Report No.:	RF190213E02
FCC ID:	KA2AP2682A1
Test Model:	DAP-2682
Received Date:	Feb. 13, 2019
Test Date:	Apr. 29 to May 05, 2019
Issued Date:	July 26, 2019
Applicant:	D-Link Corporation
Address:	No.289, Xinhu 3rd Rd., Neihu District, Tapei City 11494, Taiwan
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

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RF190213E02	Original release.	July 26, 2019

1 Certificate of Conformity

Product:	Nuclias Connect AC2300 Wave2 Access Point
Brand:	D-Link
Test Model:	DAP-2682
Sample Status:	ENGINEERING SAMPLE
Applicant:	D-Link Corporation
Test Date:	Apr. 29 to May 05, 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:** July 26, 2019

Claire Kuan / Specialist

Approved by : _____ , **Date:** July 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 -3.8dB at 20.85156MHz.
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 2483.5MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) not a standard connector.
-	Occupied Bandwidth Measurement	-	Reference only

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	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	5.0 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	Nuclias Connect AC2300 Wave2 Access Point
Brand	D-Link
Test Model	DAP-2682
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter or POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733.3Mbps
Operating Frequency	**2.4GHz:** 2.412GHz ~ 2.462GHz **5GHz:** 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.412 ~ 2.462GHz** 867.929mW **5.18 ~ 5.24GHz** **CDD Mode:** 505.494mW **Beamforming Mode:** 342.608mW **5.745 ~ 5.825GHz** **CDD Mode:** 680.795mW **Beamforming Mode:** 323.067mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
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 with a adapter as following table:

Brand	Model No.	Spec.
Asian Power Devices Inc.	WA-30P12R	Input: 100-240Vac, 50-60Hz, 0.9A Max Output: 12V/2.5A (1.2, unshielded)

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

Ant. No.	Model	Antenna Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
1	290-20382	3.86	2.4~2.4835	PIFA	i-pex(MHF)
		4.62	5.15~5.25		
		4.68	5.25~5.35		
		4.88	5.47~5.725		
		4.88	5.725~5.85		
2	290-20383	3.96	2.4~2.4835	PIFA	i-pex(MHF)
		4.51	5.15~5.25		
		4.59	5.25~5.35		
		4.74	5.47~5.725		
		4.93	5.725~5.85		
3	290-20384	3.73	2.4~2.4835	PIFA	i-pex(MHF)
		4.25	5.15~5.25		
		4.77	5.25~5.35		
		4.66	5.47~5.725		
		4.88	5.725~5.85		
4	290-20385	3.7	2.4~2.4835	PIFA	i-pex(MHF)
		4.93	5.15~5.25		
		4.65	5.25~5.35		
		4.74	5.47~5.725		
		4.74	5.725~5.85		

4. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	Power from adapter
Mode B	Power from PoE adapter
Note: From the above modes, the conducted emission worst case was found in **Mode B** and the radiated emission worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.	

5. 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
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

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

3.2 Description of Test Modes

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

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):

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

NOTE: The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane .**

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

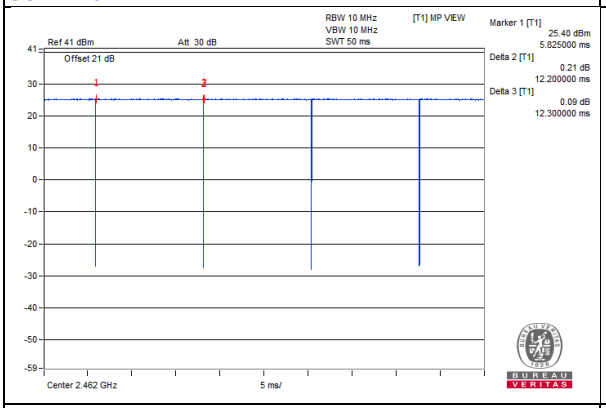
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Ryan Du
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 68%RH	120Vac, 60Hz	Andy Ho
APCM	21deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

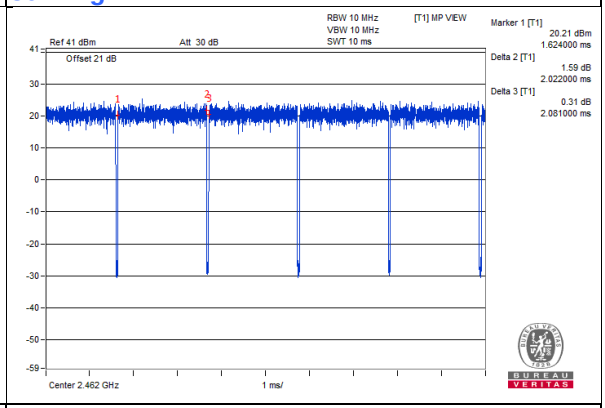
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.2/12.3 = 0.992
802.11g: Duty cycle = 2.022/2.081 = 0.972, Duty factor = 10 * log(1/0.972) = 0.12
802.11n (HT20): Duty cycle = 2.023/2.074 = 0.975, Duty factor = 10 * log(1/0.975) = 0.11
802.11n (HT40): Duty cycle = 0.926/0.966 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18

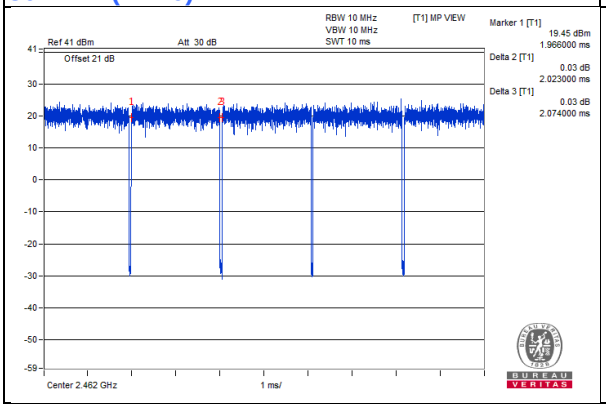
802.11b



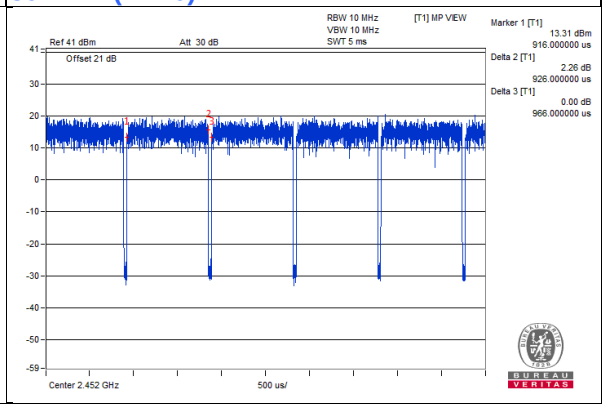
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
C.	PoE Adapter	NA	740-64214-001	NA	NA	Provided by Lab

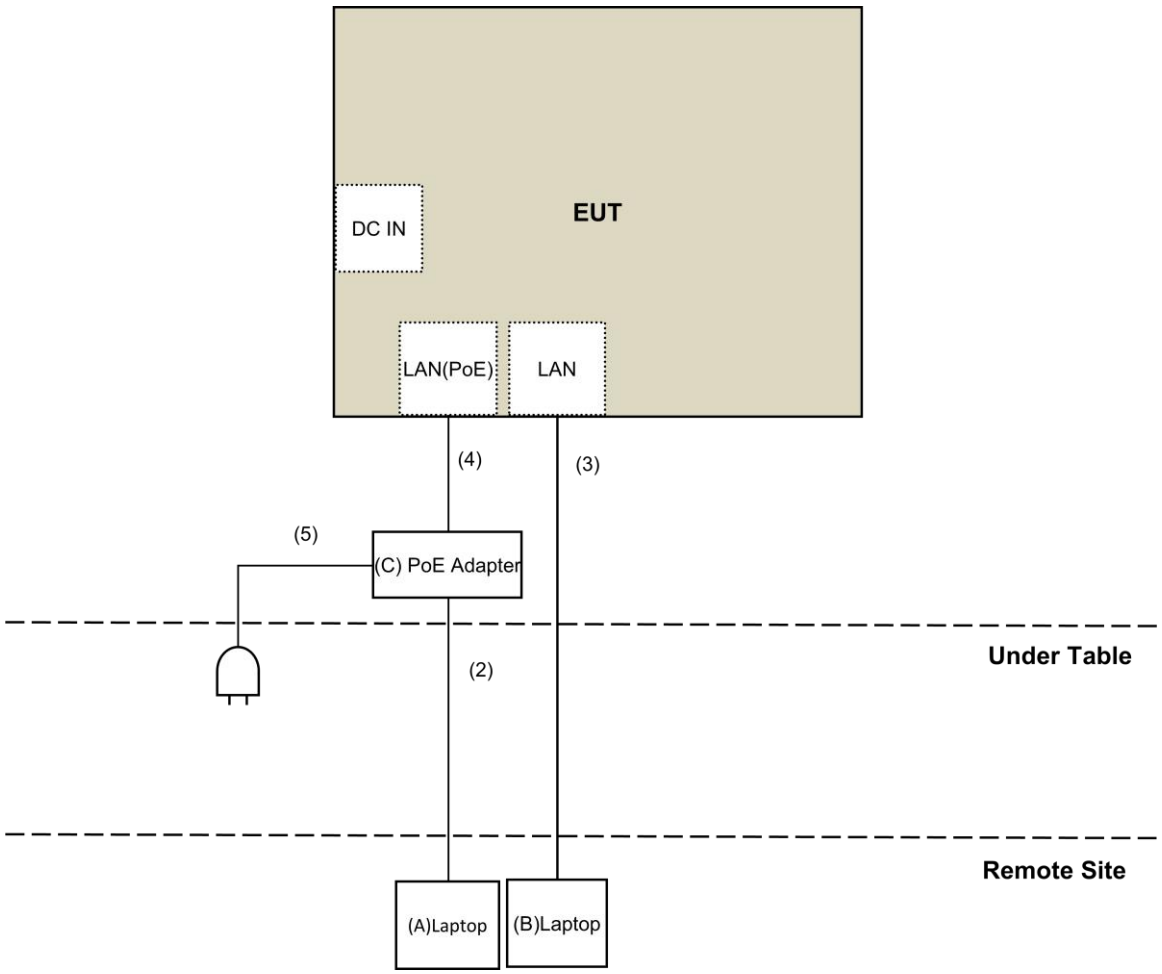
Note:

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

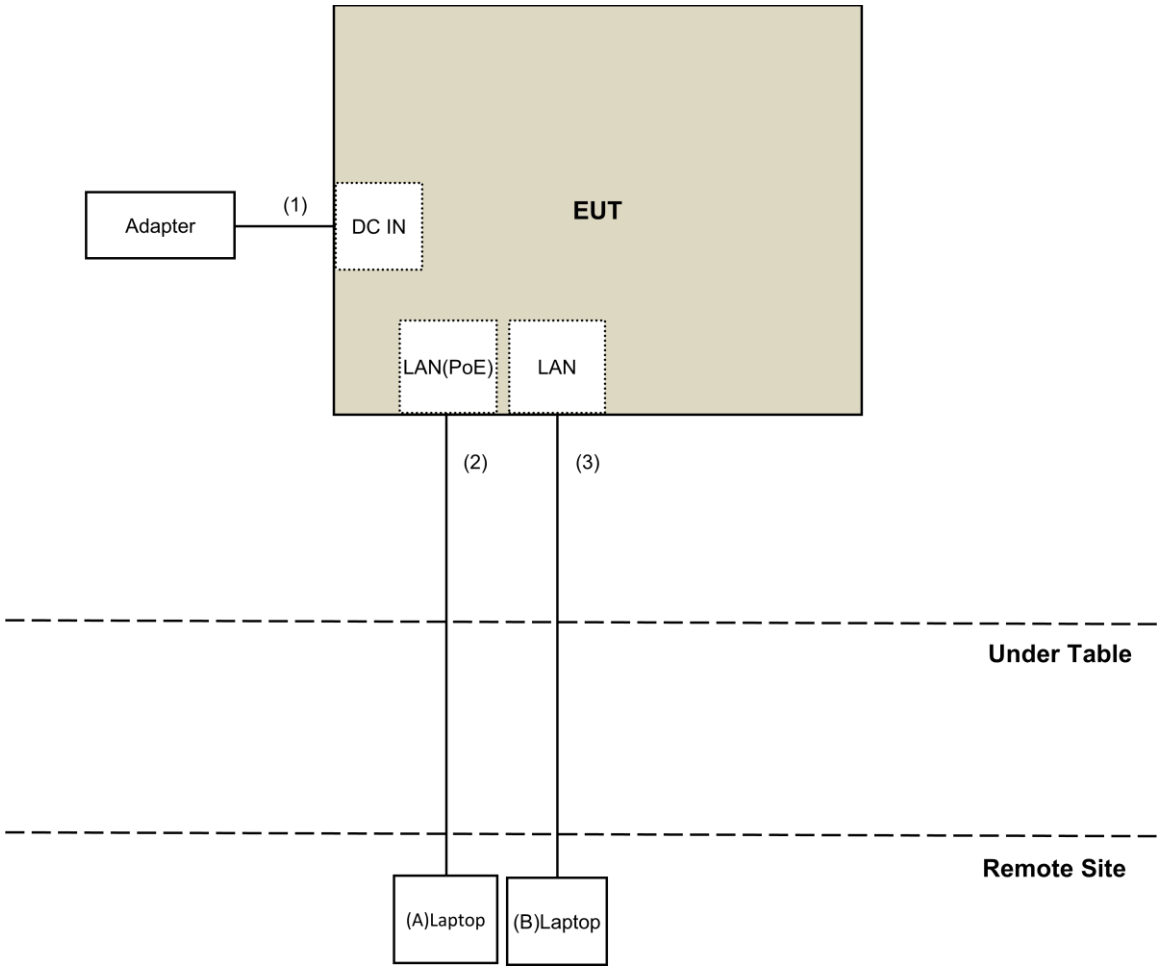
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.2	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	AC Cable	1	1.8	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For Conducted Emission test:



For Radiation Emission 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 elow the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

For Radiated Emissions above 1GHz:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 12, 2018	June 11, 2019
RF Cable	EMC104-SM-SM-6000	180602	June 12, 2018	June 11, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
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
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
4. Tested Date: May. 05, 2019

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 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-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 22, 2018	Nov. 21, 2019
RF Cable	8D	966-3-1	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-2	Mar. 18, 2019	Mar. 17, 2020
RF Cable	8D	966-3-3	Mar. 18, 2019	Mar. 17, 2020
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 25, 2018	Nov. 24, 2019
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-1200	160922	Jan. 28, 2019	Jan. 27, 2020
RF Cable	EMC104-SM-SM-2000	180601	June 12, 2018	June 11, 2019
RF Cable	EMC104-SM-SM-6000	180602	June 12, 2018	June 11, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
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
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSV40	100964	June 20, 2018	June 19, 2019
Power meter Anritsu	ML2495A	1014008	May 09, 2018	May 08, 2019
Power sensor Anritsu	MA2411B	0917122	May 09, 2018	May 08, 2019
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. 3.
3. Loop antenna was used for all emissions below 30 MHz.
4. Tested Date: Apr. 29 to May. 03, 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:

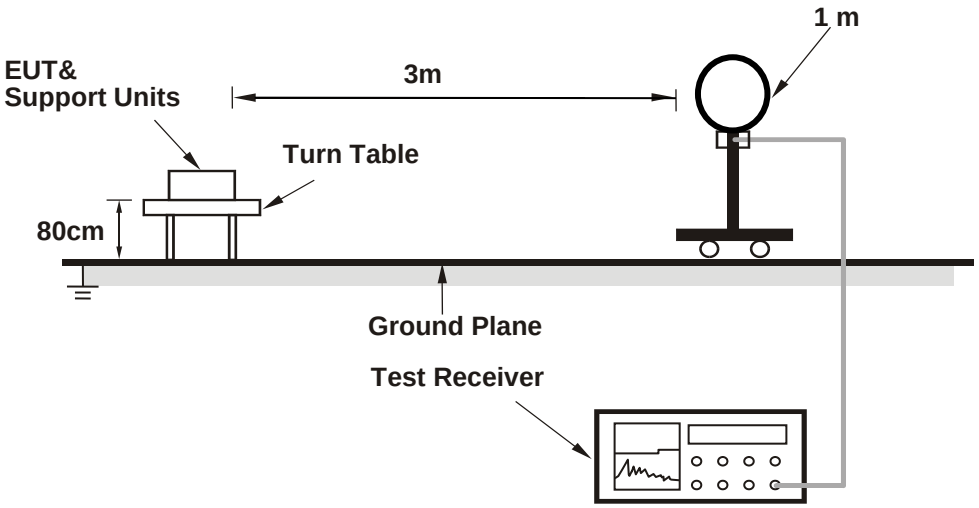
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

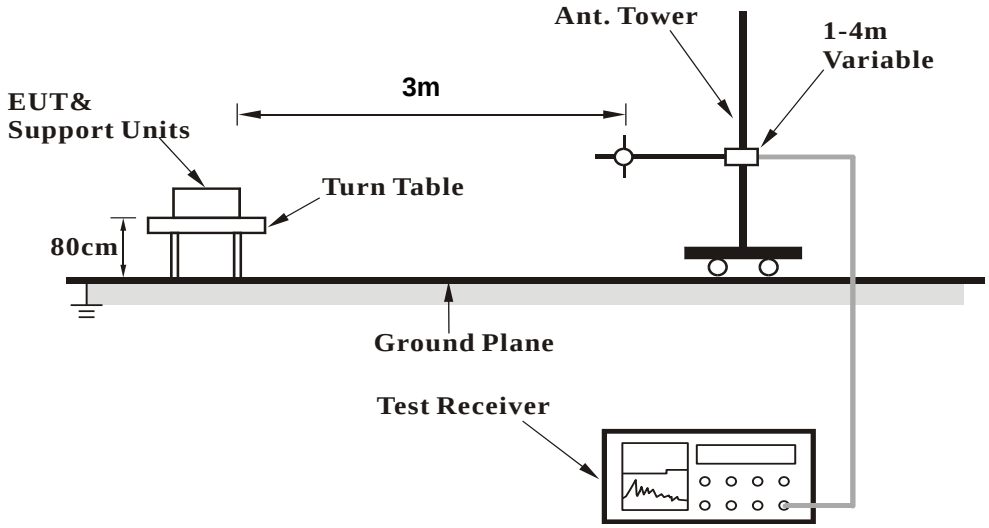
No deviation.

