FCC Test Report

Report No.:	RFBDYS-WTW-P20080137
FCC ID:	TVE-3417T0696
Test Model:	FAP-231F
Series Model:	FortiAP 231Fxxxxxx, FAP-231Fxxxxxx, FORTIAP-231Fxxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only) (Refer to item 3.1 for more details)
Received Date:	Aug. 07, 2020
Test Date:	Aug. 19 ~ Aug. 26, 2020
Issued Date:	Aug. 31, 2020
Applicant:	Fortinet Inc.
Address:	899 Kifer Road Sunnyvale, CA 94086 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RFBDYS-WTW-P20080137	Original release.	Aug. 31, 2020

1 Certificate of Conformity

Product:	Secured Wireless Access Point
Brand:	Fortinet
Test Model:	FAP-231F
Series Model:	FortiAP 231Fxxxxxx, FAP-231Fxxxxxx, FORTIAP-231Fxxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only) (Refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	Fortinet Inc.
Test Date:	Aug. 19 ~ Aug. 26, 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 RF characteristics under the conditions specified in this report.

Prepared by : Polly Chien , **Date:** Aug. 31, 2020

Polly Chien / Specialist

Approved by : Bruce Chen , **Date:** Aug. 31, 2020

Bruce Chen / Senior Project 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 -8.11dB at 0.46444MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2483.50MHz & 2390.00MHz & 14472.00MHz.
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:

1. 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.
2. 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	9 kHz ~ 30 MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~1000MHz	3.87 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	Secured Wireless Access Point
Brand	Fortinet
Test Model	FAP-231F
Series Model	FortiAP 231Fxxxxxx, FAP-231Fxxxxxx, FORTIAP-231Fxxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)
Model Difference	Refer to note
Sample Status	Engineering sample
Power Supply rating	12Vdc from Adapter 54Vdc from PoE
Modulation Type	802.11b: BPSK, QPSK, CCK 802.11g/n: BPSK, QPSK, 16QAM, 64QAM 802.11ax: BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
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 (HT20/40): up to MCS15 802.11n (VHT20/40): up to MCS9 802.11ax: up to MCS11
Operating Frequency	2412~2462MHz
Number of Channel	2GHz traffic radio: 802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20) , 802.11ax (HE20): 11 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40): 7 Scanning radio: 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	2G traffic radio: CDD Mode: 370.710mW 2G traffic radio: Beamforming Mode: 178.465mW Scanning radio: CDD Mode: 129.122mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The following models are provided to this EUT. The model FAP-231F was chosen for final test.

Brand	Test Model	Series Model	Difference
Fortinet	FAP-231F	FortiAP 231Fxxxxxx, FAP-231Fxxxxxx, FORTIAP-231Fxxxxxx	Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only.

2. The EUT consumes power from the following power supply. (Support unit only)

Adapter	
Brand	Asian Power Devices Inc.
Model	WA-30J12R
Input Power	100-240Vac, 50-60Hz, 0.9A MAX
Output Power	12Vdc, 2.5A
Power Line	1.5m cable without core attached on adapter

POE	
Brand	EnGenius
Model	EPA5006GPR
Input Power	100-240Vac, 50-60Hz, 0.8A
Output Power	54V, 0.6A

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

Modulation Mode	CDD Mode	Beamforming Mode	TX Function	Radio
802.11b	Support	Not Support	2TX	2G traffic radio (Radio 1)
802.11g	Support	Not Support	2TX	
802.11n (HT20)	Support	Support	2TX	
802.11n (HT40)	Support	Support	2TX	
802.11n (VHT20)	Support	Support	2TX	
802.11n (VHT40)	Support	Support	2TX	
802.11ax (HE20)	Support	Support	2TX	
802.11ax (HE40)	Support	Support	2TX	
802.11b	Support	Not Support	1TX	Scanning radio (Radio 3)
802.11g	Support	Not Support	1TX	
802.11n (HT20)	Support	Not Support	1TX	
802.11n (HT40)	Support	Not Support	1TX	

* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40 on 802.11ac 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/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 following antennas were provided to the EUT.

Antenna Type		PIFA	
Antenna Connector		i-pex(MHF)	
Antenna No.		Gain (dBi)	
		2.4~2.4835GHz	5.180~5.825GHz
1	Chain0	4.9	5.2
2	Chain1	3.8	5.5
3	Scan	4.0	5.1
4	BLE & Zigbee	3.6	-

*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 simultaneous operation mode was determined by client.

No	Mode
1	2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) +BLE
2	2G traffic radio (Radio 1) + 5GHz traffic radio (Radio 2) + 5G Scanning radio (Radio 3) +Zigbee
3	5GHz traffic radio (Radio 2)+ 2G Scanning radio (Radio 3) + BLE
4	5GHz traffic radio (Radio 2)+ 2G Scanning radio (Radio 3) + Zigbee

*5GHz traffic radio (Radio 2) and 5G Scanning radio (Radio 3) cannot transmit in the same band at same time.

2G traffic radio (Radio 1) and 2G Scanning radio (Radio 3) cannot transmit at same time.

2G traffic radio (Radio 1) and Zigbee and BT technologies cannot transmit at same time.

6. Spurious emission of the simultaneous operation (WLAN, BLE and Zigbee) has been evaluated and no non-compliance was found.

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≥1G	RE<1G	PLC	APCM	
A	-	√	√	-	Power from adapter
B	√	√	√	√	Power from PoE

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane (For 2G traffic radio), Z-plane (For Scanning radio)**.
2. "-"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
B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	2G traffic radio
	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	
	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	Scanning radio
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	

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
CDD Mode							
A, B	802.11ax (HE20)	1 to 11	6	OFDMA	BPSK	MCS0	2G traffic radio
A, B	802.11g	1 to 11	11	OFDM	BPSK	6.0	Scanning radio

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
CDD Mode							
A, B	802.11ax (HE20)	1 to 11	6	OFDMA	BPSK	MCS0	2G traffic radio
A, B	802.11g	1 to 11	11	OFDM	BPSK	6.0	Scanning radio

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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
CDD Mode							
B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	2G traffic radio
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0	
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0	
	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	Scanning radio
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
Beamforming Mode							
B	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	2G traffic radio
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0	
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0	

*802.11n (VHT20), 802.11n (VHT40) are for Conducted Power Measurement only.

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 66% RH	120Vac, 60Hz	Titan Hsu
RE<1G	23 deg. C, 66% RH	120Vac, 60Hz 54Vdc	Titan Hsu
PLC	25 deg. C, 75% RH	120Vac, 60Hz 54Vdc	Greg Lin
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

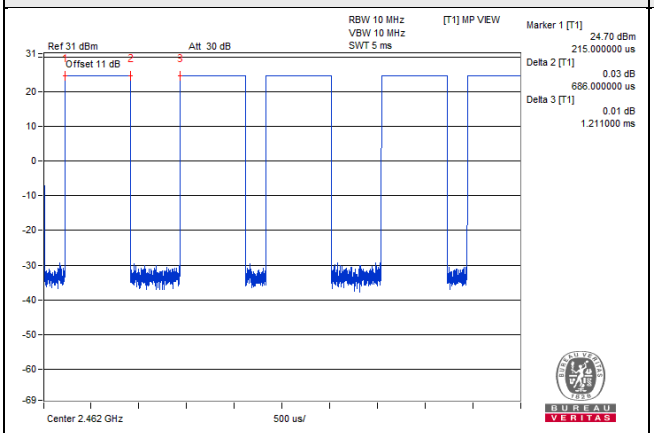
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

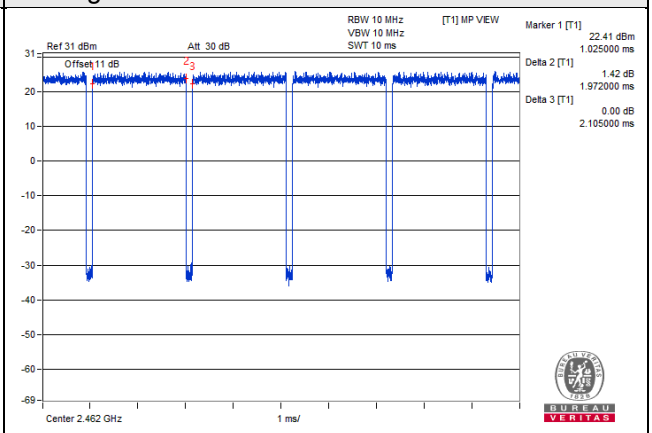
2G traffic radio: CDD Mode

802.11b: Duty cycle = 0.686/1.211 = 0.566, Duty factor = 10 * log(1/0.566) = 2.47
802.11g: Duty cycle = 1.972/2.105 = 0.937, Duty factor = 10 * log(1/0.937) = 0.28
802.11ax (HE20): Duty cycle = 5.435/5.830 = 0.932, Duty factor = 10 * log(1/0.932) = 0.30
802.11ax (HE40): Duty cycle = 5.425/5.765 = 0.941, Duty factor = 10 * log(1/0.941) = 0.26

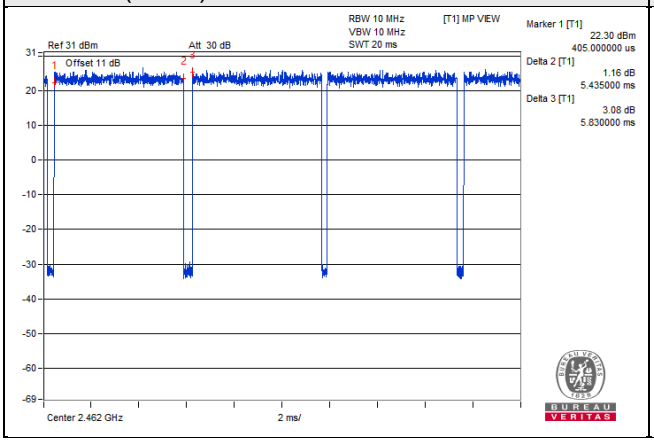
802.11b



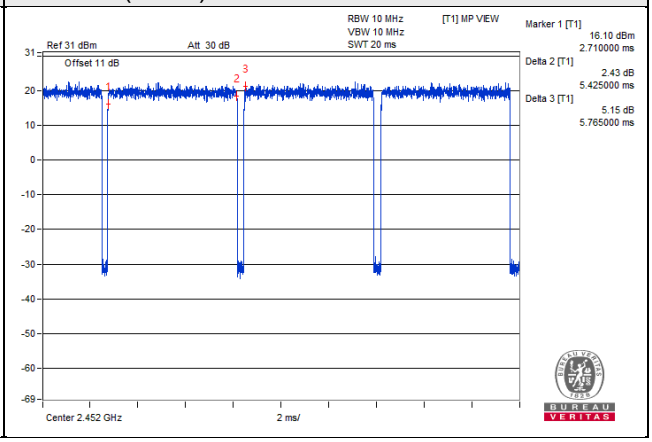
802.11g



802.11ax (HE20)

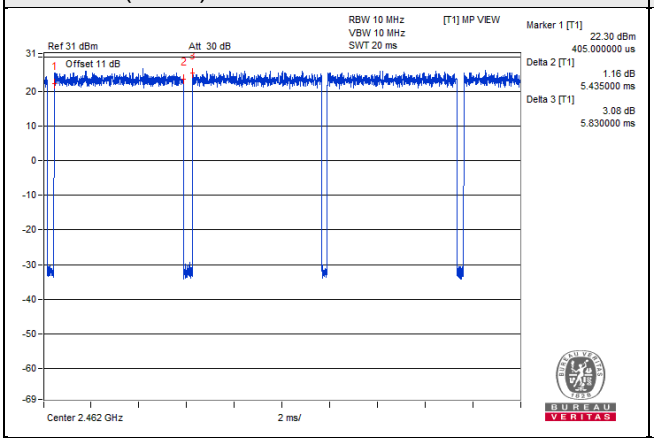
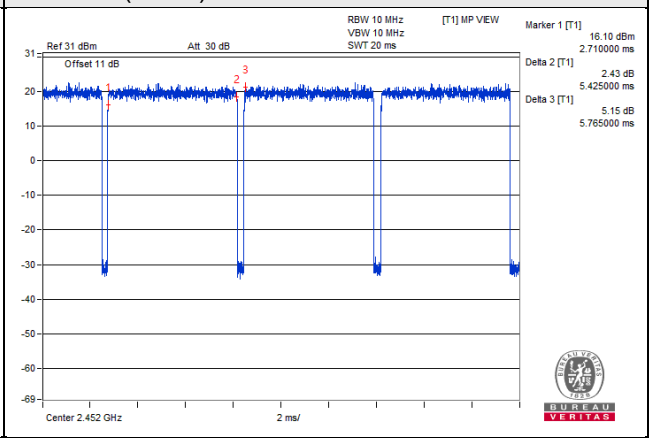


802.11ax (HE40)



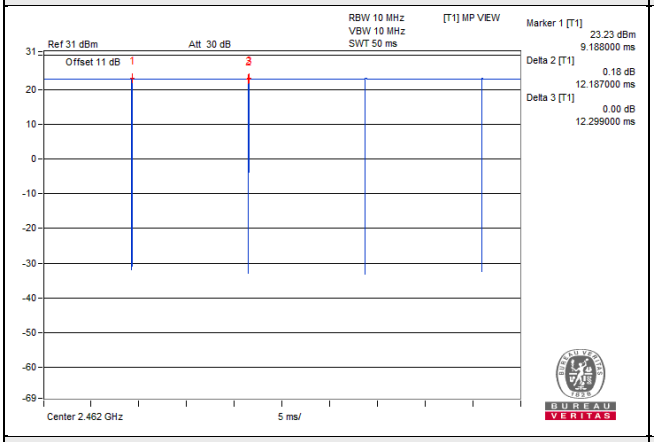
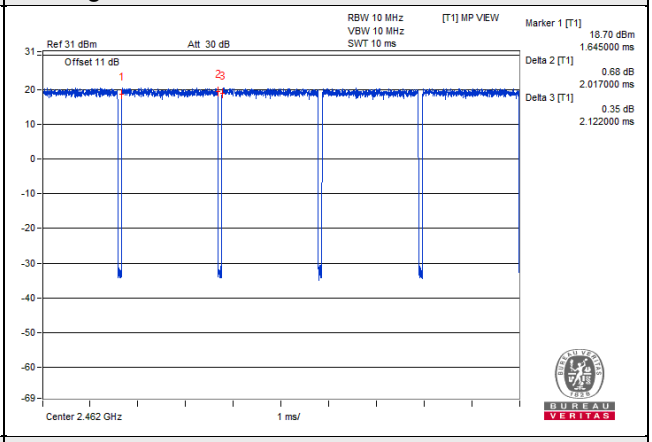
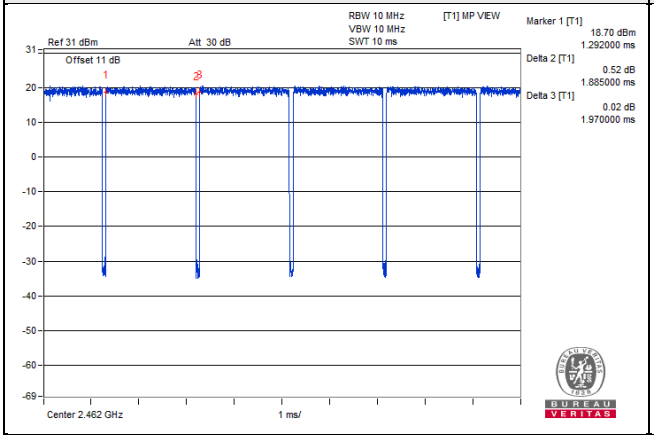
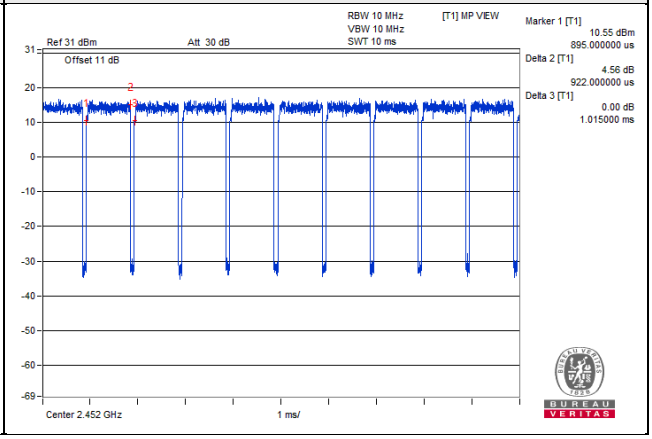
2G traffic radio: Beamforming Mode

802.11ax (HE20): Duty cycle = 5.435/5.830 = 0.932, Duty factor = 10 * log(1/0.932) = 0.30
802.11ax (HE40): Duty cycle = 5.425/5.765 = 0.941, Duty factor = 10 * log(1/0.941) = 0.26

802.11ax (HE20)	802.11ax (HE40)
	

Scanning radio: CDD Mode

802.11b: Duty cycle = 12.187/12.299 = 0.991
802.11g: Duty cycle = 2.017/2.122 = 0.951, Duty factor = 10 * log(1/0.951) = 0.22
802.11n (HT20): Duty cycle = 1.885/1.970 = 0.957, Duty factor = 10 * log(1/0.957) = 0.19
802.11n (HT40): Duty cycle = 0.922/1.015 = 0.908, Duty factor = 10 * log(1/0.908) = 0.42

802.11b	802.11g
	
802.11n (HT20)	802.11n (HT40)
	

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	E5410	1HC2XM1	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	Adapter	Asian Power Devices Inc.	WA-30J12R	NA	NA	Provided by client
D.	USB Flash	HP	v250W	03	NA	-
E.	POE	EnGenius	EPA5006GPR	NA	NA	Provided by client

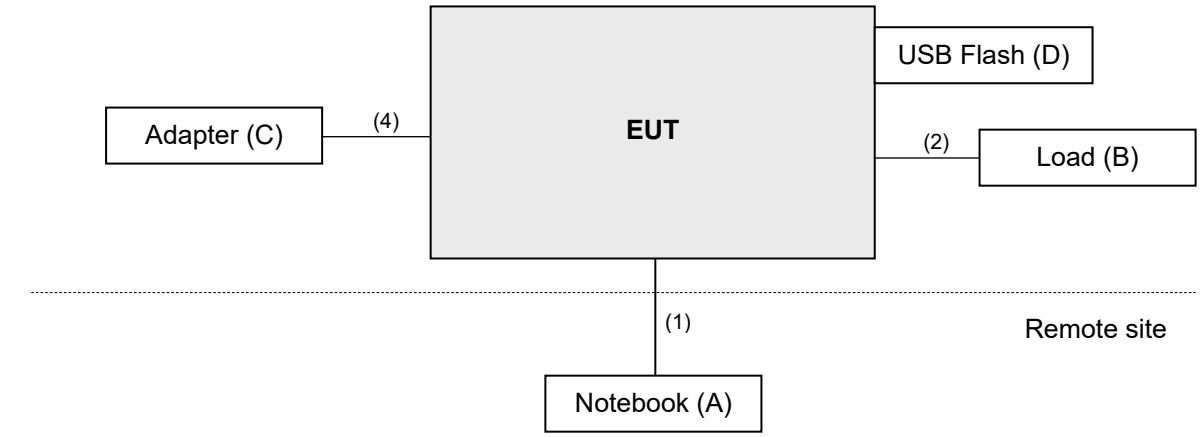
Note:

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.

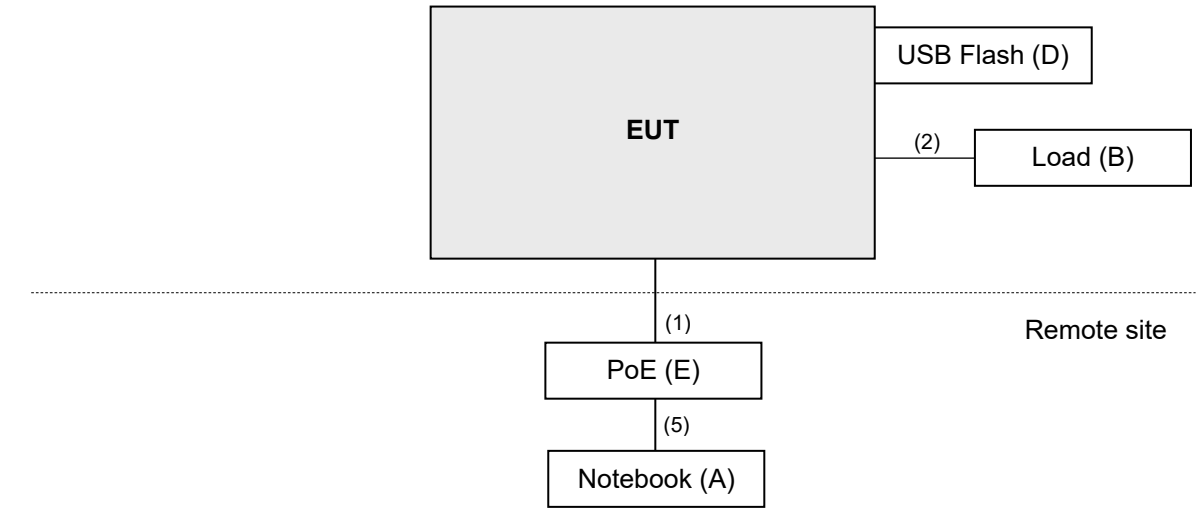
ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN	1	7.0	N	0	RJ45, Cat5e
2.	LAN	2	1.5	N	0	RJ45, Cat5e
3.	Power cable	1	1.5	-	0	Provided by client
4.	LAN	1	1.5	N	0	RJ45, Cat5e

3.4.1 Configuration of System under Test

Mode A



Mode B



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	ESR3	102579	Jul. 07, 2020	Jul. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 09, 2020	Jun. 08, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 16, 2020	Aug. 15, 2021
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 23, 2020	Mar. 22, 2021
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-S M-8000	Cable-CH3-03 (309224+170907)	Aug. 16, 2020	Aug. 15, 2021
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5519 0004/MY55190007/MY 55210005	Jul. 13, 2020	Jul. 12, 2021

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 3.

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 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:

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 ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.

   (2G traffic radio: 802.11b: RBW = 1MHz, VBW = 3kHz; 802.11g: RBW = 1MHz, VBW = 1kHz;
   802.11ax (HE20): RBW = 1MHz, VBW = 1kHz; 802.11ax (HE40): RBW = 1MHz, VBW = 1kHz;
   2G traffic radio: Beamforming Mode:
   802.11ax (HE20): RBW = 1MHz, VBW = 1kHz; 802.11ax (HE40): RBW = 1MHz, VBW = 1kHz;
   Scanning radio: 802.11b: RBW = 1MHz, VBW = 10Hz; 802.11g: RBW = 1MHz, VBW = 1kHz;
   802.11n (HT20): RBW = 1MHz, VBW = 1kHz; 802.11n (HT40): RBW = 1MHz, VBW = 3kHz)

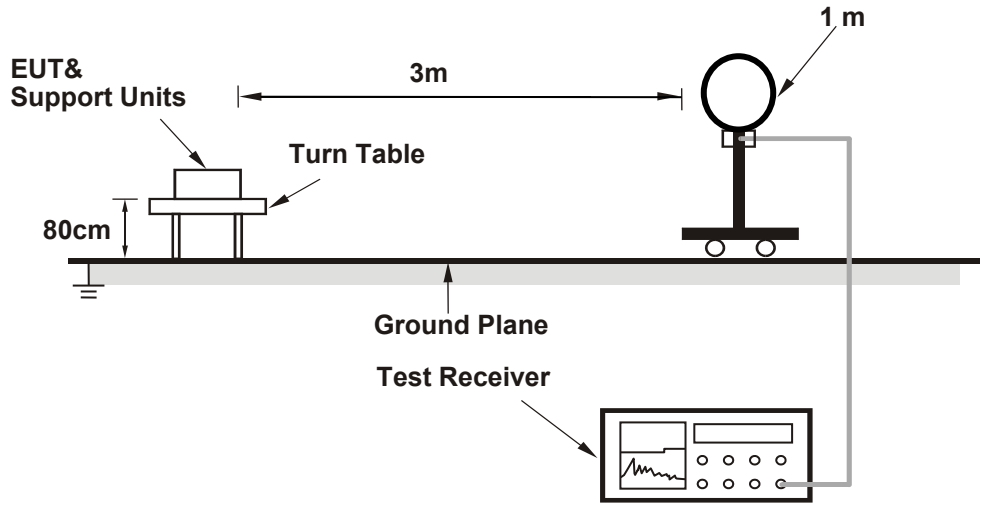
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

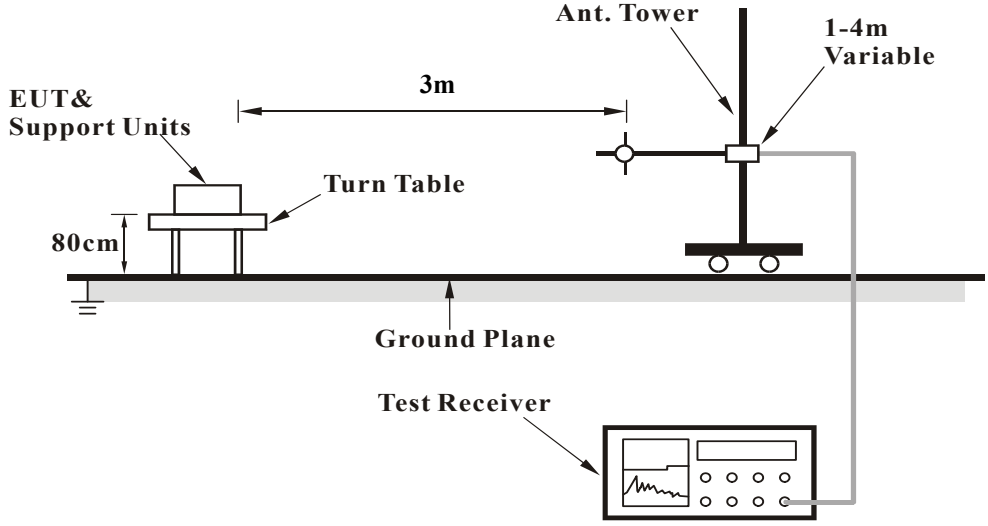
No deviation.

