FCC Test Report (WLAN)

Report No.:	RF180206E03
FCC ID:	S9GM510
Test Model:	M510
Received Date:	Feb. 06, 2018
Test Date:	Feb. 23 to Mar. 27, 2018
Issued Date:	May 16, 2018
Applicant:	Ruckus Wireless, Inc.
Address:	350 West Java Drive, Sunnyvale, CA 94089
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF180206E03	Original release.	May 16, 2018

1 Certificate of Conformity

Product:	M510 Access Point
Brand:	Ruckus Wireless
Test Model:	M510
Sample Status:	ENGINEERING SAMPLE
Applicant:	Ruckus Wireless, Inc.
Test Date:	Feb. 23 to Mar. 27, 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 , **Date:** May 16, 2018

Phoenix Huang / Specialist

Approved by : , **Date:** May 16, 2018

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 -3.56dB at 0.46628MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex (MHF) 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) (±)
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

Product	M510 Access Point
Brand	Ruckus Wireless
Test Model	M510
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 48V from POE or DC 12V from adapter or DC 12V from Terminal
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
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, 802.11ac (VHT20), VHT20: 11 802.11ac (VHT40), VHT40: 7 **5GHz:** 802.11a, 802.11ac (VHT20), 802.11ac (VHT20): 9 802.11ac (VHT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** 702.651mW **5GHz:** 5.18 ~ 5.24GHz: 652.747mW 5.745 ~ 5.825GHz: 830.988mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are WLAN, WWAN and GPS technology used for the EUT. The EUT has below radios as following table:

Radio 1	Radio 2
WLAN (2.4GHz + 5GHz)	WWAN (LTE + WCDMA) +GPS

2. Simultaneously transmission condition.

Condition	Technology			
1	WLAN 2.4GHz	WLAN 5GHz	WWAN WCDMA	GPS
2	WLAN 2.4GHz	WLAN 5GHz	WWAN LTE	GPS
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.				

3. The EUT must be supplied with a POE or power adapter as following table:

PoE (only for test)		
Brand	Model No.	Spec.
Ruckus Wireless, Inc	740-64214-001	Input: 100-240V, 0.75A, 50/60Hz Output: 48V, 0.5A
Adapter (only for test)		
Brand	Model No.	Spec.
Ruckus Wireless, Inc	NBS24J120200B3	Input: 100-240V, 0.6A, 50/60Hz Output: 12V, 2.0A

4. For radiated emissions test, the EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	**Power from POE**
Mode B	Power from Adapter
Mode C	Power from Terminal
Note: From the above modes, the worst cases were found in **Mode A**. Therefore only the test data of the mode was recorded in this report.	

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

WLAN								
Antenna NO.	Transmitter Circuit	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connecter Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1	5GHz_chain_0 2.4GHz_chain_1	1	2.4~2.4835	PIFA	i-pex (MHF)	120	0	1
		3	5.15~5.85				0	3
2	5GHz_chain_1 2.4GHz_chain_0	1.2	2.4~2.4835	PIFA	i-pex (MHF)	70	0	1.2
		3	5.15~5.85				0	3

GPS						
Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connecter Type	Cable Length (mm)	Cable Loss (dB)	Excluding cable loss Antenna Gain(dBi)
1.66	1575.42	Dipole	i-pex (MHF)	80	0.34	2

WWAN						
Antenna NO.	Antenna Type	Brand	Model	Band	Freq. Range	Gain (dBi)
1 (Main)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)	1850~1910	1.66
				WCDMA IV (B4)	1710~1755	1.66
				WCDMA V (B5)	824~849	1.66
				LTE Band (2)	1850~1910	1.66
				LTE Band (4)	1710~1755	1.66
				LTE Band (12)	698~716	1.53
2 (Aux)	Dipole	Aristotle	RFA-LTE-C55-B70-C255	WCDMA II (B2)	1850~1910	1.5
				WCDMA IV (B4)	1710~1755	1.5
				WCDMA V (B5)	824~849	1.5
				LTE Band (2)	1850~1910	1.5
				LTE Band (4)	1710~1755	1.5
				LTE Band (12)	698~716	1.37

Note: There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

6. 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
802.11ac (VHT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
VHT20	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
VHT40	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
5GHz Band			
Modulation Mode	Data Rate (MCS)	TX & RX Configuration	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11ac (VHT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
802.11ac (VHT40)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
802.11ac (VHT80)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX

Note:
1. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

7. The above EUT information is declared by manufacturer and for more detailed features description, please refers 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), VHT20:

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

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

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	
1	√	√	√	√	Power from POE
2	-	-	√	-	Power from Adapter
3	-	-	√	-	Power from Terminal Blocking

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

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

Note:
1. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **Y-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

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

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

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, 2, 6, 10, 11	OFDM	BPSK	6
VHT20	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.5
VHT40	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)
802.11b	1 to 11	6	DSSS	DBPSK	1

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)
802.11b	1 to 11	6	DSSS	DBPSK	1

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, 2, 6, 10, 11	OFDM	BPSK	6
VHT20	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.5
VHT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

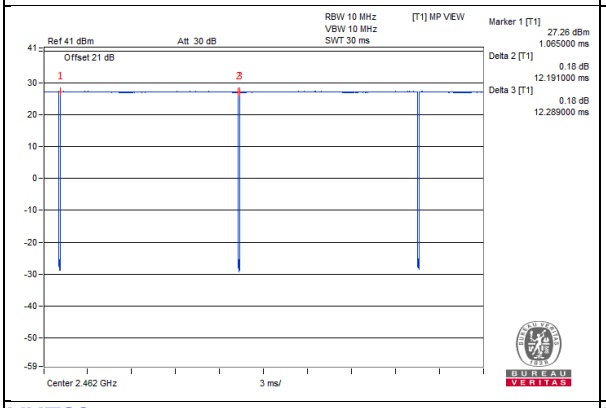
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	23deg. C, 69%RH	120Vac, 60Hz	Steven Chiang
RE<1G	23deg. C, 61%RH	120Vac, 60Hz	Eason Tseng
PLC	24deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

3.3 Duty Cycle of Test Signal

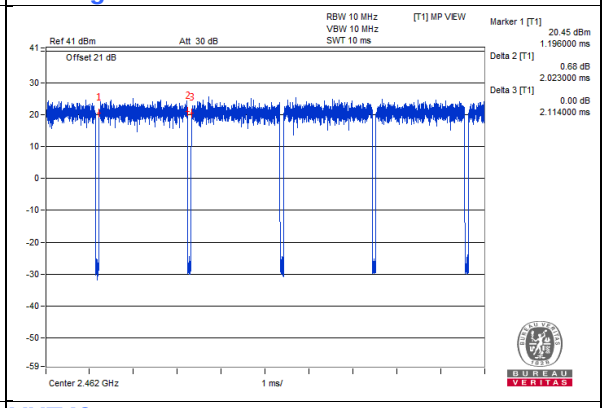
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.191 ms/12.289 ms = 0.992
802.11g: Duty cycle = 2.023 ms/2.114 ms = 0.957, Duty factor = 10 * log(1/0.957) = 0.19
VHT20: Duty cycle = 4.962 ms/5.057 ms = 0.981
VHT40: Duty cycle = 2.414 ms/2.506 ms = 0.963, Duty factor = 10 * log(1/0.963) = 0.16

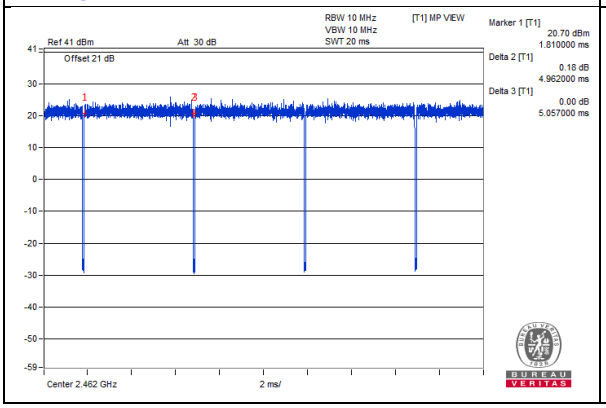
802.11b



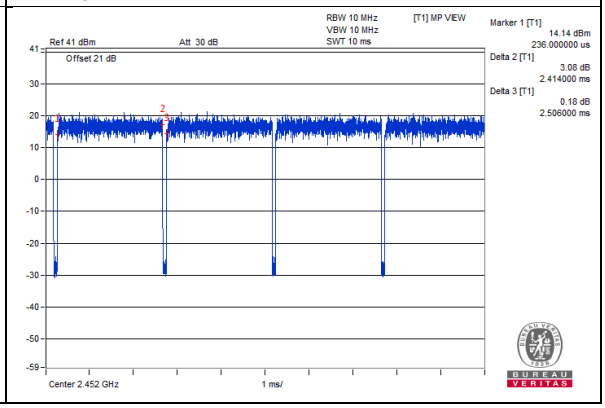
802.11g



VHT20



VHT40



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.

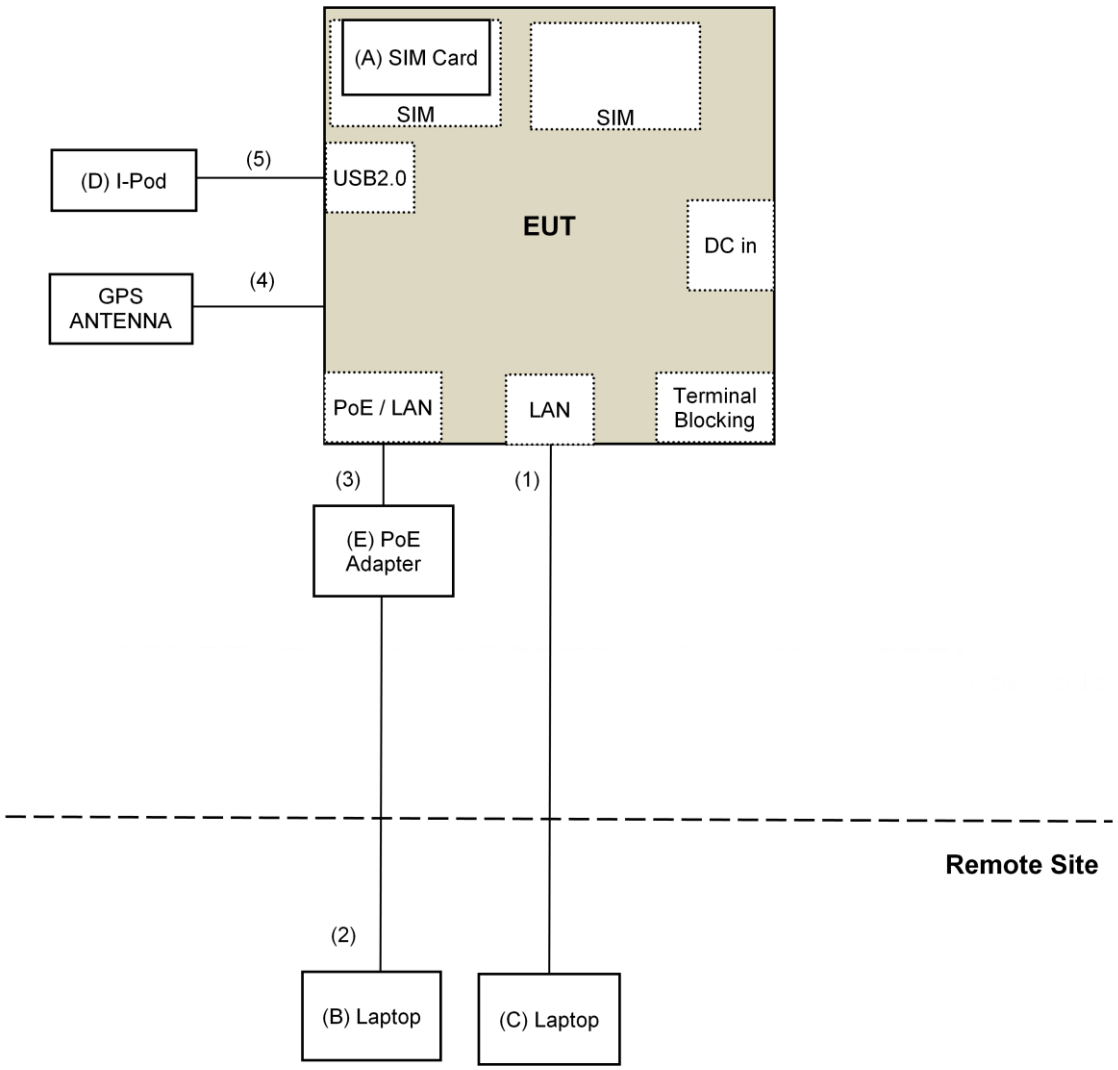
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	SIM Card	R&S	CMW-Z04	NA	NA	Provided by Lab
B.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
C.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab
D.	iPod	Apple	MD778TA/A	CC4JL03FF4T1	NA	Provided by Lab
E.	PoE Adapter	Ruckus Wireless	740-64214-001	NA	NA	Supplied by client
F.	DC Power supply	GOOD WILL INSTRUMENT CO., LTD	GPC-3030D	E847076	NA	Provided by Lab
G.	Adapter	Ruckus Wireless	NBS24J120200B3	NA	NA	Supplied by client

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

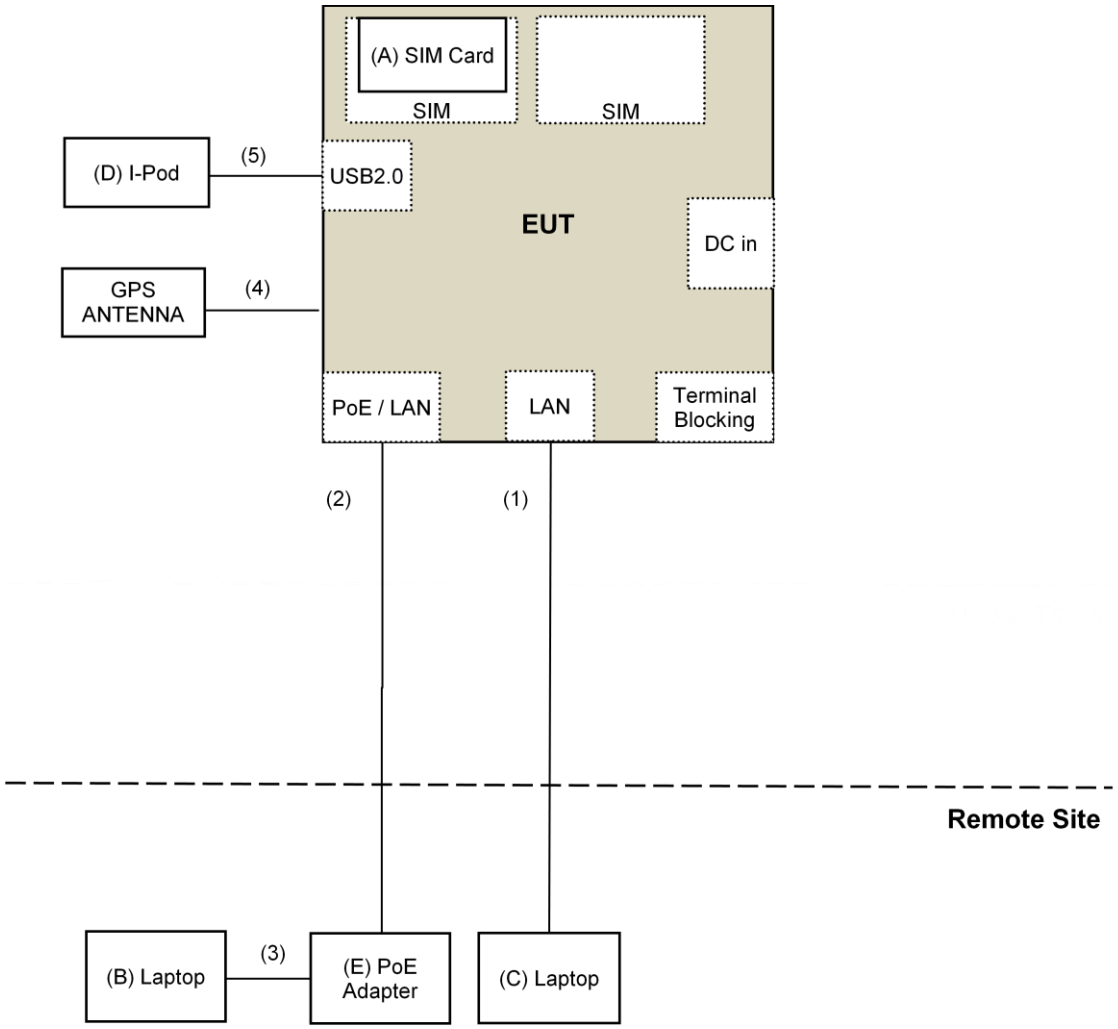
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	3	No	0	Provided by Lab
4.	GPS Cable	1	5	No	0	Supplied by client
5.	USB Cable	1	0.1	Yes	0	Provided by Lab
6.	AC Cable	1	1.8	No	0	Supplied by client
7.	DC Cable	1	1.8	No	0	Supplied by client
8.	DC Cable	1	1.2	No	0	Provided by Lab

