FCC Test Report

Report No.: RF181219E01

FCC ID: PY319100440

Test Model: EAX80

Received Date: Dec. 19, 2018

Test Date: Apr. 25 to May 17, 2019

Issued Date: Aug. 26, 2019

Applicant: NETGEAR, Inc.

Address: 350 East Plumeria Drive San Jose, CA 95134

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

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

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

FCC Registration / Designation Number: 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF181219E01	Original release.	Aug. 26, 2019

1 Certificate of Conformity

Product: AX6000 Nighthawk Mesh Extender

Brand: NETGEAR

Test Model: EAX80

Applicant: NETGEAR, Inc.

Test Date: Apr. 25 to May 17, 2019

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

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

Prepared by : _____ , **Date:** Aug. 26, 2019
Wendy Wu / Specialist

Approved by : _____ , **Date:** Aug. 26, 2019
May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -10.76dB at 0.34141 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.50MHz
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

Note:
Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.8 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX6000 Nighthawk Mesh Extender
Brand	NETGEAR
Test Model	EAX80
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 3466.7Mbps 802.11ax: up to 4803.9Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5 ~ 5.72GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 25 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 12 802.11ac (VHT80), 802.11ax (HE80): 6 802.11ac (VHT160), 802.11ax (HE160): 2
Output Power	**Non-Beamforming Mode:** **2.4GHz:** 980.941mW **5.18 ~ 5.24GHz:** 983.82mW **5.26 ~ 5.32GHz:** 246.721mW **5.5 ~ 5.72GHz:** 249.087mW **5.745 ~ 5.825GHz:** 950.125mW **Beamforming Mode:** **2.4GHz:** 741.222mW **5.18 ~ 5.24GHz:** 688.216mW **5.26 ~ 5.32GHz:** 174.013mW **5.5 ~ 5.72GHz:** 182.735mW **5.745 ~ 5.825GHz:** 751.22mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN 5GHz
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

2. The EUT must be supplied power adapter and following different models could be chosen as following table:

No.	Brand	Model No.	P/N	Spec.
1	NETGEAR	AD2150F10	332-11494-01	Input: 100-120Vac, 1.0A, 50/60Hz Output: 12V, 3.5A DC Output cable: Unshielded, 1.8m
2	NETGEAR	2ABN042F NA	332-10761-01	Input: 100-240Vac, 1.3A, 50/60Hz Output: 12V, 3.5A DC Output cable: Unshielded, 1.8m
Note: From the above adapters, the worst case was found in **Adapter 2.** Therefore only the test data of the mode was recorded in this report.				

3. The antennas provided to the EUT, please refer to the following table:

Frequency Range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4~2.4835	7.24	PIFA	NA
5.15~5.25	7.58		
5.25~5.35	7.49		
5.47~5.725	7.33		
5.725~5.85	7.23		
Note: More detailed information, please refer to opearating description.			

4. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
VHT20	4TX	4RX
VHT40	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ac (VHT160)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX
802.11ax (HE160)	4TX	4RX

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and non-beamforming mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), 802.11ac mode for 20MHz (40MHz, 80MHz, 160MHz) and 802.11ax mode for 20MHz (40MHz, 80MHz, 160MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), VHT20 and 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), VHT40 and 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	
-	√	√	√	√	-

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

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.

Non-Beamforming Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Radiated Emission Test (Below 1GHz):

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

Non-Beamforming Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11ax (HE20)	1 to 11	6	OFDMA	BPSK	MCS0

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.

Non-Beamforming Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	Data Rate Parameter
802.11ax (HE20)	1 to 11	6	OFDMA	BPSK	MCS0

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.

Non-Beamforming Mode					
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**	**Data Rate Parameter**
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
VHT20 (Output power only)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40 (Output power only)	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
Beamforming Mode (output power only)					
MODE	**AVAILABLE CHANNEL**	**TESTED CHANNEL**	**MODULATION TECHNOLOGY**	**MODULATION TYPE**	**Data Rate Parameter**
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
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

Test Condition:

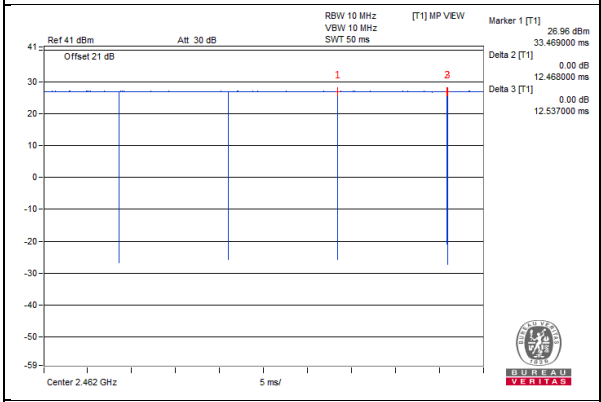
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Robert Cheng
RE<1G	20deg. C, 70%RH	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

3.3 Duty Cycle of Test Signal

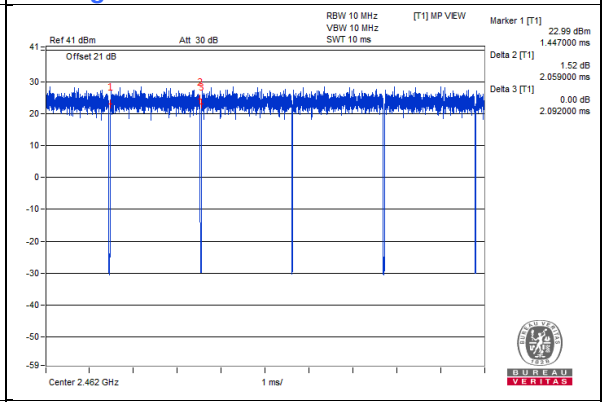
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.468/12.537 = 0.994
802.11g: Duty cycle = 2.059/2.092 = 0.984
VHT20: Duty cycle = 1.92/1.95 = 0.985
VHT40: Duty cycle = 0.941/0.974 = 0.966, Duty factor = 10 * log(1/0.966) = 0.15
802.11ax (HE20) : Duty cycle = 1.487/1.519 = 0.979, Duty factor = 10 * log(1/0.979) = 0.09
802.11ax (HE40) : Duty cycle = 0.77/0.802 = 0.96, Duty factor = 10 * log(1/0.96) = 0.18

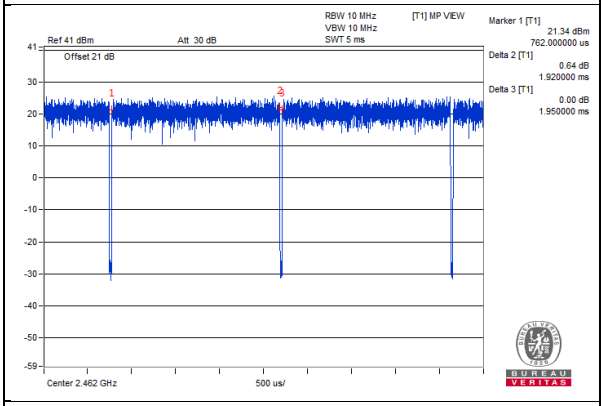
802.11b



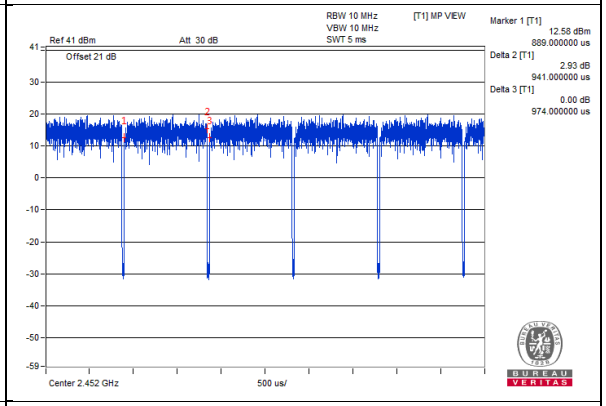
802.11g



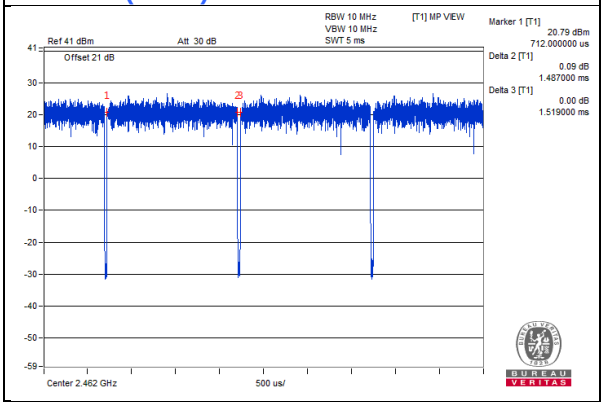
VHT20



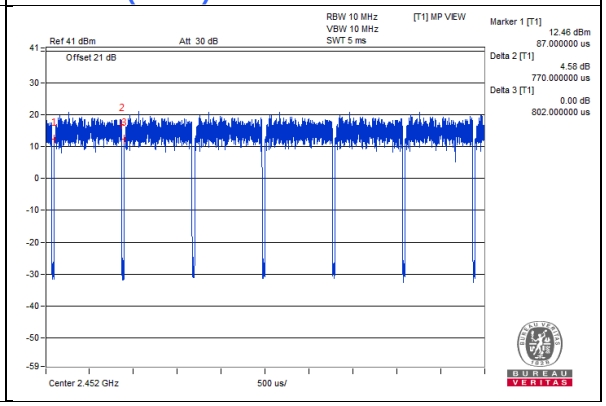
VHT40



802.11ax (HE20)



802.11ax (HE40)



3.4 Description of Support Units

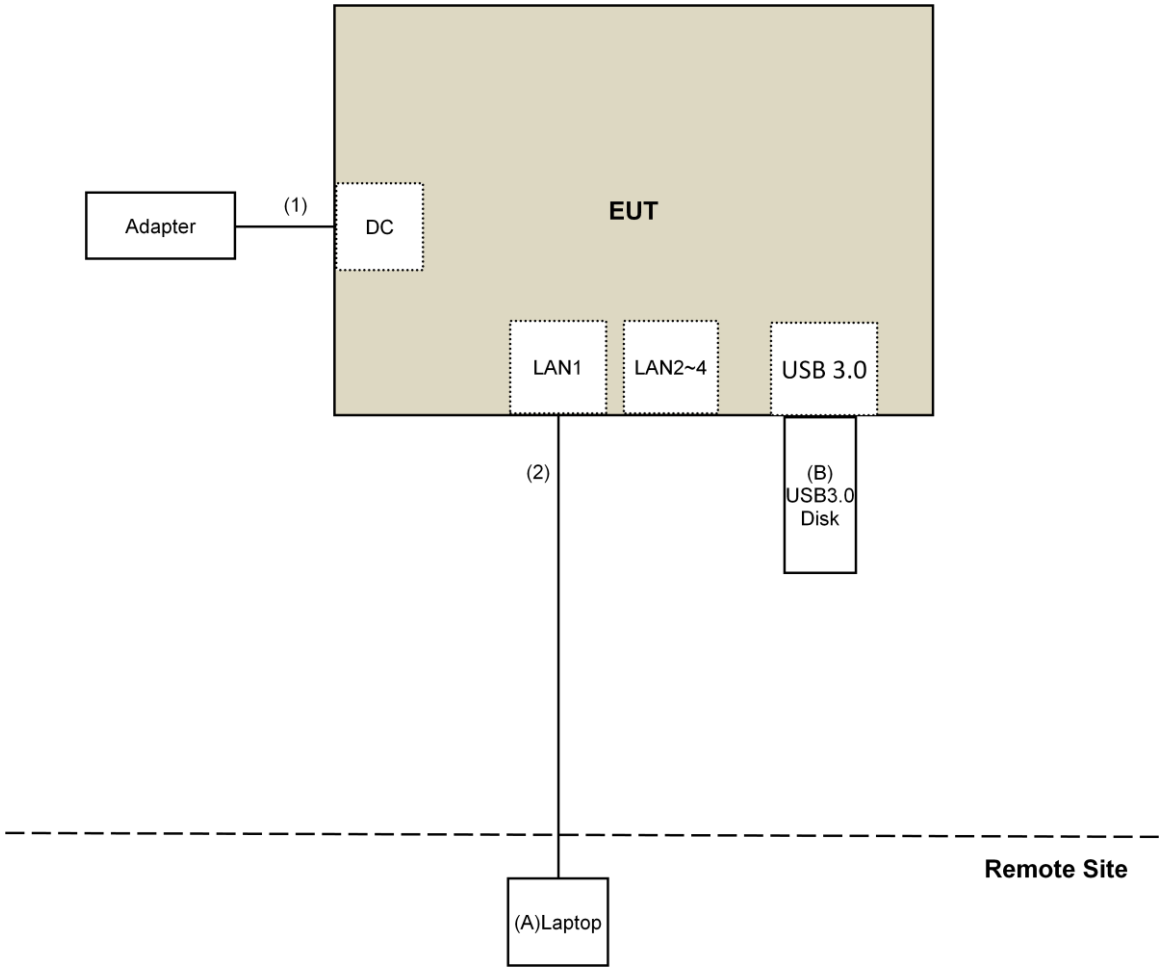
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	USB3.0 Disk	SanDisk	32GB	NA	NA	Provided by Lab

Note:
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	Jan. 25, 2019	Jan. 24, 2020
Loop Antenna Electro-Metrics	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
RF Cable	NA	LOOPCAB-001	Jan. 14, 2019	Jan. 13, 2020
RF Cable	NA	LOOPCAB-002	Jan. 14, 2019	Jan. 13, 2020
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 30, 2018	Oct. 29, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-4-1	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-2	Mar. 19, 2019	Mar. 18, 2020
RF Cable	8D	966-4-3	Mar. 19, 2019	Mar. 18, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 27, 2018	Sep. 26, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Apr. 25, 2019

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 16, 2018	Aug. 15, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 28, 2019	Jan. 27, 2020
RF Cable	104 RF cable	131215	Jan. 10, 2019	Jan. 09, 2020
RF Cable	EMC104-SM-SM-6000	180418	May 03, 2019	May 02, 2020
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 28, 2019	Jan. 27, 2020
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 25, 2018	Nov. 24, 2019
RF Cable	EMC102-KM-KM-1200	160924	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC102-KM-KM-1200	160925	Jan. 28, 2019	Jan. 27, 2020
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 13, 2019	May 12, 2020
Power sensor Anritsu	MA2411B	0917122	May 13, 2019	May 12, 2020
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Tested Date: May 16 to 17, 2019

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

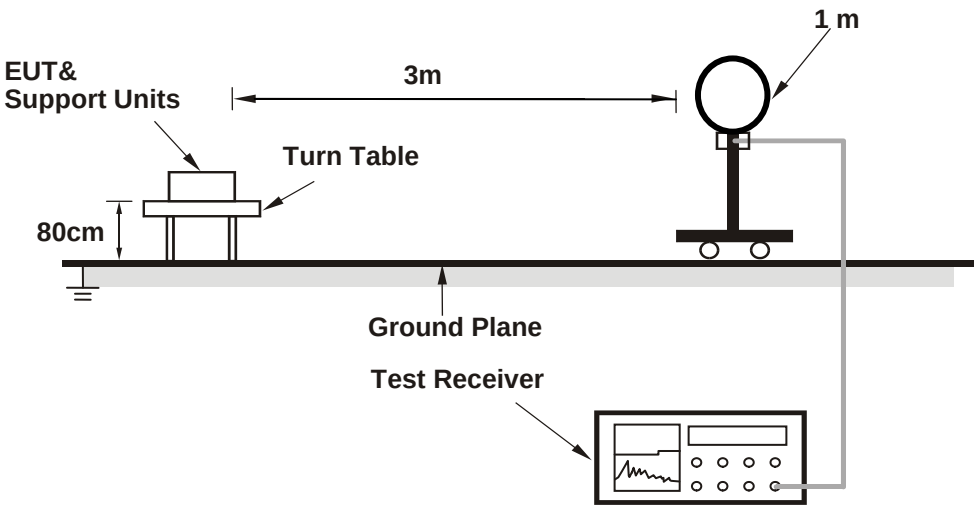
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

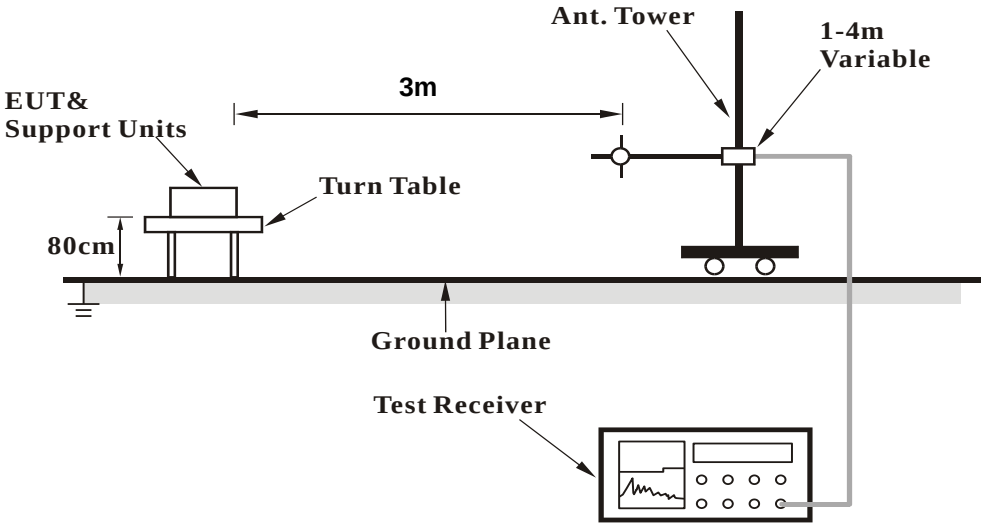
No deviation.