4.1.5 Test Setup

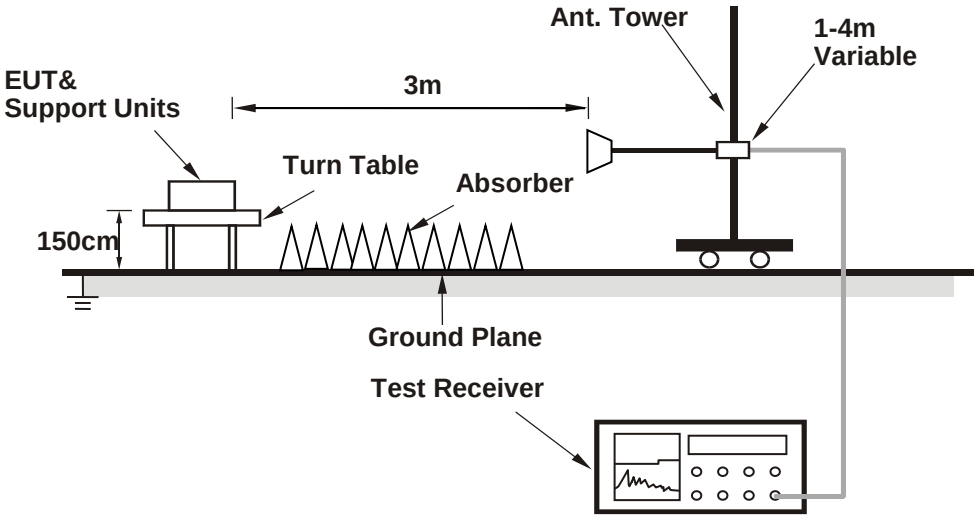
For Radiated emission below 30MHz



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. Placed the EUT on the testing table.
b. Controlling software (QDART-Connectivity (1.0.00058)) has been activated to set the EUT under transmission condition continuously.

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	61.7 PK	74.0	-12.3	1.52 H	224	63.8	-2.1
2	2390.00	43.8 AV	54.0	-10.2	1.52 H	224	45.9	-2.1
3	*2412.00	115.2 PK			1.49 H	213	117.3	-2.1
4	*2412.00	112.9 AV			1.49 H	213	115.0	-2.1
5	4824.00	42.2 PK	74.0	-31.8	2.51 H	204	40.1	2.1
6	4824.00	36.8 AV	54.0	-17.2	2.51 H	204	34.7	2.1
7	12060.00	53.5 PK	74.0	-20.5	1.24 H	33	41.2	12.3
8	12060.00	48.1 AV	54.0	-5.9	1.24 H	33	35.8	12.3
9	14472.00	52.9 PK	74.0	-21.1	1.20 H	7	37.6	15.3
10	14472.00	46.0 AV	54.0	-8.0	1.20 H	7	30.7	15.3
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	2390.00	62.2 PK	74.0	-11.8	2.38 V	270	64.3	-2.1
2	2390.00	51.6 AV	54.0	-2.4	2.38 V	270	53.7	-2.1
3	*2412.00	118.4 PK			2.38 V	148	120.5	-2.1
4	*2412.00	116.3 AV			2.38 V	148	118.4	-2.1
5	4824.00	51.6 PK	74.0	-22.4	1.47 V	65	49.5	2.1
6	4824.00	50.0 AV	54.0	-4.0	1.47 V	65	47.9	2.1
7	12060.00	55.8 PK	74.0	-18.2	1.26 V	193	43.5	12.3
8	12060.00	53.7 AV	54.0	-0.3	1.26 V	193	41.4	12.3
9	14472.00	54.1 PK	74.0	-19.9	2.29 V	34	38.8	15.3
10	14472.00	51.6 AV	54.0	-2.4	2.29 V	34	36.3	15.3

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	114.4 PK			1.44 H	222	116.7	-2.3
2	*2437.00	112.4 AV			1.44 H	222	114.7	-2.3
3	4874.00	41.4 PK	74.0	-32.6	2.53 H	189	39.3	2.1
4	4874.00	36.1 AV	54.0	-17.9	2.53 H	189	34.0	2.1
5	7311.00	48.5 PK	74.0	-25.5	2.49 H	203	40.5	8.0
6	7311.00	43.0 AV	54.0	-11.0	2.49 H	203	35.0	8.0
7	12185.00	52.9 PK	74.0	-21.1	1.23 H	20	40.4	12.5
8	12185.00	47.7 AV	54.0	-6.3	1.23 H	20	35.2	12.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.1 PK	74.0	-15.9	1.86 V	158	60.2	-2.1
2	2390.00	46.2 AV	54.0	-7.8	1.86 V	158	48.3	-2.1
3	*2437.00	118.0 PK			1.86 V	158	120.3	-2.3
4	*2437.00	115.6 AV			1.86 V	158	117.9	-2.3
5	2483.50	57.3 PK	74.0	-16.7	1.86 V	158	59.7	-2.4
6	2483.50	45.3 AV	54.0	-8.7	1.86 V	158	47.7	-2.4
7	4874.00	52.9 PK	74.0	-21.1	1.41 V	65	50.8	2.1
8	4874.00	51.7 AV	54.0	-2.3	1.41 V	65	49.6	2.1
9	7311.00	56.1 PK	74.0	-17.9	1.21 V	115	48.1	8.0
10	7311.00	53.6 AV	54.0	-0.4	1.21 V	115	45.6	8.0
11	12185.00	51.6 PK	74.0	-22.4	1.32 V	201	39.1	12.5
12	12185.00	45.7 AV	54.0	-8.3	1.32 V	201	33.2	12.5

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.5 PK			1.47 H	222	116.8	-2.3
2	*2462.00	112.5 AV			1.47 H	222	114.8	-2.3
3	2483.50	62.3 PK	74.0	-11.7	1.47 H	222	64.7	-2.4
4	2483.50	44.3 AV	54.0	-9.7	1.47 H	222	46.7	-2.4
5	4924.00	42.1 PK	74.0	-31.9	2.55 H	196	39.8	2.3
6	4924.00	36.6 AV	54.0	-17.4	2.55 H	196	34.3	2.3
7	7386.00	48.6 PK	74.0	-25.4	2.53 H	213	40.5	8.1
8	7386.00	43.4 AV	54.0	-10.6	2.53 H	213	35.3	8.1
9	12310.00	52.8 PK	74.0	-21.2	1.27 H	20	40.4	12.4
10	12310.00	47.5 AV	54.0	-6.5	1.27 H	20	35.1	12.4
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	117.7 PK			1.71 V	138	120.0	-2.3
2	*2462.00	115.4 AV			1.71 V	138	117.7	-2.3
3	2483.50	61.7 PK	74.0	-12.3	1.71 V	138	64.1	-2.4
4	2483.50	48.4 AV	54.0	-5.6	1.71 V	138	50.8	-2.4
5	4924.00	55.2 PK	74.0	-18.8	1.30 V	66	52.9	2.3
6	4924.00	53.6 AV	54.0	-0.4	1.30 V	66	51.3	2.3
7	7386.00	52.2 PK	74.0	-21.8	2.10 V	271	44.1	8.1
8	7386.00	48.4 AV	54.0	-5.6	2.10 V	271	40.3	8.1
9	12310.00	53.7 PK	74.0	-20.3	1.23 V	300	41.3	12.4
10	12310.00	49.8 AV	54.0	-4.2	1.23 V	300	37.4	12.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	1.43 H	222	70.3	-2.1
2	2390.00	50.0 AV	54.0	-4.0	1.43 H	222	52.1	-2.1
3	*2412.00	112.8 PK			1.43 H	222	114.9	-2.1
4	*2412.00	103.6 AV			1.43 H	222	105.7	-2.1
5	4824.00	39.3 PK	74.0	-34.7	2.49 H	202	37.2	2.1
6	4824.00	33.4 AV	54.0	-20.6	2.49 H	202	31.3	2.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.6 PK	74.0	-2.4	2.59 V	217	73.7	-2.1
2	2390.00	53.5 AV	54.0	-0.5	2.59 V	217	55.6	-2.1
3	*2412.00	116.7 PK			2.59 V	217	118.8	-2.1
4	*2412.00	107.4 AV			2.59 V	217	109.5	-2.1
5	4824.00	38.8 PK	74.0	-35.2	1.25 V	57	36.7	2.1
6	4824.00	33.1 AV	54.0	-20.9	1.25 V	57	31.0	2.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.3 PK	74.0	-4.7	1.50 H	207	71.4	-2.1
2	2390.00	48.3 AV	54.0	-5.7	1.50 H	207	50.4	-2.1
3	*2437.00	119.8 PK			1.50 H	207	122.1	-2.3
4	*2437.00	110.2 AV			1.50 H	207	112.5	-2.3
5	2483.50	70.6 PK	74.0	-3.4	1.50 H	207	73.0	-2.4
6	2483.50	48.7 AV	54.0	-5.3	1.50 H	207	51.1	-2.4
7	4874.00	42.3 PK	74.0	-31.7	2.54 H	198	40.2	2.1
8	4874.00	36.9 AV	54.0	-17.1	2.54 H	198	34.8	2.1
9	7311.00	49.4 PK	74.0	-24.6	2.47 H	197	41.4	8.0
10	7311.00	44.1 AV	54.0	-9.9	2.47 H	197	36.1	8.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2333.00	64.2 PK	74.0	-9.8	2.63 V	220	66.2	-2.0
2	2333.00	52.2 AV	54.0	-1.8	2.63 V	220	54.2	-2.0
3	2390.00	72.8 PK	74.0	-1.2	2.63 V	220	74.9	-2.1
4	2390.00	52.1 AV	54.0	-1.9	2.63 V	220	54.2	-2.1
5	*2437.00	122.6 PK			2.63 V	220	124.9	-2.3
6	*2437.00	113.3 AV			2.63 V	220	115.6	-2.3
7	2483.50	73.5 PK	74.0	-0.5	2.63 V	220	75.9	-2.4
8	2483.50	51.7 AV	54.0	-2.3	2.63 V	220	54.1	-2.4
9	4874.00	42.7 PK	74.0	-31.3	1.24 V	63	40.6	2.1
10	4874.00	37.0 AV	54.0	-17.0	1.24 V	63	34.9	2.1
11	7311.00	48.9 PK	74.0	-25.1	2.15 V	263	40.9	8.0
12	7311.00	43.6 AV	54.0	-10.4	2.15 V	263	35.6	8.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.4 PK			1.50 H	200	115.7	-2.3
2	*2462.00	104.1 AV			1.50 H	200	106.4	-2.3
3	2483.50	70.6 PK	74.0	-3.4	1.50 H	200	73.0	-2.4
4	2483.50	49.9 AV	54.0	-4.1	1.50 H	200	52.3	-2.4
5	4924.00	38.9 PK	74.0	-35.1	2.55 H	198	36.6	2.3
6	4924.00	33.3 AV	54.0	-20.7	2.55 H	198	31.0	2.3
7	7386.00	44.5 PK	74.0	-29.5	2.45 H	203	36.4	8.1
8	7386.00	39.4 AV	54.0	-14.6	2.45 H	203	31.3	8.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	117.3 PK			2.57 V	215	119.6	-2.3
2	*2462.00	108.1 AV			2.57 V	215	110.4	-2.3
3	2483.50	73.6 PK	74.0	-0.4	2.57 V	215	76.0	-2.4
4	2483.50	53.0 AV	54.0	-1.0	2.57 V	215	55.4	-2.4
5	4924.00	38.8 PK	74.0	-35.2	1.35 V	62	36.5	2.3
6	4924.00	33.2 AV	54.0	-20.8	1.35 V	62	30.9	2.3
7	7386.00	44.9 PK	74.0	-29.1	2.16 V	267	36.8	8.1
8	7386.00	39.6 AV	54.0	-14.4	2.16 V	267	31.5	8.1

