TEST REPORT

Product Name:	Mobile Phone
Trade Mark:	ACER
Model No.:	SOSPIRO-A60G
Add. Model No.:	SOSPIRO-A60S
Report Number:	211008003RFC-3
Test Standards:	FCC 47 CFR Part 15.247
FCC ID:	2AZYA-A60
Test Result:	PASS
Date of Issue:	Dec. 03, 2021

Prepared for:

Senwa Global International, S.A. de C.V.
Carretera Mexico-Toluca No. 5324 PB, Colonia El Yaqui Del.
Cuajimalpa de Morelos, C.P. 05320 Ciudad de Mexico

Prepared by:

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UnionTrust Laboratories UnionTrust *Carried*

Version

Version No.	Date	Description
V1.0	Dec. 03, 2021	Original Report

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1. GENERAL INFORMATION

1.1. CLIENT INFORMATION

Applicant:	Senwa Global International, S.A. de C.V.
Address of Applicant:	Carretera Mexico-Toluca No. 5324 PB, Colonia El Yaqui Del. Cuajimalpa de Morelos, C.P. 05320 Ciudad de Mexico
Manufacturer:	Senwa Mobile China Ltd
Address of Manufacturer:	A611, Languang technology building, No. 27, Gaoxin North 6th Road, songpingshan community, Xili street, Nanshan District, Shenzhen, Guangdong Province

1.2. EUT INFORMATION

1.2.1. General Description of EUT

Product Name:	Mobile Phone
Model No.:	SOSPIRO-A60G
Add. Model No.:	SOSPIRO-A60S (Note 1)
Trade Mark:	ACER
DUT Stage:	Identical Prototype
Power Supply (AC):	100-240 V~50/60 Hz, 0.2 A
Power Supply (DC):	5.0 V/1 A or USB Port
Power Supply (Battery):	3.8 Vdc
Software Version:	Acer_A60_Ver01
Hardware Version:	sp7731e_1h10
Sample Received Date:	October 8, 2021
Sample Tested Date:	October 11, 2021 to October 20, 2021
Note 1: SOSPIRO-A60S is the serial model of SOSPIRO-A60G, there is no any other different for these two models except color. The last letter of model indicated different color, G is for green, S is for silver.	

1.2.2. Description of Accessories

Adapter	
Model No.:	SGCH1000
Input:	100-240 V~50/60 Hz, 0.2 A
Output:	5.0 V/1 A
AC Cable:	N/A
DC Cable:	N/A

Battery	
Model No.:	SGBT3000
Battery Type:	Lithium-ion Rechargeable Battery
Rated Voltage:	3.8 Vdc
Limited Charge Voltage:	4.4 Vdc
Rated Capacity:	3000 mAh

Cable	
Model No.:	N/A
Description:	USB Micro-B Plug Cable
Cable Type:	Unshielded without ferrite
Length:	1 Meter

Earphone	
Model No.:	N/A
Cable Type:	Unshielded without ferrite
Length:	0.9 Meter

1.3. PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

EUT Supports technology of radio frequency	
Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Bluetooth Version:	Bluetooth V4.2
Bluetooth Mode:	Bluetooth LE
Type of Modulation:	GFSK
Number of Channels:	40
Channel Separation:	2 MHz
Maximum Peak Power:	-1.37 dBm
Antenna Type:	PIFA Antenna
Antenna Gain:	1.2 dBi
Normal Test Voltage:	3.8 Vdc
EUT Test software:	Test Mode: *#*#83781#*#*

1.4. GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Mobile Phone according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC 47 CFR Part 15.247

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

1.5. DESCRIPTION OF SUPPORT UNITS

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
--	--	--	--	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	SMA Cable	3.5mm SMA	0.15m	UnionTrust

1.6. TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.7. TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

Shenzhen UnionTrust Quality and Technology Co., Ltd.

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturers recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.8. DEVIATION FROM STANDARDS

None.

1.9. ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10. OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission	9 kHz to 150 kHz: ± 3.2 dB (AMN)
2		150 kHz to 30 MHz: ± 2.7 dB (AMN)
3	Radiated emission	9 kHz to 30 MHz: ± 4.7 dB (SAC)
4		30 MHz to 1 GHz: ± 4.6 dB (SAC)
5		1 GHz to 18 GHz: ± 4.4 dB (FAR)
6		18 GHz to 26 GHz: ± 4.6 dB (FAR)
7		26 GHz to 40 GHz: ± 4.6 dB (FAR)
8	Conducted Output Power	± 0.68 dB
9	6dB Bandwidth	± 1.86 %
10	Power Spectral Density	± 0.6 dB
11	Conducted Out of Band Emission	± 2.7 dB
12	Radio Frequency	± 6.5 x 10^{-8}

2. TEST SUMMARY

RF Measurement Requirements					
Test Item	**Test Standard**	**Test Requirement**	**Test Method**	**Limit**	**Result**
AC Power Line Conducted Emission	FCC 47 CFR Part 15.247	FCC Part 15.207	ANSI C63.10-2013, Clause 6.2	FCC Part 15.207	Pass
Conducted Peak Output Power	FCC 47 CFR Part 15.247	FCC Part 15.247 (b)(3)	ANSI C63.10-2013, Clause 11.9.1.3	FCC Part 15.247 (b)(3)	Pass
6dB Bandwidth	FCC 47 CFR Part 15.247	FCC Part 15.247 (a)(2)	ANSI C63.10-2013, Clause 11.8.1	FCC Part 15.247 (a)(2)	Pass
Power Spectral Density	FCC 47 CFR Part 15.247	FCC Part 15.247 (e)	ANSI C63.10-2013, Clause 11.10.2	FCC Part 15.247 (e)	Pass
Conducted Out of Band Emission	FCC 47 CFR Part 15.247	FCC Part 15.247(d)	ANSI C63.10-2013, Clause 11.11	FCC Part 15.247(d)	Pass
Radiated Emissions	FCC 47 CFR Part 15.247	FCC Part 15.205/15.209	ANSI C63.10-2013, Clause 11.11 & Clause 11.12	FCC Part 15.205/15.209	Pass
Band Edge Measurements (Radiated)	FCC 47 CFR Part 15.247	FCC Part 15.205/15.209	ANSI C63.10-2013, Clause 11.13	FCC Part 15.205/15.209	Pass
Duty Cycle	FCC 47 CFR Part 15.247	None; for reporting purposes only.	ANSI C63.10-2013, Clause 11.6	N/A	Pass

RF Evaluation Requirements					
Test Item	**Test Standard**	**Test Requirement**	**Test Method**	**Limit**	**Result**
Antenna Requirement	FCC 47 CFR Part 15.247	FCC Part 15.203/15.247 (b)(4)	N/A	FCC Part 15.203/15.247 (b)(4)	Pass

3. EQUIPMENT LIST

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Test Equipment of AC Power Line Conducted Emission					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm dd, yyyy)**	**Cal.Due Date (mm dd, yyyy)**
LISN Artifical Mains Network	ROHDE & SCHWARZ	ESH2-Z5	860014/024	18-Nov-2020	17-Nov-2021
Receiver	ROHDE & SCHWARZ	ESR7	101181	18-Nov-2020	17-Nov-2021
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	0357.8810.54	18-Nov-2020	17-Nov-2021
Test Software	Audix	e3	Software Version: 9 20151119i	N/A	N/A

Test Equipment of RF Conducted					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm dd, yyyy)**	**Cal.Due Date (mm dd, yyyy)**
EXA Signal Analyzer	KEYSIGHT	N9010A	MY51440197	22-Apr-2021	21-Apr-2022
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	10-Nov-2020	9-Nov-2021

Test Equipment of Radiated Emissions & Band Edge Measurements (Radiated)					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm dd, yyyy)**	**Cal.Due Date (mm dd, yyyy)**
3 m SAC	ETS-Lindgren	3 m	Euroshiedpn-CT001270-1317	22-Jan-2021	21-Jan-2024
Loop Antenna	ETS-Lindgren	6502	00202525	14-Nov-2020	13-Nov-2022
Broadband Antenna	ETS-Lindgren	3142E	00201566	14-Nov-2020	13-Nov-2022
Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-Lindgren	3117-PA	00201541	30-Apr-2021	29-Apr-2023
Pre-amplifier	ETS-Lindgren	00118385	00201874	10-Nov-2020	9-Nov-2021
Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-Lindgren	3116C-PA	00202652	14-Nov-2020	13-Nov-2022
Pre-amplifier	ETS-Lindgren	00118384	00202652	17-Nov-2020	16-Nov-2022
Receiver	ROHDE & SCHWARZ	ESIB26	100114	18-Nov-2020	17-Nov-2021
Pre-amplifier	HP	8447F	2805A02960	10-Nov-2020	9-Nov-2021
Band Reject Filter(2400MHz~2500MHz)	Micro-tronics	BRM50702	G248	16-Nov-2020	15-Nov-2021
6dB Attenuator	Talent	RA6A5-N-18	18103001	14-Nov-2020	13-Nov-2022
Test Software	Audix	e3	Software Version: 19815(V9)	N/A	N/A
Multi device Controller	ETS-Lindgren	7006-001	00160105	N/A	N/A

4. TEST CONFIGURATION

4.1. ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1. Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage	Relative Humidity (%)
TN/VN	+15 to +35	3.8 V	20 to 75
Remark: 1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2. Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
AC Power Line Conducted Emission	25	48	101.1	David Zhang
Conducted Peak Output Power	24	51	101.8	Hank Wu
6dB Bandwidth	24	51	101.8	Hank Wu
Power Spectral Density	24	51	101	Hank Wu
Conducted Out of Band Emission	24	51	101.8	Hank Wu
Radiated Emissions	24.5	46	100.14	Fire Huo
Band Edge Measurements (Radiated)	24.5	46	100.14	Fire Huo
Duty Cycle	24	51	101.8	Hank Wu

4.2. CHANNEL LIST

4.2.1. All Channel List

For Bluetooth Operation Frequency Each of Channel
Bluetooth LE
f = 2402 + 2k MHz, k = 0,…,39
Note: **f** is the operating frequency (MHz); **k** is the operating channel.

