

TEST REPORT

Applicant Name : XIAMEN CAME TECHNOLOGY CO.,LTD
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Report Number : SZNS1220329-11273E-RF-00
FCC ID: 2ATOR-KUMINIK8-2R

Test Standard (s)

FCC PART 15D

Sample Description

Product Type: Wireless Headsets
Model No.: KUMINIK8-2R
Multiple Model(s) No.: KUMINIK8-1R (Please refer to DOS for Model difference)
Trade Mark: CAME-TV
Date Received: 2022/03/29
Report Date: 2022/06/22

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

Prepared and Checked By:

Approved By:



Nick Fang
EMC Engineer

Robert Li
EMC Engineer

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

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TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....	4
OBJECTIVE.....	4
TEST METHODOLOGY.....	4
MEASUREMENT UNCERTAINTY.....	5
TEST FACILITY.....	5
SYSTEM TEST CONFIGURATION.....	6
DESCRIPTION OF TEST CONFIGURATION.....	6
EQUIPMENT MODIFICATIONS.....	6
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS.....	6
EXTERNAL I/O CABLE.....	6
SUMMARY OF TEST RESULTS.....	7
TEST EQUIPMENT LIST.....	8
FCC §1.1307&§2.1093 - RF EXPOSURE.....	9
APPLICABLE STANDARD.....	9
TEST RESULT.....	9
§ 15.317, § 15.203 ANTENNA REQUIREMENT.....	10
APPLICABLE STANDARD.....	10
ANTENNA CONNECTOR CONSTRUCTION.....	10
FCC§15.323 (A) - EMISSION BANDWIDTH.....	11
APPLICABLE STANDARD.....	11
TEST PROCEDURE.....	11
TEST DATA.....	11
FCC§15.319 (C) - PEAK TRANSMIT POWER.....	14
APPLICABLE STANDARD.....	14
TEST PROCEDURE.....	14
TEST DATA.....	14
FCC§15.319 (D) - POWER SPECTRAL DENSITY.....	17
APPLICABLE STANDARD.....	17
TEST PROCEDURE.....	17
TEST DATA.....	17
FCC§15.323 (D) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND.....	21
APPLICABLE STANDARD.....	21
TEST PROCEDURE.....	21
TEST DATA.....	21
FCC§15.323 (F) - FREQUENCY STABILITY.....	31
APPLICABLE STANDARD.....	31
TEST PROCEDURE.....	31
TEST DATA.....	31
FCC§15.323 (C) (E) & §15.319(F) – SPECIFIC REQUIREMENTS FOR UPCS DEVICE.....	33
APPLICABLE STANDARD.....	33

TEST PROCEDURE	33
TEST DATA	33
1) AUTOMATIC DISCONTINUATION OF TRANSMISSION, FCC §15.319(F)	34
2) MONITORING TIME, FCC §15.323(c) (1)	34
3) LOWER MONITORING THRESHOLD, FCC §15.323(c) (2)	34
4) MAXIMUM TRANSMIT PERIOD, FCC §15.323(c) (3)	35
5) SYSTEM ACKNOWLEDGEMENT, FCC §15.323(c) (4)	35
6) LEAST INTERFERED CHANNEL (LIC), FCC §15.323(c) (5)	36
7) RANDOM WAITING, FCC §15.323(c) (6)	38
8) MONITORING BANDWIDTH AND REACTION TIME, FCC §15.323(c) (7)	38
9) MONITORING ANTENNA, FCC §15.323(c) (8)	39
10) MONITORING THRESHOLD RELAXATION, FCC §15.323(c) (9)	40
11) DUPLEX CONNECTIONS, FCC §15.323(c) (10).....	40
12) ALTERNATIVE MONITORING INTERVAL, FCC §15.323(c) (11).....	41
13) FAIR ACCESS, FCC §15.323(c) (12)	42
14) FRAME REPETITION STABILITY FRAME PERIOD AND JITTER, FCC§15.323 (E)	42

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	1921.536-1928.448 MHz
Maximum conducted peak output power	19.68dBm
Modulation Technique	GFSK
Antenna Specification*	0 dBi(It is provided by the applicant)
Voltage Range	DC 3.7V from battery
Sample serial number	SZNS1220329-11273E-RF-S1 (Assigned by ATC, Shenzhen)
Sample/EUT Status	Good condition
Normal/Extreme Condition	N.V.: Nominal Voltage: 3.7V _{DC} L.T.: Low Temperature 0°C N.T.: Normal Temperature +25°C H.T.: High Temperature +40°C Note: the extreme test condition was declared by applicant.

Note: Pre-scanned all models, only the worst case KUMINIK8-2R test was reported.

Objective

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart D, section 15.317, 15.319 and 15.323 rules. The EMI measurements were performed according to the measurement procedure described in ANSI C63.17 – 2013.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.17 - 2013, American National Standard Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices.

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.

Each test item follows test standards and with no deviation.

