

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-248-RWD-004
Reception No. : 2403001027
Applicant : OTOS Wing Co.,Ltd.
Address : 49, Dusan-ro 11-gil, Geumcheon-gu, Seoul, Korea
Manufacturer : OTOS Wing Co.,Ltd.
Address : 49, Dusan-ro 11-gil, Geumcheon-gu, Seoul, Korea
Type of Equipment : Welding Camera
FCC ID. : 2BHHTWGC400
Model Name : WGC400
Multiple Model Name : N/A
Serial number : N/A
Total page of Report : 62 pages (including this page)
Date of Incoming : April 24, 2024
Date of issue : August 05, 2024

SUMMARY

The equipment complies with the regulation; **FCC PART 15 SUBPART C Section 15.247**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

This report is not correlated with the "KS Q ISO/IEC 17025 and KOLAS accreditation" of Korean Laboratory Accreditation Scheme.



Tested by
 Si-eon Lee / Senior Project Engineer
 ONETECH Corp.



Reviewed by
 Tae-Ho, Kim / Chief Engineer
 ONETECH Corp.



Approved by
 Jae-Ho, Lee / Chief Engineer
 ONETECH Corp.

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※ Please refer to the Annex section for All test plots

Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-248-RWD-004	August 05, 2024	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : OTOS Wing Co.,Ltd.
Address : 49, Dusan-ro 11-gil, Geumcheon-gu, Seoul, Korea
Contact Person : Kim, Byeong Ryeol / CTO
Telephone No. : +82-2-700-8090
FCC ID : 2BHHTWGC400
Model Name : WGC400
Brand Name : -
Serial Number : N/A
Date : August 05, 2024

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	Welding Camera
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2013
TYPE OF EQUIPMENT TESTED	Pre-Production
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	Certification
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SUBPART C Section 15.247 KDB 558074 D01 15.247 Meas Guidance v05r02
Modifications on the Equipment to Achieve Compliance	None
Final Test was Conducted On	3 m, Semi Anechoic Chamber

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
15.247 (a) (2)	Minimum 6 dB Bandwidth	Met the Limit / PASS
15.247 (b) (3)	Maximum Conducted(Average) Output Power	Met the Limit / PASS
15.247 (d)	100 kHz Bandwidth Outside the Frequency Band	Met the Limit / PASS
15.247 (d)	Radiated Emission which fall in the Restricted Band	Met the Limit / PASS
15.247 (e)	Average Power Spectral Density	Met the Limit / PASS
15.209	Radiated Emission Limits	Met the Limit / PASS
15.207	Conducted Limits	Met the Limit / PASS
15.203	Antenna Requirement	Met requirement / PASS

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Original submittal only

2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in FCC PART 15 SUBPART C Section 15.247.

2.5 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

-. Lab Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. GENERAL INFORMATION

3.1 Product Description

The OTOS Wing Co.,Ltd., Model WGC400 (referred to as the EUT in this report) is a Welding Camera. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	Welding Camera	
OPERATING FREQUENCY	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20)) 2 422 MHz ~ 2 452 MHz (802.11n(HT40))	
MODULATION TYPE	802.11b: DSSS Modulation (DBPSK/DQPSK/CCK) 802.11g/n(HT20)/n(HT40): OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	
RF OUTPUT POWER	Antenna 0	15.67 dBm(802.11b) 16.13 dBm(802.11g) 13.15 dBm(802.11n_HT20) 13.21 dBm(802.11n_HT40)
	Antenna 1	14.04 dBm(802.11b) 14.63 dBm(802.11g) 12.13 dBm(802.11n_HT20) 12.34 dBm(802.11n_HT40)
	Multiple Antenna	14.83 dBm(802.11n_HT20) 15.60 dBm(802.11n_HT40)
ANTENNA TYPE	Dipole Antenna	
ANTENNA GAIN	Antenna 0	-1.20 dBi
	Antenna 1	-1.20 dBi
	Multiple Antenna	1.81 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	32.768 KHz, 19.200 MHz, 27.000 MHz	

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

4. EUT MODIFICATIONS

-. None

5. SYSTEM TEST CONFIGURATION

5.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	OTOS Wing Co.,Ltd.	N/A	N/A

5.2 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
WGC400	OTOS Wing Co.,Ltd.	Welding Camera (EUT)	-
Ideapad320	LENOVO	Notebook PC	EUT

5.3 Mode of operation during the test

For the testing, software used to control the EUT for staying in continuous transmitting mode is programmed.

-. Frequency / Channel Operations

Channel	Frequency
1	2 412
2	2 417
3	2 422
4	2 427
5	2 432
6	2 437
7	2 442
8	2 447
9	2 452
10	2 457
11	2 462

-. Power Level Setting

Operating Frequency / Modulation			Power Level Setting			
			SISO		MIMO	
			Ant 0	Ant 1	Ant 0	Ant 1
WLAN 2.4 GHz (2 412 MHz ~ 2 462 MHz)	802.11 b	2 412 MHz	66	65	-	-
		2 437 MHz	63	61	-	-
		2 462 MHz	66	63	-	-
	802.11 g	2 412 MHz	70	73	-	-
		2 437 MHz	74	68	-	-
		2 462 MHz	70	67	-	-
	802.11 n(HT20)	2 412 MHz	64	64	58	58
		2 437 MHz	60	56	58	55
		2 462 MHz	58	55	58	52
WLAN 2.4 GHz (2 422 MHz ~ 2 452 MHz)	802.11 n(HT40)	2 422 MHz	57	63	45	45
		2 437 MHz	61	58	58	54
		2 452 MHz	57	58	59	56

-. Duty Cycle

Antenna 0

Band	TEST Mode	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
WLAN 2.4 GHz	802.11 b	1	12.450	12.850	96.89	0.14
		2	6.300	6.800	92.65	0.33
		5.5	2.427	2.856	84.98	0.71
		11	1.300	1.690	76.92	1.14
	802.11 g	6	2.070	2.250	92.00	0.36
		9	1.380	1.510	91.39	0.39
		12	1.044	1.176	88.78	0.52
		18	0.708	0.912	77.63	1.10
		24	0.534	0.726	73.55	1.33
		36	0.363	0.497	73.04	1.36
		48	0.276	0.462	59.74	2.24
		54	0.246	0.423	58.16	2.35
	802.11 n(HT20)	MCS0	1.919	2.083	92.13	0.36
		MCS1	0.979	1.098	89.16	0.50
		MCS2	0.667	0.806	82.75	0.82
		MCS3	0.508	0.677	75.04	1.25
		MCS4	0.349	0.475	73.47	1.34
		MCS5	0.273	0.403	67.74	1.69
		MCS6	0.247	0.369	66.94	1.74
		MCS7	0.229	0.359	63.79	1.95
	802.11 n(HT40)	MCS0	0.944	1.139	82.88	0.82
		MCS1	0.494	0.608	81.25	0.90
		MCS2	0.340	0.472	72.03	1.42
		MCS3	0.264	0.378	69.84	1.56
		MCS4	0.188	0.294	63.95	1.94
		MCS5	0.152	0.266	57.14	2.43
		MCS6	0.140	0.254	55.12	2.59
		MCS7	0.128	0.234	54.70	2.62

Note – Duty Cycle : (Tx On Time / (Tx On Time + Tx Off Time)) * 100

Correction Factor : 10 * Log(1 / (Duty Cycle / 100))

