RADIO PERFORMANCE TEST REPORT

Test Report No.	**: OT-223-RWD-045**
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	**: 106 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.

Tested by	Reviewed by	Approved by
Youngyong Kim/ Manager	Tae-Ho, Kim / Senior Manager	Ki-Hong, Nam / General Manager
ONETECH Corp.	ONETECH Corp.	ONETECH Corp.

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※ Please refer to the Annex section for All test plots

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-223-RWD-045	March 21, 2022	Initial Release	All

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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.

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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

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, π/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

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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	Notebokk PC	EUT

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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.

5.3.1 Test RU offset for Tones

BW (MHz)	Tones (T)	RU offset	Test RU offset		
			Low	Mid	High
20	26	0~8	0	4	8
	52	37~40	37	38	40
	106	53~54	53	-	54
	242	61	-	61	-
	SU	-	-	-	-
40	26	0~17	0	9	17
	52	37~44	37	41	44
	106	53~56	53	54	56
	242	61~62	61	-	62
	484	65	-	65	-
	SU	-	-	-	-

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5.3.2 Worst case configuration and mode

Conducted Test

1) All data rate of operation were investigated and the worst case results are reported. (Worst case : MCS0)

Radiated Test

1) All modes of operation were investigated and the worst case configuration results are reported.
2) The EUT was moved throughout the XY, XZ, and YZ planes and the worst case is "XY" axis, but the worst data was recorded in this report.
3) All data rate of operation were investigated and the worst case results are reported. (Worst case : MCS0)
4) All mode(Tone, RU Offset) of operation were investigated and the worst case configuration results are reported

- BW 20 MHz

Test	Tone	RU Offset
Radiated Spurious Emission & Harmonic	Tone : 26, 52, 106, 242 T	26 T : 4
		52T : 38
		106 T : 53
		242 T : 61
	SU	-
Restricted Band	Tone : 26, 52, 106 T	Low Edge: 0, 37, 53
		High Edge: 8, 40, 54
	242 T	61
	SU	-

- BW 40 MHz

Test	Tone	RU Offset
Radiated Spurious Emission & Harmonic	Tone : 26, 52, 106, 242, 484 T	26 T : 9
		52T : 41
		106 T : 54
		242 T : 61
		484 T : 65
	SU	-
Restricted Band	Tone : 26, 52, 106, 242 T	Low Edge: 0, 37, 53, 61
		High Edge: 17, 44, 56, 62
	484T	65
	SU	-

5.3.3 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		

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5.3.4 Duty Cycle

802.11 ax(HE20)_ANT 0

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	1.360	1.560	87.18	0.596
		MCS1	1.360	1.510	90.07	0.454
		MCS2	1.360	1.540	88.31	0.540
		MCS3	1.360	1.530	88.89	0.512
		MCS4	1.360	1.530	88.89	0.512
		MCS5	1.360	1.540	88.31	0.540
		MCS6	1.360	1.530	88.89	0.512
		MCS7	1.360	1.530	88.89	0.512
		MCS8	1.360	1.550	87.74	0.568
		MCS9	1.360	1.540	88.31	0.540
	52	MCS0	1.360	1.550	87.74	0.568
		MCS1	1.360	1.550	87.74	0.568
		MCS2	1.360	1.560	87.18	0.596
		MCS3	1.360	1.550	87.74	0.568
		MCS4	1.360	1.560	87.18	0.596
		MCS5	1.360	1.530	88.89	0.512
		MCS6	1.360	1.550	87.74	0.568
		MCS7	1.360	1.540	88.31	0.540
		MCS8	1.360	1.530	88.89	0.512
		MCS9	1.350	1.530	88.24	0.544
	106	MCS0	1.360	1.540	88.31	0.540
		MCS1	1.360	1.540	88.31	0.540
		MCS2	1.360	1.530	88.89	0.512
		MCS3	1.360	1.540	88.31	0.540
		MCS4	1.360	1.540	88.31	0.540
		MCS5	1.360	1.540	88.31	0.540
		MCS6	1.360	1.530	88.89	0.512
		MCS7	1.360	1.530	88.89	0.512
		MCS8	1.360	1.540	88.31	0.540
		MCS9	1.360	1.540	88.31	0.540
	242	MCS0	1.360	1.540	88.31	0.540
		MCS1	1.360	1.530	88.89	0.512
		MCS2	1.360	1.540	88.31	0.540
		MCS3	1.360	1.540	88.31	0.540
		MCS4	1.360	1.550	87.74	0.568
		MCS5	1.360	1.540	88.31	0.540
		MCS6	1.360	1.540	88.31	0.540
		MCS7	1.360	1.540	88.31	0.540
		MCS8	1.360	1.540	88.31	0.540
		MCS9	1.360	1.540	88.31	0.540
		MCS10	1.360	1.540	88.31	0.540
		MCS11	1.360	1.540	88.31	0.540

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Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax(SU)	BW 20	MCS0	1.046	1.062	98.49	0.066
		MCS1	0.552	0.568	97.18	0.124
		MCS2	0.386	0.400	96.50	0.155
		MCS3	0.302	0.318	94.97	0.224
		MCS4	0.222	0.238	93.28	0.302
		MCS5	0.180	0.196	91.84	0.370
		MCS6	0.166	0.182	91.21	0.400
		MCS7	0.156	0.172	90.70	0.424
		MCS8	0.138	0.154	89.61	0.476
		MCS9	0.130	0.146	89.04	0.504
		MCS10	0.124	0.140	88.57	0.527
		MCS11	0.116	0.132	87.88	0.561

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802.11 ax(HE20)_ANT 1

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax (HE20)	26	MCS0	1.359	1.555	87.40	0.585
		MCS1	1.359	1.505	90.30	0.443
		MCS2	1.359	1.505	90.30	0.443
		MCS3	1.359	1.545	87.96	0.557
		MCS4	1.359	1.535	88.53	0.529
		MCS5	1.359	1.545	87.96	0.557
		MCS6	1.359	1.535	88.53	0.529
		MCS7	1.359	1.545	87.96	0.557
		MCS8	1.359	1.545	87.96	0.557
		MCS9	1.359	1.555	87.40	0.585
	52	MCS0	1.359	1.565	86.84	0.613
		MCS1	1.359	1.555	87.40	0.585
		MCS2	1.359	1.555	87.40	0.585
		MCS3	1.359	1.565	86.84	0.613
		MCS4	1.359	1.565	86.84	0.613
		MCS5	1.359	1.545	87.96	0.557
		MCS6	1.359	1.545	87.96	0.557
		MCS7	1.359	1.545	87.96	0.557
		MCS8	1.359	1.545	87.96	0.557
		MCS9	1.359	1.545	87.96	0.557
	106	MCS0	1.359	1.545	87.96	0.557
		MCS1	1.359	1.545	87.96	0.557
		MCS2	1.359	1.545	87.96	0.557
		MCS3	1.359	1.545	87.96	0.557
		MCS4	1.359	1.545	87.96	0.557
		MCS5	1.359	1.545	87.96	0.557
		MCS6	1.359	1.555	87.40	0.585
		MCS7	1.359	1.545	87.96	0.557
		MCS8	1.359	1.545	87.96	0.557
		MCS9	1.359	1.545	87.96	0.557
	242	MCS0	1.359	1.545	87.96	0.557
		MCS1	1.359	1.545	87.96	0.557
		MCS2	1.359	1.545	87.96	0.557
		MCS3	1.359	1.545	87.96	0.557
		MCS4	1.359	1.545	87.96	0.557
		MCS5	1.359	1.545	87.96	0.557
		MCS6	1.359	1.555	87.40	0.585
		MCS7	1.359	1.545	87.96	0.557
		MCS8	1.359	1.545	87.96	0.557
		MCS9	1.359	1.545	87.96	0.557
		MCS10	1.359	1.545	87.96	0.557
		MCS11	1.359	1.555	87.40	0.585

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Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax(SU)	BW 20	MCS0	1.044	1.06	98.49	0.066
		MCS1	0.552	0.568	97.18	0.124
		MCS2	0.384	0.398	96.48	0.156
		MCS3	0.302	0.318	94.97	0.224
		MCS4	0.22	0.236	93.22	0.305
		MCS5	0.18	0.196	91.84	0.370
		MCS6	0.166	0.182	91.21	0.400
		MCS7	0.156	0.172	90.70	0.424
		MCS8	0.14	0.156	89.74	0.470
		MCS9	0.13	0.146	89.04	0.504
		MCS10	0.126	0.142	88.73	0.519
		MCS11	0.116	0.132	87.88	0.561

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802.11 ax(HE40)_ANT 0

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax (HE40)	26	MCS0	1.36	1.51	90.07	0.454
		MCS1	1.36	1.51	90.07	0.454
		MCS2	1.36	1.5	90.67	0.426
		MCS3	1.35	1.5	90.00	0.458
		MCS4	1.36	1.52	89.47	0.483
		MCS5	1.36	1.5	90.67	0.426
		MCS6	1.36	1.5	90.67	0.426
		MCS7	1.36	1.5	90.67	0.426
		MCS8	1.35	1.5	90.00	0.458
		MCS9	1.36	1.51	90.07	0.454
	52	MCS0	1.36	1.5	90.67	0.426
		MCS1	1.35	1.5	90.00	0.458
		MCS2	1.35	1.51	89.40	0.486
		MCS3	1.35	1.5	90.00	0.458
		MCS4	1.36	1.51	90.07	0.454
		MCS5	1.35	1.5	90.00	0.458
		MCS6	1.36	1.51	90.07	0.454
		MCS7	1.36	1.5	90.67	0.426
		MCS8	1.35	1.51	89.40	0.486
		MCS9	1.36	1.51	90.07	0.454
	106	MCS0	1.36	1.51	90.07	0.454
		MCS1	1.36	1.51	90.07	0.454
		MCS2	1.36	1.51	90.07	0.454
		MCS3	1.36	1.52	89.47	0.483
		MCS4	1.36	1.5	90.67	0.426
		MCS5	1.36	1.51	90.07	0.454
		MCS6	1.36	1.51	90.07	0.454
		MCS7	1.36	1.52	89.47	0.483
		MCS8	1.36	1.5	90.67	0.426
		MCS9	1.36	1.51	90.07	0.454

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Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax (HE40)	242	MCS0	1.35	1.5	90.00	0.458
		MCS1	1.36	1.5	90.67	0.426
		MCS2	1.36	1.51	90.07	0.454
		MCS3	1.36	1.51	90.07	0.454
		MCS4	1.36	1.51	90.07	0.454
		MCS5	1.36	1.51	90.07	0.454
		MCS6	1.36	1.5	90.67	0.426
		MCS7	1.36	1.51	90.07	0.454
		MCS8	1.36	1.5	90.67	0.426
		MCS9	1.36	1.51	90.07	0.454
		MCS10	1.36	1.51	90.07	0.454
		MCS11	1.36	1.5	90.67	0.426
	484	MCS0	1.36	1.5	90.67	0.426
		MCS1	1.36	1.5	90.67	0.426
		MCS2	1.36	1.51	90.07	0.454
		MCS3	1.35	1.5	90.00	0.458
		MCS4	1.36	1.51	90.07	0.454
		MCS5	1.36	1.51	90.07	0.454
		MCS6	1.36	1.5	90.67	0.426
		MCS7	1.36	1.5	90.67	0.426
		MCS8	1.36	1.5	90.67	0.426
		MCS9	1.36	1.5	90.67	0.426
		MCS10	1.36	1.51	90.07	0.454
		MCS11	1.36	1.5	90.67	0.426
802.11ax(SU)	BW 40	MCS0	0.552	0.568	97.18	0.124
		MCS1	0.302	0.318	94.97	0.224
		MCS2	0.222	0.238	93.28	0.302
		MCS3	0.18	0.196	91.84	0.370
		MCS4	0.144	0.16	90.00	0.458
		MCS5	0.12	0.136	88.24	0.544
		MCS6	0.116	0.132	87.88	0.561
		MCS7	0.108	0.124	87.10	0.600
		MCS8	0.104	0.12	86.67	0.621
		MCS9	0.098	0.114	85.96	0.657
		MCS10	0.092	0.108	85.19	0.696
		MCS11	0.086	0.102	84.31	0.741

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802.11 ax(HE40)_ANT 1

Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax (HE40)	26	MCS0	1.359	1.505	90.30	0.443
		MCS1	1.359	1.505	90.30	0.443
		MCS2	1.359	1.515	89.70	0.472
		MCS3	1.359	1.515	89.70	0.472
		MCS4	1.349	1.505	89.63	0.475
		MCS5	1.359	1.515	89.70	0.472
		MCS6	1.349	1.505	89.63	0.475
		MCS7	1.349	1.505	89.63	0.475
		MCS8	1.359	1.515	89.70	0.472
		MCS9	1.359	1.515	89.70	0.472
	52	MCS0	1.359	1.515	89.70	0.472
		MCS1	1.359	1.515	89.70	0.472
		MCS2	1.359	1.505	90.30	0.443
		MCS3	1.359	1.505	90.30	0.443
		MCS4	1.359	1.515	89.70	0.472
		MCS5	1.349	1.505	89.63	0.475
		MCS6	1.359	1.515	89.70	0.472
		MCS7	1.359	1.515	89.70	0.472
		MCS8	1.349	1.505	89.63	0.475
		MCS9	1.349	1.505	89.63	0.475
	106	MCS0	1.359	1.515	89.70	0.472
		MCS1	1.359	1.515	89.70	0.472
		MCS2	1.359	1.515	89.70	0.472
		MCS3	1.359	1.515	89.70	0.472
		MCS4	1.359	1.505	90.30	0.443
		MCS5	1.359	1.515	89.70	0.472
		MCS6	1.359	1.505	90.30	0.443
		MCS7	1.359	1.515	89.70	0.472
		MCS8	1359	1.515	89702.97	-29.528
		MCS9	1.359	1.515	89.70	0.472

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Mode	Tone (T)	Data Rate	On Time (ms)	Total Time (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11ax (HE40)	242	MCS0	1.359	1.505	90.30	0.443
		MCS1	1.359	1.515	89.70	0.472
		MCS2	1.359	1.505	90.30	0.443
		MCS3	1.359	1.505	90.30	0.443
		MCS4	1.359	1.505	90.30	0.443
		MCS5	1.359	1.515	89.70	0.472
		MCS6	1.359	1.515	89.70	0.472
		MCS7	1.359	1.505	90.30	0.443
		MCS8	1.359	1.505	90.30	0.443
		MCS9	1.359	1.505	90.30	0.443
		MCS10	1.359	1.505	90.30	0.443
		MCS11	1.359	1.505	90.30	0.443
	484	MCS0	1.359	1.515	89.70	0.472
		MCS1	1.359	1.505	90.30	0.443
		MCS2	1.359	1.515	89.70	0.472
		MCS3	1.359	1.515	89.70	0.472
		MCS4	1.359	1.505	90.30	0.443
		MCS5	1.359	1.515	89.70	0.472
		MCS6	1.359	1.515	89.70	0.472
		MCS7	1.359	1.505	90.30	0.443
		MCS8	1.359	1.505	90.30	0.443
		MCS9	1.359	1.515	89.70	0.472
		MCS10	1.359	1.505	90.30	0.443
		MCS11	1.359	1.515	89.70	0.472
802.11ax(SU)	BW 40	MCS0	0.552	0.568	97.18	0.124
		MCS1	0.302	0.318	94.97	0.224
		MCS2	0.22	0.236	93.22	0.305
		MCS3	0.18	0.196	91.84	0.370
		MCS4	0.144	0.16	90.00	0.458
		MCS5	0.12	0.136	88.24	0.544
		MCS6	0.116	0.132	87.88	0.561
		MCS7	0.106	0.122	86.89	0.611
		MCS8	0.102	0.118	86.44	0.633
		MCS9	0.096	0.112	85.71	0.669
		MCS10	0.092	0.108	85.19	0.696
		MCS11	0.084	0.1	84.00	0.757

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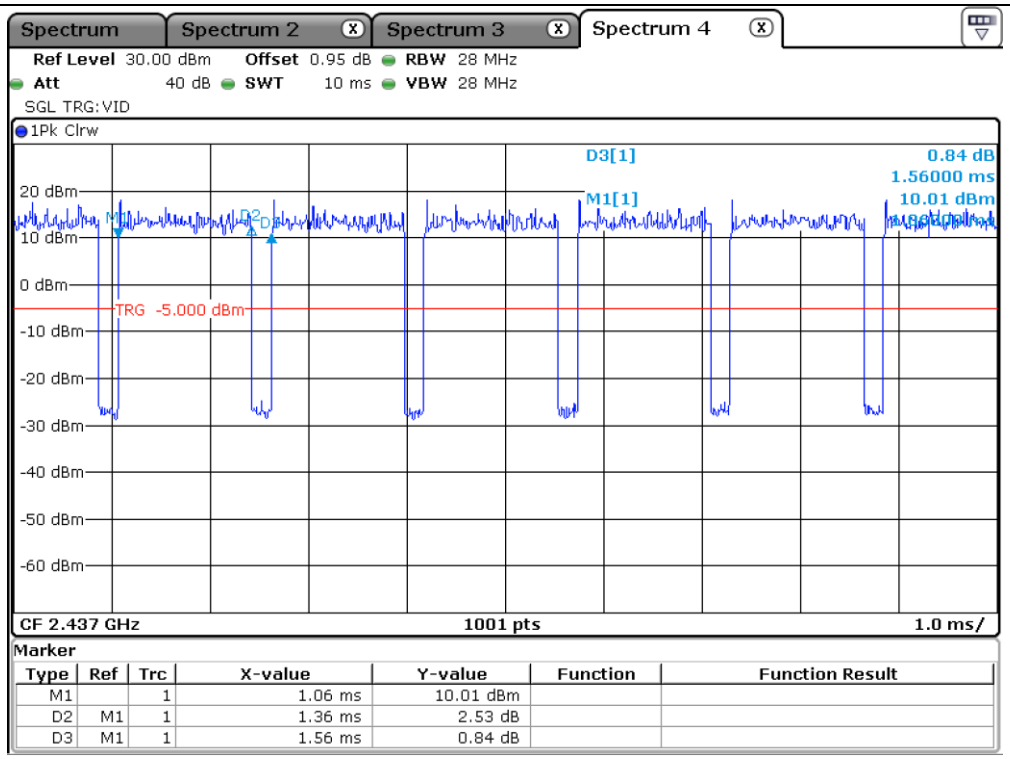
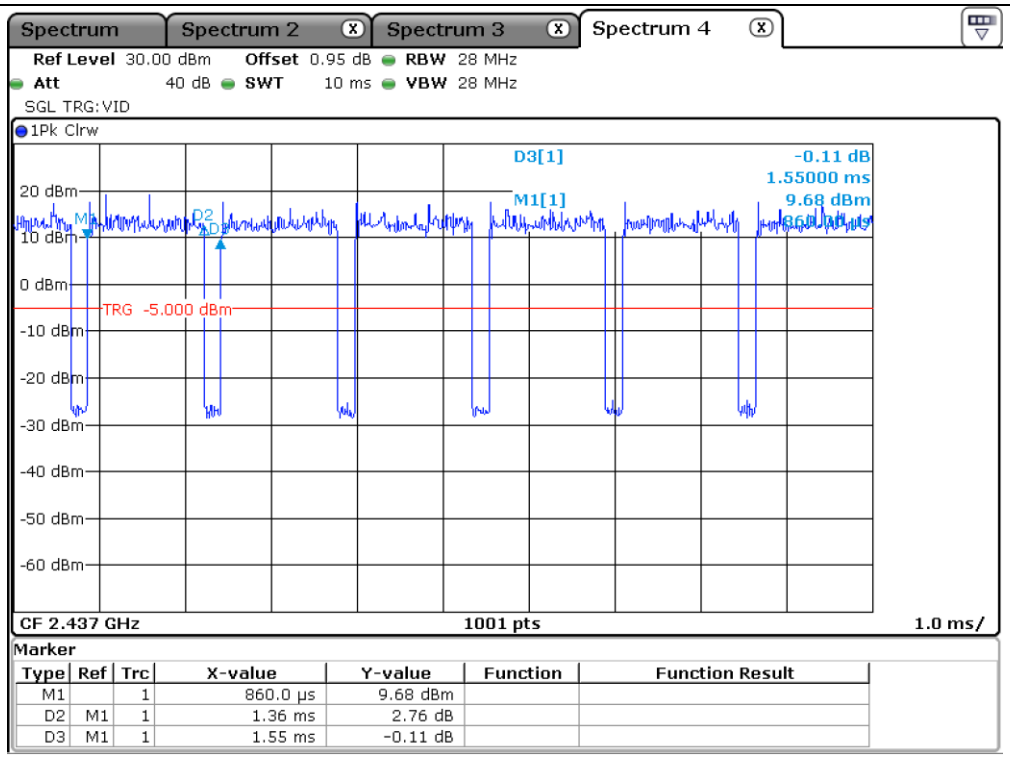
Test Plot for 802.11 ax(HE20)

