

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	<b>ULR-TC568820300000061F</b>	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	<b>166494301 0010</b>	Seite 1 von 38 <i>Page 1 of 38</i>
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	NA	<b>Auftragsdatum</b> <i>Order date:</i>	2020-10-27	
<b>Auftraggeber:</b> <i>Client:</i>	Saankhya Labs Pvt Ltd Embassy Icon, Third Floor & Ground Floor, #3, Infantry Rd, Bengaluru, Karnataka, INDIA-560001			
<b>Prüfgegenstand:</b> <i>Test item:</i>	BRH Kailash unit			
<b>Bezeichnung:</b> <i>Identification:</i>	KAILASH5W00			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Testing and Issue of test report with FCC grant certificate			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC Part 2 & Part 27			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2020-10-27			
<b>Prüfmuster-Nr &amp; Serien-Nr.:</b> <i>Test sample no &amp; serial no.:</i>	A002918526-001 & SLBRH05W-TX725-11-A-00001			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2020-10-30 - 2020-11-04			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	Wireless laboratory, Bangalore			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (India) Pvt. Ltd. 27/B, 2nd cross road, Electronic city Phase 1, Bangalore-560100, India FCC Test Site Registration No: 496599 ISED Test Site Registration No.: 3466E-1			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>geprüft von:</b> <i>tested by:</i>			<b>genehmigt von:</b> <i>authorized by:</i>	
<b>Datum:</b> <i>Date:</i>	2020-11-25		<b>Ausstattatum:</b> <i>Issue date:</i>	2020-11-25
<b>Stellung / Position:</b>	<b>Madhu Karadere Nagaraju</b> Senior Engineer		<b>Stellung / Position:</b>	<b>Mahammadgouse Kaladagi</b> Assistant Manager
<b>Sonstiges / Other:</b>	FCC ID: 2AUUC-KAILASH5W00			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
<b>* Legende:</b>	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
<b>* Legend:</b>	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				



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## TEST SUMMARY

Test Item	FCC Clause	Results
Conducted Output Average Power and Peak to Average Power ratio	§2.1046 (a) §27.50 (c)	Pass
Equivalent Isotropic Radiated Power (EIRP) / Effective Radiated Power (ERP)	§27.50 (c)	Pass
Field strength of spurious radiation	§2.1053 §27.53 (g)	Pass
Frequency Stability	§2.1055 §27.54	Pass
Occupied Bandwidth	§2.1049 (d)	Pass
Band Edge	§27.53 (g)	Pass
Spurious emissions at antenna terminals	§2.1051 §27.53 (g)	Pass

**Note:** N/T: Not Tested

Product Category: Electronics Testing  
Test Discipline: EMC Test Facility

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## REVISION HISTORY OF THIS REPORT

Report Number	Version	Description	Issue date
ULR-TC56882030000061F	01	Initial issue of report	2020-11-25

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# 1 GENERAL REMARKS

## 1.1 Attachments

All attachments are part of this test report and are issued in separate document

**1:** TEST SETUP PHOTOS

**2:** EUT EXTERNAL PHOTOS

**3:** EUT INTERNAL PHOTOS

**4:** FCC LABEL AND LABEL LOCATION

**5:** BLOCK DIAGRAM

**6:** SPECIFICATION OF EUT

**7:** SCHEMATIC DIAGRAM

**8:** BILL OF MATERIAL

**9:** USER MANUAL

**10:** MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

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## 2 TEST SITES

### 2.1 Testing Facilities

1. TÜV Rheinland (India) Pvt.Ltd.,  
27/B, 2nd Cross,  
ElectronicCityPhase1  
Bangalore – 560 100,  
India
2. TUV Rheinland (India) Private Limited  
108 , Beside ISBR Business School,  
Electronic city Phase I  
Bangalore - 560 100.  
India

### 2.2 List of Test and Measurement Instruments

**Table 1: List of test and measurement instruments**

Equipment	Manufacturer	Model Name	Serial Number	Firmware Versions	Calibration Due Date	Periodicity	Test Facility
EMI Receiver	Rohde & Schwarz	ESW 44	101732	-	10.12.2020	Yearly	Radiated Spurious Emission
Active loop antenna	Schwarzbeck	FMZB 1519 B	1519B-00111	-	31.01.2021	Yearly	
Biconical Antenna	Schwarzbeck	VHBB91 24+BBA 9106	9124-1208+9106-0525	-	17.02.2021	Yearly	
Log - Periodical Antenna	Schwarzbeck	VULP 9118 A	VULP9118A-0733	-	13.02.2021	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170-0904	-	29.01.2021	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1944	-	30.01.2021	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	-	
Fully Anechoic Chamber	Albatross	-	-	-	-	-	
Spectrum Analyser	Rohde & Schwarz	FSV7	101644	FW 3.40	27.12.2020	Yearly	Antenna - Port Measurements
Spectrum Analyser	Agilent Technologies	E4407B	US41192772	A.14.06	10.08.2021	Yearly	
USB Wideband Power Sensor	Boonton	55006	10231	-	09.01.2021	Yearly	

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**Table 2: Instrument application Software versions**

<b>SL. No.</b>	<b>Test Type</b>	<b>Application software</b>	<b>Version</b>
1	Radiated spurious emission measurement in SAC	EMC 32	10.60.00
2	Radiated spurious emission measurement in FAC	EMC 32	10.60.00

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## 3 GENERAL PRODUCT INFORMATION

### 3.1 Product Function and Intended Use

The Broadcast Radio Head (BRH) solution is a licensed 5 W ATSC 3.0 transmitter operating in the 6 MHz band from 722- 728 MHz (Channel 56). It is deployed in Low-Power Low Tower (LPLT) topology mode. LPLT networks provide broadcast services in High Population Density/Low Population Density Areas.

### 3.2 Ratings and System Details of Equipment under Test

**Table 3: Ratings and System Details as declared by Client\***

<b>Protocol</b>	ATSC 3.0	
<b>Operating Frequency Range</b>	722 MHz – 728 MHz	
<b>No. of Channels</b>	1(Refer Table 5)	
<b>Channel Spacing</b>	6 MHz	
<b>Maximum Measured Power (e.i.r.p)</b>	49.3 dBm EIRP; 37.3 dBm conducted power including all tolerances	
<b>Modulation</b>	OFDM	
<b>Number of antennas</b>	1	
<b>Antenna Gain</b>	12 dBi maximum**	
<b>Antenna Type</b>	-	
<b>Supply Voltage to Product</b>	-48 V DC	
<b>Environmental conditions</b>	<b>Storage</b>	-40 °C to +70 °C
	<b>Operating</b>	-40 °C to +50 °C
<b>EUT Dimension</b>	622 mm x 172.2 mm x 137 mm	

**\*Disclaimer:**

The information/data is supplied by the client and the same is considered to arrive at the final value. Any changes made apart from the specified specification, can directly impact on the tests results. Refer the products user manual for more details.

