

FCC Test Report

Report No.: RF161220E19

FCC ID: NOIKBN867

Test Model: N867

Received Date: Dec. 20, 2016

Test Date: Dec. 30, 2016 to Jan. 20, 2017

Issued Date: Feb. 03, 2017

Applicant: NETRONIX, INC.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	9
3.2.1 Test Mode Applicability and Tested Channel Detail	10
3.3 Duty Cycle of Test Signal	12
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	14
3.5 General Description of Applied Standards	15
4 Test Types and Results	16
4.1 Radiated Emission and Bandedge Measurement	16
4.1.1 Limits of Radiated Emission and Bandedge Measurement	16
4.1.2 Test Instruments	17
4.1.3 Test Procedures	18
4.1.4 Deviation from Test Standard	18
4.1.5 Test Setup	19
4.1.6 EUT Operating Conditions	20
4.1.7 Test Results	21
4.2 Conducted Emission Measurement	31
4.2.1 Limits of Conducted Emission Measurement	31
4.2.2 Test Instruments	31
4.2.3 Test Procedures	32
4.2.4 Deviation from Test Standard	32
4.2.5 Test Setup	32
4.2.6 EUT Operating Conditions	32
4.2.7 Test Results (Mode 1)	33
4.2.8 Test Results (Mode 2)	35
4.3 6dB Bandwidth Measurement	37
4.3.1 Limits of 6dB Bandwidth Measurement	37
4.3.2 Test Setup	37
4.3.3 Test Instruments	37
4.3.4 Test Procedure	37
4.3.5 Deviation from Test Standard	37
4.3.6 EUT Operating Conditions	37
4.3.7 Test Result	38
4.4 Conducted Output Power Measurement	40
4.4.1 Limits of Conducted Output Power Measurement	40
4.4.2 Test Setup	40
4.4.3 Test Instruments	40
4.4.4 Test Procedures	40
4.4.5 Deviation from Test Standard	40
4.4.6 EUT Operating Conditions	40
4.4.7 Test Results	41
4.5 Power Spectral Density Measurement	43
4.5.1 Limits of Power Spectral Density Measurement	43
4.5.2 Test Setup	43
4.5.3 Test Instruments	43
4.5.4 Test Procedure	43
4.5.5 Deviation from Test Standard	43

4.5.6 EUT Operating Condition	43
4.5.7 Test Results	44
4.6 Conducted Out of Band Emission Measurement	46
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	46
4.6.2 Test Setup.....	46
4.6.3 Test Instruments	46
4.6.4 Test Procedure	46
4.6.5 Deviation from Test Standard	46
4.6.6 EUT Operating Condition	47
4.6.7 Test Results	47
5 Pictures of Test Arrangements.....	51
Appendix – Information on the Testing Laboratories	52

Release Control Record

Issue No.	Description	Date Issued
RF161220E19	Original release.	Feb. 03, 2017

1 Certificate of Conformity

Product: Electronic Display Device

Brand: Kobo

Test Model: N867

Sample Status: ENGINEERING SAMPLE

Applicant: NETRONIX, INC.

Test Date: Dec. 30, 2016 to Jan. 20, 2017

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 : Wendy Wu , **Date:** Feb. 03, 2017
Wendy Wu / Specialist

Approved by : May Chen , **Date:** Feb. 03, 2017
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 -16.43dB at 0.16562MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -8.6dB at 40.69MHz.
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 Soldering terminal not a standard connector.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.83 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.36 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.47 dB
	6GHz ~ 18GHz	3.75 dB
	18GHz ~ 40GHz	3.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Electronic Display Device
Brand	Kobo
Test Model	N867
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.7Vdc from battery or 5Vdc 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	11
Output Power	306.902mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	USB cable (Shielded, 1.0m)

Note:

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

Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (GHz to GHz)
Walsin Technology Corporation	RFECA3216060AAT	2	Ceramic	Soldering terminal	2.4 ~ 2.4835

2. The EUT must be supplied with a battery as below table:

Brand	Model No.	Spec.
SPRINGPOWER TECHNOLOGY	SP 285083	3.7Vdc, 1500mAh, 5.55Wh

3. The EUT incorporates a SISO function.

Modulation Mode	Data Rate (MCS)	TX/RX FUNCTION
802.11b	1 ~ 11Mbps	1TX/1RX
802.11g	6 ~ 54Mbps	1TX/1RX
802.11n (HT20)	MCS 0~7	1TX/1RX

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

Pre-test Mode	Power
Mode A	Power from battery
Mode B	Power from USB interface

From the above modes, the worst spurious emission was found in **Mode B**. Therefore only the test data of the modes were recorded in this report.

5. The EUT has below eMMC:

No	Brand	Spec
1	Sandisk	8G Byte
2	Samsung	8G Byte

From the above conditions, the worst spurious emission was found in **No.1 (Brand: Sandisk)**. Therefore only the test data of the modes were recorded in this report.

6. 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.
7. 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 \geq 1G	RE<1G	PLC	APCM	
1	√	√	√	√	Power from USB interface (adapter)
2			√		Power from USB interface (Laptop)

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

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

Radiated Emission Test (Above 1GHz):

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

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

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	1	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	1	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.

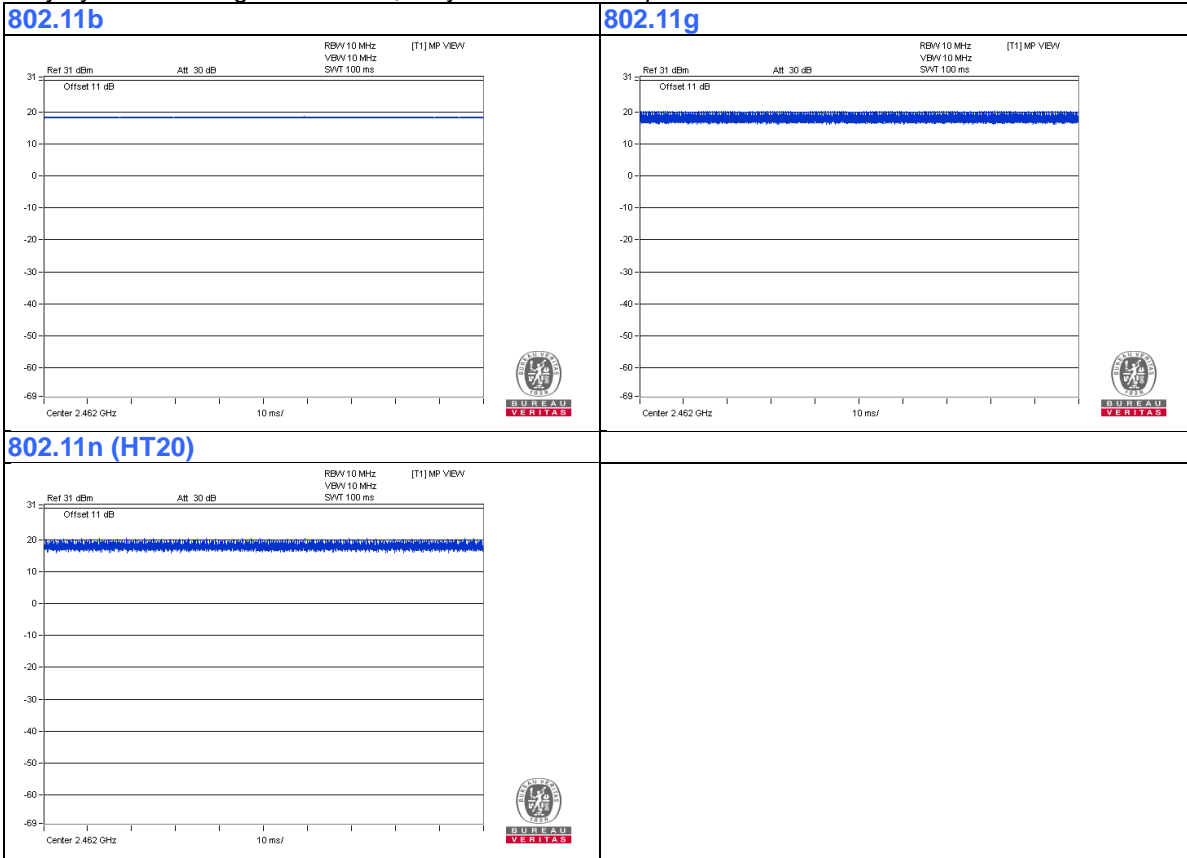
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE \geq 1G	23deg. C, 69%RH	120Vac, 60Hz	Andy Ho
RE $<$ 1G	23deg. C, 68%RH	120Vac, 60Hz	Andy Ho
PLC	25deg. C, 75%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

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



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	ASUS	EXA1205UA	NA	NA	Provided by Lab
B.	Laptop	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab

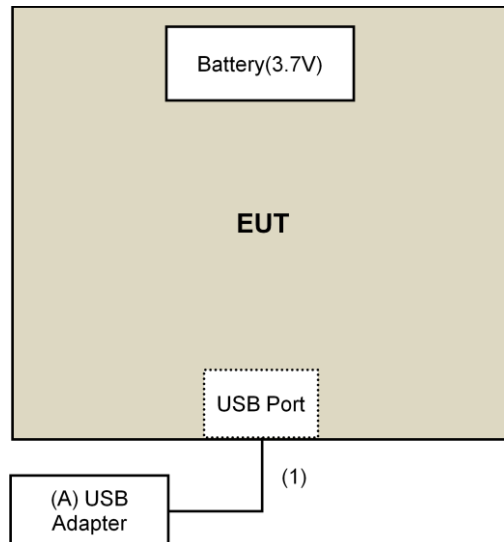
Note:

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

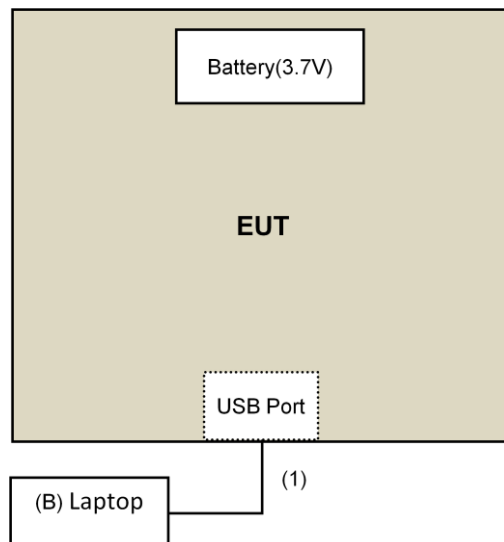
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1	Yes	0	Supplied by client

3.4.1 Configuration of System under Test

Mode 1:



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 DTS Meas Guidance v03r05
ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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 20dB below the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 18, 2016	Aug. 17, 2017
Pre-Amplifier ^(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 18, 2016	Jan. 17, 2017
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 07, 2016	May 06, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Dec. 29, 2016	Dec. 28, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 02, 2016	Apr. 01, 2017
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Jan. 20, 2016	Jan. 19, 2017
Pre-Amplifier Agilent	8449B	3008A02465	Apr. 05, 2016	Apr. 04, 2017
RF Cable	EMC104-SM-SM-2000 EMC104-SM-SM-5000 EMC104-SM-SM-5000	150317 150321 150322	Mar. 30, 2016	Mar. 29, 2017
Spectrum Analyzer Keysight	N9030A	MY54490520	July 29, 2016	July 28, 2017
Pre-Amplifier EMCI	EMC184045	980143	Jan. 15, 2016	Jan. 14, 2017
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Jan. 08, 2016	Jan. 07, 2017
RF Cable	SUCOFLEX 102	36432/2 36441/2	Jan. 16, 2016	Jan. 15, 2017
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The FCC Site Registration No. is 147459
5. Loop antenna was used for all emissions below 30 MHz.
6. The CANADA Site Registration No. is 20331-1
7. Tested Date: Dec. 30, 2016 to Jan. 07, 2017

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. Both X and Y axes 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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

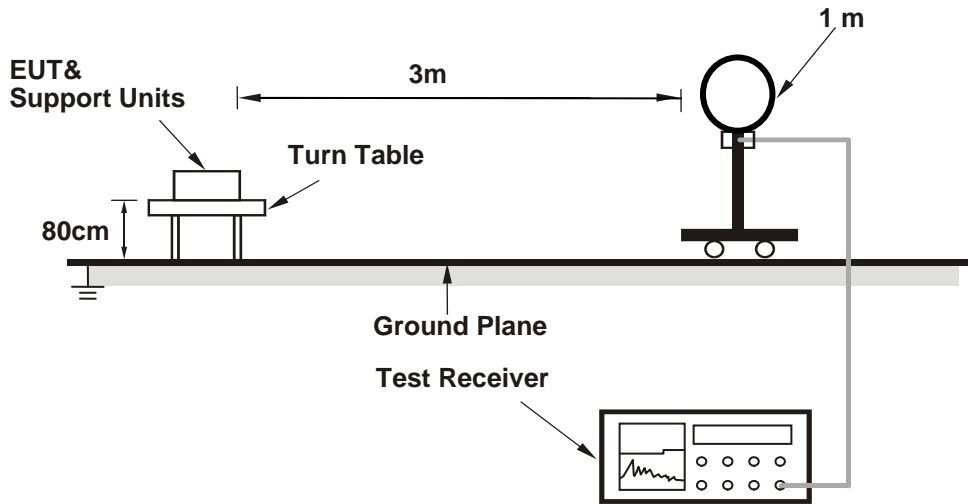
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

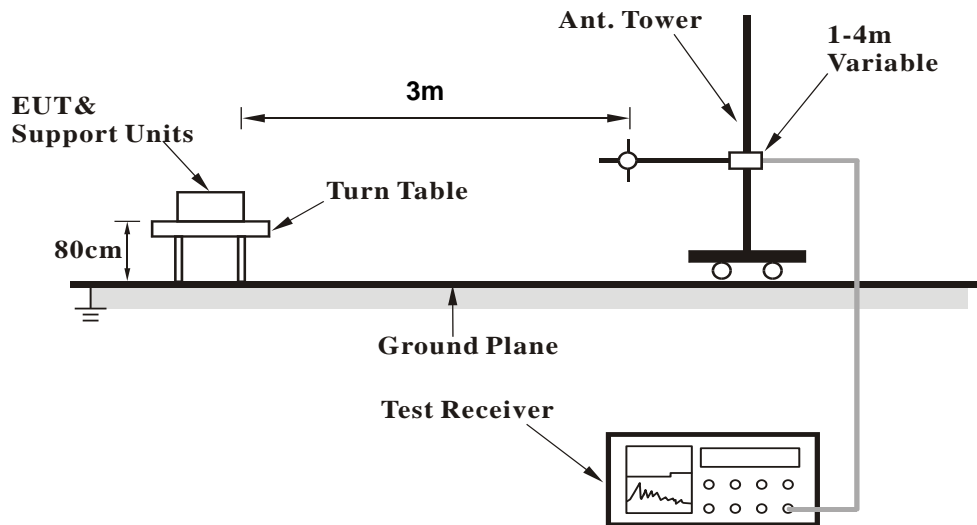
No deviation.

4.1.5 Test Setup

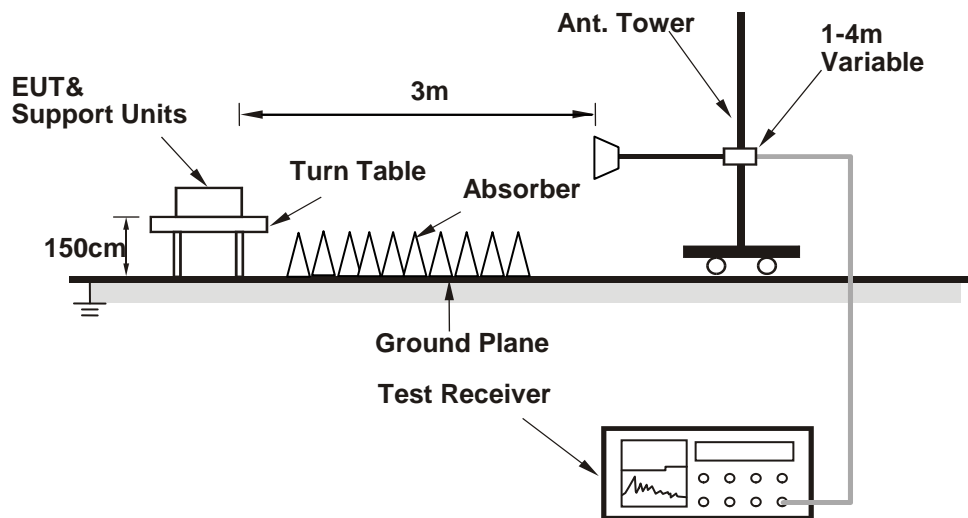
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Connected the EUT with the Notebook Computer which is placed on remote site.
- Controlling software (HyperTerminal paste TX 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)
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	48.4 PK	74.0	-25.6	3.62 H	261	52.6	-4.2
2	2390.00	37.1 AV	54.0	-16.9	3.62 H	261	41.3	-4.2
3	*2412.00	104.9 PK			3.62 H	261	109.0	-4.1
4	*2412.00	102.3 AV			3.62 H	261	106.4	-4.1
5	4824.00	40.6 PK	74.0	-33.4	2.14 H	345	38.3	2.3
6	4824.00	27.5 AV	54.0	-26.5	2.14 H	345	25.2	2.3