4.2.2. Test Channel

BLE				
Type of Modulation	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
GFSK	2402 MHz to 2480 MHz	Channel 0	Channel 19	Channel 39
		2402 MHz	2440 MHz	2480 MHz

4.3. TEST MODES

Type of Modulation	Tx Function	Description
GFSK	1Tx	1. Keep the EUT in continuously transmitting with modulation test single.

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1. ANTENNA REQUIREMENT

5.1.1. Applicability

FCC Part 15.203/15.247 (b)(4)

5.1.2. Requirements

Antenna Requirement
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. **15.247(b) (4) requirement:** The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.3. Description

The EUT Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is 1.2 dBi.

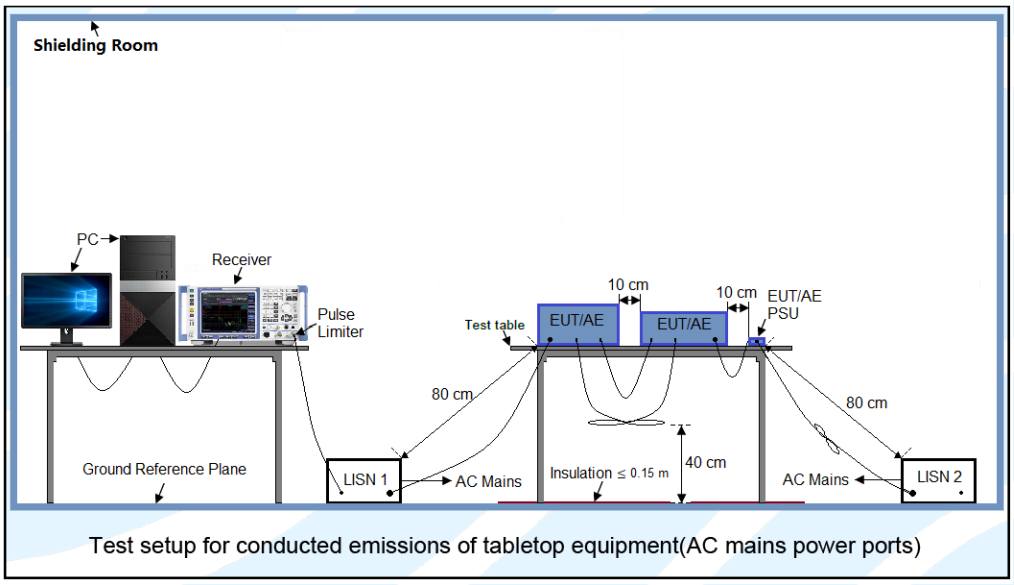
5.2. AC POWER LINE CONDUCTED EMISSION

Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.207
Test Method: ANSI C63.10-2013, Clause 6.2
Limit:

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:
1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup:



Test setup for conducted emissions of tabletop equipment(AC mains power ports)

Test Procedures:

Test frequency range :150kHz-30MHz

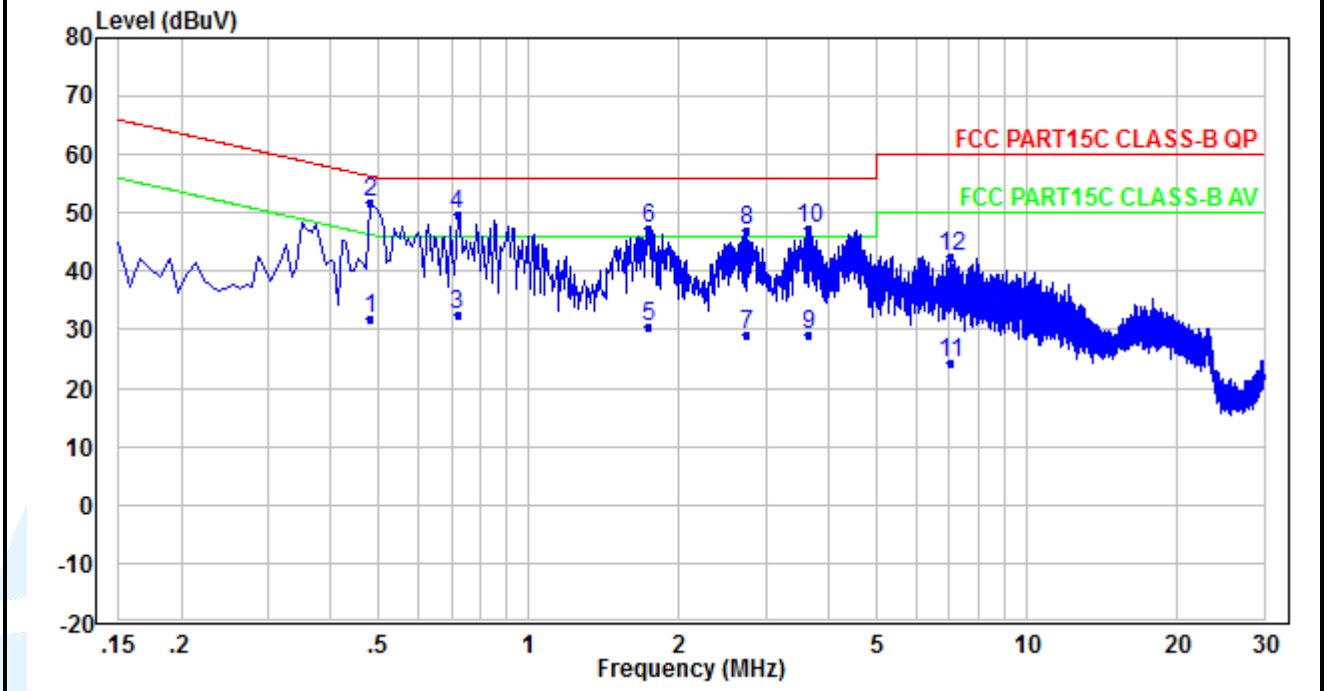
1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

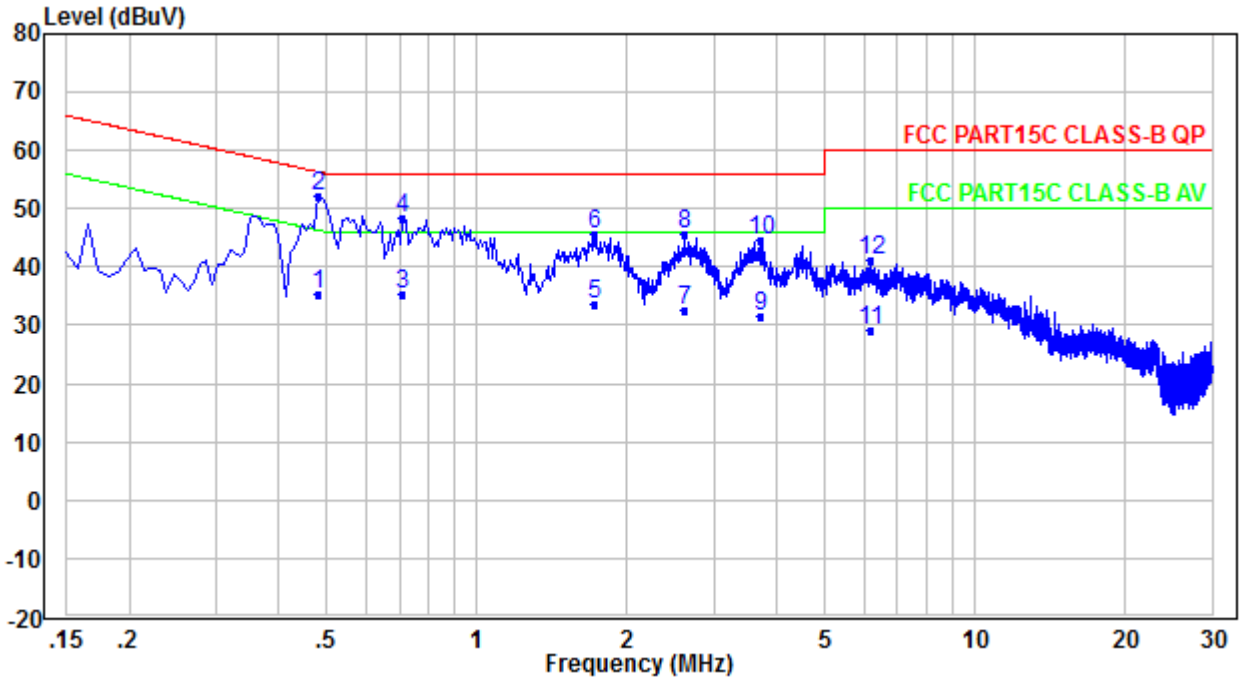
The measurement data as follows:

AC Power Ports: BT Link_Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.47793	22.1	9.8	31.9	46.4	-14.5	Average
2	0.47793	42.1	9.8	51.9	56.4	-4.5	QP
3	0.71789	22.9	9.9	32.7	46.0	-13.3	Average
4	0.71789	39.9	9.9	49.7	56.0	-6.3	QP
5	1.742	20.5	9.9	30.4	46.0	-15.6	Average
6	1.742	37.5	9.9	47.4	56.0	-8.6	QP
7	2.741	19.2	9.9	29.1	46.0	-16.9	Average
8	2.741	37.2	9.9	47.1	56.0	-8.9	QP
9	3.661	19.2	10.1	29.3	46.0	-16.8	Average
10	3.661	37.2	10.1	47.3	56.0	-8.8	QP
11	7.045	14.2	10.2	24.4	50.0	-25.6	Average
12	7.045	32.2	10.2	42.4	60.0	-17.6	QP

AC Power Ports: BT Link_Neutral

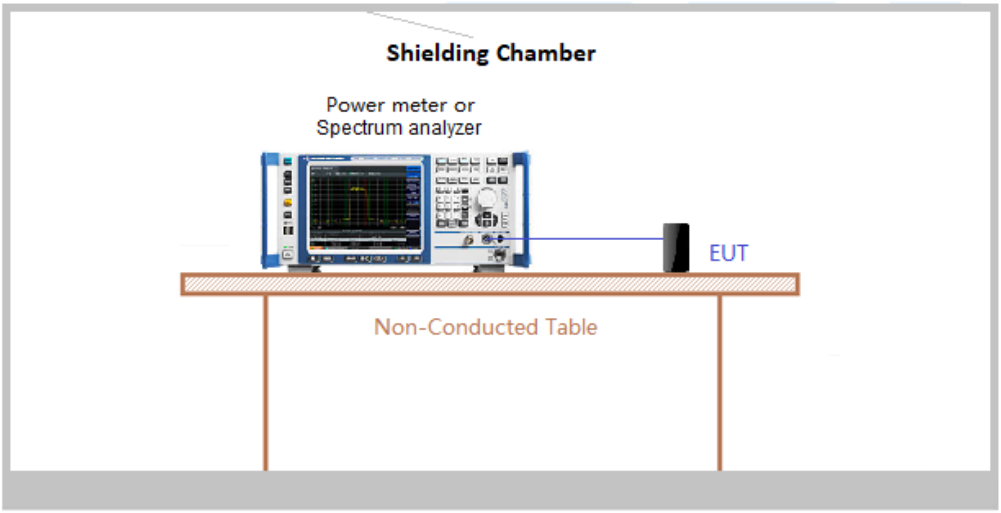


No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.47793	25.4	9.8	35.2	46.4	-11.1	Average
2	0.47793	42.4	9.8	52.2	56.4	-4.1	QP
3	0.70989	25.7	9.8	35.5	46.0	-10.5	Average
4	0.70989	38.7	9.8	48.5	56.0	-7.5	QP
5	1.718	23.7	9.9	33.6	46.0	-12.4	Average
6	1.718	35.7	9.9	45.6	56.0	-10.4	QP
7	2.614	22.7	10.0	32.7	46.0	-13.3	Average
8	2.614	35.7	10.0	45.7	56.0	-10.3	QP
9	3.701	21.6	10.0	31.6	46.0	-14.4	Average
10	3.701	34.6	10.0	44.6	56.0	-11.4	QP
11	6.181	18.9	10.2	29.1	50.0	-20.9	Average
12	6.181	30.9	10.2	41.1	60.0	-18.9	QP

5.3. CONDUCTED PEAK OUTPUT POWER

Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.247 (b)(3)
Test Method: ANSI C63.10-2013, Clause 11.9.1.3
Limit:
For systems using digital modulation in the 2400-2483.5 MHz bands: 1 Watt.

Test Setup:



Test Procedures:

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.
2. Measure out each test modes' peak or average output power, record the power level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Equipment Used: Refer to section 3 for details.
Test Result: Pass

The measurement data as follows:

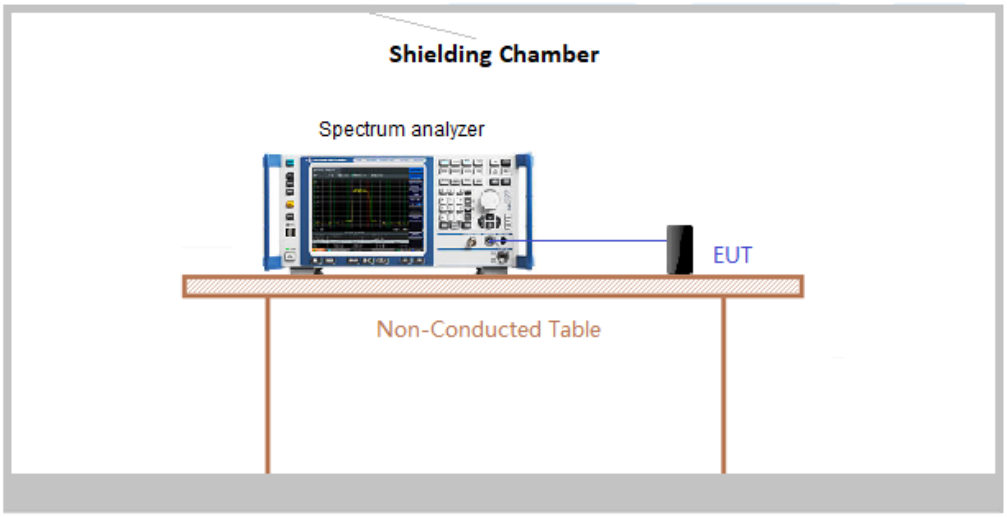
Mode	Channel	Frequency (MHz)	Power Setting	Maximum Conducted Peak Power (dBm)	Limit (dBm)	Results
LE	0	2402	NA	-1.37	30	Pass
LE	19	2440	NA	-1.91	30	Pass
LE	39	2480	NA	-1.94	30	Pass

Mode	Channel	Frequency (MHz)	Power Setting	Maximum Conducted Average Power (dBm)
LE	0	2402	NA	-2.29
LE	19	2440	NA	-2.78
LE	39	2480	NA	-2.77
Note: Average power is for reporting purposes only.				

5.4. 6DB BANDWIDTH

Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.247 (a)(2)
Test Method: ANSI C63.10-2013, Clause 11.8.1
Limit:
For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

Test Setup:



Test Procedures:

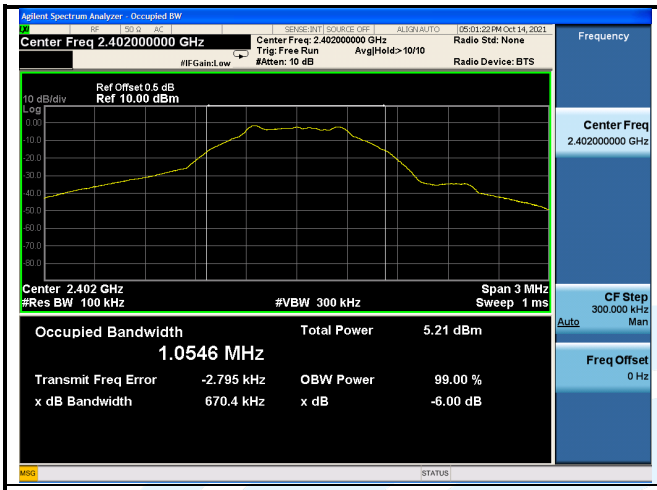
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Use the following spectrum analyzer settings:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 x RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) 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.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

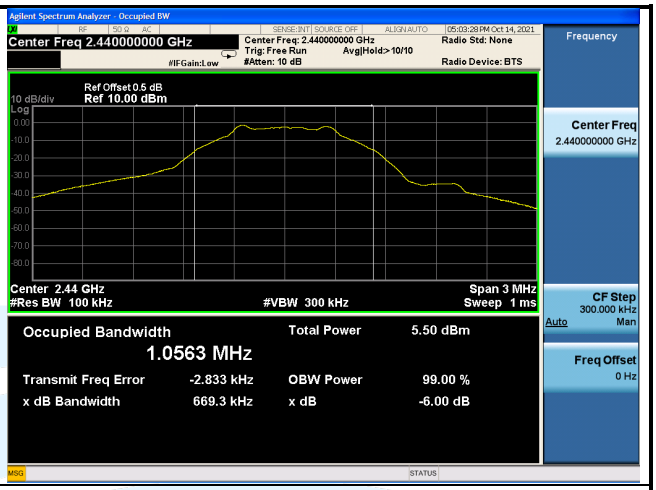
Equipment Used: Refer to section 3 for details.
Test Result: Pass

The measurement data as follows:

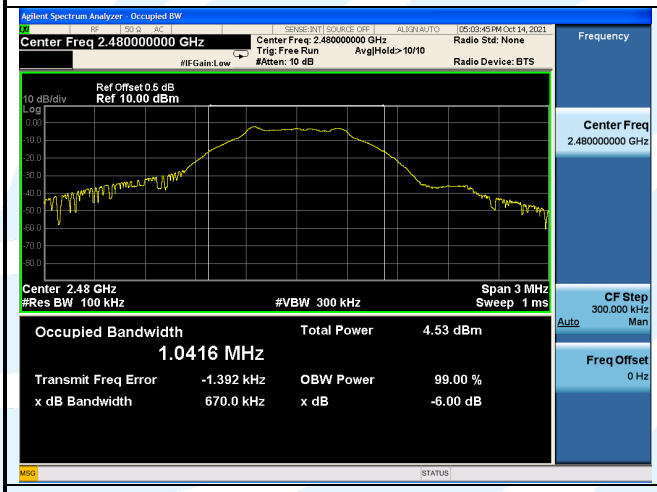
Mode	Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit (kHz)	Results
LE	0	2402	0.6704	1.0546	> 500	Pass
LE	19	2440	0.6693	1.0563	> 500	Pass
LE	39	2480	0.6700	1.0416	> 500	Pass



