

# TEST REPORT

## No. AR22-0085840-01

performed in accordance with

**FCC Rules: Code of Federal Regulations (CFR) no. 47**  
**Part 15 Subpart C Section 15.247**

PRODUCT	Wi-Fi radio module integrated into indoor video door phone.
MODEL(s) TESTED	1760/32
FCC ID	REA176032
TRADE MARK(s)	URMET

APPLICANT	URMET S.p.A. ~ Via Bologna, 188/c ~ I-10154 TORINO
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Tested by	Robertino Torri <i>[Laboratory Technician]</i>	
Approved by	Roberto Colombo <i>[Laboratory manager]</i>	

### Revision Sheet

Release No.	Date	Revision Description
Rev. 0	2023-01-23	First edition Digital signed - AR22-0085840-01_TR_FCC 15.247- URMET - 1760-3x.doc

The results of tests and checks reported in this Test Report refer exclusively to the samples tested and described in the Report itself.  
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## 1. GENERAL DATA

SAMPLE		
Samples received on	2022-07-21	(Item(s) sampled and sent by applicant)
IMQ reference samples	BEM	109750
Samples tested No.	1	
Object under analysis recognition	<b>Not carried out</b> Except where stated, characteristics of products were taken from client description and were not verified by the laboratory	
Date of acceptance of test item	2022-09-13	
TEST LOCATION		
Testing dates	2022-09-15 ÷ 2023-01-23	
Testing laboratory.	IMQ S.p.A. - Via Quintiliano, 43 – I-20138 Milano	
Testing site	Via Quintiliano, 43 – I-20138 Milano	
ENVIRONMENTAL CONDITIONING		
Parameter	Measured	
Ambient Temperature	23.5 ÷ 25.0 °C	
Relative Humidity	48 ÷ 50 %	
Atmospheric Pressure	990 ÷ 1000 mbar	
The laboratory is monitored by a continuous environmental conditions measurements system. Temperature, humidity and pressure data are recorded on a weekly basis and stored in local archive.		
REMARKS		
Throughout this report a point is used as the decimal separator. The ability or reliability of this product to perform its intended function in a particular application has not been investigated. The test results apply to the sample as received. All information relating to the details of the equipment under test at the § 3 of this document was provided by the applicant. IMQ declines any responsibility derived from missing or wrong information provided aside by the applicant.		

## 2. REFERENCE DOCUMENT

DOCUMENT		DATE	TITLE
<input checked="" type="checkbox"/>	47 CFR Part 15	2015	Radio Frequency Device
<input checked="" type="checkbox"/>	ANSI C63.4	2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
<input checked="" type="checkbox"/>	ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

### 3. EQUIPMENT UNDER TEST (EUT) DETAILS

#### GENERAL DATA (according to manufacturer declaration)

MODEL (basic)	Description
1760/32	Indoor video door phone with Wi-Fi radio modules
VARIANT	Description
/	/

FCC ID	REA176032
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MANUFACTURER	URMET S.p.A. ~ Via Bologna, 188/c ~ I-10154 TORINO
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Type of equipment	DTS - Digital transmission equipment (Wi-Fi radio module)
Operating frequency	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40)
Max RF conducted power	802.11b : 16.9 dBm 802.11g : 11.4 dBm 802.11n(HT20) : 11.4 dBm 802.11n(HT40) : 10.4 dBm
Modulation	802.11b : DSSS(DBPSK/DQPSK/CCK) 802.11g/n : OFDM(BPSK/QPSK/16QAM/64QAM)
Number of channel	802.11b/g/n(HT20) : 11 802.11n(HT40) : 7
Antenna	Integrated on PCB. Gain 2dBi
Dedicated AC supply	AC/AC Power adapter URMET mod. 1723/22
Remarks	None

## 4. STATE OF THE EUT DURING TESTS

### RF parameters

#### List of frequency and channel

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>802.11b/g/n (HT20)</b>							
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	---	---
<b>802.11n (HT40)</b>							
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447	---	---

#### List of frequency and channel used during the test

Lower		Middle		Higher	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>802.11b/g/n (HT20)</b>					
1	2412	6	2437	11	2462
<b>802.11n (HT40)</b>					
3	2422	6	2437	9	2452

#### Data rate used for all test

802.11b	802.11g	802.11n (HT20)	802.11n (HT40)
1 Mbps	6 Mbps	MCS0	MCS0

#### Operating mode description used during test

Mode	Description
#1	<p>The EUT is mounted and supply in normal operating condition.</p> <p>Engineering program for management of RF parameters was used during testing to control the transmitter for staying in continuous transmissiome at the max RF output power.</p> <p>The single TX channel was fixed which was for the purpose of the measurements and included the lower, middle, and higher frequency to perform the test.</p> <p>3axis were chosen for radiated emission testing for each applicable mode.</p> <p>The choice of axis and transmission was made based on preliminary analysis measurements in order to maximize the emission characteristics of measurement performed.</p> <p>Only the worst result was recorded in the report, unless otherwise stated.</p> <p>A temporary antenna connector is provided by the manufacturer for conducted test.</p>

## SUPPORT EQUIPMENT

Defined as equipment needed for correct operation or loading of the EUT, but not considered as tested

Equipment	Manufacturer	Model
PC with dedicated SW & FW for radio parameter management	/	/

## ELECTROMAGNETICALLY RELEVANT COMPONENTS

Component	No.	Manufacturer	Model
13.56 MHz radio module	1	NXP Semiconductor	MFRC63002
Wi-Fi radio module	1	B-LINK	BL-R8188EU1(EUS)
Main board	1	URMET	C1760-003A

## RFI SUPPRESSION DEVICES

Component	No.	Manufacturer	Model
/	/	/	/

## EMI PROTECTION DEVICES

Component	No.	Manufacturer	Model
/	/	/	/

## EUT TECHNICAL DOCUMENTATION

Document	Reference
/	/

## 5. METHODS OF MEASUREMENT

All compliance measurements have been carried out using the procedures described in the standard ANSI C63.4-2014, ANSI C63.10-2013, Section 15.31 of 47CFR Part 15 – Subpart A (General),

Additional test requirements have been adopted according to the reference Section indicated in the § 6 of this test report.

### **FREQUENCY RANGE INVESTIGATED**

Radiated emission tests: from 9 kHz to tenth harmonic of fundamental.

## 6. SUMMARY OF TEST RESULTS

POSSIBLE TEST CASE VERDICT	
Test object meets the requirement	PASS
Test object does not meet the requirement	FAIL
Test case does not apply to the test object	N.A.
Test not performed	N.P.

47CFR Part 15C	TITLE	RESULT
<b>15.203</b>	<b>Antenna Requirements</b>	PASS
<b>15.207 (a)</b>	<b>Conducted Emission</b>	PASS
<b>15.209 (a)(f)</b>	<b>Radiated Emission</b>	PASS
<b>15.247 (a)</b>	<b>Frequency Hopping Spread Spectrum Specifications</b>	
15.247 (a)	20 dB Bandwidth	N.A.
15.247 (a)(1)	Carrier frequency (Hopping Channel) Separation	N.A.
15.247(a)(1)(iii)	Number of Hopping Channels Used	N.A.
15.247(a)(1)(iii)	Channel occupancy time	N.A.
15.247 (a)(2)	6dB Minimum Bandwidth	PASS
<b>15.247 (b)</b>	<b>Maximum Peak Output Power</b>	
15.247 (b)(1)	Peak Output Power	N.A.
15.247 (b)(3)	Maximum conducted output power	PASS
15.247 (b)(4)	Antenna gain	N.A.
<b>15.247 (c)</b>	<b>Operation with directional antenna gains greater than 6dBi</b>	N.A.
<b>15.247 (d)</b>	<b>100 kHz Bandwidth emissions outside frequency Band</b>	PASS
<b>15.247 (e)</b>	<b>Power Spectral Density</b>	PASS
<b>15.247 (f)</b>	<b>Hybrid systems</b>	N.A.
<b>15.247 (g)</b>	<b>FHSS Transmission characteristics</b>	N.A.
<b>15.247 (h)</b>	<b>Recognition of occupied channel &amp; multiple transmission</b>	N.A.
<b>15.247 (i)</b>	<b>RF humane exposure § 47CFR 1.1307 (b)(1)</b>	PASS



## 7. TEST RESULTS

### 7.1 ANTENNA REQUIREMENTS

TEST REQUIREMENT	
<p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.</p>	
Testing dates	2022-09-15

Antenna specifications	
N° of authorized antenna types	/
Antenna type	Dedicated on PCB
Maximum total gain	2 dBi
External power amplifiers	Not present

TEST RESULT
The EUT meets the requirements of section 15.203

## 7.2 AC MAINS POWER SUPPLY CONDUCTED EMISSION

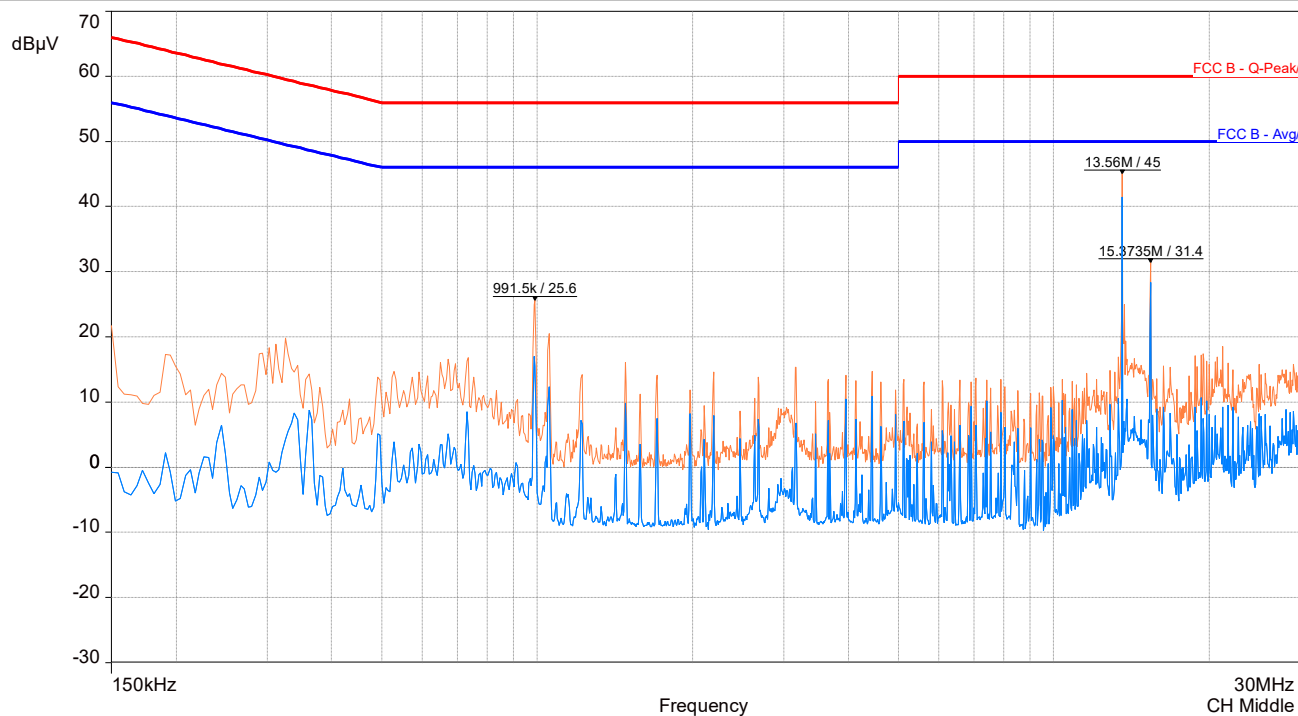
TEST REQUIREMENT	
Test setup	ANSI C63.4
Test facility	Shielded chamber
Frequency range	150 kHz – 30 MHz
IF bandwidth	9 kHz
EMC class	B
EUT operating condition	#1 (Only worst case was reported)
Testing dates	2022-09-15 ÷ 2022-09-22

LIMITS		
Band of operations	Quasi-Peak (dBμV)	Average Limit (dBμV)
0.15 ÷ 0.5	66 ÷ 56	56 ÷ 46
0.5 ÷ 5	56	46
5 ÷ 30	60	50

TEST RESULT
The EUT meets the requirements of sections 15.207 (a)

TEST PROCEDURE
<ol style="list-style-type: none"> <li>1) The EUT was placed on a wooden table of size, 80 cm by 80 cm, raised 80 cm.</li> <li>2) The EUT received power supply from AC/DC power adapter which is connected to 50Ω/50μH LISN to the input power source.</li> <li>3) Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.</li> <li>4) The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.</li> <li>5) The measurements were made with the detector set to PEAK and AVERAGE amplitude within a bandwidth of 9 kHz during the measurements.</li> <li>6) The measurements with Quasi-Peak detector are performed only for frequencies for which the Peak values are <math>\geq</math> (Q.P. limit - 6 dB).</li> </ol>

