

TEST REPORT

Applicant Name : Cobra Electronics Corporation
Address : 6500 West Cortland Street, Chicago, Illinois, United States. 60707
Report Number : SZ4211012-52235E-RF-00C
FCC ID: BBO29LXMAX

Test Standard (s)

FCC PART 95

Sample Description

Product Type: CB Radio
Model No.: 29LXMAX
Trade Mark: Cobra
Date Received: 2021/10/12
Date of Test: 2021/11/11~2021/12/10
Report Date: 2021/12/10

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:



Ting Lü
EMC Engineer

Approved By:



Candy Li
EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*" .

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk "**". Customer model name, addresses, names, trademarks etc. are not considered data.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Frequency Range	26.965-27.405MHz
Rated Output Power	4 Watts
Modulation Technique	AM
Antenna Specification*	0dBi(It is provided by the applicant)
Voltage Range	DC 10.8~15.6V
Sample serial number	SZ4211012-52235E-RF-S1 (Assigned by ATC)
Sample/EUT Status	Good condition

Objective

This test report is in accordance with Part 2 and Part 95, Subpart D of the Federal Communication Commissions rules.

Test Methodology

EIA/TIA-382-A:Minimum standards – Citizens Band Radio Service Amplitude Modulation (AM) Transceivers Operation in the 27MHz Band.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF output power, conducted		0.73dB
Unwanted Emission, conducted		1.6dB
Emissions, Radiated	30MHz - 1GHz	4.28dB
	1GHz - 18GHz	4.98dB
Temperature		1°C
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

Listed by Innovation, Science and Economic Development Canada (ISED), the Registration Number is 5077A.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Channel List

Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	26.965	11	27.085	21	27.215	31	27.315
2	26.975	12	27.105	22	27.225	32	27.325
3	26.985	13	27.115	23	27.255	33	27.335
4	27.005	14	27.125	24	27.235	34	27.345
5	27.015	15	27.135	25	27.245	35	27.355
6	27.025	16	27.155	26	27.265	36	27.365
7	27.035	17	27.165	27	27.275	37	27.375
8	27.055	18	27.175	28	27.285	38	27.385
9	27.065	19	27.185	29	27.295	39	27.395
10	27.075	20	27.205	30	27.305	40	27.405

Channel 1, 19, 40 was selected to test.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

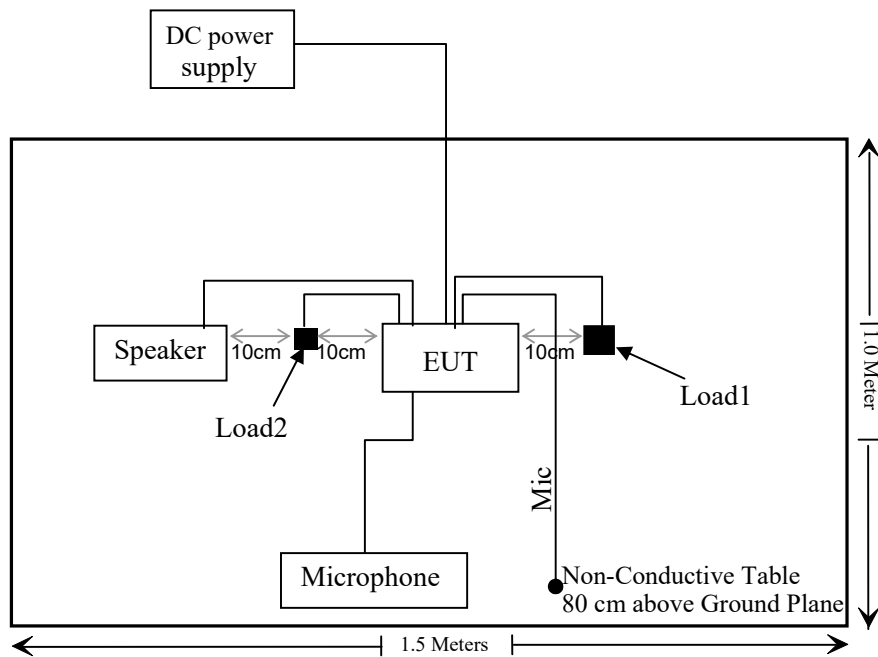
Manufacturer	Description	Model	Serial Number
Unknown	Load1	50ohm/100W	Unknown
Unknown	Load2	Unknown	Unknown
Unknown	Speaker	Unknown	Unknown
Unknown	Mic	Unknown	Unknown
UNI-T	DC Power Supply	UTP1306S	2109D0903324

