

TEST REPORT

Report Number: 20070829HKG-002

Application for Original Grant of 47 CFR Part 15 Certification

FCC ID: 2AD2W-LOWSC710SWBI

PREPARED AND CHECKED BY:

APPROVED BY:

Signed On File
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Date: August 20, 2020

TEST REPORT

GENERAL INFORMATION

Applicant Name:	C&A Marketing Inc.
Applicant Address:	114 Tived Lane East, Edison, New Jersey, 08837, United States.
FCC Specification Standard:	FCC Part 15, October 1, 2019 Edition
FCC ID:	2AD2W-LOWSC710SWBI
FCC Model(s):	LOWSC710SWBI
Type of EUT:	Spread Spectrum Transmitter
Description of EUT:	Wifi Weather Station
Serial Number:	N/A
Sample Receipt Date:	July 18, 2020
Date of Test:	July 18, 2020 to August 20, 2020
Report Date:	August 20, 2020
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as after modification complied with the 47 CFR Part 15 Certification.

TEST REPORT

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EXHIBIT 1 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.1 Summary of Test Results

TEST ITEMS	FCC PART 15 SECTION	RESULTS	DETAILS SEE SECTION
Antenna Requirement	15.203	Pass	2.1
Max. Conducted Output Power (Peak)	15.247(b)(3)&(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	Pass	4.2
Max. Power Density (average)	15.247(e)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	Pass	4.7

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2019 Edition

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EXHIBIT 2 GENERAL DESCRIPTION

2.0 GENERAL DESCRIPTION

2.1 Product Description

The Equipment Under Test (EUT) is a Wifi Weather Station which can remote monitoring indoor and outdoor temperature and humidity. It contains a WiFi module and a 915MHz receiver. The EUT receive the weather information from the corresponding sensors (915MHz transmitter). Then the temperature and humidity data can be viewed on internet once the EUT is connected to the WiFi server.

This report contains the test data of Wifi portion only.

For 802.11b mode, it operates at frequency range of 2412MHz to 2462MHz with 11 channels. It transmits via direct-sequence spread spectrum (DSSS) modulation. Maximum bit rate can be up to 11Mbps. For 802.11g mode, it operates at frequency range of 2412MHz to 2462MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps. For 802.11n (HT20 with 20MHz bandwidth) mode, it operates at frequency range of 2412MHz to 2462MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7). Maximum bit rate can support up to 65Mbps. For 802.11n (HT40 with 40MHz bandwidth) mode, it operates at frequency range of 2422MHz to 2452MHz with 9 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation (mcs0 to mcs7). Maximum bit rate can support up to 130Mbps.

The antenna(s) used in the EUT is integral, internal.

The circuit description is saved with filename: descri.pdf.

2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No.558074 D01 v05r01 (11-February-2019). All other measurements were made in accordance with the procedures in 47 CFR Part 2.

2.3 Test Facility

The radiated emission test site and antenna port conducted measurement facility used to collect the radiated data and conductive data are at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (WiFi portion).

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EXHIBIT 3 SYSTEM TEST CONFIGURATION

3.0 SYSTEM TEST CONFIGURATION

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by 120VAC.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 Limits.

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3.1 Justification – Cont'd

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.8.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF*. The effective period (Teff) was referred to Exhibit 4.8.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All setting of data rate for 802.11b/g/n(HT20)/n(HT40) of WiFi mode had been considered, and worst case test data are shown on this test report.

3.2 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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3.3 Details of EUT and Description of Accessories

Details of EUT:

- (1) The EUT is powered by 120VAC

Description of Accessories:

An AC adaptor (provided with the unit) was used to power the device. Their description are listed below.

- (1) An AC adaptor (AC Input: 100-240V 50/60Hz / Output: 5VDC 1A
Model: HX075-0501000-AU-001)
(Provided by Client)

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are $\pm 5.3\text{dB}$ and $\pm 0.99\text{dB}$ respectively. The value of the Measurement uncertainty for conducted emission test is $\pm 4.2\text{dB}$.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

TEST REPORT

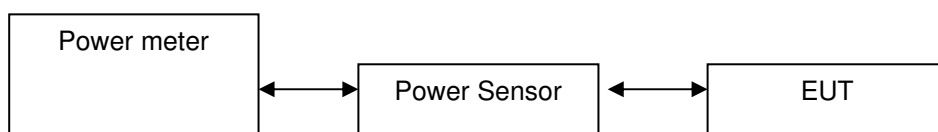
EXHIBIT 4 TEST RESULTS

4.0 TEST RESULTS

4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

RF Conduct Measurement Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



The antenna port of the EUT was connected to the input of a spectrum analyzer.

- ☒ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals. The measurement procedure 9.1.3 was used.
- ☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

IEEE 802.11b (DSSS, 11 Mbps) Antenna Gain = 2 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	20.0	100.0
Middle Channel:	2437	19.6	91.2
High Channel:	2462	19.4	87.1

IEEE 802.11g (OFDM, 54 Mbps) Antenna Gain = 2 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	16.8	47.9
Middle Channel:	2437	16.4	43.7
High Channel:	2462	16.2	41.7

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 2 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	16.5	44.7
Middle Channel:	2437	16.4	43.7
High Channel:	2462	15.8	38.0

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4.1 Maximum Conducted Output Power at Antenna Terminals – Cont'd

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 2 dBi

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2422	16.4	43.7
Middle Channel:	2437	16.2	41.7
High Channel:	2452	15.8	38.0

Cable loss : 0.5 dB External Attenuation : 2 dB

Cable loss, external attenuation: ☒ included in OFFSET function
☐ added to SA raw reading

IEEE 802.11b (DSSS, 1 Mbps)

max. conducted (peak) output level = 20.0 dBm

IEEE 802.11g (OFDM, 9 Mbps)

max. conducted (peak) output level = 16.8 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)

max. conducted (peak) output level = 16.5 dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)

max. conducted (peak) output level = 16.4 dBm

Limits:

☒ 1W (30dBm) for antennas with gains of 6dBi or less

☐ ___W (___dBm) for antennas with gains more than 6dBi

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4.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

IEEE 802.11b (DSSS, 1 Mbps)

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	8.80
Middle Channel: 2437	8.80
High Channel: 2462	8.80

IEEE 802.11g (OFDM, 6 Mbps)

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.64
Middle Channel: 2437	16.60
High Channel: 2462	16.64

IEEE 802.11n (20MHz) (OFDM, MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	17.76
Middle Channel: 2437	17.72
High Channel: 2462	17.76

IEEE 802.11n (40MHz) (OFDM, MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2422	36.00
Middle Channel: 2437	36.00
High Channel: 2452	36.00

Limits

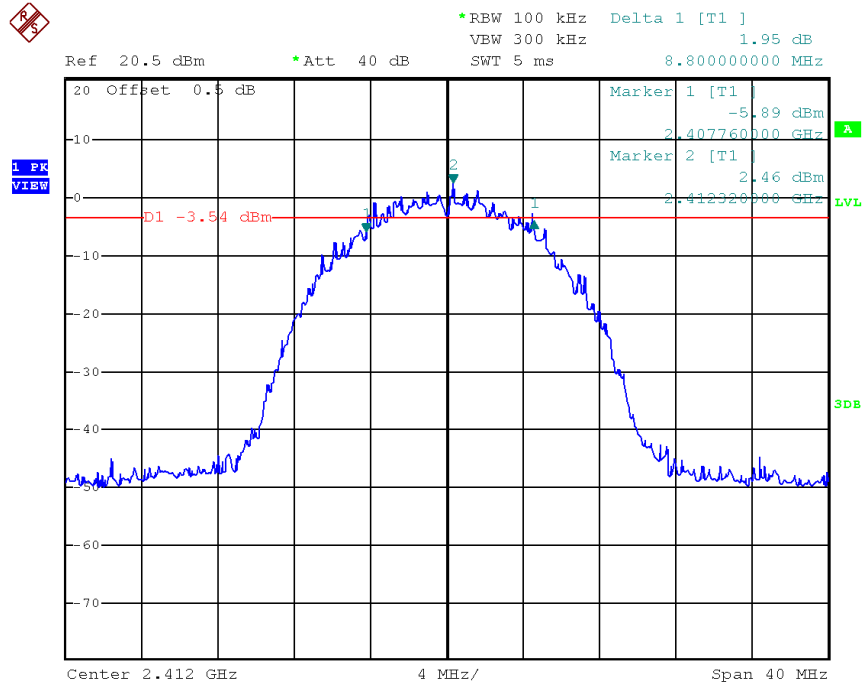
6 dB bandwidth shall be at least 500kHz

The plots of 6dB RF bandwidth are saved as below.