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	48.3 PK	74.0	-25.7	3.51 V	7	52.5	-4.2
2	2390.00	37.0 AV	54.0	-17.0	3.51 V	7	41.2	-4.2
3	*2412.00	98.9 PK			3.51 V	7	103.0	-4.1
4	*2412.00	96.5 AV			3.51 V	7	100.6	-4.1
5	4824.00	43.7 PK	74.0	-30.3	1.31 V	234	41.4	2.3
6	4824.00	38.9 AV	54.0	-15.1	1.31 V	234	36.6	2.3

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 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	48.3 PK	74.0	-25.7	3.56 H	258	52.5	-4.2
2	2390.00	34.9 AV	54.0	-19.1	3.56 H	258	39.1	-4.2
3	*2437.00	106.6 PK			3.56 H	258	110.6	-4.0
4	*2437.00	104.1 AV			3.56 H	258	108.1	-4.0
5	2483.50	48.5 PK	74.0	-25.5	3.56 H	258	52.5	-4.0
6	2483.50	35.5 AV	54.0	-18.5	3.56 H	258	39.5	-4.0
7	4874.00	44.5 PK	74.0	-29.5	1.50 H	140	42.0	2.5
8	4874.00	39.2 AV	54.0	-14.8	1.50 H	140	36.7	2.5
9	7311.00	48.3 PK	74.0	-25.7	1.52 H	144	39.4	8.9
10	7311.00	36.6 AV	54.0	-17.4	1.52 H	144	27.7	8.9

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	2390.00	47.9 PK	74.0	-26.1	3.55 V	18	52.1	-4.2
2	2390.00	34.2 AV	54.0	-19.8	3.55 V	18	38.4	-4.2
3	*2437.00	100.6 PK			3.55 V	18	104.6	-4.0
4	*2437.00	98.3 AV			3.55 V	18	102.3	-4.0
5	2483.50	47.6 PK	74.0	-26.4	3.55 V	18	51.6	-4.0
6	2483.50	34.8 AV	54.0	-19.2	3.55 V	18	38.8	-4.0
7	4874.00	45.9 PK	74.0	-28.1	1.00 V	282	43.4	2.5
8	4874.00	40.7 AV	54.0	-13.3	1.00 V	282	38.2	2.5
9	7311.00	48.9 PK	74.0	-25.1	1.61 V	174	40.0	8.9
10	7311.00	39.4 AV	54.0	-14.6	1.61 V	174	30.5	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.8 PK			3.17 H	265	110.9	-4.1
2	*2462.00	104.3 AV			3.17 H	265	108.4	-4.1
3	2483.50	51.6 PK	74.0	-22.4	3.17 H	265	55.6	-4.0
4	2483.50	40.6 AV	54.0	-13.4	3.17 H	265	44.6	-4.0
5	4924.00	45.3 PK	74.0	-28.7	1.45 H	142	42.8	2.5
6	4924.00	39.7 AV	54.0	-14.3	1.45 H	142	37.2	2.5
7	7386.00	48.1 PK	74.0	-25.9	1.56 H	142	38.8	9.3
8	7386.00	36.2 AV	54.0	-17.8	1.56 H	142	26.9	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	*2462.00	100.8 PK			3.60 V	21	104.9	-4.1
2	*2462.00	98.5 AV			3.60 V	21	102.6	-4.1
3	2483.50	51.4 PK	74.0	-22.6	3.60 V	21	55.4	-4.0
4	2483.50	39.4 AV	54.0	-14.6	3.60 V	21	43.4	-4.0
5	4924.00	46.2 PK	74.0	-27.8	1.02 V	287	43.7	2.5
6	4924.00	40.8 AV	54.0	-13.2	1.02 V	287	38.3	2.5
7	7386.00	48.8 PK	74.0	-25.2	1.65 V	174	39.5	9.3
8	7386.00	39.4 AV	54.0	-14.6	1.65 V	174	30.1	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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	49.6 PK	74.0	-24.4	3.61 H	256	53.8	-4.2
2	2390.00	36.1 AV	54.0	-17.9	3.61 H	256	40.3	-4.2
3	*2412.00	100.4 PK			3.61 H	256	104.5	-4.1
4	*2412.00	90.9 AV			3.61 H	256	95.0	-4.1
5	4824.00	45.4 PK	74.0	-28.6	1.49 H	153	43.1	2.3
6	4824.00	39.7 AV	54.0	-14.3	1.49 H	153	37.4	2.3

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	48.9 PK	74.0	-25.1	4.00 V	131	53.1	-4.2
2	2390.00	35.4 AV	54.0	-18.6	4.00 V	131	39.6	-4.2
3	*2412.00	93.8 PK			4.00 V	131	97.9	-4.1
4	*2412.00	87.0 AV			4.00 V	131	91.1	-4.1
5	4824.00	45.9 PK	74.0	-28.1	1.03 V	291	43.6	2.3
6	4824.00	40.4 AV	54.0	-13.6	1.03 V	291	38.1	2.3

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 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	47.9 PK	74.0	-26.1	3.56 H	256	52.1	-4.2
2	2390.00	35.0 AV	54.0	-19.0	3.56 H	256	39.2	-4.2
3	*2437.00	102.5 PK			3.56 H	256	106.5	-4.0
4	*2437.00	93.2 AV			3.56 H	256	97.2	-4.0
5	2483.50	48.9 PK	74.0	-25.1	3.56 H	256	52.9	-4.0
6	2483.50	35.5 AV	54.0	-18.5	3.56 H	256	39.5	-4.0
7	4874.00	45.9 PK	74.0	-28.1	1.49 H	137	43.4	2.5
8	4874.00	40.0 AV	54.0	-14.0	1.49 H	137	37.5	2.5
9	7311.00	48.0 PK	74.0	-26.0	1.58 H	150	39.1	8.9
10	7311.00	36.2 AV	54.0	-17.8	1.58 H	150	27.3	8.9

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	2390.00	47.5 PK	74.0	-26.5	3.35 V	346	51.7	-4.2
2	2390.00	34.3 AV	54.0	-19.7	3.35 V	346	38.5	-4.2
3	*2437.00	98.3 PK			3.35 V	346	102.3	-4.0
4	*2437.00	88.9 AV			3.35 V	346	92.9	-4.0
5	2483.50	48.6 PK	74.0	-25.4	3.35 V	346	52.6	-4.0
6	2483.50	35.2 AV	54.0	-18.8	3.35 V	346	39.2	-4.0
7	4874.00	46.8 PK	74.0	-27.2	1.06 V	284	44.3	2.5
8	4874.00	41.2 AV	54.0	-12.8	1.06 V	284	38.7	2.5
9	7311.00	49.3 PK	74.0	-24.7	1.63 V	183	40.4	8.9
10	7311.00	39.9 AV	54.0	-14.1	1.63 V	183	31.0	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	102.4 PK			3.94 H	267	106.5	-4.1
2	*2462.00	94.8 AV			3.94 H	267	98.9	-4.1
3	2483.50	56.3 PK	74.0	-17.7	3.94 H	267	60.3	-4.0
4	2483.50	41.8 AV	54.0	-12.2	3.94 H	267	45.8	-4.0
5	4924.00	45.9 PK	74.0	-28.1	1.47 H	124	43.4	2.5
6	4924.00	39.9 AV	54.0	-14.1	1.47 H	124	37.4	2.5
7	7386.00	48.7 PK	74.0	-25.3	1.56 H	147	39.4	9.3
8	7386.00	36.6 AV	54.0	-17.4	1.56 H	147	27.3	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	*2462.00	96.4 PK			3.35 V	334	100.5	-4.1
2	*2462.00	89.0 AV			3.35 V	334	93.1	-4.1
3	2483.50	55.8 PK	74.0	-18.2	3.35 V	334	59.8	-4.0
4	2483.50	40.1 AV	54.0	-13.9	3.35 V	334	44.1	-4.0
5	4924.00	46.2 PK	74.0	-27.8	1.00 V	294	43.7	2.5
6	4924.00	41.0 AV	54.0	-13.0	1.00 V	294	38.5	2.5
7	7386.00	49.1 PK	74.0	-24.9	1.65 V	197	39.8	9.3
8	7386.00	39.9 AV	54.0	-14.1	1.65 V	197	30.6	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.

