

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-223-RWD-043

Reception No. : 2112005097

Applicant : LG Innotek Co., Ltd.

Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, Gwangju, 506-731, South Korea

Manufacturer : LG Innotek Co., Ltd.

Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, Gwangju, 506-731, South Korea

Type of Equipment : RF Module

FCC ID. : YZP-ATC6NPL002

Model Name : ATC6NPL002

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 83 pages (including this page)

Date of Incoming : December 01, 2021

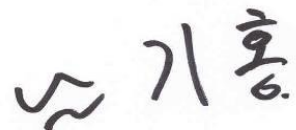
Date of issue : March 21, 2022

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.



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ONETECH Corp.

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OTC-TRF-RF-001(0)

ONETECH Corp.: 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

CONTENTS

PAGE

1. VERIFICATION OF COMPLIANCE	6
2. TEST SUMMARY.....	7
2.1 TEST ITEMS AND RESULTS	7
2.2 ADDITIONS, DEVIATIONS, EXCLUSIONS FROM STANDARDS.....	7
2.3 RELATED SUBMITTAL(S) / GRANT(S)	7
2.4 PURPOSE OF THE TEST	7
2.5 TEST METHODOLOGY.....	7
2.6 TEST FACILITY.....	7
3. GENERAL INFORMATION.....	8
3.1 PRODUCT DESCRIPTION.....	8
4. EUT MODIFICATIONS.....	29
5. SYSTEM TEST CONFIGURATION	30
5.1 JUSTIFICATION.....	30
5.2 PERIPHERAL EQUIPMENT	30
5.3 MODE OF OPERATION DURING THE TEST	31
5.4 CONFIGURATION OF TEST SYSTEM.....	38
5.5 ANTENNA REQUIREMENT	38
6. PRELIMINARY TEST	38
6.1 AC POWER LINE CONDUCTED EMISSIONS TESTS.....	38
6.2 GENERAL RADIATED EMISSIONS TESTS	38
7. MIMIMUM 6 DB BANDWIDTH	39
7.1 OPERATING ENVIRONMENT	39
7.2 TEST SET-UP	39
7.3 TEST DATE	39
7.4 TEST DATA FOR 802.11B WLAN MODE.....	40
7.5 TEST DATA FOR 802.11G WLAN MODE	41
7.6 TEST DATA FOR 802.11N_HT20 WLAN MODE.....	42
7.7 TEST DATA FOR 802.11N_HT40 WLAN MODE.....	43
8. MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER	44
8.1 OPERATING ENVIRONMENT	44
8.2 TEST SET-UP	44

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OTC-TRF-RF-001(0)

8.3 TEST DATE	44
8.4 TEST DATA FOR 802.11B WLAN MODE.....	45
8.5 TEST DATA FOR 802.11G WLAN MODE	46
8.6 TEST DATA FOR 802.11N_HT20 WLAN MODE.....	47
9. 100 KHZ BANDWIDTH OUTSIDE THE FREQUENCY BAND.....	49
9.1 OPERATING ENVIRONMENT	49
9.2 TEST SET-UP FOR CONDUCTED MEASUREMENT	49
9.3 TEST SET-UP FOR RADIATED MEASUREMENT.....	49
9.4 TEST DATE	49
9.5 TEST DATA FOR CONDUCTED EMISSION	49
9.6 TEST DATA FOR RADIATED EMISSION.....	50
9.6.1 Radiated Emission which fall in the Restricted Band.....	50
9.6.2 Spurious & Harmonic Radiated Emission.....	56
10. PEAK POWER SPECTRAL DENSITY	62
10.1 OPERATING ENVIRONMENT	62
10.2 TEST SET-UP	62
10.3 TEST DATE	62
10.4 TEST DATA FOR 802.11B WLAN MODE.....	63
10.5 TEST DATA FOR 802.11G WLAN MODE	64
10.6 TEST DATA FOR 802.11N_HT20 WLAN MODE.....	65
10.7 TEST DATA FOR 802.11N_HT40 WLAN MODE.....	66
11. RADIATED EMISSION TEST	67
11.1 OPERATING ENVIRONMENT	67
11.2 TEST SET-UP	67
11.3 TEST DATE	68
11.4 TEST DATA FOR 30 MHz ~ 1 000 MHz	69
11.4.1 Test data for WLAN 2.4 GHz	69
11.4.2 Test data for Intermodulation Mode(WLAN 2.4 GHz + Bluetooth)	70
11.4.3 Test data for Intermodulation Mode(WLAN 2.4 GHz + Bluetooth LE)	71
11.4.4 Test data for Intermodulation Mode(WLAN 2.4 GHz + WLAN 5 GHz)	72
11.5 TEST DATA FOR BELOW 30 MHz	73
11.6 TEST DATA FOR ABOVE 1 GHz	73
12. CONDUCTED EMISSION TEST.....	74
12.1 OPERATING ENVIRONMENT	74
12.2 TEST SET-UP	74

12.3 TEST DATE	74
12.4 TEST DATA FOR WLAN 2.4 GHz	75
12.5 TEST DATA FOR INTERMODULATION MODE(WLAN 2.4 GHz + BLUETOOTH)	77
12.6 TEST DATA FOR INTERMODULATION MODE(WLAN 2.4 GHz + BLUETOOTH LE)	79
12.7 TEST DATA FOR INTERMODULATION MODE(WLAN 2.4 GHz + WLAN 5 GHz)	81
13. LIST OF TEST EQUIPMENT	83

Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-223-RWD-043	March 21, 2022	Initial Release	All

1. VERIFICATION OF COMPLIANCE

Applicant : LG Innotek Co., Ltd.

Address : 26, Hanamsandan 5beon-ro Gwangsan-gu, Gwangju, 506-731, South Korea

Contact Person : Jeong Inchang / Senior Research Engineer

Telephone No. : +82-62-950-0332

FCC ID : YZP-ATC6NPL002

Model Name : ATC6NPL002

Brand Name :  **LG Innotek**

Serial Number : N/A

Date : March 21, 2022

EQUIPMENT CLASS	DTS – DIGITAL TRNSMISSION SYSTEM
E.U.T. DESCRIPTION	RF Module
THIS REPORT CONCERNS	Original Grant
MEASUREMENT PROCEDURES	ANSI C63.10: 2020
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 Peak Conducted 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)	Peak 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: 2020. 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

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

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

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. GENERAL INFORMATION

3.1 Product Description

The LG Innotek Co., Ltd., Model ATC6NPL002 (referred to as the EUT in this report) is a RF Module. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE	RF Module	
OPERATING FREQUENCY	Bluetooth LE	2 402 MHz ~ 2 480 MHz
	Bluetooth	2 402 MHz ~ 2 480 MHz
	WLAN 2.4 GHz	2 412 MHz ~ 2 462 MHz (802.11b/g/n(HT20)/ax(HE20))
		2 422 MHz ~ 2 452 MHz (802.11n(HT40)/ax(HE40))
	WLAN 5 150 MHz ~ 5 250 MHz Band	5 180 MHz ~ 5 240 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20))
		5 190 MHz ~ 5 230 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40))
		5 210 MHz (802.11ac(VHT80)/ax(HE80))
	WLAN 5 250 MHz ~ 5 350 MHz Band	5 260 MHz ~ 5 320 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20))
		5 270 MHz ~ 5 310 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40))
		5 290 MHz (802.11ac(VHT80)/ax(HE80))
	WLAN 5 470 MHz ~ 5 725 MHz Band	5 500 MHz ~ 5 720 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20))
		5 510 MHz ~ 5 710 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40))
		5 530 MHz ~ 5 690 MHz (802.11ac(VHT80)/ax(HE80))
	WLAN 5 725 MHz ~ 5 850 MHz Band	5 745 MHz ~ 5 825 MHz (802.11a/n(HT20)/ac(VHT20)/ax(HE20))
		5 755 MHz ~ 5 795 MHz (802.11n(HT40)/ac(VHT40)/ax(HE40))
		5 775 MHz (802.11ac(VHT80)/ax(HE80))
MODULATION TYPE	Bluetooth LE	GFSK for 1 Mbps / 2 Mbps / 125 kbps / 500 kbps
	Bluetooth	GFSK for 1Mbps, $\pi/4$ -DQPSK for 2Mbps, 8-DPSK for 3Mbps
	WLAN 2.4 GHz	802.11b: DSSS Modulation(DBPSK/DQPSK/CCK) 802.11g/n(HT20)/n(HT40)/ax(HE20)/ax(HE40): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)
	WLAN 5 GHz	802.11a/n(HT20)/n(HT40)/ac(VHT80)/ax(HE20)/ax(HE40)/ax(HE80): OFDM Modulation(BPSK/QPSK/16QAM/64QAM)

RF OUTPUT POWER	Bluetooth LE	1 Mbps	1.21 dBm
		2 Mbps	1.17 dBm
		125 kbps	1.22 dBm
		500 kbps	1.24 dBm
	Bluetooth	1 Mbps	0.67 dBm
		2 Mbps	-0.27 dBm
		3 Mbps	0.09 dBm
	WLAN 2.4 GHz	Antenna 0	15.57 dBm(802.11b)
			11.80 dBm(802.11g)
			11.67 dBm(802.11n_HT20)
			13.27 dBm(802.11ax_HE20)_26 Tone
			13.06 dBm(802.11ax_HE20)_52 Tone
			12.66 dBm(802.11ax_HE20)_106 Tone
			11.85 dBm(802.11ax_HE20)_242 Tone
			11.47 dBm(802.11ax_HE20)_Single User
			11.31 dBm(802.11n_HT40)
			12.02 dBm(802.11ax_HE40)_26 Tone
			12.93 dBm(802.11ax_HE40)_52 Tone
			13.04 dBm(802.11ax_HE40)_106 Tone
			12.44 dBm(802.11ax_HE40)_242 Tone
			11.52 dBm(802.11ax_HE40)_484 Tone
			11.50 dBm(802.11ax_HE40)_Single User

RF OUTPUT POWER	WLAN 2.4 GHz	Antenna 1	16.19 dBm(802.11b) 12.88 dBm(802.11g) 13.11 dBm(802.11n_HT20) 13.35 dBm(802.11ax_HE20)_26 Tone 13.57 dBm(802.11ax_HE20)_52 Tone 13.47 dBm(802.11ax_HE20)_106 Tone 13.33 dBm(802.11ax_HE20)_242 Tone 13.65 dBm(802.11ax_HE20)_Single User 12.11 dBm(802.11n_HT40) 12.31 dBm(802.11ax_HE40)_26 Tone 12.67 dBm(802.11ax_HE40)_52 Tone 12.70 dBm(802.11ax_HE40)_106 Tone 12.68 dBm(802.11ax_HE40)_242 Tone 12.48 dBm(802.11ax_HE40)_484 Tone 12.69 dBm(802.11ax_HE40)_Single User
		Multiple Antenna	15.46 dBm(802.11n_HT20) 16.32 dBm(802.11ax_HE20)_26 Tone 16.22 dBm(802.11ax_HE20)_52 Tone 16.09 dBm(802.11ax_HE20)_106 Tone 15.66 dBm(802.11ax_HE20)_242 Tone 15.70 dBm(802.11ax_HE20)_Single User 14.74 dBm(802.11n_HT40) 14.90 dBm(802.11ax_HE40)_26 Tone 15.78 dBm(802.11ax_HE40)_52 Tone 15.83 dBm(802.11ax_HE40)_106 Tone 15.57 dBm(802.11ax_HE40)_242 Tone 15.04 dBm(802.11ax_HE40)_484 Tone 15.15 dBm(802.11ax_HE40)_Single User

