



FCC LISTED, REGISTRATION
NUMBER: 2764.01

ISED LISTED REGISTRATION
NUMBER: 23595-1

Test Report No:

4552ERM.019A1

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	Display Audio Infotainment Unit
(*) Trademark	Visteon
(*) Model and /or type reference	VW REGIO FLOAT
(*) Derived model not tested	-
Other identification of the product	FCC ID: NT8-VWREGIOFLOAT IC: 3043A-VWREGIOFLOAT HVIN: H04.1 FVIN: 0850
(*) Features	Features: a. USB 3.0 / USB Video, USB Video, USB Hub b. Bluetooth EDR 2.4GHz, Version 4.2 c. Audio BT streaming music, control and browsing d. Wireless 2.4GHz and 5GHz bands e. GNSS Receiver - GPS f. AM/FM single tuner, seek, scan and manual tuning g. Smartphone integration (Apple Car Play and Android Auto), Capability to run local APPs, e-Call
(*) Manufacturer	VISTEON CORPORATION ONE VILLAGE CENTER DRIVE, VAN BUREN TOWNSHIP, MI, 48111 U.S.A
Test method requested, standard	USA FCC Part 15.247 (06-01-20): Operation within the bands 902 - 928 MHz, 2400 -2483.5 MHz, and 5725 - 5850 MHz USA FCC Part 15.209 (06-28-21): Radiated emission limits; general requirements. CANADA RSS-247 Issue 3 (August 2023). CANADA RSS-Gen Issue 5 amendment 1 (March 2019). Guidance for Performing Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid Systems Devices Operating Under Section 15.247 of the FCC Rules. 558074 D01 Meas Guidance v05r02 dated April 2, 2019. 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
Date of issue	01-15-2025
Report template No	FDT08_23 (*) "Data provided by the client"

Index

Competences and guarantees3

General conditions4

Uncertainty4

Data provided by the client4

Usage of samples5

Test sample description6

Identification of the client7

Testing period and place7

Document history7

Environmental conditions8

Remarks and comments8

Testing verdicts9

Summary9

List of equipment used during the test 10

Appendix A: Test results (Bluetooth EDR) 11

Appendix B: Test results (WI-FI 2.4GHz) 79

Acronyms

Acronym ID	Acronym Description
Avg COT	Average Channel Occupancy Time
BW	Bandwidth
Detector	Detector used
Ebw	Emission Bandwidth
Equipment	Equipment Type
Freq	Frequency
Freq Rng	Frequency Range
Freq Sep	Frequency Separation
Inband Peak Lvl	Inband Peak Level
Lvl	Level
MP	Measurement Point
Mod	Modulation
Mode	MIMO Mode
NHC	Number of Hopping Channels
NHp	Number of hops over the period
Occ Ch BW	Occupied Channel Bandwidth
Peak Power	Maximum Peak Conducted Output Power
Pol	Polarization
Port	Active Port
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

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** and **CAB ID US0215**.

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

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

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample consists of a Display Audio Infotainment Unit. Display audio Infotainment Unit with capacitive touch screen with the following functionalities: a. USB 3.0 / USB Video, USB Video, USB Hub b. Bluetooth EDR 2.4GHz, Version 4.2 c. Audio BT streaming music, control and browsing d. Wireless 2.4GHz and 5GHz bands e. GNSS Receiver - GPS f. AM/FM single tuner, seek, scan and manual tuning g. Smartphone integration (Apple Car Play and Android Auto), Capability to run local APPs, e-Call.

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, accessories and auxiliary equipment:

Id	Control Number	Description	Manufacturer / Model	Serial N°	Date of Reception	Application
S/01	4552/01	Volkswagen Infotainment 10" Unit	Visteon / MIB Regio Float	VWZ7Z2C9134279	2024-09-30	Element Under Test
S/01	4555/06	Fakra USB Cable	-		2024-09-09	Accessory
S/01	4555/09	Visteon Skoda Test Panel 1	-	-	2024-09-09	Accessory
S/01	1482	Laptop	LENOVO / V14 G2 ITL	PF3QAFFH	-	Auxiliary

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

Sample S/012 is composed of the following elements, accessories and auxiliary equipment:

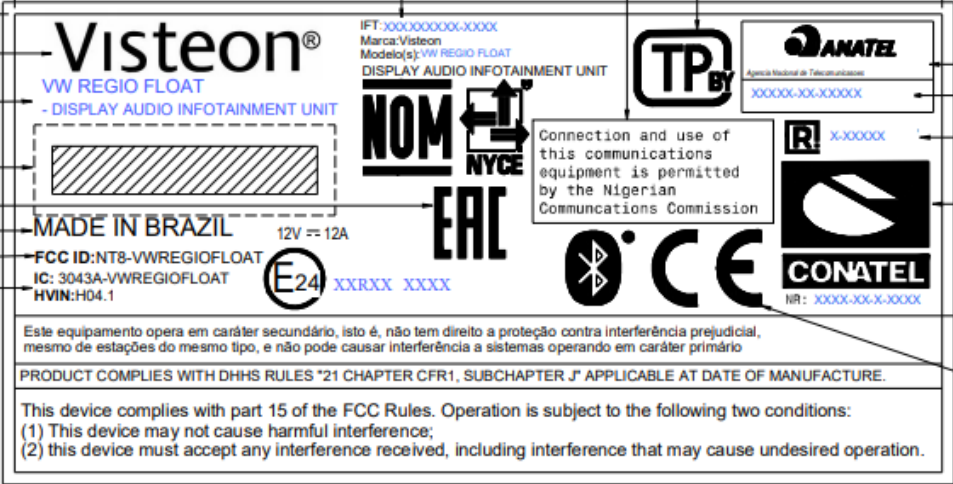
Id	Control Number	Description	Manufacturer / Model	Serial N°	Date of Reception	Application
S/02	4552/09	Skoda Audio Infotainment 10" unit(Radiated)	Visteon / MIB Regio Float	VWZ7Z2C9134311	2024-09-30	Element Under Test
S/02	4555/06	Fakra USB Cable	-		2024-09-09	Accessory
S/02	4555/09	Visteon Skoda Test Panel 1	-	-	2024-09-09	Accessory
S/02	1482	Laptop	LENOVO / V14 G2 ITL	PF3QAFFH	-	Auxiliary

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

Test sample description

Test Sample description (compulsory information for EMC and RF testing services)

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾		
	AM/FM Antenna connector (FAKRA)	1.5	[]	[]	[]		
	GPS Antenna connector (FAKRA)	1.0	[]	[]	[]		
	USB Video Port	0.1	[]	[]	[]		
	USB 3.0	0.1	[]	[]	[]		
	Main connector	-	[]	[]	[]		
	-	-	[]	[]	[]		
Supplementary information to the ports..... :	No Data Provided						
Rated power supply :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	[]	AC:	[]	[]	[]	[]	[]
	[]	AC:	[]	[]	[]	[]	[]
	[]	DC:					
	[X]	DC: 12V, 12A (vehicle battery)					
Rated Power..... :	sleep current: 350uA +-30uA; current in normal mode: 10A						
Clock frequencies :	LVDS/TFT:76.8MHz / LPDDR4: 1.333GHz eMMC: 197MHz						
Other parameters..... :	No Data Provided						
Software version :	0850						
Hardware version..... :	H04.1						
Dimensions in cm (W x H x D)..... :	153.5x146.3x275.4 mm						
Mounting position..... :	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[]	Hand-held equipment					
	[X]	Other: Built into vehicle					
Modules/parts :	Module/parts of test item		Type		Manufacturer		
	No Data Provided						
Accessories (not part of the test item) :	Description		Type		Manufacturer		
	AM/FM/GPS Antenna						
	SMA Connector						
	USB Cable						
	Harness						
	Description		File name		Issue date		
	Test instructions						
	Technical Files						

	DUT Manual		
	FDT30_18 Declaration Equipment Data - R1 (1)		11/13/2024
Marking Label			
			

Identification of the client

VISTEON CORPORATION
ONE VILLAGE CENTER DRIVE, VAN BUREN TOWNSHIP, MI, 48111 U.S.A

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	10/08/2024
Date (finish)	10/14/2024

Document history

Report number	Date	Description
4552ERM.019	11-20-2024	First release
4552ERM.019A1	01-15-2025	Second release. The information for Wi-Fi worst case for radiated spurious emission test is updated in the description of test conditions on page 82. This modified test report cancels and replaces the report 4552ERM.019

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: Juliana Cherry, Prudhvi Kothapalli, Madhava Gooduru, Fahim Tahiree and Yuri Barone.

Testing verdicts

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

Summary

FCC PART 15 PARAGRAPH / RSS-247 (Bluetooth 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
A.6	§ 15.247 (d)	RSS-247 5.5	Emission limitations Radiated (Transmitter)	P	N/A
<u>Supplementary information and remarks:</u> 1: None					

FCC PART 15 PARAGRAPH (WIFI 2.4GHz)					
Section	FCC Spec Clause	RSS Spec Clause	Test Description	Verdict	Remark
B.1	§ 2.1049 & §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
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: None					

List of equipment used during the test

Test Equipment used for testing.

FCC 47 CFR Part 15.247 / RSS-247

Conducted Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
1039	FSV40 SIGNAL ANALYSER 40GHZ	101627	2022-11-01	2024-11-01
1107	ETHERNET SNMP THERMOMETER	60038026952	2022-10-18	2024-10-18
1313	WIRELESS MEASUREMENT SOFTWARE R&S WMS32	-	N/A	N/A

Radiated Measurements

CONTROL NUMBER	DESCRIPTION	Serial No	LAST CALIBRATION	NEXT CALIBRATION
981	LOW NOISE PREAMPLIFIER	1711156B	2024-02-20	2026-02-20
1012	ESR26 EMI TEST RECEIVER	101478	2023-01-18	2025-01-18
1014	FSV40 SIGNAL ANALYZER 40GHZ	101626	2023-01-18	2025-01-18
1056	3116C DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	213179	2023-02-23	2026-02-23
1057	3115 DOUBLE-RIDGED WAVEGUIDE HORN ANTENNAS	211373	2023-07-18	2026-07-18
1064	3142E BICONILOG ANTENNA	208600	2021-12-13	2024-12-13
1471	ETHERNET SNMP THERMOMETER	60038026577	2022-10-24	2024-10-24
1179	SEMI-ANECHOIC CHAMBER	F169021	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	1040-OT102236	N/A	N/A

Appendix A: Test results (Bluetooth EDR)

Appendix A Content

PRODUCT INFORMATION..... 13

DESCRIPTION OF TEST CONDITIONS 14

TEST A.1: 20DB EMISSION BANDWIDTH, OCCUPIED BANDWIDTH AND CARRIER FREQUENCY SEPARATION..... 15

TEST A.2: NUMBER OF HOPPING CHANNELS 31

TEST A.3: TIME OF OCCUPANCY (DWELL TIME) 35

TEST A.4: MAXIMUM PEAK CONDUCTED OUTPUT POWER AND ANTENNA GAIN..... 39

TEST A.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER) 45

TEST A.6: EMISSION LIMITATIONS RADIATED (TRANSMITTER) 58

PRODUCT INFORMATION

The following information is provided by the client

Information	Description
Modulation	FHSS
Adaptive	Adaptive equipment
Operating Frequency Range	2400 – 2483.5 MHz
Nominal Channel Bandwidth	1 MHz
RF Output Power	10 dBm E.I.R.P
Extreme operating conditions	
- Temperature range	-40 °C to +70 °C
Antenna type	BT/WLAN internal Antenna
Antenna gain	-4 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	Bluetooth EDR
Geo-location capability	No

DESCRIPTION OF TEST CONDITIONS

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

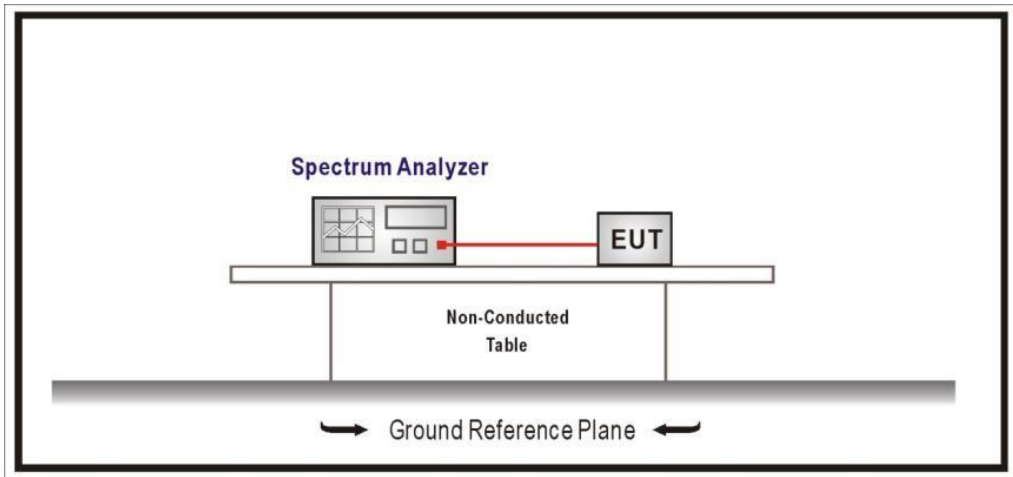
TEST A.1: 20DB EMISSION BANDWIDTH, OCCUPIED BANDWIDTH AND CARRIER FREQUENCY SEPARATION

LIMITS:	Product standard:	§ 2.1049, 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:



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	930	930
Occupied bandwidth (kHz)	880	885	885
Measurement uncertainty (kHz)	<± 1.80		

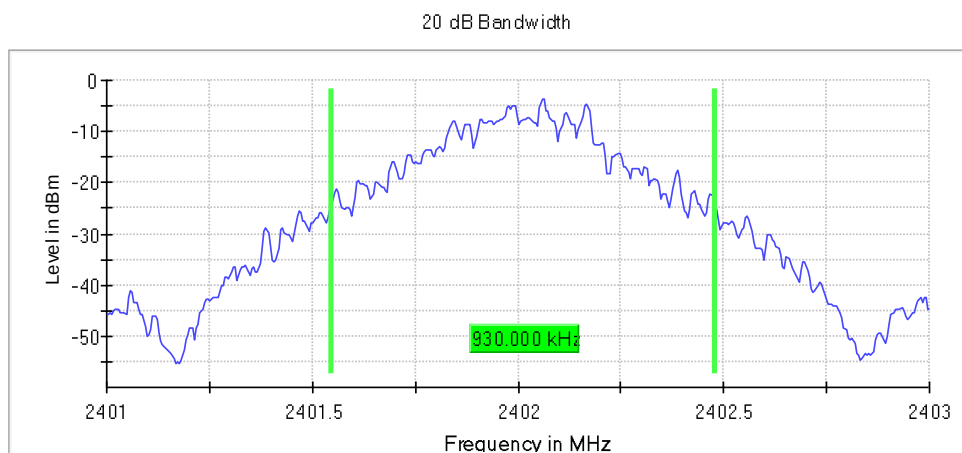
Spectrum Analyzer Parameters

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	189.453 µs	189.453 µs	189.453 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
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	11 / max. 150	12 / max. 150	17 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.09 dB	0.02 dB	0.08 dB

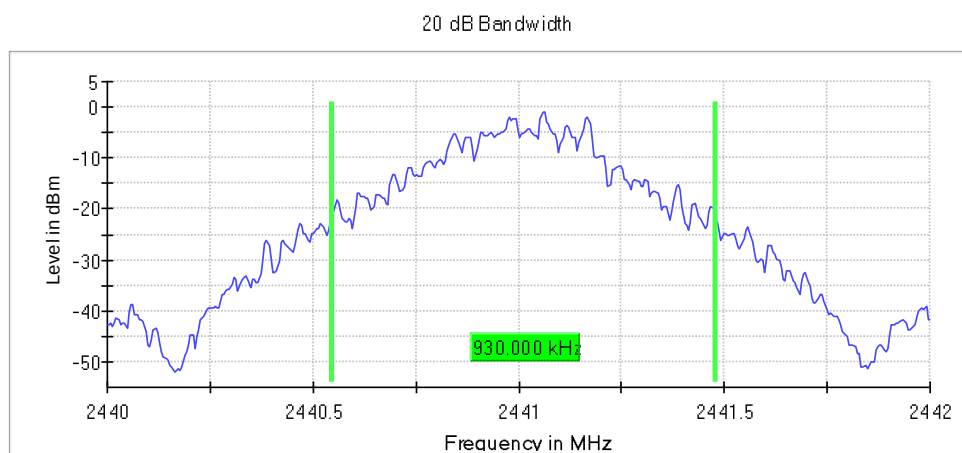
TEST RESULTS (Cont.):

20 dB BANDWIDTH

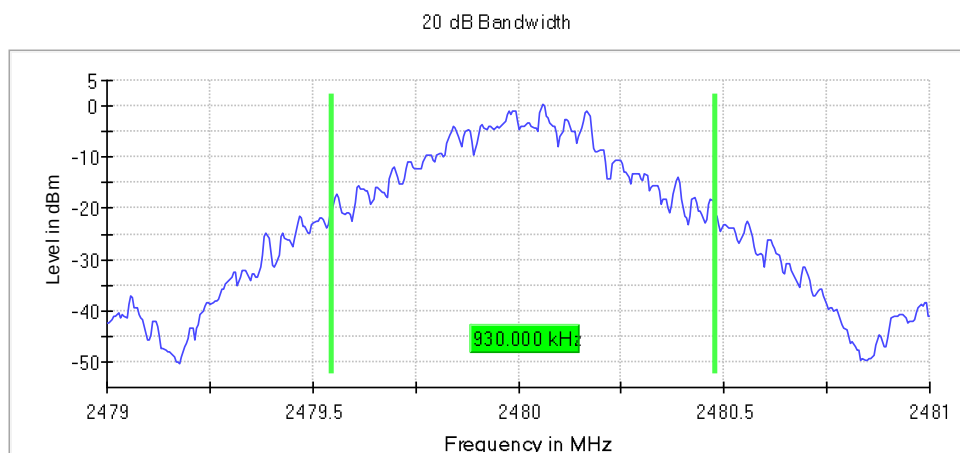
Lowest Channel



Middle Channel



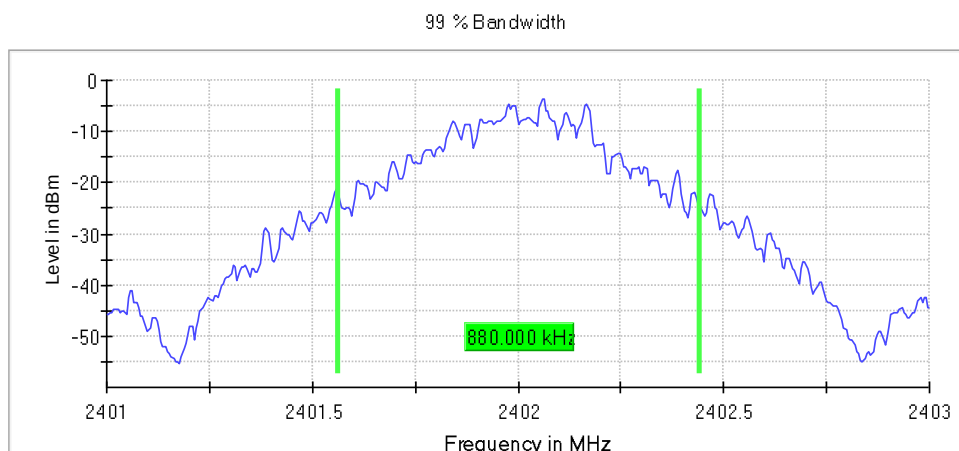
Highest Channel



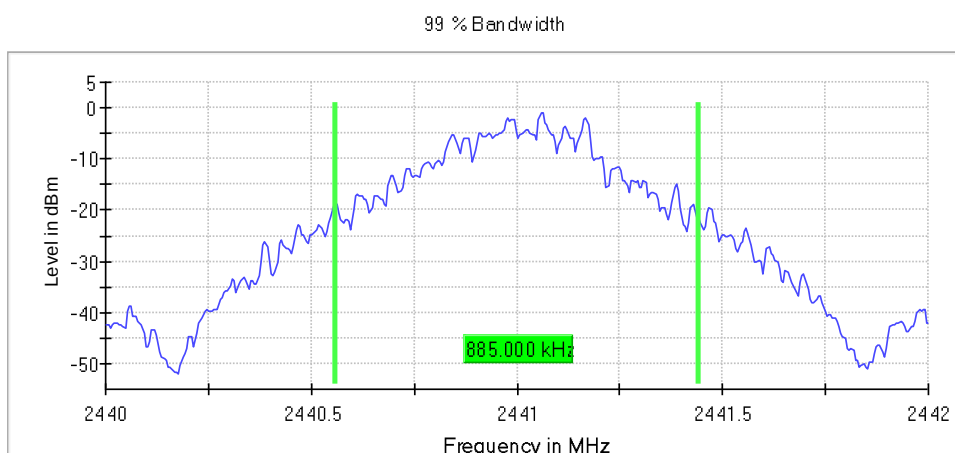
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

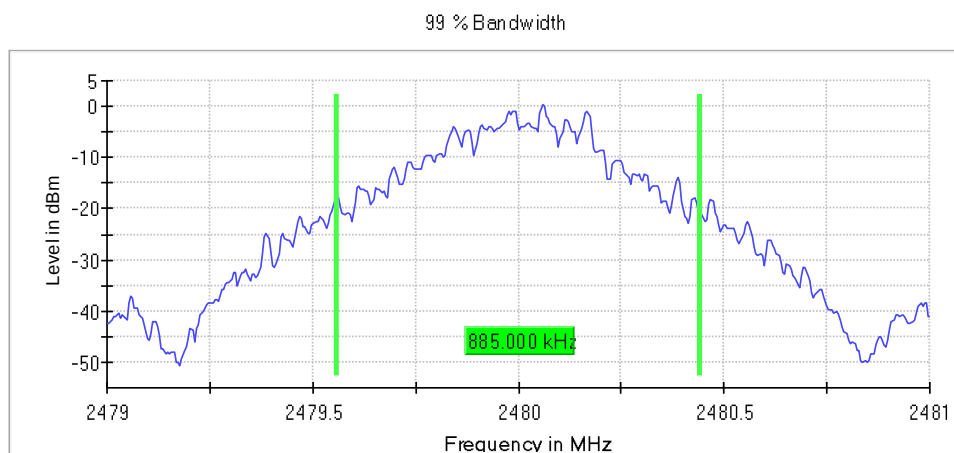
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

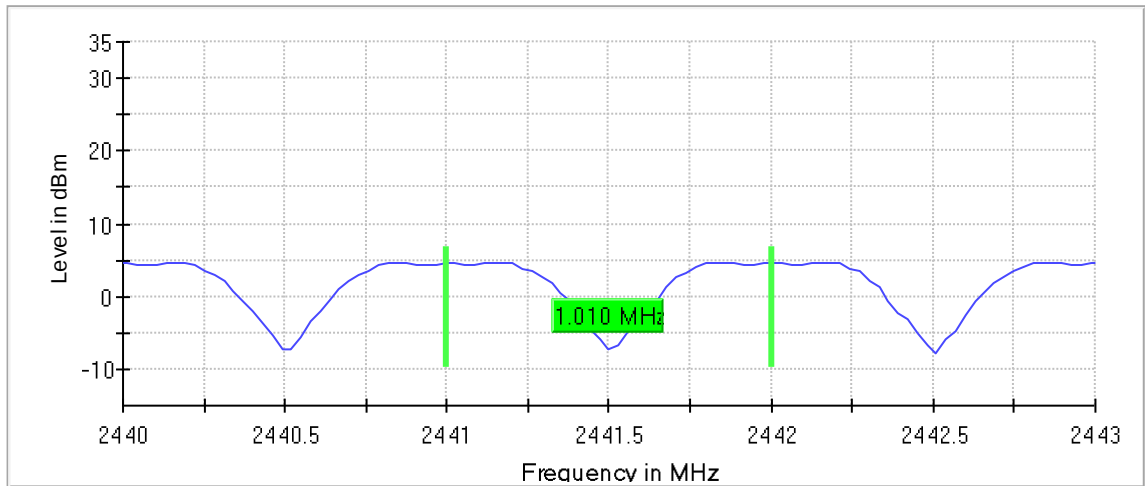
Spectrum Analyzer Parameters

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	189.453 μ s	189.453 μ s	189.453 μ s
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
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
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	7 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.28 dB	0.16 dB	0.06 dB

TEST RESULTS (Cont.)

CARRIER FREQUENCY SEPARATION

CFS



DUT Frequency (MHz)	Frequency Separation (MHz)	Limit Min (MHz)	Limit Max (MHz)	Center Frequency low Channel (MHz)	Center Frequency high Channel (MHz)	DUT Frequency (MHz)	Result
2441.000000	1.009900	0.620000	---	2440.995050	2442.004950	2441.000000	PASS

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)	1.235	1.235	1.235
Occupied bandwidth (MHz)	1.160	1.160	1.160
Measurement uncertainty (kHz)	<± 1.80		

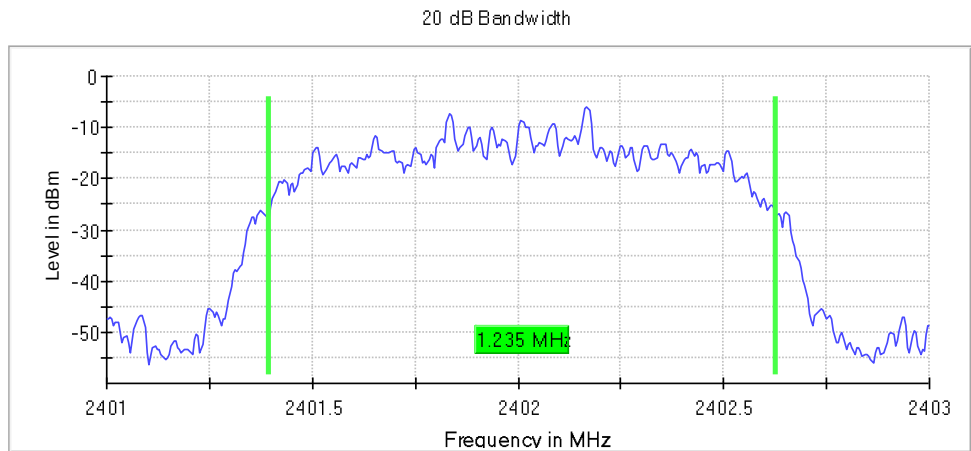
Spectrum Analyzer Parameters

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	189.453 µs	189.453 µs	189.453 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
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	10 / max. 150	11 / max. 150	13 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.10 dB	0.21 dB	0.13 dB

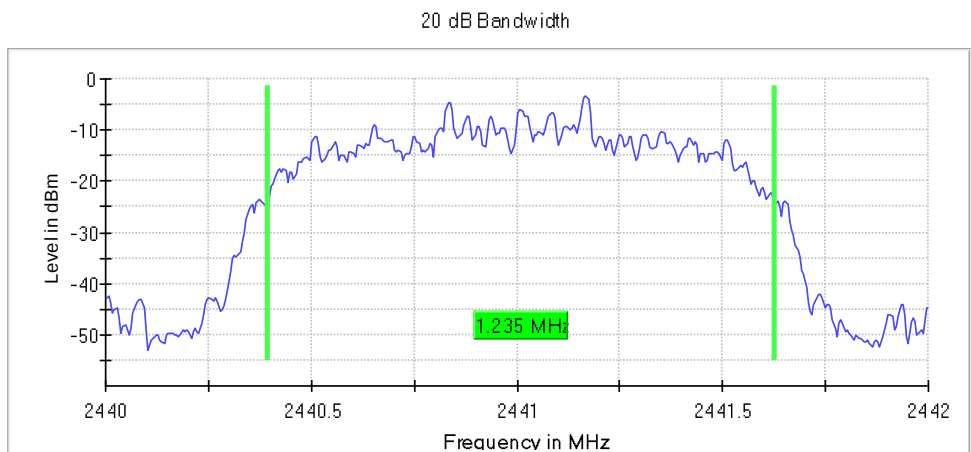
TEST RESULTS (Cont.):

20 dB BANDWIDTH

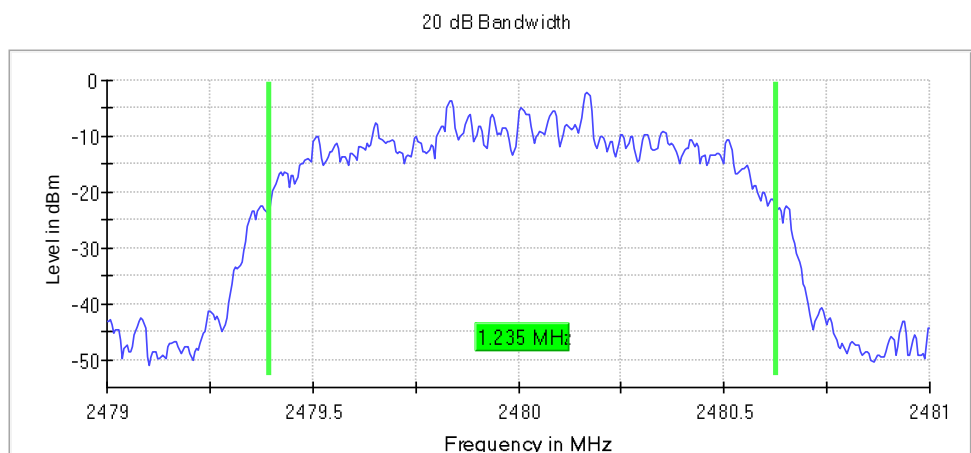
Lowest Channel



Middle Channel



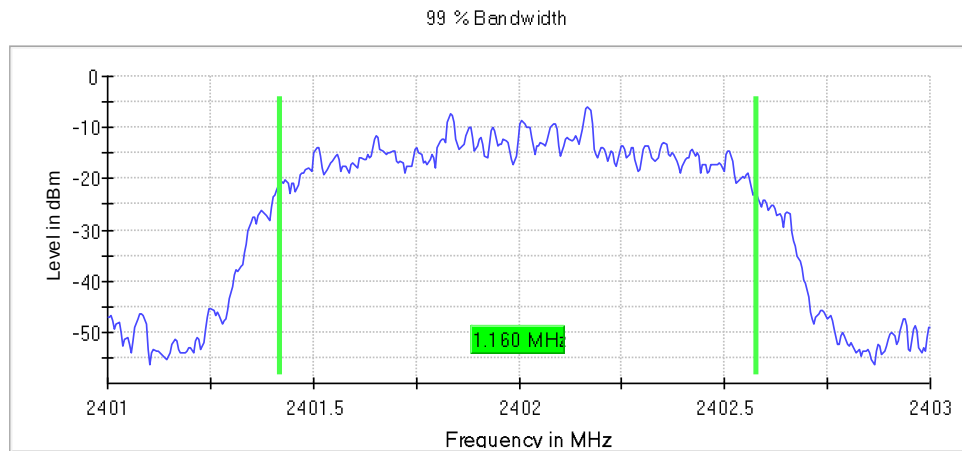
Highest Channel



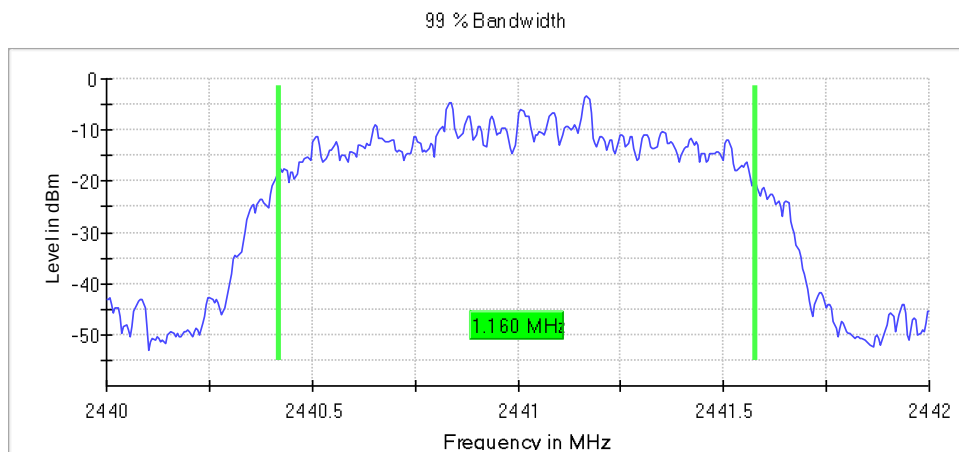
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

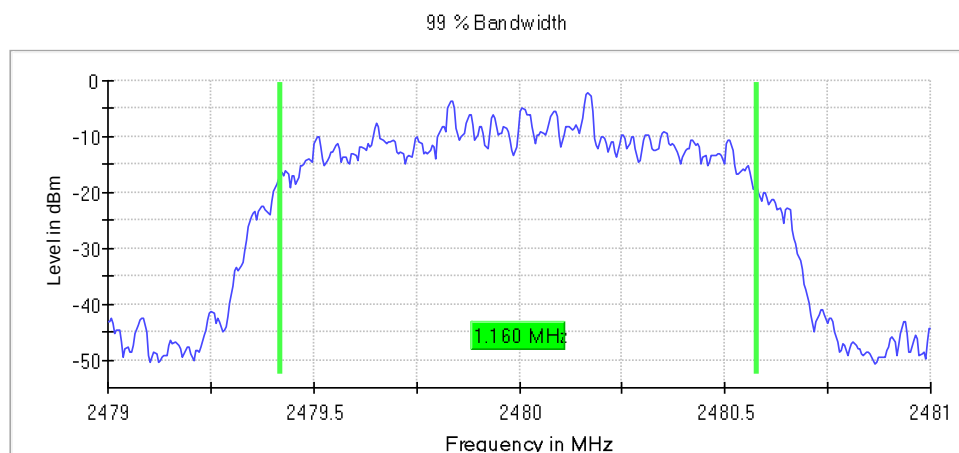
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

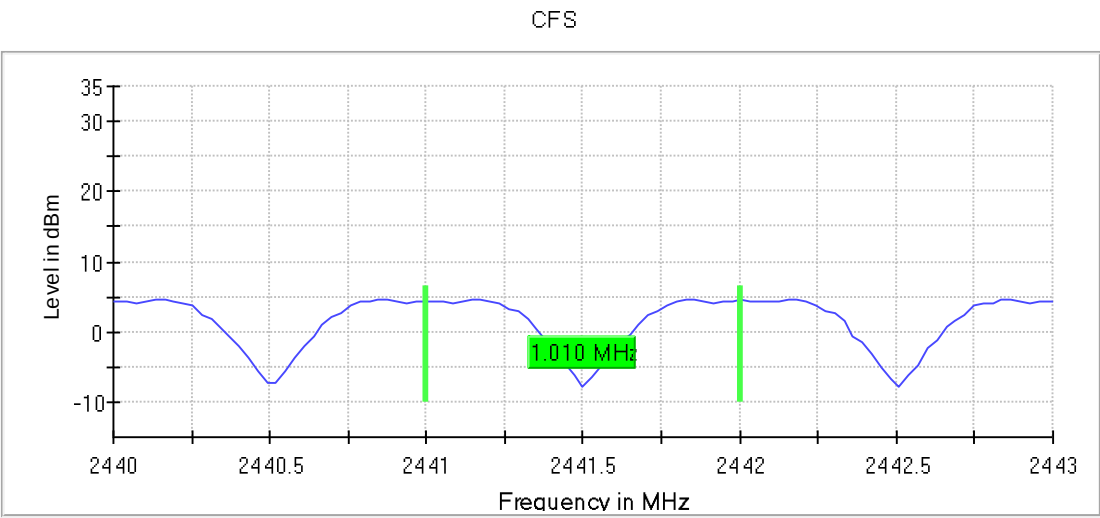
OCCUPIED BANDWIDTH

Spectrum Analyzer Parameters

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	189.453 μ s	189.453 μ s	189.453 μ s
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
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	6 / max. 150	6 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.09 dB	0.10 dB	0.07 dB

TEST RESULTS (Cont.)

