

TEST REPORT

Report No. : **CHTEW2201018402** Report Verification: 

Project No..... : **SHT2201044201EW**

FCC ID..... : **BBOSC100**

Applicant's name..... : **COBRA ELECTRONICS CORPORATION**

Address..... : 6500 WEST CORTLAND STREET, CHICAGO, IL 60707 USA

Manufacturer..... : COBRA ELECTRONICS CORPORATION

Address..... : 6500 WEST CORTLAND STREET, CHICAGO, IL 60707 USA

Test item description : **Cobra SC 100**

Trade Mark : Cobra

Model/Type reference..... : SC100

Listed Model(s) : -

Standard : **FCC CFR Title 47 Part 15 Subpart C Section 15.247**

Date of receipt of test sample..... : May 19, 2020

Date of testing..... : May 19, 2020- Jan.28, 2022

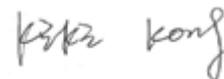
Date of issue..... : Jan.29, 2022

Result..... : **PASS**

Compiled by
 (Position+Printed name+Signature): File administrator Echo Wei



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 (Position+Printed name+Signature): Project Engineer Kiki Kong



Approved by
 (Position+Printed name+Signature): RF Manager Hans Hu



Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road,
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1. TEST STANDARDS AND REPORT VERSION

1.1. Test Standards

The tests were performed according to following standards:

- [FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
- [ANSI C63.10:2013](#): American National Standard for Testing Unlicensed Wireless Devices
- [KDB 558074 D01 15.247 Meas Guidance v05r02](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2022-01-29	Change the chip and Bluetooth version, and update Software version,update Peak Output Power,AC Conducted Emission, Radiated Band edge Emission, Radiated Spurious Emission and test setup photos based on the report CHTEW20060003(2020-06-01)

2. TEST DESCRIPTION

Report clause	Test Items	Standard Requirement	Result
5.1	Antenna Requirement	15.203/15.247 (c)	PASS
5.2	AC Conducted Emission	15.207	PASS
5.3	Peak Output Power	15.247 (b)(1)	PASS ^{*2}
5.4	20 dB Bandwidth	15.247 (a)(1)	PASS ^{*2}
5.5	99% Occupied Bandwidth	-	PASS ^{*1} , PASS ^{*2}
5.6	Carrier Frequency Separation	15.247 (a)(1)	PASS ^{*2}
5.7	Hopping Channel Number	15.247 (a)(1)	PASS ^{*2}
5.8	Dwell Time	15.247 (a)(1)	PASS ^{*2}
5.9	Duty Cycle Correction Factor	-	PASS ^{*1} , PASS ^{*2}
5.10	Pseudorandom Frequency Hopping Sequence	15.247(b)(4)	PASS ^{*2}
5.11	Conducted Band Edge and Spurious Emission	15.247(d)/15.205	PASS ^{*2}
5.12	Radiated Band Edge Emission	15.205/15.209	PASS
5.13	Radiated Spurious Emission	15.247(d)/15.205/15.209	PASS

Note:

- The measurement uncertainty is not included in the test result.
- *1: No requirement on standard, only report these test data.
- * 2:EUT which had been certified by telefication and the report No. is CHTEW20060003 tested by Shenzhen Huatongwei International Inspection Co., Ltd.. So except the "Peak Output Power, AC Conducted Emission, Radiated Band edge Emission, Radiated Spurious Emission " was retested, all other items please refer to report CHTEW20060003.

3. SUMMARY

3.1. Client Information

Applicant:	COBRA ELECTRONICS CORPORATION
Address:	6500 WEST CORTLAND STREET, CHICAGO, IL 60707 USA
Manufacturer:	COBRA ELECTRONICS CORPORATION
Address:	6500 WEST CORTLAND STREET, CHICAGO, IL 60707 USA

3.2. Product Description

Name of EUT:	Cobra SC 100
Trade Mark:	Cobra
Model No.:	SC100
Listed Model(s):	-
Power supply:	DC 5V
Hardware version:	90100D1590001
Software version:	COBRA SC-100 V1.57

3.3. Radio Specification Description

Bluetooth version:	V5.0
Support function ^{*3} :	EDR
Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC
Antenna gain:	2.85dBi

Note:

*3: only show the RF function associated with this report.

