FCC Test Report

Report No.:	RF180823E06
FCC ID:	NOIKBE60QR2
Test Model:	E60QR2
Received Date:	Aug. 24, 2018
Test Date:	Aug. 30 to Oct. 06, 2018
Issued Date:	Nov. 12, 2018
Applicant:	NETRONIX, INC.
Address:	No. 945, Boai St., Jubei City, Hsin-Chu,302,Taiwan, R.O.C.
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
RF180823E06	Original release.	Nov. 12, 2018

1 Certificate of Conformity

Product:	6.8” E Ink Digital Notepad
Brand:	MobiScribe
Test Model:	E60QR2
Sample Status:	ENGINEERING SAMPLE
Applicant:	NETRONIX, INC.
Test Date:	Aug. 30 to Oct. 06, 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 : Mary Ko , **Date:** Nov. 12, 2018

Mary Ko / Specialist

Approved by : , **Date:** Nov. 12, 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 -13.29dB at 0.18125MHz.
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
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

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	5.33 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	6.8” E Ink Digital Notepad
Brand	MobiScribe
Test Model	E60QR2
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 3.7V from battery or DC 5V from USB interface
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 72.2Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11
Output Power	12.794mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Stylus pen x 1
Data Cable Supplied	USB cable (Shielded, 1m) x 1

Note:

1. The EUT has two samples, please refer to the following table:

Brand	Model No.	Difference
MobiScribe	E60QR2	With Audio
		Without Audio
From the above samples, the sample **With Audio** was selected as representative model for the test and its data was recorded in this report.		

2. The EUT could be supplied with a rechargeable battery as the following table:

Brand Name	Model No.	Spec.
EVE	PR-284983N	3.7Vdc, 1500mAh, 5.25 Wh

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

Brand	Model	Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connecter Type
Walsin Technology Corporation	RFECA3216060AAT	2	2.4~2.4835	Ceramic	soldering terminal

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

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

5. The EUT has below eMMC as following table:

No.	Brand	Model	Capacity	Remark
1	Samsung	KLM8G1GETF-B041	8G Byte	1st source eMMC
2	SanDisk	SDINBDG4-8G	8G Byte	2nd source eMMC
Note: From the above eMMC, the worst was found in **No. 1**. Therefore only the test data of the mode was recorded in this report.				

6. The EUT has below panel power IC as following table:

No.	Brand	Model	Remark
1	TI	TPS65185RSL	1st source panel power IC
2	SILERGY	SY7636ARMC	2nd source panel power IC
Note: From the above modes, the radiated emission worst case was found in **No. 1**. Therefore only the test data of the mode was recorded in this report.			

7. The EUT incorporates a SISO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX

8. When USB port is charging the rechargeable battery, the EUT has WiFi function under charging mode. And the USB port is connected to Host unit, the EUT WiFi function will be disabled.
9. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	√	√	With adapter mode
2	-	-	√	-	With Laptop mode

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

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

NOTE: 1**.** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-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, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

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	1	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	1	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.

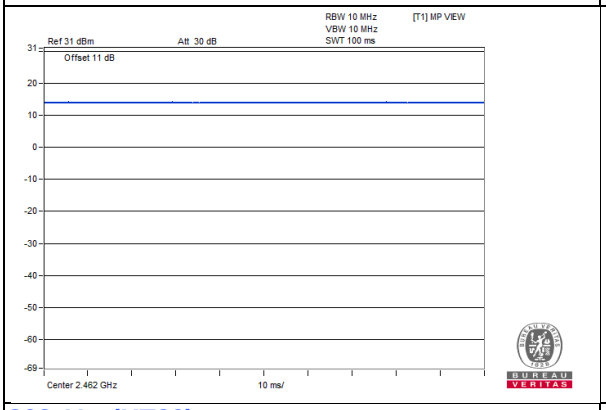
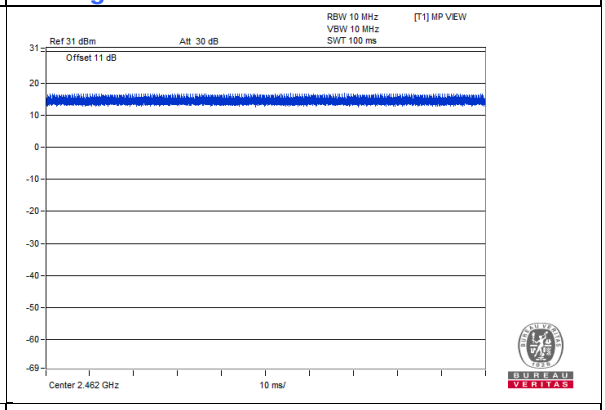
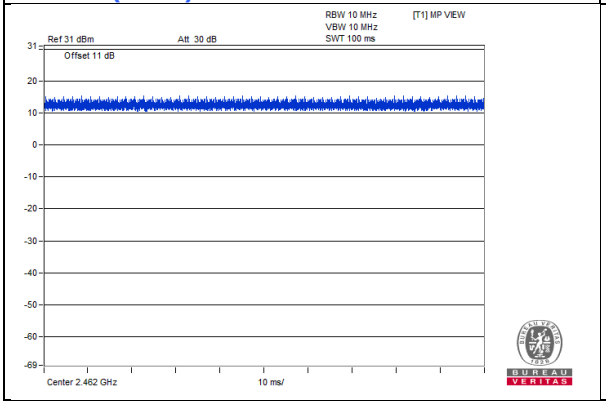
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE≥1G	23deg. C, 68%RH	120Vac, 60Hz	Frank Chuang
RE<1G	22deg. C, 68%RH	120Vac, 60Hz	Frank Chuang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Frank Chuang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

802.11b	802.11g
	
802.11n (HT20)	
	

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.	USB Adapter	BVADT2	NA	NA	NA	Provided by Lab
B.	Micro SD Card	NA	NA	NA	NA	Provided by Lab
C.	Earphone	NA	NA	NA	NA	Provided by Lab
D.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
E.	Micro SD Card	Transcend	NA	NA	NA	Provided by Lab

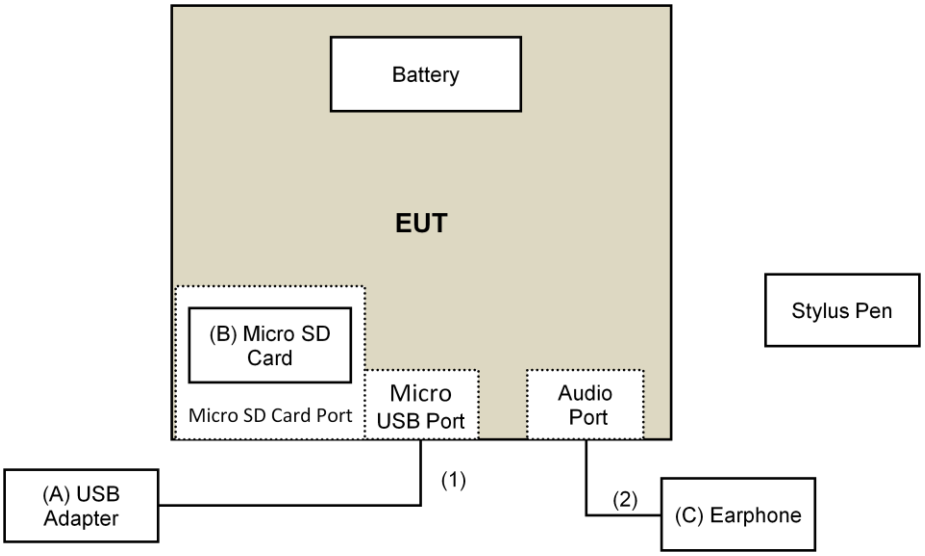
Note:

