

# FCC TEST REPORT

**Product Name:** Wireless Microphone  
**Trade Mark:** AVGO  
**Model No.:** NPVXX-MIC  
**Add. Model No.:** N/A  
**Report Number:** 190323001RFC-2  
**Test Standards:** FCC 47 CFR Part 74 Subpart H  
**FCC ID:** 2ASZE-NPVXXMIC  
**Test Result:** PASS  
**Date of Issue:** May 25, 2019

Prepared for:

**ONE SIX EIGHT (HK) CO., LIMITED**  
**UNIT C3 9/F WINNING HOUSE 72-76 WING LOK STREET SHEUNG**  
**WAN, HONGKONG**

Prepared by:

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Date: May 25, 2019

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**Version**

Version No.	Date	Description
V1.0	May 25, 2019	Original

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## 1. GENERAL INFORMATION

### 1.1 CLIENT INFORMATION

<b>Applicant:</b>	ONE SIX EIGHT (HK) CO., LIMITED
<b>Address of Applicant:</b>	UNIT C3 9/F WINNING HOUSE 72-76 WING LOK STREET SHEUNG WAN, HONGKONG
<b>Manufacturer:</b>	ONE SIX EIGHT (HK) CO., LIMITED
<b>Address of Manufacturer:</b>	UNIT C3 9/F WINNING HOUSE 72-76 WING LOK STREET SHEUNG WAN, HONGKONG

### 1.2 EUT INFORMATION


#### 1.2.1 General Description of EUT

<b>Product Name:</b>	Wireless Microphone	
<b>Model No.:</b>	NPVXX-MIC	
<b>Add. Model No.:</b>	N/A	
<b>Trade Mark:</b>		
<b>DUT Stage:</b>	Production Unit	
<b>EUT Supports Function:</b>	Wireless microphones:	653 - 657 MHz (duplex gap)
<b>Power Supply:</b>	The transmitter unit is supplied by 2x1.5V  AA batteries.	
<b>Sample Received Date:</b>	April 11, 2019	
<b>Sample Tested Date:</b>	April 19, 2019 to May 25, 2019	

#### 1.2.2 Description of Accessories

None

### 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

<b>Frequency Band:</b>	653 - 657 MHz (duplex gap)
<b>Frequency Range:</b>	653.5 MHz; 656.5 MHz
<b>Type of Modulation:</b>	<input type="checkbox"/> Analog: FM <input checked="" type="checkbox"/> Digital: 4FSK
<b>Number of Channels:</b>	1
<b>Channel Separation:</b>	1 MHz
<b>Antenna Type:</b>	Integral Antenna
<b>Antenna Gain:</b>	10 dBi
<b>Max. EIRP:</b>	-34.88 dBm
<b>Normal Test Voltage:</b>	3.0 V (2 x 1.5V  AA batteries)
<b>Extreme Test Voltage:</b>	2.8 to 3.2Vdc
<b>Extreme Test Temperature:</b>	-30 °C to +50 °C

### 1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.15 Meter	UnionTrust

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## 1.5 TEST LOCATION

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### Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109  
Telephone: +86 (0) 755 2823 0888  
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## 1.6 TEST FACILITY

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

### CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

### A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

### FCC Accredited Lab.

Designation Number: CN1194  
Test Firm Registration Number: 259480

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## 1.7 DEVIATION FROM STANDARDS

None.

## 1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

### 1.10 MEASUREMENT UNCERTAINTY

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

No.	Item	Measurement Uncertainty
1	RF output power, conducted	±0.52 dB
2	Radio frequency	±6.3 x 10 <sup>-8</sup>
3	Occupied Channel Bandwidth	±2.3 %
4	Radiated Spurious emissions 30MHz-1GHz	±4.5 dB
5	Radiated Spurious emissions 1GHz-18GHz	±4.4 dB

## 2. TEST SUMMARY

FCC 47 CFR Part 74 Subpart H Test Cases			
Test Item	Test Requirement	Test Method	Result
RF output power	FCC 47 CFR Part 74.861(e)(1)(ii), (iii) FCC 47 CFR Part 2.1046(a)	ANSI C63.26-2015	PASS
Emission mask	FCC 47 CFR Part 74.861(e)(7)	ETSI EN 300 422-1 V1.4.2, section 8.3.2.1	PASS
Radiated Spurious emissions	FCC 47 CFR Part 74.861(e)(6)(iii)	ANSI C63.26-2015	PASS
Occupied Bandwidth	FCC 47 CFR Part 74.861(e) (5)	ANSI C63.26-2015	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 74.861(e) (4)	ANSI C63.26-2015	PASS

