RF MEASUREMENT REPORT

FCC ID:	DD4ADTQG57
Applicant:	Shure Incorporated
Product:	Wireless Quad Transmitter
Model No.:	ADTQ G57, ADTQ DC G57
Brand Name:	SHURE, SHURE
FCC Classification:	Licensed LPAS Device (TLD)
FCC Rule Part(s):	Part 74 Subpart H (Section 74.861)
Result:	Complies
Received Date:	2024-06-13
Test Date:	2024-07-30 ~ 2024-12-04

Reviewed By: Jame Yuan

Approved By: Robin Wu

ilac-MRA

A2LA ACCREDITED TESTING LABORATORY CERTIFICATE #3628.01

Revision History

Report No.	Version	Description	Issue Date	Note
2406RSU021-U3	V01	Initial Report	2024-12-05	Invalid
2406RSU021-U3	V02	Update KDB 206256 Version	2024-12-10	Valid

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1. General Information

1.1. Applicant

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.2. Manufacturer

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.3. Testing Facility

<table>
<tr><td rowspan="8">☒</td><td colspan="5">Test Site – MRT Suzhou Laboratory</td></tr>
<tr><td colspan="5">Laboratory Location (Suzhou - Wuzhong)
D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Laboratory Location (Suzhou - SIP)
4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
Laboratory Location (Suzhou - Wujiang)
Building 1, No.1 Xingdong Road, Wujiang, Suzhou, Jiangsu, People's Republic of China</td></tr>
<tr><td colspan="5">Laboratory Accreditations</td></tr>
<tr><td colspan="3">A2LA: 3628.01</td><td colspan="2">CNAS: L10551</td></tr>
<tr><td colspan="3">FCC: CN1166</td><td colspan="2">ISED: CN0001</td></tr>
<tr><td rowspan="2">VCCI:</td><td>☐ R-20025</td><td>☐ G-20034</td><td>☐ C-20020</td><td>☐ T-20020</td></tr>
<tr><td>☐ R-20141</td><td>☐ G-20134</td><td>☐ C-20103</td><td>☐ T-20104</td></tr>
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<tr><td rowspan="5">☐</td><td colspan="5">Test Site – MRT Shenzhen Laboratory</td></tr>
<tr><td colspan="5">Laboratory Location (Shenzhen)
1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China</td></tr>
<tr><td colspan="5">Laboratory Accreditations</td></tr>
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<tr><td colspan="5">Laboratory Accreditations</td></tr>
<tr><td colspan="5">TAF: 3261</td></tr>
<tr><td colspan="3">FCC: 291082, TW3261</td><td colspan="2">ISED: TW3261</td></tr>
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1.4. Product Information

Product Name	Quad Transmitters
Model No.	ADTQ G57, ADTQ DC G57
Serial No.	2DE08236407
Radio Specification	UHF Microphone Transmitter
Antenna Information	Refer to section 1.7
Operating Temperature	-18 ~ 50 °C
Network Interface	10/100/1000 Mbps, Dante Digital Audio
Power Type	AC Power Input (100~240V AC) & DC Power Input (12~48V) AC Power Output (100~240V AC)
Accessories	
8 Port Antenna Combiner	Model: AD8C, AD8C DC AC Ver.: 100-240V~, 50/60Hz, 0.76A max (5.76A max outlet loaded), DC Ver.: 12-48V DC, 4A max
Note 1: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer. Note 2: ADTQ G57 and ADTQ DC G57 are completely same except power supply difference, ADTQ G57 supports AC power supply, while ADTQ DC G57 supports both AC and DC power supply. Note 3: AD8C and AD8C DC are completely same except power supply difference, AD8C supports AC power supply, while AD8C DC supports both AC and DC power supply.	

1.5. Radio Specification under Test

Transmission Mode	Analog FM & Narrowband & 4-channel Wideband (WMAS) & PTP
Frequency Range	470 ~ 608 MHz
Declared Power Level	Low & Mid & High
Type of Modulation	Analog FM: FM
	Narrowband: OFDM
	4-channel Wideband: OFDM
	PTP: 16QAM
Declared Occupied Bandwidth	Analog FM: 200kHz
	Narrowband: 200kHz
	4-channel Wideband (WMAS): 440kHz
	4-channel Wideband (WMAS): 850kHz
	PTP: 200kHz
Channel Spacing	25kHz
RF Connector Type	BNC

1.6. Working Frequencies

Bottom Channel (MHz)	Middle Channel (MHz)	Top Channel (MHz)
Analog FM & Narrow Band & PTP		
470.125	539.000	607.875
4-channel wideband		
470.400	539.000	607.600

1.7. Antenna Details

Antenna Type	Frequency Band (MHz)	Manufacturer	Peak Gain (dBi)
Dipole	470 ~ 608	Shure	1.10

2. Test Configuration

2.1. Test Mode

Mode 1: Transmit at G57 Band by Analog FM (Power Level = 250mW)
Mode 2: Transmit at G57 Band by Analog FM combined (Power Level = 20mW)
Mode 3: Transmit at G57 Band by Narrowband (Power Level = 250mW)
Mode 4: Transmit at G57 Band by Narrowband combined (Power Level = 20mW)
Mode 5: Transmit at G57 Band by Narrowband spatial diversity (Power Level = 40mW)
Mode 6: Transmit at G57 Band by Narrowband spatial diversity combined (Power Level = 20mW)
Mode 7: Transmit at G57 Band by 4-channel wideband (Power Level = 250mW)
Mode 8: Transmit at G57 Band by 4-channel wideband 8 audio mixes (Power Level = 40mW)
Mode 9: Transmit at G57 Band by 4-channel wideband 16 audio mixes (Power Level = 50mW)
Mode 10: Transmit at G57 Band by 4-channel wideband spatial diversity (Power Level = 100mW)
Mode 11: Transmit at G57 Band by Axient Digital Standard (PTP) (Power Level = 250mW)
Mode 12: Transmit at G57 Band by Axient Digital Standard (PTP) combined (Power Level = 20mW)
Mode 13: Transmit at G57 Band by Narrowband frequency diversity combined (Power Level = 20mW)
Mode 14: Transmit at G57 Band by Narrowband spatial diversity frequency diversity combined (Power Level = 20mW)
Mode 15: Transmit at G57 Band by 4-channel wideband frequency diversity (Power Level = 20mW)
Mode 16: Transmit at G57 Band by 4-channel wideband spatial diversity frequency diversity (Power Level = 20mW)
Note 1: After evaluation, the full test was done for mode 1 & 3 & 7 & 8 & 9 & 11 and output power and radiated spurious emission were done for other modes. Note 2: Mode 13 was covered by mode 4, mode 15 was covered by mode 16, mode 14 was covered by mode 6. Note 3: For Mode 1 & 3 & 7 & 11, we verify output power and radiated spurious emission with antenna combiner AD8C.

2.2. Test Software

Power level and transmit frequency can be selected using the front panel controls.

2.3. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 74.861
- KDB 206256 D01v03
- ANSI C63.26-2015
- ETSI EN 300 422 - 1 V 2.2.1

2.4. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Temperature Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2025-09-02	WZ-TR3
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2025-05-08	WZ-TR3
Thermohygrometer	testo	608-H1	MRTSUE11268	1 year	2024-12-14	WZ-TR3
Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2025-02-03	WZ-SR5
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2025-05-12	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
Signal Analyzer	Keysight	N9010B	MRTSUE06558	1 year	2025-05-20	WZ-SR5
Audio Analyzer	R&S	UPV	MRTSUE06357	1 year	2025-04-11	WZ-SR5
Multifunction Synthesizer	HP	HP8904A	MRTSUE06097	1 year	2025-07-18	WZ-SR5
Modulation Analyzer	HP	HP8901A	MRTSUE06098	1 year	2025-07-18	WZ-SR5
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2025-05-08	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11077	1 year	2025-06-05	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11078	1 year	2025-06-05	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11079	1 year	2025-06-05	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11080	1 year	2025-06-05	WZ-SR5
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2025-05-08	SIP-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2025-05-08	SIP-SR2
Thermohygrometer	testo	608-H1	MRTSUE06621	1 year	2025-10-29	SIP-SR2
Shielding Room	MIX-BEP	SIP-SR2	MRTSUE06949	5 years	2029-10-13	SIP-SR2
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2024-12-17	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2025-07-26	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2024-11-09	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2025-11-08	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2025-05-15	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2025-04-19	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2025-10-13	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2024-10-23	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2025-10-16	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2024-10-25	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2025-04-17	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2025-05-08	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2025-09-23	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2024-10-11	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2025-05-06	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2025-04-18	WZ-AC2

Thermohygrometer	testo	608-H1	MRTSUE11263	1 year	2025-10-16	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11263	1 year	2024-11-07	WZ-AC2

Software	Version	Function
e3	230711	RE & CE
Controller_MF 7802	1.02	RE Antenna & Turntable
BenchVue Power Meter	2018.1	Power

4. Decision Rules and Measurement Uncertainty

4.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT 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.