3.4. Testing Laboratory Information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.	
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China	
Connect information:	Phone: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn	
Qualifications	Type	Accreditation Number
	FCC	762235

4. TEST CONFIGURATION

4.1. Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channels which were tested. The Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the below blue front.

Channel	Frequency (MHz)
00	2402
01	2403
⋮	⋮
39	2441
⋮	⋮
77	2479
78	2480

4.2. Descriptions of Test mode

Preliminary tests were performed in different data rates and recorded the RF output power in the clause 5.3

Note:

- 1) The manufacturer declare that the maximum power value of the product is set as a default value in the enter test mode software.
- 2) All the test data for each data rate were verified, found 8DPSK Modulation which is worse case mode

4.3. Test mode

For RF test items:			
The engineering test program was provided and enabled to make EUT continuous transmitting.			
Test Item	Modulation / Data Rate		
	GFSK 1Mbps	$\pi/4$ DQPSK 2Mbps	8DPSK 3Mbps
Conducted test item	✓	✓	✓
Radiated test item	-	-	✓
Remark:			
<ul style="list-style-type: none"> - For radiated test item, the worst mode data rate 3Mbps was reported only, because this data rate has the highest RF output power at preliminary tests. - The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report. 			

4.4. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?					
✓ No					
Item	Equipement	Trade Name	Model No.	FCC ID	Power cord
1					
2					

4.5. Testing environmental condition

Type	Requirement	Actual
Temperature:	15~35°C	25°C
Relative Humidity:	25~75%	50%
Air Pressure:	860~1060mbar	1000mbar

4.6. Measurement uncertainty

Test Item	Measurement Uncertainty
AC Conducted Emission (150kHz~30MHz)	3.02 dB
Radiated Emission (30MHz~1000MHz)	4.90 dB
Radiated Emissions (1GHz~25GHz)	4.96 dB
Peak Output Power	0.51 dB
Power Spectral Density	0.51 dB
Conducted Spurious Emission	0.51 dB
6dB Bandwidth	70 Hz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.7. Equipment Used during the Test

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2021/9/14	2022/9/13
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2021/9/17	2022/9/16
●	Pulse Limiter	R&S	HTWE0033	ESH3-Z2	100499	2021/9/13	2022/9/12
●	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLE X_142	EF-NM-BNCM-2M	2021/9/17	2022/9/16
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-6th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2022/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2021/9/14	2022/9/13
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2022/04/05
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2022/04/05
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2021/11/5	2022/11/04
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX104	501184/4	2021/02/26	2022/02/25
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-7th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	N/A	2018/09/27	2022/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2021/09/13	2022/09/12
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/4/27	2023/4/27
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2021/11/5	2022/11/4
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2021/03/05	2022/03/04
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2021/02/26	2022/02/25
●	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	6m 18GHz S Serisa	N/A	2021/02/26	2022/02/25
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

● RF Conducted Method						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	FSV40	100048	2019/10/26	2020/10/25
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2019/10/26	2020/10/25
○	Power Meter	Anritsu	ML249A	N/A	2019/10/26	2020/10/25
○	Radio communication tester	R&S	CMW500	137688-Lv	2019/10/26	2020/10/25

5. TEST CONDITIONS AND RESULTS

5.1. Antenna Requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST RESULT

Passed **Not Applicable**

The antenna type is a FPC antenna, the directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.

|



5.2. AC Conducted Emission

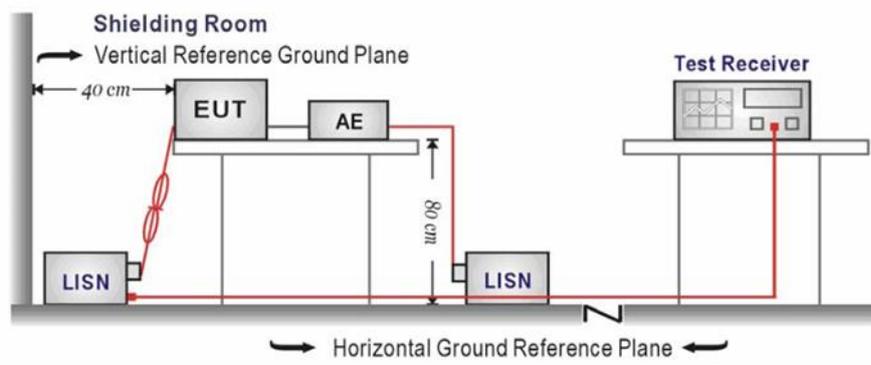
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
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.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST MODE:

