FCC & IC TEST REPORT for DTS Device (2.4G Band)
No. 150501907SHA-001

Applicant	: Sunbeam Products, Inc. d/b/a Jarden Consumer Solutions 2381 NW Executive Center Drive, Boca Raton, FL 33431, U.S.A
Manufacturer	: Sunbeam Products, Inc. d/b/a Jarden Consumer Solutions 2381 NW Executive Center Drive, Boca Raton, FL 33431, U.S.A
Equipment	: Healthometer® nuyu™ Wireless Scale
Type/Model	: HNY200KD-WT, HNY200KD-BK

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2014): Radio Frequency Devices

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 1 (2015): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 4 (November 2014): General Requirements and Information for the Certification of Radiocommunication Equipment

Date of issue: June 25, 2015

Prepared by:

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Reviewed by:

Daniel Zhao (*Reviewer*)

FCC ID: Z4D-HNY200
IC: 9973A-HNY200

Description of Test Facility

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1. General Information

1.1 Applicant Information

Applicant:	Sunbeam Products, Inc. d/b/a Jarden Consumer Solutions 2381 NW Executive Center Drive, Boca Raton, FL 33431, U.S.A
Name of contact:	Anson Wong
Tel:	(561) 912-4267
Fax:	/
Manufacturer:	Sunbeam Products, Inc. d/b/a Jarden Consumer Solutions 2381 NW Executive Center Drive, Boca Raton, FL 33431, U.S.A
Sample received date:	June 1, 2015
Sample Identification No:	/
Date of test:	June 1, 2015 ~ June 10, 2015

1.2 Identification of the EUT

Equipment:	Healthometer® nuyu™ Wireless Scale
Type/model:	HNY200KD-WT, HNY200KD-BK
FCC ID:	Z4D-HNY200
IC:	9973A-HNY200

1.3 Technical specification

Frequency Range:	2402 - 2480 MHz
Modulation:	GFSK (Bluetooth 4.0 BLE)
Gain of Antenna:	PCB antenna, un-detachable, 0dBi max
Rating:	6VDC (battery 1.5V * 4)
Description of EUT:	There are two models. They are electrically identical except for different color. Therefore, the model HNY200KD-BK was chosen to perform test as representative.
Channel Description:	2402-2480MHz with channel spacing of 2MHz.

1.4 Mode of operation during the test / Test peripherals used

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

The L, M and H channels were tested as representatives (2402MHz, 2440MHz and 2480MHz).

2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2014-10-21	2015-10-20
Test Receiver	ESIB 26	R&S	EC 3045	2014-10-20	2015-10-19
Test Receiver	ESCI 7	R&S	EC4501	2014-12-25	2015-12-24
Semi-anechoic chamber	-	Albatross project	EC 3048	2015-5-11	2016-5-10
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2015-1-8	2016-1-7
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2015-1-8	2016-1-7
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2015-1-8	2016-1-7
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2015-1-8	2016-1-7
RF cable	SUCOFLEX 104	HUBER+SUHNER	/	2015-2-13	2016-2-12
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2015-4-27	2016-4-26
Horn antenna	HF 906	R&S	EC 3049	2015-4-27	2016-4-26
Horn antenna	3117	ETS	EC 4792-1	2015-4-16	2016-4-15
Horn antenna	HAP18-26W		EC 4792-3	2015-4-9	2016-4-8
Pre-amplifier	Tpa0118-40	R&S	EC 4792-2	2015-4-11	2016-4-10
Spectrum analyzer	E7402A	Agilent	EC2254	2014-08-16	2015-08-15

2.2 Test Standard

47CFR Part 15 (2014)
ANSI C63.10 (2013)
RSS-247 Issue 1 (2015)
RSS-Gen Issue 4 (November 2014)
KDB 558074 (V03R03)

2.3 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-247 Clause 5.2(1)	Pass
Maximum peak output power	15.247(b)	RSS-247 Clause 5.4	Pass
Power spectrum density	15.247(e)	RSS-247 Clause 5.2(2)	Pass
Radiated emission	15.205 & 15.209	RSS-Gen Clause 8.9	Pass
Emission outside the frequency band	15.247(d)	RSS-247 Clause 5.5	Pass
Power line conducted emission	15.207	RSS-Gen Clause 8.8	NA
Occupied bandwidth	-	RSS-Gen Clause 6.6	Tested

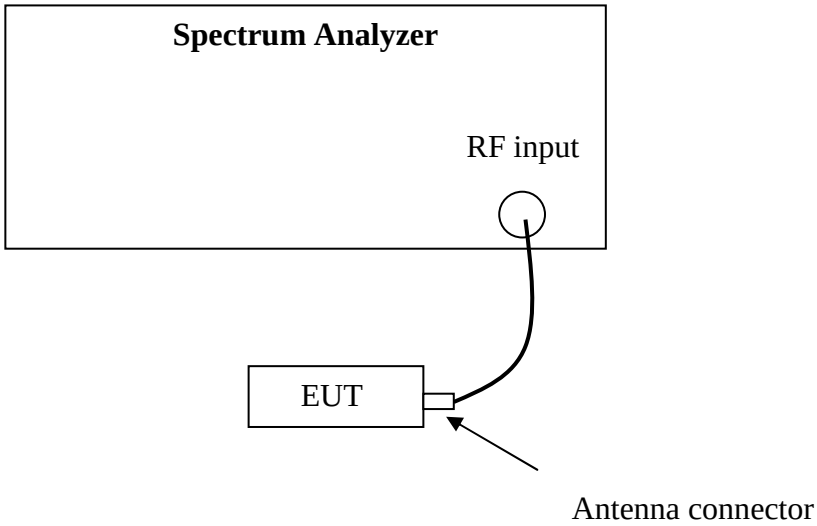
3. Minimum 6dB Bandwidth

Test result: PASS

3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Test Configuration



3.3 Test Procedure and test setup

This test is conducted according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r03”:

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) The automatic bandwidth measurement capability of an instrument is employed using the X dB bandwidth mode with X set to 6 dB.