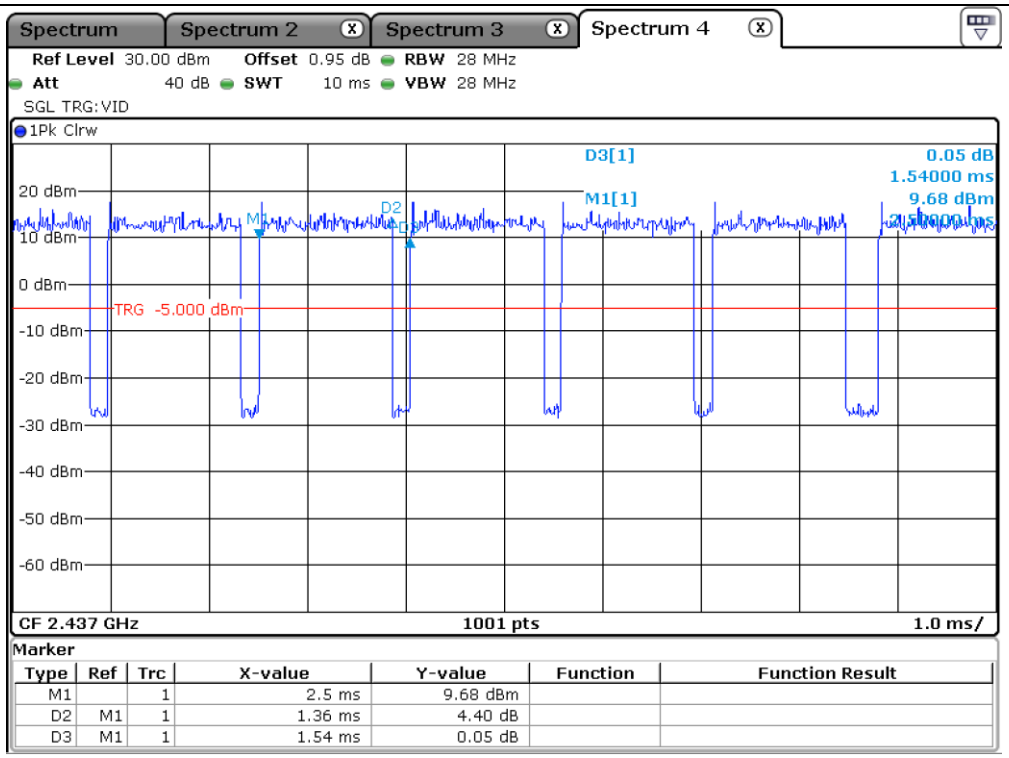
-. Antenna 0



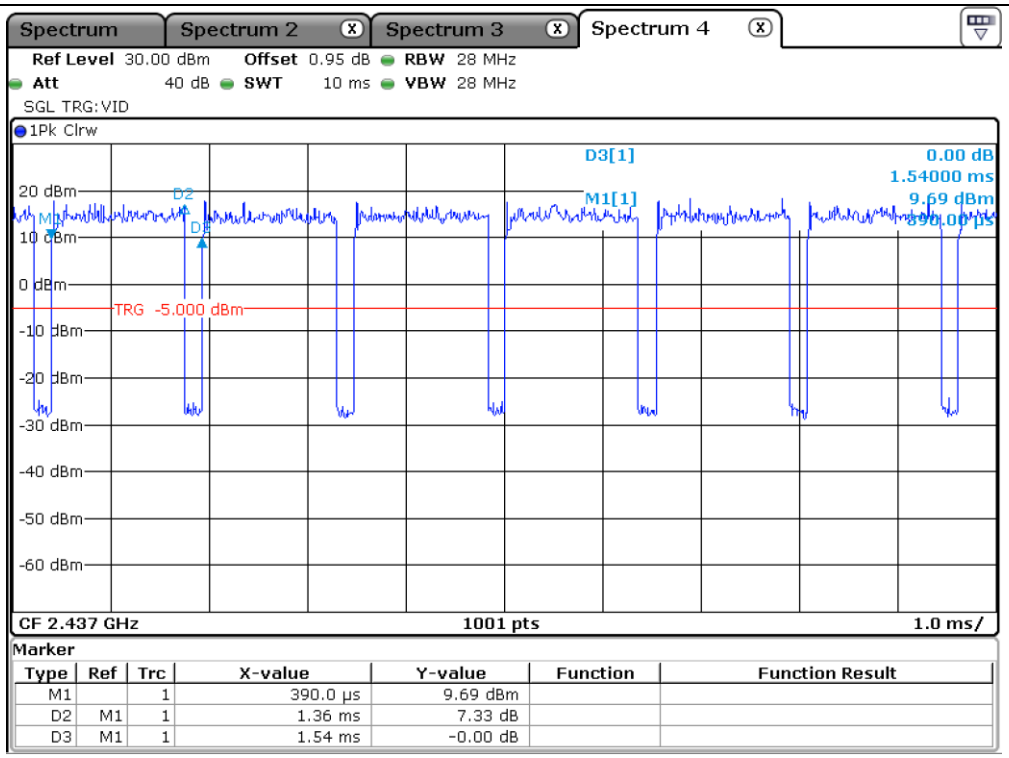
26 Tone



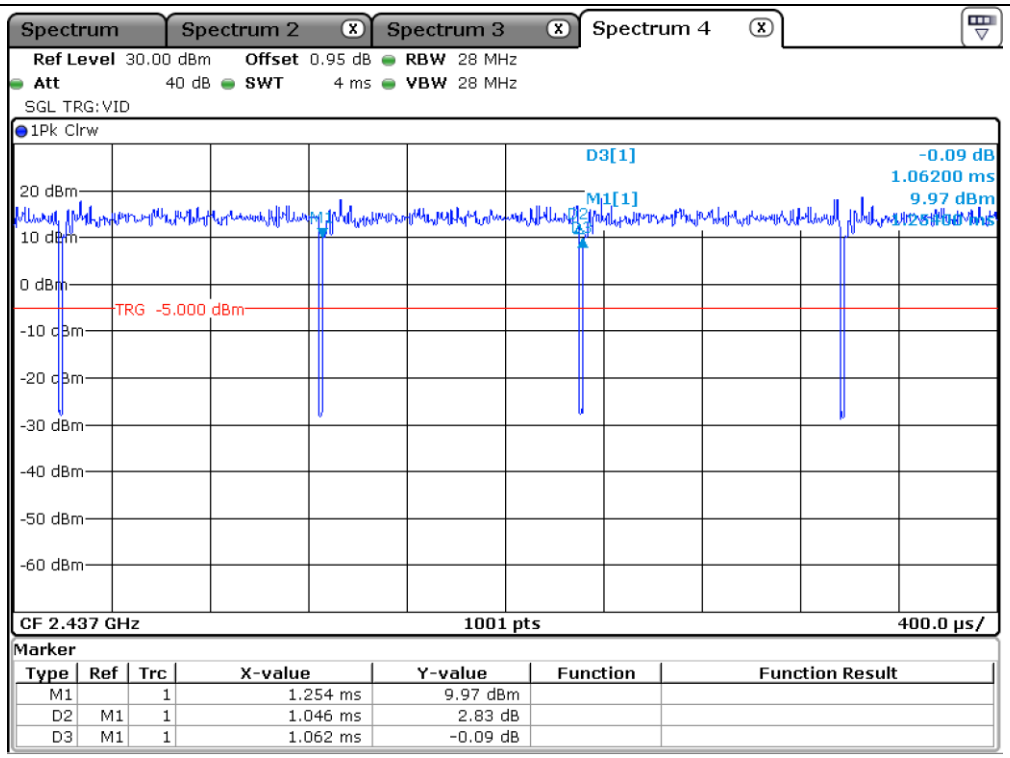
52 Tone



106 Tone

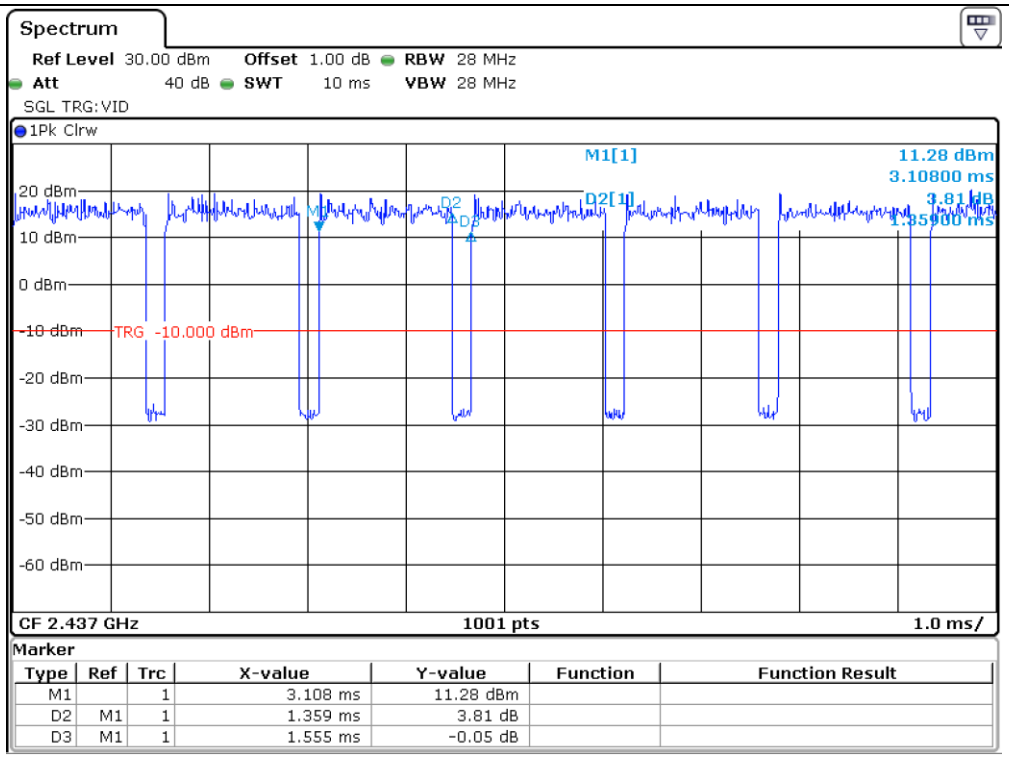


242 Tone

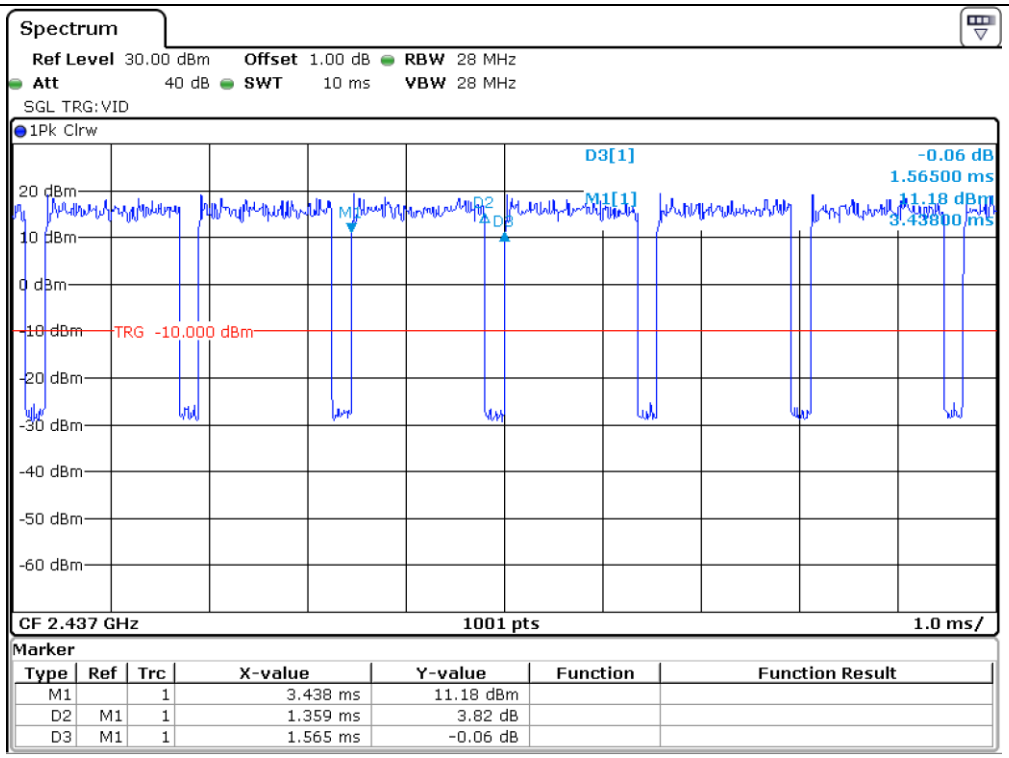

Spectrum
Spectrum 2
Spectrum 3
Spectrum 4
Ref Level 30.00 dBm Offset 0.95 dB RBW 28 MHz
Att 40 dB SWT 4 ms VBW 28 MHz
SGL TRG: VID
1Pk Clrw
D3[1] -0.09 dB
1.06200 ms
M1[1] 9.97 dBm
1.25400 ms
20 dBm
10 dBm
0 dBm
TRG -5.000 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.437 GHz
1001 pts
400.0 µs/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 1.254 ms 9.97 dBm
D2 M1 1 1.046 ms 2.83 dB
D3 M1 1 1.062 ms -0.09 dB

