HERMON LABORATORIES

ELECTRICAL TESTING
0839.01

Hermon Laboratories Ltd.
P.O. Box 23, Binyamina 3055001, Israel
Tel. +972 4628 8001
Fax. +972 4628 8277
E-mail: mail@hermonlabs.com

PARTIAL TEST REPORT

ACCORDING TO:

FCC 47CFR part 15 subpart C §15.247 (DTS) and subpart B,

FCC 47CFR part 15 subpart C §15.247 (FHSS) and subpart B,

FCC 47CFR part 15 subpart E §15.407

FOR:

CompuLab Ltd.

Multi-Standard Module

Model: Sterling-LWB5

Part Number: LSR 450-0162C

FCC ID: TFB-1004

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1 Applicant information

Client name:	CompuLab Ltd.
Address:	HaYetzira street. 17, "Mordot HaCarmel" Industrial park, P.O.Box 687, Yokneam Ilit 20692, Israel
Telephone:	+972 4829 0142
Fax:	+972 4829 0180
E-mail:	dimitry@compulab.co.il
Contact name:	Mr. Dimitry Katkov

2 Equipment under test attributes

Product name:	Multi-Standart Module
Trade Mark:	Compulab
Model(s):	Sterling-LWB5
Part Number:	LSR 450-0162C
Serial number:	951054
Hardware version:	1.11
Software release:	Linux ucm-imx8m-mini-laird 5.4.24-iot-gate-imx8-2.5-00125-gbf0f0e998a2b
Receipt date	14-Mar-21

3 Manufacturer information

Manufacturer name:	Laird Connectivity, Inc.
Address:	W66 N220 Commerce Court Cedarburg, Wisconsin 53012 USA
Telephone:	262-375-3091
Fax:	262-375-4248
E-mail:	adam.alger@lairdconnect.com
Contact name:	Mr. Adam Alger

4 Test details

Project ID:	41918
Location:	Hermon Laboratories Ltd. P.O. Box 23, Binyamina 3055001, Israel
Test started:	15-Mar-21
Test completed:	24-May-21
Test specification(s):	FCC 47CFR part 15 subpart C §15.247 (DTS) and subpart B, FCC 47CFR part 15 subpart C §15.247 (FHSS) and subpart B, FCC 47CFR part 15 subpart E §15.407

5 Tests summary

Test	Status
Transmitter characteristics according to FCC 15.247	
FCC section 15.247(a)2, 6 dB bandwidth	Not required*
FCC section 15.247(b)3, Peak output power	Pass
FCC section 15.247(i), RF exposure	Pass, the exhibit to the application of certification is provided
FCC section 15.247(d), Radiated spurious emissions	Pass
FCC section 15.247(d), Emissions at band edges	Pass
FCC section 15.247(e), Peak power density	Not required*
FCC section 15.207(a), Conducted emission	Not required*
FCC section 15.203, Antenna requirement	Pass
Unintentional emissions	
FCC section 15.107, Class B, Conducted emission	Not required
FCC section 15.109, Radiated emission	Pass
Transmitter characteristics according to FCC 15.407	
FCC section 15.407(a)(5)/(e), 26 dB, 6 dB, occupied bandwidth	Not required*
FCC section 15.407(a)(1,3), Peak output power	Pass
FCC section 15.407(a)(1,3), Peak spectral power density	Not required*
FCC section 15.407(b), Conducted out of band emissions	Not required*
FCC section 15.407(b), Field strength of unwanted emissions	Pass
FCC section 15.407(b)(6), Conducted emissions	Not required*
FCC section 15.203, 15.407, The maximum EIRP at any elevation angle above 30 degrees	Not required*
FCC section 15.203, Antenna requirement	Pass
FCC section 15.407(f), RF exposure	Pass, the exhibit to the application of certification is provided
FCC section 15.407(c), Continuity of transmission	Not required *
FCC section 15.407(g) Frequency stability	Not required *

The module was approved under FCC ID: TFB-1004.

*The relevant tests were performed to support Application for Class II permissive changes certification to reflect the following changes related to the addition LSR PN 002-0021 FlexPIFA antenna implemented in Compulab UCM-iMX8M module:

1. Different antenna trace.
2. Antenna connector change.

This test report supersedes the previously issued test report identified by Doc ID: COMRAD_FCC.41918_WiFi_BLE

Testing was completed against all relevant requirements of the test standard. The results obtained indicate that the product under test complies in full with the requirements tested.
The test results relate only to the items tested. Pass/ fail decision was based on nominal values.

	Name and Title	**Date**	**Signature**
Tested by:	Mrs. E. Pitt, test engineer, EMC & Radio Mr. A. Morozov, test engineer, EMC & Radio	15-Mar-21 – 24-May-21	 
Reviewed by:	Mrs. S. Peysahov Sheynin, test engineer, EMC & Radio	10-Sep-21	
Approved by:	Mr. S. Samokha, technical manager, EMC & Radio	24-Oct-21	

6 EUT description

Note: The following data in this clause is provided by the customer and represents his sole responsibility

6.1 General information

The EUT is a Sterling-LWB5 module. The Sterling-LWB5 is a 2.4 GHz and 5 GHz WLAN and Bluetooth combo module based on Cypress's BCM43353 silicon. The module has multiple antenna options:

Chip Antenna: Johanson Part # 2450AD14A5500 peak gain 1.0 dBi (2.4 GHz) / 4.0 dBi (5.5 GHz)*

U.FL Antenna port utilizes the following antenna options:

LSR Part #001-0009 2.4 GHz Dipole Antenna peak gain 2.0 dBi (2.4 GHz & 5.5 GHz) *

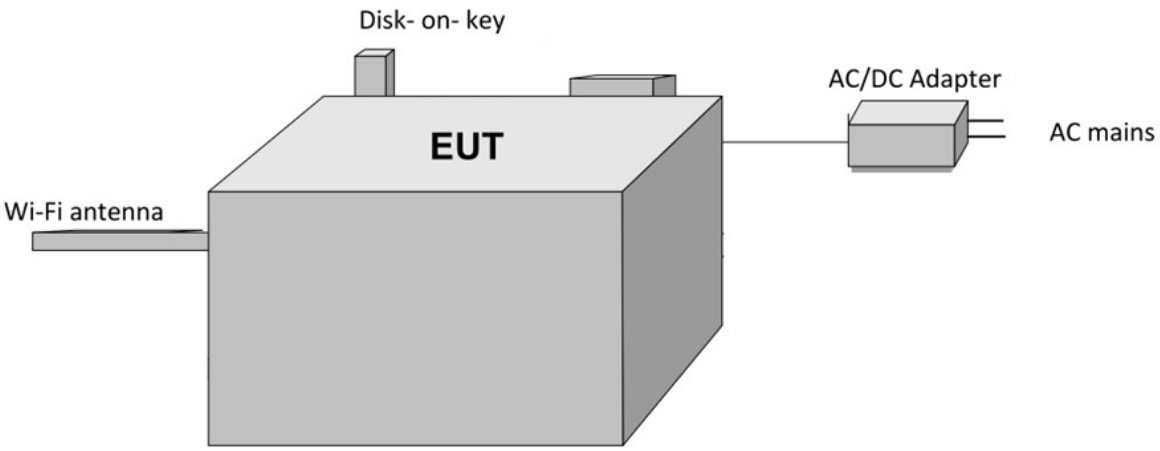
LSR Part #001-0016 2.4 GHz FlexPIFA peak gain 2.5 dBi (2.4 GHz) / 3.0 dBi (5.5 GHz) *

LSR PN 002-0021 FlexPIFA with MHF4 connector, peak gain 2.5dBi (2.4GHz) / 3.0 dBi (5.5GHz)**

*The permitted antennas for use with the specified Sterling-LWB5 module, approved by FCC ID: TFB-1004.

**The additional substituted equivalent antenna for a Class II permissive changes certification for use with the specified Sterling-LWB5 module being implemented in to Compulab UCM-iMX8M module.

6.2 Test configuration



6.3 Changes made in the EUT

No changes were implemented in the EUT during the testing.

6.4 Transmitter characteristics at Wi-Fi 2.4 GHz

Assigned frequency ranges	**2400.0 – 2483.5** MHz					
Operating frequencies	2412 – 2462 MHz					
Maximum rated output power	Peak output power @ CCK 8.85 dBm					
	Peak output power @ BPSK 6.91 dBm					
	Peak output power @ 64-QAM 5.39 dBm					
Is transmitter output power variable?	X	No				
		Yes		continuous variable		
				stepped variable with stepsize	dB	
			minimum RF power		dBm	
			maximum RF power		dBm	

Antenna connection					
X	unique coupling	standard connector	integral	X	with temporary RF connector
					without temporary RF connector

Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Dual Band Antenna	Laird Connectivity	LSR PN 001-0021	2.5 / 3 dBi

Type of modulation	GFSK

Transmitter power source					
	Battery	**Nominal rated voltage**		Battery type	
	DC	**Nominal rated voltage**	VDC		
X	AC mains	**Nominal rated voltage**	230 VAC	Frequency	50 Hz

6.5 Transmitter characteristics BT and BLE protocols

Assigned frequency range	2400.0 – 2483.5 MHz				
Operating frequency range	2402.0 – 2480.0 MHz				
Maximum rated output power	Peak output power @ BLE	-10.69 dBm			
	Peak output power @ BT	-9.30 dBm			
Is transmitter output power variable?	X	No			
		Yes		continuous variable	
				stepped variable with stepsize	dB
			minimum RF power		dBm
			maximum RF power		dBm

Antenna connection					
X	unique coupling	standard connector	integral	X	with temporary RF connector
					without temporary RF connector

Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Dual Band Antenna	Laird Connectivity	LSR PN 001-0021	2.5 / 3 dBi

Type of modulation	GFSK				
Modulating test signal (baseband)					
Transmitter power source					
	Battery	**Nominal rated voltage**			Battery type
	DC	**Nominal rated voltage**	VDC		
X	AC mains	**Nominal rated voltage**	230 VAC	Frequency	50 Hz

6.6 Transmitter characteristics at Wi-Fi 5 GHz

Assigned frequency range	5150.0 – 5250.0 MHz, 5725.0 – 5850.0 MHz						
Operating frequency range	5160.0 – 5245.0 MHz 5730.0 – 5845.0 MHz						
RF channel spacing	20 MHz, 40 MHz, 80 MHz						
Maximum rated output power	Peak (conducted) in 5160.0 – 5245.0 MHz						6.93 dBm for 20 MHz 2.42 dBm for 40 MHz 1.60 dBm for 80 MHz
Maximum rated output power	Peak (conducted) in 5730.0 – 5845.0 MHz						6.80 dBm for 20 MHz 2.48 dBm for 40 MHz 1.61 dBm for 80 MHz
Antenna connection							
V	unique coupling		standard connector		Integral	V	with temporary RF connector
							without temporary RF connector

Antenna/s technical characteristics			
Type	Manufacturer	Model number	Gain
Dual Band Antenna	Laird Connectivity	LSR PN 001-0021	2.5 / 3 dBi

Type of modulation	GFSK				
Modulating test signal (baseband)					
Transmitter power source					
	Battery	**Nominal rated voltage**		Battery type	
	DC	**Nominal rated voltage**	VDC		
X	AC mains	**Nominal rated voltage**	230 VAC	Frequency	50 Hz

Test specification:	Section 15.247(b)3, Peak output power		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	Relative Humidity: 48 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

7 Transmitter tests according to 47CFR part 15 subpart C requirements

7.1 Peak output power at Wi-Fi 2.4 GHz

7.1.1 General

This test was performed to measure the maximum peak output power radiated by transmitter. Specification test limits are given in Table 7.1.1.

Table 7.1.1 Peak output power limits

Assigned frequency range, MHz	Maximum antenna gain, dBi	Peak output power*		Equivalent field strength limit @ 3m, dB(μV/m)**
		W	dBm	
902.0 – 928.0	6.0	1.0	30.0	131.2
2400.0 – 2483.5				
5725.0 – 5850.0				

*- The limit is provided in terms of conducted RF power at the antenna connector. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power limit shall be reduced below the stated value as follows:

by 1 dB for every 3 dB that the directional gain of antenna exceeds 6 dBi for fixed point-to-point transmitters operate in 2400-2483.5 MHz band;
without any corresponding reduction for fixed point-to-point transmitters operate in 5725-5850 MHz band;
by the amount in dB that the directional gain of antenna exceeds 6 dBi for the rest of transmitters.

**- Equivalent field strength limit was calculated from the peak output power as follows: E=sqrt(30×P×G)/r, where P is peak output power in Watts, r is antenna to EUT distance in meters and G is transmitter antenna gain in dBi.

7.1.2 Test procedure

7.1.2.1 The EUT was set up as shown in Figure 7.1.1, energized and its proper operation was checked.

7.1.2.2 The EUT was adjusted to produce maximum available to end user RF output power.

7.1.2.3 The resolution bandwidth of spectrum analyzer was set wider than 6 dB bandwidth of the EUT and the field strength of the EUT carrier frequency was measured with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna height was swept in both vertical and horizontal polarizations.

7.1.2.4 The maximum field strength of the EUT carrier frequency was measured as provided in Table 7.1.2 and associated plots.

7.1.2.5 The maximum peak output power was calculated from the field strength of carrier as follows:

$$P = (E \times d)^2 / (30 \times G),$$

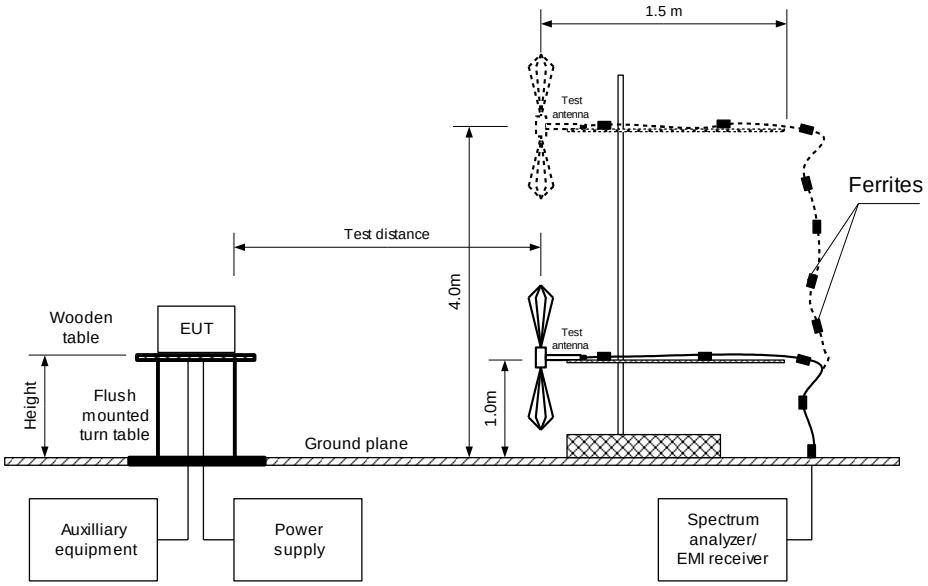
where P is the peak output power in W, E is the field strength in V/m, d is the test distance and G is the transmitter numeric antenna gain over an isotropic radiator.
The above equation was converted in logarithmic units for 3 m test distance:

Peak output power in dBm = Field strength in dB(μV/m) - Transmitter antenna gain in dBi – 95.2 dB

7.1.2.6 The worst test results (the lowest margins) were recorded in Table 7.1.2.

Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Figure 7.1.1 Setup for carrier field strength measurements



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Table 7.1.2 Peak output power test results

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
TEST DISTANCE: 3 m
TEST SITE: Semi anechoic chamber
EUT HEIGHT: 1.5 m
DETECTOR USED: Average
DUTY CYCLE: 100%
TEST ANTENNA TYPE: Double ridged guide (above 1000 MHz)
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 1 MHz
VIDEO BANDWIDTH: 8 MHz

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 1 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	105.33	Vertical	1.5	200	2.5	7.63	30.0	-22.37	Pass
2437.0	105.83	Vertical	1.5	120	2.5	8.13	30.0	-21.87	Pass
2462.0	105.20	Vertical	1.5	150	2.5	7.50	30.0	-22.50	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 2 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	105.42	Vertical	1.5	200	2.5	7.72	30.0	-22.28	Pass
2437.0	105.86	Vertical	1.5	120	2.5	8.16	30.0	-21.84	Pass
2462.0	105.31	Vertical	1.5	150	2.5	7.61	30.0	-22.39	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 5.5 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	106.09	Vertical	1.5	200	2.5	8.39	30.0	-21.61	Pass
2437.0	106.55	Vertical	1.5	120	2.5	8.85	30.0	-21.15	Pass
2462.0	106.00	Vertical	1.5	150	2.5	8.30	30.0	-21.70	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 11 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	105.52	Vertical	1.5	200	2.5	7.82	30.0	-22.18	Pass
2437.0	106.03	Vertical	1.5	120	2.5	8.33	30.0	-21.67	Pass
2462.0	105.40	Vertical	1.5	150	2.5	7.70	30.0	-22.30	Pass

Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	104.32	Vertical	1.5	200	2.5	6.62	30.0	-23.38	Pass
2437.0	104.61	Vertical	1.5	120	2.5	6.91	30.0	-23.09	Pass
2462.0	103.89	Vertical	1.5	150	2.5	6.19	30.0	-23.81	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	102.73	Vertical	1.5	200	2.5	5.03	30.0	-24.97	Pass
2437.0	103.09	Vertical	1.5	120	2.5	5.39	30.0	-24.61	Pass
2462.0	102.30	Vertical	1.5	150	2.5	4.60	30.0	-25.40	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	103.54	Vertical	1.5	200	2.5	5.84	30.0	-24.16	Pass
2437.0	103.89	Vertical	1.5	120	2.5	6.19	30.0	-23.81	Pass
2462.0	103.33	Vertical	1.5	150	2.5	5.63	30.0	-24.37	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps

Frequency, MHz	Field strength, dB(µV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2412.0	101.96	Vertical	1.5	200	2.5	4.26	30.0	-25.74	Pass
2437.0	102.29	Vertical	1.5	120	2.5	4.59	30.0	-25.41	Pass
2462.0	101.73	Vertical	1.5	150	2.5	4.03	30.0	-25.97	Pass

Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2422.0	101.85	Vertical	1.5	200	2.5	4.15	30.0	-25.85	Pass
2442.0	101.04	Vertical	1.5	120	2.5	3.34	30.0	-26.66	Pass
2452.0	100.61	Vertical	1.5	150	2.5	2.91	30.0	-27.09	Pass

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps

Frequency, MHz	Field strength, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	EUT antenna gain, dBi	Peak output power, dBm**	Limit, dBm	Margin, dB***	Verdict
2422.0	99.42	Vertical	1.5	200	2.5	1.72	30.0	-28.28	Pass
2442.0	98.49	Vertical	1.5	120	2.5	0.79	30.0	-29.21	Pass
2452.0	98.21	Vertical	1.5	150	2.5	0.51	30.0	-29.49	Pass

*****- EUT front panel refer to 0 degrees position of turntable.
******- Peak output power was calculated from the field strength of carrier as follows: $P = (E \times d)^2 / (30 \times G)$,
where P is the peak output power in W, E is the field strength in V/m, d is the test distance in meters and G is the transmitter numeric antenna gain over an isotropic radiator. The above equation was converted in logarithmic units for 3 m test distance: *Peak output power in dBm = Field strength in dB(μV/m) - Transmitter antenna gain in dBi – 95.2 dB*
***- Margin = Peak output power – specification limit.
Note: Maximum peak output power was obtained at U_{nom} ($115\%U_{nom}$, $85\%U_{nom}$) input power voltage.