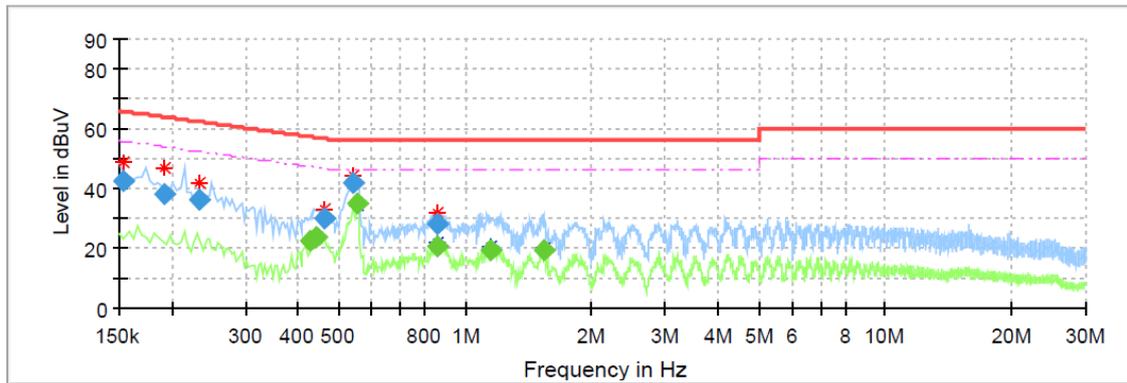
Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

Test Line:

L

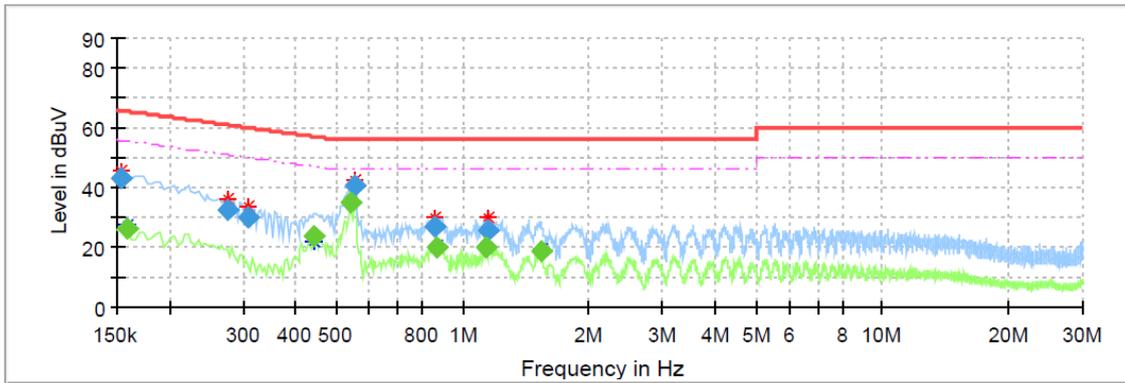


Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.154000	42.55	---	65.78	23.23	L1	10.1
0.191500	37.98	---	63.97	25.99	L1	10.1
0.231500	36.00	---	62.40	26.40	L1	10.1
0.427500	---	22.56	47.30	24.74	L1	10.1
0.443500	---	23.61	47.00	23.39	L1	10.1
0.459500	30.15	---	56.70	26.55	L1	10.1
0.539500	41.94	---	56.00	14.06	L1	10.1
0.555500	---	34.71	46.00	11.29	L1	10.1
0.855500	28.20	---	56.00	27.80	L1	10.1
0.859500	---	20.75	46.00	25.25	L1	10.1
1.151500	---	19.47	46.00	26.53	L1	10.1
1.535500	---	19.36	46.00	26.64	L1	10.1

Test Line:

N



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.154000	42.82	---	65.78	22.96	N	10.1
0.158000	---	26.44	55.57	29.13	N	10.1
0.275500	32.34	---	60.95	28.61	N	10.1
0.307500	30.08	---	60.04	29.96	N	10.1
0.443500	---	23.52	47.00	23.48	N	10.1
0.539500	---	35.00	46.00	11.00	N	10.1
0.551500	40.75	---	56.00	15.25	N	10.1
0.855500	26.77	---	56.00	29.23	N	10.1
0.867500	---	20.11	46.00	25.89	N	10.1
1.139500	---	19.71	46.00	26.29	N	10.1
1.147500	25.34	---	56.00	30.66	N	10.1
1.539500	---	18.52	46.00	27.48	N	10.1

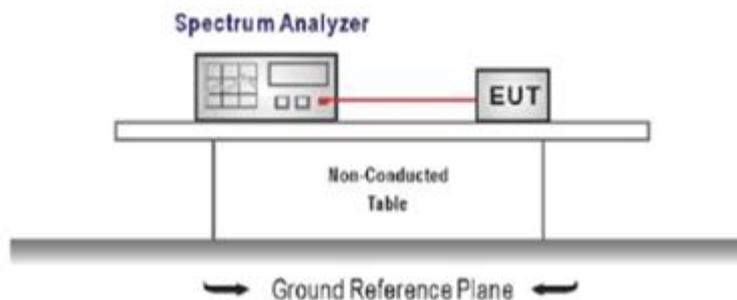
5.3. Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1):

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.

TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the pathloss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
RBW \geq the 20 dB bandwidth of the emission being measured, VBW \geq RBW
Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

TEST Data

Modulation type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
GFSK	00	-11.25	-11.30	≤ 30.00	Pass
	39	-11.80	-11.84		
	78	-13.00	-13.05		
π/4DQPSK	00	-8.90	-9.33	≤ 21.00	Pass
	39	-9.55	-10.00		
	78	-10.63	-11.04		
8DPSK	00	-8.41	-8.99	≤ 21.00	Pass
	39	-9.06	-9.65		
	78	-10.12	-10.74		

Modulation Type: GFSK	
CH00	<p>The spectrum plot for CH00 shows a GFSK signal centered at 2.402 GHz. The peak level is -11.25 dBm. The plot includes a grid with a 500 kHz resolution and a 5.0 MHz span. The y-axis represents power in dBm, ranging from -80 to 10. The x-axis represents frequency in GHz, ranging from 2.400 to 2.404. The signal is a smooth curve with a peak at 2.40183520 GHz.</p> <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 M1[1] -11.25 dBm 2.40183520 GHz CF 2.402 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 26 JAN 2022 14:37:45</p>
CH39	<p>The spectrum plot for CH39 shows a GFSK signal centered at 2.441 GHz. The peak level is -11.80 dBm. The plot includes a grid with a 500 kHz resolution and a 5.0 MHz span. The y-axis represents power in dBm, ranging from -80 to 10. The x-axis represents frequency in GHz, ranging from 2.439 to 2.443. The signal is a smooth curve with a peak at 2.44084520 GHz.</p> <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 M1[1] -11.80 dBm 2.44084520 GHz CF 2.441 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 26 JAN 2022 14:36:56</p>
CH78	<p>The spectrum plot for CH78 shows a GFSK signal centered at 2.48 GHz. The peak level is -15.00 dBm. The plot includes a grid with a 500 kHz resolution and a 5.0 MHz span. The y-axis represents power in dBm, ranging from -80 to 10. The x-axis represents frequency in GHz, ranging from 2.478 to 2.482. The signal is a smooth curve with a peak at 2.47985010 GHz.</p> <p>Ref Level 20.00 dBm Offset 1.00 dB RBW 1 MHz Att 30 dB SWI 4.21 us (~31 ms) VBW 3 MHz Mode Auto FFT Count 300/300 M1[1] -15.00 dBm 2.47985010 GHz CF 2.48 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 26 JAN 2022 14:36:08</p>