Single User

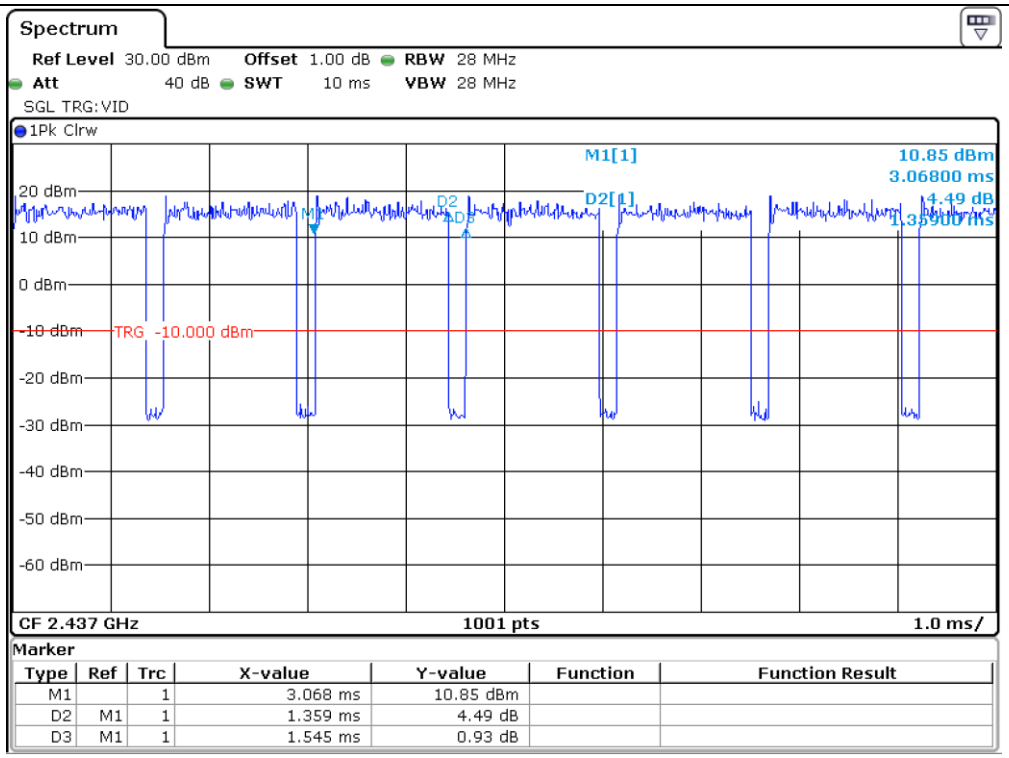
-. Antenna 1



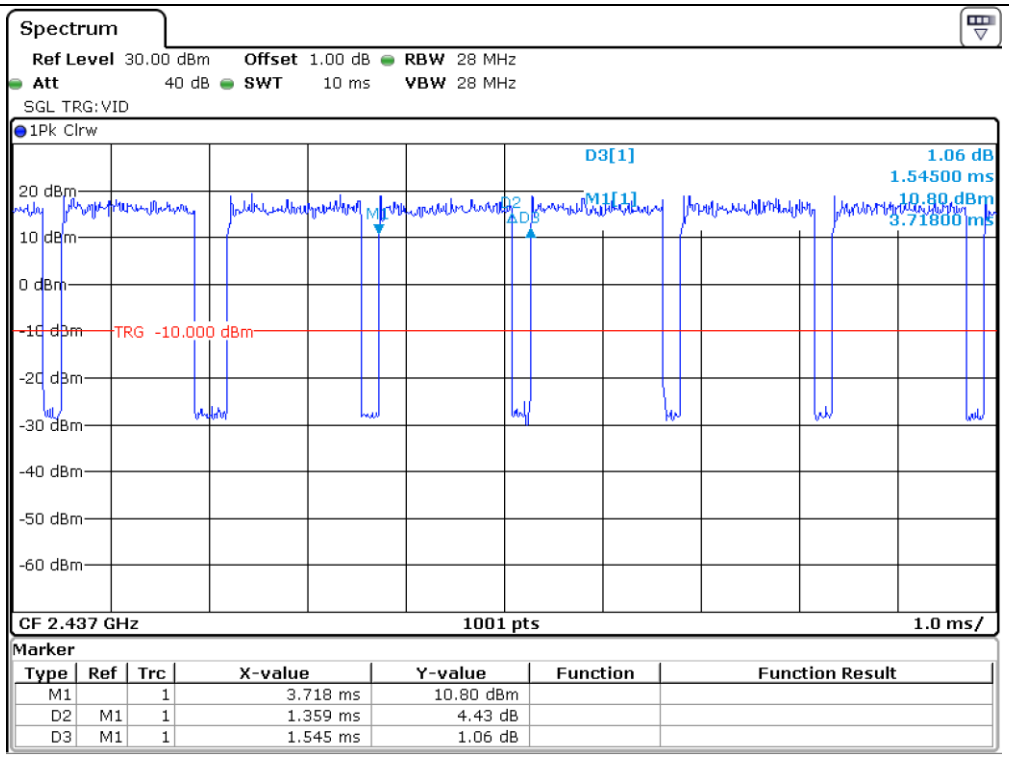
26 Tone



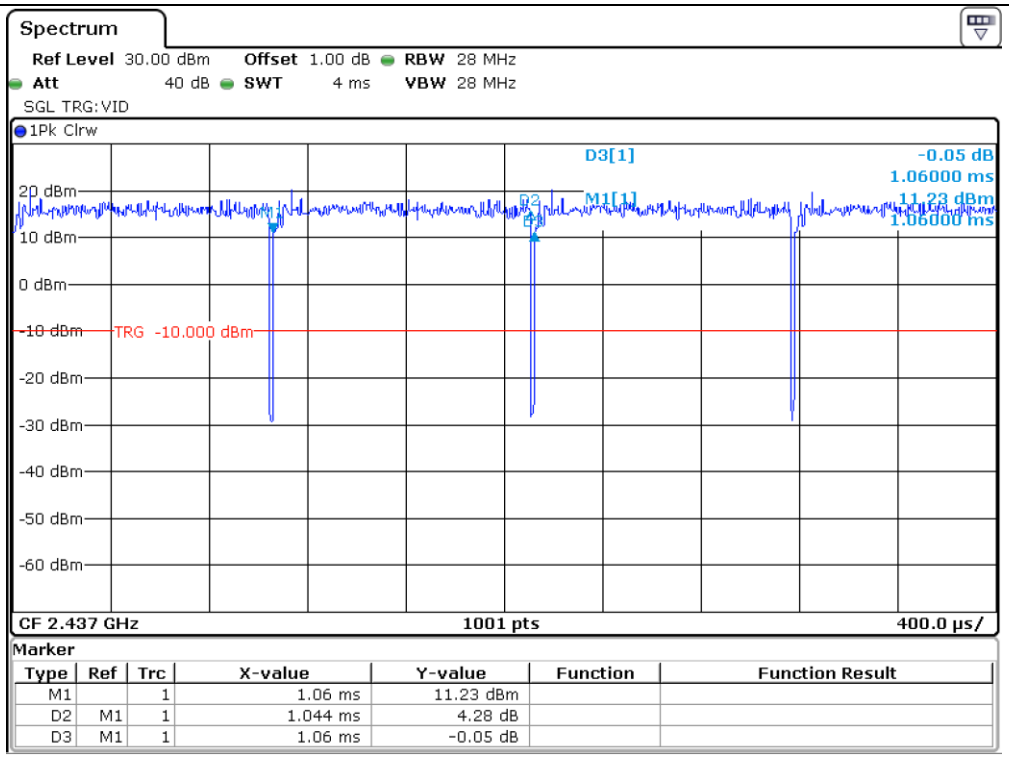
52 Tone



106 Tone



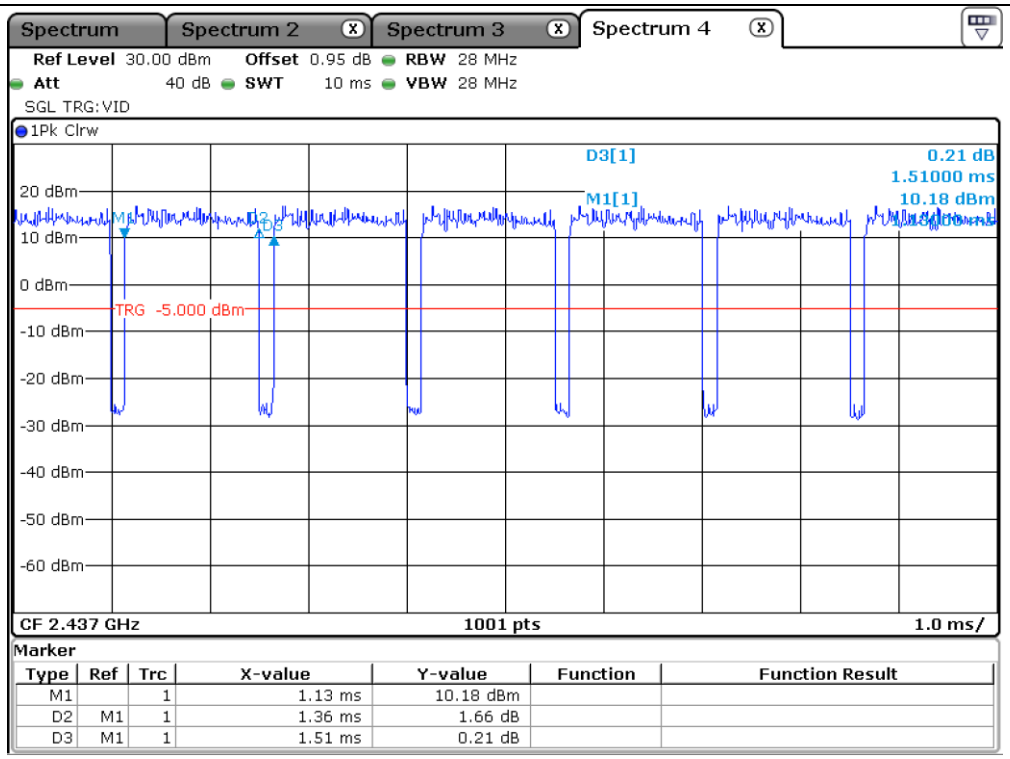
242 Tone


Spectrum
Ref Level 30.00 dBm Offset 1.00 dB RBW 28 MHz
Att 40 dB SWT 4 ms VBW 28 MHz
SGL TRG: VID
1Pk Clrw
D3[1] -0.05 dB
1.06000 ms
M1[1] 11.23 dBm
1.06000 ms
D2
4.28 dB
20 dBm
10 dBm
0 dBm
-10 dBm
TRG -10.000 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.437 GHz
1001 pts
400.0 µs/
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 1.06 ms 11.23 dBm
D2 M1 1 1.044 ms 4.28 dB
D3 M1 1 1.06 ms -0.05 dB

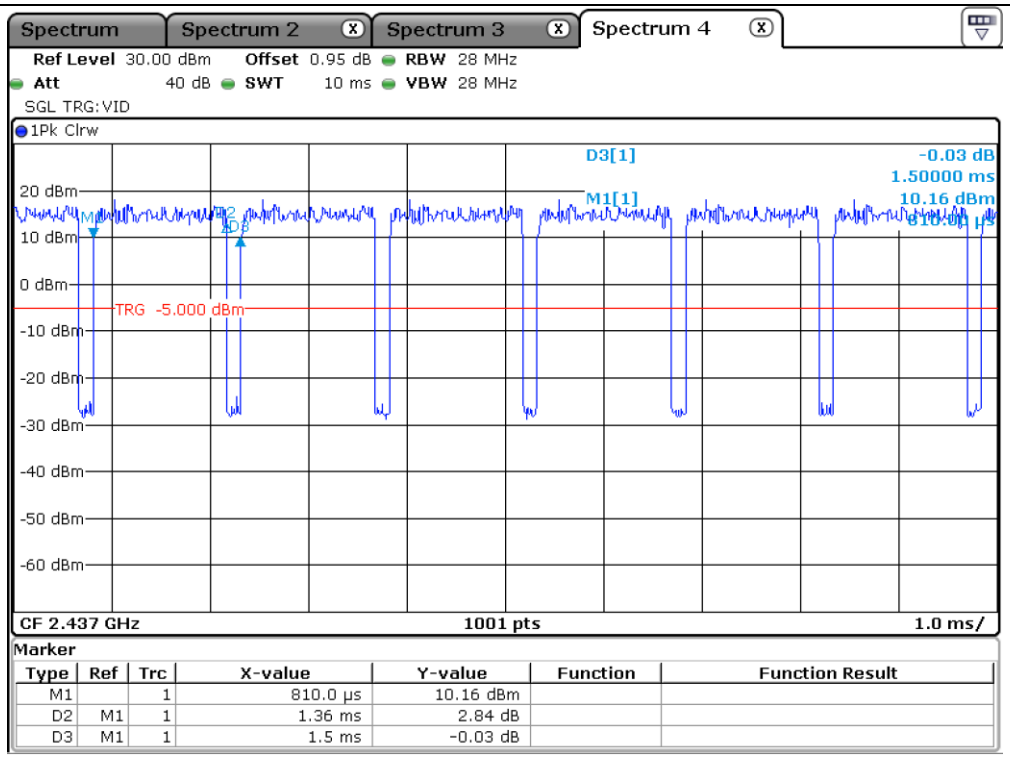
Single User

-. Test Plot for 802.11 ax(HE40)