CARRIER FREQUENCY SEPARATION



DUT Frequency (MHz)	Frequency Separation (MHz)	Limit Min (MHz)	Limit Max (MHz)	Center Frequency low Channel (MHz)	Center Frequency high Channel (MHz)	DUT Frequency (MHz)	Result
2441.000000	1.009900	0.823333	---	2440.995050	2442.004950	2441.000000	PASS

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)	1.265	1.265	1.265
Occupied bandwidth (MHz)	1.170	1.170	1.170
Measurement uncertainty (kHz)	<± 1.80		

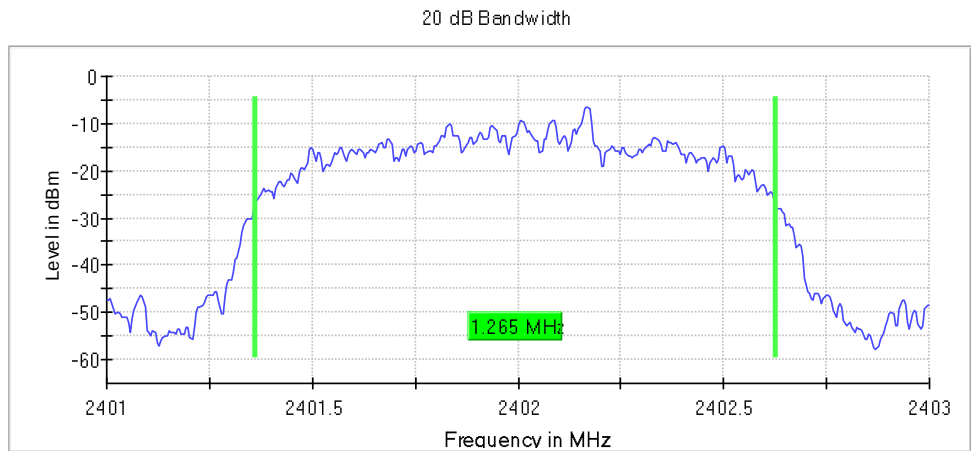
Spectrum Analyzer Parameters

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	189.453 µs	189.453 µs	189.453 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
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
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	12 / max. 150	10 / max. 150	10 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.07 dB	0.28 dB	0.41 dB

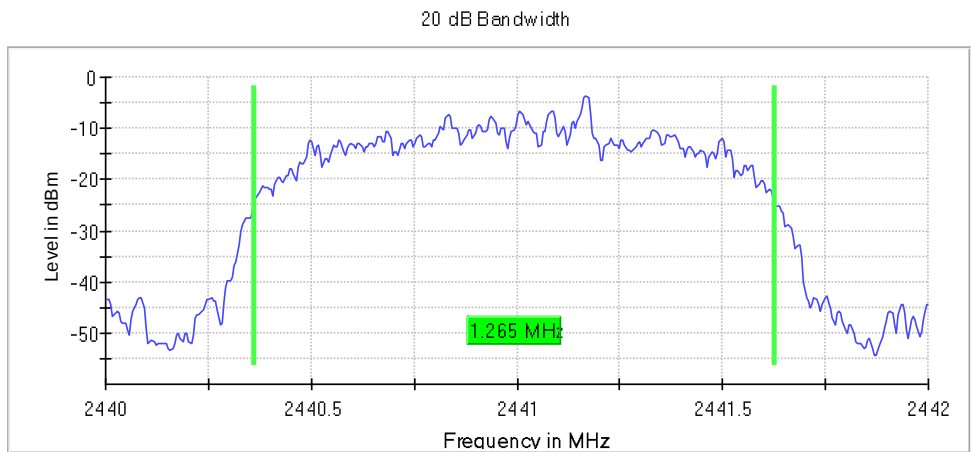
TEST RESULTS (Cont.):

20 dB BANDWIDTH

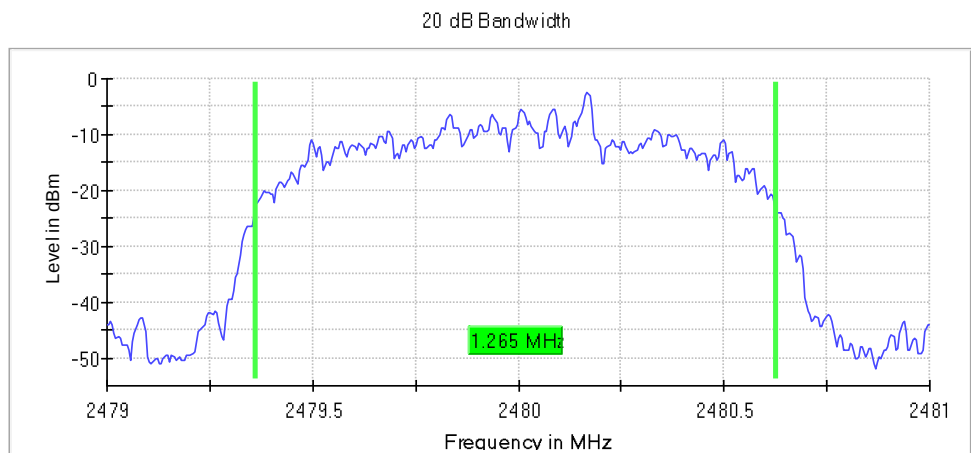
Lowest Channel



Middle Channel



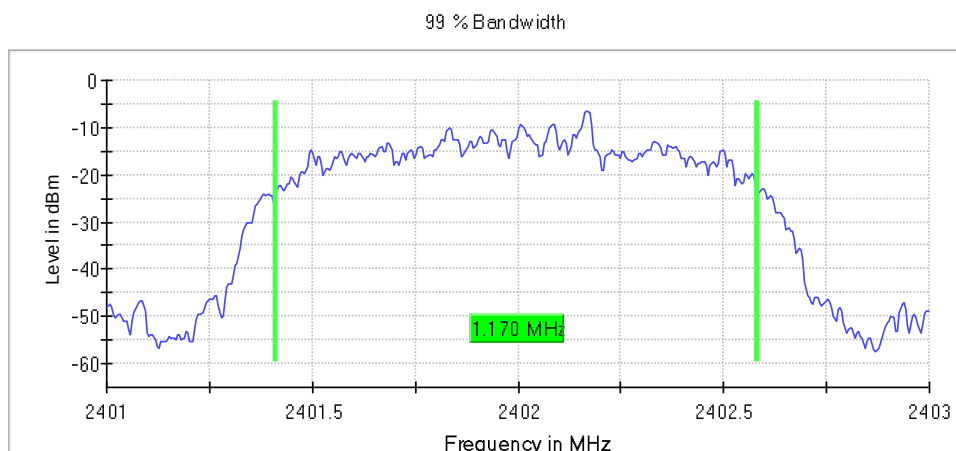
Highest Channel



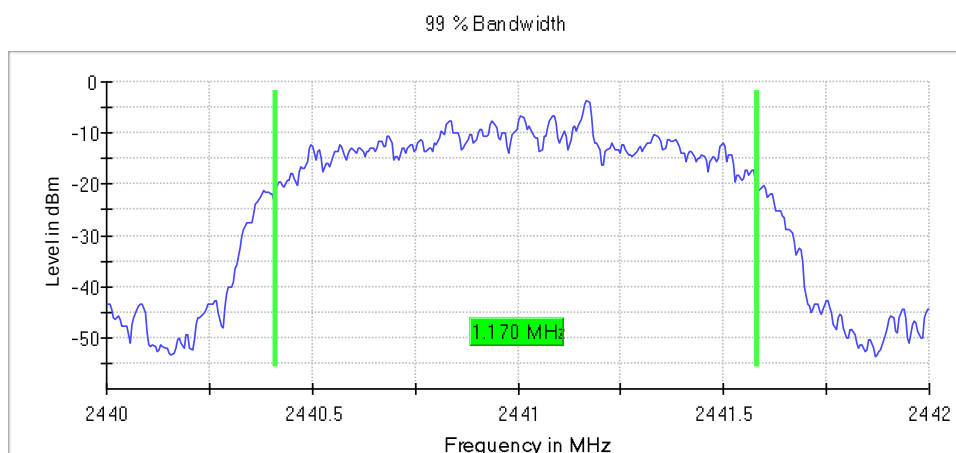
TEST RESULTS (Cont.)

OCCUPIED BANDWIDTH

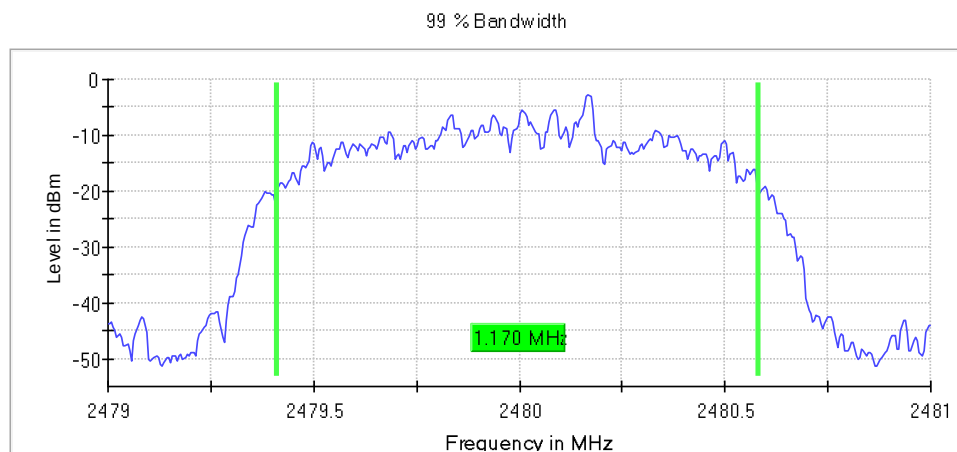
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

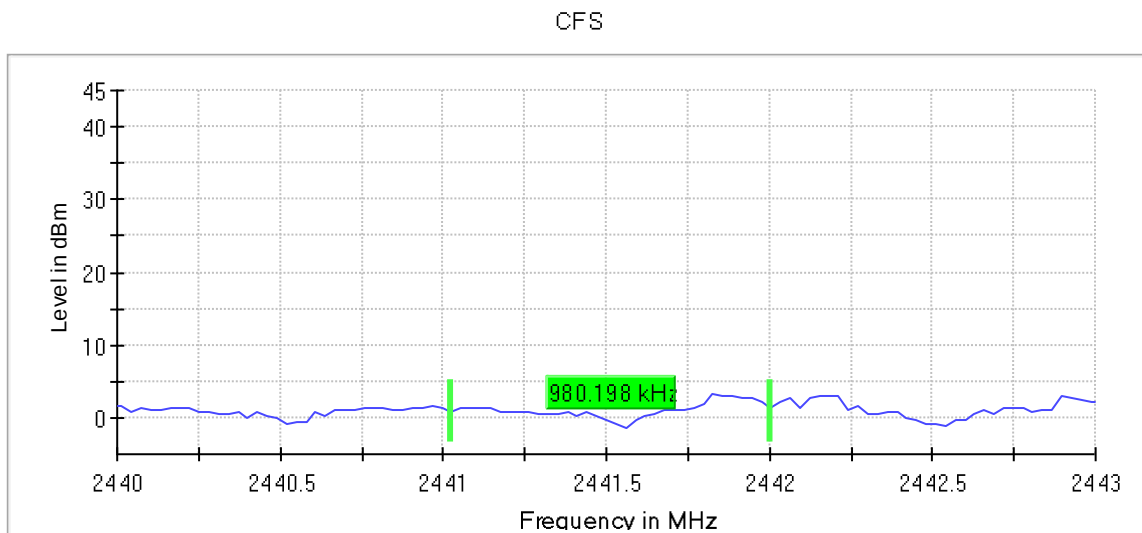
OCCUPIED BANDWIDTH

Spectrum Analyzer Parameters

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	189.453 μ s	189.453 μ s	189.453 μ s
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
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
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	5 / max. 150	7 / max. 150	5 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.17 dB	0.25 dB	0.06 dB

TEST RESULTS (Cont.)

CARRIER FREQUENCY SEPARATION



DUT Frequency (MHz)	Frequency Separation (MHz)	Limit Min (MHz)	Limit Max (MHz)	Center Frequency low Channel (MHz)	Center Frequency high Channel (MHz)	DUT Frequency (MHz)	Result
2441.000000	0.980198	0.843333	---	2441.024752	2442.004950	2441.000000	PASS

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

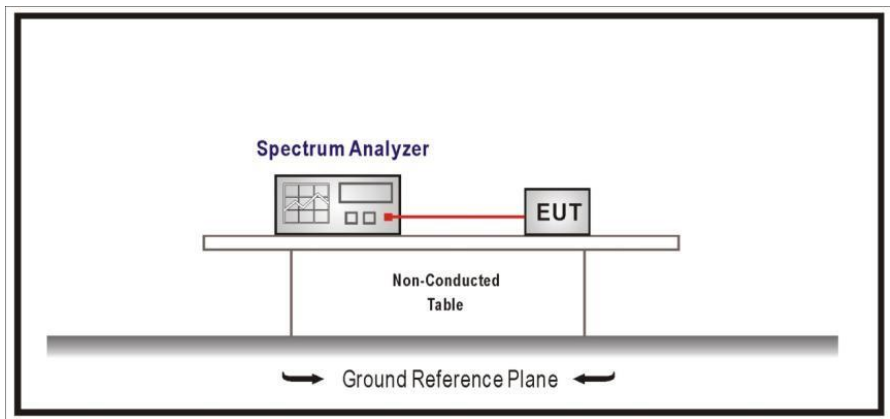
TEST A.2: NUMBER OF HOPPING CHANNELS

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

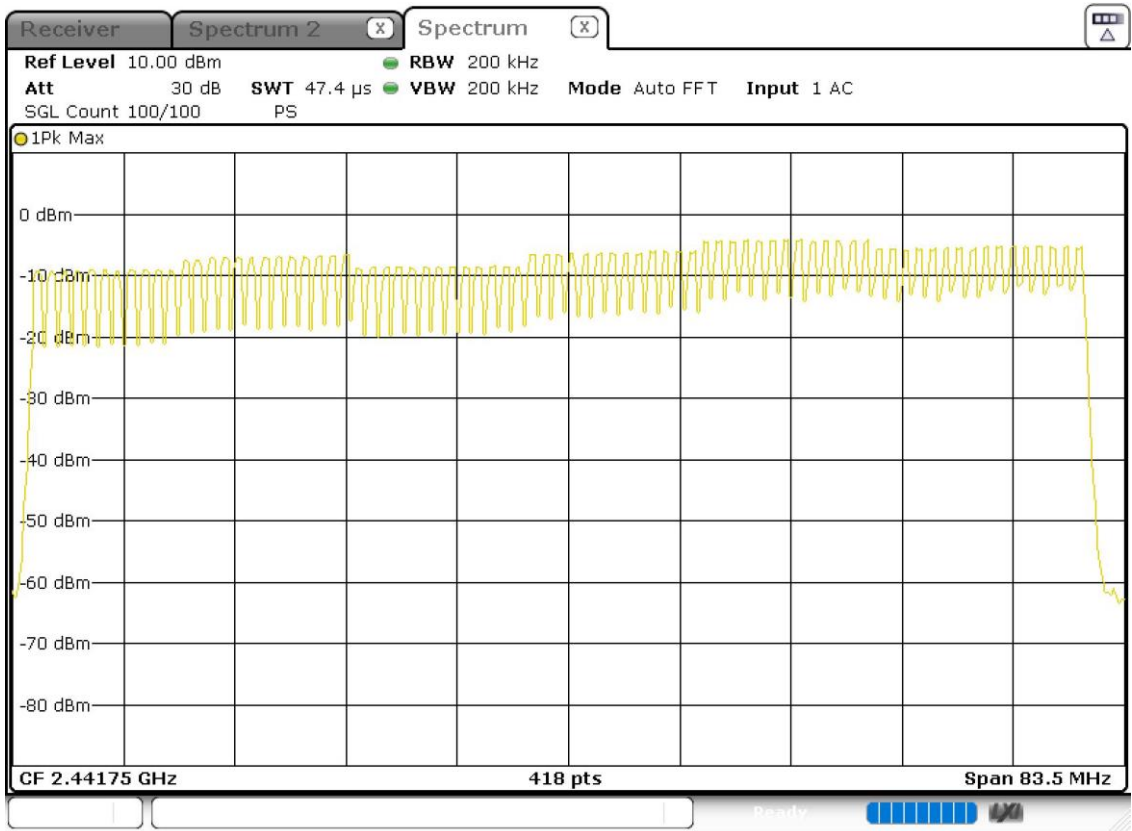
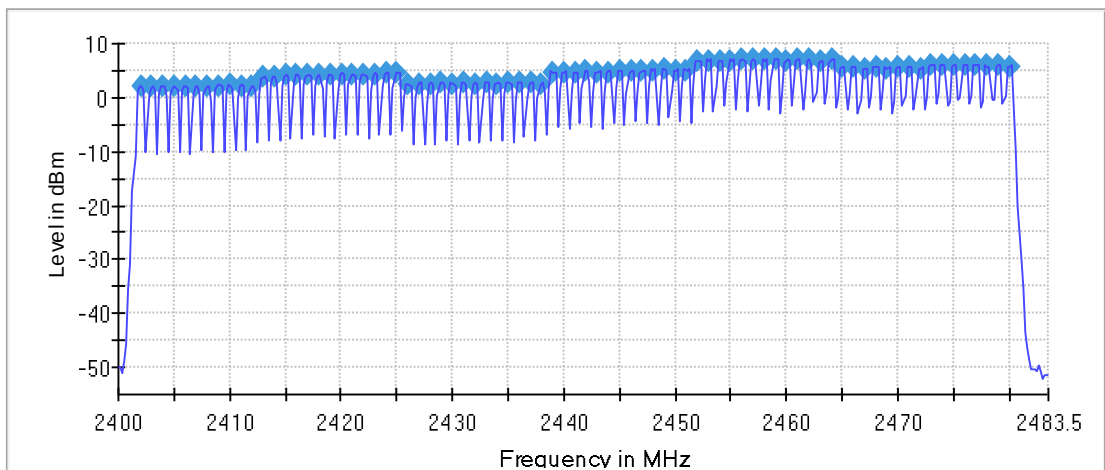
TESTED CONDITIONS MODES:

TC#01

TEST RESULTS:

PASS

Sequence



Number of Hopping Frequencies: 79

TESTED SAMPLES:

S/01

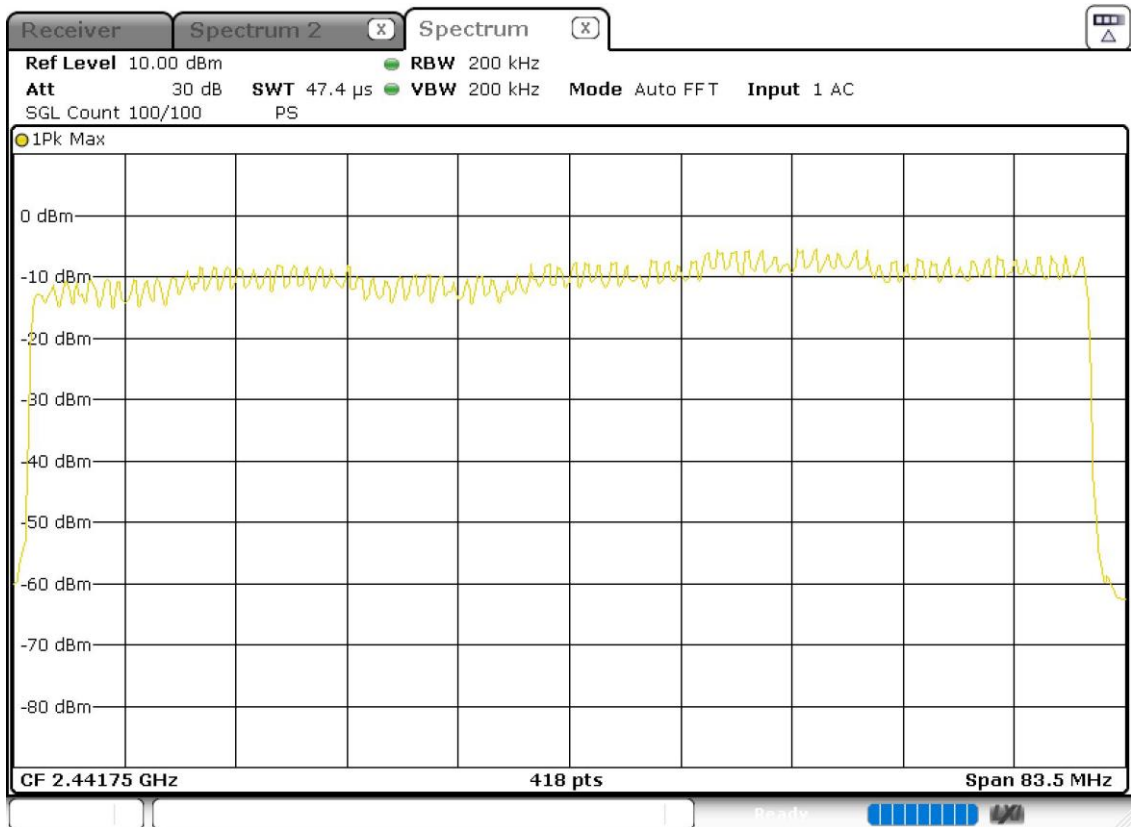
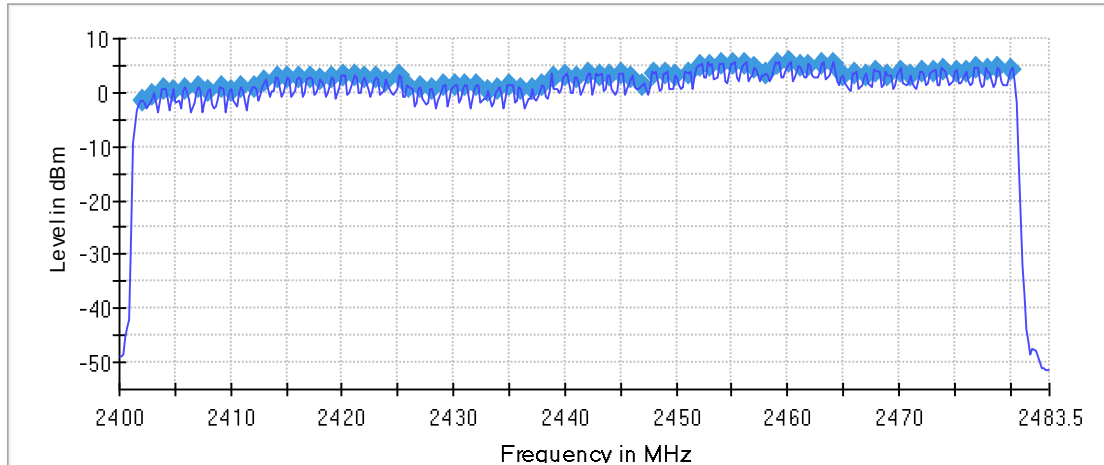
TESTED CONDITIONS MODES:

TC#02

TEST RESULTS:

PASS

Sequence



Number of Hopping Frequencies: 79

TESTED SAMPLES:

S/01

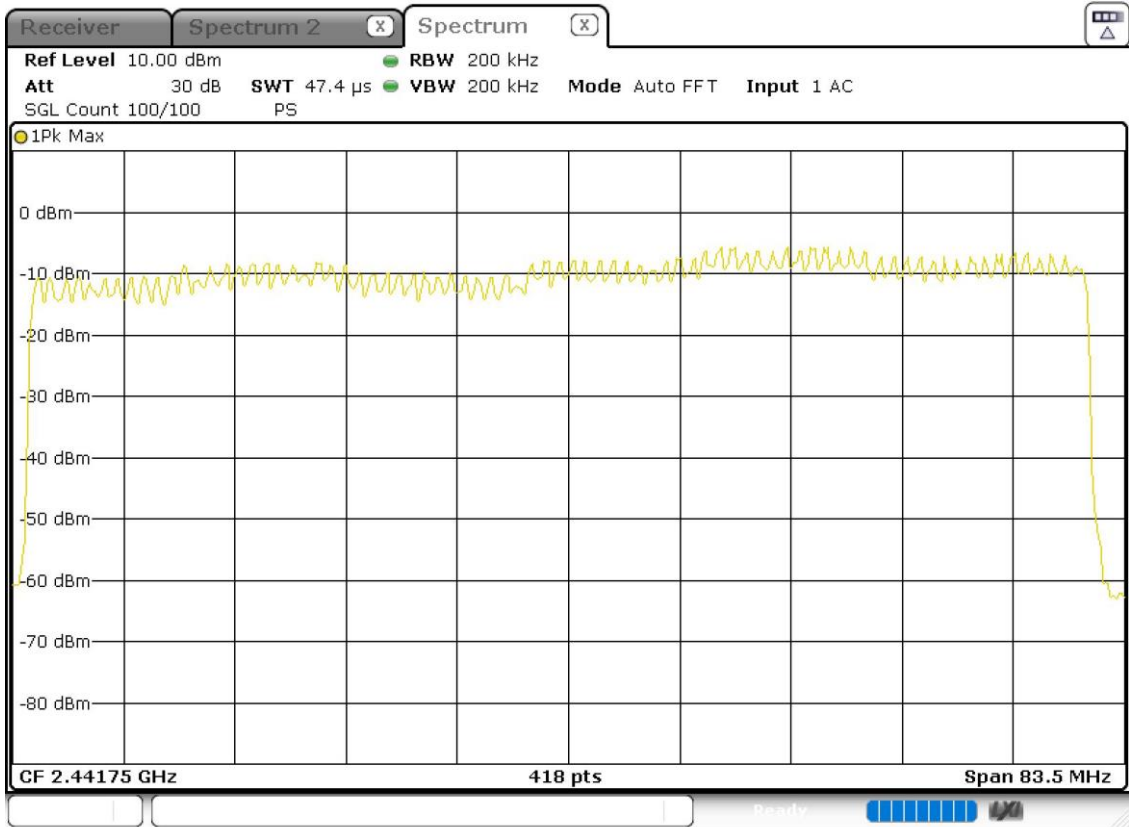
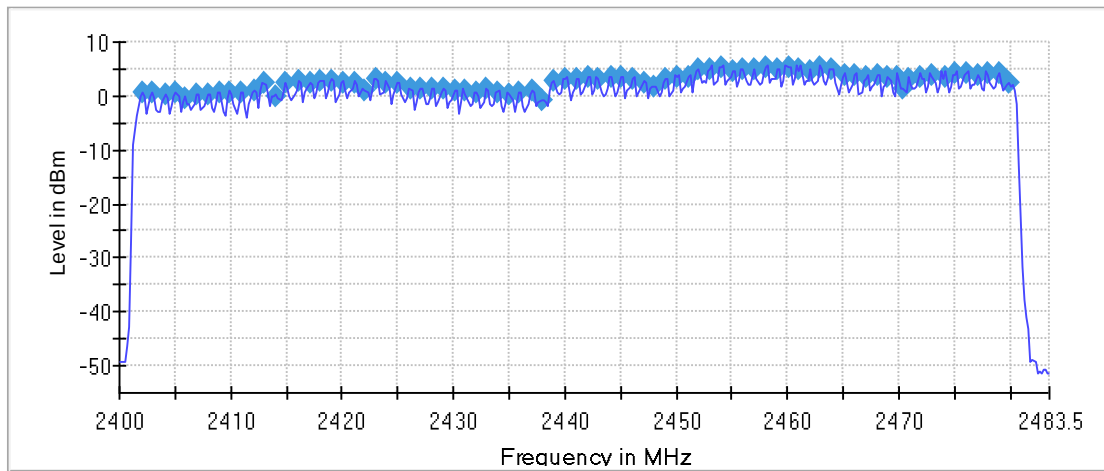
TESTED CONDITIONS MODES:

TC#03

TEST RESULTS:

PASS

Sequence



Number of Hopping Frequencies: 79

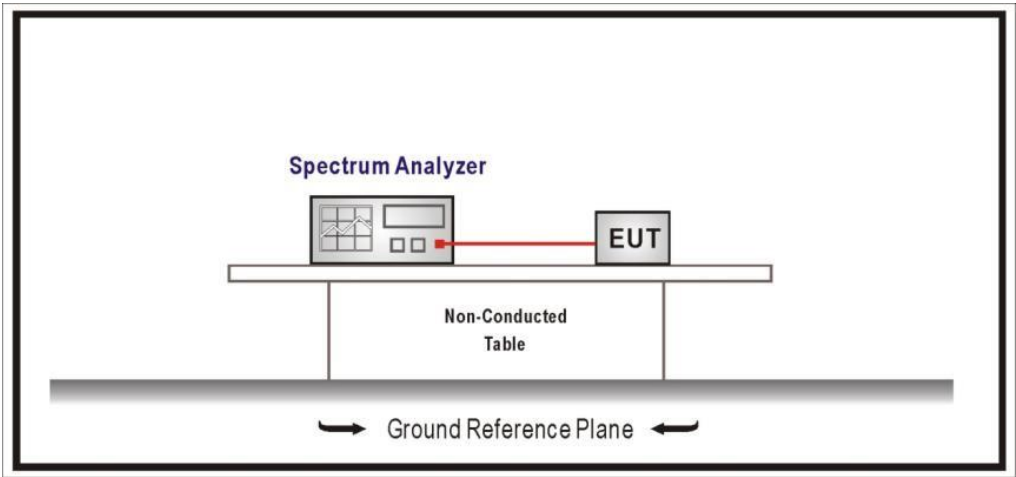
TEST A.3: TIME OF OCCUPANCY (DWELL TIME)

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

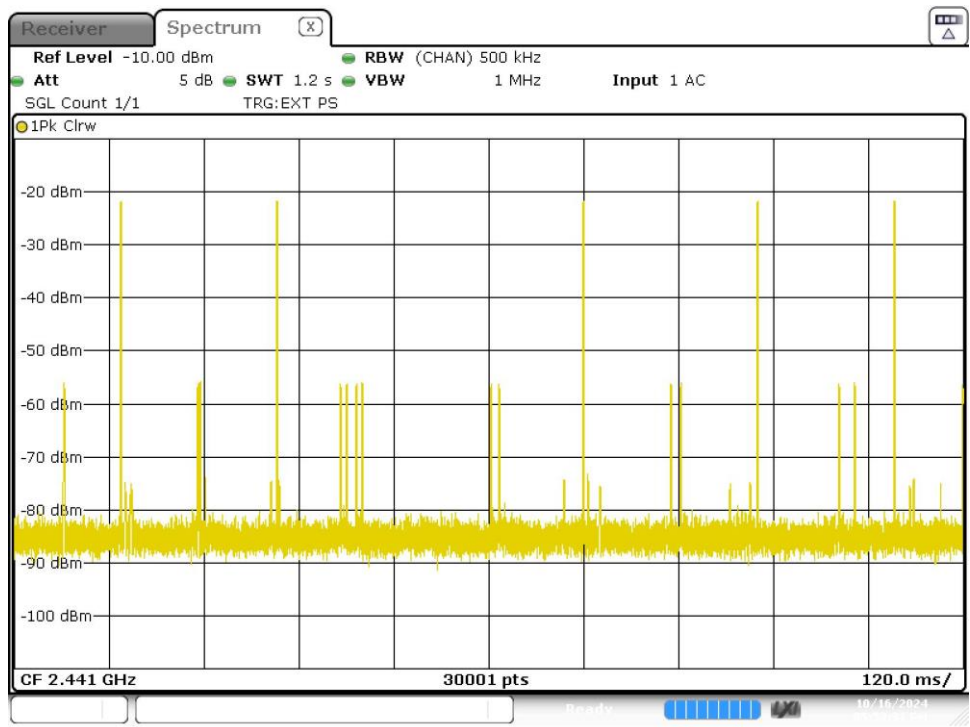
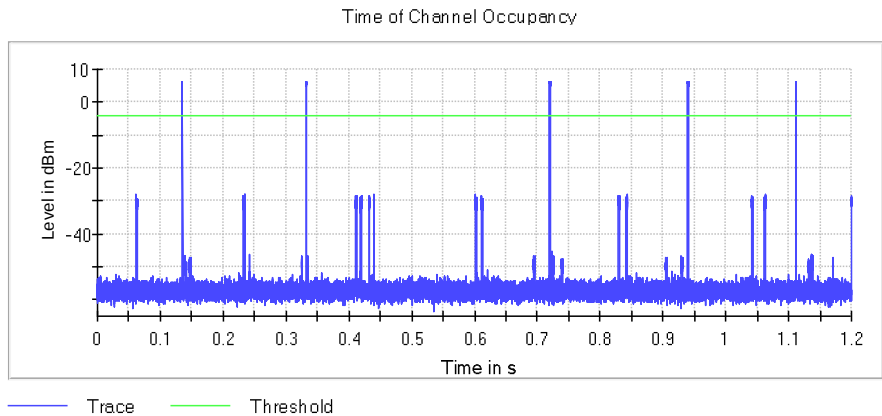
The average time of occupancy on any channel shall not be greater than 0.4 seconds (400 ms) within a period of 0.4 seconds multiplied by the number of hopping channels employed = $0.4 \times 79 = 31.6$ seconds.