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-Shielding Detachable DC Cable	1.0	EUT	DC Power Supply
Shielding Detachable RF Cable	1.0	EUT	Load1
Un-Shielding Detachable Audio Cable	1.0	EUT	Speaker
Un-Shielding Detachable Audio Cable	2.0	EUT	Mic
Un-Shielding Detachable Audio Cable	1.0	EUT	Microphone
Shielding Detachable Signal Cable	1.0	EUT	Load2

Block Diagram of Test Setup

For radiated emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§1.1310, §2.1091	Maximum Permissible Exposure(MPE)	Compliance
§2.1046, §95.967	RF Output Power	Compliance
§2.1047, §95.975	Modulation Characteristic	Compliance
§2.1049, §95.973, §95.979	Occupied Bandwidth & Emission Mask	Compliance
§2.1053, §95.979	Spurious Radiation Emission	Compliance
§ 2.1051, § 95.979	Conducted Spurious at Antenna Terminals	Compliance
§2.1055, §95.965	Frequency Stability	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde& Schwarz	Test Receiver	ESR	101817	2020/12/24	2021/12/23
SONOMA INSTRUMENT	Amplifier	310 N	186131	2020/12/25	2021/12/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2020/12/25	2021/12/24
SCHWARZBECK	LOOP ANTENNA	FMZB1516	1516131	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-194	2020/01/05	2023/01/04
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2020/01/05	2023/01/04
Unknown	RF Coaxial Cable	N-5m	No.3	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.5	2020/12/25	2021/12/24
Unknown	RF Coaxial Cable	N-1m	No.6	2020/12/25	2021/12/24
Anritsu	Signal Generator	68369B	004114	2021/7/31	2022/7/30
RF Conducted test					
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2021/07/06	2022/07/05
HP Agilent	RF Communication test set	8920B	3325U00859	2021/03/15	2022/03/15
Aeroflex/Weinschel	30dB Attenuator (Input 250W/Output 50W)	58-30-33	PS467	2020/12/25	2021/12/24
Mini-Circuits	High Pass filter	NHP-50+	15542	2021/11/29	2022/11/28
Gongwen	Temp. & Humid. Chamber	JB913R	GZ-WS004	2020/12/25	2021/12/24

* **Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

§1.1310, §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

According to subpart 1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (Minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Frequency (MHz)	Maximum Antenna Gain		Tune up conducted power (mW)	Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)				
26.965-27.405	0	1	4000	40	0.20	0.24

Note: 1. the antenna gain and tune up power was provide by applicant.
2. The BT/BLE and CB radio cannot transmit at same time

To maintain compliance with the FCC's RF exposure guidelines, please place the CB radio antenna at least 40cm from nearby persons.

Result: Compliance

FCC §2.1046 & §95.967 - RF OUTPUT POWER

Applicable Standard

Per FCC §95.967: Each CBRS transmitter type must be designed such that the transmitter power can not exceed the following limits:

(a) When transmitting amplitude modulated (AM) voice signals, the mean carrier power must not exceed 4 Watts.

Test Procedure

Conducted RF Output Power:

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Spectrum Analyzer Setting:

R B/W	Video B/W
10 kHz	30 kHz

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

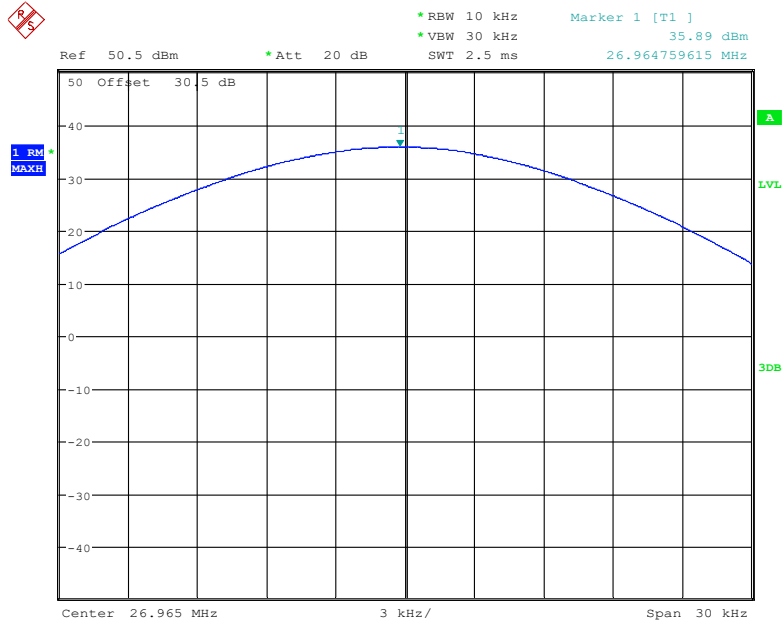
The testing was performed by Ting Lü on 2021-12-10.

