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CERTIFICATION TEST REPORT

Manufacturer: Securus Technologies
4000 International Parkway
Carrollton, Texas 75007 USA

Applicant: Same As Above

Product Name: JP6S

Product Description: 7" Lithium Capacitive Touch Tablet for the correctional environment

Operating Voltage/Freq. of EUT During Testing: 5V @ 2.5A Adaptor/Battery

Model: JP6S

FCC ID: 2AUJ4JP6S2

Testing Commenced: 2021-02-01

Testing Ended: 2021-02-12

Summary of Test Results: **In Compliance**

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

Standards:

- **FCC Part 15 Subpart C, Section 15.247**
- **FCC15.207 - Conducted Limits**
- **FCC Part 15.31(e)**
- **ANSI C63.10:2013**



Order Number: F2P24999

Applicant: Securus Technologies
Model: JP6S

Evaluation Conducted by:

Julius Chiller, EMC/Wireless Engineer

Report Reviewed by:

Ken Littell, Vice President of EMC

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of DTS operating under Section 15.247 and in KDB558074. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor. Note: Only measurements listed below which relate to tests included in this Test Report are applicable to it.

Measurement Range	Expanded Uncertainty	Combined Uncertainty
Radiated Emissions <1 GHz @ 3m	±5.07dB	±2.54
Radiated Emissions <1 GHz @10m	±5.09dB	±2.55
Radiated Emissions 1 GHz to 2.7 GHz	±3.62dB	±1.81
Radiated Emissions 2.7 GHz to 18 GHz	±3.10dB	±1.55
AC Power Line Conducted Emissions, 150kHz to 30 MHz	±2.76dB	±1.38

This Uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P24999-01E	First Issue	2021-02-26	K. Littell

**2 SUMMARY OF TEST RESULTS**

Test Name	Standard(s)	Results
Occupied Bandwidth: -6dB 99%	CFR 47 Part 15.247(a)(2) / KDB558074	Complies Complies
Conducted Output Power	CFR 47 Part 15.247(b)(3) / KDB558074	Complies
Voltage Variations	CFR 47 Part 15.31(e)	Complies
Conducted Spurious Emissions	CFR 47 Part 15.247(d) / Part 15.207 / KDB558074	Complies
Radiated Spurious Emission	CFR 47 Part 15.247(d) / Part 15.209 / KDB558074	Complies
Peak Power Spectral Density	CFR 47 Part 15.247(e) / KDB558074	Complies
Frequency Separation	ANSI 63.10 2013 (7.8.2)	N/A
Number of Hopping Frequencies	ANSI 63.10 2013 (7.8.3)	N/A
Dwell Time	ANSI 63.10 2013 (7.8.4)	N/A
Conducted Emissions	CFR 47 Part 15.207(a)	Complies

Modifications Made to the Equipment
None

**3 TABLE OF MEASURED RESULTS****Bluetooth (GFSK)**

Test		Low Channel 2402 MHz	Mid Channel 2440 MHz	High Channel 2480 MHz
Conducted Output Power		6.20mW (7.93dBm)	6.44mW (8.09dBm)	6.31mW (8.00dBm)
Conducted Output Power Limit		1 Watt, (30dBm)	1 Watt, (30dBm)	1 Watt, (30dBm)
E.I.R.P. with 2.0dBi Integral Antenna		9.84mW (9.93dBm)	10.21mW (10.09dBm)	10.00mW (10.00dBm)
E.I.R.P. Limit		4 Watts, (36.02dBm)	4 Watts, (36.02dBm)	4 Watts, (36.02dBm)
Peak Power Spectral Density		-6.92 dBm	-6.73 dBm	-6.83 dBm
Peak Power Spectral Density Limit		8 dBm	8 dBm	8 dBm
-6dB Occupied Bandwidth		0.729 MHz	0.724 MHz	0.727 MHz
99% Occupied Bandwidth		1.047 MHz	1.042 MHz	1.045 MHz
Occupied Bandwidth Limit		≥ 500kHz	≥ 500kHz	≥ 500kHz
Voltage Variations	-15%	7.83dBm	8.4dBm	7.97dBm
	+15%	7.84dBm	8.39dBm	7.94dBm
Limit		1W 30dBm	1W 30dBm	1W 30dBm



Wi-Fi, 2.4 GHz (CCK 11mbps)

Test		Low Channel 2412 MHz	Mid Channel 2442 MHz	High Channel 2462 MHz
Conducted Output Power, Power Set 14	CCK, 11mbps	35.97mW / 15.56dBm	36.14mW / 15.58dBm	36.89mW / 15.67dBm
Conducted Output Power Limit		1 Watt / 30dBm	1 Watt / 30dBm	1 Watt / 30dBm
E.I.R.P. with 2dBi Integral Antenna, Power Set 14	CCK, 11mbps	57.01mW / 17.56dBm	57.2mW / 17.58dBm	58.5mW / 17.67dBm
E.I.R.P. Limit		4000mW / 36dBm	4000mW / 36dBm	4000mW / 36dBm
Peak Power Spectral Density		-8.33dBm	-7.69dBm	-7.17dBm
Peak Power Spectral Density Limit		8dBm	8dBm	8dBm
-6dB Occupied Bandwidth		9.187 MHz	9.913 MHz	8.992 MHz
99%dB Occupied Bandwidth		12.367 MHz	12.415 MHz	12.319 MHz
Occupied Bandwidth Limit		≥ 500kHz	≥ 500kHz	≥ 500kHz
Voltage Variations	-15%	20.55dBm	20.52dBm	20.71dBm
	+15%	20.43dBm	20.66dBm	20.72dBm
Limit		1W 30dBm	1W 30dBm	1W 30dBm



4 ENGINEERING STATEMENT

This report has been prepared on behalf of Securus Technologies to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.247 of the FCC Rules using ANSI C63.10:2013 and KDB558074 standards. The test results found in this test report relate only to the items tested.



5 EUT INFORMATION AND DATA

5.1 Equipment Under Test:

Product: Tablet

Model: JP6S

Serial No.: 0123456789ABCDEF

FCC ID: **2AUJ4JP6S2**

5.2 Trade Name:

Securus Technologies

5.3 Power Supply:

Securus AC Adapter, model MX15X1-0502500UX

5.4 Applicable Rules:

CFR 47, Part 15.247, subpart C

5.5 Equipment Category:

Radio Transmitter-DTS

5.6 Antenna:

Integral, 2.0dBi Gain

5.7 Accessories:

N/A

5.8 Test Item Condition:

The equipment to be tested was received in good condition.

5.9 Testing Algorithm:

EUT was set to provide a continuous modulated signal in the 2.4 GHz BLE and Wifi bands. For RF antenna conducted tests, the EUT was equipped with an SMA connector for connection to the measuring equipment. For radiated emissions tests in a semi-anechoic chamber, the EUT was equipped with integral/internal antenna. The highest emissions were recorded in the data tables.

**6 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	AlbatrossProjects	B83117-DF435-T261	US140023	2021-02-28
Temp/Hum. Recorder	CL263	Extech	445814	06	2021-03-31
Temp/Hum. Recorder	CL261	Extech	445814	04	2021-03-31
Spectrum Analyzer	CL138	Agilent Technologies	E4407B	US41192779	Verified
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2021-10-06
Horn Antenna	CL098	Emco	3115	9809-5580	2022-01-08
Pre-Amplifier	CL285	AH Systems	PAM-0207	322	2021-11-04
Pre-Amplifier	CL250	Com-Power	PAM-118A	18040011	2021-06-01
Antenna, JB3 Combination	CL175	Sunol Sciences	JB3	A030315	2021-11-05
Antenna, Horn	CL114	A. H. Systems, Inc.	SAS-572	237	2021-02-04
Transient Limiter	CL102	Hewlett Packard	11947A	3107A03325	2021-02-17
Software:	Tile Version 3.4.B.3.		Software Verified: 2021-02-08		
Spectrum Analyzer	CL147	Agilent	E7402A	MY45101241	2021-03-31
LISN	CL184	Com-Power	LI-125A	191213	2023-11-02
LISN	CL185	Com-Power	LI-125A	191214	2023-11-02
Low Loss Cable Set	--	Pasternack	PE3C0666-252 / PE3C066-50CM	None Spec.	2023-10-12



7 OCCUPIED BANDWIDTH

7.1 Requirements:

The -6dB bandwidth shall be greater than 500 kHz.

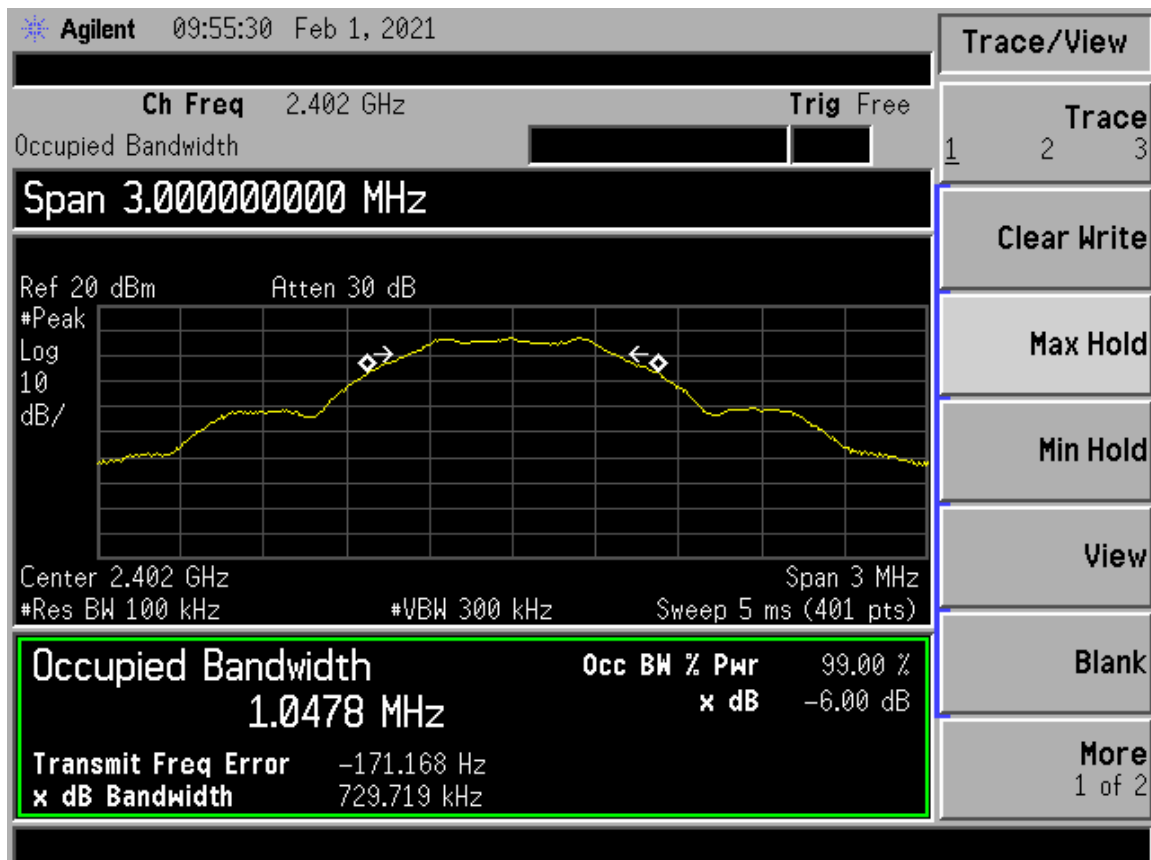
Bandwidth measurements were made at the low, mid and upper frequencies with the resolution Bandwidth set according to KDB558074. The bandwidth was measured using the analyzer's OBW measurement function.



7.2 Occupied Bandwidth Test Data

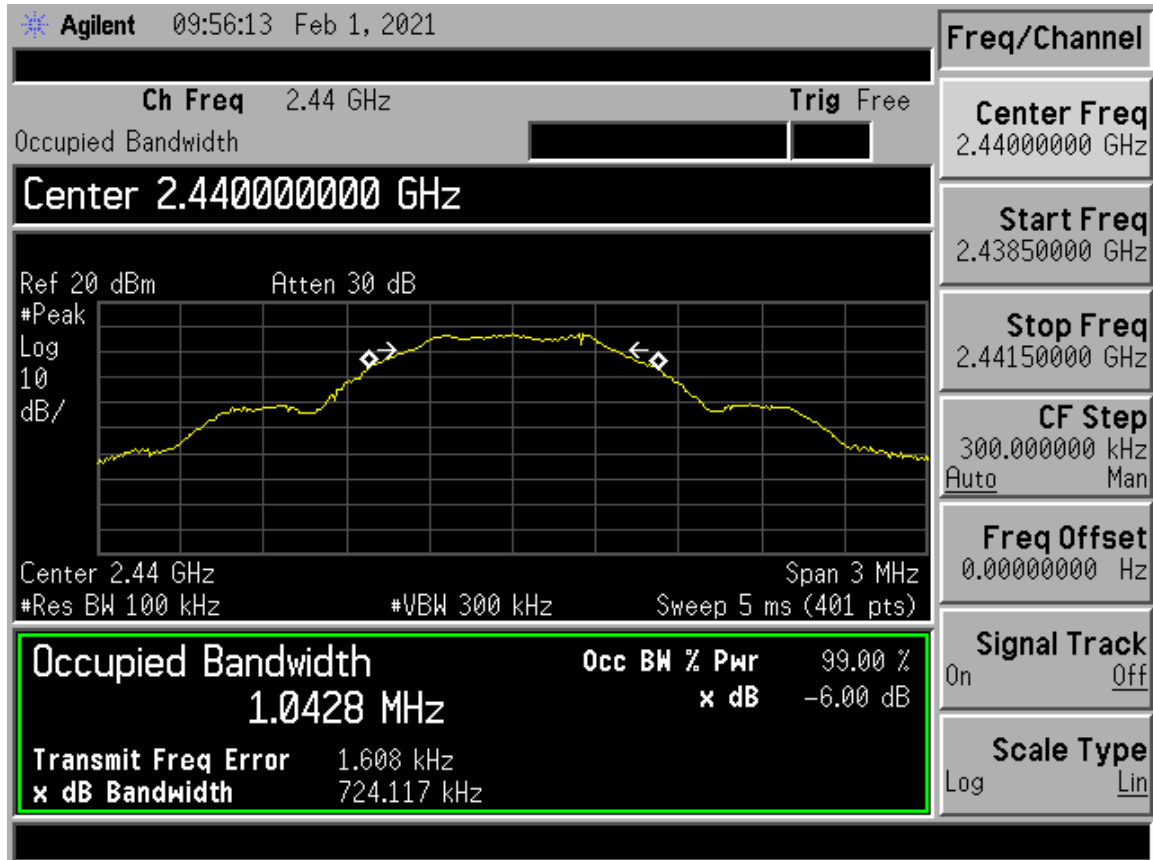
Test Date:	2021-02-01	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(a)(2); KDB558074	Air Temperature:	20.6°C
		Relative Humidity:	37%

Bluetooth: GFSK, Low Channel



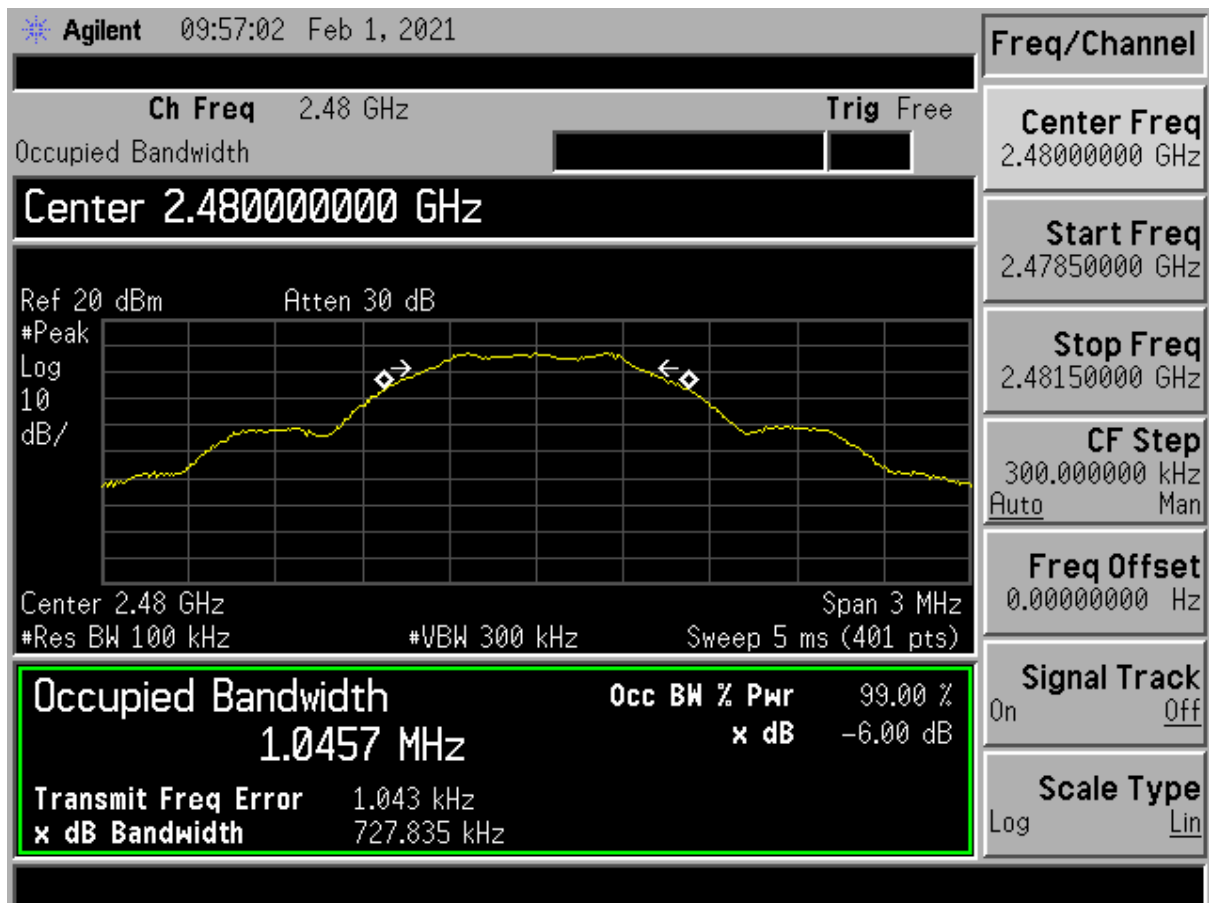


Bluetooth: GFSK, Mid Channel



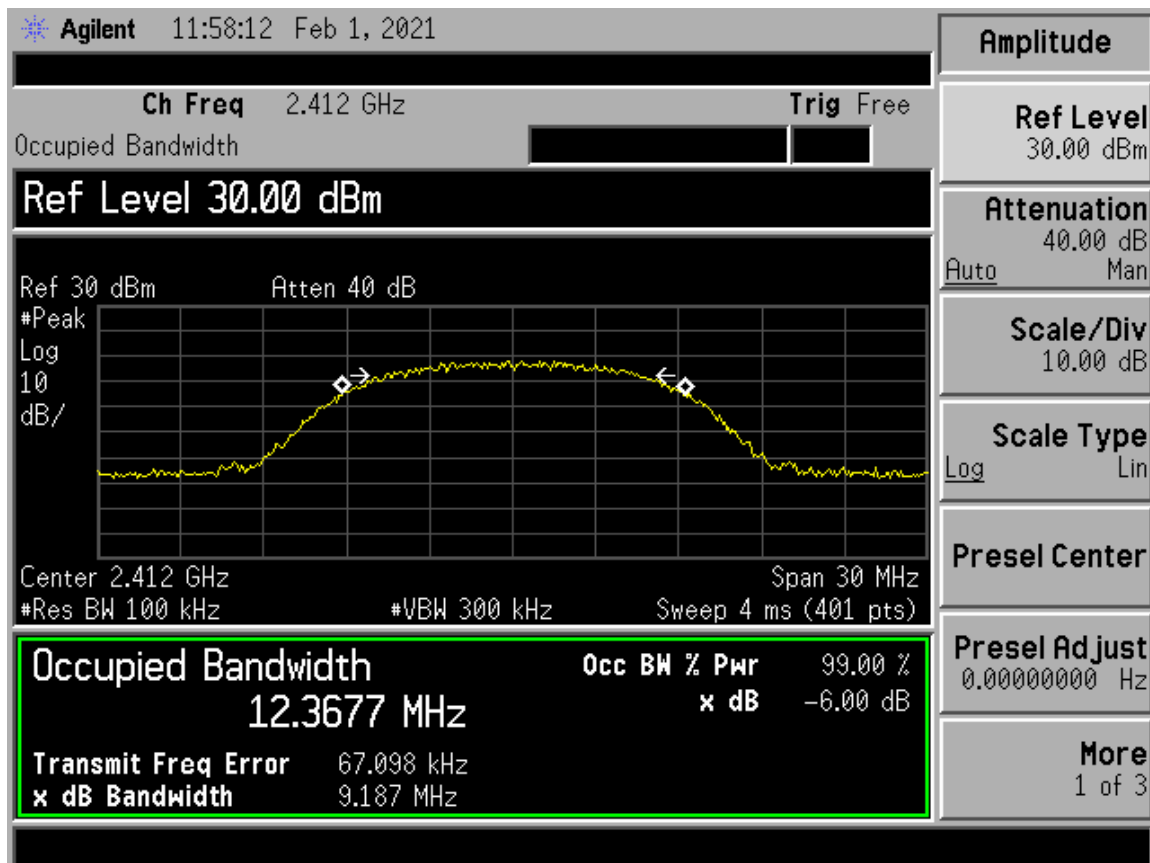


Bluetooth: GFSK, High Channel



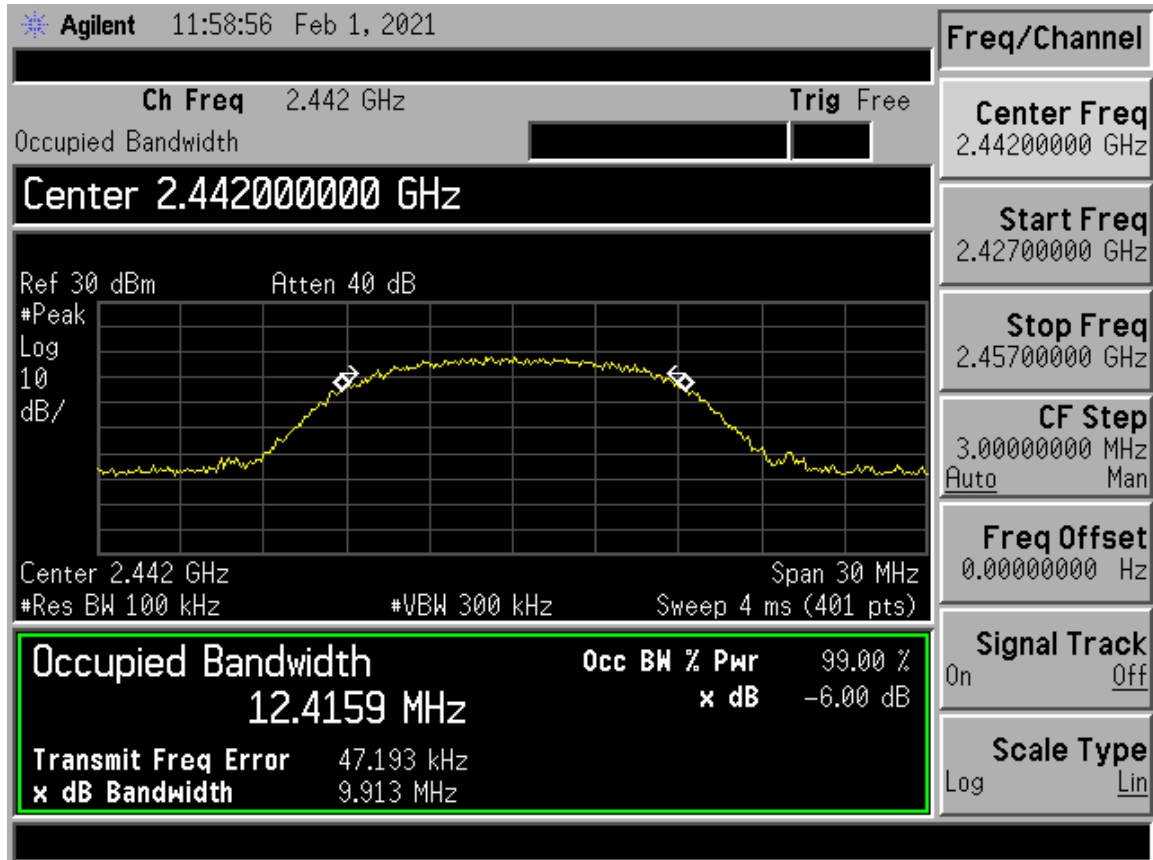


Wi-Fi, 2.4 GHz - CCK: Low Channel



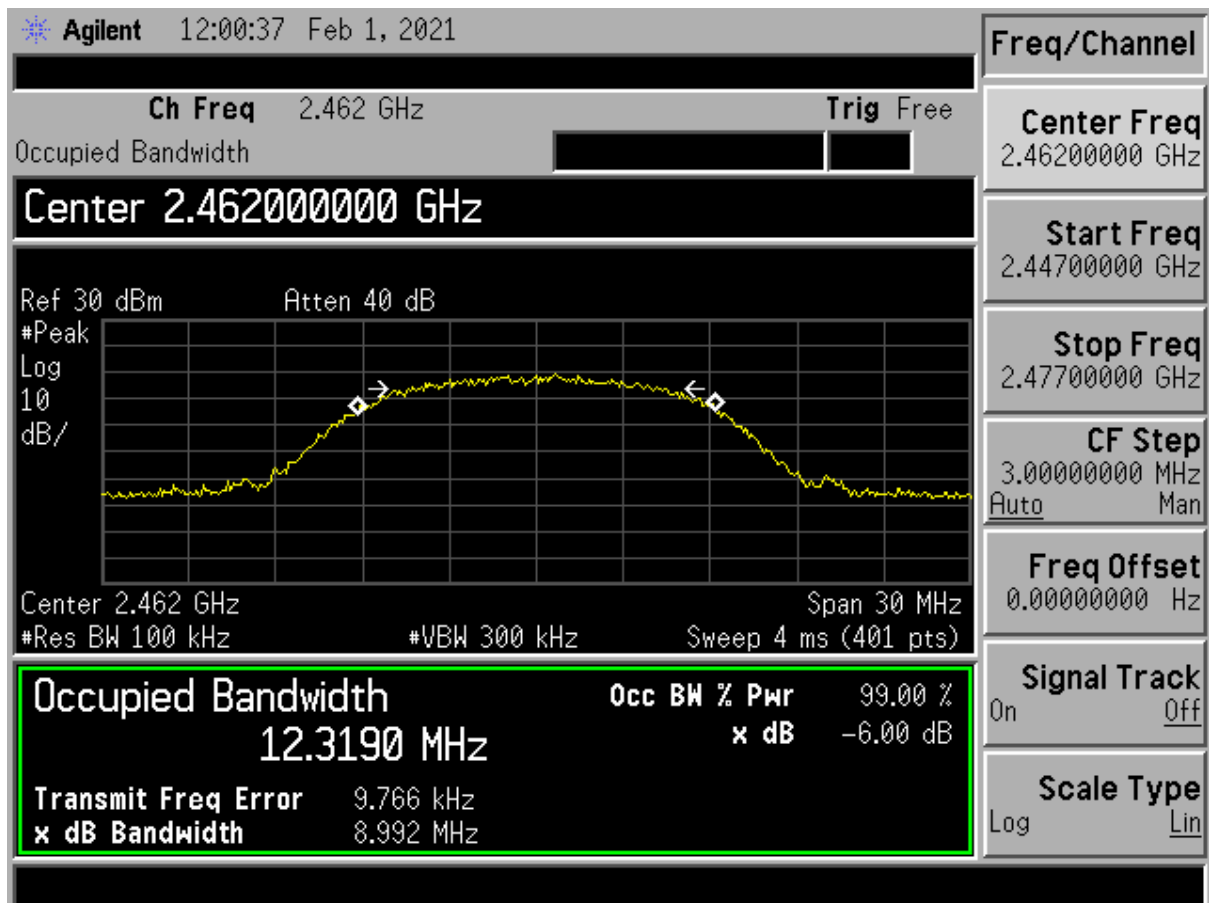


Wi-Fi, 2.4 GHz - CCK: Mid Channel





Wi-Fi, 2.4 GHz - CCK: High Channel





8 CONDUCTED OUTPUT POWER

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the receiver. The peak power output was measured.