TEST REPORT

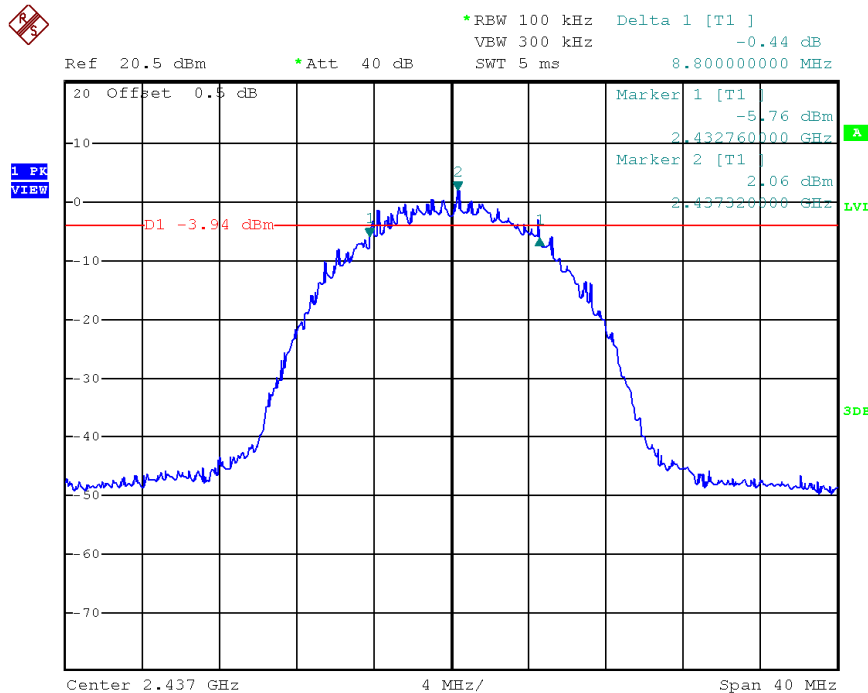
PLOTS OF 6dB RF BANDWIDTH

802.11b, Lowest Channel



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802.11b, Middle Channel

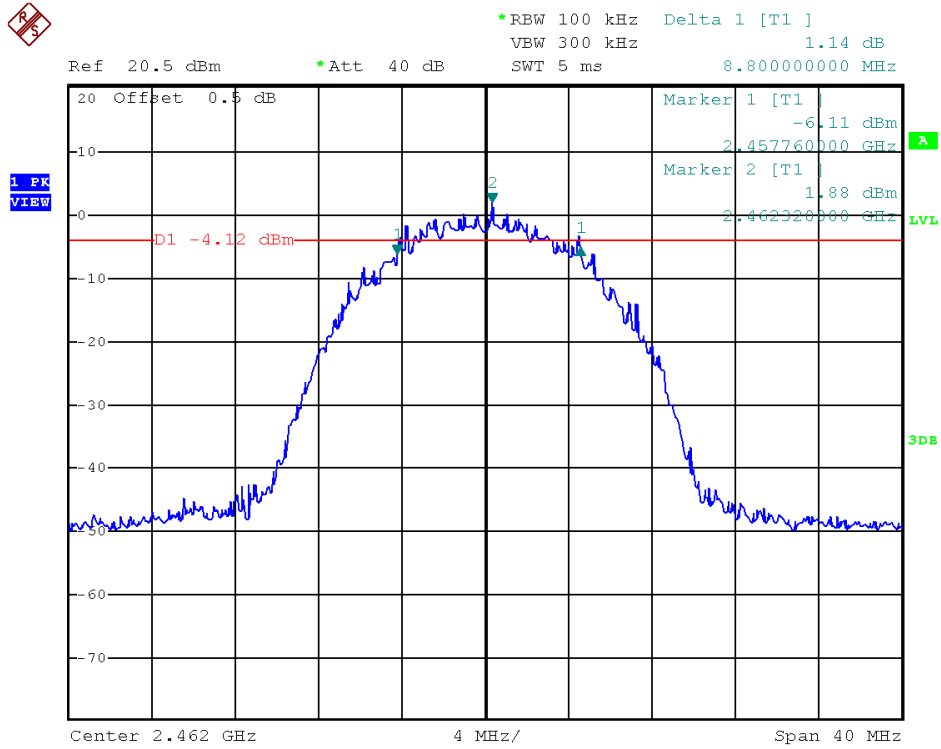


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TEST REPORT

PLOTS OF 6dB RF BANDWIDTH

802.11b, Highest Channel

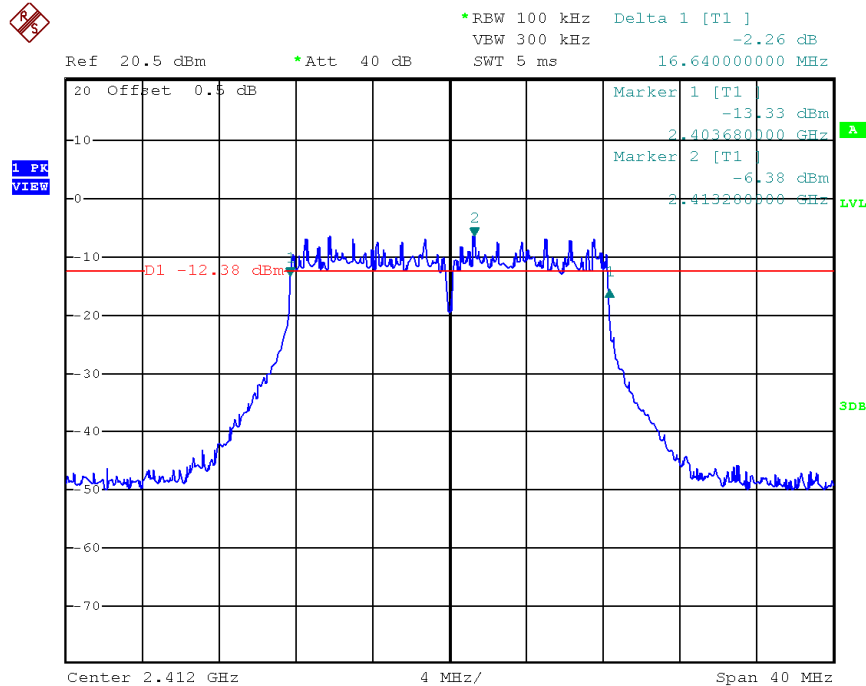


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TEST REPORT

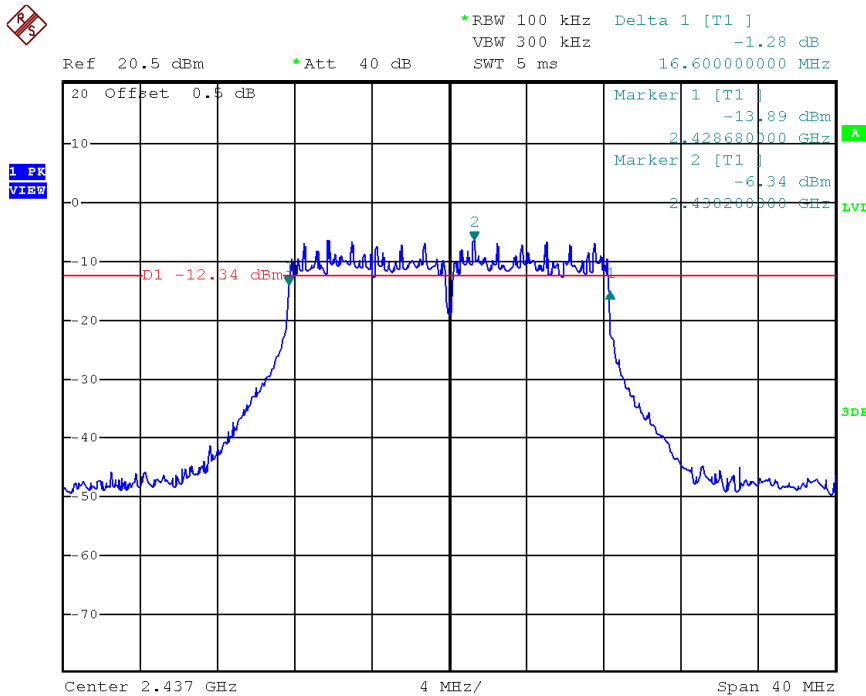
PLOTS OF 6dB RF BANDWIDTH

802.11g, Lowest Channel



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802.11g, Middle Channel

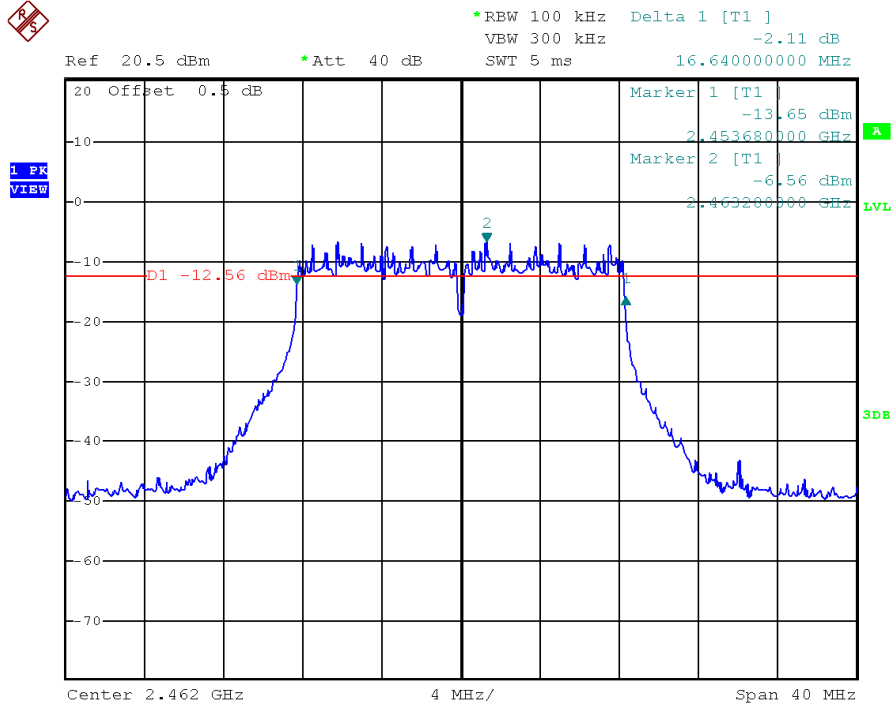


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TEST REPORT

PLOTS OF 6dB RF BANDWIDTH

802.11g, Highest Channel

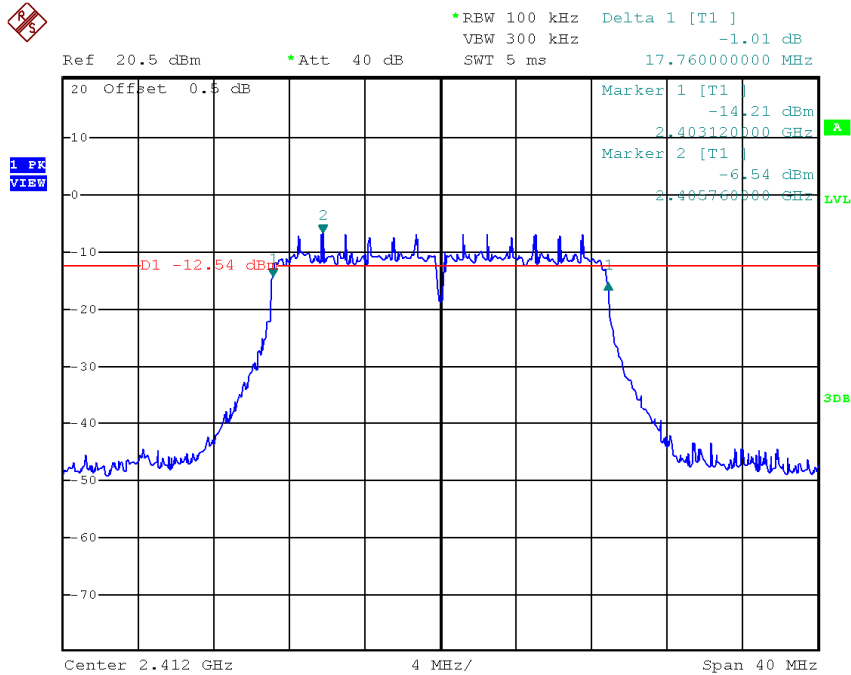


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TEST REPORT

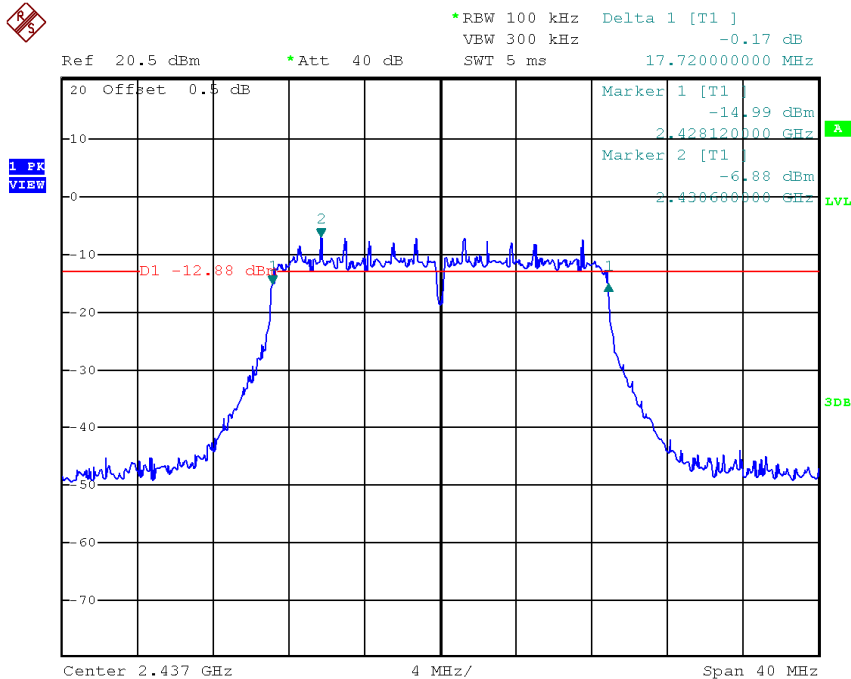
PLOTS OF 6dB RF BANDWIDTH

802.11n (20MHz), Lowest Channel



Date: 29.JUL.2020 15:59:38

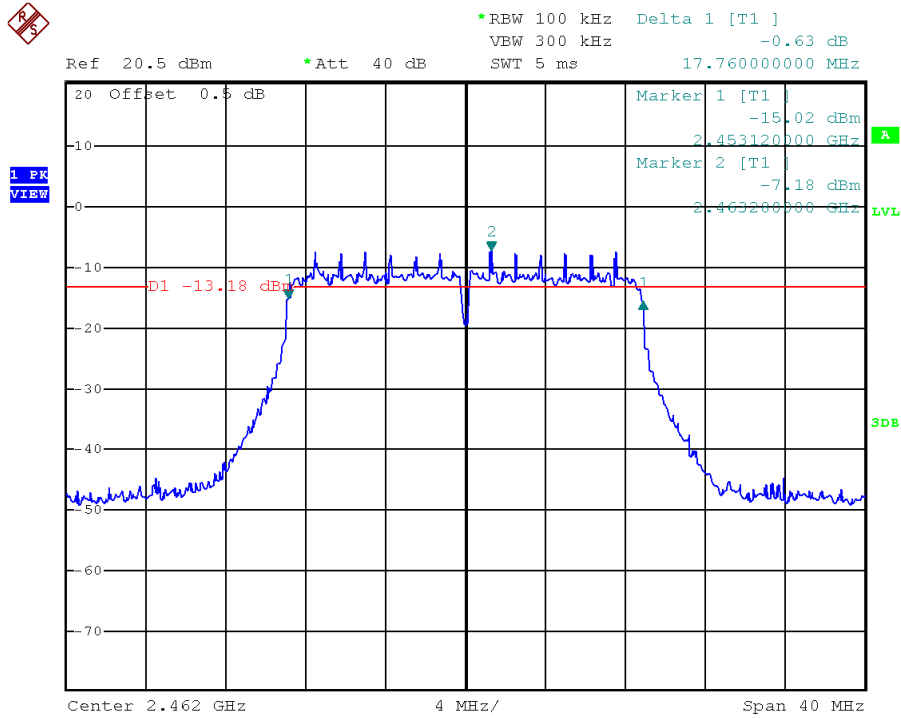
802.11n (20MHz), Middle Channel



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TEST REPORT

PLOTS OF 6dB RF BANDWIDTH
802.11n (20MHz), Highest Channel

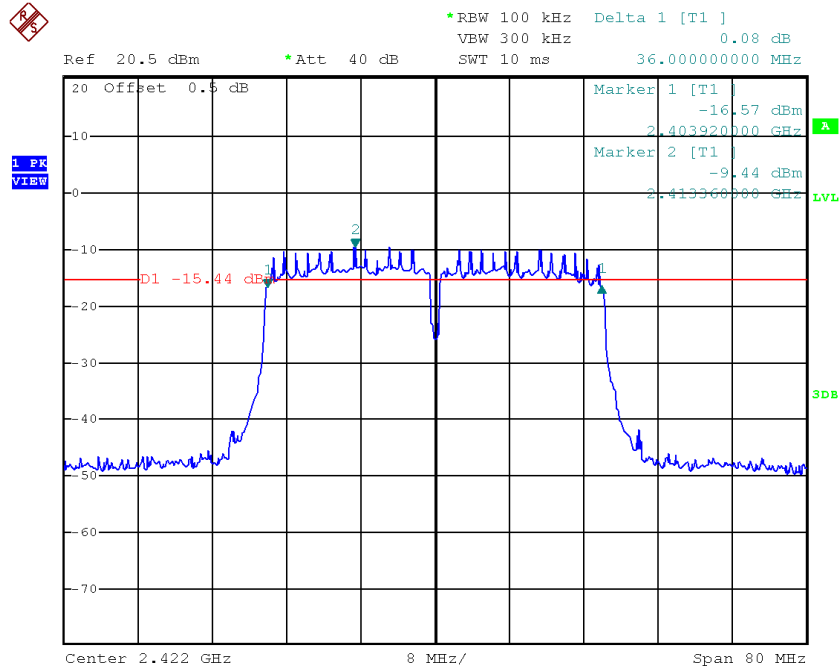


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TEST REPORT

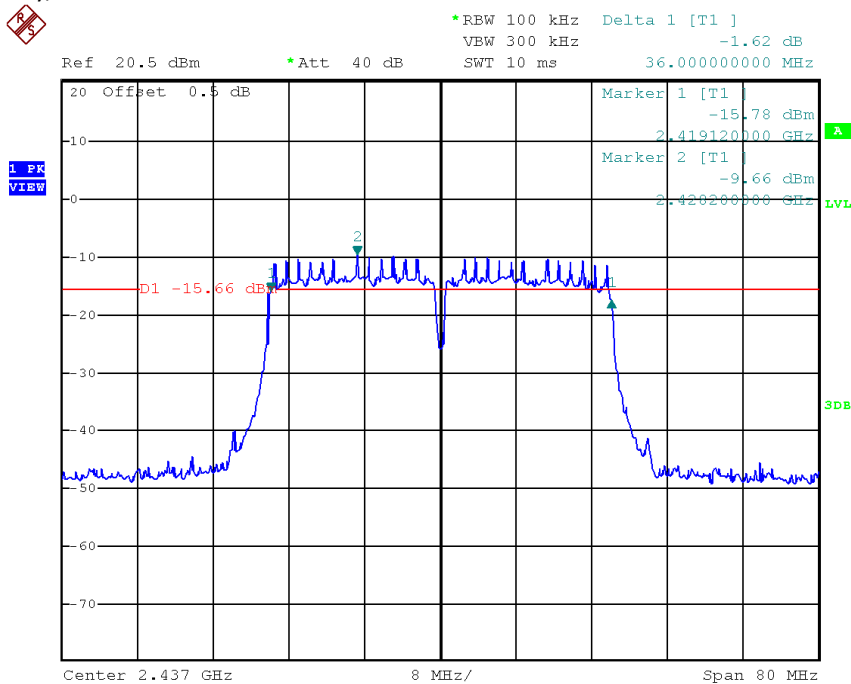
PLOTS OF 6dB RF BANDWIDTH

802.11n (40MHz), Lowest Channel



Date: 29.JUL.2020 16:19:07

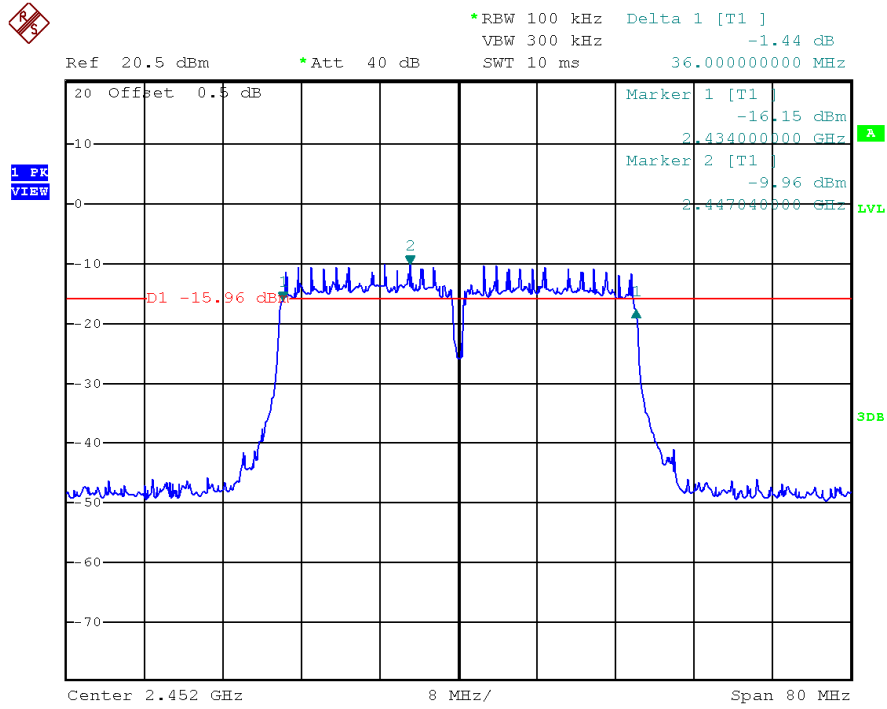
802.11n (40MHz), Middle Channel



Date: 29.JUL.2020 16:12:34

TEST REPORT

PLOTS OF 6dB RF BANDWIDTH
802.11n (40MHz), Highest Channel



Date: 29.JUL.2020 16:14:08

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4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	3.55
Middle Channel:	2437	3.34
High Channel:	2462	2.25

IEEE 802.11g (OFDM, 6 Mbps)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-5.56
Middle Channel:	2437	-5.70
High Channel:	2462	-6.05

IEEE 802.11n (20MHz) (OFDM, MCS0)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-5.88
Middle Channel:	2437	-6.40
High Channel:	2462	-6.62

IEEE 802.11n (40MHz) (OFDM, MCS0)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2422	-9.12
Middle Channel:	2437	-9.34
High Channel:	2452	-9.45

Cable Loss: 0.5 dB

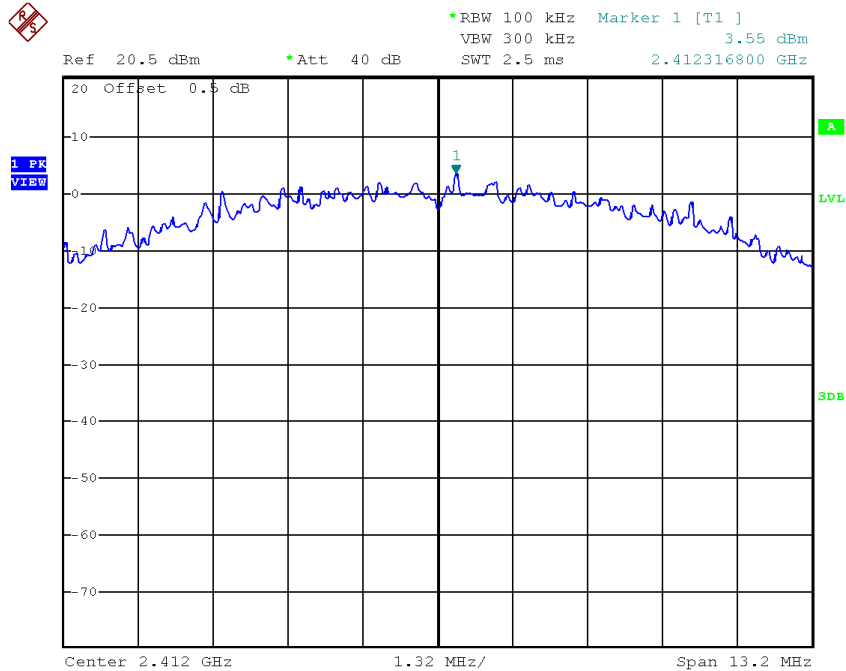
Limit:
8dBm

The plots of power spectral density are as below.

