

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT****CLASS II PERMISSIVE CHANGE TEST REPORT**

**Applicant:** Castles Technology Co., Ltd  
6F, No. 207-5, Sec.3, Beixin Rd., Xindian District, New Taipei City 231, Taiwan

**Product Name:** LTE Module

**Brand Name:** CASTLES TECHNOLOGY

**Model No.:** SC20-A

**Model Difference:** N/A

**Report Number:** E2/2020/40007

**FCC ID:** WIYQSC20A

**FCC Rule Part:** §15.247, Cat: DTS

**Issue Date:** Aug. 25, 2020

**Date of Test:** Apr. 28, 2020 ~ Apr. 29, 2020

**Date of EUT Received:** Apr. 07, 2020

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

**Approved By:**

Jazz Huang

**Jazz Huang / Asst. Supervisor**

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## Revision History

Report Number	Revision	Description	Issue Date	Remark
E2/2020/40007	Rev.00	Original.	Aug. 25, 2020	Revised By: Violetta Tang

**Note:**

## 1、Disclaimer

Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

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# 1 GENERAL INFORMATION

## 1.1 Product description

Product Name:	LTE Module	
Brand Name:	CASTLES TECHNOLOGY	
Model No.:	SC20-A	
Model Difference:	N/A	
Hardware Version:	R1.0	
Software Version:	SC20ASAR04A03H8G	
Host Product Name:	SATURN1000-E	
Host Model No.:	SATURN1000-E	
Class II Permissive Change:	LTE Module installed in SATURN1000-E	
Power Supply:	3.75Vdc from Rechargeable Li-ion Battery Pack or 5V from USB Port	
	Battery:	Model No.: S1E, Supplier: ShenZhen Kayo Battery Co., Ltd

Wi-Fi 802.11	Frequency Range	Channels	Modulation Technology
b	2412-2462	11	DSSS
g			OFDM
n_HT20			
n_HT40	2422-2452	7	
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM	
Transistion Rate:		802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_HT20MHz: 6.5 – 72.2 Mbps 802.11 n_HT40MHz: 13.5 - 150.0 Mbps	

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## 1.2 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)
PIFA	ARISTOTLE	RFA-25-AP795-70B-50	2400-2500	1.77

## 1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10:2013

## 1.4 Test Facility

SGS Taiwan Ltd. Central RF Lab (TAF code 3702)

No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333

FCC Designation number: TW0028

## 1.5 Special Accessories

There are no special accessories used while test was conducted.

## 1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2 SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

### 2.3 Test Procedure

#### 2.3.1 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

### 2.4 Measurement Results Explanation Example

#### 2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m\*9m\*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

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## 2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission configuration



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L440	P0000367	N/A	N/A

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### 3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.205 §15.209 §15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b/g/n/20M.

CHANNEL	FREQUENCY (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

7 channels are provided for 802.11n 40M

CHANNEL	FREQUENCY (MHz)
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452

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#### 4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case. The given UE is pre-scanned among below modes.

Modulation	Transmission Chain				Single Transmission Spatial	Multiple Transmission Spatial
<input checked="" type="checkbox"/> 802.11 b	<input checked="" type="checkbox"/> Ch0	<input type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input checked="" type="checkbox"/> 1TX	<input type="checkbox"/> 2TX
<input checked="" type="checkbox"/> 802.11 g	<input checked="" type="checkbox"/> Ch0	<input type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input checked="" type="checkbox"/> 1TX	<input type="checkbox"/> 2TX
<input checked="" type="checkbox"/> 802.11 n	<input checked="" type="checkbox"/> Ch0	<input type="checkbox"/> Ch1	<input type="checkbox"/> Ch2	<input type="checkbox"/> Ch3	<input checked="" type="checkbox"/> SISO	<input type="checkbox"/> MIMO

4. Therefore, below summary is the modes of test configuration that yield the highest reading and generate the highest emission chosen to carry out the relevantly mandatory test items.

#### 4.3 Radiated Emission Test:

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
<b>RADIATED EMISSION TEST (ABOVE 1 GHz)</b>					
802.11b	1 to 11	6	OFDM	6	Ch0
<b>RADIATED BAND EDGE TEST</b>					
802.11b	1 to 11	1,11	DSSS	1	Ch0
802.11g	1 to 11	1,11	OFDM	6	Ch0
802.11n 20M	1 to 11	111	OFDM	MCS 0	SISO
802.11n 40M	3 to 9	3,9	OFDM	MCS 0	SISO
<b>Note:</b> The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case E1 position was reported.					

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## 5 MEASUREMENT UNCERTAINTY

Radiated Spurious Emission Measurement Uncertainty	
Polarization: Vertical	9kHz~30MHz: +/-2.3dB
	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB
Polarization: Horizontal	9kHz~30MHz: +/-2.3dB
	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

**Note:**

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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## 6 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

### 6.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

#### Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m)

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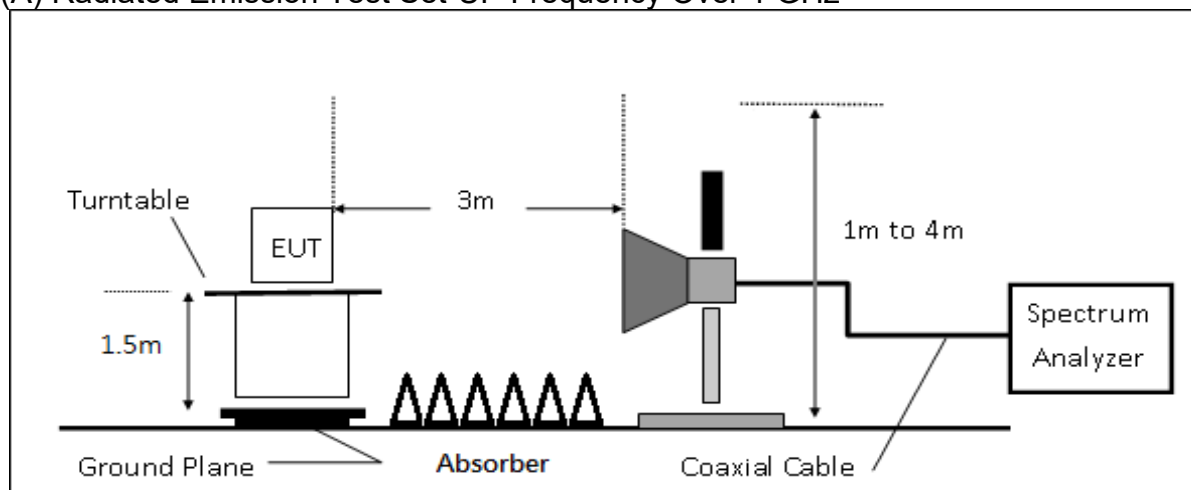
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## 6.2 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	Schwarzbeck	BBHA9170	185	08/07/2019	08/06/2020
Horn Antenna	Schwarzbeck	BBHA9120D	1187	01/10/2020	01/09/2021
Spectrum Analyzer	KEYSIGHT	N9010A	MY57120200	03/17/2020	03/16/2021
Pre-Amplifier	EMC Instruments	EMC330	980096	11/20/2019	11/19/2020
Pre-Amplifier	EMC Instruments	EMC0011830	980199	11/20/2019	11/19/2020
Pre-Amplifier	EMC Instruments	EMC184045B	980135	11/20/2019	11/19/2020
Attenuator	Woken	WATT-218FS-10	RF25	11/20/2019	11/19/2020
Highpass Filter	Micro Tronics	BRM50701-01	G008	11/20/2019	11/19/2020
Coaxial Cable	Huber Suhner	SUCOFLEX 104	MY17388/4	11/20/2019	11/19/2020
Coaxial Cable	Huber Suhner	RG 214/U	W22.03	11/20/2019	11/19/2020

