DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
3128ERM.006A1

Test report

USA FCC Part 15.247, 15.209, 15.207
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 License-Exempt Local Area Network (LE-LAN) Devices.

Identification of item tested	LCD display unit for Rear seat entertainment
Trademark	Innolux
Model and /or type reference	Padi 31.3
Other identification of the product	FCC ID: 2AQPW-DD313BZ-01C ISED ID: 27960-DD313BZ01C
Features	Bluetooth Classic (BR & EDR)
Manufacturer	CARUX TECHNOLOGY INC. No. 12, Building B, Nanke 8th Road, Shanhua District, Tainan City, 74144
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). 558074 D01 15.247 Meas Guidance v05r02. Guidance for Compliance Measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under section §15.247 of the FCC Rules 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 Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2022.02.28 11:50:56 -05'00'
Date of issue	01-05-2022
Report template No	FDT08_23

Index

Competences and guarantees

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.

General conditions

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

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

Test case	Frequency (MHz)	U(k=2)	Units
RF Power and PSD	2402-2483	0.88	dB
Occupied Bandwidth		1.87	%
Band Edge		0.64	dB
Radiated Spurious Emission	30-180	4.27	dB
	180-1000	3.14	dB
	1000-18000	3.30	dB
	18000-40000	3.49	dB

Data provided by the client

Automotive RearSeat Entertainment LCD Display mounted on the Ceiling.

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 Nº	Description	Model	Serial Nº	Date of reception
3128/98	Conducted sample	Padi 31.3	0507211167	08/30/2021

Following Accessories items were used with Sample S/01 to perform testing:

Control Nº	Description	Model	Serial Nº	Date of reception
3128/02	Ghidorra	--	--	08/30/2021
3128/36	Cable USB type A male to Mini B	--	--	08/30/2021
3128/47	Adapter USB type A to USB-C	--	--	08/30/2021
3128/54	USB Hub	AB-50001-1	2021010960	08/30/2021

Sample S/01 was used for following test(s): All Conducted tests indicated in appendix A.

Sample S/02 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
3128/108	Radiated sample	Padi 31.3	0407211143	08/30/2021

Following Accessories items were used with Sample S/01 to perform testing:

Control Nº	Description	Model	Serial Nº	Date of reception
3128/02	Ghidorra	--	--	08/30/2021
3128/36	Cable USB type A male to Mini B	--	--	08/30/2021
3128/47	Adapter USB type A to USB-C	--	--	08/30/2021
3128/54	USB Hub	AB-50001-1	2021010960	08/30/2021

Sample S/02 was used for following test(s): All Radiated tests indicated in appendix A.

Test sample description

Ports…… :	Port name and description		Cable				
			Specified length [m]	Attached during test	Shielded		
	USB-C		2	☐	☐		
	HDMI		2	☐	☐		
	Headphone jacks		2	☐	☐		
	OABR		2	☐	☐		
	Power supply		2	☐	☐		
				☐	☐		
Supplementary information to the ports……	No Data Provided						
Rated power supply .....:	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☐	AC:	☐	☐	☐	☐	☐
	☐	AC:	☐	☐	☐	☐	☐
	☒	DC: 13 V					
	☐	DC:					
Rated Power .....:	110W						
Clock frequencies .....:	No Data Provided						
Other parameters.....:	No Data Provided						
Software version .....:	10-11						
Hardware version.....:	10-11						
Dimensions in mm (W x H x D):	82.5 x 26 x 4.6						
Mounting position.....:	☐	*Tabletop equipment*					
	☒	*Wall/Ceiling mounted equipment*					
	☐	*Floor standing equipment*					
	☐	*Hand-held equipment*					
	☐	Other:					

Modules/parts .....:	Module/parts of test item	Type	Manufacturer
	I430 China, 5A44AC5-01, GDD313IA0120S	China	CarUX
	I430 ROW, 5A44AC6-01, GDD313IA0130S	ROW	CarUX
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	No Data Provided		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data_Signed	12/16/2021

Copy of marking plate:

Identification of the client

Innolux Europe BV
Stationsstraat 39G
6411NK, Heerlen, Netherlands

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	09-15-2021
Date (finish)	09-21-2021

Document history

Report number	Date	Description
3128ERM.006	01-05-2022	First release
3128ERM.006A1	02-18-2022	Second release

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 3128ERM.006 related with the same samples:

Clauses/ Sub-Clauses	Modification	Justification
Page 12: PRODUCT INFORMATION	Antenna Gain value updated	Typo error
Pages 44, 46 and 48: TEST A.4: MAXIMUM PEAK CONDUCTED OUTPUT POWER AND ANTENNA GAIN	Antenna Gain value updated	To show updated results
Page 1: Cover	Manufacturer information	Update requested by the customer

This modification test report cancels and replaces the test report 3128ERM.006.

Environmental conditions

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

Temperature	Min. = 15 ºC Max. = 35 ºC
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 ºC Max. = 35 ºC
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 ºC Max. = 35 ºC
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: Sravani Gollamudi, Nasir Khan, Lourdes Maria

Valverde and Koji Nishimoto.

Testing verdicts

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

Summary

FCC PART 15 PARAGRAPH / RSS-247 (Bluetooth BR+EDR)					
Section	**FCC Spec Clause**	**RSS Spec Clause**	**Test Description**	**Verdict**	**Remark**
A.1	§ 2.1049 & § 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-Gen 8.9 and 8.10	Emission limitations Radiated (Transmitter)	P	N/A
Supplementary information and remarks: 1: Device has an internal antenna. No testing required.					

List of equipment used during the test

Conducted Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1038	TS8997 TEST SYSTEM	Rohde & Schwarz	TS8997	N/A	N/A
1107	ETHERNET SNMP THERMOMETER	HW GROUP	HWg-STE Plain	2020/08	2022/08
1313	WIRELESS MEASUREMENT SOFTWARE R&S WMS32	Rohde & Schwarz	N/A	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
0981	RF pre-amplifier	Bonn Elektronik	BLMA0118-2A	2020/11	2022/11
1012	EMI TEST RECEIVER	Rohde & Schwarz	ESR 26	2019/12	2021/12
1014	Spectrum analyzer	Rohde & Schwarz	FSV40	2021/05	2023/05
1056	Double-ridge Waveguide Horn antenna 18-40 GHz	ETS LINDGREN	3116C	2020/01	2023/01
1057	Double-ridge Waveguide Horn antenna 1-18 GHz	ETS LINDGREN	3115	2020/06	2023/06
1065	Biconical Log antenna	ETS LINDGREN	3142E	2020/08	2023/08
1111	ETHERNET SNMP THERMOMETER	HW GROUP	HWg-STE Plain	2020/08	2022/08
1179	Semi anechoic Absorber Lined Chamber	Frankonia	SAC 3 plus “L”	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	Rohde & Schwarz	N/A	N/A	N/A

Appendix A:
Test results (Bluetooth BR+EDR)

Appendix A Content

PRODUCT INFORMATION

The following information is provided by the client

Information	**Description**
Modulation	FHSS
- Number of Hopping Frequencies:	79
Adaptive	Non-Adaptive Equipment
- Operating Frequency Band	2400 – 2483.5 MHz
- Operating Frequency Range	2402 - 2480 MHz
- Nominal Channel Bandwidth	1 MHz
- RF Output Power	4 dBm
Extreme operating conditions	
- Temperature range	-40 ºC to +65 ºC
Antenna type	Whip
Antenna gain	-3.2 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth Classic
Geo-location capability	No

DESCRIPTION OF TEST CONDITIONS

TEST CONDITIONS	DESCRIPTION
TC#01	Power supply (V): $V_{nominal}$ = 12 Vdc Modulation: GFSK Test Frequencies for conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz
TC#02	Power supply (V): $V_{nominal}$ = 12 Vdc Modulation: π/4-DQPSK Test Frequencies for Conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz
TC#03	Power supply (V): $V_{nominal}$ = 12 Vdc Modulation: 8-DPSK Test Frequencies for Conducted/Radiated tests: Lowest range: 2402 MHz Middle channel: 2441 MHz Highest range: 2480 MHz

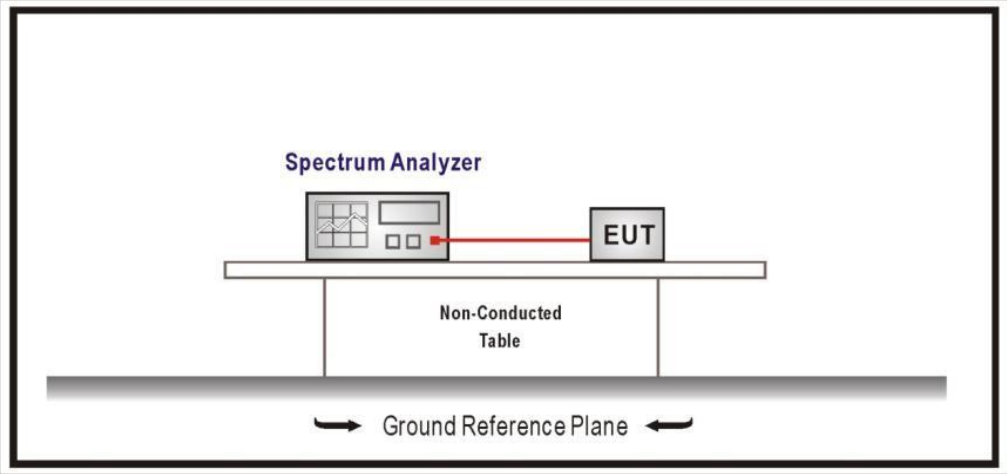
TEST A.1: 20DB EMISSION BANDWIDTH, OCCUPIED BANDWIDTH AND CARRIER FREQUENCY SEPARATION

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	§ 2.1049, 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:	



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

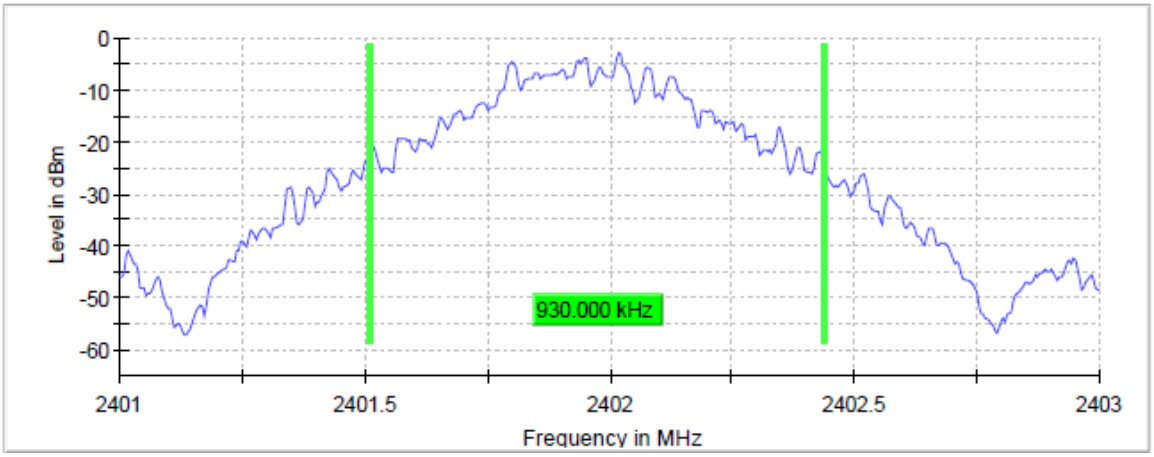
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB Bandwidth (kHz)	930	925	925
Occupied bandwidth (kHz)	860	860	860

Measurement Set up

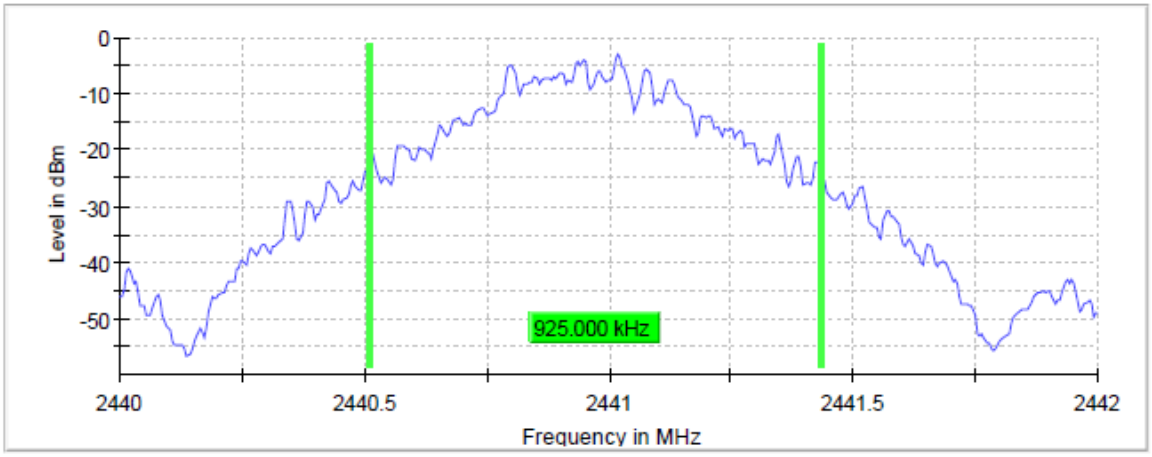
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.30 dB
Run	8 / max. 150	9/ max. 150	5 / max. 150
Stable	5 / 5	5 / 5	3 / 3
Max Stable Difference	0.07 dB	0.03 dB	0.06 dB

TEST RESULTS (Cont.):	20 dB BANDWIDTH

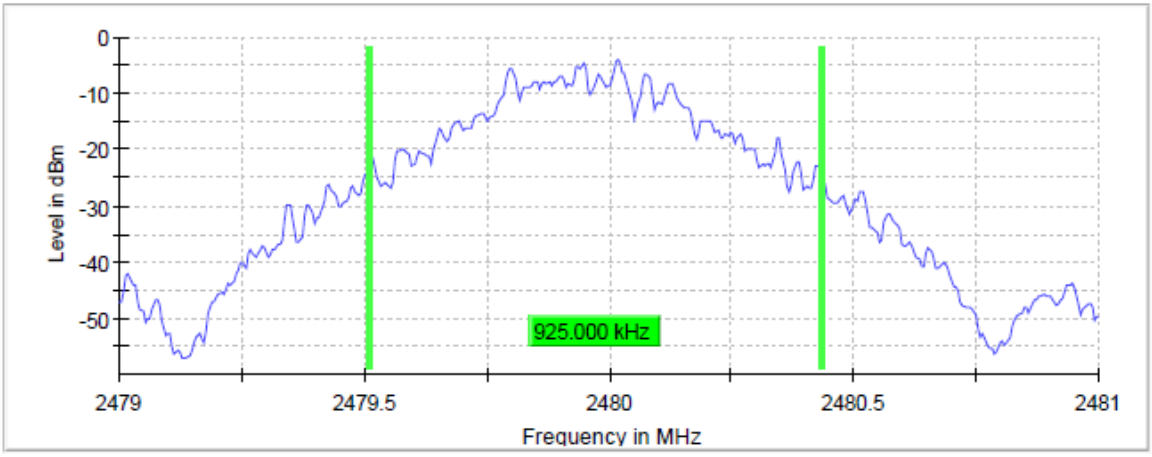
Lowest Channel



Middle Channel

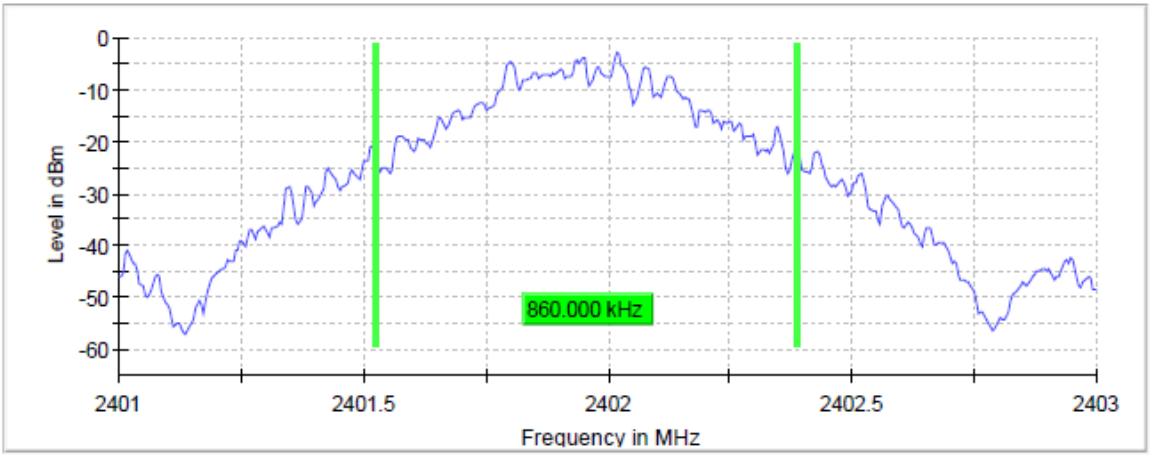


Highest Channel

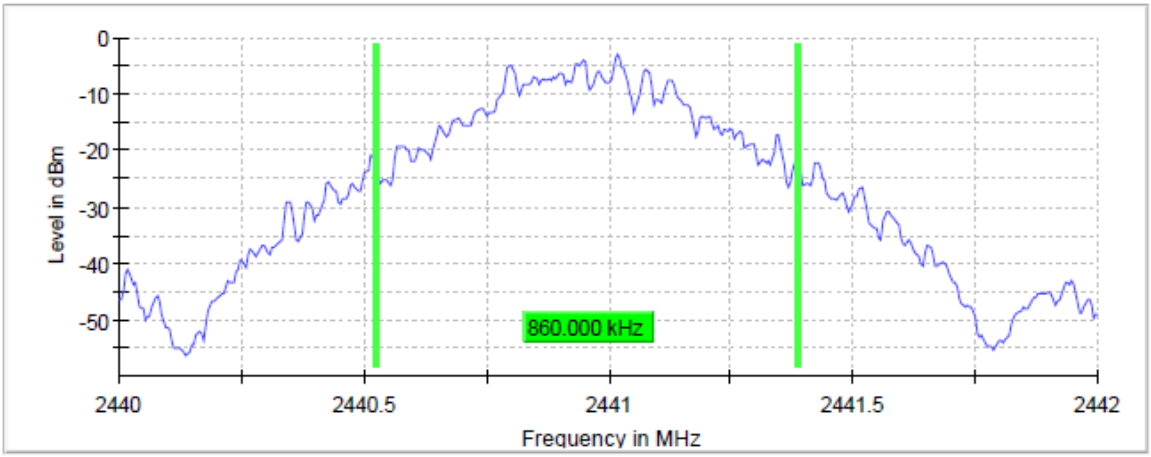


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

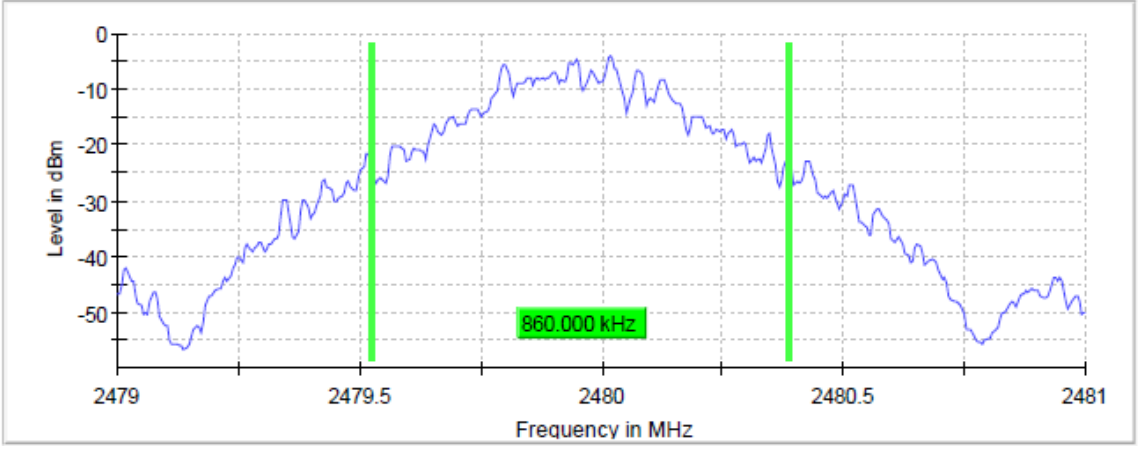
Lowest Channel



Middle Channel



Highest Channel

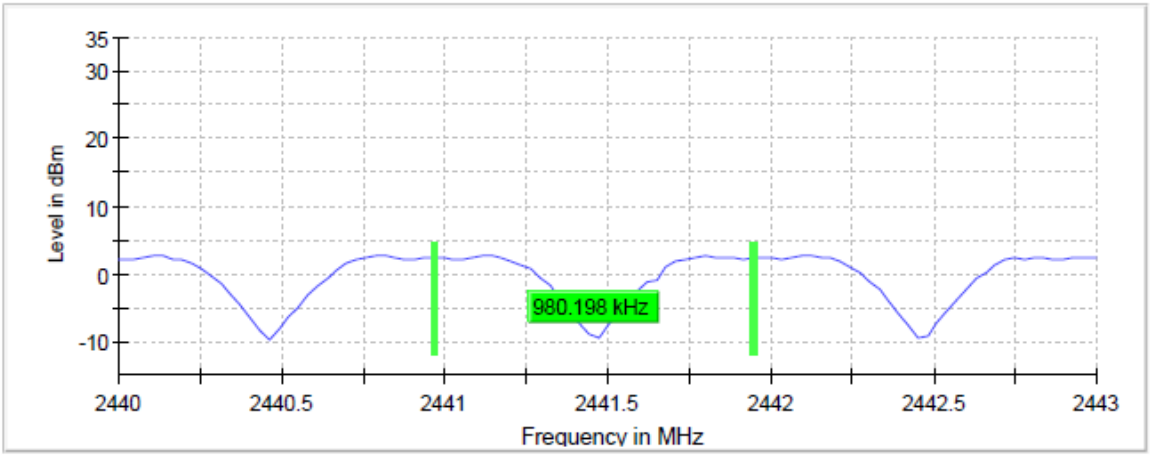


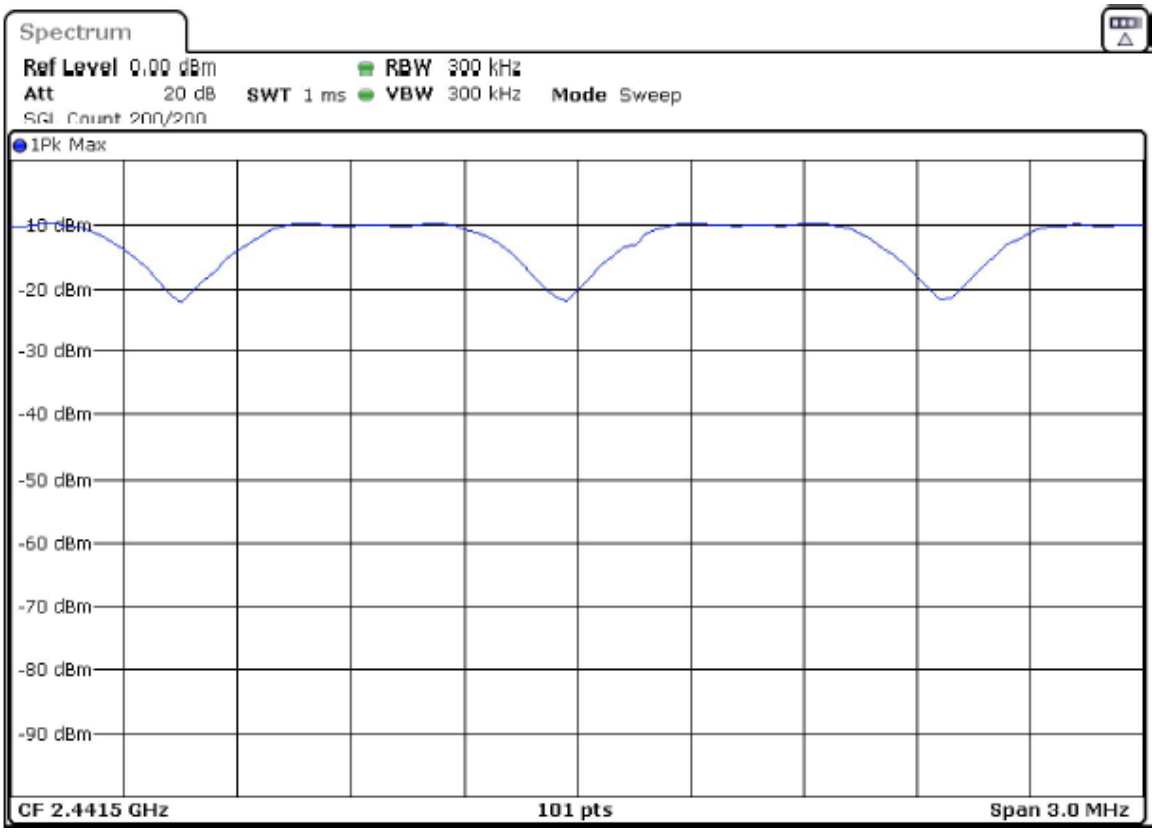
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Measurement Set- up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	4 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.06 dB	0.05 dB	0.06 dB

