

TEST REPORT

FCC DTS Test for CTS-CISW
Class II Permissive Change

APPLICANT
CanTops Co., Ltd.

REPORT NO.
HCT-RF-2302-FC005

DATE OF ISSUE
February 10, 2023

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<p>TEST REPORT</p> <p>FCC DTS Test for CTS-CISW</p>	<p>REPORT NO. HCT-RF-2302-FC005</p> <p>DATE OF ISSUE February 10, 2023</p> <p>Additional Model CTS-CISW-MNAX, CTS-CISW-BNAX</p>
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Applicant

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Eut Type Model Name	Wireless IoT Station CTS-CISW
FCC ID	RMN-60SIPT
Max. RF Output Power	29.41 dBm
Modulation type	CCK/DSSS/OFDM
FCC Classification	Digital Transmission System(DTS)
FCC Rule Part(s)	Part 15.247

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	February 10, 2023	Initial Release

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

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1. EUT DESCRIPTION

Model	CTS-CISW
Additional Model	CTS-CISW-MNAX, CTS-CISW-BNAX
EUT Type	Wireless IoT Station
Power Supply	DC 24.0 V
Frequency Range	2 412 MHz – 2 462 MHz
Max. RF Output Power	29.41 dBm
Modulation Type	DSSS/CCK : 802.11b OFDM : 802.11g, 802.11n
Number of Channels	11 Channels
Antenna Specification	Antenna type: Internal PCB Antenna
Date(s) of Tests	January 09, 2023 ~ February 06, 2023
EUT serial numbers	Conduction : CW-00637 1.0.1 Radiated : CW-00638 1.0.1

• **Directional Gain Calculation**

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) f) (ii)

Directional gain =

$$\bullet \quad \text{Directional Gain} = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

[2.4G WLAN] CDD

Ant Gain (dBi)		N_{ANT} / N_{SS}	Directional Gain (dBi)
ANT1	3.04		
ANT2	3.04	2 / 2	6.05

[2.4G WLAN] SDM

Ant Gain (dBi)		N_{ANT} / N_{SS}	Directional Gain (dBi)
ANT1	3.04		
ANT2	3.04	2 / 2	3.04

2. TEST METHODOLOGY

FCC KDB 558074 D01 15.247 Meas Guidance v05r02 dated April 02, 2019 entitled “guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices and the measurement procedure described in ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’.

EUT CONFIGURATION

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

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3.75 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

3. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

4. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements. Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of § 15.203

6. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, $k=2$)

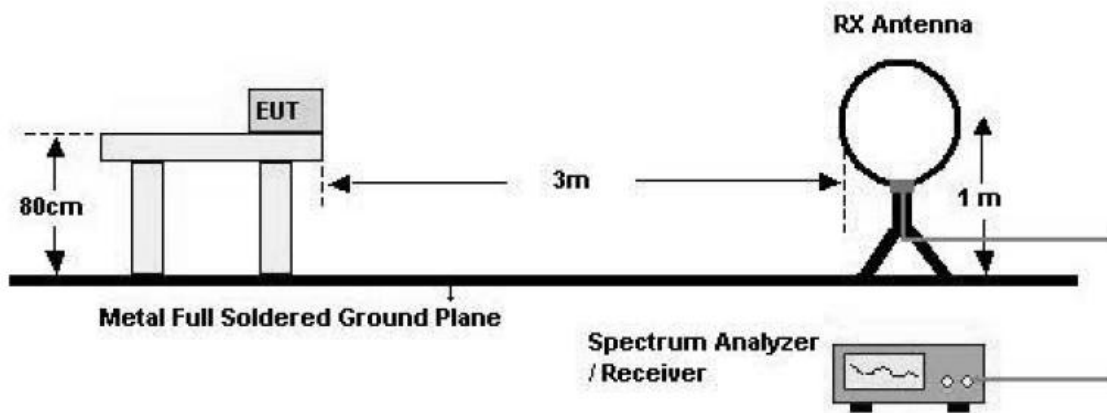
7. DESCRIPTION OF TESTS

7.1. Radiated Test

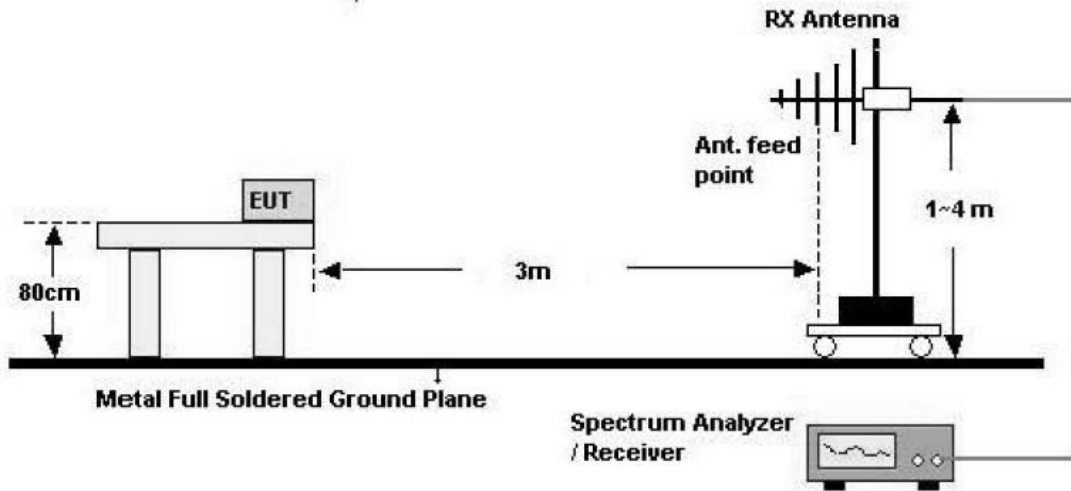
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30

