EMC TEST REPORT
No. 150601278SHA-001

Applicant	:	Yanzi Networks AB Isafjordgatan 32C, 16440 Kista Sweden
Manufacturer	:	Shanghai Pinyuan Info. Co., Ltd. 1007 No.9, No.970 Dalian Road, Shanghai 200082, China
Product Name	:	IoT Dongle
Type/Model	:	IOT-U10
TEST RESULT	**:**	**PASS**

SUMMARY

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

47CFR Part 15 (2014): Radio Frequency Devices (Subpart C)

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

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

RSS-Gen Issue 4 (December 2014): General Requirements for Compliance of Radio Apparatus

Date of issue: July 20, 2015

Prepared by: Reviewed by:

Nemo Li (*Project Engineer*) Daniel Zhao (*Reviewer*)

Description of Test Facility

Name: Intertek Testing Service Limited Shanghai
Address: Building No.86, 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

FCC Registration Number: 236597
IC Assigned Code: 2402B-1

Name of contact: Jonny Jing
Tel: 86 21 61278271
Fax: 86 21 54262353

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1 GENERAL INFORMATION

1.1 Description of Client

Applicant	:	Yanzi Networks AB Isafjordgatan 32C, 16440 Kista Sweden
Name of contact	:	Stefan Sandhagen
Tel	:	+46 8 559 21 440
Fax	:	--
Email	:	stefan@yanzi.se
Manufacturer	:	Shanghai Pinyuan Info. Co., Ltd. 1007 No.9, No.970 Dalian Road, Shanghai 200082, China

1.2 Identification of the EUT

Product Name	:	IoT Dongle
Type/model	:	IOT-U10
FCC ID	:	2AE7LIOT-U10
IC	:	20363-IOTU10

1.3 Technical Specification

Operation Frequency Band	:	2400~2483.5 MHz;
Type of Modulation	:	O-QPSK
EUT Modes of Modulation	:	IEEE 802.15.4
Channel Number	:	16 channels
Description of EUT	:	This EUT is an IoT-dongle which is designed for indoor use only.
Port identification	:	USB port
Antenna	:	Chip antenna, -0.5dBi
Rating	:	USB 5Vdc
Declared Temperature range	:	0℃ ~ 50℃
Category of EUT	:	Class B
EUT type	:	☒ Table top ☐ Floor standing
Sample received date	:	2015.6.18
Sample Identification No	:	--
Date of test	:	2015.6.18 – 2015.7.5

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2014)
RSS-247 Issue 1 (May 2015)
RSS-Gen Issue 4 (December 2014)
ANSI C63.10 (2013)
KDB 558074 (v03r03)

2.2 Mode of operation during the test

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

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	HP ProBook 6470b	100-240V AC, 50/60Hz

2.5 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	2014-12-29	2015-12-28
Spectrum Analyzer	N9010	Agilent	EC4890	2014-10-21	2015-10-20
Spectrum Analyzer	E4446	Agilent	/	2014-10-21	2015-10-20
Power meter	ML 2495A	Anritsu	EC 4895	2014-10-21	2015-10-20
A.M.N.	ESH2-Z5	R&S	EC 3119	2015-1-9	2016-1-8
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2015-5-15	2016-5-14
Horn antenna	HF 906	R&S	EC 3049	2015-5-12	2016-5-11
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2015-4-11	2016-4-10
Pre-amplifier	Tpa0118-40	R&S	EC 4792-2	2015-4-11	2016-4-10
Log-period antenna	AT 1080	AR	EC 3044-7	2015-5-21	2016-5-20
Biconical antenna	3109PX	ETS	EC3564	2014-8-25	2015-8-24
Semi-anechoic chamber	-	Albatross project	EC 3048	2015-5-20	2016-5-19
Shielded room	-	Zhongyu	EC 2838	2015-1-12	2016-1-11
Shielded room	-	Zhongyu	EC 2839	2015-1-12	2016-1-11
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2015-2-1	2016-1-31
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2015-2-1	2016-1-31
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2015-2-1	2016-1-31
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2015-2-1	2016-1-31
MXG Analog Signal Generator	N5181A	KEYSIGHT	EC5338-2	2014-11-7	2015-11-6
MXG Vector Signal Generator	N51812B	KEYSIGHT	EC5175	2014-12-30	2015-12-29
Power sensor	U2021XA	KEYSIGHT	EC5338-1	2014-10-2	2015-10-1
PXA Signal Analyzer	N9030A	KEYSIGHT	EC5338	2014-11-18	2015-11-17

2.6 Test Summary

This report applies to tested sample only. The test results have been compared directly with the limits, and the measurement uncertainty is recorded. 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 & Occupied bandwidth	15.247(a)(2)	RSS-247 Issue 1 Annex 5.2	Pass
Maximum peak output power	15.247(b)	RSS-247 Issue 1 Annex 5.4	Pass
Power spectrum density	15.247(e)	RSS-247 Issue 1 Annex 5.2	Pass
Radiated emission	15.205 & 15.209	RSS-Gen Issue 4 Clause 8.9	Pass
Emission outside the frequency band	15.247(d)	RSS-247 Issue 1 Annex 5.5	Pass
Power line conducted emission	15.207	RSS-Gen Issue 4 Clause 8.8	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 6.6	Tested

Notes: 1: NA =Not Applicable

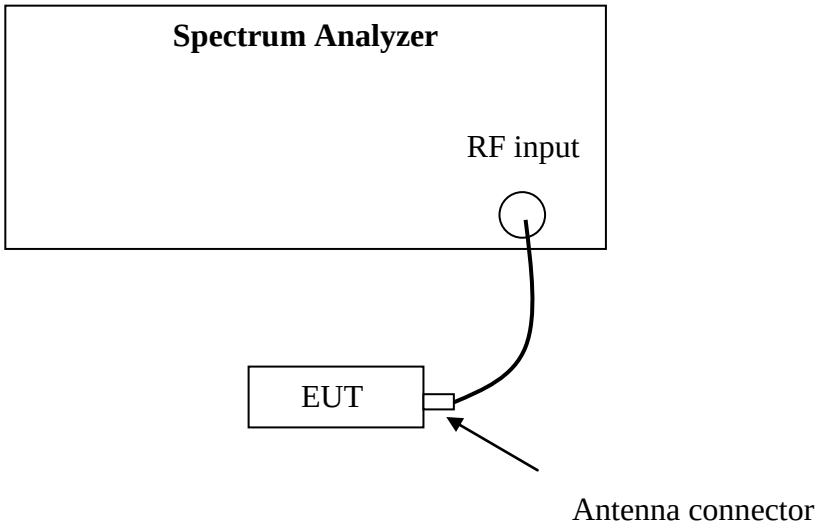
3 Minimum 6dB Bandwidth

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

The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements(clause 8.2).

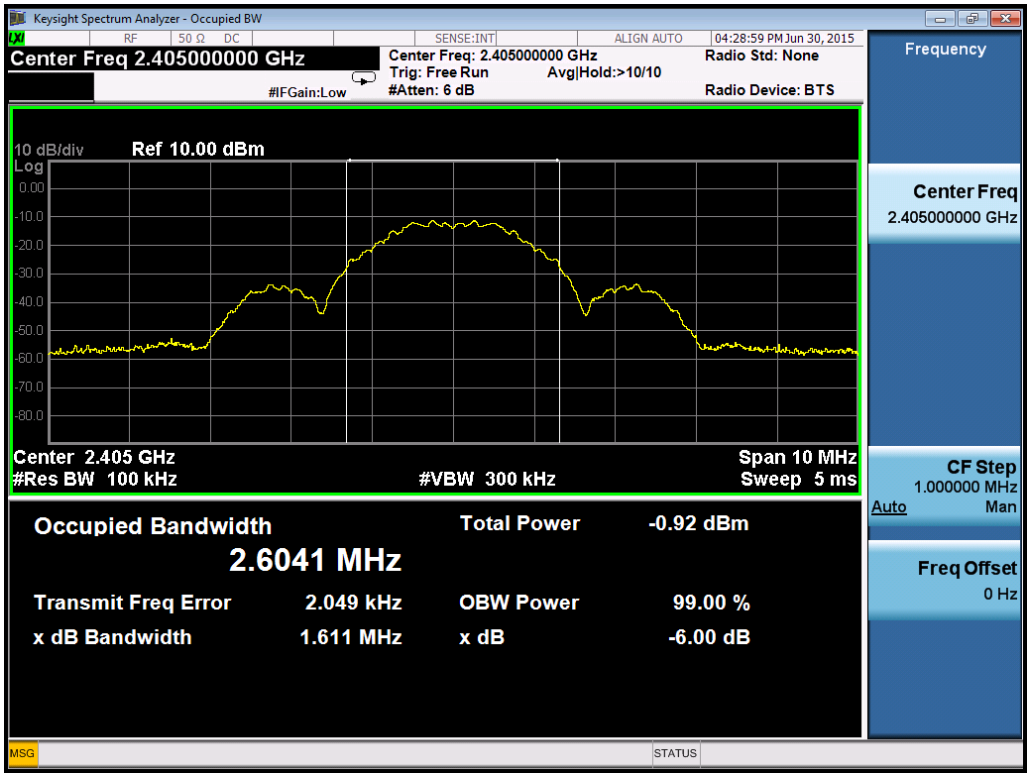
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points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