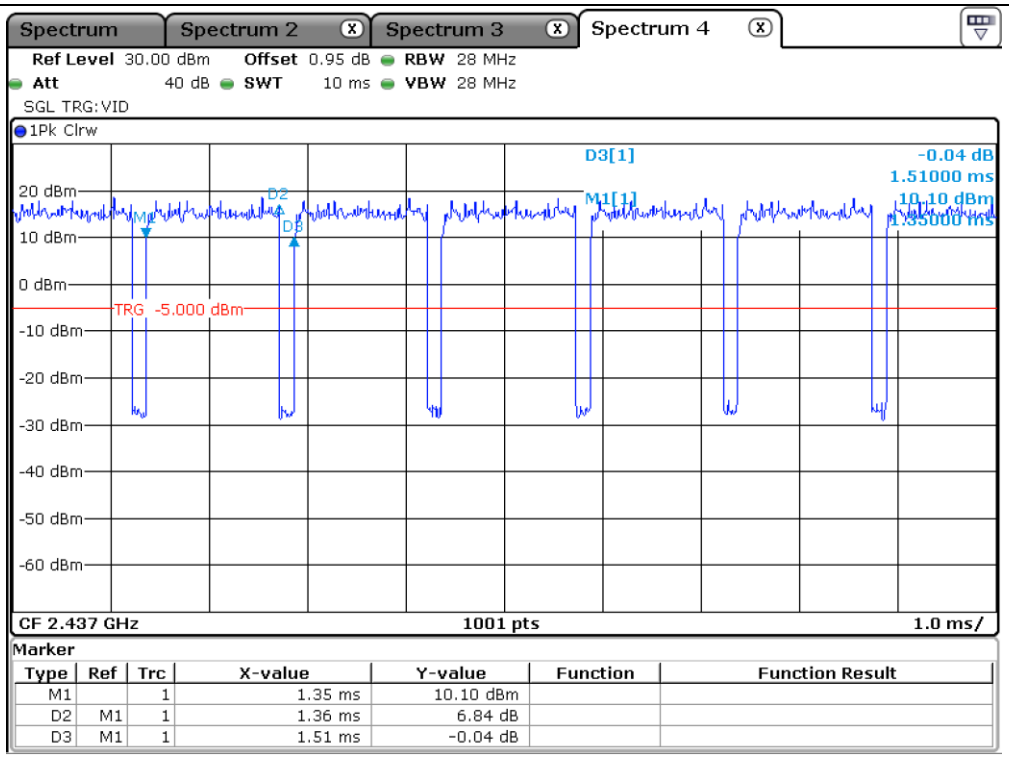
-. Antenna 0



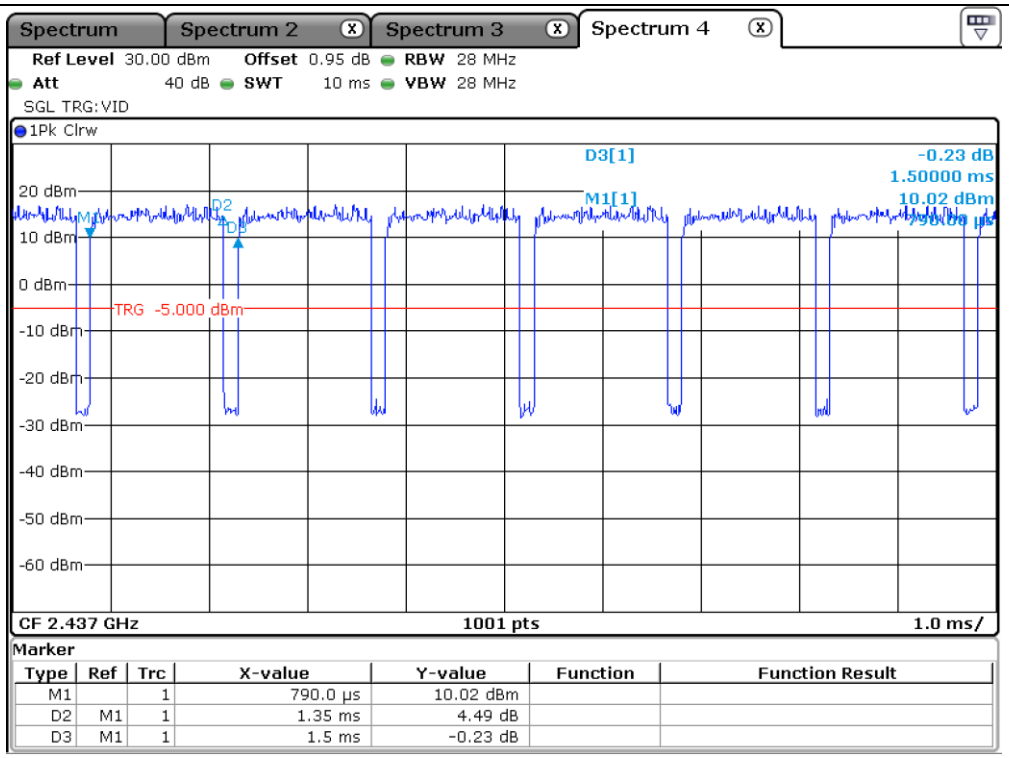
26 Tone



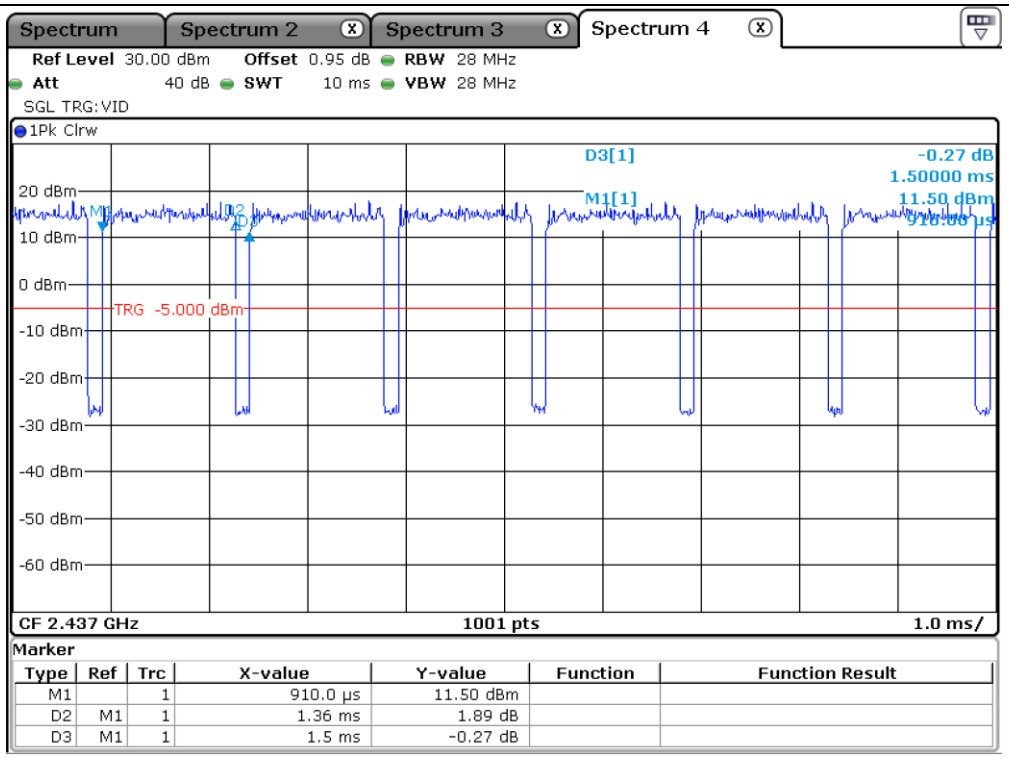
52 Tone



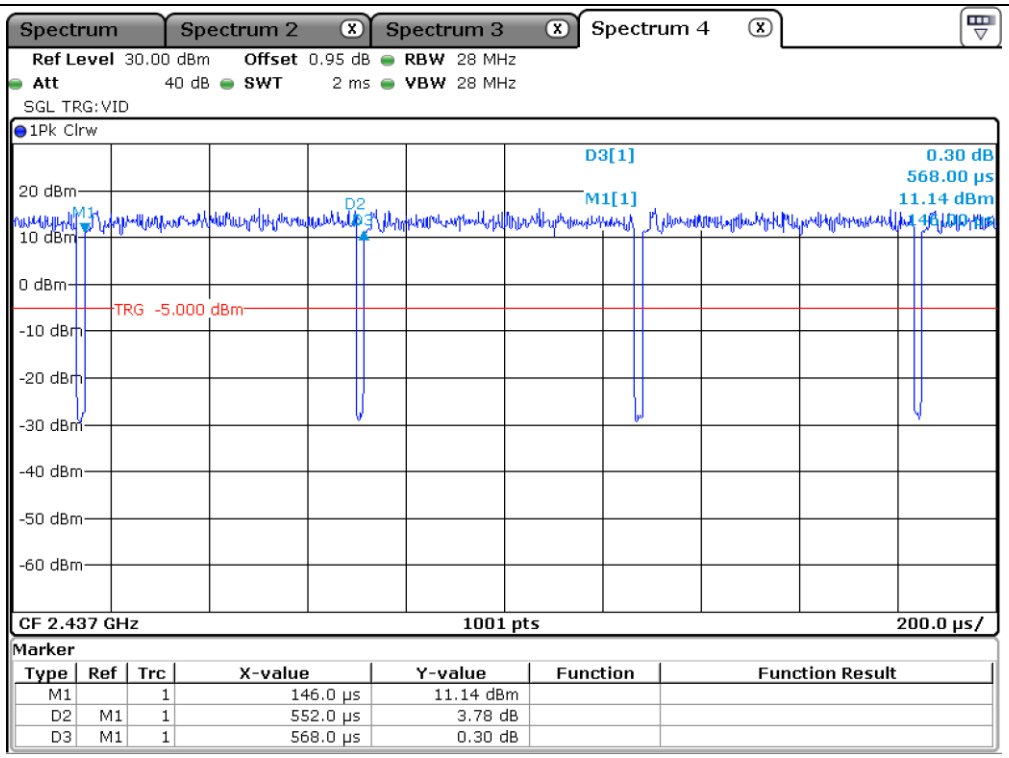
106 Tone



242 Tone

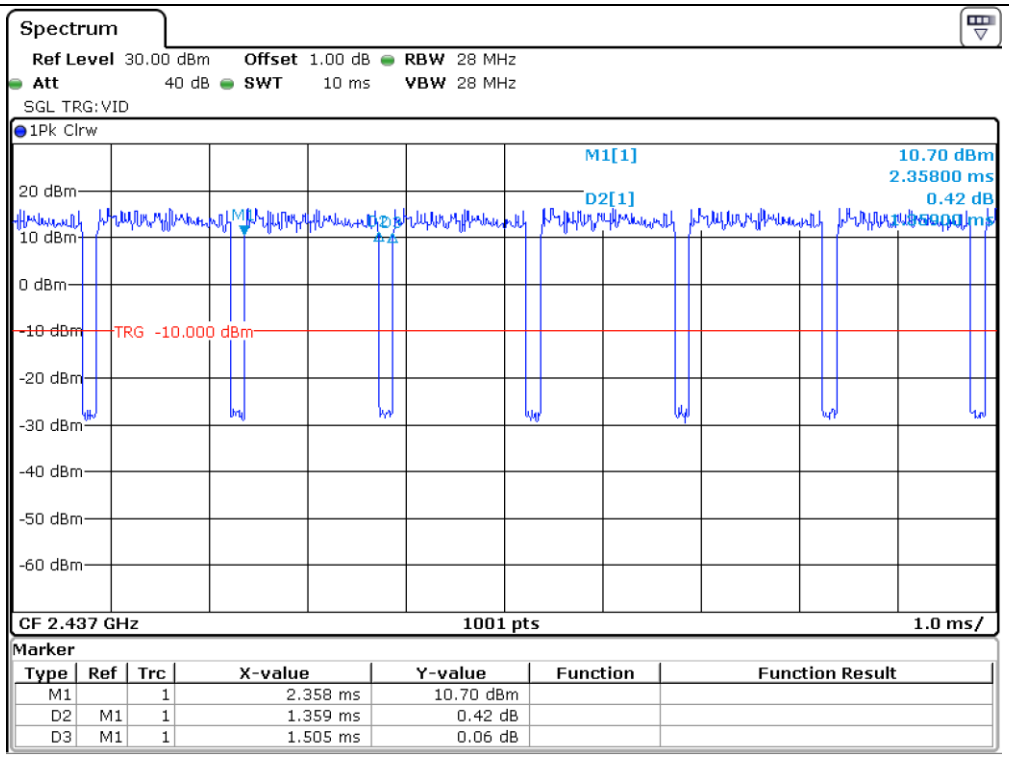


484 Tone

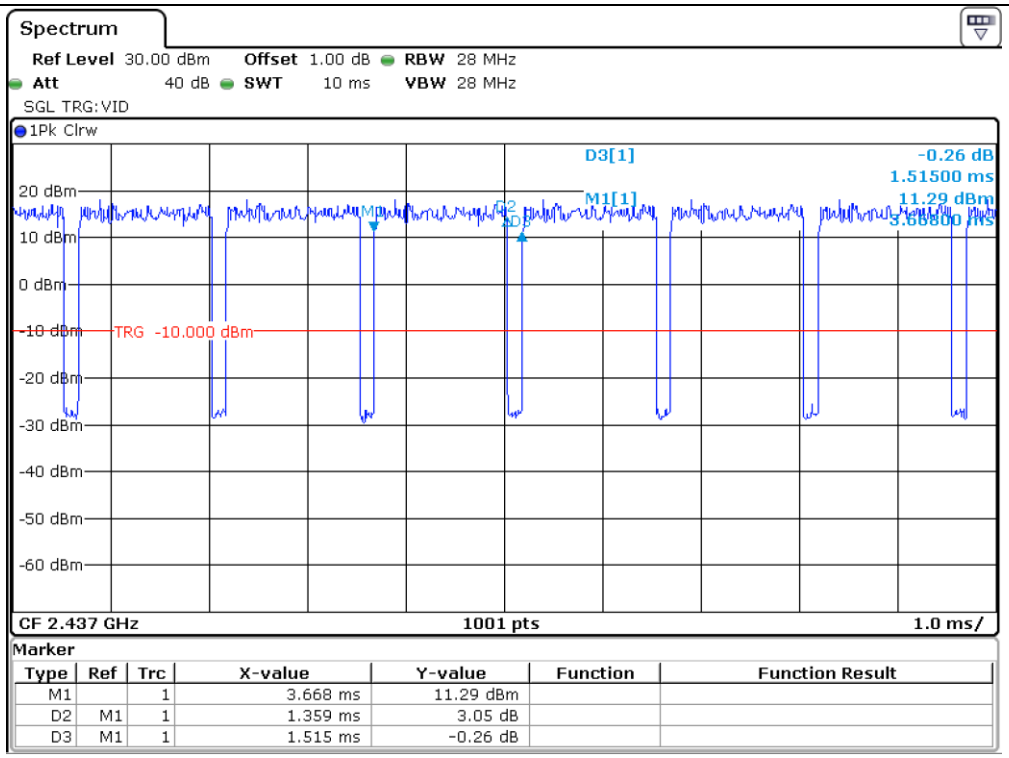


Single User

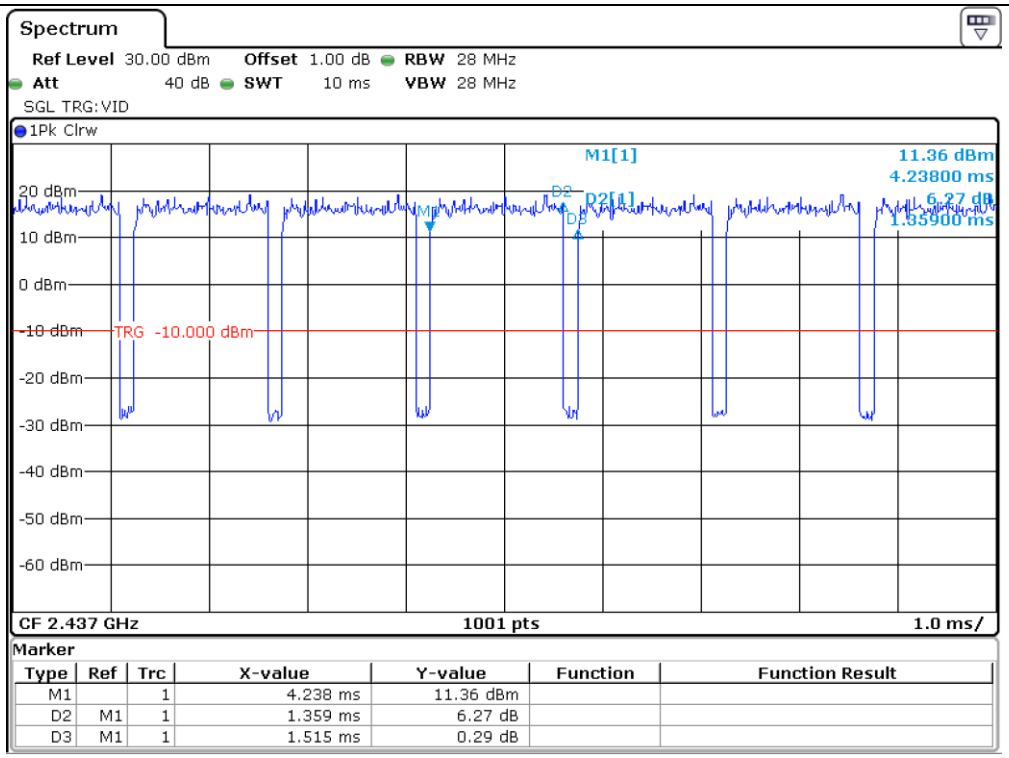
-. Antenna 1



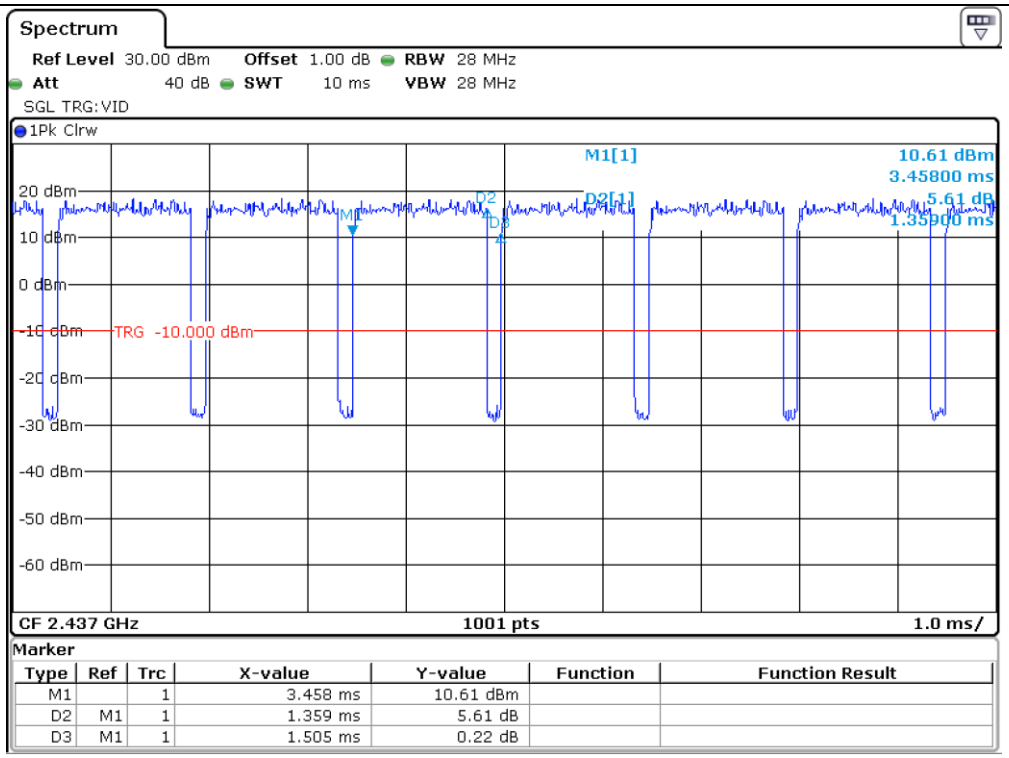
26 Tone



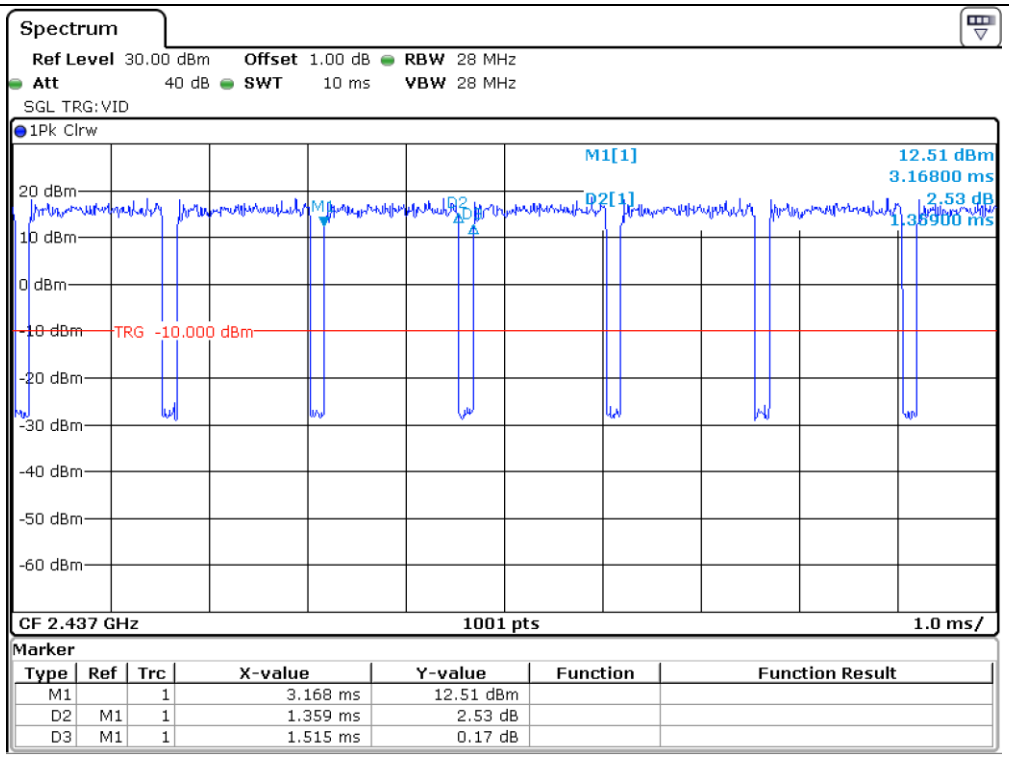
52 Tone



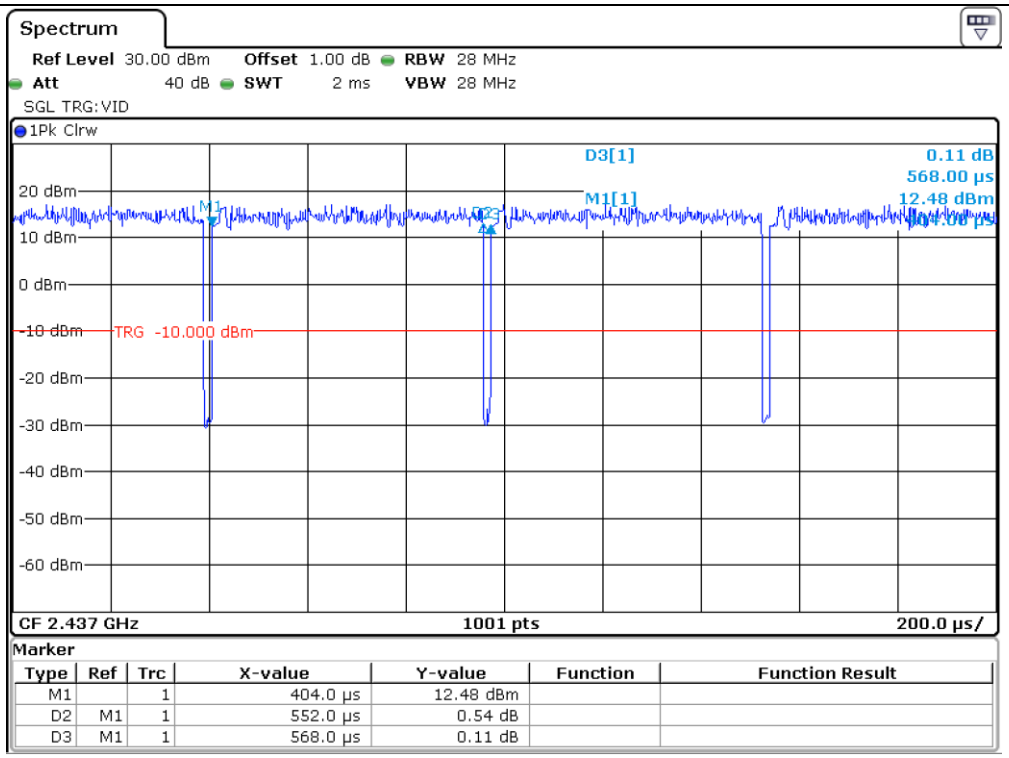
106 Tone



242 Tone



484 Tone



Single User

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. MIMIMUM 6 dB BANDWIDTH

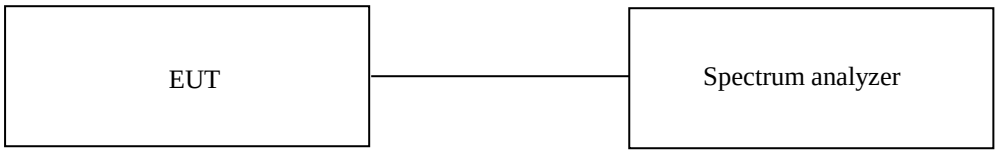
7.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % 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 802.11 ax(HE20) WLAN Mode

7.4.1 Test data for Antenna 0

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	6 dB Bandwidth (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.05	3.90	8.14	-	-
			Mid	1.10	4.10	-	18.28	18.78
			High	2.05	4.05	8.04	-	-
	2437	6	Low	2.05	4.05	8.24	-	-
			Mid	1.05	4.10	-	18.51	18.48
			High	2.05	4.00	8.34	-	-
	2462	11	Low	2.05	4.00	8.29	-	-
			Mid	1.05	4.10	-	18.93	18.58
			High	2.05	4.05	8.14	-	-

7.4.2 Test data for Antenna 1

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	6 dB Bandwidth (MHz)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	2.03	4.01	8.30	-	-
			Mid	1.10	4.18	-	18.90	18.03
			High	2.03	4.01	8.35	-	-
	2437	6	Low	2.03	4.01	8.30	-	-
			Mid	1.04	4.18	-	18.74	18.28
			High	2.03	4.01	8.30	-	-
	2462	11	Low	2.03	4.01	8.35	-	-
			Mid	1.04	4.12	-	18.57	18.23
			High	2.09	4.01	8.24	-	-

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7.5 Test data for 802.11 ax(HE40) WLAN Mode

7.5.1 Test data for Antenna 0

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	6 dB Bandwidth (MHz)					
				26 T	52 T	106 T	242 T	484 T	SU
HE40	2422	3	Low	2.00	3.70	8.29	18.48	-	-
			Mid	2.10	4.10	8.29	-	37.36	37.16
			High	2.10	4.10	8.19	18.48	-	-
	2437	6	Low	2.10	4.10	8.09	18.78	-	-
			Mid	2.10	4.10	8.29	-	37.66	37.36
			High	2.00	4.10	8.19	18.08	-	-
	2452	9	Low	2.10	3.90	8.19	18.68	-	-
			Mid	2.10	4.10	8.29	-	36.66	35.46
			High	2.00	4.00	8.19	17.88	-	-

Remark. Margin = Measured Value – Limit

7.5.2 Test data for Antenna 1

BW	Frequency [MHz]	Channel No.	RU Index	6 dB Bandwidth (MHz)					
				26 T	52 T	106 T	242 T	484 T	SU
HE40	2422	3	Low	2.00	4.10	8.29	17.78	-	-
			Mid	2.10	4.10	8.29	-	37.36	36.56
			High	2.00	4.00	8.29	18.08	-	-
	2437	6	Low	2.00	4.20	8.09	18.68	-	-
			Mid	2.10	4.10	8.29	-	36.86	36.26
			High	2.10	4.10	8.19	17.88	-	-
	2452	9	Low	2.00	4.00	8.09	18.08	-	-
			Mid	2.20	4.10	8.29	-	36.66	36.06
			High	2.10	4.10	8.19	18.28	-	-

Remark. Margin = Measured Value – Limit

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8. MAXIMUM PEAK OUTPUT POWER

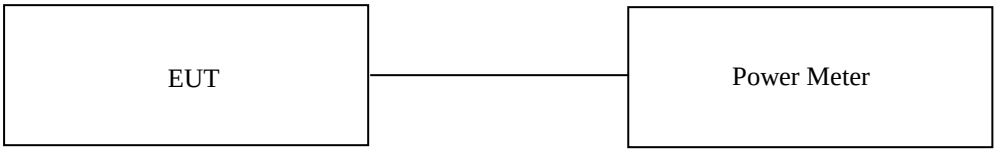
8.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

8.2 Test set-up

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



8.3 Test Date

December 05, 2021 ~ March 08, 2022

8.4 Test data for 802.11 ax(HE20) WLAN Mode

8.4.1 Test data for Antenna 0

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Conducted Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	7.046	7.368	8.13	-	-
			Mid	9.216	8.958	-	8.42	8.45
			High	7.786	7.998	8.5	-	-
	2437	6	Low	10.646	10.708	10.91	-	-
			Mid	11.586	11.348	-	11.85	11.47
			High	13.266	13.058	12.66	-	-
	2462	11	Low	11.876	12.748	12.45	-	-
			Mid	10.826	12.458	-	7.92	7.72
			High	10.136	11.128	11.31	-	-

Remark. Limit : 30 dBm

8.4.2 Test data for Antenna 1

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Conducted Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	8.36	8.46	8.57	-	-
			Mid	8.66	8.94	-	8.69	9.08
			High	8.77	8.77	8.79	-	-
	2437	6	Low	13.04	13.13	13.29	-	-
			Mid	13.34	13.57	-	13.33	13.65
			High	13.35	13.35	13.47	-	-
	2462	11	Low	10.52	11.63	11.63	-	-
			Mid	10.86	11.98	-	7.87	8.31
			High	10.72	11.79	11.87	-	-

Remark. Limit : 30 dBm

8.4.3Test data for Multiple Transmit

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Conducted Average Power (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	10.76	10.96	11.36	-	-
			Mid	11.95	11.96	-	11.57	11.78
			High	11.31	11.41	11.66	-	-
	2437	6	Low	15.01	15.10	15.27	-	-
			Mid	15.56	15.61	-	15.66	15.70
			High	16.32	16.22	16.09	-	-
	2462	11	Low	14.26	15.24	15.07	-	-
			Mid	13.85	15.24	-	10.90	11.03
			High	13.45	14.48	14.61	-	-

Remark. Limit : 30 dBm

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8.5 Test data for 802.11 ax(HE40) WLAN Mode

8.5.1 Test data for Antenna 0

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Conducted Average Power (dBm)					
				26 T	52 T	106 T	242 T	484 T	SU
HE40	2422	3	Low	8.39	9.59	10.23	9.60	-	-
			Mid	9.88	10.37	10.88	-	7.99	8.01
			High	9.22	9.85	9.56	8.39	-	-
	2437	6	Low	10.03	10.70	10.39	10.27	-	-
			Mid	10.32	10.47	10.43	-	11.52	11.50
			High	12.02	12.93	13.04	12.44	-	-
	2452	9	Low	7.30	9.32	9.71	9.20	-	-
			Mid	11.41	12.58	12.41	-	8.31	6.29
			High	8.65	10.52	10.65	9.48	-	-

Remark. Limit : 30 dBm

8.4.2 Test data for Antenna 1

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Conducted Average Power (dBm)					
				26 T	52 T	106 T	242 T	484 T	SU
HE40	2422	3	Low	9.52	10.56	10.54	9.86	-	-
			Mid	10.97	11.24	11.29	-	9.01	9.35
			High	10.32	11.25	11.22	10.28	-	-
	2437	6	Low	10.99	11.96	12.07	12.33	-	-
			Mid	12.31	12.67	12.70	-	12.48	12.69
			High	11.75	12.60	12.59	12.68	-	-
	2452	9	Low	9.28	11.18	11.30	9.63	-	-
			Mid	10.66	11.90	11.97	-	8.99	7.39
			High	9.97	11.78	11.78	9.99	-	-

Remark. Limit : 30 dBm

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8.5.2 Test data for Multiple Transmit

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Conducted Average Power (dBm)					
				26 T	52 T	106 T	242 T	484 T	SU
HE40	2422	3	Low	12.01	13.11	13.40	12.75	-	-
			Mid	13.47	13.84	14.10	-	11.54	11.75
			High	12.82	13.62	13.48	12.45	-	-
	2437	6	Low	13.55	14.39	14.32	14.43	-	-
			Mid	14.44	14.72	14.72	-	15.04	15.15
			High	14.90	15.78	15.83	15.57	-	-
	2452	9	Low	11.42	13.36	13.59	12.43	-	-
			Mid	14.07	15.26	15.21	-	11.67	9.89
			High	12.37	14.21	14.26	12.76	-	-

Remark. Limit : 30 dBm

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9. 100 kHz BANDWIDTH OUTSIDE THE FREQUENCY BAND

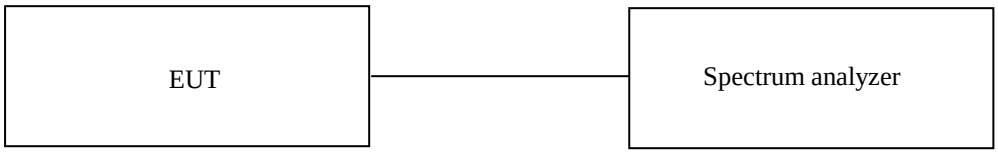
9.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % 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

Please refer to the Annex

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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 802.11 ax(HE20) WLAN Mode

-. 26 Tone

-. 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 : 87.18 %

-. Result : PASSED

Tone	Channel	RU Index
26	1	0
	11	8

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 1	2 385.050	56.71	Peak	H	28.30	6.03	45.14	10.48	-	56.38	74.00	17.62
	2 372.170	42.67	Average	H	28.30	6.03	45.14	10.48	0.60	42.94	54.00	11.06
	2 385.010	52.45	Peak	V	28.30	6.03	45.14	10.48	-	52.12	74.00	21.88
	2 388.980	42.42	Average	V	28.30	6.03	45.14	10.48	0.60	42.69	54.00	11.31
High ch. 11	2 485.318	65.01	Peak	H	28.70	6.12	45.79	10.51	-	64.55	74.00	9.45
	2 483.500	47.43	Average	H	28.70	6.12	45.79	10.51	0.60	47.57	54.00	6.43
	2 484.143	65.21	Peak	V	28.70	6.12	45.79	10.51	-	64.75	74.00	9.25
	2 483.500	48.62	Average	V	28.70	6.12	45.79	10.51	0.60	48.76	54.00	5.24