Test Configuration

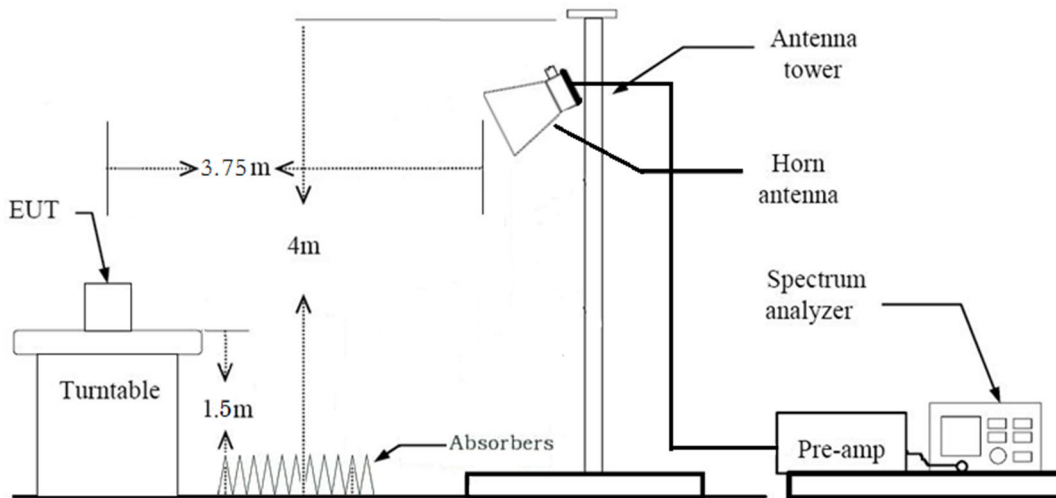
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.

5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = $40\log(3 \text{ m}/300 \text{ m}) = - 80 \text{ dB}$

Measurement Distance : 3 m

7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3 \text{ m}/30 \text{ m}) = - 40 \text{ dB}$

Measurement Distance : 3 m

8. Spectrum Setting

- Frequency Range = 9 kHz ~ 30 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 9 kHz
- VBW $\geq 3 \times$ RBW

9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

6. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak

- Trace = Maxhold
- RBW = 100 kHz
- VBW \geq 3 x RBW

(2) Measurement Type(Quasi-peak):

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

In general, (1) is used mainly

7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)

8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - ◆ Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting (Method 8.6 in KDB 558074 v05r02, Procedure 11.12 in ANSI 63.10-2013)
 - (1) Measurement Type(Peak):
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average): Duty cycle \geq 98%
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - Sweep time = auto.
 - Trace mode = average (at least 100 traces).
 - (3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than $\pm 2\%$
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = RMS
 - Averaging type = power (*i.e.*, RMS)
 - RBW = 1 MHz

- $VBW \geq 3 \times RBW$
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

11. Total(Measurement Type : Peak)

= Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle \geq 98%)

= Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Total(Measurement Type : Average, Duty cycle < 98%)

= Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

+ Duty Cycle Factor

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
 - ◆ Distance extrapolation factor = $20 \log(\text{test distance} / \text{specific distance})$ (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both

horizontal and vertical.

8. The unit was tested with its standard battery.

9. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW \geq 3 x RBW

(2) Measurement Type(Average): Duty cycle \geq 98%,

- Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW \geq 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).

(3) Measurement Type(Average): Duty cycle < 98%, duty cycle variations are less than $\pm 2\%$

- Measured Frequency Range : 2310 MHz ~ 2390 MHz/ 2483.5 MHz ~ 2500 MHz
- Detector = RMS
- Averaging type = power (*i.e.*, RMS)
- RBW = 1 MHz
- VBW \geq 3 x RBW
- Sweep time = auto.
- Trace mode = average (at least 100 traces).
- Correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle.
- Duty Cycle Factor (dB) : Please refer to the please refer to section 9.1.

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

11. Total(Measurement Type : Peak)

= Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – AMP Gain (A.G)
+Attenuator(ATT)

Total(Measurement Type : Average, Duty cycle \geq 98%)

= Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – AMP Gain (A.G)
+Attenuator(ATT)

Total(Measurement Type : Average, Duty cycle < 98%)

= Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) – AMP Gain (A.G)
+Attenuator(ATT) + Duty Cycle Factor

7.2 Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone
 - Worstcase : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : X
 - Radiated Restricted Band Edge : X
3. All tests are performed in continuous transmission mode. (Duty cycle >98%)
4. All data rate of operation were investigated and the test results are worst case in lowest datarate of each mode.
 - 802.11b : 1Mbps
 - 802.11g : 6Mbps
 - 802.11n_HT20 : MCS0
 - 802.11n_HT40 : MCS0
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
 - Position : Horizontal, Vertical, Parallel to the ground plane

8. SUMMARY TEST OF RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
6 dB Bandwidth	§ 15.247(a)(2)	> 500 kHz	Conducted	NT ^{Note2}
Conducted Maximum Output Power	§ 15.247(b)(3)	< 1 Watt		NT ^{Note2}
Power Spectral Density	§ 15.247(e)	< 8 dBm / 3 kHz Band		NT ^{Note2}
Band Edge (Out of Band Emissions)	§ 15.247(d)	Conducted > 30 dBc		NT ^{Note2}
AC Power line Conducted Emissions	§ 15.207	cf. Section 7.7		NT ^{Note2}
Radiated Spurious Emissions	§ 15.247(d), 15.205, 15.209	cf. Section 7.6	Radiated	C ^{Note3}
Radiated Restricted Band Edge	§ 15.247(d), 15.205, 15.209	cf. Section 7.6		C ^{Note3}

Note:

1. C = Comply, NT = Not Tested, NA = Not Applicable, NC = Not Comply
2. C2PC model is electrically identical to the Original model.
The Product Equality Declaration includes detailed information about the changes between the devices.
3. The data from that application has been verified through appropriate spot checks to demonstrate compliance for this device as shown in the test result of section 10
4. Output power was verified to be within the expected tune up tolerances prior to performing the spot checks for radiated spurious emissions and band edge to confirm that the proposed changes to the digital circuitry had not adversely affected the previously reported values in the original filing.