## 6.3 Test SET-UP

### (A) Radiated Emission Test Set-UP Frequency Over 1 GHz



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## 6.4 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
2. The EUT was placed on a turn table with 0.8m for frequency < 1GHz and 1.5m for frequency > 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
12. Repeat above procedures until all default test channel measured were complete.

## 6.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

**Where** *FS* = Field Strength

*CL* = Cable Attenuation Factor (Cable Loss)

*RA* = Reading Amplitude

*AG* = Amplifier Gain

*AF* = Antenna Factor

The limit of the emission level is expressed in dBuV/m, which converts  $20 \cdot \log(uV/m)$

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

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## 6.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

## 6.7 Measurement Result

### Note:

1. *Refer to next page spectrum analyzer data chart and tabular data sheets.*
2. *Measurements are completed at peak and average level, the mark of average is the highest emission in restricted bands.*

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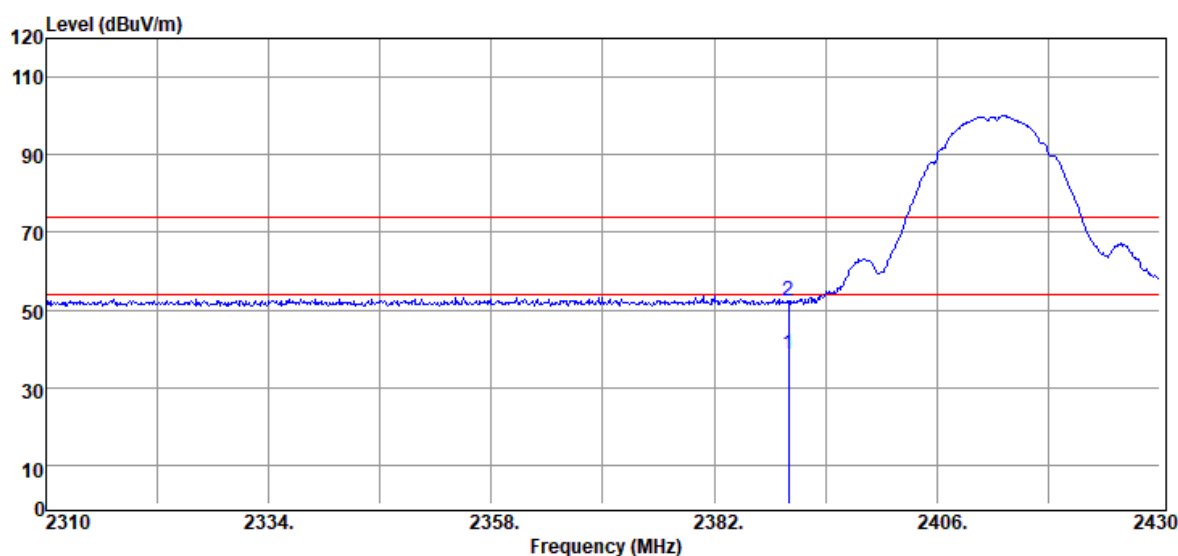
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### 6.7.1 Radiated Band Edge Measurement Result

Report Number :E2/2020/40007  
Operation Mode :802.11b  
Test Frequency :2412 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Ashton



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	34.83	3.76	38.59	54.00	-15.41
2390.00	Peak	48.62	3.76	52.38	74.00	-21.62

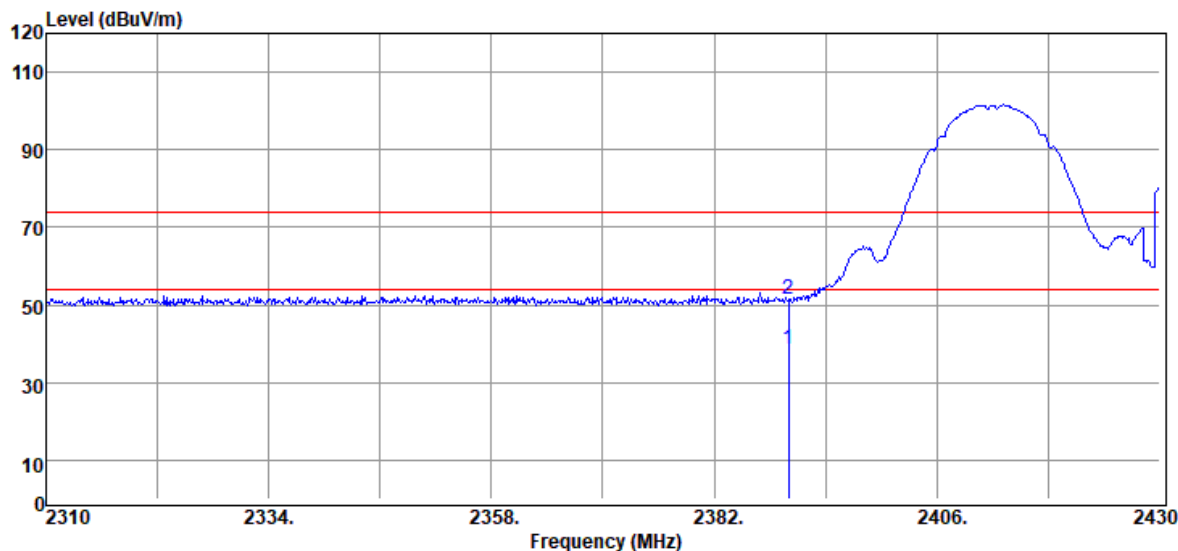
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Report Number :E2/2020/40007  
Operation Mode :802.11b  
Test Frequency :2412 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Ashton