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	48.0 PK	74.0	-26.0	3.60 H	255	52.2	-4.2
2	2390.00	36.0 AV	54.0	-18.0	3.60 H	255	40.2	-4.2
3	*2412.00	99.9 PK			3.60 H	255	104.0	-4.1
4	*2412.00	90.3 AV			3.60 H	255	94.4	-4.1
5	4824.00	45.9 PK	74.0	-28.1	1.43 H	109	43.6	2.3
6	4824.00	40.0 AV	54.0	-14.0	1.43 H	109	37.7	2.3

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	47.9 PK	74.0	-26.1	3.40 V	326	52.1	-4.2
2	2390.00	35.4 AV	54.0	-18.6	3.40 V	326	39.6	-4.2
3	*2412.00	93.9 PK			3.40 V	326	98.0	-4.1
4	*2412.00	84.5 AV			3.40 V	326	88.6	-4.1
5	4824.00	46.3 PK	74.0	-27.7	1.05 V	303	44.0	2.3
6	4824.00	40.8 AV	54.0	-13.2	1.05 V	303	38.5	2.3

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 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	48.4 PK	74.0	-25.6	3.50 H	256	52.6	-4.2
2	2390.00	36.1 AV	54.0	-17.9	3.50 H	256	40.3	-4.2
3	*2437.00	102.2 PK			3.50 H	256	106.2	-4.0
4	*2437.00	92.9 AV			3.50 H	256	96.9	-4.0
5	2483.50	49.3 PK	74.0	-24.7	3.50 H	256	53.3	-4.0
6	2483.50	36.4 AV	54.0	-17.6	3.50 H	256	40.4	-4.0
7	4874.00	45.7 PK	74.0	-28.3	1.42 H	123	43.2	2.5
8	4874.00	39.6 AV	54.0	-14.4	1.42 H	123	37.1	2.5
9	7311.00	48.5 PK	74.0	-25.5	1.60 H	142	39.6	8.9
10	7311.00	36.3 AV	54.0	-17.7	1.60 H	142	27.4	8.9

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	2390.00	48.2 PK	74.0	-25.8	3.42 V	331	52.4	-4.2
2	2390.00	36.0 AV	54.0	-18.0	3.42 V	331	40.2	-4.2
3	*2437.00	96.2 PK			3.42 V	331	100.2	-4.0
4	*2437.00	87.1 AV			3.42 V	331	91.1	-4.0
5	2483.50	49.1 PK	74.0	-24.9	3.42 V	331	53.1	-4.0
6	2483.50	35.8 AV	54.0	-18.2	3.42 V	331	39.8	-4.0
7	4874.00	46.4 PK	74.0	-27.6	1.03 V	310	43.9	2.5
8	4874.00	40.7 AV	54.0	-13.3	1.03 V	310	38.2	2.5
9	7311.00	49.5 PK	74.0	-24.5	1.60 V	193	40.6	8.9
10	7311.00	40.2 AV	54.0	-13.8	1.60 V	193	31.3	8.9

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.6 PK			3.95 H	268	107.7	-4.1
2	*2462.00	94.5 AV			3.95 H	268	98.6	-4.1
3	2483.50	59.4 PK	74.0	-14.6	3.95 H	268	63.4	-4.0
4	2483.50	41.8 AV	54.0	-12.2	3.95 H	268	45.8	-4.0
5	4924.00	45.3 PK	74.0	-28.7	1.47 H	114	42.8	2.5
6	4924.00	39.2 AV	54.0	-14.8	1.47 H	114	36.7	2.5
7	7386.00	48.4 PK	74.0	-25.6	1.63 H	145	39.1	9.3
8	7386.00	35.9 AV	54.0	-18.1	1.63 H	145	26.6	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	*2462.00	97.6 PK			3.43 V	320	101.7	-4.1
2	*2462.00	88.7 AV			3.43 V	320	92.8	-4.1
3	2483.50	59.1 PK	74.0	-14.9	3.43 V	320	63.1	-4.0
4	2483.50	40.8 AV	54.0	-13.2	3.43 V	320	44.8	-4.0
5	4924.00	46.7 PK	74.0	-27.3	1.03 V	314	44.2	2.5
6	4924.00	41.0 AV	54.0	-13.0	1.03 V	314	38.5	2.5
7	7386.00	49.4 PK	74.0	-24.6	1.66 V	184	40.1	9.3
8	7386.00	39.9 AV	54.0	-14.1	1.66 V	184	30.6	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.

Below 1GHz Data:

802.11b

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	30.85	28.8 QP	40.0	-11.2	1.00 H	223	38.3	-9.5
2	149.77	26.2 QP	43.5	-17.3	1.20 H	262	34.4	-8.2
3	331.89	26.9 QP	46.0	-19.1	1.50 H	261	33.2	-6.3
4	619.83	30.8 QP	46.0	-15.2	1.50 H	214	30.8	0.0
5	842.08	32.8 QP	46.0	-13.2	1.50 H	308	29.4	3.4
6	992.41	34.6 QP	54.0	-19.4	1.50 H	223	29.4	5.2

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	40.69	31.4 QP	40.0	-8.6	1.50 V	226	40.4	-9.0
2	111.36	27.5 QP	43.5	-16.0	1.00 V	136	38.6	-11.1
3	150.96	26.3 QP	43.5	-17.2	1.50 V	223	34.5	-8.2
4	644.35	32.0 QP	46.0	-14.0	1.50 V	325	31.6	0.4
5	759.44	32.6 QP	46.0	-13.4	1.20 V	331	30.1	2.5
6	953.42	34.6 QP	46.0	-11.4	1.50 V	231	29.8	4.8

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	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
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 Shielded Room No. 1.
- 3 Tested Date:Dec. 30, 2016

4.2.3 Test Procedures

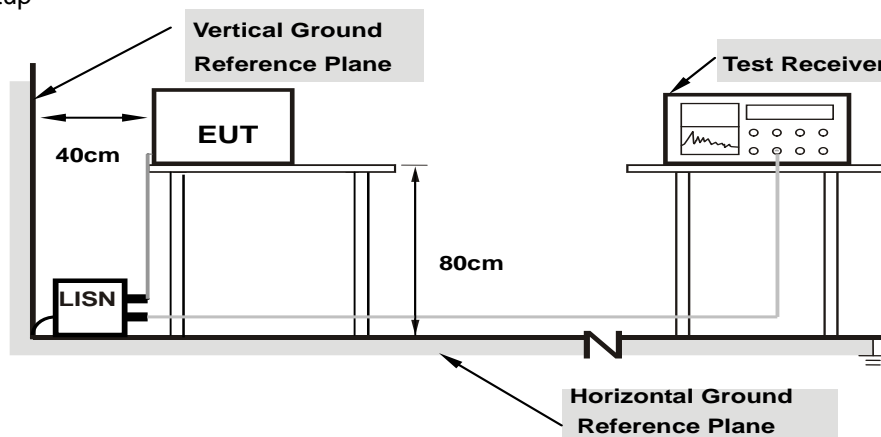
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

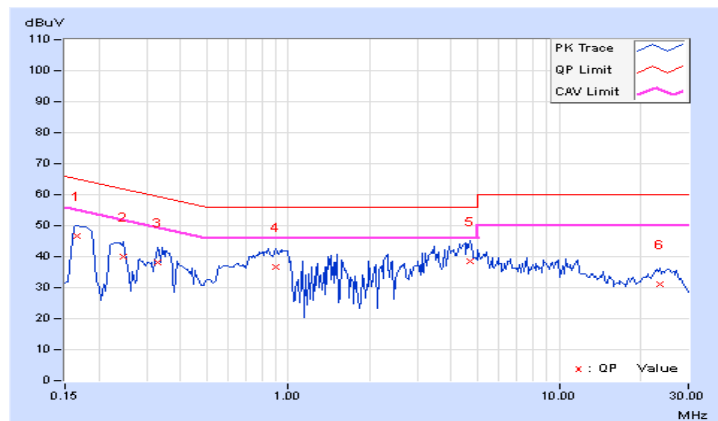
4.2.7 Test Results (Mode 1)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.20	36.40	21.47	46.60	31.67	65.18	55.18	-18.58	-23.51
2	0.24766	10.21	29.87	13.21	40.08	23.42	61.84	51.84	-21.76	-28.42
3	0.32969	10.23	28.08	12.67	38.31	22.90	59.46	49.46	-21.15	-26.56
4	0.90000	10.29	26.23	10.12	36.52	20.41	56.00	46.00	-19.48	-25.59
5	4.71094	10.36	28.08	14.48	38.44	24.84	56.00	46.00	-17.56	-21.16
6	23.48438	11.75	19.28	8.98	31.03	20.73	60.00	50.00	-28.97	-29.27

REMARKS:

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

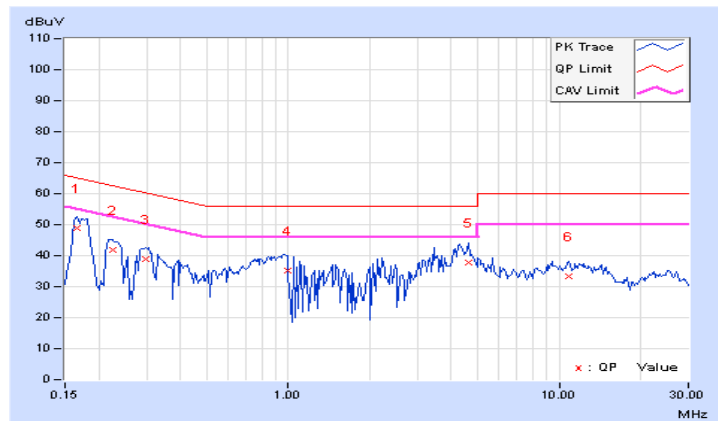


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.18	38.57	21.03	48.75	31.21	65.18	55.18	-16.43	-23.97
2	0.22422	10.18	31.81	16.49	41.99	26.67	62.66	52.66	-20.67	-25.99
3	0.29844	10.20	28.63	11.79	38.83	21.99	60.29	50.29	-21.46	-28.30
4	0.99375	10.26	24.90	8.92	35.16	19.18	56.00	46.00	-20.84	-26.82
5	4.63672	10.26	27.41	13.23	37.67	23.49	56.00	46.00	-18.33	-22.51
6	10.92188	10.71	22.50	12.43	33.21	23.14	60.00	50.00	-26.79	-26.86

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.