TEST SETUP:



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

Transmit Time per Hop: 1.631 ms



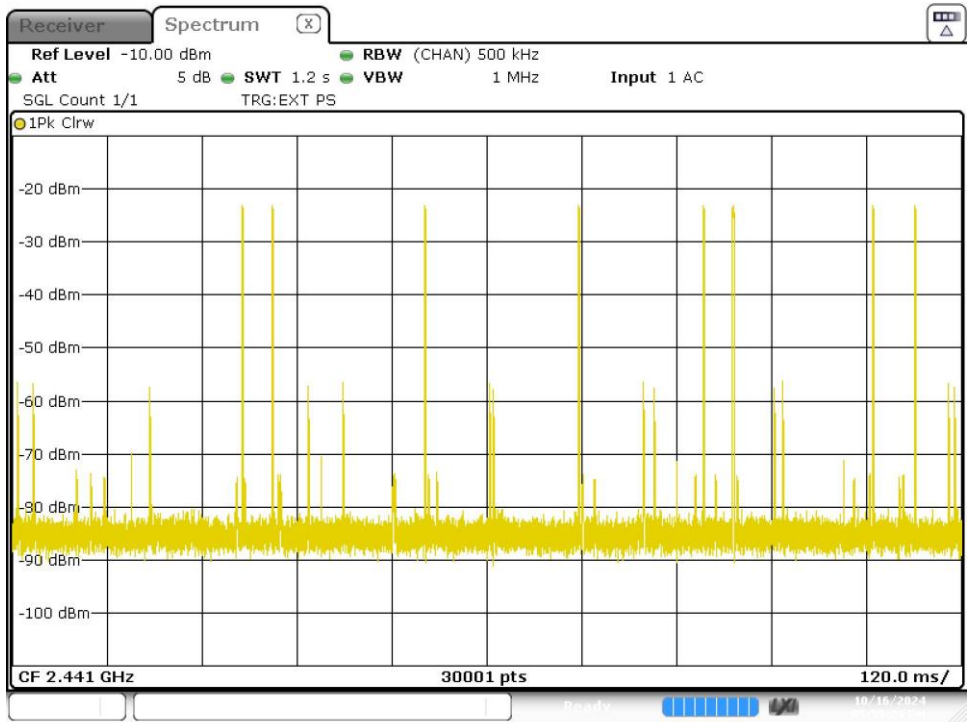
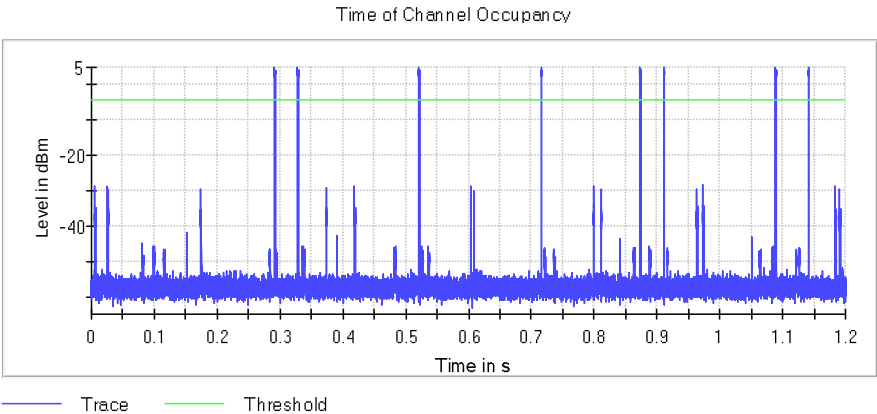
Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	4	1.631

Measurement uncertainty (%)

<±0.12

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (PI4DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	PACKET TYPE 2DH5

Transmit Time per Hop: 1.633 ms



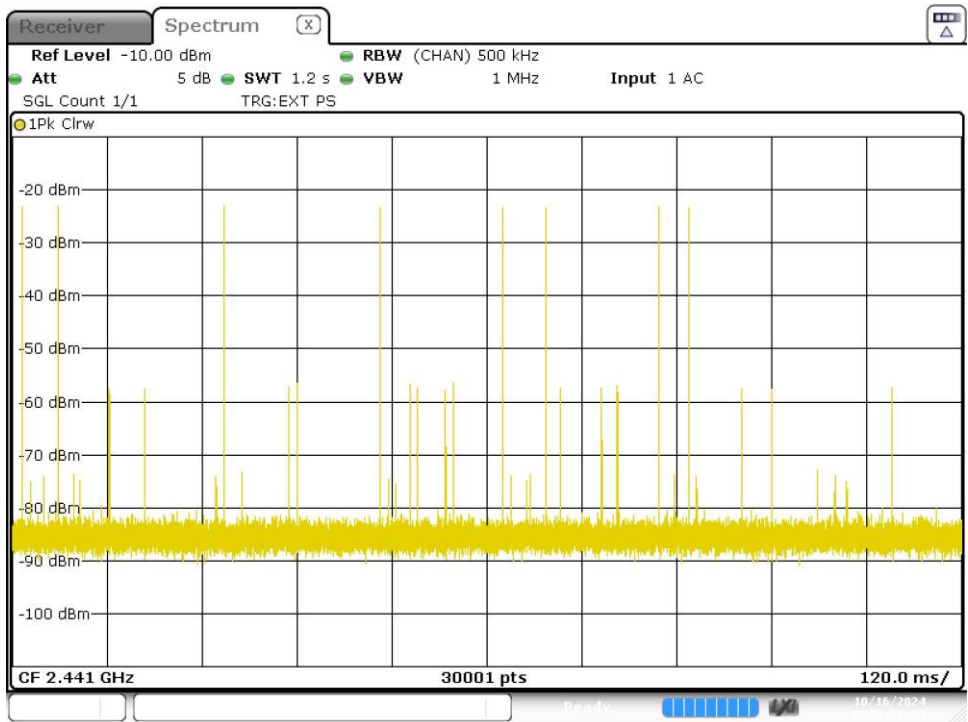
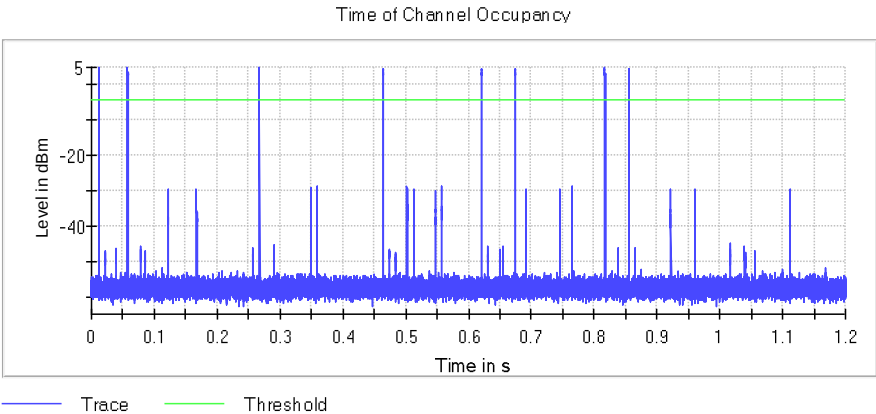
Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	8	1.633

Measurement uncertainty (%)

<±0.12

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

Transmit Time per Hop: 0.382



Date: 16.OCT.2024 17:57:56

Equipment	BW (MHz)	# of Tx Chains	Port	NHp	Avg COT (ms)
Frequency Hopping Spread Spectrum systems (DSS)	1	1	1	5	0.382
Measurement uncertainty (%)			<±0.12		

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)

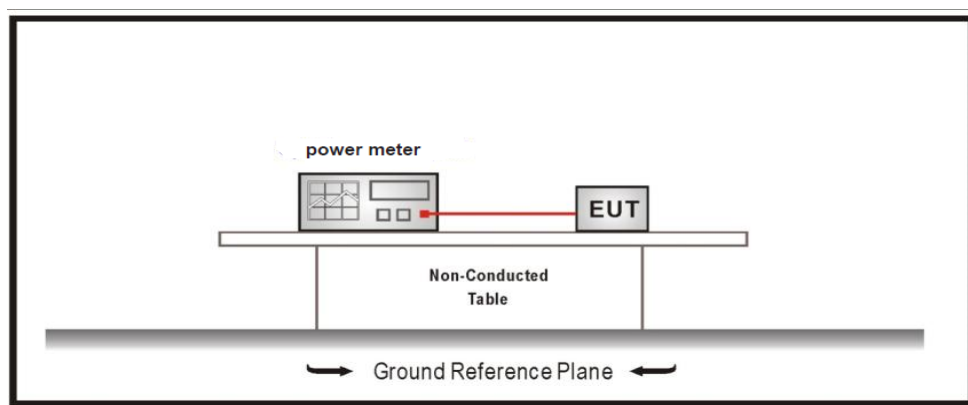
LIMITS

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

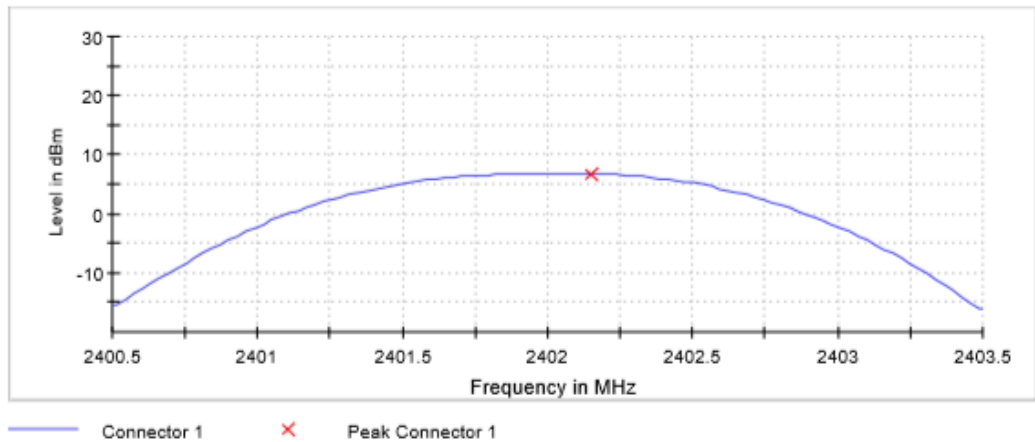
Maximum declared antenna gain: -4 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	2.2	4.9	6.1
Maximum EIRP power (dBm)	-1.8	0.9	2.1
Measurement uncertainty (dB)	<±0.78		

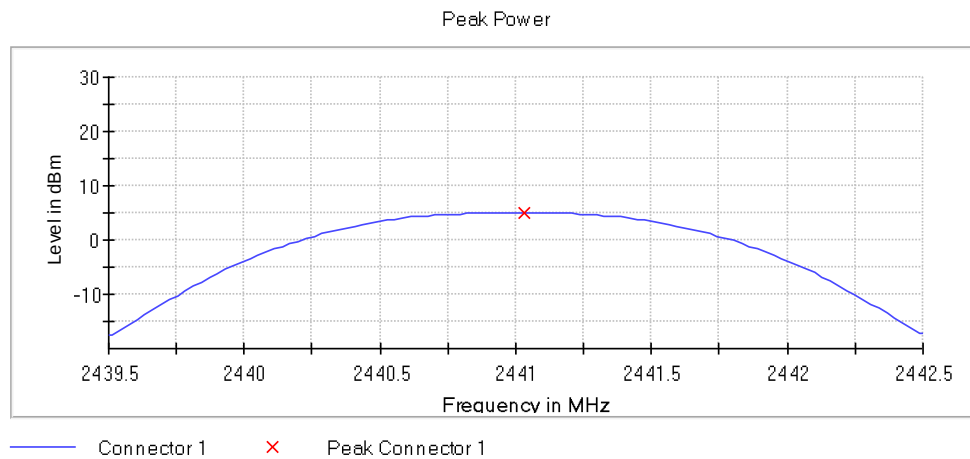
TEST RESULTS (Cont.):

CONDUCTED OUTPUT POWER

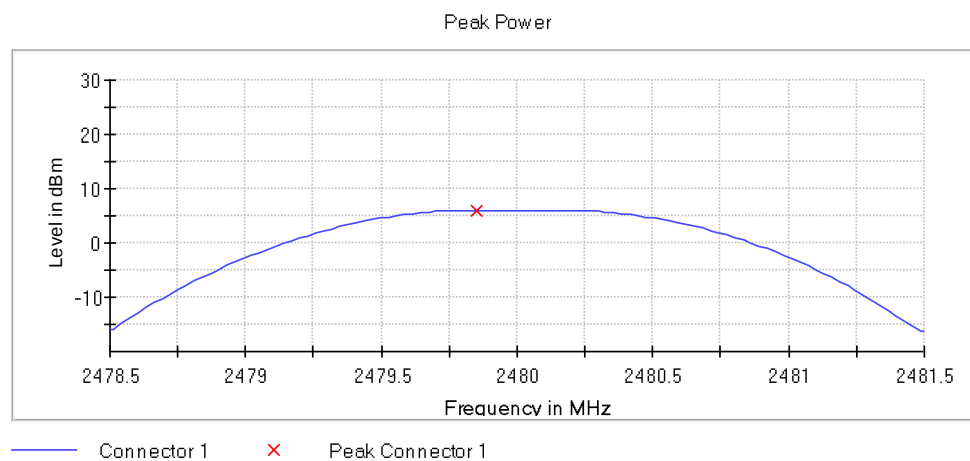
Lowest Channel



Middle Channel



Highest Channel

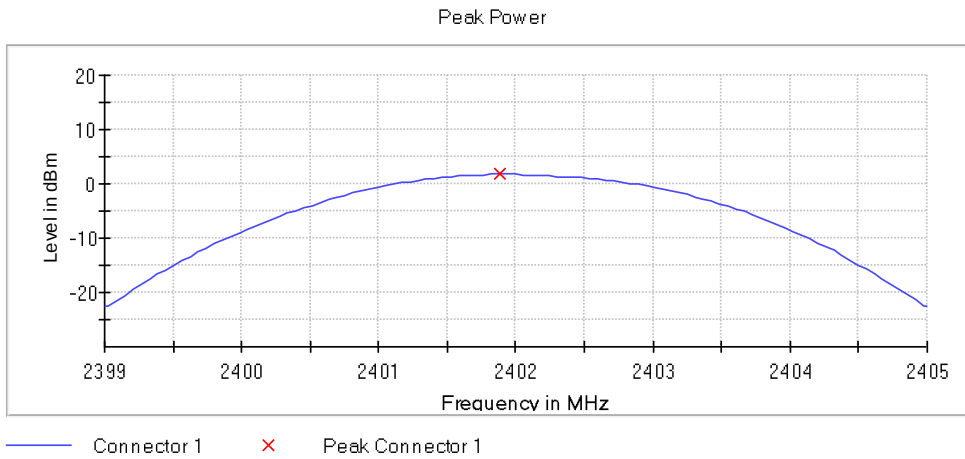


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02
TEST RESULTS:	PASS

Maximum declared antenna gain: -4 dBi

	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	1.8	4.2	5.5
Maximum EIRP power (dBm)	-2.2	0.2	1.5
Measurement uncertainty (dB)	<±0.78		

Lowest Channel

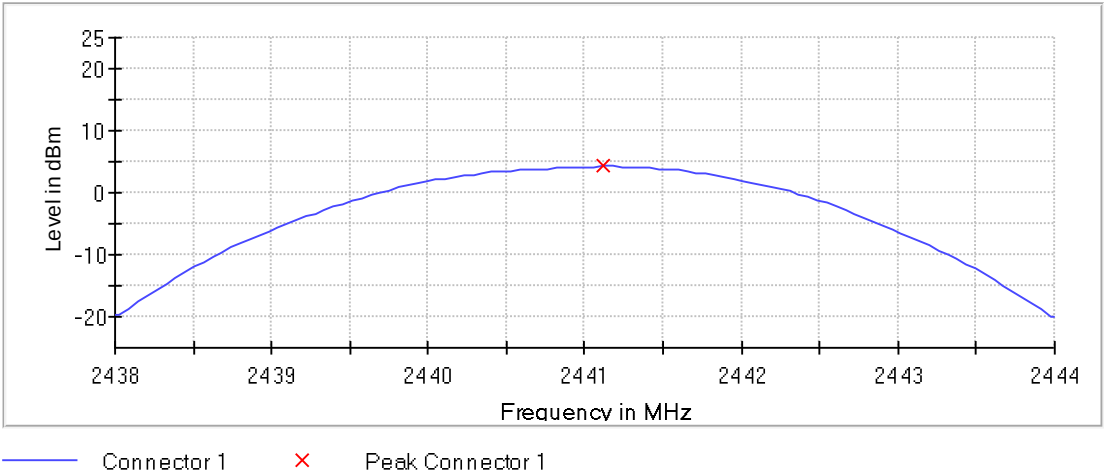


TEST RESULTS (Cont.)

CONDUCTED OUTPUT POWER

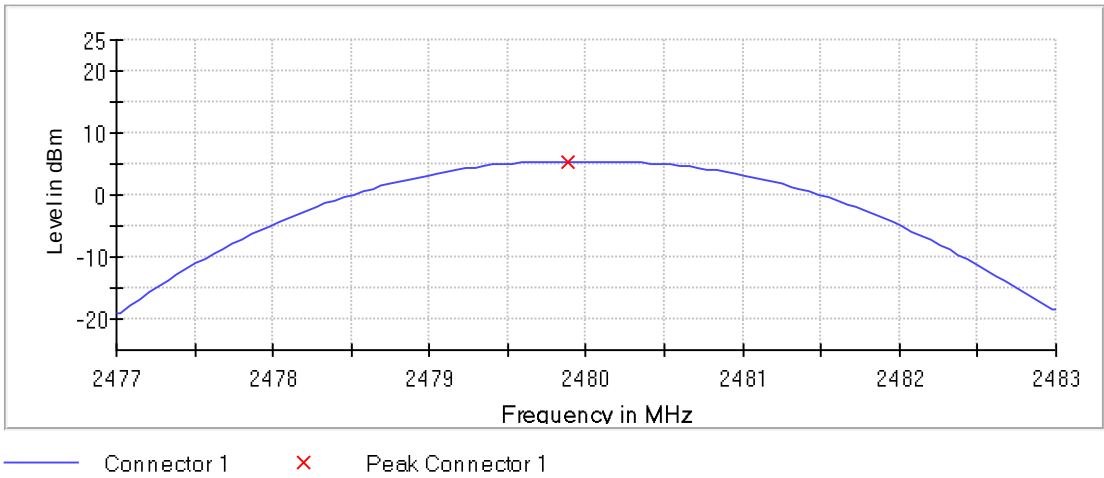
Middle Channel

Peak Power



Highest Channel

Peak Power

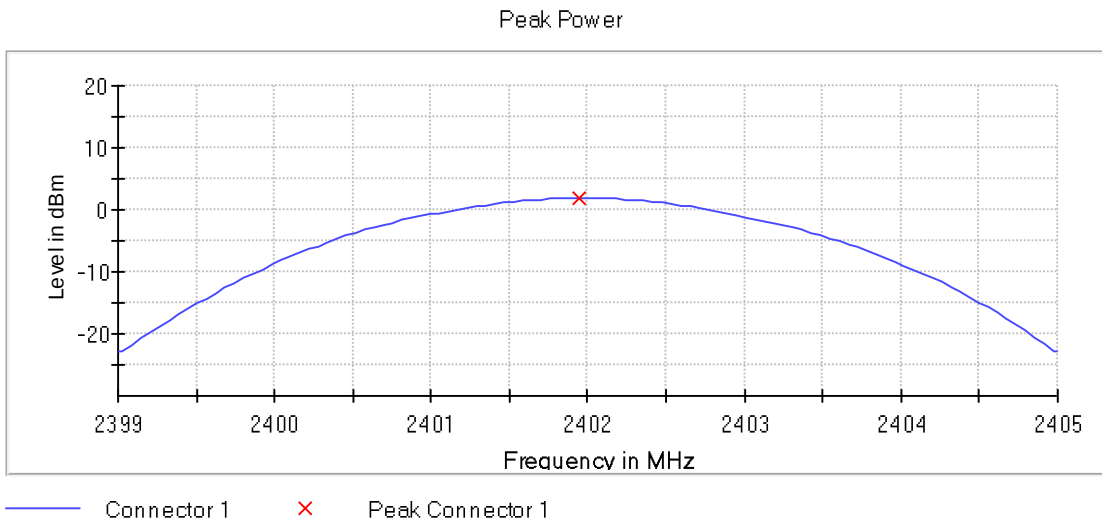


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03
TEST RESULTS:	PASS

Maximum declared antenna gain: -4 dBi

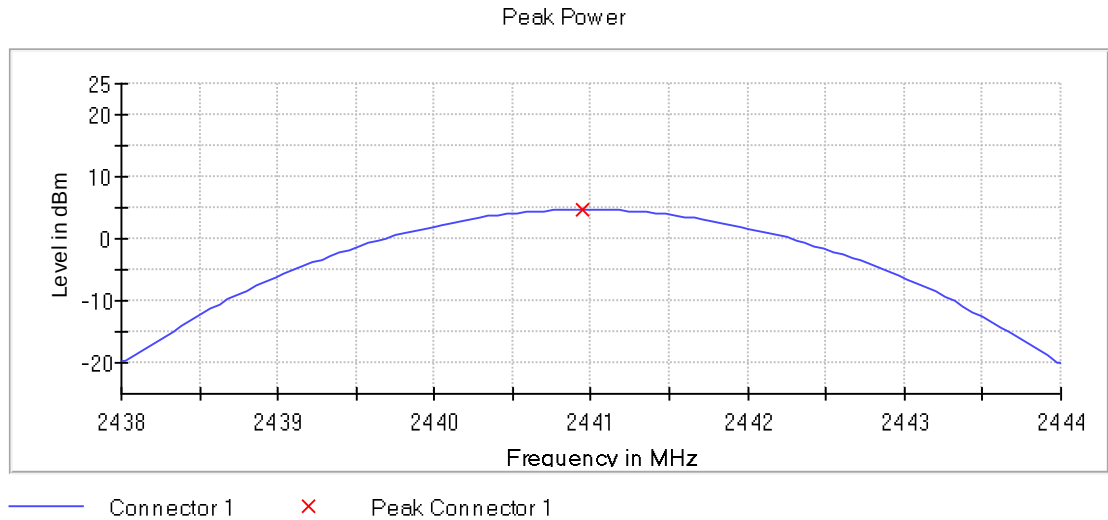
	Lowest frequency 2402 MHz	Middle frequency 2441 MHz	Highest frequency 2480 MHz
Maximum conducted power (dBm)	1.9	4.7	5.6
Maximum EIRP power (dBm)	-2.1	0.7	1.6
Measurement uncertainty (dB)	<±0.78		

Lowest Channel

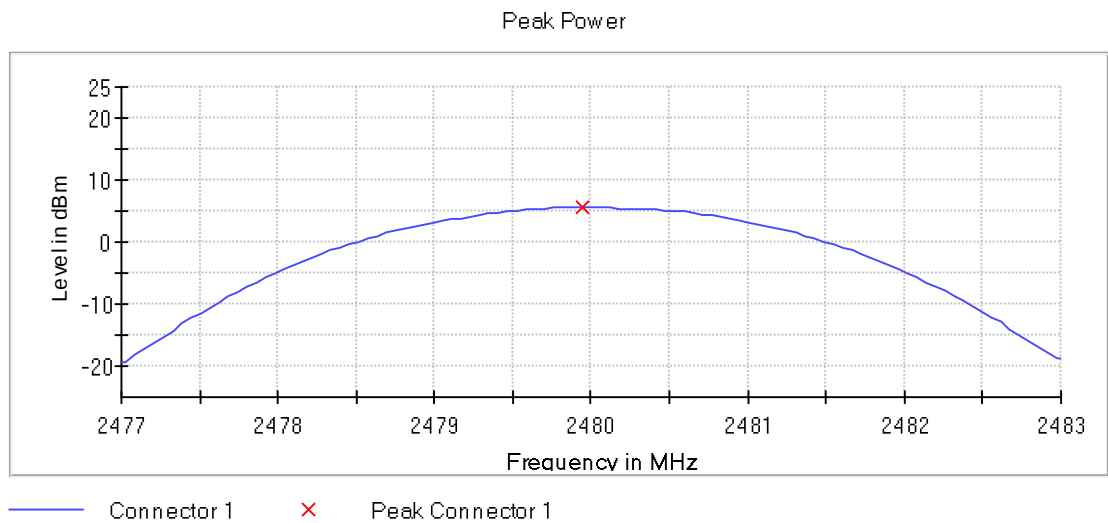


TEST RESULTS (Cont.)

Middle Channel



Highest Channel



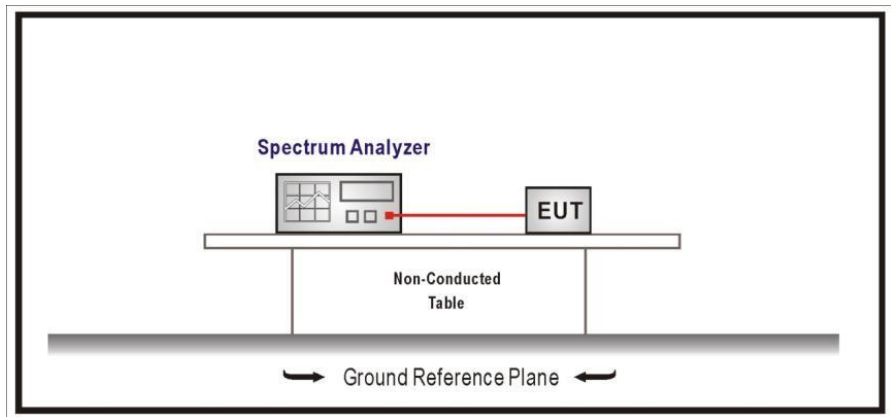
TEST A.5: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER)

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

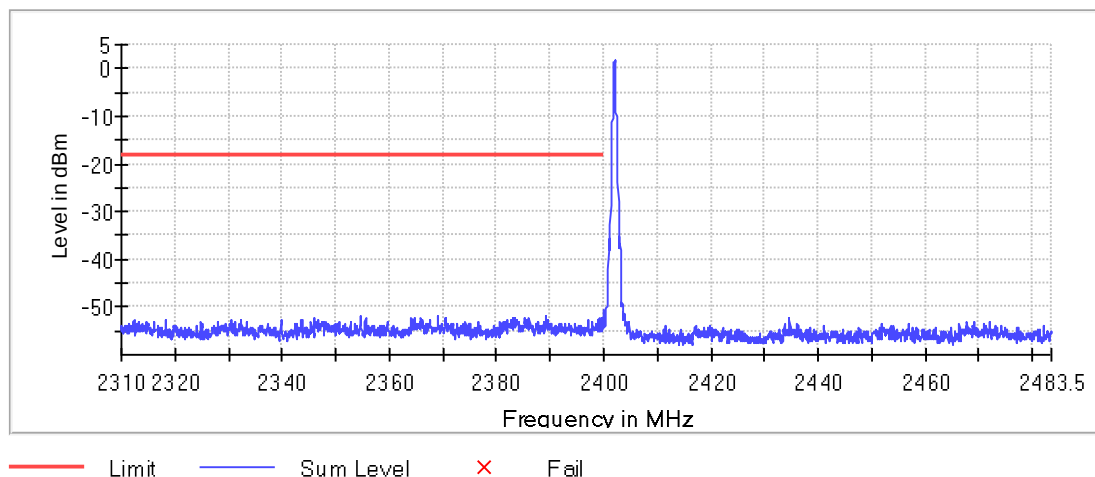
Emissions outside the frequency band in which the intentional radiator is operating shall be at least 20dB below the highest level of the desired power.