REMARKS:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.6 PK	74.0	-5.4	1.38 H	223	70.7	-2.1
2	2390.00	50.4 AV	54.0	-3.6	1.38 H	223	52.5	-2.1
3	*2412.00	113.2 PK			1.38 H	223	115.3	-2.1
4	*2412.00	104.1 AV			1.38 H	223	106.2	-2.1
5	4824.00	39.6 PK	74.0	-34.4	2.44 H	207	37.5	2.1
6	4824.00	33.9 AV	54.0	-20.1	2.44 H	207	31.8	2.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	73.5 PK	74.0	-0.5	3.33 V	5	75.6	-2.1
2	2390.00	53.1 AV	54.0	-0.9	3.33 V	5	55.2	-2.1
3	*2412.00	117.0 PK			3.33 V	5	119.1	-2.1
4	*2412.00	107.1 AV			3.33 V	5	109.2	-2.1
5	4824.00	38.8 PK	74.0	-35.2	1.28 V	68	36.7	2.1
6	4824.00	33.2 AV	54.0	-20.8	1.28 V	68	31.1	2.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.6 PK	74.0	-5.4	1.44 H	195	70.7	-2.1
2	2390.00	47.8 AV	54.0	-6.2	1.44 H	195	49.9	-2.1
3	*2437.00	119.6 PK			1.44 H	195	121.9	-2.3
4	*2437.00	109.8 AV			1.44 H	195	112.1	-2.3
5	2483.50	71.0 PK	74.0	-3.0	1.44 H	195	73.4	-2.4
6	2483.50	48.9 AV	54.0	-5.1	1.44 H	195	51.3	-2.4
7	4874.00	42.4 PK	74.0	-31.6	2.50 H	194	40.3	2.1
8	4874.00	36.8 AV	54.0	-17.2	2.50 H	194	34.7	2.1
9	7311.00	49.4 PK	74.0	-24.6	2.44 H	199	41.4	8.0
10	7311.00	44.2 AV	54.0	-9.8	2.44 H	199	36.2	8.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.2 PK	74.0	-1.8	3.10 V	7	74.3	-2.1
2	2390.00	51.8 AV	54.0	-2.2	3.10 V	7	53.9	-2.1
3	*2437.00	122.6 PK			3.10 V	7	124.9	-2.3
4	*2437.00	113.1 AV			3.10 V	7	115.4	-2.3
5	2483.50	73.6 PK	74.0	-0.4	3.10 V	7	76.0	-2.4
6	2483.50	50.2 AV	54.0	-3.8	3.10 V	7	52.6	-2.4
7	4874.00	43.0 PK	74.0	-31.0	1.19 V	78	40.9	2.1
8	4874.00	37.5 AV	54.0	-16.5	1.19 V	78	35.4	2.1
9	7311.00	48.6 PK	74.0	-25.4	2.16 V	254	40.6	8.0
10	7311.00	43.4 AV	54.0	-10.6	2.16 V	254	35.4	8.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.0 PK			1.50 H	187	115.3	-2.3
2	*2462.00	103.6 AV			1.50 H	187	105.9	-2.3
3	2483.50	70.7 PK	74.0	-3.3	1.50 H	187	73.1	-2.4
4	2483.50	50.1 AV	54.0	-3.9	1.50 H	187	52.5	-2.4
5	4924.00	39.4 PK	74.0	-34.6	2.51 H	183	37.1	2.3
6	4924.00	33.5 AV	54.0	-20.5	2.51 H	183	31.2	2.3
7	7386.00	45.0 PK	74.0	-29.0	2.44 H	192	36.9	8.1
8	7386.00	39.7 AV	54.0	-14.3	2.44 H	192	31.6	8.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	115.9 PK			3.18 V	9	118.2	-2.3
2	*2462.00	106.1 AV			3.18 V	9	108.4	-2.3
3	**2483.50**	**73.9 PK**	**74.0**	**-0.1**	**3.18 V**	**9**	**76.3**	**-2.4**
4	2483.50	51.0 AV	54.0	-3.0	3.18 V	9	53.4	-2.4
5	4924.00	39.0 PK	74.0	-35.0	1.37 V	50	36.7	2.3
6	4924.00	33.4 AV	54.0	-20.6	1.37 V	50	31.1	2.3
7	7386.00	44.6 PK	74.0	-29.4	2.12 V	279	36.5	8.1
8	7386.00	39.6 AV	54.0	-14.4	2.12 V	279	31.5	8.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	64.1 PK	74.0	-9.9	1.53 H	187	66.2	-2.1
2	2390.00	49.7 AV	54.0	-4.3	1.53 H	187	51.8	-2.1
3	*2422.00	108.5 PK			1.53 H	187	110.7	-2.2
4	*2422.00	98.6 AV			1.53 H	187	100.8	-2.2
5	4844.00	38.8 PK	74.0	-35.2	2.55 H	176	36.7	2.1
6	4844.00	33.1 AV	54.0	-20.9	2.55 H	176	31.0	2.1
7	7266.00	43.6 PK	74.0	-30.4	2.38 H	193	35.4	8.2
8	7266.00	38.8 AV	54.0	-15.2	2.38 H	193	30.6	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	67.7 PK	74.0	-6.3	3.30 V	4	69.8	-2.1
2	2390.00	53.5 AV	54.0	-0.5	3.30 V	4	55.6	-2.1
3	*2422.00	111.8 PK			3.30 V	4	114.0	-2.2
4	*2422.00	101.8 AV			3.30 V	4	104.0	-2.2
5	4844.00	38.9 PK	74.0	-35.1	1.43 V	63	36.8	2.1
6	4844.00	33.2 AV	54.0	-20.8	1.43 V	63	31.1	2.1
7	7266.00	44.1 PK	74.0	-29.9	2.12 V	271	35.9	8.2
8	7266.00	39.3 AV	54.0	-14.7	2.12 V	271	31.1	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)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	1.48 H	192	66.4	-2.1
2	2390.00	50.5 AV	54.0	-3.5	1.48 H	192	52.6	-2.1
3	*2437.00	112.0 PK			1.48 H	192	114.3	-2.3
4	*2437.00	102.4 AV			1.48 H	192	104.7	-2.3
5	2483.50	62.4 PK	74.0	-11.6	1.48 H	192	64.8	-2.4
6	2483.50	48.2 AV	54.0	-5.8	1.48 H	192	50.6	-2.4
7	4874.00	41.7 PK	74.0	-32.3	2.56 H	178	39.6	2.1
8	4874.00	36.0 AV	54.0	-18.0	2.56 H	178	33.9	2.1
9	7311.00	47.2 PK	74.0	-26.8	2.40 H	201	39.2	8.0
10	7311.00	42.3 AV	54.0	-11.7	2.40 H	201	34.3	8.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2333.00	62.5 PK	74.0	-11.5	3.59 V	7	64.5	-2.0
2	2333.00	52.4 AV	54.0	-1.6	3.59 V	7	54.4	-2.0
3	2390.00	67.8 PK	74.0	-6.2	3.59 V	7	69.9	-2.1
4	2390.00	53.8 AV	54.0	-0.2	3.59 V	7	55.9	-2.1
5	*2437.00	115.6 PK			3.59 V	7	117.9	-2.3
6	*2437.00	106.1 AV			3.59 V	7	108.4	-2.3
7	2483.50	65.8 PK	74.0	-8.2	3.59 V	7	68.2	-2.4
8	2483.50	51.8 AV	54.0	-2.2	3.59 V	7	54.2	-2.4
9	4874.00	41.8 PK	74.0	-32.2	1.40 V	37	39.7	2.1
10	4874.00	36.2 AV	54.0	-17.8	1.40 V	37	34.1	2.1
11	7311.00	47.4 PK	74.0	-26.6	2.20 V	296	39.4	8.0
12	7311.00	42.7 AV	54.0	-11.3	2.20 V	296	34.7	8.0

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	109.0 PK			1.48 H	192	111.3	-2.3
2	*2452.00	99.7 AV			1.48 H	192	102.0	-2.3
3	2483.50	61.5 PK	74.0	-12.5	1.48 H	192	63.9	-2.4
4	2483.50	49.8 AV	54.0	-4.2	1.48 H	192	52.2	-2.4
5	4904.00	41.6 PK	74.0	-32.4	2.56 H	178	39.4	2.2
6	4904.00	35.7 AV	54.0	-18.3	2.56 H	178	33.5	2.2
7	7356.00	47.2 PK	74.0	-26.8	2.40 H	201	39.1	8.1
8	7356.00	42.8 AV	54.0	-11.2	2.40 H	201	34.7	8.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	112.5 PK			3.64 V	8	114.8	-2.3
2	*2452.00	103.3 AV			3.64 V	8	105.6	-2.3
3	2483.50	65.2 PK	74.0	-8.8	3.64 V	8	67.6	-2.4
4	2483.50	53.5 AV	54.0	-0.5	3.64 V	8	55.9	-2.4
5	4904.00	38.7 PK	74.0	-35.3	1.36 V	50	36.5	2.2
6	4904.00	33.1 AV	54.0	-20.9	1.36 V	50	30.9	2.2
7	7356.00	44.3 PK	74.0	-29.7	2.15 V	281	36.2	8.1
8	7356.00	39.6 AV	54.0	-14.4	2.15 V	281	31.5	8.1

REMARKS:

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

Below 1GHz Data:

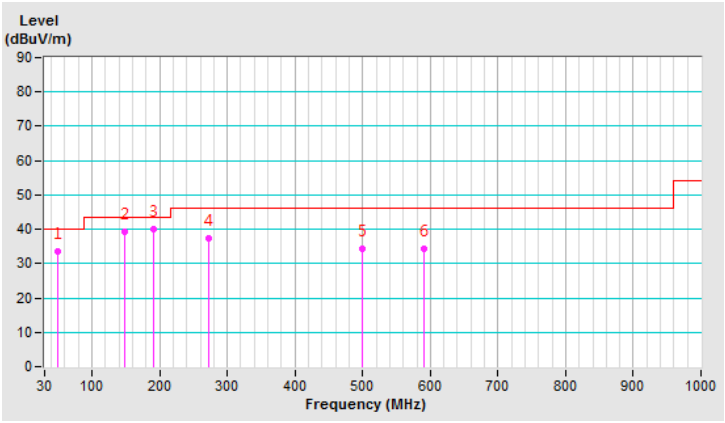
802.11g

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	49.69	33.6 QP	40.0	-6.4	4.00 H	115	42.2	-8.6
2	147.61	39.3 QP	43.5	-4.2	2.00 H	303	47.1	-7.8
3	191.07	40.1 QP	43.5	-3.4	1.50 H	349	50.1	-10.0
4	272.09	37.2 QP	46.0	-8.8	1.00 H	12	44.9	-7.7
5	499.99	34.3 QP	46.0	-11.7	1.50 H	314	35.9	-1.6
6	590.32	34.2 QP	46.0	-11.8	2.00 H	0	33.9	0.3

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 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.

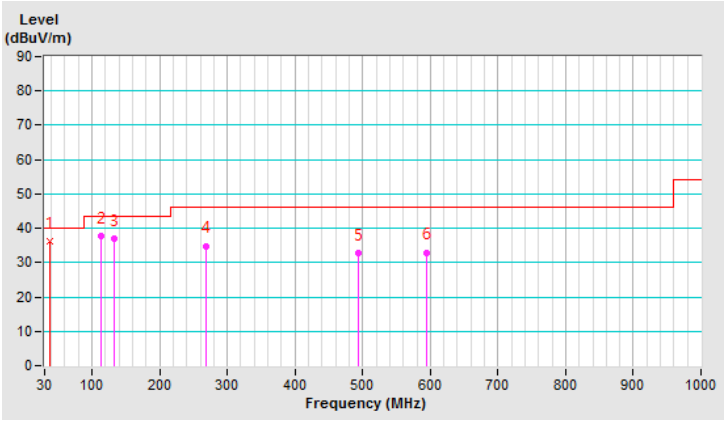


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	38.34	36.1 QP	40.0	-3.9	1.00 V	57	45.5	-9.4
2	112.98	37.6 QP	43.5	-5.9	1.00 V	335	48.0	-10.4
3	133.45	37.1 QP	43.5	-6.4	1.00 V	296	46.1	-9.0
4	268.96	34.9 QP	46.0	-11.1	2.00 V	314	42.7	-7.8
5	494.12	32.9 QP	46.0	-13.1	1.00 V	290	34.8	-1.9
6	594.73	33.0 QP	46.0	-13.0	1.00 V	323	32.6	0.4

REMARKS:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 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:May. 03, 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.

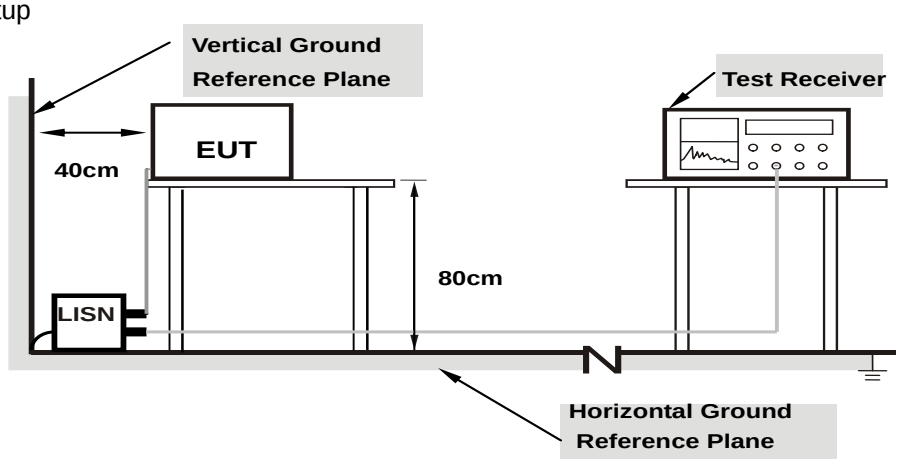
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

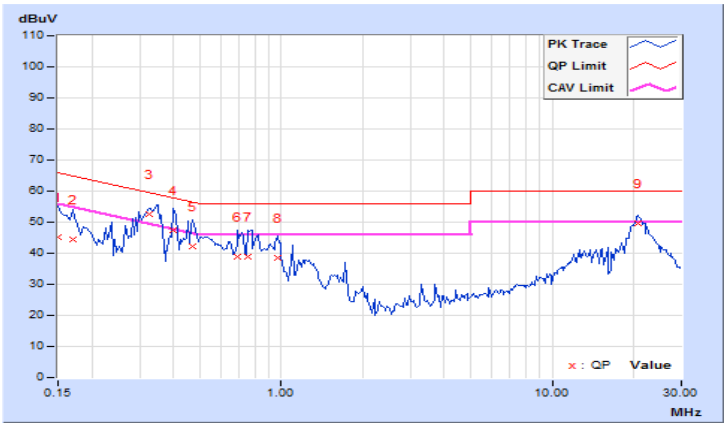
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.02	35.14	21.03	45.16	31.05	66.00	56.00	-20.84	-24.95
2	0.16953	10.03	34.39	18.13	44.42	28.16	64.98	54.98	-20.56	-26.82
3	0.32472	10.06	42.56	35.32	52.62	45.38	59.59	49.59	-6.97	-4.21
4	0.40000	10.07	37.42	11.42	47.49	21.49	57.85	47.85	-10.36	-26.36
5	0.47031	10.07	31.97	21.57	42.04	31.64	56.51	46.51	-14.47	-14.87
6	0.69297	10.09	28.62	14.77	38.71	24.86	56.00	46.00	-17.29	-21.14
7	0.75156	10.09	28.79	15.36	38.88	25.45	56.00	46.00	-17.12	-20.55
8	0.96641	10.11	28.42	21.29	38.53	31.40	56.00	46.00	-17.47	-14.60
9	**20.85156**	**11.08**	**38.67**	**35.12**	**49.75**	**46.20**	**60.00**	**50.00**	**-10.25**	**-3.80**

Remarks:

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



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

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23203	9.94	30.22	17.02	40.16	26.96	62.38	52.38	-22.22	-25.42
2	0.34531	9.95	42.93	33.16	52.88	43.11	59.07	49.07	-6.19	-5.96
3	0.40781	9.96	37.00	12.89	46.96	22.85	57.69	47.69	-10.73	-24.84
4	0.46641	9.96	32.50	19.91	42.46	29.87	56.58	46.58	-14.12	-16.71
5	0.60313	9.97	27.87	19.37	37.84	29.34	56.00	46.00	-18.16	-16.66
6	0.75156	9.98	27.46	14.74	37.44	24.72	56.00	46.00	-18.56	-21.28
7	0.95078	9.99	27.03	18.54	37.02	28.53	56.00	46.00	-18.98	-17.47
8	20.84766	10.88	38.47	35.24	49.35	46.12	60.00	50.00	-10.65	-3.88

Remarks:

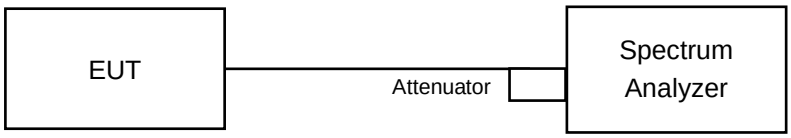
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

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	6.11	7.10	6.62	6.64	0.5	PASS
6	2437	6.60	7.09	6.55	7.06	0.5	PASS
11	2462	6.58	7.11	6.58	6.61	0.5	PASS

802.11g

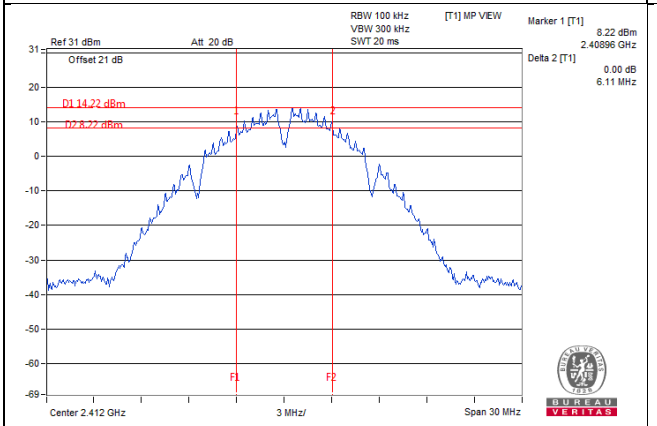
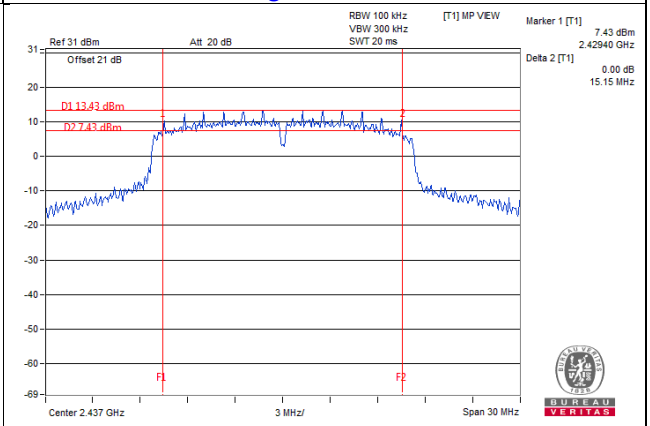
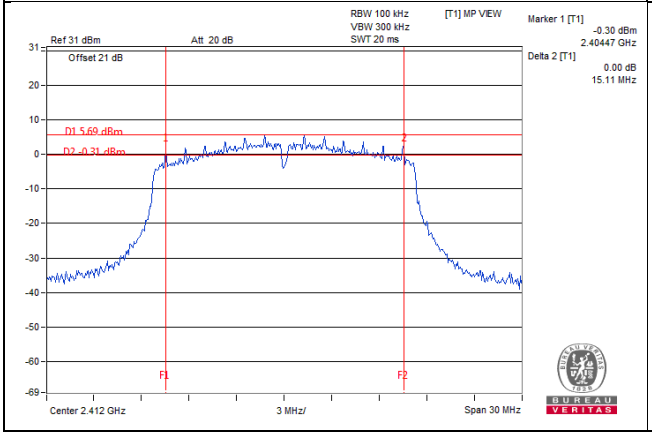
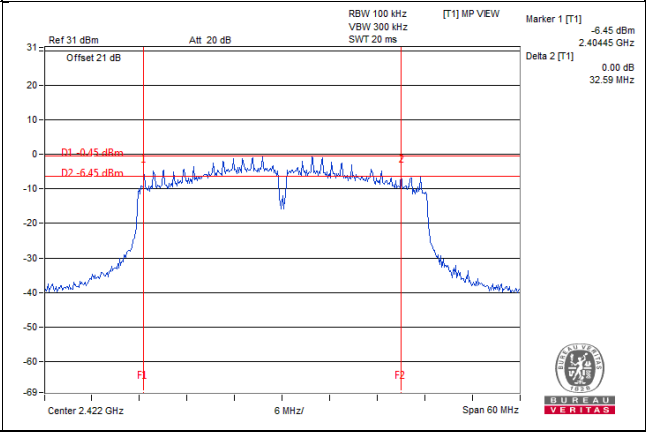
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	15.16	15.47	15.19	15.52	0.5	PASS
6	2437	15.77	15.19	15.46	15.15	0.5	PASS
11	2462	15.17	15.19	15.40	15.19	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	15.11	15.18	15.18	15.18	0.5	PASS
6	2437	15.52	15.12	15.20	15.18	0.5	PASS
11	2462	15.18	15.20	15.14	15.19	0.5	PASS

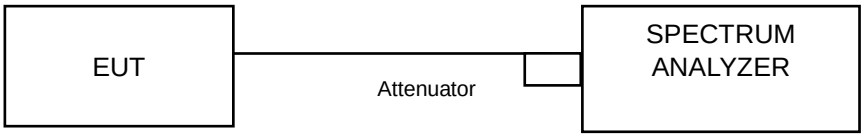
802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	32.62	33.90	32.67	32.59	0.5	Pass
6	2437	33.95	32.68	33.89	32.70	0.5	Pass
9	2452	33.83	33.88	33.86	32.61	0.5	Pass

Spectrum Plot of Worst Value	
802.11b / Chain 0 : CH1	**802.11g / Chain 3 CH6**
	
802.11n (HT20) / Chain 0 : CH1	**802.11n (HT40) / Chain 3: CH3**
	

4.4 OCCUPIED BANDWIDTH MEASUREMENT

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

4.4.4 Deviation from Test Standard

No deviation.