### Worst case measurement result



### 7.3 RADIATED DISTURBANCES

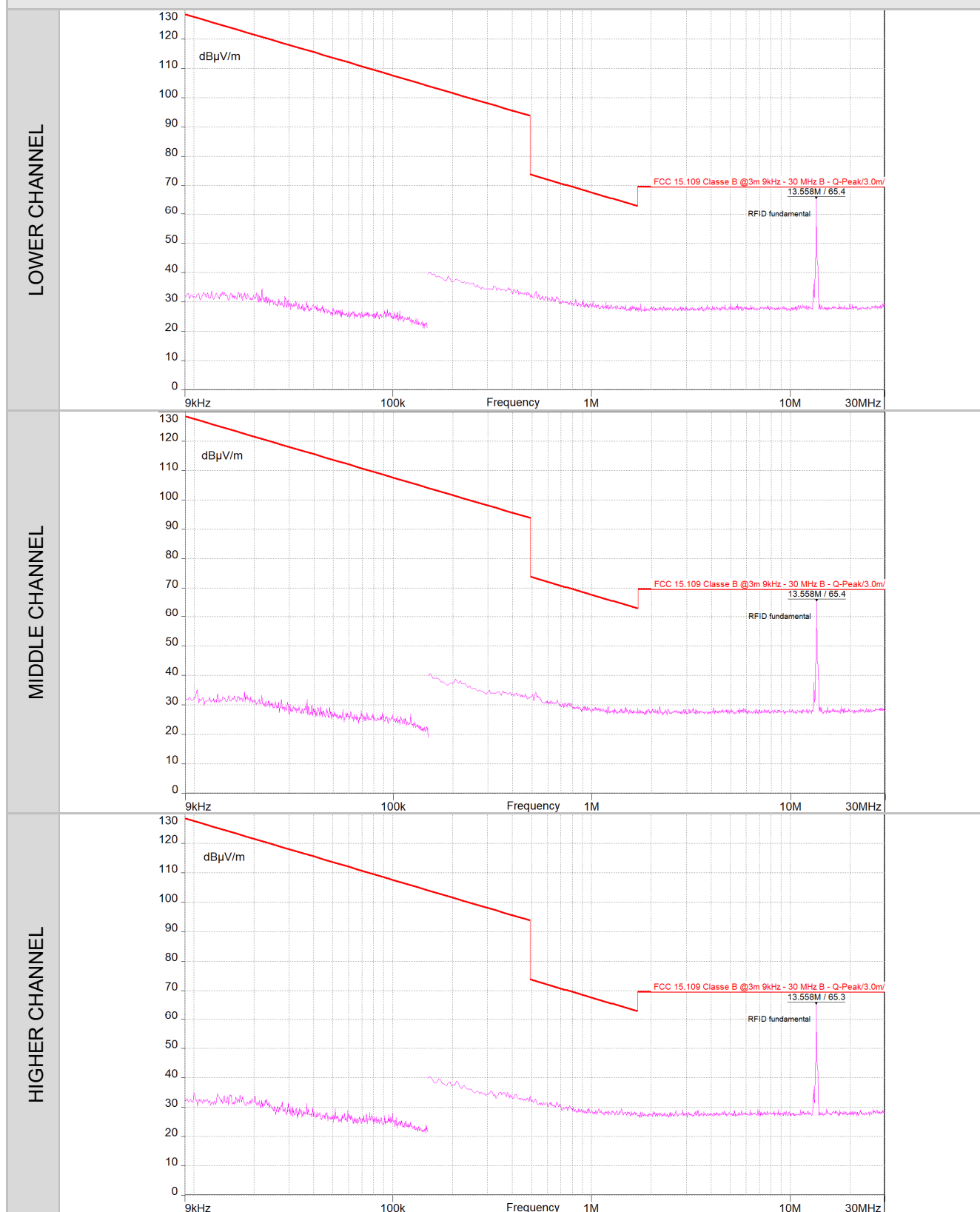
TEST REQUIREMENT	
Test setup	ANSI C63.4
Test facility	Semi-anechoic chamber
Test distance	3 meters
Frequency range	9 kHz to tenth harmonic of fundamental
IF bandwidth (below 30 MHz)	9 kHz
IF bandwidth (below 1,000 MHz)	120 kHz
IF bandwidth (above 1,000 MHz)	1 MHz
EMC class	B
EUT operating condition	#1
Remark: In accordance with part 15.31 (f) (2), where the measurement distance was specified to be 30 or 300 meters, a correction factor was applied in order to permit measurement to be performed at a separation distance. The applied formula for limits at 3 meter is: Extrapolation (dB) = 40log (300meter / 3meter) = +80db Extrapolation (dB) = 40log (30meter / 3meter) = +40db After the analysis of the preliminary measurements in search of the maximum noise, in order to maximize the emission characteristics, the 802.11b was selected as the worst case.	
Testing dates	2022-09-15 ÷ 2023-01-17

LIMITS		
Band of operations	Peak (dBµV/m)	Average Limit (dBµV/m)
Restricted bands	74	54
Other bands	According to emissions limit or Fundamental –20dB (which is greater)	According to emissions limit or Fundamental –20dB (which is greater)

TEST PROCEDURE	
1)	The EUT was placed on turntable which is 0.8 m above the ground plane
2)	The turntable shall rotate from 0° to 360° degrees to determine the position of maximum emission level.
3)	The EUT is positioned 3 m away from the receiving antenna, which varied from 1 to 4 m to find the highest emission.
4)	The measurements were made with the detector set to PEAK and AVERAGE amplitude within a bandwidth of 100 kHz below 1000 MHz and 1 MHz above 1000 MHz.
5)	The receiving antenna was positioned in both horizontal and vertical polarization.
6)	The measurements with Quasi-Peak detector, below 1000 MHz are performed only for frequencies for which the Peak values are ≥ (Q.P. limit - 6 dB).

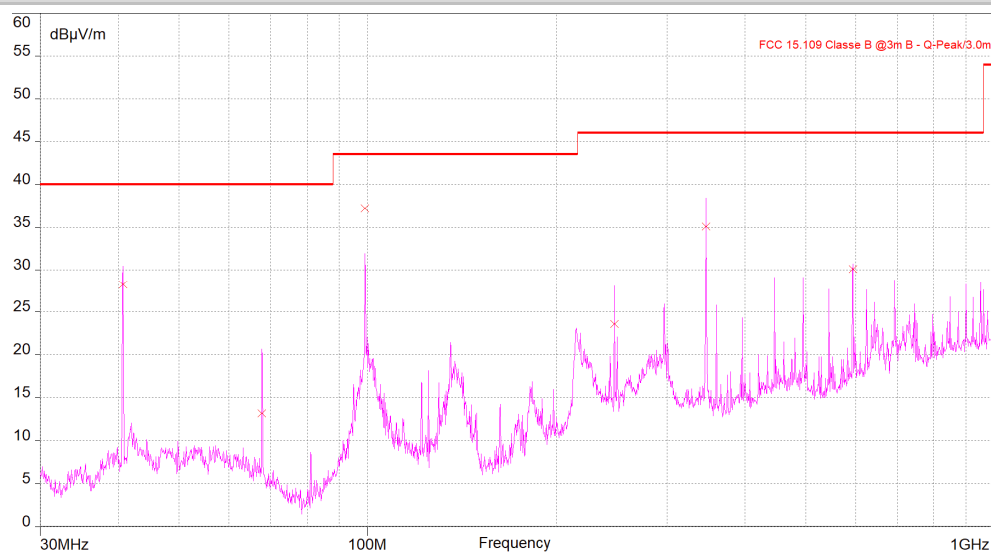
TEST RESULT
The EUT has been tested in 3 orthogonal axes at the frequencies lowest, middle and highest for each modulation. The measurement of spurious emission of EUT in receiver mode is deemed to be fulfilled as no limits are exceeded in transmitter mode (condition considered more burdensome). The EUT meets the requirements of sections 15.205. 15.209. 15.247