### 3. EQUIPMENT LIST

RF Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Audio Test System	Audio Precision	ATS-1	ATS1-41075	May 22, 2018	May 22, 2019
<input checked="" type="checkbox"/>	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 18, 2018	Sep. 18, 2019
<input type="checkbox"/>	Temp & Humidity chamber	Espec	GL(U)04K A(W)	16921H201P3	Sep. 20, 2018	Sep. 20, 2019
<input checked="" type="checkbox"/>	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Jun. 05, 2018	Jun. 05, 2020

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
<input checked="" type="checkbox"/>	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
<input checked="" type="checkbox"/>	Receiver	R&S	ESIB26	100114	Nov. 24, 2018	Nov. 24, 2019
<input type="checkbox"/>	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 03, 2018	Dec. 03, 2019
<input checked="" type="checkbox"/>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103001	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Preamplifier	HP	8447F	2805A02960	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May 19, 2018	May 19, 2019
<input checked="" type="checkbox"/>	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 24, 2018	Nov. 24, 2019
<input checked="" type="checkbox"/>	Horn Antenna	ETS-LINDGREN	3117	00164202	Dec. 08, 2018	Dec. 08, 2019
<input checked="" type="checkbox"/>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May 22, 2018	May 22, 2019
<input checked="" type="checkbox"/>	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
<input checked="" type="checkbox"/>	Test Software	Audix	e3	Software Version: 9.160333		



## 4. TEST CONFIGURATION

### 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

#### 4.1.1 Normal or Extreme Test Conditions

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.0	20 to 75
TL/VL	-30	2.8	20 to 75
TH/VL	+50	2.8	20 to 75
TL/VH	-30	3.2	20 to 75
TH/VH	+50	3.2	20 to 75

**Remark:**

- The EUT just work in such extreme temperature of -30 °C to +50 °C and the extreme voltage of 2.8 V to 3.2 V, so here the EUT is tested in the temperature of -30 °C to +50 °C and the voltage of 2.8 V to 3.2 V.
- VN: Normal Voltage; TN: Normal Temperature;  
 TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;  
 VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

#### 4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
RF output power	25.4	53.0	99.80	Fire Huo
Emission mask	24.7	56.2	100.3	Hank Wu
Radiated Spurious emissions	25.4	53.0	99.80	Fire Huo
Occupied Bandwidth	24.7	56.2	100.3	Hank Wu
Frequency stability	24.7	56.2	100.3	Hank Wu