4.1.5 Test Setup

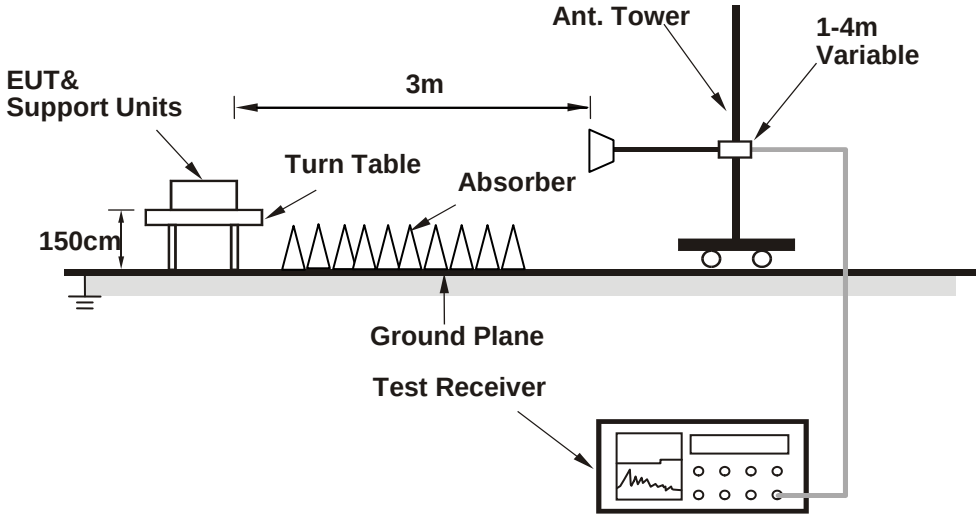
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (Mtool[3.1.0.1]) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	58.8 PK	74.0	-15.2	2.09 H	144	61.0	-2.2
2	2390.00	47.4 AV	54.0	-6.6	2.09 H	144	49.6	-2.2
3	*2412.00	118.3 PK			2.09 H	144	120.6	-2.3
4	*2412.00	116.0 AV			2.09 H	144	118.3	-2.3
5	4824.00	50.6 PK	74.0	-23.4	2.14 H	231	48.9	1.7
6	4824.00	48.6 AV	54.0	-5.4	2.14 H	231	46.9	1.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	62.0 PK	74.0	-12.0	1.41 V	288	64.2	-2.2
2	2390.00	49.3 AV	54.0	-4.7	1.41 V	288	51.5	-2.2
3	*2412.00	118.6 PK			1.41 V	288	120.9	-2.3
4	*2412.00	116.7 AV			1.41 V	288	119.0	-2.3
5	4824.00	47.4 PK	74.0	-26.6	2.12 V	50	45.7	1.7
6	4824.00	44.8 AV	54.0	-9.2	2.12 V	50	43.1	1.7

REMARKS:

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

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	2390.00	58.6 PK	74.0	-15.4	1.77 H	139	60.8	-2.2
2	2390.00	46.1 AV	54.0	-7.9	1.77 H	139	48.3	-2.2
3	*2437.00	118.6 PK			1.77 H	139	121.0	-2.4
4	*2437.00	116.5 AV			1.77 H	139	118.9	-2.4
5	2483.50	59.2 PK	74.0	-14.8	1.77 H	139	61.5	-2.3
6	2483.50	47.1 AV	54.0	-6.9	1.77 H	139	49.4	-2.3
7	4874.00	50.3 PK	74.0	-23.7	2.14 H	214	48.6	1.7
8	4874.00	48.2 AV	54.0	-5.8	2.14 H	214	46.5	1.7
9	7311.00	44.2 PK	74.0	-29.8	1.67 H	131	36.0	8.2
10	7311.00	32.4 AV	54.0	-21.6	1.67 H	131	24.2	8.2
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	60.6 PK	74.0	-13.4	1.40 V	287	62.8	-2.2
2	2390.00	48.2 AV	54.0	-5.8	1.40 V	287	50.4	-2.2
3	*2437.00	119.3 PK			1.40 V	287	121.7	-2.4
4	*2437.00	117.4 AV			1.40 V	287	119.8	-2.4
5	2483.50	61.3 PK	74.0	-12.7	1.40 V	287	63.6	-2.3
6	2483.50	49.2 AV	54.0	-4.8	1.40 V	287	51.5	-2.3
7	4874.00	46.8 PK	74.0	-27.2	2.15 V	40	45.1	1.7
8	4874.00	44.2 AV	54.0	-9.8	2.15 V	40	42.5	1.7
9	7311.00	44.2 PK	74.0	-29.8	1.56 V	196	36.0	8.2
10	7311.00	33.0 AV	54.0	-21.0	1.56 V	196	24.8	8.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	118.2 PK			2.32 H	144	120.6	-2.4
2	*2462.00	116.0 AV			2.32 H	144	118.4	-2.4
3	2483.50	60.4 PK	74.0	-13.6	2.32 H	144	62.7	-2.3
4	2483.50	47.7 AV	54.0	-6.3	2.32 H	144	50.0	-2.3
5	4924.00	50.0 PK	74.0	-24.0	2.45 H	228	48.2	1.8
6	4924.00	48.5 AV	54.0	-5.5	2.45 H	228	46.7	1.8
7	7386.00	44.5 PK	74.0	-29.5	1.65 H	134	36.2	8.3
8	7386.00	32.8 AV	54.0	-21.2	1.65 H	134	24.5	8.3
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	118.8 PK			1.45 V	272	121.2	-2.4
2	*2462.00	116.8 AV			1.45 V	272	119.2	-2.4
3	2483.50	62.2 PK	74.0	-11.8	1.45 V	272	64.5	-2.3
4	2483.50	49.6 AV	54.0	-4.4	1.45 V	272	51.9	-2.3
5	4924.00	47.2 PK	74.0	-26.8	2.17 V	54	45.4	1.8
6	4924.00	44.6 AV	54.0	-9.4	2.17 V	54	42.8	1.8
7	7386.00	44.4 PK	74.0	-29.6	1.60 V	207	36.1	8.3
8	7386.00	33.3 AV	54.0	-20.7	1.60 V	207	25.0	8.3

REMARKS:

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

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	68.2 PK	74.0	-5.8	1.96 H	162	70.4	-2.2
2	2390.00	51.3 AV	54.0	-2.7	1.96 H	162	53.5	-2.2
3	*2412.00	117.2 PK			1.96 H	162	119.5	-2.3
4	*2412.00	106.3 AV			1.96 H	162	108.6	-2.3
5	4824.00	46.9 PK	74.0	-27.1	2.23 H	245	45.2	1.7
6	4824.00	44.1 AV	54.0	-9.9	2.23 H	245	42.4	1.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.2 PK	74.0	-2.8	1.86 V	49	73.4	-2.2
2	2390.00	53.8 AV	54.0	-0.2	1.86 V	49	56.0	-2.2
3	*2412.00	118.1 PK			1.86 V	49	120.4	-2.3
4	*2412.00	107.6 AV			1.86 V	49	109.9	-2.3
5	4824.00	44.6 PK	74.0	-29.4	2.06 V	54	42.9	1.7
6	4824.00	41.2 AV	54.0	-12.8	2.06 V	54	39.5	1.7

REMARKS:

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

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	2390.00	60.2 PK	74.0	-13.8	1.69 H	146	62.4	-2.2
2	2390.00	45.9 AV	54.0	-8.1	1.69 H	146	48.1	-2.2
3	*2437.00	119.3 PK			1.69 H	146	121.7	-2.4
4	*2437.00	108.9 AV			1.69 H	146	111.3	-2.4
5	2483.50	62.2 PK	74.0	-11.8	1.69 H	146	64.5	-2.3
6	2483.50	48.1 AV	54.0	-5.9	1.69 H	146	50.4	-2.3
7	4874.00	50.2 PK	74.0	-23.8	2.16 H	201	48.5	1.7
8	4874.00	48.0 AV	54.0	-6.0	2.16 H	201	46.3	1.7
9	7311.00	44.2 PK	74.0	-29.8	1.71 H	128	36.0	8.2
10	7311.00	32.3 AV	54.0	-21.7	1.71 H	128	24.1	8.2
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	62.6 PK	74.0	-11.4	1.86 V	49	64.8	-2.2
2	2390.00	48.2 AV	54.0	-5.8	1.86 V	49	50.4	-2.2
3	*2437.00	120.4 PK			1.86 V	49	122.8	-2.4
4	*2437.00	109.8 AV			1.86 V	49	112.2	-2.4
5	2483.50	64.1 PK	74.0	-9.9	1.86 V	49	66.4	-2.3
6	2483.50	50.0 AV	54.0	-4.0	1.86 V	49	52.3	-2.3
7	4874.00	46.2 PK	74.0	-27.8	2.19 V	42	44.5	1.7
8	4874.00	43.8 AV	54.0	-10.2	2.19 V	42	42.1	1.7
9	7311.00	43.9 PK	74.0	-30.1	1.52 V	188	35.7	8.2
10	7311.00	32.7 AV	54.0	-21.3	1.52 V	188	24.5	8.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	116.2 PK			2.16 H	192	118.6	-2.4
2	*2462.00	106.1 AV			2.16 H	192	108.5	-2.4
3	2483.50	71.4 PK	74.0	-2.6	2.16 H	192	73.7	-2.3
4	2483.50	51.3 AV	54.0	-2.7	2.16 H	192	53.6	-2.3
5	4924.00	47.3 PK	74.0	-26.7	2.41 H	228	45.5	1.8
6	4924.00	45.6 AV	54.0	-8.4	2.41 H	228	43.8	1.8
7	7386.00	44.5 PK	74.0	-29.5	1.63 H	131	36.2	8.3
8	7386.00	32.8 AV	54.0	-21.2	1.63 H	131	24.5	8.3
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	117.3 PK			1.74 V	1	119.7	-2.4
2	*2462.00	107.5 AV			1.74 V	1	109.9	-2.4
3	2483.50	73.8 PK	74.0	-0.2	1.74 V	1	76.1	-2.3
4	2483.50	53.6 AV	54.0	-0.4	1.74 V	1	55.9	-2.3
5	4924.00	44.1 PK	74.0	-29.9	2.23 V	42	42.3	1.8
6	4924.00	41.9 AV	54.0	-12.1	2.23 V	42	40.1	1.8
7	7386.00	44.8 PK	74.0	-29.2	1.55 V	196	36.5	8.3
8	7386.00	33.6 AV	54.0	-20.4	1.55 V	196	25.3	8.3

REMARKS:

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

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	68.0 PK	74.0	-6.0	1.95 H	164	70.2	-2.2
2	2390.00	51.2 AV	54.0	-2.8	1.95 H	164	53.4	-2.2
3	*2412.00	118.2 PK			1.95 H	164	120.5	-2.3
4	*2412.00	105.1 AV			1.95 H	164	107.4	-2.3
5	4824.00	46.9 PK	74.0	-27.1	2.27 H	255	45.2	1.7
6	4824.00	43.9 AV	54.0	-10.1	2.27 H	255	42.2	1.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.6 PK	74.0	-0.4	1.69 V	113	75.8	-2.2
2	2390.00	53.6 AV	54.0	-0.4	1.69 V	113	55.8	-2.2
3	*2412.00	119.9 PK			1.69 V	113	122.2	-2.3
4	*2412.00	106.6 AV			1.69 V	113	108.9	-2.3
5	4824.00	44.6 PK	74.0	-29.4	2.04 V	60	42.9	1.7
6	4824.00	41.1 AV	54.0	-12.9	2.04 V	60	39.4	1.7

REMARKS:

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

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	2390.00	62.4 PK	74.0	-11.6	1.76 H	152	64.6	-2.2
2	2390.00	47.5 AV	54.0	-6.5	1.76 H	152	49.7	-2.2
3	*2437.00	119.6 PK			1.76 H	152	122.0	-2.4
4	*2437.00	109.0 AV			1.76 H	152	111.4	-2.4
5	2483.50	64.8 PK	74.0	-9.2	1.76 H	152	67.1	-2.3
6	2483.50	49.4 AV	54.0	-4.6	1.76 H	152	51.7	-2.3
7	4874.00	50.5 PK	74.0	-23.5	2.20 H	205	48.8	1.7
8	4874.00	48.3 AV	54.0	-5.7	2.20 H	205	46.6	1.7
9	7311.00	44.6 PK	74.0	-29.4	1.73 H	139	36.4	8.2
10	7311.00	32.8 AV	54.0	-21.2	1.73 H	139	24.6	8.2
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	64.6 PK	74.0	-9.4	1.88 V	109	66.8	-2.2
2	2390.00	49.6 AV	54.0	-4.4	1.88 V	109	51.8	-2.2
3	*2437.00	122.7 PK			1.88 V	109	125.1	-2.4
4	*2437.00	110.0 AV			1.88 V	109	112.4	-2.4
5	2483.50	66.6 PK	74.0	-7.4	1.88 V	109	68.9	-2.3
6	2483.50	51.3 AV	54.0	-2.7	1.88 V	109	53.6	-2.3
7	4874.00	46.0 PK	74.0	-28.0	2.21 V	33	44.3	1.7
8	4874.00	43.5 AV	54.0	-10.5	2.21 V	33	41.8	1.7
9	7311.00	44.1 PK	74.0	-29.9	1.51 V	196	35.9	8.2
10	7311.00	32.5 AV	54.0	-21.5	1.51 V	196	24.3	8.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	116.7 PK			1.92 H	172	119.1	-2.4
2	*2462.00	103.6 AV			1.92 H	172	106.0	-2.4
3	2483.50	71.5 PK	74.0	-2.5	1.92 H	172	73.8	-2.3
4	2483.50	51.2 AV	54.0	-2.8	1.92 H	172	53.5	-2.3
5	4924.00	47.3 PK	74.0	-26.7	2.40 H	217	45.5	1.8
6	4924.00	43.9 AV	54.0	-10.1	2.40 H	217	42.1	1.8
7	7386.00	44.3 PK	74.0	-29.7	1.61 H	120	36.0	8.3
8	7386.00	33.2 AV	54.0	-20.8	1.61 H	120	24.9	8.3
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	118.0 PK			1.69 V	358	120.4	-2.4
2	*2462.00	104.8 AV			1.69 V	358	107.2	-2.4
3	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**1.69 V**	**358**	**76.2**	**-2.3**
4	2483.50	53.7 AV	54.0	-0.3	1.69 V	358	56.0	-2.3
5	4924.00	45.4 PK	74.0	-28.6	2.21 V	31	43.6	1.8
6	4924.00	40.1 AV	54.0	-13.9	2.21 V	31	38.3	1.8
7	7386.00	44.5 PK	74.0	-29.5	1.51 V	209	36.2	8.3
8	7386.00	33.6 AV	54.0	-20.4	1.51 V	209	25.3	8.3