4.1.5 Test Setup

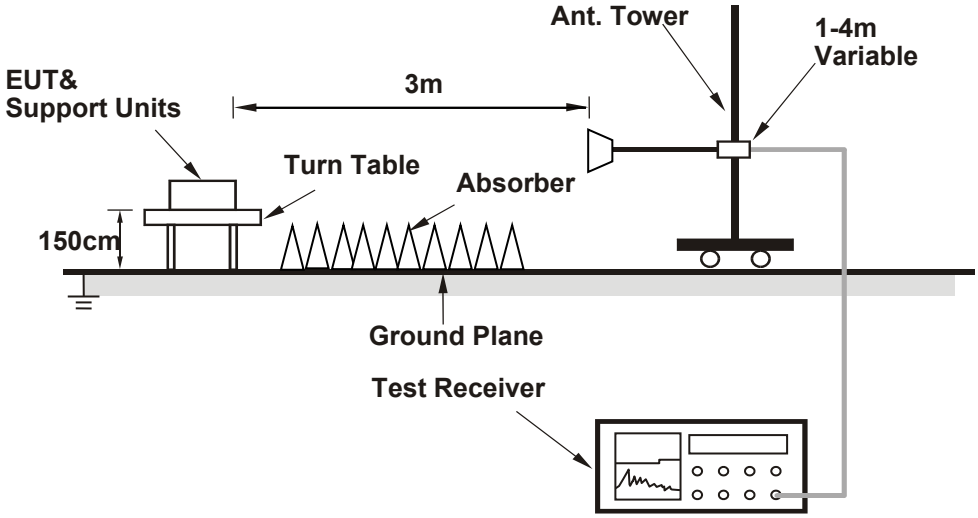
For Radiated emission below 30MHz



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

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. 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.
d. The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Above 1GHz worst-Case data:

2G traffic radio:

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	2390.00	58.8 PK	74.0	-15.2	1.38 H	39	26.5	32.3
2	2390.00	46.7 AV	54.0	-7.3	1.38 H	39	14.4	32.3
3	*2412.00	118.6 PK			1.35 H	34	86.3	32.3
4	*2412.00	114.8 AV			1.35 H	34	82.5	32.3
5	4824.00	50.4 PK	74.0	-23.6	3.43 H	357	47.2	3.2
6	4824.00	40.4 AV	54.0	-13.6	3.43 H	357	37.2	3.2
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	58.8 PK	74.0	-15.2	2.66 V	315	26.5	32.3
2	2390.00	46.6 AV	54.0	-7.4	2.66 V	315	14.3	32.3
3	*2412.00	111.2 PK			2.62 V	309	78.9	32.3
4	*2412.00	107.3 AV			2.62 V	309	75.0	32.3
5	4824.00	50.0 PK	74.0	-24.0	1.72 V	356	46.8	3.2
6	4824.00	44.3 AV	54.0	-9.7	1.72 V	356	41.1	3.2

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	117.2 PK			1.09 H	37	84.9	32.3
2	*2437.00	113.5 AV			1.09 H	37	81.2	32.3
3	4874.00	45.7 PK	74.0	-28.3	3.12 H	318	42.6	3.1
4	4874.00	35.0 AV	54.0	-19.0	3.12 H	318	31.9	3.1
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	109.3 PK			2.17 V	309	77.0	32.3
2	*2437.00	105.7 AV			2.17 V	309	73.4	32.3
3	4874.00	47.2 PK	74.0	-26.8	1.36 V	302	44.1	3.1
4	4874.00	37.9 AV	54.0	-16.1	1.36 V	302	34.8	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	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	*2462.00	117.0 PK			1.27 H	39	84.6	32.4
2	*2462.00	113.3 AV			1.27 H	39	80.9	32.4
3	2483.50	59.6 PK	74.0	-14.4	1.32 H	44	27.2	32.4
4	2483.50	47.9 AV	54.0	-6.1	1.32 H	44	15.5	32.4
5	4924.00	46.3 PK	74.0	-27.7	3.53 H	360	43.2	3.1
6	4924.00	37.2 AV	54.0	-16.8	3.53 H	360	34.1	3.1
7	7386.00	55.1 PK	74.0	-18.9	1.61 H	334	45.3	9.8
8	7386.00	47.7 AV	54.0	-6.3	1.61 H	334	37.9	9.8
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	109.3 PK			2.41 V	339	76.9	32.4
2	*2462.00	105.6 AV			2.41 V	339	73.2	32.4
3	2483.50	58.9 PK	74.0	-15.1	2.45 V	342	26.5	32.4
4	2483.50	47.1 AV	54.0	-6.9	2.45 V	342	14.7	32.4
5	4924.00	47.3 PK	74.0	-26.7	1.59 V	343	44.2	3.1
6	4924.00	39.0 AV	54.0	-15.0	1.59 V	343	35.9	3.1
7	7386.00	57.9 PK	74.0	-16.1	1.75 V	359	48.1	9.8
8	7386.00	52.5 AV	54.0	-1.5	1.75 V	359	42.7	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. 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) 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	2390.00	66.0 PK	74.0	-8.0	1.55 H	34	33.7	32.3
2	2390.00	52.9 AV	54.0	-1.1	1.55 H	34	20.6	32.3
3	*2412.00	118.0 PK			1.36 H	36	85.7	32.3
4	*2412.00	107.4 AV			1.36 H	36	75.1	32.3
5	4824.00	45.5 PK	74.0	-28.5	2.56 H	328	42.3	3.2
6	4824.00	33.5 AV	54.0	-20.5	2.56 H	328	30.3	3.2
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	58.9 PK	74.0	-15.1	2.22 V	333	26.6	32.3
2	2390.00	47.6 AV	54.0	-6.4	2.22 V	333	15.3	32.3
3	*2412.00	110.9 PK			2.20 V	330	78.6	32.3
4	*2412.00	100.6 AV			2.20 V	330	68.3	32.3
5	4824.00	45.4 PK	74.0	-28.6	1.68 V	333	42.2	3.2
6	4824.00	34.0 AV	54.0	-20.0	1.68 V	333	30.8	3.2

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	118.0 PK			1.08 H	37	85.7	32.3
2	*2437.00	107.9 AV			1.08 H	37	75.6	32.3
3	4874.00	45.7 PK	74.0	-28.3	2.66 H	332	42.6	3.1
4	4874.00	33.7 AV	54.0	-20.3	2.66 H	332	30.6	3.1
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	111.9 PK			2.18 V	329	79.6	32.3
2	*2437.00	101.9 AV			2.18 V	329	69.6	32.3
3	4874.00	45.4 PK	74.0	-28.6	1.60 V	319	42.3	3.1
4	4874.00	34.0 AV	54.0	-20.0	1.60 V	319	30.9	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	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	*2462.00	116.3 PK			1.02 H	38	83.9	32.4
2	*2462.00	106.2 AV			1.02 H	38	73.8	32.4
3	2483.50	65.3 PK	74.0	-8.7	1.62 H	55	32.9	32.4
4	2483.50	52.7 AV	54.0	-1.3	1.62 H	55	20.3	32.4
5	4924.00	45.5 PK	74.0	-28.5	2.69 H	335	42.4	3.1
6	4924.00	33.6 AV	54.0	-20.4	2.69 H	335	30.5	3.1
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	112.3 PK			2.15 V	328	79.9	32.4
2	*2462.00	102.0 AV			2.15 V	328	69.6	32.4
3	2483.50	61.5 PK	74.0	-12.5	2.19 V	336	29.1	32.4
4	2483.50	48.6 AV	54.0	-5.4	2.19 V	336	16.2	32.4
5	4924.00	45.6 PK	74.0	-28.4	1.59 V	322	42.5	3.1
6	4924.00	34.3 AV	54.0	-19.7	1.59 V	322	31.2	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ax (HE20)

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	2390.00	66.0 PK	74.0	-8.0	1.56 H	32	33.7	32.3
2	2390.00	52.9 AV	54.0	-1.1	1.56 H	32	20.6	32.3
3	*2412.00	117.6 PK			1.55 H	35	85.3	32.3
4	*2412.00	104.7 AV			1.55 H	35	72.4	32.3
5	4824.00	45.7 PK	74.0	-28.3	2.51 H	325	42.5	3.2
6	4824.00	33.7 AV	54.0	-20.3	2.51 H	325	30.5	3.2
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	59.3 PK	74.0	-14.7	2.20 V	336	27.0	32.3
2	2390.00	47.8 AV	54.0	-6.2	2.20 V	336	15.5	32.3
3	*2412.00	112.4 PK			2.17 V	333	80.1	32.3
4	*2412.00	99.2 AV			2.17 V	333	66.9	32.3
5	4824.00	45.7 PK	74.0	-28.3	1.69 V	327	42.5	3.2
6	4824.00	34.3 AV	54.0	-19.7	1.69 V	327	31.1	3.2

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	119.9 PK			1.07 H	34	87.6	32.3
2	*2437.00	106.5 AV			1.07 H	34	74.2	32.3
3	4874.00	45.9 PK	74.0	-28.1	2.63 H	332	42.8	3.1
4	4874.00	33.7 AV	54.0	-20.3	2.63 H	332	30.6	3.1
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	113.7 PK			2.14 V	330	81.4	32.3
2	*2437.00	101.4 AV			2.14 V	330	69.1	32.3
3	4874.00	45.6 PK	74.0	-28.4	1.72 V	334	42.5	3.1
4	4874.00	34.2 AV	54.0	-19.8	1.72 V	334	31.1	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	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	*2462.00	118.0 PK			1.28 H	33	85.6	32.4
2	*2462.00	105.2 AV			1.28 H	33	72.8	32.4
3	2483.50	65.7 PK	74.0	-8.3	1.64 H	41	33.3	32.4
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.64 H**	**41**	**20.6**	**32.4**
5	4924.00	45.6 PK	74.0	-28.4	2.65 H	334	42.5	3.1
6	4924.00	33.6 AV	54.0	-20.4	2.65 H	334	30.5	3.1
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	113.0 PK			2.16 V	328	80.6	32.4
2	*2462.00	100.4 AV			2.16 V	328	68.0	32.4
3	2483.50	61.4 PK	74.0	-12.6	2.19 V	330	29.0	32.4
4	2483.50	48.4 AV	54.0	-5.6	2.19 V	330	16.0	32.4
5	4924.00	45.6 PK	74.0	-28.4	1.68 V	335	42.5	3.1
6	4924.00	33.9 AV	54.0	-20.1	1.68 V	335	30.8	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11ax (HE40)

CHANNEL	TX Channel 3	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	2390.00	64.7 PK	74.0	-9.3	1.57 H	28	32.4	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.57 H	28	20.0	32.3
3	*2422.00	116.1 PK			1.58 H	37	83.8	32.3
4	*2422.00	103.8 AV			1.58 H	37	71.5	32.3
5	4844.00	45.5 PK	74.0	-28.5	2.59 H	330	42.4	3.1
6	4844.00	32.9 AV	54.0	-21.1	2.59 H	330	29.8	3.1
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	61.3 PK	74.0	-12.7	2.20 V	334	29.0	32.3
2	2390.00	48.3 AV	54.0	-5.7	2.20 V	334	16.0	32.3
3	*2422.00	110.3 PK			2.18 V	332	78.0	32.3
4	*2422.00	97.5 AV			2.18 V	332	65.2	32.3
5	4844.00	45.7 PK	74.0	-28.3	1.69 V	336	42.6	3.1
6	4844.00	34.0 AV	54.0	-20.0	1.69 V	336	30.9	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	115.7 PK			1.06 H	31	83.4	32.3
2	*2437.00	102.6 AV			1.06 H	31	70.3	32.3
3	2483.50	65.7 PK	74.0	-8.3	1.02 H	25	33.3	32.4
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.02 H**	**25**	**20.6**	**32.4**
5	4874.00	45.6 PK	74.0	-28.4	2.69 H	336	42.5	3.1
6	4874.00	33.0 AV	54.0	-21.0	2.69 H	336	29.9	3.1
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	110.5 PK			2.18 V	329	78.2	32.3
2	*2437.00	98.5 AV			2.18 V	329	66.2	32.3
3	2483.50	62.9 PK	74.0	-11.1	2.23 V	331	30.5	32.4
4	2483.50	50.9 AV	54.0	-3.1	2.23 V	331	18.5	32.4
5	4874.00	45.5 PK	74.0	-28.5	1.69 V	332	42.4	3.1
6	4874.00	34.1 AV	54.0	-19.9	1.69 V	332	31.0	3.1

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.
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	113.5 PK			1.26 H	33	81.1	32.4
2	*2452.00	100.8 AV			1.26 H	33	68.4	32.4
3	2483.50	65.1 PK	74.0	-8.9	1.38 H	67	32.7	32.4
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.38 H**	**67**	**20.6**	**32.4**
5	4904.00	45.4 PK	74.0	-28.6	2.69 H	336	42.4	3.0
6	4904.00	32.6 AV	54.0	-21.4	2.69 H	336	29.6	3.0
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	108.6 PK			2.16 V	330	76.2	32.4
2	*2452.00	96.0 AV			2.16 V	330	63.6	32.4
3	2483.50	62.7 PK	74.0	-11.3	2.20 V	333	30.3	32.4
4	2483.50	49.4 AV	54.0	-4.6	2.20 V	333	17.0	32.4
5	4904.00	45.3 PK	74.0	-28.7	1.63 V	329	42.3	3.0
6	4904.00	33.1 AV	54.0	-20.9	1.63 V	329	30.1	3.0

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

Scanning radio:

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	2390.00	61.9 PK	74.0	-12.1	2.65 H	300	29.6	32.3
2	2390.00	50.3 AV	54.0	-3.7	2.65 H	300	18.0	32.3
3	*2412.00	110.9 PK			2.65 H	300	78.6	32.3
4	*2412.00	107.2 AV			2.65 H	300	74.9	32.3
5	4824.00	46.9 PK	74.0	-27.1	1.59 H	333	43.7	3.2
6	4824.00	38.1 AV	54.0	-15.9	1.59 H	333	34.9	3.2
7	14472.00	66.4 PK	74.0	-7.6	1.69 H	305	42.2	24.2
8	**14472.00**	**53.0 AV**	**54.0**	**-1.0**	**1.69 H**	**305**	**28.8**	**24.2**
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	58.6 PK	74.0	-15.4	3.08 V	13	26.3	32.3
2	2390.00	46.9 AV	54.0	-7.1	3.08 V	13	14.6	32.3
3	*2412.00	107.0 PK			3.06 V	10	74.7	32.3
4	*2412.00	103.1 AV			3.06 V	10	70.8	32.3
5	4824.00	46.4 PK	74.0	-27.6	2.40 V	21	43.2	3.2
6	4824.00	37.1 AV	54.0	-16.9	2.40 V	21	33.9	3.2
7	14472.00	66.3 PK	74.0	-7.7	2.69 V	354	42.1	24.2
8	14472.00	52.6 AV	54.0	-1.4	2.69 V	354	28.4	24.2

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	111.5 PK			2.89 H	310	79.2	32.3
2	*2437.00	107.9 AV			2.89 H	310	75.6	32.3
3	4874.00	52.8 PK	74.0	-21.2	1.47 H	330	49.7	3.1
4	4874.00	48.8 AV	54.0	-5.2	1.47 H	330	45.7	3.1
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	107.5 PK			3.31 V	346	75.2	32.3
2	*2437.00	103.9 AV			3.31 V	346	71.6	32.3
3	4874.00	50.9 PK	74.0	-23.1	2.22 V	20	47.8	3.1
4	4874.00	46.1 AV	54.0	-7.9	2.22 V	20	43.0	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	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	*2462.00	113.2 PK			2.06 H	304	80.8	32.4
2	*2462.00	109.4 AV			2.06 H	304	77.0	32.4
3	2483.50	61.5 PK	74.0	-12.5	2.51 H	303	29.1	32.4
4	2483.50	52.4 AV	54.0	-1.6	2.51 H	303	20.0	32.4
5	4924.00	50.7 PK	74.0	-23.3	1.36 H	328	47.6	3.1
6	4924.00	45.8 AV	54.0	-8.2	1.36 H	328	42.7	3.1
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	108.4 PK			3.17 V	345	76.0	32.4
2	*2462.00	104.8 AV			3.17 V	345	72.4	32.4
3	2483.50	59.7 PK	74.0	-14.3	3.20 V	347	27.3	32.4
4	2483.50	49.8 AV	54.0	-4.2	3.20 V	347	17.4	32.4
5	4924.00	49.5 PK	74.0	-24.5	2.20 V	22	46.4	3.1
6	4924.00	43.8 AV	54.0	-10.2	2.20 V	22	40.7	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11g

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	2390.00	67.5 PK	74.0	-6.5	2.41 H	295	35.2	32.3
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**2.41 H**	**295**	**20.7**	**32.3**
3	*2412.00	111.0 PK			2.37 H	308	78.7	32.3
4	*2412.00	100.7 AV			2.37 H	308	68.4	32.3
5	4824.00	45.3 PK	74.0	-28.7	1.64 H	17	42.1	3.2
6	4824.00	32.2 AV	54.0	-21.8	1.64 H	17	29.0	3.2
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	62.9 PK	74.0	-11.1	3.46 V	350	30.6	32.3
2	2390.00	50.4 AV	54.0	-3.6	3.46 V	350	18.1	32.3
3	*2412.00	107.4 PK			3.42 V	347	75.1	32.3
4	*2412.00	96.8 AV			3.42 V	347	64.5	32.3
5	4824.00	45.4 PK	74.0	-28.6	2.23 V	12	42.2	3.2
6	4824.00	32.3 AV	54.0	-21.7	2.23 V	12	29.1	3.2

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	112.6 PK			2.60 H	302	80.3	32.3
2	*2437.00	102.2 AV			2.60 H	302	69.9	32.3
3	4874.00	46.1 PK	74.0	-27.9	1.66 H	20	43.0	3.1
4	4874.00	32.6 AV	54.0	-21.4	1.66 H	20	29.5	3.1
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	106.3 PK			3.42 V	360	74.0	32.3
2	*2437.00	95.8 AV			3.42 V	360	63.5	32.3
3	4874.00	45.4 PK	74.0	-28.6	2.26 V	15	42.3	3.1
4	4874.00	32.3 AV	54.0	-21.7	2.26 V	15	29.2	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	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	*2462.00	110.4 PK			2.30 H	310	78.0	32.4
2	*2462.00	99.7 AV			2.30 H	310	67.3	32.4
3	2483.50	65.0 PK	74.0	-9.0	2.29 H	306	32.6	32.4
4	2483.50	52.4 AV	54.0	-1.6	2.29 H	306	20.0	32.4
5	4924.00	46.2 PK	74.0	-27.8	1.72 H	22	43.1	3.1
6	4924.00	32.6 AV	54.0	-21.4	1.72 H	22	29.5	3.1
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	104.8 PK			3.44 V	315	72.4	32.4
2	*2462.00	94.4 AV			3.44 V	315	62.0	32.4
3	2483.50	61.2 PK	74.0	-12.8	3.47 V	316	28.8	32.4
4	2483.50	48.9 AV	54.0	-5.1	3.47 V	316	16.5	32.4
5	4924.00	45.4 PK	74.0	-28.6	2.29 V	15	42.3	3.1
6	4924.00	32.3 AV	54.0	-21.7	2.29 V	15	29.2	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (HT20)

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	2390.00	67.0 PK	74.0	-7.0	2.43 H	297	34.7	32.3
2	2390.00	52.4 AV	54.0	-1.6	2.43 H	297	20.1	32.3
3	*2412.00	110.0 PK			2.37 H	309	77.7	32.3
4	*2412.00	99.5 AV			2.37 H	309	67.2	32.3
5	4824.00	45.4 PK	74.0	-28.6	1.66 H	22	42.2	3.2
6	4824.00	32.4 AV	54.0	-21.6	1.66 H	22	29.2	3.2
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	62.1 PK	74.0	-11.9	3.44 V	357	29.8	32.3
2	2390.00	50.2 AV	54.0	-3.8	3.44 V	357	17.9	32.3
3	*2412.00	106.6 PK			3.43 V	359	74.3	32.3
4	*2412.00	93.3 AV			3.43 V	359	61.0	32.3
5	4824.00	45.5 PK	74.0	-28.5	2.31 V	15	42.3	3.2
6	4824.00	32.4 AV	54.0	-21.6	2.31 V	15	29.2	3.2

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	112.1 PK			2.33 H	308	79.8	32.3
2	*2437.00	101.4 AV			2.33 H	308	69.1	32.3
3	2483.50	66.1 PK	74.0	-7.9	2.32 H	306	33.7	32.4
4	2483.50	52.6 AV	54.0	-1.4	2.32 H	306	20.2	32.4
5	4874.00	45.3 PK	74.0	-28.7	1.73 H	25	42.2	3.1
6	4874.00	32.9 AV	54.0	-21.1	1.73 H	25	29.8	3.1
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	107.4 PK			3.70 V	351	75.1	32.3
2	*2437.00	97.1 AV			3.70 V	351	64.8	32.3
3	2483.50	60.6 PK	74.0	-13.4	3.68 V	355	28.2	32.4
4	2483.50	48.7 AV	54.0	-5.3	3.68 V	355	16.3	32.4
5	4874.00	45.6 PK	74.0	-28.4	2.29 V	15	42.5	3.1
6	4874.00	32.4 AV	54.0	-21.6	2.29 V	15	29.3	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	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	*2462.00	110.2 PK			2.31 H	307	77.8	32.4
2	*2462.00	99.6 AV			2.31 H	307	67.2	32.4
3	2483.50	66.3 PK	74.0	-7.7	2.30 H	308	33.9	32.4
4	2483.50	52.7 AV	54.0	-1.3	2.30 H	308	20.3	32.4
5	4924.00	45.4 PK	74.0	-28.6	1.72 H	22	42.3	3.1
6	4924.00	32.2 AV	54.0	-21.8	1.72 H	22	29.1	3.1
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	105.6 PK			3.21 V	346	73.2	32.4
2	*2462.00	95.2 AV			3.21 V	346	62.8	32.4
3	2483.50	60.9 PK	74.0	-13.1	3.25 V	349	28.5	32.4
4	2483.50	48.7 AV	54.0	-5.3	3.25 V	349	16.3	32.4
5	4924.00	45.5 PK	74.0	-28.5	2.33 V	17	42.4	3.1
6	4924.00	32.3 AV	54.0	-21.7	2.33 V	17	29.2	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

802.11n (HT40)

CHANNEL	TX Channel 3	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	2390.00	65.4 PK	74.0	-8.6	2.26 H	331	33.1	32.3
2	2390.00	52.6 AV	54.0	-1.4	2.26 H	331	20.3	32.3
3	*2422.00	106.0 PK			2.58 H	298	73.7	32.3
4	*2422.00	95.3 AV			2.58 H	298	63.0	32.3
5	4844.00	45.2 PK	74.0	-28.8	1.75 H	30	42.1	3.1
6	4844.00	32.4 AV	54.0	-21.6	1.75 H	30	29.3	3.1
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	61.4 PK	74.0	-12.6	2.98 V	9	29.1	32.3
2	2390.00	49.4 AV	54.0	-4.6	2.98 V	9	17.1	32.3
3	*2422.00	101.5 PK			2.98 V	9	69.2	32.3
4	*2422.00	91.1 AV			2.98 V	9	58.8	32.3
5	4844.00	45.4 PK	74.0	-28.6	2.28 V	20	42.3	3.1
6	4844.00	32.3 AV	54.0	-21.7	2.28 V	20	29.2	3.1

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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	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	*2437.00	106.5 PK			2.11 H	301	74.2	32.3
2	*2437.00	96.0 AV			2.11 H	301	63.7	32.3
3	2483.50	64.7 PK	74.0	-9.3	2.32 H	304	32.3	32.4
4	2483.50	52.8 AV	54.0	-1.2	2.32 H	304	20.4	32.4
5	4874.00	45.3 PK	74.0	-28.7	1.77 H	27	42.2	3.1
6	4874.00	32.6 AV	54.0	-21.4	1.77 H	27	29.5	3.1
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	101.7 PK			3.30 V	348	69.4	32.3
2	*2437.00	91.4 AV			3.30 V	348	59.1	32.3
3	2483.50	60.7 PK	74.0	-13.3	3.36 V	350	28.3	32.4
4	2483.50	48.5 AV	54.0	-5.5	3.36 V	350	16.1	32.4
5	4874.00	45.4 PK	74.0	-28.6	2.28 V	19	42.3	3.1
6	4874.00	32.2 AV	54.0	-21.8	2.28 V	19	29.1	3.1

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.
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	104.0 PK			2.05 H	301	71.6	32.4
2	*2452.00	93.7 AV			2.05 H	301	61.3	32.4
3	2483.50	65.0 PK	74.0	-9.0	2.11 H	312	32.6	32.4
4	2483.50	52.7 AV	54.0	-1.3	2.11 H	312	20.3	32.4
5	4904.00	45.3 PK	74.0	-28.7	1.75 H	28	42.3	3.0
6	4904.00	32.3 AV	54.0	-21.7	1.75 H	28	29.3	3.0
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	99.7 PK			3.22 V	345	67.3	32.4
2	*2452.00	89.7 AV			3.22 V	345	57.3	32.4
3	2483.50	61.8 PK	74.0	-12.2	3.25 V	347	29.4	32.4
4	2483.50	49.6 AV	54.0	-4.4	3.25 V	347	17.2	32.4
5	4904.00	45.3 PK	74.0	-28.7	2.28 V	21	42.3	3.0
6	4904.00	32.2 AV	54.0	-21.8	2.28 V	21	29.2	3.0

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. 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:

2G traffic radio

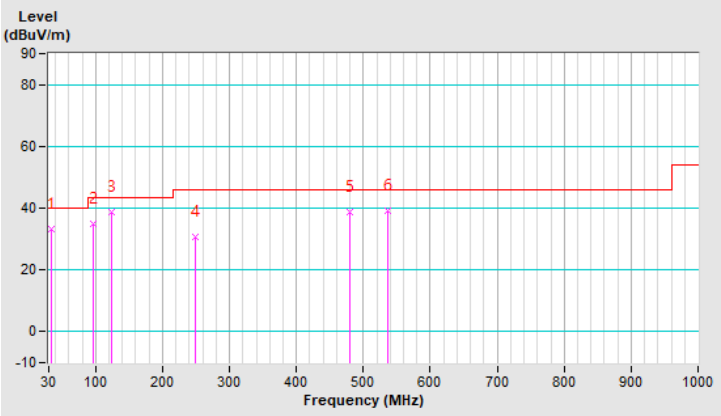
802.11ax (HE20)

CHANNEL	TX Channel 6	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	34.22	33.3 QP	40.0	-6.7	2.00 H	270	43.8	-10.5
2	96.07	34.8 QP	43.5	-8.7	2.00 H	281	48.5	-13.7
3	124.19	38.6 QP	43.5	-4.9	1.50 H	100	49.1	-10.5
4	249.30	30.5 QP	46.0	-15.5	1.00 H	143	39.3	-8.8
5	479.86	38.8 QP	46.0	-7.2	2.00 H	11	41.4	-2.6
6	536.09	39.2 QP	46.0	-6.8	1.50 H	10	40.8	-1.6

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.

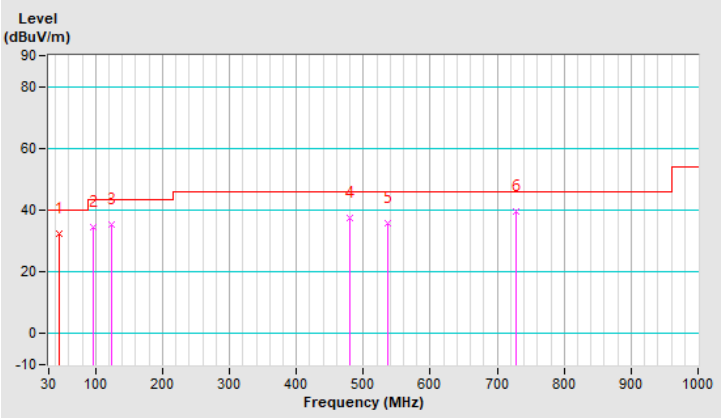


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

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	45.13	32.3 QP	40.0	-7.7	1.00 V	273	41.4	-9.1
2	96.07	34.5 QP	43.5	-9.0	1.00 V	163	48.2	-13.7
3	124.19	35.2 QP	43.5	-8.3	1.00 V	172	45.7	-10.5
4	479.86	37.4 QP	46.0	-8.6	1.00 V	158	40.0	-2.6
5	536.09	35.9 QP	46.0	-10.1	1.00 V	181	37.5	-1.6
6	728.68	39.6 QP	46.0	-6.4	1.50 V	17	37.0	2.6

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.

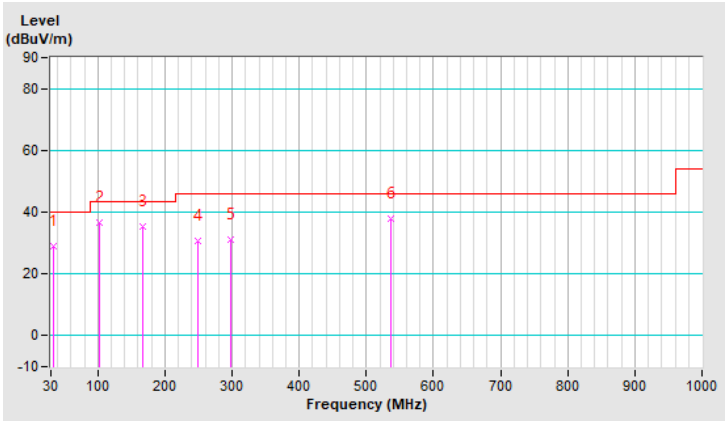


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	34.22	29.0 QP	40.0	-11.0	2.00 H	280	39.5	-10.5
2	103.10	36.5 QP	43.5	-7.0	2.00 H	281	49.2	-12.7
3	167.77	35.3 QP	43.5	-8.2	1.49 H	299	43.9	-8.6
4	249.30	30.6 QP	46.0	-15.4	1.00 H	109	39.4	-8.8
5	297.10	31.2 QP	46.0	-14.8	1.00 H	138	38.0	-6.8
6	536.09	37.9 QP	46.0	-8.1	1.49 H	185	39.5	-1.6

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.

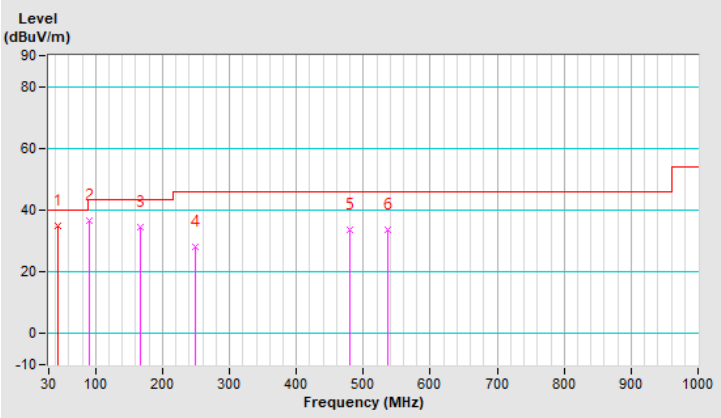


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	43.54	34.8 QP	40.0	-5.2	1.00 V	3	44.1	-9.3
2	90.45	36.8 QP	43.5	-6.7	1.00 V	178	51.1	-14.3
3	166.36	34.5 QP	43.5	-9.0	1.00 V	294	43.1	-8.6
4	249.30	28.0 QP	46.0	-18.0	1.49 V	161	36.8	-8.8
5	479.86	33.6 QP	46.0	-12.4	1.00 V	172	36.2	-2.6
6	536.09	33.8 QP	46.0	-12.2	1.49 V	197	35.4	-1.6

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.



Scanning radio

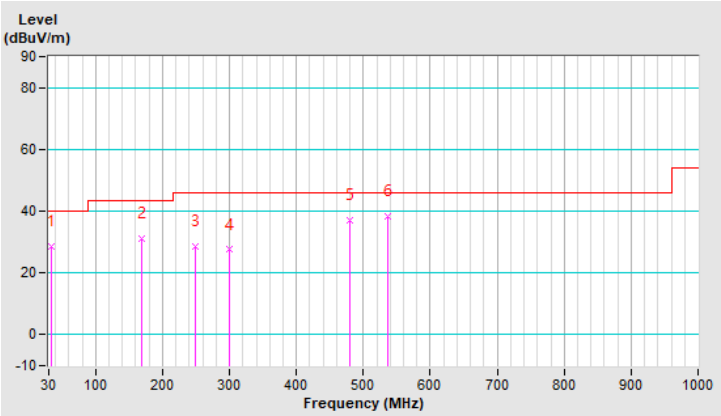
802.11g

CHANNEL	TX Channel 11	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	34.22	28.4 QP	40.0	-11.6	1.00 H	139	38.9	-10.5
2	169.17	31.1 QP	43.5	-12.4	1.50 H	302	39.9	-8.8
3	249.30	28.7 QP	46.0	-17.3	1.50 H	199	37.5	-8.8
4	299.91	27.5 QP	46.0	-18.5	1.50 H	152	34.2	-6.7
5	479.86	37.1 QP	46.0	-8.9	1.00 H	2	39.7	-2.6
6	536.09	38.4 QP	46.0	-7.6	2.00 H	1	40.0	-1.6

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.

