

FCC Test Report (WLAN)

Report No.: RF180830E03

FCC ID: 2APLE18300394

Test Model: VMB5000

Received Date: Sep. 04, 2018

Test Date: Sep. 27 to Oct. 13, 2018

Issued Date: Nov. 01, 2018

Applicant: Arlo Technologies, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF180830E03	Original release.	Nov. 01, 2018

1 Certificate of Conformity

Product: Alro Gen5 Entry Hub

Brand: Arlo

Test Model: VMB5000

Sample Status: ENGINEERING SAMPLE

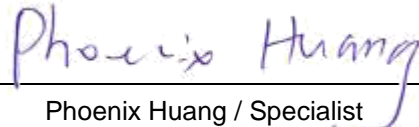
Applicant: Arlo Technologies, Inc.

Test Date: Sep. 27 to Oct. 13, 2018

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.

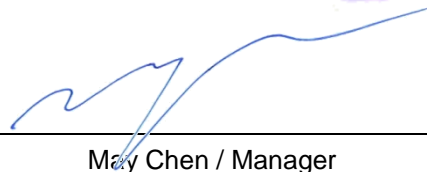
Prepared by :


Phoenix Huang / Specialist

Date:

Nov. 01, 2018

Approved by :


May Chen / Manager

Date:

Nov. 01, 2018

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 -12.20dB at 0.47031MHz.
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 2390.00MHz, 2483.50MHz, 2486.80MHz, 2490.00MHz, 4824.00MHz and 4874.00MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex not a standard connector.

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) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.53 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.08 dB
	6GHz ~ 18GHz	4.98 dB
	18GHz ~ 40GHz	5.19 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Alro Gen5 Entry Hub
Brand	Arlo
Test Model	VMB5000
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 only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 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: 508.821mW 5.18 ~ 5.24GHz: 571.179mW 5.745 ~ 5.825GHz: 490.624mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	NA

Note:

- There are WLAN, Z-Wave, Zigbee and Sub-GHz technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
WLAN (2.4GHz+5GHz band)	Z-Wave	Zigbee	Sub-GHz

- Simultaneously transmission condition.

Condition	Technology				
1	WLAN 2.4GHz	WLAN 5GHz	Z-Wave	Zigbee	Sub-GHz

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

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

No.	Brand	Model No.	P/N No.	Spec.
1	NETGEAR	AD2076F10	332-10993-01	Input: 100-120Vac, 0.56A, 50/60Hz Output: 12Vdc, 1.5A DC output cable (Unshielded, 1.8m)
2	NETGEAR	AD2067M20	332-11074-01	Input: 100-240Vac, 1.0A, 50/60Hz Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.8m)
3	NETGEAR	2ABB018F 1 NJ	332-10927-01	Input: 100-120Vac, 0.6A, 50/60Hz Output: 12Vdc, 1.5A DC output cable (Unshielded, 1.8m)
4	NETGEAR	P030WM120B	332-10345-02	Input: 100-240Vac, 1.0A, 50/60Hz Output: 12Vdc, 2.5A DC output cable (Unshielded, 1.8m)

Note: From the above models, the worst radiated emission and AC power conducted emission test was found in **Adapter 2**. Therefore only the test data of the modes were recorded in this report.

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

Sub-GHz							
Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (MHz)	Antenna type	Connector type	
1	NA	902P00214N0	1.5	860~930	PIFA	NA	
Z-Wave							
Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (MHz)	Antenna type	Connector type	
1	NA	902P00213N0	2.5	860~930	PIFA	NA	
Zigbee							
Ant No.	Brand	Model	Antenna Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type	
1	INPAQ TECHNOLOGY CO., LTD.	ACA-5036-A2-CC-S	3.5	2.4~2.4835	CHIP	NA	
WLAN							
Ant No.	Brand	Model	Antenna Net Gain (dBi)	Frequency rang (GHz)	Antenna type	Connector type	Cable Length (mm)
1	NA	9 07X01052X0	2.5	2.4~2.4835	Dipole	i-pex	75
			1.8	5.15~5.25			
			2	5.25~5.35			
			2.2	5.47~5.725			
			1.6	5.725~5.85			
2	NA	9 07X00747X19	2.5	2.4~2.4835	Dipole	i-pex	90
			2.2	5.15~5.25			
			1.2	5.25~5.35			
			3.2	5.47~5.725			
			3.5	5.725~5.85			

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
5GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

Radiated Emission Test (Above 1GHz):

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

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 \geq 1G	24deg. C, 63%RH	120Vac, 60Hz	Rey Chen
RE $<$ 1G	23deg. C, 68%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

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

If duty cycle of test signal is $< 98\%$, duty factor shall be considered.

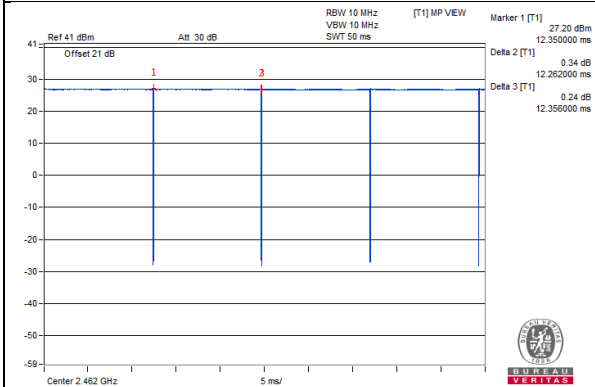
802.11b: Duty cycle = $12.262 \text{ ms} / 12.356 \text{ ms} = 0.992$

802.11g: Duty cycle = $2.027 \text{ ms} / 2.128 \text{ ms} = 0.953$, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.21$

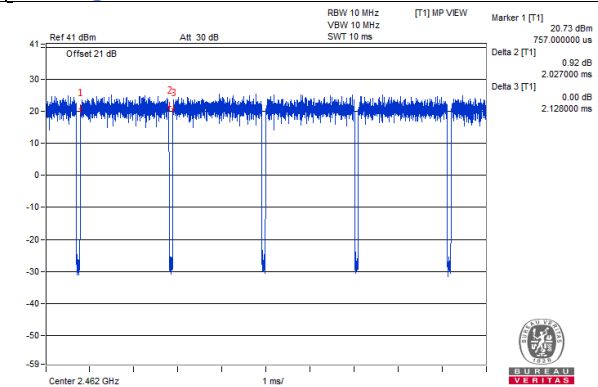
802.11n (HT20): Duty cycle = $4.958 \text{ ms} / 5.043 \text{ ms} = 0.983$

802.11n (HT40): Duty cycle = $2.405 \text{ ms} / 2.498 \text{ ms} = 0.963$, Duty factor = $10 * \log(1/\text{Duty cycle}) = 0.16$

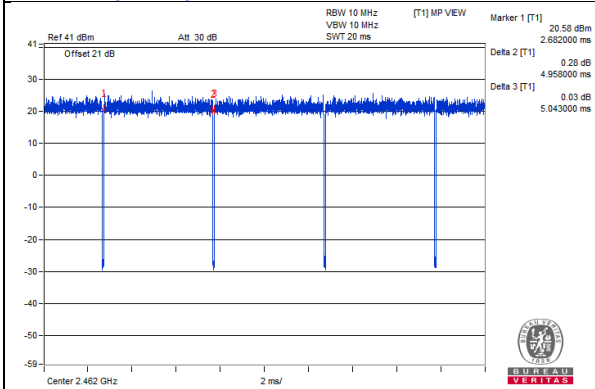
802.11b



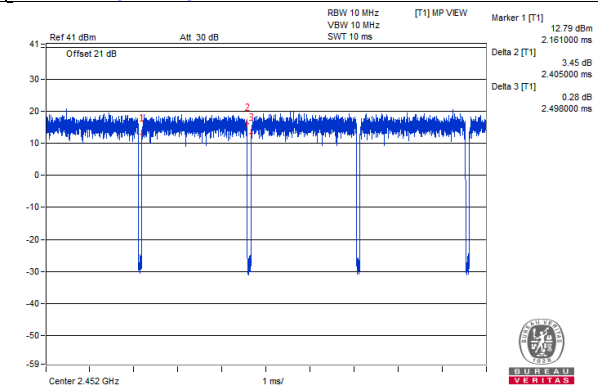
802.11g



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.

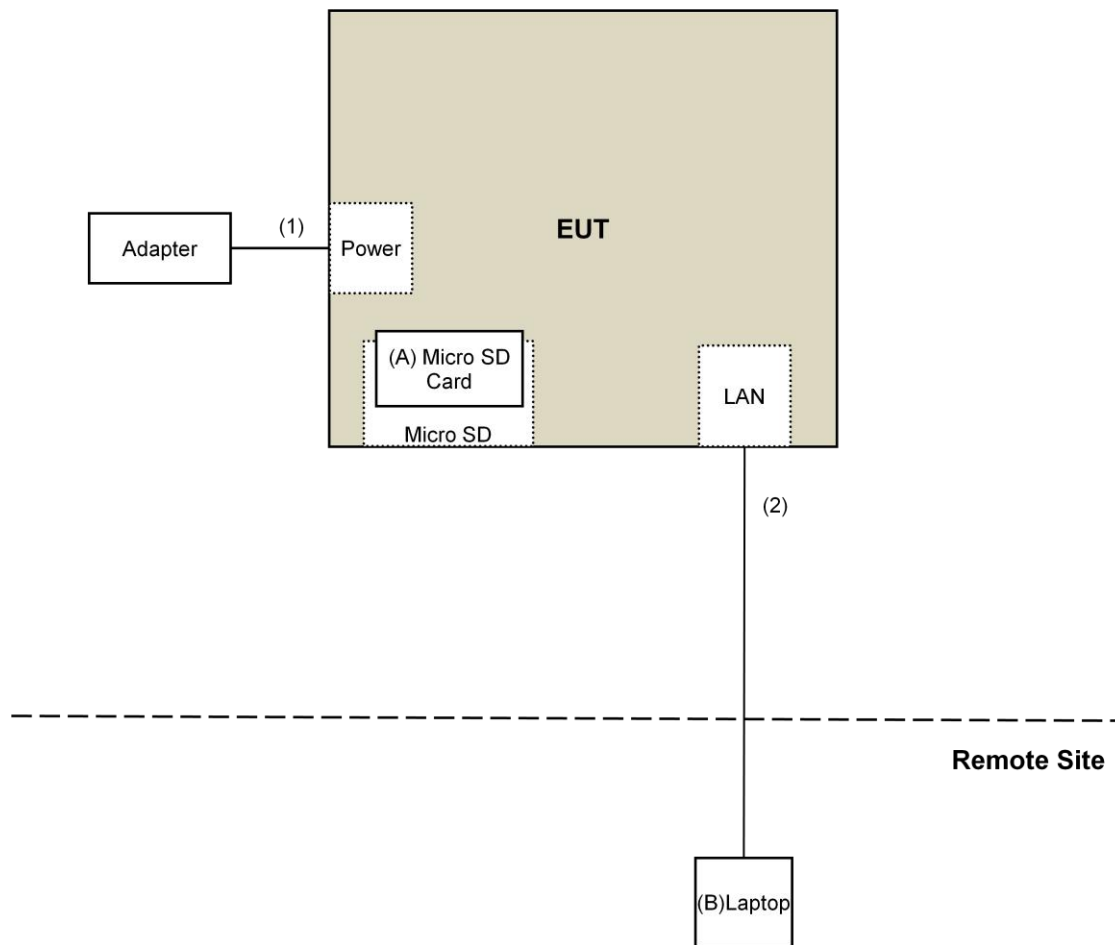
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	MicroSD Card	SanDisk	8GB	NA	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab

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 v05

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

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	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
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

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Sep. 27 to Oct. 13, 2018

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

Note:

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

For Radiated emission above 30MHz

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

Note:

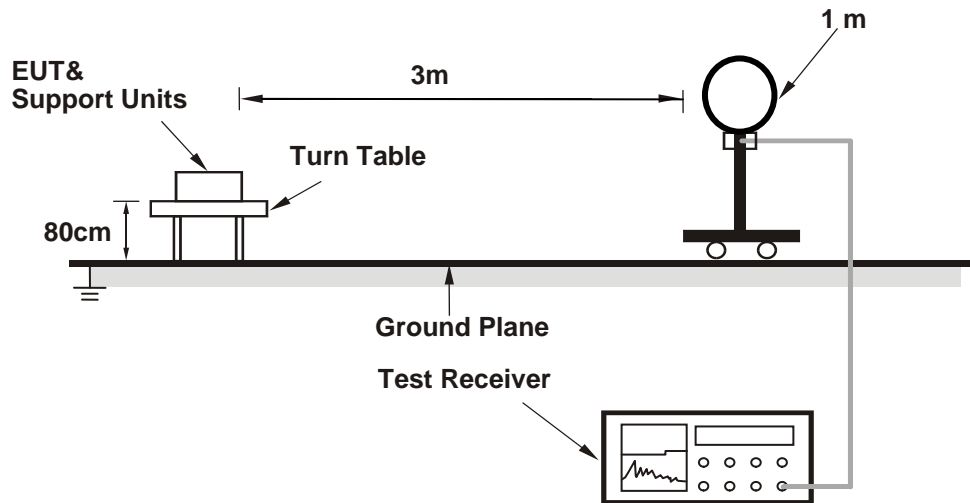
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

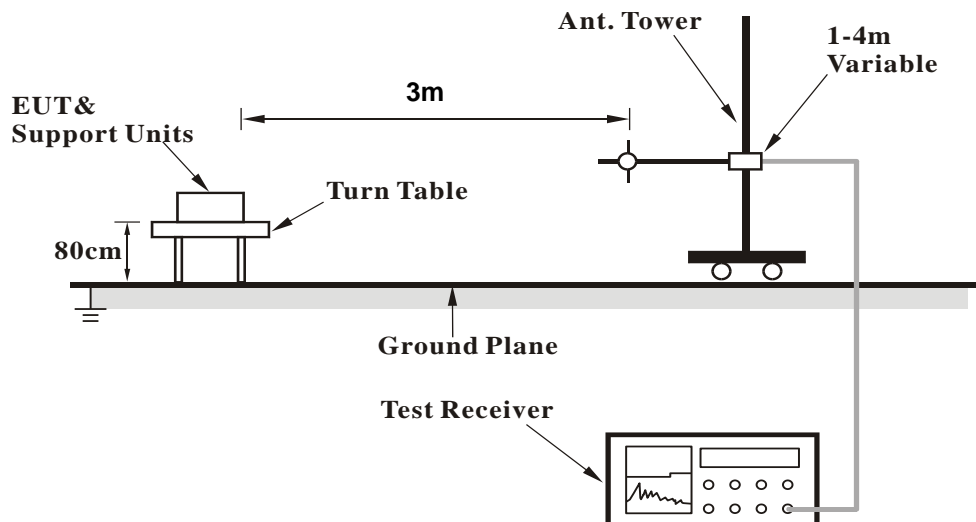
No deviation.

4.1.5 Test Setup

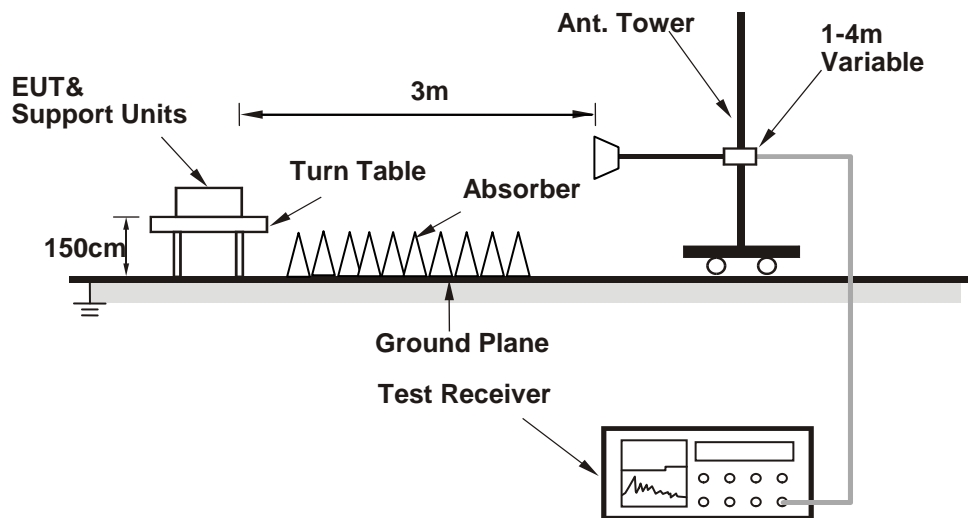
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on remote site.
- Controlling software (QDART-Connectivity100040.exe) 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)
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	55.8 PK	74.0	-18.2	2.17 H	353	58.5	-2.7
2	2390.00	44.0 AV	54.0	-10.0	2.17 H	353	46.7	-2.7
3	*2412.00	114.9 PK			2.17 H	353	117.6	-2.7
4	*2412.00	113.4 AV			2.17 H	353	116.1	-2.7
5	4824.00	51.9 PK	74.0	-22.1	2.06 H	11	50.3	1.6
6	4824.00	49.6 AV	54.0	-4.4	2.06 H	11	48.0	1.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.2 PK	74.0	-15.8	3.09 V	297	60.9	-2.7
2	2390.00	45.3 AV	54.0	-8.7	3.09 V	297	48.0	-2.7
3	*2412.00	115.3 PK			3.09 V	297	118.0	-2.7
4	*2412.00	113.9 AV			3.09 V	297	116.6	-2.7
5	4824.00	55.0 PK	74.0	-19.0	3.26 V	262	53.4	1.6
6	4824.00	53.9 AV	54.0	-0.1	3.26 V	262	52.3	1.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	115.8 PK			2.21 H	360	118.8	-3.0
2	*2437.00	114.5 AV			2.21 H	360	117.5	-3.0
3	4874.00	52.3 PK	74.0	-21.7	2.03 H	24	50.7	1.6
4	4874.00	49.6 AV	54.0	-4.4	2.03 H	24	48.0	1.6
5	7311.00	47.4 PK	74.0	-26.6	1.43 H	317	39.7	7.7
6	7311.00	34.8 AV	54.0	-19.2	1.43 H	317	27.1	7.7

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	116.2 PK			1.62 V	308	119.2	-3.0
2	*2437.00	115.0 AV			1.62 V	308	118.0	-3.0
3	4874.00	55.4 PK	74.0	-18.6	1.47 V	253	53.8	1.6
4	4874.00	53.9 AV	54.0	-0.1	1.47 V	253	52.3	1.6
5	7311.00	47.2 PK	74.0	-26.8	1.54 V	308	39.5	7.7
6	7311.00	35.1 AV	54.0	-18.9	1.54 V	308	27.4	7.7

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	118.1 PK			2.21 H	337	121.1	-3.0
2	*2462.00	115.3 AV			2.21 H	337	118.3	-3.0
3	2483.50	47.3 PK	74.0	-26.7	1.42 H	328	50.3	-3.0
4	2483.50	34.4 AV	54.0	-19.6	1.42 H	328	37.4	-3.0
5	2486.80	58.5 PK	74.0	-15.5	2.21 H	337	61.4	-2.9
6	2486.80	52.6 AV	54.0	-1.4	2.21 H	337	55.5	-2.9
7	4924.00	51.1 PK	74.0	-22.9	2.00 H	26	49.4	1.7
8	4924.00	48.6 AV	54.0	-5.4	2.00 H	26	46.9	1.7
9	7386.00	47.0 PK	74.0	-27.0	1.39 H	309	39.1	7.9
10	7386.00	34.7 AV	54.0	-19.3	1.39 H	309	26.8	7.9

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	118.5 PK			1.12 V	121	121.5	-3.0
2	*2462.00	115.8 AV			1.12 V	121	118.8	-3.0
3	2483.50	60.1 PK	74.0	-13.9	1.12 V	121	63.1	-3.0
4	2483.50	52.7 AV	54.0	-1.3	1.12 V	121	55.7	-3.0
5	2486.80	60.9 PK	74.0	-13.1	1.12 V	121	63.8	-2.9
6	2486.80	53.9 AV	54.0	-0.1	1.12 V	121	56.8	-2.9
7	4924.00	54.2 PK	74.0	-19.8	2.45 V	254	52.5	1.7
8	4924.00	52.9 AV	54.0	-1.1	2.45 V	254	51.2	1.7
9	7386.00	47.2 PK	74.0	-26.8	1.49 V	314	39.3	7.9
10	7386.00	35.0 AV	54.0	-19.0	1.49 V	314	27.1	7.9

REMARKS:

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.0 PK	74.0	-7.0	2.11 H	344	69.7	-2.7
2	2390.00	52.6 AV	54.0	-1.4	2.11 H	344	55.3	-2.7
3	*2412.00	115.5 PK			2.11 H	344	118.2	-2.7
4	*2412.00	105.2 AV			2.11 H	344	107.9	-2.7
5	4824.00	45.4 PK	74.0	-28.6	2.01 H	151	43.8	1.6
6	4824.00	31.0 AV	54.0	-23.0	2.01 H	151	29.4	1.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.4 PK	74.0	-4.6	1.23 V	158	72.1	-2.7
2	2390.00	53.9 AV	54.0	-0.1	1.23 V	158	56.6	-2.7
3	*2412.00	115.9 PK			1.23 V	158	118.6	-2.7
4	*2412.00	105.7 AV			1.23 V	158	108.4	-2.7
5	4824.00	48.5 PK	74.0	-25.5	1.44 V	279	46.9	1.6
6	4824.00	35.3 AV	54.0	-18.7	1.44 V	279	33.7	1.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2387.60	58.4 PK	74.0	-15.6	2.12 H	339	61.1	-2.7
2	2387.60	46.0 AV	54.0	-8.0	2.12 H	339	48.7	-2.7
3	2390.00	51.5 PK	74.0	-22.5	2.12 H	339	54.2	-2.7
4	2390.00	45.0 AV	54.0	-9.0	2.12 H	339	47.7	-2.7
5	*2437.00	120.1 PK			2.12 H	339	123.1	-3.0
6	*2437.00	107.9 AV			2.12 H	339	110.9	-3.0
7	2483.50	55.3 PK	74.0	-18.7	2.12 H	339	58.3	-3.0
8	2483.50	46.2 AV	54.0	-7.8	2.12 H	339	49.2	-3.0
9	4874.00	46.5 PK	74.0	-27.5	1.98 H	126	44.9	1.6
10	4874.00	32.0 AV	54.0	-22.0	1.98 H	126	30.4	1.6
11	7311.00	46.7 PK	74.0	-27.3	1.49 H	268	39.0	7.7
12	7311.00	34.5 AV	54.0	-19.5	1.49 H	268	26.8	7.7