3.4 Test Protocol

Temperature: 24 °C
Relative Humidity: 52 %

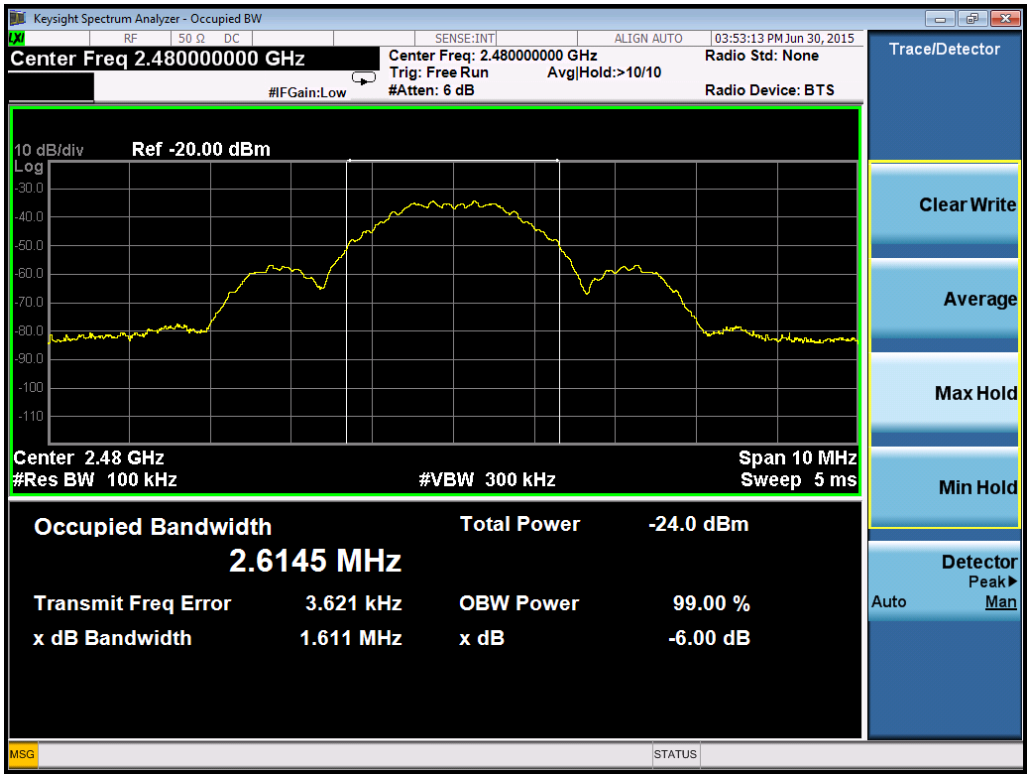
Mode	Frequency (MHz)	Minimum 6dB Bandwidth (MHz)			Limits (MHz)
		Port0	Port 1	Port 2	
-	2405	1.611	-	-	> 0.5
	2440	1.611	-	-	> 0.5
	2480	1.611	-	-	> 0.5

Channel L



Channel M

Channel H



4 Maximum Conducted Output power

Test result: Pass

4.1 Test limit

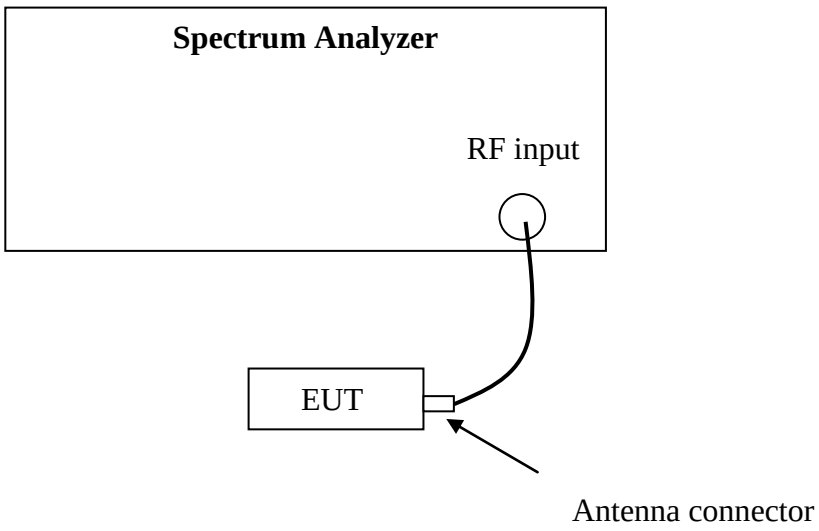
☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt

☐ 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 (EIRP: 4 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. If there have a beam forming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beam forming gain).

4.2 Test Configuration



4.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements (clause 9.1.2).

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth andshall utilize a fast-responding diode detector.

4.4 Test protocol

Temperature: 24 °C
Relative Humidity: 52 %

Mode	Frequency (MHz)	Reading (dBm)			Total Power (dBm)	Limit (dBm)
		Port0	Port 1	Port 2		
-	2405	-4.74	-	-	-4.74	30
	2440	-3.27	-	-	-3.27	30
	2480	-3.19	-	-	-3.19	30

The maximum EIRP of the EUT = -3.19dBm - 0.5dBi = -3.69dBm = 0.43mW which is lower than the EIRP limit of RSS-247.

Note:

Reading port x (mW) = 10 ^ (reading port x (dBm)/10
x = 0, 1, 2.
Total Power (mW) = reading port 0 (mW) + reading port 1 (mW) + reading port 2 (mW)
Total power (dBm) = 10 * log (Total power (mW))

5 Power spectrum density

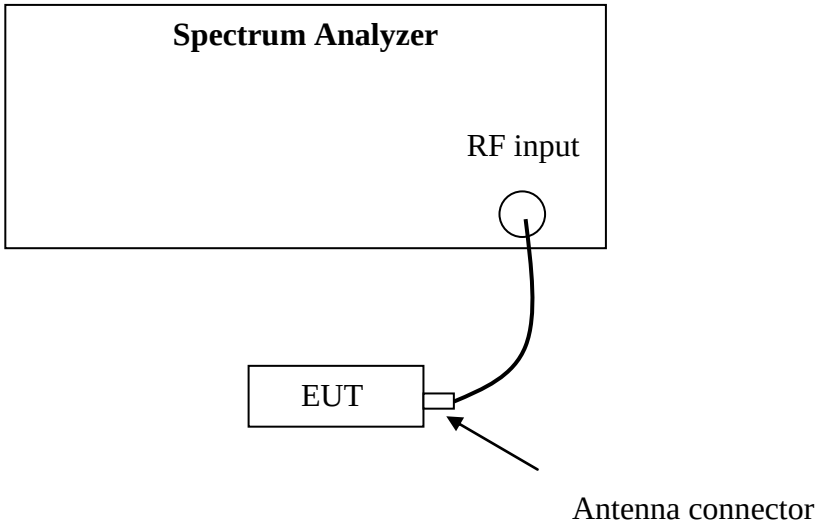
Test result: **Pass**

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.

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. If there have a beam forming type, the limit should be the minimum of 8dBm/MHz and 8+ (6 –antenna gain-beam forming gain).

5.2 Test Configuration



5.3 Test procedure and test setup

The power output per FCC §15.247(e) was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r02" (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.

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: 24 °C
Relative Humidity: 52 %

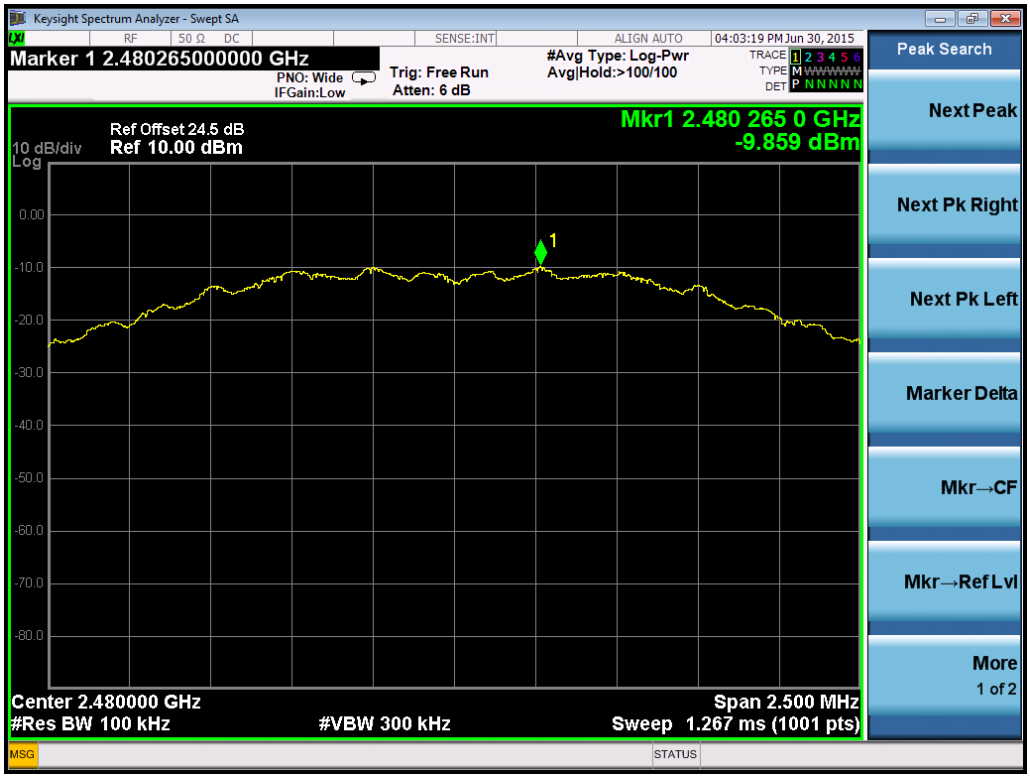
Mode	Frequency (MHz)	PSD (dBm)			Total PSD (dBm)	Limit (dBm)
		Port 0	Port 1	Port 2		
-	2405	-11.237	-	-	-11.237	8
	2440	-10.016	-	-	-10.016	8
	2480	-9.859	-	-	-9.859	8