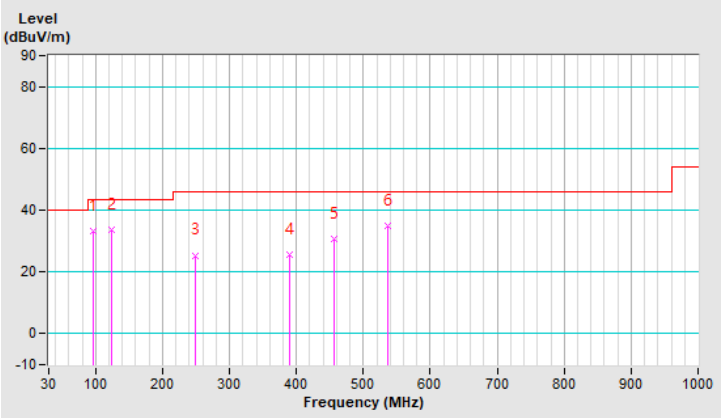


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

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	96.07	33.2 QP	43.5	-10.3	2.00 V	138	46.9	-13.7
2	124.19	33.7 QP	43.5	-9.8	1.50 V	30	44.2	-10.5
3	249.30	25.4 QP	46.0	-20.6	1.50 V	213	34.2	-8.8
4	389.88	25.8 QP	46.0	-20.2	1.50 V	269	30.5	-4.7
5	455.96	30.5 QP	46.0	-15.5	2.00 V	14	33.6	-3.1
6	536.09	34.8 QP	46.0	-11.2	1.50 V	14	36.4	-1.6

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.

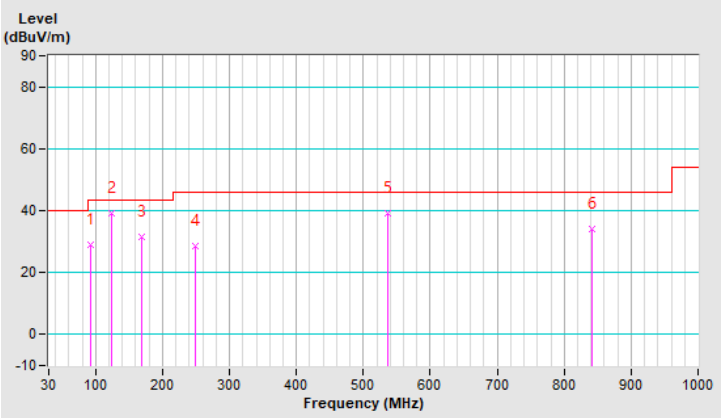


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	91.86	28.9 QP	43.5	-14.6	1.50 H	123	43.1	-14.2
2	124.19	39.2 QP	43.5	-4.3	1.00 H	109	49.7	-10.5
3	169.17	31.7 QP	43.5	-11.8	1.50 H	133	40.5	-8.8
4	249.30	28.6 QP	46.0	-17.4	1.50 H	111	37.4	-8.8
5	536.09	39.3 QP	46.0	-6.7	2.00 H	168	40.9	-1.6
6	841.14	34.1 QP	46.0	-11.9	1.50 H	335	29.6	4.5

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.

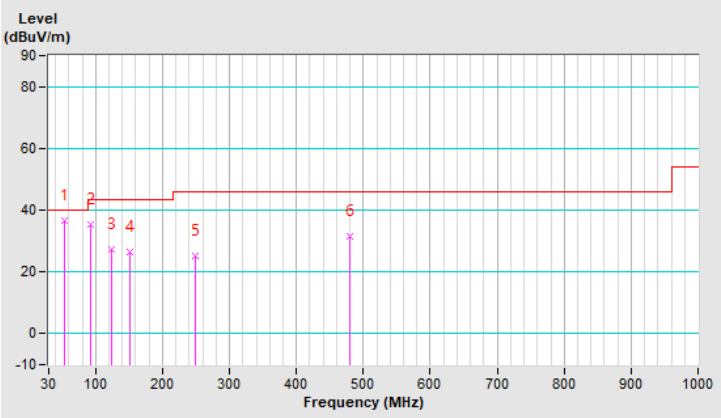


CHANNEL	TX Channel 11	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	53.90	36.6 QP	40.0	-3.4	1.00 V	16	45.7	-9.1
2	91.86	35.4 QP	43.5	-8.1	1.50 V	135	49.6	-14.2
3	124.19	27.4 QP	43.5	-16.1	1.50 V	57	37.9	-10.5
4	150.90	26.6 QP	43.5	-16.9	1.50 V	254	35.1	-8.5
5	249.30	25.2 QP	46.0	-20.8	2.00 V	176	34.0	-8.8
6	479.86	31.6 QP	46.0	-14.4	1.50 V	80	34.2	-2.6

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.



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

Tested date: Aug. 25, 2020

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 20, 2020	Feb. 19, 2021
V-LISN ROHDE & SCHWARZ (Peripheral)	NNBL 8226-2	8226-142	Jul. 31, 2020	Jul. 30, 2021
Software ADT	BV ADT_Cond_ 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

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

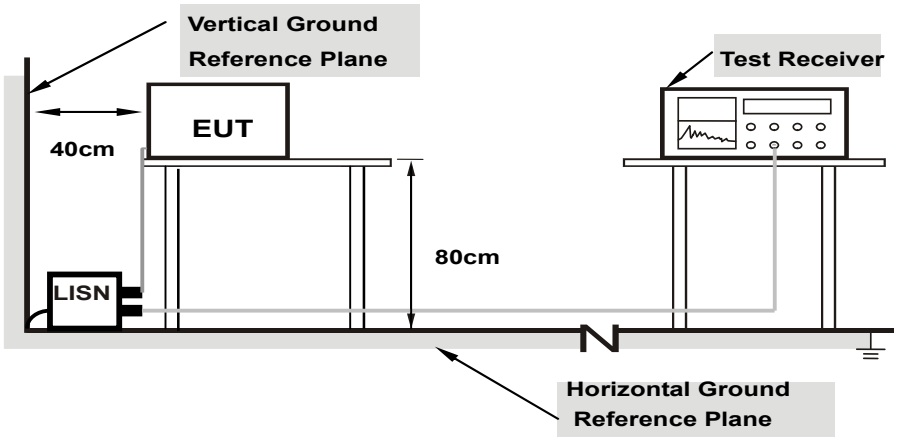
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

2G traffic radio:

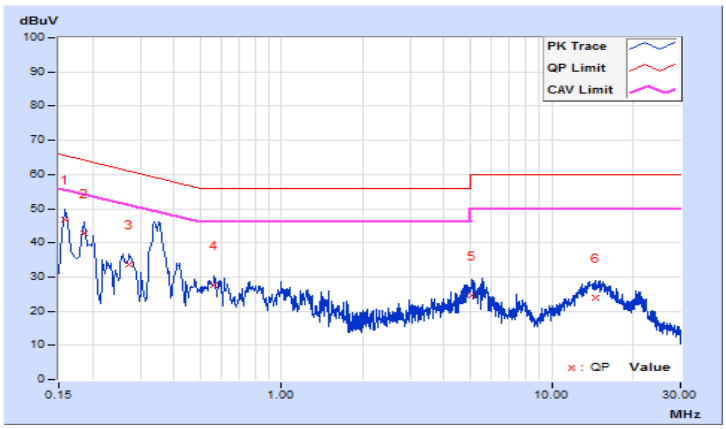
Worst-case data: 802.11ax (HE20)

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.63	37.11	25.23	46.74	34.86	65.57	55.57	-18.83	-20.71
2	0.18600	9.62	33.22	22.62	42.84	32.24	64.21	54.21	-21.37	-21.97
3	0.27350	9.63	24.00	15.50	33.63	25.13	61.01	51.01	-27.38	-25.88
4	0.56200	9.66	17.79	12.23	27.45	21.89	56.00	46.00	-28.55	-24.11
5	5.08600	9.80	14.94	7.30	24.74	17.10	60.00	50.00	-35.26	-32.90
6	14.48600	9.90	14.00	7.79	23.90	17.69	60.00	50.00	-36.10	-32.31

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.

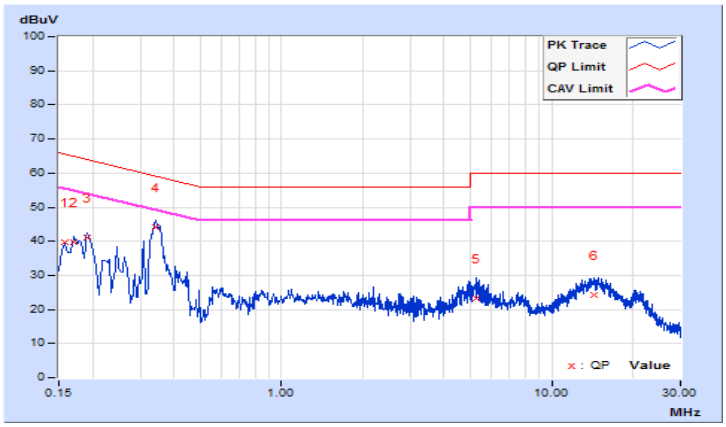


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.66	30.04	24.59	39.70	34.25	65.57	55.57	-25.87	-21.32
2	0.17000	9.65	30.10	22.86	39.75	32.51	64.96	54.96	-25.21	-22.45
3	0.19000	9.64	31.58	22.20	41.22	31.84	64.04	54.04	-22.82	-22.20
4	0.34200	9.66	34.33	26.35	43.99	36.01	59.15	49.15	-15.16	-13.14
5	5.27800	9.84	13.49	6.42	23.33	16.26	60.00	50.00	-36.67	-33.74
6	14.33000	9.97	14.20	8.12	24.17	18.09	60.00	50.00	-35.83	-31.91

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.

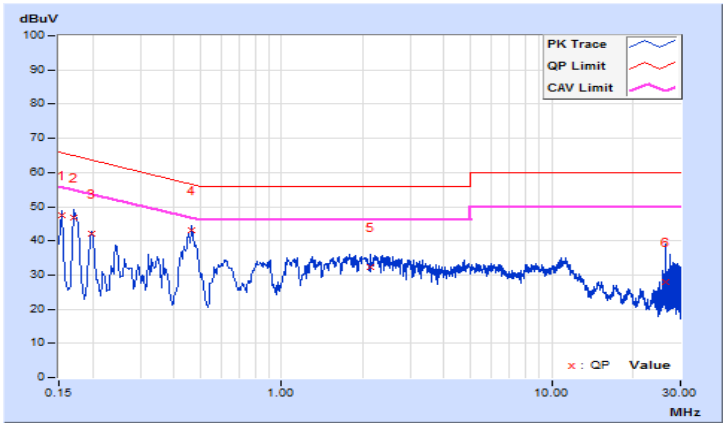


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.56	37.81	26.49	47.37	36.05	65.78	55.78	-18.41	-19.73
2	0.17000	9.56	37.30	22.86	46.86	32.42	64.96	54.96	-18.10	-22.54
3	0.19800	9.55	32.51	18.37	42.06	27.92	63.69	53.69	-21.63	-25.77
4	**0.46444**	**9.57**	**33.42**	**28.93**	**42.99**	**38.50**	**56.61**	**46.61**	**-13.62**	**-8.11**
5	2.14200	9.66	22.70	17.71	32.36	27.37	56.00	46.00	-23.64	-18.63
6	26.47400	9.83	18.26	14.24	28.09	24.07	60.00	50.00	-31.91	-25.93

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.

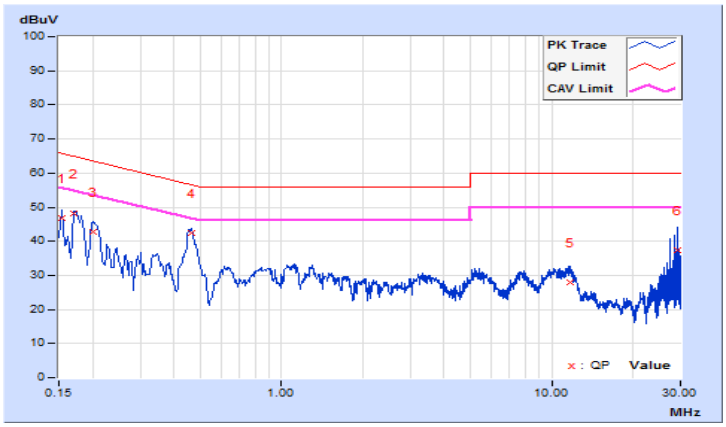


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.54	37.34	28.04	46.88	37.58	65.78	55.78	-18.90	-18.20
2	0.17000	9.54	38.76	24.22	48.30	33.76	64.96	54.96	-16.66	-21.20
3	0.20095	9.53	33.39	18.00	42.92	27.53	63.57	53.57	-20.65	-26.04
4	0.46200	9.55	32.99	28.70	42.54	38.25	56.66	46.66	-14.12	-8.41
5	11.75400	9.81	18.10	13.08	27.91	22.89	60.00	50.00	-32.09	-27.11
6	29.38600	9.91	27.54	21.25	37.45	31.16	60.00	50.00	-22.55	-18.84

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.



Scanning radio:

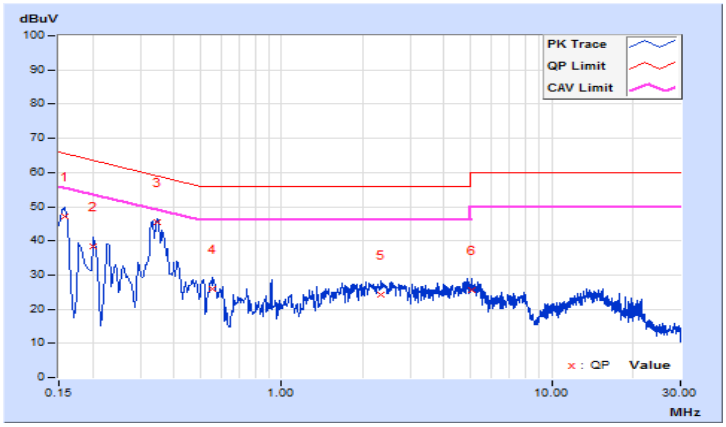
Worst-case data: 802.11g

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.63	37.37	22.57	47.00	32.20	65.57	55.57	-18.57	-23.37
2	0.20200	9.62	28.71	13.63	38.33	23.25	63.53	53.53	-25.20	-30.28
3	0.34577	9.64	35.74	27.98	45.38	37.62	59.06	49.06	-13.68	-11.44
4	0.55800	9.66	16.32	8.76	25.98	18.42	56.00	46.00	-30.02	-27.58
5	2.34600	9.74	14.54	8.81	24.28	18.55	56.00	46.00	-31.72	-27.45
6	5.07800	9.80	15.73	8.33	25.53	18.13	60.00	50.00	-34.47	-31.87

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.

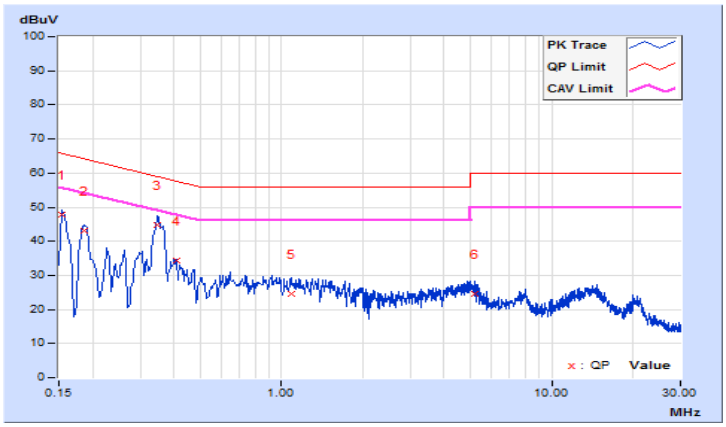


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.66	38.00	20.43	47.66	30.09	65.78	55.78	-18.12	-25.69
2	0.18568	9.65	33.35	20.17	43.00	29.82	64.23	54.23	-21.23	-24.41
3	0.34600	9.66	35.01	26.72	44.67	36.38	59.06	49.06	-14.39	-12.68
4	0.41000	9.67	24.71	16.66	34.38	26.33	57.65	47.65	-23.27	-21.32
5	1.08198	9.70	14.74	10.34	24.44	20.04	56.00	46.00	-31.56	-25.96
6	5.18600	9.84	14.62	7.91	24.46	17.75	60.00	50.00	-35.54	-32.25

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.

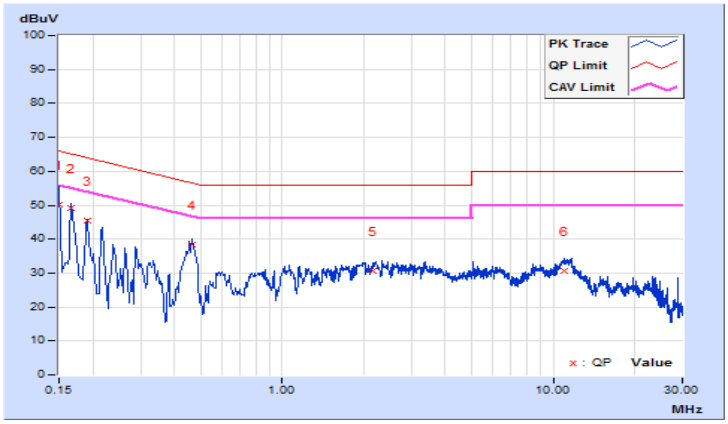


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.56	40.68	28.76	50.24	38.32	66.00	56.00	-15.76	-17.68
2	0.16579	9.56	39.62	24.47	49.18	34.03	65.17	55.17	-15.99	-21.14
3	0.19000	9.55	36.07	21.70	45.62	31.25	64.04	54.04	-18.42	-22.79
4	0.46567	9.57	28.84	23.80	38.41	33.37	56.59	46.59	-18.18	-13.22
5	2.15771	9.66	21.07	16.35	30.73	26.01	56.00	46.00	-25.27	-19.99
6	10.97400	9.80	20.83	15.79	30.63	25.59	60.00	50.00	-29.37	-24.41

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.

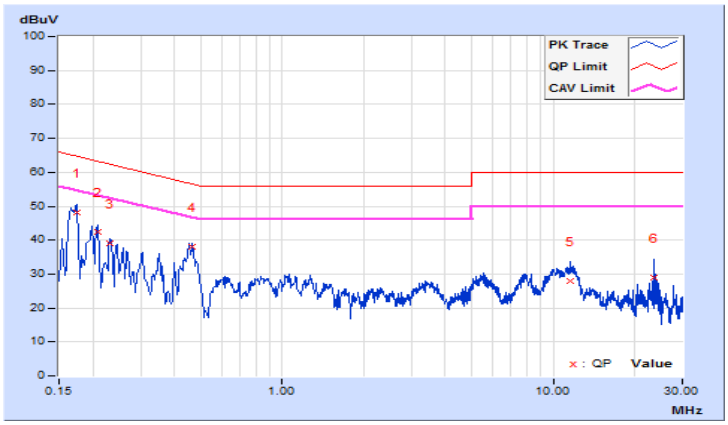


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17384	9.54	38.44	23.80	47.98	33.34	64.77	54.77	-16.79	-21.43
2	0.20905	9.53	32.81	18.61	42.34	28.14	63.24	53.24	-20.90	-25.10
3	0.23000	9.53	29.42	16.66	38.95	26.19	62.45	52.45	-23.50	-26.26
4	0.46600	9.55	28.45	23.45	38.00	33.00	56.58	46.58	-18.58	-13.58
5	11.61791	9.81	18.27	13.09	28.08	22.90	60.00	50.00	-31.92	-27.10
6	23.67400	9.90	19.01	10.88	28.91	20.78	60.00	50.00	-31.09	-29.22

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.

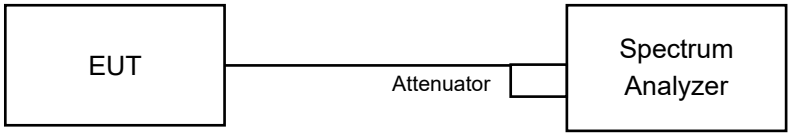


4.3 6dB Bandwidth Measurement

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) ≥ 3 x 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 fromTest 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

2G traffic radio: CDD Mode

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	7.56	8.07	0.5	Pass
6	2437	8.06	8.12	0.5	Pass
11	2462	7.54	8.07	0.5	Pass

802.11g

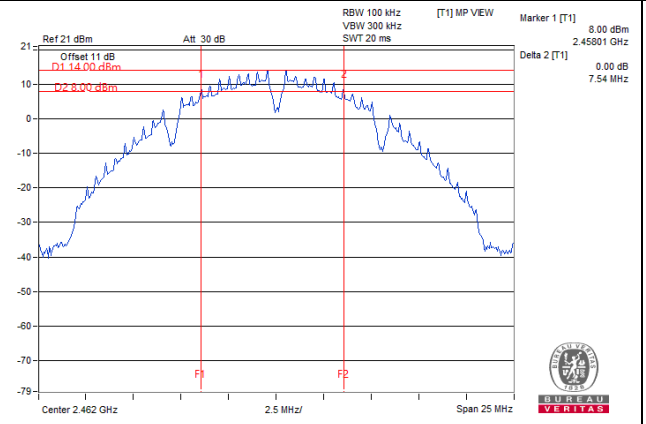
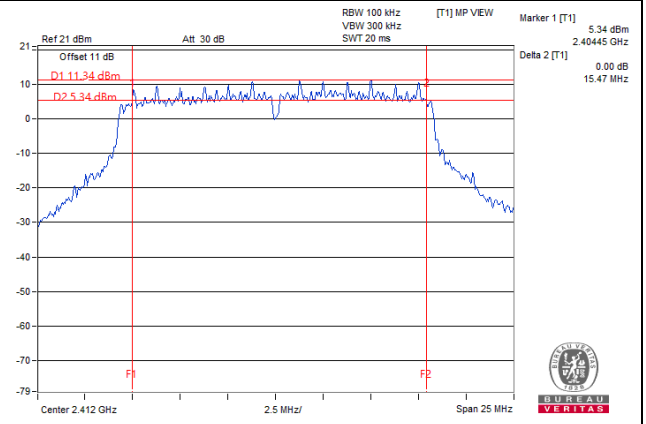
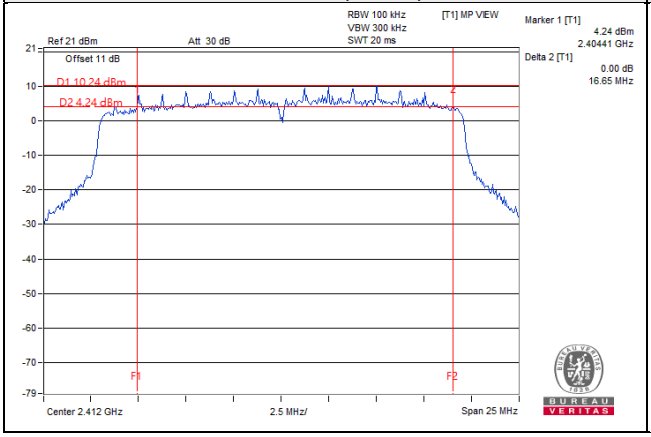
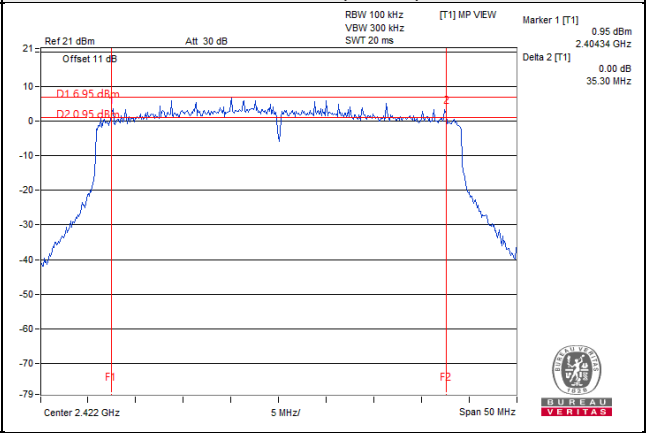
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.49	15.47	0.5	Pass
6	2437	15.87	16.35	0.5	Pass
11	2462	15.93	15.78	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.18	16.65	0.5	Pass
6	2437	18.72	18.57	0.5	Pass
11	2462	17.23	17.84	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	37.74	35.30	0.5	Pass
6	2437	38.02	37.97	0.5	Pass
9	2452	36.26	36.48	0.5	Pass

Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11ax (HE20)	802.11ax (HE40)
	

Scanning radio:

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	7.11	0.5	Pass
6	2437	7.58	0.5	Pass
11	2462	7.58	0.5	Pass

802.11g

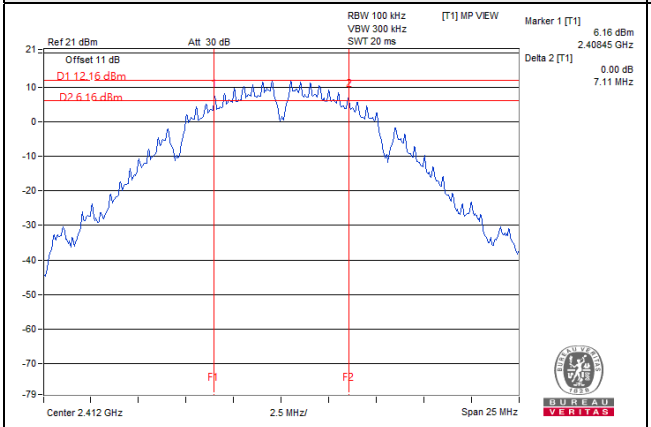
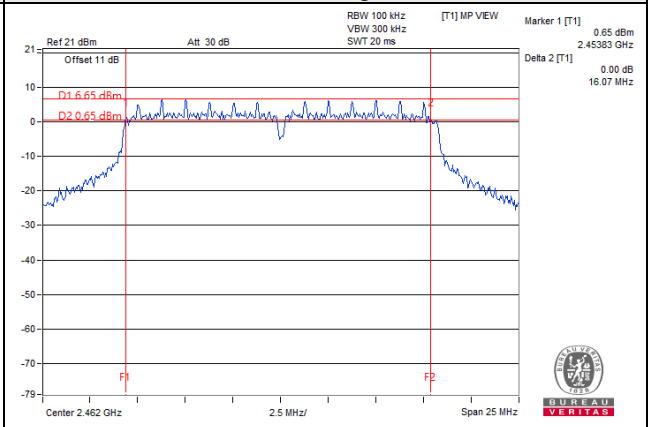
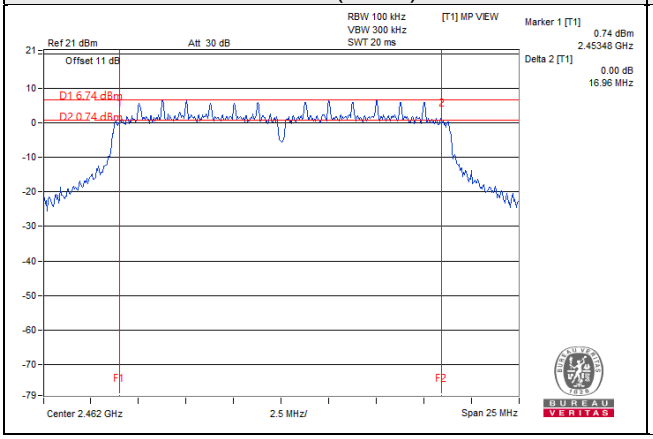
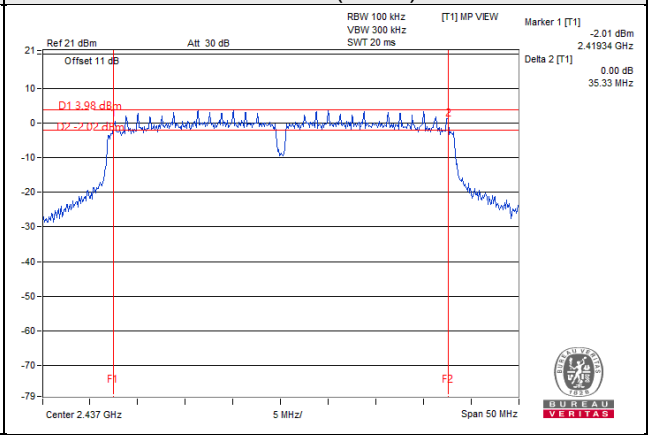
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.37	0.5	Pass
6	2437	16.37	0.5	Pass
11	2462	16.07	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.98	0.5	Pass
6	2437	17.32	0.5	Pass
11	2462	16.96	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.54	0.5	Pass
6	2437	35.33	0.5	Pass
9	2452	35.49	0.5	Pass

Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11n (HT20)	802.11n (HT40)
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

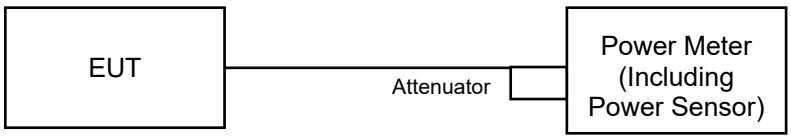
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

2G traffic radio: 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	21.82	21.70	299.966	24.77	30	Pass
6	2437	21.63	21.57	289.095	24.61	30	Pass
11	2462	20.56	20.32	221.409	23.45	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	20.05	20.02	201.620	23.05	30	Pass
6	2437	22.70	22.66	**370.710**	25.69	30	Pass
11	2462	20.40	20.26	215.817	23.34	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.58	19.50	179.907	22.55	30	Pass
6	2437	22.50	22.43	352.813	25.48	30	Pass
11	2462	19.58	19.45	178.887	22.53	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	19.85	19.82	192.545	22.85	30	Pass
6	2437	19.87	19.83	193.212	22.86	30	Pass
9	2452	17.81	17.74	119.824	20.79	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	19.61	19.52	180.948	22.58	30	Pass
6	2437	22.52	22.45	354.441	25.50	30	Pass
11	2462	19.61	19.47	179.923	22.55	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	19.88	19.84	193.658	22.87	30	Pass
6	2437	19.90	19.86	194.552	22.89	30	Pass
9	2452	17.84	17.76	120.517	20.81	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	19.65	19.54	182.207	22.61	30	Pass
6	2437	22.56	22.47	356.906	25.53	30	Pass
11	2462	19.63	19.51	181.164	22.58	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	19.90	19.86	194.552	22.89	30	Pass
6	2437	19.92	19.88	195.450	22.91	30	Pass
9	2452	17.88	17.80	121.632	20.85	30	Pass

2G traffic radio: Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.57	16.49	89.960	19.54	28.09	Pass
6	2437	19.49	19.42	176.418	22.47	28.09	Pass
11	2462	16.57	16.44	89.450	19.52	28.09	Pass

Note: Max. Beamforming Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 30-(7.91-6) = 28.09dBm.