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	35.04	3.76	38.80	54.00	-15.20
2390.00	Peak	47.91	3.76	51.67	74.00	-22.33

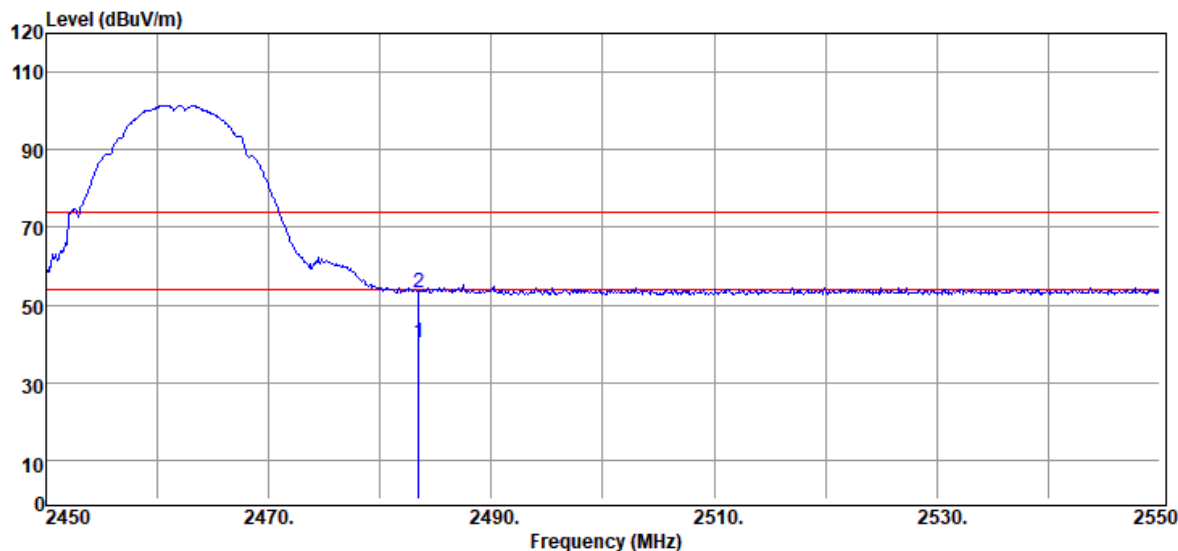
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Report Number :E2/2020/40007  
Operation Mode :802.11b  
Test Frequency :2462 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	35.90	4.42	40.32	54.00	-13.68
2483.50	Peak	48.57	4.42	52.99	74.00	-21.01

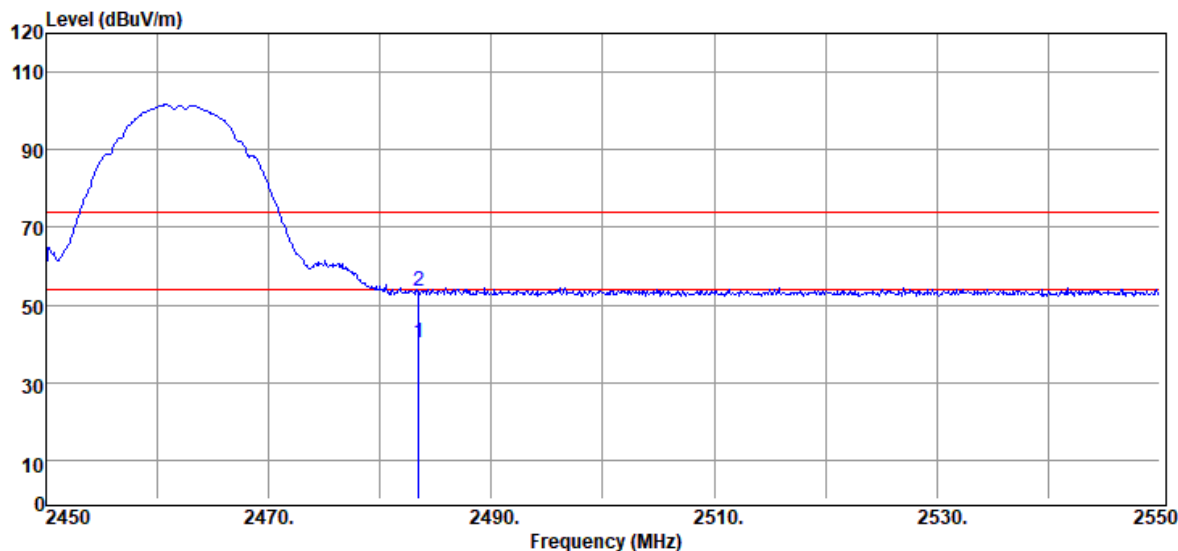
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Report Number :E2/2020/40007  
Operation Mode :802.11b  
Test Frequency :2462 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



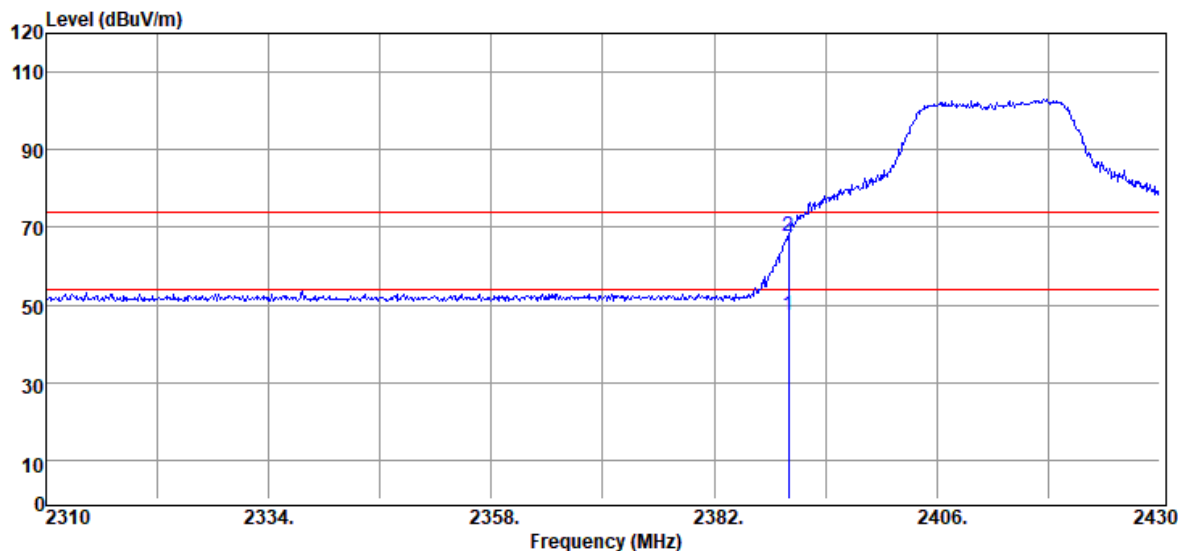
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	35.71	4.42	40.13	54.00	-13.87
2483.50	Peak	48.94	4.42	53.36	74.00	-20.64