3.4.1 Configuration of System under Test

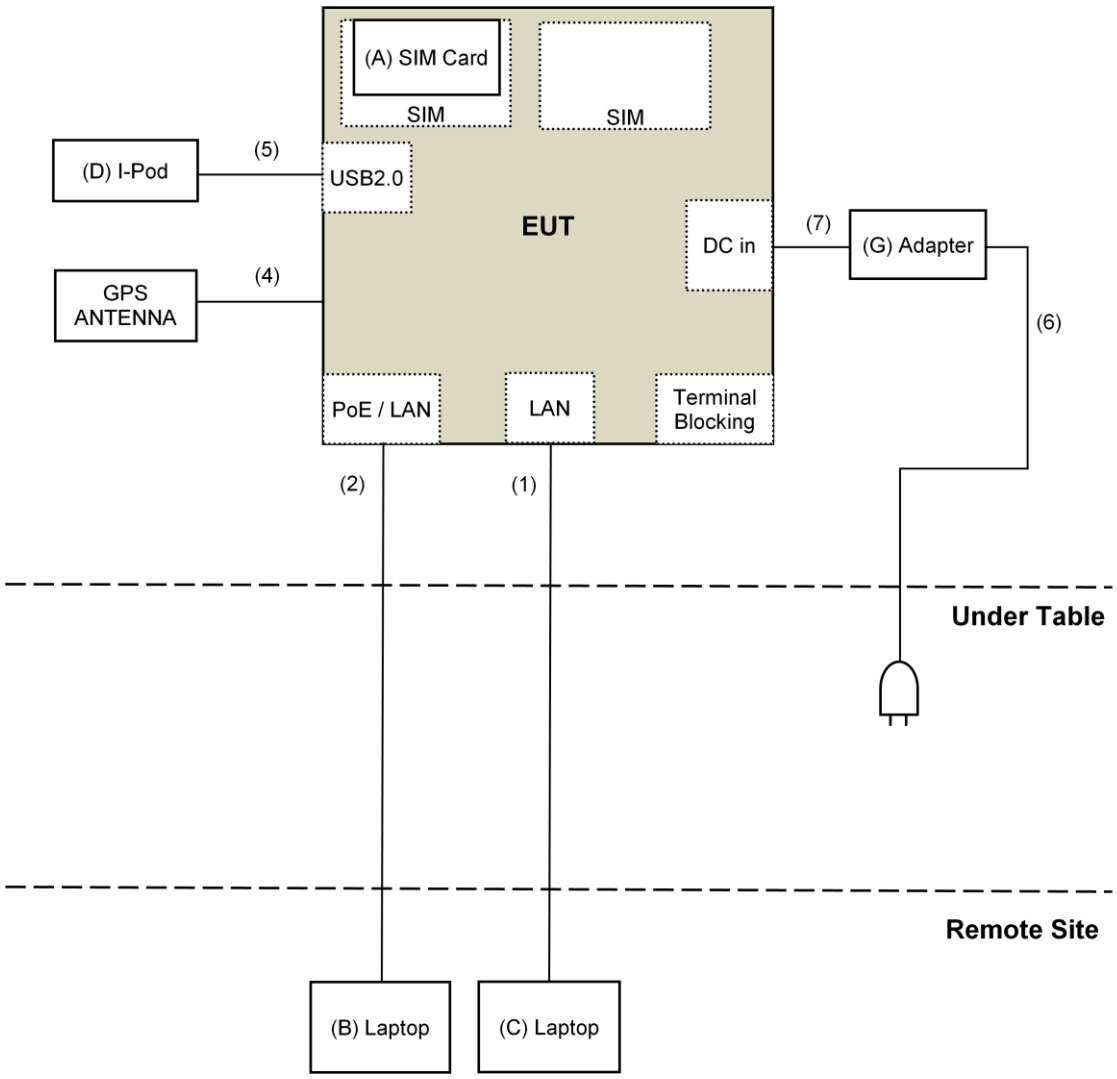
For Mode 1:
Conducted emission test item



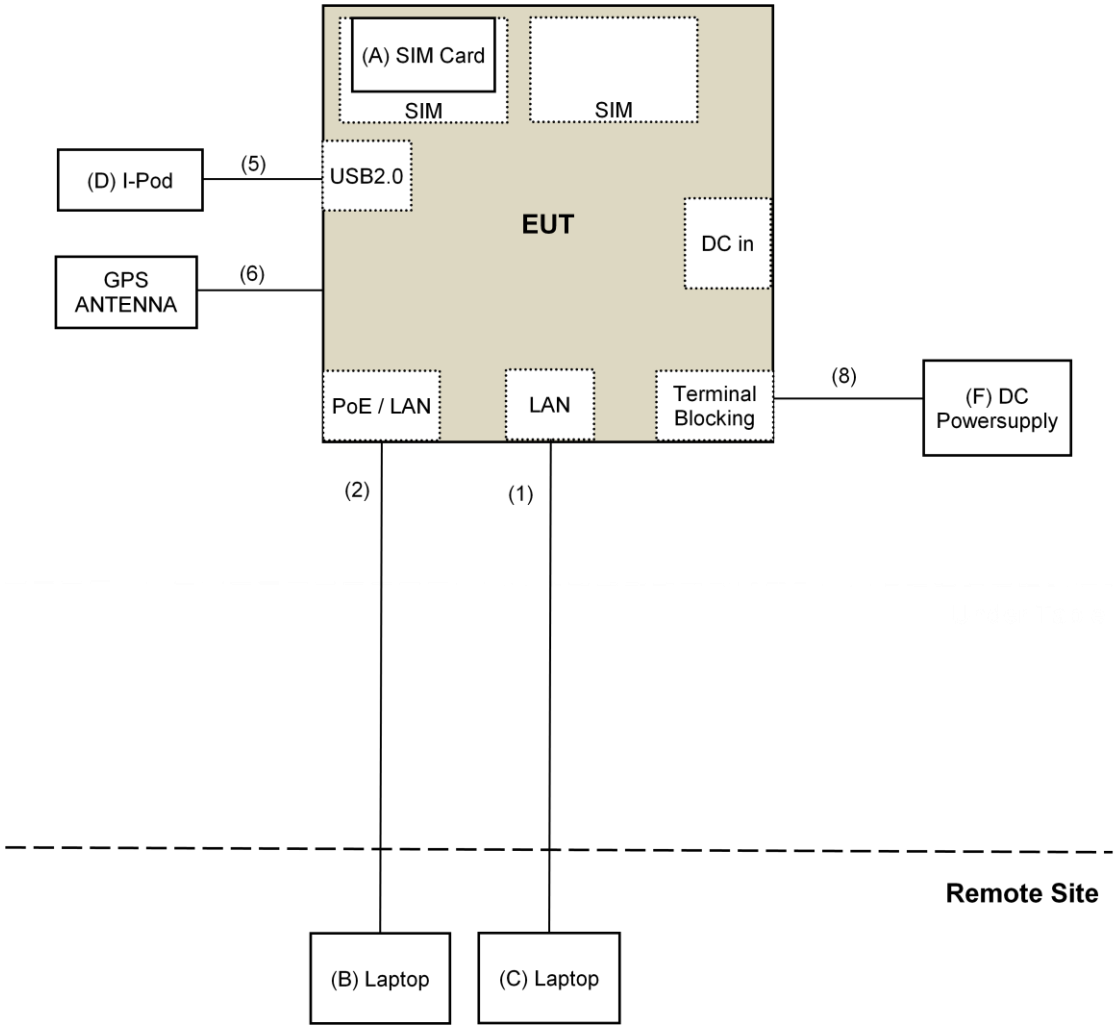
Other test items



For Mode 2


(A) SIM Card
SIM
SIM
(D) I-Pod
(5)
USB2.0
EUT
DC in
(7)
(G) Adapter
GPS ANTENNA
(4)
(6)
PoE / LAN
LAN
Terminal Blocking
(2)
(1)
Under Table
Remote Site
(B) Laptop
(C) Laptop

For Mode 3


(A) SIM Card
SIM
SIM
(D) I-Pod
(5)
USB2.0
EUT
DC in
GPS ANTENNA
(6)
PoE / LAN
LAN
Terminal Blocking
(8)
(F) DC Powersupply
(2)
(1)
Remote Site
(B) Laptop
(C) Laptop

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 DTS Meas Guidance v04
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 Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
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	5D-FB	LOOPCAB-001 LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Jan. 29, 2018	Jan. 28, 2019
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	EMC102-KM-KM-1200	160925	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 10, 2018	Jan. 09, 2019
DC Power Supply Topward	6603D	795558	NA	NA
True RMS Clamp Meter FLUKE	325	31130711WS	May 29, 2017	May 28, 2018

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. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Feb. 24 to Mar. 21, 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:

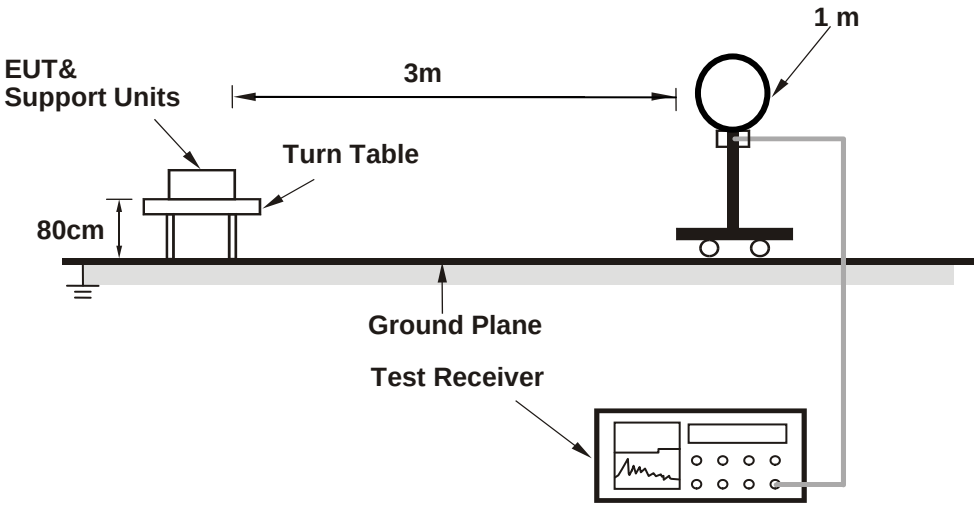
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

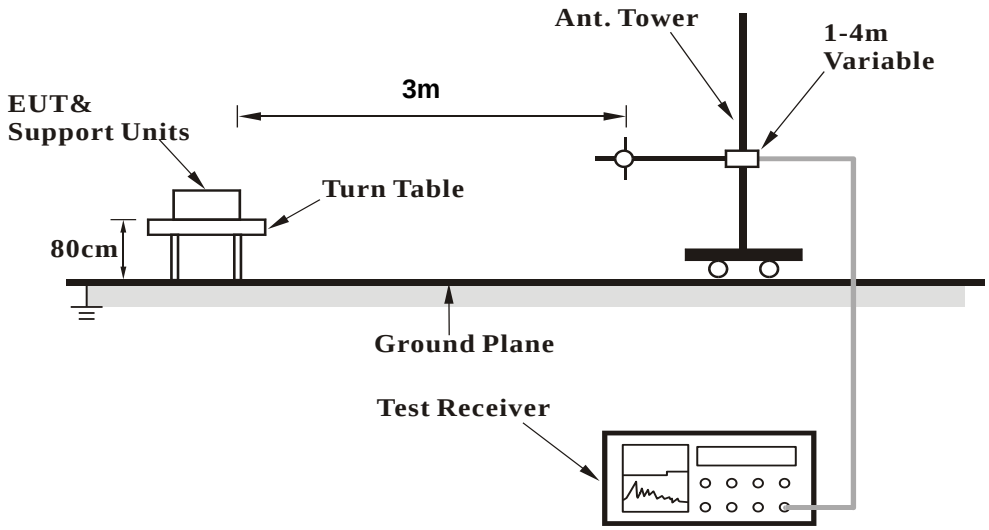
No deviation.