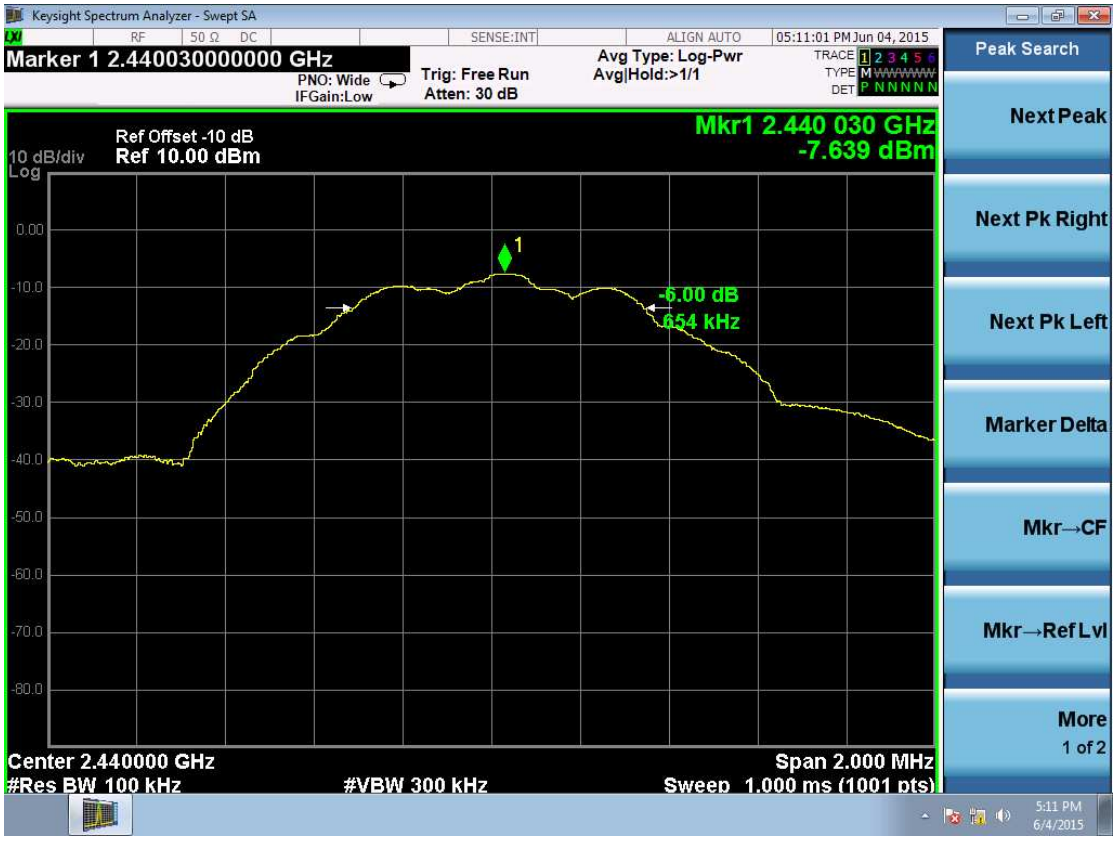
3.4 Test Protocol

Temperature : 25°C
Relative Humidity : 55%

Mode	CH	Bandwidth (MHz)	Limit (MHz)
Operating	L	0.652	⩾0.5
	M	0.654	
	H	0.655	

Channel L

Channel M



Channel H

4. Maximum peak output power

Test result: Pass

4.1 Test limit

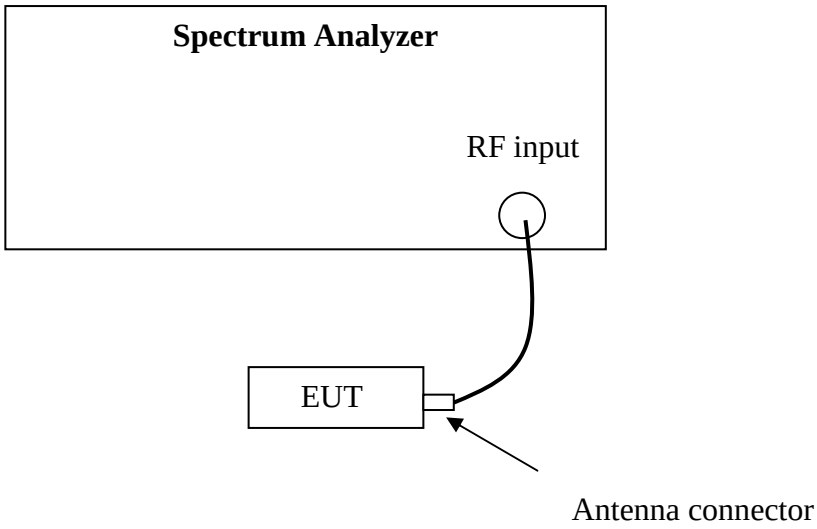
☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

☐ For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts

☒ For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2 Test Configuration



4.3 Test procedure and test setup

This test is conducted according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03":

a) Set the RBW ≥ *DTS bandwidth*.
b) Set VBW ≥ 3 × RBW.
c) Set span ≥ 3 x RBW
d) Sweep time = auto couple.
e) Detector = peak.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use peak marker function to determine the peak amplitude level.

4.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %

Mode	CH	Conducted Power (dBm)	Limit (dBm)
Operating	L	-7.50	≤30
	M	-7.20	
	H	-7.10	

Mode	CH	Ant Gain (dBi)	EIRP (dBm)	Limit (dBm)
Operating	L	0	-7.50	≤36
	M		-7.20	
	H		-7.10	

Note: EIRP = Conducted Power + Ant Gain

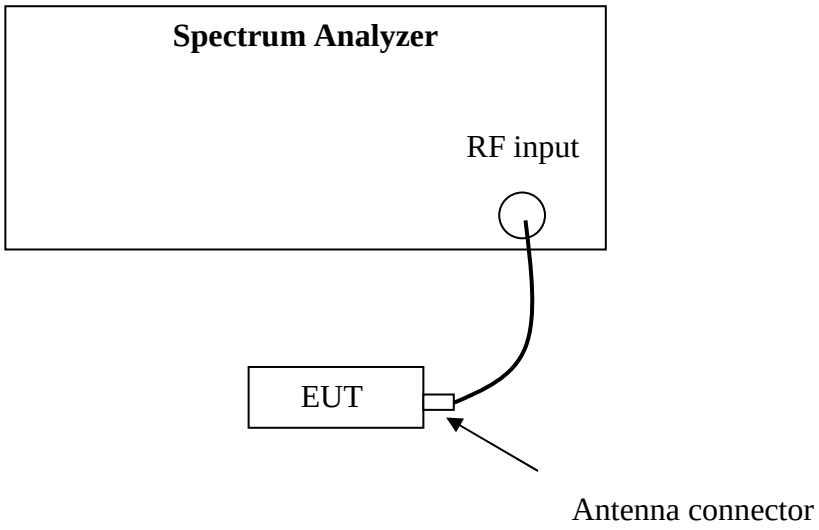
5. Power spectrum density

Test result: **Pass**

5.1 Test limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Configuration



5.3 Test procedure and test setup

This test is conducted according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r03”:

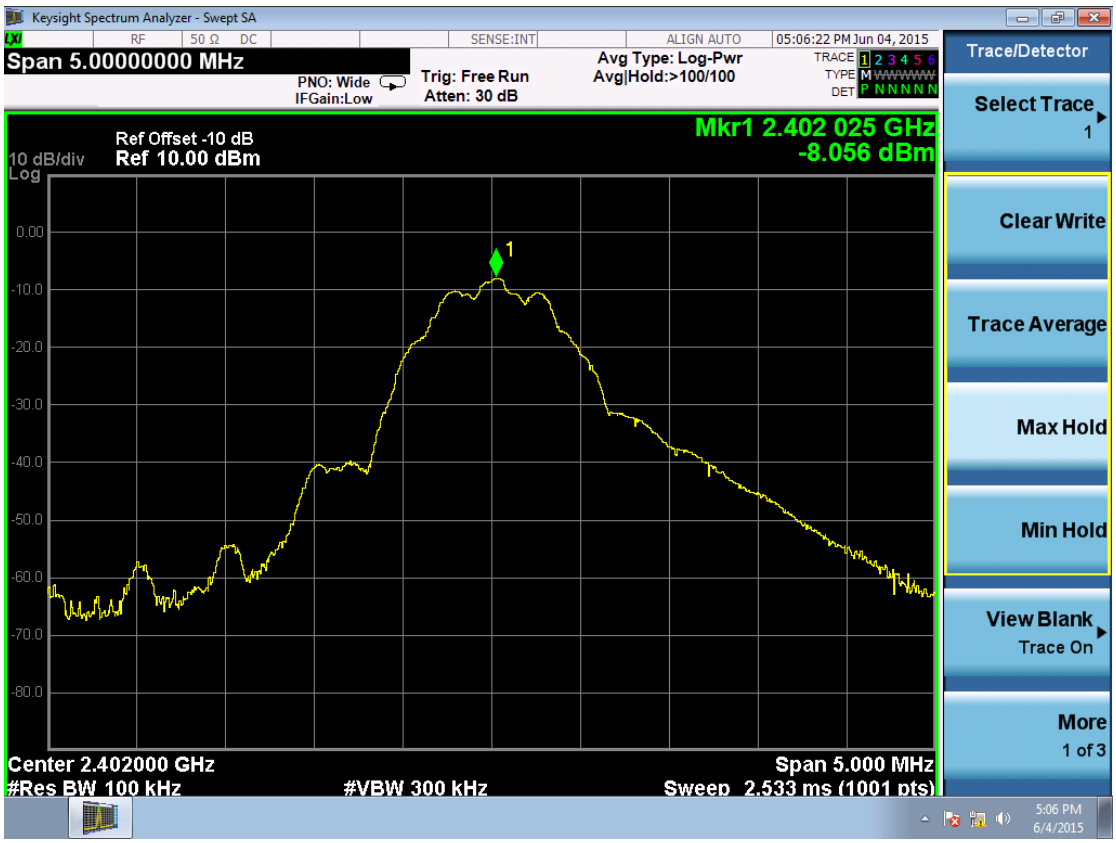
a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 × RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum amplitude level within the RBW.
j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.4 Test Protocol