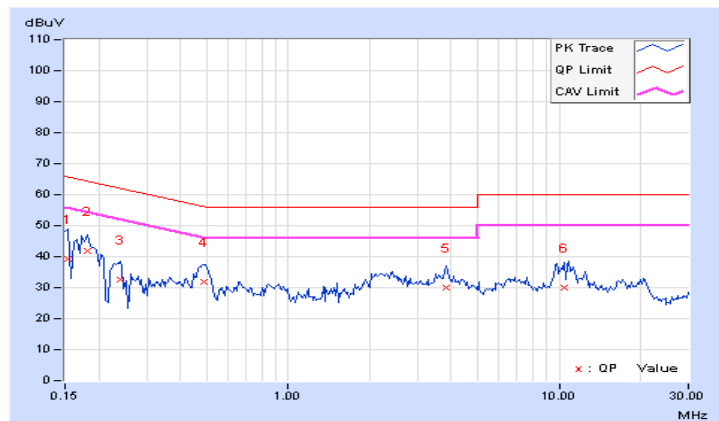
4.2.8 Test Results (Mode 2)

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

No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.15391	10.19	29.11	7.31	39.30	17.50	65.79	55.79	-26.49
2	0.18125	10.19	31.59	20.22	41.78	30.41	64.43	54.43	-22.65	-24.02
3	0.23984	10.20	22.28	7.24	32.48	17.44	62.10	52.10	-29.62	-34.66
4	0.48594	10.23	21.59	10.90	31.82	21.13	56.24	46.24	-24.42	-25.11
5	3.85156	10.24	19.93	14.00	30.17	24.24	56.00	46.00	-25.83	-21.76
6	10.40234	10.59	19.25	13.80	29.84	24.39	60.00	50.00	-30.16	-25.61

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.

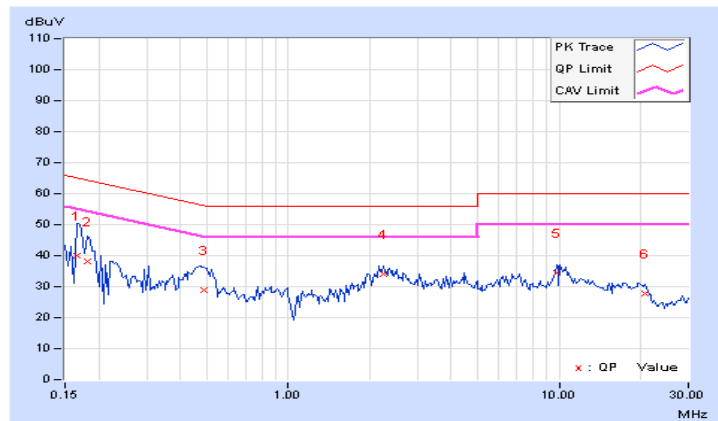


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.17	29.95	13.80	40.12	23.97	65.18	55.18	-25.06	-31.21
2	0.18125	10.17	28.00	8.64	38.17	18.81	64.43	54.43	-26.26	-35.62
3	0.48594	10.21	18.76	4.69	28.97	14.90	56.24	46.24	-27.27	-31.34
4	2.24219	10.27	23.92	17.79	34.19	28.06	56.00	46.00	-21.81	-17.94
5	9.82813	10.48	24.08	17.85	34.56	28.33	60.00	50.00	-25.44	-21.67
6	20.76563	11.10	16.81	11.29	27.91	22.39	60.00	50.00	-32.09	-27.61

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.

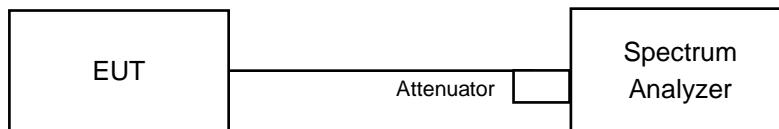


4.3 6dB Bandwidth Measurement

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 28, 2016	June 27, 2017

- 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: Jan. 20, 2017

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.12	0.5	PASS
6	2437	9.10	0.5	PASS
11	2462	9.12	0.5	PASS

802.11g

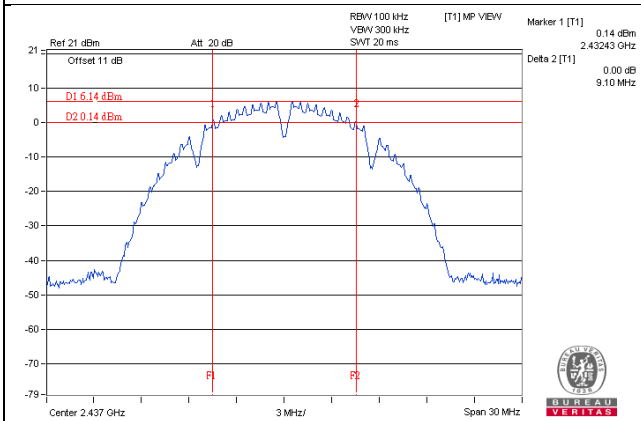
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.61	0.5	PASS
6	2437	16.62	0.5	PASS
11	2462	16.63	0.5	PASS

802.11n (HT20)

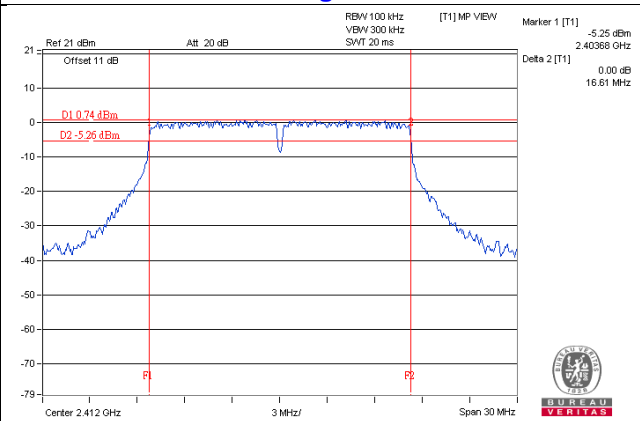
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.77	0.5	Pass
6	2437	17.77	0.5	Pass
11	2462	17.76	0.5	Pass

Spectrum Plot of Worst Value

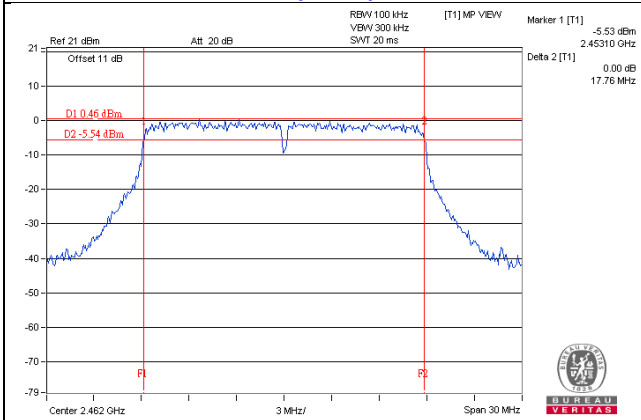
802.11b: CH6



802.11g: CH1



802.11n (HT20): CH11

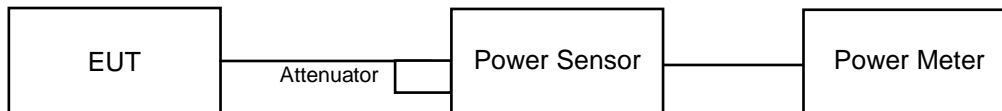


4.4 Conducted Output Power Measurement

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017

- 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: Jan. 20, 2017

4.4.4 Test Procedures

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

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

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	89.95	19.54	30	Pass
6	2437	84.14	19.25	30	Pass
11	2462	81.283	19.10	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	302.691	24.81	30	Pass
6	2437	300.608	24.78	30	Pass
11	2462	260.615	24.16	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	306.902	24.87	30	Pass
6	2437	304.089	24.83	30	Pass
11	2462	229.087	23.60	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	47.973	16.81
6	2437	45.814	16.61
11	2462	43.652	16.40