RF OUTPUT POWER	WLAN 5 150 MHz ~ 5 250 MHz Band	Antenna 0	12.59 dBm(802.11a) 12.15 dBm(802.11n_HT20) 2.53 dBm(802.11ax_HE20)_26 Tone 4.65 dBm(802.11ax_HE20)_52 Tone 7.54 dBm(802.11ax_HE20)_106 Tone 10.29 dBm(802.11ax_HE20)_242 Tone 12.19 dBm(802.11ax_HE20)_Single User 9.02 dBm(802.11n_HT40) 3.32 dBm(802.11ax_HE40)_26 Tone 5.26 dBm(802.11ax_HE40)_52 Tone 7.72 dBm(802.11ax_HE40)_106 Tone 7.54 dBm(802.11ax_HE40)_242 Tone 7.43 dBm(802.11ax_HE40)_484 Tone 9.15 dBm(802.11ax_HE40)_Single User 8.33 dBm(802.11ac_VHT80) 3.10 dBm(802.11ax_HE40)_26 Tone 5.03 dBm(802.11ax_HE40)_52 Tone 4.87 dBm(802.11ax_HE40)_106 Tone 4.76 dBm(802.11ax_HE40)_242 Tone 4.72 dBm(802.11ax_HE40)_484 Tone 4.33 dBm(802.11ax_HE40)_996 Tone 8.55 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 150 MHz ~ 5 250 MHz Band	Antenna 1	12.45 dBm(802.11a) 12.01 dBm(802.11n_HT20) 3.45 dBm(802.11ax_HE20)_26 Tone 5.63 dBm(802.11ax_HE20)_52 Tone 8.30 dBm(802.11ax_HE20)_106 Tone 10.77 dBm(802.11ax_HE20)_242 Tone 12.02 dBm(802.11ax_HE20)_Single User 8.87 dBm(802.11n_HT40) 4.18 dBm(802.11ax_HE40)_26 Tone 6.25 dBm(802.11ax_HE40)_52 Tone 8.44 dBm(802.11ax_HE40)_106 Tone 8.29 dBm(802.11ax_HE40)_242 Tone 8.20 dBm(802.11ax_HE40)_484 Tone 9.21 dBm(802.11ax_HE40)_Single User 8.11 dBm(802.11ac_VHT80) 4.10 dBm(802.11ax_HE40)_26 Tone 6.10 dBm(802.11ax_HE40)_52 Tone 5.90 dBm(802.11ax_HE40)_106 Tone 5.81 dBm(802.11ax_HE40)_242 Tone 5.75 dBm(802.11ax_HE40)_484 Tone 5.50 dBm(802.11ax_HE40)_996 Tone 8.27 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 150 MHz ~ 5 250 MHz Band	Multiple Antenna	15.09 dBm(802.11n_HT20) 6.03 dBm(802.11ax_HE20)_26 Tone 8.18 dBm(802.11ax_HE20)_52 Tone 10.95 dBm(802.11ax_HE20)_106 Tone 13.55 dBm(802.11ax_HE20)_242 Tone 15.11 dBm(802.11ax_HE20)_Single User 11.95 dBm(802.11n_HT40) 6.78 dBm(802.11ax_HE40)_26 Tone 8.80 dBm(802.11ax_HE40)_52 Tone 11.11 dBm(802.11ax_HE40)_106 Tone 10.94 dBm(802.11ax_HE40)_242 Tone 10.84 dBm(802.11ax_HE40)_484 Tone 12.19 dBm(802.11ax_HE40)_Single User 11.24 dBm(802.11ac_VHT80) 6.64 dBm(802.11ax_HE40)_26 Tone 8.61 dBm(802.11ax_HE40)_52 Tone 8.42 dBm(802.11ax_HE40)_106 Tone 8.32 dBm(802.11ax_HE40)_242 Tone 8.27 dBm(802.11ax_HE40)_484 Tone 7.96 dBm(802.11ax_HE40)_996 Tone 11.42 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 250 MHz ~ 5 350 MHz Band	Antenna 0	12.38 dBm(802.11a) 11.90 dBm(802.11n_HT20) 2.66 dBm(802.11ax_HE20)_26 Tone 4.79 dBm(802.11ax_HE20)_52 Tone 7.63 dBm(802.11ax_HE20)_106 Tone 10.35 dBm(802.11ax_HE20)_242 Tone 11.97 dBm(802.11ax_HE20)_Single User 8.28 dBm(802.11n_HT40) 3.52 dBm(802.11ax_HE40)_26 Tone 5.62 dBm(802.11ax_HE40)_52 Tone 7.88 dBm(802.11ax_HE40)_106 Tone 5.55 dBm(802.11ax_HE40)_242 Tone 7.49 dBm(802.11ax_HE40)_484 Tone 8.44 dBm(802.11ax_HE40)_Single User 6.35 dBm(802.11ac_VHT80) 3.18 dBm(802.11ax_HE40)_26 Tone 5.13 dBm(802.11ax_HE40)_52 Tone 4.96 dBm(802.11ax_HE40)_106 Tone 4.88 dBm(802.11ax_HE40)_242 Tone 4.86 dBm(802.11ax_HE40)_484 Tone 4.82 dBm(802.11ax_HE40)_996 Tone 6.54 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 250 MHz ~ 5 350 MHz Band	Antenna 1	12.39 dBm(802.11a) 11.94 dBm(802.11n_HT20) 3.67 dBm(802.11ax_HE20)_26 Tone 5.73 dBm(802.11ax_HE20)_52 Tone 8.46 dBm(802.11ax_HE20)_106 Tone 10.87 dBm(802.11ax_HE20)_242 Tone 12.03 dBm(802.11ax_HE20)_Single User 8.21 dBm(802.11n_HT40) 4.43 dBm(802.11ax_HE40)_26 Tone 6.58 dBm(802.11ax_HE40)_52 Tone 8.63 dBm(802.11ax_HE40)_106 Tone 6.48 dBm(802.11ax_HE40)_242 Tone 8.39 dBm(802.11ax_HE40)_484 Tone 8.48 dBm(802.11ax_HE40)_Single User 6.23 dBm(802.11ac_VHT80) 4.28 dBm(802.11ax_HE40)_26 Tone 6.24 dBm(802.11ax_HE40)_52 Tone 6.07 dBm(802.11ax_HE40)_106 Tone 5.88 dBm(802.11ax_HE40)_242 Tone 5.90 dBm(802.11ax_HE40)_484 Tone 5.86 dBm(802.11ax_HE40)_996 Tone 6.54 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 250 MHz ~ 5 350 MHz Band	Multiple Antenna	14.89 dBm(802.11n_HT20) 6.21 dBm(802.11ax_HE20)_26 Tone 8.29 dBm(802.11ax_HE20)_52 Tone 11.07 dBm(802.11ax_HE20)_106 Tone 13.58 dBm(802.11ax_HE20)_242 Tone 15.01 dBm(802.11ax_HE20)_Single User 11.23 dBm(802.11n_HT40) 6.98 dBm(802.11ax_HE40)_26 Tone 9.14 dBm(802.11ax_HE40)_52 Tone 11.28 dBm(802.11ax_HE40)_106 Tone 9.05 dBm(802.11ax_HE40)_242 Tone 10.97 dBm(802.11ax_HE40)_484 Tone 11.47 dBm(802.11ax_HE40)_Single User 9.30 dBm(802.11ac_VHT80) 6.77 dBm(802.11ax_HE40)_26 Tone 8.73 dBm(802.11ax_HE40)_52 Tone 8.56 dBm(802.11ax_HE40)_106 Tone 8.41 dBm(802.11ax_HE40)_242 Tone 8.42 dBm(802.11ax_HE40)_484 Tone 8.38 dBm(802.11ax_HE40)_996 Tone 9.55 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 0	12.24 dBm(802.11a) 11.76 dBm(802.11n_HT20) 2.82 dBm(802.11ax_HE20)_26 Tone 4.98 dBm(802.11ax_HE20)_52 Tone 7.90 dBm(802.11ax_HE20)_106 Tone 10.64 dBm(802.11ax_HE20)_242 Tone 12.03 dBm(802.11ax_HE20)_Single User 9.62 dBm(802.11n_HT40) 3.69 dBm(802.11ax_HE40)_26 Tone 5.92 dBm(802.11ax_HE40)_52 Tone 8.02 dBm(802.11ax_HE40)_106 Tone 7.72 dBm(802.11ax_HE40)_242 Tone 7.76 dBm(802.11ax_HE40)_484 Tone 9.99 dBm(802.11ax_HE40)_Single User 5.91 dBm(802.11ac_VHT80) 3.20 dBm(802.11ax_HE40)_26 Tone 5.21 dBm(802.11ax_HE40)_52 Tone 4.98 dBm(802.11ax_HE40)_106 Tone 4.80 dBm(802.11ax_HE40)_242 Tone 4.78 dBm(802.11ax_HE40)_484 Tone 4.46 dBm(802.11ax_HE40)_996 Tone 6.27 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 0_Straddle	9.32 dBm(802.11a) 9.20 dBm(802.11n_HT20) 2.00 dBm(802.11ax_HE20)_26 Tone 4.19 dBm(802.11ax_HE20)_52 Tone 6.86 dBm(802.11ax_HE20)_106 Tone 8.57 dBm(802.11ax_HE20)_242 Tone 9.31 dBm(802.11ax_HE20)_Single User 7.36 dBm(802.11n_HT40) -14.30 dBm(802.11ax_HE40)_26 Tone -6.24 dBm(802.11ax_HE40)_52 Tone 3.73 dBm(802.11ax_HE40)_106 Tone 5.66 dBm(802.11ax_HE40)_242 Tone 6.45 dBm(802.11ax_HE40)_484 Tone 7.74 dBm(802.11ax_HE40)_Single User 4.72 dBm(802.11ac_VHT80) -15.24 dBm(802.11ax_HE40)_26 Tone -7.11 dBm(802.11ax_HE40)_52 Tone 1.12 dBm(802.11ax_HE40)_106 Tone 2.80 dBm(802.11ax_HE40)_242 Tone 3.65 dBm(802.11ax_HE40)_484 Tone 4.16 dBm(802.11ax_HE40)_996 Tone 5.03 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 1	12.50 dBm(802.11a) 11.89 dBm(802.11n_HT20) 3.90 dBm(802.11ax_HE20)_26 Tone 8.53 dBm(802.11ax_HE20)_52 Tone 8.55 dBm(802.11ax_HE20)_106 Tone 11.07 dBm(802.11ax_HE20)_242 Tone 12.15 dBm(802.11ax_HE20)_Single User 9.93 dBm(802.11n_HT40) 5.05 dBm(802.11ax_HE40)_26 Tone 7.13 dBm(802.11ax_HE40)_52 Tone 9.13 dBm(802.11ax_HE40)_106 Tone 8.84 dBm(802.11ax_HE40)_242 Tone 8.81 dBm(802.11ax_HE40)_484 Tone 10.15 dBm(802.11ax_HE40)_Single User 5.90 dBm(802.11ac_VHT80) 4.26 dBm(802.11ax_HE40)_26 Tone 6.28 dBm(802.11ax_HE40)_52 Tone 6.15 dBm(802.11ax_HE40)_106 Tone 6.02 dBm(802.11ax_HE40)_242 Tone 5.96 dBm(802.11ax_HE40)_484 Tone 5.71 dBm(802.11ax_HE40)_996 Tone 6.27 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Antenna 1_Straddle	9.42 dBm(802.11a) 9.23 dBm(802.11n_HT20) 3.92 dBm(802.11ax_HE20)_26 Tone 5.88 dBm(802.11ax_HE20)_52 Tone 8.59 dBm(802.11ax_HE20)_106 Tone 9.80 dBm(802.11ax_HE20)_242 Tone 9.35 dBm(802.11ax_HE20)_Single User 7.45 dBm(802.11n_HT40) -12.01 dBm(802.11ax_HE40)_26 Tone -4.37 dBm(802.11ax_HE40)_52 Tone 5.52 dBm(802.11ax_HE40)_106 Tone 7.38 dBm(802.11ax_HE40)_242 Tone 7.74 dBm(802.11ax_HE40)_484 Tone 7.79 dBm(802.11ax_HE40)_Single User 4.37 dBm(802.11ac_VHT80) -13.11 dBm(802.11ax_HE40)_26 Tone -5.17 dBm(802.11ax_HE40)_52 Tone 2.86 dBm(802.11ax_HE40)_106 Tone 4.42 dBm(802.11ax_HE40)_242 Tone 5.11 dBm(802.11ax_HE40)_484 Tone 5.32 dBm(802.11ax_HE40)_996 Tone 4.66 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Multiple Antenna	14.89 dBm(802.11n_HT20) 6.33 dBm(802.11ax_HE20)_26 Tone 9.99 dBm(802.11ax_HE20)_52 Tone 11.21 dBm(802.11ax_HE20)_106 Tone 13.87 dBm(802.11ax_HE20)_242 Tone 15.10 dBm(802.11ax_HE20)_Single User 12.79 dBm(802.11n_HT40) 7.44 dBm(802.11ax_HE40)_26 Tone 9.58 dBm(802.11ax_HE40)_52 Tone 11.62 dBm(802.11ax_HE40)_106 Tone 11.31 dBm(802.11ax_HE40)_242 Tone 11.33 dBm(802.11ax_HE40)_484 Tone 13.09 dBm(802.11ax_HE40)_Single User 8.92 dBm(802.11ac_VHT80) 6.77 dBm(802.11ax_HE40)_26 Tone 8.79 dBm(802.11ax_HE40)_52 Tone 8.61 dBm(802.11ax_HE40)_106 Tone 8.46 dBm(802.11ax_HE40)_242 Tone 8.42 dBm(802.11ax_HE40)_484 Tone 8.14 dBm(802.11ax_HE40)_996 Tone 9.28 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 470 MHz ~ 5 725 MHz Band	Multiple Antenna _Straddle	12.22 dBm(802.11n_HT20) 5.99 dBm(802.11ax_HE20)_26 Tone 8.12 dBm(802.11ax_HE20)_52 Tone 10.82 dBm(802.11ax_HE20)_106 Tone 12.24 dBm(802.11ax_HE20)_242 Tone 12.34 dBm(802.11ax_HE20)_Single User 10.41 dBm(802.11n_HT40) -9.99 dBm(802.11ax_HE40)_26 Tone -2.19 dBm(802.11ax_HE40)_52 Tone 7.73 dBm(802.11ax_HE40)_106 Tone 9.62 dBm(802.11ax_HE40)_242 Tone 10.15 dBm(802.11ax_HE40)_484 Tone 10.78 dBm(802.11ax_HE40)_Single User 7.56 dBm(802.11ac_VHT80) -11.04 dBm(802.11ax_HE40)_26 Tone -3.02 dBm(802.11ax_HE40)_52 Tone 5.08 dBm(802.11ax_HE40)_106 Tone 6.69 dBm(802.11ax_HE40)_242 Tone 7.45 dBm(802.11ax_HE40)_484 Tone 7.79 dBm(802.11ax_HE40)_996 Tone 7.86 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 0	11.47 dBm(802.11a) 11.43 dBm(802.11n_HT20) 10.25 dBm(802.11ax_HE20)_26 Tone 10.40 dBm(802.11ax_HE20)_52 Tone 10.13 dBm(802.11ax_HE20)_106 Tone 10.13 dBm(802.11ax_HE20)_242 Tone 11.28 dBm(802.11ax_HE20)_Single User 10.37 dBm(802.11n_HT40) 7.10 dBm(802.11ax_HE40)_26 Tone 7.39 dBm(802.11ax_HE40)_52 Tone 7.69 dBm(802.11ax_HE40)_106 Tone 7.32 dBm(802.11ax_HE40)_242 Tone 7.16 dBm(802.11ax_HE40)_484 Tone 10.38 dBm(802.11ax_HE40)_Single User 8.02 dBm(802.11ac_VHT80) 4.77 dBm(802.11ax_HE40)_26 Tone 4.91 dBm(802.11ax_HE40)_52 Tone 4.76 dBm(802.11ax_HE40)_106 Tone 4.66 dBm(802.11ax_HE40)_242 Tone 4.57 dBm(802.11ax_HE40)_484 Tone 4.48 dBm(802.11ax_HE40)_996 Tone 8.01 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 0_Straddle	3.14 dBm(802.11a) 3.50 dBm(802.11n_HT20) 1.68 dBm(802.11ax_HE20)_26 Tone 3.49 dBm(802.11ax_HE20)_52 Tone 3.76 dBm(802.11ax_HE20)_106 Tone 3.11 dBm(802.11ax_HE20)_242 Tone 3.94 dBm(802.11ax_HE20)_Single User -2.90 dBm(802.11n_HT40) 1.45 dBm(802.11ax_HE40)_26 Tone 4.04 dBm(802.11ax_HE40)_52 Tone 3.01 dBm(802.11ax_HE40)_106 Tone -0.30 dBm(802.11ax_HE40)_242 Tone -3.47 dBm(802.11ax_HE40)_484 Tone -2.02 dBm(802.11ax_HE40)_Single User -9.20 dBm(802.11ac_VHT80) 2.00 dBm(802.11ax_HE40)_26 Tone 3.63 dBm(802.11ax_HE40)_52 Tone 0.73 dBm(802.11ax_HE40)_106 Tone -2.85 dBm(802.11ax_HE40)_242 Tone -5.78 dBm(802.11ax_HE40)_484 Tone -8.89 dBm(802.11ax_HE40)_996 Tone -8.06 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 1	11.78 dBm(802.11a) 11.49 dBm(802.11n_HT20) 11.36 dBm(802.11ax_HE20)_26 Tone 11.55 dBm(802.11ax_HE20)_52 Tone 11.29 dBm(802.11ax_HE20)_106 Tone 11.21 dBm(802.11ax_HE20)_242 Tone 11.16 dBm(802.11ax_HE20)_Single User 10.47 dBm(802.11n_HT40) 8.73 dBm(802.11ax_HE40)_26 Tone 9.01 dBm(802.11ax_HE40)_52 Tone 9.13 dBm(802.11ax_HE40)_106 Tone 8.83 dBm(802.11ax_HE40)_242 Tone 8.72 dBm(802.11ax_HE40)_484 Tone 10.31 dBm(802.11ax_HE40)_Single User 7.69 dBm(802.11ac_VHT80) 6.50 dBm(802.11ax_HE40)_26 Tone 6.53 dBm(802.11ax_HE40)_52 Tone 6.39 dBm(802.11ax_HE40)_106 Tone 6.26 dBm(802.11ax_HE40)_242 Tone 6.26 dBm(802.11ax_HE40)_484 Tone 5.91 dBm(802.11ax_HE40)_996 Tone 7.47 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Antenna 1_Straddle	3.33 dBm(802.11a) 3.62 dBm(802.11n_HT20) 3.83 dBm(802.11ax_HE20)_26 Tone 5.36 dBm(802.11ax_HE20)_52 Tone 5.47 dBm(802.11ax_HE20)_106 Tone 4.50 dBm(802.11ax_HE20)_242 Tone 4.12 dBm(802.11ax_HE20)_Single User -2.38 dBm(802.11n_HT40) 3.33 dBm(802.11ax_HE40)_26 Tone 5.93 dBm(802.11ax_HE40)_52 Tone 4.85 dBm(802.11ax_HE40)_106 Tone 1.50 dBm(802.11ax_HE40)_242 Tone -1.68 dBm(802.11ax_HE40)_484 Tone -1.56 dBm(802.11ax_HE40)_Single User -8.90 dBm(802.11ac_VHT80) 3.96 dBm(802.11ax_HE40)_26 Tone 5.51 dBm(802.11ax_HE40)_52 Tone 2.53 dBm(802.11ax_HE40)_106 Tone -0.93 dBm(802.11ax_HE40)_242 Tone -3.96 dBm(802.11ax_HE40)_484 Tone -7.03 dBm(802.11ax_HE40)_996 Tone -7.70 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Multiple Antenna	14.34 dBm(802.11n_HT20) 13.70 dBm(802.11ax_HE20)_26 Tone 13.90 dBm(802.11ax_HE20)_52 Tone 13.63 dBm(802.11ax_HE20)_106 Tone 13.54 dBm(802.11ax_HE20)_242 Tone 14.17 dBm(802.11ax_HE20)_Single User 13.43 dBm(802.11n_HT40) 10.97 dBm(802.11ax_HE40)_26 Tone 11.25 dBm(802.11ax_HE40)_52 Tone 11.33 dBm(802.11ax_HE40)_106 Tone 11.04 dBm(802.11ax_HE40)_242 Tone 11.02 dBm(802.11ax_HE40)_484 Tone 13.34 dBm(802.11ax_HE40)_Single User 10.87 dBm(802.11ac_VHT80) 8.60 dBm(802.11ax_HE40)_26 Tone 8.61 dBm(802.11ax_HE40)_52 Tone 8.50 dBm(802.11ax_HE40)_106 Tone 8.50 dBm(802.11ax_HE40)_242 Tone 8.48 dBm(802.11ax_HE40)_484 Tone 8.26 dBm(802.11ax_HE40)_996 Tone 10.76 dBm(802.11ax_HE40)_Single User
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RF OUTPUT POWER	WLAN 5 725 MHz ~ 5 850 MHz Band	Multiple Antenna _Straddle	6.57 dBm(802.11n_HT20) 5.90 dBm(802.11ax_HE20)_26 Tone 7.53 dBm(802.11ax_HE20)_52 Tone 7.71 dBm(802.11ax_HE20)_106 Tone 6.87 dBm(802.11ax_HE20)_242 Tone 7.04 dBm(802.11ax_HE20)_Single User 0.38 dBm(802.11n_HT40) 5.50 dBm(802.11ax_HE40)_26 Tone 8.10 dBm(802.11ax_HE40)_52 Tone 7.05 dBm(802.11ax_HE40)_106 Tone 3.70 dBm(802.11ax_HE40)_242 Tone 0.53 dBm(802.11ax_HE40)_484 Tone 1.23 dBm(802.11ax_HE40)_Single User -6.03 dBm(802.11ac_VHT80) 6.10 dBm(802.11ax_HE40)_26 Tone 7.68 dBm(802.11ax_HE40)_52 Tone 4.73 dBm(802.11ax_HE40)_106 Tone 1.23 dBm(802.11ax_HE40)_242 Tone -1.76 dBm(802.11ax_HE40)_484 Tone -4.85 dBm(802.11ax_HE40)_996 Tone -4.87 dBm(802.11ax_HE40)_Single User
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ANTENNA TYPE	Dipole Antenna		
ANTENNA GAIN	Bluetooth LE	7 dBi	
	Bluetooth	7 dBi	
	WLAN 2.4 GHz	Antenna 0	7 dBi
		Antenna 1	7 dBi
		Multiple Antenna	10.01 dBi
	5 150 MHz ~ 5 250 MHz Band	Antenna 0	9 dBi
		Antenna 1	9 dBi
		Multiple Antenna	12.01 dBi
	5 250 MHz ~ 5 350 MHz Band	Antenna 0	9 dBi
		Antenna 1	9 dBi
		Multiple Antenna	12.01 dBi
	5 470 MHz ~ 5 725 MHz Band	Antenna 0	9 dBi
		Antenna 1	9 dBi
		Multiple Antenna	12.01 dBi
	5 725 MHz ~ 5 850 MHz Band	Antenna 0	9 dBi
		Antenna 1	9 dBi
		Multiple Antenna	12.01 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)		40 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	LG Innotek Co., Ltd.	cTP3.0_Rev0.1	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
ATC6NPL002	LG Innotek Co., Ltd.	RF Module (EUT)	-
ZUP36-6	NEMIC-LAMBDA	DC Power Supply	EUT
ideapad320	Lenovo	Notebook PC	EUT