AC Conducted Emission Measurement
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.02dB 150kHz~30MHz: 2.56dB
Radiated Emission Measurement
The maximum measurement uncertainty is evaluated as: Coaxial: 9kHz~30MHz: 2.35dB Coplanar: 9kHz~30MHz: 2.37dB Horizontal: 30MHz~200MHz: 3.46dB 200MHz~1GHz: 3.78dB 1GHz~40GHz: 4.97dB Vertical: 30MHz~200MHz: 4.07dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.78dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.5dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.3dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.5dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.6%

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Test Result
74.861(e)(1)(ii)	RF Output Power	Conducted	Pass
74.861(e)(3)	Modulation		Pass
74.861(e)(4)	Frequency Stability		Pass
74.861(e)(5)	99% Occupied Bandwidth		Pass
74.861(e)(6)	Out of Band Emission		Pass
74.861(e)(7) (i&ii&iii)	Emission Mask		Pass
74.861(e)(7) (iv)	Radiated Spurious Emission	Radiated	Pass

Note: The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

5.2. RF Output Power Measurement

5.2.1. Test Limit

470-608 MHz band: 250 mW conducted power

5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.4.2

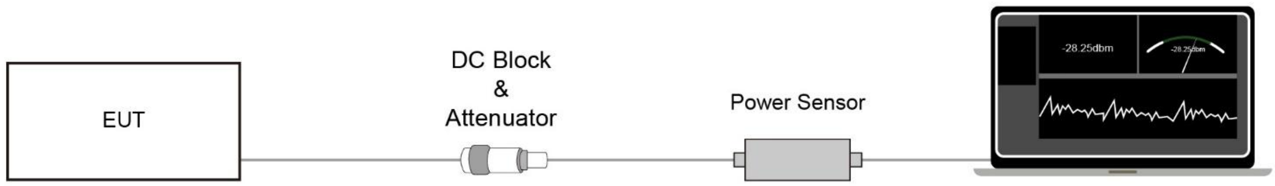
5.2.3. Test Setting

The output of the EUT was connected to an RF average power meter through fixed attenuation.

The EUT was set to transmit on the low, middle, and high frequencies in each power level.

Measure the average power of the transmitter.

5.2.4. Test Setup



5.2.5. Test Result

Refer to Appendix A.1.

5.3. Frequency Stability Measurement

5.3.1. Test Limit

The frequency tolerance of the transmitter shall be 0.005 percent.

5.3.2. Test Procedure

ANSI C63.26 - Section 5.6.3

5.3.3. Test Setting

Frequency Stability Under Temperature Variations:

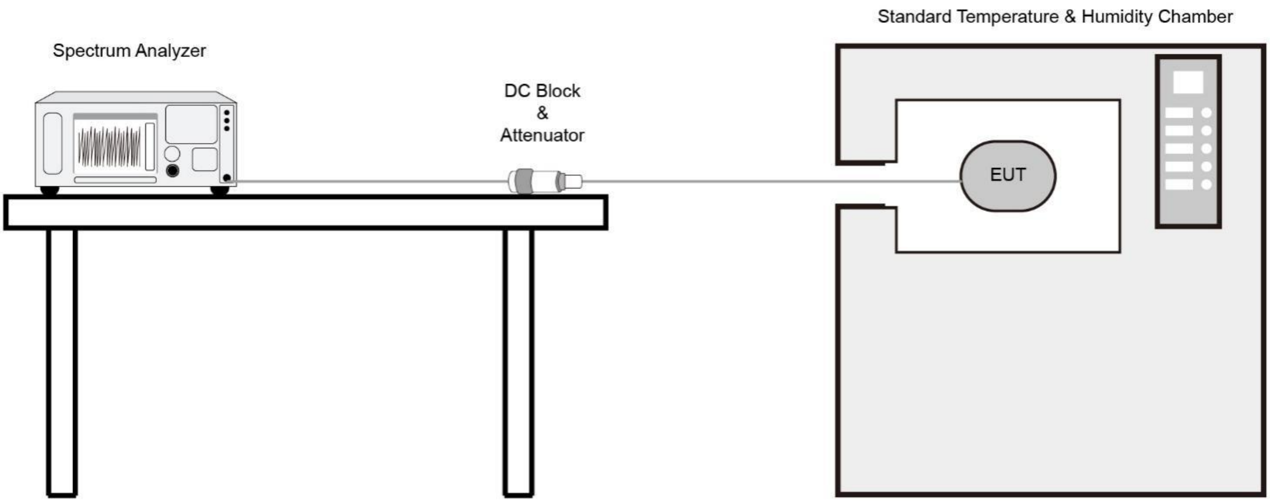
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint (If a product is specified to operate over a range of input voltage then the −15% variation is applied to the lowermost voltage and the +15%is applied to the uppermost voltage), record the maximum frequency change.

5.3.4. Test Setup



5.3.5. Test Result

Refer to Appendix A.2.

5.4. 99% Occupied Bandwidth Measurement

5.4.1. Test Limit

The operating bandwidth shall not exceed 200 kilohertz, except that a wireless multichannel audio system must have an operating bandwidth not exceeding 6 megahertz in the TV bands or 4 megahertz in the 653–657 MHz band.

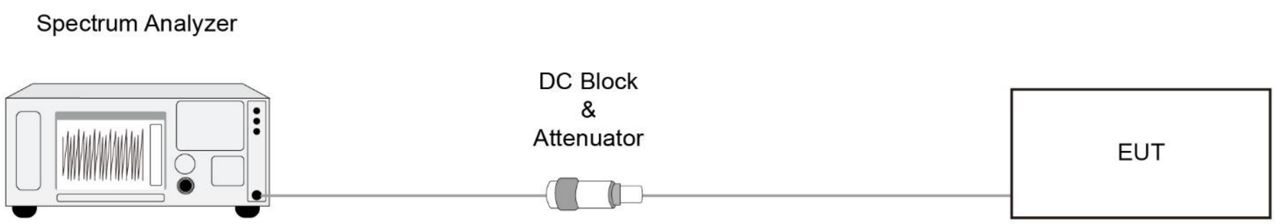
5.4.2. Test Procedure

ANSI C63.26-2015 - Section 5.4.4

5.4.3. Test Setting

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 - 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. Reported the measured 99% occupied bandwidth

5.4.4. Test Setup



5.4.5. Test Result

Refer to Appendix A.3.

5.5. Modulation Measurement

5.5.1. Test Limit

A maximum deviation of ±75 kHz is permitted when frequency modulation is employed.

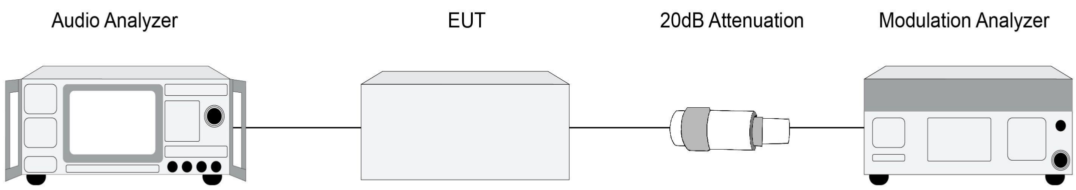
5.5.2. Test Procedure

ANSI C63.26-2013 - Section 5.3.2

5.5.3. Test Setting

1. Connect the equipment following the below figure
2. Apply a 1000 Hz modulating signal to the transmitter from the audio frequency generator, and adjust the level to obtain 60% of full rated system deviation. This is the 0 dB reference level.
3. Increase the level from the audio generator by 20 dB in 5 dB increments recording the deviation as measured from the test receiver in each step. Verify that the audio level used to make the OBW measurement is included in the sweep.
4. Repeat for step 3) at 300 Hz, 2500 Hz and 3000 Hz at a minimum using the 0 dB reference level obtained in step 2).
5. Set the test receiver to measure peak negative deviation and repeat step 2) through step 4).
6. The values recorded in step 4) and step 5) are the modulation limiting

5.5.4. Test Setup



5.5.5. Test Result

Refer to Appendix A.4.

5.6. Out-of-Band Emission Measurement

5.6.1. Test Limit

The mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(i) On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;

(ii) On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;

(iii) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log10 (mean output power in watts) dB.

5.6.2. Test Procedure

ANSI C63.26 - Section 5.7

5.6.3. Test Setting

a) The EUT was connected to a spectrum analyzer.

b) The EUT was modulated with typical digital modulation.

c) Set span to 2 × to 3 × the OBW

Set RBW ≥ OBW;

Set VBW ≥ 3 × RBW;

sweep time set to Auto,

Detector = power averaging (rms)

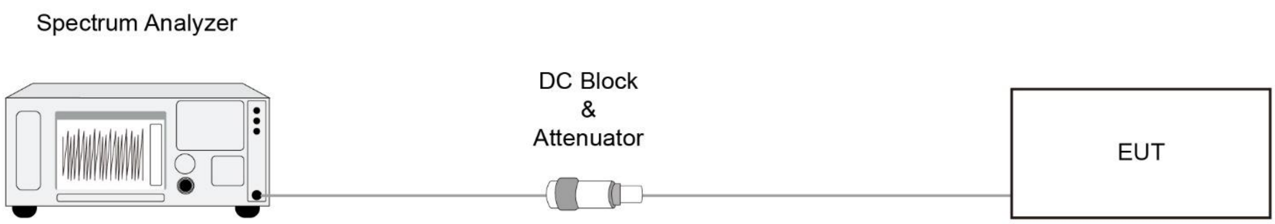
Use the peak marker function to determine the maximum amplitude level

d) The RMS output power was recorded and used to set the reference level on the spectrum analyzer.

e) The spectrum analyzer span was then set to 5× the OBW;

RBW set to 1% of the OBW, VBW set to 3 × RBW, sweep time to Auto.