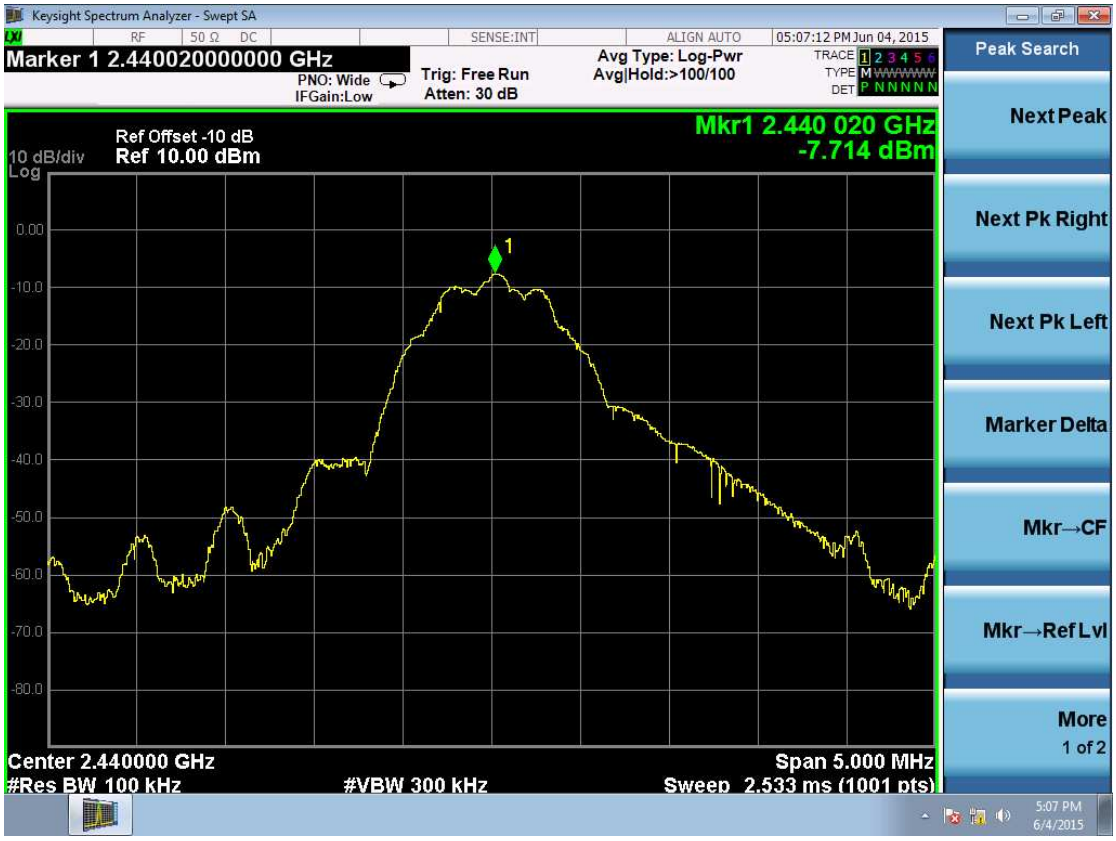
Temperature : 25 °C
Relative Humidity: 55 %

Mode	CH	Spectrum Density (dBm/100kHz)	Limit (dBm/3kHz)
Operating	L	-8.10	≤8.00
	M	-7.70	
	H	-7.70	

