

FCC Test Report

Report No.: RFBBQZ-WTW-P21031069

FCC ID: PY321100530

Test Model: RBR760 and RBS760 (refer to item 3.1 for more details)

Received Date: Aug. 13, 2021

Test Date: Aug. 19 ~ Oct. 15, 2021

Issued Date: Nov. 22, 2021

Applicant and Manufacturer: NETGEAR, INC.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RFBBQZ-WTW-P21031069	Original release.	Nov. 22, 2021

1 Certificate of Conformity

Product: Orbi Router / Orbi Satellite

Brand: NETGEAR

Test Model: RBR760 and RBS760 (refer to item 3.1 for more details)

Sample Status: Engineering sample

Applicant and Manufacturer: NETGEAR, INC.

Test Date: Aug. 19 ~ Oct. 15, 2021

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 RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen, **Date:** Nov. 22, 2021
Pettie Chen / Senior Specialist

Approved by : Jeremy Lin, **Date:** Nov. 22, 2021
Jeremy Lin / Senior Engineer

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 -9.36dB at 0.32102MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2385.20MHz, 2390.00, 2389.30, 2483.50MHz.
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 IPEX not a standard connector.

Note:

- For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- 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	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Orbi Router / Orbi Satellite
Brand	NETGEAR
Test Model	RBR760 and RBS760
Model Difference	Refer to note
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 400Mbps 802.11ax: up to 574Mbps
Operating Frequency	2412~2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 7
Output Power	CDD Mode: 914.186mW Beamforming Mode: 839.894mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	1.95m non-shielded RJ45 cable without core

Note:

1. The models are listed as below.

Brand	Product Name	Model	Difference
NETGEAR	Orbi Router	RBR760	Master mode Ethernet port* 4 eMMC flash 4GB NAND Flash 512MB 1GB DDR3 (4Gb DDR3*2)
	Orbi Satellite	RBS760	Master mode and Client mode Ethernet port* 2 NAND Flash 256MB 512MB DDR3 (2Gb DDR3*2)

2. The EUT has three different pin-to-pin FEM in 2.4G & 5G module, after pretest the mode 1 was the worst case for final test.

Mode	Description
1	1 st 2.4G + 1 st 5G FEM
2	2 nd 2.4G + 2 nd 5G FEM
3	3 rd 2.4G + 3 rd 5G FEM

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

Modulation Mode	Beamforming Mode	TX Function
802.11b	Not Support	2TX
802.11g	Not Support	2TX
802.11n (HT20)	Not Support	2TX
802.11n (HT40)	Not Support	2TX
802.11n (VHT20)	Support	2TX
802.11n (VHT40)	Support	2TX
802.11ax (HE20)	Support	2TX
802.11ax (HE40)	Support	2TX

* The bandwidth and modulation are similar for HT20/HT40/ VHT20/VHT40 on 802.11n mode and HE20/HE40 on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n and 802.11ac/ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

4. The EUT uses following adapters.

Adapter 1	
Brand	Netgear
Model	ADS-40FPA-12 12030EPCU-L ADS-40FPA-12 12030EPC-L
P/N	332-11584-01
Input Power	100-120Vac ~50/60MHz Max. 1A
Output Power	12Vdc/2.5A
Power line	1.8m cable without core

Adapter 2	
Brand	Netgear
Model	2ABL030F 1
P/N	332-10948-01
Input Power	100-120Vac ~50/60MHz Max. 1A
Output Power	12Vdc/2.5A
Power line	1.82m cable without core

*After pre-testing, adapter 1 was the worst for final tests.

5. The EUT with follow antennas gain is listed as table below.

Radio	No.	Type	Connector	Gain (dBi)					
				2400-2483.5 MHz	5150-5250 MHz	5250-5350 MHz	5470-5725 MHz	5725-5850 MHz	5845-5885 MHz
Low Band Radio	0	Dipole	IPEX	3.80	2.64	2.64	-	-	
	1	Dipole	IPEX	3.51	2.98	2.85	-	-	
High Band Radio	2	Dipole	IPEX	-	-	-	3.39	3.48	3.48
	3	Dipole	IPEX	-	-	-	3.41	3.37	3.15

* 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.

6. WLAN 2.4GHz & 5150-5250 MHz & WLAN 5725-5850 MHz technology can transmit at same time.
WLAN 2.4GHz & 5150-5250 MHz & WLAN 5845-5885 MHz technology can transmit at same time.

3.2 Description of Test Modes

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

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

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter 1
B	-	√	√	-	Power from adapter 2

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

Note: "-": Means no effect.

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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11b	1 to 11	1	DSSS	DBPSK	1.0	-

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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11b	1 to 11	1	DSSS	DBPSK	1.0	-

Conducted Output Power 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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
A	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
A	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Bandwidth, Power Spectral Density and Conducted Out of Band Emission 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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
A	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	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
RE<1G	25 deg. C, 70% RH	120Vac, 60Hz	Luis Lee
PLC	25 deg. C, 69% RH	120Vac, 60Hz	Luis Lee
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Chris Lin

3.3 Duty Cycle of Test Signal

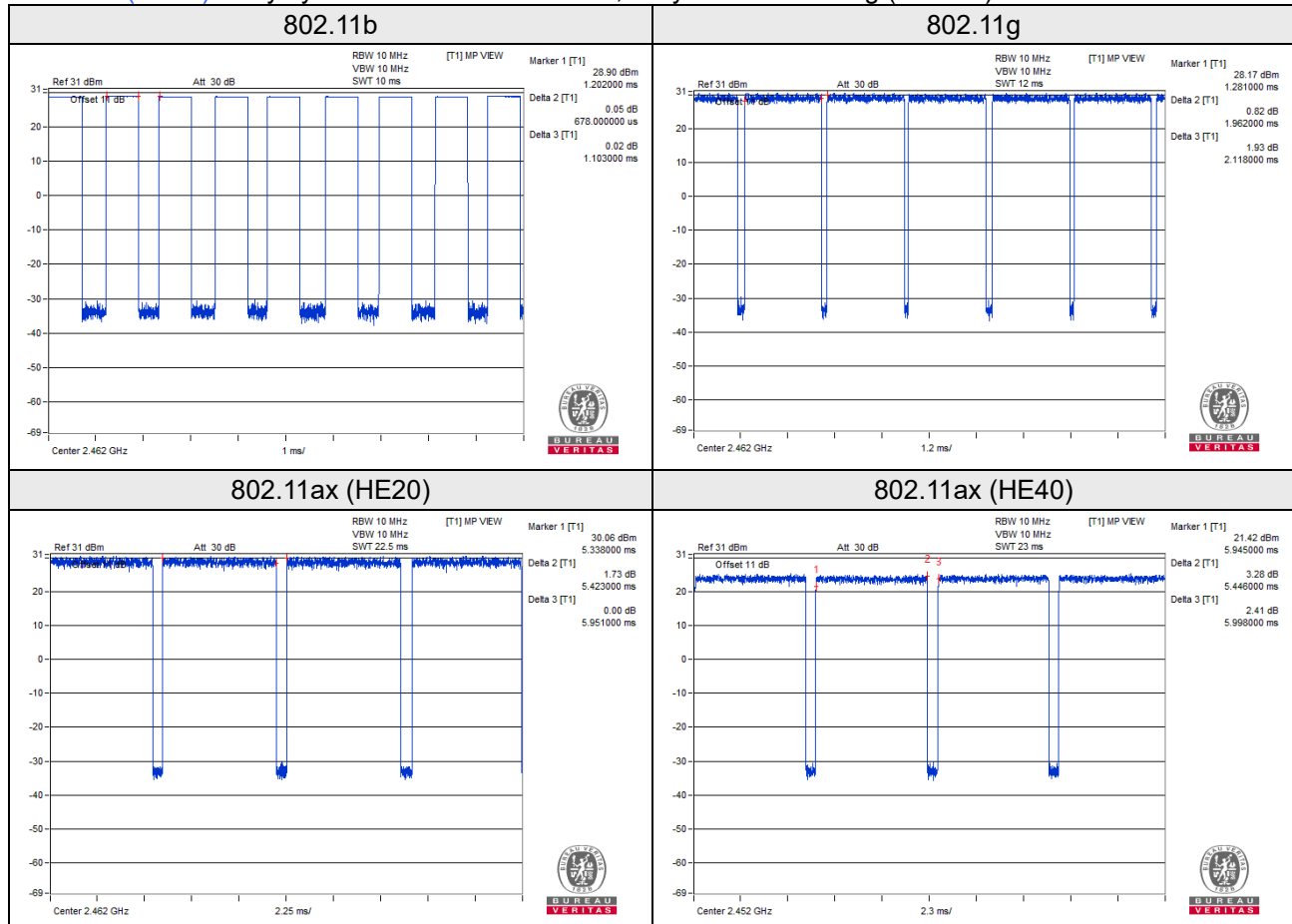
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = $0.678/1.103 = 0.615$, Duty factor = $10 * \log(1/0.615) = 2.11$

802.11g: Duty cycle = $1.962/2.118 = 0.926$, Duty factor = $10 * \log(1/0.926) = 0.33$

802.11ax (HE20): Duty cycle = $5.423/5.951 = 0.911$, Duty factor = $10 * \log(1/0.911) = 0.40$

802.11ax (HE40): Duty cycle = $5.446/5.998 = 0.908$, Duty factor = $10 * \log(1/0.908) = 0.42$



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.

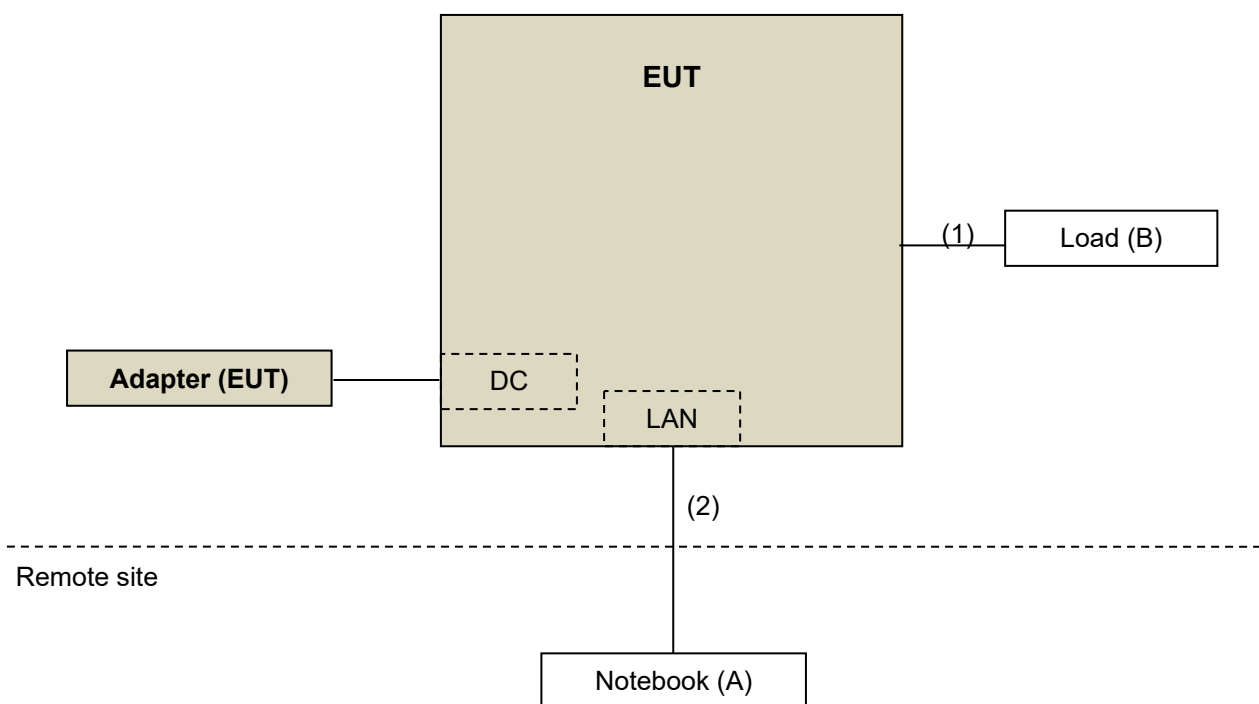
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5520	8Y4DMQ1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as a communication partner to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.95	N	0	RJ45, Cat5e
2.	LAN cable	1	6	N	0	RJ45, Cat5e

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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Dec. 31, 2020	Dec. 30, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020 Sep. 15, 2021	Sep. 15, 2021 Sep. 14, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 03, 2020	Nov. 02, 2021
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Jun. 05, 2021	Jun. 04, 2022
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jun. 05, 2021	Jun. 04, 2022
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH4-01	Jul. 24, 2021	Jul. 23, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Jul. 24, 2021	Jul. 23, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Jul. 24, 2021	Jul. 23, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Jun. 05, 2021	Jun. 04, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 19, 2021	Jan. 18, 2022
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 11, 2021	Jan. 10, 2022

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 HwaYa Chamber 4.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- 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.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- 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.
- The test-receiver system was set to peak and average detect 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:

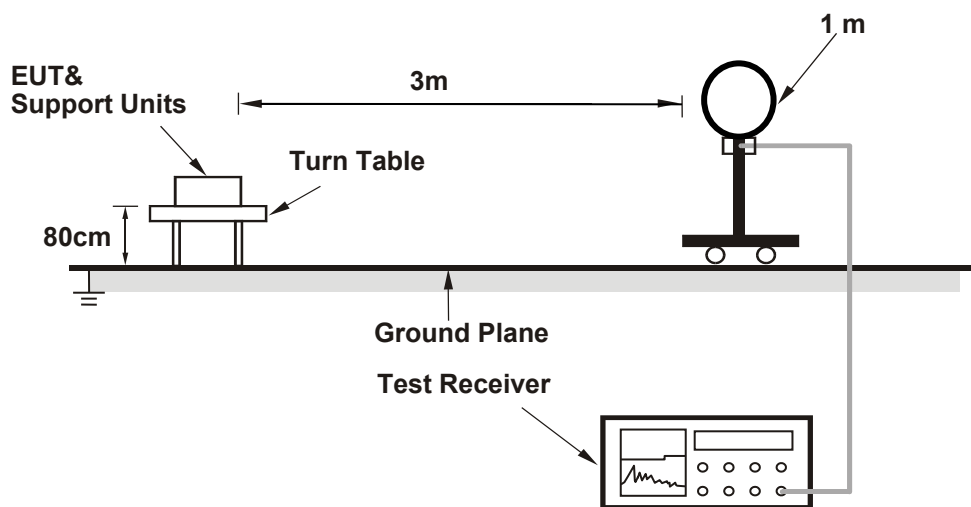
- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- 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. (802.11b: RBW = 1MHz, VBW = 3kHz; 802.11g, 802.11ax (HE20), 802.11ax (HE40): RBW = 1MHz, VBW = 1kHz)
- All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

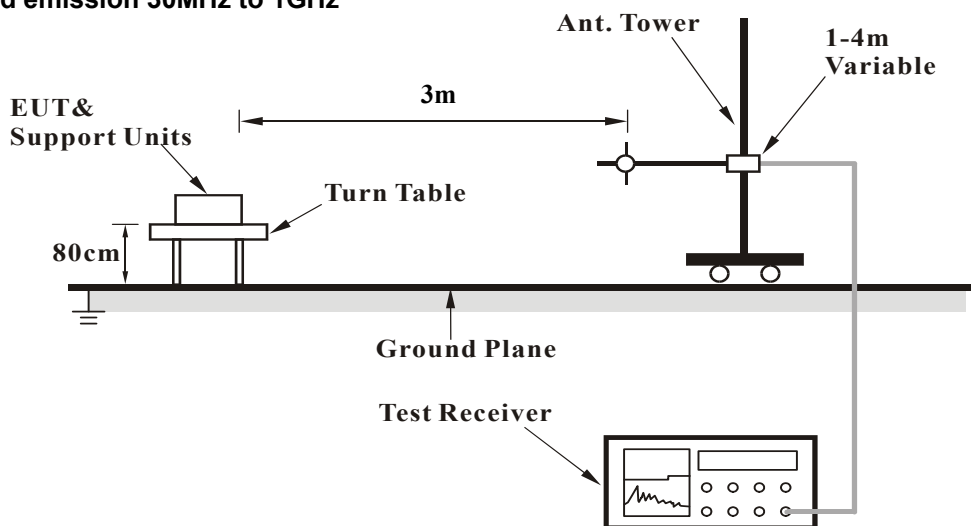
No deviation.