4.4.5 EUT Operating Conditions

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

4.4.6 Test Results

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
1	2412	11.40	11.40	11.76	11.16
6	2437	11.76	11.28	10.44	11.64
11	2462	11.76	11.64	10.56	11.40

802.11g

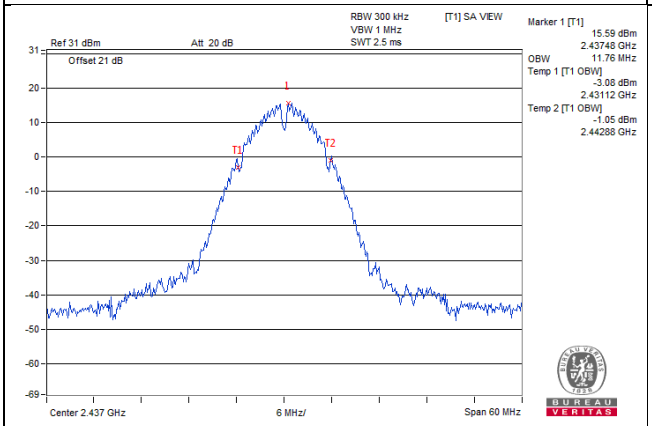
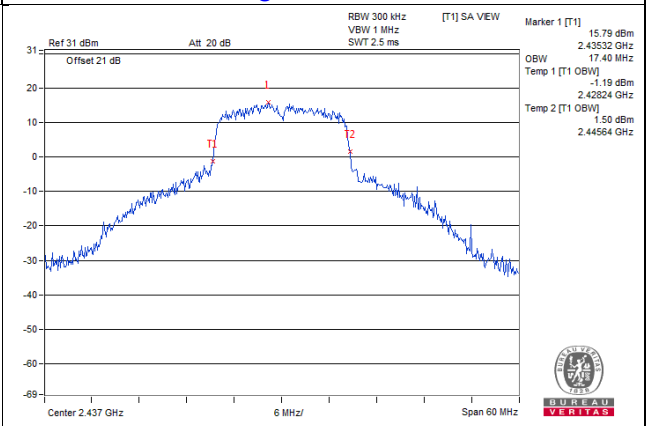
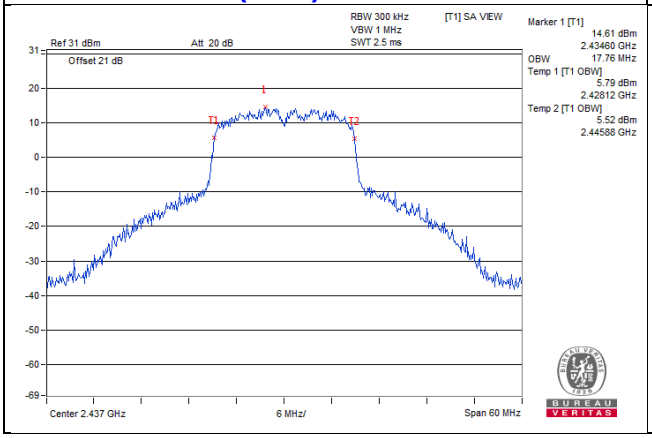
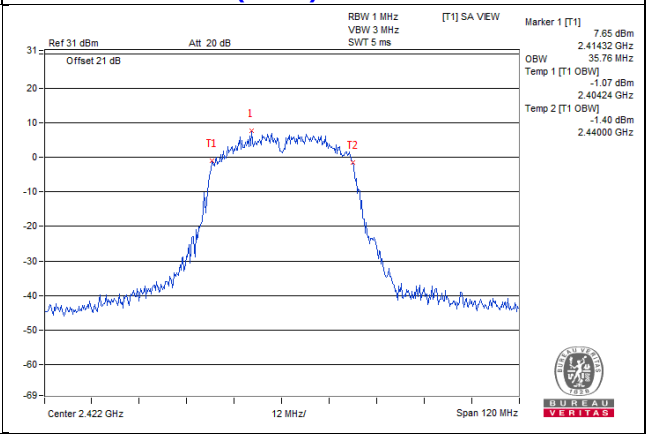
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
1	2412	16.20	16.32	16.20	16.20
6	2437	17.40	16.44	16.80	16.68
11	2462	16.20	16.20	16.20	16.20

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
1	2412	16.20	17.40	17.40	16.32
6	2437	17.52	17.64	17.76	16.56
11	2462	16.20	17.52	17.28	16.20

802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
3	2422	35.76	36.24	36.00	36.00
6	2437	36.00	36.00	36.00	36.24
9	2452	35.76	36.00	36.00	36.00

Spectrum Plot of Worst Value	
802.11b / Chain 0 : CH6	**802.11g / Chain 0 : CH6**
	
802.11n (HT20) / Chain 2 : CH6	**802.11n (HT40) / Chain 0 : CH3**
	

4.5 Conducted Output Power Measurement

4.5.1 Limits of Conducted Output Power Measurement

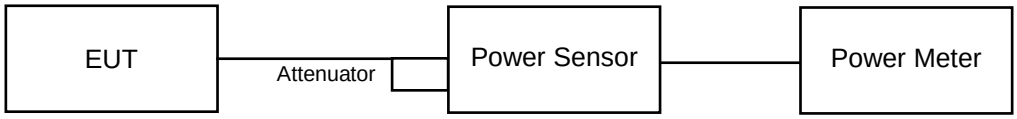
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test 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..

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as Item 4.3.6.

4.5.7 Test Results

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	22.21	21.16	21.84	22.12	612.645	27.87	30	Pass
6	2437	21.64	20.62	21.37	21.56	541.533	27.34	30	Pass
11	2462	21.74	20.76	21.24	21.52	543.354	27.35	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	18.05	17.41	16.68	16.45	209.623	23.21	30	Pass
6	2437	23.94	23.48	23.21	22.74	867.929	29.38	30	Pass
11	2462	18.75	17.86	17.55	17.06	243.784	23.87	30	Pass

802.11n (HT20)

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	17.62	16.33	15.43	15.22	168.944	22.28	30	Pass
6	2437	23.77	23.45	23.11	22.78	853.856	29.31	30	Pass
11	2462	17.82	16.54	16.32	15.94	187.735	22.74	30	Pass

802.11n (HT40)

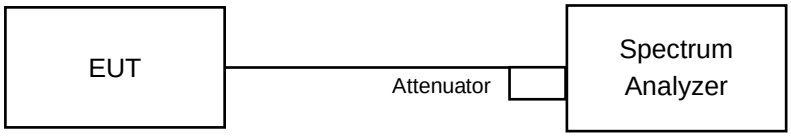
Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	14.43	14.17	12.36	11.77	86.105	19.35	30	Pass
6	2437	18.95	18.69	17.45	16.68	254.634	24.06	30	Pass
9	2452	15.94	15.61	14.31	13.32	124.111	20.94	30	Pass

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

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

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

For 802.11b:
a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

For other:
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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results

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	-7.81	6.02	-1.79	4.17	Pass
	6	2437	-7.74	6.02	-1.72	4.17	Pass
	11	2462	-6.27	6.02	-0.25	4.17	Pass
1	1	2412	-7.33	6.02	-1.31	4.17	Pass
	6	2437	-7.22	6.02	-1.20	4.17	Pass
	11	2462	-6.73	6.02	-0.71	4.17	Pass
2	1	2412	-7.69	6.02	-1.67	4.17	Pass
	6	2437	-6.91	6.02	-0.89	4.17	Pass
	11	2462	-7.57	6.02	-1.55	4.17	Pass
3	1	2412	-7.97	6.02	-1.95	4.17	Pass
	6	2437	-7.66	6.02	-1.64	4.17	Pass
	11	2462	-7.65	6.02	-1.63	4.17	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.83dBi > 6dBi , so the power density limit shall be reduced to 8-(9.83-6) = 4.17dBm.

802.11g

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	-15.25	6.02	0.12	-9.11	4.17	Pass
	6	2437	-8.30	6.02	0.12	-2.16	4.17	Pass
	11	2462	-13.12	6.02	0.12	-6.98	4.17	Pass
1	1	2412	-15.13	6.02	0.12	-8.99	4.17	Pass
	6	2437	-9.22	6.02	0.12	-3.08	4.17	Pass
	11	2462	-13.84	6.02	0.12	-7.70	4.17	Pass
2	1	2412	-14.94	6.02	0.12	-8.80	4.17	Pass
	6	2437	-8.99	6.02	0.12	-2.85	4.17	Pass
	11	2462	-14.16	6.02	0.12	-8.02	4.17	Pass
3	1	2412	-15.98	6.02	0.12	-9.84	4.17	Pass
	6	2437	-9.26	6.02	0.12	-3.12	4.17	Pass
	11	2462	-14.49	6.02	0.12	-8.35	4.17	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.83dBi > 6dBi , so the power density limit shall be reduced to 8-(9.83-6) = 4.17dBm.

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

802.11n (HT20)

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	-15.70	6.02	0.11	-9.57	4.17	Pass
	6	2437	-8.48	6.02	0.11	-2.35	4.17	Pass
	11	2462	-15.00	6.02	0.11	-8.87	4.17	Pass
1	1	2412	-16.03	6.02	0.11	-9.90	4.17	Pass
	6	2437	-8.42	6.02	0.11	-2.29	4.17	Pass
	11	2462	-15.05	6.02	0.11	-8.92	4.17	Pass
2	1	2412	-15.65	6.02	0.11	-9.52	4.17	Pass
	6	2437	-9.09	6.02	0.11	-2.96	4.17	Pass
	11	2462	-14.85	6.02	0.11	-8.72	4.17	Pass
3	1	2412	-16.88	6.02	0.11	-10.75	4.17	Pass
	6	2437	-8.38	6.02	0.11	-2.25	4.17	Pass
	11	2462	-15.25	6.02	0.11	-9.12	4.17	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.83dBi > 6dBi , so the power density limit shall be reduced to 8-(9.83-6) = 4.17dBm.

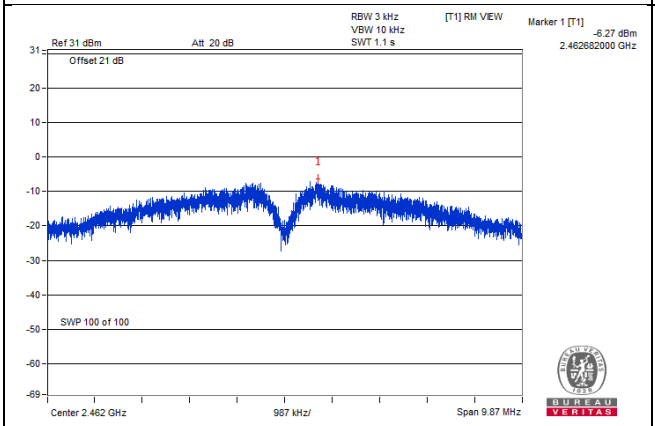
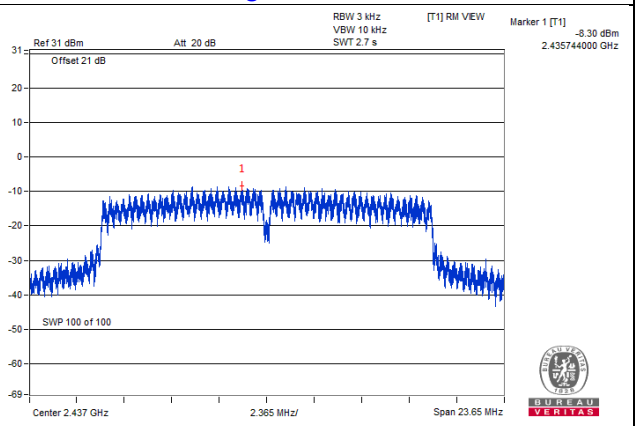
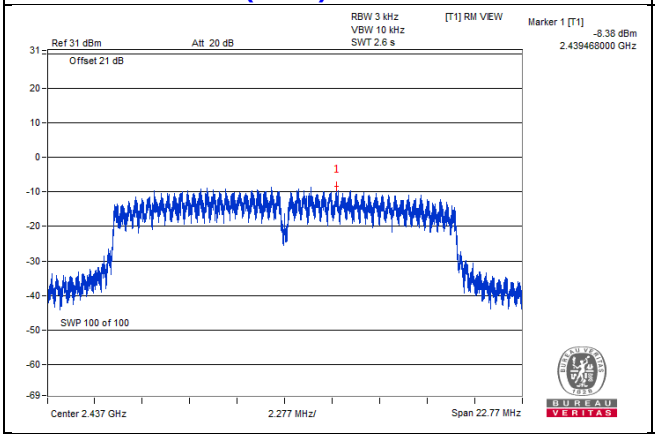
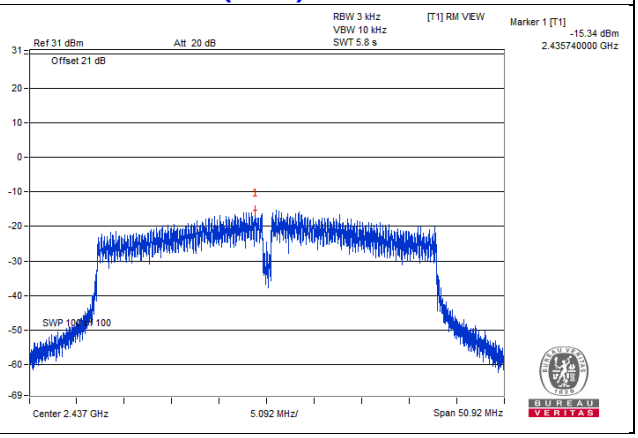
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

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	-21.48	6.02	0.18	-15.28	4.17	Pass
	6	2437	-15.34	6.02	0.18	-9.14	4.17	Pass
	9	2452	-18.23	6.02	0.18	-12.03	4.17	Pass
1	3	2422	-20.73	6.02	0.18	-14.53	4.17	Pass
	6	2437	-15.98	6.02	0.18	-9.78	4.17	Pass
	9	2452	-18.19	6.02	0.18	-11.99	4.17	Pass
2	3	2422	-19.84	6.02	0.18	-13.64	4.17	Pass
	6	2437	-15.53	6.02	0.18	-9.33	4.17	Pass
	9	2452	-20.16	6.02	0.18	-13.96	4.17	Pass
3	3	2422	-21.81	6.02	0.18	-15.61	4.17	Pass
	6	2437	-17.79	6.02	0.18	-11.59	4.17	Pass
	9	2452	-20.15	6.02	0.18	-13.95	4.17	Pass

Note: 1. Directional gain = 10 log[$(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2$ / 4] = 9.83dBi > 6dBi , so the power density limit shall be reduced to 8-(9.83-6) = 4.17dBm.

