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CERTIFICATION TEST REPORT

Manufacturer:	**Securus Technologies** **4000 International Parkway** **Carrollton, Texas 75007 USA**
Applicant:	**Same As Above**
Product Name:	**JP6Mini**
Product Description:	**4.3" Lithium Capacitive Touch Tablet for Inmates**
Power Source:	**Battery and AC/DC Adaptor**
Model:	**JP6Mini**
FCC ID:	**2AUJ4JP6MINI**
Testing Commenced:	2020-04-13
Testing Ended:	2020-08-11
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**

Evaluation Conducted by:

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Report Reviewed by:

Ken Littell, Director of EMC & Wireless Operations

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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 Uncertainly
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
F2P22752-01E	First Issue	2020-08-11	K. Littell

2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
-6dB Occupied Bandwidth	CFR 47 Part 15.247(a)(2) / KDB558074	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

Test		Low Channel 2402 MHz	Mid Channel 2440 MHz	High Channel 2480 MHz
Conducted Output Power		6.01mW / 7.79dBm	6.29mW / 7.99dBm	6.30mW / 8.00dBm
Conducted Output Power Limit		1 Watt / 30dBm	1 Watt / 30dBm	1 Watt / 30dBm
E.I.R.P. with 2dBi Integral Antenna		9.52mW / 9.79dBm	9.97mW / 9.99dBm	10.0mW / 10.0dBm
E.I.R.P. Limit		4 Watts / 36.02dBm	4 Watts / 36.02dBm	4 Watts / 36.02dBm
Peak Power Spectral Density		-7.98dBm	-7.89dBm	-8.11dBm
Peak Power Spectral Density Limit		8dBm	8dBm	8dBm
-6dB Occupied Bandwidth, GFSK		0.704 MHz	0.713 MHz	0.709 MHz
-6dB Occupied Bandwidth Limit		≥ 500kHz	≥ 500kHz	≥ 500kHz
Voltage Variations	93.5V	7.48dBm / 5.59mW	7.65dBm / 5.82mW	8.01dBm / 6.32mW
	126.5V	7.83dBm / 6.06mW	8.00dBm / 6.30mW	8.02dBm / 6.34mW
Limit		1W / 30dBm	1W / 30dBm	1W / 30dBm

Wi-Fi, 2.4 GHz

Test		Low Channel 2412 MHz	Mid Channel 2437 MHz	High Channel 2464 MHz
Conducted Output Power*	CCK 11mbps	20.18mW / 13.05dBm	19.86mW / 12.98dBm	20.37mW / 13.09dBm
Conducted Output Power Limit		1 Watt / 30dBm	1 Watt / 30dBm	1 Watt / 30dBm
E.I.R.P. with 2dBi Integral Antenna*	CCK 11mbps	31.98mW / 15.05dBm	31.47mW / 14.98dBm	32.28mW / 15.09dBm
E.I.R.P. Limit		4000mW / 36dBm	4000mW / 36dBm	4000mW / 36dBm
Peak Power Spectral Density		-5.670dBm	-5.91dBm	-6.21dBm
Peak Power Spectral Density Limit		8dBm	8dBm	8dBm
-6dB Occupied Bandwidth		9.038 MHz	9.807 MHz	9.471 MHz
-6dB Occupied Bandwidth Limit		≥ 500kHz	≥ 500kHz	≥ 500kHz
Voltage Variations	93.5V	20.18dBm / 104.2mW	20.33dBm / 107.9mW	20.46dBm / 111.2mW
	126.5V	20.40dBm / 109.6mW	20.35dBm / 108.4mW	20.47dBm / 111.4mW
Limit		1W / 30dBm	1W / 30dBm	1W / 30dBm

**The Output Power was reduced in order to meet SAR requirements. These results are not the max power that the device can transmit at, but is the max power allowed to meet the requirements. The setting is controlled in firmware and will be set to this level with no option by the end user to increase it. The max power before the reduction to meet SAR was at the 5190 Low channel at OFDM54 40M bandwidth and was 111.2mW / 20.46dBm. All other tests listed in this report were done at the previous higher power setting. The results would only comply by even more since the power was reduced, so those tests were not reperformed at the lower power setting.*

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: JP6Mini
Serial No.: None Specified
FCC ID: **2AUJ4JP6MINI**

5.2 Trade Name:

Securus Technologies

5.3 Power Supply:

Charger, Securus model MX15X-0502500UX

5.4 Applicable Rules:

CFR 47, Part 15.247, subpart C

5.5 Equipment Category:

Radio Transmitter-DTS

5.6 Antenna:

2.0dBi Integral

5.7 Accessories:

N/A

5.8 Test Item Condition:

The equipment to be tested was received in good condition.

5.9 Testing Algorithm:

The EUT was configured to provide a continuous modulated carrier in the 2.4 GHz Wi-Fi and Bluetooth bands. Transmitter power and channels were controlled using software provided by the client.

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	2021-01-02
Temp/Hum. Recorder	CL261	Extech	445814	04	2021-02-12
Temp/Hum. Recorder	CL263	Extech	445814	06	2021-02-12
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2020-10-21
Receiver	CL204	Rohde & Schwarz	ESR7	101714	2020-10-16
Antenna, Bilog	CL211	Sunol Sciences, Inc.	JB1	QA021017	2021-10-03
Horn Antenna	CL098	Emco	3115	9809-5580	2021-01-31
Pre-Amplifier	CL153	Agilent	83006-69007	MY39500791	2020-08-05
Amplifier w/Monopole & 18" Loop	CL163-Loop	A.H. Systems, Inc.	EHA-52B	100	2020-07-24
Software:	Tile Version 3.4.B.3		Software Verified: 2020-04-13 to 2020-04-20		
Software:	EMC 32, Version 8.53.0		Software Verified: 2020-04-13 to 2020-04-20		
Antenna, Horn	CL114	A. H. Systems, Inc.	SAS-572	237	2021-02-04
Spectrum Analyzer	CL147	Agilent	E7402	MY45101241	2021-01-06
Temp./Hum. Recorder	CL263	Extech	445814	06	2021-02-12
Spectrum Analyzer	0204	Hewlett Packard	HP8591A	3149A02546	2020-07-29
Software	EMC Analyzer 85712D Rev. A.00.01			Date Verified	2020-04-13
Transient Limiter	0202	Hewlett Packard	11947A	3107A00729	2020-07-29
LISN	CL181	Com-Power	LI-125A	191226	2020-09-06
LISN	CL182	Com-Power	LI-125A	191225	2020-09-06
Low Loss Cable Set	--	Pasternack	PE3C0666-252 / PE3C066-50CM	None Spec.	2020-08-31

7 OCCUPIED BANDWIDTH

7.1 Requirements:

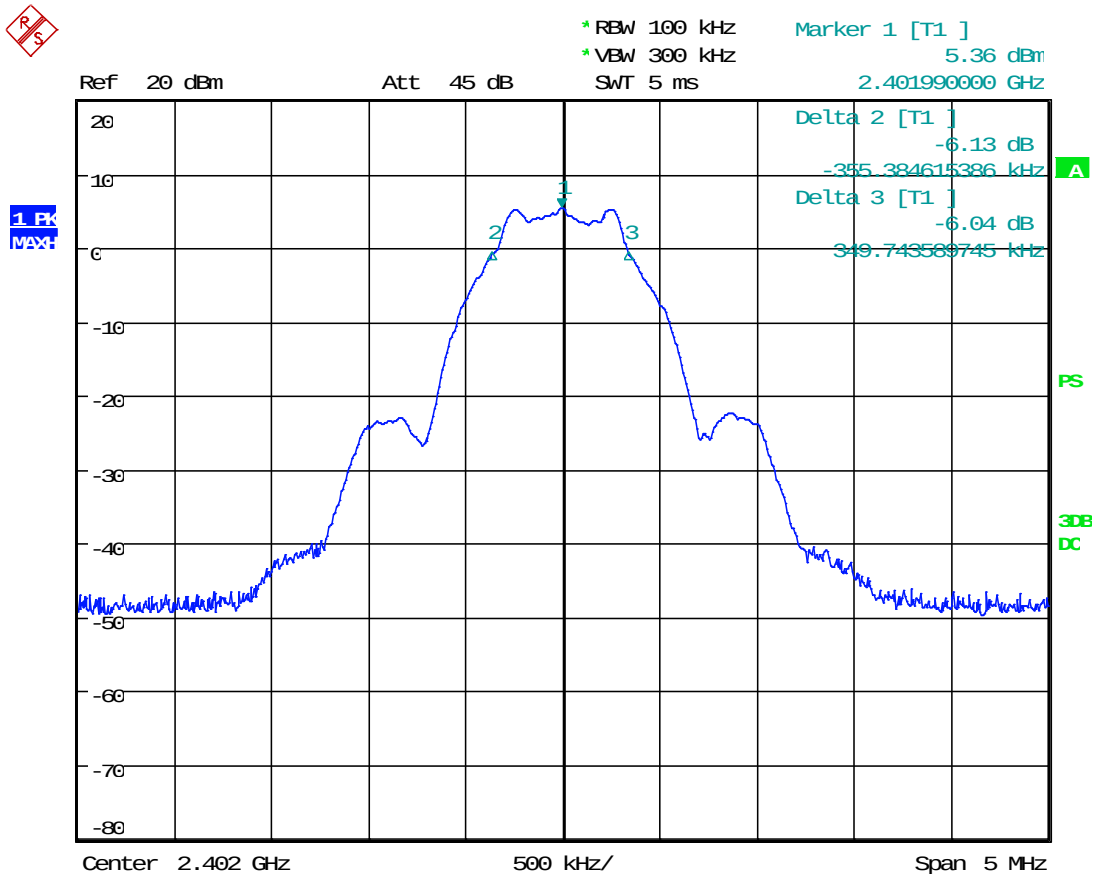
The -6dB bandwidth shall be greater than 500 kHz.

Bandwidth measurements were made at the low, mid and upper frequencies with the resolution Bandwidth set according to KDB558074 v05r02. The bandwidth was measured using the marker delta method.

7.2 Occupied Bandwidth Test Data

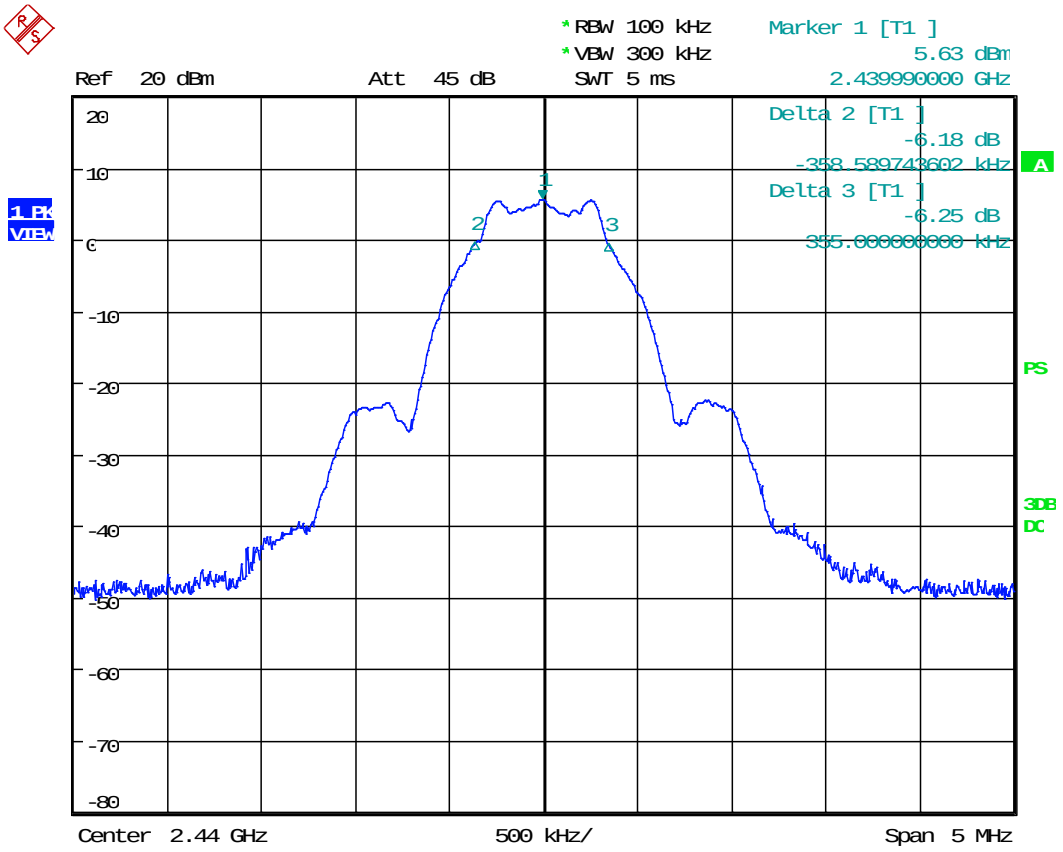
Test Date(s):	2020-04-14	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(a)(2); KDB558074 v05r02	**Air Temperature:**	20.1ºC
		Relative Humidity:	34%

Bluetooth – GFSK: Low Channel



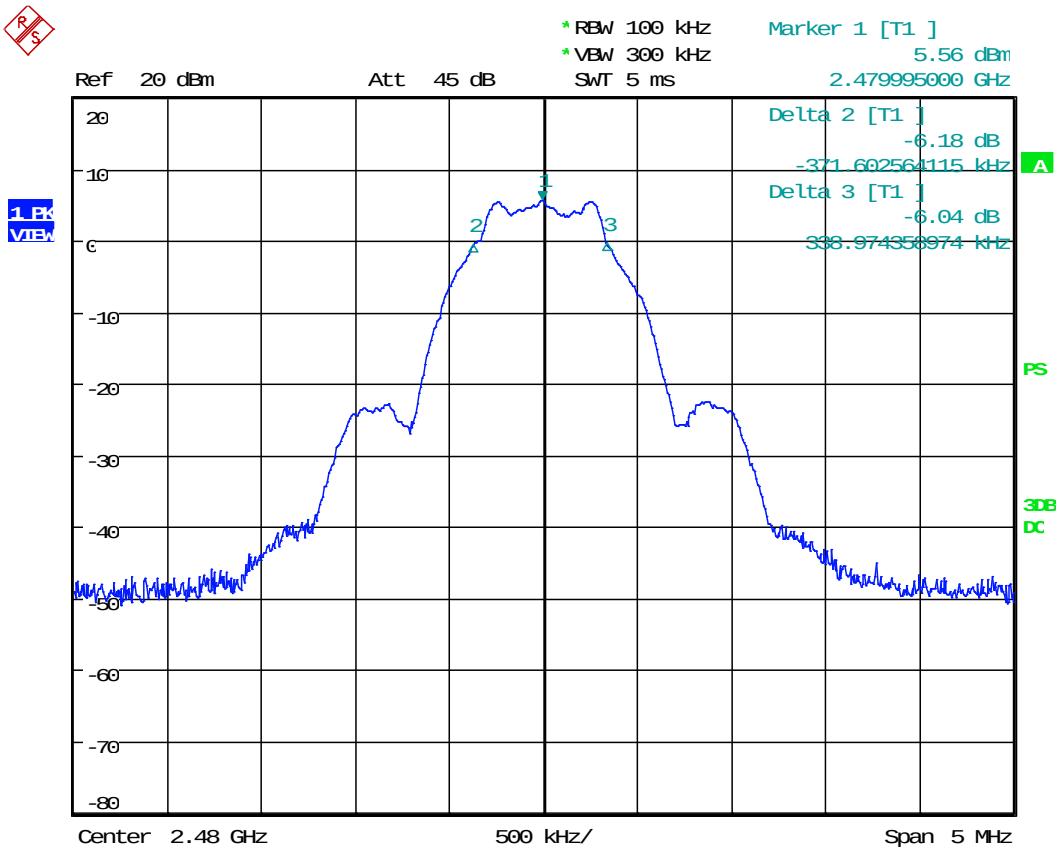
Date: 14.APR.2020 09:33:43

Bluetooth – GFSK: Mid Channel



Date: 14.APR.2020 09:35:56

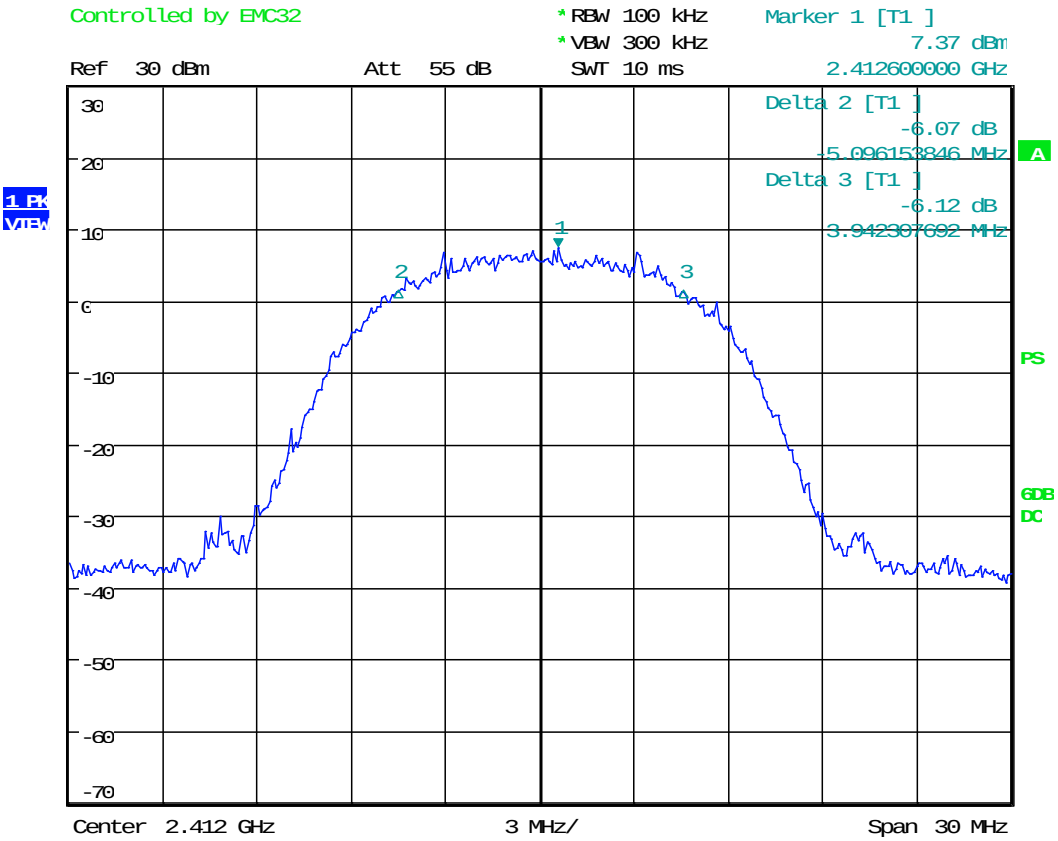
Bluetooth – GFSK: High Channel



Date: 14.APR.2020 09:37:35

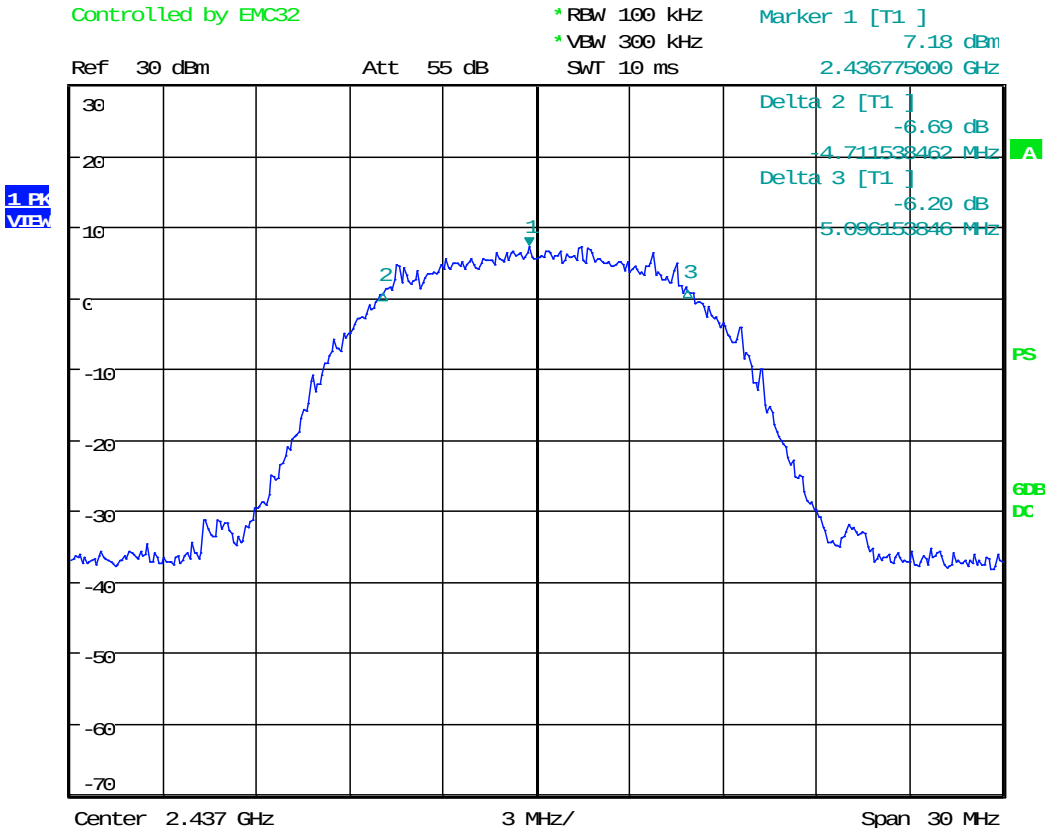
Test Date(s):	2020-04-13	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(a)(2); KDB558074 v05r02	**Air Temperature:**	22.1ºC
		Relative Humidity:	35%

Wi-Fi, 2.4 GHz – CCK 11mbps: Low Channel



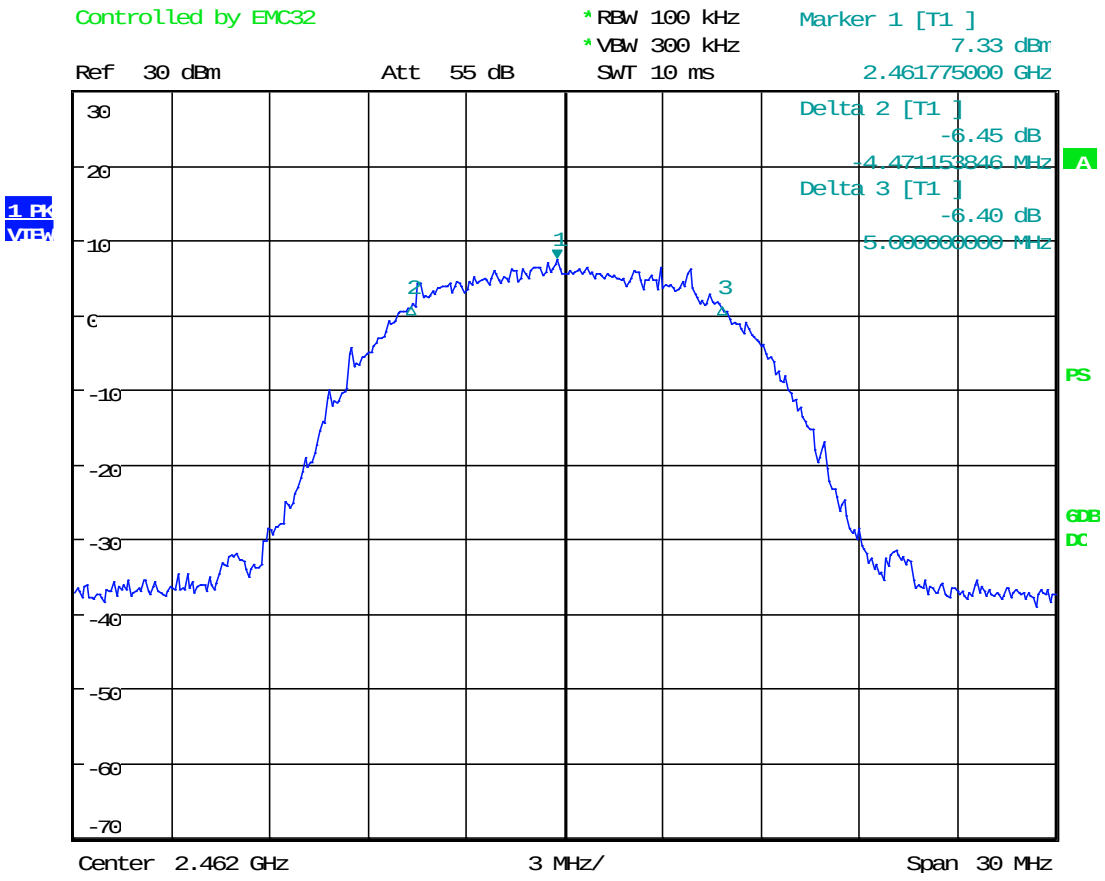
Date: 13.APR.2020 10:23:46

Wi-Fi, 2.4 GHz – CCK 11mbps: Mid Channel



Date: 13.APR.2020 10:27:40

Wi-Fi, 2.4 GHz – CCK 11mbps: 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.

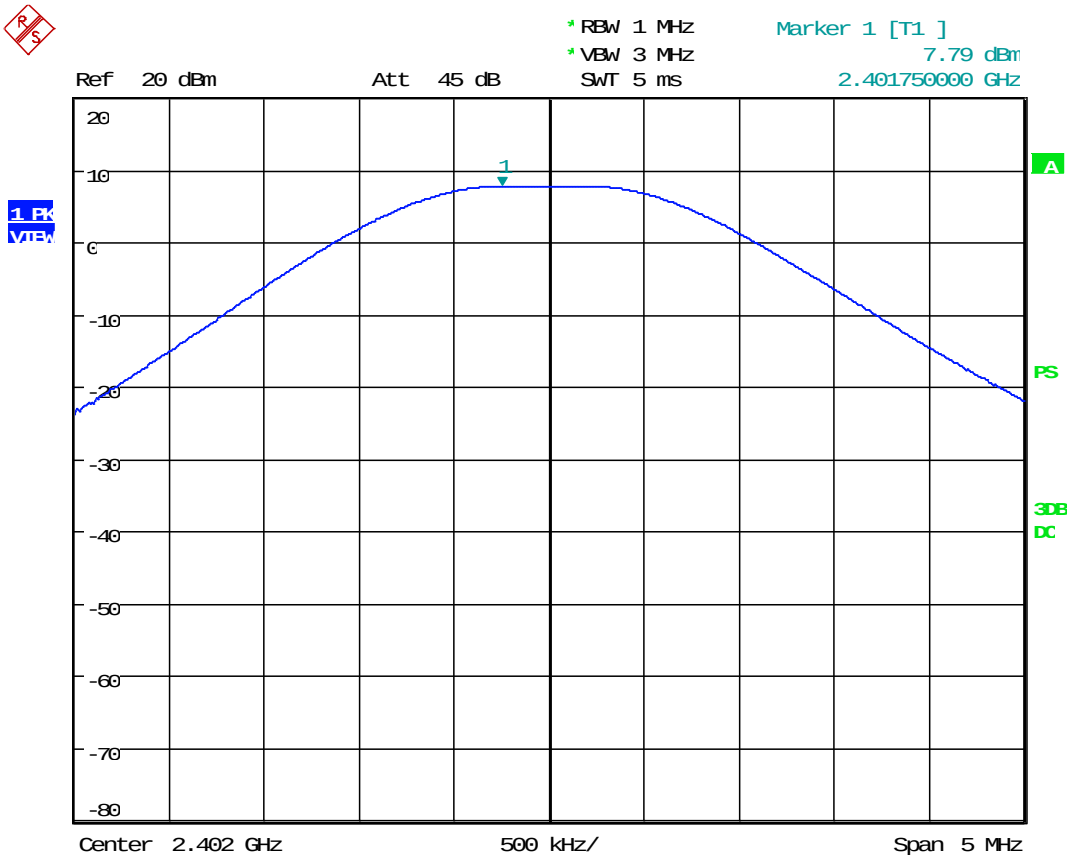
8.1 Requirements:

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.

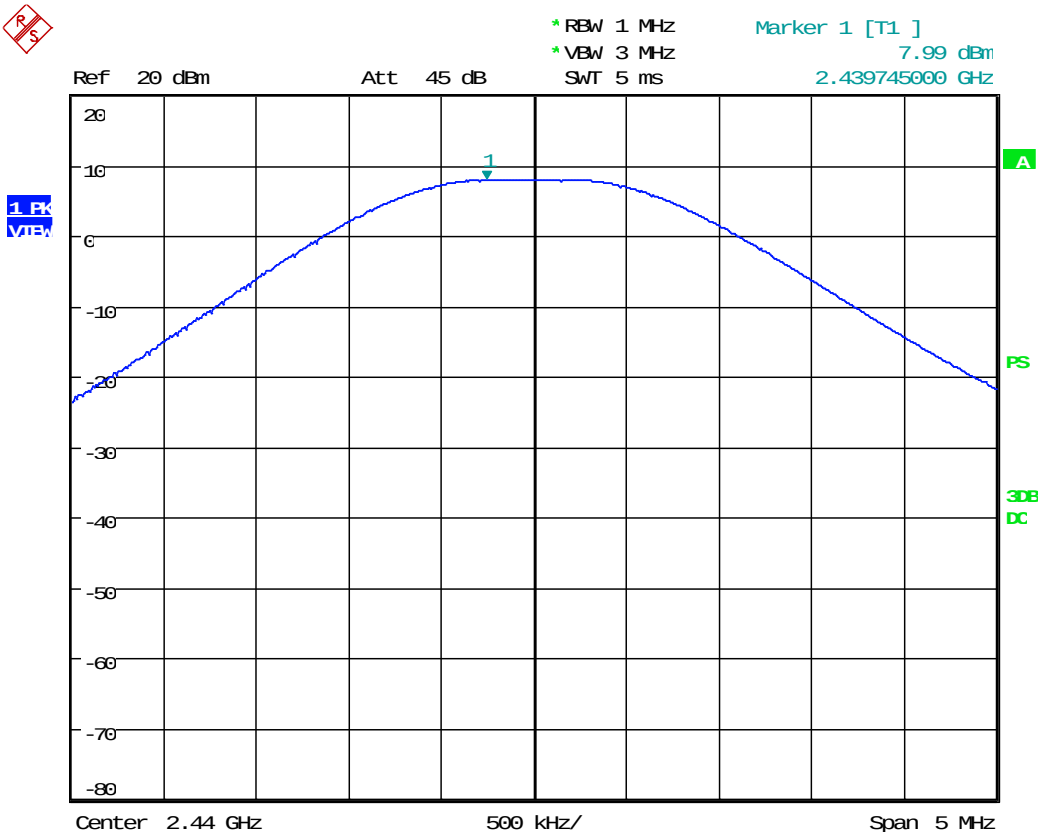
8.2 Conducted Output Power Test Data

Test Date(s):	2020-04-14	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(b)(3); KDB558074 v05r02	**Air Temperature:**	20.4ºC
		Relative Humidity:	33%

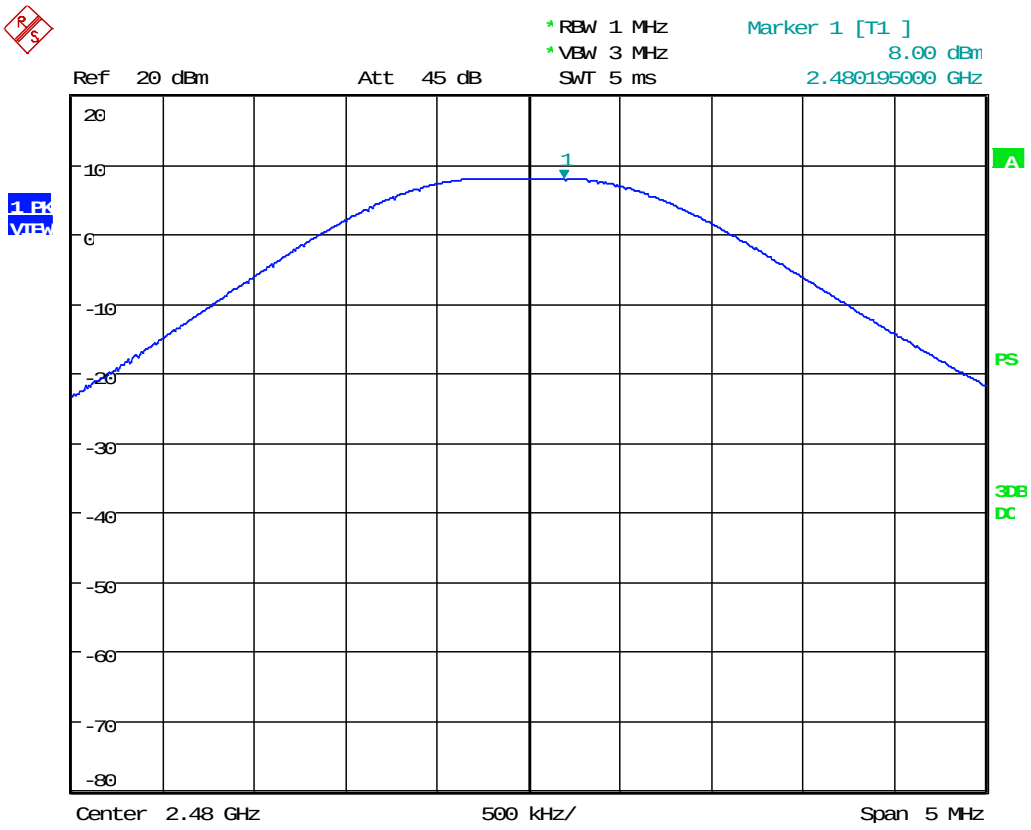
Bluetooth: Low Channel



Bluetooth: Mid Channel



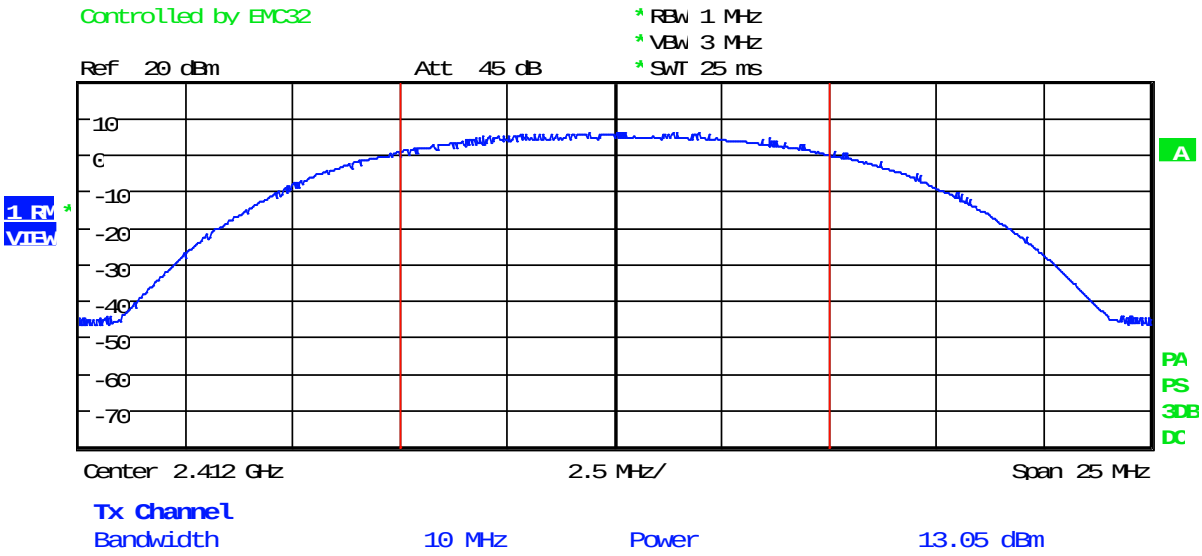
Bluetooth: High Channel



Date: 14.APR.2020 09:50:31

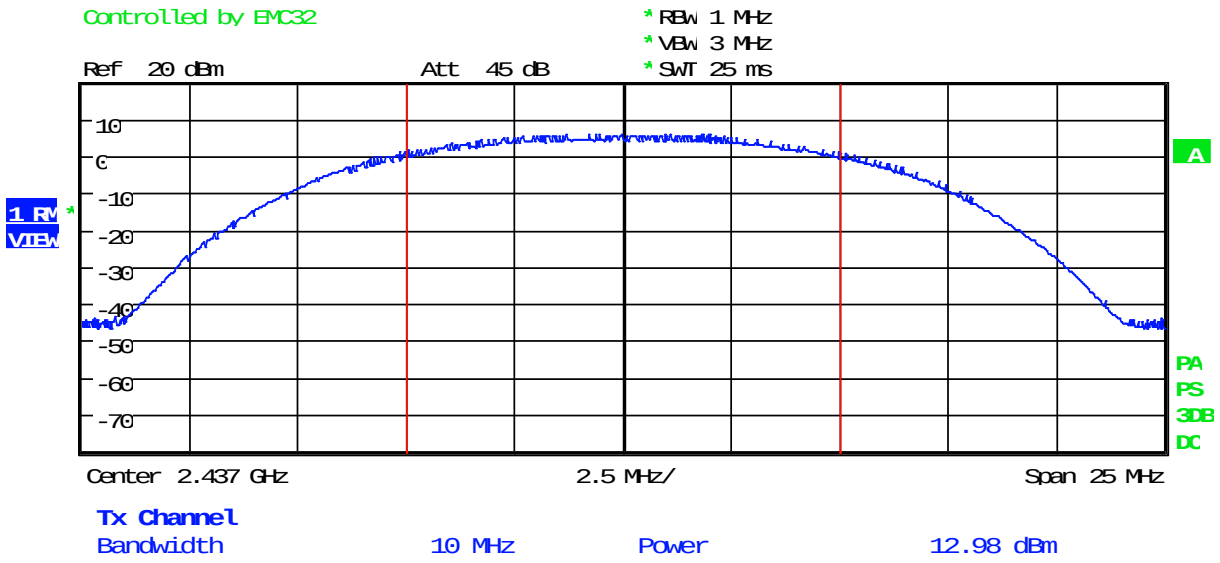
Test Date(s):	2020-07-27	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(b)(3); KDB558074 v05r02	**Air Temperature:**	20.1ºC
		Relative Humidity:	50%