4.1.5 Test Setup

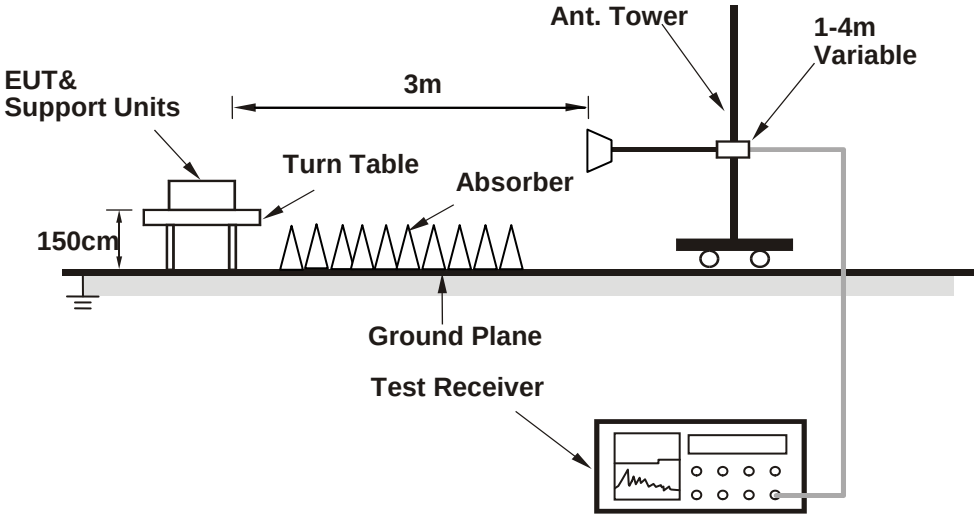
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QRCT.exe VER 3.0.297.0) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.2 PK	74.0	-15.8	2.79 H	176	60.2	-2.0
2	2390.00	50.2 AV	54.0	-3.8	2.79 H	176	52.2	-2.0
3	*2412.00	113.1 PK			2.79 H	176	115.2	-2.1
4	*2412.00	111.1 AV			2.79 H	176	113.2	-2.1
5	4824.00	48.1 PK	74.0	-25.9	2.15 H	181	45.4	2.7
6	4824.00	46.6 AV	54.0	-7.4	2.15 H	181	43.9	2.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.6 PK	74.0	-14.4	2.42 V	210	61.6	-2.0
2	2390.00	52.9 AV	54.0	-1.1	2.42 V	210	54.9	-2.0
3	*2412.00	115.8 PK			2.42 V	210	117.9	-2.1
4	*2412.00	113.5 AV			2.42 V	210	115.6	-2.1
5	4824.00	49.3 PK	74.0	-24.7	2.87 V	146	46.6	2.7
6	4824.00	47.8 AV	54.0	-6.2	2.87 V	146	45.1	2.7

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) 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	46.7 PK	74.0	-27.3	2.84 H	191	48.7	-2.0
2	2390.00	38.5 AV	54.0	-15.5	2.84 H	191	40.5	-2.0
3	*2437.00	114.1 PK			2.84 H	191	116.4	-2.3
4	*2437.00	112.2 AV			2.84 H	191	114.5	-2.3
5	2483.50	48.7 PK	74.0	-25.3	2.84 H	191	50.9	-2.2
6	2483.50	40.3 AV	54.0	-13.7	2.84 H	191	42.5	-2.2
7	4874.00	48.6 PK	74.0	-25.4	2.18 H	176	45.7	2.9
8	4874.00	46.8 AV	54.0	-7.2	2.18 H	176	43.9	2.9
9	7311.00	45.4 PK	74.0	-28.6	1.67 H	321	36.1	9.3
10	7311.00	35.1 AV	54.0	-18.9	1.67 H	321	25.8	9.3
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	55.0 PK	74.0	-19.0	2.75 V	203	57.0	-2.0
2	2390.00	41.0 AV	54.0	-13.0	2.75 V	203	43.0	-2.0
3	*2437.00	115.4 PK			2.75 V	203	117.7	-2.3
4	*2437.00	114.0 AV			2.75 V	203	116.3	-2.3
5	2483.50	55.2 PK	74.0	-18.8	2.75 V	203	57.4	-2.2
6	2483.50	43.0 AV	54.0	-11.0	2.75 V	203	45.2	-2.2
7	4874.00	50.2 PK	74.0	-23.8	3.17 V	146	47.3	2.9
8	4874.00	47.9 AV	54.0	-6.1	3.17 V	146	45.0	2.9
9	7311.00	44.9 PK	74.0	-29.1	1.65 V	318	35.6	9.3
10	7311.00	34.8 AV	54.0	-19.2	1.65 V	318	25.5	9.3

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.5 PK			2.77 H	168	116.8	-2.3
2	*2462.00	111.4 AV			2.77 H	168	113.7	-2.3
3	2483.50	55.2 PK	74.0	-18.8	2.77 H	168	57.4	-2.2
4	2483.50	47.8 AV	54.0	-6.2	2.77 H	168	50.0	-2.2
5	4924.00	48.9 PK	74.0	-25.1	2.12 H	187	45.9	3.0
6	4924.00	47.2 AV	54.0	-6.8	2.12 H	187	44.2	3.0
7	7386.00	44.5 PK	74.0	-29.5	1.63 H	305	34.8	9.7
8	7386.00	34.7 AV	54.0	-19.3	1.63 H	305	25.0	9.7
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	*2462.00	116.0 PK			2.72 V	194	118.3	-2.3
2	*2462.00	113.3 AV			2.72 V	194	115.6	-2.3
3	2483.50	58.6 PK	74.0	-15.4	2.72 V	194	60.8	-2.2
4	2483.50	50.4 AV	54.0	-3.6	2.72 V	194	52.6	-2.2
5	4924.00	50.1 PK	74.0	-23.9	3.19 V	159	47.1	3.0
6	4924.00	47.6 AV	54.0	-6.4	3.19 V	159	44.6	3.0
7	7386.00	44.9 PK	74.0	-29.1	1.60 V	307	35.2	9.7
8	7386.00	35.1 AV	54.0	-18.9	1.60 V	307	25.4	9.7

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.

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	68.4 PK	74.0	-5.6	2.53 H	132	70.4	-2.0
2	2390.00	49.2 AV	54.0	-4.8	2.53 H	132	51.2	-2.0
3	*2412.00	116.1 PK			2.53 H	132	118.2	-2.1
4	*2412.00	103.2 AV			2.53 H	132	105.3	-2.1
5	4824.00	36.7 PK	74.0	-37.3	1.62 H	220	34.0	2.7
6	4824.00	26.4 AV	54.0	-27.6	1.62 H	220	23.7	2.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.3 PK	74.0	-1.7	2.81 V	204	74.3	-2.0
2	2390.00	53.0 AV	54.0	-1.0	2.81 V	204	55.0	-2.0
3	*2412.00	114.8 PK			2.81 V	204	116.9	-2.1
4	*2412.00	102.0 AV			2.81 V	204	104.1	-2.1
5	4824.00	47.0 PK	74.0	-27.0	2.06 V	123	44.3	2.7
6	4824.00	35.3 AV	54.0	-18.7	2.06 V	123	32.6	2.7

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 2	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	68.8 PK	74.0	-5.2	2.53 H	132	70.8	-2.0
2	2390.00	51.5 AV	54.0	-2.5	2.53 H	132	53.5	-2.0
3	*2417.00	118.4 PK			2.53 H	132	120.5	-2.1
4	*2417.00	105.5 AV			2.53 H	132	107.6	-2.1
5	4834.00	37.5 PK	74.0	-36.5	1.52 H	214	34.8	2.7
6	4834.00	27.3 AV	54.0	-26.7	1.52 H	214	24.6	2.7
7	7251.00	44.2 PK	74.0	-29.8	2.31 H	41	35.2	9.0
8	7251.00	32.5 AV	54.0	-21.5	2.31 H	41	23.5	9.0
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	70.3 PK	74.0	-3.7	2.74 V	215	72.3	-2.0
2	2390.00	53.1 AV	54.0	-0.9	2.74 V	215	55.1	-2.0
3	*2417.00	118.1 PK			2.74 V	215	120.2	-2.1
4	*2417.00	105.2 AV			2.74 V	215	107.3	-2.1
5	4834.00	48.4 PK	74.0	-25.6	1.97 V	125	45.7	2.7
6	4834.00	36.5 AV	54.0	-17.5	1.97 V	125	33.8	2.7
7	7251.00	44.5 PK	74.0	-29.5	2.56 V	307	35.5	9.0
8	7251.00	32.0 AV	54.0	-22.0	2.56 V	307	23.0	9.0

REMARKS:

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

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	55.8 PK	74.0	-18.2	2.69 H	143	57.8	-2.0
2	2390.00	42.7 AV	54.0	-11.3	2.69 H	143	44.7	-2.0
3	*2437.00	119.8 PK			2.69 H	143	122.1	-2.3
4	*2437.00	106.1 AV			2.69 H	143	108.4	-2.3
5	2483.50	63.0 PK	74.0	-11.0	2.69 H	143	65.2	-2.2
6	2483.50	45.8 AV	54.0	-8.2	2.69 H	143	48.0	-2.2
7	4874.00	37.8 PK	74.0	-36.2	1.57 H	220	34.9	2.9
8	4874.00	27.5 AV	54.0	-26.5	1.57 H	220	24.6	2.9
9	7311.00	44.8 PK	74.0	-29.2	2.36 H	48	35.5	9.3
10	7311.00	32.9 AV	54.0	-21.1	2.36 H	48	23.6	9.3
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	57.0 PK	74.0	-17.0	2.74 V	217	59.0	-2.0
2	2390.00	43.8 AV	54.0	-10.2	2.74 V	217	45.8	-2.0
3	*2437.00	119.4 PK			2.74 V	217	121.7	-2.3
4	*2437.00	106.8 AV			2.74 V	217	109.1	-2.3
5	2483.50	65.5 PK	74.0	-8.5	2.74 V	217	67.7	-2.2
6	2483.50	48.3 AV	54.0	-5.7	2.74 V	217	50.5	-2.2
7	4874.00	48.7 PK	74.0	-25.3	2.01 V	114	45.8	2.9
8	4874.00	36.8 AV	54.0	-17.2	2.01 V	114	33.9	2.9
9	7311.00	44.6 PK	74.0	-29.4	2.57 V	315	35.3	9.3
10	7311.00	32.4 AV	54.0	-21.6	2.57 V	315	23.1	9.3

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

CHANNEL	TX Channel 10	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	*2457.00	116.5 PK			2.78 H	144	118.8	-2.3
2	*2457.00	104.5 AV			2.78 H	144	106.8	-2.3
3	2483.50	71.0 PK	74.0	-3.0	2.78 H	144	73.2	-2.2
4	**2483.50**	**53.5 AV**	**54.0**	**-0.5**	**2.78 H**	**144**	**55.7**	**-2.2**
5	4914.00	37.2 PK	74.0	-36.8	1.57 H	204	34.3	2.9
6	4914.00	27.2 AV	54.0	-26.8	1.57 H	204	24.3	2.9
7	7371.00	44.5 PK	74.0	-29.5	2.39 H	39	34.8	9.7
8	7371.00	32.7 AV	54.0	-21.3	2.39 H	39	23.0	9.7
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	*2457.00	116.4 PK			2.95 V	220	118.7	-2.3
2	*2457.00	104.3 AV			2.95 V	220	106.6	-2.3
3	2483.50	68.5 PK	74.0	-5.5	2.95 V	220	70.7	-2.2
4	2483.50	53.1 AV	54.0	-0.9	2.95 V	220	55.3	-2.2
5	4914.00	47.7 PK	74.0	-26.3	2.02 V	116	44.8	2.9
6	4914.00	35.7 AV	54.0	-18.3	2.02 V	116	32.8	2.9
7	7371.00	44.3 PK	74.0	-29.7	2.58 V	309	34.6	9.7
8	7371.00	32.5 AV	54.0	-21.5	2.58 V	309	22.8	9.7

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) 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	114.8 PK			2.66 H	141	117.1	-2.3
2	*2462.00	101.7 AV			2.66 H	141	104.0	-2.3
3	2483.50	66.8 PK	74.0	-7.2	2.66 H	141	69.0	-2.2
4	2483.50	49.6 AV	54.0	-4.4	2.66 H	141	51.8	-2.2
5	4924.00	36.8 PK	74.0	-37.2	1.57 H	222	33.8	3.0
6	4924.00	27.3 AV	54.0	-26.7	1.57 H	222	24.3	3.0
7	7386.00	43.8 PK	74.0	-30.2	2.33 H	34	34.1	9.7
8	7386.00	32.0 AV	54.0	-22.0	2.33 H	34	22.3	9.7
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	*2462.00	114.1 PK			2.84 V	205	116.4	-2.3
2	*2462.00	101.6 AV			2.84 V	205	103.9	-2.3
3	2483.50	71.5 PK	74.0	-2.5	2.84 V	205	73.7	-2.2
4	2483.50	53.0 AV	54.0	-1.0	2.84 V	205	55.2	-2.2
5	4924.00	47.3 PK	74.0	-26.7	2.05 V	109	44.3	3.0
6	4924.00	35.1 AV	54.0	-18.9	2.05 V	109	32.1	3.0
7	7386.00	44.8 PK	74.0	-29.2	2.58 V	322	35.1	9.7
8	7386.00	32.8 AV	54.0	-21.2	2.58 V	322	23.1	9.7

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.

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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	2.40 H	125	70.6	-2.0
2	2390.00	53.0 AV	54.0	-1.0	2.40 H	125	55.0	-2.0
3	*2412.00	115.0 PK			2.40 H	125	117.1	-2.1
4	*2412.00	103.0 AV			2.40 H	125	105.1	-2.1
5	4824.00	37.2 PK	74.0	-36.8	1.62 H	212	34.5	2.7
6	4824.00	27.7 AV	54.0	-26.3	1.62 H	212	25.0	2.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.5 PK	74.0	-6.5	2.71 V	184	69.5	-2.0
2	2390.00	52.7 AV	54.0	-1.3	2.71 V	184	54.7	-2.0
3	*2412.00	113.2 PK			2.71 V	184	115.3	-2.1
4	*2412.00	101.5 AV			2.71 V	184	103.6	-2.1
5	4824.00	48.7 PK	74.0	-25.3	2.03 V	109	46.0	2.7
6	4824.00	36.5 AV	54.0	-17.5	2.03 V	109	33.8	2.7

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 2	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.4 PK	74.0	-7.6	2.20 H	142	68.4	-2.0
2	2390.00	50.9 AV	54.0	-3.1	2.20 H	142	52.9	-2.0
3	*2417.00	115.6 PK			2.20 H	142	117.7	-2.1
4	*2417.00	103.7 AV			2.20 H	142	105.8	-2.1
5	4834.00	37.4 PK	74.0	-36.6	1.59 H	227	34.7	2.7
6	4834.00	27.8 AV	54.0	-26.2	1.59 H	227	25.1	2.7
7	7251.00	43.5 PK	74.0	-30.5	2.29 H	37	34.5	9.0
8	7251.00	31.8 AV	54.0	-22.2	2.29 H	37	22.8	9.0
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	67.8 PK	74.0	-6.2	2.84 V	168	69.8	-2.0
2	2390.00	53.1 AV	54.0	-0.9	2.84 V	168	55.1	-2.0
3	*2417.00	116.6 PK			2.84 V	168	118.7	-2.1
4	*2417.00	104.9 AV			2.84 V	168	107.0	-2.1
5	4834.00	49.0 PK	74.0	-25.0	2.06 V	129	46.3	2.7
6	4834.00	37.2 AV	54.0	-16.8	2.06 V	129	34.5	2.7
7	7251.00	44.7 PK	74.0	-29.3	2.52 V	299	35.7	9.0
8	7251.00	32.7 AV	54.0	-21.3	2.52 V	299	23.7	9.0

REMARKS:

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

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	57.7 PK	74.0	-16.3	2.22 H	132	59.7	-2.0
2	2390.00	44.1 AV	54.0	-9.9	2.22 H	132	46.1	-2.0
3	*2437.00	117.5 PK			2.22 H	132	119.8	-2.3
4	*2437.00	106.1 AV			2.22 H	132	108.4	-2.3
5	2483.50	62.9 PK	74.0	-11.1	2.22 H	132	65.1	-2.2
6	2483.50	47.2 AV	54.0	-6.8	2.22 H	132	49.4	-2.2
7	4874.00	37.2 PK	74.0	-36.8	1.53 H	222	34.3	2.9
8	4874.00	27.7 AV	54.0	-26.3	1.53 H	222	24.8	2.9
9	7311.00	44.3 PK	74.0	-29.7	2.36 H	41	35.0	9.3
10	7311.00	32.3 AV	54.0	-21.7	2.36 H	41	23.0	9.3
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	54.1 PK	74.0	-19.9	2.89 V	208	56.1	-2.0
2	2390.00	41.2 AV	54.0	-12.8	2.89 V	208	43.2	-2.0
3	*2437.00	117.7 PK			2.89 V	208	120.0	-2.3
4	*2437.00	106.2 AV			2.89 V	208	108.5	-2.3
5	2483.50	58.7 PK	74.0	-15.3	2.89 V	208	60.9	-2.2
6	2483.50	44.2 AV	54.0	-9.8	2.89 V	208	46.4	-2.2
7	4874.00	48.3 PK	74.0	-25.7	1.95 V	125	45.4	2.9
8	4874.00	36.3 AV	54.0	-17.7	1.95 V	125	33.4	2.9
9	7311.00	45.1 PK	74.0	-28.9	2.62 V	306	35.8	9.3
10	7311.00	32.9 AV	54.0	-21.1	2.62 V	306	23.6	9.3