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

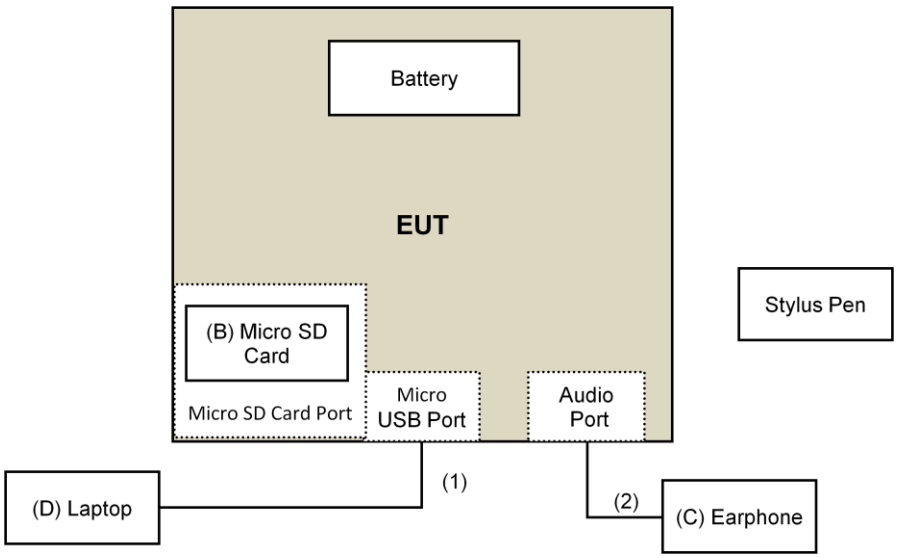
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1	Yes	0	Supplied by client
2.	Aduio Cable	1	0.5	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For Mode 1



For Mode 2



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
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

For Radiated Emissions test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 05, 2018	July 04, 2019
Pre-Amplifier EMCI	EMC001340	980142	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-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	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-2	Mar. 21, 2018	Mar. 20, 2019
RF Cable	8D	966-4-3	Mar. 21, 2018	Mar. 20, 2019
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 Mini-Circuits	ZVA-183-S+	AMP-ZVA-03	May 10, 2018	May 09, 2019
RF Cable	EMC104-SM-SM-1200	160923	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-2000	150318	Jan. 29, 2018	Jan. 28, 2019
RF Cable	EMC104-SM-SM-5000	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
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The 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: Aug. 30 to 31, 2018

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
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 test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Oct. 06, 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:

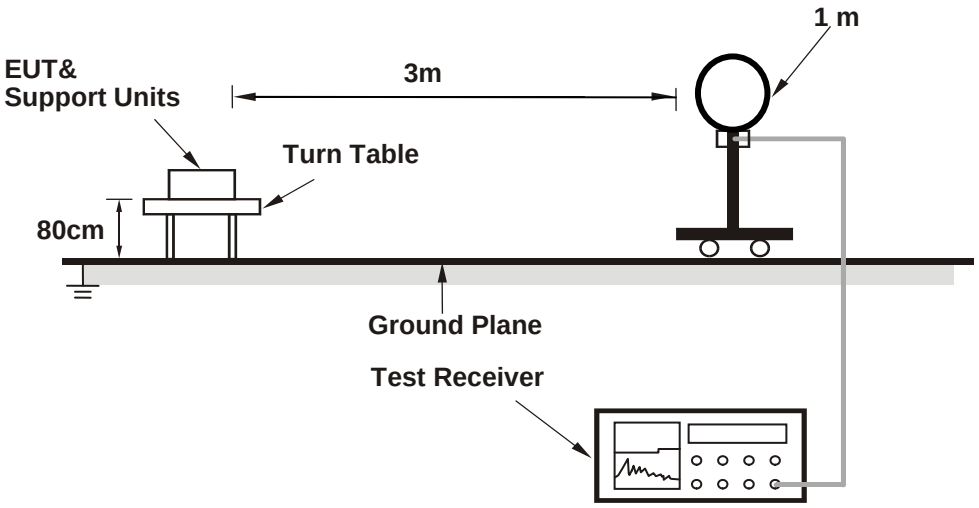
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

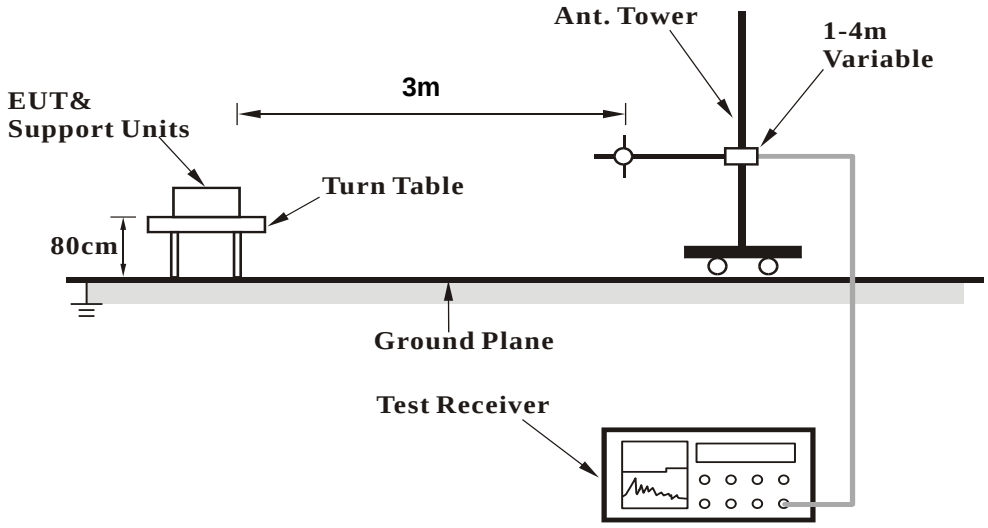
No deviation.