Test Mode: Transmitting

Fc (MHz)	Reading (dBm)	Power (Watt)	Limit (Watt)
26.965	35.89	3.88	4.0
27.185	35.76	3.77	
27.405	35.99	3.97	

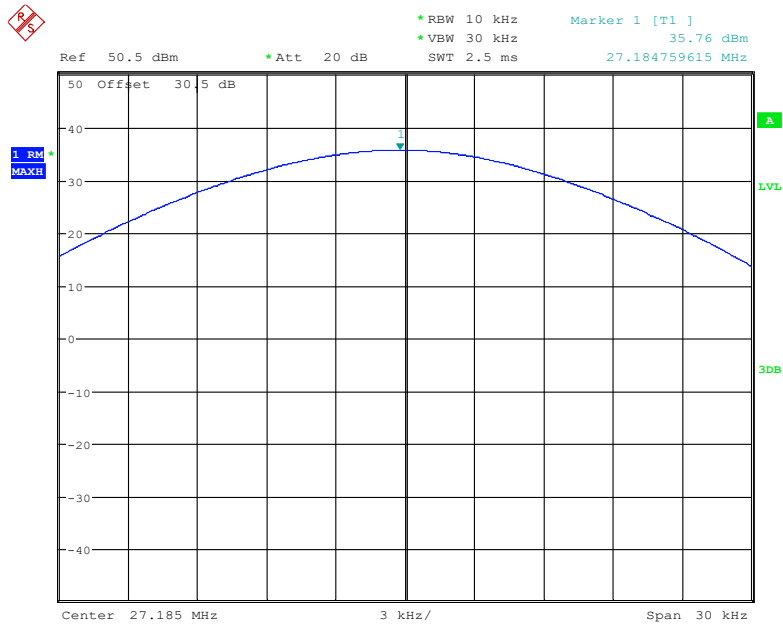
Test Result: Compliance.

Low Channel



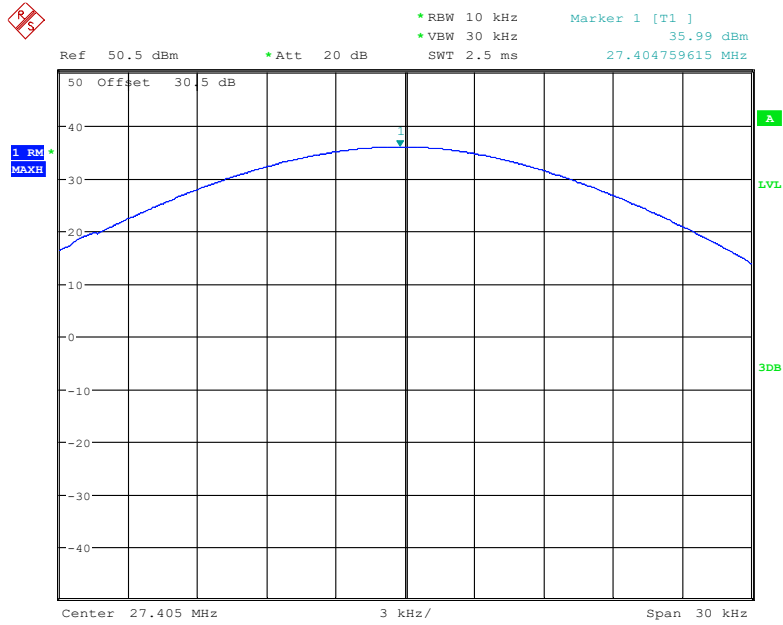
Date: 10.DEC.2021 16:21:59

Middle Channel



Date: 10.DEC.2021 16:22:38

High Channel



Date: 10.DEC.2021 16:02:56

FCC §2.1047 & §95.975 - MODULATION CHARACTERISTIC

Applicable Standard

Per FCC §95.975: Each CBRS transmitter type must be designed such that the modulation characteristics are in compliance with the rules in this section.