TEST RESULTS (Cont.)	CARRIER FREQUENCY SEPARATION





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

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

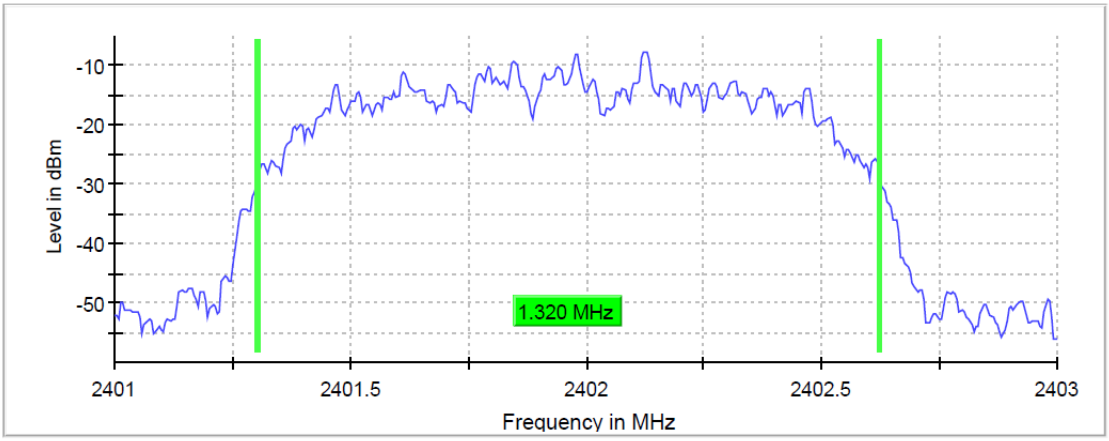
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.320	1.320	1.320
Occupied bandwidth (MHz)	1.165	1.165	1.165

Measurement Setup

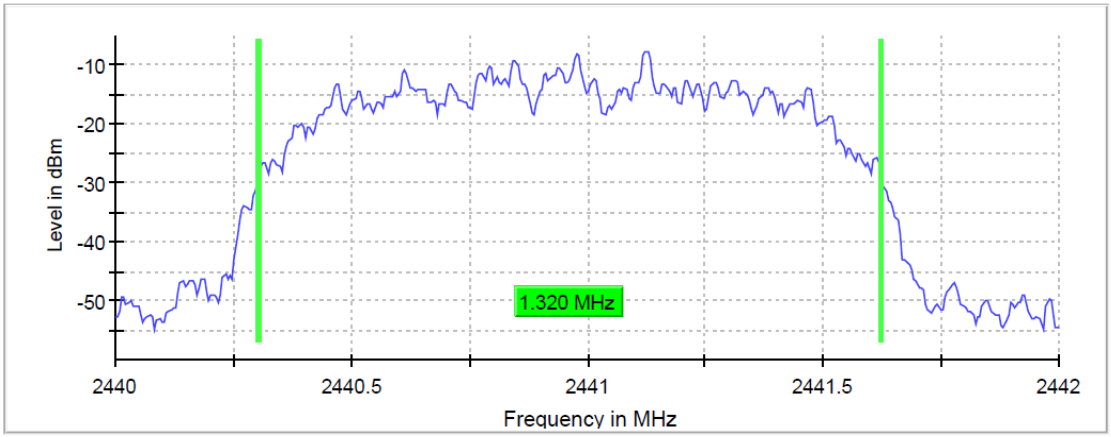
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	16 / max. 150	11 / max. 150	7 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.14 dB	0.04 dB	0.06 dB

TEST RESULTS (Cont.):	20 dB BANDWIDTH

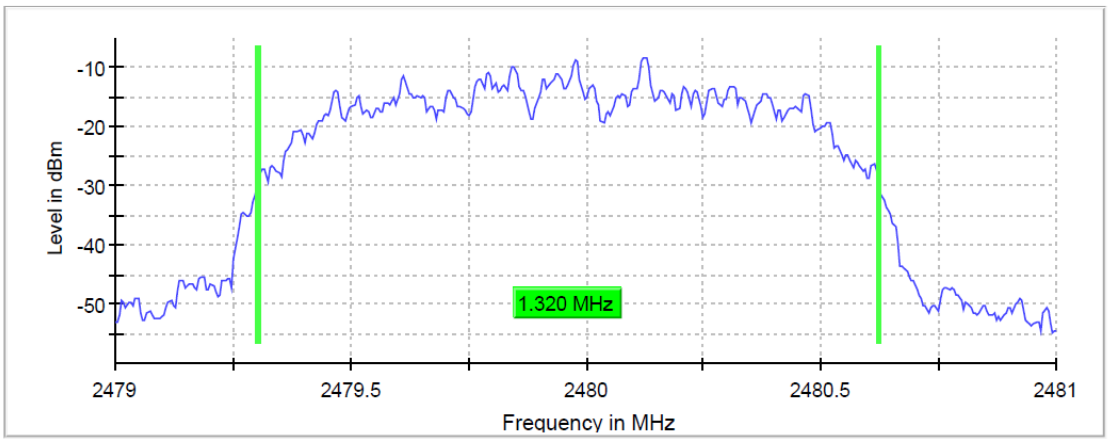
Lowest Channel



Middle Channel

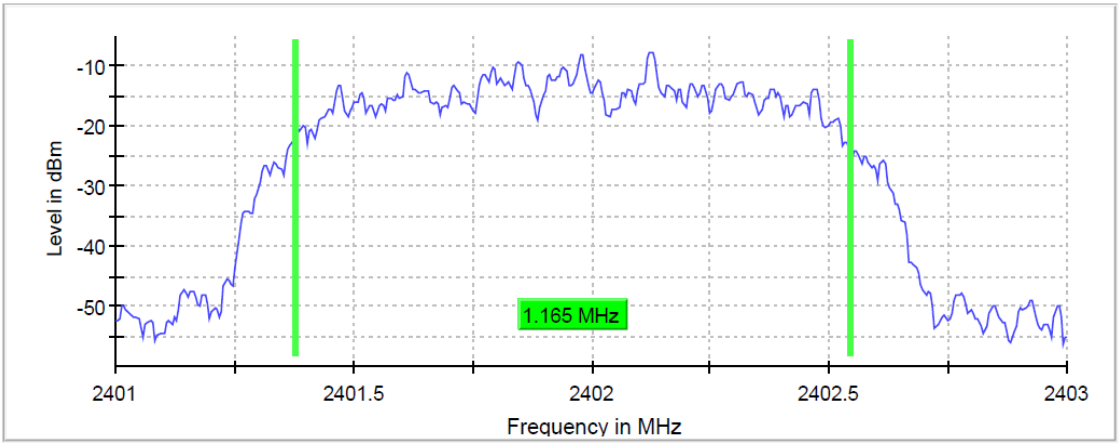


Highest Channel

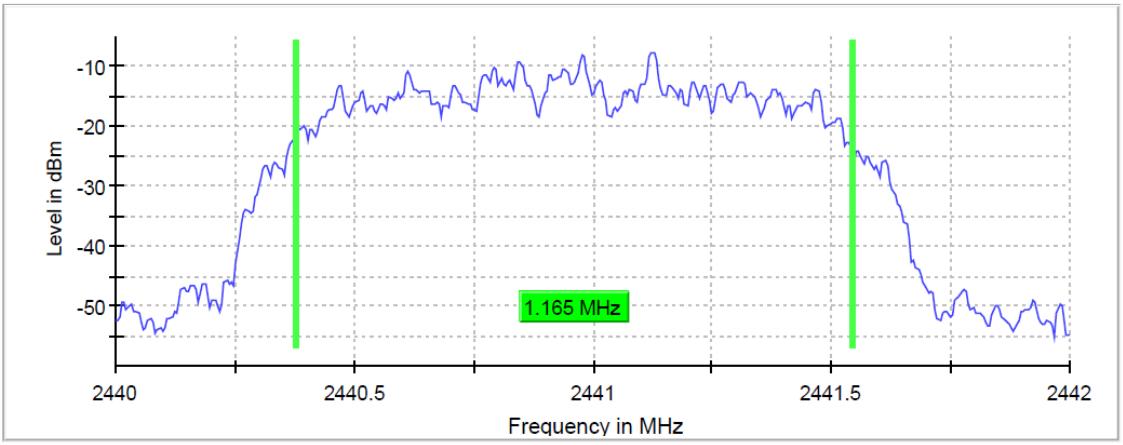


TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

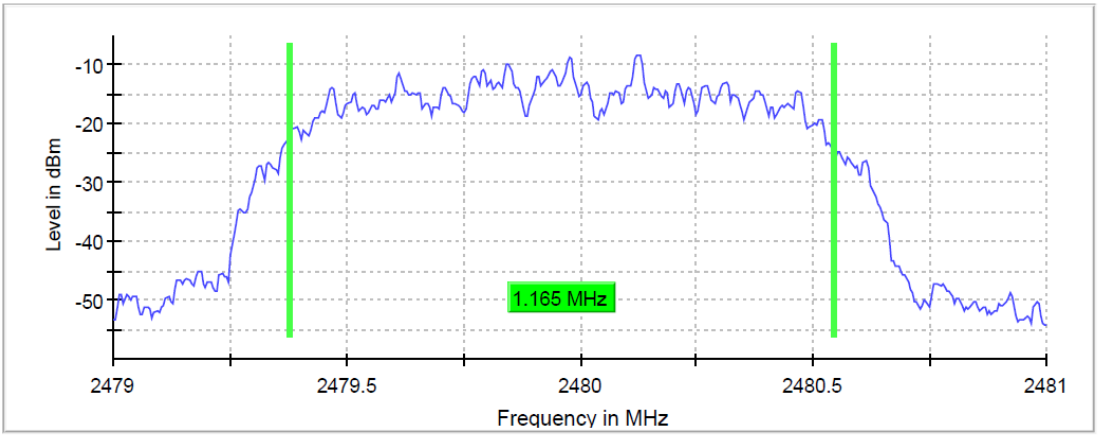
Lowest Channel



Middle Channel



Highest Channel

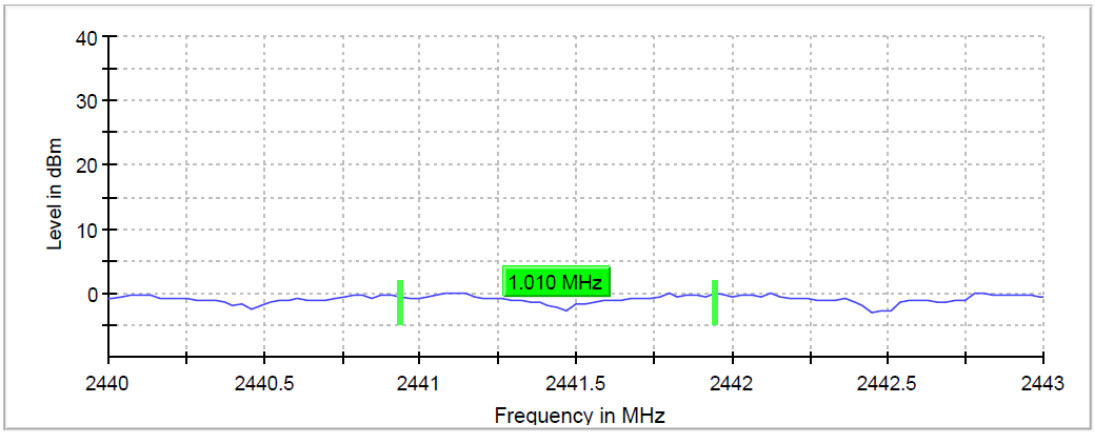


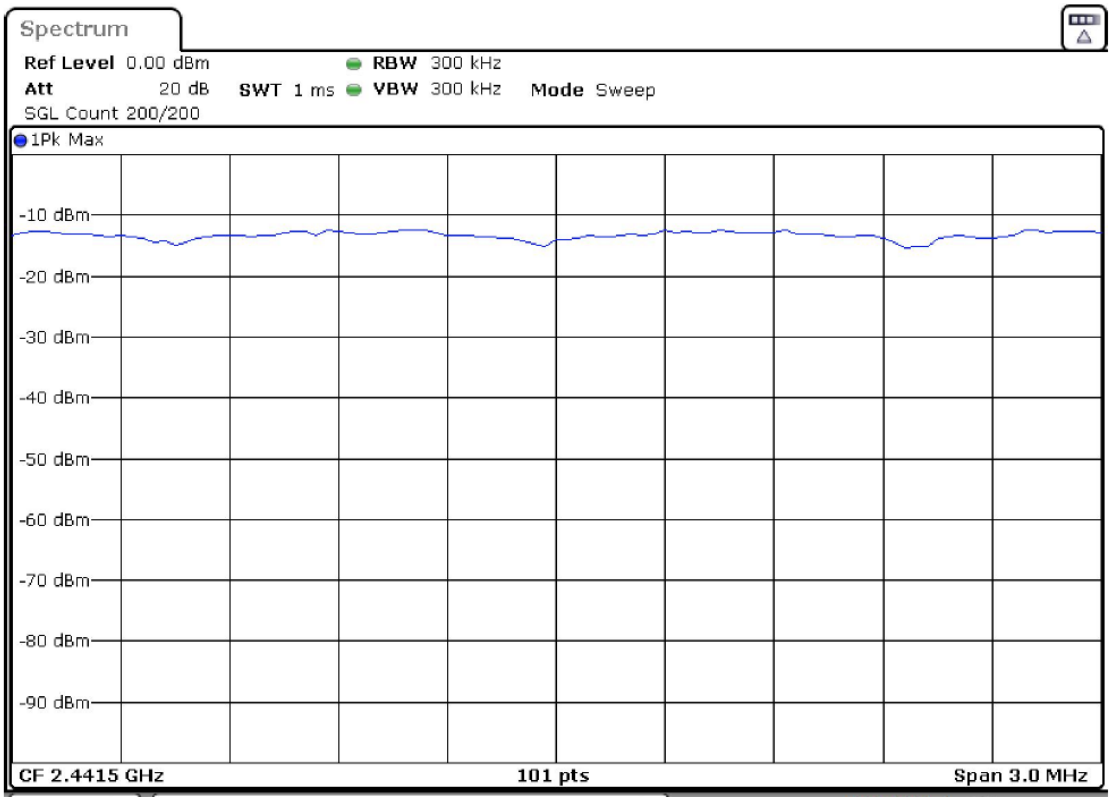
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Measurement Set-up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	6 / max. 150	6 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.06 dB	0.12 dB	0.06 dB

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.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

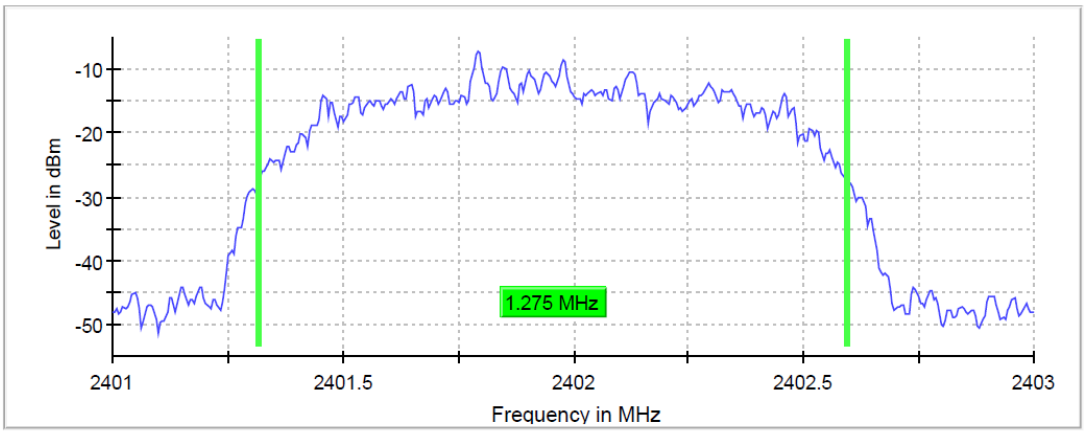
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
20dB bandwidth (MHz)	1.275	1.270	1.275
Occupied bandwidth (MHz)	1.170	1.170	1.170

Measurement Setup

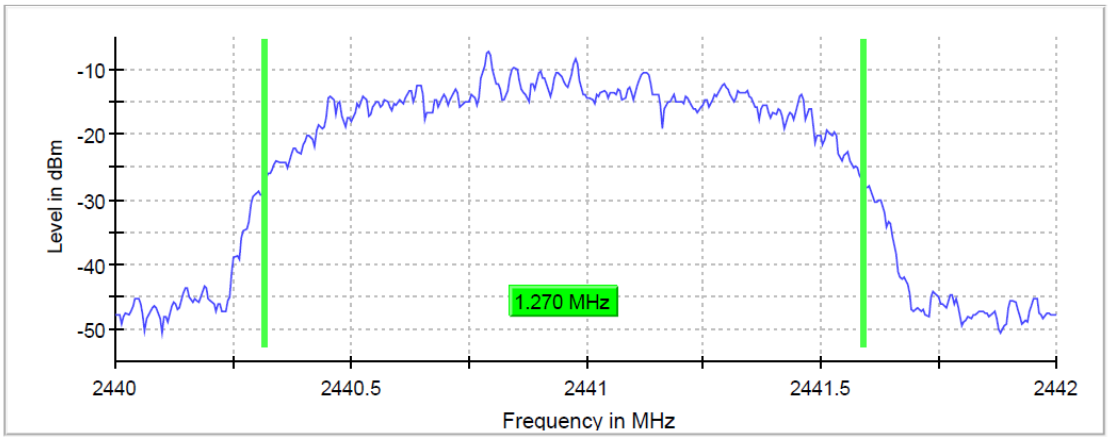
Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	200	200	200
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	8 / max. 150	9 / max. 150	8 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.00 dB	0.09 dB	0.03 dB