5.6.4. Test Setup



5.6.5. Test Result

Refer to Appendix A.5.

5.7. Emission Mask Measurement

5.7.1. Test Limit

(i) Analog systems. Emissions within the band from 2.5 × B below to 2.5 × B above the carrier frequency, where B is the channel bandwidth, shall comply with the emission mask in Figure 1 of section 4.2.4.2.2 of ETSI EN 300 422-1 V2.2.1 (2021-11) (incorporated by reference, see § 74.35).

(ii) Digital systems. Emissions within the band from 2.5 × B below to 2.5 × B above the carrier frequency, where B is the channel bandwidth, shall comply with the emission mask in Figure 2 of section 4.2.4.2.2 of ETSI EN 300 422-1 V2.2.1 (2021-11) (incorporated by reference, see § 74.35).

(iii) Wireless Multichannel Audio Systems. Emissions within the band from 2.5 × B below to 2.5 × B above the carrier frequency, where B is the channel bandwidth, shall comply with the emission mask in Figure 3 of section 4.2.4.2.2 of ETSI EN 300 422-1 V2.2.1 (2021-11), (incorporated by reference, see § 74.35).

The mean Power Density, measured with 1 kHz measurement bandwidth and RMS detector, of the transmitter unwanted emissions shall not exceed the limits of the masks provided in figure 1 for equipment employing analogue modulation and figure 2 for equipment employing digital modulation, but excluding WMAS. B is the Declared Channel Bandwidth.

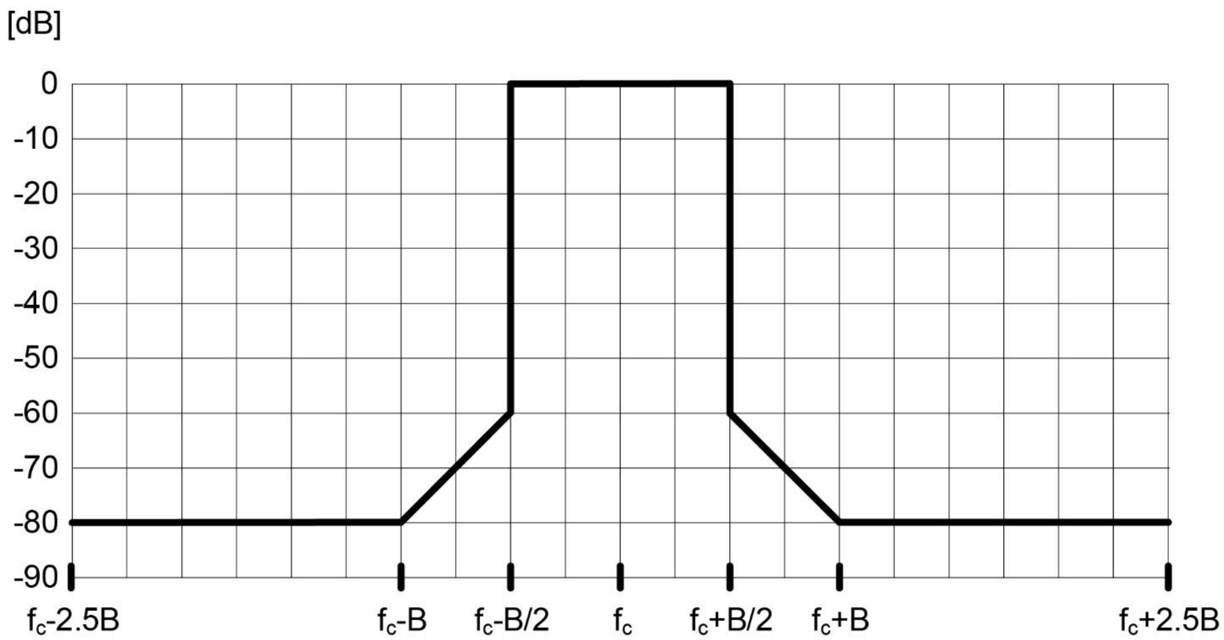


Figure 1: Transmit spectral power mask for equipment employing analogue modulation, RBW = 1 kHz

Figure 2: Transmit spectral power mask for equipment employing digital modulation, except WMAS, RBW = 1 kHz

The limits in figure 3 are applicable for WMAS, where B is the Declared Channel Bandwidth.

The mean Power Density, measured with 100 kHz measurement bandwidth and PEAK detector, of the transmitter unwanted emissions shall not exceed the limits of the mask provided in figure 3.

Figure 3: Transmit spectral power mask for WMAS, RBW = 100 kHz

The limits in figure 3 are provided with RBW = 100 kHz. The relevant measurements can also be performed with other RBW for certain ranges of B, accounting that the relevant limit given under RBW = 100 kHz needs to be converted appropriately by adding c = 10 × log10 (RBW/100 kHz) for correction.

Correction Factor for different B and applicable RBW

B	RBW, VBW	c = correction factor
B < 2 MHz	10 kHz	-10dB
2 MHz ≤ B < 5 MHz	25 kHz	-7dB
5 Hz ≤ B ≤ 20MHz	100 kHz	0dB

5.7.2. Test Procedure

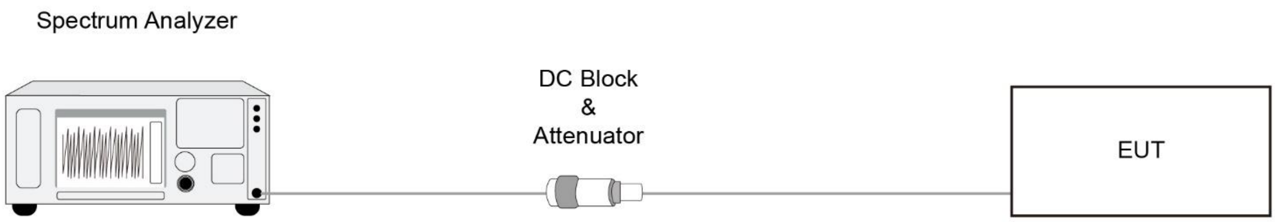
EN 300 422-1 V2.2.1 clause 5.4.3.2.

5.7.3. Test Setting

The EUT was powered up and the transmit frequency & power output of the EUT were selected.

The spectrum analyzer center frequency is set to the nominal EUT channel frequency.

5.7.4. Test Setup



5.7.5. Test Result

Refer to Appendix A.6.

5.8. Radiated Spurious Emissions Measurement

5.8.1. Test Limit

Spurious emission limits. Emissions outside of the emission masks listed in paragraphs (e)(7)(i) through (e)(7)(iii) shall comply with the limits specified in section 4.2.4.1.2 of ETSI EN 300 422-1 V2.2.1 (2021-11) (incorporated by reference, see § 74.35).

The level of transmitter unwanted emissions in the spurious domain shall not exceed the limits given in table Transmitter unwanted emission limits

Frequency Range	Maximum power	RBW
9kHz – 150kHz	-36dBm	1kHz
150kHz – 30MHz	-36dBm	10kHz
30MHz – 1GHz	-36dBm	F_c + 2.5B ≤ f ≤ F_c + 4B: 1kHz F_c + 4B < f ≤ F_c + 10B: 10kHz f > F_c + 10B: 100kHz f < F_c - 10B: 100kHz F_c - 10B ≤ f < F_c - 4B: 10kHz F_c - 4B ≤ f ≤ F_c – 2.5B: 1kHz
Except:		
47MHz to 74MHz 87.5MHz to 118MHz	-54dBm	100kHz
174MHz to 230MHz 470MHz to 862MHz	-36dBm	F_c + 2.5B ≤ f ≤ F_c + 4B: 1kHz F_c + 4B < f ≤ F_c + 10B: 10kHz f > F_c + 10B: 100kHz f < F_c - 10B: 100kHz F_c - 10B ≤ f < F_c - 4B: 10kHz F_c - 4B ≤ f ≤ F_c – 2.5B: 1kHz
1GHz < f≤ F_{upper}	-30dBm	F_c + 2.5B ≤ f ≤ F_c + 10B: 30kHz F_c + 10B < f ≤ F_c + 12B: 300kHz f > F_c + 12B: 1MHz f < F_c - 12B: 1MHz F_c - 12B ≤ f < F_c - 10B: 300kHz F_c - 10B ≤ f ≤ F_c – 2.5B: 30kHz
With B being the Declared Channel Bandwidth. F_{upper} is defined in table 5.		

