

FCC Test Report

Report No.: RFBCKS-WTW-P20110426-2

FCC ID: K7S-03685

Test Model: MX8500

Series Model: MX85EC, MX85WH, MX85MS

Received Date: Nov. 12, 2020

Test Date: Nov. 19 to Dec. 13, 2020

Issued Date: Mar. 04, 2021

Applicant: Belkin International, Inc.

Address: 12045 East Waterfront Drive, Playa Vista, CA 90094

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan

**FCC Registration /
Designation Number:** 723255 / TW2022



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

Release Control Record	4
1 Certificate of Conformity.....	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information.....	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	14
3.5 General Description of Applied Standards and References	15
4 Test Types and Results	16
4.1 Radiated Emission and Bandedge Measurement.....	16
4.1.1 Limits of Radiated Emission and Bandedge Measurement	16
4.1.2 Test Instruments	17
4.1.3 Test Procedures.....	20
4.1.4 Deviation from Test Standard	20
4.1.5 Test Setup.....	21
4.1.6 EUT Operating Conditions.....	22
4.1.7 Test Results	23
4.2 Conducted Emission Measurement	37
4.2.1 Limits of Conducted Emission Measurement	37
4.2.2 Test Instruments	37
4.2.3 Test Procedures.....	38
4.2.4 Deviation from Test Standard	38
4.2.5 Test Setup.....	38
4.2.6 EUT Operating Conditions.....	38
4.2.7 Test Results	39
4.3 6dB Bandwidth Measurement	41
4.3.1 Limits of 6dB Bandwidth Measurement	41
4.3.2 Test Setup.....	41
4.3.3 Test Instruments	41
4.3.4 Test Procedure	41
4.3.5 Deviation from Test Standard	41
4.3.6 EUT Operating Conditions.....	41
4.3.7 Test Result.....	42
4.4 Conducted Output Power Measurement.....	44
4.4.1 Limits of Conducted Output Power Measurement	44
4.4.2 Test Setup.....	44
4.4.3 Test Instruments	44
4.4.4 Test Procedures.....	44
4.4.5 Deviation from Test Standard	44
4.4.6 EUT Operating Conditions.....	44
4.4.7 Test Results	45
4.5 Power Spectral Density Measurement.....	47
4.5.1 Limits of Power Spectral Density Measurement	47
4.5.2 Test Setup.....	47
4.5.3 Test Instruments	47
4.5.4 Test Procedure	47
4.5.5 Deviation from Test Standard	47
4.5.6 EUT Operating Condition	47

4.5.7 Test Results	48
4.6 Conducted Out of Band Emission Measurement	50
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	50
4.6.2 Test Setup.....	50
4.6.3 Test Instruments	50
4.6.4 Test Procedure	50
4.6.5 Deviation from Test Standard	50
4.6.6 EUT Operating Condition	50
4.6.7 Test Results	50
5 Pictures of Test Arrangements.....	67
Annex A - Band-Edge Measurement.....	68
Appendix – Information of the Testing Laboratories	72

Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P20110426-2	Original release.	Mar. 04, 2021

1 Certificate of Conformity

Product: Linksys Tri-Band 802.11ax Wireless Router

Brand: Linksys

Test Model: MX8500

Series Model: MX85EC, MX85WH, MX85MS

Sample Status: Engineering sample

Applicant: Belkin International, Inc.

Test Date: Nov. 19 to Dec. 13, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** Mar. 04, 2021
Claire Kuan / Specialist

Approved by :  , **Date:** Mar. 04, 2021
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.37 dB at 0.15000 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1 dB at 2388.45 MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.

Note:

- For 2.4 GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted Emission	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Linksys Tri-Band 802.11ax Wireless Router
Brand	Linksys
Test Model	MX8500
Series Model	MX85EC, MX85WH, MX85MS
Model Difference	Marketing Differentiation
Status of EUT	Engineering sample
Driver version	SPF11.3_CS_v1.12_CBP
Power Supply Rating	12Vdc from adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT20/40 mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 720 Mbps 802.11ax: up to 1147.1 Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7
Output Power	CDD Mode: 2.412 ~ 2.462 GHz: 993.158 mW Beamforming Mode: 2.412 ~ 2.462 GHz: 990.125 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. The EUT power needs to be supplied from one power adapter, the information is as below table:

Adapter 1	
Brand	Ktec
Model	KSAS0501200400HU
Input Power	100-240Vac, 50/60Hz, 1.2A
Output Power	12Vdc, 4.0A
Power Cord	AC 2-Pin, Non-shielded DC cable (1.5m)
Adapter 2	
Brand	APD
Model	WA-48B12FU
Input Power	100-240Vac, 50/60Hz, 1.5A
Output Power	12Vdc, 4.0A
Power Cord	AC 2-Pin, Non-shielded DC cable (1.5m)

The above two adapters were pre-tested, for conducted emission Adapter 2 was the worst case for final test and for radiated emission Adapter 1 was the worst case for final test.

2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	CDD Mode	Beamforming Mode	TX Function
802.11b	Support	Not Support	4TX
802.11g	Support	Not Support	4TX
802.11n (HT20)	Support	Support	4TX
802.11n (HT40)	Support	Support	4TX
VHT20	Support	Support	4TX
VHT40	Support	Support	4TX
802.11ax (HE20)	Support	Support	4TX
802.11ax (HE40)	Support	Support	4TX

* The EUT support Beamforming (Except 802.11b/g) and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.

* The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), VHT mode for 20MHz (40MHz) and 802.11ax mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n/ac mode is the same as the 802.11ax mode or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

3. The following antennas were provided to the EUT.

Antenna Type	Dipole on PCB
Antenna Connector	i-pex (MHF)
Antenna No.	Gain (dBi)
	2.4~2.4835GHz
Ant1 = 2GA1	2.5
Ant2 = 2GA2	3.1
Ant3 = 2GB1	3.1
Ant4 = 2GB2	2.8

The following antenna allocation table was provided to the EUT.

2G Antenna port		2G Antenna port		TX Function	
Degree -45°	2GA1	Degree +45°	2GB1	MIMO	Correlated
Degree -45°	2GA2	Degree +45°	2GB2	MIMO	

All antennas are dipole type. Thus antennas are all used the same type, the difference is only in the placement direction. According this condition, 2GA1 / 2GA2 are cross-polarization, 2GB1 / 2GB2 are cross-polarization, 5GA / 5GC are cross-polarization, 5GB / 5GD are cross-polarization, 6GA / 6GC are cross-polarization, 6GB / 6GD are cross-polarization.

4. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20), VHT20, 802.11ax (HE20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

7 channels are provided for 802.11n (HT40), VHT40, 802.11ax (HE40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
6	2437		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
802.11b	1 to 11	11	DSSS	DBPSK	1Mb/s

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
802.11b	1 to 11	11	DSSS	DBPSK	1Mb/s

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
VHT20 (output power only)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
VHT40 (output power only)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0
Beamforming Mode (output power only)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE PARAMETER
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
VHT40	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	22deg. C, 65%RH	120Vac, 60Hz	Tom Yang
RE $<$ 1G	23deg. C, 67%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 67%RH	120Vac, 60Hz	Tom Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

If duty cycle of test signal is $\geq 98\%$, duty factor is not required.

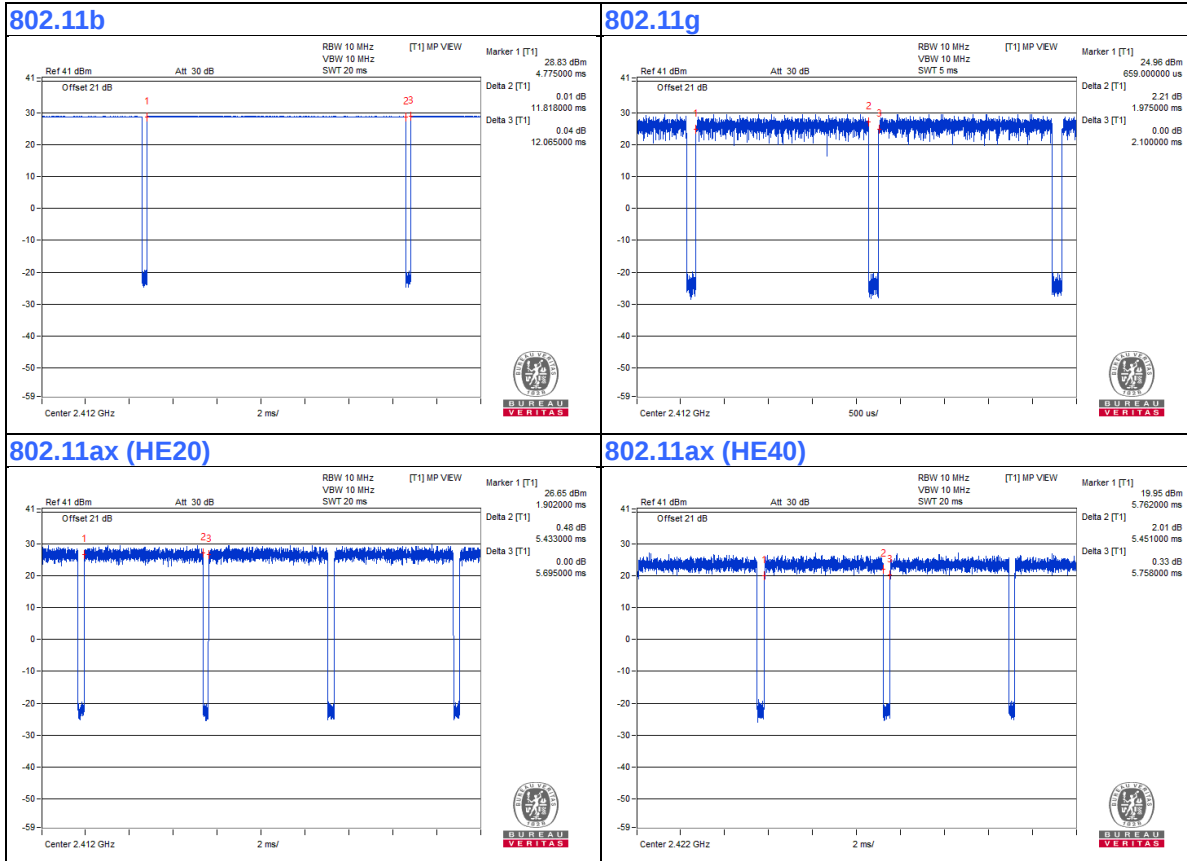
If duty cycle of test signal is $< 98\%$, duty factor is required.

802.11b: Duty cycle = $11.818/12.065 = 0.98$

802.11g: Duty cycle = $1.975/2.1 = 0.94$, Duty factor = $10 * \log(1/0.94) = 0.27$

802.11ax (HE20): Duty cycle = $5.433/5.695 = 0.954$, Duty factor = $10 * \log(1/0.954) = 0.20$

802.11ax (HE40): Duty cycle = $5.451/5.758 = 0.947$, Duty factor = $10 * \log(1/0.947) = 0.24$



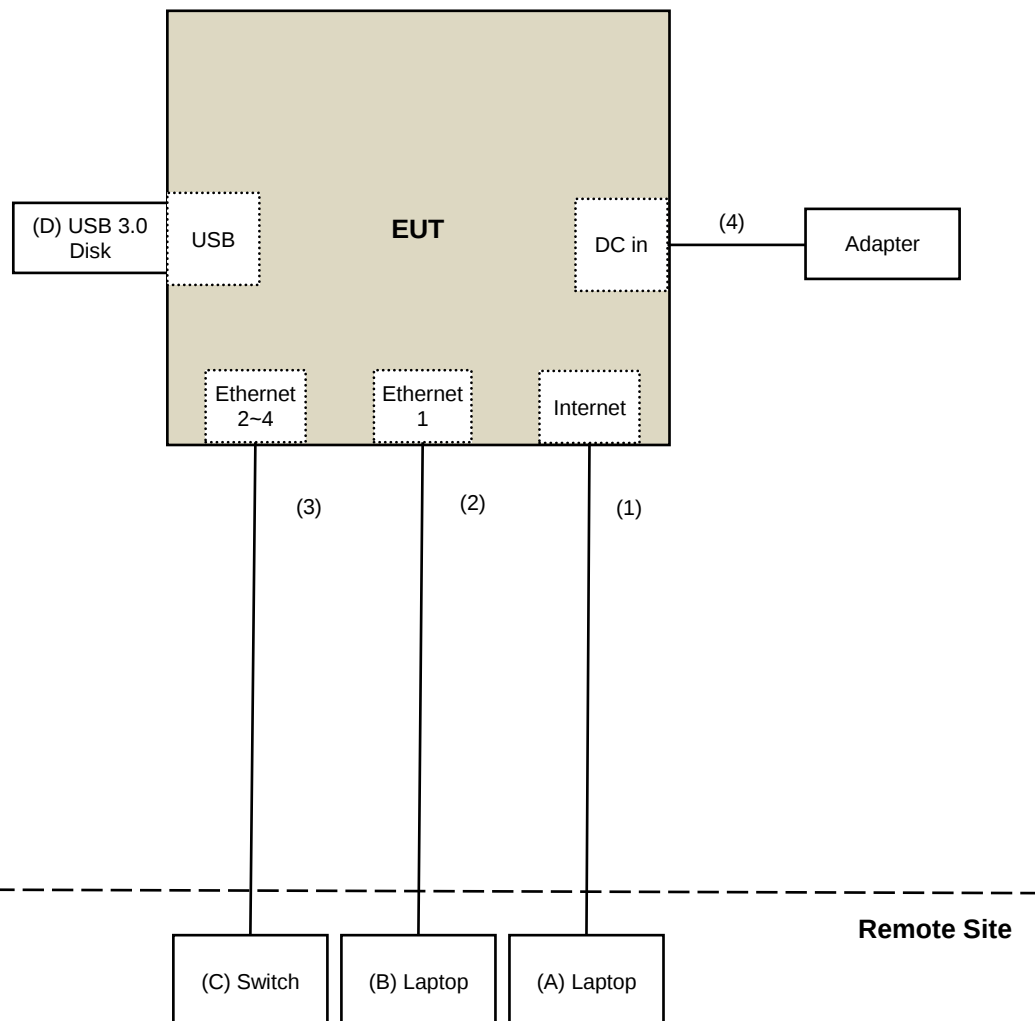
3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	DoC	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	DoC	Provided by Lab
C.	Switch	D-Link	DGS-1005D	DR8WC92000523	NA	Provided by Lab
D.	USB 3.0 Disk	SanDisk	SDCZ73-032G-G46	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	3	10	No	0	Provided by Lab
4.	DC Cable	1	1.5	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

For Radiated Emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 2021
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 05, 2020	Nov. 04, 2021
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 24, 2020	Sep. 23, 2021
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1500	180504	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Nov. 30 to Dec. 13, 2020

For Band-Edge test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 2021
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMC	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1500	180504	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMC	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Nov. 19, 2020

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	May 29, 2020	May 28, 2021
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Dec. 04, 2020

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

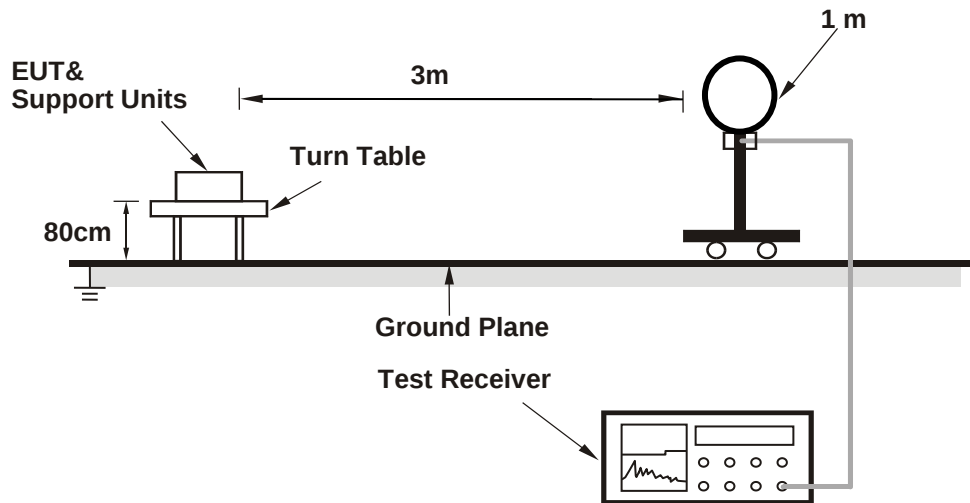
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

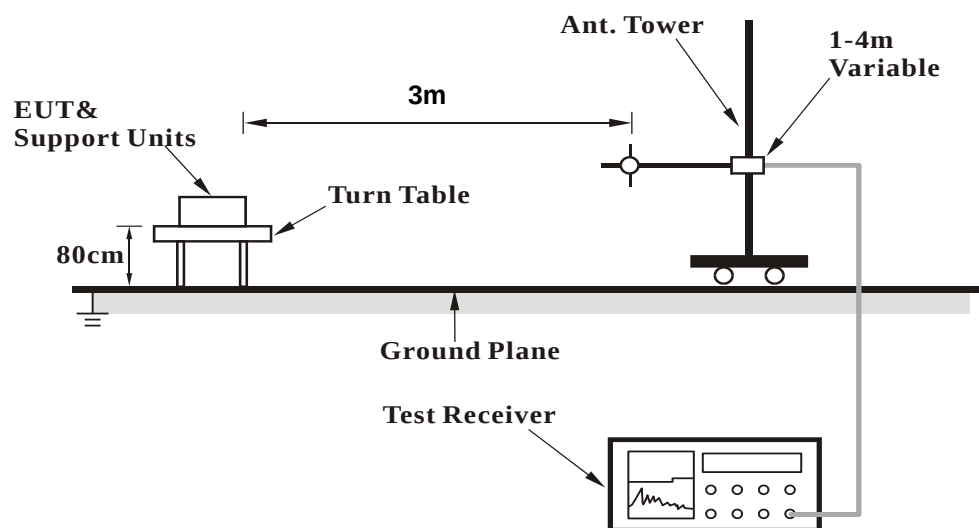
No deviation.