LE: CH00



LE: CH19



LE: CH39

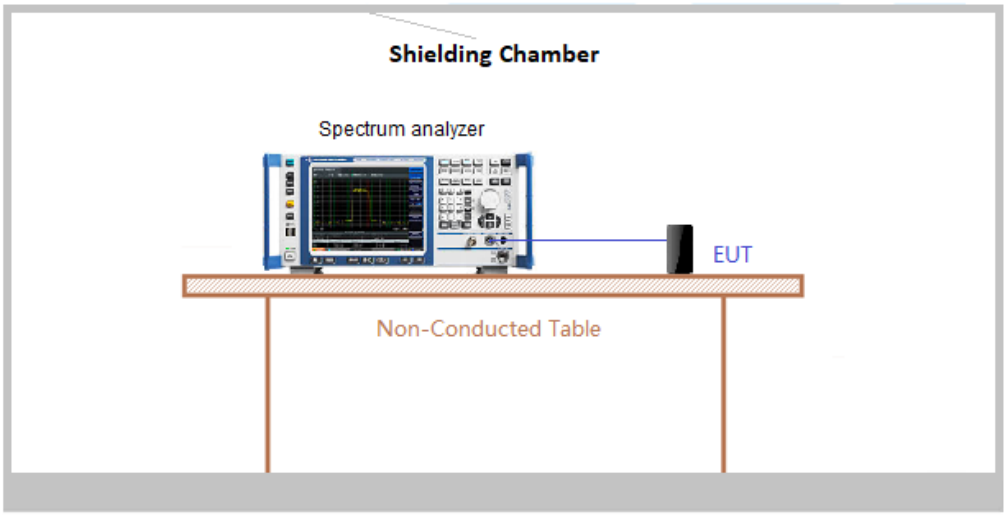
N/A

5.5. POWER SPECTRAL DENSITY

Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.247 (e)
Test Method: ANSI C63.10-2013, Clause 11.10.2
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 3kHz band during any time interval of continuous transmission.

Test Setup:



Test Procedures:

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Use the following spectrum analyzer settings:

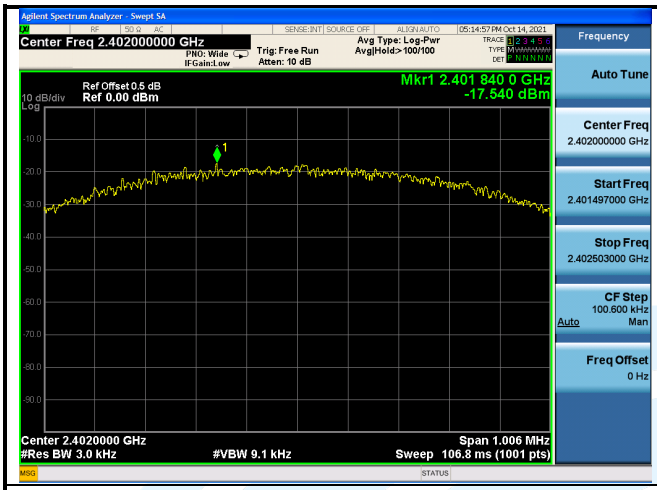
a) Set analyzer center frequency to DTS channel center frequency.
b) Set the span to 1.5 times the DTS bandwidth.
c) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the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

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Equipment Used: Refer to section 3 for details.
Test Result: Pass

The measurement data as follows:

Mode	Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Results
LE	0	2402	-17.540	30	Pass
LE	19	2440	-17.279	30	Pass
LE	39	2480	-18.091	30	Pass

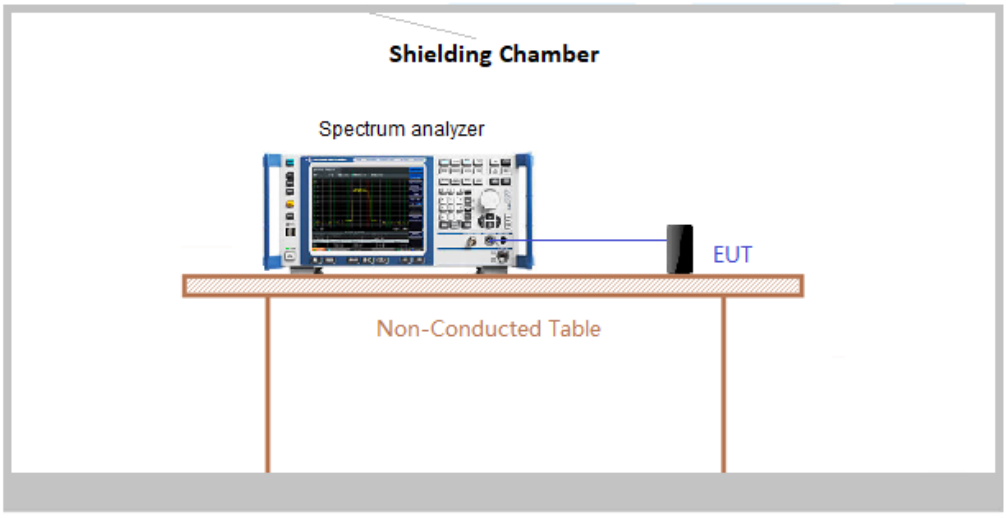
	
LE: CH00	LE: CH19
	Blank
LE: CH39	N/A

5.6. CONDUCTED OUT OF BAND EMISSION

Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.247(d)
Test Method: ANSI C63.10-2013, Clause 11.11
Limit:

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

Test Setup:



Test Procedures:

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Use the following spectrum analyzer settings:

Step 1: Measurement Procedure REF

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

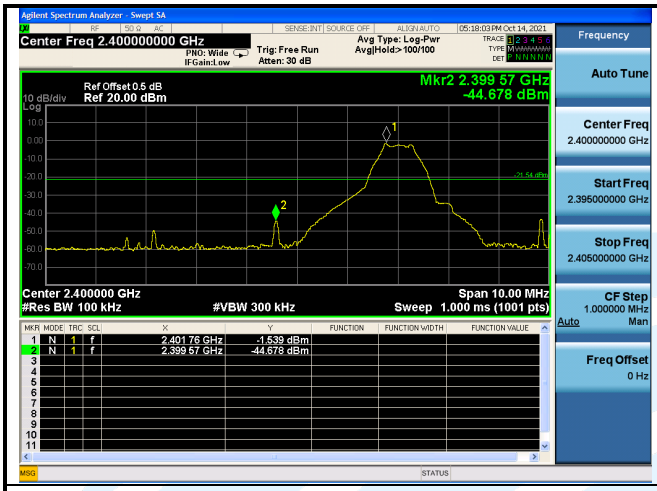
Step 2: Measurement Procedure OOBE

a) Set RBW = 100 kHz.
b) Set VBW ≥ 300 kHz.
c) Detector = peak.
d) Sweep = auto couple.
e) Trace Mode = max hold.
f) Allow trace to fully stabilize.
g) Use the peak marker function to determine the maximum amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

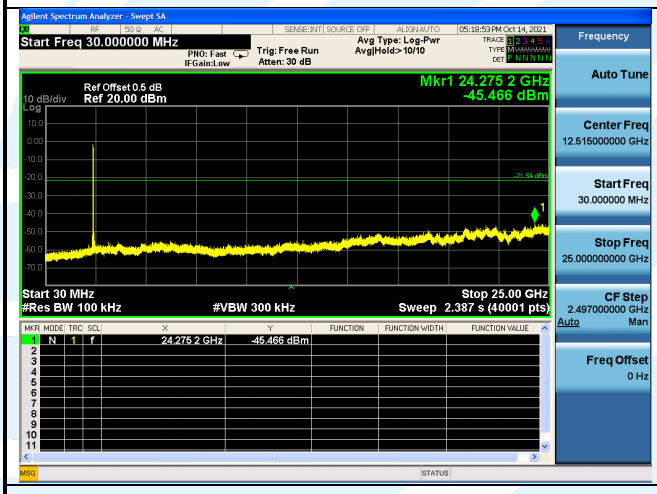
Equipment Used: Refer to section 3 for details.
Test Result: Pass

The measurement data as follows:



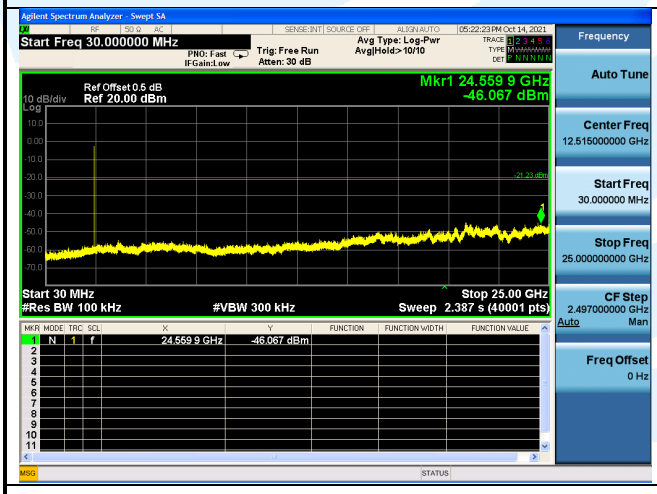
LE CH00 BE

LE CH00 CSE

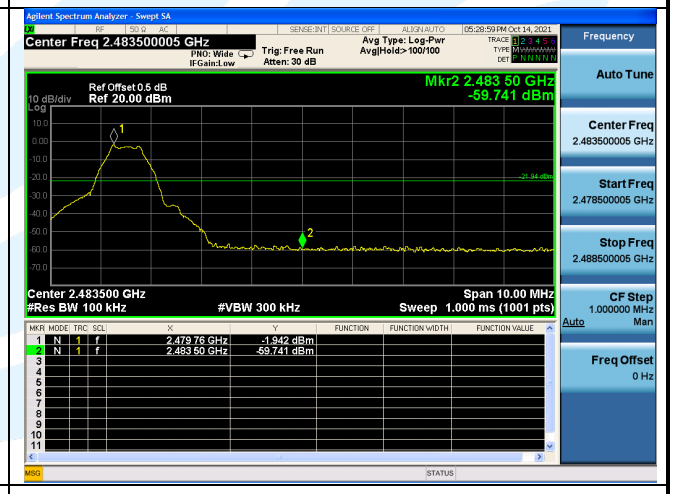


LE CH00 REF

LE CH19 CSE

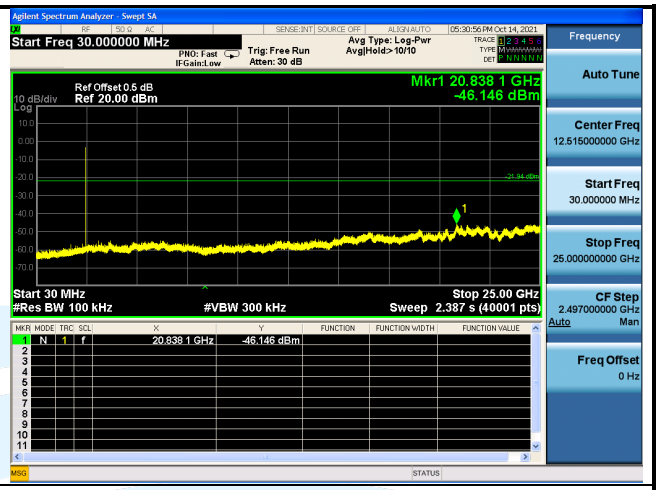


LE CH19 REF



LE CH39 BE

LE CH39 CSE



LE CH39 REF

5.7. RADIATED EMISSIONS

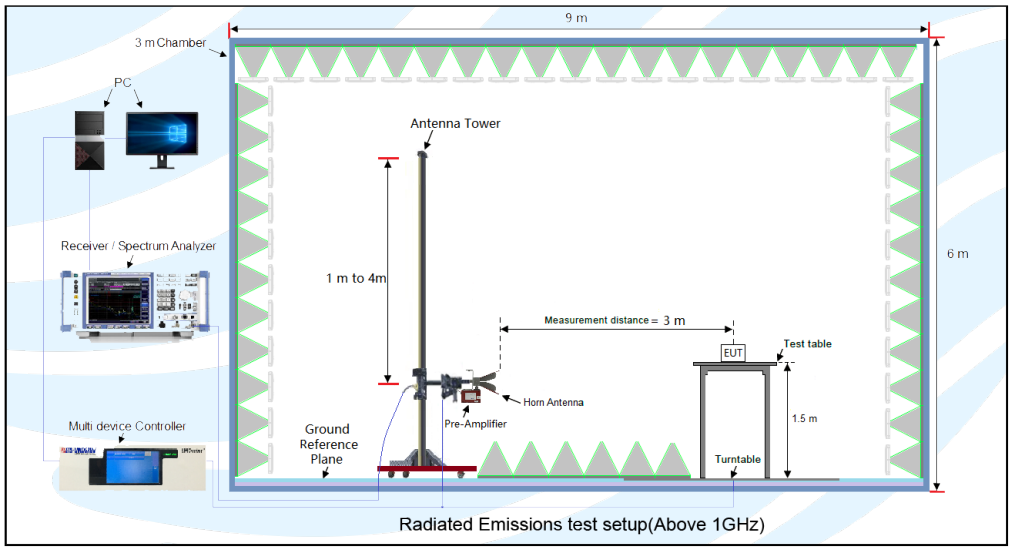
Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.205/15.209
Test Method: ANSI C63.10-2013, Clause 11.11 & Clause 11.12
Limit:

Spurious Emissions

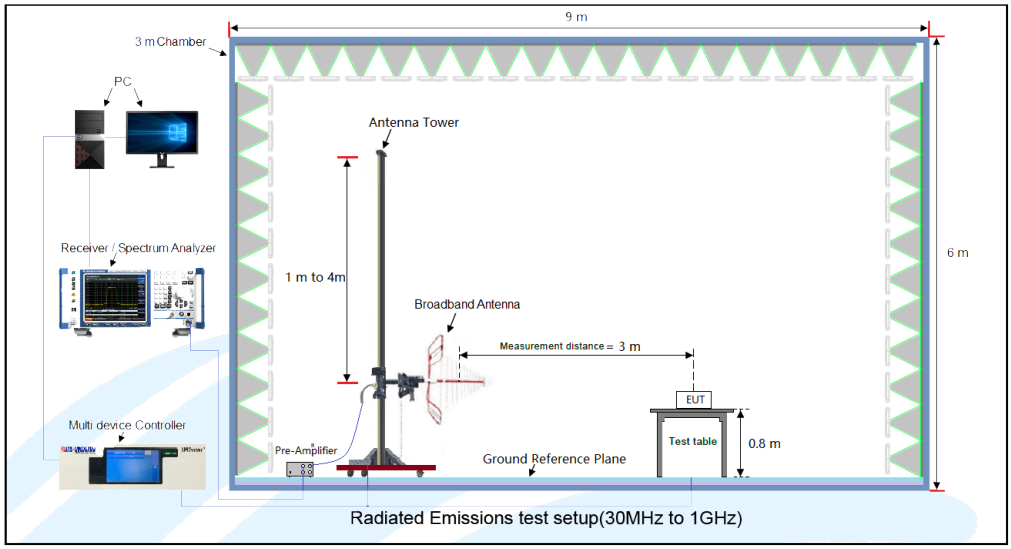
Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Detector	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).
3. For frequencies above 1000 MHz, 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 20 dB under any condition of modulation.

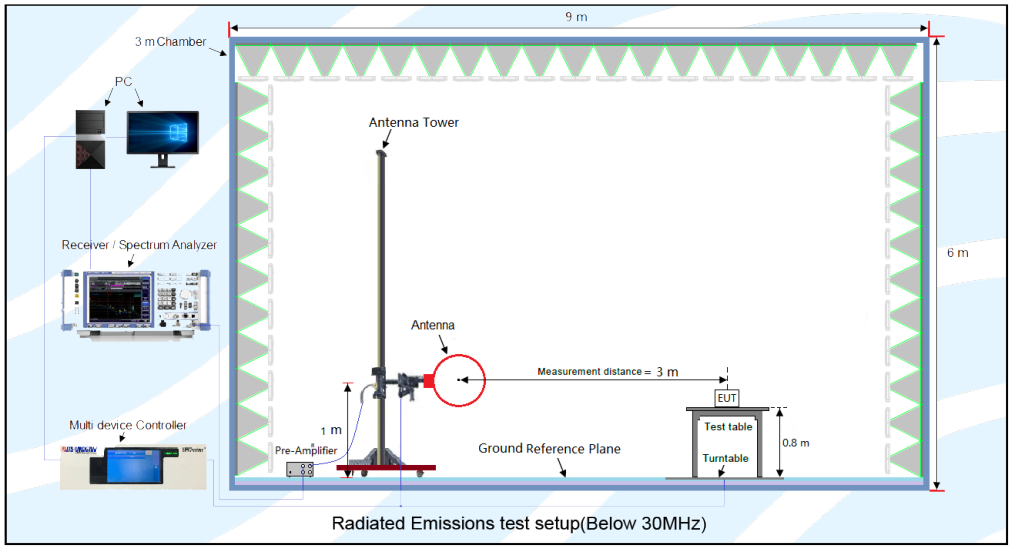
Test Setup:



Radiated Emissions test setup(Above 1GHz)



Radiated Emissions test setup(30MHz to 1GHz)



Radiated Emissions test setup(Below 30MHz)

Test Procedures:

➢ **<u>From 30 MHz to 1GHz test procedure as below:</u>**

1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3-meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3) The antenna height 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.
4) 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
5) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise, the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