Table 5: Frequency range for measurement of unwanted emissions

Applicable fundamental frequency range	Frequency range for measurements	
	Lower frequency	Upper frequency
9 kHz - 100 MHz	9 kHz	1GHz
100 MHz - 300 MHz	9 kHz	10th harmonic of the operating frequency
300 MHz - 600 MHz	30MHz	3GHz
600 MHz - 3 GHz	30MHz	5th harmonic of the operating frequency

5.8.2. Test Procedure

ETSI EN 300 422-1 V2.2.1 clause 5.4.4

5.8.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
30 ~ 1000 MHz	100 kHz
1000 ~ 7000 MHz	1 MHz

Emissions shall be investigated up to the 10^{th} harmonic of the fundamental.

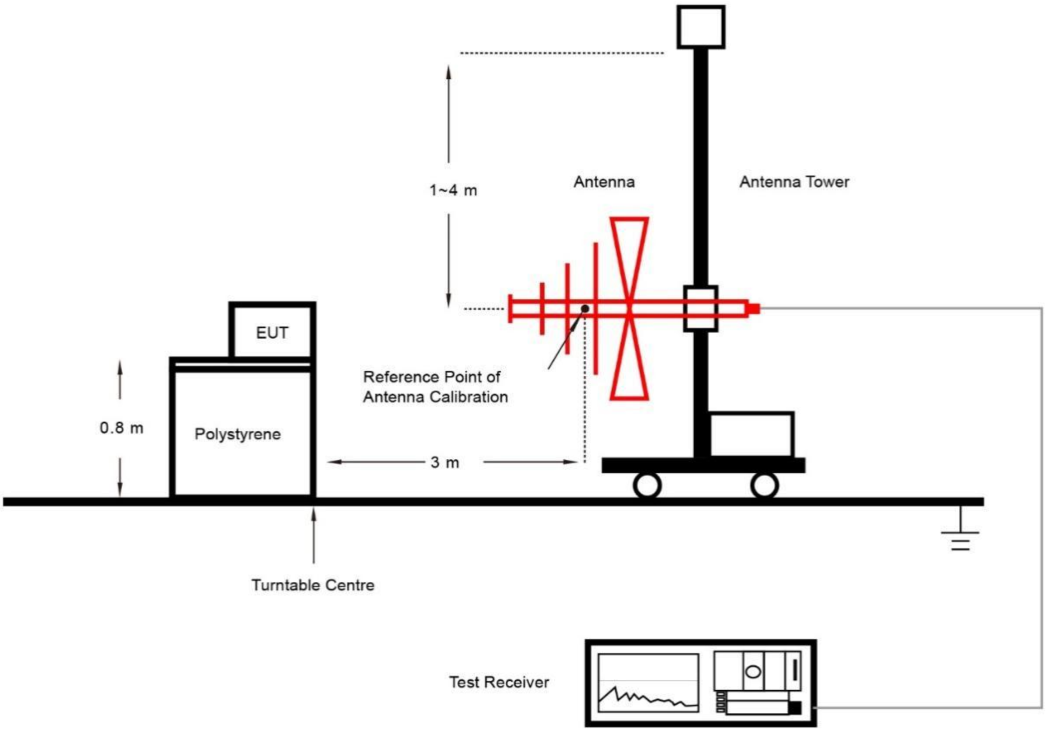
Compliance with the emission limits shall be demonstrated using an RMS Average detector.

All significant broadband and narrowband signals found in the preliminary sweeps were measured using a peak detector at a test distance of 3 meters.

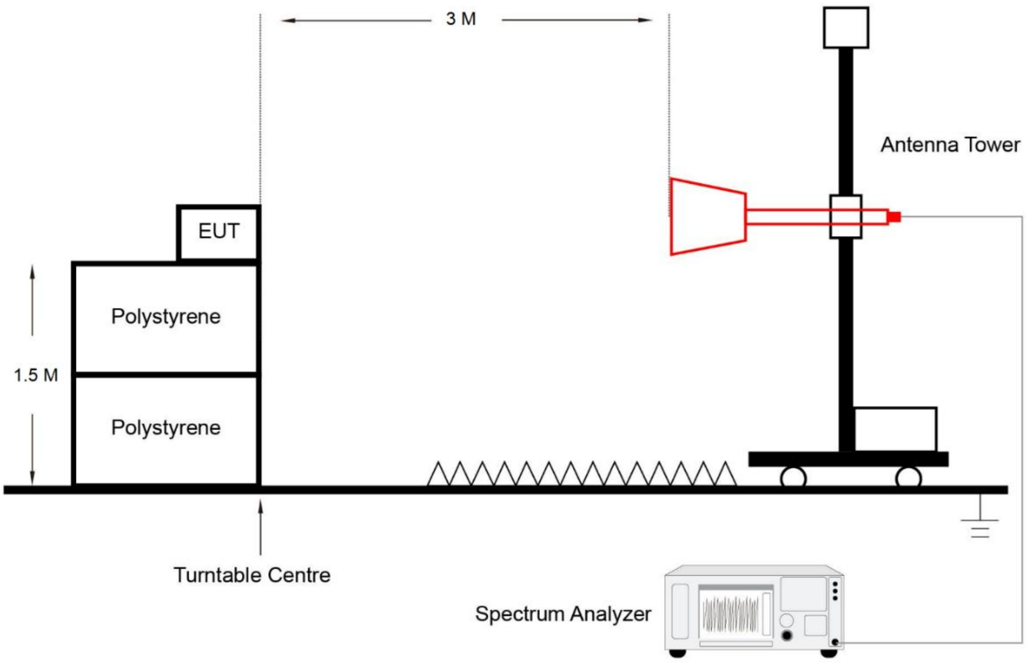
At each frequency at which a component is detected, the sample shall be rotated to obtain maximum response and the effective radiated power of that component determined by a substitution measurement.

5.8.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.8.5. Test Result

Refer to Appendix A.7.

Appendix A – Test Result

A.1 RF Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 1 Single Port

Frequency (MHz)	Conducted Output Power (dBm)				Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D		
250mW Power Level						
470.125	22.20	22.97	23.85	23.14	≤ 23.98	Pass
539.000	22.12	21.94	23.47	22.65	≤ 23.98	Pass
607.875	21.79	21.74	22.23	21.54	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 1 Multi Ports

Frequency (MHz)	Conducted Output Power (dBm)				Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D			
40mW Power Level							
470.125	15.30	15.83	15.47	15.70	21.60	≤ 23.98	Pass
539.000	14.61	15.50	15.75	14.38	21.12	≤ 23.98	Pass
607.875	14.14	15.26	14.69	14.34	20.65	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port B/10) + 10^(Port C/10) +10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 1 with AD8C

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A		
250mW Power Level			
470.125	21.33	≤ 23.98	Pass
539.000	21.18	≤ 23.98	Pass
607.875	20.40	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 2

Frequency (MHz)				Conducted Output Power (dBm)	Limit (dBm)	Test Result
F1	F2	F3	F4			
20mW Power Level						
470.125	470.475	470.825	471.175	17.06	≤ 23.98	Pass
539.000	539.350	539.700	540.050	16.28	≤ 23.98	Pass
607.875	607.525	607.175	606.825	15.68	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 3 Single Port

Frequency (MHz)	Conducted Output Power (dBm)				Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D		
250mW Power Level						
470.125	21.45	21.45	22.50	22.16	≤ 23.98	Pass
539.000	20.93	20.56	21.80	21.80	≤ 23.98	Pass
607.875	20.93	20.75	21.30	20.98	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 3 with AD8C

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A		
250mW Power Level			
470.125	17.87	≤ 23.98	Pass
539.000	18.23	≤ 23.98	Pass
607.875	16.75	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 3 Multi Ports

Frequency (MHz)	Conducted Output Power (dBm)				Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D			
40mW Power Level							
470.125	15.46	15.70	15.56	15.54	21.59	≤ 23.98	Pass
539.000	14.72	15.66	15.22	14.62	21.10	≤ 23.98	Pass
607.875	14.54	15.53	15.35	14.63	21.05	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port B/10) + 10^(Port C/10) +10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 4

Frequency (MHz)				Conducted Output Power (dBm)	Limit (dBm)	Test Result
F1	F2	F3	F4			
20mW Power Level						
470.125	470.475	470.825	471.175	17.51	≤ 23.98	Pass
539.000	539.350	539.700	540.050	17.08	≤ 23.98	Pass
607.875	607.525	607.175	606.825	16.31	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 5

Frequency (MHz)	Conducted Output Power (dBm)				Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D			
40mW Power Level							
470.125	15.23	15.63	15.93	15.82	21.68	≤ 23.98	Pass
539.000	14.52	15.92	15.77	14.92	21.34	≤ 23.98	Pass
607.875	14.32	15.38	15.38	14.73	21.00	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port B/10) + 10^(Port C/10) +10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 6

Frequency (MHz)		Conducted Output Power (dBm)		Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
F1	F2	Port A	Port D			
20mW Power Level						
470.125	470.475	16.01	16.73	19.40	≤ 23.98	Pass
539.000	539.350	14.92	15.78	18.38	≤ 23.98	Pass
607.875	607.525	15.13	14.83	17.99	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 7