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	43.053	16.34
6	2437	41.976	16.23
11	2462	33.037	15.19

802.11n (HT20)

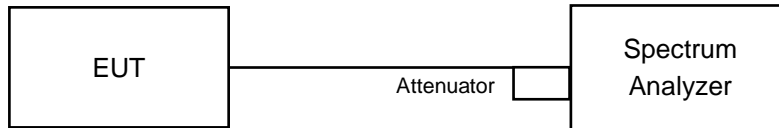
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	42.954	16.33
6	2437	41.591	16.19
11	2462	32.584	15.13

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 Test Setup



4.5.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 28, 2016	June 27, 2017

- 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: Jan. 20, 2017

4.5.4 Test Procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set the VBW $\geq 3 \times \text{RBW}$.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

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	-13.58	8	Pass
6	2437	-13.92	8	Pass
11	2462	-13.91	8	Pass

802.11g

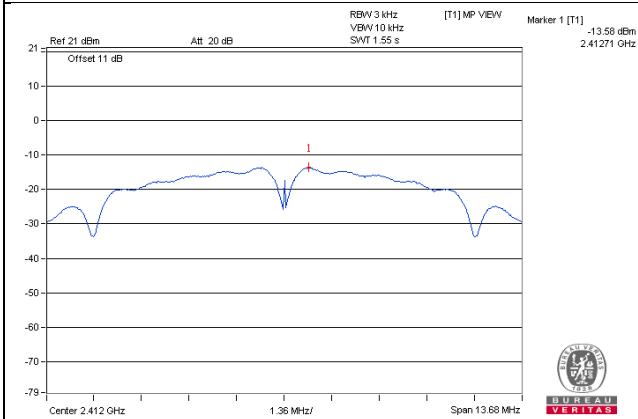
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-13.93	8	Pass
6	2437	-13.09	8	Pass
11	2462	-14.30	8	Pass

802.11n (HT20)

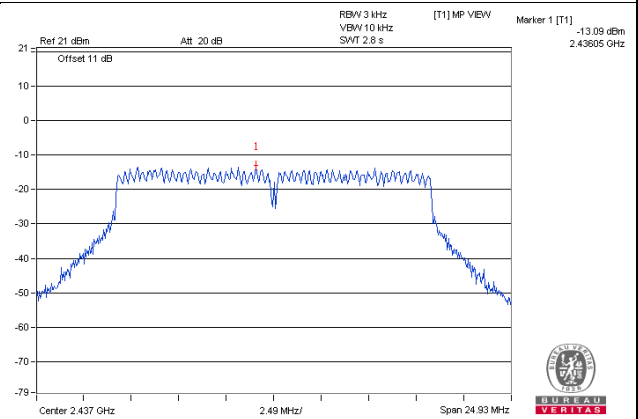
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-12.28	8	Pass
6	2437	-12.30	8	Pass
11	2462	-13.07	8	Pass

Spectrum Plot of Worst Value

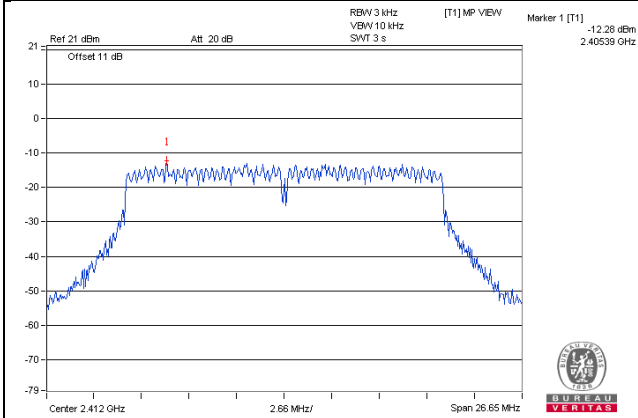
802.11b: CH1



802.11g: CH6



802.11n (HT20): CH1

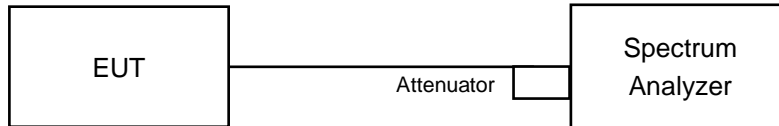


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	June 28, 2016	June 27, 2017

- 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: Jan. 20, 2017

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

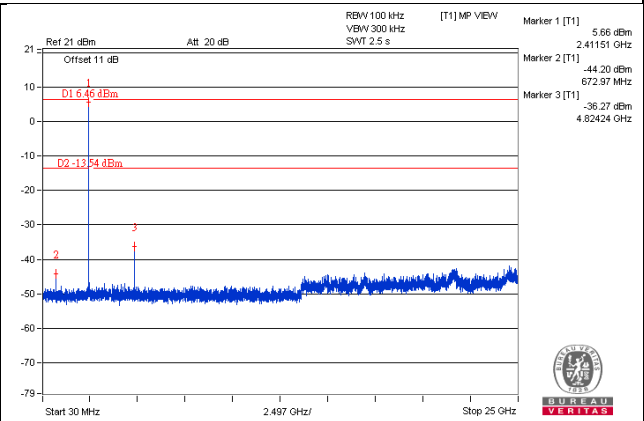
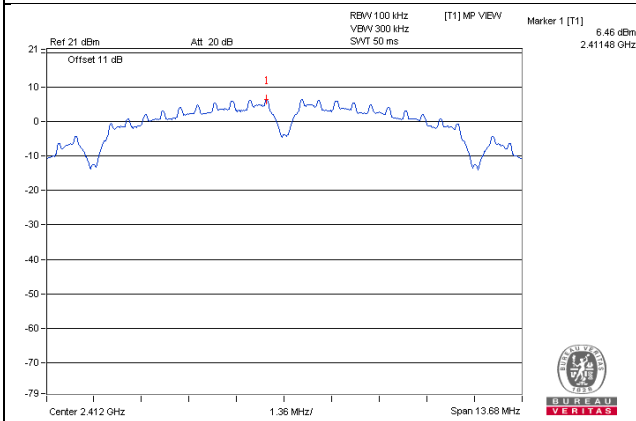
Same as Item 4.3.6

4.6.7 Test Results

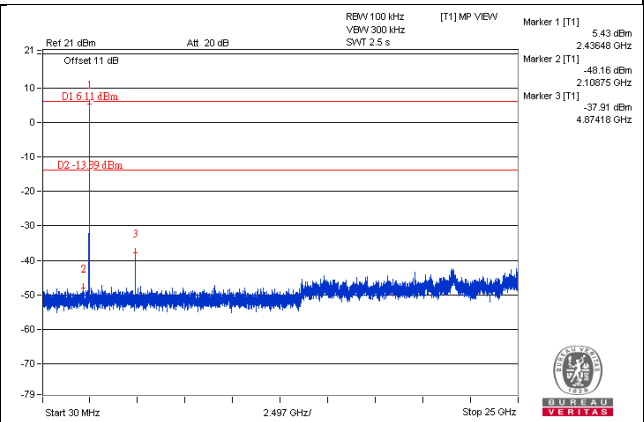
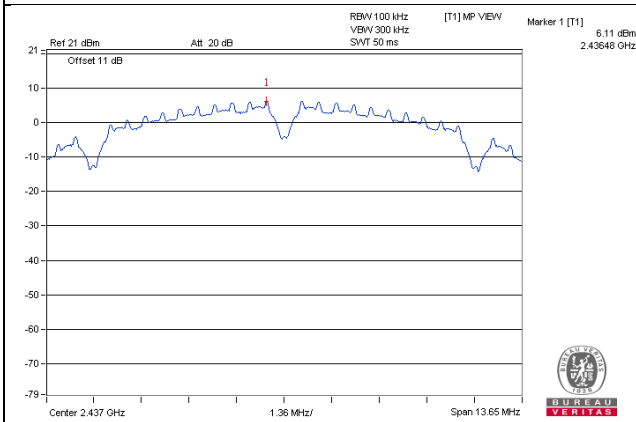
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