Note 1:
PSD port x (mW) = 10 ^ (PSD port x (dBm)/10; x = 0, 1, 2.
Total PSD (mW) = PSD port 0 (mW) + PSD port 1 (mW) + PSD port 2 (mW)
Total PSD (dBm) = 10 * log (Total PSD (mW))

Channel L

Channel M

Channel H



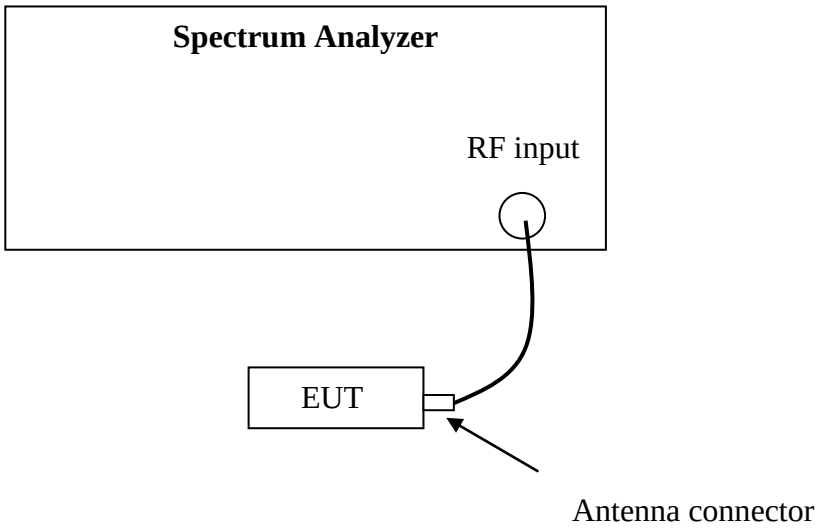
6 Emission outside the frequency band

Test result: **Pass**

6.1 Test limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

6.2 Test Configuration



6.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of "KDB558074 D01 DTS Meas Guidance v03r03" (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

Reference level measurement

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to ≥ 1.5 times the *DTS bandwidth*.
c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x 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 PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Emission level measurement
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.

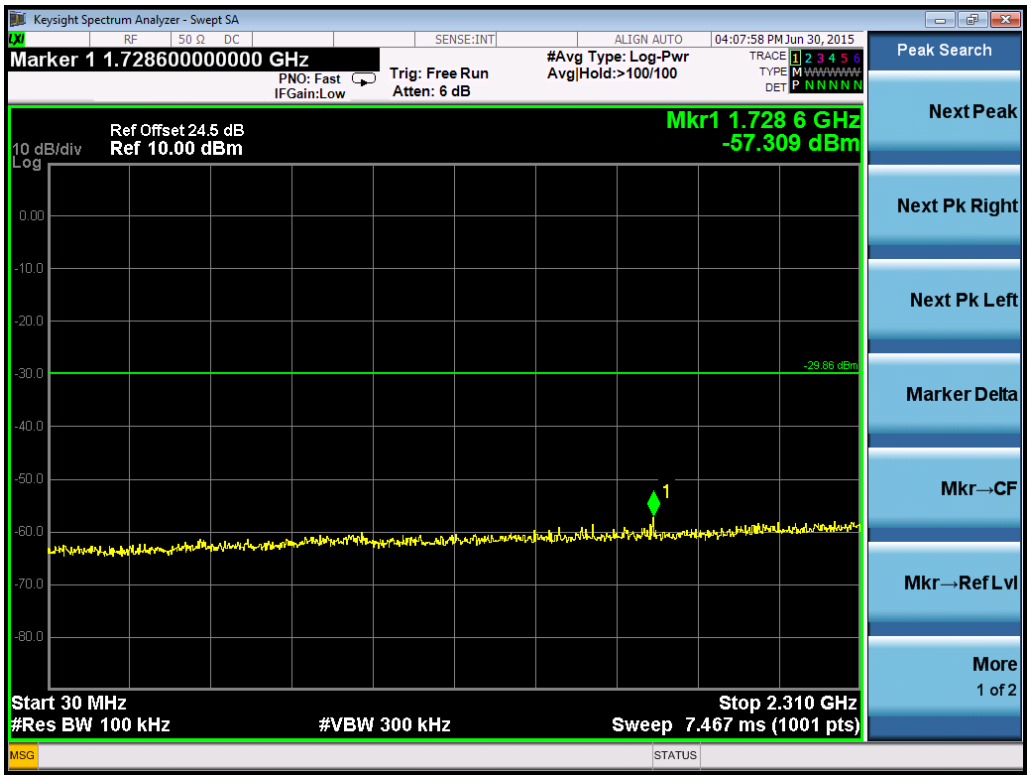
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