Reference numbers of test equipment used

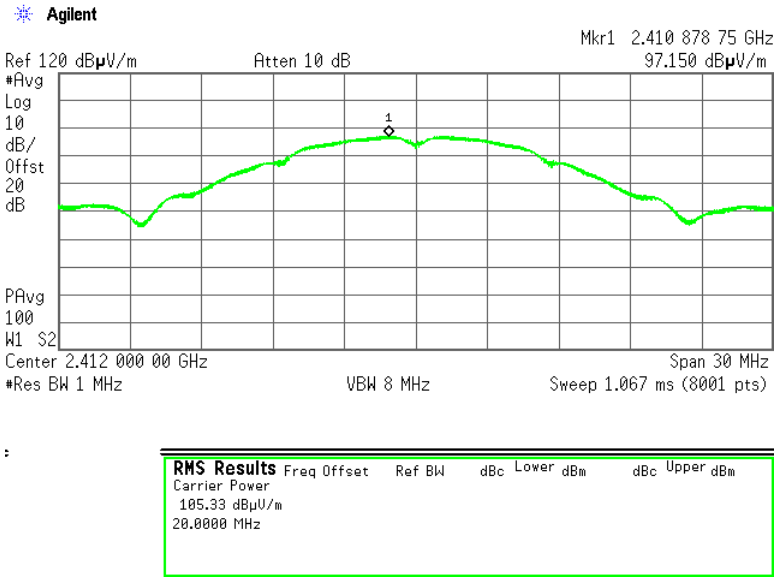
HL 3818	HL 3903	HL 5902	HL 4933	HL 3442			

Full description is given in Appendix A.

Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

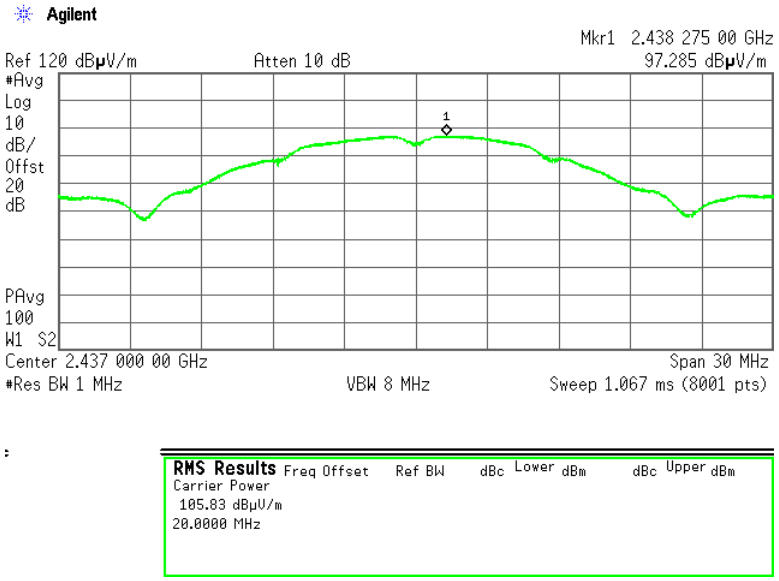
Plot 7.1.1 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 1 Mbps



Plot 7.1.2 Field strength of carrier at mid frequency

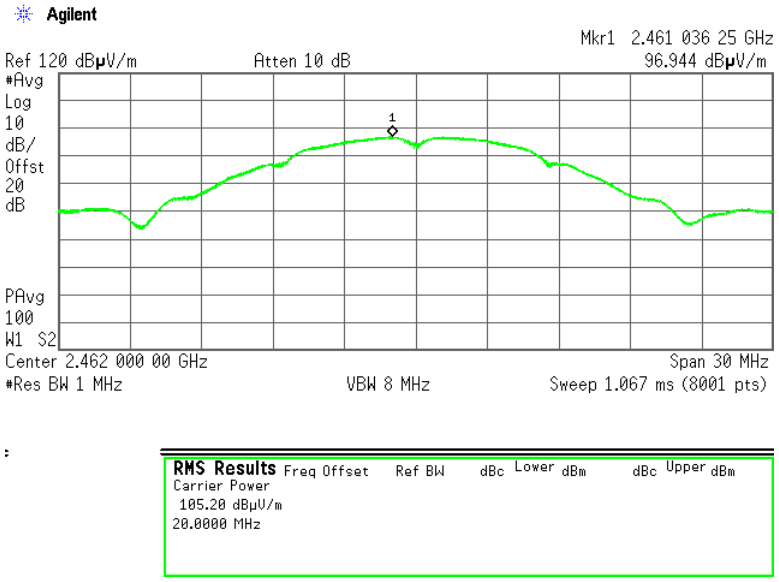
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 1 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.3 Field strength of carrier at high frequency

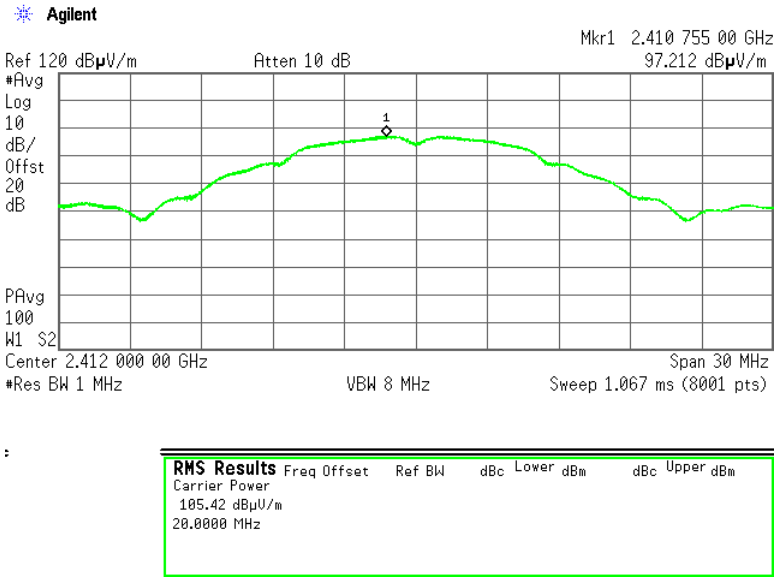
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 1 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

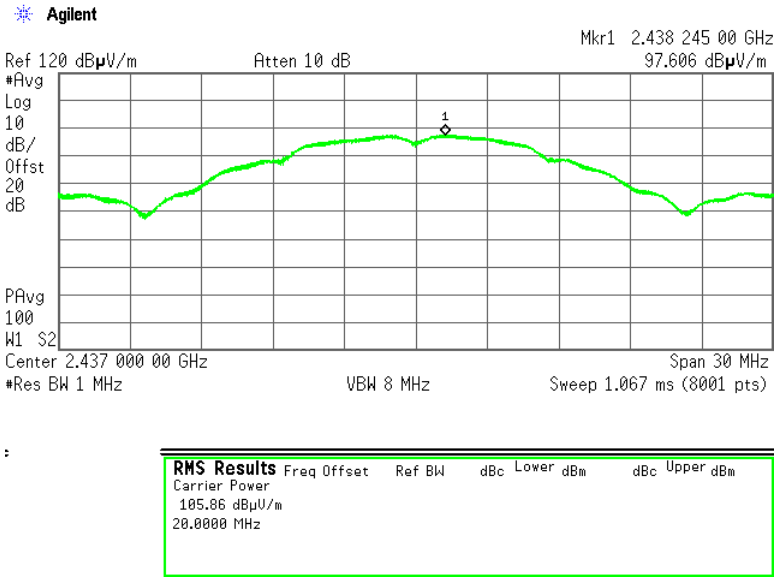
Plot 7.1.4 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 2 Mbps



Plot 7.1.5 Field strength of carrier at mid frequency

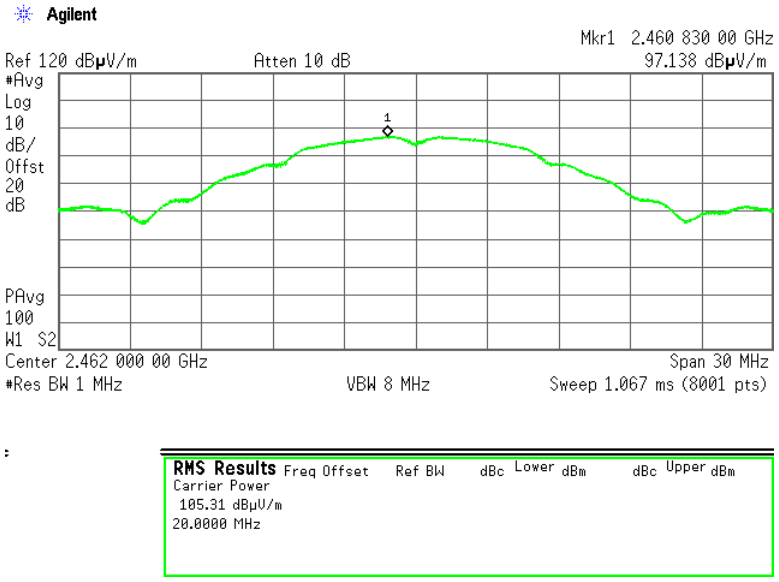
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 2 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.6 Field strength of carrier at high frequency

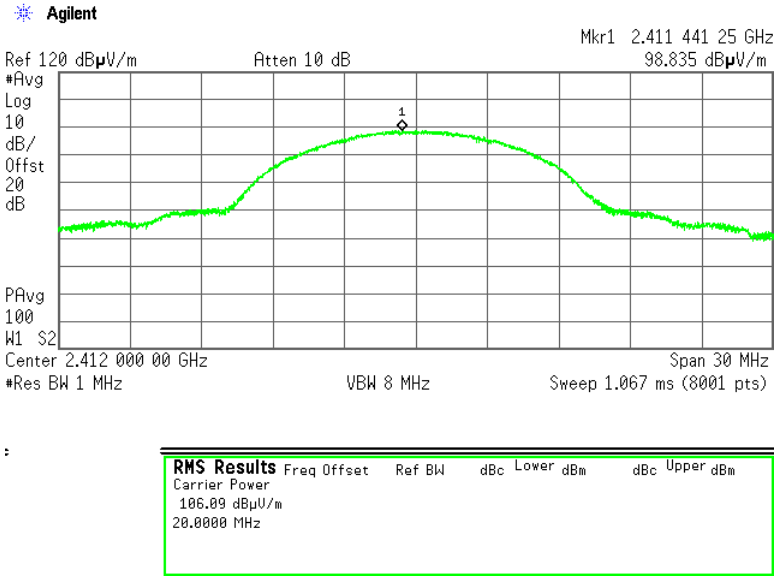
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 2 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

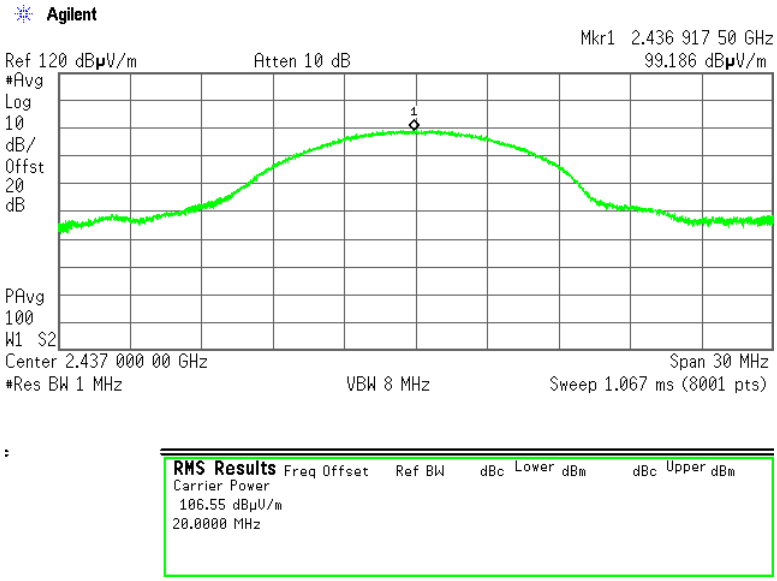
Plot 7.1.7 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 5.5 Mbps



Plot 7.1.8 Field strength of carrier at mid frequency

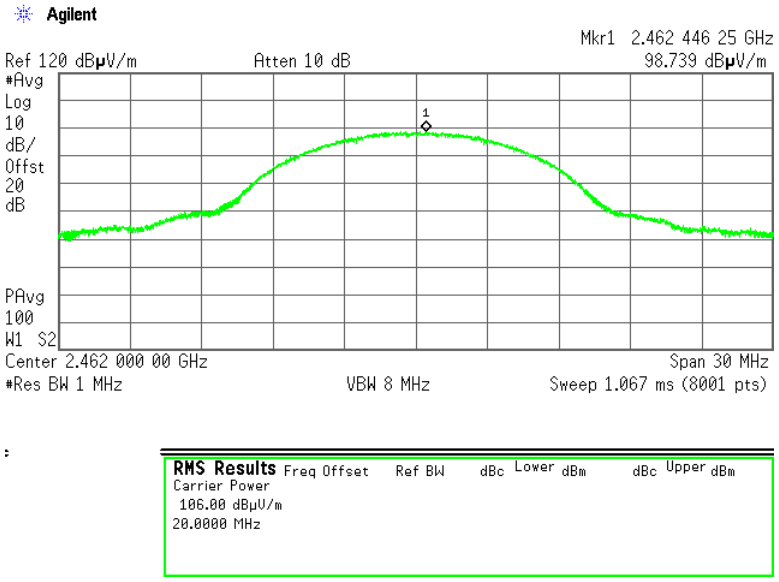
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 5.5 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.9 Field strength of carrier at high frequency

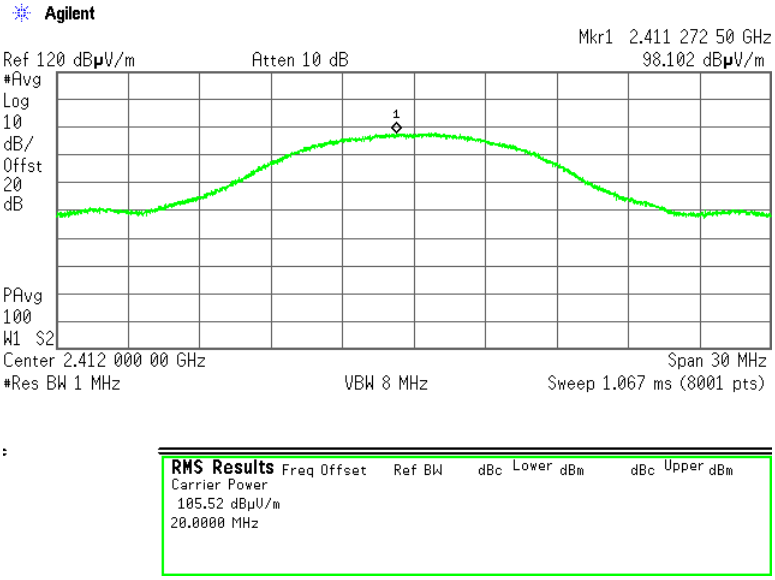
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 5.5 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

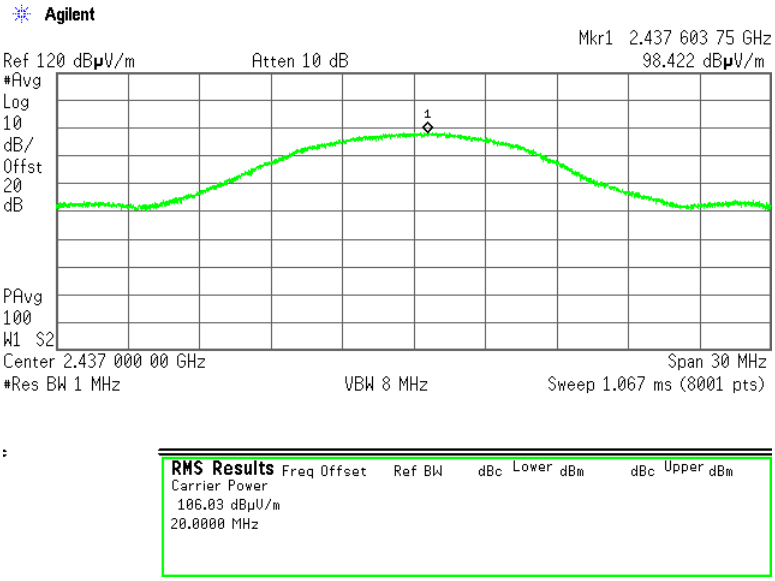
Plot 7.1.10 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 11 Mbps



Plot 7.1.11 Field strength of carrier at mid frequency

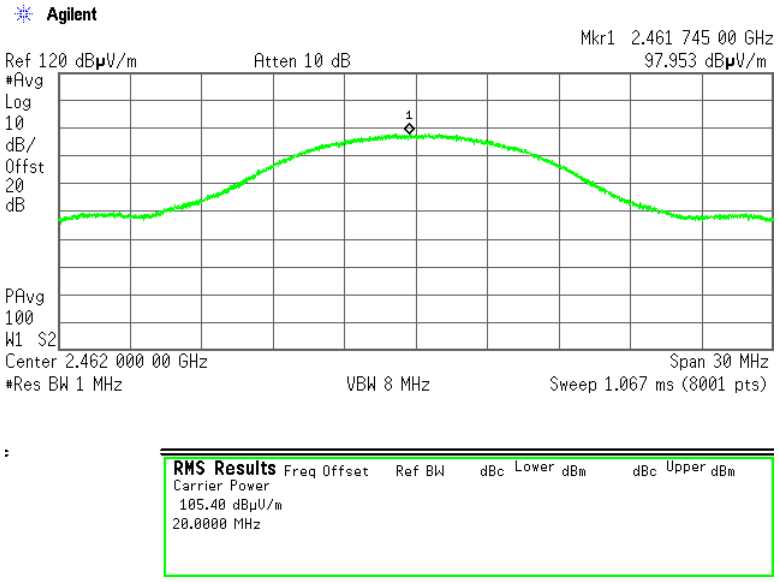
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 11 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.12 Field strength of carrier at high frequency