4.1.5 Test Setup

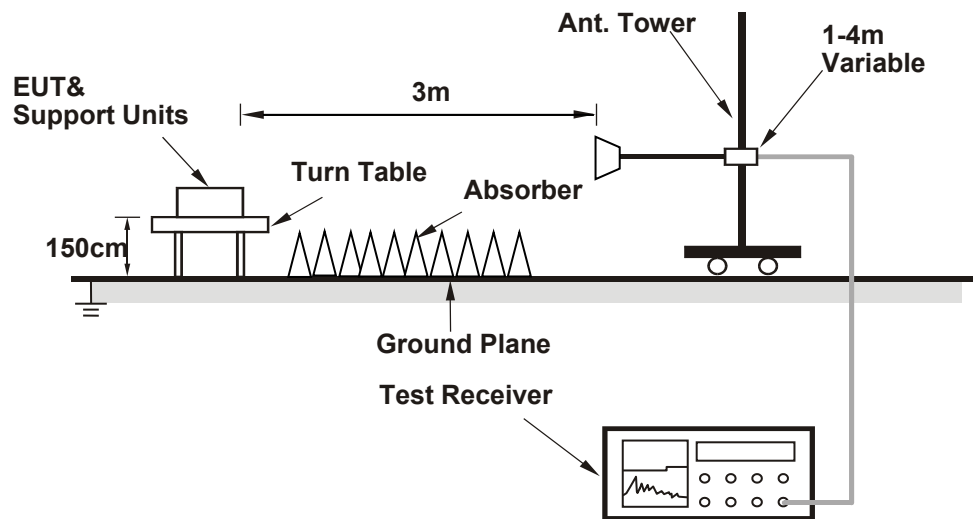
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Above 1GHz worst-Case data:

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2385.20	60.3 PK	74.0	-13.7	3.16 H	185	26.3	34.0
2	2385.20	49.5 AV	54.0	-4.5	3.16 H	185	15.5	34.0
3	*2412.00	115.9 PK			3.16 H	185	81.8	34.1
4	*2412.00	113.7 AV			3.16 H	185	79.6	34.1
5	4824.00	50.8 PK	74.0	-23.2	2.13 H	266	37.1	13.7
6	4824.00	39.4 AV	54.0	-14.6	2.13 H	266	25.7	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2385.20	63.6 PK	74.0	-10.4	2.20 V	139	29.6	34.0
2	2385.20	53.9 AV	54.0	-0.1	2.20 V	139	19.9	34.0
3	*2412.00	122.2 PK			2.20 V	139	88.1	34.1
4	*2412.00	119.0 AV			2.20 V	139	84.9	34.1
5	4824.00	50.7 PK	74.0	-23.3	1.63 V	274	37.0	13.7
6	4824.00	39.5 AV	54.0	-14.5	1.63 V	274	25.8	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	117.6 PK			3.05 H	189	83.5	34.1
2	*2437.00	114.4 AV			3.05 H	189	80.3	34.1
3	4874.00	51.0 PK	74.0	-23.0	2.20 H	253	37.3	13.7
4	4874.00	39.7 AV	54.0	-14.3	2.20 H	253	26.0	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	122.6 PK			1.92 V	50	88.5	34.1
2	*2437.00	120.1 AV			1.92 V	50	86.0	34.1
3	4874.00	51.3 PK	74.0	-22.7	1.69 V	275	37.6	13.7
4	4874.00	39.6 AV	54.0	-14.4	1.69 V	275	25.9	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	117.7 PK			3.12 H	192	83.6	34.1
2	*2462.00	114.3 AV			3.12 H	192	80.2	34.1
3	2491.00	63.2 PK	74.0	-10.8	3.12 H	192	29.0	34.2
4	2491.00	50.2 AV	54.0	-3.8	3.12 H	192	16.0	34.2
5	4924.00	50.8 PK	74.0	-23.2	2.28 H	271	37.2	13.6
6	4924.00	39.4 AV	54.0	-14.6	2.28 H	271	25.8	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	122.5 PK			1.94 V	165	88.4	34.1
2	*2462.00	119.2 AV			1.94 V	165	85.1	34.1
3	2491.00	65.0 PK	74.0	-9.0	1.94 V	165	30.8	34.2
4	2491.00	52.4 AV	54.0	-1.6	1.94 V	165	18.2	34.2
5	4924.00	50.8 PK	74.0	-23.2	1.58 V	273	37.2	13.6
6	4924.00	39.4 AV	54.0	-14.6	1.58 V	273	25.8	13.6

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	63.9 PK	74.0	-10.1	3.11 H	179	29.8	34.1
2	2390.00	51.0 AV	54.0	-3.0	3.11 H	179	16.9	34.1
3	*2412.00	118.2 PK			3.11 H	179	84.1	34.1
4	*2412.00	108.7 AV			3.11 H	179	74.6	34.1
5	4824.00	50.9 PK	74.0	-23.1	2.51 H	263	37.2	13.7
6	4824.00	39.3 AV	54.0	-14.7	2.51 H	263	25.6	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	68.4 PK	74.0	-5.6	2.15 V	189	34.3	34.1
2	2390.00	53.9 AV	54.0	-0.1	2.15 V	189	19.8	34.1
3	*2412.00	123.1 PK			2.15 V	189	89.0	34.1
4	*2412.00	113.7 AV			2.15 V	189	79.6	34.1
5	4824.00	50.7 PK	74.0	-23.3	1.72 V	271	37.0	13.7
6	4824.00	39.4 AV	54.0	-14.6	1.72 V	271	25.7	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	120.5 PK			3.18 H	190	86.4	34.1
2	*2437.00	111.1 AV			3.18 H	190	77.0	34.1
3	4874.00	50.7 PK	74.0	-23.3	2.36 H	251	37.0	13.7
4	4874.00	39.6 AV	54.0	-14.4	2.36 H	251	25.9	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	125.7 PK			2.41 V	191	91.6	34.1
2	*2437.00	116.1 AV			2.41 V	191	82.0	34.1
3	4874.00	50.6 PK	74.0	-23.4	1.75 V	277	36.9	13.7
4	4874.00	39.4 AV	54.0	-14.6	1.75 V	277	25.7	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	120.3 PK			3.11 H	186	86.2	34.1
2	*2462.00	110.4 AV			3.11 H	186	76.3	34.1
3	2484.10	63.4 PK	74.0	-10.6	3.11 H	186	29.3	34.1
4	2484.10	50.9 AV	54.0	-3.1	3.11 H	186	16.8	34.1
5	4924.00	50.8 PK	74.0	-23.2	1.96 H	254	37.2	13.6
6	4924.00	39.5 AV	54.0	-14.5	1.96 H	254	25.9	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	125.3 PK			2.14 V	139	91.2	34.1
2	*2462.00	115.5 AV			2.14 V	139	81.4	34.1
3	2484.10	67.0 PK	74.0	-7.0	2.14 V	139	32.9	34.1
4	2484.10	53.8 AV	54.0	-0.2	2.14 V	139	19.7	34.1
5	4924.00	50.6 PK	74.0	-23.4	1.59 V	274	37.0	13.6
6	4924.00	39.2 AV	54.0	-14.8	1.59 V	274	25.6	13.6

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ax (HE20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	64.1 PK	74.0	-9.9	3.10 H	185	30.0	34.1
2	2390.00	50.7 AV	54.0	-3.3	3.10 H	185	16.6	34.1
3	*2412.00	121.5 PK			3.10 H	185	87.4	34.1
4	*2412.00	108.4 AV			3.10 H	185	74.3	34.1
5	4824.00	50.8 PK	74.0	-23.2	1.99 H	243	37.1	13.7
6	4824.00	39.5 AV	54.0	-14.5	1.99 H	243	25.8	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	65.7 PK	74.0	-8.3	1.92 V	235	31.6	34.1
2	2390.00	53.6 AV	54.0	-0.4	1.92 V	235	19.5	34.1
3	*2412.00	126.8 PK			1.92 V	235	92.7	34.1
4	*2412.00	113.6 AV			1.92 V	235	79.5	34.1
5	4824.00	50.9 PK	74.0	-23.1	1.66 V	284	37.2	13.7
6	4824.00	39.2 AV	54.0	-14.8	1.66 V	284	25.5	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	122.5 PK			3.08 H	187	88.4	34.1
2	*2437.00	110.7 AV			3.08 H	187	76.6	34.1
3	4874.00	51.2 PK	74.0	-22.8	1.99 H	254	37.5	13.7
4	4874.00	39.8 AV	54.0	-14.2	1.99 H	254	26.1	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	128.4 PK			1.92 V	189	94.3	34.1
2	*2437.00	115.6 AV			1.92 V	189	81.5	34.1
3	4874.00	50.9 PK	74.0	-23.1	1.66 V	279	37.2	13.7
4	4874.00	39.4 AV	54.0	-14.6	1.66 V	279	25.7	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	123.5 PK			3.12 H	189	89.4	34.1
2	*2462.00	110.2 AV			3.12 H	189	76.1	34.1
3	2483.50	63.2 PK	74.0	-10.8	3.12 H	189	29.1	34.1
4	2483.50	51.2 AV	54.0	-2.8	3.12 H	189	17.1	34.1
5	4924.00	50.6 PK	74.0	-23.4	1.87 H	246	37.0	13.6
6	4924.00	39.3 AV	54.0	-14.7	1.87 H	246	25.7	13.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	128.1 PK			1.91 V	173	94.0	34.1
2	*2462.00	115.6 AV			1.91 V	173	81.5	34.1
3	2483.50	67.3 PK	74.0	-6.7	1.91 V	173	33.2	34.1
4	2483.50	53.9 AV	54.0	-0.1	1.91 V	173	19.8	34.1
5	4924.00	50.4 PK	74.0	-23.6	1.61 V	281	36.8	13.6
6	4924.00	39.2 AV	54.0	-14.8	1.61 V	281	25.6	13.6

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ax (HE40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	61.4 PK	74.0	-12.6	3.10 H	191	27.3	34.1
2	2390.00	50.3 AV	54.0	-3.7	3.10 H	191	16.2	34.1
3	*2422.00	113.3 PK			3.10 H	191	79.3	34.0
4	*2422.00	101.1 AV			3.10 H	191	67.1	34.0
5	4844.00	50.5 PK	74.0	-23.5	2.06 H	255	36.8	13.7
6	4844.00	39.4 AV	54.0	-14.6	2.06 H	255	25.7	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	65.2 PK	74.0	-8.8	2.10 V	208	31.1	34.1
2	2390.00	53.9 AV	54.0	-0.1	2.10 V	208	19.8	34.1
3	*2422.00	119.0 PK			2.10 V	208	85.0	34.0
4	*2422.00	106.8 AV			2.10 V	208	72.8	34.0
5	4844.00	50.2 PK	74.0	-23.8	1.52 V	281	36.5	13.7
6	4844.00	39.1 AV	54.0	-14.9	1.52 V	281	25.4	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.30	63.2 PK	74.0	-10.8	3.14 H	189	29.1	34.1
2	2389.30	50.5 AV	54.0	-3.5	3.14 H	189	16.4	34.1
3	*2437.00	117.8 PK			3.14 H	189	83.7	34.1
4	*2437.00	105.7 AV			3.14 H	189	71.6	34.1
5	4874.00	50.4 PK	74.0	-23.6	1.86 H	247	36.7	13.7
6	4874.00	39.4 AV	54.0	-14.6	1.86 H	247	25.7	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2389.30	68.6 PK	74.0	-5.4	1.91 V	199	34.5	34.1
2	2389.30	53.9 AV	54.0	-0.1	1.91 V	199	19.8	34.1
3	*2437.00	124.1 PK			1.91 V	199	90.0	34.1
4	*2437.00	112.7 AV			1.91 V	199	78.6	34.1
5	4874.00	50.7 PK	74.0	-23.3	1.58 V	256	37.0	13.7
6	4874.00	39.1 AV	54.0	-14.9	1.58 V	256	25.4	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * " : Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	115.8 PK			3.09 H	190	81.7	34.1
2	*2452.00	103.3 AV			3.09 H	190	69.2	34.1
3	2483.50	62.8 PK	74.0	-11.2	3.09 H	190	28.7	34.1
4	2483.50	50.8 AV	54.0	-3.2	3.09 H	190	16.7	34.1
5	4904.00	50.7 PK	74.0	-23.3	1.86 H	243	37.0	13.7
6	4904.00	39.4 AV	54.0	-14.6	1.86 H	243	25.7	13.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	121.2 PK			1.88 V	172	87.1	34.1
2	*2452.00	110.1 AV			1.88 V	172	76.0	34.1
3	2483.50	67.7 PK	74.0	-6.3	1.88 V	172	33.6	34.1
4	2483.50	53.9 AV	54.0	-0.1	1.88 V	172	19.8	34.1
5	4904.00	50.4 PK	74.0	-23.6	1.64 V	271	36.7	13.7
6	4904.00	39.5 AV	54.0	-14.5	1.64 V	271	25.8	13.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * " : Fundamental frequency.

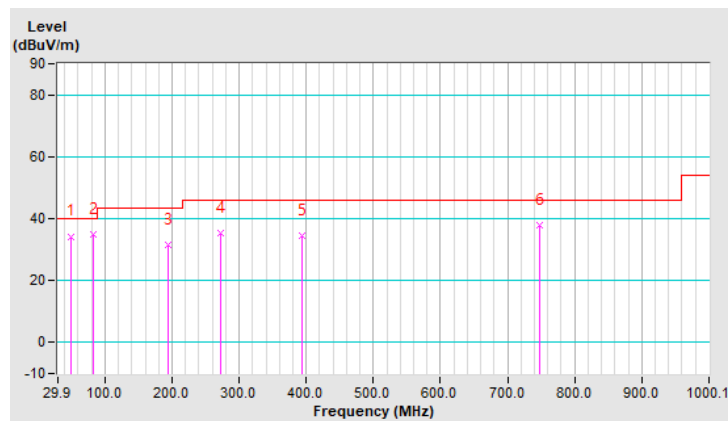
Below 1GHz worst-case data: 802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	50.27	34.3 QP	40.0	-5.7	1.00 H	187	43.1	-8.8
2	82.29	35.0 QP	40.0	-5.0	1.50 H	313	48.9	-13.9
3	194.83	31.7 QP	43.5	-11.8	1.50 H	315	43.4	-11.7
4	272.45	35.4 QP	46.0	-10.6	1.50 H	313	43.8	-8.4
5	392.75	34.5 QP	46.0	-11.5	1.00 H	154	40.6	-6.1
6	746.88	37.7 QP	46.0	-8.3	1.50 H	12	36.5	1.2

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
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.

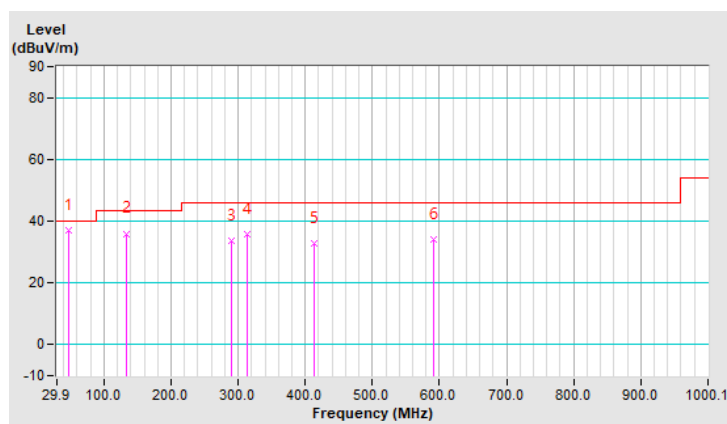


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	48.33	37.0 QP	40.0	-3.0	1.50 V	306	45.7	-8.7
2	132.74	36.0 QP	43.5	-7.5	1.00 V	269	45.9	-9.9
3	289.91	33.8 QP	46.0	-12.2	1.00 V	56	41.8	-8.0
4	314.17	35.7 QP	46.0	-10.3	1.00 V	264	43.2	-7.5
5	414.10	32.9 QP	46.0	-13.1	1.00 V	267	38.6	-5.7
6	591.65	34.2 QP	46.0	-11.8	1.00 V	56	36.7	-2.5

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
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.

