2271.055	BNC 1 to 2-way splitter			12/28/2018

1. Sample S/02 has undergone following test(s):

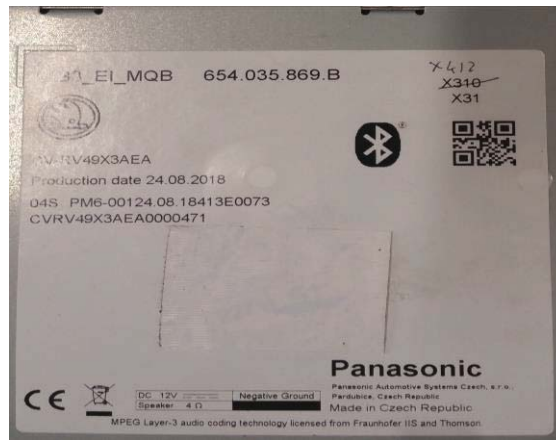
All radiated tests indicated in appendix A and B.

## Test sample description

Ports..... :	Port name and	Cable

	description	Specified max length [m]	Attached during test	Shielded	Coupled to patient <sup>(3)</sup>		
	<i>Not Provided Data</i>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Supplementary information to the ports..... :							
Rated power supply .....	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	DC: 12 Vdc						
Rated Power .....	<i>Data not provided</i>						
Clock frequencies .....	<i>Data not provided</i>						
Other parameters..... :	<i>Data not provided</i>						
Software version .....	X450						
Hardware version..... :	X31						
Dimensions in cm (W x H x D).... :	<i>Data not provided</i>						
Mounting position..... :	<input type="checkbox"/>	Table top equipment					
	<input type="checkbox"/>	Wall/Ceiling mounted equipment					
	<input type="checkbox"/>	Floor standing equipment					
	<input type="checkbox"/>	Hand-held equipment					
	<input checked="" type="checkbox"/>	Other: Car Equipment					
Modules/parts .....	Module/parts of test item		Type	Manufacturer			
	<i>Not Provided Data</i>						
Accessories (not part of the test item) .....	Description		Type	Manufacturer			
	<i>Not Provided Data</i>						
Documents as provided by the applicant..... :	Description		File name	Issue date			
	<i>FDT30_14 Data Declaration Equipment Data</i>						

**Copy of marking plate:**



## Identification of the client

PANASONIC AUTOMOTIVE SYSTEMS EUROPE GMBH  
 Robert Bosch Str. 27-29-63225 Langen- Germany.

## Testing period and place

<b>Test Location</b>	DEKRA Certification Inc.
<b>Date (start)</b>	12-26-2018
<b>Date (finish)</b>	02-19-2019

## Document history

Report number	Date	Description
2271ERM.006	01-22-2019	First release
2271ERM.006A1	02-21-2019	Second release

## Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 2271ERM.006 related with the same samples, in the next clauses and sub-clauses:

Clauses/ Sub-Clauses	Modification	Justification
Page 32/A3.Time of OCCUPANCY Test	Re-corrected the graphs with details	Detailed description provided
Page 42, 107/Maximum Output Power Test	Added Test Method description	Requested by the reviewer
Page 92/Channels for Canada	Added the test results for Canada Channels	Documentation error

This modification test report cancels and replaces the test report 2271ERM.006

## Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semi-anechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

## Remarks and comments

The tests have been performed by the technical personnel: Lakshmi Gollamudi, Nasir khan and Poojita Bhattu.

## Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

## Summary

FCC PART 15 PARAGRAPH / RSS-247 (Bluetooth EDR)					
Section	15.247 Spec Clause	RSS Spec Clause	Test Description	Verdict	Remark
A.1	§ 15.247 (a) (1)	RSS-247 5.1 (b)	20dB Emission Bandwidth, Occupied Bandwidth & Carrier Frequency Separation	P	N/A
A.2	§ 15.247 (a) (1) (iii)	RSS-247 5.1 (d)	Number of hopping channels	P	N/A
A.3	§ 15.247 (a) (1) (iii)	RSS-247 5.1 (d)	Time of Occupancy (Dwell Time)	P	N/A
A.4	§ 15.247 (b) (3)	RSS-247 5.4 (b)	Maximum peak conducted output power and antenna gain	P	N/A
A.5	§ 15.247 (d)	RSS-247 5.5	Band-edge conducted emissions compliance (Transmitter)	P	N/A
--	§ 15.247 (d)	RSS-247 5.5	Emission limitations Conducted (Transmitter)	N/A	Refer 1
A.6	§ 15.247 (d)	RSS-247 5.5	Emission limitations Radiated (Transmitter)	P	N/A
<u>Supplementary information and remarks:</u>					
1) Device is incorporated with integral antenna.					

FCC PART 15 PARAGRAPH (WIFI 2.4GHz)					
Section	15.247 Spec Clause	RSS Spec Clause	Test Description	Verdict	Remark
B.1	§ 15.247 (a) (2)	RSS-247 5.2 (a)	99% Occupied Bandwidth & 6dB Bandwidth	P	N/A
B.2	§ 15.247 (b)	RSS-247 5.4 (d)	Maximum Output Power and antenna gain	P	N/A
--	§15.247(d)	RSS-247 5.5	Emission limitations Conducted (Transmitter)	N/A	Refer 1
B.3	§ 15.247 (d)	RSS-247 5.5	Band-edge conducted emissions compliance (Transmitter)	P	N/A
B.4	§ 15.247 (e)	RSS-247 5.2 (b)	Power Spectral Density	P	N/A
B.5	§15.247 (d)	RSS-247 5.5	Emission limitations Radiated (Transmitter)	P	N/A
<u>Supplementary information and remarks:</u>					
1) Device is incorporated with integral antenna.					



## List of equipment used during the test

### Conducted Measurements

Test system Rohde & Schwarz TS 8997:

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1039	Signal Analyzer	ROHDE & SCHWARZ	FSV40	2017/03	2019/03
1040	EMI Test Receiver	ROHDE & SCHWARZ	OSP120 / OSPB157	2017/03	2019/03
1041	RF generator	ROHDE & SCHWARZ	SMB100A	2017/04	2019/04
1042	RF generator	ROHDE & SCHWARZ	SMBV100A	2018/01	2019/01
0101	Climatic Chamber	ESPEC NA	ESL-2CA	2019/01	2020/01

### Radiated Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1014	Signal Analyzer	ROHDE & SCHWARZ	FSV40	2017/03	2019/03
1012	EMI Test Receiver	ROHDE & SCHWARZ	ESR26	2018/09	2020/09
1058	Double Ridged Waveguide Horn Antenna	ETS LINDGREN	3115	2017/03	2020/03
1055	Double Ridged Waveguide Horn Antenna	ETS LINDGREN	3116C	2016/12	2019/12
1065	Biconilog Antenna	ETS LINDGREN	3142E	2017/03	2020/03
0981	Preamplifier	BONN ELEKTRONIK	BLMA 0118-2A	2017/05	2019/05
0980	Preamplifier	BONN ELEKTRONIK	BLNA 0360-01N	2017/05	2019/05
0982	Preamplifier	BONN ELEKTRONIK	BLMA1840-1M	2017/05	2019/05
1017	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---

## Appendix A: Test results (Bluetooth EDR)

## Appendix A Content

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## PRODUCT INFORMATION

The following information is provided by the client

Information	Description
Modulation	FHSS
Adaptive	Adaptive Equipment without the possibility to switch to a non-adaptive equipment.
Operation mode 1: Single Antenna Equipment	Equipment with only one antenna
Operating Frequency Range	2402 – 2480 MHz
Nominal Channel Bandwidth	1 MHz
RF Output Power	4 dBm
Extreme operating conditions	
Temperature range	-38 °C to +70 °C
Antenna type	Integral antenna
Antenna gain	BT: 1.3 dBi Wifi 2.4GHz: 0.4 dBi
Nominal Voltage	
Supply Voltage	12 Vdc
Type of power source	DC voltage from battery
Equipment type	Bluetooth EDR and WIFI
Geo-location capability	No

## DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	<p><u>Power supply (V):</u>  <math>V_{\text{nominal}} = 12 \text{ Vdc}</math></p> <p><u>Modulation:</u>            GFSK</p> <p><u>Test Frequencies for Radiated tests:</u>            Lowest range: 2402 MHz            Middle channel: 2440 MHz            Highest range: 2480 MHz</p>
TC#02	<p><u>Power supply (V):</u>  <math>V_{\text{nominal}} = 12 \text{ Vdc}</math></p> <p><u>Modulation:</u>            PI4DQPSK</p> <p><u>Test Frequencies for Radiated tests:</u>            Lowest range: 2402 MHz            Middle channel: 2440 MHz            Highest range: 2480 MHz</p>
TC#03	<p><u>Power supply (V):</u>  <math>V_{\text{nominal}} = 12 \text{ Vdc}</math></p> <p><u>Modulation:</u>            8DPSK</p> <p><u>Test Frequencies for Radiated tests:</u>            Lowest range: 2402 MHz            Middle channel: 2440 MHz            Highest range: 2480 MHz</p>

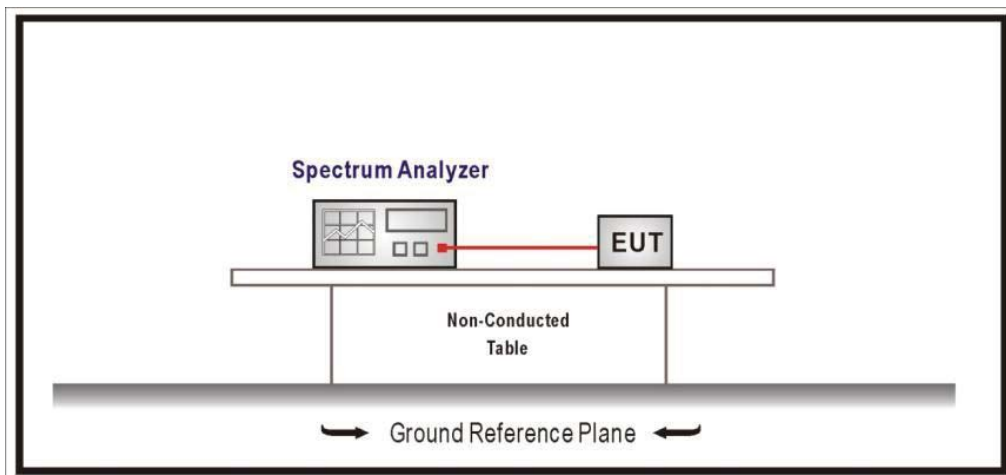
**TEST A.1: 20DB EMISSION BANDWIDTH, OCCUPIED BANDWIDTH AND CARRIER FREQUENCY SEPARATION**

<b>LIMITS:</b>	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a) (1) and RSS-247 5.1 (b)

LIMITS

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

**TEST SETUP:**



<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#01
<b>TEST RESULTS:</b>	PASS

	Lowest frequency	Middle frequency	Highest frequency
	2402 MHz	2440 MHz	2480 MHz
20dB Bandwidth (MHz)	1.149	1.129	1.149
Occupied bandwidth (kHz)	880	880	880
Measurement uncertainty (kHz)	<± 1.80		