5.3 Mode of operation during the test

-. Channel List (WLAN 2.4 GHz)

Channel	Frequency[MHz]	Channel	Frequency[MHz]	Channel	Frequency[MHz]
1	2 412.00	6	2 437.00	11	2 462.00
2	2 417.00	7	2 442.00		
3	2 422.00	8	2 447.00		
4	2 427.00	9	2 452.00		
5	2 432.00	10	2 457.00		

-. 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	8.624	8.634	99.88	0.005
		2	4.407	4.419	99.73	0.012
		5.5	1.724	1.736	99.28	0.031
		11	0.958	0.969	98.80	0.052
	802.11 g	6	1.432	1.448	98.90	0.048
		9	0.956	0.976	97.95	0.090
		12	0.728	0.744	97.85	0.094
		18	0.492	0.508	96.85	0.139
		24	0.376	0.392	95.92	0.181
		36	0.256	0.270	94.81	0.231
		48	0.200	0.214	93.46	0.294
		54	0.182	0.196	92.86	0.322
	802.11 n(HT20)	MCS0	1.340	1.356	98.82	0.052
		MCS1	0.688	0.704	97.73	0.100
		MCS2	0.472	0.488	96.72	0.145
		MCS3	0.364	0.380	95.79	0.187
		MCS4	0.256	0.272	94.12	0.263
		MCS5	0.200	0.216	92.59	0.334
		MCS6	0.184	0.200	92.00	0.362
		MCS7	0.168	0.184	91.30	0.395
	802.11 n(HT40)	MCS0	0.664	0.680	97.65	0.103
		MCS1	0.352	0.368	95.65	0.193
		MCS2	0.248	0.264	93.94	0.272
		MCS3	0.196	0.212	92.45	0.341
		MCS4	0.144	0.160	90.00	0.458
		MCS5	0.116	0.130	89.23	0.495
		MCS6	0.108	0.122	88.52	0.529
		MCS7	0.100	0.116	86.21	0.645

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

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

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[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	8.624	8.636	99.86	0.006
		2	4.408	4.419	99.75	0.011
		5.5	1.725	1.736	99.37	0.028
		11	0.958	0.969	98.84	0.050
	802.11 g	6	1.428	1.448	98.62	0.060
		9	0.956	0.976	97.95	0.090
		12	0.728	0.744	97.85	0.094
		18	0.492	0.508	96.85	0.139
		24	0.376	0.392	95.92	0.181
		36	0.256	0.270	94.81	0.231
		48	0.200	0.214	93.46	0.294
		54	0.180	0.194	92.78	0.325
	802.11 n(HT20)	MCS0	1.340	1.356	98.82	0.052
		MCS1	0.688	0.704	97.73	0.100
		MCS2	0.472	0.488	96.72	0.145
		MCS3	0.364	0.380	95.79	0.187
		MCS4	0.256	0.270	94.81	0.231
		MCS5	0.200	0.216	92.59	0.334
		MCS6	0.184	0.200	92.00	0.362
		MCS7	0.168	0.184	91.30	0.395
	802.11 n(HT40)	MCS0	0.662	0.678	97.64	0.104
		MCS1	0.350	0.366	95.63	0.194
		MCS2	0.248	0.264	93.94	0.272
		MCS3	0.196	0.212	92.45	0.341
		MCS4	0.144	0.160	90.00	0.458
		MCS5	0.116	0.130	89.23	0.495
		MCS6	0.108	0.122	88.52	0.529
		MCS7	0.100	0.116	86.21	0.645

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

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

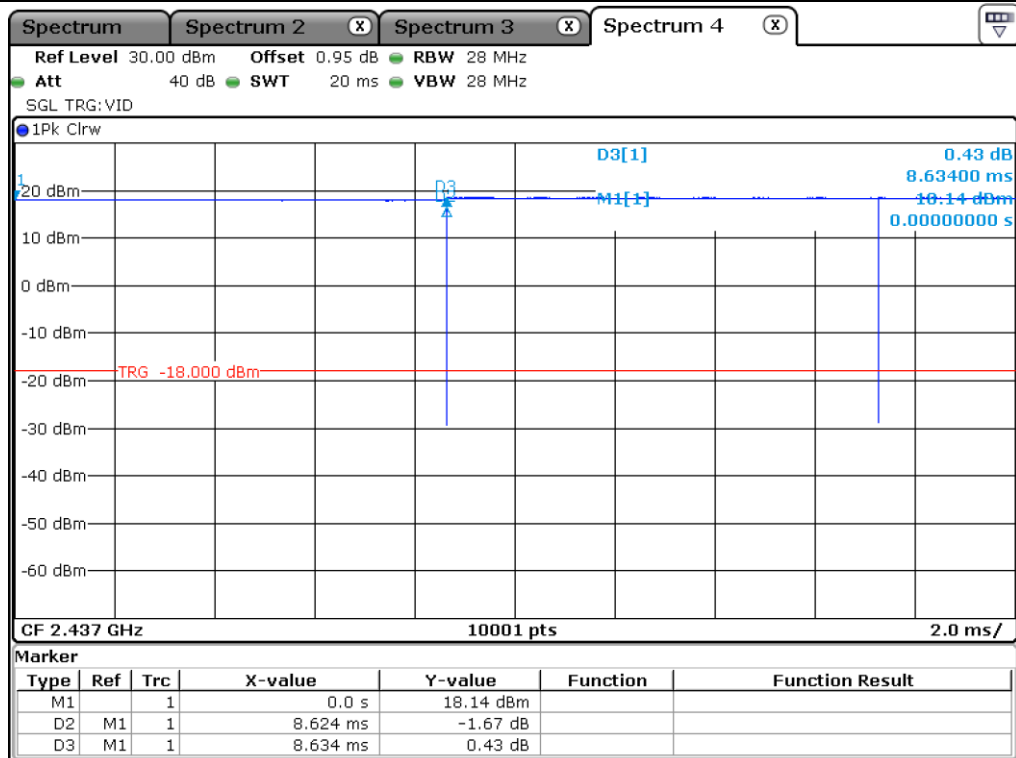
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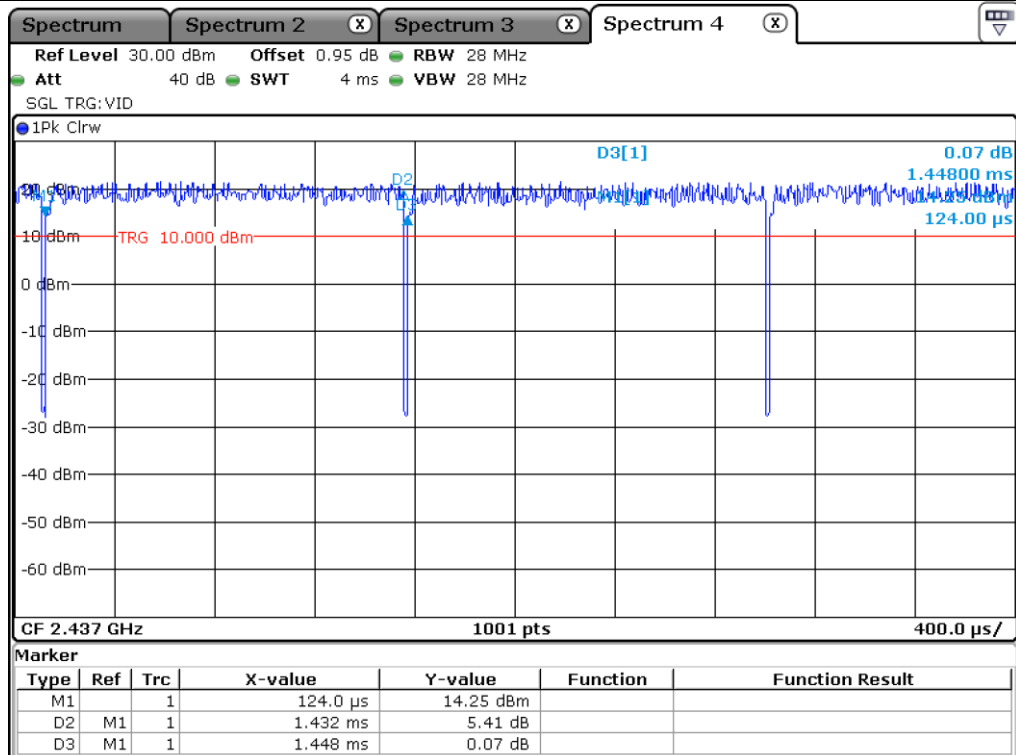
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-. Test Plot



802.11 b_Antenna 0



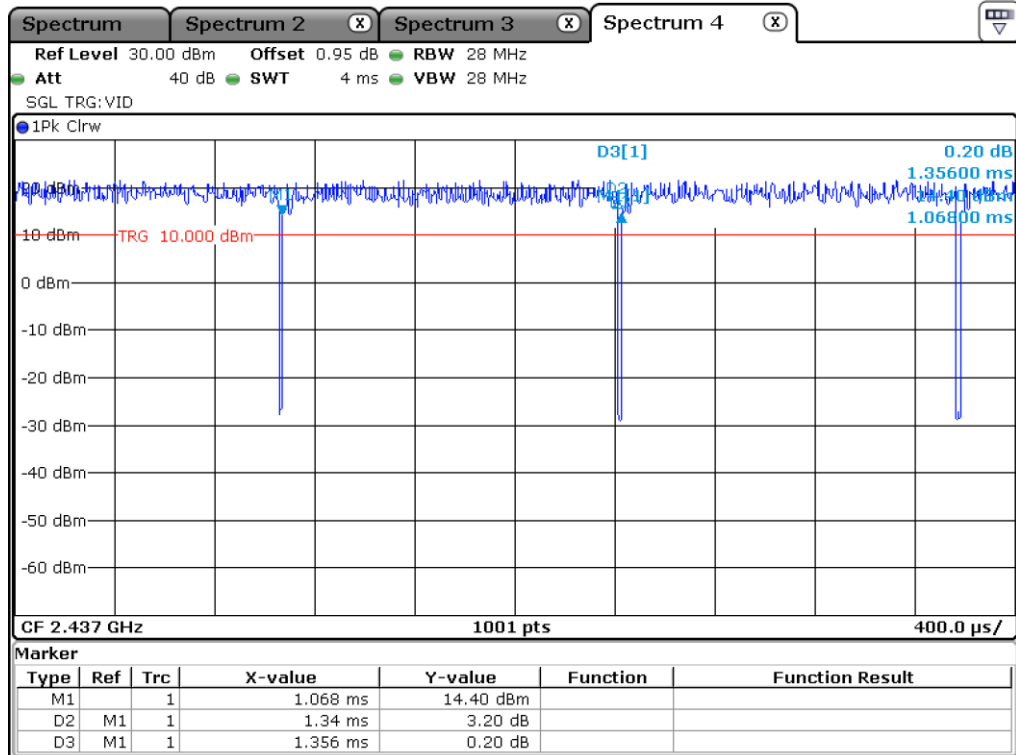
802.11 g_Antenna 0

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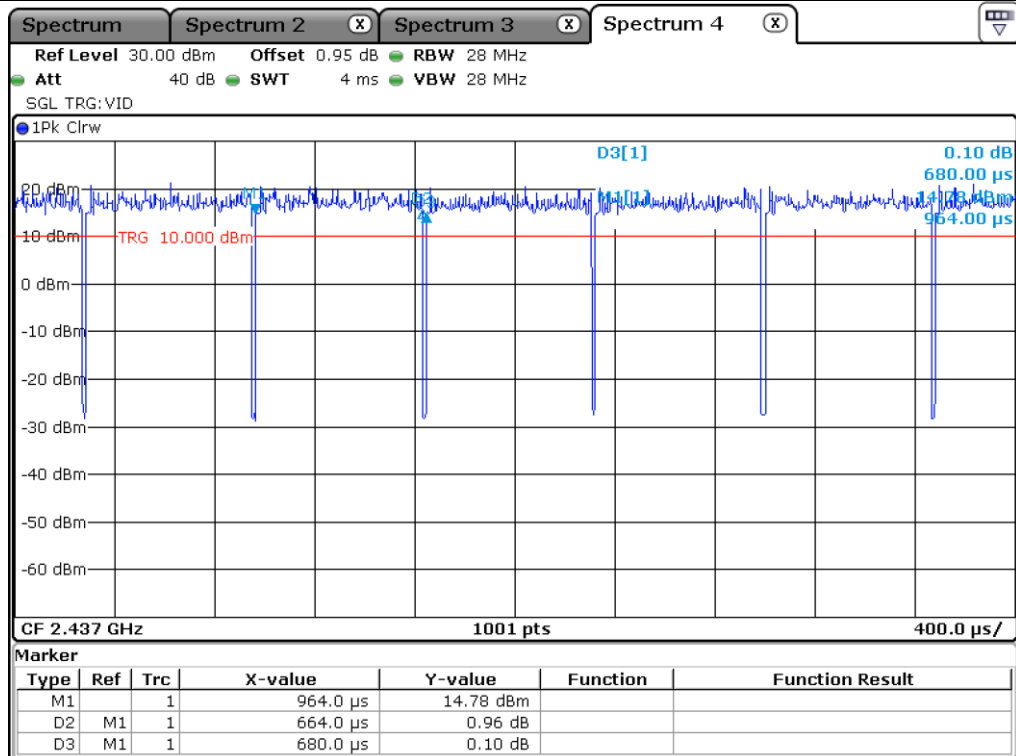
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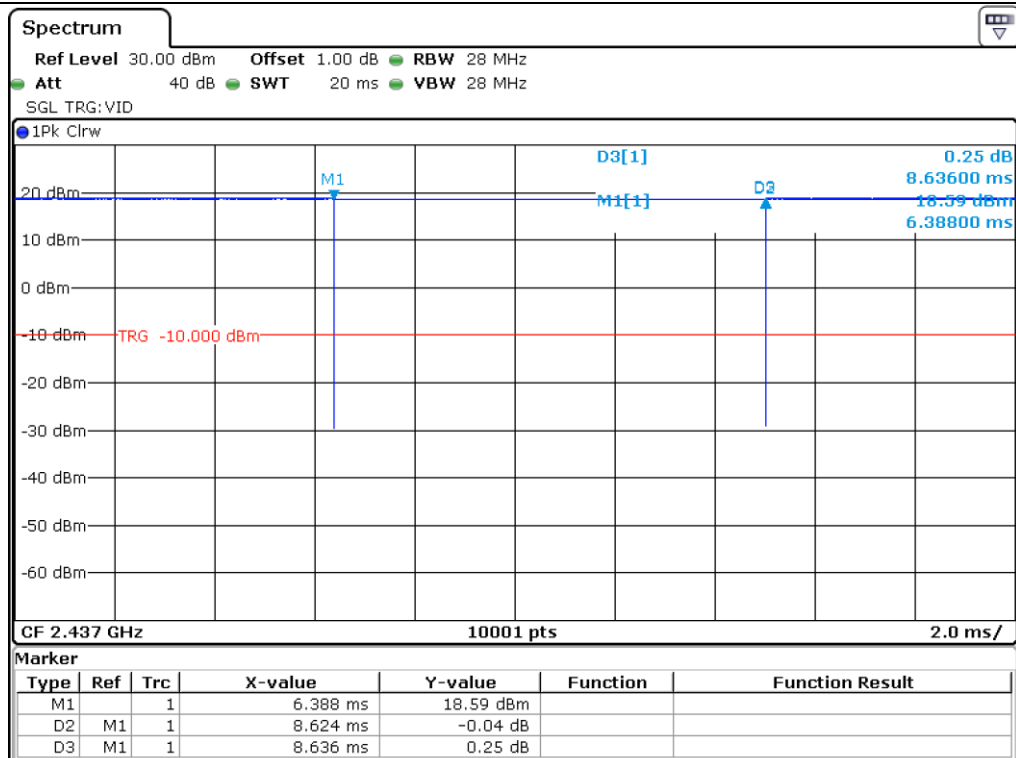
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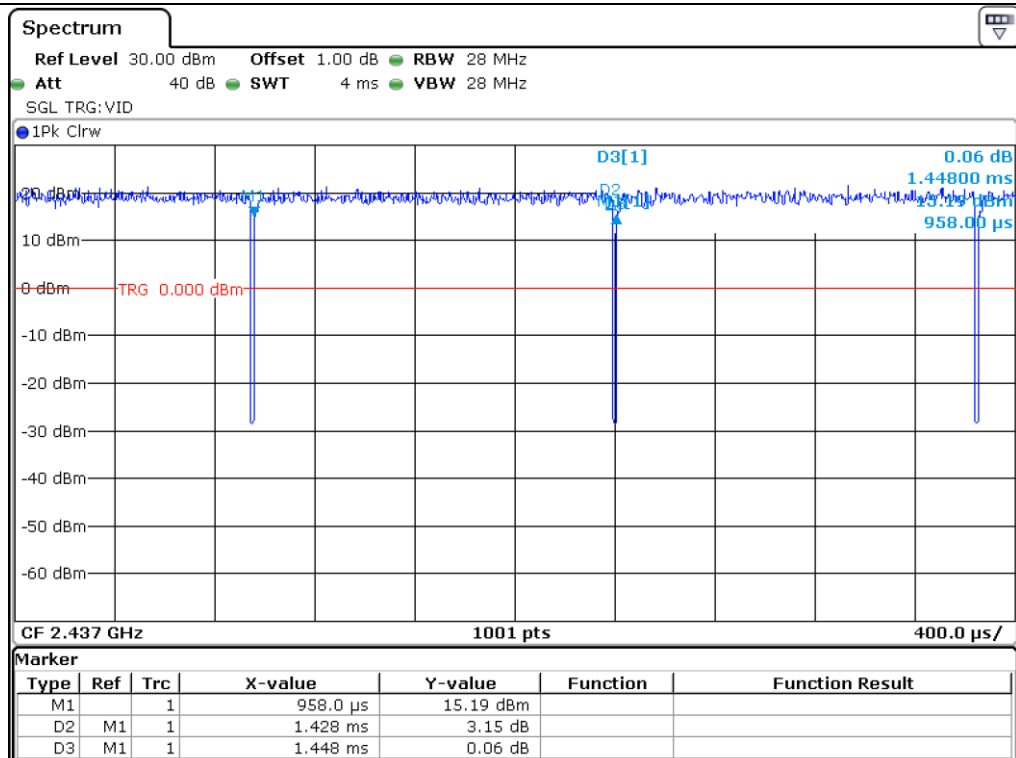
802.11 HT 20_Antenna 0