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Report Number :E2/2020/40007  
Operation Mode :802.11g  
Test Frequency :2412 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo


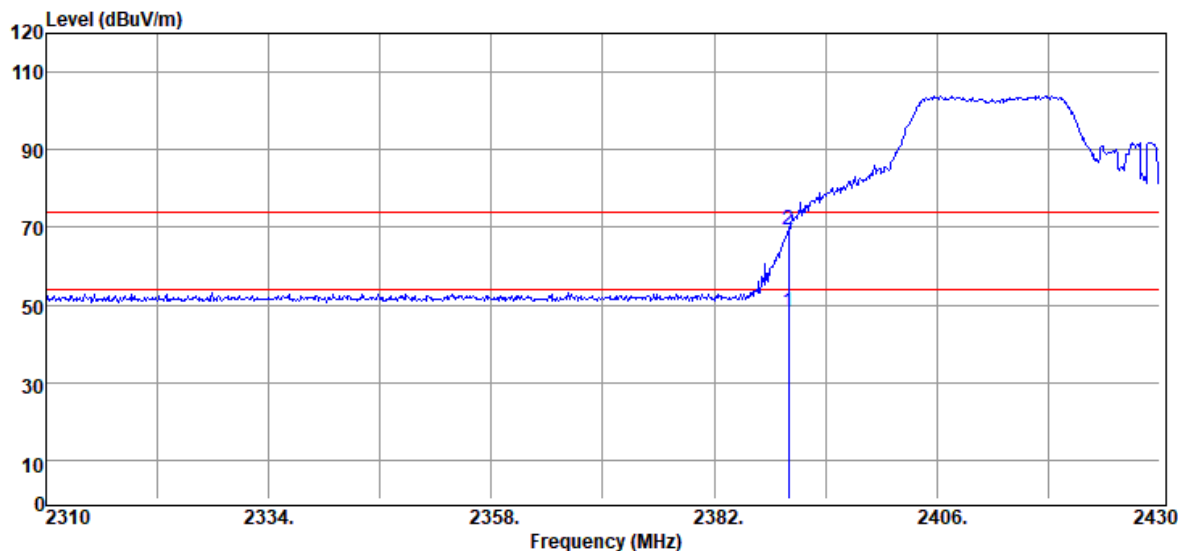
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	43.67	3.76	47.43	54.00	-6.57
2390.00	Peak	63.79	3.76	67.55	74.00	-6.45

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Report Number :E2/2020/40007  
Operation Mode :802.11g  
Test Frequency :2412 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	44.44	3.76	48.20	54.00	-5.80
2390.00	Peak	65.67	3.76	69.43	74.00	-4.57

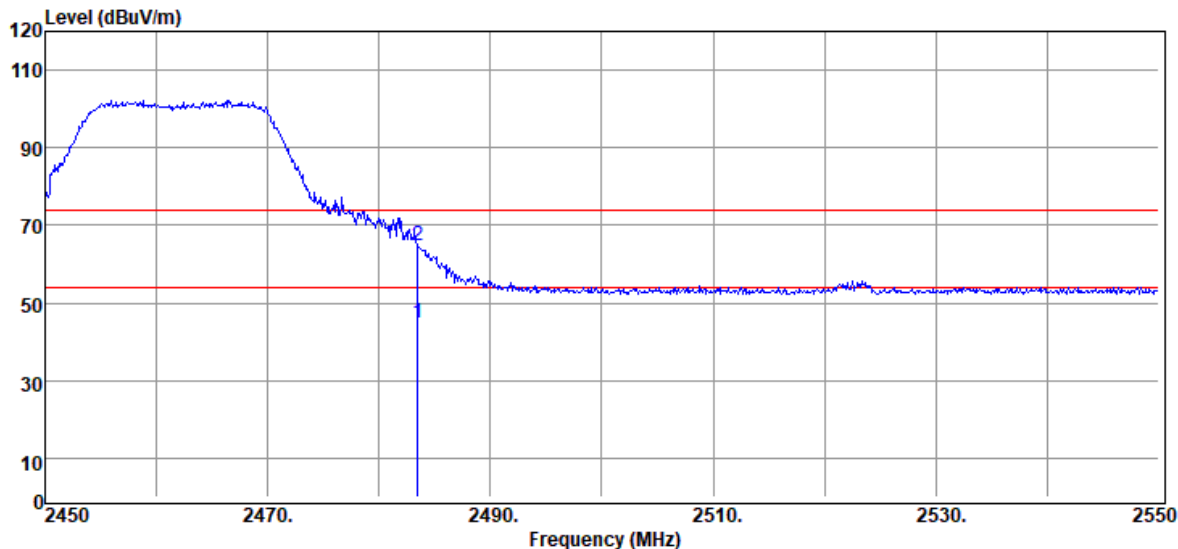
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Report Number :E2/2020/40007  
Operation Mode :802.11g  
Test Frequency :2462 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	40.47	4.42	44.89	54.00	-9.11
2483.50	Peak	60.24	4.42	64.66	74.00	-9.34