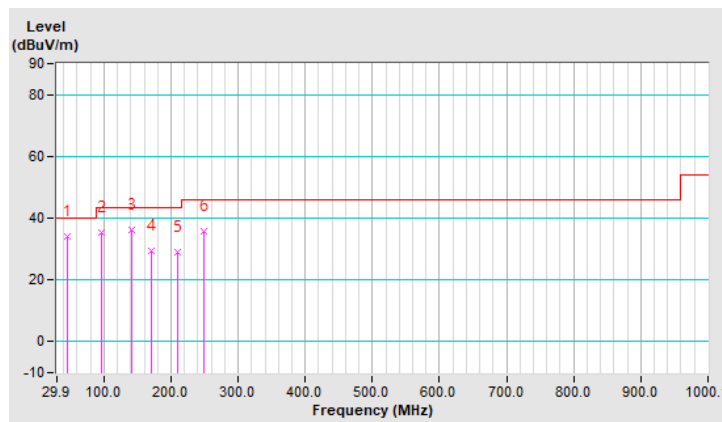


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	46.39	34.2 QP	40.0	-5.8	1.00 H	226	43.1	-8.9
2	96.84	35.2 QP	43.5	-8.3	1.00 H	184	49.1	-13.9
3	141.47	36.3 QP	43.5	-7.2	1.50 H	78	45.6	-9.3
4	170.58	29.4 QP	43.5	-14.1	1.00 H	106	38.8	-9.4
5	209.39	29.0 QP	43.5	-14.5	1.00 H	25	40.8	-11.8
6	249.17	35.7 QP	46.0	-10.3	2.00 H	119	45.3	-9.6

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
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.

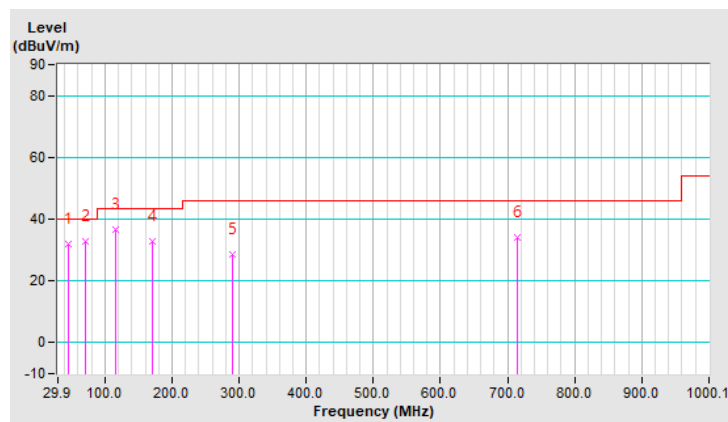


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	45.42	32.1 QP	40.0	-7.9	1.00 V	253	41.0	-8.9
2	70.65	32.6 QP	40.0	-7.4	1.50 V	111	43.7	-11.1
3	115.28	36.7 QP	43.5	-6.8	1.50 V	89	48.5	-11.8
4	171.55	32.6 QP	43.5	-10.9	1.00 V	244	42.1	-9.5
5	289.91	28.6 QP	46.0	-17.4	1.00 V	269	36.6	-8.0
6	714.86	33.9 QP	46.0	-12.1	1.00 V	72	33.8	0.1

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 04, 2020	Dec. 03, 2021
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 16, 2021	Jan. 15, 2022
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 25, 2021	Feb. 24, 2022
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 2022
Software ADT	BV ADT_Conc_ V7.3.7.4	NA	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 HwaYa Shielded Room 1(Conduction 1).

3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

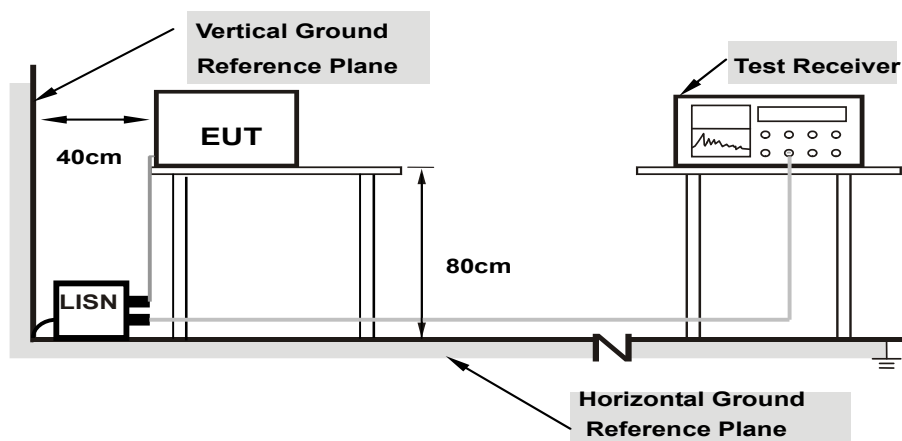
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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

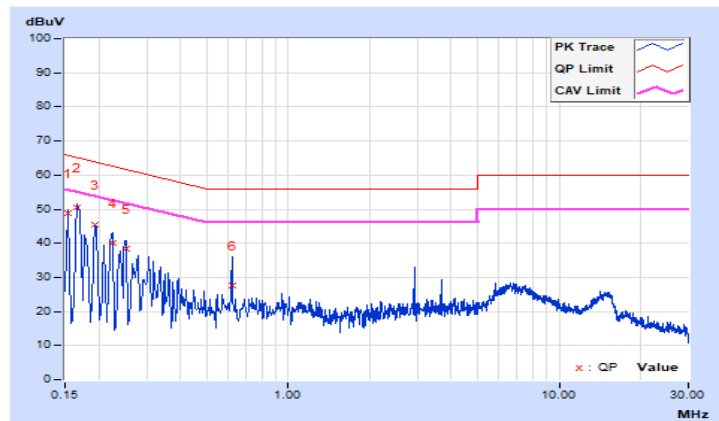
Worst-case data: 802.11b

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.71	39.22	21.74	48.93	31.45	65.79	55.79	-16.86	-24.34
2	0.16564	9.71	40.95	24.12	50.66	33.83	65.18	55.18	-14.52	-21.35
3	0.19301	9.71	35.91	20.79	45.62	30.50	63.91	53.91	-18.29	-23.41
4	0.22429	9.71	30.24	14.79	39.95	24.50	62.66	52.66	-22.71	-28.16
5	0.25125	9.72	28.71	13.31	38.43	23.03	61.72	51.72	-23.29	-28.69
6	0.61920	9.74	18.03	10.75	27.77	20.49	56.00	46.00	-28.23	-25.51

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.

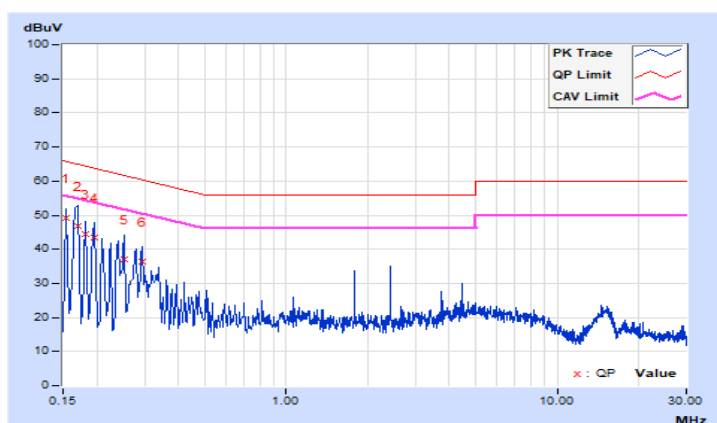


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.77	39.27	22.44	49.04	32.21	65.79	55.79	-16.75	-23.58
2	0.16955	9.77	36.98	22.28	46.75	32.05	64.98	54.98	-18.23	-22.93
3	0.18128	9.77	34.68	14.51	44.45	24.28	64.43	54.43	-19.98	-30.15
4	0.19665	9.77	33.56	17.92	43.33	27.69	63.75	53.75	-20.42	-26.06
5	0.25166	9.78	27.41	14.80	37.19	24.58	61.70	51.70	-24.51	-27.12
6	0.29429	9.78	26.60	15.83	36.38	25.61	60.40	50.40	-24.02	-24.79

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	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16564	9.71	32.87	23.29	42.58	33.00	65.18	55.18	-22.60	-22.18
2	0.18508	9.71	34.37	24.06	44.08	33.77	64.25	54.25	-20.17	-20.48
3	0.20083	9.71	32.77	23.61	42.48	33.32	63.58	53.58	-21.10	-20.26
4	0.26730	9.72	37.07	22.94	46.79	32.66	61.20	51.20	-14.41	-18.54
5	0.32187	9.72	36.32	28.26	46.04	37.98	59.66	49.66	-13.62	-11.68
6	0.70913	9.75	23.00	16.56	32.75	26.31	56.00	46.00	-23.25	-19.69

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.

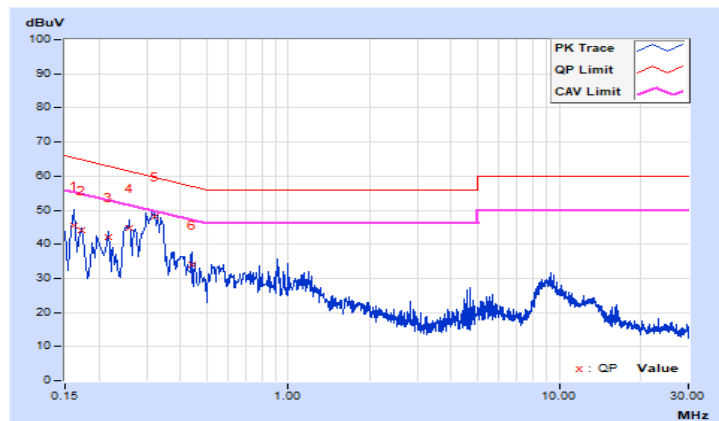


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	9.77	35.76	23.99	45.53	33.76	65.37	55.37	-19.84	-21.61
2	0.17328	9.77	34.33	22.00	44.10	31.77	64.80	54.80	-20.70	-23.03
3	0.21621	9.77	32.15	19.18	41.92	28.95	62.96	52.96	-21.04	-24.01
4	0.25948	9.78	34.92	28.20	44.70	37.98	61.45	51.45	-16.75	-13.47
5	0.32102	9.78	38.23	30.54	48.01	40.32	59.68	49.68	-11.67	-9.36
6	0.43924	9.79	24.38	15.33	34.17	25.12	57.08	47.08	-22.91	-21.96

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.

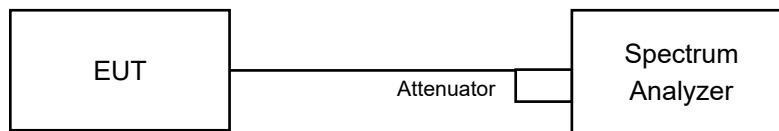


4.3 6dB Bandwidth Measurement

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

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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		
1	2412	7.11	7.63	0.5	Pass
6	2437	7.58	8.07	0.5	Pass
11	2462	8.09	7.58	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.09	15.12	0.5	Pass
6	2437	15.09	15.13	0.5	Pass
11	2462	15.08	15.11	0.5	Pass

802.11ax (HE20)

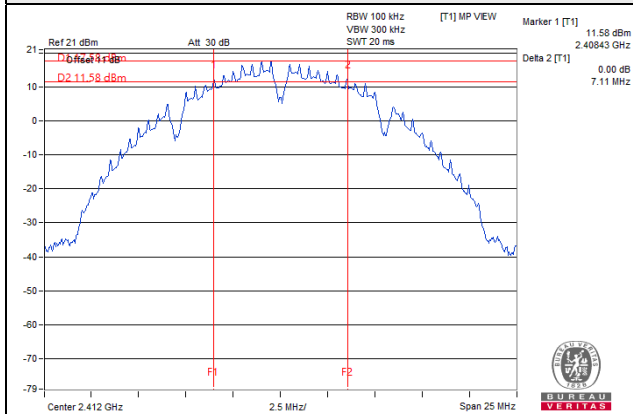
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.07	15.07	0.5	Pass
6	2437	15.13	15.08	0.5	Pass
11	2462	15.07	15.07	0.5	Pass

802.11ax (HE40)

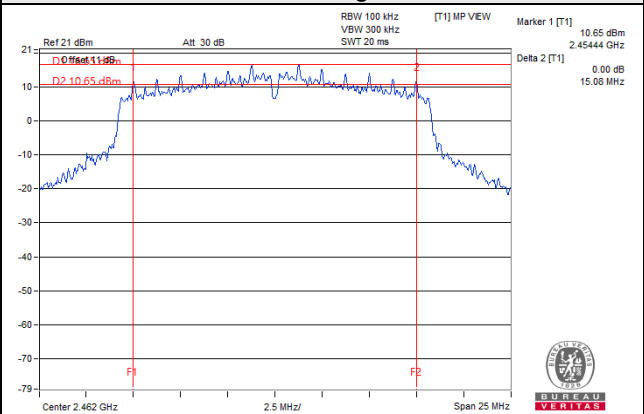
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	30.18	33.88	0.5	Pass
6	2437	31.37	31.44	0.5	Pass
9	2452	35.05	32.64	0.5	Pass

Spectrum Plot of Worst Value

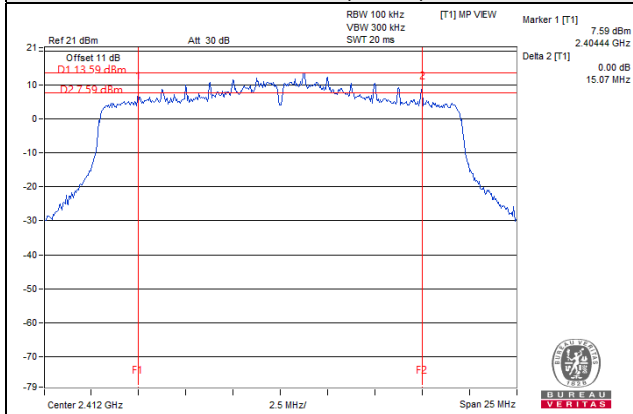
802.11b



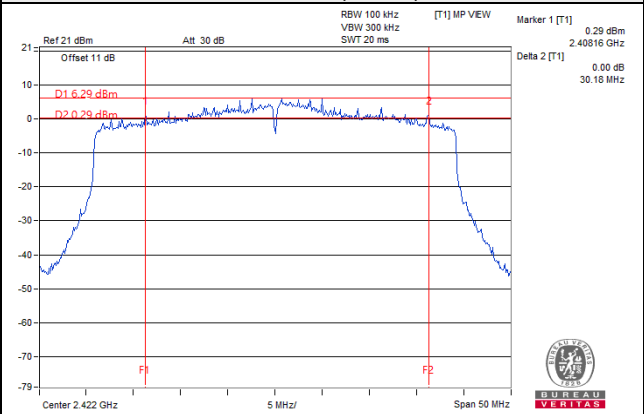
802.11g



802.11ax (HE20)



802.11ax (HE40)



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,

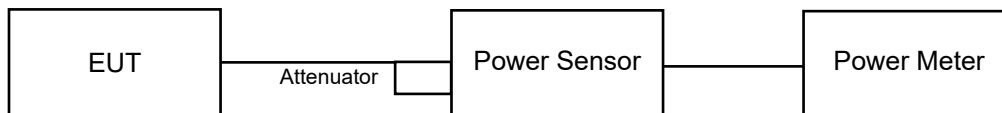
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	25.53	25.47	709.644	28.51	30	Pass
6	2437	26.62	26.58	914.186	29.61	30	Pass
11	2462	26.37	26.48	878.142	29.44	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	24.16	24.14	520.033	27.16	30	Pass
6	2437	26.45	26.59	897.607	29.53	30	Pass
11	2462	25.69	25.68	740.509	28.70	30	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.25	22.41	342.061	25.34	30	Pass
6	2437	26.04	26.31	829.354	29.19	30	Pass
11	2462	24.09	24.21	520.082	27.16	30	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.13	18.95	160.370	22.05	30	Pass
6	2437	23.14	23.25	417.412	26.21	30	Pass
9	2452	21.72	21.75	298.217	24.75	30	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.26	22.45	344.060	25.37	30	Pass
6	2437	26.10	26.36	839.894	29.24	30	Pass
11	2462	24.11	24.26	524.318	27.20	30	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.17	18.97	161.490	22.08	30	Pass
6	2437	23.19	23.29	421.754	26.25	30	Pass
9	2452	21.81	21.79	302.713	24.81	30	Pass

Beamforming Mode

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.25	22.41	342.061	25.34	29.33	Pass
6	2437	26.04	26.31	829.354	29.19	29.33	Pass
11	2462	24.09	24.21	520.082	27.16	29.33	Pass

Note: Beamforming Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.67 - 6) = 29.33\text{dBm}$.