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Test Result
250mW Power Level			
470.400	20.80	≤ 23.98	Pass
539.000	20.08	≤ 23.98	Pass
607.600	20.60	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 7 with AD8C

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A		
250mW Power Level			
470.400	15.37	≤ 23.98	Pass
539.000	15.34	≤ 23.98	Pass
607.600	14.28	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 8 Single Port

Frequency (MHz)	Conducted Output Power (dBm)				Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D		
40mW Power Level						
470.400	14.86	15.11	14.94	15.44	≤ 23.98	Pass
539.000	14.84	14.42	14.52	14.83	≤ 23.98	Pass
607.600	15.03	14.79	15.04	14.31	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 8 Multi Ports

Frequency (MHz)	Conducted Output Power (dBm)				Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D			
40mW Power Level							
470.400	14.86	15.11	14.94	15.44	21.11	≤ 23.98	Pass
539.000	14.84	14.42	14.52	14.83	20.68	≤ 23.98	Pass
607.600	15.03	14.79	15.04	14.31	20.82	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port B/10) + 10^(Port C/10) +10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 9 Single Port

Frequency (MHz)	Conducted Output Power (dBm)				Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D		
50mW Power Level						
470.400	14.68	15.45	15.32	15.20	≤ 23.98	Pass
539.000	14.45	14.46	14.60	14.98	≤ 23.98	Pass
607.600	14.11	14.19	14.42	14.06	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 9 Multi Ports

Frequency (MHz)	Conducted Output Power (dBm)				Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D			
50mW Power Level							
470.400	14.68	15.45	15.32	15.20	21.19	≤ 23.98	Pass
539.000	14.45	14.46	14.60	14.98	20.65	≤ 23.98	Pass
607.600	14.11	14.19	14.42	14.06	20.22	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port B/10) + 10^(Port C/10) +10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 10

Frequency (MHz)	Conducted Output Power (dBm)		Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port D			
100mW Power Level					
470.400	19.12	19.20	22.17	≤ 23.98	Pass
539.000	17.34	21.35	22.80	≤ 23.98	Pass
607.600	19.24	20.34	22.84	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 11 Single Port

Frequency (MHz)	Conducted Output Power (dBm)				Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D		
250mW Power Level						
470.125	20.64	21.64	22.14	22.00	≤ 23.98	Pass
539.000	20.41	20.64	21.37	21.65	≤ 23.98	Pass
607.875	20.24	20.44	20.94	20.73	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 11 with AD8C

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A		
250mW Power Level			
470.125	18.35	≤ 23.98	Pass
539.000	18.59	≤ 23.98	Pass
607.875	17.13	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 11 Multi Ports

Frequency (MHz)	Conducted Output Power (dBm)				Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
	Port A	Port B	Port C	Port D			
40mW Power Level							
470.125	15.35	16.11	16.06	16.58	22.07	≤ 23.98	Pass
539.000	15.26	15.40	15.64	16.08	21.63	≤ 23.98	Pass
607.875	15.26	15.80	16.02	15.36	21.64	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port B/10) + 10^(Port C/10) +10^(Port D/10)) (dBm).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 12

Frequency (MHz)				Conducted Output Power (dBm)	Limit (dBm)	Test Result
F1	F2	F3	F4			
20mW Power Level						
470.125	470.475	470.825	471.175	18.14	≤ 23.98	Pass
539.000	539.350	539.700	540.050	17.43	≤ 23.98	Pass
607.875	607.525	607.175	606.825	16.74	≤ 23.98	Pass

Note: Limit = 10*Log (250mW) = 23.98 dBm.

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-11-24 ~ 2024-11-28	Test Mode	Mode 16

Frequency (MHz)		Conducted Output Power (dBm)		Total Conducted Output Power (dBm)	Limit (dBm)	Test Result
F1	F2	Port A	Port D			
20mW Power Level						
470.400	471.650	17.23	16.83	20.04	≤ 23.98	Pass
539.000	540.000	16.28	15.96	19.13	≤ 23.98	Pass
607.600	606.400	16.53	15.83	19.20	≤ 23.98	Pass

Note1: Limit = 10*Log (250mW) = 23.98 dBm.

Note2: Total Conducted Output Power (dBm) = 10*log(10^(Port A /10)+ 10^(Port D/10)) (dBm).

A.2 Frequency Stability Test Result

Test Site	WZ-TR3	Test Engineer	Lynn Yang
Test Date	2024-10-10 ~ 2024-10-11	Test Frequency	470.125MHz

Voltage (%)	Power (AC)	Temp (°C)	Frequency Tolerance (%)			
			0 minutes	2 minutes	5 minutes	10 minutes
100	120	- 20	-0.00004424	-0.00004424	-0.00004382	-0.00004403
		-10	-0.00004467	-0.00004488	-0.00004488	-0.00004488
		0	-0.00004722	-0.00004743	-0.00004722	-0.00004531
		+ 10	-0.00004467	-0.00005445	-0.00005211	-0.00004722
		+ 20	-0.00004275	-0.00005041	-0.00005020	-0.00005041
		+ 30	-0.00004552	-0.00005326	-0.00004318	-0.00004254
		+ 40	-0.00004063	-0.00003978	-0.00004020	-0.00003914
		+ 50	-0.00002978	-0.00003467	-0.00003382	-0.00003467
115	138	+ 20	-0.00004743	-0.00005020	-0.00005020	-0.00005126
85	102	+ 20	-0.00004743	-0.00005062	-0.00004935	-0.00004956
Limit	0.005%					
Result	Pass					

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) - Declared Frequency (Hz)] / Declared Frequency (Hz)} $*10^2$.

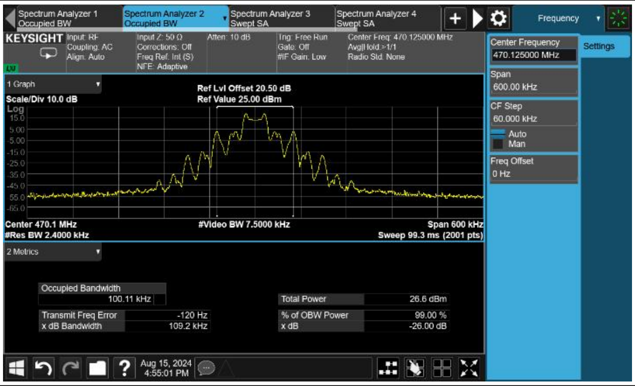
A.3 99% Occupied Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-15	Test Mode	Mode 1

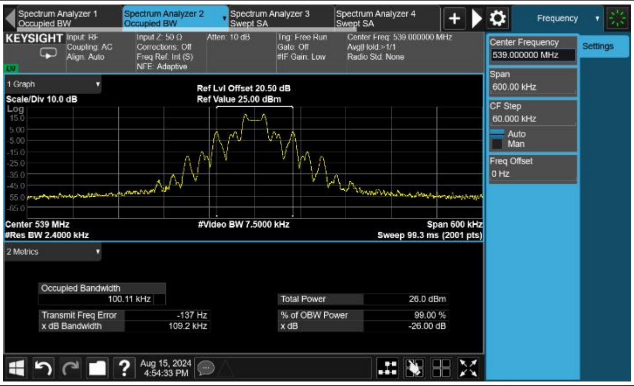
Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
470.125	100.11	< 200	Pass
539.000	100.11	< 200	Pass
607.875	100.06	< 200	Pass

99% Occupied Bandwidth

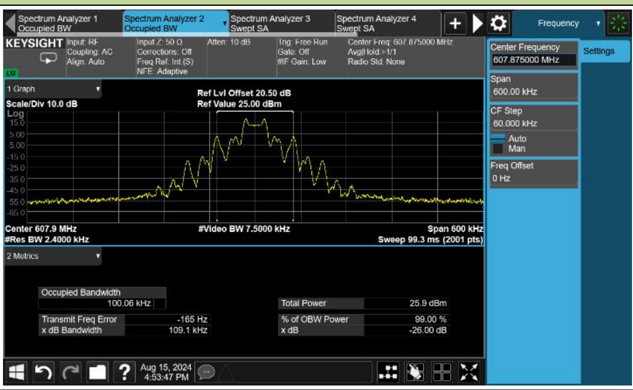
470.125MHz



539.000MHz



607.875MHz

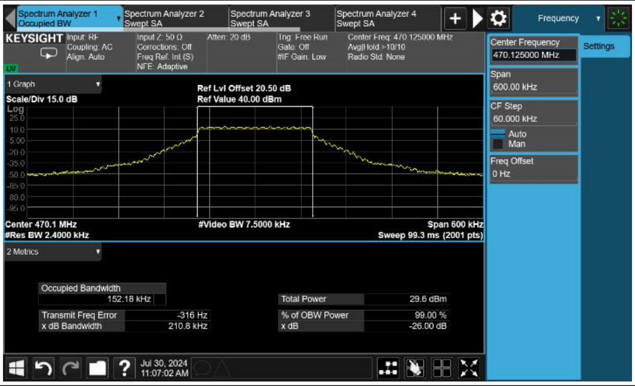


Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-07-30	Test Mode	Mode 3

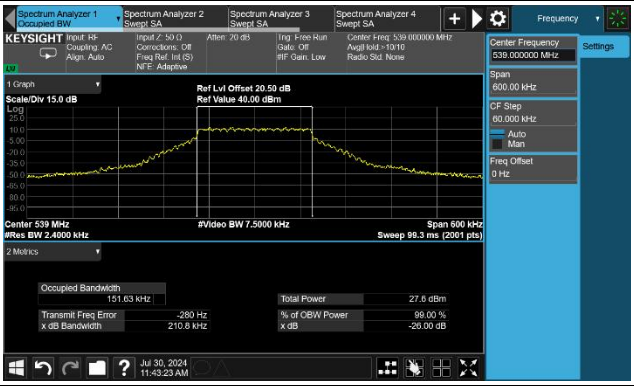
Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
470.125	152.18	< 200	Pass
539.000	151.63	< 200	Pass
607.875	151.74	< 200	Pass