REMARKS:

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

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	67.6 PK	74.0	-6.4	2.36 H	179	69.8	-2.2
2	2390.00	50.8 AV	54.0	-3.2	2.36 H	179	53.0	-2.2
3	*2422.00	112.7 PK			2.36 H	179	115.0	-2.3
4	*2422.00	99.8 AV			2.36 H	179	102.1	-2.3
5	4844.00	47.1 PK	74.0	-26.9	2.46 H	196	45.5	1.6
6	4844.00	43.6 AV	54.0	-10.4	2.46 H	196	42.0	1.6
7	7266.00	43.9 PK	74.0	-30.1	1.91 H	65	35.7	8.2
8	7266.00	33.0 AV	54.0	-21.0	1.91 H	65	24.8	8.2
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	66.5 PK	74.0	-7.5	2.04 V	109	68.7	-2.2
2	2390.00	53.7 AV	54.0	-0.3	2.04 V	109	55.9	-2.2
3	*2422.00	114.5 PK			2.04 V	109	116.8	-2.3
4	*2422.00	101.5 AV			2.04 V	109	103.8	-2.3
5	4844.00	45.3 PK	74.0	-28.7	2.18 V	41	43.7	1.6
6	4844.00	40.3 AV	54.0	-13.7	2.18 V	41	38.7	1.6
7	7266.00	44.5 PK	74.0	-29.5	1.66 V	187	36.3	8.2
8	7266.00	32.9 AV	54.0	-21.1	1.66 V	187	24.7	8.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	2390.00	67.8 PK	74.0	-6.2	1.68 H	144	70.0	-2.2
2	2390.00	51.6 AV	54.0	-2.4	1.68 H	144	53.8	-2.2
3	*2437.00	116.0 PK			1.68 H	144	118.4	-2.4
4	*2437.00	103.2 AV			1.68 H	144	105.6	-2.4
5	2483.50	67.3 PK	74.0	-6.7	1.68 H	144	69.6	-2.3
6	2483.50	50.9 AV	54.0	-3.1	1.68 H	144	53.2	-2.3
7	2487.10	67.2 PK	74.0	-6.8	1.68 H	144	69.5	-2.3
8	2487.10	51.2 AV	54.0	-2.8	1.68 H	144	53.5	-2.3
9	4874.00	50.1 PK	74.0	-23.9	2.14 H	219	48.4	1.7
10	4874.00	46.9 AV	54.0	-7.1	2.14 H	219	45.2	1.7
11	7311.00	44.7 PK	74.0	-29.3	1.69 H	126	36.5	8.2
12	7311.00	33.0 AV	54.0	-21.0	1.69 H	126	24.8	8.2
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	69.2 PK	74.0	-4.8	2.04 V	109	71.4	-2.2
2	2390.00	53.8 AV	54.0	-0.2	2.04 V	109	56.0	-2.2
3	*2437.00	117.7 PK			2.04 V	109	120.1	-2.4
4	*2437.00	104.9 AV			2.04 V	109	107.3	-2.4
5	2483.50	69.4 PK	74.0	-4.6	2.04 V	109	71.7	-2.3
6	2483.50	52.2 AV	54.0	-1.8	2.04 V	109	54.5	-2.3
7	2487.10	68.2 PK	74.0	-5.8	2.04 V	109	70.5	-2.3
8	2487.10	53.6 AV	54.0	-0.4	2.04 V	109	55.9	-2.3
9	4874.00	48.6 PK	74.0	-25.4	2.18 V	16	46.9	1.7
10	4874.00	42.2 AV	54.0	-11.8	2.18 V	16	40.5	1.7
11	7311.00	43.9 PK	74.0	-30.1	1.46 V	204	35.7	8.2
12	7311.00	33.1 AV	54.0	-20.9	1.46 V	204	24.9	8.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	2390.00	60.1 PK	74.0	-13.9	2.40 H	169	62.3	-2.2
2	2390.00	47.3 AV	54.0	-6.7	2.40 H	169	49.5	-2.2
3	*2452.00	113.2 PK			2.40 H	169	115.6	-2.4
4	*2452.00	100.0 AV			2.40 H	169	102.4	-2.4
5	2483.50	66.9 PK	74.0	-7.1	2.40 H	169	69.2	-2.3
6	2483.50	51.7 AV	54.0	-2.3	2.40 H	169	54.0	-2.3
7	4904.00	47.3 PK	74.0	-26.7	2.51 H	212	45.5	1.8
8	4904.00	43.7 AV	54.0	-10.3	2.51 H	212	41.9	1.8
9	7356.00	44.1 PK	74.0	-29.9	1.96 H	64	35.9	8.2
10	7356.00	33.0 AV	54.0	-21.0	1.96 H	64	24.8	8.2
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	61.5 PK	74.0	-12.5	1.93 V	107	63.7	-2.2
2	2390.00	48.6 AV	54.0	-5.4	1.93 V	107	50.8	-2.2
3	*2452.00	115.0 PK			1.93 V	107	117.4	-2.4
4	*2452.00	101.7 AV			1.93 V	107	104.1	-2.4
5	2483.50	68.2 PK	74.0	-5.8	1.93 V	107	70.5	-2.3
6	2483.50	53.8 AV	54.0	-0.2	1.93 V	107	56.1	-2.3
7	4904.00	45.5 PK	74.0	-28.5	2.17 V	47	43.7	1.8
8	4904.00	40.7 AV	54.0	-13.3	2.17 V	47	38.9	1.8
9	7356.00	44.1 PK	74.0	-29.9	1.65 V	175	35.9	8.2
10	7356.00	32.5 AV	54.0	-21.5	1.65 V	175	24.3	8.2

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

Below 1GHz Data:

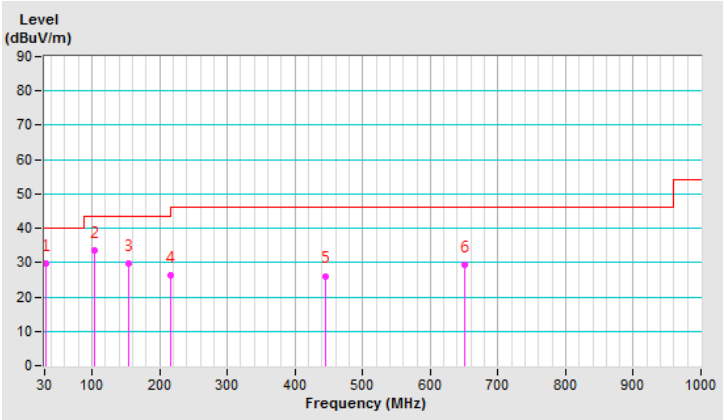
802.11ax (HE20)

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

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	31.25	29.8 QP	40.0	-10.2	1.00 H	12	39.5	-9.7
2	102.85	33.7 QP	43.5	-9.8	3.00 H	300	45.3	-11.6
3	154.28	29.8 QP	43.5	-13.7	2.00 H	141	37.6	-7.8
4	216.95	26.2 QP	46.0	-19.8	1.00 H	99	36.5	-10.3
5	445.89	26.1 QP	46.0	-19.9	2.00 H	313	28.7	-2.6
6	650.00	29.4 QP	46.0	-16.6	1.00 H	96	27.9	1.5

REMARKS:

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

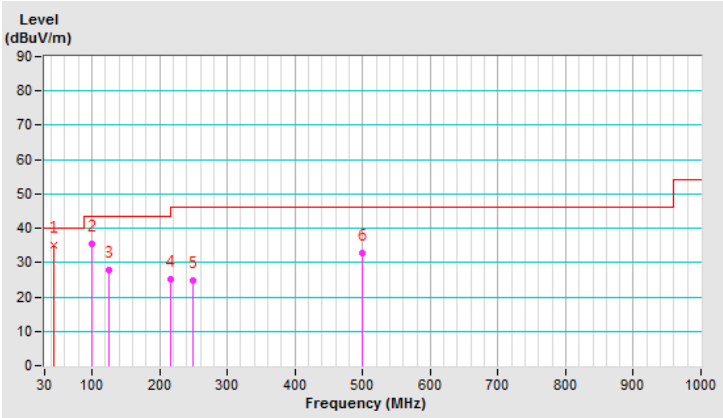


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	43.39	35.0 QP	40.0	-5.0	1.00 V	198	43.4	-8.4
2	99.16	35.4 QP	43.5	-8.1	1.00 V	273	47.5	-12.1
3	125.01	27.7 QP	43.5	-15.8	1.50 V	180	37.1	-9.4
4	215.44	25.0 QP	43.5	-18.5	1.00 V	187	35.3	-10.3
5	250.04	24.7 QP	46.0	-21.3	1.00 V	151	33.4	-8.7
6	500.01	32.8 QP	46.0	-13.2	1.00 V	0	34.6	-1.8

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2018	Oct. 23, 2019
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 22, 2018	Oct. 21, 2019
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 17, 2019	Mar. 16, 2020
50 ohms Terminator	N/A	3	Oct. 22, 2018	Oct. 21, 2019
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 14, 2019	Mar. 13, 2020
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Apr. 29, 2019

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.

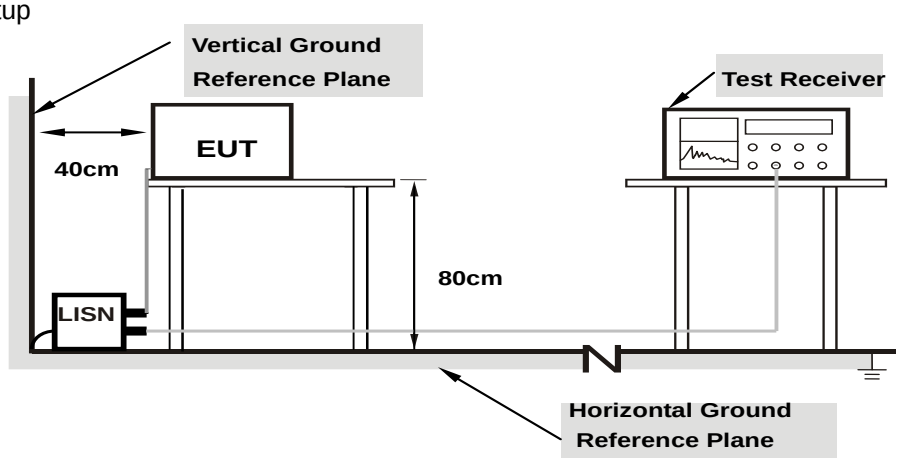
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

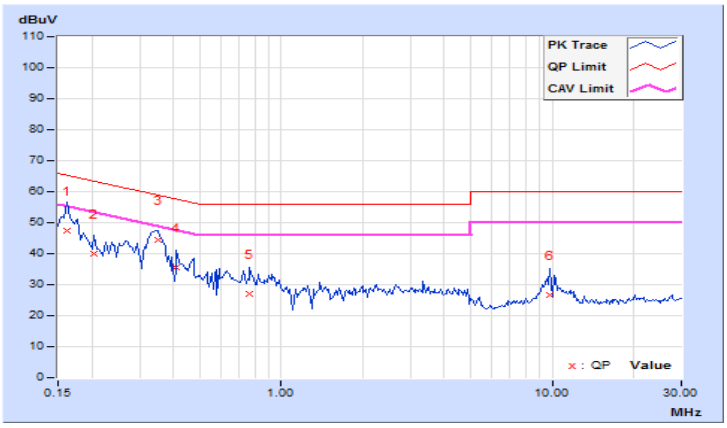
4.2.7 Test Results

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

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	0.16172	10.03	37.31	23.96	47.34	33.99	65.38	55.38	-18.04	-21.39
2	0.20469	10.05	29.81	15.32	39.86	25.37	63.42	53.42	-23.56	-28.05
3	0.35313	10.07	34.34	24.09	44.41	34.16	58.89	48.89	-14.48	-14.73
4	0.41172	10.08	25.41	11.64	35.49	21.72	57.61	47.61	-22.12	-25.89
5	0.76719	10.11	16.93	6.23	27.04	16.34	56.00	46.00	-28.96	-29.66
6	9.78516	10.69	16.12	10.40	26.81	21.09	60.00	50.00	-33.19	-28.91

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.

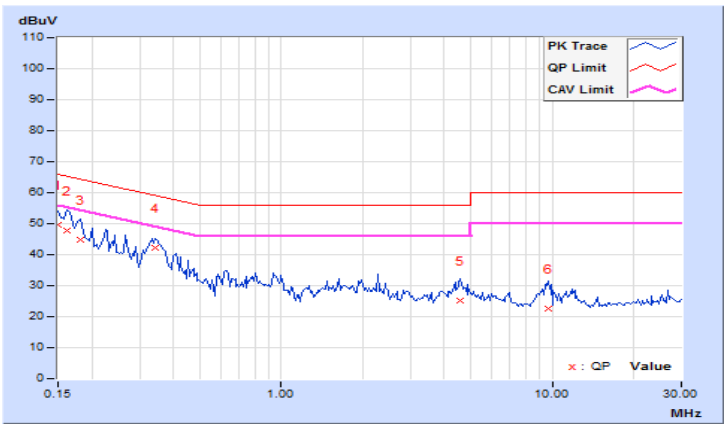


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	9.94	39.59	22.59	49.53	32.53	66.00	56.00	-16.47	-23.47
2	0.16172	9.94	37.92	23.46	47.86	33.40	65.38	55.38	-17.52	-21.98
3	0.18125	9.95	34.74	19.42	44.69	29.37	64.43	54.43	-19.74	-25.06
4	**0.34141**	**9.97**	**32.39**	**28.44**	**42.36**	**38.41**	**59.17**	**49.17**	**-16.81**	**-10.76**
5	4.58594	10.21	14.80	7.60	25.01	17.81	56.00	46.00	-30.99	-28.19
6	9.62500	10.51	11.96	6.27	22.47	16.78	60.00	50.00	-37.53	-33.22

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.