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.13	18.95	160.370	22.05	29.33	Pass
6	2437	23.14	23.25	417.412	26.21	29.33	Pass
9	2452	21.72	21.75	298.217	24.75	29.33	Pass

Note: Beamforming Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.67 - 6) = 29.33\text{dBm}$.

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.26	22.45	344.060	25.37	29.33	Pass
6	2437	26.10	26.36	839.894	29.24	29.33	Pass
11	2462	24.11	24.26	524.318	27.20	29.33	Pass

Note: Beamforming Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.67 - 6) = 29.33\text{dBm}$.

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.17	18.97	161.490	22.08	29.33	Pass
6	2437	23.19	23.29	421.754	26.25	29.33	Pass
9	2452	21.81	21.79	302.713	24.81	29.33	Pass

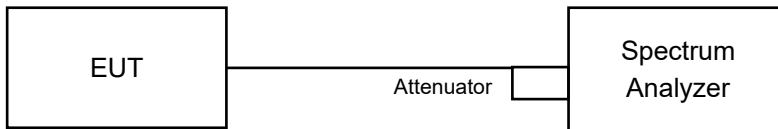
Note: Beamforming Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (6.67 - 6) = 29.33\text{dBm}$.

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 band during any time interval of continuous transmission.

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

For Average Power (Duty cycle < 98%)

- a) Measure the duty cycle (x).
- b) Set instrument center frequency to DTS channel center frequency.
- c) Set span to at least 1.5 times the OBW.
- d) Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- e) Set VBW $\geq 3 \times \text{RBW}$.
- f) Detector = power averaging (RMS) or sample detector (when RMS not available).
- g) Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- h) Sweep time = auto couple.
- i) Do not use sweep triggering. Allow sweep to "free run".
- j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
- k) Use the peak marker function to determine the maximum amplitude level.
- l) Add $10 \log (1/x)$, where x is the duty cycle measured in step (a), to the measured PSD to compute the average PSD during the actual transmission time.

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

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-13.86	3.01	2.11	-8.74	7.33	Pass
	6	2437	-12.90	3.01	2.11	-7.78	7.33	Pass
	11	2462	-13.19	3.01	2.11	-8.07	7.33	Pass
1	1	2412	-14.79	3.01	2.11	-9.67	7.33	Pass
	6	2437	-14.67	3.01	2.11	-9.55	7.33	Pass
	11	2462	-12.57	3.01	2.11	-7.45	7.33	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power spectral density limit shall be reduced to $8-(6.67-6) = 7.33\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-10.58	3.01	0.33	-7.24	7.33	Pass
	6	2437	-8.18	3.01	0.33	-4.84	7.33	Pass
	11	2462	-8.45	3.01	0.33	-5.11	7.33	Pass
1	1	2412	-10.93	3.01	0.33	-7.59	7.33	Pass
	6	2437	-8.23	3.01	0.33	-4.89	7.33	Pass
	11	2462	-9.53	3.01	0.33	-6.19	7.33	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power spectral density limit shall be reduced to $8-(6.67-6) = 7.33\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-14.57	3.01	0.40	-11.16	7.33	Pass
	6	2437	-11.37	3.01	0.40	-7.96	7.33	Pass
	11	2462	-11.88	3.01	0.40	-8.47	7.33	Pass
1	1	2412	-15.30	3.01	0.40	-11.89	7.33	Pass
	6	2437	-11.35	3.01	0.40	-7.94	7.33	Pass
	11	2462	-13.71	3.01	0.40	-10.30	7.33	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power spectral density limit shall be reduced to $8-(6.67-6) = 7.33\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

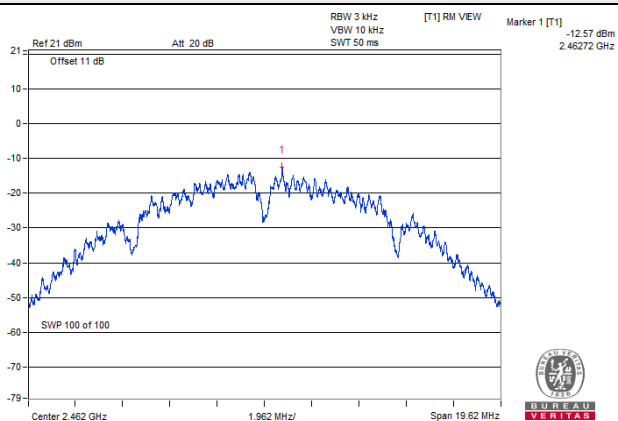
TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-20.68	3.01	0.42	-17.25	7.33	Pass
	6	2437	-16.40	3.01	0.42	-12.97	7.33	Pass
	9	2452	-18.53	3.01	0.42	-15.10	7.33	Pass
1	3	2422	-21.34	3.01	0.42	-17.91	7.33	Pass
	6	2437	-17.36	3.01	0.42	-13.93	7.33	Pass
	9	2452	-19.18	3.01	0.42	-15.75	7.33	Pass

Note:

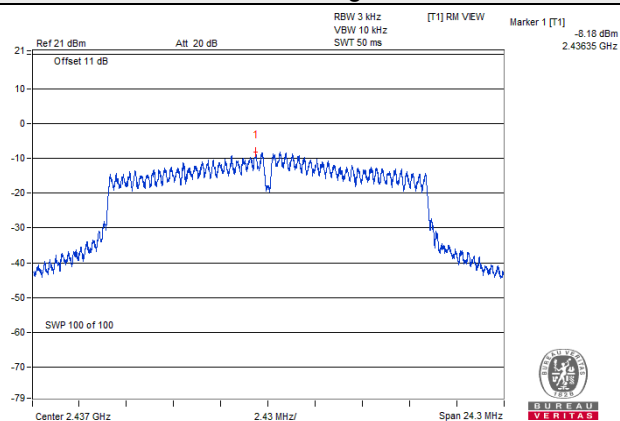
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.67\text{dBi} > 6\text{dBi}$, so the power spectral density limit shall be reduced to $8-(6.67-6) = 7.33\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

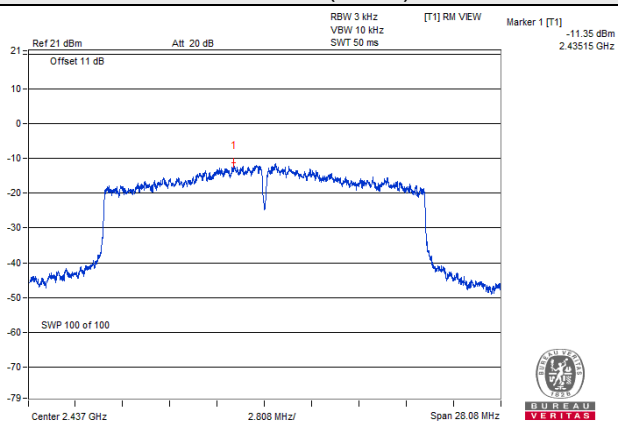
802.11b



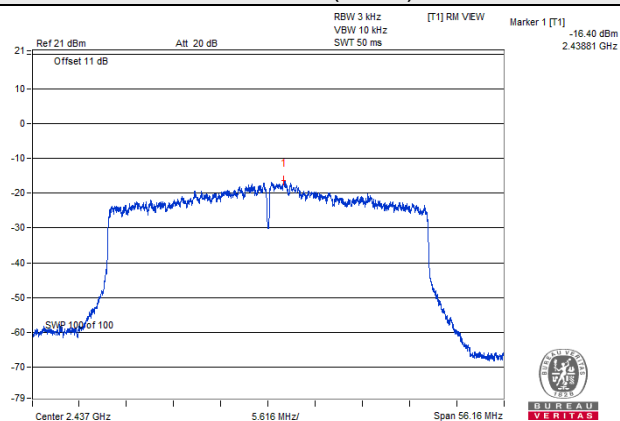
802.11g



802.11ax (HE20)



802.11ax (HE40)

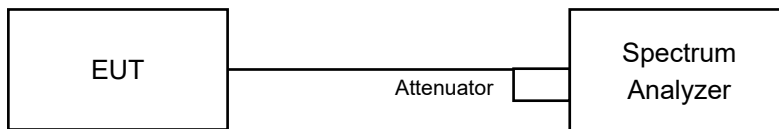


4.6 Conducted Out of Band Emission Measurement

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.

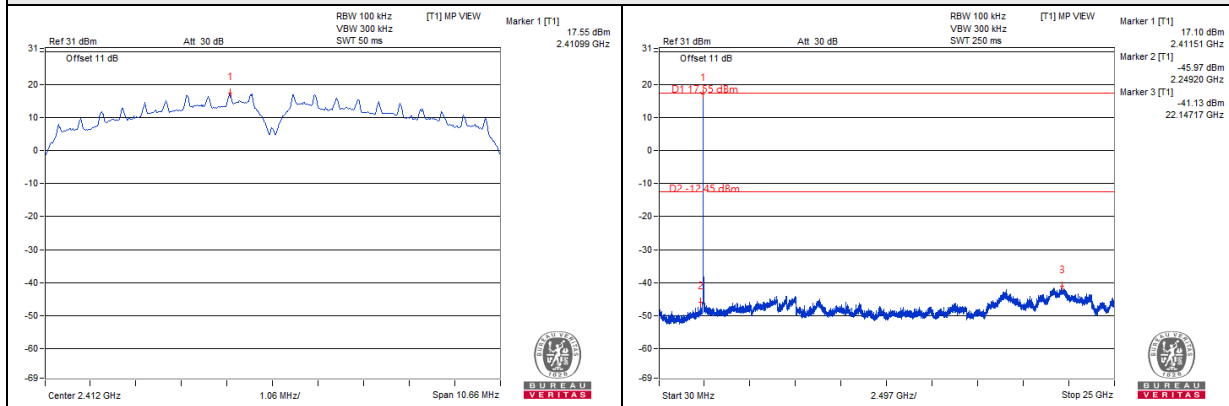
4.6.7 Test Results

The conducted emission test is performed on each TX port of operating mode without summing or adding $10\log(N)$ since the limit is relative emission limit.

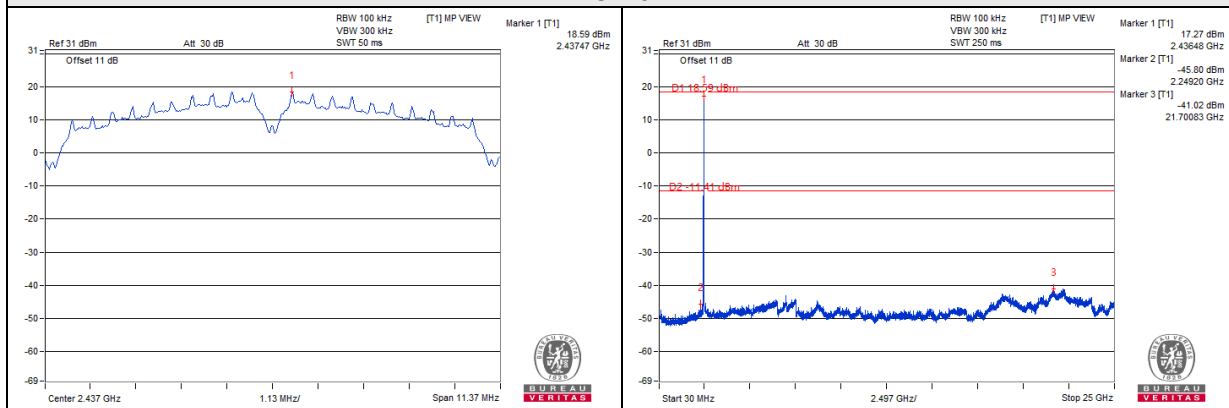
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b_Chain 0