Wi-Fi, 2.4 GHz - CCK 11mbps: Low Channel



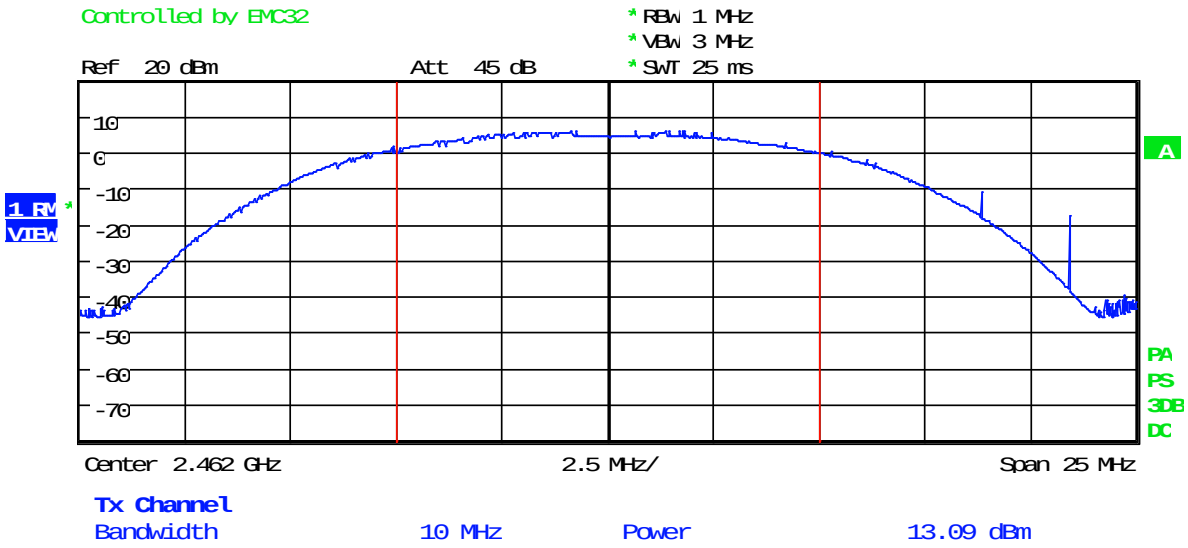
Date: 27.JUL.2020 10:18:07

Wi-Fi, 2.4 GHz - CCK 11mbps: Mid Channel



Date: 27.JUL.2020 10:20:59

Wi-Fi, 2.4 GHz - CCK 11mbps: High Channel



Date: 27.JUL.2020 10:23:03

9.0 VOLTAGE VARIATIONS

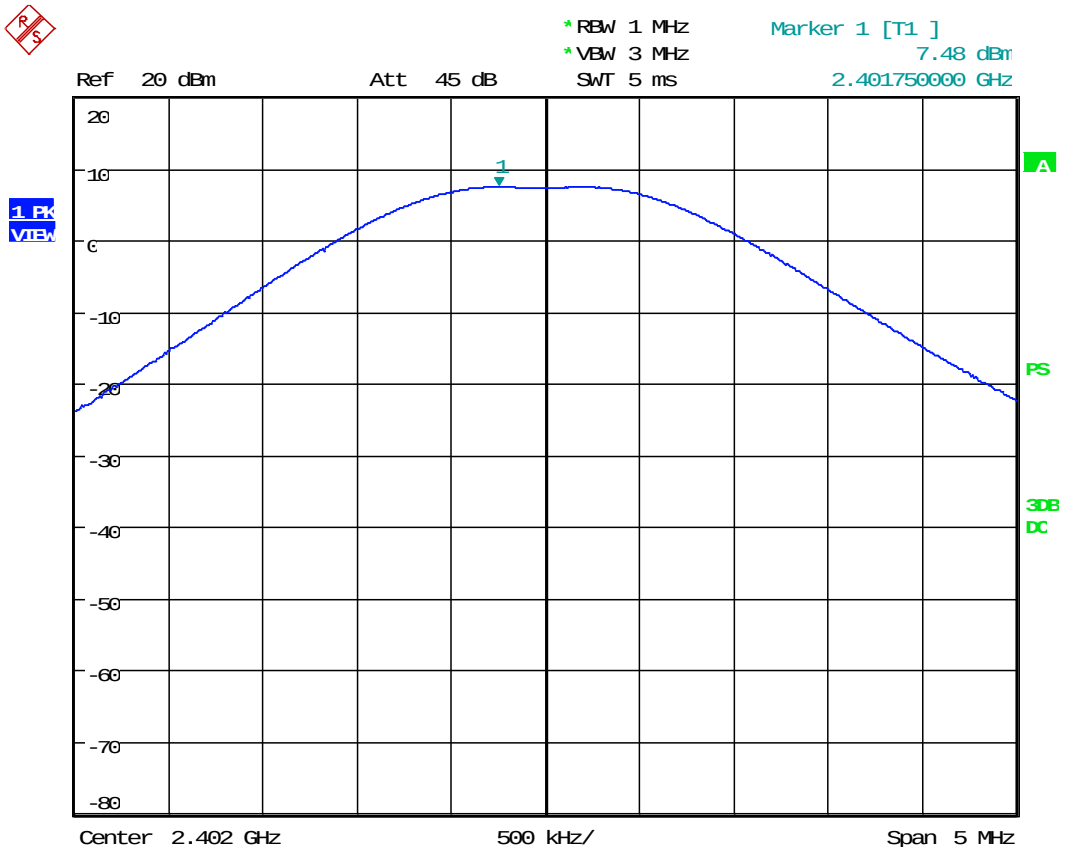
9.1 Requirements

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

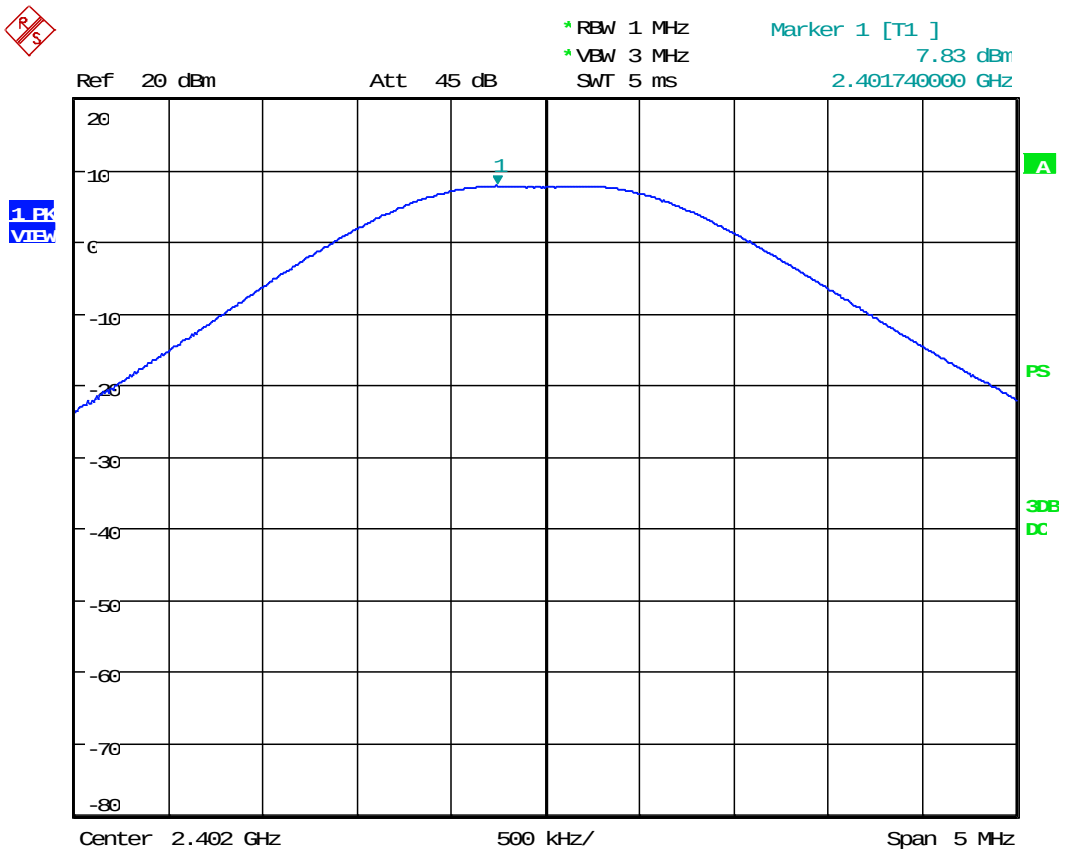
Test Date(s):	2020-04-14	**Test Engineer:**	J. Chiller
Rule:	15.31(e)	**Air Temperature:**	20.6°C
Test Results:	Complies	**Relative Humidity:**	33%

Bluetooth, Low Channel @ 85%



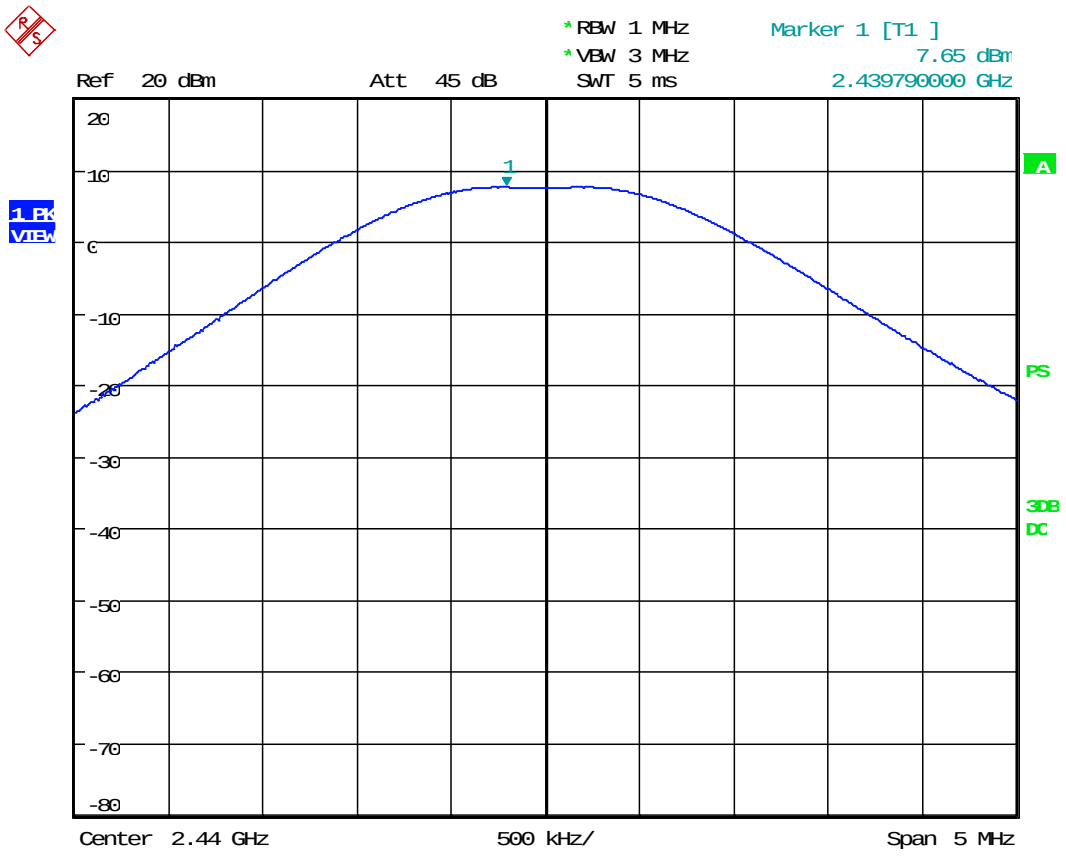
Date: 14.APR.2020 10:03:25

Bluetooth, Low Channel @ 115%



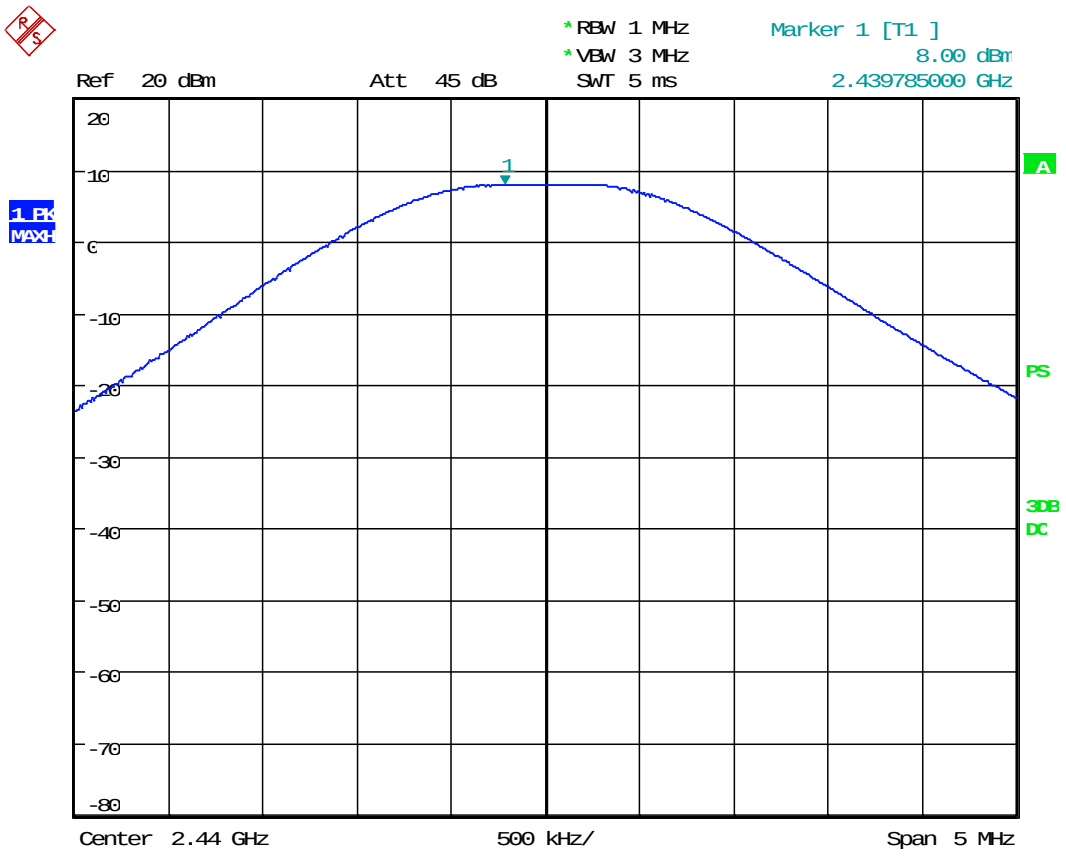
Date: 14.APR.2020 10:04:46

Bluetooth, Mid Channel @ 85%



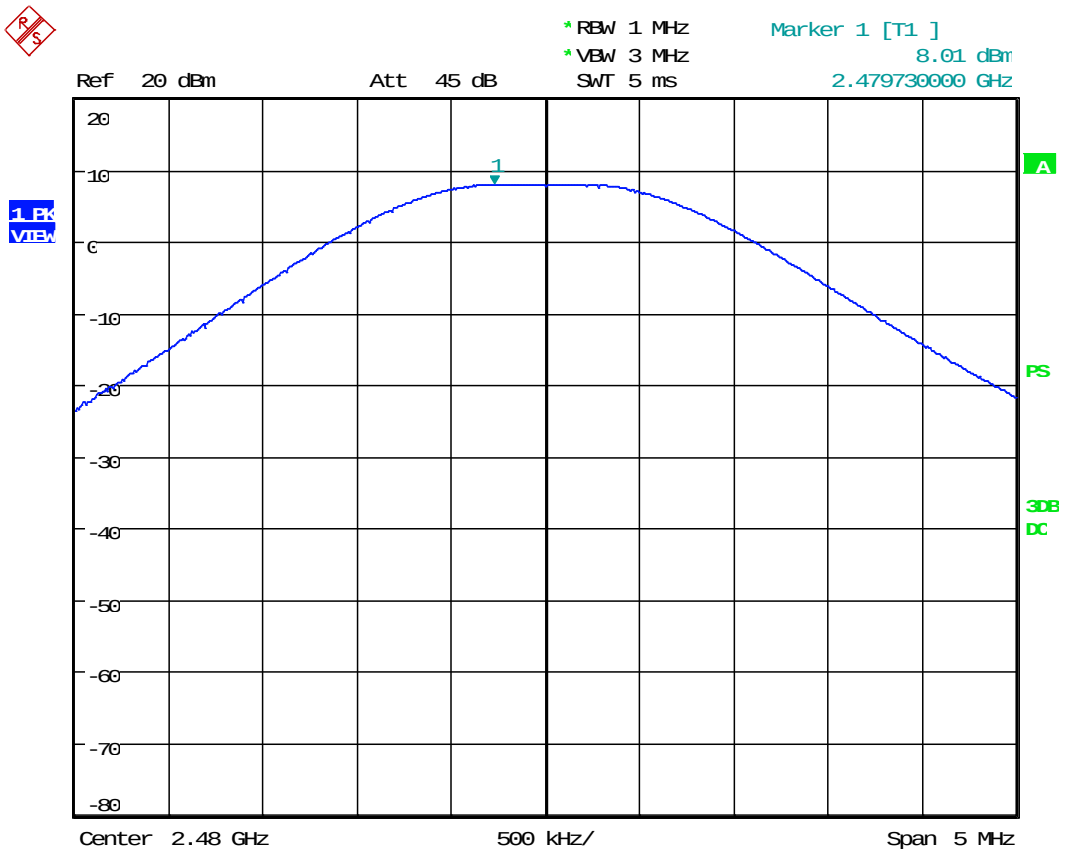
Date: 14.APR.2020 10:01:37

Bluetooth, Mid Channel @ 115%



Date: 14.APR.2020 10:00:32

Bluetooth, High Channel @ 85%



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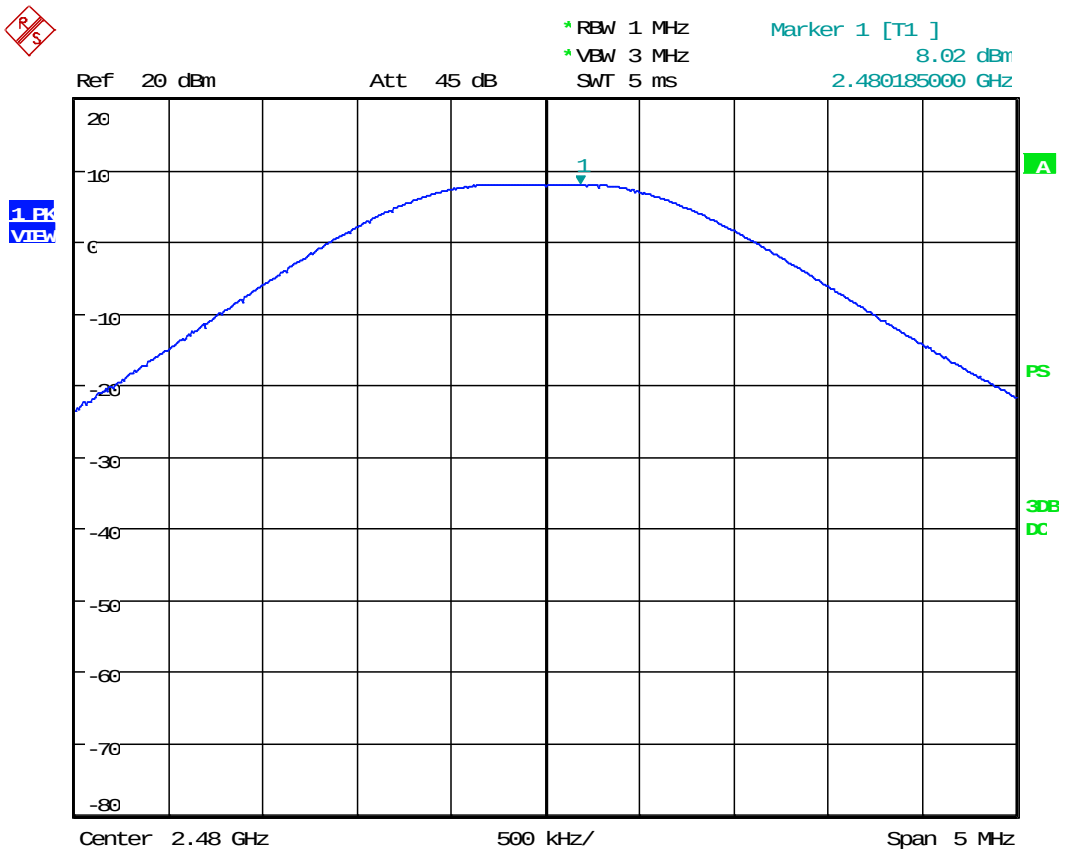
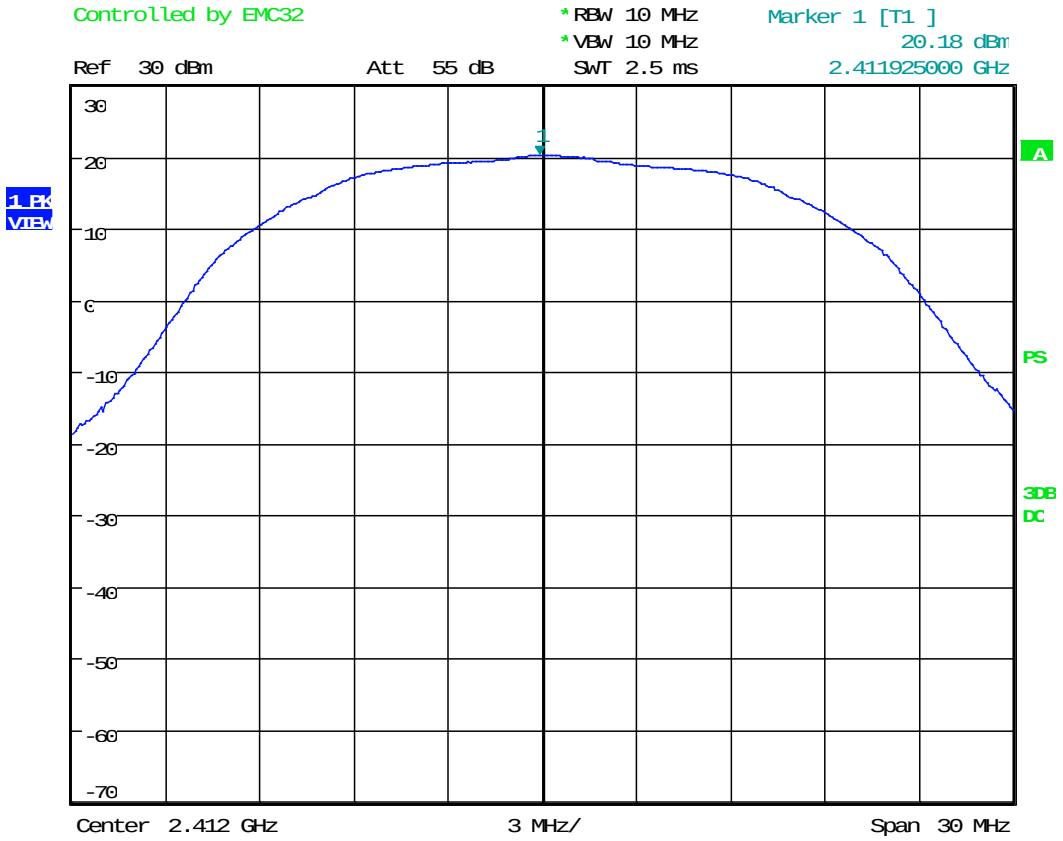
Bluetooth, High Channel @ 115%



Date: 14.APR.2020 09:58:49

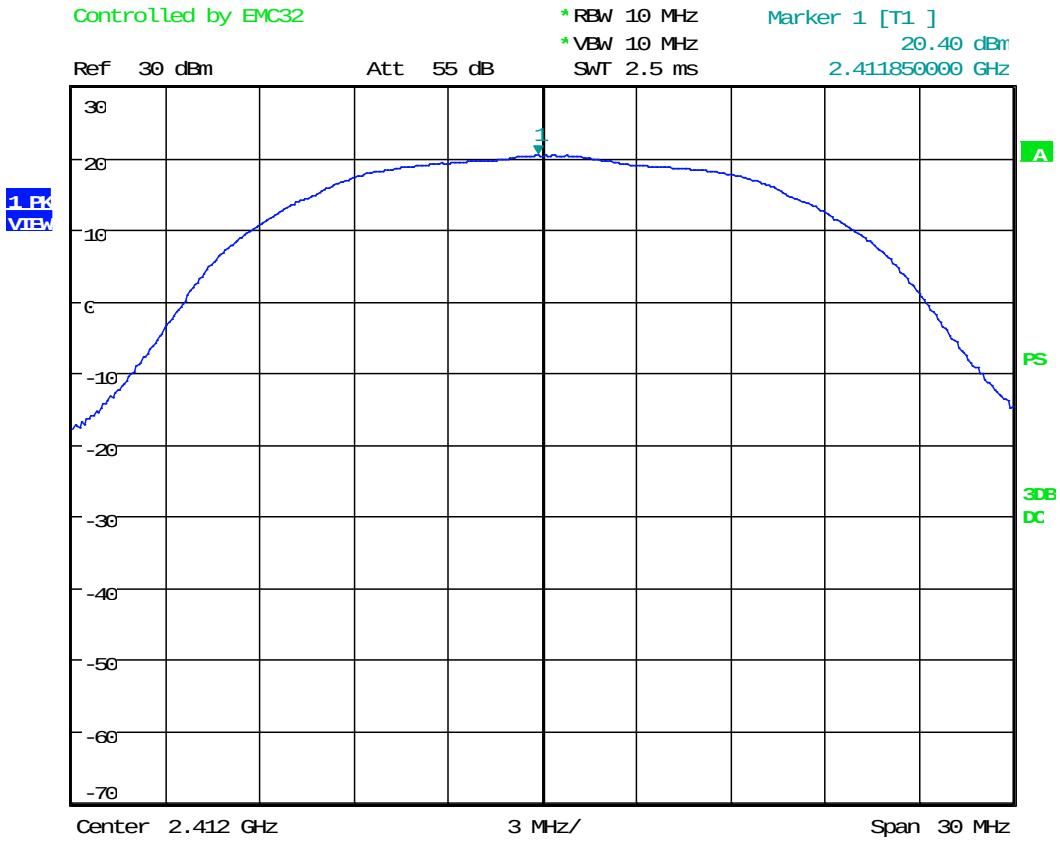
Test Date(s):	2020-04-13	**Test Engineer:**	J. Chiller
Rule:	15.31(e)	**Air Temperature:**	23.1°C
Test Results:	Complies	**Relative Humidity:**	33%