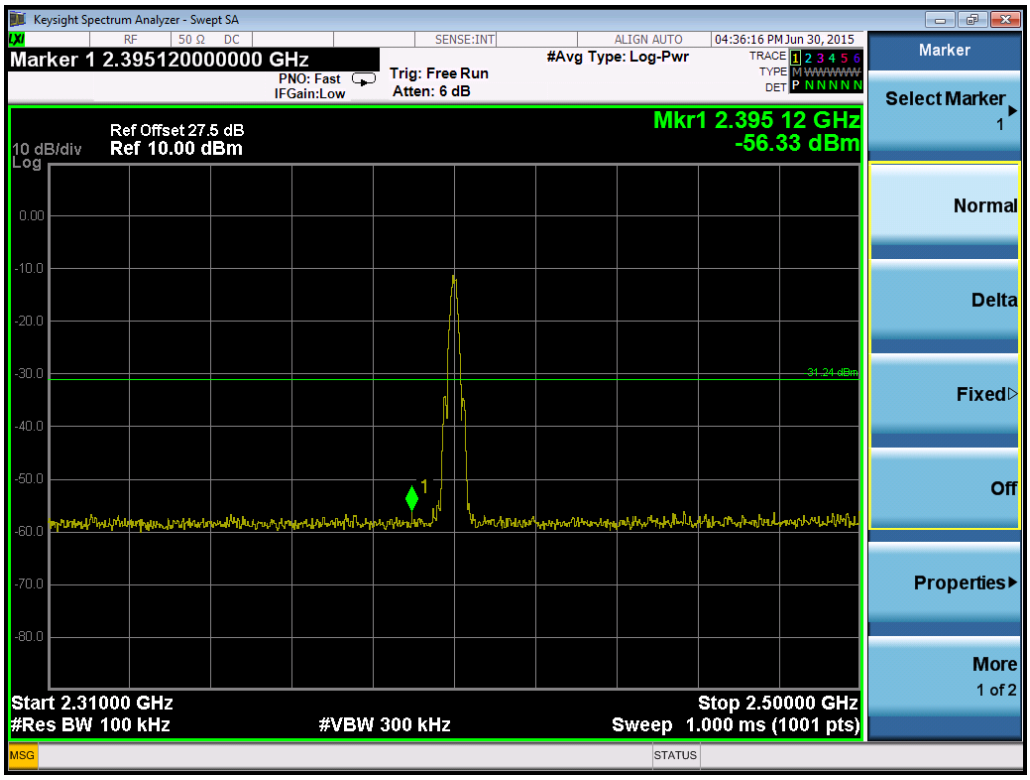
6.4 Test Protocol

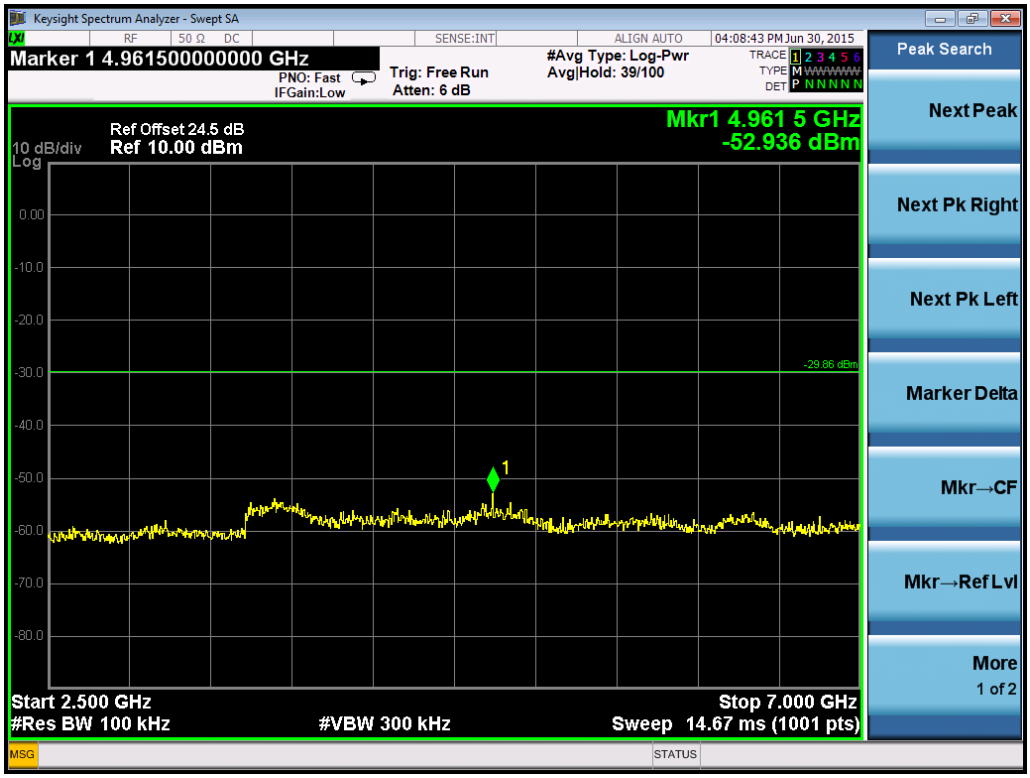
Temperature: 24 °C
Relative Humidity: 52 %

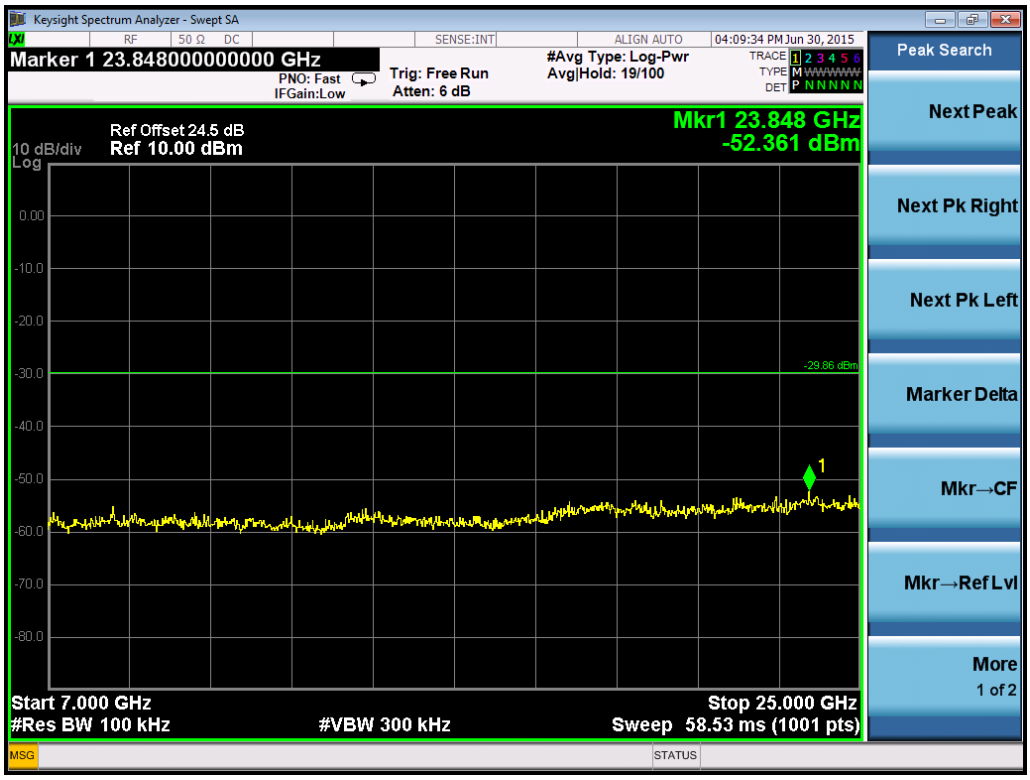
Mode	Frequency (MHz)	Results (dB)			Limits (dB)
		Port0	Port 1	Port 2	
-	2405	41.124	-	-	≥20
	2440	43.141	-	-	≥20
	2480	43.129	-	-	≥20
Note: Result = Max (PSD value - Reading value)					

Channel L

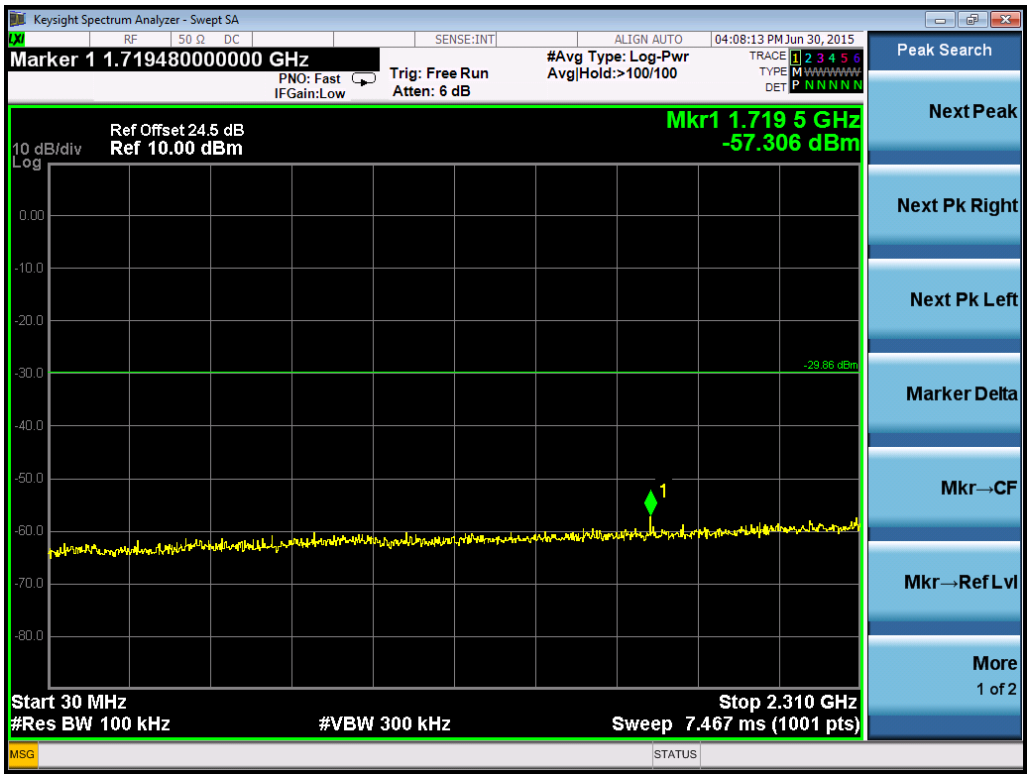


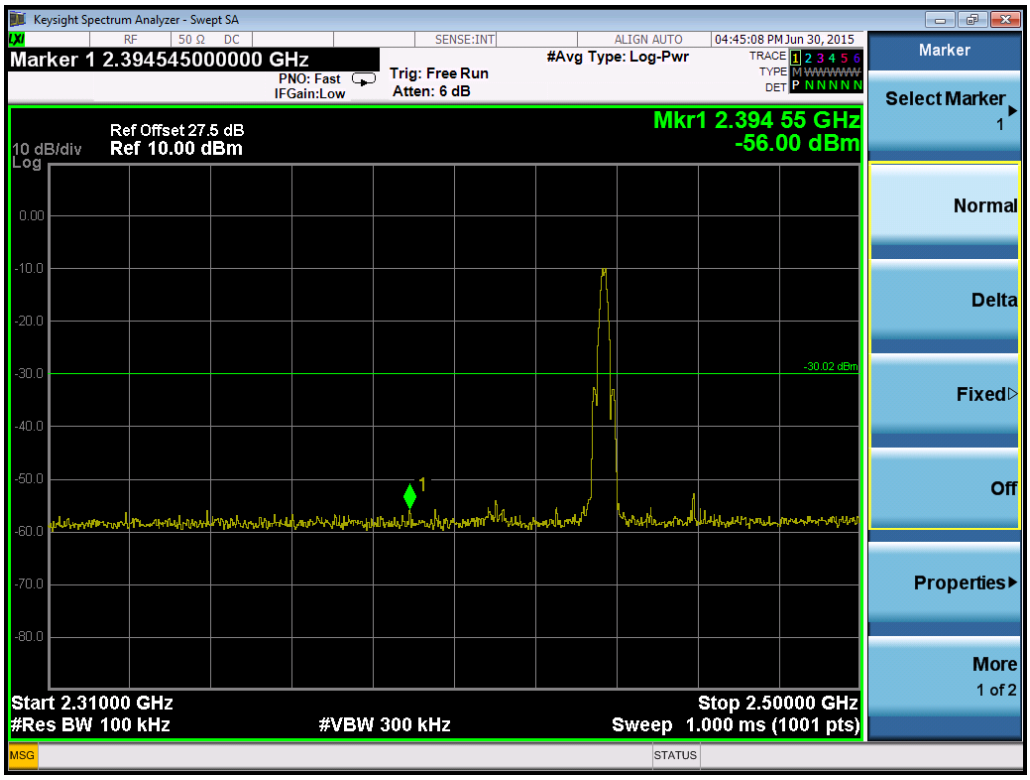

Keysight Spectrum Analyzer - Swept SA
Marker 1 2.395120000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
04:36:16 PM Jun 30, 2015
Ref Offset 27.5 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 2.395 12 GHz
-56.33 dBm
-31.24 dBm
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 1.000 ms (1001 pts)
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Marker 1 4.961500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold: 39/100
04:08:43 PM Jun 30, 2015
Ref Offset 24.5 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 4.961 5 GHz
-52.936 dBm
-29.86 dBm
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 14.67 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Marker 1 23.848000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold: 19/100
04:09:34 PM Jun 30, 2015
Ref Offset 24.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 23.848 GHz
-52.361 dBm
-29.86 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.53 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