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

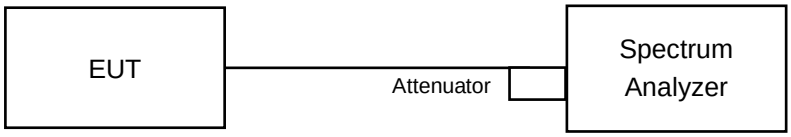
Spectrum Plot of Worst Value	
802.11b / Chain 0 : CH11	**802.11g / Chain 0 : CH6**
	
802.11n (HT20) / Chain 3: CH6	**802.11n (HT40) / Chain 0 : CH6**
	

4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

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

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 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.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

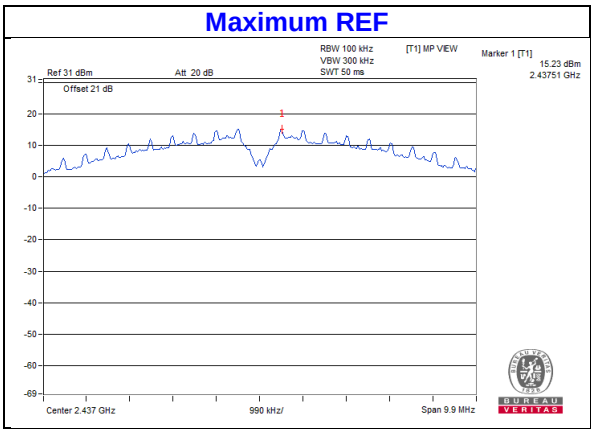
Same as Item 4.3.6

4.7.7 Test Results

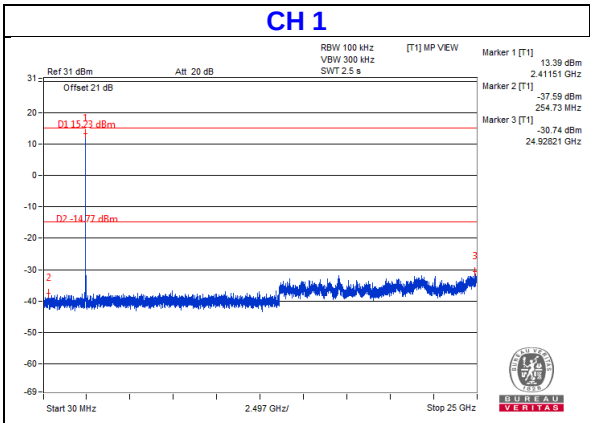
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b
Chain0

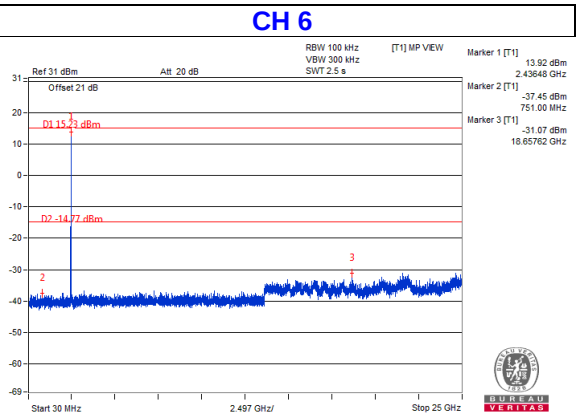
Maximum REF



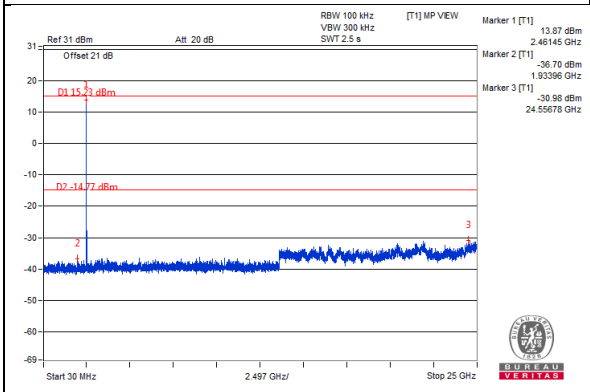
CH 1



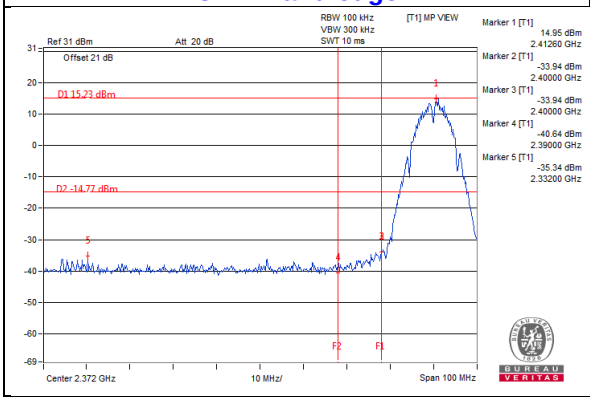
CH 6



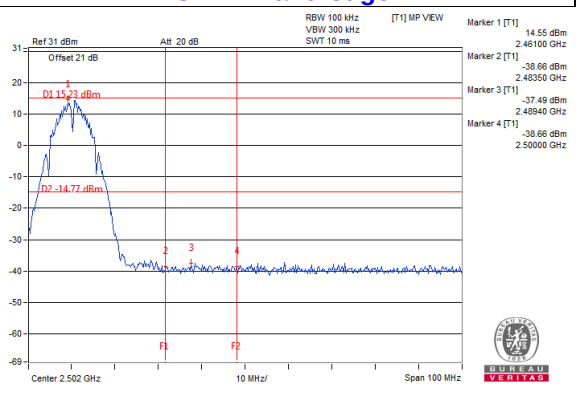
CH 11



CH 1 Band edge

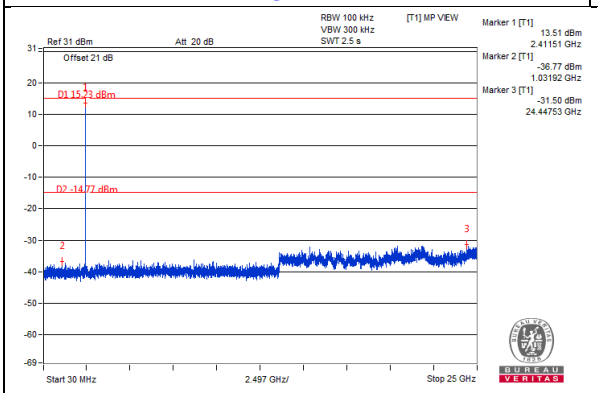


CH 11 Band edge

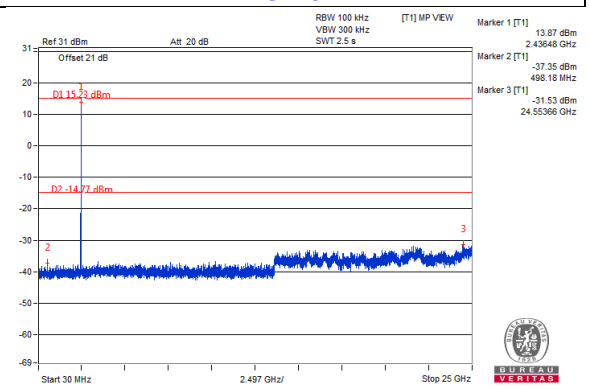


Chain 1

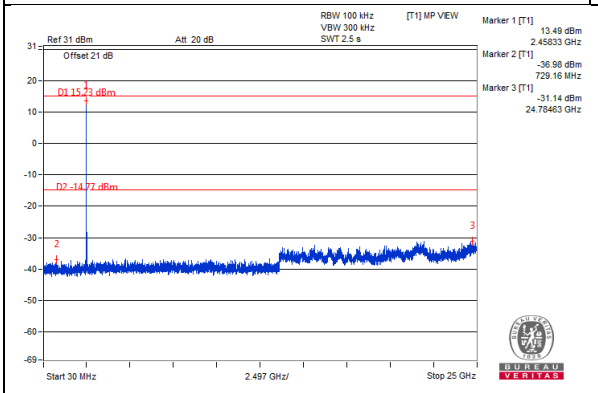
CH 1



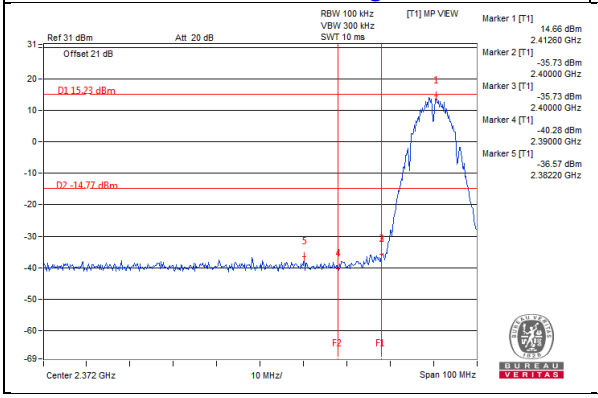
CH 6



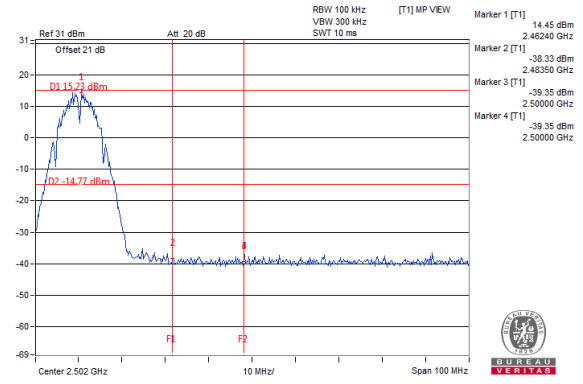
CH 11



CH 1 Band edge

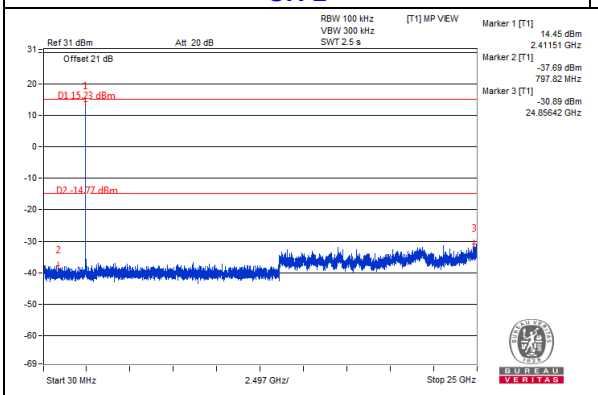


CH 11 Band edge

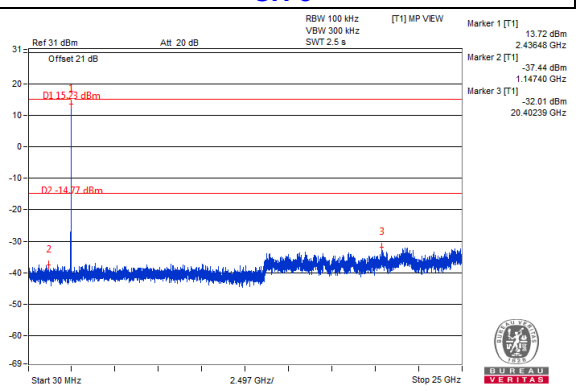


Chain 2

CH 1



CH 6



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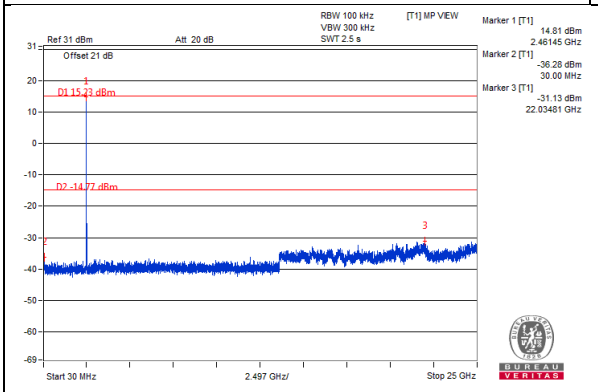

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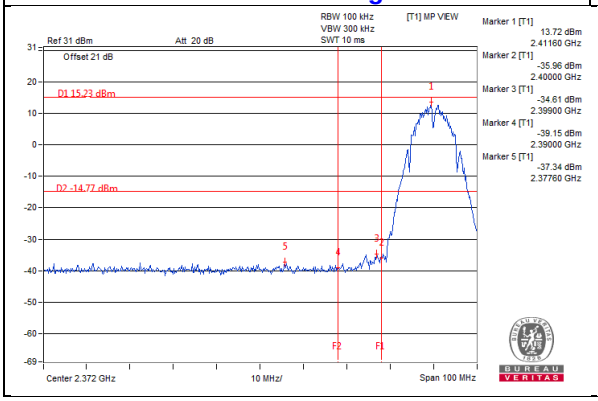
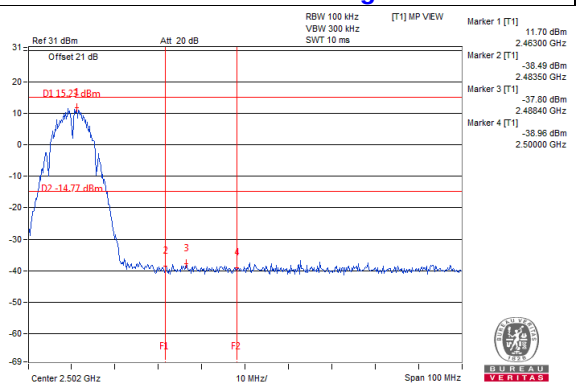
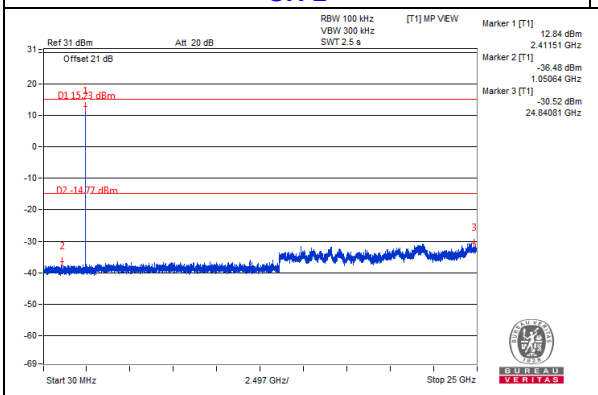


CH 11 Band edge

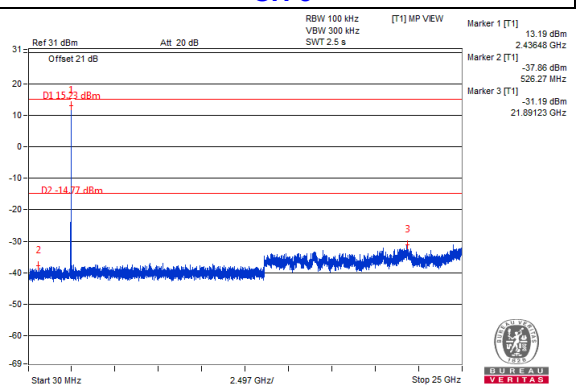


Chain 3

CH 1



CH 6



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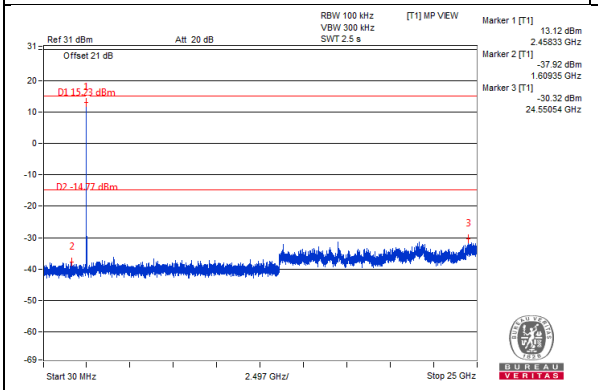

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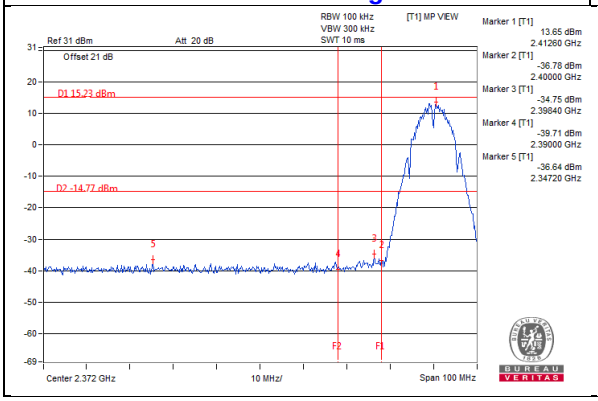
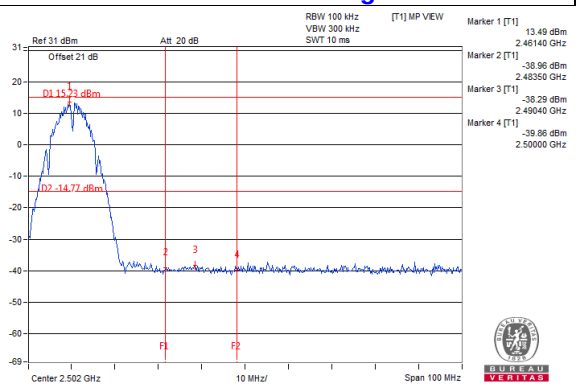
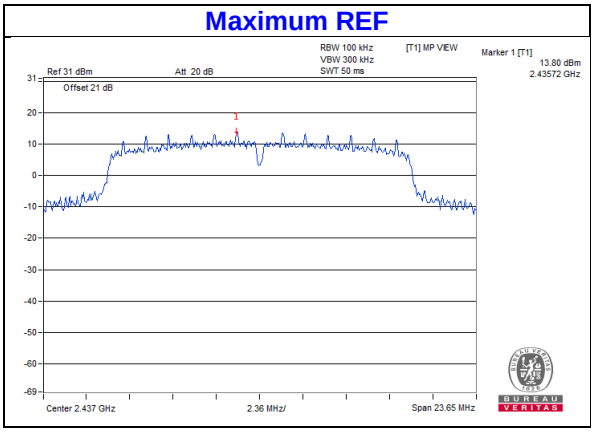