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



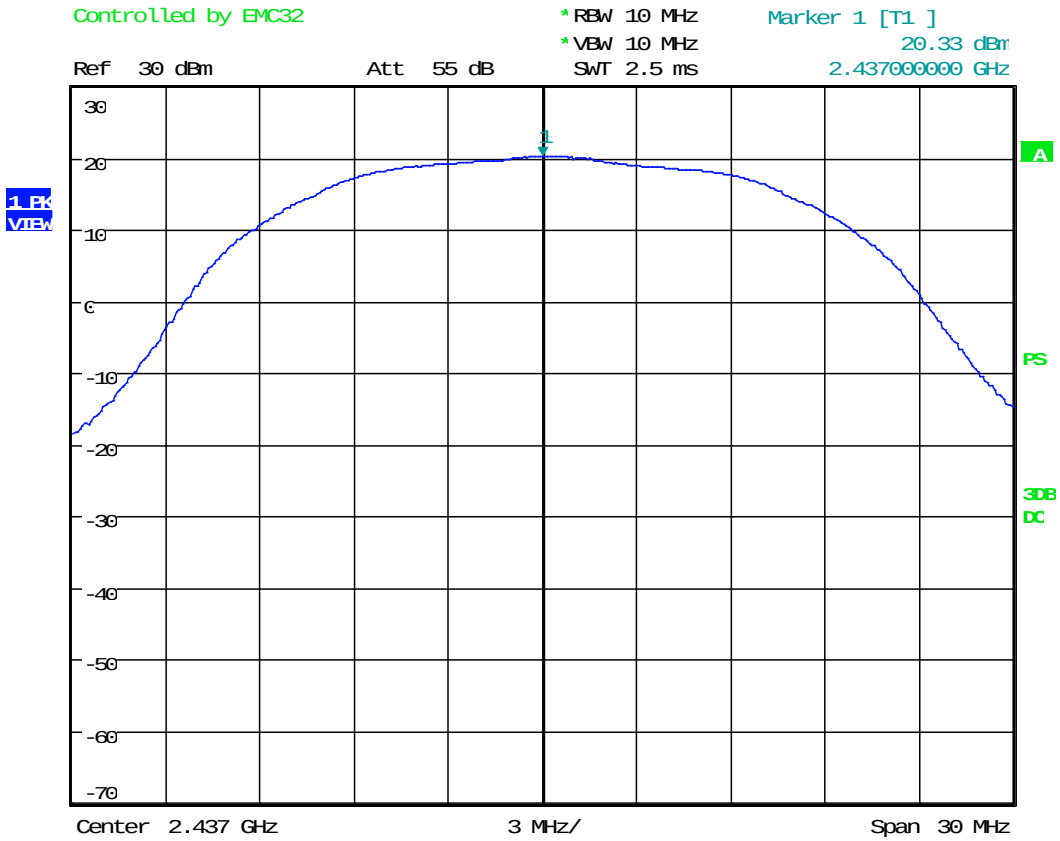
Date: 13.APR.2020 11:01:08

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



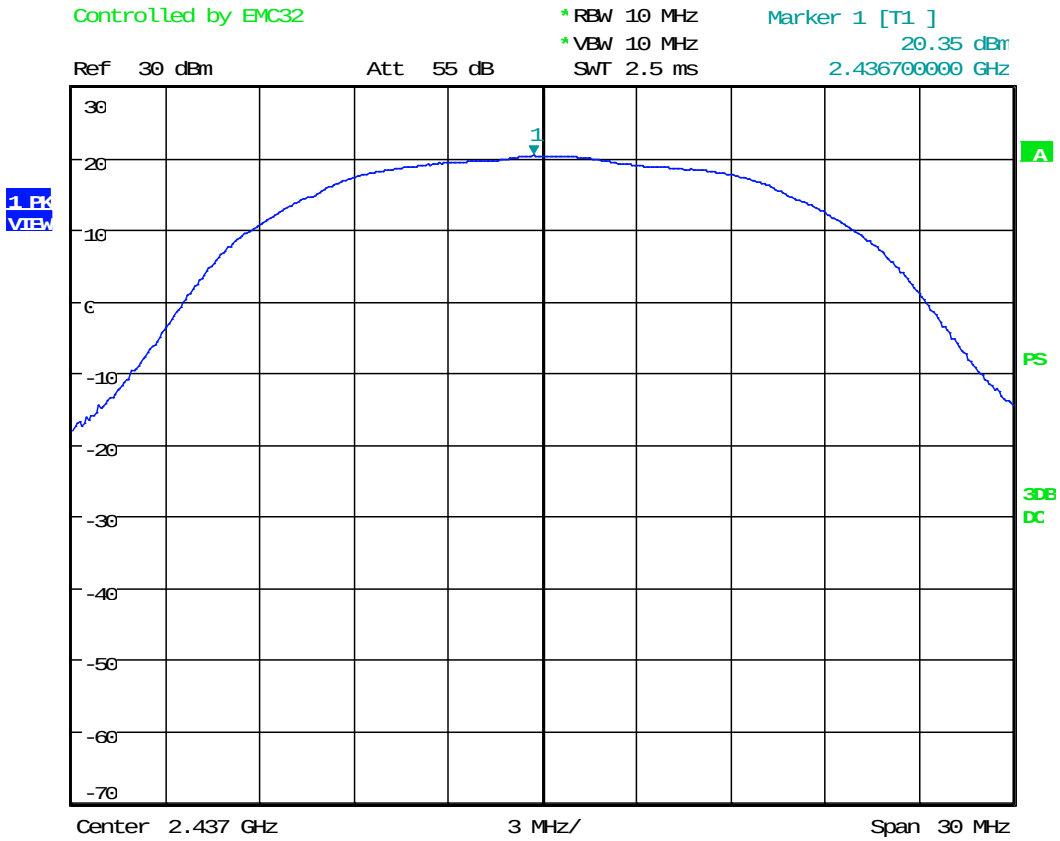
Date: 13.APR.2020 11:00:17

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



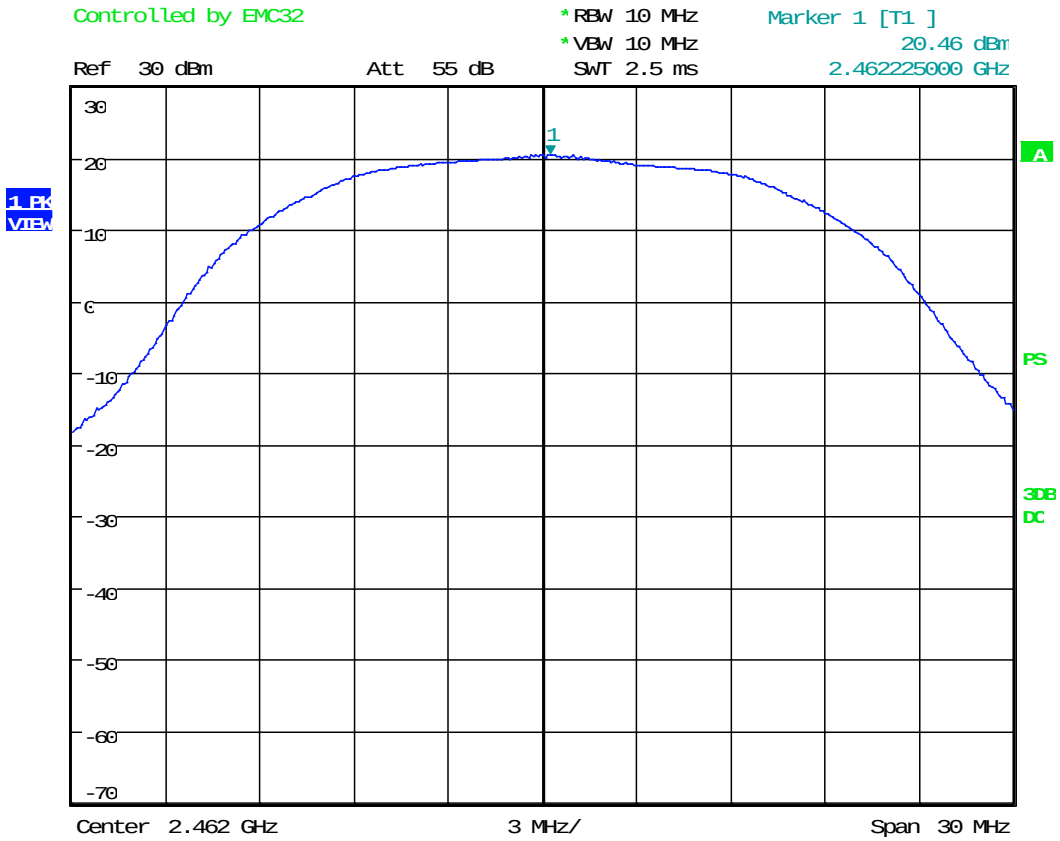
Date: 13.APR.2020 10:55:03

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



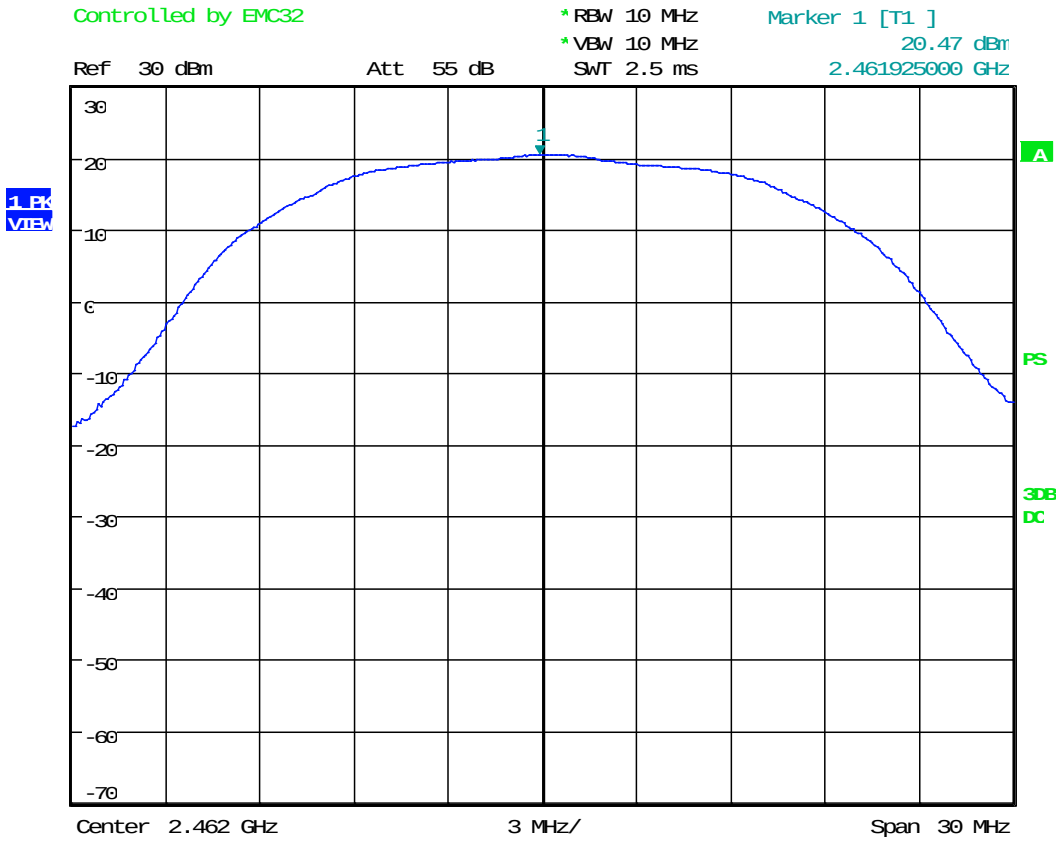
Date: 13.APR.2020 10:56:01

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



Date: 13.APR.2020 10:49:10

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



Date: 13.APR.2020 10:50:21

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 resolution 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(s):	2020-07-17	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(d) / Part 15.207 KDB558074 v05r02	**Air Temperature:**	20.8ºC
		Relative Humidity:	32%

Note: The display line in the following graphs represents the reference line determined from the Peak PSD/100kHz to set the -20dBc spurious emissions limit. All emissions were more than 40dB below this reference line as indicated on the graphs.

Bluetooth: Low Channel
0.009 MHz to 0.15 MHz

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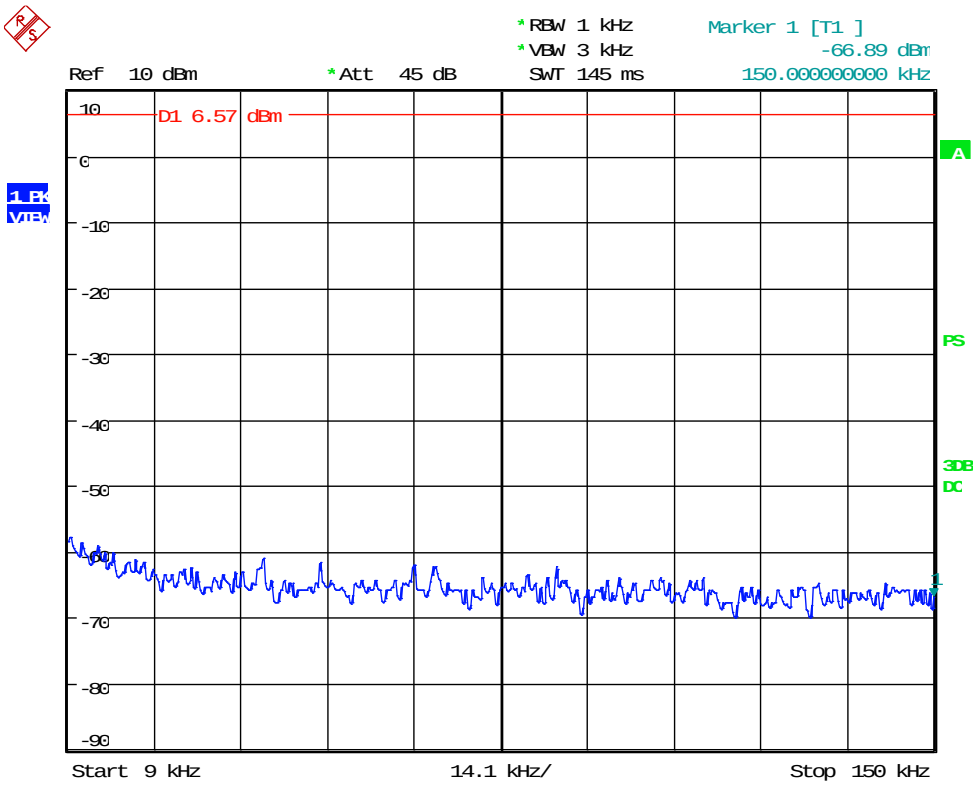
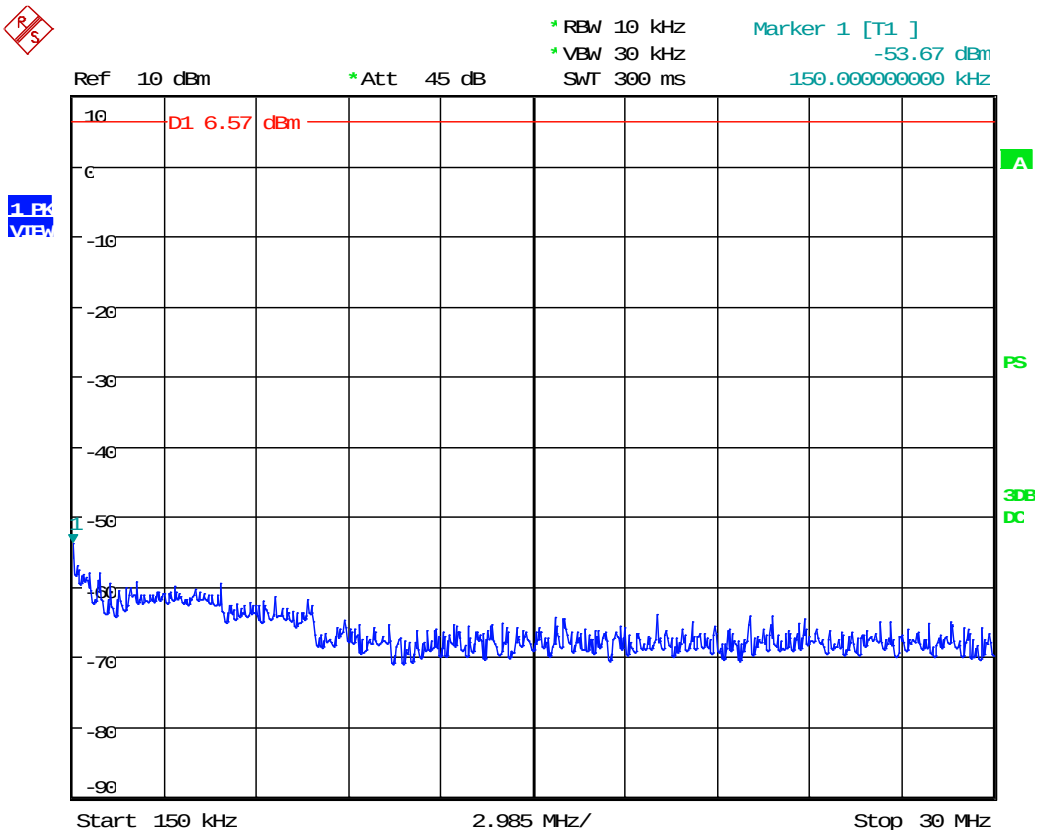


Date: 17.JUL.2020 10:12:55

Bluetooth: Low Channel
0.15 MHz to 30 MHz

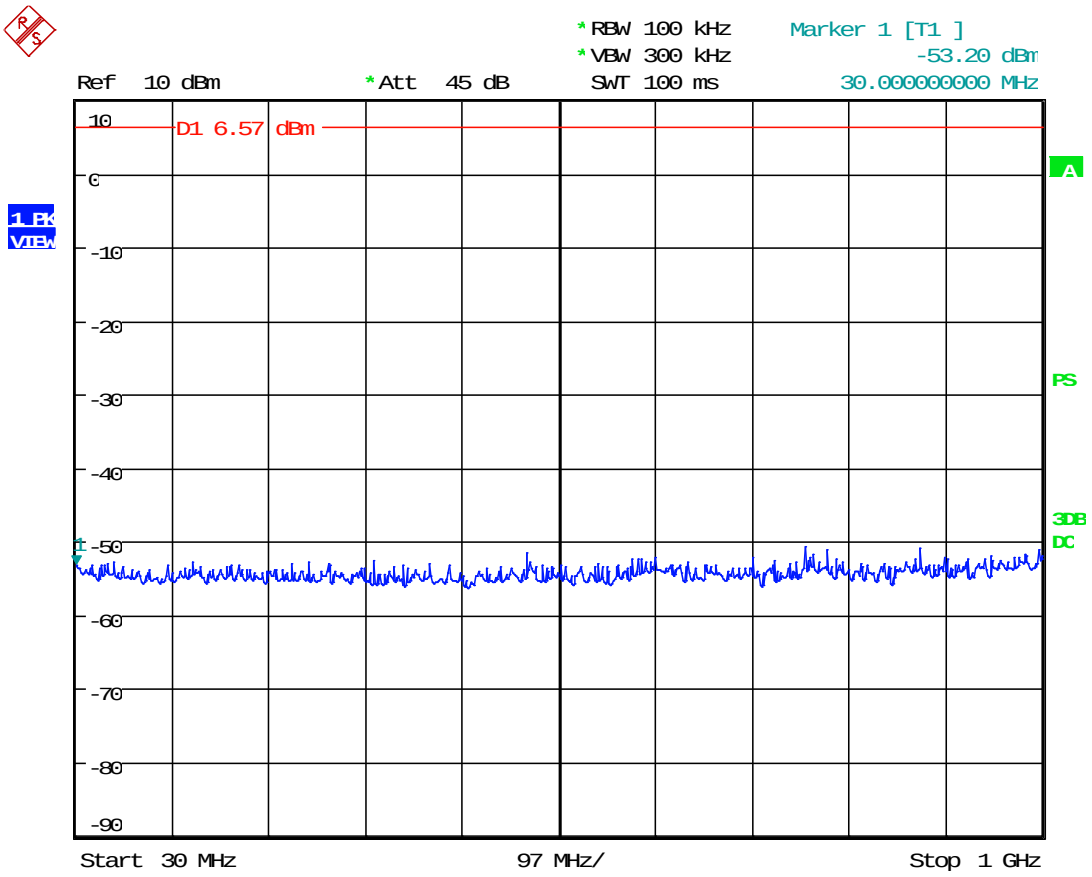
.



Date: 17.JUL.2020 10:13:52

Bluetooth: Low Channel
30 MHz to 1000 MHz

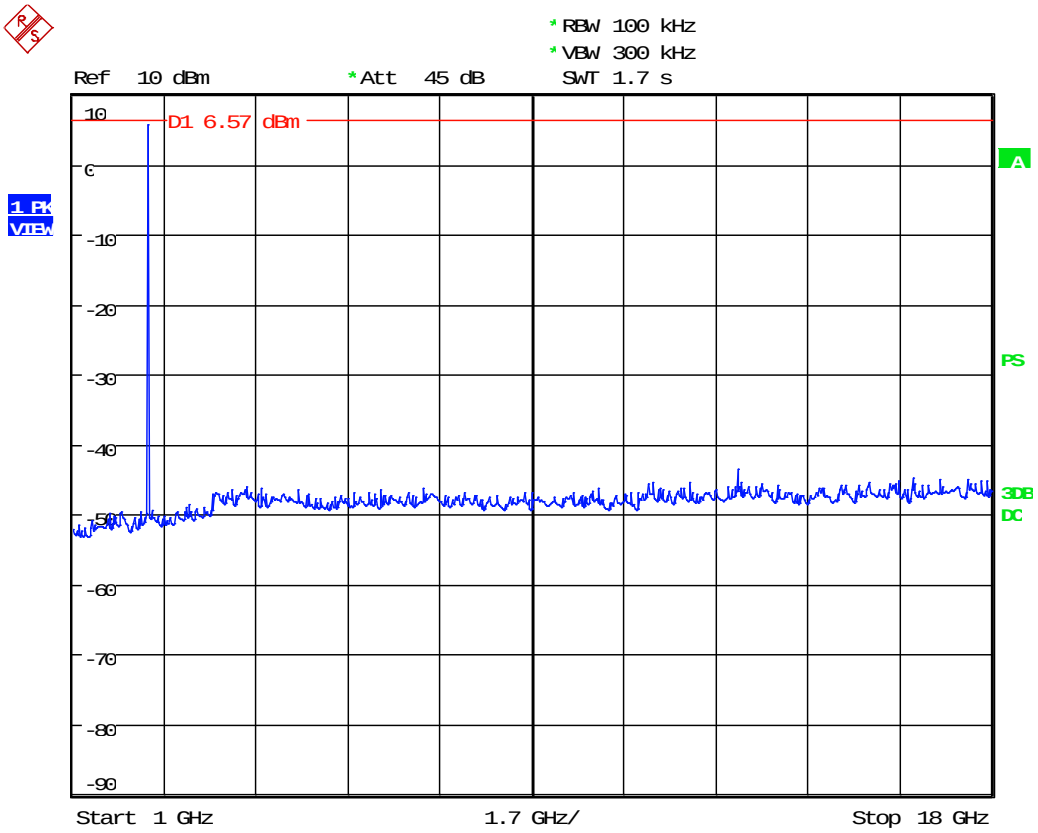
.



Date: 17.JUL.2020 10:14:40

Bluetooth: Low Channel
1 GHz to 18 GHz

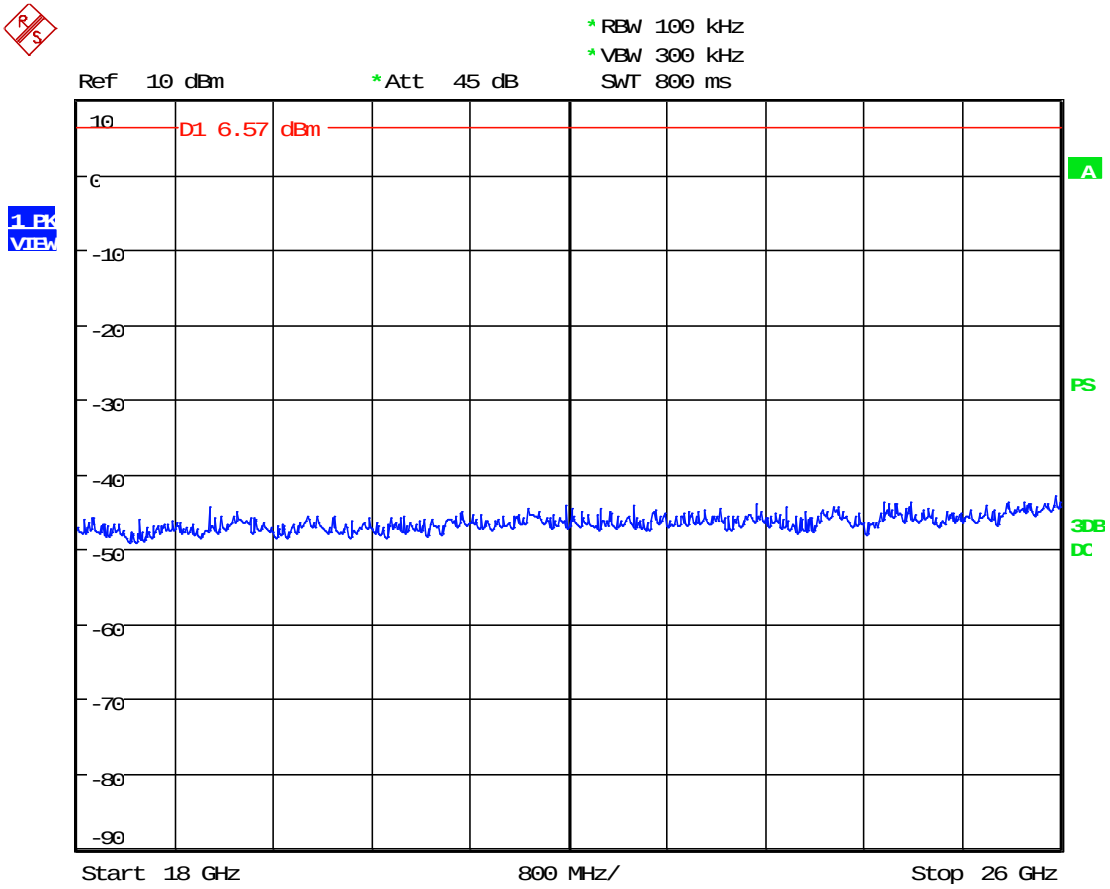
.



Date: 17.JUL.2020 10:16:28

Bluetooth: Low Channel
18 GHz to 26 GHz

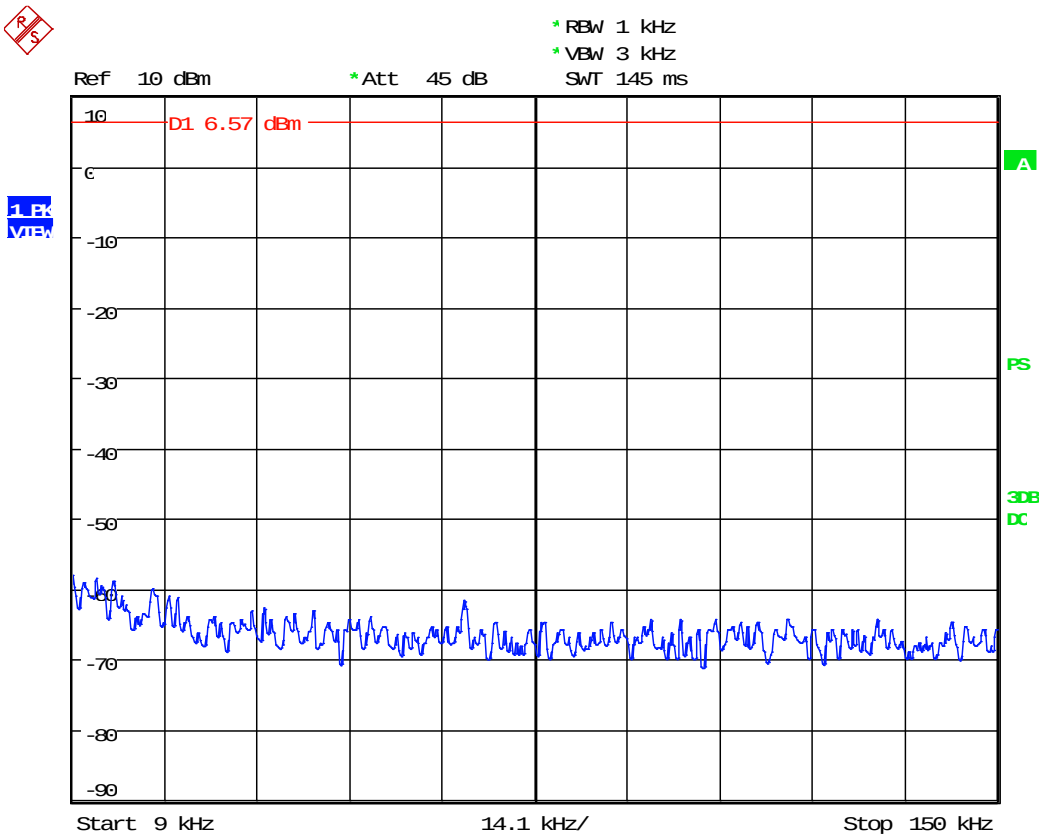
.



Date: 17.JUL.2020 10:29:21

Bluetooth: Mid Channel
0.009 MHz to 0.15 MHz

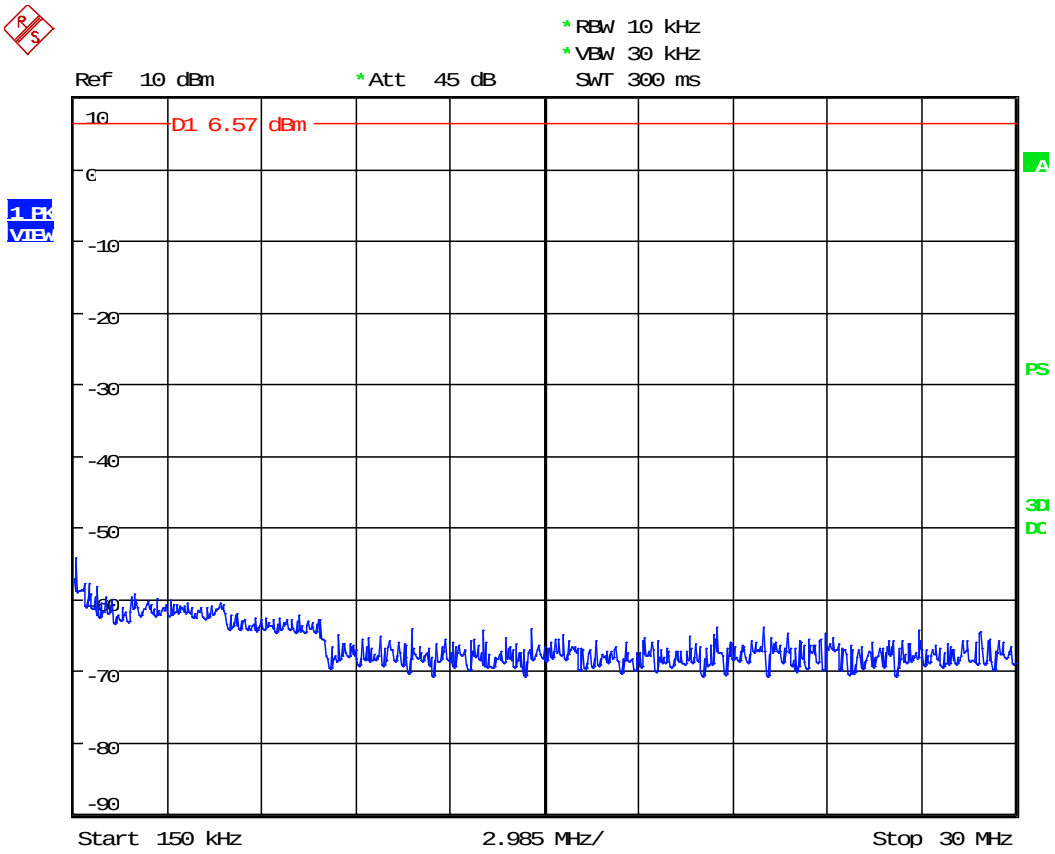
.



Date: 17.JUL.2020 10:33:15

Bluetooth: Mid Channel
0.15 MHz to 30 MHz

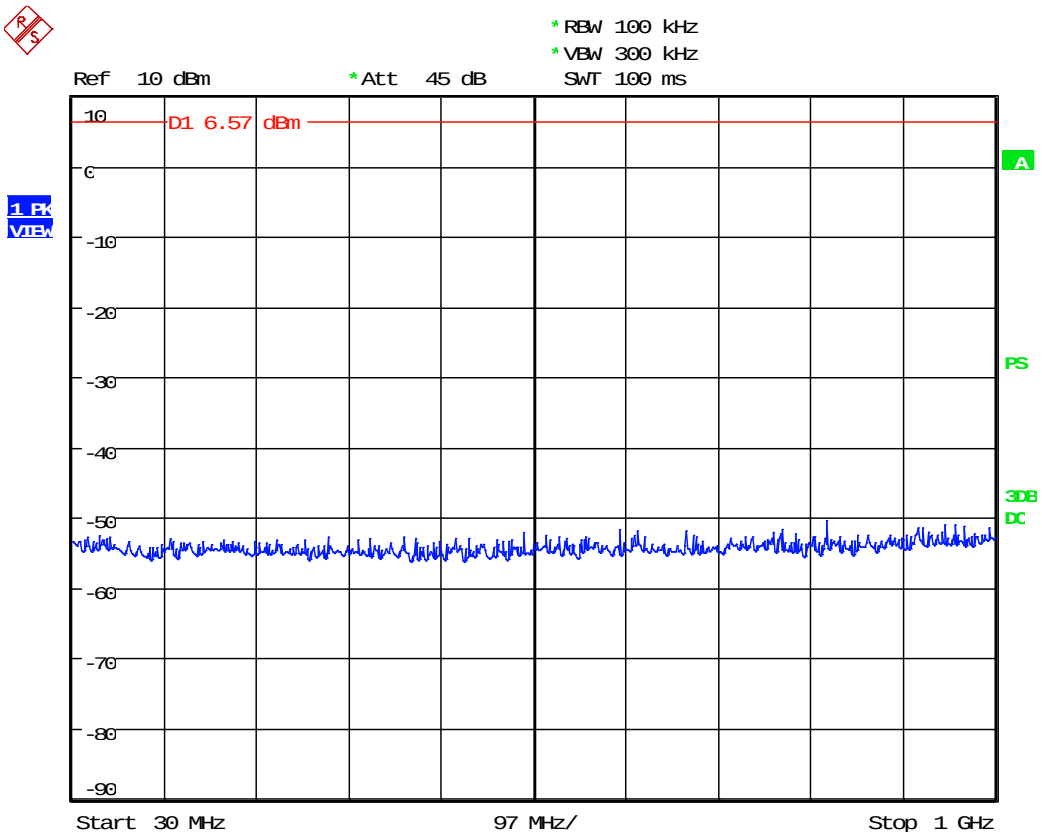
.



Date: 17.JUL.2020 10:32:35

Bluetooth: Mid Channel
30 MHz to 1000 MHz

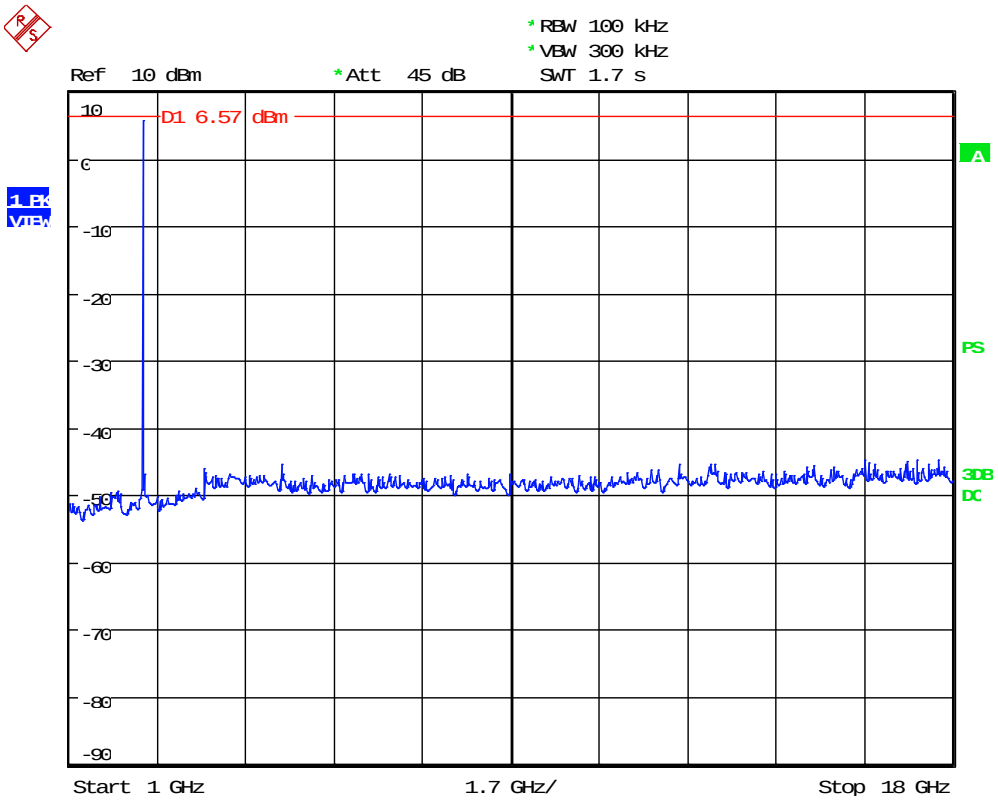
.



Date: 17.JUL.2020 10:31:49

Bluetooth: Mid Channel
1 GHz to 18 GHz

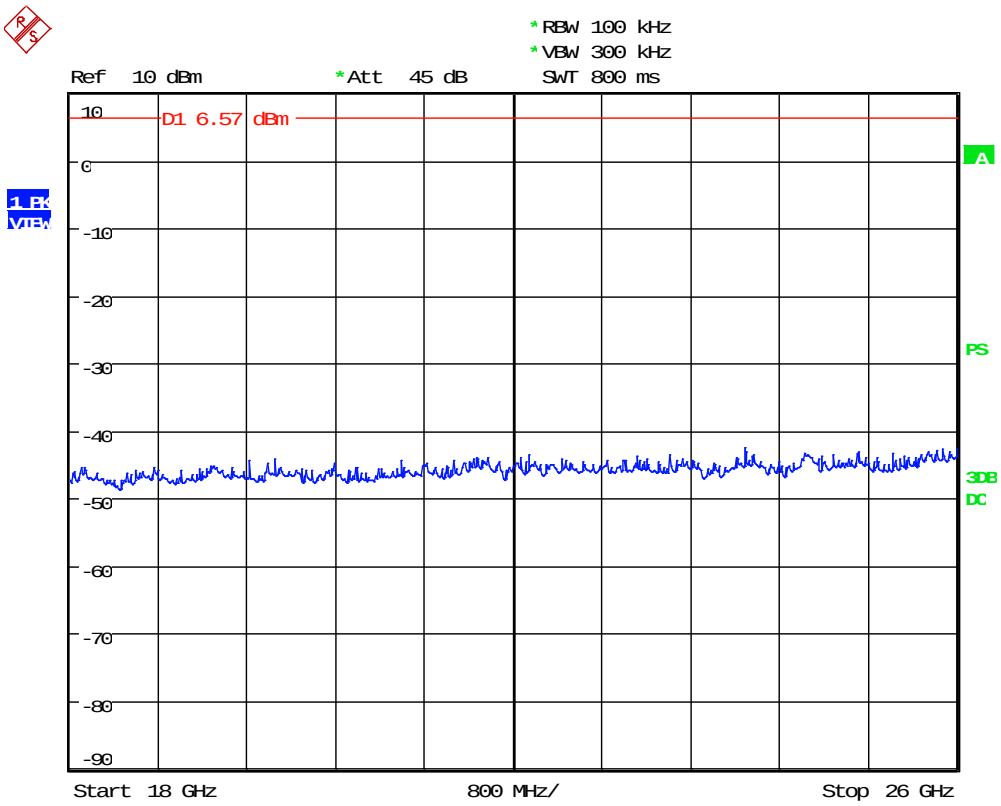
.