9. TEST RESULT

9.1 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	A.F+C.L+D.F	Ant. POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]

No Critical peaks found

Note:

1. The Measured value of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = $40\log(\text{specific distance} / \text{test distance})$ (dB)
3. Limit line = specific Limits (dB μ V) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	Ant. POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]

No Critical peaks found

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode.

[Only MIMO(CDD)]
Frequency Range : Above 1 GHz

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2 412 MHz
Channel No.	01 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB μ V]	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	Type
3617	50.49	-2.60	V	47.89	73.98	26.09	PK
3617	35.12	-2.60	V	32.52	53.98	21.46	AV
4824	48.37	3.57	V	51.94	73.98	22.04	PK
4824	43.26	3.57	V	46.83	53.98	7.15	AV
7236	42.18	12.30	V	54.48	73.98	19.51	PK
7236	32.77	12.30	V	45.07	53.98	8.92	AV
16884	45.79	15.24	V	61.03	Non-Restricted Band		PK
16884	37.52	15.24	V	52.76	Non-Restricted Band		AV
3617	51.52	-2.60	H	48.92	73.98	25.06	PK
3617	36.38	-2.60	H	33.78	53.98	20.20	AV
4824	49.56	3.57	H	53.13	73.98	20.85	PK
4824	44.95	3.57	H	48.52	53.98	5.46	AV
7236	43.77	12.30	H	56.07	73.98	17.92	PK
7236	33.82	12.30	H	46.12	53.98	7.87	AV
16884	53.04	15.24	H	68.28	Non-Restricted Band		PK
16884	48.24	15.24	H	63.48	Non-Restricted Band		AV

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2 437 MHz
Channel No.	06 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
3655	54.42	-2.58	V	51.84	73.98	22.14	PK
3655	47.54	-2.58	V	44.96	53.98	9.02	AV
4874	48.47	3.76	V	52.23	73.98	21.76	PK
4874	45.16	3.76	V	48.92	53.98	5.07	AV
7311	43.91	11.51	V	55.42	73.98	18.56	PK
7311	35.26	11.51	V	46.77	53.98	7.21	AV
17060	47.57	15.37	V	62.94	Non-Restricted Band		PK
17060	41.39	15.37	V	56.76	Non-Restricted Band		AV
3655	53.18	-2.58	V	50.60	73.98	23.38	PK
3655	46.35	-2.58	V	43.77	53.98	10.21	AV
4874	49.83	3.76	H	53.59	73.98	20.40	PK
4874	45.80	3.76	H	49.56	53.98	4.43	AV
7311	44.80	11.51	H	56.31	73.98	17.67	PK
7311	36.54	11.51	H	48.05	53.98	5.93	AV
17060	51.09	15.37	V	66.46	Non-Restricted Band		PK
17060	46.00	15.37	V	61.37	Non-Restricted Band		AV

Operation Mode:	802.11b
Transfer MCS Index:	1 Mbps
Operating Frequency	2 462 MHz
Channel No.	11 Ch

Frequency	Measured Value	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dBμV]	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	Type
3685	48.75	-2.08	V	46.67	73.98	27.31	PK
3685	37.28	-2.08	V	35.20	53.98	18.78	AV
4924	47.63	4.78	V	52.41	73.98	21.57	PK
4924	42.49	4.78	V	47.27	53.98	6.71	AV
7386	42.62	12.03	V	54.65	73.98	19.33	PK
7386	35.29	12.03	V	47.32	53.98	6.66	AV
17234	44.55	17.29	V	61.84	Non-Restricted Band		PK
17234	36.68	17.29	V	53.97	Non-Restricted Band		AV
3685	50.03	-2.08	H	47.95	73.98	26.03	PK
3685	38.14	-2.08	H	36.06	53.98	17.92	AV
4924	46.74	4.78	H	51.52	73.98	22.46	PK
4924	41.67	4.78	H	46.45	53.98	7.53	AV
7386	44.73	12.03	H	56.76	73.98	17.22	PK
7386	36.40	12.03	H	48.43	53.98	5.55	AV
17234	46.32	17.29	H	63.61	Non-Restricted Band		PK
17234	39.46	17.29	H	56.75	Non-Restricted Band		AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2 412 MHz
 Channel No.: 01 Ch

Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
3617	51.64	0.00	-2.60	V	49.04	73.98	24.94	PK
3617	39.67	0.00	-2.60	V	37.07	53.98	16.91	AV
4824	46.72	0.00	3.57	V	50.29	73.98	23.69	PK
4824	33.29	0.00	3.57	V	36.86	53.98	17.12	AV
7236	41.27	0.00	12.30	V	53.57	73.98	20.42	PK
7236	30.25	0.00	12.30	V	42.55	53.98	11.44	AV
16884	52.45	0.00	15.24	H	15.24	Non-Restricted Band		PK
16884	38.61	0.00	15.24	H	15.24	Non-Restricted Band		AV
3617	52.33	0.00	-2.60	H	49.73	73.98	24.25	PK
3617	40.14	0.00	-2.60	H	37.54	53.98	16.44	AV
4824	47.64	0.00	3.57	H	51.21	73.98	22.77	PK
4824	34.66	0.00	3.57	H	38.23	53.98	15.75	AV
7236	42.74	0.00	12.30	H	55.04	73.98	18.95	PK
7236	30.57	0.00	12.30	H	42.87	53.98	11.12	AV
16884	53.09	0.00	15.24	H	15.24	Non-Restricted Band		PK
16884	39.27	0.00	15.24	H	15.24	Non-Restricted Band		AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2 437 MHz
Channel No.	06 Ch

Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	Factor	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
3655	53.33	0.00	-2.58	V	-2.58	73.98	76.56	PK
3655	43.18	0.00	-2.58	V	-2.58	53.98	56.56	AV
4874	47.53	0.00	3.76	V	51.29	73.98	22.70	PK
4874	35.29	0.00	3.76	V	39.05	53.98	14.94	AV
7311	43.80	0.00	11.51	V	55.31	73.98	18.67	PK
7311	32.18	0.00	11.51	V	43.69	53.98	10.29	AV
17060	52.16	0.00	15.37	V	67.53	Non-Restricted Band		PK
17060	38.69	0.00	15.37	V	54.06	Non-Restricted Band		AV
3655	52.55	0.00	-2.58	H	-2.58	73.98	76.56	PK
3655	42.67	0.00	-2.58	H	-2.58	53.98	56.56	AV
4874	48.57	0.00	3.76	H	52.33	73.98	21.66	PK
4874	36.38	0.00	3.76	H	40.14	53.98	13.85	AV
7311	45.16	0.00	11.51	H	56.67	73.98	17.31	PK
7311	33.08	0.00	11.51	H	44.59	53.98	9.39	AV
17060	53.17	0.00	15.37	V	68.54	Non-Restricted Band		PK
17060	39.78	0.00	15.37	V	55.15	Non-Restricted Band		AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2 462 MHz
Channel No.	11 Ch

Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	Factor	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
3685	48.06	0.00	-2.08	V	45.98	73.98	28.00	PK
3685	35.29	0.00	-2.08	V	33.21	53.98	20.77	AV
4924	45.23	0.00	4.78	V	50.01	73.98	23.97	PK
4924	32.77	0.00	4.78	V	37.55	53.98	16.43	AV
7386	42.57	0.00	12.03	V	54.60	73.98	19.38	PK
7386	30.68	0.00	12.03	V	42.71	53.98	11.27	AV
17234	43.82	0.00	17.23	V	17.23	Non-Restricted Band		PK
17234	31.69	0.00	17.23	V	17.23	Non-Restricted Band		AV
3685	48.63	0.00	-2.08	H	46.55	73.98	27.43	PK
3685	36.85	0.00	-2.08	H	34.77	53.98	19.21	AV
4924	44.77	0.00	4.78	H	49.55	73.98	24.43	PK
4924	31.46	0.00	4.78	H	36.24	53.98	17.74	AV
7386	43.35	0.00	12.03	H	55.38	73.98	18.60	PK
7386	31.04	0.00	12.03	H	43.07	53.98	10.91	AV
17234	45.21	0.00	17.23	H	17.23	Non-Restricted Band		PK
17234	32.11	0.00	17.23	H	17.23	Non-Restricted Band		AV

Operation Mode:	802.11n_HT20
MCS Index:	0
Operating Frequency	2 412 MHz
Channel No.	01 Ch

Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	Factor	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
3617	49.76	0.00	-2.60	V	47.16	73.98	26.82	PK
3617	38.47	0.00	-2.60	V	35.87	53.98	18.11	AV
4824	45.17	0.00	3.57	V	48.74	73.98	25.24	PK
4824	33.28	0.00	3.57	V	36.85	53.98	17.13	AV
7236	40.43	0.00	12.30	V	52.73	73.98	21.26	PK
7236	29.49	0.00	12.30	V	41.79	53.98	12.20	AV
16884	51.66	0.00	15.24	V	15.24	Non-Restricted Band		PK
16884	37.29	0.00	15.24	V	15.24	Non-Restricted Band		AV
3617	50.90	0.00	-2.60	H	48.30	73.98	25.68	PK
3617	39.61	0.00	-2.60	H	37.01	53.98	16.97	AV
4824	46.56	0.00	3.57	H	50.13	73.98	23.85	PK
4824	34.01	0.00	3.57	H	37.58	53.98	16.40	AV
7236	41.93	0.00	12.30	H	54.23	73.98	19.76	PK
7236	30.21	0.00	12.30	H	42.51	53.98	11.48	AV
16884	52.57	0.00	15.24	H	15.24	Non-Restricted Band		PK
16884	38.49	0.00	15.24	H	15.24	Non-Restricted Band		AV

Operation Mode:	802.11n_HT20
MCS Index:	0
Operating Frequency	2 437 MHz
Channel No.	06 Ch

Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	Factor	[dB]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
3655	55.03	0.00	-2.58	V	52.45	73.98	21.53	PK
3655	44.91	0.00	-2.58	V	42.33	53.98	11.65	AV
4874	48.47	0.00	3.76	V	52.23	73.98	21.76	PK
4874	35.81	0.00	3.76	V	39.57	53.98	14.42	AV
7311	43.56	0.00	11.51	V	55.07	73.98	18.91	PK
7311	31.54	0.00	11.51	V	43.05	53.98	10.93	AV
17060	52.67	0.00	15.37	V	68.04	Non-Restricted Band		PK
17060	38.61	0.00	15.37	V	53.98	Non-Restricted Band		AV
3655	54.19	0.00	-2.58	H	51.61	73.98	22.37	PK
3655	43.72	0.00	-2.58	H	41.14	53.98	12.84	AV
4874	49.29	0.00	3.76	H	53.05	73.98	20.94	PK
4874	36.48	0.00	3.76	H	40.24	53.98	13.75	AV
7311	44.87	0.00	11.51	H	56.38	73.98	17.60	PK
7311	32.72	0.00	11.51	H	44.23	53.98	9.75	AV
17060	53.37	0.00	15.37	H	68.74	Non-Restricted Band		PK
17060	39.75	0.00	15.37	H	55.12	Non-Restricted Band		AV

Operation Mode:	802.11n_HT20
MCS Index:	0
Operating Frequency	2 462 MHz
Channel No.	11 Ch