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

CHANNEL	TX Channel 10	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	*2457.00	114.7 PK			2.28 H	139	117.0	-2.3
2	*2457.00	103.8 AV			2.28 H	139	106.1	-2.3
3	2483.50	67.0 PK	74.0	-7.0	2.28 H	139	69.2	-2.2
4	2483.50	51.4 AV	54.0	-2.6	2.28 H	139	53.6	-2.2
5	4914.00	37.1 PK	74.0	-36.9	1.55 H	233	34.2	2.9
6	4914.00	27.7 AV	54.0	-26.3	1.55 H	233	24.8	2.9
7	7371.00	43.8 PK	74.0	-30.2	2.33 H	49	34.1	9.7
8	7371.00	32.0 AV	54.0	-22.0	2.33 H	49	22.3	9.7
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	*2457.00	116.1 PK			2.64 V	173	118.4	-2.3
2	*2457.00	104.5 AV			2.64 V	173	106.8	-2.3
3	2483.50	68.2 PK	74.0	-5.8	2.64 V	173	70.4	-2.2
4	2483.50	53.4 AV	54.0	-0.6	2.64 V	173	55.6	-2.2
5	4914.00	48.9 PK	74.0	-25.1	1.99 V	98	46.0	2.9
6	4914.00	37.2 AV	54.0	-16.8	1.99 V	98	34.3	2.9
7	7371.00	44.8 PK	74.0	-29.2	2.59 V	325	35.1	9.7
8	7371.00	32.6 AV	54.0	-21.4	2.59 V	325	22.9	9.7

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) 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	112.5 PK			2.19 H	133	114.8	-2.3
2	*2462.00	100.4 AV			2.19 H	133	102.7	-2.3
3	2483.50	68.2 PK	74.0	-5.8	2.19 H	133	70.4	-2.2
4	2483.50	53.4 AV	54.0	-0.6	2.19 H	133	55.6	-2.2
5	4924.00	36.1 PK	74.0	-37.9	1.59 H	221	33.1	3.0
6	4924.00	26.9 AV	54.0	-27.1	1.59 H	221	23.9	3.0
7	7386.00	43.5 PK	74.0	-30.5	2.34 H	48	33.8	9.7
8	7386.00	31.8 AV	54.0	-22.2	2.34 H	48	22.1	9.7
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	*2462.00	112.7 PK			2.93 V	168	115.0	-2.3
2	*2462.00	101.1 AV			2.93 V	168	103.4	-2.3
3	2483.50	67.4 PK	74.0	-6.6	2.93 V	168	69.6	-2.2
4	2483.50	52.4 AV	54.0	-1.6	2.93 V	168	54.6	-2.2
5	4924.00	48.5 PK	74.0	-25.5	2.01 V	111	45.5	3.0
6	4924.00	36.7 AV	54.0	-17.3	2.01 V	111	33.7	3.0
7	7386.00	44.8 PK	74.0	-29.2	2.62 V	311	35.1	9.7
8	7386.00	32.8 AV	54.0	-21.2	2.62 V	311	23.1	9.7

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.

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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	63.8 PK	74.0	-10.2	2.45 H	128	65.8	-2.0
2	2390.00	49.5 AV	54.0	-4.5	2.45 H	128	51.5	-2.0
3	*2422.00	108.2 PK			2.45 H	128	110.4	-2.2
4	*2422.00	98.1 AV			2.45 H	128	100.3	-2.2
5	4844.00	36.7 PK	74.0	-37.3	1.60 H	220	34.0	2.7
6	4844.00	27.3 AV	54.0	-26.7	1.60 H	220	24.6	2.7
7	7266.00	43.9 PK	74.0	-30.1	2.31 H	41	34.8	9.1
8	7266.00	32.1 AV	54.0	-21.9	2.31 H	41	23.0	9.1
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	67.3 PK	74.0	-6.7	2.49 V	167	69.3	-2.0
2	2390.00	53.1 AV	54.0	-0.9	2.49 V	167	55.1	-2.0
3	*2422.00	109.4 PK			2.49 V	167	111.6	-2.2
4	*2422.00	99.7 AV			2.49 V	167	101.9	-2.2
5	4844.00	48.0 PK	74.0	-26.0	1.99 V	115	45.3	2.7
6	4844.00	36.4 AV	54.0	-17.6	1.99 V	115	33.7	2.7
7	7266.00	44.0 PK	74.0	-30.0	2.59 V	329	34.9	9.1
8	7266.00	31.9 AV	54.0	-22.1	2.59 V	329	22.8	9.1

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
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	59.8 PK	74.0	-14.2	2.46 H	132	61.8	-2.0
2	2390.00	46.3 AV	54.0	-7.7	2.46 H	132	48.3	-2.0
3	*2437.00	109.9 PK			2.46 H	132	112.2	-2.3
4	*2437.00	100.6 AV			2.46 H	132	102.9	-2.3
5	2483.50	67.5 PK	74.0	-6.5	2.46 H	132	69.7	-2.2
6	2483.50	50.5 AV	54.0	-3.5	2.46 H	132	52.7	-2.2
7	4874.00	36.8 PK	74.0	-37.2	1.54 H	219	33.9	2.9
8	4874.00	27.5 AV	54.0	-26.5	1.54 H	219	24.6	2.9
9	7311.00	43.3 PK	74.0	-30.7	2.37 H	24	34.0	9.3
10	7311.00	31.6 AV	54.0	-22.4	2.37 H	24	22.3	9.3
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	67.1 PK	74.0	-6.9	2.50 V	166	69.1	-2.0
2	2390.00	49.2 AV	54.0	-4.8	2.50 V	166	51.2	-2.0
3	*2437.00	112.4 PK			2.50 V	166	114.7	-2.3
4	*2437.00	102.1 AV			2.50 V	166	104.4	-2.3
5	2483.50	71.1 PK	74.0	-2.9	2.50 V	166	73.3	-2.2
6	2483.50	53.3 AV	54.0	-0.7	2.50 V	166	55.5	-2.2
7	4874.00	49.0 PK	74.0	-25.0	2.07 V	116	46.1	2.9
8	4874.00	36.9 AV	54.0	-17.1	2.07 V	116	34.0	2.9
9	7311.00	44.9 PK	74.0	-29.1	2.58 V	317	35.6	9.3
10	7311.00	32.9 AV	54.0	-21.1	2.58 V	317	23.6	9.3

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	107.9 PK			2.44 H	139	110.2	-2.3
2	*2452.00	97.8 AV			2.44 H	139	100.1	-2.3
3	2483.50	69.8 PK	74.0	-4.2	2.44 H	139	72.0	-2.2
4	2483.50	52.9 AV	54.0	-1.1	2.44 H	139	55.1	-2.2
5	4904.00	37.1 PK	74.0	-36.9	1.52 H	222	34.2	2.9
6	4904.00	27.7 AV	54.0	-26.3	1.52 H	222	24.8	2.9
7	7356.00	44.0 PK	74.0	-30.0	2.30 H	36	34.3	9.7
8	7356.00	32.0 AV	54.0	-22.0	2.30 H	36	22.3	9.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	109.2 PK			2.48 V	178	111.5	-2.3
2	*2452.00	99.6 AV			2.48 V	178	101.9	-2.3
3	2483.50	69.4 PK	74.0	-4.6	2.48 V	178	71.6	-2.2
4	2483.50	53.2 AV	54.0	-0.8	2.48 V	178	55.4	-2.2
5	4904.00	49.1 PK	74.0	-24.9	2.00 V	110	46.2	2.9
6	4904.00	37.2 AV	54.0	-16.8	2.00 V	110	34.3	2.9
7	7356.00	44.6 PK	74.0	-29.4	2.57 V	304	34.9	9.7
8	7356.00	32.4 AV	54.0	-21.6	2.57 V	304	22.7	9.7

REMARKS:

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

Below 1GHz Data:

802.11b

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	83.52	34.9 QP	40.0	-5.1	2.01 H	81	48.2	-13.3
2	271.77	39.3 QP	46.0	-6.7	1.57 H	74	47.4	-8.1
3	304.19	40.7 QP	46.0	-5.3	1.24 H	43	47.8	-7.1
4	313.19	41.2 QP	46.0	-4.8	1.38 H	44	47.9	-6.7
5	342.00	41.3 QP	46.0	-4.7	1.19 H	308	47.4	-6.1
6	353.91	42.3 QP	46.0	-3.7	3.02 H	312	48.2	-5.9
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	31.55	36.6 QP	40.0	-3.4	1.33 V	23	45.5	-8.9
2	82.84	34.4 QP	40.0	-5.6	1.54 V	122	47.5	-13.1
3	255.65	37.4 QP	46.0	-8.6	3.00 V	205	46.2	-8.8
4	347.97	40.3 QP	46.0	-5.7	1.24 V	53	46.3	-6.0
5	419.67	39.8 QP	46.0	-6.2	1.08 V	253	43.8	-4.0
6	463.74	39.4 QP	46.0	-6.6	2.68 V	293	42.2	-2.8

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

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 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
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: Feb. 23 to Mar. 27, 2018

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.

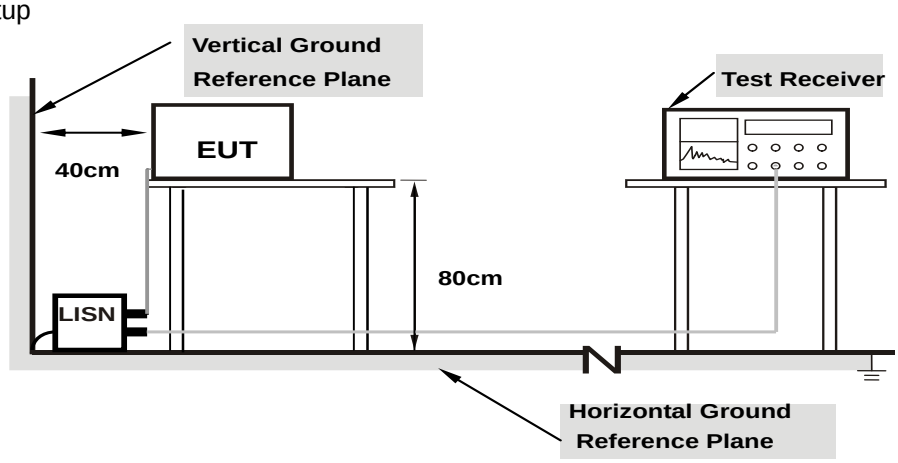
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

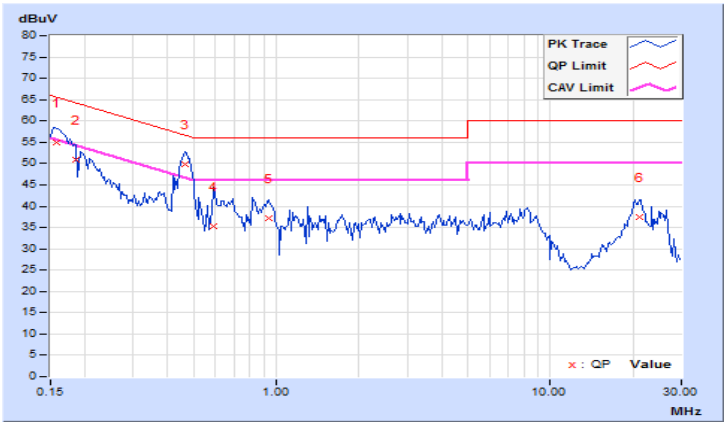
4.2.7 Test Results (Mode 1)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	10.13	44.92	26.42	55.05	36.55	65.58	55.58	-10.53	-19.03
2	0.18516	10.14	40.72	24.34	50.86	34.48	64.25	54.25	-13.39	-19.77
3	**0.46628**	**10.19**	**39.59**	**32.83**	**49.78**	**43.02**	**56.58**	**46.58**	**-6.80**	**-3.56**
4	0.58750	10.20	25.10	15.53	35.30	25.73	56.00	46.00	-20.70	-20.27
5	0.94297	10.23	26.81	18.68	37.04	28.91	56.00	46.00	-18.96	-17.09
6	21.21875	11.23	26.09	20.00	37.32	31.23	60.00	50.00	-22.68	-18.77

REMARKS:

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

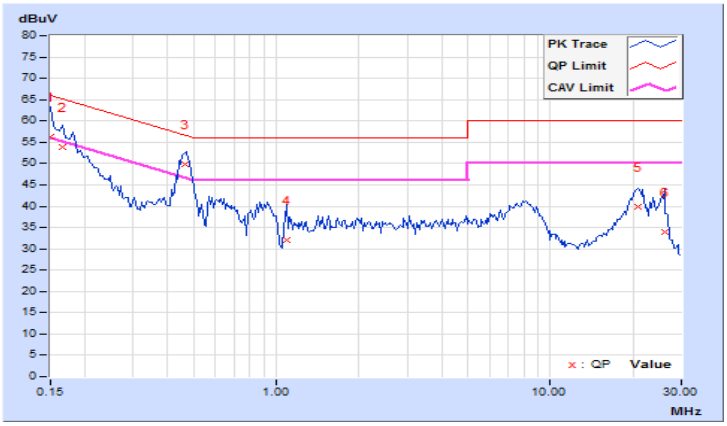


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.04	46.22	28.11	56.26	38.15	66.00	56.00	-9.74	-17.85
2	0.16562	10.04	43.88	25.91	53.92	35.95	65.18	55.18	-11.26	-19.23
3	0.46475	10.08	39.71	32.51	49.79	42.59	56.61	46.61	-6.82	-4.02
4	1.08594	10.11	21.81	14.43	31.92	24.54	56.00	46.00	-24.08	-21.46
5	20.95313	11.02	28.85	23.48	39.87	34.50	60.00	50.00	-20.13	-15.50
6	26.00391	11.05	22.93	15.28	33.98	26.33	60.00	50.00	-26.02	-23.67

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.