Date: 17.JUL.2020 10:31:11

Bluetooth: Mid Channel
18 GHz to 26 GHz

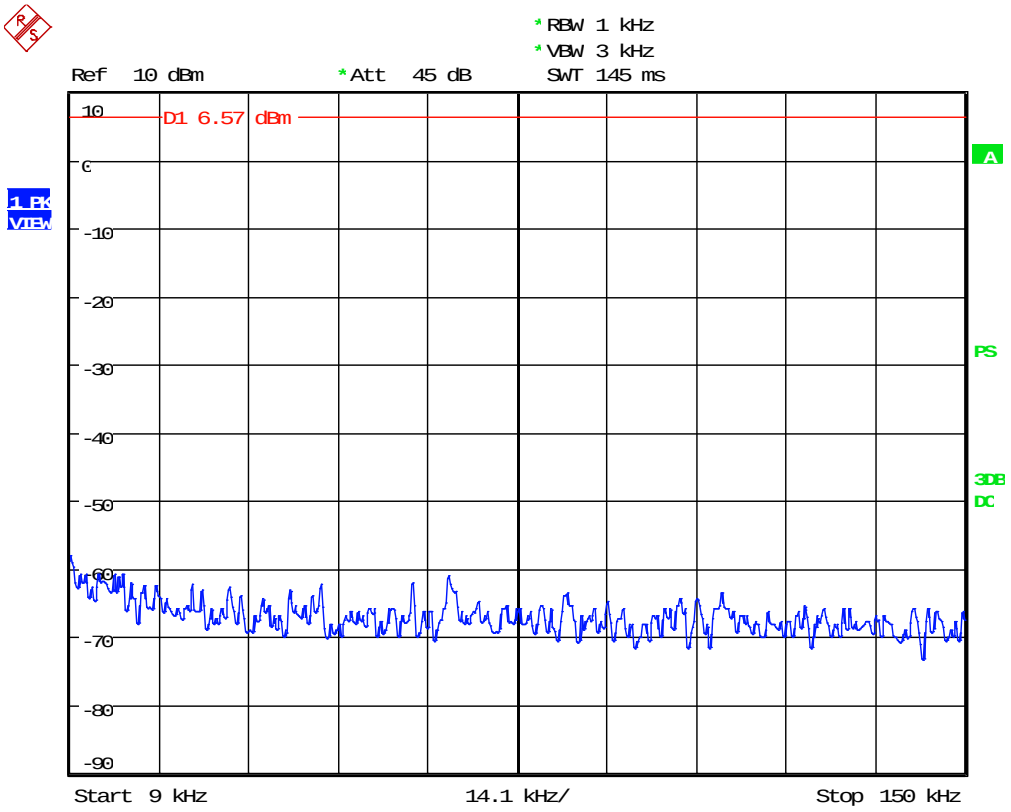
.



Date: 17.JUL.2020 10:30:31

Bluetooth: High Channel
0.009 MHz to 0.15 MHz

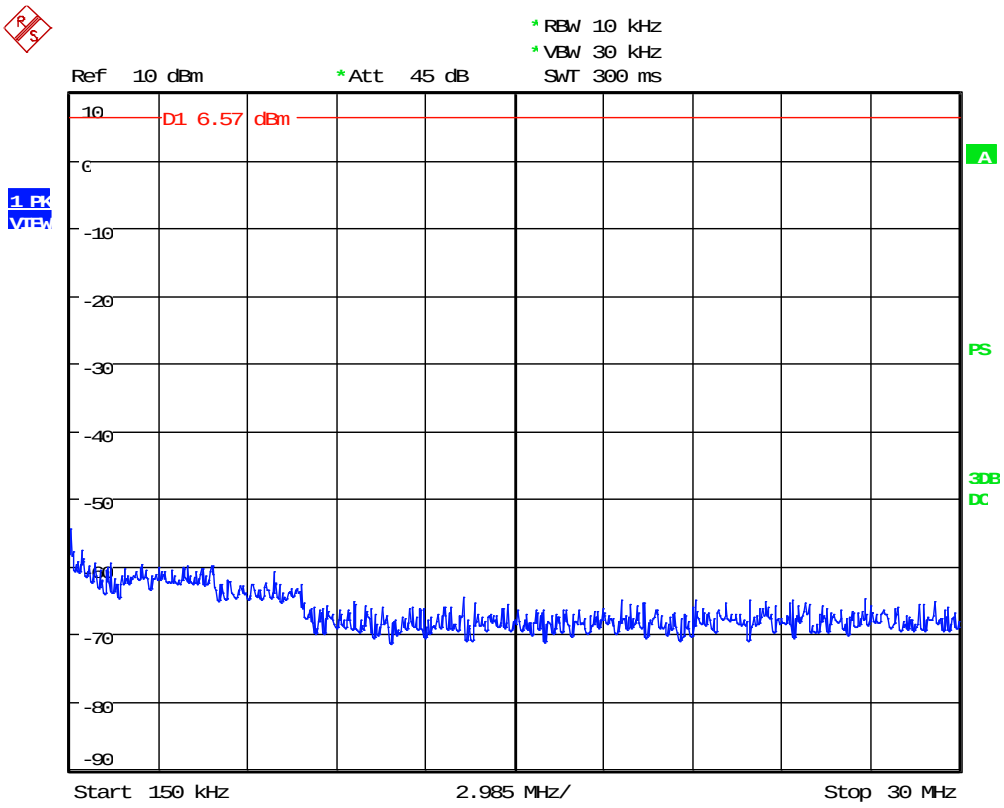
.



Date: 17.JUL.2020 10:34:05

Bluetooth: High Channel
0.15 MHz to 30 MHz

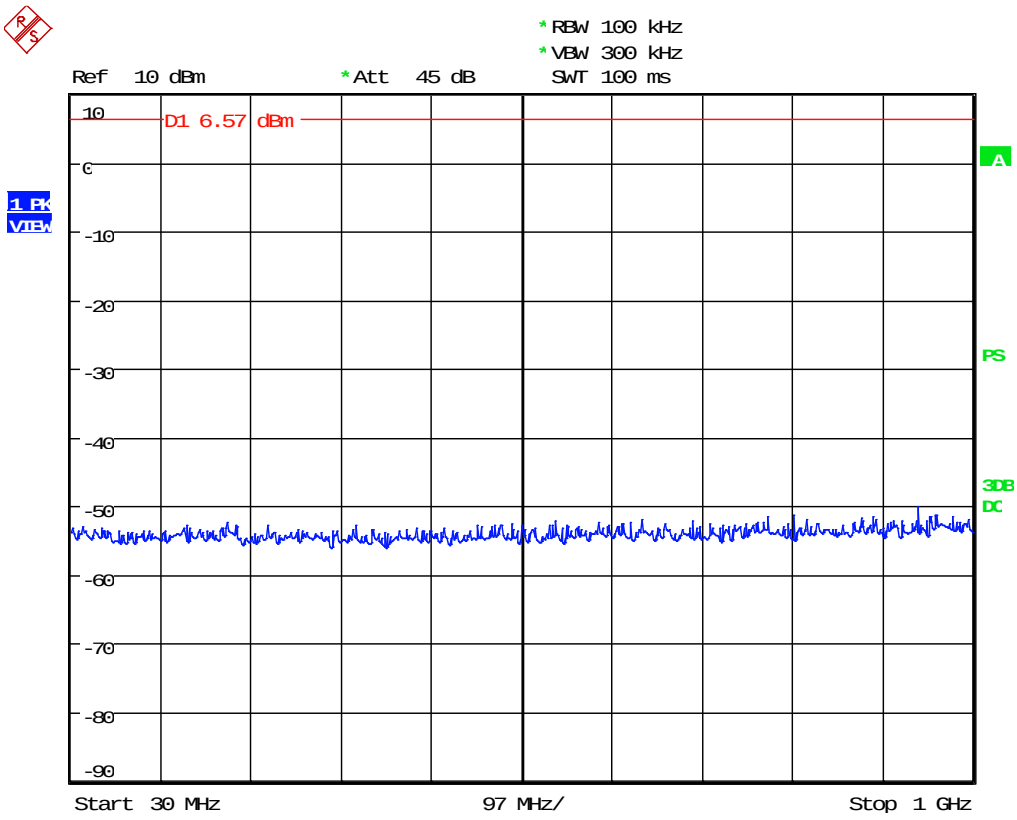
.



Date: 17.JUL.2020 10:34:51

Bluetooth: High Channel
30 MHz to 1000 MHz

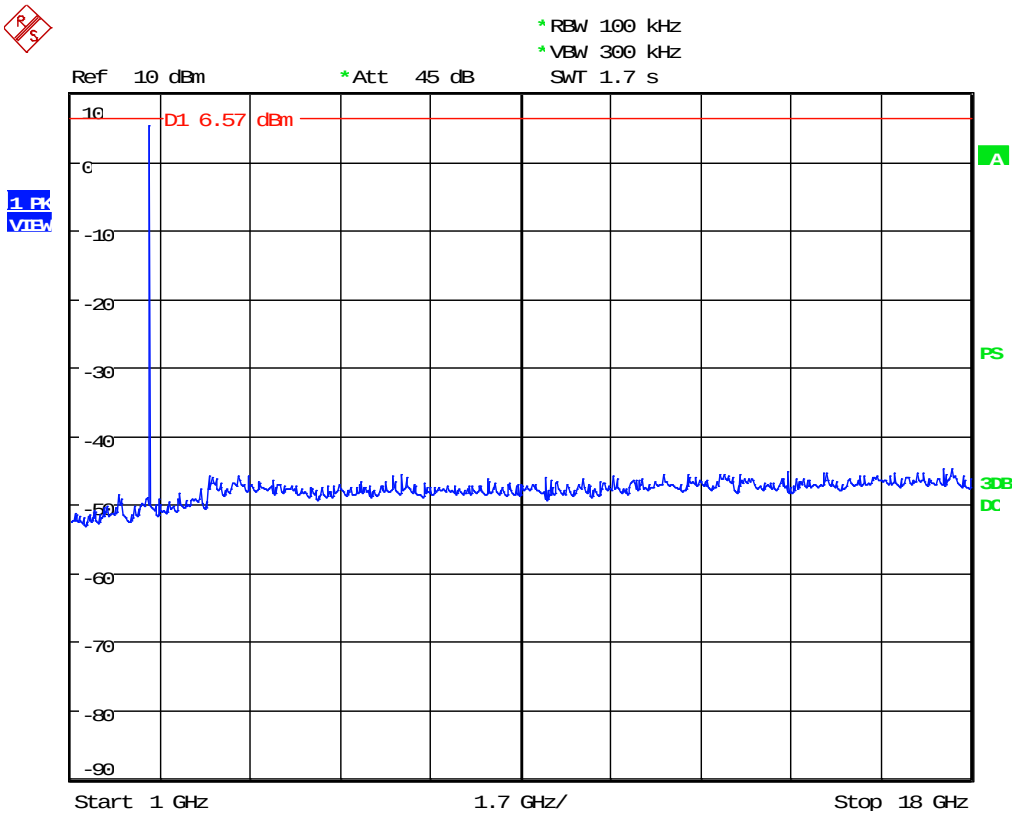
.



Date: 17.JUL.2020 10:35:28

Bluetooth: High Channel
1 GHz to 18 GHz

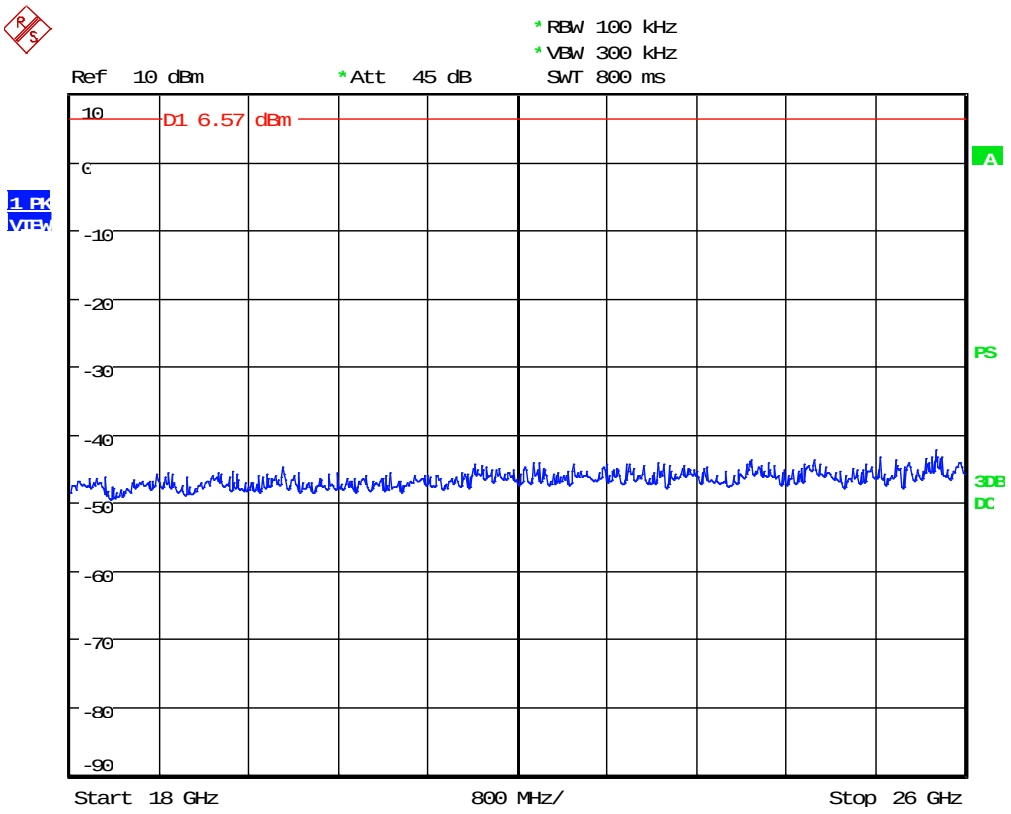
.



Date: 17.JUL.2020 10:36:16

Bluetooth: High Channel
18 GHz to 26 GHz

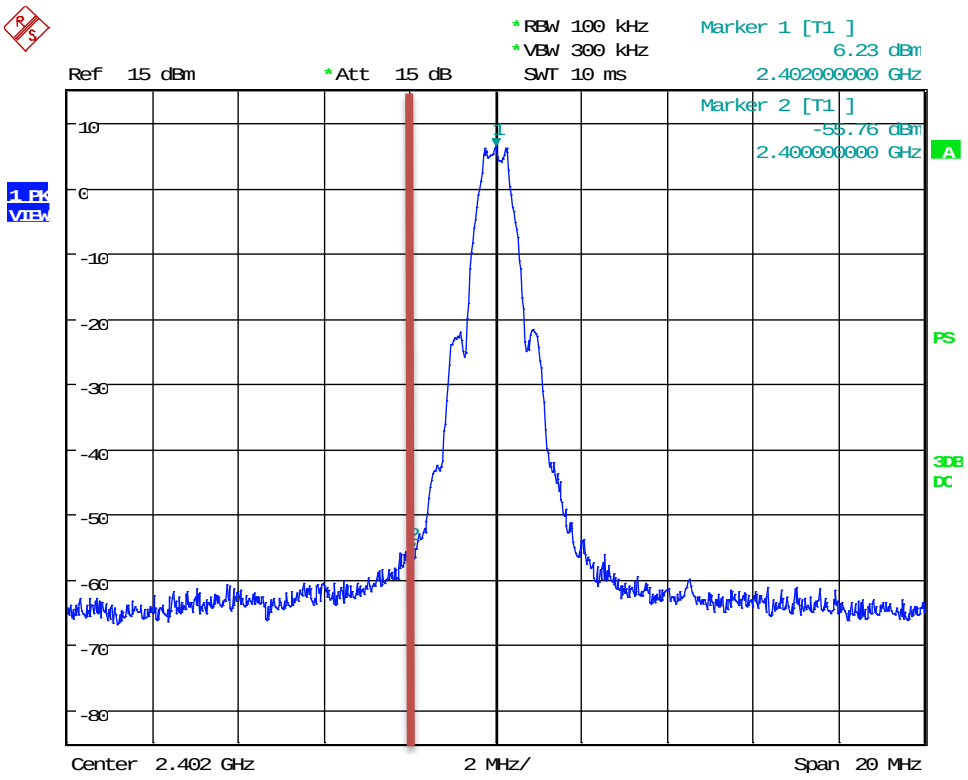
.



Date: 17.JUL.2020 10:36:49

Bluetooth: Low Band Edge

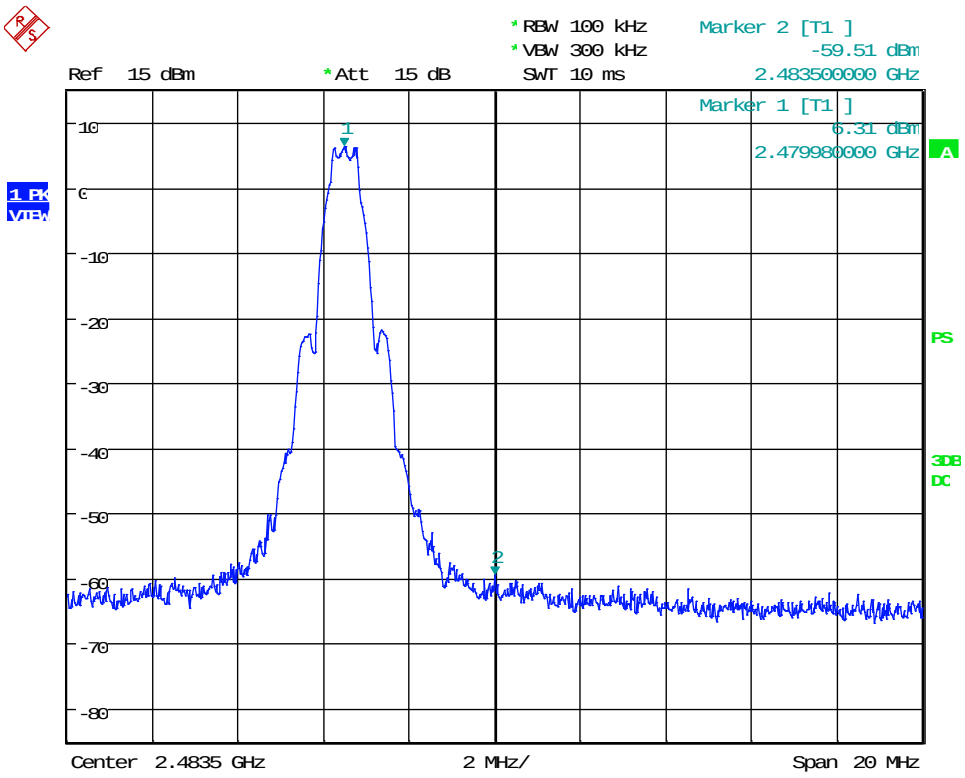
.



Date: 14.APR.2020 10:45:31

Bluetooth: High Band Edge

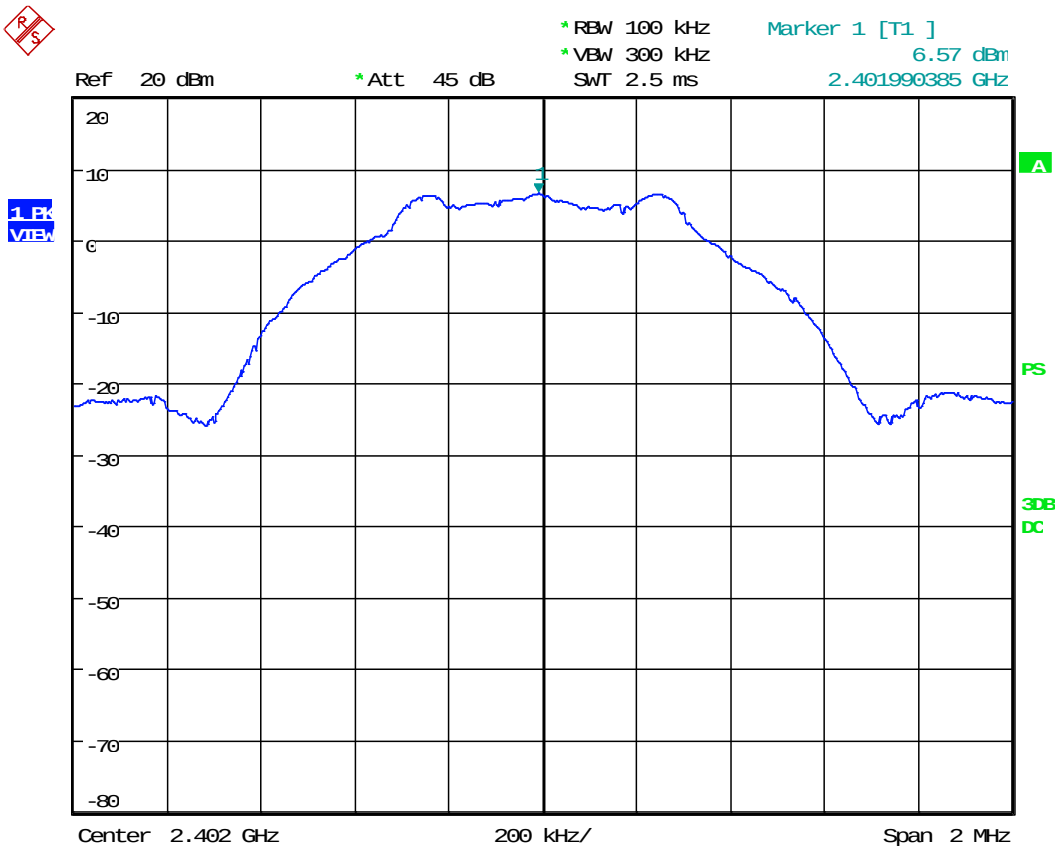
.



Date: 14.APR.2020 10:43:42

Bluetooth: Reference Scan

.



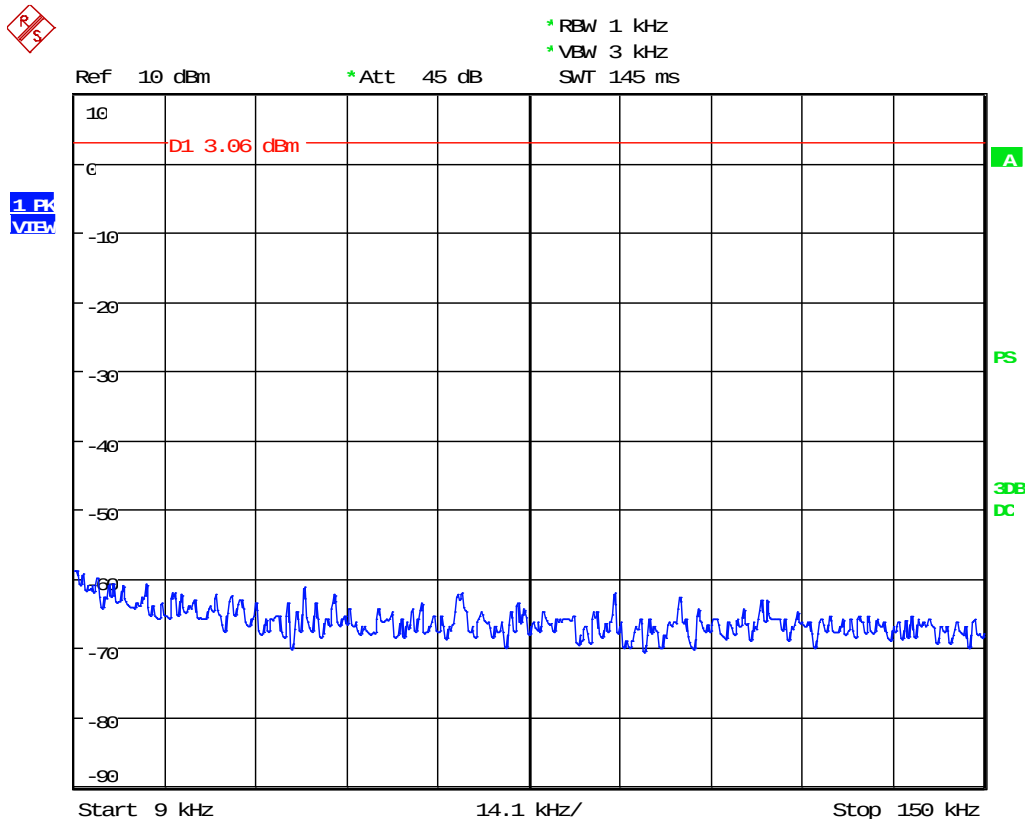
Date: 17.JUL.2020 09:58:34

Test Date(s):	2020-07-17	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(d) / Part 15.207 KDB558074 v05r02	**Air Temperature:**	22.5ºC
		Relative Humidity:	35%

Note: The display line in the following graphs represents the reference line determined from the Peak PSD/100kHz to set the -20dBc spurious emissions limit. All emissions were more than 40dB below this reference line as indicated on the graphs.

Wi-Fi, 2.4 GHz - CCK 11mbps: Low Channel
0.009 MHz to 0.15 MHz

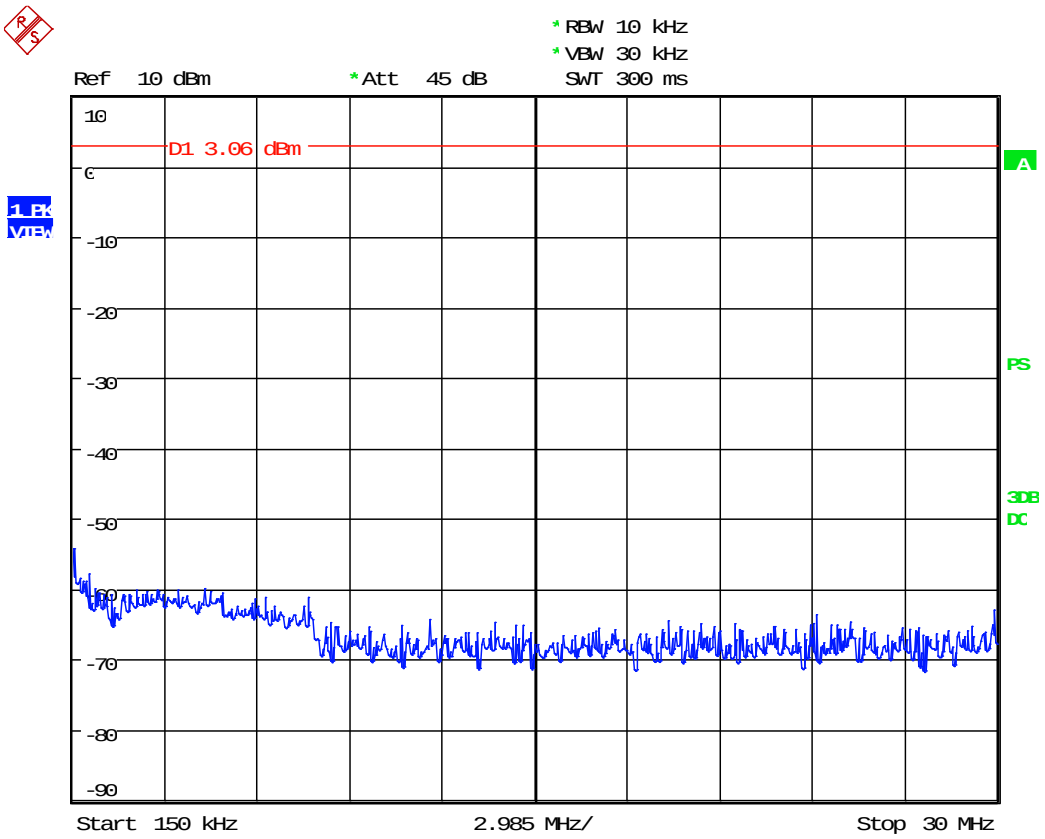
.



Date: 17.JUL.2020 10:49:13

Wi-Fi, 2.4 GHz - CCK 11mbps: Low Channel
0.15 MHz to 30 MHz

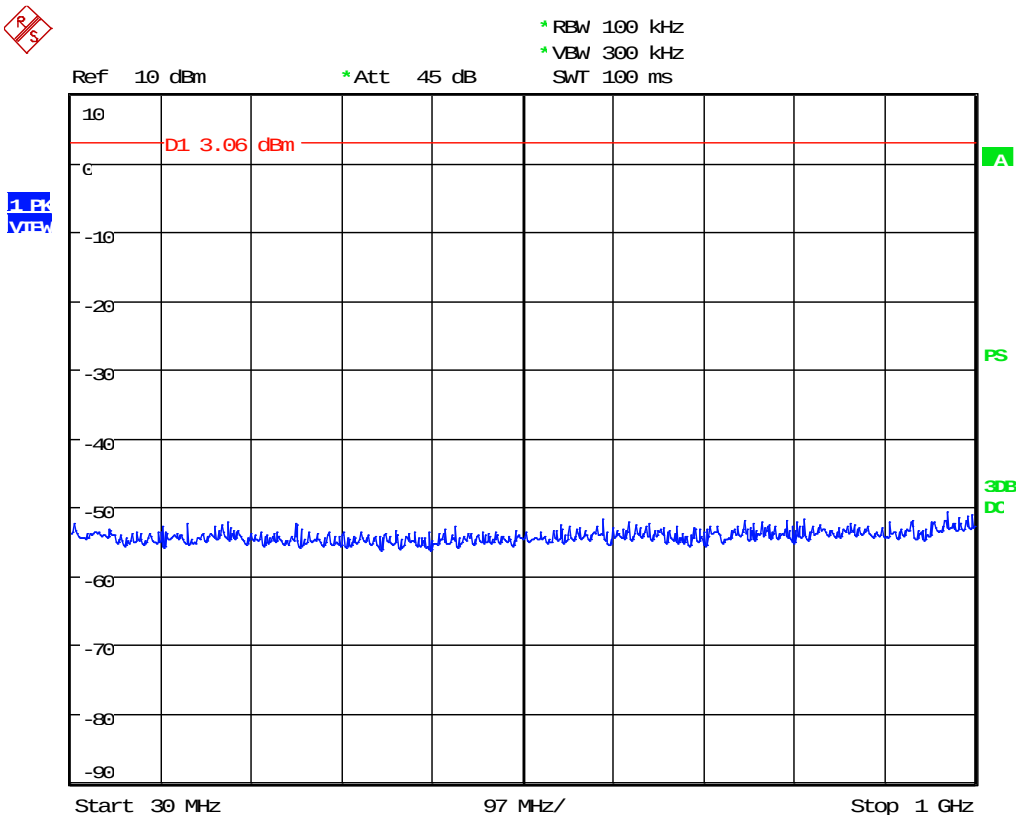
.



Date: 17.JUL.2020 10:49:59

Wi-Fi, 2.4 GHz - CCK 11mbps: Low Channel
30 MHz to 1000 MHz

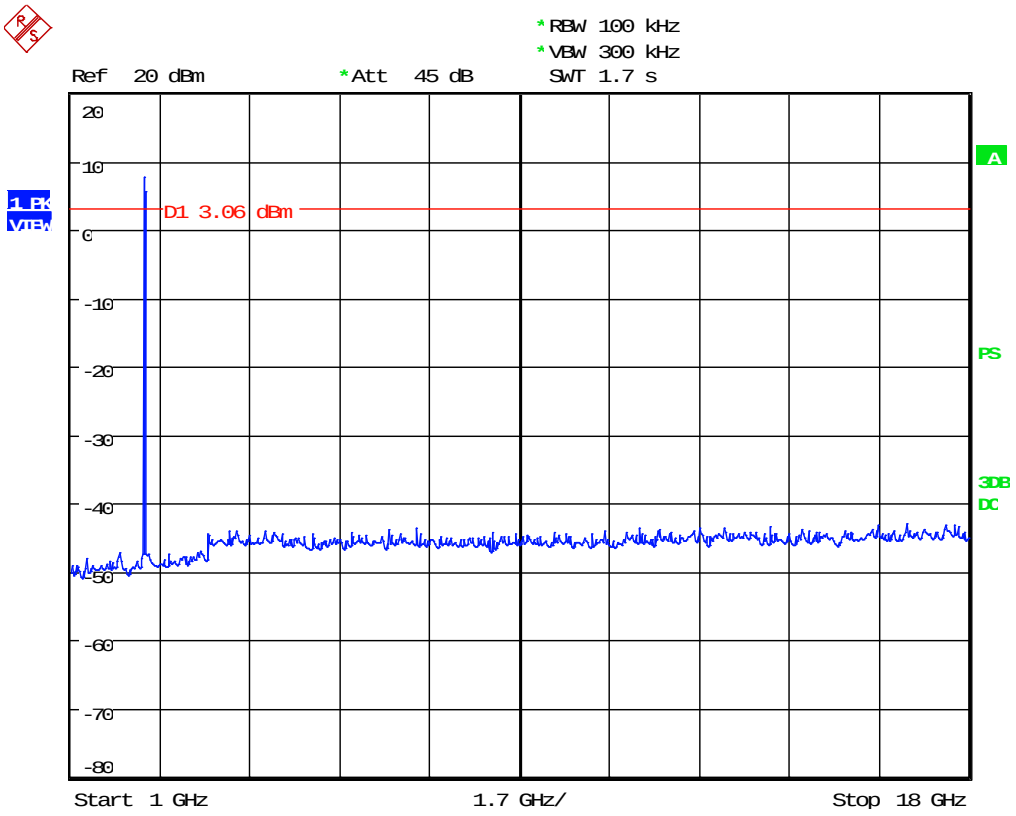
.



Date: 17.JUL.2020 10:50:34

Wi-Fi, 2.4 GHz - CCK 11mbps: Low Channel
1 GHz to 18 GHz

.

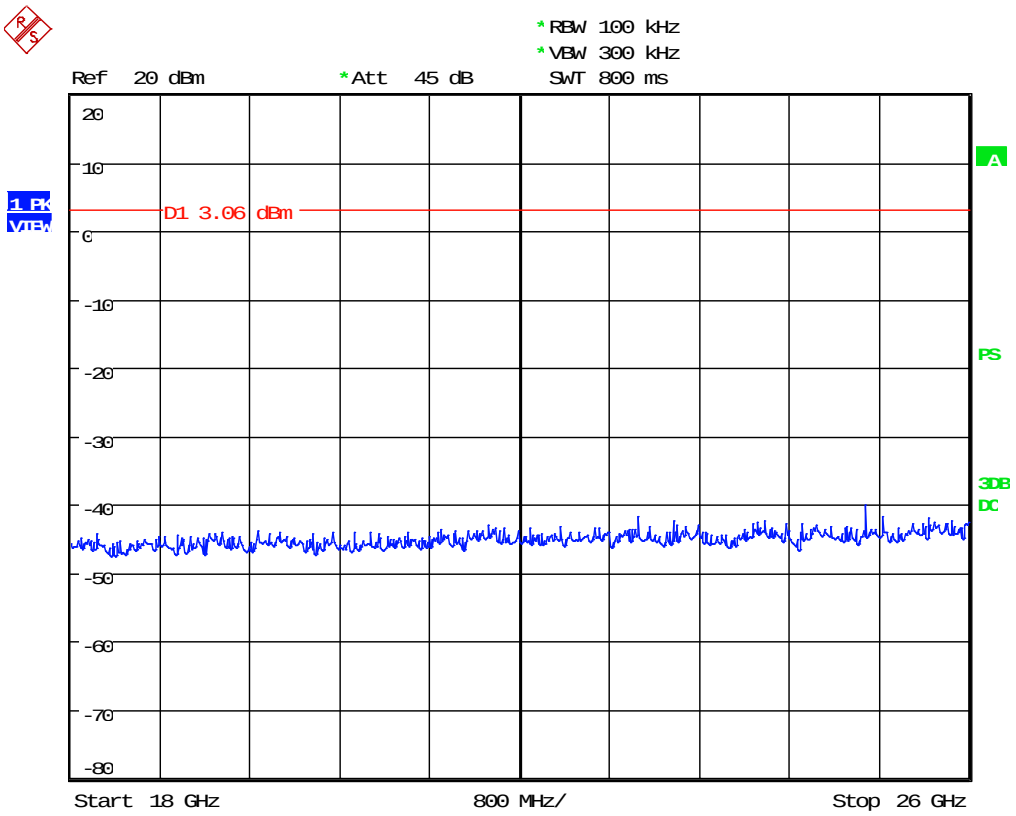


.