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	2387.60	60.8 PK	74.0	-13.2	1.59 V	313	63.5	-2.7
2	2387.60	47.3 AV	54.0	-6.7	1.59 V	313	50.0	-2.7
3	2390.00	53.9 PK	74.0	-20.1	1.59 V	313	56.6	-2.7
4	2390.00	46.3 AV	54.0	-7.7	1.59 V	313	49.0	-2.7
5	*2437.00	120.5 PK			1.59 V	313	123.5	-3.0
6	*2437.00	108.4 AV			1.59 V	313	111.4	-3.0
7	2483.50	57.7 PK	74.0	-16.3	1.59 V	313	60.7	-3.0
8	2483.50	47.5 AV	54.0	-6.5	1.59 V	313	50.5	-3.0
9	4874.00	49.6 PK	74.0	-24.4	1.50 V	254	48.0	1.6
10	4874.00	36.3 AV	54.0	-17.7	1.50 V	254	34.7	1.6
11	7311.00	46.9 PK	74.0	-27.1	1.58 V	320	39.2	7.7
12	7311.00	34.8 AV	54.0	-19.2	1.58 V	320	27.1	7.7

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	115.1 PK			2.19 H	350	118.1	-3.0
2	*2462.00	104.8 AV			2.19 H	350	107.8	-3.0
3	2483.50	71.3 PK	74.0	-2.7	2.19 H	350	74.3	-3.0
4	2483.50	52.6 AV	54.0	-1.4	2.19 H	350	55.6	-3.0
5	4924.00	44.6 PK	74.0	-29.4	2.04 H	135	42.9	1.7
6	4924.00	30.4 AV	54.0	-23.6	2.04 H	135	28.7	1.7
7	7386.00	46.0 PK	74.0	-28.0	1.49 H	272	38.1	7.9
8	7386.00	34.0 AV	54.0	-20.0	1.49 H	272	26.1	7.9

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	115.5 PK			1.13 V	119	118.5	-3.0
2	*2462.00	105.3 AV			1.13 V	119	108.3	-3.0
3	2483.50	73.7 PK	74.0	-0.3	1.13 V	119	76.7	-3.0
4	2483.50	53.9 AV	54.0	-0.1	1.13 V	119	56.9	-3.0
5	4924.00	47.7 PK	74.0	-26.3	1.48 V	256	46.0	1.7
6	4924.00	34.7 AV	54.0	-19.3	1.48 V	256	33.0	1.7
7	7386.00	46.2 PK	74.0	-27.8	1.64 V	330	38.3	7.9
8	7386.00	34.3 AV	54.0	-19.7	1.64 V	330	26.4	7.9

REMARKS:

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

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
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	66.7 PK	74.0	-7.3	2.16 H	351	69.4	-2.7
2	2390.00	52.5 AV	54.0	-1.5	2.16 H	351	55.2	-2.7
3	*2412.00	116.8 PK			2.16 H	351	119.5	-2.7
4	*2412.00	102.7 AV			2.16 H	351	105.4	-2.7
5	4824.00	45.1 PK	74.0	-28.9	1.97 H	112	43.5	1.6
6	4824.00	31.0 AV	54.0	-23.0	1.97 H	112	29.4	1.6

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.1 PK	74.0	-4.9	3.07 V	284	71.8	-2.7
2	2390.00	53.8 AV	54.0	-0.2	3.07 V	284	56.5	-2.7
3	*2412.00	117.2 PK			3.07 V	284	119.9	-2.7
4	*2412.00	103.2 AV			3.07 V	284	105.9	-2.7
5	4824.00	48.2 PK	74.0	-25.8	1.44 V	272	46.6	1.6
6	4824.00	35.3 AV	54.0	-18.7	1.44 V	272	33.7	1.6

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.50	58.7 PK	74.0	-15.3	2.11 H	355	61.4	-2.7
2	2386.50	45.1 AV	54.0	-8.9	2.11 H	355	47.8	-2.7
3	2390.00	54.2 PK	74.0	-19.8	2.11 H	355	56.9	-2.7
4	2390.00	44.9 AV	54.0	-9.1	2.11 H	355	47.6	-2.7
5	*2437.00	120.6 PK			2.11 H	355	123.6	-3.0
6	*2437.00	108.6 AV			2.11 H	355	111.6	-3.0
7	2483.50	59.1 PK	74.0	-14.9	2.11 H	355	62.1	-3.0
8	2483.50	45.7 AV	54.0	-8.3	2.11 H	355	48.7	-3.0
9	4874.00	46.4 PK	74.0	-27.6	1.96 H	123	44.8	1.6
10	4874.00	32.1 AV	54.0	-21.9	1.96 H	123	30.5	1.6
11	7311.00	46.9 PK	74.0	-27.1	1.48 H	277	39.2	7.7
12	7311.00	34.9 AV	54.0	-19.1	1.48 H	277	27.2	7.7

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	2386.50	61.1 PK	74.0	-12.9	1.63 V	328	63.8	-2.7
2	2386.50	46.4 AV	54.0	-7.6	1.63 V	328	49.1	-2.7
3	2390.00	56.6 PK	74.0	-17.4	1.63 V	328	59.3	-2.7
4	2390.00	46.2 AV	54.0	-7.8	1.63 V	328	48.9	-2.7
5	*2437.00	121.0 PK			1.63 V	328	124.0	-3.0
6	*2437.00	109.1 AV			1.63 V	328	112.1	-3.0
7	2483.50	61.5 PK	74.0	-12.5	1.63 V	328	64.5	-3.0
8	2483.50	47.0 AV	54.0	-7.0	1.63 V	328	50.0	-3.0
9	4874.00	49.5 PK	74.0	-24.5	1.49 V	268	47.9	1.6
10	4874.00	36.4 AV	54.0	-17.6	1.49 V	268	34.8	1.6
11	7311.00	47.1 PK	74.0	-26.9	1.63 V	322	39.4	7.7
12	7311.00	35.2 AV	54.0	-18.8	1.63 V	322	27.5	7.7

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR 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	115.6 PK			2.22 H	343	118.6	-3.0
2	*2462.00	103.4 AV			2.22 H	343	106.4	-3.0
3	2483.50	71.4 PK	74.0	-2.6	2.22 H	343	74.4	-3.0
4	2483.50	51.3 AV	54.0	-2.7	2.22 H	343	54.3	-3.0
5	4924.00	45.2 PK	74.0	-28.8	1.97 H	124	43.5	1.7
6	4924.00	30.9 AV	54.0	-23.1	1.97 H	124	29.2	1.7
7	7386.00	45.5 PK	74.0	-28.5	1.43 H	267	37.6	7.9
8	7386.00	33.7 AV	54.0	-20.3	1.43 H	267	25.8	7.9

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	116.0 PK			1.87 V	121	119.0	-3.0
2	*2462.00	103.9 AV			1.87 V	121	106.9	-3.0
3	2483.50	73.8 PK	74.0	-0.2	1.87 V	121	76.8	-3.0
4	2483.50	52.6 AV	54.0	-1.4	1.87 V	121	55.6	-3.0
5	4924.00	48.3 PK	74.0	-25.7	1.50 V	267	46.6	1.7
6	4924.00	35.2 AV	54.0	-18.8	1.50 V	267	33.5	1.7
7	7386.00	45.7 PK	74.0	-28.3	1.62 V	317	37.8	7.9
8	7386.00	34.0 AV	54.0	-20.0	1.62 V	317	26.1	7.9

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
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	64.6 PK	74.0	-9.4	2.19 H	339	67.3	-2.7
2	2390.00	52.6 AV	54.0	-1.4	2.19 H	339	55.3	-2.7
3	*2422.00	109.5 PK			2.19 H	339	112.4	-2.9
4	*2422.00	99.6 AV			2.19 H	339	102.5	-2.9
5	4844.00	44.9 PK	74.0	-29.1	1.93 H	122	43.3	1.6
6	4844.00	30.6 AV	54.0	-23.4	1.93 H	122	29.0	1.6
7	7266.00	45.2 PK	74.0	-28.8	1.43 H	283	37.4	7.8
8	7266.00	33.4 AV	54.0	-20.6	1.43 H	283	25.6	7.8

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.0 PK	74.0	-7.0	1.19 V	142	69.7	-2.7
2	2390.00	53.9 AV	54.0	-0.1	1.19 V	142	56.6	-2.7
3	*2422.00	109.9 PK			1.19 V	142	112.8	-2.9
4	*2422.00	100.1 AV			1.19 V	142	103.0	-2.9
5	4844.00	48.0 PK	74.0	-26.0	1.54 V	265	46.4	1.6
6	4844.00	34.9 AV	54.0	-19.1	1.54 V	265	33.3	1.6
7	7266.00	45.4 PK	74.0	-28.6	1.57 V	331	37.6	7.8
8	7266.00	33.7 AV	54.0	-20.3	1.57 V	331	25.9	7.8

REMARKS:

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

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	2380.70	62.9 PK	74.0	-11.1	2.11 H	360	65.5	-2.6
2	2380.70	48.6 AV	54.0	-5.4	2.11 H	360	51.2	-2.6
3	2390.00	58.8 PK	74.0	-15.2	2.11 H	360	61.5	-2.7
4	2390.00	47.8 AV	54.0	-6.2	2.11 H	360	50.5	-2.7
5	*2437.00	113.6 PK			2.11 H	360	116.6	-3.0
6	*2437.00	103.6 AV			2.11 H	360	106.6	-3.0
7	2483.50	66.3 PK	74.0	-7.7	2.11 H	360	69.3	-3.0
8	2483.50	52.6 AV	54.0	-1.4	2.11 H	360	55.6	-3.0
9	4874.00	46.4 PK	74.0	-27.6	1.99 H	126	44.8	1.6
10	4874.00	32.1 AV	54.0	-21.9	1.99 H	126	30.5	1.6
11	7311.00	46.7 PK	74.0	-27.3	1.45 H	261	39.0	7.7
12	7311.00	34.9 AV	54.0	-19.1	1.45 H	261	27.2	7.7

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	2380.70	65.3 PK	74.0	-8.7	1.68 V	310	67.9	-2.6
2	2380.70	49.9 AV	54.0	-4.1	1.68 V	310	52.5	-2.6
3	2390.00	61.2 PK	74.0	-12.8	1.68 V	310	63.9	-2.7
4	2390.00	49.1 AV	54.0	-4.9	1.68 V	310	51.8	-2.7
5	*2437.00	114.0 PK			1.68 V	310	117.0	-3.0
6	*2437.00	104.1 AV			1.68 V	310	107.1	-3.0
7	2483.50	68.7 PK	74.0	-5.3	1.68 V	310	71.7	-3.0
8	2483.50	53.9 AV	54.0	-0.1	1.68 V	310	56.9	-3.0
9	4874.00	49.5 PK	74.0	-24.5	1.51 V	264	47.9	1.6
10	4874.00	36.4 AV	54.0	-17.6	1.51 V	264	34.8	1.6
11	7311.00	46.9 PK	74.0	-27.1	1.62 V	315	39.2	7.7
12	7311.00	35.2 AV	54.0	-18.8	1.62 V	315	27.5	7.7

REMARKS:

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

CHANNEL	TX Channel 9	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	*2452.00	111.2 PK			2.12 H	339	114.2	-3.0
2	*2452.00	101.1 AV			2.12 H	339	104.1	-3.0
3	2483.50	61.0 PK	74.0	-13.0	2.12 H	339	64.0	-3.0
4	2483.50	46.3 AV	54.0	-7.7	2.12 H	339	49.3	-3.0
5	2490.00	67.9 PK	74.0	-6.1	2.12 H	339	70.8	-2.9
6	2490.00	52.6 AV	54.0	-1.4	2.12 H	339	55.5	-2.9
7	4904.00	45.4 PK	74.0	-28.6	1.98 H	135	43.7	1.7
8	4904.00	31.1 AV	54.0	-22.9	1.98 H	135	29.4	1.7
9	7356.00	45.7 PK	74.0	-28.3	1.45 H	265	37.8	7.9
10	7356.00	33.9 AV	54.0	-20.1	1.45 H	265	26.0	7.9

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	111.6 PK			1.67 V	302	114.6	-3.0
2	*2452.00	101.6 AV			1.67 V	302	104.6	-3.0
3	2483.50	63.4 PK	74.0	-10.6	1.67 V	302	66.4	-3.0
4	2483.50	47.6 AV	54.0	-6.4	1.67 V	302	50.6	-3.0
5	2490.00	70.3 PK	74.0	-3.7	1.67 V	302	73.2	-2.9
6	2490.00	53.9 AV	54.0	-0.1	1.67 V	302	56.8	-2.9
7	4904.00	48.5 PK	74.0	-25.5	1.55 V	254	46.8	1.7
8	4904.00	35.4 AV	54.0	-18.6	1.55 V	254	33.7	1.7
9	7356.00	45.9 PK	74.0	-28.1	1.57 V	307	38.0	7.9
10	7356.00	34.2 AV	54.0	-19.8	1.57 V	307	26.3	7.9

REMARKS:

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

Below 1GHz Data:

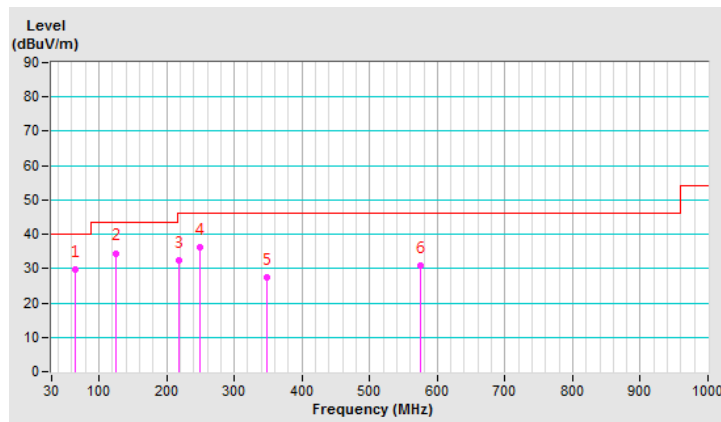
802.11g

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	64.53	29.6 QP	40.0	-10.4	2.50 H	154	38.8	-9.2
2	125.01	34.5 QP	43.5	-9.0	3.00 H	121	43.8	-9.3
3	217.89	32.3 QP	46.0	-13.7	1.50 H	143	43.1	-10.8
4	250.00	36.1 QP	46.0	-9.9	1.00 H	116	45.0	-8.9
5	347.84	27.3 QP	46.0	-18.7	1.50 H	264	33.0	-5.7
6	574.76	30.9 QP	46.0	-15.1	1.50 H	247	31.4	-0.5

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 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.



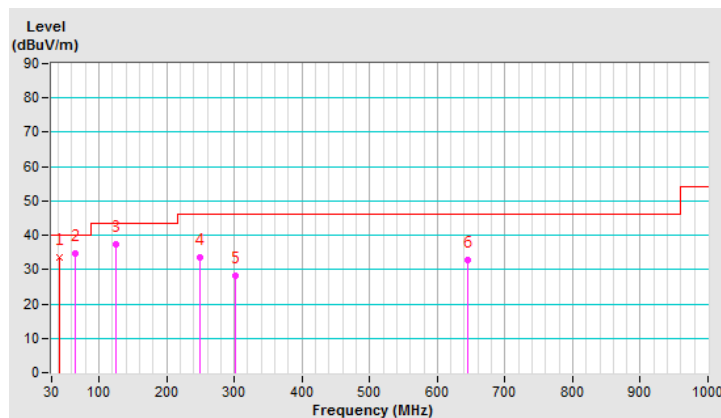
CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	41.70	33.7 QP	40.0	-6.3	1.00 V	115	41.8	-8.1
2	65.57	34.8 QP	40.0	-5.2	1.00 V	134	44.2	-9.4
3	124.99	37.4 QP	43.5	-6.1	1.00 V	126	46.7	-9.3
4	250.00	33.7 QP	46.0	-12.3	1.50 V	115	42.6	-8.9
5	302.30	28.3 QP	46.0	-17.7	1.00 V	264	35.1	-6.8
6	644.33	32.8 QP	46.0	-13.2	1.50 V	143	31.6	1.2

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. 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	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2017	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 04, 2018	June 03, 2019
50 ohms Terminator	N/A	EMC-04	Nov. 01, 2017	Oct. 31, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 28, 2018	Sep. 27, 2019
Fixed attenuator EMCI	STI02-2200-10	003	Mar. 16, 2018	Mar. 15, 2019
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: Oct. 10, 2018

4.2.3 Test Procedures

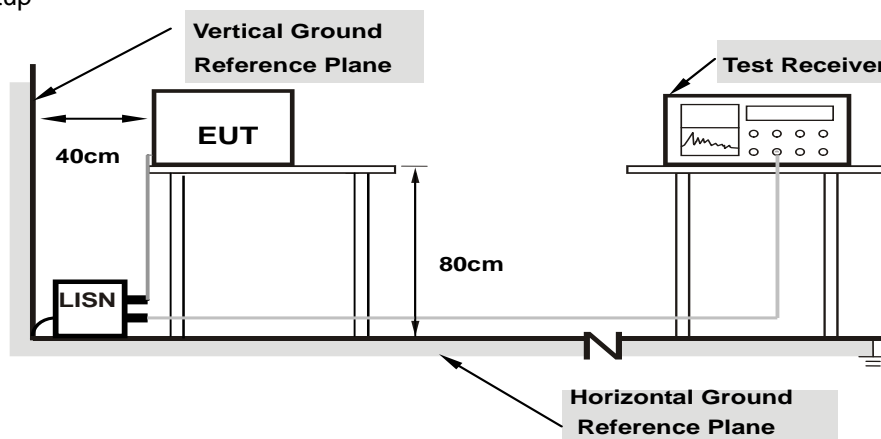
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

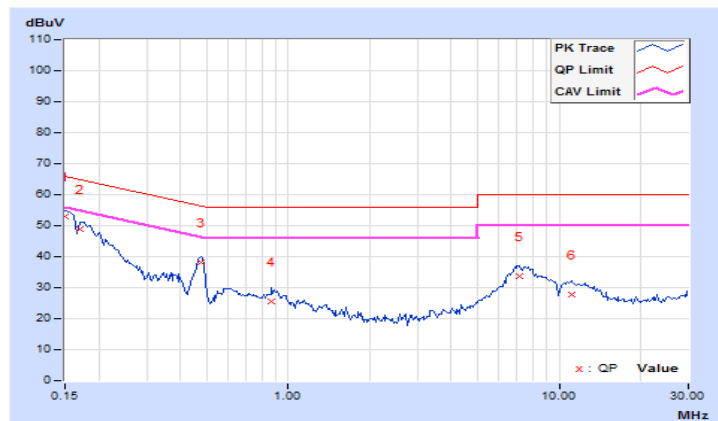
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15000	10.05	42.82	26.28	52.87	36.33	66.00	56.00	-13.13
2	0.16953	10.05	38.87	21.35	48.92	31.40	64.98	54.98	-16.06	-23.58
3	0.47422	10.13	28.04	20.80	38.17	30.93	56.44	46.44	-18.27	-15.51
4	0.86875	10.16	15.55	11.63	25.71	21.79	56.00	46.00	-30.29	-24.21
5	7.09766	10.53	23.35	17.59	33.88	28.12	60.00	50.00	-26.12	-21.88
6	11.20313	10.79	17.13	10.13	27.92	20.92	60.00	50.00	-32.08	-29.08

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

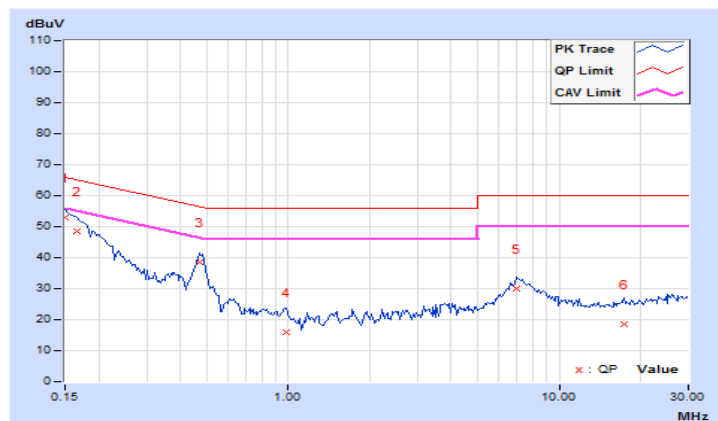


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	
1	0.15000	9.95	43.02	25.88	52.97	35.83	66.00	56.00	-13.03	-20.17
2	0.16562	9.96	38.63	20.05	48.59	30.01	65.18	55.18	-16.59	-25.17
3	0.47031	10.02	28.51	24.29	38.53	34.31	56.51	46.51	-17.98	-12.20
4	0.97813	10.04	5.93	1.57	15.97	11.61	56.00	46.00	-40.03	-34.39
5	6.95703	10.36	19.69	14.41	30.05	24.77	60.00	50.00	-29.95	-25.23
6	17.32422	11.01	7.36	1.93	18.37	12.94	60.00	50.00	-41.63	-37.06

Remarks:

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

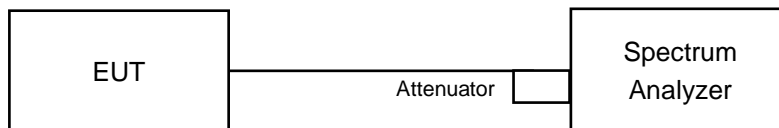


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.08	8.06	0.5	Pass
6	2437	8.11	8.08	0.5	Pass
11	2462	8.12	8.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.40	16.42	0.5	Pass
6	2437	16.37	16.39	0.5	Pass
11	2462	16.37	16.39	0.5	Pass

802.11n (HT20)

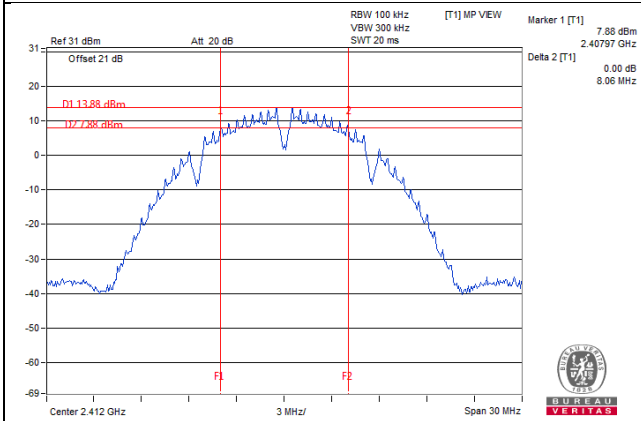
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.65	17.64	0.5	Pass
6	2437	17.64	17.65	0.5	Pass
11	2462	17.65	17.65	0.5	Pass