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

-. 52 Tone

-. 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 : 86.84 %

-. Result : PASSED

Tone	Channel	RU Index
52	1	37
	11	40

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 1	2 385.310	56.61	Peak	H	28.30	6.03	45.14	10.48	-	56.28	74.00	17.72
	2 347.300	43.77	Average	H	28.30	6.03	45.14	10.48	0.61	44.05	54.00	9.95
	2 369.210	53.00	Peak	V	28.30	6.03	45.14	10.48	-	52.67	74.00	21.33
	2 384.090	42.29	Average	V	28.30	6.03	45.14	10.48	0.61	42.57	54.00	11.43
High ch. 11	2 483.500	67.78	Peak	H	28.70	6.12	45.79	10.51	-	67.32	74.00	6.68
	2 483.500	49.59	Average	H	28.70	6.12	45.79	10.51	0.61	49.74	54.00	4.26
	2 483.500	62.30	Peak	V	28.70	6.12	45.79	10.51	-	61.84	74.00	12.16
	2 483.500	50.57	Average	V	28.70	6.12	45.79	10.51	0.61	50.72	54.00	3.28

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

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-. 106 Tone

-. 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 : 87.96 %

-. Result : PASSED

Tone	Channel	RU Index
106	1	53
	11	54

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 1	2 370.030	53.86	Peak	H	28.30	6.03	45.14	10.48	-	53.53	74.00	20.47
	2 383.680	42.53	Average	H	28.30	6.03	45.14	10.48	0.56	42.76	54.00	11.24
	2 317.750	53.38	Peak	V	28.30	6.03	45.14	10.48	-	53.05	74.00	20.95
	2 389.590	43.38	Average	V	28.30	6.03	45.14	10.48	0.56	43.61	54.00	10.39
High ch. 11	2 483.500	64.94	Peak	H	28.70	6.12	45.79	10.51	-	64.48	74.00	9.52
	2 483.500	49.99	Average	H	28.70	6.12	45.79	10.51	0.56	50.09	54.00	3.91
	2 483.500	68.14	Peak	V	28.70	6.12	45.79	10.51	-	67.68	74.00	6.32
	2 483.500	49.90	Average	V	28.70	6.12	45.79	10.51	0.56	50.00	54.00	4.00

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

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-. 242 Tone

-. 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 : 87.96 %

-. Result : PASSED

Tone	Channel	RU Index
242	1	61
	11	61

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 1	2 390.000	57.92	Peak	H	28.30	6.03	45.14	10.48	-	57.59	74.00	16.41
	2 389.080	43.97	Average	H	28.30	6.03	45.14	10.48	0.56	44.20	54.00	9.80
	2 390.000	56.08	Peak	V	28.30	6.03	45.14	10.48	-	55.75	74.00	18.25
	2 390.000	43.52	Average	V	28.30	6.03	45.14	10.48	0.56	43.75	54.00	10.25
High ch. 11	2 484.815	64.21	Peak	H	28.70	6.12	45.79	10.51	-	63.75	74.00	10.25
	2 483.500	49.78	Average	H	28.70	6.12	45.79	10.51	0.56	49.88	54.00	4.12
	2 483.500	61.98	Peak	V	28.70	6.12	45.79	10.51	-	61.52	74.00	12.48
	2 483.500	48.48	Average	V	28.70	6.12	45.79	10.51	0.56	48.58	54.00	5.42

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

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-. Singgle user

-. 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 : 98.49 %

-. Result : PASSED

Tone	Channel	RU Index
SU	1	-
	11	-

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 1	2389.230	66.41	Peak	H	28.30	6.03	45.14	10.48	-	66.08	74.00	7.92
	2389.430	51.38	Average	H	28.30	6.03	45.14	10.48	0.07	51.17	54.00	2.83
	2389.630	66.89	Peak	V	28.30	6.03	45.14	10.48	-	66.56	74.00	7.44
	2389.740	50.99	Average	V	28.30	6.03	45.14	10.48	0.07	50.78	54.00	3.22
High ch. 11	2484.545	69.03	Peak	H	28.70	6.12	45.79	10.51	-	68.57	74.00	5.43
	2483.986	51.95	Average	H	28.70	6.12	45.79	10.51	0.07	51.61	54.00	2.39
	2484.014	69.68	Peak	V	28.70	6.12	45.79	10.51	-	69.22	74.00	4.78
	2483.706	51.81	Average	V	28.70	6.12	45.79	10.51	0.07	51.47	54.00	2.53

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

9.6.1.2 Test data for 802.11 ax(HE40) WLAN Mode

-. 26 Tone

-. 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 : 90.07 %

-. Result : PASSED

Tone	Channel	RU Index
26	3	0
	9	17

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 3	2381.850	52.15	Peak	H	28.30	6.03	45.14	10.48	-	51.82	74.00	22.18
	2385.210	44.61	Average	H	28.30	6.03	45.14	10.48	0.45	44.73	54.00	9.27
	2353.210	52.25	Peak	V	28.30	6.03	45.14	10.48	-	51.92	74.00	22.08
	2387.450	42.36	Average	V	28.30	6.03	45.14	10.48	0.45	42.48	54.00	11.52
High ch. 9	2483.500	64.00	Peak	H	28.70	6.12	45.79	10.51	-	63.54	74.00	10.46
	2483.500	48.13	Average	H	28.70	6.12	45.79	10.51	0.45	48.12	54.00	5.88
	2483.500	63.41	Peak	V	28.70	6.12	45.79	10.51	-	62.95	74.00	11.05
	2483.500	48.59	Average	V	28.70	6.12	45.79	10.51	0.45	48.58	54.00	5.42

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

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-. 52 Tone

-. 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 : 89.70 %

-. Result : PASSED

Tone	Channel	RU Index
52	3	37
	9	44

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 3	2384.910	55.26	Peak	H	28.30	6.03	45.14	10.48	-	54.93	74.00	19.07
	2386.230	42.60	Average	H	28.30	6.03	45.14	10.48	0.47	42.74	54.00	11.26
	2349.550	52.95	Peak	V	28.30	6.03	45.14	10.48	-	52.62	74.00	21.38
	2388.880	44.09	Average	V	28.30	6.03	45.14	10.48	0.47	44.23	54.00	9.77
High ch. 9	2485.262	61.13	Peak	H	28.70	6.12	45.79	10.51	-	60.67	74.00	13.33
	2484.675	47.39	Average	H	28.70	6.12	45.79	10.51	0.47	47.40	54.00	6.60
	2483.500	64.75	Peak	V	28.70	6.12	45.79	10.51	-	64.29	74.00	9.71
	2483.500	49.96	Average	V	28.70	6.12	45.79	10.51	0.47	49.97	54.00	4.03

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

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-. 106 Tone

-. 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 : 89.70 %

-. Result : PASSED

Tone	Channel	RU Index
106	3	53
	9	56

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 3	2370.030	58.16	Peak	H	28.30	6.03	45.14	10.48	-	57.83	74.00	16.17
	2377.470	42.96	Average	H	28.30	6.03	45.14	10.48	0.47	43.10	54.00	10.90
	2388.680	54.95	Peak	V	28.30	6.03	45.14	10.48	-	54.62	74.00	19.38
	2389.590	42.14	Average	V	28.30	6.03	45.14	10.48	0.47	42.28	54.00	11.72
High ch. 9	2483.500	67.32	Peak	H	28.70	6.12	45.79	10.51	-	66.86	74.00	7.14
	2483.500	48.56	Average	H	28.70	6.12	45.79	10.51	0.47	48.57	54.00	5.43
	2497.934	65.34	Peak	V	28.70	6.12	45.79	10.51	-	64.88	74.00	9.12
	2483.500	49.43	Average	V	28.70	6.12	45.79	10.51	0.47	49.44	54.00	4.56

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

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-. 242 Tone

-. 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 : 90.00 %

-. Result : PASSED

Tone	Channel	RU Index
242	3	61
	9	62

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 1	2389.430	63.16	Peak	H	28.30	6.03	45.14	10.48	-	62.83	74.00	11.17
	2389.940	50.15	Average	H	28.30	6.03	45.14	10.48	0.46	50.26	54.00	3.74
	2389.840	63.77	Peak	V	28.30	6.03	45.14	10.48	-	63.44	74.00	10.56
	2389.940	49.96	Average	V	28.30	6.03	45.14	10.48	0.46	50.07	54.00	3.93
High ch. 9	2483.566	67.65	Peak	H	28.70	6.12	45.79	10.51	-	67.19	74.00	6.81
	2483.538	51.47	Average	H	28.70	6.12	45.79	10.51	0.46	51.45	54.00	2.55
	2483.510	68.27	Peak	V	28.70	6.12	45.79	10.51	-	67.81	74.00	6.19
	2483.762	51.04	Average	V	28.70	6.12	45.79	10.51	0.46	51.02	54.00	2.98

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

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-. 484 Tone

-. 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 : 89.70 %

-. Result : PASSED

Tone	Channel	RU Index
484	3	65
	9	65

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 3	2389.120	58.60	Peak	H	28.30	6.03	45.14	10.48	-	58.27	74.00	15.73
	2388.920	46.56	Average	H	28.30	6.03	45.14	10.48	0.47	46.67	54.00	7.33
	2386.270	59.47	Peak	V	28.30	6.03	45.14	10.48	-	59.14	74.00	14.86
	2388.410	46.47	Average	V	28.30	6.03	45.14	10.48	0.47	46.58	54.00	7.42
High ch. 9	2488.378	65.64	Peak	H	28.70	6.12	45.79	10.51	-	65.18	74.00	8.82
	2483.678	52.02	Average	H	28.70	6.12	45.79	10.51	0.47	52.00	54.00	2.00
	2487.930	65.85	Peak	V	28.70	6.12	45.79	10.51	-	65.39	74.00	8.61
	2483.622	51.70	Average	V	28.70	6.12	45.79	10.51	0.47	51.68	54.00	2.32

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

-. Singgle user

-. 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 : 97.18 %

-. Result : PASSED

Tone	Channel	RU Index
SU	3	-
	9	-

Channel	Frequency (MHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP (dB)	ATT (dB)	Duty Factor (dB)	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. 3	2387.900	65.92	Peak	H	28.30	6.03	45.14	10.48	-	65.59	74.00	8.41
	2389.940	51.92	Average	H	28.30	6.03	45.14	10.48	0.12	51.71	54.00	2.29
	2388.920	64.65	Peak	V	28.30	6.03	45.14	10.48	-	64.32	74.00	9.68
	2389.530	52.12	Average	V	28.30	6.03	45.14	10.48	0.12	51.91	54.00	2.09
High ch. 9	2489.916	66.42	Peak	H	28.70	6.12	45.79	10.51	-	65.96	74.00	8.04
	2484.042	51.83	Average	H	28.70	6.12	45.79	10.51	0.12	51.49	54.00	2.51
	2484.909	66.64	Peak	V	28.70	6.12	45.79	10.51	-	66.18	74.00	7.82
	2483.510	51.76	Average	V	28.70	6.12	45.79	10.51	0.12	51.42	54.00	2.58

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

9.6.2 Spurious & Harmonic Radiated Emission

9.6.2.1 Test data for 802.11 ax(HE20) WLAN Mode

-. 26 Tone

-. 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 : 87.18 %

-. Result : PASSED

Tone	Channel	RU Index
26	1	8
	6	8
	11	8

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4824.00	49.63	Peak	H	33.40	7.91	45.10	-	45.84	74.00	28.16
	4824.00	40.56	Average	H	33.40	7.91	45.10	0.60	37.37	54.00	16.63
	4824.00	50.59	Peak	V	33.40	7.91	45.10	-	46.80	74.00	27.20
	4824.00	40.24	Average	V	33.40	7.91	45.10	0.60	37.05	54.00	16.95
Middle ch. Harmonic	4874.00	49.78	Peak	H	33.50	8.08	45.08	-	46.28	74.00	27.72
	4874.00	40.49	Average	H	33.50	8.08	45.08	0.60	37.59	54.00	16.41
	4874.00	50.20	Peak	V	33.50	8.08	45.08	-	46.70	74.00	27.30
	4874.00	40.24	Average	V	33.50	8.08	45.08	0.60	37.34	54.00	16.66
High ch. Harmonic	4924.00	49.75	Peak	H	33.30	8.14	45.03	-	46.16	74.00	27.84
	4924.00	40.35	Average	H	33.30	8.14	45.03	0.60	37.36	54.00	16.64
	4924.00	50.03	Peak	V	33.30	8.14	45.03	-	46.44	74.00	27.56
	4924.00	40.59	Average	V	33.30	8.14	45.03	0.60	37.60	54.00	16.40

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 52 Tone

-. 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 : 86.84 %

-. Result : PASSED

Tone	Channel	RU Index
52	1	38
	6	38
	11	38

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4824.00	49.44	Peak	H	33.40	7.91	45.10	-	45.65	74.00	28.35
	4824.00	40.51	Average	H	33.40	7.91	45.10	0.61	37.33	54.00	16.67
	4824.00	50.80	Peak	V	33.40	7.91	45.10	-	47.01	74.00	26.99
	4824.00	40.11	Average	V	33.40	7.91	45.10	0.61	36.93	54.00	17.07
Middle ch. Harmonic	4874.00	49.71	Peak	H	33.50	8.08	45.08	-	46.21	74.00	27.79
	4874.00	40.54	Average	H	33.50	8.08	45.08	0.61	37.65	54.00	16.35
	4874.00	50.51	Peak	V	33.50	8.08	45.08	-	47.01	74.00	26.99
	4874.00	40.72	Average	V	33.50	8.08	45.08	0.61	37.83	54.00	16.17
High ch. Harmonic	4924.00	50.00	Peak	H	33.30	8.14	45.03	-	46.41	74.00	27.59
	4924.00	40.57	Average	H	33.30	8.14	45.03	0.61	37.59	54.00	16.41
	4924.00	50.74	Peak	V	33.30	8.14	45.03	-	47.15	74.00	26.85
	4924.00	40.23	Average	V	33.30	8.14	45.03	0.61	37.25	54.00	16.75

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 106 Tone

-. 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 : 87.96 %

-. Result : PASSED

Tone	Channel	RU Index
106	1	53
	6	53
	11	53

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4824.00	50.49	Peak	H	33.40	7.91	45.10	-	46.70	74.00	27.30
	4824.00	40.42	Average	H	33.40	7.91	45.10	0.56	37.19	54.00	16.81
	4824.00	50.78	Peak	V	33.40	7.91	45.10	-	46.99	74.00	27.01
	4824.00	40.74	Average	V	33.40	7.91	45.10	0.56	37.51	54.00	16.49
Middle ch. Harmonic	4874.00	50.75	Peak	H	33.50	8.08	45.08	-	47.25	74.00	26.75
	4874.00	40.36	Average	H	33.50	8.08	45.08	0.56	37.42	54.00	16.58
	4874.00	49.69	Peak	V	33.50	8.08	45.08	-	46.19	74.00	27.81
	4874.00	40.42	Average	V	33.50	8.08	45.08	0.56	37.48	54.00	16.52
High ch. Harmonic	4924.00	49.77	Peak	H	33.30	8.14	45.03	-	46.18	74.00	27.82
	4924.00	40.62	Average	H	33.30	8.14	45.03	0.56	37.59	54.00	16.41
	4924.00	51.36	Peak	V	33.30	8.14	45.03	-	47.77	74.00	26.23
	4924.00	40.59	Average	V	33.30	8.14	45.03	0.56	37.56	54.00	16.44

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 242 Tone

-. 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 : 87.96 %

-. Result : PASSED

Tone	Channel	RU Index
242	1	61
	6	61
	11	61

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4824.00	50.26	Peak	H	33.40	7.91	45.10	-	46.47	74.00	27.53
	4824.00	40.18	Average	H	33.40	7.91	45.10	0.56	36.95	54.00	17.05
	4824.00	49.62	Peak	V	33.40	7.91	45.10	-	45.83	74.00	28.17
	4824.00	40.30	Average	V	33.40	7.91	45.10	0.56	37.07	54.00	16.93
Middle ch. Harmonic	4874.00	49.72	Peak	H	33.50	8.08	45.08	-	46.22	74.00	27.78
	4874.00	40.19	Average	H	33.50	8.08	45.08	0.56	37.25	54.00	16.75
	4874.00	50.04	Peak	V	33.50	8.08	45.08	-	46.54	74.00	27.46
	4874.00	40.94	Average	V	33.50	8.08	45.08	0.56	38.00	54.00	16.00
High ch. Harmonic	4924.00	49.73	Peak	H	33.30	8.14	45.03	-	46.14	74.00	27.86
	4924.00	40.48	Average	H	33.30	8.14	45.03	0.56	37.45	54.00	16.55
	4924.00	50.10	Peak	V	33.30	8.14	45.03	-	46.51	74.00	27.49
	4924.00	40.44	Average	V	33.30	8.14	45.03	0.56	37.41	54.00	16.59

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. Singgle user

-. 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 : 98.49 %

-. Result : PASSED

Tone	Channel	RU Index
SU	1	-
	6	-
	11	-

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4824.00	50.11	Peak	H	33.40	7.91	45.10		46.32	74.00	27.68
	4824.00	40.31	Average	H	33.40	7.91	45.10	0.07	36.59	54.00	17.41
	4824.00	49.92	Peak	V	33.40	7.91	45.10		46.13	74.00	27.87
	4824.00	40.37	Average	V	33.40	7.91	45.10	0.07	36.65	54.00	17.35
Middle ch. Harmonic	4874.00	50.92	Peak	H	33.50	8.08	45.08		47.42	74.00	26.58
	4874.00	40.75	Average	H	33.50	8.08	45.08	0.07	37.32	54.00	16.68
	4874.00	50.29	Peak	V	33.50	8.08	45.08		46.79	74.00	27.21
	4874.00	40.35	Average	V	33.50	8.08	45.08	0.07	36.92	54.00	17.08
High ch. Harmonic	4924.00	51.30	Peak	H	33.30	8.14	45.03		47.71	74.00	26.29
	4924.00	40.37	Average	H	33.30	8.14	45.03	0.07	36.85	54.00	17.15
	4924.00	50.56	Peak	V	33.30	8.14	45.03		46.97	74.00	27.03
	4924.00	40.32	Average	V	33.30	8.14	45.03	0.07	36.80	54.00	17.20

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

9.6.2.2 Test data for 802.11 ax(HE40) WLAN Mode

-. 26 Tone

-. 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 : 90.07 %

-. Result : PASSED

Tone	Channel	RU Index
26	3	8
	6	8
	9	8

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4844.00	49.88	Peak	H	33.40	7.91	45.10	-	46.09	74.00	27.91
	4844.00	39.63	Average	H	33.40	7.91	45.10	0.45	36.29	54.00	17.71
	4844.00	49.88	Peak	V	33.40	7.91	45.10	-	46.09	74.00	27.91
	4844.00	40.09	Average	V	33.40	7.91	45.10	0.45	36.75	54.00	17.25
Middle ch. Harmonic	4874.00	50.03	Peak	H	33.50	8.08	45.08	-	46.53	74.00	27.47
	4874.00	39.79	Average	H	33.50	8.08	45.08	0.45	36.74	54.00	17.26
	4874.00	49.63	Peak	V	33.50	8.08	45.08	-	46.13	74.00	27.87
	4874.00	40.01	Average	V	33.50	8.08	45.08	0.45	36.96	54.00	17.04
High ch. Harmonic	4904.00	49.42	Peak	H	33.30	8.14	45.03	-	45.83	74.00	28.17
	4904.00	39.77	Average	H	33.30	8.14	45.03	0.45	36.63	54.00	17.37
	4904.00	49.71	Peak	V	33.30	8.14	45.03	-	46.12	74.00	27.88
	4904.00	40.16	Average	V	33.30	8.14	45.03	0.45	37.02	54.00	16.98

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 52 Tone

-. 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 : 89.70 %

-. Result : PASSED

Tone	Channel	RU Index
52	3	40
	6	40
	9	40

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4844.00	49.40	Peak	H	33.40	7.91	45.10	-	45.61	74.00	28.39
	4844.00	39.46	Average	H	33.40	7.91	45.10	0.47	36.14	54.00	17.86
	4844.00	49.49	Peak	V	33.40	7.91	45.10	-	45.70	74.00	28.30
	4844.00	40.10	Average	V	33.40	7.91	45.10	0.47	36.78	54.00	17.22
Middle ch. Harmonic	4874.00	50.44	Peak	H	33.50	8.08	45.08	-	46.94	74.00	27.06
	4874.00	39.99	Average	H	33.50	8.08	45.08	0.47	36.96	54.00	17.04
	4874.00	49.46	Peak	V	33.50	8.08	45.08	-	45.96	74.00	28.04
	4874.00	40.04	Average	V	33.50	8.08	45.08	0.47	37.01	54.00	16.99
High ch. Harmonic	4904.00	50.11	Peak	H	33.30	8.14	45.03	-	46.52	74.00	27.48
	4904.00	39.85	Average	H	33.30	8.14	45.03	0.47	36.73	54.00	17.27
	4904.00	50.19	Peak	V	33.30	8.14	45.03	-	46.60	74.00	27.40
	4904.00	40.07	Average	V	33.30	8.14	45.03	0.47	36.95	54.00	17.05