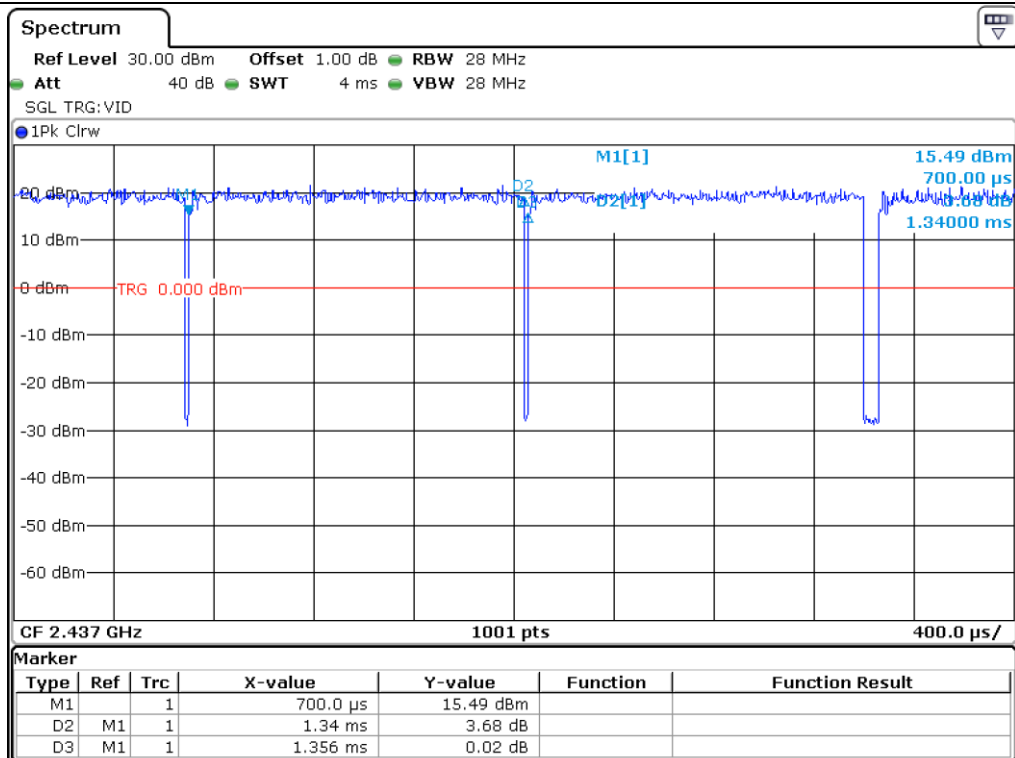
802.11 HT 40_Antenna 0



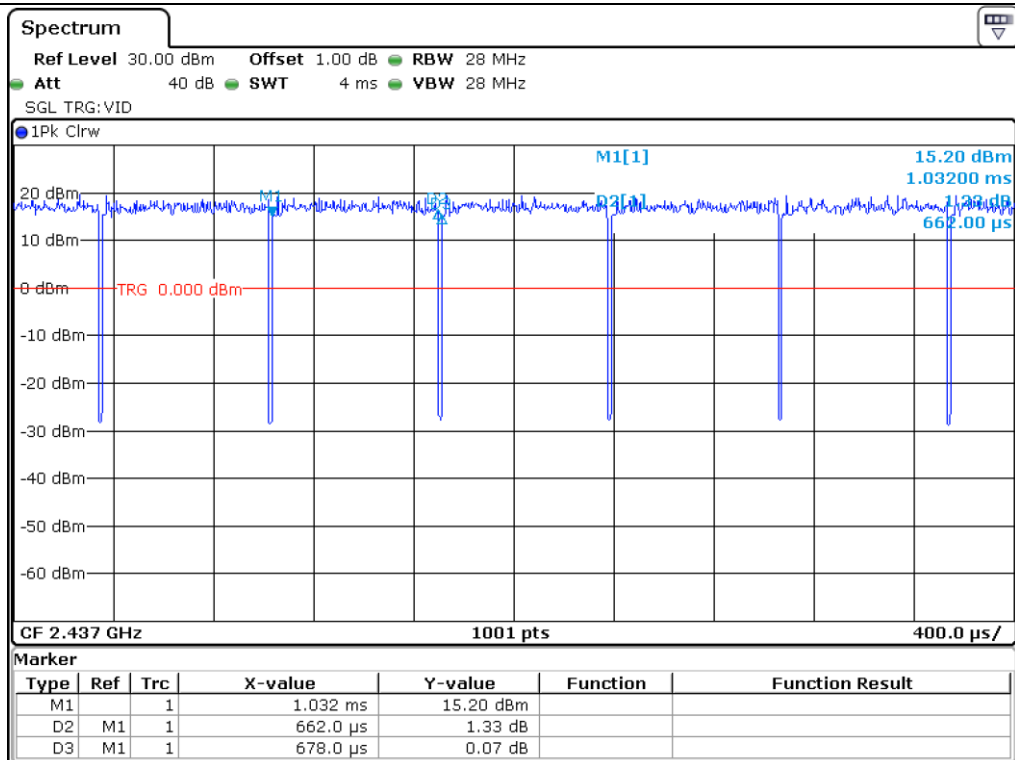
802.11 b_Antenna 1



802.11 g_Antenna 1



802.11 HT 20_Antenna 1



802.11 HT 40_Antenna 1

5.4 Configuration of Test System

Line Conducted Test: The EUT was tested in the Transmitting mode. All supporting equipment were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.10: 2020 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emissions test were conducted using the procedure in ANSI C63.10: 2020 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 a Dipole Antenna. However, The manufacture has designed a strucyure that connects to the antenna using a unique coupling connector of the Fakra Type. So no consideration of replacement by the user.

6. PRELIMINARY TEST

6.1 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

6.2 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

7. MINIMUM 6 dB BANDWIDTH

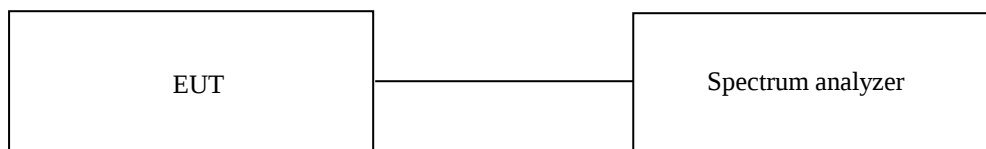
7.1 Operating environment

Temperature : 23 °C

Relative humidity : 41 % R.H.

7.2 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.



7.3 Test Date

December 05, 2021 ~ March 08, 2022

7.4 Test data for 802.11b WLAN Mode

7.4.1 Test data for Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	9.19	0.50	8.69
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

7.4.2 Test data for 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

7.5 Test data for 802.11g WLAN Mode

7.4.1 Test data for Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.38	0.50	15.88
Middle	2 437.00	16.38	0.50	15.88
High	2 462.00	16.33	0.50	15.83

Remark. Margin = Measured Value – Limit

7.4.2 Test data for Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	16.38	0.50	15.88
Middle	2 437.00	16.38	0.50	15.88
High	2 462.00	16.38	0.50	15.88

Remark. Margin = Measured Value - Limit

7.6 Test data for 802.11n_HT20 WLAN Mode

7.6.1 Test data for Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 437.00	17.63	0.50	17.13
High	2 462.00	17.58	0.50	17.08

Remark. Margin = Measured Value – Limit

7.6.2 Test data for Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	17.58	0.50	17.08
Middle	2 437.00	17.58	0.50	17.08
High	2 462.00	17.53	0.50	17.03

Remark. Margin = Measured Value – Limit

7.7 Test data for 802.11n_HT40 WLAN Mode

7.7.1 Test data for Antenna 0

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	36.06	0.50	35.56
Middle	2 437.00	36.36	0.50	35.86
High	2 462.00	35.46	0.50	34.96

Remark. Margin = Measured Value – Limit

7.7.2 Test data for Antenna 1

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	6 dB Bandwidth (MHz)	LIMIT (MHz)	Margin (MHz)
Low	2 412.00	35.66	0.50	35.16
Middle	2 437.00	35.46	0.50	34.96
High	2 462.00	35.66	0.50	35.16

Remark. Margin = Measured Value - Limit

8. MAXIMUM CONDUCTED(AVERAGE) OUTPUT POWER

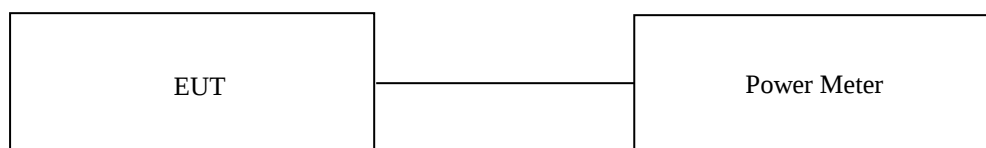
8.1 Operating environment

Temperature : 23 °C

Relative humidity : 41 % R.H.

8.2 Test set-up

The antenna output of the EUT was connected to the Power Meter



8.3 Test Date

December 05, 2021 ~ March 08, 2022

8.4 Test data for 802.11b WLAN Mode

8.4.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 98.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	12.28	0.005	12.29	29.00	16.72
MIDDLE	2 437.00	15.23	0.005	15.24	29.00	13.77
HIGH(11)	2 462.00	15.56	0.005	15.57	29.00	13.44

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.4.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 99.86 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	12.31	0.006	12.32	29.00	16.68
MIDDLE	2 437.00	16.18	0.006	16.19	29.00	12.81
HIGH(11)	2 462.00	16.05	0.006	16.06	29.00	12.94

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.5 Test data for 802.11g WLAN Mode

8.5.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 98.90 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	8.56	0.048	8.61	29.00	20.39
MIDDLE	2 437.00	11.75	0.048	11.80	29.00	17.20
HIGH(11)	2 462.00	9.15	0.048	9.20	29.00	19.80

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.5.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 98.62 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	8.81	0.060	8.87	29.00	20.13
MIDDLE	2 437.00	12.82	0.060	12.88	29.00	16.12
HIGH(11)	2 462.00	12.32	0.060	12.38	29.00	16.62

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.6 Test data for 802.11n_HT20 WLAN Mode

8.6.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 98.82 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	8.39	0.052	8.44	29.00	20.56
MIDDLE	2 437.00	11.62	0.052	11.67	29.00	17.33
HIGH(11)	2 462.00	7.92	0.052	7.97	29.00	21.03

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.6.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 98.82 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	8.45	0.052	8.50	29.00	20.50
MIDDLE	2 437.00	13.06	0.052	13.11	29.00	15.89
HIGH(11)	2 462.00	7.65	0.052	7.70	29.00	21.30

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.6.3 Test data for Multiple Transmit

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	ANT0 Total Value (dBm)	ANT1 Total Value (dBm)	ANT0 + ANT1 Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 412.00	8.44	8.50	11.48	27.00	15.52
MIDDLE	2 437.00	11.67	13.11	15.46	27.00	11.54
HIGH(11)	2 462.00	7.97	7.70	10.85	27.00	16.15

Remark. Margin = Limit – Measured Value

8.7 Test data for 802.11n_HT40 WLAN Mode

8.7.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 97.65 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	7.75	0.103	7.85	29.00	21.15
MIDDLE	2 437.00	11.21	0.103	11.31	29.00	17.69
HIGH(9)	2 452.00	6.10	0.103	6.20	29.00	22.80

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.7.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 97.64 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	8.66	0.104	8.76	29.00	20.24
MIDDLE	2 437.00	12.01	0.104	12.11	29.00	16.89
HIGH(9)	2 452.00	6.66	0.104	6.76	29.00	22.24

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

8.7.3 Test data for Multiple Transmit

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	ANT0 Total Value (dBm)	ANT1 Total Value (dBm)	ANT0 + ANT1 Total Value (dBm)	LIMIT (dBm)	MARGIN (dB)
LOW	2 422.00	7.85	8.76	11.34	27.00	15.66
MIDDLE	2 437.00	11.31	12.11	14.74	27.00	12.26
HIGH(9)	2 452.00	6.20	6.76	9.50	27.00	17.50

Remark. Margin = Limit – Measured Value

9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

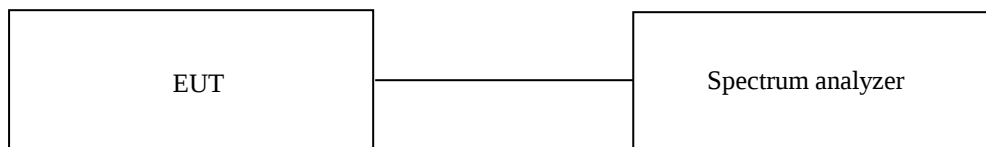
9.1 Operating environment

Temperature : 23 °C

Relative humidity : 41 % R.H.

9.2 Test set-up for conducted measurement

The antenna output of the EUT was connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz and video bandwidth is set to 300 kHz, and peak detection was used.



9.3 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.

9.4 Test Date

December 05, 2021 ~ March 08, 2022

9.5 Test data for conducted emission

Please refer to the Annex

9.6 Test data for radiated emission

9.6.1 Radiated Emission which fall in the Restricted Band

9.6.1.1 Test data for 802.11b WLAN Mode

9.6.1.1.1 Test data for 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 : 99.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.630	54.20	Peak	H	28.30	6.03	45.14	10.48	-	53.87	74.00	20.13
2 389.120	44.16	Average	H	28.30	6.03	45.14	10.48	0.005	43.84	54.00	10.17
2 377.810	54.30	Peak	V	28.30	6.03	45.14	10.48	-	53.97	74.00	20.03
2 390.040	44.01	Average	V	28.30	6.03	45.14	10.48	0.005	43.69	54.00	10.32
Test Data for High Channel											
2 499.818	58.49	Peak	H	28.70	6.12	45.79	10.51	-	58.03	74.00	15.97
2 483.510	51.41	Average	H	28.70	6.12	45.79	10.51	0.005	50.96	54.00	3.05
2 483.622	58.58	Peak	V	28.70	6.12	45.79	10.51	-	58.12	74.00	15.88
2 483.510	51.12	Average	V	28.70	6.12	45.79	10.51	0.005	50.67	54.00	3.34

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

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

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

9.6.1.1.2 Test data for 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 : 99.86 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 359.570	53.86	Peak	H	28.30	6.03	45.14	10.48	-	53.53	74.00	20.47
2 385.760	43.22	Average	H	28.30	6.03	45.14	10.48	0.006	42.90	54.00	11.10
2 383.010	54.18	Peak	V	28.30	6.03	45.14	10.48	-	53.85	74.00	20.15
2 379.140	43.03	Average	V	28.30	6.03	45.14	10.48	0.006	42.71	54.00	11.29
Test Data for High Channel											
2 488.573	54.63	Peak	H	28.70	6.12	45.79	10.51	-	54.17	74.00	19.83
2 488.881	43.91	Average	H	28.70	6.12	45.79	10.51	0.006	43.46	54.00	10.54
2 483.818	54.49	Peak	V	28.70	6.12	45.79	10.51	-	54.03	74.00	19.97
2 488.881	43.96	Average	V	28.70	6.12	45.79	10.51	0.006	43.51	54.00	10.49

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

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

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

9.6.1.2 Test data for 802.11g WLAN Mode

9.6.1.2.1 Test data for 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 : 98.90 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.840	63.49	Peak	H	28.30	6.03	45.14	10.48	-	63.16	74.00	10.84
2 389.840	47.83	Average	H	28.30	6.03	45.14	10.48	0.048	47.55	54.00	6.45
2 389.840	62.96	Peak	V	28.30	6.03	45.14	10.48	-	62.63	74.00	11.37
2 389.940	48.48	Average	V	28.30	6.03	45.14	10.48	0.048	48.20	54.00	5.80
Test Data for High Channel											
2 483.930	66.89	Peak	H	28.70	6.12	45.79	10.51	-	66.43	74.00	7.57
2 483.566	50.65	Average	H	28.70	6.12	45.79	10.51	0.048	50.24	54.00	3.76
2 484.098	66.83	Peak	V	28.70	6.12	45.79	10.51	-	66.37	74.00	7.63
2 483.510	50.69	Average	V	28.70	6.12	45.79	10.51	0.048	50.28	54.00	3.72