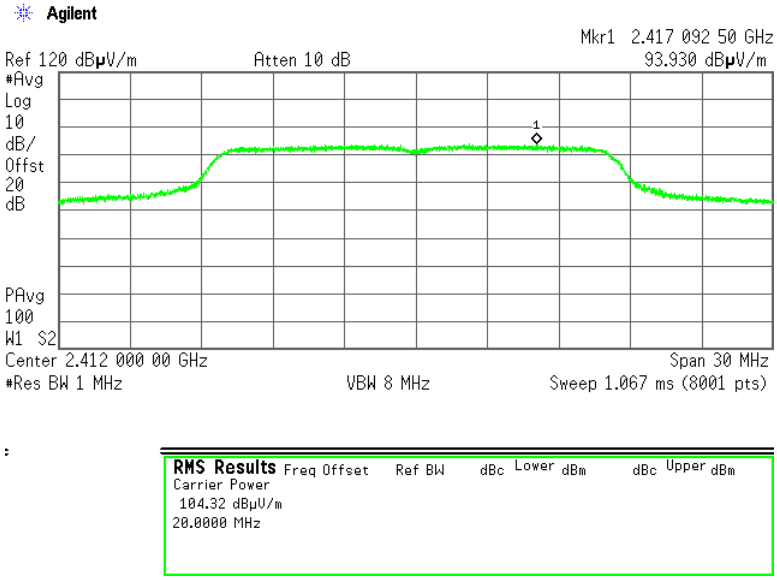
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 11 Mbps



Test specification:	Section 15.247(b)3, Peak output power		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	Relative Humidity: 48 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

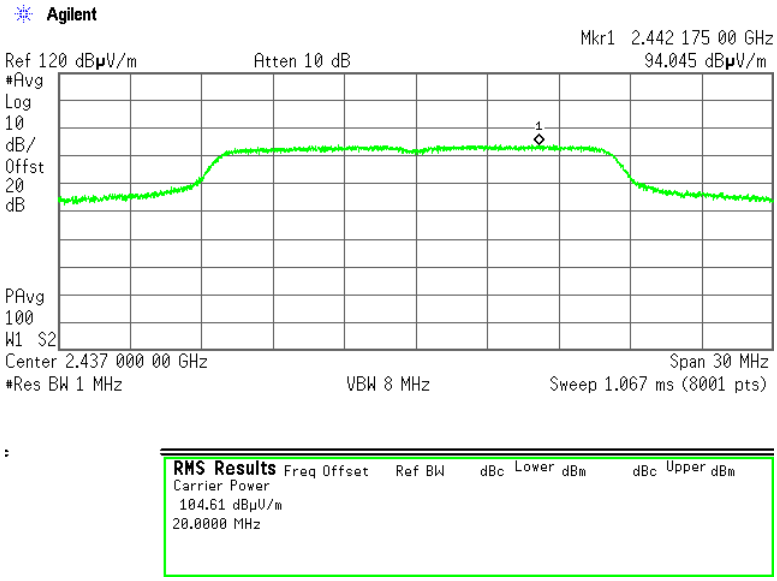
Plot 7.1.13 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6 Mbps



Plot 7.1.14 Field strength of carrier at mid frequency

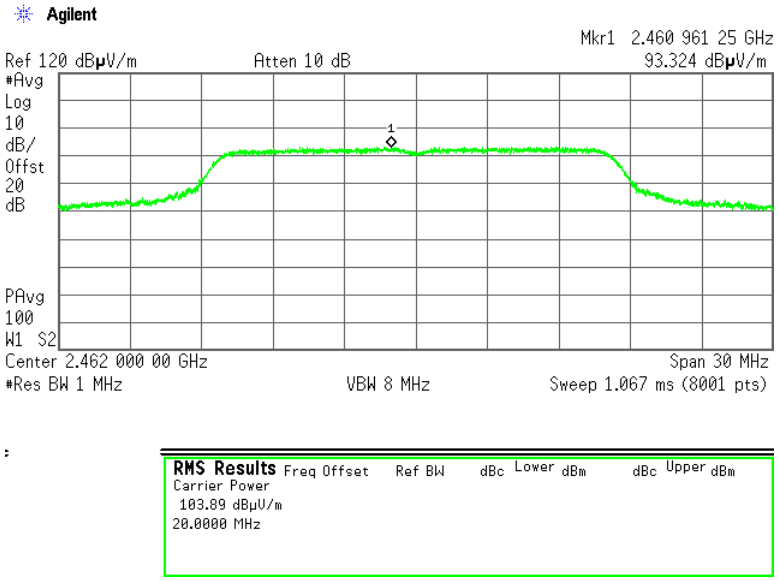
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.15 Field strength of carrier at high frequency

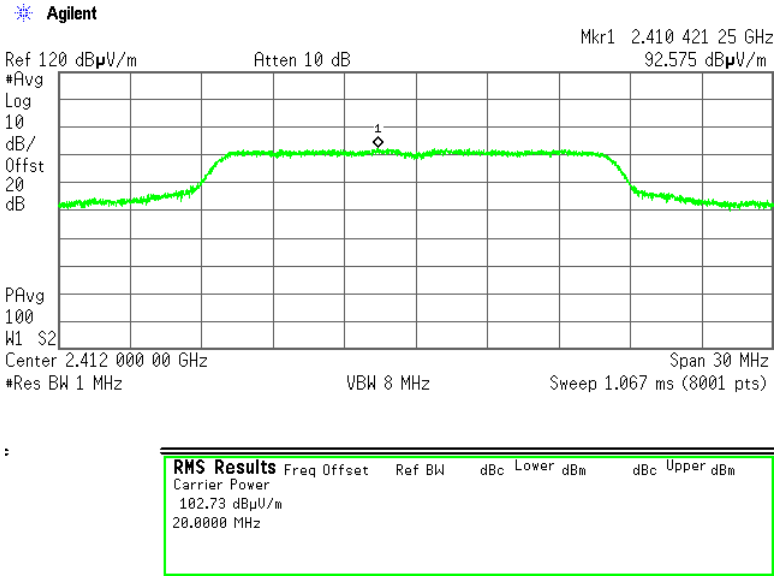
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

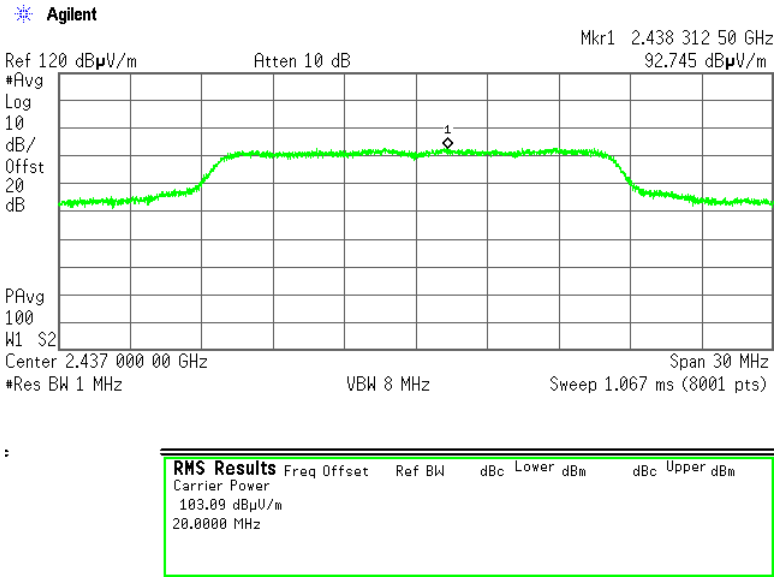
Plot 7.1.16 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps



Plot 7.1.17 Field strength of carrier at mid frequency

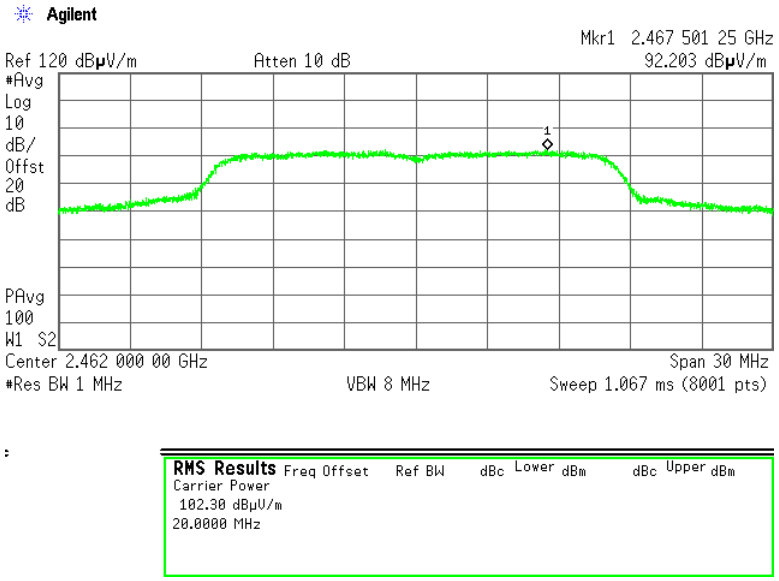
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.18 Field strength of carrier at high frequency

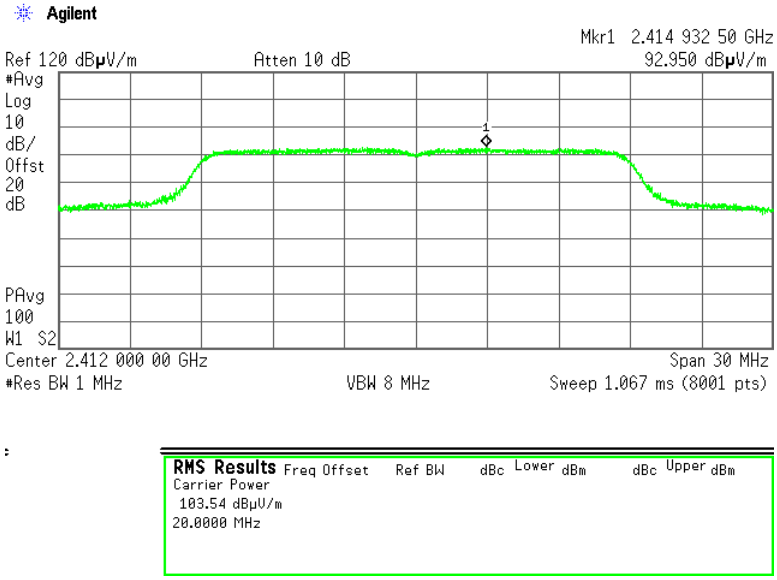
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

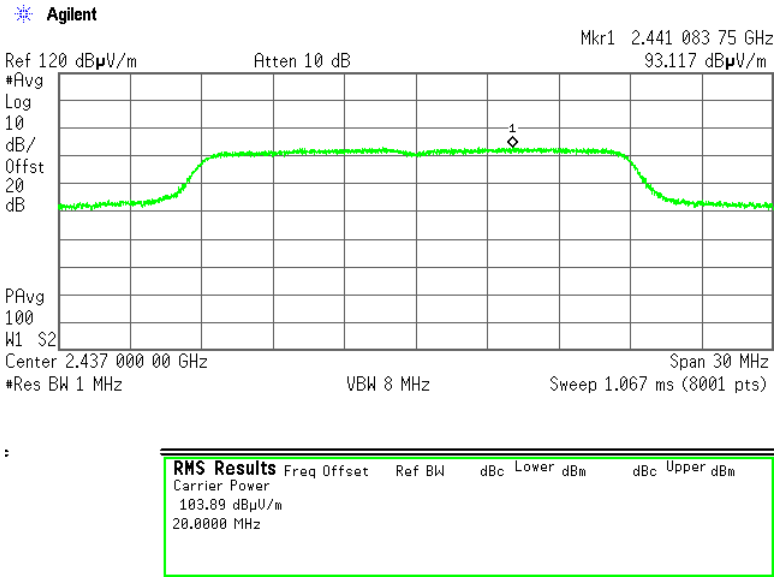
Plot 7.1.19 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps



Plot 7.1.20 Field strength of carrier at mid frequency

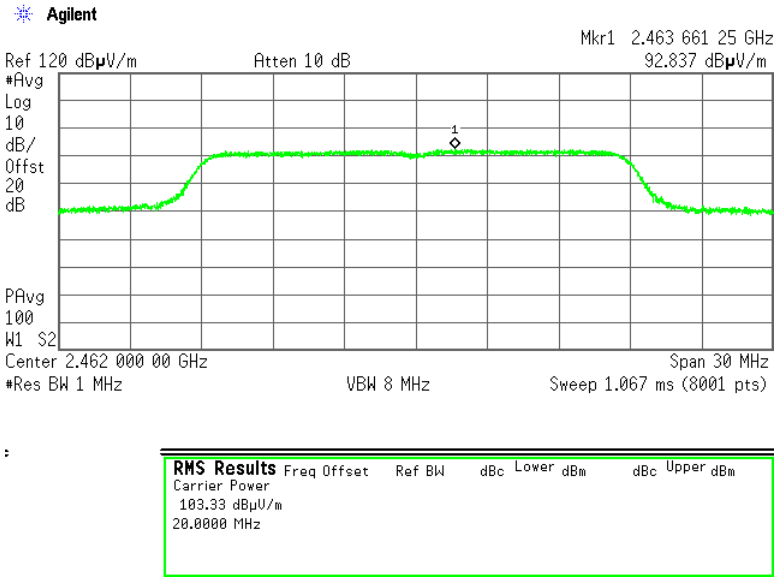
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.21 Field strength of carrier at high frequency

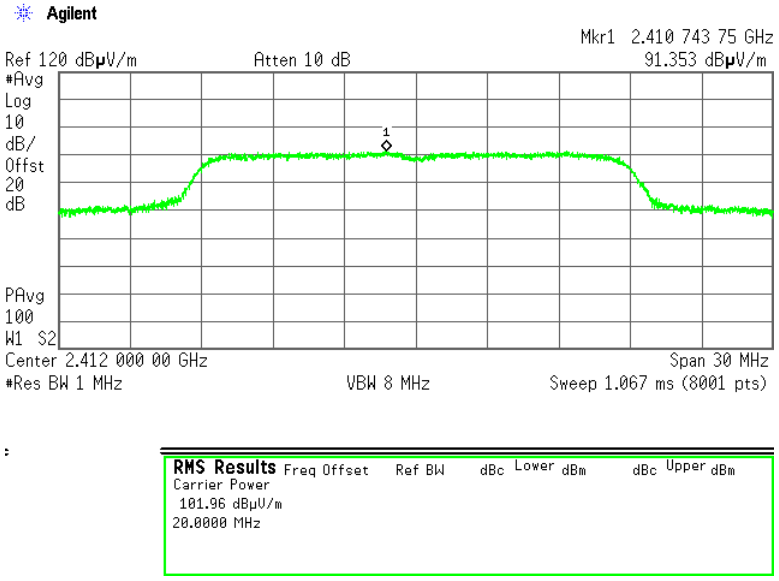
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

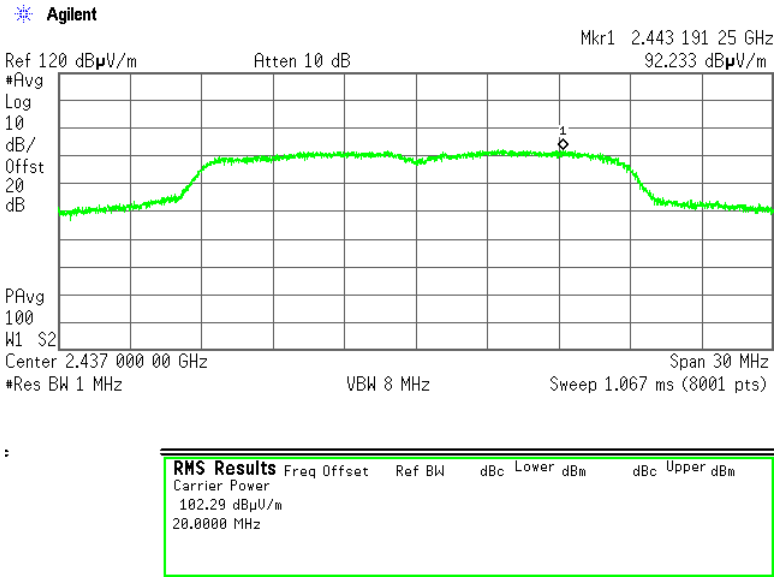
Plot 7.1.22 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps



Plot 7.1.23 Field strength of carrier at mid frequency

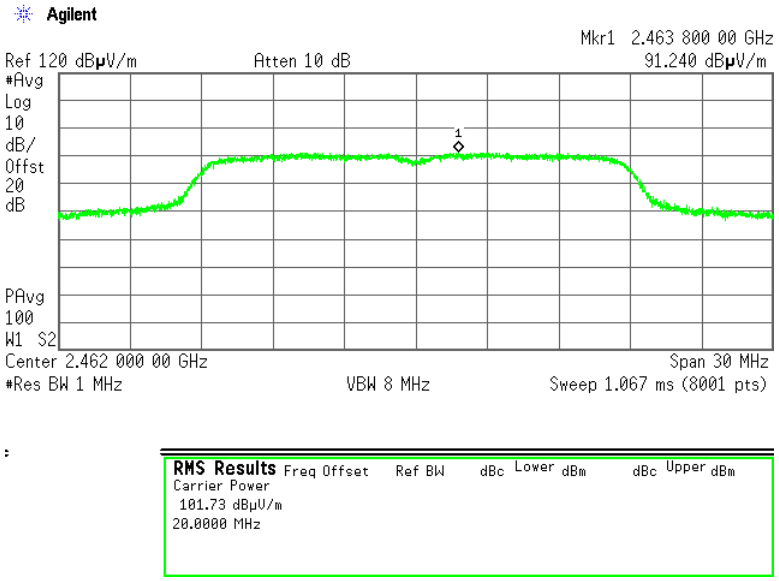
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.24 Field strength of carrier at high frequency