TEST RESULTS (Cont.):	20 dB BANDWIDTH

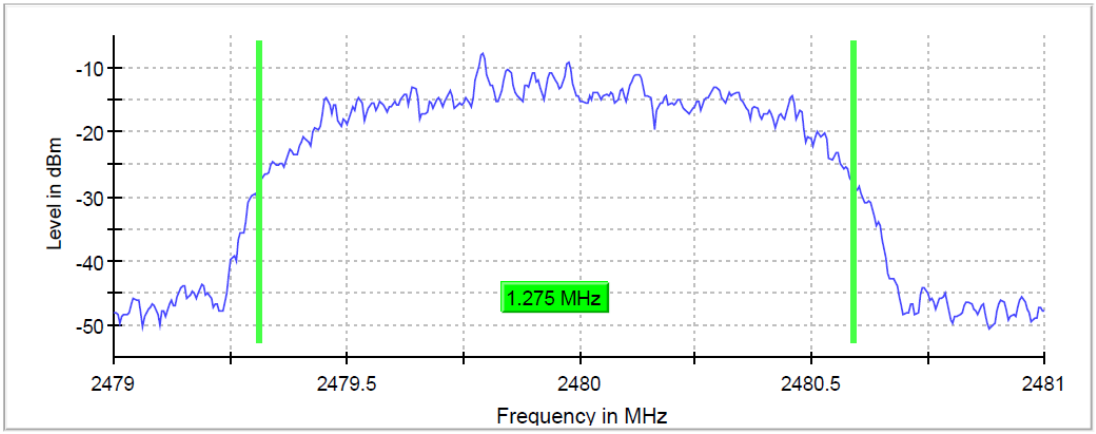
Lowest Channel



Middle Channel

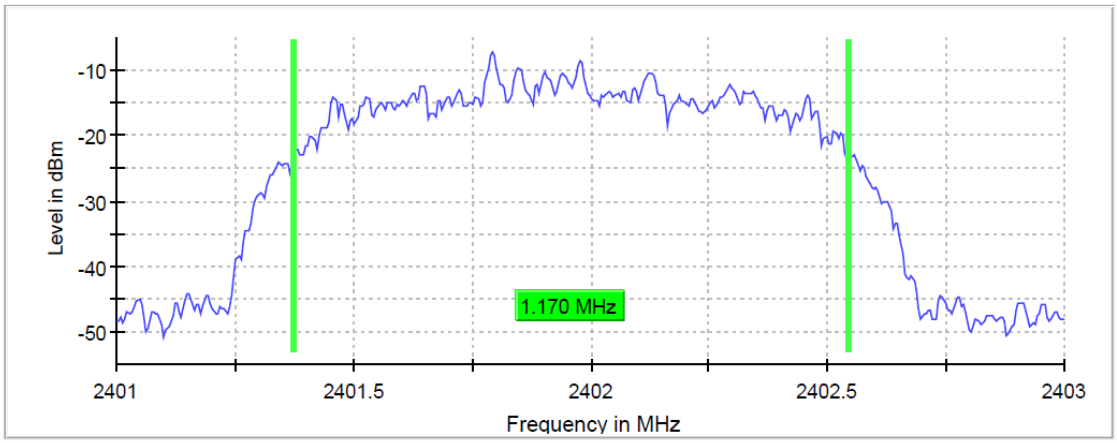


Highest Channel

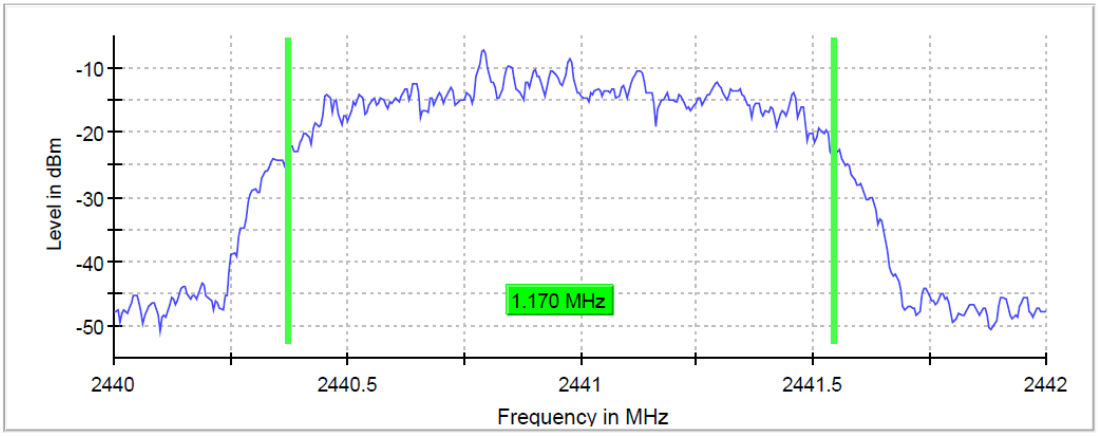


TEST RESULTS (Cont.)	OCCUPIED BANDWIDTH

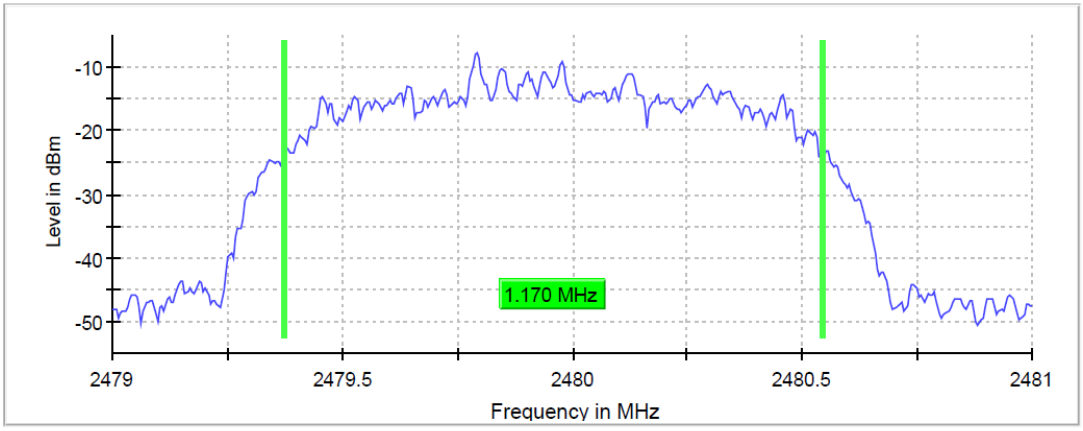
Lowest Channel



Middle Channel



Highest Channel

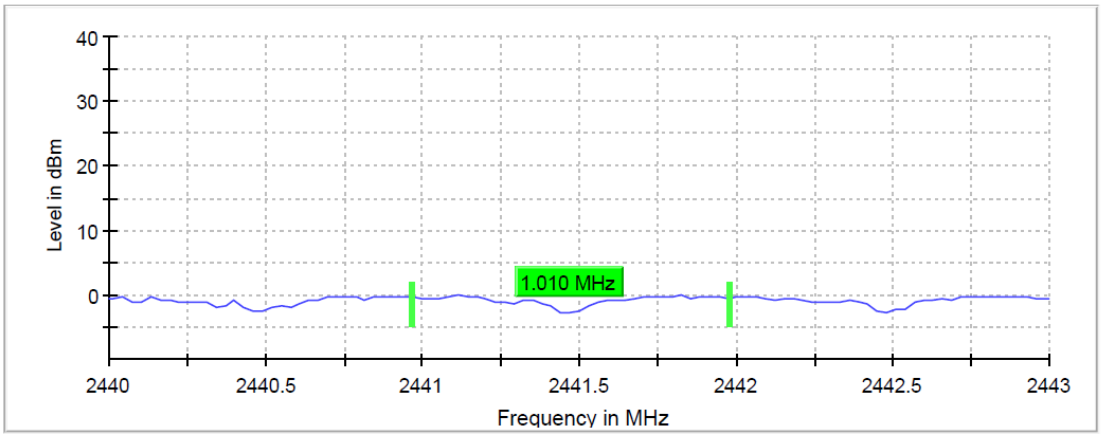


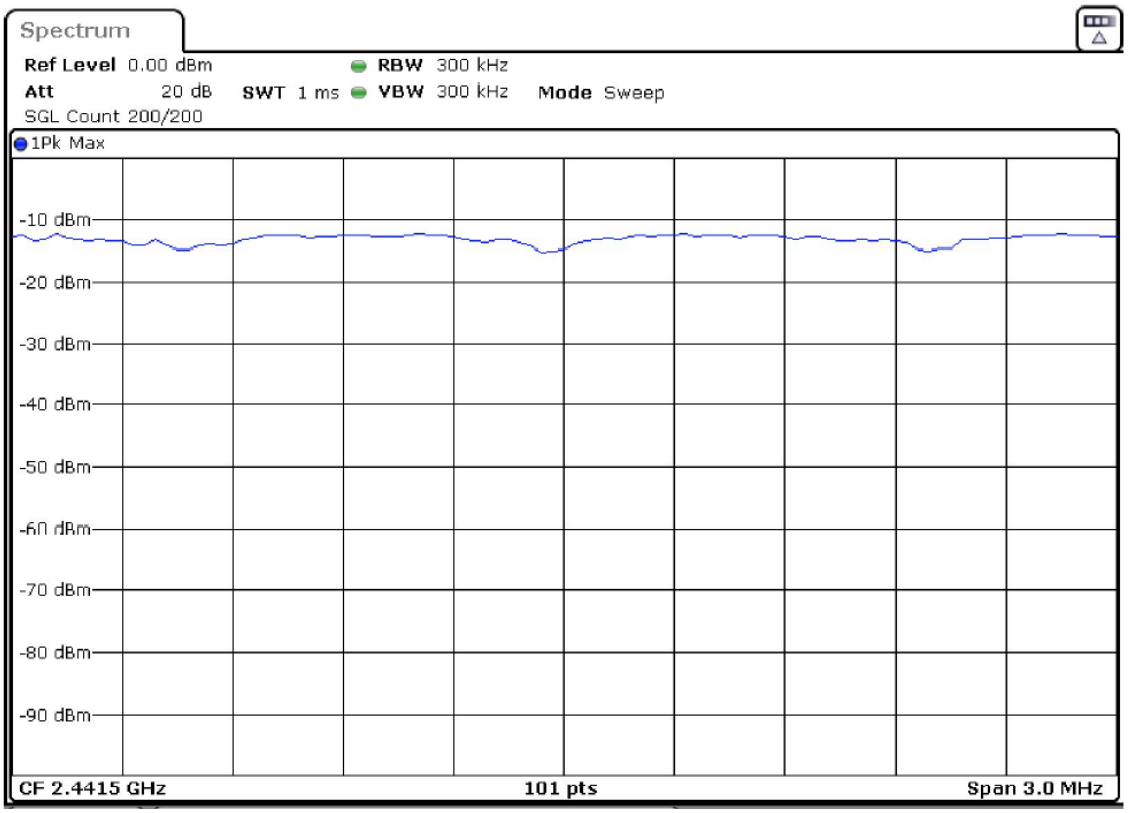
TEST RESULTS (Cont.):	OCCUPIED BANDWIDTH

Measurement Set-up

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.40100 GHz	2.44000 GHz	2.47900 GHz
Stop Frequency	2.40300 GHz	2.44200 GHz	2.48100 GHz
Span	2.000 MHz	2.000 MHz	2.000 MHz
RBW	10.000 kHz	10.000 kHz	10.000 kHz
VBW	30.000 kHz	30.000 kHz	30.000 kHz
Sweep Points	400	400	400
Sweep time	189.648 µs	189.648 µs	189.648 µs
Reference Level	0.000 dBm	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	500	500	500
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamp	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	5 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.13 dB	0.06 dB	0.06 dB

TEST RESULTS (Cont.)	CARRIER FREQUENCY SEPARATION





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

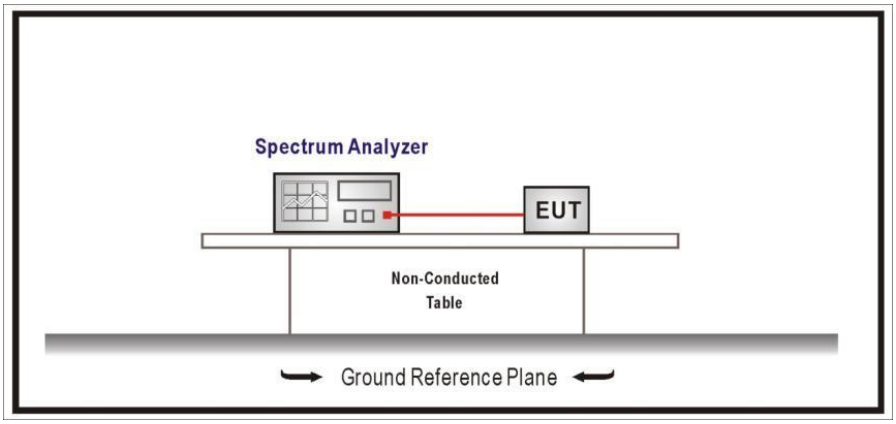
TEST A.2: NUMBER OF HOPPING CHANNELS

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a) (1) (iii) and RSS-247 5.1 (d)

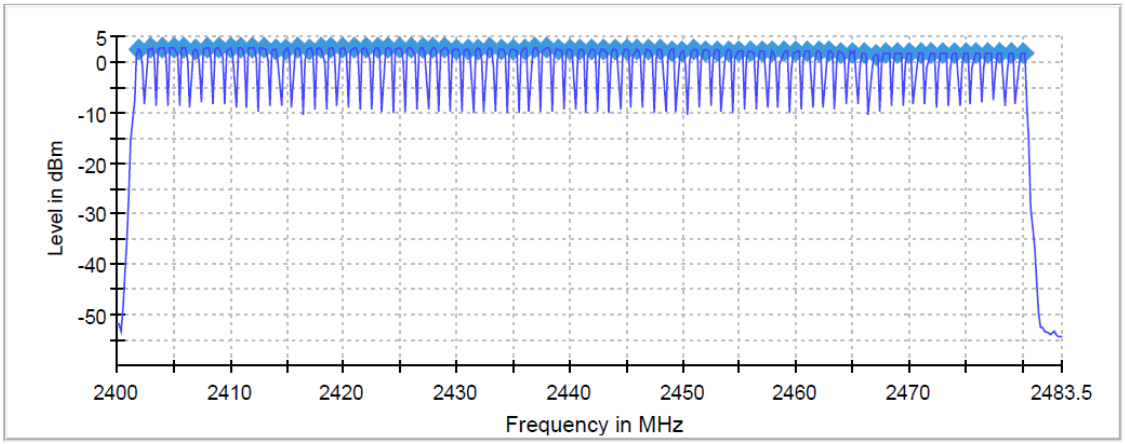
LIMITS

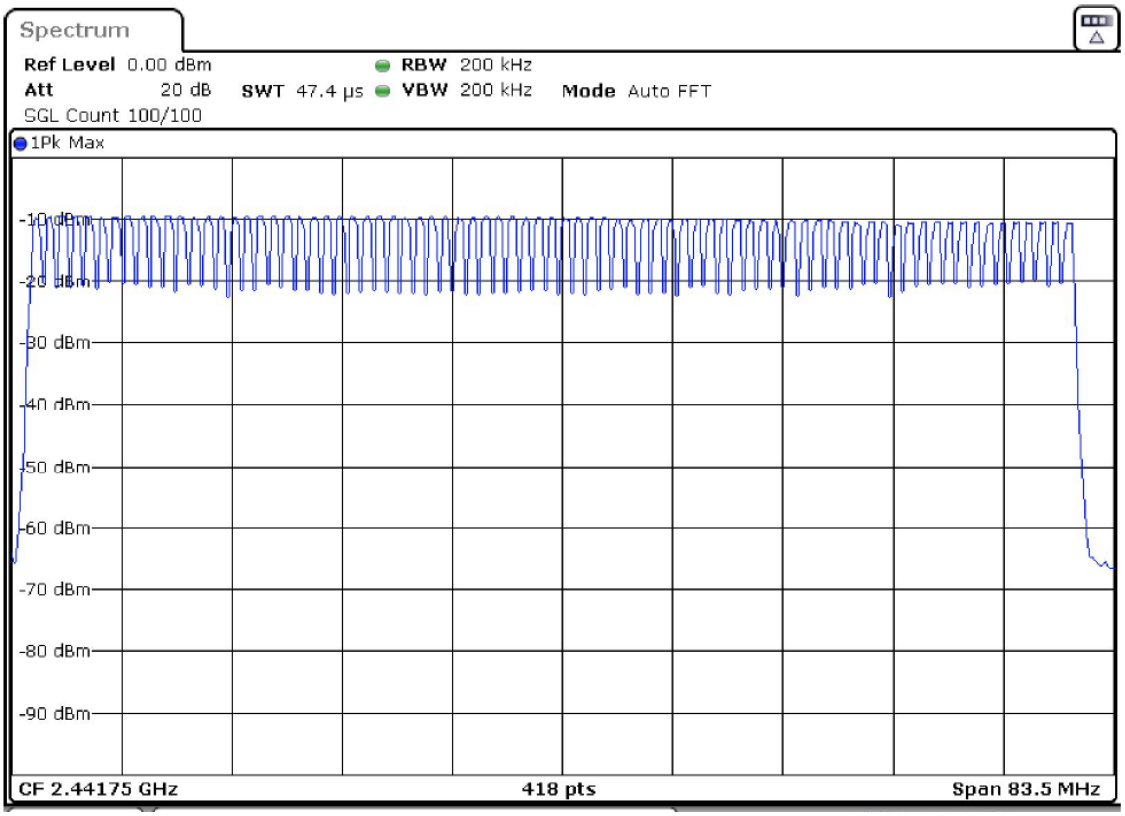
Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 channels.

TEST SETUP:	



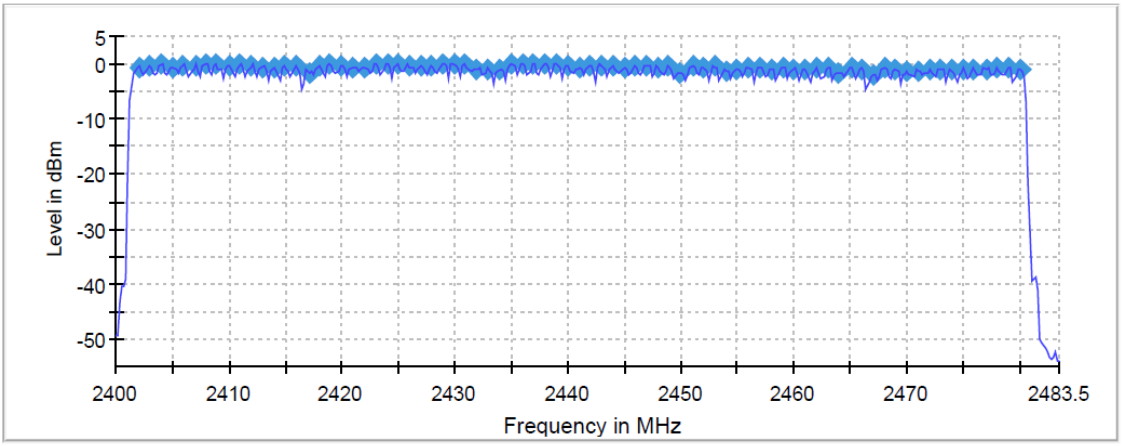
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS

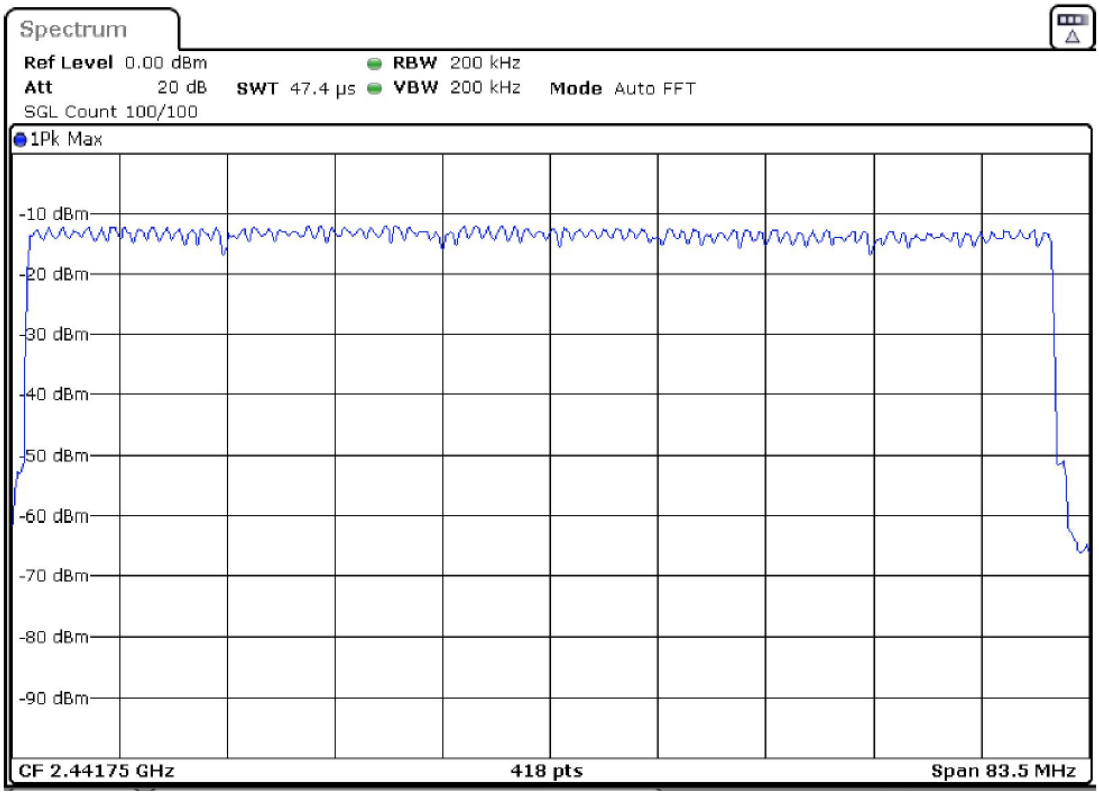




Number of Hopping Frequencies: 79

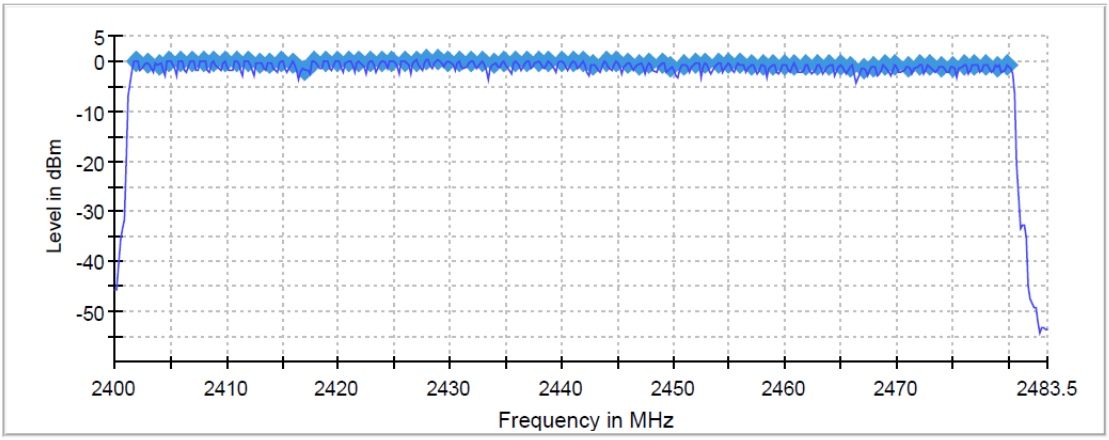
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

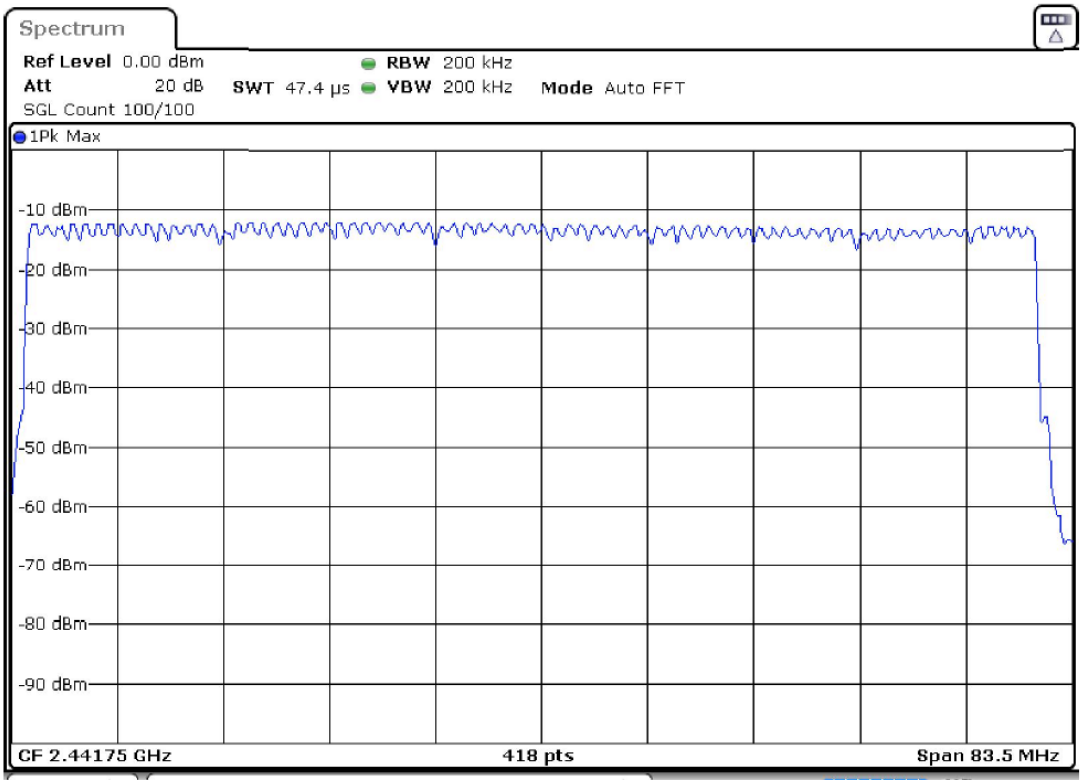




Number of Hopping Frequencies: 79

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS





Number of Hopping Frequencies: 79

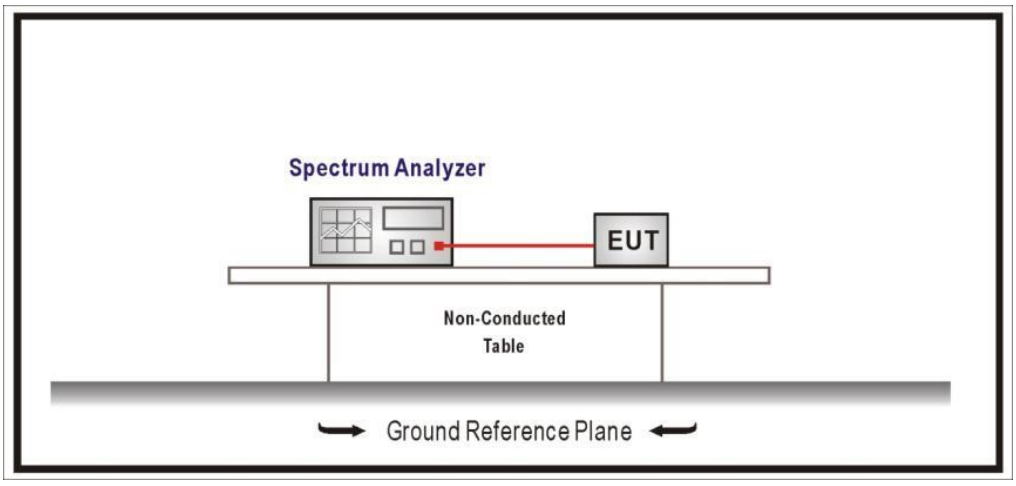
TEST A.3: TIME OF OCCUPANCY (DWELL TIME)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(a)(1)(iii) and RSS-247 5.1(d)

LIMITS

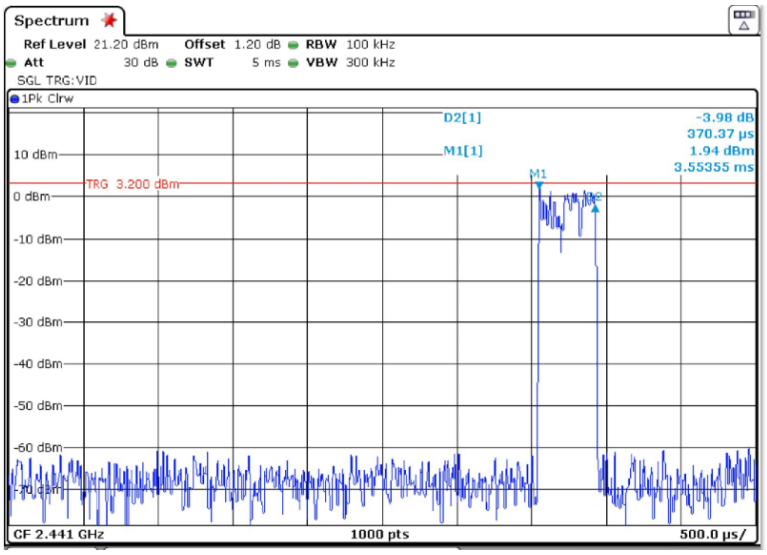
The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = 0.4 x 79= 31.6 seconds.