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
	18GHz- 26.5GHz	5.06dB
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 to testing mode which is provided by the manufacturer.

Equipment Modifications

No modification was made to the EUT tested.

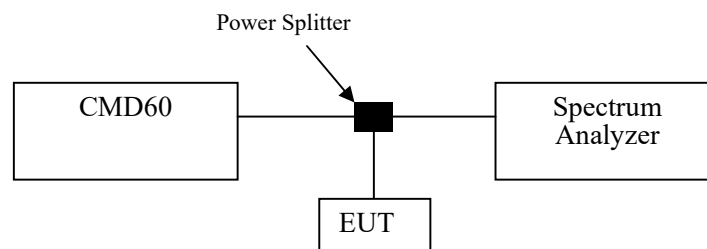
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S
Rohde & Schwarz	Digital Radio Communication Tester	CMD60	830861/029
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495

External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

Test Set up Connect:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 & 2.1093	RF EXPOSURE	Compliant
§ 15.317, § 15.203	Antenna Requirement	Compliant
§ 15.315, § 15.207	Conducted Emission	Not Applicable
§ 15.323 (a)	Emission Bandwidth	Compliant
§ 15.319 (c)	Peak Transmit Power	Compliant
§ 15.319 (d)	Power Spectral Density	Compliant
§ 15.323 (d)	Emission Inside and Outside the sub-band	Compliant
§ 15.323 (f)	Frequency Stability	Compliant
§ 15.323 (c)(e) § 15.319 (f)	Specific Requirements for UPCS	Compliant

Not Applicable: EUT is powered by battery.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted test					
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101495	2021/12/13	2022/12/12
Rohde & Schwarz	Digital Radio Communication Tester	CMD60	830861/029	2021/07/09	2022/07/08
Mini-Circuits	Power Splitter	DC-18000MHz	SF10944151S	2021/12/14	2022/12/13
Gongwen	Temp. & Humid. Chamber	HSD-500	109	2021/10/14	2022/10/13
AGILENT	Vector Signal Generator	N5182A	MY50143401	2021/12/13	2022/12/12
Rohde&Schwarz	Vector Signal Generator	SMBV100A	260434	2021/12/13	2022/12/12
Fluke	Multi Meter	45	7664009	2021/12/14	2022/12/13
Manson	DC Power Source	KPS-6604	ATCS-205	NCR	NCR
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	

* **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).

FCC §1.1307&§2.1093 - RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: SZNS1220329-11273E-SA

§ 15.317, § 15.203 ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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 shall be considered sufficient to comply with the provisions of this Section. 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.

Antenna Connector Construction

The EUT has one internal antenna which was permanently attached and the antenna gain is 0 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

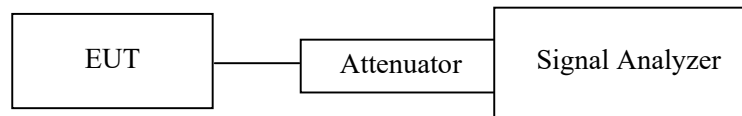
FCC§15.323 (a) - EMISSION BANDWIDTH

Applicable Standard

Operation shall be contained within the 1920–1930 MHz band. The emission bandwidth shall be less than 2.5 MHz and greater than 50 kHz.

The emission bandwidth is measured in accordance with ANSI C63.17 sub-clause 6.1.3 using the setup below:

Test Setup 1:



The width, in Hz, of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that is 26 dB down relative to the maximum level of the modulated carrier. It is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1% of the emission band-width of the device under measurement. [Extraction from 47 CFR 15, subpart D, 15.303 (C)].

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

Resolution bandwidth	1.0% of the emission bandwidth (as close as possible)
Video bandwidth	>3 times the resolution bandwidth
Number of sweeps	sufficient to stability the trace
Detection mode	peak detection with maximum hold

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

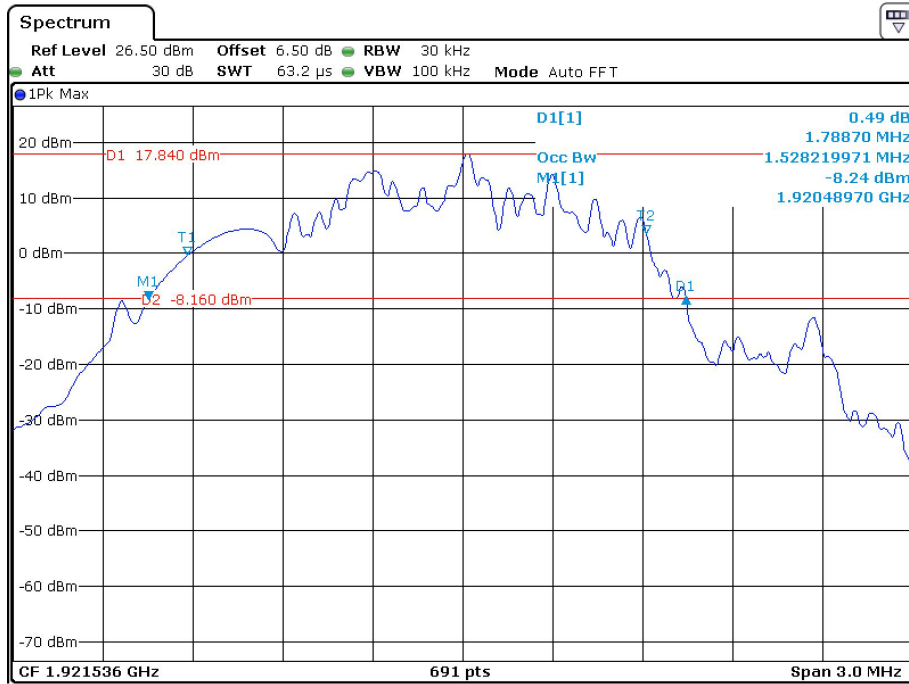
The testing was performed by Nick Fang on 2022-05-26.