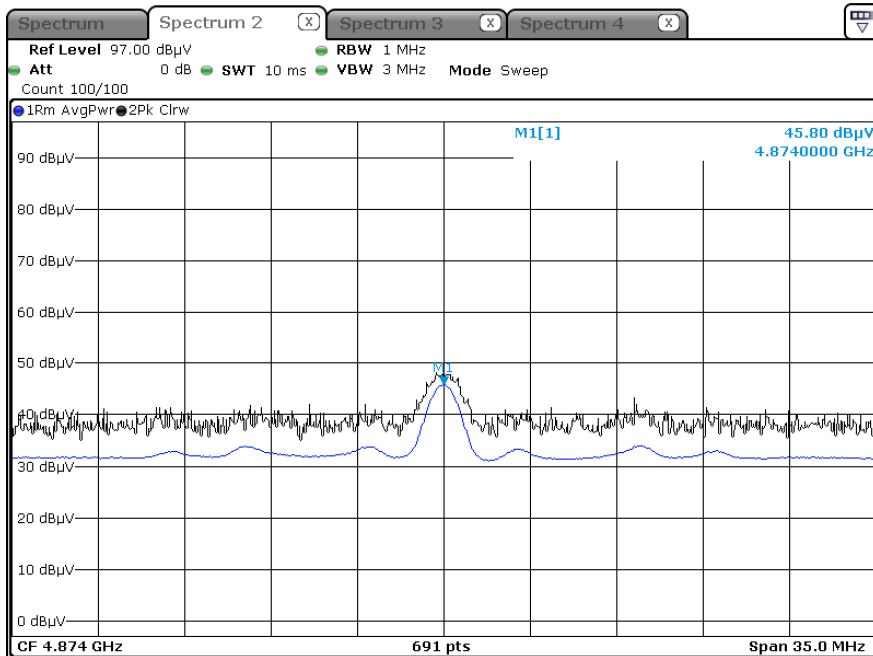
Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
3685	49.56	0.00	-2.08	V	47.48	73.98	26.50	PK
3685	36.57	0.00	-2.08	V	34.49	53.98	19.49	AV
4924	44.59	0.00	4.78	V	49.37	73.98	24.61	PK
4924	32.18	0.00	4.78	V	36.96	53.98	17.02	AV
7386	41.37	0.00	12.03	V	53.40	73.98	20.58	PK
7386	30.04	0.00	12.03	V	42.07	53.98	11.91	AV
17234	43.94	0.00	17.23	V	17.23	Non-Restricted Band		PK
17234	30.26	0.00	17.23	V	17.23	Non-Restricted Band		AV
3685	48.37	0.00	-2.08	H	46.29	73.98	27.69	PK
3685	37.07	0.00	-2.08	H	34.99	53.98	18.99	AV
4924	43.42	0.00	4.78	H	48.20	73.98	25.78	PK
4924	31.72	0.00	4.78	H	36.50	53.98	17.48	AV
7386	42.59	0.00	12.03	H	54.62	73.98	19.36	PK
7386	30.20	0.00	12.03	H	42.23	53.98	11.75	AV
17234	44.33	0.00	17.23	H	17.23	Non-Restricted Band		PK
17234	31.36	0.00	17.23	H	17.23	Non-Restricted Band		AV

Operation Mode:	802.11n_HT40
MCS Index:	0
Operating Frequency	2 437 MHz
Channel No.	6 Ch

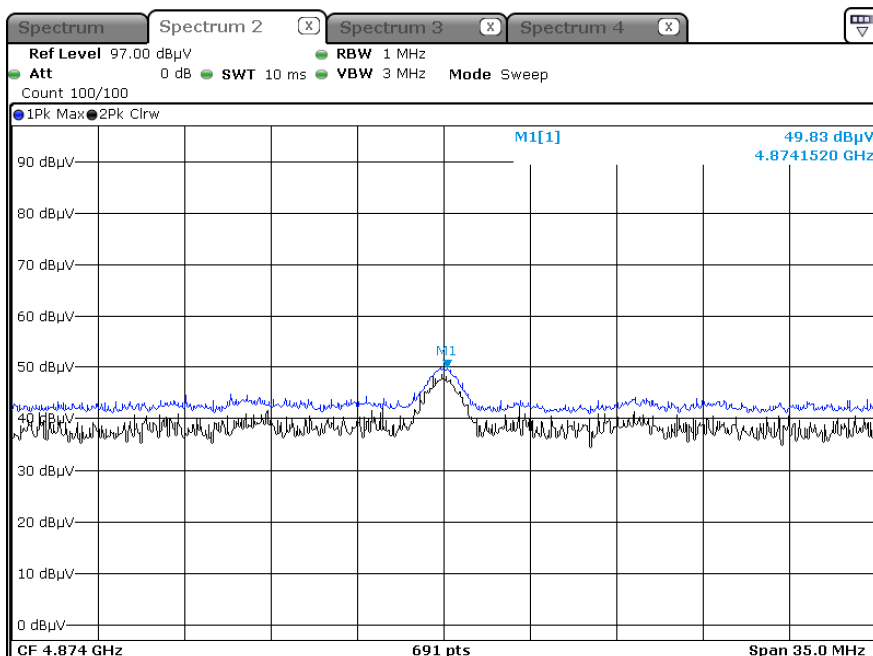
Frequency	Measured Value	Duty Cycle	A.F+C.L-A.G+D.F	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dBμV]	Factor	[dB]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
3655	50.91	0.00	-2.55	V	48.36	73.98	25.62	PK
3655	39.64	0.00	-2.55	V	37.09	53.98	16.89	AV
4874	44.87	0.00	3.76	V	48.63	73.98	25.36	PK
4874	33.72	0.00	3.76	V	37.48	53.98	16.51	AV
7311	41.98	0.00	11.51	V	53.49	73.98	20.49	PK
7311	30.31	0.00	11.51	V	41.82	53.98	12.16	AV
17060	47.66	0.00	15.37	V	63.03	Non-Restricted Band		PK
17060	35.62	0.00	15.37	V	50.99	Non-Restricted Band		AV
3655	49.68	0.00	-2.55	V	47.13	73.98	26.85	PK
3655	38.57	0.00	-2.55	V	36.02	53.98	17.96	AV
4874	46.10	0.00	3.76	H	49.86	73.98	24.13	PK
4874	34.29	0.00	3.76	H	38.05	53.98	15.94	AV
7311	42.62	0.00	11.51	H	54.13	73.98	19.85	PK
7311	30.81	0.00	11.51	H	42.32	53.98	11.66	AV
17060	48.65	0.00	15.37	H	64.02	Non-Restricted Band		PK
17060	36.36	0.00	15.37	H	51.73	Non-Restricted Band		AV

▣ Test Plots (Worst case : X-H)

Radiated Spurious Emissions plot – Average Measured Value (802.11b, Ch.6 2nd Harmonic)



Radiated Spurious Emissions plot – Peak Measured Value (802.11b, Ch.6 2nd Harmonic)



Note:

Plot of worst case are only reported.