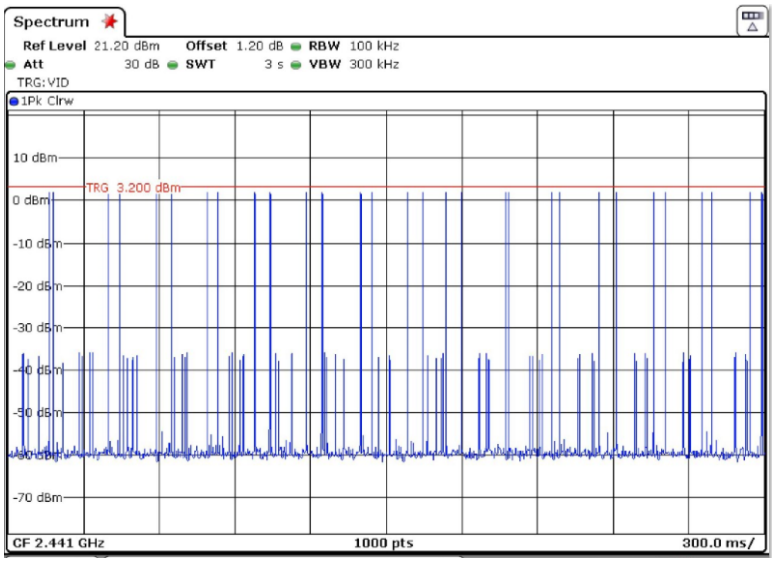
TEST SETUP:	



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (GFSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE DH1**

Transmit Time per Hop: 0.370 ms



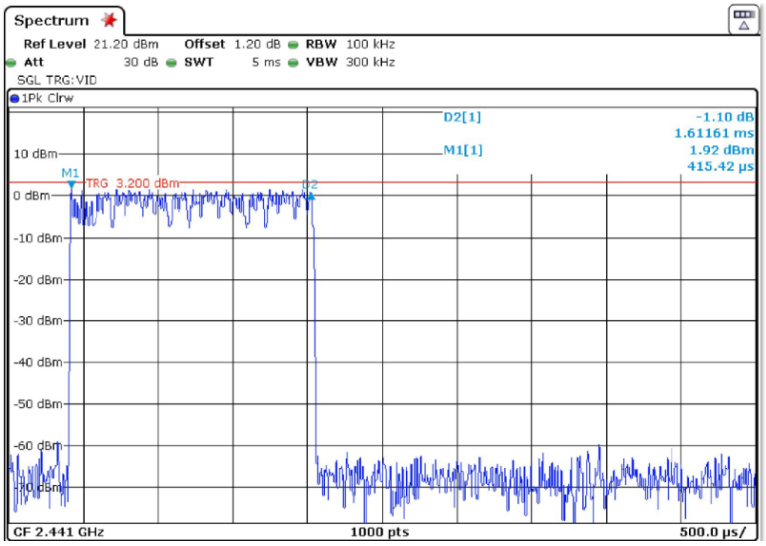


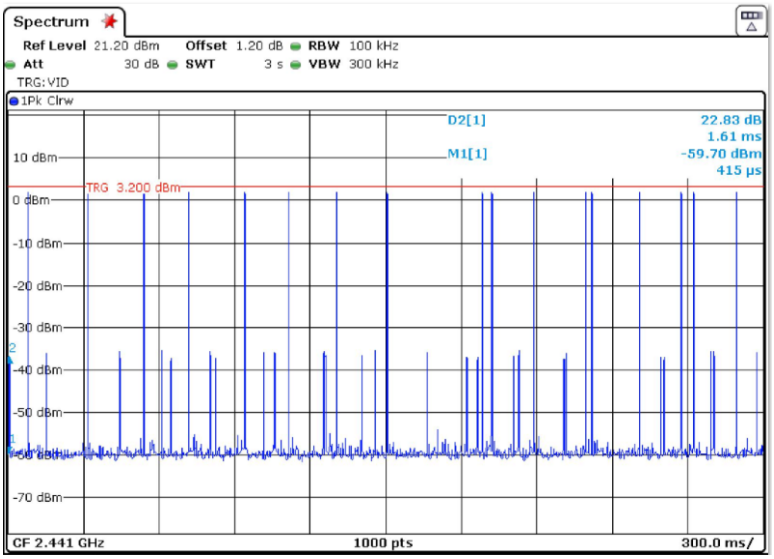
Number of hops over a period of 3 seconds: 28 hops.

Number of hops in the period specified in the requirements = (28 hops) x (31.6 s / 3 s) = 295 hops.
Averaging time of occupancy = 0.370 ms x 295 hops = 109.15 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (GFSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE DH3**

Transmit Time per Hop: 1.612 ms



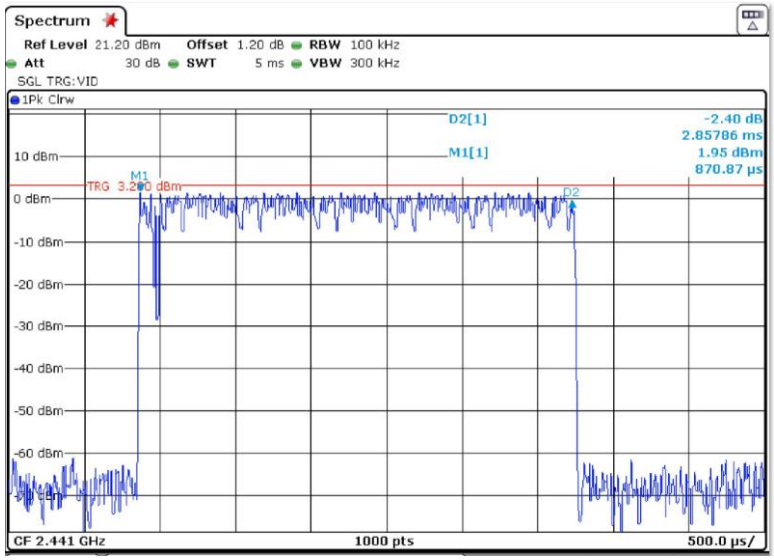


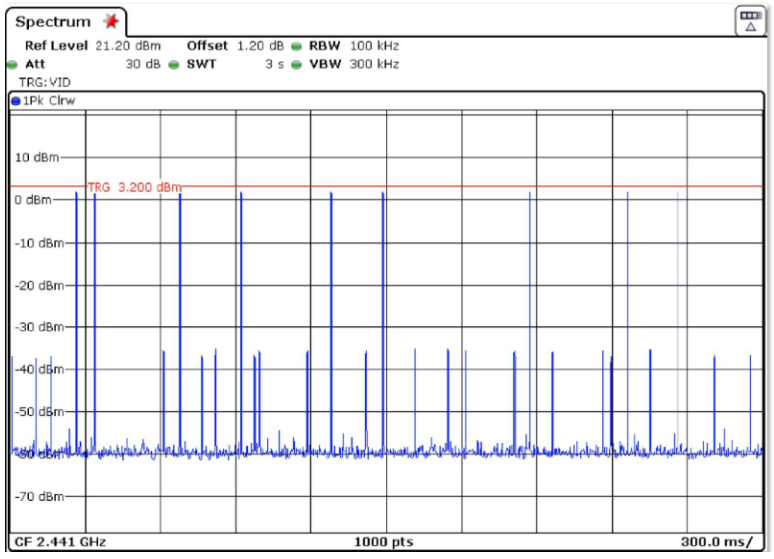
Number of hops over a period of 3 seconds: 14 hops.

Number of hops in the period specified in the requirements = (14 hops) x (31.6 s / 3 s) = 148 hops.
Averaging time of occupancy = 1.612 ms x 148 hops = 238.58 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (GFSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE DH5**

Transmit Time per Hop: 2.858 ms



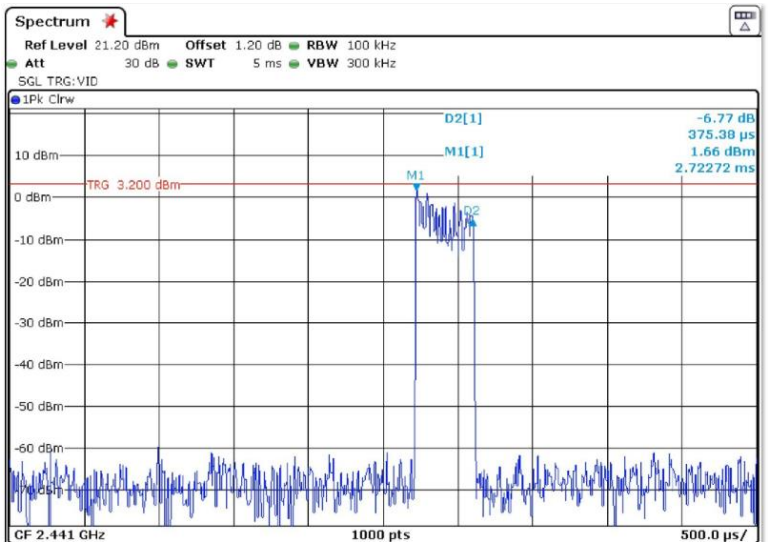


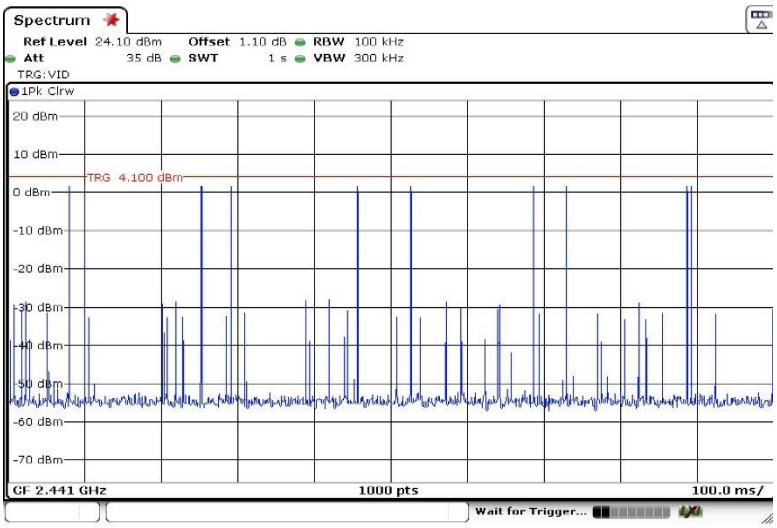
Number of hops over a period of 3 seconds: 9 hops.

Number of hops in the period specified in the requirements = (9 hops) x (31.6 s / 3 s) = 95 hops.
Averaging time of occupancy = 2.858 ms x 95 hops = 268.65 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 2DH1**

Transmit Time per Hop: 0.375 ms



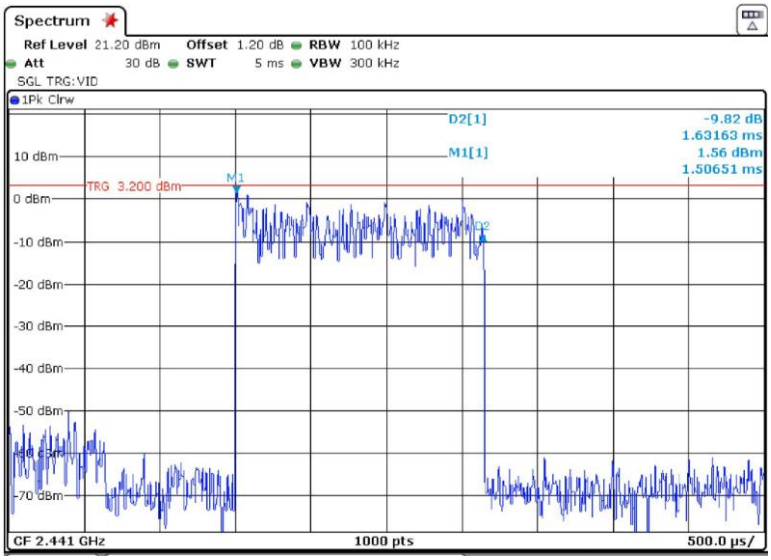


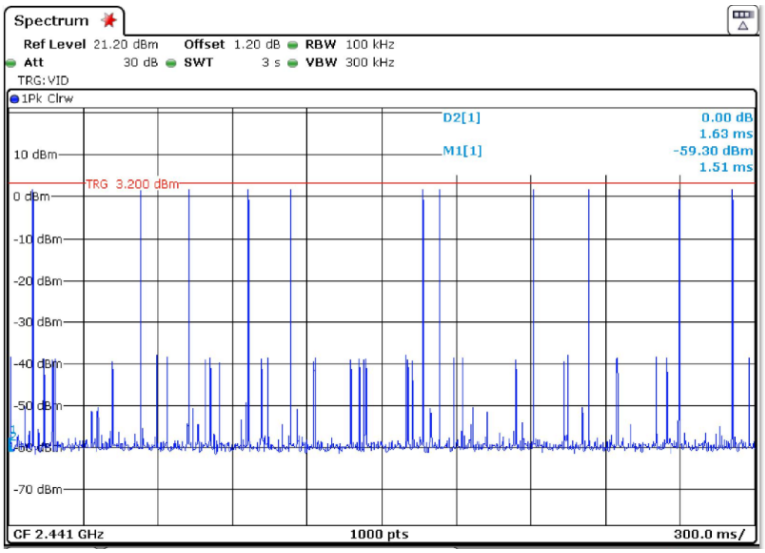
Number of hops over a period of 3 seconds: 31 hops.

Number of hops in the period specified in the requirements = (31 hops) x (31.6 s / 3 s) = 327 hops.
Averaging time of occupancy = 0.375 ms x 327 hops = 122.63 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 2DH3**

Transmit Time per Hop: 1.632 ms



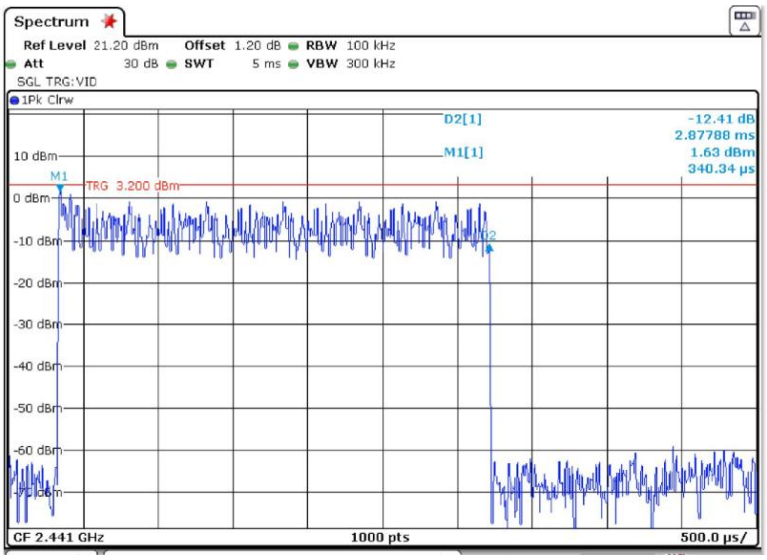


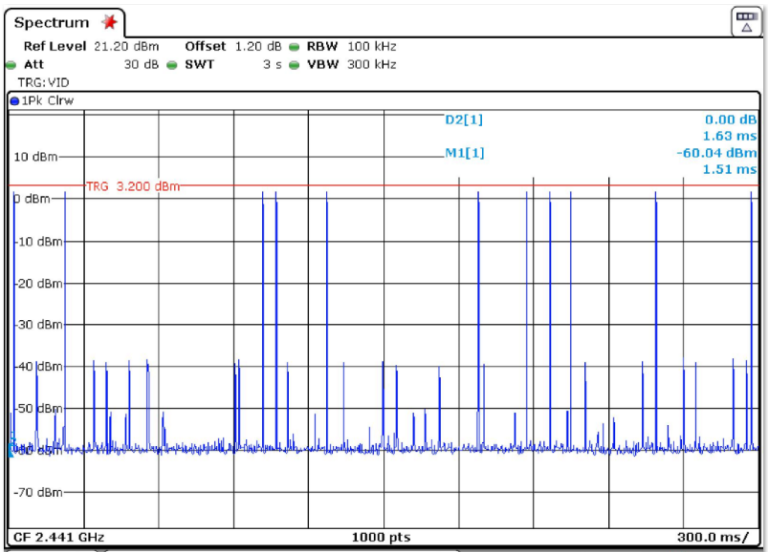
Number of hops over a period of 3 seconds: 10 hops.

Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 106 hops.
Averaging time of occupancy = 1.632 ms x 106 hops = 173.02 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 2DH5**

Transmit Time per Hop: 2.878 ms



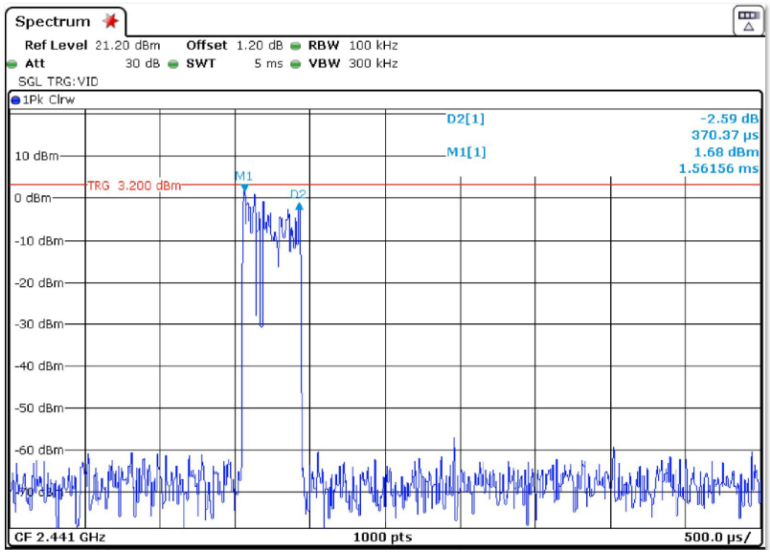


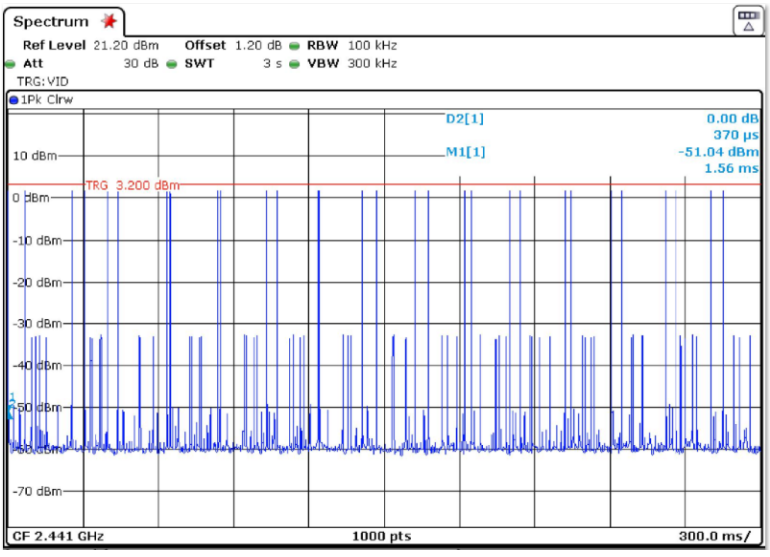
Number of hops over a period of 3 seconds: 10 hops.

Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 106 hops.
Averaging time of occupancy = 2.878 ms x 106 hops = 305.07 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 3DH1**

Transmit Time per Hop: 0.370 ms



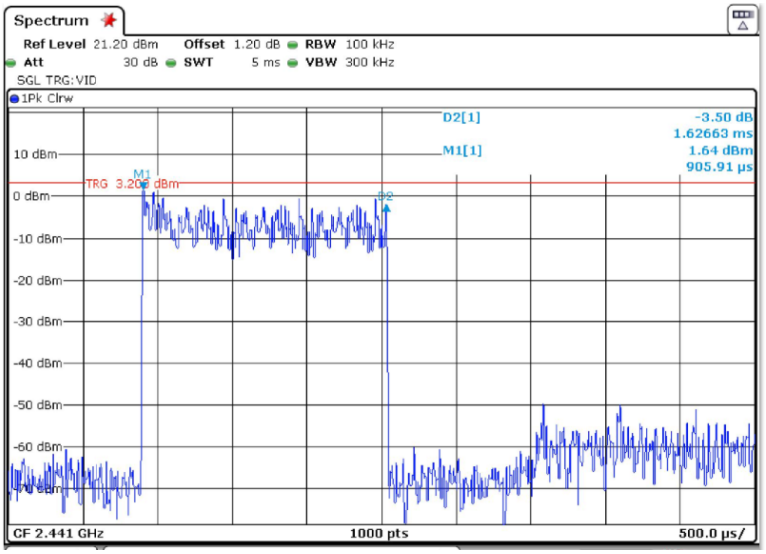


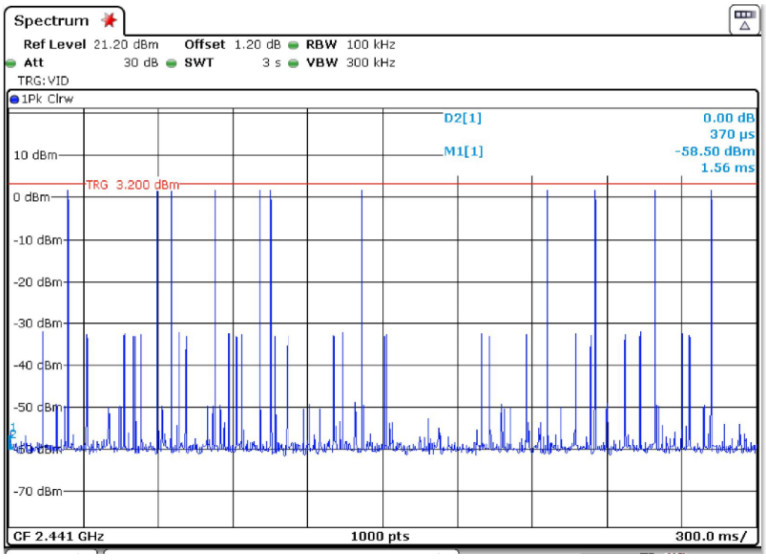
Number of hops over a period of 3 seconds: 25 hops.

Number of hops in the period specified in the requirements = (25 hops) x (31.6 s / 3 s) = 264 hops.
Averaging time of occupancy = 0.370 ms x 264 hops = 97.68 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 3DH3**

Transmit Time per Hop: 1.627 ms



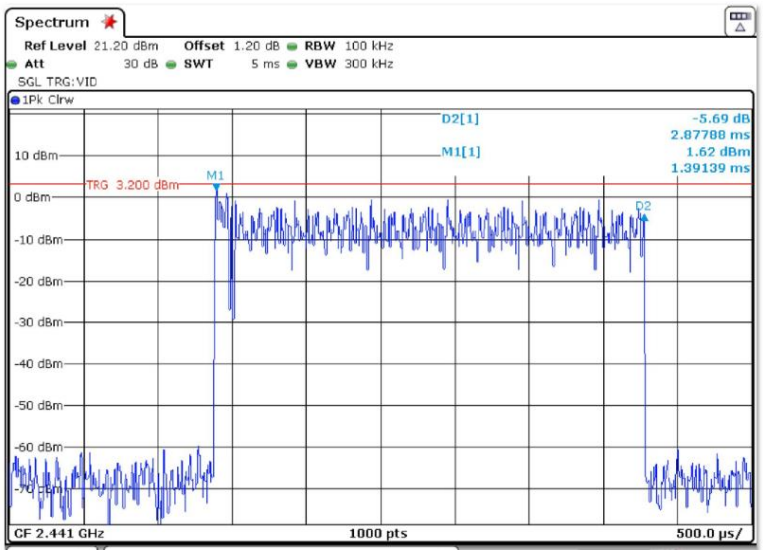


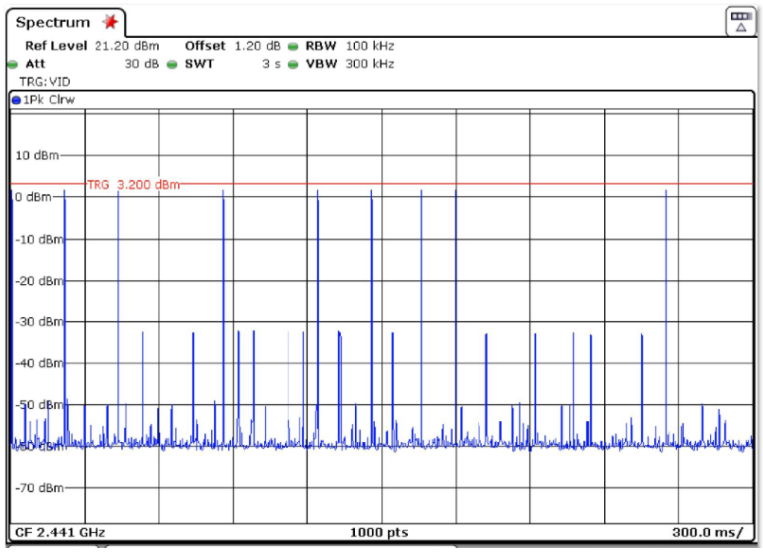
Number of hops over a period of 3 seconds: 10 hops.

Number of hops in the period specified in the requirements = (10 hops) x (31.6 s / 3 s) = 106 hops.
Averaging time of occupancy = 1.627 ms x 106 hops = 172.46 ms per 31.6 seconds.