802.11n (HT40)

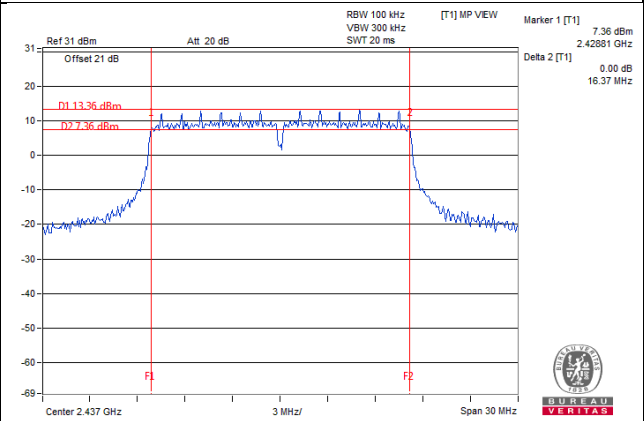
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.25	35.33	0.5	Pass
6	2437	35.32	35.43	0.5	Pass
9	2452	34.13	35.48	0.5	Pass

Spectrum Plot of Worst Value

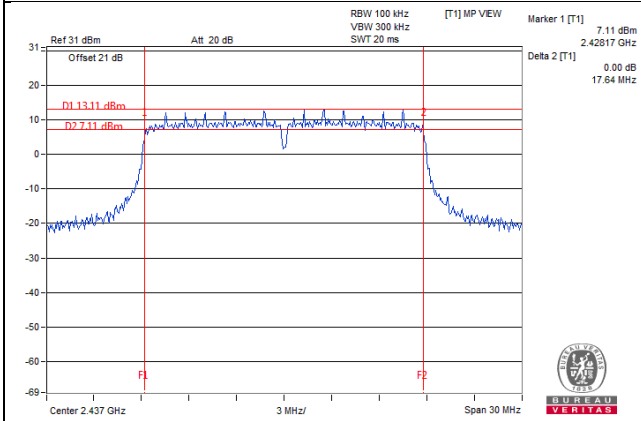
802.11b_Chain 1 / CH1



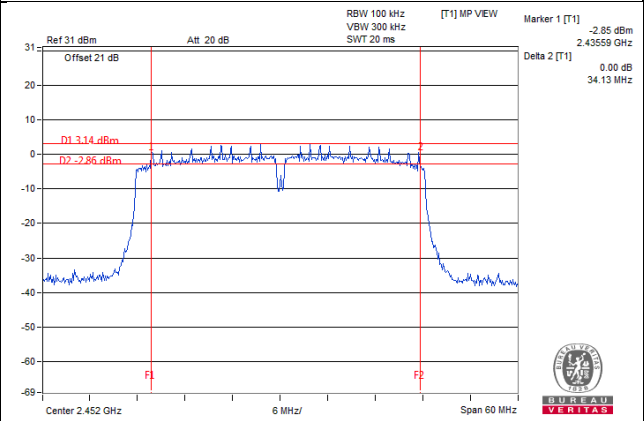
802.11g_Chain 0 / CH6



802.11n (HT20)_Chain 0 / CH6



802.11n (HT40)_Chain 0 / CH9



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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

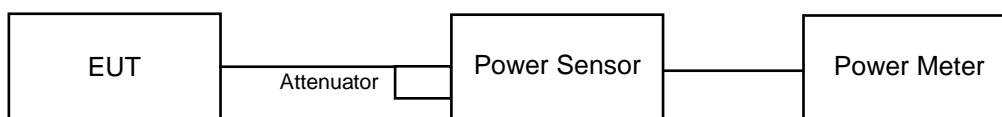
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.39	21.36	274.494	24.39	30	Pass
6	2437	23.14	23.25	417.412	26.21	30	Pass
11	2462	23.96	23.93	496.058	26.96	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				
1	2412	18.34	18.44	138.057	21.40	30	Pass
6	2437	24.00	24.11	508.821	27.07	30	Pass
11	2462	18.76	18.69	149.123	21.74	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				
1	2412	17.38	17.40	109.656	20.40	30	Pass
6	2437	24.01	24.07	507.038	27.05	30	Pass
11	2462	18.71	18.76	149.464	21.75	30	Pass

802.11n (HT40)

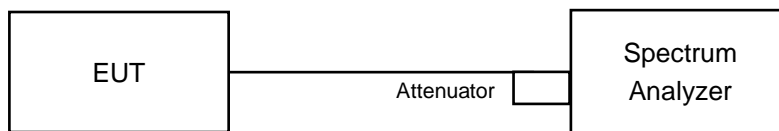
Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.11	16.15	82.042	19.14	30	Pass
6	2437	20.09	20.21	207.048	23.16	30	Pass
9	2452	16.61	17.01	96.048	19.82	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For 802.11b, 802.11n (HT20)

- a. Set instrument center frequency to DTS channel center frequency.
- b. Set span to at least 1.5 times the OBW.
- c. Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set VBW $\geq 3 \times \text{RBW}$.
- e. Detector = power averaging (RMS) or sample detector (when RMS not available).
- f. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- 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 802.11g, 802.11n (HT40)

- a. Measure the duty cycle (x).
- b. Set instrument center frequency to DTS channel center frequency.
- c. Set span to at least 1.5 times the OBW.
- d. Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- e. Set VBW $\geq 3 \times \text{RBW}$.
- f. Detector = power averaging (RMS) or sample detector (when RMS not available).
- g. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- 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=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-8.95	3.01	-5.94	8	Pass
	6	2437	-7.08	3.01	-4.07	8	Pass
	11	2462	-6.58	3.01	-3.57	8	Pass
1	1	2412	-8.88	3.01	-5.87	8	Pass
	6	2437	-6.94	3.01	-3.93	8	Pass
	11	2462	-6.22	3.01	-3.21	8	Pass

Note: 1. The directional gain = $2.5\text{dBi} + 10\log(2) = 5.51\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-14.05	3.01	0.21	-10.83	8	Pass
	6	2437	-8.51	3.01	0.21	-5.29	8	Pass
	11	2462	-14.31	3.01	0.21	-11.09	8	Pass
1	1	2412	-14.27	3.01	0.21	-11.05	8	Pass
	6	2437	-8.60	3.01	0.21	-5.38	8	Pass
	11	2462	-13.71	3.01	0.21	-10.49	8	Pass

Note: 1. The directional gain = $2.5\text{dBi} + 10\log(2) = 5.51\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

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

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-14.72	3.01	-11.71	8	Pass
	6	2437	-8.81	3.01	-5.80	8	Pass
	11	2462	-13.51	3.01	-10.50	8	Pass
1	1	2412	-14.95	3.01	-11.94	8	Pass
	6	2437	-8.40	3.01	-5.39	8	Pass
	11	2462	-13.79	3.01	-10.78	8	Pass

Note: 1. The directional gain = $2.5\text{dBi} + 10\log(2) = 5.51\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11n (HT40)

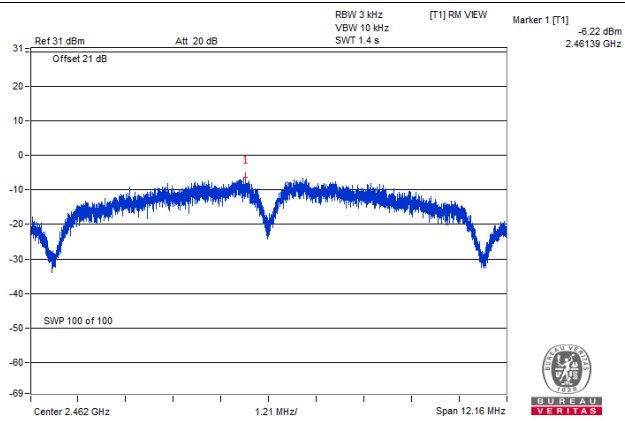
TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-19.21	3.01	0.16	-16.04	8	Pass
	6	2437	-14.94	3.01	0.16	-11.77	8	Pass
	9	2452	-14.72	3.01	0.16	-11.55	8	Pass
1	3	2422	-19.37	3.01	0.16	-16.20	8	Pass
	6	2437	-14.42	3.01	0.16	-11.25	8	Pass
	9	2452	-17.71	3.01	0.16	-14.54	8	Pass

Note: 1. The directional gain = $2.5\text{dBi} + 10\log(2) = 5.51\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

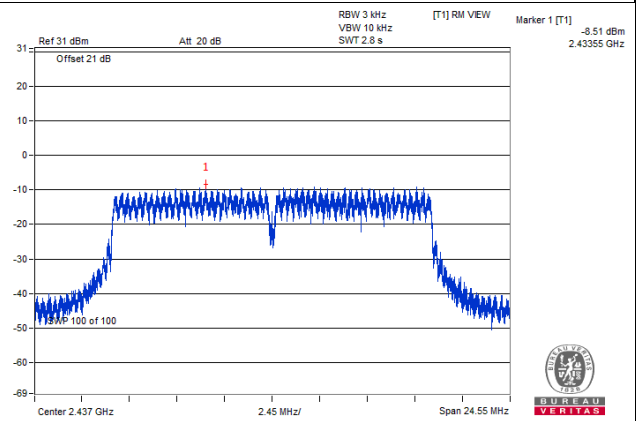
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