4.1.5 Test Setup

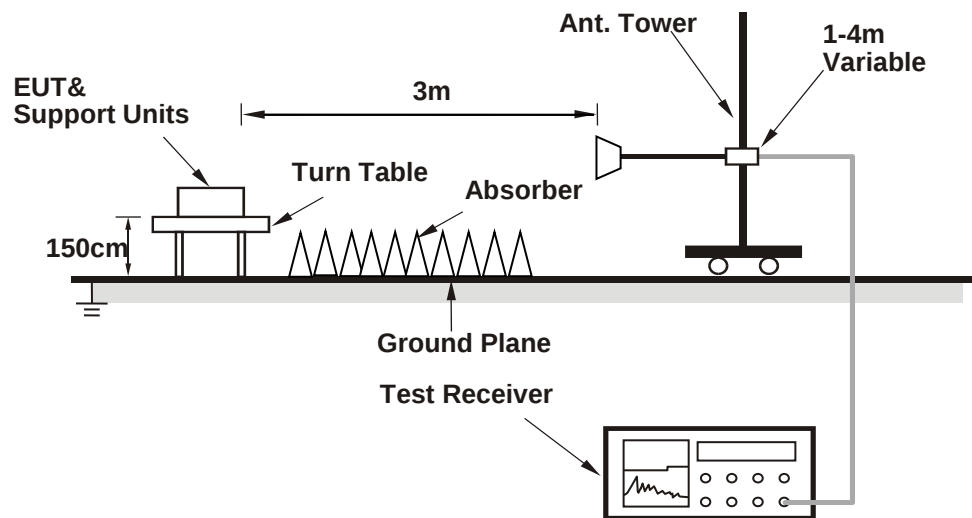
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on remote site.
- Controlling software (QSPR (1.0-00070)) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2385.40	55.6 PK	74.0	-18.4	1.00 H	215	57.0	-1.4
2	2385.40	45.1 AV	54.0	-8.9	1.00 H	215	46.5	-1.4
3	*2412.00	111.5 PK			1.00 H	215	112.9	-1.4
4	*2412.00	109.4 AV			1.00 H	215	110.8	-1.4
5	4824.00	41.9 PK	74.0	-32.1	2.26 H	135	38.4	3.5
6	4824.00	37.3 AV	54.0	-16.7	2.26 H	135	33.8	3.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2385.40	57.1 PK	74.0	-16.9	1.83 V	25	58.5	-1.4
2	2385.40	47.7 AV	54.0	-6.3	1.83 V	25	49.1	-1.4
3	*2412.00	112.1 PK			1.83 V	25	113.5	-1.4
4	*2412.00	108.6 AV			1.83 V	25	110.0	-1.4
5	4824.00	42.3 PK	74.0	-31.7	2.05 V	204	38.8	3.5
6	4824.00	38.1 AV	54.0	-15.9	2.05 V	204	34.6	3.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.9 PK	74.0	-19.1	1.27 H	195	56.3	-1.4
2	2390.00	42.3 AV	54.0	-11.7	1.27 H	195	43.7	-1.4
3	*2437.00	110.9 PK			1.27 H	195	112.4	-1.5
4	*2437.00	109.7 AV			1.27 H	195	111.2	-1.5
5	2483.50	54.5 PK	74.0	-19.5	1.27 H	195	55.9	-1.4
6	2483.50	41.6 AV	54.0	-12.4	1.27 H	195	43.0	-1.4
7	4874.00	41.4 PK	74.0	-32.6	2.21 H	143	37.7	3.7
8	4874.00	37.0 AV	54.0	-17.0	2.21 H	143	33.3	3.7
9	7311.00	41.9 PK	74.0	-32.1	2.82 H	309	32.1	9.8
10	7311.00	31.6 AV	54.0	-22.4	2.82 H	309	21.8	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.0 PK	74.0	-19.0	1.84 V	9	56.4	-1.4
2	2390.00	42.4 AV	54.0	-11.6	1.84 V	9	43.8	-1.4
3	*2437.00	112.4 PK			1.84 V	9	113.9	-1.5
4	*2437.00	109.2 AV			1.84 V	9	110.7	-1.5
5	2483.50	54.8 PK	74.0	-19.2	1.84 V	9	56.2	-1.4
6	2483.50	41.9 AV	54.0	-12.1	1.84 V	9	43.3	-1.4
7	4874.00	41.7 PK	74.0	-32.3	2.10 V	215	38.0	3.7
8	4874.00	37.6 AV	54.0	-16.4	2.10 V	215	33.9	3.7
9	7311.00	43.3 PK	74.0	-30.7	2.32 V	204	33.5	9.8
10	7311.00	31.8 AV	54.0	-22.2	2.32 V	204	22.0	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	112.4 PK			1.00 H	98	113.8	-1.4
2	*2462.00	110.6 AV			1.00 H	98	112.0	-1.4
3	2490.56	56.2 PK	74.0	-17.8	1.00 H	98	57.6	-1.4
4	2490.56	45.7 AV	54.0	-8.3	1.00 H	98	47.1	-1.4
5	4924.00	41.5 PK	74.0	-32.5	2.27 H	142	37.8	3.7
6	4924.00	37.1 AV	54.0	-16.9	2.27 H	142	33.4	3.7
7	7386.00	41.7 PK	74.0	-32.3	2.85 H	296	31.9	9.8
8	7386.00	31.6 AV	54.0	-22.4	2.85 H	296	21.8	9.8

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	113.3 PK			1.17 V	62	114.7	-1.4
2	*2462.00	109.9 AV			1.17 V	62	111.3	-1.4
3	2490.40	55.1 PK	74.0	-18.9	1.17 V	62	56.5	-1.4
4	2490.40	43.9 AV	54.0	-10.1	1.17 V	62	45.3	-1.4
5	4924.00	42.0 PK	74.0	-32.0	2.10 V	218	38.3	3.7
6	4924.00	37.8 AV	54.0	-16.2	2.10 V	218	34.1	3.7
7	7386.00	43.6 PK	74.0	-30.4	2.34 V	191	33.8	9.8
8	7386.00	31.9 AV	54.0	-22.1	2.34 V	191	22.1	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2388.40	69.7 PK	74.0	-4.3	1.00 H	182	71.1	-1.4
2	2388.40	53.8 AV	54.0	-0.2	1.00 H	182	55.2	-1.4
3	*2412.00	114.8 PK			1.00 H	182	116.2	-1.4
4	*2412.00	104.1 AV			1.00 H	182	105.5	-1.4
5	4824.00	42.2 PK	74.0	-31.8	2.26 H	115	38.7	3.5
6	4824.00	37.6 AV	54.0	-16.4	2.26 H	115	34.1	3.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2388.80	66.1 PK	74.0	-7.9	1.97 V	69	67.5	-1.4
2	2388.80	53.1 AV	54.0	-0.9	1.97 V	69	54.5	-1.4
3	*2412.00	116.1 PK			1.97 V	69	117.5	-1.4
4	*2412.00	107.1 AV			1.97 V	69	108.5	-1.4
5	4824.00	41.7 PK	74.0	-32.3	2.08 V	229	38.2	3.5
6	4824.00	37.1 AV	54.0	-16.9	2.08 V	229	33.6	3.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.9 PK	74.0	-19.1	1.08 H	228	56.3	-1.4
2	2390.00	42.6 AV	54.0	-11.4	1.08 H	228	44.0	-1.4
3	*2437.00	115.7 PK			1.08 H	228	117.2	-1.5
4	*2437.00	106.2 AV			1.08 H	228	107.7	-1.5
5	2483.50	54.6 PK	74.0	-19.4	1.08 H	228	56.0	-1.4
6	2483.50	41.8 AV	54.0	-12.2	1.08 H	228	43.2	-1.4
7	4874.00	41.0 PK	74.0	-33.0	2.31 H	155	37.3	3.7
8	4874.00	36.7 AV	54.0	-17.3	2.31 H	155	33.0	3.7
9	7311.00	41.3 PK	74.0	-32.7	2.89 H	299	31.5	9.8
10	7311.00	31.4 AV	54.0	-22.6	2.89 H	299	21.6	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.0 PK	74.0	-19.0	1.72 V	47	56.4	-1.4
2	2390.00	42.9 AV	54.0	-11.1	1.72 V	47	44.3	-1.4
3	*2437.00	115.8 PK			1.72 V	47	117.3	-1.5
4	*2437.00	107.1 AV			1.72 V	47	108.6	-1.5
5	2483.50	54.5 PK	74.0	-19.5	1.72 V	47	55.9	-1.4
6	2483.50	41.8 AV	54.0	-12.2	1.72 V	47	43.2	-1.4
7	4874.00	42.0 PK	74.0	-32.0	2.09 V	209	38.3	3.7
8	4874.00	37.9 AV	54.0	-16.1	2.09 V	209	34.2	3.7
9	7311.00	43.1 PK	74.0	-30.9	2.37 V	204	33.3	9.8
10	7311.00	31.6 AV	54.0	-22.4	2.37 V	204	21.8	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2387.98	72.0 PK	74.0	-2.0	1.71 H	239	73.4	-1.4
2	2387.98	53.5 AV	54.0	-0.5	1.71 H	239	54.9	-1.4
3	*2462.00	115.4 PK			1.71 H	239	116.8	-1.4
4	*2462.00	105.7 AV			1.71 H	239	107.1	-1.4
5	4924.00	42.2 PK	74.0	-31.8	2.32 H	130	38.5	3.7
6	4924.00	37.6 AV	54.0	-16.4	2.32 H	130	33.9	3.7
7	7386.00	41.5 PK	74.0	-32.5	2.80 H	300	31.7	9.8
8	7386.00	31.6 AV	54.0	-22.4	2.80 H	300	21.8	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	115.1 PK			1.77 V	40	116.5	-1.4
2	*2462.00	106.6 AV			1.77 V	40	108.0	-1.4
3	2484.20	63.2 PK	74.0	-10.8	1.77 V	40	64.6	-1.4
4	2484.20	53.1 AV	54.0	-0.9	1.77 V	40	54.5	-1.4
5	2486.26	67.9 PK	74.0	-6.1	1.77 V	40	69.3	-1.4
6	2486.26	51.4 AV	54.0	-2.6	1.77 V	40	52.8	-1.4
7	4924.00	41.9 PK	74.0	-32.1	2.08 V	231	38.2	3.7
8	4924.00	37.4 AV	54.0	-16.6	2.08 V	231	33.7	3.7
9	7386.00	43.4 PK	74.0	-30.6	2.33 V	182	33.6	9.8
10	7386.00	31.7 AV	54.0	-22.3	2.33 V	182	21.9	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11ax (HE20)	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2389.40	67.5 PK	74.0	-6.5	1.57 H	199	68.9	-1.4
2	2389.40	53.8 AV	54.0	-0.2	1.57 H	199	55.2	-1.4
3	*2412.00	118.3 PK			1.57 H	199	119.7	-1.4
4	*2412.00	104.9 AV			1.57 H	199	106.3	-1.4
5	4824.00	39.7 PK	74.0	-34.3	2.33 H	126	36.2	3.5
6	4824.00	35.3 AV	54.0	-18.7	2.33 H	126	31.8	3.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2384.20	61.3 PK	74.0	-12.7	1.93 V	57	62.7	-1.4
2	2384.20	48.1 AV	54.0	-5.9	1.93 V	57	49.5	-1.4
3	*2412.00	117.6 PK			1.93 V	57	119.0	-1.4
4	*2412.00	105.2 AV			1.93 V	57	106.6	-1.4
5	4824.00	40.3 PK	74.0	-33.7	2.02 V	224	36.8	3.5
6	4824.00	35.7 AV	54.0	-18.3	2.02 V	224	32.2	3.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11ax (HE20)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	57.0 PK	74.0	-17.0	1.42 H	31	58.4	-1.4
2	2390.00	44.1 AV	54.0	-9.9	1.42 H	31	45.5	-1.4
3	*2437.00	121.1 PK			1.42 H	31	122.6	-1.5
4	*2437.00	108.5 AV			1.42 H	31	110.0	-1.5
5	2483.50	56.1 PK	74.0	-17.9	1.42 H	31	57.5	-1.4
6	2483.50	43.0 AV	54.0	-11.0	1.42 H	31	44.4	-1.4
7	4874.00	41.7 PK	74.0	-32.3	2.37 H	140	38.0	3.7
8	4874.00	37.2 AV	54.0	-16.8	2.37 H	140	33.5	3.7
9	7311.00	41.4 PK	74.0	-32.6	2.78 H	284	31.6	9.8
10	7311.00	31.7 AV	54.0	-22.3	2.78 H	284	21.9	9.8

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.2 PK	74.0	-18.8	1.96 V	29	56.6	-1.4
2	2390.00	43.0 AV	54.0	-11.0	1.96 V	29	44.4	-1.4
3	*2437.00	117.7 PK			1.96 V	29	119.2	-1.5
4	*2437.00	106.2 AV			1.96 V	29	107.7	-1.5
5	2483.50	56.7 PK	74.0	-17.3	1.96 V	29	58.1	-1.4
6	2483.50	42.8 AV	54.0	-11.2	1.96 V	29	44.2	-1.4
7	4874.00	42.1 PK	74.0	-31.9	2.11 V	245	38.4	3.7
8	4874.00	37.6 AV	54.0	-16.4	2.11 V	245	33.9	3.7
9	7311.00	43.2 PK	74.0	-30.8	2.29 V	179	33.4	9.8
10	7311.00	31.7 AV	54.0	-22.3	2.29 V	179	21.9	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11ax (HE20)	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	116.5 PK			1.48 H	34	117.9	-1.4
2	*2462.00	104.1 AV			1.48 H	34	105.5	-1.4
3	2485.55	69.5 PK	74.0	-4.5	1.48 H	34	70.9	-1.4
4	2485.55	53.5 AV	54.0	-0.5	1.48 H	34	54.9	-1.4
5	4924.00	40.1 PK	74.0	-33.9	2.31 H	129	36.4	3.7
6	4924.00	35.4 AV	54.0	-18.6	2.31 H	129	31.7	3.7
7	7386.00	41.5 PK	74.0	-32.5	2.84 H	302	31.7	9.8
8	7386.00	31.8 AV	54.0	-22.2	2.84 H	302	22.0	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	116.9 PK			1.93 V	24	118.3	-1.4
2	*2462.00	104.7 AV			1.93 V	24	106.1	-1.4
3	2483.50	65.6 PK	74.0	-8.4	1.93 V	24	67.0	-1.4
4	2483.50	53.0 AV	54.0	-1.0	1.93 V	24	54.4	-1.4
5	4924.00	40.4 PK	74.0	-33.6	2.05 V	231	36.7	3.7
6	4924.00	35.7 AV	54.0	-18.3	2.05 V	231	32.0	3.7
7	7386.00	43.0 PK	74.0	-31.0	2.38 V	175	33.2	9.8
8	7386.00	31.4 AV	54.0	-22.6	2.38 V	175	21.6	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11ax (HE40)	Channel	CH 3 : 2422 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2388.45	66.4 PK	74.0	-7.6	1.46 H	203	67.8	-1.4
2	2388.45	53.9 AV	54.0	-0.1	1.46 H	203	55.3	-1.4
3	*2422.00	114.4 PK			1.46 H	203	115.8	-1.4
4	*2422.00	101.9 AV			1.46 H	203	103.3	-1.4
5	4844.00	40.3 PK	74.0	-33.7	2.32 H	121	36.7	3.6
6	4844.00	35.6 AV	54.0	-18.4	2.32 H	121	32.0	3.6
7	7266.00	42.1 PK	74.0	-31.9	2.84 H	310	32.4	9.7
8	7266.00	32.3 AV	54.0	-21.7	2.84 H	310	22.6	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2374.40	63.8 PK	74.0	-10.2	1.35 V	58	65.2	-1.4
2	2374.40	52.2 AV	54.0	-1.8	1.35 V	58	53.6	-1.4
3	*2422.00	113.2 PK			1.35 V	58	114.6	-1.4
4	*2422.00	101.4 AV			1.35 V	58	102.8	-1.4
5	4844.00	40.4 PK	74.0	-33.6	2.01 V	237	36.8	3.6
6	4844.00	35.4 AV	54.0	-18.6	2.01 V	237	31.8	3.6
7	7266.00	43.0 PK	74.0	-31.0	2.39 V	168	33.3	9.7
8	7266.00	31.6 AV	54.0	-22.4	2.39 V	168	21.9	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11ax (HE40)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	61.6 PK	74.0	-12.4	1.50 H	236	63.0	-1.4
2	2390.00	46.2 AV	54.0	-7.8	1.50 H	236	47.6	-1.4
3	*2437.00	114.7 PK			1.50 H	236	116.2	-1.5
4	*2437.00	104.3 AV			1.50 H	236	105.8	-1.5
5	2483.50	66.2 PK	74.0	-7.8	1.50 H	236	67.6	-1.4
6	2483.50	51.6 AV	54.0	-2.4	1.50 H	236	53.0	-1.4
7	4874.00	40.1 PK	74.0	-33.9	2.29 H	119	36.4	3.7
8	4874.00	35.7 AV	54.0	-18.3	2.29 H	119	32.0	3.7
9	7311.00	41.5 PK	74.0	-32.5	2.87 H	302	31.7	9.8
10	7311.00	32.0 AV	54.0	-22.0	2.87 H	302	22.2	9.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.7 PK	74.0	-17.3	1.38 V	54	58.1	-1.4
2	2390.00	42.3 AV	54.0	-11.7	1.38 V	54	43.7	-1.4
3	*2437.00	113.6 PK			1.38 V	54	115.1	-1.5
4	*2437.00	101.7 AV			1.38 V	54	103.2	-1.5
5	2483.50	61.8 PK	74.0	-12.2	1.38 V	54	63.2	-1.4
6	2483.50	46.3 AV	54.0	-7.7	1.38 V	54	47.7	-1.4
7	4874.00	40.7 PK	74.0	-33.3	2.04 V	234	37.0	3.7
8	4874.00	35.9 AV	54.0	-18.1	2.04 V	234	32.2	3.7
9	7311.00	43.1 PK	74.0	-30.9	2.35 V	174	33.3	9.8
10	7311.00	31.5 AV	54.0	-22.5	2.35 V	174	21.7	9.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11ax (HE40)	Channel	CH 9 : 2452 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	113.5 PK			1.47 H	236	114.9	-1.4
2	*2452.00	101.5 AV			1.47 H	236	102.9	-1.4
3	2486.80	67.5 PK	74.0	-6.5	1.47 H	236	68.9	-1.4
4	2486.80	53.7 AV	54.0	-0.3	1.47 H	236	55.1	-1.4
5	4904.00	40.1 PK	74.0	-33.9	2.26 H	119	36.4	3.7
6	4904.00	35.6 AV	54.0	-18.4	2.26 H	119	31.9	3.7
7	7356.00	41.3 PK	74.0	-32.7	2.78 H	312	31.4	9.9
8	7356.00	31.4 AV	54.0	-22.6	2.78 H	312	21.5	9.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	113.0 PK			2.00 V	10	114.4	-1.4
2	*2452.00	100.7 AV			2.00 V	10	102.1	-1.4
3	2483.50	61.3 PK	74.0	-12.7	2.00 V	10	62.7	-1.4
4	2483.50	51.6 AV	54.0	-2.4	2.00 V	10	53.0	-1.4
5	4904.00	40.1 PK	74.0	-33.9	2.00 V	225	36.4	3.7
6	4904.00	35.4 AV	54.0	-18.6	2.00 V	225	31.7	3.7
7	7356.00	43.6 PK	74.0	-30.4	2.40 V	175	33.7	9.9
8	7356.00	31.8 AV	54.0	-22.2	2.40 V	175	21.9	9.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