Modulation Type:		$\pi/4$ DQPSK
CH00	<p>MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Count 500/500 Att 30 dB SWI 1.01 ms VBW 5 MHz Mode Auto Sweep 1 Frequency Sweep M1[1] -8.90 dBm 2.40210490 GHz CF 2.402 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 26 JAN 2022 14:30:26</p>	
CH39	<p>MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Count 500/500 Att 30 dB SWI 1.01 ms VBW 5 MHz Mode Auto Sweep 1 Frequency Sweep M1[1] -9.55 dBm 2.44079520 GHz CF 2.441 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 26 JAN 2022 14:31:37</p>	
CH78	<p>MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 2 MHz Count 500/500 Att 30 dB SWI 1.01 ms VBW 5 MHz Mode Auto Sweep 1 Frequency Sweep M1[1] -10.63 dBm 2.48008490 GHz CF 2.48 GHz 1001 pts 500.0 kHz/ Span 5.0 MHz Date: 26 JAN 2022 14:32:25</p>	

Modulation Type: 8DPSK	
CH00	<p>The spectrum plot for CH00 shows a signal centered at 2.402 GHz. The peak level is -8.41 dBm. The plot includes a grid with frequency in GHz on the x-axis and power in dBm on the y-axis. The span is 5.0 MHz and the resolution bandwidth is 500.0 kHz. The date is 26 JAN 2022 14:33:04.</p>
CH39	<p>The spectrum plot for CH39 shows a signal centered at 2.441 GHz. The peak level is -9.06 dBm. The plot includes a grid with frequency in GHz on the x-axis and power in dBm on the y-axis. The span is 5.0 MHz and the resolution bandwidth is 500.0 kHz. The date is 26 JAN 2022 14:34:21.</p>
CH78	<p>The spectrum plot for CH78 shows a signal centered at 2.48 GHz. The peak level is -10.12 dBm. The plot includes a grid with frequency in GHz on the x-axis and power in dBm on the y-axis. The span is 5.0 MHz and the resolution bandwidth is 500.0 kHz. The date is 26 JAN 2022 14:35:19.</p>

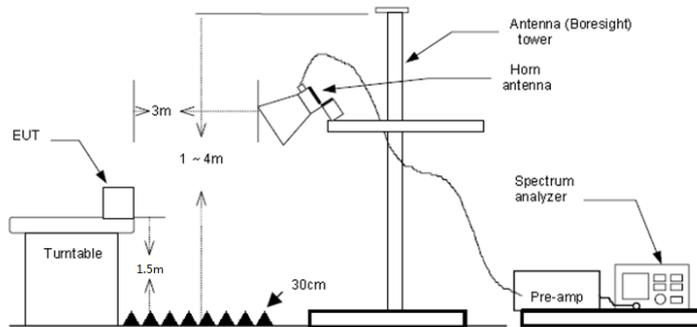
5.4. Radiated Band edge Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, Radiated Emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the Radiated Emissions limits specified in §15.209(a) (see §15.205(c)).

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10 .
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
5. Use the following spectrum analyzer settings:
 - a) Span shall wide enough to fully capture the emission being measured
 - b) Set RBW=100kHz for <1GHz, VBW=3*RBW, Sweep time=auto, Detector=peak, Trace=max hold
 - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)
 Averager level = Peak level + DCCF

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed Not Applicable

Note:

- 1) Level= Reading + Factor; Factor =Antenna Factor+ Cable Loss- Preamp Factor
- 2) Over Limit = Level - Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m).

Test channel:		CH00		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	37.75	27.96	5.43	37.56	33.58	74.00	-40.42	Peak
2	2323.92	42.27	27.90	5.44	37.55	38.06	74.00	-35.94	Peak
3	2390.03	38.42	27.72	5.53	37.45	34.22	74.00	-39.78	Peak

Test channel:		CH00		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2310.00	38.66	27.96	5.43	37.56	34.49	74.00	-39.51	Peak
2	2379.24	42.41	27.74	5.51	37.48	38.18	74.00	-35.82	Peak
3	2390.03	38.42	27.72	5.53	37.45	34.22	74.00	-39.78	Peak

Test channel:		CH78		Polarity			Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	49.51	27.43	5.64	37.26	45.32	74.00	-28.68	Peak
2	2500.00	38.75	27.40	5.66	37.26	34.55	74.00	-39.45	Peak