TEST SETUP



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

Band Edge

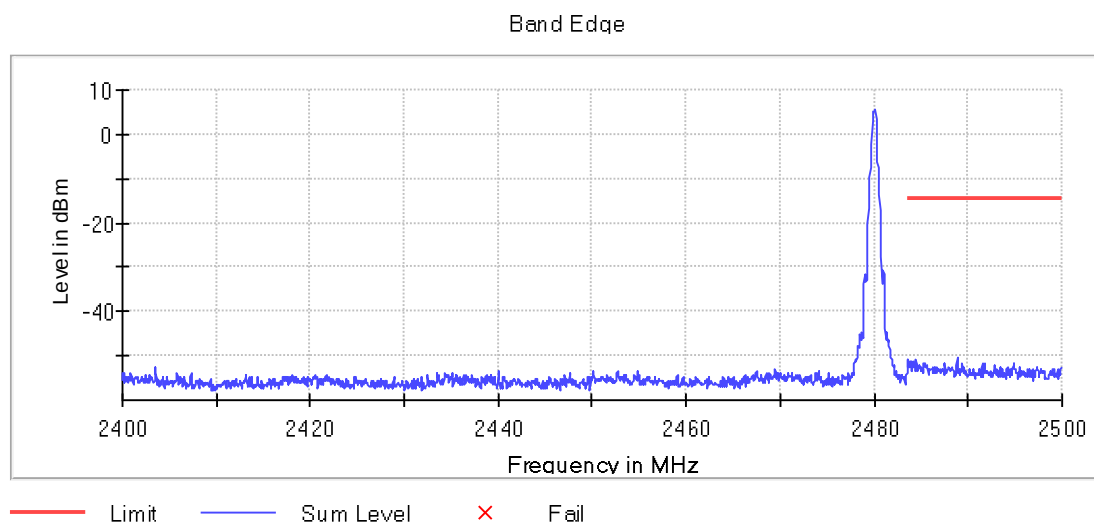


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.925000	-50.8	32.7	-18.1	PASS
2399.975000	-50.8	32.8	-18.1	PASS
2389.175000	-51.7	33.6	-18.1	PASS
2389.225000	-51.8	33.7	-18.1	PASS
2368.975000	-51.9	33.8	-18.1	PASS
2354.575000	-52.0	33.9	-18.1	PASS
2385.325000	-52.1	34.0	-18.1	PASS
2370.575000	-52.1	34.1	-18.1	PASS
2399.125000	-52.1	34.1	-18.1	PASS
2346.075000	-52.2	34.1	-18.1	PASS
2385.275000	-52.2	34.1	-18.1	PASS
2364.825000	-52.2	34.1	-18.1	PASS
2364.775000	-52.2	34.1	-18.1	PASS
2370.425000	-52.2	34.1	-18.1	PASS
2355.575000	-52.2	34.1	-18.1	PASS

TEST RESULTS (Cont.):

HOPPING OFF (Highest channel)

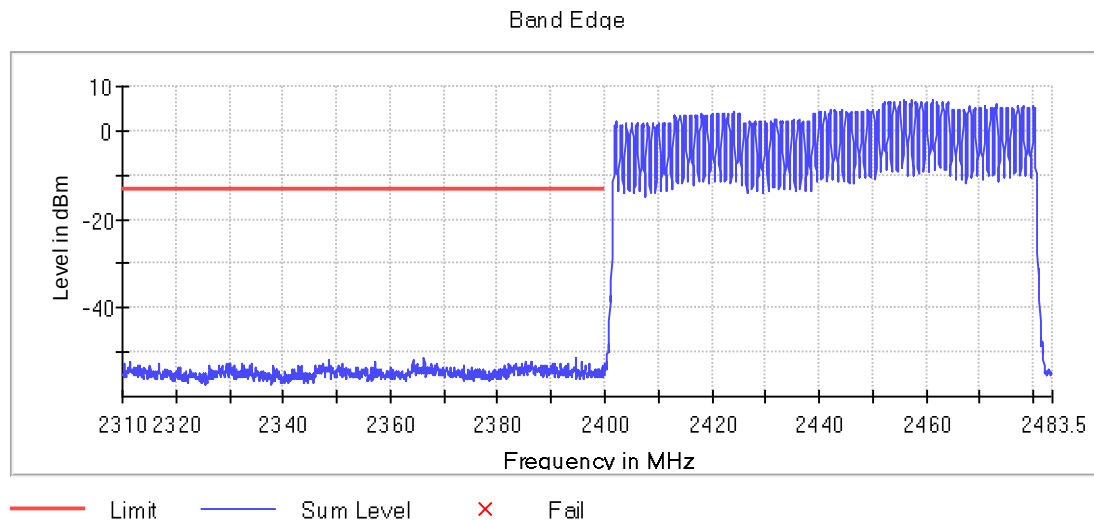


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.825000	-50.5	36.1	-14.4	PASS
2488.875000	-50.6	36.2	-14.4	PASS
2483.525000	-50.7	36.3	-14.4	PASS
2484.475000	-50.8	36.3	-14.4	PASS
2484.425000	-50.9	36.5	-14.4	PASS
2483.875000	-51.1	36.6	-14.4	PASS
2484.125000	-51.1	36.7	-14.4	PASS
2483.925000	-51.2	36.8	-14.4	PASS
2484.075000	-51.5	37.1	-14.4	PASS
2489.425000	-51.5	37.1	-14.4	PASS
2485.325000	-51.6	37.2	-14.4	PASS
2484.325000	-51.6	37.2	-14.4	PASS
2489.375000	-51.6	37.2	-14.4	PASS
2483.575000	-51.7	37.3	-14.4	PASS
2484.275000	-51.7	37.3	-14.4	PASS

TEST RESULTS (Cont.):

HOPPING ON (Lowest channel)

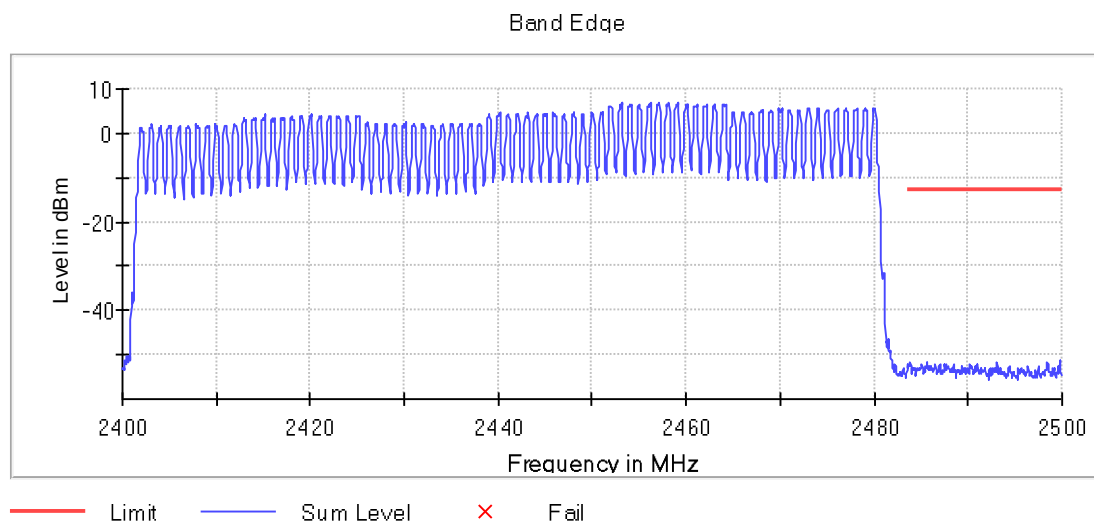


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2366.325000	-51.1	38.1	-13.0	PASS
2366.275000	-51.2	38.2	-13.0	PASS
2394.525000	-51.4	38.4	-13.0	PASS
2394.575000	-51.6	38.6	-13.0	PASS
2348.475000	-51.7	38.7	-13.0	PASS
2364.175000	-51.9	38.9	-13.0	PASS
2385.175000	-51.9	38.9	-13.0	PASS
2385.125000	-51.9	38.9	-13.0	PASS
2364.225000	-51.9	38.9	-13.0	PASS
2395.725000	-51.9	38.9	-13.0	PASS
2348.425000	-52.0	39.0	-13.0	PASS
2386.225000	-52.1	39.0	-13.0	PASS
2386.425000	-52.1	39.1	-13.0	PASS
2357.125000	-52.2	39.2	-13.0	PASS
2348.525000	-52.2	39.2	-13.0	PASS

TEST RESULTS (Cont.):

HOPPING ON (Highest channel)

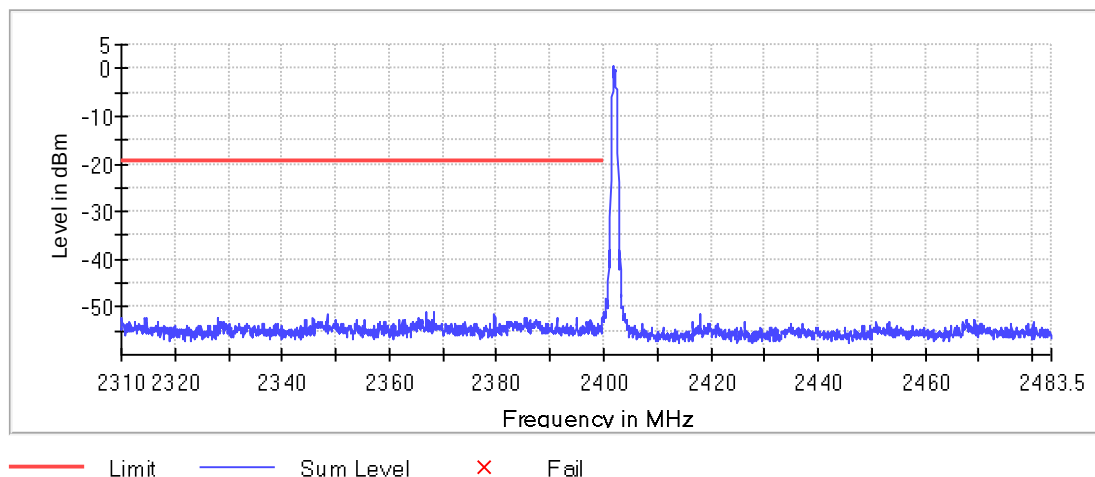


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2499.775000	-51.4	38.4	-13.0	PASS
2499.725000	-51.7	38.8	-13.0	PASS
2485.625000	-51.8	38.8	-13.0	PASS
2483.875000	-51.8	38.8	-13.0	PASS
2493.075000	-51.8	38.9	-13.0	PASS
2498.425000	-51.9	38.9	-13.0	PASS
2493.025000	-51.9	39.0	-13.0	PASS
2485.675000	-51.9	39.0	-13.0	PASS
2498.375000	-51.9	39.0	-13.0	PASS
2498.475000	-52.0	39.0	-13.0	PASS
2483.825000	-52.0	39.0	-13.0	PASS
2490.975000	-52.1	39.1	-13.0	PASS
2490.225000	-52.1	39.1	-13.0	PASS
2486.475000	-52.1	39.1	-13.0	PASS
2487.475000	-52.1	39.2	-13.0	PASS

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (PI4DQPSK)
TEST RESULTS:	PASS
TEST RESULTS (Cont.)	HOPPING OFF (Lowest channel)

Band Edge



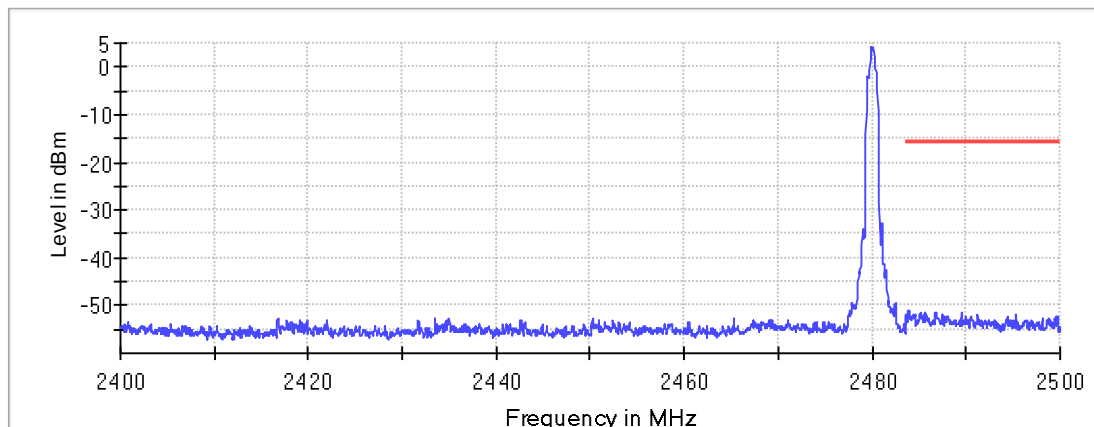
Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2366.925000	-51.0	31.6	-19.3	PASS
2366.875000	-51.0	31.7	-19.3	PASS
2399.975000	-51.2	31.9	-19.3	PASS
2368.325000	-51.2	31.9	-19.3	PASS
2348.425000	-51.3	32.0	-19.3	PASS
2368.375000	-51.4	32.1	-19.3	PASS
2348.375000	-51.4	32.1	-19.3	PASS
2379.625000	-51.6	32.3	-19.3	PASS
2399.825000	-52.0	32.6	-19.3	PASS
2379.575000	-52.1	32.8	-19.3	PASS
2379.675000	-52.1	32.8	-19.3	PASS
2394.925000	-52.2	32.8	-19.3	PASS
2399.775000	-52.2	32.9	-19.3	PASS
2391.225000	-52.2	32.9	-19.3	PASS
2385.175000	-52.3	32.9	-19.3	PASS

TEST RESULTS (Cont.):

HOPPING OFF (Highest channel)

Band Edge



— Limit — Sum Level × Fail

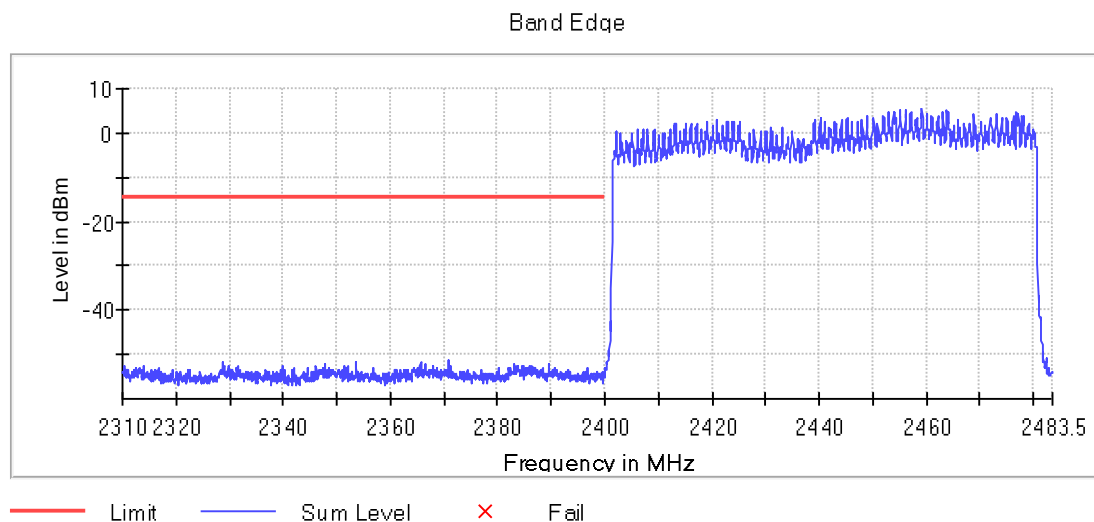
Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.875000	-51.0	35.4	-15.6	PASS
2483.925000	-51.2	35.6	-15.6	PASS
2486.775000	-51.3	35.7	-15.6	PASS
2486.725000	-51.4	35.8	-15.6	PASS
2485.725000	-51.5	35.8	-15.6	PASS
2485.525000	-51.5	35.9	-15.6	PASS
2489.525000	-51.5	35.9	-15.6	PASS
2485.125000	-51.6	36.0	-15.6	PASS
2486.875000	-51.7	36.1	-15.6	PASS
2485.175000	-51.8	36.1	-15.6	PASS
2484.375000	-51.8	36.2	-15.6	PASS
2484.425000	-51.8	36.2	-15.6	PASS
2485.075000	-51.9	36.3	-15.6	PASS
2484.575000	-51.9	36.3	-15.6	PASS
2486.825000	-52.0	36.4	-15.6	PASS

TEST RESULTS (Cont.):

HOPPING ON (Lowest channel)

Lowest Channel

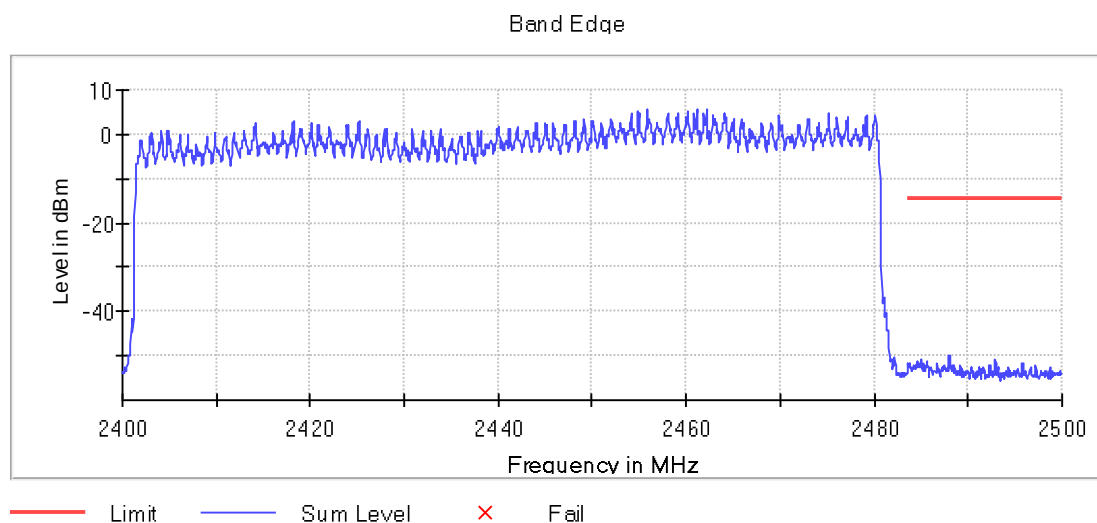


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2370.825000	-51.4	37.0	-14.3	PASS
2365.625000	-51.7	37.4	-14.3	PASS
2353.675000	-51.9	37.5	-14.3	PASS
2365.675000	-51.9	37.5	-14.3	PASS
2328.725000	-51.9	37.5	-14.3	PASS
2328.775000	-51.9	37.6	-14.3	PASS
2370.775000	-51.9	37.6	-14.3	PASS
2366.575000	-52.0	37.7	-14.3	PASS
2347.725000	-52.0	37.7	-14.3	PASS
2366.525000	-52.1	37.7	-14.3	PASS
2347.775000	-52.1	37.8	-14.3	PASS
2383.075000	-52.3	38.0	-14.3	PASS
2389.475000	-52.3	38.0	-14.3	PASS
2353.625000	-52.3	38.0	-14.3	PASS
2370.875000	-52.3	38.0	-14.3	PASS

TEST RESULTS (Cont.):

HOPPING ON (Highest channel)

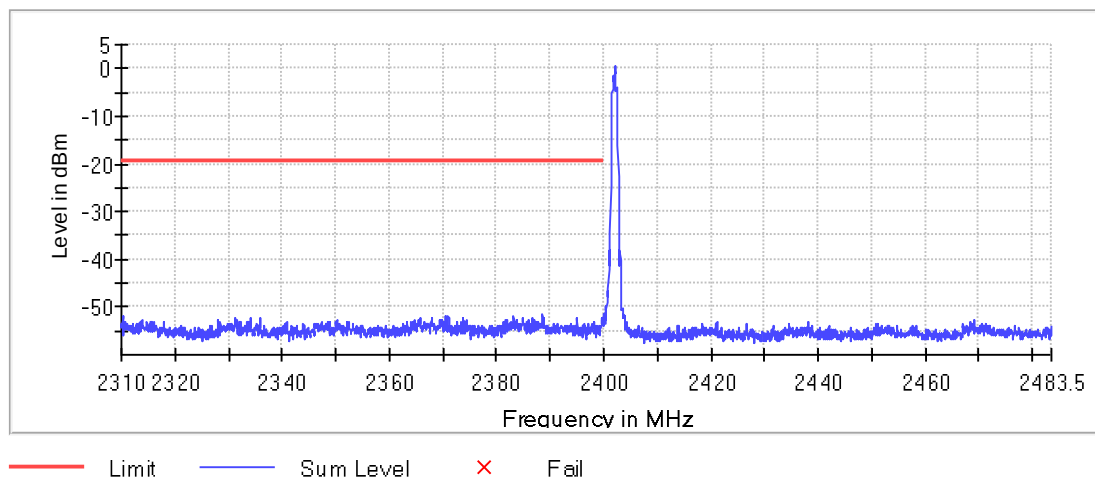


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.025000	-50.1	35.7	-14.3	PASS
2487.975000	-50.1	35.8	-14.3	PASS
2485.025000	-50.9	36.6	-14.3	PASS
2492.875000	-50.9	36.6	-14.3	PASS
2484.975000	-51.0	36.7	-14.3	PASS
2485.575000	-51.3	36.9	-14.3	PASS
2484.575000	-51.4	37.1	-14.3	PASS
2492.825000	-51.5	37.2	-14.3	PASS
2485.525000	-51.6	37.2	-14.3	PASS
2484.875000	-51.6	37.3	-14.3	PASS
2495.775000	-51.6	37.3	-14.3	PASS
2488.125000	-51.6	37.3	-14.3	PASS
2483.825000	-51.7	37.4	-14.3	PASS
2485.225000	-51.7	37.4	-14.3	PASS
2495.825000	-51.7	37.4	-14.3	PASS

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

Band Edge



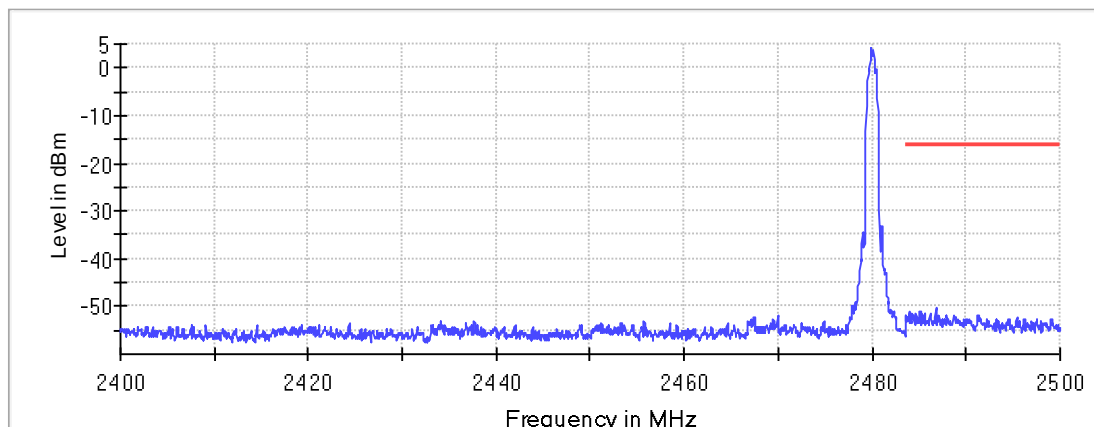
Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2388.625000	-51.4	32.0	-19.4	PASS
2399.975000	-51.5	32.1	-19.4	PASS
2388.575000	-51.5	32.2	-19.4	PASS
2370.575000	-51.7	32.4	-19.4	PASS
2370.525000	-51.9	32.5	-19.4	PASS
2383.225000	-51.9	32.6	-19.4	PASS
2310.275000	-52.0	32.6	-19.4	PASS
2370.975000	-52.1	32.7	-19.4	PASS
2371.025000	-52.1	32.7	-19.4	PASS
2384.975000	-52.1	32.8	-19.4	PASS
2310.225000	-52.2	32.8	-19.4	PASS
2399.625000	-52.2	32.8	-19.4	PASS
2386.775000	-52.3	32.9	-19.4	PASS
2367.825000	-52.4	33.0	-19.4	PASS
2335.875000	-52.4	33.0	-19.4	PASS

TEST RESULTS (Cont.):

HOPPING OFF (Highest channel)

Band Edge



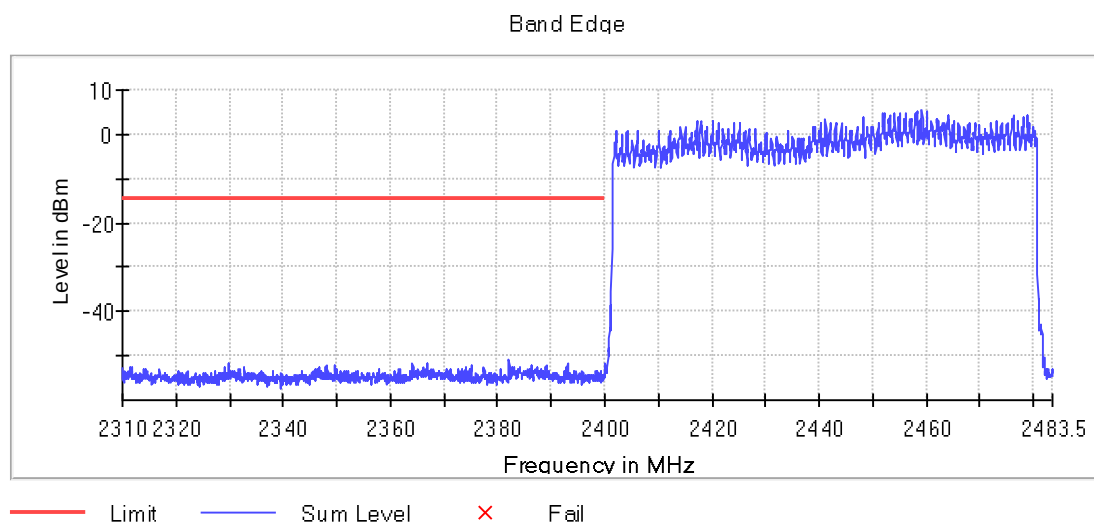
— Limit — Sum Level × Fail

Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2486.775000	-50.4	34.5	-16.0	PASS
2486.825000	-50.5	34.6	-16.0	PASS
2485.075000	-51.0	35.0	-16.0	PASS
2485.125000	-51.1	35.1	-16.0	PASS
2483.925000	-51.3	35.3	-16.0	PASS
2483.975000	-51.3	35.3	-16.0	PASS
2484.275000	-51.4	35.4	-16.0	PASS
2484.675000	-51.5	35.5	-16.0	PASS
2486.175000	-51.5	35.5	-16.0	PASS
2485.625000	-51.6	35.6	-16.0	PASS
2485.275000	-51.6	35.7	-16.0	PASS
2483.525000	-51.7	35.7	-16.0	PASS
2491.225000	-51.7	35.8	-16.0	PASS
2485.575000	-51.7	35.8	-16.0	PASS
2486.225000	-51.7	35.8	-16.0	PASS

TEST RESULTS (Cont.):

HOPPING ON (Lowest channel)

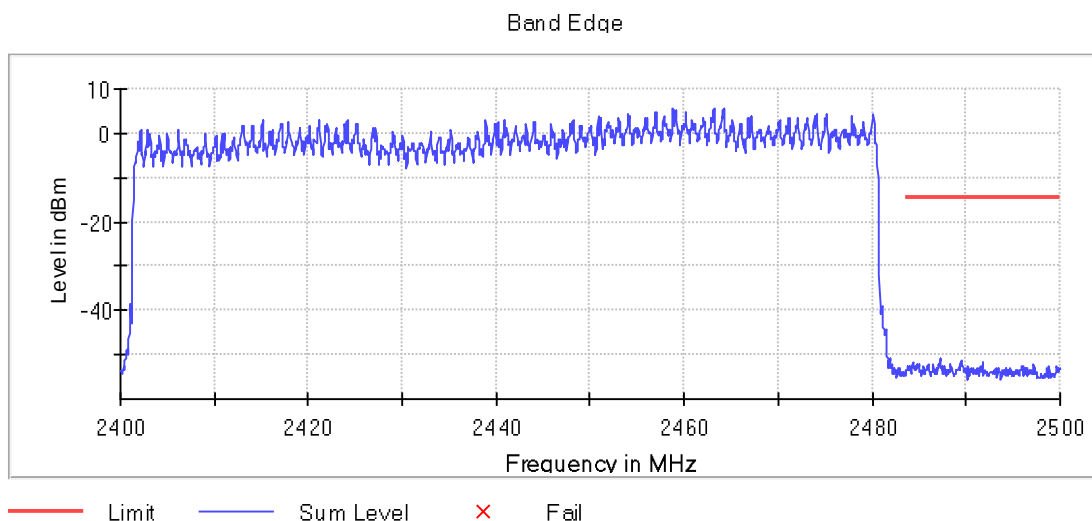


Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2382.125000	-50.8	36.3	-14.5	PASS
2382.075000	-50.8	36.4	-14.5	PASS
2366.875000	-51.6	37.1	-14.5	PASS
2366.925000	-51.6	37.1	-14.5	PASS
2392.975000	-51.8	37.3	-14.5	PASS
2329.725000	-51.8	37.3	-14.5	PASS
2393.025000	-51.9	37.4	-14.5	PASS
2364.125000	-51.9	37.4	-14.5	PASS
2375.025000	-52.1	37.6	-14.5	PASS
2348.025000	-52.1	37.6	-14.5	PASS
2329.775000	-52.1	37.6	-14.5	PASS
2349.725000	-52.2	37.7	-14.5	PASS
2389.025000	-52.2	37.7	-14.5	PASS
2348.075000	-52.2	37.8	-14.5	PASS
2386.225000	-52.3	37.8	-14.5	PASS

TEST RESULTS (Cont.):

HOPPING ON (Highest channel)



Measurement

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2487.225000	-50.9	36.5	-14.4	PASS
2487.175000	-51.1	36.8	-14.4	PASS
2489.475000	-51.3	36.9	-14.4	PASS
2489.525000	-51.5	37.1	-14.4	PASS
2484.325000	-51.5	37.2	-14.4	PASS
2487.275000	-51.6	37.3	-14.4	PASS
2491.775000	-51.8	37.5	-14.4	PASS
2484.375000	-51.9	37.5	-14.4	PASS
2491.725000	-51.9	37.6	-14.4	PASS
2484.775000	-51.9	37.6	-14.4	PASS
2486.475000	-52.1	37.7	-14.4	PASS
2487.075000	-52.1	37.7	-14.4	PASS
2486.025000	-52.1	37.7	-14.4	PASS
2486.525000	-52.1	37.7	-14.4	PASS
2484.825000	-52.1	37.8	-14.4	PASS

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-247 5.5

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 at 1m for the frequency range 1-40 GHz (1 GHz-18 GHz and 18 GHz-40 GHz Double ridge horn antennas).

For radiated emissions in the range 1-40 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.

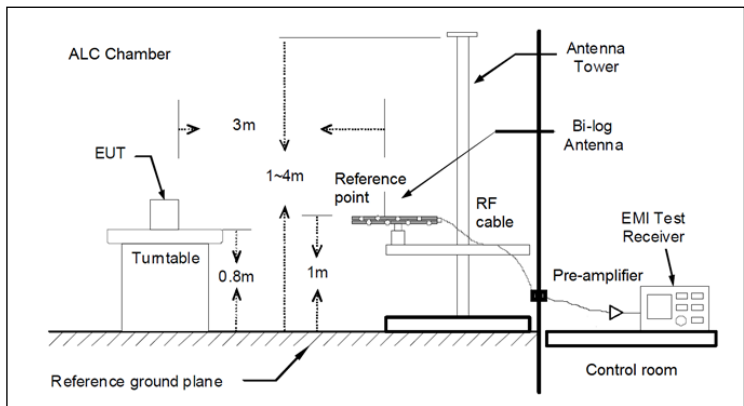
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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

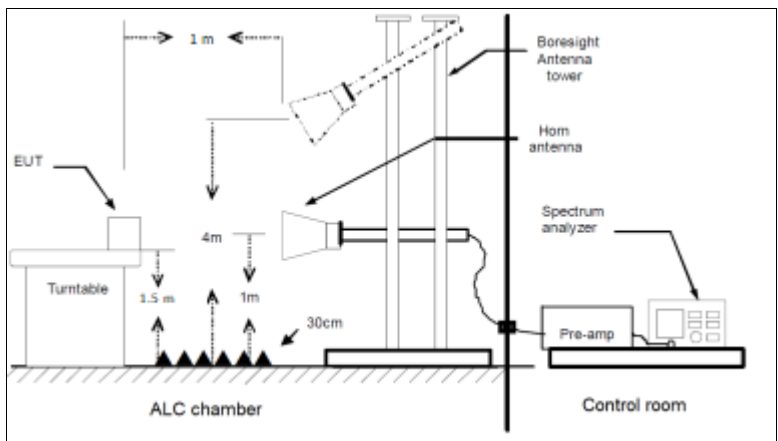
The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (CONT.)