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 106 Tone

-. 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 : 89.70 %

-. Result : PASSED

Tone	Channel	RU Index
106	3	54
	6	54
	9	54

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4844.00	49.49	Peak	H	33.40	7.91	45.10	-	45.70	74.00	28.30
	4844.00	39.68	Average	H	33.40	7.91	45.10	0.47	36.36	54.00	17.64
	4844.00	49.10	Peak	V	33.40	7.91	45.10	-	45.31	74.00	28.69
	4844.00	39.99	Average	V	33.40	7.91	45.10	0.47	36.67	54.00	17.33
Middle ch. Harmonic	4874.00	48.89	Peak	H	33.50	8.08	45.08	-	45.39	74.00	28.61
	4874.00	39.85	Average	H	33.50	8.08	45.08	0.47	36.82	54.00	17.18
	4874.00	50.00	Peak	V	33.50	8.08	45.08	-	46.50	74.00	27.50
	4874.00	40.46	Average	V	33.50	8.08	45.08	0.47	37.43	54.00	16.57
High ch. Harmonic	4904.00	48.88	Peak	H	33.30	8.14	45.03	-	45.29	74.00	28.71
	4904.00	39.71	Average	H	33.30	8.14	45.03	0.47	36.59	54.00	17.41
	4904.00	49.24	Peak	V	33.30	8.14	45.03	-	45.65	74.00	28.35
	4904.00	40.16	Average	V	33.30	8.14	45.03	0.47	37.04	54.00	16.96

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 242 Tone

-. 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 : 90.00 %

-. Result : PASSED

Tone	Channel	RU Index
242	3	61
	6	61
	9	61

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4844.00	49.50	Peak	H	33.40	7.91	45.10	-	45.71	74.00	28.29
	4844.00	39.90	Average	H	33.40	7.91	45.10	0.46	36.57	54.00	17.43
	4844.00	49.69	Peak	V	33.40	7.91	45.10	-	45.90	74.00	28.10
	4844.00	40.12	Average	V	33.40	7.91	45.10	0.46	36.79	54.00	17.21
Middle ch. Harmonic	4874.00	49.50	Peak	H	33.50	8.08	45.08	-	46.00	74.00	28.00
	4874.00	39.65	Average	H	33.50	8.08	45.08	0.46	36.61	54.00	17.39
	4874.00	50.23	Peak	V	33.50	8.08	45.08	-	46.73	74.00	27.27
	4874.00	40.03	Average	V	33.50	8.08	45.08	0.46	36.99	54.00	17.01
High ch. Harmonic	4904.00	49.54	Peak	H	33.30	8.14	45.03	-	45.95	74.00	28.05
	4904.00	39.75	Average	H	33.30	8.14	45.03	0.46	36.62	54.00	17.38
	4904.00	49.47	Peak	V	33.30	8.14	45.03	-	45.88	74.00	28.12
	4904.00	39.92	Average	V	33.30	8.14	45.03	0.46	36.79	54.00	17.21

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. 484 Tone

-. 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 : 89.70 %

-. Result : PASSED

Tone	Channel	RU Index
484	3	65
	6	65
	9	65

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4844.00	48.91	Peak	H	33.40	7.91	45.10	-	45.12	74.00	28.88
	4844.00	39.58	Average	H	33.40	7.91	45.10	0.47	36.26	54.00	17.74
	4844.00	50.43	Peak	V	33.40	7.91	45.10	-	46.64	74.00	27.36
	4844.00	40.05	Average	V	33.40	7.91	45.10	0.47	36.73	54.00	17.27
Middle ch. Harmonic	4874.00	49.30	Peak	H	33.50	8.08	45.08	-	45.80	74.00	28.20
	4874.00	39.78	Average	H	33.50	8.08	45.08	0.47	36.75	54.00	17.25
	4874.00	50.16	Peak	V	33.50	8.08	45.08	-	46.66	74.00	27.34
	4874.00	40.09	Average	V	33.50	8.08	45.08	0.47	37.06	54.00	16.94
High ch. Harmonic	4904.00	50.58	Peak	H	33.30	8.14	45.03	-	46.99	74.00	27.01
	4904.00	39.90	Average	H	33.30	8.14	45.03	0.47	36.78	54.00	17.22
	4904.00	50.09	Peak	V	33.30	8.14	45.03	-	46.50	74.00	27.50
	4904.00	40.07	Average	V	33.30	8.14	45.03	0.47	36.95	54.00	17.05

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

-. Singgle user

-. 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 : 97.18 %

-. Result : PASSED

Tone	Channel	RU Index
SU	3	-
	6	-
	9	-

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	AMP Factor	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
Low ch. Harmonic	4844.00	49.49	Peak	H	33.40	7.91	45.10	-	45.70	74.00	28.30
	4844.00	39.80	Average	H	33.40	7.91	45.10	0.12	36.13	54.00	17.87
	4844.00	50.67	Peak	V	33.40	7.91	45.10	-	46.88	74.00	27.12
	4844.00	40.27	Average	V	33.40	7.91	45.10	0.12	36.60	54.00	17.40
Middle ch. Harmonic	4874.00	49.66	Peak	H	33.50	8.08	45.08	-	46.16	74.00	27.84
	4874.00	39.95	Average	H	33.50	8.08	45.08	0.12	36.57	54.00	17.43
	4874.00	49.52	Peak	V	33.50	8.08	45.08	-	46.02	74.00	27.98
	4874.00	40.09	Average	V	33.50	8.08	45.08	0.12	36.71	54.00	17.29
High ch. Harmonic	4904.00	49.57	Peak	H	33.30	8.14	45.03	-	45.98	74.00	28.02
	4904.00	39.75	Average	H	33.30	8.14	45.03	0.12	36.28	54.00	17.72
	4904.00	49.82	Peak	V	33.30	8.14	45.03	-	46.23	74.00	27.77
	4904.00	40.14	Average	V	33.30	8.14	45.03	0.12	36.67	54.00	17.33

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

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

Total Level = Reading + Antenna Factor + Cable Loss + Duty Factor - Amp Factor

Spurious emission (Test Data above 1 GHz except for harmonic)

Channel	Frequency (GHz)	Reading (dBuV)	Detector Mode	Ant. Pol. (H/V)	Ant. Factor	Cable Loss	Amp Gain	Duty Factor	Total (dBuV/m)	Limits (dBuV/m)	Margin (dB)
	It was not observed any emissions from the EUT.										

10. PEAK POWER SPECTRAL DENSITY

10.1 Operating environment

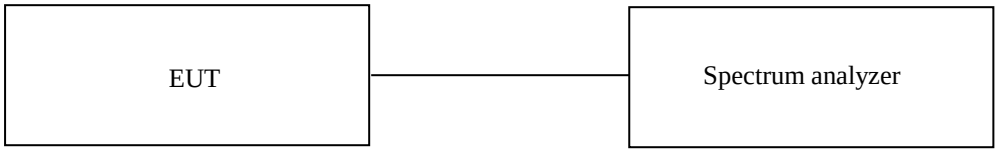
Temperature : 23 °C

Relative humidity : 45 % 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 kHz ≤ RBW ≤ 100 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 802.11 ax(HE20) WLAN Mode

10.4.1 Test data for Antenna 0

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power Spectrul Density (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-19.06	-22.02	-23.55	-	-
			Mid	-17.73	-20.18	-	-25.77	-25.69
			High	-18.32	-21.41	-23.02	-	-
	2437	6	Low	-15.70	-19.02	-21.64	-	-
			Mid	-15.89	-18.29	-	-22.41	-21.97
			High	-13.08	-16.41	-19.39	-	-
	2462	11	Low	-14.86	-16.81	-20.08	-	-
			Mid	-15.97	-17.60	-	-27.60	-27.13
			High	-16.36	-18.10	-20.77	-	-

Remark. Limit : 8 dBm

10.4.2 Test data for Antenna 1

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power Spectrul Density (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-18.14	-21.10	-23.82	-	-
			Mid	-18.45	-20.50	-	-26.69	-26.80
			High	-18.09	-20.86	-23.44	-	-
	2437	6	Low	-13.75	-16.73	-19.56	-	-
			Mid	-14.23	-16.48	-	-22.22	-21.90
			High	-13.39	-16.31	-19.47	-	-
	2462	11	Low	-15.08	-17.11	-20.06	-	-
			Mid	-15.78	-16.56	-	-26.80	-27.24
			High	-15.30	-16.49	-19.50	-	-

Remark. Limit : 8 dBm

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10.4.3 Test data for Multiple Transmit

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power Spectrul Density (dBm)				
				26 T	52 T	106 T	242 T	SU
HE20	2412	1	Low	-15.56	-18.52	-20.67	-	-
			Mid	-15.06	-17.33	-	-23.20	-23.20
			High	-15.19	-18.12	-20.22	-	-
	2437	6	Low	-11.60	-14.71	-17.47	-	-
			Mid	-11.97	-14.28	-	-19.31	-18.93
			High	-10.22	-13.35	-16.42	-	-
	2462	11	Low	-11.96	-13.95	-17.06	-	-
			Mid	-12.86	-14.04	-	-24.17	-24.18
			High	-12.79	-14.21	-17.08	-	-

Remark. Limit : 8 dBm

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10.5 Test data for 802.11 ax(HE40) WLAN Mode

10.5.1 Test data for Antenna 0

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power Spectrul Density (dBm)					
				26 T	52 T	106 T	242 T	484 T	SU
HE20	2412	1	Low	-18.72	-20.39	-23.31	-26.32	-	-
			Mid	-18.11	-19.98	-22.30	-	-30.66	-29.44
			High	-18.15	-20.92	-23.78	-28.02	-	-
	2437	6	Low	-17.14	-20.03	-22.55	-25.98	-	-
			Mid	-18.00	-20.60	-23.59	-	-26.65	-24.88
			High	-14.92	-17.31	-20.06	-23.73	-	-
	2462	11	Low	-20.12	-21.12	-24.01	-26.43	-	-
			Mid	-16.46	-18.07	-21.28	-	-30.33	-30.84
			High	-18.28	-19.78	-22.59	-26.88	-	-

Remark. Limit : 8 dBm

10.5.2 Test data for Antenna 1

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power Spectrul Density (dBm)					
				26 T	52 T	106 T	242 T	484 T	SU
HE20	2412	1	Low	-17.58	-19.94	-22.80	-26.84	-	-
			Mid	-17.23	-19.46	-22.36	-	-30.43	-28.99
			High	-16.77	-19.04	-21.97	-26.42	-	-
	2437	6	Low	-16.36	-18.57	-21.44	-24.09	-	-
			Mid	-15.90	-17.89	-21.01	-	-26.93	-25.59
			High	-15.19	-17.59	-20.68	-24.06	-	-
	2462	11	Low	-17.78	-19.03	-22.07	-26.80	-	-
			Mid	-17.35	-18.78	-21.79	-	-30.52	-31.03
			High	-17.16	-18.48	-22.45	-26.75	-	-

Remark. Limit : 8 dBm

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10.5.3 Test data for Multiple Transmit

-. Test Result : Pass

BW	Frequency [MHz]	Channel No.	RU Index	Peak Power Spectrul Density (dBm)					
				26 T	52 T	106 T	242 T	484 T	SU
HE20	2412	1	Low	-15.10	-17.15	-20.03	-23.56	-	-
			Mid	-14.63	-16.70	-19.32	-	-27.53	-26.19
			High	-14.39	-16.87	-19.77	-24.13	-	-
	2437	6	Low	-13.72	-16.23	-18.95	-21.92	-	-
			Mid	-13.81	-16.03	-19.10	-	-23.78	-22.21
			High	-12.04	-14.44	-17.35	-20.88	-	-
	2462	11	Low	-15.78	-16.94	-19.92	-23.60	-	-
			Mid	-13.87	-15.40	-18.51	-	-27.41	-27.92
			High	-14.67	-16.07	-19.51	-23.80	-	-

Remark. Limit : 8 dBm

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11. RADIATED EMISSION TEST

11.1 Operating environment

Temperature : 23 °C

Relative humidity : 45 % R.H.

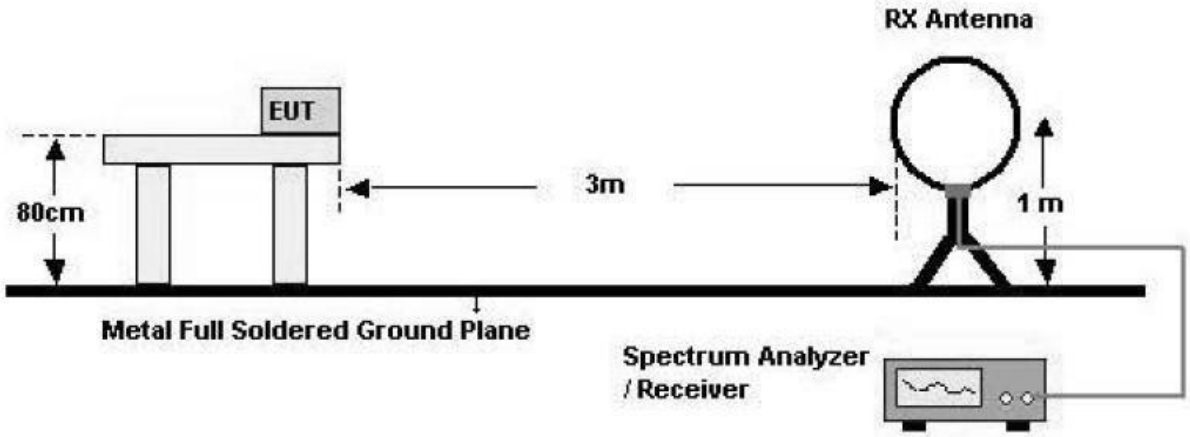
11.2 Test set-up

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.

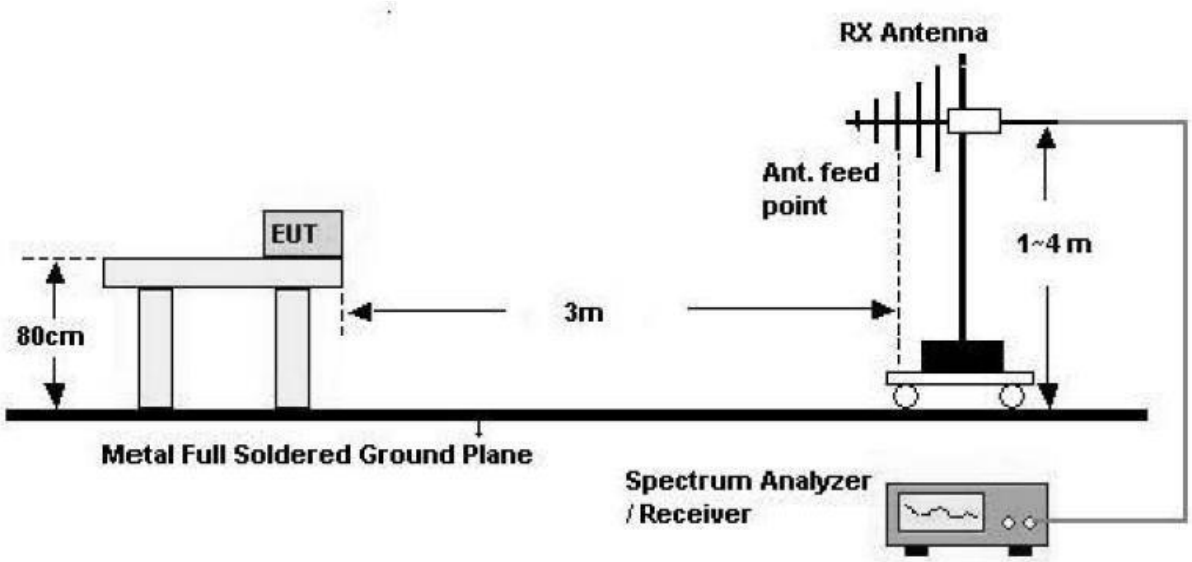
The frequency spectrum from 30 MHz to 26.5 GHz was scanned and emission levels maximized at each frequency recorded. The system was rotated 360°, and the antenna was varied in height between 1.0 m and 4.0 m in order to determine the maximum emission levels. This procedure was performed for both horizontal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

- Test Configuration

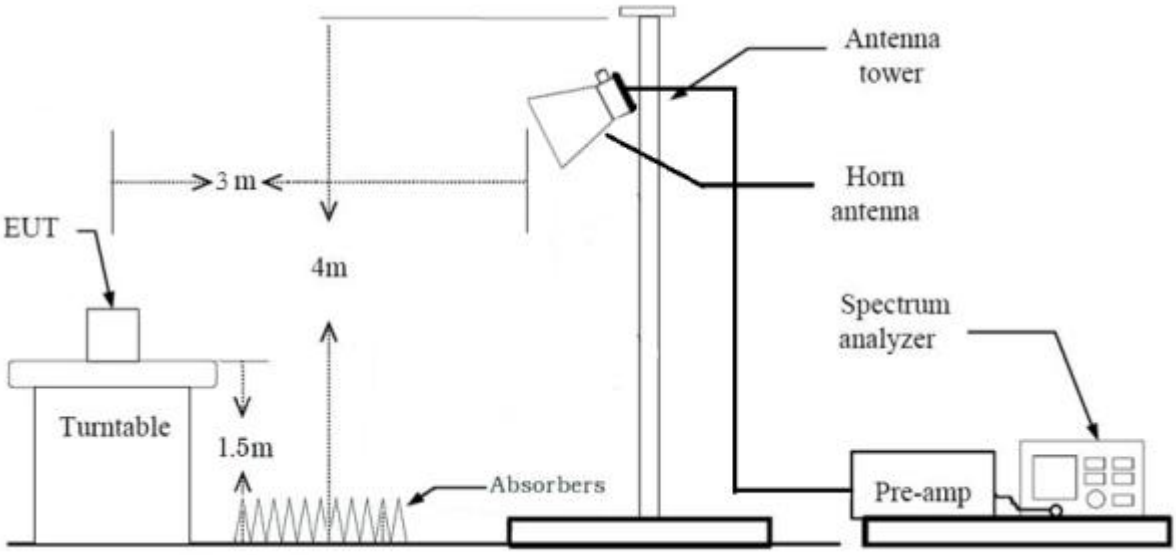
1. Below 30 MHz



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

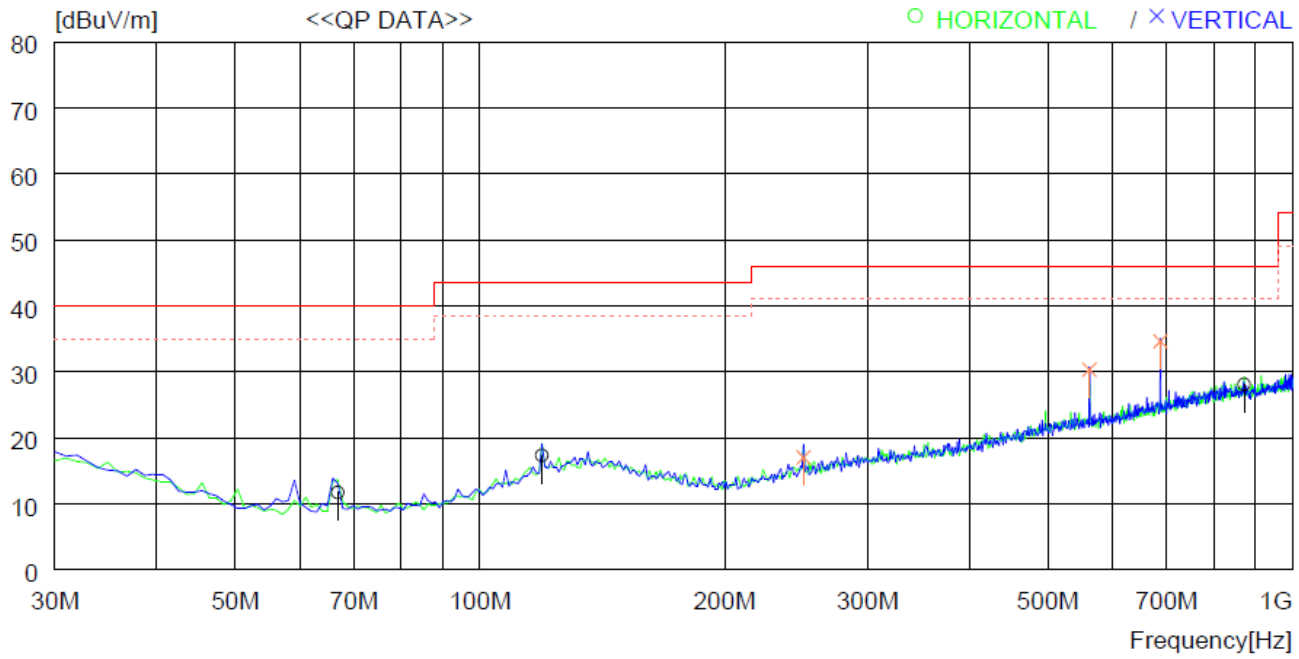
11.4.1 Test data for WLAN 2 GHz AX Mode

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 [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	66.860	29.5	12.6	1.6	32.0	11.7	40.0	28.3	100	343
2	119.240	28.9	18.5	2.0	32.1	17.3	43.5	26.2	200	0
3	871.950	27.6	27.4	5.2	32.1	28.1	46.0	17.9	100	27
----- Vertical ------										
4	250.190	28.6	17.8	2.8	32.2	17.0	46.0	29.0	100	132
5	562.529	34.8	23.8	4.1	32.4	30.3	46.0	15.7	100	359
6	687.655	37.0	25.4	4.6	32.4	34.6	46.0	11.4	100	359