9.2 RADIATED RESTRICTED BAND EDGES

[Olny MIMO(CDD)]

Operation Mode:	802.11b
Transfer Rate:	1 Mbps
Operating Frequency	2 412 MHz, 2 462 MHz
Channel No.	01 Ch, 11 Ch

Frequency	Measured Value	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	52.62	2.20	H	54.82	73.98	19.16	PK
2390.0	43.19	2.20	H	45.39	53.98	8.59	AV
2390.0	53.94	2.20	V	56.14	73.98	17.84	PK
2390.0	44.60	2.20	V	46.80	53.98	7.18	AV
2483.5	52.19	2.45	H	54.64	73.98	19.34	PK
2483.5	40.63	2.45	H	43.08	53.98	10.90	AV
2483.5	53.71	2.45	V	56.16	73.98	17.82	PK
2483.5	41.75	2.45	V	44.20	53.98	9.78	AV

Operation Mode:	802.11g
Transfer Rate:	6 Mbps
Operating Frequency	2 412 MHz, 2 462 MHz
Channel No.	01 Ch, 11 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	61.81	0.00	2.20	H	64.01	73.98	9.97	PK
2390.0	44.16	0.00	2.20	H	46.36	53.98	7.62	AV
2390.0	62.23	0.00	2.20	V	64.43	73.98	9.55	PK
2390.0	45.95	0.00	2.20	V	48.15	53.98	5.83	AV
2483.5	54.61	0.00	2.45	H	57.06	73.98	16.92	PK
2483.5	40.55	0.00	2.45	H	43.00	53.98	10.98	AV
2483.5	55.55	0.00	2.45	V	58.00	73.98	15.98	PK
2483.5	41.67	0.00	2.45	V	44.12	53.98	9.86	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2 417 MHz, 2 457 MHz
 Channel No.: 02 Ch, 10 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	59.66	0.00	2.20	H	61.86	73.98	12.12	PK
2390.0	43.28	0.00	2.20	H	45.48	53.98	8.50	AV
2390.0	60.25	0.00	2.20	V	62.45	73.98	11.53	PK
2390.0	44.51	0.00	2.20	V	46.71	53.98	7.27	AV
2483.5	60.49	0.00	2.45	H	62.94	73.98	11.04	PK
2483.5	42.34	0.00	2.45	H	44.79	53.98	9.19	AV
2483.5	61.15	0.00	2.45	V	63.60	73.98	10.38	PK
2483.5	43.58	0.00	2.45	V	46.03	53.98	7.95	AV

Operation Mode: 802.11g
 Transfer Rate: 6 Mbps
 Operating Frequency: 2 422 MHz, 2 452 MHz
 Channel No.: 03 Ch, 09 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	61.21	0.00	2.20	H	63.41	73.98	10.57	PK
2390.0	46.57	0.00	2.20	H	48.77	53.98	5.21	AV
2390.0	62.56	0.00	2.20	V	64.76	73.98	9.22	PK
2390.0	47.18	0.00	2.20	V	49.38	53.98	4.60	AV
2483.5	65.34	0.00	2.45	H	67.79	73.98	6.19	PK
2483.5	45.19	0.00	2.45	H	47.64	53.98	6.34	AV
2483.5	66.12	0.00	2.45	V	68.57	73.98	5.41	PK
2483.5	46.90	0.00	2.45	V	49.35	53.98	4.63	AV

Operation Mode: 802.11n (HT20)
 Transfer Rate: MCS0
 Operating Frequency: 2 412 MHz, 2 462 MHz
 Channel No. 01 Ch, 11 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	57.62	0.00	2.20	H	59.82	73.98	14.16	PK
2390.0	43.29	0.00	2.20	H	45.49	53.98	8.49	AV
2390.0	59.62	0.00	2.20	V	61.82	73.98	12.16	PK
2390.0	44.65	0.00	2.20	V	46.85	53.98	7.13	AV
2483.5	52.41	0.00	2.45	H	54.86	73.98	19.12	PK
2483.5	40.72	0.00	2.45	H	43.17	53.98	10.81	AV
2483.5	54.43	0.00	2.45	V	56.88	73.98	17.10	PK
2483.5	41.39	0.00	2.45	V	43.84	53.98	10.14	AV

Operation Mode: 802.11n (HT20)
 Transfer Rate: MCS0
 Operating Frequency: 2 417 MHz, 2 457 MHz
 Channel No. 02 Ch, 10 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	59.57	0.00	2.20	H	61.77	73.98	12.21	PK
2390.0	42.96	0.00	2.20	H	45.16	53.98	8.82	AV
2390.0	60.99	0.00	2.20	V	63.19	73.98	10.79	PK
2390.0	44.06	0.00	2.20	V	46.26	53.98	7.72	AV
2483.5	61.81	0.00	2.45	H	64.26	73.98	9.72	PK
2483.5	42.25	0.00	2.45	H	44.70	53.98	9.28	AV
2483.5	62.62	0.00	2.45	V	65.07	73.98	8.91	PK
2483.5	43.26	0.00	2.45	V	45.71	53.98	8.27	AV

Operation Mode: 802.11n (HT20)
 Transfer Rate: MCS0
 Operating Frequency: 2 422 MHz, 2 452 MHz
 Channel No.: 03 Ch, 09 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	61.42	0.00	2.20	H	63.62	73.98	10.36	PK
2390.0	45.38	0.00	2.20	H	47.58	53.98	6.40	AV
2390.0	62.77	0.00	2.20	V	64.97	73.98	9.01	PK
2390.0	46.87	0.00	2.20	V	49.07	53.98	4.91	AV
2483.5	63.02	0.00	2.45	H	65.47	73.98	8.51	PK
2483.5	45.29	0.00	2.45	H	47.74	53.98	6.24	AV
2483.5	63.78	0.00	2.45	V	66.23	73.98	7.75	PK
2483.5	46.66	0.00	2.45	V	49.11	53.98	4.87	AV