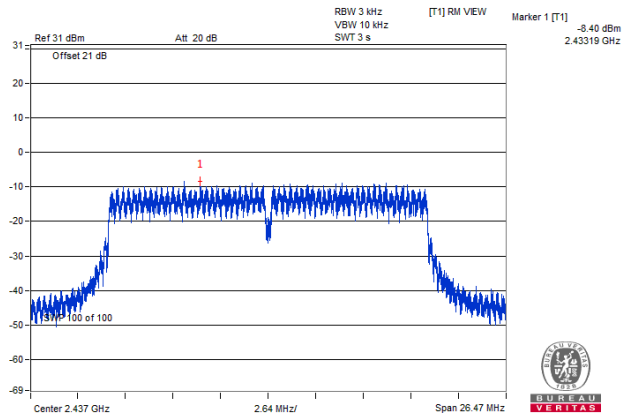
802.11b_Chain 1 / CH11



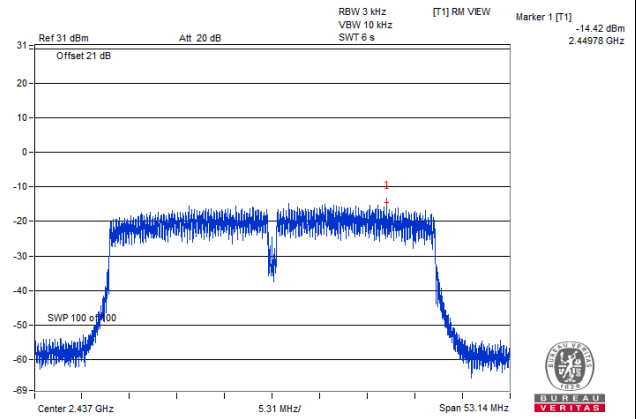
802.11g_Chain 0 / CH6



802.11n (HT20)_Chain 1 / CH6



802.11n (HT40)_Chain 1 / CH6

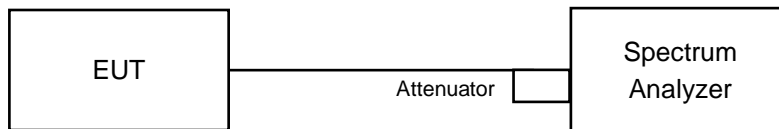


4.6 Conducted Out of Band Emission Measurement

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

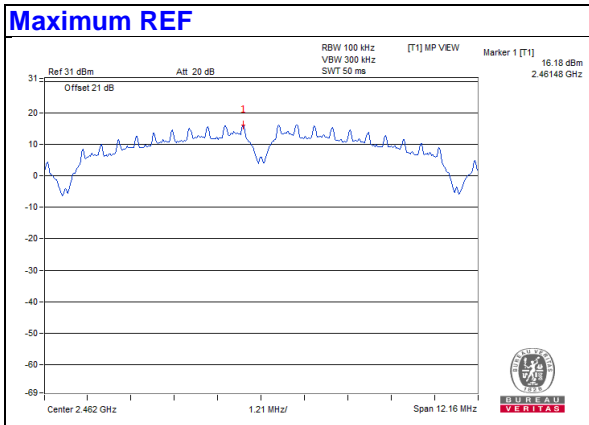
4.6.6 EUT Operating Condition

Same as Item 4.3.6

4.6.7 Test Results

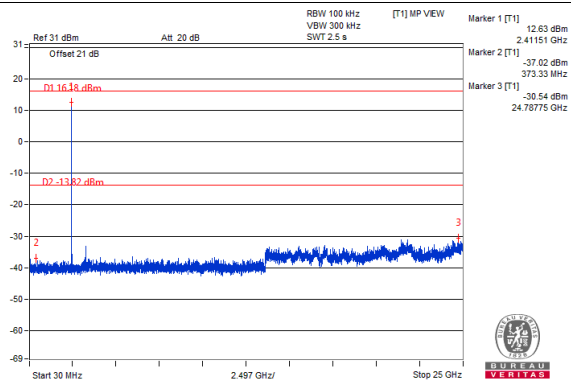
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