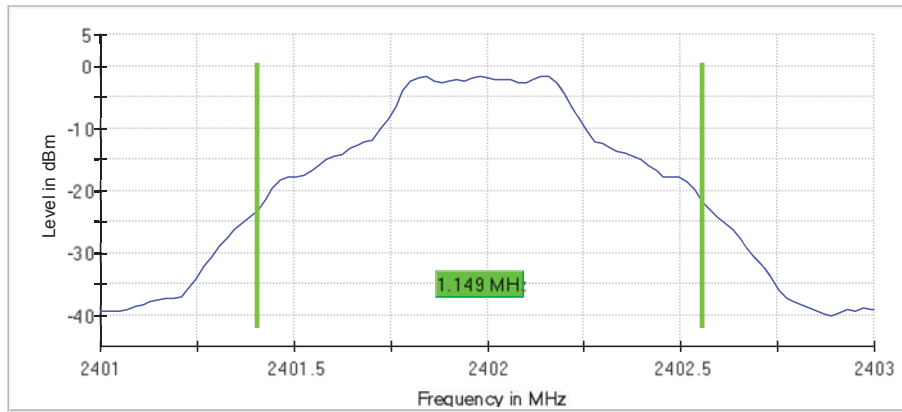
#### Measurement Set up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	101	101	101
Sweeptime	18.938 µs	18.938 µs	18.938 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweeptype	FFT	FFT	FFT
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.50 dB	0.50 dB	0.50 dB
Run	7 / max. 150	9 / max.	12 / max.
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.02 dB	0.15 dB	0.05 dB

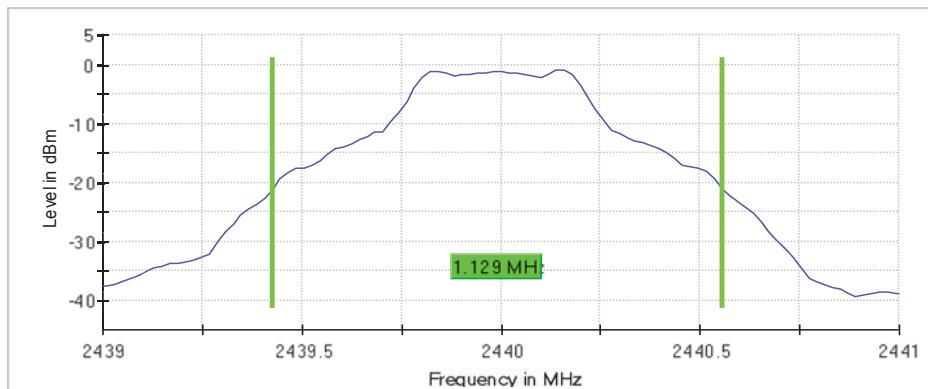
TEST RESULTS (Cont.):