Operation Mode: 802.11n (HT40)
 Transfer Rate: MCS0
 Operating Frequency: 2 422 MHz, 2 452 MHz
 Channel No.: 03 Ch, 09 Ch

Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	57.40	0.00	2.20	H	59.60	73.98	14.38	PK
2390.0	44.92	0.00	2.20	H	47.12	53.98	6.86	AV
2390.0	58.62	0.00	2.20	V	60.82	73.98	13.16	PK
2390.0	46.07	0.00	2.20	V	48.27	53.98	5.71	AV
2483.5	51.86	0.00	2.45	H	54.31	73.98	19.67	PK
2483.5	40.67	0.00	2.45	H	43.12	53.98	10.86	AV
2483.5	53.61	0.00	2.45	V	56.06	73.98	17.92	PK
2483.5	41.89	0.00	2.45	V	44.34	53.98	9.64	AV

Operation Mode: 802.11n (HT40)
 Transfer Rate: MCS0
 Operating Frequency: 2 427 MHz, 2 447 MHz
 Channel No. 04 Ch, 08 Ch

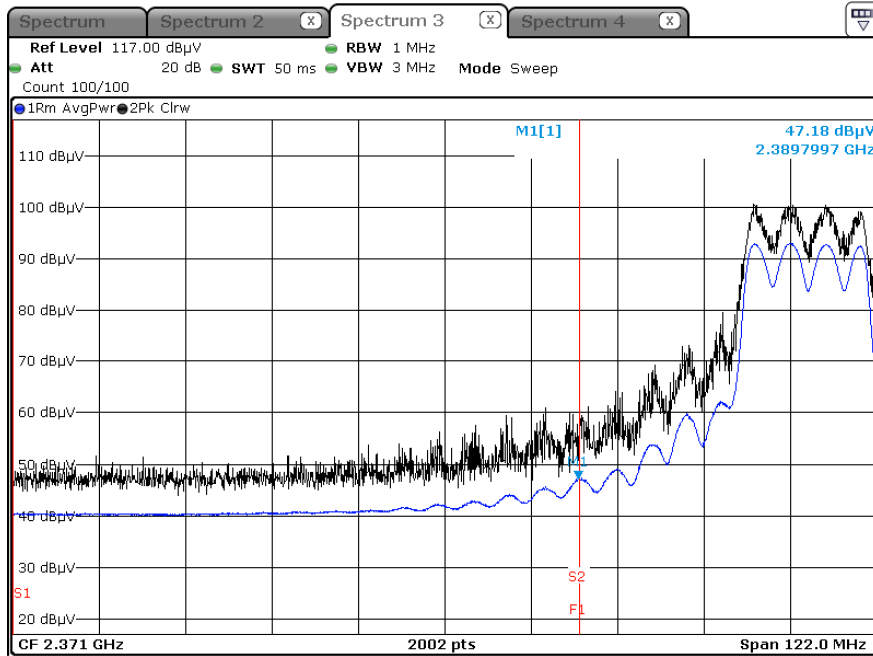
Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	56.82	0.00	2.20	H	59.02	73.98	14.96	PK
2390.0	46.21	0.00	2.20	H	48.41	53.98	5.57	AV
2390.0	57.64	0.00	2.20	V	59.84	73.98	14.14	PK
2390.0	47.16	0.00	2.20	V	49.36	53.98	4.62	AV
2483.5	55.18	0.00	2.45	H	57.63	73.98	16.35	PK
2483.5	41.60	0.00	2.45	H	44.05	53.98	9.93	AV
2483.5	56.40	0.00	2.45	V	58.85	73.98	15.13	PK
2483.5	42.68	0.00	2.45	V	45.13	53.98	8.85	AV

Operation Mode: 802.11n (HT40)
 Transfer Rate: MCS0
 Operating Frequency: 2 432 MHz, 2 437 MHz
 Channel No. 05 Ch, 06 Ch

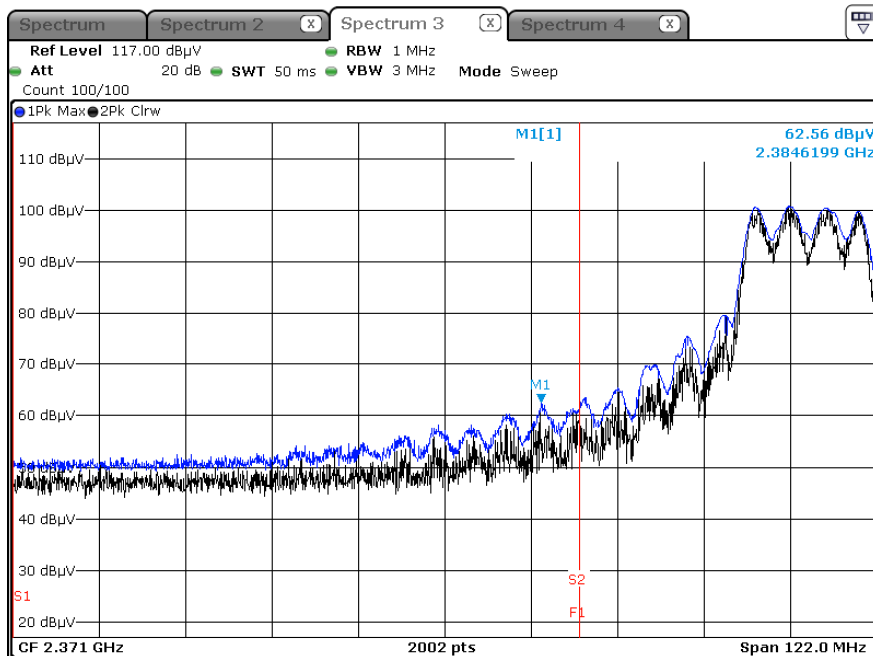
Frequency	Measured Value	Duty Cycle Factor	A.F.+CL+ATT-A.G	ANT. POL	Total	Limit	Margin	Measurement Type
[MHz]	[dB μ V]	[dB]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
2390.0	56.27	0.00	2.20	H	58.47	73.98	15.51	PK
2390.0	45.49	0.00	2.20	H	47.69	53.98	6.29	AV
2390.0	57.90	0.00	2.20	V	60.10	73.98	13.88	PK
2390.0	46.23	0.00	2.20	V	48.43	53.98	5.55	AV
2483.5	58.62	0.00	2.45	H	61.07	73.98	12.91	PK
2483.5	42.57	0.00	2.45	H	45.02	53.98	8.96	AV
2483.5	60.92	0.00	2.45	V	63.37	73.98	10.61	PK
2483.5	44.33	0.00	2.45	V	46.78	53.98	7.20	AV