Radiated measurements Setup $f < 1$ GHz



Radiated measurements setup $f > 1$ 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

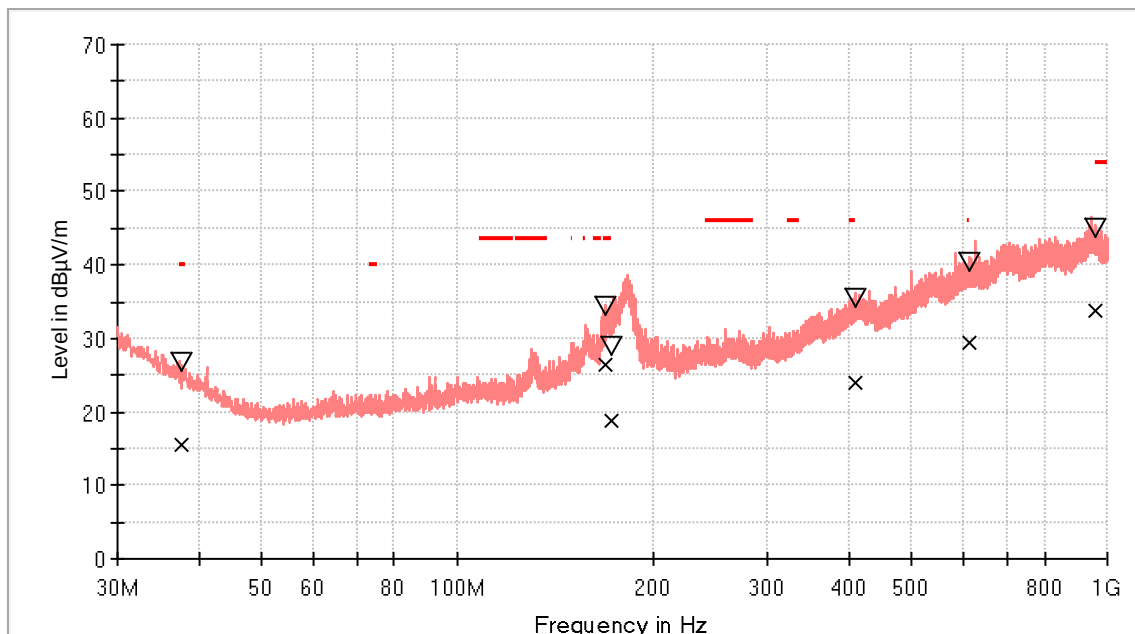
The results in the following plots and tables show the maximum measured levels in the 1-26 GHz range including the restricted bands 2.31-2.5 GHz.

TEST RESULTS (Cont.):

30 MHz – 1000 MHz (GFSK)

Middle Channel

RF_FCC_15.247_E Field_30MHz_1GHz



- PK+_MAXH
- - - TX limits to Spurious Emission FCC15.247 (30MHz to 1GHz) Restricted Bands QPK Limit
- ▽ MaxPeak-PK+ (Single)
- × QuasiPeak-QPK (Single)

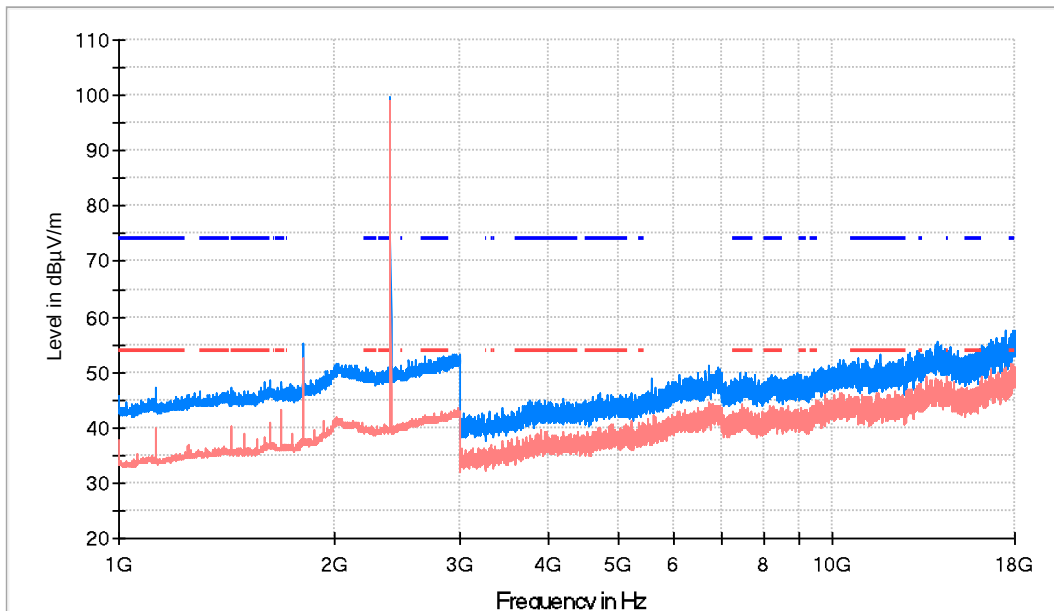
Maximizations

Frequency (MHz)	MaxPeak (dBμV/m)	QuasiPeak (dBμV/m)	Pol	Margin - QPK (dB)	Limit - QPK (dBμV/m)
37.760000	26.6	15.6	H	24.4	40.0
168.467500	34.4	26.3	V	17.2	43.5
172.493000	28.9	18.8	H	24.8	43.5
408.251500	35.4	23.9	V	22.2	46.0
613.164000	40.2	29.5	H	16.5	46.0
961.442500	45.0	33.7	H	20.3	54.0

TEST RESULTS (Cont.)

1 GHz – 18 GHz (GFSK)

CHANNEL: Lowest (2402 MHz).



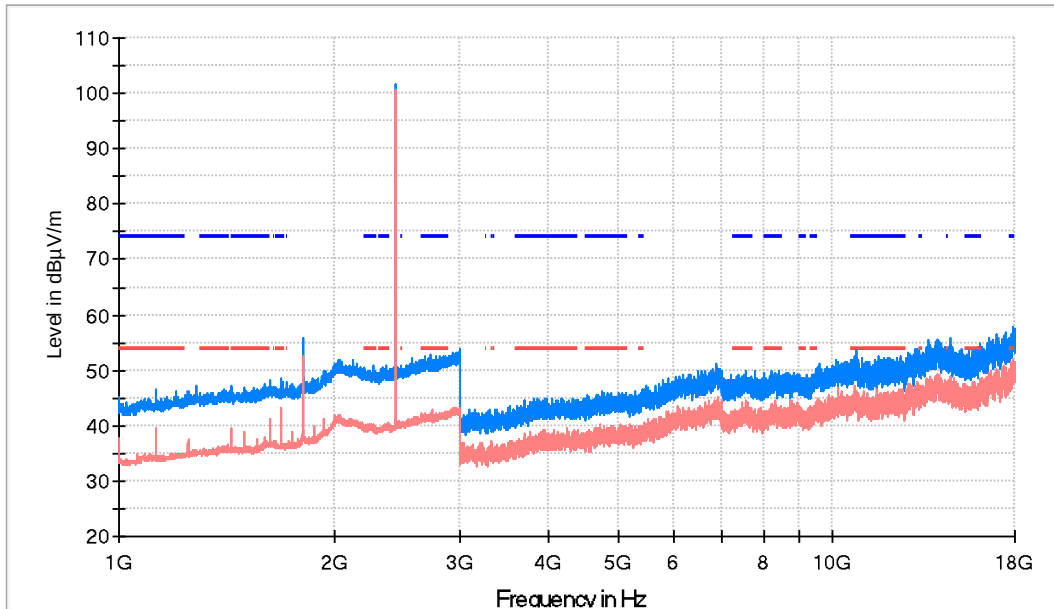
— PK+_MAXH
— TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
— TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit
— AVG_MAXH

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)	Comment
1125.000000	45.9	39.9	V	14.1	54.0	
1687.500000	48.3	43.1	V	10.9	54.0	
2402.000000	99.7	99.1	V	---	---	Fundamental
17756.500000	55.7	51.4	V	2.6	54.0	

TEST RESULTS (Cont.)

CHANNEL: Middle (2441 MHz).



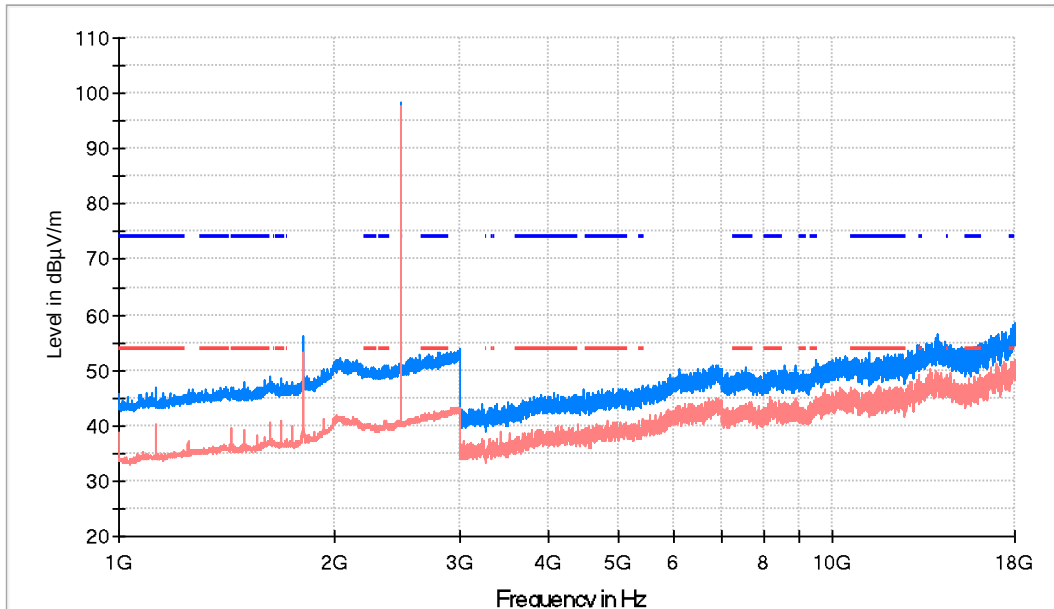
— PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 - - TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit
 — AVG_MAXH

Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	46.5	39.7	V	14.3	54.0	
1687.500000	48.5	43.4	V	10.6	54.0	
2441.000000	101.6	100.8	V	---	---	Fundamental

TEST RESULTS (Cont.)

CHANNEL: Highest (2480 MHz).



— PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit
 — AVG_MAXH

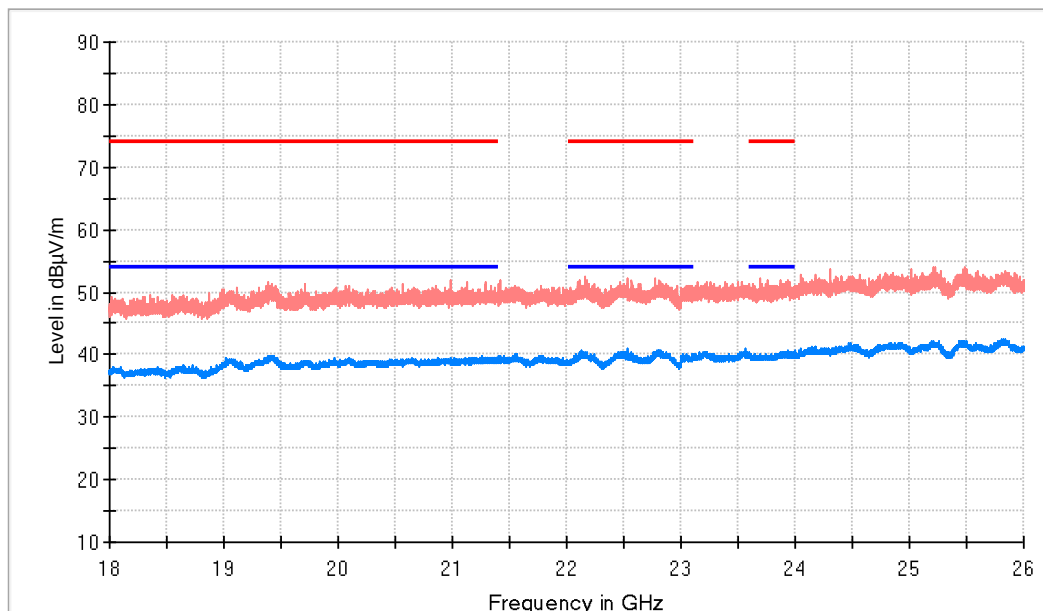
Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	47.0	40.3	V	13.7	54.0	
1687.500000	48.7	40.8	V	13.2	54.0	
2480.000000	98.5	97.6	V	---	---	Fundamental

TEST RESULTS (Cont.)

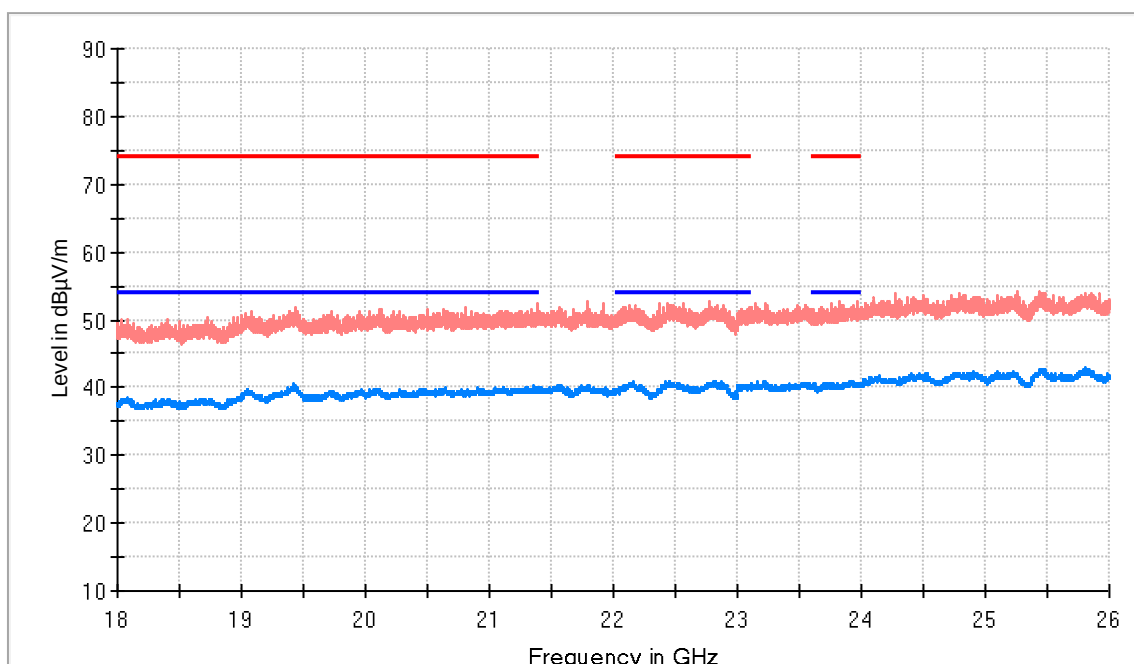
18 GHz – 26 GHz (GFSK)

CHANNEL: Lowest (2402 MHz).



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

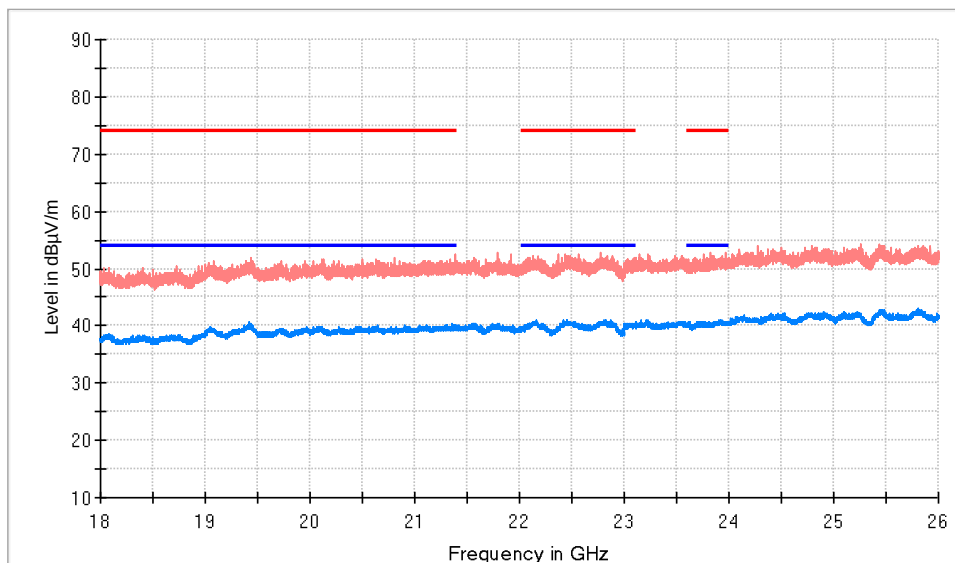
CHANNEL: Middle (2441 MHz).



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

TEST RESULTS (Cont.)

CHANNEL: Highest (2480 MHz).

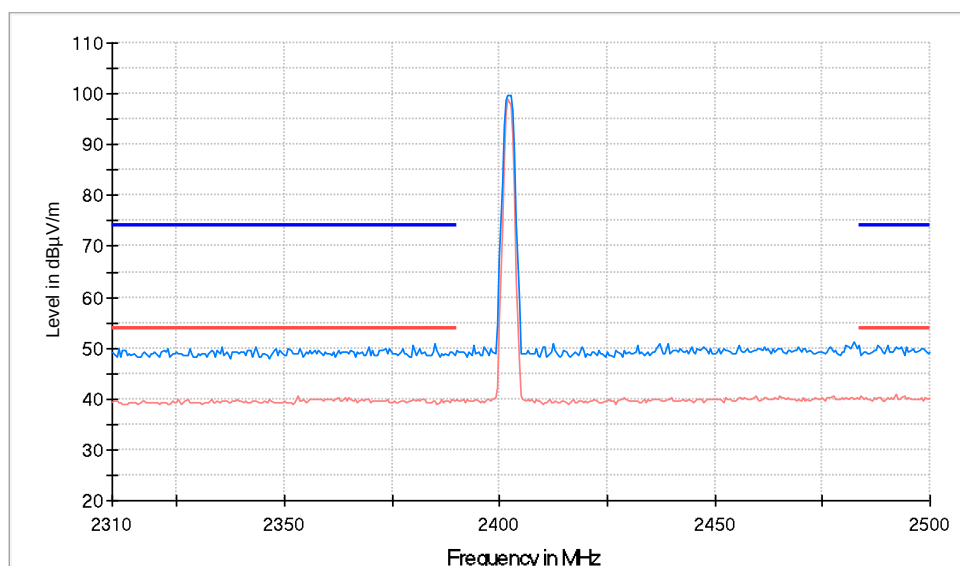


- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247 Restricted Bands PK Limit
- TX limits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit

RESTRICTED BANDS

2.31 GHz – 2.5 GHz (GFSK)

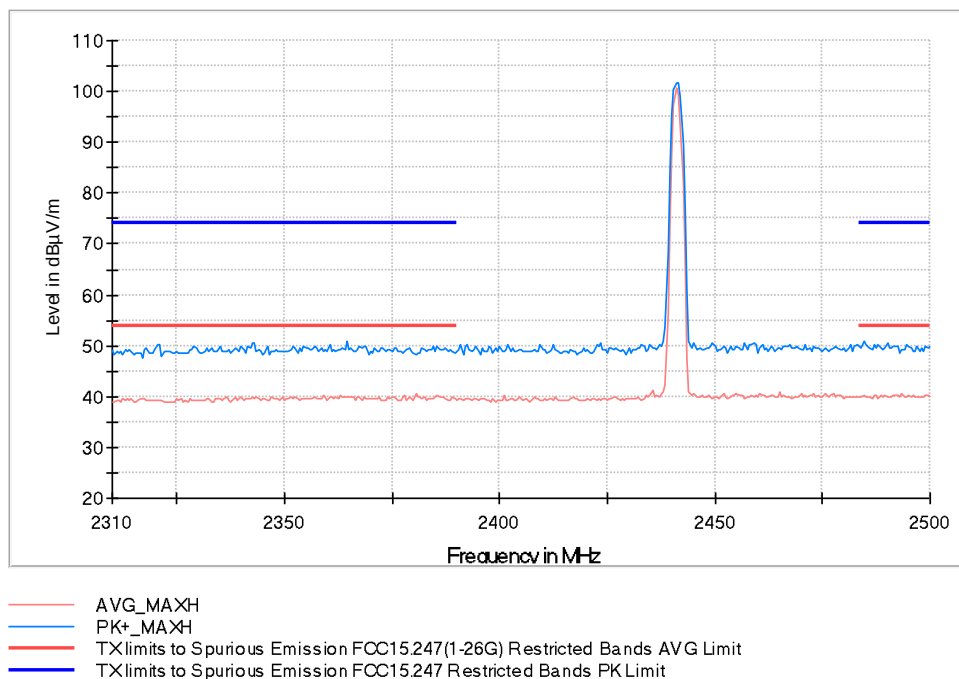
CHANNEL: Lowest (2402 MHz)



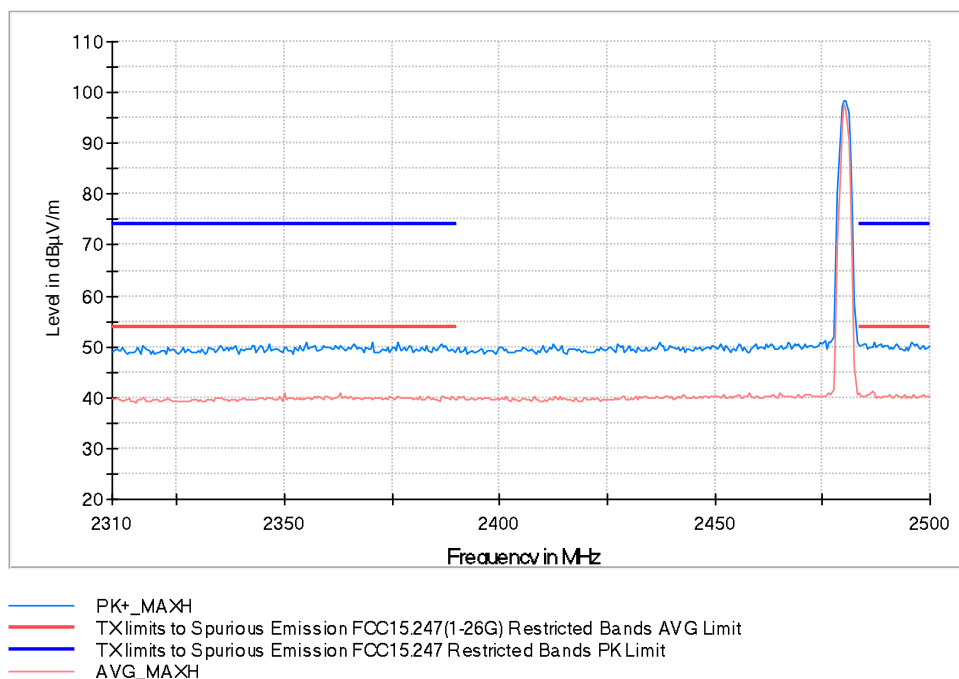
- AVG_MAXH
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
- TX limits to Spurious Emission FCC15.247 Restricted Bands PK Limit

TEST RESULTS (Cont.)

CHANNEL: Middle (2441 MHz)



CHANNEL: Highest (2480 MHz)



TESTED SAMPLES:	S/02
TESTED CONDITIONS MODES:	TC#02 (PI4DQPSK)
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.

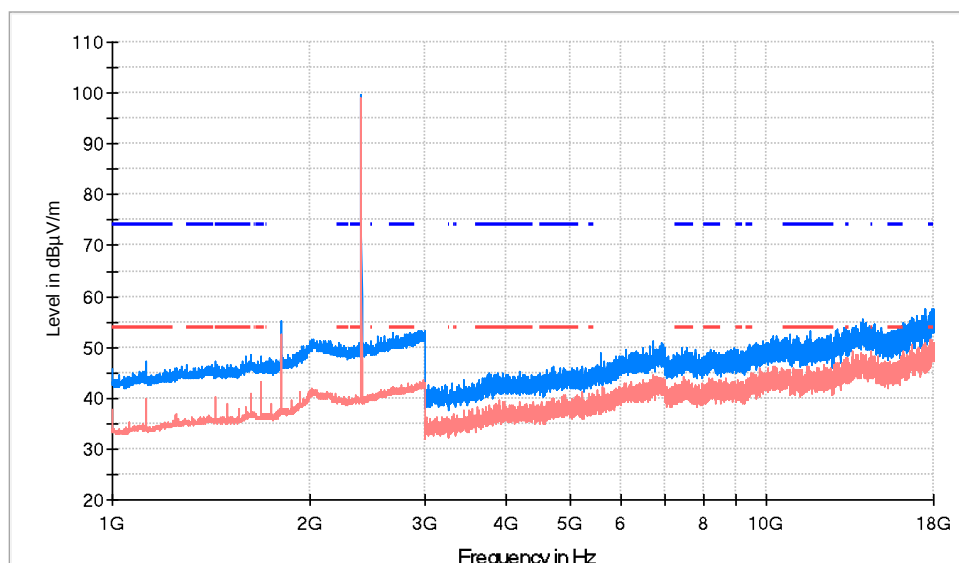
The results in the following plots and tables show the maximum measured levels in the 30-1000 MHz range.

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 2.31-2.5 GHz.

TEST RESULTS (Cont.)	1 GHz – 18 GHz (PI4DQPSK)
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CHANNEL: Lowest (2402 MHz).



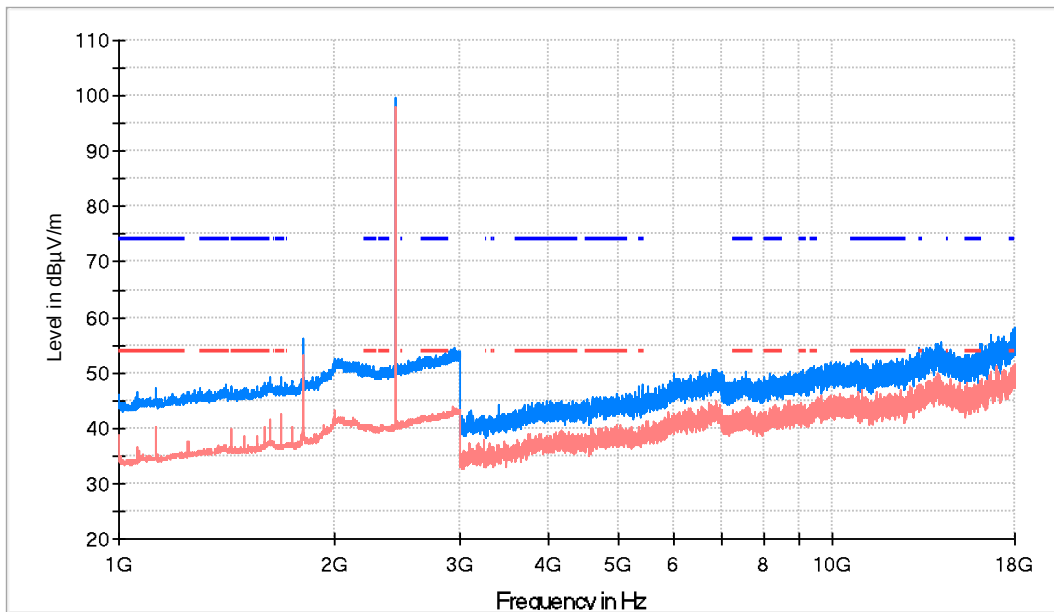
— PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 — TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit
 — AVG_MAXH

Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	45.9	39.9	V	14.1	54.0	
2402.500000	99.8	97.9	V	---	---	Fundamental
17756.500000	55.7	51.4	V	2.6	54.0	

TEST RESULTS (Cont.)

CHANNEL: Middle (2441 MHz).



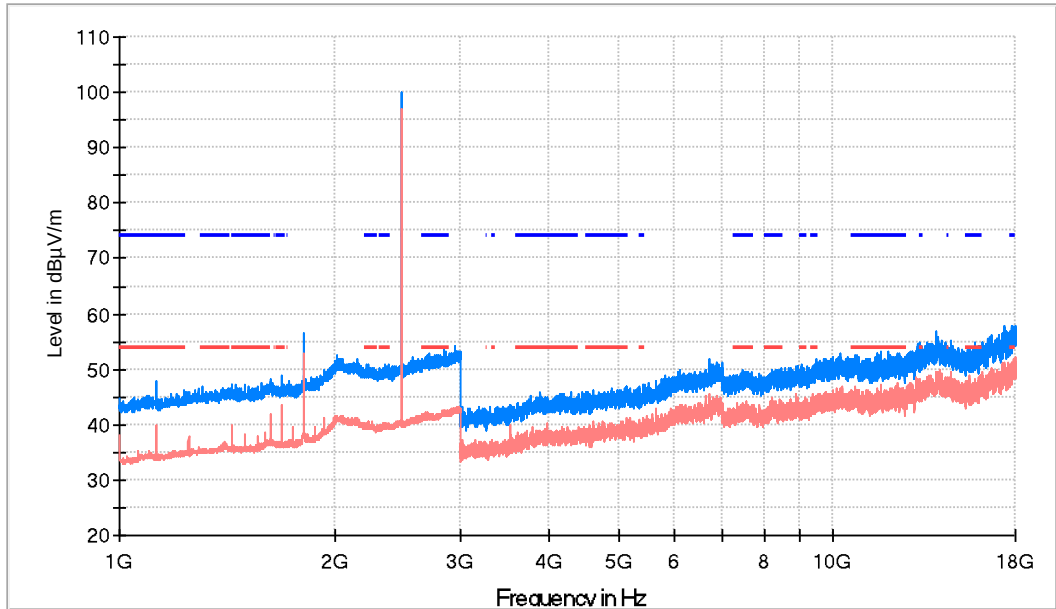
— PK+_MAXH
 — TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
 - - TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit
 — AVG_MAXH

Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	47.4	40.3	V	13.7	54.0	
1687.500000	49.2	42.7	V	11.3	54.0	
2441.000000	99.8	98.0	V	---	---	Fundamental
17904.000000	55.1	51.4	H	2.6	54.0	

TEST RESULTS (Cont.)