\*\* This product is not sold with the antenna. Antenna gain of 12 dBi is considered as a max gain for testing purpose only



### 3.3 Measurement Uncertainty

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$

**Table 4: Measurement Uncertainty**

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±3 °C
Supply Voltages	±3 %
Time	±5 %

Note: The Listed Measurement Uncertainties are the worst-case uncertainty, for the respective test cases. Above Table is for reporting purpose only and not used in determining Final Pass/Fail verdict.

## 4 TEST SET-UP AND OPERATION MODE

### 4.1 Principle of Configuration Selection

Transmission was enabled with the help of DVB-S2 signal source on single channel at 725MHz. The unit is controlled by the element management system (EMS) to force the EUT to operate at specified conducted Transmit power and in modulated/ continuous wave mode.

#### 4.1.1 Operation and Software of the EUT

**Software Name:** BRH KAILASH EMS  
**Software Version:** v1.1.1  
**Firmware Name:** BRH KAILASH  
**Firmware Version:** v1.0.3  
**Hardware Name:** BRH KALASH  
**Hardware Version:** v1.0

### 4.2 Special Accessories and Auxiliary Equipment

Sl.no	Accessories	Model
1	Test laptop	Dell latitude
2	DVB-S2 signal source	DekTek DTU-315
3	Power supply	BK Precision 1685B
4	GPS antenna	Toaglas A.01.C.301111
5	Router	TP Link TL-MR3420
6	Attenuator	30 dB RF Shenzen Teleworld TWAN-250W-2G
7	Attenuator	20 dB Narda 776C-20

#### 4.2.1 Countermeasures to achieve EMC Compliance

- None

### 4.3 List of frequencies

Table 5: List of Center frequencies

Frequency band (MHz)	Channel no.	Bandwidth (MHz)
725	56	6 MHz

**Note:**

TUV Sample Identification number : A002918526-001 - Radiated & Conducted test Sample

### 4.4 Report references

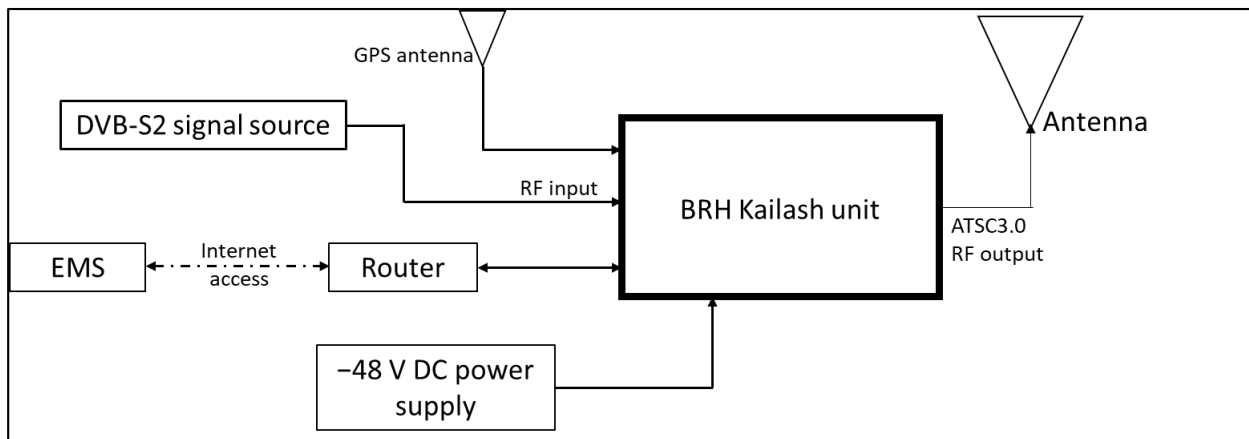
- None

## 5 Operational Description of the product

The solution consists of an LNB (low noise block) antenna which receives the DVB-S2 signal in Ku band and converts into L-band. The L-band DVB-S2 signal is fed as input to the BRH Kailash unit which converts it into an ATSC 3.0 output with 5 W average power and is broadcasted in the 722 MHz – 728 MHz band. Time and location information of the Unit is available using the connected GPS antenna.

EMS connectivity is provided on the Ethernet port and communication between the BRH Unit and EMS is done over a HTTPS connection.

## 6 Block Diagram of the product



## 7 TEST METHODOLOGY

### Radiated Emission Test

#### Frequency Range 9 kHz - 30 MHz

#### Test performed as per ANSI C63.4-2014 section 8.3

The loop Antenna was placed at 1m above the ground plane & EUT is 3 meters far from the measuring antenna. With 3m measurement distance, correction data were applied to the measured results. The test arrangement, measuring antenna guidelines and operational configurations in 8.2.1 and 8.2.2, shall be followed. The measurement antenna shall be positioned with its plane perpendicular to the ground at the Specified distance, when perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT. EUT & its associates are placed on non-conducting table of 0.8m height which is placed on the turn table, For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. The report shall list worst case emission results, for each of the parallel & perpendicular orientations.