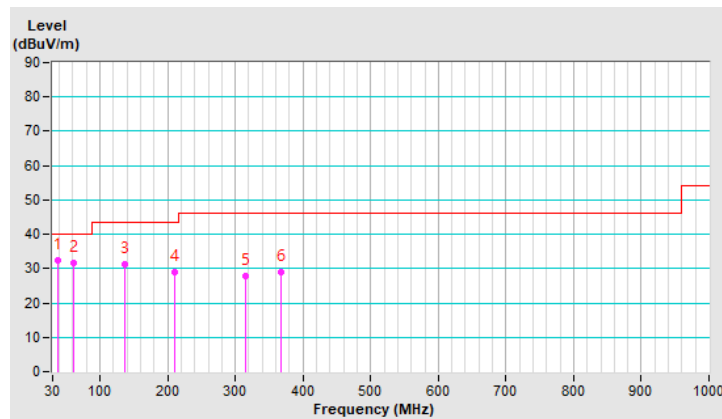
Below 1GHz Data:

RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	38.15	32.4 QP	40.0	-7.6	1.00 H	40	40.8	-8.4
2	61.67	31.6 QP	40.0	-8.4	1.50 H	136	40.1	-8.5
3	137.11	31.2 QP	43.5	-12.3	2.00 H	94	38.8	-7.6
4	209.84	29.1 QP	43.5	-14.4	1.50 H	259	39.1	-10.0
5	315.54	27.9 QP	46.0	-18.1	1.00 H	87	33.1	-5.2
6	367.10	28.8 QP	46.0	-17.2	1.50 H	90	32.8	-4.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

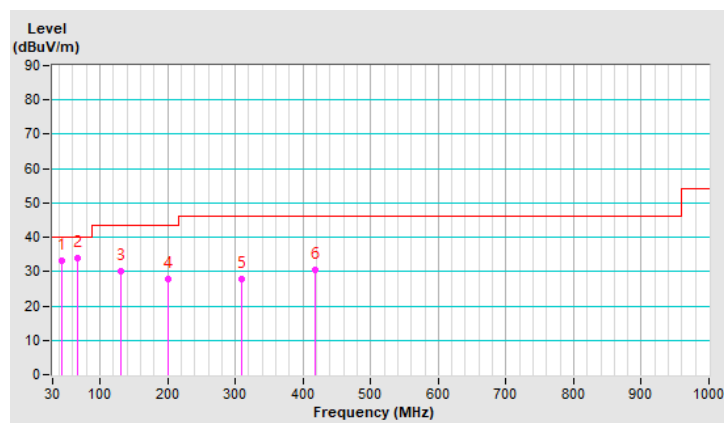


RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	43.09	33.3 QP	40.0	-6.7	1.00 V	298	41.2	-7.9
2	66.93	33.8 QP	40.0	-6.2	1.50 V	336	43.0	-9.2
3	130.54	30.1 QP	43.5	-13.4	1.00 V	330	38.3	-8.2
4	201.01	27.9 QP	43.5	-15.6	1.00 V	62	37.9	-10.0
5	310.21	27.7 QP	46.0	-18.3	1.00 V	360	33.2	-5.5
6	418.65	30.6 QP	46.0	-15.4	1.50 V	219	33.0	-2.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 20, 2020	Oct. 19, 2021
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 27, 2020	Oct. 26, 2021
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 26, 2020	Oct. 25, 2021
RF Cable	5D-FB	COCCAB-001	Sep. 26, 2020	Sep. 25, 2021
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 29, 2020	Aug. 28, 2021
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: Dec. 13, 2020

4.2.3 Test Procedures

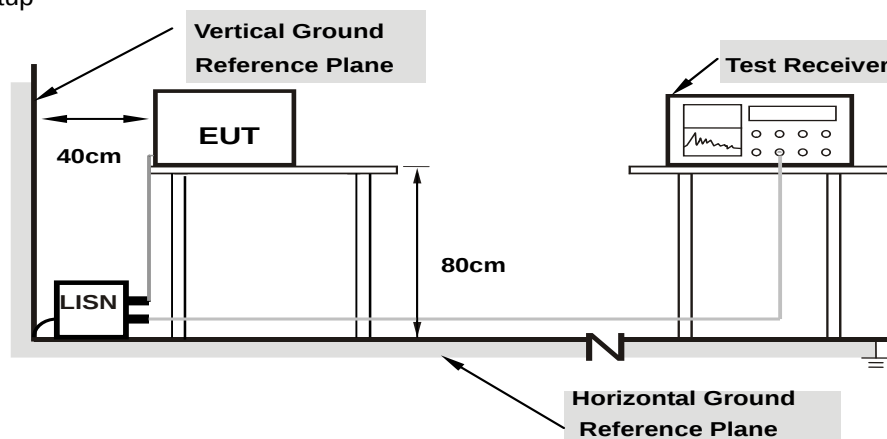
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

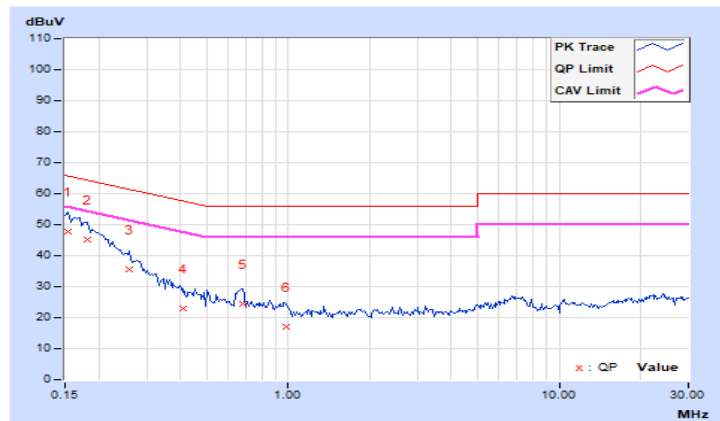
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.96	37.70	19.22	47.66	29.18	65.79	55.79	-18.13	-26.61
2	0.18125	9.98	35.31	18.20	45.29	28.18	64.43	54.43	-19.14	-26.25
3	0.25938	10.00	25.65	11.40	35.65	21.40	61.45	51.45	-25.80	-30.05
4	0.40781	10.02	12.84	0.42	22.86	10.44	57.69	47.69	-34.83	-37.25
5	0.67734	10.04	14.39	7.98	24.43	18.02	56.00	46.00	-31.57	-27.98
6	0.97813	10.06	7.09	1.72	17.15	11.78	56.00	46.00	-38.85	-34.22

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

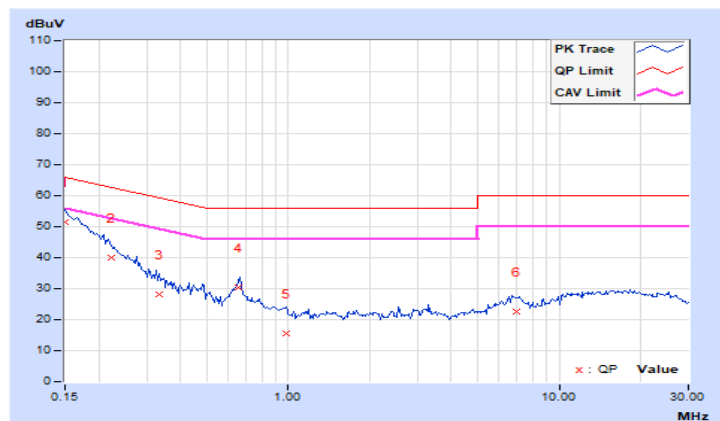


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	41.69	22.97	51.63	32.91	66.00	56.00	-14.37	-23.09
2	0.22309	9.98	30.08	15.18	40.06	25.16	62.70	52.70	-22.64	-27.54
3	0.33359	10.00	17.97	7.80	27.97	17.80	59.36	49.36	-31.39	-31.56
4	0.65391	10.04	20.23	15.47	30.27	25.51	56.00	46.00	-25.73	-20.49
5	0.98203	10.07	5.39	0.75	15.46	10.82	56.00	46.00	-40.54	-35.18
6	6.97656	10.43	12.13	5.91	22.56	16.34	60.00	50.00	-37.44	-33.66

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

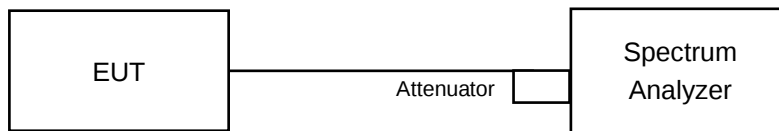


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	8.08	7.59	7.61	8.1	0.5	Pass
6	2437	8.07	8.08	8.08	7.58	0.5	Pass
11	2462	7.6	8.08	8.08	8.07	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	16.36	16.38	16.36	16.36	0.5	Pass
6	2437	16.36	16.13	16.36	16.37	0.5	Pass
11	2462	16.35	16.34	16.37	16.37	0.5	Pass

802.11ax (HE20)

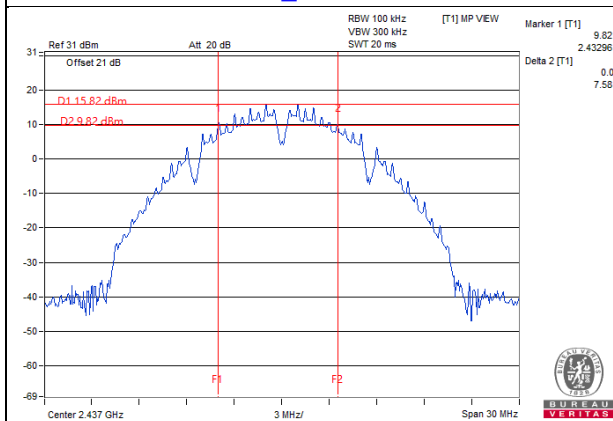
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	18.9	19.07	18.92	18.93	0.5	Pass
6	2437	18.83	18.85	18.98	18.94	0.5	Pass
11	2462	18.98	18.86	18.97	18.88	0.5	Pass

802.11ax (HE40)

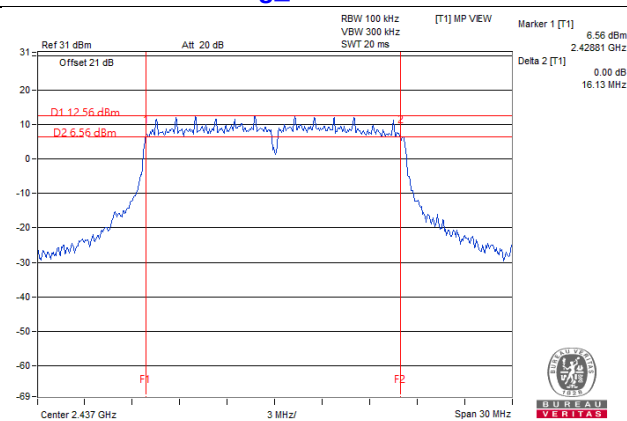
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	37.96	38	37.86	37.91	0.5	Pass
6	2437	37.98	38.12	38.02	37.98	0.5	Pass
9	2452	38.03	37.98	37.81	37.97	0.5	Pass

Spectrum Plot of Worst Value

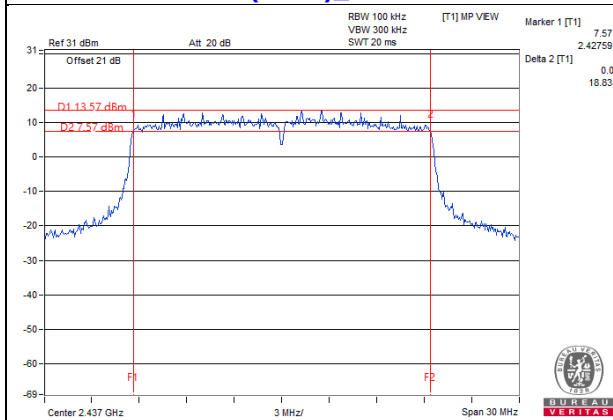
802.11b_Chain 3 / CH6



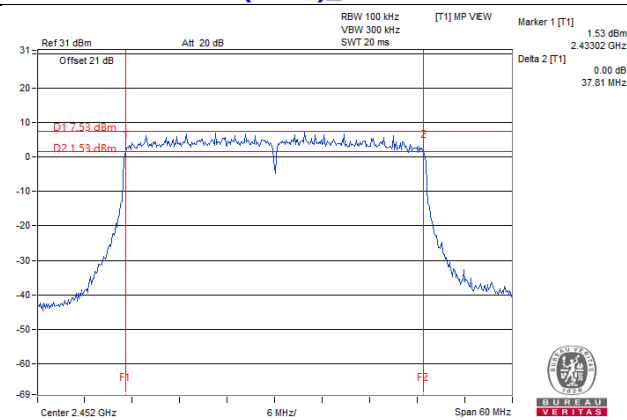
802.11g_Chain 1 / CH6



802.11ax (HE20)_Chain 0 / CH6



802.11ax (HE40)_Chain 2 / CH9



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

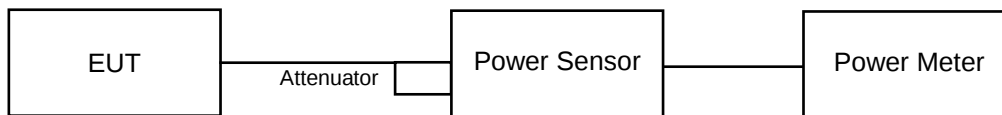
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

CDD Mode

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	24.35	23.93	23.59	23.81	988.439	29.95	30	Pass
6	2437	23.82	23.64	23.49	23.50	919.426	29.64	30	Pass
11	2462	24.13	23.96	23.75	23.95	993.158	29.97	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	24.12	23.90	23.71	23.80	978.543	29.91	30	Pass
6	2437	24.17	23.98	23.88	23.74	992.186	29.97	30	Pass
11	2462	24.05	24.01	23.71	23.77	979.06	29.91	30	Pass

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	22.85	22.45	22.35	22.36	712.523	28.53	30	Pass
6	2437	24.01	23.88	23.75	23.70	967.671	29.86	30	Pass
11	2462	22.92	22.91	22.68	22.73	764.171	28.83	30	Pass

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	22.85	22.54	22.50	22.43	725.038	28.60	30	Pass
6	2437	22.94	22.24	22.91	22.89	754.253	28.78	30	Pass
9	2452	21.60	21.51	21.32	21.30	556.539	27.45	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	22.91	22.51	22.47	22.43	725.26	28.60	30	Pass
6	2437	24.09	23.97	23.87	23.81	990.125	29.96	30	Pass
11	2462	23.07	23.05	22.79	22.82	786.138	28.95	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	22.99	22.64	22.55	22.51	740.846	28.70	30	Pass
6	2437	23.30	23.02	23.00	22.99	812.837	29.10	30	Pass
9	2452	21.67	21.60	21.44	21.43	569.748	27.56	30	Pass

Beamforming Mode

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	22.85	22.45	22.35	22.36	712.523	28.53	30	Pass
6	2437	24.01	23.88	23.75	23.70	967.671	29.86	30	Pass
11	2462	22.92	22.91	22.68	22.73	764.171	28.83	30	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power limit shall not be reduced.