### 9 kHz÷30 MHz - Measurement result

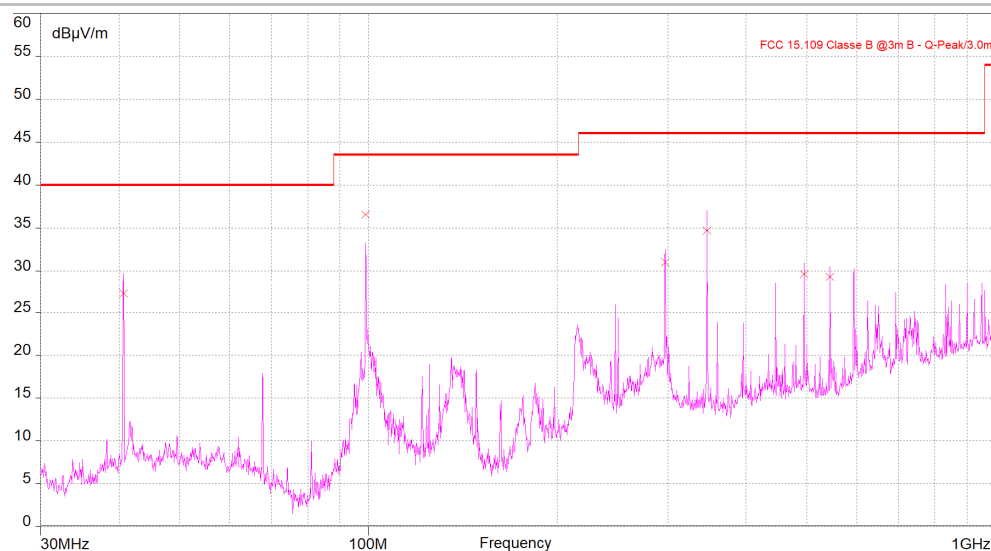


### 30÷1,000 MHz - Measurement result

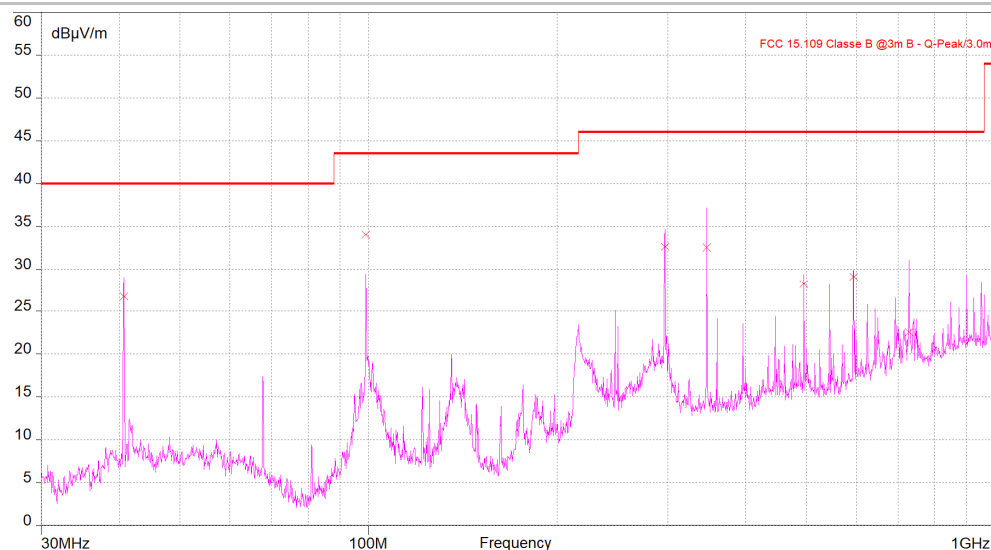
LOWER CHANNEL



MIDDLE CHANNEL

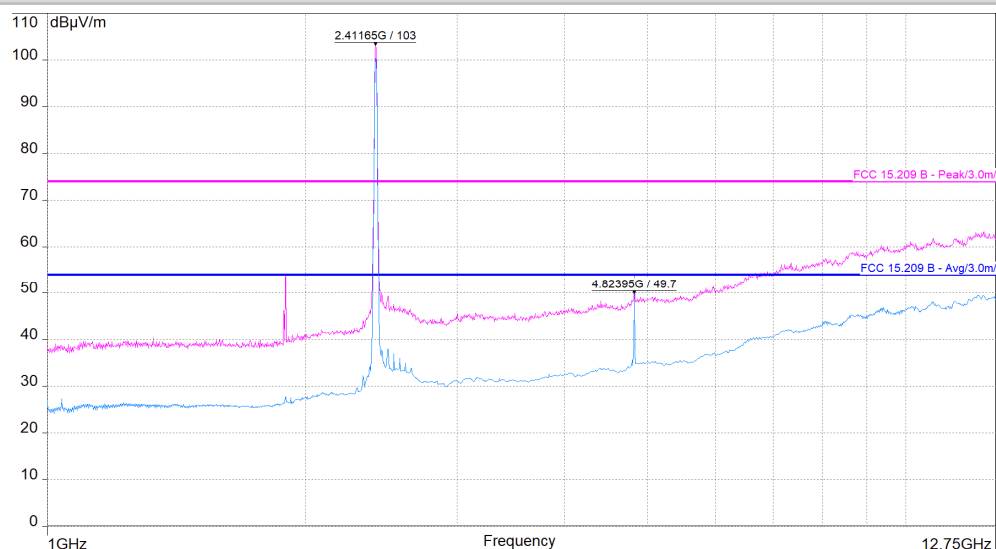


HIGHER CHANNEL

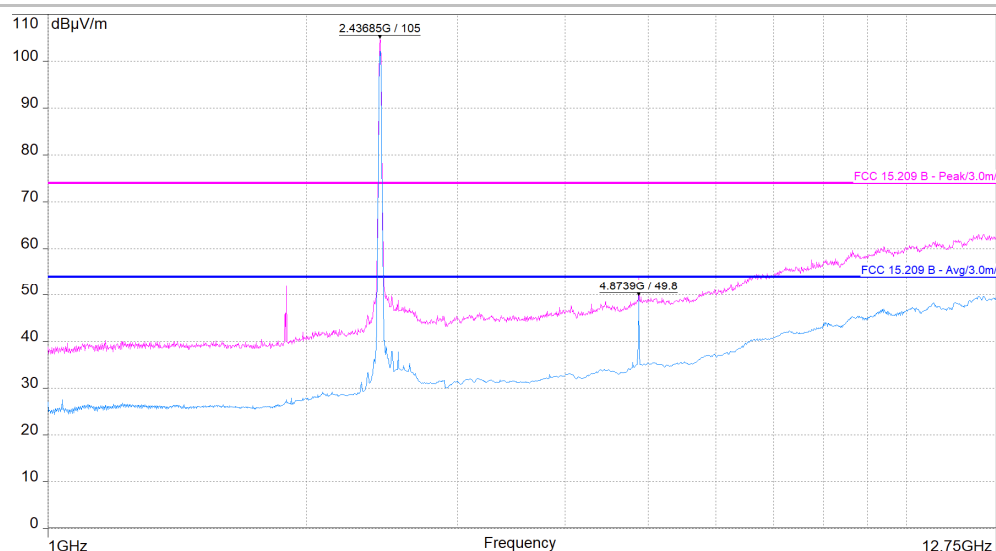


1÷12.75 GHz - Measurement result

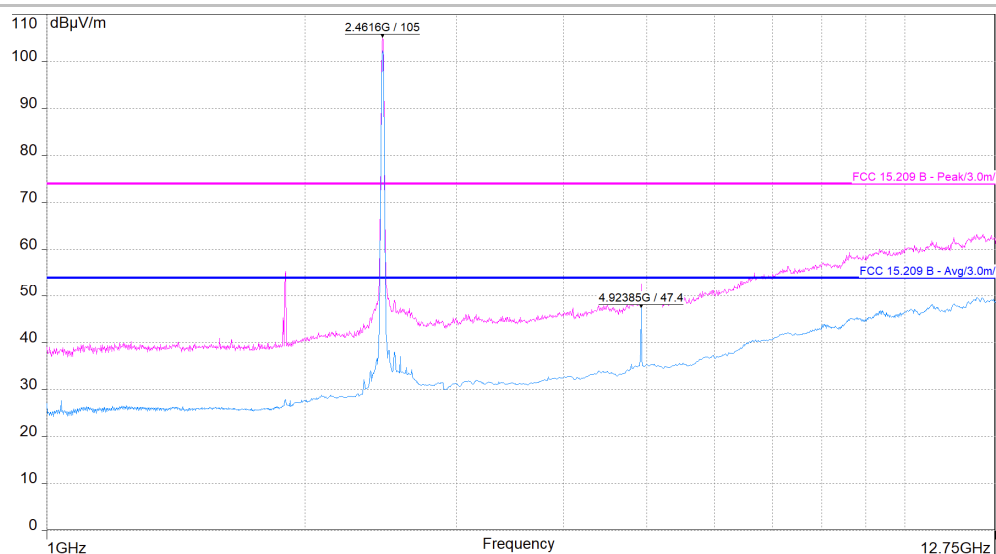
LOWER CHANNEL



MIDDLE CHANNEL

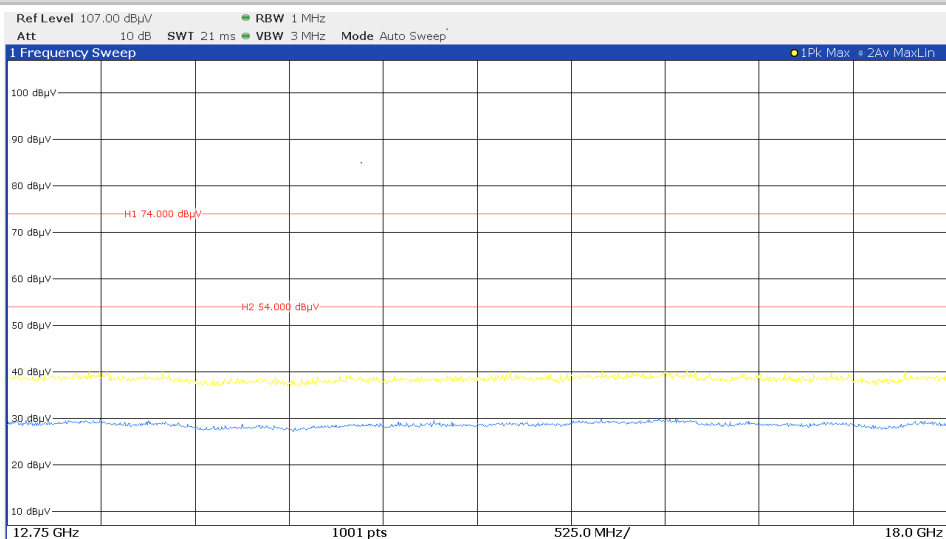


HIGHER CHANNEL

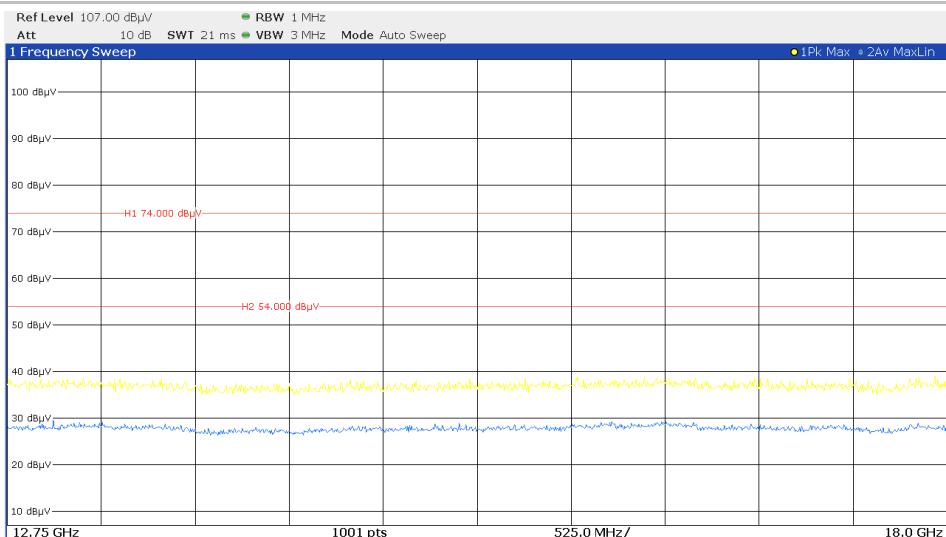


## 12.75÷18 GHz - Measurement result

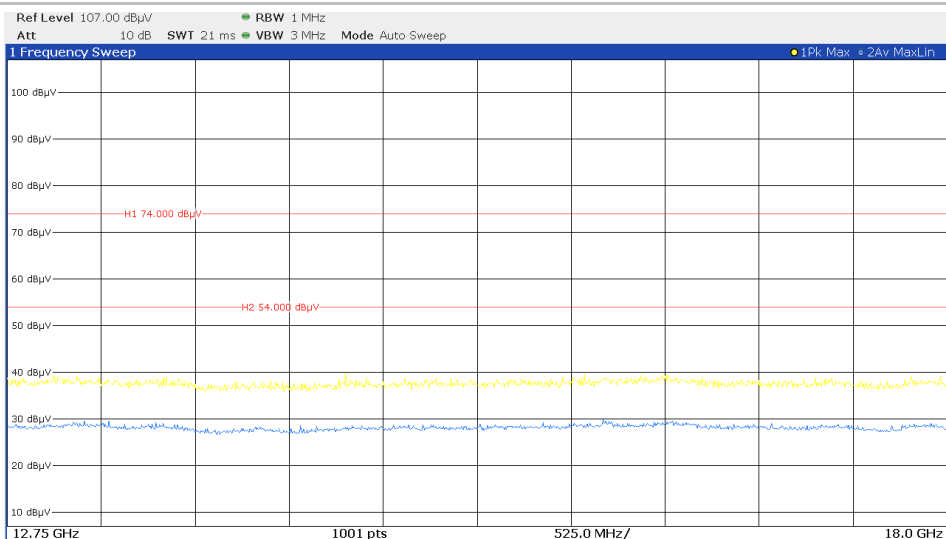
LOWER CHANNEL



MIDDLE CHANNEL



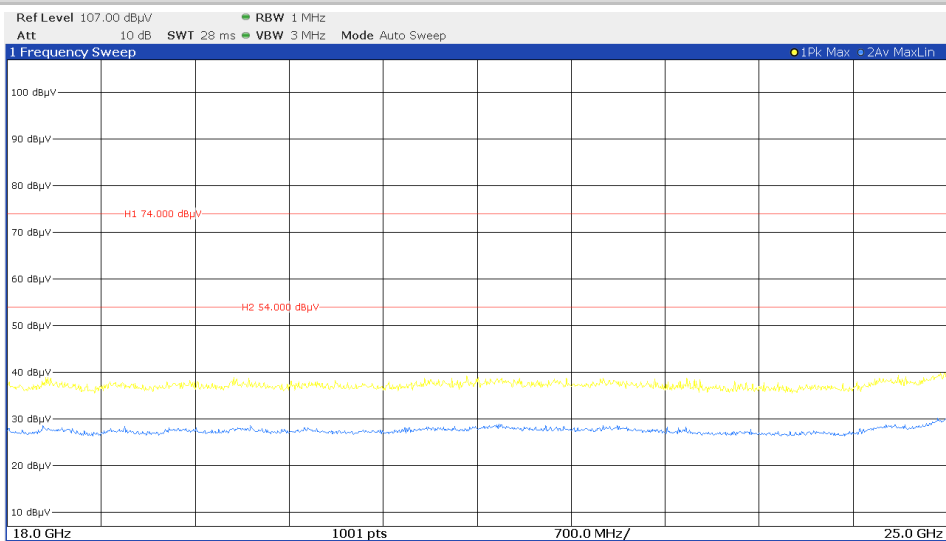
HIGHER CHANNEL



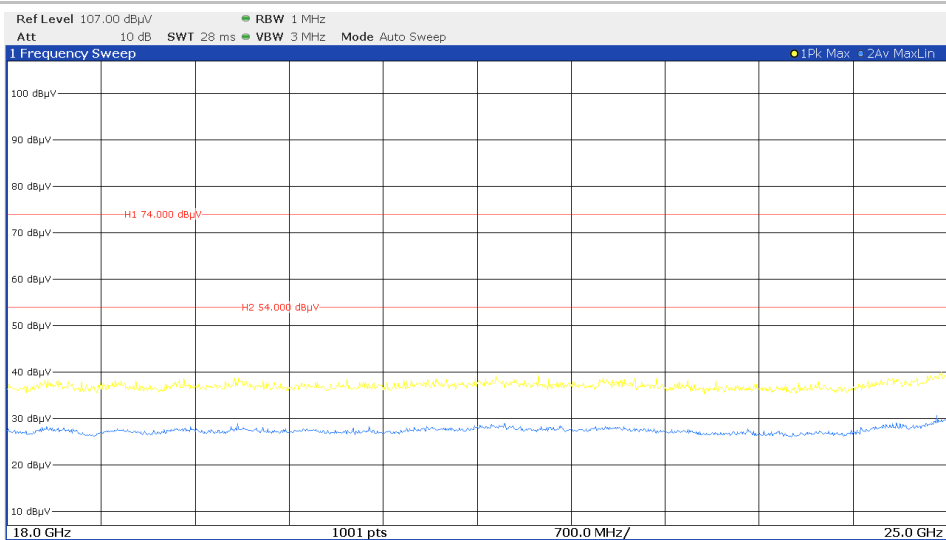


## 18÷25 GHz - Measurement result

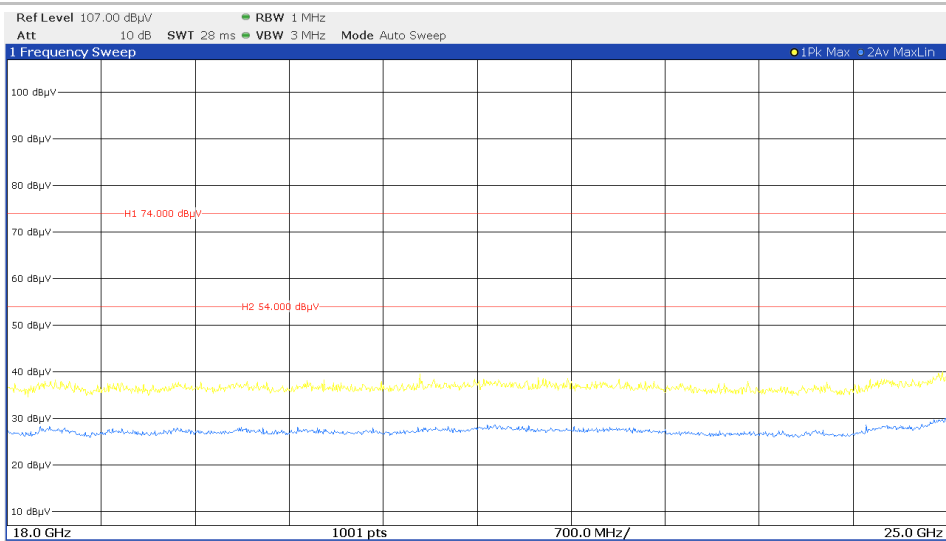
LOWER CHANNEL



MIDDLE CHANNEL



HIGHER CHANNEL



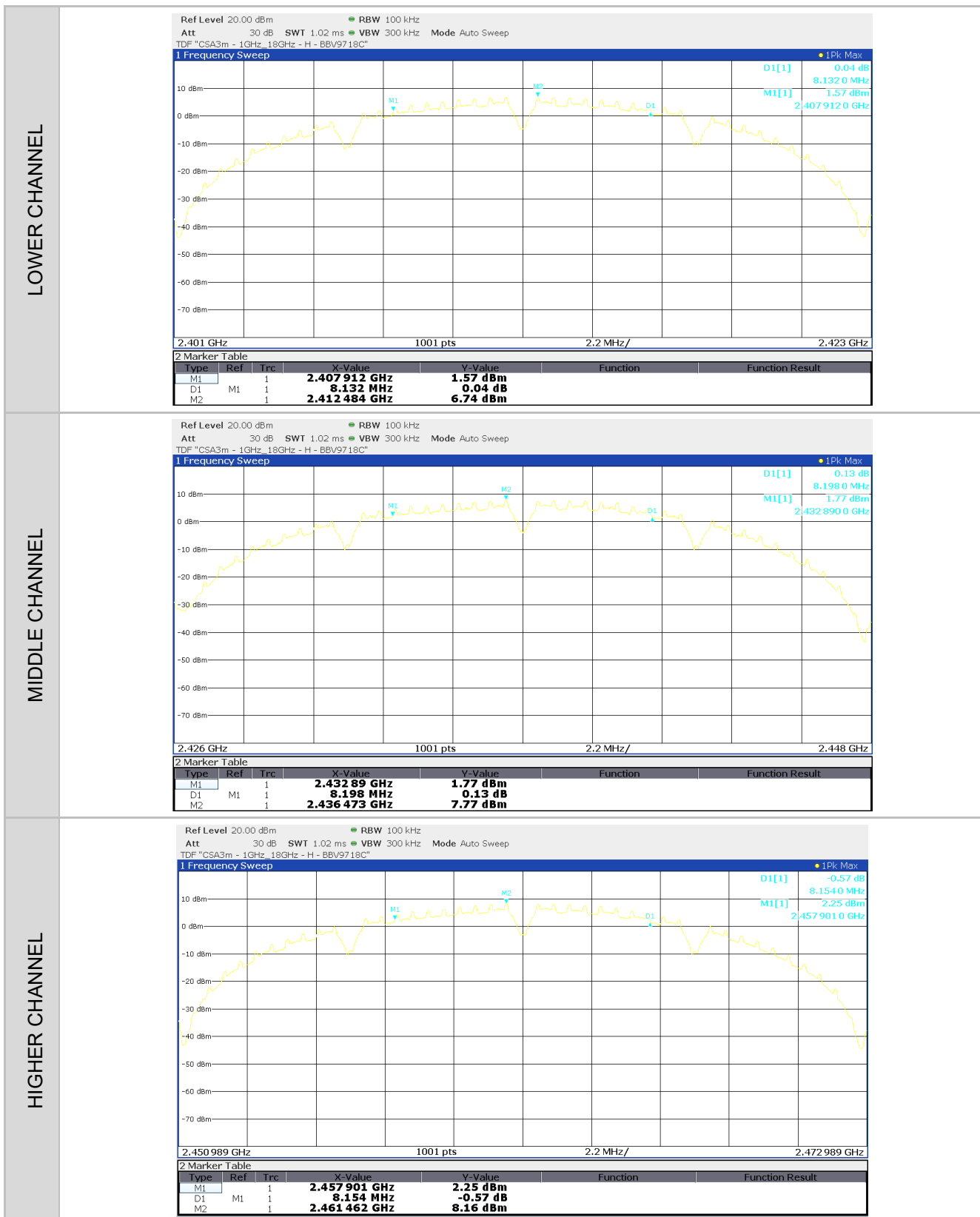
## 7.4 6dB BANDWIDTH

TEST REQUIREMENT	
Spectrum analyzer settings	
Span	Wide enough for the measurement to be made
Resolution bandwidth (RBW)	100 kHz
Video bandwidth (VBW)	300 kHz
Sweep time (SWT)	AUTO
Detector function	Peak
Trace	Max hold
EUT operating condition	#1
Remark	None
Testing dates	2023-01-18