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

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

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

9.6.1.2.2 Test data for 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 : 98.62 %
- . Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 389.740	59.86	Peak	H	28.30	6.03	45.14	10.48	-	59.53	74.00	14.47
2 389.940	45.19	Average	H	28.30	6.03	45.14	10.48	0.060	44.92	54.00	9.08
2 389.330	59.44	Peak	V	28.30	6.03	45.14	10.48	-	59.11	74.00	14.89
2 389.840	45.11	Average	V	28.30	6.03	45.14	10.48	0.060	44.84	54.00	9.16
Test Data for High Channel											
2 483.594	62.35	Peak	H	28.70	6.12	45.79	10.51	-	61.89	74.00	12.11
2 484.014	46.53	Average	H	28.70	6.12	45.79	10.51	0.060	46.13	54.00	7.87
2 484.434	62.09	Peak	V	28.70	6.12	45.79	10.51	-	61.63	74.00	12.37
2 483.510	47.45	Average	V	28.70	6.12	45.79	10.51	0.060	47.05	54.00	6.95

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

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

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

9.6.1.3 Test data for 802.11n_HT20 WLAN Mode

9.6.1.3.1 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 : 98.82 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 388.610	64.81	Peak	H	28.30	6.03	45.14	10.48	-	64.48	74.00	9.52
2 389.630	47.94	Average	H	28.30	6.03	45.14	10.48	0.052	47.66	54.00	6.34
2 389.120	66.15	Peak	V	28.30	6.03	45.14	10.48	-	65.82	74.00	8.18
2 389.740	47.74	Average	V	28.30	6.03	45.14	10.48	0.052	47.46	54.00	6.54
Test Data for High Channel											
2 483.790	68.70	Peak	H	28.70	6.12	45.79	10.51	-	68.24	74.00	5.76
2 483.650	51.47	Average	H	28.70	6.12	45.79	10.51	0.052	51.06	54.00	2.94
2 484.126	68.19	Peak	V	28.70	6.12	45.79	10.51	-	67.73	74.00	6.27
2 483.762	51.27	Average	V	28.70	6.12	45.79	10.51	0.052	50.86	54.00	3.14

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

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

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

9.6.1.4 Test data for 802.11n_HT40 WLAN Mode

9.6.1.4.1 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 : 97.64 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	ATT (dB)	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel											
2 387.190	67.78	Peak	H	28.30	6.03	45.14	10.48	-	67.45	74.00	6.55
2 389.940	52.48	Average	H	28.30	6.03	45.14	10.48	0.104	52.25	54.00	1.75
2 387.490	68.38	Peak	V	28.30	6.03	45.14	10.48	-	68.05	74.00	5.95
2 389.840	52.39	Average	V	28.30	6.03	45.14	10.48	0.104	52.16	54.00	1.84
Test Data for High Channel											
2 486.364	69.14	Peak	H	28.70	6.12	45.79	10.51	-	68.68	74.00	5.32
2 483.538	52.06	Average	H	28.70	6.12	45.79	10.51	0.104	51.70	54.00	2.30
2 486.308	69.02	Peak	V	28.70	6.12	45.79	10.51	-	68.56	74.00	5.44
2 483.790	52.27	Average	V	28.70	6.12	45.79	10.51	0.104	51.91	54.00	2.09

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

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

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

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for 802.11b WLAN Mode

9.6.2.1.1 Test data for 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 : 99.88 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 824.000	51.63	Peak	H	33.40	7.91	45.10	-	47.84	74.00	26.16
4 824.000	43.85	Average	H	33.40	7.91	45.10	0.005	40.07	54.00	13.94
4 824.000	53.35	Peak	V	33.40	7.91	45.10	-	49.56	74.00	24.44
4 824.000	44.27	Average	V	33.40	7.91	45.10	0.005	40.49	54.00	13.52
Test Data for Middle Channel										
4 874.000	52.21	Peak	H	33.50	8.08	45.08	-	48.71	74.00	25.29
4 874.000	43.66	Average	H	33.50	8.08	45.08	0.005	40.17	54.00	13.84
4 874.000	51.45	Peak	V	33.50	8.08	45.08	-	47.95	74.00	26.05
4 874.000	43.90	Average	V	33.50	8.08	45.08	0.005	40.41	54.00	13.60
Test Data for High Channel										
4 924.000	50.73	Peak	H	33.30	8.14	45.03	-	47.14	74.00	26.86
4 924.000	41.74	Average	H	33.30	8.14	45.03	0.005	38.16	54.00	15.85
4 924.000	51.92	Peak	V	33.30	8.14	45.03	-	48.33	74.00	25.67
4 924.000	42.39	Average	V	33.30	8.14	45.03	0.005	38.81	54.00	15.20

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

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

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

9.6.2.1.2 Test data for 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 : 99.86 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 824.000	51.29	Peak	H	33.40	7.91	45.10	-	47.50	74.00	26.50
4 824.000	40.48	Average	H	33.40	7.91	45.10	0.006	36.70	54.00	17.30
4 824.000	50.30	Peak	V	33.40	7.91	45.10	-	46.51	74.00	27.49
4 824.000	41.68	Average	V	33.40	7.91	45.10	0.006	37.90	54.00	16.10
Test Data for Middle Channel										
4 874.000	50.50	Peak	H	33.50	8.08	45.08	-	47.00	74.00	27.00
4 874.000	40.64	Average	H	33.50	8.08	45.08	0.006	37.15	54.00	16.85
4 874.000	51.65	Peak	V	33.50	8.08	45.08	-	48.15	74.00	25.85
4 874.000	42.88	Average	V	33.50	8.08	45.08	0.006	39.39	54.00	14.61
Test Data for High Channel										
4 924.000	51.20	Peak	H	33.30	8.14	45.03	-	47.61	74.00	26.39
4 924.000	40.89	Average	H	33.30	8.14	45.03	0.006	37.31	54.00	16.69
4 924.000	52.31	Peak	V	33.30	8.14	45.03	-	48.72	74.00	25.28
4 924.000	42.03	Average	V	33.30	8.14	45.03	0.006	38.45	54.00	15.55

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

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

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

9.6.2.2 Test data for 802.11g WLAN Mode

9.6.2.2.1 Test data for 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 : 98.90 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 824.000	49.55	Peak	H	33.40	7.91	45.10	-	45.76	74.00	28.24
4 824.000	40.42	Average	H	33.40	7.91	45.10	0.048	36.68	54.00	17.32
4 824.000	49.67	Peak	V	33.40	7.91	45.10	-	45.88	74.00	28.12
4 824.000	39.71	Average	V	33.40	7.91	45.10	0.048	35.97	54.00	18.03
Test Data for Middle Channel										
4 874.000	50.16	Peak	H	33.50	8.08	45.08	-	46.66	74.00	27.34
4 874.000	40.59	Average	H	33.50	8.08	45.08	0.048	37.14	54.00	16.86
4 874.000	50.26	Peak	V	33.50	8.08	45.08	-	46.76	74.00	27.24
4 874.000	40.52	Average	V	33.50	8.08	45.08	0.048	37.07	54.00	16.93
Test Data for High Channel										
4 924.000	49.87	Peak	H	33.30	8.14	45.03	-	46.28	74.00	27.72
4 924.000	40.50	Average	H	33.30	8.14	45.03	0.048	36.96	54.00	17.04
4 924.000	49.92	Peak	V	33.30	8.14	45.03	-	46.33	74.00	27.67
4 924.000	40.23	Average	V	33.30	8.14	45.03	0.048	36.69	54.00	17.31

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

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

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

9.6.2.2.2 Test data for 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 : 98.62 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 824.000	49.66	Peak	H	33.40	7.91	45.10	-	45.87	74.00	28.13
4 824.000	40.48	Average	H	33.40	7.91	45.10	0.060	36.75	54.00	17.25
4 824.000	51.34	Peak	V	33.40	7.91	45.10	-	47.55	74.00	26.45
4 824.000	40.89	Average	V	33.40	7.91	45.10	0.060	37.16	54.00	16.84
Test Data for Middle Channel										
4 874.000	50.50	Peak	H	33.50	8.08	45.08	-	47.00	74.00	27.00
4 874.000	40.56	Average	H	33.50	8.08	45.08	0.060	37.12	54.00	16.88
4 874.000	50.60	Peak	V	33.50	8.08	45.08	-	47.10	74.00	26.90
4 874.000	40.44	Average	V	33.50	8.08	45.08	0.060	37.00	54.00	17.00
Test Data for High Channel										
4 924.000	49.86	Peak	H	33.30	8.14	45.03	-	46.27	74.00	27.73
4 924.000	40.47	Average	H	33.30	8.14	45.03	0.060	36.94	54.00	17.06
4 924.000	50.32	Peak	V	33.30	8.14	45.03	-	46.73	74.00	27.27
4 924.000	40.64	Average	V	33.30	8.14	45.03	0.060	37.11	54.00	16.89

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

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

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

9.6.2.3 Test data for 802.11n_HT20 WLAN Mode

9.6.2.3.1 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 : 98.82 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 824.000	49.31	Peak	H	33.40	7.91	45.10	-	45.52	74.00	28.48
4 824.000	40.22	Average	H	33.40	7.91	45.10	0.052	36.48	54.00	17.52
4 824.000	49.71	Peak	V	33.40	7.91	45.10	-	45.92	74.00	28.08
4 824.000	39.91	Average	V	33.40	7.91	45.10	0.052	36.17	54.00	17.83
Test Data for Middle Channel										
4 874.000	49.70	Peak	H	33.50	8.08	45.08	-	46.20	74.00	27.80
4 874.000	40.41	Average	H	33.50	8.08	45.08	0.052	36.96	54.00	17.04
4 874.000	51.20	Peak	V	33.50	8.08	45.08	-	47.70	74.00	26.30
4 874.000	40.54	Average	V	33.50	8.08	45.08	0.052	37.09	54.00	16.91
Test Data for High Channel										
4 924.000	49.61	Peak	H	33.30	8.14	45.03	-	46.02	74.00	27.98
4 924.000	40.17	Average	H	33.30	8.14	45.03	0.052	36.63	54.00	17.37
4 924.000	50.26	Peak	V	33.30	8.14	45.03	-	46.67	74.00	27.33
4 924.000	39.98	Average	V	33.30	8.14	45.03	0.052	36.44	54.00	17.56

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

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

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

9.6.2.4 Test data for 802.11n_HT40 WLAN Mode

9.6.2.4.1 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 : 97.64 %
- Result : PASSED

Frequency (MHz)	Reading (dBμV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor (dB)	Total (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Test Data for Low Channel										
4 844.000	49.29	Peak	H	33.40	7.91	45.10	-	45.50	74.00	28.50
4 844.000	40.39	Average	H	33.40	7.91	45.10	0.104	36.70	54.00	17.30
4 844.000	49.38	Peak	V	33.40	7.91	45.10	-	45.59	74.00	28.41
4 844.000	40.13	Average	V	33.40	7.91	45.10	0.104	36.44	54.00	17.56
Test Data for Middle Channel										
4 874.000	49.87	Peak	H	33.50	8.08	45.08	-	46.37	74.00	27.63
4 874.000	40.29	Average	H	33.50	8.08	45.08	0.104	36.89	54.00	17.11
4 874.000	51.03	Peak	V	33.50	8.08	45.08	-	47.53	74.00	26.47
4 874.000	40.37	Average	V	33.50	8.08	45.08	0.104	36.97	54.00	17.03
Test Data for High Channel										
4 904.000	51.04	Peak	H	33.30	8.14	45.03	-	47.45	74.00	26.55
4 904.000	40.21	Average	H	33.30	8.14	45.03	0.104	36.72	54.00	17.28
4 904.000	50.28	Peak	V	33.30	8.14	45.03	-	46.69	74.00	27.31
4 904.000	40.16	Average	V	33.30	8.14	45.03	0.104	36.67	54.00	17.33

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

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

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

10. PEAK POWER SPECTRAL DENSITY

10.1 Operating environment

Temperature : 23 °C

Relative humidity : 41 % R.H.

10.2 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.



10.3 Test Date

December 05, 2021 ~ March 08, 2022

10.4 Test data for 802.11b WLAN Mode

10.4.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 99.88 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-20.44	0.01	-20.44	7.00	27.44
MIDDLE	2 437.00	-18.16	0.01	-18.16	7.00	25.16
HIGH(11)	2 462.00	-17.95	0.01	-17.95	7.00	24.95

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.4.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 99.86 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-20.93	0.01	-20.92	7.00	27.92
MIDDLE	2 437.00	-16.56	0.01	-16.55	7.00	23.55
HIGH(11)	2 462.00	-16.89	0.01	-16.88	7.00	23.88

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.5 Test data for 802.11g WLAN Mode

10.5.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 98.90 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-25.22	0.05	-25.17	7.00	32.17
MIDDLE	2 437.00	-21.57	0.05	-21.52	7.00	28.52
HIGH(11)	2 462.00	-24.84	0.05	-24.79	7.00	31.79

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.5.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 98.62 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-25.74	0.06	-25.68	7.00	32.68
MIDDLE	2 437.00	-25.04	0.06	-24.98	7.00	31.98
HIGH(11)	2 462.00	-25.38	0.06	-25.32	7.00	32.32

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.6 Test data for 802.11n_HT20 WLAN Mode

10.6.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 98.82 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-25.89	0.05	-25.84	7.00	32.84
MIDDLE	2 437.00	-21.97	0.05	-21.92	7.00	28.92
HIGH(11)	2 462.00	-26.12	0.05	-26.07	7.00	33.07

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.6.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 98.82 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-26.62	0.05	-26.57	7.00	33.57
MIDDLE	2 437.00	-21.96	0.05	-21.91	7.00	28.91
HIGH(11)	2 462.00	-27.18	0.05	-27.13	7.00	34.13

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.6.3 Test data for Multiple Transmit

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	ANT0 Total Value (dBm)	ANT1 Total Value (dBm)	ANT0 + ANT1 Total Value (dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 412.00	-25.84	-26.57	-23.18	5.00	28.18
MIDDLE	2 437.00	-21.92	-21.91	-18.90	5.00	23.90
HIGH(11)	2 462.00	-26.07	-27.13	-23.56	5.00	28.56

Remark. Margin = Limit – Measured Value

10.7 Test data for 802.11n_HT40 WLAN Mode

10.7.1 Test data for Antenna 0

-. Test Result : Pass

-. Duty Cycle : 97.65 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 422.00	-29.17	0.10	-29.07	7.00	36.07
MIDDLE	2 437.00	-24.90	0.10	-24.80	7.00	31.80
HIGH(9)	2 452.00	-30.64	0.10	-30.54	7.00	37.54

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.7.2 Test data for Antenna 1

-. Test Result : Pass

-. Duty Cycle : 97.64 %

CHANNEL	FREQUENCY (MHz)	MEASURED VALUE (dBm)	Duty Factor(dB)	Total Value(dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 422.00	-28.95	0.10	-28.85	7.00	35.85
MIDDLE	2 437.00	-25.60	0.10	-25.50	7.00	32.50
HIGH(9)	2 452.00	-30.87	0.10	-30.77	7.00	37.77

Remark. Margin = Limit – Result (=Measured Value + Duty Factor)

10.7.3 Test data for Multiple Transmit

-. Test Result : Pass

CHANNEL	FREQUENCY (MHz)	ANT0 Total Value (dBm)	ANT1 Total Value (dBm)	ANT0 + ANT1 Total Value (dBm)	LIMIT (dBm / 3 kHz)	MARGIN (dB)
LOW	2 422.00	-29.07	-28.85	-25.94	5.00	30.94
MIDDLE	2 437.00	-24.80	-25.50	-22.12	5.00	27.12
HIGH(9)	2 452.00	-30.54	-30.77	-27.64	5.00	32.64

Remark. Margin = Limit – Measured Value

11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : 23 °C

Relative humidity : 41 % R.H.

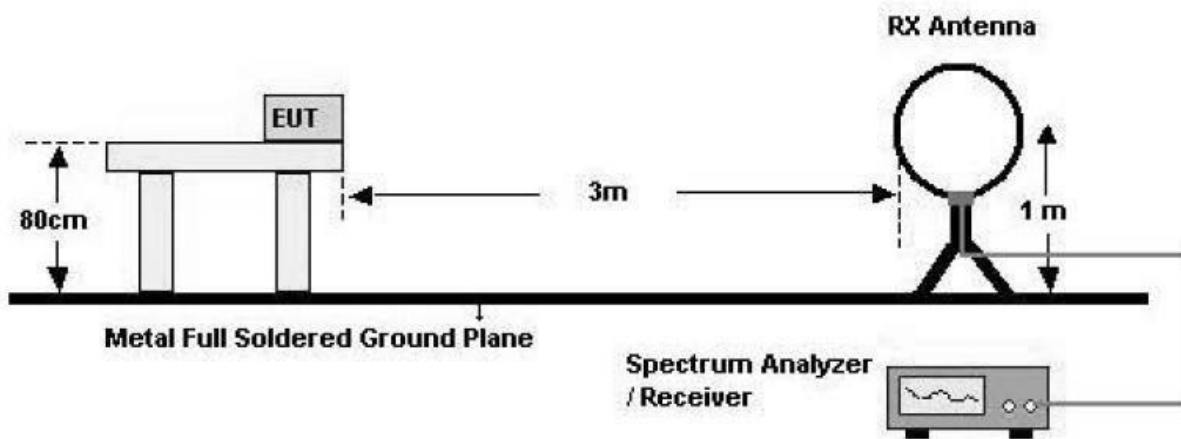
11.2 Test set-up

The radiated emissions measurements were on the 3 m semi anechoic chamber. The EUT and other support equipment were placed on a non-conductive 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.