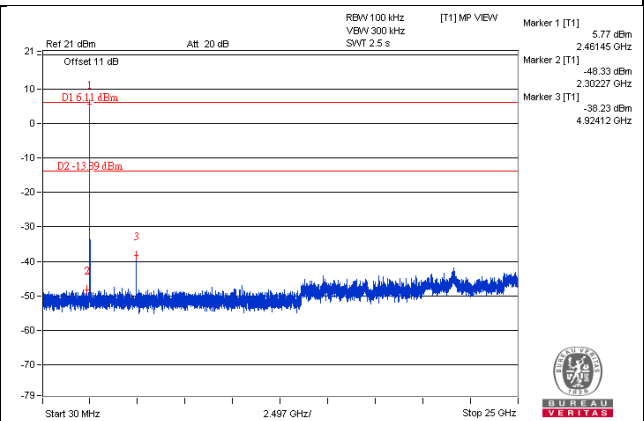
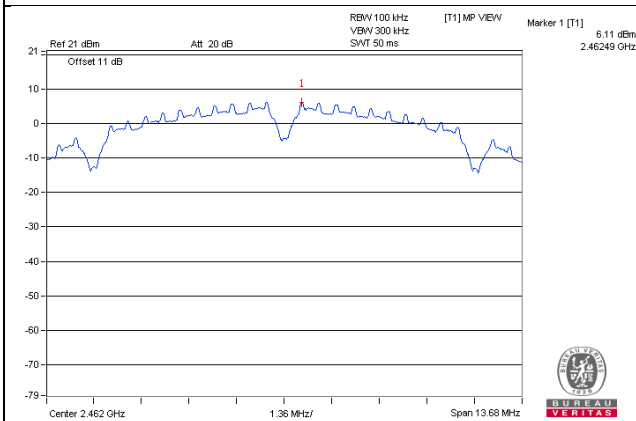
CH 1



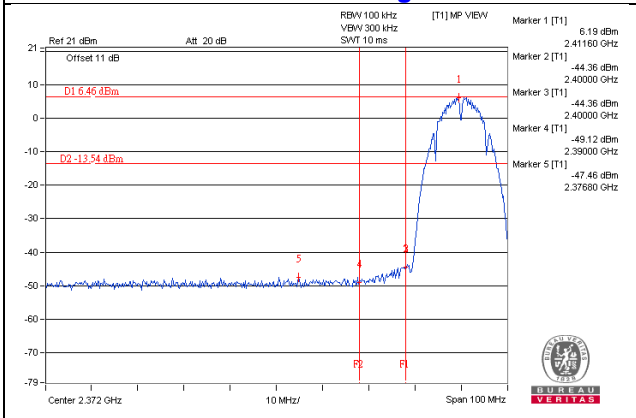
CH 6



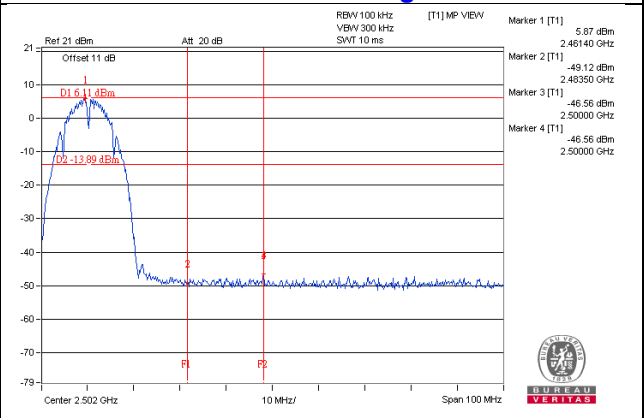
CH 11



CH 1 Band edge

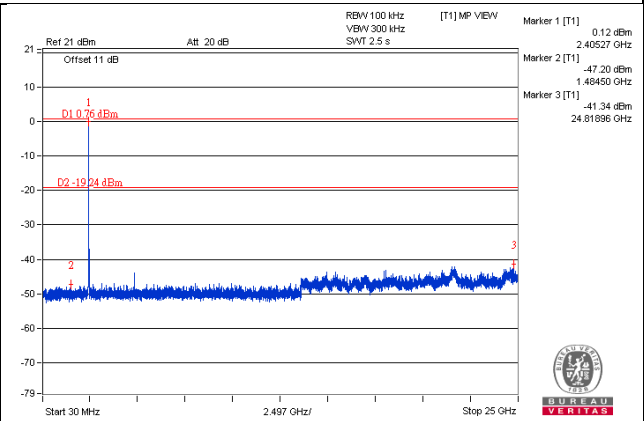
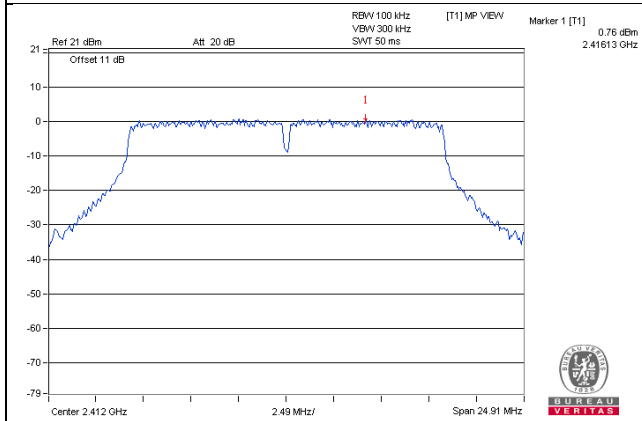


CH 11 Band edge

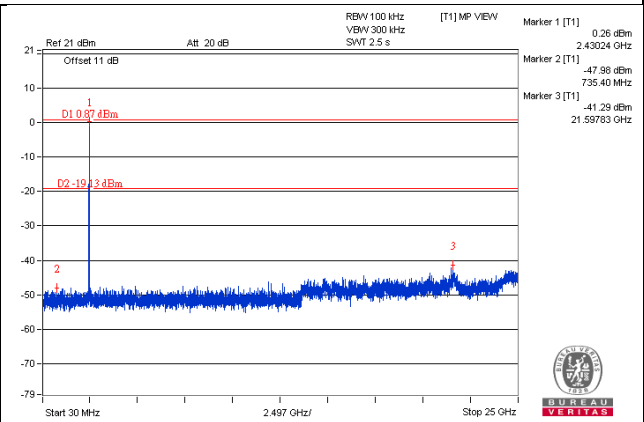
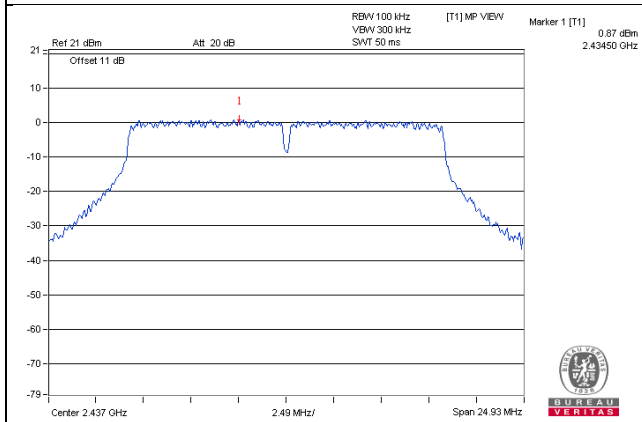


802.11g

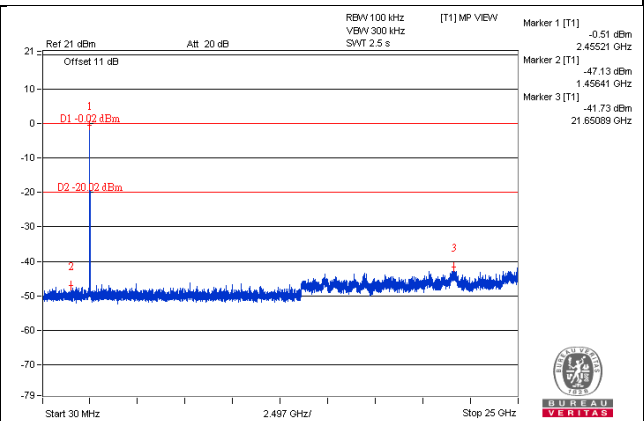
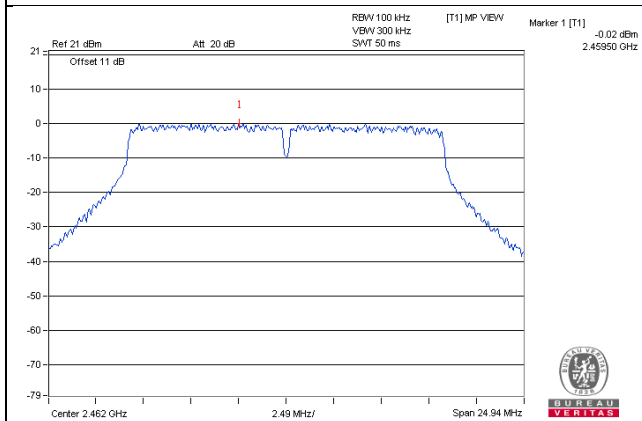
CH 1