#### 7.1.1 Test Setup Configuration

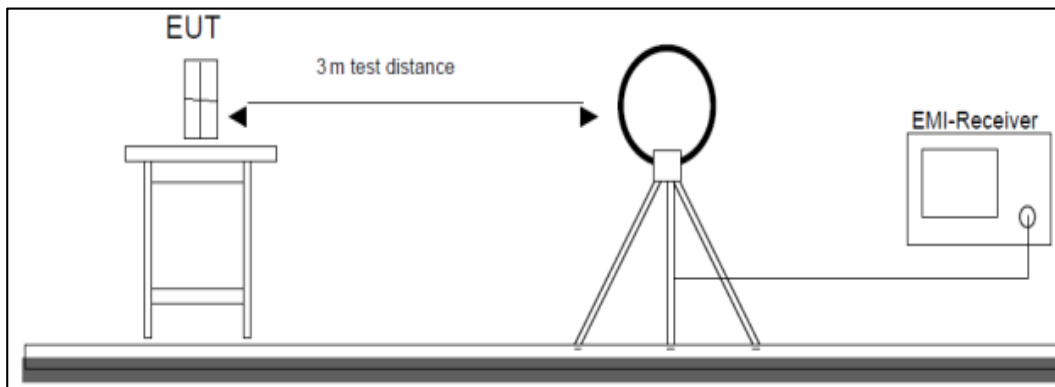


Figure 1: Frequency Range 9 kHz - 30 MHz

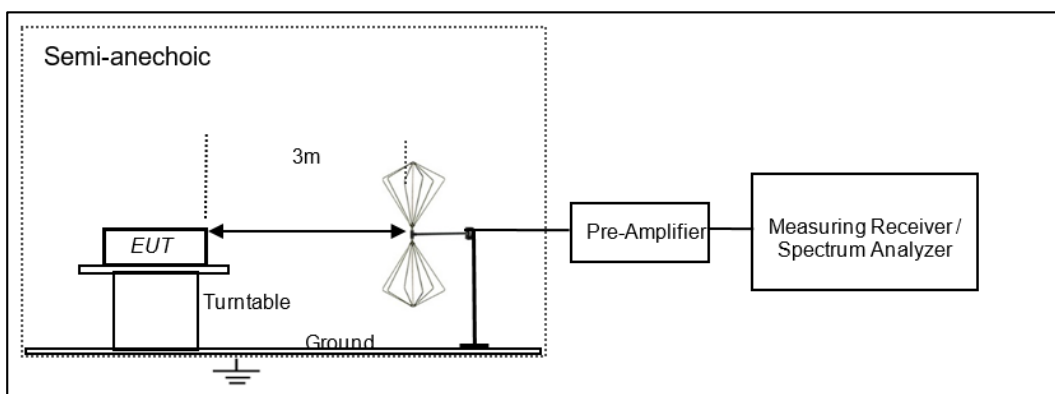
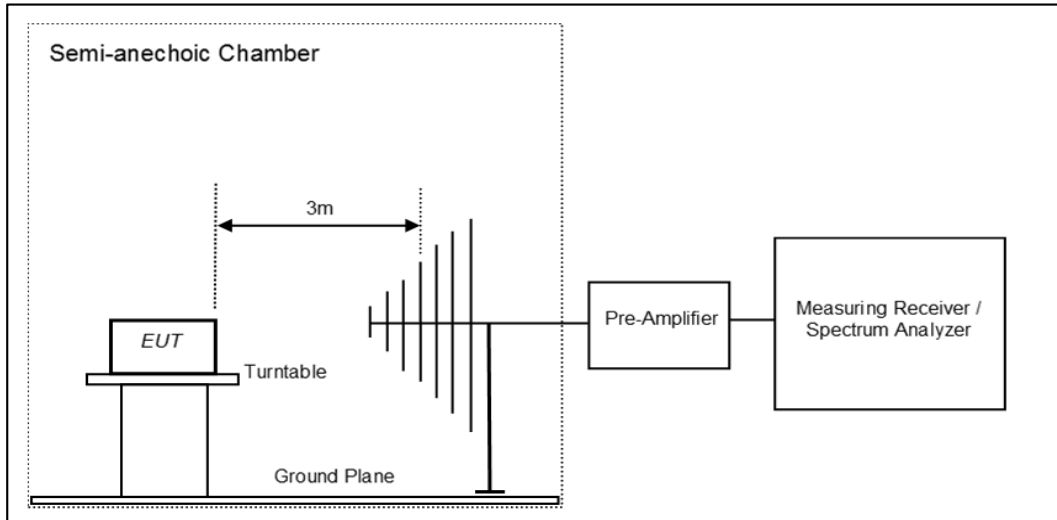
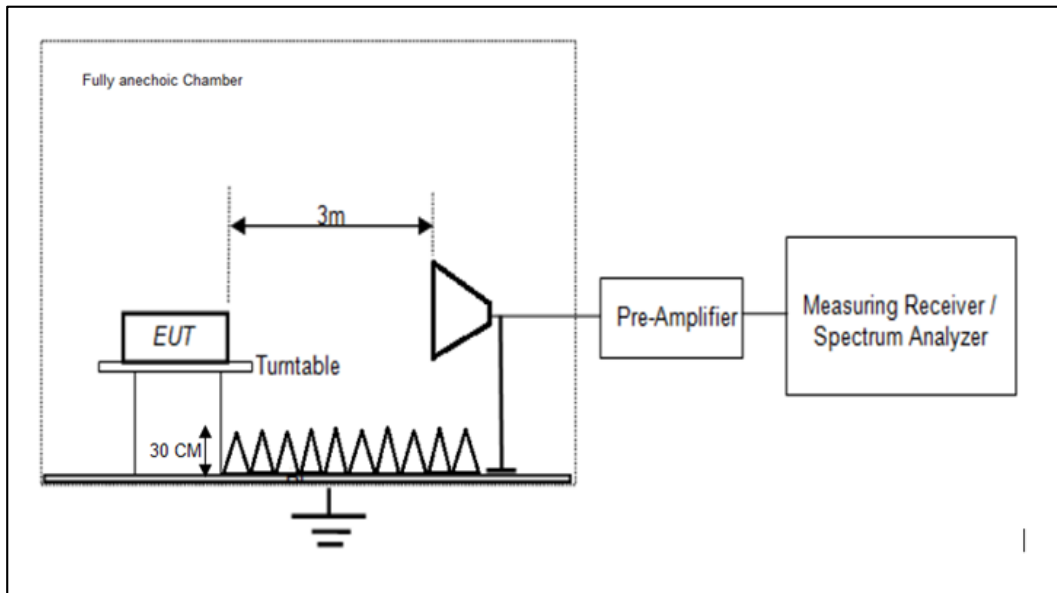


Figure 2: Frequency Range 30 MHz - 200 MHz



**Figure 3: Frequency Range 200 MHz - 1GHz**



**Figure 4: Frequency Range above 1 GHz**

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## Frequency Range 30MHz to 10<sup>th</sup> harmonics of the highest fundamental frequency

### Test performed as per ANSI C63.26-2015

Radiated spurious emission test are performed as below.

All the radiated emission measurements are performed in accordance with common requirement specified in 5.5.2 and Pre-test site path loss correction factors are used to adjust the EUT emission data in place of two step substitution method (as defined in Annex B of ANSI C63.26-2015).

The equipment under test is placed on non-conductive table at 3m away from the receive antenna in accordance with above mentioned standard. Turn table is rotated through 360 degree, and receiver antenna height is varied in order to determine the level of maximum emission. The maximum emission level and position of the maximized emission is recorded with use of spectrum analyzer.