(a) When emission type A3E is transmitted with voice modulation, the modulation percentage must be at least 85%, but not more than 100%.

(b) When emission type A3E is transmitted by a CBRS transmitter having a transmitter output power of more than 2.5 W, the transmitter must contain a circuit that automatically prevents the modulation percentage from exceeding 100%.

Test Procedure

EIA/TIA-382-A Section 24.2 and section 25.2.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Ting Lü on 2021-12-10.

Please refer to the following tables and plots.

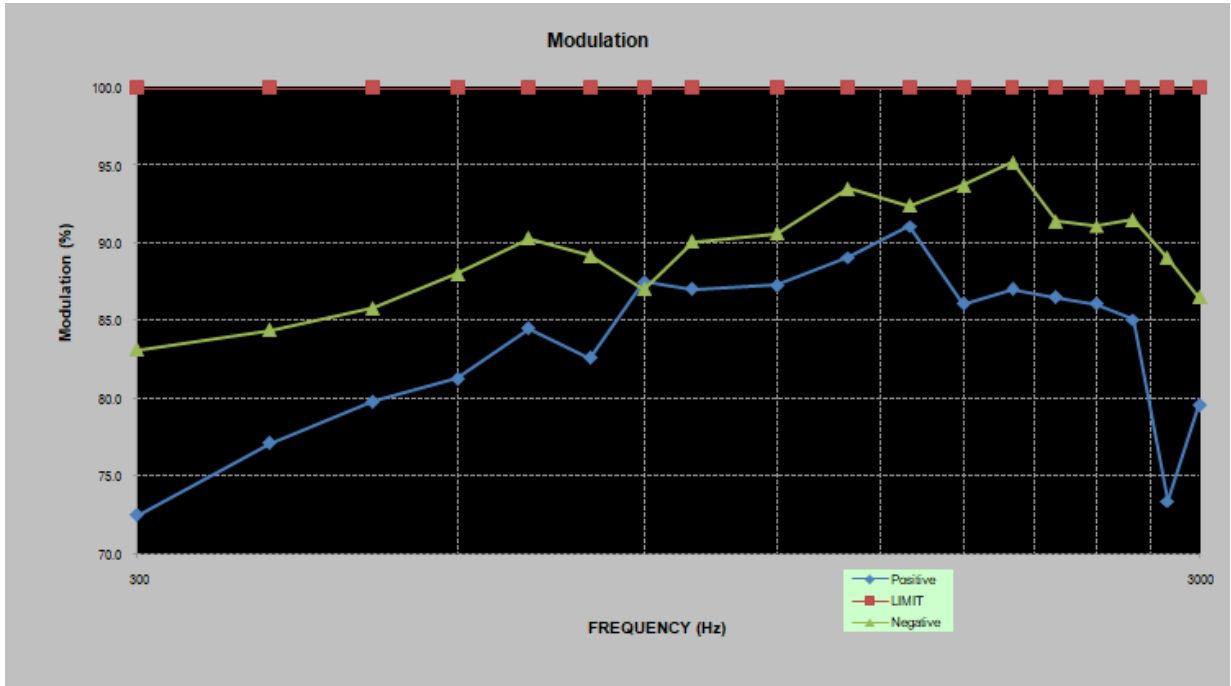
Test Mode: Transmitting

Modulation limiting

Carrier Frequency: 27.185MHz

Audio Frequency (Hz)	Modulation Level[%]		Limit [%]
	Positive	Negative	
300	72.500	83.100	100.00
400	77.100	84.400	100.00
500	79.800	85.800	100.00
600	81.300	88.000	100.00
700	84.500	90.300	100.00
800	82.600	89.200	100.00
900	87.500	87.000	100.00
1000	87.000	90.100	100.00
1200	87.300	90.6	100.00
1400	89.100	93.500	100.00
1600	91.100	92.400	100.00
1800	86.100	93.700	100.00
2000	87.000	95.200	100.00
2200	86.500	91.400	100.00
2400	86.100	91.100	100.00
2600	85.100	91.500	100.00
2800	73.400	89.000	100.00
3000	79.600	86.500	100.00

Note: Audio input level (the 40dB above 0dB reference): 100.4dBuV



FCC §2.1049 & §95.973 & §95.979- OCCUPIED BANDWIDTH AND EMISSION MASK

Applicable Standard

According to §95.973: Each CBRS transmitter type must be designed such that the occupied bandwidth does not exceed the authorized bandwidth for the emission type under test.