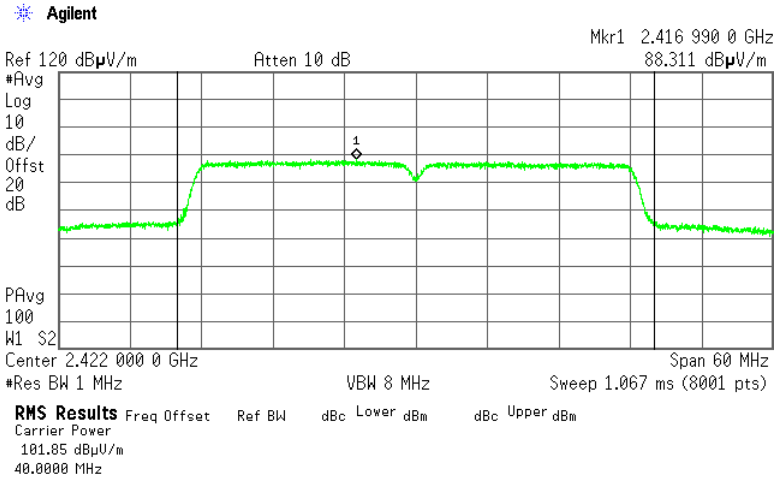
CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps



Test specification:	Section 15.247(b)3, Peak output power		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	Relative Humidity: 48 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

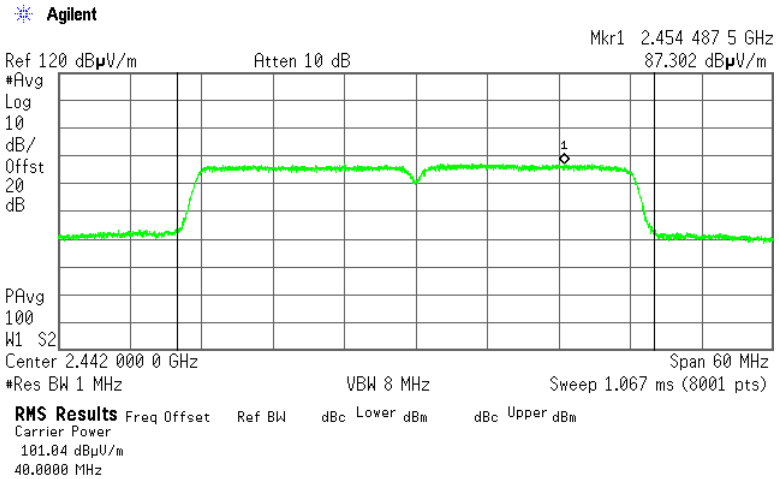
Plot 7.1.25 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps



Plot 7.1.26 Field strength of carrier at mid frequency

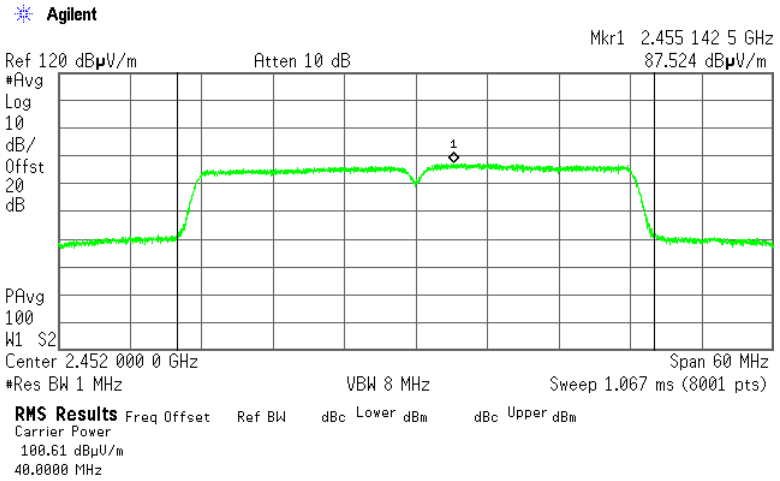
CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.27 Field strength of carrier at high frequency

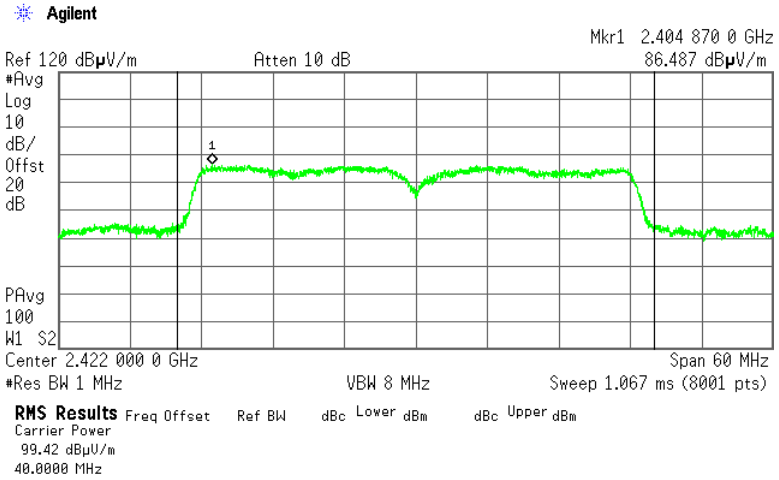
CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

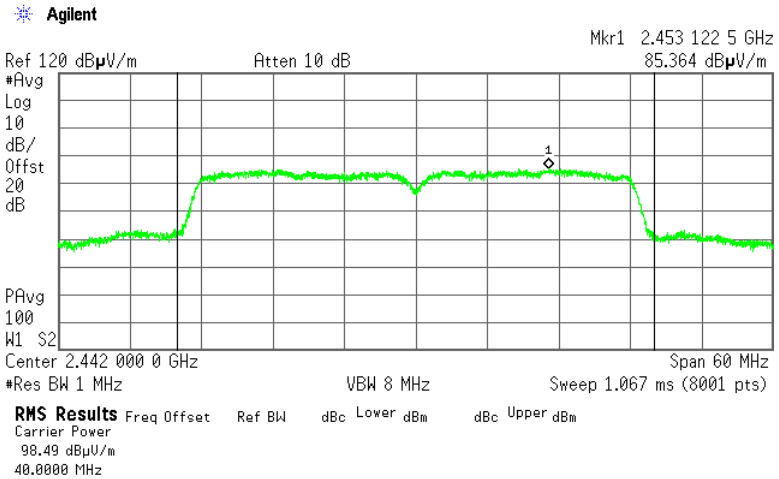
Plot 7.1.28 Field strength of carrier at low frequency

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps



Plot 7.1.29 Field strength of carrier at mid frequency

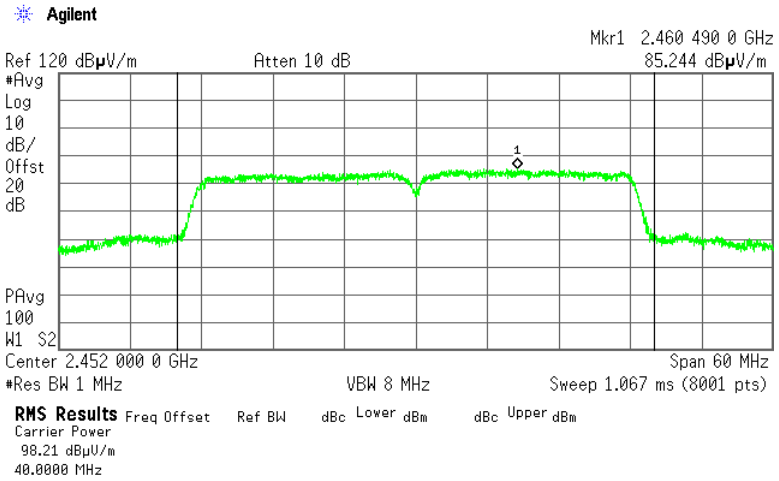
CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps



Test specification:	**Section 15.247(b)3, Peak output power**		
Test procedure:	ANSI C63.10 section 11.9.1.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 08-Apr-21		
Temperature: 23 ºC	**Relative Humidity:** 48 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.1.30 Field strength of carrier at high frequency

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

7.2 Field strength of spurious emissions at Wi-Fi 2.4 GHz

7.2.1 General

This test was performed to measure field strength of spurious emissions from the EUT. Specification test limits are given in Table 7.2.1

Table 7.2.1 Radiated spurious emissions limits

Frequency, MHz	Field strength at 3 m within restricted bands, dB(μV/m)*			Attenuation of field strength of spurious versus carrier outside restricted bands, dBc***
	Peak	Quasi Peak	Average	
0.009 – 0.090	148.5 – 128.5	NA	128.5 – 108.5**	20.0
0.090 – 0.110	NA	108.5 – 106.8**	NA	
0.110 – 0.490	126.8 – 113.8	NA	106.8 – 93.8**	
0.490 – 1.705	NA	73.8 – 63.0**	NA	
1.705 – 30.0*		69.5		
30 – 88		40.0		
88 – 216		43.5		
216 – 960		46.0		
960 - 1000		54.0		
1000 – 10thharmonic	74.0	NA	54.0	

*- The limit for 3 m test distance was calculated using the inverse square distance extrapolation factor as follows:

$$Lim_{S2} = Lim_{S1} + 40 \log (S_1/S_2),$$

where S_1 and S_2 – standard defined and test distance respectively in meters.
**- The limit decreases linearly with the logarithm of frequency.
*** - The field strength limits applied from the lowest radio frequency generated in the device, without going below 9 kHz up to the tenth harmonic of the highest fundamental frequency.

7.2.2 Test procedure for spurious emission field strength measurements in 9 kHz to 30 MHz band

7.2.2.1 The EUT was set up as shown in Figure 7.2.1, energized and the performance check was conducted.

7.2.2.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0 and the measuring antenna was rotated around its vertical axis.

7.2.2.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

7.2.3 Test procedure for spurious emission field strength measurements above 30 MHz

7.2.3.1 The EUT was set up as shown in Figure 7.2.2, Figure 7.2.3, energized and the performance check was conducted.

7.2.3.2 The specified frequency range was investigated with antenna connected to spectrum analyzer/ EMI receiver. To find maximum radiation the turntable was rotated 360^0, the measuring antenna height was changed from 1 to 4 m, its polarization was switched from vertical to horizontal.

7.2.3.3 The worst test results (the lowest margins) were recorded and shown in the associated plots.

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	Relative Humidity: 47 %	Air Pressure: 1017 hPa	Power: 230 VAC, 50 Hz
Remarks:			

Figure 7.2.1 Setup for spurious emission field strength measurements below 30 MHz

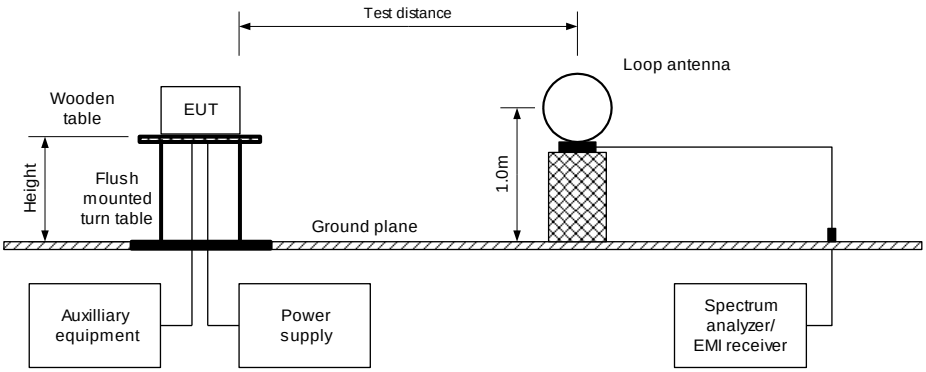
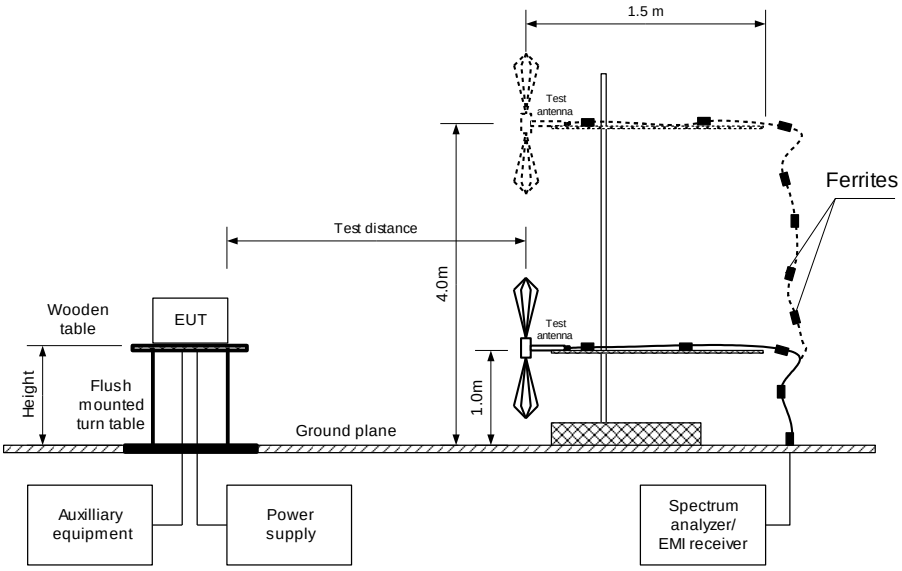
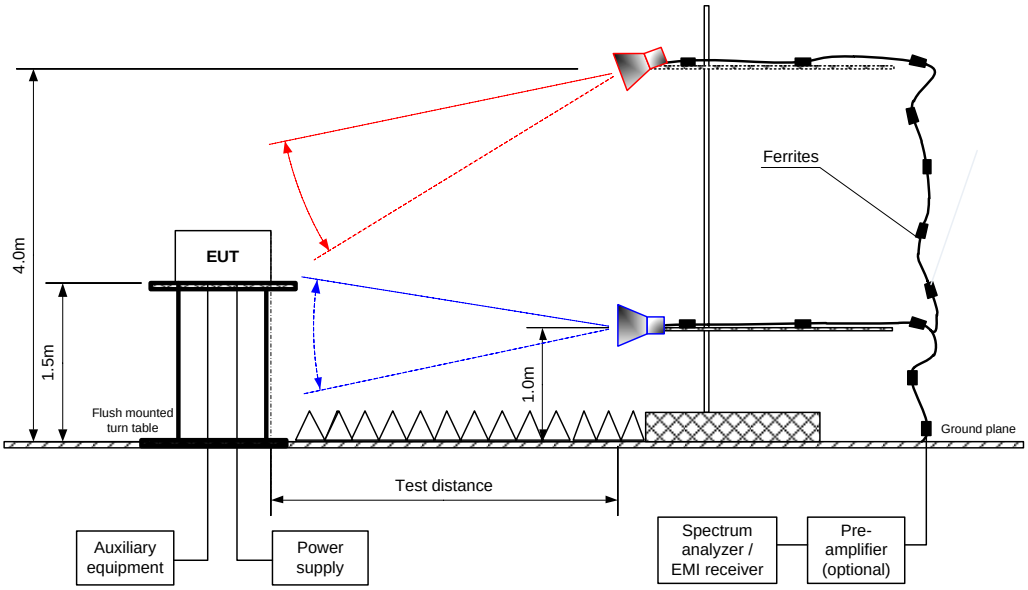


Figure 7.2.2 Setup for spurious emission field strength measurements in 30 – 1000 MHz



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Figure 7.2.3 Setup for spurious emission field strength measurements above1000 MHz



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	Relative Humidity: 47 %	Air Pressure: 1017 hPa	Power: 230 VAC, 50 Hz
Remarks:			

Table 7.2.2 Field strength of emissions outside restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE: 0.009 - 25000 MHz
TEST DISTANCE: 3 m
MODULATION: CCK
BIT RATE: 5.5 Mbps
DUTY CYCLE: 100 %
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: 300 kHz
TEST ANTENNA TYPE: Active loop (9 kHz – 30 MHz)
Biconilog (30 MHz – 1000 MHz)
Double ridged guide (above 1000 MHz)

Frequency, MHz	Field strength of spurious, dB(μV/m)	Antenna polarization	Antenna height, m	Azimuth, degrees*	Field strength of carrier, dB(μV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB**	Verdict
Low carrier frequency 2412.0 MHz									
60.005789	45.25	V	1.00	180	106.09	60.84	20.0	40.84	Pass
Mid carrier frequency 2437.0 MHz									
60.014786	45.42	V	1.00	176	106.55	61.13	20.0	41.13	Pass
High carrier frequency 2462.0 MHz									
60.007933	45.19	V	1.00	180	106.00	60.81	20.0	40.81	Pass

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Attenuation below carrier – specification limit.

Table 7.2.3 Field strength of spurious emissions above 1 GHz within restricted bands

ASSIGNED FREQUENCY: 2400.0 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE: 1000 - 25000 MHz
TEST DISTANCE: 3 m
MODULATION: CCK
BIT RATE: 5.5 Mbps
DUTY CYCLE: 100 %
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
DETECTOR USED: Peak
RESOLUTION BANDWIDTH: 1000 kHz
TEST ANTENNA TYPE: Double ridged guide

Frequency, MHz	Antenna		Azimuth, degrees*	Peak field strength(VBW=3 MHz)			Average field strength(VBW=10 Hz)				Verdict
	Polarization	Height, m		Measured, dB(μV/m)	Limit, dB(μV/m)	Margin, dB**	Measured, dB(μV/m)	Calculated, dB(μV/m)	Limit, dB(μV/m)	Margin, dB***	
Low carrier frequency 2412.0 MHz											
All emission were found below the limit											Pass
Mid carrier frequency 2437.0 MHz											
All emission were found below the limit											Pass
High carrier frequency 2462.0 MHz											
All emission were found below the limit											Pass

*****- EUT front panel refers to 0 degrees position of turntable.
******- Margin = Measured field strength - specification limit.
***- Margin = Calculated field strength - specification limit,
where Calculated field strength = Measured field strength + average factor.

Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Table 7.2.4 Field strength of spurious emissions below 1 GHz within restricted bands

ASSIGNED FREQUENCY:	2400.0 – 2483.5 MHz
INVESTIGATED FREQUENCY RANGE:	0.009 – 1000 MHz
TEST DISTANCE:	3 m
MODULATION:	CCK
BIT RATE:	5.5 Mbps
DUTY CYCLE:	100 %
TRANSMITTER OUTPUT POWER SETTINGS:	Maximum
RESOLUTION BANDWIDTH:	0.2 kHz (9 kHz – 150 kHz) 9.0 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1000 MHz)
VIDEO BANDWIDTH:	> Resolution bandwidth
TEST ANTENNA TYPE:	Active loop (9 kHz – 30 MHz) Biconilog (30 MHz – 1000 MHz)

Frequency, MHz	**Peak emission, dB(µV/m)**	**Quasi-peak**			**Antenna polarization**	**Antenna height, m**	**Turn-table position**, degrees**	**Verdict**
		Measured emission, dB(µV/m)	**Limit, dB(µV/m)**	**Margin, dB***				
Low carrier frequency 2412.0 MHz								
120.010399	45.41	42.53	43.50	-0.97	V	1.04	-59	Pass
240.025400	38.69	36.75	46.00	-9.25	H	1.32	-131	
Mid carrier frequency 2437.0 MHz								
120.010399	45.52	42.59	43.50	-0.91	V	1.15	-45	Pass
High carrier frequency 2462.0 MHz								
120.010399	45.59	42.64	43.50	-0.86	V	1.09	-52	Pass

*****- Margin = Measured emission - specification limit.
******- EUT front panel refer to 0 degrees position of turntable.

Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Table 7.2.5 Restricted bands according to FCC section 15.205

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.37625 - 8.38675	73 - 74.6	399.9 - 410	2690 - 2900	10.6 - 12.7
0.495 - 0.505	8.41425 - 8.41475	74.8 - 75.2	608 - 614	3260 - 3267	13.25 - 13.4
2.1735 - 2.1905	12.29 - 12.293	108 - 121.94	960 - 1240	3332 - 3339	14.47 - 14.5
4.125 - 4.128	12.51975 - 12.52025	123 - 138	1300 - 1427	3345.8 - 3358	15.35 - 16.2
4.17725 - 4.17775	12.57675 - 12.57725	149.9 - 150.05	1435 - 1626.5	3600 - 4400	17.7 - 21.4
4.20725 - 4.20775	13.36 - 13.41	156.52475 - 156.52525	1645.5 - 1646.5	4500 - 5150	22.01 - 23.12
6.215 - 6.218	16.42 - 16.423	156.7 - 156.9	1660 - 1710	5350 – 5460	23.6 - 24
6.26775 - 6.26825	16.69475 - 16.69525	162.0125 - 167.17	1718.8 - 1722.2	7250 - 7750	31.2 - 31.8
6.31175 - 6.31225	16.80425 - 16.80475	167.72 - 173.2	2200 - 2300	8025 – 8500	36.43 - 36.5
8.291 - 8.294	25.5 - 25.67	240 - 285	2310 - 2390	9000 - 9200	Above 38.6
8.362 - 8.366	37.5 - 38.25	322 - 335.4	2483.5 - 2500	9300 - 9500	

Table 7.2.6 Restricted bands according to RSS-Gen

MHz	MHz	MHz	MHz	MHz	GHz
0.09 - 0.11	8.291 - 8.294	16.80425 - 16.80475	399.9 - 410	3260 - 3267	10.6 - 12.7
2.1735 - 2.1905	8.362 - 8.366	25.5 - 25.67	608 - 614	3332 – 3339	13.25 - 13.4
3.020 – 3.026	8.37625 - 8.38675	37.5 - 38.25	960 – 1427	3345.8 – 3358	14.47 – 14.5
4.125 – 4.128	8.41425 - 8.41475	73 - 74.6	1435 – 1626.5	3500 – 4400	15.35 – 16.2
4.17725 – 4.17775	12.29 – 12.293	74.8 - 75.2	1645.5 – 1646.5	4500 – 5150	17.7 – 21.4
4.20725 – 4.20775	12.51975 – 12.52025	108 – 138	1660 - 1710	5350 – 5460	22.01 – 23.12
5.677 – 5.683	12.57675 – 12.57725	156.52475 – 156.52525	1718.8 - 1722.2	7250 - 7750	23.6 - 24
6.215 - 6.218	13.36 – 13.41	156.7 - 156.9	2200 - 2300	8025 – 8500	31.2 - 31.8
6.26775 - 6.26825	16.42 - 16.423	240 - 285	2310 - 2390	9000 - 9200	36.43 - 36.5
6.31175 - 6.31225	16.69475 - 16.69525	322 - 335.4	2655 - 2900	9300 - 9500	Above 38.6

Reference numbers of test equipment used

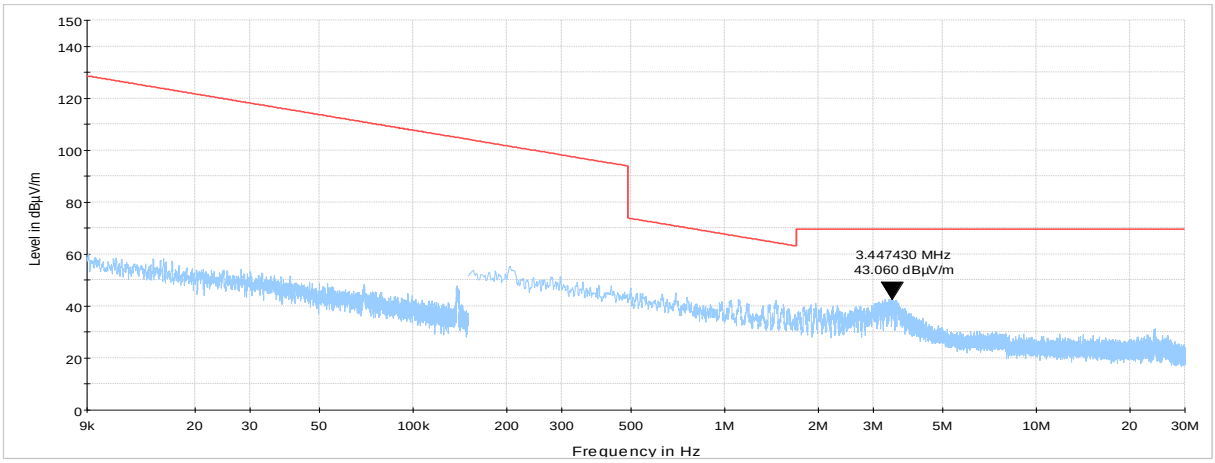
HL 4360	HL 3903	HL 4933	HL 446	HL 4956	HL 5288	HL 5085	HL 5112
HL 5902	HL 4378	HL 5286					

Full description is given in Appendix A.

Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	Relative Humidity: 47 %	Air Pressure: 1017 hPa	Power: 230 VAC, 50 Hz
Remarks:			

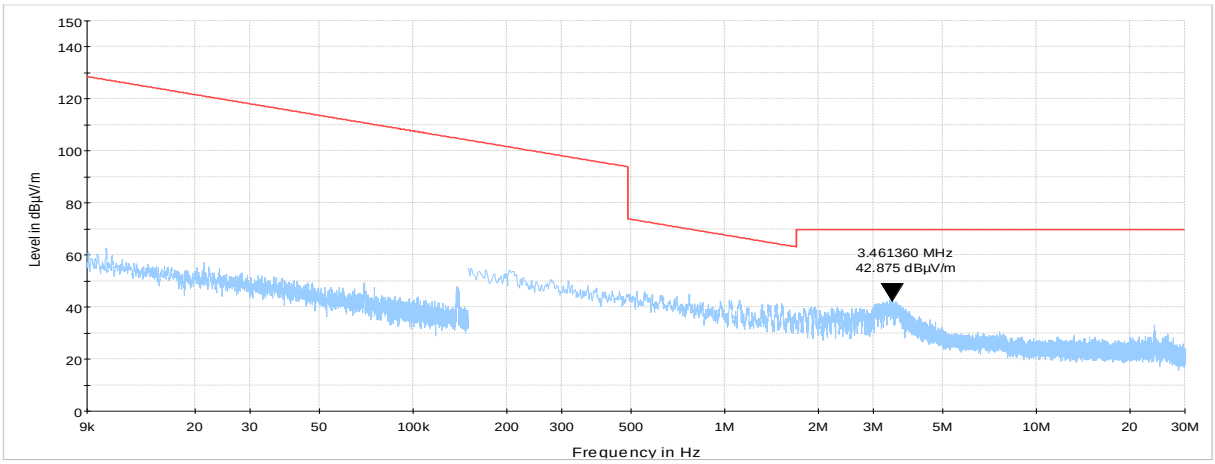
Plot 7.2.1 Radiated emission measurements from 9 kHz to 30 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Plot 7.2.2 Radiated emission measurements from 9 kHz to 30 MHz at the mid carrier frequency

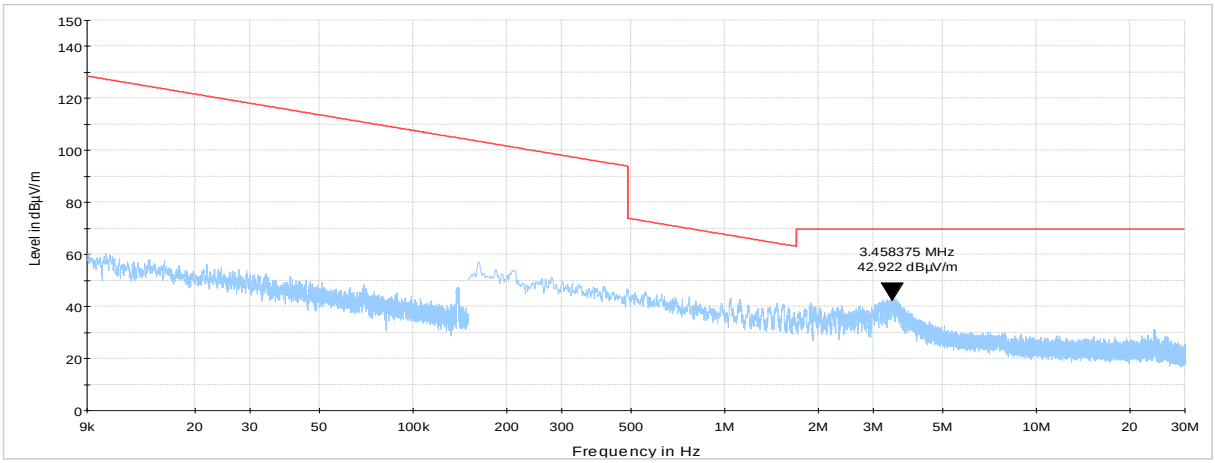
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.2.3 Radiated emission measurements from 9 kHz to 30 MHz at the high carrier frequency

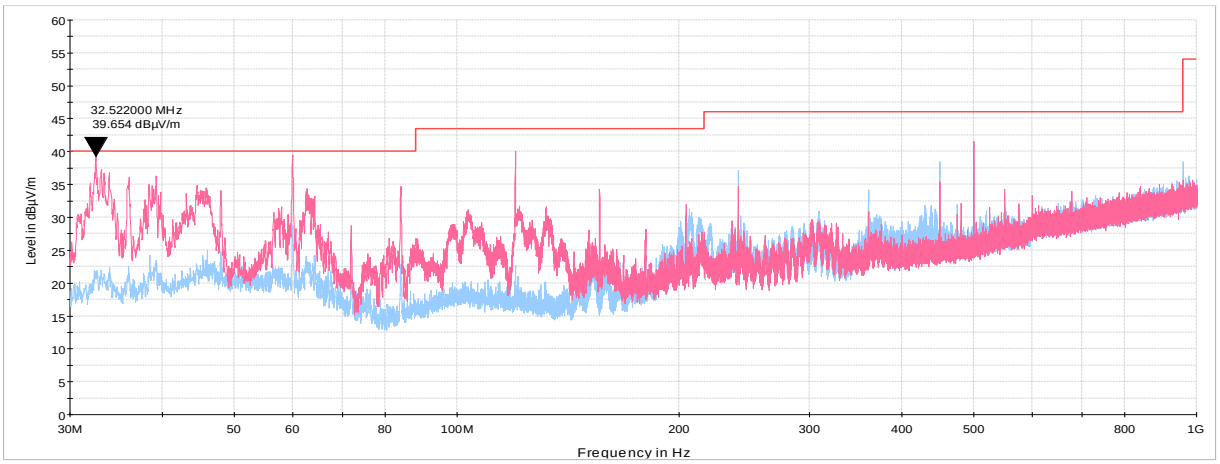
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

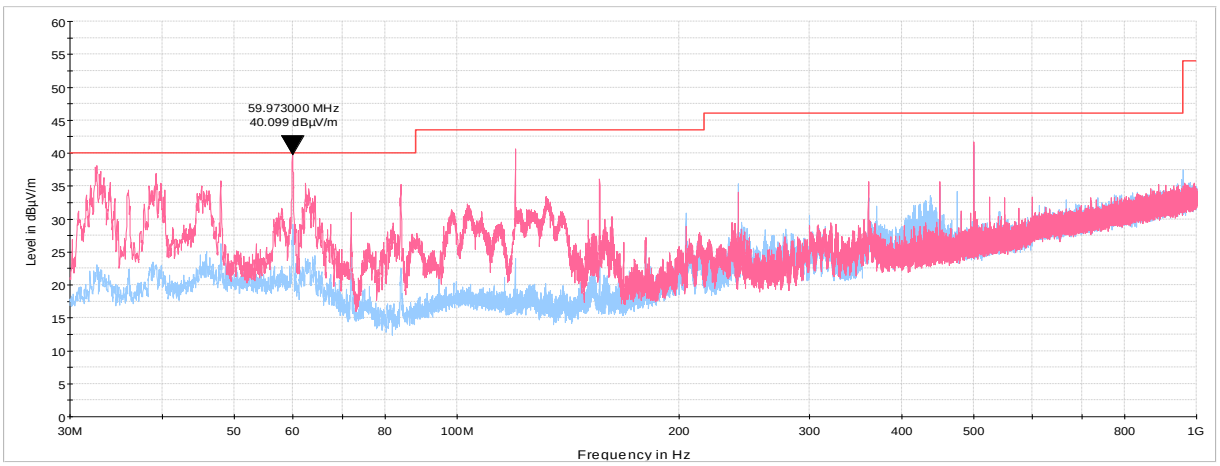
Plot 7.2.4 Radiated emission measurements from 30 to 1000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.2.5 Radiated emission measurements from 30 to 1000 MHz at the mid carrier frequency

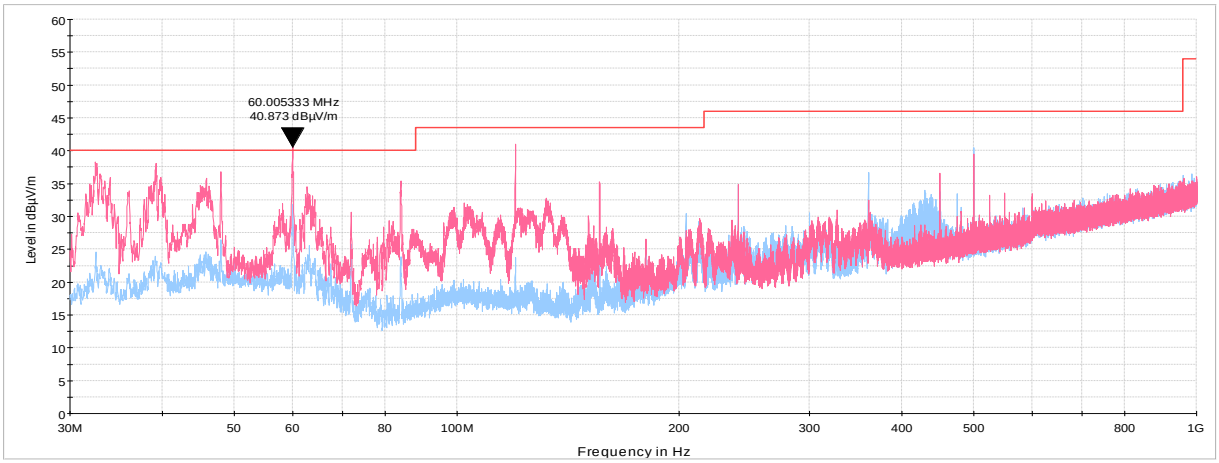
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.2.6 Radiated emission measurements from 30 to 1000 MHz at the high carrier frequency

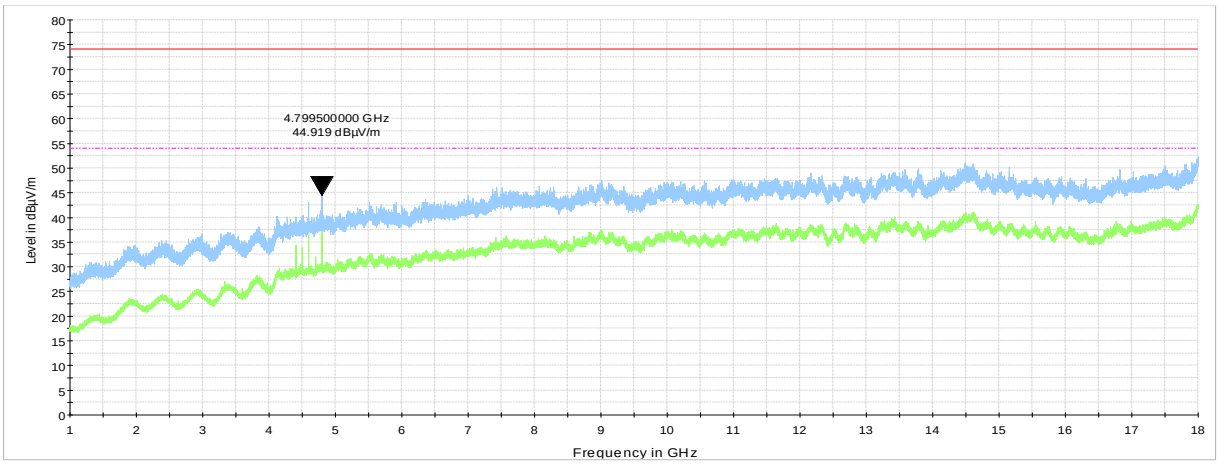
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

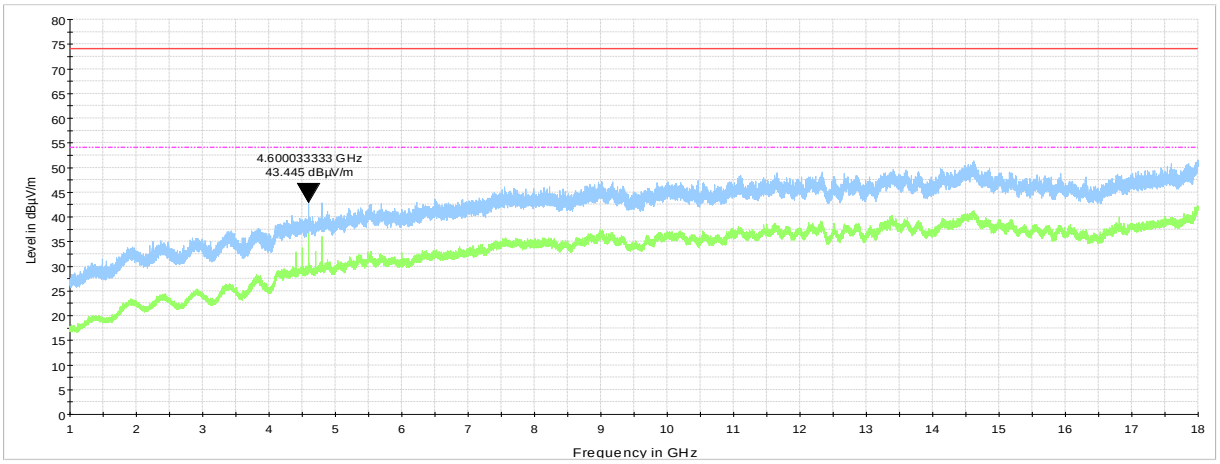
Plot 7.2.7 Radiated emission measurements from 1000 to 18000 MHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.2.8 Radiated emission measurements from 1000 to 18000 MHz at the mid carrier frequency