CH 11 Band edge

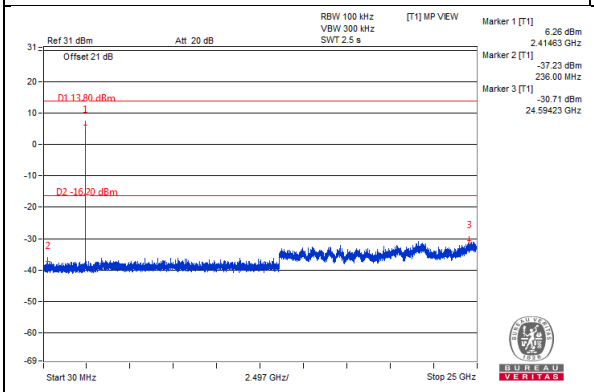


802.11g
Chain0

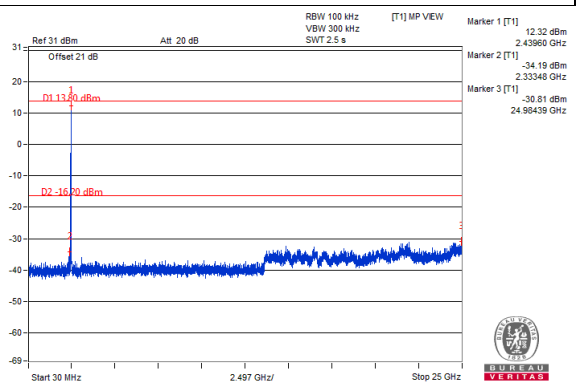
Maximum REF



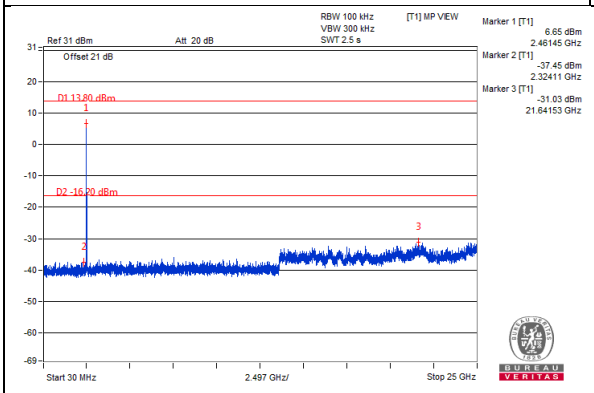
CH 1



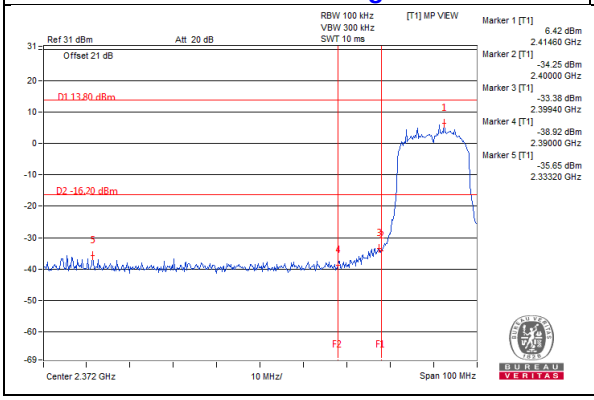
CH 6



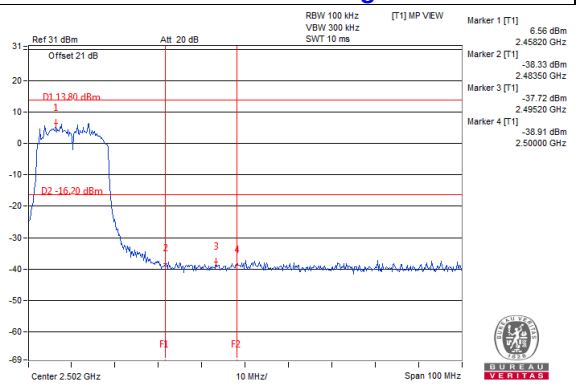
CH 11



CH 1 Band edge

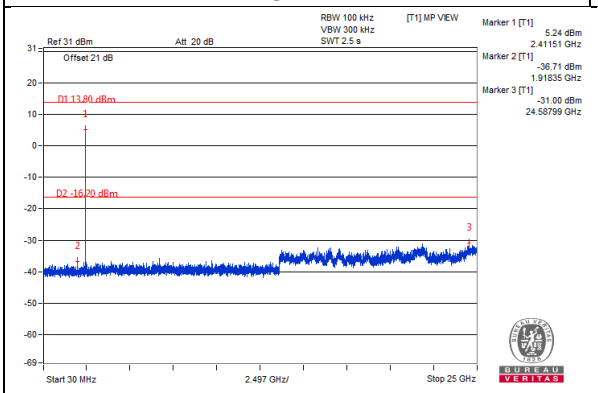


CH 11 Band edge

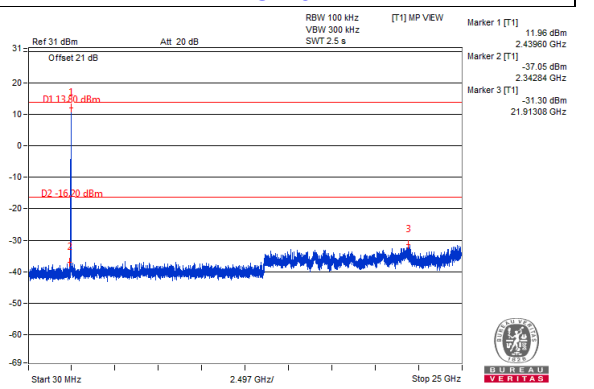


Chain 1

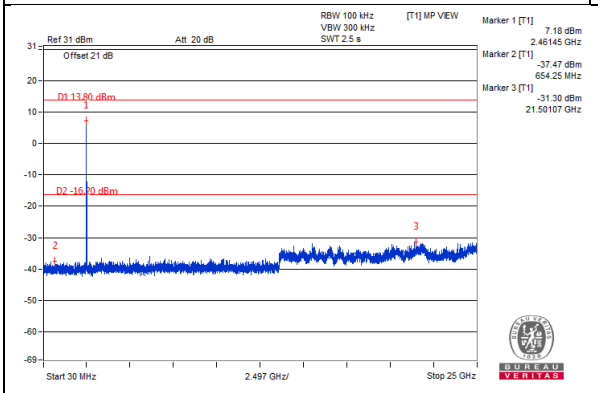
CH 1



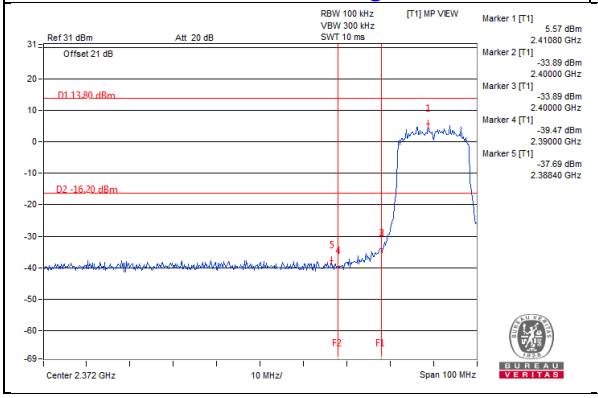
CH 6



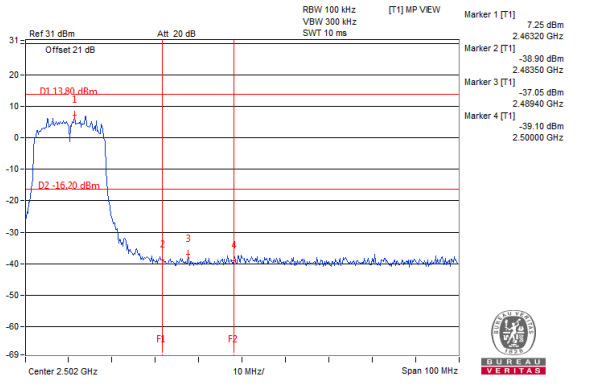
CH 11



CH 1 Band edge

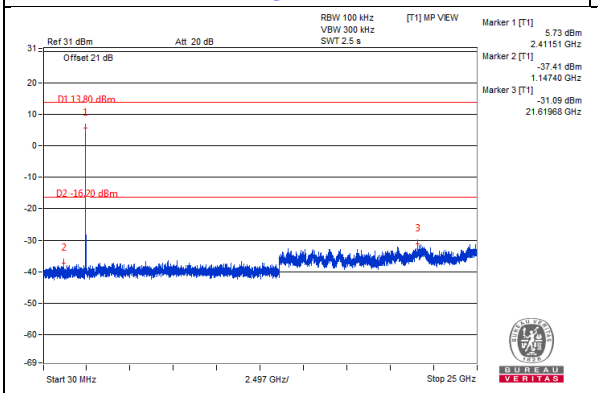


CH 11 Band edge

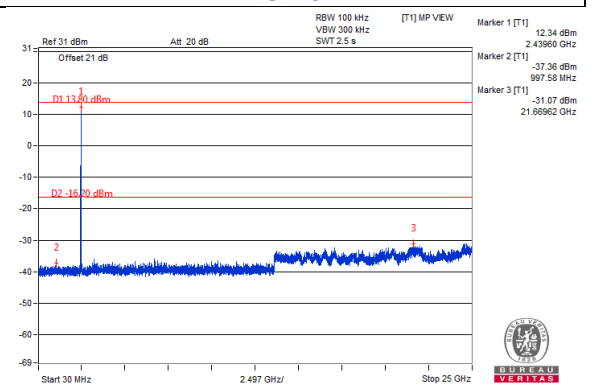


Chain 2

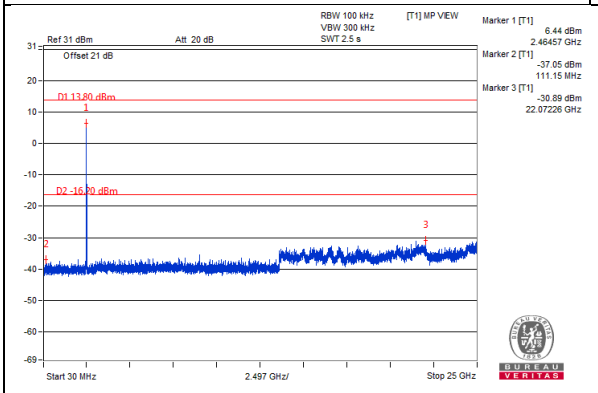
CH 1



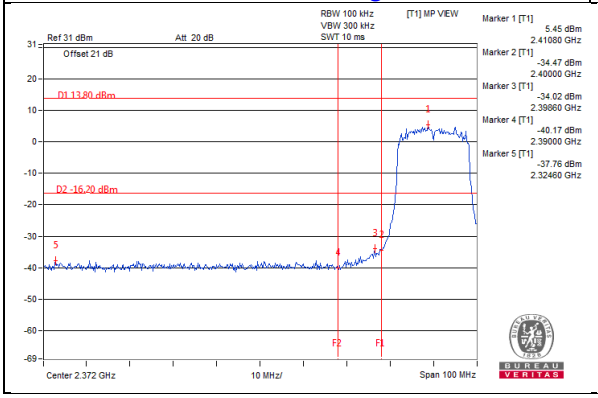
CH 6



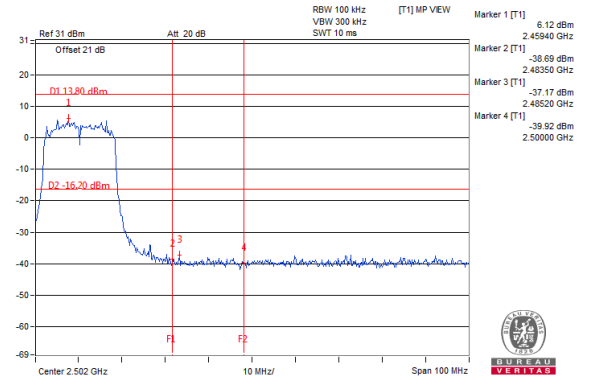
CH 11



CH 1 Band edge

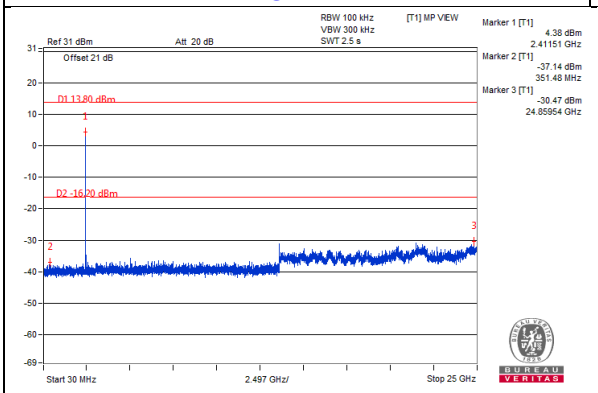


CH 11 Band edge

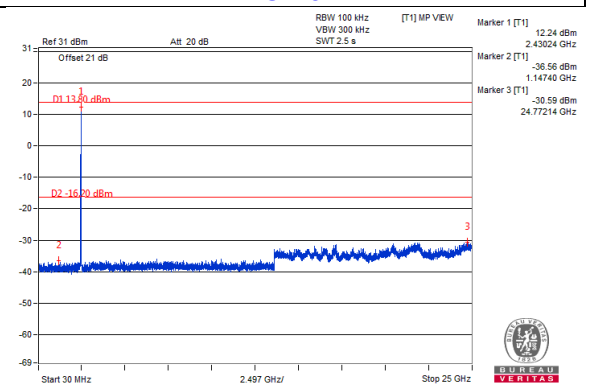


Chain 3

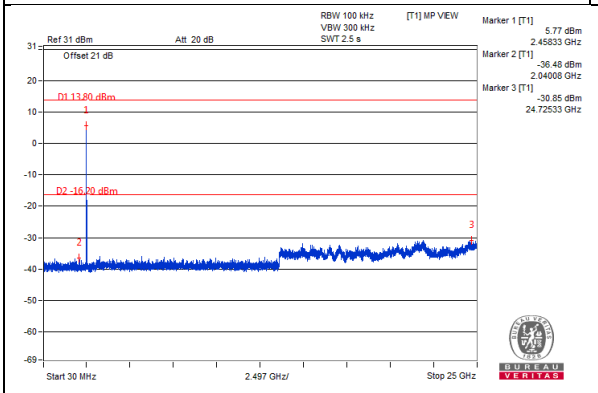
CH 1



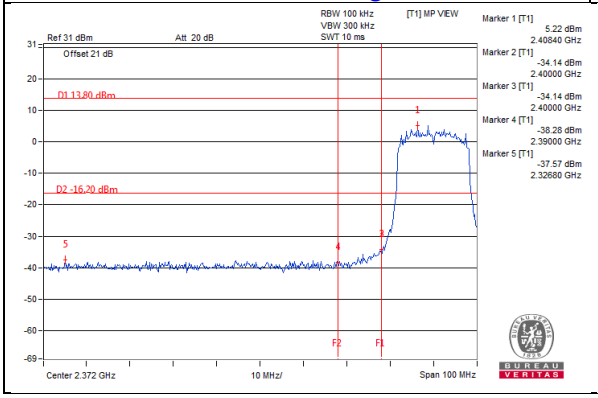
CH 6



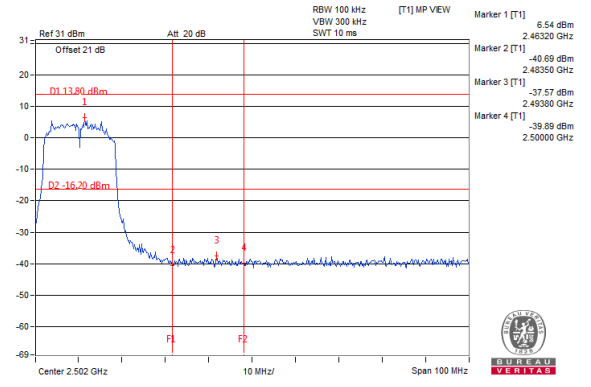
CH 11



CH 1 Band edge

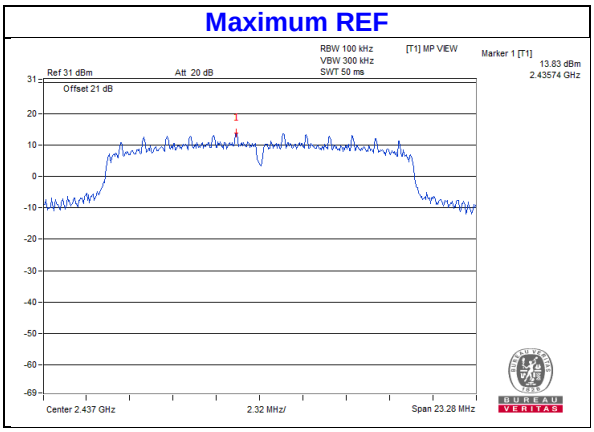


CH 11 Band edge

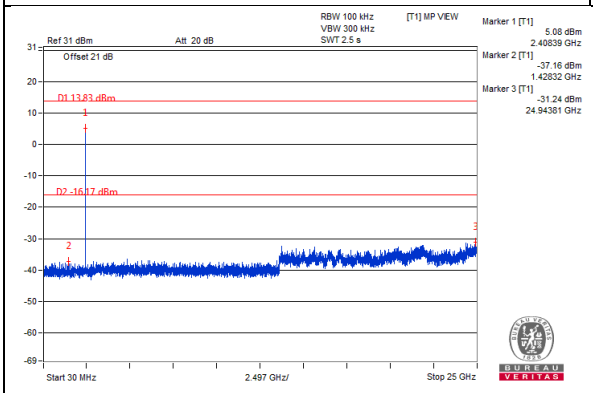


802.11n (HT20)
Chain0

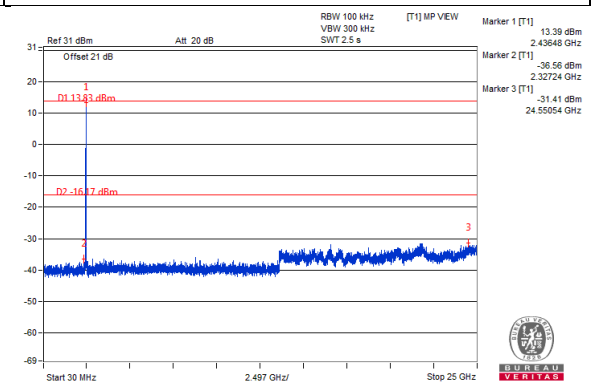