TEST REPORT

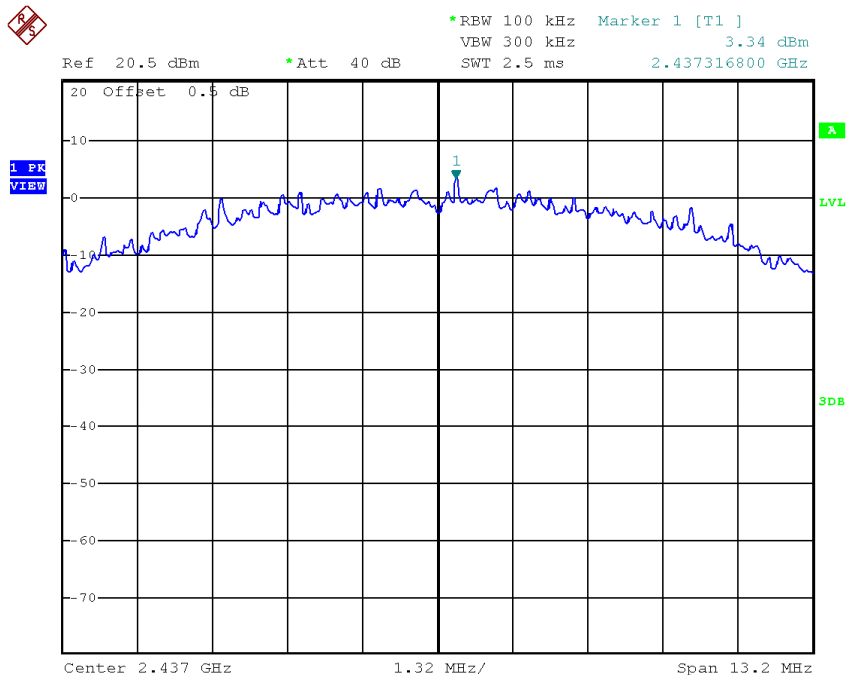
PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

802.11b, Lowest channel



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802.11b, Middle channel

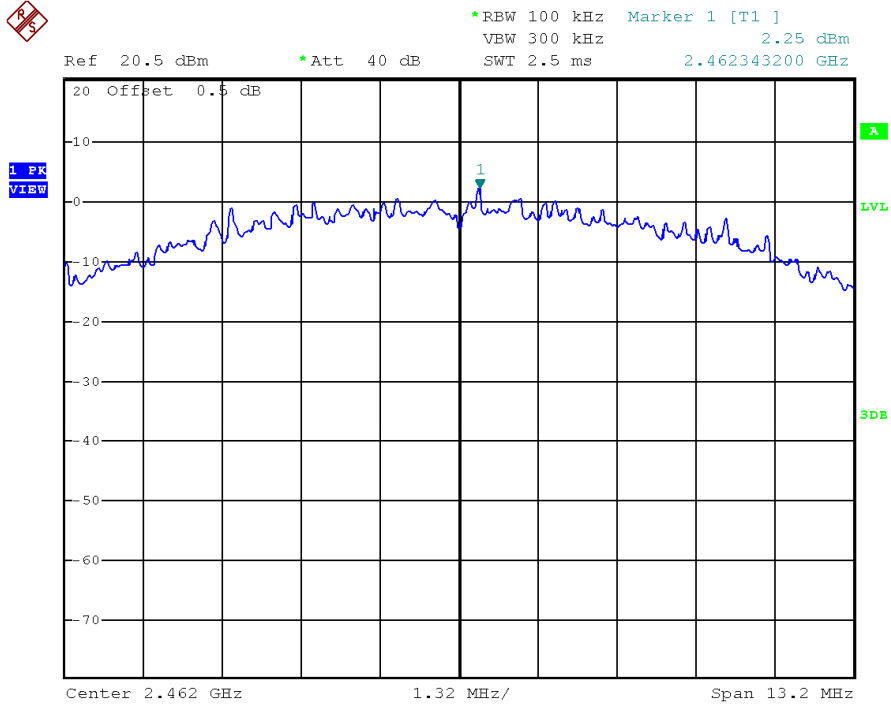


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TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY (3kHz RBW)

802.11b, Highest channel

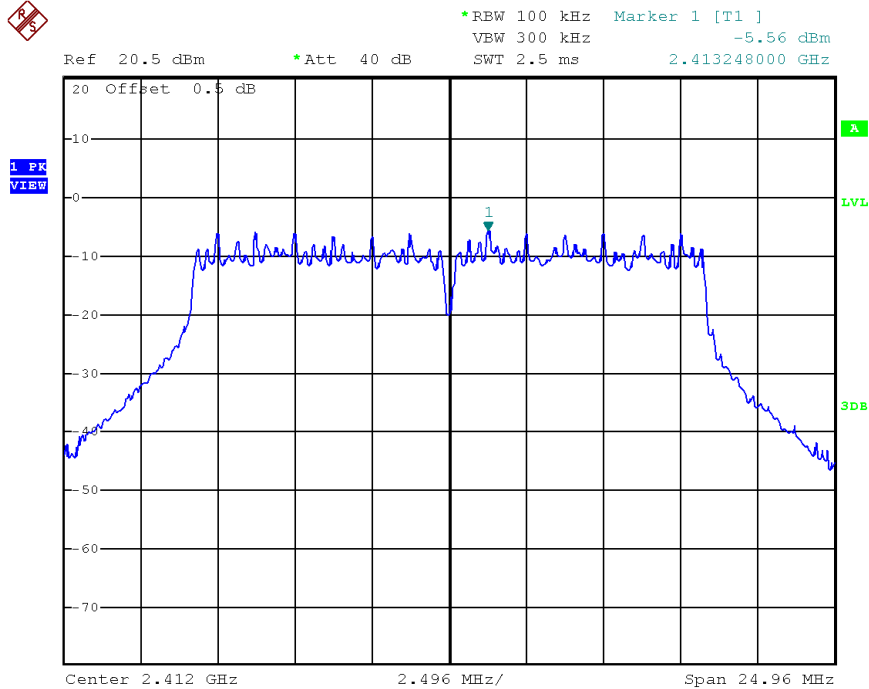


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TEST REPORT

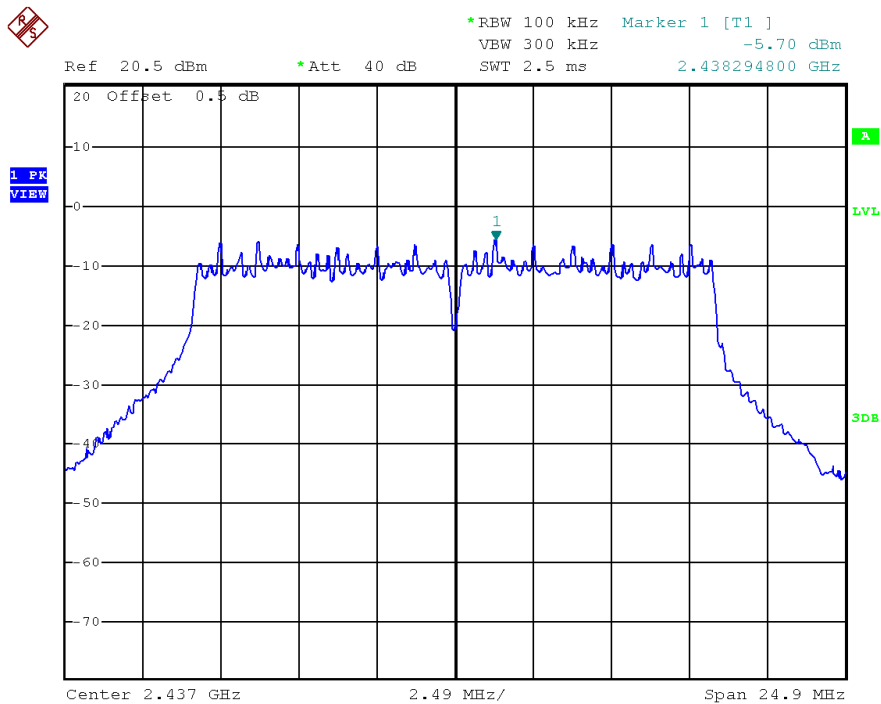
PLOTS OF POWER SPECTRAL DENSITY

802.11g, Lowest channel



Date: 30.JUL.2020 09:32:50

802.11g, Middle channel

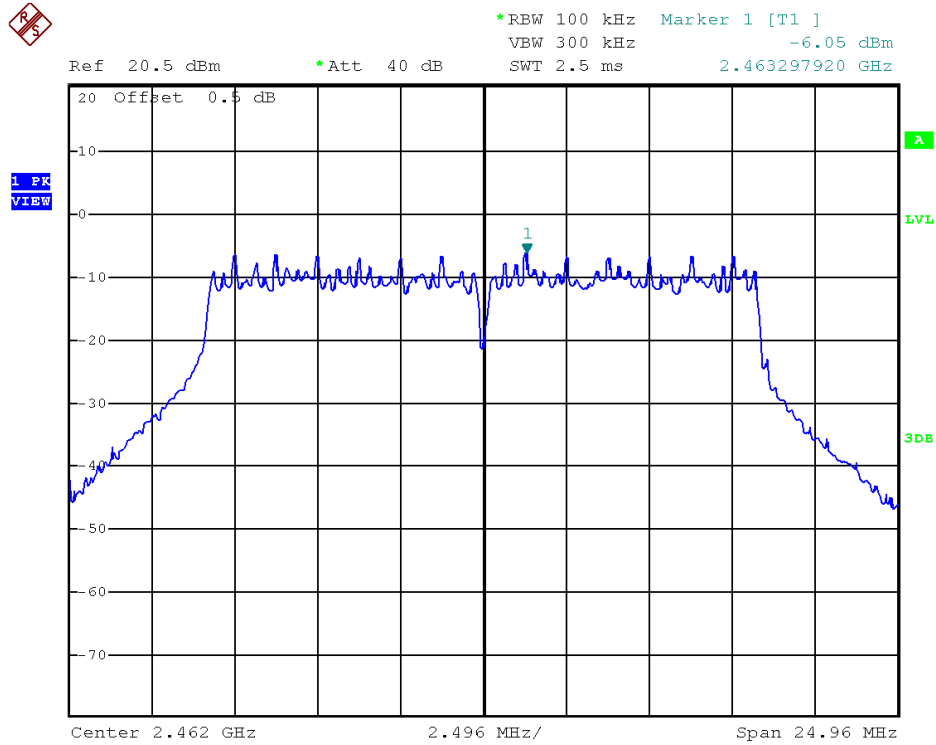


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TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY

802.11g, Highest channel

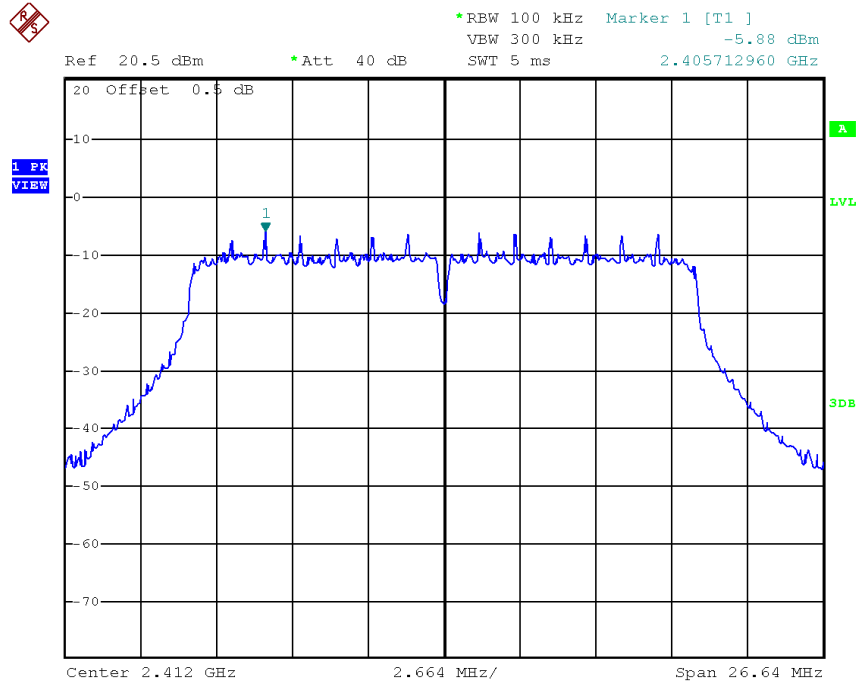


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TEST REPORT

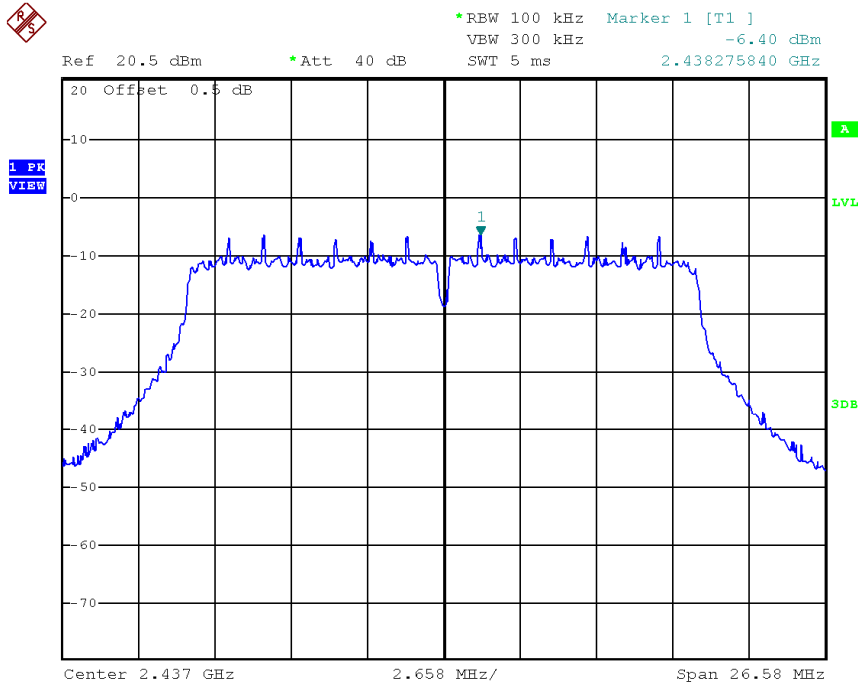
PLOTS OF POWER SPECTRAL DENSITY

802.11n (20MHz), Lowest channel



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802.11n (20MHz), Middle channel

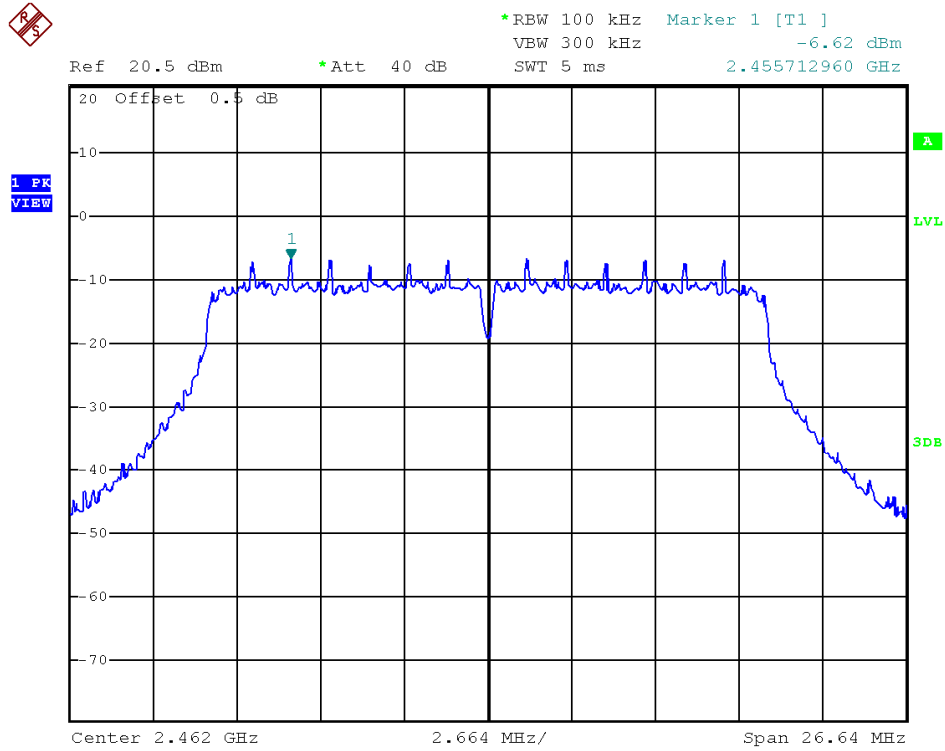


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TEST REPORT

PLOTS OF POWER SPECTRAL DENSITY

802.11n (20MHz), Highest channel

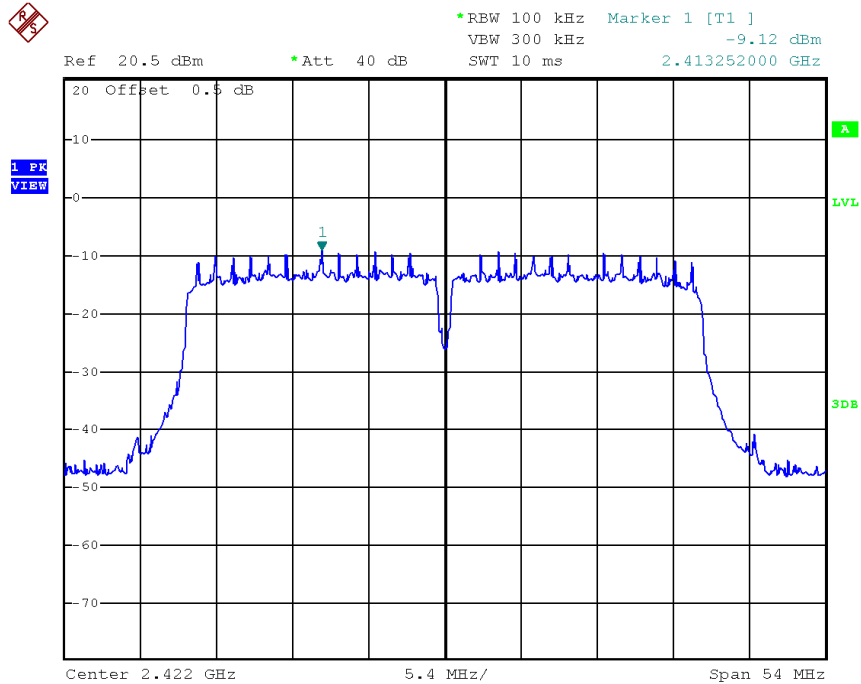


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TEST REPORT

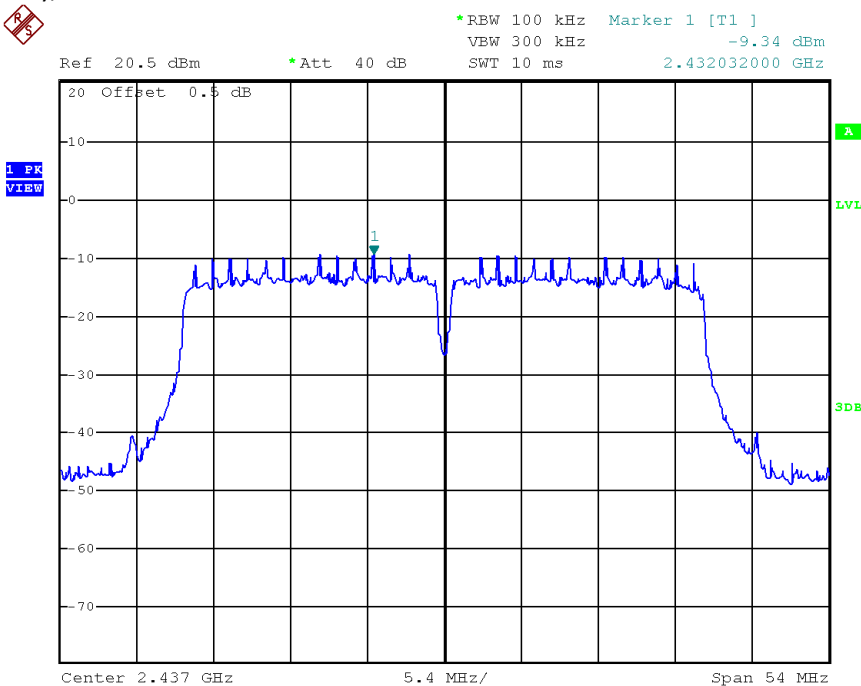
PLOTS OF POWER SPECTRAL DENSITY

802.11n (40MHz), Lowest channel



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802.11n (40MHz), Middle channel

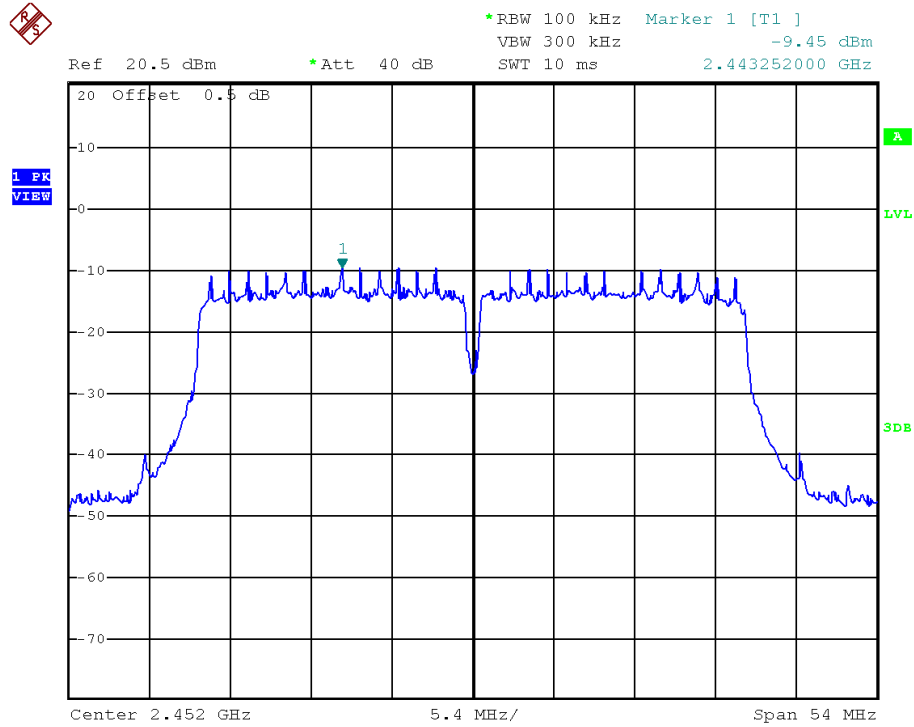


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PLOTS OF POWER SPECTRAL DENSITY

802.11n (20MHz), Highest channel



Date: 30.JUL.2020 09:47:40

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4.4 Out of Band Conducted Emissions

For 802.11b/g/n20/n40MHz, the maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth for 802.11b/g/n20/n40MHz.