4.1.5 Test Setup

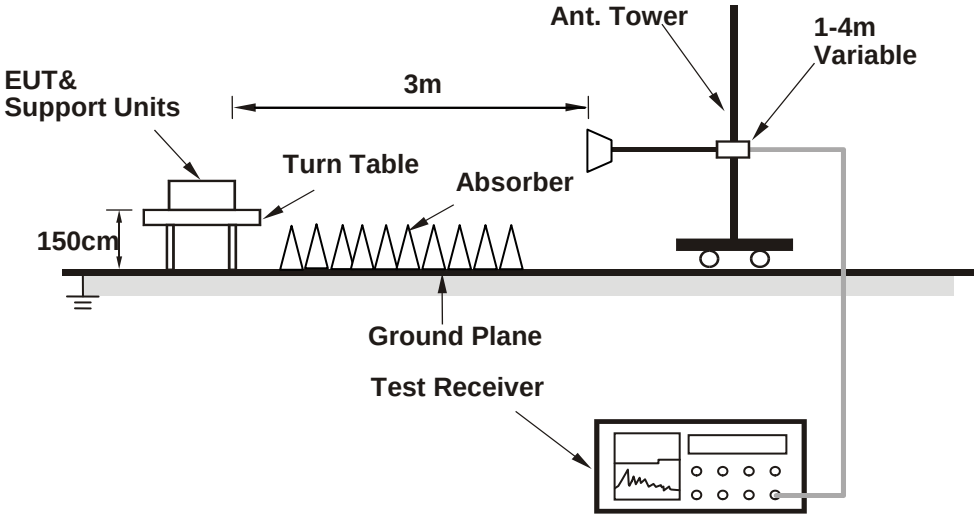
For Radiated emission below 30MHz



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. Placed the EUT on the testing table.
b. Controlling software (HyperTerminal paste WiFi_Mp.txt command) 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	2386.70	60.3 PK	74.0	-13.7	1.02 H	215	62.5	-2.2
2	2386.70	48.9 AV	54.0	-5.1	1.02 H	215	51.1	-2.2
3	2390.00	57.7 PK	74.0	-16.3	1.02 H	215	59.9	-2.2
4	2390.00	45.8 AV	54.0	-8.2	1.02 H	215	48.0	-2.2
5	*2412.00	110.3 PK			1.02 H	215	112.7	-2.4
6	*2412.00	107.8 AV			1.02 H	215	110.2	-2.4
7	4824.00	45.5 PK	74.0	-28.5	1.23 H	34	43.7	1.8
8	4824.00	43.2 AV	54.0	-10.8	1.23 H	34	41.4	1.8
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	2386.70	55.6 PK	74.0	-18.4	1.46 V	194	57.8	-2.2
2	2386.70	43.5 AV	54.0	-10.5	1.46 V	194	45.7	-2.2
3	2390.00	54.8 PK	74.0	-19.2	1.46 V	194	57.0	-2.2
4	2390.00	42.3 AV	54.0	-11.7	1.46 V	194	44.5	-2.2
5	*2412.00	99.6 PK			1.46 V	194	102.0	-2.4
6	*2412.00	97.0 AV			1.46 V	194	99.4	-2.4
7	4824.00	47.8 PK	74.0	-26.2	1.17 V	360	46.0	1.8
8	4824.00	46.0 AV	54.0	-8.0	1.17 V	360	44.2	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	55.3 PK	74.0	-18.7	1.26 H	215	57.5	-2.2
2	2390.00	43.2 AV	54.0	-10.8	1.26 H	215	45.4	-2.2
3	*2437.00	110.1 PK			1.26 H	215	112.7	-2.6
4	*2437.00	107.6 AV			1.26 H	215	110.2	-2.6
5	2483.50	55.1 PK	74.0	-18.9	1.26 H	215	57.5	-2.4
6	2483.50	42.4 AV	54.0	-11.6	1.26 H	215	44.8	-2.4
7	4874.00	45.7 PK	74.0	-28.3	1.00 H	30	43.7	2.0
8	4874.00	43.4 AV	54.0	-10.6	1.00 H	30	41.4	2.0
9	7311.00	54.9 PK	74.0	-19.1	3.90 H	121	46.5	8.4
10	7311.00	51.6 AV	54.0	-2.4	3.90 H	121	43.2	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.2 PK	74.0	-18.8	1.47 V	187	57.4	-2.2
2	2390.00	43.1 AV	54.0	-10.9	1.47 V	187	45.3	-2.2
3	*2437.00	99.9 PK			1.47 V	187	102.5	-2.6
4	*2437.00	97.2 AV			1.47 V	187	99.8	-2.6
5	2483.50	54.5 PK	74.0	-19.5	1.47 V	187	56.9	-2.4
6	2483.50	42.0 AV	54.0	-12.0	1.47 V	187	44.4	-2.4
7	4874.00	48.5 PK	74.0	-25.5	1.20 V	358	46.5	2.0
8	4874.00	46.5 AV	54.0	-7.5	1.20 V	358	44.5	2.0
9	7311.00	55.2 PK	74.0	-18.8	2.84 V	359	46.8	8.4
10	7311.00	51.8 AV	54.0	-2.2	2.84 V	359	43.4	8.4

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.2 PK			1.01 H	214	112.8	-2.6
2	*2462.00	107.6 AV			1.01 H	214	110.2	-2.6
3	2483.50	59.6 PK	74.0	-14.4	1.01 H	214	62.0	-2.4
4	2483.50	53.7 AV	54.0	-0.3	1.01 H	214	56.1	-2.4
5	4924.00	45.5 PK	74.0	-28.5	1.00 H	41	43.5	2.0
6	4924.00	43.2 AV	54.0	-10.8	1.00 H	41	41.2	2.0
7	7386.00	54.8 PK	74.0	-19.2	3.91 H	110	46.2	8.6
8	7386.00	51.4 AV	54.0	-2.6	3.91 H	110	42.8	8.6
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	*2462.00	100.3 PK			1.50 V	180	102.9	-2.6
2	*2462.00	97.4 AV			1.50 V	180	100.0	-2.6
3	2483.50	54.8 PK	74.0	-19.2	1.50 V	180	57.2	-2.4
4	2483.50	42.6 AV	54.0	-11.4	1.50 V	180	45.0	-2.4
5	4924.00	48.1 PK	74.0	-25.9	1.16 V	358	46.1	2.0
6	4924.00	46.1 AV	54.0	-7.9	1.16 V	358	44.1	2.0
7	7386.00	54.9 PK	74.0	-19.1	2.78 V	360	46.3	8.6
8	7386.00	51.4 AV	54.0	-2.6	2.78 V	360	42.8	8.6

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.

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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	71.0 PK	74.0	-3.0	1.01 H	214	73.2	-2.2
2	2390.00	51.5 AV	54.0	-2.5	1.01 H	214	53.7	-2.2
3	*2412.00	107.2 PK			1.01 H	214	109.6	-2.4
4	*2412.00	97.8 AV			1.01 H	214	100.2	-2.4
5	4824.00	44.4 PK	74.0	-29.6	1.29 H	46	42.6	1.8
6	4824.00	41.4 AV	54.0	-12.6	1.29 H	46	39.6	1.8
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	56.1 PK	74.0	-17.9	1.51 V	181	58.3	-2.2
2	2390.00	43.5 AV	54.0	-10.5	1.51 V	181	45.7	-2.2
3	*2412.00	97.0 PK			1.51 V	181	99.4	-2.4
4	*2412.00	88.7 AV			1.51 V	181	91.1	-2.4
5	4824.00	48.8 PK	74.0	-25.2	1.30 V	43	47.0	1.8
6	4824.00	43.3 AV	54.0	-10.7	1.30 V	43	41.5	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	56.8 PK	74.0	-17.2	1.24 H	216	59.0	-2.2
2	2390.00	43.8 AV	54.0	-10.2	1.24 H	216	46.0	-2.2
3	*2437.00	106.9 PK			1.24 H	216	109.5	-2.6
4	*2437.00	97.9 AV			1.24 H	216	100.5	-2.6
5	2483.50	57.8 PK	74.0	-16.2	1.24 H	216	60.2	-2.4
6	2483.50	42.4 AV	54.0	-11.6	1.24 H	216	44.8	-2.4
7	4874.00	44.1 PK	74.0	-29.9	1.25 H	41	42.1	2.0
8	4874.00	41.2 AV	54.0	-12.8	1.25 H	41	39.2	2.0
9	7311.00	54.5 PK	74.0	-19.5	3.87 H	117	46.1	8.4
10	7311.00	46.6 AV	54.0	-7.4	3.87 H	117	38.2	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.2 PK	74.0	-17.8	1.54 V	175	58.4	-2.2
2	2390.00	43.3 AV	54.0	-10.7	1.54 V	175	45.5	-2.2
3	*2437.00	97.2 PK			1.54 V	175	99.8	-2.6
4	*2437.00	89.1 AV			1.54 V	175	91.7	-2.6
5	2483.50	56.4 PK	74.0	-17.6	1.54 V	175	58.8	-2.4
6	2483.50	42.2 AV	54.0	-11.8	1.54 V	175	44.6	-2.4
7	4874.00	48.5 PK	74.0	-25.5	1.27 V	35	46.5	2.0
8	4874.00	43.2 AV	54.0	-10.8	1.27 V	35	41.2	2.0
9	7311.00	54.4 PK	74.0	-19.6	3.90 V	130	46.0	8.4
10	7311.00	46.6 AV	54.0	-7.4	3.90 V	130	38.2	8.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	108.6 PK			1.00 H	216	111.2	-2.6
2	*2462.00	98.2 AV			1.00 H	216	100.8	-2.6
3	2483.50	70.6 PK	74.0	-3.4	1.00 H	216	73.0	-2.4
4	2483.50	51.9 AV	54.0	-2.1	1.00 H	216	54.3	-2.4
5	4924.00	43.4 PK	74.0	-30.6	1.28 H	41	41.4	2.0
6	4924.00	40.7 AV	54.0	-13.3	1.28 H	41	38.7	2.0
7	7386.00	54.7 PK	74.0	-19.3	3.81 H	127	46.1	8.6
8	7386.00	46.6 AV	54.0	-7.4	3.81 H	127	38.0	8.6
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	*2462.00	97.0 PK			1.48 V	161	99.6	-2.6
2	*2462.00	89.0 AV			1.48 V	161	91.6	-2.6
3	2483.50	56.1 PK	74.0	-17.9	1.48 V	161	58.5	-2.4
4	2483.50	43.2 AV	54.0	-10.8	1.48 V	161	45.6	-2.4
5	4924.00	49.5 PK	74.0	-24.5	1.31 V	158	47.5	2.0
6	4924.00	44.0 AV	54.0	-10.0	1.31 V	158	42.0	2.0
7	7386.00	54.3 PK	74.0	-19.7	2.35 V	135	45.7	8.6
8	7386.00	46.4 AV	54.0	-7.6	2.35 V	135	37.8	8.6

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.