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.84	16.81	96.279	19.84	28.09	Pass
6	2437	16.86	16.82	96.613	19.85	28.09	Pass
9	2452	14.80	14.73	59.916	17.78	28.09	Pass

Note: Max. Beamforming Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 30-(7.91-6) = 28.09dBm.

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	16.60	16.51	90.480	19.57	28.09	Pass
6	2437	19.51	19.44	177.233	22.49	28.09	Pass
11	2462	16.60	16.46	89.968	19.54	28.09	Pass

Note: Max. Beamforming Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 30-(7.91-6) = 28.09dBm.

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	16.87	16.83	96.836	19.86	28.09	Pass
6	2437	16.89	16.85	97.282	19.88	28.09	Pass
9	2452	14.83	14.75	60.263	17.80	28.09	Pass

Note: Max. Beamforming Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 30-(7.91-6) = 28.09dBm.

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	16.64	16.53	91.110	19.60	28.09	Pass
6	2437	19.55	19.46	**178.465**	22.52	28.09	Pass
11	2462	16.62	16.50	90.588	19.57	28.09	Pass

Note: Max. Beamforming Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 30-(7.91-6) = 28.09dBm.

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	16.89	16.85	97.282	19.88	28.09	Pass
6	2437	16.91	16.87	97.732	19.90	28.09	Pass
9	2452	14.87	14.79	60.820	17.84	28.09	Pass

Note: Max. Beamforming Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 30-(7.91-6) = 28.09dBm.

Scanning radio: CDD Mode

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	96.161	19.83	30	Pass
6	2437	**129.122**	21.11	30	Pass
11	2462	119.950	20.79	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	66.222	18.21	30	Pass
6	2437	126.183	21.01	30	Pass
11	2462	46.238	16.65	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	66.834	18.25	30	Pass
6	2437	122.744	20.89	30	Pass
11	2462	44.463	16.48	30	Pass

802.11n (HT40)

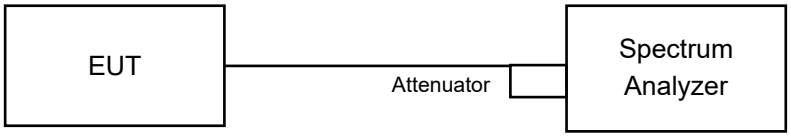
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	42.756	16.31	30	Pass
6	2437	58.345	17.66	30	Pass
9	2452	26.303	14.20	30	Pass

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) 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 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x 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.

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 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x 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

2G traffic radio:

802.11b

TX chain	Channel	Freq. (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	-14.17	3.01	2.47	-8.69	6.09	Pass
	6	2437	-14.59	3.01	2.47	-9.11	6.09	Pass
	11	2462	-16.00	3.01	2.47	-10.52	6.09	Pass
1	1	2412	-13.67	3.01	2.47	-8.19	6.09	Pass
	6	2437	-14.56	3.01	2.47	-9.08	6.09	Pass
	11	2462	-16.13	3.01	2.47	-10.65	6.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 8-(7.91-6) = 6.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Channel	Freq. (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	-14.68	3.01	0.28	-11.39	6.09	Pass
	6	2437	-13.47	3.01	0.28	-10.18	6.09	Pass
	11	2462	-15.68	3.01	0.28	-12.39	6.09	Pass
1	1	2412	-14.90	3.01	0.28	-11.61	6.09	Pass
	6	2437	-13.44	3.01	0.28	-10.15	6.09	Pass
	11	2462	-15.25	3.01	0.28	-11.96	6.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 8-(7.91-6) = 6.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX chain	Channel	Freq. (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	-18.10	3.01	0.30	-14.79	6.09	Pass
	6	2437	-15.46	3.01	0.30	-12.15	6.09	Pass
	11	2462	-17.76	3.01	0.30	-14.45	6.09	Pass
1	1	2412	-18.22	3.01	0.30	-14.91	6.09	Pass
	6	2437	-15.78	3.01	0.30	-12.47	6.09	Pass
	11	2462	-18.13	3.01	0.30	-14.82	6.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 8-(7.91-6) = 6.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

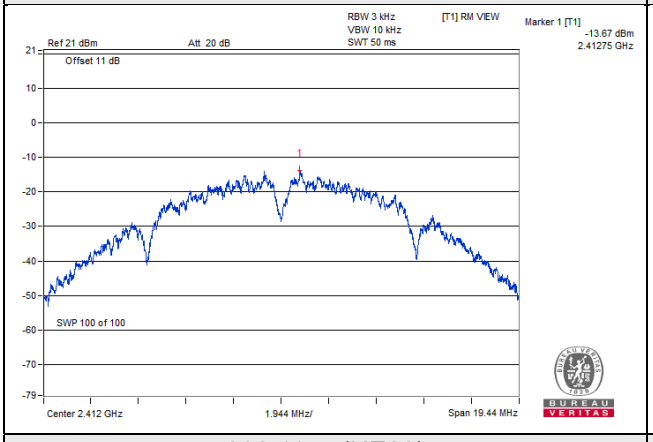
802.11ax (HE40)

TX chain	Channel	Freq. (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	-20.05	3.01	0.26	-16.78	6.09	Pass
	6	2437	-20.76	3.01	0.26	-17.49	6.09	Pass
	9	2452	-22.56	3.01	0.26	-19.29	6.09	Pass
1	3	2422	-20.17	3.01	0.26	-16.90	6.09	Pass
	6	2437	-20.77	3.01	0.26	-17.50	6.09	Pass
	9	2452	-22.41	3.01	0.26	-19.14	6.09	Pass

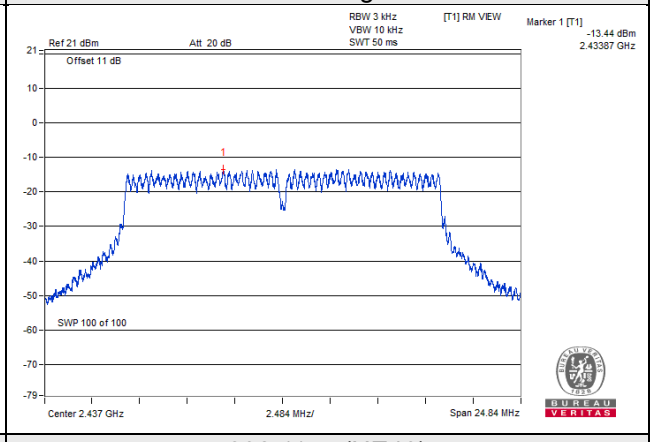
Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 4.90dBi + 10log(2) = 7.91dBi > 6dBi, so the limit shall be reduced to 8-(7.91-6) = 6.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

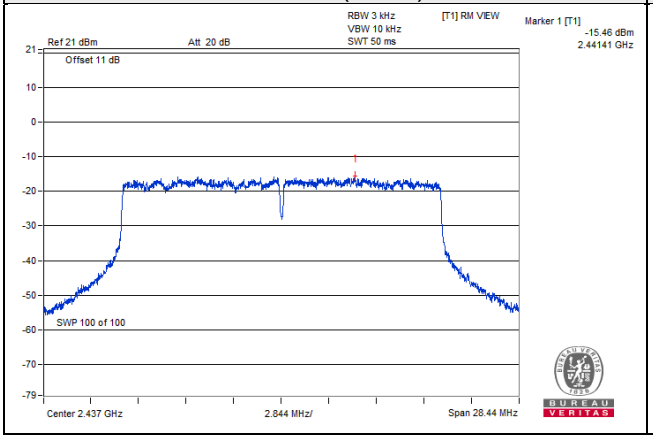
802.11b



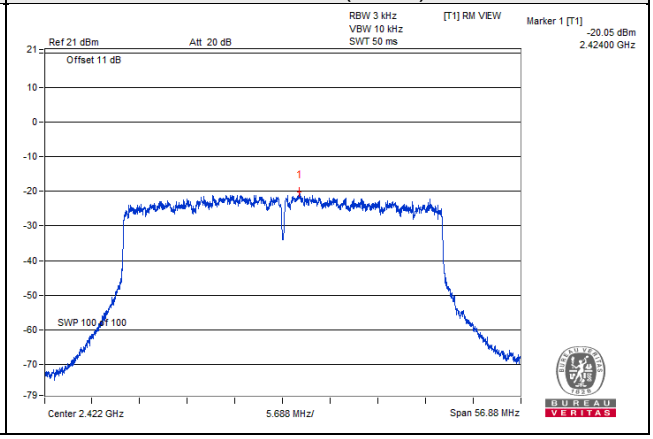
802.11g



802.11ax (HE20)



802.11ax (HE40)



Scanning radio:

802.11b

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-13.19	8.00	Pass
6	2437	-12.04	8.00	Pass
11	2462	-12.08	8.00	Pass

802.11g

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-18.30	0.22	-18.08	8.00	Pass
6	2437	-15.57	0.22	-15.35	8.00	Pass
11	2462	-19.59	0.22	-19.37	8.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

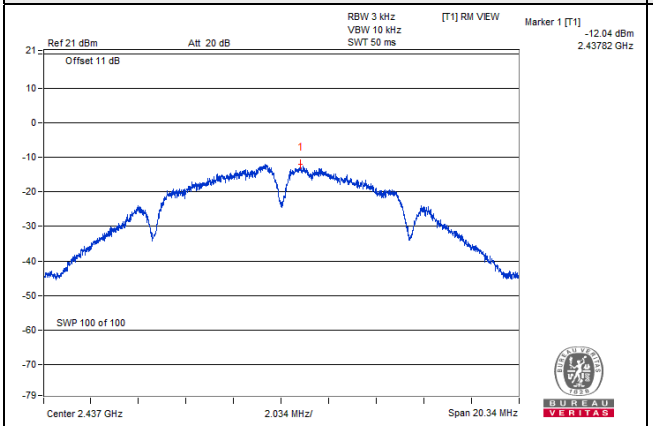
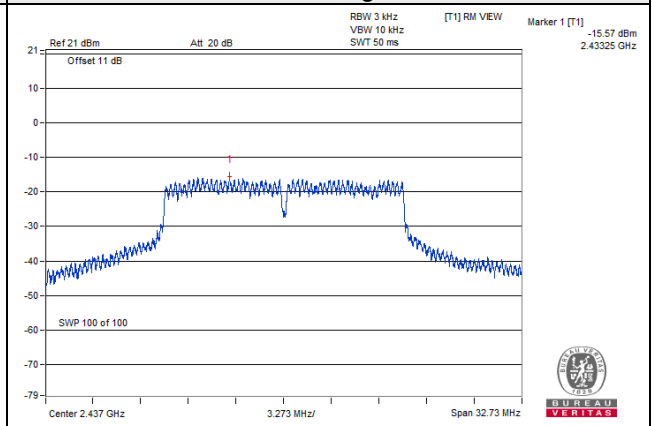
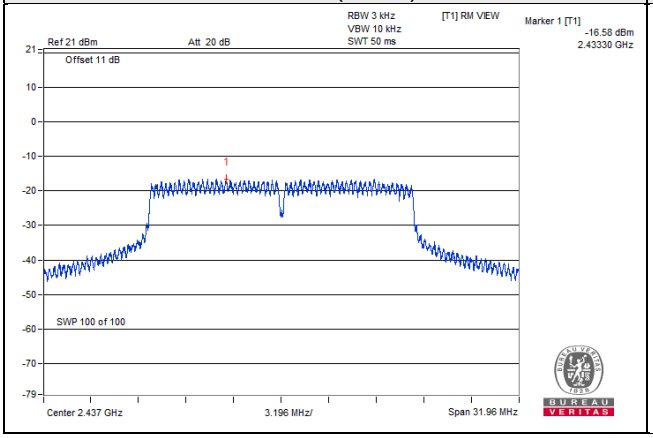
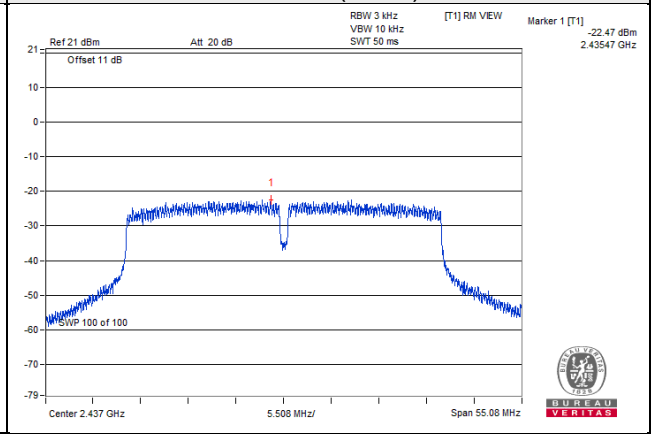
Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-18.40	0.19	-18.21	8.00	Pass
6	2437	-16.58	0.19	-16.39	8.00	Pass
11	2462	-20.43	0.19	-20.24	8.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
3	2422	-23.06	0.42	-22.64	8.00	Pass
6	2437	-22.47	0.42	-22.05	8.00	Pass
9	2452	-25.95	0.42	-25.53	8.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

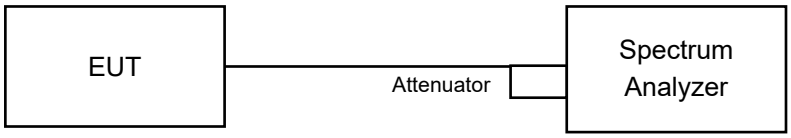
Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11n (HT20)	802.11n (HT40)
	

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 ≥ 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 OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 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.

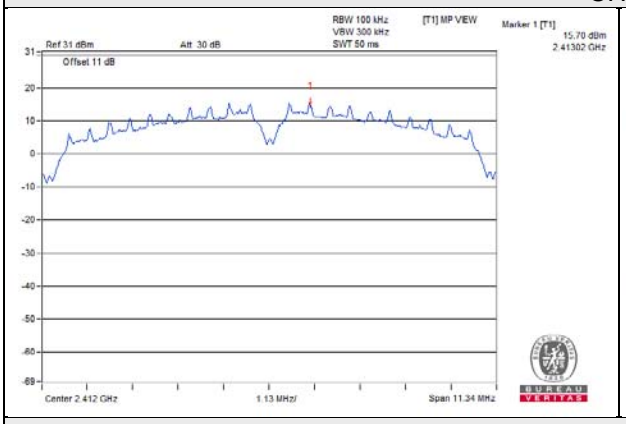
4.6.7 Test Results

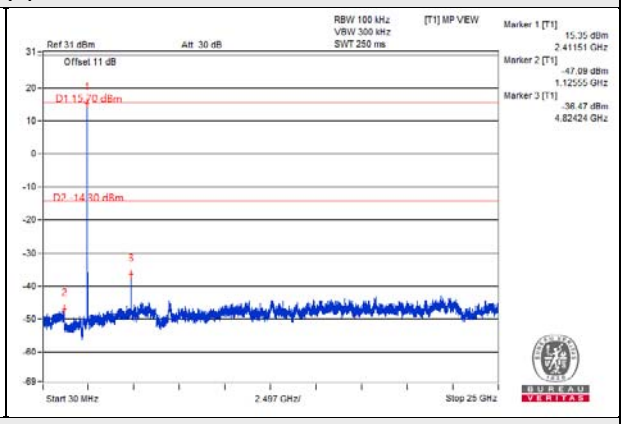
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

2G traffic radio:

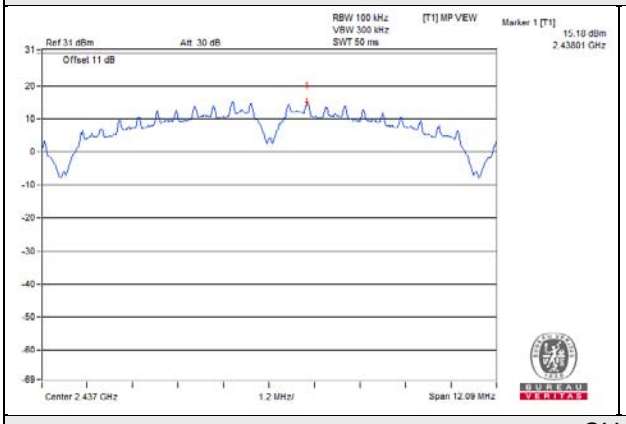
802.11b_Chain 0

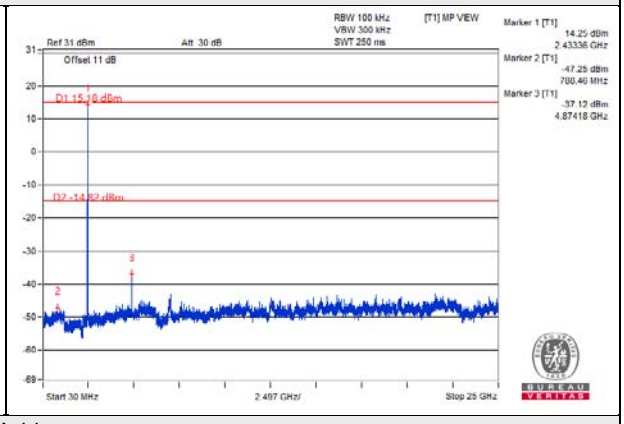
CH 1



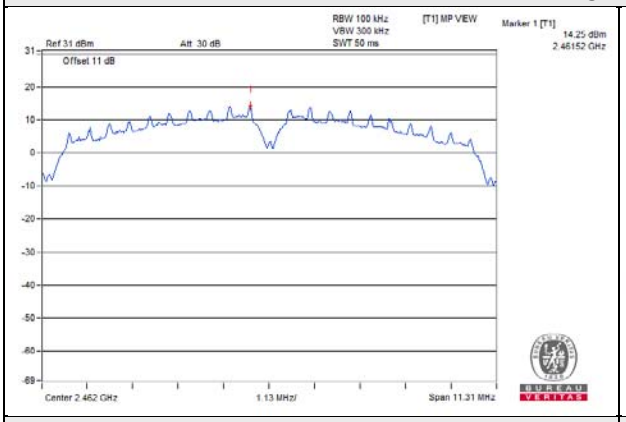


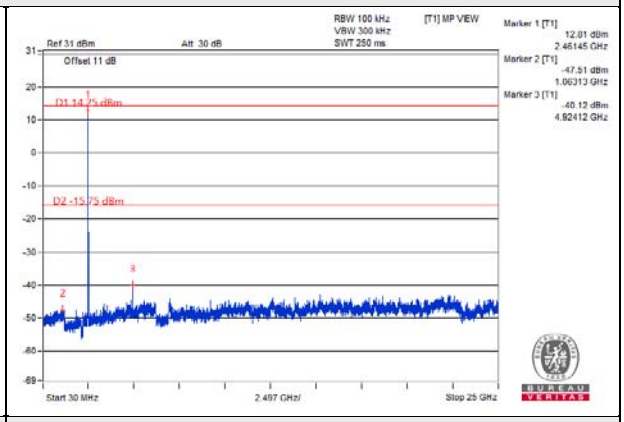
CH 6



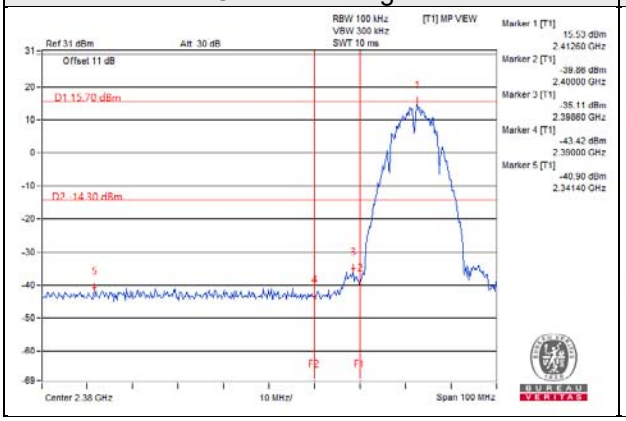


CH 11

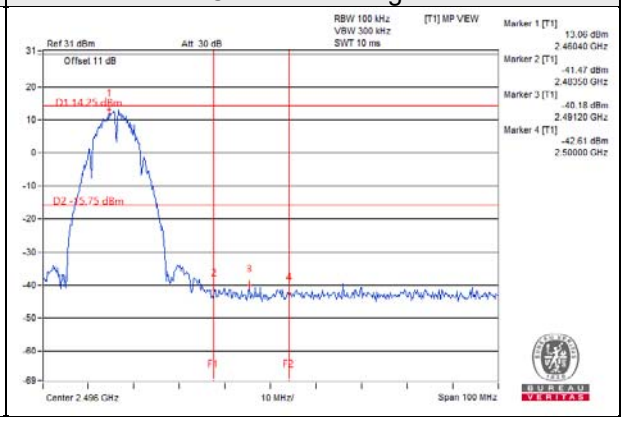




CH 1 Band edge

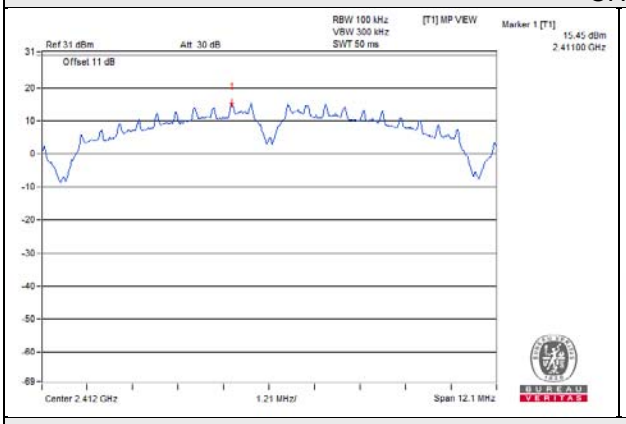


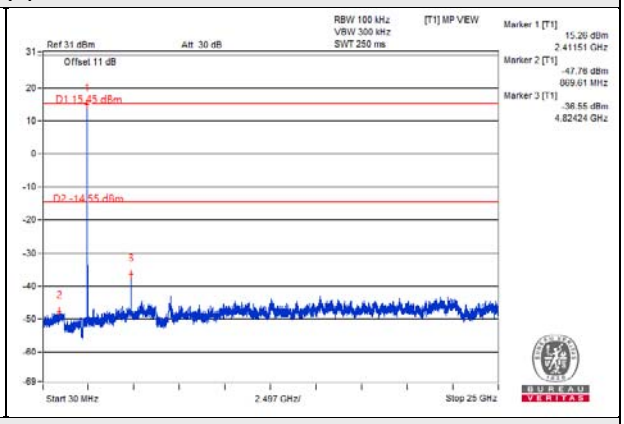
CH 11 Band edge



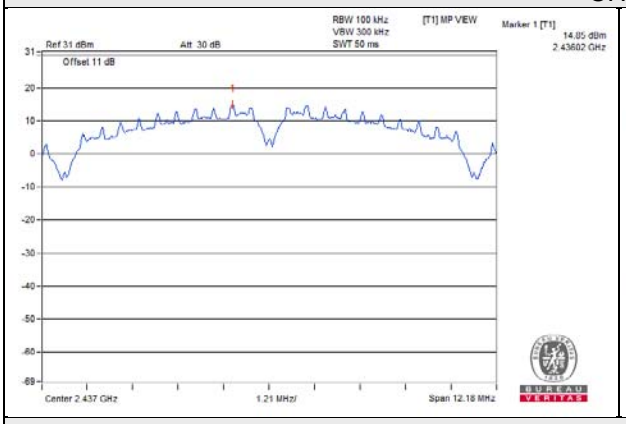
802.11b_Chain 1

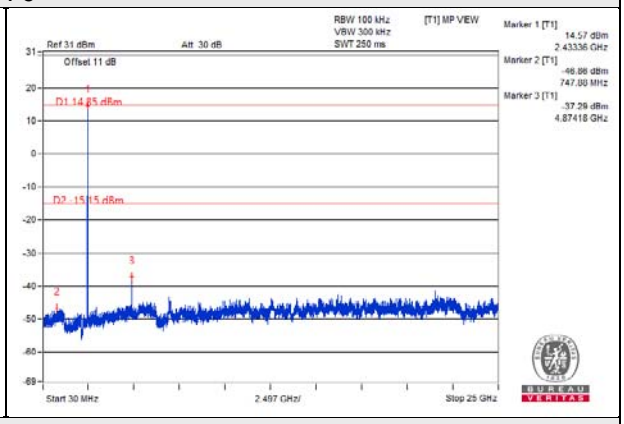
CH 1



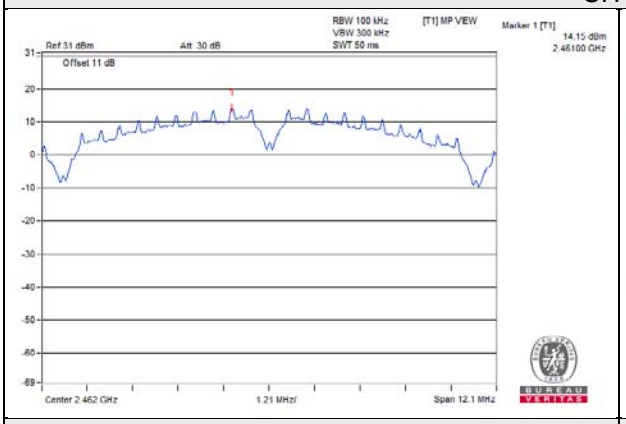


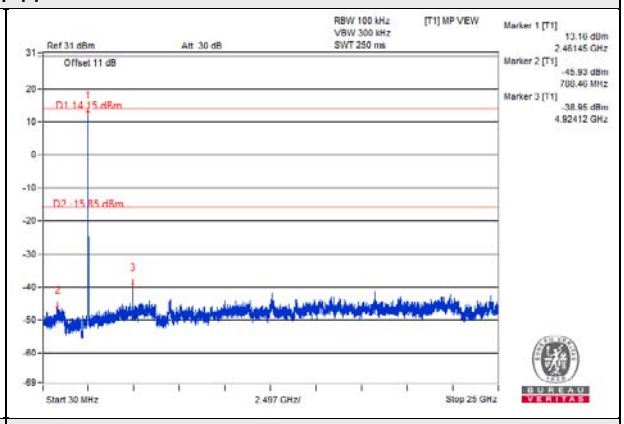
CH 6



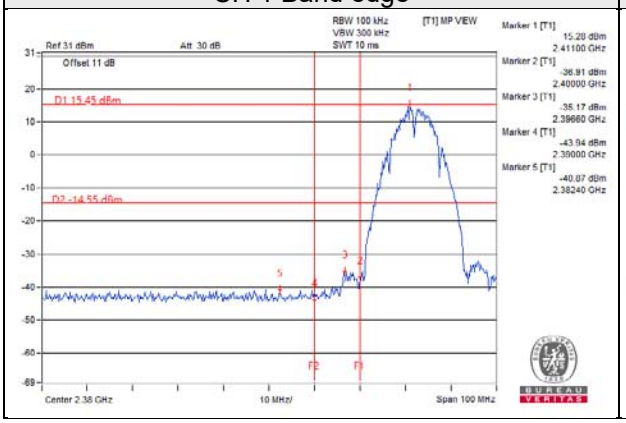


CH 11

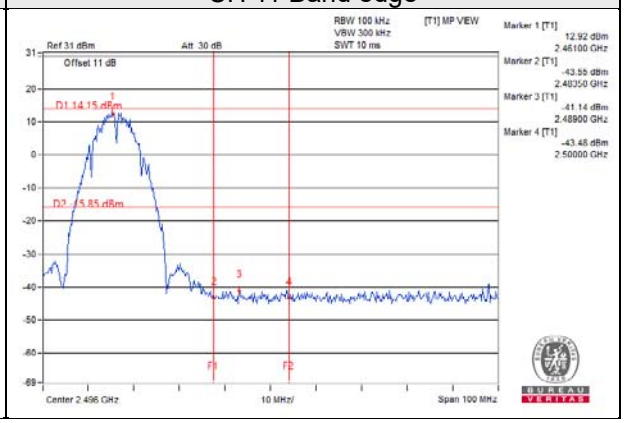




CH 1 Band edge

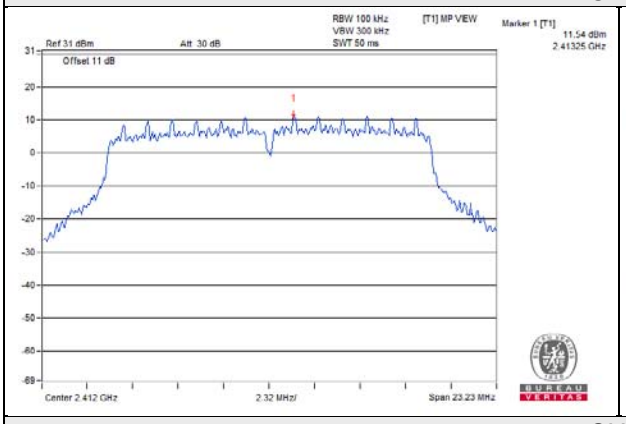


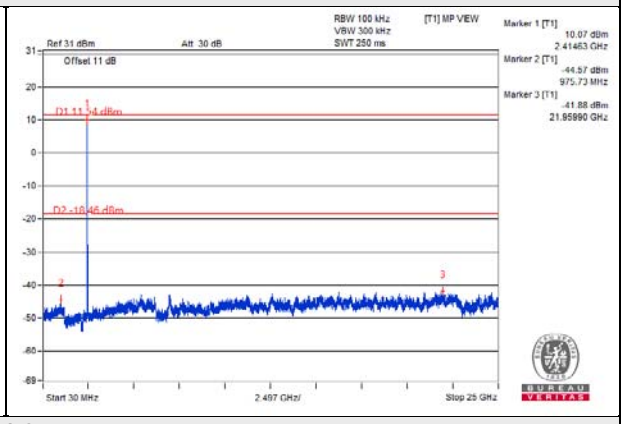
CH 11 Band edge



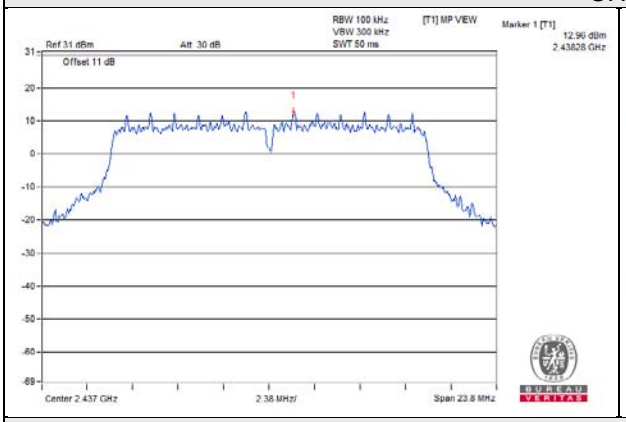
802.11g_Chain 0

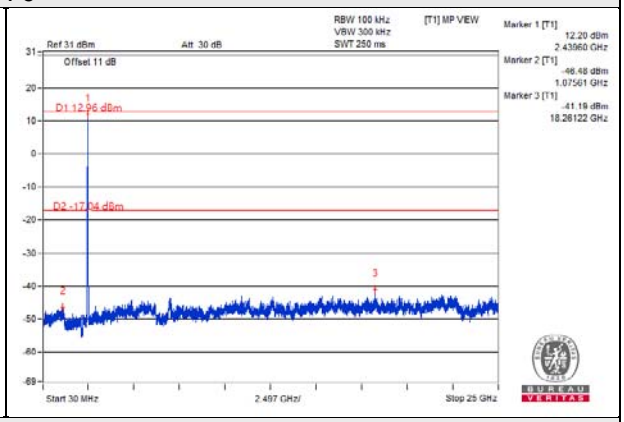
CH 1



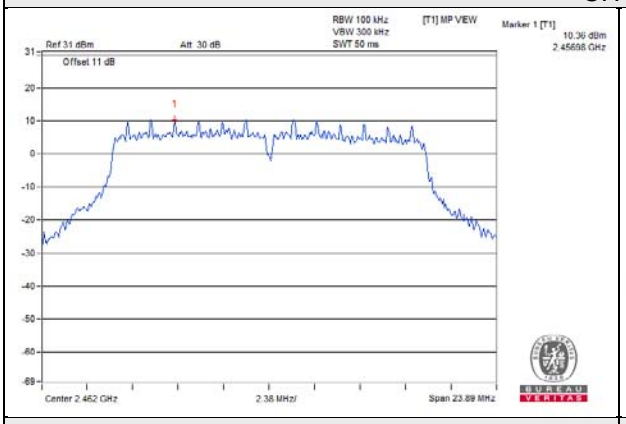


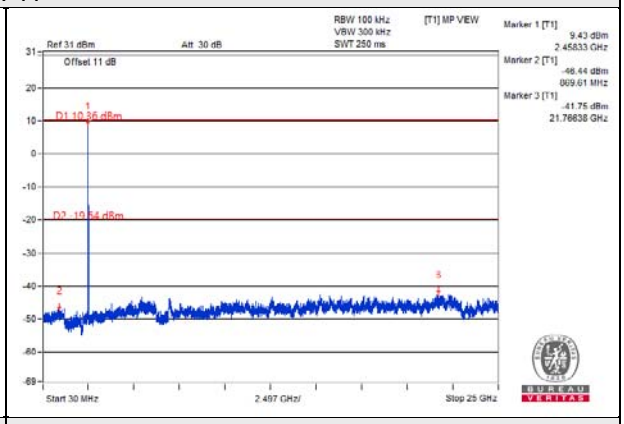
CH 6



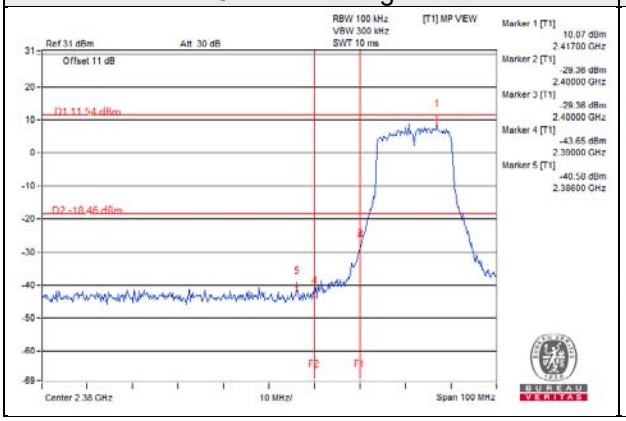


CH 11

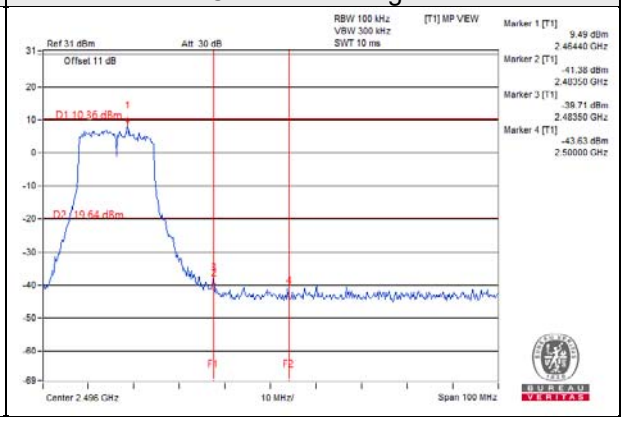




CH 1 Band edge

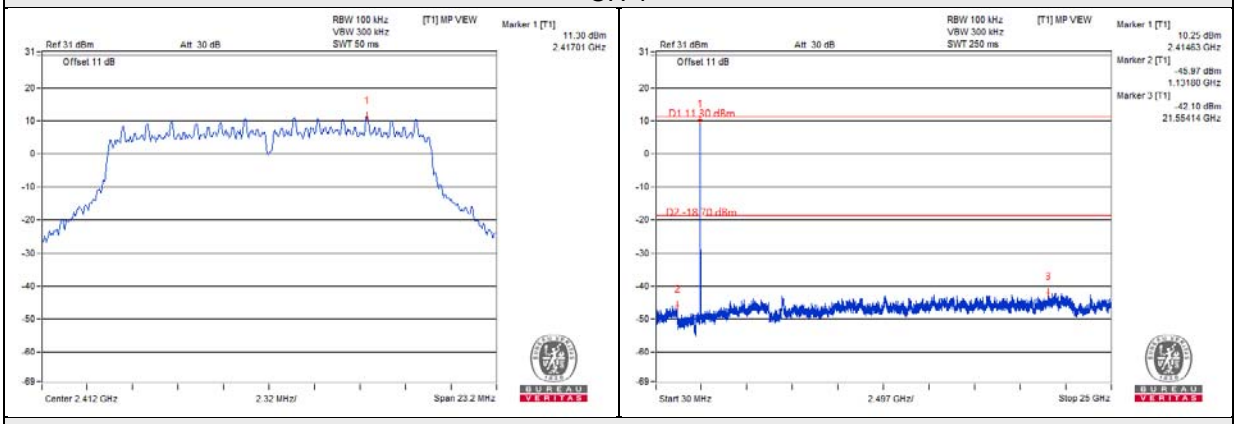


CH 11 Band edge

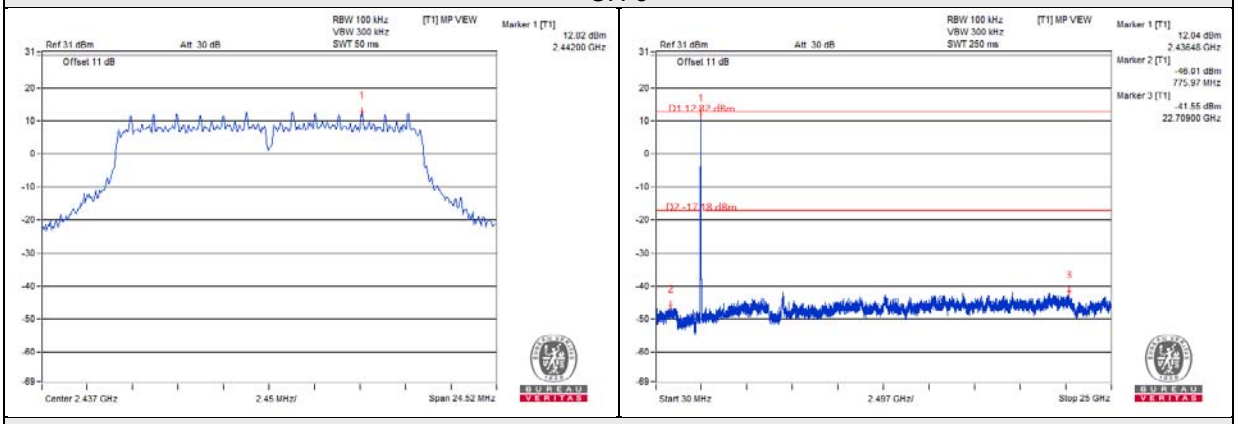


802.11g_Chain 1

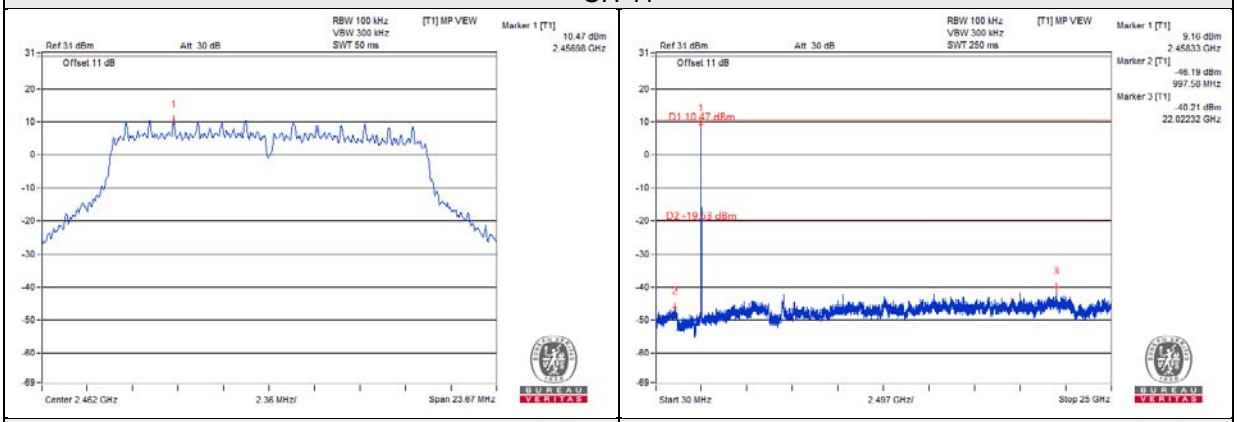
CH 1



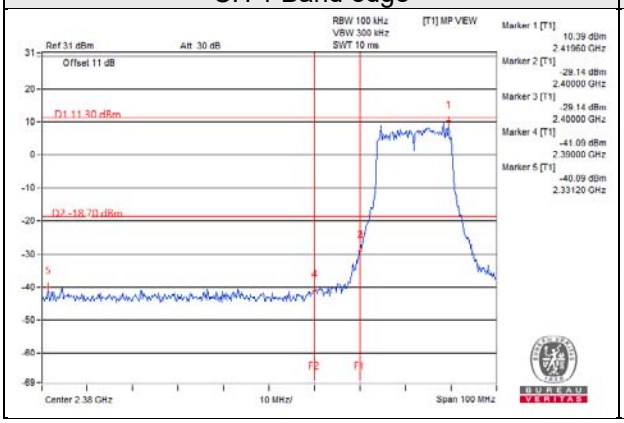
CH 6



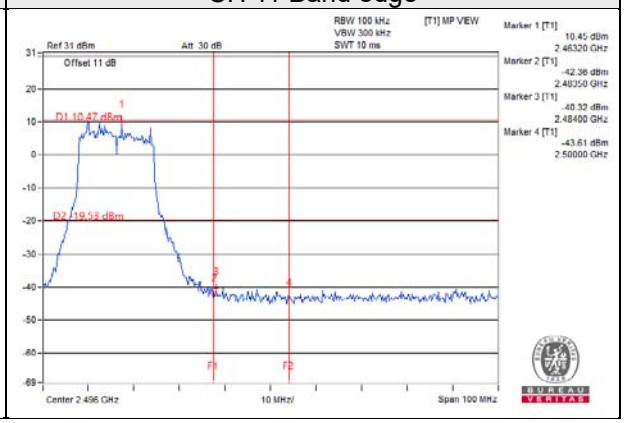
CH 11



CH 1 Band edge

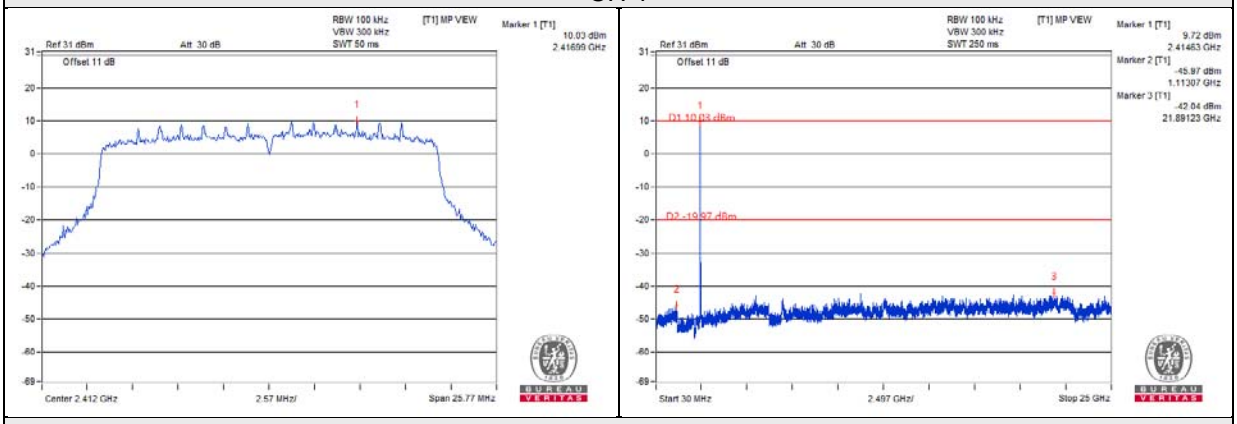


CH 11 Band edge

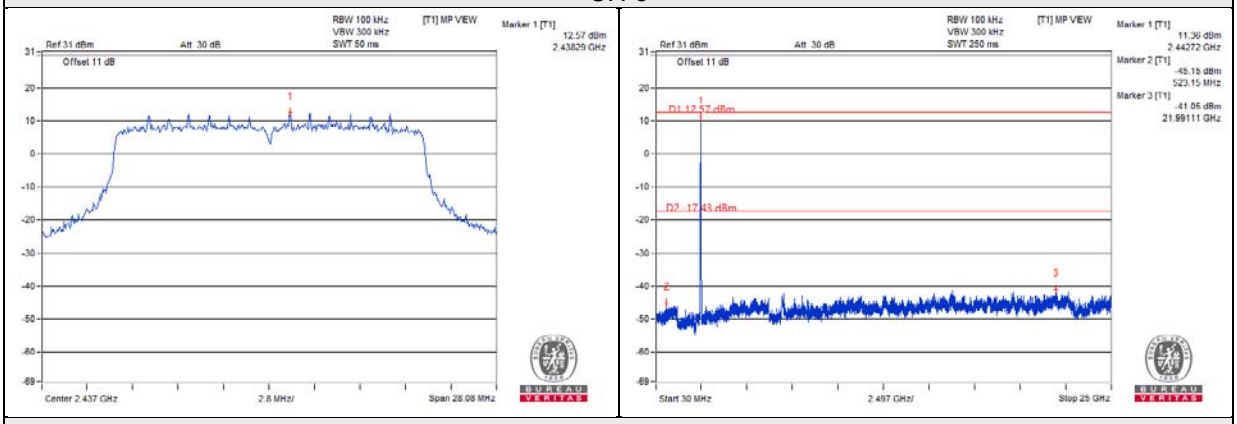


802.11ax (HE20)_Chain 0

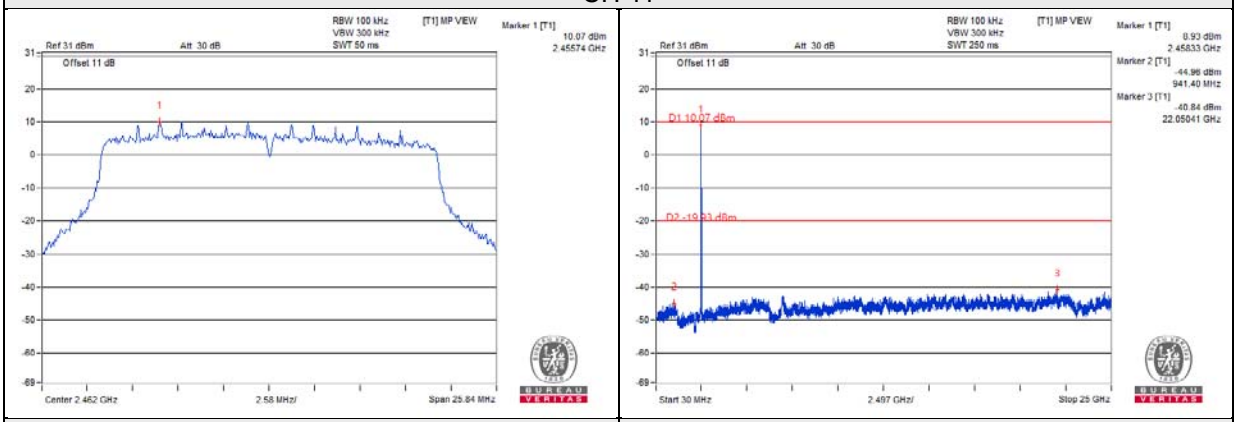
CH 1



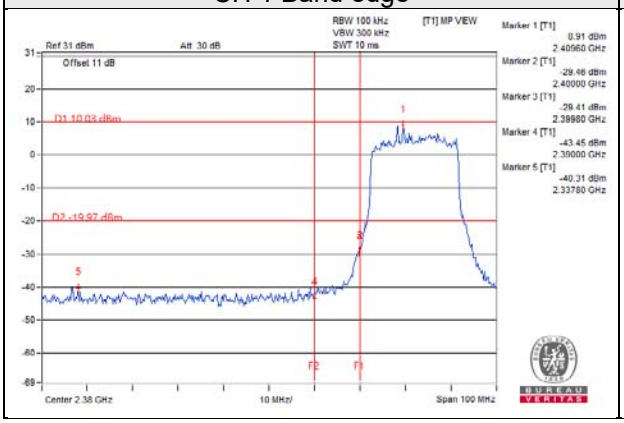
CH 6



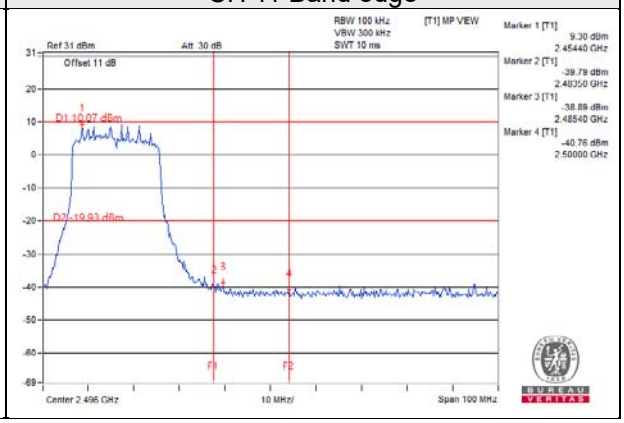
CH 11



CH 1 Band edge

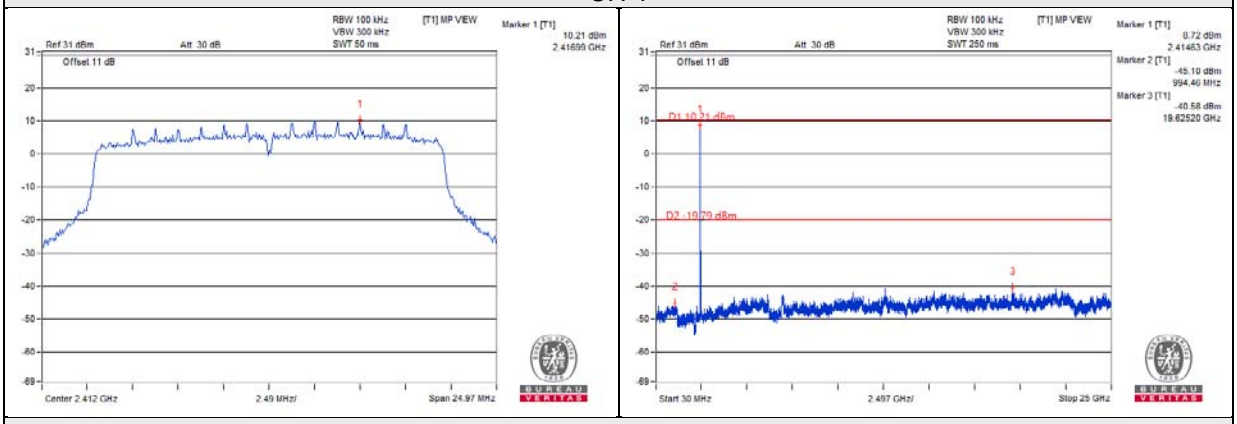


CH 11 Band edge

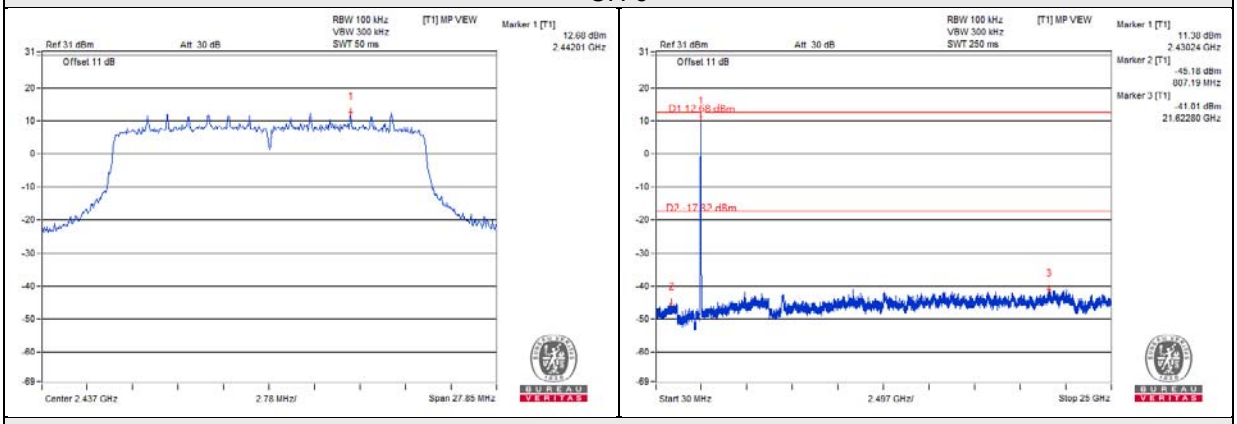


802.11ax (HE20)_Chain 1

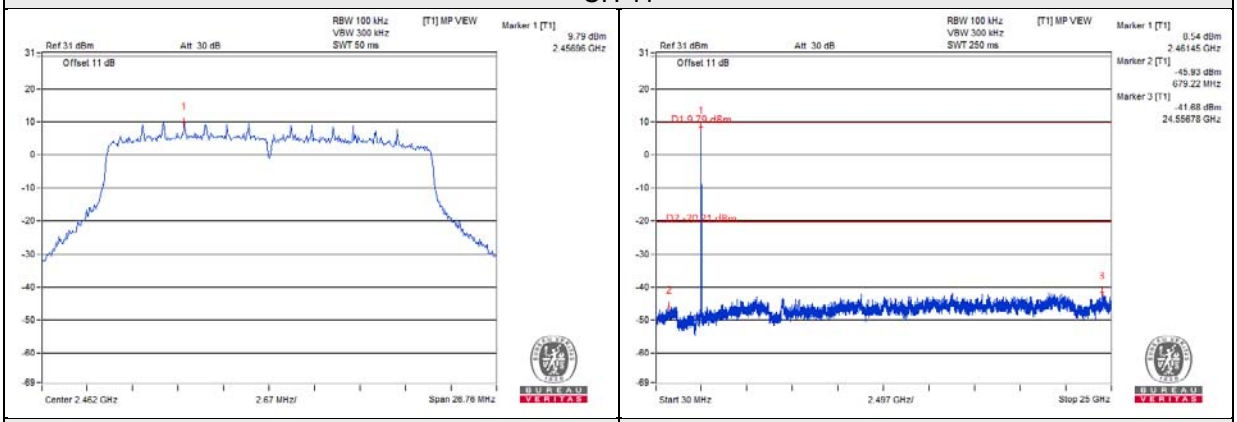
CH 1



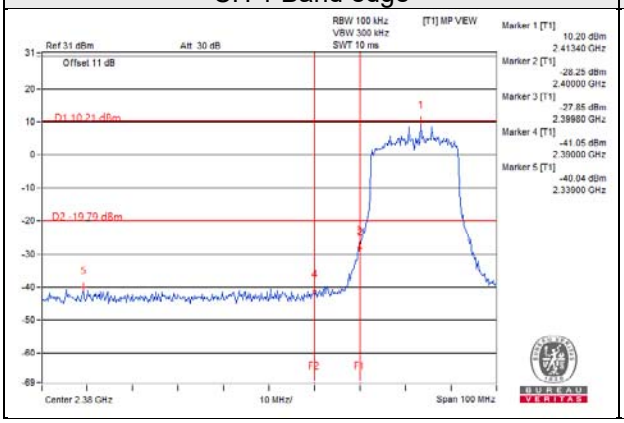