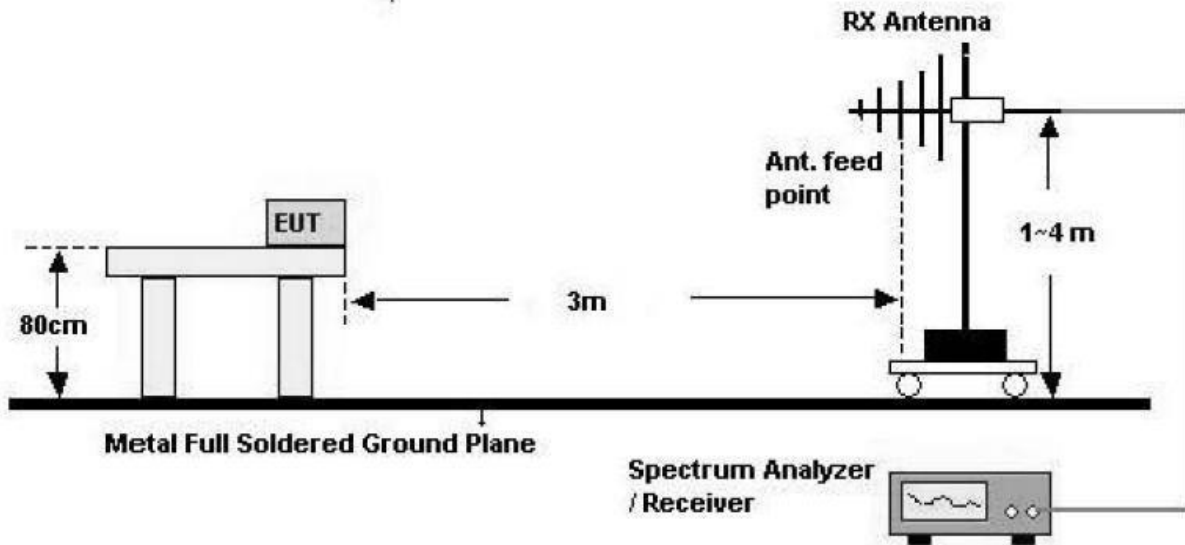
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal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

- Test Configuration

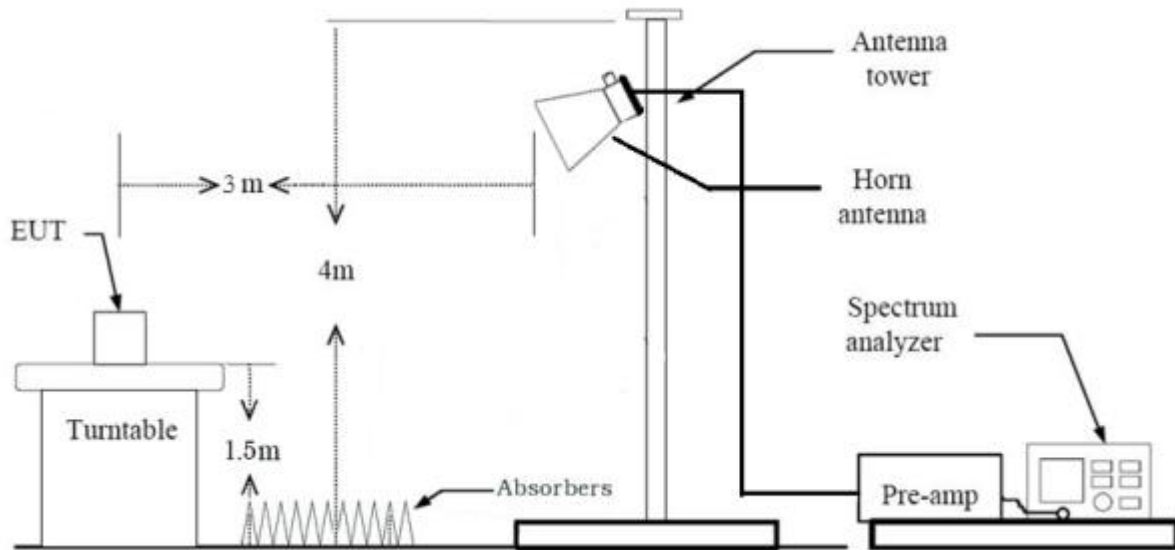
1. Below 30 MHz



2. 30 MHz - 1 GHz



3. Above 1 GHz



11.3 Test Date

December 05, 2021 ~ March 08, 2022

11.4 Test data for 30 MHz ~ 1 000 MHz

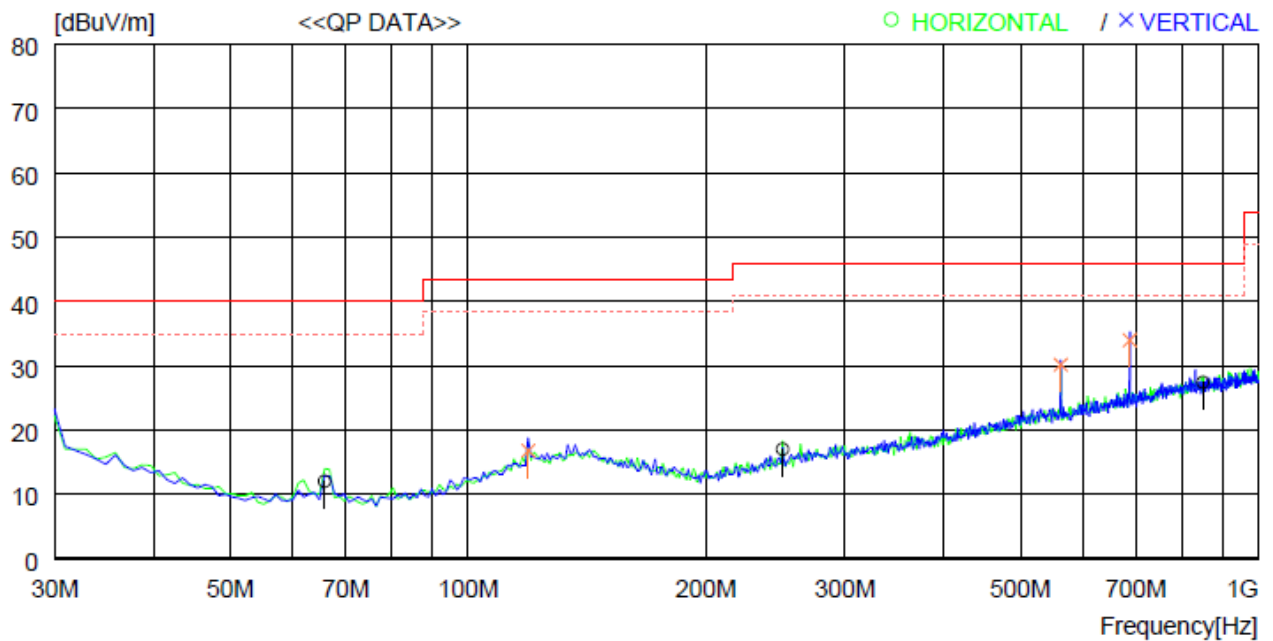
11.4.1 Test data for WLAN 2.4 GHz

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

Result : PASSED

EUT : RF Module

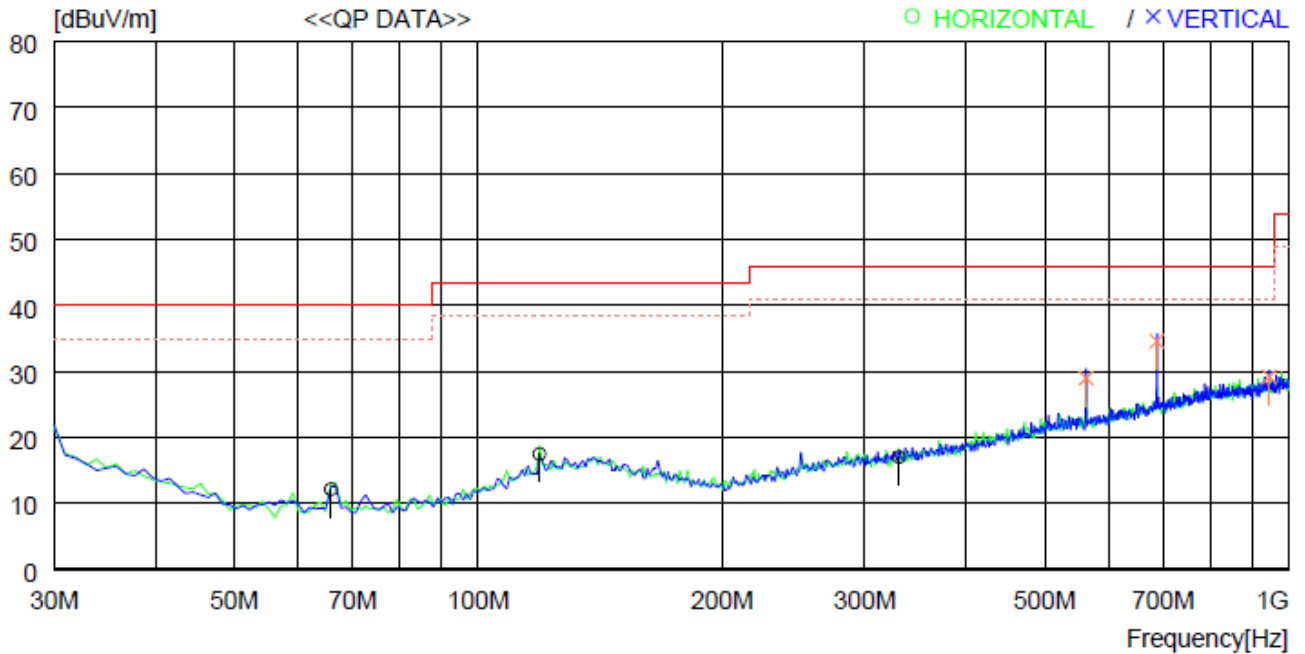
Detector : CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	65.890	29.9	12.6	1.5	32.0	12.0	40.0	28.0	200	324
2	250.190	28.6	17.8	2.8	32.2	17.0	46.0	29.0	200	0
3	851.580	27.1	27.3	5.1	32.1	27.4	46.0	18.6	200	88
----- Vertical -----										
4	119.240	28.4	18.5	2.0	32.1	16.8	43.5	26.7	100	359
5	562.529	34.7	23.8	4.1	32.4	30.2	46.0	15.8	100	359
6	687.655	36.4	25.4	4.6	32.4	34.0	46.0	12.0	100	359

11.4.2 Test data for Intermodulation Mode(WLAN 2.4 GHz + Bluetooth)

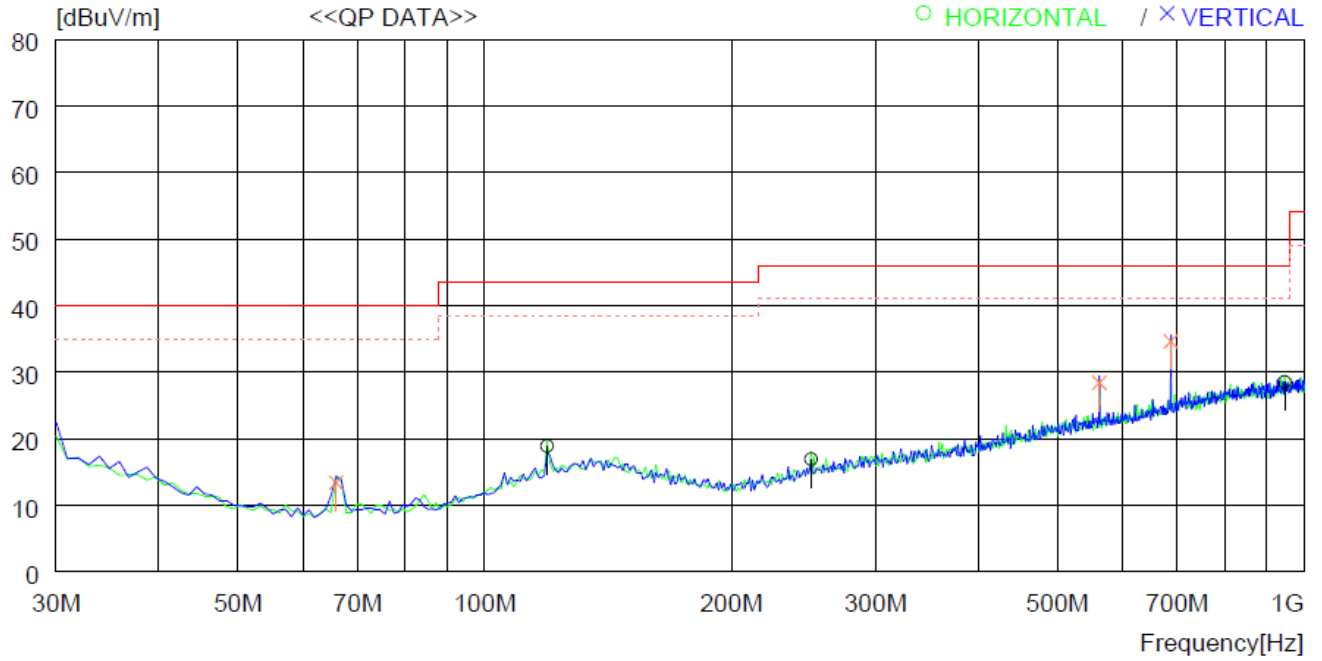
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
		QP	FACTOR							
	[MHz]	[dBuV]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	65.890	30.0	12.6	1.5	32.0	12.1	40.0	27.9	100	359
2	119.240	29.1	18.5	2.0	32.1	17.5	43.5	26.0	100	276
3	330.700	26.3	19.7	3.2	32.2	17.0	46.0	29.0	100	359
----- Vertical -----										
4	562.529	33.5	23.8	4.1	32.4	29.0	46.0	17.0	100	359
5	687.655	37.0	25.4	4.6	32.4	34.6	46.0	11.4	100	359
6	945.668	27.5	28.0	5.4	31.7	29.2	46.0	16.8	200	0

11.4.3 Test data for Intermodulation Mode(WLAN 2.4 GHz + Bluetooth LE)

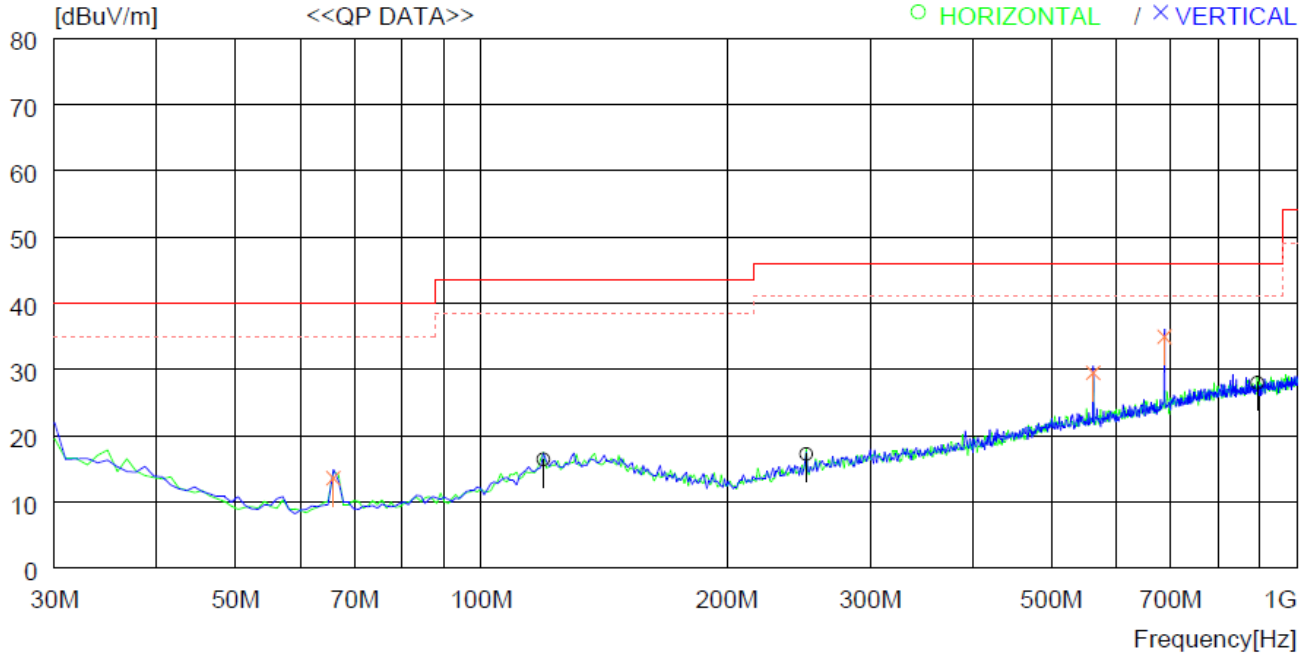
- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	119.240	30.5	18.5	2.0	32.1	18.9	43.5	24.6	200	0
2	250.190	28.5	17.8	2.8	32.2	16.9	46.0	29.1	200	0
3	946.638	26.8	28.0	5.4	31.7	28.5	46.0	17.5	200	0
----- Vertical -----										
4	65.890	31.3	12.6	1.5	32.0	13.4	40.0	26.6	100	140
5	562.529	32.9	23.8	4.1	32.4	28.4	46.0	17.6	100	0
6	687.655	37.0	25.4	4.6	32.4	34.6	46.0	11.4	100	0

11.4.4 Test data for Intermodulation Mode(WLAN 2.4 GHz + WLAN 5 GHz)

- Resolution bandwidth : 120 kHz
- Frequency range : 30 MHz ~ 1 000 MHz
- Measurement distance : 3 m



No.	FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP	FACTOR	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
----- Horizontal -----										
1	119.240	28.0	18.5	2.0	32.1	16.4	43.5	27.1	200	13
2	250.190	28.8	17.8	2.8	32.2	17.2	46.0	28.8	200	78
3	893.289	27.2	27.5	5.3	32.0	28.0	46.0	18.0	200	194
----- Vertical -----										
4	65.890	31.5	12.6	1.5	32.0	13.6	40.0	26.4	200	62
5	562.529	34.0	23.8	4.1	32.4	29.5	46.0	16.5	100	358
6	687.655	37.3	25.4	4.6	32.4	34.9	46.0	11.1	100	189

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

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

12. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature : 23 °C
Relative humidity : 46 % R.H.