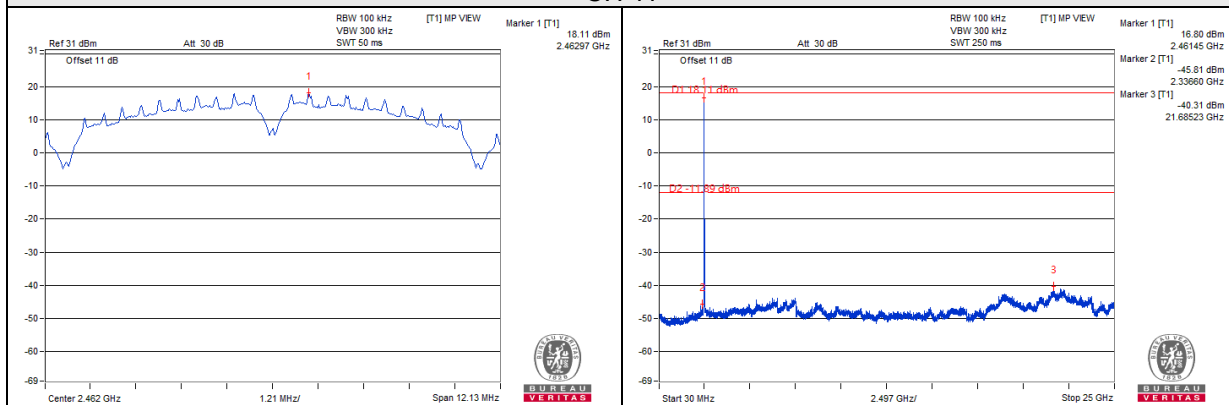
CH 1



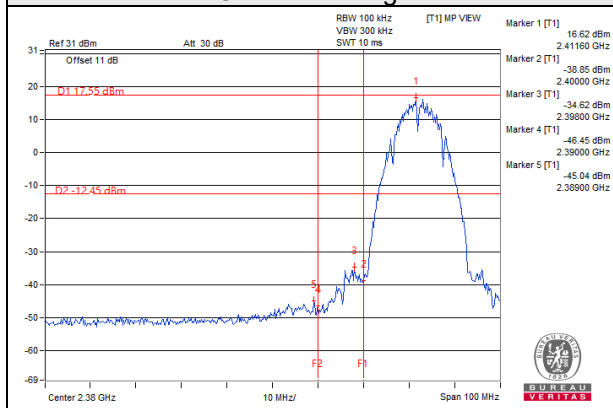
CH 6



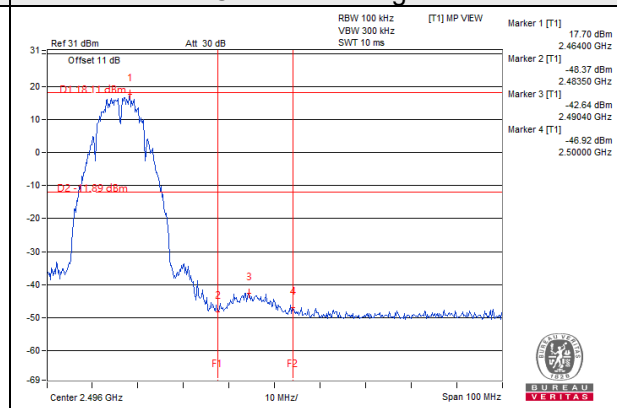
CH 11



CH 1 Band edge

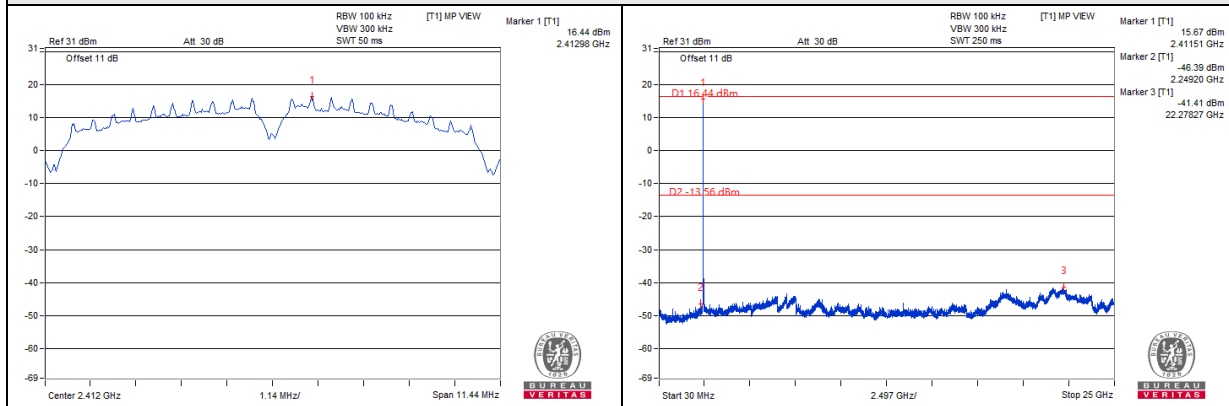


CH 11 Band edge

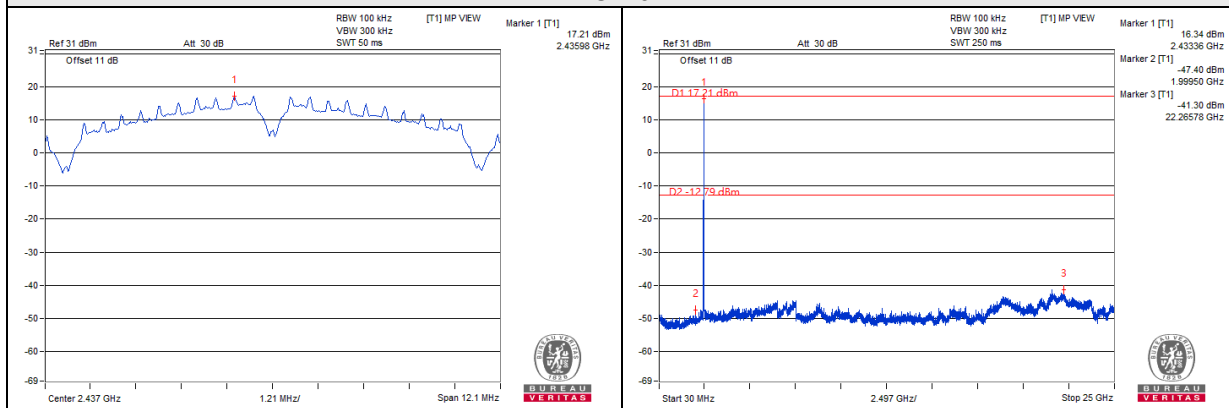


802.11b_Chain 1

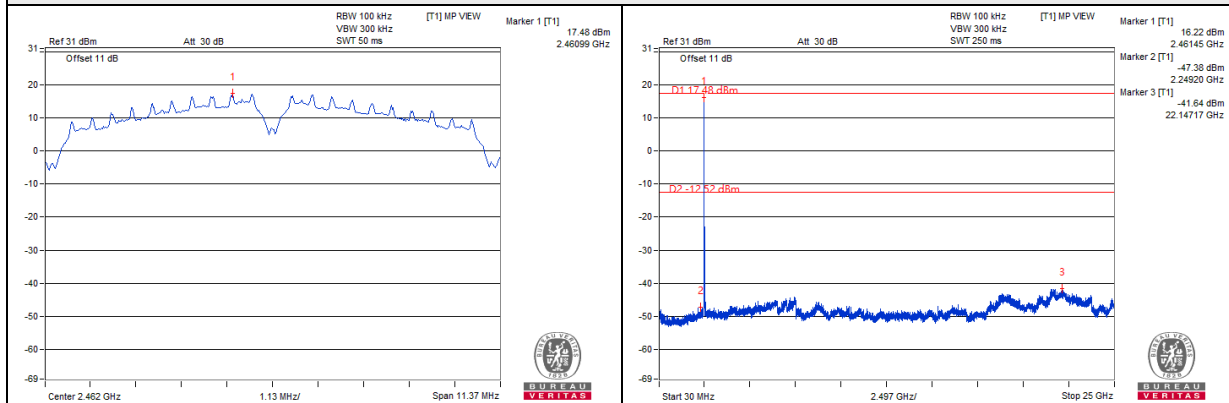
CH 1



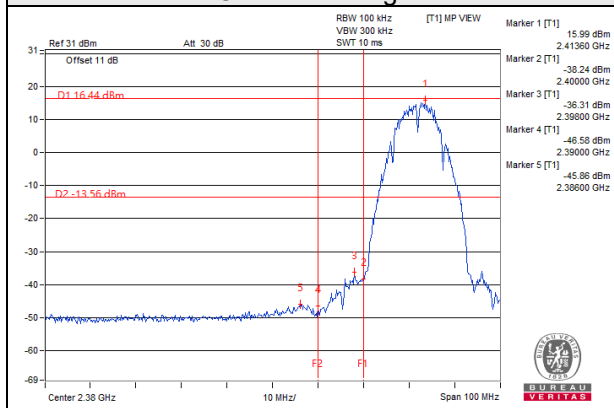
CH 6



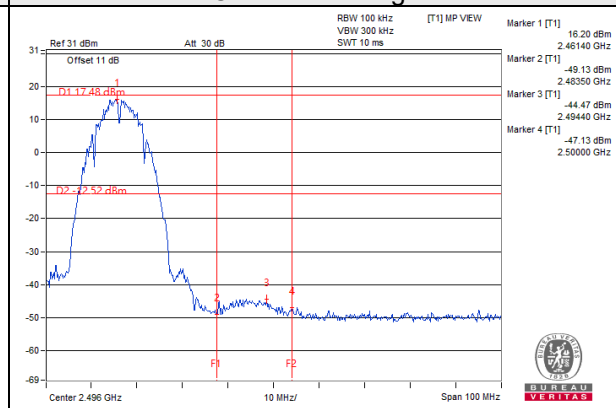
CH 11



CH 1 Band edge

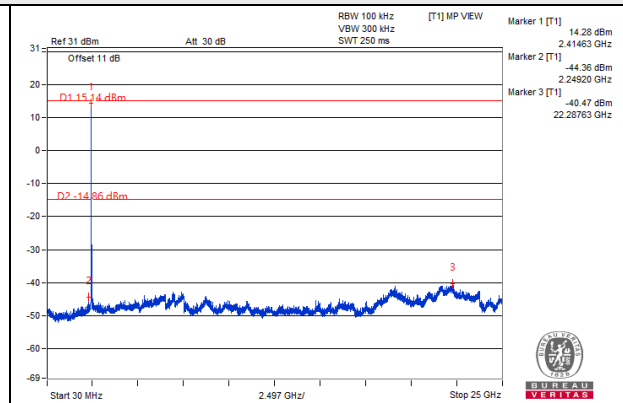
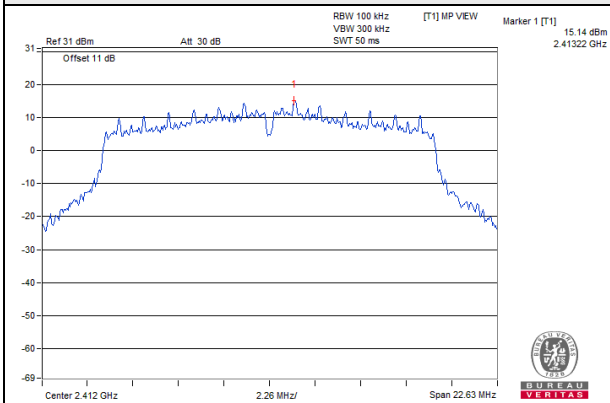


CH 11 Band edge

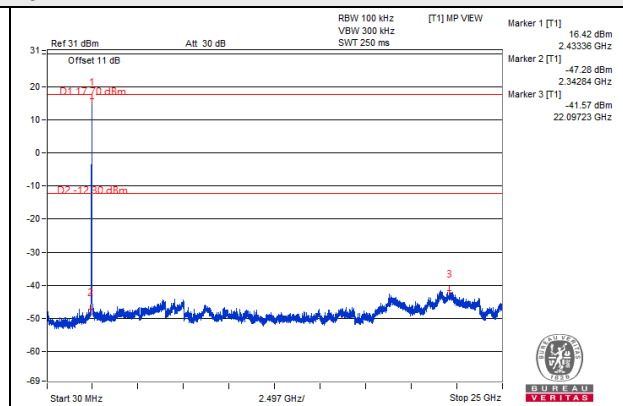
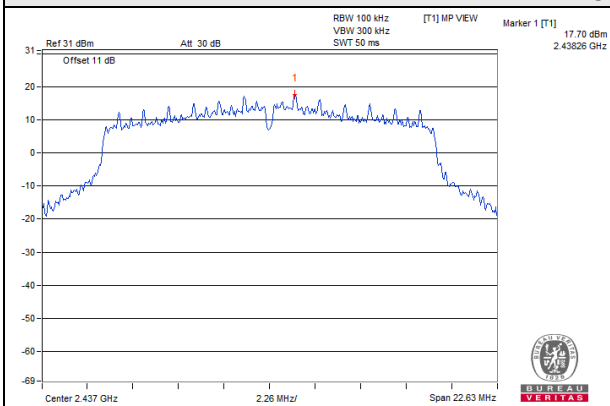


802.11g_Chain 0

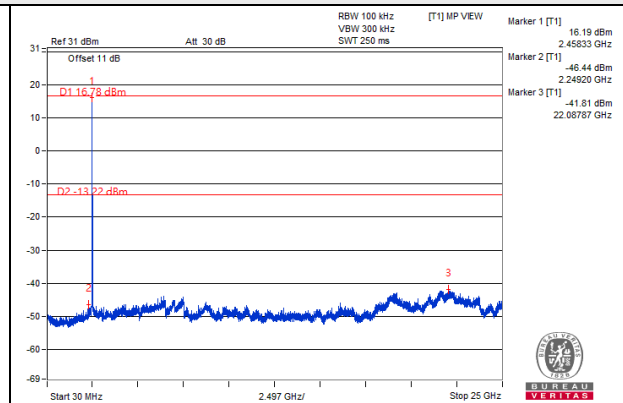
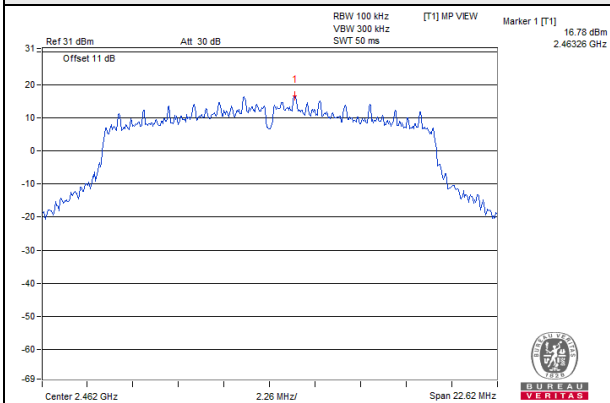
CH 1