Channel M

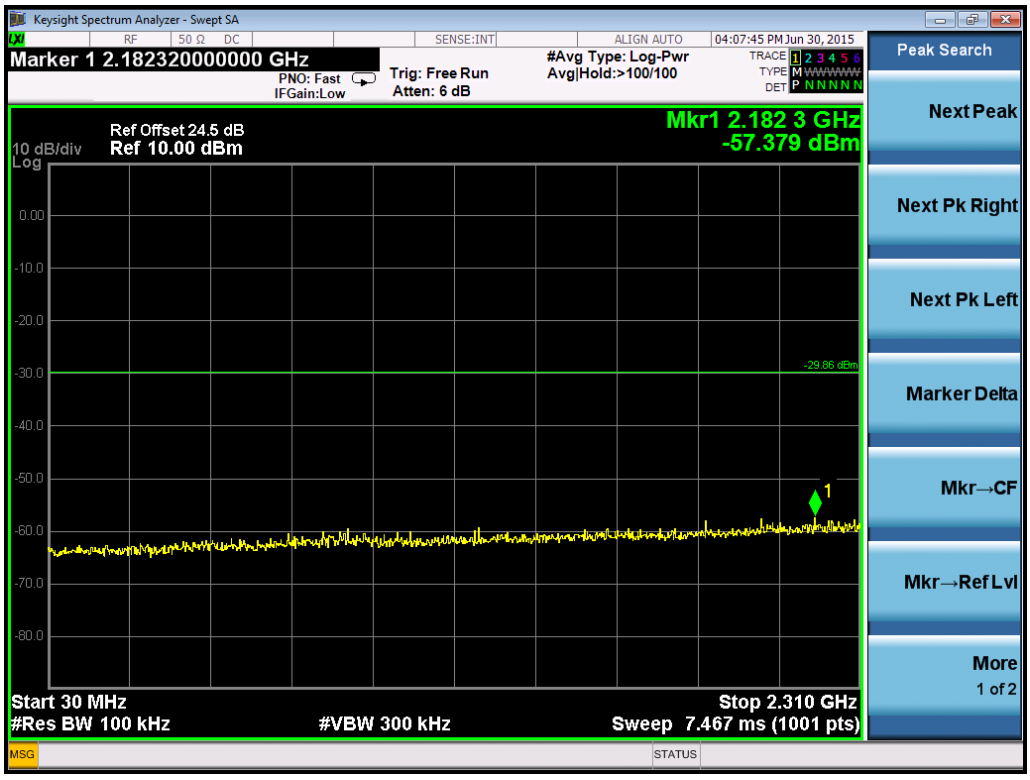

Keysight Spectrum Analyzer - Swept SA
Marker 1 1.719480000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold:>100/100
04:08:13 PM Jun 30, 2015
Ref Offset 24.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 1.719 5 GHz
-57.306 dBm
-29.86 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 7.467 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
MSG
STATUS

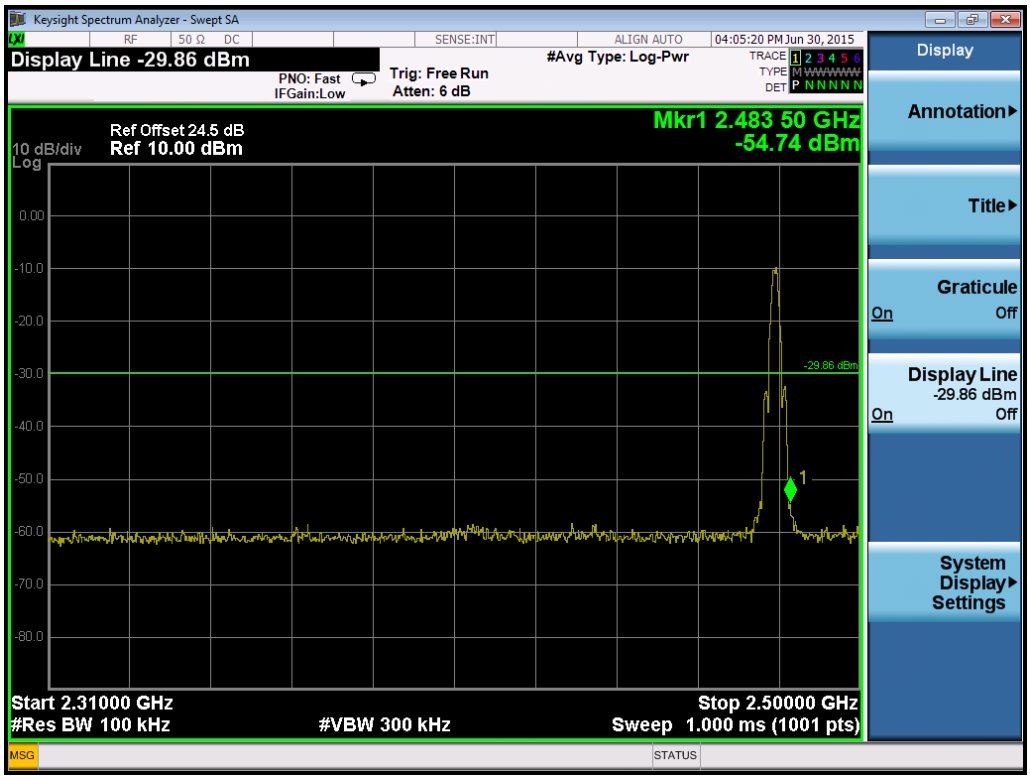

Keysight Spectrum Analyzer - Swept SA
RF 50 Ω DC
SENSE:INT
ALIGN AUTO
04:45:08 PM Jun 30, 2015
Marker 1 2.394545000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 27.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 2.394 55 GHz
-56.00 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-30.02 dBm
1
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS
Marker
Select Marker
1
Normal
Delta
Fixed
Off
Properties
More
1 of 2

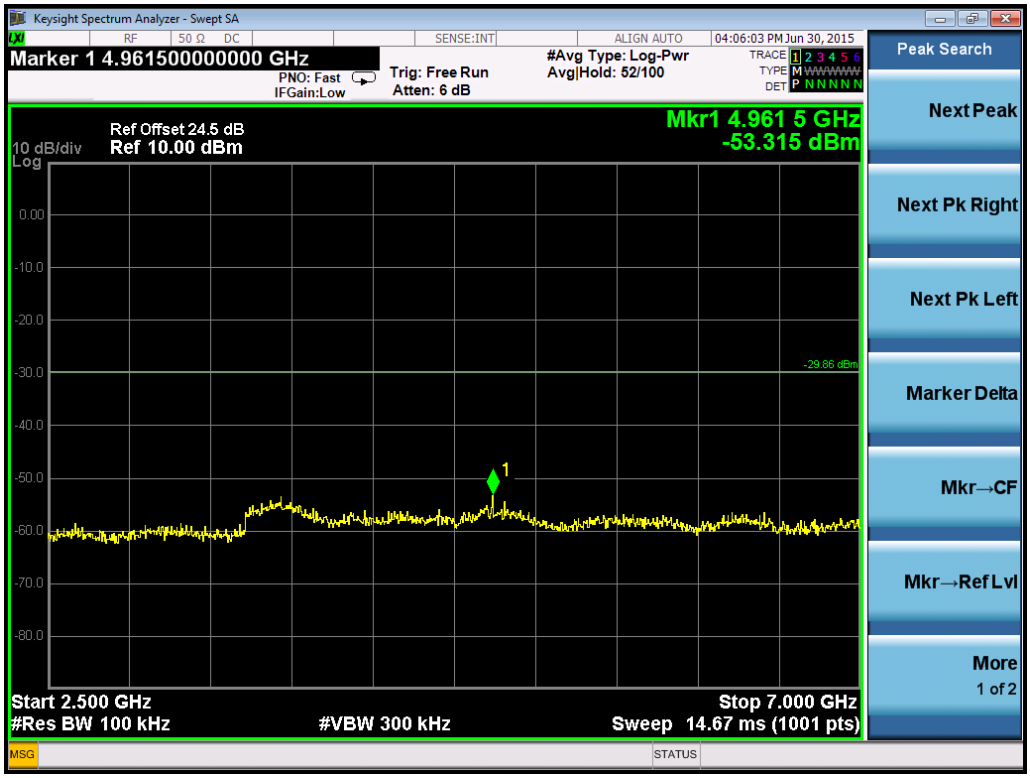

Keysight Spectrum Analyzer - Swept SA
RF 50 Ω DC
SENSE:INT
ALIGN AUTO
04:09:14 PM Jun 30, 2015
Marker 1 4.961500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold: 31/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 24.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 4.961 5 GHz
-54.032 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-29.86 dBm
1
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 14.67 ms (1001 pts)
MSG
STATUS
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2