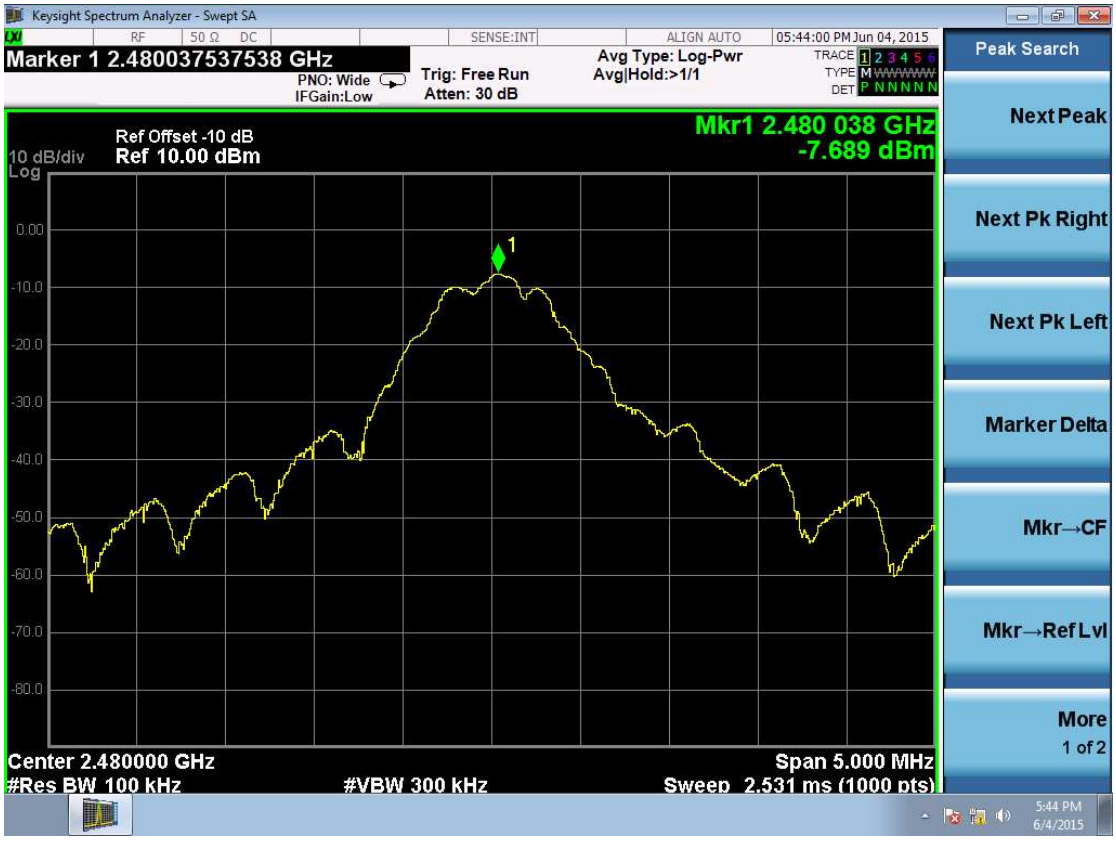
Channel L



Channel M



Channel H



6. Radiated emission

Test result: **PASS**

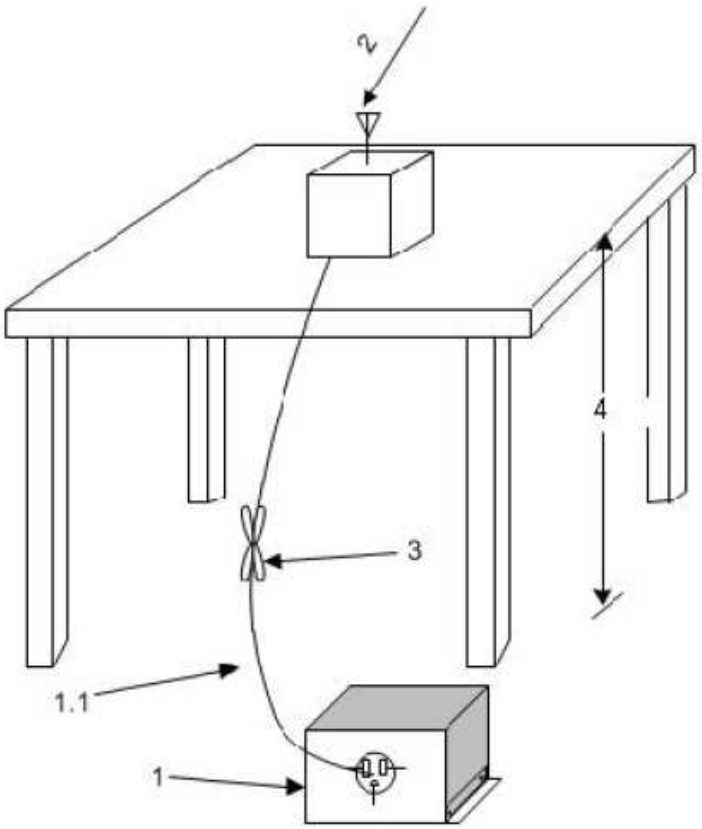
6.1 Test limit

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

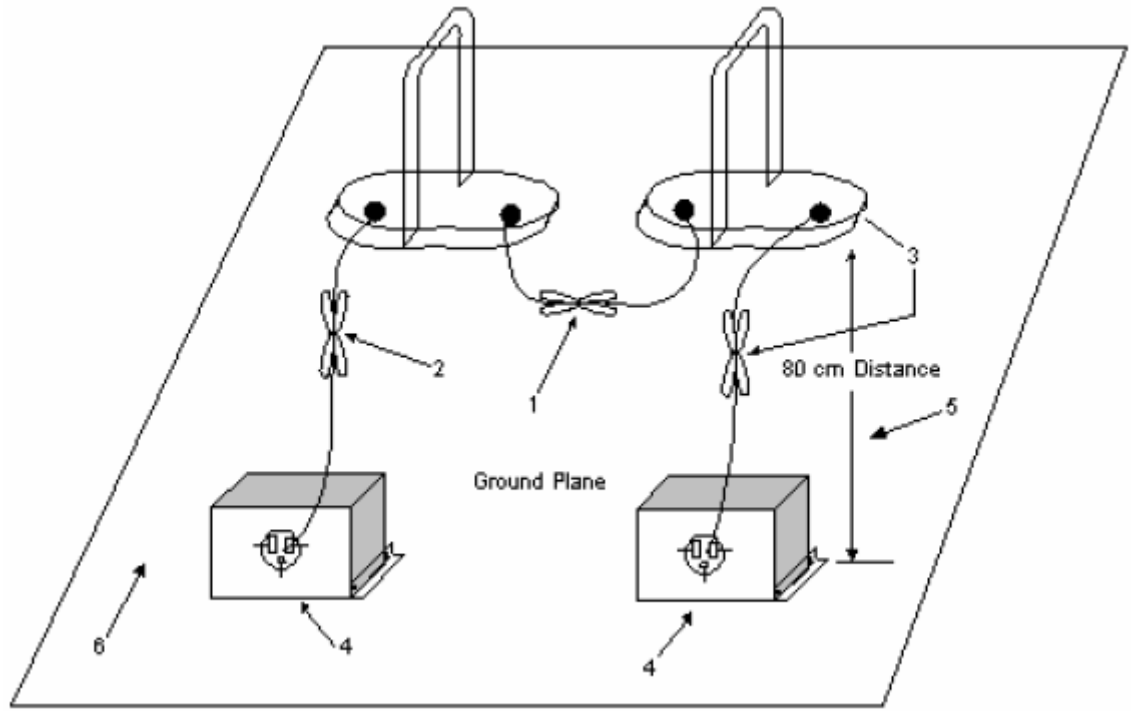
Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

6.2 Test Configuration

☐ For table top equipment



☒ For floor standing equipment



6.3 Test procedure and test setup

The measurement was performed in a semi/full-anechoic chamber.
The distance from EUT to receiving antenna is 3 meter.
For the emission test higher than 1GHz, the antenna(s) of the EUT is located at a height of 1.5 m above the floor.
The EUT was tested according to DTS test procedure of KDB558074 D01 DTS “Meas Guidance v03r03” for compliance to FCC 47CFR 15.247 requirements.

6.4 Test protocol

CH	Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2401.80	-8.20	79.50	Fundamental	/	PK
	H	39.71	16.30	20.30	40.00	19.70	PK
	V	45.55	12.70	21.60	40.00	18.40	PK
	V	465.43	18.80	28.90	46.00	17.10	PK
	V	580.12	21.70	26.70	46.00	19.30	PK
	H	2382.16	-8.30	40.20	54.00	13.80	PK
	H	4804.60	-2.40	62.30	74.00	11.70	PK
	H	4804.60	-2.40	41.70	54.00	12.30	AV
	H	7209.41	2.20	47.80	54.00	6.20	PK
	V	9692.04	4.30	37.60	54.00	16.40	PK
M	H	2440.28	-8.10	76.90	Fundamental	/	PK
	H	39.71	16.30	20.30	40.00	19.70	PK
	V	45.55	12.70	21.60	40.00	18.40	PK
	V	465.43	18.80	28.90	46.00	17.10	PK
	V	580.12	21.70	26.70	46.00	19.30	PK
	H	4883.55	-2.40	57.80	74.00	16.20	PK
	H	4883.55	-2.40	37.10	54.00	16.90	AV
	H	6728.45	1.50	44.40	54.00	9.60	PK
	V	9810.22	4.80	38.20	54.00	15.80	PK
H	H	2480.76	-8.00	74.00	Fundamental	/	PK
	H	39.71	16.30	20.30	40.00	19.70	PK
	V	45.55	12.70	21.60	40.00	18.40	PK
	V	465.43	18.80	28.90	46.00	17.10	PK
	V	580.12	21.70	26.70	46.00	19.30	PK
	H	2492.46	-7.90	39.70	54.00	14.30	PK
	H	4964.92	-2.40	56.80	74.00	17.20	PK
	H	4964.92	-2.40	37.40	54.00	16.60	AV

	H	6608.21	2.70	42.40	54.00	11.60	PK
	V	9924.70	5.00	37.40	54.00	16.60	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = limit – Corrected Reading
4. If the PK reading is lower than AV limit, the AV test can be elided.
5. For all the frequencies assessed with QP detector, it is found they have pulse-repetition frequency higher than 20 Hz.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

7. Emission outside the frequency Band

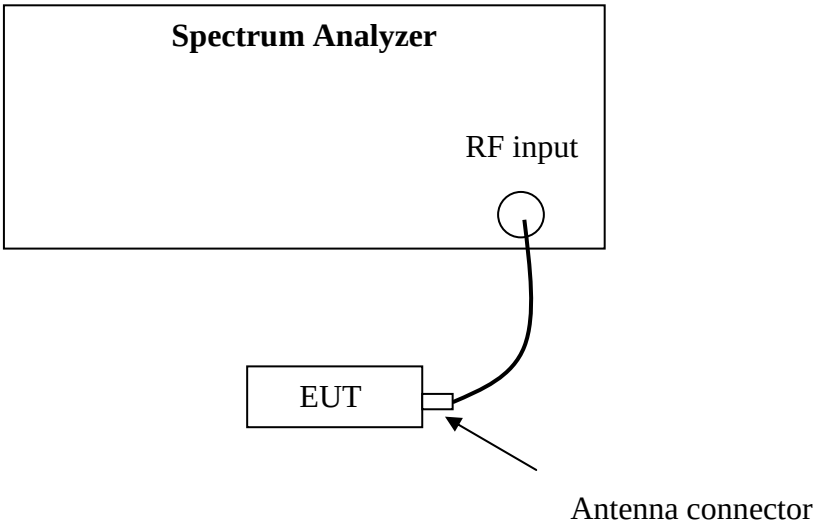
Test result: **PASS**

7.1 Limit

☒ If the maximum peak conducted output power procedure was used to demonstrate compliance, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

☐ If maximum conducted (average) output power was used to demonstrate compliance, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 30 dBc).