8.1 Requirements:

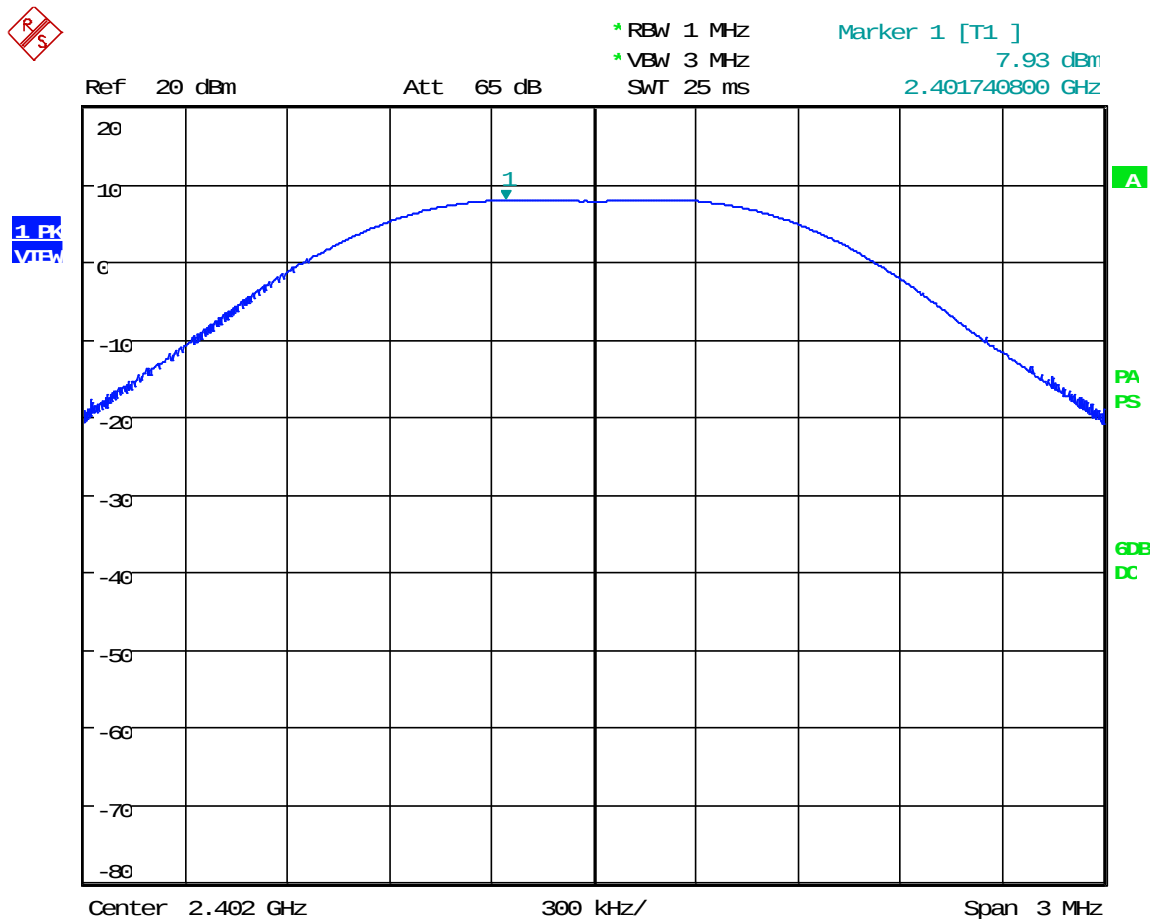
The peak power output shall be 1 watt (30 dBm) or less when using an antenna with a gain of less than 6dBi. For antennas having a gain of more than 6dBi, the limit is reduced by 1dB for every dB the antenna gain is over 6dBi.



8.2 Conducted Output Power Test Data

Test Date:	2021-02-01	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(b)(3); KDB558074	Air Temperature:	20.4°C
		Relative Humidity:	28%

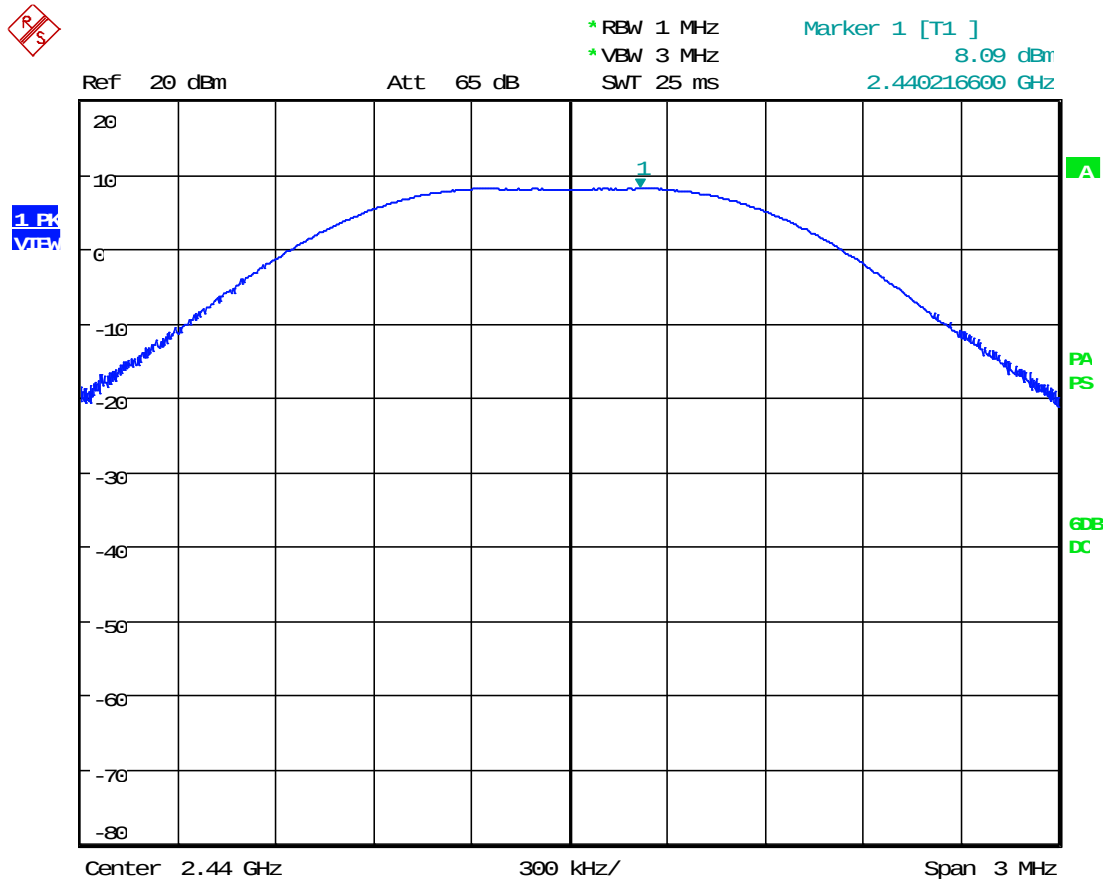
Bluetooth: Low Channel



Date: 1.FEB.2021 11:12:47



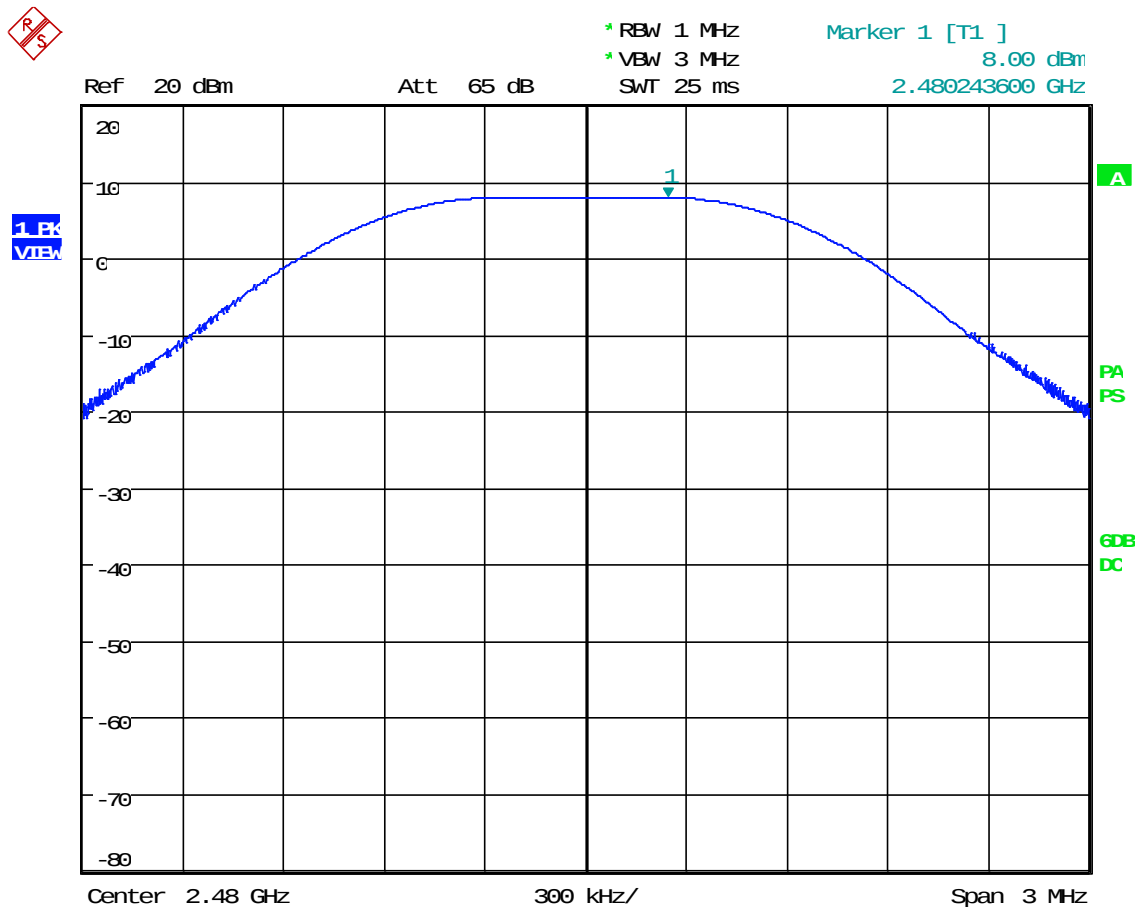
Bluetooth: Mid Channel



Date: 1.FEB.2021 11:13:47



Bluetooth: High Channel



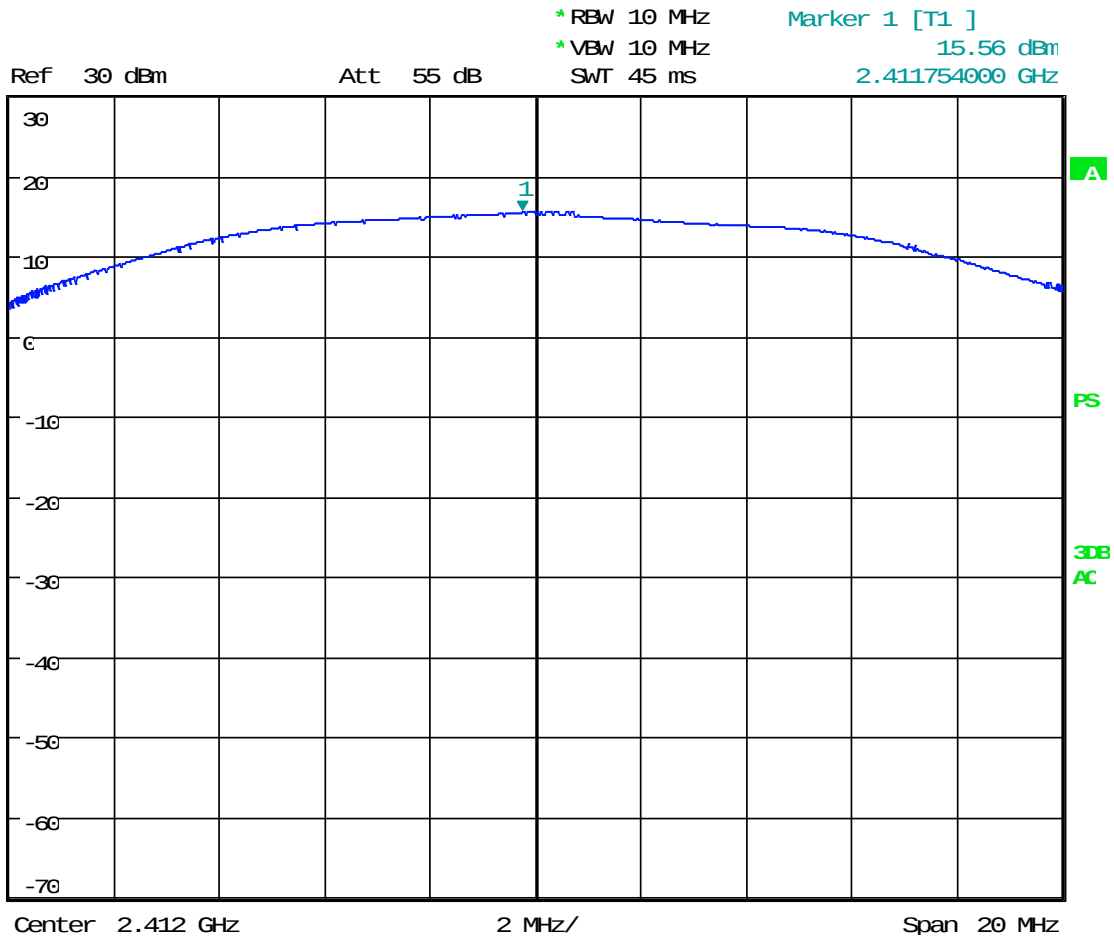
Date: 1.FEB.2021 11:14:48



Wi-Fi, 2.4 GHz - CCK: Low Channel



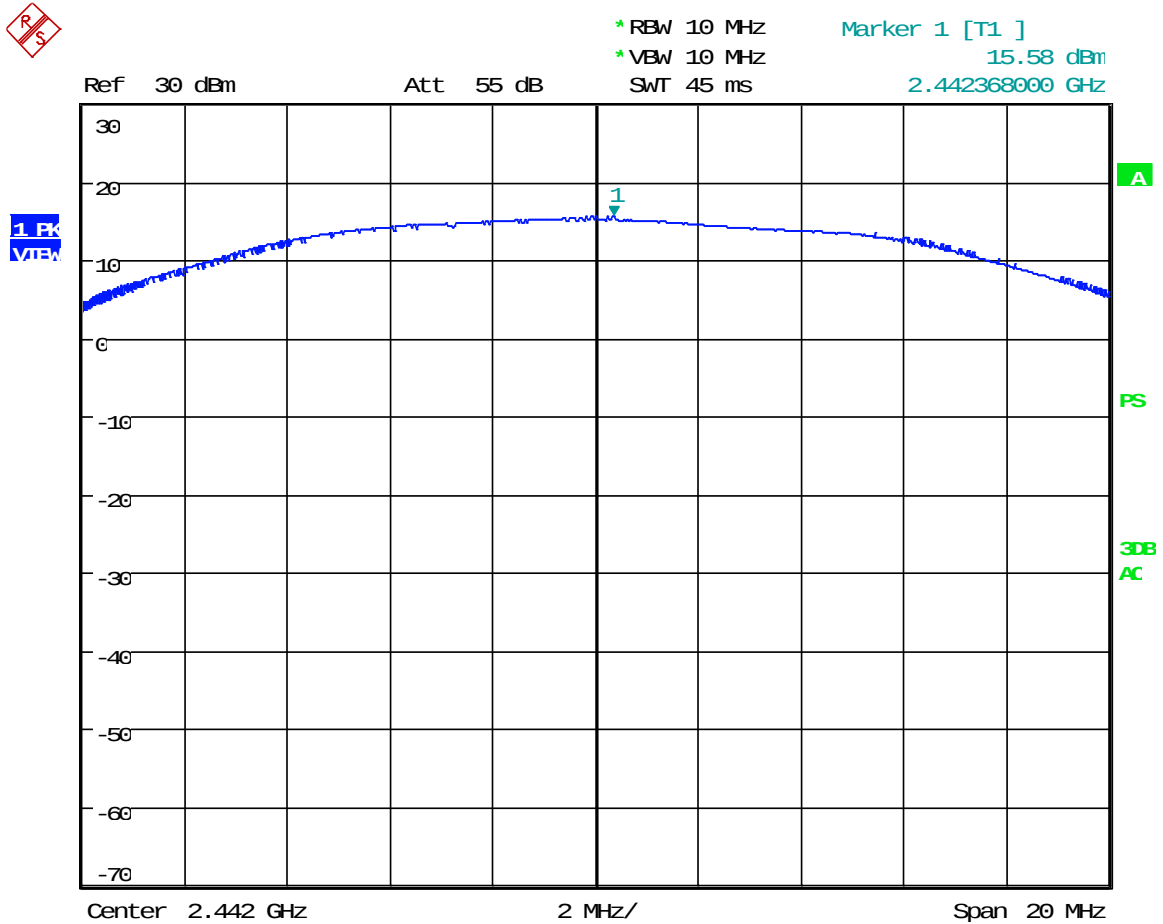
1 PK
MAX



Date: 1.FEB.2021 16:37:37



Wi-Fi, 2.4 GHz - CCK: Mid Channel



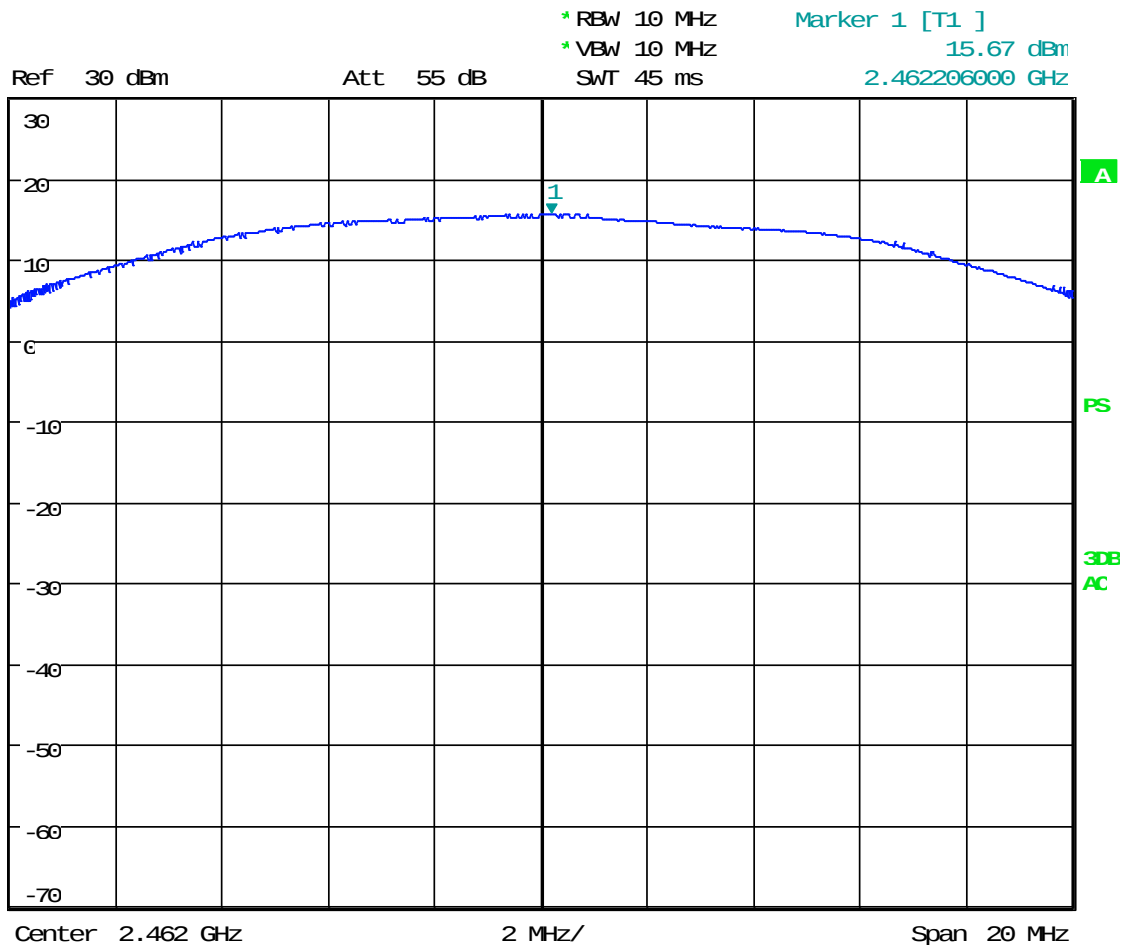
Date: 1.FEB.2021 16:38:52



Wi-Fi, 2.4 GHz - CCK: High Channel



1 PK
VIEW



Date: 1.FEB.2021 16:39:46



9 VOLTAGE VARIATIONS

9.1 Requirements

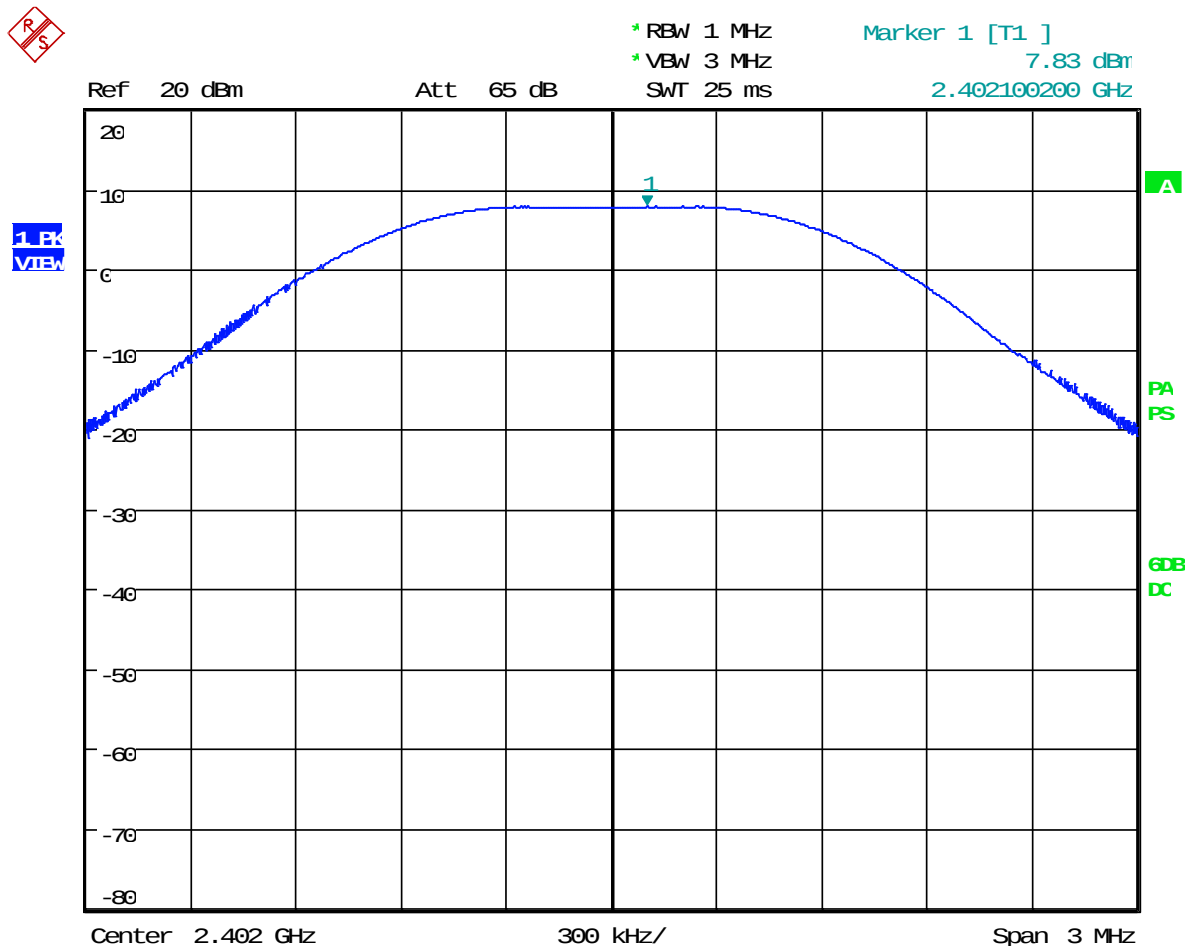
For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery-operated equipment, the equipment tests shall be performed using a new battery.



9.2 Voltage Variations Test Data

Test Date(s):		Test Engineer:	J. Chiller
Rule:	15.31(e)	Air Temperature:	°C
Test Results:	Complies	Relative Humidity:	%