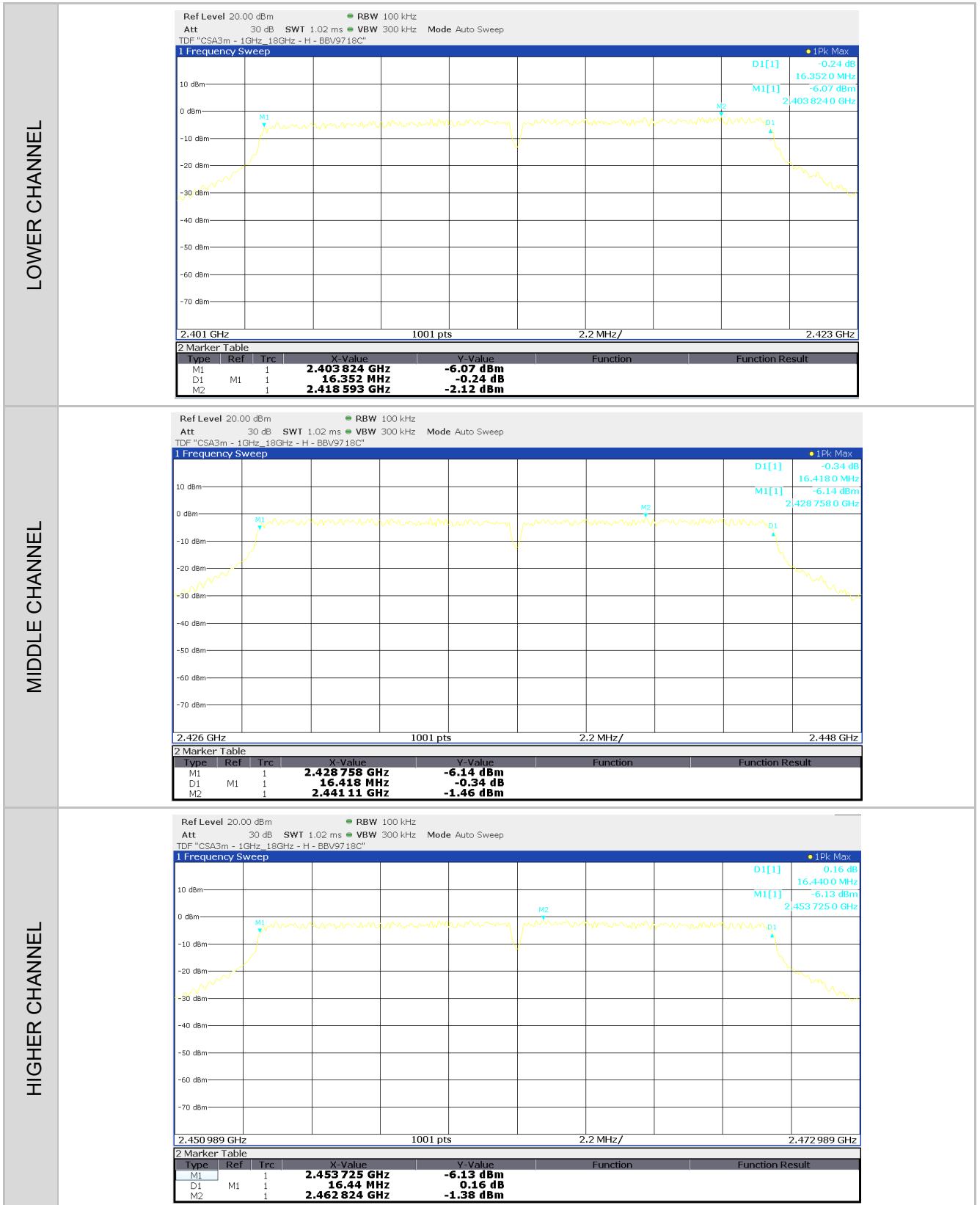
TEST RESULT
The EUT meets the requirements of sections 15.247 (a)(2)

TEST PROCEDURE
The Channel bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

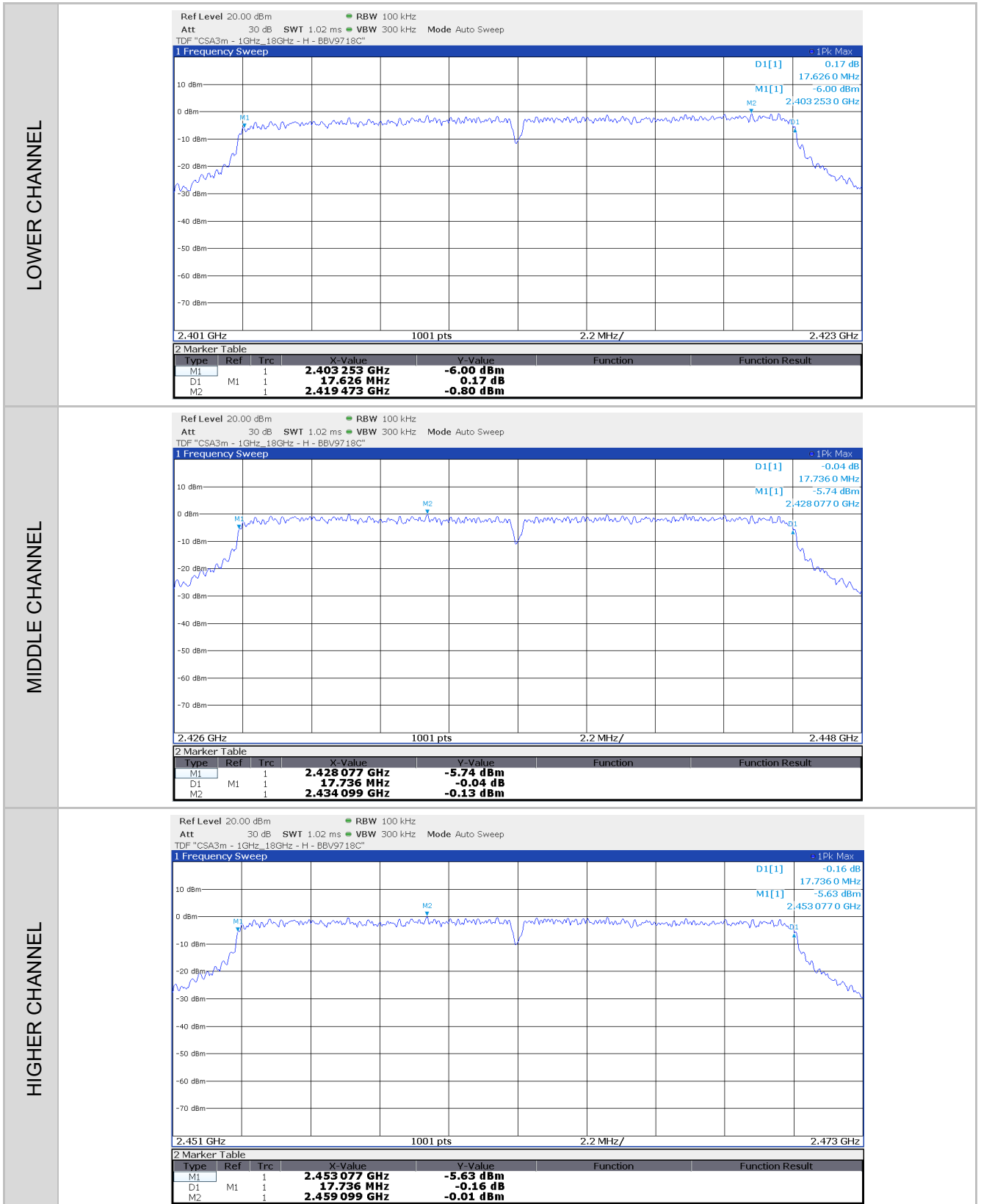
Modulation	Channel	Frequency	-6dB Bandwidth (MHz)
802.11b	Lower	2412	8,132
	Middle	2437	8,198
	Higher	2462	8,154



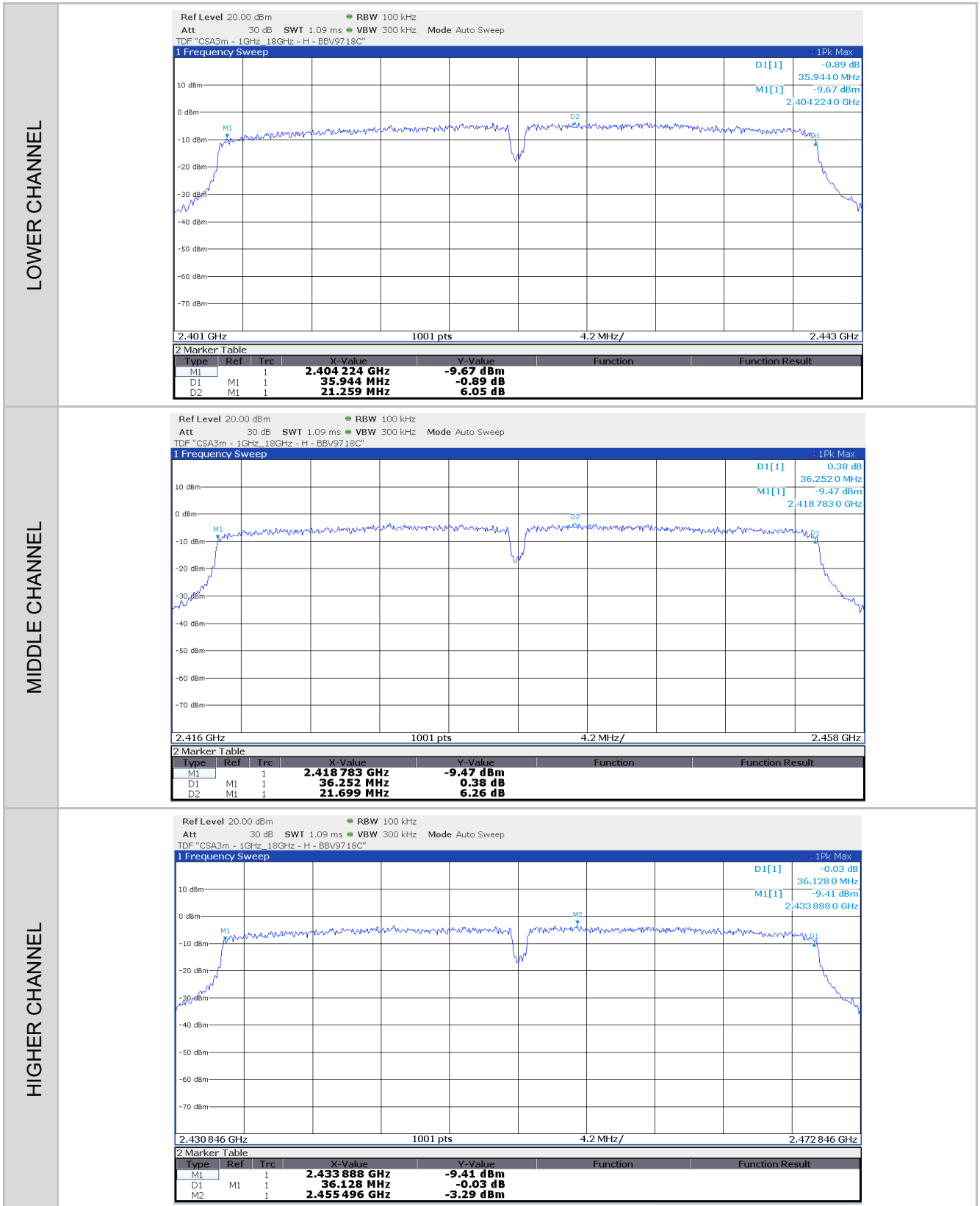
Modulation	Channel	Frequency	-6dB Bandwidth (MHz)
802.11g	Lower	2412	16.352
	Middle	2437	16.418
	Higher	2462	16.440



Modulation	Channel	Frequency	-6dB Bandwidth (MHz)
802.11n (HT20)	Lower	2412	17.626
	Middle	2437	17.736
	Higher	2462	17.736



Modulation	Channel	Frequency	-6dB Bandwidth (MHz)
802.11n (HT40)	Lower	2422	35.944
	Middle	2437	36.252
	Higher	2452	36.128



## 7.5 MAXIMUM PEAK CONDUCTED OUTPUT POWER

### TEST PROCEDURE

The maximum peak conducted output power was measured using a wideband power sensor.

The power sensor must have a bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast, average-responding diode type sensor.

As the transmitter antenna integrated, a temporary antenna RF connector is provided by the manufacturer for conducted test. The temporary RF connector is mounted on PCB of the transmitter at the output antenna port and was connected to the power sensor by short RF pigtail adapter for conducted measurement.

Turn on the EUT and power meter and then record the peak power value.

Above procedures was repeated on all channels needed to be tested.

Detector function	Peak
EUT operating condition	#1
Remark	/
Testing dates	2023-01-20

Channel	Max conducted output power (dBm)					Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	Limit	
Lowest	15.3	10.5	10.1	9.7	30	Pass
Middle	15.9	10.9	10.6	10.1		
Highest	<b>16.9</b>	11.4	11.4	10.4		

### TEST RESULT

The EUT meets the requirements of sections 15.247 (b) (3)

## 7.6 BAND-EDGE COMPLIANCE OF RF RADIATED EMISSIONS

TEST REQUIREMENT	
Spectrum analyzer settings	
Span	Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
Resolution bandwidth (RBW)	1 MHz (100 kHz band-edge)
Video bandwidth (VBW)	1 MHz (100 kHz band-edge)
Sweep time (SWT)	Auto
Detector function	Peak
Trace	Max hold
Attenuator	/
Deviation to test procedure	None
EUT operating condition	#1
Remark	None
Testing dates	2023-01-23

TEST RESULT
The EUT meets the requirements of sections 15.247 (d). All out of band spurious emissions are more 20 dB below the in band power of the fundamental.