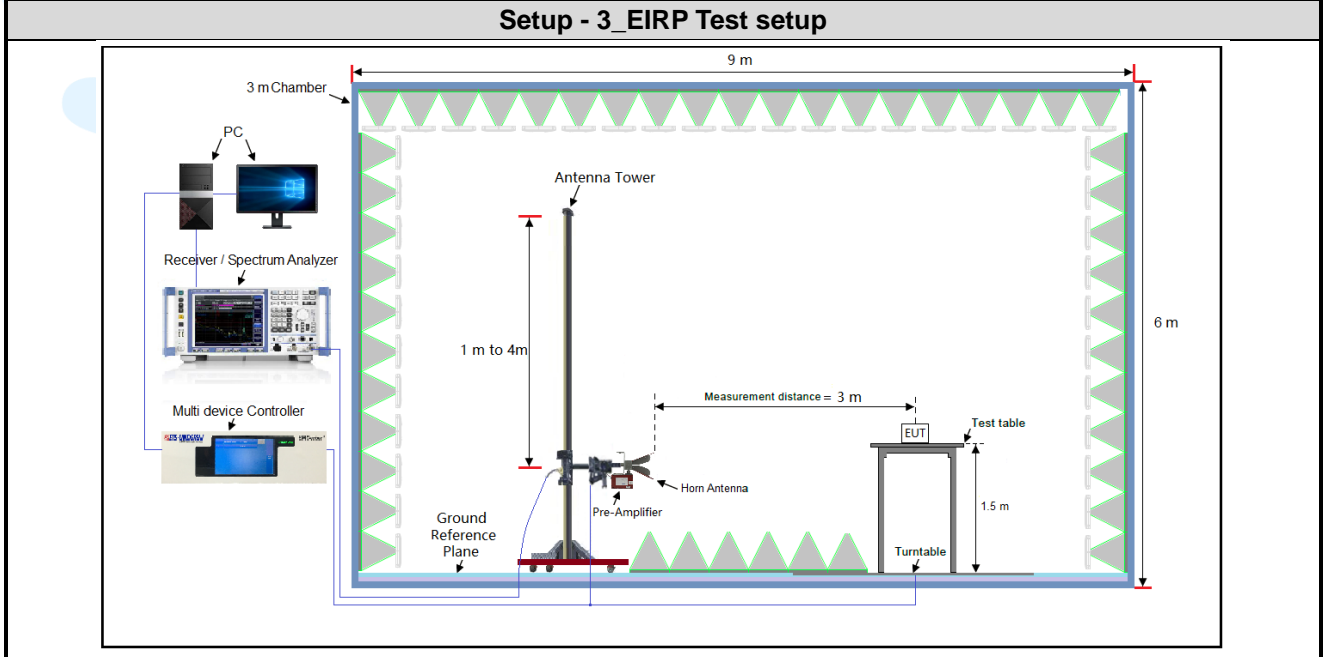
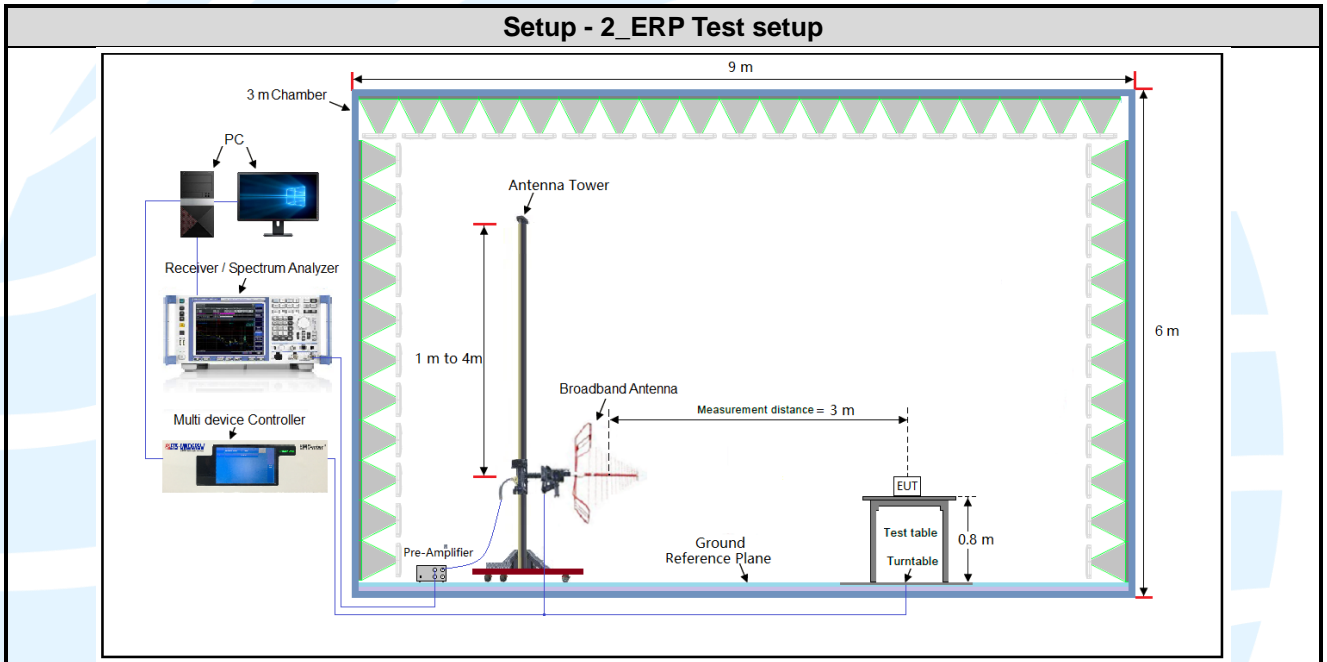
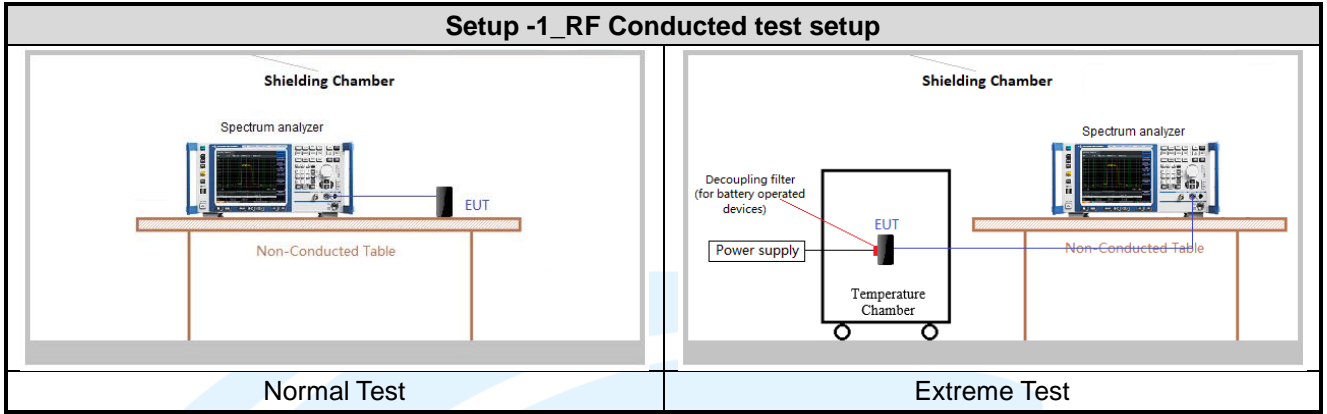
## 4.2 TEST CHANNELS