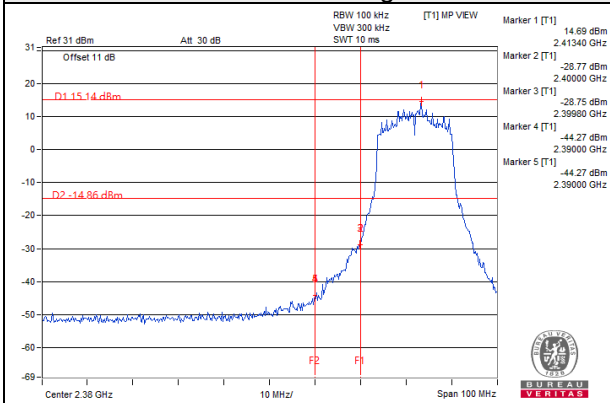
CH 6



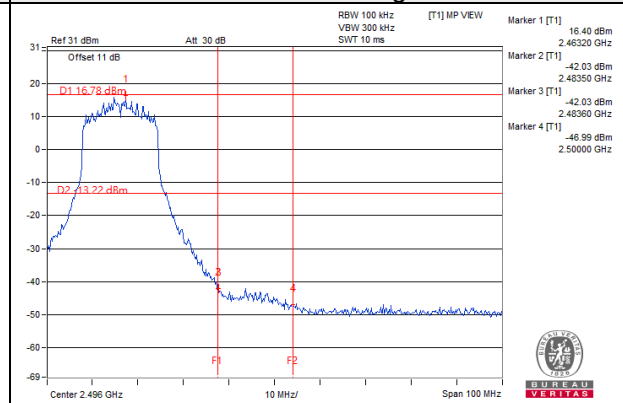
CH 11



CH 1 Band edge

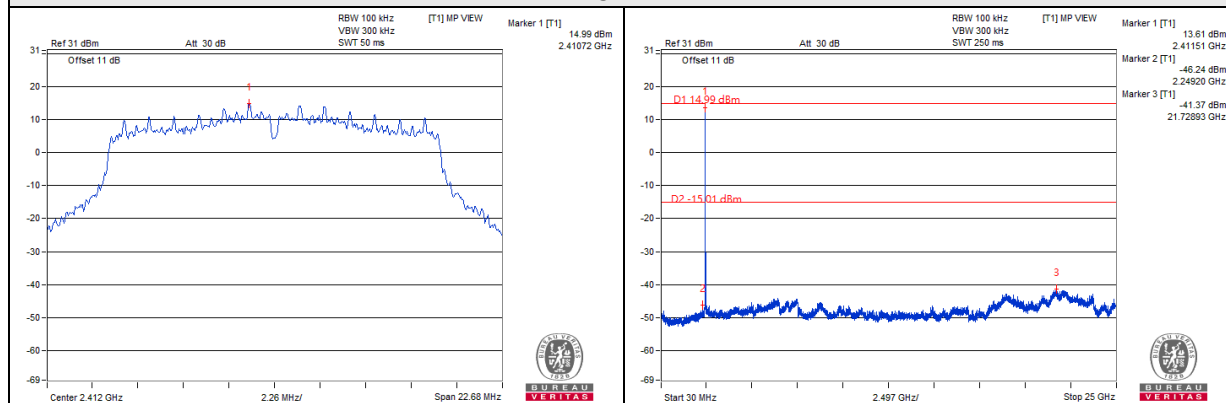


CH 11 Band edge

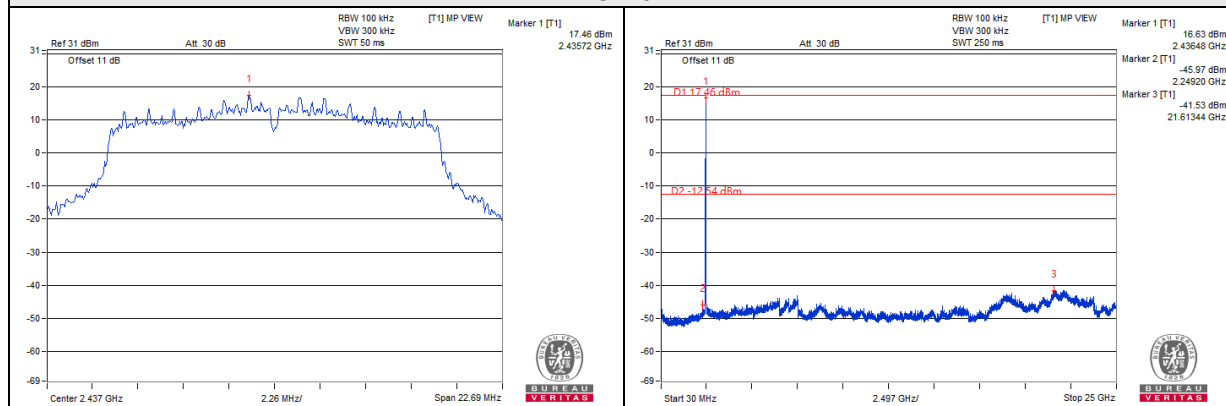


802.11g_Chain 1

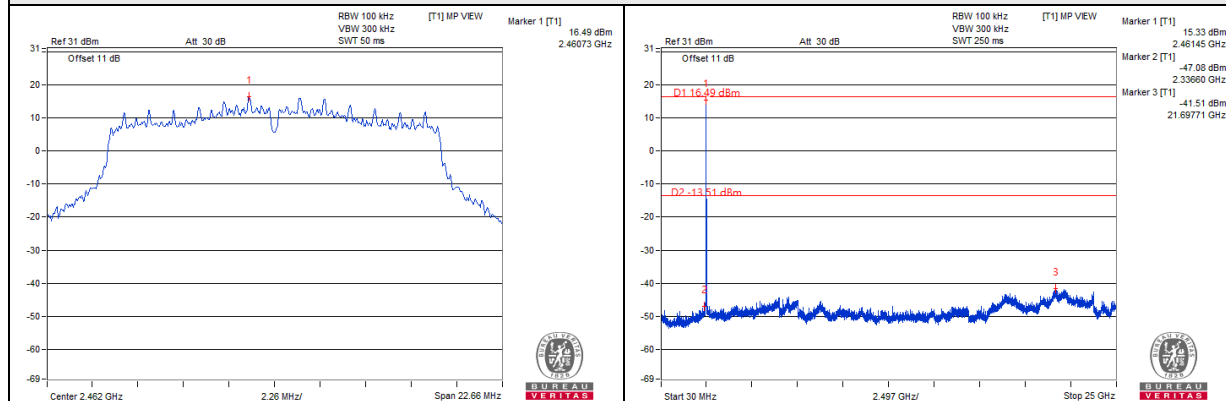
CH 1



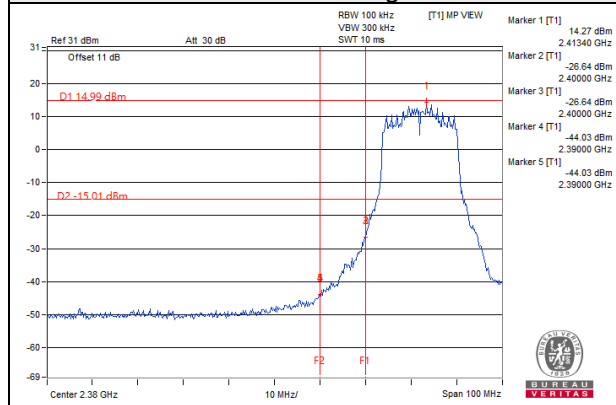
CH 6



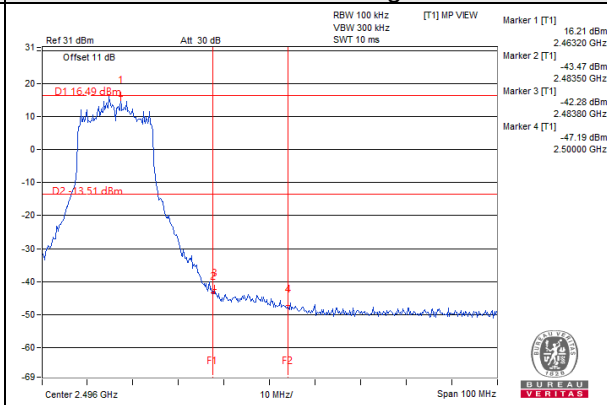
CH 11



CH 1 Band edge

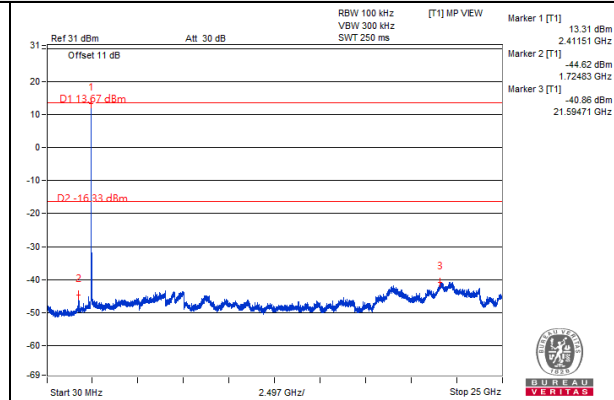
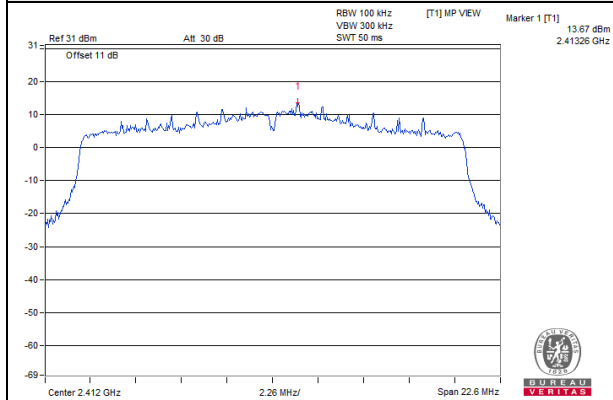


CH 11 Band edge

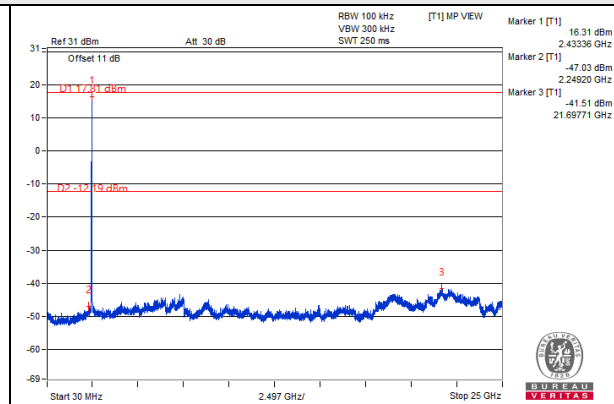
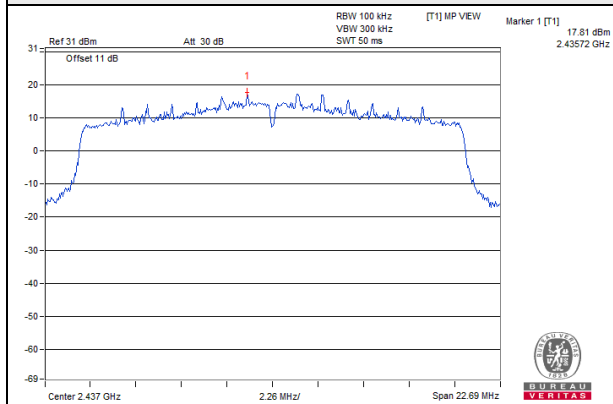


802.11ax (HE20)_Chain 0

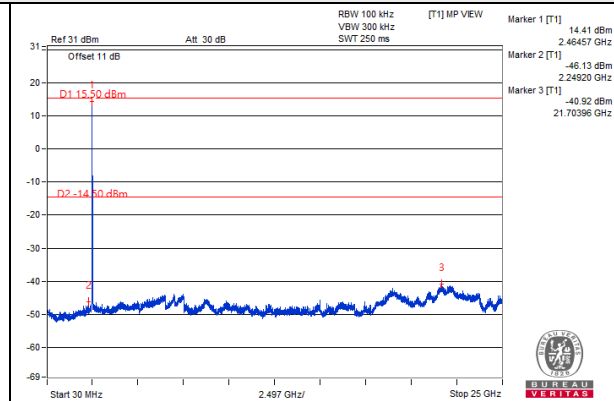
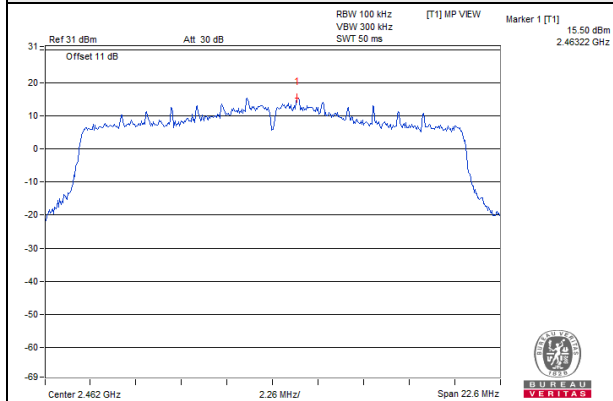
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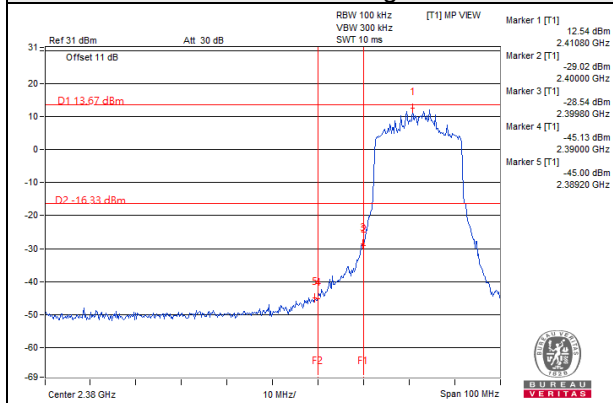
CH 6



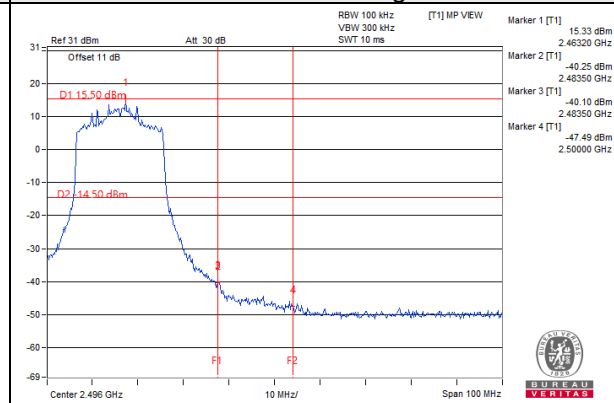
CH 11



CH 1 Band edge

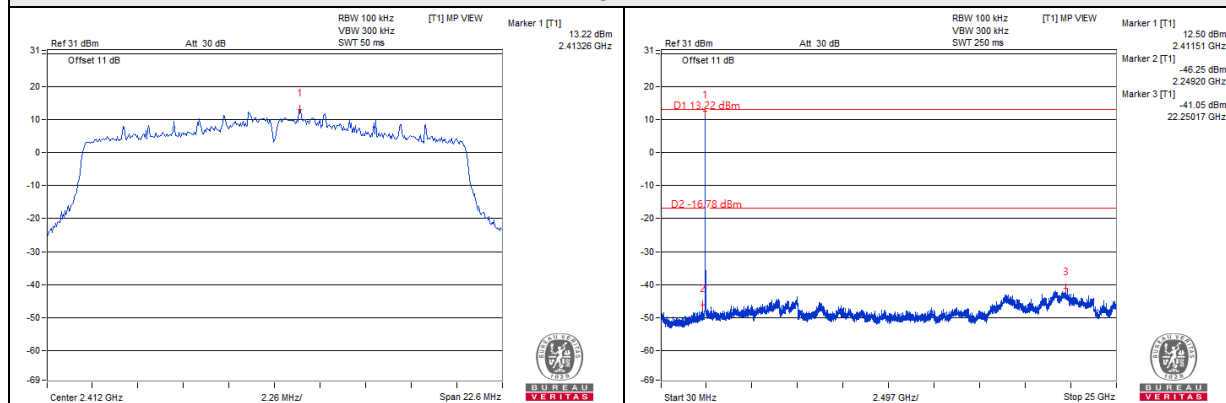


CH 11 Band edge

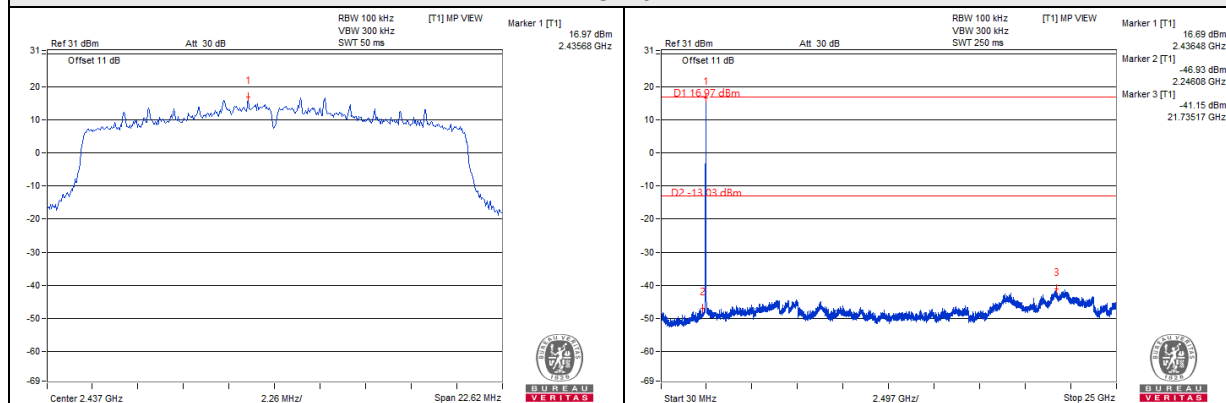


802.11ax (HE20)_Chain 1

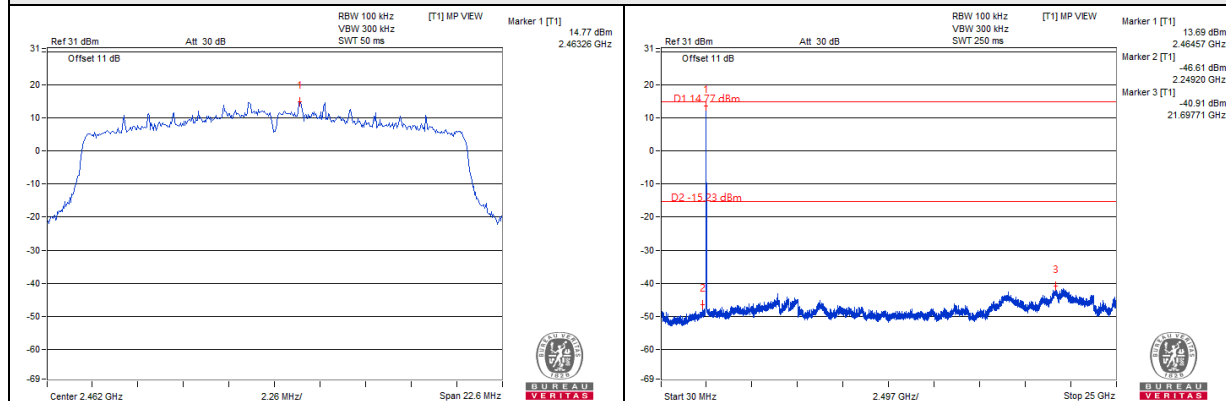
CH 1



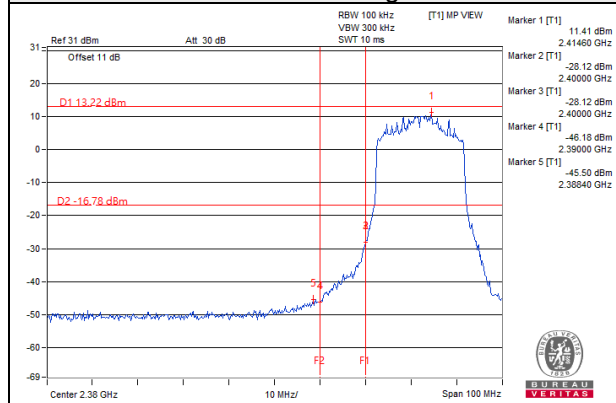
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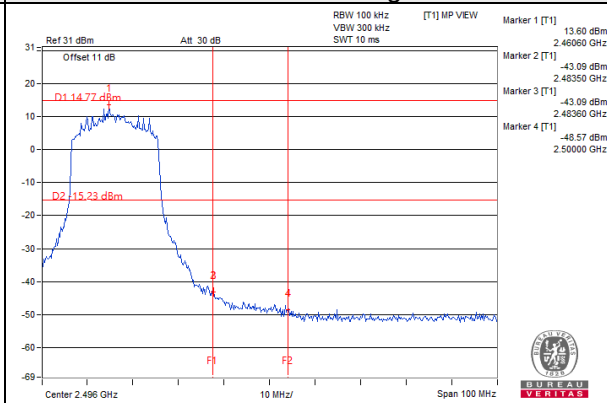
CH 11