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	22.85	22.54	22.50	22.43	725.038	28.60	30	Pass
6	2437	22.94	22.24	22.91	22.89	754.253	28.78	30	Pass
9	2452	21.60	21.51	21.32	21.30	556.539	27.45	30	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	22.91	22.51	22.47	22.43	725.26	28.60	30	Pass
6	2437	24.09	23.97	23.87	23.81	990.125	29.96	30	Pass
11	2462	23.07	23.05	22.79	22.82	786.138	28.95	30	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	22.99	22.64	22.55	22.51	740.846	28.70	30	Pass
6	2437	23.30	23.02	23.00	22.99	812.837	29.10	30	Pass
9	2452	21.67	21.60	21.44	21.43	569.748	27.56	30	Pass

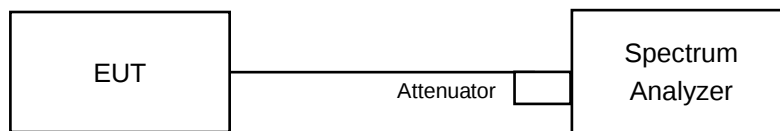
- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
 2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power limit shall not be reduced.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

- a. Set instrument center frequency to DTS channel center frequency.
- b. Set span to at least 1.5 times the OBW.
- c. Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set VBW $\geq 3 \times \text{RBW}$.
- e. Detector = power averaging (RMS) or sample detector (when RMS not available).
- f. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- g. Sweep time = auto couple.
- h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
- i. Use the peak marker function to determine the maximum amplitude level.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)				Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
1	2412	-8.67	-5.46	-4.97	-5.19	0.18	8.00	Pass
6	2437	-5.58	-5.62	-5.35	-5.48	0.51	8.00	Pass
11	2462	-9.93	-5.88	-5.83	-5.57	-0.47	8.00	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11g

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)				Duty Factor (dB)	Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
1	2412	-9.63	-9.63	-9.46	-9.54	0.27	0.4702	-3.28	8.00	PASS
6	2437	-10.53	-9.04	-9.91	-9.45	0.27	0.45599	-3.41	8.00	PASS
11	2462	-9.94	-9.40	-9.69	-9.12	0.27	0.4743	-3.24	8.00	PASS

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

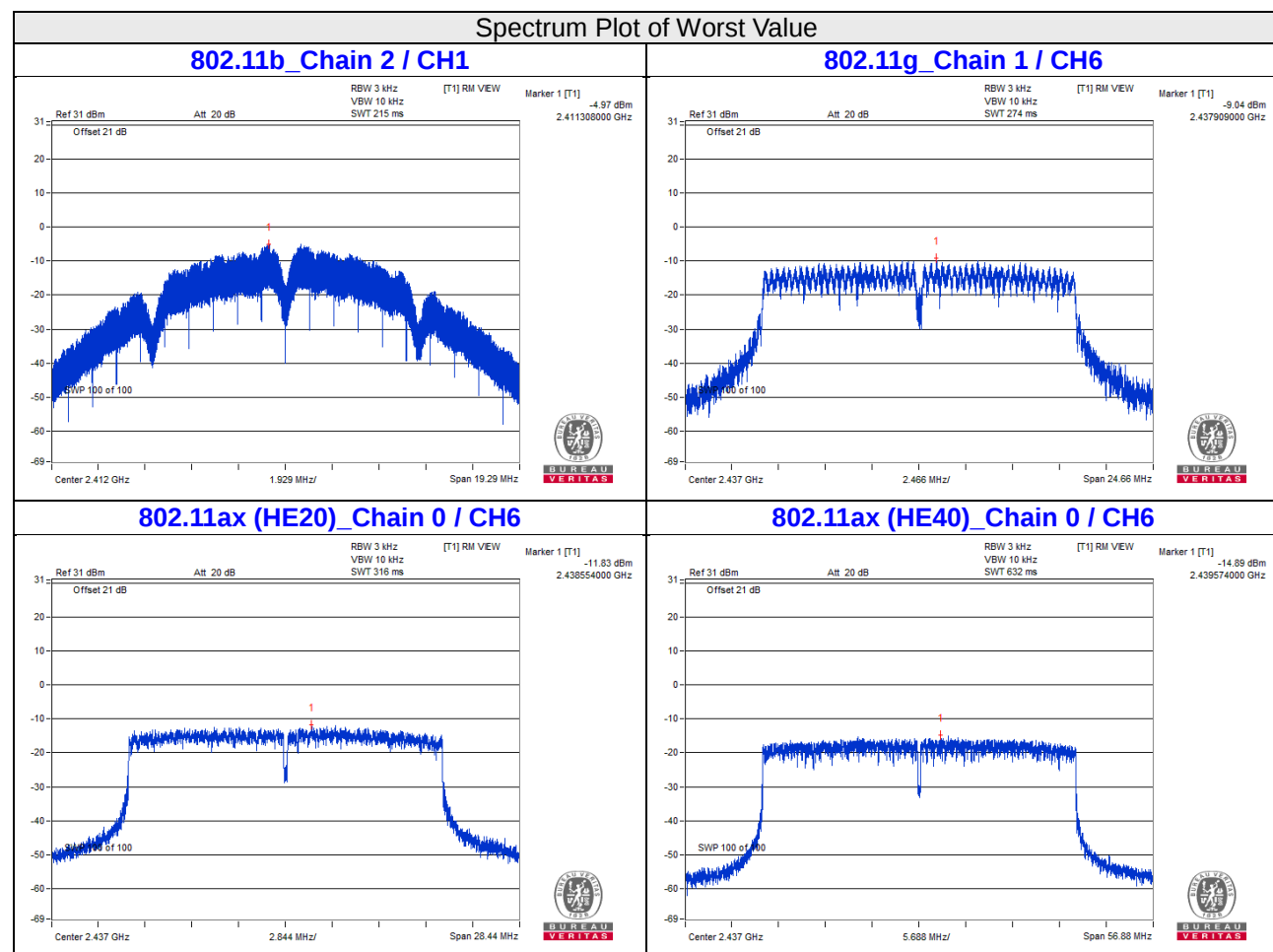
Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)				Duty Factor (dB)	Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
1	2412	-13.05	-14.30	-14.57	-14.12	0.20	0.16807	-7.75	8.00	PASS
6	2437	-11.83	-12.78	-12.81	-12.97	0.20	0.23183	-6.35	8.00	PASS
11	2462	-13.87	-13.78	-13.44	-13.94	0.20	0.17668	-7.53	8.00	PASS

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)				Duty Factor (dB)	Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3					
3	2422	-16.29	-16.06	-16.01	-16.62	0.24	0.10047	-9.98	8.00	PASS
6	2437	-14.89	-15.71	-15.55	-16.09	0.24	0.11805	-9.28	8.00	PASS
9	2452	-17.30	-17.22	-17.51	-17.59	0.24	0.07685	-11.14	8.00	PASS

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2] = 5.96\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

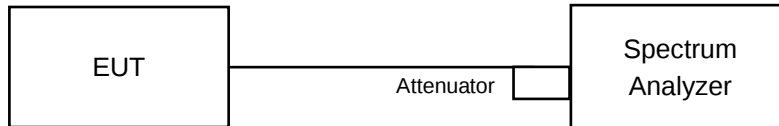


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

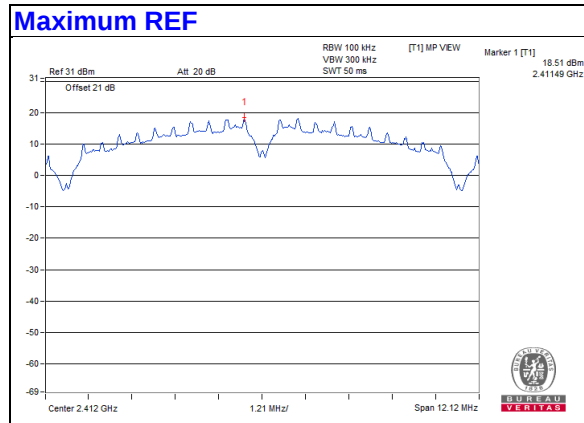
4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results

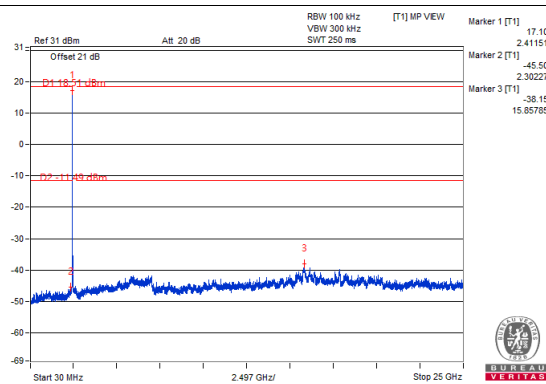
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