Frequency Range	Test RF Channel Lists
653.5 MHz	653.5 MHz
656.5 MHz	656.5 MHz

## 4.3 EUT TEST STATUS

Description
<ol style="list-style-type: none"> <li>Keep the EUT in continuously transmitting with modulation test mode.</li> <li>Keep the EUT in continuously transmitting with Un-modulation test mode.</li> </ol>
Power Setting
Power Setting: not applicable, test used software default power level.
Test Software
Test software name: N/A;

4.4 TEST SETUP



## 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

### 5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 74 Subpart H	Low Power Auxiliary Stations
2	FCC 47 CFR Part 2 Subpart J	Frequency allocations and radio treaty matters; general rules and regulations
3	ETSI EN 300 422-1 V1.4.2	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement
4	KDB 206256 D01 Wireless Microphone Certification v02	Basic certification requirements for Wireless microphones
5	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

### 5.2 RF OUTPUT POWER

**Test Requirement:** FCC 47 CFR Part 74.861(e)(1)(ii), (iii)  
FCC 47 CFR Part 2.1046(a)

**Test Method:** ANSI C63.26-2015

**Limits:**

(e) For low power auxiliary stations operating in the 600 MHz duplex gap and the bands allocated for TV broadcasting, the following technical requirements apply:

- (1) The power may not exceed the following values.
- (ii) 470-608 and 614-698: 250 mW conducted power
- (iii) 600 MHz duplex gap: 20 mW EIRP

**Test Setup:** Refer to section 4.4 for details.

**Test Procedures:**

1. The output of the EUT was connected to a spectrum analyzer through 20dB of attenuation. The EUT was set to transmit on the lowest/ middle/ highest frequency.
2. Measure out each test modes' average output power, record the power level.

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

**Equipment Used:** Refer to section 3 for details.

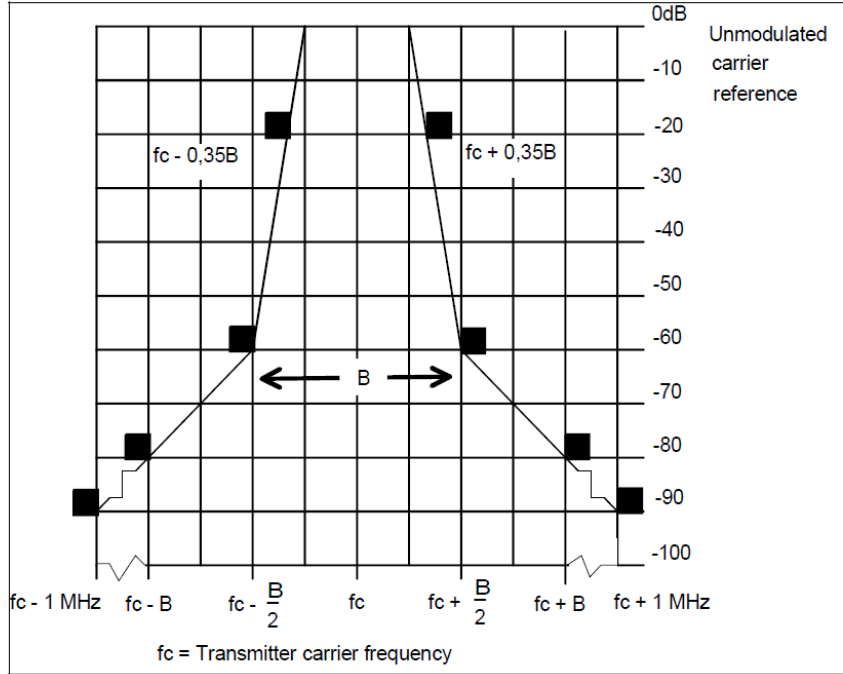
**Test Result:** Pass

**The measurement data as follows:**

Test Frequency (MHz)	EIRP (dBm)	EIRP (mW)	Limit (mW)	Margin (mW)
	653.50	-36.61		
656.50	-34.88	0.000325	20.00	19.999675