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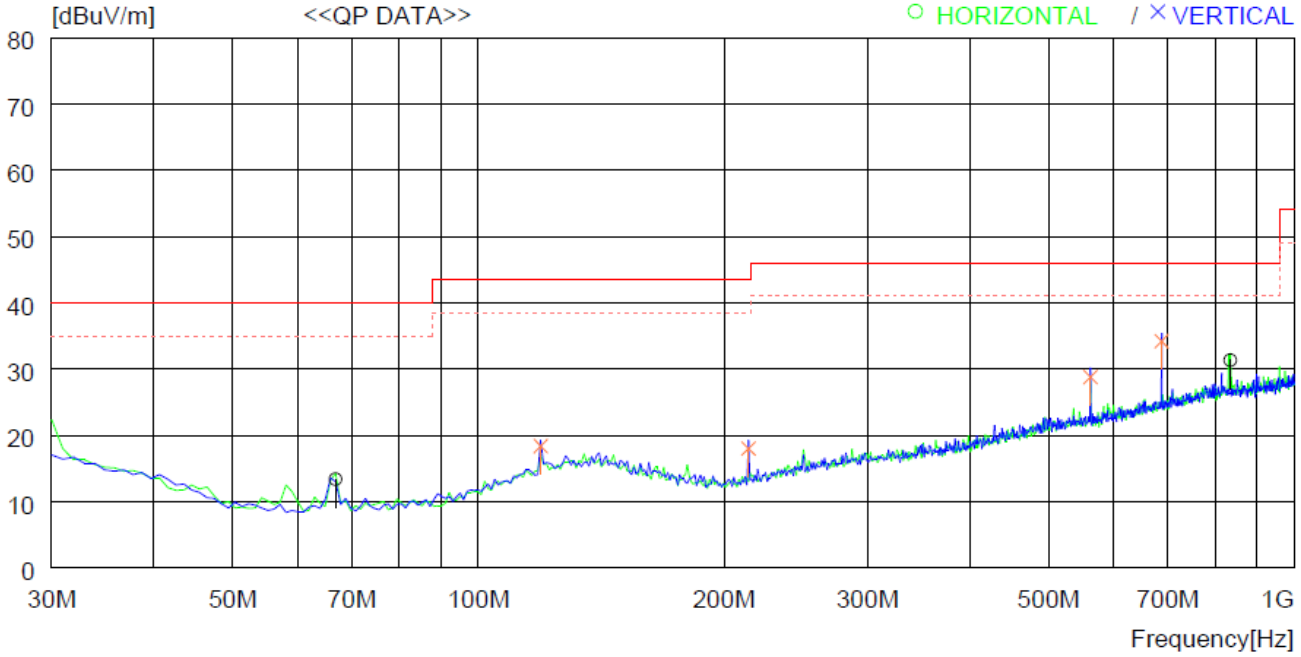
11.4.2 Test data for Intermodulation Mode(WLAN 2 GHz AX Mode + Bluetooth)

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	66.860	31.2	12.6	1.6	32.0	13.4	40.0	26.6	100	359
2	835.091	31.2	27.2	5.1	32.2	31.3	46.0	14.7	200	0
----- Vertical ------										
3	119.240	30.0	18.5	2.0	32.1	18.4	43.5	25.1	200	234
4	214.300	31.4	16.2	2.5	32.1	18.0	43.5	25.5	100	359
5	562.529	33.3	23.8	4.1	32.4	28.8	46.0	17.2	100	359
6	687.655	36.6	25.4	4.6	32.4	34.2	46.0	11.8	100	359

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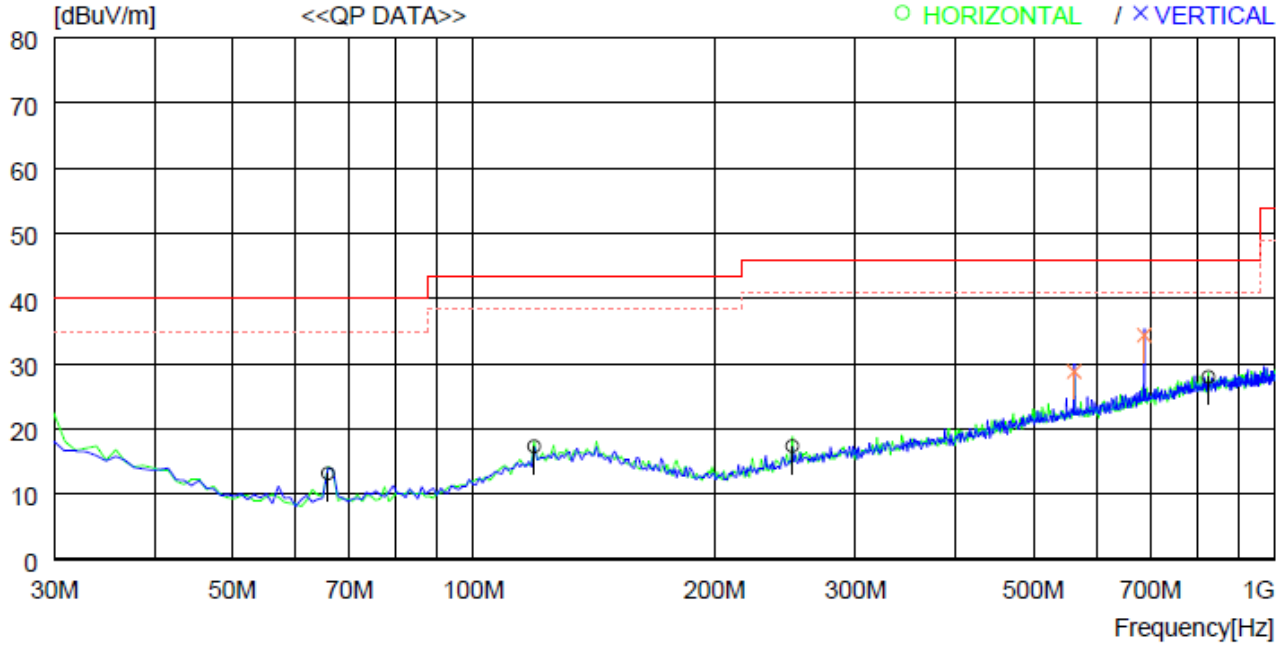
11.4.3 Test data for Intermodulation Mode(WLAN 2 GHz AX Mode + Bluetooth LE)

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	65.890	31.1	12.6	1.5	32.0	13.2	40.0	26.8	100	228
2	119.240	28.9	18.5	2.0	32.1	17.3	43.5	26.2	200	59
3	250.190	29.0	17.8	2.8	32.2	17.4	46.0	28.6	200	359
4	827.331	28.0	27.2	5.0	32.2	28.0	46.0	18.0	200	252
----- Vertical ------										
5	562.529	33.3	23.8	4.1	32.4	28.8	46.0	17.2	100	359
6	687.655	36.8	25.4	4.6	32.4	34.4	46.0	11.6	100	138

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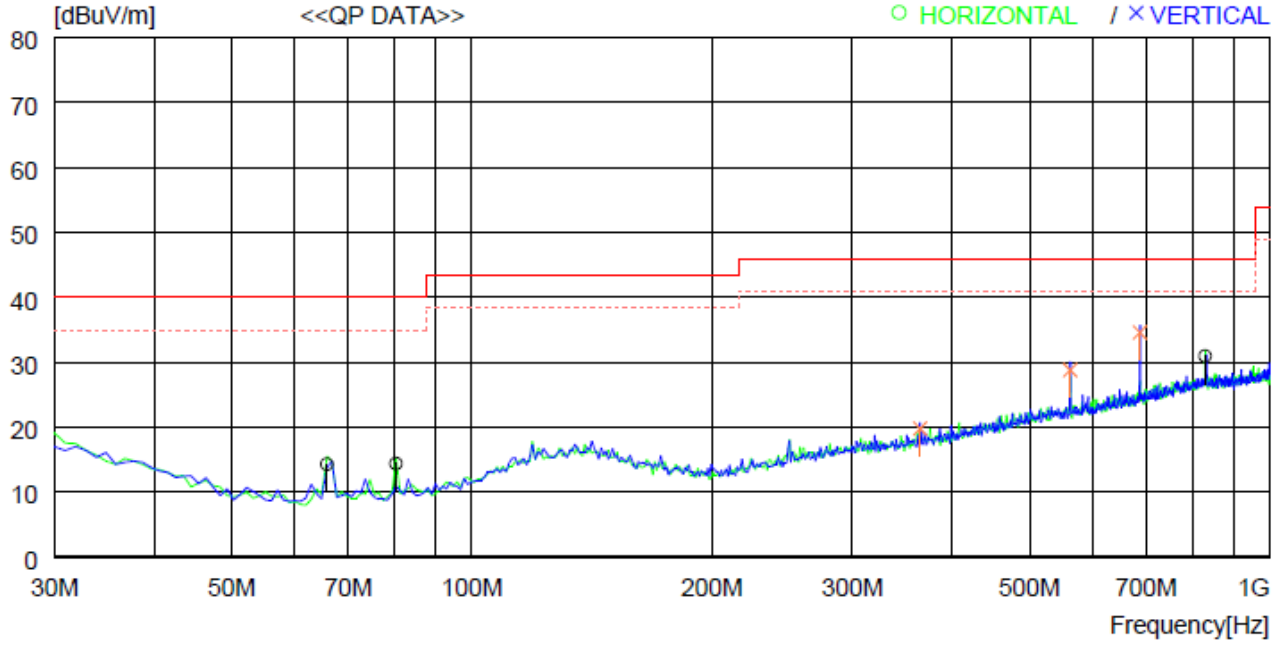
11.4.4 Test data for Intermodulation Mode(WLAN 2 GHz AX Mode + WLAN 5 GHz AX Mode)

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 3 m



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	65.890	32.2	12.6	1.5	32.0	14.3	40.0	25.7	100	359
2	80.440	31.8	12.9	1.7	32.0	14.4	40.0	25.6	100	359
3	830.241	30.9	27.2	5.1	32.2	31.0	46.0	15.0	200	314
----- Vertical ------										
4	364.650	28.5	20.2	3.3	32.2	19.8	46.0	26.2	100	264
5	562.529	33.3	23.8	4.1	32.4	28.8	46.0	17.2	100	359
6	687.655	37.0	25.4	4.6	32.4	34.6	46.0	11.4	100	359

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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 (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.									

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 (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. CONDUCTED EMISSION TEST

12.1 Operating environment

Temperature	:	23 °C
Relative humidity	:	45 % 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 Ω / 50 μH + 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.

12.3 Test Date

December 05, 2021 ~ March 08, 2022

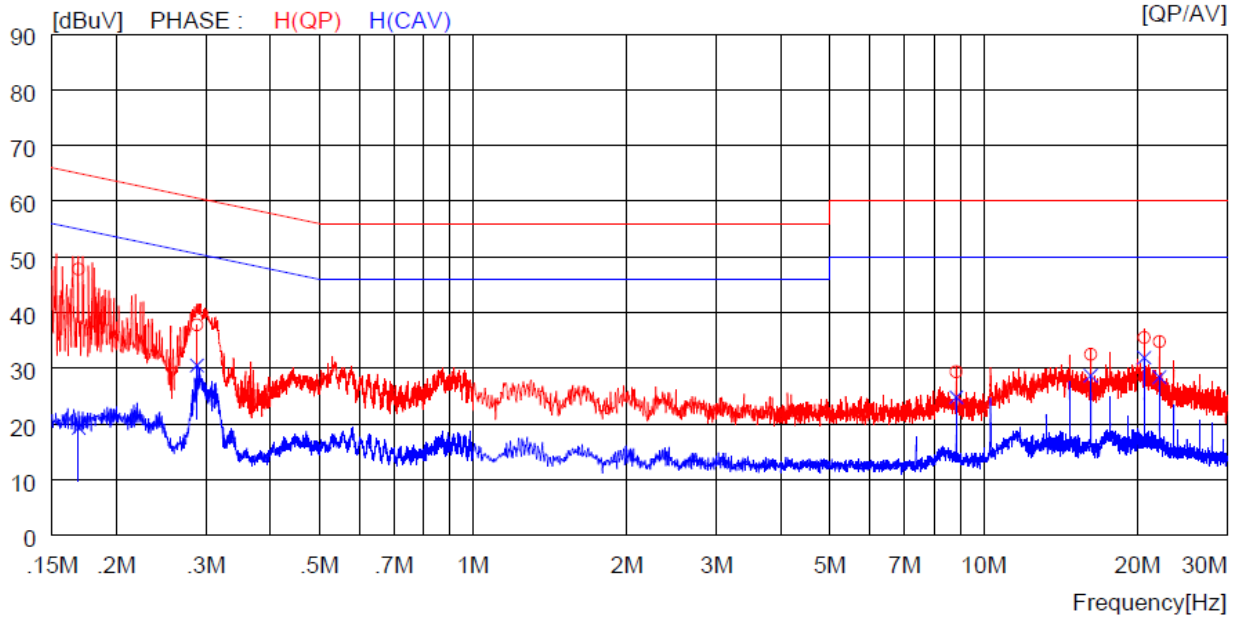
12.4 Test data for WLAN 2 GHz AX Mode

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : LIVE LINE

-. Antenna 0, Antenna 1 and Multiple transmit tested, but the worst data were recorded.



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16900	37.8	----	10.0	47.8	----	65.0	----	17.2	----	H(QP)
2	0.28800	27.8	----	10.0	37.8	----	60.6	----	22.8	----	H(QP)
3	8.84500	19.2	----	10.2	29.4	----	60.0	----	30.6	----	H(QP)
4	16.21000	22.2	----	10.3	32.5	----	60.0	----	27.5	----	H(QP)
5	20.63000	25.1	----	10.4	35.5	----	60.0	----	24.5	----	H(QP)
6	22.10000	24.4	----	10.4	34.8	----	60.0	----	25.2	----	H(QP)
7	0.16900	----	9.3	10.0	----	19.3	----	55.0	----	35.7	H(CAV)
8	0.28800	----	20.5	10.0	----	30.5	----	50.6	----	20.1	H(CAV)
9	8.84500	----	14.6	10.2	----	24.8	----	50.0	----	25.2	H(CAV)
10	16.21000	----	18.4	10.3	----	28.7	----	50.0	----	21.3	H(CAV)
11	20.63000	----	21.5	10.4	----	31.9	----	50.0	----	18.1	H(CAV)
12	22.10000	----	18.0	10.4	----	28.4	----	50.0	----	21.6	H(CAV)

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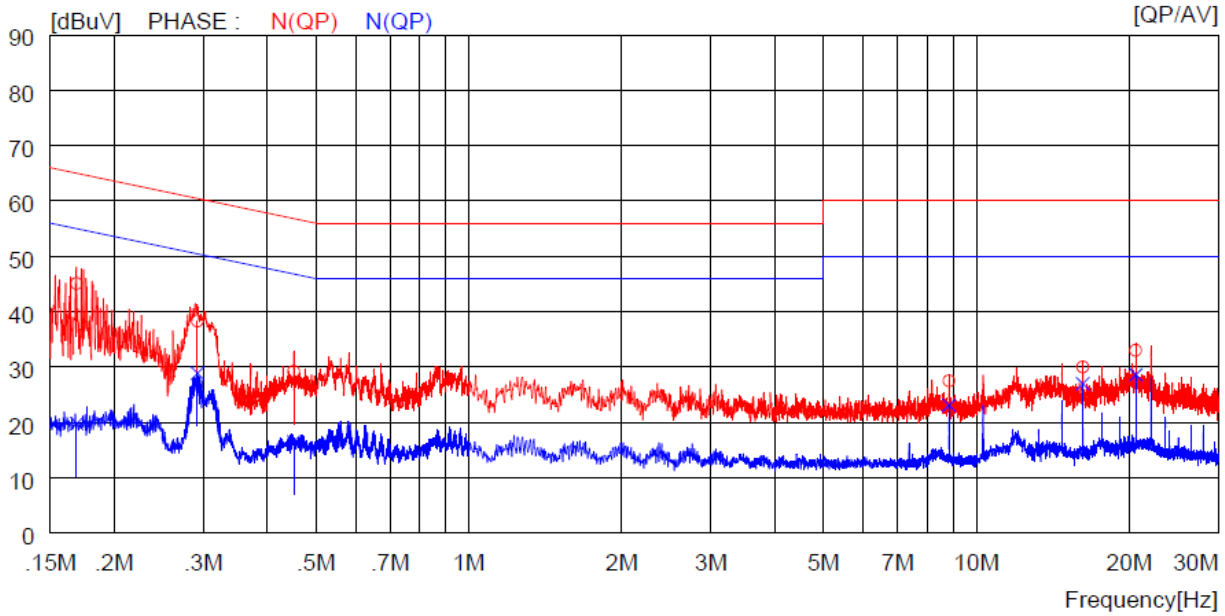
-. Tested Line : NEUTRAL LINE

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 QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16900	35.1	----	10.0	45.1	----	65.0	----	19.9	----	N(QP)
2	0.29200	28.3	----	10.0	38.3	----	60.5	----	22.2	----	N(QP)
3	0.45200	19.2	----	10.0	29.2	----	56.8	----	27.6	----	N(QP)
4	8.84000	17.3	----	10.2	27.5	----	60.0	----	32.5	----	N(QP)
5	16.21000	19.7	----	10.3	30.0	----	60.0	----	30.0	----	N(QP)
6	20.62000	22.6	----	10.4	33.0	----	60.0	----	27.0	----	N(QP)
7	0.16900	----	9.8	10.0	----	19.8	----	55.0	----	35.2	N(CAV)
8	0.29200	----	18.9	10.0	----	28.9	----	50.5	----	21.6	N(CAV)
9	0.45200	----	6.5	10.0	----	16.5	----	46.8	----	30.3	N(CAV)
10	8.84000	----	12.9	10.2	----	23.1	----	50.0	----	26.9	N(CAV)
11	16.21000	----	16.7	10.3	----	27.0	----	50.0	----	23.0	N(CAV)
12	20.62000	----	18.2	10.4	----	28.6	----	50.0	----	21.4	N(CAV)

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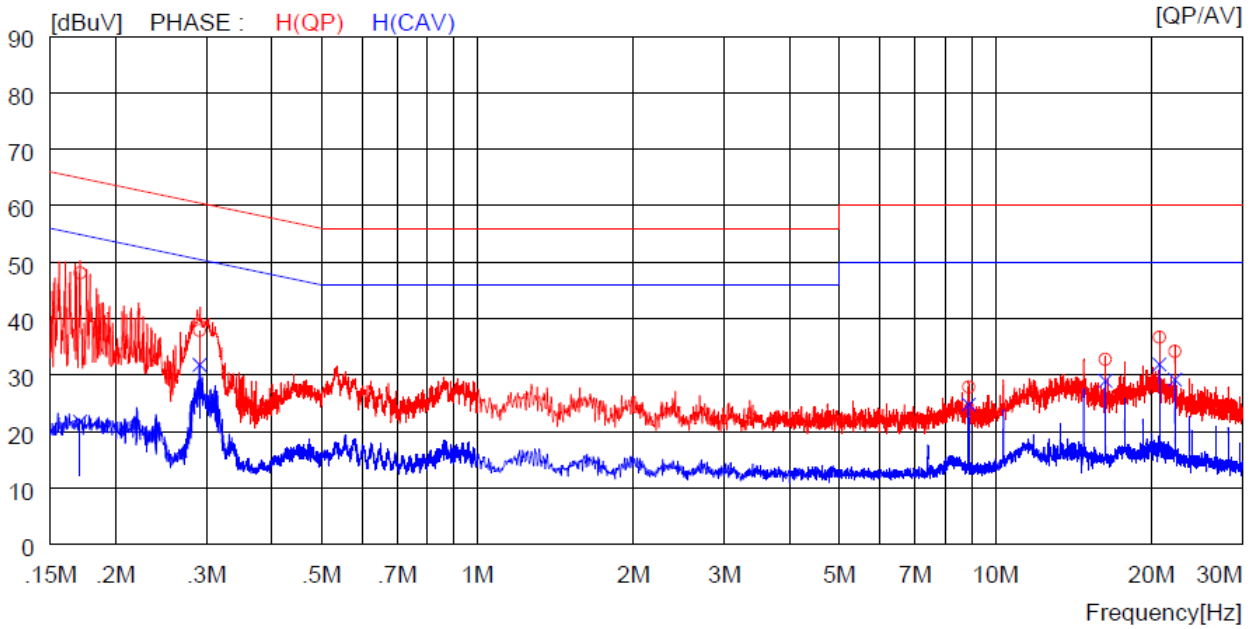
12.5 Test data for Intermodulation Mode(WLAN 2 GHz AX Mode + Bluetooth)