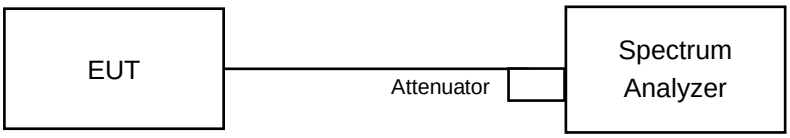


4.3 6dB Bandwidth Measurement

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 from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	7.07	7.05	6.62	7.56	0.5	Pass
6	2437	7.05	7.07	7.59	7.09	0.5	Pass
11	2462	7.09	6.60	7.05	7.14	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	15.81	15.84	15.85	16.44	0.5	Pass
6	2437	15.82	16.43	16.41	16.43	0.5	Pass
11	2462	16.43	15.84	15.80	16.46	0.5	Pass

802.11ax (HE20)

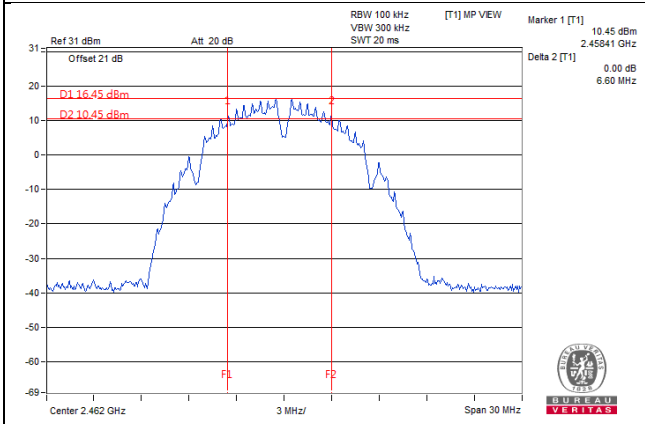
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	17.46	17.14	18.89	19.14	0.5	Pass
6	2437	18.78	18.63	18.36	18.97	0.5	Pass
11	2462	19.05	18.92	18.85	19.18	0.5	Pass

802.11ax (HE40)

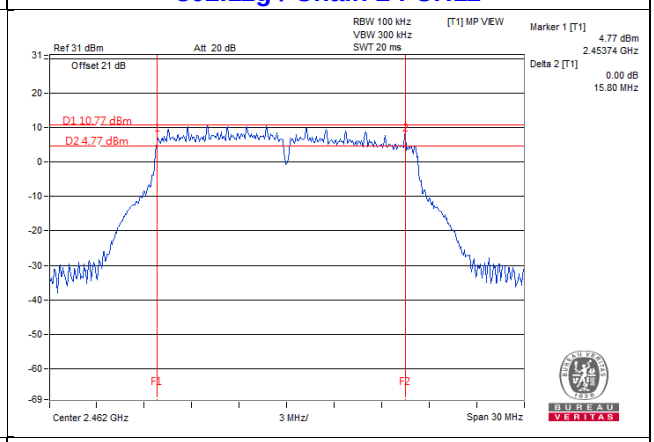
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	35.21	37.39	37.47	36.98	0.5	Pass
6	2437	36.42	36.55	36.81	35.31	0.5	Pass
9	2452	37.60	35.28	35.32	36.56	0.5	Pass

Spectrum Plot of Worst Value

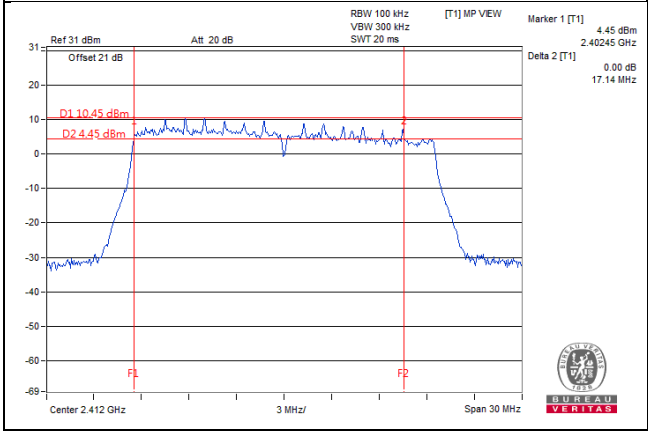
802.11b / Chain 1 : CH11



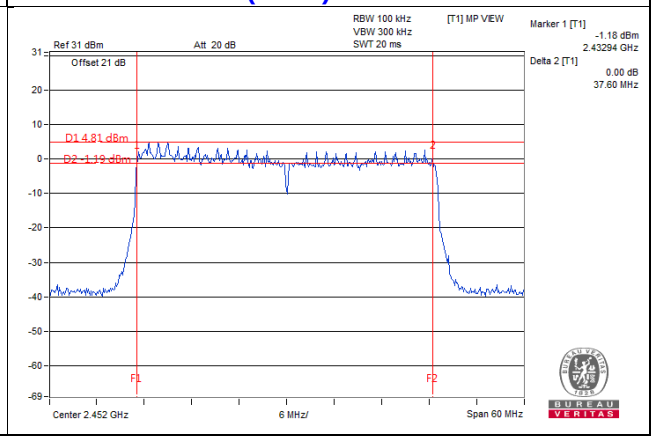
802.11g / Chain 2 : CH11



802.11ax (HE20) / Chain 1 : CH1



802.11ax (HE40) / Chain 0 : CH3



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

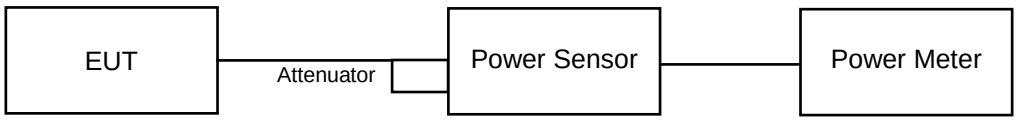
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Non-Beamforming Mode

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	23.79	23.86	23.86	23.76	963.456	29.84	30.00	Pass
6	2437	23.88	23.78	23.79	23.89	967.362	29.86	30.00	Pass
11	2462	23.70	23.83	23.90	23.88	965.783	29.85	30.00	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.03	21.05	20.63	21.02	496.2	26.96	30.00	Pass
6	2437	23.86	23.73	23.64	23.73	946.522	29.76	30.00	Pass
11	2462	21.63	21.98	21.54	21.77	596.182	27.75	30.00	Pass

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.01	20.79	20.31	20.70	471.022	26.73	30.00	Pass
6	2437	23.85	23.78	23.71	23.65	948.144	29.77	30.00	Pass
11	2462	20.11	20.19	20.11	20.32	417.249	26.20	30.00	Pass

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	17.83	18.41	18.20	18.61	268.697	24.29	30.00	Pass
6	2437	22.02	22.00	21.89	21.98	629.996	27.99	30.00	Pass
9	2452	17.85	17.90	18.21	18.24	255.517	24.07	30.00	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.12	20.91	20.45	20.84	484.986	26.86	30.00	Pass
6	2437	24.01	23.93	23.86	23.78	980.941	29.92	30.00	Pass
11	2462	20.23	20.35	20.25	20.48	431.443	26.35	30.00	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	17.98	18.54	18.33	18.78	277.842	24.44	30.00	Pass
6	2437	22.17	22.18	22.02	22.14	652.915	28.15	30.00	Pass
9	2452	17.90	18.01	18.38	18.39	262.79	24.20	30.00	Pass

Beamforming Mode

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.01	20.79	20.31	20.70	471.022	26.73	28.76	Pass
6	2437	22.63	22.50	22.40	22.34	706.235	28.49	28.76	Pass
11	2462	20.11	20.19	20.11	20.32	417.249	26.20	28.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power limit shall be reduced to 30-(7.24-6) = 28.76dBm.

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	17.83	18.41	18.20	18.61	268.697	24.29	28.76	Pass
6	2437	22.02	22.00	21.89	21.98	629.996	27.99	28.76	Pass
9	2452	17.85	17.90	18.21	18.24	255.517	24.07	28.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power limit shall be reduced to 30-(7.24-6) = 28.76dBm.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.12	20.91	20.45	20.84	484.986	26.86	28.76	Pass
6	2437	22.84	22.70	22.63	22.54	741.222	28.70	28.76	Pass
11	2462	20.23	20.35	20.25	20.48	431.443	26.35	28.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power limit shall be reduced to 30-(7.24-6) = 28.76dBm.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	17.98	18.54	18.33	18.78	277.842	24.44	28.76	Pass
6	2437	22.17	22.18	22.02	22.14	652.915	28.15	28.76	Pass
9	2452	17.90	18.01	18.38	18.39	262.79	24.20	28.76	Pass

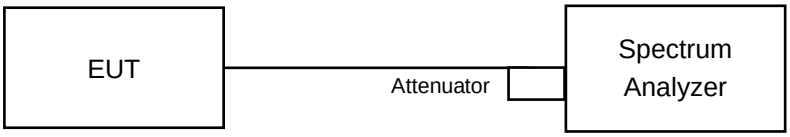
Note: 1. Directional gain = 7.24dBi > 6dBi , so the power limit shall be reduced to 30-(7.24-6) = 28.76dBm.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11b, 802.11g

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.

802.11ax (HE20), 802.11ax (HE40)

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

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=4) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-5.89	6.02	0.13	6.76	Pass
	6	2437	-6.24	6.02	-0.22	6.76	Pass
	11	2462	-6.09	6.02	-0.07	6.76	Pass
1	1	2412	-5.96	6.02	0.06	6.76	Pass
	6	2437	-6.19	6.02	-0.17	6.76	Pass
	11	2462	-6.13	6.02	-0.11	6.76	Pass
2	1	2412	-6.42	6.02	-0.40	6.76	Pass
	6	2437	-6.73	6.02	-0.71	6.76	Pass
	11	2462	-5.74	6.02	0.28	6.76	Pass
3	1	2412	-5.64	6.02	0.38	6.76	Pass
	6	2437	-6.51	6.02	-0.49	6.76	Pass
	11	2462	-6.88	6.02	-0.86	6.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power density limit shall be reduced to 8-(7.24-6) = 6.76dBm.

802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=4) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-8.96	6.02	-2.94	6.76	Pass
	6	2437	-6.97	6.02	-0.95	6.76	Pass
	11	2462	-9.37	6.02	-3.35	6.76	Pass
1	1	2412	-9.61	6.02	-3.59	6.76	Pass
	6	2437	-6.55	6.02	-0.53	6.76	Pass
	11	2462	-7.37	6.02	-1.35	6.76	Pass
2	1	2412	-8.42	6.02	-2.40	6.76	Pass
	6	2437	-7.43	6.02	-1.41	6.76	Pass
	11	2462	-9.19	6.02	-3.17	6.76	Pass
3	1	2412	-10.58	6.02	-4.56	6.76	Pass
	6	2437	-7.97	6.02	-1.95	6.76	Pass
	11	2462	-8.36	6.02	-2.34	6.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power density limit shall be reduced to 8-(7.24-6) = 6.76dBm.

802.11ax (HE20)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=4) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-10.17	6.02	0.09	-4.06	6.76	Pass
	6	2437	-8.20	6.02	0.09	-2.09	6.76	Pass
	11	2462	-12.53	6.02	0.09	-6.42	6.76	Pass
1	1	2412	-10.47	6.02	0.09	-4.36	6.76	Pass
	6	2437	-7.28	6.02	0.09	-1.17	6.76	Pass
	11	2462	-11.23	6.02	0.09	-5.12	6.76	Pass
2	1	2412	-9.24	6.02	0.09	-3.13	6.76	Pass
	6	2437	-7.97	6.02	0.09	-1.86	6.76	Pass
	11	2462	-11.94	6.02	0.09	-5.83	6.76	Pass
3	1	2412	-11.97	6.02	0.09	-5.86	6.76	Pass
	6	2437	-8.13	6.02	0.09	-2.02	6.76	Pass
	11	2462	-10.45	6.02	0.09	-4.34	6.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power density limit shall be reduced to 8-(7.24-6) = 6.76dBm.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

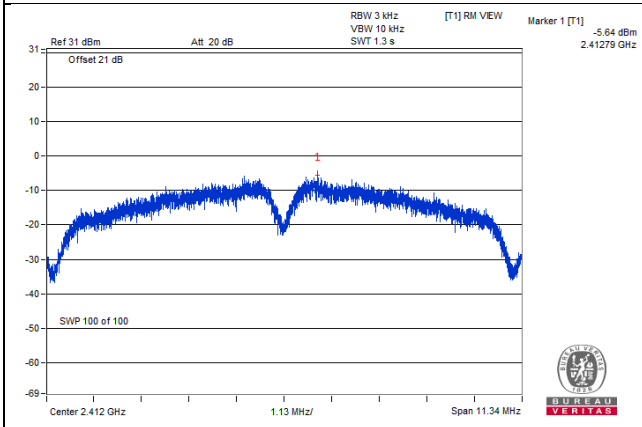
TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=4) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-16.10	6.02	0.15	-9.90	6.76	Pass
	6	2437	-12.34	6.02	0.15	-6.14	6.76	Pass
	9	2452	-16.84	6.02	0.15	-10.64	6.76	Pass
1	3	2422	-14.89	6.02	0.15	-8.69	6.76	Pass
	6	2437	-11.46	6.02	0.15	-5.26	6.76	Pass
	9	2452	-15.61	6.02	0.15	-9.41	6.76	Pass
2	3	2422	-15.21	6.02	0.15	-9.01	6.76	Pass
	6	2437	-12.57	6.02	0.15	-6.37	6.76	Pass
	9	2452	-15.66	6.02	0.15	-9.46	6.76	Pass
3	3	2422	-16.12	6.02	0.15	-9.92	6.76	Pass
	6	2437	-12.53	6.02	0.15	-6.33	6.76	Pass
	9	2452	-14.74	6.02	0.15	-8.54	6.76	Pass

Note: 1. Directional gain = 7.24dBi > 6dBi , so the power density limit shall be reduced to 8-(7.24-6) = 6.76dBm.

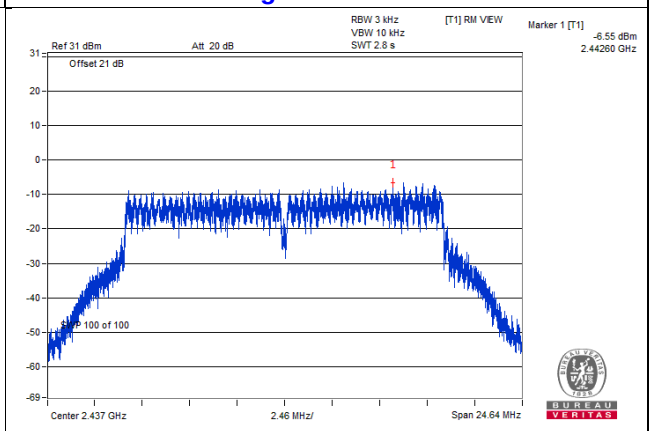
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