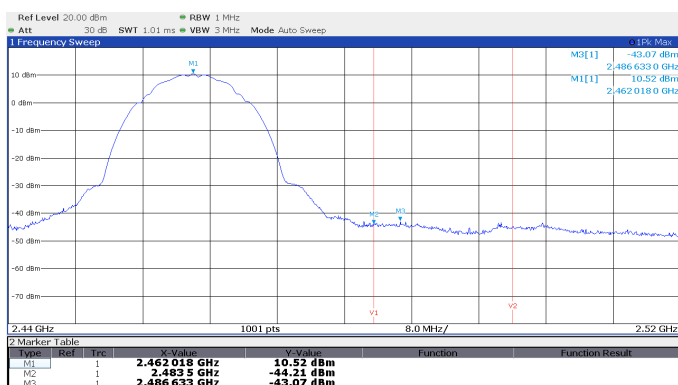
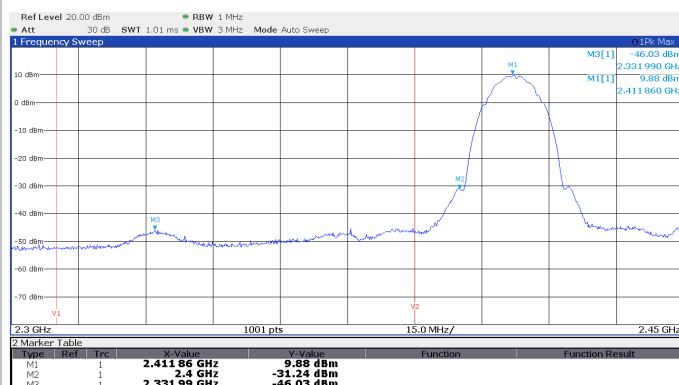
LIMITS
-20 dB below peak output power

TEST PROCEDURE
Only for measuring emissions up to 2 MHz removed from the band-edge the "delta" technique for Radiated emissions was used. As the transmitter antenna integrated, a temporary antenna RF connector is provided by the manufacturer for conducted test. The temporary RF connector is mounted on PCB of the transmitter at the output antenna port and was connected by short RF pigtail adapter to the spectrum analyzer for conducted measurement. Once the trace is stabilized, by the marker the emission at the band edge (or on the highest modulation product outside of the band, if this level is greater than that at the band edge) was set. The "n" by the marker-delta function and the marker-to-peak function the peak of the in-band emission was selected. The marker-delta value displayed was compared with the limit specified in this Section



## MEASUREMENTS RESULTS Modulation 802.11b

### Band-edge (Peak)

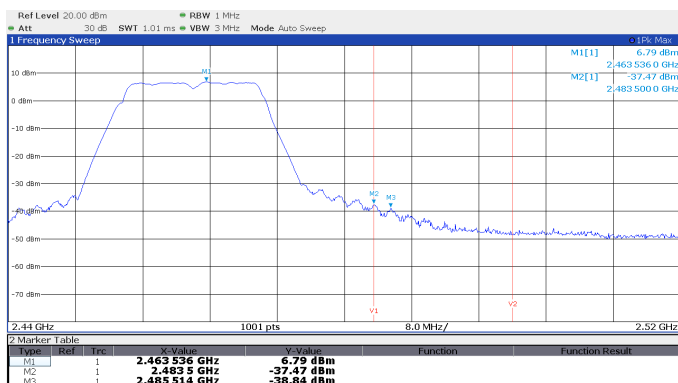
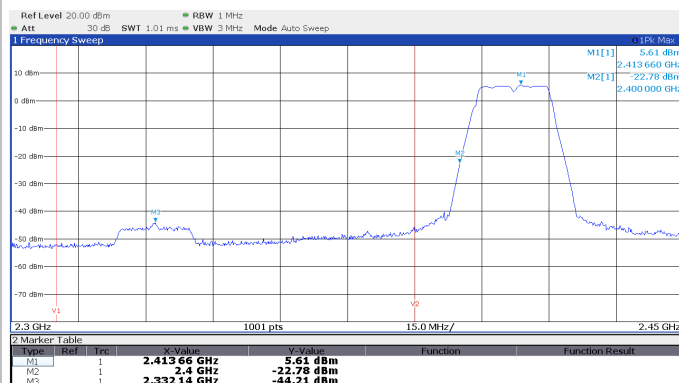


### Band-edge (AveAge)

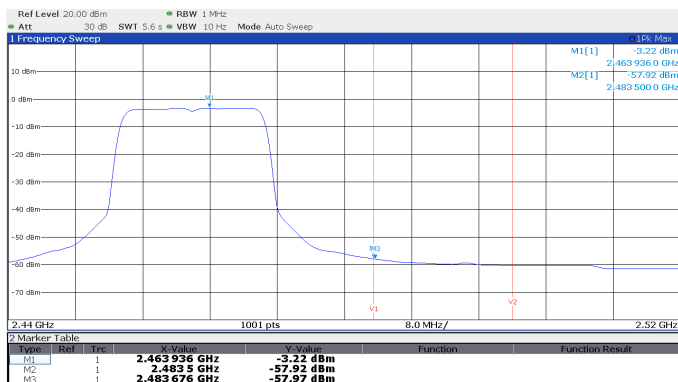
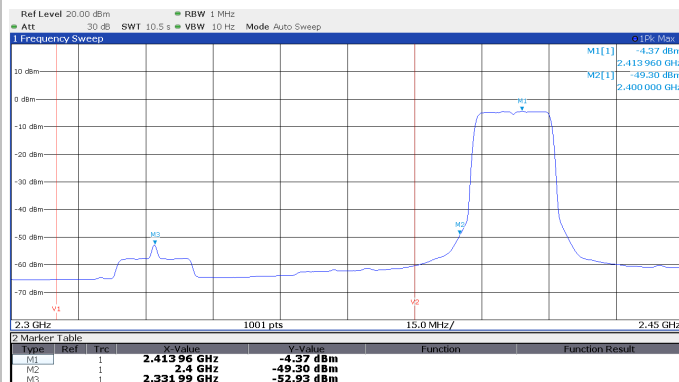


## MEASUREMENTS RESULTS Modulation 802.11g

### Band-edge (Peak)

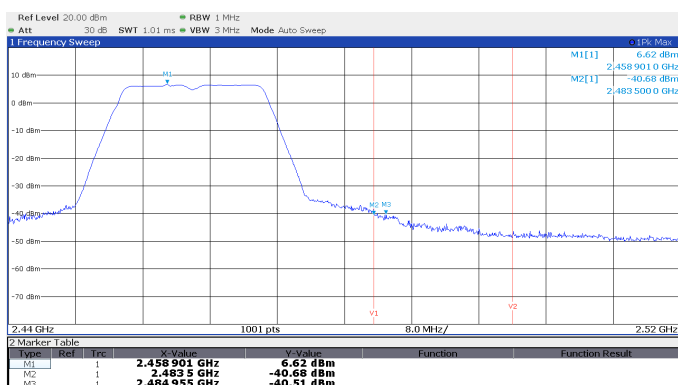
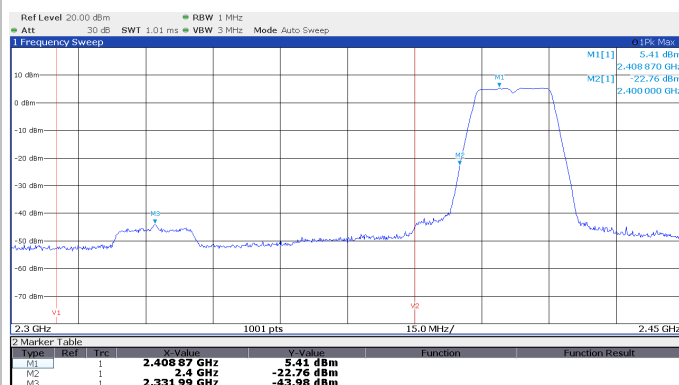


### Band-edge (AveAge)

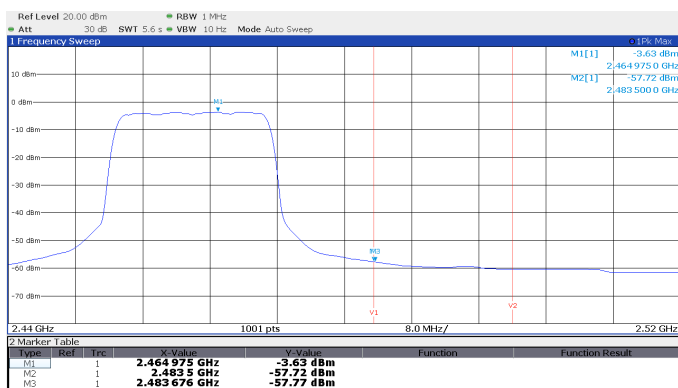
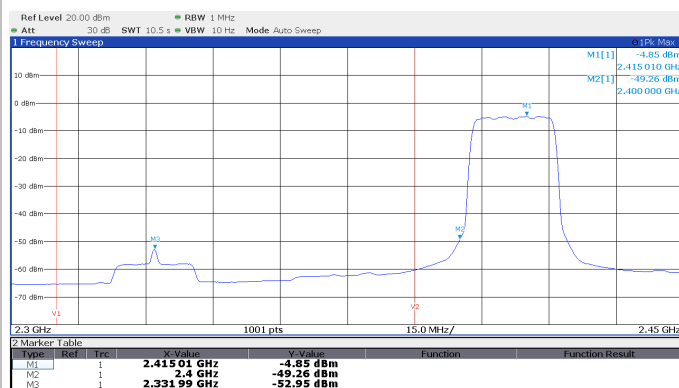


## MEASUREMENTS RESULTS Modulation 802.11n (HT20)

### Band-edge (Peak)

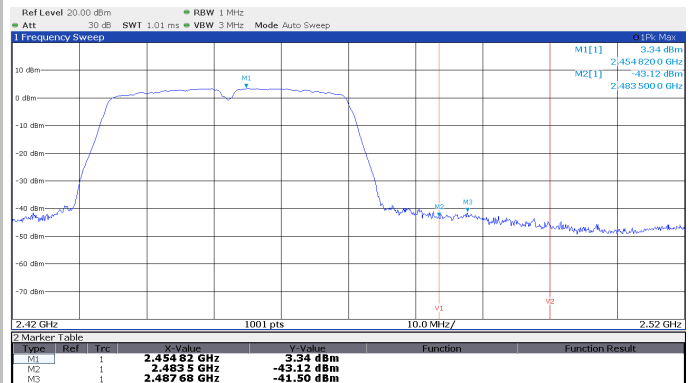
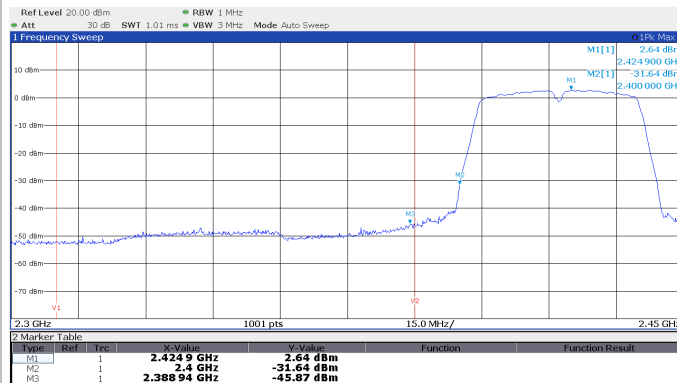


### Band-edge (Average)

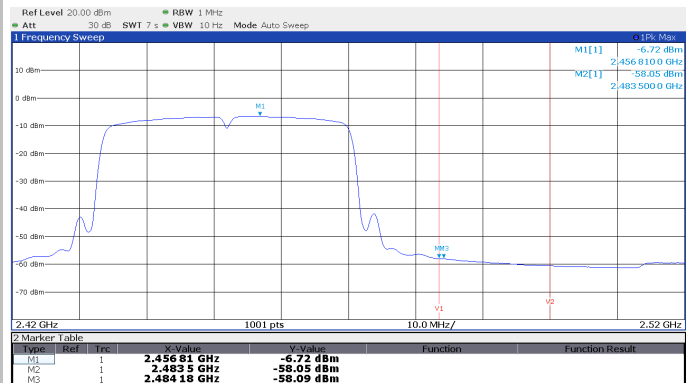
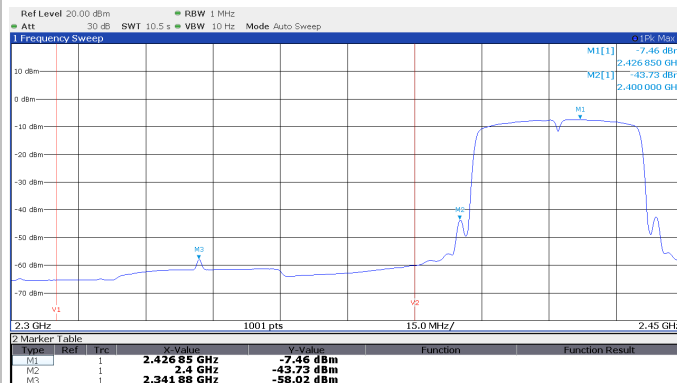


## MEASUREMENTS RESULTS Modulation 802.11n (HT40)

### Band-edge (Peak)



### Band-edge (AveRage)



## 7.6 100kHz EMISSIONS OUTSIDE THE FREQUENCY BAND

### TEST REQUIREMENT

#### Spectrum analyzer settings

Resolution bandwidth (RBW)	100 kHz
Video bandwidth (VBW)	300 kHz
Sweep time (SWT)	Auto
Detector function	Peak
Trace	Max hold
EUT operating condition	1 to 3
Testing dates	2022-10-28

### TEST PROCEDURE

The EUT RF output port is connected directly to RF input port of spectrum analyzer by short RF pigtail adapter. Set the EUT to work at lower, middle and higher channel. With a SPAN adjusted as necessary to best identify the center of each individual channel, wait until the trace has stabilized and set the markers to the peak of affected frequencies emission.