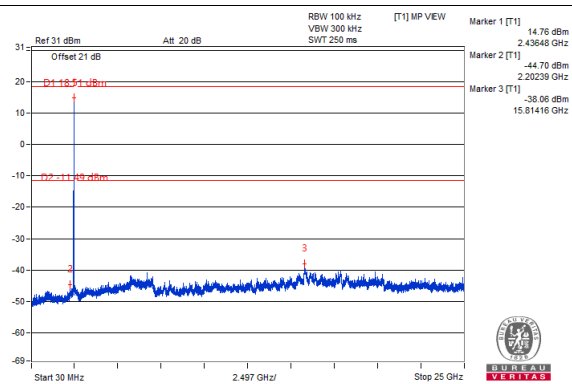


Chain 0

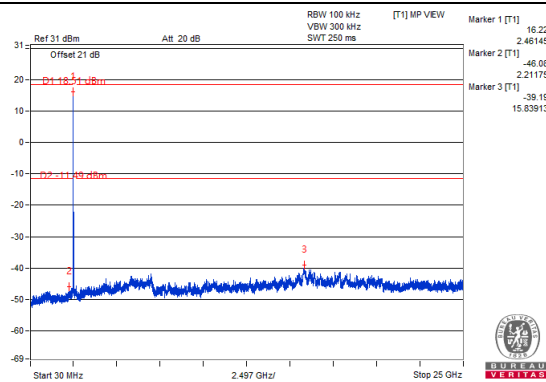
CH 1



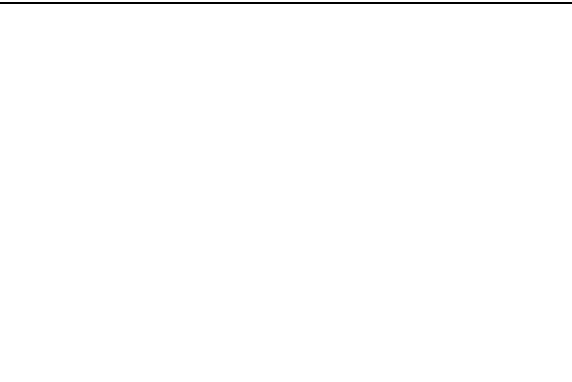
CH 6



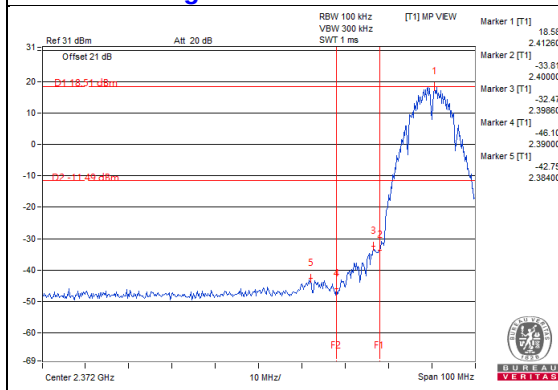
CH 11



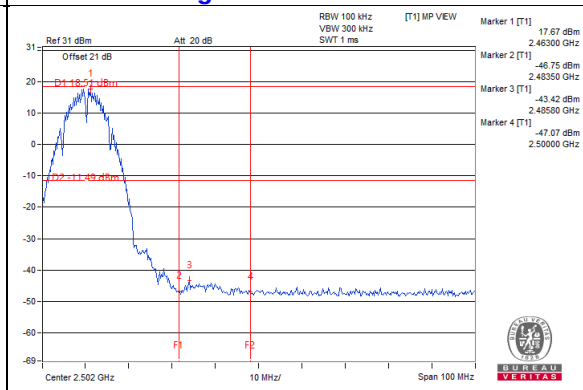
CH 11



CH 1 Band edge

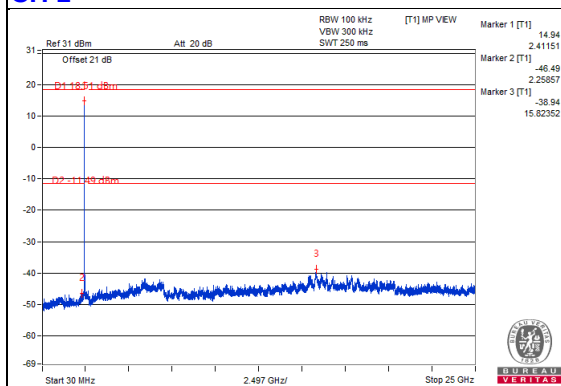


CH 11 Band edge

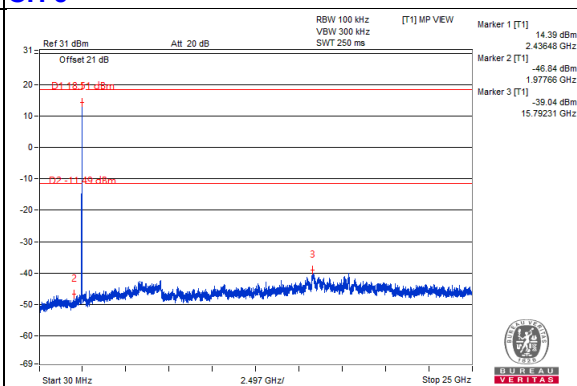


Chain 1

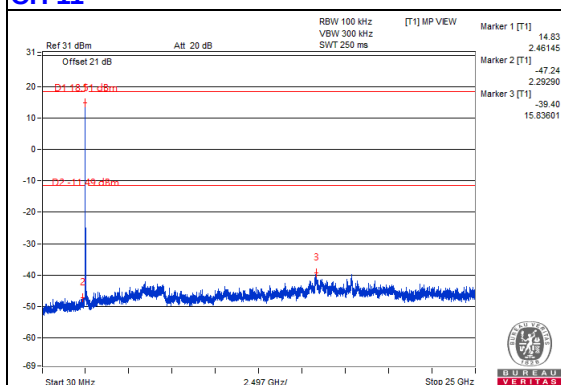
CH 1



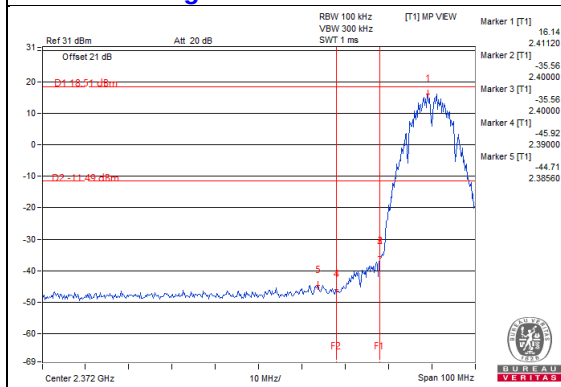
CH 6



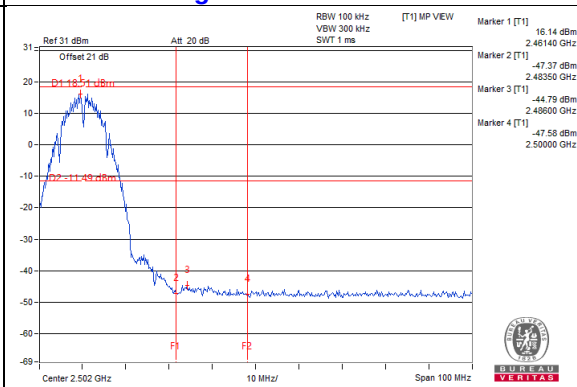
CH 11



CH 1 Band edge

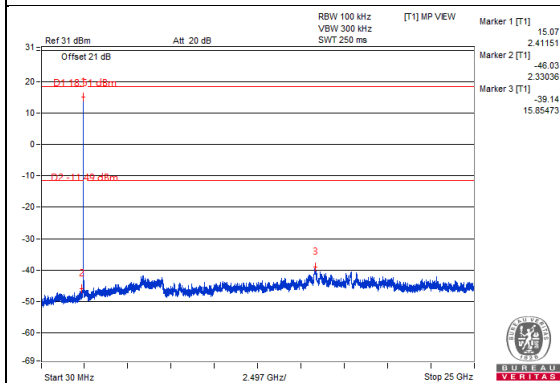


CH 11 Band edge

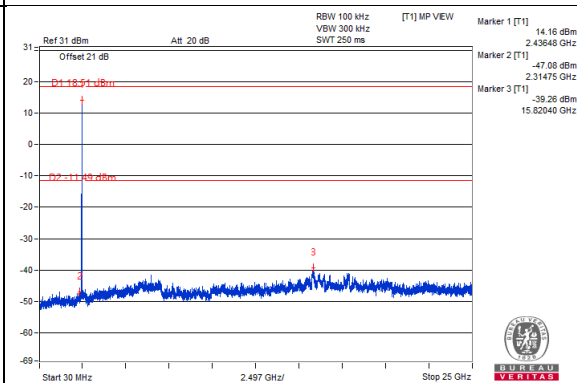


Chain 2

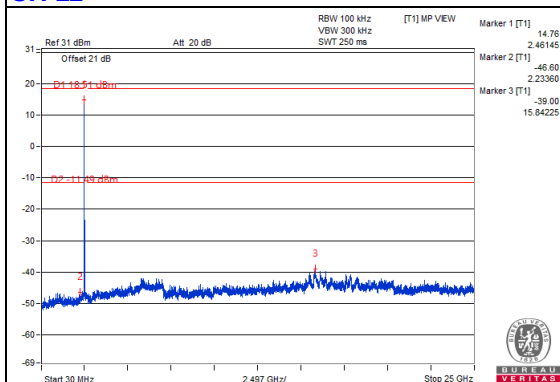
CH 1



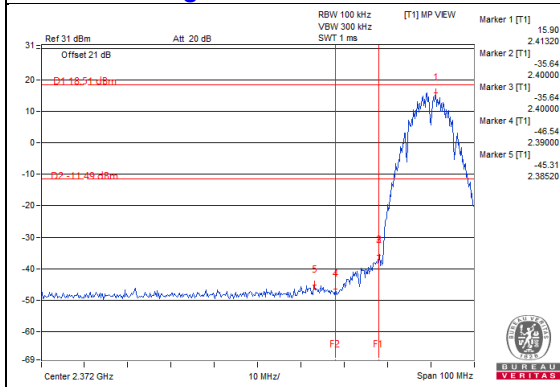
CH 6



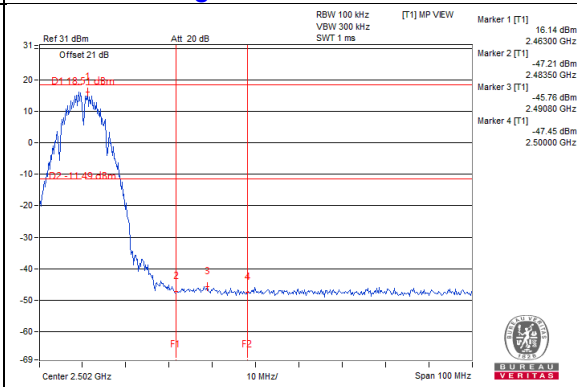
CH 11



CH 1 Band edge

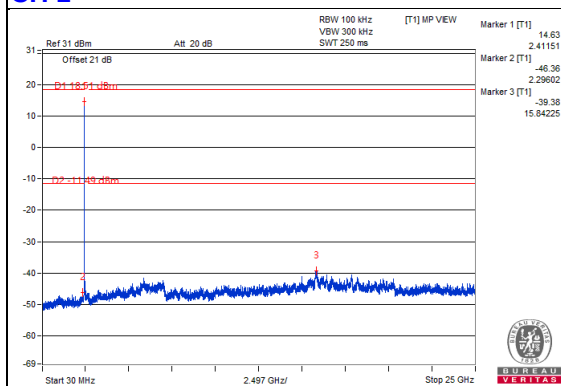


CH 11 Band edge

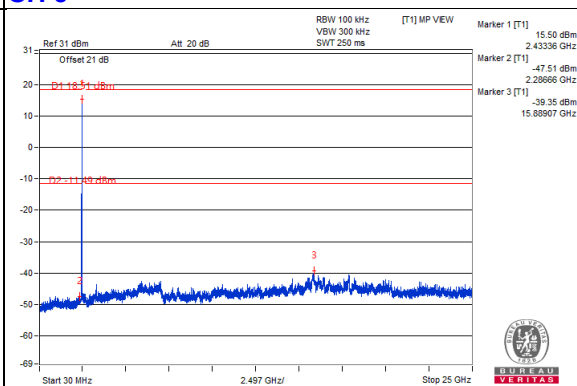


Chain 3

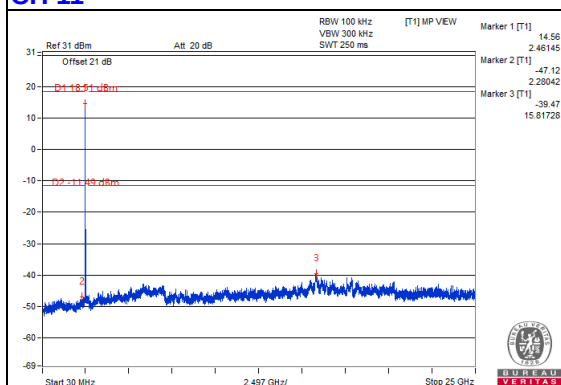
CH 1



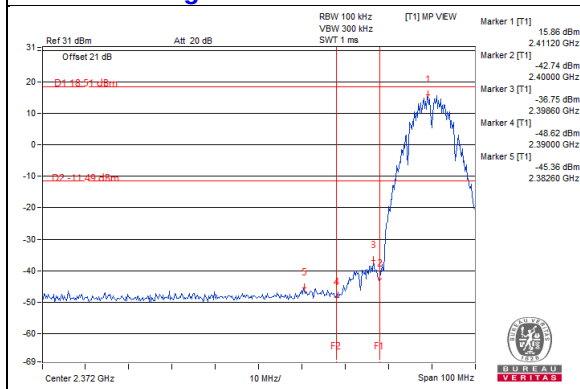
CH 6



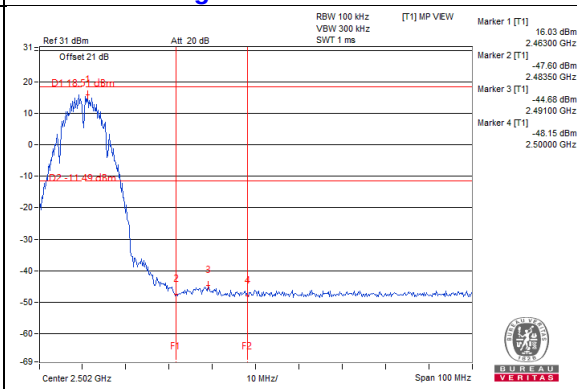
CH 11



CH 1 Band edge

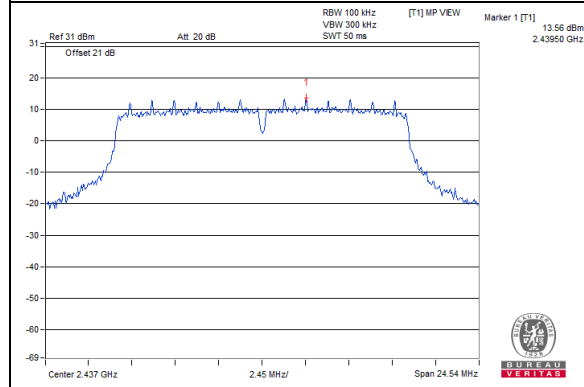


CH 11 Band edge



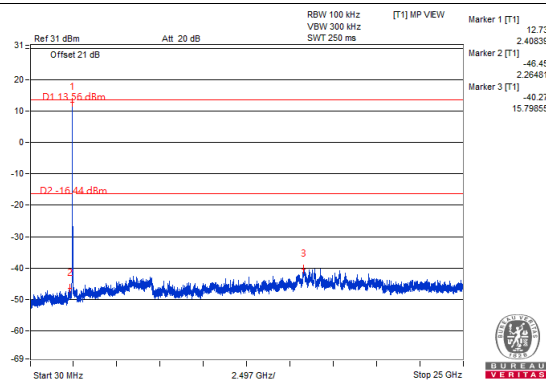
802.11g

Maximum REF

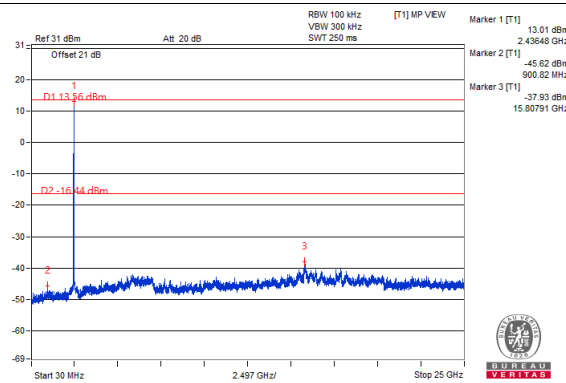


Chain 0

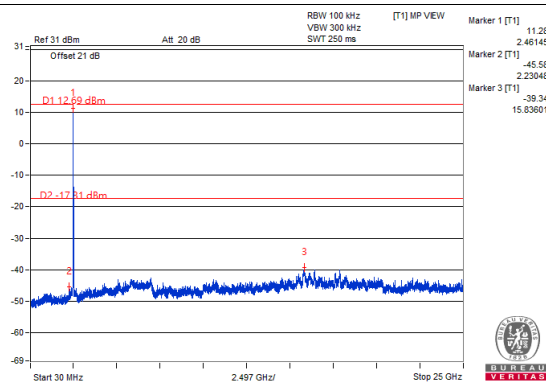
CH 1



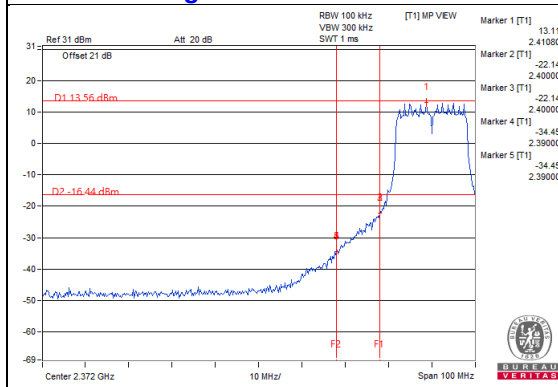
CH 6



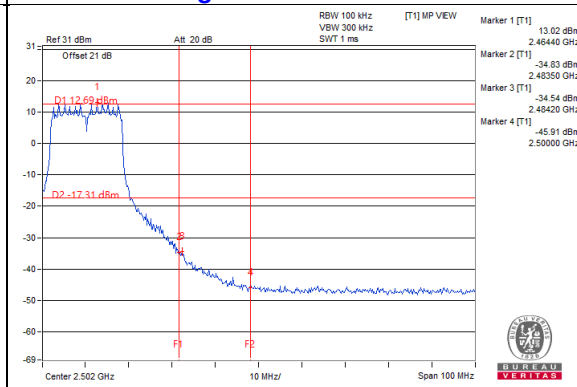
CH 11



CH 1 Band edge

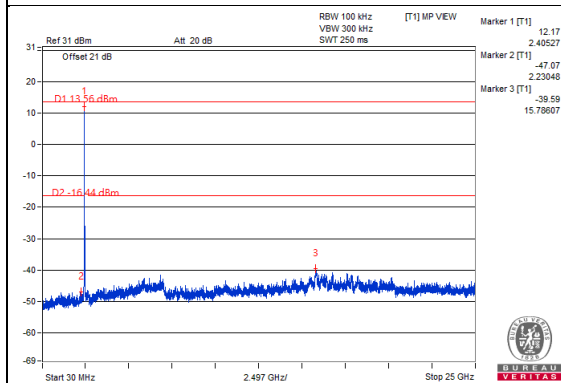


CH 11 Band edge

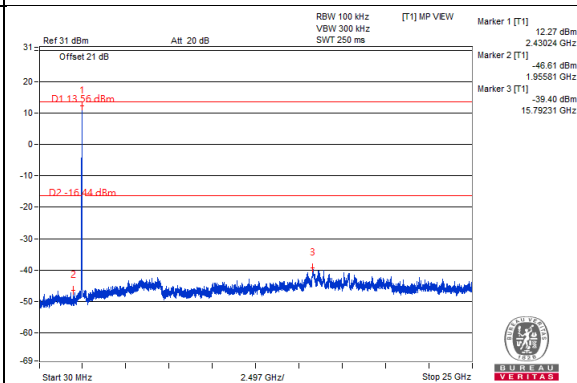


Chain 1

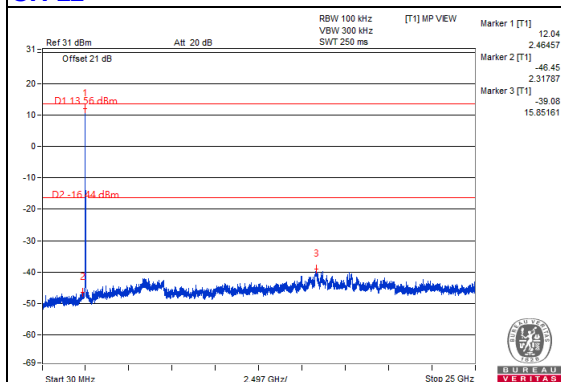
CH 1



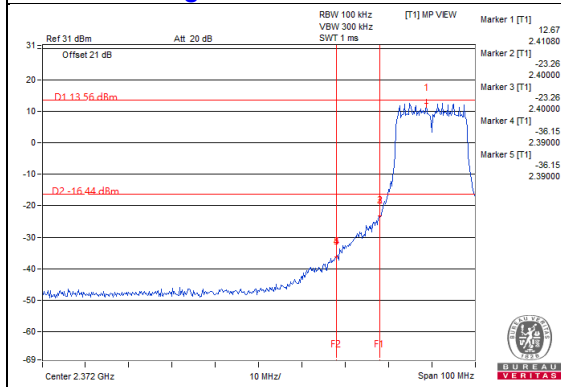
CH 6



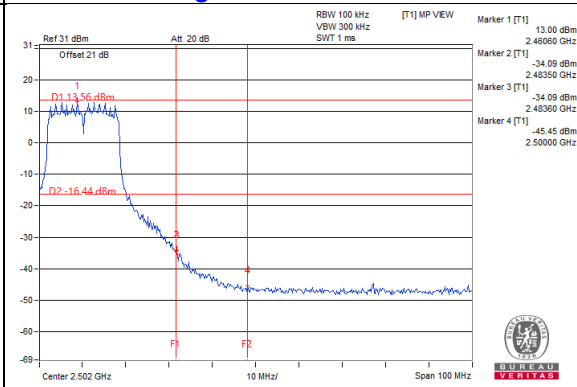
CH 11



CH 1 Band edge