CHANNEL: Highest (2480 MHz)



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

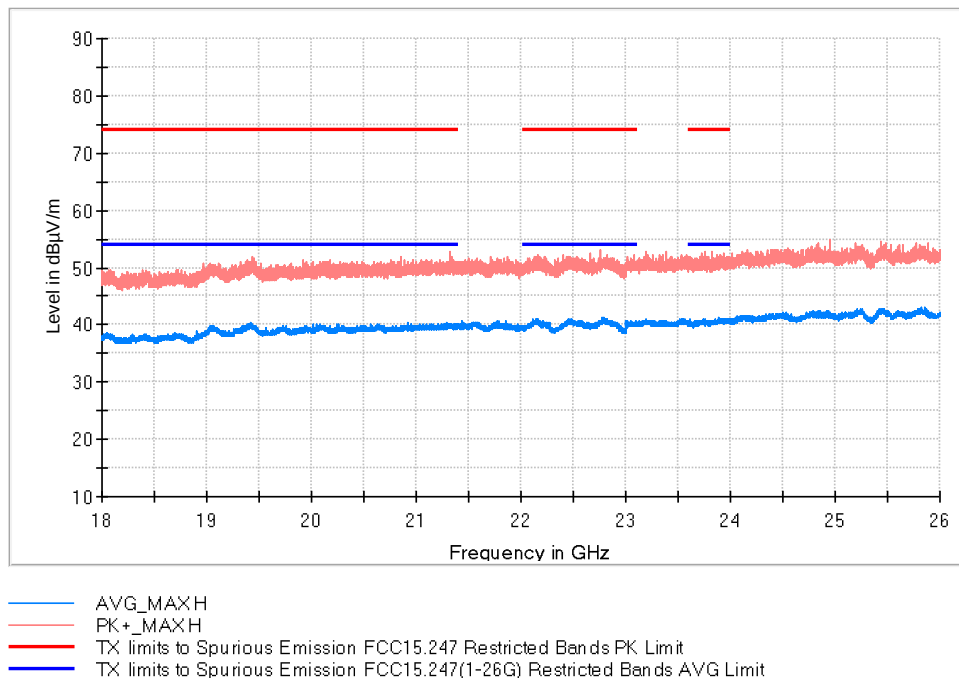
Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	46.9	39.8	V	14.2	54.0	
1687.500000	48.5	43.7	V	10.3	54.0	
2480.500000	100.0	95.9	V	---	---	Fundamental
17908.500000	56.7	52.0	V	2.0	54.0	

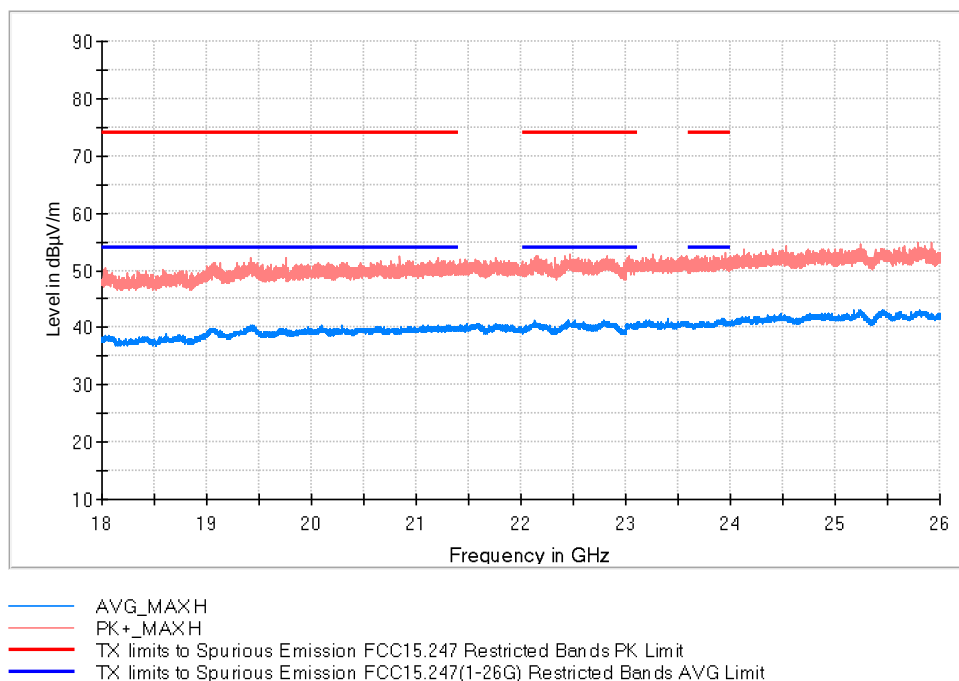
TEST RESULTS (Cont.)

18 GHz – 26 GHz (PI4DQPSK)

CHANNEL: Lowest (2402 MHz)

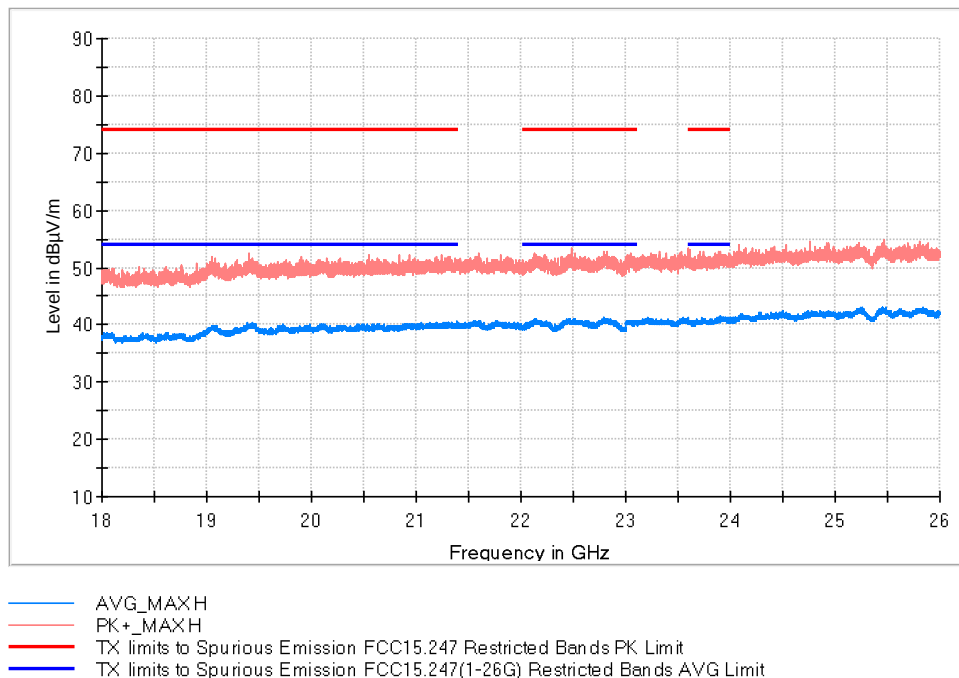


CHANNEL: Middle (2441 MHz)



TEST RESULTS (Cont.)

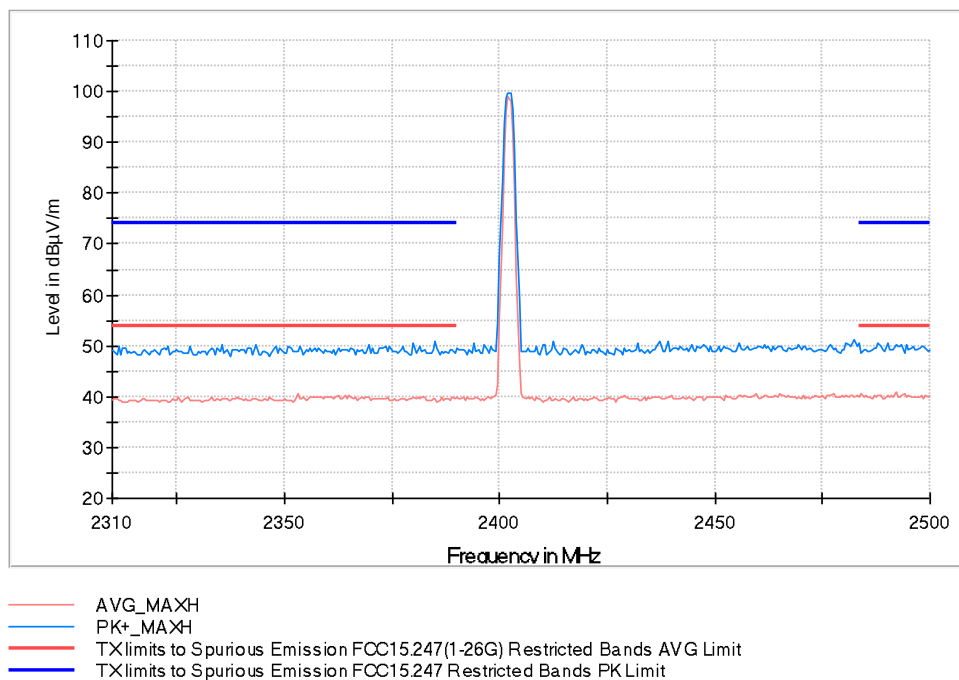
CHANNEL: Highest (2480 MHz)



TEST RESULTS (Cont.):

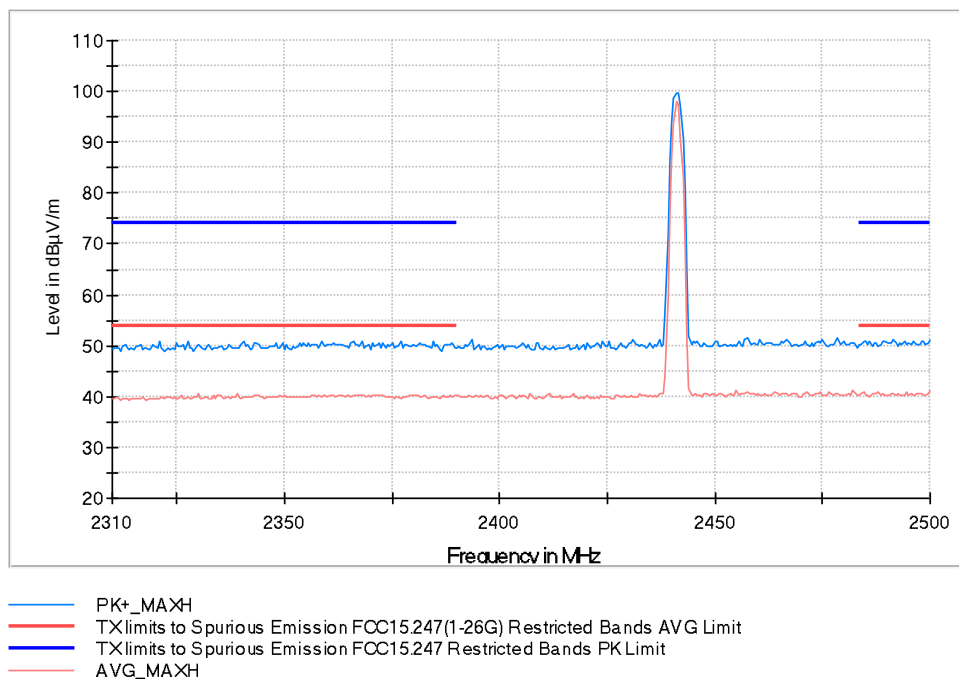
RESTRICTED BAND 2.31 GHz – 2.5 GHz (PI4DQPSK)

CHANNEL: Lowest (2402 MHz)

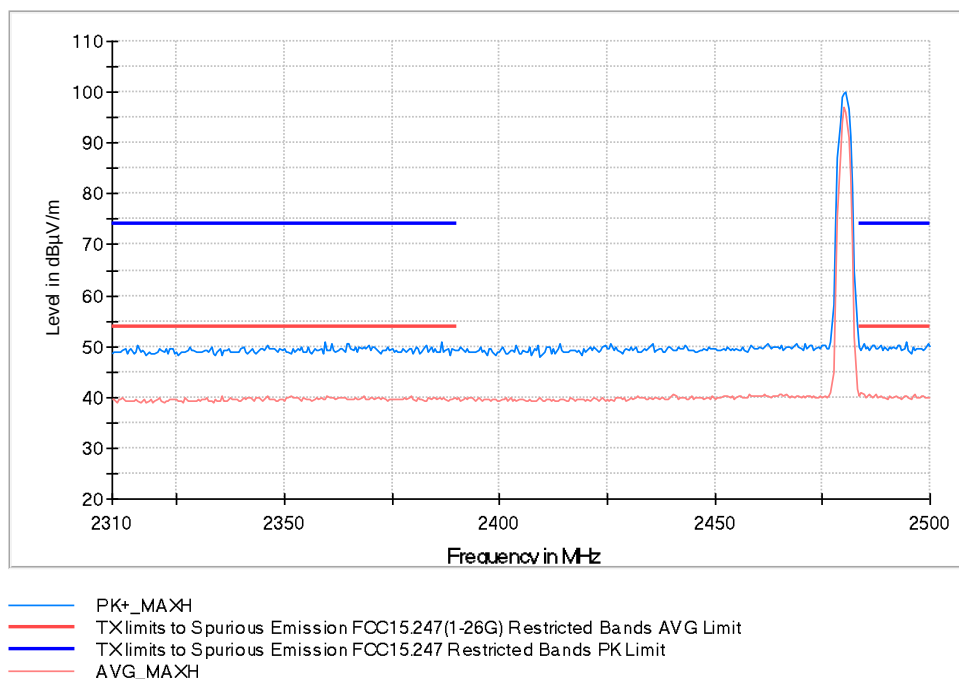


TEST RESULTS (Cont.)

CHANNEL: Middle (2441 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.

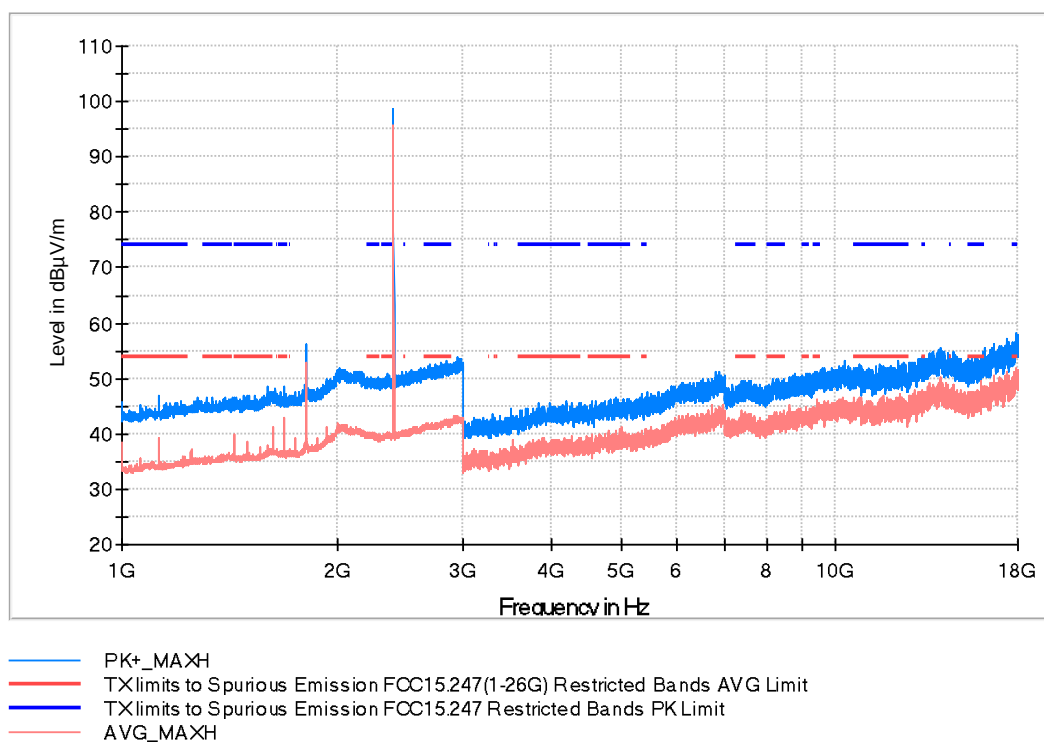
The results in the following plots and tables show the maximum measured levels in the 30-1000 MHz range.

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 2.31-2.5 GHz.

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

CHANNEL: Lowest (2402 MHz)

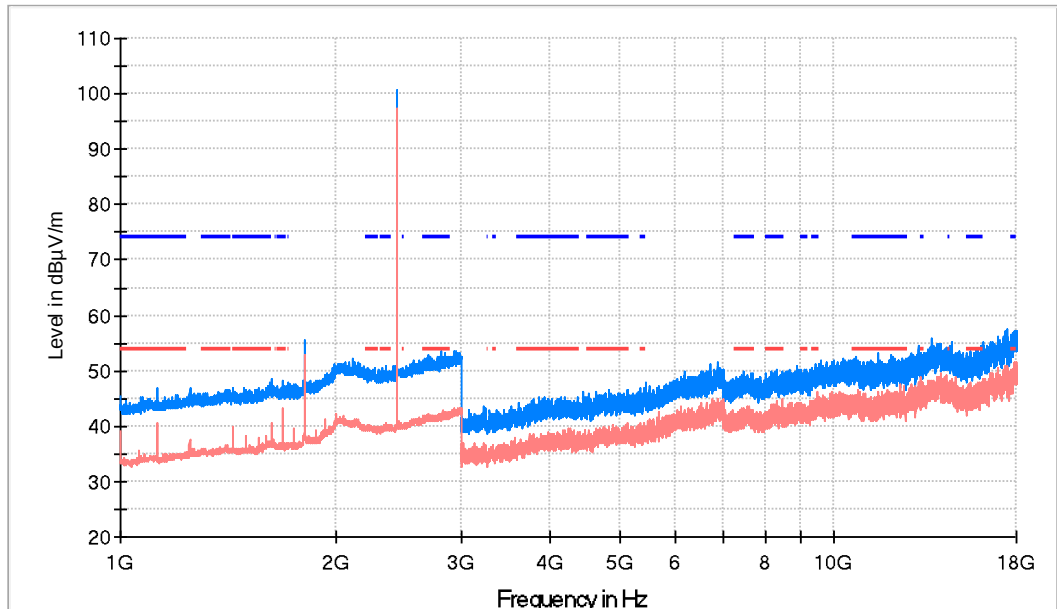


Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1124.500000	46.8	39.3	V	14.7	54.0	
1687.500000	48.5	42.9	V	11.1	54.0	
2402.000000	98.7	95.6	V	---	---	Fundamental
17903.500000	55.5	52.0	V	2.0	54.0	

TEST RESULTS (Cont.)

CHANNEL: Middle (2441 MHz)



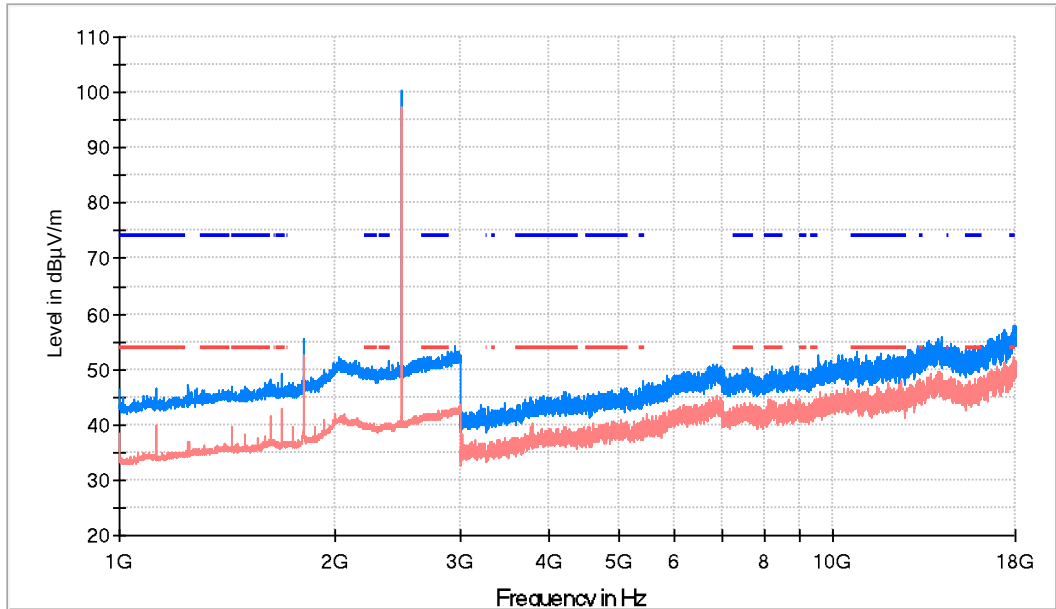
- PK+_MAXH
- TX limits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
- - - TX limits to Spurious Emission FCC15.247 Restricted Bands PK Limit
- AVG_MAXH

Maximizations

Frequency (MHz)	PK+_MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	46.9	40.5	V	13.5	54.0	
1687.500000	48.1	43.3	V	10.7	54.0	
2441.000000	100.6	97.5	V	---	---	Fundamental
17913.500000	56.1	51.6	V	2.4	54.0	

TEST RESULTS (Cont.)

CHANNEL: Highest (2480 MHz)



PK+ MAXH
TXlimits to Spurious Emission FCC15.247(1-26G) Restricted Bands AVG Limit
TXlimits to Spurious Emission FCC15.247 Restricted Bands PK Limit
AVG_MAXH

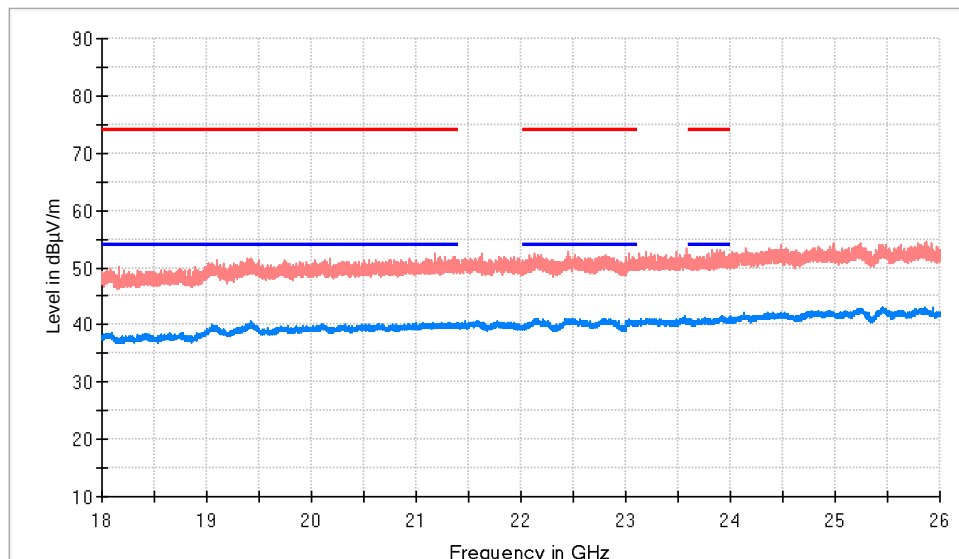
Maximizations

Frequency (MHz)	PK+ MAXH (dBμV/m)	AVG_MAXH (dBμV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBμV/m)	Comment
1125.000000	46.1	39.9	V	14.1	54.0	
1687.500000	49.2	42.9	V	11.1	54.0	
2480.000000	100.4	97.2	V	---	---	Fundamental
17900.000000	55.8	52.1	V	1.9	54.0	

TEST RESULTS (Cont.)

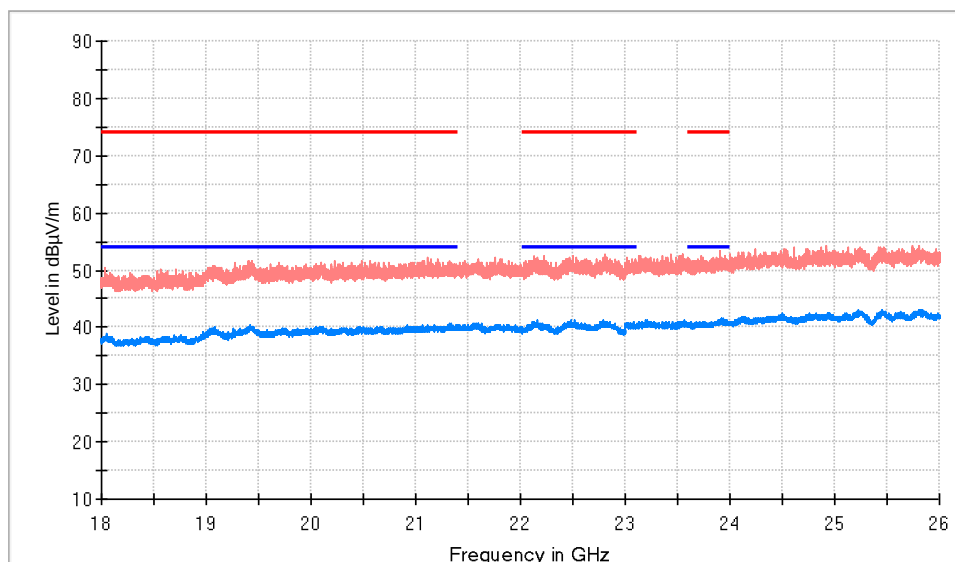
18 GHz – 26 GHz (8DPSK)

CHANNEL: Lowest (2402 MHz)



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

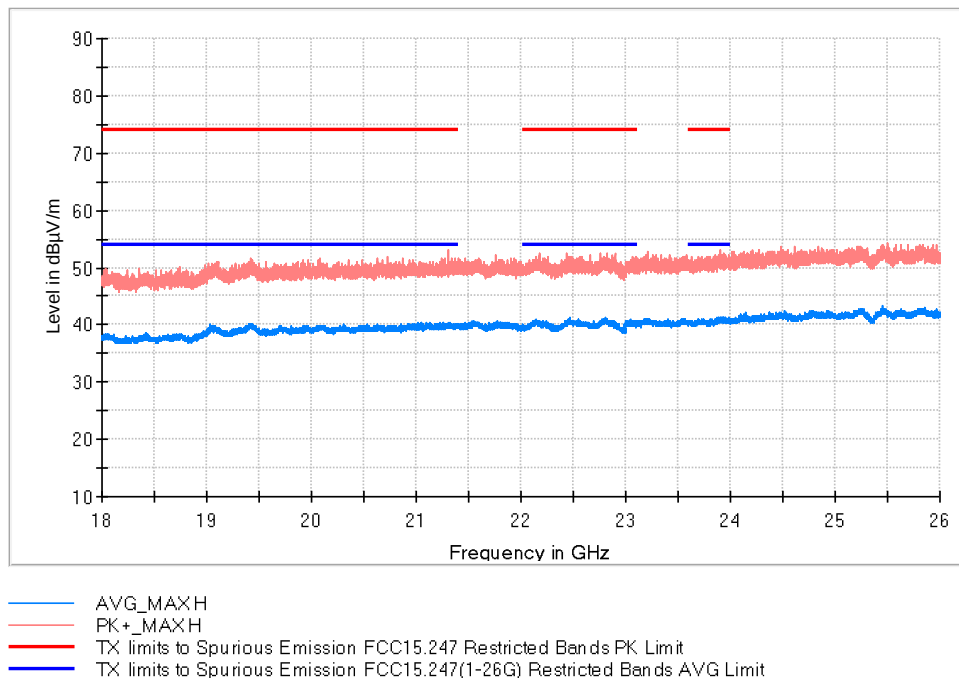
CHANNEL: Middle (2441 MHz)



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

TEST RESULTS (Cont.)

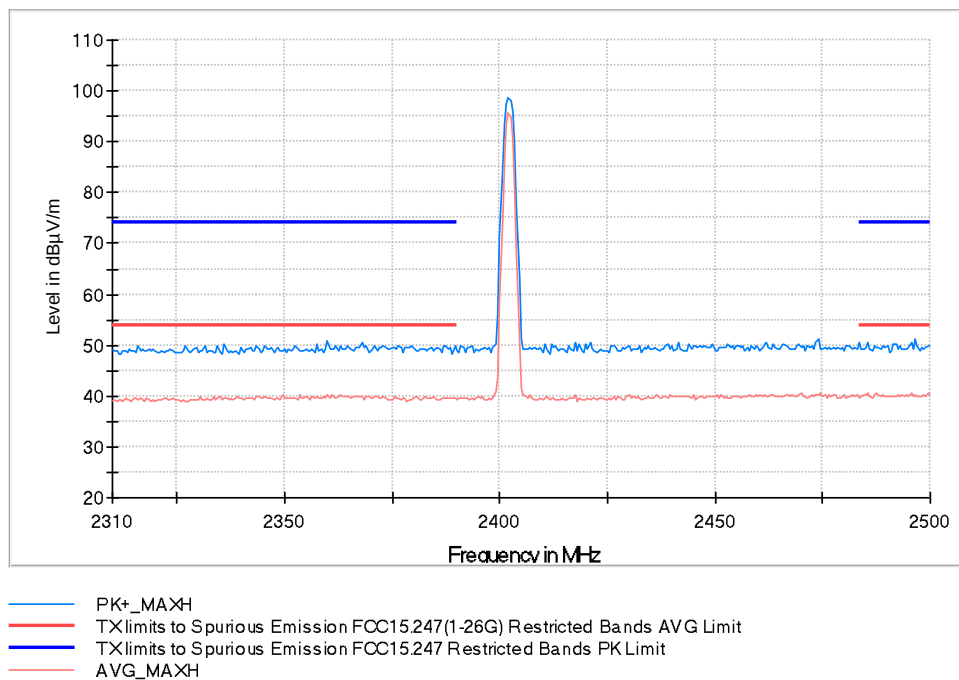
CHANNEL: Highest (2480 MHz)



RESTRICTED BANDS

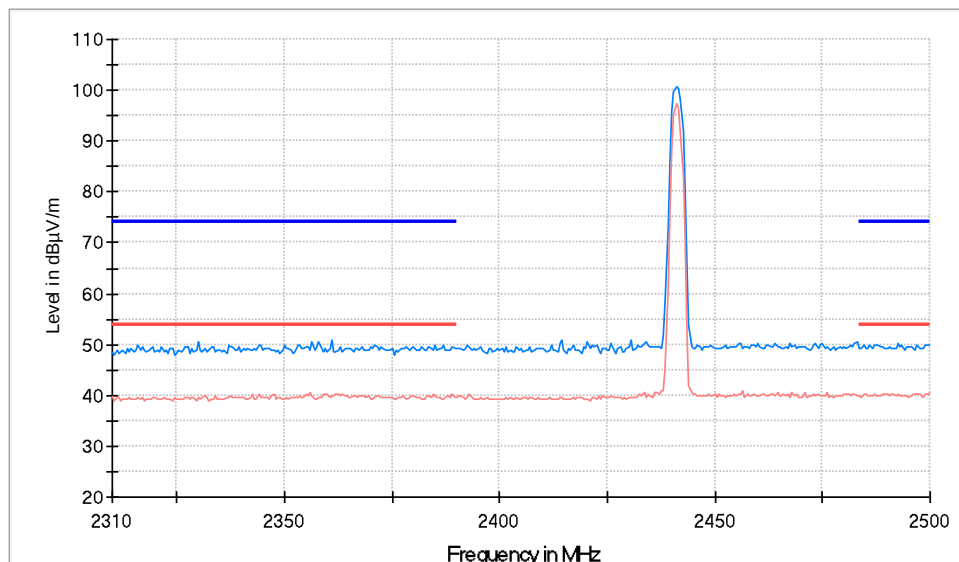
2.31 GHz – 2.5 GHz (8DPSK)

CHANNEL: Lowest (2402 MHz)



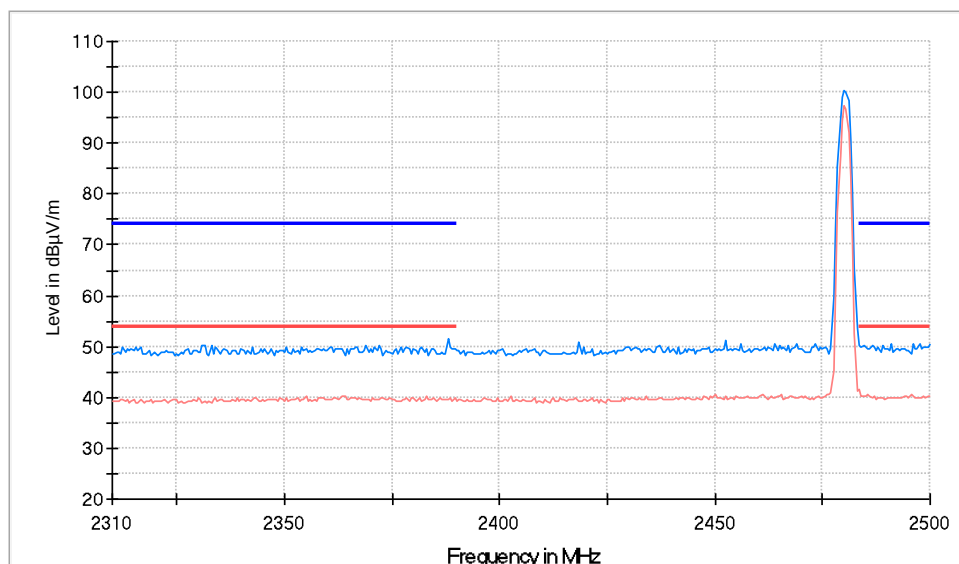
TEST RESULTS (Cont.)

CHANNEL: Middle (2441 MHz)



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

CHANNEL: Highest (2480 MHz)



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

Appendix B: Test results (WI-FI 2.4GHz)

Appendix B Content

PRODUCT INFORMATION81

DESCRIPTION OF TEST CONDITIONS82

TEST B.1: 99% OCCUPIED BANDWIDTH AND 6DB BANDWIDTH.....83

TEST B.2: MAXIMUM CONDUCTED OUTPUT POWER AND ANTENNA GAIN100

TEST B.3: BAND-EDGE EMISSIONS COMPLIANCE (TRANSMITTER).....109

TEST B.4: POWER SPECTRAL DENSITY134

TEST B.5: EMISSION LIMITATIONS RADIATED (TRANSMITTER).....143

PRODUCT INFORMATION

The following information is provided by the supplier, in accordance with clause 5.4.1:

Information	Description
Modulation	DSSS/OFDM
Maximum RF Output Power	b/g mode: 14 dBm n20 mode: 8 dBm n40 mode: 6 dBm
Operating Frequency Range	2412 – 2462 MHz
Nominal Channel Bandwidth	20 MHz 40 MHz
Extreme operating conditions	
- Temperature range	-40 °C to +70 °C
Antenna type	BT/WLAN internal Antenna
Antenna gain	-4 dBi
Nominal Voltage	
- Supply Voltage	12 Vdc
- Type of power source	DC voltage
Equipment type	WIFI 2.4GHz b/g/n20/n40
Geo-location capability	No

DESCRIPTION OF TEST CONDITIONS

During transmitter test the EUT was being controlled by the SW tool to operate in a continuous transmit mode on the test channel as required and in each of the different modulation modes.