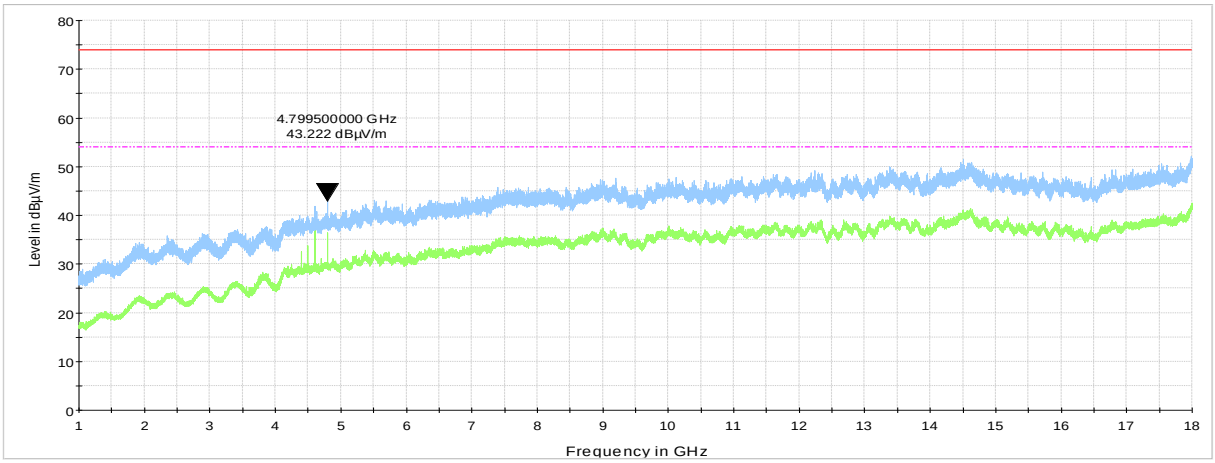
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.2.9 Radiated emission measurements from 1000 to 18000 MHz at the high carrier frequency

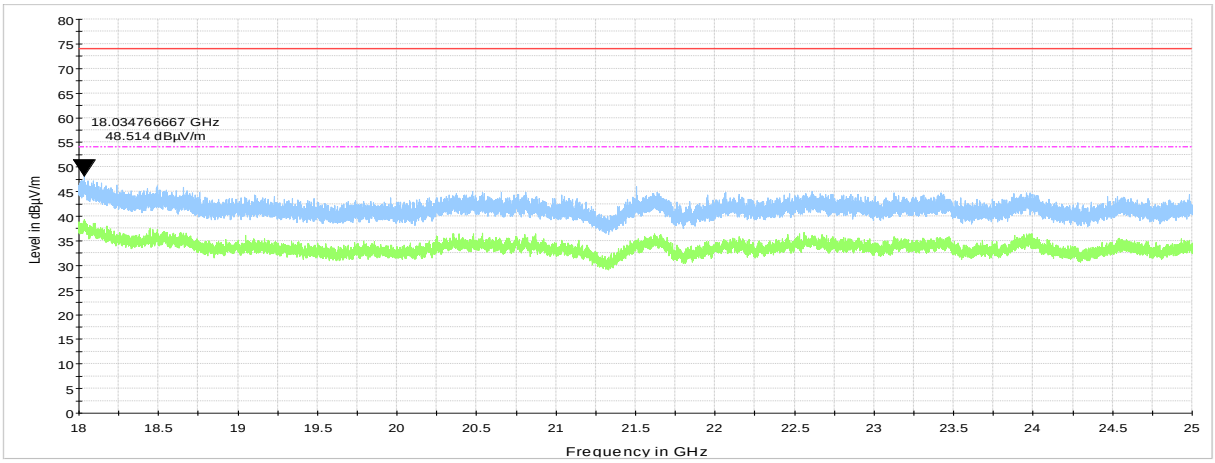
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(d), Radiated spurious emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	Relative Humidity: 47 %	Air Pressure: 1017 hPa	Power: 230 VAC, 50 Hz
Remarks:			

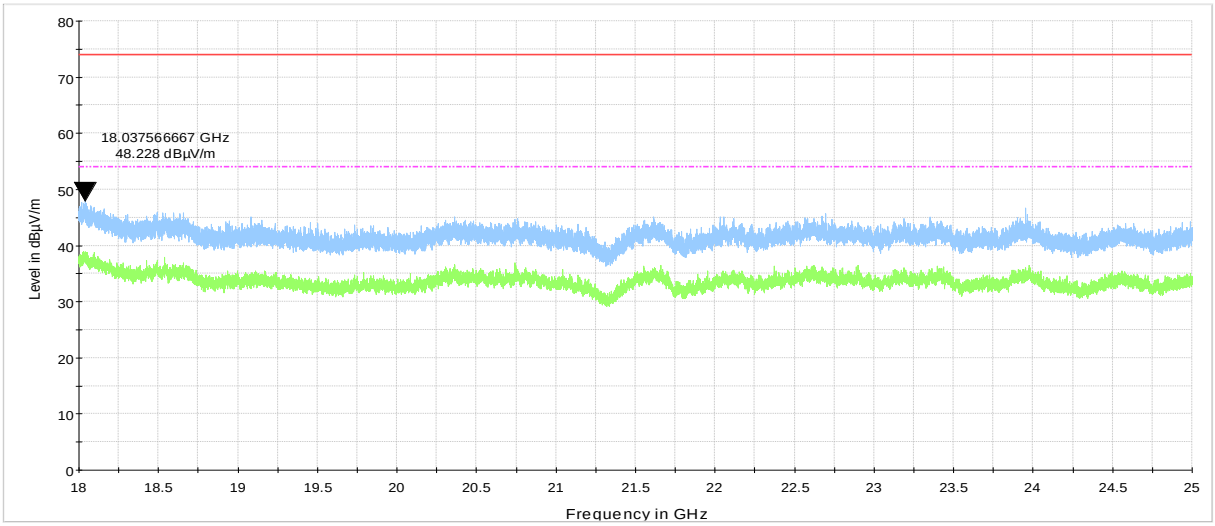
Plot 7.2.10 Radiated emission measurements from 18 GHz to 25 GHz at the low carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Plot 7.2.11 Radiated emission measurements from 18 GHz to 25 GHz at the mid carrier frequency

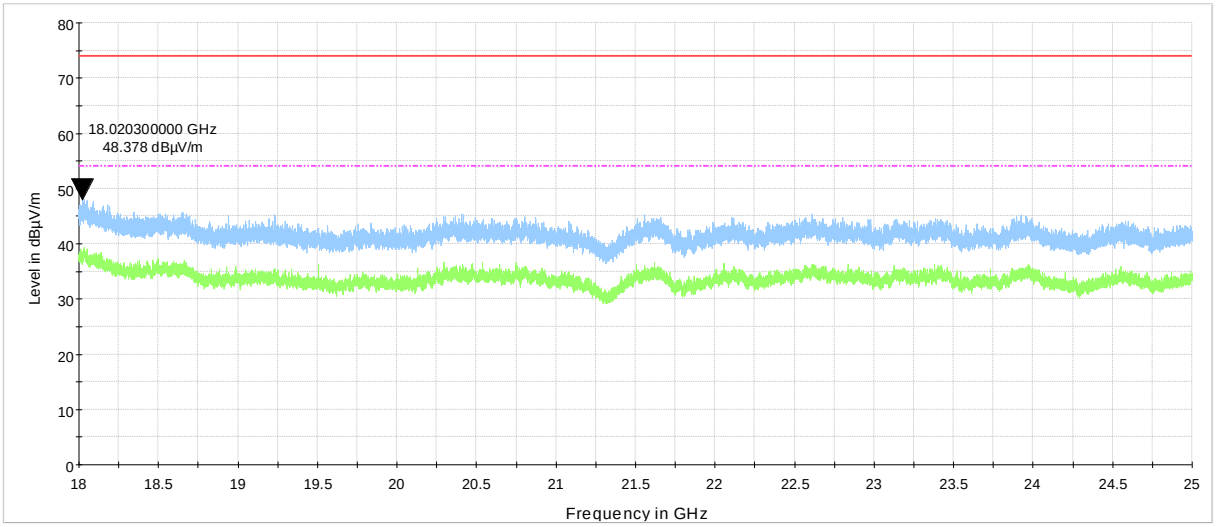
TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	**Section 15.247(d), Radiated spurious emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	06-Apr-21 - 19-May-21		
Temperature: 23 ºC	**Relative Humidity:** 47 %	**Air Pressure:** 1017 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Plot 7.2.12 Radiated emission measurements from 18 GHz to 25 GHz at the high carrier frequency

TEST SITE: Semi anechoic chamber
TEST DISTANCE: 3 m
ANTENNA POLARIZATION: Vertical and Horizontal



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

7.3 Band edge radiated emissions at Wi-Fi 2.4 GHz

7.3.1 General

This test was performed to measure emissions, radiated from the EUT at the assigned frequency band edges. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Band edge emission limits

Output power	Assigned frequency, MHz	Attenuation below carrier*, dBc	Field strength at 3 m within restricted bands, dB(µV/m)	
			Peak	Average
Peak	902.0 – 928.0	20.0	74.0	54.0
	2400.0 – 2483.5			
	5725.0 – 5850.0			
Averaged over a time interval	902.0 – 928.0	**30.0**	**74.0**	**54.0**
	2400.0 – 2483.5			
	5725.0 – 5850.0			

* - Band edge emission limit is provided in terms of attenuation below the peak of modulated carrier measured with the same resolution bandwidth.

7.3.2 Test procedure

7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized normally modulated at the maximum data rate and its proper operation was checked.

7.3.2.2 The EUT was adjusted to produce maximum available to end user RF output power at the lowest carrier frequency.

7.3.2.3 The spectrum analyzer span was set to capture the carrier frequency and associated modulation products. The resolution bandwidth was set wider than 1 % of the frequency span.

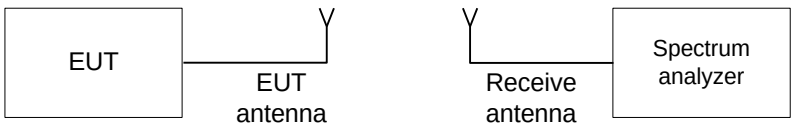
7.3.2.4 The spectrum analyzer was set in max hold mode and allowed trace to stabilize. The highest emission level within the authorized band was measured.

7.3.2.5 The maximum band edge emission and modulation product outside of the band were measured as provided in Table 7.3.2 and associated plots and referenced to the highest emission level measured within the authorized band.

7.3.2.6 The above procedure was repeated with the EUT adjusted to produce maximum RF output power at the highest carrier frequency.

7.3.2.7 The above procedure was repeated with the frequency hopping function enabled.

Figure 7.3.1 Band edge emission test setup



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

Table 7.3.2 Band edge emission outside restricted bands test results

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz
DETECTOR USED: Peak
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
RESOLUTION BANDWIDTH: 100 kHz
VIDEO BANDWIDTH: ≥ RBW

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 1 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	59.72	94.87	35.15	30.0	5.15	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 2 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	59.30	94.55	35.25	30.0	5.25	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 5.5 Mbps

Frequency, MHz	Band edge emission, dBm	Emission at carrier, dBm	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	52.04	94.06	42.02	30.0	12.02	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 11 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	54.43	93.39	38.96	30.0	8.96	Pass

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	46.26	88.71	42.45	30.0	12.45	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	47.53	89.13	41.60	30.0	11.60	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	46.31	87.20	40.89	30.0	10.89	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	43.75	87.49	43.74	30.0	13.74	Pass

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	40.95	82.01	41.06	30.0	11.06	Pass

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps

Frequency, MHz	Band edge emission, dB(µV/m)	Emission at carrier, dB(µV/m)	Attenuation below carrier, dBc	Limit, dBc	Margin, dB*	Verdict
2400.0	41.65	81.47	39.82	30.0	9.82	Pass

*****- Margin = Attenuation below carrier – specification limit.

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

Table 7.3.3 Band edge emission inside restricted bands test results

ASSIGNED FREQUENCY RANGE: 2400.0 – 2483.5 MHz
DETECTOR USED: Peak
TRANSMITTER OUTPUT POWER SETTINGS: Maximum
VIDEO BANDWIDTH: ≥ RBW

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 1 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2385.83	59.88	74.0	-14.12	50.02	54.0	-3.98	Pass
2483.50	58.64	74.0	-15.36	48.71	54.0	-5.29	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 2 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2387.10	59.38	74.0	-14.62	50.15	54.0	-3.85	Pass
2483.50	58.78	74.0	-15.22	48.58	54.0	-5.42	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 5.5 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2385.61	58.90	74.0	-15.10	47.76	54.0	-6.24	Pass
2483.50	59.19	74.0	-14.81	46.52	54.0	-7.48	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: CCK / 11 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2387.14	59.27	74.0	-14.73	47.73	54.0	-6.27	Pass
2483.50	59.02	74.0	-14.98	46.99	54.0	-7.01	Pass

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.93	60.78	74.0	-13.22	48.65	54.0	-5.35	Pass
2483.76	58.59	74.0	-15.41	46.58	54.0	-7.42	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.89	63.42	74.0	-10.58	47.96	54.0	-6.04	Pass
2483.63	62.00	74.0	-12.00	47.22	54.0	-6.78	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.31	60.86	74.0	-13.14	47.11	54.0	-6.89	Pass
2484.79	58.31	74.0	-15.69	46.24	54.0	-7.76	Pass

CHANNEL BANDWIDTH: 20 MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2390.00	61.90	74.0	-12.10	46.50	54.0	-7.50	Pass
2483.69	61.43	74.0	-12.57	45.98	54.0	-8.02	Pass

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2387.14	59.90	74.0	-14.10	47.65	54.0	-6.35	Pass
2486.99	58.55	74.0	-15.45	46.33	54.0	-7.67	Pass

CHANNEL BANDWIDTH: 40 MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps

Frequency, MHz	Peak field strength(VBW=8 MHz)			Average field strength(VBW=1 kHz)			Verdict
	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	Measured, dB(µV/m)	Limit, dB(µV/m)	Margin, dB**	
2389.46	60.93	74.0	-13.07	47.11	54.0	-6.89	Pass
2485.57	58.33	74.0	-15.67	45.89	54.0	-8.11	Pass

Reference numbers of test equipment used

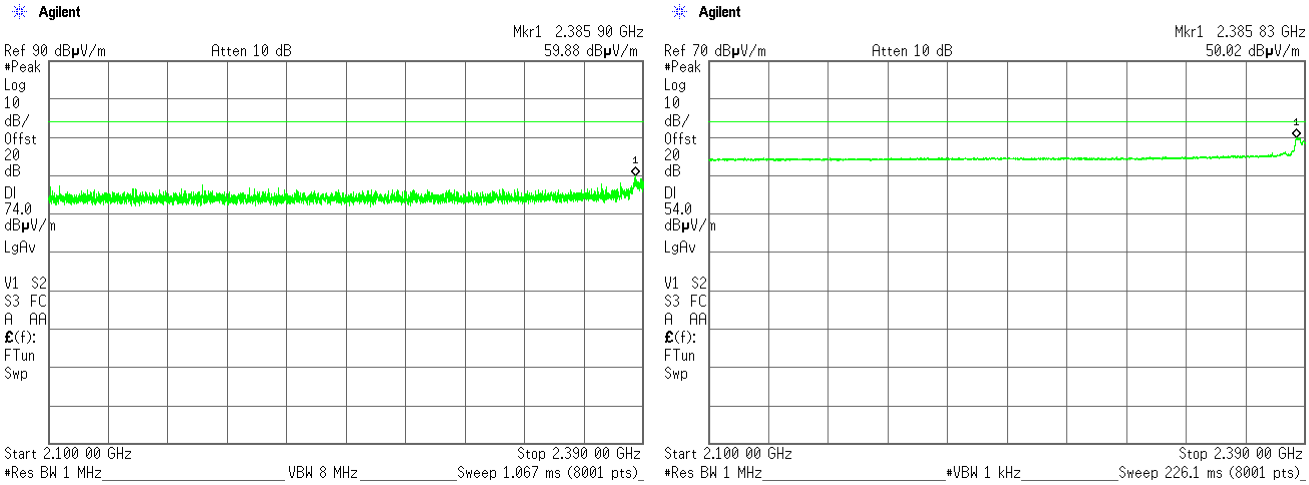
HL 3818	HL 3903	HL 5902	HL 4933	HL 3442			

Full description is given in Appendix A.

Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

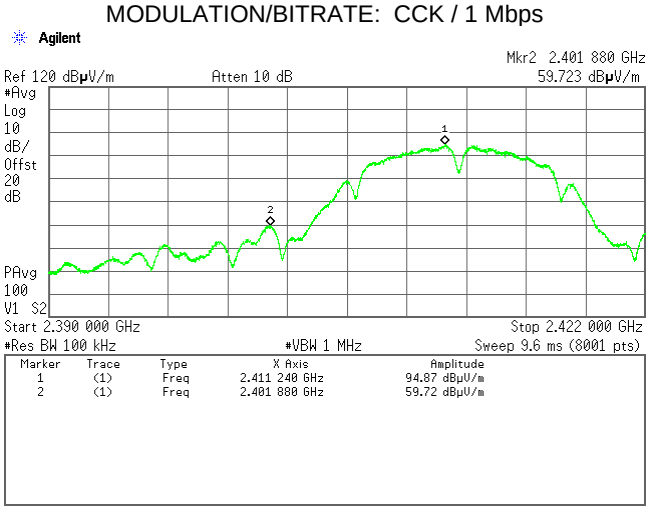
Plot 7.3.1 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 1 Mbps



Plot 7.3.2 The highest emission level outside restricted band at low carrier frequency

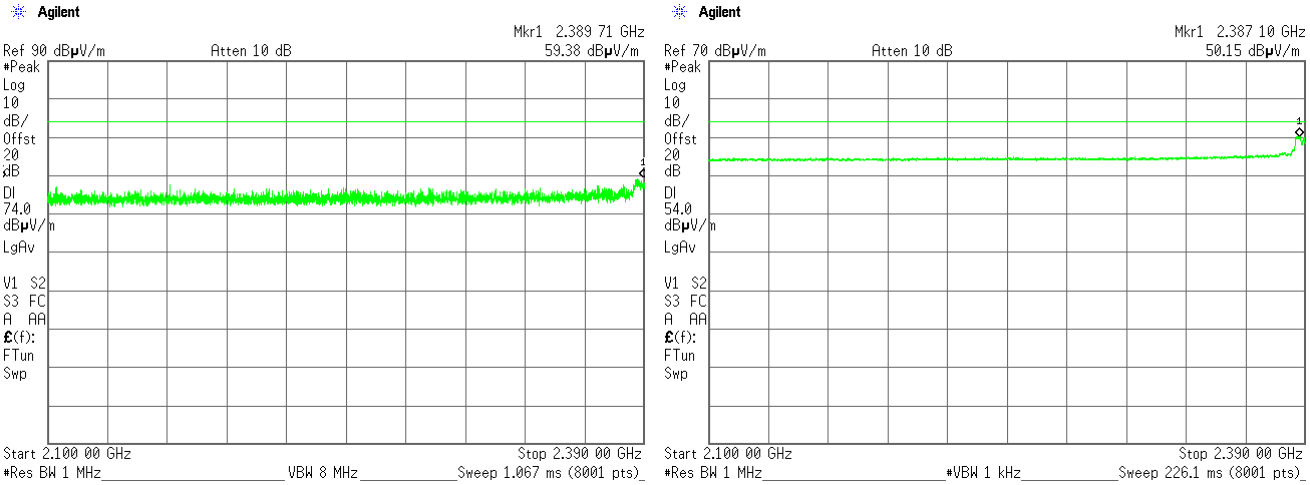
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 1 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

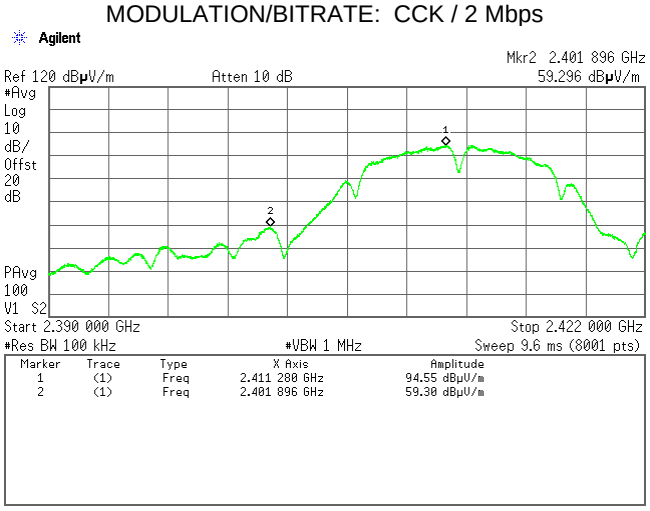
Plot 7.3.3 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 2 Mbps



Plot 7.3.4 The highest emission level outside restricted band at low carrier frequency

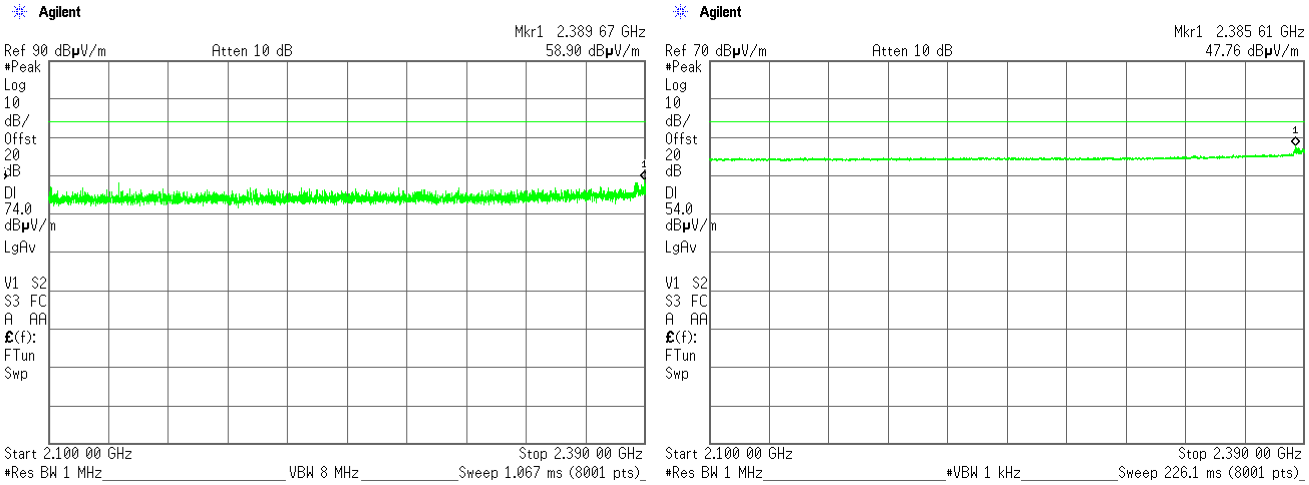
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 2 Mbps



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

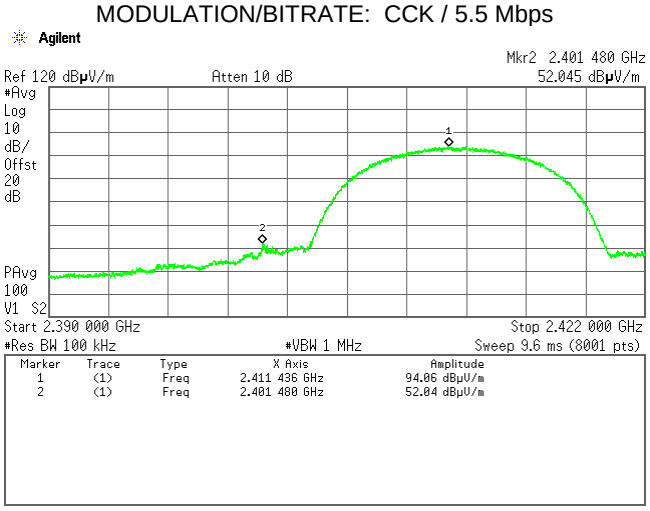
Plot 7.3.5 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 5.5 Mbps



Plot 7.3.6 The highest emission level outside restricted band at low carrier frequency

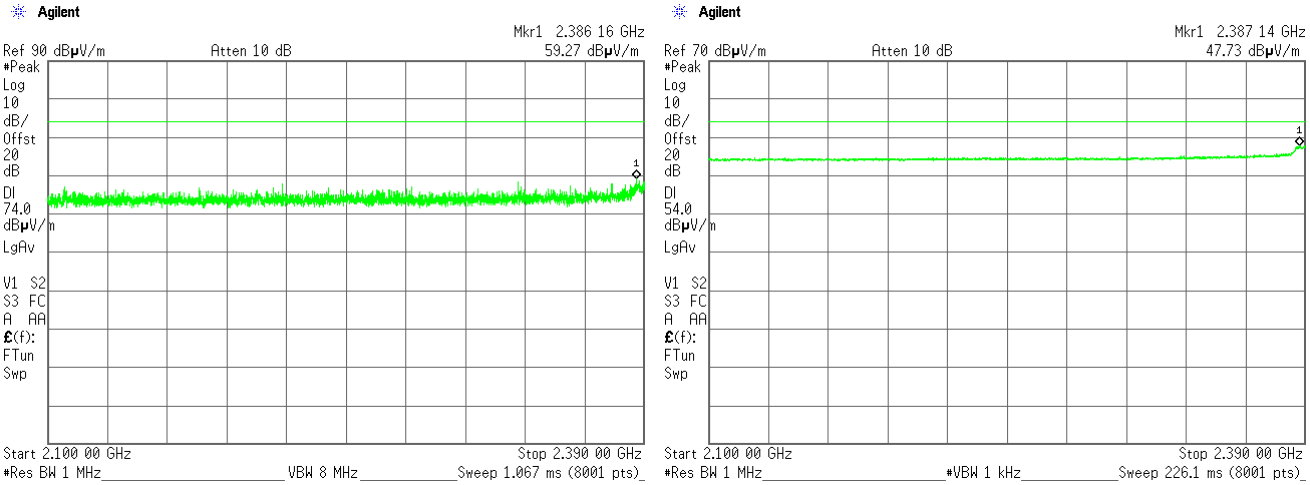
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 5.5 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

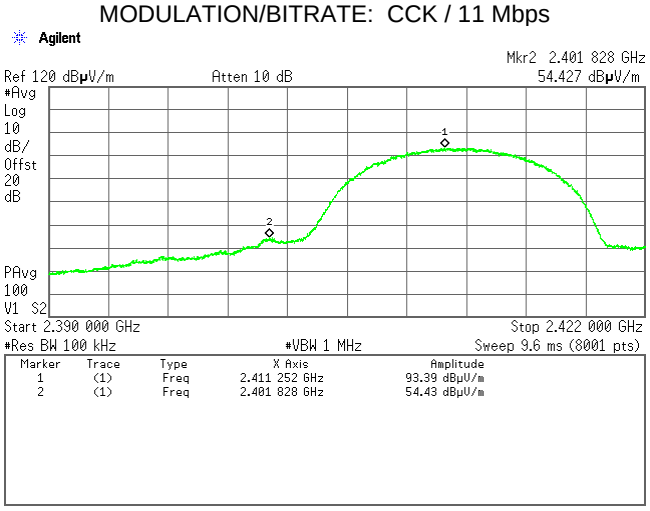
Plot 7.3.7 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 11 Mbps



Plot 7.3.8 The highest emission level outside restricted band at low carrier frequency

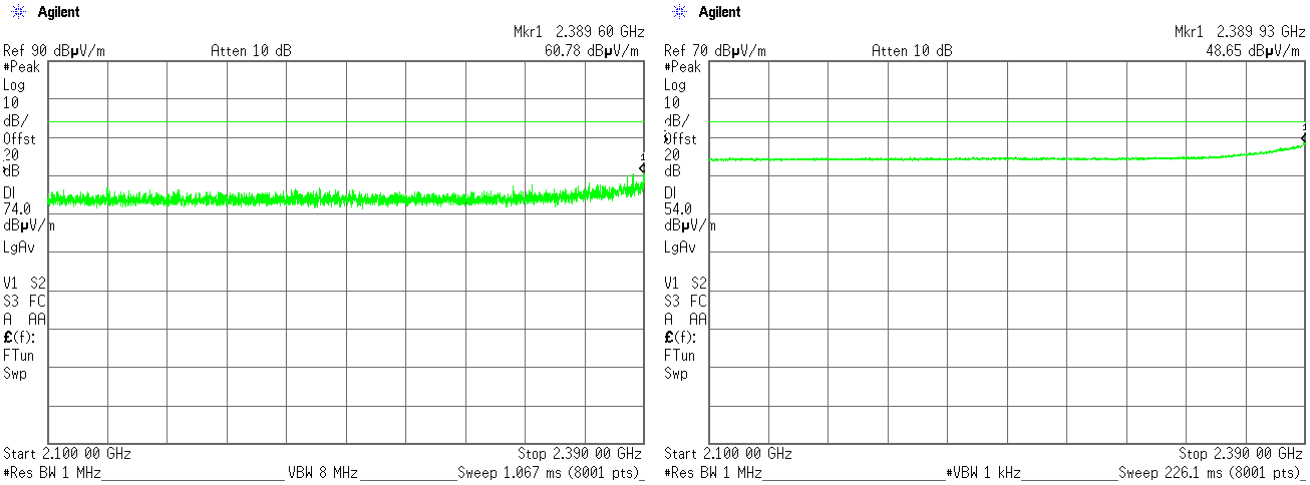
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 11 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

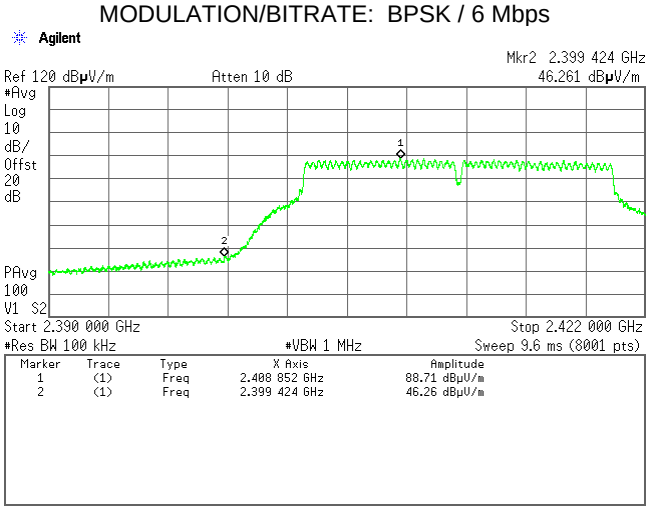
Plot 7.3.9 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: BPSK / 6 Mbps



Plot 7.3.10 The highest emission level outside restricted band at low carrier frequency

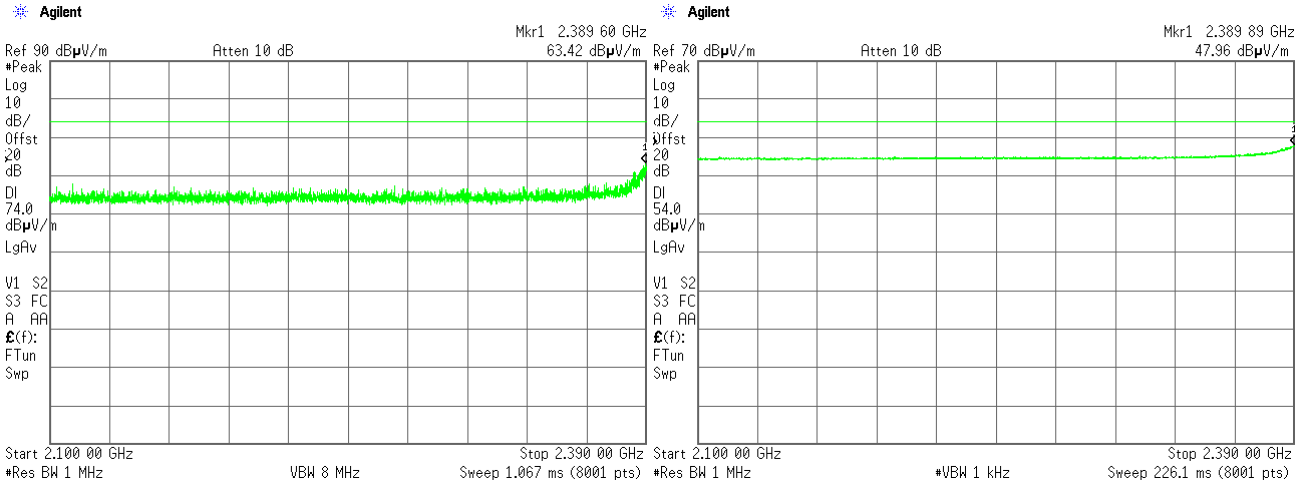
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: BPSK / 6 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

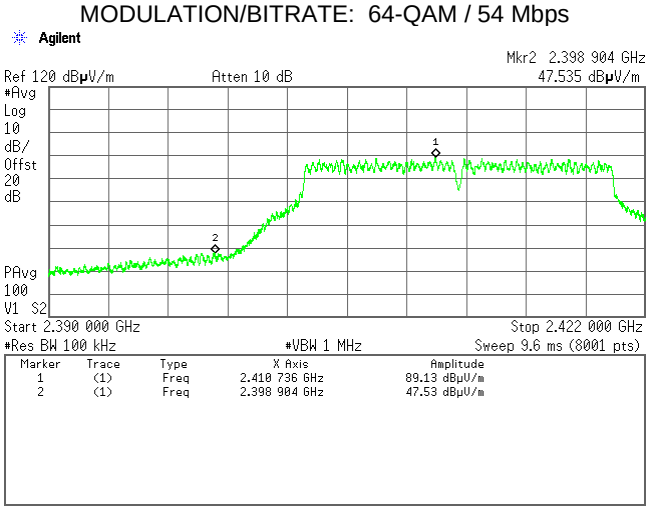
Plot 7.3.11 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps



Plot 7.3.12 The highest emission level outside restricted band at low carrier frequency

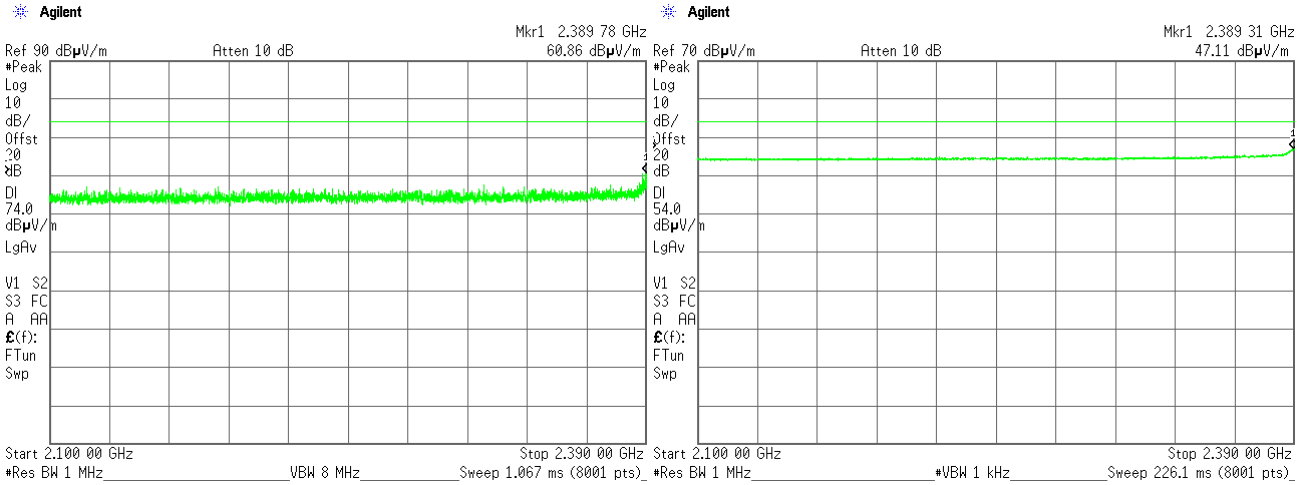
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: 64-QAM / 54 Mbps