### Using pre-test site path loss to determine EUT emission power:

1) EUT emission powers are calculated using the following equation:

$$\text{Emission Power} = \text{EUT}_{\text{Prec}} [\text{dBm EIRP/ ERP}] + \text{P}_L [\text{dB}]$$

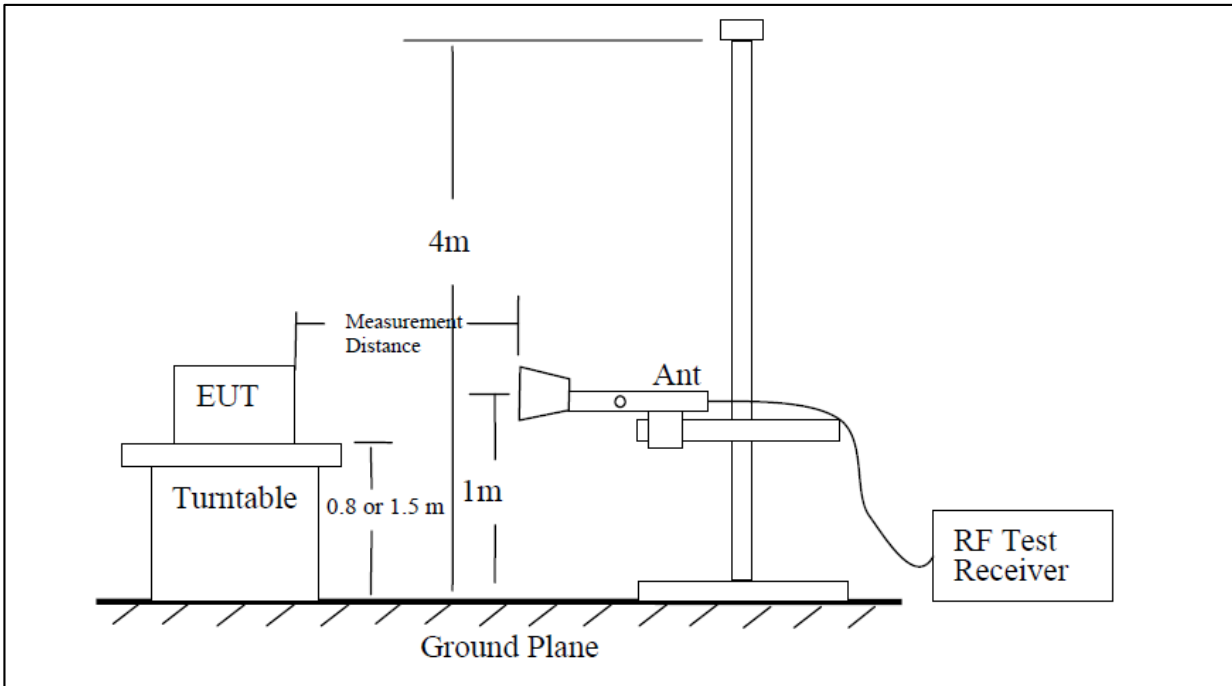
where

$\text{EUT}_{\text{Prec}}$  = power of the emission measured at the test receiver during EUT measurements.

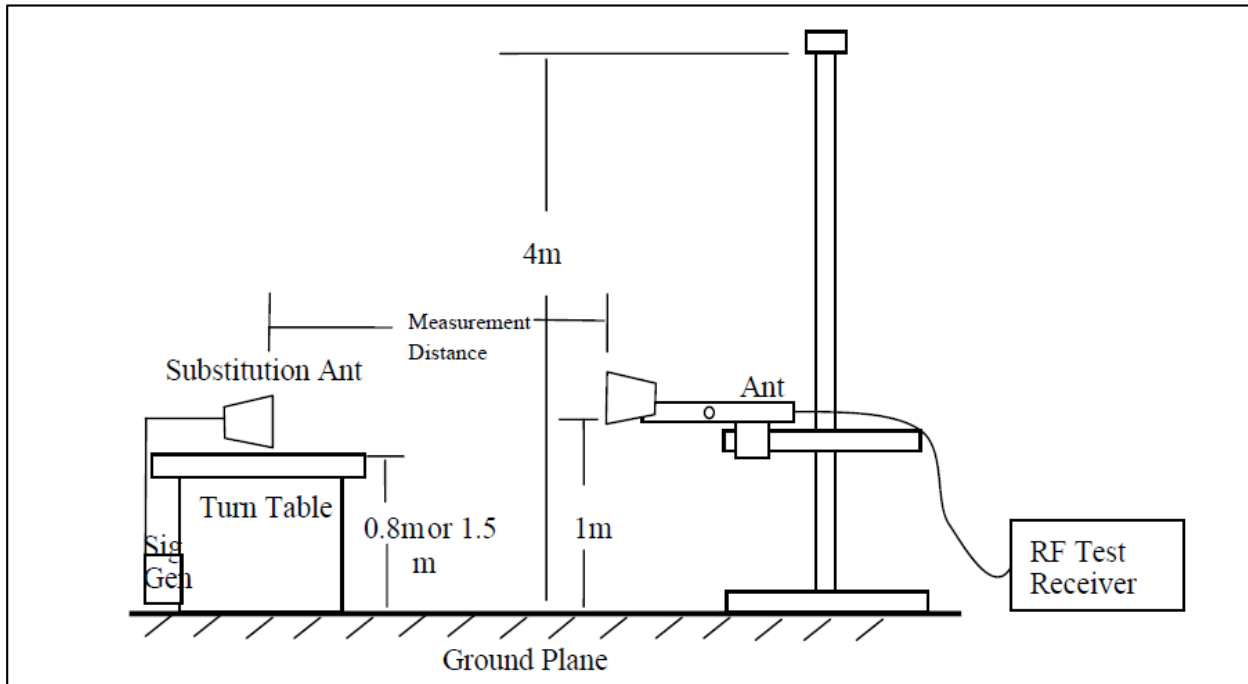
$\text{P}_L$  = path loss determined on the frequency of the EUT emission or calculated using linear interpolation between site characterization frequencies.

2) This is the level to be compared against the regulatory limit as it is the emission power referenced back to the EUT on the test site.

**Test site-up for radiated measurements**



**Substitution method set-up for radiated emission**



## 8 TEST RESULTS

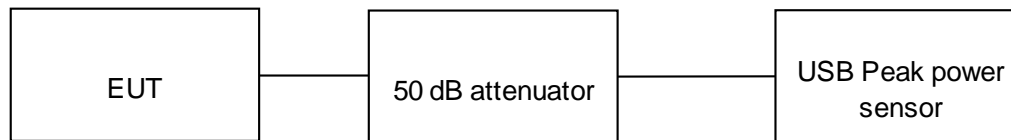
### 8.1 Conducted Output Average Power

**Result**

**Pass**

Test Specification	FCC Part §2.1046 (a), §27.50 (c)
Test Method / Procedure	As per subclause 5.2.3.2 & 5.2.4.2 ANSI C63.26-2015 As per subclause 5.1.3 & 5.2.4 in KDB 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth(RBW)	≥ OBW
Detector function	Peak / Average
Requirement	NA

**Test Setup:**



**Environmental conditions:**

Temperature (Norm) = + 22.3 °C      Voltage = -48 V DC      Relative humidity = 62 %

**Test results:**

- Note:**
- All the losses are included during measurement and final values are mentioned in the test report.
  - Total Measured Average Output power (dBm) = Measured Average power (dBm) + Attenuator factor (50dB) + Cable loss (0.6dB)
  - Total Measured Peak Output power (dBm) = Measured Peak power (dBm) + Attenuator factor (50dB) + Cable loss (0.6dB)