- (a) AM. The authorized bandwidth for emission type A3E is 8 kHz.
- (b) SSB. The authorized bandwidth for emission types J3E, R3E, and H3E is 4 kHz.

According to §95.979: Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(a) Attenuation requirements. The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table:

Emission type	Paragraph
A3E	(1), (3), (5), (6)
H3E, J3E, R3E	(2), (4), (5), (6)

- (1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency;
 - (2) 25 dB in the frequency band 2 kHz to 6 kHz removed from the channel center frequency;
 - (3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency;
 - (4) 35 dB in the frequency band 6 kHz to 10 kHz removed from the channel center frequency;
 - (5) $53 + 10 \log (P)$ dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth.
 - (6) 60 dB in any frequency band centered on a harmonic (*i.e.*, an integer multiple of two or more times) of the carrier frequency.
- (b) *Measurement bandwidths.* The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (a)(5) and (6) of this section is measured with a reference bandwidth of at least 30 kHz.
- (c) *Measurement conditions and procedures.* Subject to additional measurement standards and procedures established pursuant to part 2, subpart J, the following conditions and procedures must be used.

- (1) The unwanted emissions limits requirements in this section must be met both with and without the connection of permitted attachments, such as external speakers, microphones, power cords and/or antennas.
- (2) Either mean power output or peak envelope power output may be used for measurements, as appropriate for the emission type under test, provided that the same type of power measurement is used for both the transmitter output power and the power of the unwanted emissions.

Test Procedure

EIA/TIA-382-A Section 23.2.

Test Data

Environmental Conditions

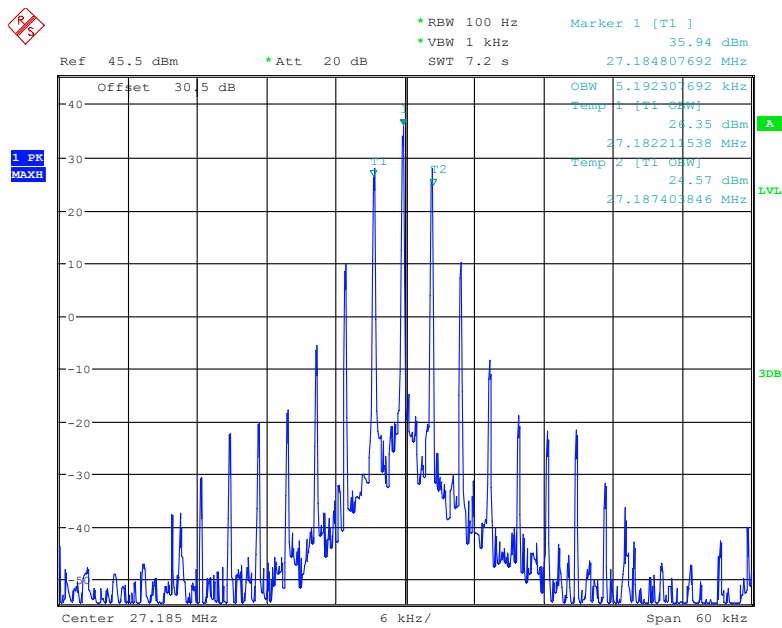
Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Ting Lü on 2021-12-10.

Test Mode: Transmitting

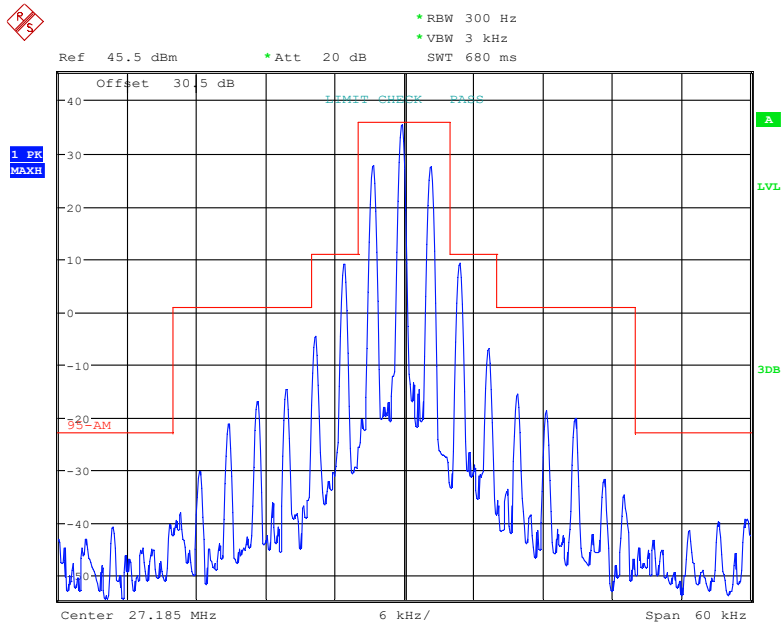
Fc (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)
27.185	5.19	8.0