The measurement procedures under sections 11 of KDB Publication No.558074 D01 v05r01 (11-February-2019) were used.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

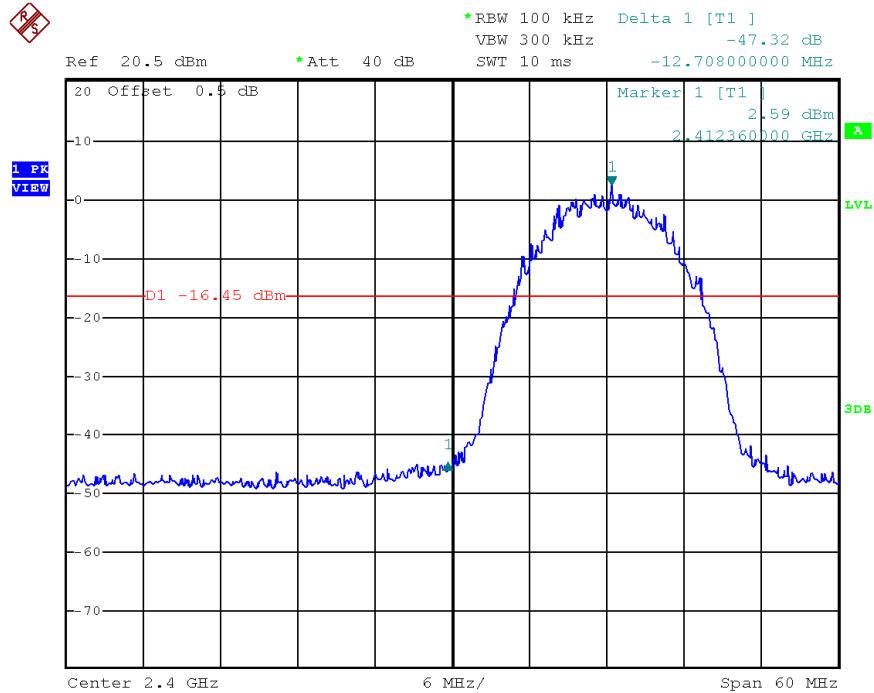
Limits:

All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20dB for 802.11b/g/n20/n40MHz below the maximum measured in-band peak PSD level.

TEST REPORT

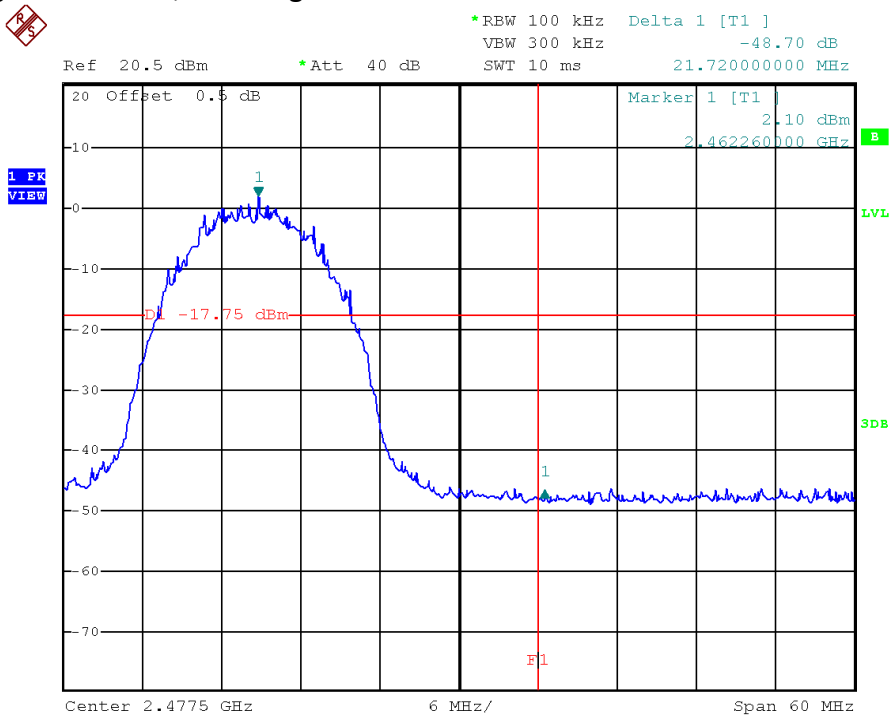
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Lowest Channel, Bandedge



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802.11b, Highest Channel, Bandedge

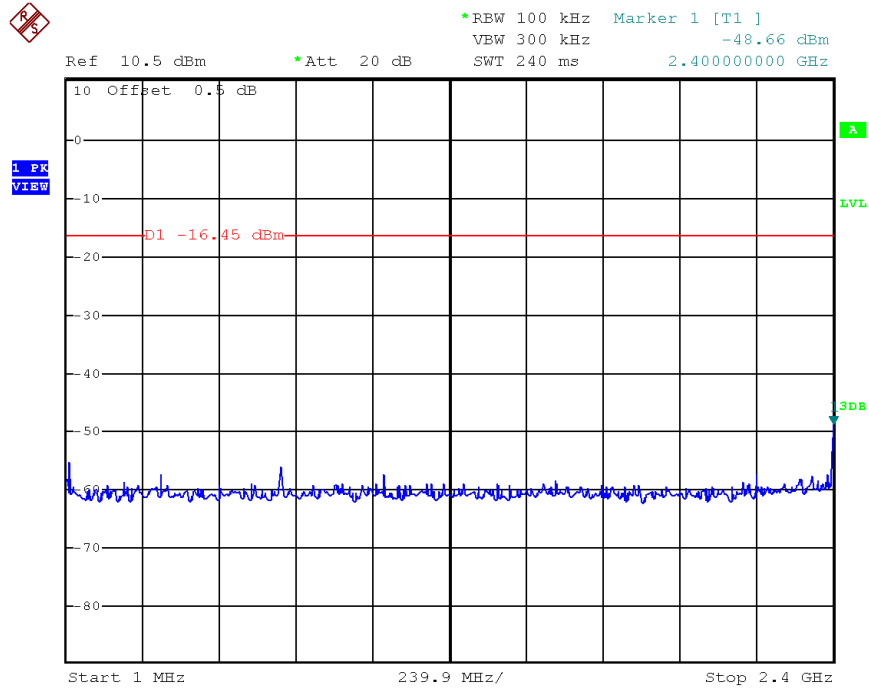


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TEST REPORT

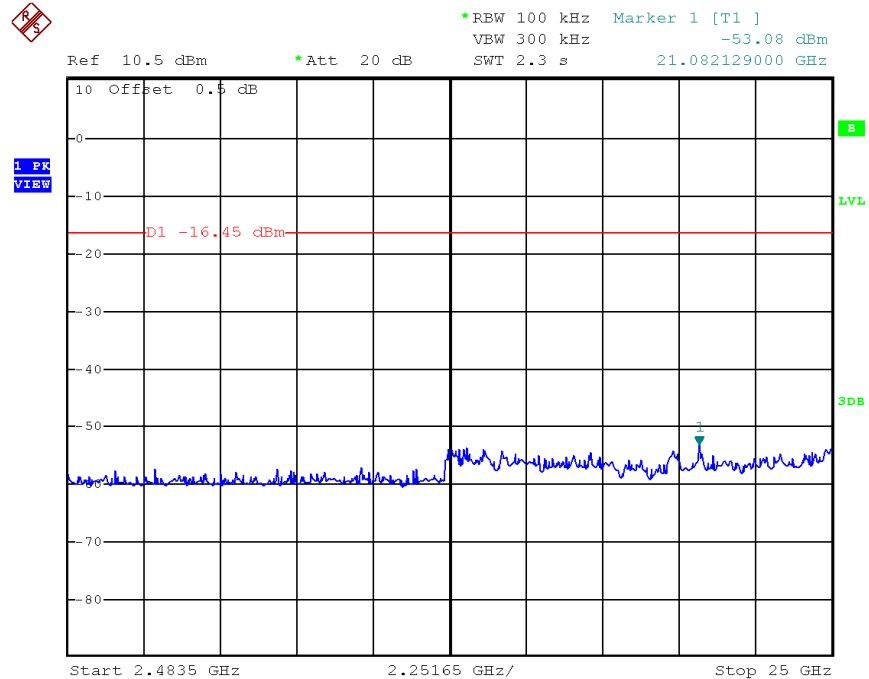
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Lowest Channel, Plot A



Date: 30.JUL.2020 11:06:04

802.11b, Lowest Channel, Plot B

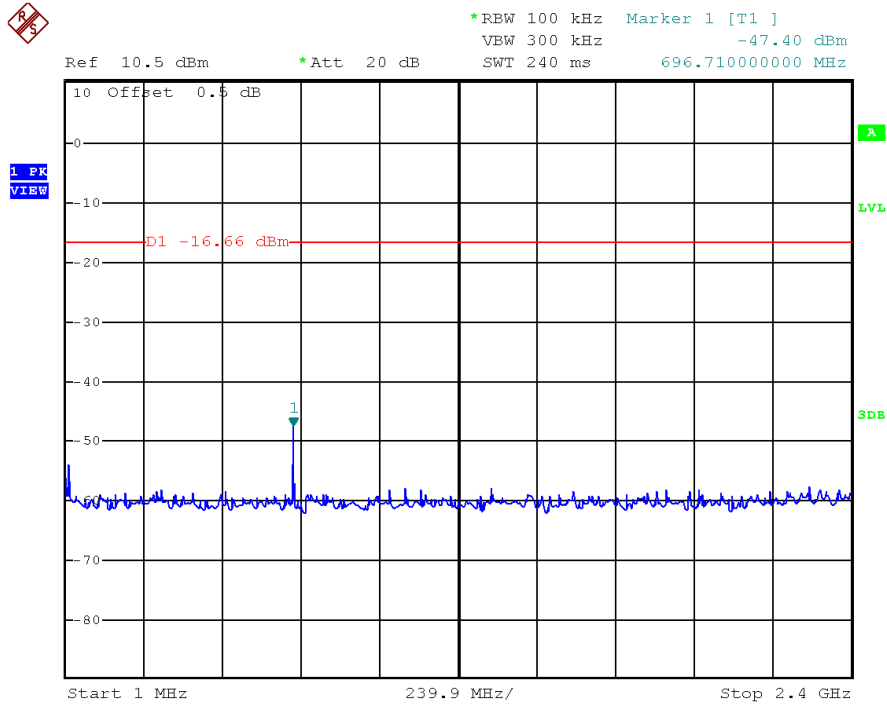


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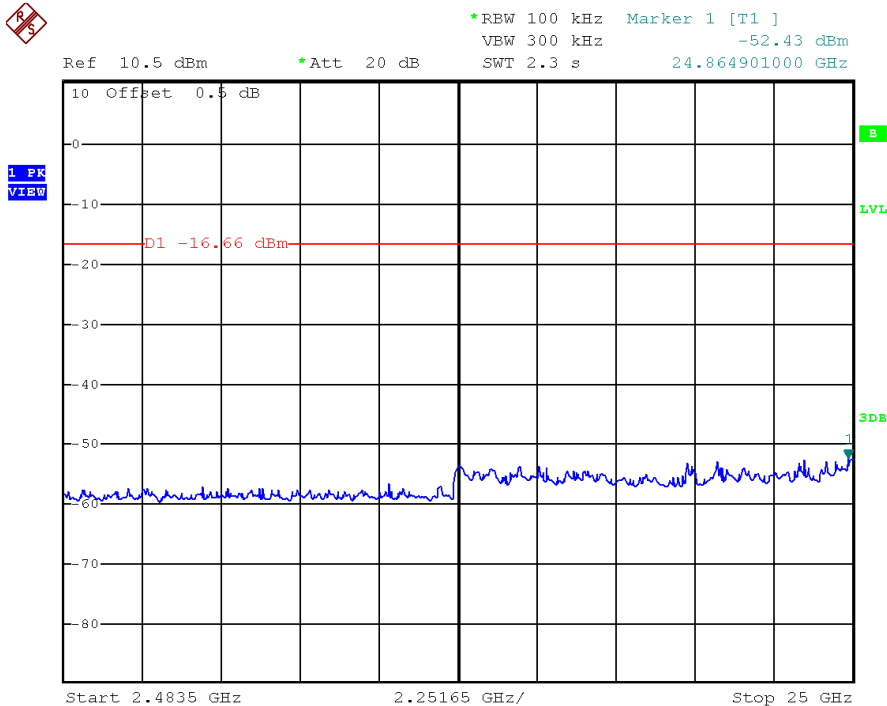
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Middle Channel, Plot A



Date: 30.JUL.2020 11:07:00

802.11b, Middle Channel, Plot B

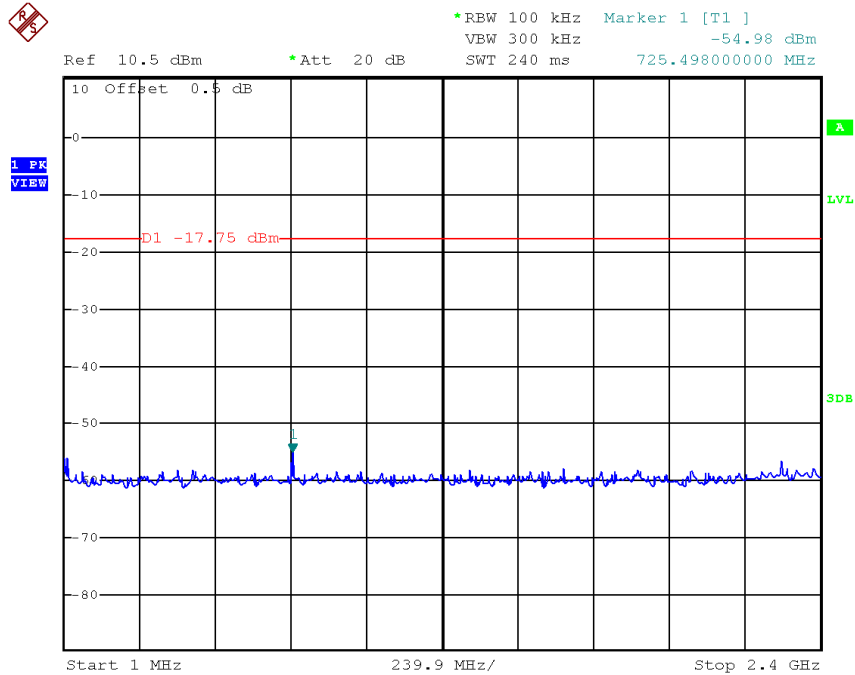


Date: 30.JUL.2020 11:08:19

TEST REPORT

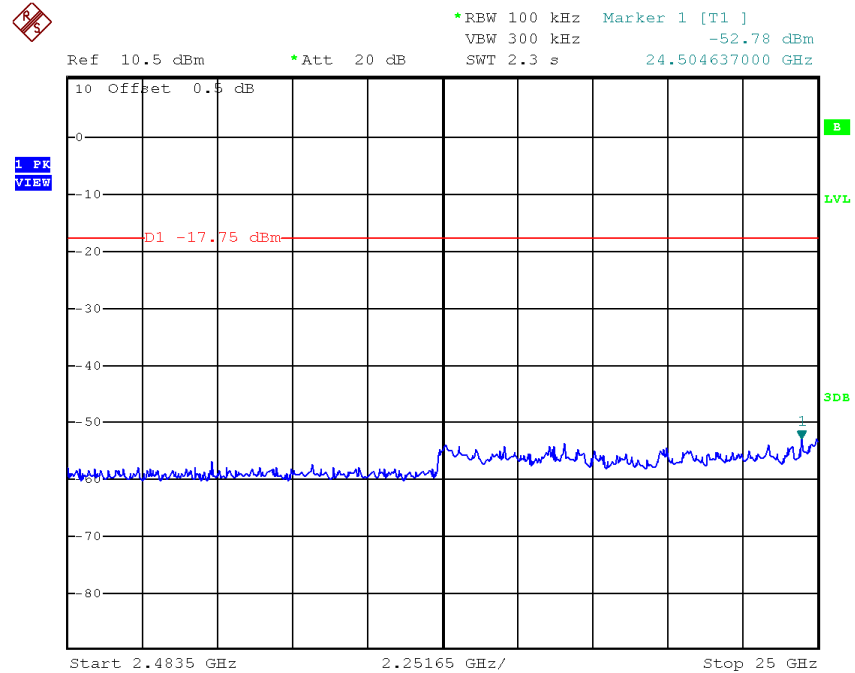
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Highest Channel, Plot A