CH 6



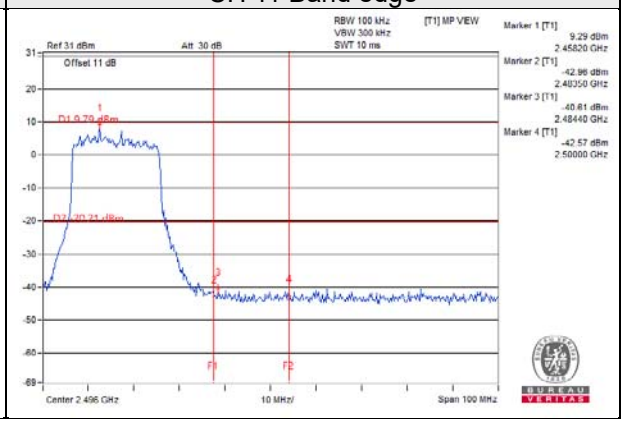
CH 11



CH 1 Band edge

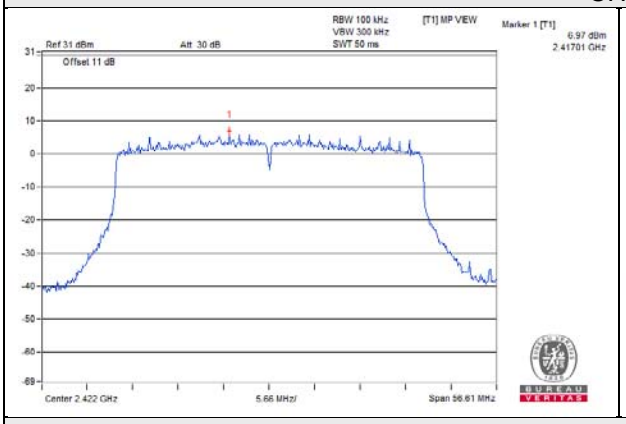


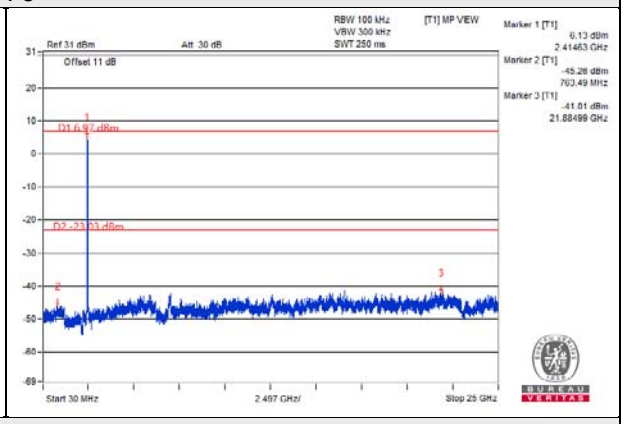
CH 11 Band edge



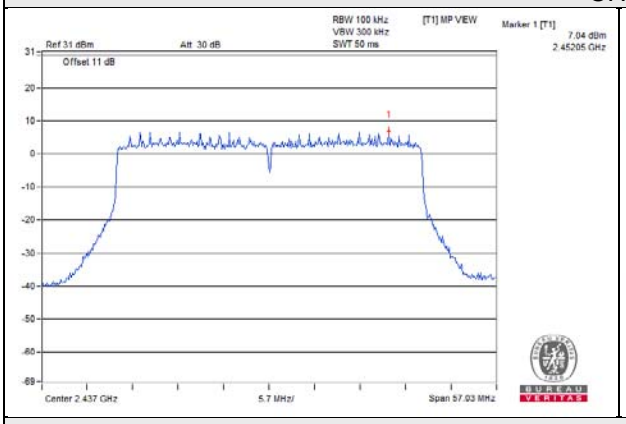
802.11ax (HE40)_Chain 0

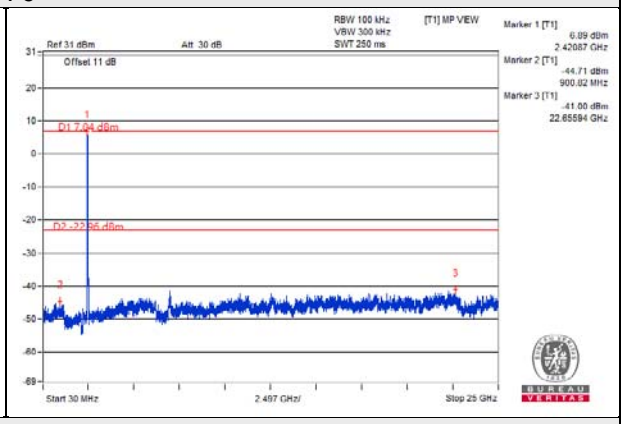
CH 3



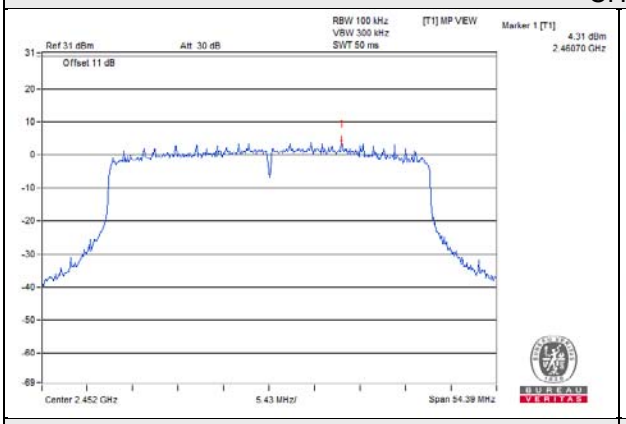


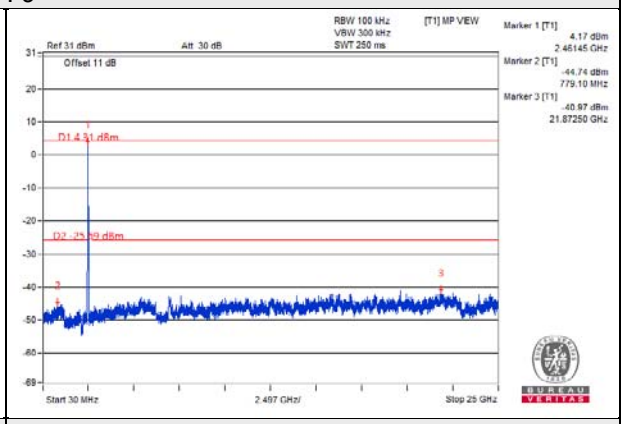
CH 6



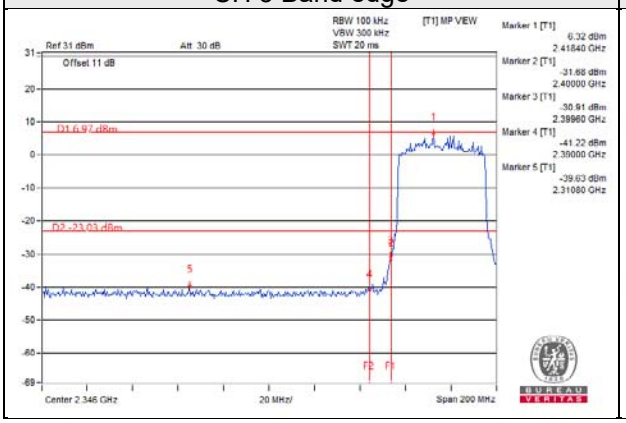


CH 9

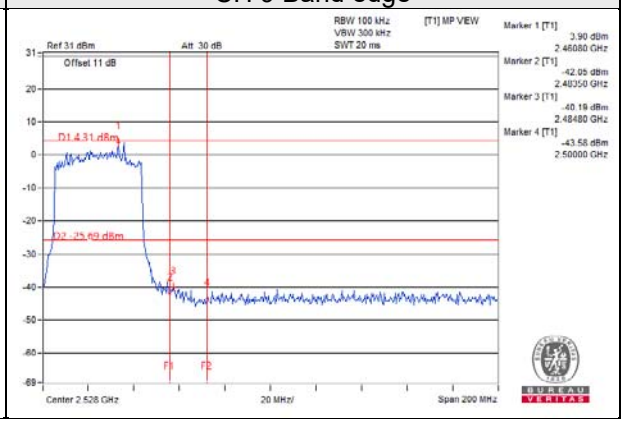




CH 3 Band edge

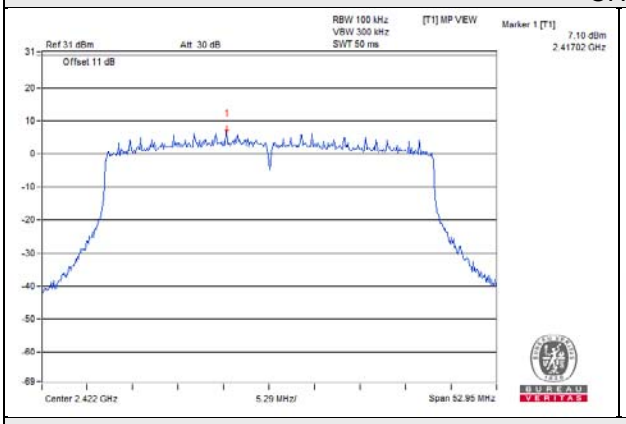


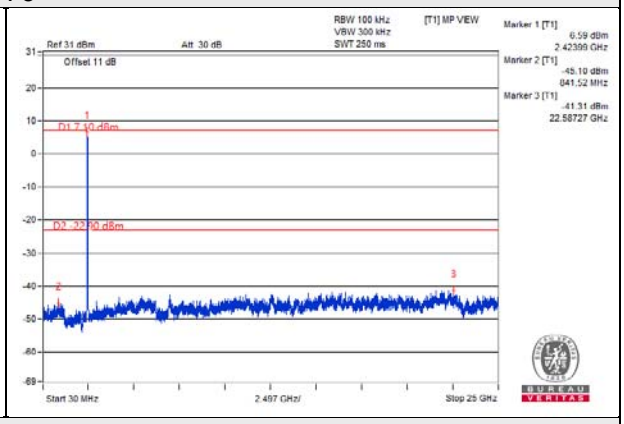
CH 9 Band edge



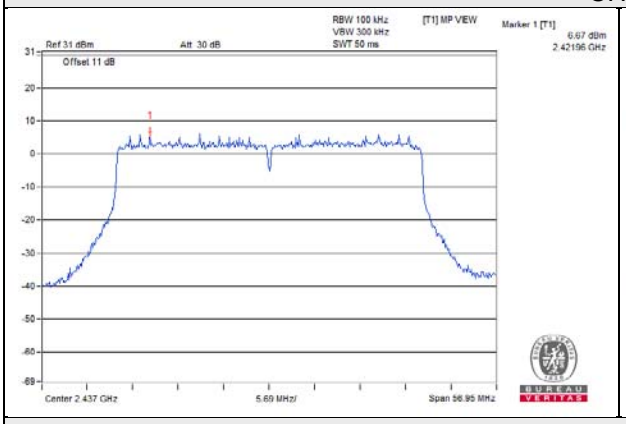
802.11ax (HE40)_Chain 1

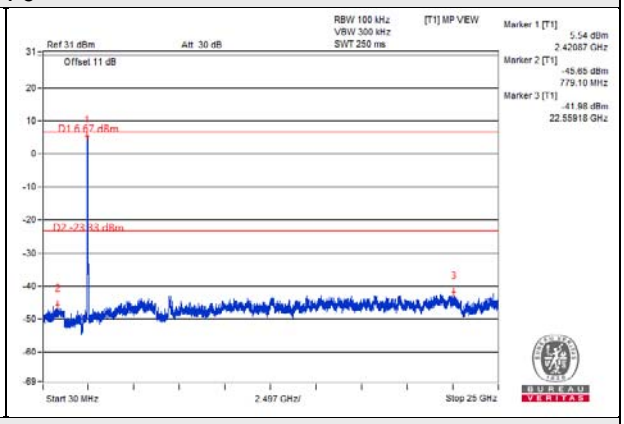
CH 3



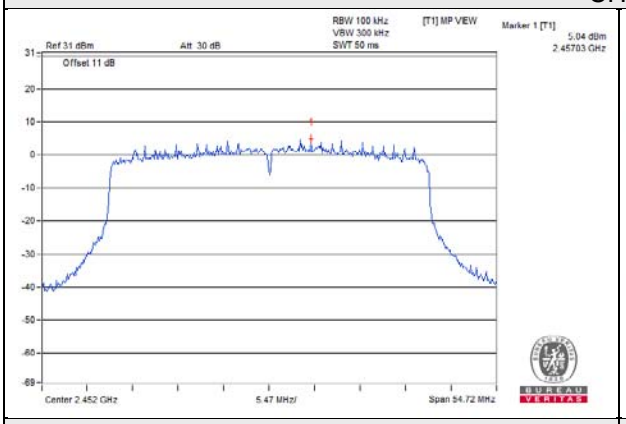


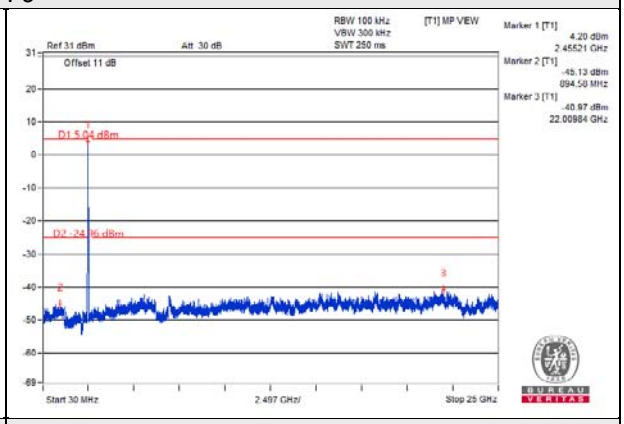
CH 6



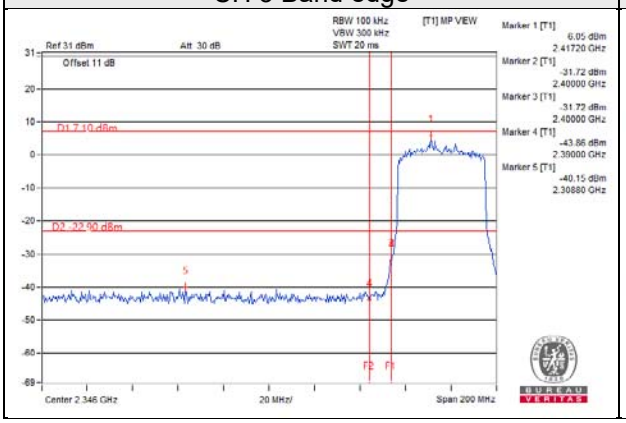


CH 9

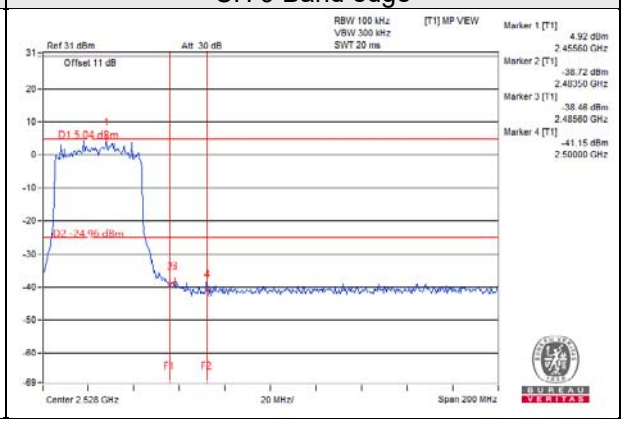




CH 3 Band edge



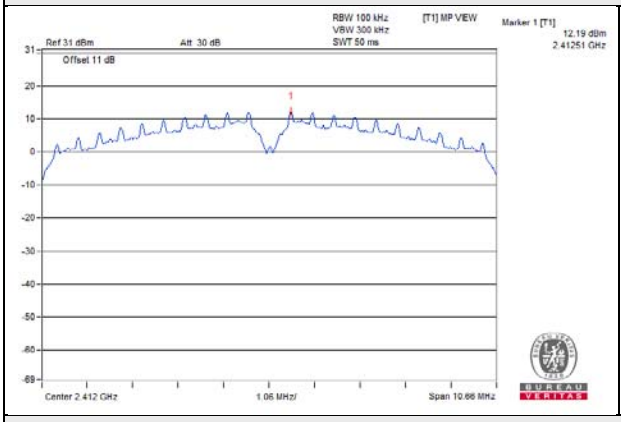
CH 9 Band edge

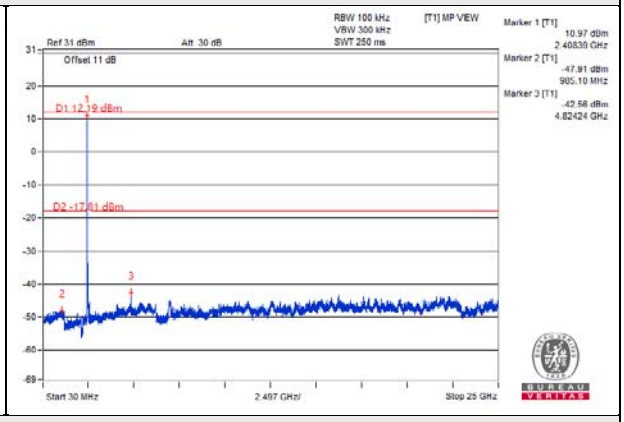


Scanning radio:

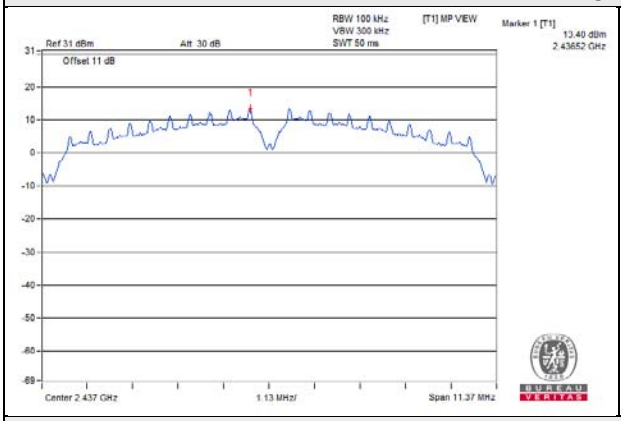
802.11b

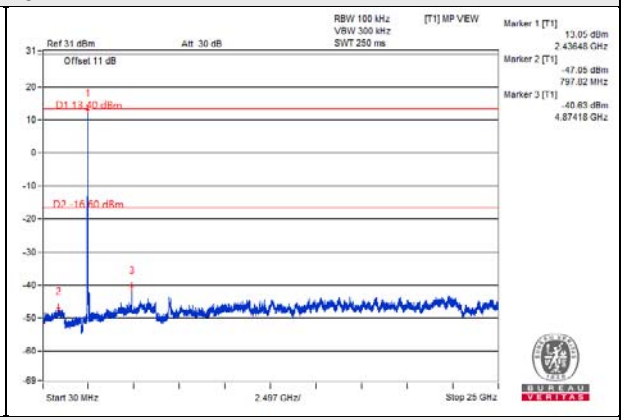
CH 1



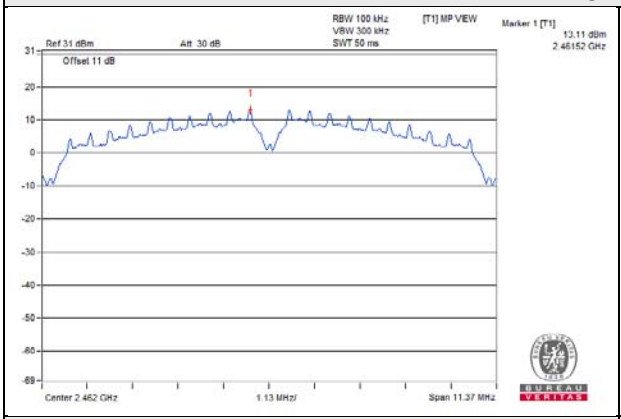


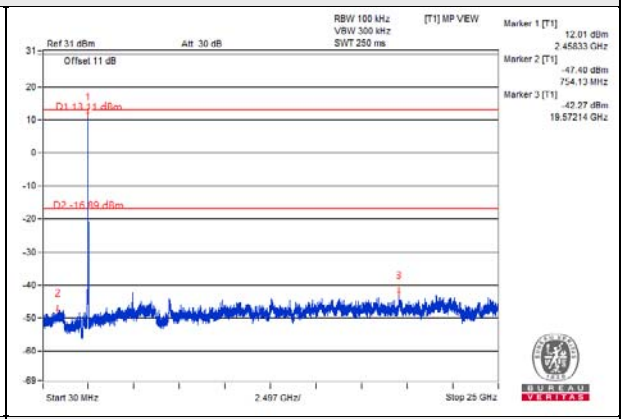
CH 6



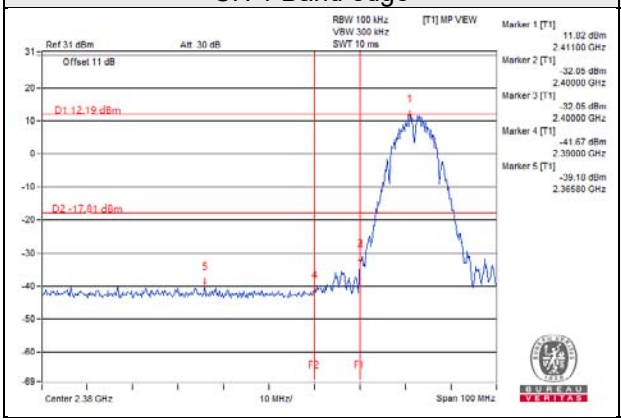


CH 11

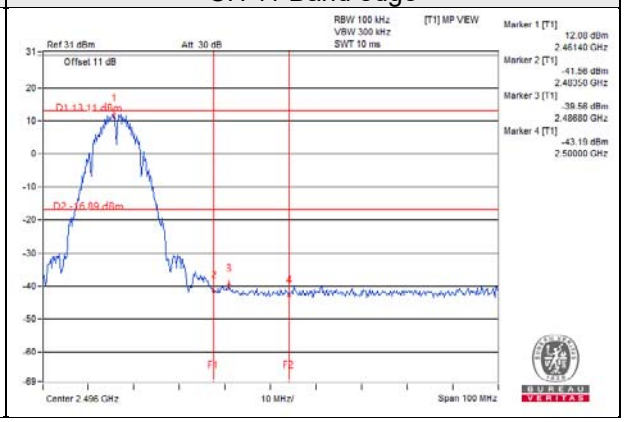




CH 1 Band edge

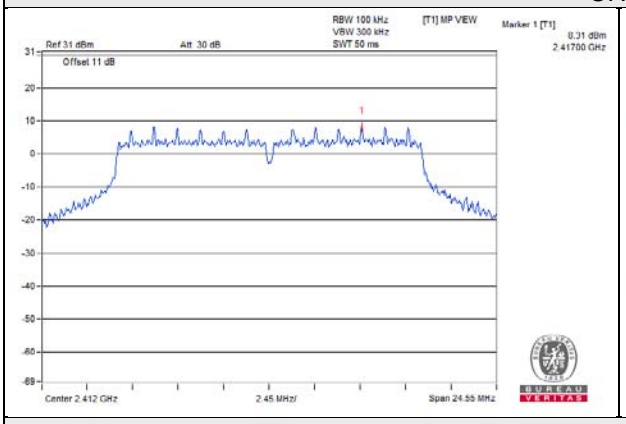


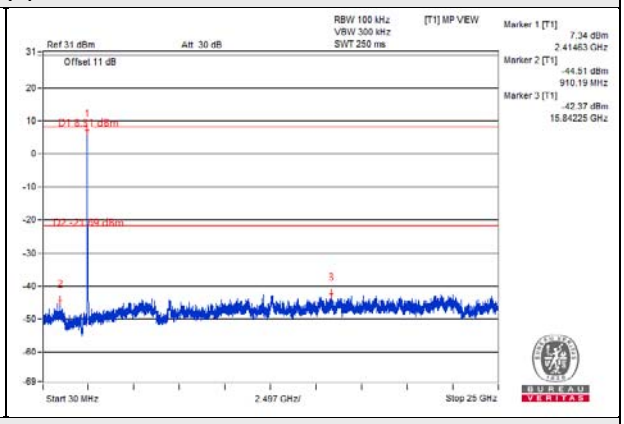
CH 11 Band edge



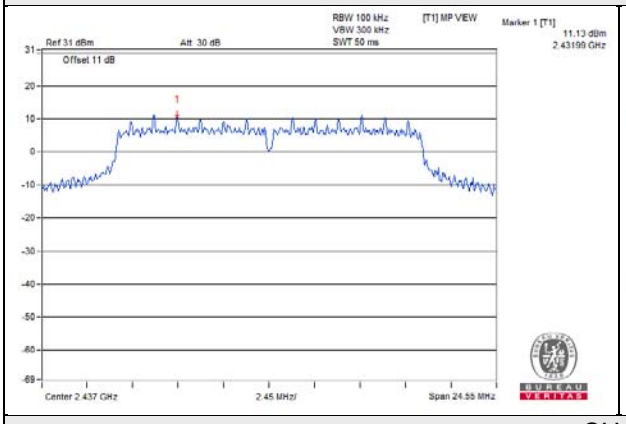
802.11g

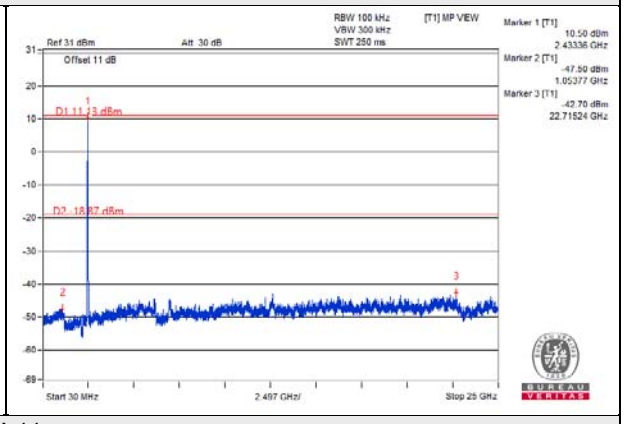
CH 1



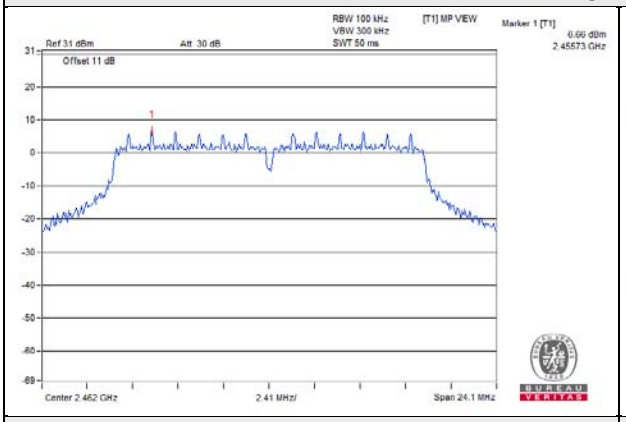


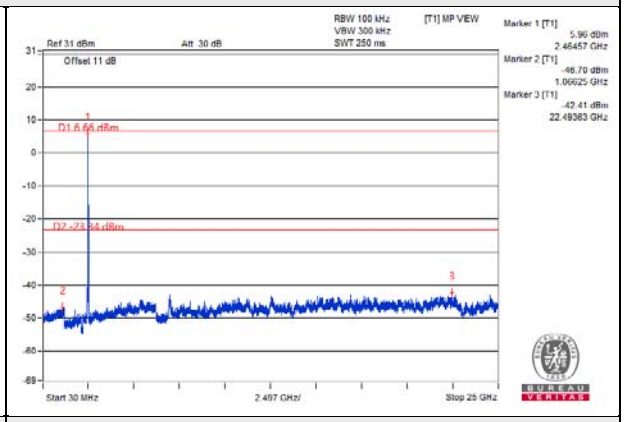
CH 6



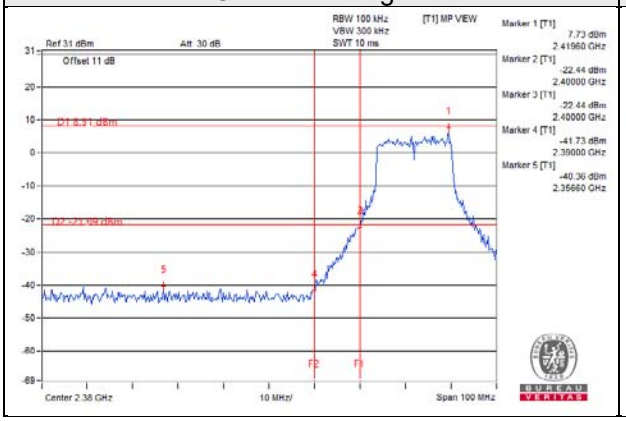


CH 11

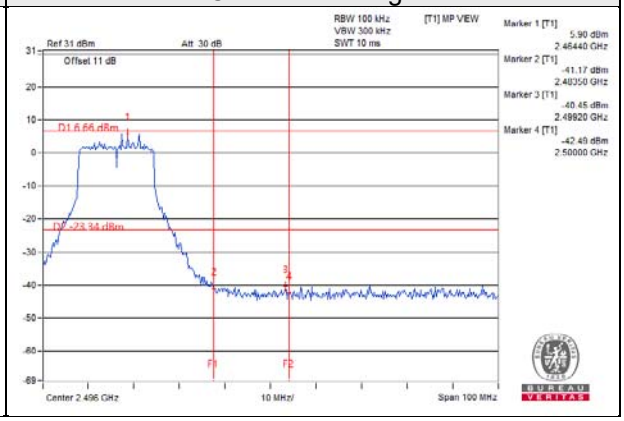




CH 1 Band edge

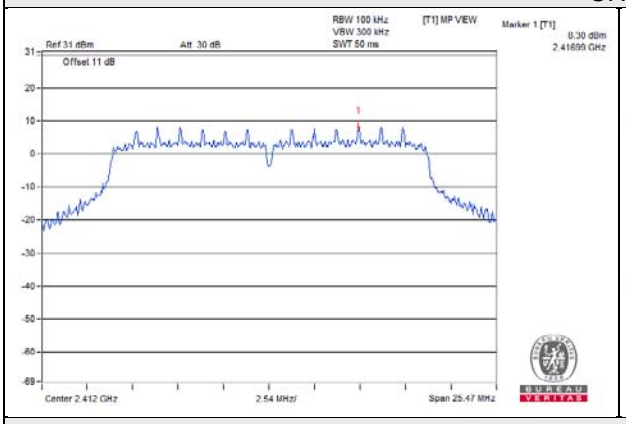


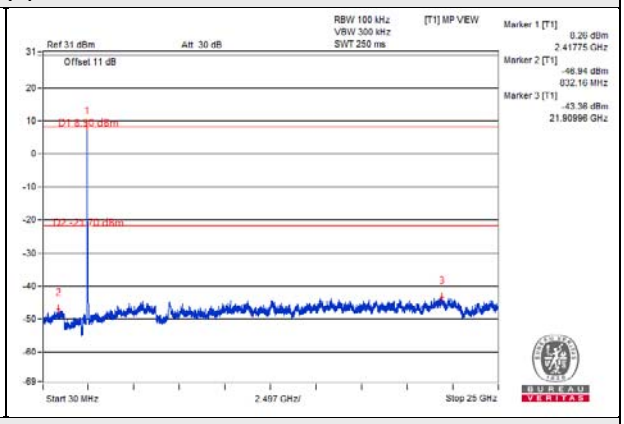
CH 11 Band edge



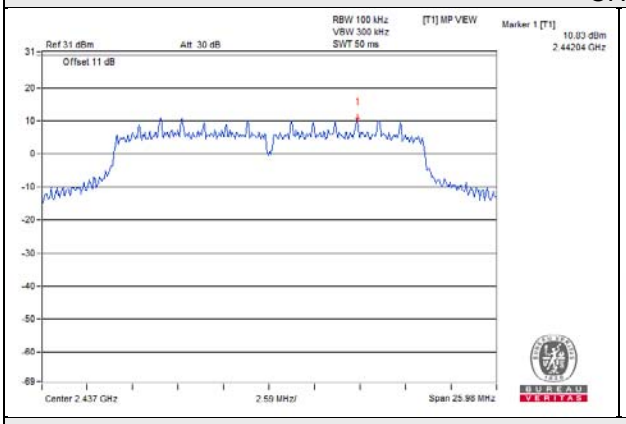
802.11n (HT20)