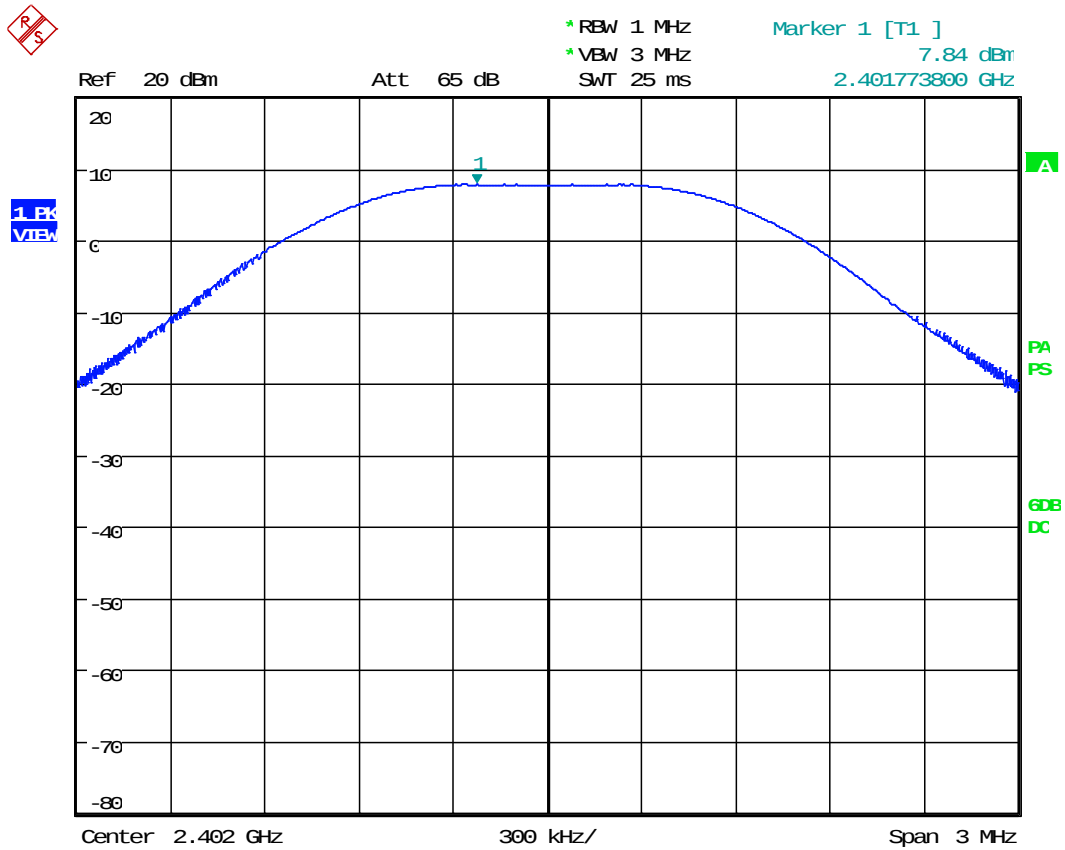
Bluetooth, Low Channel @ 85%



Date: 1.FEB.2021 11:20:27



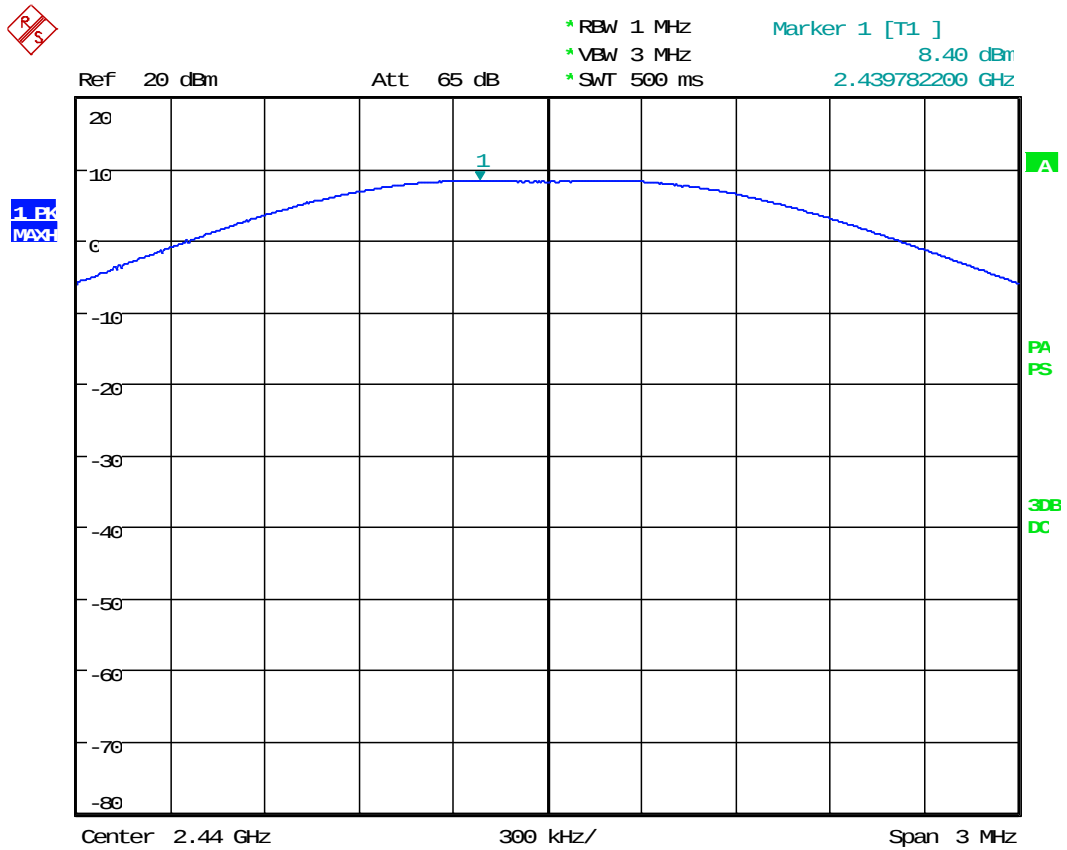
Bluetooth, Low Channel @ 115%



Date: 1.FEB.2021 11:19:35



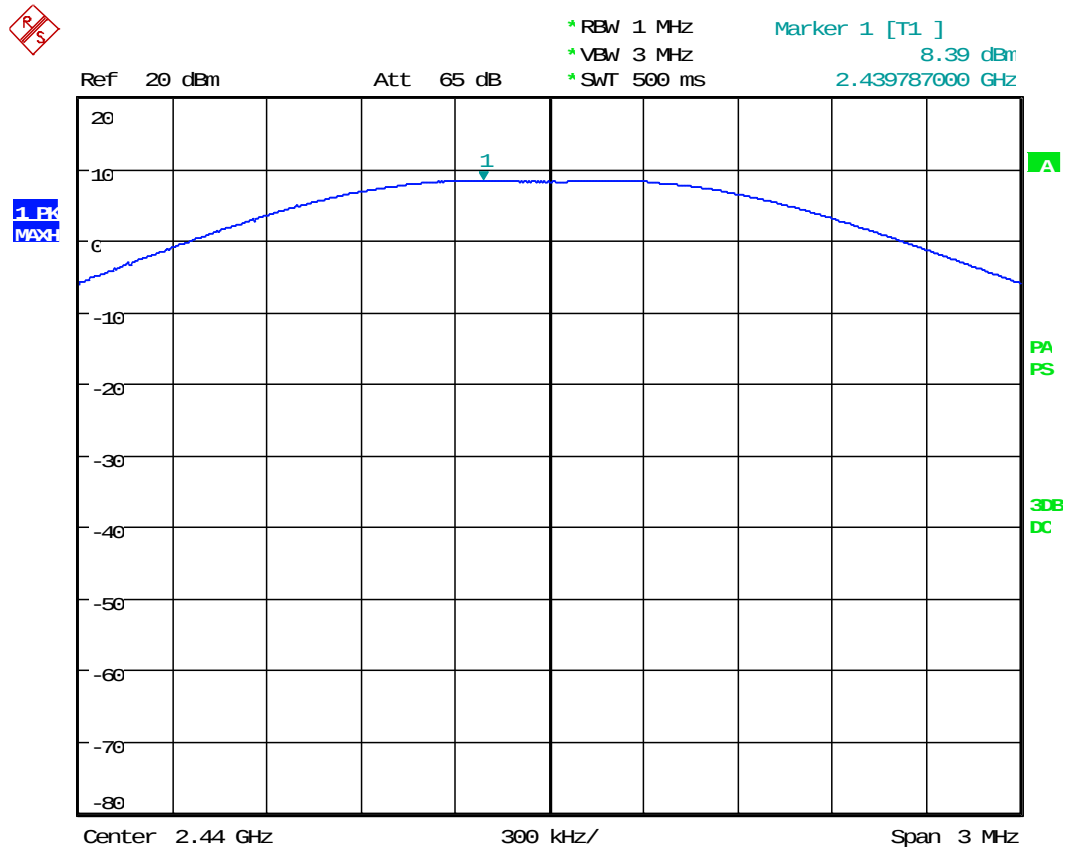
Bluetooth, Mid Channel @ 85%



Date: 1.FEB.2021 12:03:56



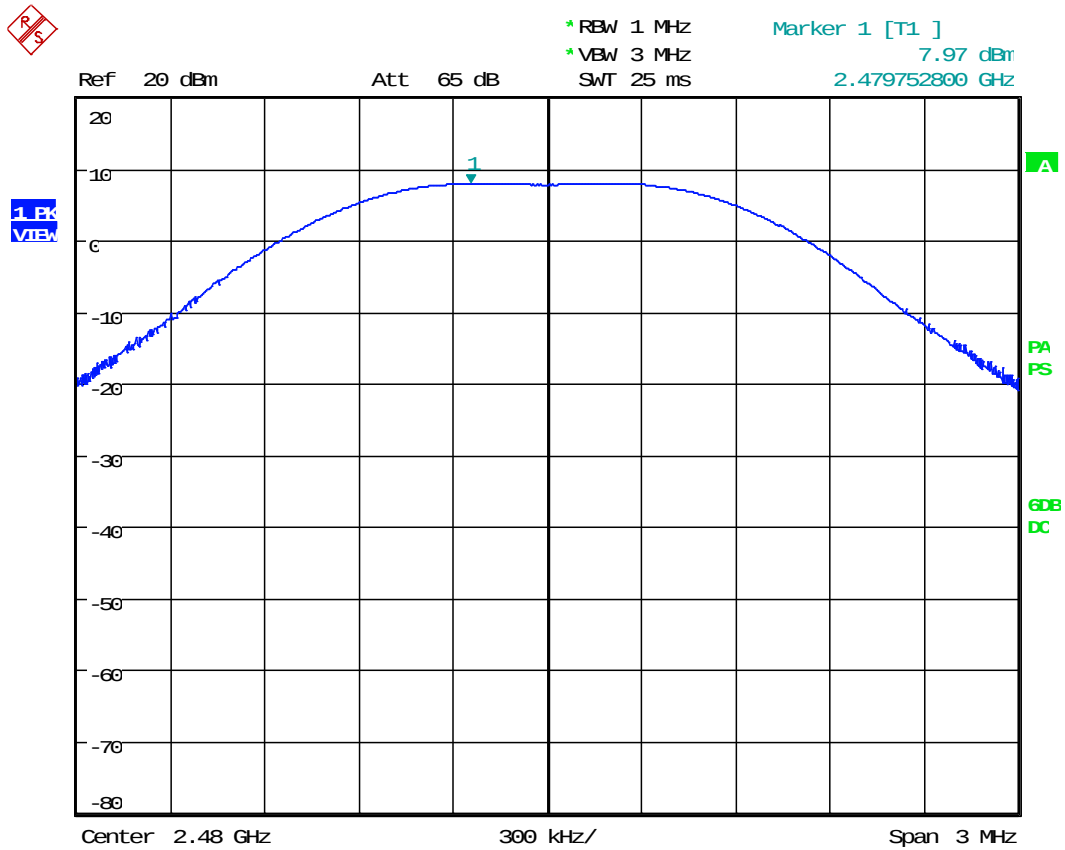
Bluetooth, Mid Channel @ 115%



Date: 1.FEB.2021 12:04:56



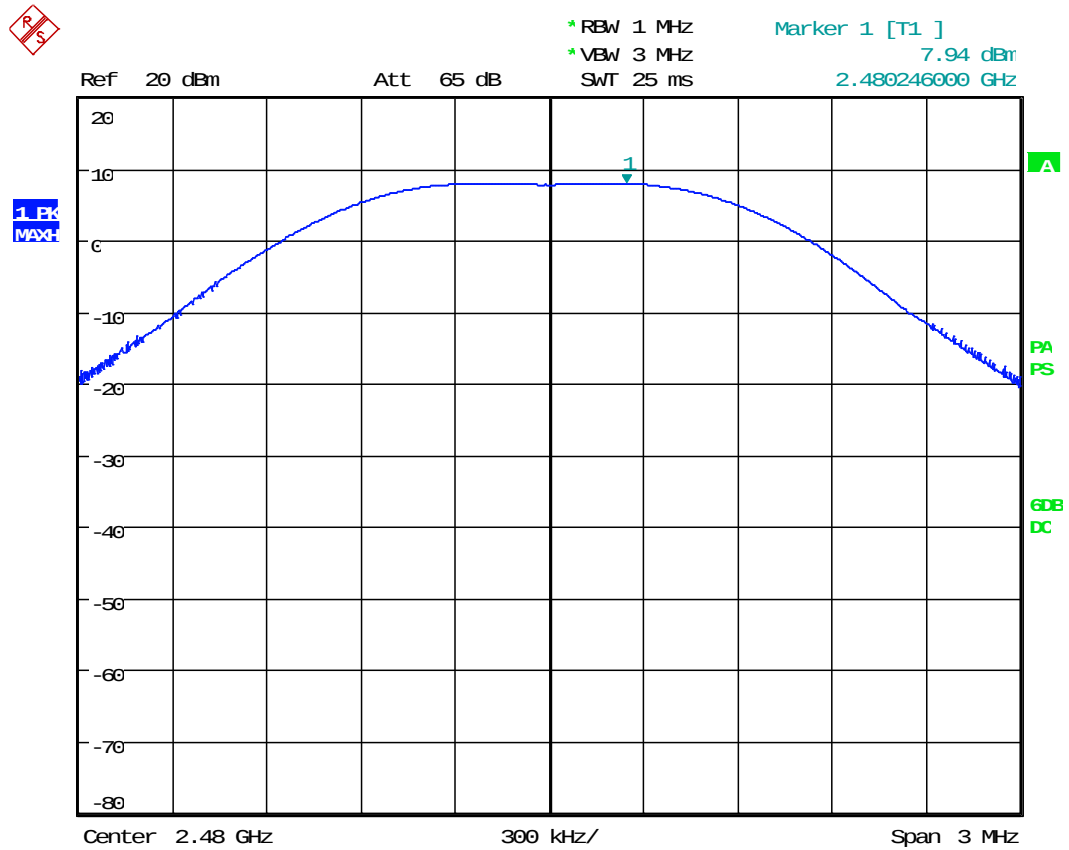
Bluetooth, High Channel @ 85%



Date: 1.FEB.2021 11:17:31



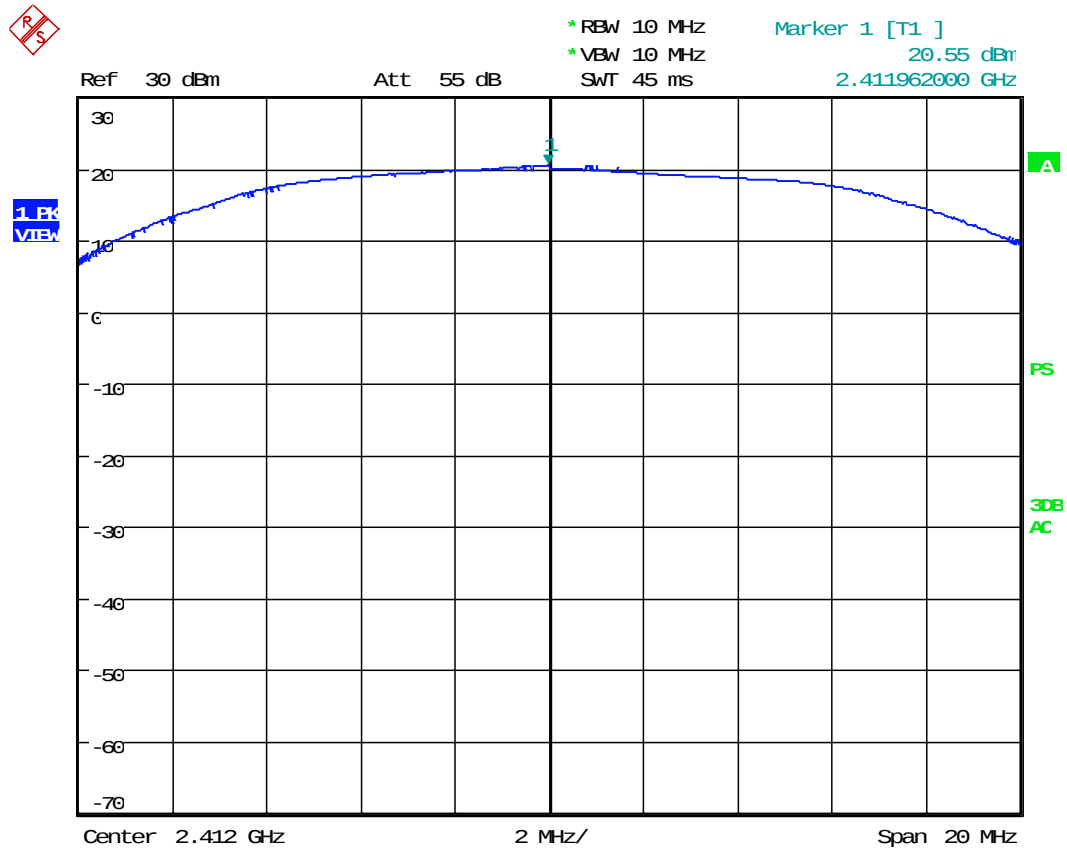
Bluetooth, High Channel @ 115%



Date: 1.FEB.2021 11:18:34



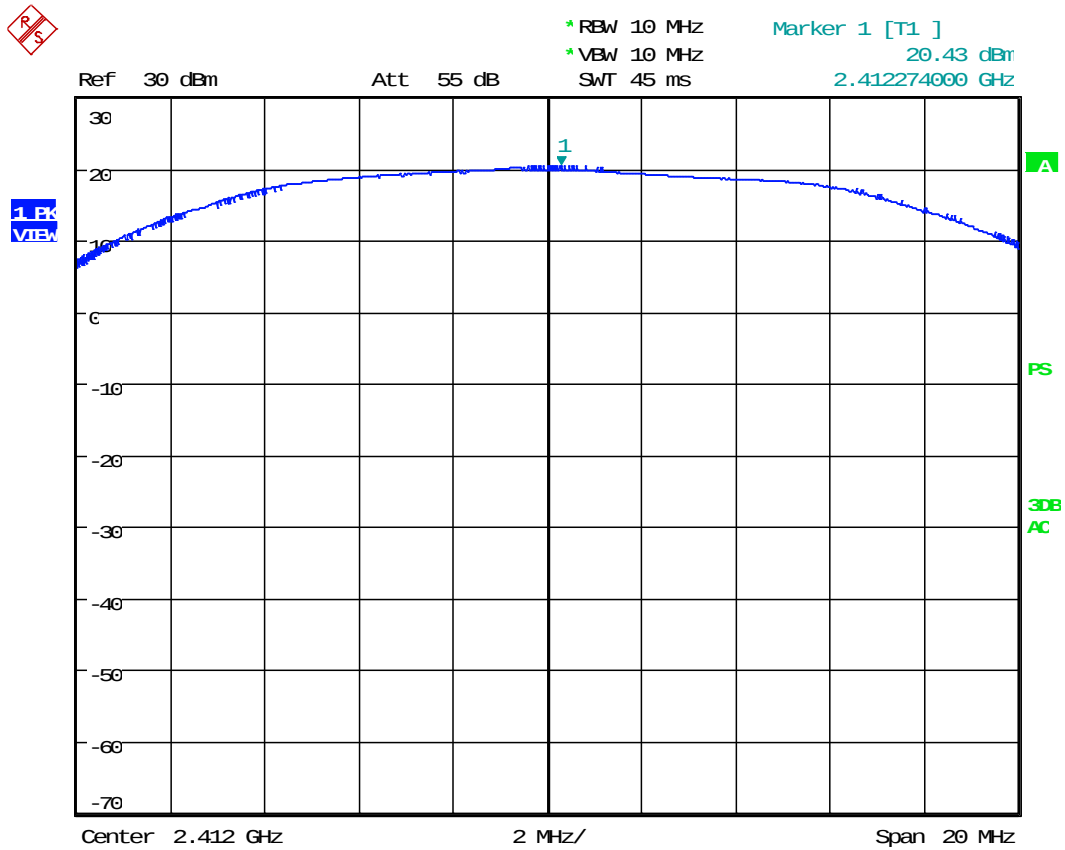
Wi-Fi, 2.4 GHz, Low Channel @ 85%



Date: 1.FEB.2021 16:17:36



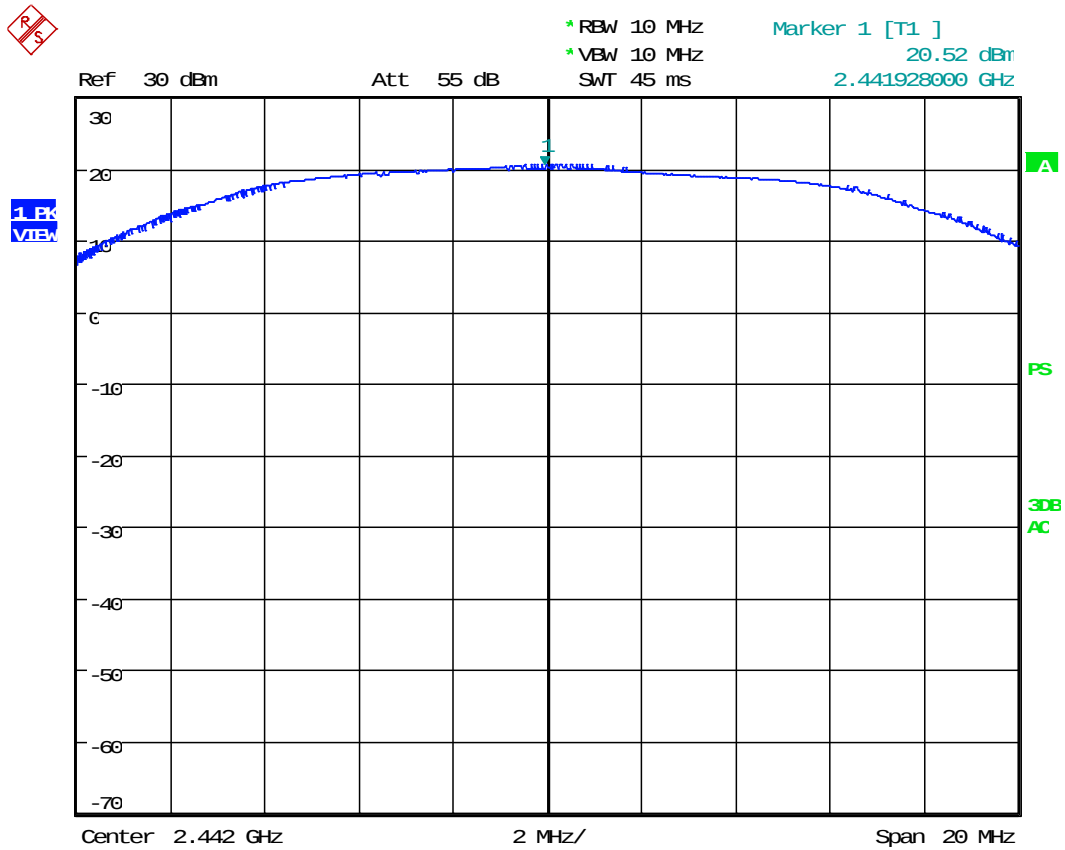
Wi-Fi, 2.4 GHz, Low Channel @ 115%



Date: 1.FEB.2021 16:21:55



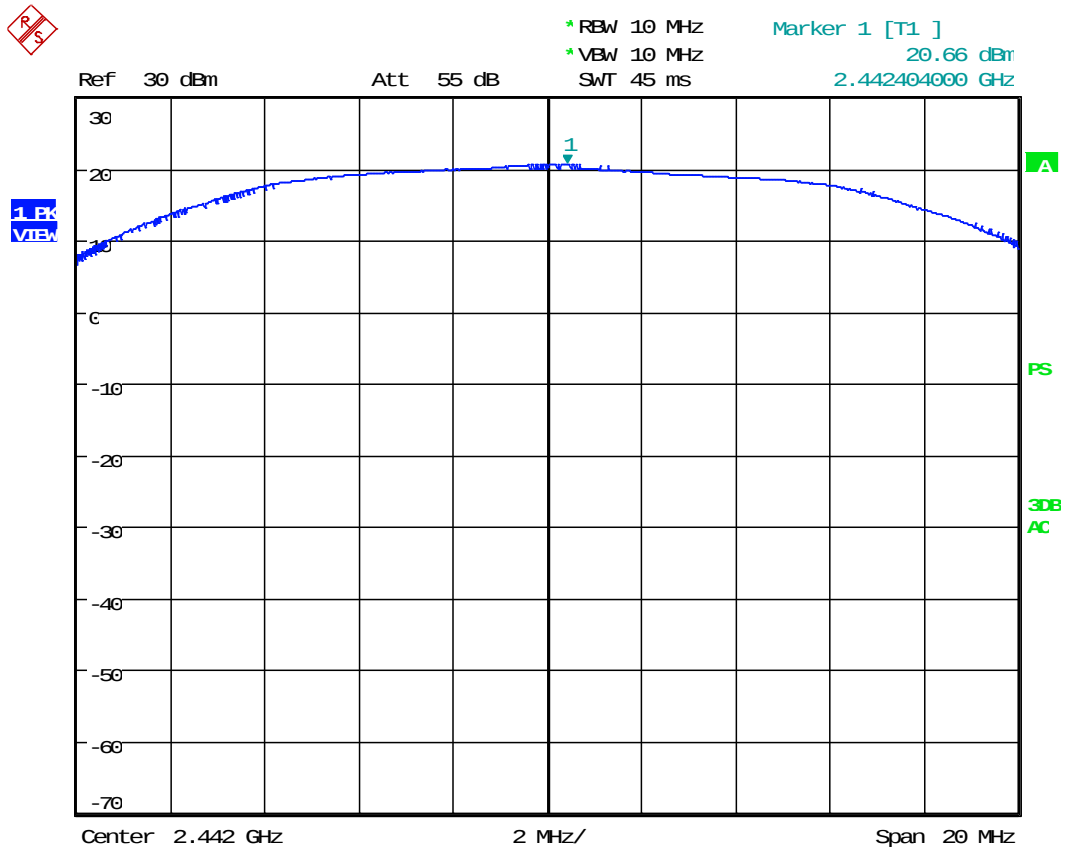
Wi-Fi, 2.4 GHz, Mid Channel @ 85%



Date: 1.FEB.2021 16:18:26



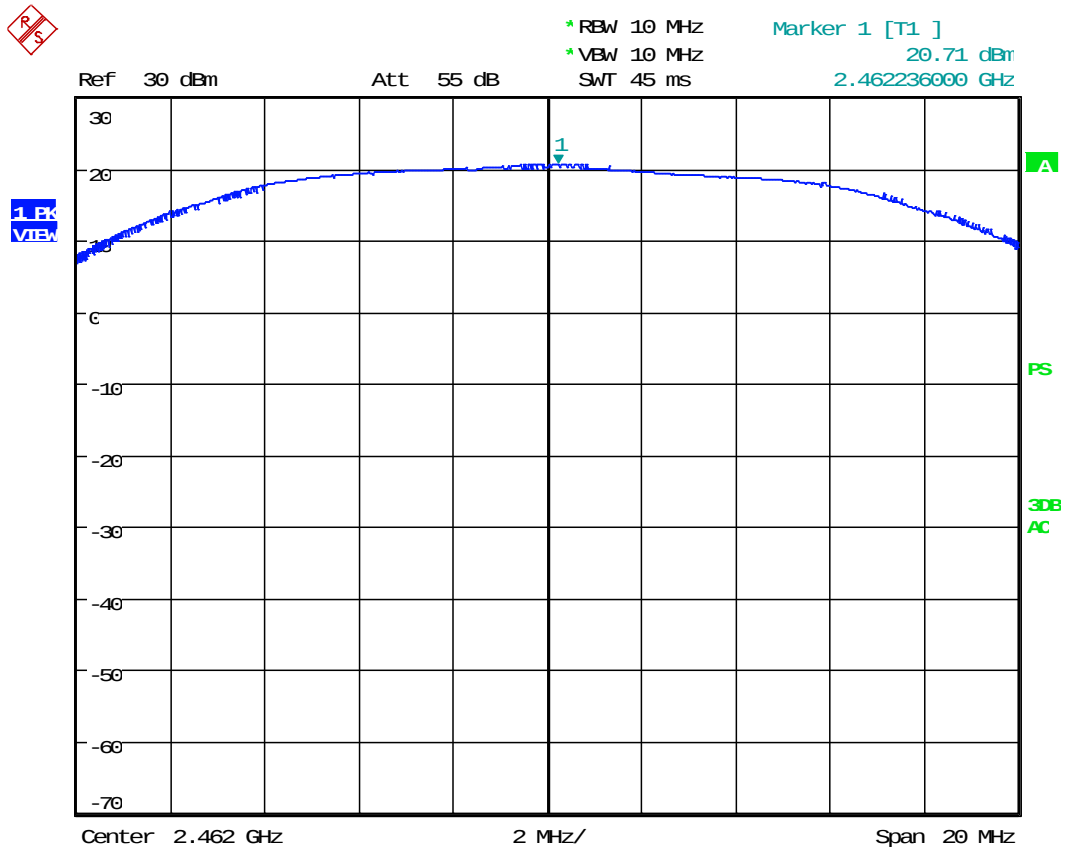
Wi-Fi, 2.4 GHz, Mid Channel @ 115%



Date: 1.FEB.2021 16:20:57



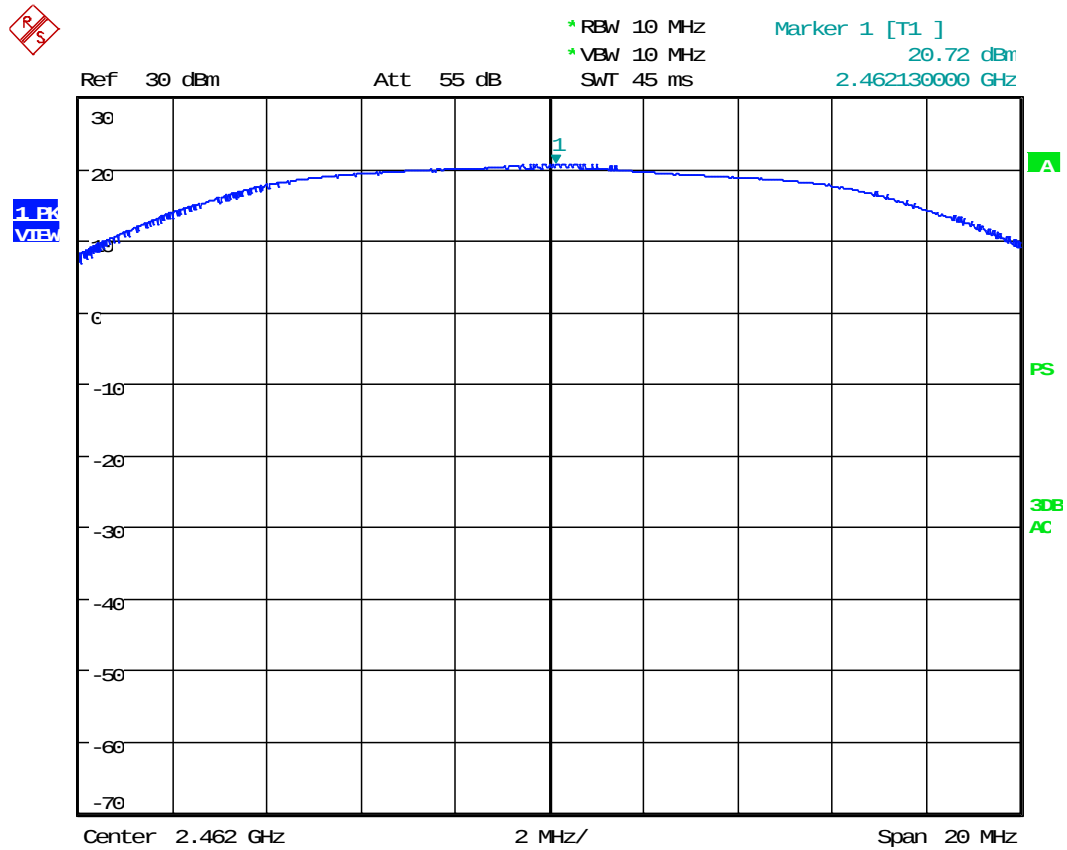
Wi-Fi, 2.4 GHz, High Channel @ 85%



Date: 1.FEB.2021 16:19:09



Wi-Fi, 2.4 GHz, High Channel @ 115%



Date: 1.FEB.2021 16:20:01



10 CONDUCTED SPURIOUS EMISSIONS

The following tests were performed to demonstrate compliance.

RF Antenna Conducted Test

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the spectrum analyzer.

10.1 Requirements:

All Spurious Emissions must be at least 20dB down from the highest emission level measured within the authorized band up through the tenth harmonic.

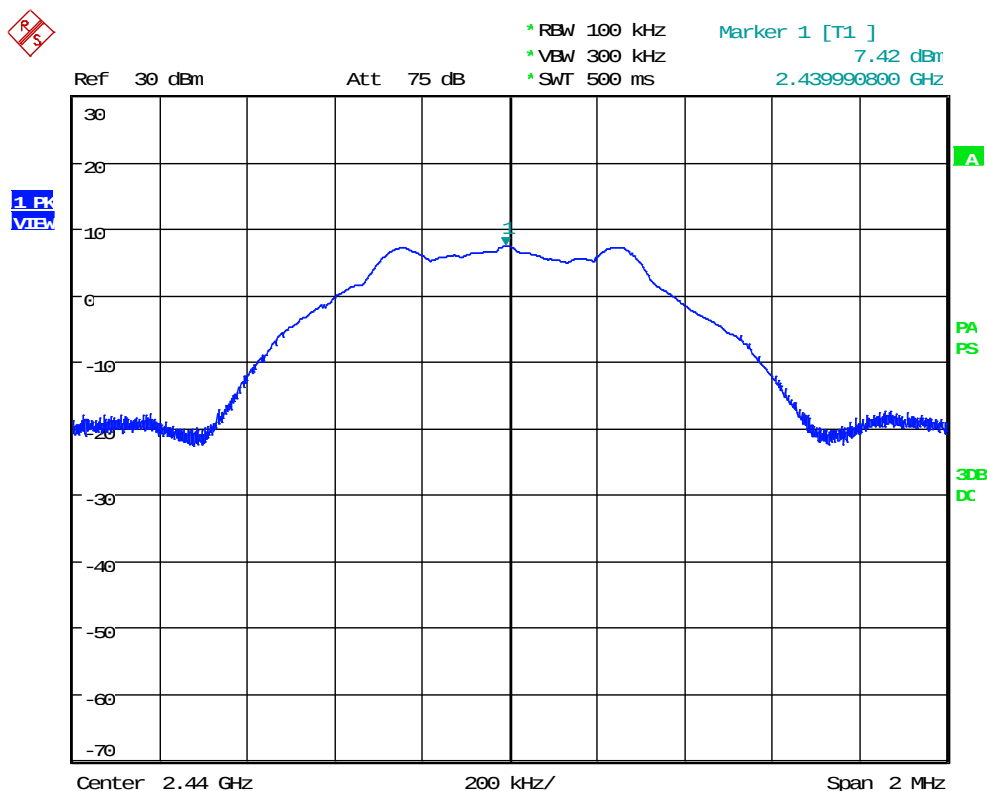
Spurious emissions measurements were made at the low, mid, and upper channels with the appropriate spectrum analyzer impulse bandwidth. Additionally, 20dB down points were measured for the low and high channels to verify band edge compliance.