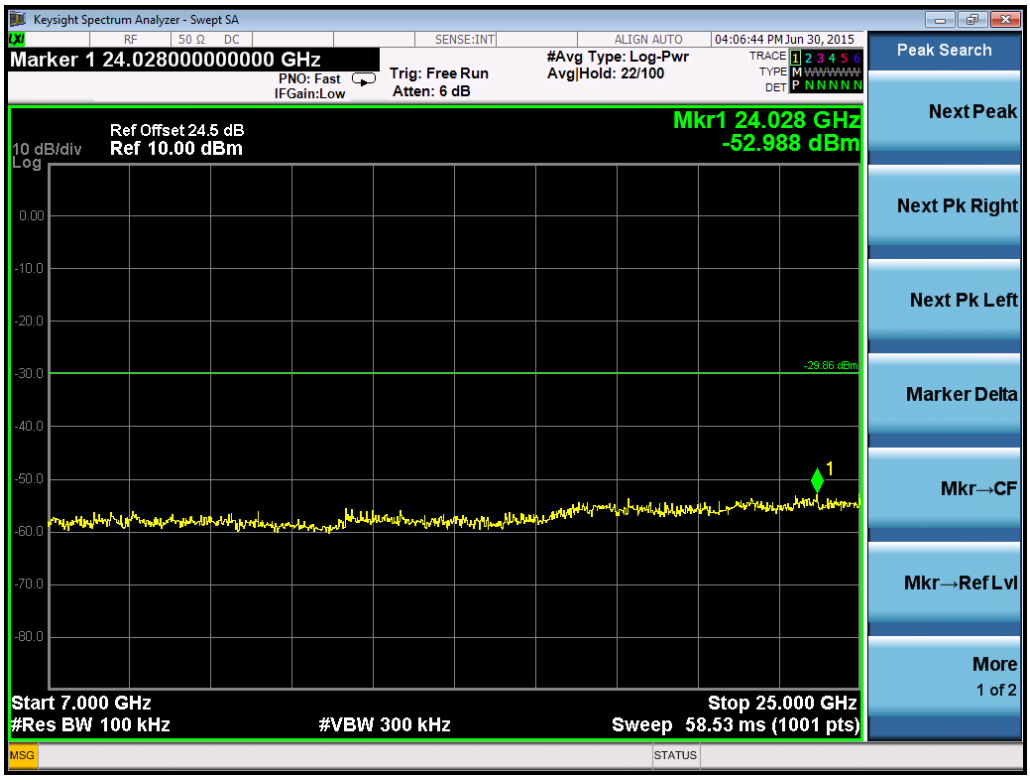

Keysight Spectrum Analyzer - Swept SA
Marker 1 19.924000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold: 16/100
04:09:45 PM Jun 30, 2015
Ref Offset 24.5 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 19.924 GHz
-53.157 dBm
-29.86 dBm
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.53 ms (1001 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 2.182320000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold:>100/100
04:07:45 PM Jun 30, 2015
Ref Offset 24.5 dB
10 dB/div
Ref 10.00 dBm
Log
Mkr1 2.182 3 GHz
-57.379 dBm
-29.86 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.310 GHz
Sweep 7.467 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
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:05:20 PM Jun 30, 2015
Display Line -29.86 dBm
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 24.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 2.483 50 GHz
-54.74 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-29.86 dBm
1
Start 2.31000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS
Display
Annotation
Title
Graticule
On Off
Display Line
-29.86 dBm
On Off
System
Display
Settings


Keysight Spectrum Analyzer - Swept SA
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:06:03 PM Jun 30, 2015
Marker 1 4.961500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold: 52/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Ref Offset 24.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 4.961 5 GHz
-53.315 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-29.86 dBm
1
Start 2.500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 7.000 GHz
Sweep 14.67 ms (1001 pts)
MSG
STATUS
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
RF
50 Ω DC
SENSE:INT
ALIGN AUTO
04:06:44 PM Jun 30, 2015
Marker 1 24.028000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
#Avg Type: Log-Pwr
Avg|Hold: 22/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Peak Search
Ref Offset 24.5 dB
10 dB/div
Log
Ref 10.00 dBm
Mkr1 24.028 GHz
-52.988 dBm
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0
-29.86 dBm
1
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2
Start 7.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.000 GHz
Sweep 58.53 ms (1001 pts)
MSG
STATUS

7 Radiated Emissions in restricted frequency bands

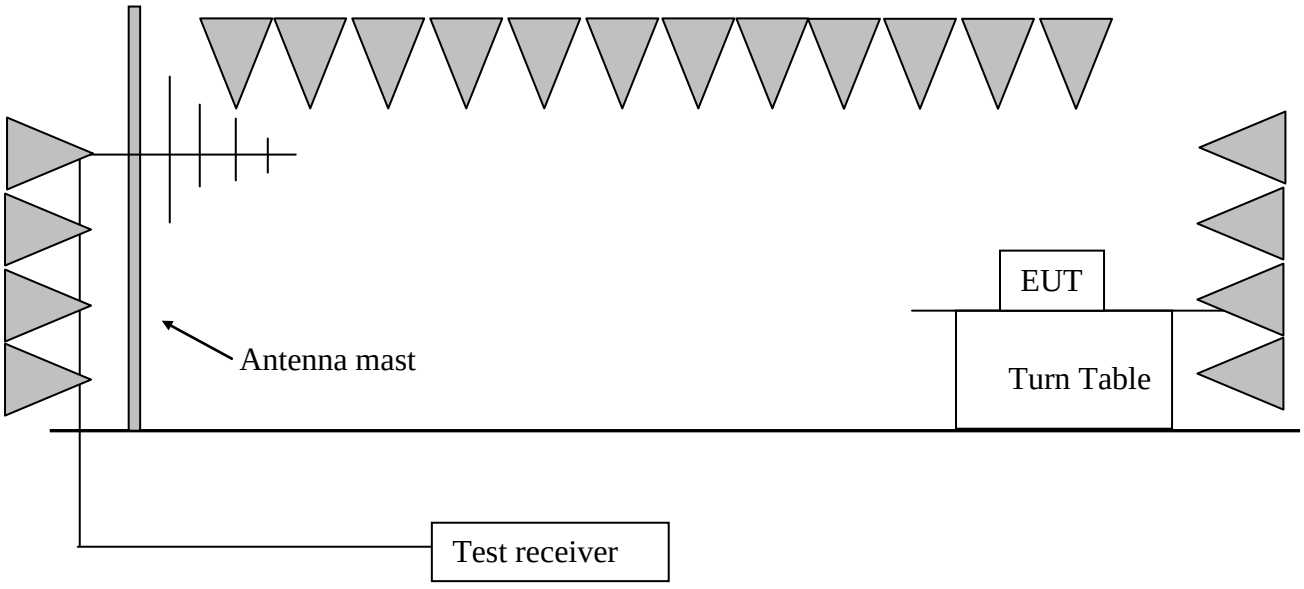
Test result: **Pass**

7.1 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:

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

7.2 Test Configuration



7.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m.

The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The EUT was tested according to DTS test procedure of KDB558074 D01 DTS "Meas Guidance v03r03" for compliance to FCC 47CFR 15.247 requirements.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 300 Hz, VBW = 1 kHz (9 kHz~150 kHz);
RBW = 10 kHz, VBW = 30 kHz (150 kHz~30MHz);
RBW = 100 kHz, VBW = 300 kHz (30MHz~1GHz for PK)
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);
RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

Remark:
1. Factor= Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Measured level= Original Receiver Reading + Factor
3. Margin = Limit – Measured level
4. If the PK measured level is lower than AV limit, the AV test can be elided.