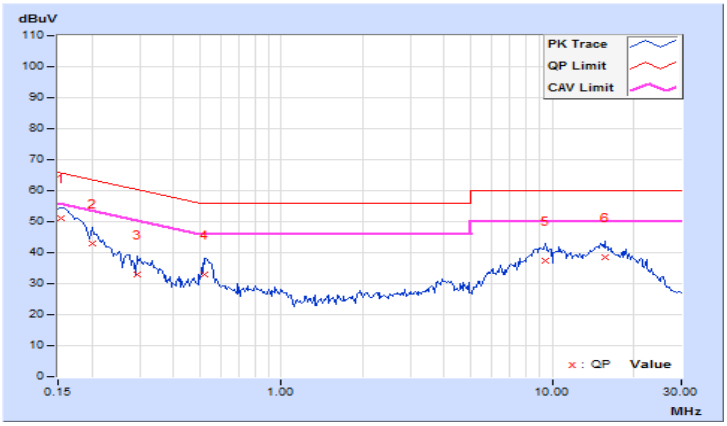
4.2.8 Test Results (Mode 2)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.04	40.90	24.97	50.94	35.01	65.79	55.79	-14.85	-20.78
2	0.20078	10.06	32.90	18.93	42.96	28.99	63.58	53.58	-20.62	-24.59
3	0.29453	10.08	22.86	10.82	32.94	20.90	60.40	50.40	-27.46	-29.50
4	0.52109	10.12	22.80	13.95	32.92	24.07	56.00	46.00	-23.08	-21.93
5	9.46484	10.52	26.96	20.24	37.48	30.76	60.00	50.00	-22.52	-19.24
6	15.64453	10.86	27.72	22.28	38.58	33.14	60.00	50.00	-21.42	-16.86

REMARKS:

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

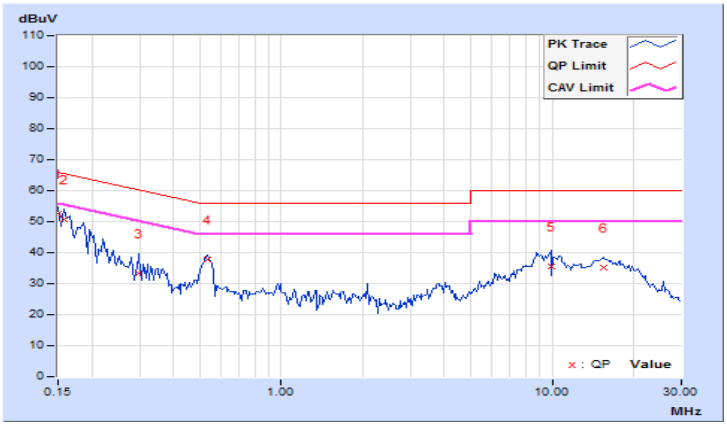


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.94	42.48	26.27	52.42	36.21	66.00	56.00	-13.58	-19.79
2	0.15781	9.95	40.76	24.68	50.71	34.63	65.58	55.58	-14.87	-20.95
3	0.29844	9.98	23.41	11.30	33.39	21.28	60.29	50.29	-26.90	-29.01
4	0.53672	10.01	27.66	20.45	37.67	30.46	56.00	46.00	-18.33	-15.54
5	9.98047	10.39	25.28	18.70	35.67	29.09	60.00	50.00	-24.33	-20.91
6	15.46094	10.68	24.52	19.30	35.20	29.98	60.00	50.00	-24.80	-20.02

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.



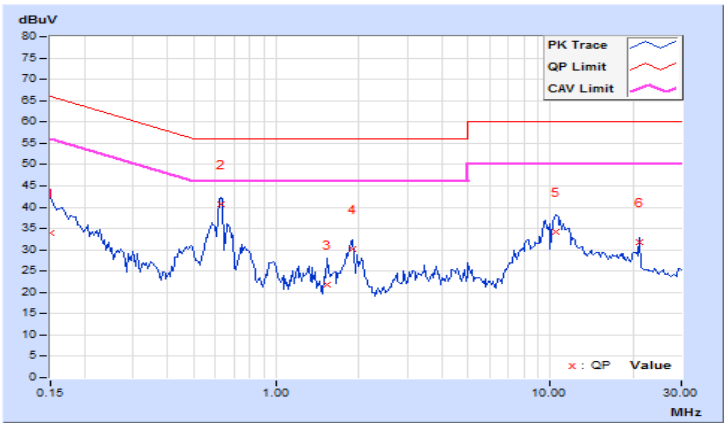
4.2.9 Test Results (Mode 3)

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.13	23.88	11.72	34.01	21.85	66.00	56.00	-31.99	-34.15
2	0.62528	10.21	30.36	25.98	40.57	36.19	56.00	46.00	-15.43	-9.81
3	1.52344	10.25	11.65	5.02	21.90	15.27	56.00	46.00	-34.10	-30.73
4	1.88672	10.27	20.02	11.90	30.29	22.17	56.00	46.00	-25.71	-23.83
5	10.44922	10.67	23.59	16.93	34.26	27.60	60.00	50.00	-25.74	-22.40
6	21.16797	11.23	20.47	19.55	31.70	30.78	60.00	50.00	-28.30	-19.22

REMARKS:

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

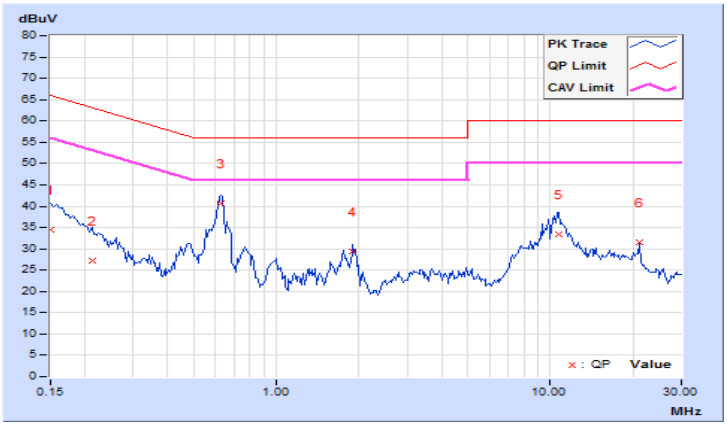


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.04	24.35	11.70	34.39	21.74	66.00	56.00	-31.61	-34.26
2	0.21250	10.04	17.18	5.33	27.22	15.37	63.11	53.11	-35.89	-37.74
3	0.62656	10.09	30.54	26.38	40.63	36.47	56.00	46.00	-15.37	-9.53
4	1.90234	10.15	19.22	10.95	29.37	21.10	56.00	46.00	-26.63	-24.90
5	10.76172	10.53	22.88	16.82	33.41	27.35	60.00	50.00	-26.59	-22.65
6	21.16797	11.02	20.45	19.41	31.47	30.43	60.00	50.00	-28.53	-19.57

REMARKS:

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

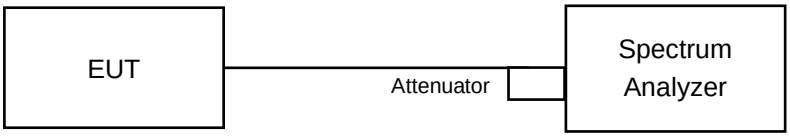


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at specific 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	9.03	9.09	0.5	PASS
6	2437	9.13	10.09	0.5	PASS
11	2462	9.12	10.06	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.41	16.39	0.5	PASS
2	2417	16.38	16.39	0.5	PASS
6	2437	16.36	16.37	0.5	PASS
10	2457	16.40	16.40	0.5	PASS
11	2462	16.39	16.42	0.5	PASS

VHT20

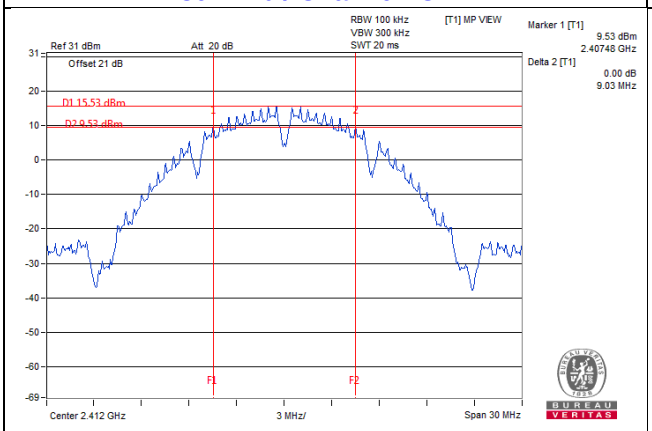
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.65	17.62	0.5	PASS
2	2417	17.66	17.63	0.5	PASS
6	2437	17.58	17.65	0.5	PASS
10	2457	17.65	17.65	0.5	PASS
11	2462	17.66	17.68	0.5	PASS

VHT40

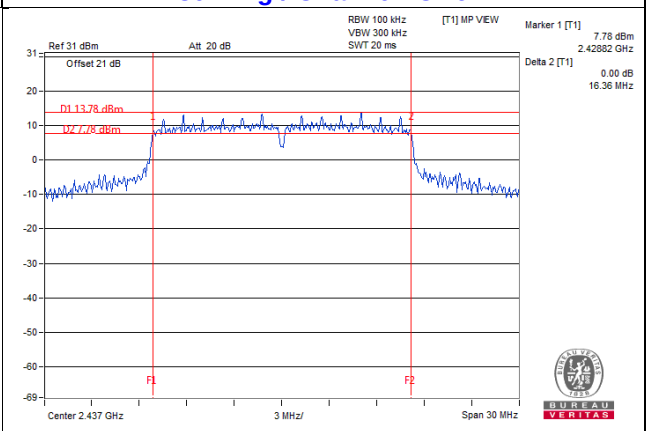
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.74	35.49	0.5	Pass
6	2437	35.26	34.03	0.5	Pass
9	2452	35.38	35.45	0.5	Pass

Spectrum Plot of Worst Value

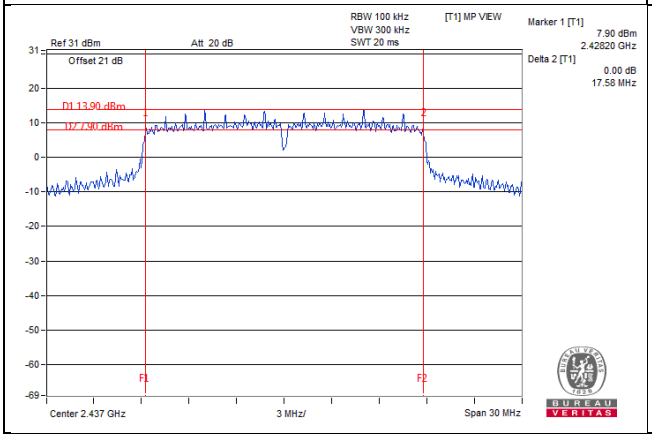
802.11b / Chain 0 : CH1



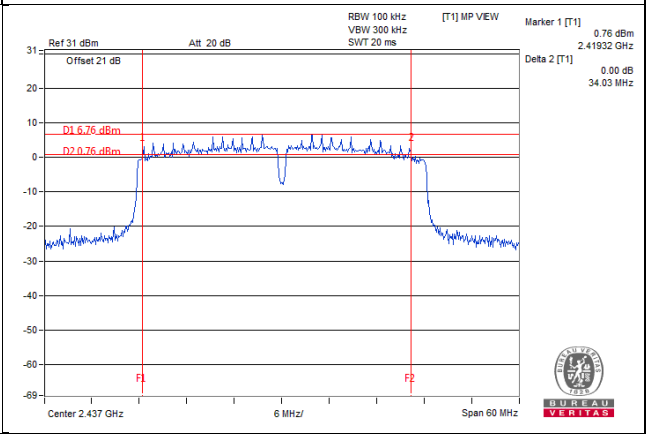
802.11g / Chain 0 : CH6



VHT20 / Chain 0 : CH6



VHT40 / Chain 1 : CH6



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

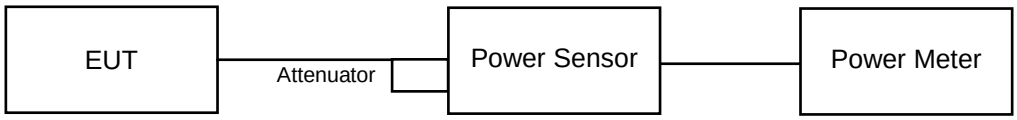
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	24.10	24.09	513.488	27.11	30.00	Pass
6	2437	25.59	25.32	702.651	28.47	30.00	Pass
11	2462	24.41	24.18	537.876	27.31	30.00	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.88	20.81	242.966	23.86	30.00	Pass
2	2417	23.07	23.04	404.14	26.07	30.00	Pass
6	2437	24.77	24.43	577.248	27.61	30.00	Pass
10	2457	21.67	21.54	289.454	24.62	30.00	Pass
11	2462	18.04	18.07	127.801	21.07	30.00	Pass

VHT20

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.77	19.94	193.47	22.87	30.00	Pass
2	2417	22.57	22.62	363.527	25.61	30.00	Pass
6	2437	24.81	24.54	587.137	27.69	30.00	Pass
10	2457	22.01	22.12	321.785	25.08	30.00	Pass
11	2462	18.76	18.87	152.252	21.83	30.00	Pass

VHT40

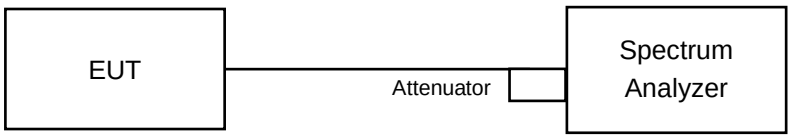
Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.35	18.28	135.689	21.33	30.00	Pass
6	2437	21.14	20.90	253.044	24.03	30.00	Pass
9	2452	18.15	18.04	128.993	21.11	30.00	Pass

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, VHT20

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 802.11g, VHT40

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-6.18	3.01	-3.17	8.00	Pass
	6	2437	-6.07	3.01	-3.06	8.00	Pass
	11	2462	-5.83	3.01	-2.82	8.00	Pass
1	1	2412	-7.18	3.01	-4.17	8.00	Pass
	6	2437	-6.53	3.01	-3.52	8.00	Pass
	11	2462	-6.54	3.01	-3.53	8.00	Pass

Note: 1. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical -- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

2. The max gain is 1.2dBi < 6dBi, 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	-12.82	3.01	0.19	-9.62	8.00	Pass
	2	2417	-10.63	3.01	0.19	-7.43	8.00	Pass
	6	2437	-7.78	3.01	0.19	-4.58	8.00	Pass
	10	2457	-10.89	3.01	0.19	-7.69	8.00	Pass
	11	2462	-14.51	3.01	0.19	-11.31	8.00	Pass
1	1	2412	-12.20	3.01	0.19	-9.00	8.00	Pass
	2	2417	-10.28	3.01	0.19	-7.08	8.00	Pass
	6	2437	-9.38	3.01	0.19	-6.18	8.00	Pass
	10	2457	-10.85	3.01	0.19	-7.65	8.00	Pass
	11	2462	-14.78	3.01	0.19	-11.58	8.00	Pass

Note: 1. Refer to section 3.3 for duty cycle spectrum plot.

2. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

3. The max gain is 1.2dBi < 6dBi, so the power density limit shall not be reduced.

VHT20

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	-13.11	3.01	-10.10	8.00	Pass
	2	2417	-10.18	3.01	-7.17	8.00	Pass
	6	2437	-8.78	3.01	-5.77	8.00	Pass
	10	2457	-10.68	3.01	-7.67	8.00	Pass
	11	2462	-14.07	3.01	-11.06	8.00	Pass
1	1	2412	-13.98	3.01	-10.97	8.00	Pass
	2	2417	-10.48	3.01	-7.47	8.00	Pass
	6	2437	-9.00	3.01	-5.99	8.00	Pass
	10	2457	-10.34	3.01	-7.33	8.00	Pass
	11	2462	-13.56	3.01	-10.55	8.00	Pass

Note: 1. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

2. The max gain is 1.2dBi < 6dBi, so the power density limit shall not be reduced.

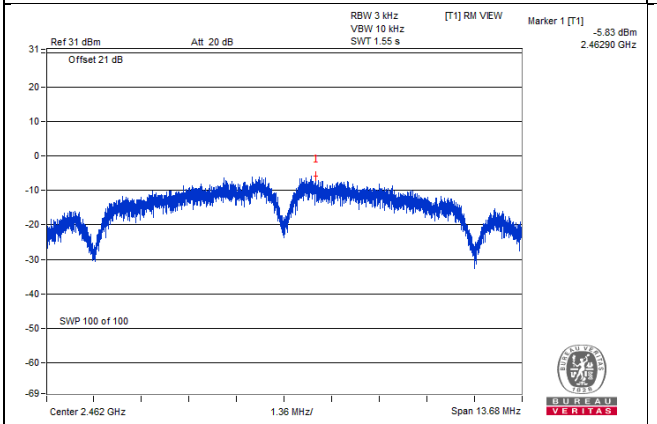
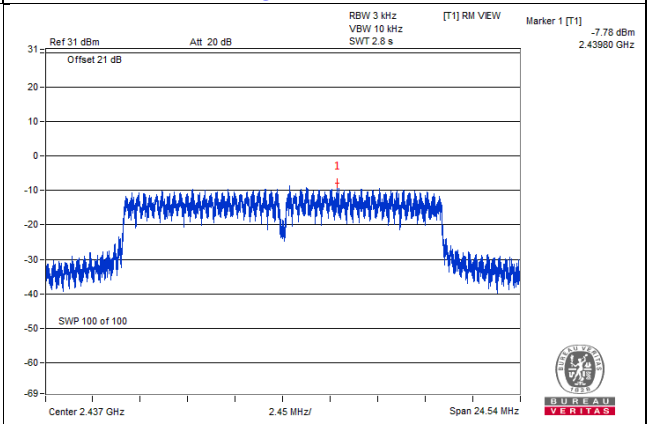
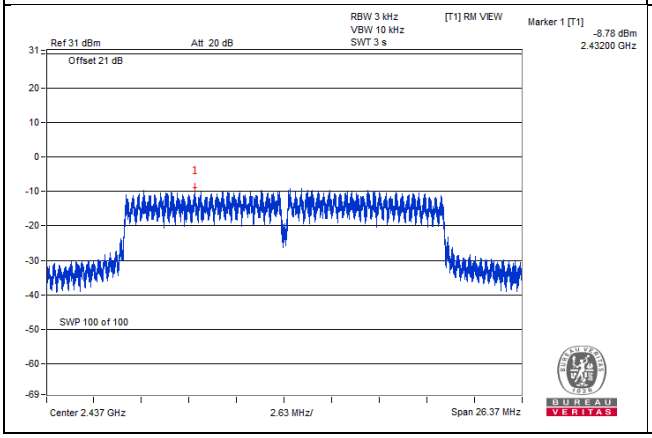
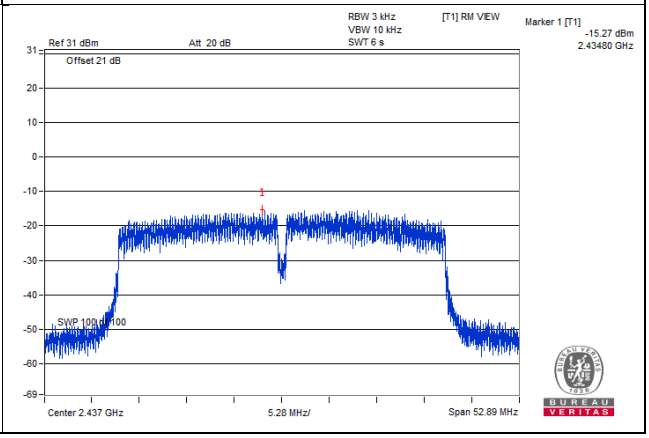
VHT40

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	-17.61	3.01	0.16	-14.44	8.00	Pass
	6	2437	-15.27	3.01	0.16	-12.10	8.00	Pass
	9	2452	-17.74	3.01	0.16	-14.57	8.00	Pass
1	3	2422	-17.14	3.01	0.16	-13.97	8.00	Pass
	6	2437	-15.72	3.01	0.16	-12.55	8.00	Pass
	9	2452	-17.50	3.01	0.16	-14.33	8.00	Pass

Note: 1. Refer to section 3.3 for duty cycle spectrum plot.

2. There are two WLAN antennas will transmit simultaneously (one is Horizontal and the other one is Vertical-- MIMO system with two outputs driving a cross-polarized pair of linearly polarized antennas). As the antenna combination must be supplied with one Horizontal and one Vertical antenna.

3. The max gain is 1.2dBi < 6dBi, so the power density limit shall not be reduced.

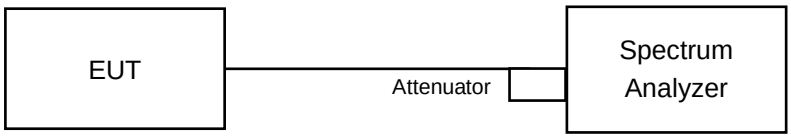
Spectrum Plot of Worst Value	
802.11b / Chain 0: CH11	**802.11g / Chain 0 : CH6**
	
VHT20 / Chain 0 : CH6	**VHT40 / Chain 0 : CH6**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