Date: 17.JUL.2020 10:52:44

Wi-Fi, 2.4 GHz - CCK 11mbps: Low Channel
18 GHz to 26 GHz

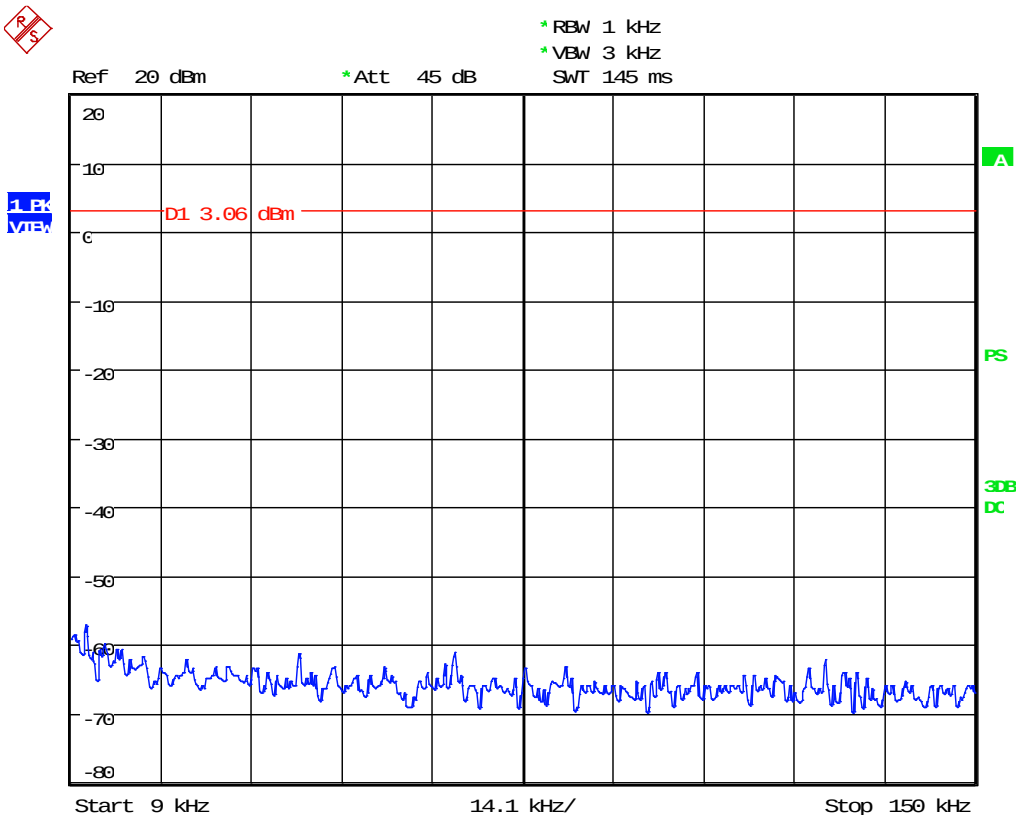
.



Date: 17.JUL.2020 10:53:13

Wi-Fi, 2.4 GHz - CCK 11mbps: Mid Channel
0.009 MHz to 0.15 MHz

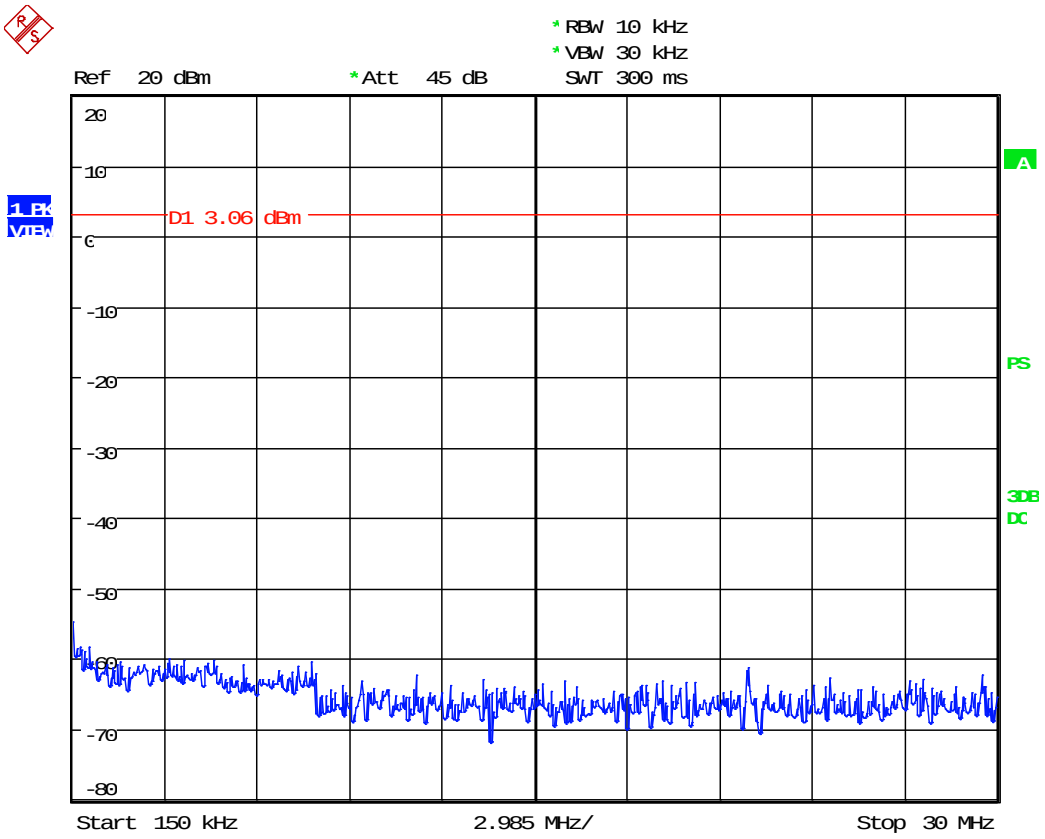
.



Date: 17.JUL.2020 10:56:32

Wi-Fi, 2.4 GHz - CCK 11mbps: Mid Channel
0.15 MHz to 30 MHz

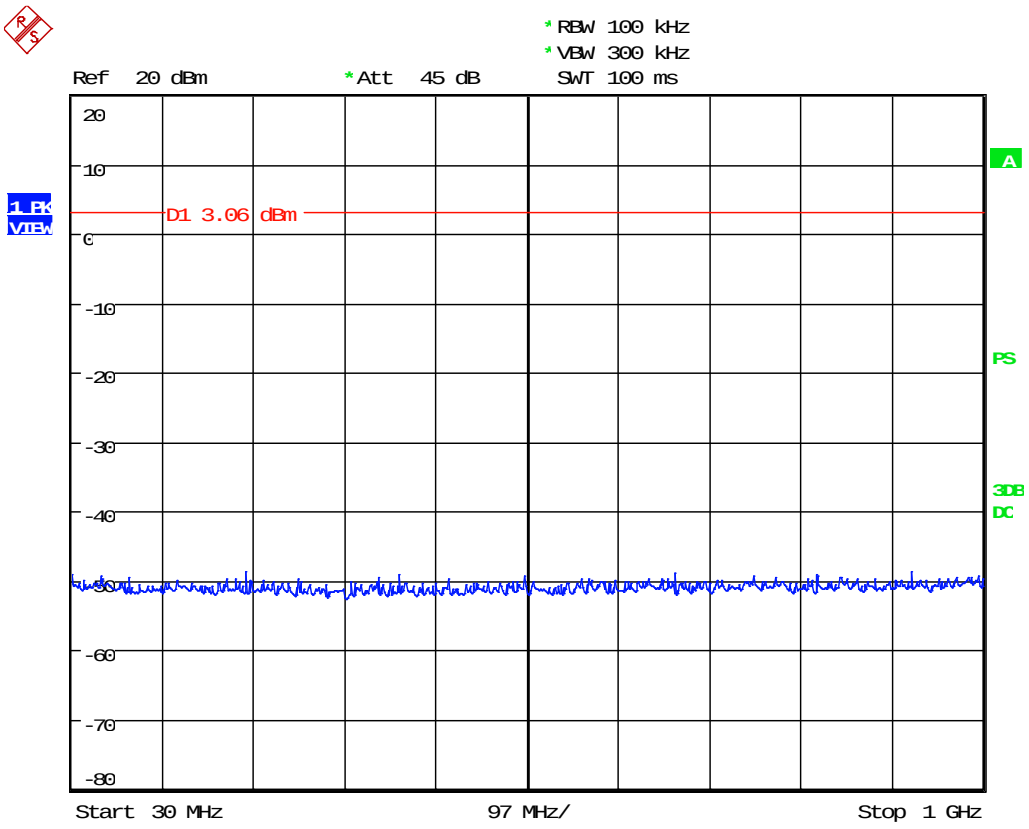
.



Date: 17.JUL.2020 10:55:58

Wi-Fi, 2.4 GHz - CCK 11mbps: Mid Channel
30 MHz to 1000 MHz

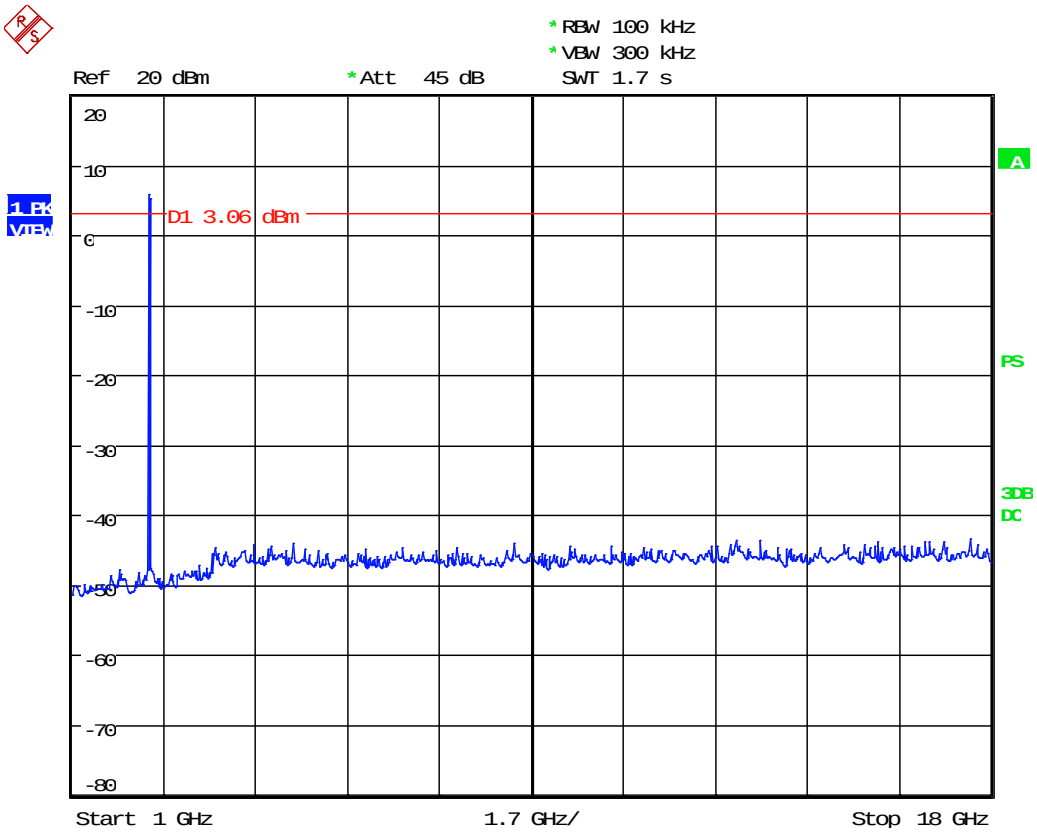
.



Date: 17.JUL.2020 10:55:12

Wi-Fi, 2.4 GHz - CCK 11mbps: Mid Channel
1 GHz to 18 GHz

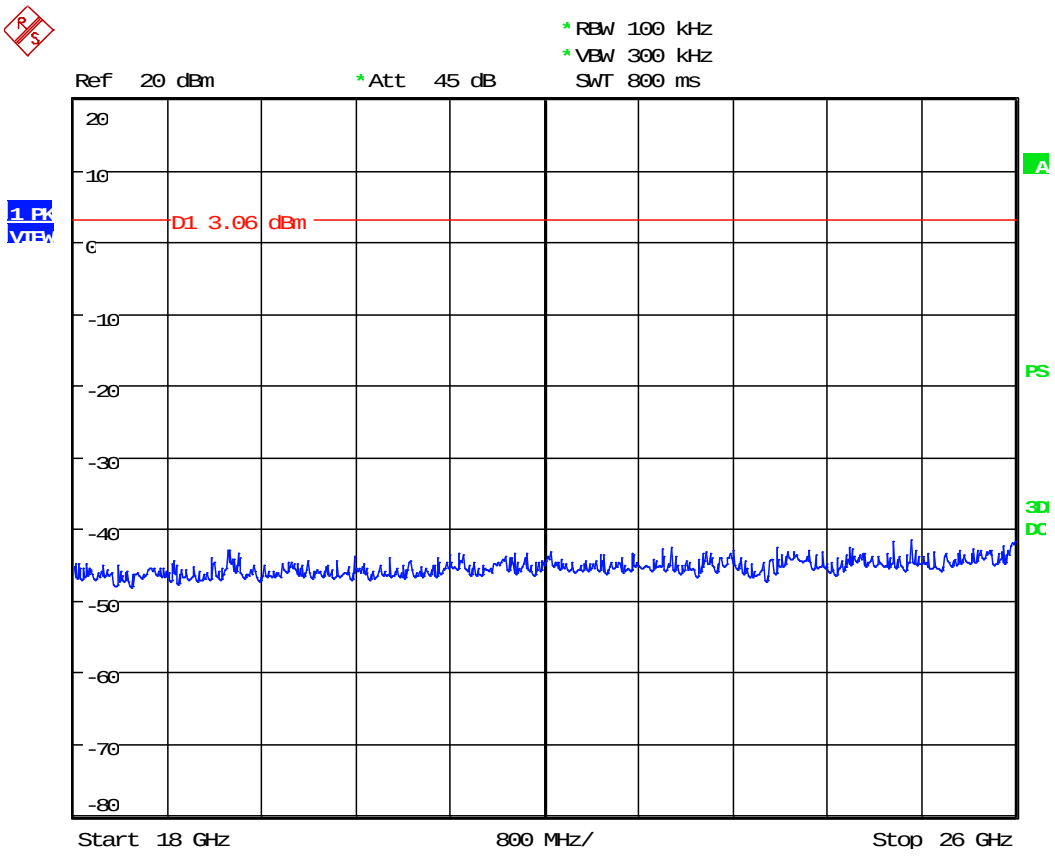
.



Date: 17.JUL.2020 10:54:29

Wi-Fi, 2.4 GHz - CCK 11mbps: Mid Channel
18 GHz to 26 GHz

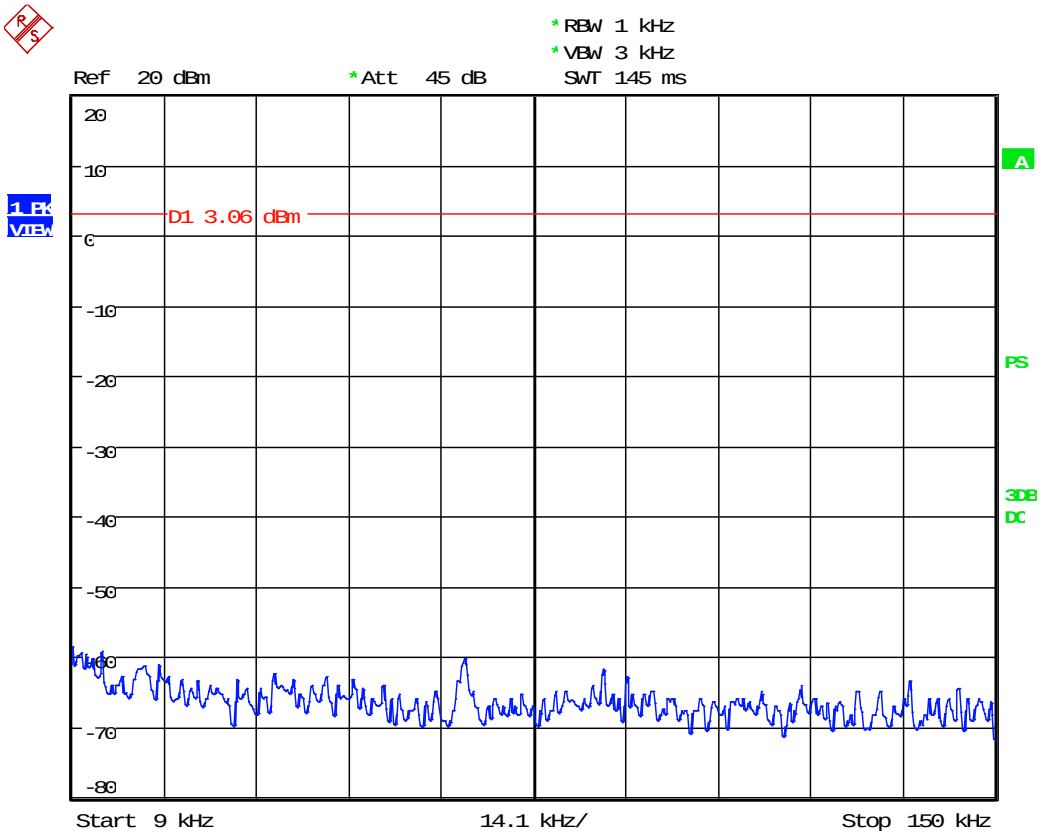
.



Date: 17.JUL.2020 10:53:58

Wi-Fi, 2.4 GHz - CCK 11mbps: High Channel
0.009 MHz to 0.15 MHz

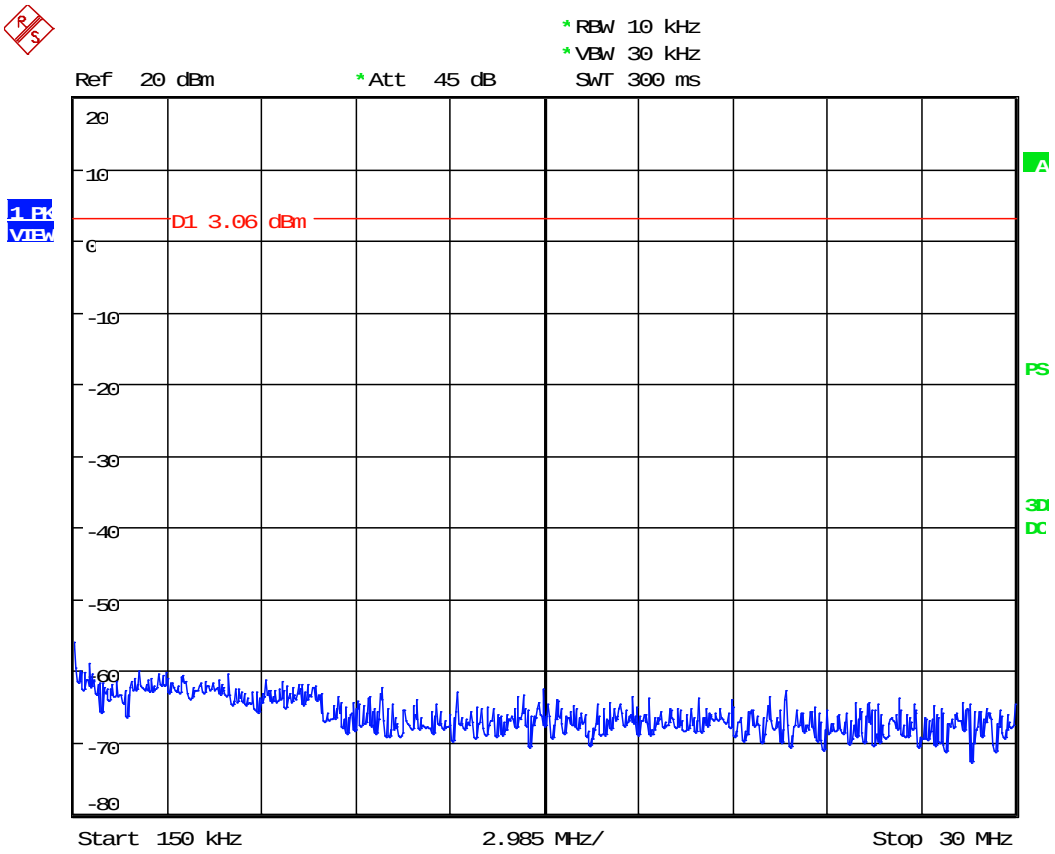
.



Date: 17.JUL.2020 10:57:13

Wi-Fi, 2.4 GHz - CCK 11mbps: High Channel
0.15 MHz to 30 MHz

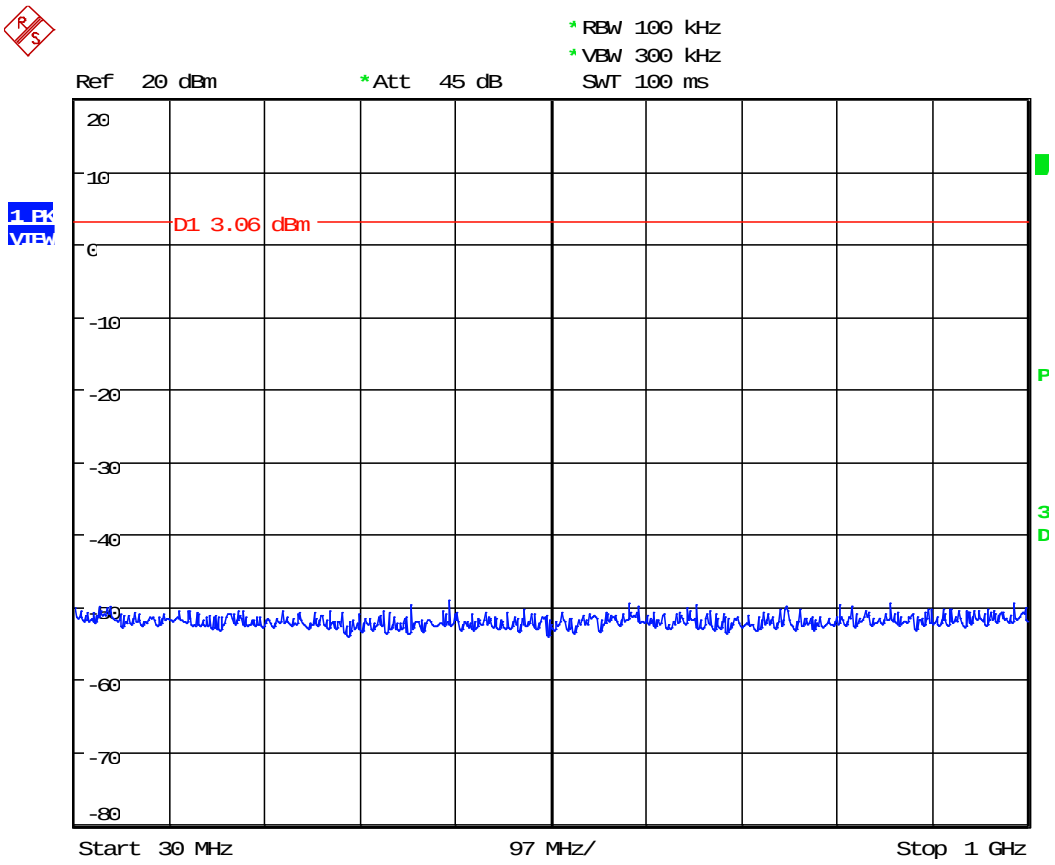
.



Date: 17.JUL.2020 10:58:02

Wi-Fi, 2.4 GHz - CCK 11mbps: High Channel
30 MHz to 1000 MHz

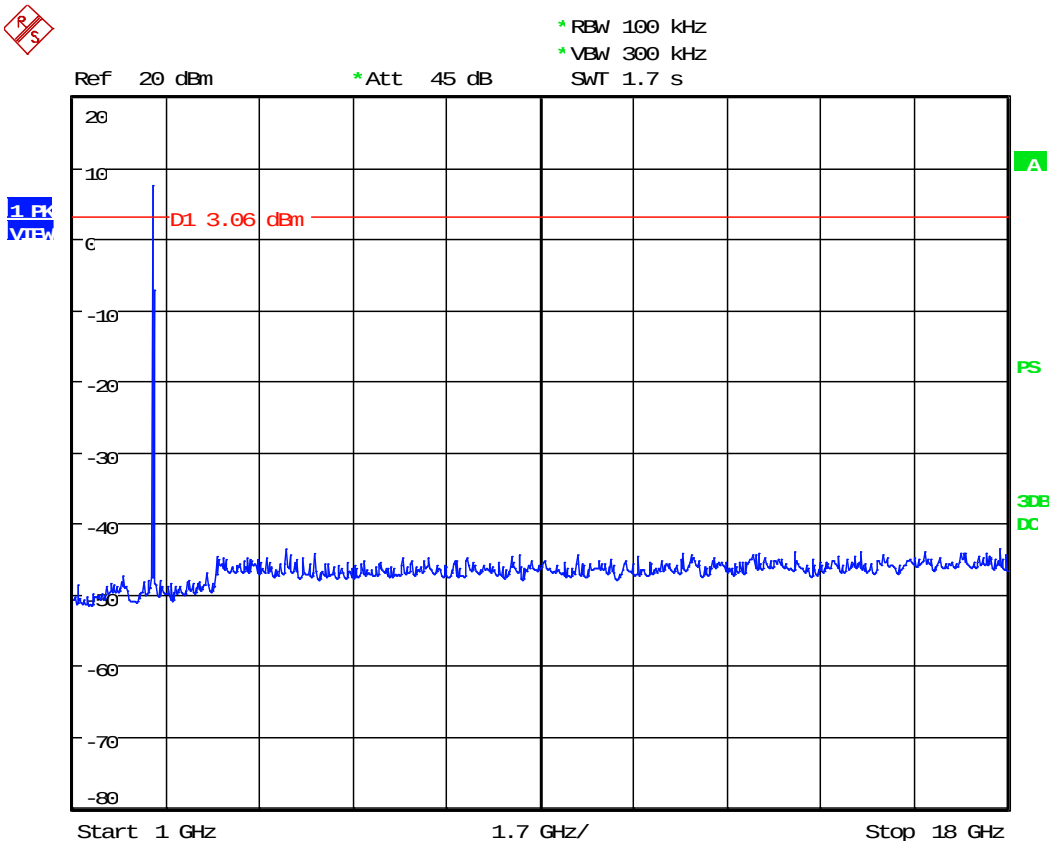
.



Date: 17.JUL.2020 10:58:36

Wi-Fi, 2.4 GHz - CCK 11mbps: High Channel
1 GHz to 18 GHz

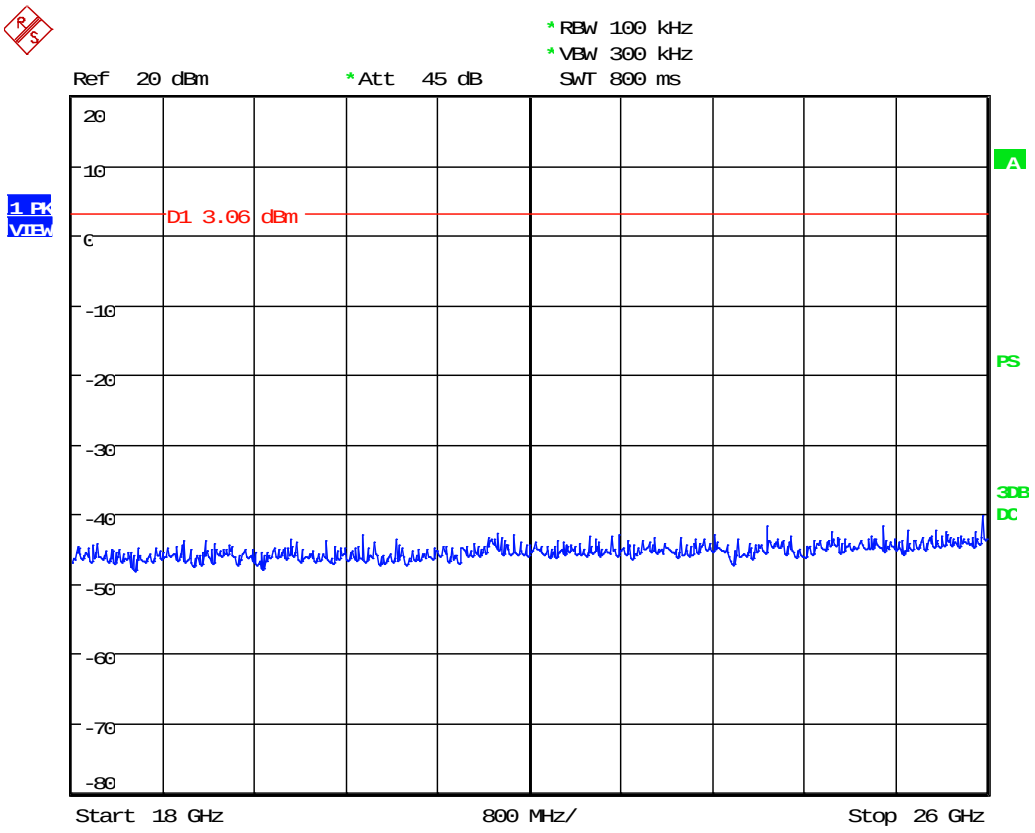
.



Date: 17.JUL.2020 10:59:32

Wi-Fi, 2.4 GHz - CCK 11mbps: High Channel
18 GHz to 26 GHz

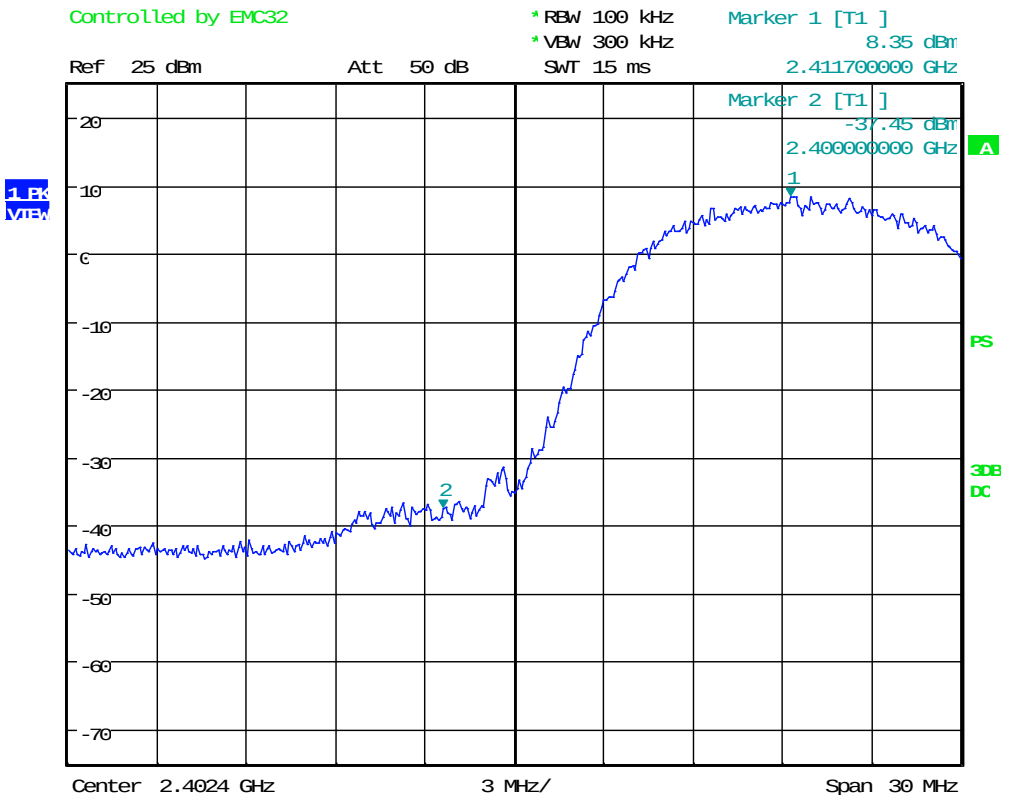
.



Date: 17.JUL.2020 11:00:11

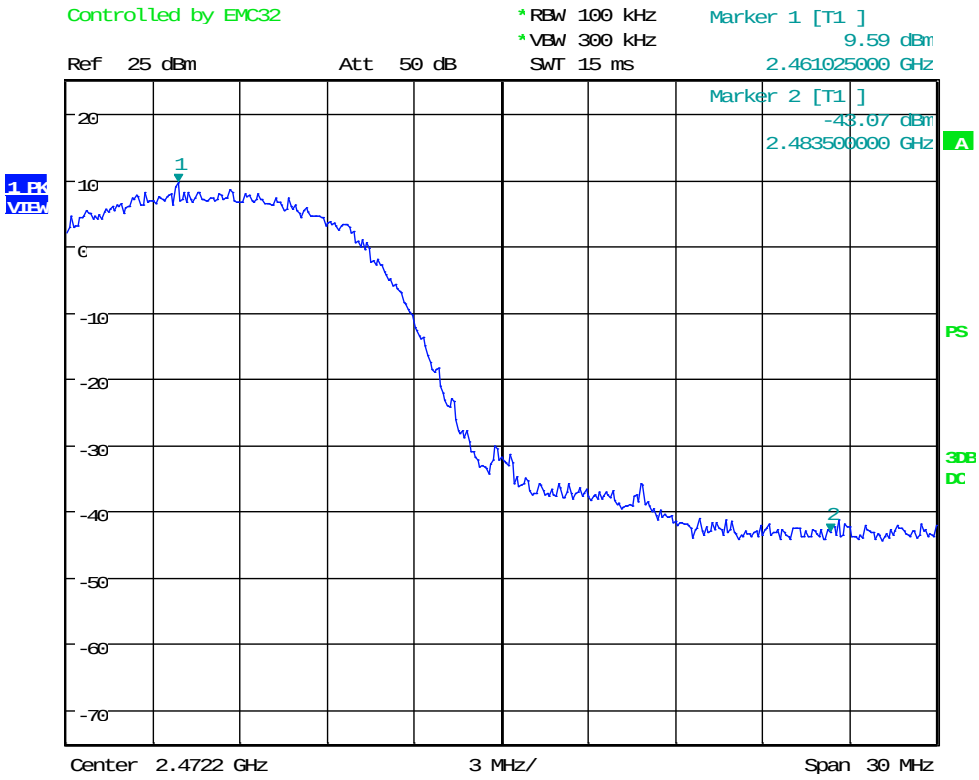
Wi-Fi, 2.4 GHz - CCK 11mbps: Low Band Edge

.



Wi-Fi, 2.4 GHz - CCK 11mbps: High Band Edge

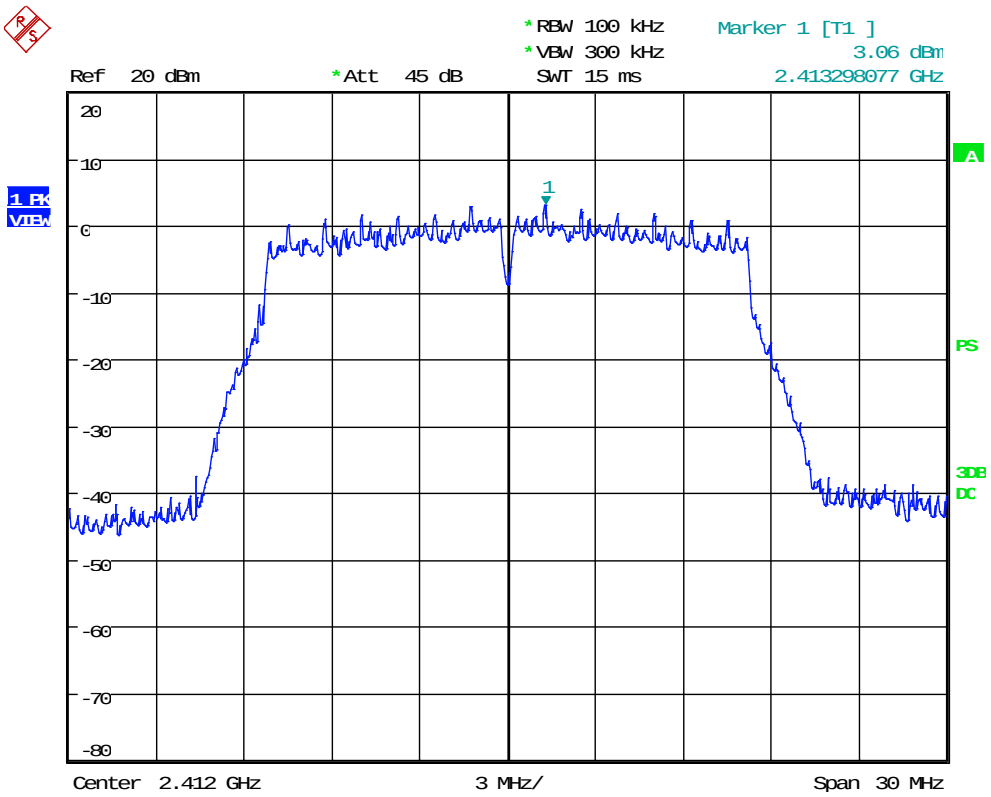
.