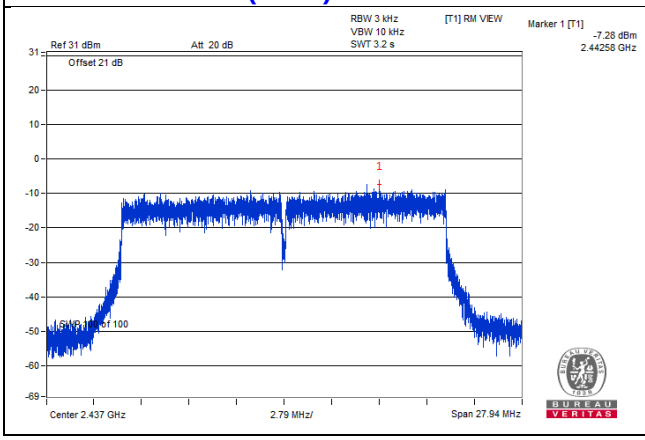
802.11b / Chain 3: CH1



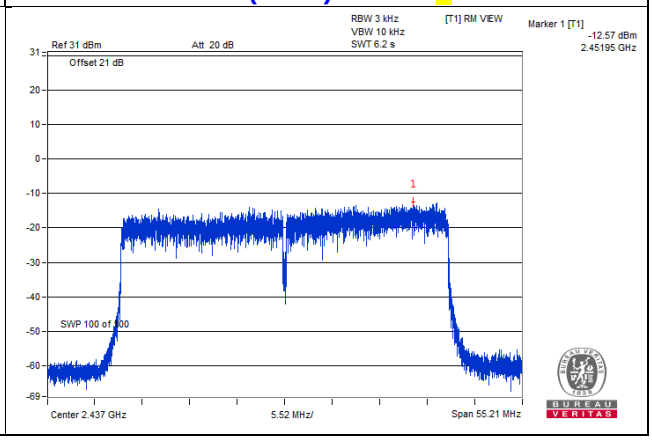
802.11g / Chain 1 : CH6



802.11ax (HE20) / Chain 1: CH6



802.11ax (HE40) / Chain 2: CH6

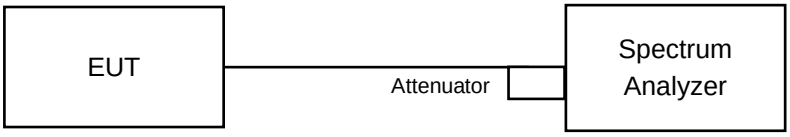


4.6 Conducted Out of Band Emission Measurement

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

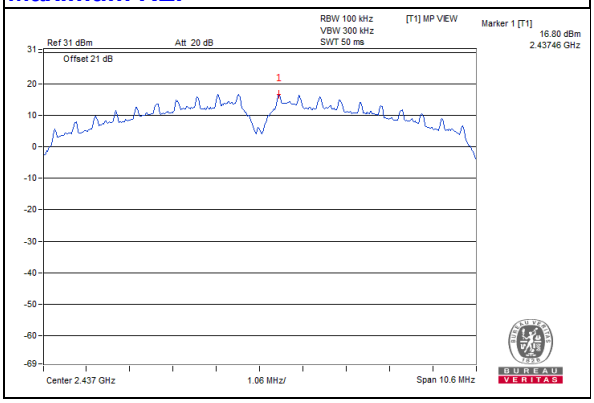
Same as Item 4.3.6

4.6.7 Test Results

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

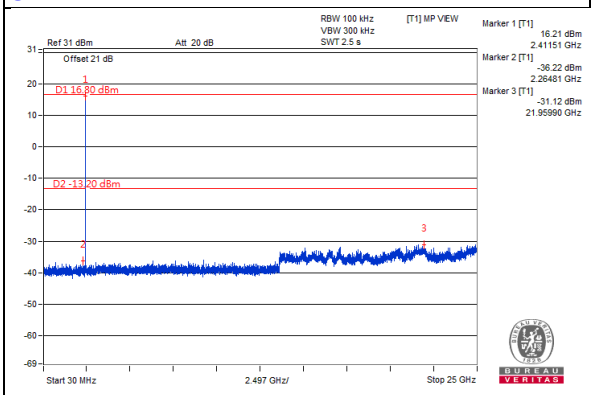
802.11b

Maximum REF

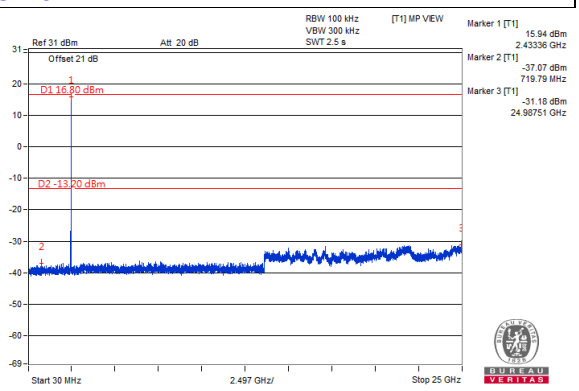


Chain 0

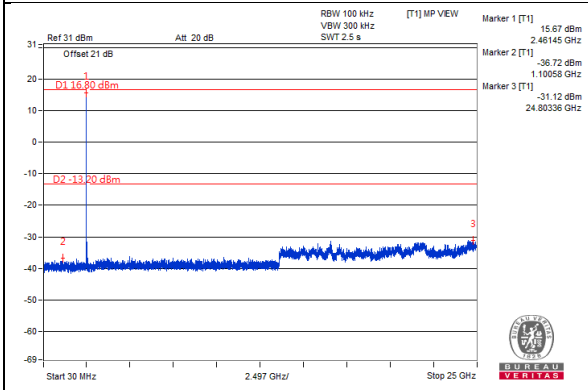
CH 1



CH 6



CH 11



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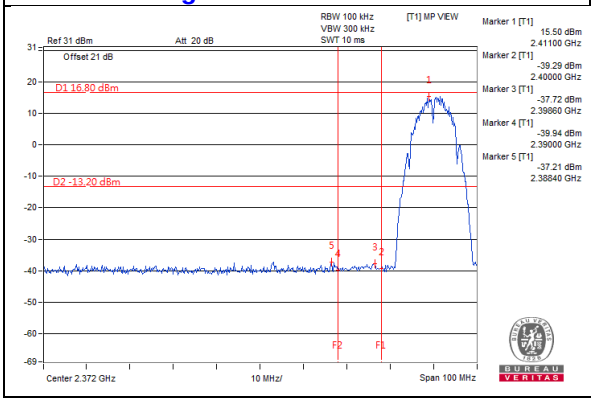

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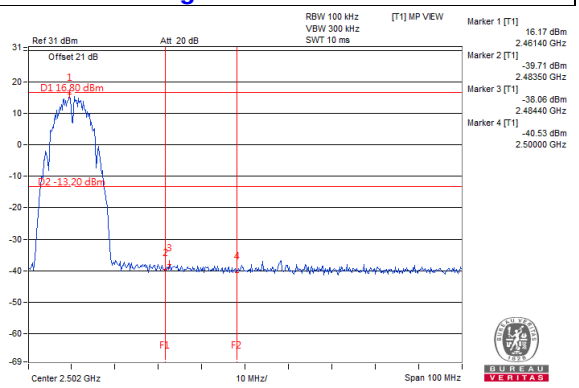
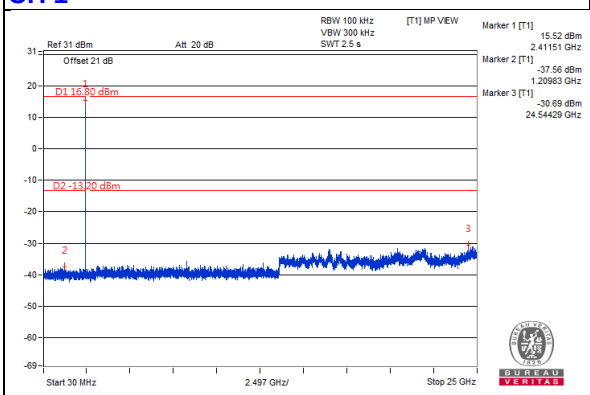


Chain 1

CH 1



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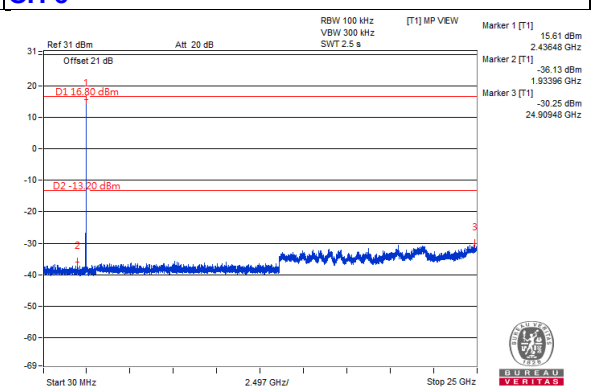

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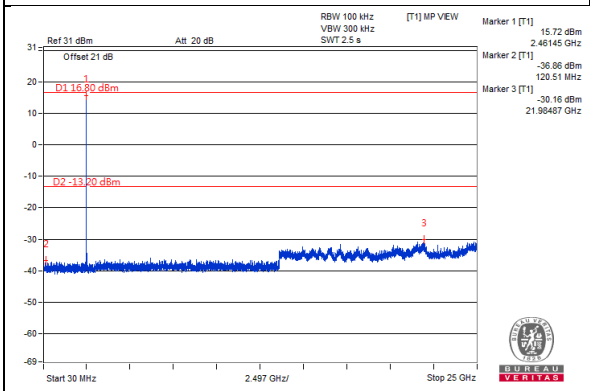

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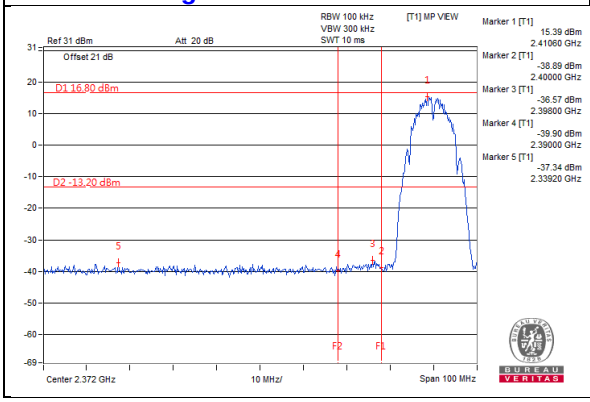

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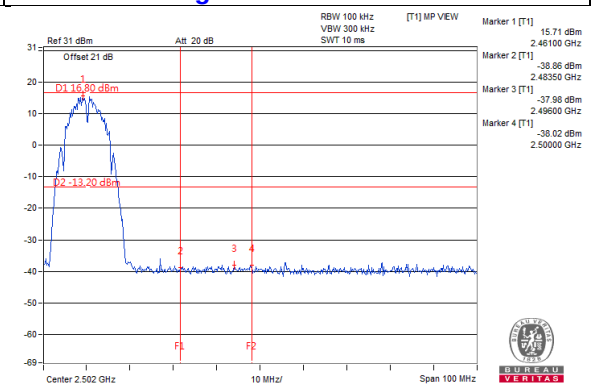

Chain 2

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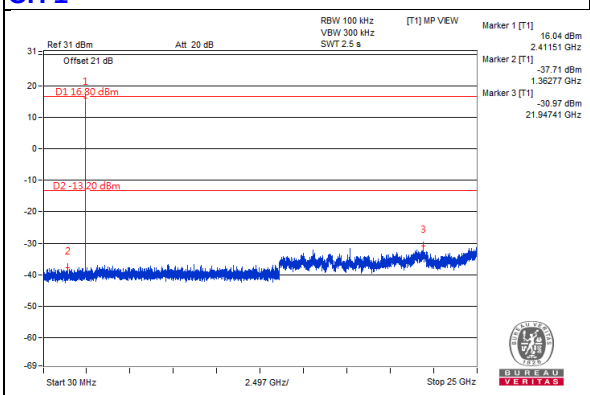

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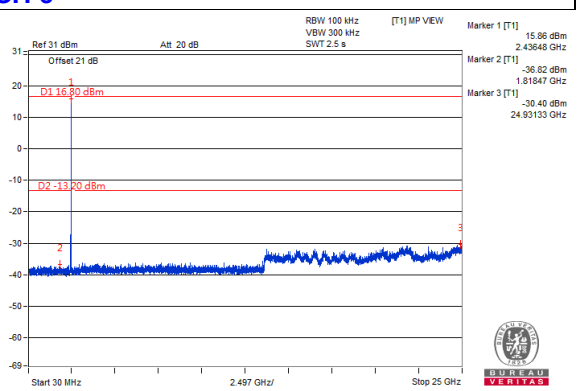

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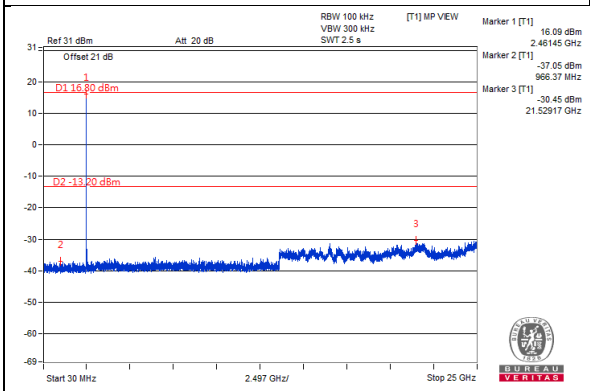

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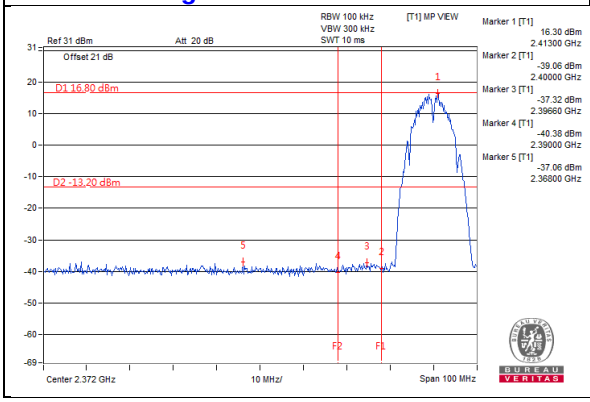

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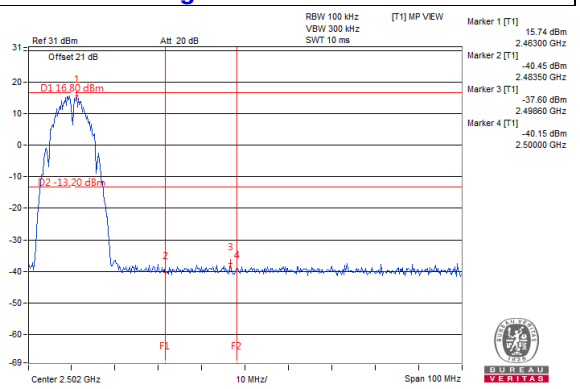
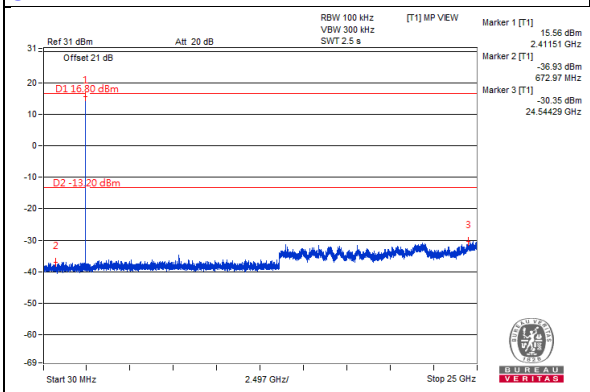


Chain 3

CH 1



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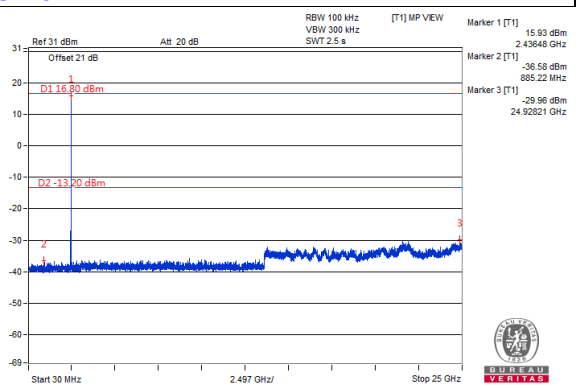

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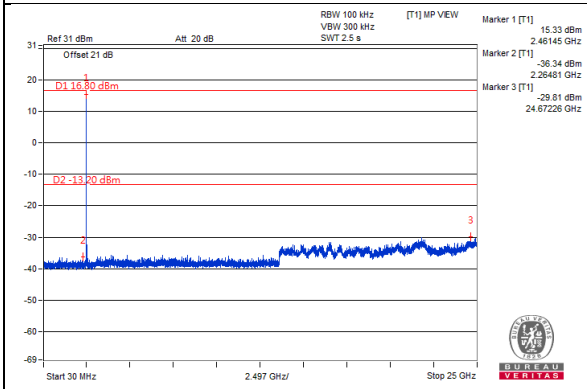

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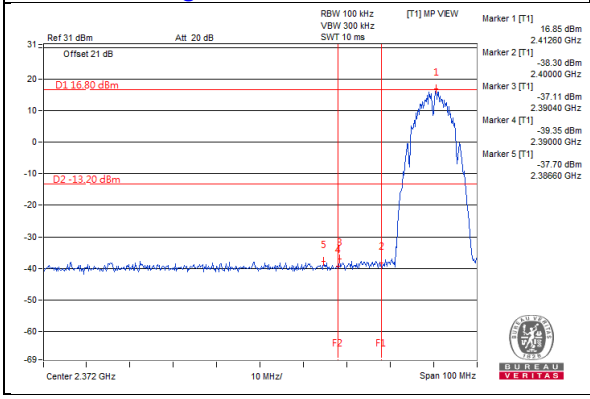

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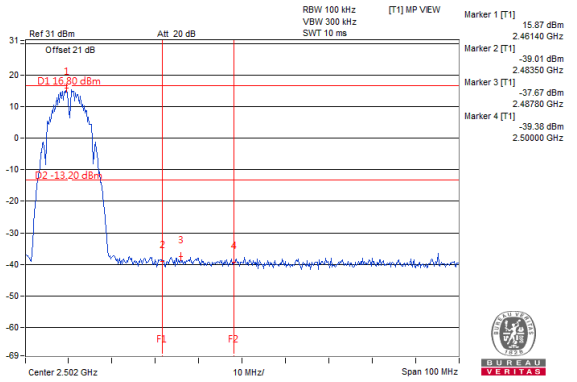

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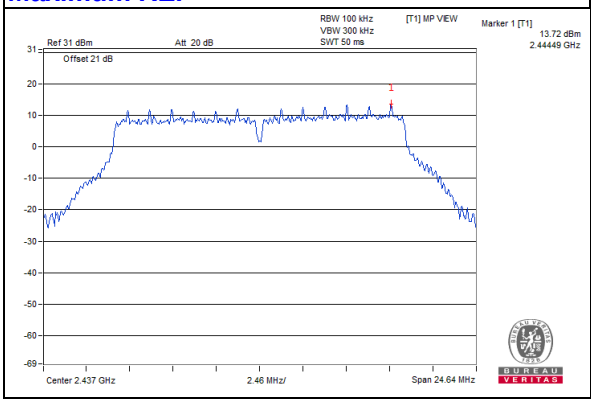
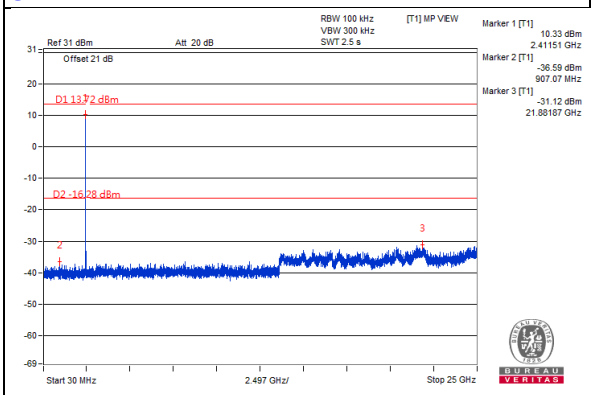
Maximum REF