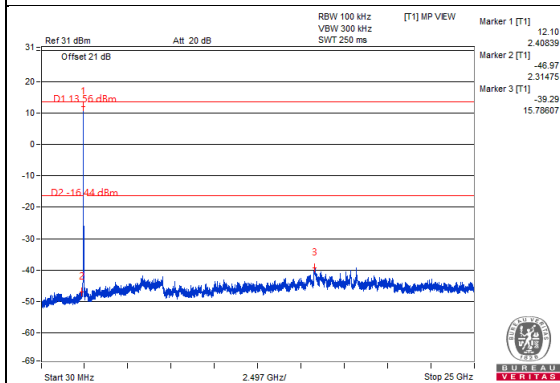


CH 11 Band edge

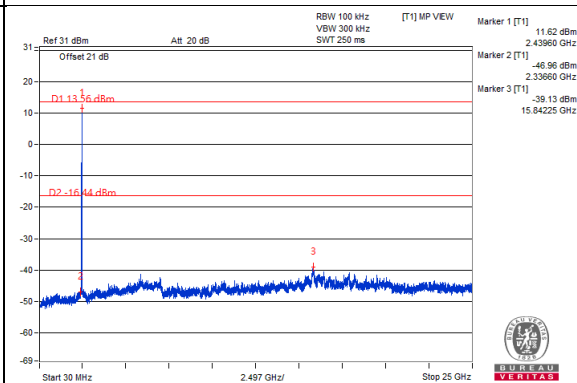


Chain 2

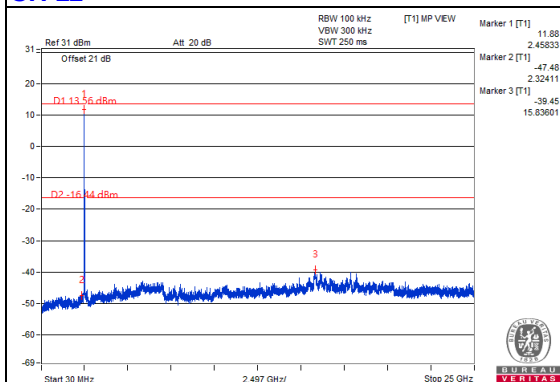
CH 1



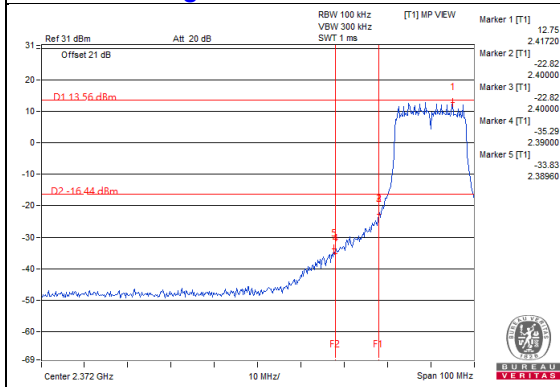
CH 6



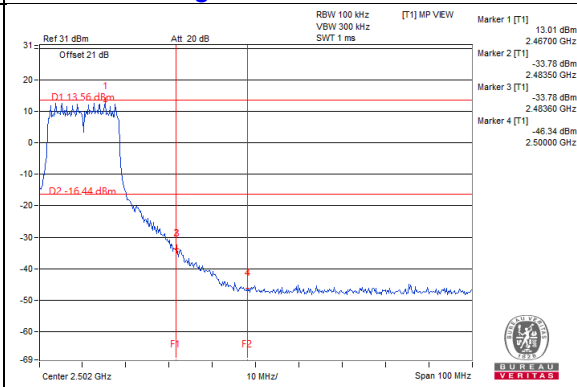
CH 11



CH 1 Band edge

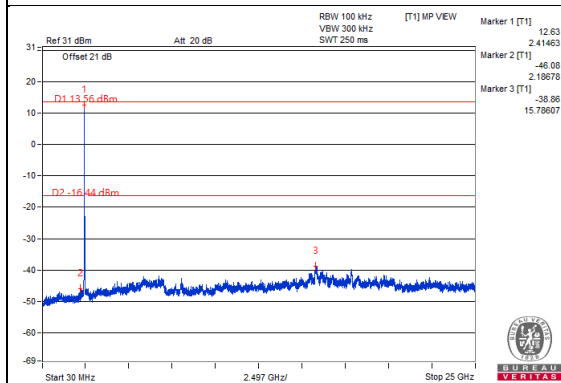


CH 11 Band edge

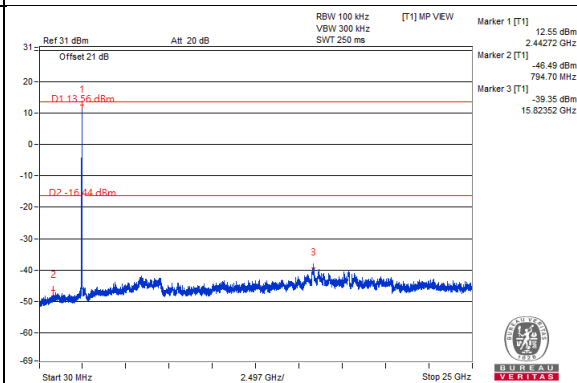


Chain 3

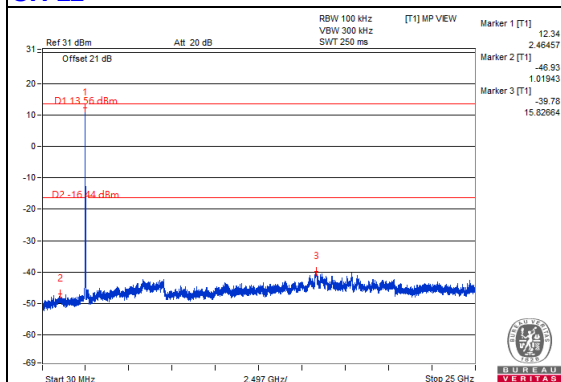
CH 1



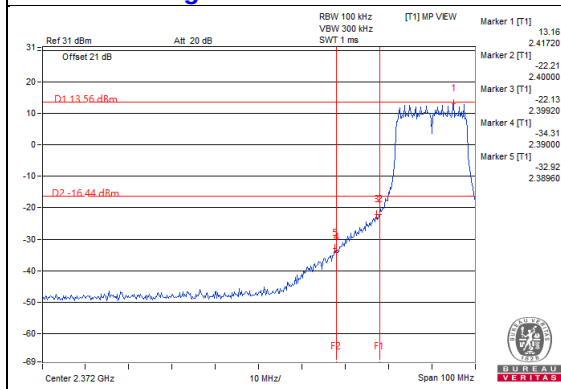
CH 6



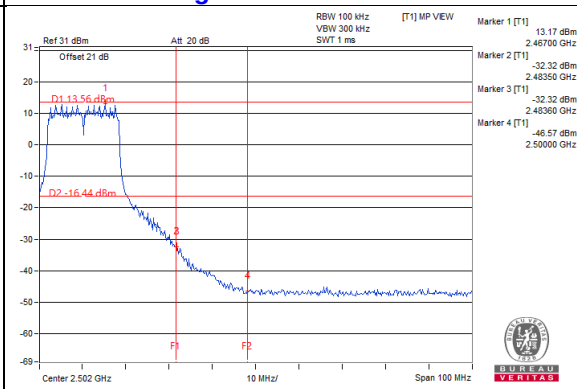
CH 11



CH 1 Band edge

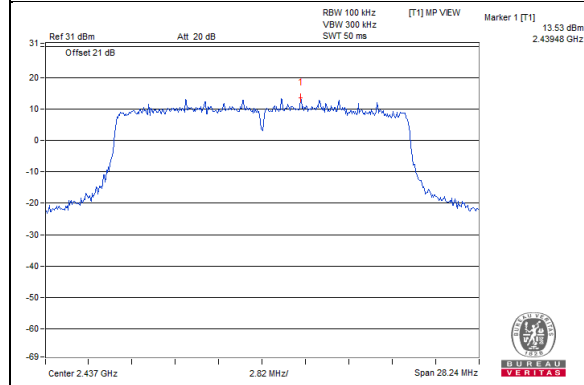


CH 11 Band edge



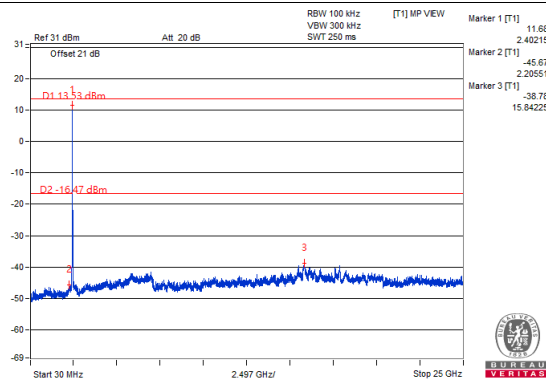
802.11ax (HE20)

Maximum REF

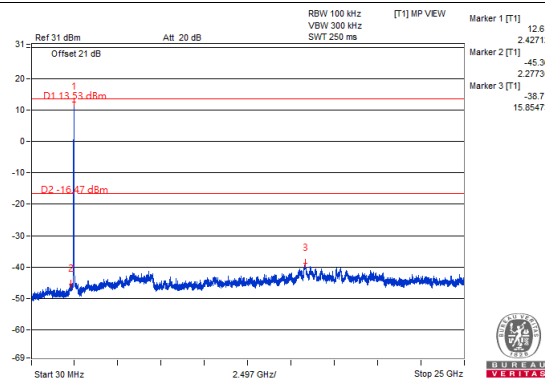


Chain 0

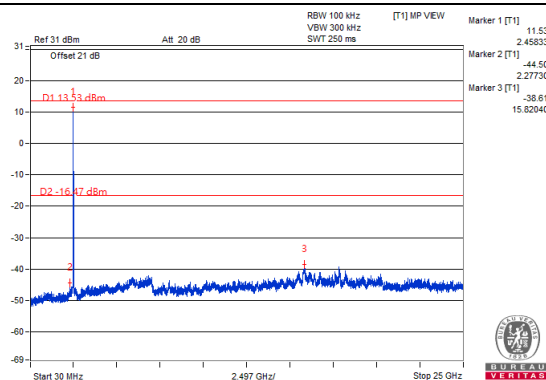
CH 1



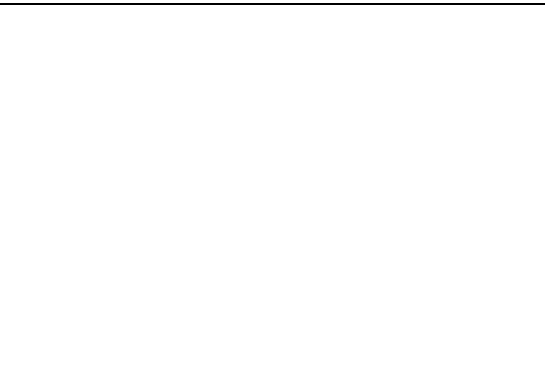
CH 6



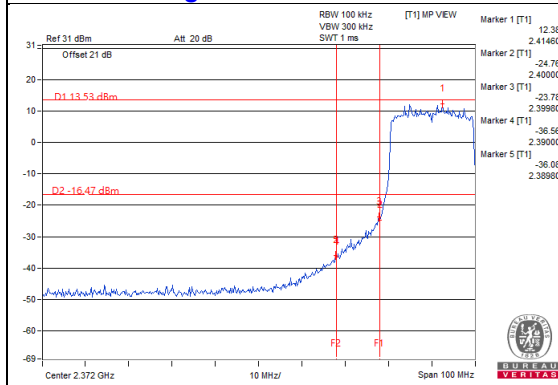
CH 11



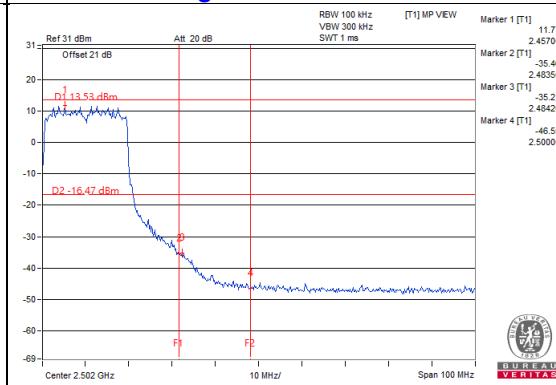
CH 11



CH 1 Band edge

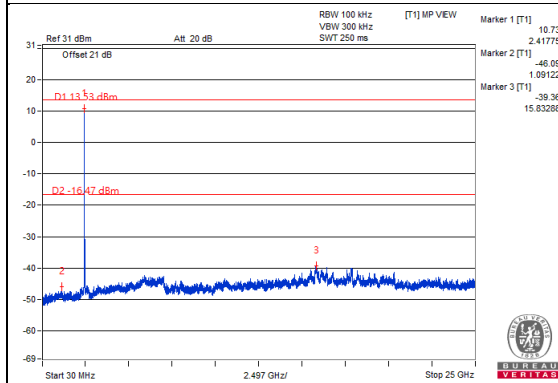


CH 11 Band edge

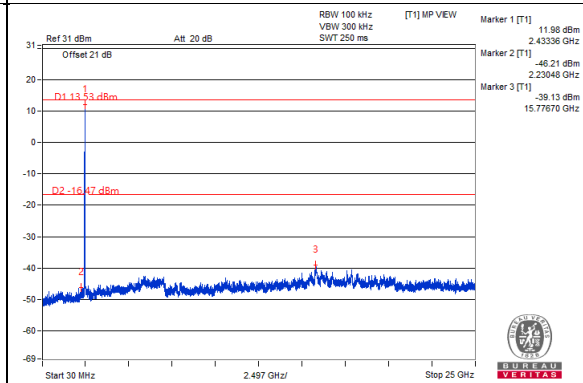


Chain 1

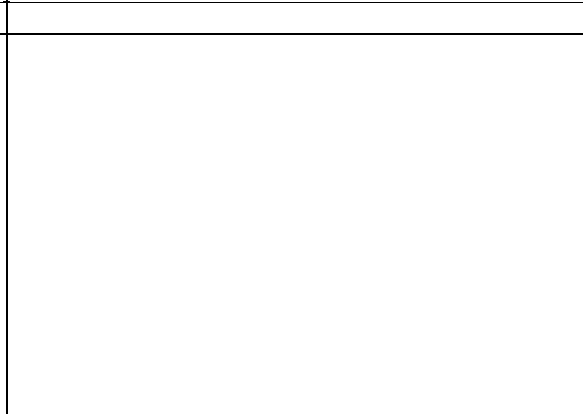
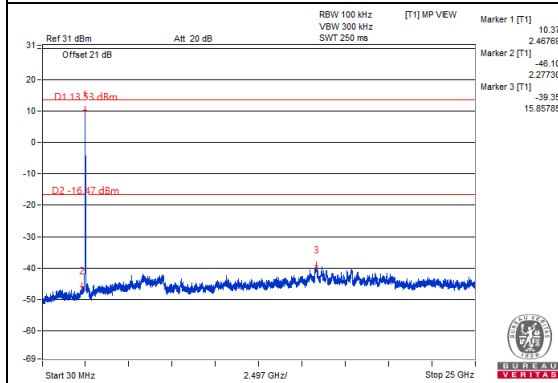
CH 1



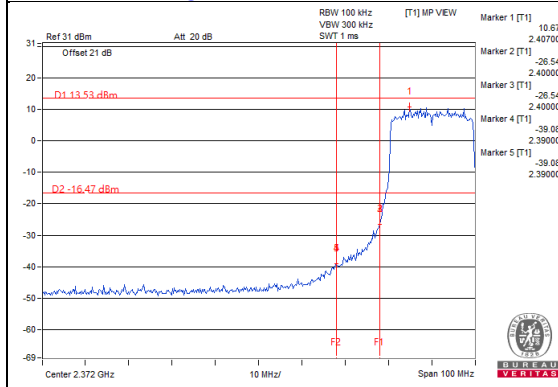
CH 6



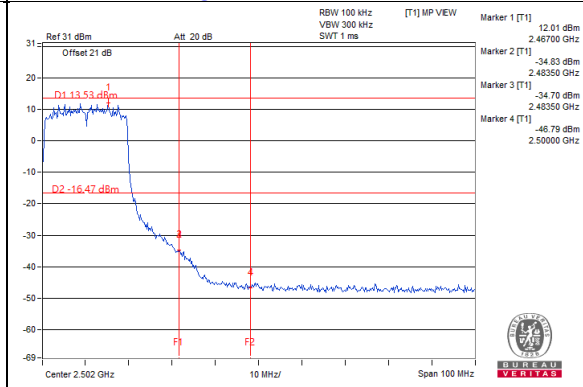
CH 11



CH 1 Band edge

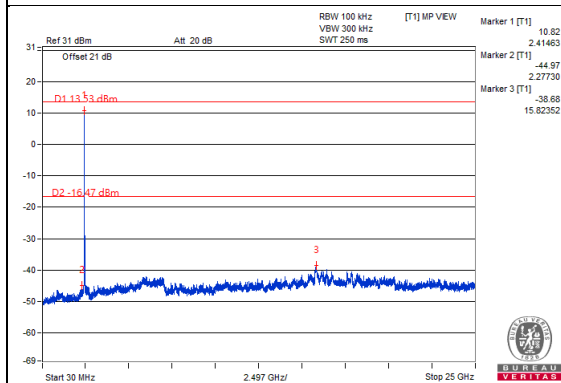


CH 11 Band edge

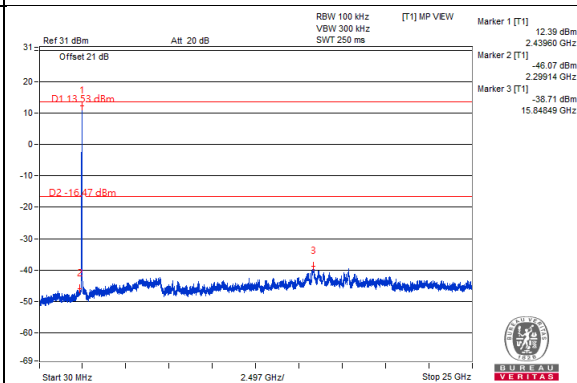


Chain 2

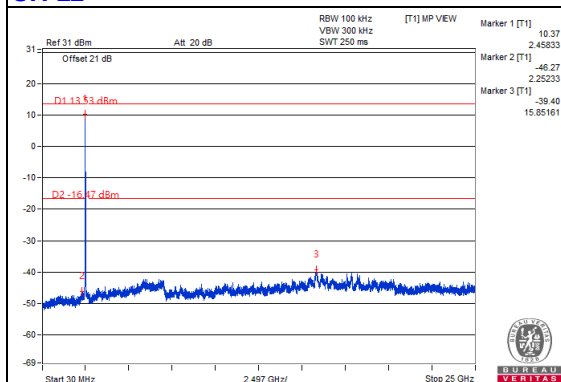
CH 1



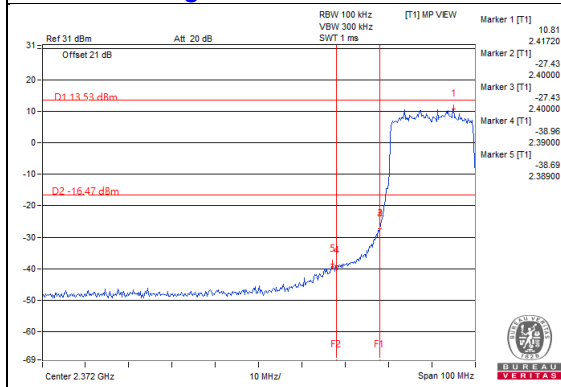
CH 6



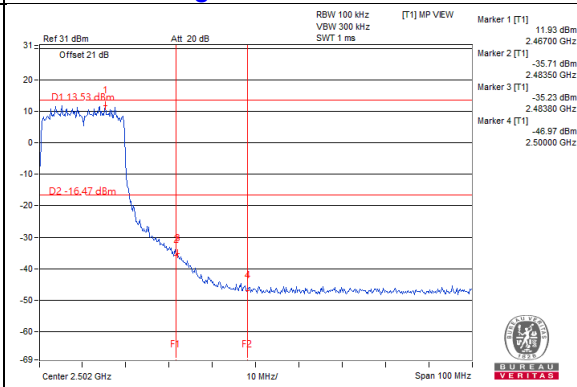
CH 11



CH 1 Band edge

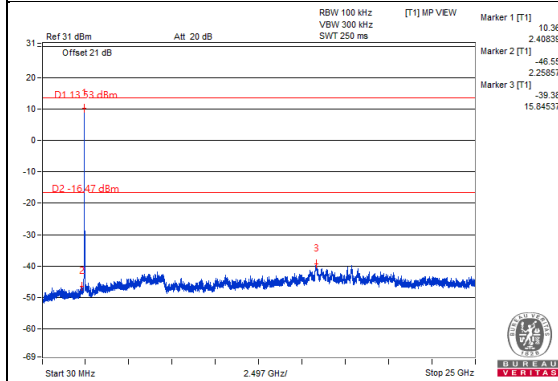


CH 11 Band edge

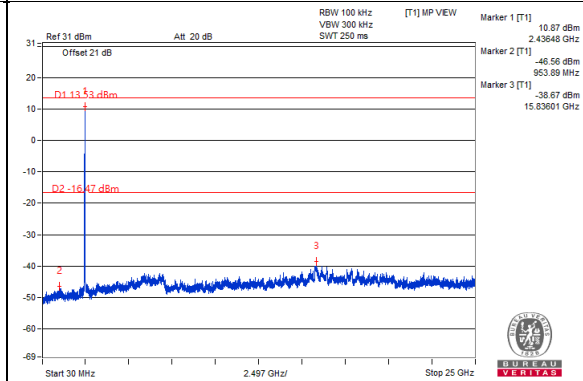


Chain 3

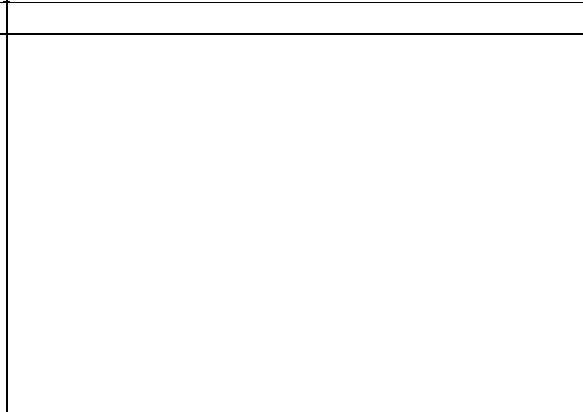
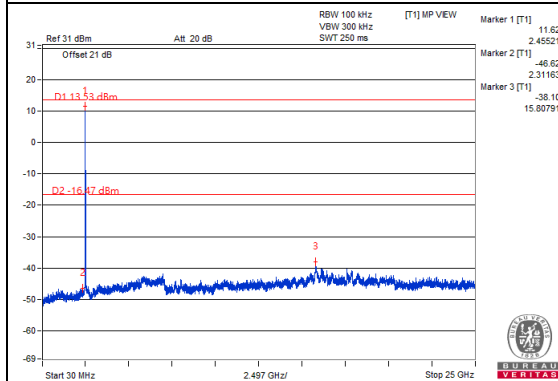
CH 1