12.2 Test set-up

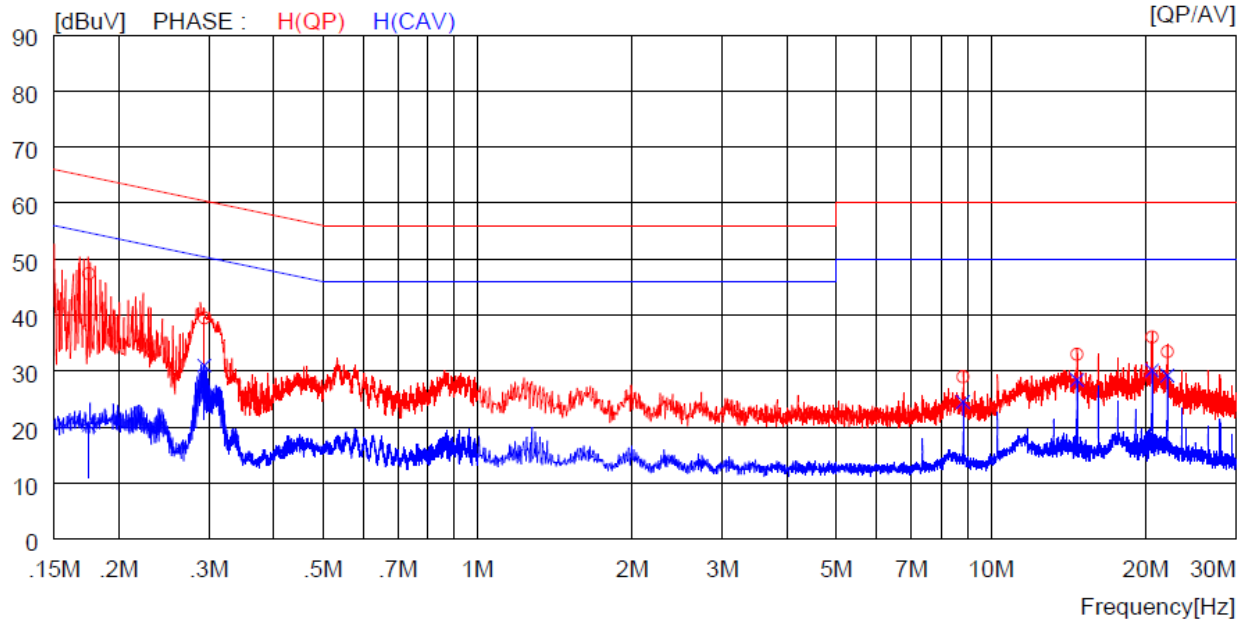
The EUT was placed on a wooden table, 0.8 m height above the floor. Power was fed to the EUT through a $50\ \Omega$ / $50\ \mu\text{H}$ + $5\ \Omega$ Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

12.3 Test Date

December 05, 2021 ~ March 08, 2022

12.4 Test data for WLAN 2.4 GHz

- . Resolution bandwidth : 9 kHz
- . Frequency range : 0.15 MHz ~ 30 MHz
- . Tested Line : LIVE 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	0.17500	37.4	----	10.0	47.4	----	64.7	----	17.3	----	H (QP)
2	0.29400	29.5	----	10.0	39.5	----	60.4	----	20.9	----	H (QP)
3	8.83000	18.8	----	10.2	29.0	----	60.0	----	31.0	----	H (QP)
4	14.71000	22.7	----	10.3	33.0	----	60.0	----	27.0	----	H (QP)
5	20.59000	25.7	----	10.4	36.1	----	60.0	----	23.9	----	H (QP)
6	22.06000	23.1	----	10.4	33.5	----	60.0	----	26.5	----	H (QP)
7	0.17500	----	10.4	10.0	----	20.4	----	54.7	----	34.3	H (CAV)
8	0.29400	----	21.0	10.0	----	31.0	----	50.4	----	19.4	H (CAV)
9	8.83000	----	14.3	10.2	----	24.5	----	50.0	----	25.5	H (CAV)
10	14.71000	----	18.1	10.3	----	28.4	----	50.0	----	21.6	H (CAV)
11	20.59000	----	19.7	10.4	----	30.1	----	50.0	----	19.9	H (CAV)
12	22.06000	----	18.8	10.4	----	29.2	----	50.0	----	20.8	H (CAV)

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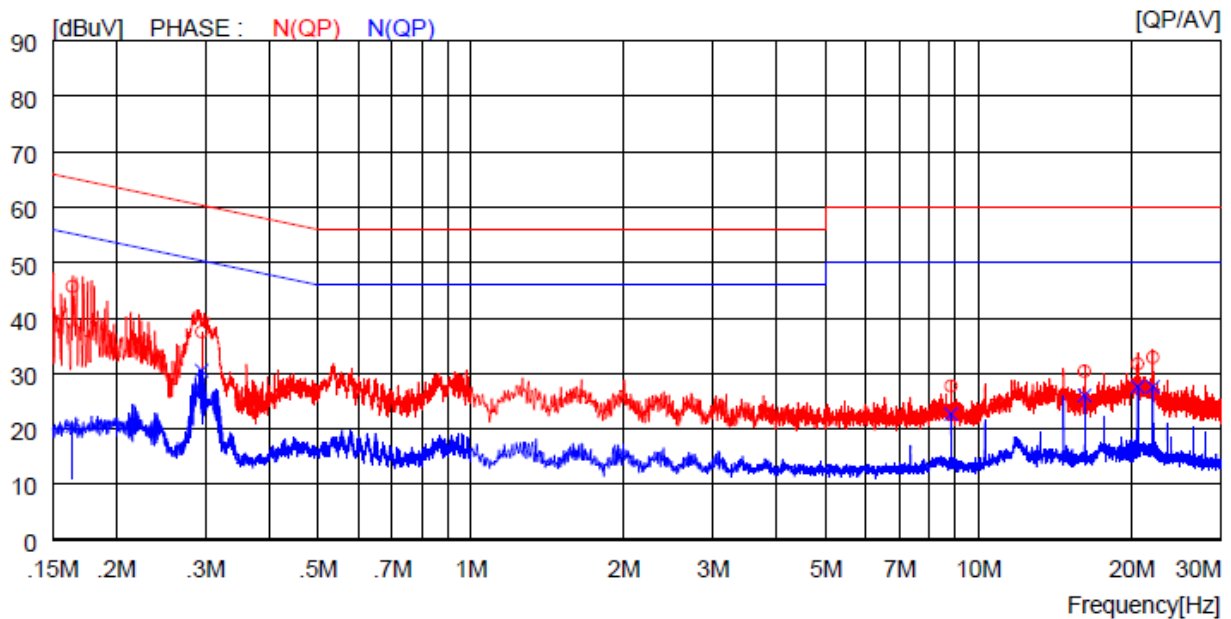
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-. Tested Line : NEUTRAL LINE

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.



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	0.16400	35.7	----	10.0	45.7	----	65.3	----	19.6	----	N (QP)
2	0.29500	27.5	----	10.0	37.5	----	60.4	----	22.9	----	N (QP)
3	8.82000	17.5	----	10.2	27.7	----	60.0	----	32.3	----	N (QP)
4	16.17000	20.1	----	10.3	30.4	----	60.0	----	29.6	----	N (QP)
5	20.58000	21.3	----	10.4	31.7	----	60.0	----	28.3	----	N (QP)
6	22.05000	22.5	----	10.4	32.9	----	60.0	----	27.1	----	N (QP)
7	0.16400	----	10.5	10.0	----	20.5	----	55.3	----	34.8	N (CAV)
8	0.29500	----	20.5	10.0	----	30.5	----	50.4	----	19.9	N (CAV)
9	8.82000	----	12.5	10.2	----	22.7	----	50.0	----	27.3	N (CAV)
10	16.17000	----	15.7	10.3	----	26.0	----	50.0	----	24.0	N (CAV)
11	20.58000	----	17.2	10.4	----	27.6	----	50.0	----	22.4	N (CAV)
12	22.05000	----	17.2	10.4	----	27.6	----	50.0	----	22.4	N (CAV)

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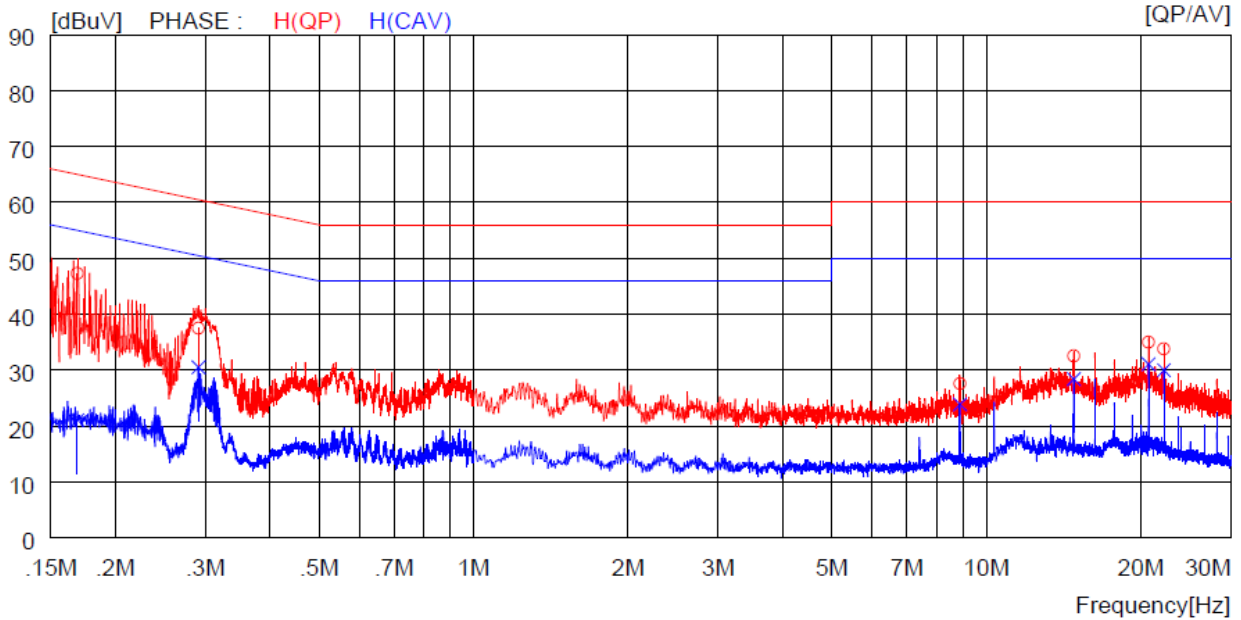
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12.5 Test data for Intermodulation Mode(WLAN 2.4 GHz + Bluetooth)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE

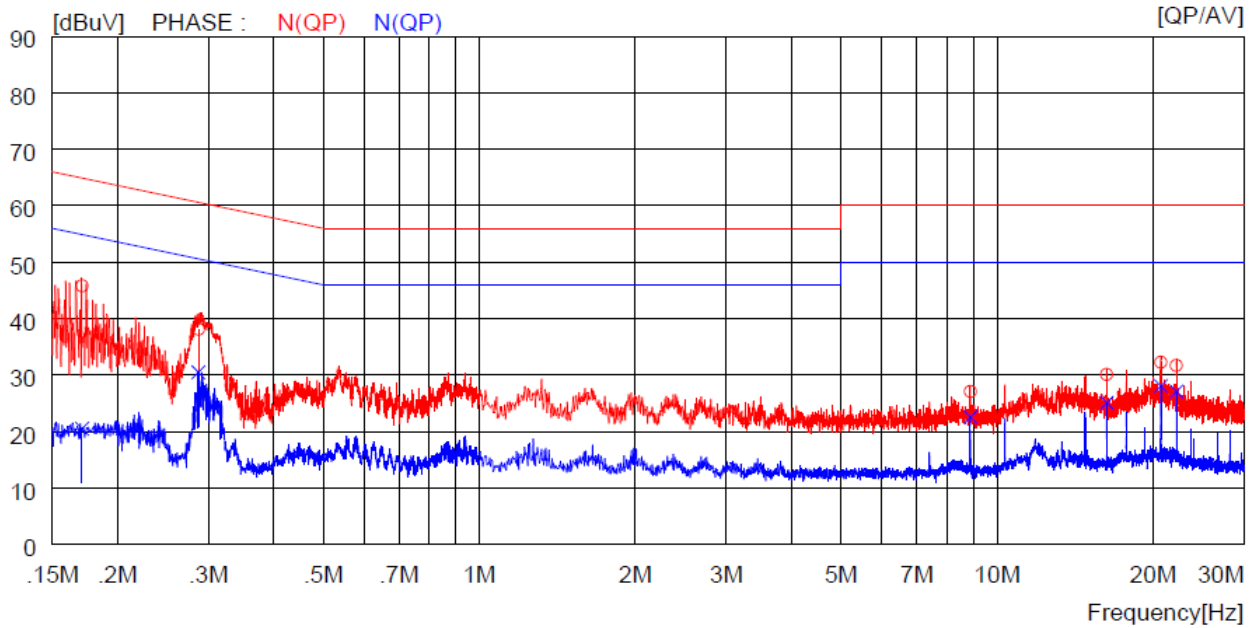


NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.16900	37.3	----	10.0	47.3	----	65.0	----	17.7	----	H (QP)
2	0.29100	27.5	----	10.0	37.5	----	60.5	----	23.0	----	H (QP)
3	8.88500	17.4	----	10.2	27.6	----	60.0	----	32.4	----	H (QP)
4	14.81000	22.3	----	10.3	32.6	----	60.0	----	27.4	----	H (QP)
5	20.73000	24.6	----	10.4	35.0	----	60.0	----	25.0	----	H (QP)
6	22.21000	23.4	----	10.4	33.8	----	60.0	----	26.2	----	H (QP)
7	0.16900	----	11.1	10.0	----	21.1	----	55.0	----	33.9	H (CAV)
8	0.29100	----	20.5	10.0	----	30.5	----	50.5	----	20.0	H (CAV)
9	8.88500	----	13.7	10.2	----	23.9	----	50.0	----	26.1	H (CAV)
10	14.81000	----	18.1	10.3	----	28.4	----	50.0	----	21.6	H (CAV)
11	20.73000	----	20.7	10.4	----	31.1	----	50.0	----	18.9	H (CAV)
12	22.21000	----	19.6	10.4	----	30.0	----	50.0	----	20.0	H (CAV)