Test channel:		CH78		Polarity			Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	2483.50	45.53	27.43	5.64	37.26	41.34	74.00	-32.66	Peak
2	2500.00	37.93	27.40	5.66	37.26	33.73	74.00	-40.27	Peak

5.5. Radiated Spurious Emission

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Frequency	Limit (dBuV/m)	Value
0.009 MHz ~0.49 MHz	2400/F(kHz) @300m	Quasi-peak
0.49 MHz ~ 1.705 MHz	24000/F(kHz) @30m	Quasi-peak
1.705 MHz ~30 MHz	30 @30m	Quasi-peak

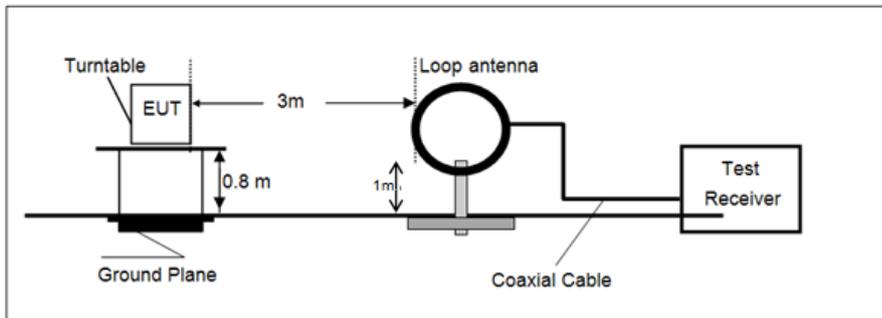
Note: Limit dBuV/m @3m = Limit dBuV/m @300m + 40*log(300/3)= Limit dBuV/m @300m +80,

Limit dBuV/m @3m = Limit dBuV/m @30m +40*log(30/3)= Limit dBuV/m @30m + 40.

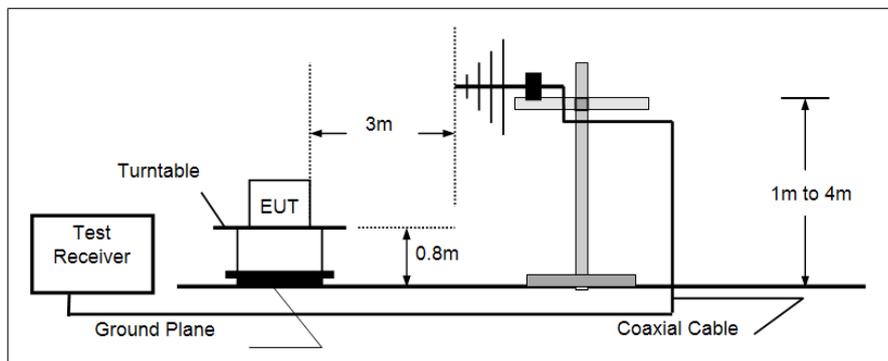
Frequency	Limit (dBuV/m @3m)	Value
30MHz~88MHz	40.00	Quasi-peak
88MHz~216MHz	43.50	Quasi-peak
216MHz~960MHz	46.00	Quasi-peak
960MHz~1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

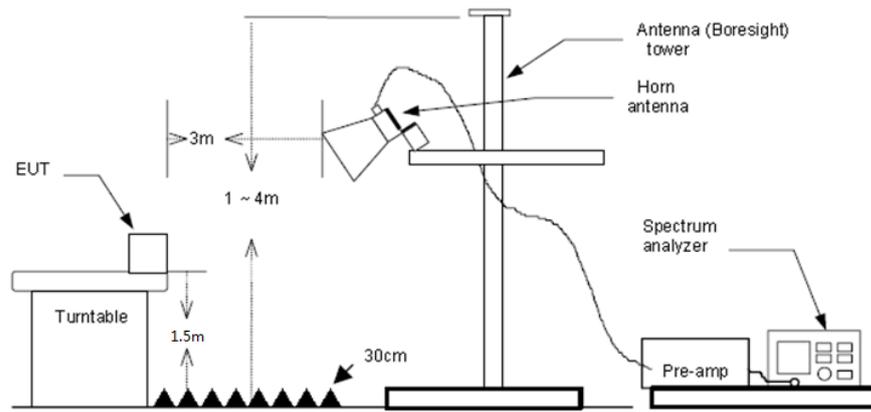
- 9 kHz ~ 30 MHz



- 30 MHz ~ 1 GHz



- Above 1 GHz



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10 .
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - a) Span shall wide enough to fully capture the emission being measured;
 - b) Below 1 GHz:
 - RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
 - If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - c) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)
 Averager level = Peak level + DCCF