20 dB BANDWIDTH

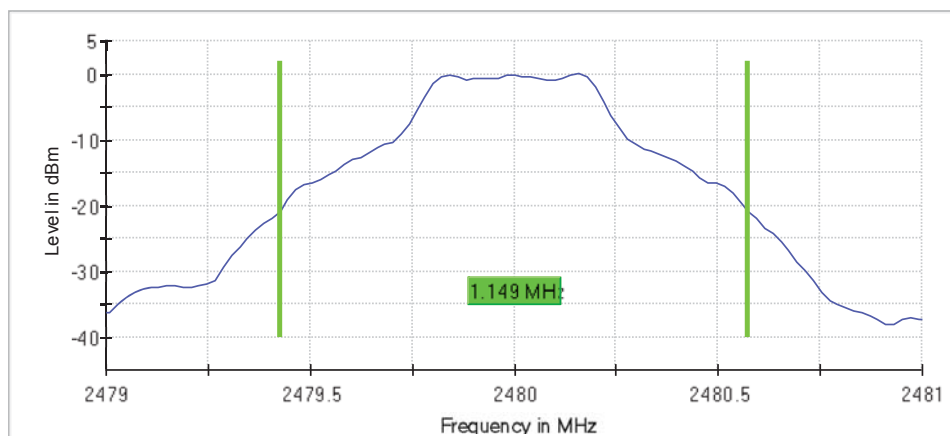
Lowest Channel



Middle Channel



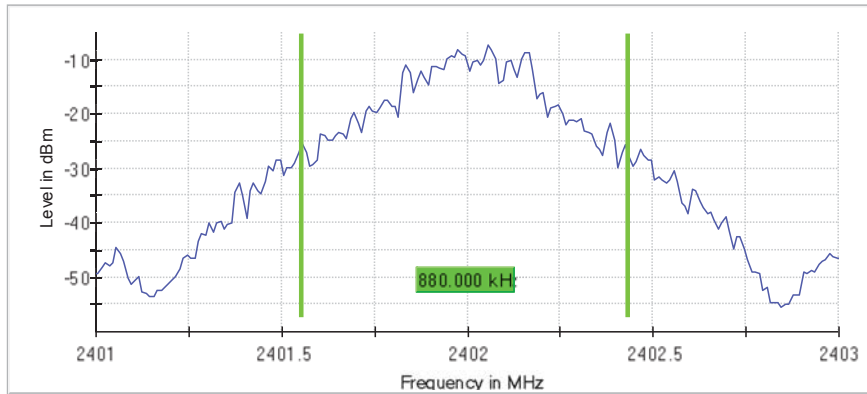
Highest Channel



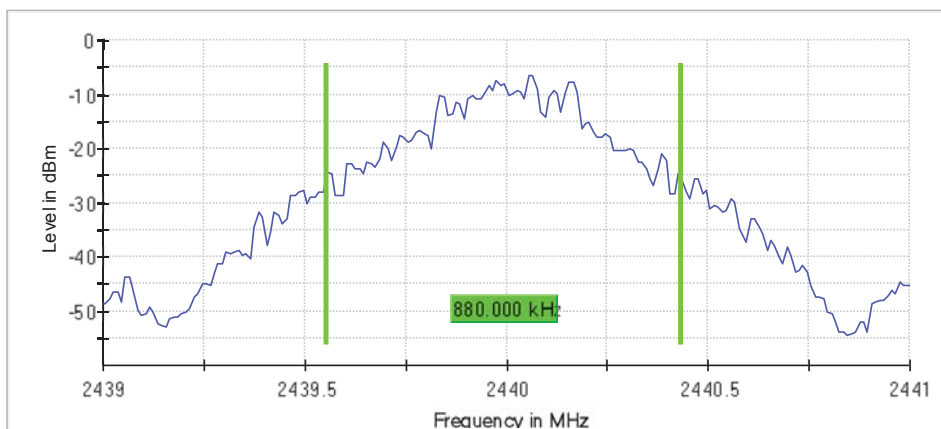


<b>TEST RESULTS (Cont.):</b>	<b>OCCUPIED BANDWIDTH</b>
------------------------------	---------------------------

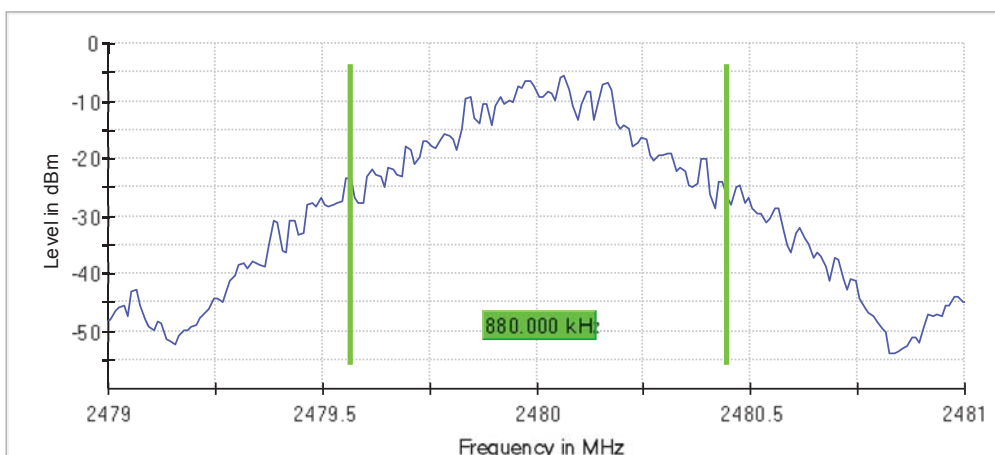
**Lowest Channel**



**Middle Channel**

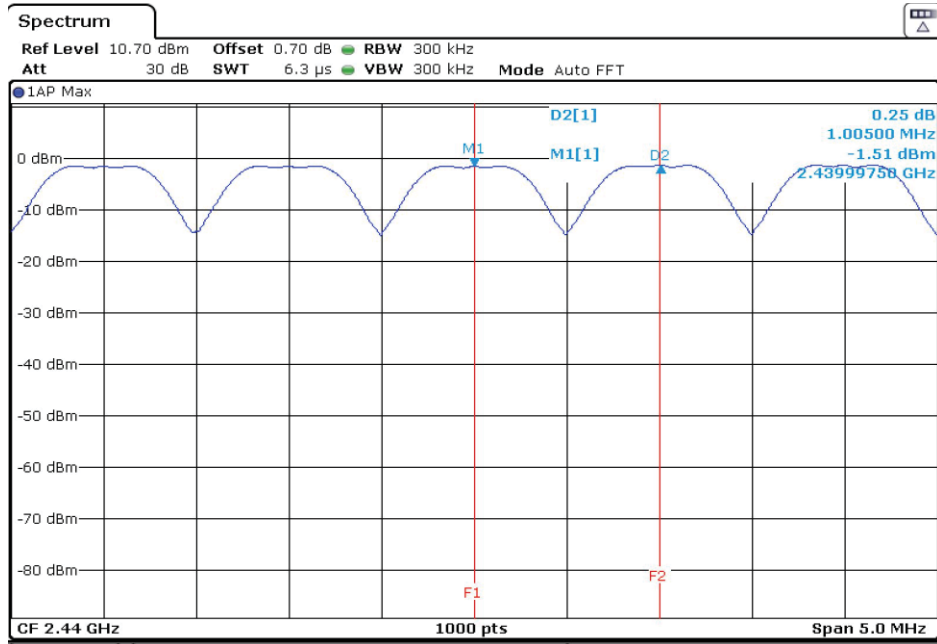


**Highest Channel**



TEST RESULTS (Cont.)

CARRIER FREQUENCY SEPARATION



The hopping channel carrier frequencies are separated by a minimum of the two-thirds of the 20 dB bandwidth of the hopping channel.

<b>TESTED SAMPLES:</b>	S/01
<b>TESTED CONDITIONS MODES:</b>	TC#02
<b>TEST RESULTS:</b>	PASS

	Lowest frequency 2402 MHz	Middle frequency 2440 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.446	1.446	1.446
Occupied bandwidth (MHz)	1.21	1.210	1.20
Measurement uncertainty (kHz)	<± 1.80		

### Measurement Setup

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.43900 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44100 GHz	2.48100 GHz
Span	2.00 MHz	2.00 MHz	2.00 MHz
RBW	100.000 KHzkHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
SweepPoints	101	101	101
Sweeptime	18.938 µs	18.938 µs	18.938 µs
Reference Level	10.000 dBm	10.000 dBm	10.000 dBm
Attenuation	30.000 dB	30.000 dB	30.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
SweepCount	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweeptype	FFT	FFT	FFT
Preamp	off	off	off
Stablemode	Trace	Trace	Trace
Stablevalue	0.50 dB	0.50 dB	0.50 dB
Run	15 / max. 150	8 / max. 150	11 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.01 dB	0.08 dB	0.05 dB