10.2 Conducted Spurious Emissions Test Data

Test Date:	2201-02-01	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(d) / Part 15.207 KDB558074	Air Temperature:	20.0°C
		Relative Humidity:	26%

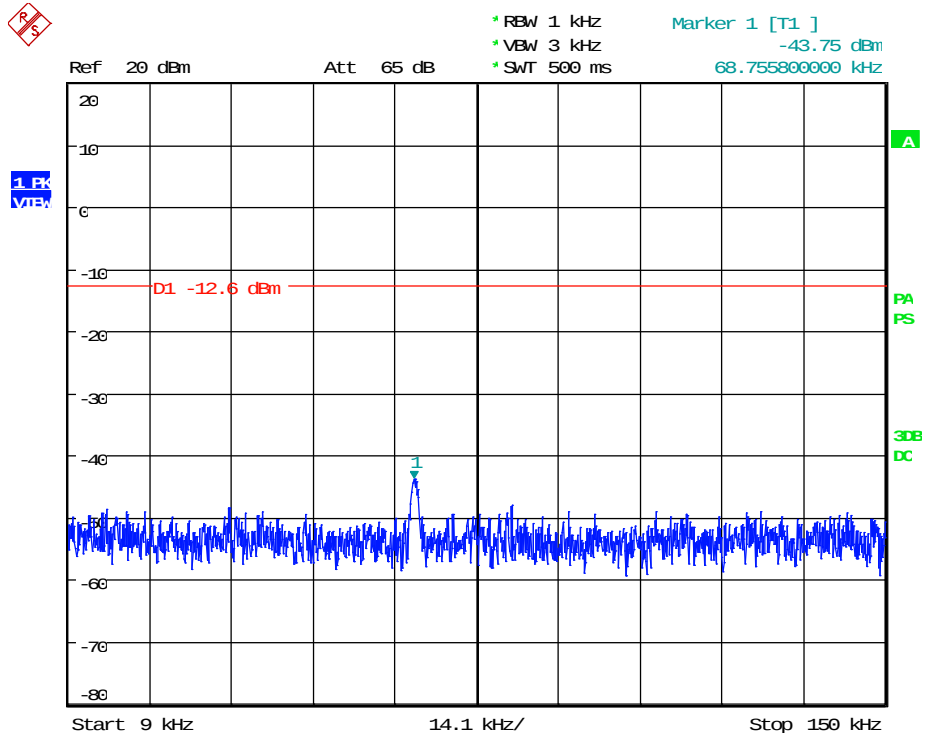
Bluetooth: Spur Reference



Date: 1.FEB.2021 11:52:12



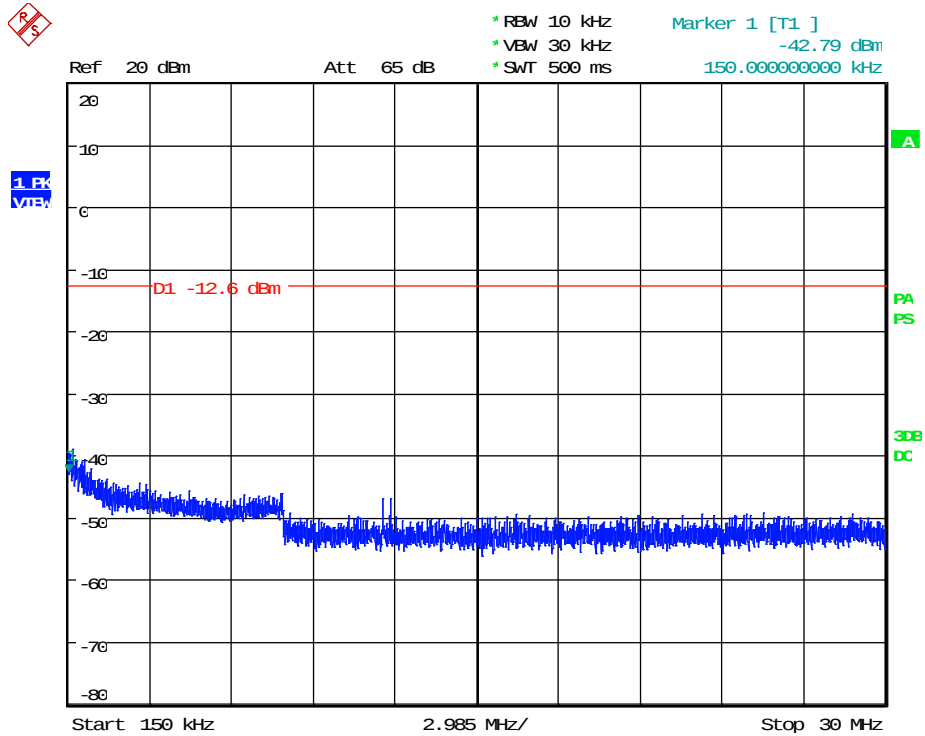
Bluetooth: Low Channel
0.009 MHz to 0.15 MHz



Date: 1.FEB.2021 12:14:58



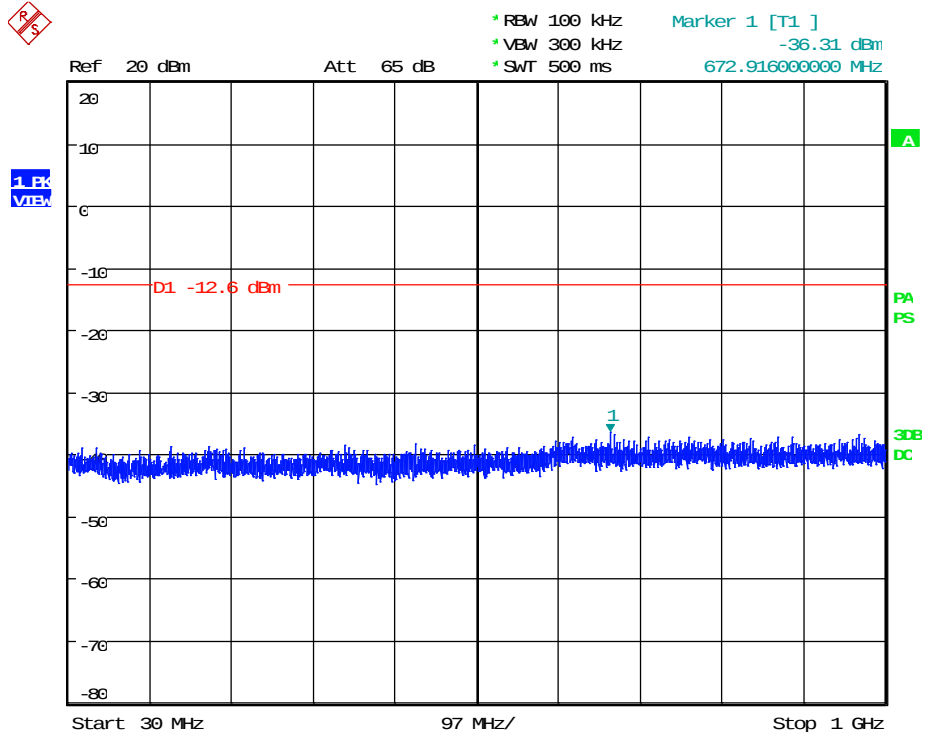
Bluetooth: Low Channel
0.15 MHz to 30 MHz



Date: 1.FEB.2021 12:13:06



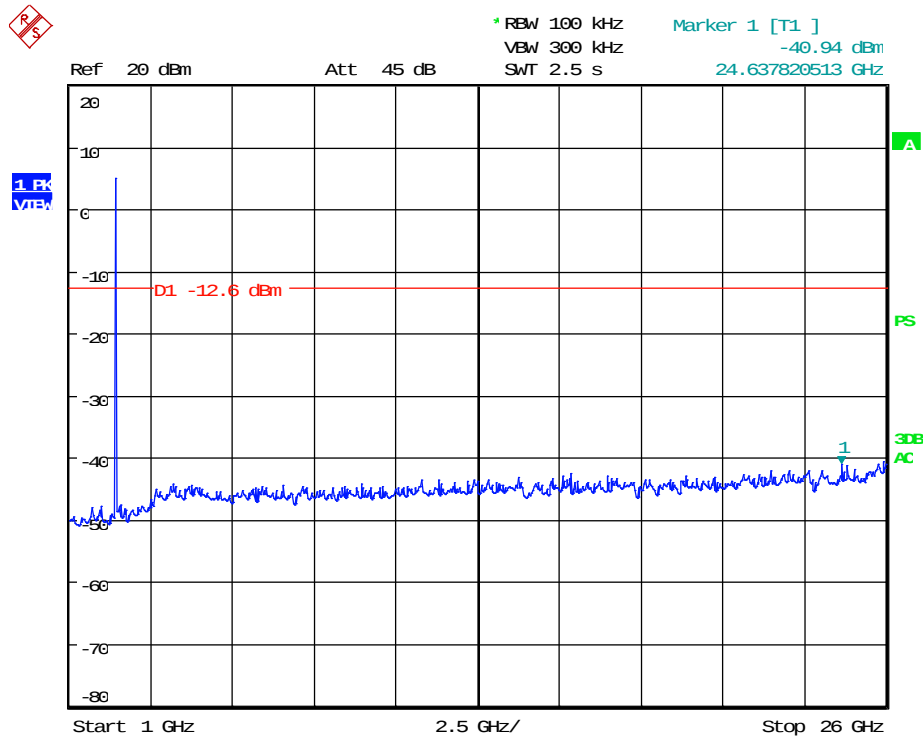
Bluetooth: Low Channel
30 MHz to 1000 MHz



Date: 1.FEB.2021 12:16:28



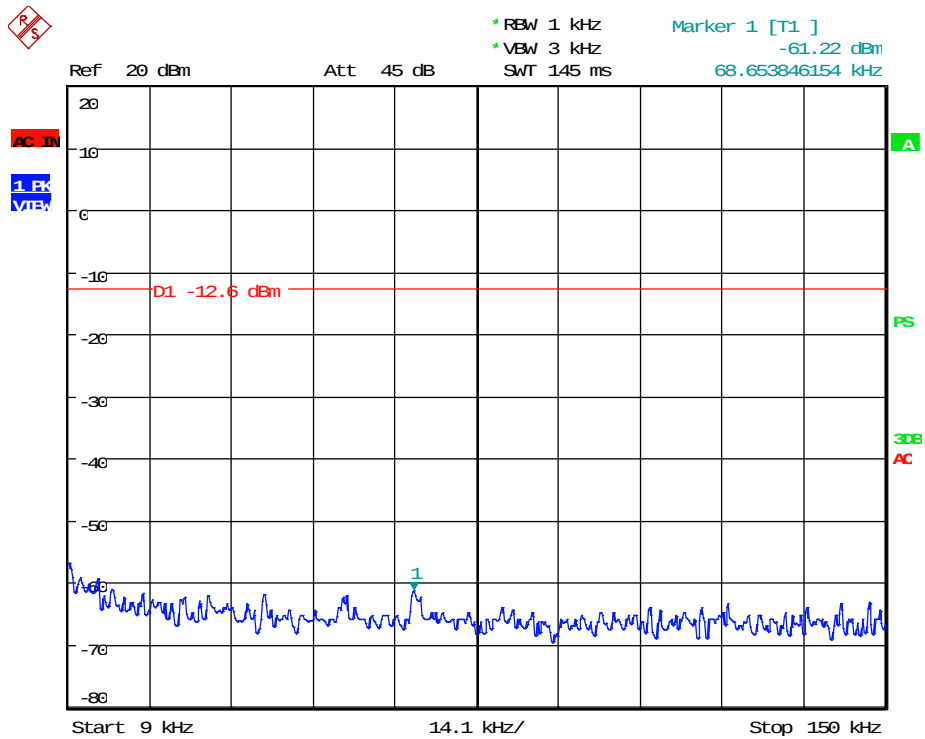
Bluetooth: Low Channel
1 GHz to 26 GHz



Date: 1.FEB.2021 12:23:43



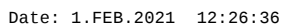
Bluetooth: Mid Channel
0.009 MHz to 0.15 MHz



Date: 1.FEB.2021 12:27:50

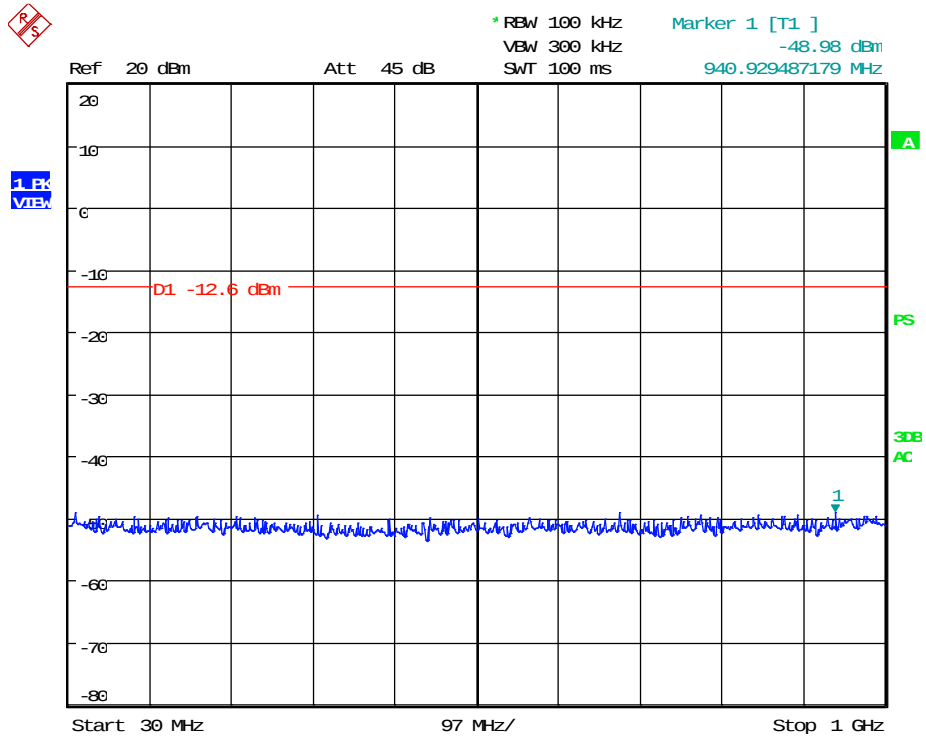


Bluetooth: Mid Channel
0.15 MHz to 30 MHz





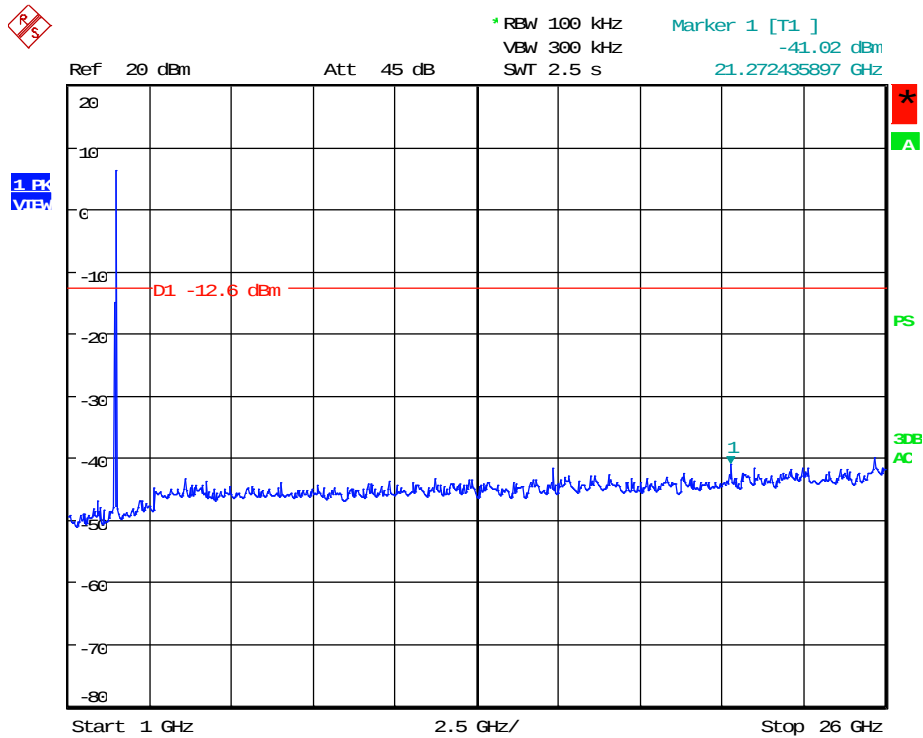
Bluetooth: Mid Channel
30 MHz to 1000 MHz



Date: 1.FEB.2021 12:25:13



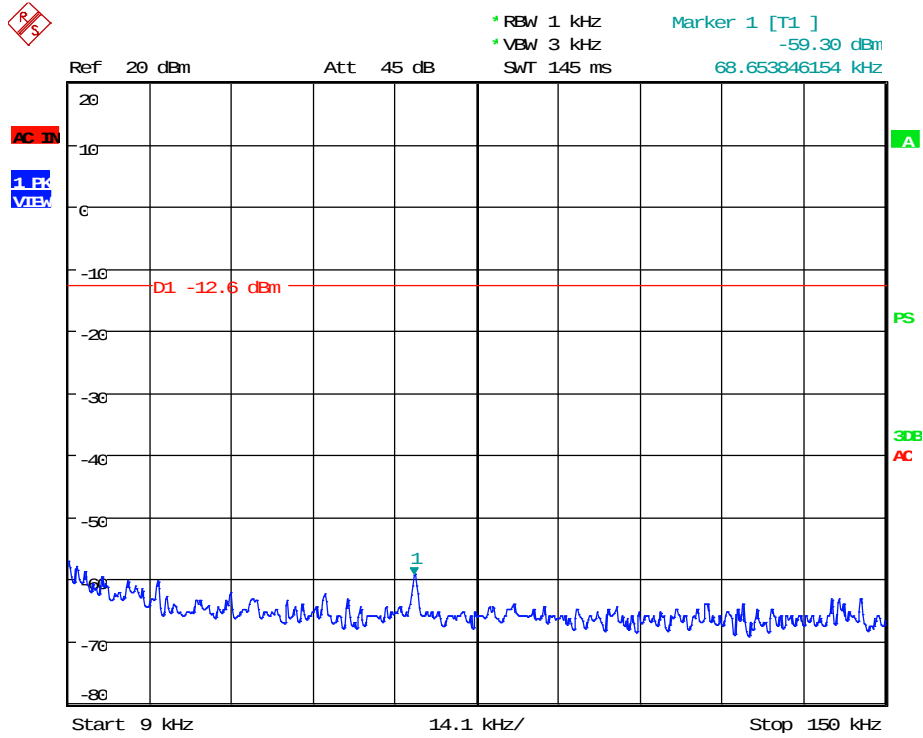
Bluetooth: Mid Channel
1 GHz to 26 GHz



Date: 1.FEB.2021 12:21:51



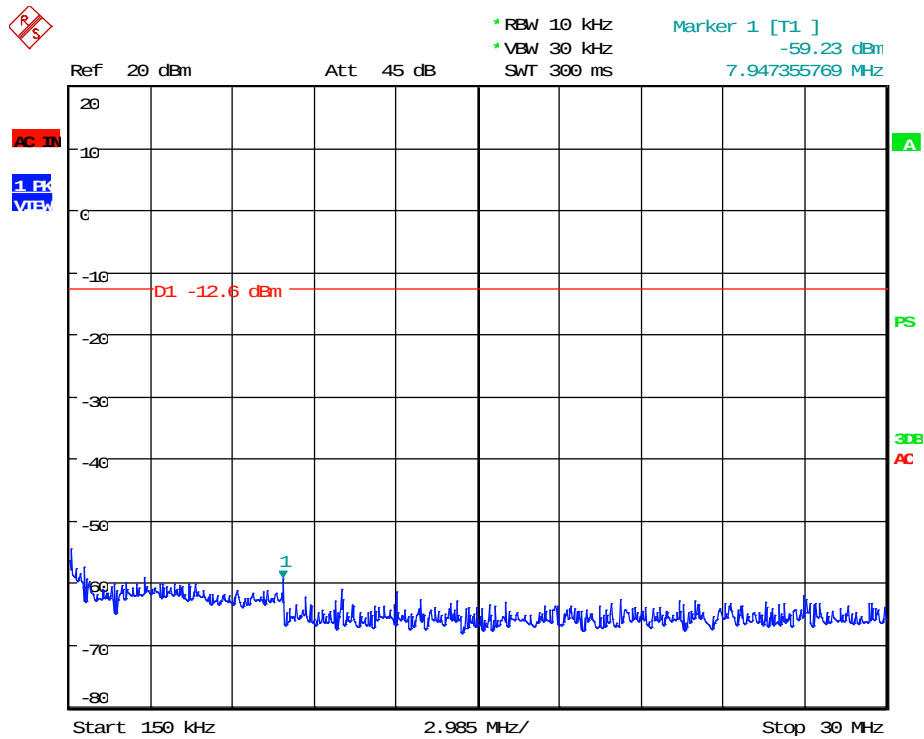
Bluetooth: High Channel
0.009 MHz to 0.15 MHz



Date: 1.FEB.2021 12:29:46



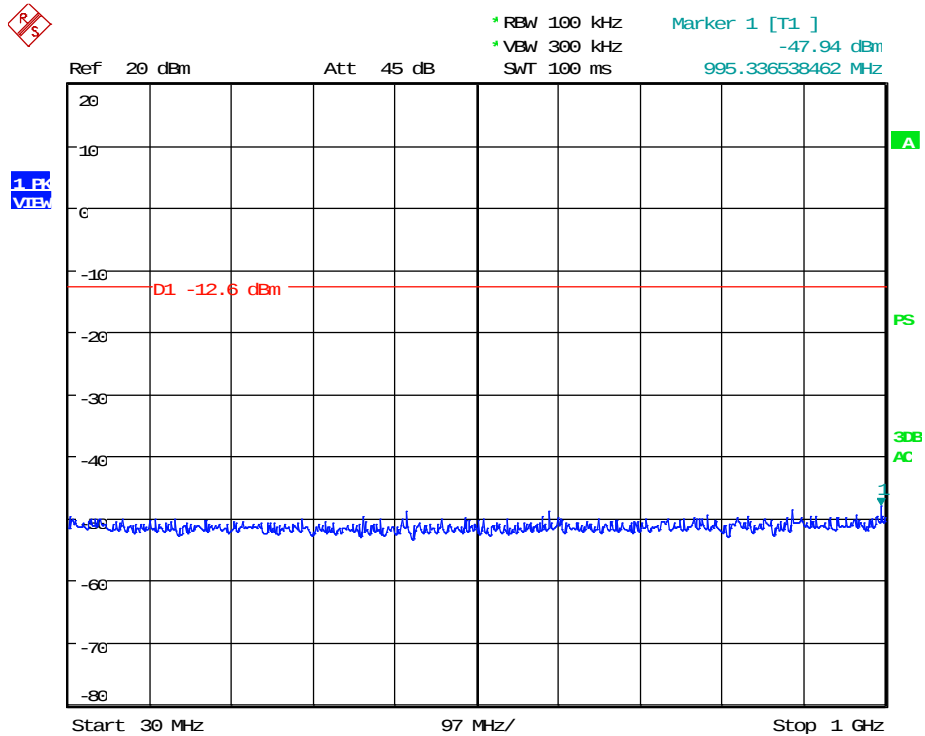
Bluetooth: High Channel 0.15 MHz to 30 MHz



Date: 1.FEB.2021 12:30:53



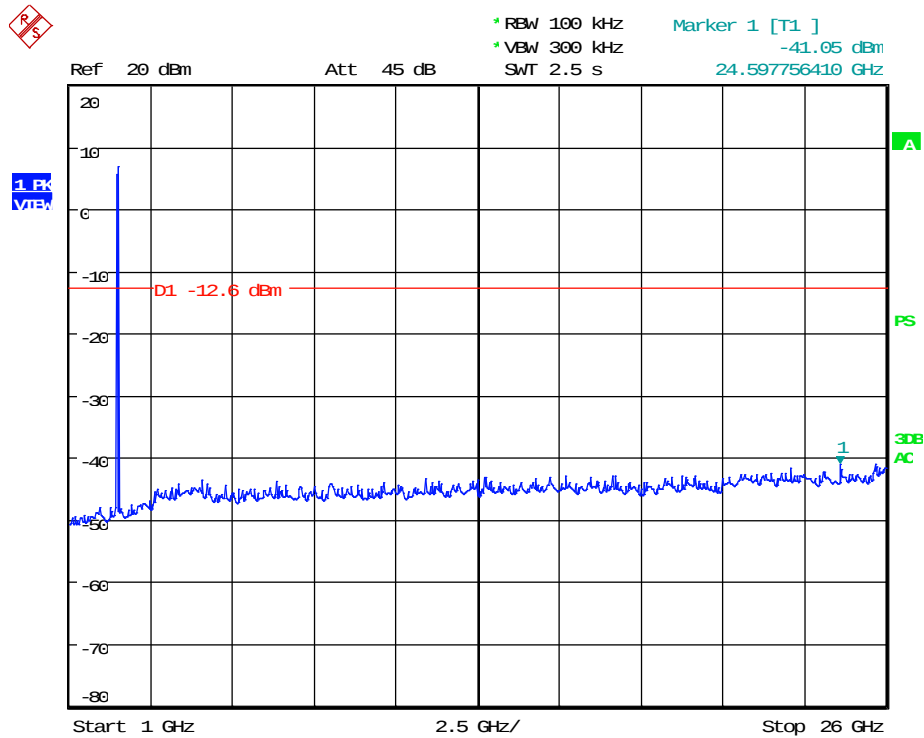
Bluetooth: High Channel 30 MHz to 1000 MHz



Date: 1.FEB.2021 12:31:59



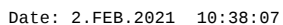
Bluetooth: High Channel 1 GHz to 26 GHz



Date: 1.FEB.2021 12:33:18

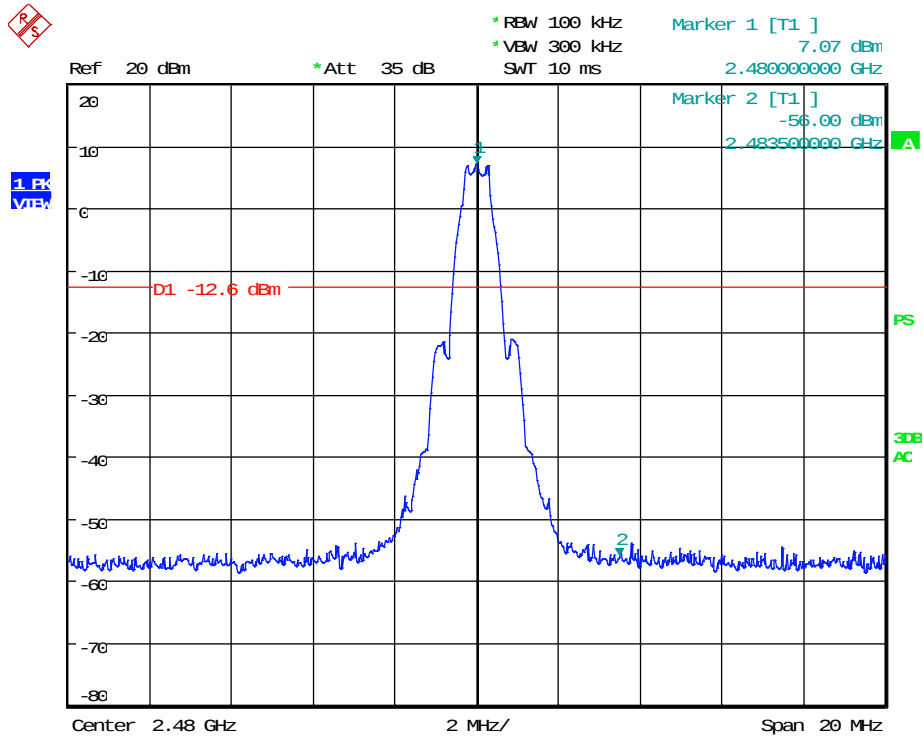


Bluetooth: Low Band Edge





Bluetooth: High Band Edge

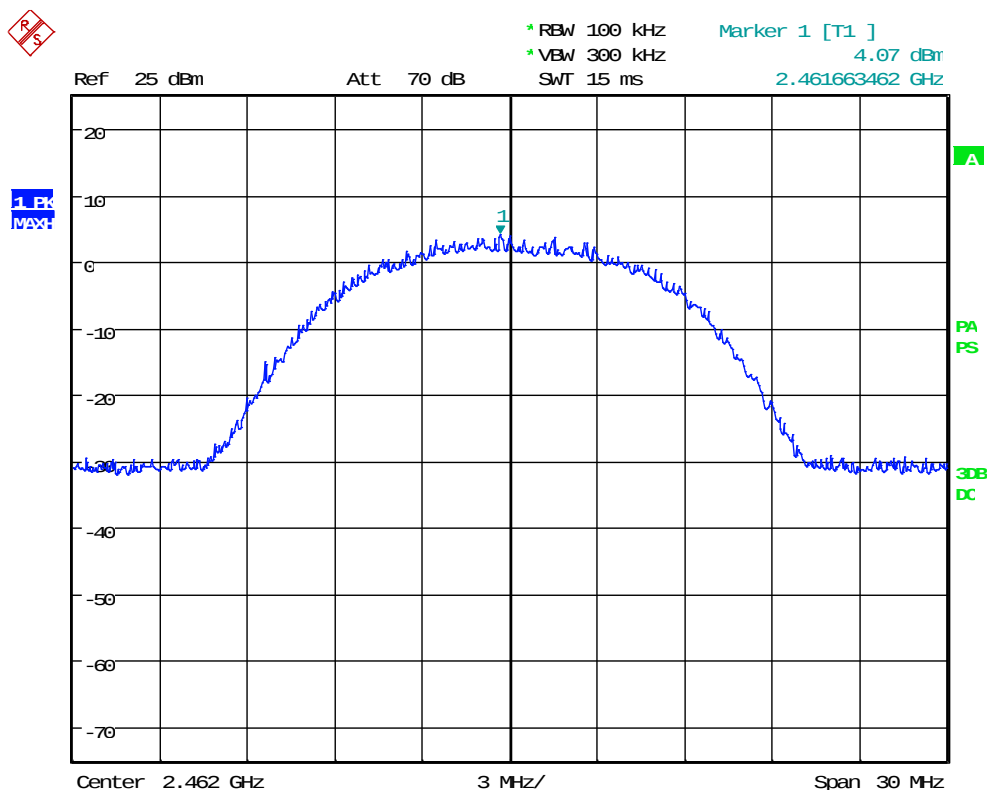


Date: 2.FEB.2021 10:36:12



Test Date:	2021-02-02	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(d) / Part 15.207 KDB558074	Air Temperature:	20.1 °C
		Relative Humidity:	26%