Test mode: Transmitting

Channel	Center Frequency (MHz)	99% Emission Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)	Limit
Low	1921.536	1.528	1.789	50 kHz ~ 2.5 MHz
Middle	1924.992	1.567	1.897	50 kHz ~ 2.5 MHz
High	1928.448	1.628	1.919	50 kHz ~ 2.5 MHz

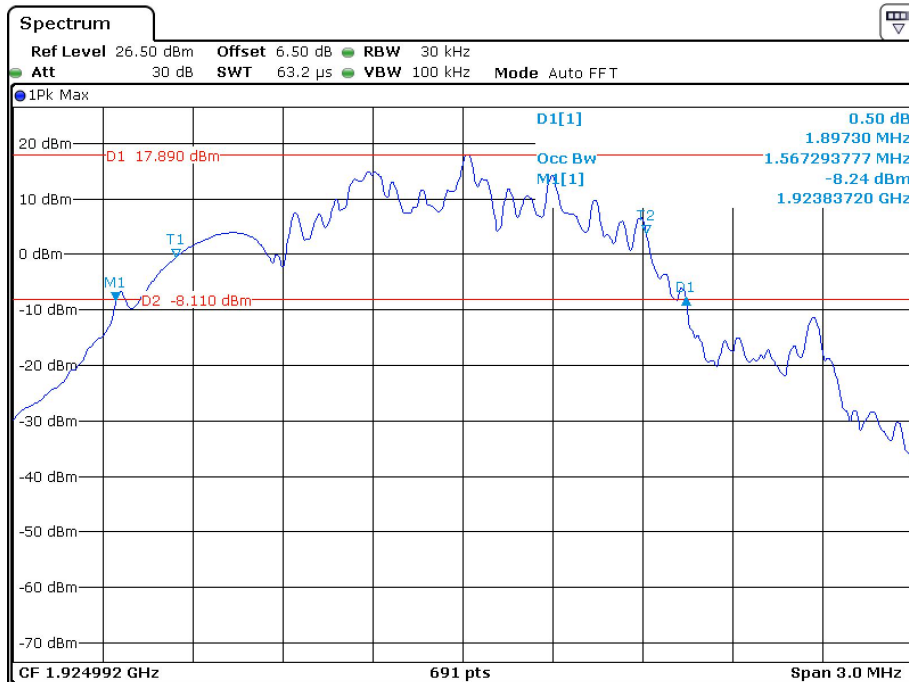
Test Result: Compliance. Please refer to the following plots.