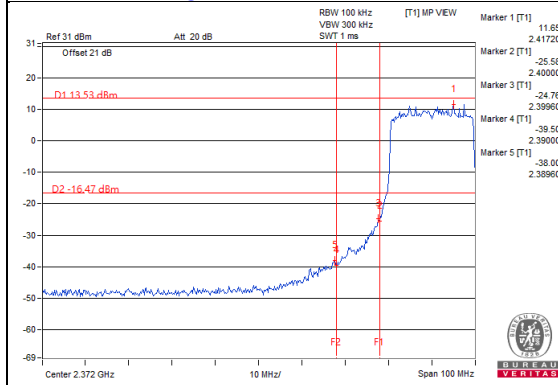
CH 6



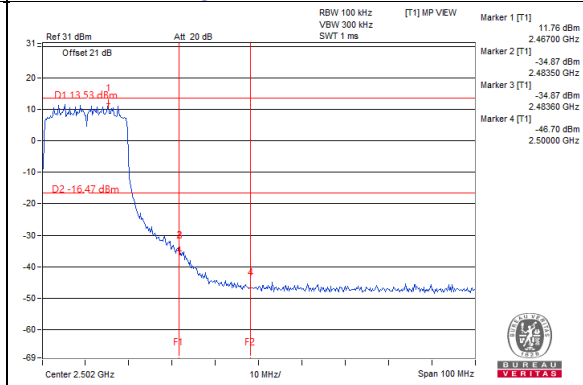
CH 11



CH 1 Band edge

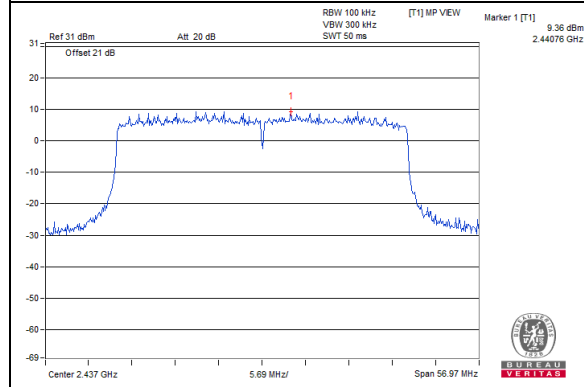


CH 11 Band edge



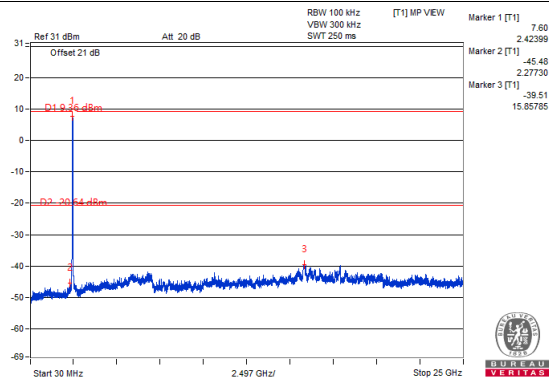
802.11ax (HE40)

Maximum REF

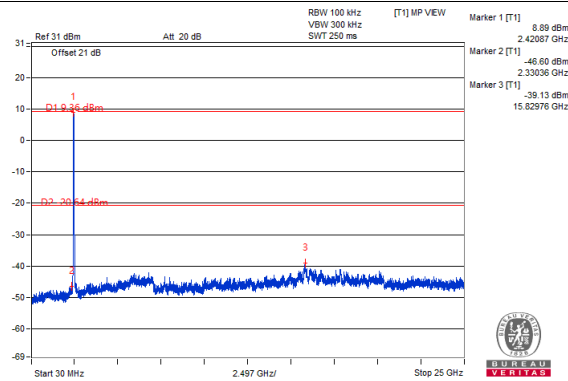


Chain 0

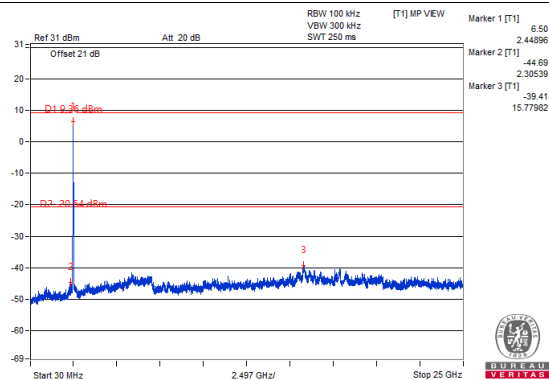
CH 3



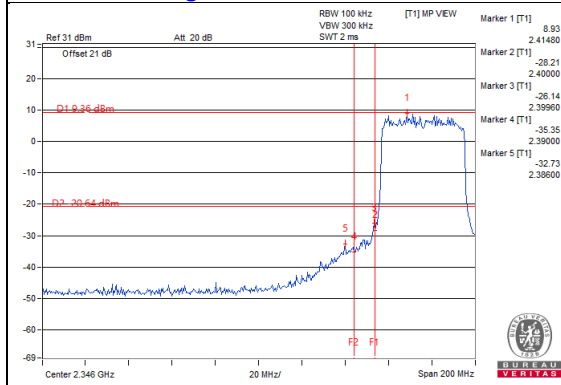
CH 6



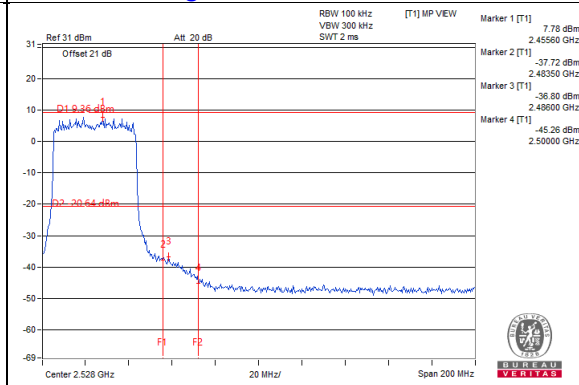
CH 9



CH 3 Band edge

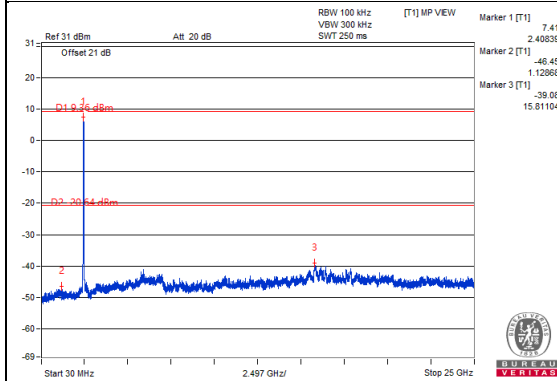


CH 9 Band edge

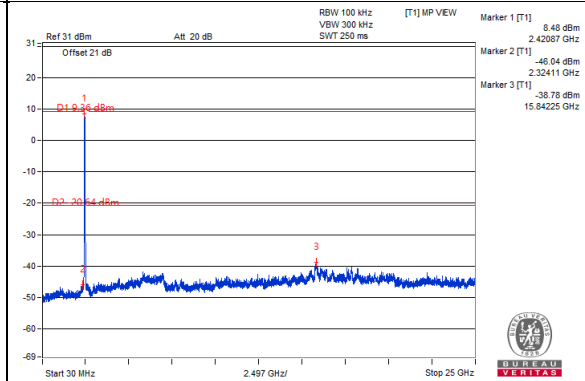


Chain 1

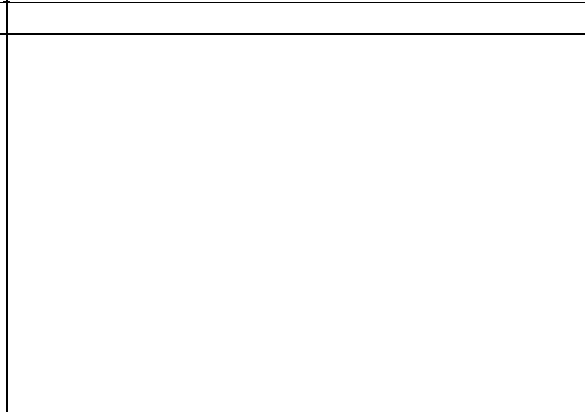
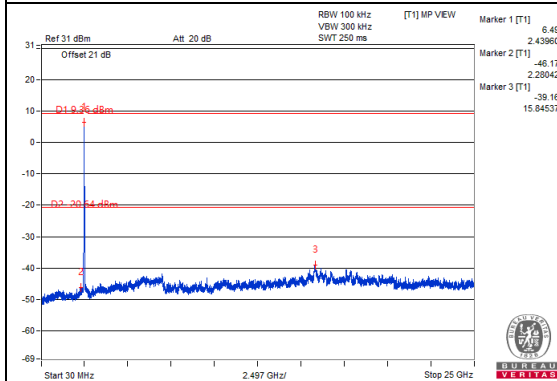
CH 3



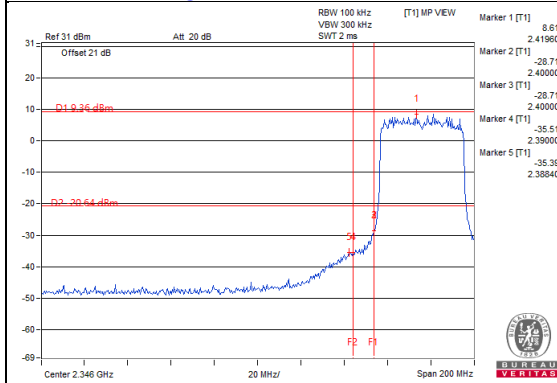
CH 6



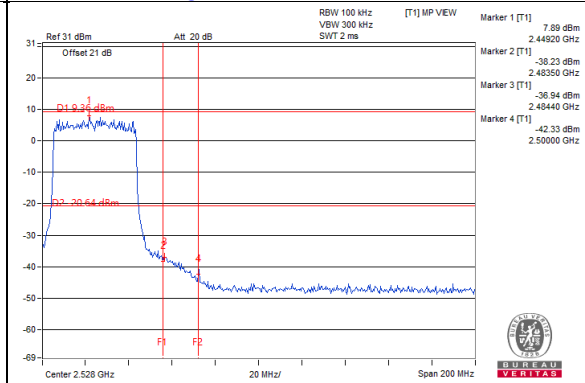
CH 9



CH 3 Band edge

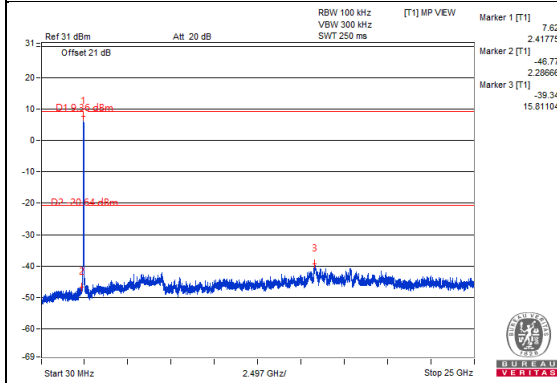


CH 9 Band edge

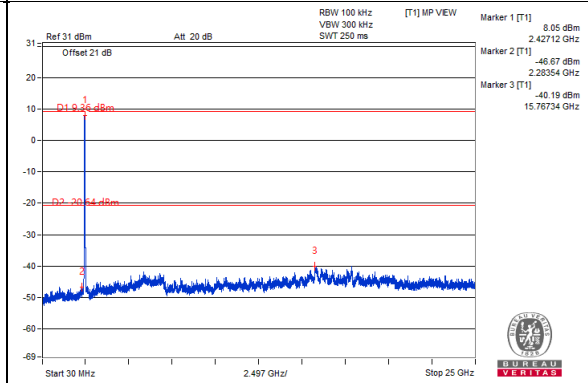


Chain 2

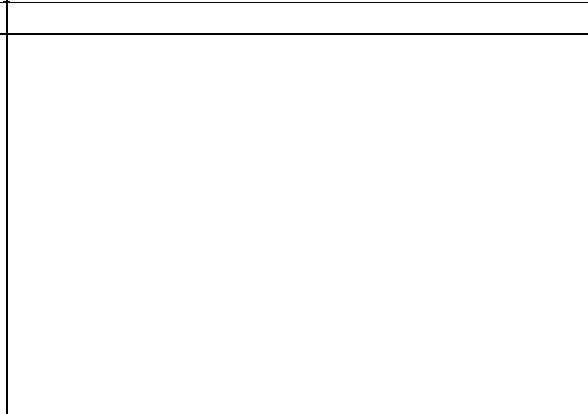
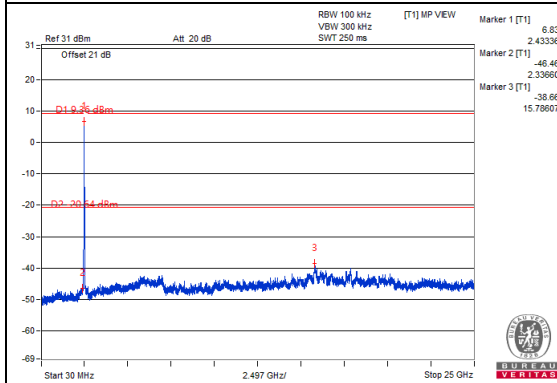
CH 3