TEST CONDITIONS	DESCRIPTION
TC#01 ⁽¹⁾ (b mode)	<u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$ <u>Channel Bandwidth: 20 MHz</u> <u>Test Frequencies for Conducted/Radiated tests</u> Lowest channel: 2412 MHz Middle channel: 2442 MHz Highest channel: 2462 MHz
TC#02 ⁽¹⁾ (g mode)	<u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$ <u>Channel Bandwidth: 20 MHz</u> <u>Test Frequencies for Conducted/Radiated tests</u> Lowest channel: 2412 MHz Middle channel: 2442 MHz Highest channel: 2462 MHz
TC#03 ⁽¹⁾ (n mode)	<u>Power supply (V):</u> $V_{\text{nominal}} = 12 \text{ Vdc}$ <u>Channel Bandwidth: 20 MHz</u> <u>Test Frequencies for Conducted tests</u> Lowest channel: 2412 MHz Middle channel: 2442 MHz Highest channel: 2462 MHz <u>Channel Bandwidth: 40 MHz</u> <u>Test Frequencies for Conducted/Radiated tests</u> Lowest channel: 2422 MHz Highest channel: 2452 MHz

Note (1): For spurious emissions for OFDM modes 802.11g and 802.11n20,802.11n40 a preliminary scan was performed to determine the worst case. The following tables and plots show the results for DSSS modulation (802.11b) and the worst case in OFDM modulation (802.11g) and (802.11n40), hence 802.11n20 is not shown.

The data rates of 1Mb/s for 802.11b, 6Mb/s for 802.11g, MCS0 for 802.11n20 and 802.11n40 were selected based on the preliminary testing that identified those rates corresponding to the worst cases.

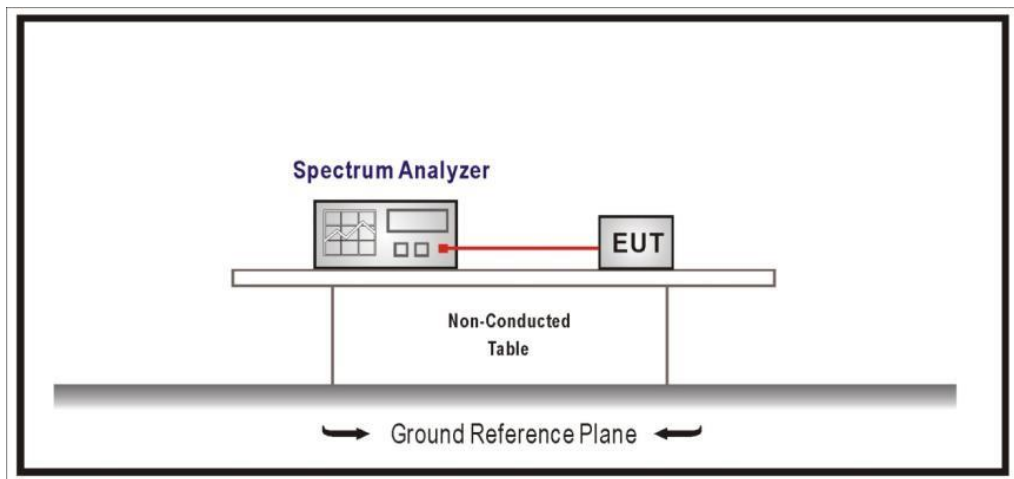
TEST B.1: 99% OCCUPIED BANDWIDTH AND 6DB BANDWIDTH

LIMITS:	Product standard:	Part 15 Subpart C §15.247 and RSS-247
	Test standard:	§2.1049, Part 15 Subpart C §15.247(a)(2) and RSS-247 5.2(a)

LIMITS

Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 KHz.

TEST SETUP



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#01 (b mode)
TEST RESULTS:	PASS

	Lowest frequency 2412 MHz	Middle frequency 2442 MHz	Highest frequency 2462 MHz
6dB Bandwidth (MHz)	10.150	9.150	9.150
Occupied bandwidth (kHz)	13.400	13.400	13.500
Measurement uncertainty (kHz)	<± 1.80		

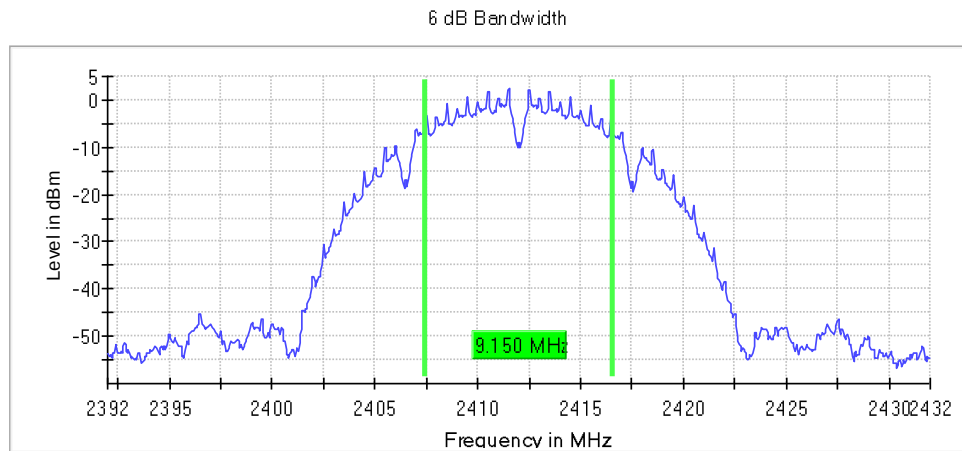
6dB Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	800	800	800
Sweep time	56.836 µs	56.836 µs	56.836 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
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	7 / max. 150	6 / max. 150	7 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.06 dB	0.34 dB	0.40 dB

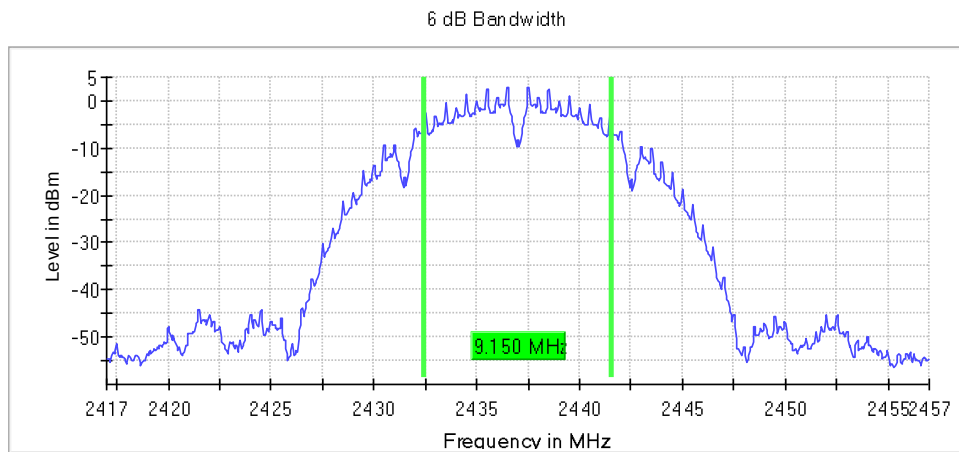
TEST RESULTS (Cont.):

6 dB BANDWIDTH

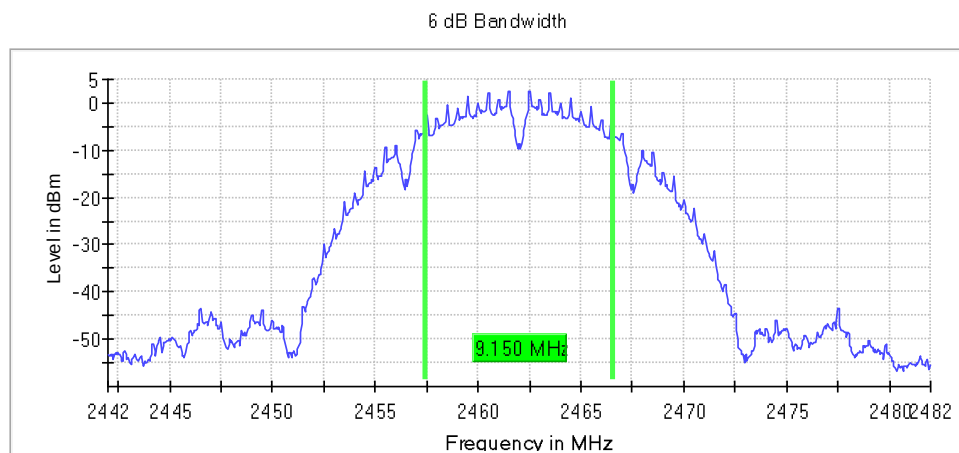
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

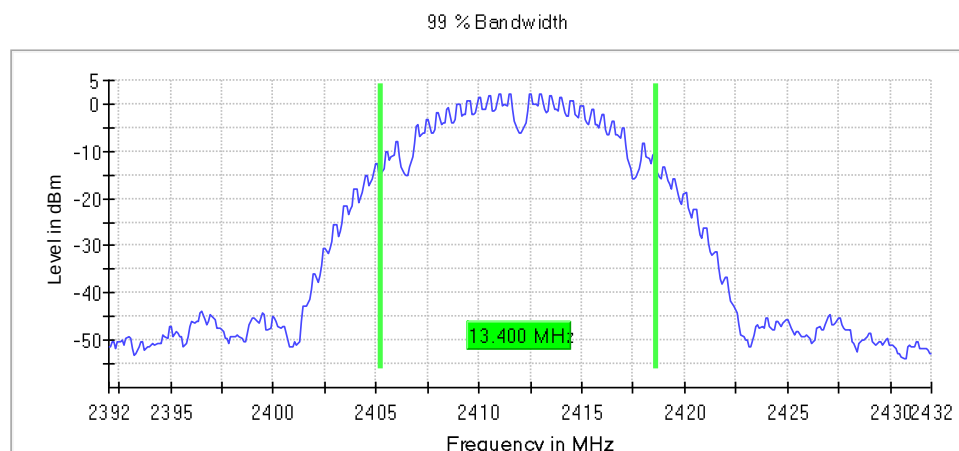
OBW Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
Sweep Points	400	400	400
Sweep time	28.477 μ s	28.477 μ s	28.477 μ s
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
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	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	4 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.03 dB	0.21 dB	0.10 dB

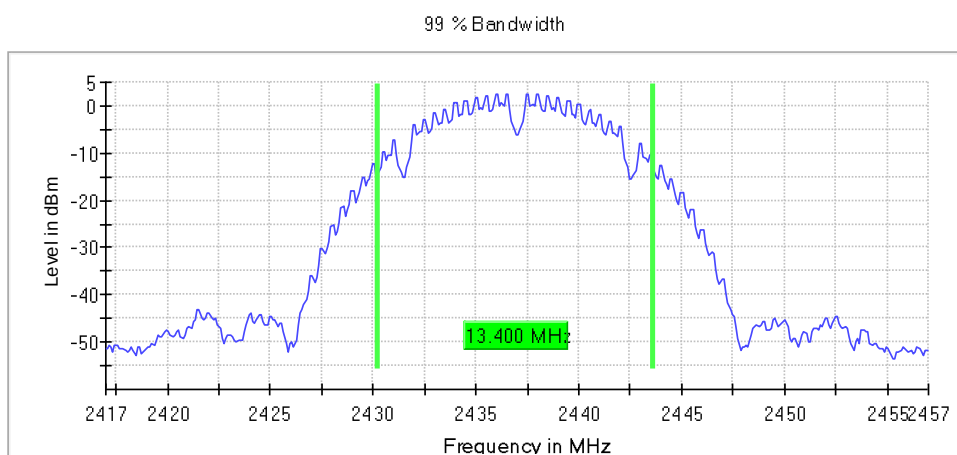
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

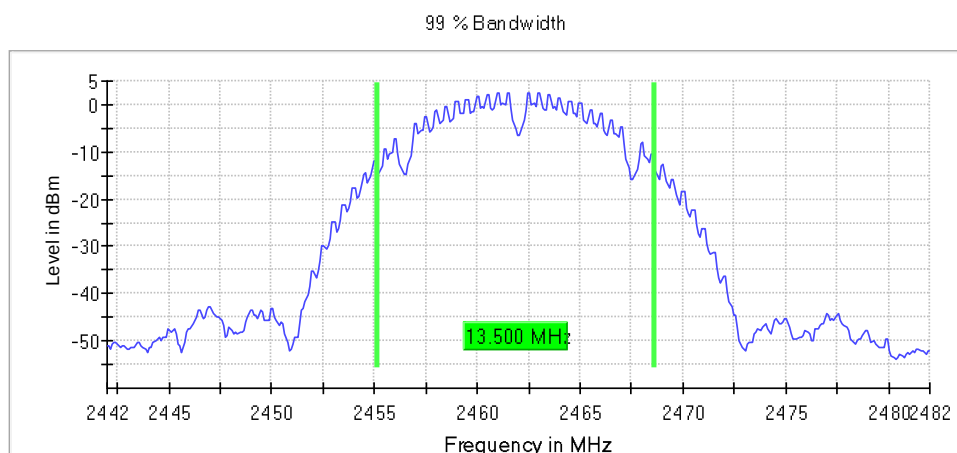
Lowest Channel



Middle Channel



Highest Channel



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

	Lowest frequency 2412 MHz	Middle frequency 2442 MHz	Highest frequency 2462 MHz
6dB bandwidth (MHz)	15.750	15.700	15.800
Occupied bandwidth (MHz)	16.700	16.600	16.700
Measurement uncertainty (kHz)	<± 1.80		

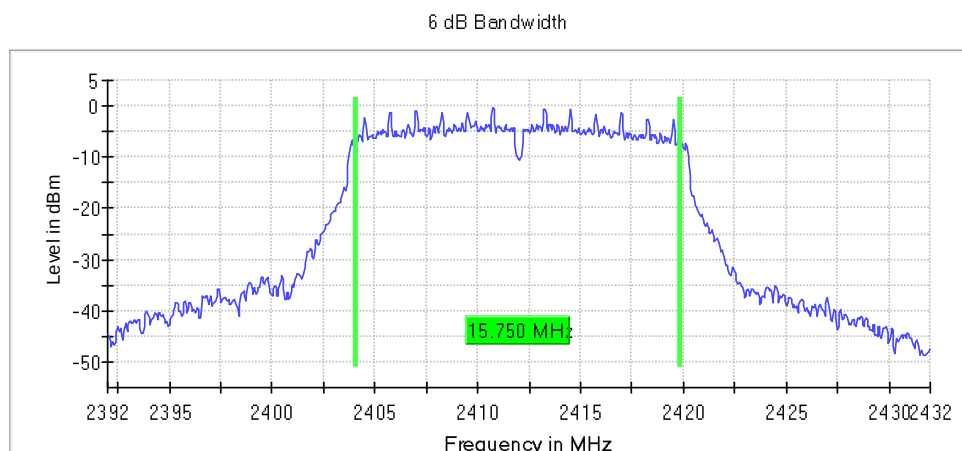
6dB Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	800	800	800
Sweep time	56.836 µs	56.836 µs	56.836 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
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	46 / max. 150	25 / max. 150	21 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.02 dB	0.22 dB	0.25 dB

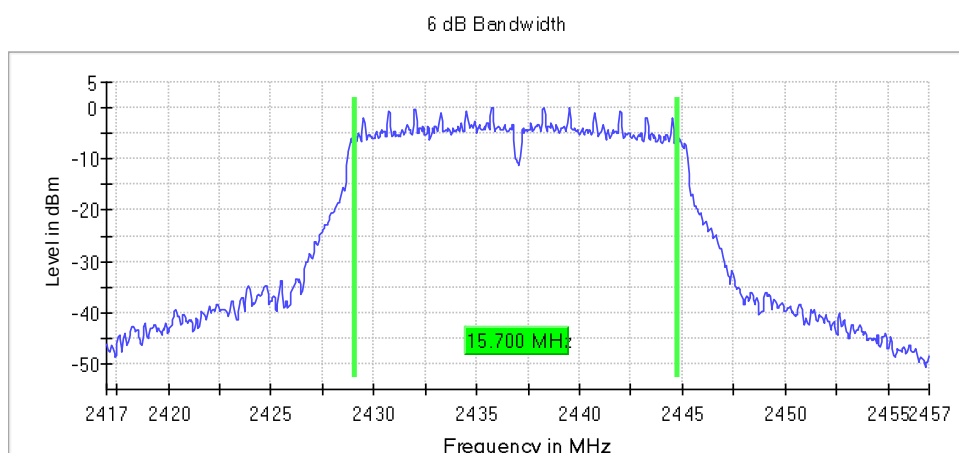
TEST RESULTS (Cont.):

6 dB BANDWIDTH

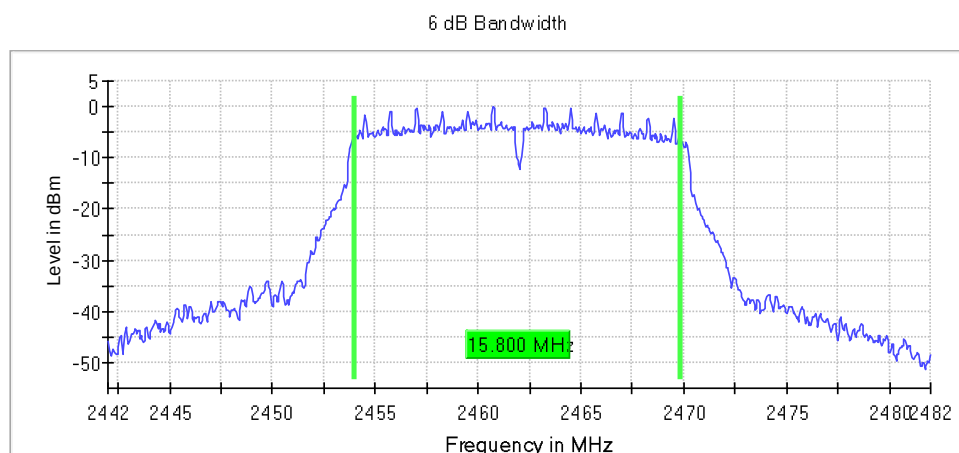
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

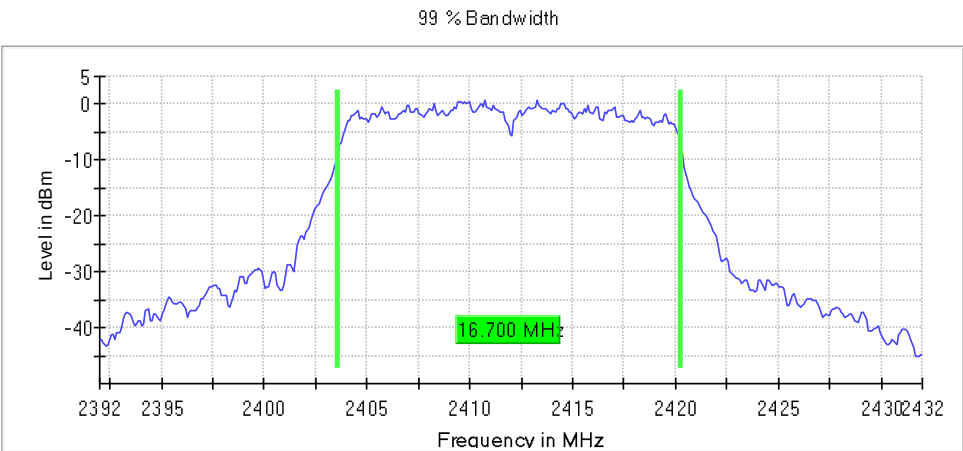
OBW Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
Sweep Points	400	400	400
Sweep time	28.477 μ s	28.477 μ s	28.477 μ s
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
Sweep Count	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	26 / max. 150	32 / max. 150	33 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.22 dB	0.25 dB	0.01 dB

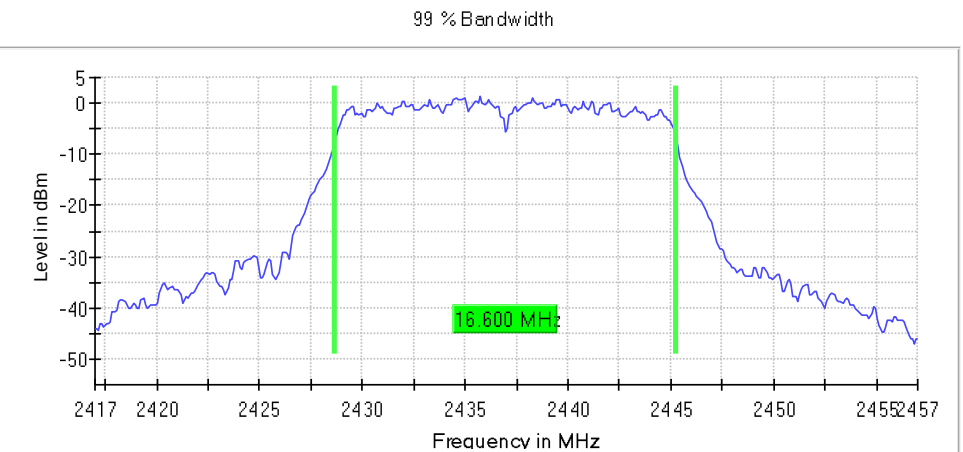
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

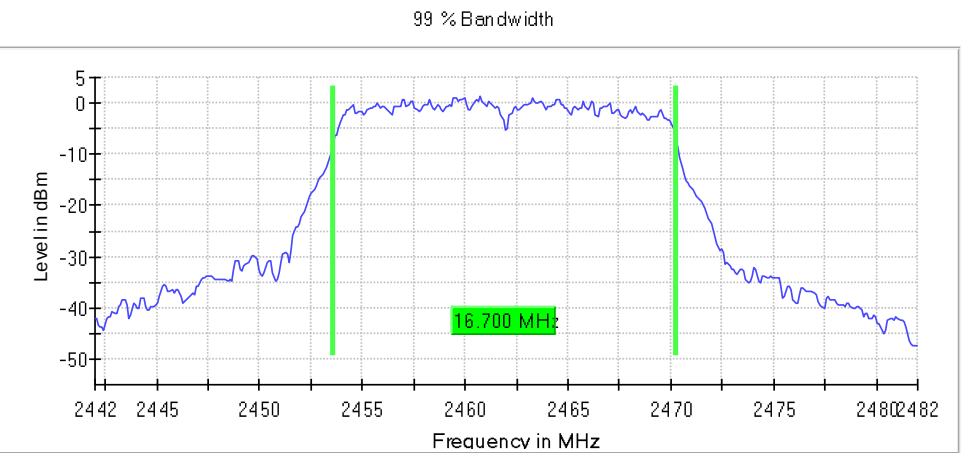
Lowest Channel



Middle Channel



Highest Channel



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (n mode 20 MHz)
TEST RESULTS:	PASS

	Lowest frequency 2412 MHz	Middle frequency 2442 MHz	Highest frequency 2462 MHz
6dB bandwidth (MHz)	16.050	17.000	17.000
Occupied bandwidth (MHz)	17.600	17.600	17.600
Measurement uncertainty (kHz)	<± 1.80		

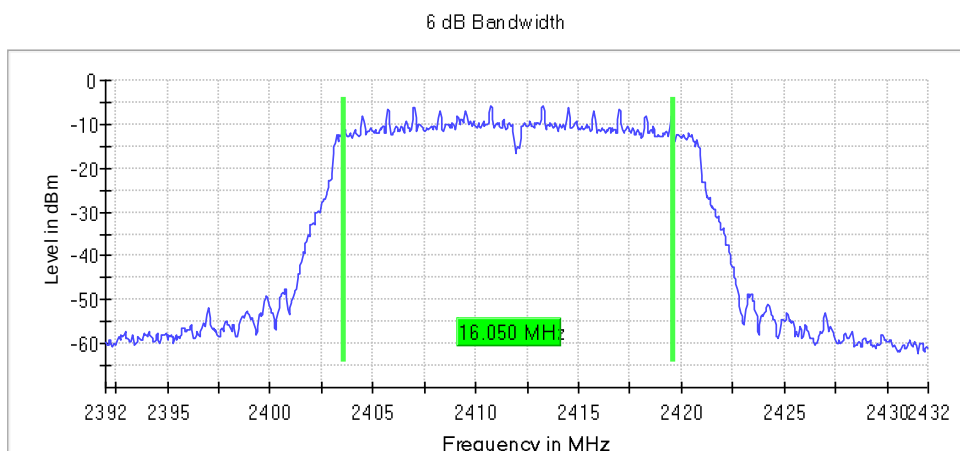
6dB Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	800	800	800
Sweep time	56.836 µs	56.836 µs	56.836 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	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.50 dB	0.50 dB	0.50 dB
Run	22 / max. 150	41 / max. 150	33 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.22 dB	0.26 dB	0.34 dB

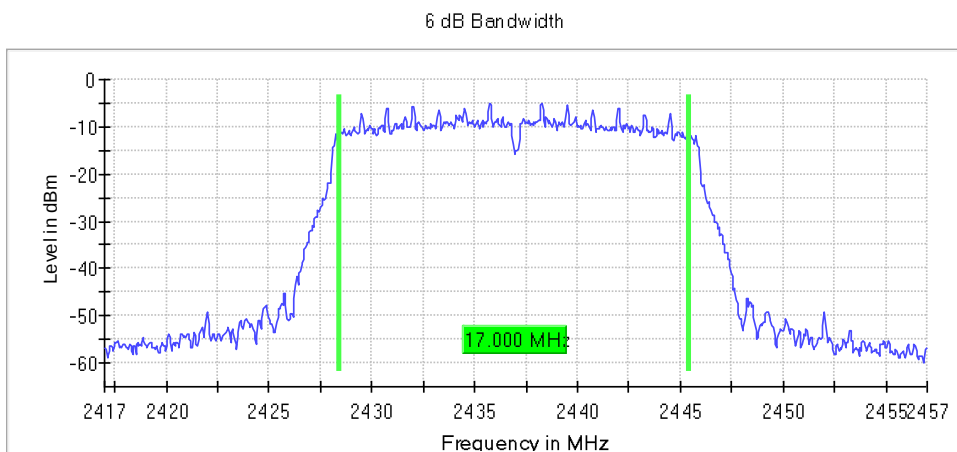
TEST RESULTS (Cont.):

6 dB BANDWIDTH

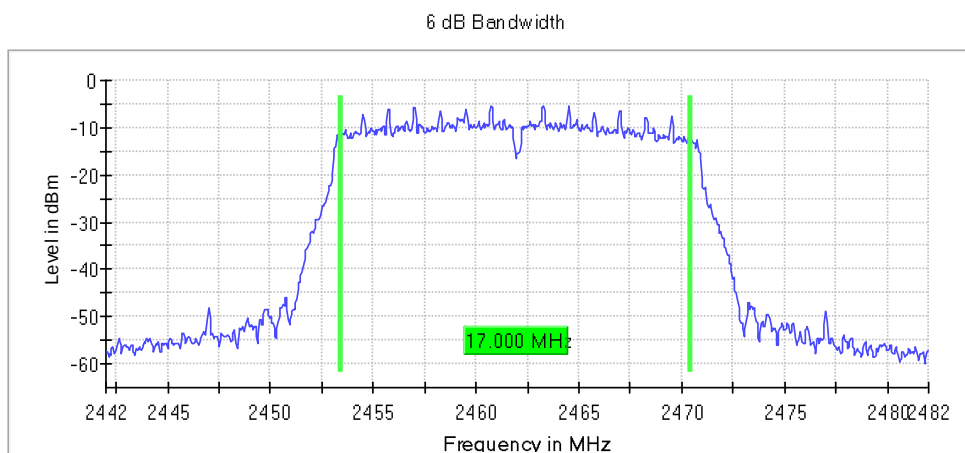
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

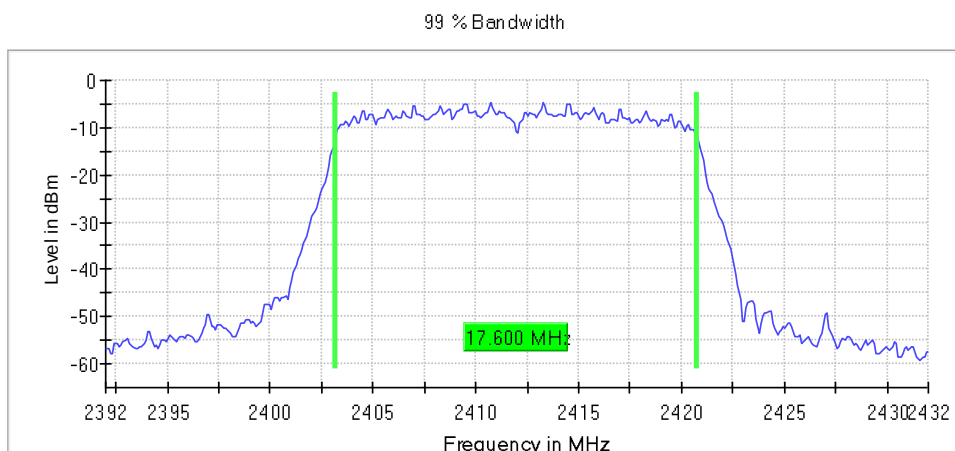
OBW Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.39200 GHz	2.41700 GHz	2.44200 GHz
Stop Frequency	2.43200 GHz	2.45700 GHz	2.48200 GHz
Span	40.000 MHz	40.000 MHz	40.000 MHz
RBW	200.000 kHz	200.000 kHz	200.000 kHz
VBW	1.000 MHz	1.000 MHz	1.000 MHz
Sweep Points	400	400	400
Sweep time	28.477 μ s	28.477 μ s	28.477 μ s
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	100	100	100
Filter	3 dB	3 dB	3 dB
Trace Mode	Max Hold	Max Hold	Max Hold
Sweep type	FFT	FFT	FFT
Preamplifier	off	off	off
Stable mode	Trace	Trace	Trace
Stable value	0.30 dB	0.30 dB	0.30 dB
Run	22 / max. 150	39 / max. 150	31 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.00 dB	0.13 dB	0.30 dB

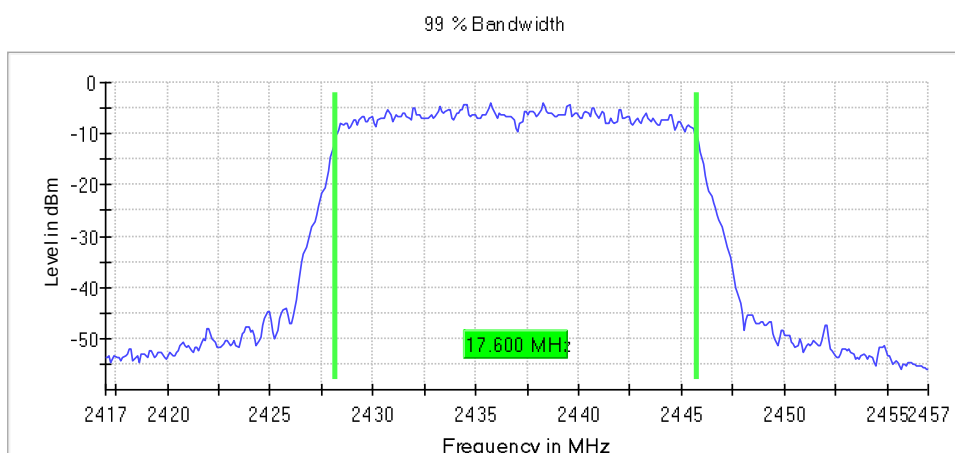
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

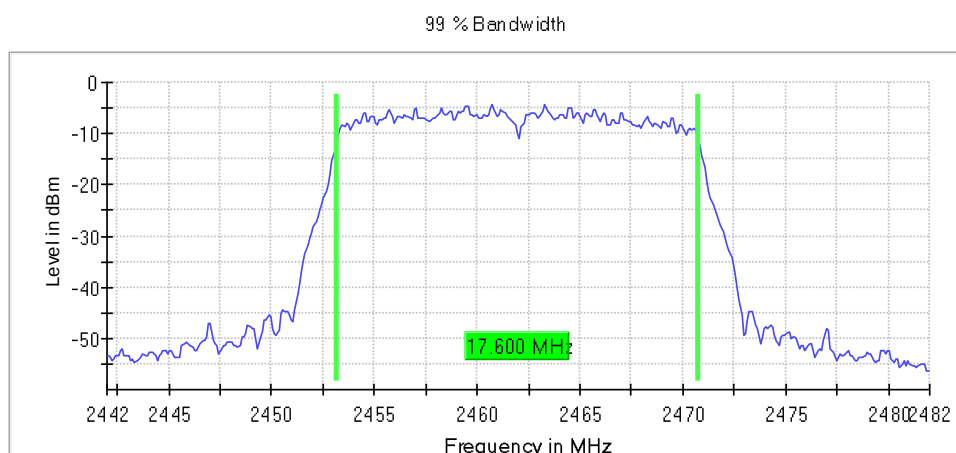
Lowest Channel



Middle Channel



Highest Channel



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (n mode 40 MHz)
TEST RESULTS:	PASS