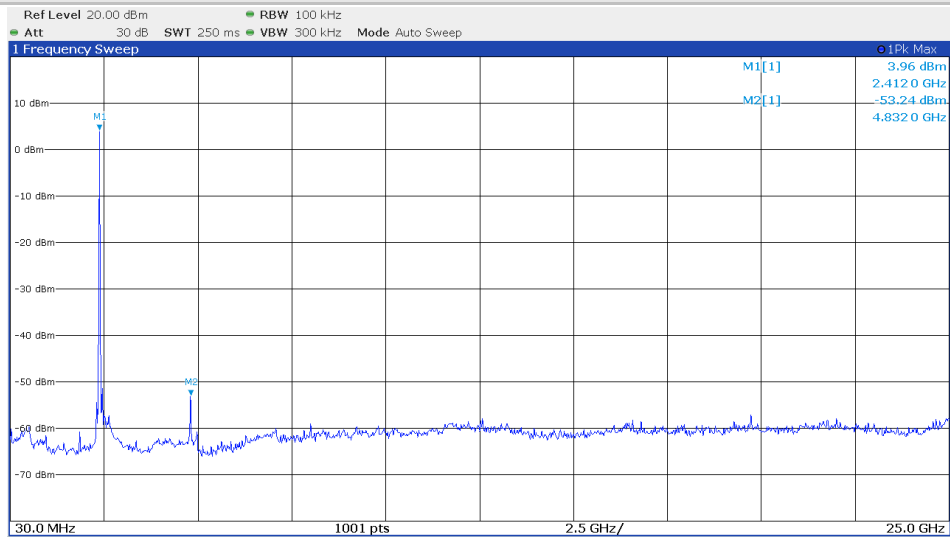
### LIMITS

-20dBc below peak output power

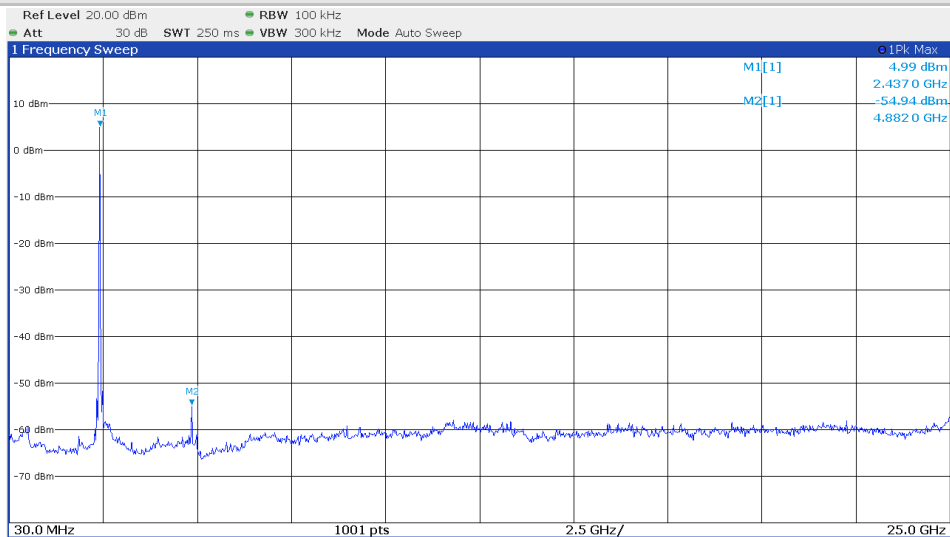
### TEST RESULT

All out of band spurious emissions are more -20dBc of the in-band power of the fundamental.  
The EUT meets the requirements of sections 15.247 (d)

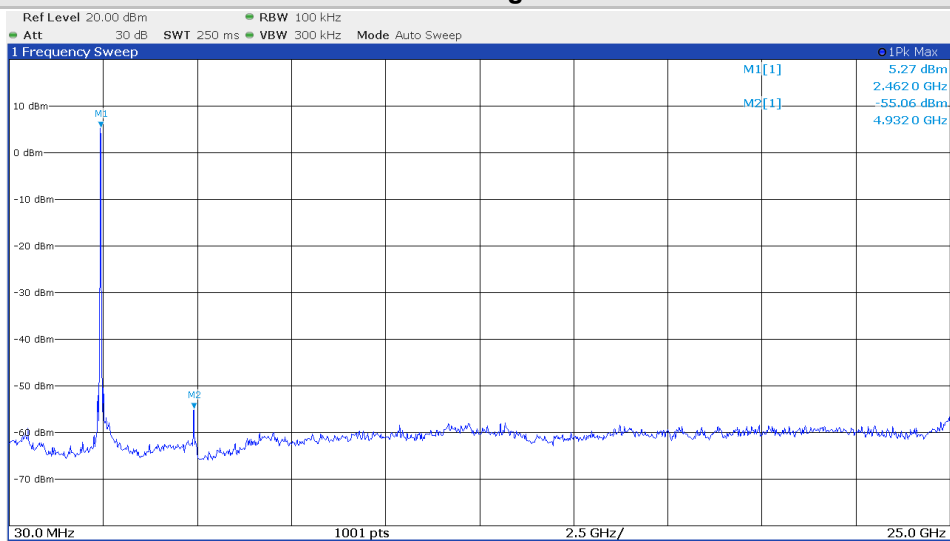
### MEASUREMENTS RESULTS - Modulation 802.11b lower



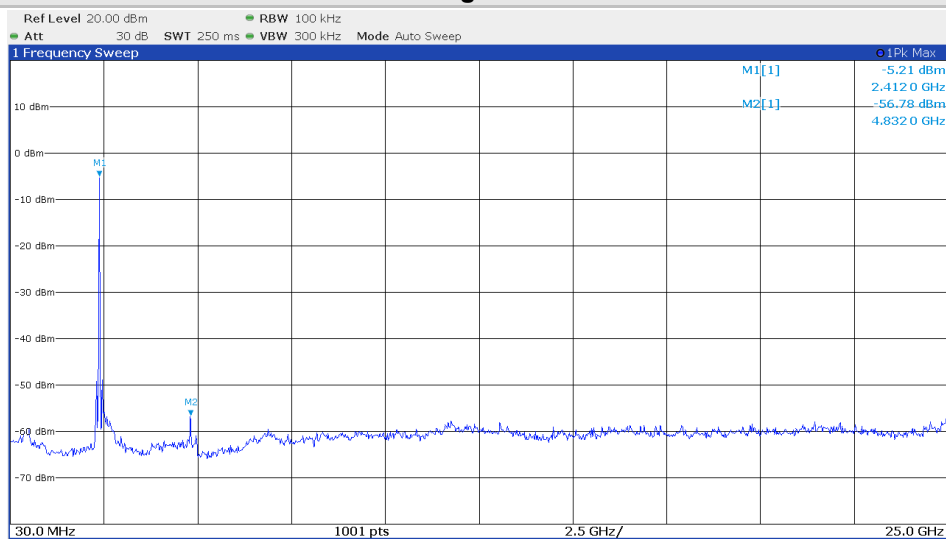
### MEASUREMENTS RESULTS - Modulation 802.11b middle



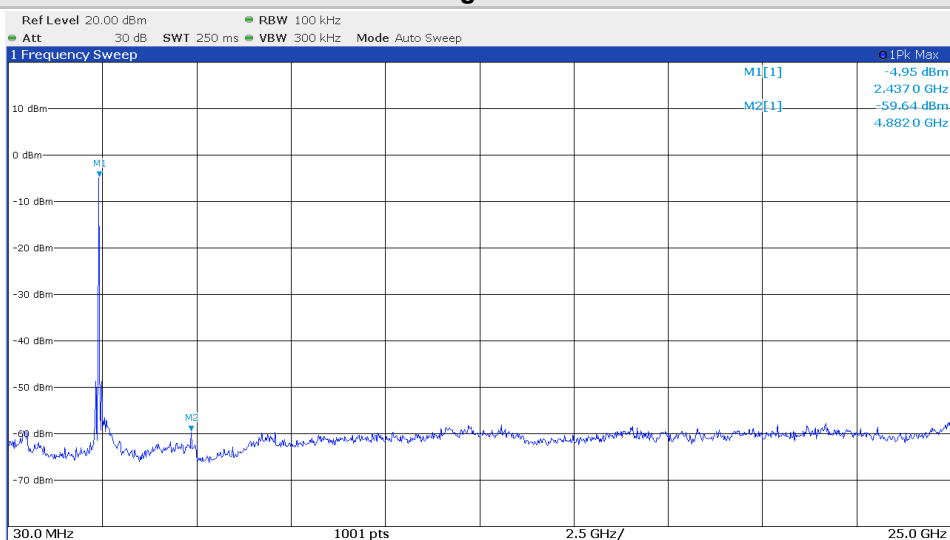
### MEASUREMENTS RESULTS - Modulation 802.11b higher



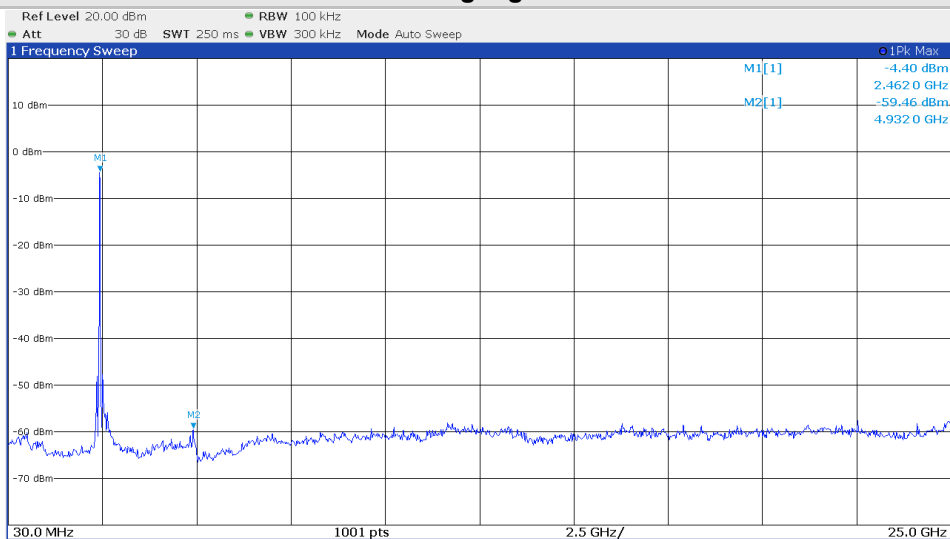
## MEASUREMENTS RESULTS - Modulation 802.11g lower



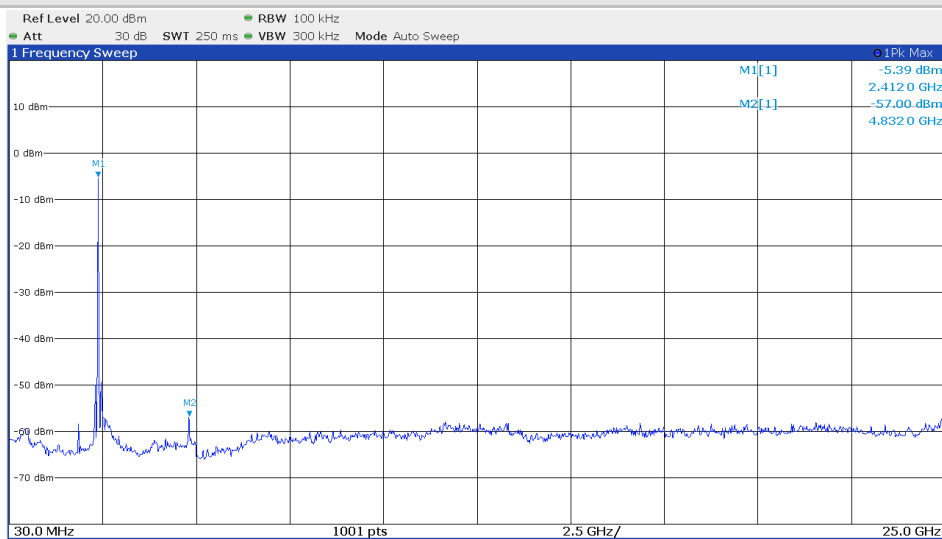
## MEASUREMENTS RESULTS - Modulation 802.11g middle



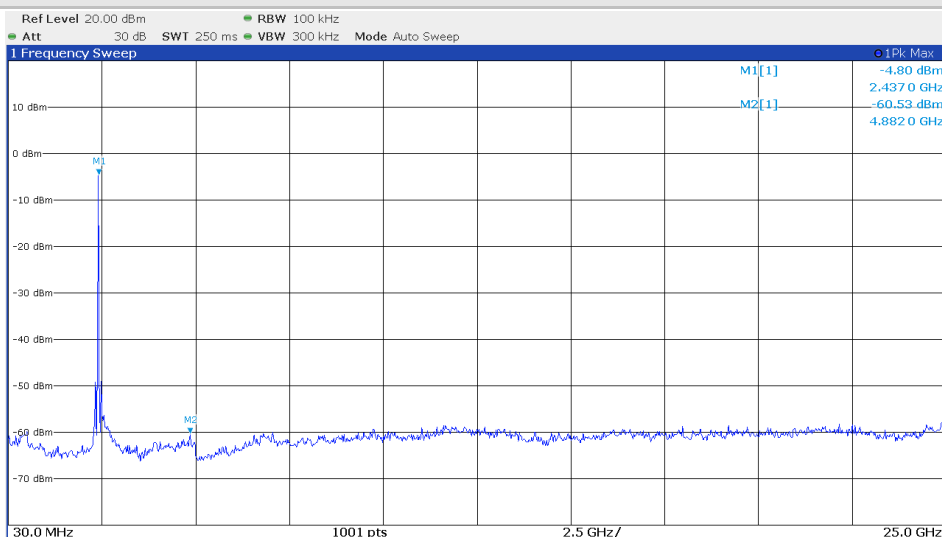
## MEASUREMENTS RESULTS - Modulation 802.11g higher



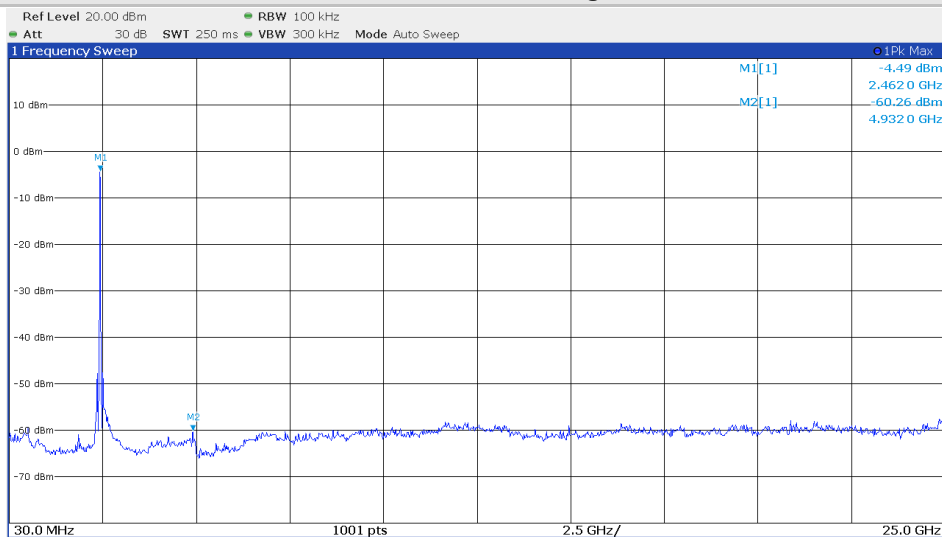
### MEASUREMENTS RESULTS - Modulation 802.11n HT20 lower