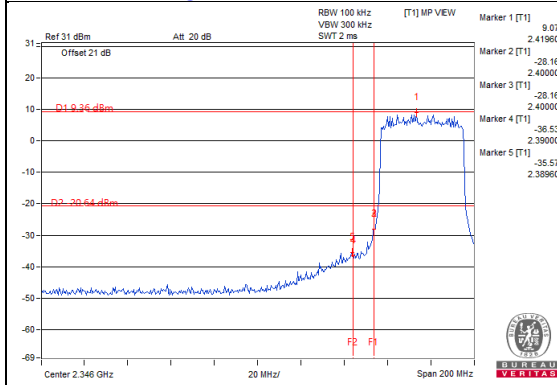
CH 6



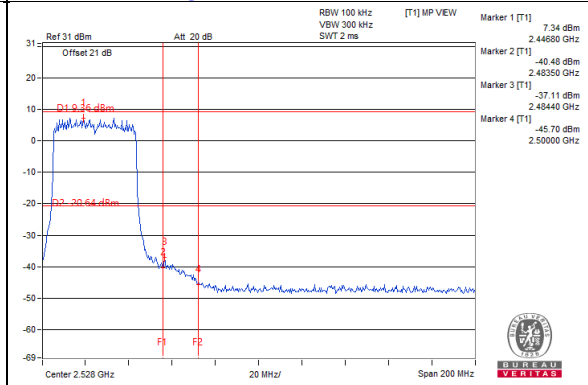
CH 9



CH 3 Band edge

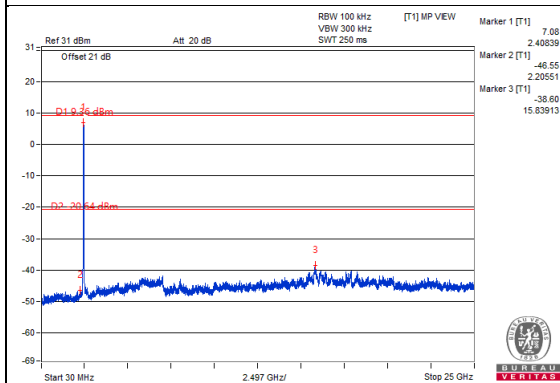


CH 9 Band edge

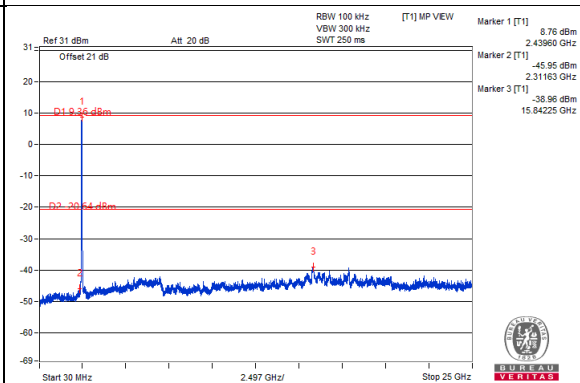


Chain 3

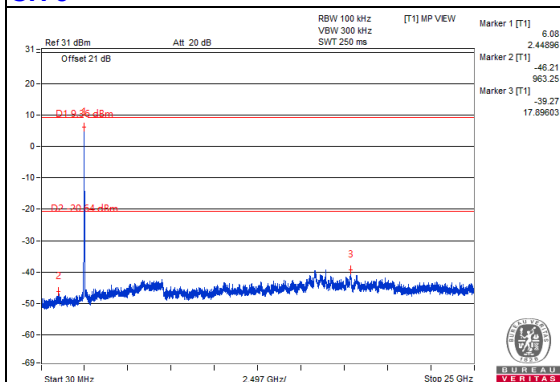
CH 3



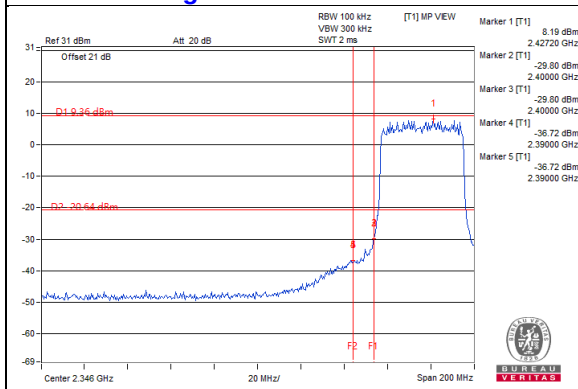
CH 6



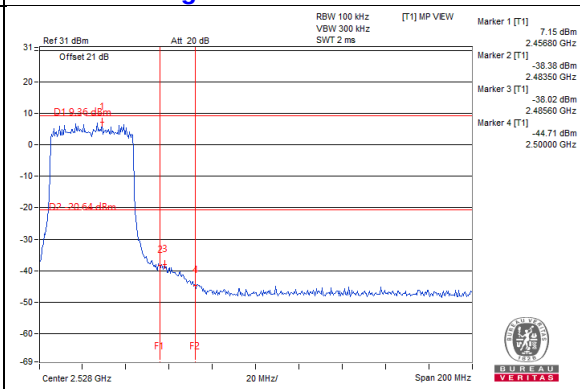
CH 9



CH 3 Band edge



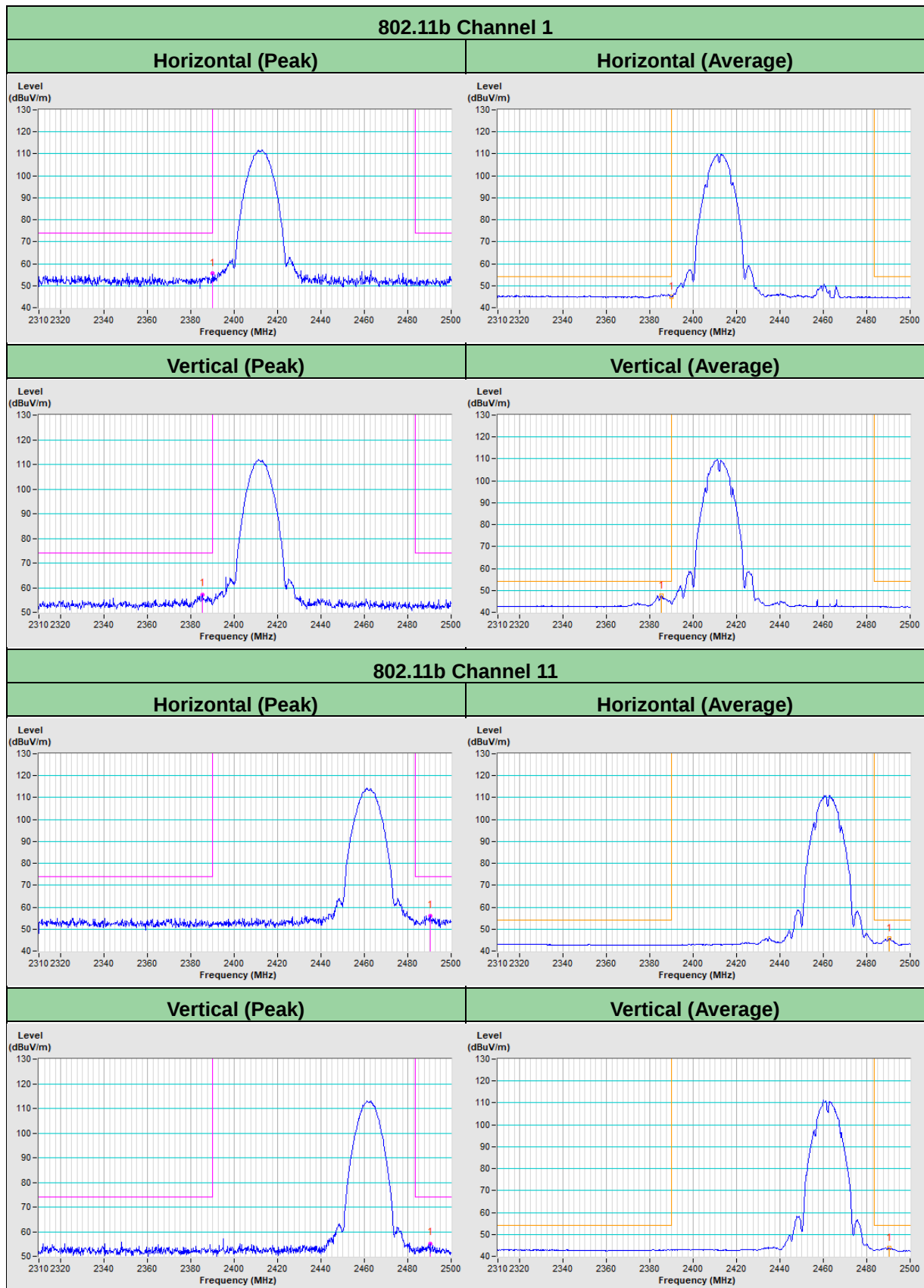
CH 9 Band edge

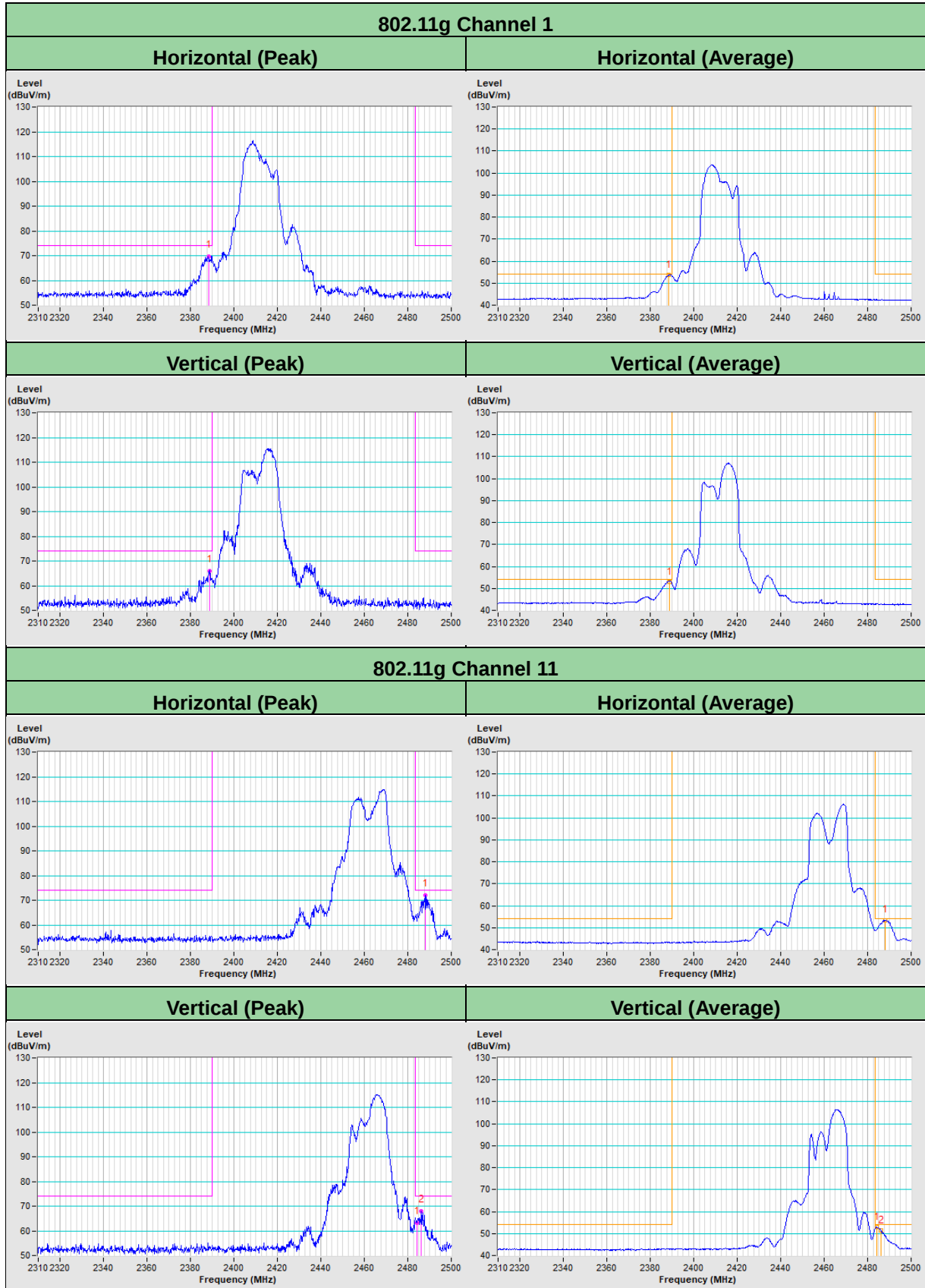


5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

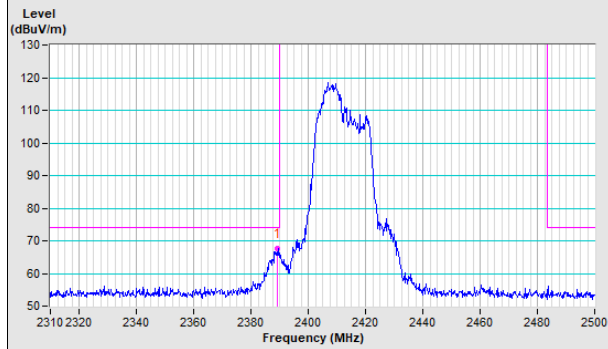
Annex A - Band-Edge Measurement



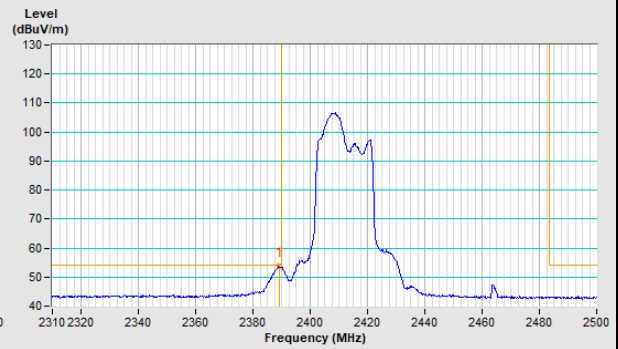


802.11ax (HE20) Channel 1

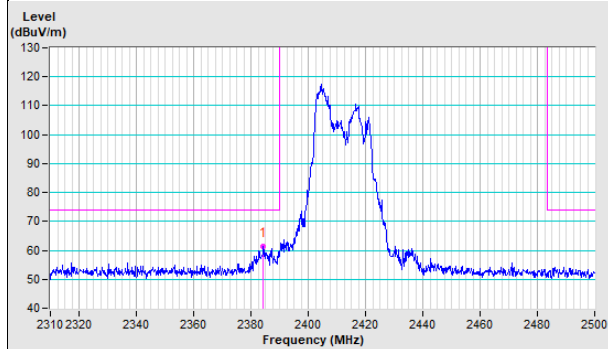
Horizontal (Peak)



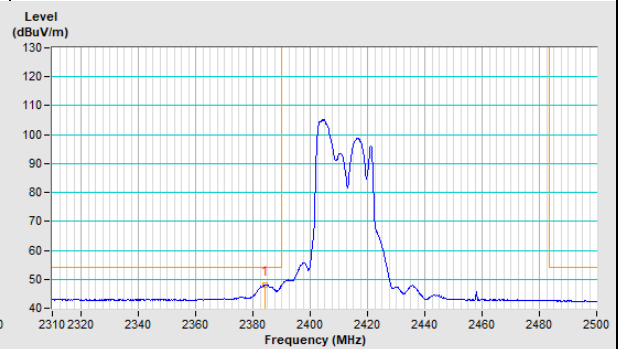
Horizontal (Average)



Vertical (Peak)

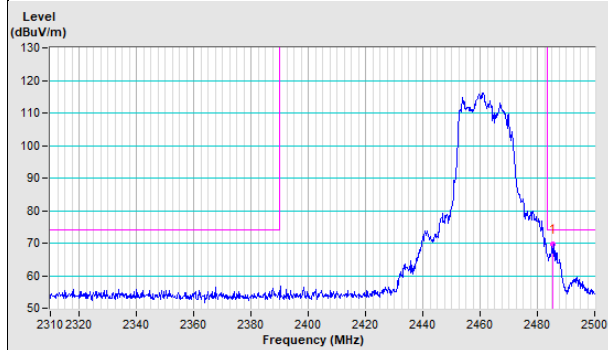


Vertical (Average)

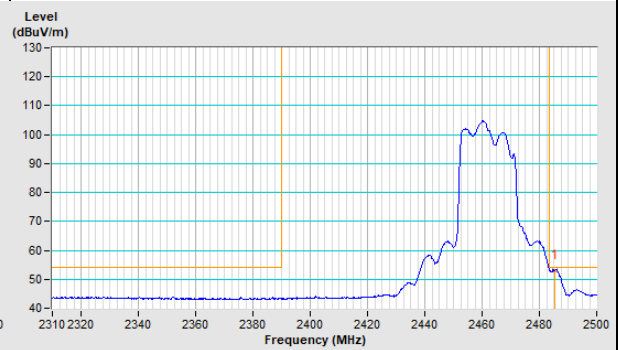


802.11ax (HE20) Channel 11

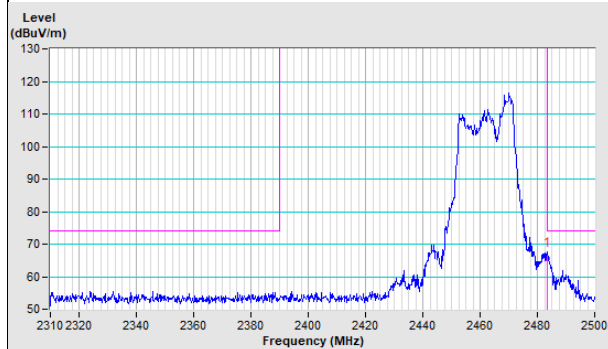
Horizontal (Peak)



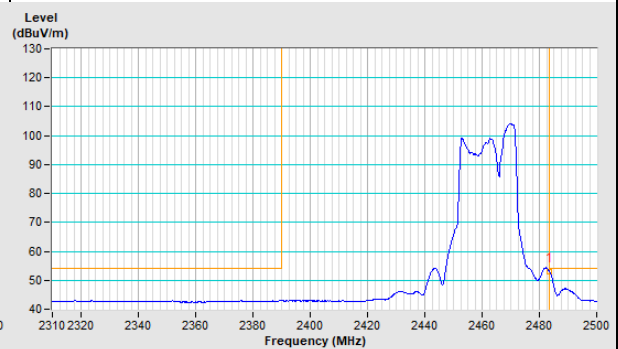
Horizontal (Average)

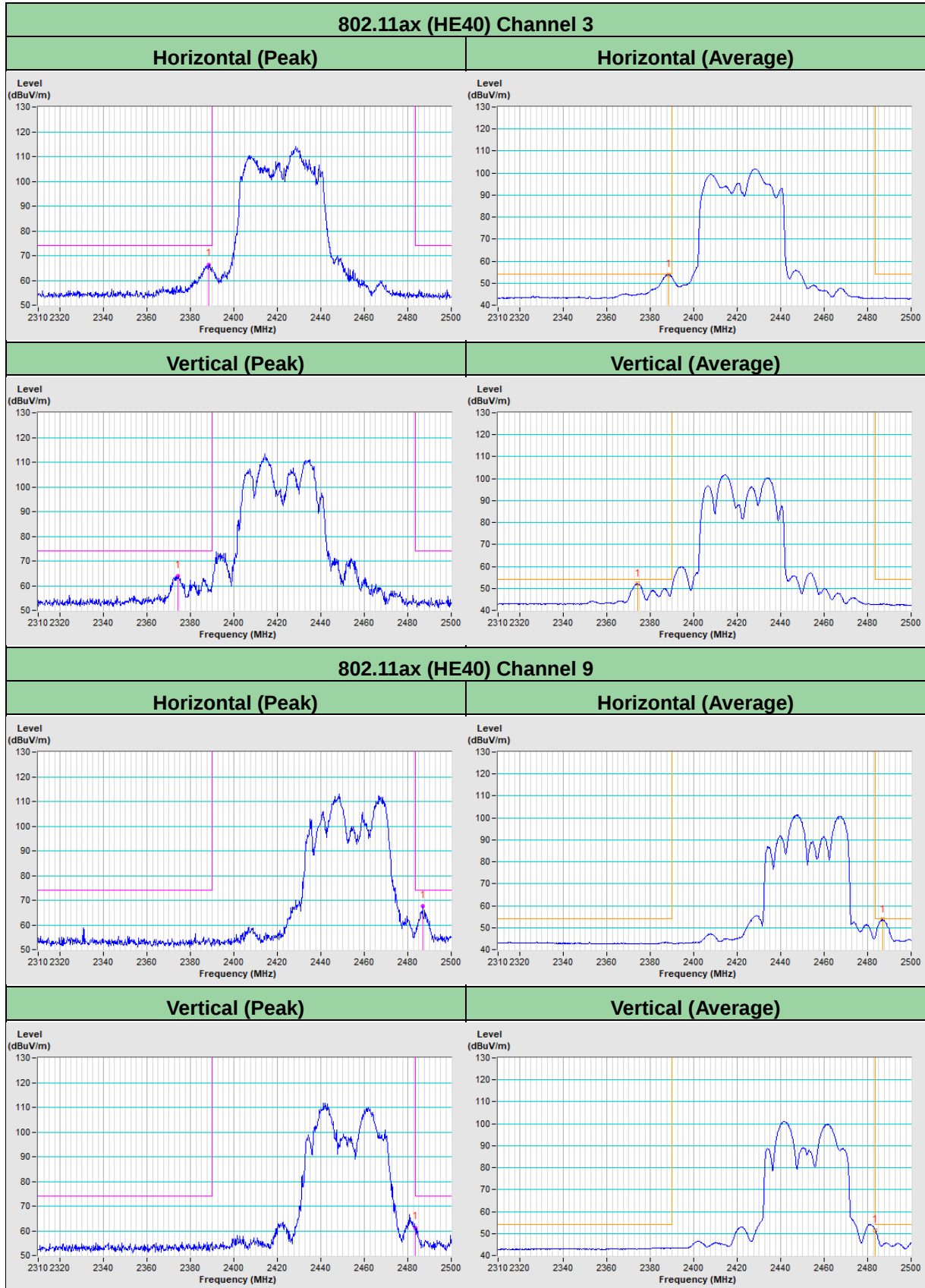


Vertical (Peak)



Vertical (Average)





Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---