### 5.3 EMISSION MASK

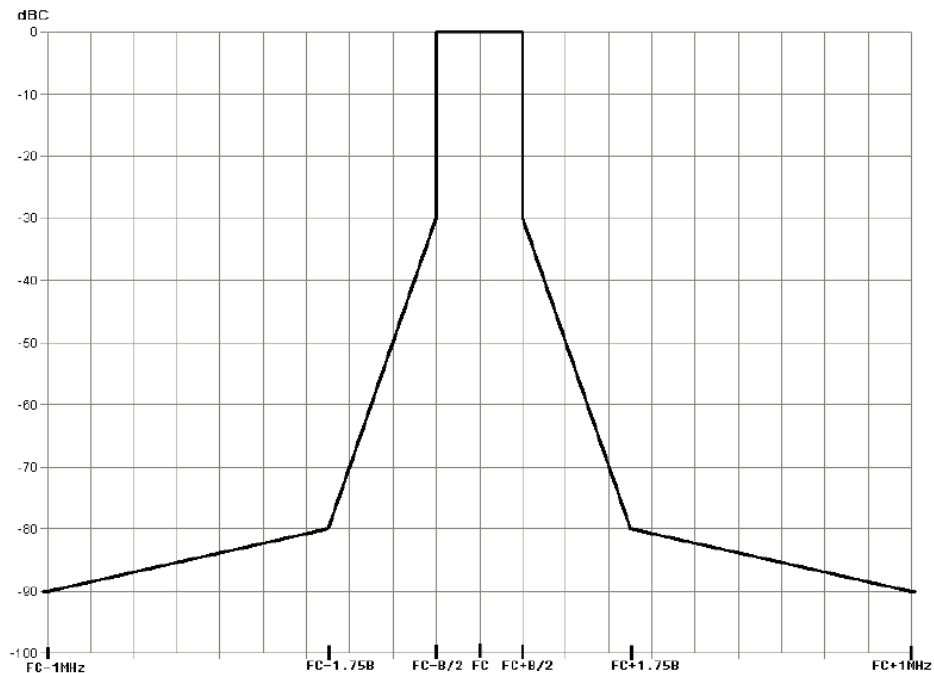
**Test Requirement:** FCC 47 CFR Part 74.861(e)(7)  
**Test Method:** ETSI EN 300 422-1 V1.4.2, section 8.3.2.1  
**Limits:**  
**For Analogue Systems:**



**Figure 3: Spectrum mask for analogue systems in all bands**

Figure 3 shows the spectrum mask for all analogue systems in the band. The -90 dBc point shall be  $\pm 1$  MHz from  $f_c$  measured with an average detector. To comply, a measured value must fall below the mask limit as shown in figure 3.

**For Digital Systems:**



**Figure 4: Spectrum mask for digital systems below 1 GHz**

For the measurement uncertainty, see clause 10. The -90 dBc point shall be  $\pm 1$  MHz from  $f_c$  measured with an average detector.

**Test Setup:** Refer to section 4.4 for details.

**Test Procedures:**

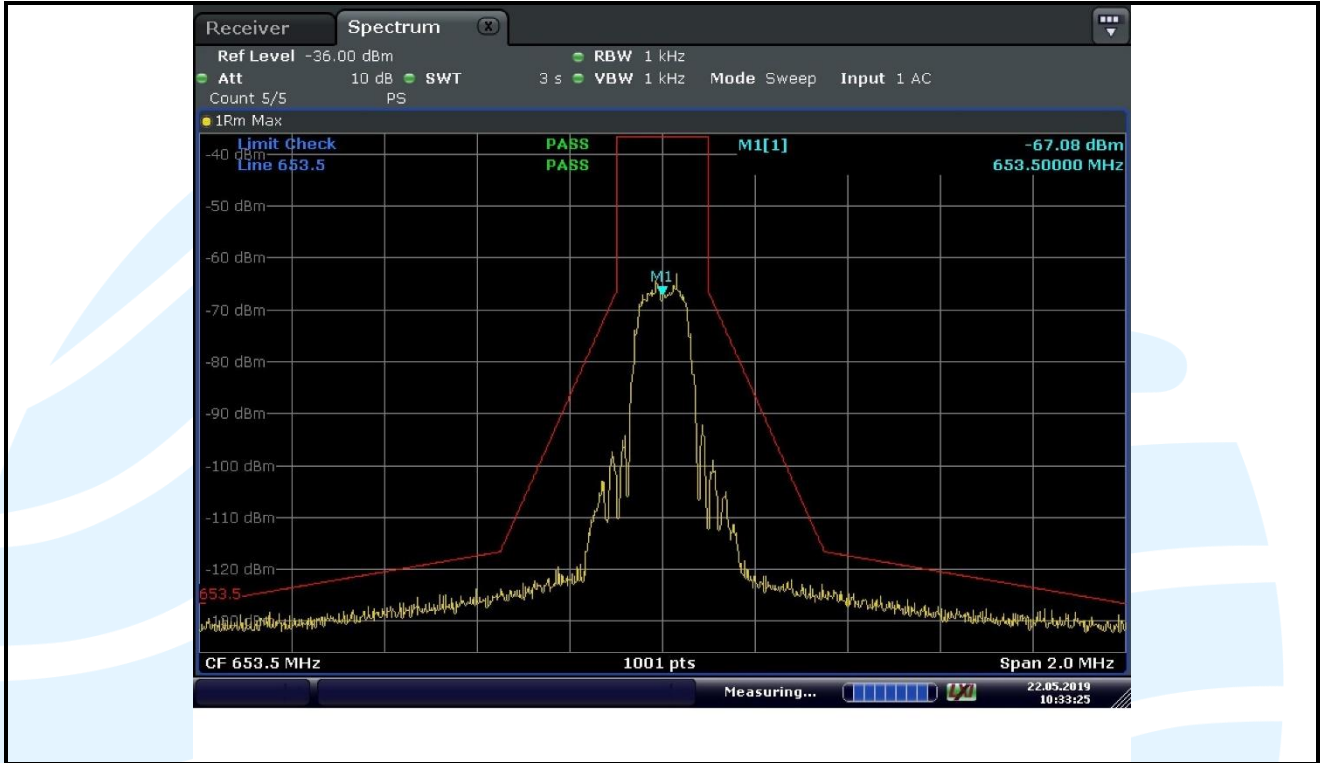
Refer to ETSI EN 300 422-1 V1.4.2, section 8.3.2.1