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**PACKET TYPE 3DH5**

Transmit Time per Hop: 2.878 ms





Number of hops over a period of 3 seconds: 7 hops.

Number of hops in the period specified in the requirements = (7 hops) x (31.6 s / 3 s) = 74 hops.
Averaging time of occupancy = 2.878 ms x 74 hops = 212.97 ms per 31.6 seconds.

TEST A.4: MAXIMUM PEAK CONDUCTED OUTPUT POWER AND ANTENNA GAIN

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(b) (3) and RSS-247 5.4(b)

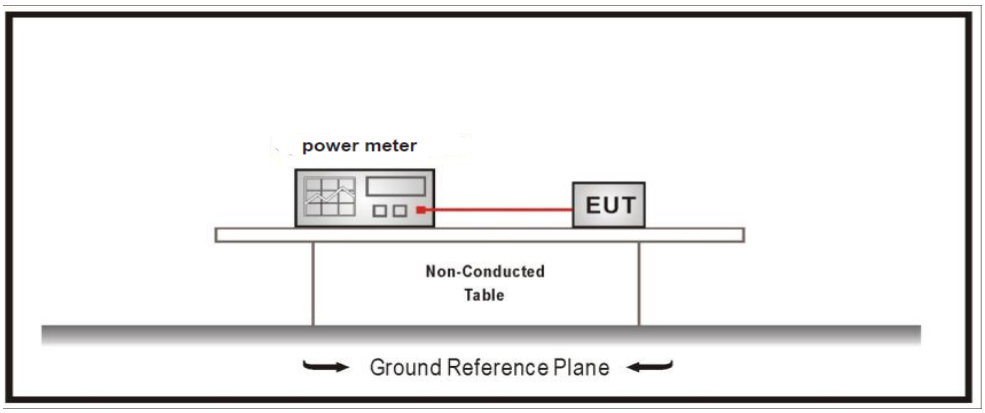
LIMITS

For Frequency Hopping systems operating in the 2400 – 2483.5 MHz band employing at least 75 hopping channels: 1 watt (30 dBm). (Part 15 Subpart C §15.247).

The e.i.r.p. shall not exceed 4 W (RSS-247).

TEST SETUP	

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power



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

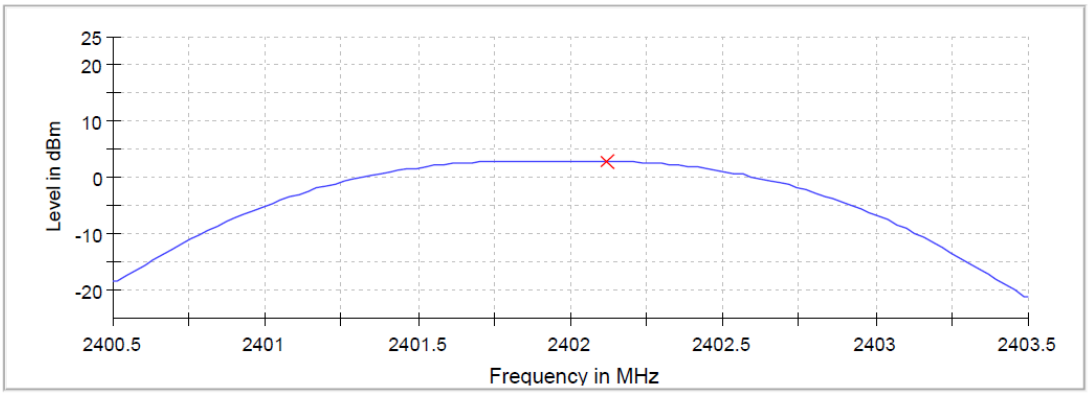
Maximum declared antenna gain: -3.2 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	2.8	2.7	2.0
Maximum EIRP power (dBm)	-0.4	-0.5	-1.2

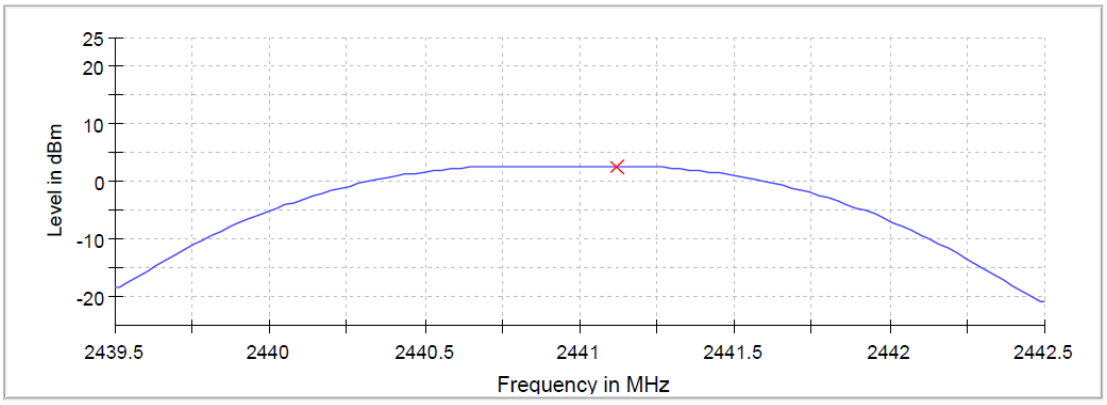
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

TEST RESULTS (Cont.):	CONDUCTED OUTPUT POWER

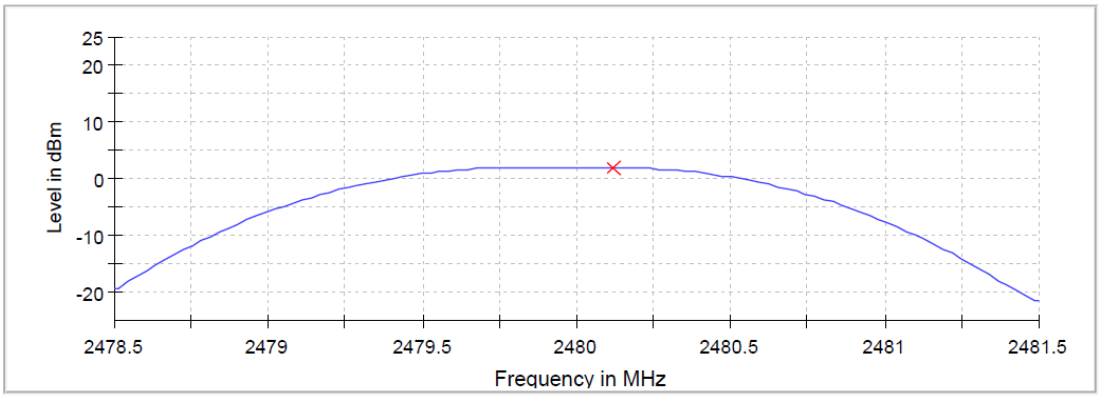
Lowest Channel



Middle Channel



Highest Channel



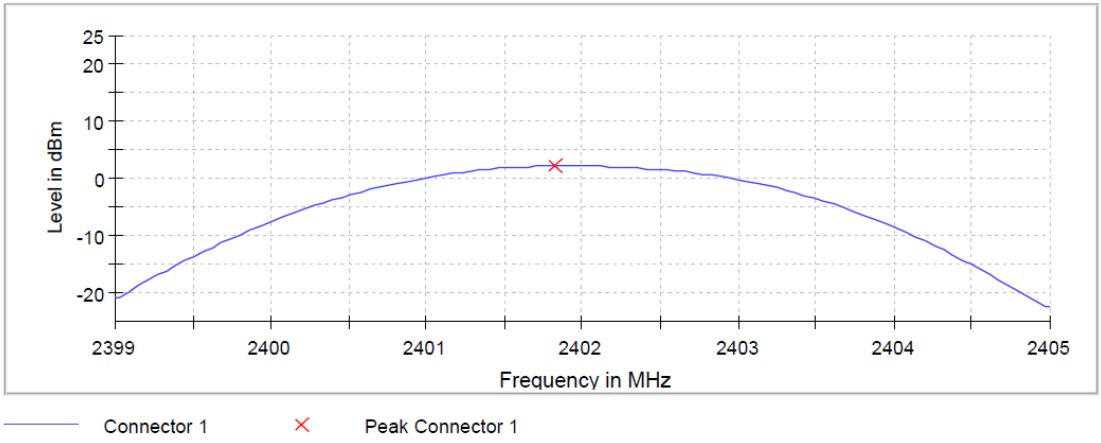
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

Maximum declared antenna gain: -3.2 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	2.1	2.2	1.5
Maximum EIRP power (dBm)	-1.1	-1.0	-1.7

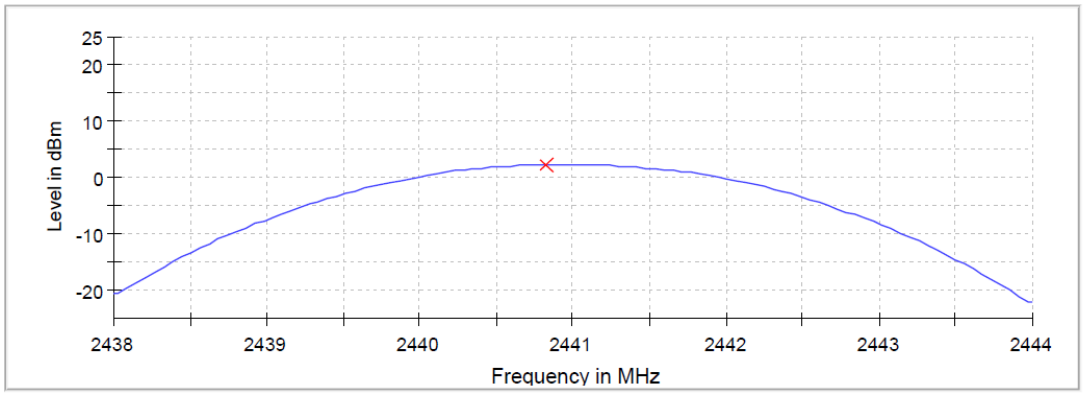
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Lowest Channel

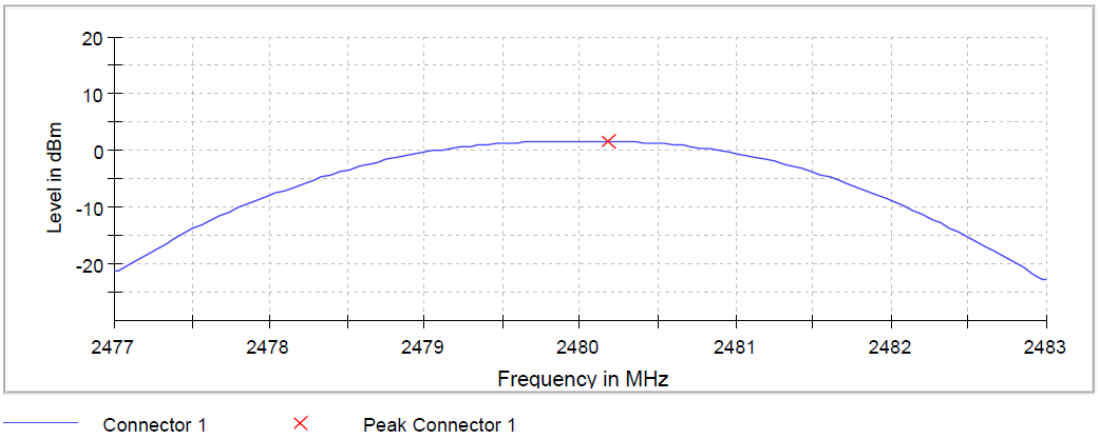


TEST RESULTS (Cont.)	CONDUCTED OUTPUT POWER

Middle Channel



Highest Channel



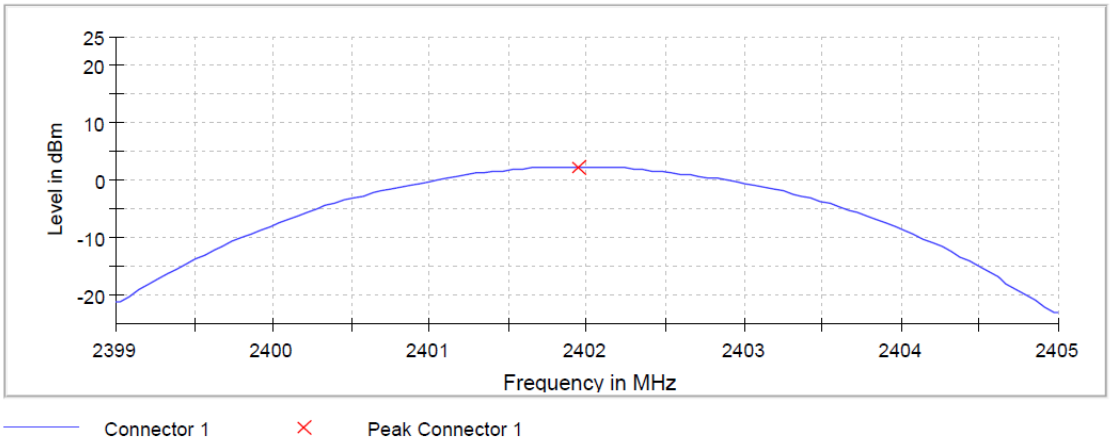
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

Maximum declared antenna gain: -3.2 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	2.3	2.5	1.9
Maximum EIRP power (dBm)	-0.9	-0.7	-1.3

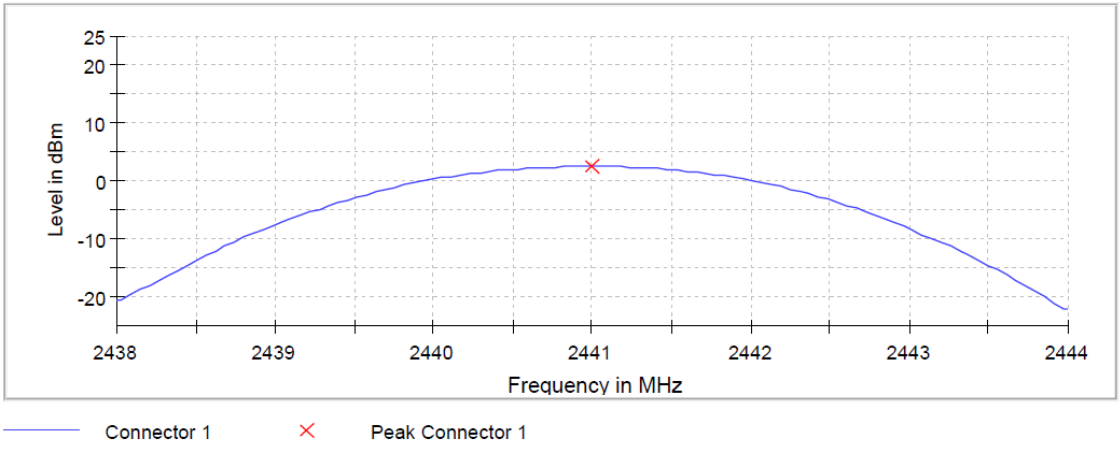
The maximum directional gain of the antenna is less than 6 dBi and therefore the maximum output power is not required to be reduced from the stated values.

Lowest Channel

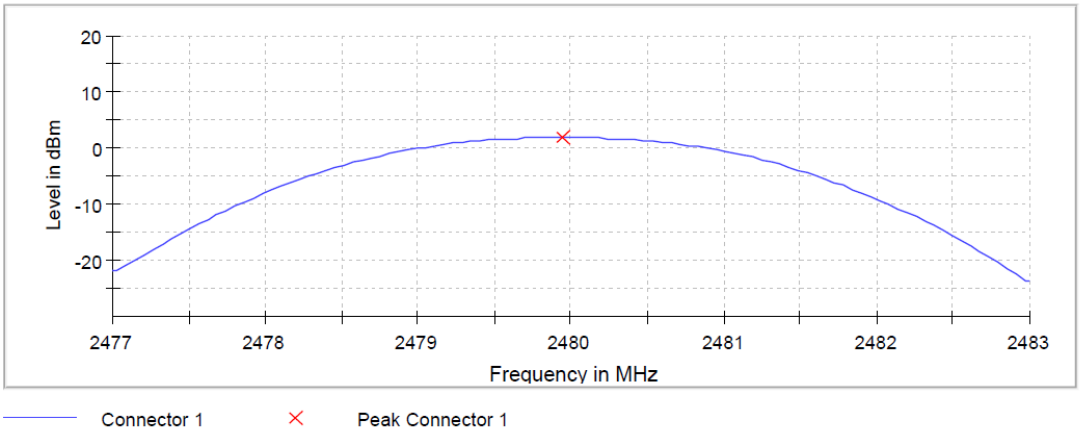


TEST RESULTS (Cont.)	

Middle Channel



Highest Channel



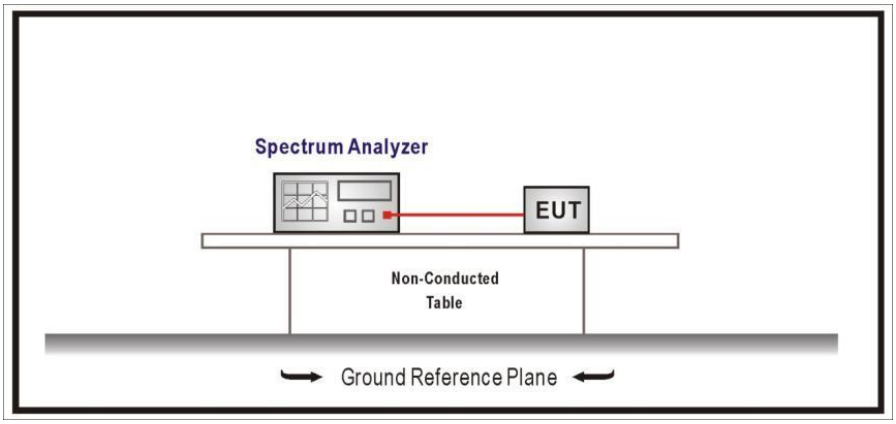
TEST A.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-247 5.5

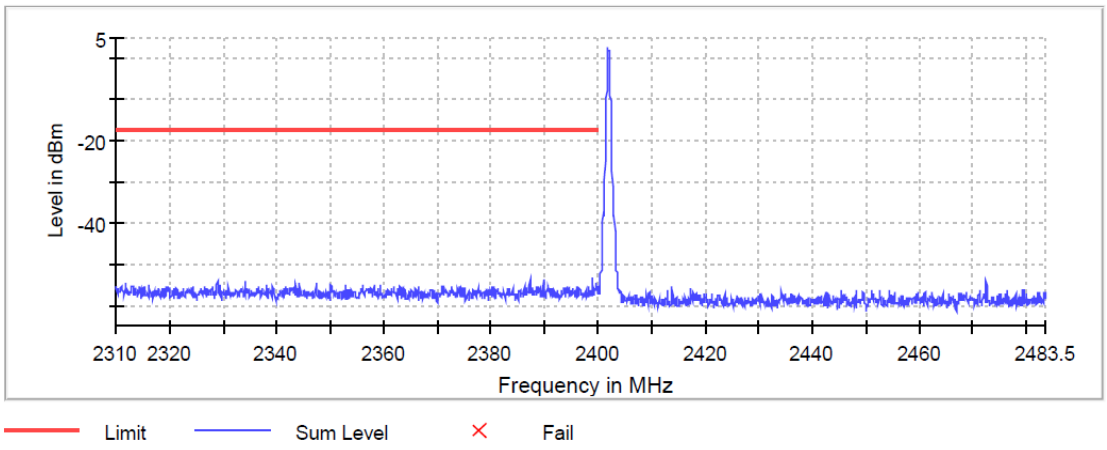
LIMITS

Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power.

TEST SETUP	



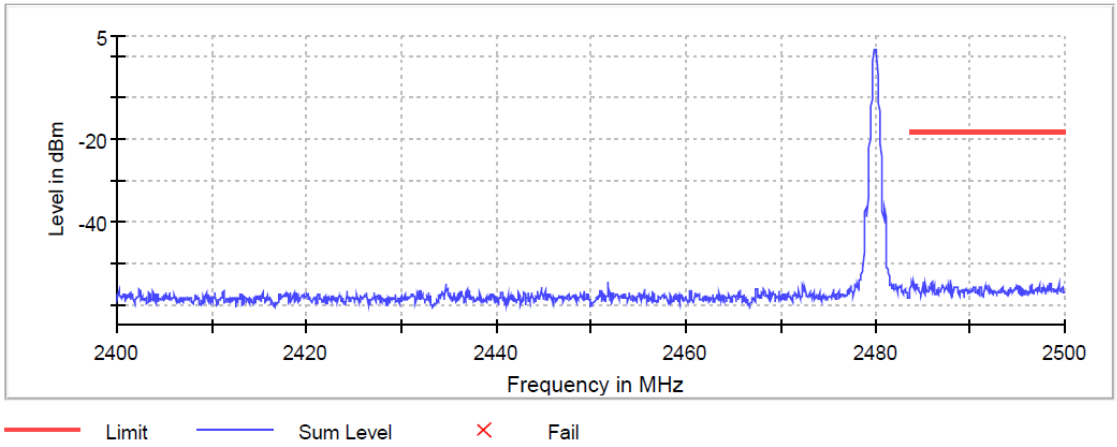
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000	2.40000 GHz
Stop Frequency	2.40000	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000	100.000 kHz
VBW	300.000	300.000 kHz
Sweep Points	1800	1670
Sweep time	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

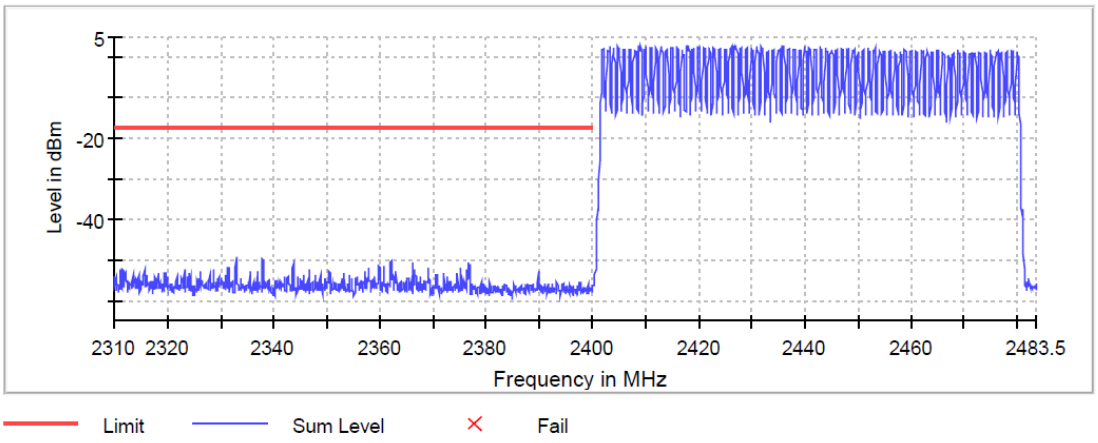
TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1670	330
Sweep time	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	8 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.09 dB	0.00 dB

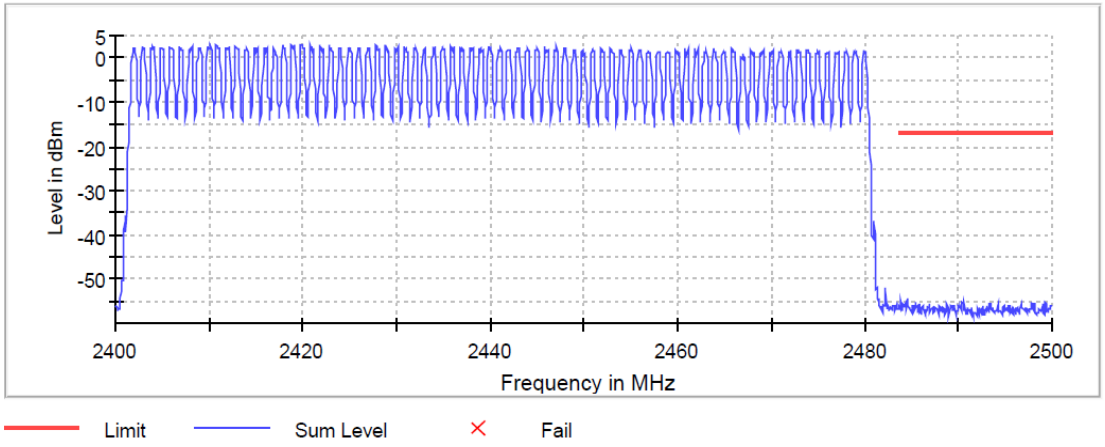
TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1800	1670
Sweep time	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	120 / max. 150
Stable	3 / 3	3/ 3
Max Stable Difference	0.00 dB	0.36 dB