Date: 30.JUL.2020 11:12:27

802.11b, Highest Channel, Plot B

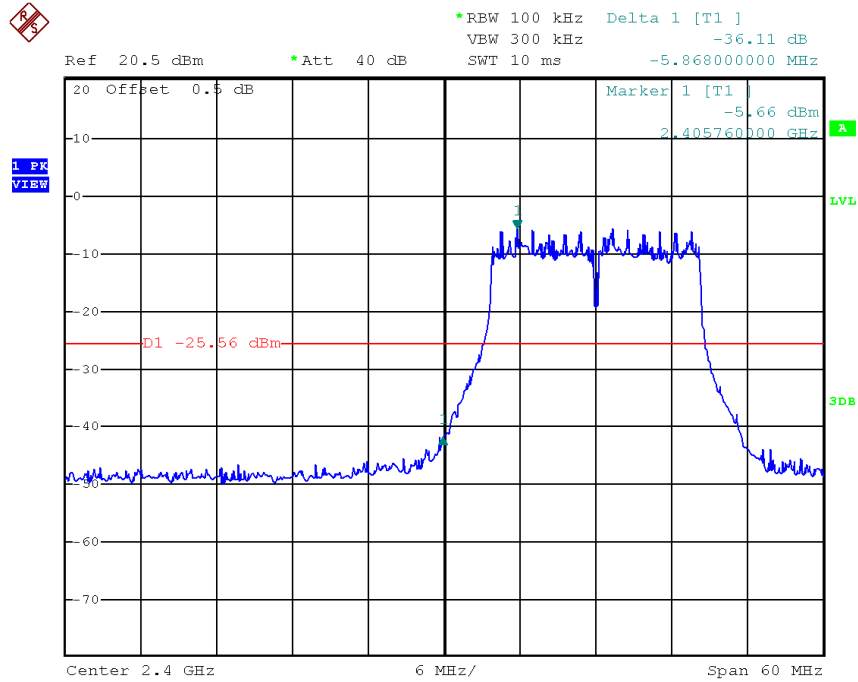


Date: 30.JUL.2020 11:11:27

TEST REPORT

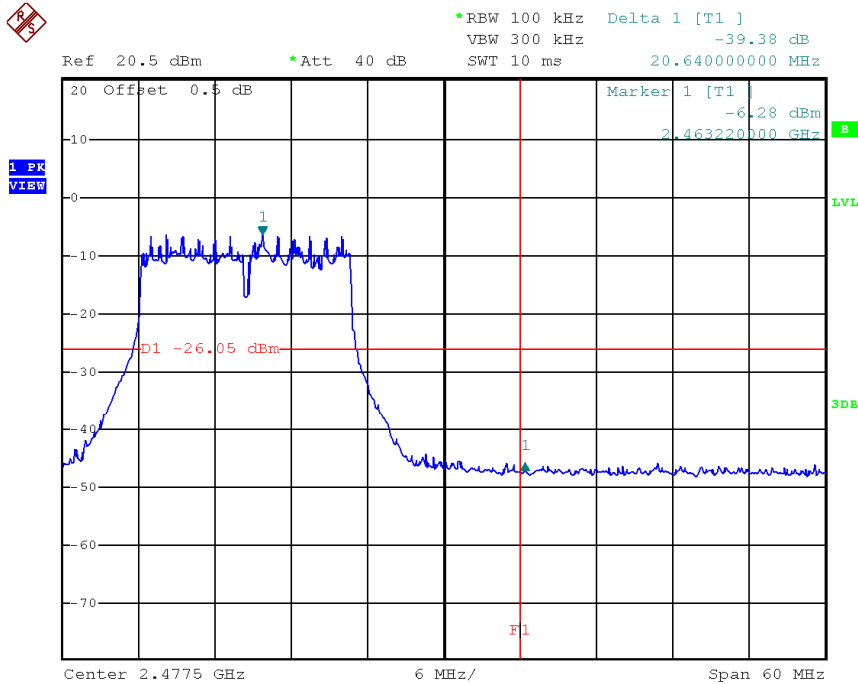
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Lowest Channel, Bandedge



Date: 30.JUL.2020 10:38:18

802.11g, Highest Channel, Bandedge

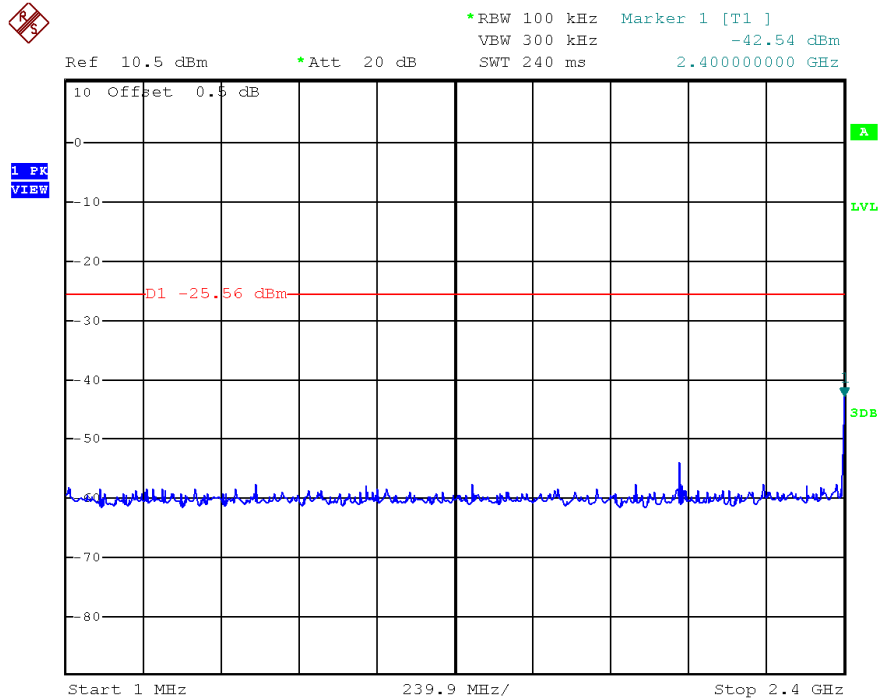


Date: 30.JUL.2020 10:33:23

TEST REPORT

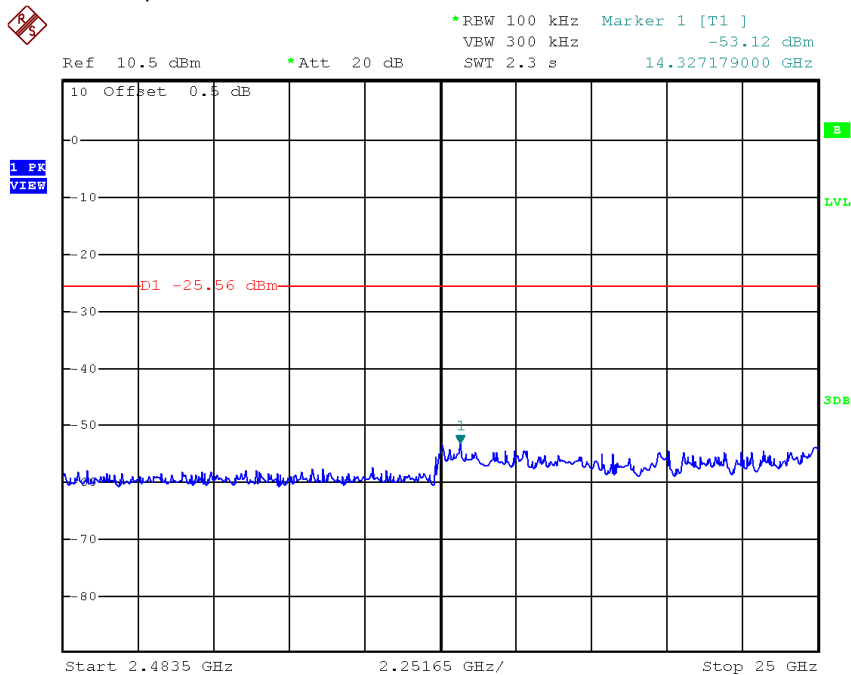
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Lowest Channel, Plot A



Date: 30.JUL.2020 11:18:46

802.11g, Lowest Channel, Plot B

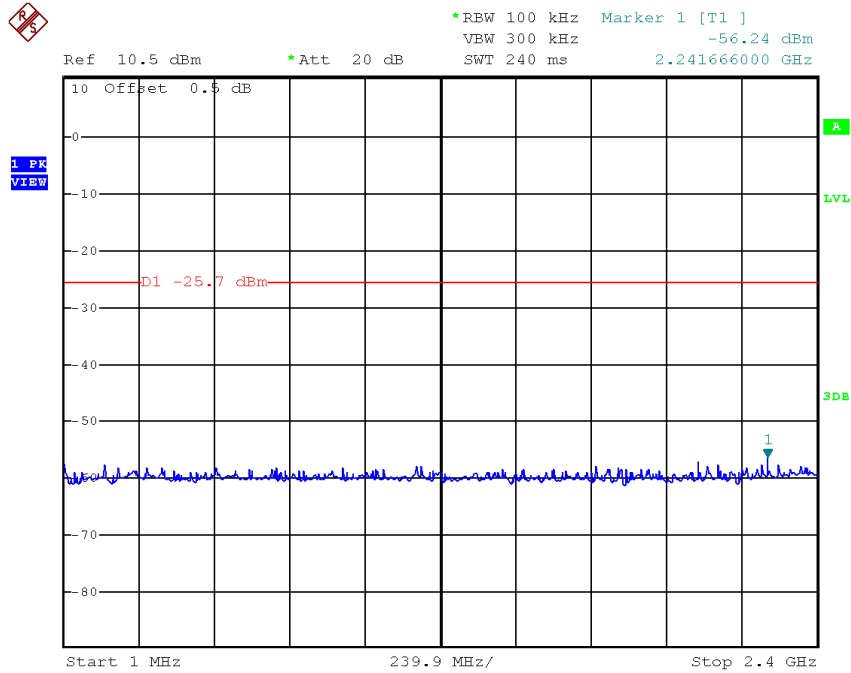


Date: 30.JUL.2020 11:20:05

TEST REPORT

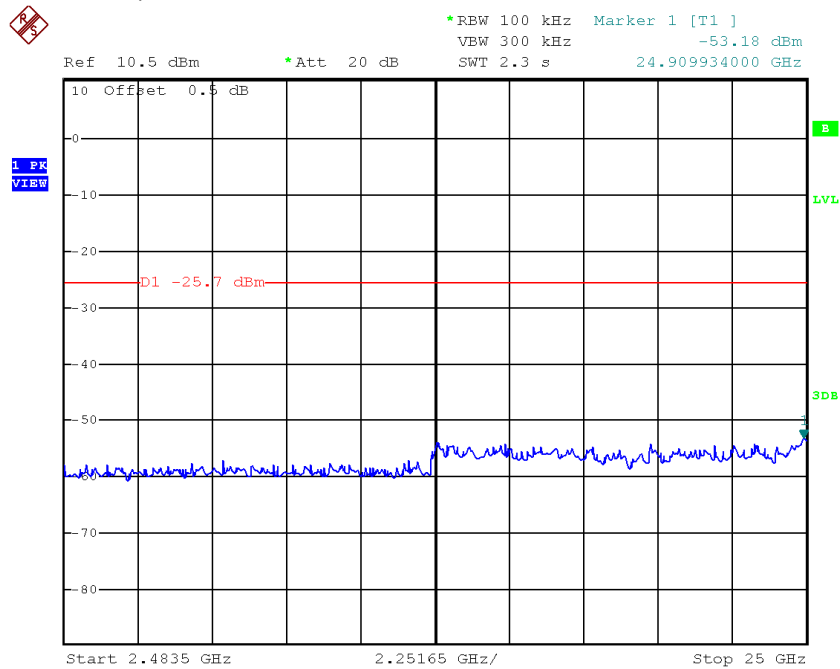
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Middle Channel, Plot A



Date: 30.JUL.2020 11:23:32

802.11g, Middle Channel, Plot B

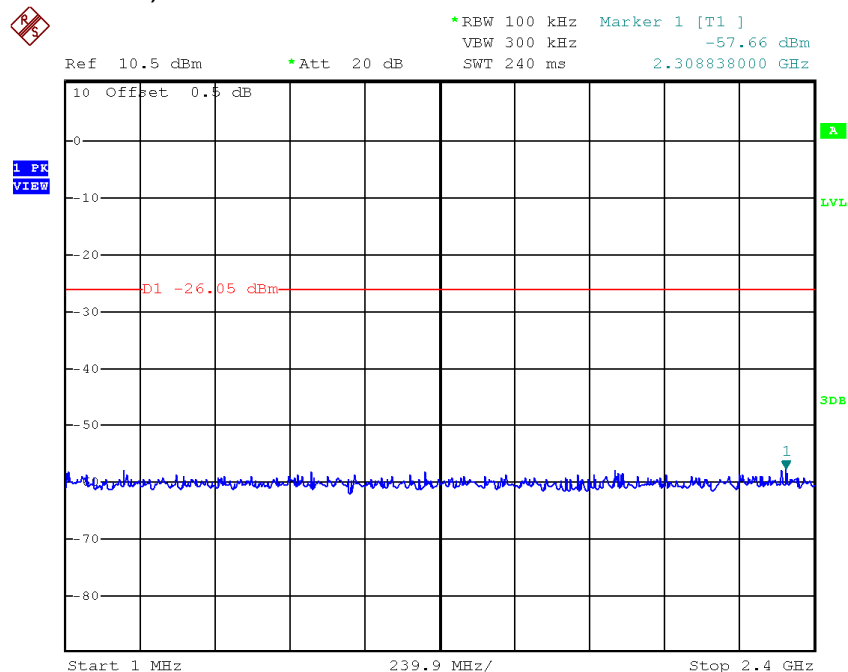


Date: 30.JUL.2020 11:21:24

TEST REPORT

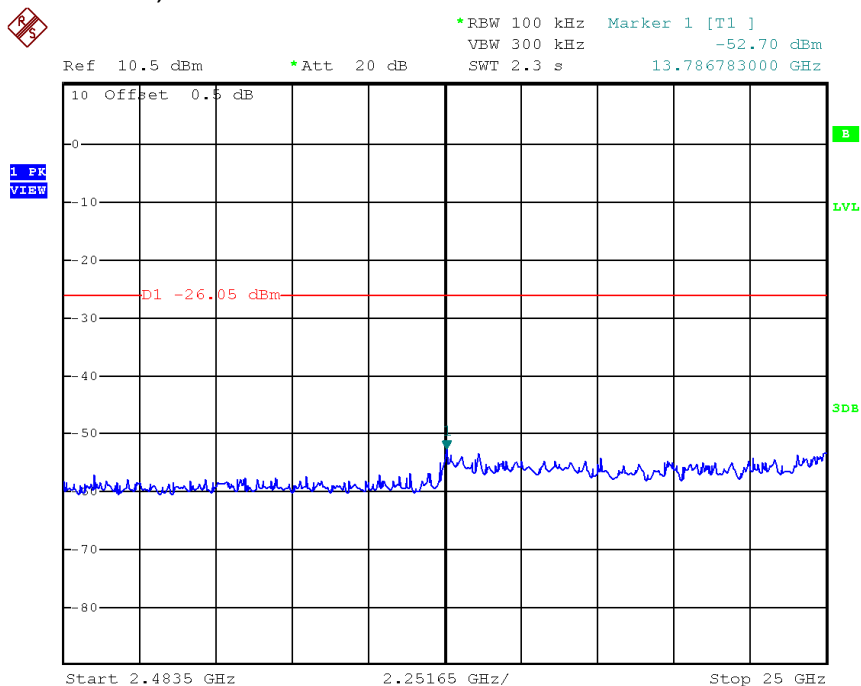
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Highest Channel, Plot A