Date: 13.APR.2020 11:55:14

Wi-Fi: Reference Scan

.



Date: 17.JUL.2020 09:50:56

11 RADIATED SPURIOUS EMISSION

The EUT's emissions were recorded with its integral/internal chip 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 worst-case emissions, and test data presented in the tables are from all channels.

11.3 Radiated Spurious Emissions Test Data

Test Date(s):	2020-04-17; 2020-08-11	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(d); Part 15.209 / KDB558074	**Air Temperature:**	22.2ºC
		Relative Humidity:	23%

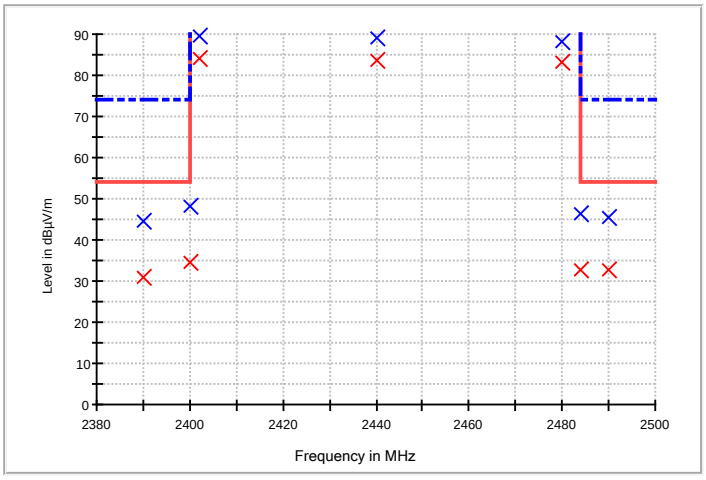
Bluetooth – Band Edges

MaxPeak

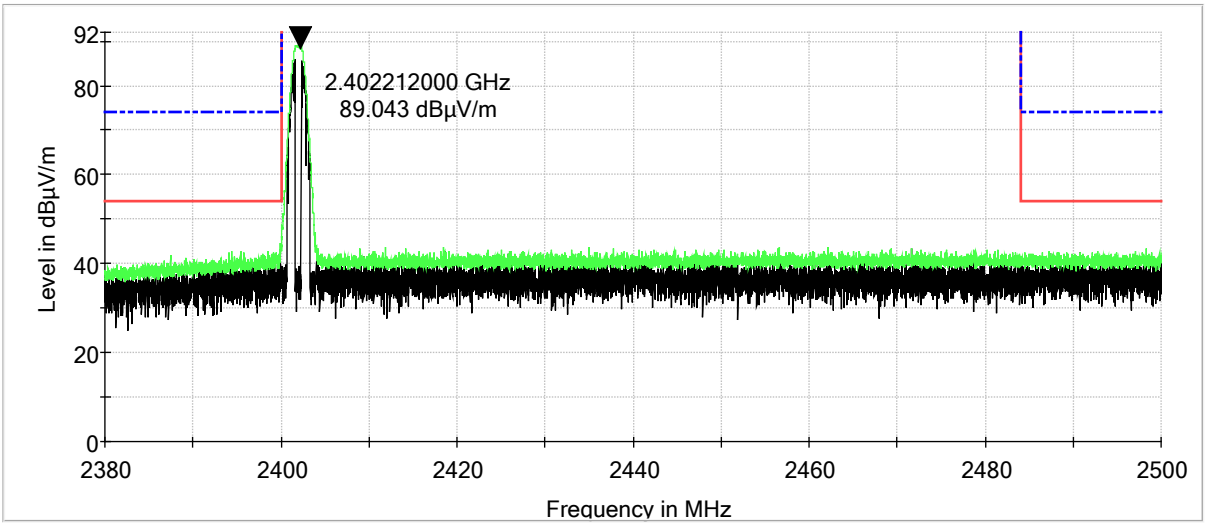
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2390.000000	H	150.00	30.00	37.1	7.3	44.40	74.0	-29.6
2400.000000	H	150.00	30.00	39.9	8.5	48.40	74.0	-25.6
2402.000000	H	150.00	30.00	81.0	8.5	89.50	--	--
2440.000000	H	150.00	42.00	80.3	8.7	89.00	--	--
2480.000000	H	150.00	44.00	79.5	8.8	88.30	--	--
2483.500000	H	150.00	44.00	37.6	8.8	46.40	74.0	-27.6
2490.000000	H	150.00	44.00	36.6	8.8	45.40	74.0	-28.6

AVG

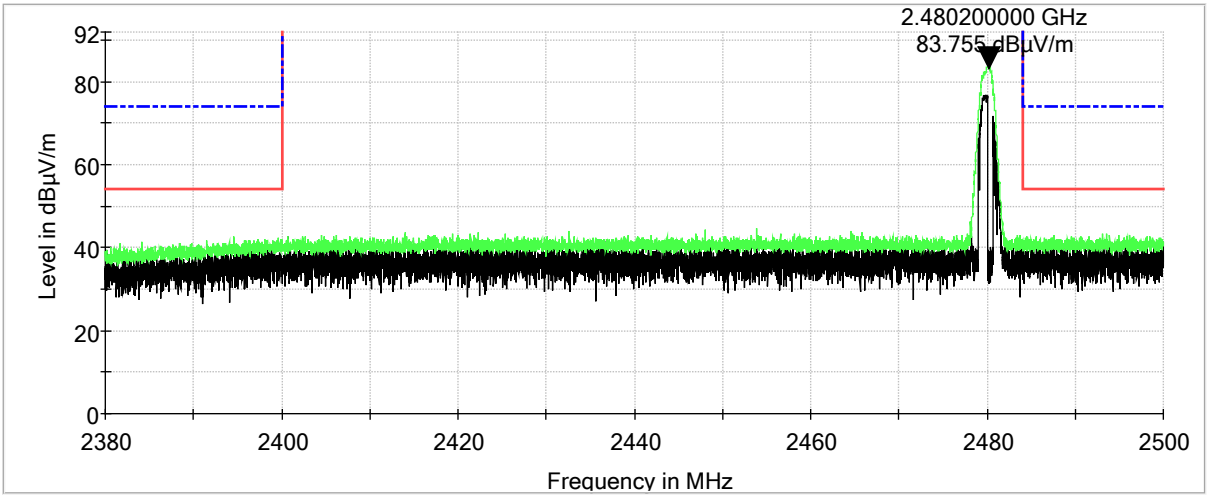
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2390.000000	H	150.00	30.00	23.8	7.3	31.10	54.0	-22.9
2400.000000	H	150.00	30.00	26.1	8.5	34.60	54.0	-19.4
2402.000000	H	150.00	30.00	75.4	8.5	83.90	--	--
2440.000000	H	150.00	42.00	75.1	8.7	83.80	--	--
2480.000000	H	150.00	44.00	74.3	8.8	83.10	--	--
2483.500000	H	150.00	44.00	24.1	8.8	32.90	54.0	-21.1
2490.000000	H	150.00	44.00	24.0	8.8	32.80	54.0	-21.2



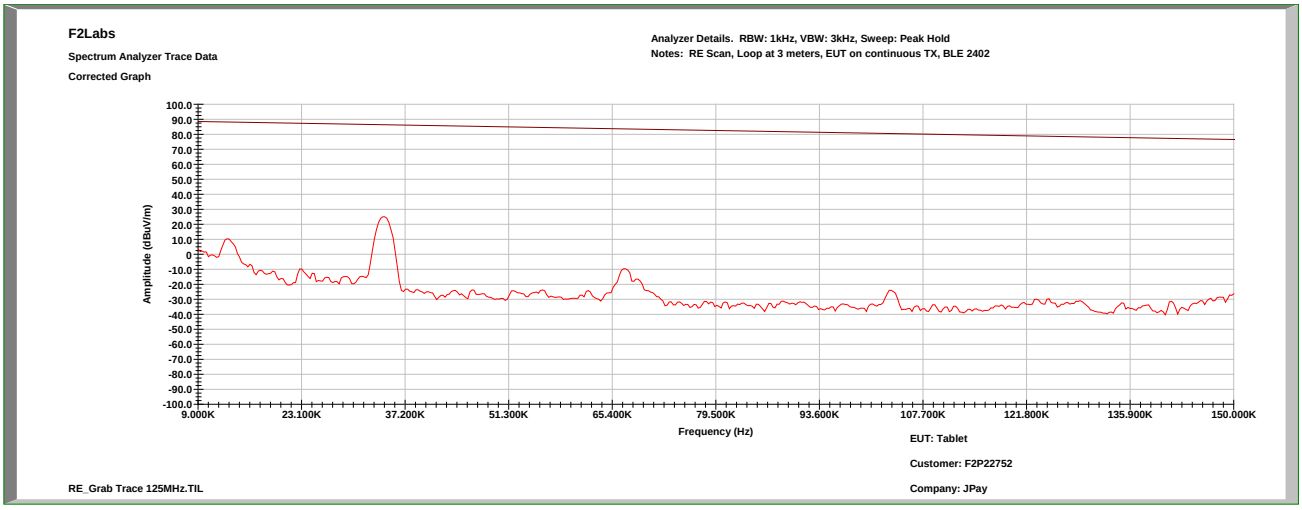
Bluetooth: Lower Band Edge



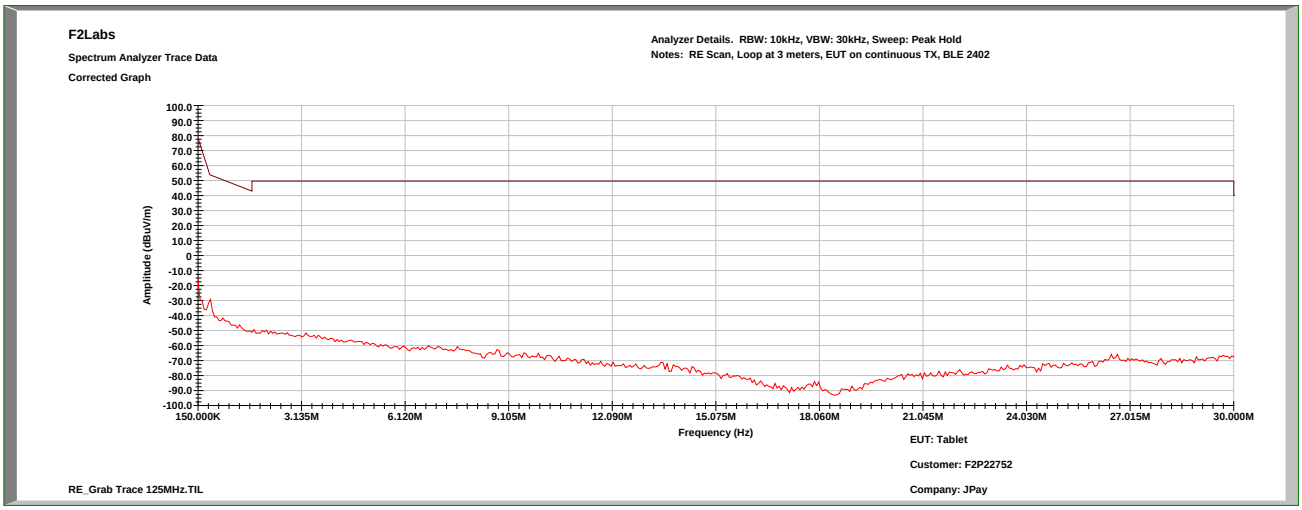
Bluetooth: Upper Band Edge



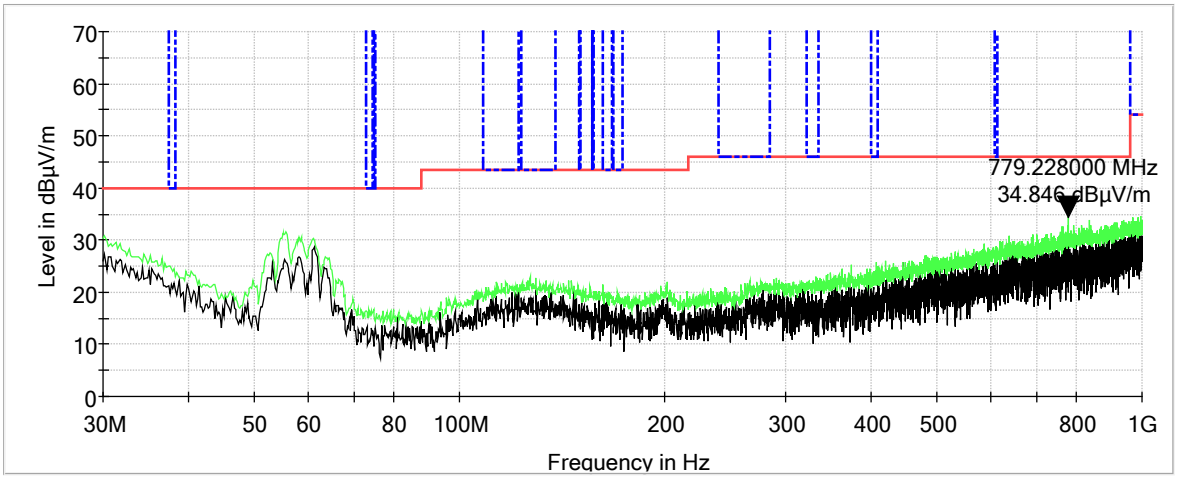
Bluetooth: 0.009 MHz to 0.15 MHz



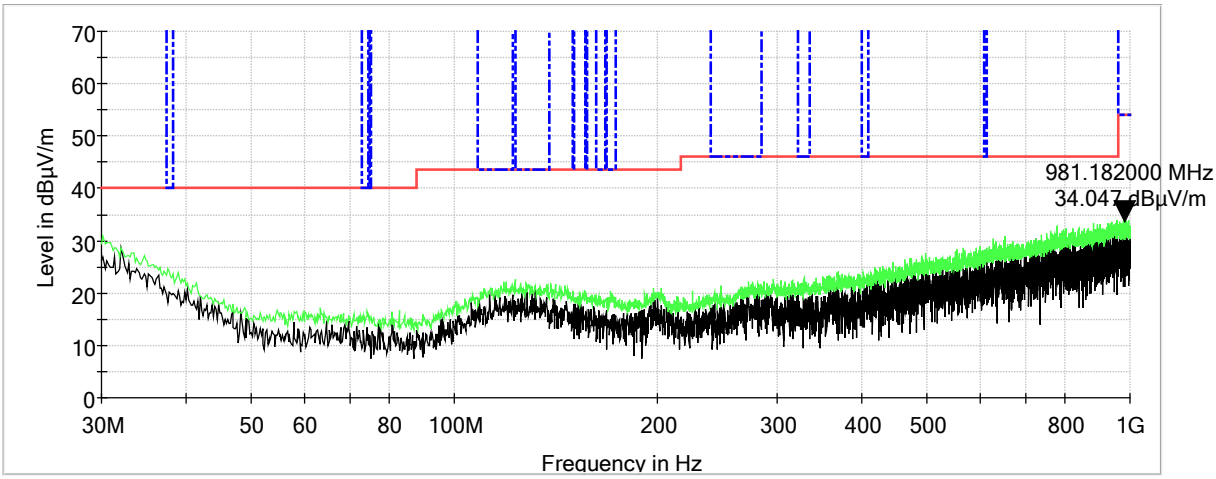
Bluetooth: 0.15 MHz to 30.0 MHz



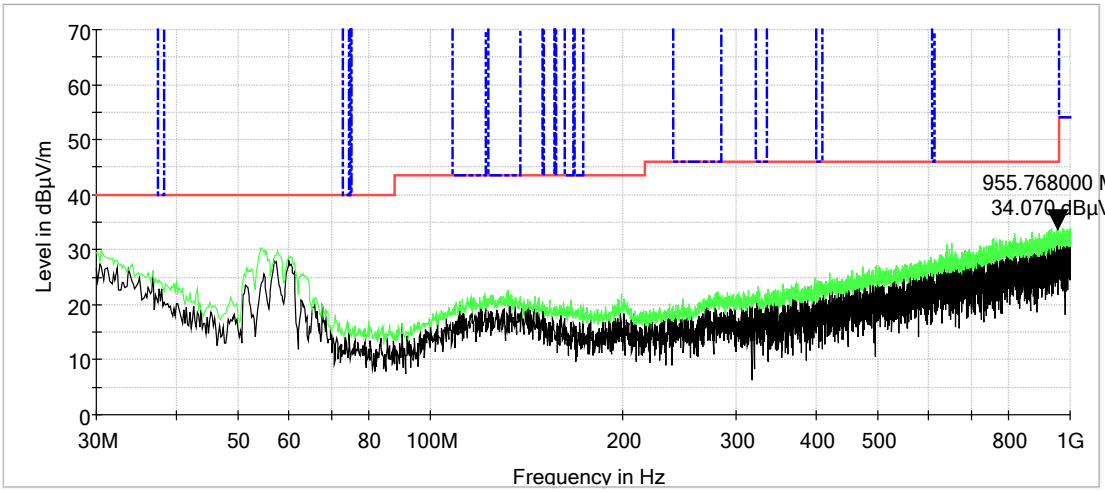
Bluetooth, Channel 0: 30 MHz to 1000 MHz, Vertical



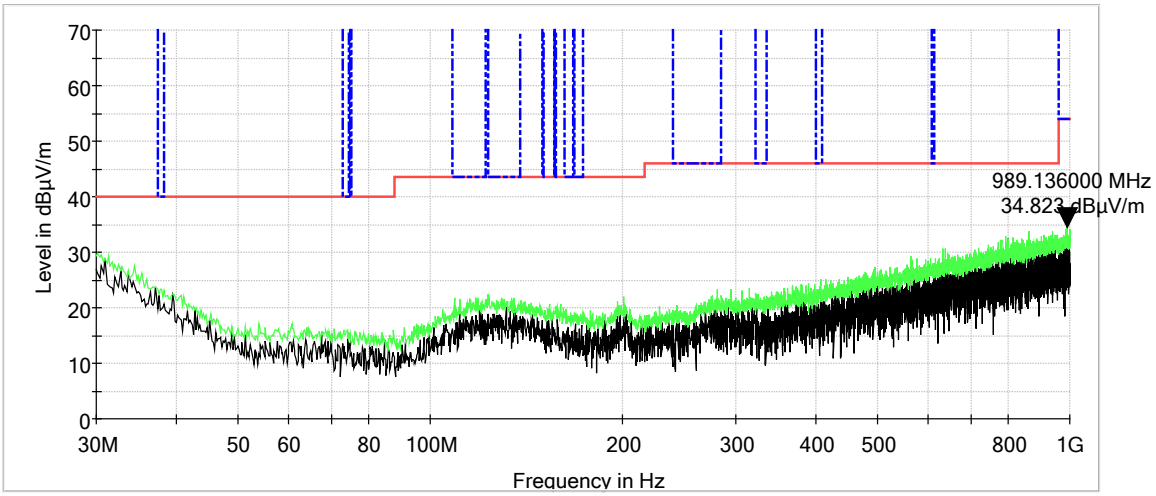
Bluetooth, Channel 0: 30 MHz to 1000 MHz, Horizontal



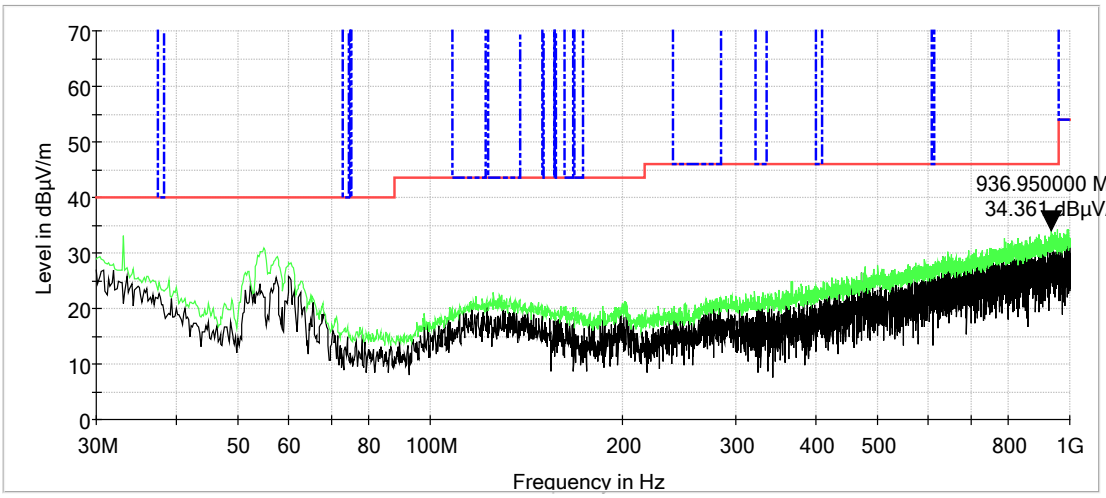
Bluetooth, Channel 19: 30 MHz to 1000 MHz, Vertical



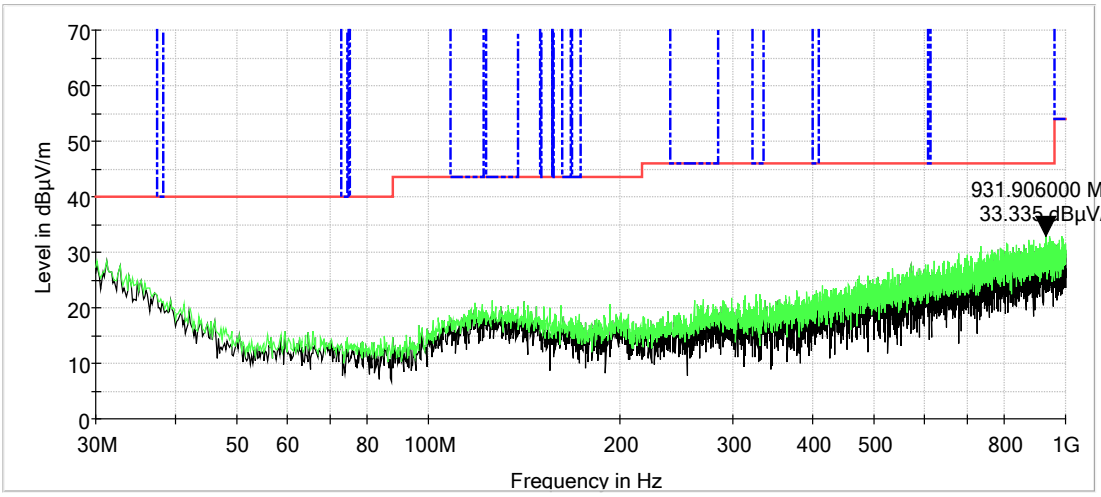
Bluetooth, Channel 19: 30 MHz to 1000 MHz, Horizontal



Bluetooth, Channel 39: 30 MHz to 1000 MHz, Vertical

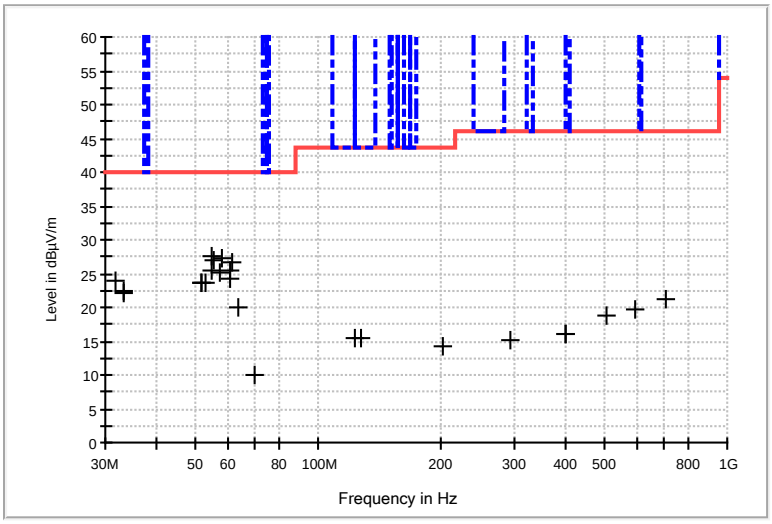


Bluetooth, Channel 39: 30 MHz to 1000 MHz, Horizontal

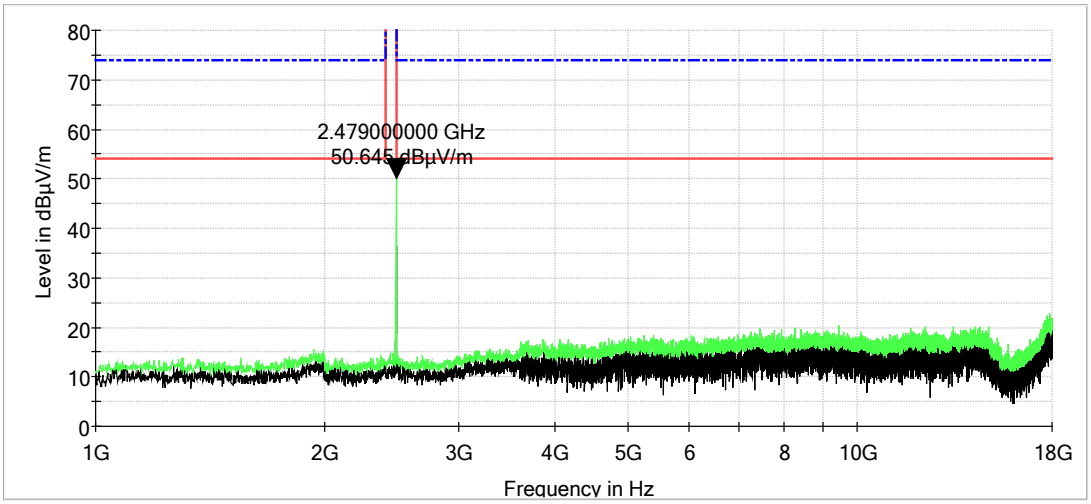


Bluetooth
Measurements, 30 MHz to 1000 MHz

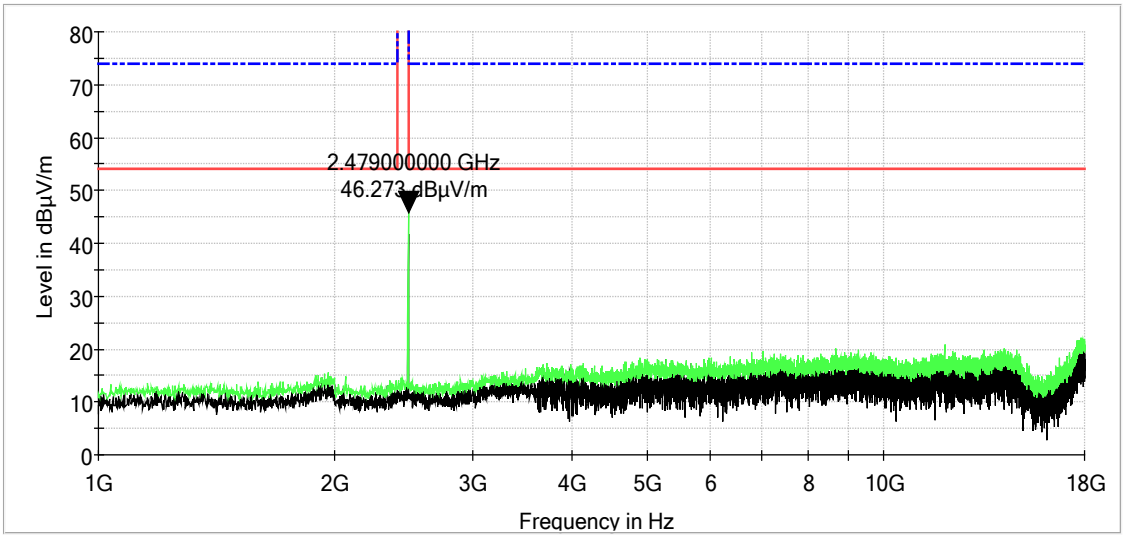
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (degrees)	Reading (dBµV)	Correcton Factors (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
31.760000	V	100.00	0.00	18.2	5.7	23.90	40.0	-16.1
33.120000	V	100.00	0.00	17.5	4.7	22.20	40.0	-17.8
33.280000	H	100.00	0.00	17.7	4.6	22.30	40.0	-17.7
51.720000	V	100.00	0.00	30.3	-6.8	23.50	40.0	-16.5
51.720000	V	100.00	0.00	30.3	-6.8	23.50	40.0	-16.5
52.680000	V	100.00	0.00	30.7	-7.0	23.70	40.0	-16.3
54.440000	V	100.00	0.00	34.5	-7.1	27.40	40.0	-12.6
54.840000	V	100.00	0.00	32.7	-7.2	25.50	40.0	-14.5
55.600000	V	100.00	0.00	34.1	-7.2	26.90	40.0	-13.1
57.560000	V	100.00	0.00	32.3	-7.2	25.10	40.0	-14.9
58.120000	V	100.00	0.00	34.3	-7.1	27.20	40.0	-12.8
60.440000	V	100.00	0.00	32.4	-7.0	25.40	40.0	-14.6
60.440000	V	100.00	0.00	31.2	-7.0	24.20	40.0	-15.8
61.040000	V	100.00	0.00	33.6	-6.9	26.70	40.0	-13.3
63.760000	V	100.00	0.00	26.8	-6.7	20.10	40.0	-19.9
69.560000	H	100.00	0.00	16.4	-6.4	10.00	40.0	-30.0
123.120000	H	100.00	0.00	15.3	0.2	15.50	43.5	-28.0
126.800000	V	100.00	0.00	15.2	0.2	15.40	43.5	-28.1
201.320000	V	100.00	0.00	14.3	0.0	14.30	43.5	-29.2
295.960000	H	100.00	0.00	13.8	1.3	15.10	46.0	-30.9
399.760000	V	100.00	0.00	12.2	3.9	16.10	46.0	-29.9
399.760000	V	100.00	0.00	12.2	3.9	16.10	46.0	-29.9
504.120000	H	100.00	0.00	12.2	6.6	18.80	46.0	-27.2
595.880000	V	100.00	0.00	11.9	7.9	19.80	46.0	-26.2
708.400000	H	100.00	0.00	11.6	9.6	21.20	46.0	-24.8



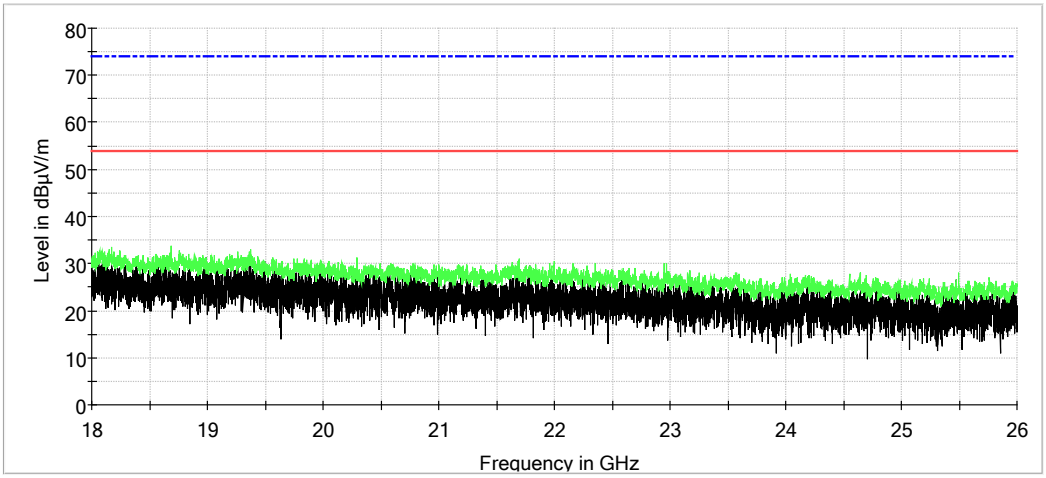
Bluetooth: 1 GHz to 18 GHz, Vertical



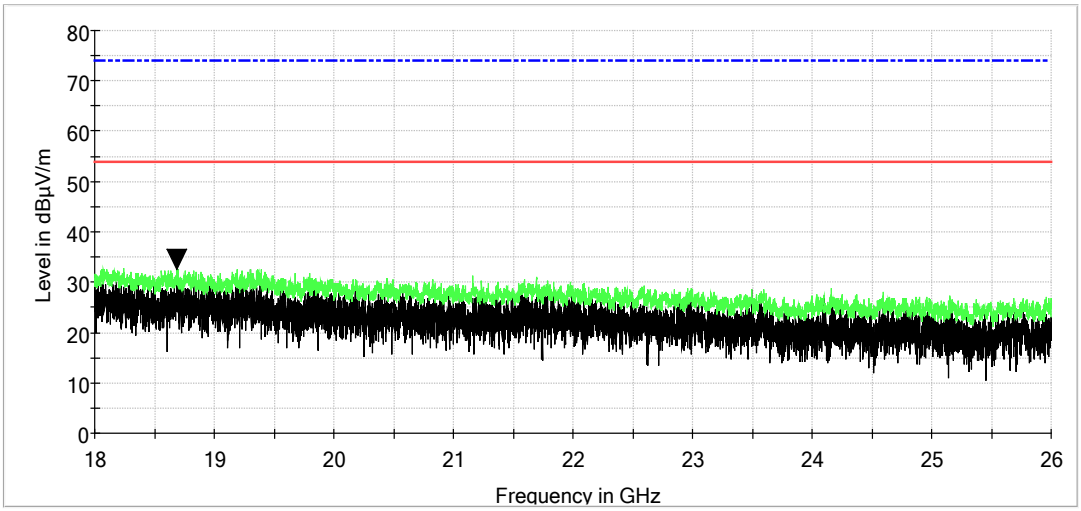
Bluetooth: 1 GHz to 18 GHz, Horizontal



Bluetooth: 18 GHz to 26 GHz, Vertical



Bluetooth: 18 GHz to 26 GHz, Horizontal



Test Date(s):	Aug. 16, 2019	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(d); Part 15.209 / KDB558074 v05r02	**Air Temperature:**	20.3ºC
		Relative Humidity:	62%