TEST MODE:

Please refer to the clause 4.3

TEST RESULT

Passed **Not Applicable**

Note:

- 1) Above 1GHz Final Level = Read level + Antenna Factor + Cable Loss – Preamplifier Factor
- 2) Over Limit = Level - Limit
- 3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.

TEST DATA FOR 9 kHz ~ 30 MHz

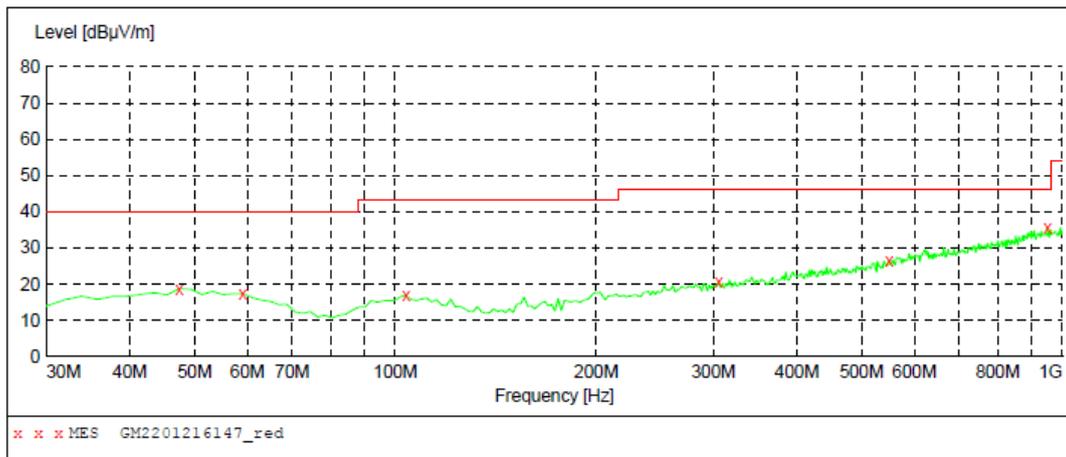
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

TEST DATA FOR 30 MHz ~ 1000 MHz

Have pre-scan all test channel, found CH39 which it was worst case, so only show the worst case's data on this report.

Polarization:

Horizontal



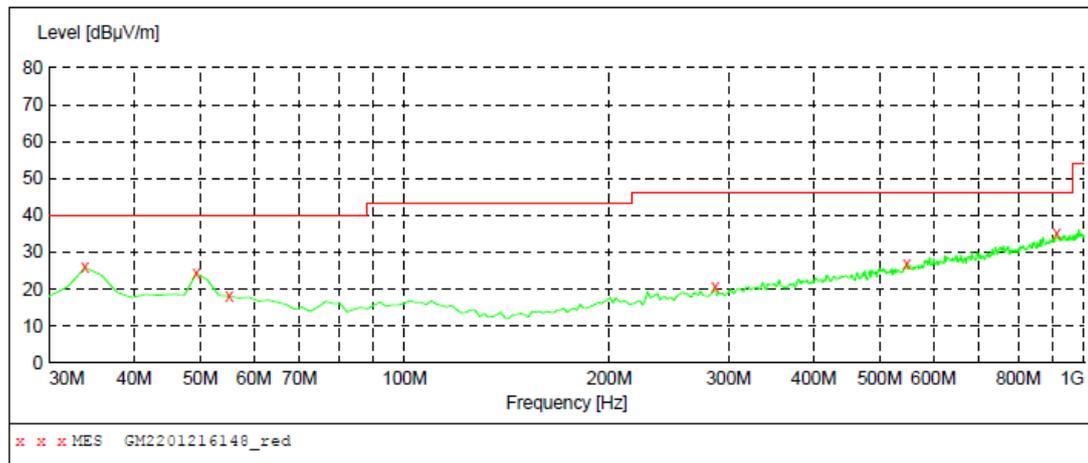
MEASUREMENT RESULT: "GM2201216147_red"