	Lowest frequency 2422 MHz	Middle frequency 2442 MHz	Highest frequency 2452 MHz
6dB bandwidth (MHz)	35.400	35.800	35.200
Occupied bandwidth (MHz)	36.250	36.250	36.250
Measurement uncertainty (kHz)	<± 1.80		

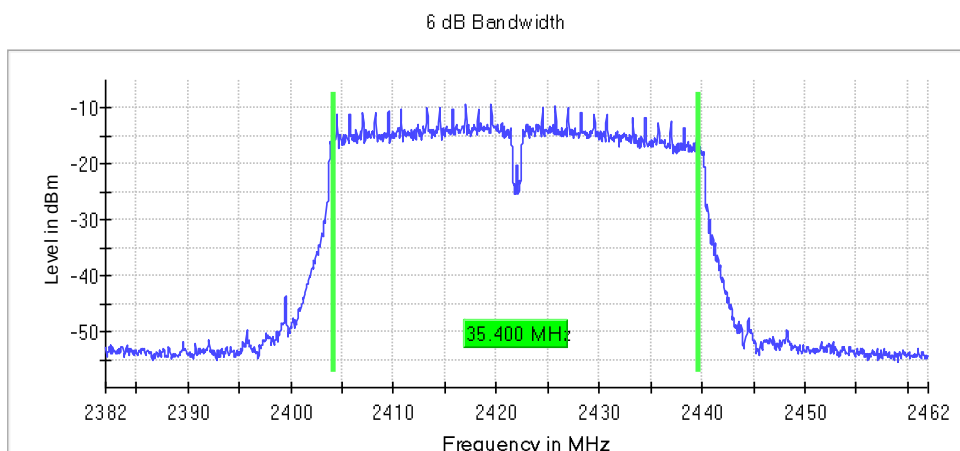
6dB Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.38200 GHz	2.39700 GHz	2.41200 GHz
Stop Frequency	2.46200 GHz	2.47700 GHz	2.49200 GHz
Span	80.000 MHz	80.000 MHz	80.000 MHz
RBW	100.000 kHz	100.000 kHz	100.000 kHz
VBW	300.000 kHz	300.000 kHz	300.000 kHz
Sweep Points	1600	1600	1600
Sweep time	94.727 µs	94.727 µs	94.727 µs
Reference Level	10.000 dBm	0.000 dBm	0.000 dBm
Attenuation	30.000 dB	20.000 dB	20.000 dB
Detector	MaxPeak	MaxPeak	MaxPeak
Sweep Count	100	100	100
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	103 / max.	71 / max. 150	105 / max. 150
Stable	5 / 5	5 / 5	5 / 5
Max Stable Difference	0.47 dB	0.18 dB	0.00 dB

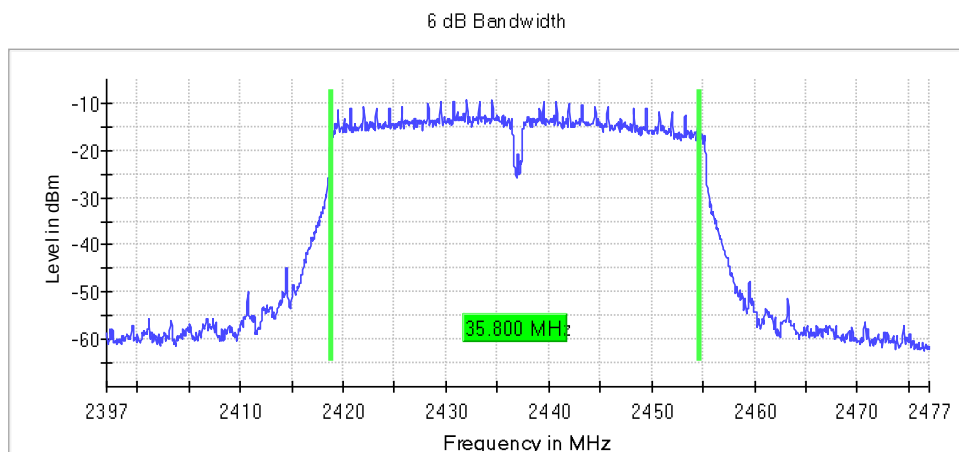
TEST RESULTS (Cont.):

6 dB BANDWIDTH

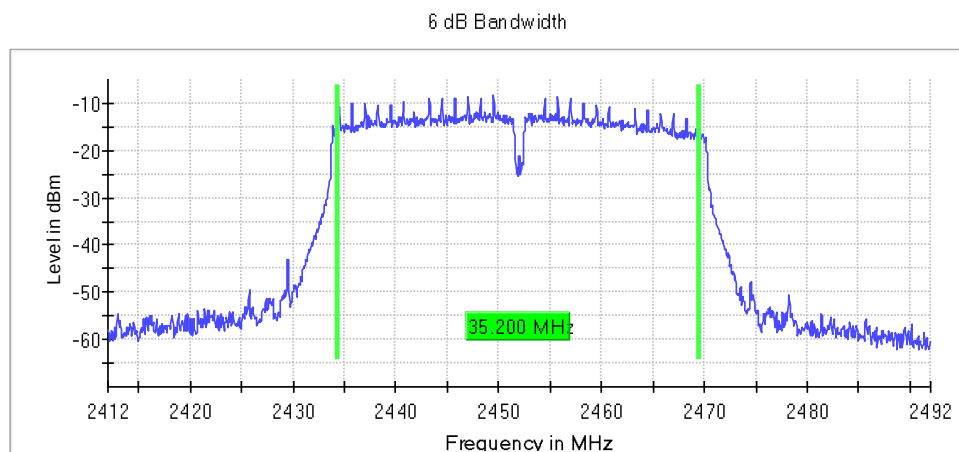
Lowest Channel



Middle Channel



Highest Channel



TEST RESULTS (Cont.):

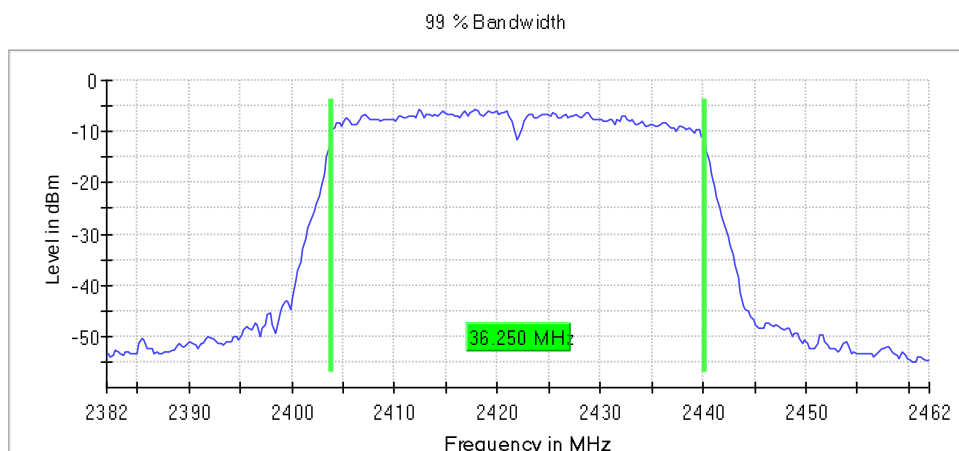
OBW Measurement

Setting	Instrument Value	Instrument Value	Instrument Value
Start Frequency	2.38200 GHz	2.39700 GHz	2.41200 GHz
Stop Frequency	2.46200 GHz	2.47700 GHz	2.49200 GHz
Span	80.000 MHz	80.000 MHz	80.000 MHz
RBW	500.000 kHz	500.000 kHz	500.000 kHz
VBW	2.000 MHz	2.000 MHz	2.000 MHz
Sweep Points	320	320	320
Sweep time	18.906 μ s	18.906 μ s	18.906 μ s
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	100	100	100
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	45 / max. 150	30 / max. 150	37 / max. 150
Stable	3 / 3	3 / 3	3 / 3
Max Stable Difference	0.08 dB	0.00 dB	0.27 dB

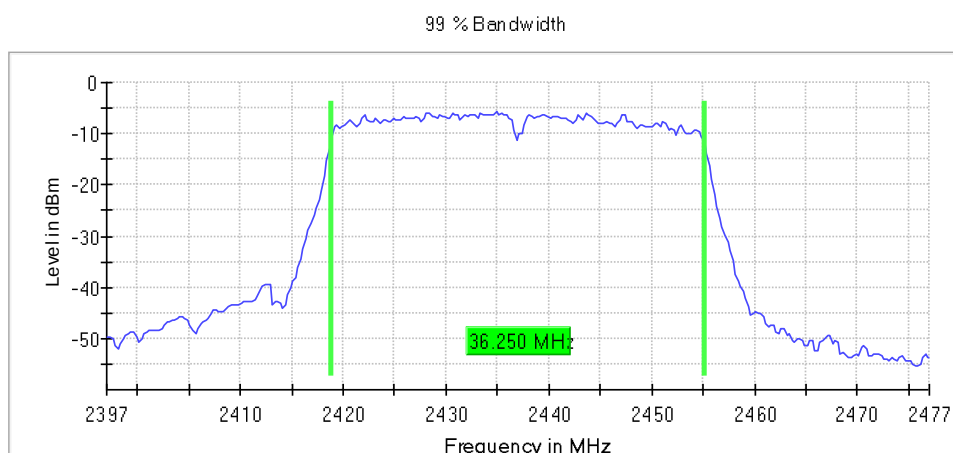
TEST RESULTS (Cont.):

OCCUPIED BANDWIDTH

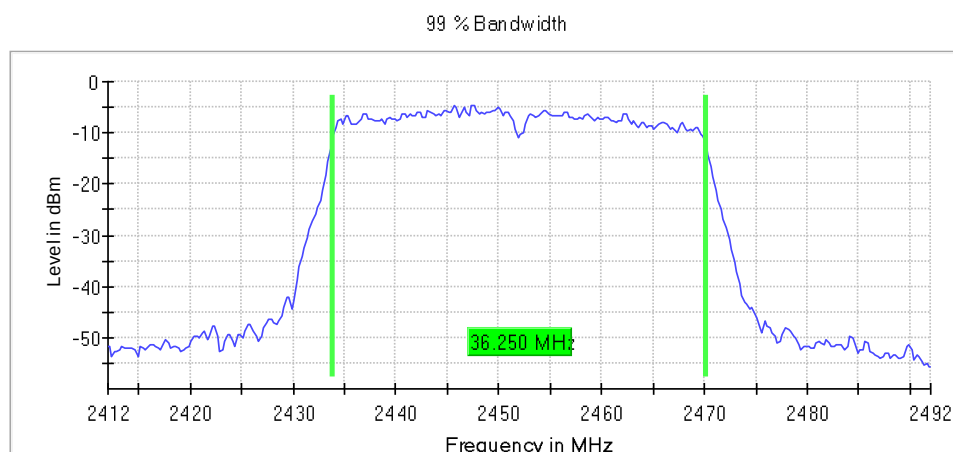
Lowest Channel



Middle Channel



Highest Channel



TEST B.2: MAXIMUM 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) and RSS-247 5.4(d)

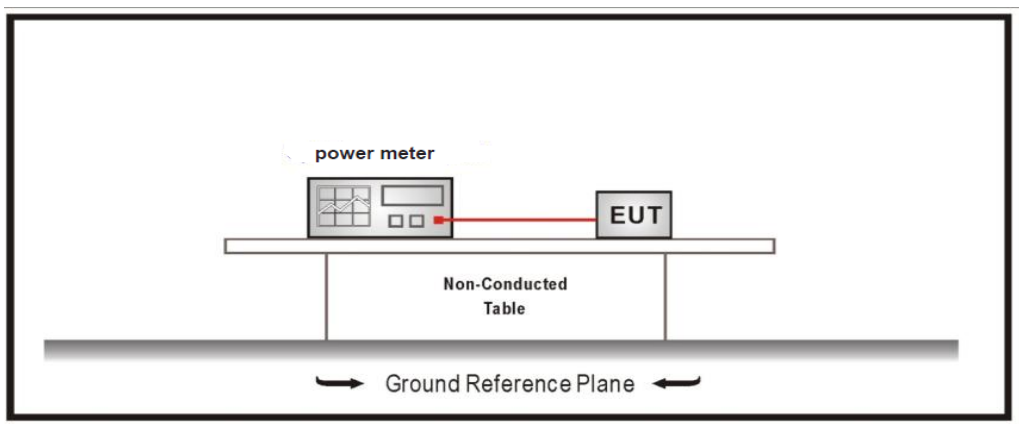
LIMITS

For systems using digital modulation in the 2400 -2483.5 MHz band: 1 watt (30 dBm).

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 (b mode)
TEST RESULTS:	PASS

Maximum declared antenna gain: -4 dBi

	Lowest frequency 2412 MHz	Middle frequency 2442 MHz	Highest frequency 2462 MHz
Maximum conducted power (dBm)	10.64	10.77	10.86
Maximum EIRP power (dBm)	6.64	6.77	6.86
Measurement uncertainty (dB)	<±0.78		

Lowest Channel

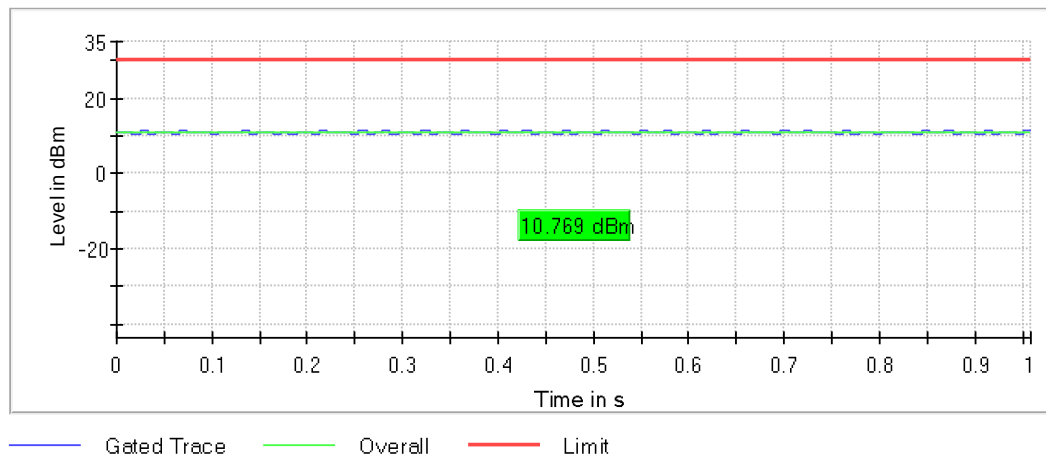


TEST RESULTS (Cont.):

CONDUCTED OUTPUT POWER

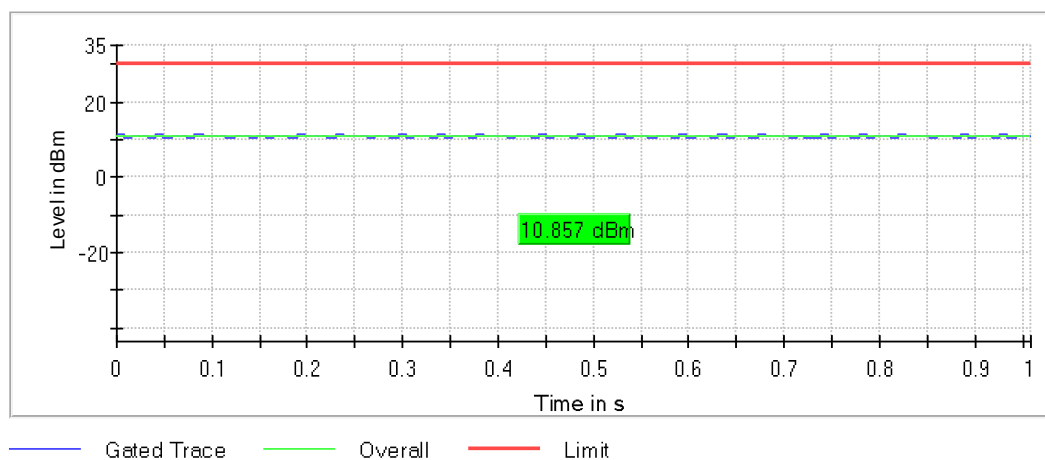
Middle Channel

Gated Trace



Highest Channel

Gated Trace

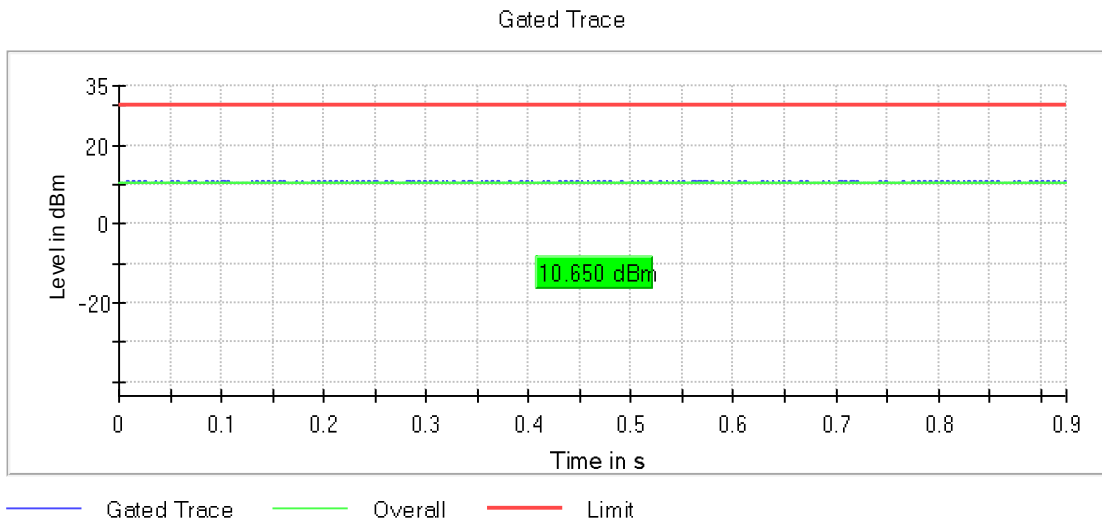


TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#02 (g mode)
TEST RESULTS:	PASS

Maximum declared antenna gain: -4 dBi

	Lowest frequency 2412 MHz	Middle frequency 2442 MHz	Highest frequency 2462 MHz
Maximum conducted power (dBm)	10.65	10.96	10.93
Maximum EIRP power (dBm)	6.65	6.96	6.93
Measurement uncertainty (dB)	<±0.78		

Lowest Channel

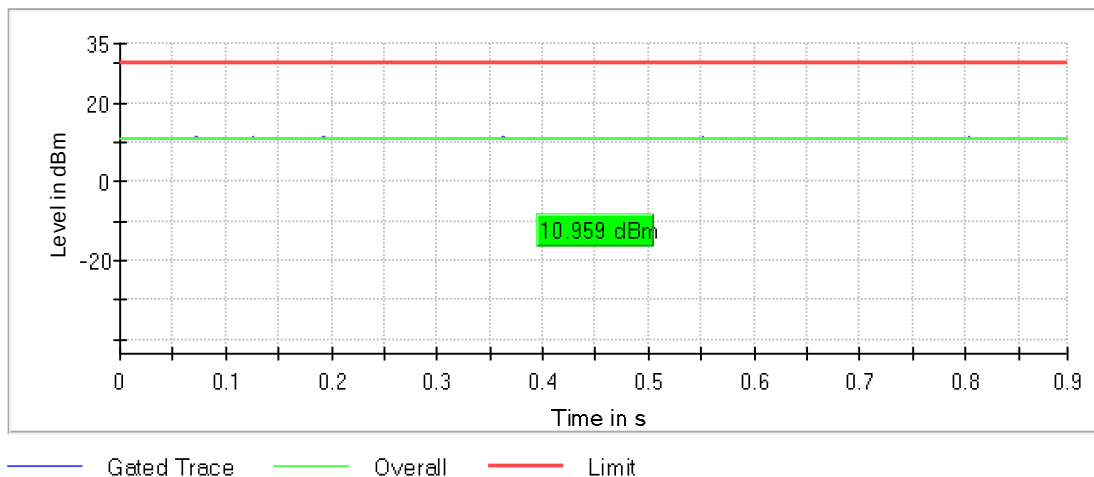


TEST RESULTS (Cont.):

CONDUCTED OUTPUT POWER

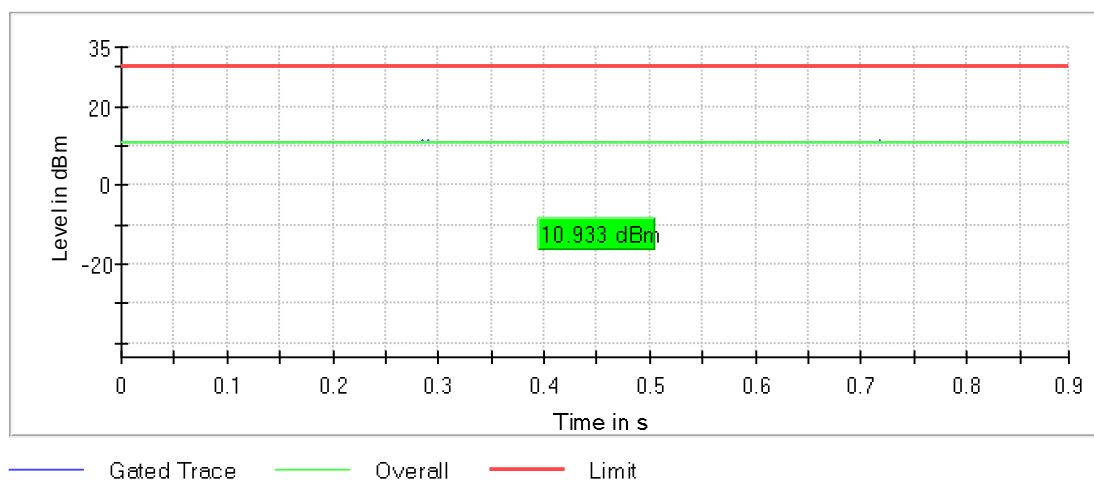
Middle Channel

Gated Trace



Highest Channel

Gated Trace



TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (n mode 20 MHz)
TEST RESULTS:	PASS

Maximum declared antenna gain: -4 dBi

	Lowest frequency 2412 MHz	Middle frequency 2442 MHz	Highest frequency 2462 MHz
Maximum conducted power (dBm)	4.98	5.41	5.40
Maximum EIRP power (dBm)	0.98	1.41	1.40
Measurement uncertainty (dB)	<±0.78		

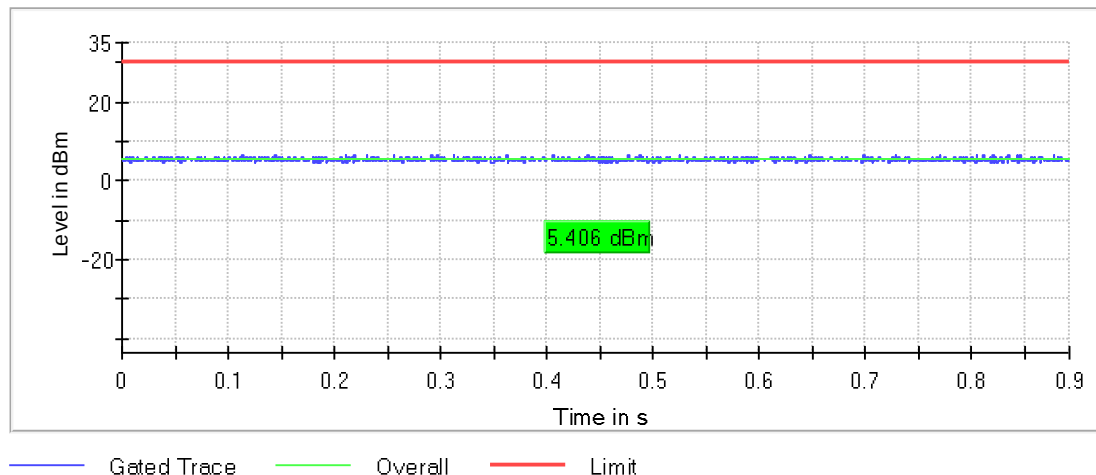
Lowest Channel



TEST RESULTS (Cont.)

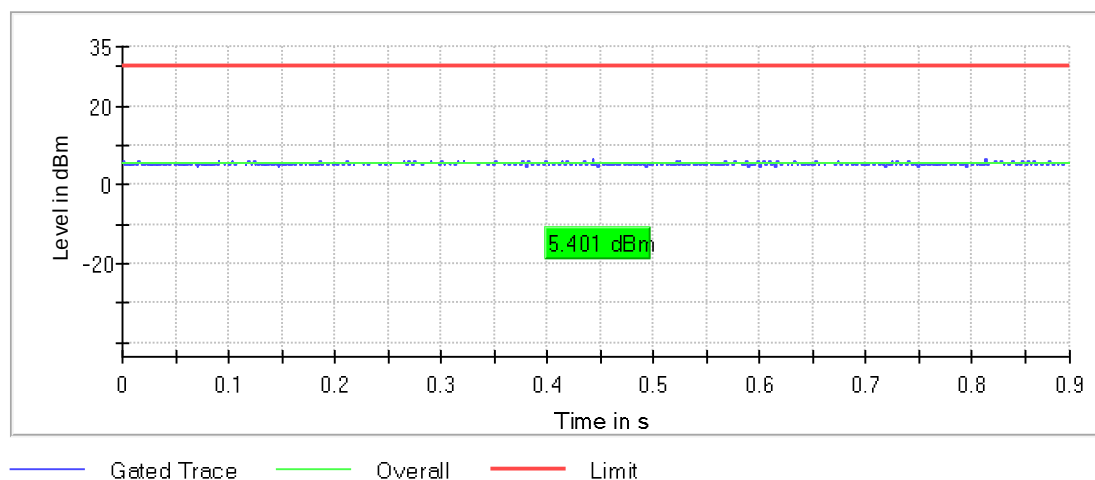
Middle Channel

Gated Trace



Highest Channel

Gated Trace



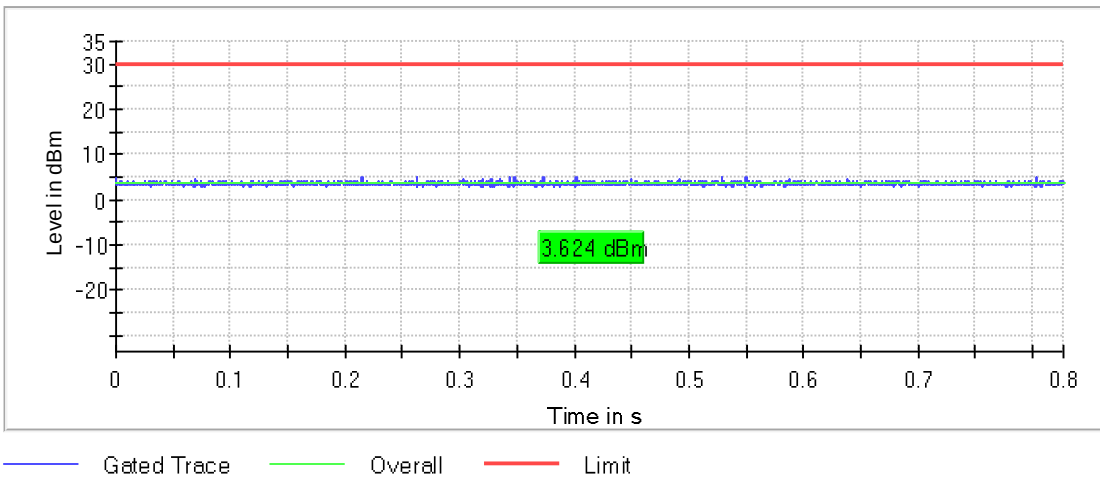
TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	TC#03 (n mode 40 MHz)
TEST RESULTS:	PASS

Maximum declared antenna gain: -4 dBi

	Lowest frequency 2422 MHz	Middle frequency 2442 MHz	Highest frequency 2452 MHz
Maximum conducted power (dBm)	3.62	3.68	3.83
Maximum EIRP power (dBm)	-0.38	-0.32	-0.17
Measurement uncertainty (dB)	<±0.78		

Lowest Channel

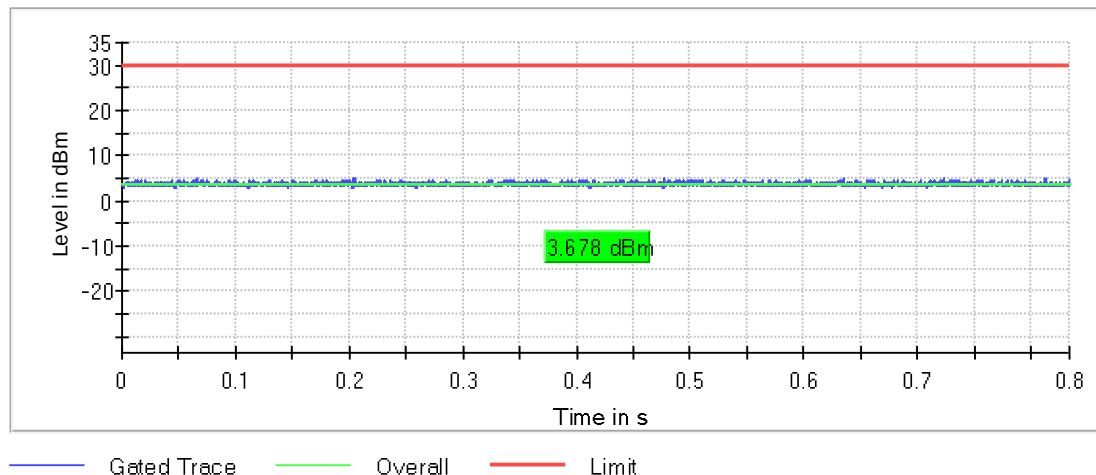
Gated Trace



TEST RESULTS (Cont.)

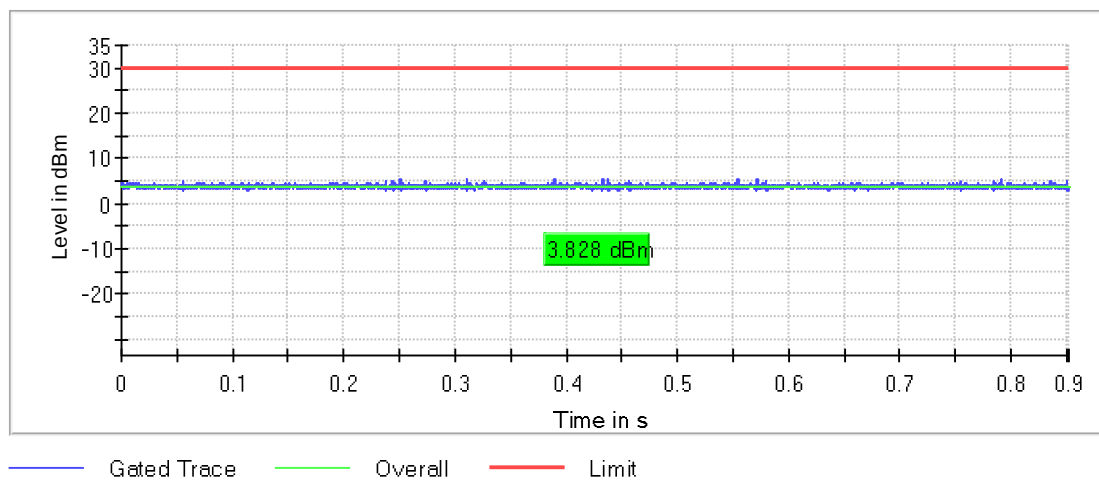
Middle Channel

Gated Trace



Highest Channel

Gated Trace



TEST B.3: 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

In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required shall be 30 dB instead of 20 dB.

TEST SETUP