CH 1 Band edge

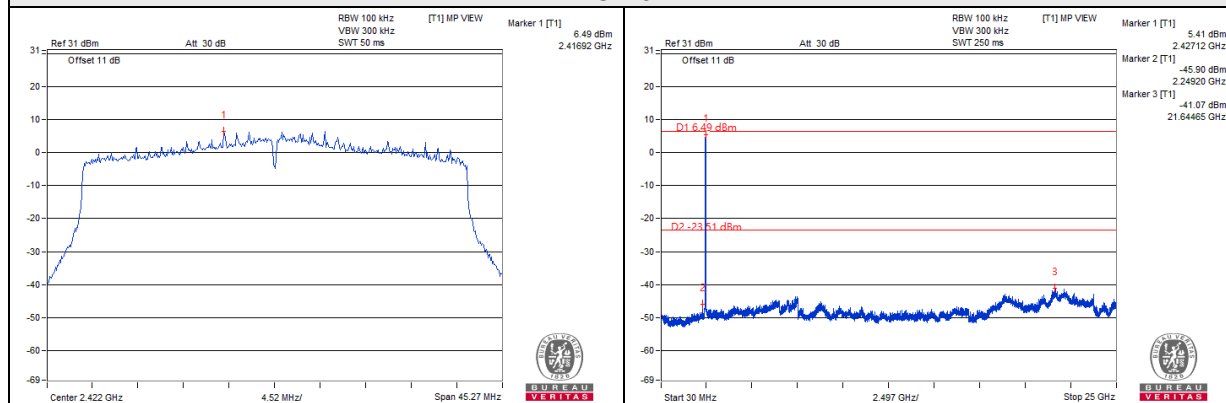


CH 11 Band edge

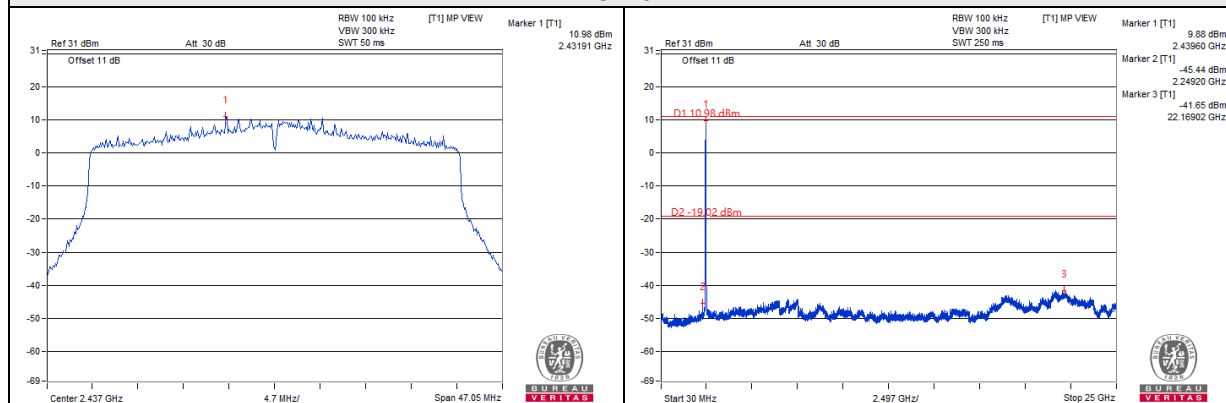


802.11ax (HE40)_Chain 0

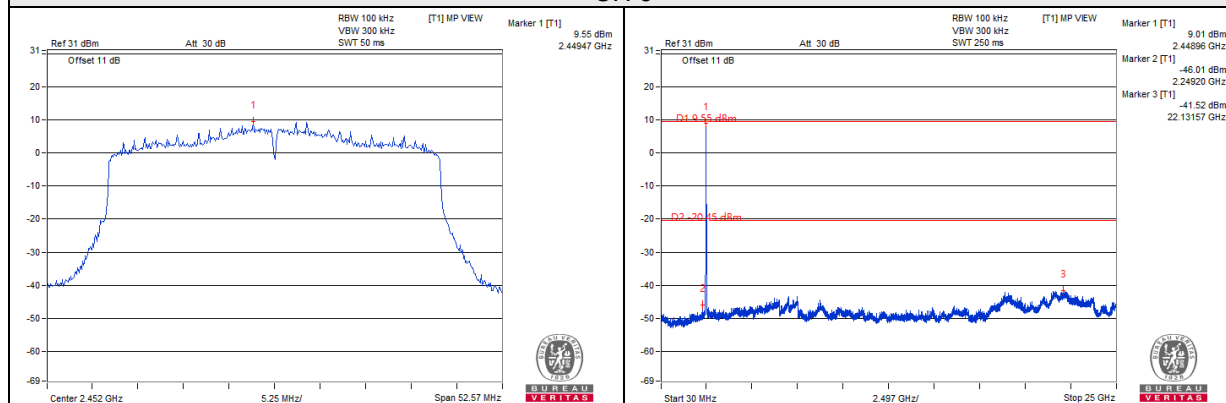
CH 3



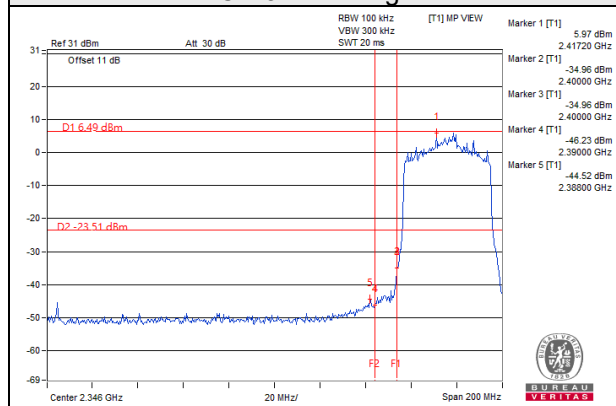
CH 6



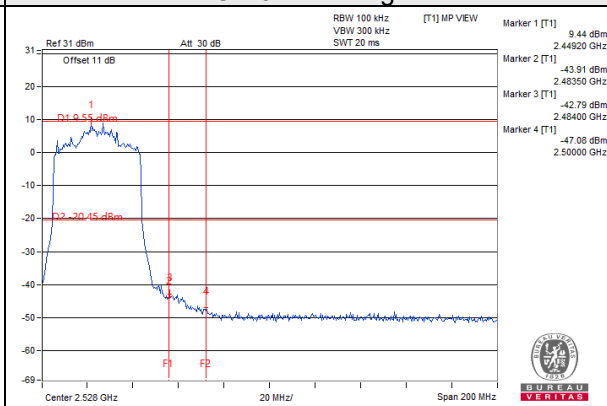
CH 9



CH 3 Band edge

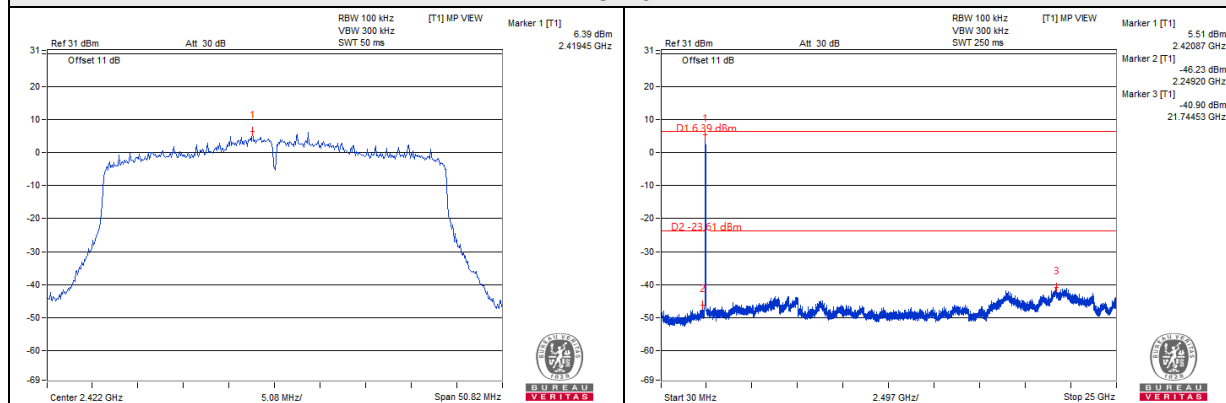


CH 9 Band edge

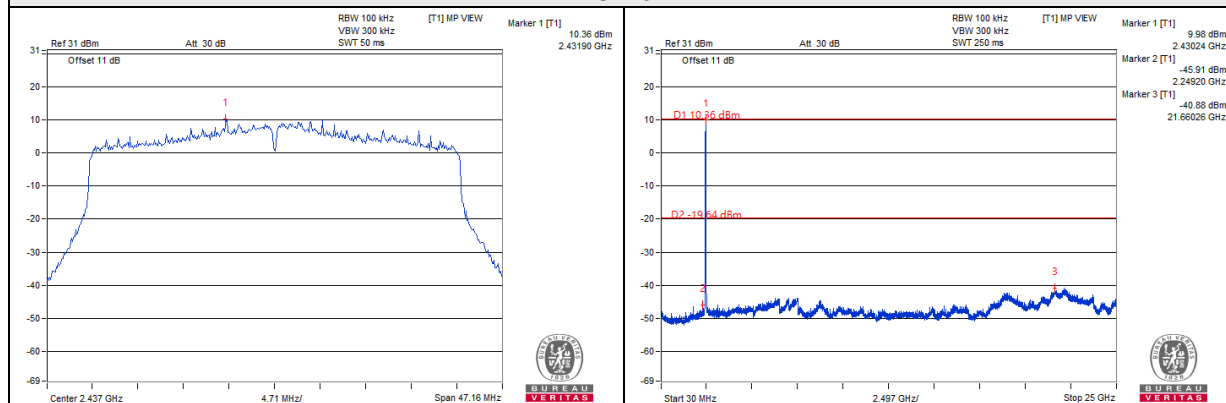


802.11ax (HE40)_Chain 1

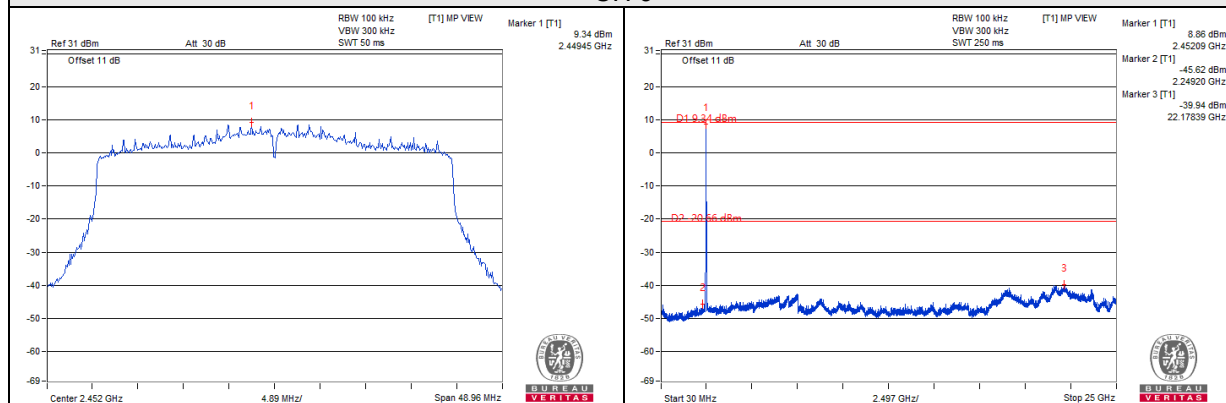
CH 3



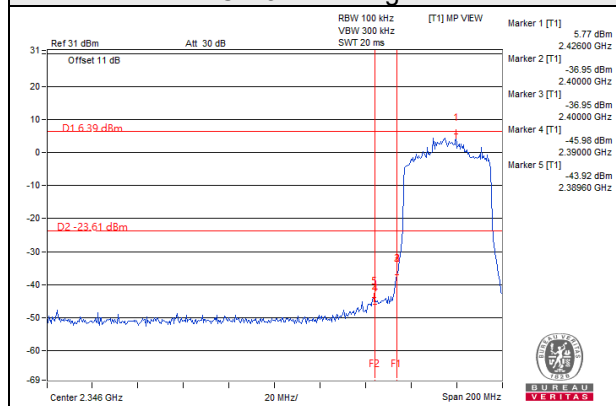
CH 6



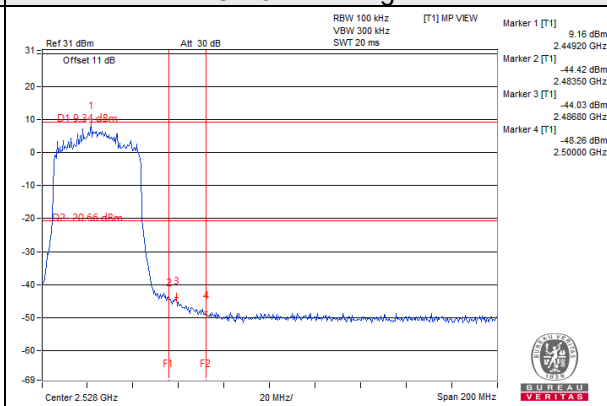
CH 9



CH 3 Band edge



CH 9 Band edge