Chain 0

CH 1



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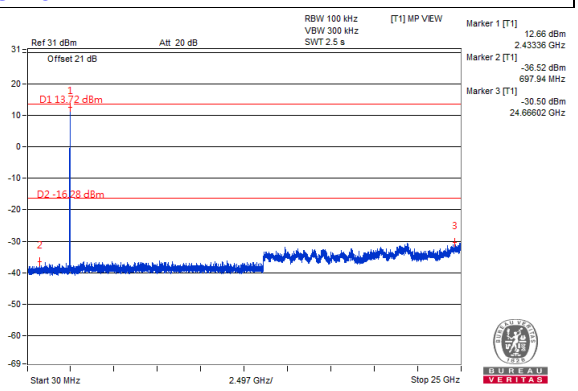

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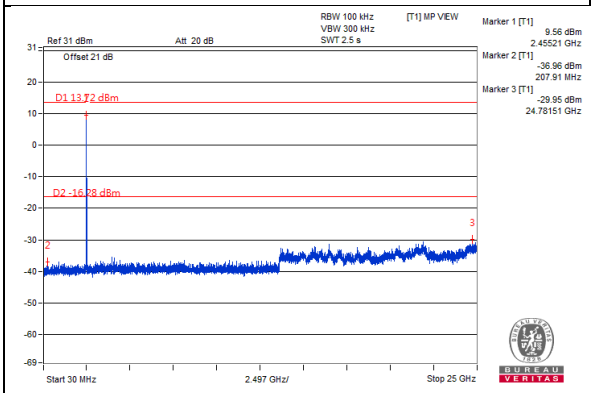

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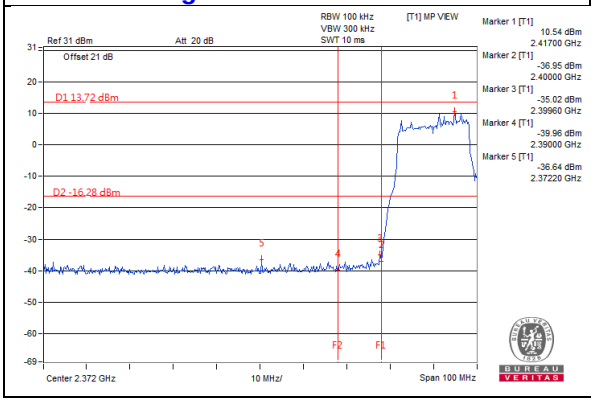

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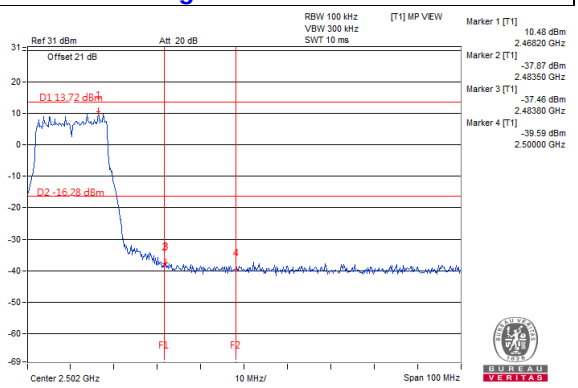

Chain 1

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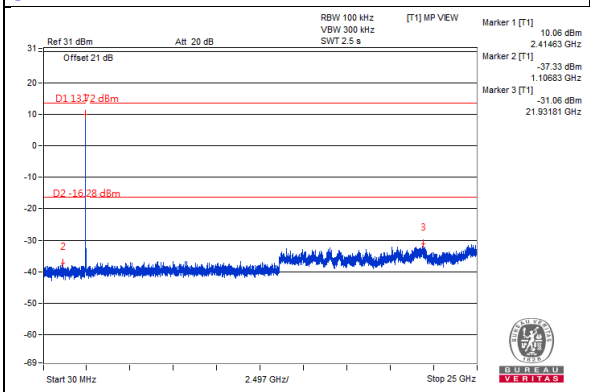

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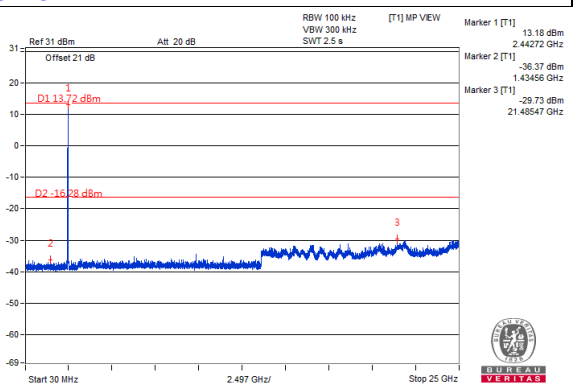

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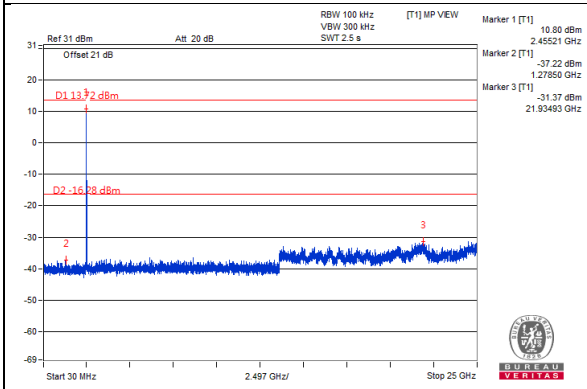

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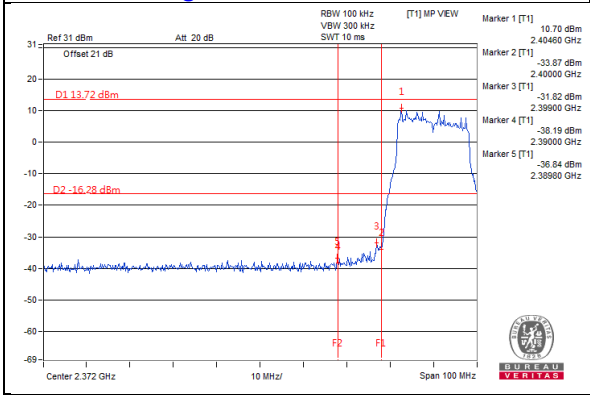

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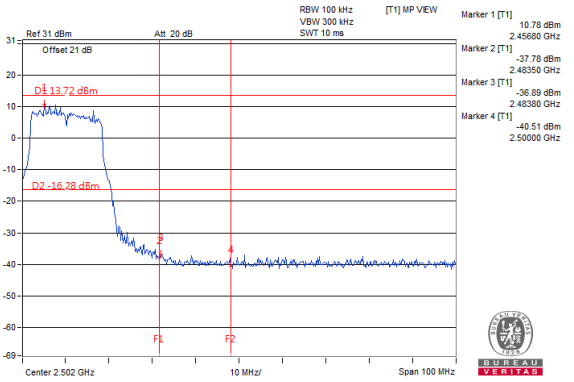
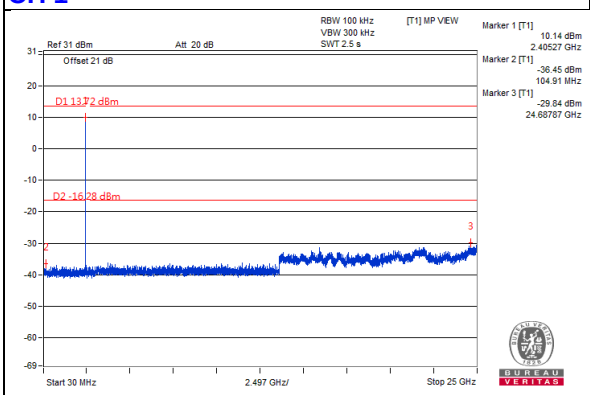


Chain 2

CH 1



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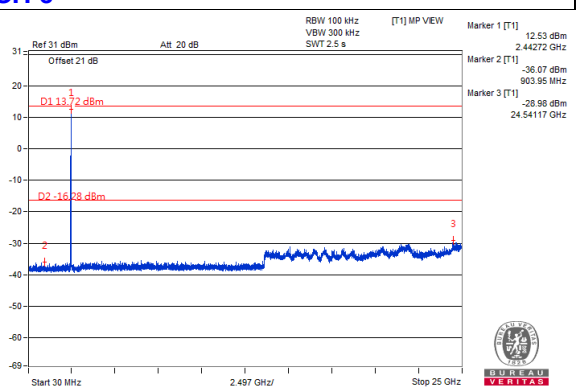

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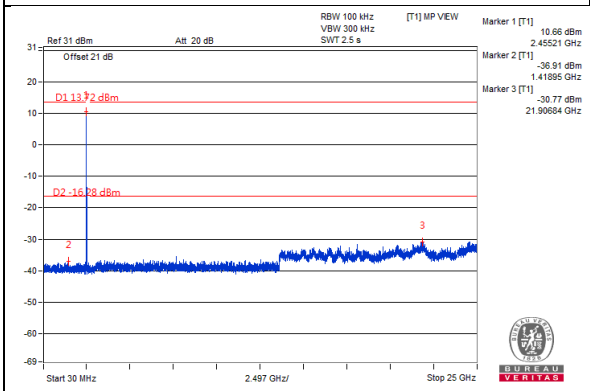

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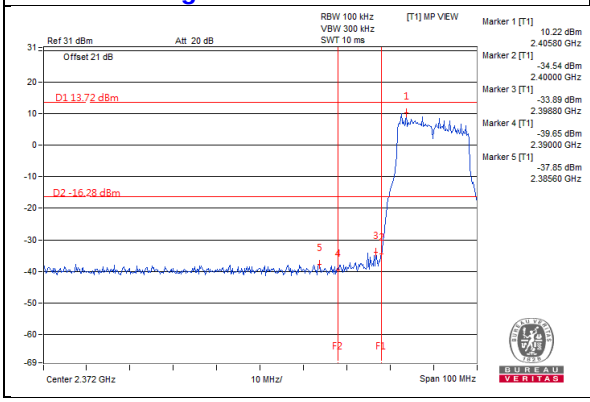

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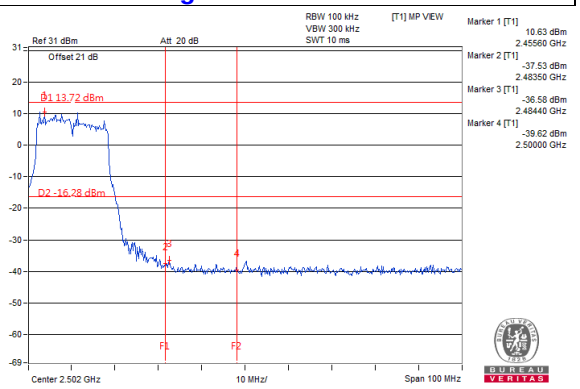
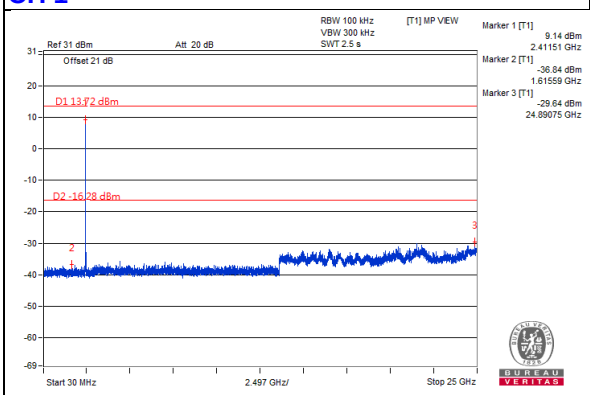
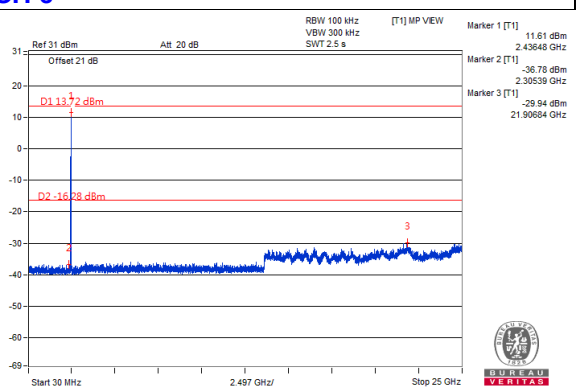


Chain 3

CH 1



CH 6



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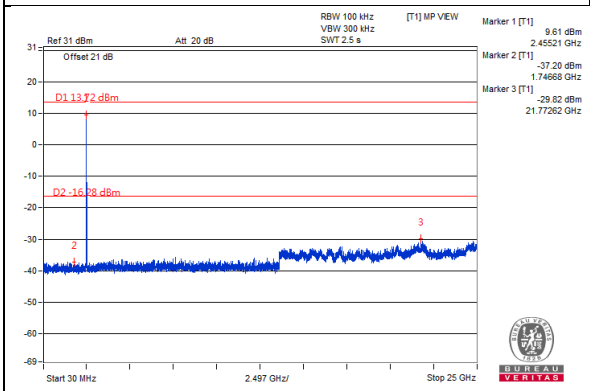

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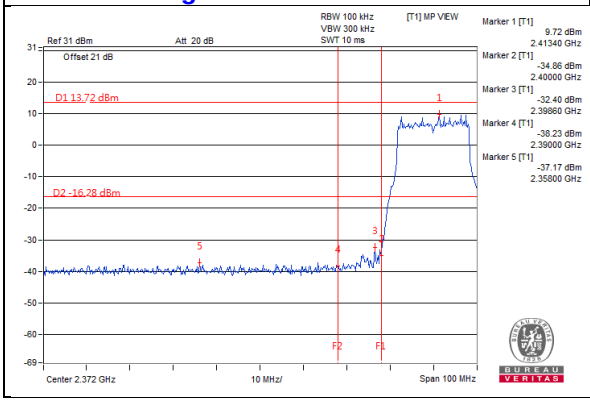
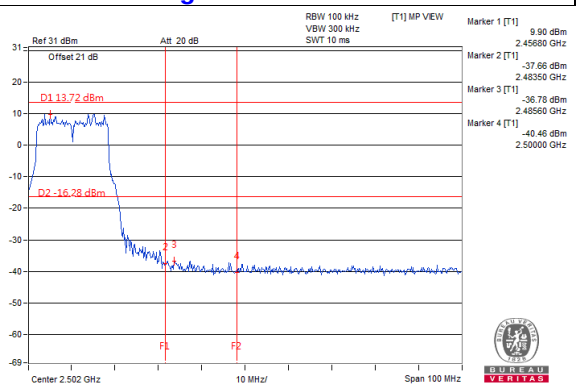
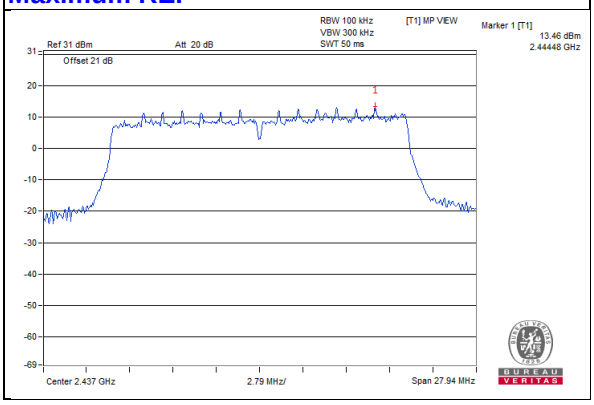