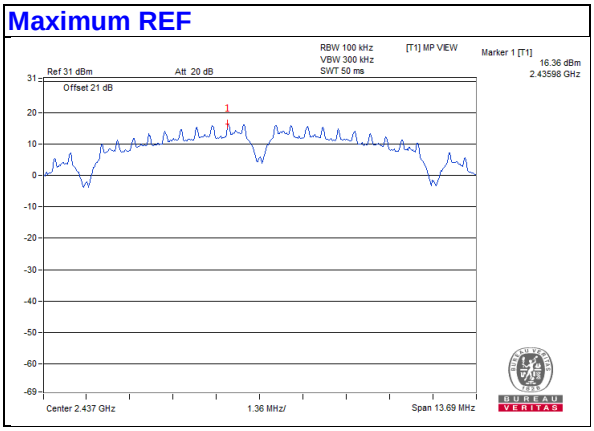
Same as Item 4.3.6

4.6.7 Test Results

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

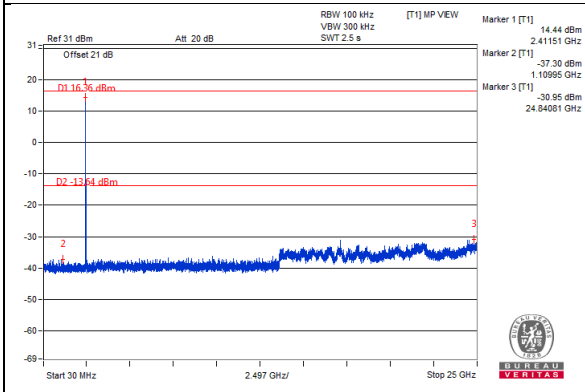
802.11b

Maximum REF

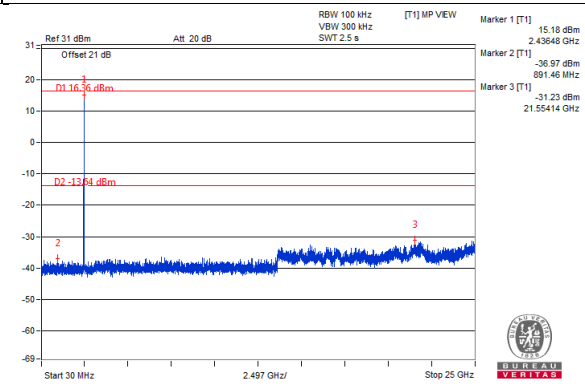


Chain 0

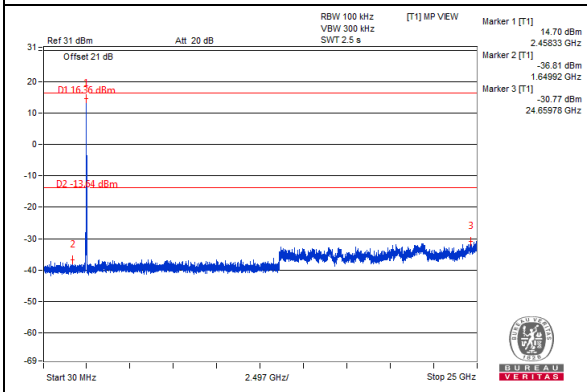
CH 1



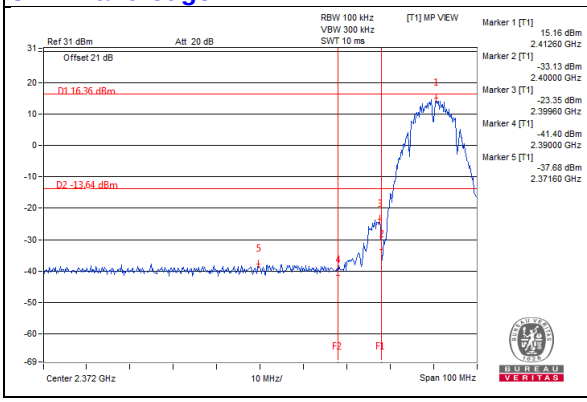
CH 6



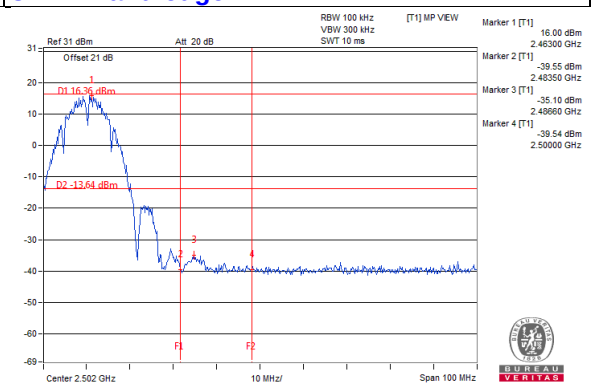
CH 11



CH 1 Band edge

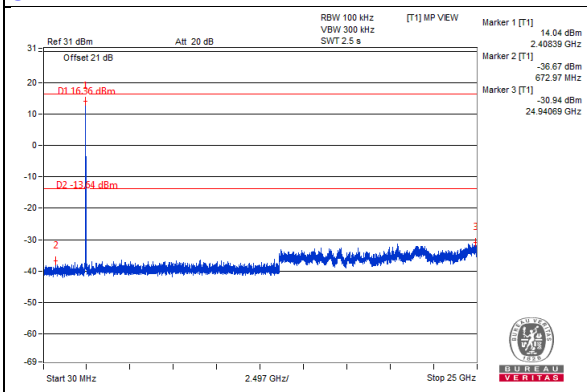


CH 11 Band edge

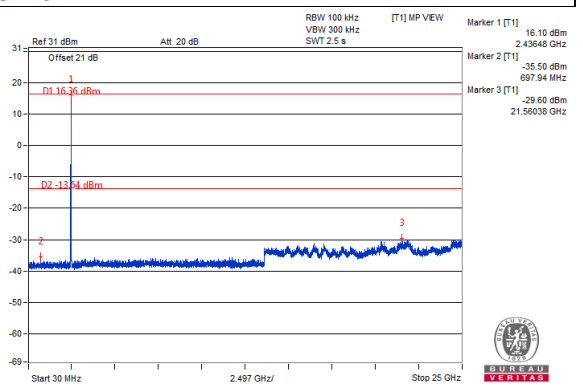


Chain 1

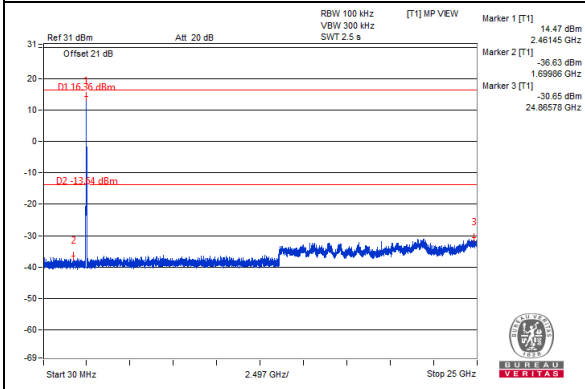
CH 1



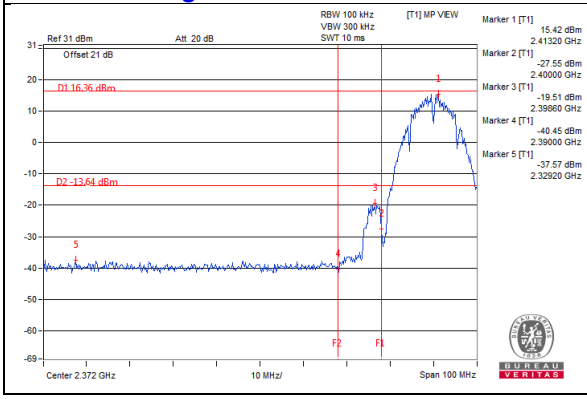
CH 6



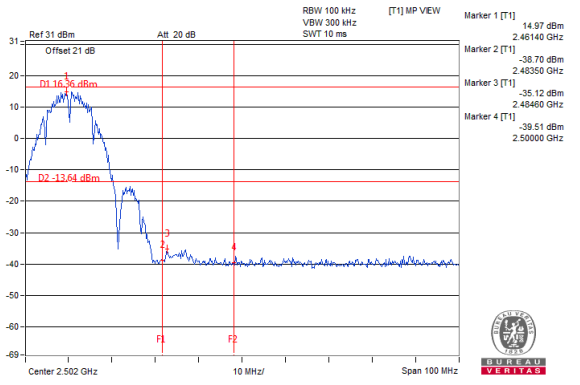
CH 11



CH 1 Band edge

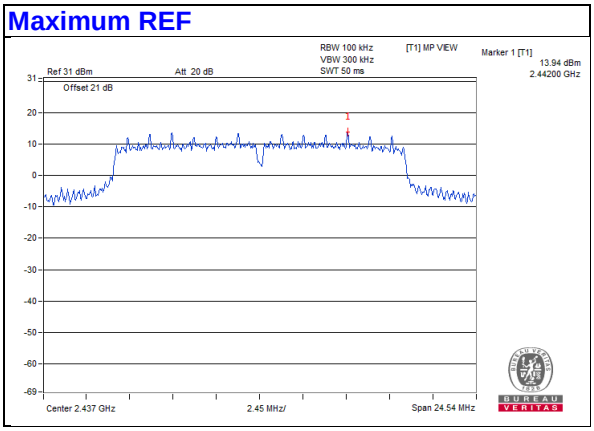


CH 11 Band edge



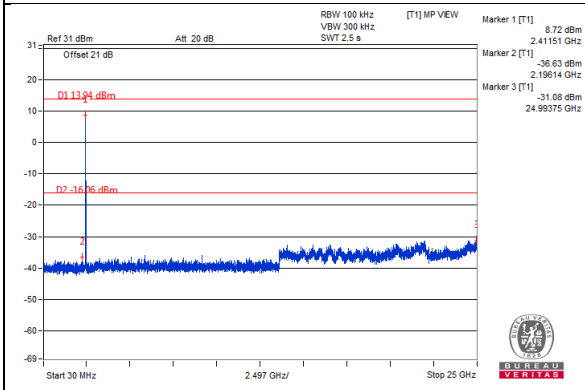
802.11g

Maximum REF

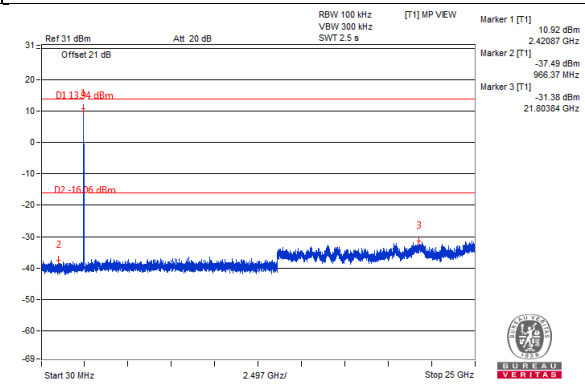


Chain 0

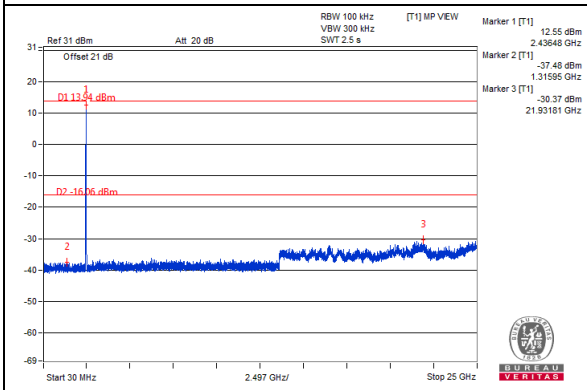
CH 1



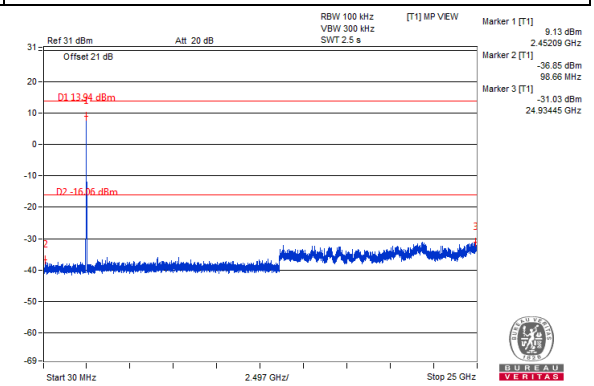
CH 2



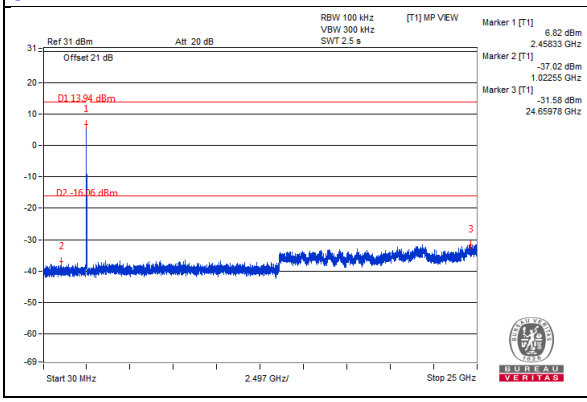
CH 6



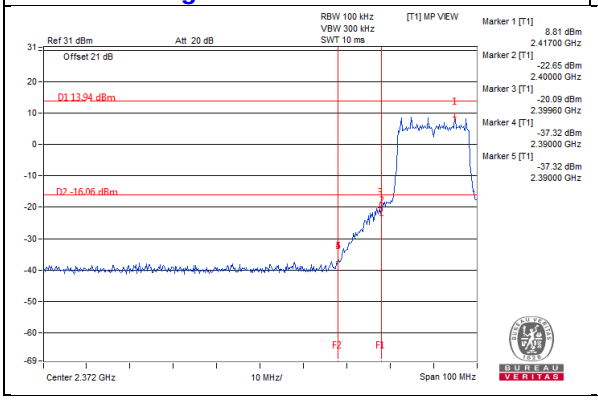
CH 10



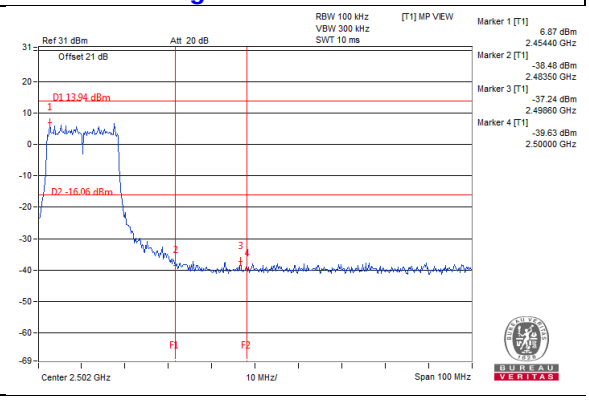
CH 11



CH 1 Band edge

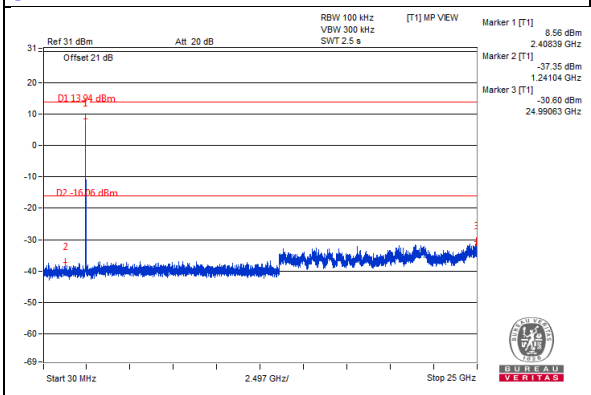


CH 11 Band edge

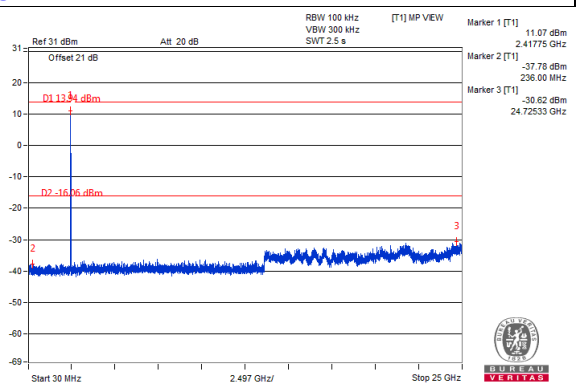


Chain 1

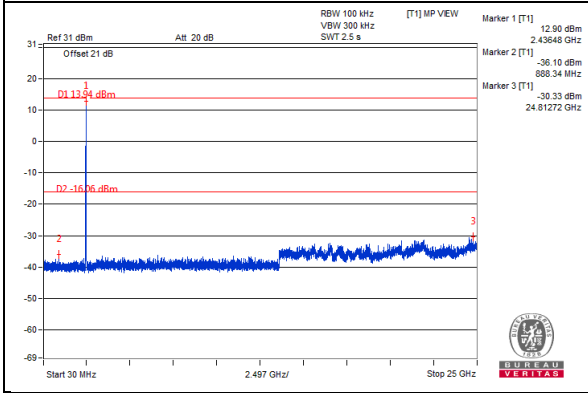
CH 1



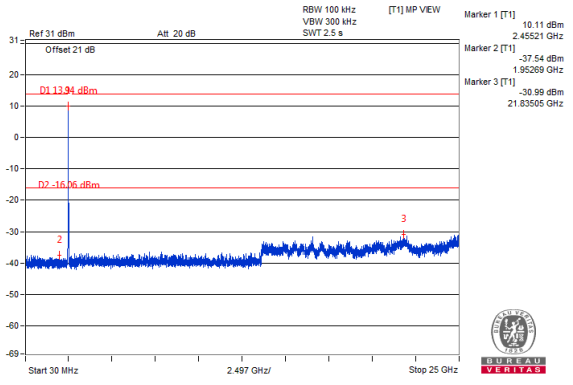
CH 2



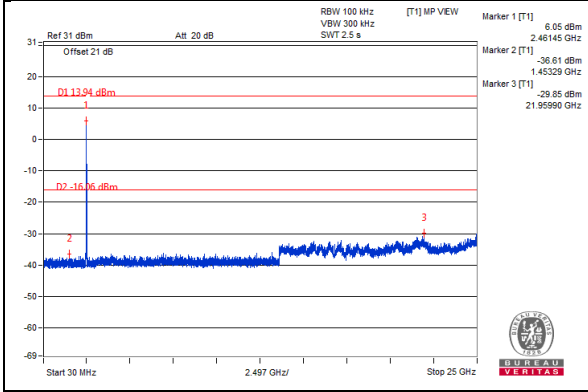
CH 6



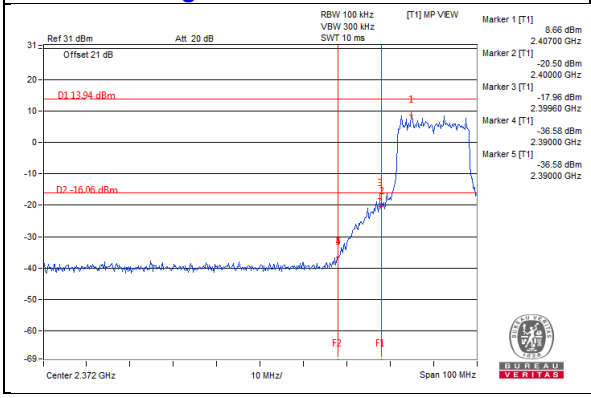
CH 10



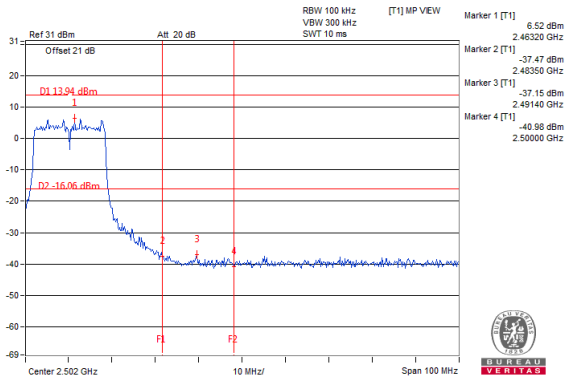
CH 11



CH 1 Band edge

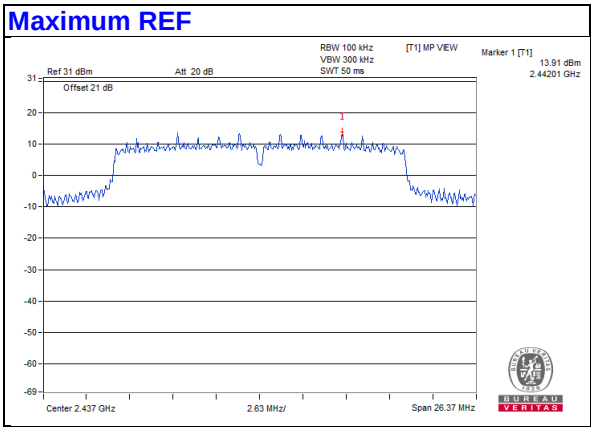


CH 11 Band edge



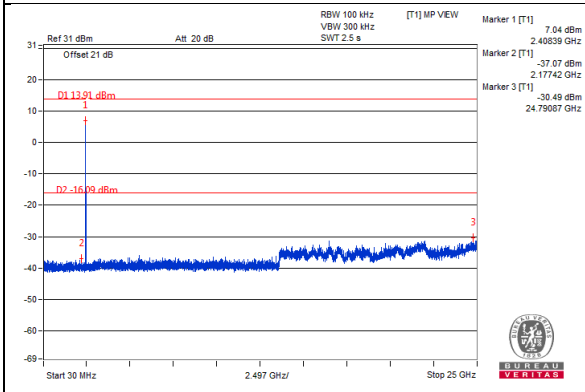
VHT20

Maximum REF

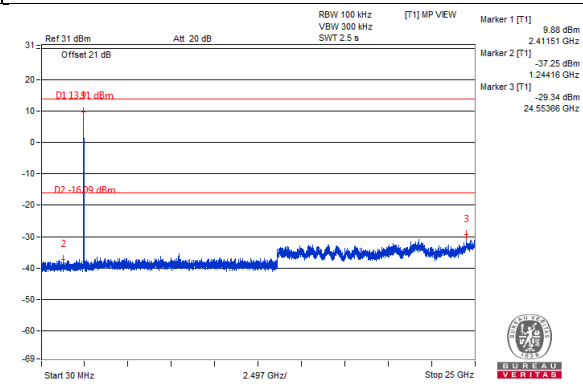


Chain 0

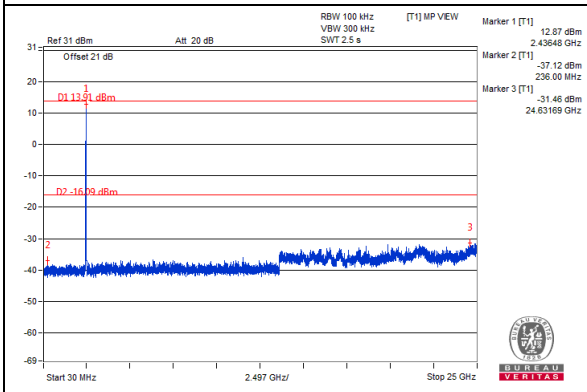
CH 1



CH 2



CH 6



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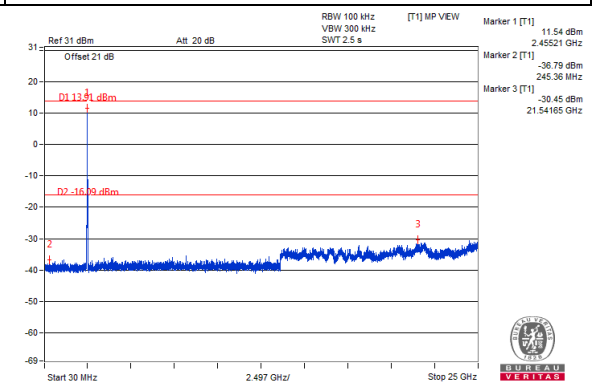