Antenna 1

Band	TEST Mode	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
WLAN 2.4 GHz	802.11 b	1	12.450	12.850	96.89	0.14
		2	6.300	6.800	92.65	0.33
		5.5	2.414	2.848	84.76	0.72
		11	1.300	1.688	77.01	1.13
	802.11 g	6	2.070	2.250	92.00	0.36
		9	1.380	1.510	91.39	0.39
		12	1.044	1.174	88.93	0.51
		18	0.702	0.906	77.48	1.11
		24	0.534	0.726	73.55	1.33
		36	0.363	0.497	73.04	1.36
		48	0.276	0.462	59.74	2.24
		54	0.246	0.423	58.16	2.35
	802.11 n(HT20)	MCS0	1.919	2.083	92.13	0.36
		MCS1	0.979	1.098	89.16	0.50
		MCS2	0.663	0.806	82.26	0.85
		MCS3	0.508	0.674	75.37	1.23
		MCS4	0.349	0.475	73.47	1.34
		MCS5	0.274	0.398	68.84	1.62
		MCS6	0.248	0.366	67.76	1.69
		MCS7	0.228	0.356	64.04	1.94
	802.11 n(HT40)	MCS0	0.944	1.139	82.88	0.82
		MCS1	0.492	0.605	81.32	0.90
		MCS2	0.340	0.471	72.19	1.42
		MCS3	0.264	0.378	69.84	1.56
		MCS4	0.188	0.302	62.25	2.06
		MCS5	0.152	0.274	55.47	2.56
		MCS6	0.142	0.258	55.04	2.59
		MCS7	0.128	0.234	54.70	2.62

Note – Duty Cycle : (Tx On Time / (Tx On Time + Tx Off Time)) * 100

Correction Factor : $10 * \log(1 / (\text{Duty Cycle} / 100))$

-. To get a maximum emission levels from the EUT, the EUT was moved throughout the XY, XZ, and YZ planes and the worst case is “XY” axis.

5.4 Configuration of Test System

Line Conducted Test: The EUT operates only with the battery, and the EUT cannot operate while the battery is charging. So this test item is not requirement to be performed.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2013 to determine the worse operating conditions. Final radiated emission tests were conducted at 3 meter Semi Anechoic Chamber.

The turntable was rotated through 360 degrees and the EUT was tested by positioned three orthogonal planes to obtain the highest reading on the field strength meter. Once maximum reading was determined, the search antenna was raised and lowered in both vertical and horizontal polarization.

5.5 Antenna Requirement

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

Antenna Construction:

The antenna of the EUT is Dipole Antenna on the main board in the EUT, so no consideration of replacement by the user.

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 Output Power	1.20
Conducted Spurious Emission < 26.5 GHz	1.26
Power Spectral Density	1.20
Line Conducted Disturbance (150 kHz ~ 30 MHz)	2.00
Radiated Disturbance (9 kHz ~ 30 MHz)	3.30
Radiated Disturbance (30 MHz ~ 1 GHz)	4.42
Radiated Disturbance (1 GHz ~ 18 GHz)	5.10
Radiated Disturbance (18 GHz ~ 40 GHz)	5.65

7. PRELIMINARY TEST

7.1 AC Power line Conducted Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

7.2 General Radiated Emissions Tests

During Preliminary Test, the following operating mode was investigated.

Operation Mode	The Worse operating condition (Please check one only)
Transmitting Mode	X

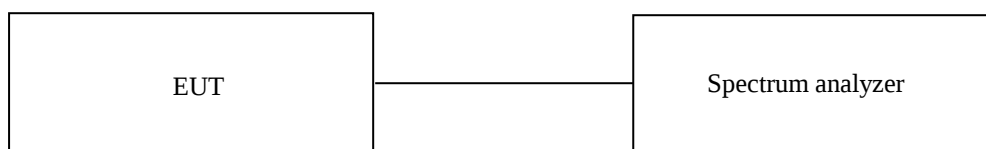
8. MINIMUM 6 dB BANDWIDTH

8.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

8.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz, and peak detection was used. The 6 dB bandwidth is defined as the total spectrum over which the power is higher than the peak power minus 6 dB.



8.3 Test Date

July 25, 2024

8.4 Test data for 802.11b WLAN Mode

8.4.1 Test data for SISO Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	10.09	0.50	9.59
Middle	2 437.00	10.09	0.50	9.59
High	2 462.00	10.09	0.50	9.59

Remark. Margin = Measured Value - Limit

8.4.2 Test data for SISO Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	10.09	0.50	9.59
Middle	2 437.00	10.09	0.50	9.59
High	2 462.00	10.09	0.50	9.59

Remark. Margin = Measured Value - Limit

8.5 Test data for 802.11g WLAN Mode

8.5.1 Test data for SISO Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.13	0.50	14.63
Middle	2 437.00	15.18	0.50	14.68
High	2 462.00	15.13	0.50	14.63

Remark. Margin = Measured Value - Limit

8.5.2 Test data for SISO Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.13	0.50	14.63
Middle	2 437.00	15.13	0.50	14.63
High	2 462.00	15.18	0.50	14.68

Remark. Margin = Measured Value – Limit

8.6 Test data for 802.11n_HT20 WLAN Mode

8.6.1 Test data for SISO Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.13	0.50	14.63
Middle	2 437.00	15.13	0.50	14.63
High	2 462.00	15.13	0.50	14.63

Remark. Margin = Measured Value - Limit

8.6.2 Test data for SISO Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.18	0.50	14.68
Middle	2 437.00	15.13	0.50	14.63
High	2 462.00	15.13	0.50	14.63

Remark. Margin = Measured Value - Limit

8.6.3 Test data for MIMO Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.13	0.50	14.63
Middle	2 437.00	15.13	0.50	14.63
High	2 462.00	15.18	0.50	14.68

Remark. Margin = Measured Value - Limit

8.6.4 Test data for MIMO Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	15.13	0.50	14.63
Middle	2 437.00	15.13	0.50	14.63
High	2 462.00	15.13	0.50	14.63

Remark. Margin = Measured Value - Limit

8.7 Test data for 802.11n_HT40 WLAN Mode

8.7.1 Test data for SISO Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 422.00	35.16	0.50	34.66
Middle	2 437.00	35.16	0.50	34.66
High	2 452.00	35.16	0.50	34.66

Remark. Margin = Measured Value - Limit

8.7.2 Test data for SISO Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 422.00	35.16	0.50	34.66
Middle	2 437.00	35.16	0.50	34.66
High	2 452.00	35.16	0.50	34.66

Remark. Margin = Measured Value - Limit

8.7.3 Test data for MIMO Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 422.00	35.16	0.50	34.66
Middle	2 437.00	35.16	0.50	34.66
High	2 452.00	35.16	0.50	34.66

Remark. Margin = Measured Value - Limit

8.7.4 Test data for MIMO Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 422.00	35.07	0.50	34.57
Middle	2 437.00	35.16	0.50	34.66
High	2 452.00	35.06	0.50	34.56

Remark. Margin = Measured Value - Limit

9. MAXIMUM CONDUCTED (AVERAGE) OUTPUT POWER

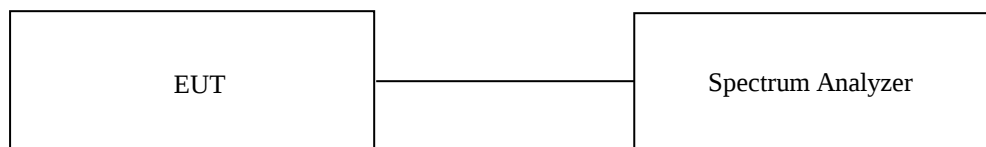
9.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

9.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to 1 MHz, the video bandwidth is set to 3 times the resolution bandwidth.