Maximum REF



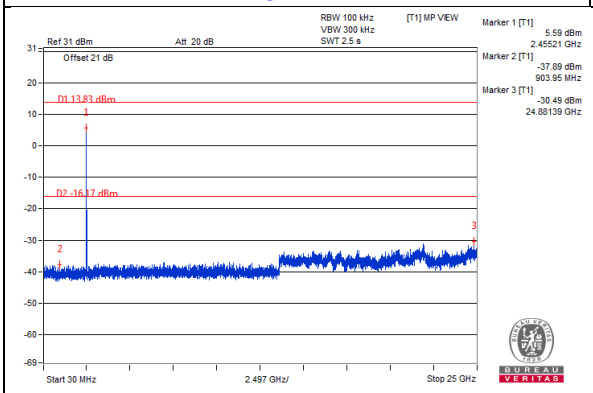
CH 1



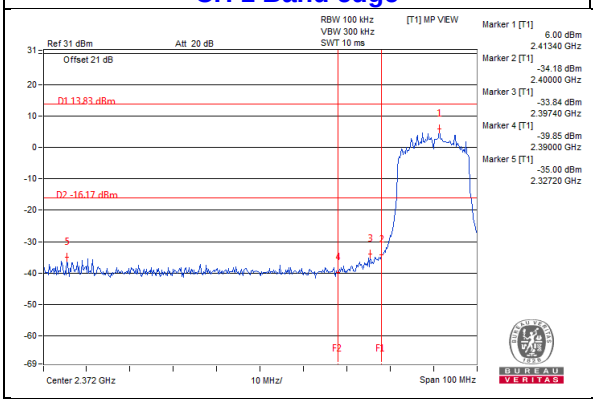
CH 6



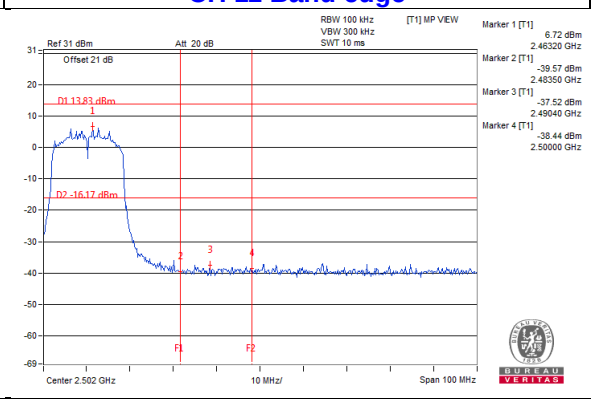
CH 11



CH 1 Band edge

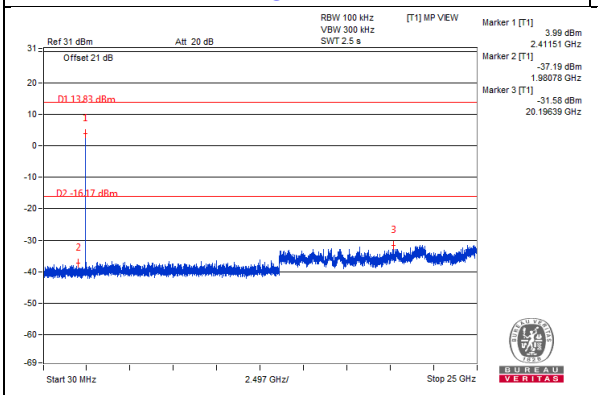


CH 11 Band edge

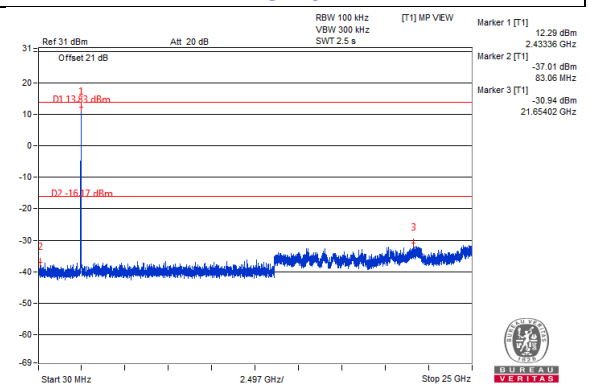


Chain 1

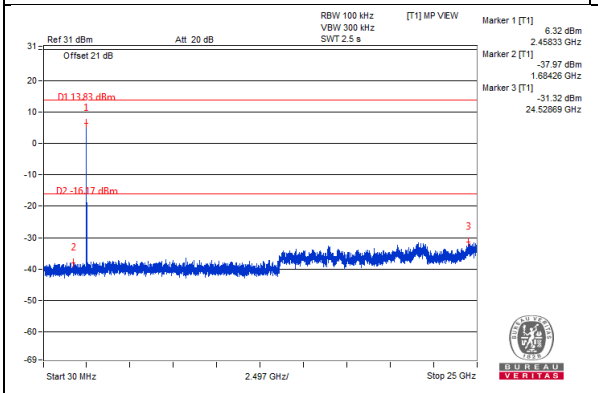
CH 1



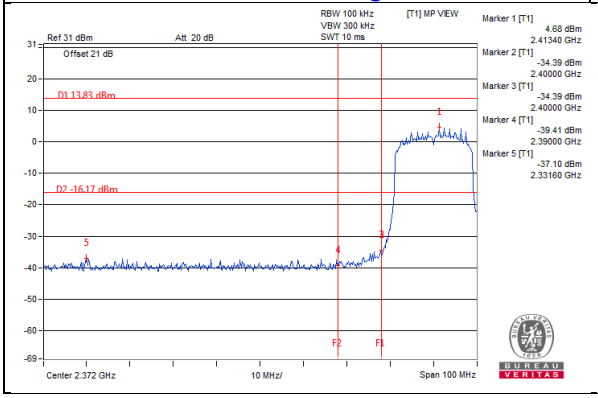
CH 6



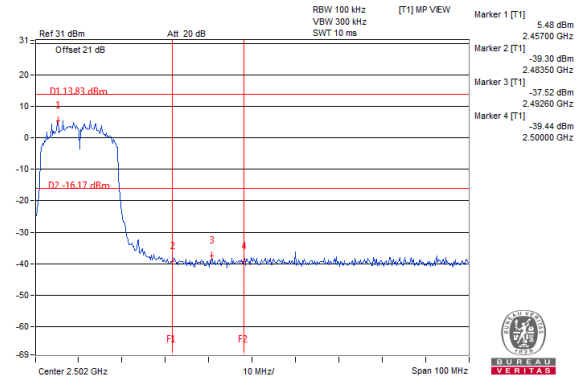
CH 11



CH 1 Band edge

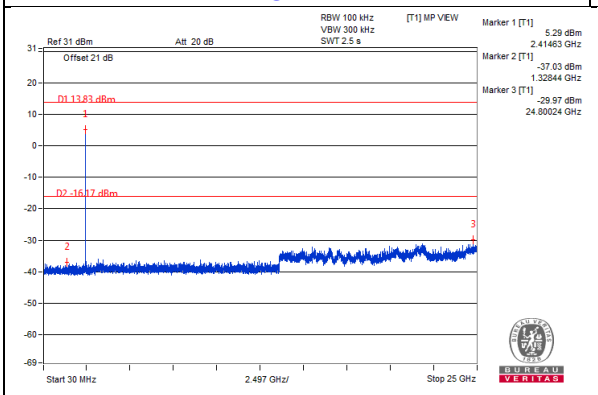


CH 11 Band edge

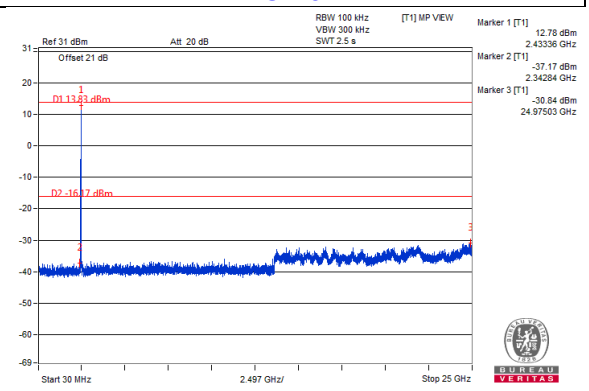


Chain 2

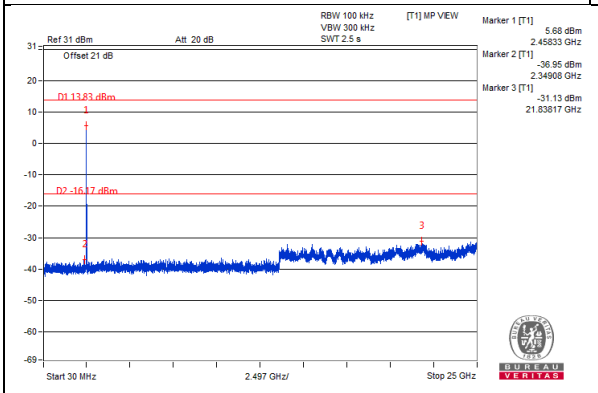
CH 1



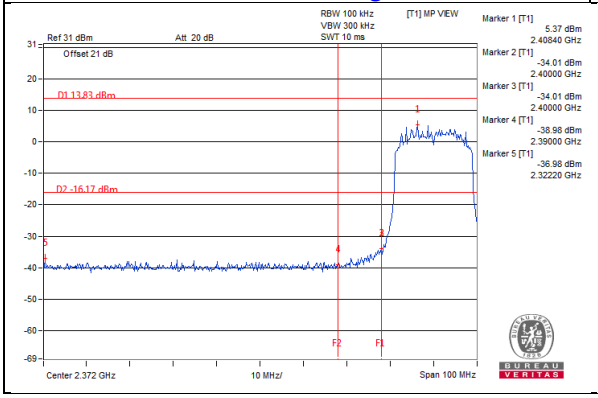
CH 6



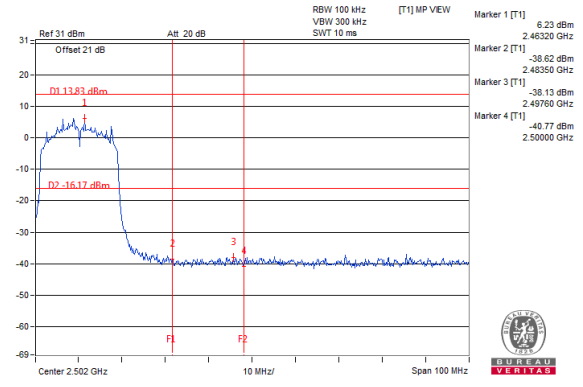
CH 11



CH 1 Band edge

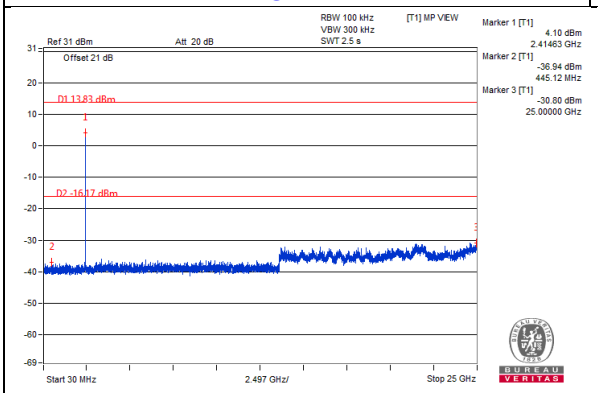


CH 11 Band edge

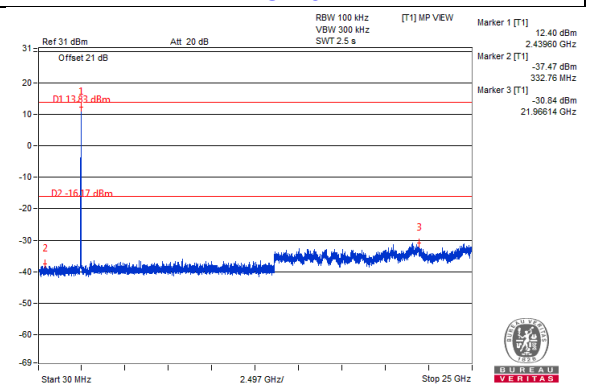


Chain 3

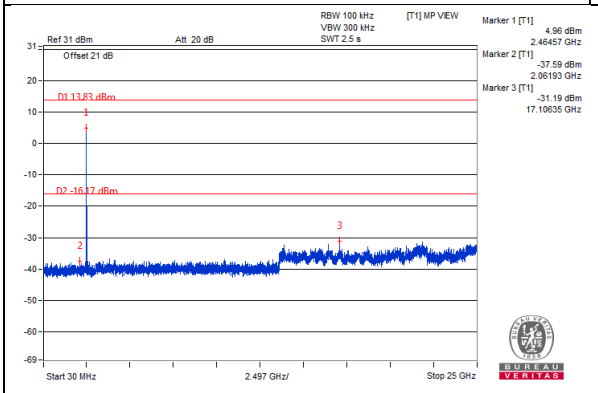
CH 1



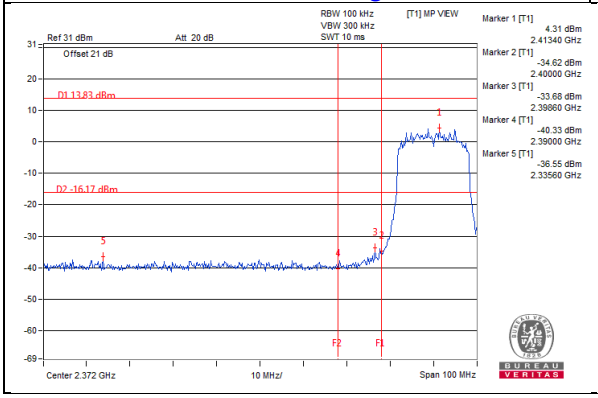
CH 6



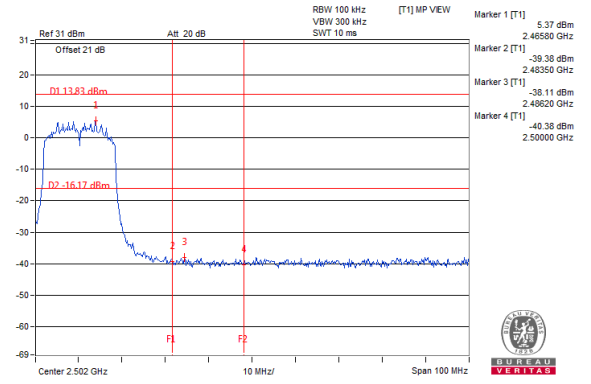
CH 11



CH 1 Band edge

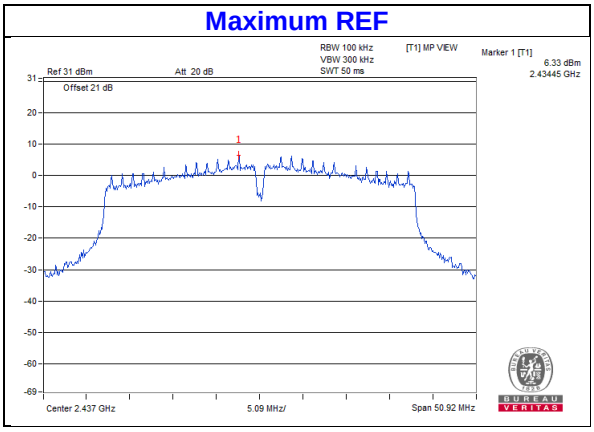


CH 11 Band edge

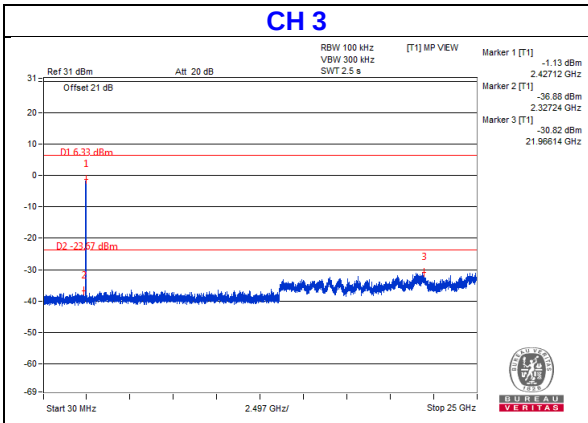


802.11n (HT40)
Chain0

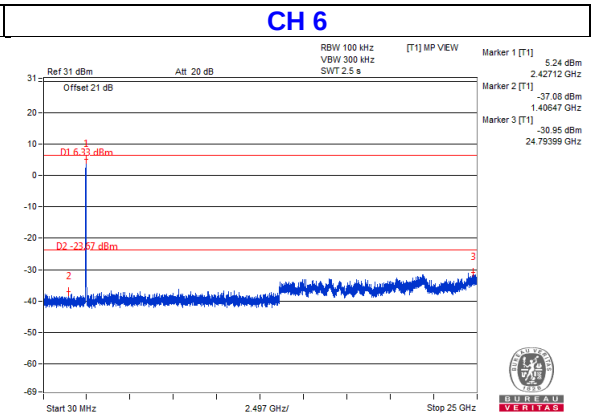
Maximum REF



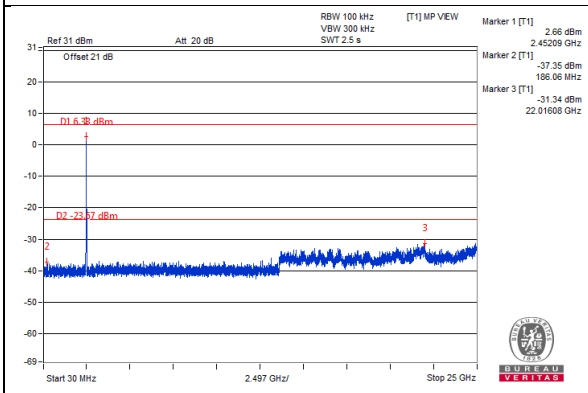
CH 3



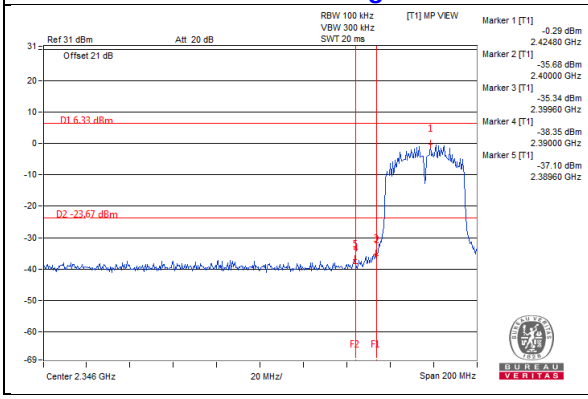
CH 6