Low Channel



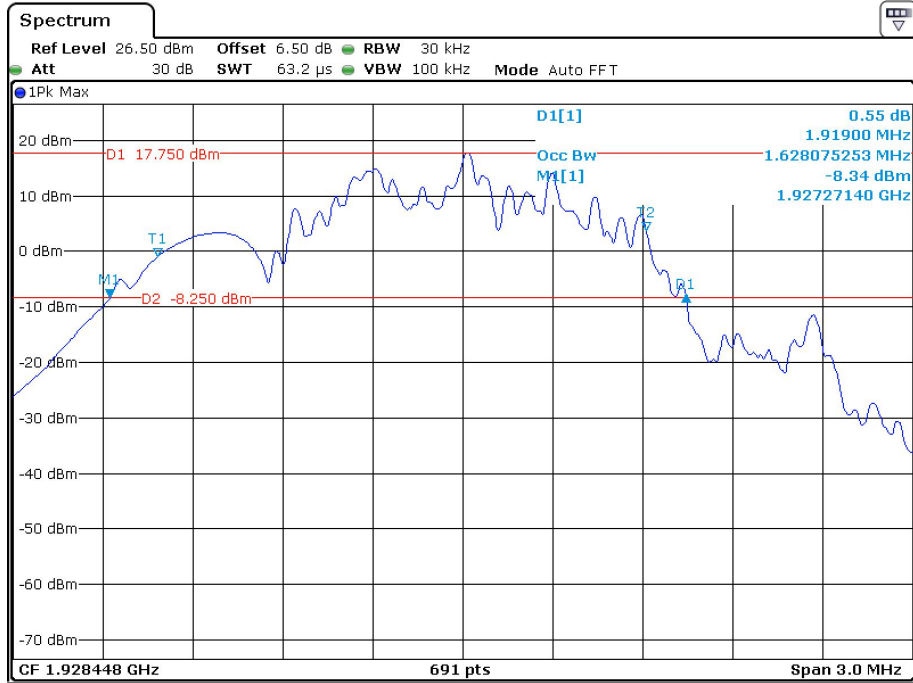
Date: 26.MAY.2022 18:16:37

Middle Channel



Date: 26.MAY.2022 18:16:02

High Channel



Date: 26.MAY.2022 18:15:20

FCC§15.319 (c) - PEAK TRANSMIT POWER

Applicable Standard

The peak power output as measured over an interval of time equal to the frame rate or transmission burst of the device under all conditions of modulation. Usually this parameter is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used[47 CFR 15, subpart D, 15.303].

The peak transmit power is according to ANSI C63.17-2013 §6.1.2

Per FCC Part15.319 (c) Peak transmit power shall not exceed 100 microwatts multiplied by the square root of the emission bandwidth in hertz. Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Per FCC Part15.319 (e), the peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

Calculation of Peak Transmit Power Limit:

$$\text{Peak Transmit Power Limit} = 100\mu\text{W} \times (\text{EBW})^{1/2}$$

EBW is the transmit emission bandwidth in Hz determined in the other test item:

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

RBW	≥ Emission bandwidth
Video bandwidth	≥ RBW
Span	Zero
Center frequency	Nominal center frequency of channels
Amplitude scale	Log (linear may be used if analyzer has sufficient linear dynamic range and accuracy)
Detection	Peak detection
Trigger	Video
Sweep rate	Sufficiently rapid to permit the transmit pulse to be resolved accurately

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

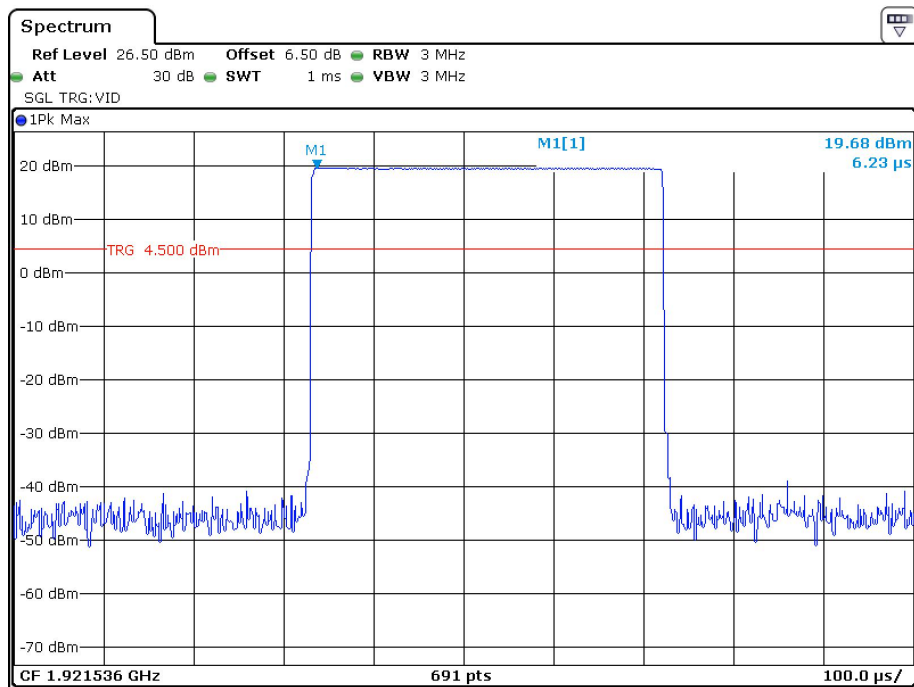
The testing was performed by Nick Fang on 2022-05-26.

Test Result: Compliance. Please refer to the following table and plots.

Test mode: Transmitting:

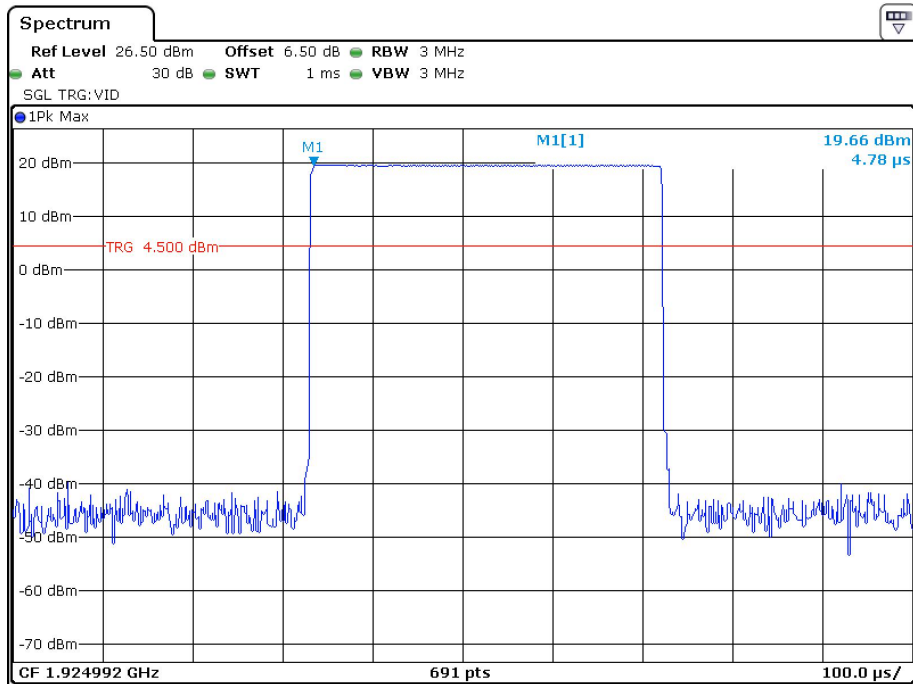
Channel	Frequency (MHz)	Peak Transmit Power (dBm)	Limit (dBm)
Low	1921.536	19.68	21.26
Middle	1924.992	19.66	21.39
High	1928.448	19.61	21.42
EBW _{Low channel} = 1789000Hz, EBW _{Middle channel} = 1897000 Hz, EBW _{High channel} = 1919000 Hz Peak Transmit Power Limit = $100(\text{EBW})^{1/2} \mu\text{W}$			

Low Channel



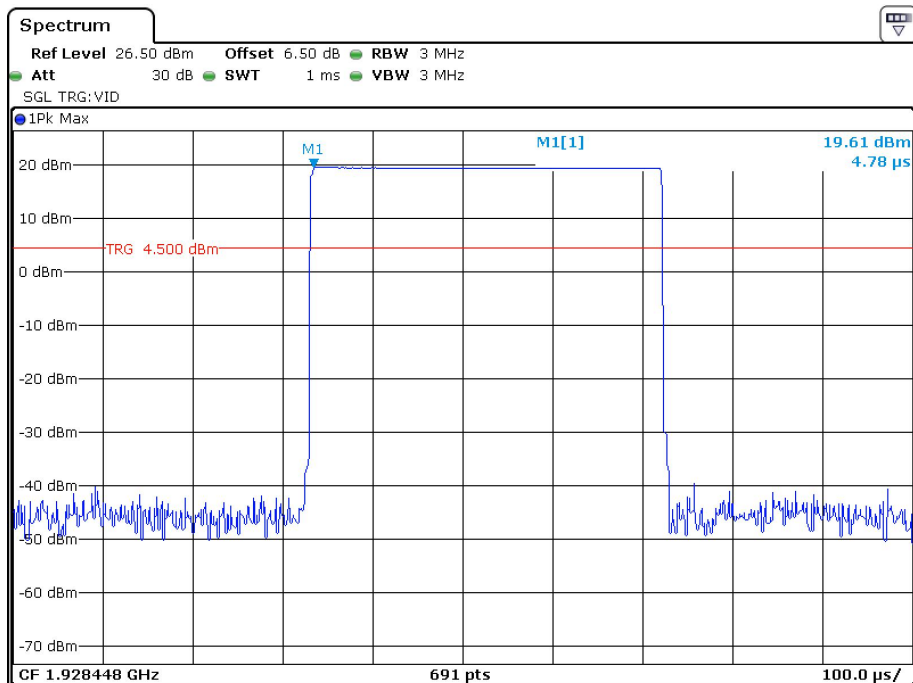
Date: 26.MAY.2022 17:51:11

Middle Channel



Date: 26.MAY.2022 17:50:22

High Channel



Date: 26.MAY.2022 17:49:55

FCC§15.319 (d) - POWER SPECTRAL DENSITY

Applicable Standard

The average pulse energy in a 3 kHz bandwidth is divided by the pulse duration.

The power spectral density shall not exceed 3mW in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

The power spectral density is measured in accordance with ANSI C63.17.2013 Clause 6.1.5.