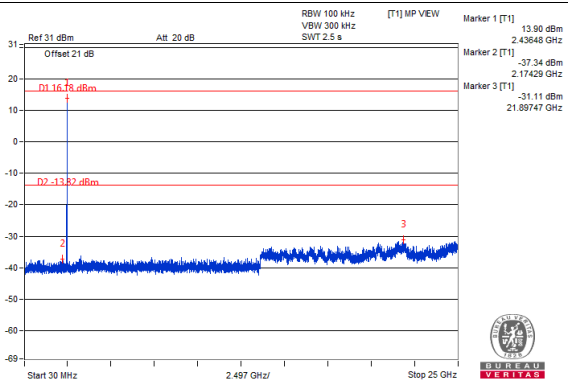


Chain 0

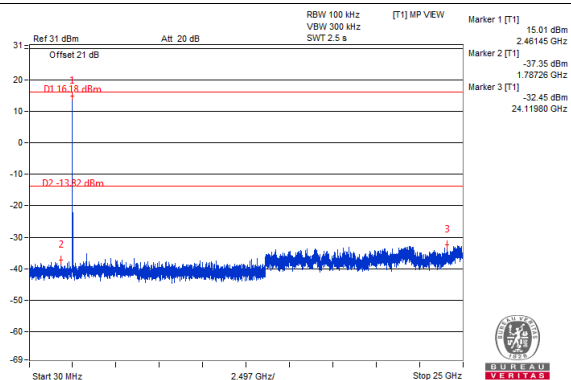
CH 1



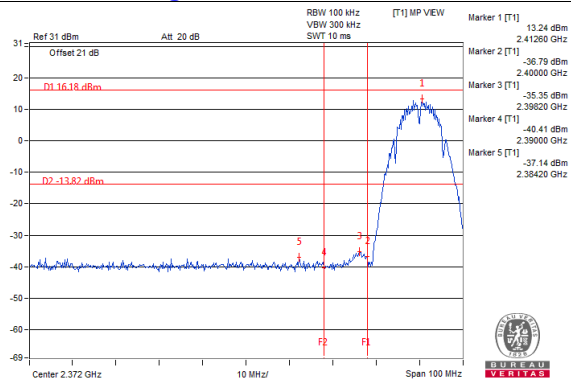
CH 6



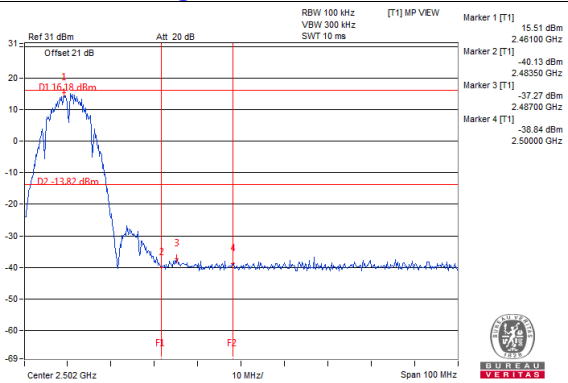
CH 11



CH 1 Band edge

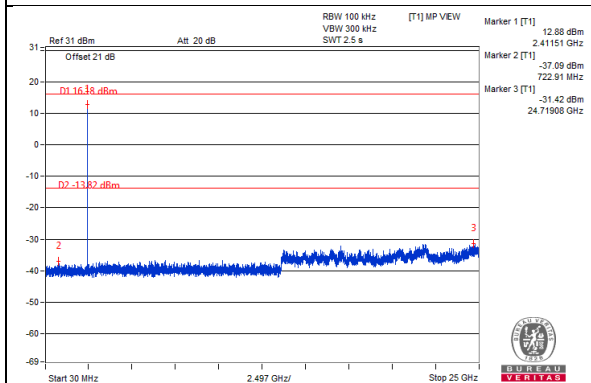


CH 11 Band edge

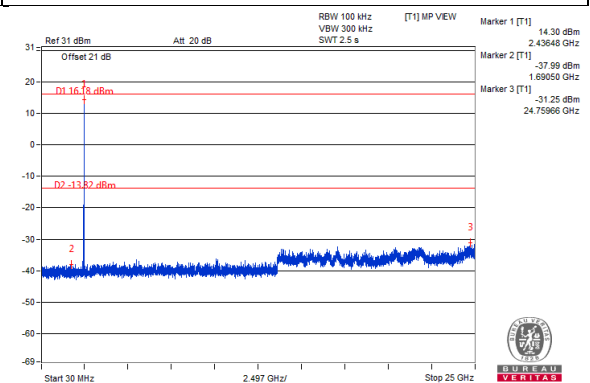


Chain 1

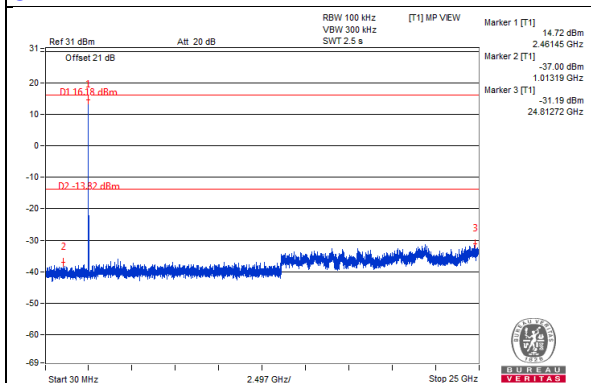
CH 1



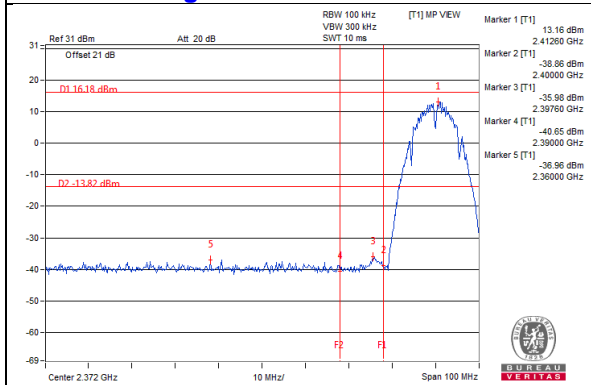
CH 6



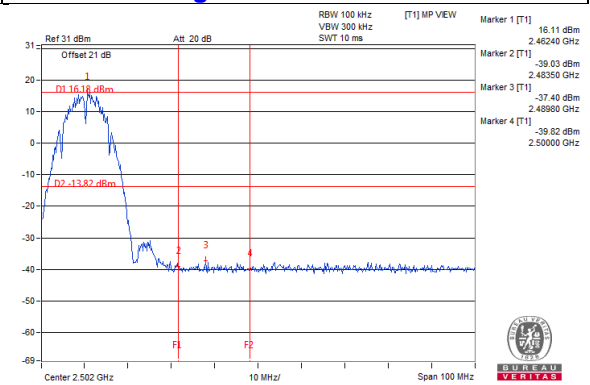
CH 11



CH 1 Band edge

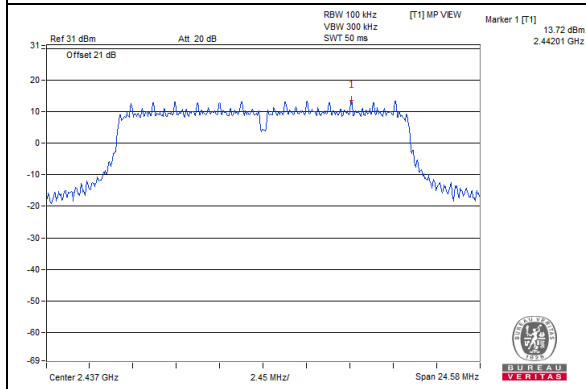


CH 11 Band edge



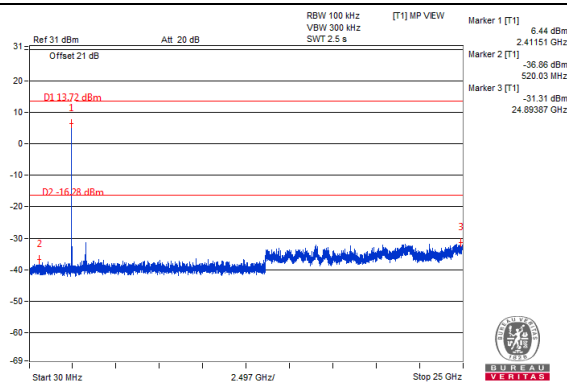
802.11g

Maximum REF

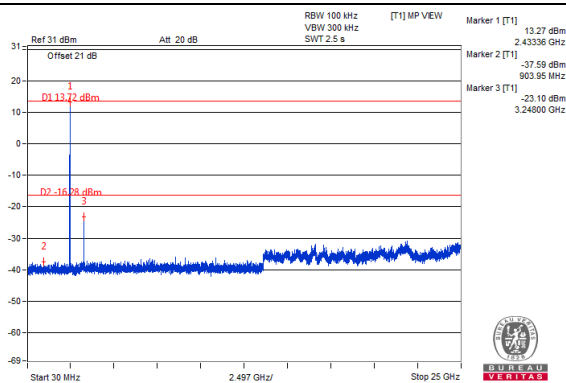


Chain 0

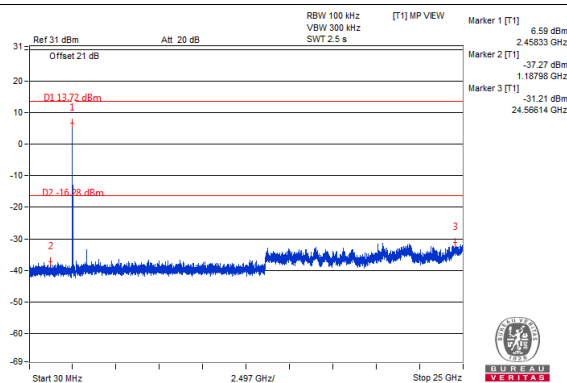
CH 1



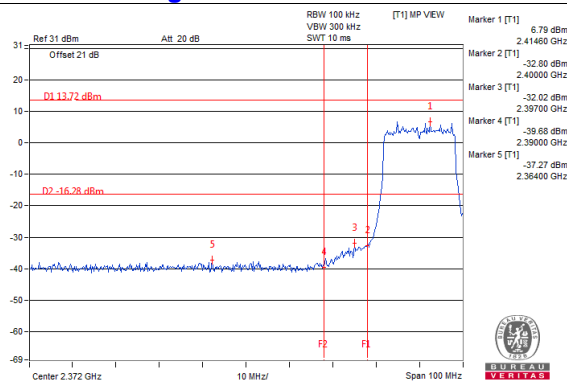
CH 6



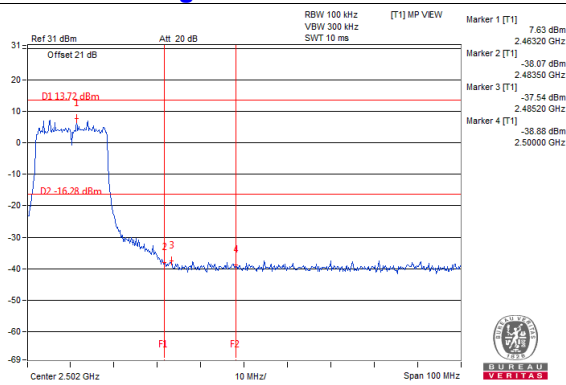
CH 11



CH 1 Band edge

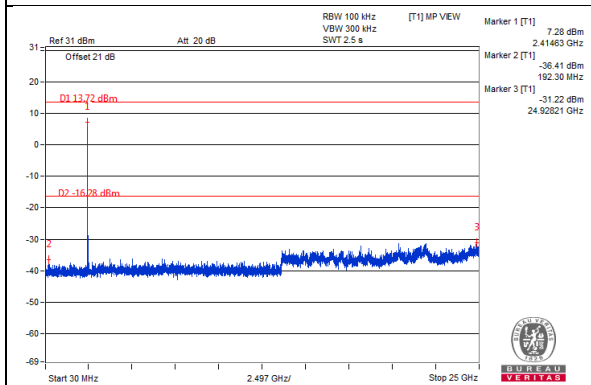


CH 11 Band edge

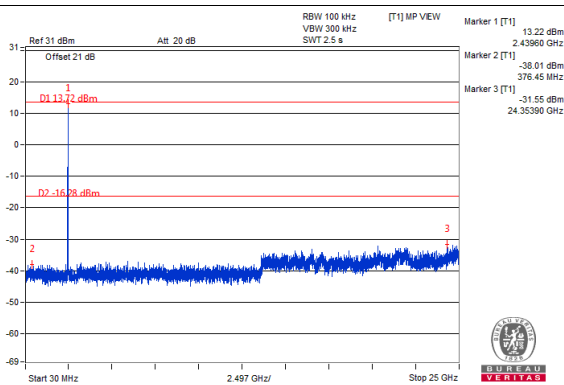


Chain 1

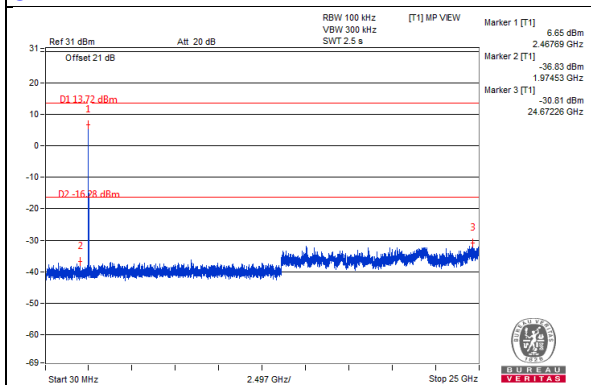
CH 1



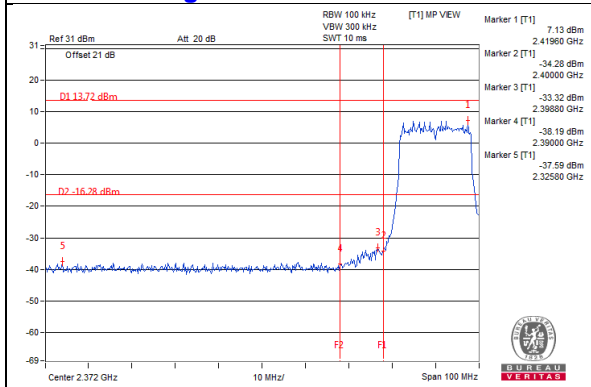
CH 6



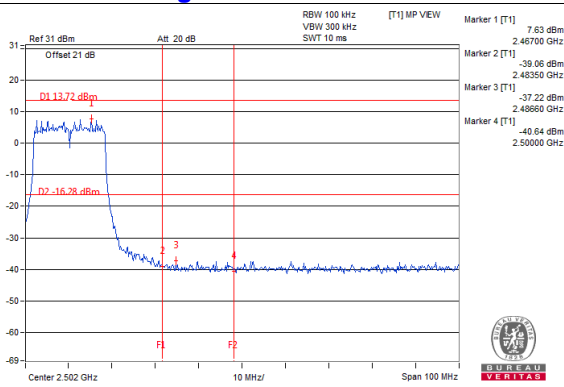
CH 11



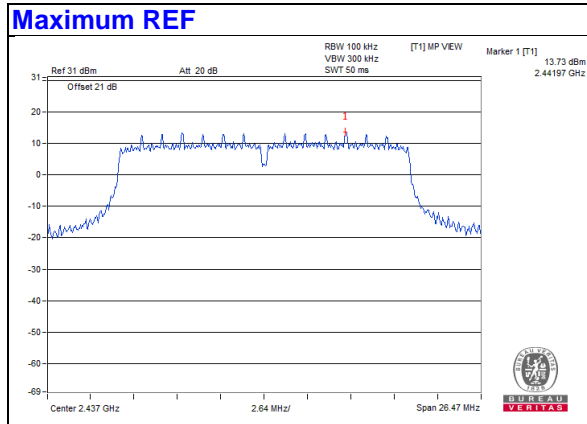
CH 1 Band edge



CH 11 Band edge

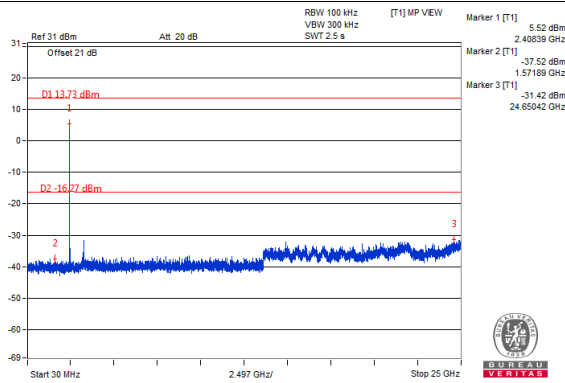


802.11n (HT20)