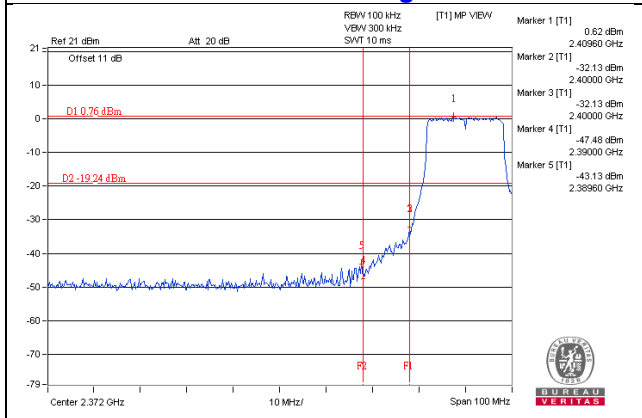
CH 6



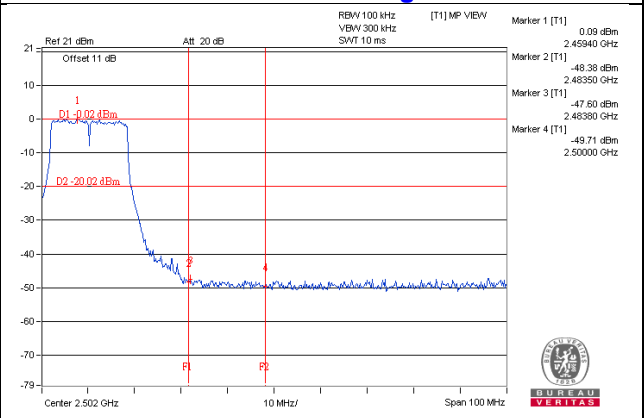
CH 11



CH 1 Band edge

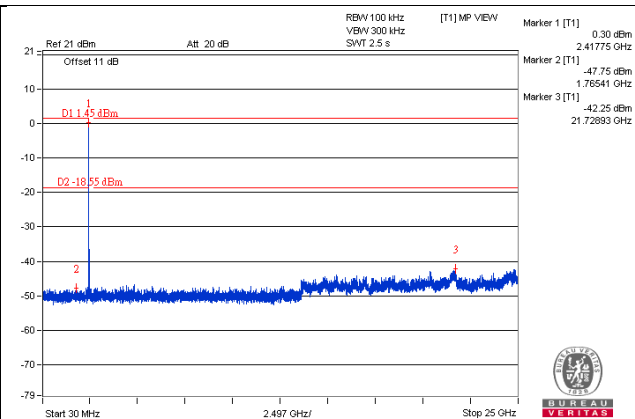
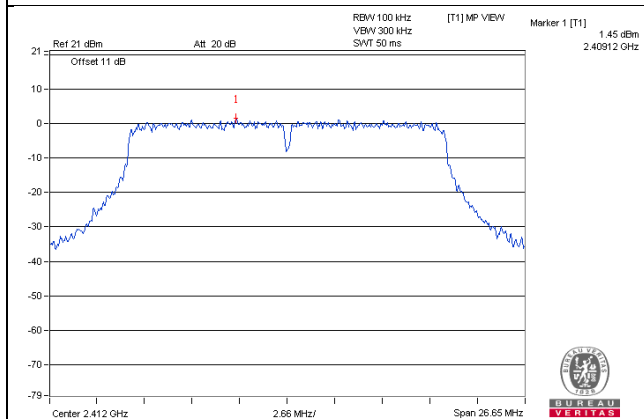


CH 11 Band edge

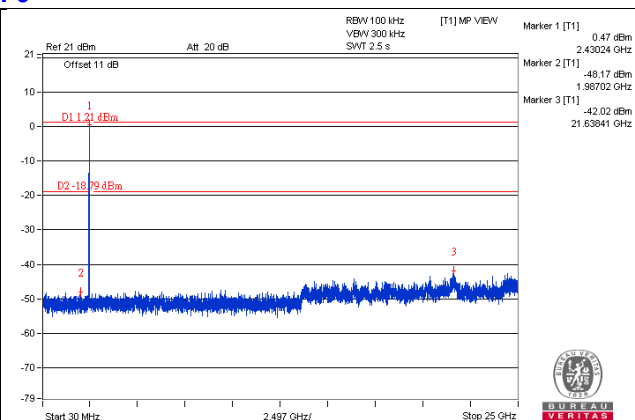
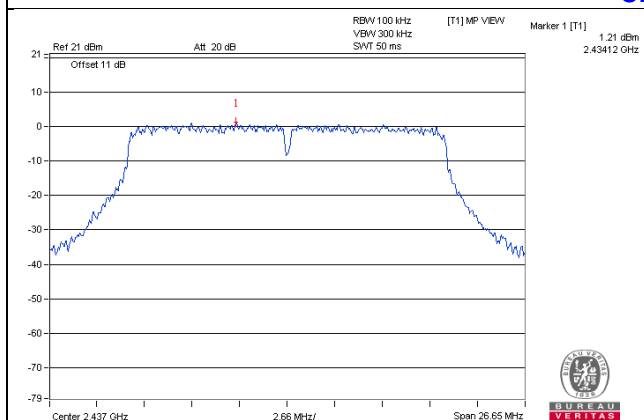


802.11n (HT20)

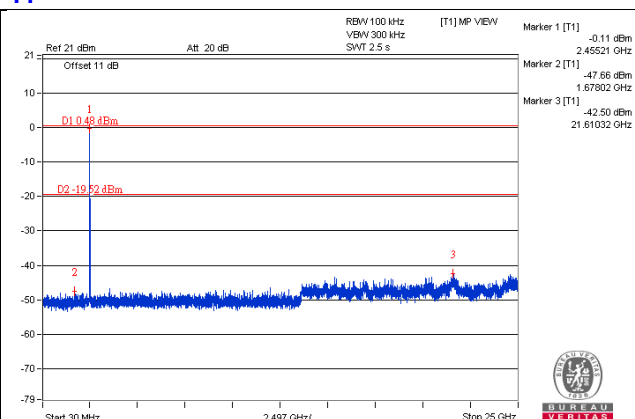
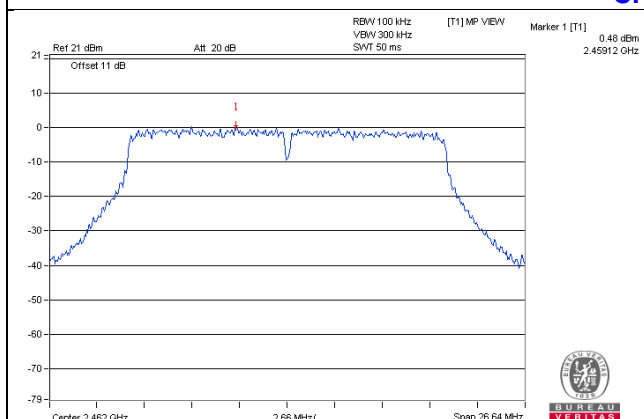
CH 1



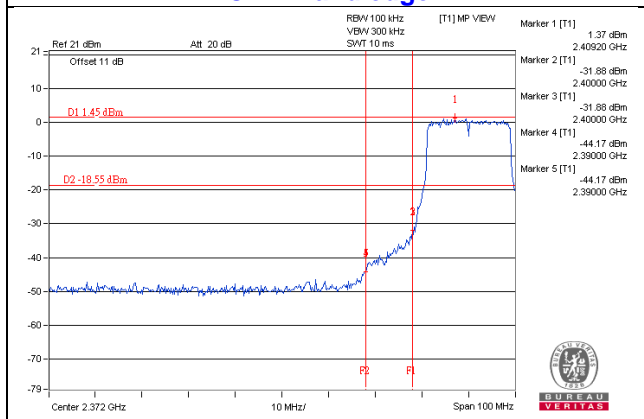
CH 6



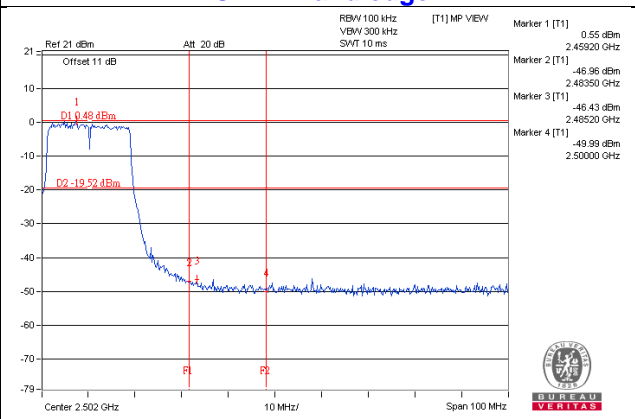
CH 11



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 accredited and approved according to ISO/IEC 17025.

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

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Web Site: www.bureauveritas-adt.com

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

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