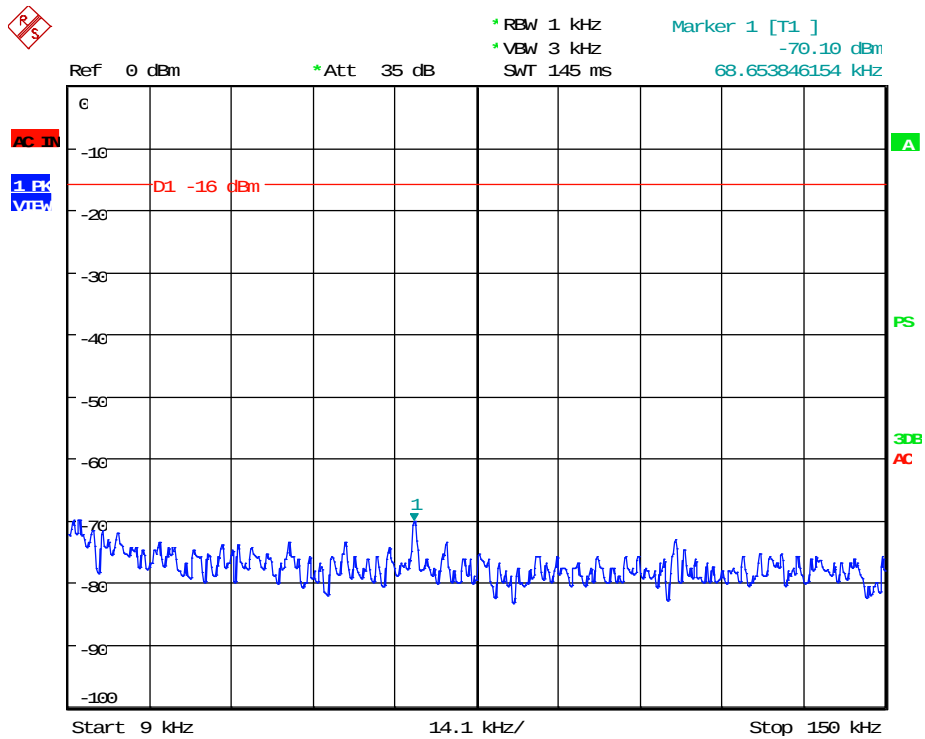
Wi-Fi, 2.4 GHz - CCK: Spur Reference



Date: 2.FEB.2021 10:00:06



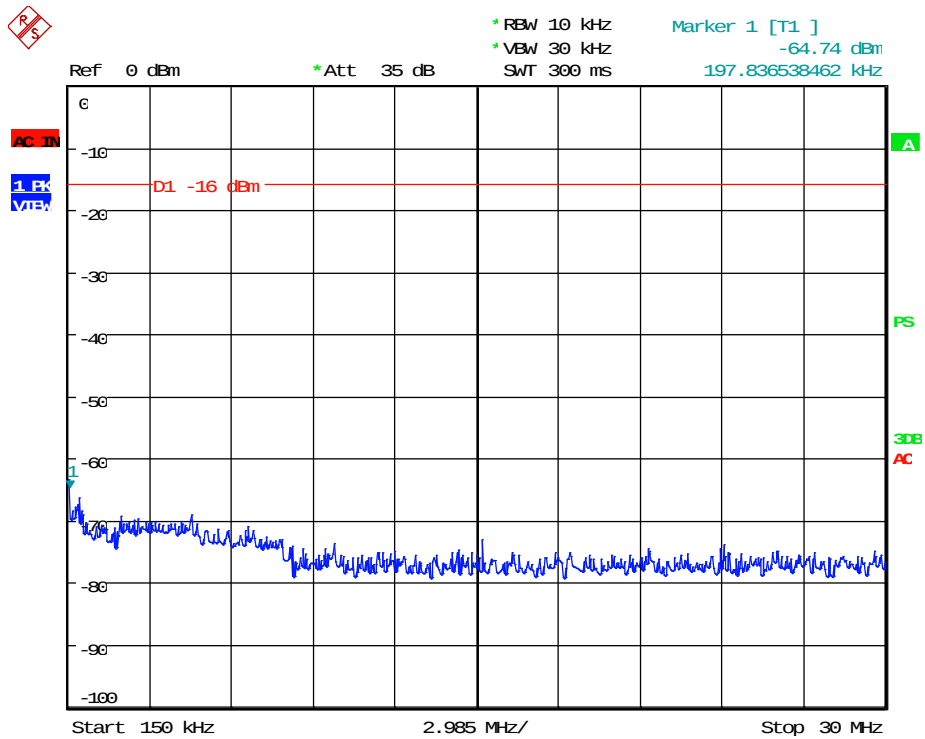
Wi-Fi, 2.4 GHz - CCK: Low Channel
0.009 MHz to 0.15 MHz



Date: 2.FEB.2021 10:20:44



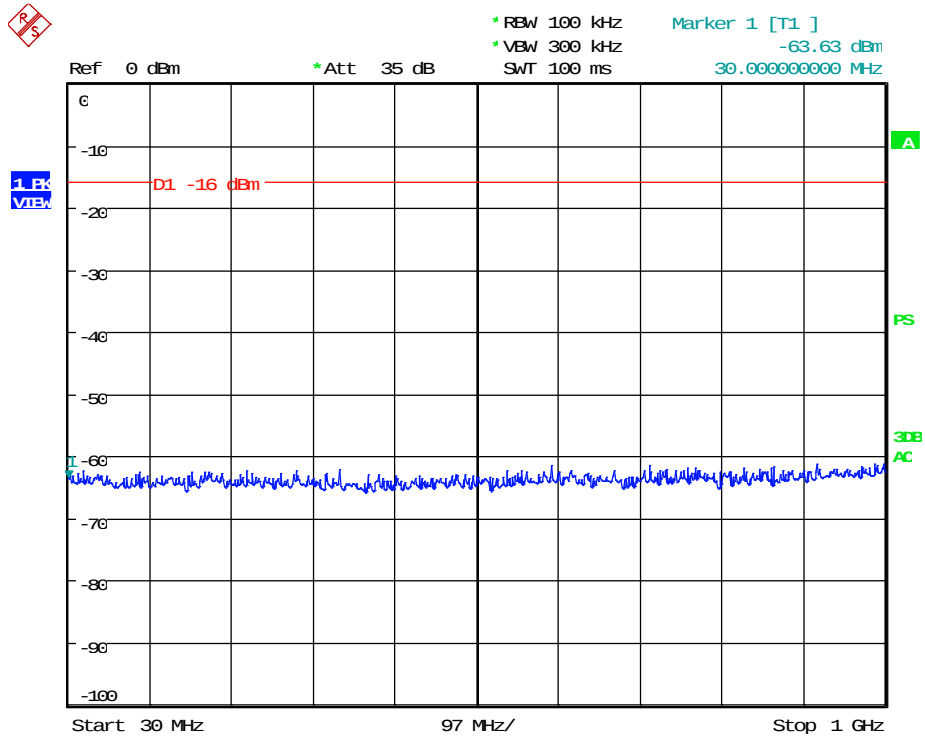
Wi-Fi, 2.4 GHz - CCK: Low Channel 0.15 MHz to 30 MHz



Date: 2.FEB.2021 10:21:59



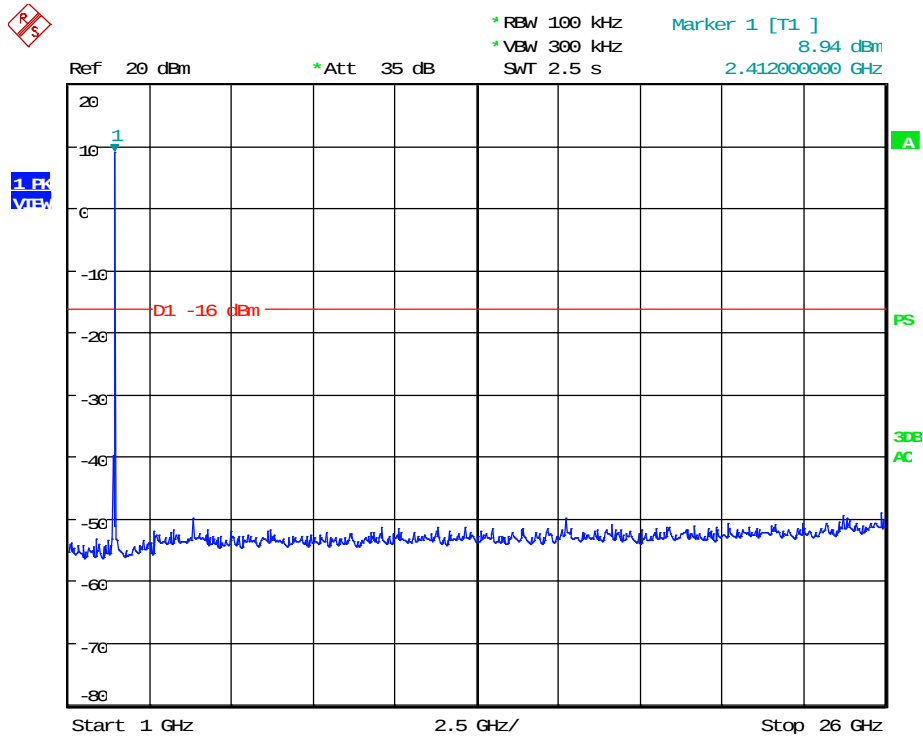
Wi-Fi, 2.4 GHz - CCK: Low Channel
30 MHz to 1000 MHz



Date: 2.FEB.2021 10:22:47



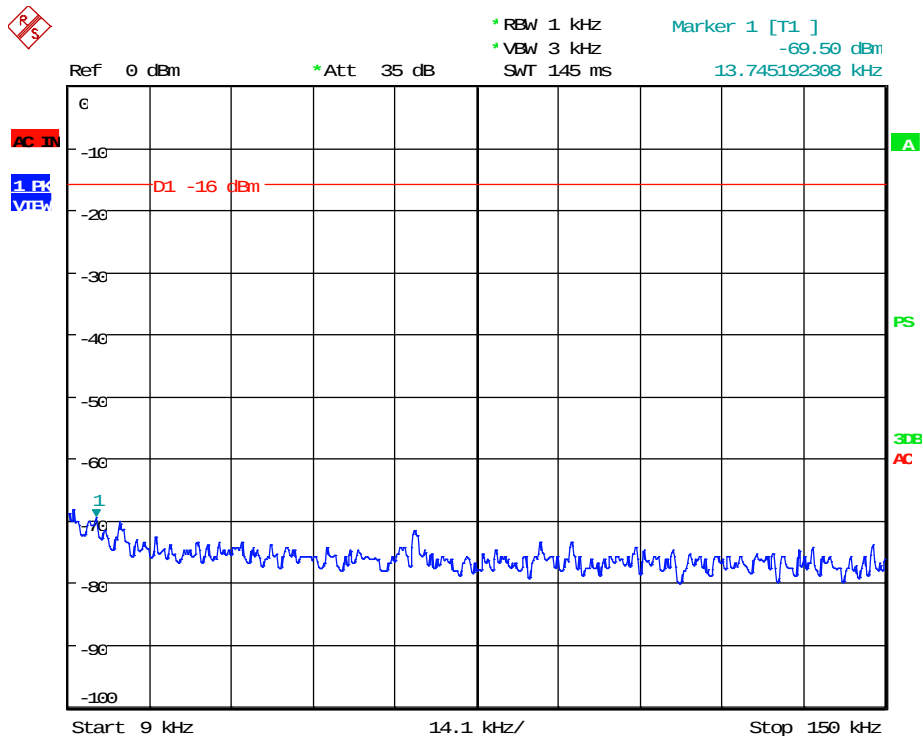
Wi-Fi, 2.4 GHz - CCK: Low Channel 1 GHz to 26 GHz



Date: 2.FEB.2021 10:24:43



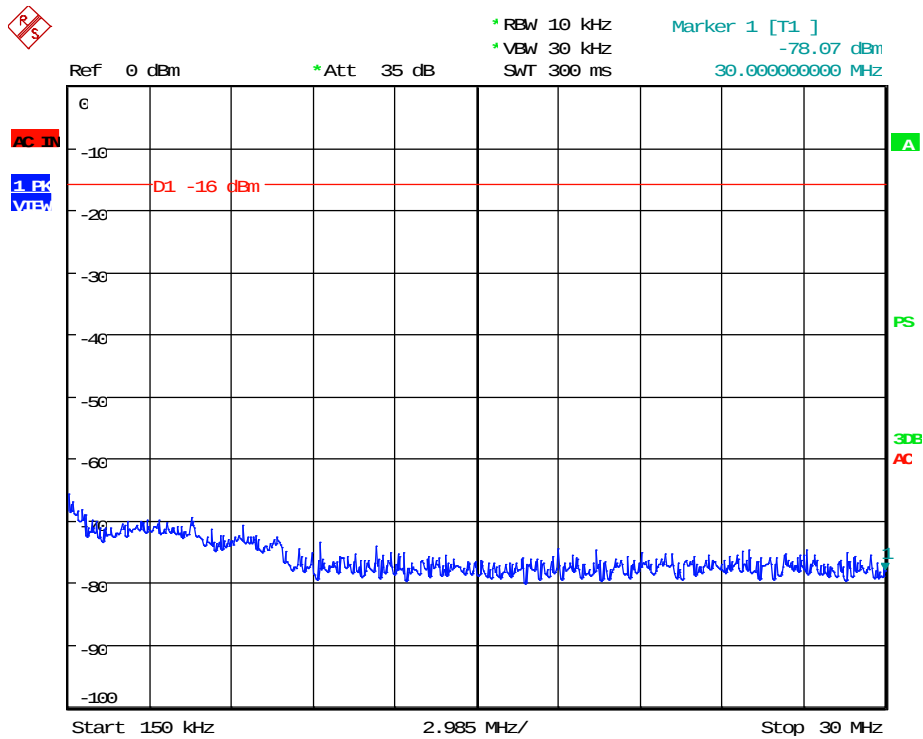
Wi-Fi, 2.4 GHz - CCK: Mid Channel
0.009 MHz to 0.15 MHz



Date: 2.FEB.2021 10:19:44



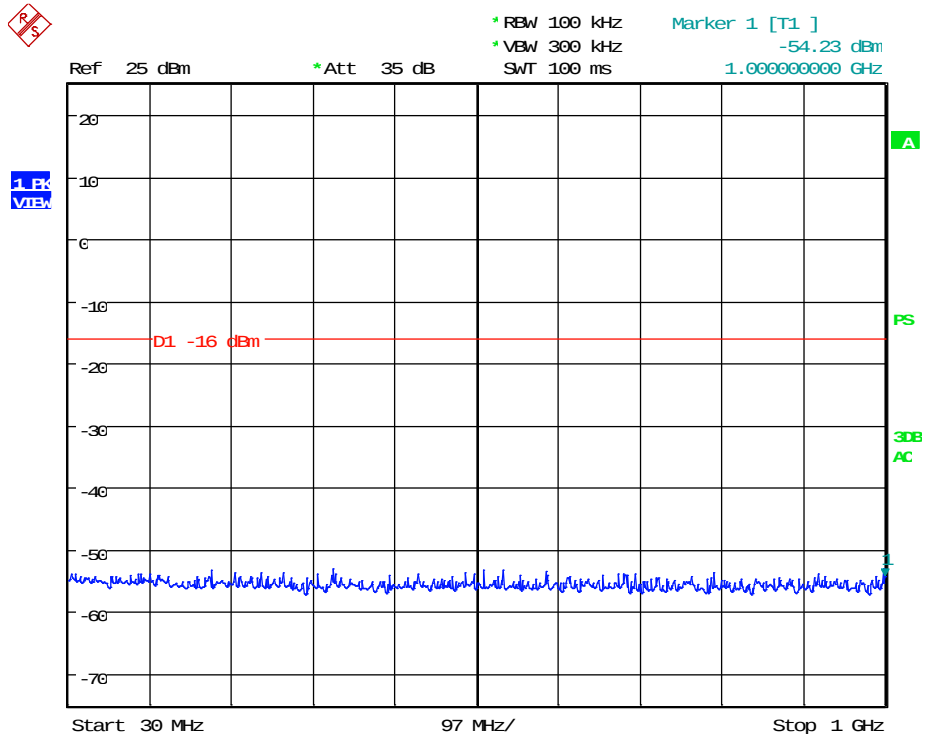
Wi-Fi, 2.4 GHz - CCK: Mid Channel
0.15 MHz to 30 MHz



Date: 2.FEB.2021 10:18:36



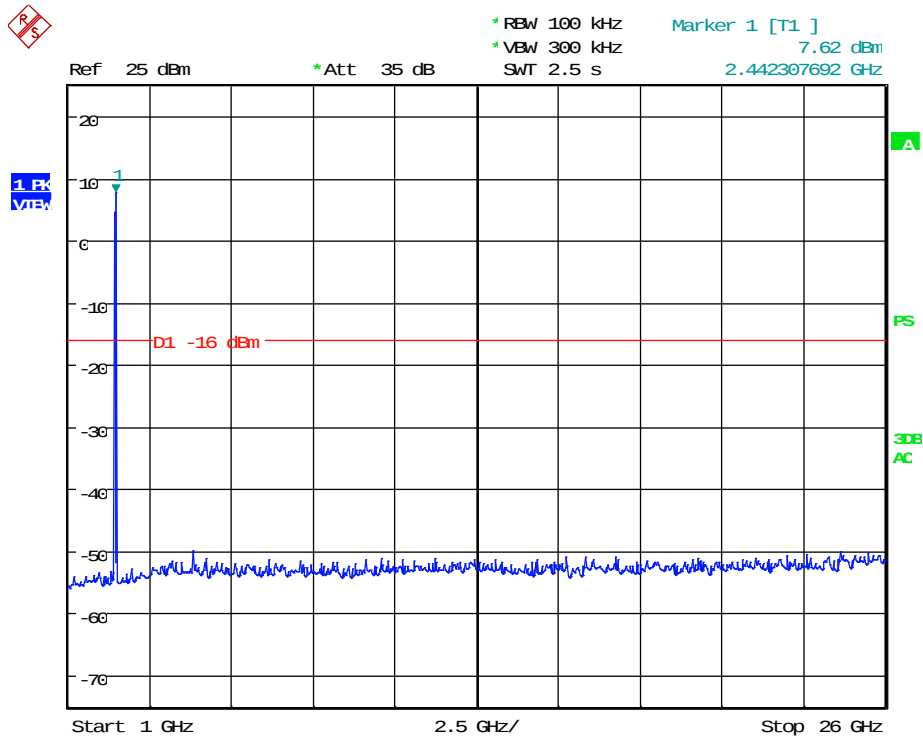
Wi-Fi, 2.4 GHz - CCK: Mid Channel
30 MHz to 1000 MHz



Date: 2.FEB.2021 10:17:38



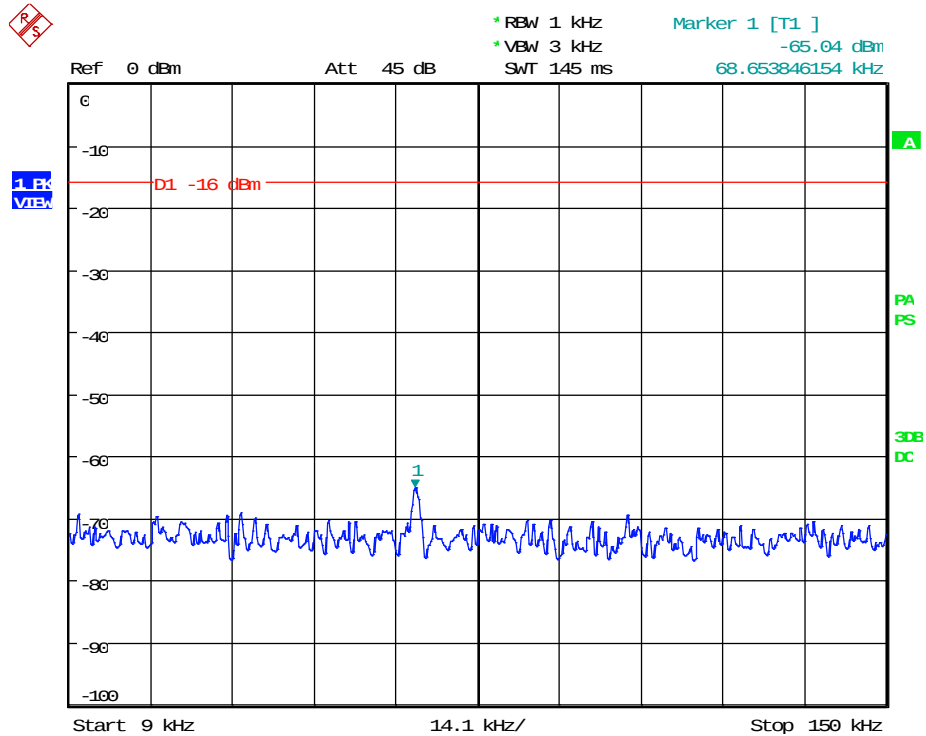
Wi-Fi, 2.4 GHz - CCK: Mid Channel
1 GHz to 26 GHz



Date: 2.FEB.2021 10:17:00



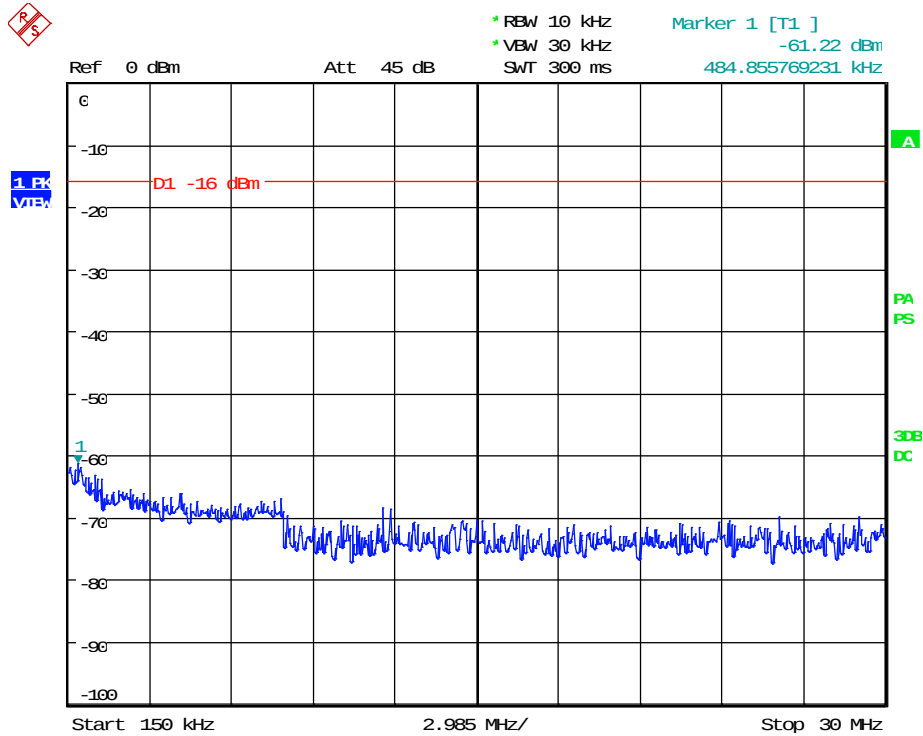
Wi-Fi, 2.4 GHz - CCK: High Channel
0.009 MHz to 0.15 MHz



Date: 2.FEB.2021 10:05:53



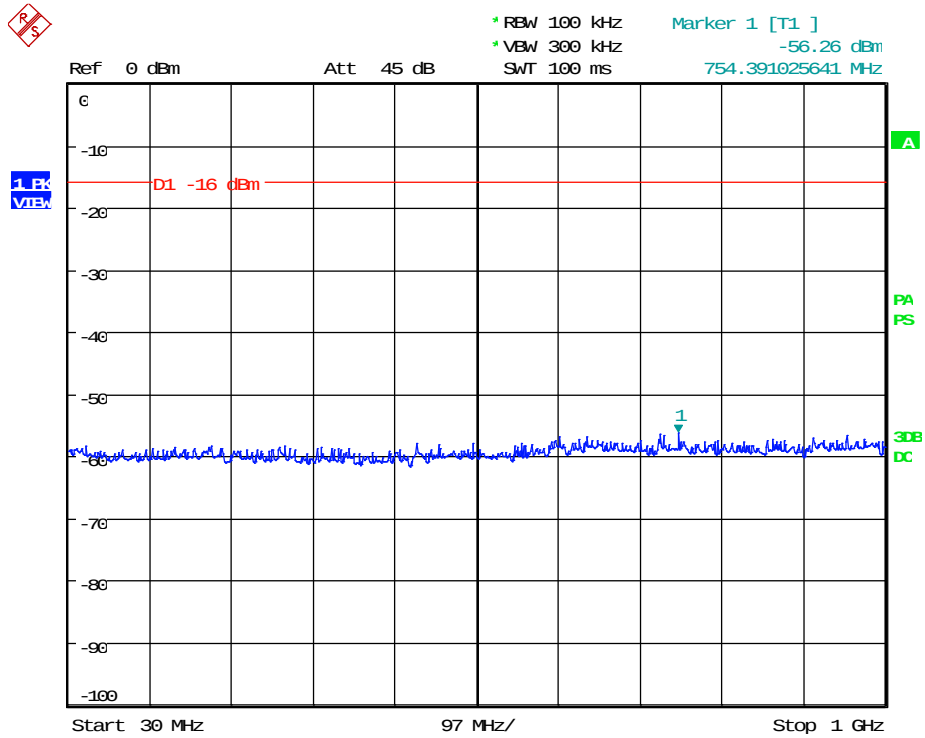
Wi-Fi, 2.4 GHz - CCK: High Channel
0.15 MHz to 30 MHz



Date: 2.FEB.2021 10:06:53



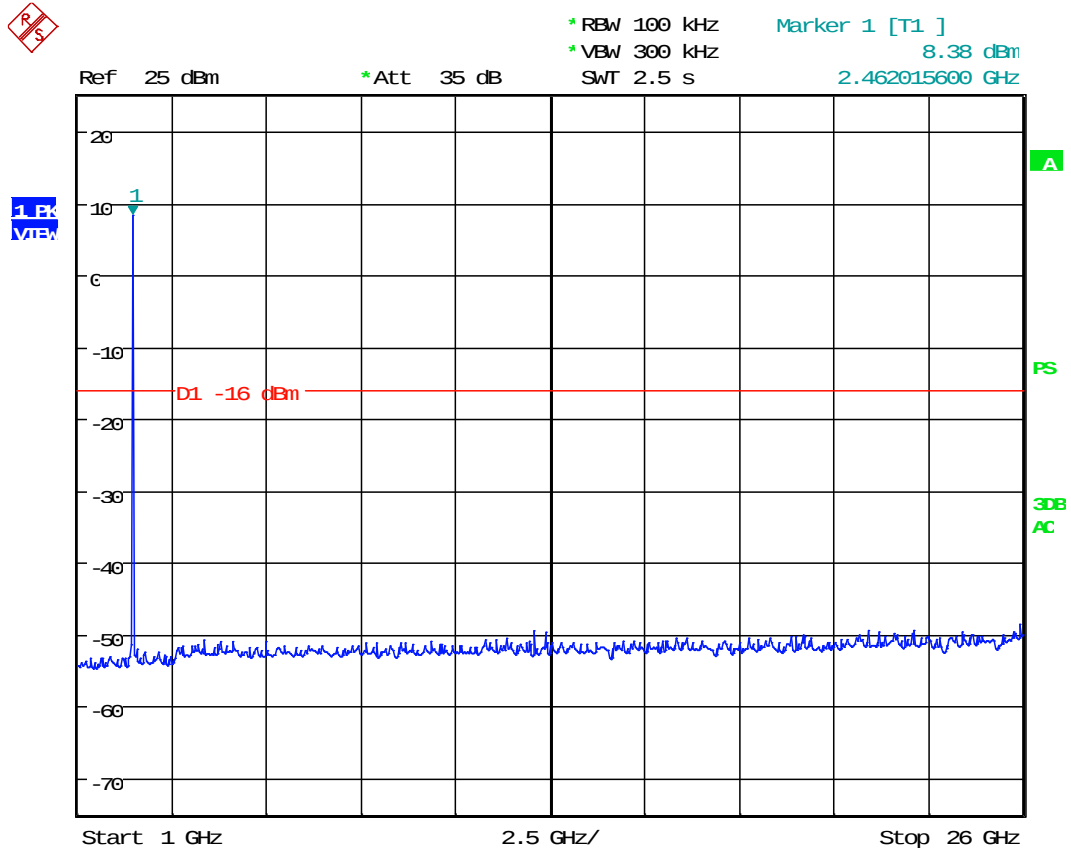
Wi-Fi, 2.4 GHz - CCK: High Channel
30 MHz to 1000 MHz



Date: 2.FEB.2021 10:07:45



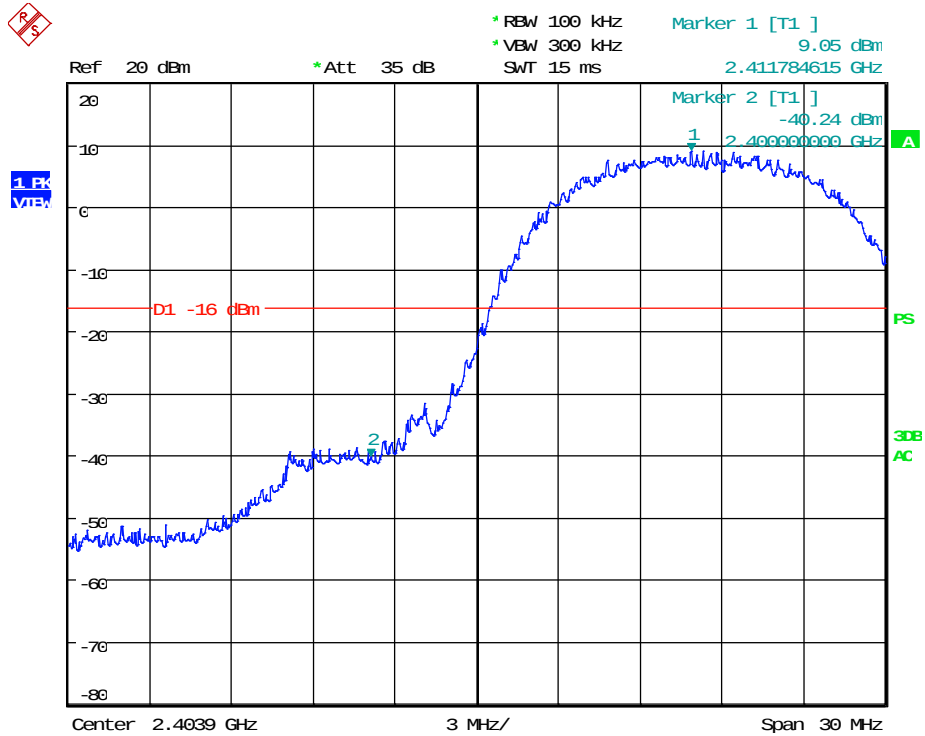
Wi-Fi, 2.4 GHz - CCK: High Channel
1 GHz to 26 GHz



Date: 2.FEB.2021 10:14:22



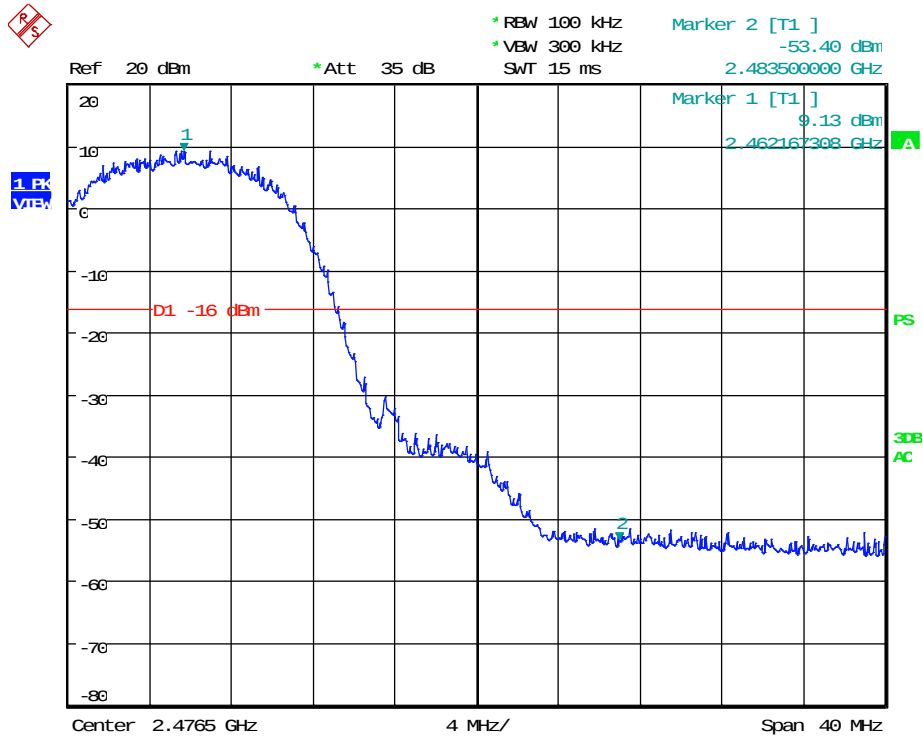
Wi-Fi, 2.4 GHz - CCK: Low Band Edge



Date: 2.FEB.2021 10:28:40



Wi-Fi, 2.4 GHz - CCK: High Band Edge



Date: 2.FEB.2021 10:31:43



11 RADIATED SPURIOUS EMISSION

The EUT's emissions were recorded with its integral/internal antenna. Radiated emissions were measured in a Semi-Anechoic Chamber. All emissions generated that fall in the restricted bands per FCC Part 15.205 were examined.