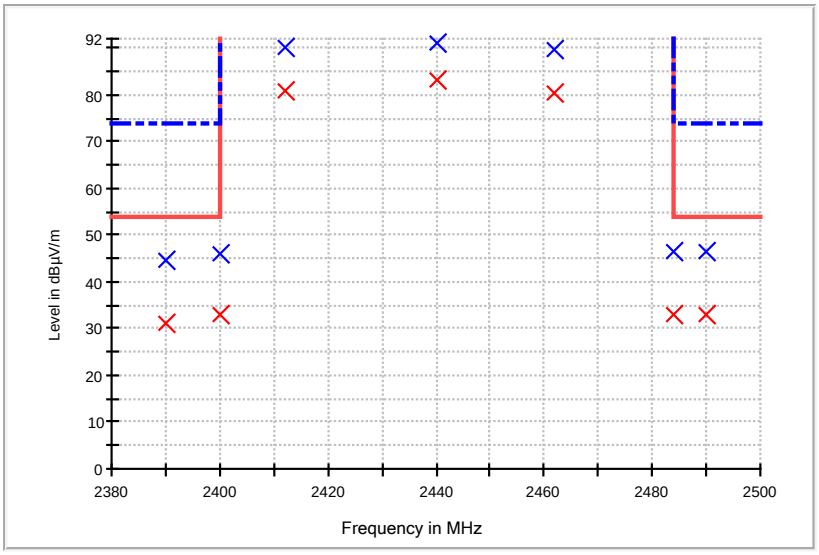
Wi-Fi, 2.4 GHz – CCK 11mbps: Band Edges

MaxPeak

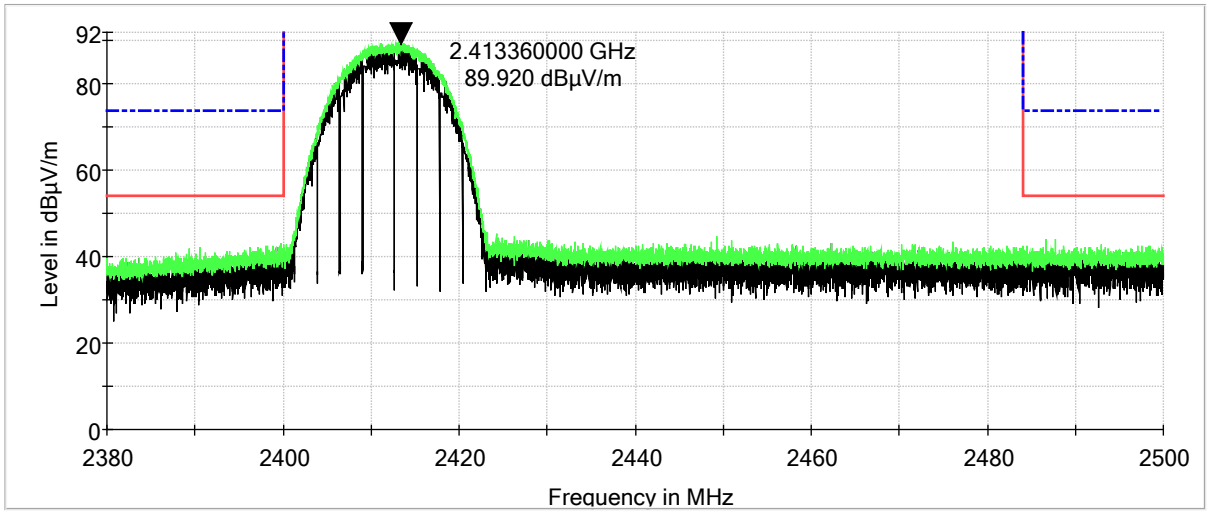
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2390.000000	H	150.00	42.00	37.2	7.3	44.50	74.0	-29.5
2400.000000	H	150.00	42.00	37.7	8.5	46.20	74.0	-27.8
2412.000000	H	150.00	42.00	81.5	8.6	90.10	--	--
2440.000000	H	150.00	42.00	82.3	8.7	91.00	--	--
2462.000000	H	160.00	42.00	80.8	8.8	89.60	--	--
2483.500000	H	160.00	42.00	37.8	8.8	46.60	74.0	-27.4
2490.000000	H	160.00	42.00	37.7	8.8	46.50	74.0	-27.5

AVG

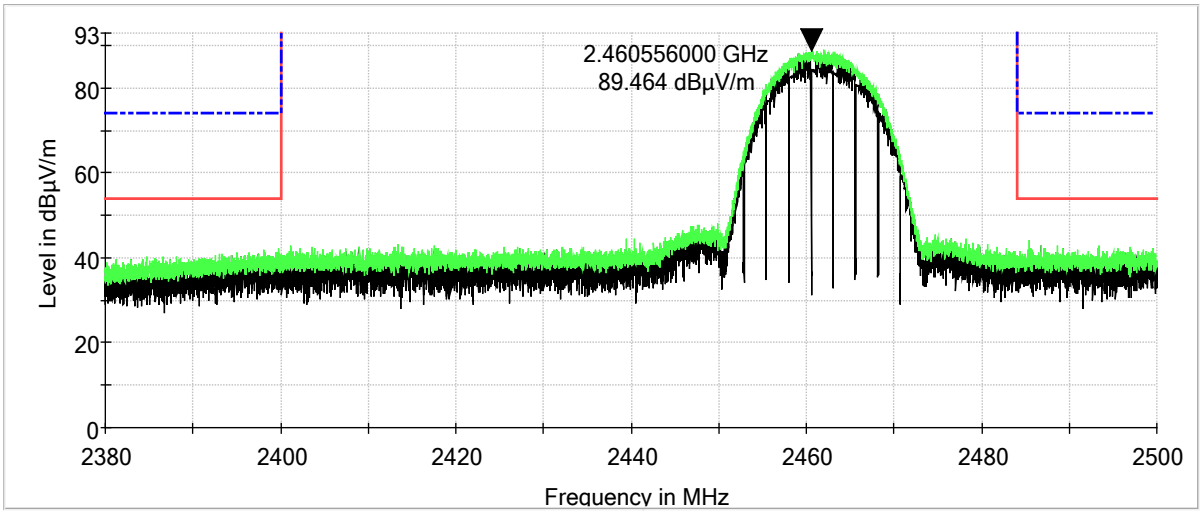
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Cable Loss & Antenna Factor (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2390.000000	H	150.00	42.00	23.9	7.3	31.20	54.0	-22.8
2400.000000	H	150.00	42.00	24.5	8.5	33.00	54.0	-21.0
2412.000000	H	150.00	42.00	72.2	8.6	80.80	--	--
2440.000000	H	150.00	42.00	74.5	8.7	83.20	--	--
2462.000000	H	160.00	42.00	71.5	8.8	80.30	--	--
2483.500000	H	160.00	42.00	24.0	8.8	32.80	54.0	-21.2
2490.000000	H	160.00	42.00	24.0	8.8	32.80	54.0	-21.2



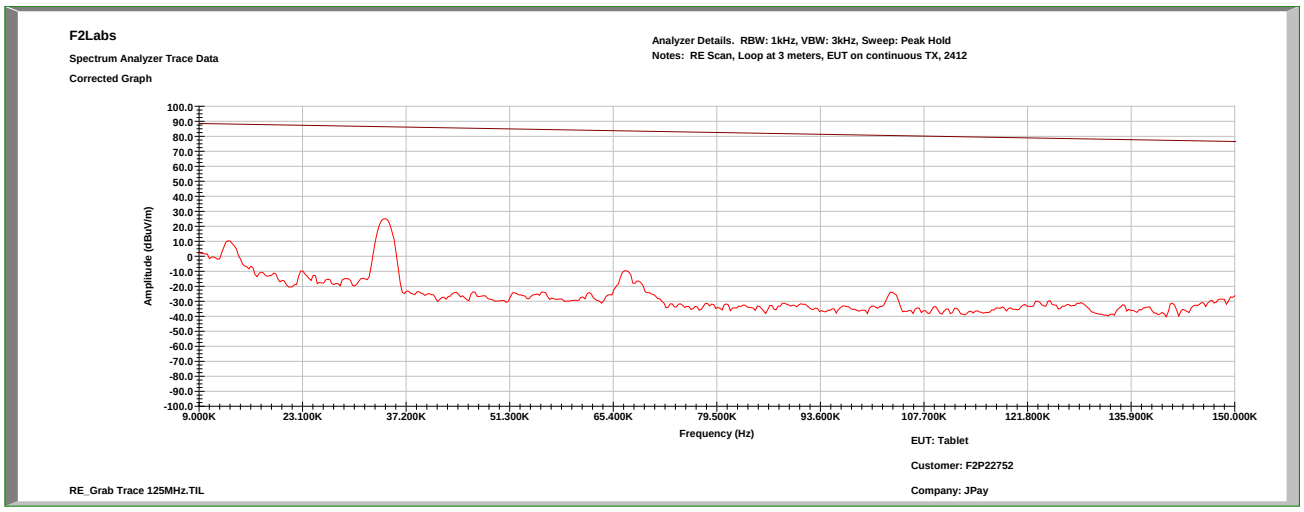
Wi-Fi, 2.4 GHz - CCK: Lower Band Edge (worse case)



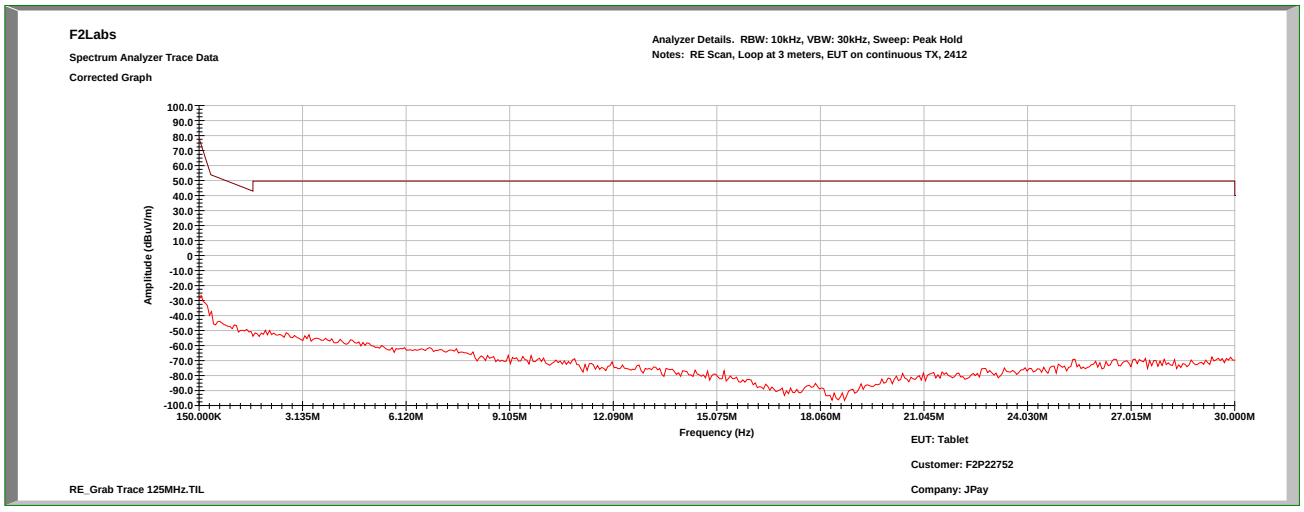
Wi-Fi, 2.4 GHz - CCK: Upper Band Edge (worse case)



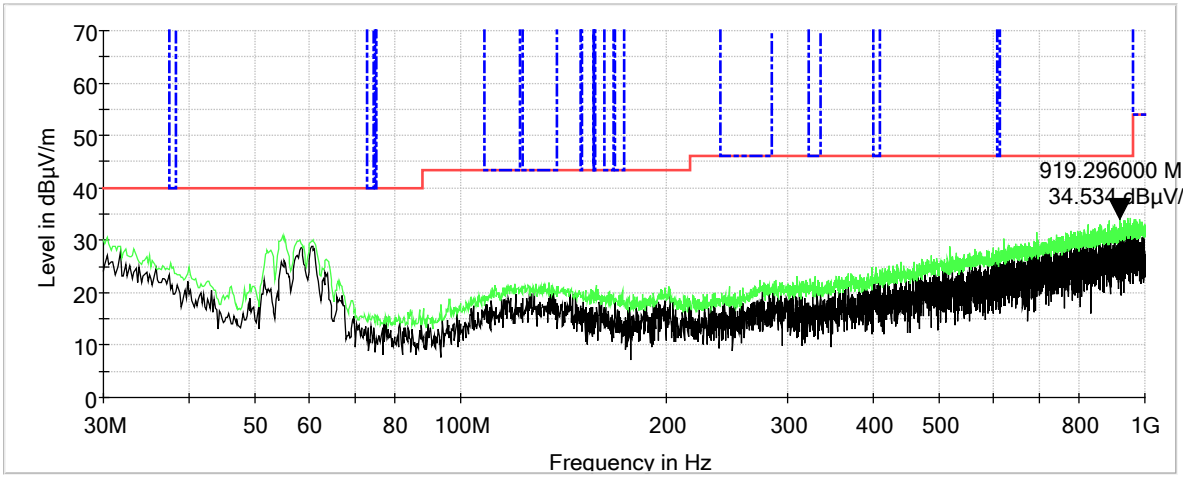
Wi-Fi, 2.4 GHz - CCK: 0.009 MHz to 0.15 MHz, Low Channel



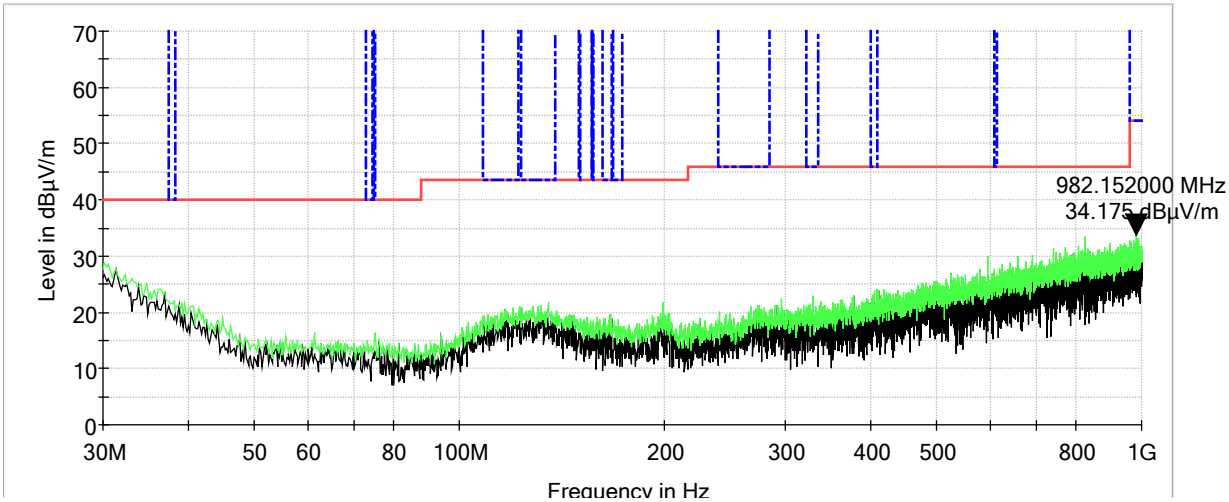
Wi-Fi, 2.4 GHz - CCK: 0.15 MHz to 30.0 MHz, Low Channel



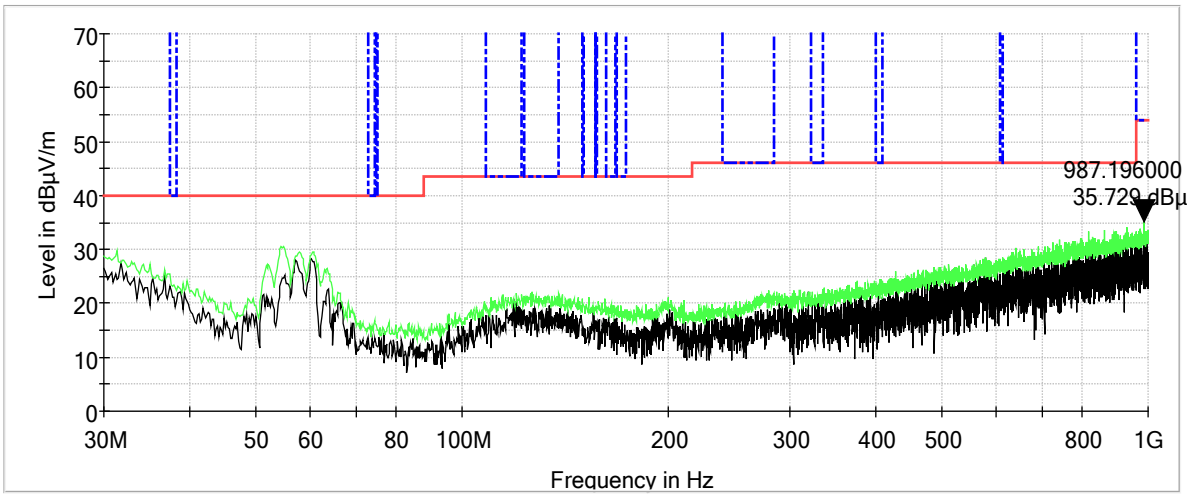
Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Vertical, Low Channel



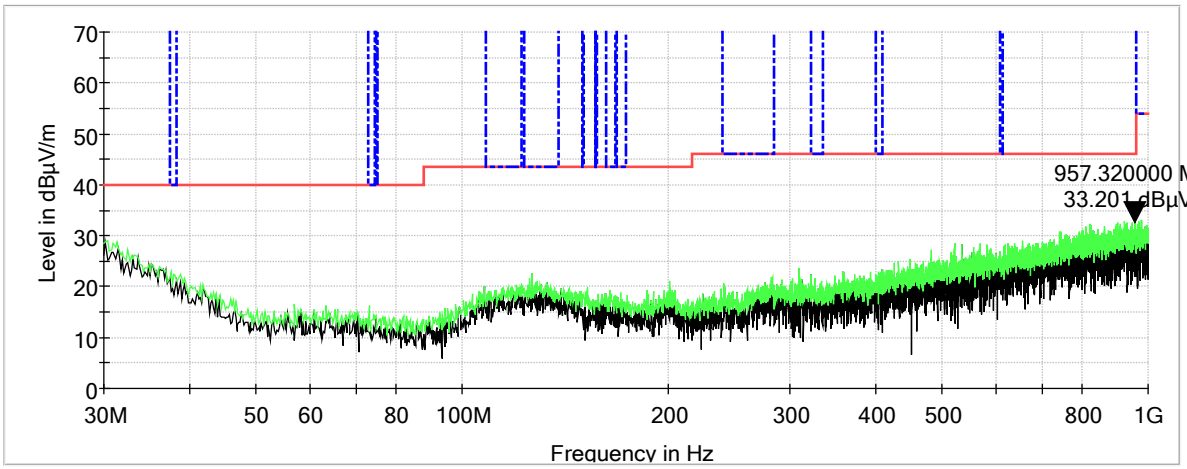
Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Horizontal, Low Channel



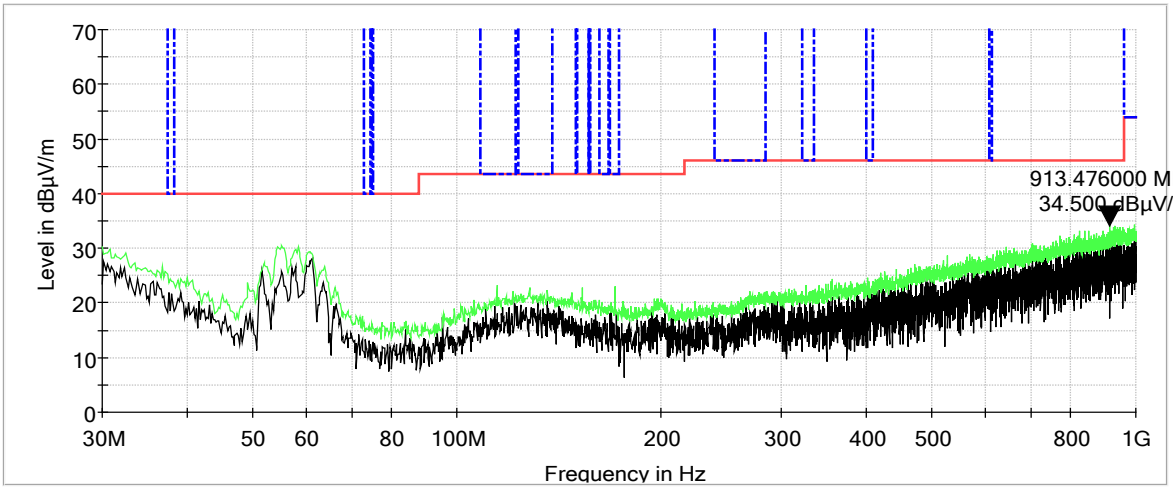
Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Vertical, Mid Channel



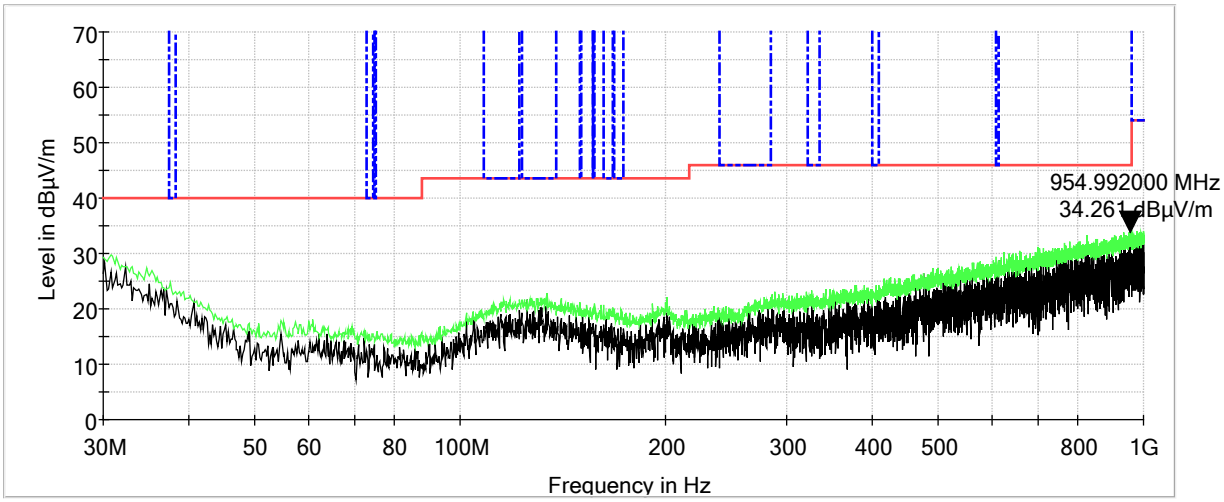
Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Horizontal, Mid Channel



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

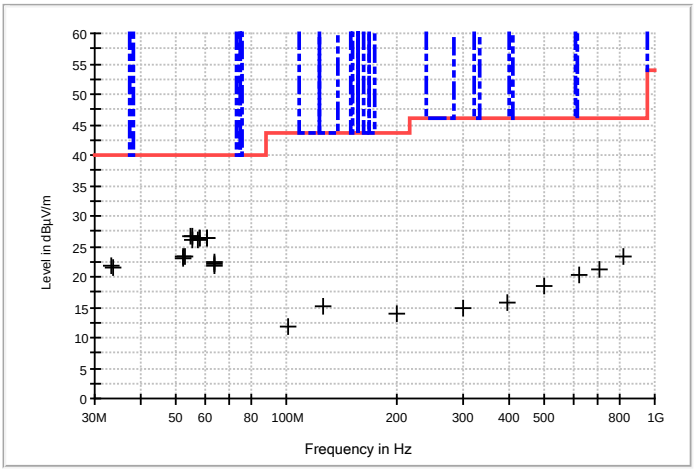


Wi-Fi, 2.4 GHz - CCK: 30 MHz to 1000 MHz, Horizontal, High Channel

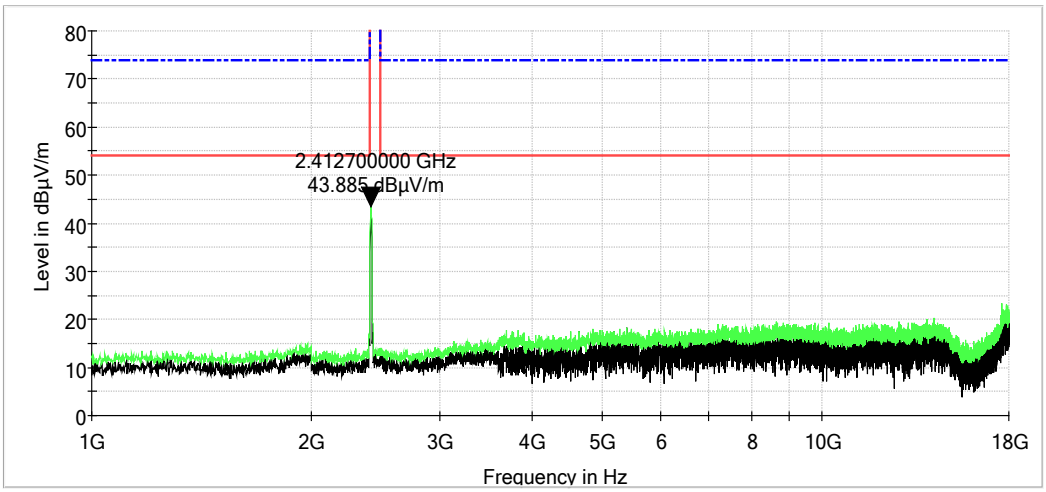


Wi-Fi, 2.4 GHz – CCK: Measurements, 30 MHz to 1000 MHz

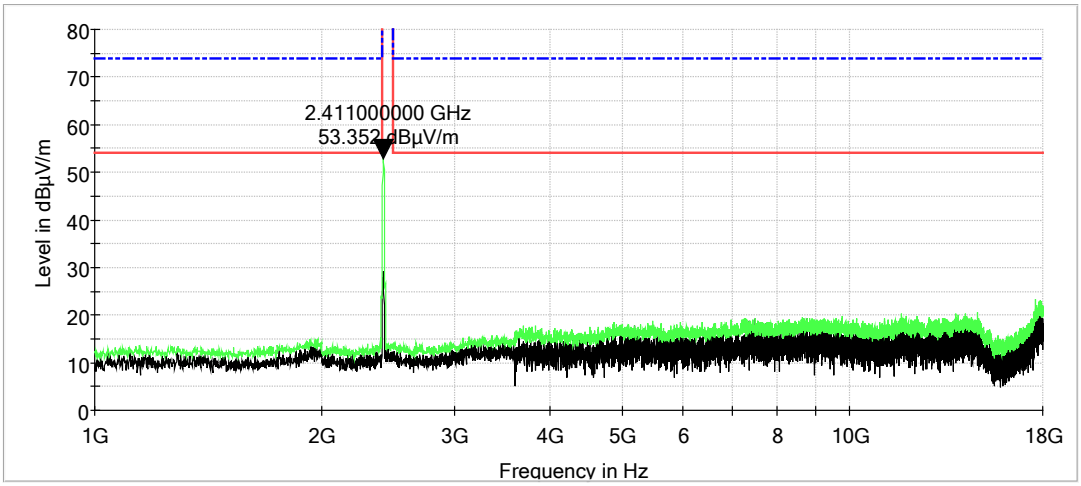
Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dBµV)	Correction Factors (dB)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
33.280000	V	100.00	0.00	17.2	4.6	21.8	40.0	-18.2
33.480000	H	100.00	0.00	17.1	4.4	21.5	40.0	-18.5
51.920000	V	100.00	0.00	30.0	-6.8	23.2	40.0	-16.8
52.120000	V	100.00	0.00	30.3	-6.9	23.4	40.0	-16.6
52.680000	V	100.00	0.00	30.2	-7.0	23.2	40.0	-16.8
54.440000	V	100.00	0.00	33.9	-7.1	26.8	40.0	-13.2
55.240000	V	100.00	0.00	33.3	-7.2	26.1	40.0	-13.9
55.240000	V	100.00	0.00	33.9	-7.2	26.7	40.0	-13.3
57.560000	V	100.00	0.00	33.3	-7.2	26.1	40.0	-13.9
57.760000	V	100.00	0.00	33.4	-7.2	26.2	40.0	-13.8
58.120000	V	100.00	0.00	33.3	-7.1	26.2	40.0	-13.8
60.640000	V	100.00	0.00	33.4	-7.0	26.4	40.0	-13.6
60.640000	V	100.00	0.00	33.2	-7.0	26.2	40.0	-13.8
63.560000	V	100.00	0.00	28.9	-6.7	22.2	40.0	-17.8
63.760000	V	100.00	0.00	29.2	-6.7	22.5	40.0	-17.5
63.760000	V	100.00	0.00	28.4	-6.7	21.7	40.0	-18.3
101.000000	H	100.00	0.00	15.5	-3.7	11.8	43.5	-31.7
125.240000	V	100.00	0.00	14.9	0.2	15.1	43.5	-28.4
198.600000	V	100.00	0.00	14.0	-0.2	13.8	43.5	-29.7
301.000000	H	100.00	0.00	13.5	1.5	15.0	46.0	-31.0
399.200000	V	100.00	0.00	11.9	3.9	15.8	46.0	-30.2
500.640000	H	100.00	0.00	11.8	6.6	18.4	46.0	-27.6
622.280000	V	100.00	0.00	11.8	8.4	20.2	46.0	-25.8
710.160000	H	100.00	0.00	11.4	9.7	21.1	46.0	-24.9
824.800000	V	100.00	0.00	11.7	11.6	23.3	46.0	-22.7



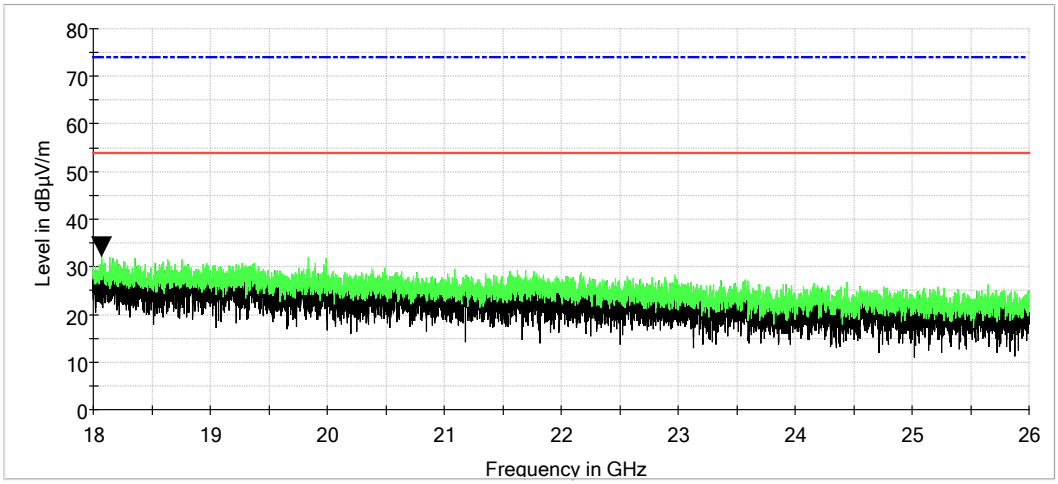
Wi-Fi, 2.4 GHz - CCK: 1 GHz to 18 GHz, Vertical



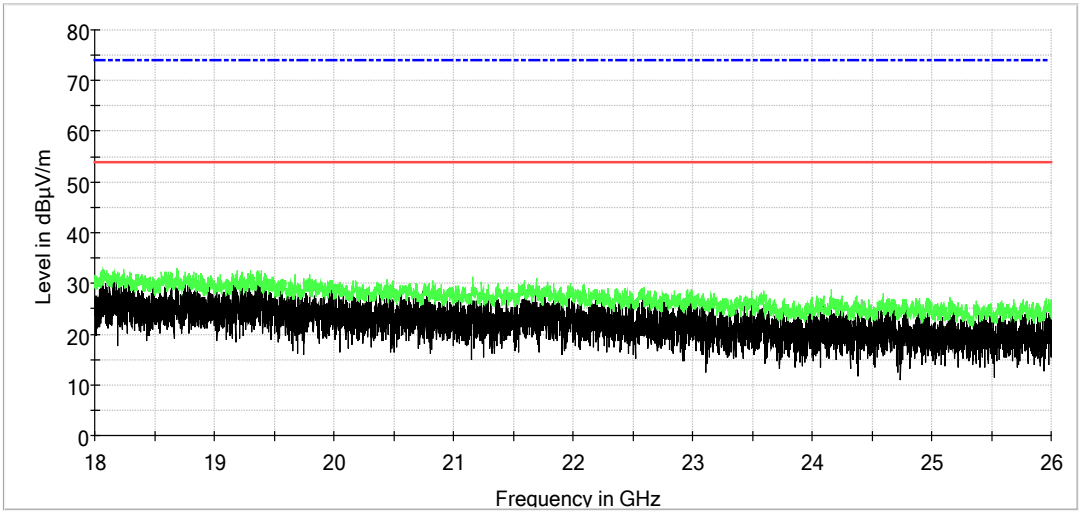
Wi-Fi, 2.4 GHz - CCK: 1 GHz to 18 GHz, Horizontal



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



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



12 PEAK POWER SPECTRAL DENSITY (PSD)

Peak power spectral density measurements were performed.

12.1 Requirements:

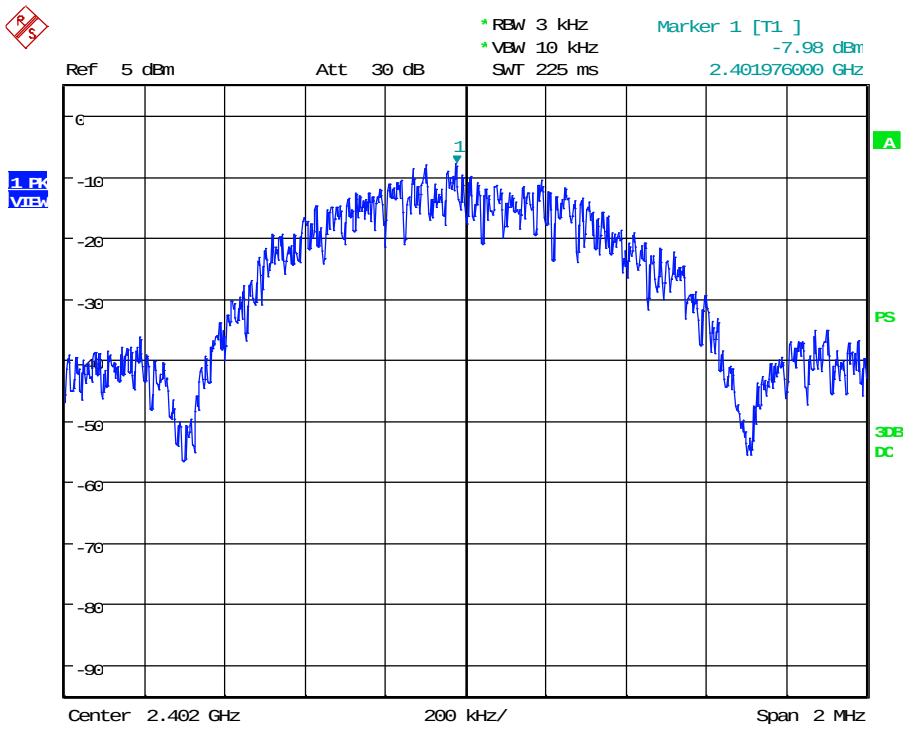
The peak power spectral density shall not exceed +8dBm in any 3 kHz band during any time interval of continuous transmission.