7.2 Test Configuration



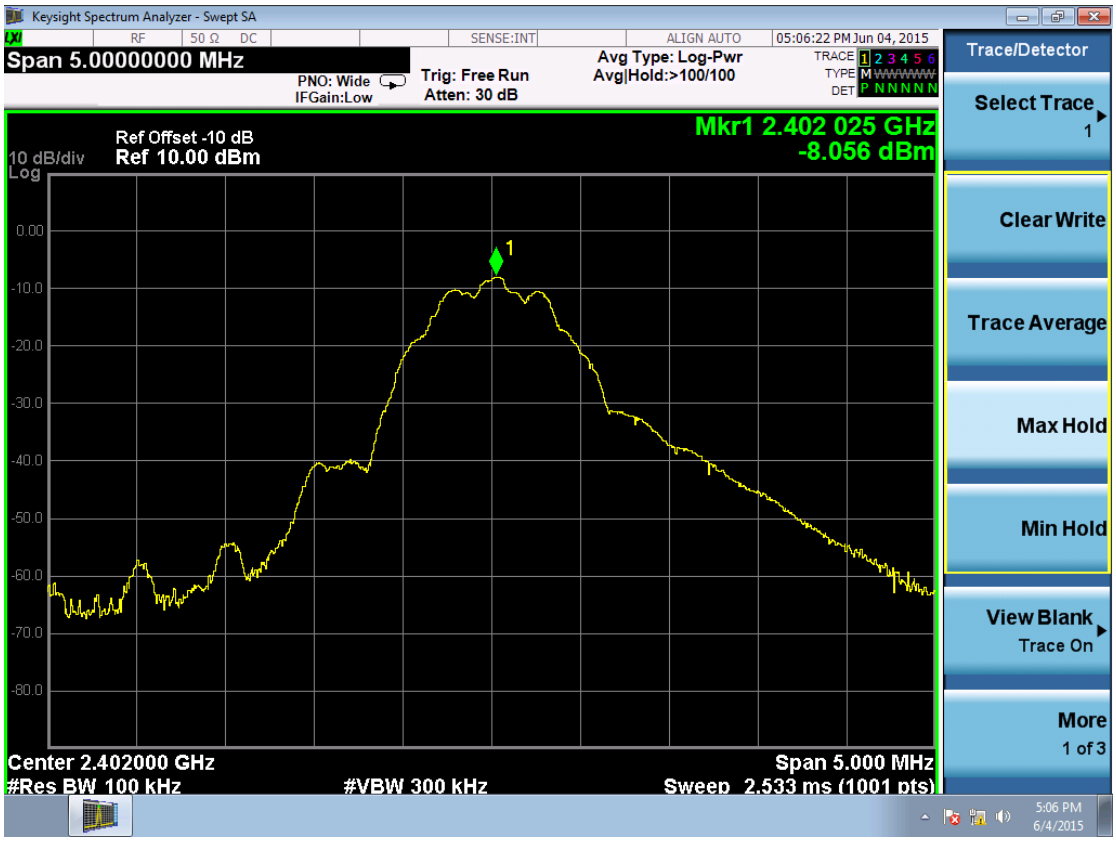
7.3 Test procedure and test setup

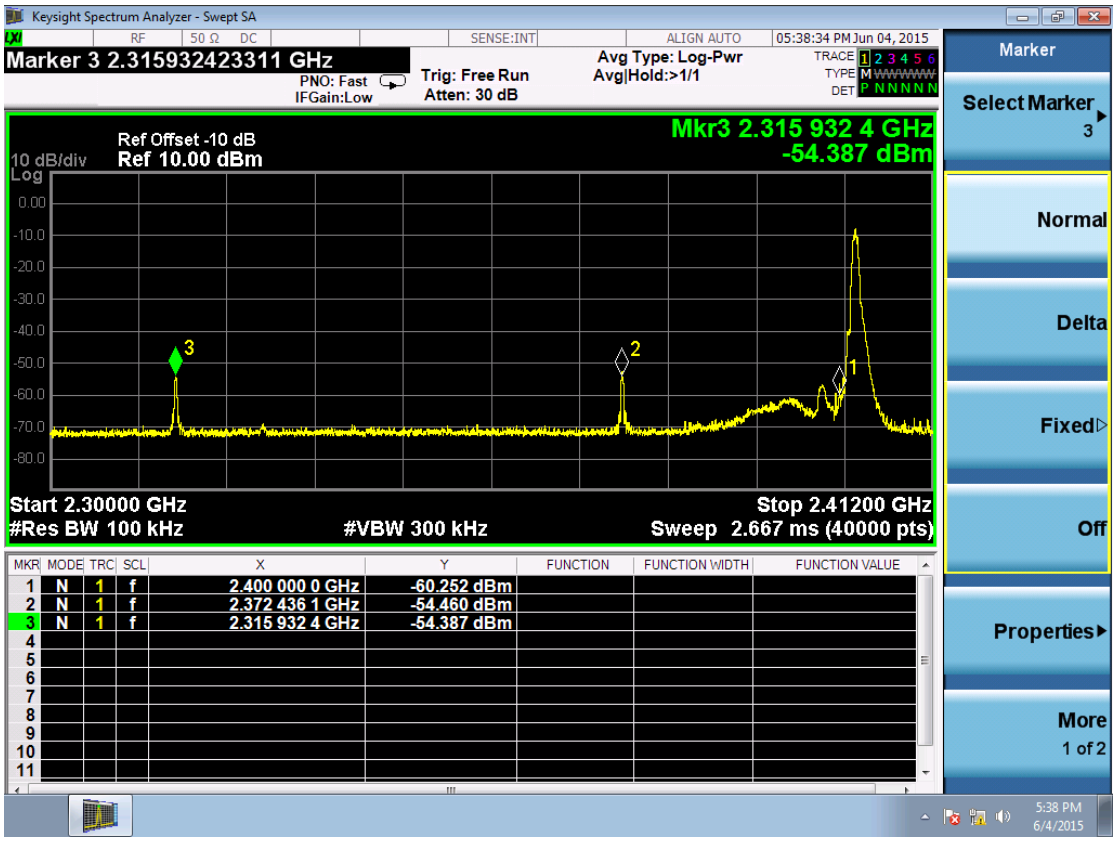
a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