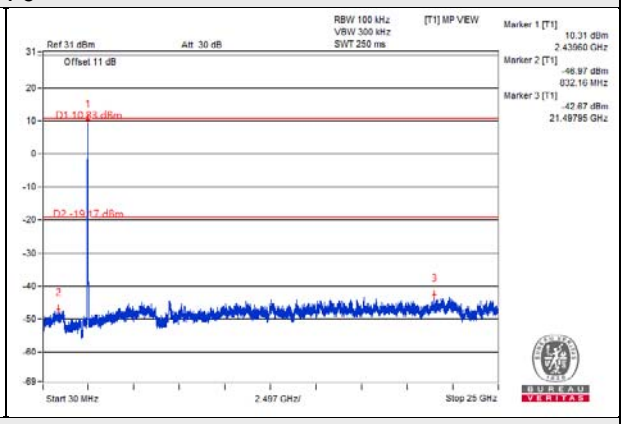
CH 1



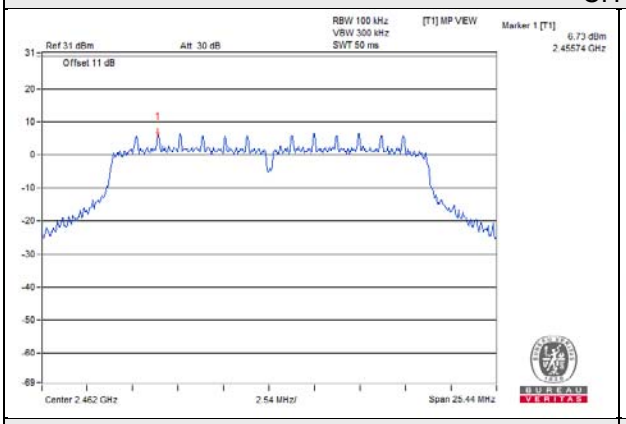


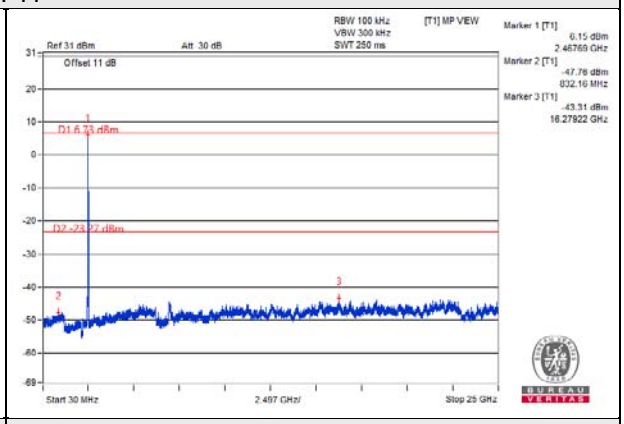
CH 6



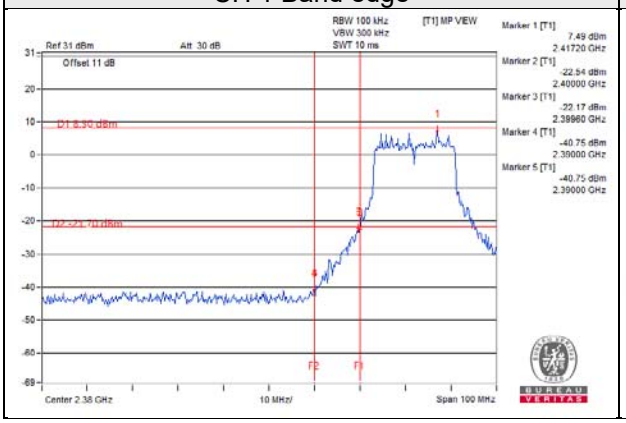


CH 11

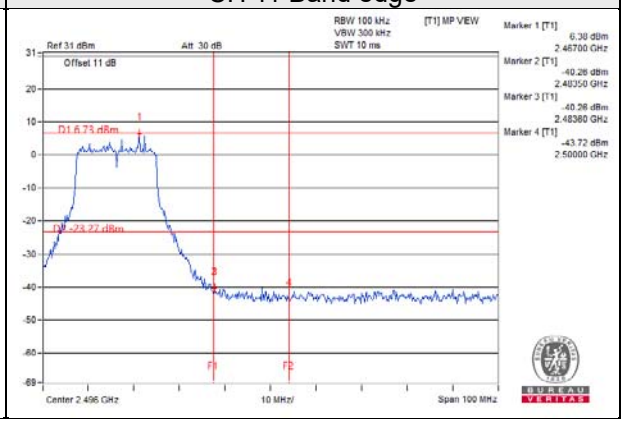




CH 1 Band edge

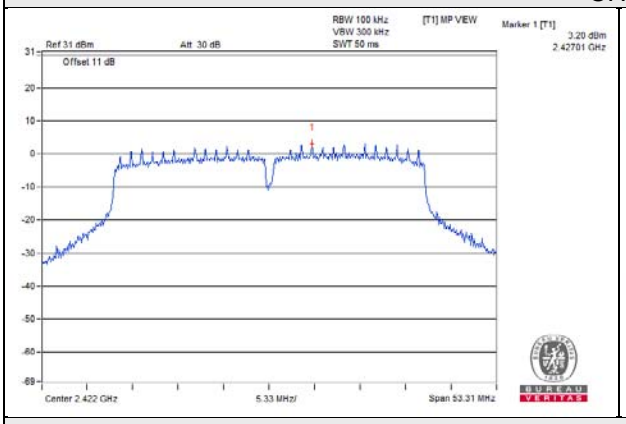


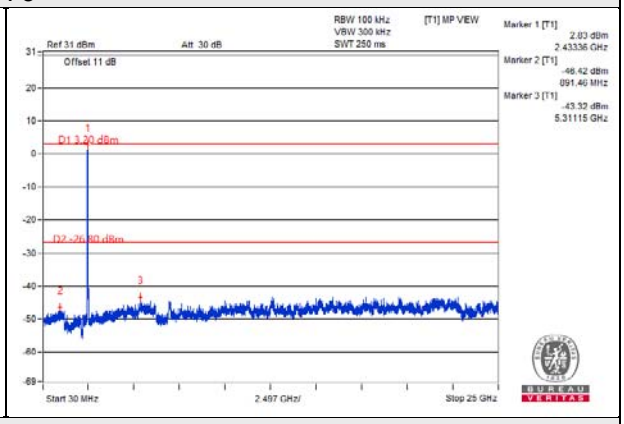
CH 11 Band edge



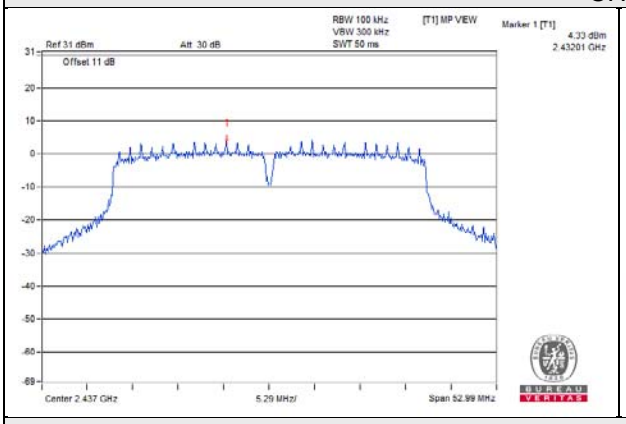
802.11n (HT40)

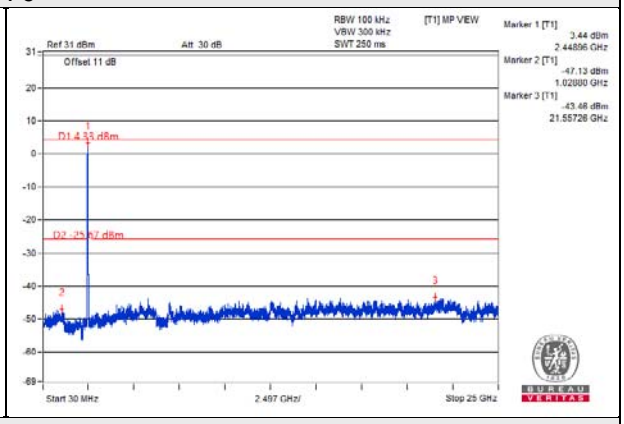
CH 3



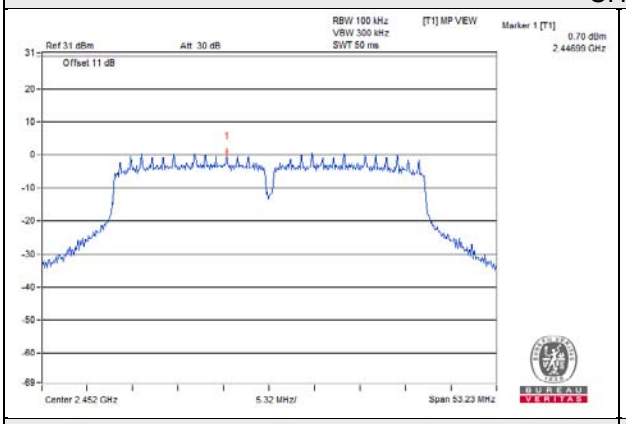


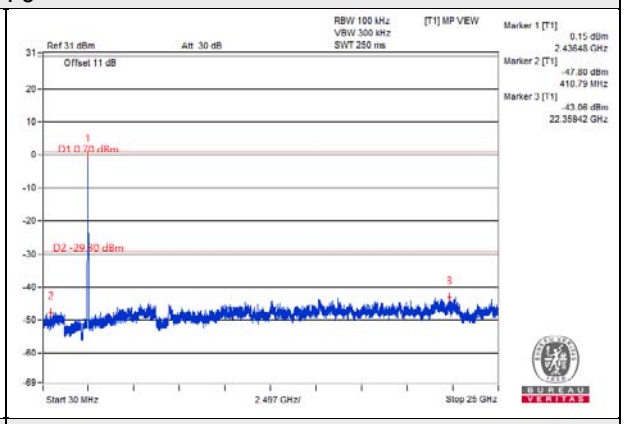
CH 6



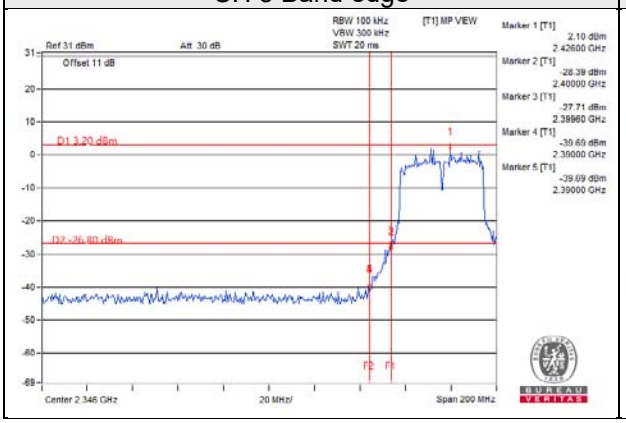


CH 9

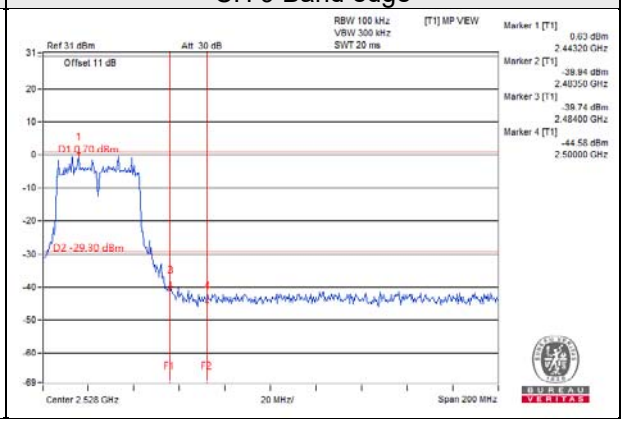




CH 3 Band edge



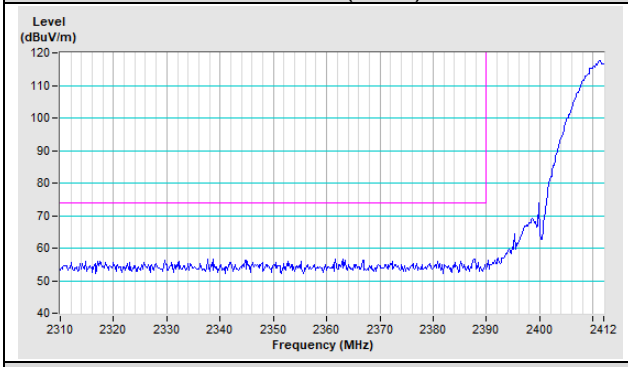
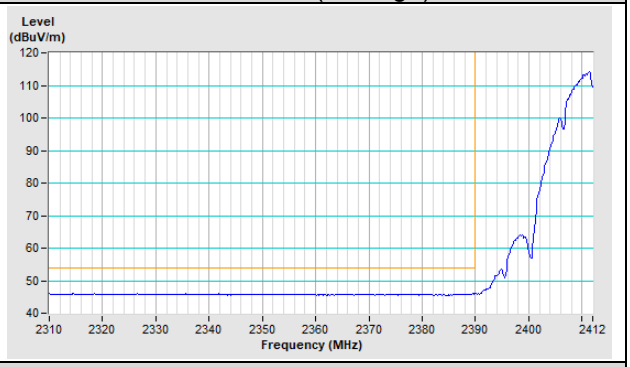
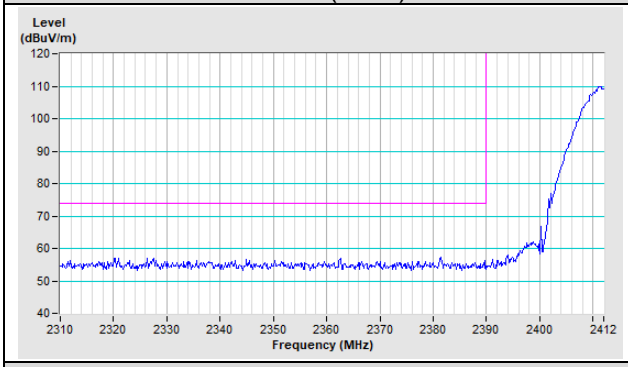
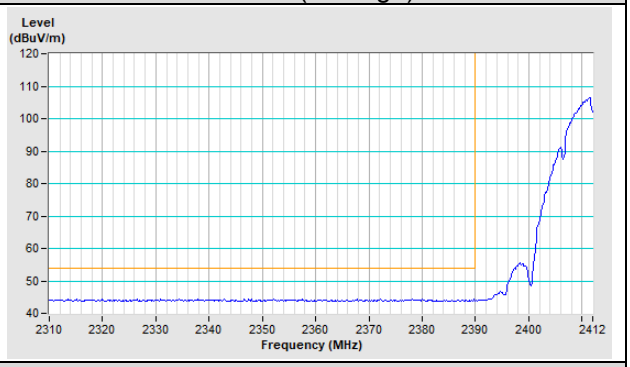
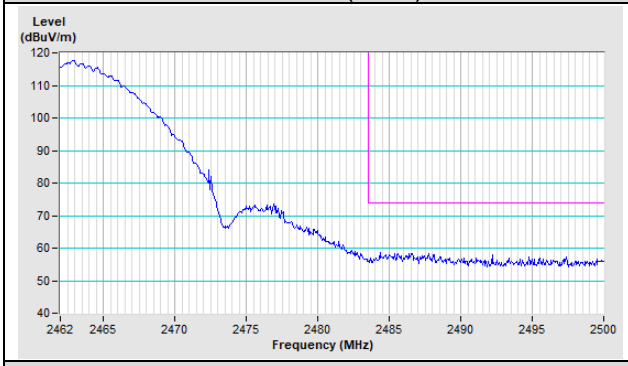
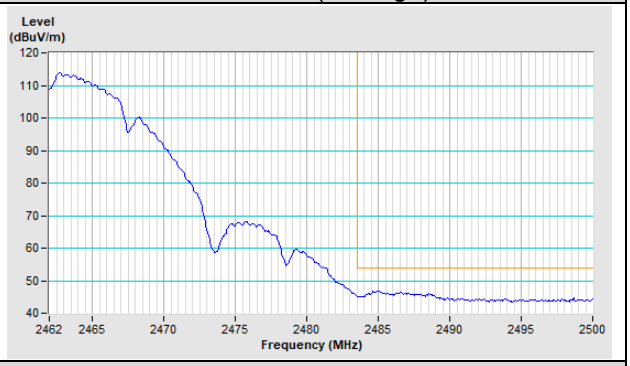
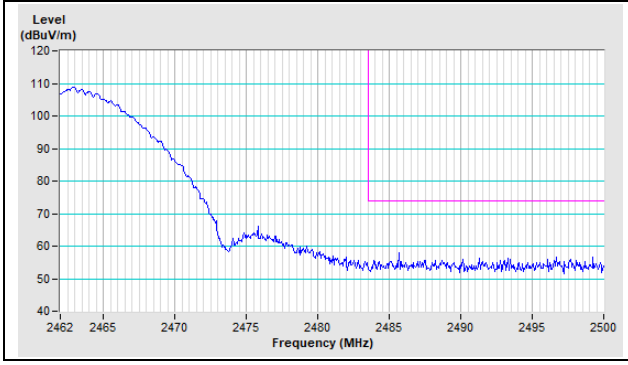
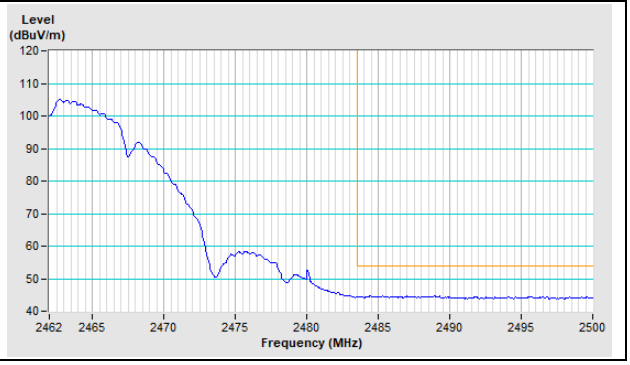
CH 9 Band edge



Annex A- Band Edge Measurement

2G traffic radio:

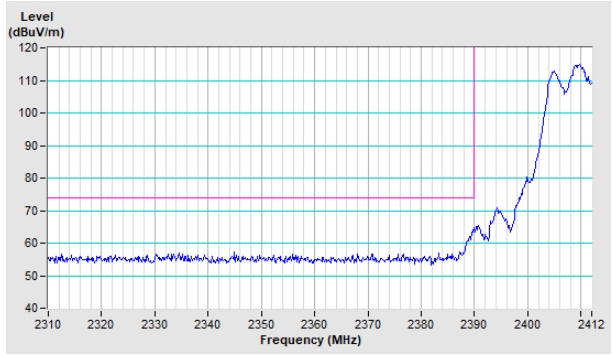
802.11b

Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 11	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

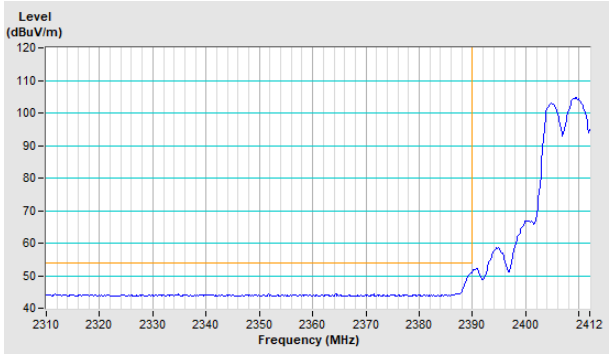
802.11g

Channel 1

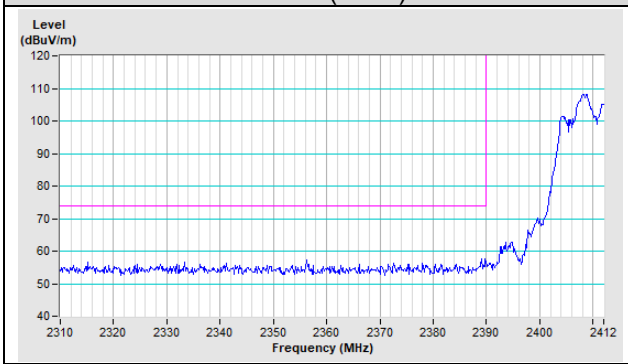
Horizontal (Peak)



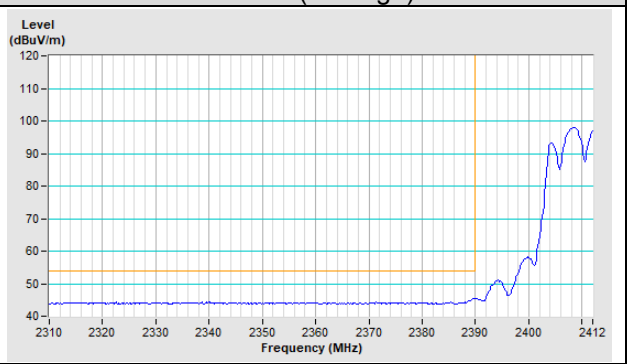
Horizontal (Average)



Vertical (Peak)

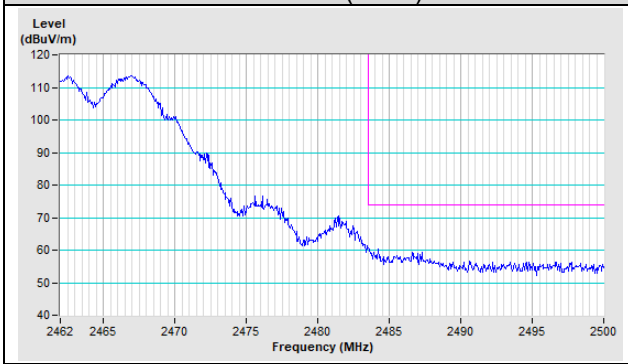


Vertical (Average)

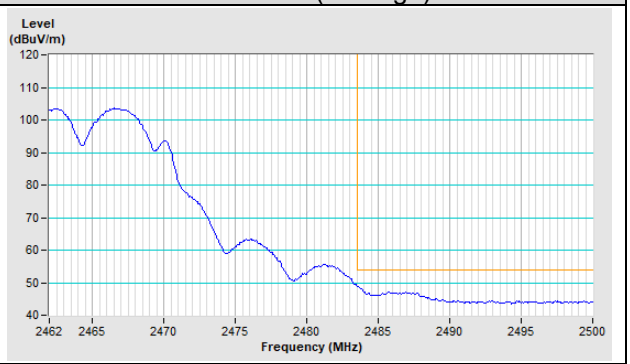


Channel 11

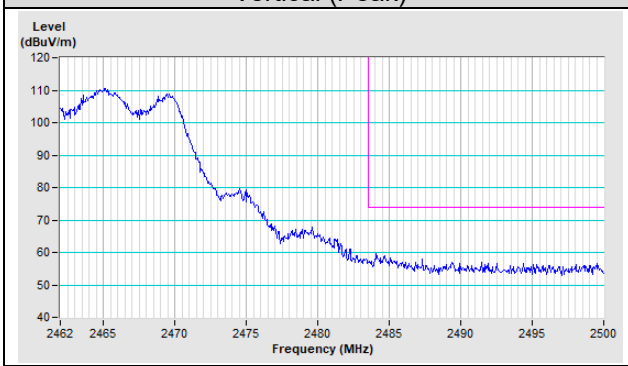
Horizontal (Peak)



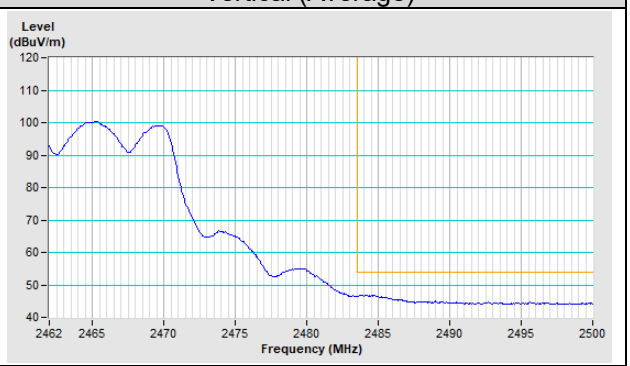
Horizontal (Average)



Vertical (Peak)



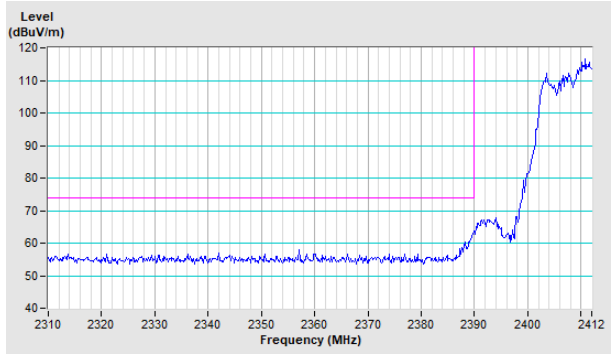
Vertical (Average)



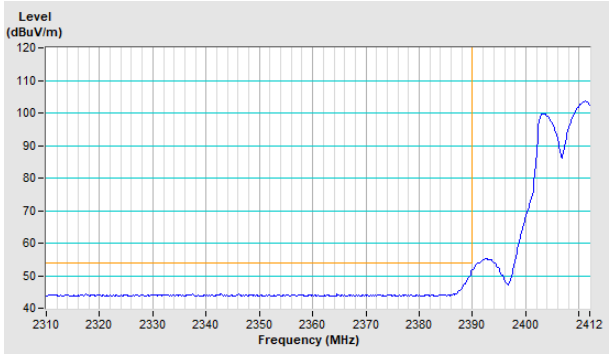
802.11ax (HE20)

Channel 1

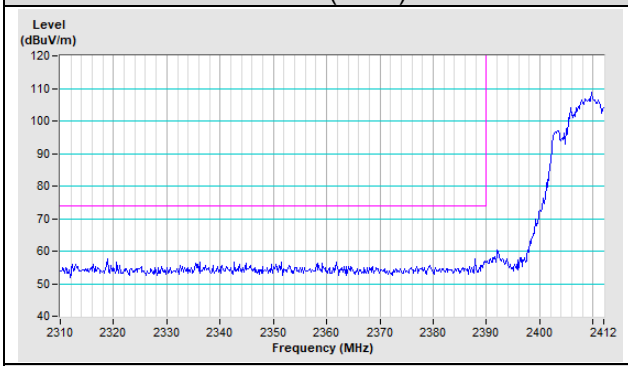
Horizontal (Peak)



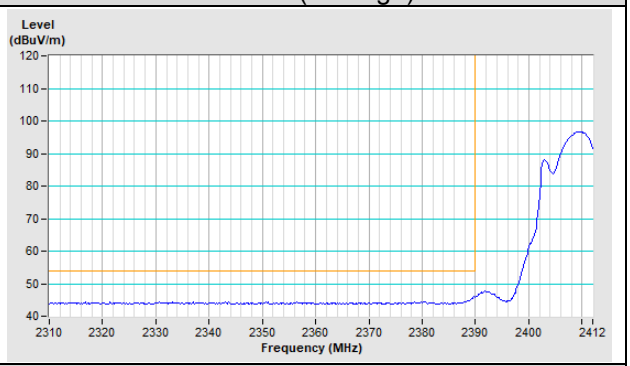
Horizontal (Average)



Vertical (Peak)

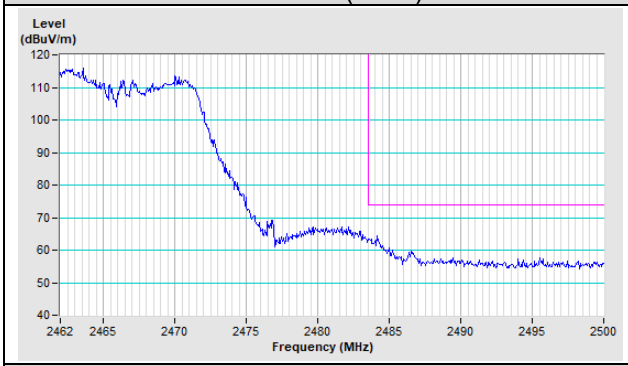


Vertical (Average)

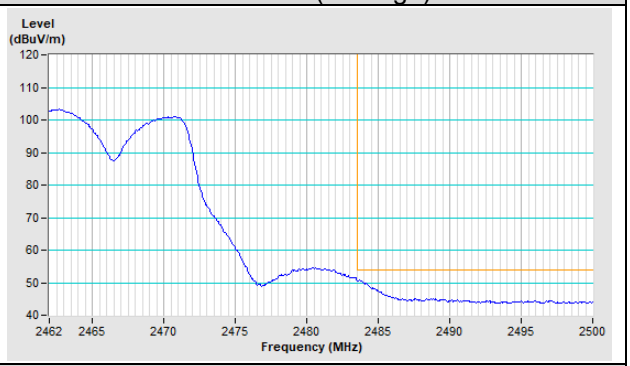


Channel 11

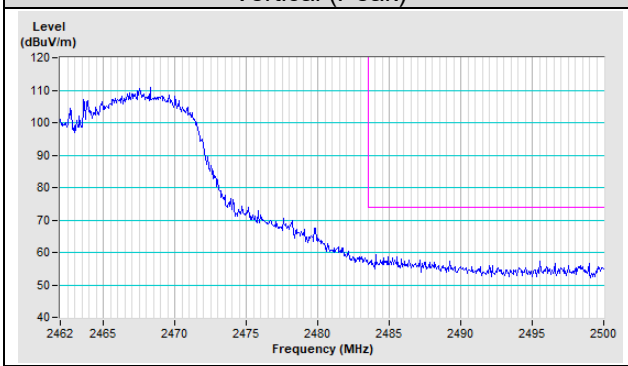
Horizontal (Peak)



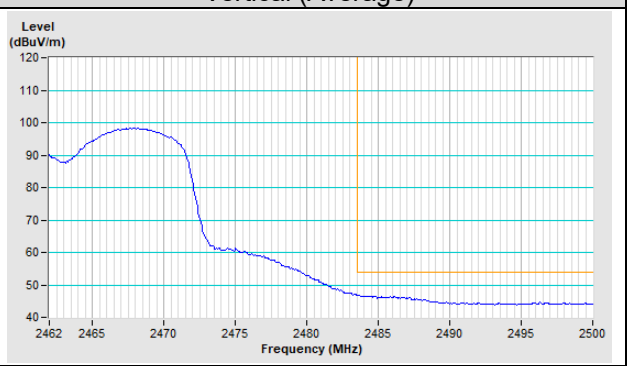
Horizontal (Average)



Vertical (Peak)



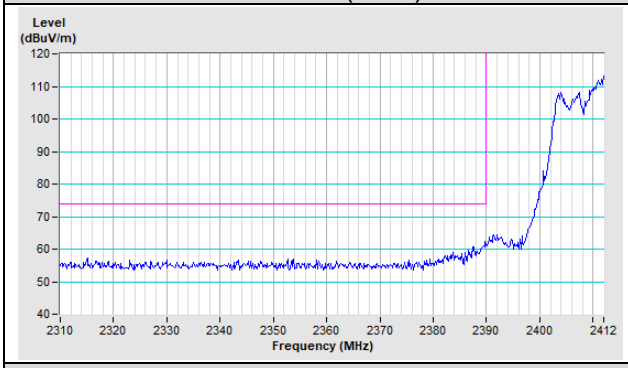
Vertical (Average)