Example:

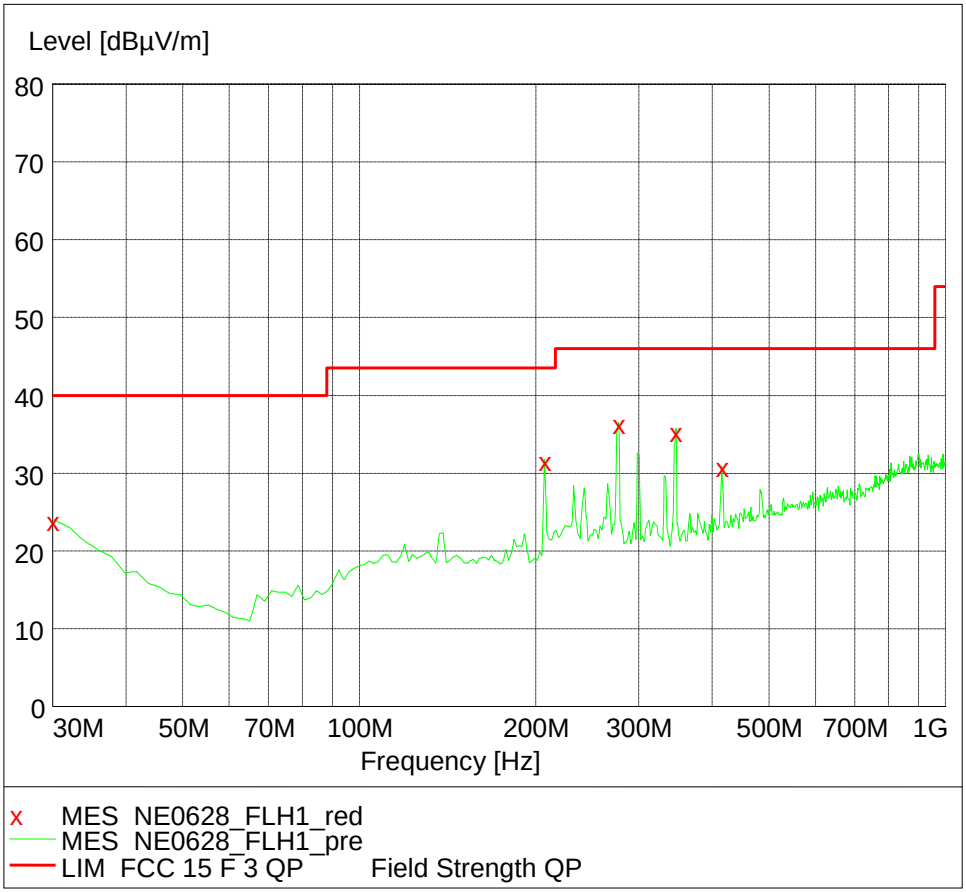
Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.
Then Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Measured level = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m,
Measured level = 10.20dBuV/m, then Margin = 54 - 10.20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

7.4 Test Protocol

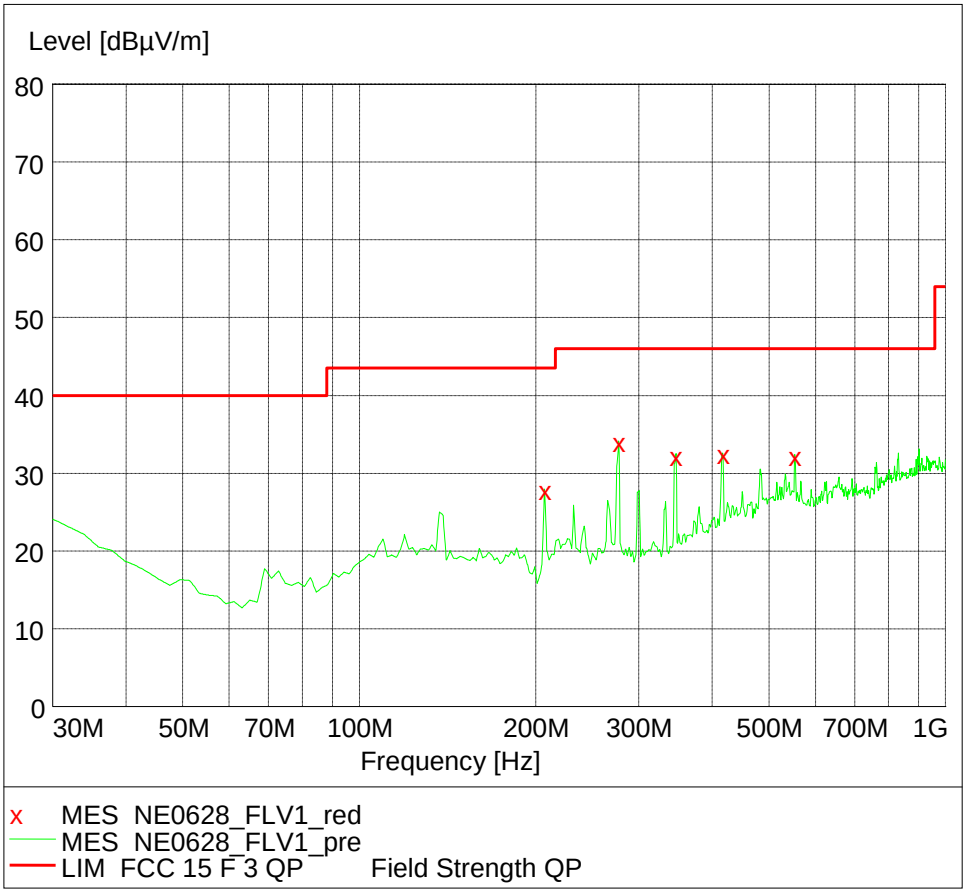
Temperature: 24 °C
Relative Humidity: 52 %

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

30MHz~1GHz, Horizontal



30MHz~1GHz, Vertical



Test data:

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2405.20	88.91	34.10	Fundamental	/	PK
	H	206.89	31.80	12.30	43.50	11.70	PK
	H	276.87	36.50	14.60	46.00	9.50	PK
	H	346.85	35.50	16.70	46.00	10.50	PK
	V	276.87	34.20	14.60	46.00	11.80	PK
	V	346.85	32.30	16.70	46.00	13.70	PK
	V	416.83	32.60	19.20	46.00	13.40	PK
	H	2386.50	51.46	34.20	74.00	22.54	PK
	H	4810.80	40.83	-3.60	74.00	33.17	PK
M	H	2440.35	87.96	34.20	Fundamental	/	PK
	H	206.89	31.80	12.30	43.50	11.70	PK
	H	276.87	36.50	14.60	46.00	9.50	PK
	H	346.85	35.50	16.70	46.00	10.50	PK
	V	276.87	34.20	14.60	46.00	11.80	PK
	V	346.85	32.30	16.70	46.00	13.70	PK
	V	416.83	32.60	19.20	46.00	13.40	PK
	H	4880.30	40.90	-3.50	74.00	33.10	PK
H	H	2480.05	90.03	34.50	Fundamental	/	PK
	H	206.89	31.80	12.30	43.50	11.70	PK
	H	276.87	36.50	14.60	46.00	9.50	PK
	H	346.85	35.50	16.70	46.00	10.50	PK
	V	276.87	34.20	14.60	46.00	11.80	PK
	V	346.85	32.30	16.70	46.00	13.70	PK
	V	416.83	32.60	19.20	46.00	13.40	PK
	H	2483.55	53.97	34.80	74.00	20.03	PK
	H	4960.25	40.50	-3.30	74.00	33.50	PK

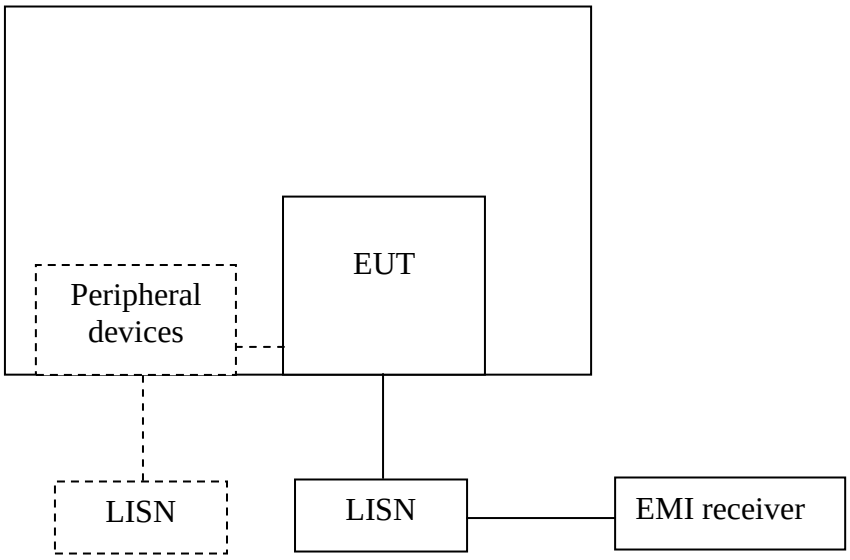
8 Power line conducted emission

Test result: **Pass**

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

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

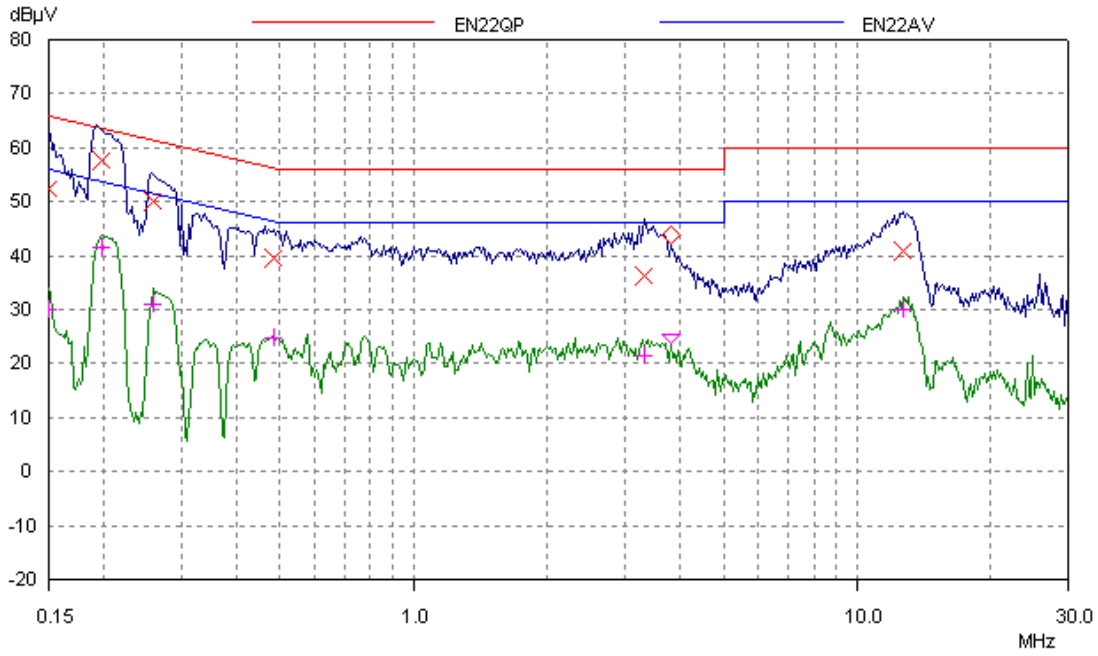
Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