➢ **<u>Above 1GHz test procedure as below:</u>**

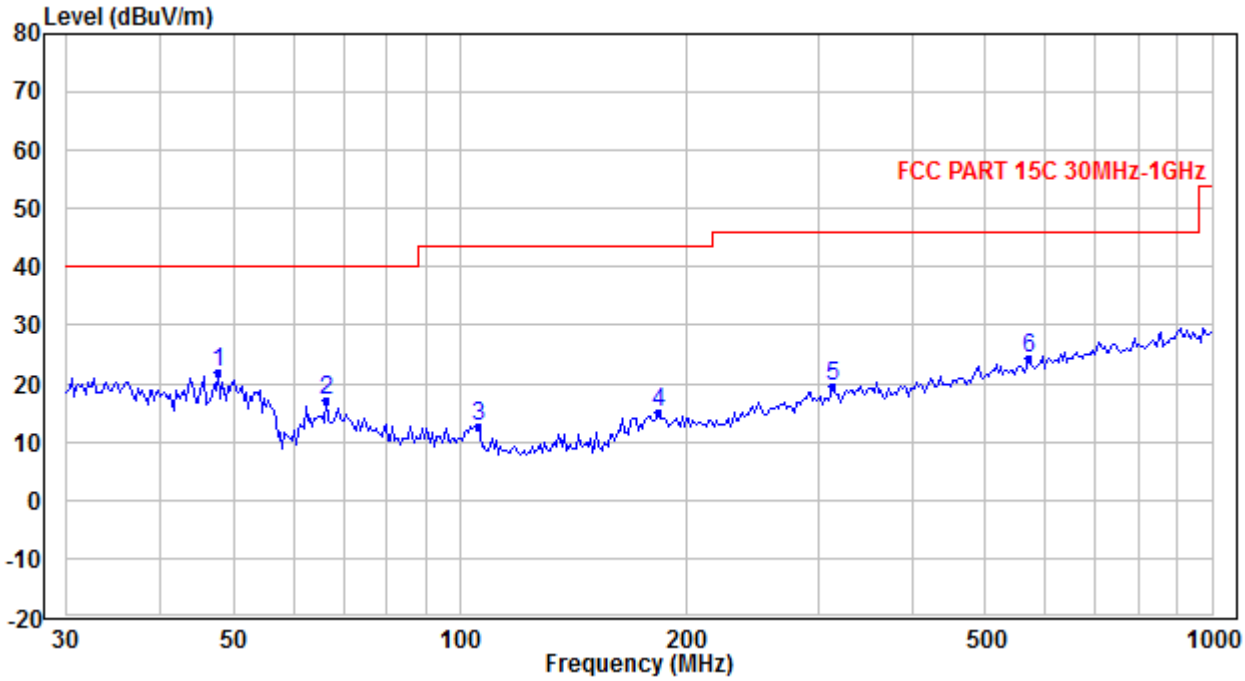
1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter (Above 18GHz the distance is 1 meter and table is 1.5

meter).
2) Test the EUT in the lowest channel, middle channel, the Highest channel
3) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and test the worst-case axis positioning.
4) Repeat above procedures until all frequencies measured was complete.

Equipment Used: Refer to section 3 for details.
Test Result: Pass

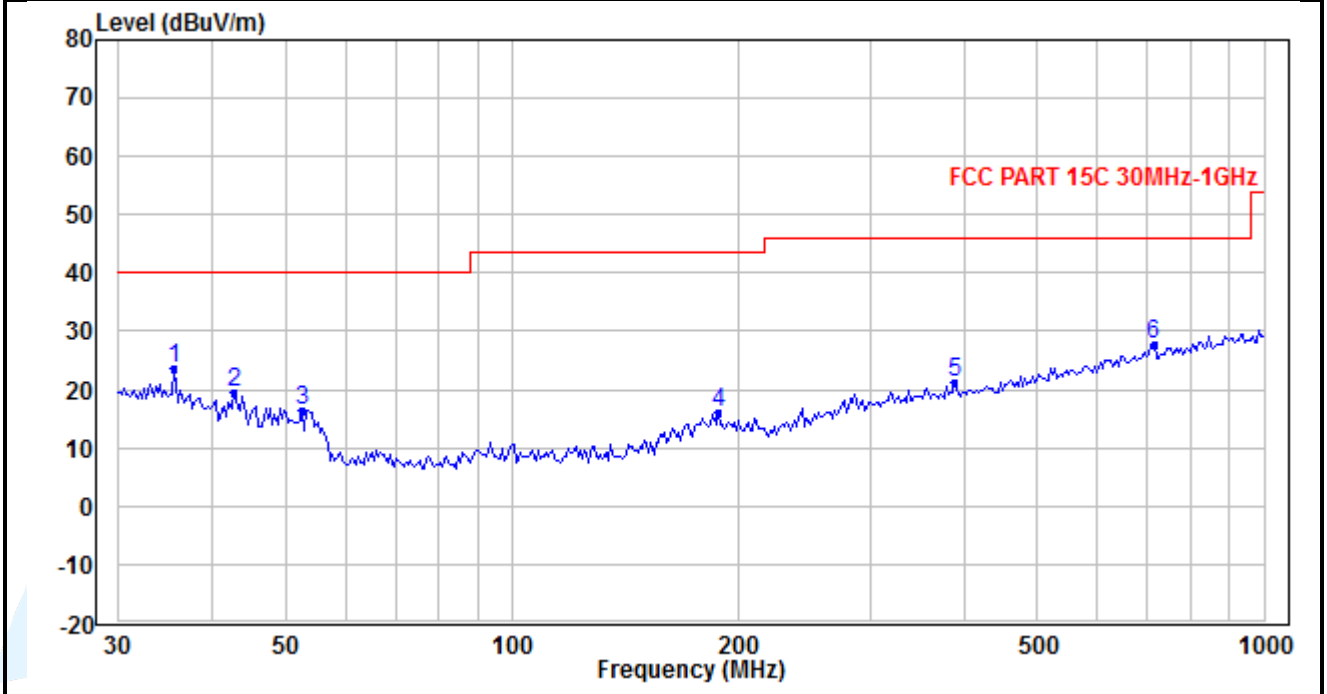
The measurement data as follows:

30-1000MHz: BT Link_H



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	47.703	35.1	-13.1	22.0	40.0	-18.0	Peak
2	66.371	34.3	-17.3	17.0	40.0	-23.0	Peak
3	105.537	28.7	-15.9	12.8	43.5	-30.7	Peak
4	183.866	25.5	-10.4	15.0	43.5	-28.5	Peak
5	313.648	25.5	-6.0	19.6	46.0	-26.5	Peak
6	569.969	26.2	-1.8	24.4	46.0	-21.6	Peak

30-1000MHz: BT Link_V



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	35.511	29.1	-5.4	23.8	40.0	-16.2	Peak
2	42.63	29.2	-9.6	19.6	40.0	-20.4	Peak
3	52.634	33.1	-16.6	16.5	40.0	-23.5	Peak
4	187.783	26.9	-10.7	16.2	43.5	-27.3	Peak
5	387.257	26.4	-5.0	21.4	46.0	-24.6	Peak
6	713.692	26.2	1.5	27.6	46.0	-18.4	Peak

Above 1GHz: LE_2402MHz_H							
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	4804	42.4	-2.3	40.1	74.0	-33.9	Peak
2	7206	41.1	1.4	42.6	74.0	-31.5	Peak
Above 1GHz: LE_2402MHz_V							
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	4804	42.2	-2.3	39.8	74.0	-34.2	Peak
2	7206	40.1	1.4	41.6	74.0	-32.5	Peak
Above 1GHz: LE_2440MHz_H							
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	4880	41.1	-2.3	38.8	74.0	-35.2	Peak
2	7320	40.5	1.6	42.2	74.0	-31.9	Peak
Above 1GHz: LE_2440MHz_V							
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	4880	42.4	-2.3	40.1	74.0	-33.9	Peak
2	7320	41.1	1.6	42.7	74.0	-31.3	Peak
Above 1GHz: LE_2480MHz_H							
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	4960	43.6	-2.3	41.4	74.0	-32.6	Peak
2	7440	39.5	1.8	41.3	74.0	-32.7	Peak
Above 1GHz: LE_2480MHz_V							
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	4960	42.9	-2.3	40.6	74.0	-33.4	Peak
2	7440	38.8	1.8	40.6	74.0	-33.4	Peak

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
   Result = Reading + Correct Factor.
   Margin = Result – Limit
2. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

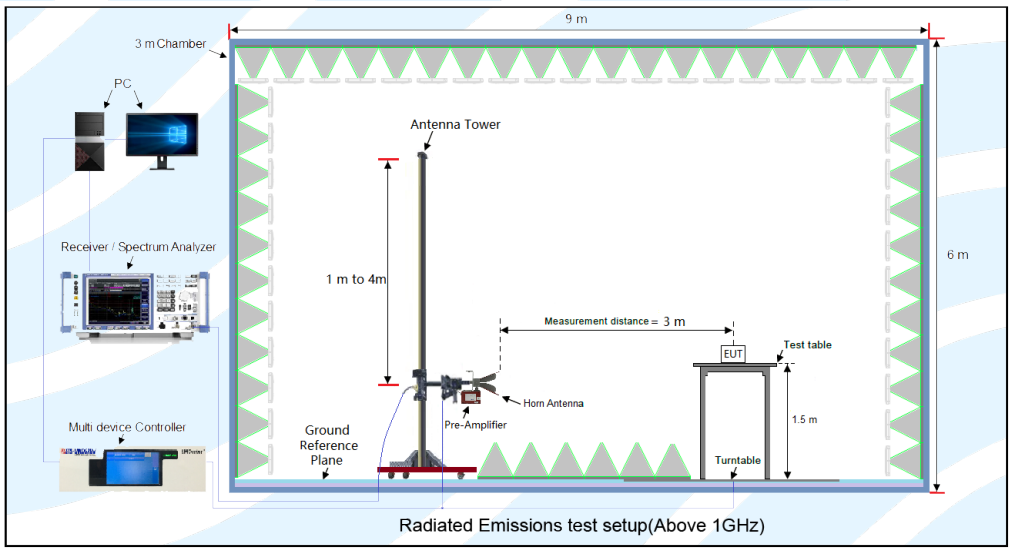
5.8. BAND EDGE MEASUREMENTS (RADIATED)

Test Standard FCC 47 CFR Part 15.247
Test Requirement: FCC Part 15.205/15.209
Test Method: ANSI C63.10-2013, Clause 11.13
Limit:

Radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Frequency	Limit (dBμV/m @3m)	Remark
30 MHz-88 MHz	40.0	Quasi-peak Value
88 MHz-216 MHz	43.5	Quasi-peak Value
216 MHz-960 MHz	46.0	Quasi-peak Value
960 MHz-1 GHz	54.0	Quasi-peak Value
Above 1 GHz	54.0	Average Value
	74.0	Peak Value