99% Occupied Bandwidth

470.125MHz



539.000MHz



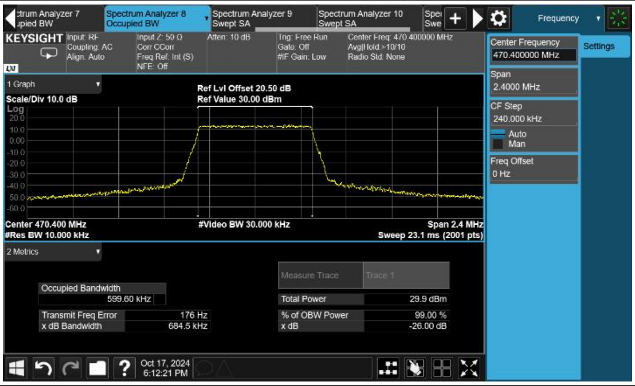
607.875MHz

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-10-17	Test Mode	Mode 7

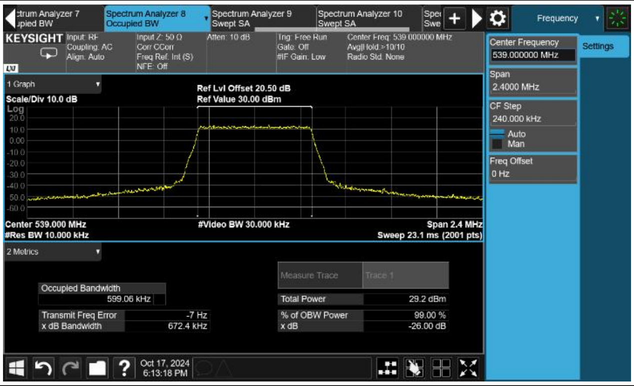
Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
470.400	599.60	< 6000	Pass
539.000	599.06	< 6000	Pass
607.600	599.35	< 6000	Pass

99% Occupied Bandwidth

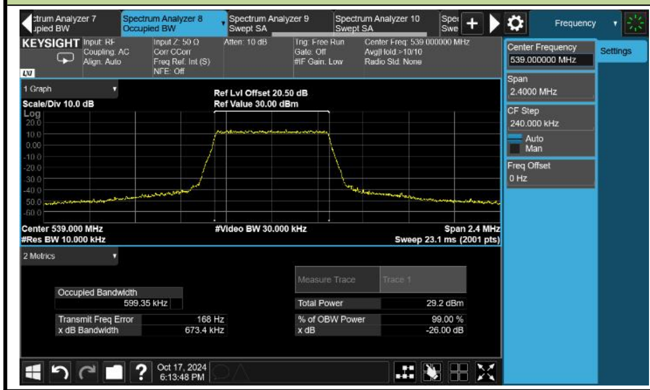
470.400MHz



539.000MHz



607.600MHz



Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-10-28	Test Mode	Mode 8

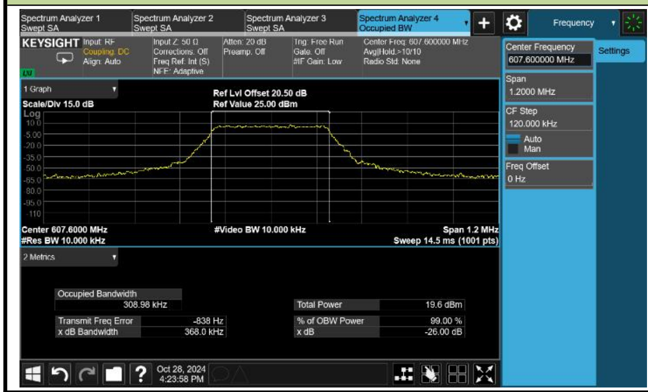
Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
470.400	308.85	< 6000	Pass
539.000	308.68	< 6000	Pass
607.600	308.98	< 6000	Pass

99% Occupied Bandwidth

470.400MHz

539.000MHz

607.600MHz

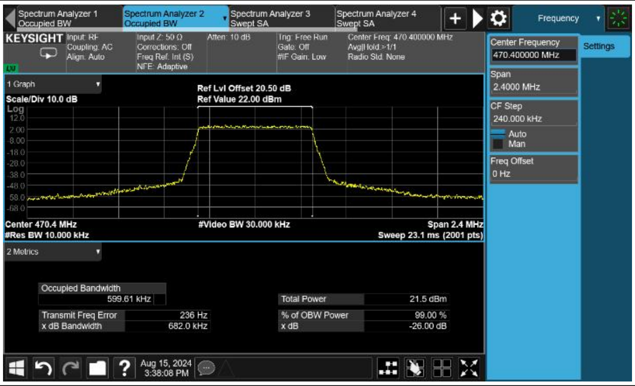


Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-15	Test Mode	Mode 9

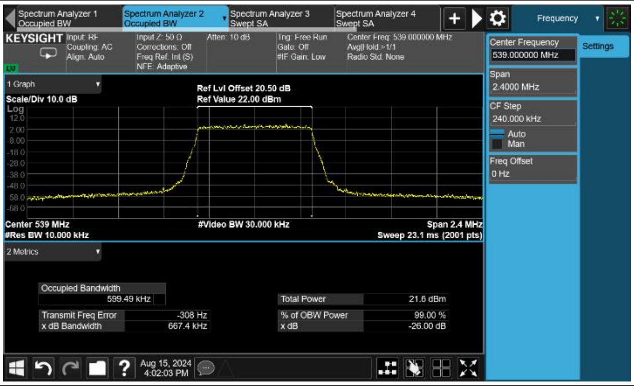
Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
470.400	599.61	< 6000	Pass
539.000	599.49	< 6000	Pass
607.600	600.27	< 6000	Pass

99% Occupied Bandwidth

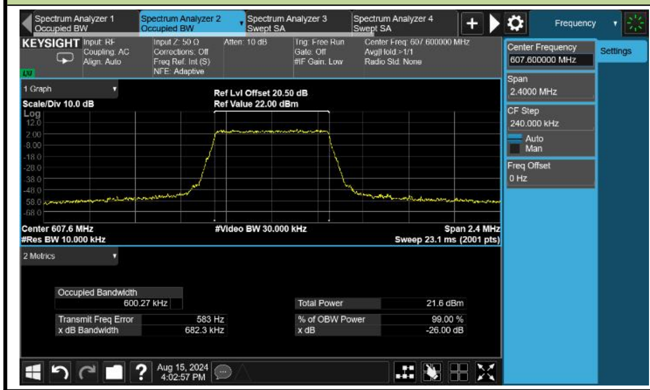
470.400MHz



539.000MHz



607.600MHz



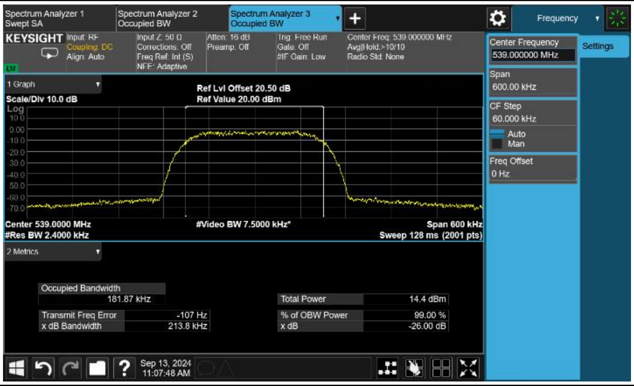
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-09-13	Test Mode	Mode 11

Frequency (MHz)	99% Occupied Bandwidth (kHz)	Limit (kHz)	Result
470.125	181.25	< 200	Pass
539.000	181.87	< 200	Pass
607.875	180.85	< 200	Pass