11.1 Requirements:

All emissions that fall in the restricted bands defined in FCC Part 15.205 shall not exceed the maximum field strength listed in FCC Part 15.209(a).



11.2 Test Procedure

Notes: Plots are peak, max hold prescan data included only to determine what frequencies to investigate and measure. The EUT was initially placed in a semi-anechoic chamber and rotated in all three orthogonal positions to maximize the emissions. Characterization measurements were then performed to determine at which frequencies significant emissions occurred. These graphs are shown below.

The equipment was fully exercised with all cabling attached to the EUT and was positioned in the SAC for maximum emissions. While the equipment was energized, the receiving antenna was scanned from 1.0 meter to 4.0 meters in both vertical and horizontal polarities while the turntable was adjusted 360 degrees to determine the maximum field strength. The tables of measured results can be found below.

In the following plots, the black line indicates the active scan and the green line indicates the MaxPk measurement with the EUT on. Emissions to be found by the EUT were measured and listed in tables. The plots are for reference only and the limit lines are not actual limit lines but merely a guide.

The high, mid, and low channels were scanned and the following plots reflect the high channel which was found to be the worst-case emissions, and test data presented in the tables are from all three channels.



11.3 Radiated Spurious Emissions Test Data

Test Date(s):	2021-02-29	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(d); Part 15.209 / KDB558074	Air Temperature:	20.1°C
		Relative Humidity:	26%

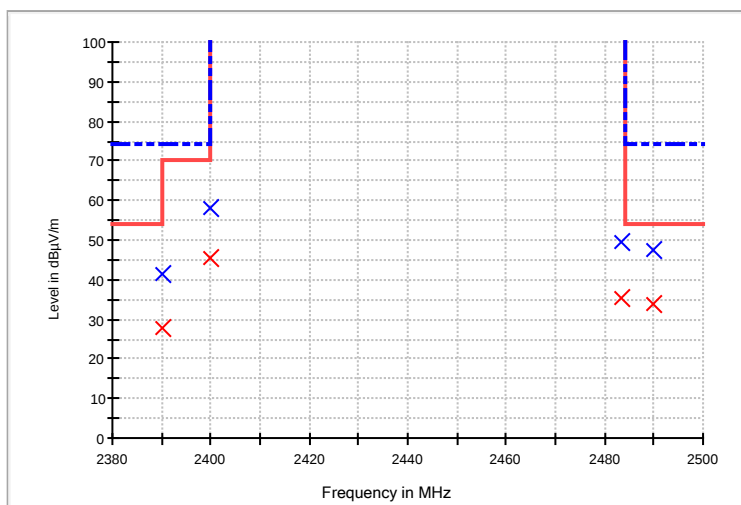
Bluetooth – Band Edges

MaxPeak

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2390.000000	H	133.00	305.00	50.7	-9.3	41.40	74.0	-32.6
2400.000000	H	133.00	305.00	67.3	-9.4	57.90	74.0	-16.1
2483.500000	H	133.00	231.00	58.8	-9.5	49.30	74.0	-24.7
2490.000000	H	133.00	231.00	56.8	-9.5	47.30	74.0	-26.7

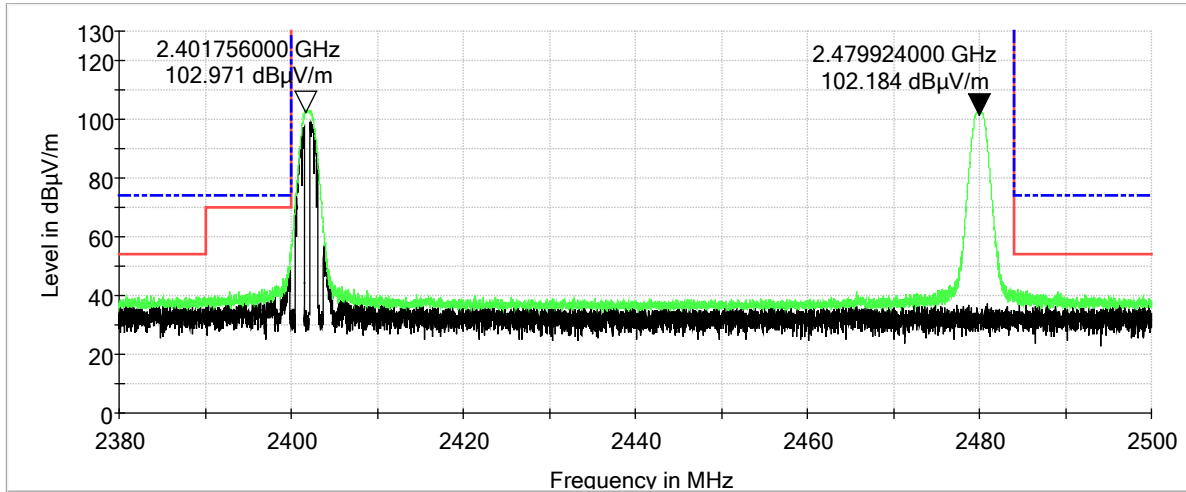
AVG

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2390.000000	H	133.00	305.00	36.9	-9.3	27.60	54.0	-26.4
2400.000000	H	133.00	305.00	54.6	-9.4	45.20	54.0	-8.8
2483.500000	H	133.00	231.00	44.8	-9.5	35.30	54.0	-18.7
2490.000000	H	133.00	231.00	43.5	-9.5	34.00	54.0	-20.0

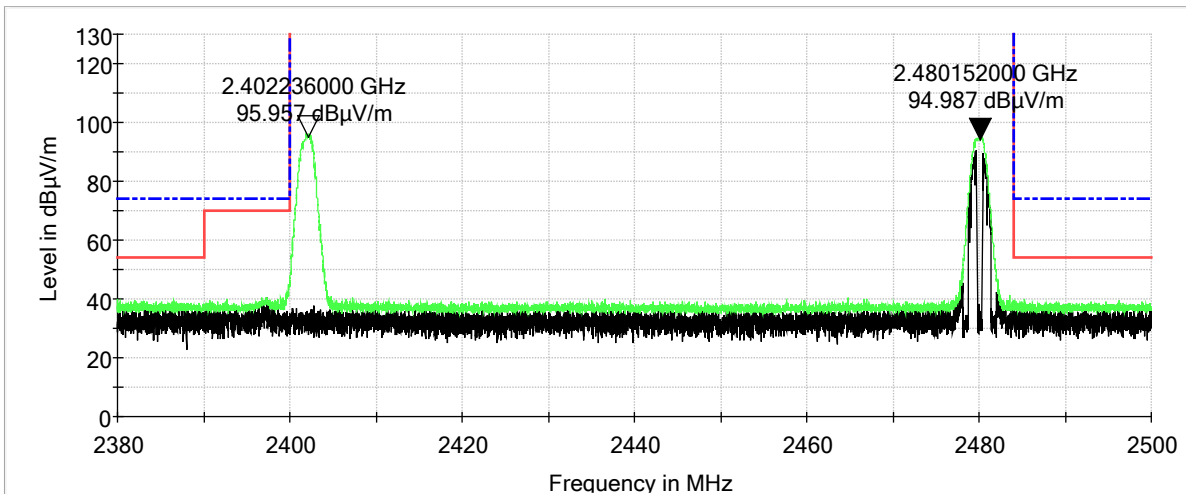




Bluetooth: Band Edge, Horizontal

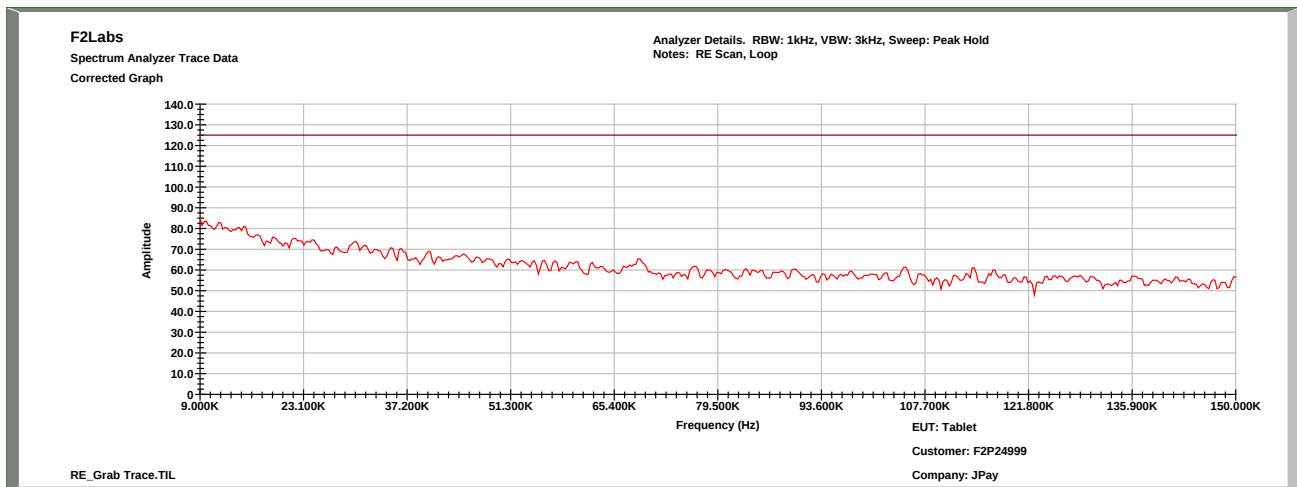


Bluetooth: Band Edge, Horizontal

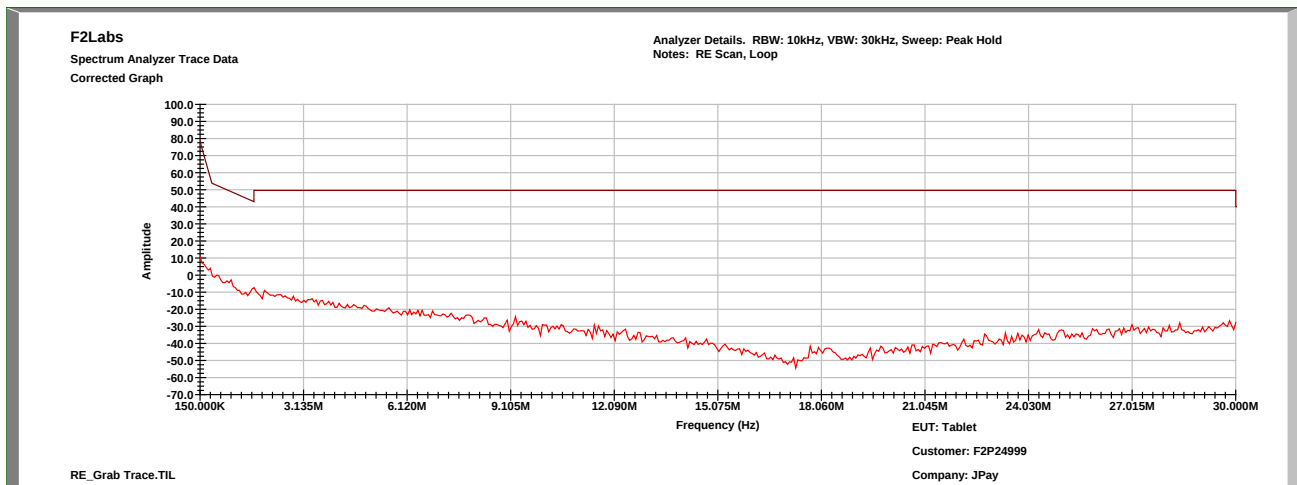




Bluetooth: 0.009 MHz to 0.15 MHz

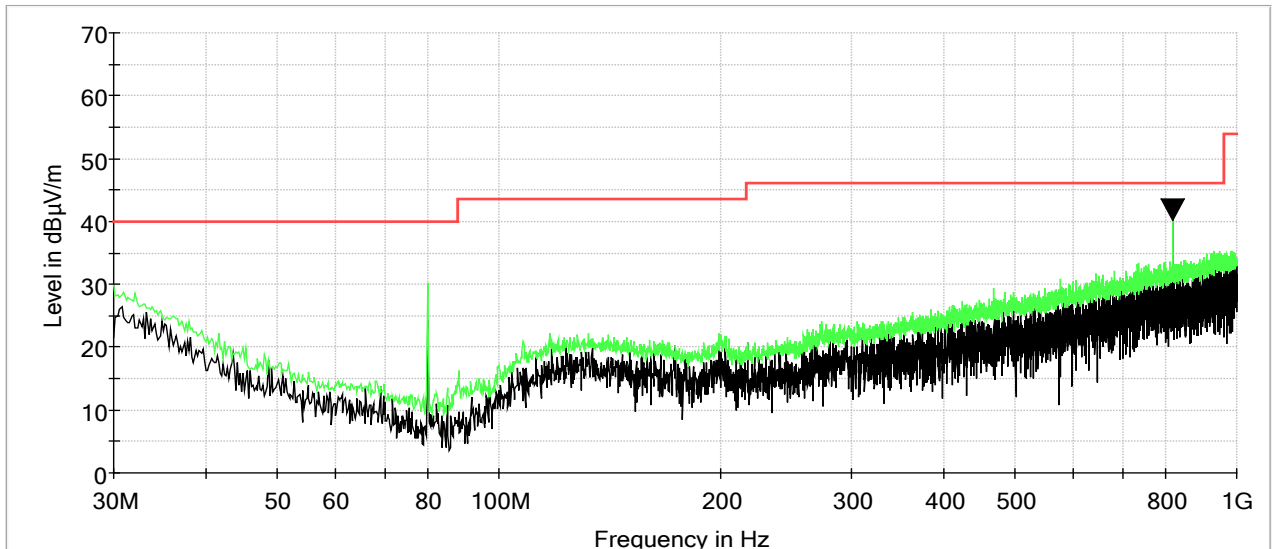


Bluetooth: 0.15 MHz to 30.0 MHz

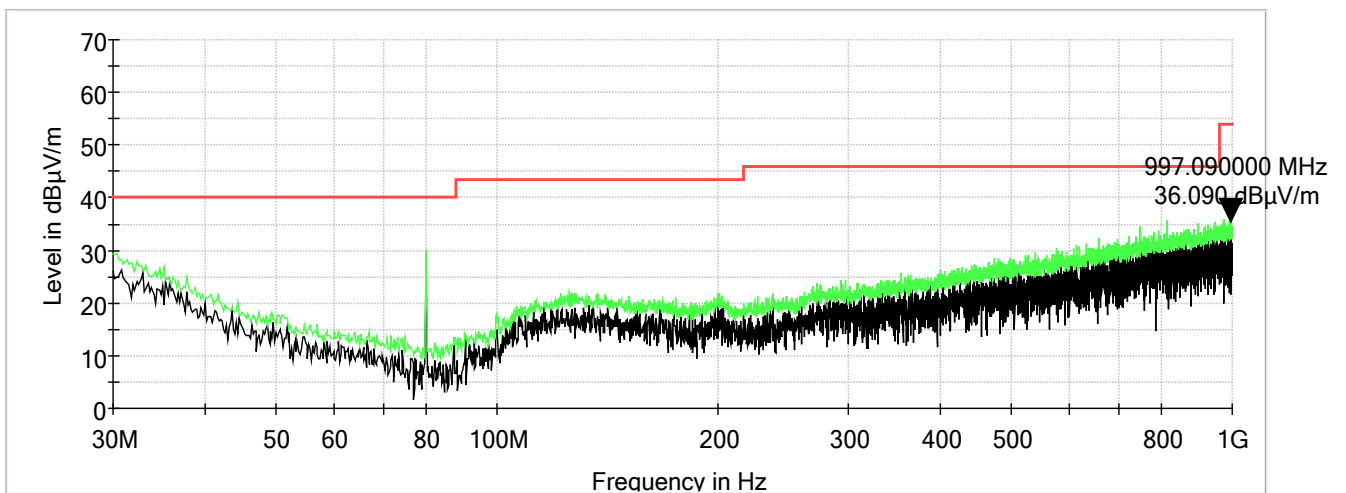




Bluetooth: 30 MHz to 1000 MHz, Vertical

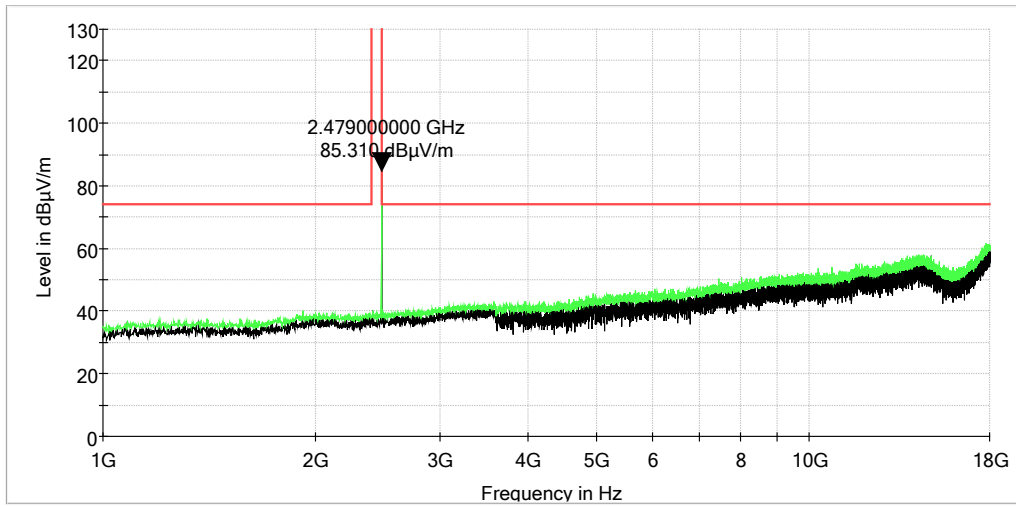


Bluetooth: 30 MHz to 1000 MHz, Horizontal

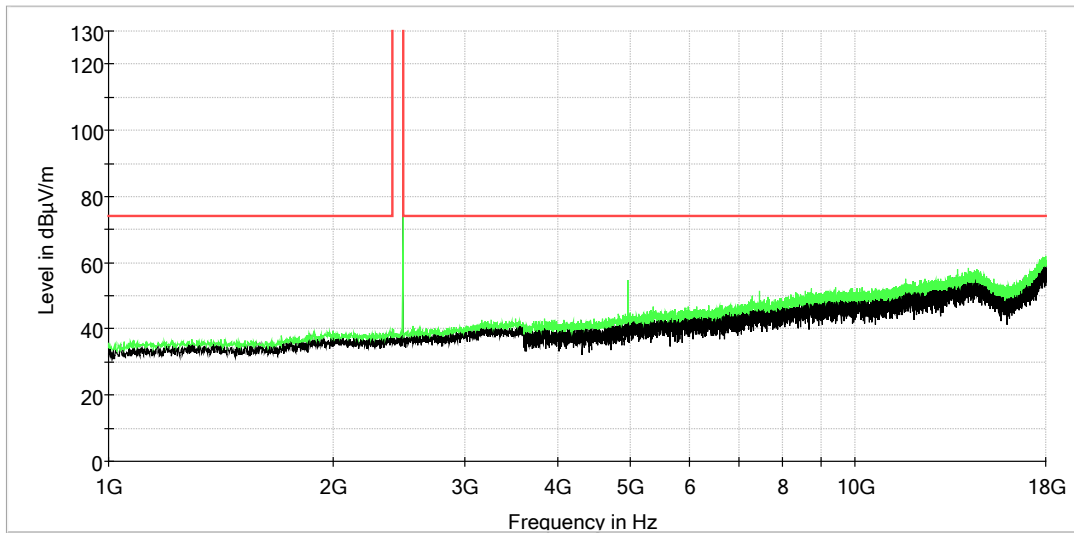




Bluetooth: 1 GHz to 18 GHz, Vertical

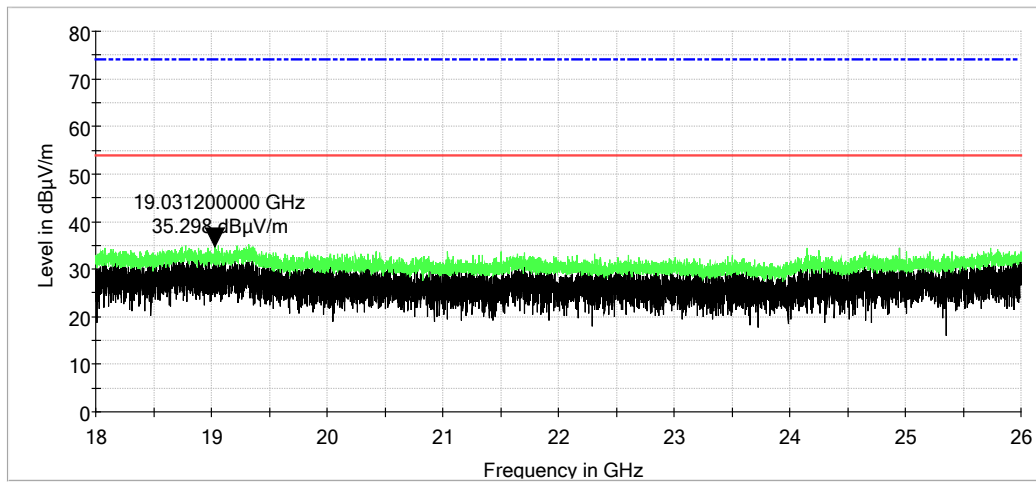


Bluetooth: 1 GHz to 18 GHz, Horizontal

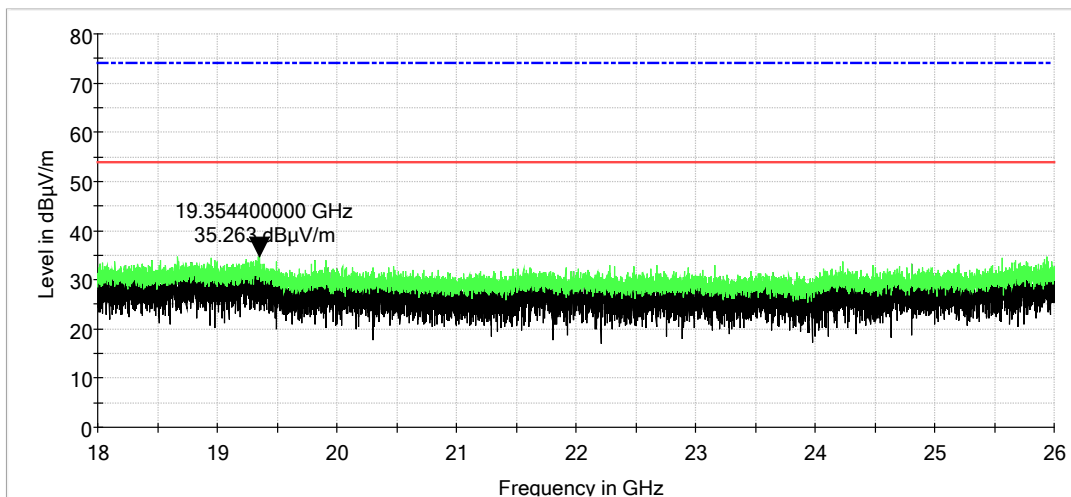




Bluetooth: 18 GHz to 26 GHz, Vertical



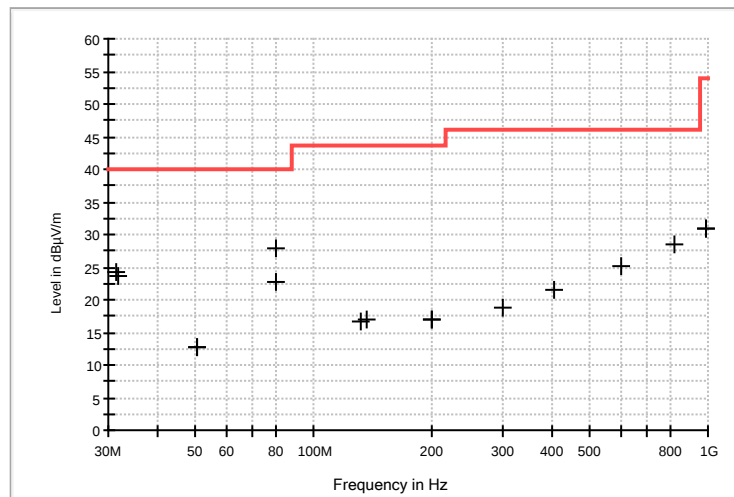
Bluetooth: 18 GHz to 26 GHz, Horizontal





Bluetooth

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
31.360000	V	100.00	0.00	26.3	-2.2	24.10	40.0	-15.9
31.746000	H	100.00	1.00	26.1	-2.4	23.70	40.0	-16.3
50.360000	V	100.00	0.00	27.0	-14.3	12.70	40.0	-27.3
50.370000	H	100.00	1.00	26.9	-14.3	12.60	40.0	-27.4
80.000000	V	100.00	26.00	37.4	-14.8	22.60	40.0	-17.4
80.000000	H	100.00	0.00	42.6	-14.8	27.80	40.0	-12.2
132.040000	V	100.00	2.00	25.2	-8.4	16.80	43.5	-26.7
135.730000	H	100.00	0.00	25.3	-8.5	16.80	43.5	-26.7
198.960000	V	100.00	2.00	25.6	-8.6	17.00	43.5	-26.5
198.974000	H	100.00	0.00	25.6	-8.6	17.00	43.5	-26.5
300.630000	H	100.00	0.00	26.2	-7.4	18.80	46.0	-27.2
404.440000	V	100.00	2.00	26.0	-4.4	21.60	46.0	-24.4
601.330000	H	100.00	0.00	25.3	-0.2	25.10	46.0	-20.9
820.550000	V	100.00	348.00	25.0	3.6	28.60	46.0	-17.4
992.822000	H	100.00	0.00	25.0	5.8	30.80	54.0	-23.2
992.822000	H	100.00	0.00	25.0	5.8	30.80	54.0	-23.2





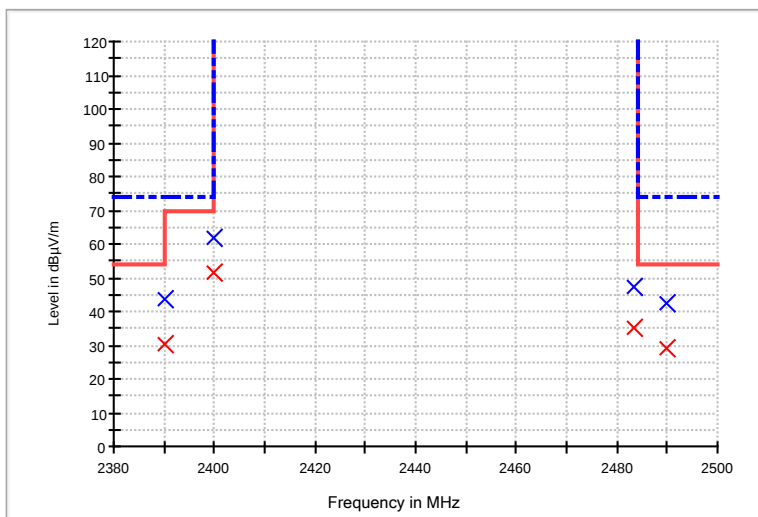
Test Date(s):	2021-02-02	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(d); Part 15.209 / KDB558074	Air Temperature:	20.1°C
		Relative Humidity:	26%

Wi-Fi, 2.4 GHz – CCK: Band Edges**MaxPeak**

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2390.000000	H	52.7	-9.3	43.40	74.0	-30.6
2400.000000	H	71.3	-9.4	61.90	74.0	-12.1
2483.500000	H	56.5	-9.5	47.00	74.0	-27.0
2490.000000	H	51.8	-9.5	42.30	74.0	-31.7