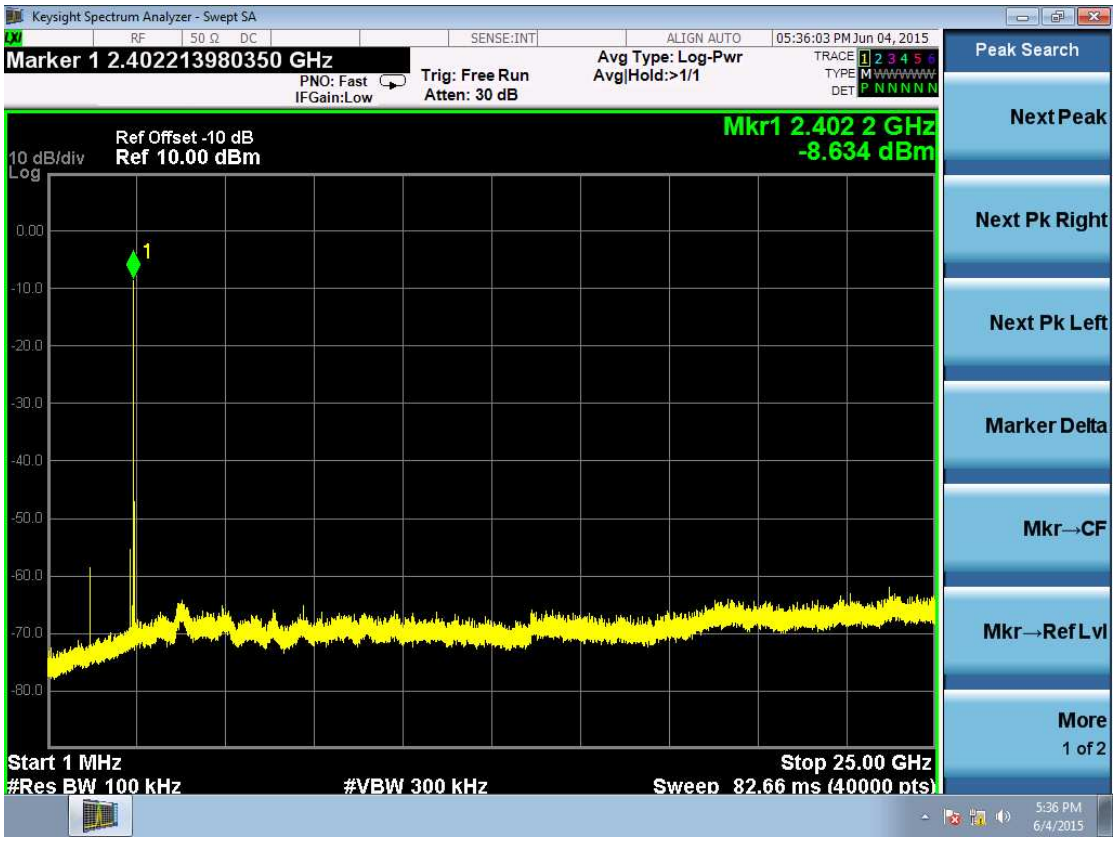
7.4 Test protocol

Mode	CH	Out of band Emission (dB)	Limit (dB)
Operating	L	>20	≥20
	M	>20	
	H	>20	

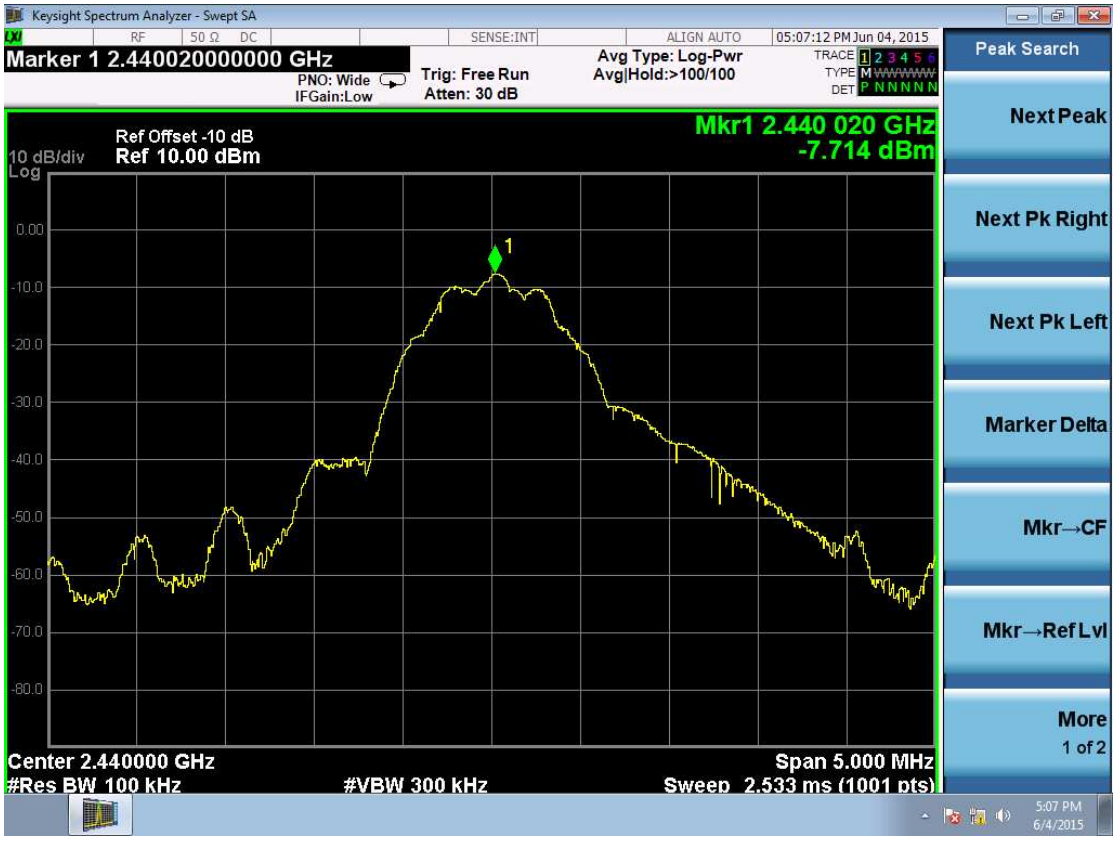
Channel L

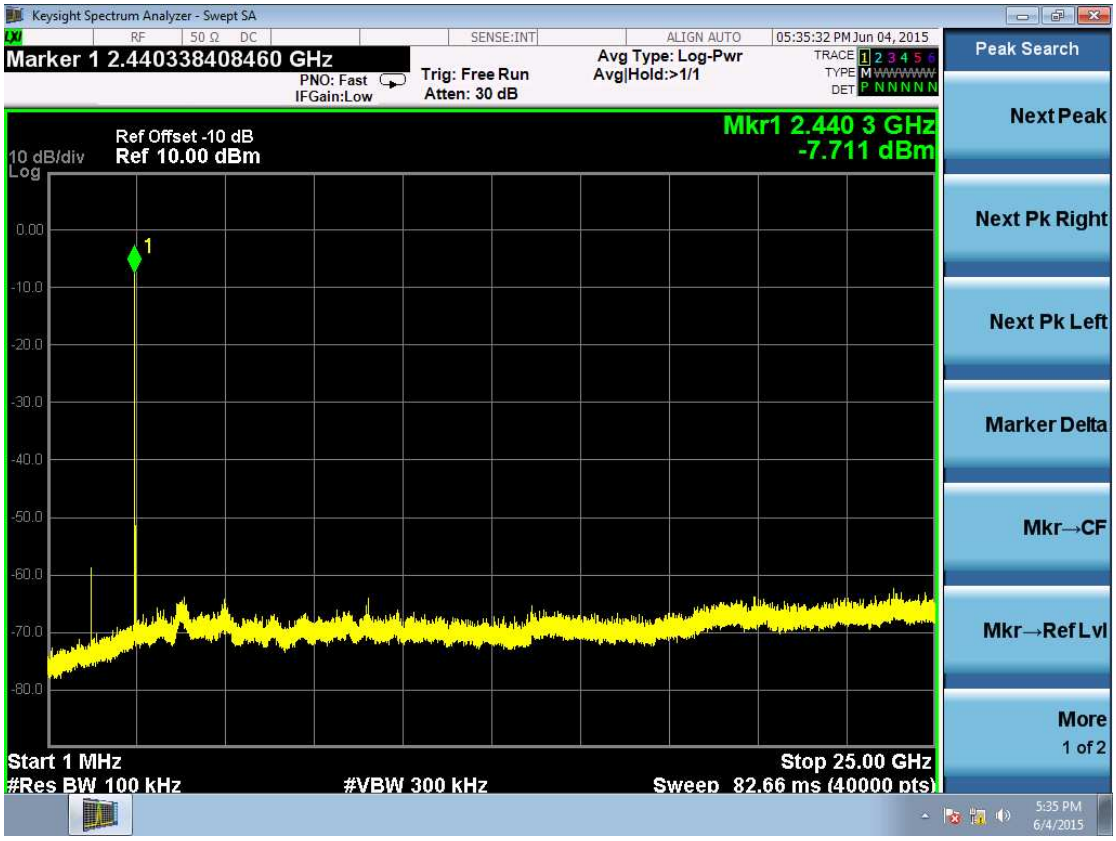



Keysight Spectrum Analyzer - Swept SA
Marker 3 2.315932423311 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
05:38:34 PM Jun 04, 2015
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr3 2.315 932 4 GHz
-54.387 dBm
Start 2.30000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.41200 GHz
Sweep 2.667 ms (40000 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.400 000 0 GHz -60.252 dBm
2 N 1 f 2.372 436 1 GHz -54.460 dBm
3 N 1 f 2.315 932 4 GHz -54.387 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More 1 of 2