OBW



Date: 10.DEC.2021 16:41:38

Emission Mask



Date: 10.DEC.2021 16:39:31

FCC §2.1053 & §95.979- SPURIOUS RADIATION EMISSION

Applicable Standard

FCC §2.1053 and §95.979: Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(a) *Attenuation requirements.* The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table:

Emission type	Paragraph
A3E	(1), (3), (5), (6)
H3E, J3E, R3E	(2), (4), (5), (6)

(1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency;

(2) 25 dB in the frequency band 2 kHz to 6 kHz removed from the channel center frequency;

(3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency;

(4) 35 dB in the frequency band 6 kHz to 10 kHz removed from the channel center frequency;

(5) $53 + 10 \log (P)$ dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth.

(6) 60 dB in any frequency band centered on a harmonic (*i.e.*, an integer multiple of two or more times) of the carrier frequency.

(b) *Measurement bandwidths.* The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (a)(5) and (6) of this section is measured with a reference bandwidth of at least 30 kHz.

(c) *Measurement conditions and procedures.* Subject to additional measurement standards and procedures established pursuant to part 2, subpart J, the following conditions and procedures must be used.

(1) The unwanted emissions limits requirements in this section must be met both with and without the connection of permitted attachments, such as external speakers, microphones, power cords and/or antennas.

(2) Either mean power output or peak envelope power output may be used for measurements, as appropriate for the emission type under test, provided that the same type of power measurement is used for both the transmitter output power and the power of the unwanted emissions.

Test Procedure

EIA/TIA-382-A Section 22.2.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Caro hu on 2021-11-11.

Test Mode: Transmitting(Pre-scan in the X,Y and Z axes of orientation, the worst case orientation was recorded)

Frequency (MHz)	Receiver Reading (dBm)	Turntable Degree	Rx Antenna		Substituted Factor (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)				
27.185MHz								
217.45	-40.76	113	1.2	H	-3.69	-44.45	-24	20.45
217.45	-34.24	51	1.7	V	-1.61	-35.85	-24	11.85
271.77	-44.81	191	2.1	H	-1.49	-46.3	-24	22.3
271.77	-35.45	280	1.4	V	-1.65	-37.1	-24	13.1
299.05	-43.35	81	1.3	H	-0.89	-44.24	-24	20.24
299.05	-32.18	311	1.1	V	1.24	-30.94	-24	6.94
353.37	-47.61	125	1.8	H	1.93	-45.68	-24	21.68
353.37	-40.61	82	2	V	3.33	-37.28	-24	13.28
434.97	-49.26	310	1.2	H	2.96	-46.3	-24	22.3
434.97	-43.48	34	1.6	V	4.88	-38.6	-24	14.6
543.73	-33.58	145	1.8	H	4.08	-29.5	-24	5.5
543.73	-33.48	198	1.2	V	6.18	-27.3	-24	3.3
570.89	-34.05	348	1.3	H	4.08	-29.97	-24	5.97
570.89	-33.59	187	1.7	V	6.18	-27.41	-24	3.41
625.21	-36.18	278	1.9	H	6.76	-29.42	-24	5.42
625.21	-35.13	237	1.4	V	8.25	-26.88	-24	2.88
652.49	-39.73	177	2	H	6.76	-32.97	-24	8.97
679.65	-43.72	188	2	V	8.25	-35.47	-24	11.47
733.97	-55.54	289	1.3	H	9.8	-45.74	-24	21.74
733.97	-51.88	117	1.2	V	11.04	-40.84	-24	16.84
951.5	-49.65	261	1.3	H	11.79	-37.86	-24	13.86
951.5	-52.64	59	2.1	V	12.48	-40.16	-24	16.16

Note:

Absolute Level = Reading Level + Substituted Factor

Substituted Factor contains: SG Level - Cable loss+ Antenna Gain

Margin = Limit - Absolute Level

Limit for harmonic: 60dB below the rated power = 36dBm-60dB=-24dBm

Limit for frequencies other than harmonic (exclude $f_c \pm 250\%$ authorized bandwidth): 53 + 10 log (P) dB below the rated power=-23dBm

The other spurious emission which is 20dB to the limit was not recorded.