**Equipment Used:** Refer to section 3 for details.

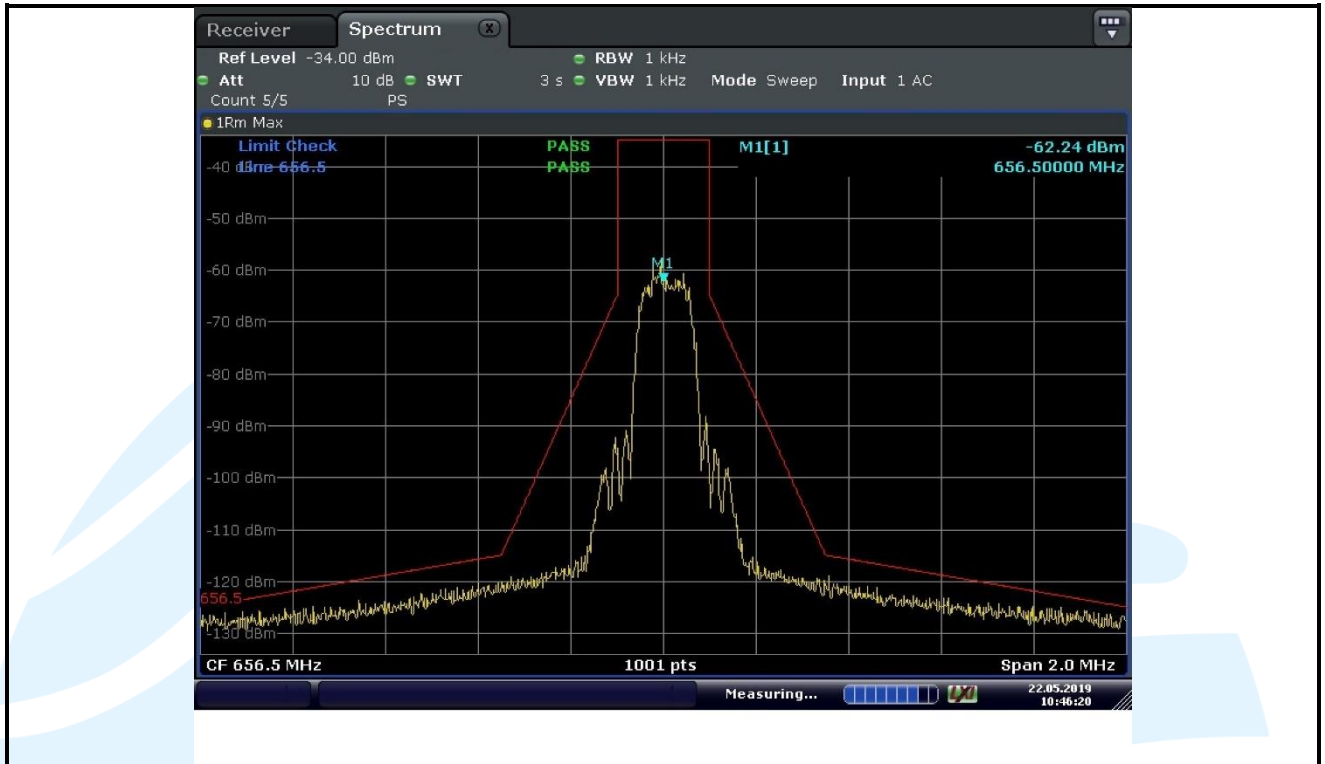
**Test Result:** Pass

**The measurement data as follows:**

**For 653.5 MHz**



For 656.5MHz



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### 5.4 RADIATED SPURIOUS EMISSIONS