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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**	**73.9 PK**	**74.0**	**-0.1**	**1.01 H**	**213**	**76.1**	**-2.2**
2	2390.00	51.2 AV	54.0	-2.8	1.01 H	213	53.4	-2.2
3	*2412.00	105.9 PK			1.01 H	213	108.3	-2.4
4	*2412.00	96.3 AV			1.01 H	213	98.7	-2.4
5	4824.00	44.0 PK	74.0	-30.0	1.38 H	70	42.2	1.8
6	4824.00	41.1 AV	54.0	-12.9	1.38 H	70	39.3	1.8
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	56.2 PK	74.0	-17.8	1.54 V	159	58.4	-2.2
2	2390.00	43.3 AV	54.0	-10.7	1.54 V	159	45.5	-2.2
3	*2412.00	94.6 PK			1.54 V	159	97.0	-2.4
4	*2412.00	86.5 AV			1.54 V	159	88.9	-2.4
5	4824.00	48.8 PK	74.0	-25.2	1.23 V	20	47.0	1.8
6	4824.00	43.5 AV	54.0	-10.5	1.23 V	20	41.7	1.8

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	55.0 PK	74.0	-19.0	1.28 H	213	57.2	-2.2
2	2390.00	43.4 AV	54.0	-10.6	1.28 H	213	45.6	-2.2
3	*2437.00	106.9 PK			1.28 H	213	109.5	-2.6
4	*2437.00	96.9 AV			1.28 H	213	99.5	-2.6
5	2483.50	56.8 PK	74.0	-17.2	1.28 H	213	59.2	-2.4
6	2483.50	42.1 AV	54.0	-11.9	1.28 H	213	44.5	-2.4
7	4874.00	43.7 PK	74.0	-30.3	1.34 H	56	41.7	2.0
8	4874.00	40.7 AV	54.0	-13.3	1.34 H	56	38.7	2.0
9	7311.00	54.6 PK	74.0	-19.4	2.25 H	121	46.2	8.4
10	7311.00	46.5 AV	54.0	-7.5	2.25 H	121	38.1	8.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.2 PK	74.0	-17.8	1.53 V	167	58.4	-2.2
2	2390.00	43.4 AV	54.0	-10.6	1.53 V	167	45.6	-2.2
3	*2437.00	94.5 PK			1.53 V	167	97.1	-2.6
4	*2437.00	86.2 AV			1.53 V	167	88.8	-2.6
5	2483.50	56.6 PK	74.0	-17.4	1.53 V	167	59.0	-2.4
6	2483.50	42.7 AV	54.0	-11.3	1.53 V	167	45.1	-2.4
7	4874.00	49.3 PK	74.0	-24.7	1.30 V	26	47.3	2.0
8	4874.00	43.7 AV	54.0	-10.3	1.30 V	26	41.7	2.0
9	7311.00	54.7 PK	74.0	-19.3	3.87 V	116	46.3	8.4
10	7311.00	46.9 AV	54.0	-7.1	3.87 V	116	38.5	8.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	107.8 PK			1.01 H	218	110.4	-2.6
2	*2462.00	97.9 AV			1.01 H	218	100.5	-2.6
3	2483.50	73.7 PK	74.0	-0.3	1.01 H	218	76.1	-2.4
4	2483.50	52.8 AV	54.0	-1.2	1.01 H	218	55.2	-2.4
5	4924.00	43.2 PK	74.0	-30.8	1.32 H	305	41.2	2.0
6	4924.00	40.3 AV	54.0	-13.7	1.32 H	305	38.3	2.0
7	7386.00	55.0 PK	74.0	-19.0	1.56 H	138	46.4	8.6
8	7386.00	47.0 AV	54.0	-7.0	1.56 H	138	38.4	8.6
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	*2462.00	94.6 PK			1.52 V	168	97.2	-2.6
2	*2462.00	86.3 AV			1.52 V	168	88.9	-2.6
3	2483.50	56.4 PK	74.0	-17.6	1.52 V	168	58.8	-2.4
4	2483.50	43.3 AV	54.0	-10.7	1.52 V	168	45.7	-2.4
5	4924.00	49.3 PK	74.0	-24.7	1.32 V	154	47.3	2.0
6	4924.00	43.7 AV	54.0	-10.3	1.32 V	154	41.7	2.0
7	7386.00	53.9 PK	74.0	-20.1	2.39 V	146	45.3	8.6
8	7386.00	46.0 AV	54.0	-8.0	2.39 V	146	37.4	8.6

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.

Below 1GHz Data:

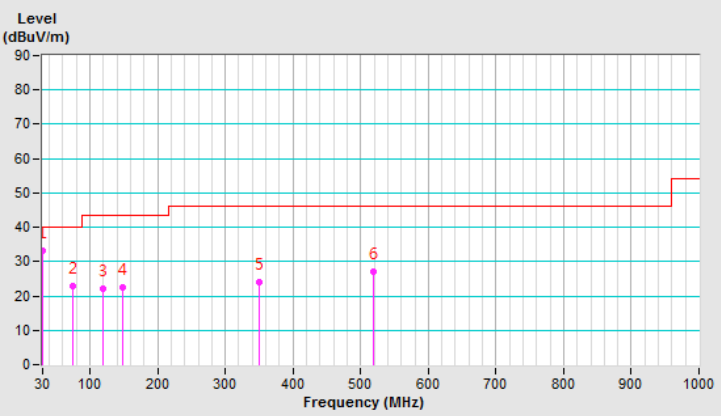
802.11g

CHANNEL	TX Channel 1	**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	30.29	33.0 QP	40.0	-7.0	2.00 H	231	42.0	-9.0
2	75.11	22.7 QP	40.0	-17.3	2.00 H	177	33.8	-11.1
3	119.17	22.2 QP	43.5	-21.3	1.50 H	64	32.0	-9.8
4	148.41	22.4 QP	43.5	-21.1	2.00 H	52	30.1	-7.7
5	349.93	24.1 QP	46.0	-21.9	1.50 H	360	29.9	-5.8
6	519.15	27.1 QP	46.0	-18.9	2.00 H	37	28.4	-1.3

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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.

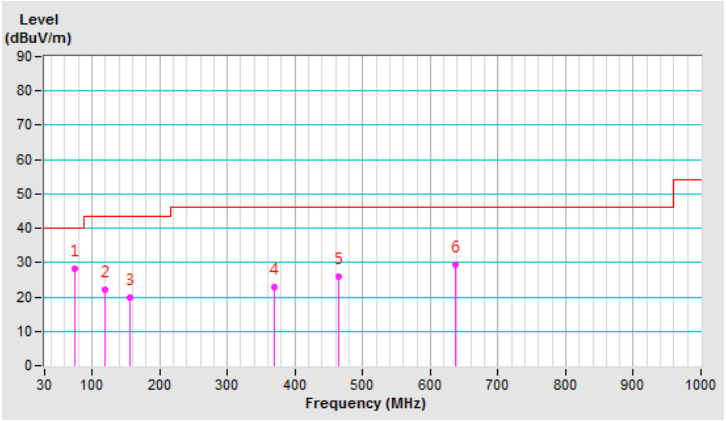


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	74.69	28.0 QP	40.0	-12.0	1.00 V	31	39.0	-11.0
2	118.92	22.1 QP	43.5	-21.4	1.00 V	354	32.0	-9.9
3	155.42	19.7 QP	43.5	-23.8	1.50 V	286	27.2	-7.5
4	370.30	22.9 QP	46.0	-23.1	1.50 V	321	27.9	-5.0
5	465.26	25.9 QP	46.0	-20.1	1.00 V	74	28.3	-2.4
6	636.37	29.4 QP	46.0	-16.6	2.00 V	256	28.0	1.4

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
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: Aug. 31, 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.