Date: 30.JUL.2020 11:25:23

802.11g, Highest Channel, Plot B

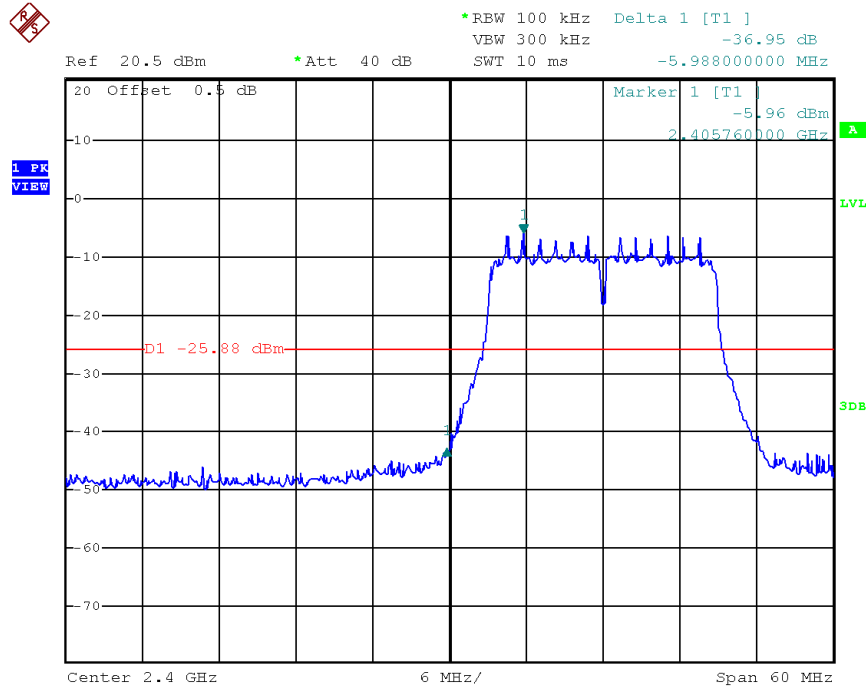


Date: 30.JUL.2020 11:26:22

TEST REPORT

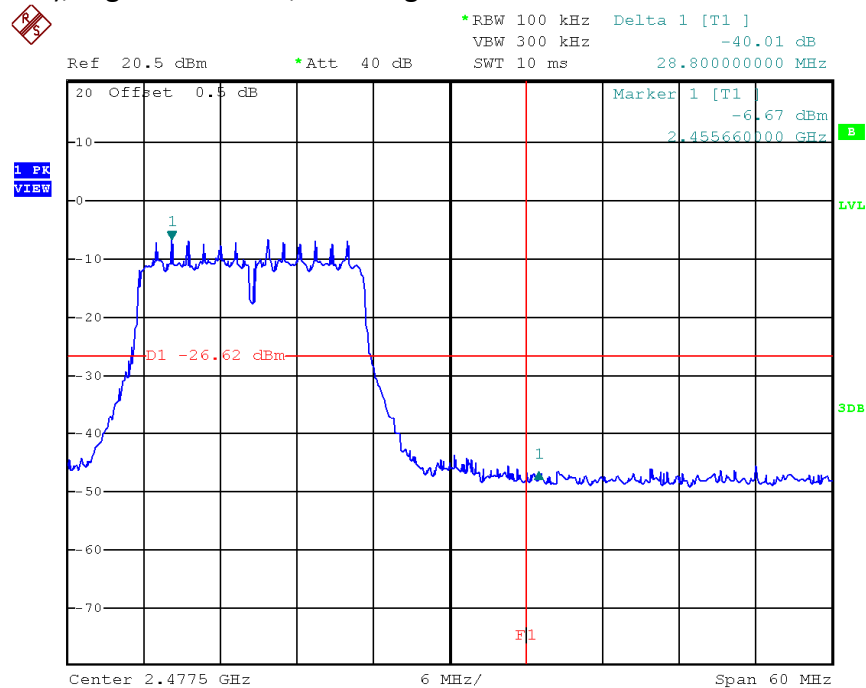
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Lowest Channel, Bandedge



Date: 30.JUL.2020 10:40:34

802.11n (20MHz), Highest Channel, Bandedge

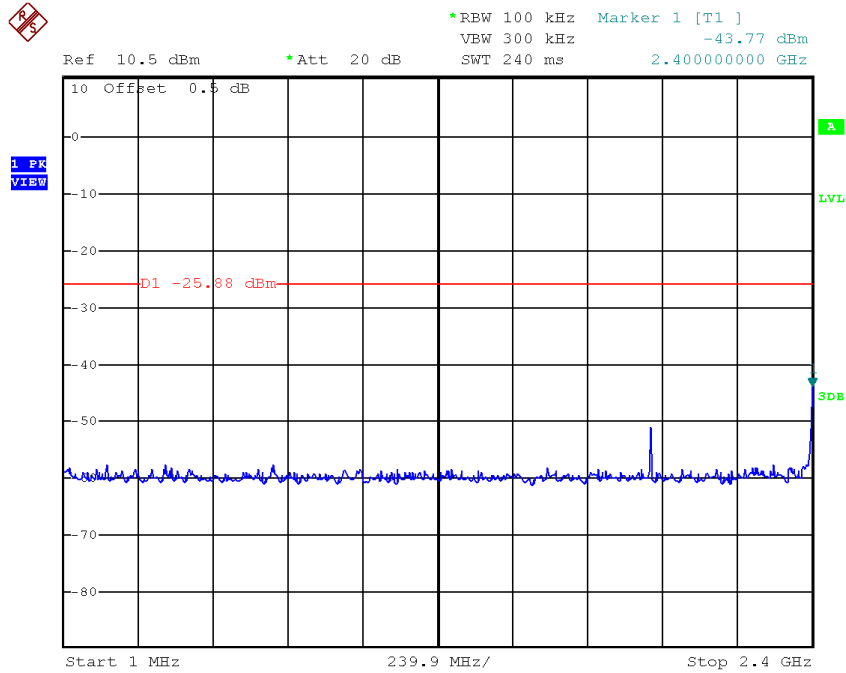


Date: 30.JUL.2020 10:42:34

TEST REPORT

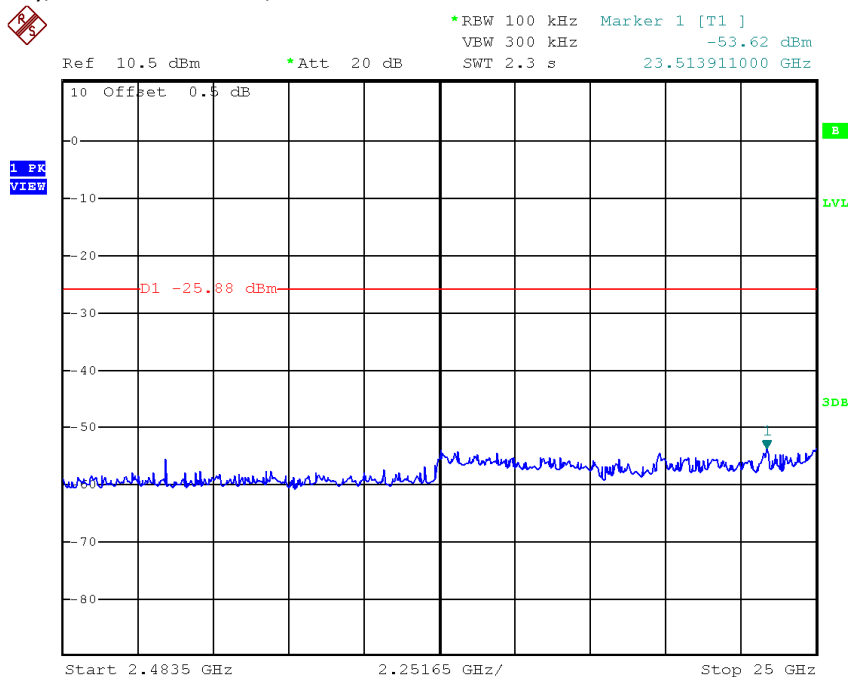
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Lowest Channel, Plot A



Date: 30.JUL.2020 11:29:28

802.11n (20MHz), Lowest Channel, Plot B

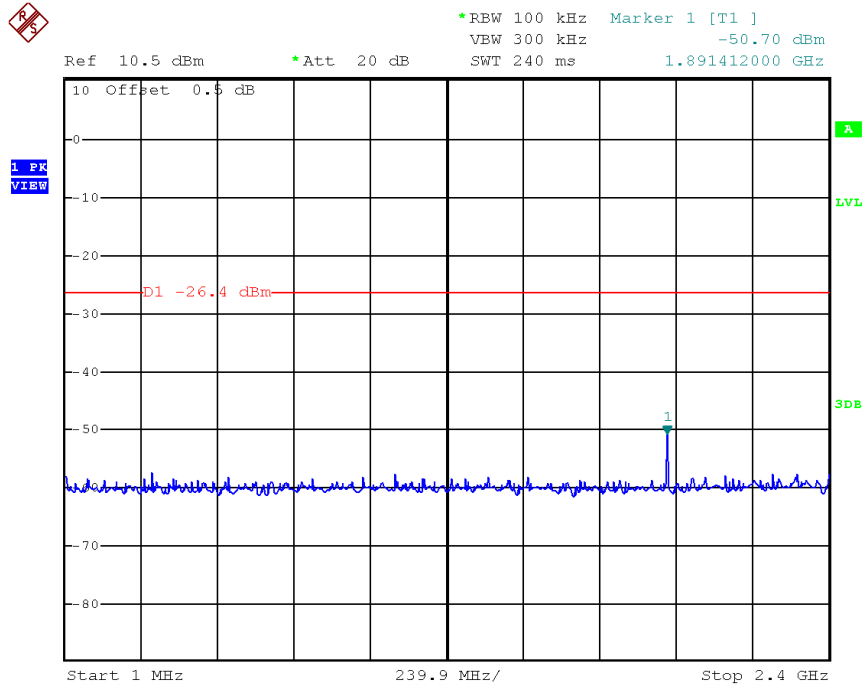


Date: 30.JUL.2020 11:30:25

TEST REPORT

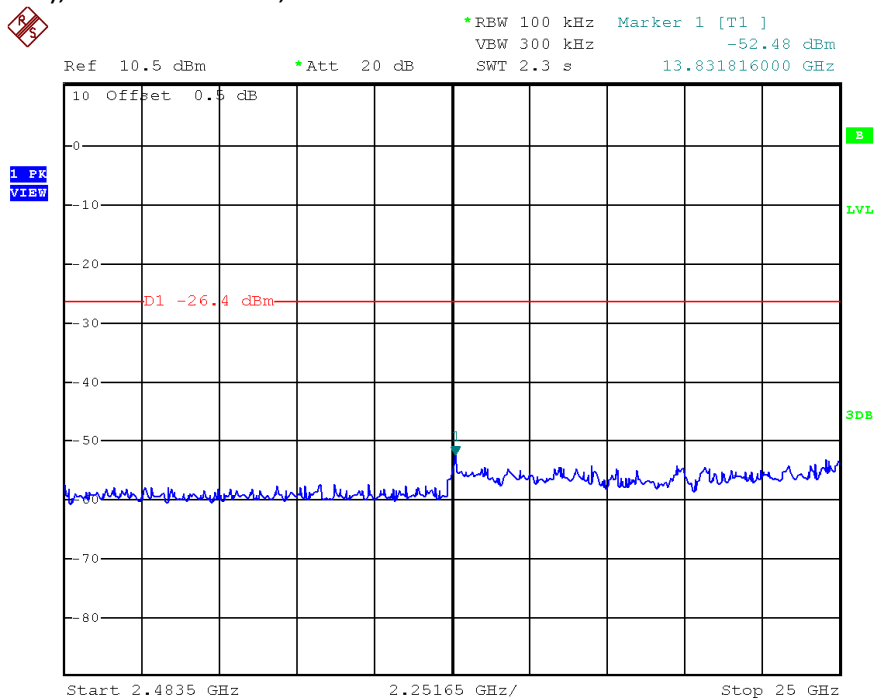
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Middle Channel, Plot A



Date: 30.JUL.2020 11:32:17

802.11n (20MHz), Middle Channel, Plot B

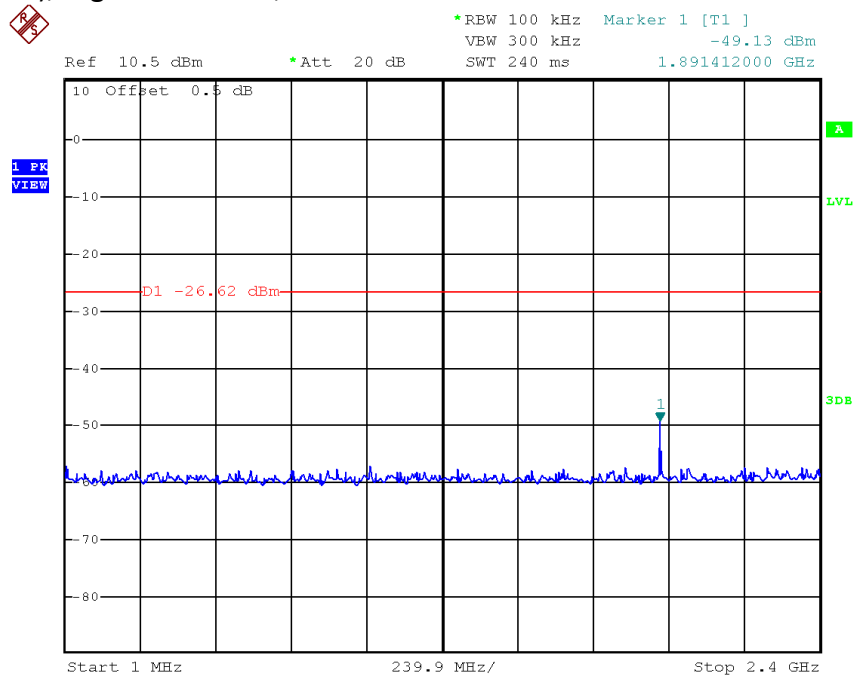


Date: 30.JUL.2020 11:31:24

TEST REPORT

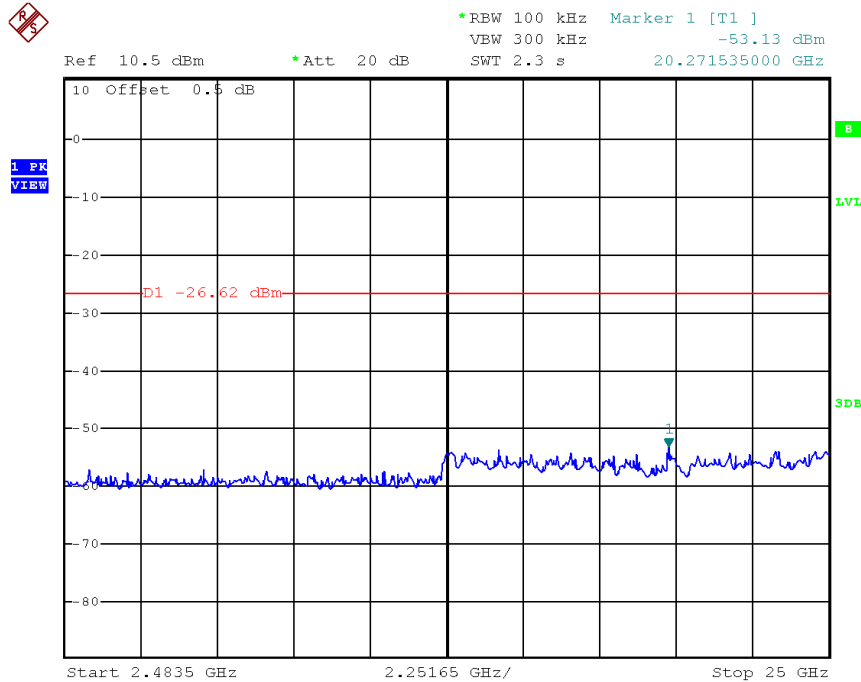
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Highest Channel, Plot A



Date: 30.JUL.2020 11:33:45

802.11n (20MHz), Highest Channel, Plot B

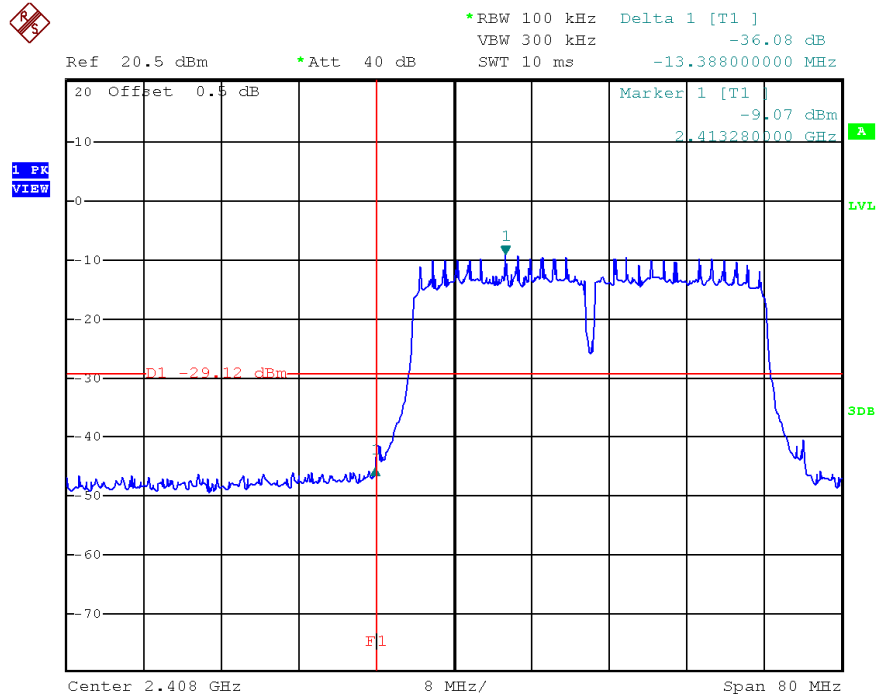


Date: 30.JUL.2020 11:34:46

TEST REPORT

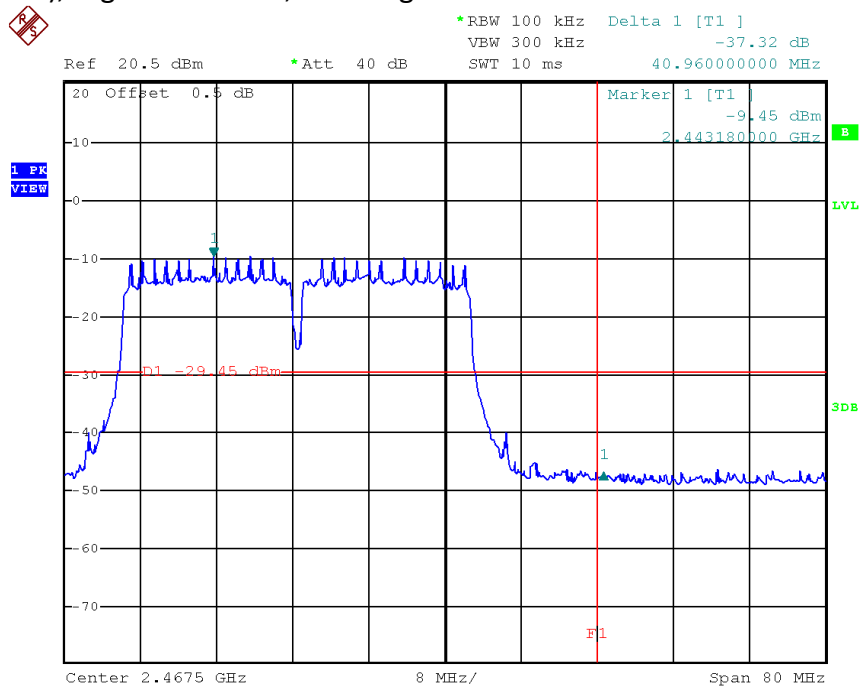
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (40MHz), Lowest Channel, Bandedge