CH 11 Band edge



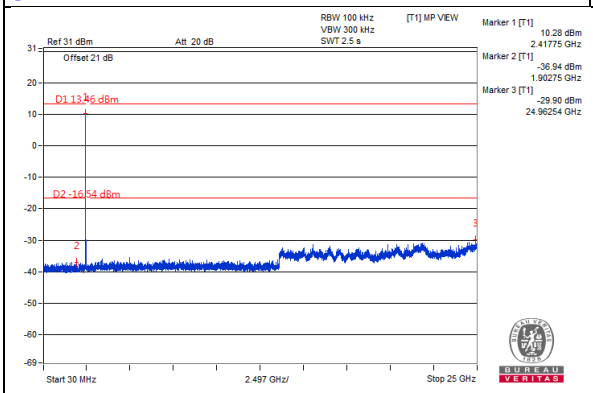
802.11ax (HE20)

Maximum REF



Chain 0

CH 1



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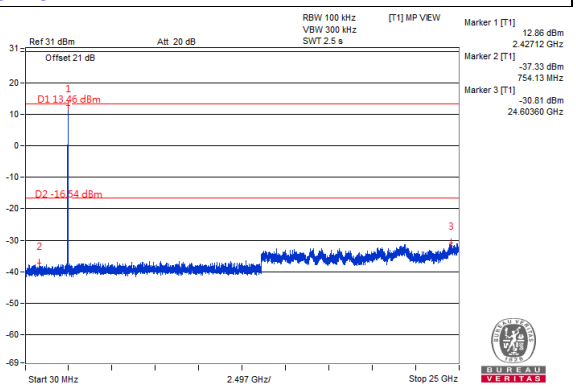

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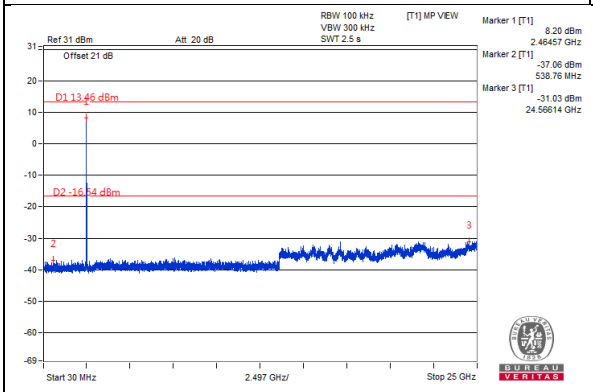

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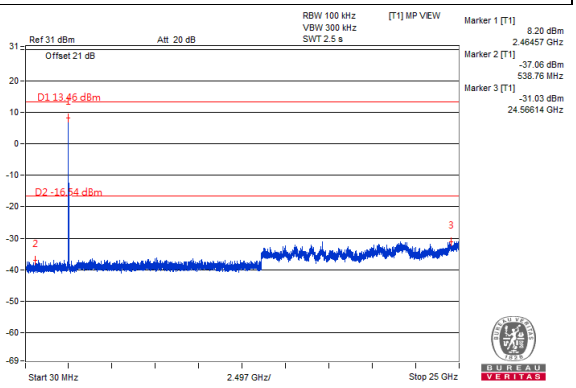
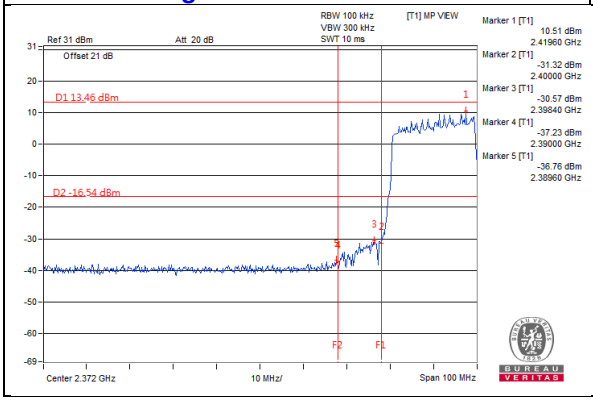
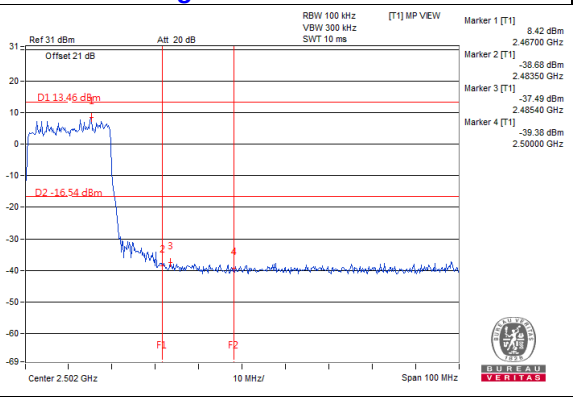


CH 1 Band edge

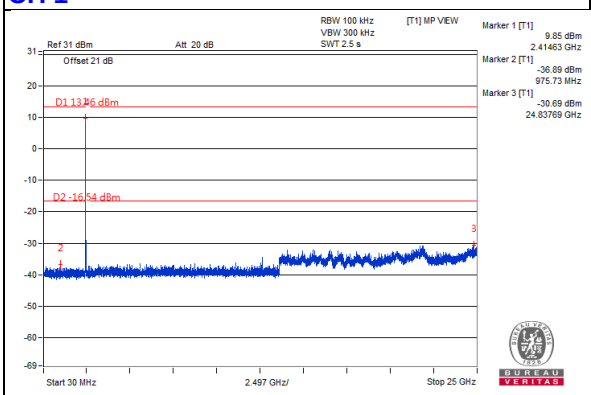


CH 11 Band edge



Chain 1

CH 1



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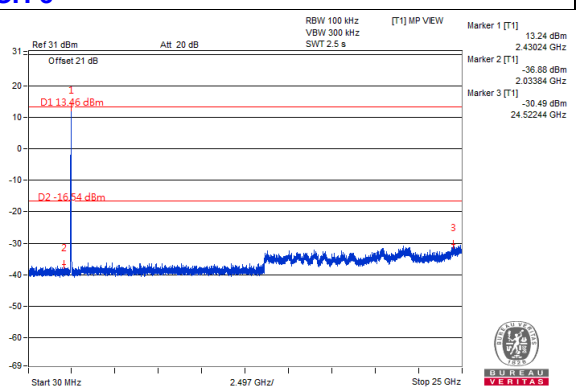

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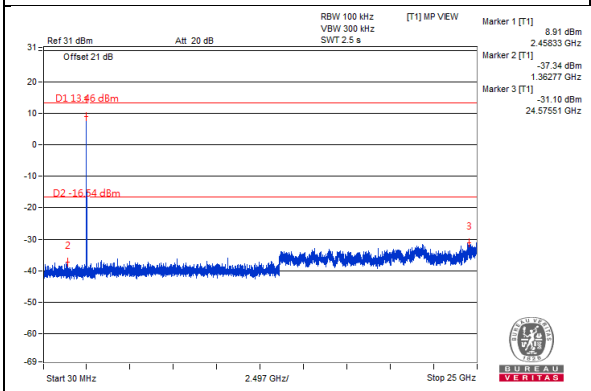

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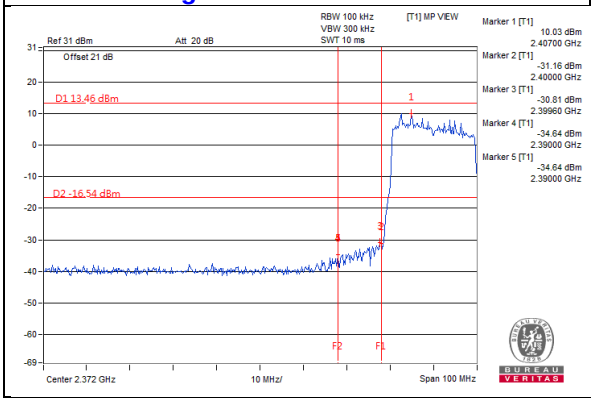
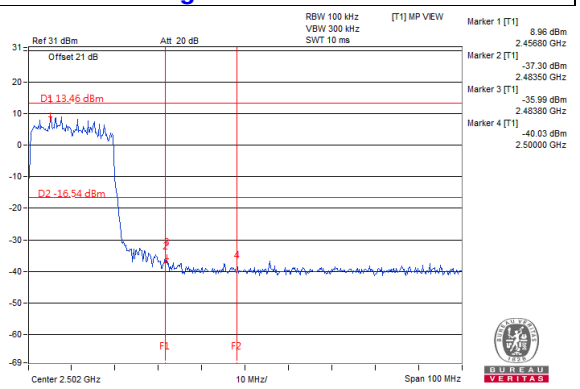


CH 11 Band edge



Chain 2

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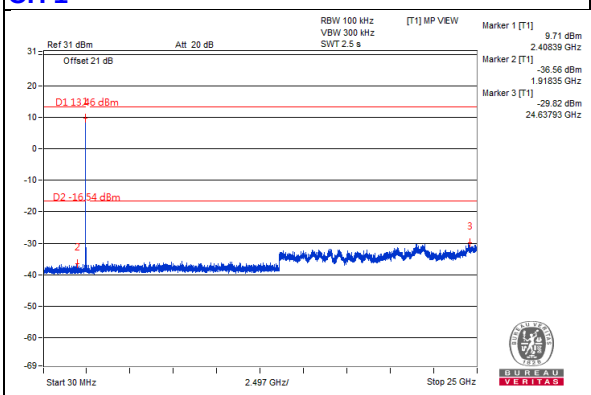

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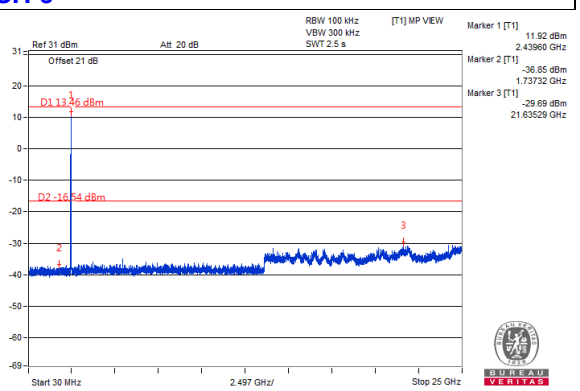
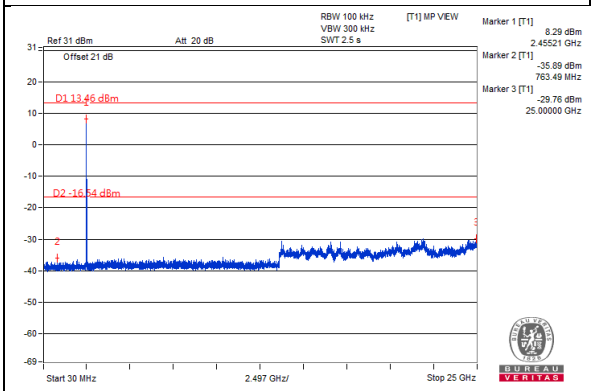
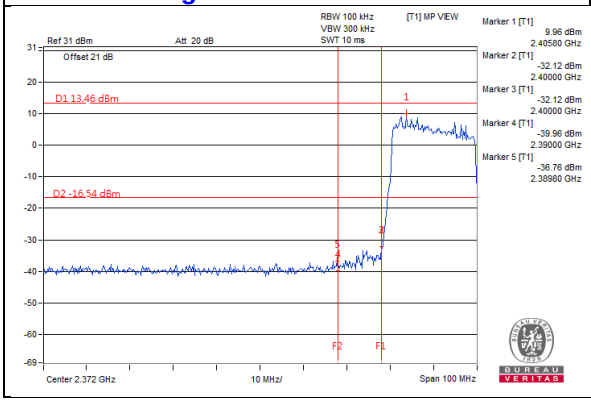


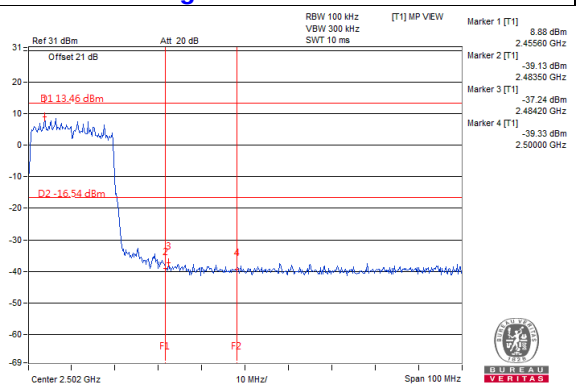
CH 11



CH 1 Band edge

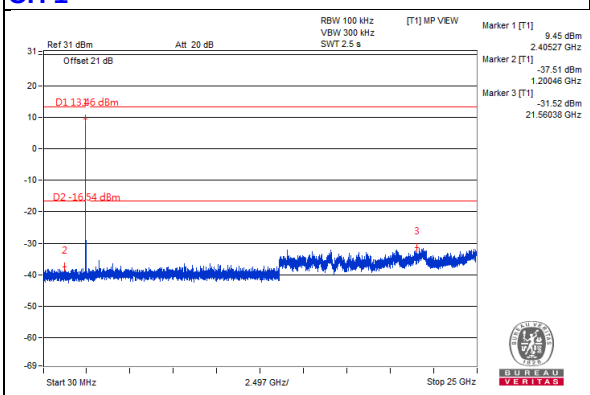


CH 11 Band edge

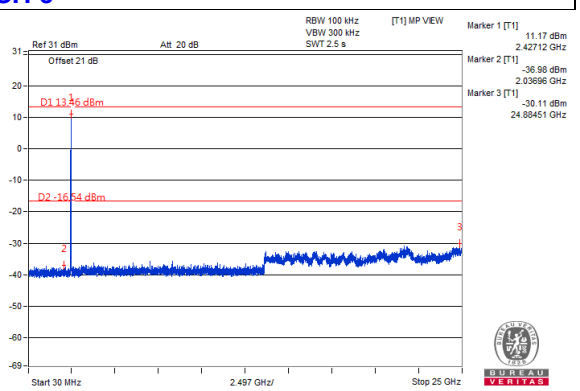


Chain 3

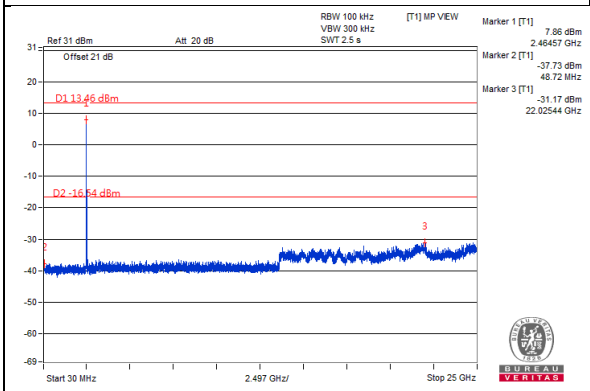
CH 1



CH 6



CH 11



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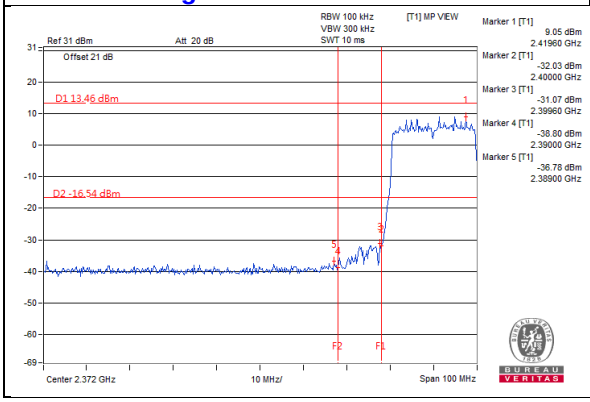

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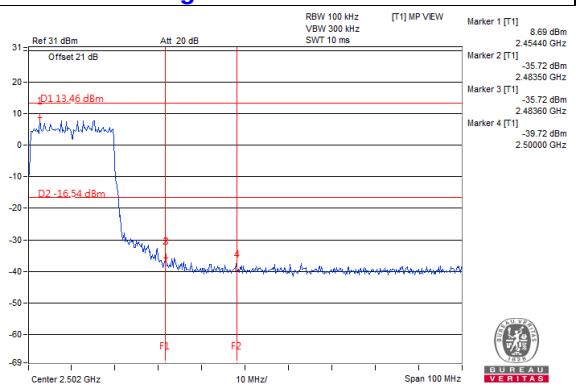
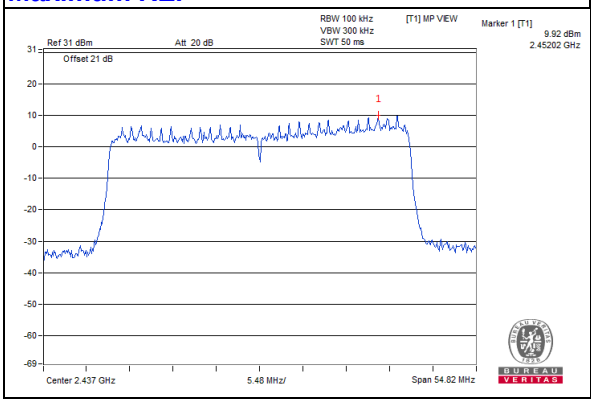