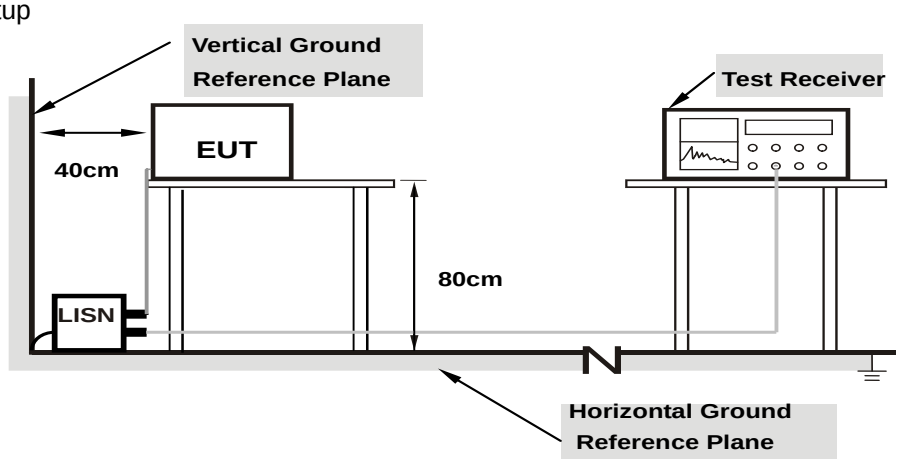
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

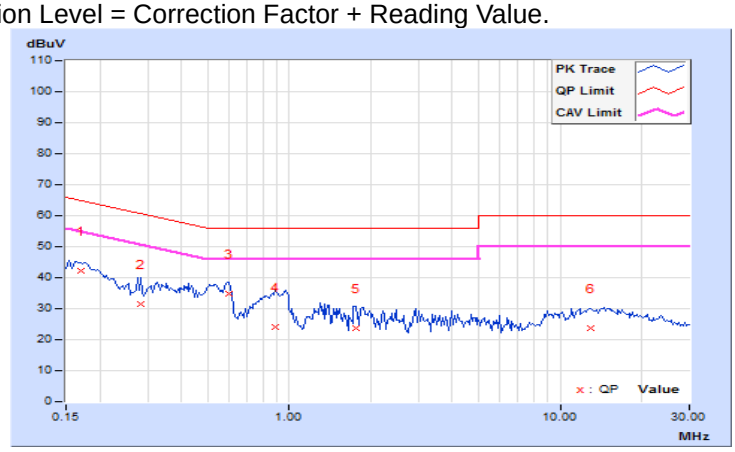
4.2.7 Test Results (Mode 1)

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	0.16953	10.05	32.03	21.80	42.08	31.85	64.98	54.98	-22.90	-23.13
2	0.28281	10.09	21.22	9.21	31.31	19.30	60.73	50.73	-29.42	-31.43
3	0.59922	10.14	24.74	12.96	34.88	23.10	56.00	46.00	-21.12	-22.90
4	0.88828	10.16	13.84	-0.23	24.00	9.93	56.00	46.00	-32.00	-36.07
5	1.76172	10.21	13.55	2.68	23.76	12.89	56.00	46.00	-32.24	-33.11
6	12.95313	10.92	12.94	5.02	23.86	15.94	60.00	50.00	-36.14	-34.06

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.



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	0.18906	9.97	27.07	14.09	37.04	24.06	64.08	54.08	-27.04	-30.02
2	0.36875	10.01	19.36	9.29	29.37	19.30	58.53	48.53	-29.16	-29.23
3	0.59531	10.03	21.59	11.66	31.62	21.69	56.00	46.00	-24.38	-24.31
4	0.86484	10.04	18.01	9.11	28.05	19.15	56.00	46.00	-27.95	-26.85
5	1.70313	10.08	15.26	5.54	25.34	15.62	56.00	46.00	-30.66	-30.38
6	3.20313	10.15	7.82	-0.31	17.97	9.84	56.00	46.00	-38.03	-36.16

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.

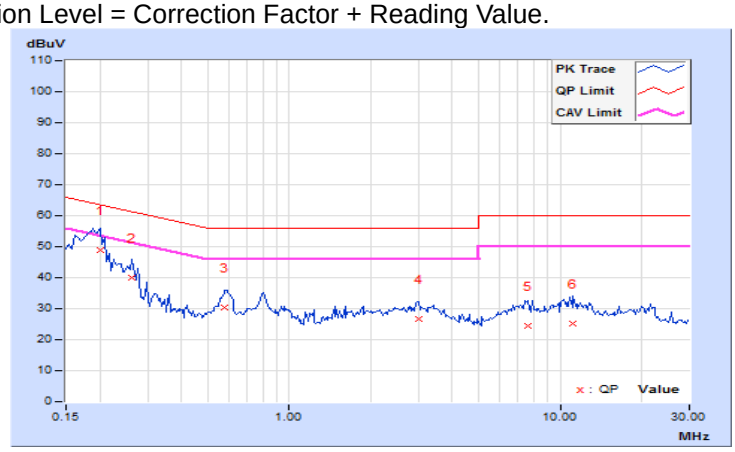
4.2.8 Test Results (Mode 2)

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	0.20078	10.06	38.76	11.84	48.82	21.90	63.58	53.58	-14.76	-31.68
2	0.26328	10.08	29.93	6.01	40.01	16.09	61.33	51.33	-21.32	-35.24
3	0.57969	10.12	20.24	10.83	30.36	20.95	56.00	46.00	-25.64	-25.05
4	3.00000	10.23	16.52	10.95	26.75	21.18	56.00	46.00	-29.25	-24.82
5	7.57031	10.43	13.88	9.40	24.31	19.83	60.00	50.00	-35.69	-30.17
6	11.12109	10.61	14.67	8.73	25.28	19.34	60.00	50.00	-34.72	-30.66

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.

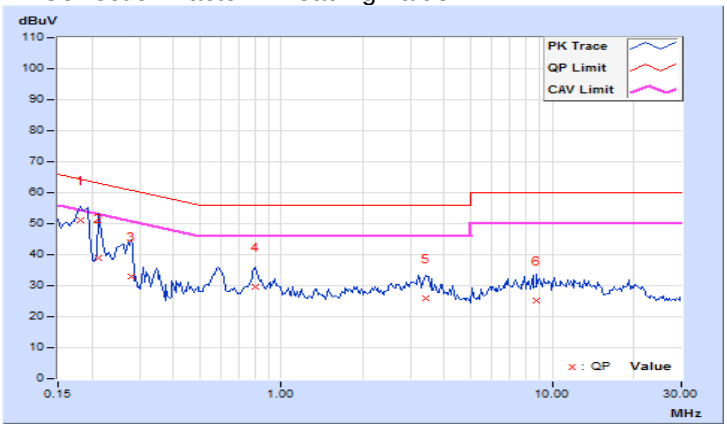


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	**0.18125**	**9.95**	**41.19**	**23.07**	**51.14**	**33.02**	**64.43**	**54.43**	**-13.29**	**-21.41**
2	0.21250	9.96	29.00	16.62	38.96	26.58	63.11	53.11	-24.15	-26.53
3	0.27891	9.98	23.15	9.68	33.13	19.66	60.85	50.85	-27.72	-31.19
4	0.80234	10.02	19.67	7.21	29.69	17.23	56.00	46.00	-26.31	-28.77
5	3.40625	10.12	15.95	10.58	26.07	20.70	56.00	46.00	-29.93	-25.30
6	8.78125	10.34	14.84	9.61	25.18	19.95	60.00	50.00	-34.82	-30.05