1/22/2022 1:45AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	18.80	-8.8	40.0	21.2	QP	100.0	143.00	HORIZONTAL
59.100000	17.40	-9.8	40.0	22.6	QP	100.0	47.00	HORIZONTAL
103.720000	17.00	-10.6	43.5	26.5	QP	100.0	313.00	HORIZONTAL
305.480000	20.50	-7.3	46.0	25.5	QP	100.0	62.00	HORIZONTAL
549.920000	26.50	-0.8	46.0	19.5	QP	100.0	143.00	HORIZONTAL
949.560000	35.60	7.4	46.0	10.4	QP	100.0	304.00	HORIZONTAL

Polarization:

Vertical



MEASUREMENT RESULT: "GM2201216148_red"

1/22/2022 1:47AM

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
33.880000	25.90	-12.0	40.0	14.1	QP	100.0	26.00	VERTICAL
49.400000	24.40	-9.0	40.0	15.6	QP	100.0	0.00	VERTICAL
55.220000	18.10	-9.2	40.0	21.9	QP	100.0	107.00	VERTICAL
286.080000	20.50	-7.9	46.0	25.5	QP	100.0	163.00	VERTICAL
547.980000	26.90	-0.8	46.0	19.1	QP	100.0	314.00	VERTICAL
910.760000	35.00	7.0	46.0	11.0	QP	100.0	0.00	VERTICAL

TEST DATA FOR 1 GHz ~ 25 GHz

Test channel		CH00			Polarity		Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1351.24	54.58	26.29	4.10	36.43	48.54	74.00	-25.46	Peak
2	1534.89	57.38	25.62	4.37	36.96	50.41	74.00	-23.59	Peak
3	2987.92	50.36	28.70	6.19	37.47	47.78	74.00	-26.22	Peak
4	5009.43	38.04	31.96	8.83	35.27	43.56	74.00	-30.44	Peak

Test channel		CH00			Polarity		Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1534.89	57.36	25.62	4.37	36.96	50.39	74.00	-23.61	Peak
2	2664.36	50.60	27.79	5.87	37.02	47.24	74.00	-26.76	Peak
3	2995.54	47.23	28.70	6.20	37.47	44.66	74.00	-29.34	Peak
4	4996.69	45.03	31.87	8.81	35.24	50.47	74.00	-23.53	Peak

Test channel		CH39			Polarity		Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1351.24	54.58	26.29	4.10	36.43	48.54	74.00	-25.46	Peak
2	1534.89	57.38	25.62	4.37	36.96	50.41	74.00	-23.59	Peak
3	2987.92	51.38	28.70	6.19	37.47	48.80	74.00	-25.20	Peak
4	6251.26	34.73	32.90	9.72	34.59	42.76	74.00	-31.24	Peak

Test channel		CH39			Polarity		Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1534.89	57.36	25.62	4.37	36.96	50.39	74.00	-23.61	Peak
2	2664.36	50.60	27.79	5.87	37.02	47.24	74.00	-26.76	Peak
3	2987.92	49.67	28.70	6.19	37.47	47.09	74.00	-26.91	Peak
4	5009.43	43.57	31.96	8.83	35.27	49.09	74.00	-24.91	Peak

Test channel		CH78			Polarity		Horizontal		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1351.24	54.58	26.29	4.10	36.43	48.54	74.00	-25.46	Peak
2	1534.89	57.38	25.62	4.37	36.96	50.41	74.00	-23.59	Peak
3	2995.54	52.42	28.70	6.20	37.47	49.85	74.00	-24.15	Peak
4	4983.99	42.21	31.77	8.80	35.22	47.56	74.00	-26.44	Peak

Test channel		CH78			Polarity		Vertical		
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1534.89	57.36	25.62	4.37	36.96	50.39	74.00	-23.61	Peak
2	2664.36	50.60	27.79	5.87	37.02	47.24	74.00	-26.76	Peak
3	2995.54	52.20	28.70	6.20	37.47	49.63	74.00	-24.37	Peak
4	4983.99	44.51	31.77	8.80	35.22	49.86	74.00	-24.14	Peak

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

-----End of Report-----