9.3 Test Date

July 25, 2024

9.4 Test data for 802.11b WLAN Mode

9.4.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 96.89 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	15.20	30.00	14.80
MIDDLE	2 437.00	14.66	30.00	15.34
HIGH	2 462.00	15.67	30.00	14.33

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.4.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 96.89 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	13.98	30.00	16.02
MIDDLE	2 437.00	13.39	30.00	16.61
HIGH	2 462.00	14.04	30.00	15.96

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.5 Test data for 802.11g WLAN Mode

9.5.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 92.00 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	14.40	30.00	15.60
MIDDLE	2 437.00	16.13	30.00	13.87
HIGH	2 462.00	15.35	30.00	14.65

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.5.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 92.00 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	14.63	30.00	15.37
MIDDLE	2 437.00	14.13	30.00	15.87
HIGH	2 462.00	14.23	30.00	15.77

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.6 Test data for 802.11n_HT20 WLAN Mode

9.6.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	13.15	30.00	16.85
MIDDLE	2 437.00	12.40	30.00	17.60
HIGH	2 462.00	12.19	30.00	17.81

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.6.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	12.13	30.00	17.87
MIDDLE	2 437.00	11.13	30.00	18.87
HIGH	2 462.00	11.44	30.00	18.56

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.6.3 Test data for MIMO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	11.87	30.00	18.13
MIDDLE	2 437.00	12.35	30.00	17.65
HIGH	2 462.00	12.63	30.00	17.37

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.6.4 Test data for MIMO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	11.53	30.00	18.47
MIDDLE	2 437.00	11.21	30.00	18.79
HIGH	2 462.00	10.74	30.00	19.26

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.6.5 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	14.71	30.00	15.29
MIDDLE	2 437.00	14.83	30.00	15.17
HIGH	2 462.00	14.80	30.00	15.20

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

Remark 2: Calculated Output Power= $10\log(10^{(\text{MIMO Antenna 0 Output Power}/10)} + 10^{(\text{MIMO Antenna 1 Output Power}/10)})$

9.7 Test data for 802.11n_HT40 WLAN Mode

9.7.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	11.57	30.00	18.43
MIDDLE	2 437.00	13.21	30.00	16.79
HIGH	2 452.00	12.19	30.00	17.81

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.7.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	12.34	30.00	17.66
MIDDLE	2 437.00	11.72	30.00	18.28
HIGH	2 452.00	12.22	30.00	17.78

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.7.3 Test data for MIMO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	9.14	30.00	20.86
MIDDLE	2 437.00	12.46	30.00	17.54
HIGH	2 452.00	13.15	30.00	16.85

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.7.4 Test data for MIMO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	8.76	30.00	21.24
MIDDLE	2 437.00	11.07	30.00	18.93
HIGH	2 452.00	11.94	30.00	18.06

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

9.7.5 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	11.96	30.00	18.04
MIDDLE	2 437.00	14.83	30.00	15.17
HIGH	2 452.00	15.60	30.00	14.40

Remark : Margin = Limit – Total Value (=Measured Value + Duty Factor)

Remark 2: Calculated Output Power= $10\log(10^{(\text{MIMO Antenna 0 Output Power}/10)} + 10^{(\text{MIMO Antenna 1 Output Power}/10)})$

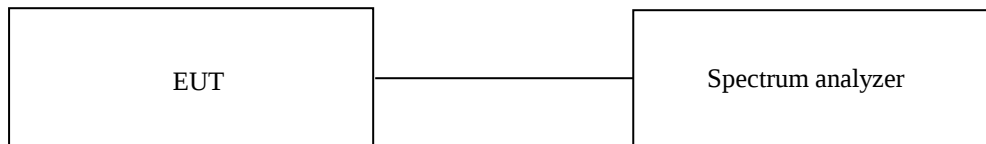
10. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

10.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

10.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution and video bandwidth is set to 100 kHz, and peak detection was used.



10.3 Test set-up for radiated measurement

The radiated emissions measurements were performed on the 3 m semi anechoic chamber. The EUT was placed on turntable approximately 1.5 m above the ground plane.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and maximum emission levels at each frequency recorded. The system was rotated 360°, and the antenna was varied in the height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for horizontal and vertical polarization of the receiving antenna.

10.4 Test Date

July 24, 2024

10.5 Test data for conducted emission

For Test data for conducted emission, please refer to the Annex.

10.6 Test data for radiated emission

10.6.1 Radiated Emission which fall in the Restricted Band

10.6.1.1 Test data for 802.11b WLAN Mode

10.6.1.1.1 Test data for SISO Antenna 0

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 96.89 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 388.31	70.00	Peak	H	27.55	4.65	41.74	6.11	-	66.57	74.00	7.43
2 386.27	51.86	Average	H	27.55	4.65	41.74	6.11	0.14	48.57	54.00	5.43
2 388.61	66.47	Peak	V	27.55	4.65	41.74	6.11	-	63.04	74.00	10.96
2 386.78	46.49	Average	V	27.55	4.65	41.74	6.11	0.14	43.20	54.00	10.80
Test Data for High Channel											
2 483.77	67.82	Peak	H	27.40	4.83	41.73	6.13	-	64.45	74.00	9.55
2 484.61	46.07	Average	H	27.40	4.83	41.73	6.13	0.14	42.84	54.00	11.16
2 484.42	68.84	Peak	V	27.40	4.83	41.73	6.13	-	65.47	74.00	8.53
2 484.80	44.77	Average	V	27.40	4.83	41.73	6.13	0.14	41.54	54.00	12.46

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + ATT + Duty Factor

10.6.1.1.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 96.89 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 387.39	66.18	Peak	H	27.55	4.65	41.74	6.11	-	62.75	74.00	11.25
2 386.47	45.40	Average	H	27.55	4.65	41.74	6.11	0.14	42.11	54.00	11.89
2 389.43	63.53	Peak	V	27.54	4.65	41.74	6.11	-	60.09	74.00	13.91
2 386.27	43.45	Average	V	27.55	4.65	41.74	6.11	0.14	40.16	54.00	13.84
Test Data for High Channel											
2 484.42	64.27	Peak	H	27.40	4.83	41.73	6.13	-	60.90	74.00	13.10
2 488.36	43.86	Average	H	27.40	4.88	41.73	6.11	0.14	40.66	54.00	13.34
2 483.89	67.20	Peak	V	27.40	4.83	41.73	6.13	-	63.83	74.00	10.17
2 486.50	44.83	Average	V	27.40	4.83	41.73	6.13	0.14	41.60	54.00	12.40

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.2 Test data for 802.11g WLAN Mode

10.6.1.2.1 Test data for SISO Antenna 0

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 92.00 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.33	66.07	Peak	H	27.54	4.65	41.74	6.11	-	62.63	74.00	11.37
2 390.04	54.02	Average	H	27.54	4.65	41.74	6.11	0.36	50.94	54.00	3.06
2 389.94	65.39	Peak	V	27.54	4.65	41.74	6.11	-	61.95	74.00	12.05
2 389.94	51.57	Average	V	27.54	4.65	41.74	6.11	0.36	48.49	54.00	5.51
Test Data for High Channel											
2 483.54	62.16	Peak	H	27.40	4.83	41.73	6.13	-	58.79	74.00	15.21
2 483.54	50.48	Average	H	27.40	4.83	41.73	6.13	0.36	47.47	54.00	6.53
2 483.54	64.99	Peak	V	27.40	4.83	41.73	6.13	-	61.62	74.00	12.38
2 483.51	52.06	Average	V	27.40	4.83	41.73	6.13	0.36	49.05	54.00	4.95

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.2.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 92.00 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 390.04	65.98	Peak	H	27.54	4.65	41.74	6.11	-	62.54	74.00	11.46
2 389.84	52.06	Average	H	27.54	4.65	41.74	6.11	0.36	48.98	54.00	5.02
2 389.94	63.07	Peak	V	27.54	4.65	41.74	6.11	-	59.63	74.00	14.37
2 390.04	46.39	Average	V	27.54	4.65	41.74	6.11	0.36	43.31	54.00	10.69
Test Data for High Channel											
2 486.32	62.61	Peak	H	27.40	4.83	41.73	6.13	-	59.24	74.00	14.76
2 483.73	48.18	Average	H	27.40	4.83	41.73	6.13	0.36	45.17	54.00	8.83
2 485.06	63.96	Peak	V	27.40	4.83	41.73	6.13	-	60.59	74.00	13.41
2 483.96	48.75	Average	V	27.40	4.83	41.73	6.13	0.36	45.74	54.00	8.26

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.3 Test data for 802.11n_HT20 WLAN Mode