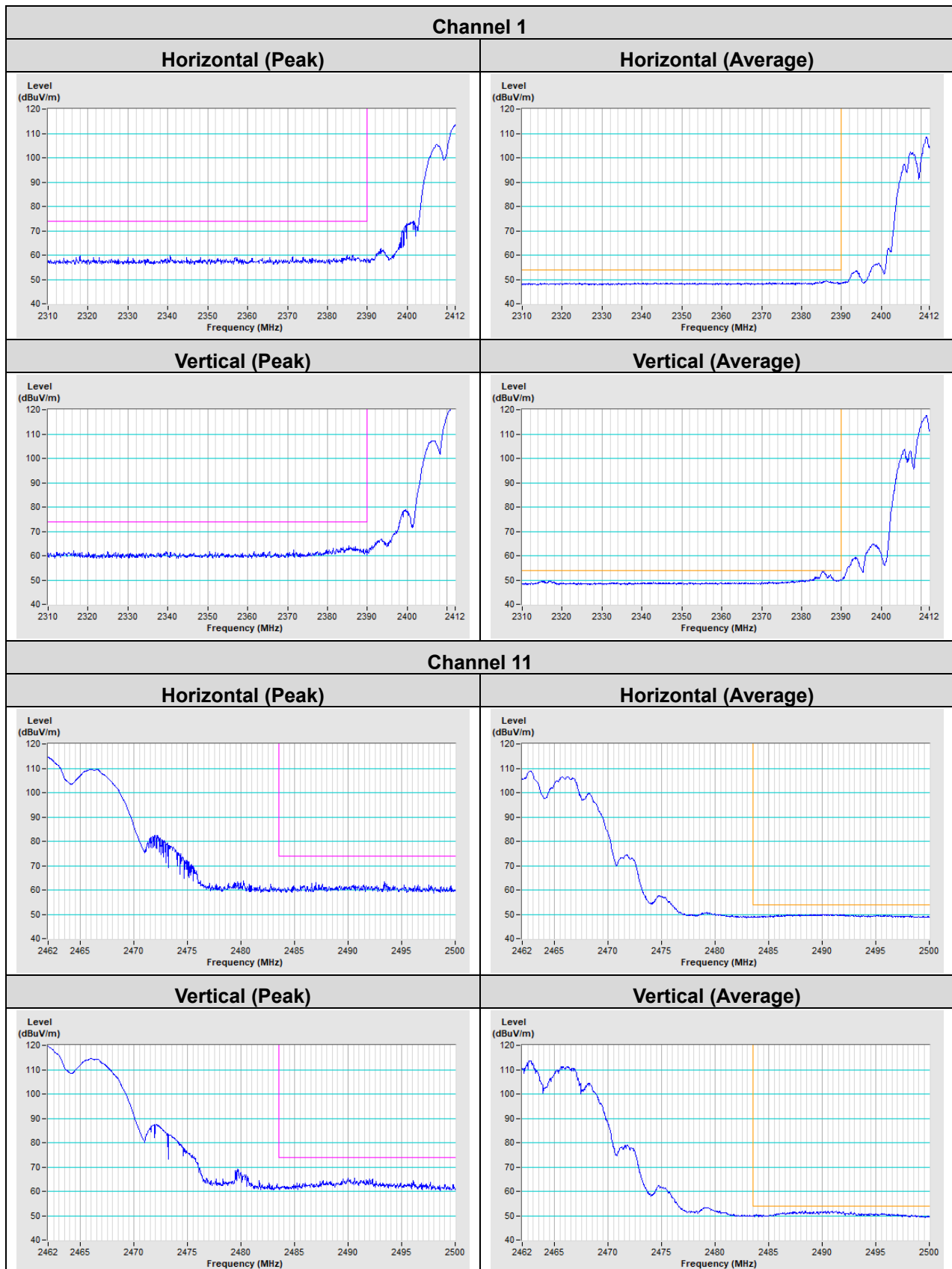


5 Pictures of Test Arrangements

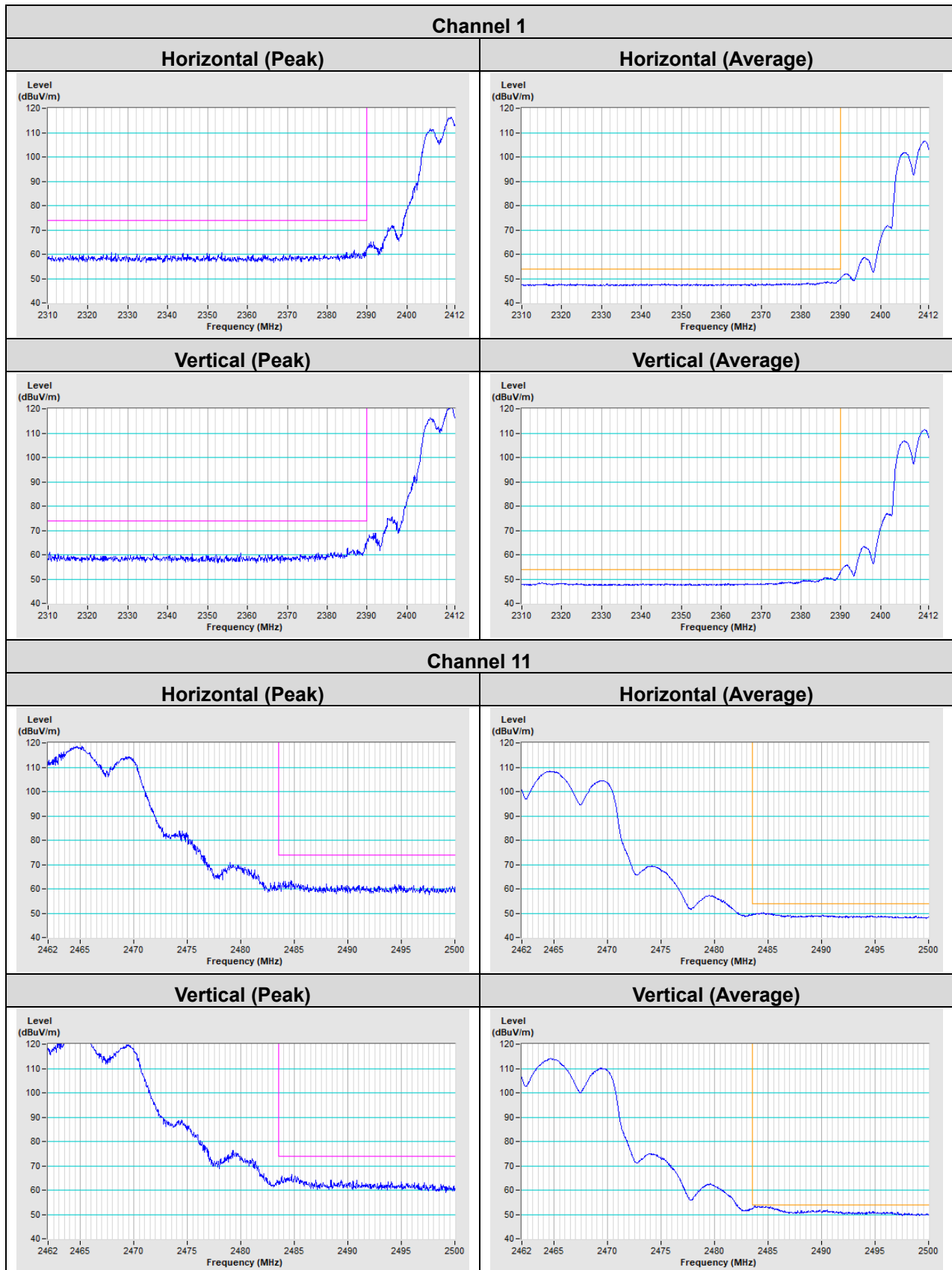
Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

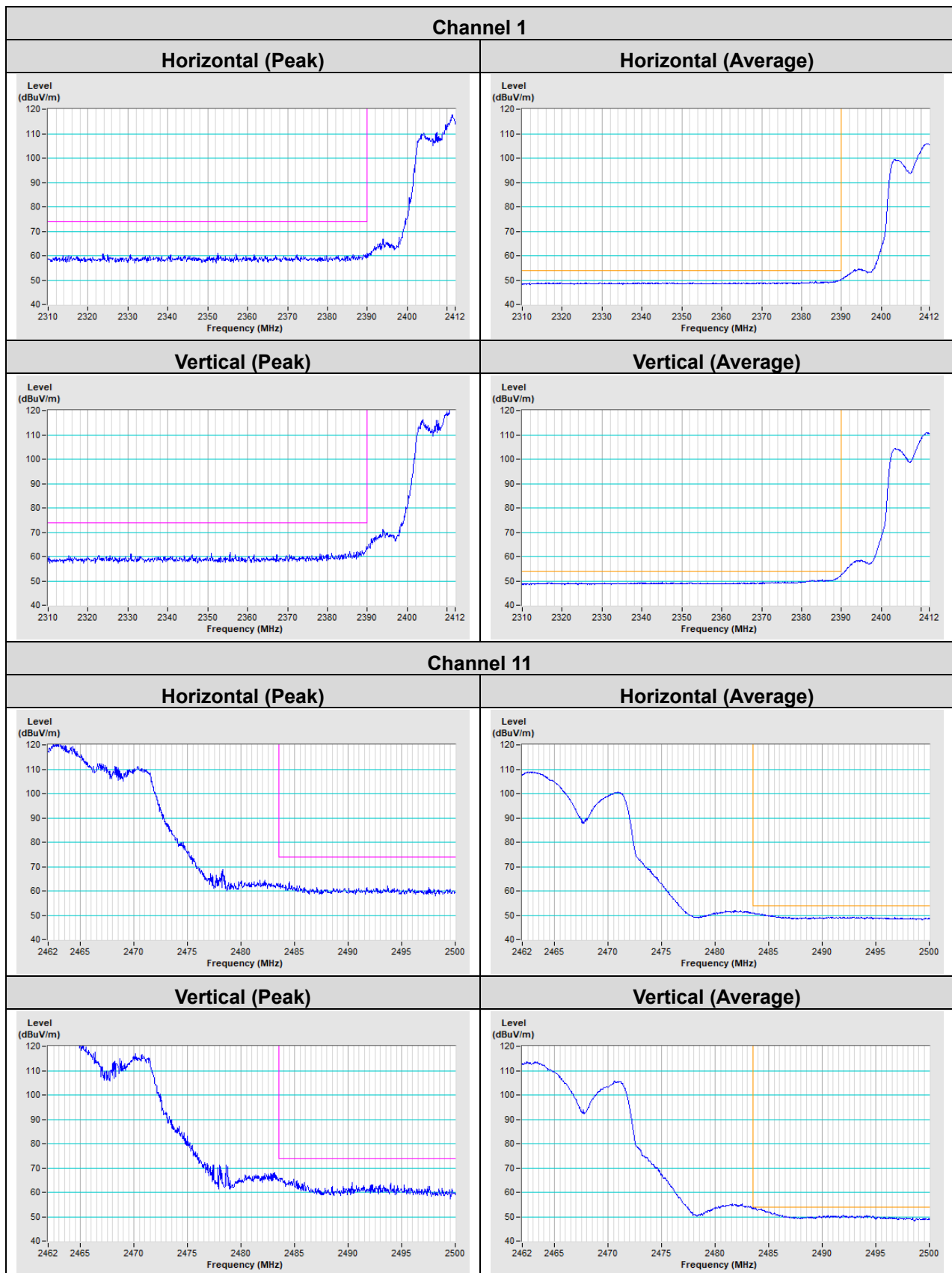
802.11b



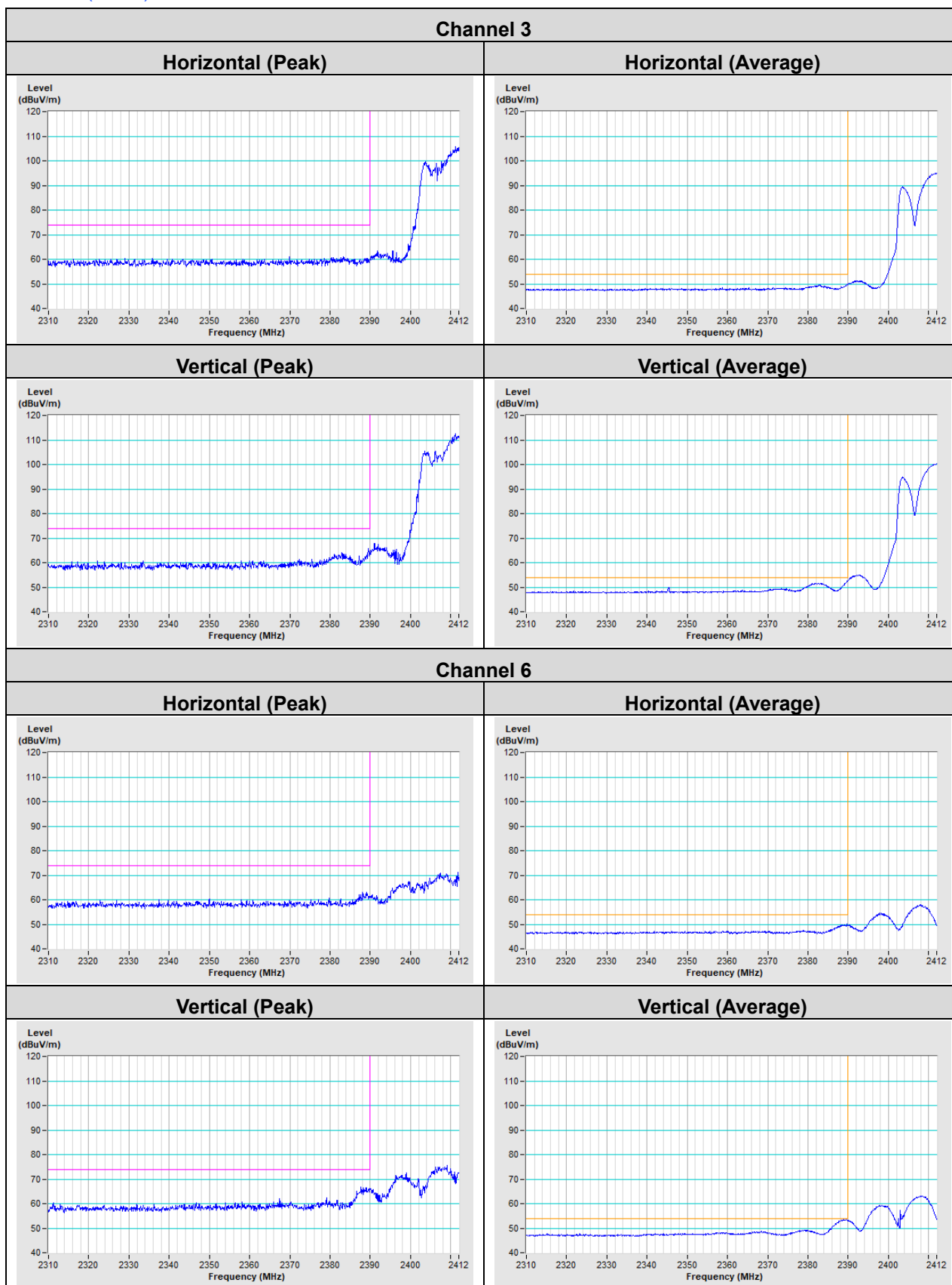
802.11g

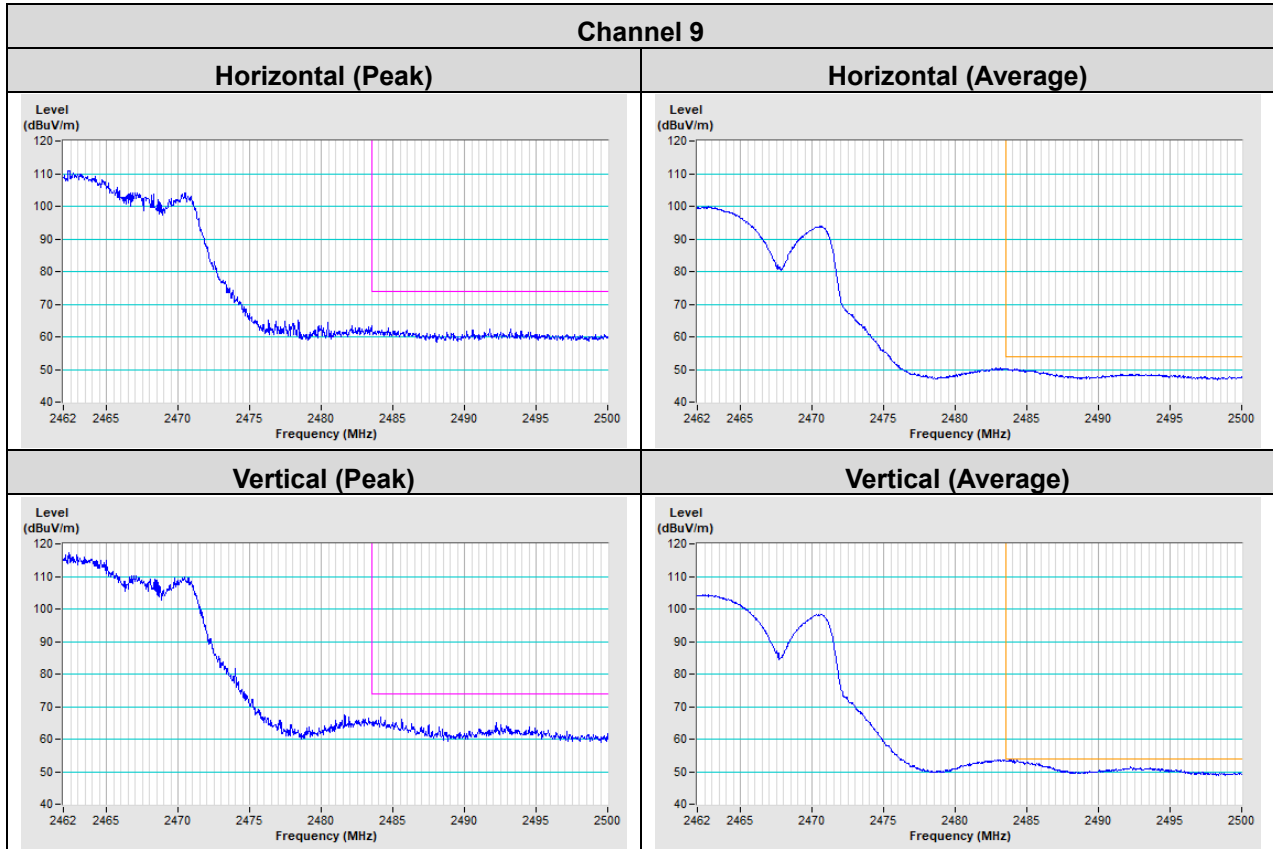


802.11ax (HE20)



802.11ax (HE40)





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 and approved according to ISO/IEC 17025.

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Web Site: www.bureauveritas-adt.com

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

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