Test Procedure

Using the manufacturer's information on occupied bandwidth set the spectrum analyzer as follows:

RBW	3 kHz
Video bandwidth	$\geq 3 \times \text{RBW}$
Span	Zero span at frequency with the maximum level (frequency determined in 6.1.3 if the same type of signal (continuous versus burst) was used in 6.1.3)
Center frequency	Spectral peak as determined in 6.1.3
Sweep time	For burst signals, sufficient to include essentially all of the maximum length burst at the output of a 3 kHz filter (e.g., maximum input burst duration plus 600 μs). For continuous signals, 20 ms.
Amplitude scale	Log power
Detection	Sample detection and averaged for a minimum of 100 sweeps
Trigger	External or internal

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

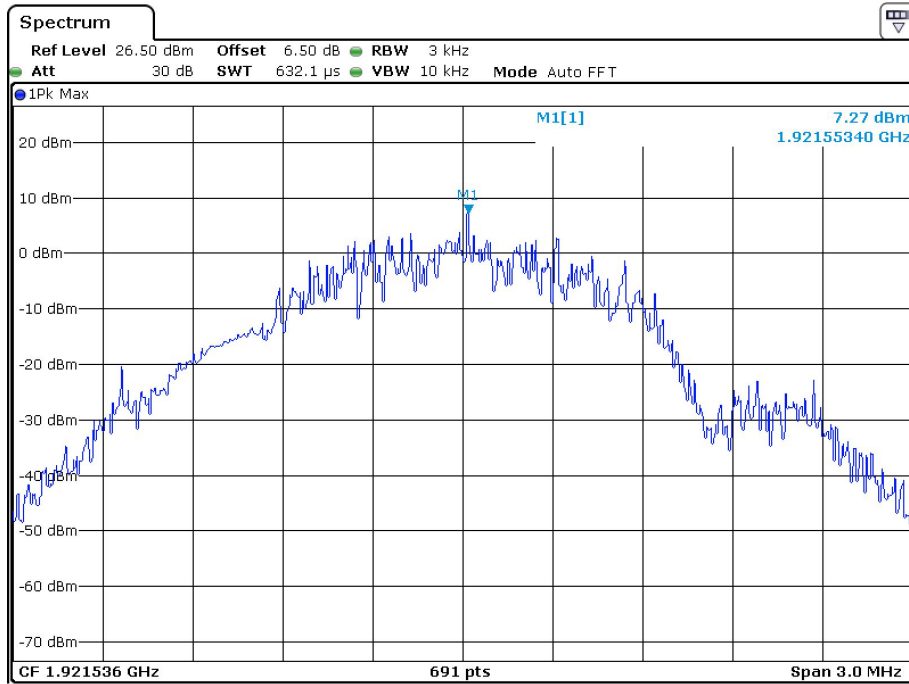
The testing was performed by Nick Fang on 2022-05-26.

Test Result: Compliance. Please refer to following table and plots

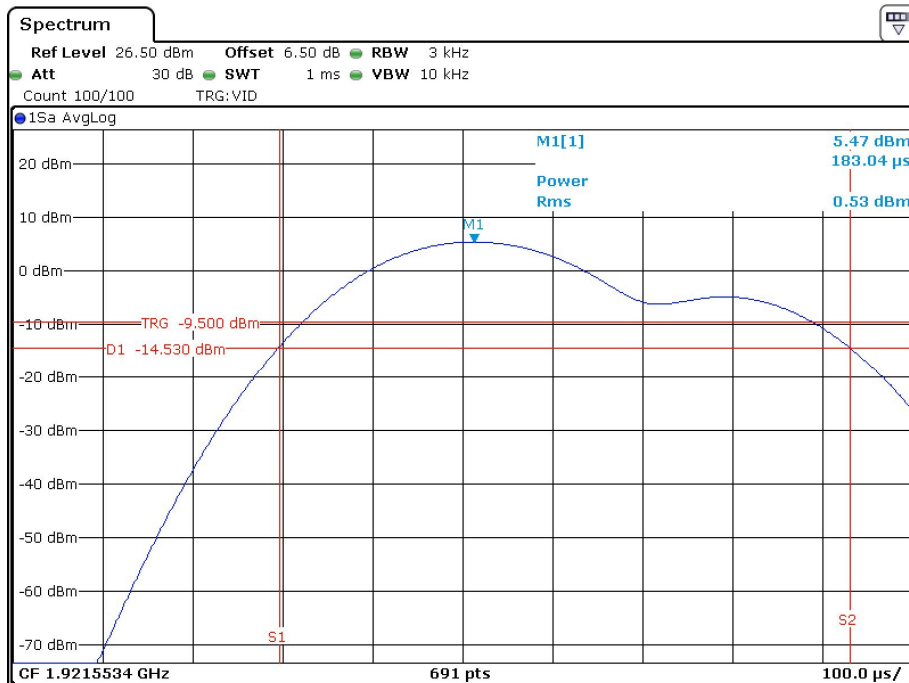
Test mode: Transmitting

Channel	Frequency (MHz)	Power Spectral Density		Limit (mW/3kHz)
		(dBm/3kHz)	(mW/3kHz)	
Low	1921.536	0.53	1.13	3
Middle	1924.992	0.55	1.14	3
High	1928.448	-0.48	0.90	3