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

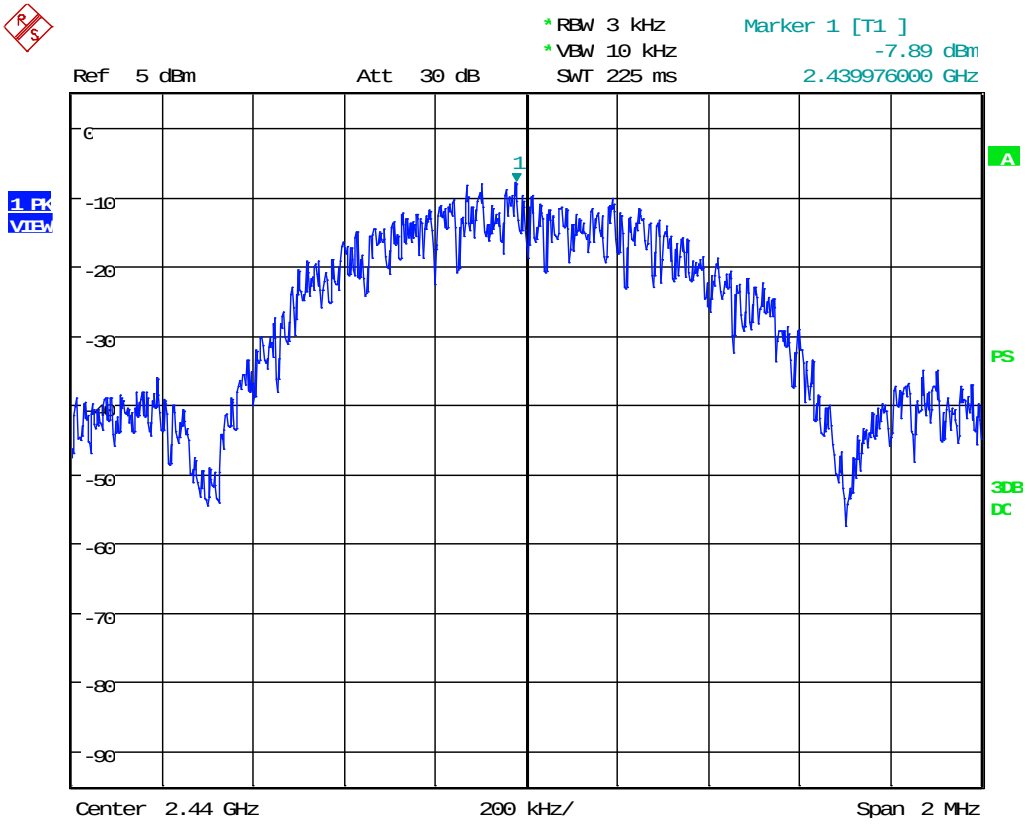
Test Date(s):	2020-04-20	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(e); KDB558074 v05r02	**Air Temperature:**	20.8 ºC
		Relative Humidity:	32%

Bluetooth: Low Channel



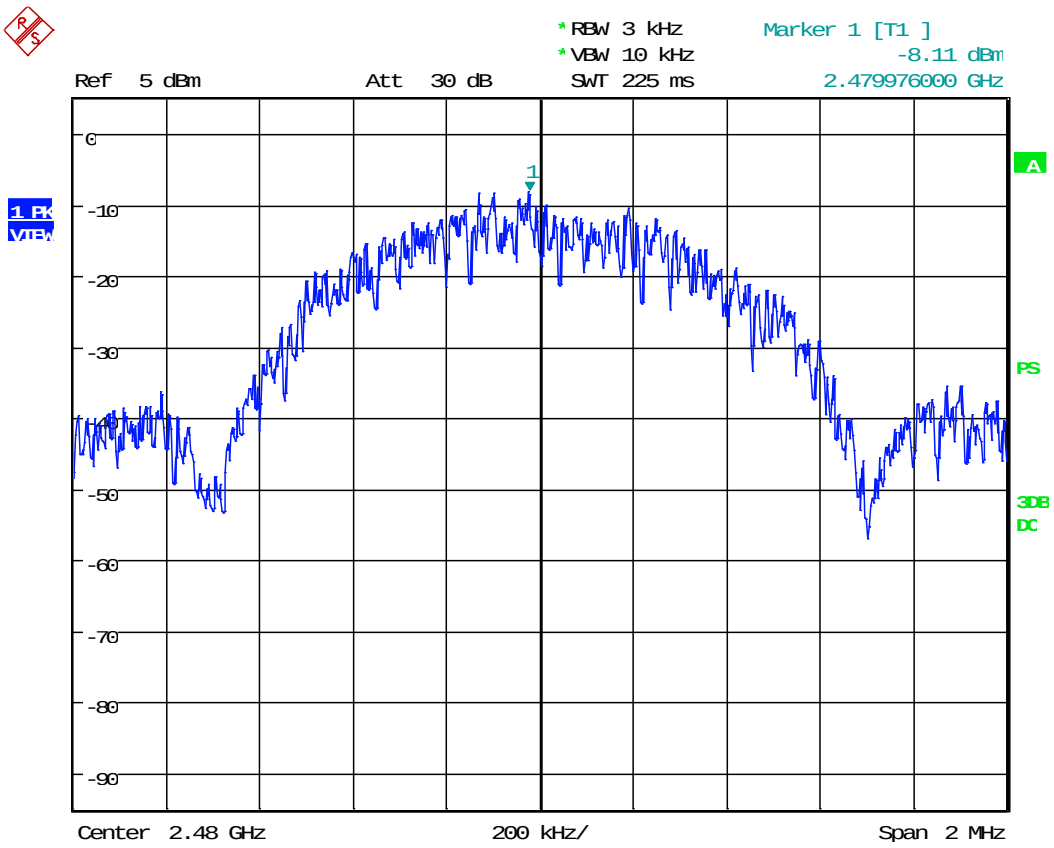
Date: 14.APR.2020 10:08:15

Bluetooth: Mid Channel



Date: 14.APR.2020 10:09:24

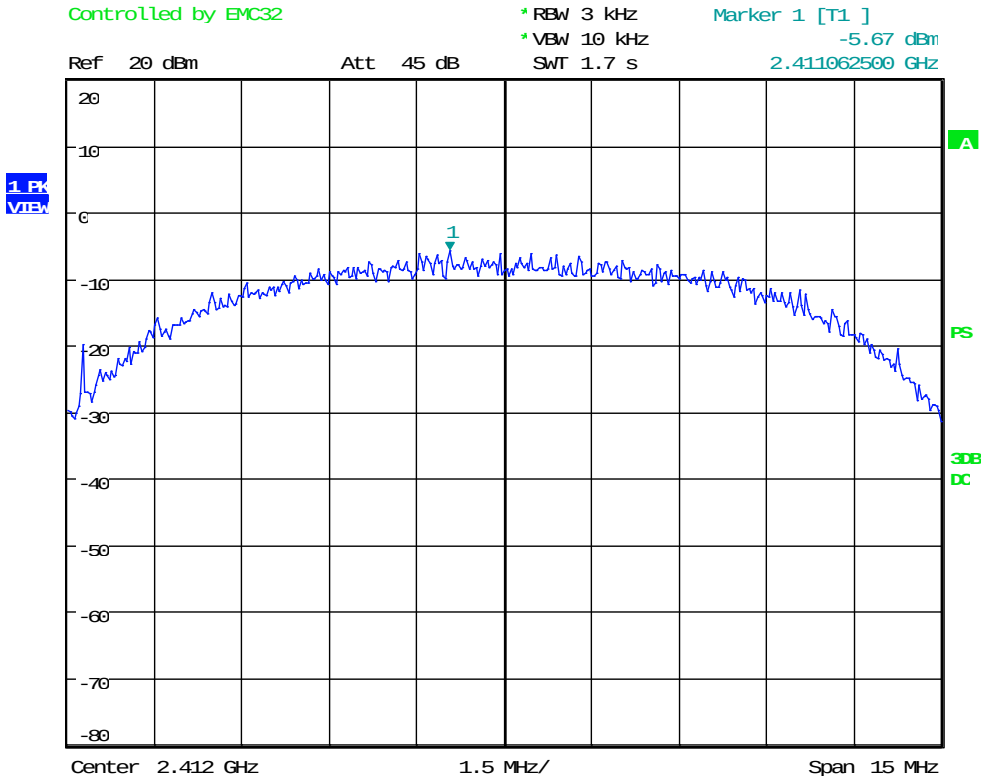
Bluetooth: High Channel



Date: 14.APR.2020 10:10:19

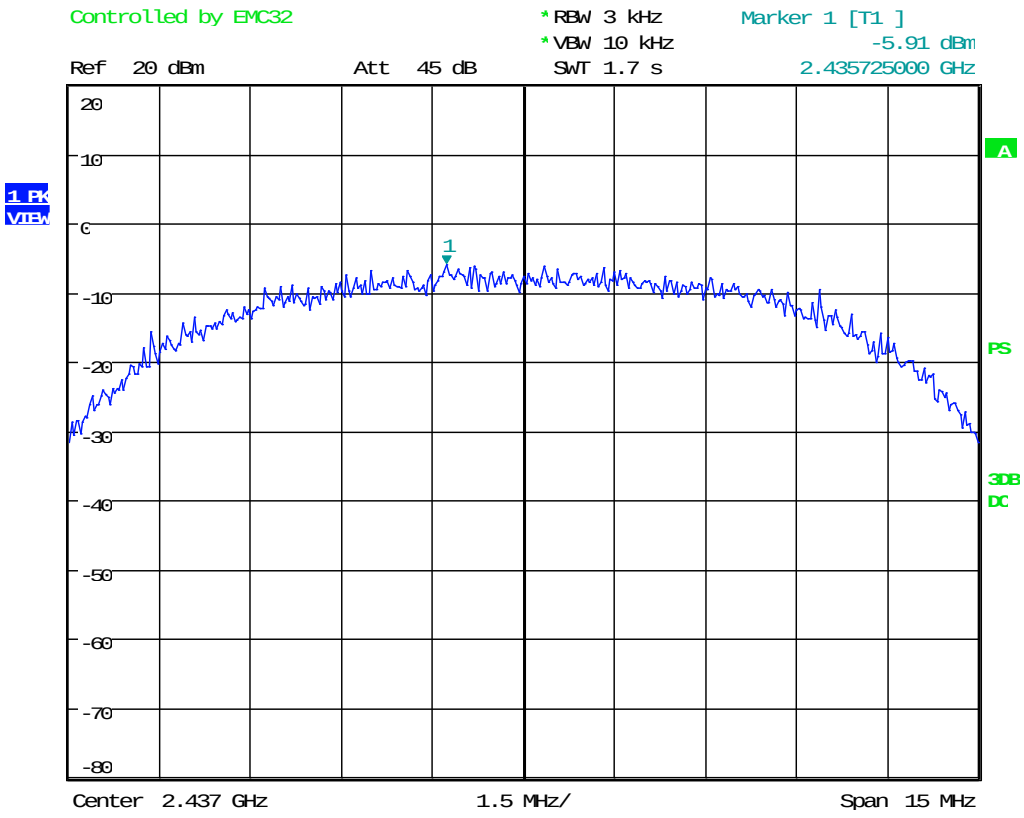
Test Date(s):	2020-04-13	**Test Engineer:**	J. Chiller
Standards:	CFR 47 Part 15.247(e); KDB558074	**Air Temperature:**	22.6 ºC
		Relative Humidity:	34%

Wi-Fi, 2.4 GHz - CCK: Low Channel



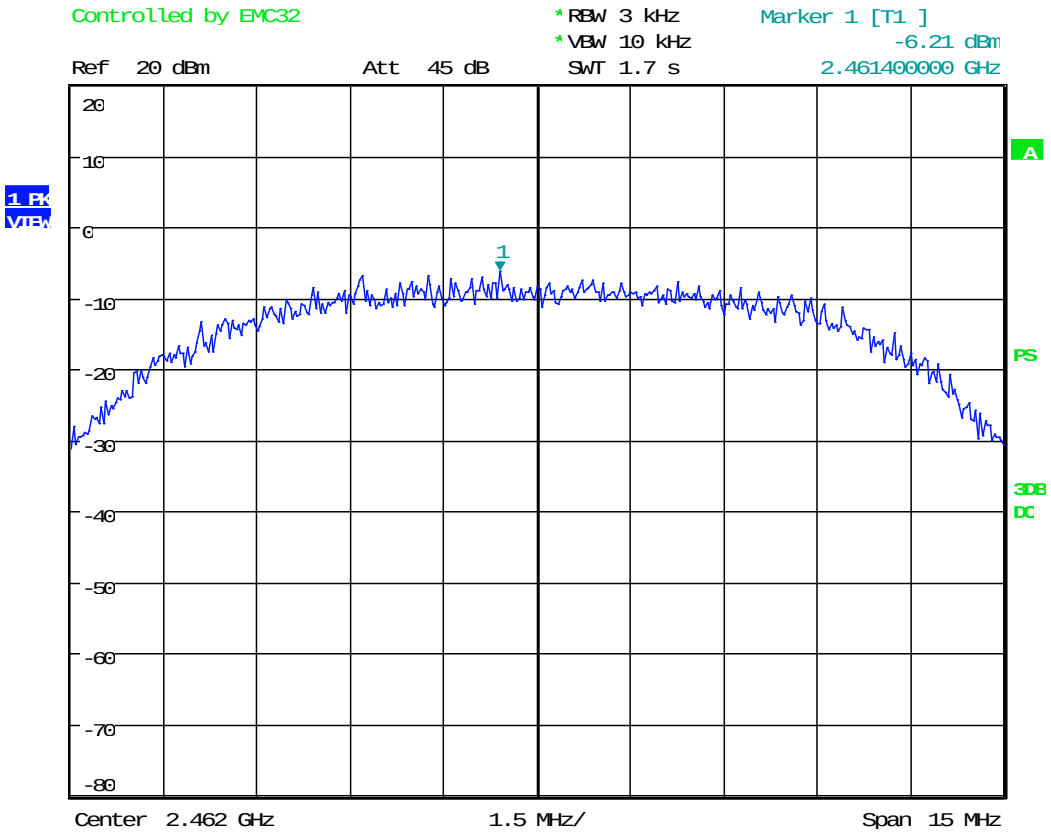
Date: 13.APR.2020 11:08:38

Wi-Fi, 2.4 GHz - CCK: Mid Channel



Date: 13.APR.2020 11:06:48

Wi-Fi, 2.4 GHz - CCK: High Channel



Date: 13.APR.2020 11:10:01

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 μH/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.

	Conducted Limit (dBμV)	
Frequency of Emission (MHz)	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

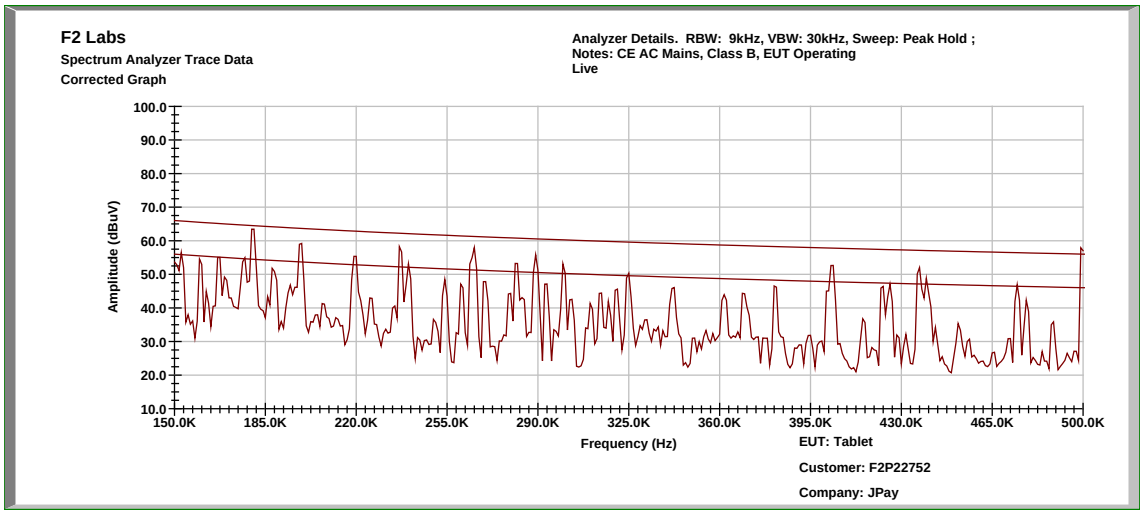
The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power 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 reference plots were taken with a peak detector with the trace set on Max Hold. 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. The battery was discharged to 50% before testing.

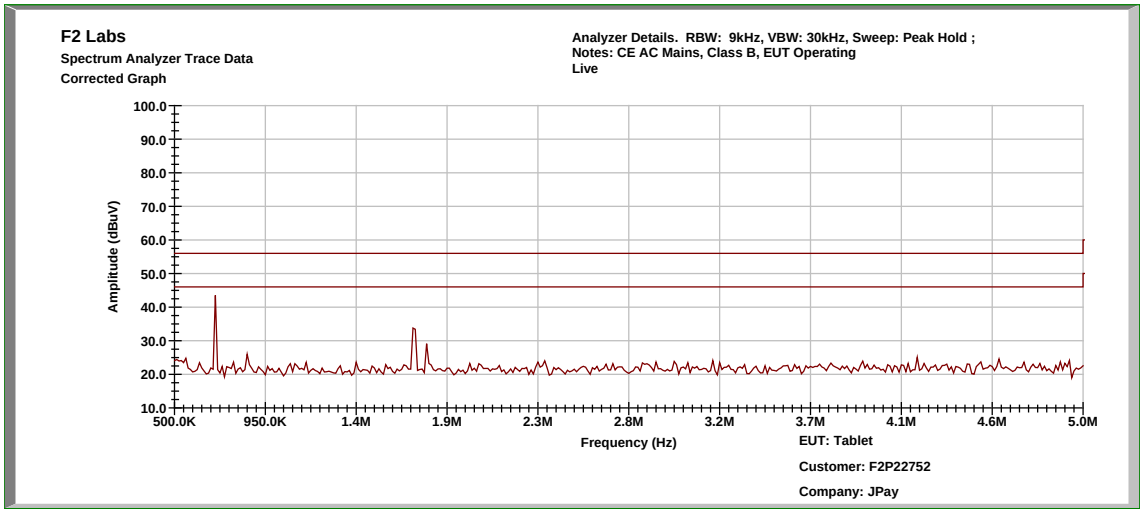
13.3 Conducted Emissions Test Data

Test Date(s):	Apr. 14, 2020	**Test Engineer:**	J. Chiller
Rule:	15.207	**Air Temperature:**	20.8º C
Test Results:	Pass	**Relative Humidity:**	32%

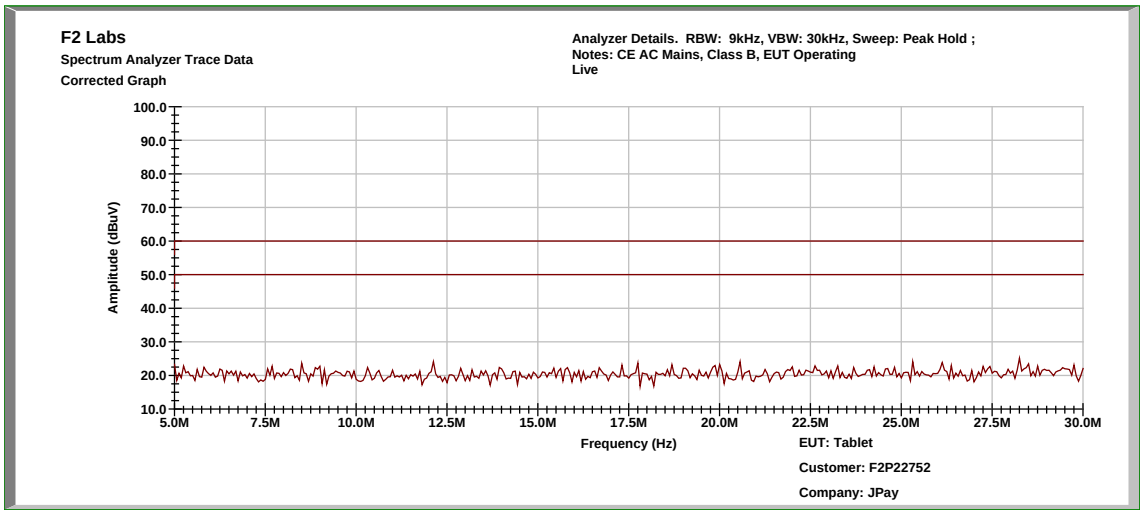
Conducted Test – Live 1: 0.15 MHz to 0.5 MHz



Conducted Test – Live 1: 0.5 MHz to 5.0 MHz

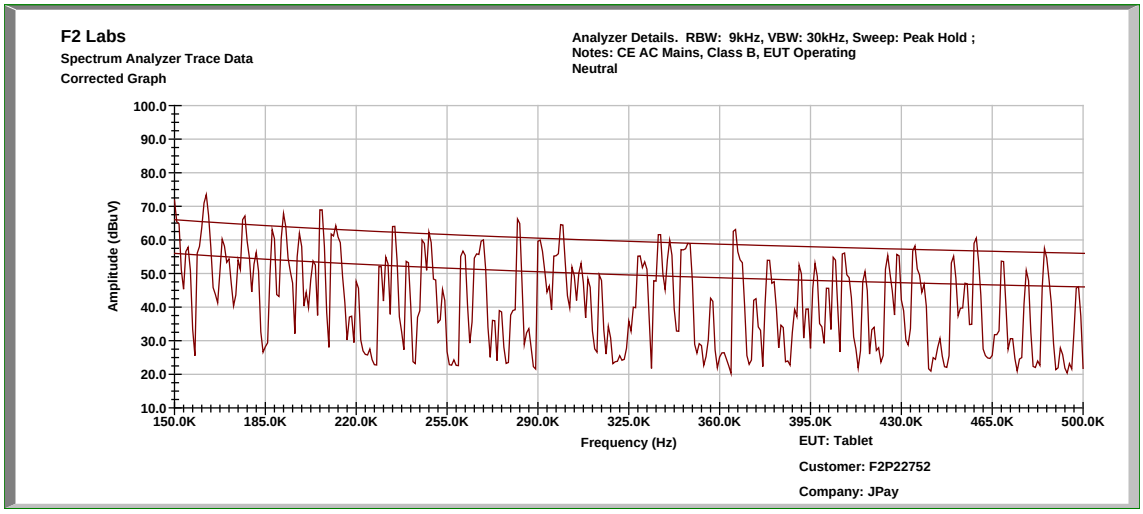


Conducted Test – Live 1: 5.0 MHz to 30.0 MHz

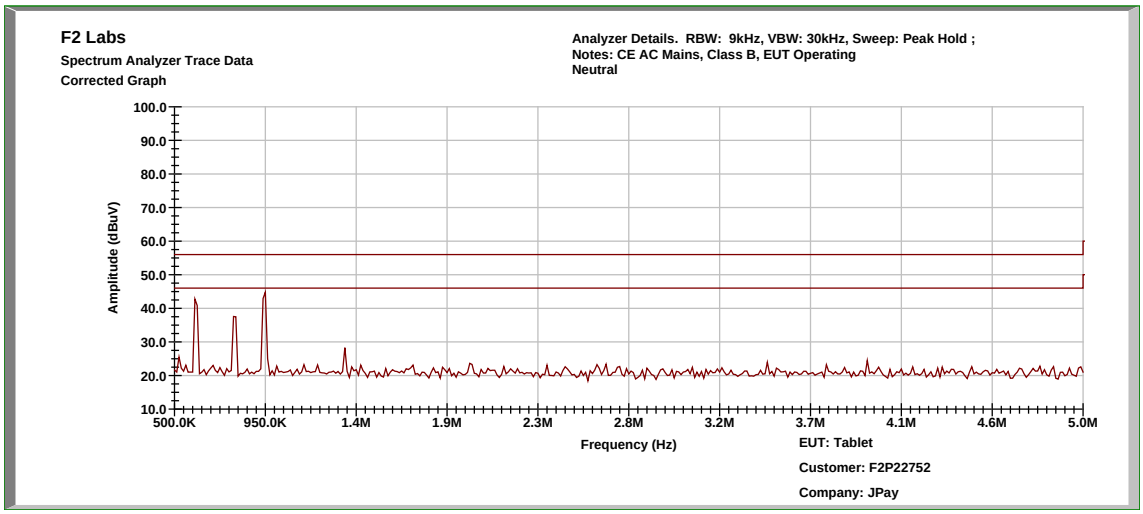


Top Discrete Measurements								
No.	**Conductor**	**Frequency (MHz)**	**Detector**	**Level (dBµV)**	**Adjustment (dB)**	**Results (dBµV)**	**Limit (dBµV)**	**Margin (dB)**
1	Live	0.152	Quasi-Peak	34.87	11.118	45.99	65.857	-19.9
			Average	9.36	11.118	20.48	55.857	-35.4
2	Live	0.180625	Quasi-Peak	41.68	10.883	52.56	64.458	-11.9
			Average	5.59	10.883	16.47	54.458	-38.0
3	Live	0.236625	Quasi-Peak	40.40	10.486	50.89	62.214	-11.3
			Average	3.92	10.486	14.41	52.214	-37.8
4	Live	0.2655	Quasi-Peak	36.71	10.384	47.09	61.257	-14.2
			Average	6.79	10.384	17.17	51.257	-34.1
5	Live	0.290	Quasi-Peak	40.18	10.36	50.54	60.525	-10.0
			Average	4.07	10.36	14.43	50.525	-36.1
6	Live	0.40375	Quasi-Peak	18.23	10.299	28.53	57.776	-29.2
			Average	2.45	10.299	12.75	47.776	-35.0
7	Live	0.437	Quasi-Peak	15.70	10.285	25.99	57.119	-31.1
			Average	2.33	10.285	12.62	47.119	-34.5
8	Live	0.702	Quasi-Peak	8.74	10.159	18.90	56.0	-37.1
			Average	1.59	10.159	11.75	46.0	-34.3

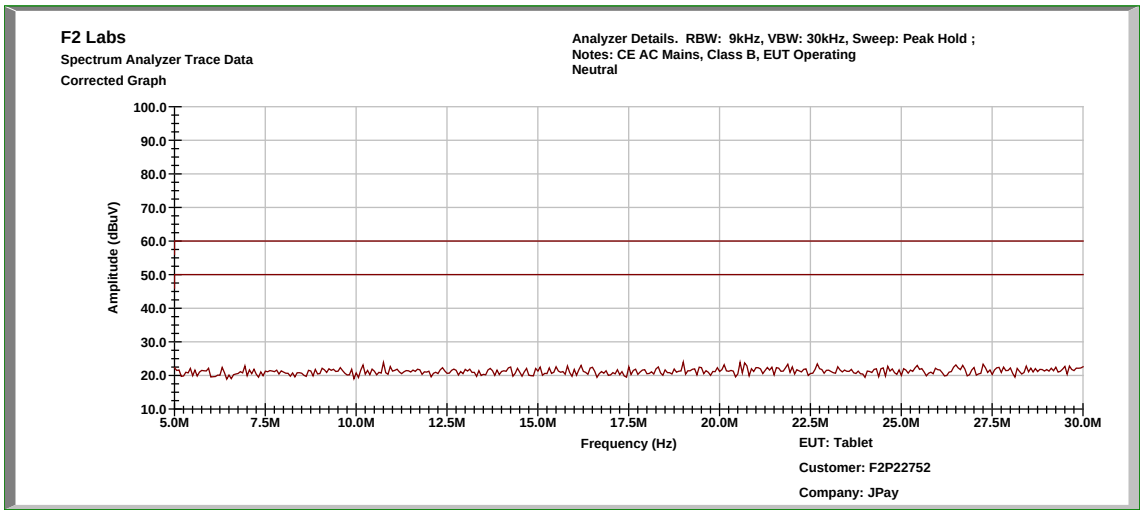
Conducted Test – Neutral: 0.15 MHz to 0.5 MHz



Conducted Test – Neutral: 0.5 MHz to 5.0 MHz



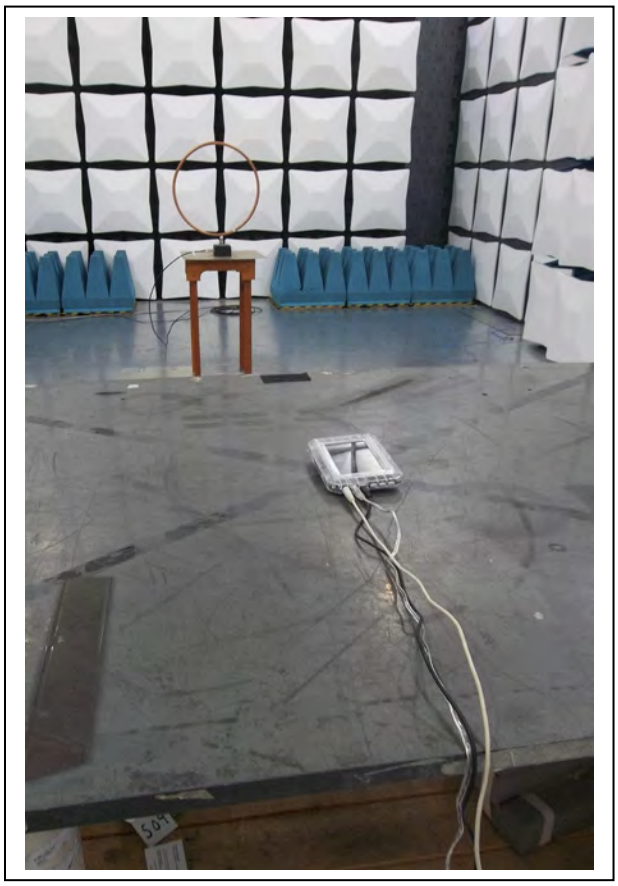
Conducted Test – Neutral: 5.0 MHz to 30.0 MHz



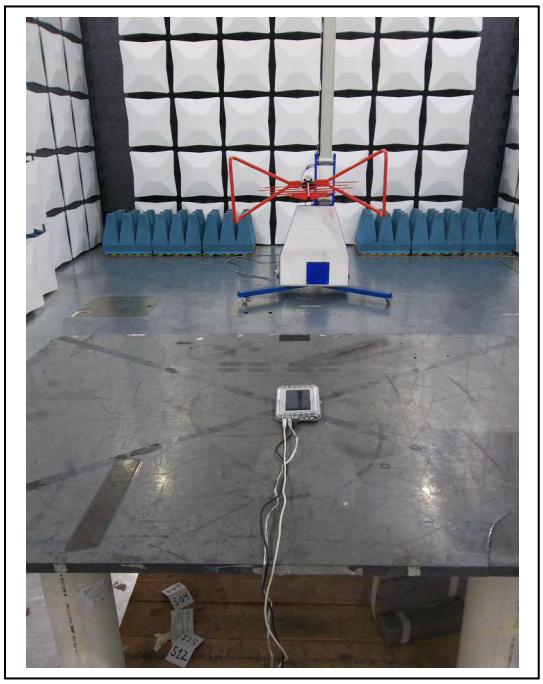
Top Discrete Measurements								
No.	**Conductor**	**Frequency (MHz)**	**Detector**	**Level (dBµV)**	**Adjustment (dB)**	**Results (dBµV)**	**Limit (dBµV)**	**Margin (dB)**
1	Neutral	0.16225	Quasi-Peak	45.54	11.00	56.54	65.349	-8.8
			Average	4.08	11.00	15.08	55.349	-40.3
2	Neutral	0.206	Quasi-Peak	36.40	10.583	46.98	63.366	-16.4
			Average	5.62	10.583	16.20	53.366	-37.2
3	Neutral	0.282125	Quasi-Peak	16.50	10.208	26.71	60.754	-34.0
			Average	3.60	10.208	13.81	50.754	-36.9
4	Neutral	0.299	Quasi-Peak	19.22	10.19	29.41	60.254	-30.8
			Average	1.92	10.19	12.11	50.254	-38.1
5	Neutral	0.366	Quasi-Peak	18.48	10.144	28.62	58.589	-30.0
			Average	-2.84	10.144	7.30	48.589	-41.3
6	Neutral	0.458	Quasi-Peak	13.27	10.091	23.36	56.729	-33.4
			Average	2.20	10.091	12.29	46.729	-34.4
7	Neutral	0.601	Quasi-Peak	25.29	10.02	35.31	56.0	-20.7
			Average	-6.35	10.02	3.67	46.0	-42.3
8	Neutral	0.950	Quasi-Peak	17.71	9.99	27.70	56.0	-28.3
			Average	-3.65	9.99	6.34	46.0	-39.7

14 PHOTOGRAPHS

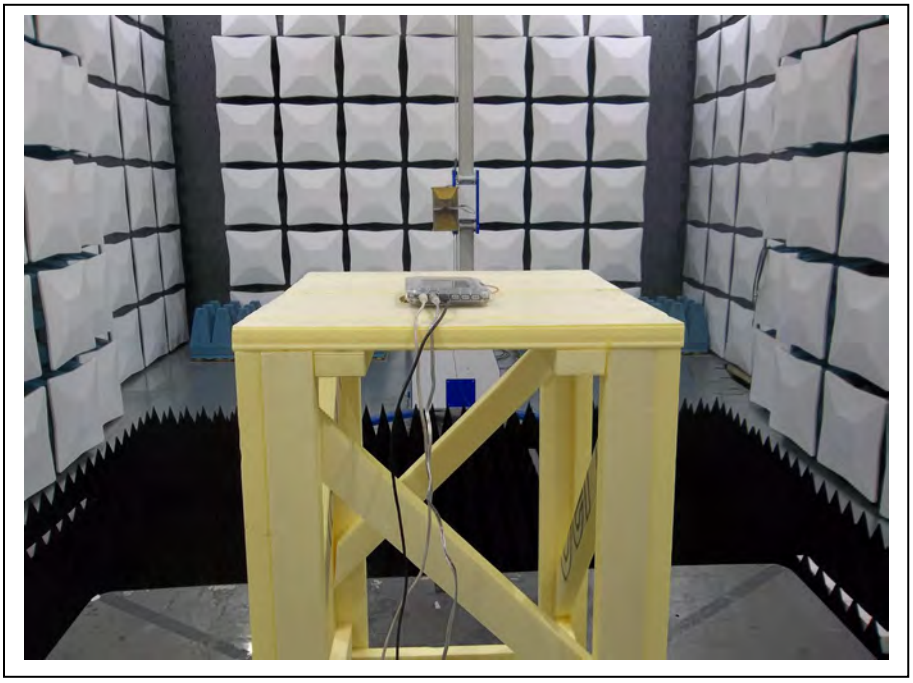
Radiated Spurious Emissions, Less Than 30 MHz



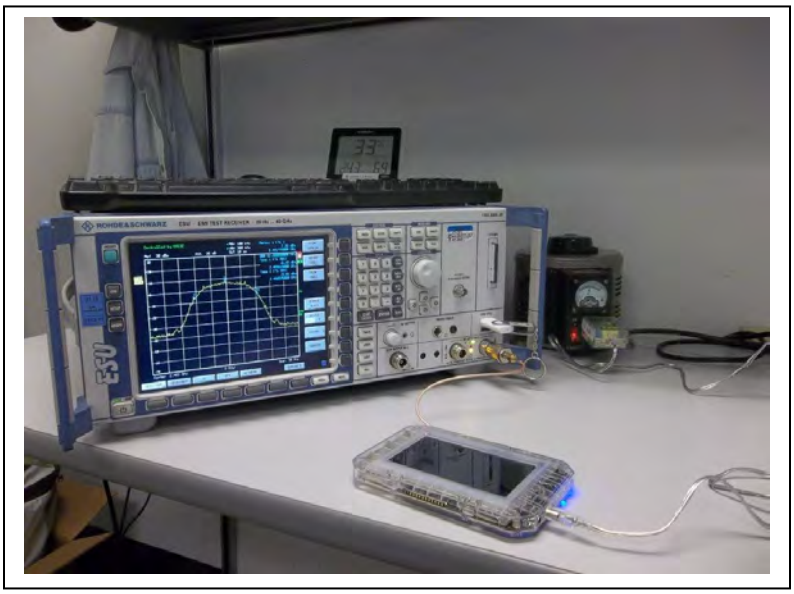
Radiated Spurious Emissions, 30 MHz to 1000 MHz



Radiated Spurious Emissions above 1 GHz



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



Conducted Emissions