8.4 Test protocol

Temperature: 24 °C
Relative Humidity: 52 %

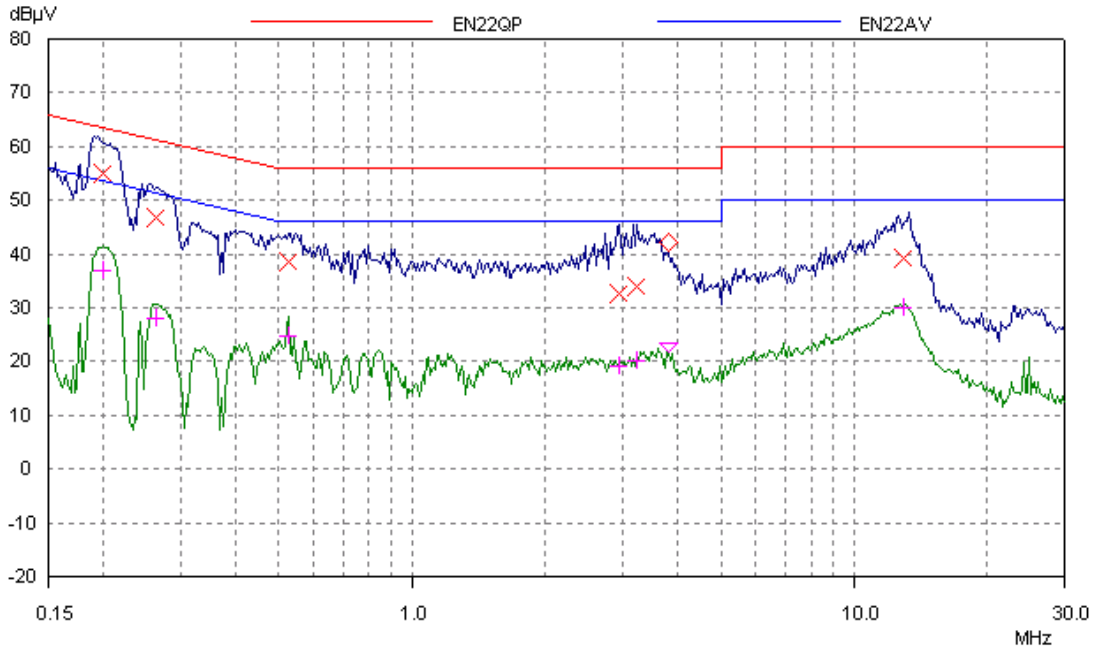
L line:



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(µV)	Limit dB(µV)	Margin (dB)	level dB(µV)	limit dB(µV)	Margin (dB)
0.150	52.22	66.00	13.78	*	56.00	*
0.198	57.68	63.71	6.03	41.47	53.71	12.24
0.256	39.93	61.56	11.63	*	51.56	*
0.483	39.50	56.29	16.79	*	46.29	*
3.309	36.25	56.00	19.75	*	46.00	*
12.655	40.79	60.00	19.21	30.11	50.00	19.89
Remark: If the margin higher than 20dB, it would be marked as *.						

N line:



Test Data:

Frequency (MHz)	Quasi-peak			Average		
	level dB(µV)	Limit dB(µV)	Margin (dB)	level dB(µV)	limit dB(µV)	Margin (dB)
0.198	54.89	63.68	8.79	36.78	53.68	16.90
0.262	46.94	61.36	14.42	28.06	51.36	23.30
0.523	38.54	56.00	17.46	24.88	46.00	21.12
2.936	32.58	56.00	23.42	19.14	46.00	26.86
3.205	33.97	56.00	22.03	20.28	46.00	25.72
12.961	39.27	60.00	20.73	30.06	50.00	19.94
Remark: If the margin higher than 20dB, it would be marked as *.						

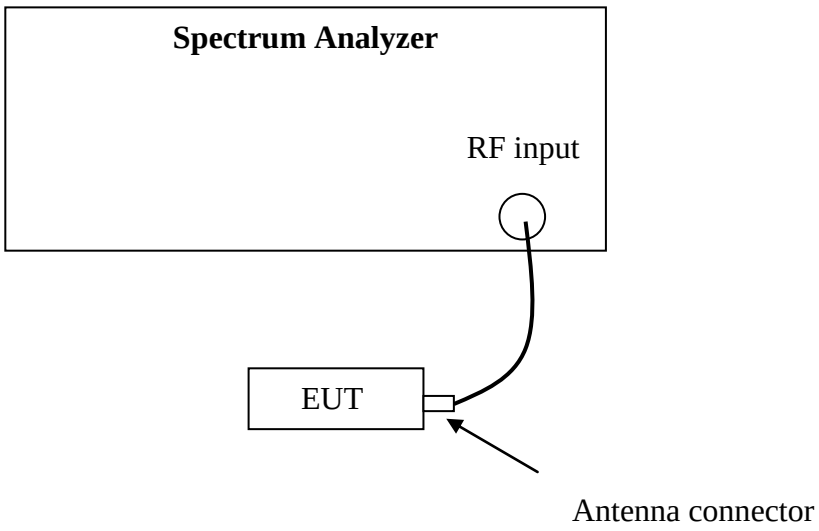
9 Occupied Bandwidth

Test Status: Tested

9.1 Test limit

None

9.2 Test Configuration



9.3 Test procedure and test setup

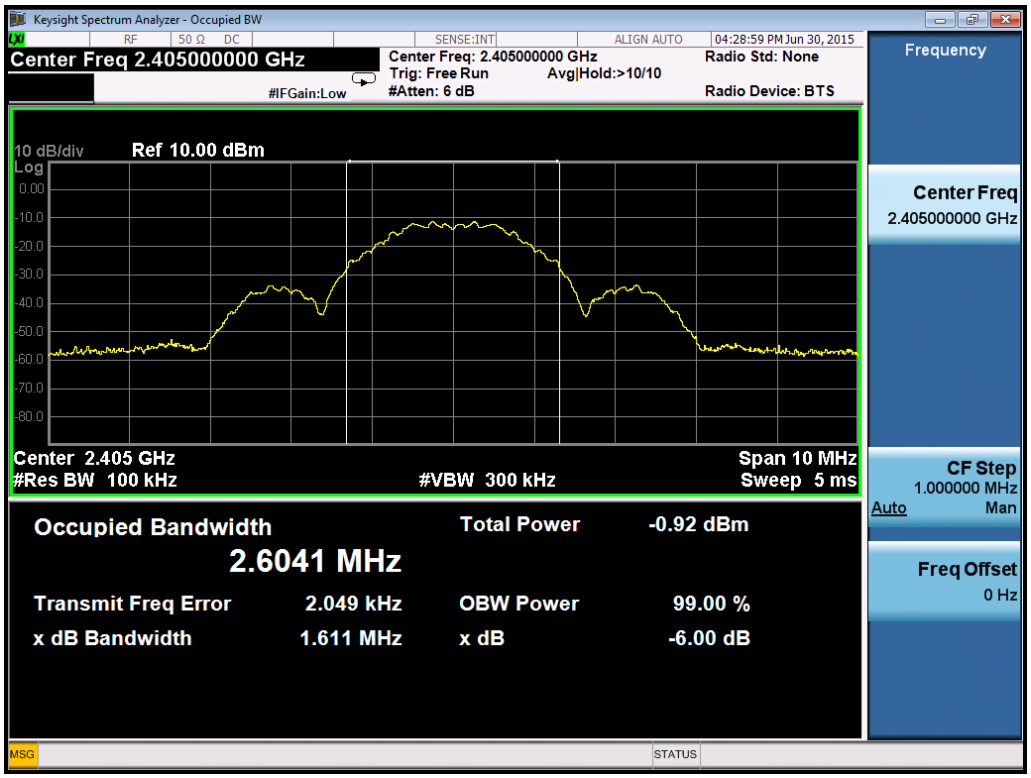
The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

9.4 Test protocol

Temperature : 24 °C
Relative Humidity : 52 %

Mode	Frequency (MHz)	99% Bandwidth (MHz)		
		Port0	Port 1	Port 2
-	2405	2.6041	-	-
	2440	2.6100	-	-
	2480	2.6145	-	-

Channel L



Channel M

Channel H