**Table 6: Conducted Power test results**

Channel Frequency (MHz)	Channel no.	Modulation	Channel Bandwidth (MHz)	Total Measured Peak Power (dBm)	Total Measured Average Power (dBm)
725	56	OFDM	6	48.84	37.30



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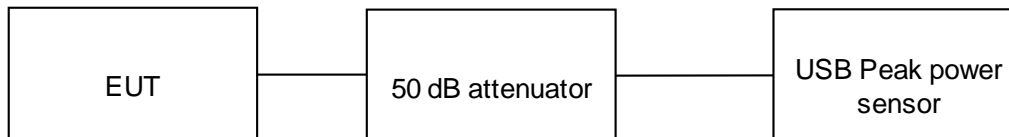
## 8.2 Peak to Average Power Ratio (PAPR)

### Result

**Pass**

Test Specification	FCC Part §2.1046 (a) & §27.50 (c)
Test Method / Procedure	As per subclause 5.2.6 ANSI C63.26-2015 As per subclause 5.7.3 in KDB 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth(RBW)	≥ OBW
Detector function	Peak / Average
Requirement	PAPR ≤ 13dB

### Test Setup:



### Environmental conditions:

Temperature (Norm) = + 22.3 °C

Voltage = -48 V DC

Relative humidity = 62 %

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**Test results:**

**Note:**

1. All the losses are included during measurement and final values are mentioned in the test report.

$$\text{PAPR (dB)} = P_{Pk} \text{ (dBm or dBW)} - P_{Avg} \text{ (dBm or dBW)}$$

Where

PAPR peak-to-average power ratio, in dB

$P_{Pk}$  measured peak power or peak PSD level, in dBm or dBW

$P_{Avg}$  measured average power or average PSD level, in dBm or dBW

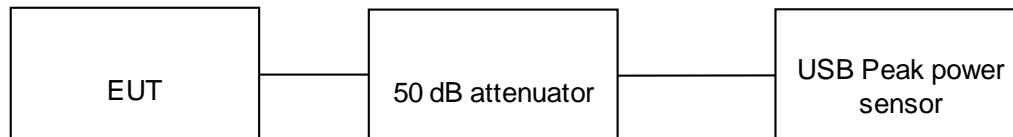
**Table 7: PAPR test results**

Channel Frequency (MHz)	Channel no.	Modulation	Channel Bandwidth (MHz)	PAPR (dB)	Limit (dB)
725	56	OFDM	6	11.54	≤13

### 8.3 Equivalent Isotropic Radiated Power (EIRP) / Effective Radiated Power (ERP)

<b>Result</b>	<b>Pass</b>
Specification	FCC Part §27.50 (c)
Test Method / Procedure	As per subclause 5.2.5.5 of ANSI C63.26-2015 As per subclause 5.6 in 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth	≥ OBW
Detector function	Peak / Average
Requirement	Fixed and base stations transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz

**Test setup**



**Environmental conditions:**

Temperature (Norm) = + 24 °C      Voltage = -48 V DC      Relative humidity = 62 %

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**Test results:**

- Note:**  
1. All the losses are included during measurement and final values are mentioned in the test report.  
2. The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is Given below

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_{\text{T}}$$

ERP = EIRP – 2.15, where ERP and EIRP are expressed in consistent units.

Where

ERP or EIRP - effective radiated power or equivalent isotropically radiated power, respectively  
(expressed in the same units as P<sub>Meas</sub>, e.g., dBm or dBW)

- P<sub>Meas</sub> - measured transmitter output power or PSD, in dBm or dBW  
G<sub>T</sub> - gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

**Table 8: ERP test results**

Channel Frequency (MHz)	Total Measured Average Power (dBm)	Gain in (dBi)	ERP (dBm)	Limit (dBm)
725	37.3	12	47.15	60

Note: EIRP= 49.3 dBm

$$\text{ERP} = 49.3 - 2.15 = 47.15$$

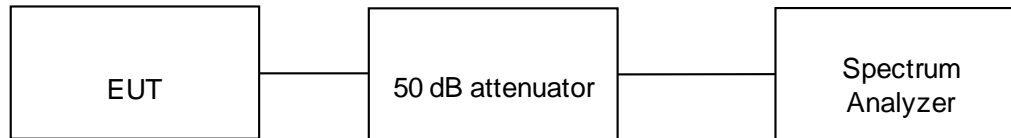
## 8.4 Occupied bandwidth

### Result

**Pass**

Specification	FCC Part §2.1049 (d)
Test Method / Procedure	As per subclause 5.4.4 of ANSI C63.26-2015 As per subclause 4.3 in 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth	100 kHz
Detector function	Peak
Requirement	NA

### Test setup



### Environmental conditions:

Temperature (Norm) = + 24 °C

Voltage = -48 V DC

Relative humidity = 62 %

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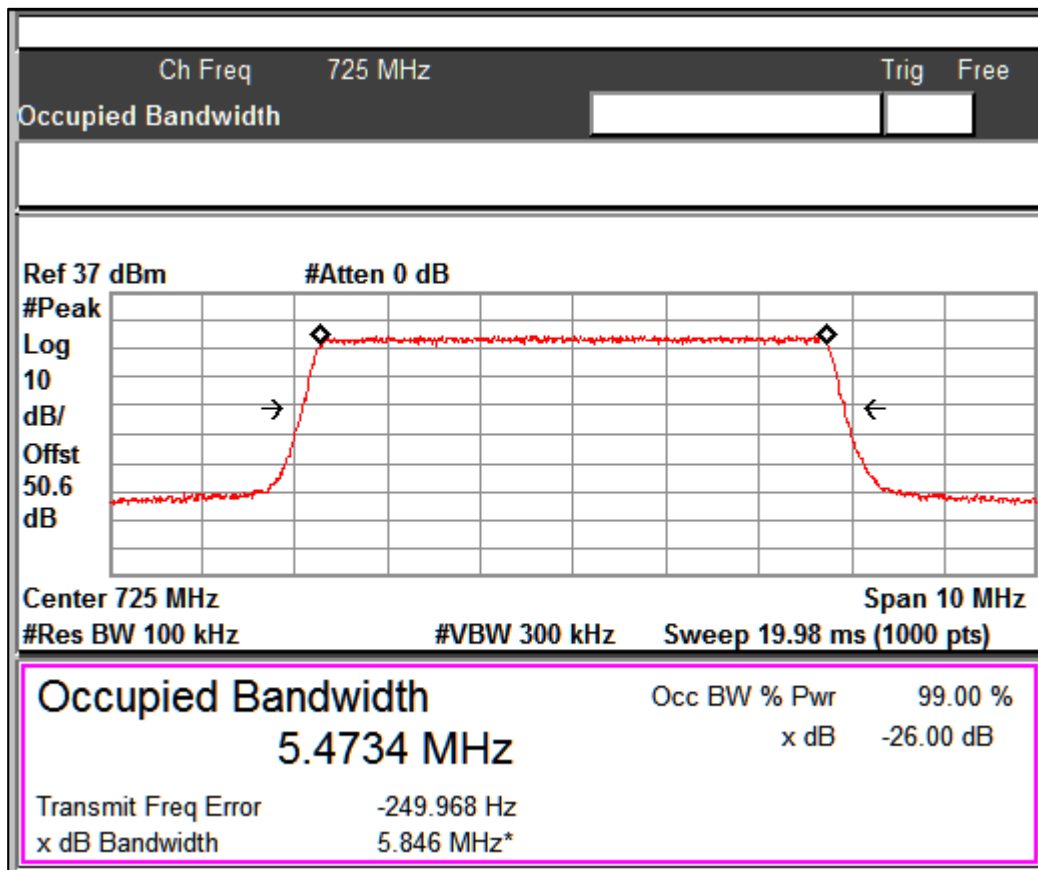
**Test results:**