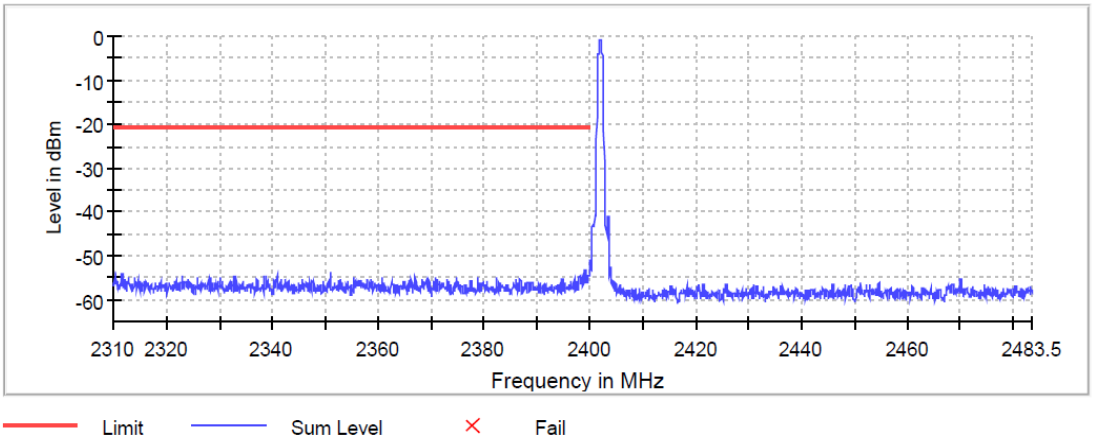
TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1670	330
Sweep time	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	114 / max.	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.05 dB	0.00 dB

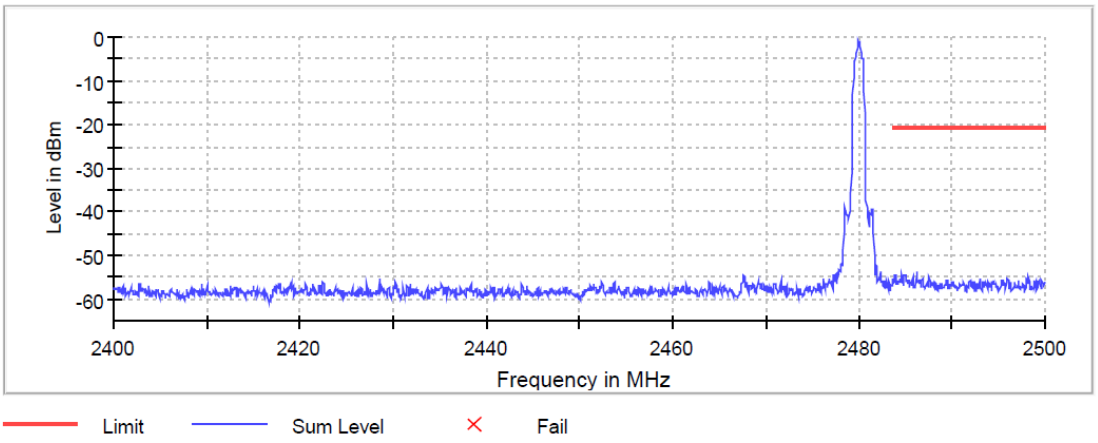
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000	2.40000 GHz
Stop Frequency	2.40000	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1800	1670
Sweep time	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	8 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.09 dB

TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)

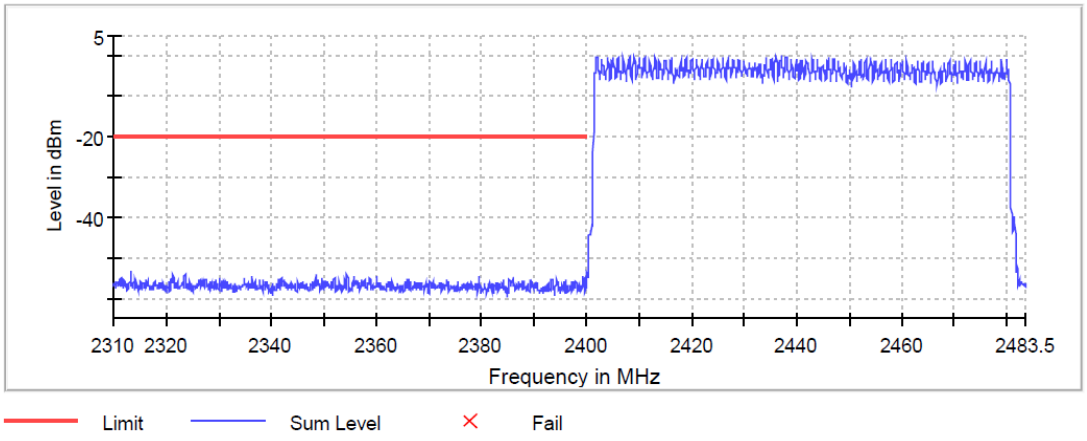


Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1670	330
Sweep time	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	12 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.01 dB	0.00 dB

TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)

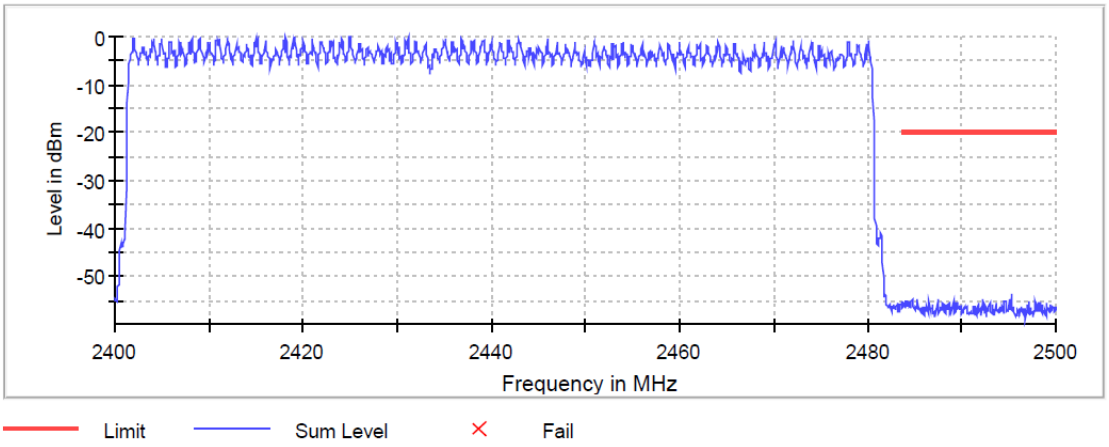
Low**est Channel**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1800	1670
Sweep time	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	146 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.00 dB

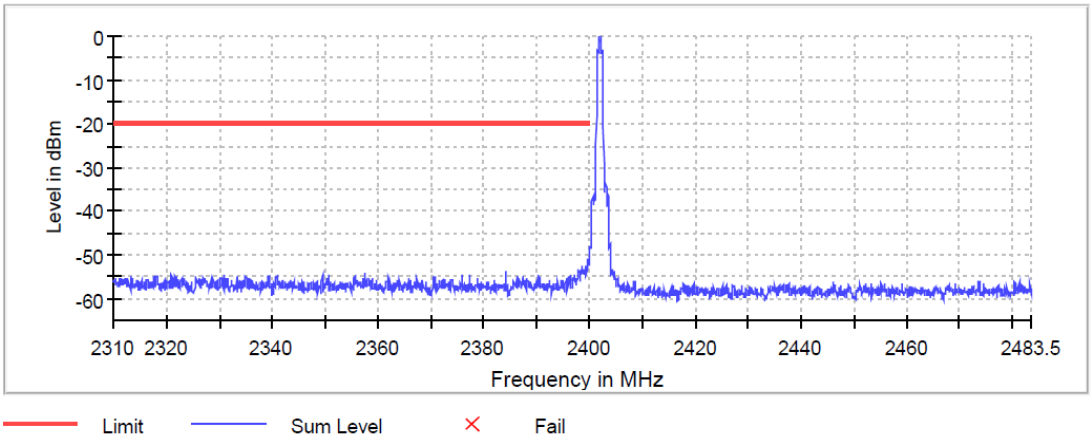
TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1670	330
Sweep time	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	131 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable	0.15 dB	0.00 dB

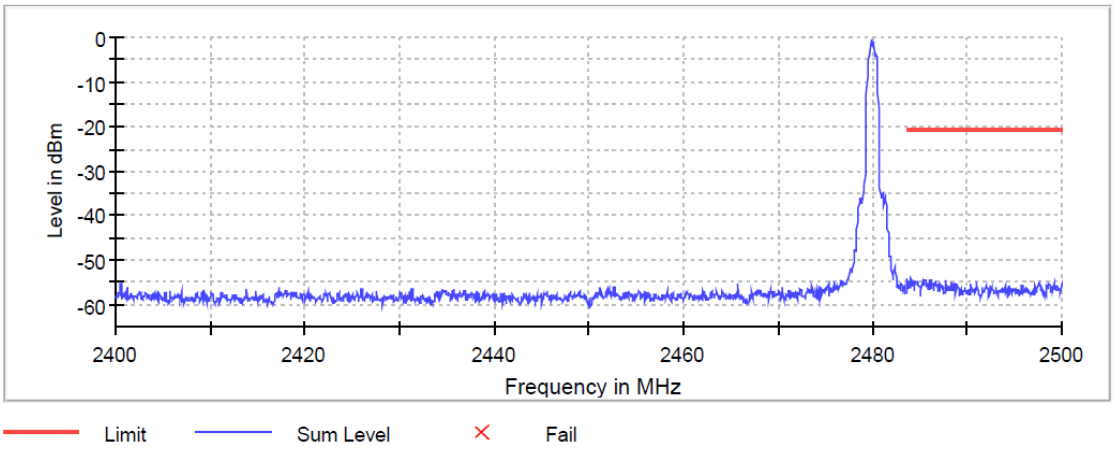
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	**HOPPING OFF (Lowest channel)**



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1800	1670
Sweep time	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	10 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.14 dB

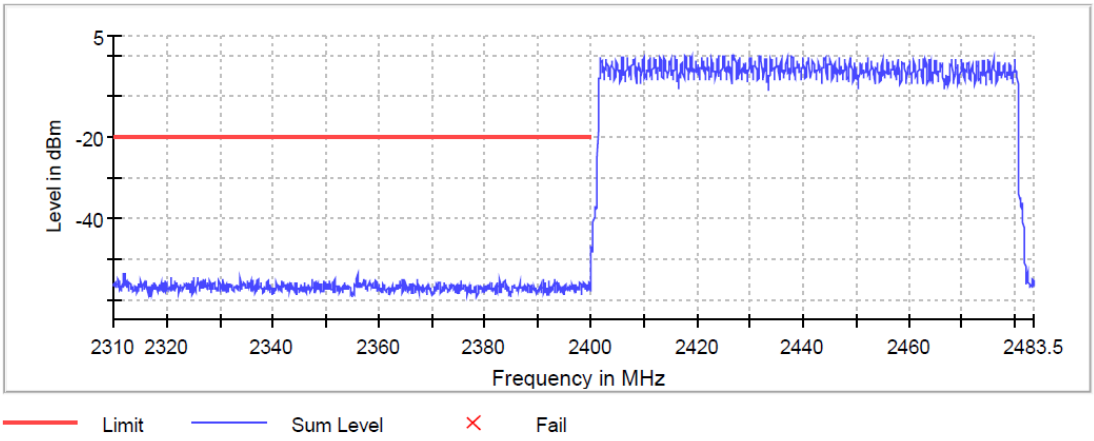
TEST RESULTS (Cont.):	HOPPING OFF (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1670	330
Sweep time	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	12 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.11 dB	0.00 dB

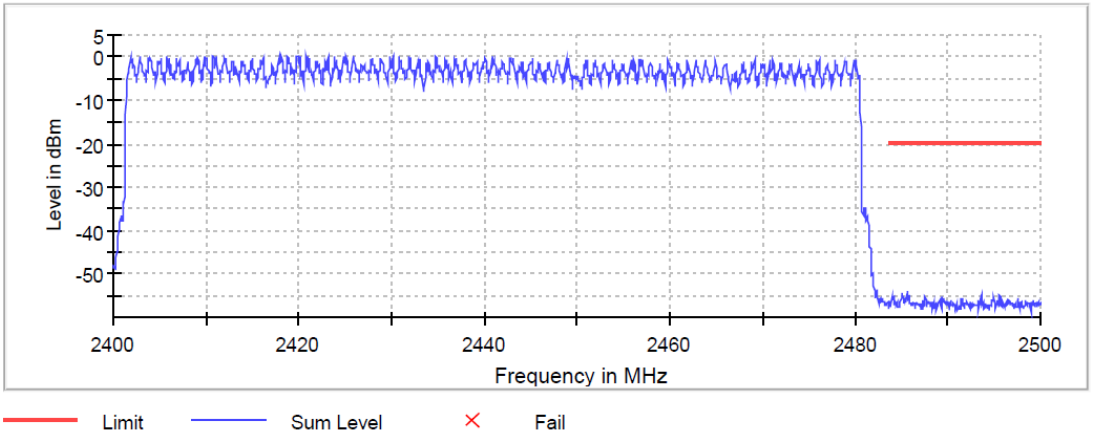
TEST RESULTS (Cont.):	HOPPING ON (Lowest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.31000 GHz	2.40000 GHz
Stop Frequency	2.40000 GHz	2.48350 GHz
Span	90.000 MHz	83.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1800	1670
Sweep time	113.672 µs	94.727 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	4 / max. 150	136 / max. 150
Stable	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.47 dB

TEST RESULTS (Cont.):	HOPPING ON (Highest channel)



Measurement

Setting	Instrument Value	Instrument Value
Start Frequency	2.40000 GHz	2.48350 GHz
Stop Frequency	2.48350 GHz	2.50000 GHz
Span	83.500 MHz	16.500 MHz
RBW	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz
Sweep Points	1670	330
Sweep time	94.727 µs	18.945 µs
Reference Level	0.000 dBm	0.000 dBm
Attenuation	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak
Sweep Count	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweep type	FFT	FFT
Preamp	off	off
Stable mode	Trace	Trace
Stable value	0.50 dB	0.50 dB
Run	145 / max. 150	4 / max. 150
Stable	3 / 3	3 / 3
Max Stable	0.00 dB	0.00 dB

TEST A.6: EMISSION LIMITATIONS RADIATED (TRANSMITTER)

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	Part 15 Subpart C §15.247(d) and RSS-Gen 8.9 and 8.10

LIMITS

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c) / RSS-Gen):

Frequency Range (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 25000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RSS-247. Attenuation below the general field strength limits specified in RSS-Gen is not required

TEST SETUP	

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18 GHz (Double ridge horn antennas), and at 1m for the frequency range 18-26 GHz (Double ridge horn antennas).

For radiated emissions in the range 18-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

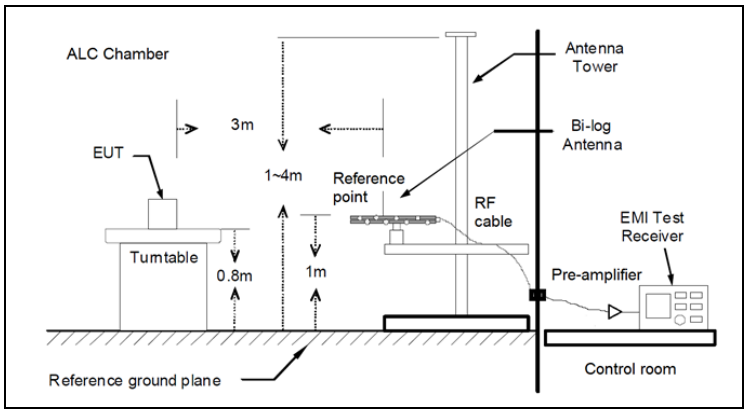
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

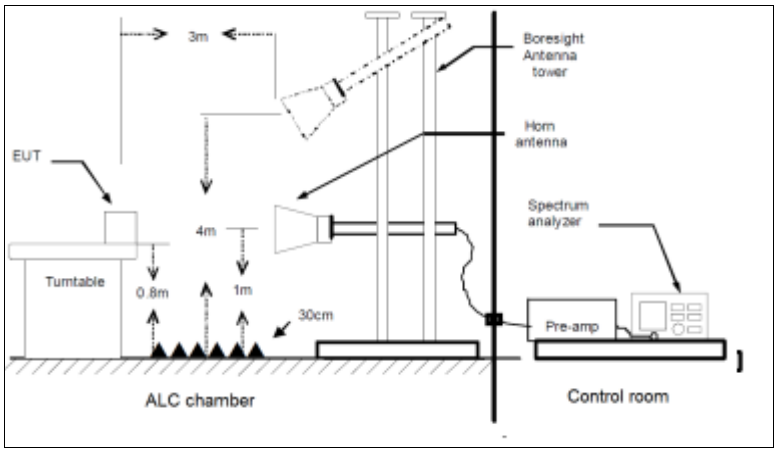
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (CONT.)	

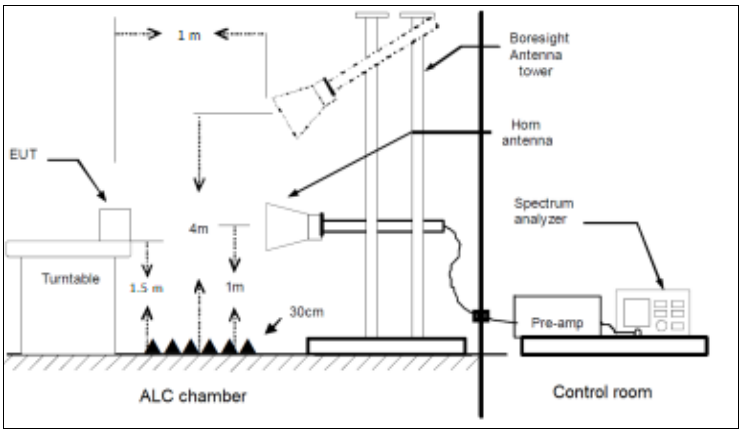
Radiated measurements Setup f < 1 GHz



Radiated measurements setup f > 1-18 GHz



Radiated measurements setup f > 18 GHz



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#01 (GFSK)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT.

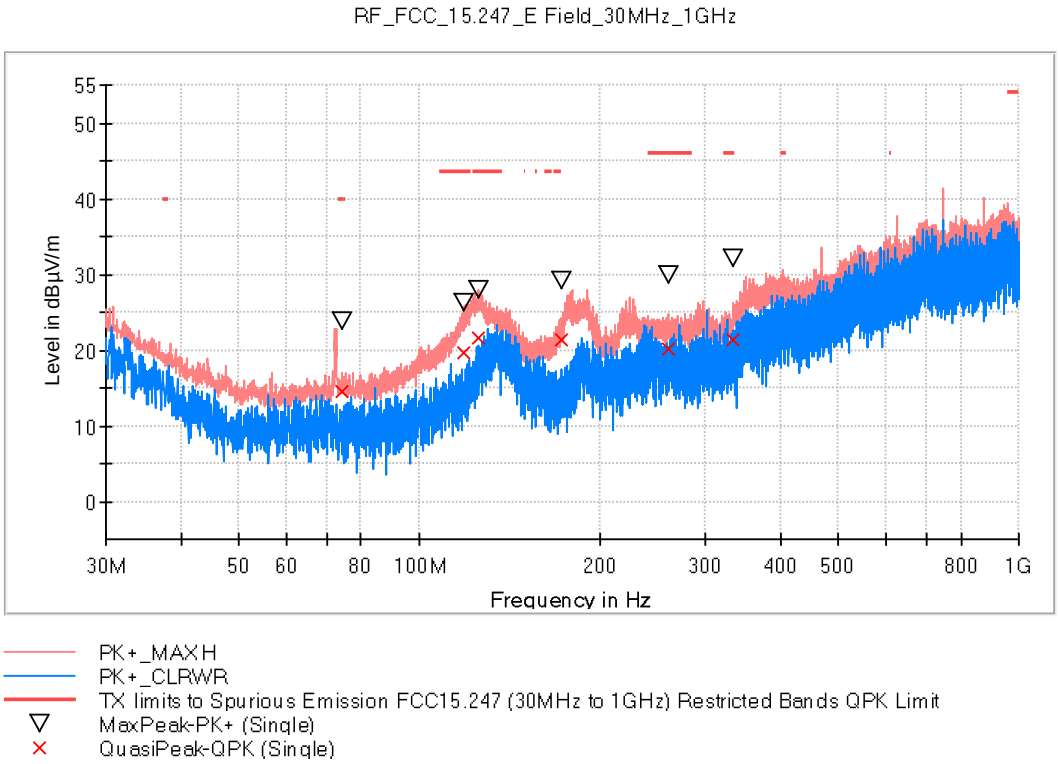
The results in the following plots and tables show the maximum measured levels in the 30-1000 MHz range.

Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31 - 2.39 GHz and 2.4835 - 2.5 GHz.

TEST RESULTS (Cont.):	30 MHz – 1000 MHz (GFSK)

CHANNEL: Middle (2441 MHz).

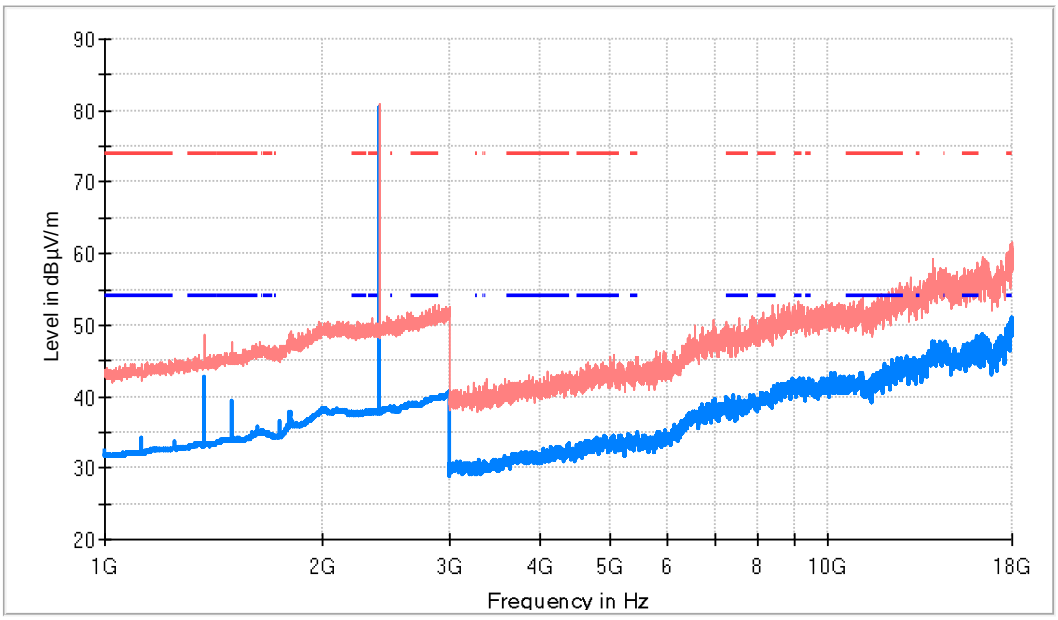


Maximizations

Frequency (MHz)	MaxPeak (dBµV/m)	QuasiPeak (dBµV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBµV/m)
74.377500	23.9	14.6	V	25.4	40.0
118.609500	26.2	19.6	V	23.9	43.5
125.642000	27.8	21.5	V	22.0	43.5
172.250500	29.3	21.4	V	22.1	43.5
260.908500	30.0	20.1	V	25.9	46.0
332.688500	32.0	21.4	V	24.6	46.0

TEST RESULTS (Cont.)	1 GHz – 18 GHz (GFSK)

CHANNEL: Lowest (2402 MHz).