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

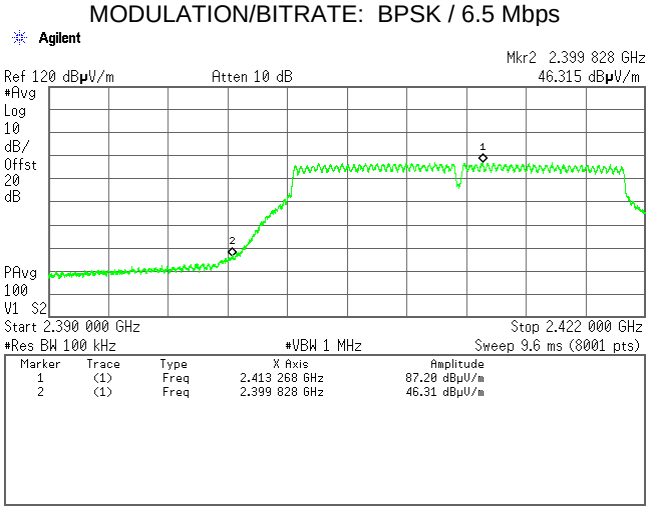
Plot 7.3.13 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps



Plot 7.3.14 The highest emission level outside restricted band at low carrier frequency

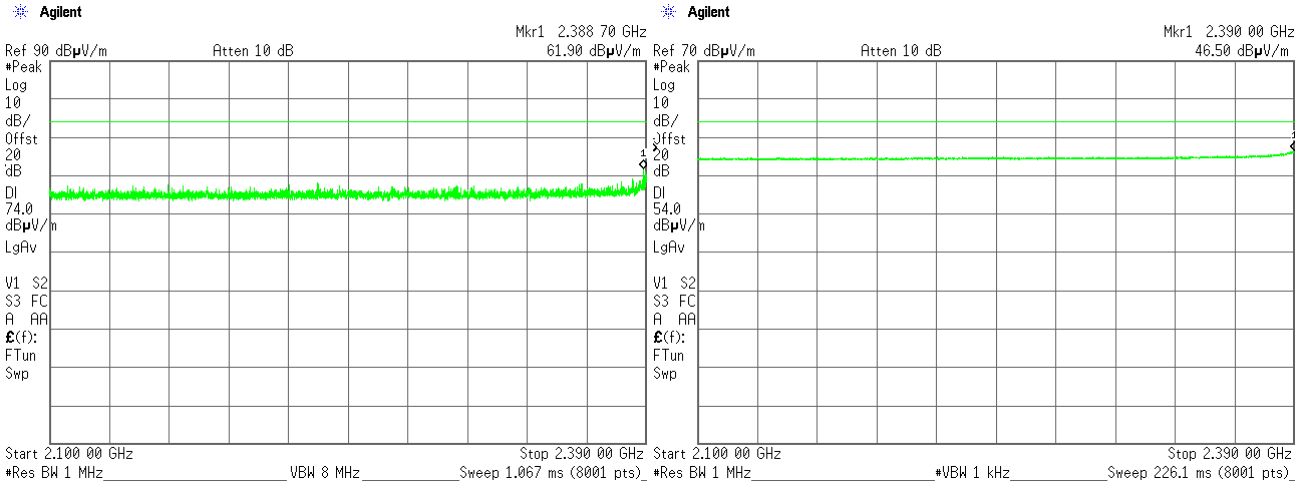
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: BPSK / 6.5 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

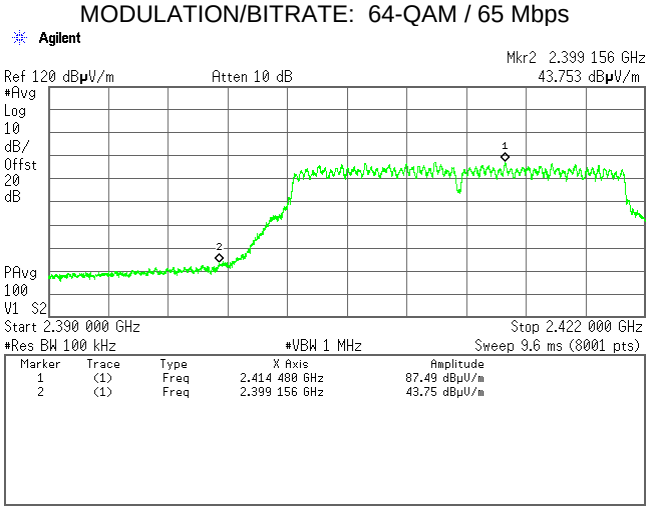
Plot 7.3.15 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps



Plot 7.3.16 The highest emission level outside restricted band at low carrier frequency

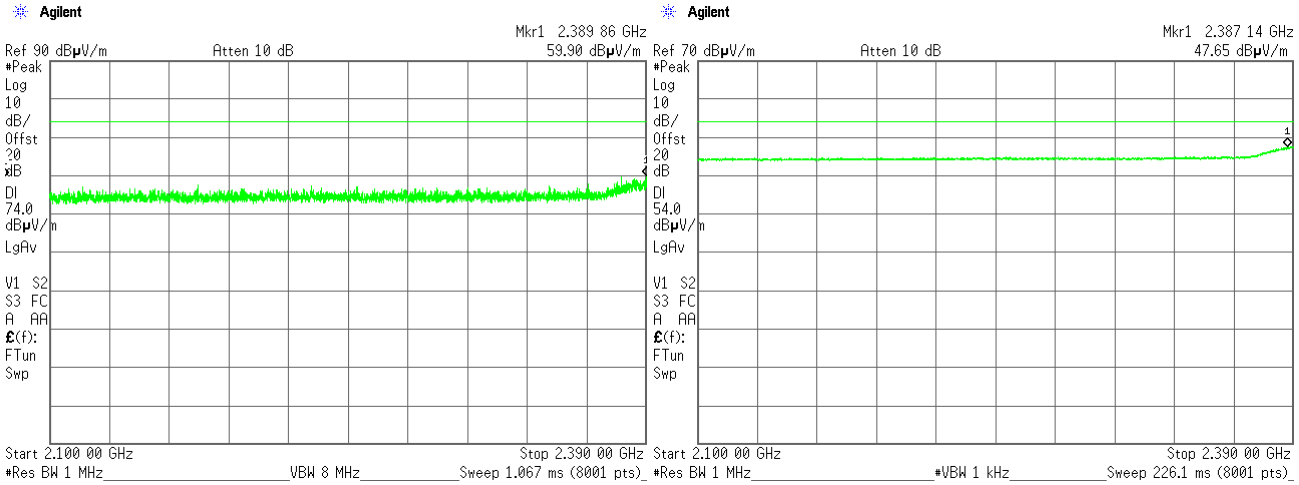
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: 64-QAM / 65 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

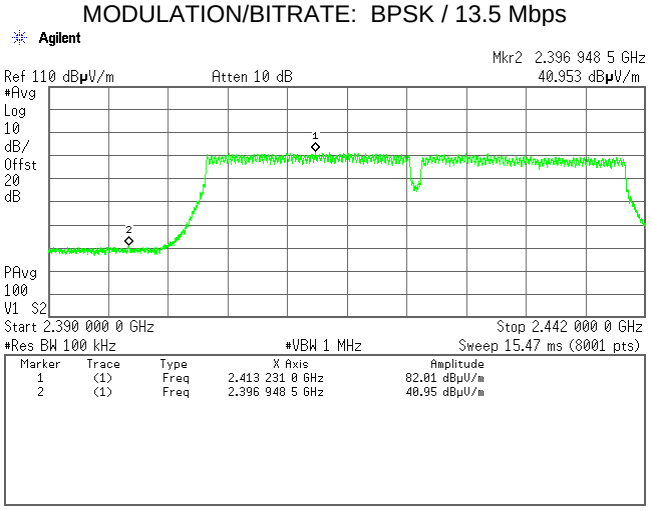
Plot 7.3.17 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 40MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps



Plot 7.3.18 The highest emission level outside restricted band at low carrier frequency

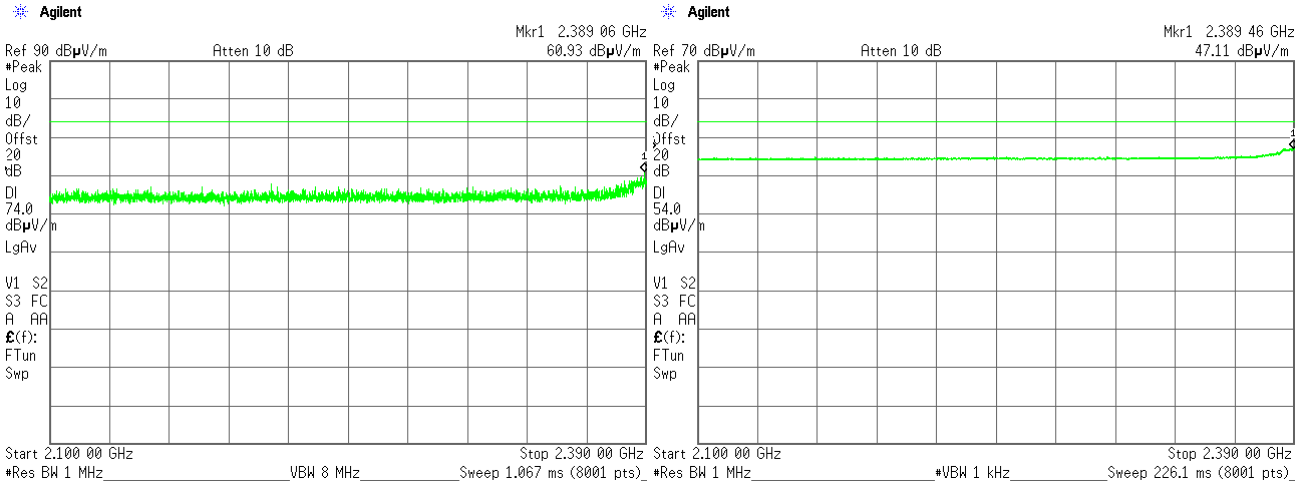
CHANNEL BANDWIDTH: 40MHz
MODULATION/BITRATE: BPSK / 13.5 Mbps



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

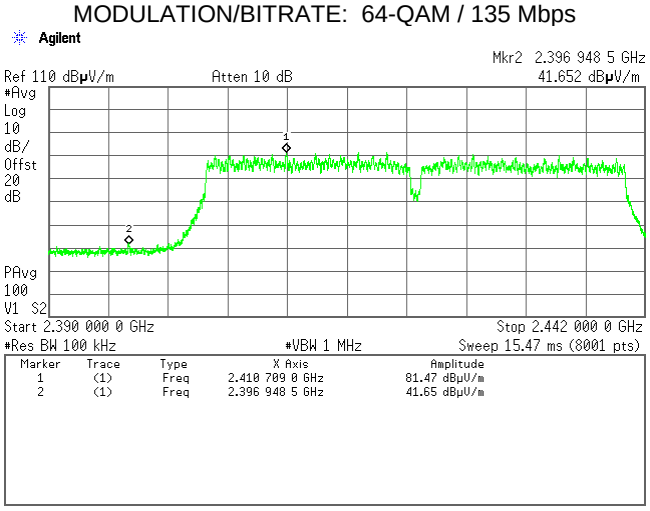
Plot 7.3.19 The highest emission level within restricted band at low carrier frequency

CHANNEL BANDWIDTH: 40MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps



Plot 7.3.20 The highest emission level outside restricted band at low carrier frequency

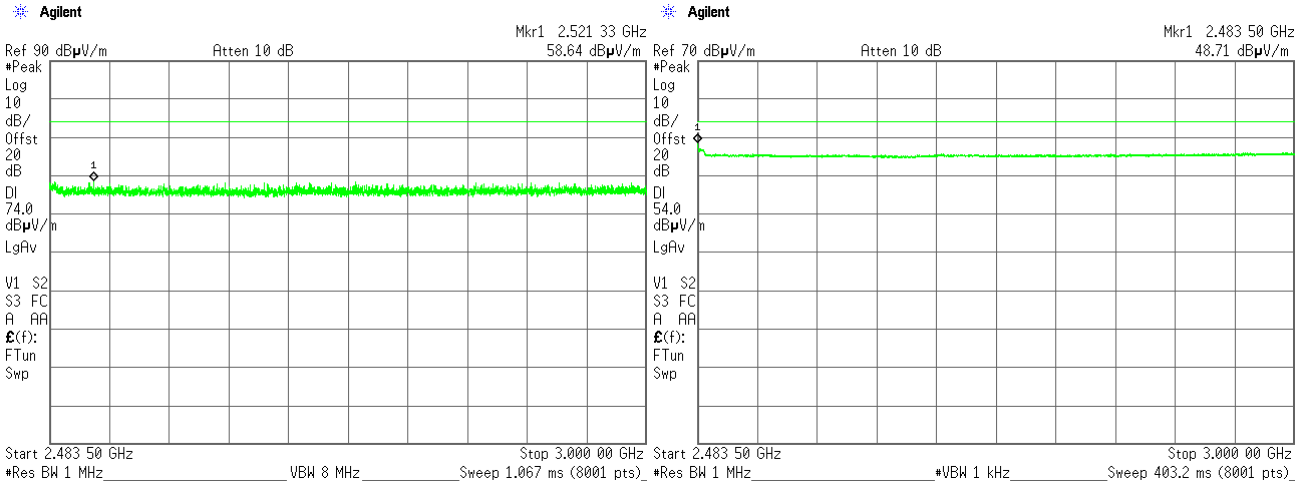
CHANNEL BANDWIDTH: 40MHz
MODULATION/BITRATE: 64-QAM / 135 Mbps



Test specification:	**Section 15.247(d), Band edge emissions**		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	**Verdict:**	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	**Relative Humidity:** 49 %	**Air Pressure:** 1007 hPa	**Power:** 230 VAC, 50 Hz
Remarks:			

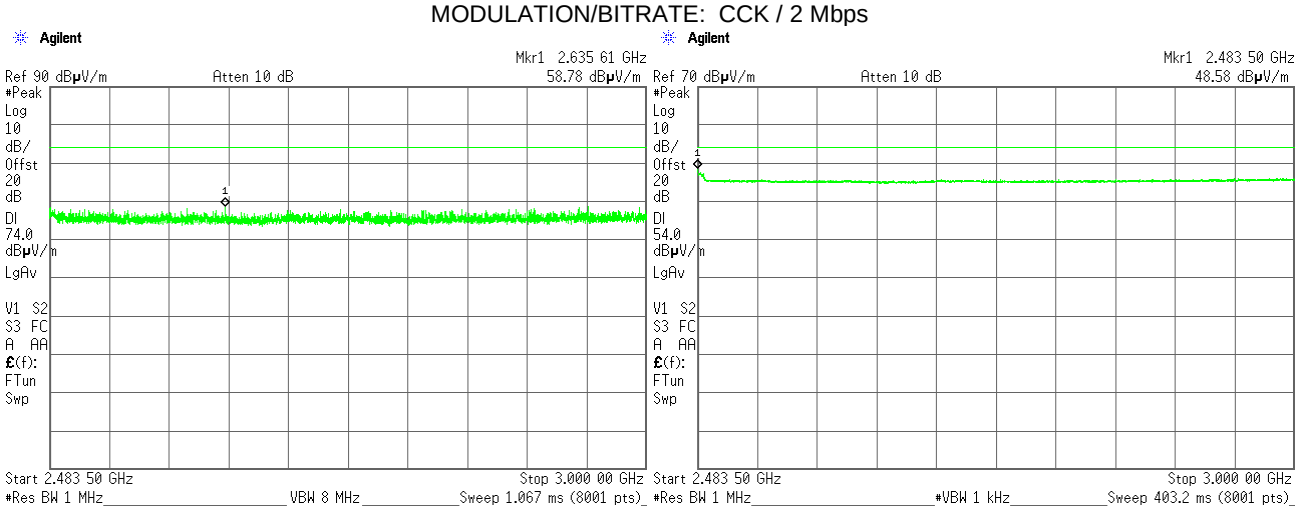
Plot 7.3.21 The highest emission level within restricted band at high carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 1 Mbps



Plot 7.3.22 The highest emission level within restricted band at high carrier frequency

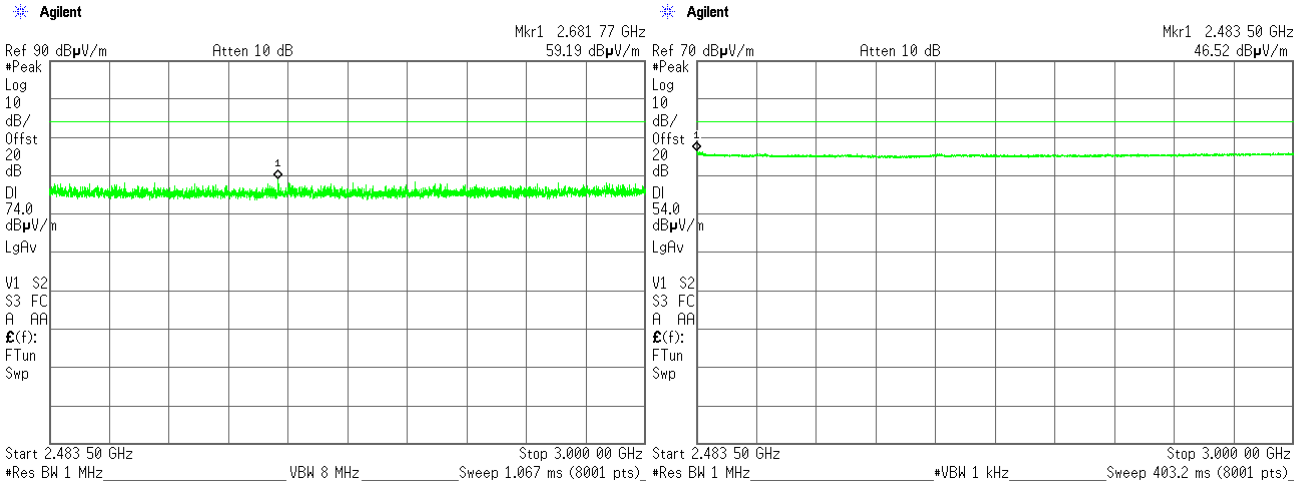
CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 2 Mbps



Test specification:	Section 15.247(d), Band edge emissions		
Test procedure:	ANSI C63.10 section 11.12.1		
Test mode:	Compliance	Verdict:	PASS
Date(s):	15-Mar-21 - 18-May-21		
Temperature: 23 ºC	Relative Humidity: 49 %	Air Pressure: 1007 hPa	Power: 230 VAC, 50 Hz
Remarks:			

Plot 7.3.23 The highest emission level within restricted band at high carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 5.5 Mbps



Plot 7.3.24 The highest emission level within restricted band at high carrier frequency

CHANNEL BANDWIDTH: 20MHz
MODULATION/BITRATE: CCK / 11 Mbps