Test Setup:



Radiated Emissions test setup(Above 1GHz)

Test Procedures:

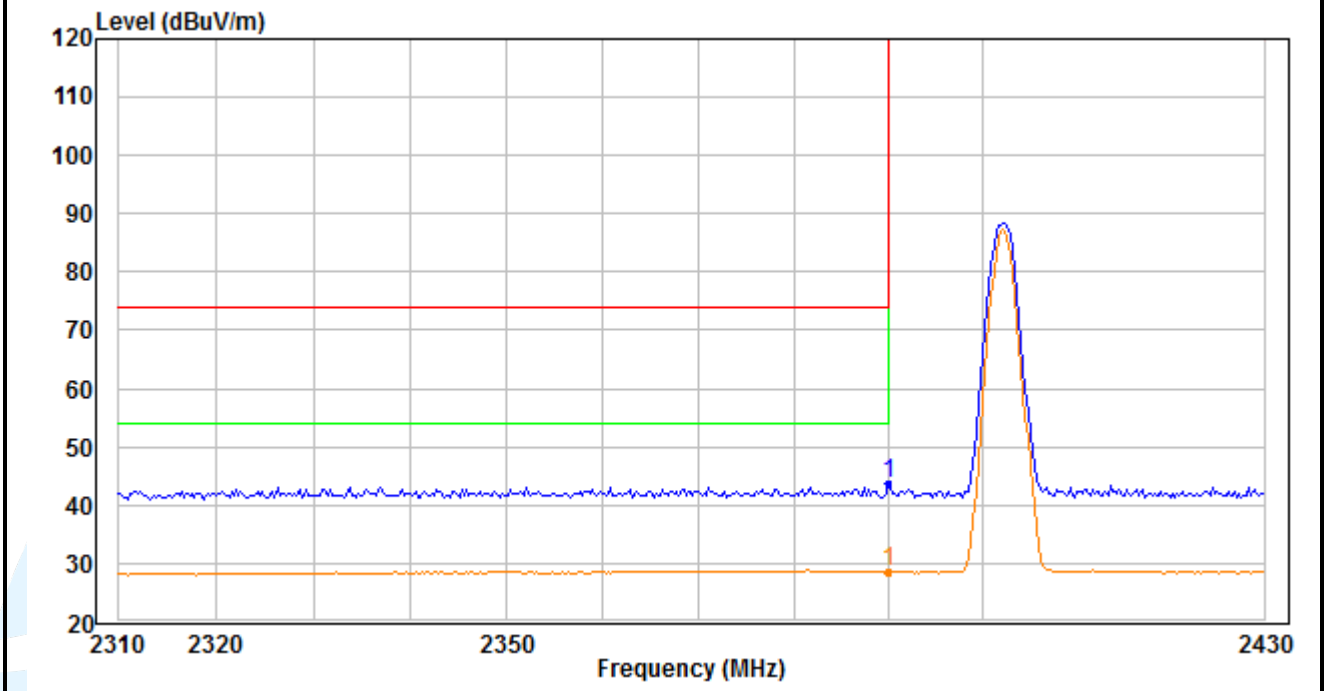
Radiated band edge measurements at 2390 MHz and 2483.5 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 3 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz or 1/T for average levels).

1. Use radiated spurious emission test procedure described in clause 5.10. The transmitter output (antenna port) was connected to the test receiver.
2. Set the Peak and Average limit line.
3. Record the fundamental emission and emissions out of the band-edge.
4. Determine band-edge compliance as required.

Equipment Used: Refer to section 3 for details.
Test Result: Pass

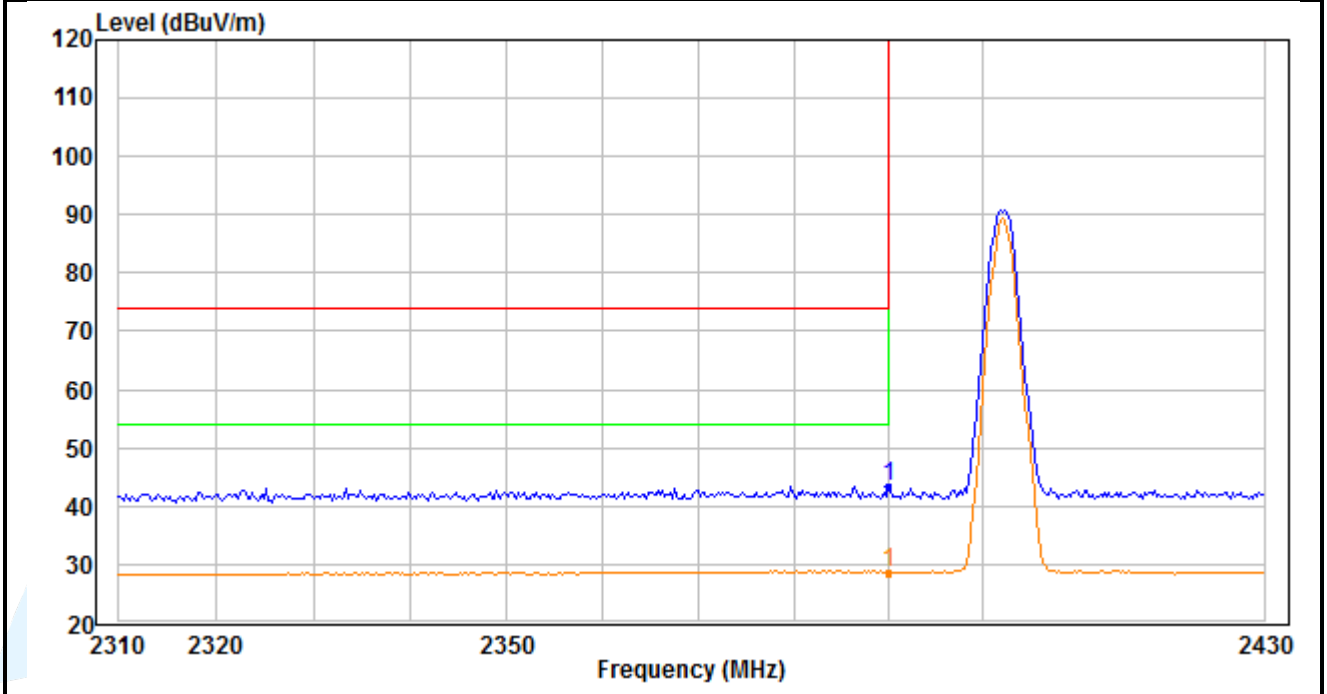
The measurement data as follows:

LE: 2402MHz_H



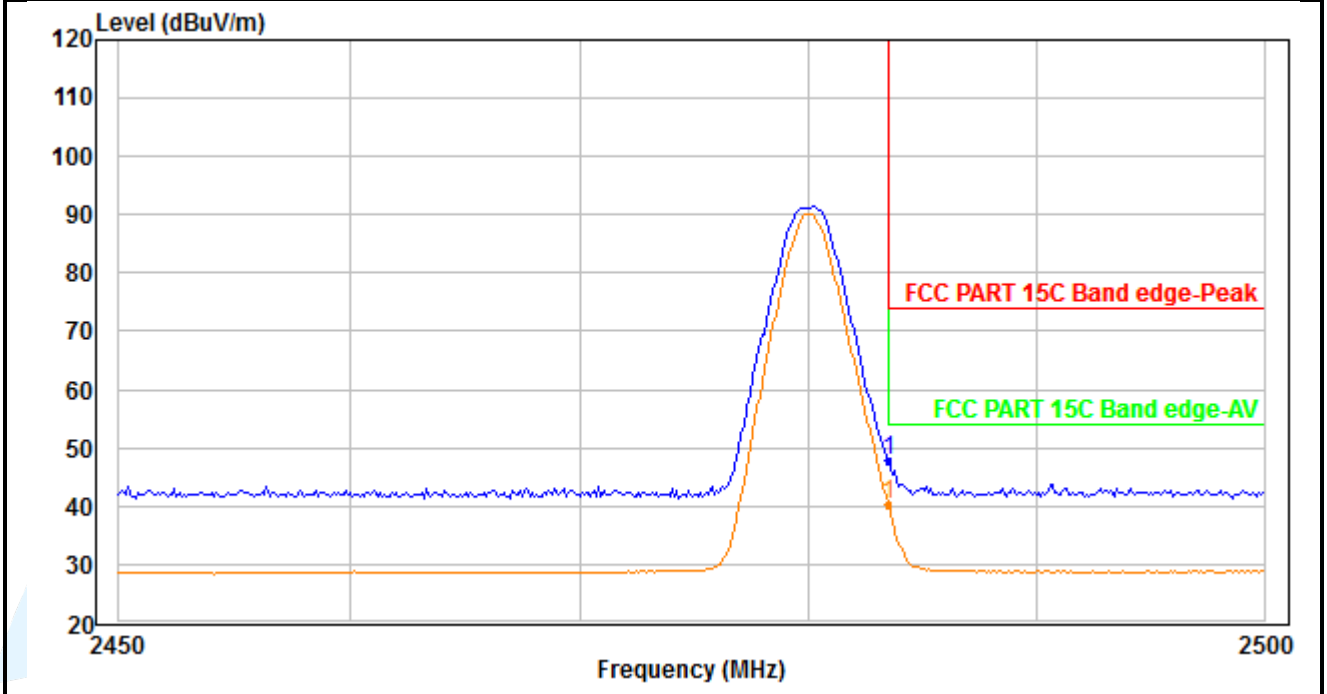
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2390	52.2	-8.4	43.8	74.0	-30.2	Peak
1	2390	36.9	-8.4	28.5	54.0	-22.6	Average