-. Tested Line : NEUTRAL LINE

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

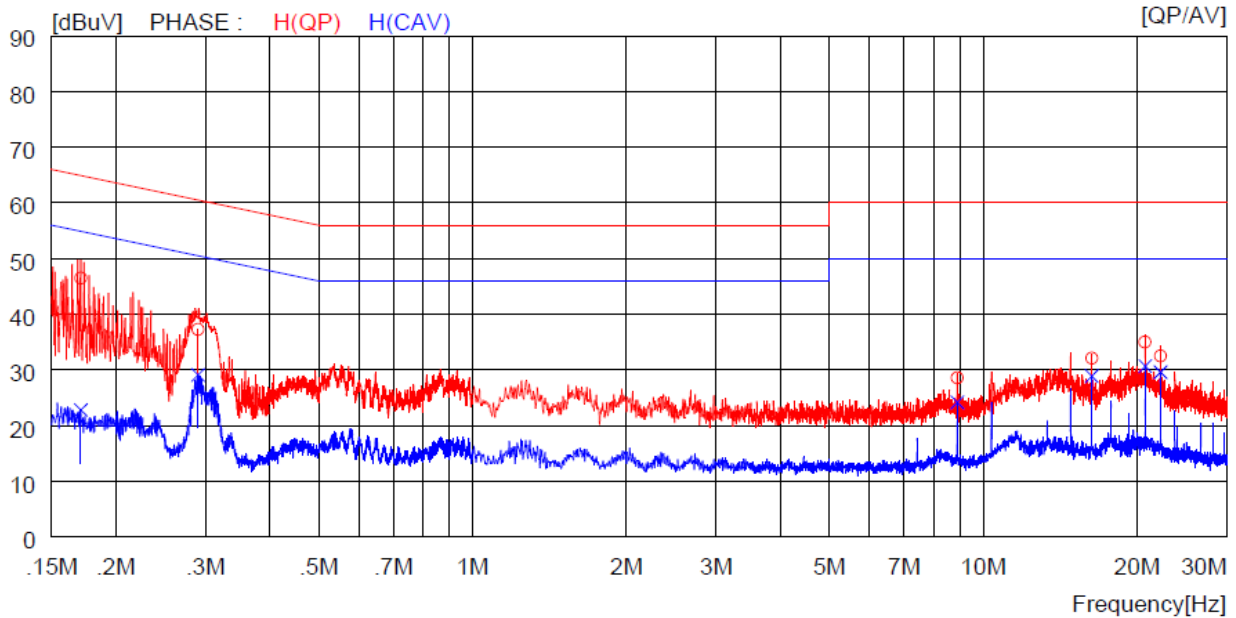
The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



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	0.17100	35.8	----	10.0	45.8	----	64.9	----	19.1	----	N (QP)
2	0.28700	28.1	----	10.0	38.1	----	60.6	----	22.5	----	N (QP)
3	8.88500	16.9	----	10.2	27.1	----	60.0	----	32.9	----	N (QP)
4	16.29000	19.8	----	10.3	30.1	----	60.0	----	29.9	----	N (QP)
5	20.72000	21.9	----	10.4	32.3	----	60.0	----	27.7	----	N (QP)
6	22.21000	21.3	----	10.4	31.7	----	60.0	----	28.3	----	N (QP)
7	0.17100	----	10.5	10.0	----	20.5	----	54.9	----	34.4	N (CAV)
8	0.28700	----	20.5	10.0	----	30.5	----	50.6	----	20.1	N (CAV)
9	8.88500	----	12.4	10.2	----	22.6	----	50.0	----	27.4	N (CAV)
10	16.29000	----	14.8	10.3	----	25.1	----	50.0	----	24.9	N (CAV)
11	20.72000	----	17.7	10.4	----	28.1	----	50.0	----	21.9	N (CAV)
12	22.21000	----	16.7	10.4	----	27.1	----	50.0	----	22.9	N (CAV)

12.6 Test data for Intermodulation Mode(WLAN 2.4 GHz + Bluetooth LE)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE 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	0.17100	36.5	----	10.0	46.5	----	64.9	----	18.4	----	H (QP)
2	0.29000	27.3	----	10.0	37.3	----	60.5	----	23.2	----	H (QP)
3	8.90000	18.4	----	10.2	28.6	----	60.0	----	31.4	----	H (QP)
4	16.32000	21.8	----	10.3	32.1	----	60.0	----	27.9	----	H (QP)
5	20.76000	24.6	----	10.4	35.0	----	60.0	----	25.0	----	H (QP)
6	22.25000	22.1	----	10.4	32.5	----	60.0	----	27.5	----	H (QP)
7	0.17100	----	12.8	10.0	----	22.8	----	54.9	----	32.1	H (CAV)
8	0.29000	----	19.1	10.0	----	29.1	----	50.5	----	21.4	H (CAV)
9	8.90000	----	14.0	10.2	----	24.2	----	50.0	----	25.8	H (CAV)
10	16.32000	----	18.6	10.3	----	28.9	----	50.0	----	21.1	H (CAV)
11	20.76000	----	20.3	10.4	----	30.7	----	50.0	----	19.3	H (CAV)
12	22.25000	----	19.2	10.4	----	29.6	----	50.0	----	20.4	H (CAV)

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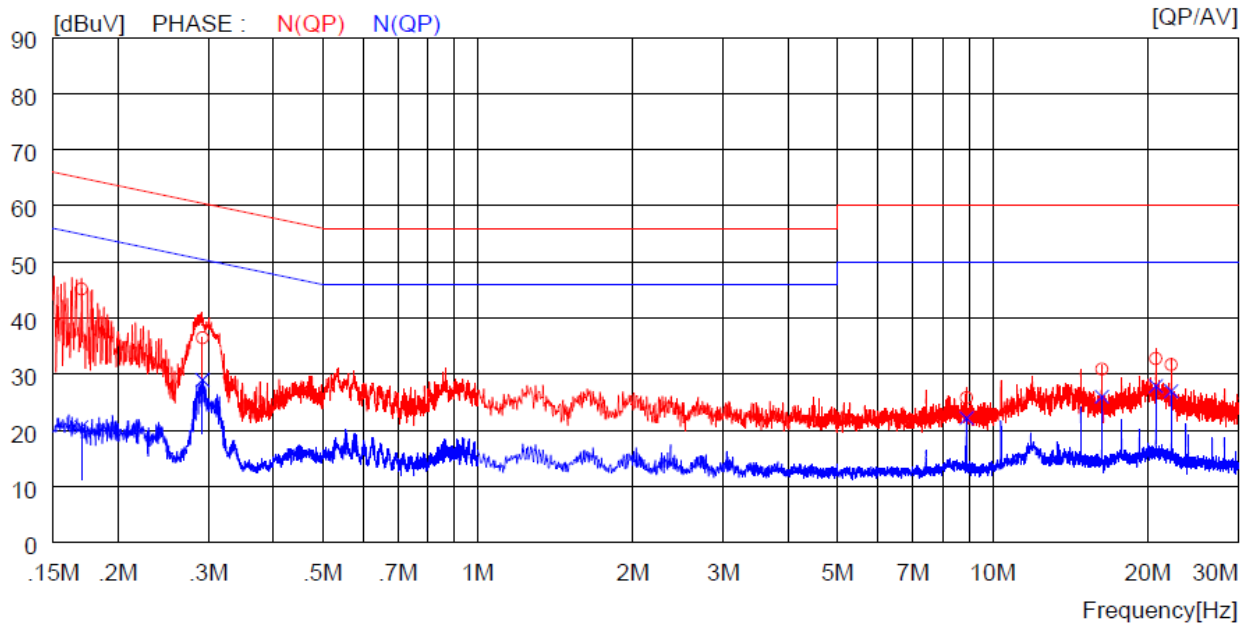
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-. Tested Line : NEUTRAL LINE

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

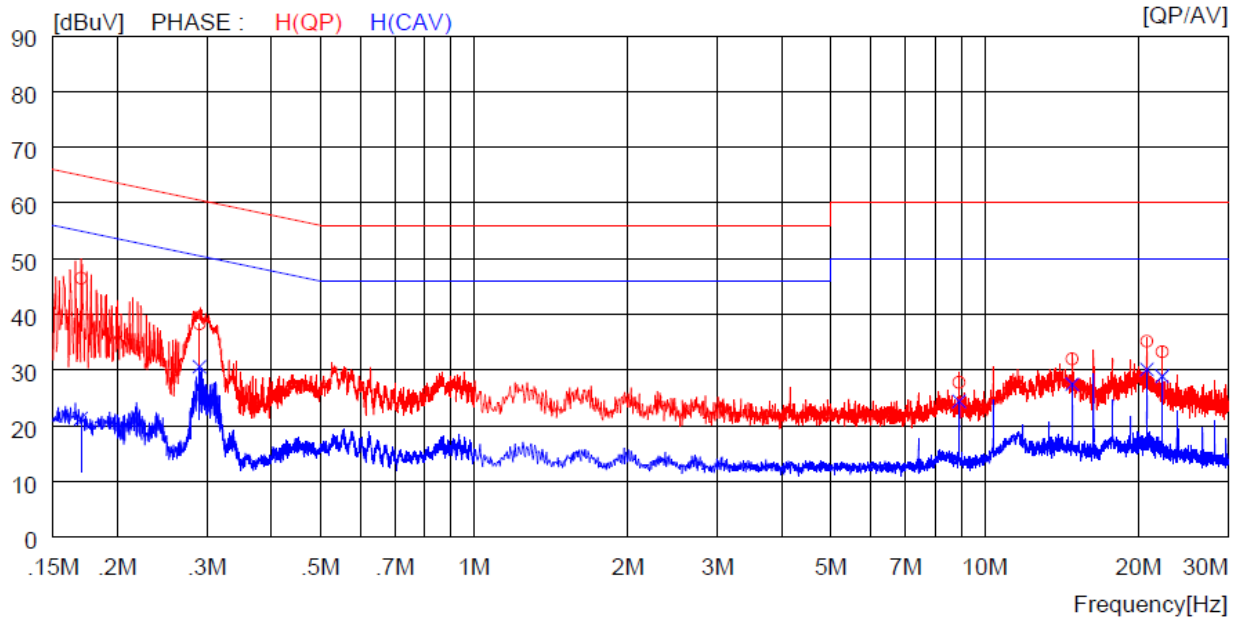
The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.



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	0.17000	35.2	----	10.0	45.2	----	65.0	----	19.8	----	N (QP)
2	0.29200	26.5	----	10.0	36.5	----	60.5	----	24.0	----	N (QP)
3	8.90000	15.6	----	10.2	25.8	----	60.0	----	34.2	----	N (QP)
4	16.31000	20.6	----	10.3	30.9	----	60.0	----	29.1	----	N (QP)
5	20.75000	22.4	----	10.4	32.8	----	60.0	----	27.2	----	N (QP)
6	22.24000	21.3	----	10.4	31.7	----	60.0	----	28.3	----	N (QP)
7	0.17000	----	10.6	10.0	----	20.6	----	55.0	----	34.4	N (CAV)
8	0.29200	----	19.0	10.0	----	29.0	----	50.5	----	21.5	N (CAV)
9	8.90000	----	12.0	10.2	----	22.2	----	50.0	----	27.8	N (CAV)
10	16.31000	----	15.7	10.3	----	26.0	----	50.0	----	24.0	N (CAV)
11	20.75000	----	17.5	10.4	----	27.9	----	50.0	----	22.1	N (CAV)
12	22.24000	----	16.6	10.4	----	27.0	----	50.0	----	23.0	N (CAV)

12.7 Test data for Intermodulation Mode(WLAN 2.4 GHz + WLAN 5 GHz)

- Resolution bandwidth : 9 kHz
- Frequency range : 0.15 MHz ~ 30 MHz
- Tested Line : LIVE LINE

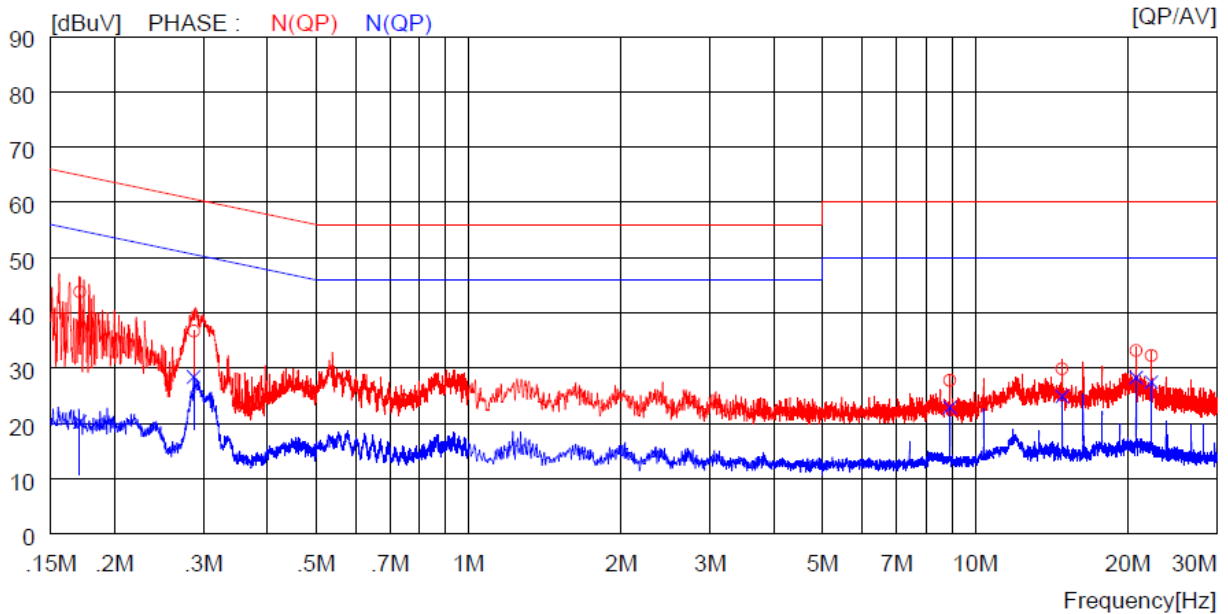


NO	FREQ [MHz]	READING		C.FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.17000	36.5	----	10.0	46.5	----	65.0	----	18.5	----	H (QP)
2	0.29000	28.3	----	10.0	38.3	----	60.5	----	22.2	----	H (QP)
3	8.91500	17.6	----	10.2	27.8	----	60.0	----	32.2	----	H (QP)
4	14.85000	21.7	----	10.3	32.0	----	60.0	----	28.0	----	H (QP)
5	20.79000	24.8	----	10.4	35.2	----	60.0	----	24.8	----	H (QP)
6	22.27000	22.9	----	10.4	33.3	----	60.0	----	26.7	----	H (QP)
7	0.17000	----	11.3	10.0	----	21.3	----	55.0	----	33.7	H (CAV)
8	0.29000	----	20.6	10.0	----	30.6	----	50.5	----	19.9	H (CAV)
9	8.91500	----	14.2	10.2	----	24.4	----	50.0	----	25.6	H (CAV)
10	14.85000	----	17.2	10.3	----	27.5	----	50.0	----	22.5	H (CAV)
11	20.79000	----	19.7	10.4	----	30.1	----	50.0	----	19.9	H (CAV)
12	22.27000	----	18.5	10.4	----	28.9	----	50.0	----	21.1	H (CAV)

-. Tested Line : NEUTRAL LINE

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.



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	0.17100	33.8	----	10.0	43.8	----	64.9	----	21.1	----	N (QP)
2	0.28700	26.7	----	10.0	36.7	----	60.6	----	23.9	----	N (QP)
3	8.91000	17.6	----	10.2	27.8	----	60.0	----	32.2	----	N (QP)
4	14.85000	19.6	----	10.3	29.9	----	60.0	----	30.1	----	N (QP)
5	20.79000	22.8	----	10.4	33.2	----	60.0	----	26.8	----	N (QP)
6	22.27000	21.9	----	10.4	32.3	----	60.0	----	27.7	----	N (QP)
7	0.17100	----	10.3	10.0	----	20.3	----	54.9	----	34.6	N (CAV)
8	0.28700	----	18.4	10.0	----	28.4	----	50.6	----	22.2	N (CAV)
9	8.91000	----	12.7	10.2	----	22.9	----	50.0	----	27.1	N (CAV)
10	14.85000	----	14.6	10.3	----	24.9	----	50.0	----	25.1	N (CAV)
11	20.79000	----	17.9	10.4	----	28.3	----	50.0	----	21.7	N (CAV)
12	22.27000	----	17.1	10.4	----	27.5	----	50.0	----	22.5	N (CAV)

13. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
FSV40-N	Rohde & Schwarz	Signal Analyzer	102177	Apr. 16, 2021 (1Y)
ESW 44	Rohde & Schwarz	EMI Test Receiver	101851	Mar. 08, 2022 (1Y)
ZUP36-6	NEMIC-LAMBDA	DC Power Supply	YJV-535Z14-0018	Apr. 16, 2021(1Y)
310N	Sonoma Instrument	Pre-Amplifier	392756	Oct. 14, 2021 (1Y)
SCU18	Rohde & Schwarz	Pre-Amplifier	102266	Jul. 14, 2021 (1Y)
PAM-840A	Com-Power	Pre-Amplifier	461339	Oct. 12, 2021 (1Y)
DT3000-3t	Innco System	Turn Table	DT3000/093	N/A
MA-4000XPET	Innco System	Antenna Master	MA4000/509	N/A
FMZB 1513	Schwarzbeck	Loop Antenna	1513-235	Mar. 24, 2022 (2Y)
HLP-2008	TDK	Hybrid Antenna	131316	Mar. 07, 2022 (2Y)
AH-118	Com-Power	Horn Antenna	10050061	Oct. 15, 2021 (1Y)
BBHA9120D	Schwarzbeck	Horn Antenna	9120D-1366	Jul. 20, 2021 (1Y)
BBHA9170	Schwarzbeck	Horn Antenna	BBHA9170178	Jan. 06, 2022(1Y)
HPF 3GHz	Rohde & Schwarz	High Pass Filter	N/A	Jan. 19, 2022(1Y)
ESCI	Rohde & Schwarz	EMI TEST RECEIVER	101012	Oct. 20, 2021 (1Y)
NSLK8126	Schwarzbeck	AMN	8126-404	Mar. 14, 2022 (1Y)
ESH3-Z2	Rohde & Schwarz	PULSE LIMITER	100655	Mar. 14, 2022 (1Y)

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