Date: 30.JUL.2020 10:51:18

802.11n (40MHz), Highest Channel, Bandedge

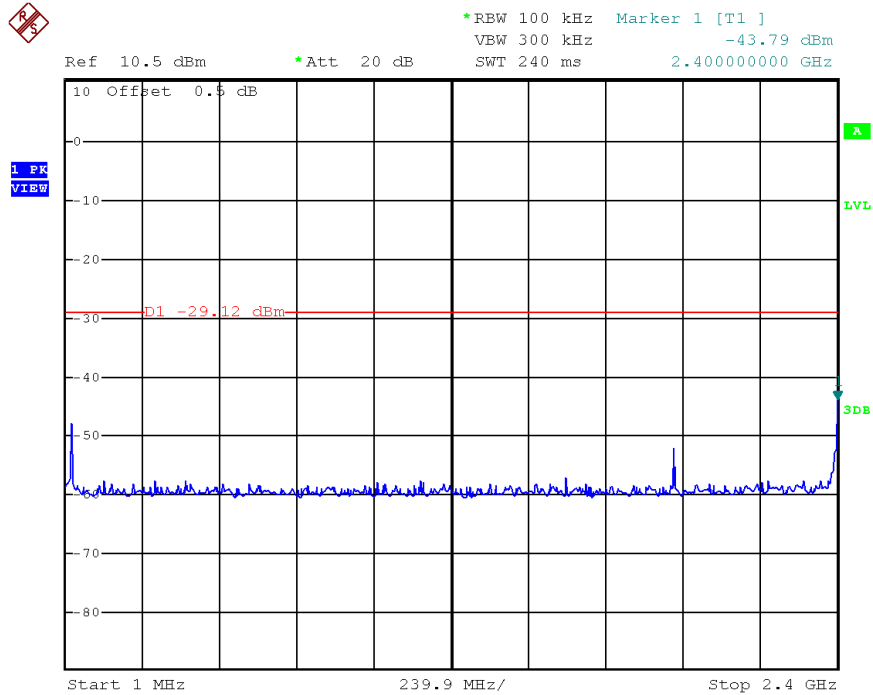


Date: 30.JUL.2020 10:48:46

TEST REPORT

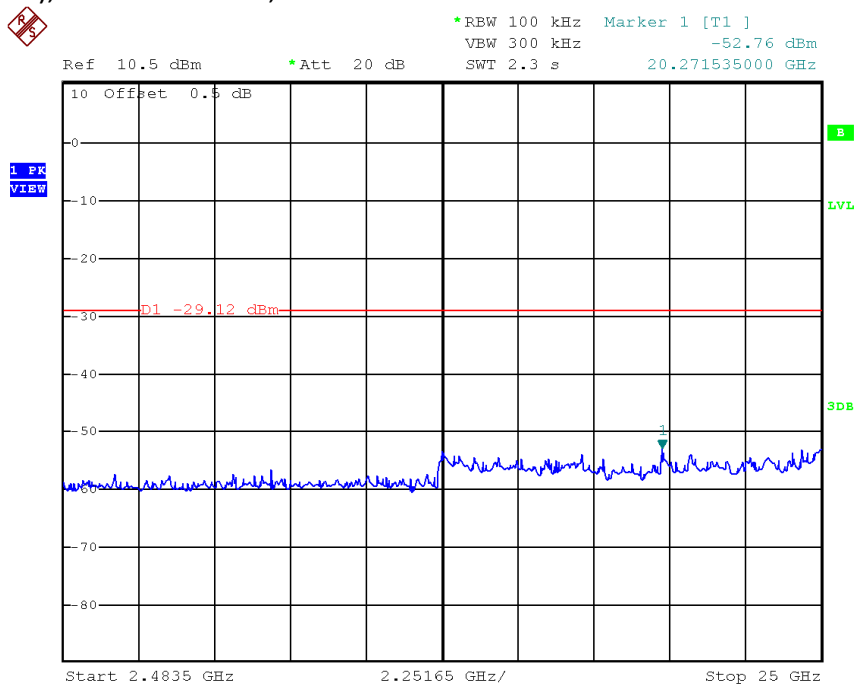
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (40MHz), Lowest Channel, Plot A



Date: 30.JUL.2020 11:36:53

802.11n (40MHz), Lowest Channel, Plot B

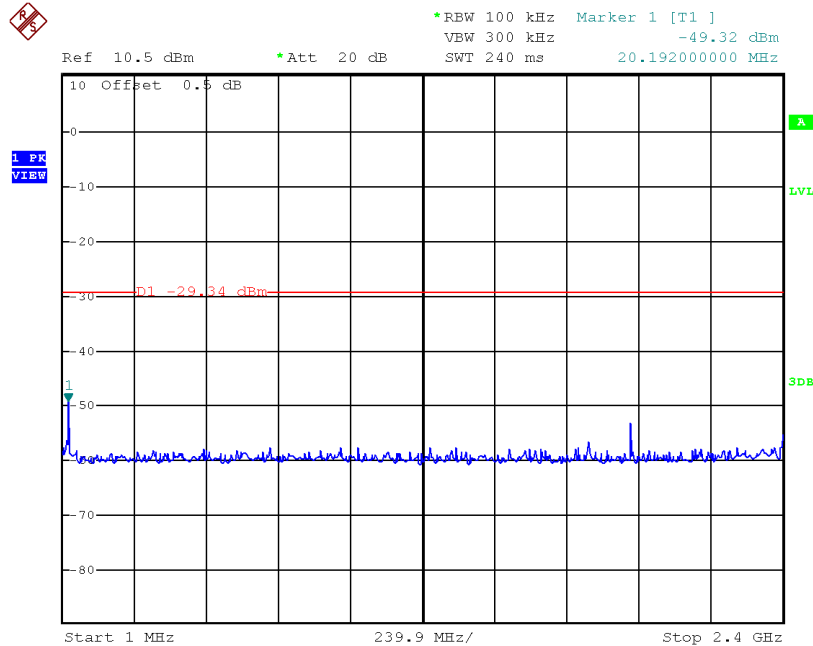


Date: 30.JUL.2020 11:45:58

TEST REPORT

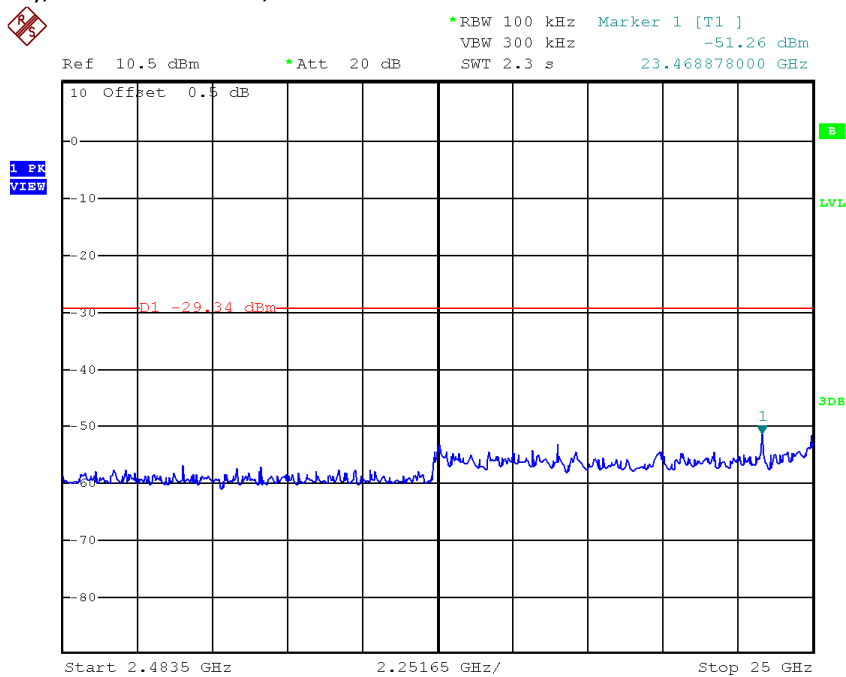
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (40MHz), Middle Channel, Plot A



Date: 30.JUL.2020 11:39:53

802.11n (40MHz), Middle Channel, Plot B

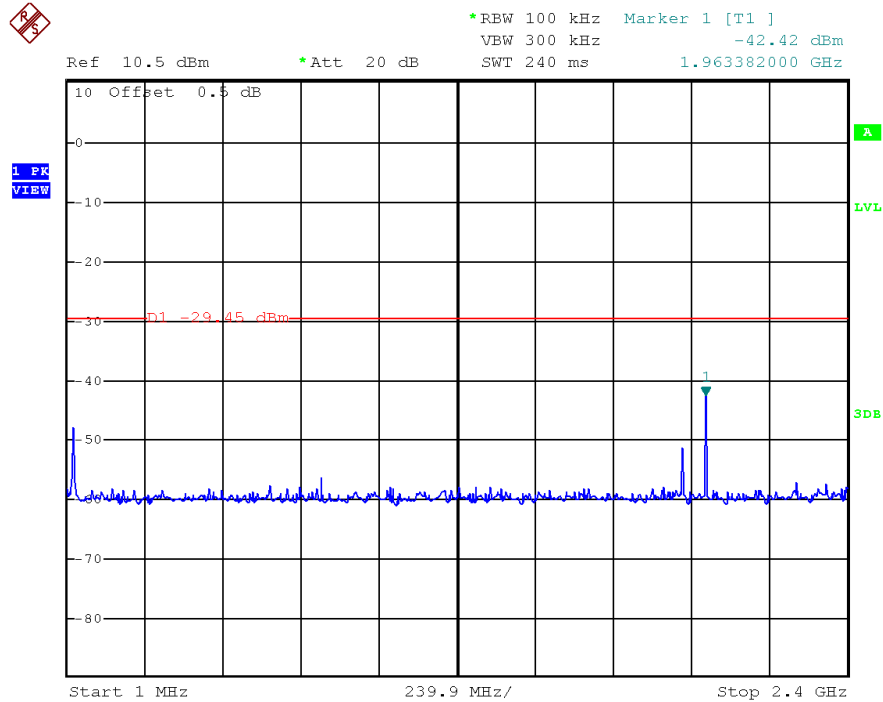


Date: 30.JUL.2020 11:38:42

TEST REPORT

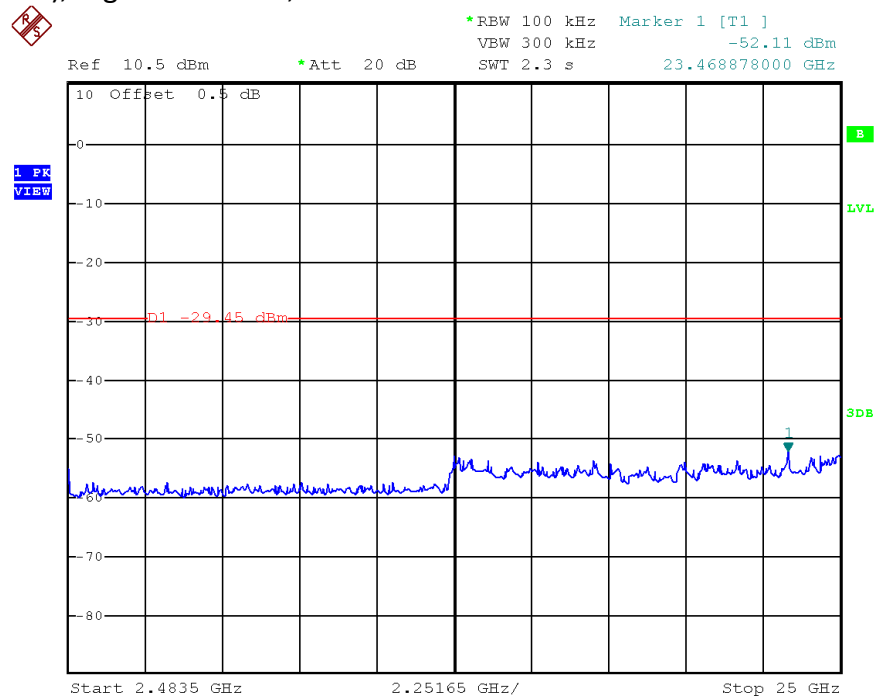
PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (40MHz), Highest Channel, Plot A



Date: 30.JUL.2020 11:41:17

802.11n (40MHz), Highest Channel, Plot B



Date: 30.JUL.2020 11:42:23

TEST REPORT

4.5 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

Where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dB μ V/m. This value in dB μ V/m is converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0.0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + (-10.0) = 32.0 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

TEST REPORT

4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

4.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

2483.500 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

4.6.2 Radiated Emission Data

The data in tables 1-13 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 2.8 dB margin

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 01

Table 1
IEEE 802.11b (DSSS, 1 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<i>H</i>	<i>2390.000</i>	<i>38.4</i>	<i>33</i>	<i>29.4</i>	<i>34.8</i>	<i>54.0</i>	<i>-19.2</i>
<i>V</i>	<i>4824.000</i>	<i>34.9</i>	<i>33</i>	<i>34.9</i>	<i>36.8</i>	<i>54.0</i>	<i>-17.2</i>
<i>H</i>	<i>12060.000</i>	<i>30.7</i>	<i>33</i>	<i>40.5</i>	<i>38.2</i>	<i>54.0</i>	<i>-15.8</i>

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
<i>H</i>	<i>2390.000</i>	<i>52.0</i>	<i>33</i>	<i>29.4</i>	<i>48.4</i>	<i>74.0</i>	<i>-25.6</i>
<i>V</i>	<i>4824.000</i>	<i>50.9</i>	<i>33</i>	<i>34.9</i>	<i>52.8</i>	<i>74.0</i>	<i>-21.2</i>
<i>H</i>	<i>12060.000</i>	<i>38.9</i>	<i>33</i>	<i>40.5</i>	<i>46.4</i>	<i>74.0</i>	<i>-27.6</i>

- NOTES: 1. Peak detector is used for the peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 06

Table 2
IEEE 802.11b (DSSS, 1 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	4874.000	34.5	33	34.9	36.4	54.0	-17.6
V	7311.000	31.6	33	37.9	36.5	54.0	-17.5
H	12185.000	28.7	33	40.5	36.2	54.0	-17.8

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	4874.000	52.9	33	34.9	54.8	74.0	-19.2
V	7311.000	49.5	33	37.9	54.4	74.0	-19.6
H	12185.000	42.9	33	40.5	50.4	74.0	-23.6

- NOTES: 1. Peak detector is used for the peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 11

Table 3
IEEE 802.11b (DSSS, 1 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	43.8	33	29.4	40.2	54.0	-13.8
V	4924.000	32.9	33	34.9	34.8	54.0	-19.2
V	7386.000	28.7	33	37.9	33.6	54.0	-20.4
H	12310.000	24.9	33	40.5	32.4	54.0	-21.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	53.8	33	29.4	50.2	74.0	-23.8
V	4924.000	50.7	33	34.9	52.6	74.0	-21.4
V	7386.000	43.3	33	37.9	48.2	74.0	-25.8
H	12310.000	38.7	33	40.5	46.2	74.0	-27.8

- NOTES: 1. Peak detector is used for the peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 01

Table 4
IEEE 802.11g (OFDM, 6 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<i>H</i>	<i>2390.000</i>	<i>41.6</i>	<i>33</i>	<i>29.4</i>	<i>38.0</i>	<i>54.0</i>	<i>-16.0</i>
<i>V</i>	<i>4824.000</i>	<i>32.6</i>	<i>33</i>	<i>34.9</i>	<i>34.5</i>	<i>54.0</i>	<i>-19.5</i>
<i>H</i>	<i>12060.000</i>	<i>30.7</i>	<i>33</i>	<i>40.5</i>	<i>38.2</i>	<i>54.0</i>	<i>-15.8</i>

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
<i>H</i>	<i>2390.000</i>	<i>60.0</i>	<i>33</i>	<i>29.4</i>	<i>56.4</i>	<i>74.0</i>	<i>-17.6</i>
<i>V</i>	<i>4824.000</i>	<i>49.3</i>	<i>33</i>	<i>34.9</i>	<i>51.2</i>	<i>74.0</i>	<i>-22.8</i>
<i>H</i>	<i>12060.000</i>	<i>41.1</i>	<i>33</i>	<i>40.5</i>	<i>48.6</i>	<i>74.0</i>	<i>-25.4</i>

- NOTES: 1. Peak detector is used for the peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 06

Table 5
IEEE 802.11g (OFDM, 6 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	4874.000	33.9	33	34.9	35.8	54.0	-18.2
V	7311.000	30.5	33	37.9	35.4	54.0	-18.6
H	12185.000	29.3	33	40.5	36.8	54.0	-17.2

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	4874.000	51.3	33	34.9	53.2	74.0	-20.8
V	7311.000	49.9	33	37.9	54.8	74.0	-19.2
H	12185.000	48.7	33	40.5	56.2	74.0	-17.8

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 11

Table 6
IEEE 802.11g (OFDM, 6 Mbps)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	49.6	33	29.4	46.0	54.0	-8.0
V	4924.000	31.9	33	34.9	33.8	54.0	-20.2
V	7386.000	28.3	33	37.9	33.2	54.0	-20.8
H	12310.000	25.3	33	40.5	32.8	54.0	-21.2

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	64.1	33	29.4	60.5	74.0	-13.5
V	4924.000	49.9	33	34.9	51.8	74.0	-22.2
V	7386.000	41.3	33	37.9	46.2	74.0	-27.8
H	12310.000	41.0	33	40.5	48.5	74.0	-25.5

- NOTES: 1. Peak detector is used for the peak emission measurement.
2. Average measurement method is according to ANSI C63.10
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 01

Table 7
IEEE 802.11n (20MHz) (OFDM, MCS0)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<i>H</i>	<i>2390.000</i>	<i>41.8</i>	<i>33</i>	<i>29.4</i>	<i>38.2</i>	<i>54.0</i>	<i>-15.8</i>
<i>V</i>	<i>4824.000</i>	<i>32.9</i>	<i>33</i>	<i>34.9</i>	<i>34.8</i>	<i>54.0</i>	<i>-19.2</i>
<i>H</i>	<i>12060.000</i>	<i>31.1</i>	<i>33</i>	<i>40.5</i>	<i>38.6</i>	<i>54.0</i>	<i>-15.4</i>