10.6.1.3.1 Test data for SISO Antenna 0

- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Measurement distance : 3 m
- . Duty Cycle : 92.13 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 390.04	64.69	Peak	H	27.54	4.65	41.74	6.11	-	61.25	74.00	12.75
2 389.84	51.93	Average	H	27.54	4.65	41.74	6.11	0.36	48.85	54.00	5.15
2 389.43	62.12	Peak	V	27.54	4.65	41.74	6.11	-	58.68	74.00	15.32
2 389.94	49.42	Average	V	27.54	4.65	41.74	6.11	0.36	46.34	54.00	7.66
Test Data for High Channel											
2 486.20	59.05	Peak	H	27.40	4.83	41.73	6.13	-	55.68	74.00	18.32
2 483.54	47.61	Average	H	27.40	4.83	41.73	6.13	0.36	44.60	54.00	9.40
2 483.85	60.59	Peak	V	27.40	4.83	41.73	6.13	-	57.22	74.00	16.78
2 483.54	46.00	Average	V	27.40	4.83	41.73	6.13	0.36	42.99	54.00	11.01

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + ATT + Duty Factor

10.6.1.3.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 92.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.63	61.60	Peak	H	27.54	4.65	41.74	6.11	-	58.16	74.00	15.84
2 390.04	49.40	Average	H	27.54	4.65	41.74	6.11	0.36	46.32	54.00	7.68
2 390.04	67.08	Peak	V	27.54	4.65	41.74	6.11	-	63.64	74.00	10.36
2 389.74	51.04	Average	V	27.54	4.65	41.74	6.11	0.36	47.96	54.00	6.04
Test Data for High Channel											
2 484.46	57.46	Peak	H	27.40	4.83	41.73	6.13	-	54.09	74.00	19.91
2 483.62	45.17	Average	H	27.40	4.83	41.73	6.13	0.36	42.16	54.00	11.84
2 483.62	56.57	Peak	V	27.40	4.83	41.73	6.13	-	53.20	74.00	20.80
2 483.66	45.22	Average	V	27.40	4.83	41.73	6.13	0.36	42.21	54.00	11.79

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.3.3 Test data for Multiple Transmit

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 92.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.84	68.34	Peak	H	27.54	4.65	41.74	6.11	-	64.90	74.00	9.10
2 390.04	53.16	Average	H	27.54	4.65	41.74	6.11	0.36	50.08	54.00	3.92
2 389.94	68.26	Peak	V	27.54	4.65	41.74	6.11	-	64.82	74.00	9.18
2 390.04	51.54	Average	V	27.54	4.65	41.74	6.11	0.36	48.46	54.00	5.54
Test Data for High Channel											
2 484.38	64.03	Peak	H	27.40	4.83	41.73	6.13	-	60.66	74.00	13.34
2 483.92	45.24	Average	H	27.40	4.83	41.73	6.13	0.36	42.23	54.00	11.77
2 483.77	68.18	Peak	V	27.40	4.83	41.73	6.13	-	64.81	74.00	9.19
2 483.92	51.44	Average	V	27.40	4.83	41.73	6.13	0.36	48.43	54.00	5.57

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.4 Test data for 802.11n_HT40 WLAN Mode

10.6.1.4.1 Test data for SISO Antenna 0

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 82.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.16	66.63	Peak	H	27.54	4.65	41.74	6.11	-	63.19	74.00	10.81
2 389.61	52.82	Average	H	27.54	4.65	41.74	6.11	0.82	50.20	54.00	3.80
2 389.61	62.48	Peak	V	27.54	4.65	41.74	6.11	-	59.04	74.00	14.96
2 389.94	48.05	Average	V	27.54	4.65	41.74	6.11	0.82	45.43	54.00	8.57
Test Data for High Channel											
2 487.60	59.30	Peak	H	27.40	4.88	41.73	6.11	-	55.96	74.00	18.04
2 483.67	48.29	Average	H	27.40	4.83	41.73	6.13	0.82	45.74	54.00	8.26
2 484.10	63.62	Peak	V	27.40	4.83	41.73	6.13	-	60.25	74.00	13.75
2 483.67	51.13	Average	V	27.40	4.83	41.73	6.13	0.82	48.58	54.00	5.42

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.4.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 82.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 390.06	65.47	Peak	H	27.54	4.65	41.74	6.11	-	62.03	74.00	11.97
2 389.72	54.79	Average	H	27.54	4.65	41.74	6.11	0.82	52.17	54.00	1.83
2 389.83	64.20	Peak	V	27.54	4.65	41.74	6.11	-	60.76	74.00	13.24
2 388.71	51.87	Average	V	27.55	4.65	41.74	6.11	0.82	49.26	54.00	4.74
Test Data for High Channel											
2 489.57	56.74	Peak	H	27.40	4.88	41.73	6.11	-	53.40	74.00	20.60
2 484.15	44.62	Average	H	27.40	4.83	41.73	6.13	0.82	42.07	54.00	11.93
2 489.48	59.06	Peak	V	27.40	4.88	41.73	6.11	-	55.72	74.00	18.28
2 484.87	45.75	Average	V	27.40	4.83	41.73	6.13	0.82	43.20	54.00	10.80

Tabulated test data for Restricted Band

Remark: “H”: Horizontal, “V”: Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.1.4.3 Test data for Multiple Transmit

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- Video bandwidth : 3 MHz for Peak and Average Mode
- Measurement distance : 3 m
- Duty Cycle : 82.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.72	63.94	Peak	H	27.54	4.65	41.74	6.11	-	60.50	74.00	13.50
2 389.83	48.11	Average	H	27.54	4.65	41.74	6.11	0.82	45.49	54.00	8.51
2 484.25	66.34	Peak	V	27.40	4.83	41.73	6.13	-	62.97	74.00	11.03
2 483.67	53.16	Average	V	27.40	4.83	41.73	6.13	0.82	50.61	54.00	3.39
Test Data for High Channel											
2 484.01	70.12	Peak	H	27.40	4.83	41.73	6.13	-	66.75	74.00	7.25
2 483.86	54.68	Average	H	27.40	4.83	41.73	6.13	0.82	52.13	54.00	1.87
2 389.72	66.36	Peak	V	27.54	4.65	41.74	6.11	-	62.92	74.00	11.08
2 390.06	51.30	Average	V	27.54	4.65	41.74	6.11	0.82	48.68	54.00	5.32

Tabulated test data for Restricted Band

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{ATT} + \text{Duty Factor}$$

10.6.2 Spurious & Harmonic Radiated Emission

10.6.2.1 Test data for 802.11b WLAN Mode

10.6.2.1.1 Test data for SISO Antenna 0

- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Duty Cycle : 96.89 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 829.59	50.53	Peak	H	31.20	6.59	41.28	-	47.04	74.00	26.96
4 832.54	38.05	Average	H	31.20	6.59	41.28	0.14	34.70	54.00	19.30
4 824.30	51.35	Peak	V	31.20	6.60	41.29	-	47.86	74.00	26.14
4 823.90	42.71	Average	V	31.20	6.60	41.29	0.14	39.36	54.00	14.64
Test Data for Middle Channel										
4 855.52	49.98	Peak	H	31.21	6.69	41.28	-	46.60	74.00	27.40
4 864.36	37.99	Average	H	31.23	6.69	41.28	0.14	34.77	54.00	19.23
4 873.45	50.74	Peak	V	31.25	6.69	41.27	-	47.41	74.00	26.59
4 874.05	40.86	Average	V	31.25	6.69	41.27	0.14	37.67	54.00	16.33
Test Data for High Channel										
4 908.42	49.90	Peak	H	31.33	6.70	41.26	-	46.67	74.00	27.33
4 942.33	38.01	Average	H	31.47	6.70	41.25	0.14	35.07	54.00	18.93
4 924.00	51.84	Peak	V	31.40	6.70	41.26	-	48.68	74.00	25.32
4 924.00	41.80	Average	V	31.40	6.70	41.26	0.14	38.78	54.00	15.22