**Test Requirement:** FCC 47 CFR Part 15.236(g)

**Test Method:** ANSI C63.26-2015

**Limits:**

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

**Test Setup:** Refer to section 4.4 for details.

**Test Procedures:**

ANSI/TIA-603-E-2016

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

**The measurement data as follows:**

For 653.5 MHz								
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Detector	Antenna Polaxis
1	1307.00	-46.18	0.63	-45.55	-13.00	-32.55	Peak	Horizontal
2	1960.50	-68.71	4.89	-63.82	-13.00	-50.82	Peak	Horizontal
3	2614.00	-69.86	9.33	-60.53	-13.00	-47.53	Peak	Horizontal
4	1307.00	-38.51	1.57	-36.94	-13.00	-23.94	Peak	Vertical
5	1960.50	-67.00	7.64	-59.36	-13.00	-46.36	Peak	Vertical
6	2614.00	-67.97	11.45	-56.52	-13.00	-43.52	Peak	Vertical

For 656.5 MHz								
No.	Frequency (MHz)	Reading (dBm)	Correction factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Detector	Antenna Polaxis
1	1313.00	-42.34	0.66	-41.68	-13.00	-28.68	Peak	Horizontal
2	1969.50	-65.36	4.97	-60.39	-13.00	-47.39	Peak	Horizontal
3	2626.00	-64.85	9.36	-55.49	-13.00	-42.49	Peak	Horizontal
4	1313.00	-40.66	1.61	-39.05	-13.00	-26.05	Peak	Vertical
5	1969.50	-68.41	7.76	-60.65	-13.00	-47.65	Peak	Vertical
6	2626.00	-68.43	11.46	-56.97	-13.00	-43.97	Peak	Vertical

**Standby mode test result:**

Not any spurious emissions has been observed.

### 5.5 OCCUPIED BANDWIDTH

**Test Requirement:** FCC 47 CFR Part 74.861(e) (5)

**Test Method:** ANSI C63.26-2015

**Limits:**

The operating bandwidth shall not exceed 200 kHz.

**Test Setup:** Refer to section 4.4 for details.

**Test Procedures:**

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

Use the following spectrum analyzer settings:

- a) Set RBW = 1 % to 5 % of the anticipated OBW.
- b) Set VBW ≥ 3 x RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.