**Note:**

1. All the losses are included during measurement and final values are mentioned in the test report.

**Table 9: Occupied bandwidth test results**

Channel Frequency (MHz)	Channel no.	Modulation	Channel Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)
725	56	OFDM	6	5.473	5.846



**Occupied Bandwidth Plot - 725MHz**

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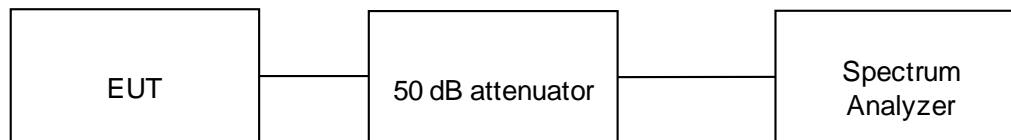
## 8.5 Band Edge

### Result

**Pass**

Specification	FCC Part §27.53 (g)
Test Method / Procedure	As per subclause 5.7 of ANSI C63.26-2015 As per subclause 6.2 in 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth	100kHz
Detector function	Average
Requirement	For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

### Test setup



### Environmental conditions:

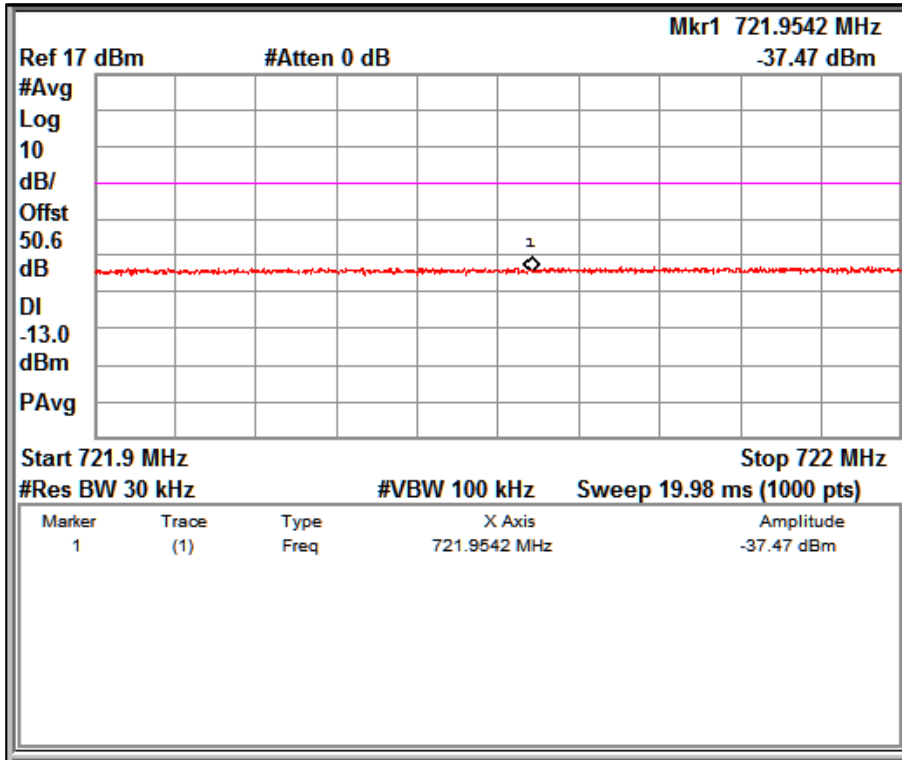
Temperature (Norm) = + 24 °C      Voltage = -48 V DC      Relative humidity = 62 %

### Test results:

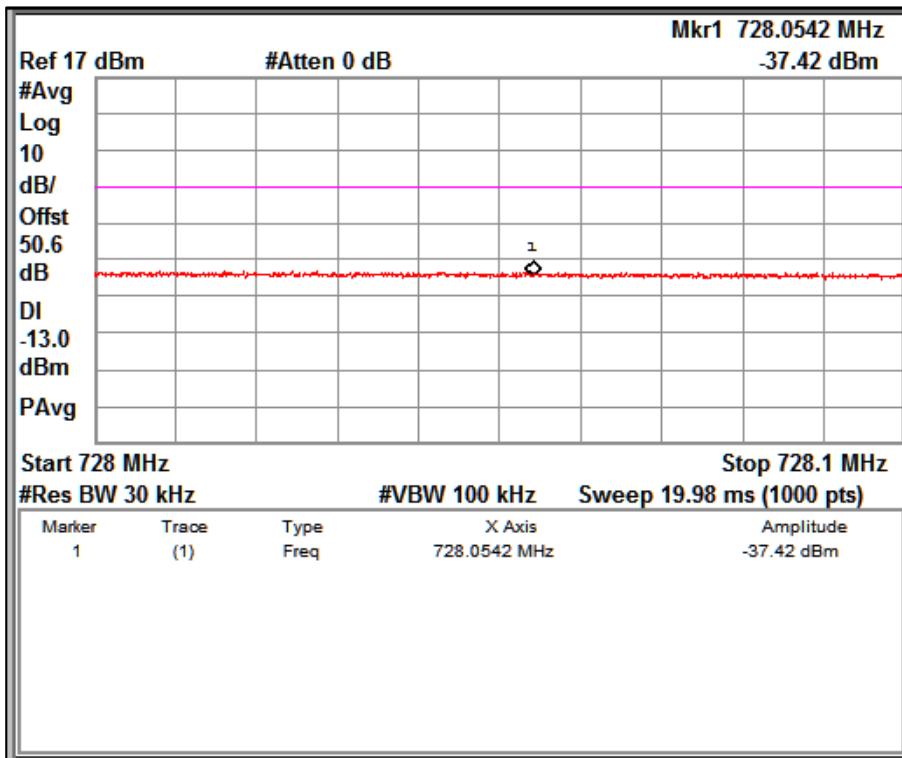
- Note:**
- All the losses are included during measurement and final values are mentioned in the test report.
  - Band Edge limit is derived using the following equation:  $43 + 10 \cdot \log(P) = 43 + 10 \cdot \log(5.37) = 50.3$   
Which is subtracted by the transmitted power i.e.  $37.3\text{dBm} - 50.3\text{dB} = -13\text{dBm}$