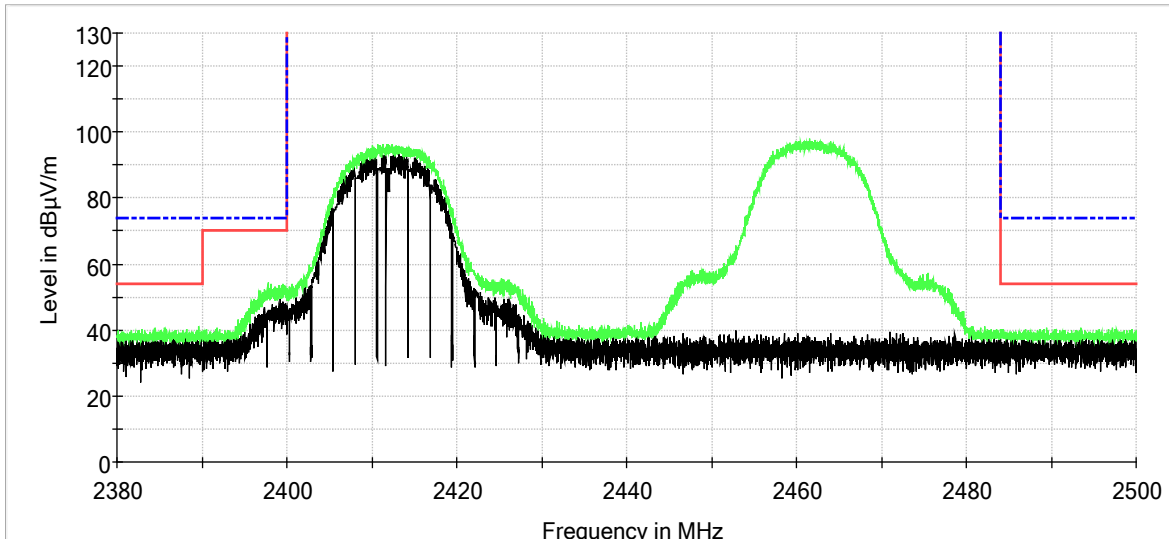
AVG

Frequency (MHz)	Antenna Polarization	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2390.000000	H	39.4	-9.3	30.10	54.0	-23.9
2400.000000	H	61.1	-9.4	51.70	54.0	-2.3
2483.500000	H	44.8	-9.5	35.30	54.0	-18.7
2490.000000	H	38.6	-9.5	29.10	54.0	-24.9

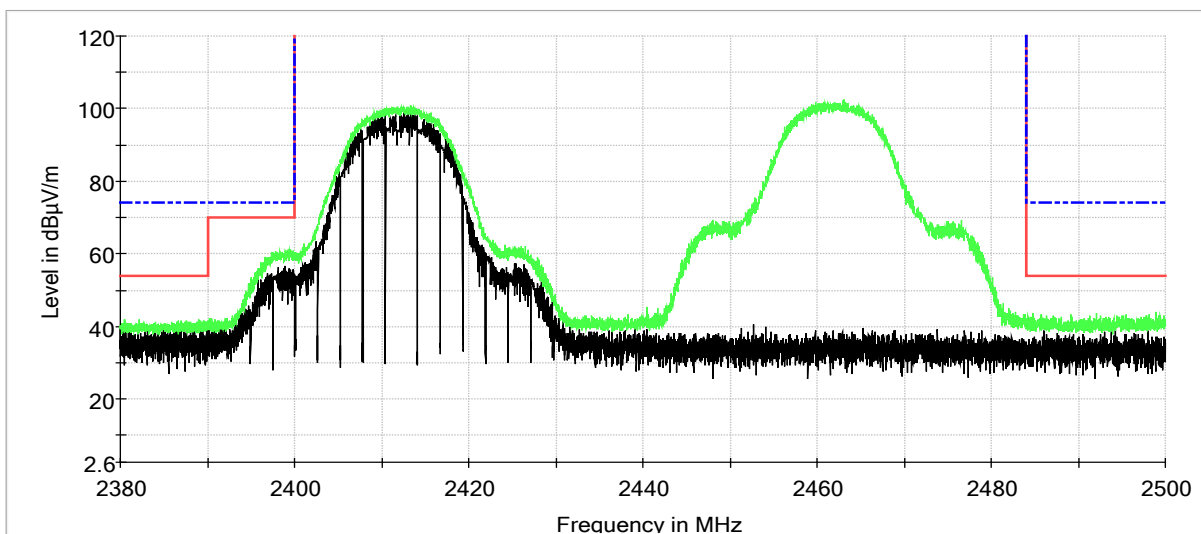




Wi-Fi, 2.4 GHz - CCK: Band Edge, Vertical



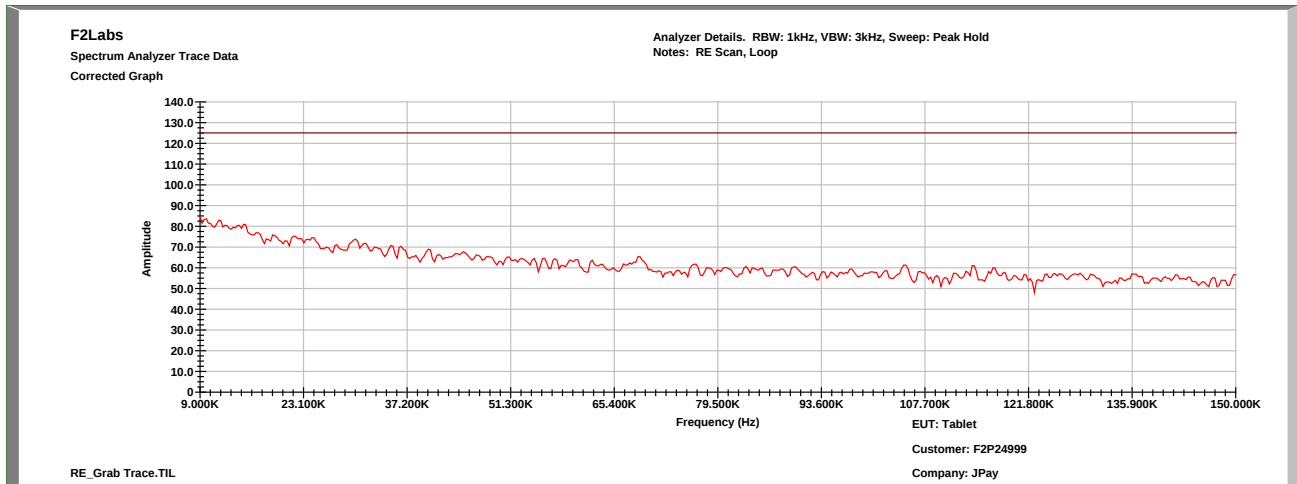
Wi-Fi, 2.4 GHz - CCK: Band Edge, Horizontal



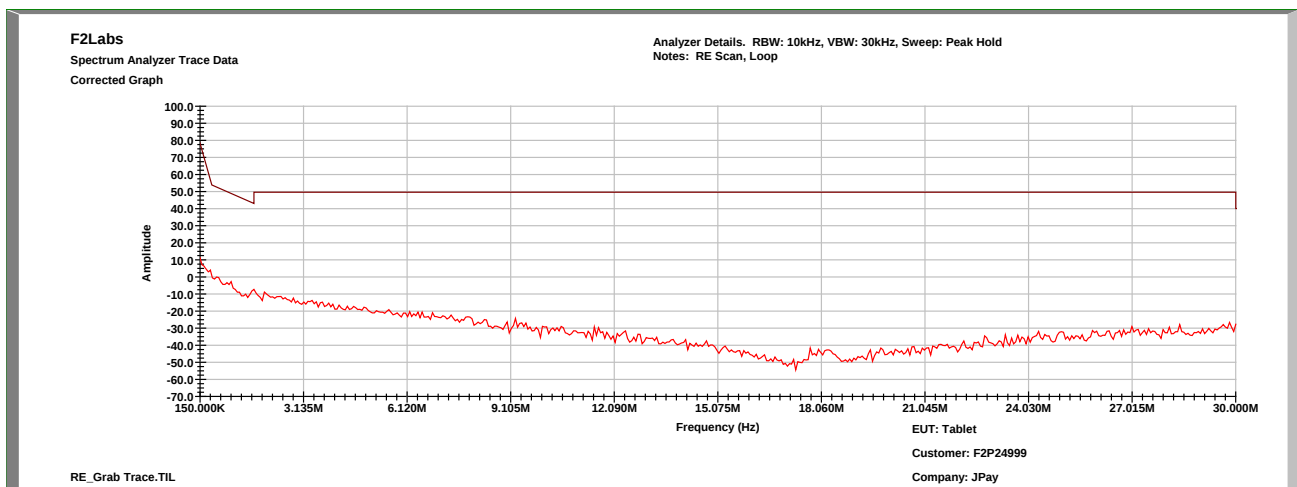
Note: Green trace indicates the MaxPeak level reached during rotation for both channels. The black trace is irrelevant and is just where the signal was when the last plot was viewed. Graphs include both Low and High Channel Band Edges.



Wi-Fi, 2.4 GHz - CCK: 0.009 MHz to 0.15 MHz

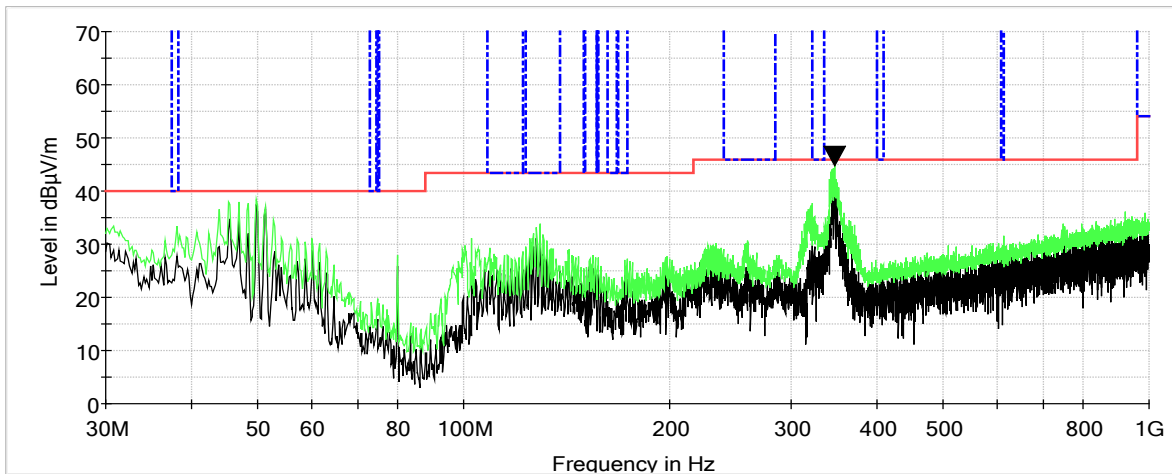


Wi-Fi, 2.4 GHz - CCK: 0.15 MHz to 30.0 MHz

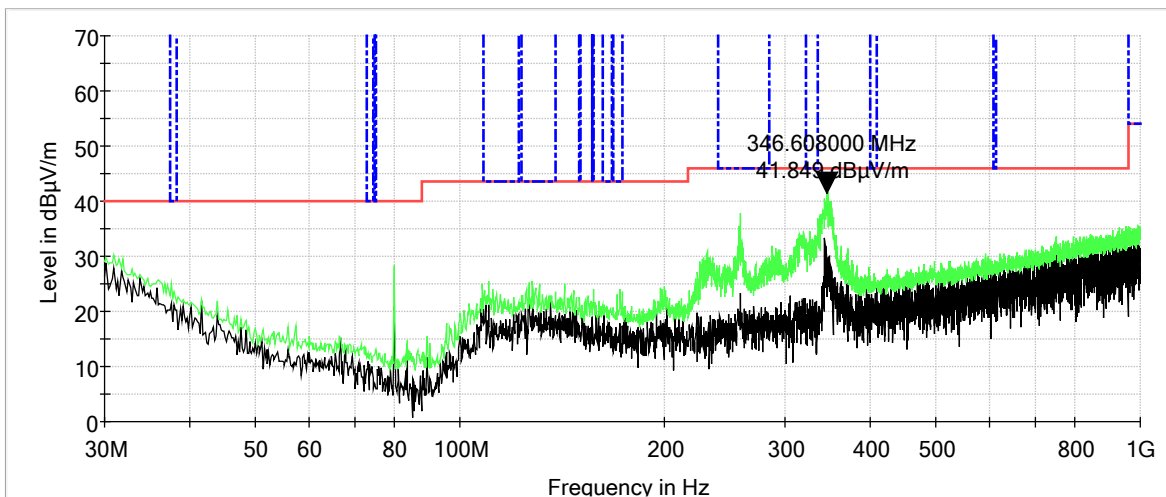




Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Vertical



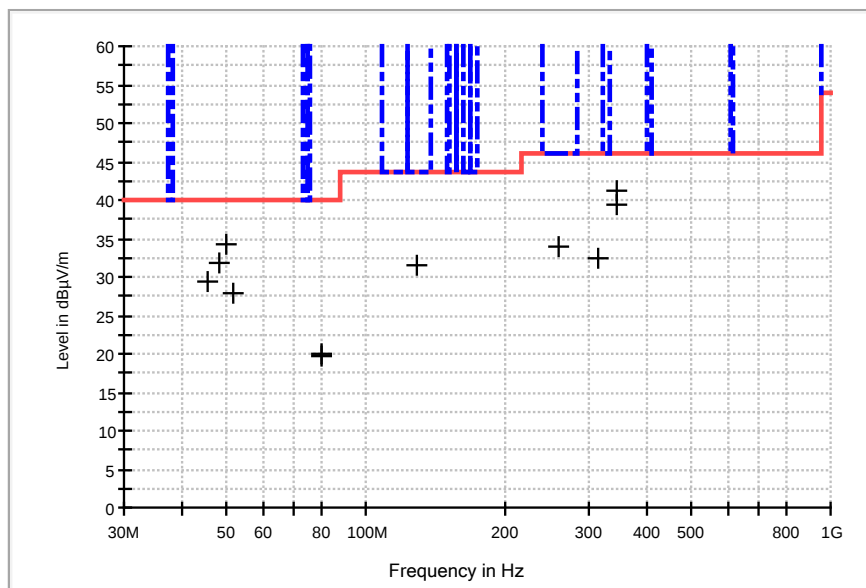
Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Horizontal





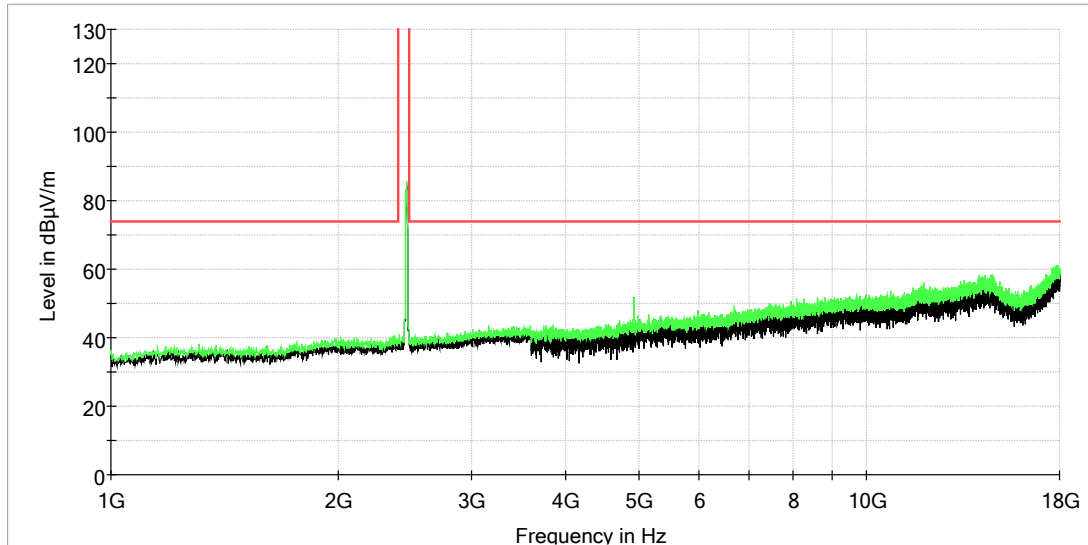
Wi-Fi, 2.4 GHz – CCK: Measurements

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBμV)	Correction Factors (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
45.400000	V	100.00	18.00	41.7	-12.3	29.4	40.0	-10.6
48.400000	V	100.00	323.00	45.6	-13.7	31.9	40.0	-8.1
49.920000	V	100.00	14.00	48.3	-14.2	34.1	40.0	-5.9
51.320000	V	100.00	337.00	42.3	-14.5	27.8	40.0	-12.2
80.000000	H	100.00	348.00	34.5	-14.8	19.7	40.0	-20.3
80.000000	V	100.00	0.00	34.8	-14.8	20.0	40.0	-20.0
127.880000	V	100.00	306.00	40.0	-8.3	31.7	40.0	-8.3
258.338000	H	125.00	76.00	43.0	-9.0	34.0	47.0	-13.0
315.680000	V	100.00	214.00	39.1	-6.7	32.4	47.0	-14.6
346.320000	V	100.00	148.00	47.2	-6.1	41.1	47.0	-5.9
346.608000	H	125.00	225.00	45.4	-6.1	39.3	47.0	-7.7

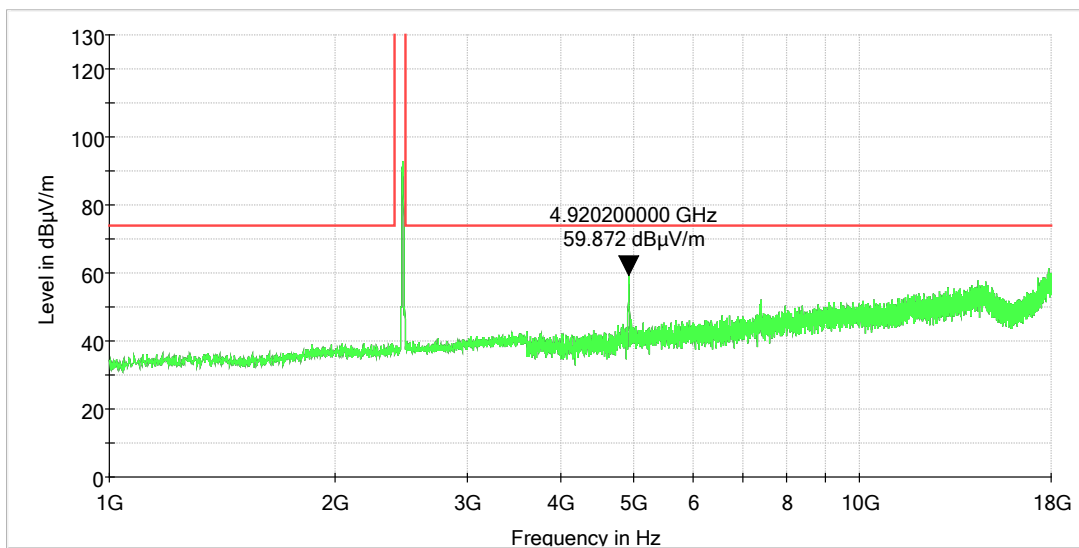




Wi-Fi, 2.4 GHz - CCK: 1 GHz to 18 GHz, Vertical

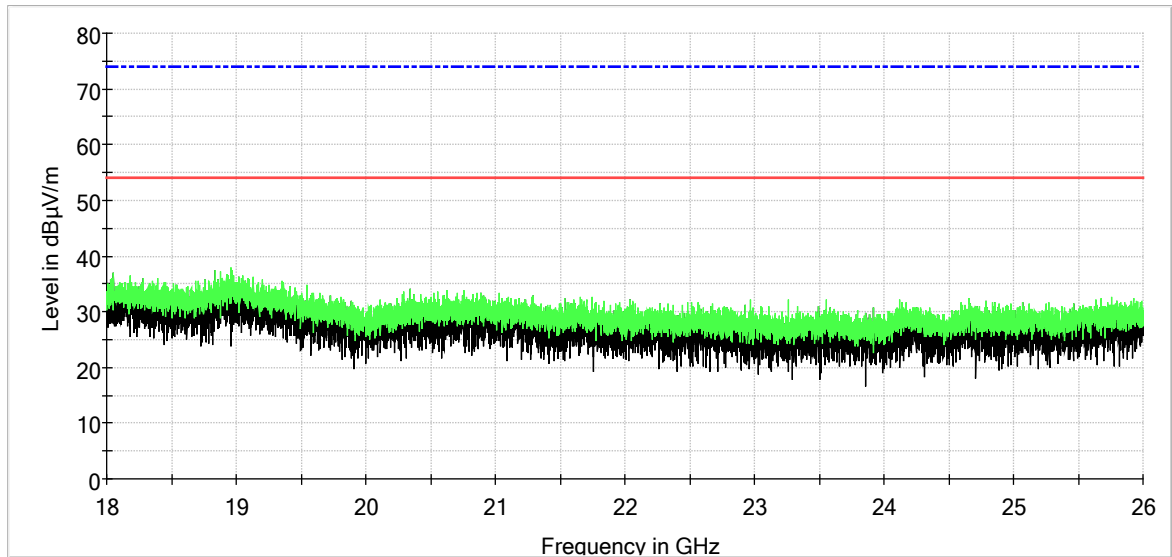


Wi-Fi, 2.4 GHz - CCK: 1 GHz to 18 GHz, Horizontal

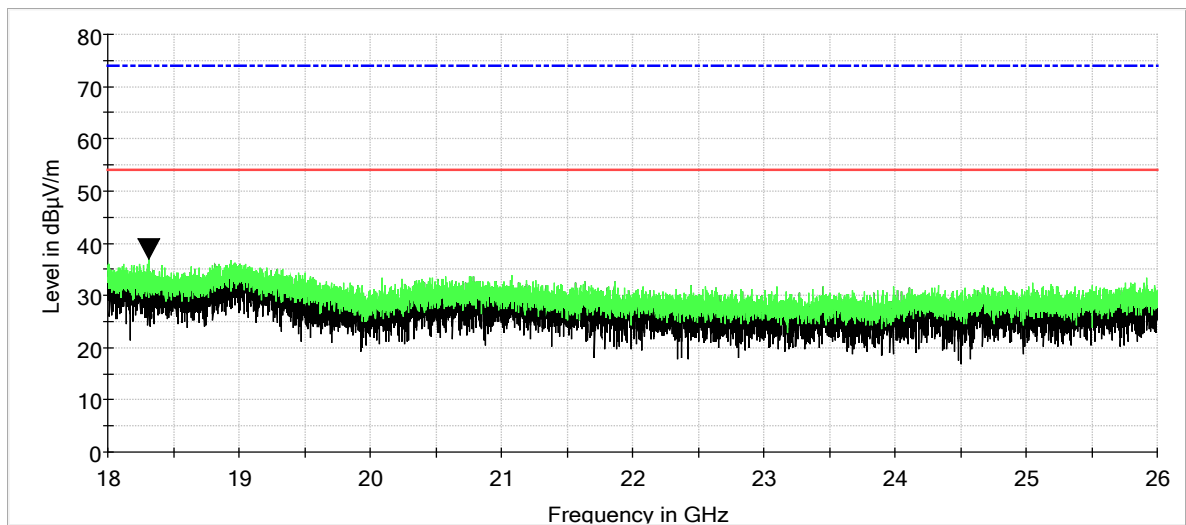




Wi-Fi, 2.4 GHz - CCK: 18 GHz to 26 GHz, Vertical



Wi-Fi, 2.4 GHz - CCK: 18 GHz to 26 GHz, Horizontal



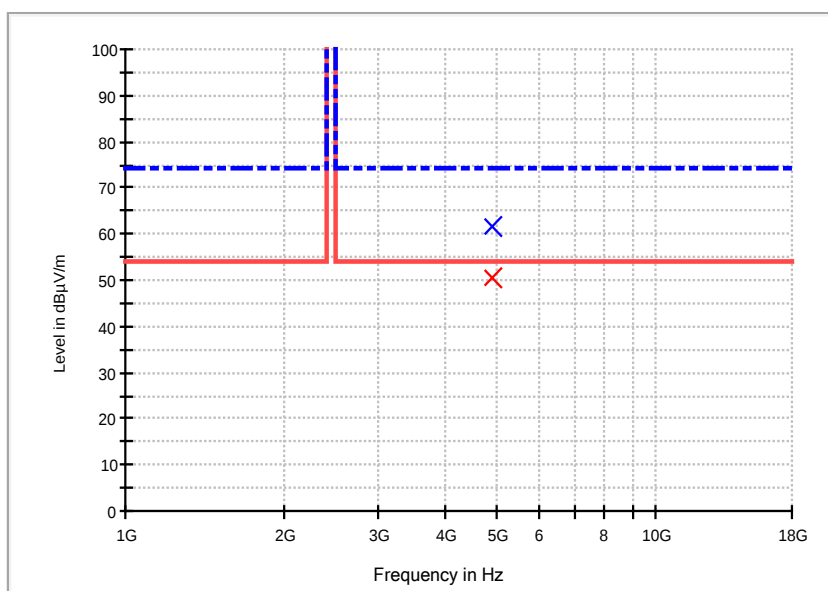


Wi-Fi, 2.4 GHz - CCK: High Channel – Harmonics - MaxPeak

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4922.000000	H	150.00	64.4	-2.8	61.60	74.0	-12.4

Wi-Fi, 2.4 GHz - CCK: High Channel – Harmonics – AVG

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Reading (dBμV)	Cable Loss & Antenna Factor (dB)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4922.000000	H	150.00	53.4	-2.8	50.60	54.0	-3.4





12 PEAK POWER SPECTRAL DENSITY (PSD)

Peak power spectral density measurements were performed.

12.1 Requirements:

The peak power spectral density shall not exceed +8dBm in any 3 kHz band during any time interval of continuous transmission.

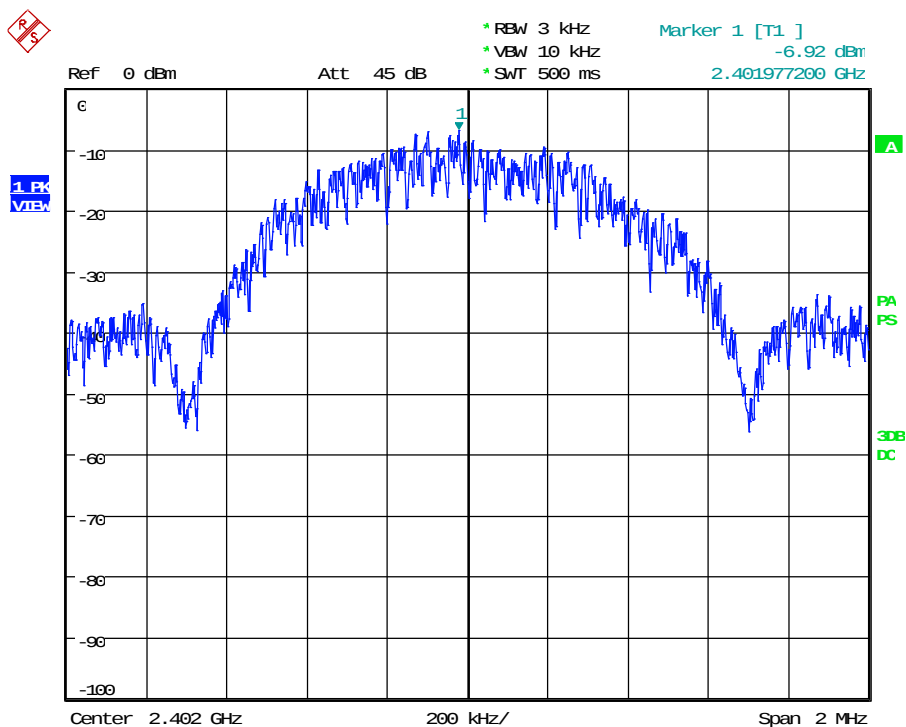
Power spectral density measurements were performed at a resolution bandwidth of 3 kHz (video bandwidth set at 10 KHz). The peak spectral densities were measured at the low, mid, and upper channels.