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : LIVE LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.17100	38.1	----	10.0	48.1	----	64.9	----	16.8	----	H(QP)
2	0.29100	27.9	----	10.0	37.9	----	60.5	----	22.6	----	H(QP)
3	8.89000	17.7	----	10.2	27.9	----	60.0	----	32.1	----	H(QP)
4	16.30000	22.5	----	10.3	32.8	----	60.0	----	27.2	----	H(QP)
5	20.74000	26.3	----	10.4	36.7	----	60.0	----	23.3	----	H(QP)
6	22.22000	23.8	----	10.4	34.2	----	60.0	----	25.8	----	H(QP)
7	0.17100	----	11.8	10.0	----	21.8	----	54.9	----	33.1	H(CAV)
8	0.29100	----	21.8	10.0	----	31.8	----	50.5	----	18.7	H(CAV)
9	8.89000	----	14.6	10.2	----	24.8	----	50.0	----	25.2	H(CAV)
10	16.30000	----	18.7	10.3	----	29.0	----	50.0	----	21.0	H(CAV)
11	20.74000	----	21.5	10.4	----	31.9	----	50.0	----	18.1	H(CAV)
12	22.22000	----	18.8	10.4	----	29.2	----	50.0	----	20.8	H(CAV)

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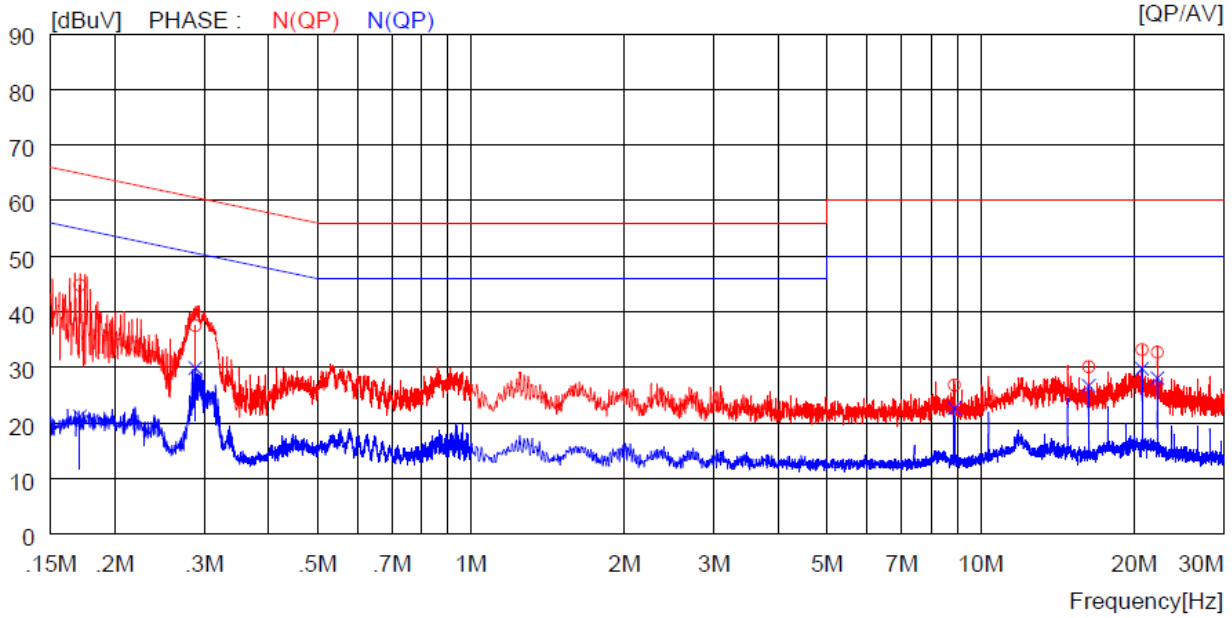
-. Tested Line : NEUTRAL LINE

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 QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.17100	34.8	----	10.0	44.8	----	64.9	----	20.1	----	N(QP)
2	0.28800	27.5	----	10.0	37.5	----	60.6	----	23.1	----	N(QP)
3	8.89000	16.6	----	10.2	26.8	----	60.0	----	33.2	----	N(QP)
4	16.30000	19.8	----	10.3	30.1	----	60.0	----	29.9	----	N(QP)
5	20.74000	22.8	----	10.4	33.2	----	60.0	----	26.8	----	N(QP)
6	22.22000	22.3	----	10.4	32.7	----	60.0	----	27.3	----	N(QP)
7	0.17100	----	11.2	10.0	----	21.2	----	54.9	----	33.7	N(CAV)
8	0.28800	----	19.9	10.0	----	29.9	----	50.6	----	20.7	N(CAV)
9	8.89000	----	12.5	10.2	----	22.7	----	50.0	----	27.3	N(CAV)
10	16.30000	----	16.4	10.3	----	26.7	----	50.0	----	23.3	N(CAV)
11	20.74000	----	19.4	10.4	----	29.8	----	50.0	----	20.2	N(CAV)
12	22.22000	----	17.7	10.4	----	28.1	----	50.0	----	21.9	N(CAV)

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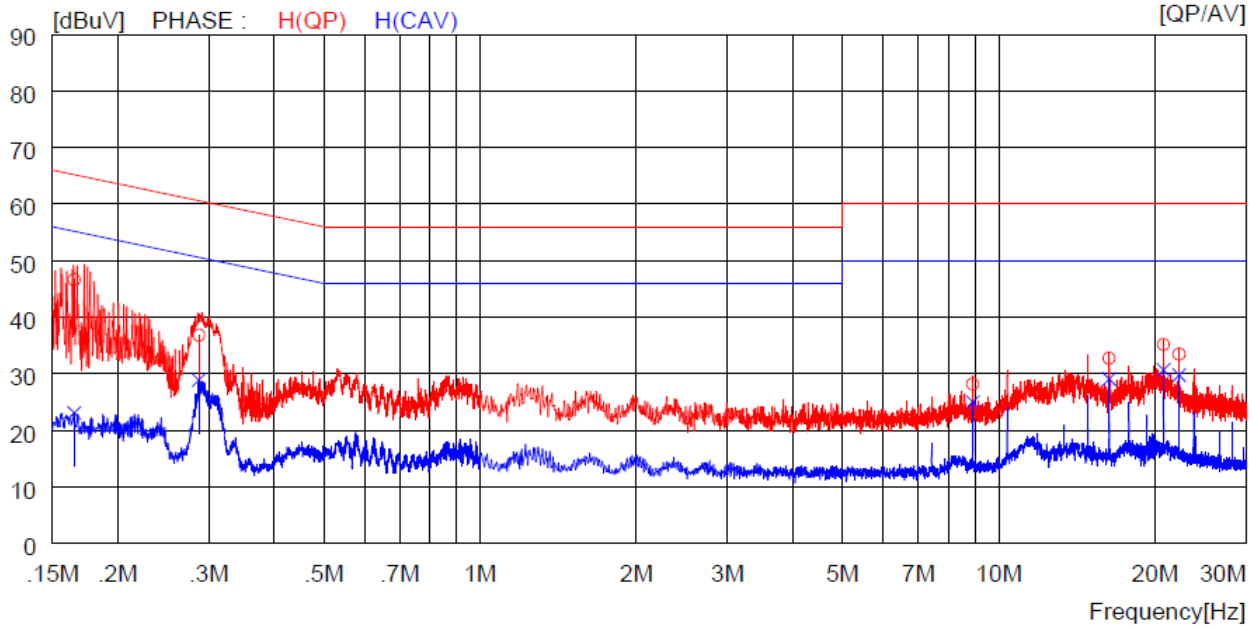
12.6 Test data for Intermodulation Mode(WLAN 2 GHz AX Mode + Bluetooth LE)

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : LIVE LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16500	36.6	----	10.0	46.6	----	65.2	----	18.6	----	H(QP)
2	0.28700	26.8	----	10.0	36.8	----	60.6	----	23.8	----	H(QP)
3	8.91000	18.0	----	10.2	28.2	----	60.0	----	31.8	----	H(QP)
4	16.33000	22.4	----	10.3	32.7	----	60.0	----	27.3	----	H(QP)
5	20.78000	24.8	----	10.4	35.2	----	60.0	----	24.8	----	H(QP)
6	22.27000	23.1	----	10.4	33.5	----	60.0	----	26.5	----	H(QP)
7	0.16500	----	13.1	10.0	----	23.1	----	55.2	----	32.1	H(CAV)
8	0.28700	----	18.9	10.0	----	28.9	----	50.6	----	21.7	H(CAV)
9	8.91000	----	14.8	10.2	----	25.0	----	50.0	----	25.0	H(CAV)
10	16.33000	----	18.8	10.3	----	29.1	----	50.0	----	20.9	H(CAV)
11	20.78000	----	20.3	10.4	----	30.7	----	50.0	----	19.3	H(CAV)
12	22.27000	----	19.4	10.4	----	29.8	----	50.0	----	20.2	H(CAV)

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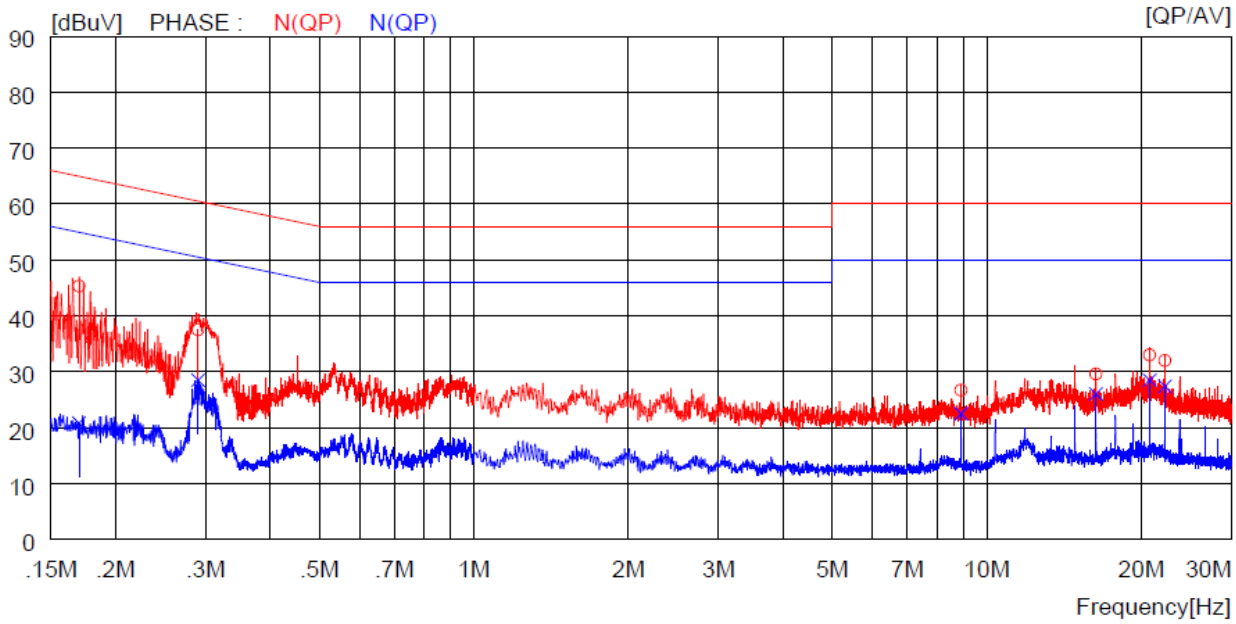
-. Tested Line : NEUTRAL LINE

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 QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.17000	35.3	----	10.0	45.3	----	65.0	----	19.7	----	N(QP)
2	0.29000	27.5	----	10.0	37.5	----	60.5	----	23.0	----	N(QP)
3	8.91000	16.5	----	10.2	26.7	----	60.0	----	33.3	----	N(QP)
4	16.33000	19.3	----	10.3	29.6	----	60.0	----	30.4	----	N(QP)
5	20.78000	22.6	----	10.4	33.0	----	60.0	----	27.0	----	N(QP)
6	22.26000	21.6	----	10.4	32.0	----	60.0	----	28.0	----	N(QP)
7	0.17000	----	10.8	10.0	----	20.8	----	55.0	----	34.2	N(CAV)
8	0.29000	----	18.5	10.0	----	28.5	----	50.5	----	22.0	N(CAV)
9	8.91000	----	12.3	10.2	----	22.5	----	50.0	----	27.5	N(CAV)
10	16.33000	----	15.8	10.3	----	26.1	----	50.0	----	23.9	N(CAV)
11	20.78000	----	18.1	10.4	----	28.5	----	50.0	----	21.5	N(CAV)
12	22.26000	----	17.0	10.4	----	27.4	----	50.0	----	22.6	N(CAV)

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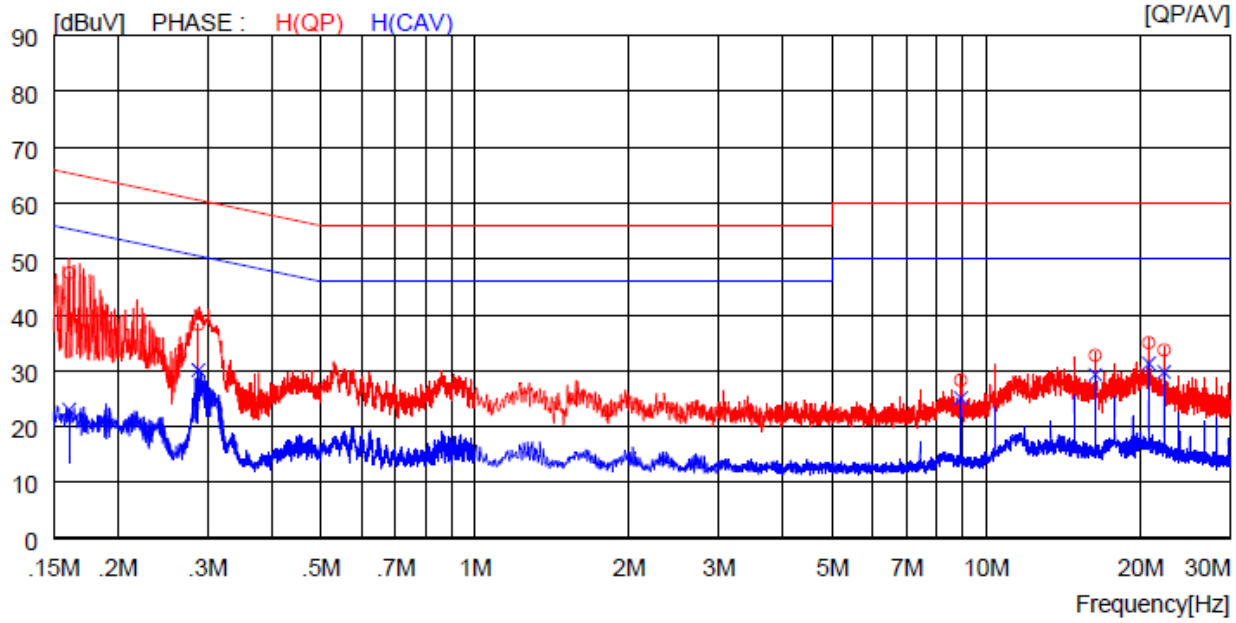
12.7 Test data for Intermodulation Mode(WLAN 2 GHz AX Mode + WLAN 5 GHz AX Mode)

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : LIVE LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16100	37.5	----	10.0	47.5	----	65.4	----	17.9	----	H(QP)
2	0.28800	28.3	----	10.0	38.3	----	60.6	----	22.3	----	H(QP)
3	8.91500	18.1	----	10.2	28.3	----	60.0	----	31.7	----	H(QP)
4	16.34000	22.4	----	10.3	32.7	----	60.0	----	27.3	----	H(QP)
5	20.79000	24.6	----	10.4	35.0	----	60.0	----	25.0	----	H(QP)
6	22.28000	23.3	----	10.4	33.7	----	60.0	----	26.3	----	H(QP)
7	0.16100	----	13.0	10.0	----	23.0	----	55.4	----	32.4	H(CAV)
8	0.28800	----	20.1	10.0	----	30.1	----	50.6	----	20.5	H(CAV)
9	8.91500	----	14.9	10.2	----	25.1	----	50.0	----	24.9	H(CAV)
10	16.34000	----	19.0	10.3	----	29.3	----	50.0	----	20.7	H(CAV)
11	20.79000	----	20.9	10.4	----	31.3	----	50.0	----	18.7	H(CAV)
12	22.28000	----	19.4	10.4	----	29.8	----	50.0	----	20.2	H(CAV)

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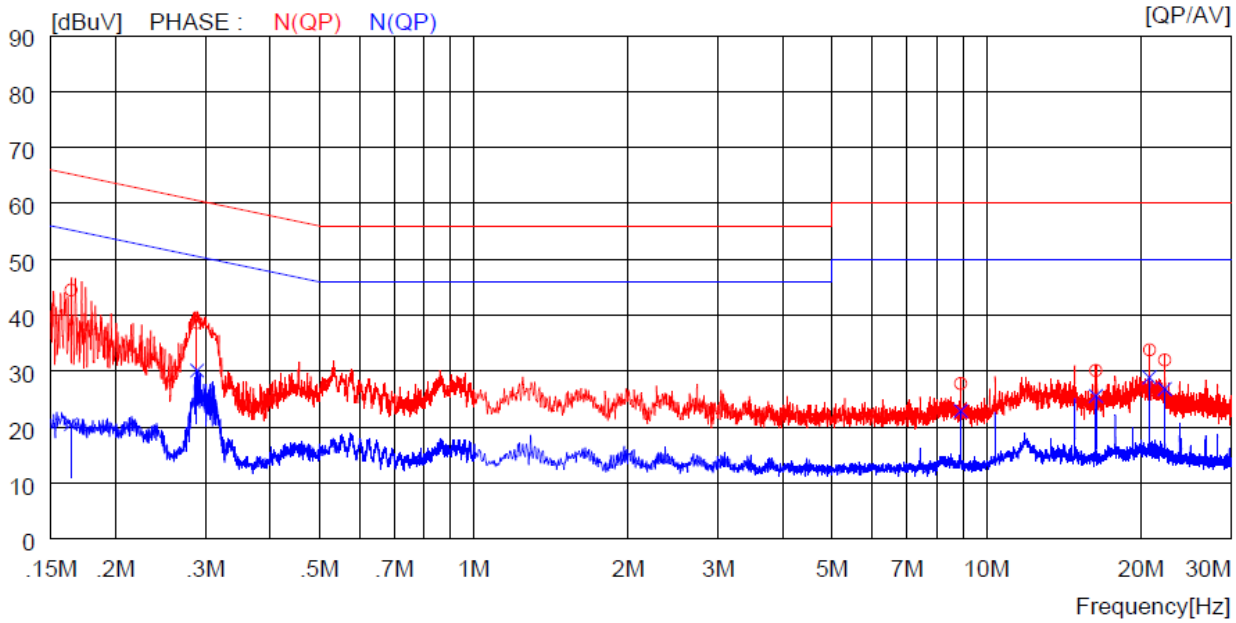
-. Tested Line : NEUTRAL LINE

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 QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.16400	34.5	----	10.0	44.5	----	65.3	----	20.8	----	N(QP)
2	0.28900	28.7	----	10.0	38.7	----	60.6	----	21.9	----	N(QP)
3	8.91500	17.6	----	10.2	27.8	----	60.0	----	32.2	----	N(QP)
4	16.35000	19.8	----	10.3	30.1	----	60.0	----	29.9	----	N(QP)
5	20.80000	23.4	----	10.4	33.8	----	60.0	----	26.2	----	N(QP)
6	22.29000	21.6	----	10.4	32.0	----	60.0	----	28.0	----	N(QP)
7	0.16400	----	10.5	10.0	----	20.5	----	55.3	----	34.8	N(CAV)
8	0.28900	----	20.1	10.0	----	30.1	----	50.6	----	20.5	N(CAV)
9	8.91500	----	12.7	10.2	----	22.9	----	50.0	----	27.1	N(CAV)
10	16.35000	----	15.3	10.3	----	25.6	----	50.0	----	24.4	N(CAV)
11	20.80000	----	18.5	10.4	----	28.9	----	50.0	----	21.1	N(CAV)
12	22.29000	----	16.4	10.4	----	26.8	----	50.0	----	23.2	N(CAV)

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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)

All test equipment used is calibrated on a regular basis.

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