REMARKS:

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

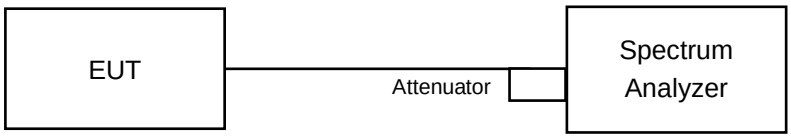


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

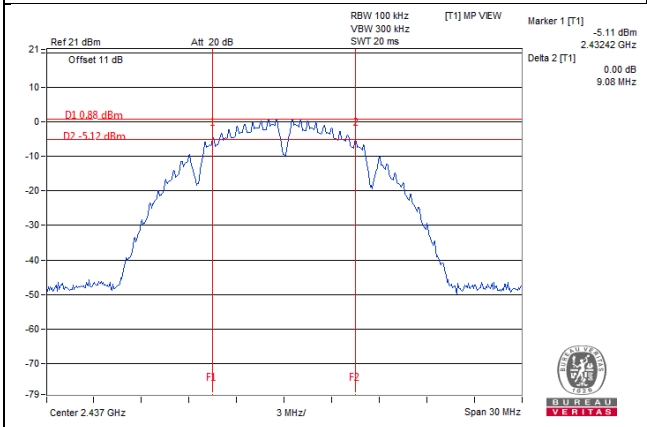
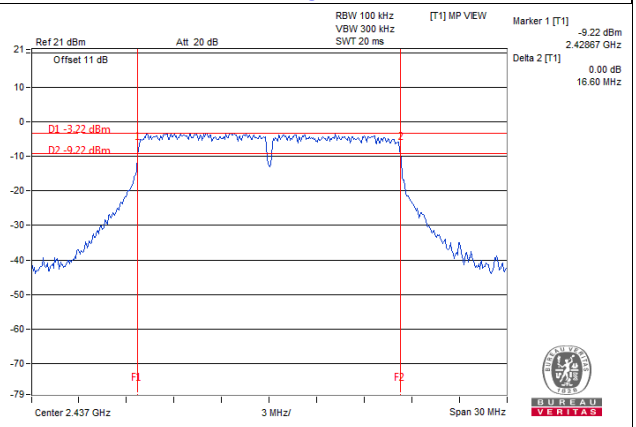
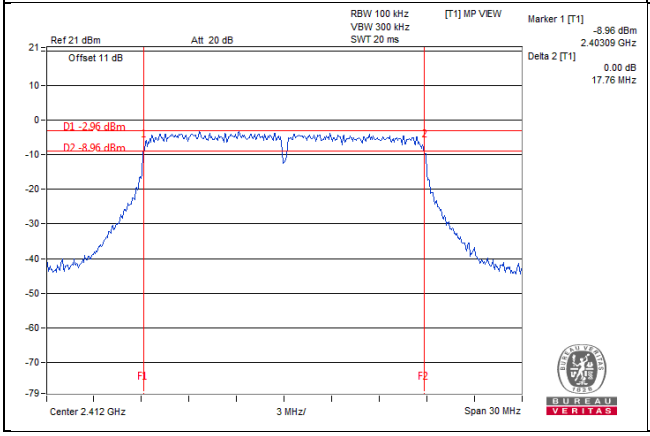
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.09	0.5	PASS
6	2437	9.08	0.5	PASS
11	2462	9.08	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.62	0.5	PASS
6	2437	16.60	0.5	PASS
11	2462	16.61	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.76	0.5	Pass
6	2437	17.76	0.5	Pass
11	2462	17.76	0.5	Pass

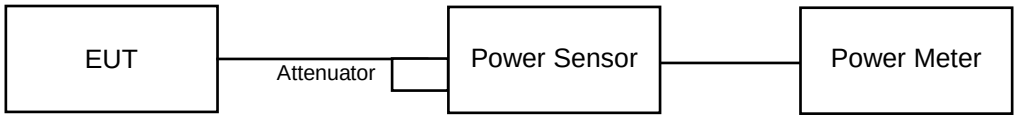
Spectrum Plot of Worst Value	
802.11b / CH6	**802.11g / CH6**
	
802.11n (HT20) / CH1	
	

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)

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 (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	12.023	10.80	30	Pass
6	2437	11.858	10.74	30	Pass
11	2462	12.794	11.07	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	12.274	10.89	30	Pass
6	2437	12.078	10.82	30	Pass
11	2462	12.106	10.83	30	Pass

802.11n (HT20)

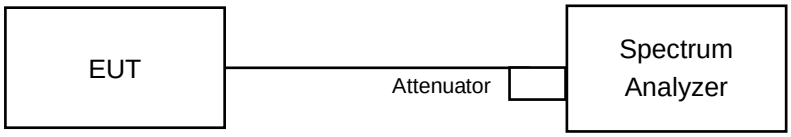
Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	12.05	10.81	30	Pass
6	2437	12.134	10.84	30	Pass
11	2462	12.023	10.80	30	Pass

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

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.

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

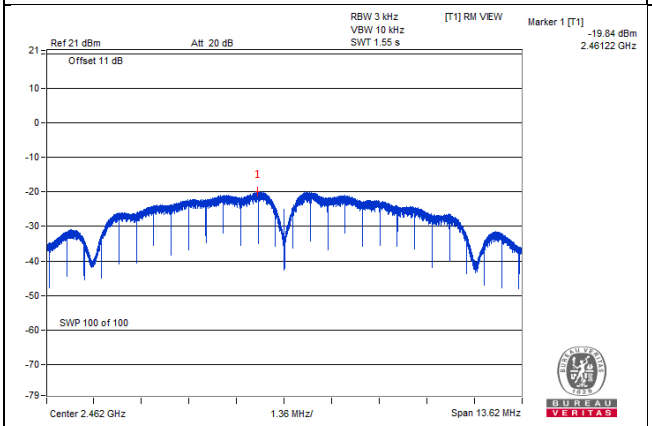
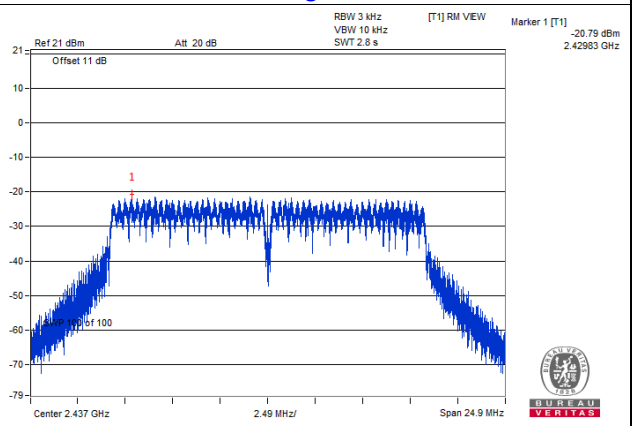
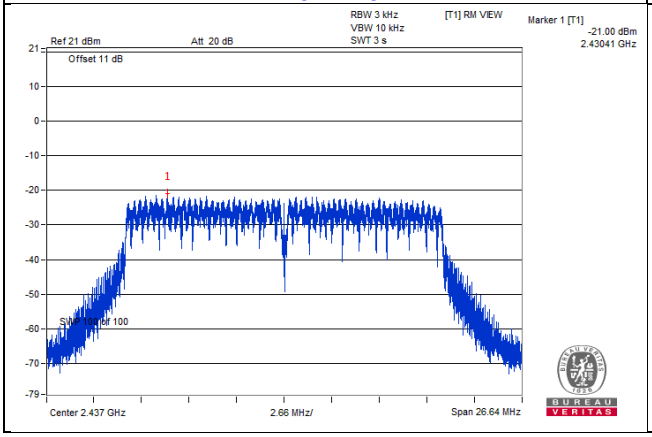
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-20.68	8.00	Pass
6	2437	-20.81	8.00	Pass
11	2462	-19.84	8.00	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-21.14	8.00	Pass
6	2437	-20.79	8.00	Pass
11	2462	-21.86	8.00	Pass