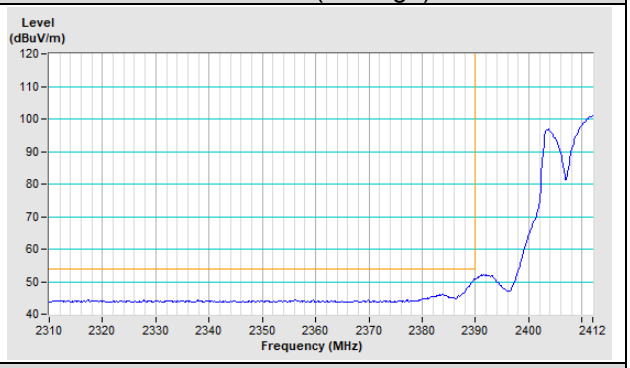
802.11ax (HE40)

Channel 3

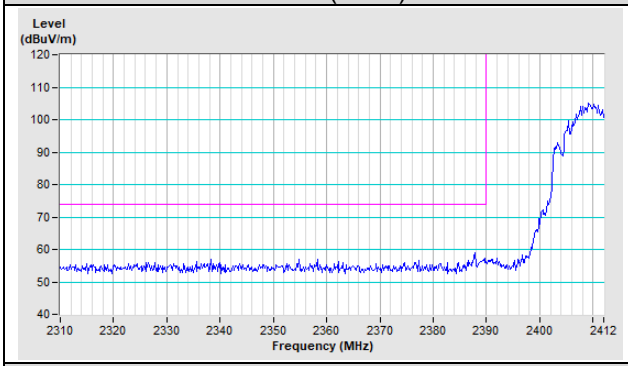
Horizontal (Peak)



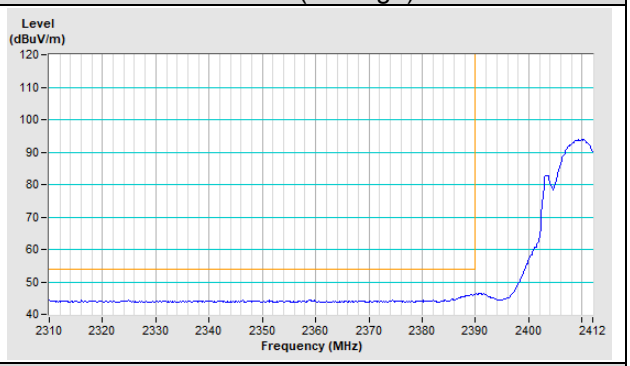
Horizontal (Average)



Vertical (Peak)

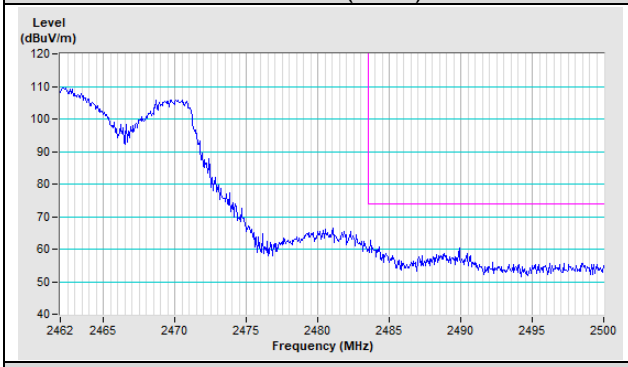


Vertical (Average)

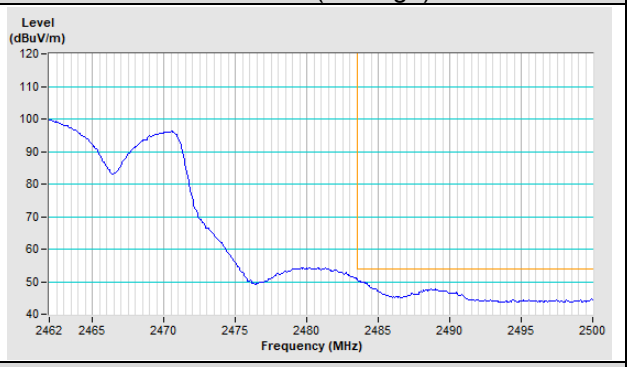


Channel 9

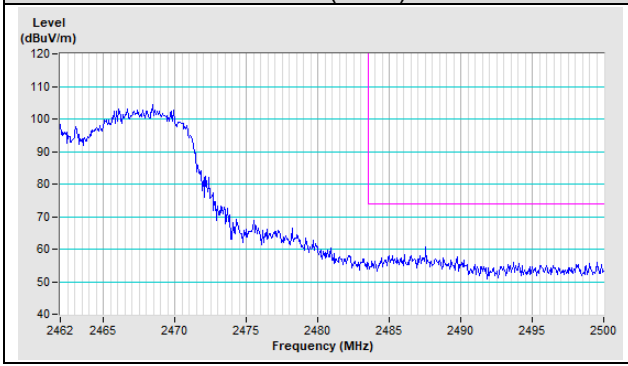
Horizontal (Peak)



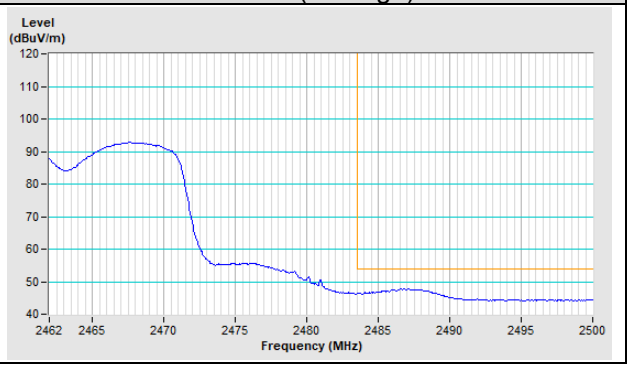
Horizontal (Average)



Vertical (Peak)

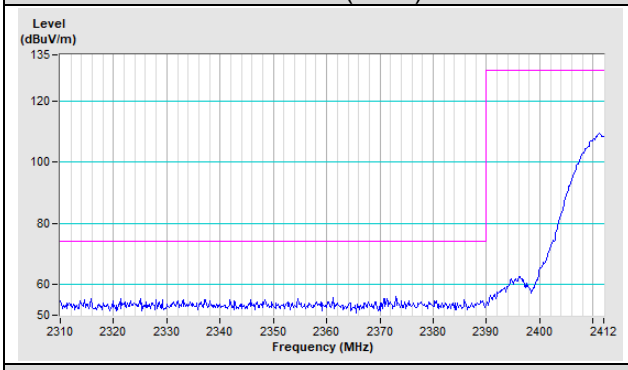
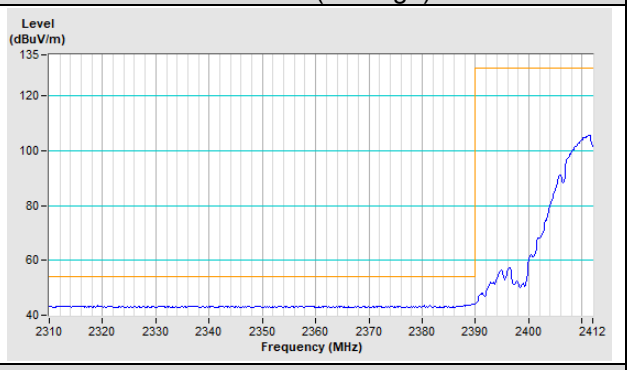
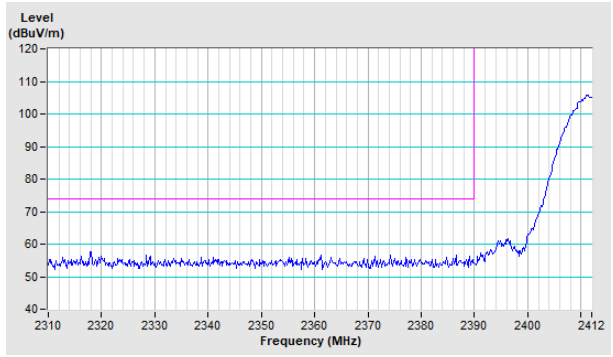
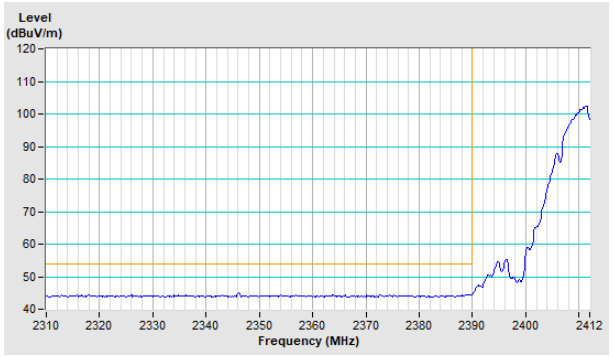
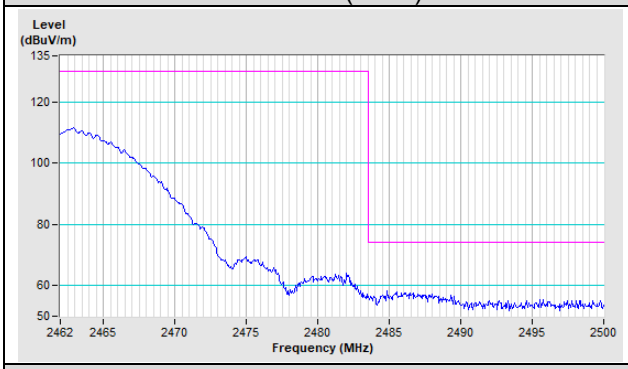
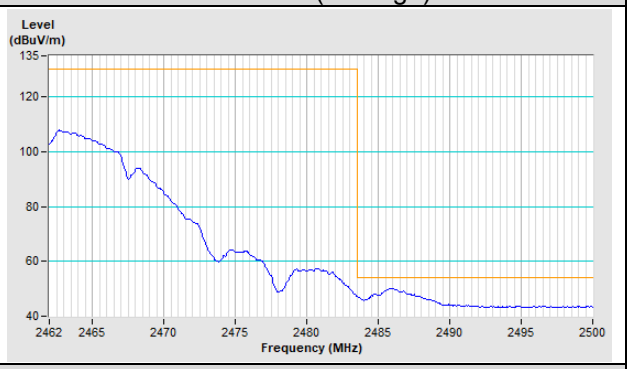
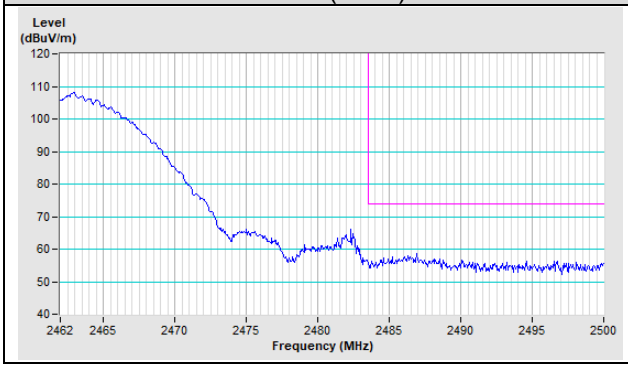
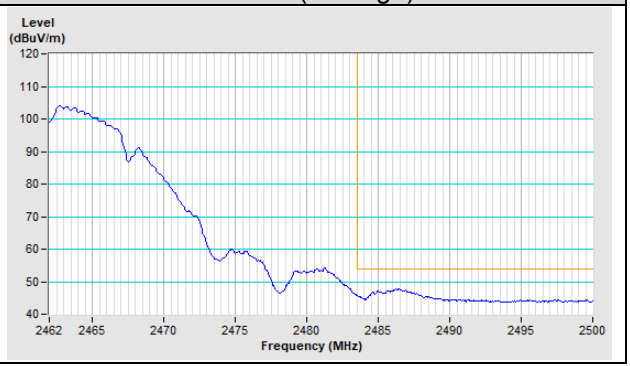


Vertical (Average)



Scanning radio:

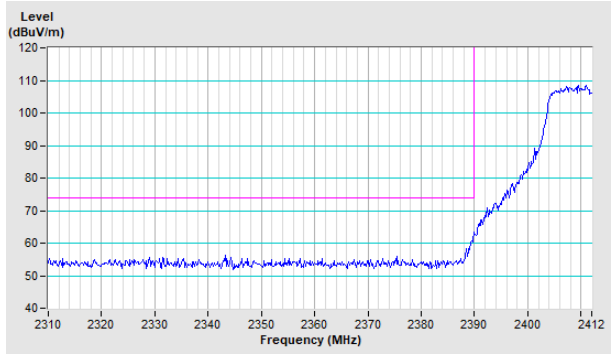
802.11b

Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 11	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

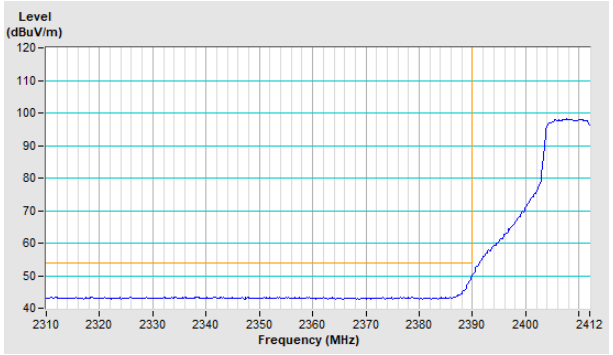
802.11g

Channel 1

Horizontal (Peak)



Horizontal (Average)



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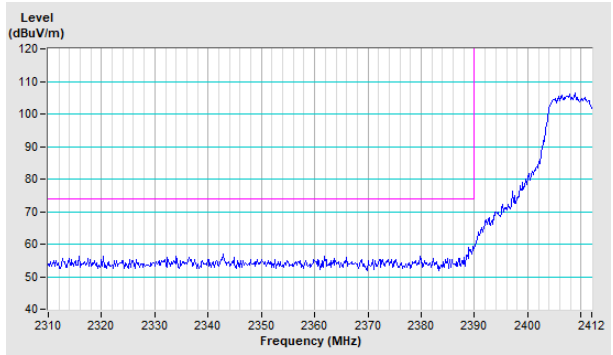
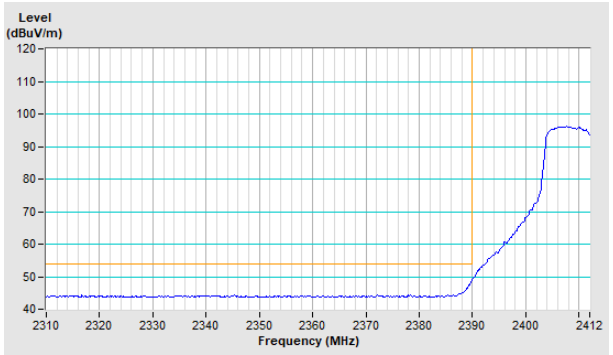
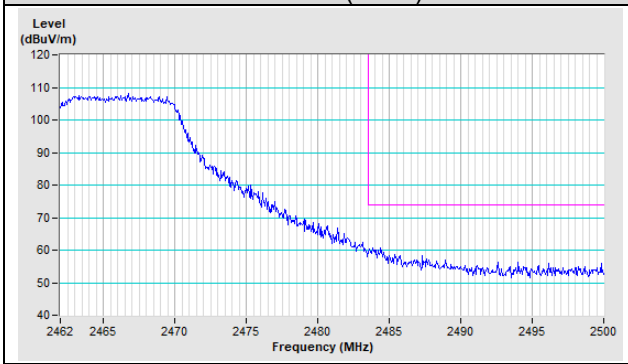


Vertical (Average)

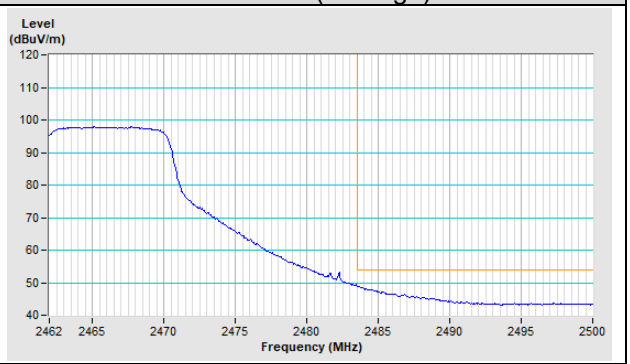


Channel 11

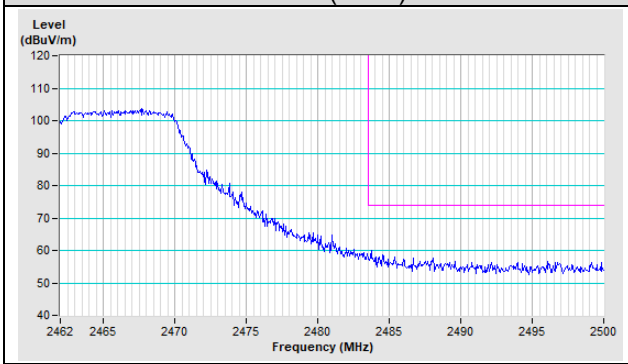
Horizontal (Peak)



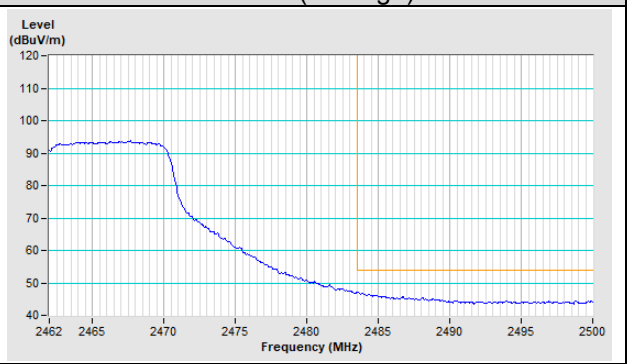
Horizontal (Average)



Vertical (Peak)



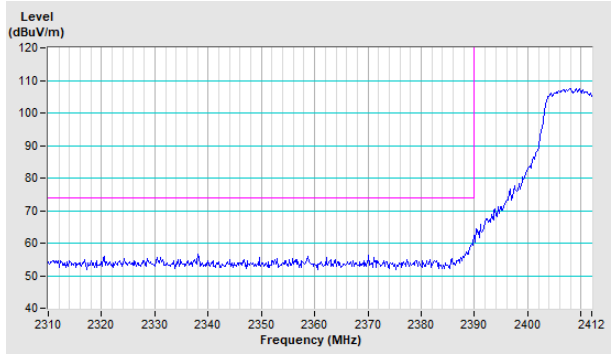
Vertical (Average)



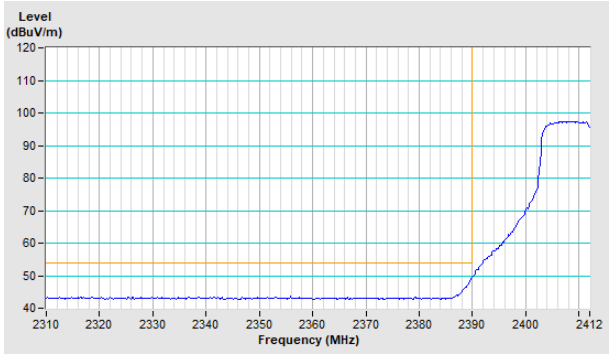
802.11n (HT20)

Channel 1

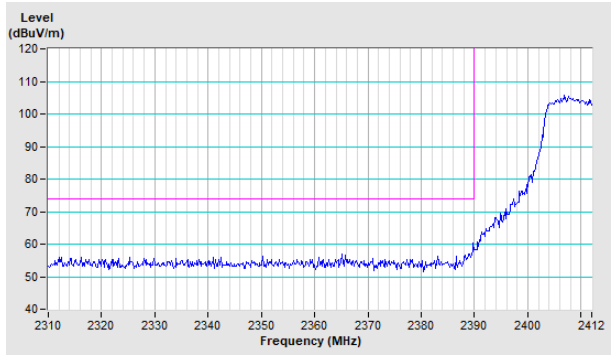
Horizontal (Peak)



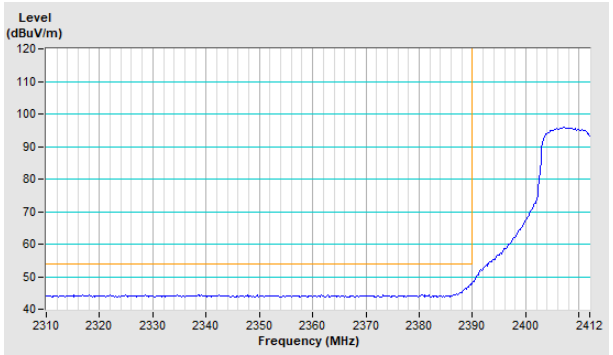
Horizontal (Average)



Vertical (Peak)

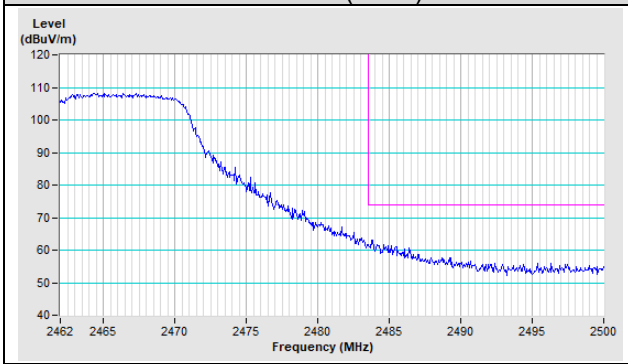


Vertical (Average)

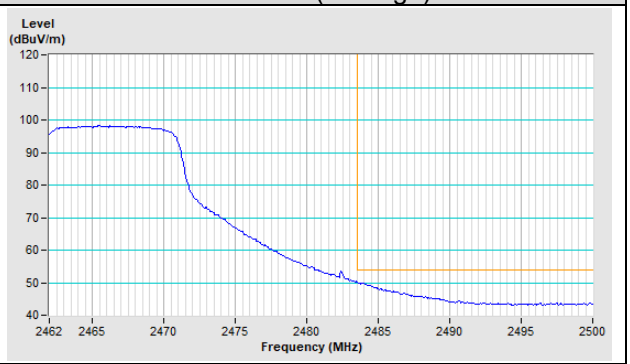


Channel 11

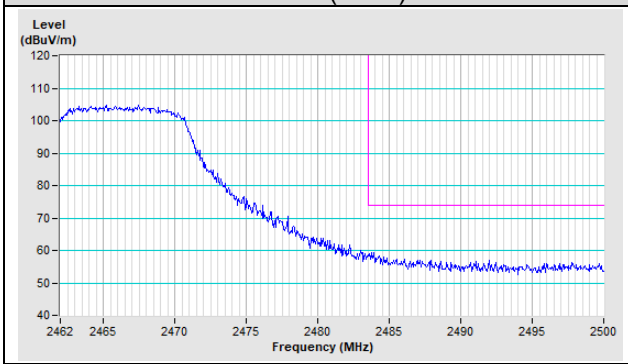
Horizontal (Peak)



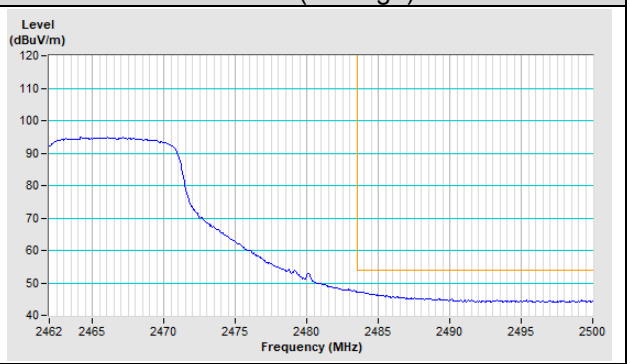
Horizontal (Average)



Vertical (Peak)



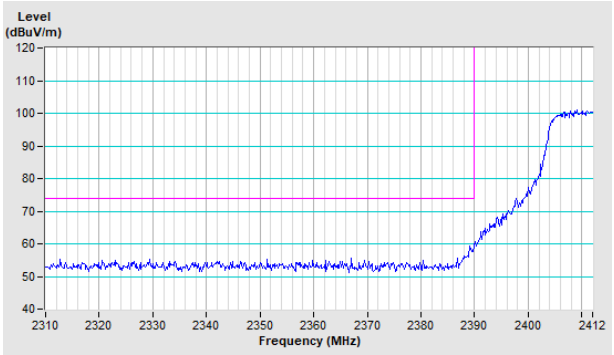
Vertical (Average)



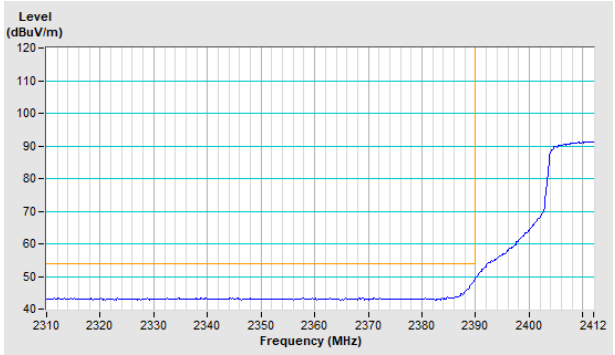
802.11n (HT40)

Channel 3

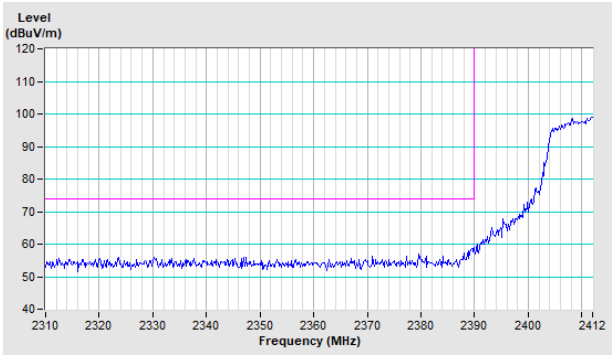
Horizontal (Peak)



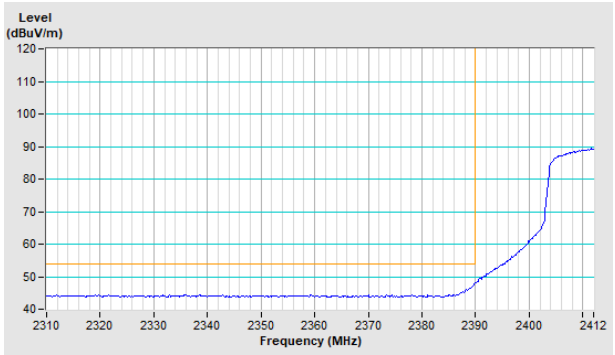
Horizontal (Average)



Vertical (Peak)

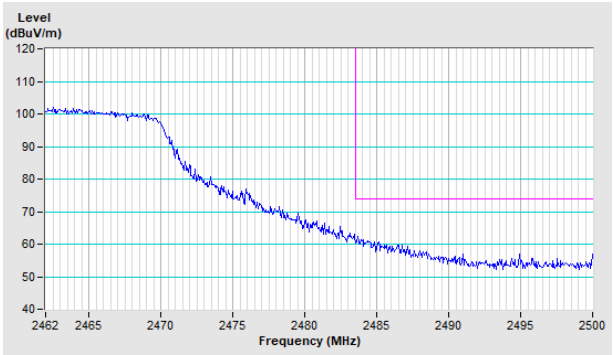


Vertical (Average)

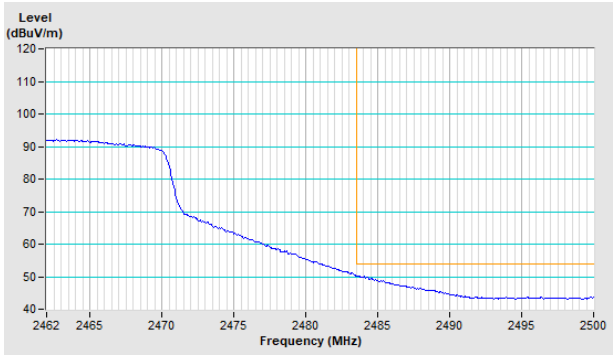


Channel 9

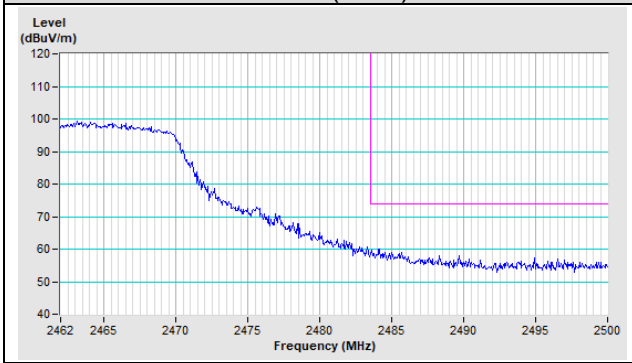
Horizontal (Peak)



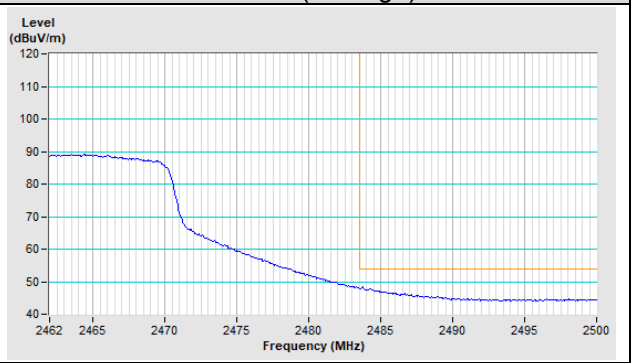
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



5 Pictures of Test Arrangements

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

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.

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

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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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