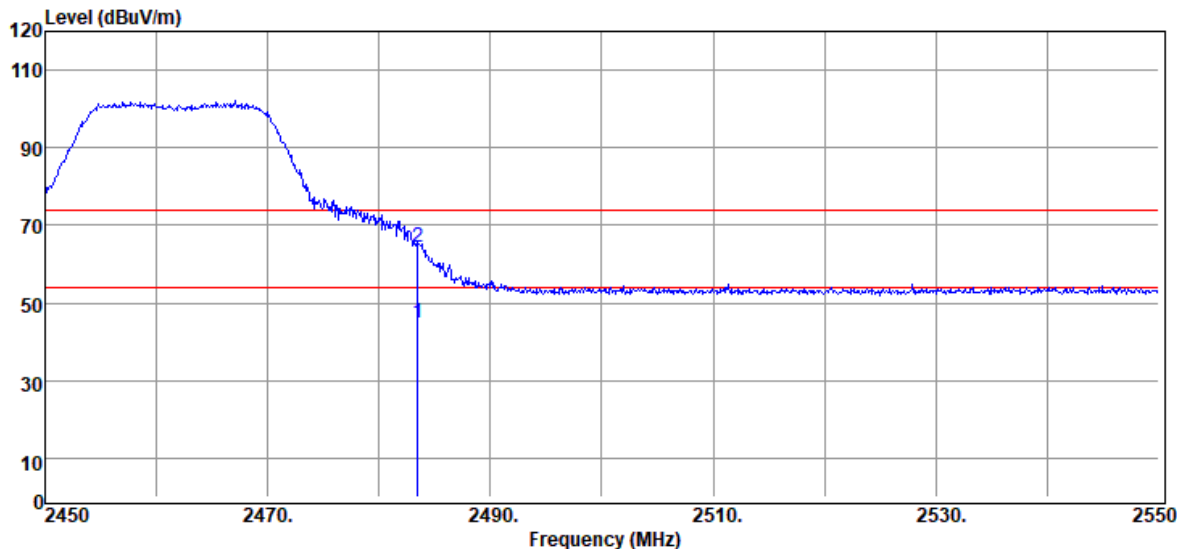
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Report Number :E2/2020/40007  
Operation Mode :802.11g  
Test Frequency :2462 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	40.28	4.42	44.70	54.00	-9.30
2483.50	Peak	59.79	4.42	64.21	74.00	-9.79

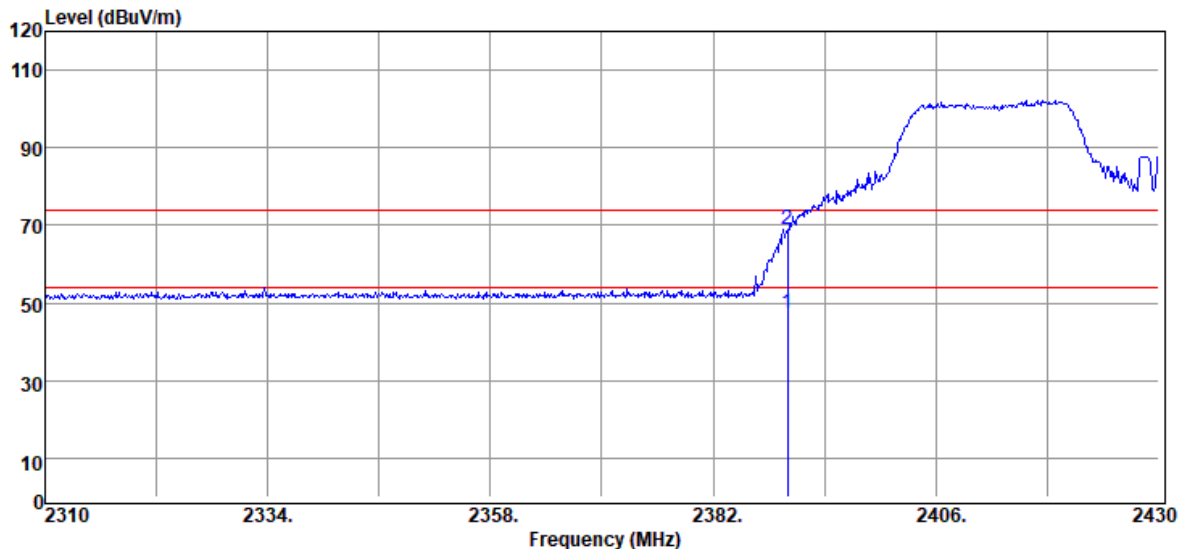
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Report Number :E2/2020/40007  
Operation Mode :802.11n20  
Test Frequency :2412 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	43.55	3.76	47.31	54.00	-6.69
2390.00	Peak	65.12	3.76	68.88	74.00	-5.12

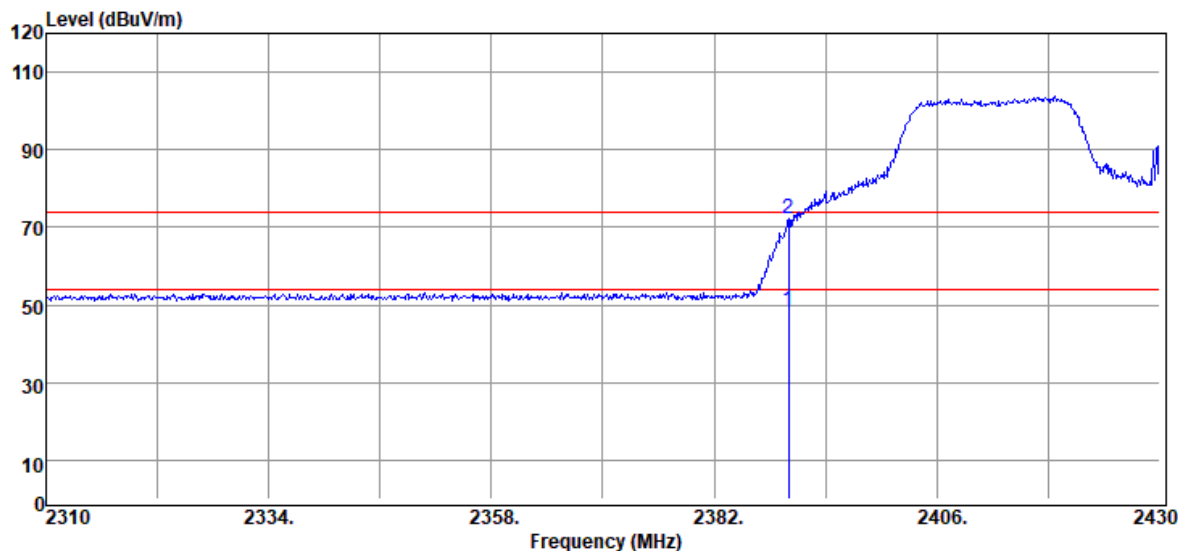
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Report Number :E2/2020/40007  
Operation Mode :802.11n20  
Test Frequency :2412 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo


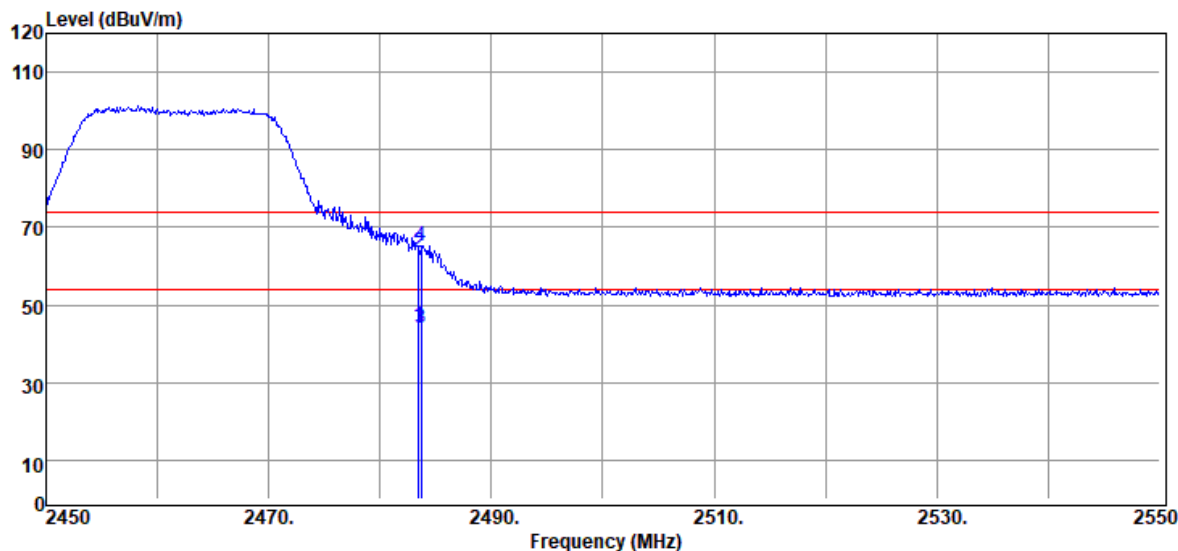
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	45.03	3.76	48.79	54.00	-5.21
2390.00	Peak	68.30	3.76	72.06	74.00	-1.94

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Report Number :E2/2020/40007  
Operation Mode :802.11n20  
Test Frequency :2462 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo


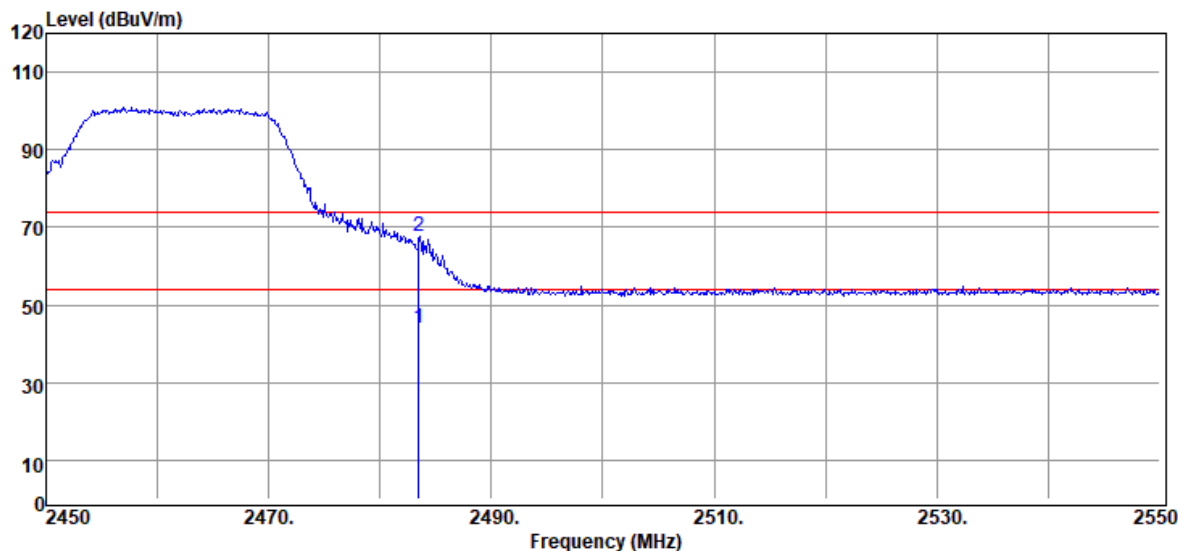
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	40.15	4.42	44.57	54.00	-9.43
2483.50	Peak	58.97	4.42	63.39	74.00	-10.61
2483.70	Average	39.72	4.43	44.15	54.00	-9.85
2483.70	Peak	60.92	4.43	65.35	74.00	-8.65

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Report Number :E2/2020/40007  
Operation Mode :802.11n20  
Test Frequency :2462 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo


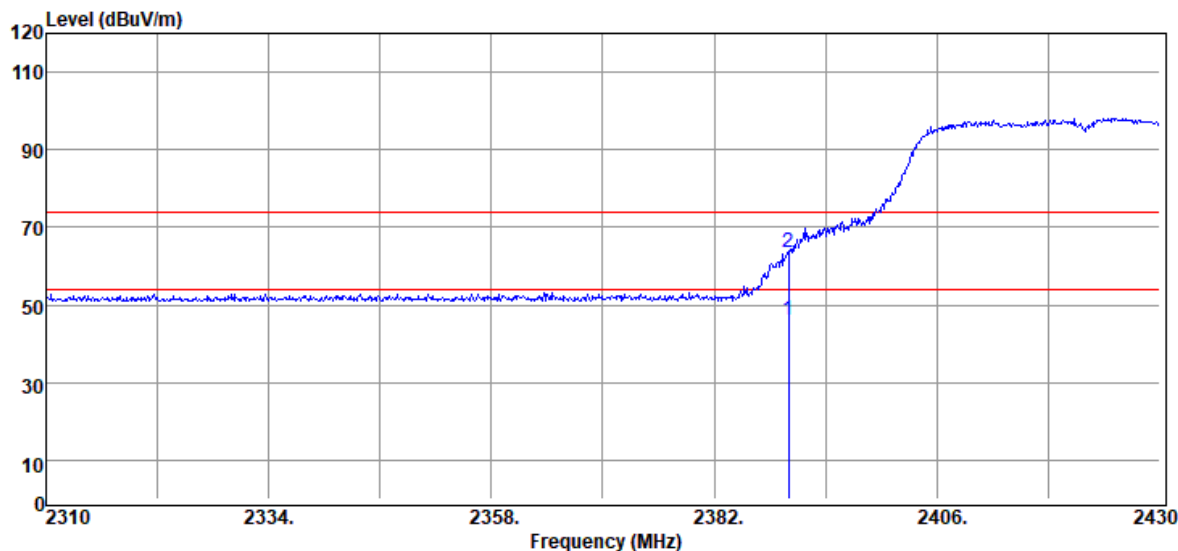
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	39.71	4.42	44.13	54.00	-9.87
2483.50	Peak	63.23	4.42	67.65	74.00	-6.35

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Report Number :E2/2020/40007  
Operation Mode :802.11n40  
Test Frequency :2422 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo


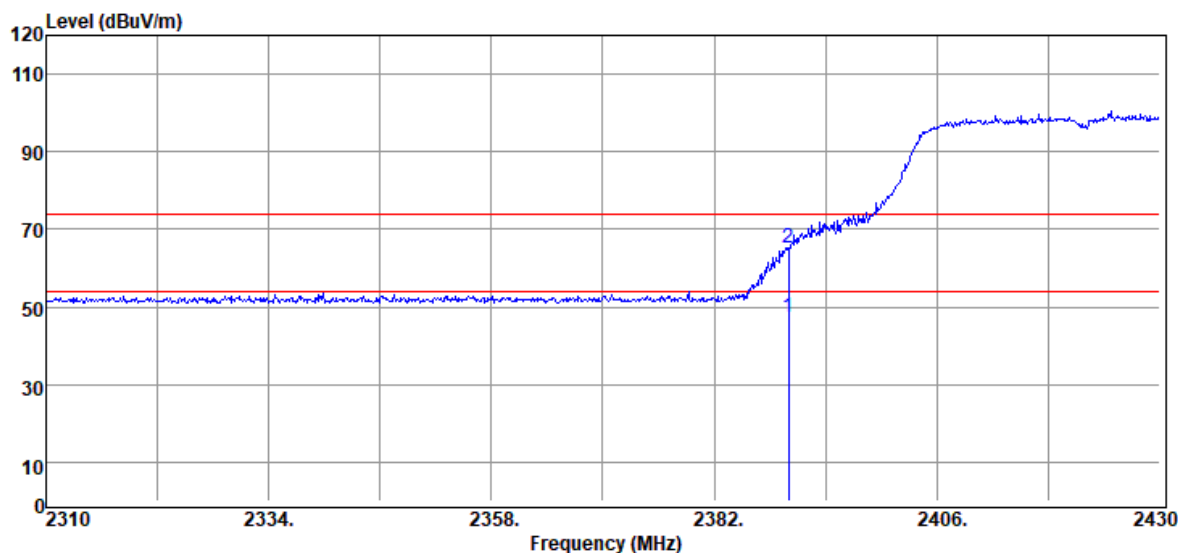
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	42.34	3.76	46.10	54.00	-7.90
2390.00	Peak	59.85	3.76	63.61	74.00	-10.39

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Report Number :E2/2020/40007  
Operation Mode :802.11n40  
Test Frequency :2422 MHz  
Test Mode :BE CH LOW  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo


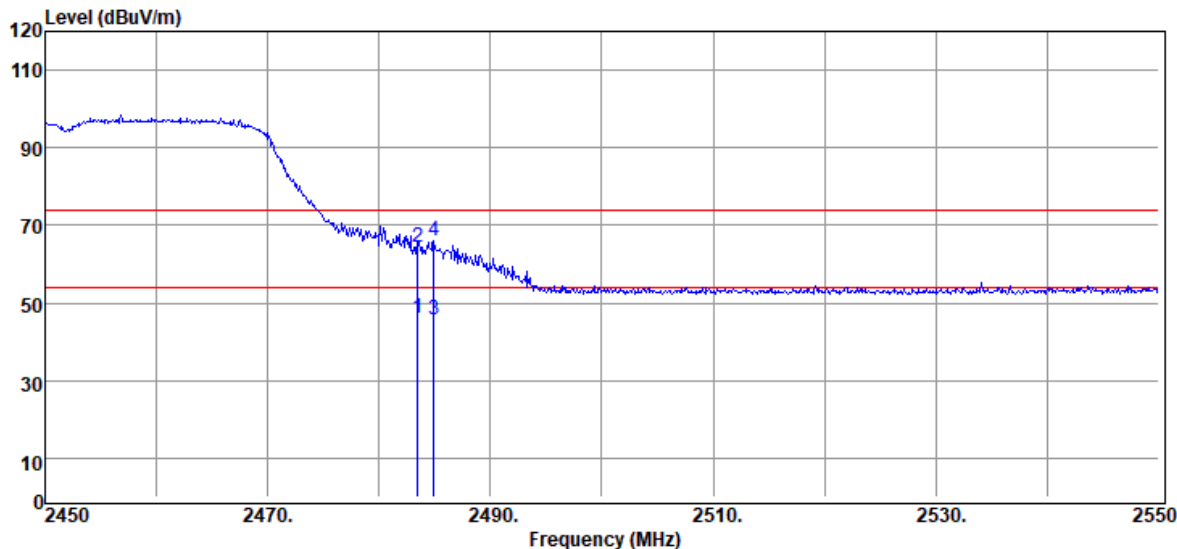
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2390.00	Average	43.45	3.76	47.21	54.00	-6.79
2390.00	Peak	61.45	3.76	65.21	74.00	-8.79

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Report Number :E2/2020/40007  
Operation Mode :802.11n40  
Test Frequency :2452 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :VERTICAL  
Engineer :Enzo


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	41.84	4.42	46.26	54.00	-7.74
2483.50	Peak	60.06	4.42	64.48	74.00	-9.52
2484.90	Average	41.32	4.45	45.77	54.00	-8.23
2484.90	Peak	61.53	4.45	65.98	74.00	-8.02

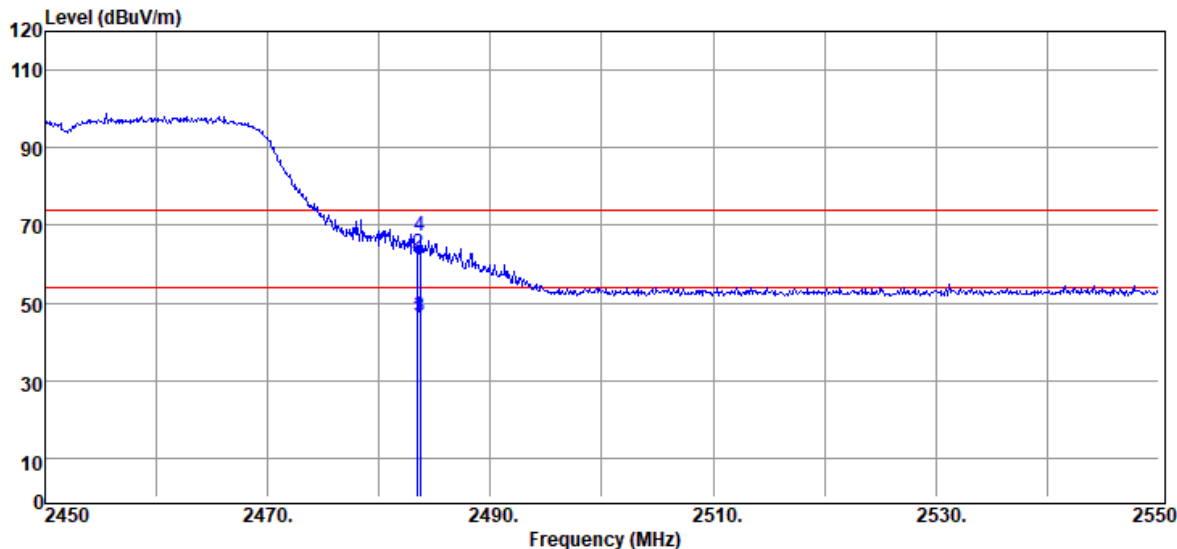
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Report Number :E2/2020/40007  
Operation Mode :802.11n40  
Test Frequency :2452 MHz  
Test Mode :BE CH HIGH  
EUT Pol :E1 Plan