▣ Test Plots

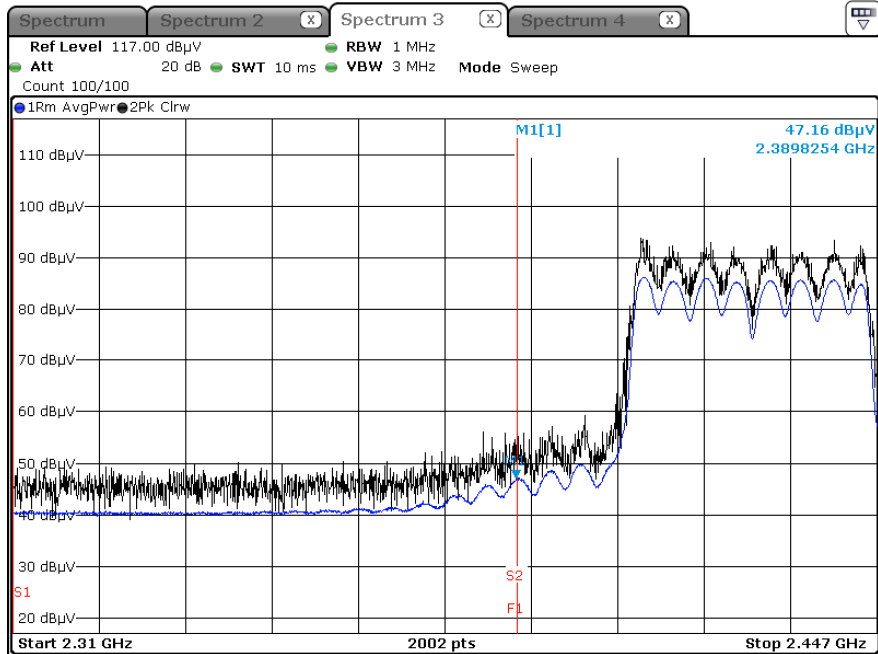
Radiated Restricted Band Edges plot – Average Measured Value (802.11g, Ch.3, Y-V)



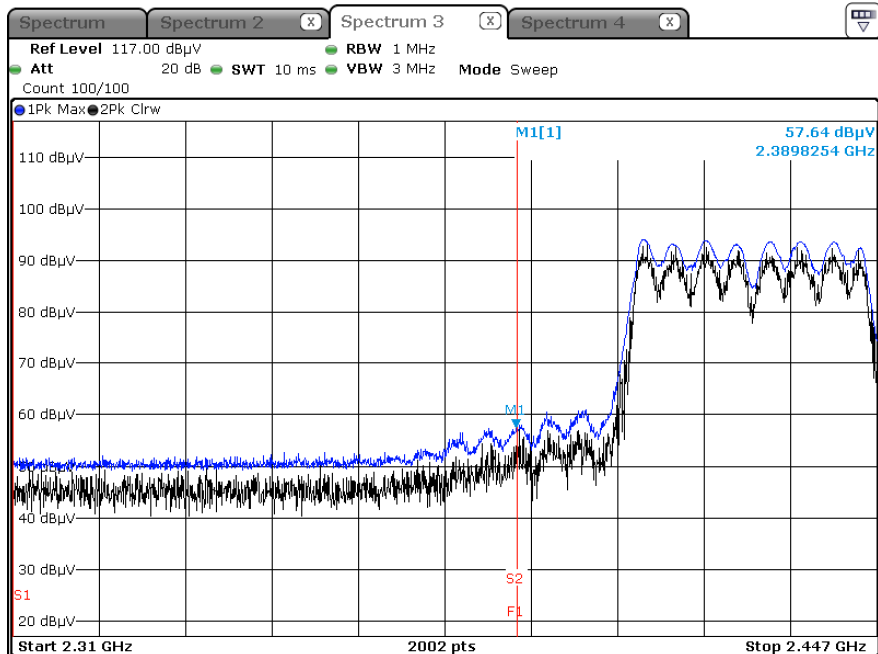
Radiated Restricted Band Edges plot – Peak Measured Value (802.11g, Ch.3, Y-V)



Radiated Restricted Band Edges plot – Average Measured Value (802.11n (HT40), Ch.4, Y-V)



Radiated Restricted Band Edges plot – Peak Measured Value (802.11n (HT40), Ch.4, Y-V)



Note:

Plot of worst case are only reported.

11. LIST OF TEST EQUIPMENT

Radiated Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	760	02/22/2023	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	02299	03/24/2024	Biennial
Horn Antenna (15GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Spectrum Analyzer	FSV40-N	Rohde & Schwarz	102168	07/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY52350879	01/02/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/05/2024	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
High Pass Filter	WHK3.0/18G-10EF	Wainwright Instruments	8	01/16/2024	Annual
High Pass Filter	WHKX8-6090-7000-18000-40SS	Wainwright Instruments	25	01/16/2024	Annual
Attenuator (3 dB)	18B-03	Api tech.	1	05/23/2023	Annual
Attenuator(10 dB)	8493C-10	Agilent	08285	06/21/2023	Annual
Power Amplifier	CBLU1183540	CERNEX	22964	01/16/2024	Annual
Power Amplifier	CBL06185030	CERNEX	22965	01/16/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).