802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-21.16	8.00	Pass
6	2437	-21.00	8.00	Pass
11	2462	-23.35	8.00	Pass

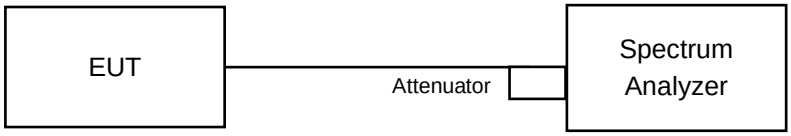
Spectrum Plot of Worst Value	
802.11b / CH11	**802.11g / CH6**
	
802.11n (HT20) / CH6	
	

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

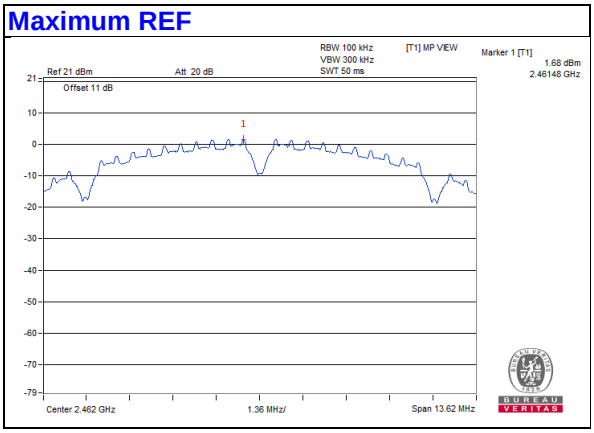
Same as Item 4.3.6

4.6.7 Test Results

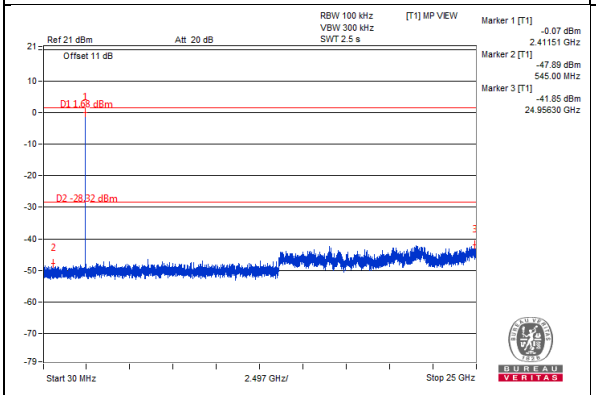
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

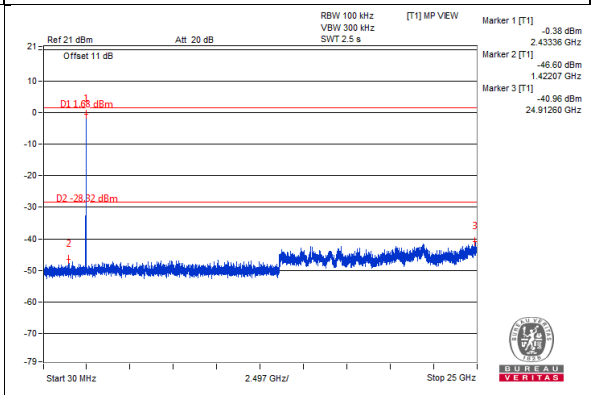
Maximum REF



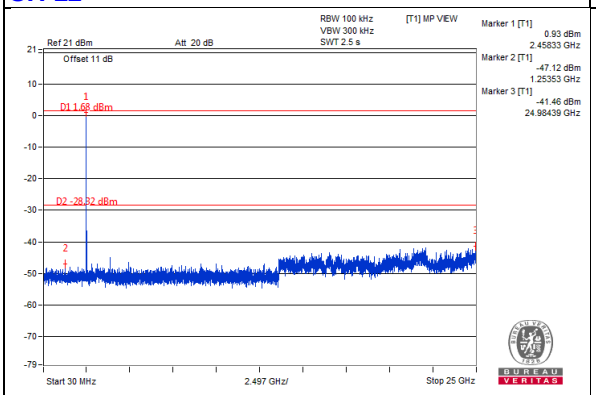
CH 1



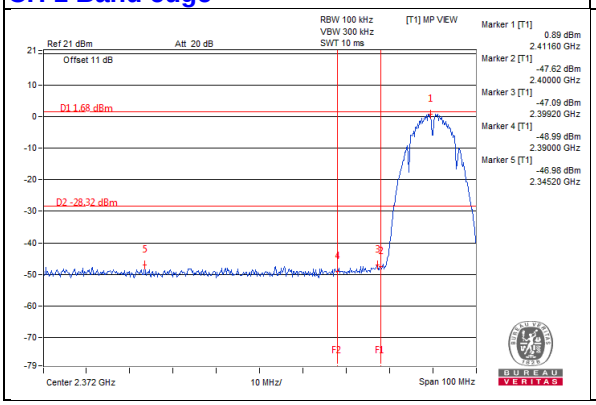
CH 6



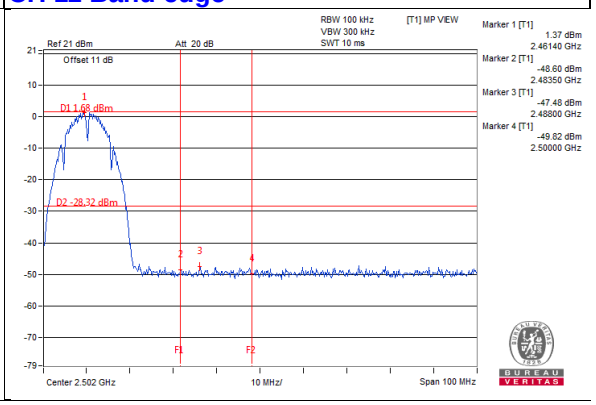
CH 11



CH 1 Band edge

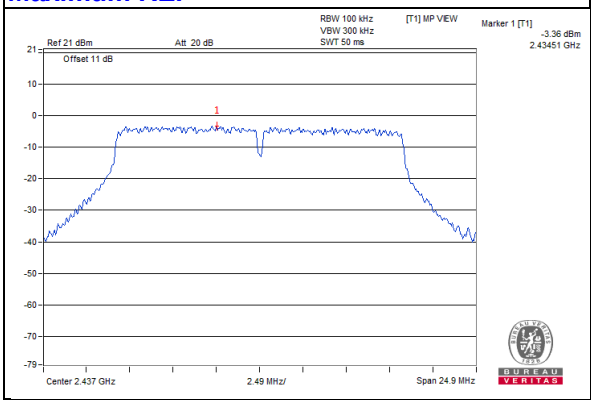


CH 11 Band edge

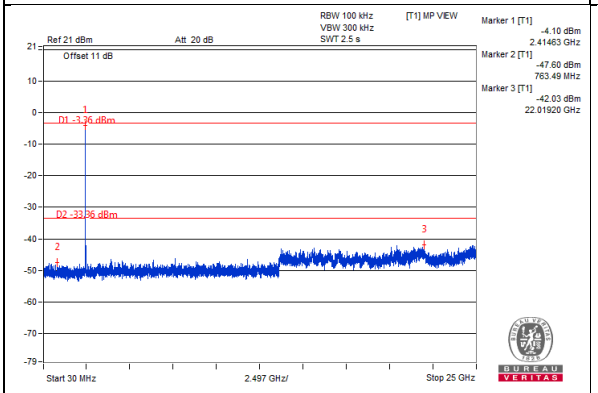


802.11g

Maximum REF



CH 1



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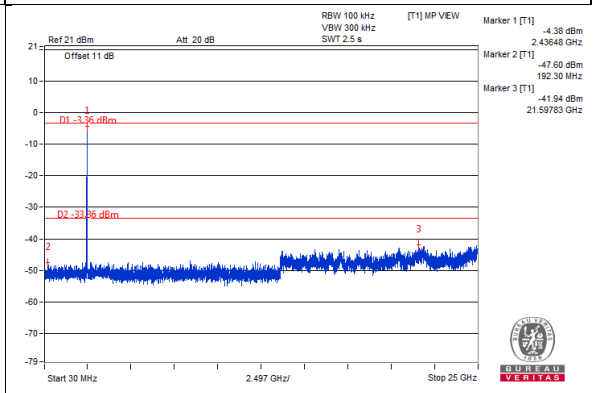