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

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

**The measurement data as follows:**

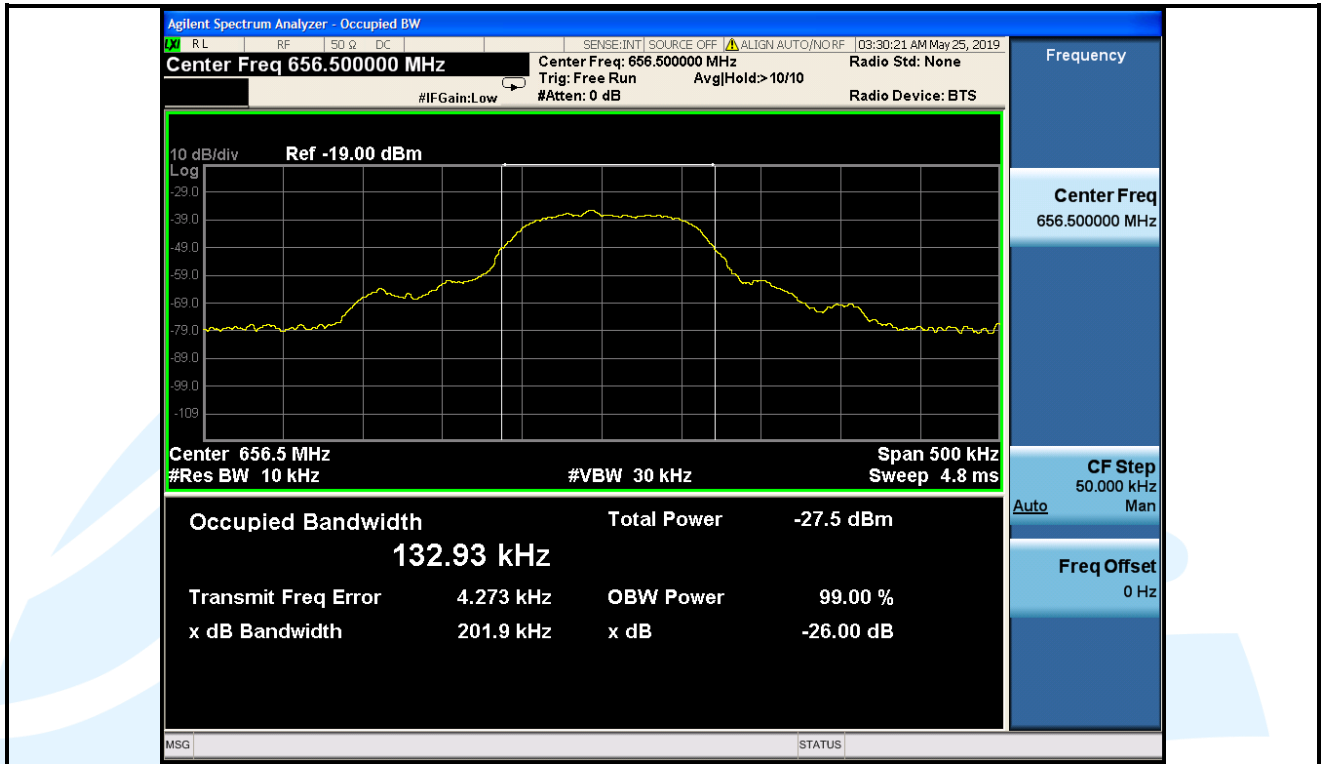
Channel	Occupied Bandwidth (kHz)	Limit (kHz)
Lowest	131.57	200
Highest	132.93	200

**For 653.5 MHz**





For 656.5MHz



### 5.6 FREQUENCY STABILITY

**Test Requirement:** FCC 47 CFR Part 74.861(e) (4)

**Test Method:** ANSI/TIA-603-E-2016

**Limits:**

The frequency tolerance of the transmitter shall be 0.005 percent (50ppm)

**Test Setup:** Refer to section 4.4 for details.

**Test Procedures:**

- 1) Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage.
- 2) The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency determining circuit element shall be made subsequent to this initial set-up. Frequency stability is tested:
  - a) at 10°C intervals of temperatures between -30°C and +50°C at the manufacturer's rated supply voltage, and
  - b) at +20 °C temperature and ± 15 % supply voltage variations. 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.
- 3) During the test all necessary settings, adjustments and control of the EUT have to be performed without disturbing the test environment, i.e., without opening the environmental chamber. The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range. For handheld equipment that is only capable of operating from internal batteries and the supply voltage cannot be varied, the frequency stability tests shall be performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer. An external supply voltage can be used and set at the internal 2483 battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

**Equipment Used:** Refer to section 3 for details.

**Test Result:** Pass

**The measurement data as follows:**

Channel	Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Measured value (MHz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
1	653.5	VL	TN	653.4876	-18.9748	± 50	Pass
		VN		653.4873	-19.4338	± 50	Pass
		VH		653.4875	-19.1278	± 50	Pass
		VN	50	653.5199	30.4514	± 50	Pass
			40	653.4844	-23.8715	± 50	Pass
			30	653.4845	-23.7184	± 50	Pass
			20	653.4878	-18.6687	± 50	Pass
			10	653.4847	-23.4124	± 50	Pass
			0	653.4870	-19.8929	± 50	Pass
			-10	653.4821	-27.3910	± 50	Pass
			-20	653.5160	24.4836	± 50	Pass
			-30	653.4848	-23.2594	± 50	Pass

Channel	Frequency (MHz)	Voltage (Vdc)	Temperature (°C)	Measured value (MHz)	Deviation (ppm)	Limit (ppm)	Pass/ Fail
2	656.5	VL	TN	656.4942	-8.8347	± 50	Pass
		VN		656.4880	-18.2788	± 50	Pass
		VH		656.4919	-12.3382	± 50	Pass
		VN	50	656.4916	-12.7951	± 50	Pass
			40	656.4885	-17.5171	± 50	Pass
			30	656.4925	-11.4242	± 50	Pass
			20	656.4874	-19.1927	± 50	Pass
			10	656.4910	-13.7091	± 50	Pass
			0	656.5192	29.2460	± 50	Pass
			-10	656.4843	-23.9147	± 50	Pass
			-20	656.4880	-18.2788	± 50	Pass
			-30	656.5005	0.7616	± 50	Pass

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## APPENDIX 1 PHOTOS OF TEST SETUP

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

## APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

\*\*\* End of Report \*\*\*

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