12.2 Peak Power Spectral Density Test Data

Test Date(s):	2021-02-01	Test Engineer:	J. Chiller
Standards:	CFR 47 Part 15.247(e); KDB558074	Air Temperature:	19.6 °C
		Relative Humidity:	28%

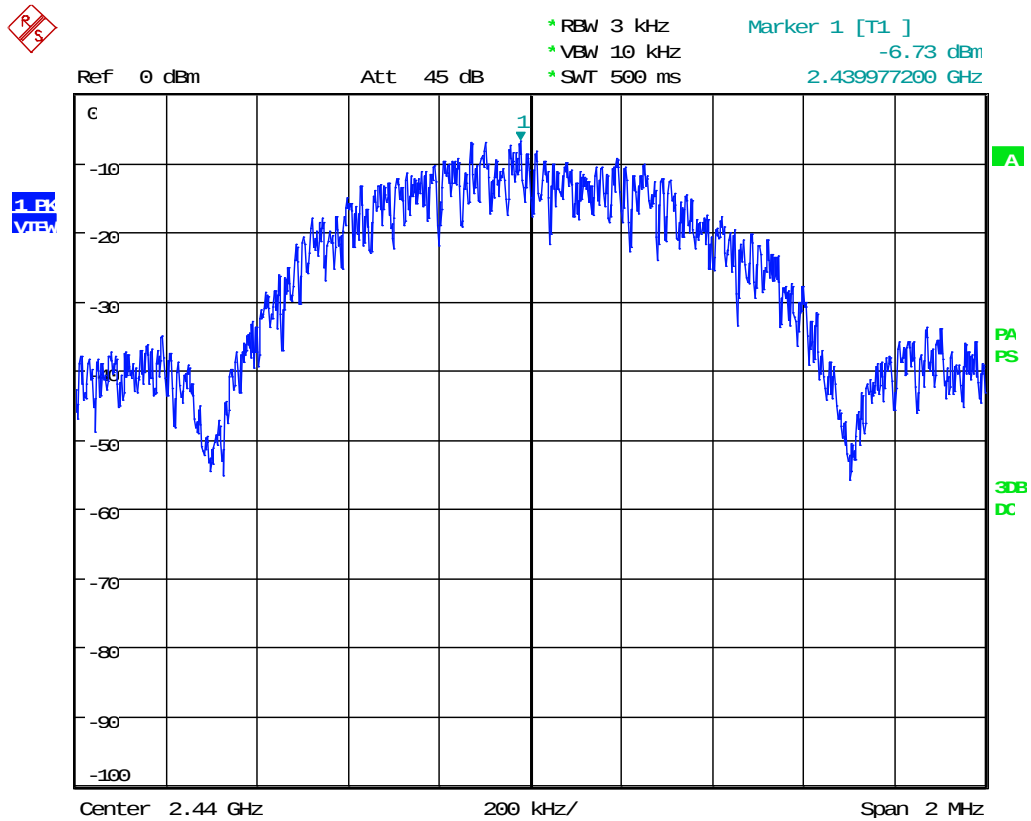
Bluetooth: Low Channel



Date: 1.FEB.2021 11:29:42



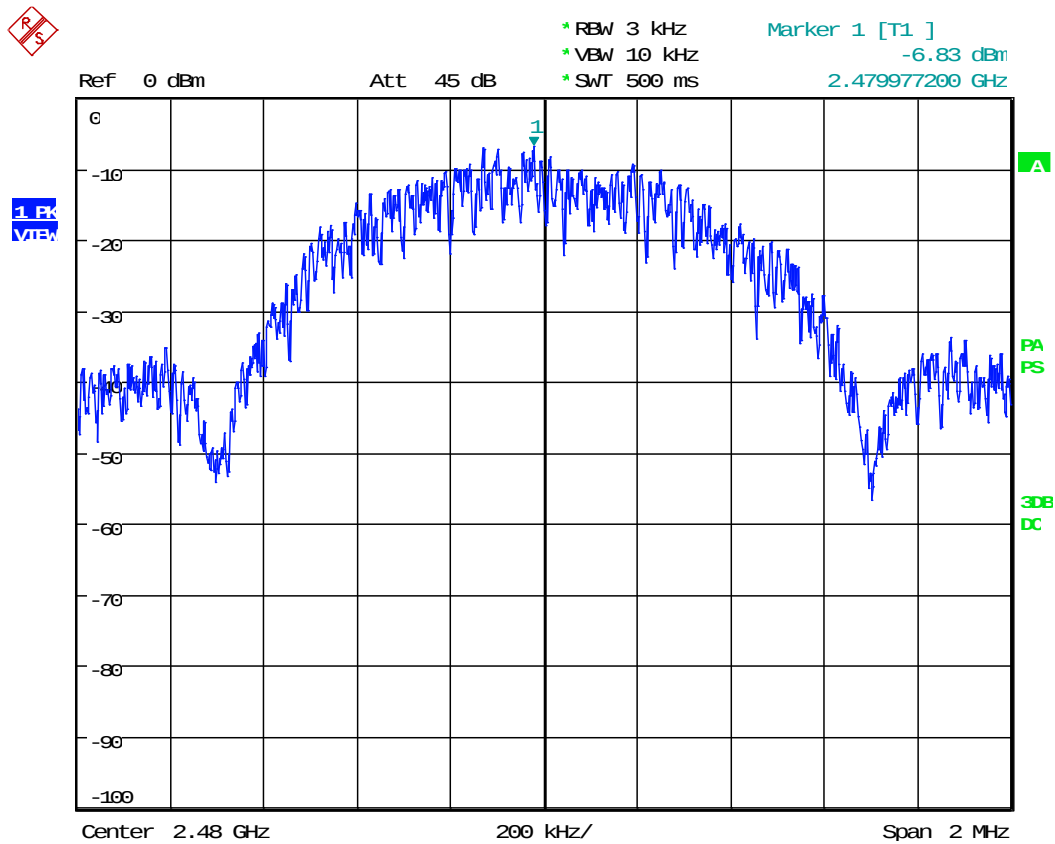
Bluetooth: Mid Channel



Date: 1.FEB.2021 11:31:03



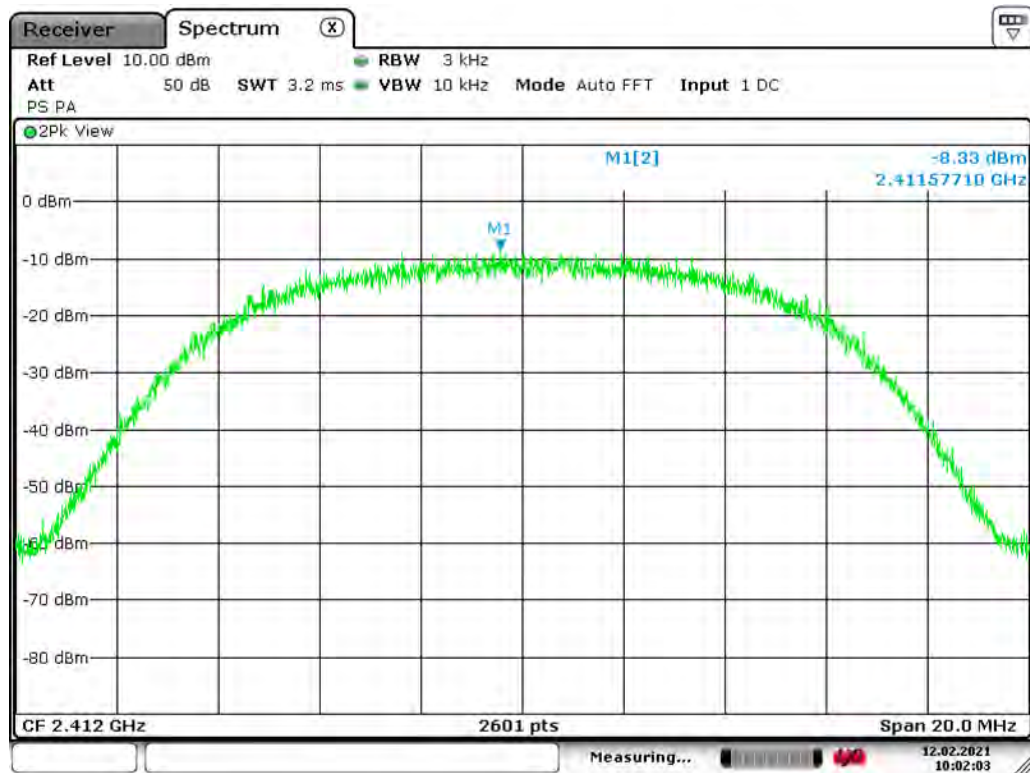
Bluetooth: High Channel



Date: 1.FEB.2021 11:32:12



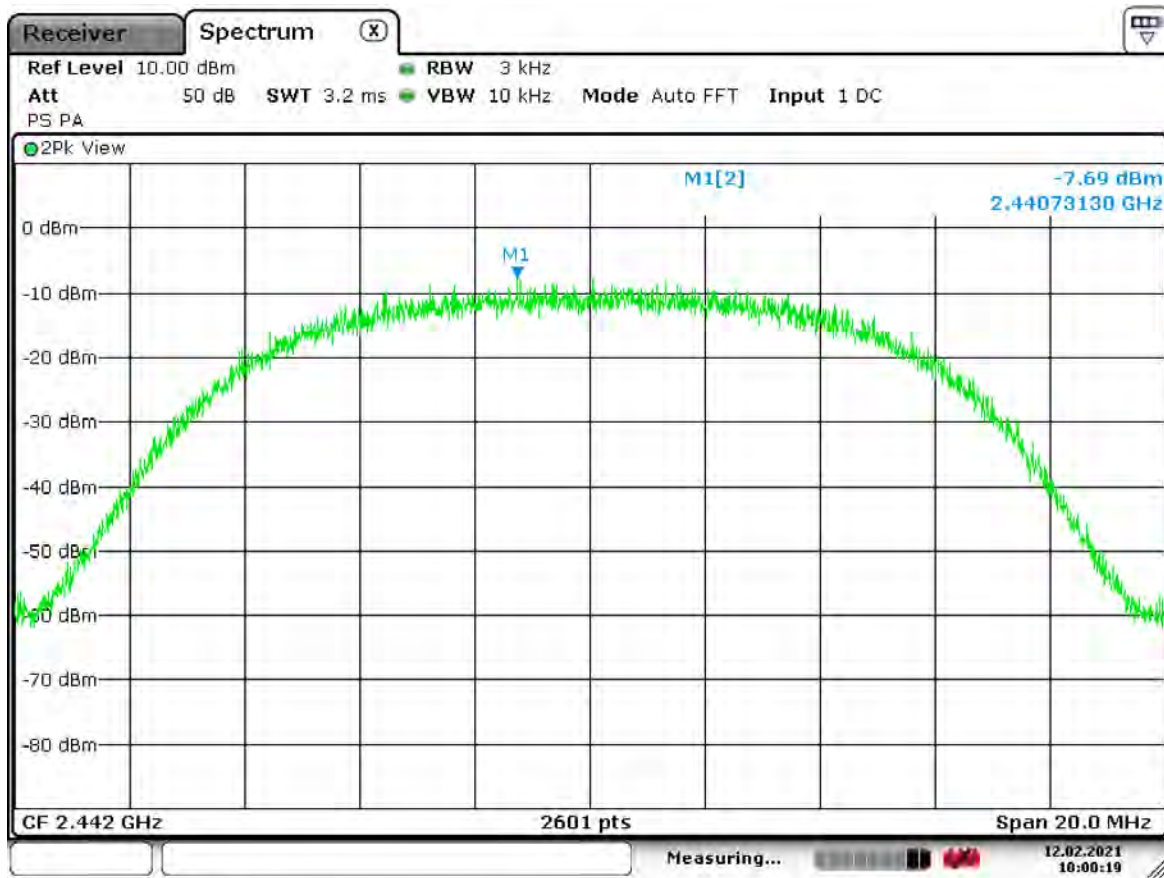
Wi-Fi, 2.4 GHz - CCK: Low Channel



Date: 12.FEB.2021 10:02:03



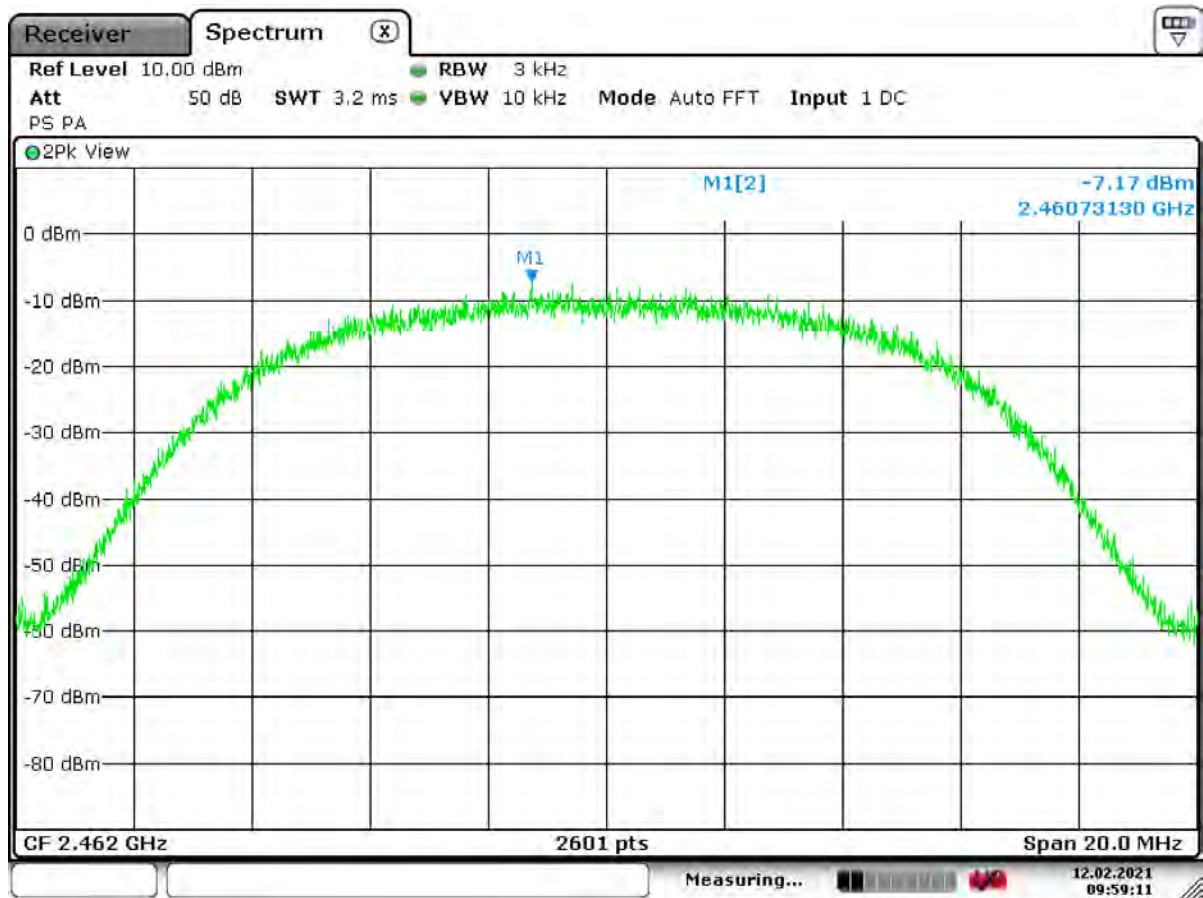
Wi-Fi, 2.4 GHz - CCK: Mid Channel



Date: 12.FEB.2021 10:00:19



Wi-Fi, 2.4 GHz - CCK: High Channel



Date: 12.FEB.2021 09:59:11



13 CONDUCTED EMISSIONS

13.1 Requirements

In accordance with FCC CFR 47 Part 15.207(a), "Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

13.2 Test Procedure

The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.

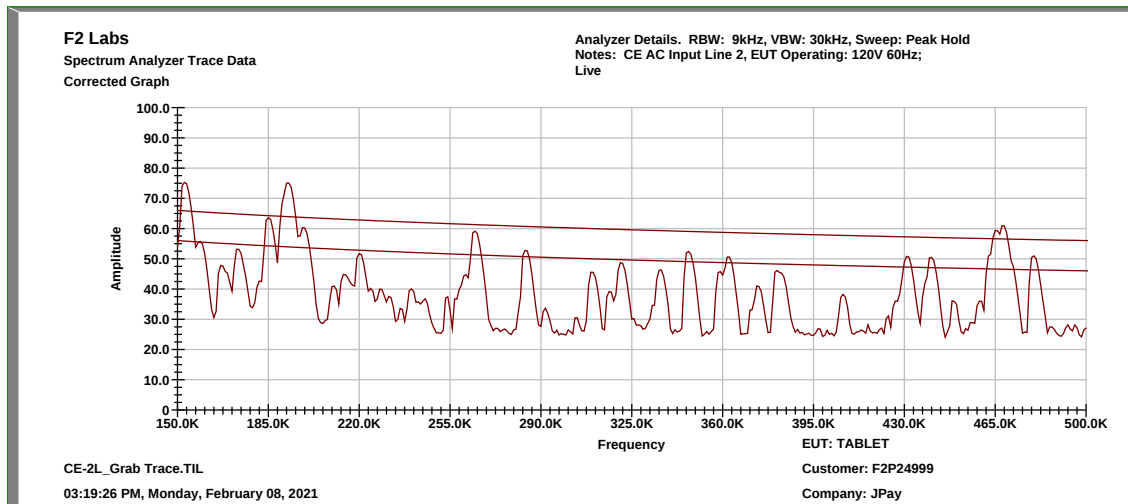
The following results are from the worse-case channel of the worse-case protocol which was the high channel of CCK 11 Mbps.



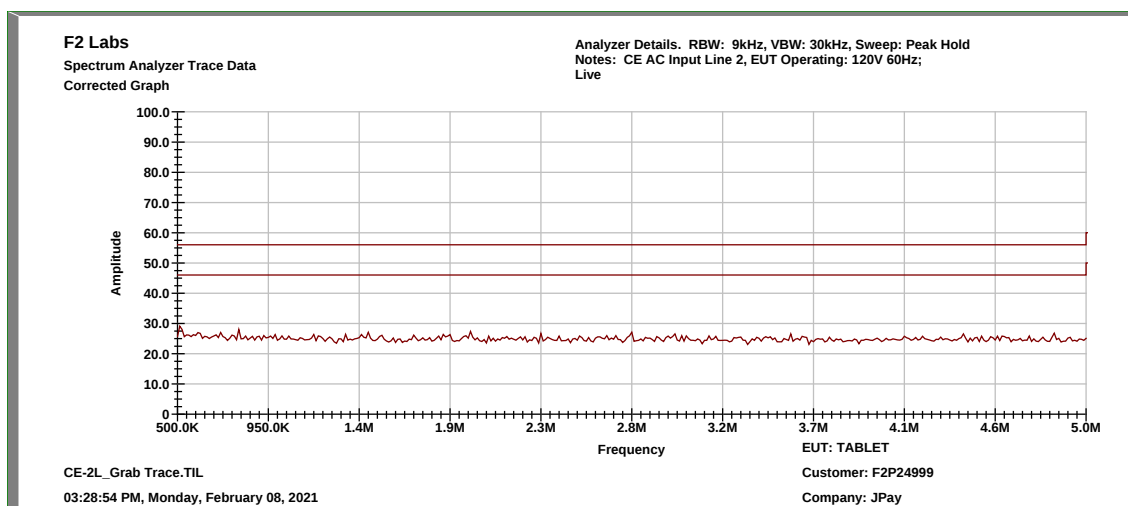
13.3 Conducted Emissions Test Data

Test Date:	2021-02-08	Test Engineer:	J. Chiller
Rule:	15.207	Air Temperature:	20.4° C
Test Results:	Pass	Relative Humidity:	33%

Conducted Test – Live: 0.15 MHz to 0.5 MHz

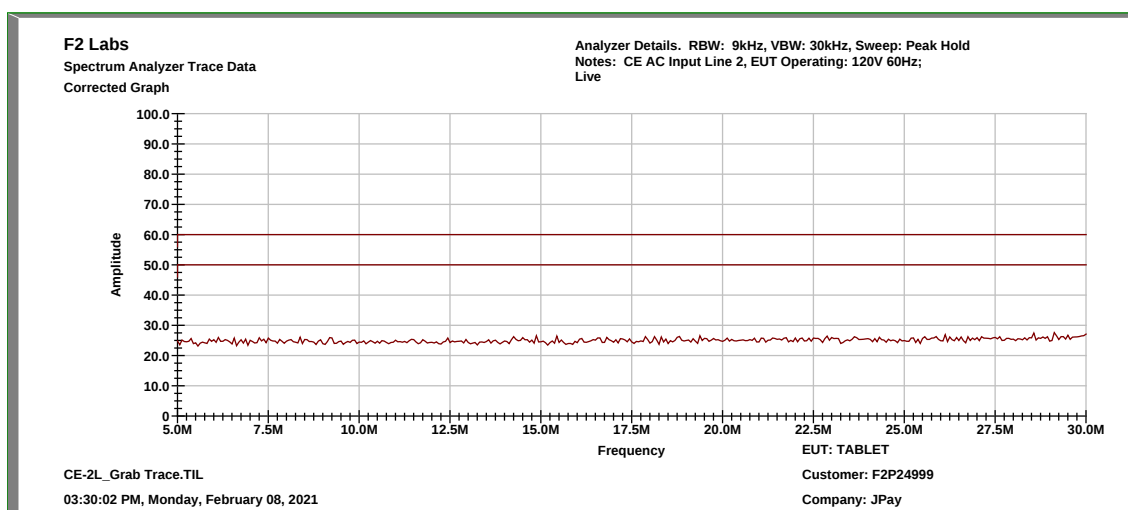


Conducted Test – Live: 0.5 MHz to 5.0 MHz





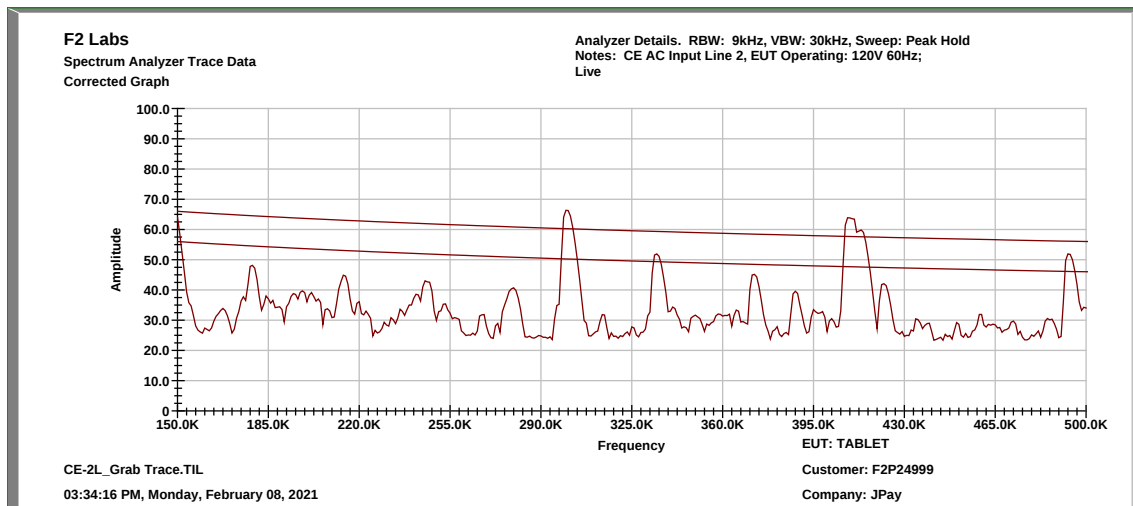
Conducted Test – Live: 5.0 MHz to 30.0 MHz



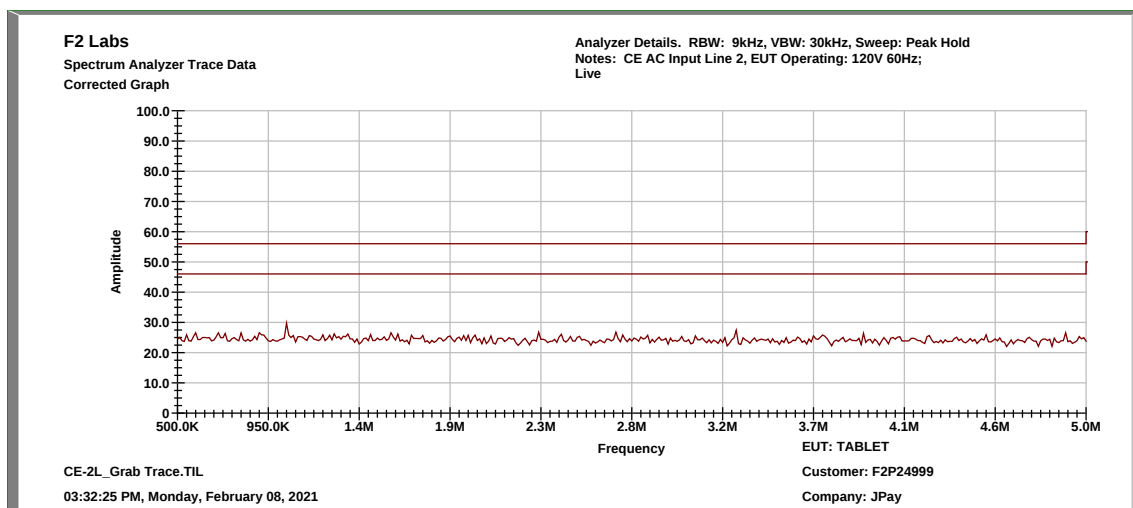
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Live	0.1535	Quasi-Peak	40.11	11.024	51.13	65.81	-14.7
			Average	6.03	11.024	17.05	55.81	-38.8
2	Live	0.192875	Quasi-Peak	39.33	10.614	49.94	63.913	-14.0
			Average	5.2	10.614	15.81	53.913	-38.1
3	Live	0.2655	Quasi-Peak	34.25	10.618	44.87	61.257	-16.4
			Average	13.87	10.618	24.49	51.257	-26.8
4	Live	0.346875	Quasi-Peak	37.75	10.087	47.84	59.037	-11.2
			Average	12.6	10.087	22.69	49.037	-26.4
5	Live	0.4685	Quasi-Peak	14.72	10.029	24.75	56.541	-31.8
			Average	2.4	10.029	12.43	46.541	-34.1



Conducted Test – Neutral: 0.15 MHz to 0.5 MHz

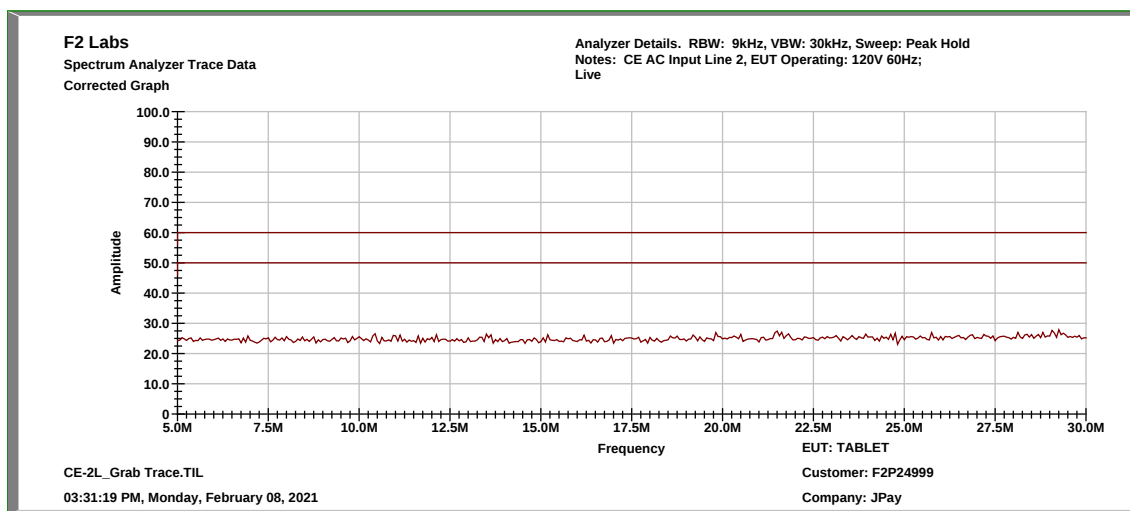


Conducted Test – Neutral: 0.5 MHz to 5.0 MHz





Conducted Test – Neutral: 5.0 MHz to 30.0 MHz

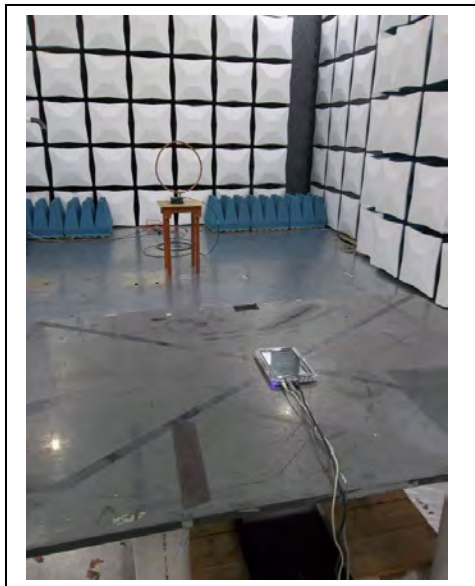


Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Neutral	0.150	Quasi-Peak	39.56	11.001	50.56	66.0	-15.4
			Average	3.62	11.001	14.62	56.0	-41.4
2	Neutral	0.3005	Quasi-Peak	26.21	10.09	36.30	60.229	-23.9
			Average	3.38	10.09	13.47	50.229	-36.8
3	Neutral	0.3355	Quasi-Peak	21.83	10.069	31.90	59.314	-27.4
			Average	3.41	10.069	13.48	49.314	-35.8
4	Neutral	0.409	Quasi-Peak	21.73	10.072	31.80	57.668	-25.9
			Average	3.02	10.072	13.09	47.668	-34.6
5	Neutral	0.493	Quasi-Peak	21.76	10.002	31.76	56.118	-24.4
			Average	3.1	10.002	13.10	46.118	-33.0

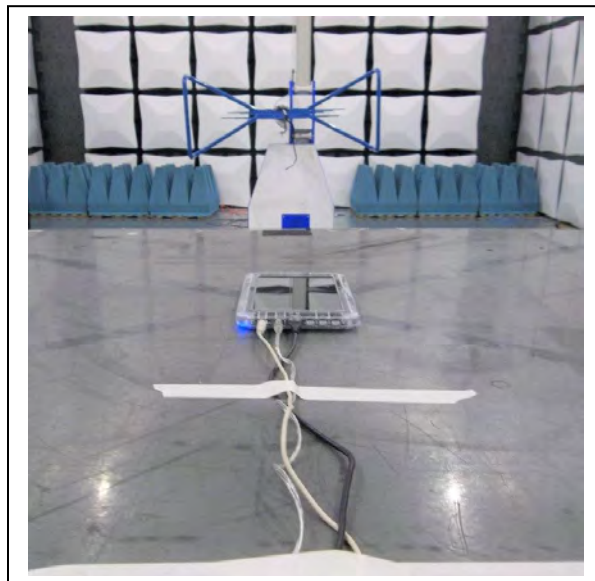


14 PHOTOGRAPHS

Radiated Spurious Emission, Less Than 30 MHz



Radiated Spurious Emission, 30 MHz to 1000 MHz

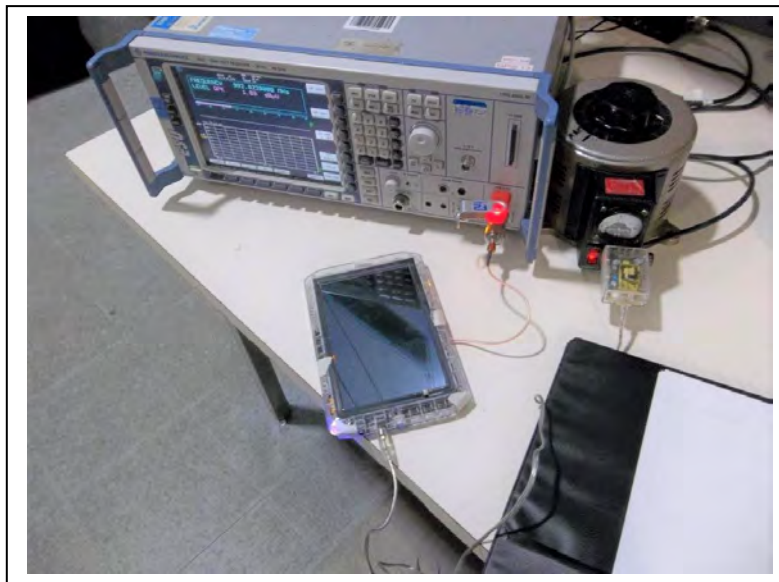




Radiated Spurious Emission, above 1 GHz



Conducted Output Power, Peak Power Spectral Density, Occupied Bandwidth, Conducted Spurious Emissions, Voltage Variations





Conducted Emissions