FCC§2.1051 & §95.979 - CONDUCTED SPURIOUS AT ANTENNA TERMINALS

Applicable Standard

FCC §2.1051 and §95.979: Each CBRS transmitter type must be designed to comply with the applicable unwanted emissions limits in this section.

(a) *Attenuation requirements.* The power of unwanted emissions must be attenuated below the transmitter output power in Watts (P) as specified in the applicable paragraphs listed in the following table:

Emission type	Paragraph
A3E	(1), (3), (5), (6)
H3E, J3E, R3E	(2), (4), (5), (6)

(1) 25 dB (decibels) in the frequency band 4 kHz to 8 kHz removed from the channel center frequency;

(2) 25 dB in the frequency band 2 kHz to 6 kHz removed from the channel center frequency;

(3) 35 dB in the frequency band 8 kHz to 20 kHz removed from the channel center frequency;

(4) 35 dB in the frequency band 6 kHz to 10 kHz removed from the channel center frequency;

(5) $53 + 10 \log (P)$ dB in any frequency band removed from the channel center frequency by more than 250% of the authorized bandwidth.

(6) 60 dB in any frequency band centered on a harmonic (*i.e.*, an integer multiple of two or more times) of the carrier frequency.

(b) *Measurement bandwidths.* The power of unwanted emissions in the frequency bands specified in paragraphs (a)(1) through (4) of this section is measured with a reference bandwidth of 300 Hz. The power of unwanted emissions in the frequency ranges specified in paragraphs (a)(5) and (6) of this section is measured with a reference bandwidth of at least 30 kHz.

(c) *Measurement conditions and procedures.* Subject to additional measurement standards and procedures established pursuant to part 2, subpart J, the following conditions and procedures must be used.

(1) The unwanted emissions limits requirements in this section must be met both with and without the connection of permitted attachments, such as external speakers, microphones, power cords and/or antennas.

(2) Either mean power output or peak envelope power output may be used for measurements, as appropriate for the emission type under test, provided that the same type of power measurement is used for both the transmitter output power and the power of the unwanted emissions.

Test Procedure

EIA/TIA-382-A Section 21.2.

Test Data

Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

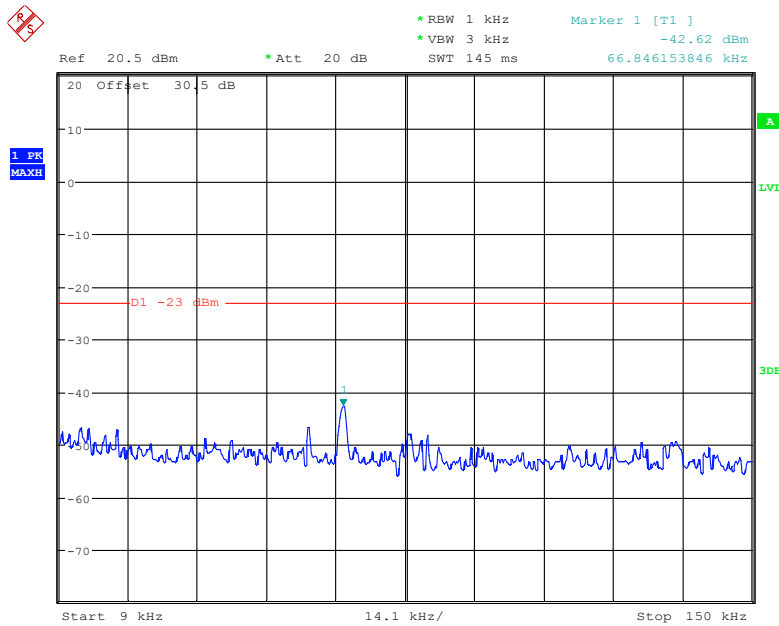
The testing was performed by Ting Lü on 2021-12-10.