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.1.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 96.89 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 841.88	50.02	Peak	H	31.20	6.59	41.28	-	46.53	74.00	27.47
4 834.14	38.06	Average	H	31.20	6.59	41.28	0.14	34.71	54.00	19.29
4 823.75	52.18	Peak	V	31.20	6.60	41.29	-	48.69	74.00	25.31
4 824.10	41.65	Average	V	31.20	6.60	41.29	0.14	38.30	54.00	15.70
Test Data for Middle Channel										
4 851.87	49.83	Peak	H	31.20	6.69	41.28	-	46.44	74.00	27.56
4 854.92	37.85	Average	H	31.21	6.69	41.28	0.14	34.61	54.00	19.39
4 849.97	50.24	Peak	V	31.20	6.59	41.28	-	46.75	74.00	27.25
4 874.10	38.75	Average	V	31.25	6.69	41.27	0.14	35.56	54.00	18.44
Test Data for High Channel										
4 923.70	50.00	Peak	H	31.39	6.70	41.26	-	46.83	74.00	27.17
4 923.95	38.72	Average	H	31.40	6.70	41.26	0.14	35.70	54.00	18.30
4 923.70	50.12	Peak	V	31.39	6.70	41.26	-	46.95	74.00	27.05
4 924.05	38.60	Average	V	31.40	6.70	41.26	0.14	35.58	54.00	18.42

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.2 Test data for 802.11g WLAN Mode

10.6.2.2.1 Test data for SISO Antenna 0

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 92.00 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 817.71	50.13	Peak	H	31.20	6.60	41.29	-	46.64	74.00	27.36
4 830.69	38.10	Average	H	31.20	6.59	41.28	0.36	34.97	54.00	19.03
4 800.47	53.15	Peak	V	31.20	6.60	41.29	-	49.66	74.00	24.34
4 845.78	38.22	Average	V	31.20	6.59	41.28	0.36	35.09	54.00	18.91
Test Data for Middle Channel										
4 853.92	50.08	Peak	H	31.21	6.69	41.28	-	46.70	74.00	27.30
4 888.98	37.93	Average	H	31.28	6.70	41.27	0.36	35.00	54.00	19.00
4 855.67	50.45	Peak	V	31.21	6.69	41.28	-	47.07	74.00	26.93
4 869.50	38.35	Average	V	31.24	6.69	41.27	0.36	35.37	54.00	18.63
Test Data for High Channel										
4 910.46	50.49	Peak	H	31.34	6.70	41.26	-	47.27	74.00	26.73
4 942.73	38.02	Average	H	31.47	6.70	41.25	0.36	35.30	54.00	18.70
4 933.04	49.99	Peak	V	31.43	6.70	41.26	-	46.86	74.00	27.14
4 936.49	38.06	Average	V	31.45	6.70	41.26	0.36	35.31	54.00	18.69

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{Duty Factor}$$

10.6.2.2.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 92.00 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 842.18	49.74	Peak	H	31.20	6.59	41.28	-	46.25	74.00	27.75
4 829.40	38.09	Average	H	31.20	6.59	41.28	0.36	34.96	54.00	19.04
4 821.05	53.88	Peak	V	31.20	6.60	41.29	-	50.39	74.00	23.61
4 828.00	38.10	Average	V	31.20	6.59	41.28	0.36	34.97	54.00	19.03
Test Data for Middle Channel										
4 855.67	50.46	Peak	H	31.21	6.69	41.28	-	47.08	74.00	26.92
4 897.63	38.16	Average	H	31.30	6.70	41.27	0.36	35.25	54.00	18.75
4 869.46	51.67	Peak	V	31.24	6.69	41.27	-	48.33	74.00	25.67
4 872.55	38.58	Average	V	31.25	6.69	41.27	0.36	35.61	54.00	18.39
Test Data for High Channel										
4 899.82	50.18	Peak	H	31.30	6.70	41.27	-	46.91	74.00	27.09
4 899.13	37.86	Average	H	31.30	6.70	41.27	0.36	34.95	54.00	19.05
4 922.85	51.22	Peak	V	31.39	6.70	41.26	-	48.05	74.00	25.95
4 921.35	37.90	Average	V	31.39	6.70	41.26	0.36	35.09	54.00	18.91

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.3 Test data for 802.11n_HT20 WLAN Mode

10.6.2.3.1 Test data for SISO Antenna 0

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 92.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 821.75	49.76	Peak	H	31.20	6.60	41.29	-	46.27	74.00	27.73
4 831.34	37.95	Average	H	31.20	6.59	41.28	0.36	34.82	54.00	19.18
4 824.45	50.15	Peak	V	31.20	6.60	41.29	-	46.66	74.00	27.34
4 822.60	38.22	Average	V	31.20	6.60	41.29	0.36	35.09	54.00	18.91
Test Data for Middle Channel										
4 855.77	49.88	Peak	H	31.21	6.69	41.28	-	46.50	74.00	27.50
4 889.19	37.93	Average	H	31.28	6.70	41.27	0.36	35.00	54.00	19.00
4 864.46	49.71	Peak	V	31.23	6.69	41.28	-	46.35	74.00	27.65
4 852.17	37.95	Average	V	31.20	6.69	41.28	0.36	34.92	54.00	19.08
Test Data for High Channel										
4 925.80	49.70	Peak	H	31.40	6.70	41.26	-	46.54	74.00	27.46
4 902.12	37.76	Average	H	31.31	6.70	41.27	0.36	34.86	54.00	19.14
4 933.94	49.98	Peak	V	31.44	6.70	41.26	-	46.86	74.00	27.14
4 942.08	37.77	Average	V	31.47	6.70	41.26	0.36	35.04	54.00	18.96

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dB}\mu\text{V/m)} - \text{Total Level (dB}\mu\text{V/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{Duty Factor}$$

10.6.2.3.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 92.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 818.01	50.13	Peak	H	31.20	6.60	41.29	-	46.64	74.00	27.36
4 826.70	38.13	Average	H	31.20	6.59	41.29	0.36	34.99	54.00	19.01
4 799.48	53.27	Peak	V	31.20	6.60	41.29	-	49.78	74.00	24.22
4 826.40	38.03	Average	V	31.20	6.59	41.29	0.36	34.89	54.00	19.11
Test Data for Middle Channel										
4 859.17	50.00	Peak	H	31.22	6.69	41.28	-	46.63	74.00	27.37
4 852.22	37.76	Average	H	31.20	6.69	41.28	0.36	34.73	54.00	19.27
4 858.87	50.07	Peak	V	31.22	6.69	41.28	-	46.70	74.00	27.30
4 850.67	38.01	Average	V	31.20	6.69	41.28	0.36	34.98	54.00	19.02
Test Data for High Channel										
4 939.19	49.85	Peak	H	31.46	6.70	41.26	-	46.75	74.00	27.25
4 920.10	37.74	Average	H	31.38	6.70	41.26	0.36	34.92	54.00	19.08
4 945.98	49.89	Peak	V	31.48	6.70	41.25	-	46.82	74.00	27.18
4 947.83	38.01	Average	V	31.49	6.70	41.25	0.36	35.31	54.00	18.69

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.3.3 Test data for Multiple Transmit

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 92.13 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 832.69	50.30	Peak	H	31.20	6.59	41.28	-	46.81	74.00	27.19
4 844.73	37.91	Average	H	31.20	6.59	41.28	0.36	34.78	54.00	19.22
4 799.52	50.91	Peak	V	31.20	6.60	41.29	-	47.42	74.00	26.58
4 833.09	38.24	Average	V	31.20	6.59	41.28	0.36	35.11	54.00	18.89
Test Data for Middle Channel										
4 864.86	50.13	Peak	H	31.23	6.69	41.28	-	46.77	74.00	27.23
4 850.62	37.90	Average	H	31.20	6.69	41.28	0.36	34.87	54.00	19.13
4 869.31	53.23	Peak	V	31.24	6.69	41.27	-	49.89	74.00	24.11
4 872.65	38.28	Average	V	31.25	6.69	41.27	0.36	35.31	54.00	18.69
Test Data for High Channel										
4 927.35	50.04	Peak	H	31.41	6.70	41.26	-	46.89	74.00	27.11
4 921.50	37.83	Average	H	31.39	6.70	41.26	0.36	35.02	54.00	18.98
4 921.75	52.04	Peak	V	31.39	6.70	41.26	-	48.87	74.00	25.13
4 936.69	38.00	Average	V	31.45	6.70	41.26	0.36	35.25	54.00	18.75