Low Channel

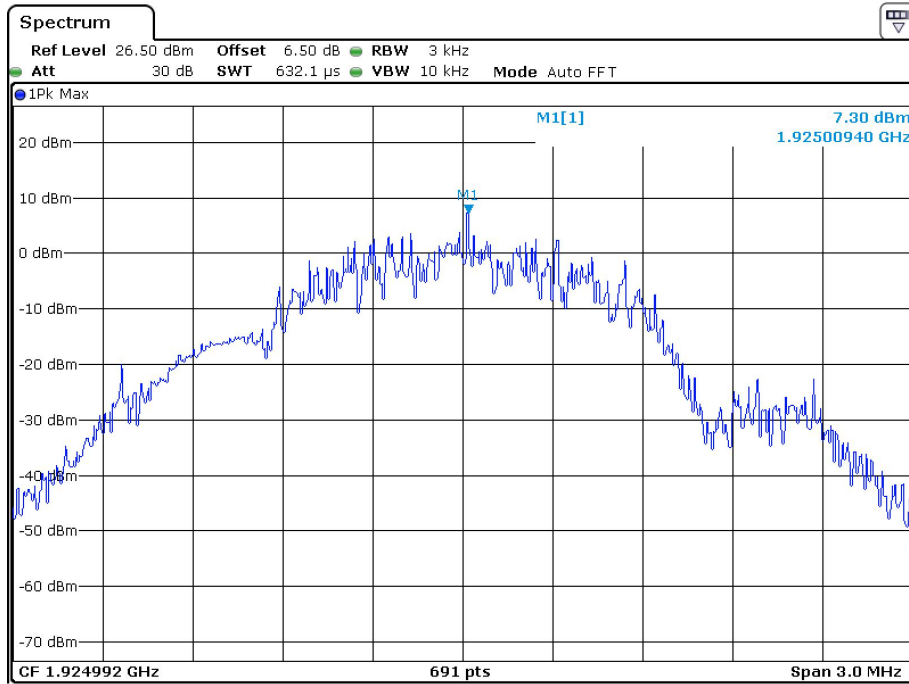


Date: 26.MAY.2022 18:17:23

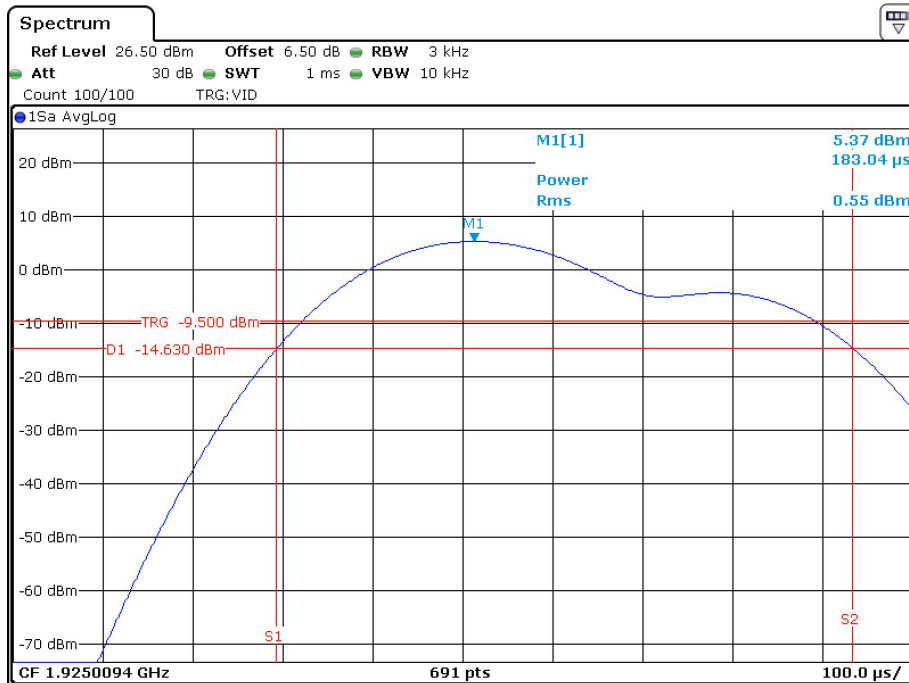


Date: 26.MAY.2022 18:19:37

Middle Channel

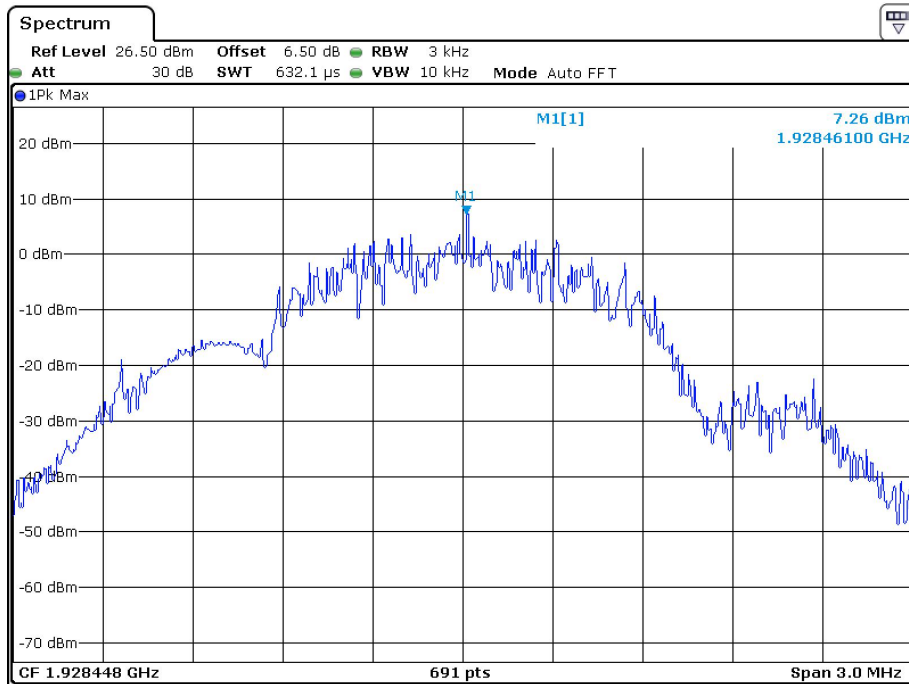


Date: 26.MAY.2022 18:20:16

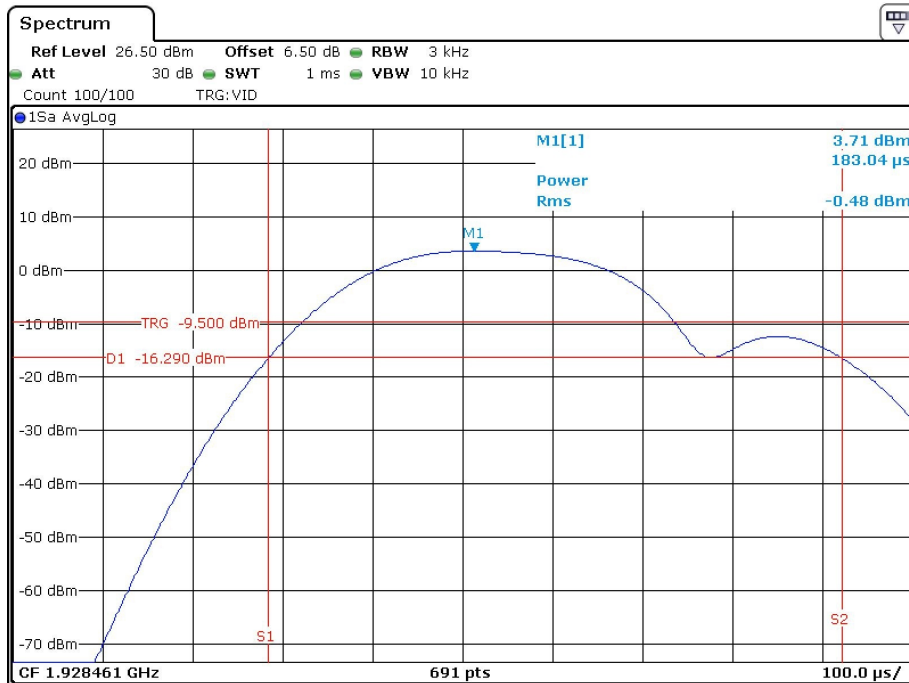


Date: 26.MAY.2022 18:21:45

High Channel



Date: 26.MAY.2022 18:22:27



Date: 26.MAY.2022 18:24:36

FCC§15.323 (d) - EMISSION INSIDE AND OUTSIDE THE SUB-BAND

Applicable Standard

Emissions inside the sub-band must comply with the following emission mask:

1. In the bands between 1B and 2B measured from the center of the emission bandwidth the total power emitted by the device shall be at least 30 dB below the transmit power permitted for that device;
2. in the bands between 2B and 3B measured from the center of the emission bandwidth the total power emitted by an intentional radiator shall be at least 50 dB below the transmit power permitted for that radiator;
3. in the bands between 3B and the sub-band edge the total power emitted by an intentional radiator in the measurement bandwidth shall be at least 60 dB below the transmit power permitted for that radiator.

Where B = emission bandwidth

Emission Outside the sub-band shall be attenuated below a reference power of 112 mw (20.5 dBm) as follows:

1. 30 dB between the sub-band and 1.25 MHz above or below the sub-band;
2. 50 dB between 1.25 and 2.5 MHz above or below the sub-band;
3. 60 dB at 2.5 MHz or greater above or below the sub-band.

Test Procedure

According to ANSI C63.17-2013 Clause 6.1.6.

Test Data

Environmental Conditions

Temperature:	26 °C
Relative Humidity:	64 %
ATM Pressure:	101.0 kPa

The testing was performed by Nick Fang on 2022-05-26.

Test mode: Transmitting

Test Result: Compliance. Please refer to following plots