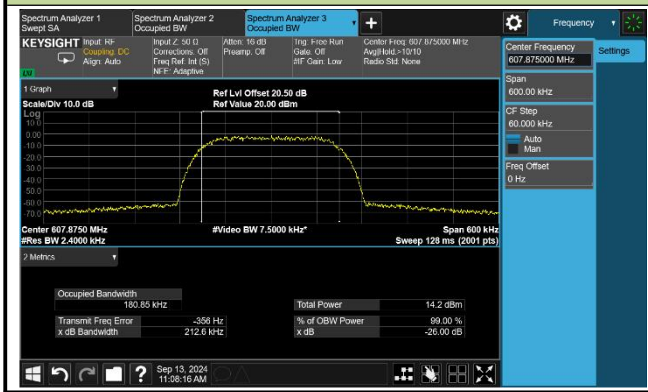
99% Occupied Bandwidth

470.125MHz

539.000MHz



607.875MHz



A.4 Modulation Test Result

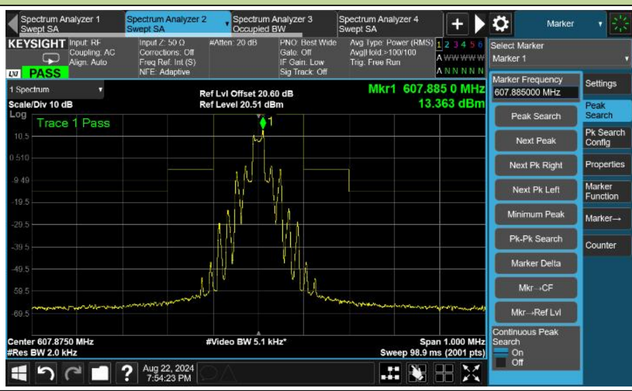
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-04	Test Mode	Mode 1

Input Level	Audio Frequency			
	300Hz	1000Hz	2500Hz	3000Hz
(dB)	Frequency Deviation (kHz)			
-20	7.85	11.03	14.54	15.02
-15	10.13	13.78	16.71	17.20
-10	13.05	16.03	18.91	19.43
-5	15.38	18.16	21.22	21.79
0	17.55	20.40	23.79	24.36
5	19.83	22.88	26.60	27.24
10	22.22	25.50	29.74	30.50
15	24.89	28.61	33.29	34.13
20	27.80	31.95	37.40	38.30
Limit	≤ ±75kHz			
Test Result	Pass			

A.5 Out-of-Band Emission Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-22	Test Mode	Mode 1

<table>
<tr><td colspan="2">Port A</td></tr>
<tr><td colspan="2">Channel 470.125MHz</td></tr>
<tr><td>Reference Level</td><td>Out of Band Emission</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td colspan="2">Channel 539.000 MHz</td></tr>
<tr><td>Reference Level</td><td>Out of Band Emission</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td colspan="2">Channel 607.875 MHz</td></tr>
<tr><td>Reference Level</td><td>Out of Band Emission</td></tr>
<tr><td>
</td><td>
</td></tr>
</table>

Port B	
Channel 470.125MHz	
Reference Level	Out of Band Emission
	
Channel 539.000 MHz	
Reference Level	Out of Band Emission
	
Channel 607.875 MHz	
Reference Level	Out of Band Emission
	

Port C

Channel 470.125MHz

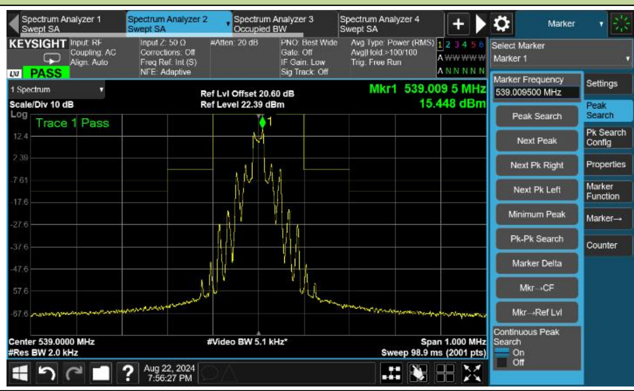
Reference Level

Out of Band Emission

Channel 539.000 MHz

Reference Level

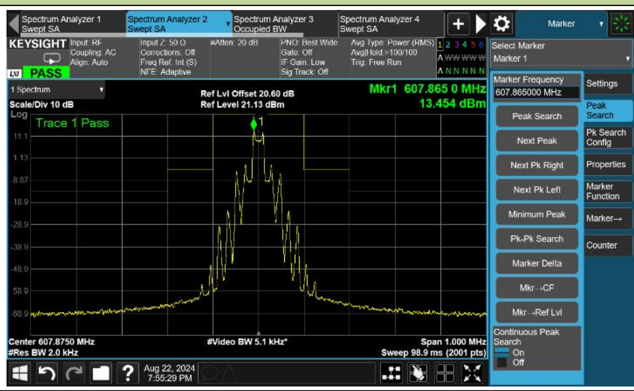
Out of Band Emission



Channel 607.875 MHz

Reference Level

Out of Band Emission



Port D

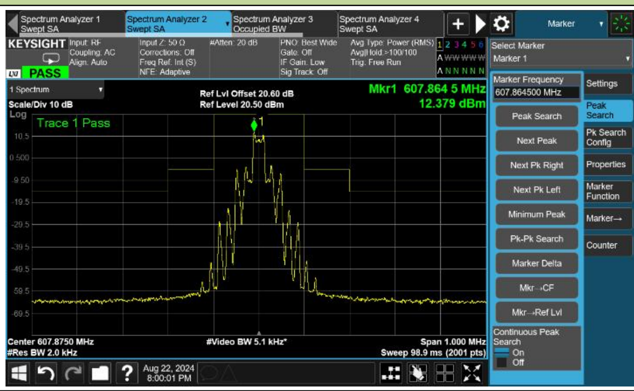
Channel 470.125MHz

Reference Level	Out of Band Emission
	

Channel 539.000 MHz

Reference Level	Out of Band Emission
	

Channel 607.875 MHz

Reference Level	Out of Band Emission
	

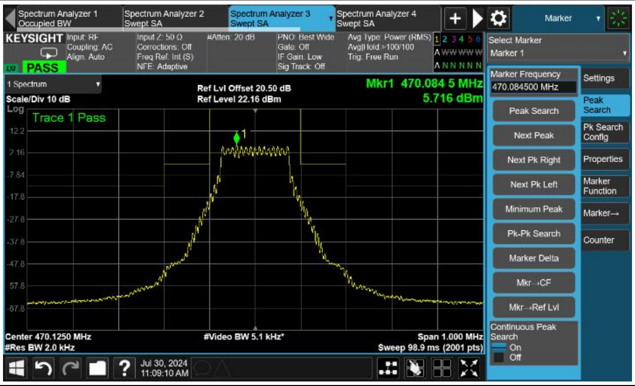
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-07-30	Test Mode	Mode 3