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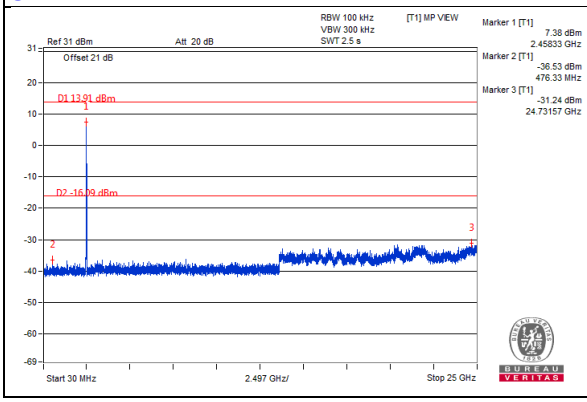
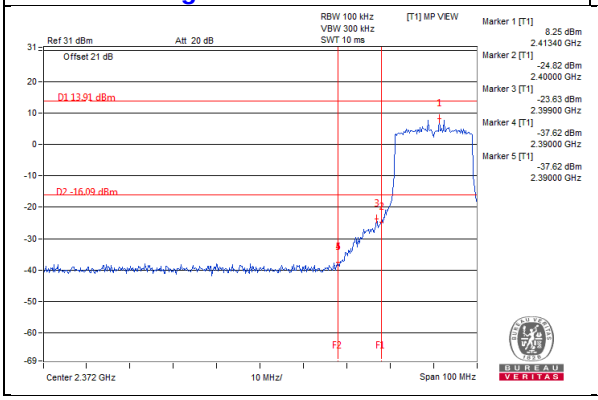
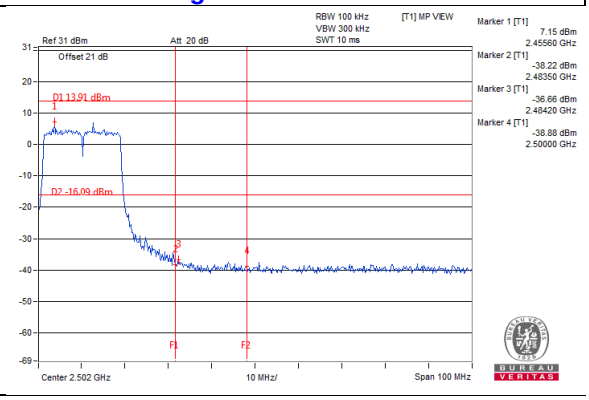


CH 1 Band edge

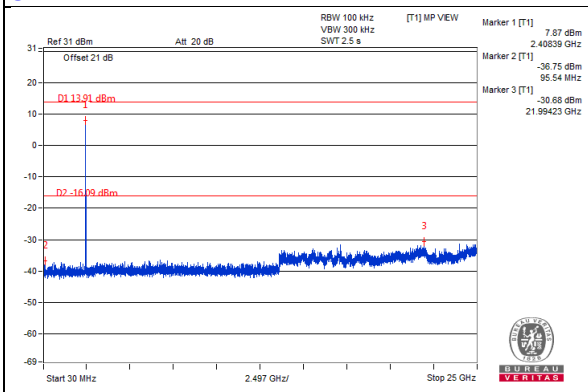


CH 11 Band edge



Chain 1

CH 1



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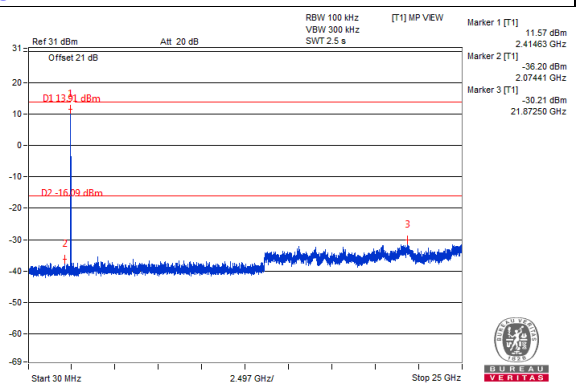

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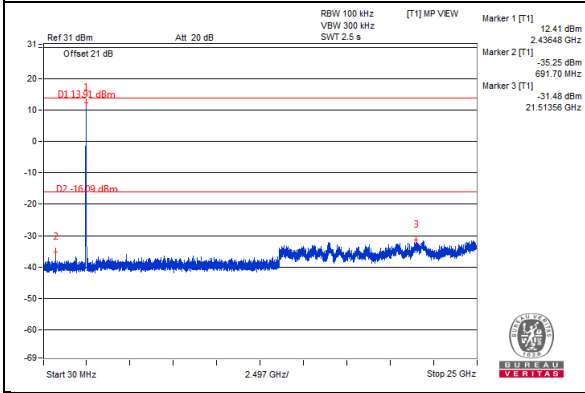

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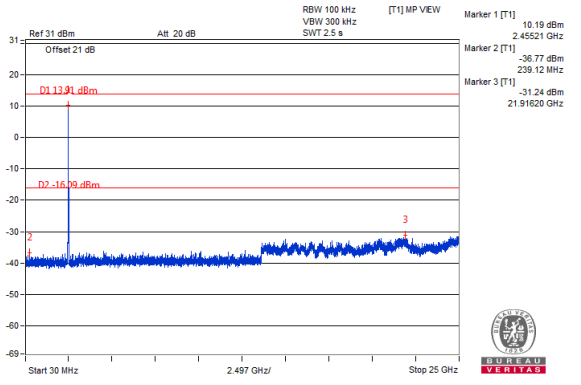

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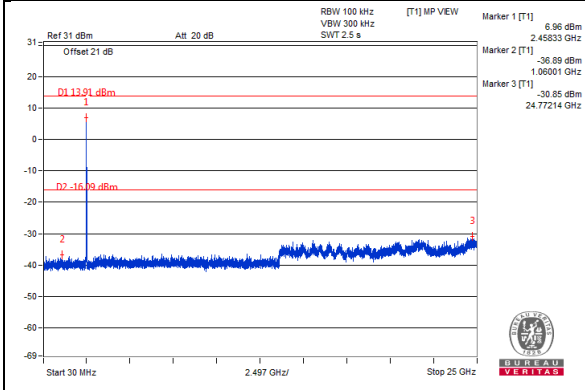
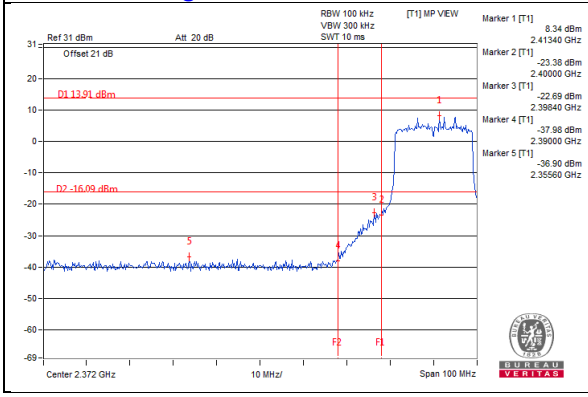


CH 1 Band edge



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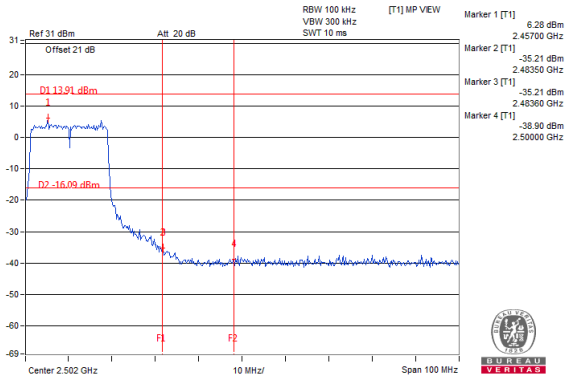
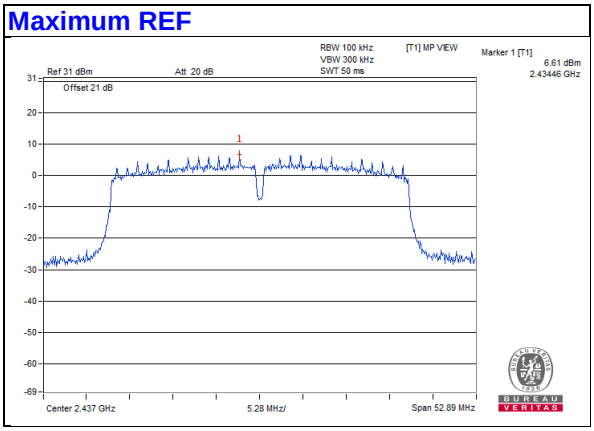


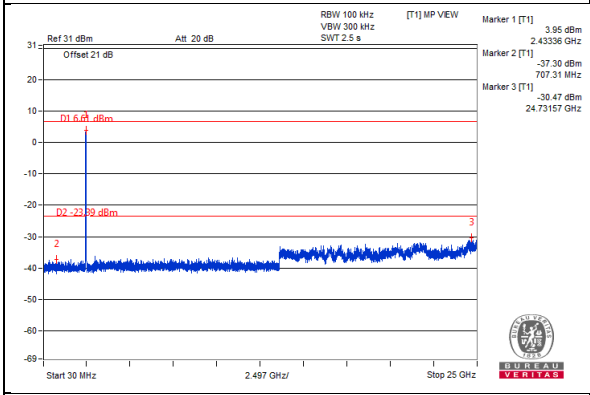
VHT40

Maximum REF

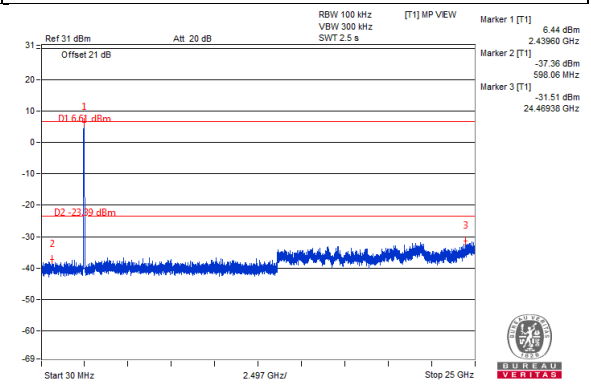


Chain 0

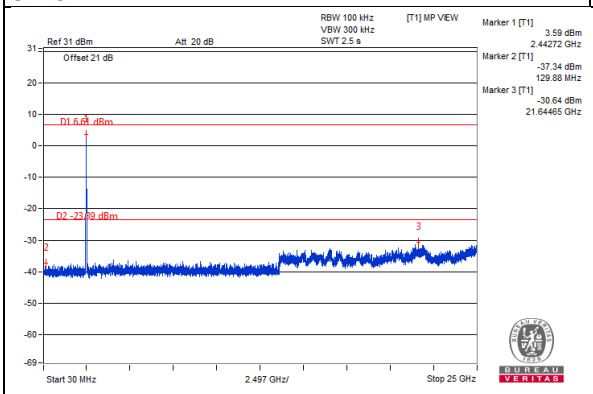
CH 3



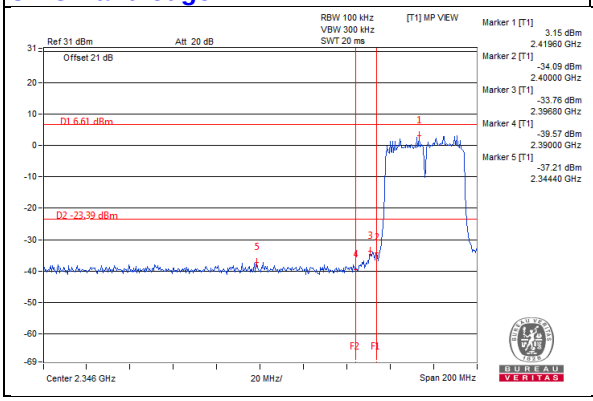
CH 6



CH 9



CH 3 Band edge



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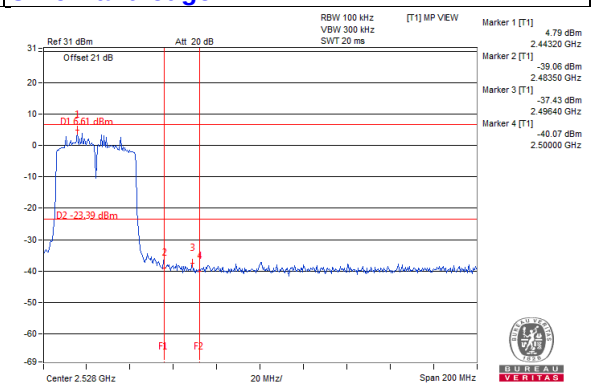
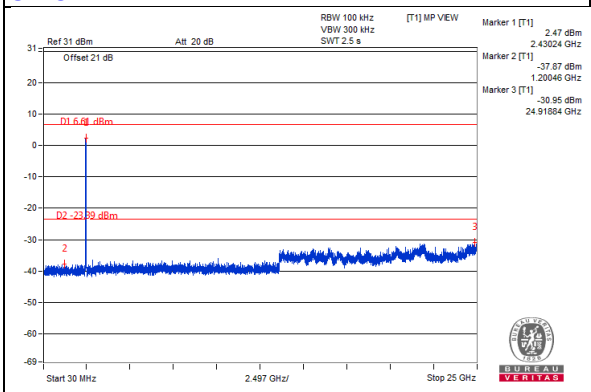
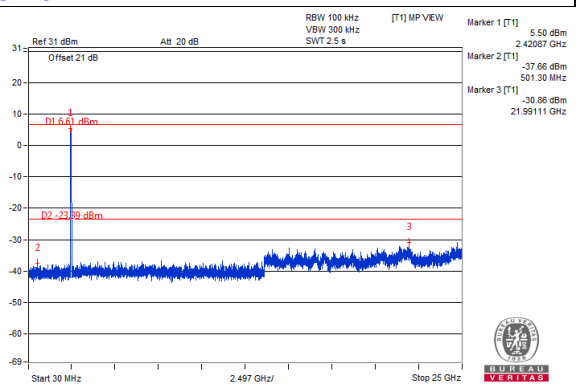


Chain 1

CH 3



CH 6



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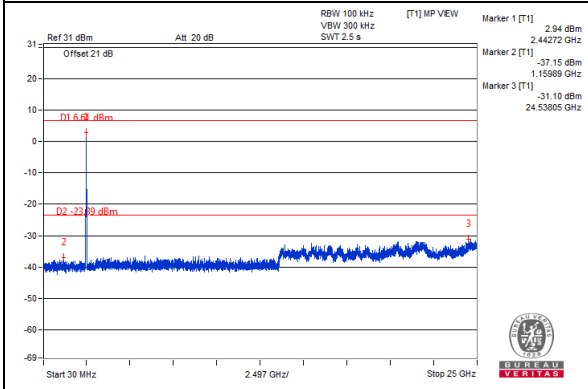
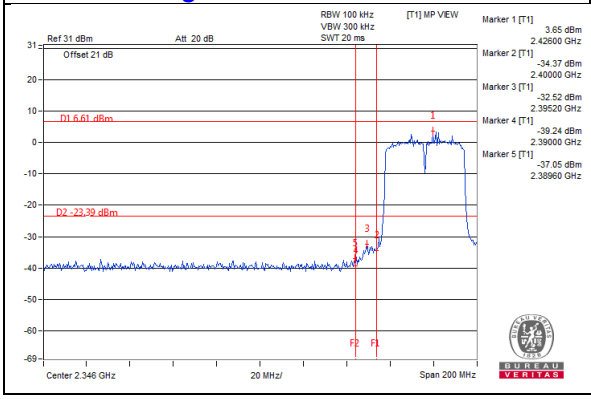


CH 3 Band edge



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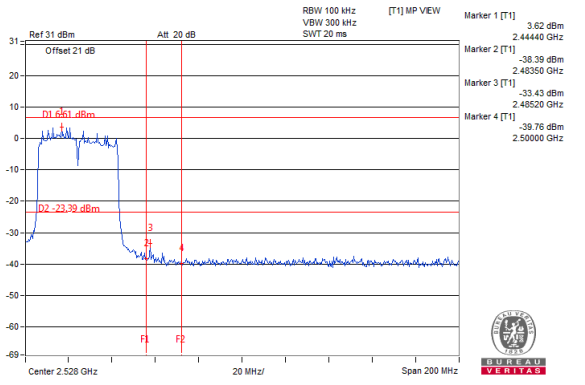

5 Pictures of Test Arrangements

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:

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

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

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