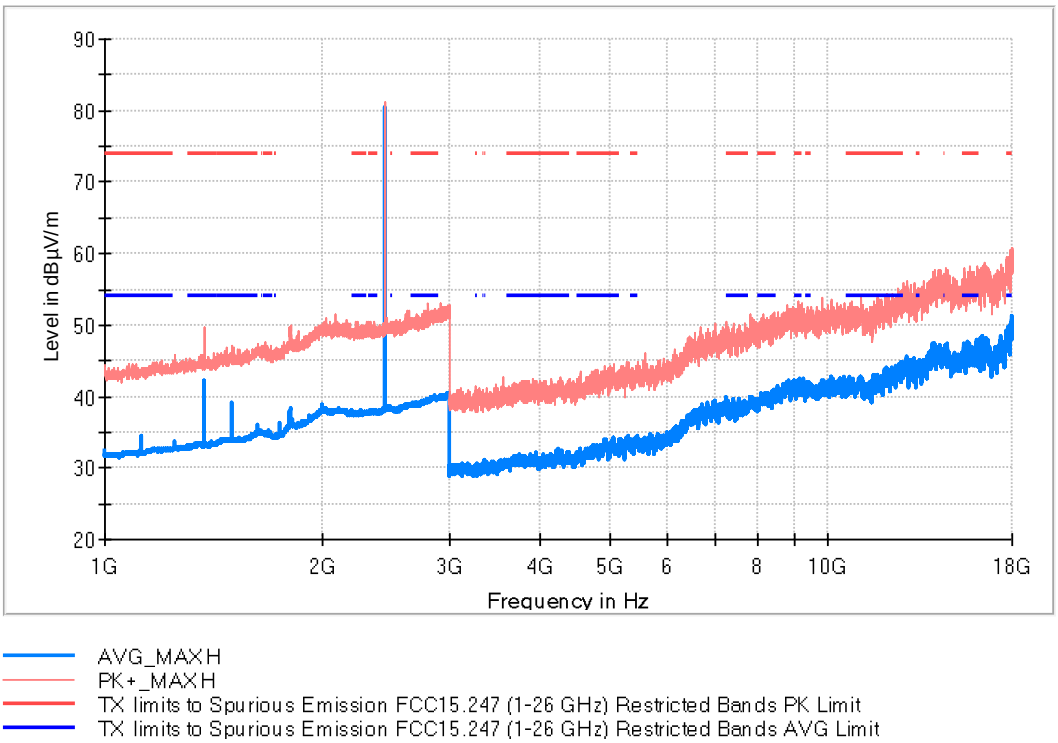
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.7	42.6	V	11.4	54.0	
2402.000000	81.0	80.4	H	---	---	Fundamental
17962.000000	61.2	50.9	H	3.1	54.0	

TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz).

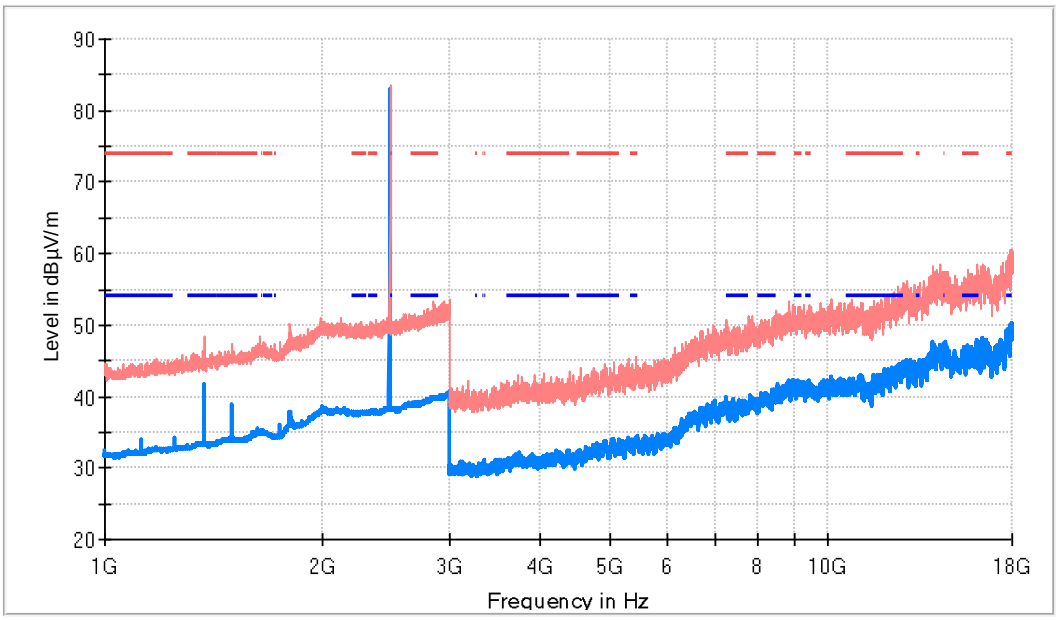


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	49.7	42.1	V	11.9	54.0	
2441.000000	81.2	80.6	V	---	---	Fundamental
17952.500000	59.3	51.2	H	2.8	54.0	

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz).

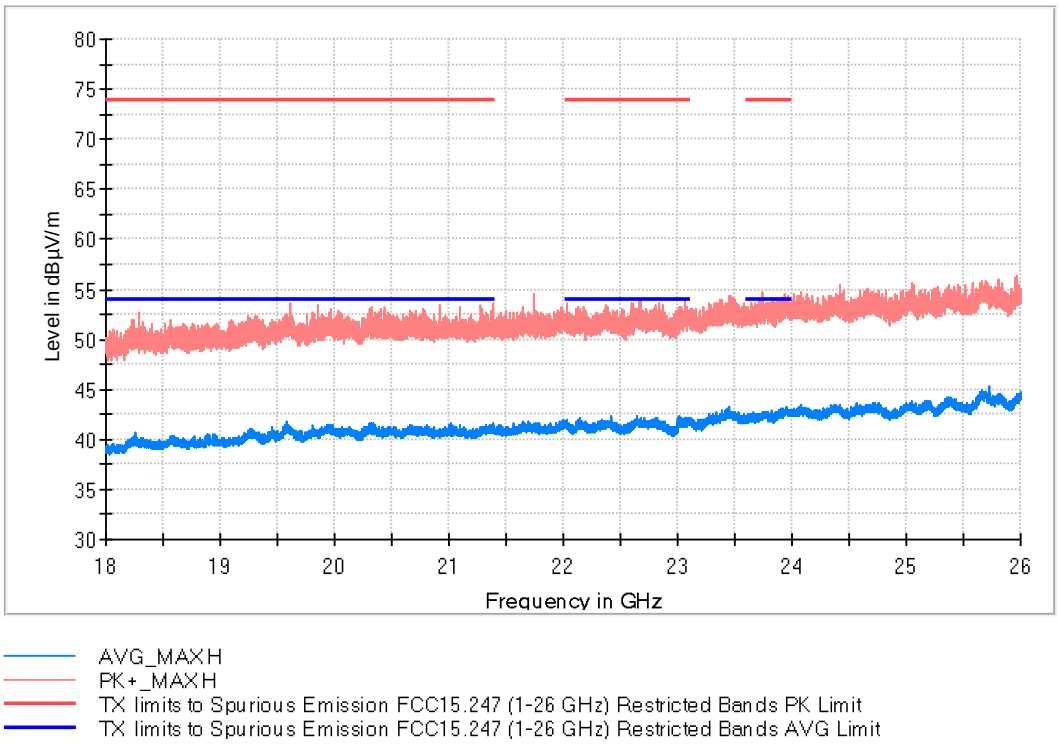


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.4	41.8	V	12.2	54.0	
2480.000000	83.5	82.9	V	---	---	Fundamental
17963.000000	59.5	50.3	V	3.7	54.0	

TEST RESULTS (Cont.)	18 GHz – 26 GHz (GFSK)

CHANNEL: Lowest (2402 MHz).

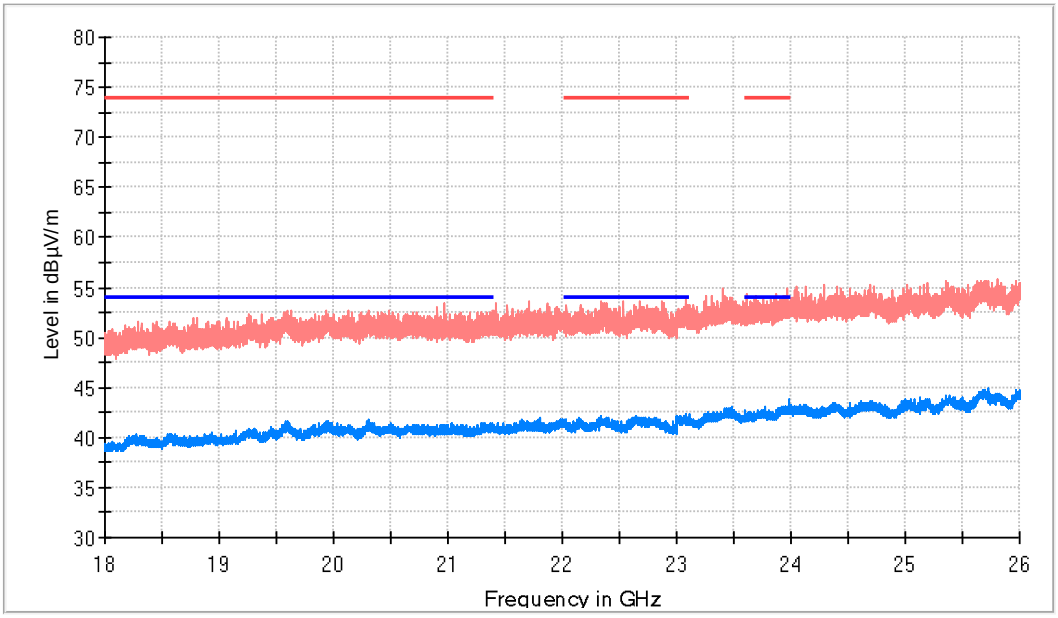


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23957.000000	52.7	43.3	H	10.7	54.0

TEST RESULTS (Cont.)	18 GHz – 26 GHz (GFSK)

CHANNEL: Middle (2441 MHz).



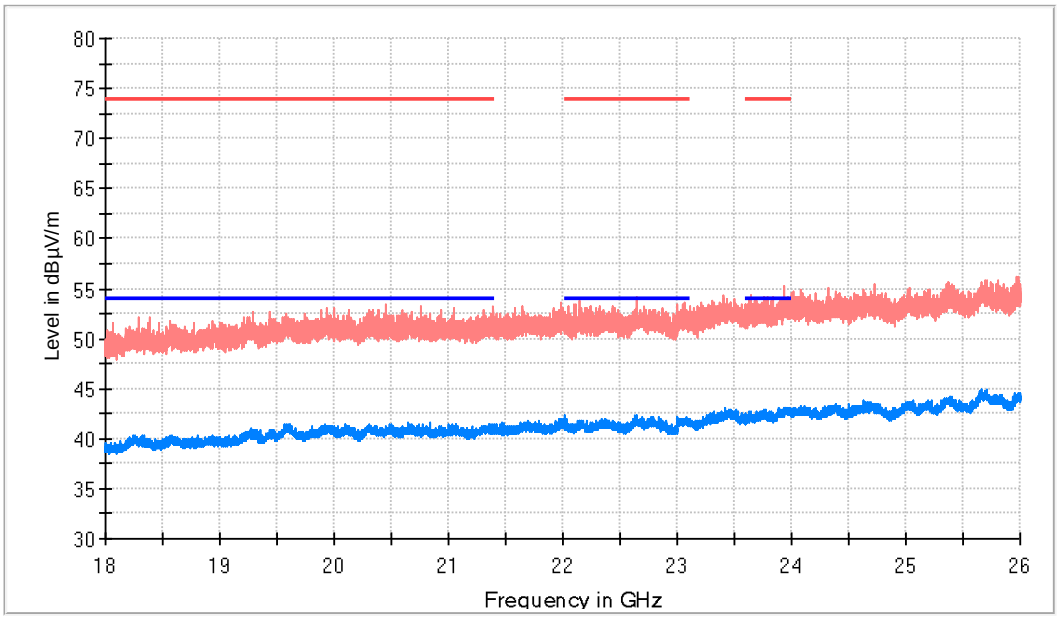
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23983.000000	52.6	43.8	H	10.2	54.0

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz).

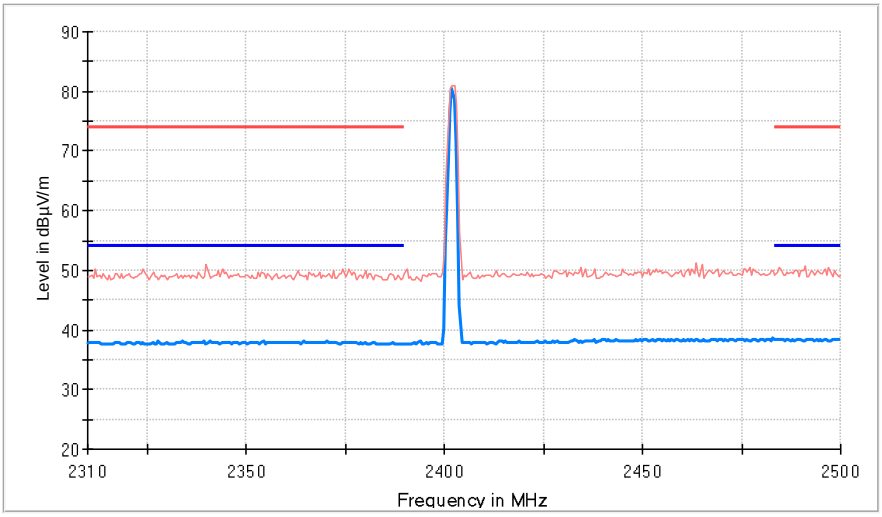


Maximizations

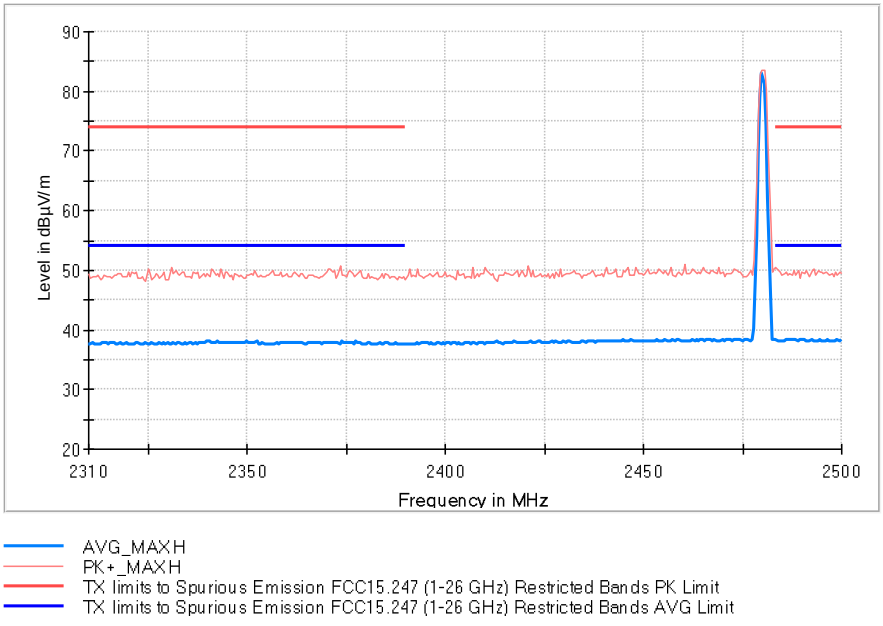
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23931.500000	53.0	43.1	V	10.9	54.0

RESTRICTED BANDS	2.31 GHz – 2.5 GHz (GFSK)

CHANNEL: Lowest (2402 MHz)



CHANNEL: Highest (2480 MHz)



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#02 (π/4-DQPSK)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

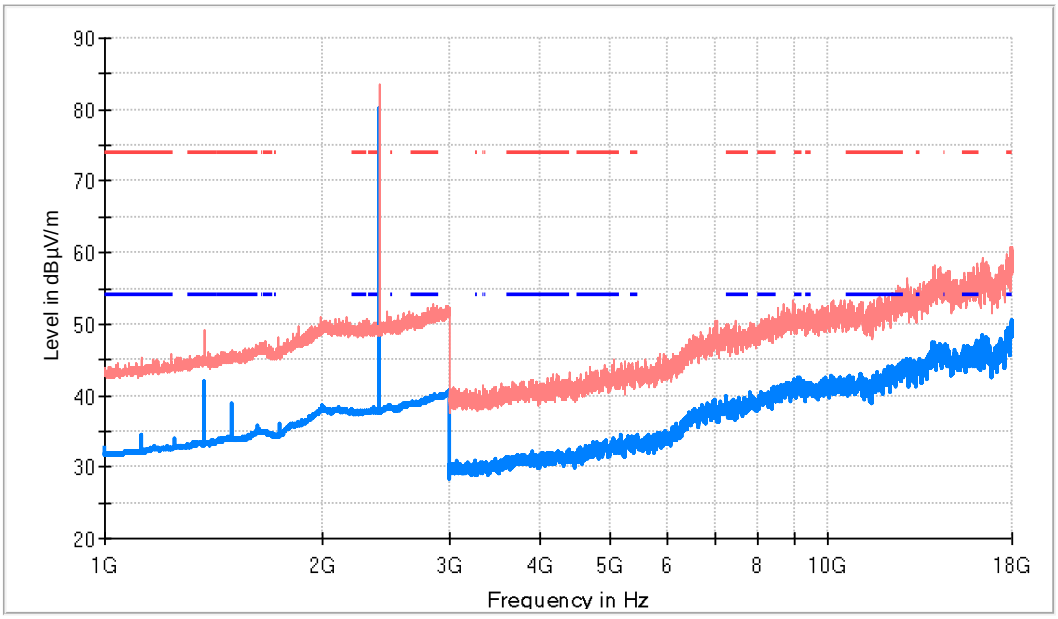
The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT. GFSK Modulation was identified as a worst case.

Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31 - 2.39 GHz and 2.4835 - 2.5 GHz.

TEST RESULTS (Cont.)	1 GHz – 18 GHz (π/4-DQPSK)

CHANNEL: Lowest (2402 MHz).



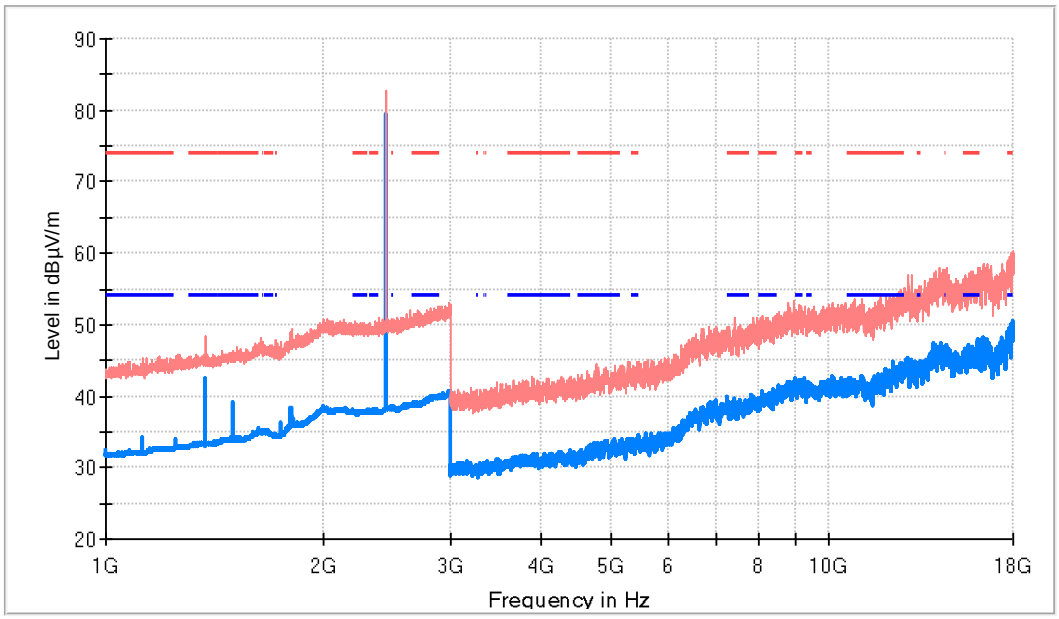
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.7	42.0	V	12.0	54.0	
2402.000000	83.5	80.1	V	---	---	Fundamental
17948.000000	59.4	50.6	H	3.4	54.0	

TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz).



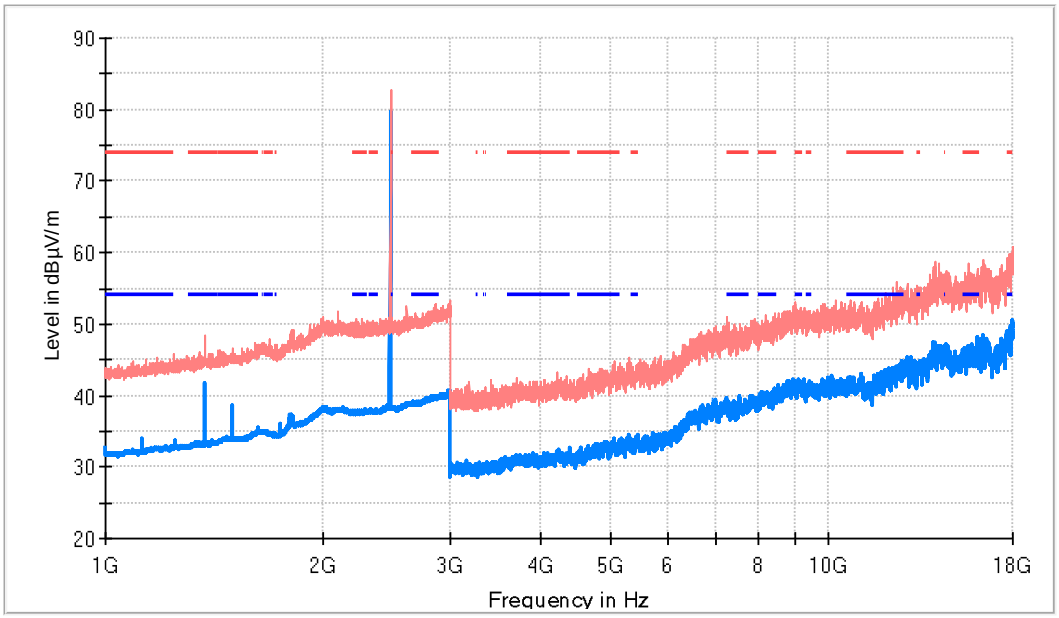
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.4	42.4	V	11.6	54.0	
2441.000000	82.8	79.3	V	---	---	Fundamental
17970.500000	58.1	50.4	H	3.6	54.0	

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)

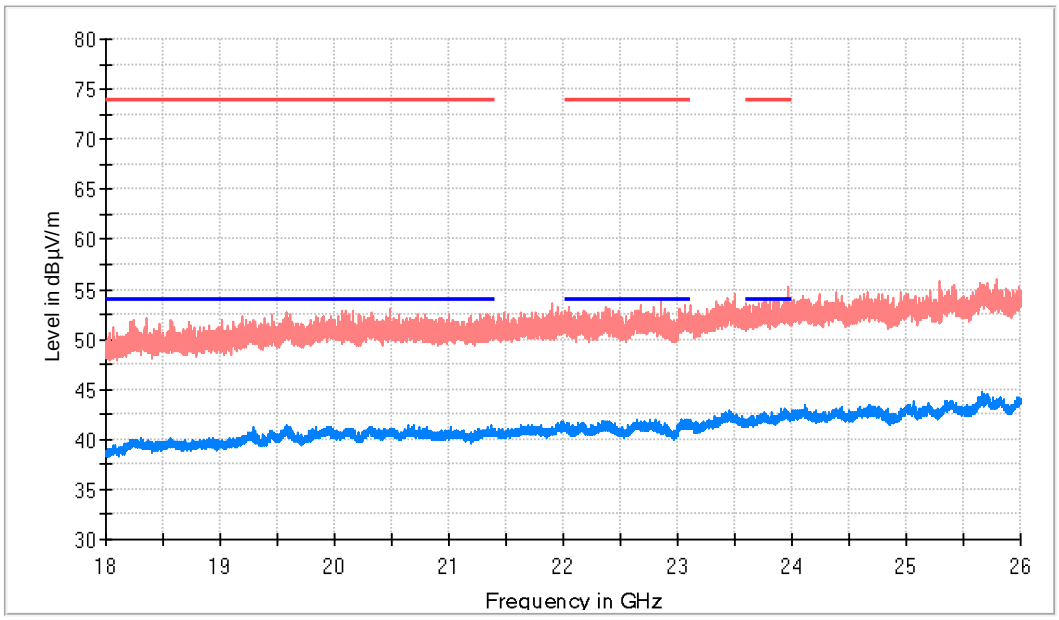


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.3	41.7	V	12.3	54.0	
2480.000000	82.9	79.6	V	---	---	Fundamental
17950.000000	58.6	50.5	H	3.5	54.0	

TEST RESULTS (Cont.)	18 GHz – 26 GHz (π/4-DQPSK)

CHANNEL: Lowest (2402 MHz)



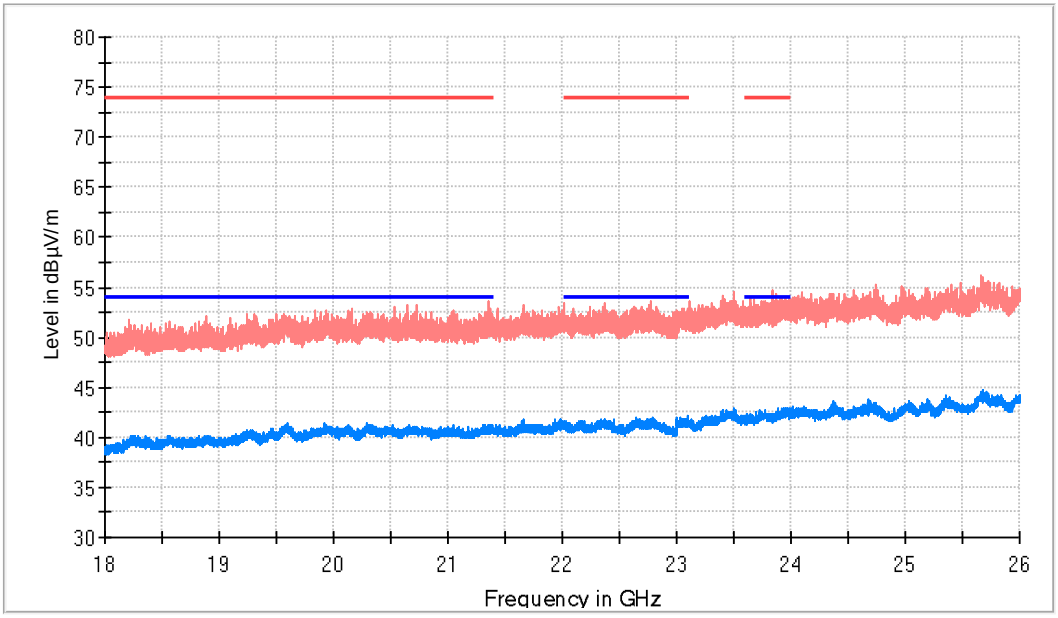
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23907.000000	52.5	43.0	H	11.0	54.0

TEST RESULTS (Cont.)