### MEASUREMENTS RESULTS - Modulation 802.11n HT20 middle

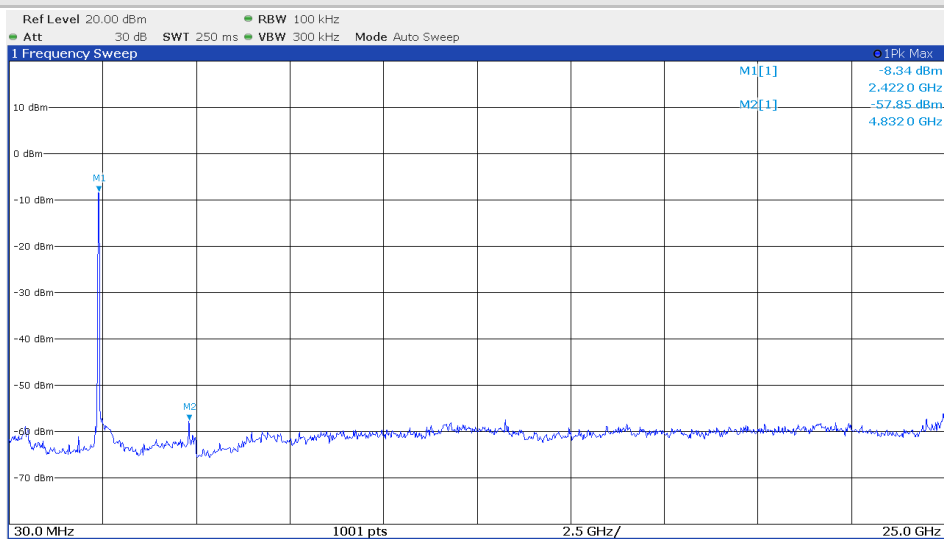


### MEASUREMENTS RESULTS - Modulation 802.11n HT20 higher

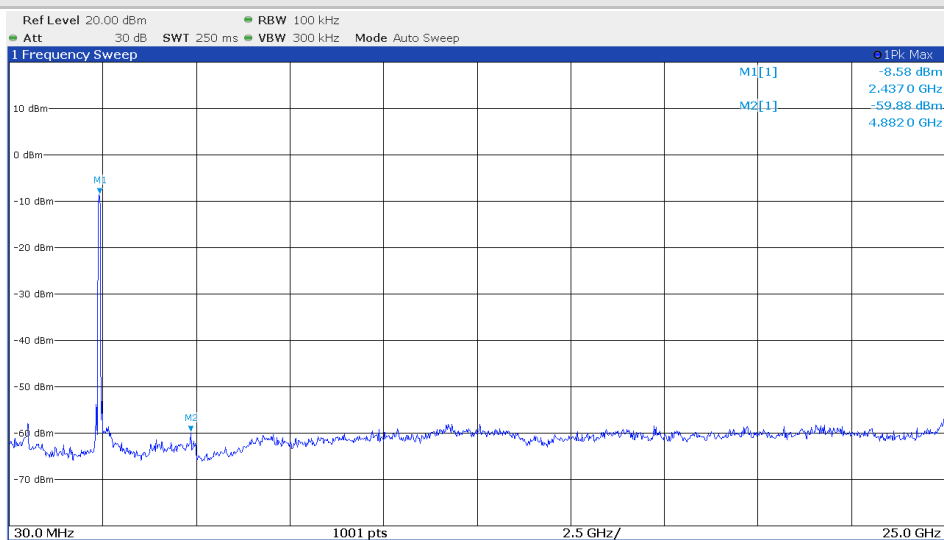




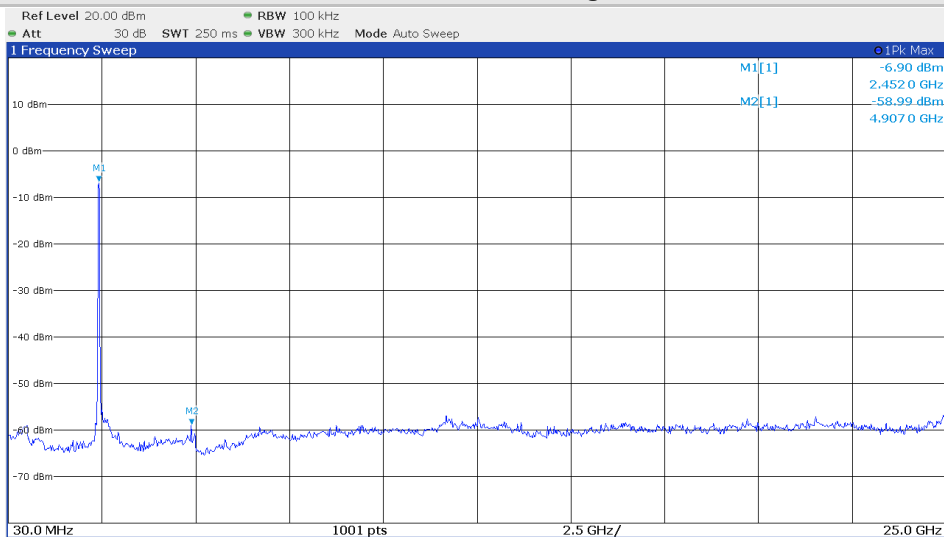
### MEASUREMENTS RESULTS - Modulation 802.11n HT40 lower



### MEASUREMENTS RESULTS - Modulation 802.11n HT40 middle



### MEASUREMENTS RESULTS - Modulation 802.11n HT40 higher



## 7.7 TRANSMITTER POWER SPECTRAL DENSITY

TEST REQUIREMENT	
<b>Spectrum analyzer settings</b>	
Resolution bandwidth (RBW)	3 kHz
Video bandwidth (VBW)	10 kHz
Sweep time (SWT)	AUTO
Detector function	Peak
Trace	Max hold
EUT operating condition	1 to 3
Testing dates	2022-10-21

### TEST RESULT

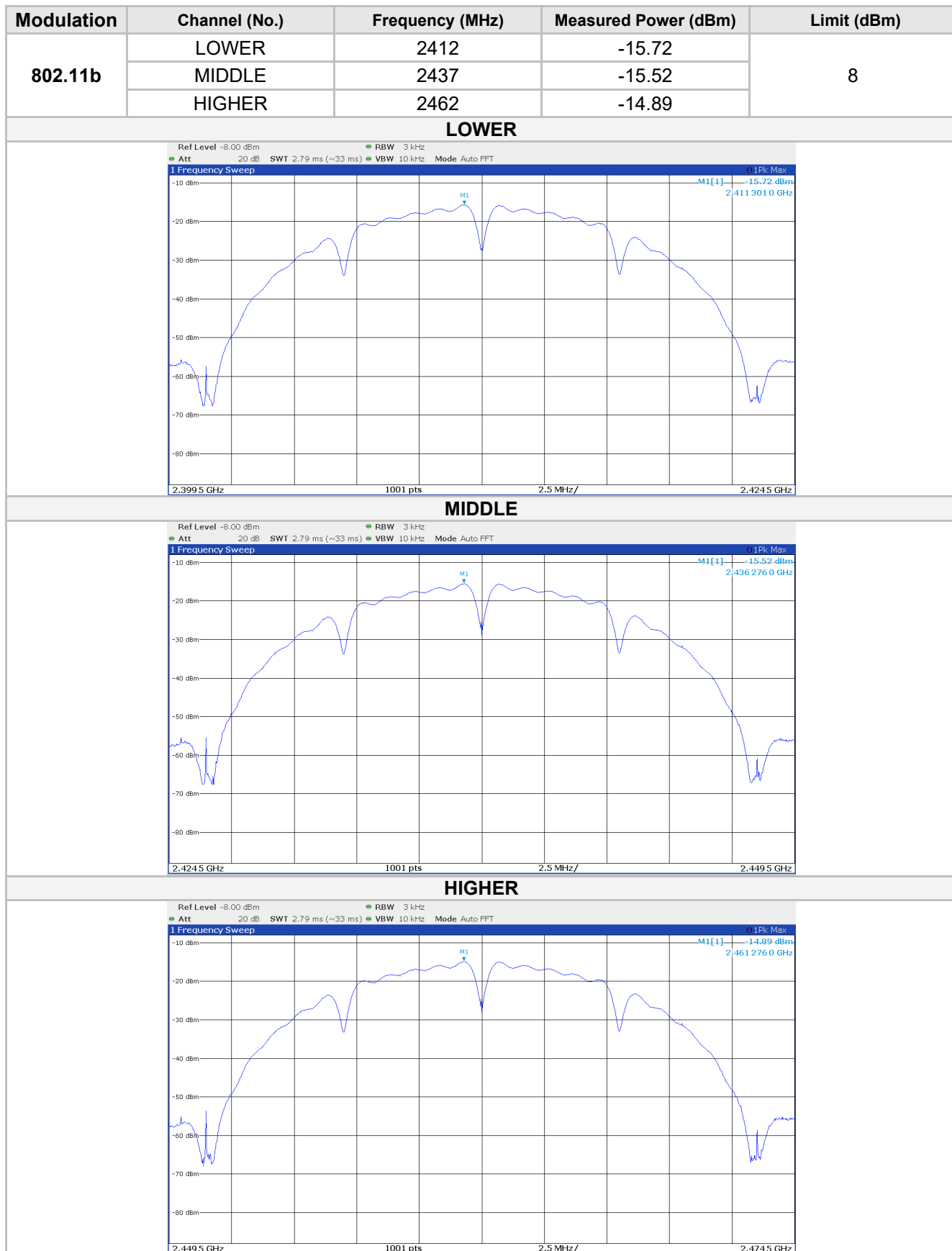
The EUT meets the requirements of sections 15.247 (e) and RSS -247 § 5.2 (b)

### LIMITS

8 dBm in 3 kHz bandwidth.

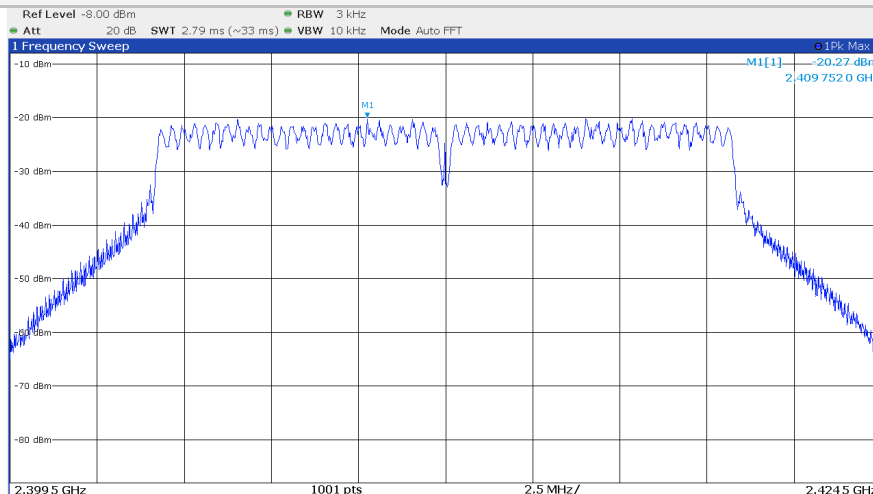
### TEST PROCEDURE

The EUT RF output port is connected directly to RF input port of spectrum analyzer. Set the EUT to work at lower, middle and higher channel. With a SPAN of about the measured -20dB BW and centered on a channel, wait until the trace has stabilized and set the marker to the peak of emission.

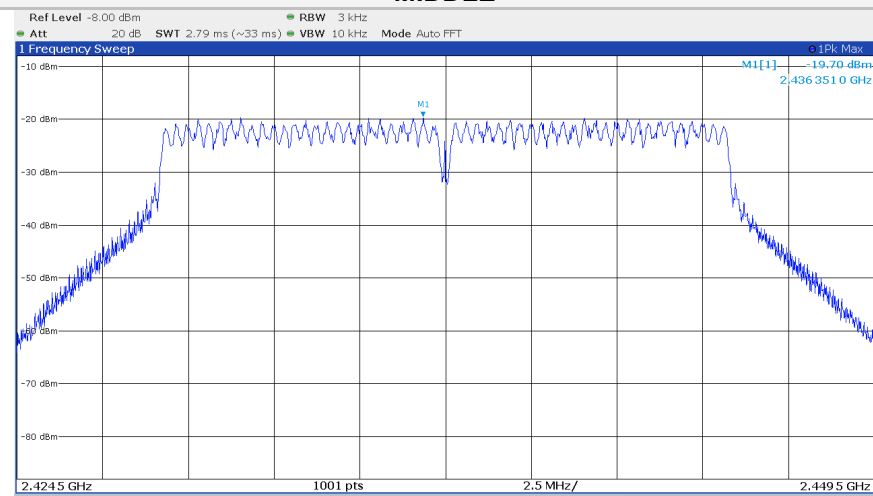


Modulation	Channel (No.)	Frequency (MHz)	Measured Power (dBm)	Limit (dBm)
802.11g	LOWER	2412	-20.27	8
	MIDDLE	2437	-19.70	
	HIGHER	2462	-19.16	