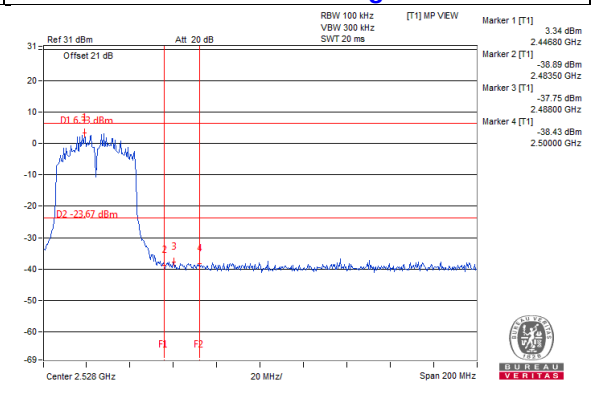
CH 9



CH 3 Band edge

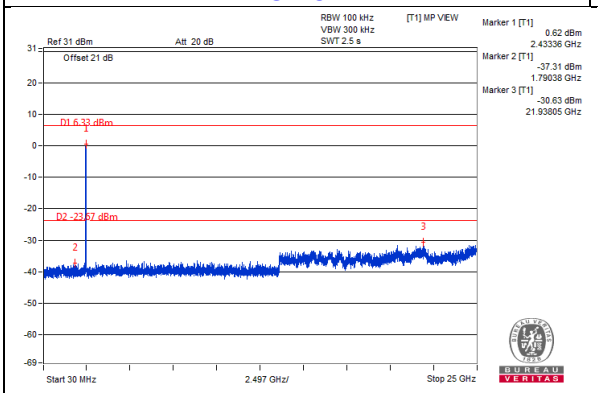


CH 9 Band edge

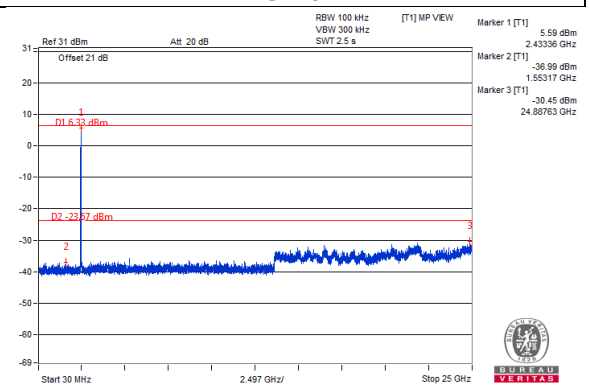


Chain 1

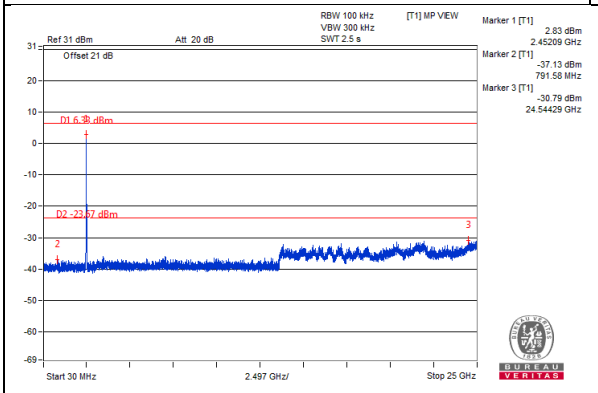
CH 3



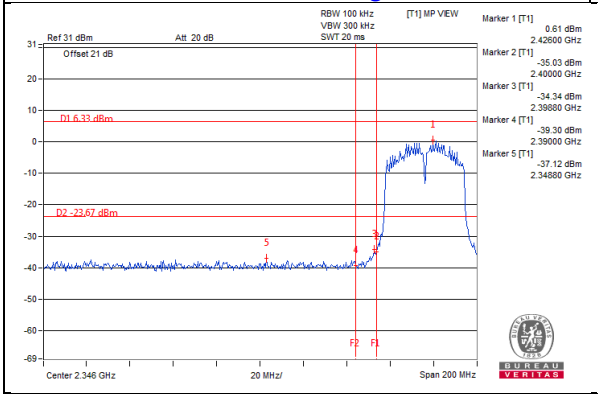
CH 6



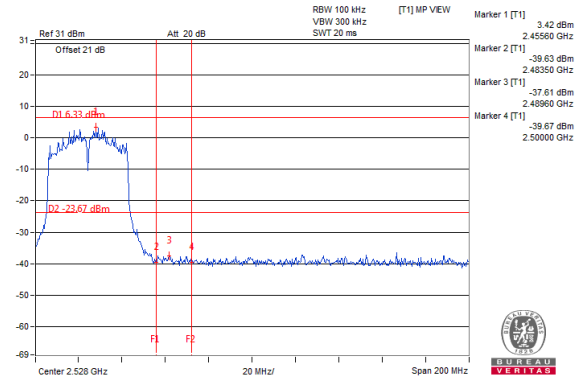
CH 9



CH 3 Band edge

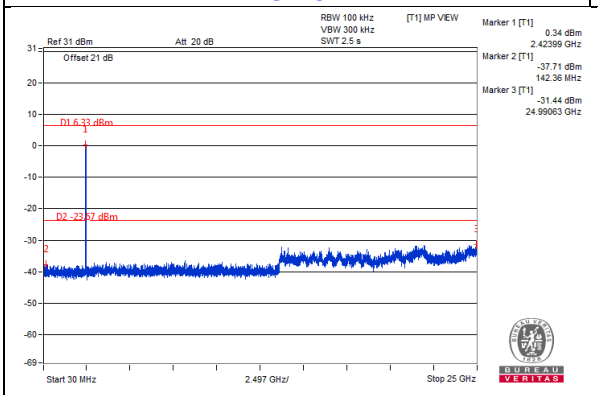


CH 9 Band edge

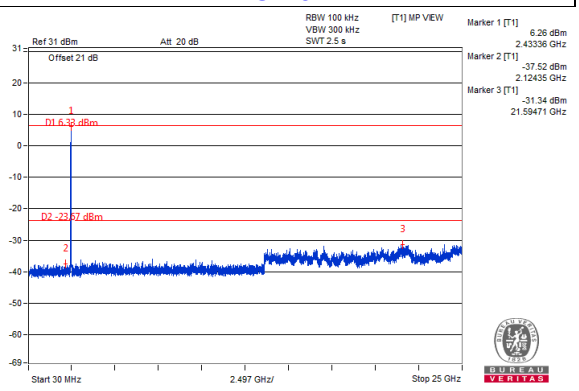


Chain 2

CH 3



CH 6



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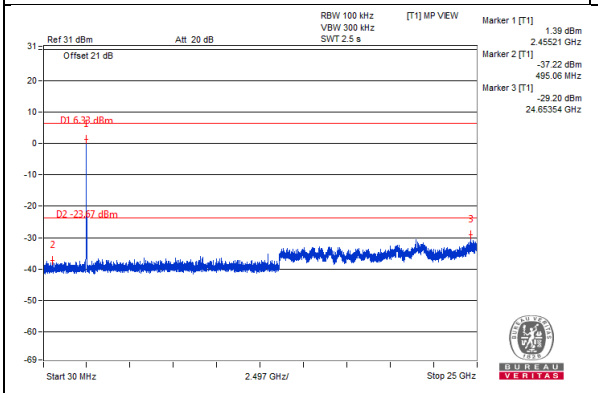

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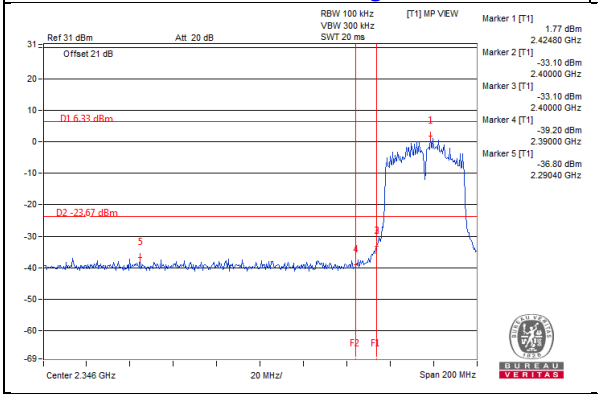

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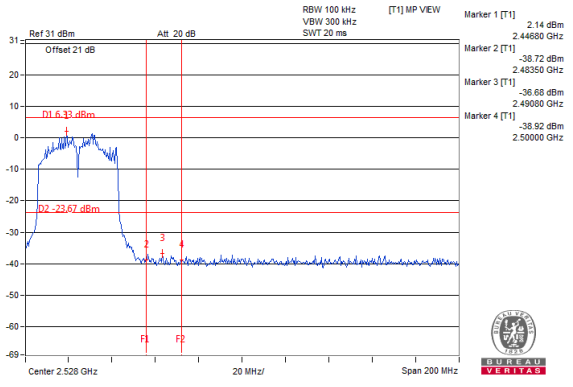
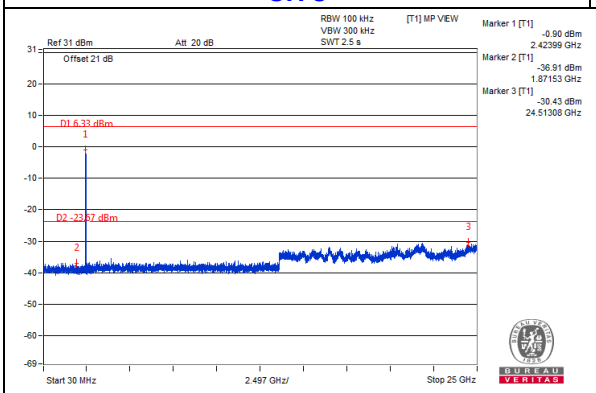
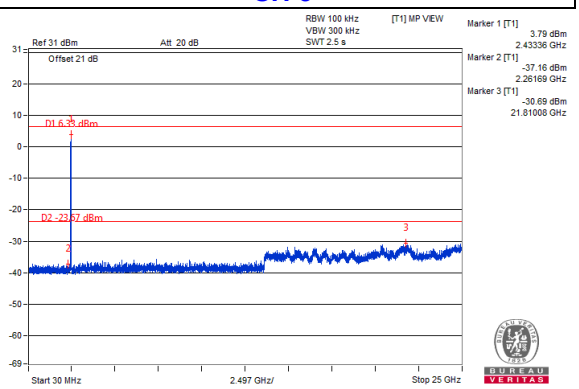


Chain 3

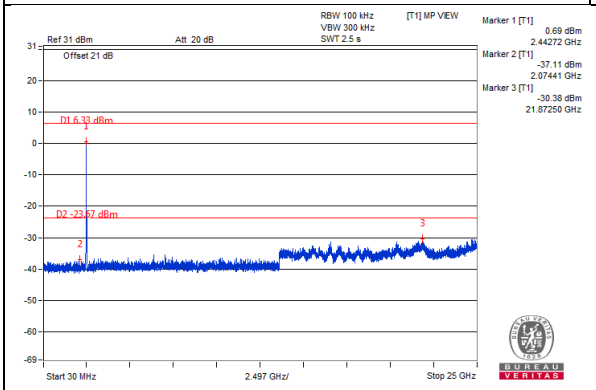
CH 3



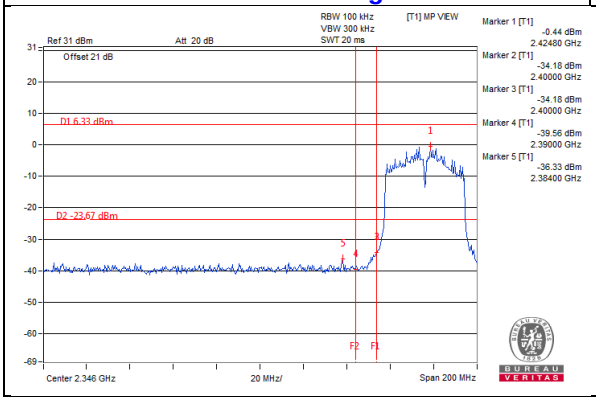
CH 6



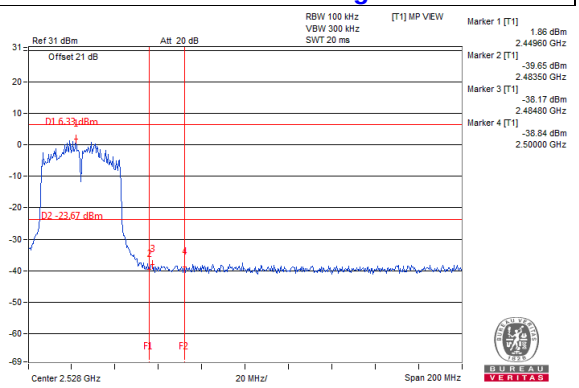
CH 9



CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

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

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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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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