Test Mode: Transmitting

Limit for harmonic: 60dB below the rated power = 36dBm-60dB=-24dBm

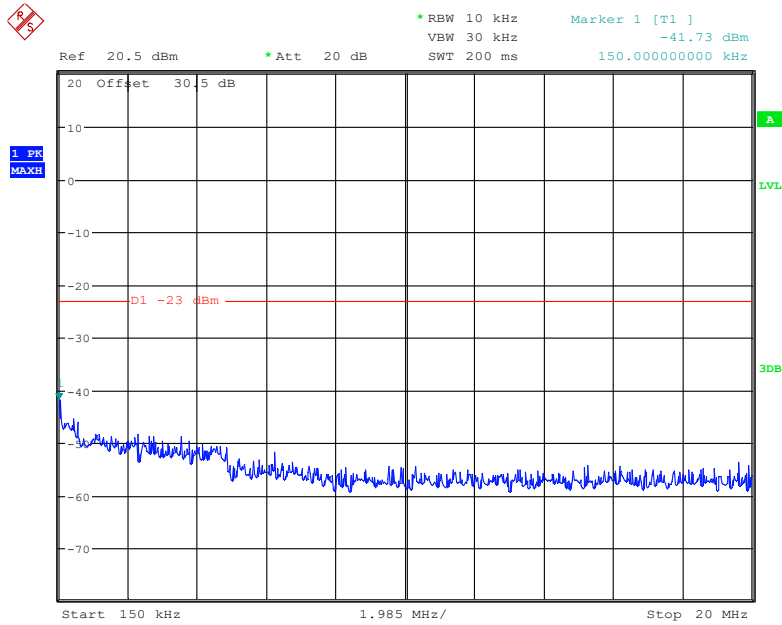
Limit for frequencies other than harmonic(exclude $f_c \pm 250\%$ authorized bandwidth): $53 + 10 \log (P)$ dB below the rated power=-23dBm

9 kHz -150 kHz



Date: 10.DEC.2021 16:05:10

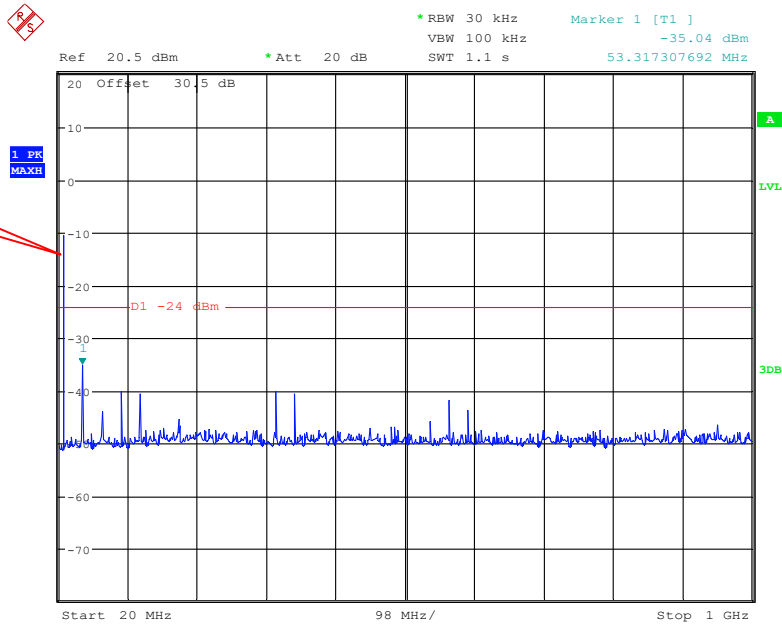
150 kHz -20 MHz



Date: 10.DEC.2021 16:06:14

20 MHz -1 GHz

Fundamental test with notch filter



Date: 10.DEC.2021 16:11:21

Note: for 20MHz-1GHz, the tighter limit -24dBm was used.

FCC§2.1055& §95.965 - FREQUENCY STABILITY

Applicable Standard

§95.965: Each CBRS transmitter type must be designed such that the transmit carrier frequency (or in the case of SSB transmissions, the reference frequency) remains within 50 parts-per-million of the channel center frequencies specified in §95.963 under all normal operating conditions.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC/DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The power cable and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Ting Lü on 2021-12-10.

Test Mode: Transmitting

Reference Frequency: 27.185 MHz				
Temperature (°C)	Voltage (V _{DC})	Reading (MHz)	Frequency Error (ppm)	Limit (ppm)
-30	13.8	27.184859	-5.187	50
-20		27.184836	-6.033	
-10		27.184876	-4.561	
0		27.184824	-6.474	
10		27.184831	-6.217	
20		27.184835	-6.070	
30		27.184854	-5.371	
40		27.184821	-6.585	
50		27.184824	-6.474	
20	10.8	27.184831	-6.217	
20	15.6	27.184825	-6.437	

***** END OF REPORT *****