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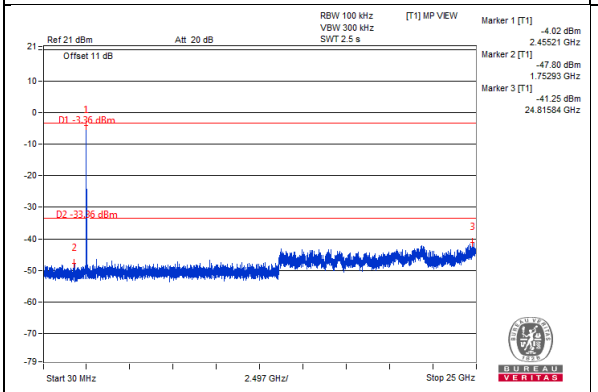
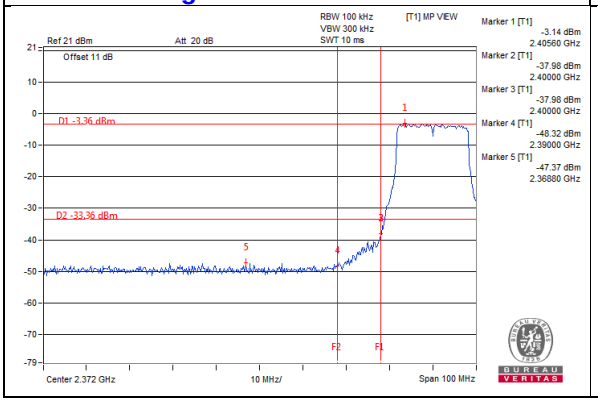


CH 1 Band edge



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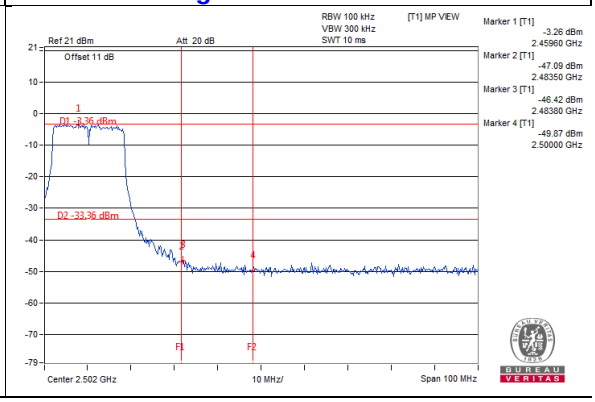
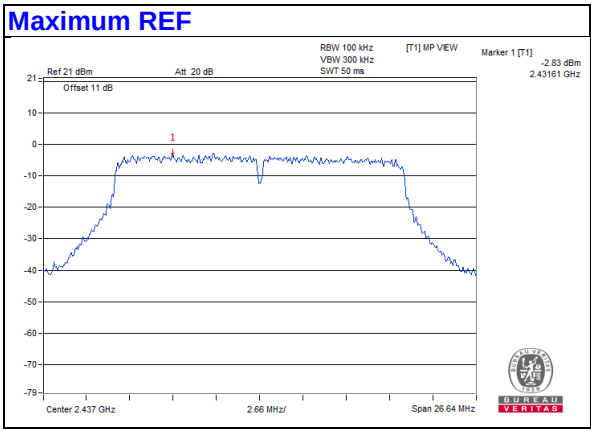
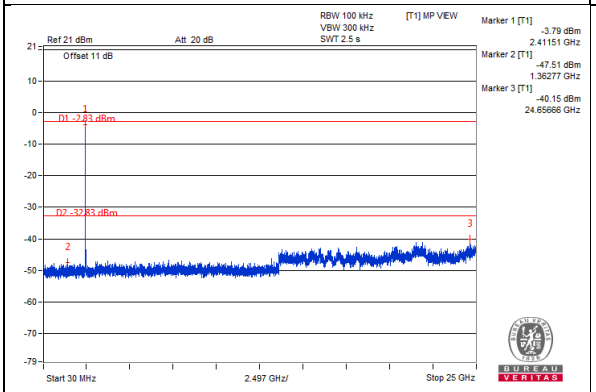


802.11n (HT20)

Maximum REF



CH 1



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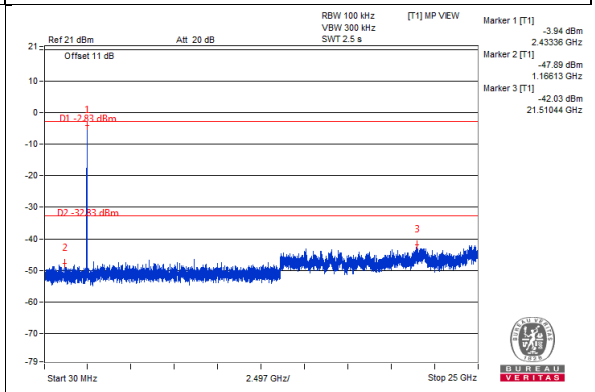

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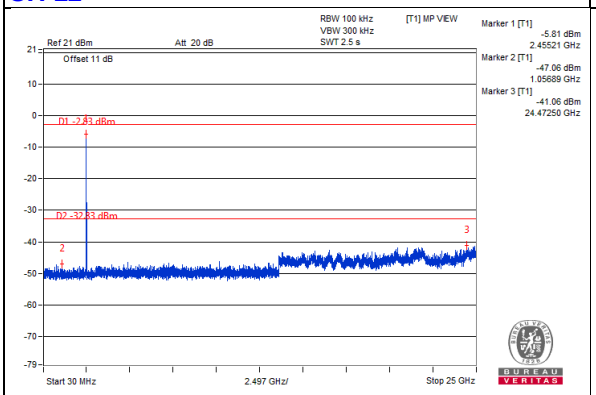
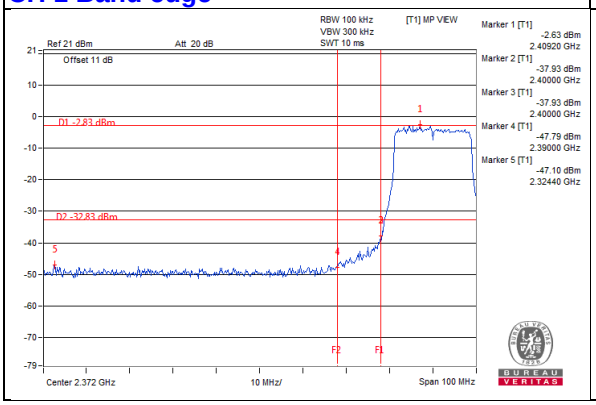
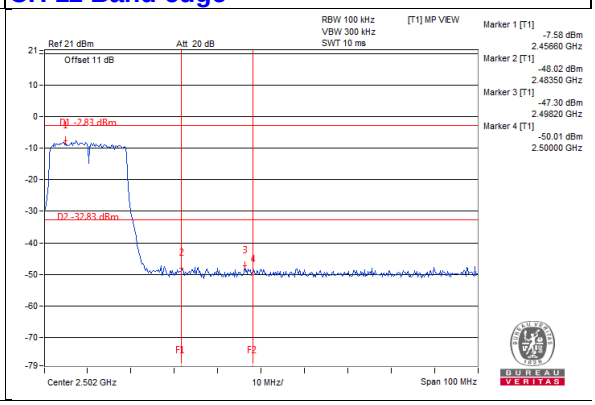


CH 1 Band edge



CH 11 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.

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Web Site: www.bureauveritas-adt.com

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

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