P is average power in W

**Plots for Band Edge Measurement:**



**Low Band Edge**



**Upper Band Edge**



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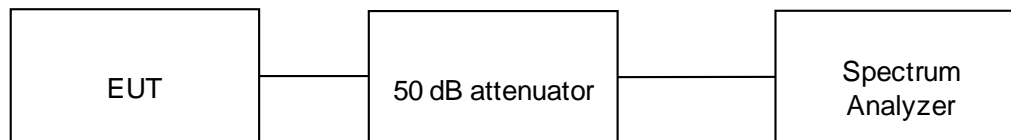
## 8.6 Spurious emissions at antenna terminals

### Result

**Pass**

Specification	FCC Part §2.1051 & §27.53 (g)
Test Method / Procedure	As per subclause 5.7 of ANSI C63.26-2015 As per subclause 6.0 in 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth	100kHz / 1MHz
Detector function	Average
Requirement	For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB.

### Test setup



### Environmental conditions:

Temperature (Norm) = + 24 °C      Voltage = -48 V DC      Relative humidity = 62 %

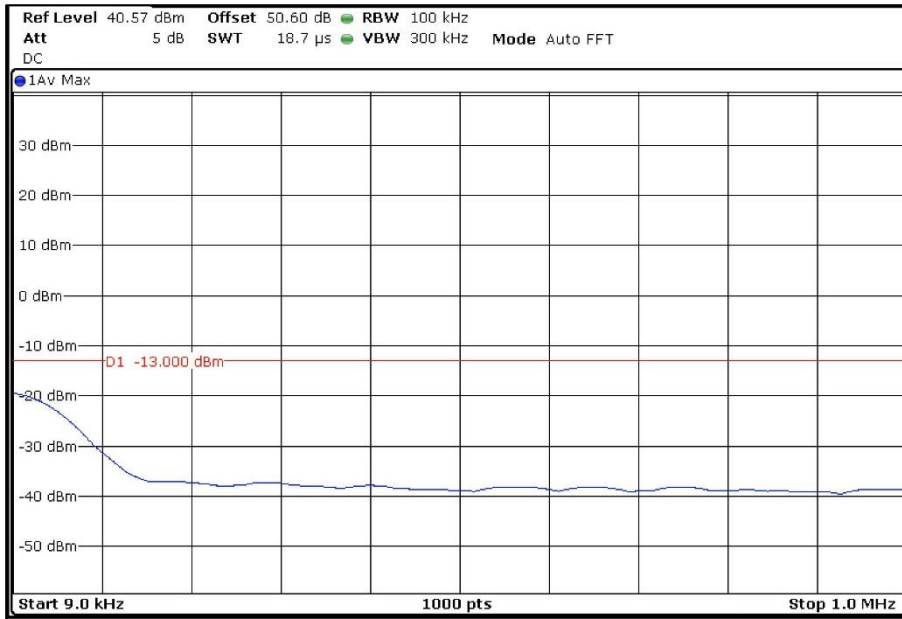
### Test results:

#### Note:

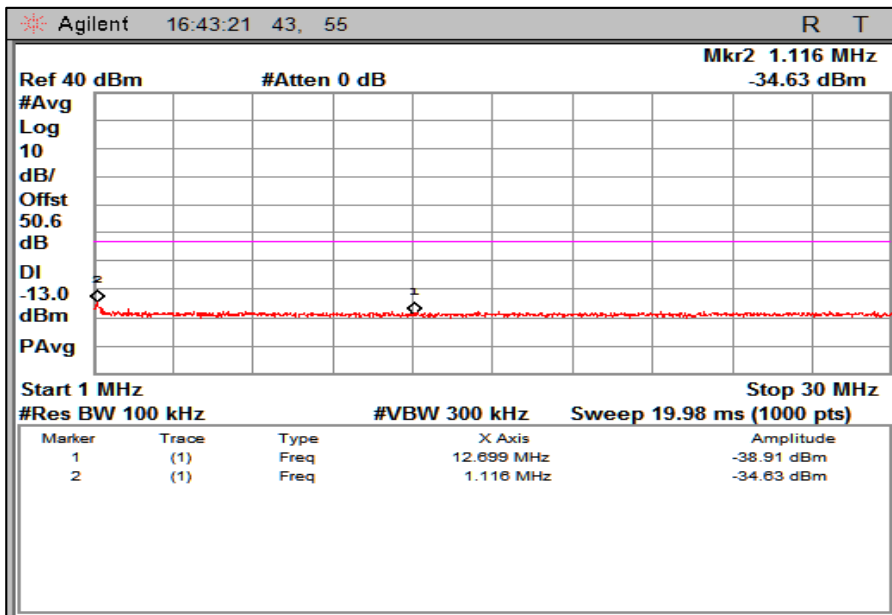
1. All the losses are included during measurement and final values are mentioned in the test report.
2. Spurious emission limit is derived using the following equation:  $43 + 10 \cdot \log(P) = 43 + 10 \cdot \log(5.37) = 50.3$   
Which is subtracted by the transmitted power i.e.  $37.3\text{dBm} - 50.3\text{dB} = -13\text{dBm}$

P is average power in W

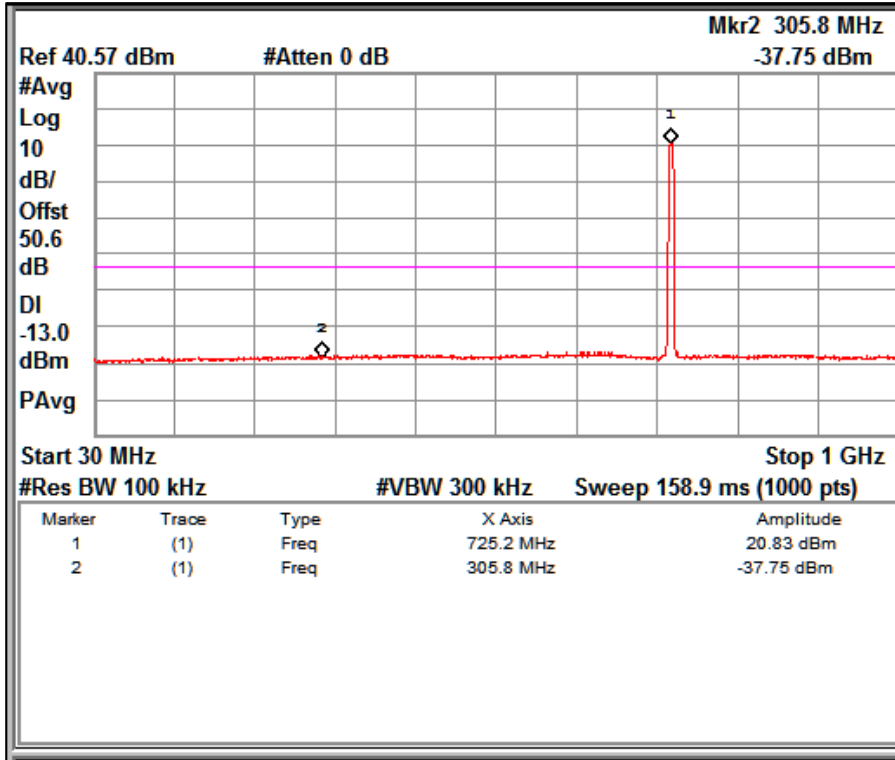
**Plots for Conducted Spurious Emission:**