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.4 Test data for 802.11n_HT40 WLAN Mode

10.6.2.4.1 Test data for SISO Antenna 0

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 82.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 866.18	50.44	Peak	H	31.23	6.69	41.27	-	47.09	74.00	26.91
4 833.71	38.20	Average	H	31.20	6.59	41.28	0.82	35.53	54.00	18.47
4 795.85	53.99	Peak	V	31.19	6.60	41.29	-	50.49	74.00	23.51
4 845.90	38.19	Average	V	31.20	6.59	41.28	0.82	35.52	54.00	18.48
Test Data for Middle Channel										
4 834.94	50.17	Peak	H	31.20	6.59	41.28	-	46.68	74.00	27.32
4 872.50	38.06	Average	H	31.25	6.69	41.27	0.82	35.55	54.00	18.45
4 872.60	49.96	Peak	V	31.25	6.69	41.27	-	46.63	74.00	27.37
4 832.34	38.11	Average	V	31.20	6.59	41.28	0.82	35.44	54.00	18.56
Test Data for High Channel										
4 919.68	50.27	Peak	H	31.38	6.70	41.26	-	47.09	74.00	26.91
4 854.15	38.08	Average	H	31.21	6.69	41.28	0.82	35.52	54.00	18.48
4 862.44	50.00	Peak	V	31.22	6.69	41.28	-	46.63	74.00	27.37
4 892.31	38.01	Average	V	31.28	6.70	41.27	0.82	35.54	54.00	18.46

Remark: "H": Horizontal, "V": Vertical

$$\text{Margin (dB)} = \text{Limits (dBμV/m)} - \text{Total Level (dBμV/m)}$$

$$\text{Total Level} = \text{Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{AMP Gain} + \text{Duty Factor}$$

10.6.2.4.2 Test data for SISO Antenna 1

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 82.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 843.80	50.15	Peak	H	31.20	6.59	41.28	-	46.66	74.00	27.34
4 854.79	38.19	Average	H	31.21	6.69	41.28	0.82	35.63	54.00	18.37
4 797.75	52.30	Peak	V	31.20	6.60	41.29	-	48.81	74.00	25.19
4 836.21	38.32	Average	V	31.20	6.59	41.28	0.82	35.65	54.00	18.35
Test Data for Middle Channel										
4 873.00	50.41	Peak	H	31.25	6.69	41.27	-	47.08	74.00	26.92
4 830.74	38.23	Average	H	31.20	6.59	41.28	0.82	35.56	54.00	18.44
4 837.24	50.09	Peak	V	31.20	6.59	41.28	-	46.60	74.00	27.40
4 836.94	38.17	Average	V	31.20	6.59	41.28	0.82	35.50	54.00	18.50
Test Data for High Channel										
4 866.84	49.66	Peak	H	31.23	6.69	41.27	-	46.31	74.00	27.69
4 950.05	38.00	Average	H	31.50	6.71	41.25	0.82	35.78	54.00	18.22
4 903.20	50.13	Peak	V	31.31	6.70	41.27	-	46.87	74.00	27.13
4 903.70	38.16	Average	V	31.31	6.70	41.27	0.82	35.72	54.00	18.28

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

10.6.2.4.3 Test data for Multiple Transmit

- Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode for the emissions fall in restricted band,
1 MHz and RMS Detector for Average Mode for the emissions fall in restricted band
100 kHz for Peak Mode for the emissions outside restricted band
- Video bandwidth : 3 MHz for Peak and Average Mode
- Frequency range : 1 GHz ~ 26.5 GHz
- Measurement distance : 3 m
- Duty Cycle : 82.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Gain	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 875.37	50.22	Peak	H	31.25	6.70	41.27	-	46.90	74.00	27.10
4 853.89	38.20	Average	H	31.21	6.69	41.28	0.82	35.64	54.00	18.36
4 796.75	52.45	Peak	V	31.19	6.60	41.29	-	48.95	74.00	25.05
4 825.32	38.31	Average	V	31.20	6.59	41.29	0.82	35.63	54.00	18.37
Test Data for Middle Channel										
4 905.97	50.12	Peak	H	31.32	6.70	41.26	-	46.88	74.00	27.12
4 852.52	38.16	Average	H	31.21	6.69	41.28	0.82	35.60	54.00	18.40
4 913.26	50.44	Peak	V	31.35	6.70	41.26	-	47.23	74.00	26.77
4 852.32	38.24	Average	V	31.20	6.69	41.28	0.82	35.67	54.00	18.33
Test Data for High Channel										
4 858.65	49.91	Peak	H	31.22	6.69	41.28	-	46.54	74.00	27.46
4 921.88	38.07	Average	H	31.39	6.70	41.26	0.82	35.72	54.00	18.28
4 876.23	50.06	Peak	V	31.25	6.70	41.27	-	46.74	74.00	27.26
4 899.80	38.09	Average	V	31.30	6.70	41.27	0.82	35.64	54.00	18.36

Remark: "H": Horizontal, "V": Vertical

Margin (dB) = Limits (dBμV/m) - Total Level (dBμV/m)

Total Level = Reading + Antenna Factor + Cable Loss – AMP Gain + Duty Factor

11. AVERAGE POWER SPECTRUL DENSITY

11.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

11.2 Test set-up

The antenna output of the EUT was connected to the spectrum analyzer.

The resolution bandwidth is set to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$, the video bandwidth is set to 3 times the resolution bandwidth.



11.3 Test Date

July 25, 2024

11.4 Test data for 802.11b WLAN Mode

11.4.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 96.89 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-17.89	8.00	25.89
Middle	2 437.00	-18.62	8.00	26.62
High	2 462.00	-17.87	8.00	25.87

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.4.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 96.89 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-19.34	8.00	27.34
Middle	2 437.00	-19.90	8.00	27.90
High	2 462.00	-19.26	8.00	27.26

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.5 Test data for 802.11g WLAN Mode

11.5.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 92.00 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-18.63	8.00	26.63
Middle	2 437.00	-17.14	8.00	25.14
High	2 462.00	-17.77	8.00	25.77

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.5.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 92.00 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-18.52	8.00	26.52
Middle	2 437.00	-18.55	8.00	26.55
High	2 462.00	-18.99	8.00	26.99

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.6 Test data for 802.11n_HT20 WLAN Mode

11.6.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-19.95	8.00	27.95
Middle	2 437.00	-20.85	8.00	28.85
High	2 462.00	-21.20	8.00	29.20

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.6.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-20.56	8.00	28.56
Middle	2 437.00	-21.74	8.00	29.74
High	2 462.00	-21.67	8.00	29.67

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.6.3 Test data for MIMO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-21.14	8.00	29.14
Middle	2 437.00	-20.78	8.00	28.78
High	2 462.00	-20.06	8.00	28.06

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.6.4 Test data for MIMO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-21.50	8.00	29.50
Middle	2 437.00	-21.83	8.00	29.83
High	2 462.00	-22.40	8.00	30.40

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.6.5 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : 92.13 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 412.00	-18.31	8.00	26.31
Middle	2 437.00	-18.26	8.00	26.26
High	2 462.00	-18.06	8.00	26.06

Remark 1 : Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

Remark 2 : Calculated Power Density = $10\log(10^{(\text{MIMO Antenna 0 Power Density}/10)} + 10^{(\text{MIMO Antenna 1 Power Density}/10)})$

11.7 Test data for 802.11n_HT40 WLAN Mode

11.7.1 Test data for SISO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-25.33	8.00	33.33
Middle	2 437.00	-23.08	8.00	31.08
High	2 452.00	-23.82	8.00	31.82

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.7.2 Test data for SISO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-24.55	8.00	32.55
Middle	2 437.00	-24.75	8.00	32.75
High	2 452.00	-24.18	8.00	32.18

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.7.3 Test data for MIMO Antenna 0

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-27.05	8.00	35.05
Middle	2 437.00	-23.61	8.00	31.61
High	2 452.00	-23.20	8.00	31.20

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.7.4 Test data for MIMO Antenna 1

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-28.01	8.00	36.01
Middle	2 437.00	-25.16	8.00	33.16
High	2 452.00	-24.29	8.00	32.29

Remark. Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

11.7.5 Test data for Multiple Transmit

-. Test Result : Pass

-. Duty Cycle : 82.88 %

CHANNEL	FREQUENCY(MHz)	MEASURED VLAUE (dBm)	LIMIT (dBm)	MARGIN (dB)
Low	2 422.00	-24.49	8.00	32.49
Middle	2 437.00	-21.31	8.00	29.31
High	2 452.00	-20.70	8.00	28.70

Remark 1 : Margin = Limit – Measured value (=S/A Reading + Duty Cycle Correction Factor)

Remark 2 : Calculated Power Density = $10\log(10^{(\text{MIMO Antenna 0 Power Density}/10)} + 10^{(\text{MIMO Antenna 1 Power Density}/10)})$

12. RADIATED EMISSION TEST

12.1 Operating environment

Temperature : 23 °C
Relative humidity : 45 % R.H.