Test Date :2020-04-28  
Temp./Humi. :22.5/62  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	Average	41.84	4.42	46.26	54.00	-7.74
2483.50	Peak	58.24	4.42	62.66	74.00	-11.34
2483.70	Average	41.89	4.43	46.32	54.00	-7.68
2483.70	Peak	62.70	4.43	67.13	74.00	-6.87

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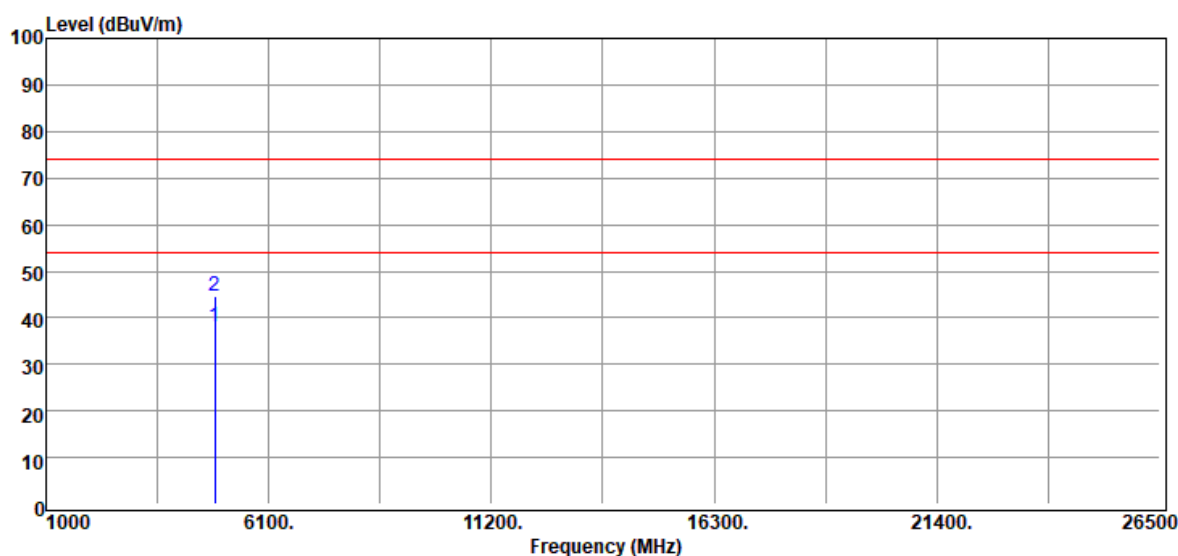
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## 6.7.2 Above 1GHz Worst-Case Emission:

Report Number :E2/2020/40007  
Operation Mode :802.11b  
Test Frequency :2437 MHz  
Test Mode :TX CH MID  
EUT Pol :E1 Plan

Test Date :2020-04-29  
Temp./Humi. :25.8/52  
Antenna Pol. :VERTICAL  
Engineer :Enzo



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4874.00	Average	23.76	14.19	37.95	54.00	-16.05
4874.00	Peak	30.30	14.19	44.49	74.00	-29.51

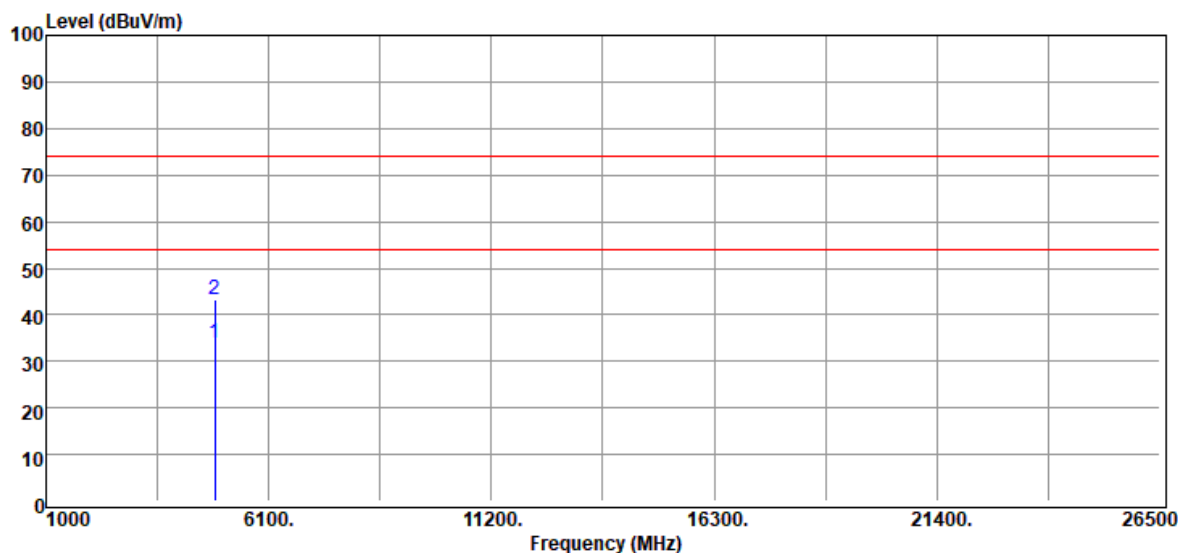
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Report Number :E2/2020/40007  
Operation Mode :802.11b  
Test Frequency :2437 MHz  
Test Mode :TX CH MID  
EUT Pol :E1 Plan

Test Date :2020-04-29  
Temp./Humi. :25.8/52  
Antenna Pol. :HORIZONTAL  
Engineer :Enzo


Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode	Reading Level		FS	@3m	
	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
4874.00	Average	19.55	14.19	33.74	54.00	-20.26
4874.00	Peak	29.07	14.19	43.26	74.00	-30.74

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## 7 ANTENNA REQUIREMENT

### 7.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

### 7.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo for details.

*~ End of Report ~*

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