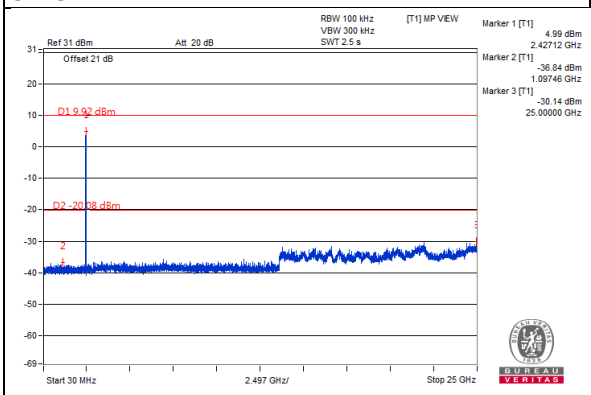
802.11ax (HE40)

Maximum REF

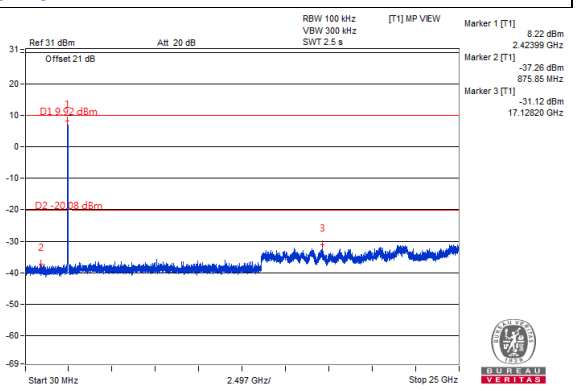


Chain 0

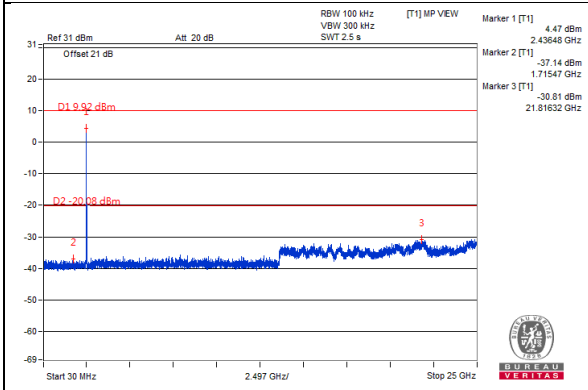
CH 3



CH 6



CH 9



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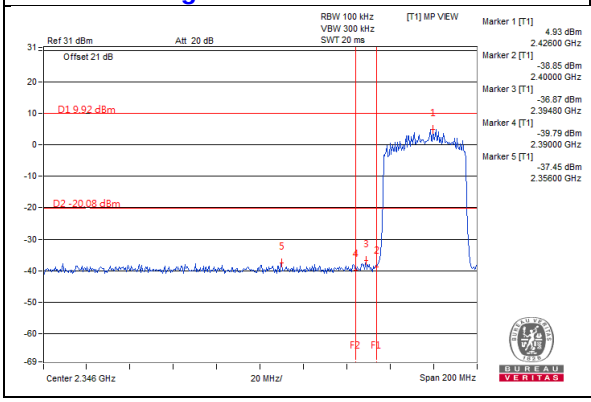

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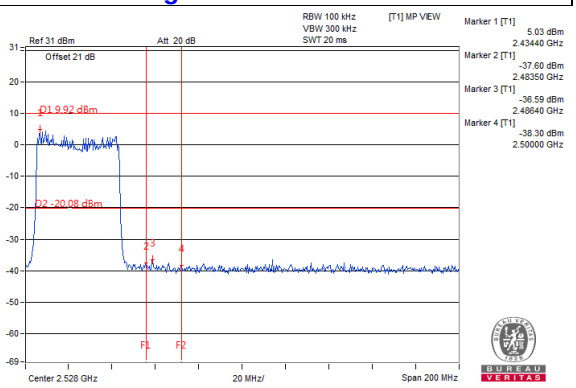
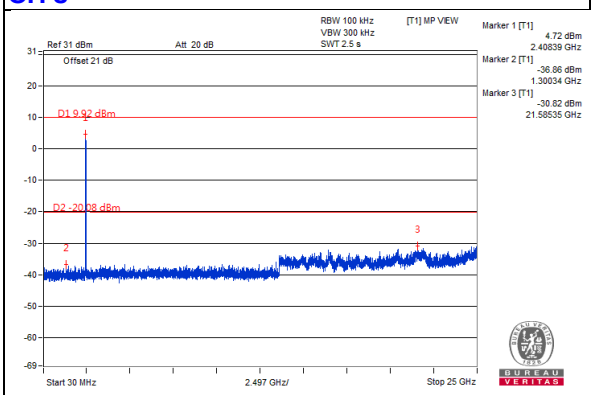


Chain 1

CH 3



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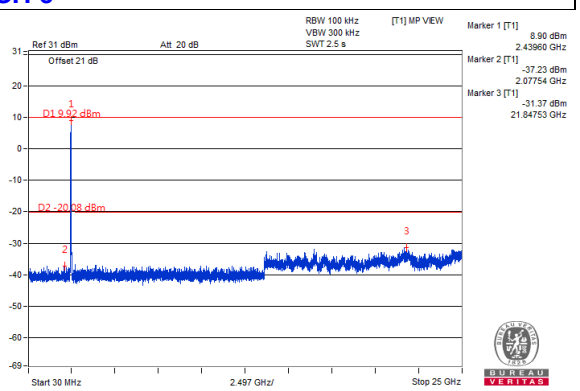

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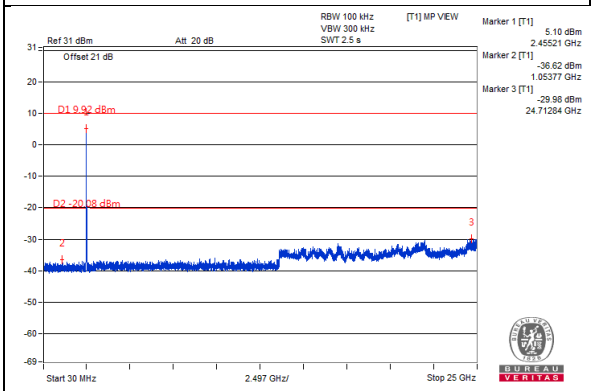

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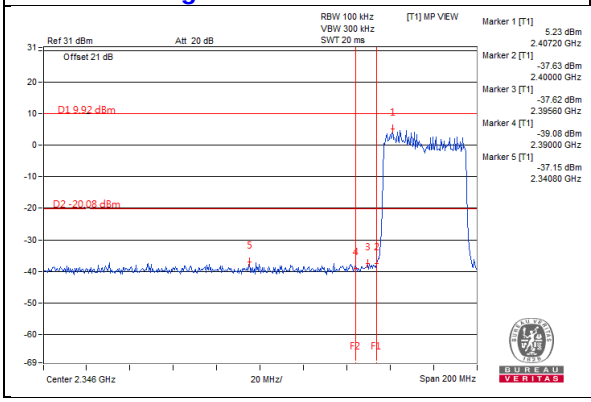

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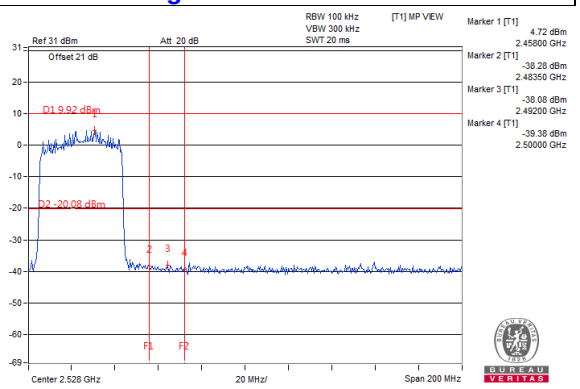
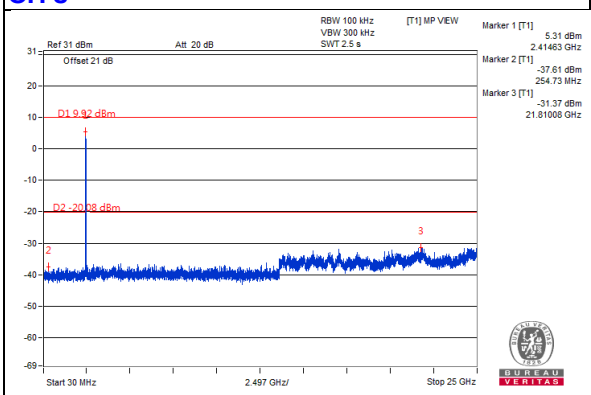


Chain 2

CH 3



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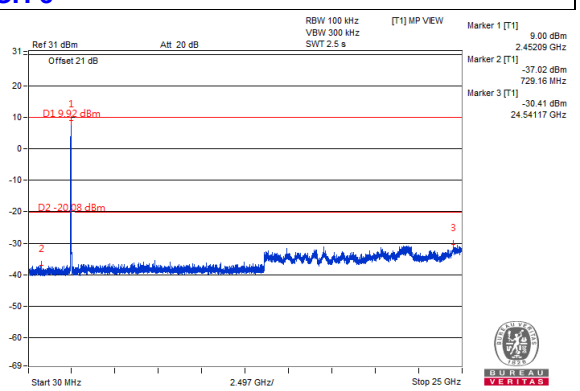

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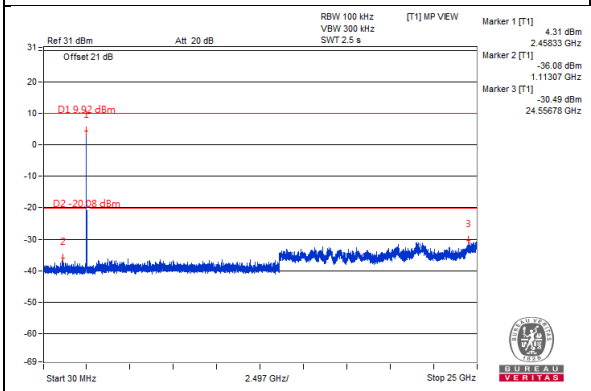

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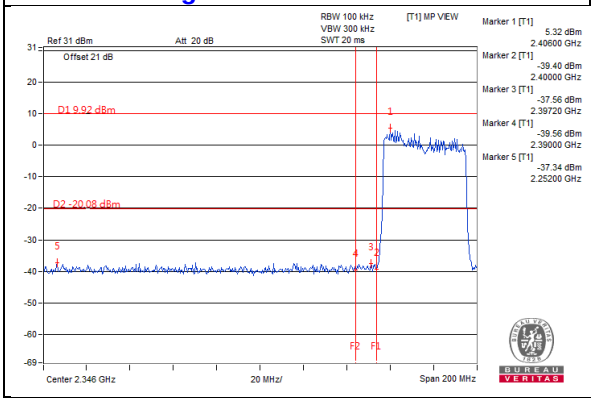

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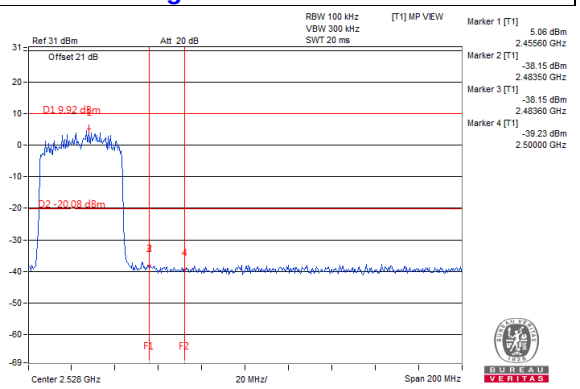

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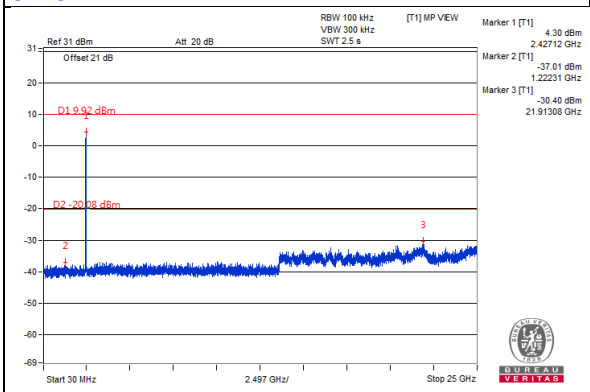

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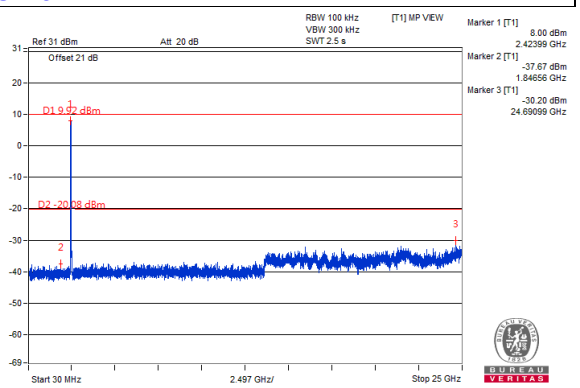

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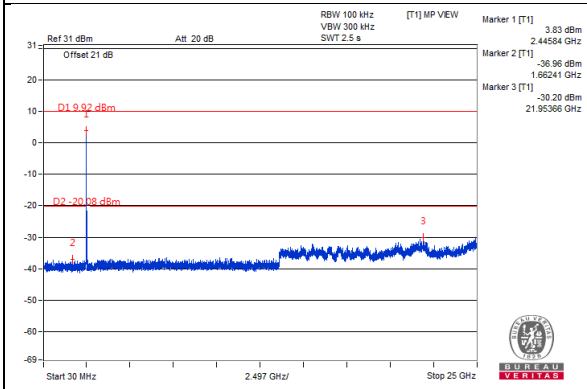

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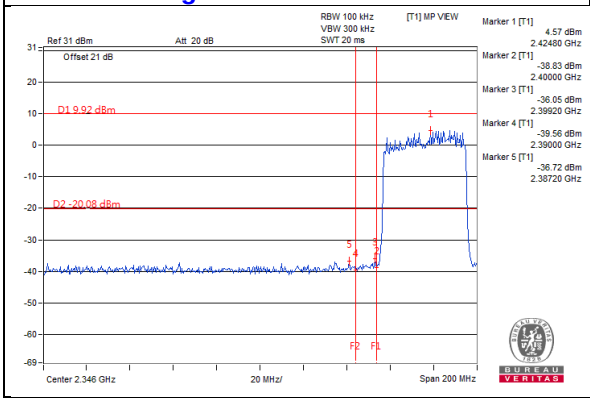

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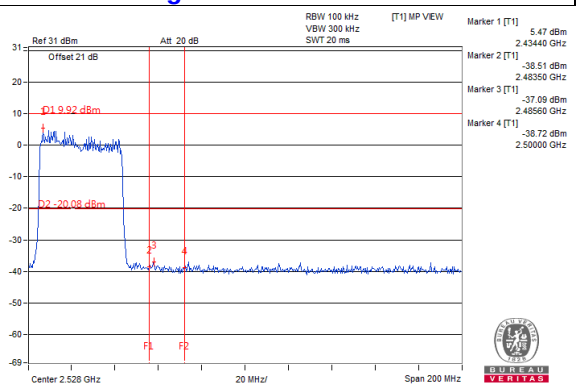

5 Pictures of Test Arrangements

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 according to ISO/IEC 17025.

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

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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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