Port A

Channel 470.125MHz

Reference Level

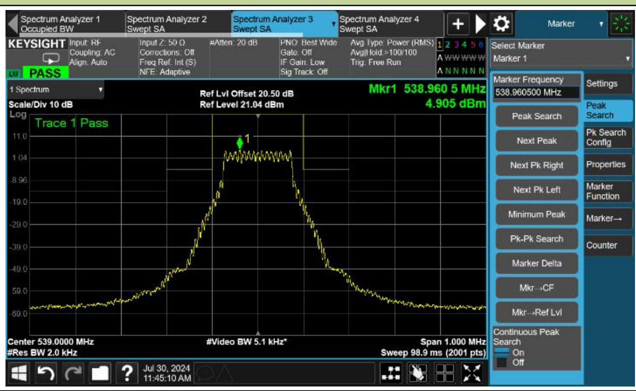
Out of Band Emission



Channel 539.000 MHz

Reference Level

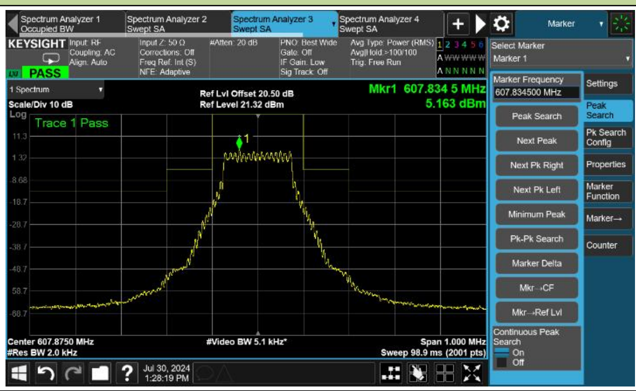
Out of Band Emission



Channel 607.875 MHz

Reference Level

Out of Band Emission

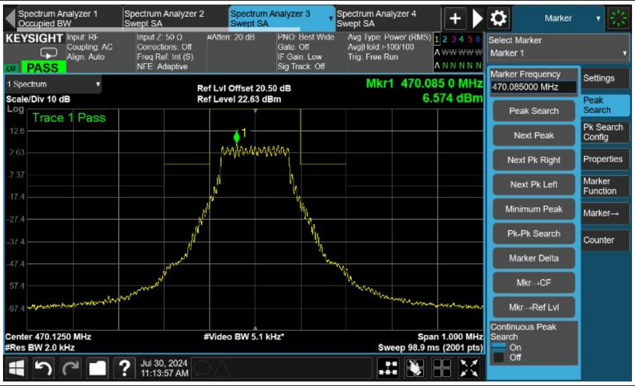


Port B

Channel 470.125MHz

Reference Level

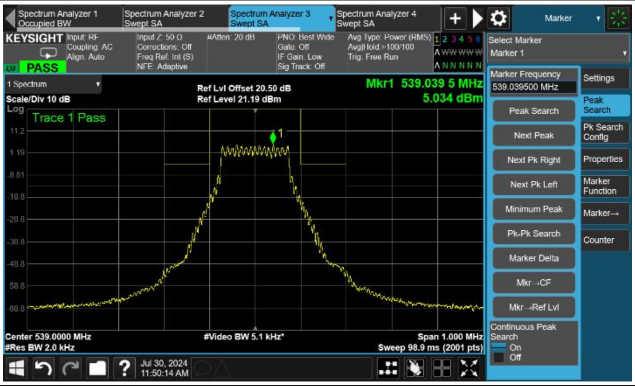
Out of Band Emission



Channel 539.000 MHz

Reference Level

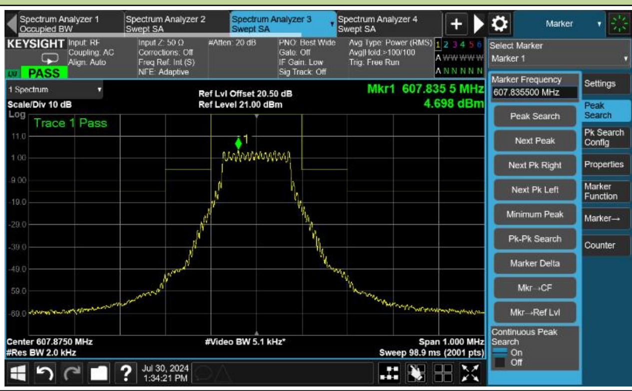
Out of Band Emission



Channel 607.875 MHz

Reference Level

Out of Band Emission

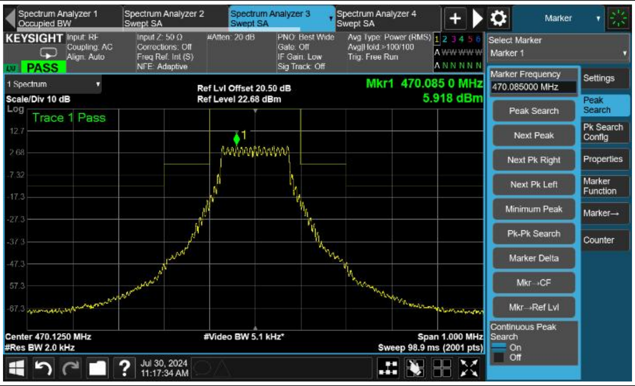


Port C

Channel 470.125MHz

Reference Level

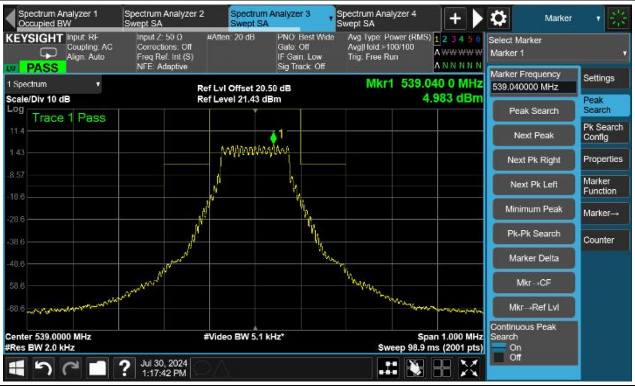
Out of Band Emission



Channel 539.000 MHz

Reference Level

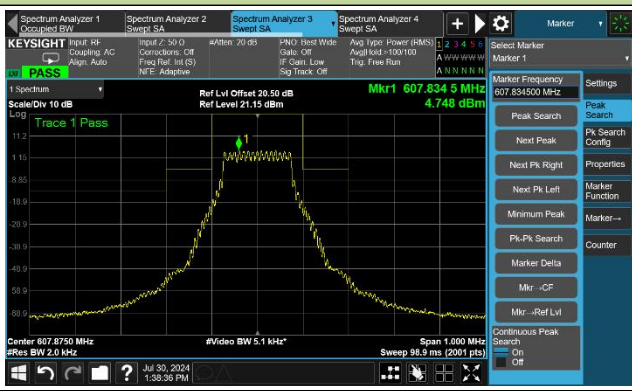
Out of Band Emission



Channel 607.875 MHz

Reference Level

Out of Band Emission



<table>
<tr><td colspan="2">Port D</td></tr>
<tr><td colspan="2">Channel 470.125MHz</td></tr>
<tr><td>Reference Level</td><td>Out of Band Emission</td></tr>
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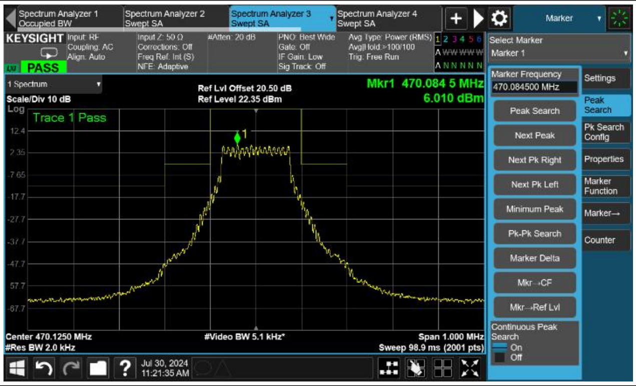
</td><td>
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<tr><td colspan="2">Channel 539.000 MHz</td></tr>
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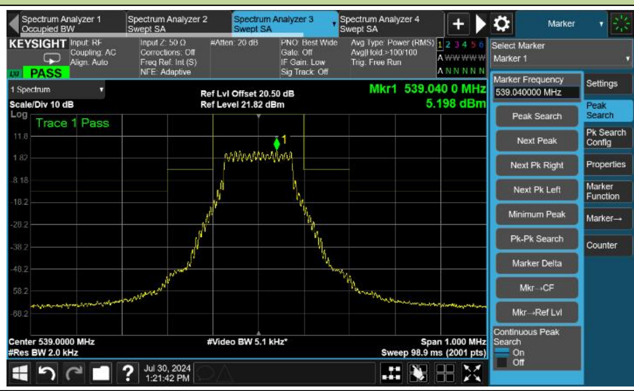
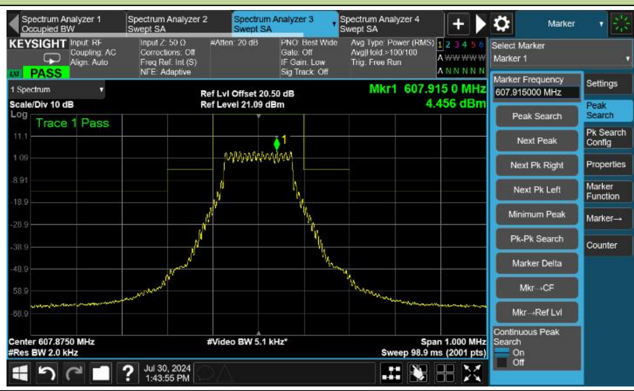
<tr><td>
</td><td>
</td></tr>
<tr><td colspan="2">Channel 607.875 MHz</td></tr>
<tr><td>Reference Level</td><td>Out of Band Emission</td></tr>
<tr><td>
</td><td>
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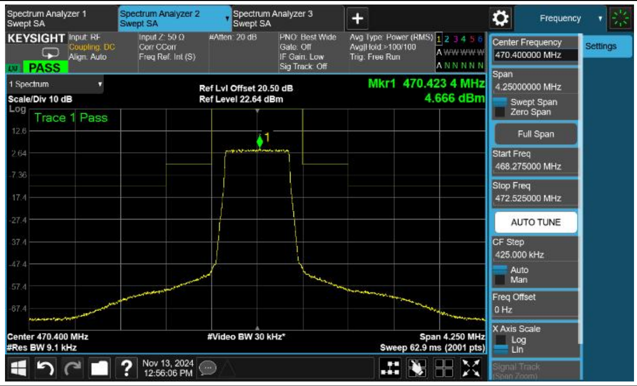
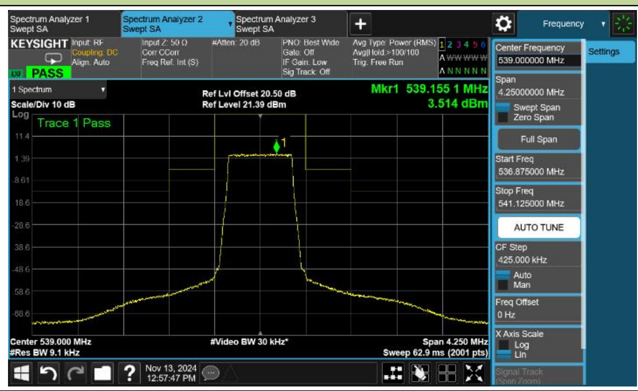
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-10-08 ~ 2024-11-13	Test Mode	Mode 7

Port A	
Channel 470.400MHz	
Reference Level	Out of Band Emission
	
Channel 539.000 MHz	
Reference Level	Out of Band Emission
	
Channel 607.600 MHz	
Reference Level	Out of Band Emission