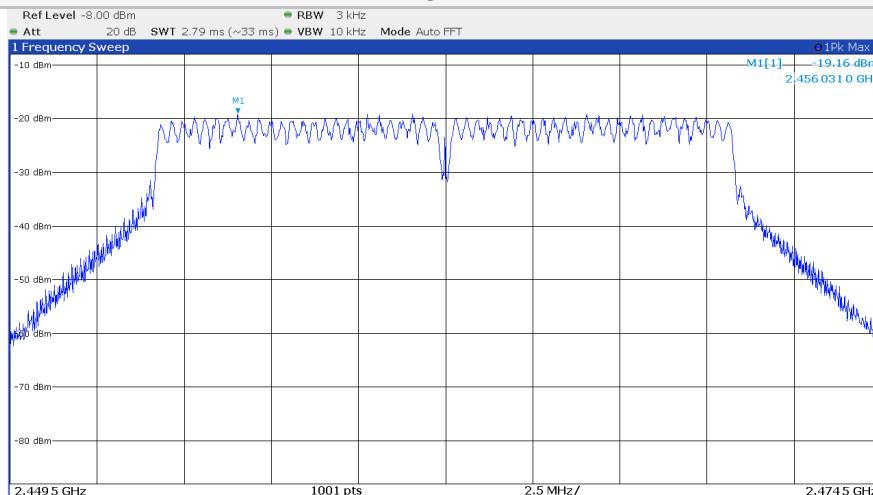
#### LOWER

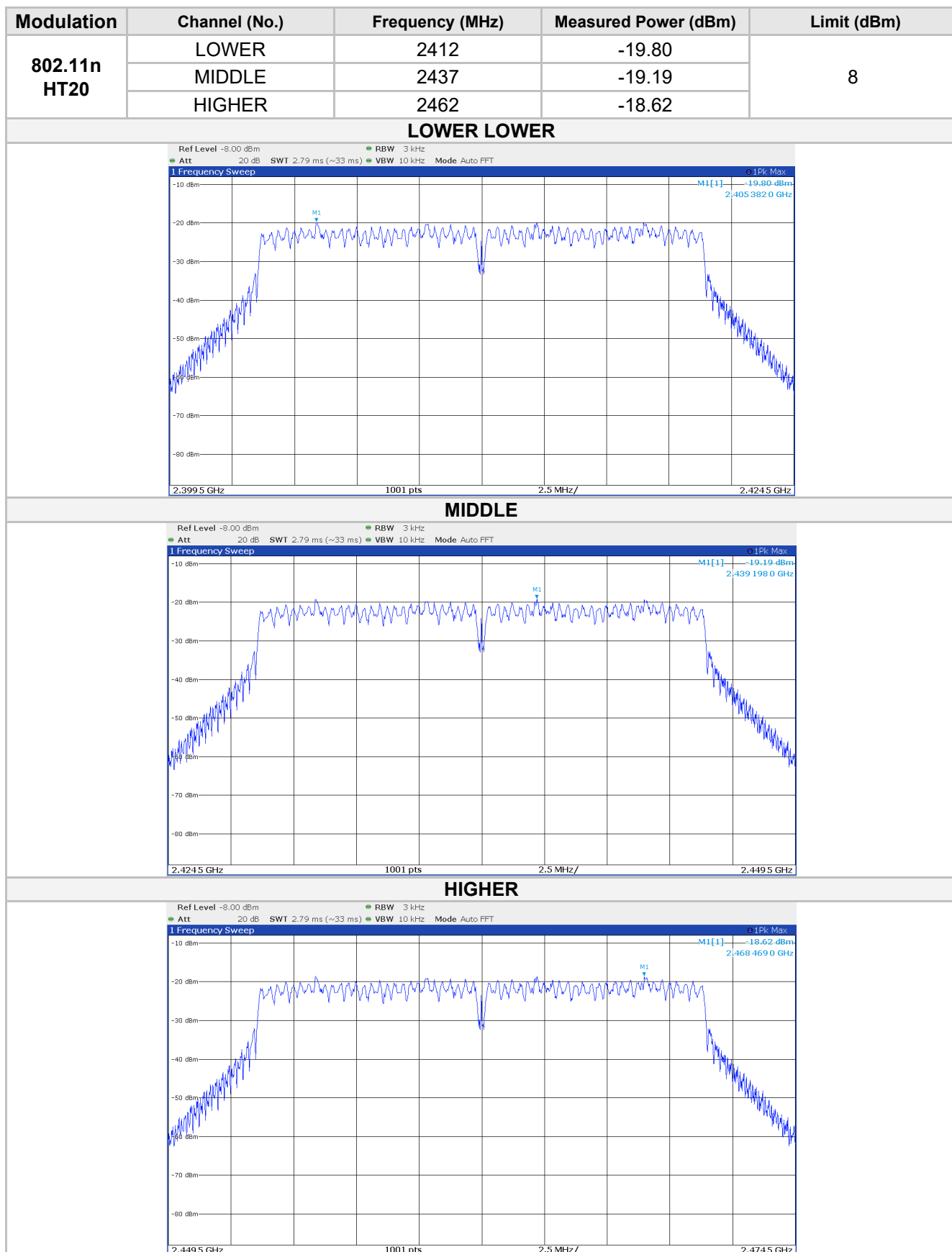


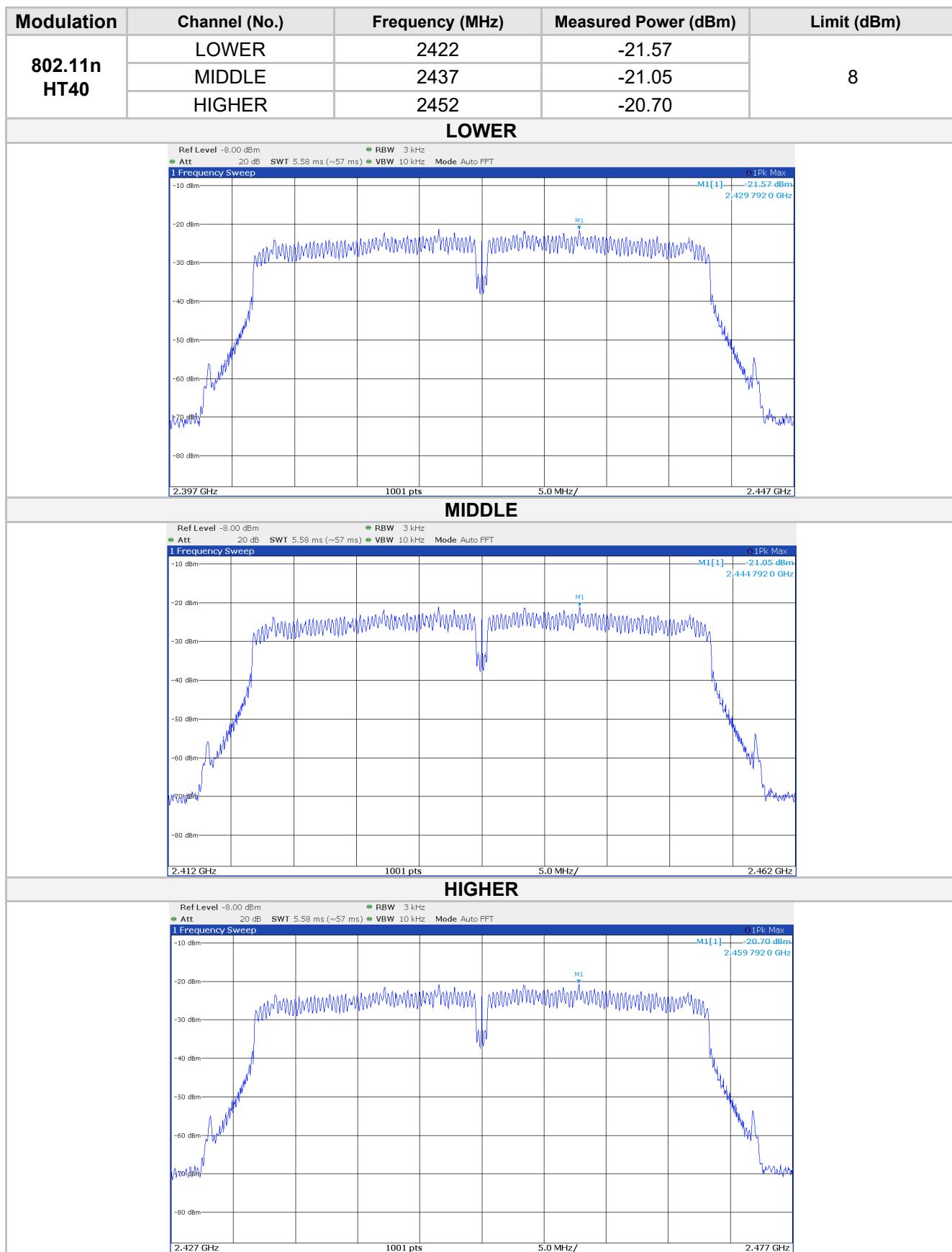
#### MIDDLE



#### HIGHER







## 7.8 RF EXPOSURE EVALUATION

TEST REQUIREMENT	
Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines § 1.1310.	
EUT classification (fixed, mobile or portable devices)	Fixed according to § 2.1091(b) of this Chapter
LIMITS	According to Table 1 to §1.1310(e)(1) — Limits for Maximum Permissible Exposure (MPE)
Testing dates	2020-09-02

**TABLE 1 TO §1.1310(E)(1) — LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(i) Limits for Occupational/Controlled Exposure</b>				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f <sup>2</sup> )	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
<b>(ii) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. \* = Plane-wave equivalent power density.

Modulation 802.11b								
Channel No.	Conducted power (dBm)	Tune-up (dB)	Antenna gain (dBi)	Max Power (dBm)	Max Power (mW)	Min distance (cm)	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1 (2.412GHz)	15.3	0.54	2	17.84	60.814	20	0.471	1
6 (2.437GHz)	15.9	0.54	2	18.44	69.823	20	0.545	
11 (2.462GHz)	16.9	0.54	2	19.44	87.902	20	0.692	

Modulation 802.11g								
Channel No.	Conducted power (dBm)	Tune-up (dB)	Antenna gain (dBi)	Max Power (dBm)	Max Power (mW)	Min distance (cm)	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1 (2.412GHz)	10.5	0.54	2	13.04	20.137	20	0.156	1
6 (2.437GHz)	10.9	0.54	2	13.44	22.080	20	0.172	
11 (2.462GHz)	11.4	0.54	2	13.94	24.774	20	0.194	

Modulation 802.11n HT20								
Channel No.	Conducted power (dBm)	Tune-up (dB)	Antenna gain (dBi)	Max Power (dBm)	Max Power (mW)	Min distance (cm)	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
1 (2.412GHz)	10.1	0.54	2	12.64	18.365	20	0.143	1
6 (2.437GHz)	10.6	0.54	2	13.14	20.606	20	0.161	
11 (2.462GHz)	11.4	0.54	2	13.94	24.774	20	0.194	

Modulation 802.11n HT40								
Channel No.	Conducted power (dBm)	Tune-up (dB)	Antenna gain (dBi)	Max Power (dBm)	Max Power (mW)	Min distance (cm)	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
3 (2.422GHz)	9.7	0.54	2	12.24	16.749	20	0.130	1
6 (2.437GHz)	10.1	0.54	2	12.64	18.365	20	0.143	
9 (2.452GHz)	10.4	0.54	2	12.94	19.679	20	0.154	

## TEST RESULT

This value is less than the low threshold limit. No SAR test is required.

Maximum radiated power was taken into consideration to establish the worst case aggregate maximum output power.



## 8. MEASUREMENTS AND TESTS UNCERTAINTY

Unless otherwise stated the uncertainties for the tests and measurements are evaluated in according to IMQ Operational Instruction IO-LAB-001, IO-LAB-004 and IO-LAB-009, and requirement of NIST Technical Note 1297 and NIS 81: 1994 "The Treatment of Uncertainty in EMC Measurements"

The expanded uncertainty was calculated for all measurements and tests listed in this test report according to CISPR 16-4-2 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainty in EMC Measurements", with UKAS document LAB 34 and is documented in the quality system accordance to ISO/IEC 17025.

Internal Procedure PG-037 ensures that the requirements for traceability of calibrations, of all test equipment requiring calibration, and calibration intervals are met.

Methods Standard	Parameter	Expanded Uncertainty	Unit	Confidence level
Continuous disturbance	Terminal disturbance voltages (9 – 150 kHz)	2.4	dB	95%
	Terminal disturbance voltages (150 k – 30 MHz)	2.7	dB	95%
Radiated disturbance	Radiation disturbance (30-200 MHz – Horizontal Polariz.)	4.0	dB	95%
	Radiation disturbance (30-200 MHz – Vertical Polariz.)	4.0	dB	95%
	Radiation disturbance (200 -1000 MHz – Horizontal Polariz.)	3.5	dB	95%
	Radiation disturbance (200-1000 MHz – Vertical Polariz.)	3.4	dB	95%
	Radiation disturbance (1-6 GHz – H/V Polarization)	4.3	dB	95%
	Radiation disturbance (6-18 GHz – H/V Polarization)	4.8	dB	95%
	Radiation disturbance (18-26 GHz – H/V Polarization)	5.0	dB	95%
	Radiation disturbance (26-40 GHz – H/V Polarization)	5.2	dB	95%

## 9. TEST EQUIPMENT

Instrument	Manufacturer	Model	IMQ Ref.	Calibration	
				Last date	Due date
Shielded semi-anechoic chamber	ETS-LINDGREN	--	P04112	/	/
Shielded anechoic chamber	SIDT	--	P02386	/	/
EMI Receiver	Rhode & Schwarz	ESU8	S05562	2022-02-15	2022-03-15
Spectrum Analyser	Rohde & Schwarz	ESW44	S07965	2022-08-10	2023-08-10
Spectrum Analyser	Rohde & Schwarz	FSW50	S07990	2021-10-13	2022-12-13(*)
POWER SENSOR	Rohde & Schwarz	NRP-Z81	S06704	2022-06-02	2023-06-02
LISN	Rohde & Schwarz	ENV216	S03631	2022-02-07	2023-02-07
Broadband preamplifier	SCHWARZBECK	BBV 9744	S09213	2022-08-03	2023-08-03
Broadband preamplifier	SCHWARZBECK	BBV9718C	S09214	2022-07-22	2023-07-22
Broadband preamplifier	HEWLETT & PACKARD	HP8449B	S03542	2022-02-08	2023-02-08
Broadband preamplifier	SCHWARZBECK	BBV 9721	S09215	2022-08-24	2023-08-24
LOOP ANTENNA	ROHDE & SCHWARZ	HFH2-Z2E	S08326	2022-01-26	2023-01-26
LOG ANTENNA	SCHWARZBECK	VULB 9160	S03511	2022-09-20	2023-09-20
HORN ANTENNA	SCHWARZBECK	BBHA9120D	S03463	2020-07-06	2023-07-06
HORN ANTENNA	SCHWARZBECK	BBHA9170	S03724	2020-07-29	2023-07-29
SOFTWARE	Nexio	BAT-EMC V3.21.0.14	/	/	/

### Note

(\*) Some calibration intervals may be extended. based on sufficient calibration data and experience of use (see IEC 60501:2015 clause 8.3)

**END OF TEST REPORT**