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
<i>H</i>	<i>2390.000</i>	<i>60.4</i>	<i>33</i>	<i>29.4</i>	<i>56.8</i>	<i>74.0</i>	<i>-17.2</i>
<i>V</i>	<i>4824.000</i>	<i>49.9</i>	<i>33</i>	<i>34.9</i>	<i>51.8</i>	<i>74.0</i>	<i>-22.2</i>
<i>H</i>	<i>12060.000</i>	<i>48.1</i>	<i>33</i>	<i>40.5</i>	<i>55.6</i>	<i>74.0</i>	<i>-18.4</i>

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 06

Table 8
IEEE 802.11n (20MHz) (OFDM, MCS0)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<i>V</i>	<i>4874.000</i>	<i>34.5</i>	<i>33</i>	<i>34.9</i>	<i>36.4</i>	<i>54.0</i>	<i>-17.6</i>
<i>V</i>	<i>7311.000</i>	<i>31.9</i>	<i>33</i>	<i>37.9</i>	<i>36.8</i>	<i>54.0</i>	<i>-17.2</i>
<i>H</i>	<i>12185.000</i>	<i>30.9</i>	<i>33</i>	<i>40.5</i>	<i>38.4</i>	<i>54.0</i>	<i>-15.6</i>

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
<i>V</i>	<i>4874.000</i>	<i>52.9</i>	<i>33</i>	<i>34.9</i>	<i>54.8</i>	<i>74.0</i>	<i>-19.2</i>
<i>V</i>	<i>7311.000</i>	<i>50.9</i>	<i>33</i>	<i>37.9</i>	<i>55.8</i>	<i>74.0</i>	<i>-18.2</i>
<i>H</i>	<i>12185.000</i>	<i>48.9</i>	<i>33</i>	<i>40.5</i>	<i>56.4</i>	<i>74.0</i>	<i>-17.6</i>

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 11

Table 9
IEEE 802.11n (20MHz) (OFDM, MCS0)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	50.4	33	29.4	46.8	54.0	-7.2
V	4924.000	32.9	33	34.9	34.8	54.0	-19.2
V	7386.000	29.7	33	37.9	34.6	54.0	-19.4
H	12310.000	32.7	33	40.5	40.2	54.0	-13.8

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	67.8	33	29.4	64.2	74.0	-9.8
V	4924.000	50.9	33	34.9	52.8	74.0	-21.2
V	7386.000	43.9	33	37.9	48.8	74.0	-25.2
H	12310.000	46.3	33	40.5	53.8	74.0	-20.2

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 03

Table 10
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2390.000	44.8	33	29.4	41.2	54.0	-12.8
V	4844.000	40.9	33	34.9	42.8	54.0	-11.2
H	12110.000	37.3	33	40.5	44.8	54.0	-9.2

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2390.000	64.0	33	29.4	60.4	74.0	-13.6
V	4844.000	48.9	33	34.9	50.8	74.0	-23.2
H	12110.000	47.3	33	40.5	54.8	74.0	-19.2

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 06

Table 11
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
<i>V</i>	<i>4874.000</i>	<i>39.3</i>	<i>33</i>	<i>34.9</i>	<i>41.2</i>	<i>54.0</i>	<i>-12.8</i>
<i>V</i>	<i>7311.000</i>	<i>35.3</i>	<i>33</i>	<i>37.9</i>	<i>40.2</i>	<i>54.0</i>	<i>-13.8</i>
<i>H</i>	<i>12185.000</i>	<i>35.3</i>	<i>33</i>	<i>40.5</i>	<i>42.8</i>	<i>54.0</i>	<i>-11.2</i>

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
<i>V</i>	<i>4874.000</i>	<i>51.3</i>	<i>33</i>	<i>34.9</i>	<i>53.2</i>	<i>74.0</i>	<i>-20.8</i>
<i>V</i>	<i>7311.000</i>	<i>49.9</i>	<i>33</i>	<i>37.9</i>	<i>54.8</i>	<i>74.0</i>	<i>-19.2</i>
<i>H</i>	<i>12185.000</i>	<i>50.3</i>	<i>33</i>	<i>40.5</i>	<i>57.8</i>	<i>74.0</i>	<i>-16.2</i>

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: TX-Channel 09

Table 12
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	54.8	33	29.4	51.2	54.0	-2.8
V	4904.000	42.9	33	34.9	44.8	54.0	-9.2
V	7356.000	37.9	33	37.9	42.8	54.0	-11.2
H	12260.000	35.1	33	40.5	42.6	54.0	-11.4

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2483.500	72.1	33	29.4	68.5	74.0	-5.5
V	4904.000	56.7	33	34.9	58.6	74.0	-15.4
V	7356.000	45.3	33	37.9	50.2	74.0	-23.8
H	12260.000	53.3	33	40.5	60.8	74.0	-13.2

- NOTES:
1. Peak detector is used for the peak emission measurement.
 2. Average measurement method is according to ANSI C63.10
 3. All measurements were made at 3 meters.
 4. Negative value in the margin column shows emission below limit.
 5. Horn antenna is used for the emission over 1000MHz.
 6. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
 7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
 8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

TEST REPORT

Mode: Wifi Operating

Table 13

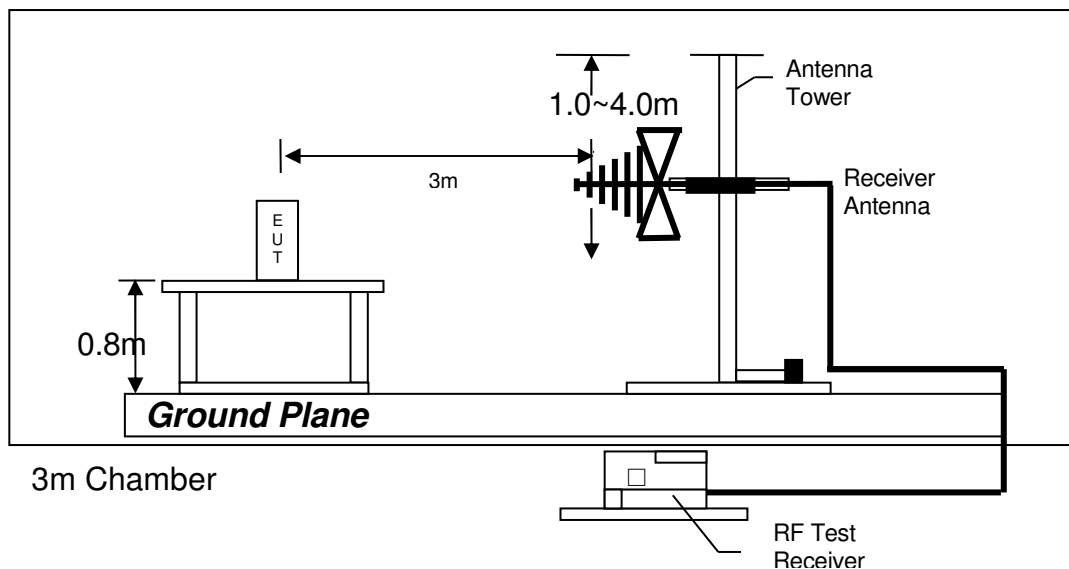
Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
H	32.010	26.5	16	10.0	20.5	40.0	-19.5
H	48.708	23.6	16	11.0	18.6	40.0	-21.4
V	60.008	24.4	16	10.0	18.4	40.0	-21.6
V	70.028	27.0	16	7.0	18.0	40.0	-22.0
V	132.128	28.5	16	14.0	26.5	43.5	-17.0
V	148.886	28.8	16	14.0	26.8	43.5	-16.7
V	156.228	30.5	16	16.0	30.5	43.5	-13.0
V	708.224	20.8	16	30.0	34.8	46.0	-11.2

- NOTES:
1. Quasi-Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

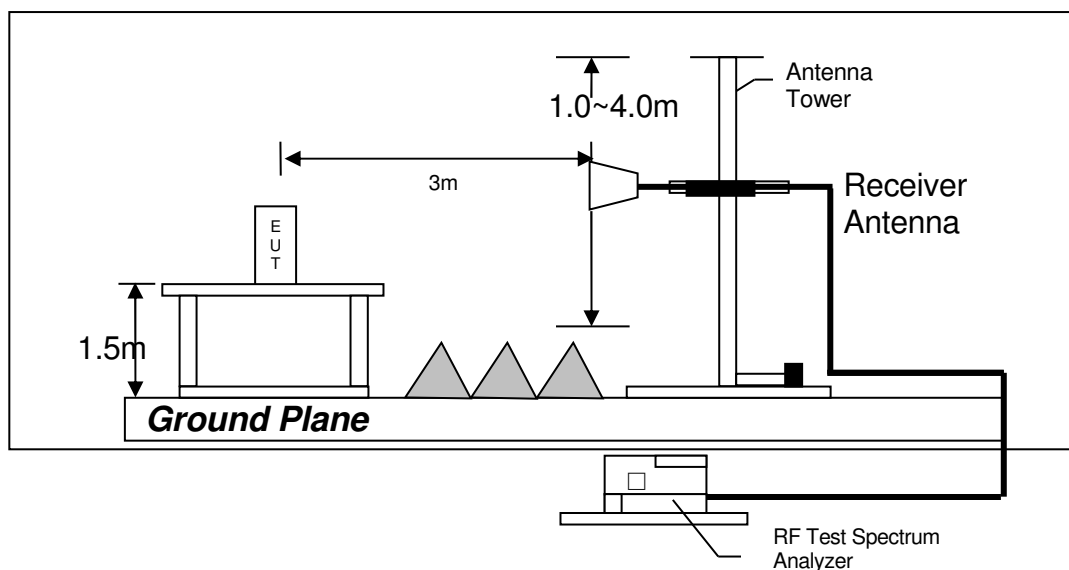
TEST REPORT

4.6.3 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

TEST REPORT

4.6.4 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

TEST REPORT

4.7 AC Power Line Conducted Emission

- ☐ Not applicable – EUT is only powered by battery for operation.
- ☒ EUT connects to AC power line. Emission Data is listed in following pages.
- ☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

0.434 MHz

The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.7.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 11.9 dB margin compare with CISPR Average limit

TEST REPORT

AC POWER LINE CONDUCTED EMISSION

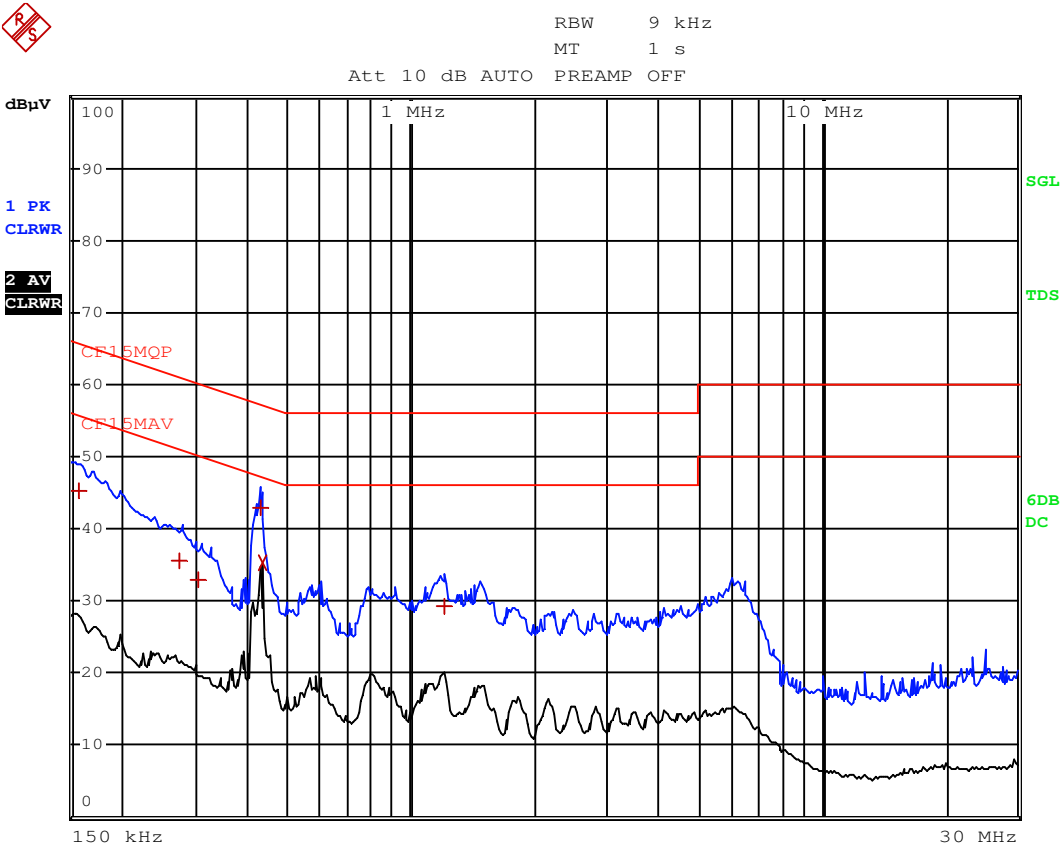
Worst Case: Wifi Operating

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1 Quasi Peak	159 kHz	45.27 N		-20.24
1 Quasi Peak	276 kHz	35.57 N		-25.35
1 Quasi Peak	307.5 kHz	32.86 L1		-27.16
1 Quasi Peak	429 kHz	42.97 N		-14.29
2 CISPR Average	433.5 kHz	35.30 L1		-11.88
1 Quasi Peak	1.203 MHz	29.36 N		-26.63

Date: 31.JUL.2020 15:34:21

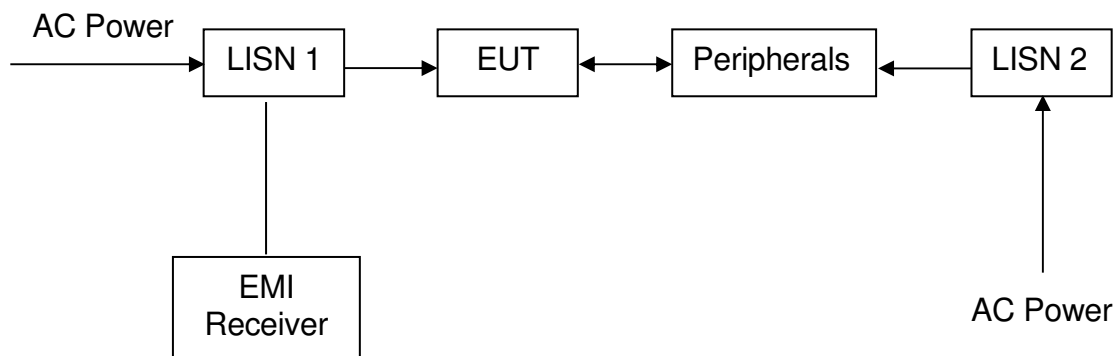
TEST REPORT

Worst Case: Wifi Operating



TEST REPORT

4.7.3 Conducted Emission Test Setup



TEST REPORT

EXHIBIT 5 EQUIPMENT LIST

5.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-3666	EW-2253	EW-0571
Manufacturer	R&S	ROHDESCHWARZ	EMCO
Model No.	ESCI7	FSP40	3104C
Calibration Date	August 28, 2019	18 Nov 2019	July 23, 2019
Calibration Due Date	August 28, 2020	18 Nov 2020	July 23, 2021

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	14m Double Shield RF Cable (20MHz - 6GHz)
Registration No.	EW-0447	EW-1015	EW-2528
Manufacturer	EMCO	EMCO	RADIALL
Model No.	3146	3115	Nm-RG142-
Calibration Date	September 25, 2019	16 May 2019	30 Sep 2019
Calibration Due Date	March 25, 2021	16 Nov 2020	30 Sep 2020

Equipment	Active Loop H-field (9kHz to 30MHz)	RF Preamplifier (9kHz to 6000MHz)	RF Cable 14m (1GHz to 26.5GHz)
Registration No.	EW-3326	EW-3006b	EW-3151
Manufacturer	EMCO	SCHWARZBECK	GREATBILLION
Model No.	6502	BBV9718	SMA m/SHF5MPU /SMA m ra14m,26G
Calibration Date	March 21, 2019	25 Nov 2019	March 04, 2020
Calibration Due Date	September 21, 2020	25 Nov 2020	March 04, 2021

Equipment	2.4GHz Notch Filter	Pyramidal Horn Antenna
Registration No.	EW-3435	EW-0905
Manufacturer	MICROWAVE	EMCO
Model No.	N0324413	3160-09
Calibration Date	16 Nov 2019	July 23, 2019
Calibration Due Date	16 Nov 2020	January 23, 2021

TEST REPORT

2) Conducted Emissions Test

Equipment	RF Cable 80cm (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver
Registration No.	EW-2451	EW-3360	EW-3666
Manufacturer	RADIALL	ROHDESCHWARZ	R&S
Model No.	RF Cable 80cm (RG142) (9kHz to 30MHz)	ENV-216	ESCI7
Calibration Date	December 08, 2019	August 29, 2019	August 28, 2019
Calibration Due Date	December 08, 2020	August 29, 2020	August 28, 2020

3) Conductive Measurement Test

Equipment	Spectrum Analyzer	RF Power Meter with Power Sensor	RF Cable (up to 40GHz) 1.5m length
Registration No.	EW-2253	EW-3309	EW-3104
Manufacturer	ROHDESCHWARZ	ROHDESCHWARZ	N/A
Model No.	FSP40	NRP-Z81	SMA-M to SMA-M
Calibration Date	18 Nov 2019	May 18, 2020	August 26, 2019
Calibration Due Date	18 Nov 2020	May 18, 2021	August 26, 2020

4) Bandwidth/Bandedge Measurement Test

Equipment	Spectrum Analyzer	RF Cable (up to 40GHz) 1.5m length
Registration No.	EW-2253	EW-3104
Manufacturer	ROHDESCHWARZ	N/A
Model No.	FSP40	SMA-M to SMA-M
Calibration Date	18 Nov 2019	August 26, 2019
Calibration Due Date	18 Nov 2020	August 26, 2020