12.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on turntable above the ground plane. The interconnecting cables from outside test site were inserted into ferrite clamps at the point where the cables reach the turntable.

The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal and vertical polarization of the receiving antenna.

12.3 Test Date

July 24, 2024

12.4 Test data for 30 MHz ~ 1 000 MHz

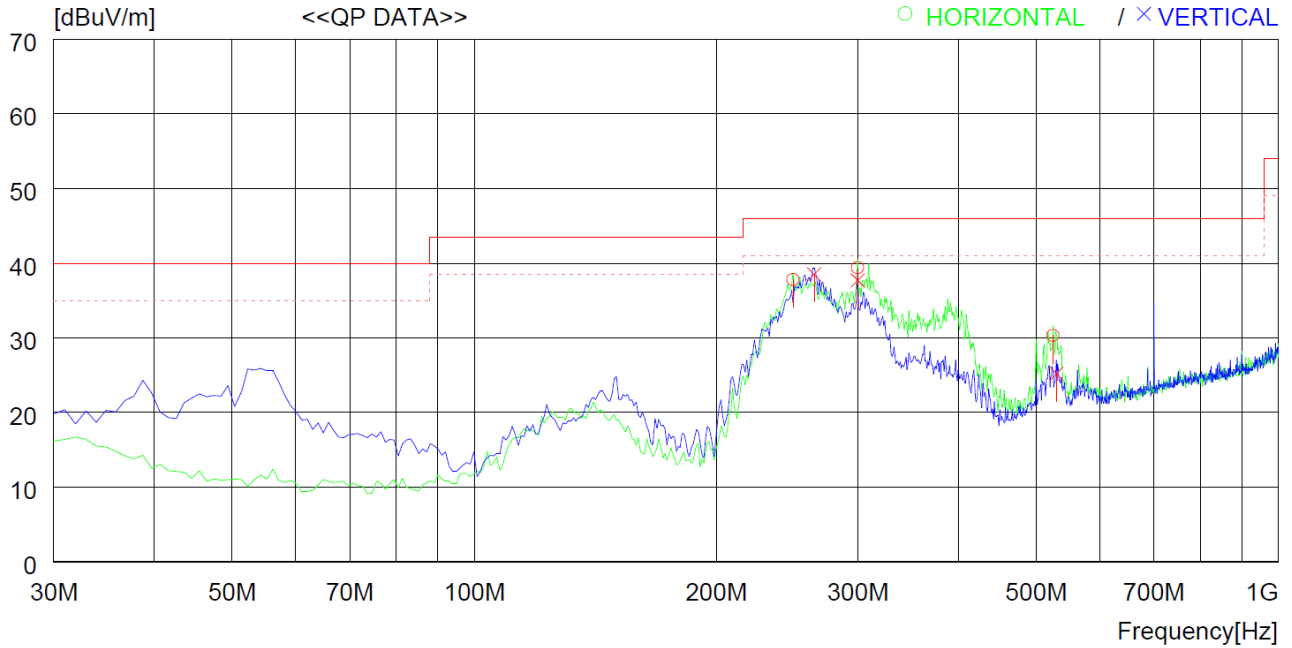
12.4.1 Test data for WLAN 2.4 GHz

Limits apply to : FCC CFR 47, PART 15, SUBPART C, SECTION 15.247

Result : PASSED

EUT : Welding Camera

Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	[dBuV]	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	249.220	50.0	17.8	2.1	32.1	37.8	46.0	8.2	200	0
2	299.660	49.9	19.4	2.2	32.1	39.4	46.0	6.6	100	256
3	524.700	36.1	23.4	3.0	32.2	30.3	46.0	15.7	100	247
----- Vertical -----										
4	264.740	50.2	18.3	2.1	32.1	38.5	46.0	7.5	200	0
5	299.660	48.2	19.4	2.2	32.1	37.7	46.0	8.3	200	241
6	529.550	30.9	23.5	3.0	32.2	25.2	46.0	20.8	100	359

-. Antenna 1, Antenna 2 and Multiple transmit tested, but the worst data were recorded.

12.5 Test data for Below 30 MHz

- . Resolution bandwidth : 200 Hz (from 9 kHz to 0.15 MHz), 9 kHz (from 0.15 MHz to 30 MHz)
- . Frequency range : 9 kHz ~ 30 MHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

12.6 Test data for above 1 GHz

- . Resolution bandwidth : 1 MHz and Peak Detector for Peak Mode
1 MHz and RMS Detector for Average Mode
- . Video bandwidth : 3 MHz for Peak and Average Mode
- . Frequency range : 1 GHz ~ 26.5 GHz
- . Measurement distance : 3 m
- . Operating mode : Transmitting mode

Frequency (MHz)	Reading (dBμV)	Ant. Pol. (H/V)	Ant. Height (m)	Angle (°)	Ant. Factor (dB/m)	Cable Loss	Emission Level(dBμV/m)	Limits (dBμV/m)	Margin (dB)
Emission from the EUT more than 20 dB below the limit in each frequency range.									

13. CONDUCTED EMISSION TEST

13.1 Operating environment

Temperature : 24 °C
Relative humidity : 52 % R.H.

13.2 Test set-up

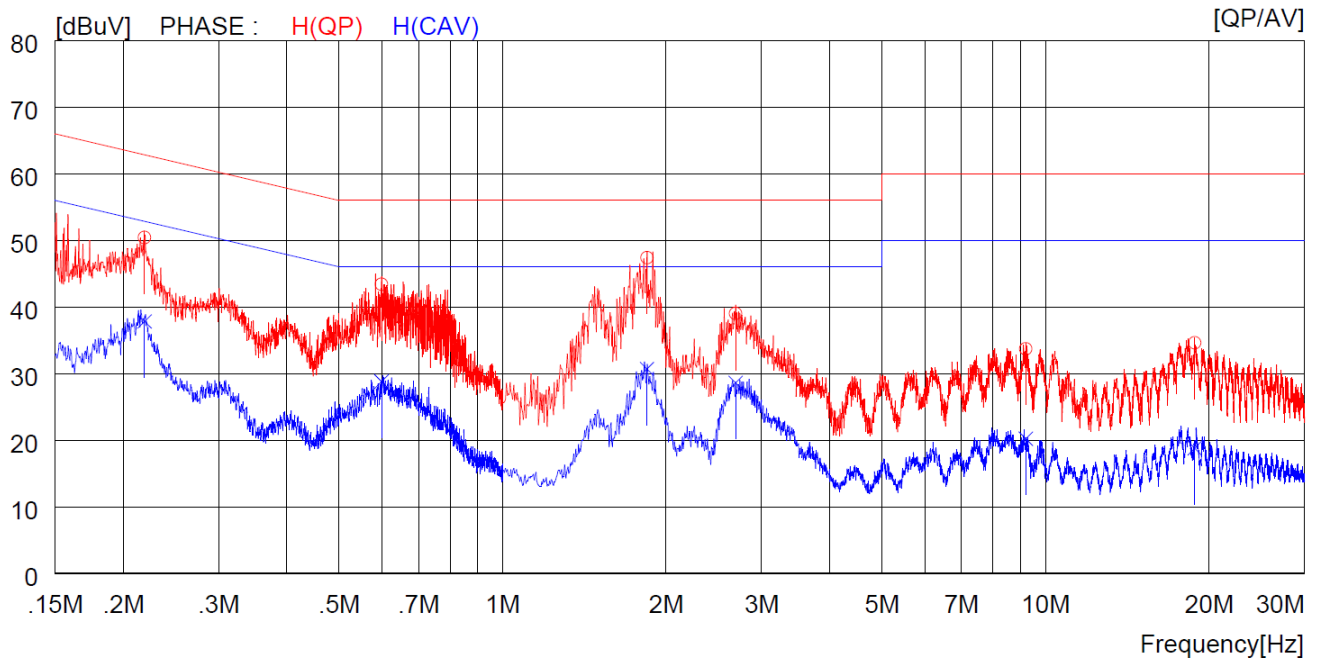
The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a 50 Ω / 50 μ H + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