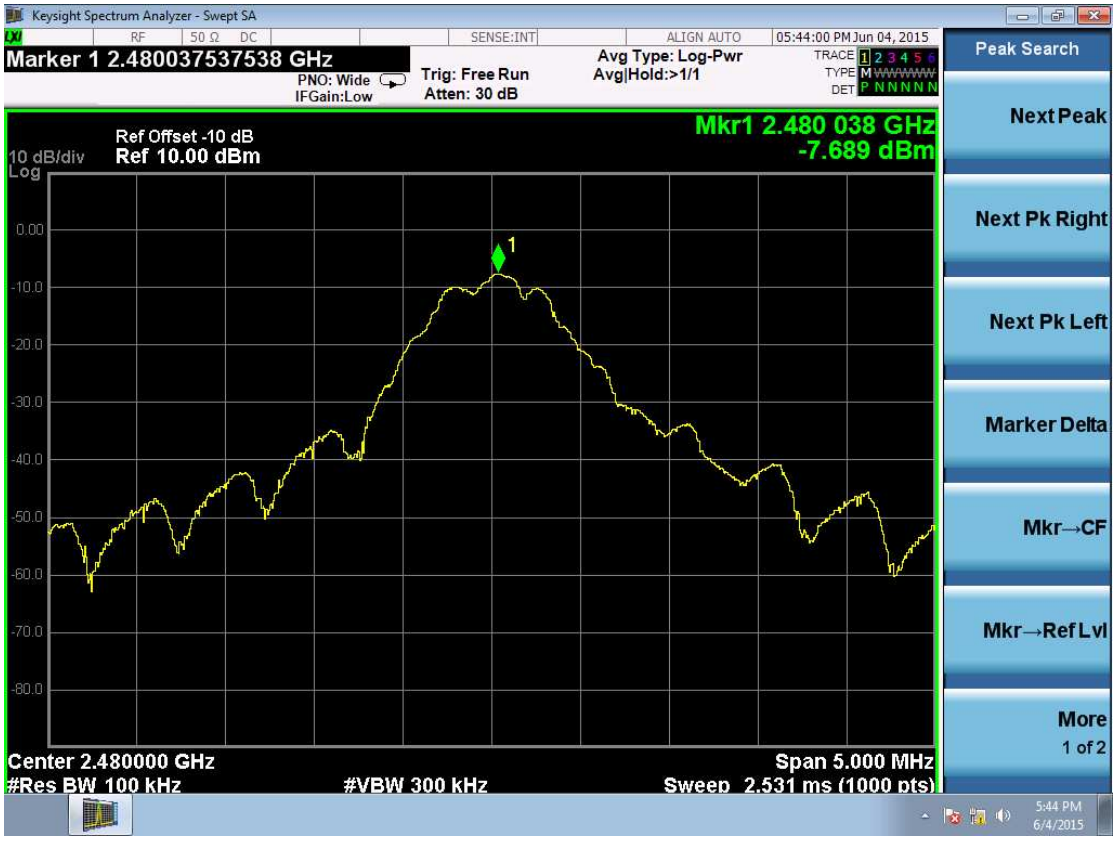

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.402213980350 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
05:36:03 PM Jun 04, 2015
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 2.402 2 GHz
-8.634 dBm
Start 1 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 82.66 ms (40000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More 1 of 2