LE: 2402MHz_V



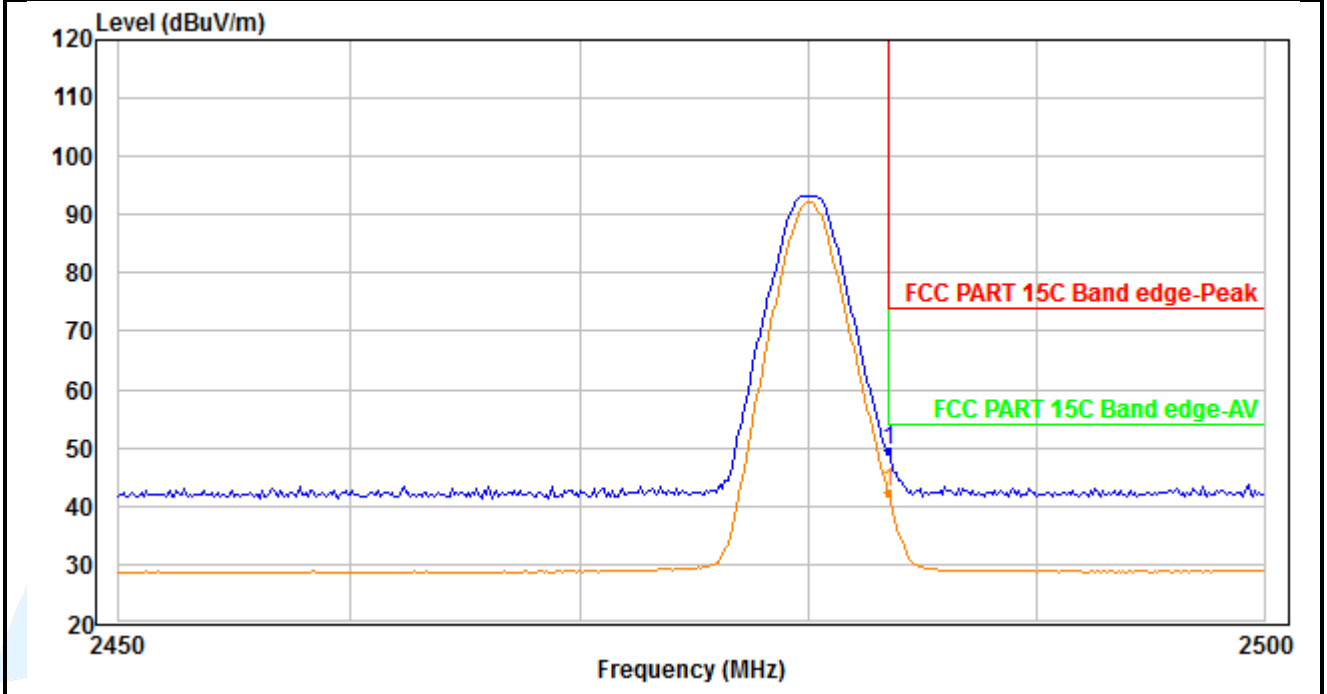
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2390	51.9	-8.4	43.5	74.0	-30.5	Peak
1	2390	32.7	-8.4	28.6	54.0	-25.4	Average

LE: 2480MHz_H



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2483.5	55.8	-8.1	47.7	74.0	-26.3	Peak
1	2483.5	48.4	-8.1	40.2	54.0	-13.8	Average

LE: 2480MHz_V

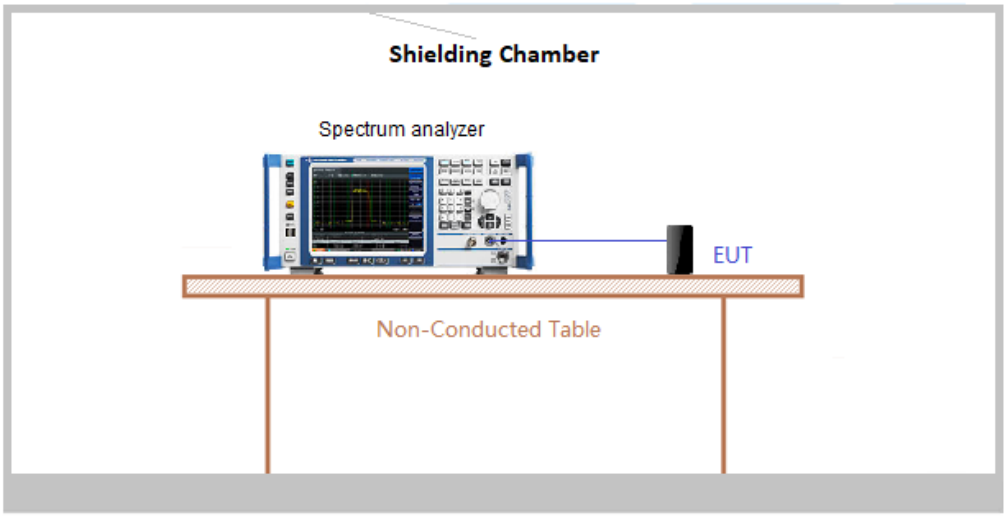


No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dBuV)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	2483.5	57.6	-8.1	49.5	74.0	-24.5	Peak
1	2483.5	50.5	-8.1	42.4	54.0	-11.6	Average

5.9. DUTY CYCLE

Test Standard FCC 47 CFR Part 15.247
Test Requirement: None; for reporting purposes only.
Test Method: ANSI C63.10-2013, Clause 11.6
Limit:
None; for reporting purposes only.

Test Setup:



Test Procedures:

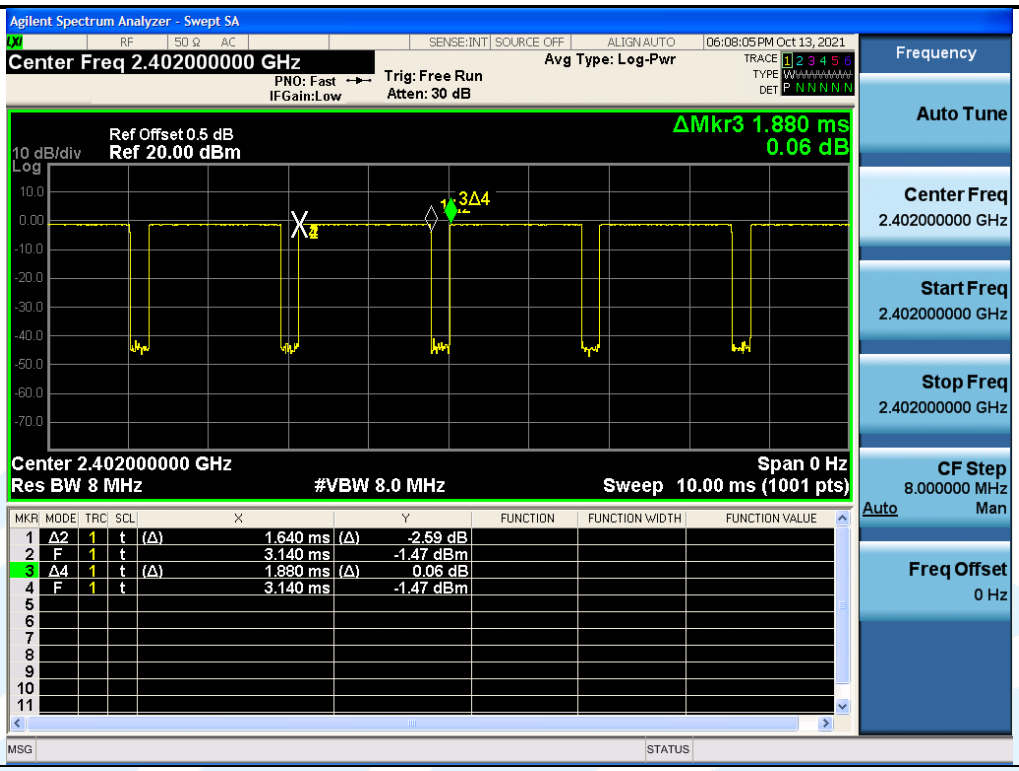
Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
   1) Set the center frequency of the instrument to the center frequency of the transmission.
   2) Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value.
   3) Set VBW ≥ RBW. Set detector = peak or average.
   4) The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if T ≤ 16.7 μs.)

Equipment Used: Refer to section 3 for details.
Test Result: Pass

The measurement data as follows:

Mode	On Time (ms)	Period (ms)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
LE	1.64	1.88	0.87	87.23	0.59	0.61	-1.19


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.402000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
06:08:05 PM Oct 13, 2021
Ref Offset 0.5 dB
10 dB/div
Ref 20.00 dBm
ΔMkr3 1.880 ms
0.06 dB
Center 2.402000000 GHz
Res BW 8 MHz
#VBW 8.0 MHz
Span 0 Hz
Sweep 10.00 ms (1001 pts)
1 Δ2 1 t (Δ) 1.640 ms (Δ) -2.59 dB
2 F 1 t 3.140 ms -1.47 dBm
3 Δ4 1 t (Δ) 1.880 ms (Δ) 0.06 dB
4 F 1 t 3.140 ms -1.47 dBm
Frequency
Auto Tune
Center Freq
2.402000000 GHz
Start Freq
2.402000000 GHz
Stop Freq
2.402000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz

LE-CH00

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***