CHANNEL: Middle (2441 MHz)

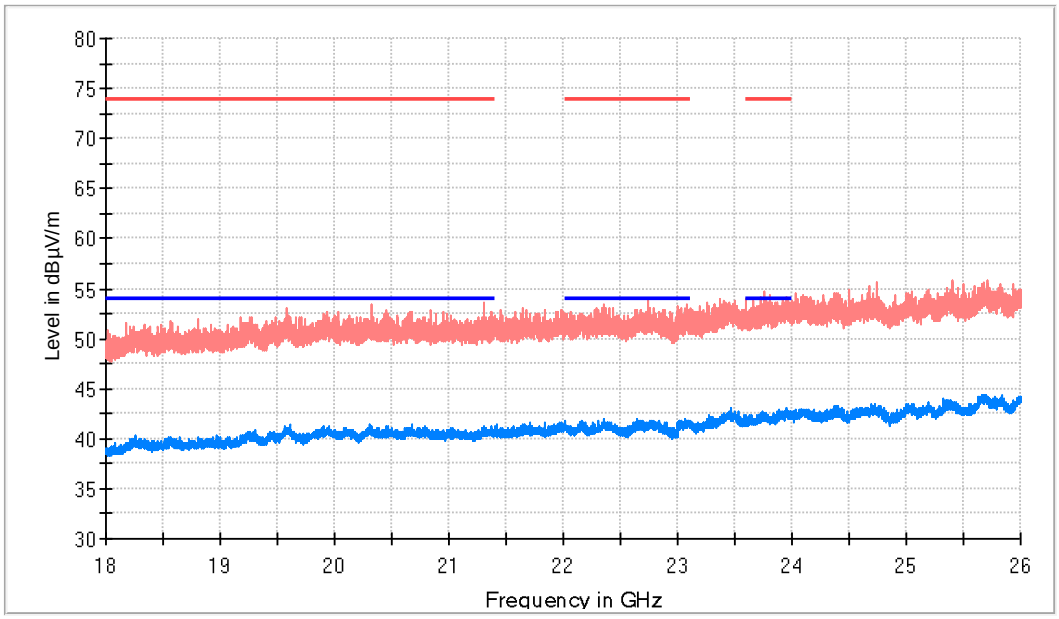


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23892.000000	52.4	42.9	H	11.1	54.0

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)

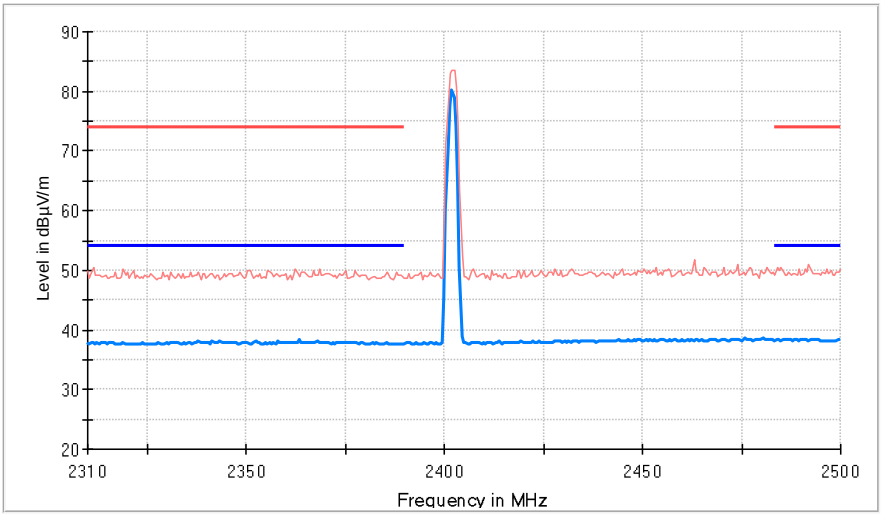


Maximizations

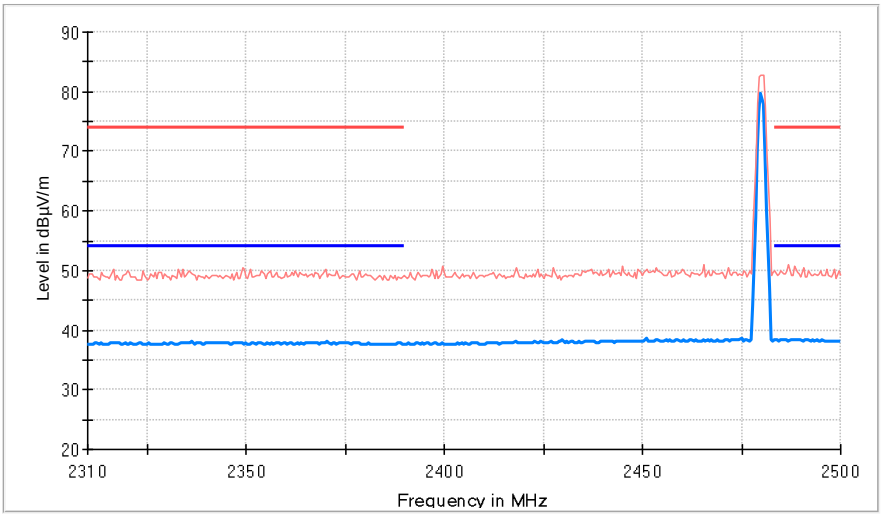
Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23952.500000	54.2	43.0	V	11.0	54.0

TEST RESULTS (Cont.):	RESTRICTED BAND 2.31 GHz – 2.5 GHz (π/4-DQPSK)

CHANNEL: Lowest (2402 MHz)



CHANNEL: Highest (2480 MHz)



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#03 (8DPSK)
TEST RESULTS:	PASS

Frequency range 30 MHz – 1000 MHz

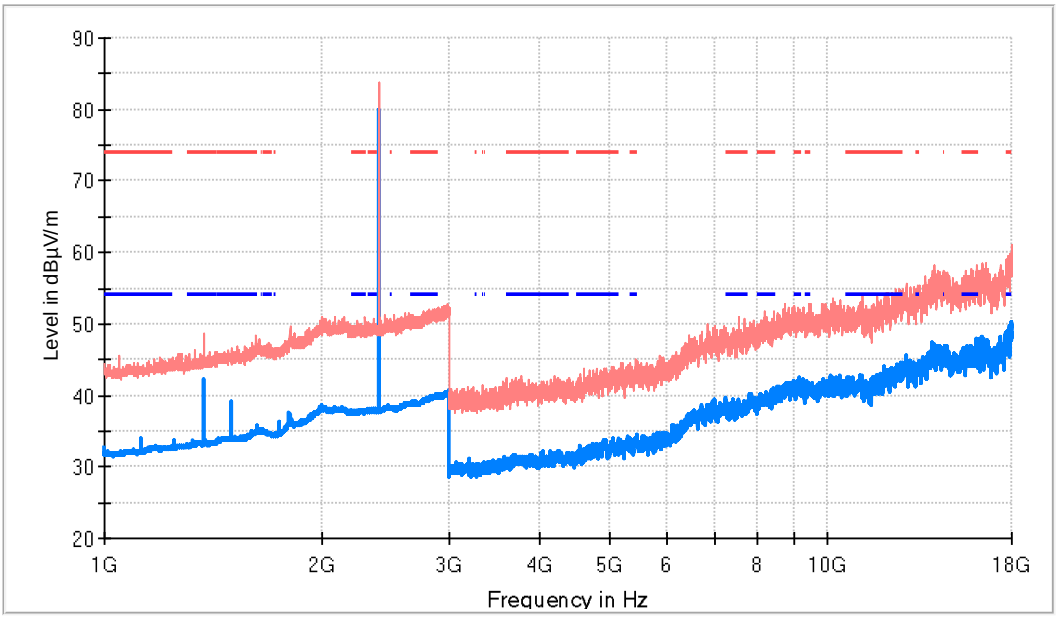
The spurious emissions below 1 GHz do not depend on the operating channel selected in the EUT. GFSK modulation was selected as a worst case.

Frequency range 1 GHz – 26 GHz

The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31 - 2.39 GHz and 2.4835 - 2.5 GHz.

TEST RESULTS (Cont.)	**1 GHz – 18 GHz (8DPSK)**

CHANNEL: Lowest (2402 MHz)

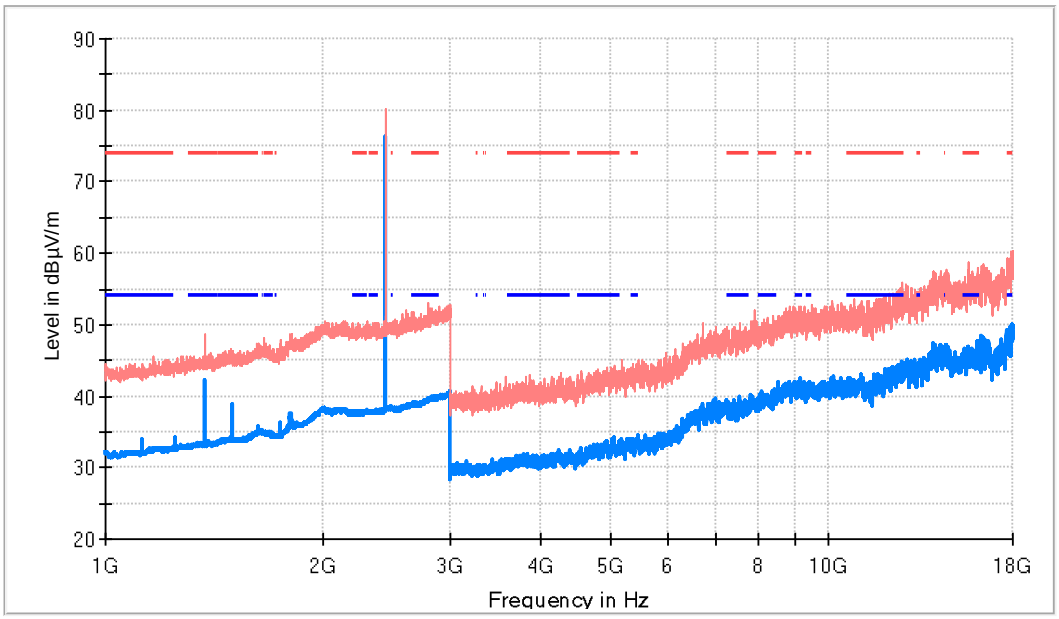


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.7	42.1	V	11.9	54.0	
2402.000000	83.8	80.0	V	---	---	Fundamental
17959.500000	59.0	50.2	H	3.8	54.0	

TEST RESULTS (Cont.)	

CHANNEL: Middle (2441 MHz)



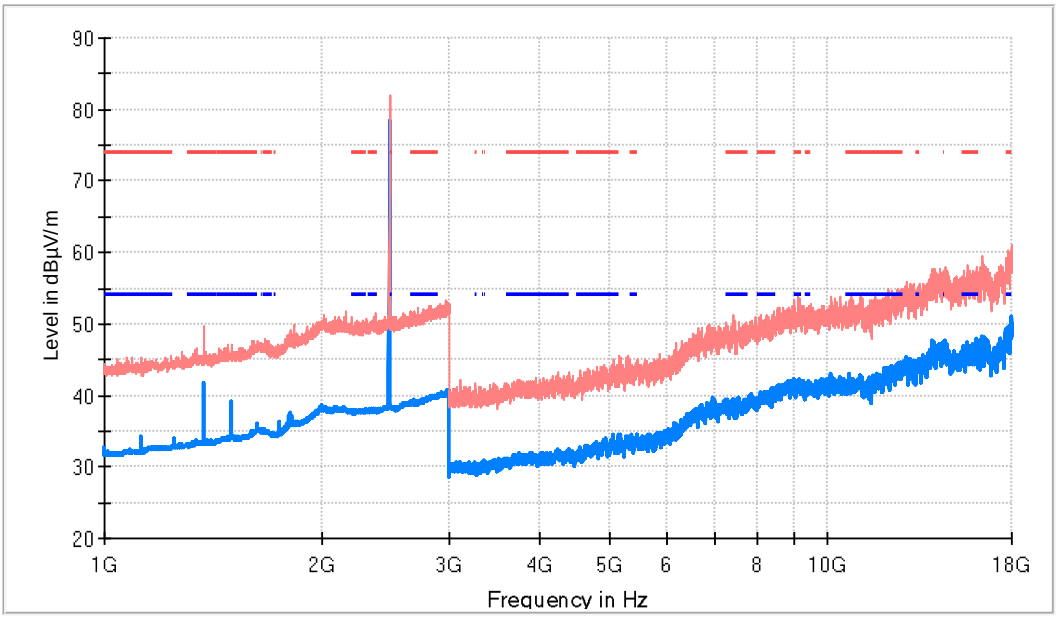
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	48.7	42.3	V	11.7	54.0	
2441.000000	80.1	76.3	V	---	---	Fundamental
17950.000000	58.6	49.9	H	4.1	54.0	

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)



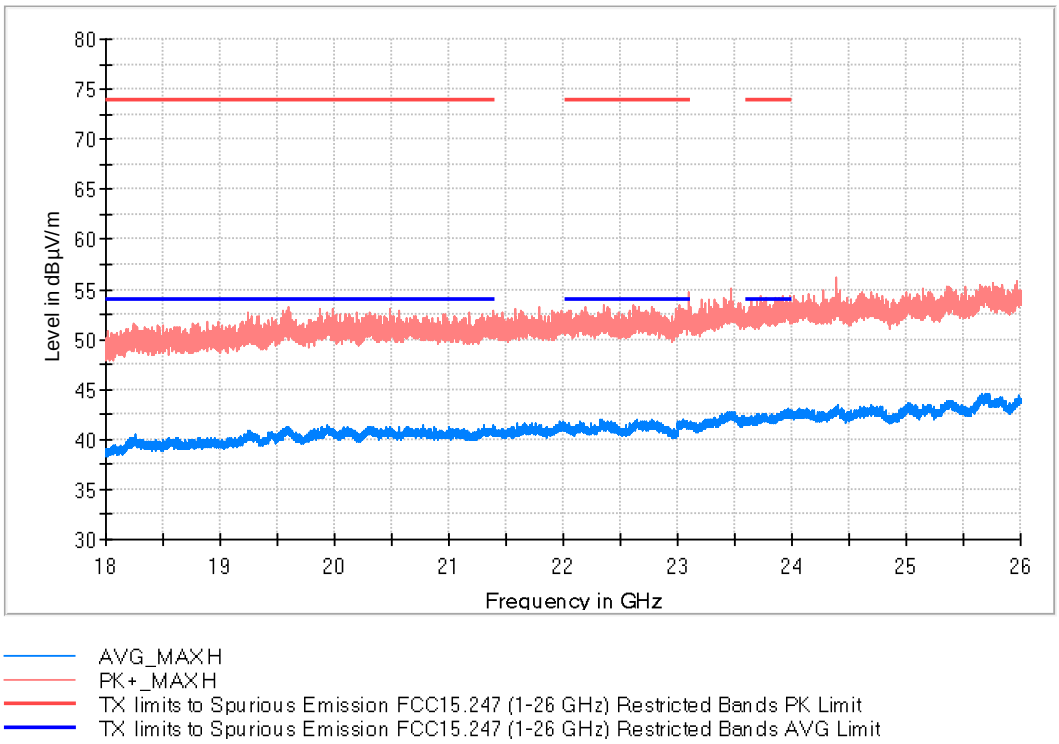
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1375.000000	49.7	41.8	V	12.2	54.0	
2480.000000	82.0	78.4	V	---	---	Fundamental
18000.000000	58.5	48.9	H	5.1	54.0	

TEST RESULTS (Cont.)	18 GHz – 26 GHz (8DPSK)

CHANNEL: Lowest (2402 MHz)

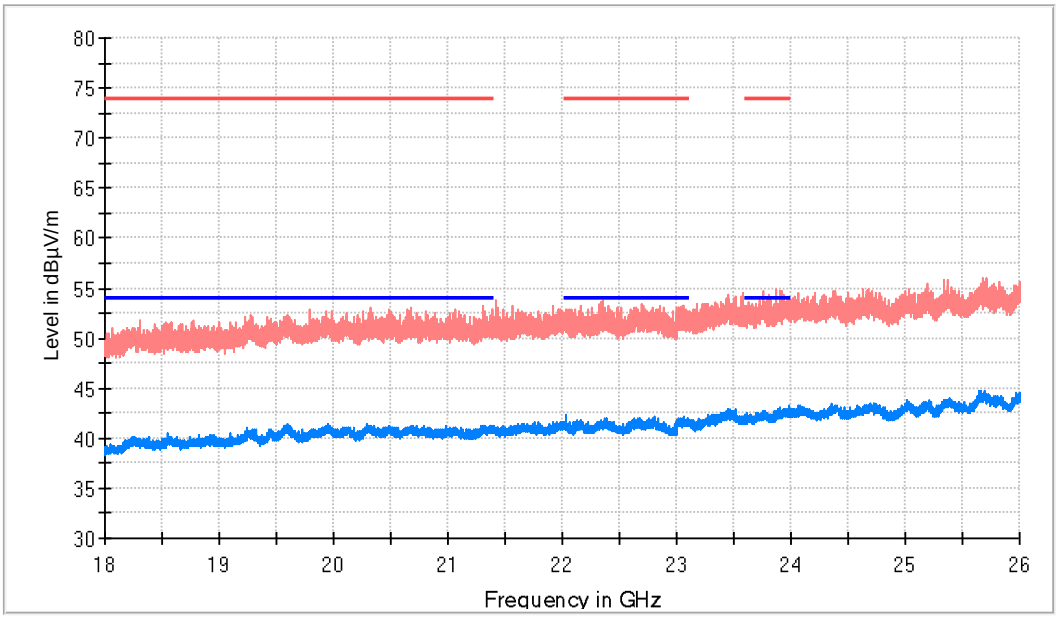


Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23966.000000	53.5	43.0	H	11.0	54.0

TEST RESULTS (Cont.)	18 GHz – 26 GHz (8DPSK)

CHANNEL: Middle (2441 MHz)



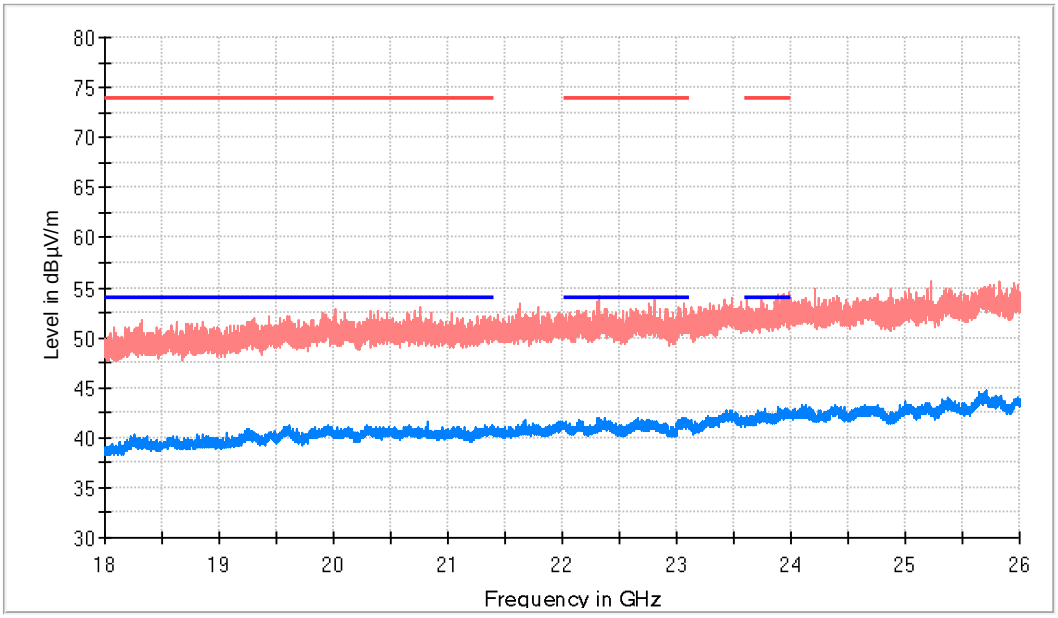
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23985.500000	52.9	43.2	H	10.8	54.0

TEST RESULTS (Cont.)	

CHANNEL: Highest (2480 MHz)



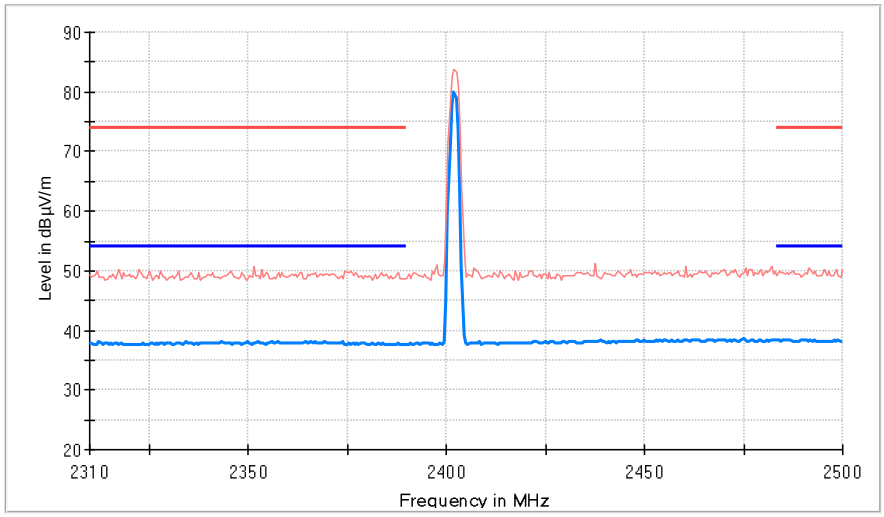
AVG_MAXH
PK+_MAXH
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands PK Limit
TX limits to Spurious Emission FCC15.247 (1-26 GHz) Restricted Bands AVG Limit

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
23886.000000	52.4	43.1	V	10.9	54.0

RESTRICTED BANDS	2.31 GHz – 2.5 GHz (8DPSK)

CHANNEL: Lowest (2402 MHz)



CHANNEL: Highest (2480 MHz)