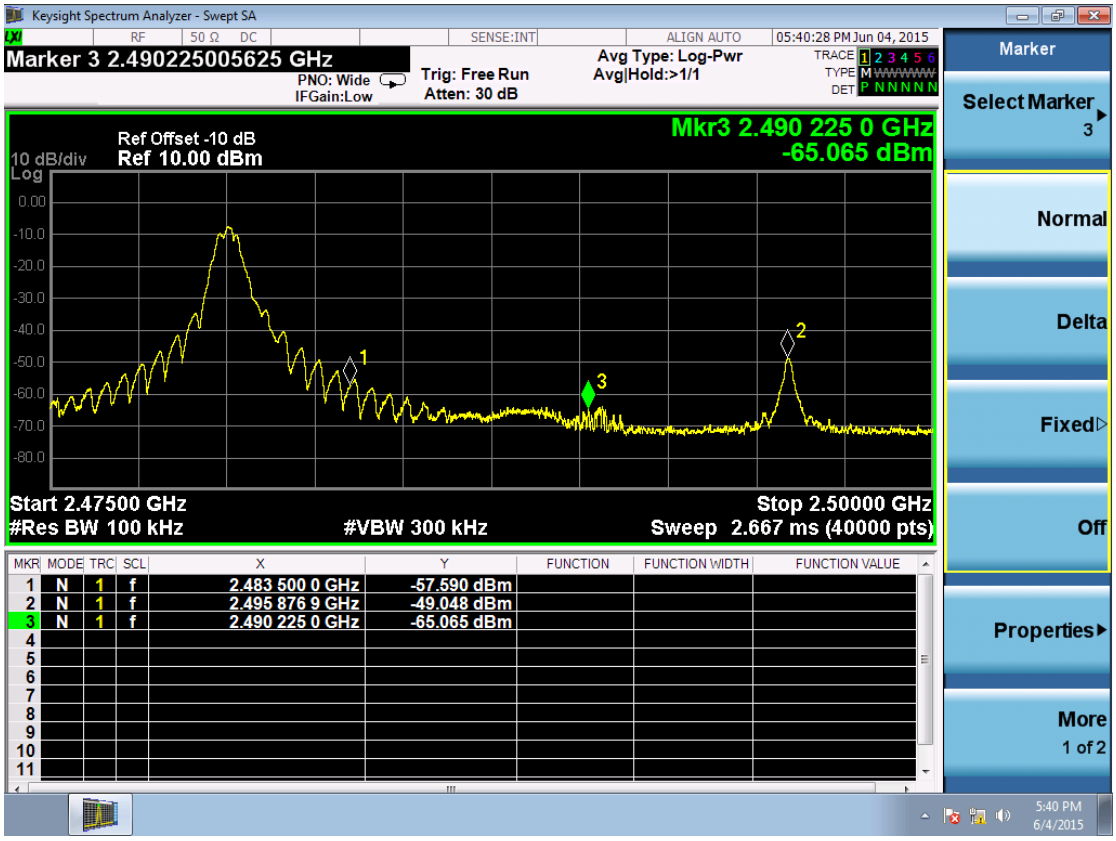
Channel M

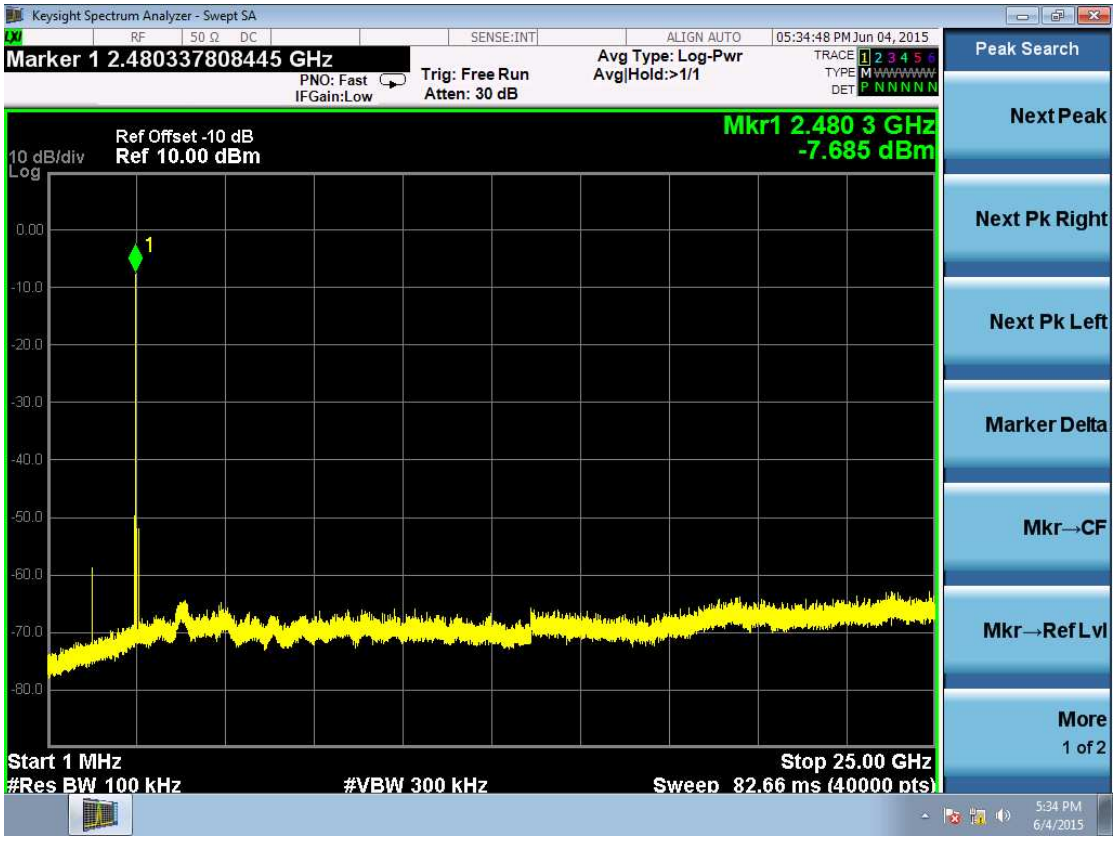

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.440020000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
05:07:12 PM Jun 04, 2015
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Mkr1 2.440 020 GHz
-7.714 dBm
Center 2.440000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5.000 MHz
Sweep 2.533 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.440338408460 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
05:35:32 PM Jun 04, 2015
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Mkr1 2.440 3 GHz
-7.711 dBm
Start 1 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 82.66 ms (40000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

Channel H


Keysight Spectrum Analyzer - Swept SA
Marker 1 2.480037537538 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
05:44:00 PM Jun 04, 2015
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Mkr1 2.480 038 GHz
-7.689 dBm
Center 2.480000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 5.000 MHz
Sweep 2.531 ms (1000 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Keysight Spectrum Analyzer - Swept SA
Marker 3 2.490225005625 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
05:40:28 PM Jun 04, 2015
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Mkr3 2.490 225 0 GHz
-65.065 dBm
Start 2.47500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.667 ms (40000 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.483 500 0 GHz -57.590 dBm
2 N 1 f 2.495 876 9 GHz -49.048 dBm
3 N 1 f 2.490 225 0 GHz -65.065 dBm
Marker
Select Marker 3
Normal
Delta
Fixed
Off
Properties
More
1 of 2


Keysight Spectrum Analyzer - Swept SA
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
05:34:48 PM Jun 04, 2015
Marker 1 2.480337808445 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold:>1/1
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Ref Offset -10 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 2.480 3 GHz
-7.685 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
1
Start 1 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 82.66 ms (40000 pts)
5:34 PM
6/4/2015

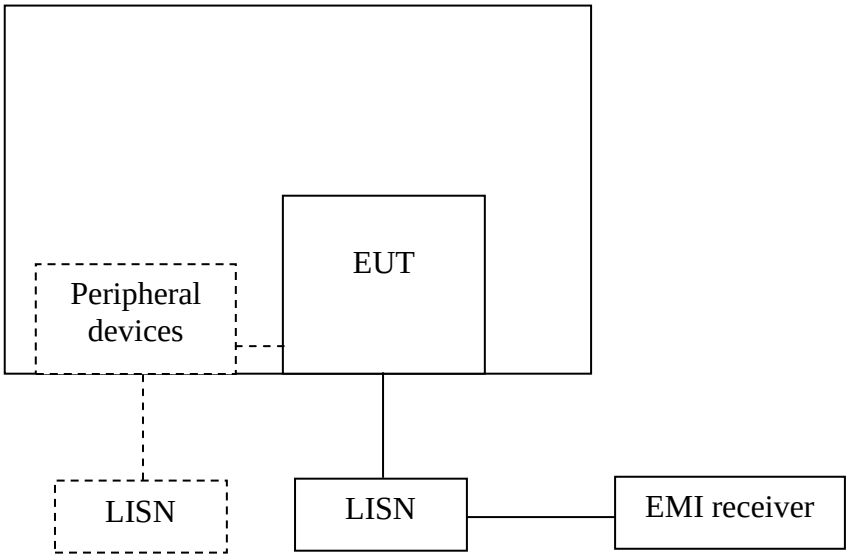
8. Power line conducted emission

Test result: **NA**

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

8.2 Test configuration



☐ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

8.3 Test procedure and test set up

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50Ω/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω/50uH coupling impedance with 50Ω termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
The bandwidth of the test receiver is set at 9 kHz.

8.4 Test protocol

Frequency	Correct Factor (dB)	Corrected Reading (dBuV)		Limit (dBuV)		Margin (dB)	
		QP	AV	QP	AV	QP	AV
0.15 (L)	-	-	-	-	-	-	-
0.34 (N)	-	-	-	-	-	-	-
0.40 (N)	-	-	-	-	-	-	-
0.72 (N)	-	-	-	-	-	-	-
1.64 (N)	-	-	-	-	-	-	-
3.74 (L)	-	-	-	-	-	-	-
Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB). 2. Margin (dB) = Limit - Corrected Reading.							

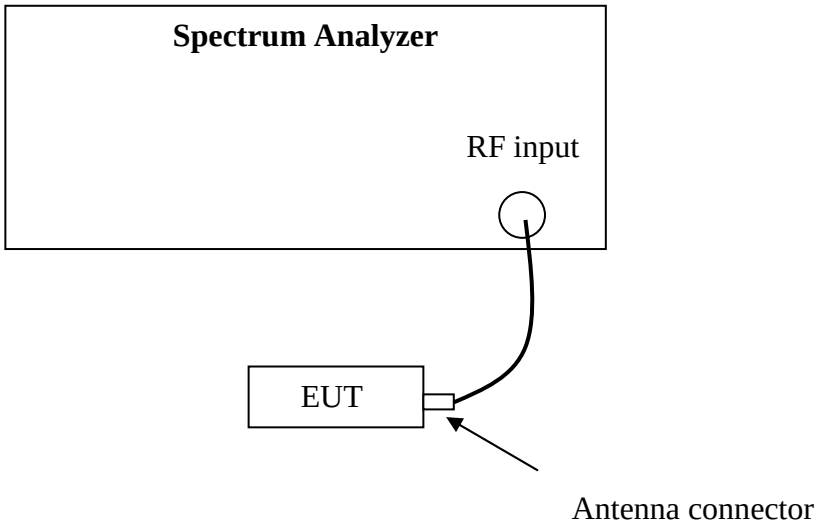
9. Occupied Bandwidth

Test Status: Tested

9.1 Test limit

None

9.2 Test Configuration



9.3 Test procedure and test setup

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

9.4 Test protocol

Temperature : 25 °C
Relative Humidity : 55 %

Mode	CH	99% Bandwidth (MHz)
Operating	L	1.01
	M	1.01
	H	1.03

Channel L

Channel M

Channel H