13.3 Test Date

July 30, 2024

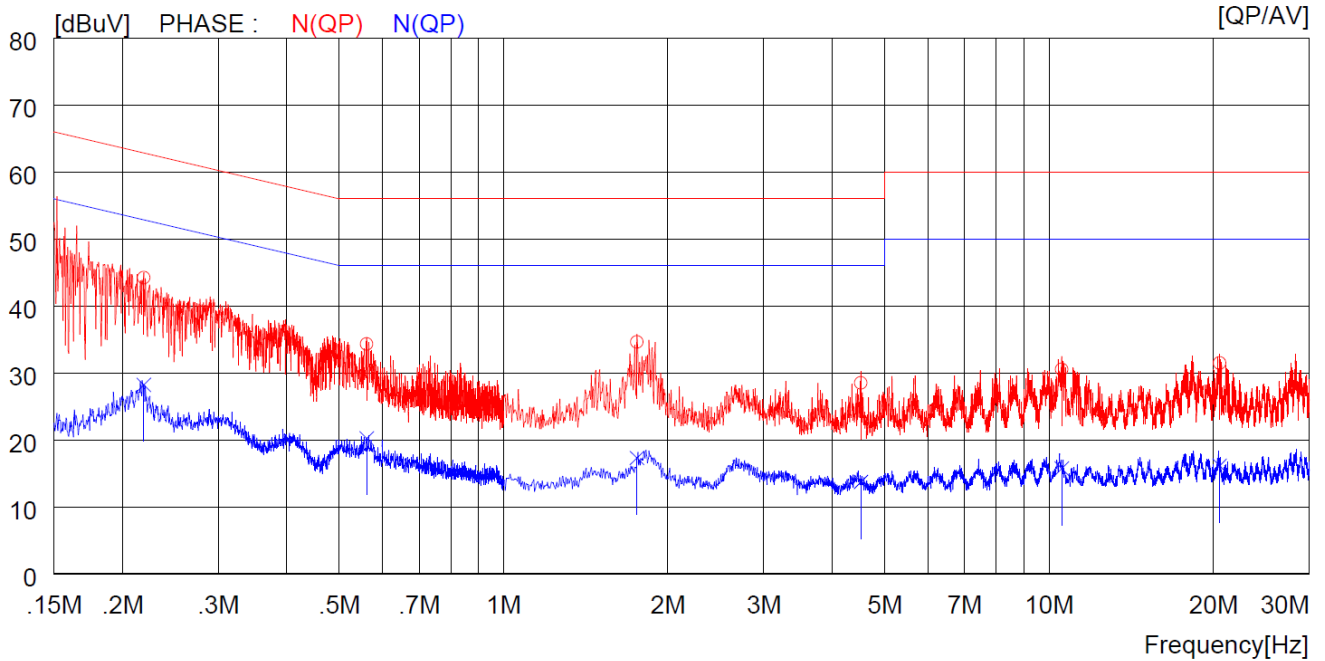
13.4 Test data

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : HOT LINE
- Antenna 1, Antenna 2 and Multiple transmit tested, but the worst data were recorded.



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.21900	40.2	----	10.2	50.4	----	62.9	----	12.5	----	H (QP)
2	0.59800	33.2	----	10.2	43.4	----	56.0	----	12.6	----	H (QP)
3	1.84400	37.2	----	10.2	47.4	----	56.0	----	8.6	----	H (QP)
4	2.68800	28.8	----	10.2	39.0	----	56.0	----	17.0	----	H (QP)
5	9.19500	23.1	----	10.6	33.7	----	60.0	----	26.3	----	H (QP)
6	18.83000	23.5	----	11.1	34.6	----	60.0	----	25.4	----	H (QP)
7	0.21900	----	27.6	10.2	----	37.8	----	52.9	----	15.1	H (CAV)
8	0.59800	----	18.6	10.2	----	28.8	----	46.0	----	17.2	H (CAV)
9	1.84400	----	20.5	10.2	----	30.7	----	46.0	----	15.3	H (CAV)
10	2.68800	----	18.4	10.2	----	28.6	----	46.0	----	17.4	H (CAV)
11	9.19500	----	9.6	10.6	----	20.2	----	50.0	----	29.8	H (CAV)
12	18.83000	----	7.7	11.1	----	18.8	----	50.0	----	31.2	H (CAV)

-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.21900	34.0	----	10.2	44.2	----	62.9	----	18.7	----	N (QP)
2	0.56100	24.1	----	10.2	34.3	----	56.0	----	21.7	----	N (QP)
3	1.75600	24.4	----	10.2	34.6	----	56.0	----	21.4	----	N (QP)
4	4.52000	18.2	----	10.3	28.5	----	56.0	----	27.5	----	N (QP)
5	10.55000	19.9	----	10.6	30.5	----	60.0	----	29.5	----	N (QP)
6	20.55000	20.3	----	11.2	31.5	----	60.0	----	28.5	----	N (QP)
7	0.21900	----	18.0	10.2	----	28.2	----	52.9	----	24.7	N (CAV)
8	0.56100	----	10.0	10.2	----	20.2	----	46.0	----	25.8	N (CAV)
9	1.75600	----	7.1	10.2	----	17.3	----	46.0	----	28.7	N (CAV)
10	4.52000	----	3.4	10.3	----	13.7	----	46.0	----	32.3	N (CAV)
11	10.55000	----	5.1	10.6	----	15.7	----	50.0	----	34.3	N (CAV)
12	20.55000	----	4.9	11.2	----	16.1	----	50.0	----	33.9	N (CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

14. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSVA40	Rohde & Schwarz	Signal Analyzer	101598	Jan. 15, 2024 (1Y)
ESU	Rohde & Schwarz	EMI Test Receiver	100261	Mar. 05, 2024 (1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 16, 2023 (1Y)
SCU18	Rohde & Schwarz	Pre-Amplifier	102266	Jul. 04, 2024 (1Y)
SCU40A	Rohde & Schwarz	Pre-Amplifier	100436	Jan. 23, 2024 (1Y)
DT3000	Innco System	Turn Table	DT3000/093	N/A
MA4000-EP	Innco System	Antenna Master	MA4000/332/27030611/L	N/A
CO3000	Innco System	Controller	CO3000/904/37211215/L	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Apr. 15, 2024 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Mar. 09, 2024 (2Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1349	Jul. 02, 2024 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 04, 2024 (1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Jan. 15, 2024 (1Y)
8493C	HP	6 dB Attenuator	01925	Jul. 14, 2024 (1Y)
ESR 3	Rohde & Schwarz	EMI TEST RECEIVER	102602	Mar. 11, 2024 (1Y)
NSLK8126	Schwarzbeck	LISN	8126404	Mar. 12, 2024 (1Y)
3825/2	EMCO	AMN	9109-1869	Mar. 15, 2024 (1Y)
VTSD 9561-F	Schwarzbeck	PULSE LIMITER	01337	Nov. 23, 2023 (1Y)