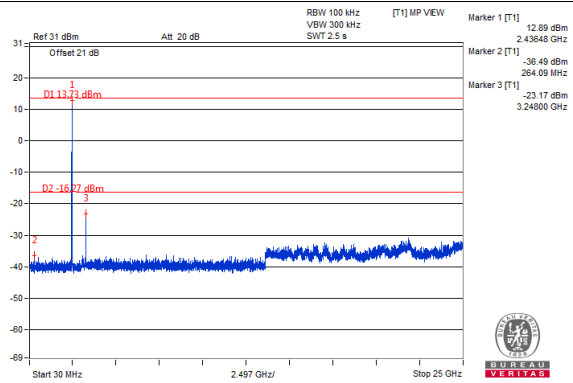


Chain 0

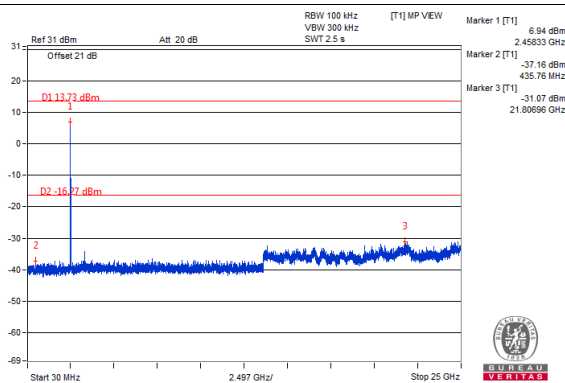
CH 1



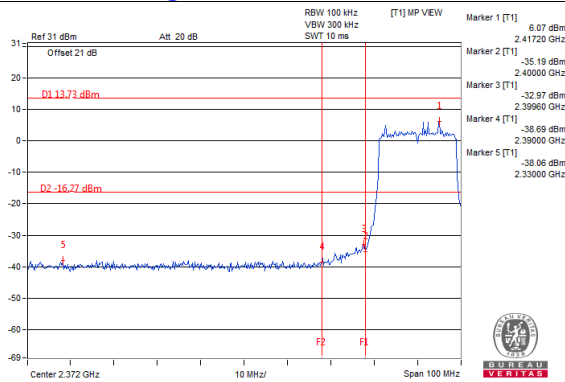
CH 6



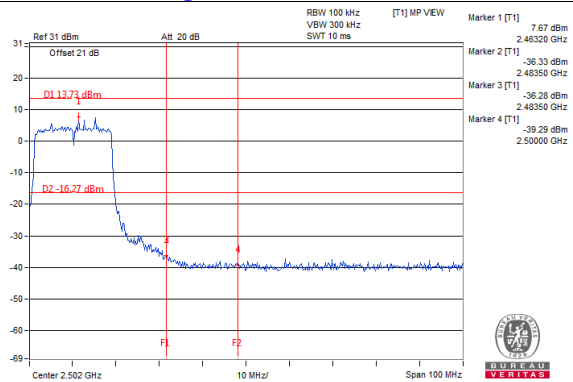
CH 11



CH 1 Band edge

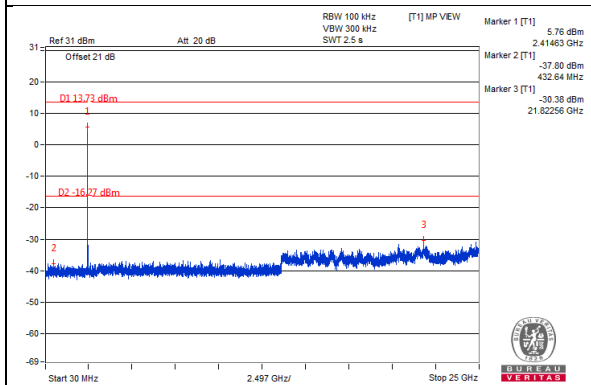


CH 11 Band edge

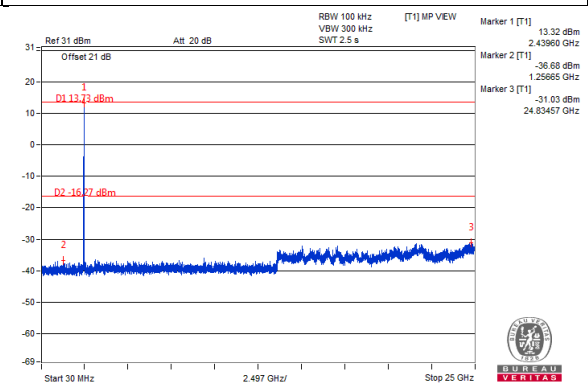


Chain 1

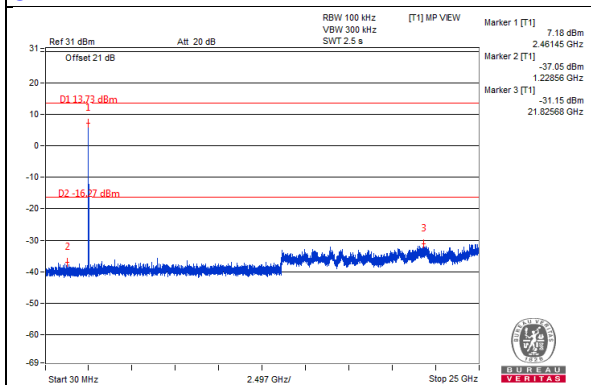
CH 1



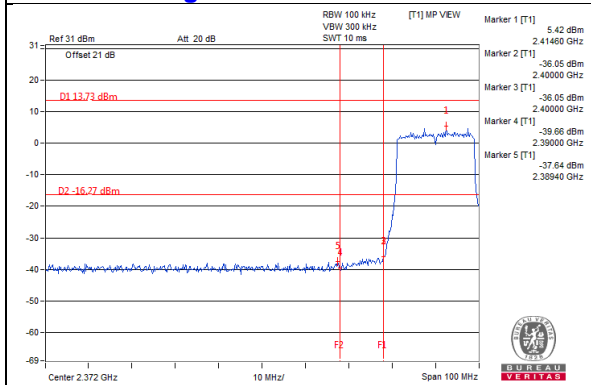
CH 6



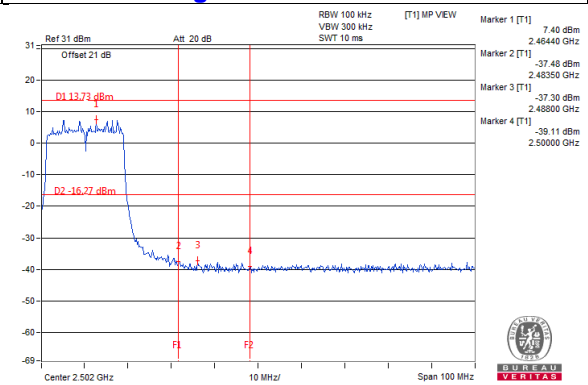
CH 11



CH 1 Band edge

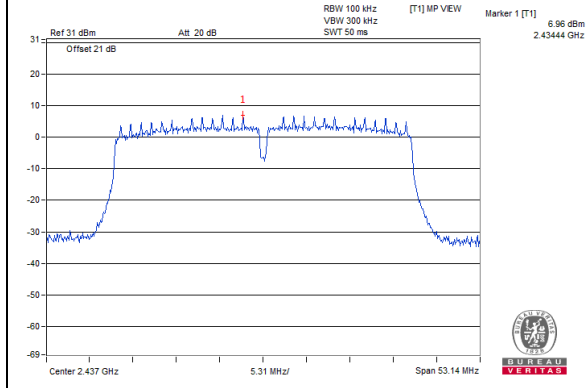


CH 11 Band edge



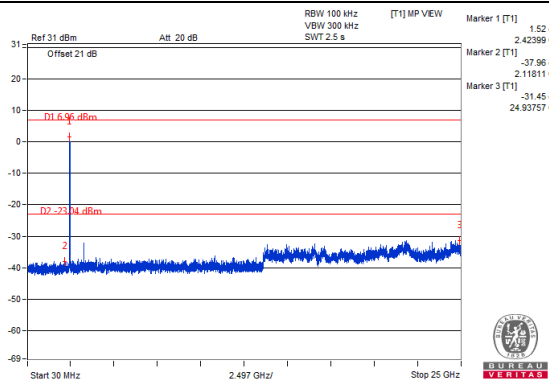
802.11n (HT40)

Maximum REF

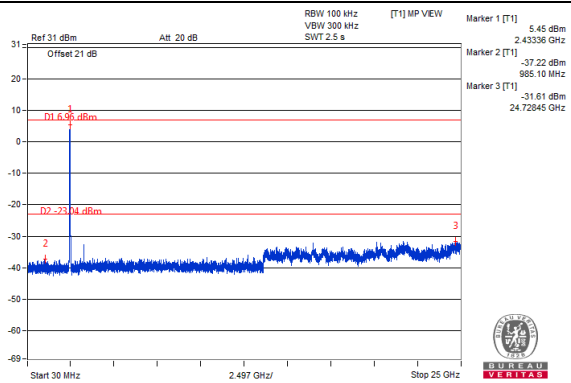


Chain 0

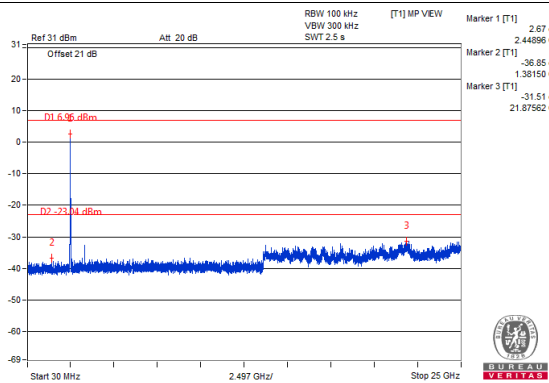
CH 3



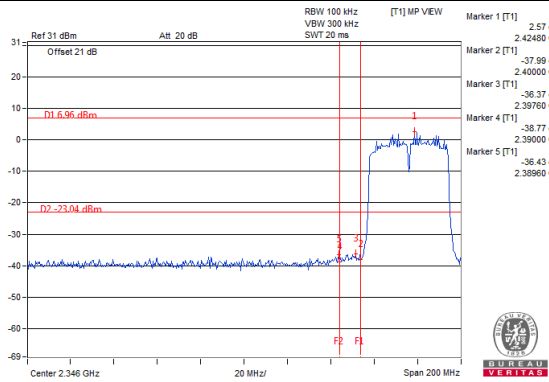
CH 6



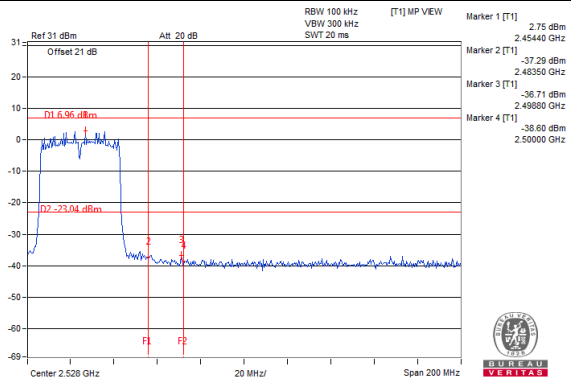
CH 9



CH 3 Band edge

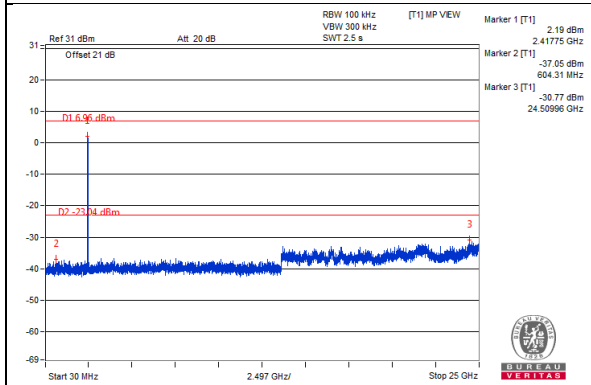


CH 9 Band edge

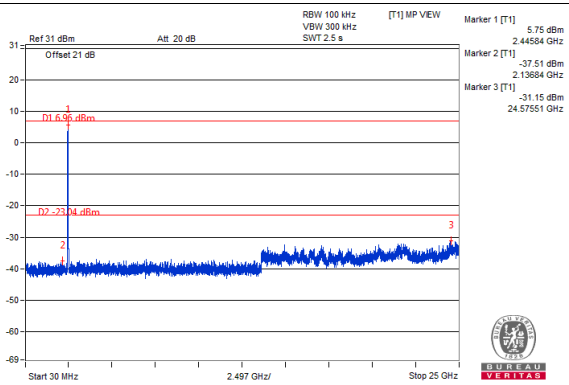


Chain 1

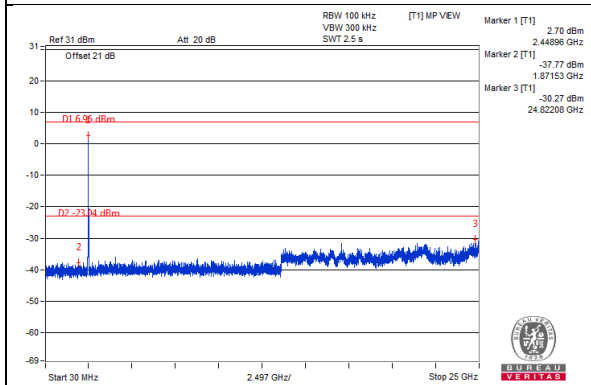
CH 3



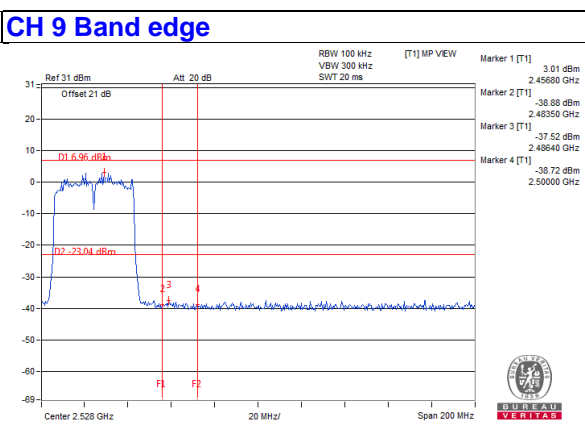
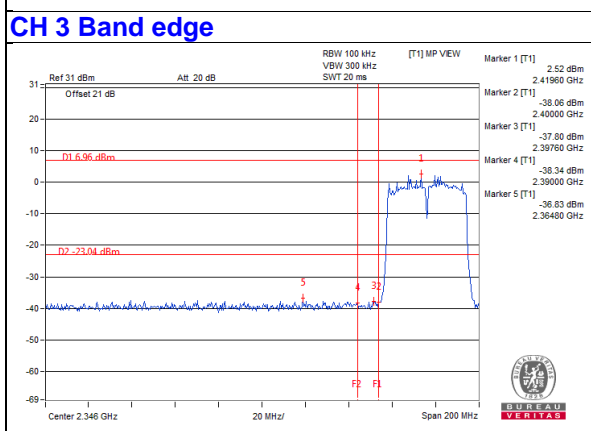
CH 6



CH 9



CH 9 Band edge



5 Pictures of Test Arrangements

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

Appendix – Information on 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:

Linkou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

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Hwa Ya EMC/RF/Safety Lab

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

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