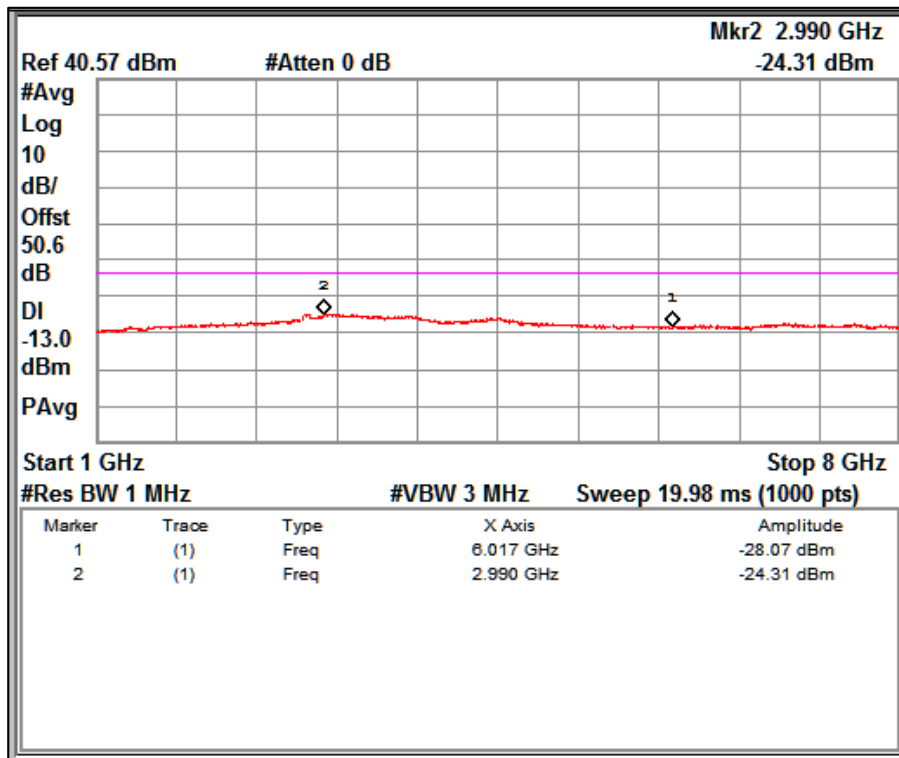
**9kHz to 1MHz**



**1MHz to 30MHz**



30MHz to 1GHz



1GHz to 8GHz

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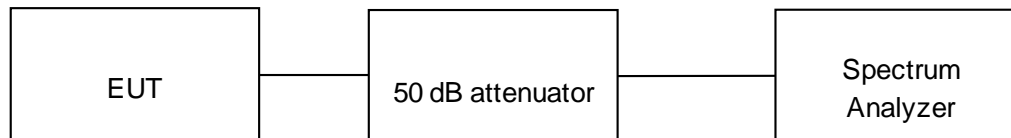
## 8.7 Frequency Stability

### Result

**Pass**

Specification	FCC Part §2.1055 & §27.54
Test Method / Procedure	As per subclause 5.6 of ANSI C63.26-2015 As per subclause 9 in 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth	100 kHz
Detector function	Peak
Requirement	The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation

### Test setup



### Environmental conditions:

Temperature (Norm) = + 24 °C

Voltage = -48 V DC

Relative humidity = 62 %

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**Test results:**

**Note:**

1. All the losses are included during measurement and final values are mentioned in the test report.

**Table 10: Frequency Stability with Temperature variation**

Channel Frequency (MHz)	Channel no.	Modulation	Channel Bandwidth (MHz)	Temperature (°C)	Frequency Error		Limit
					(Hz)	(ppm)	
725	56	OFDM	6	-40	-76.00	-0.10	Fundamental emissions stay within the authorized bands of operation.
				-30	-83.00	-0.11	
				-20	-86.00	-0.12	
				-10	-83.00	-0.11	
				0	-67.00	-0.09	
				10	-45.00	-0.06	
				20	-2.00	0.00	
				30	33.00	0.05	
				40	22.00	0.03	
				50	15.00	0.02	

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**Table 11: Frequency Stability with Voltage variation**

Channel Frequency (MHz)	Channel no.	Modulation	Channel Bandwidth (MHz)	Voltage (V)	Frequency Error		Limit
					(Hz)	(ppm)	
725	56	OFDM	6	-48	6.00	0.01	Fundamental emissions stay within the authorized bands of operation.
				-40.8	14.00	0.02	
				-55.2	18.00	0.02	

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## 8.8 Field Strength of Spurious Radiation

### Result

Pass

Specification	FCC Part §2.1053 & §27.53 (g)
Test Method / Procedure	As per subclause 5.5 of ANSI C63.26-2015 As per subclause 7 in 971168 D01 Power Meas License Digital Systems v03r01
Measurement Bandwidth (RBW)	100 kHz for frequency range < 1GHz 1 MHz for Frequency range >1GHz
Detector Function	Peak
Measuring Distance	3 m
Requirement	The power of any emission outside the authorized frequency range must be attenuated below the transmitting power (P) by a factor of at least $43+10\log(P)$ dB
Test setup	Reffer TEST METHODOLOGY

### Environmental conditions:

Temperature (Norm) = + 24 °C      Voltage = -48 V DC      Relative humidity = 62 %

Note: All the losses are included during measurement and final values are mentioned in the test report. Refer TEST METHODOLOGY for more details

### Note:

- All the losses are included during measurement and final values are mentioned in the test report.
- Spurious emission limit is derived using the following equation:  $43 + 10 \cdot \log(P) = 43 + 10 \cdot \log(5.37) = 50.3$  Which is subtracted by the transmitted power i.e.  $37.3\text{dBm} - 50.3\text{dB} = -13\text{dBm}$

P is average power in W

**Test results:**

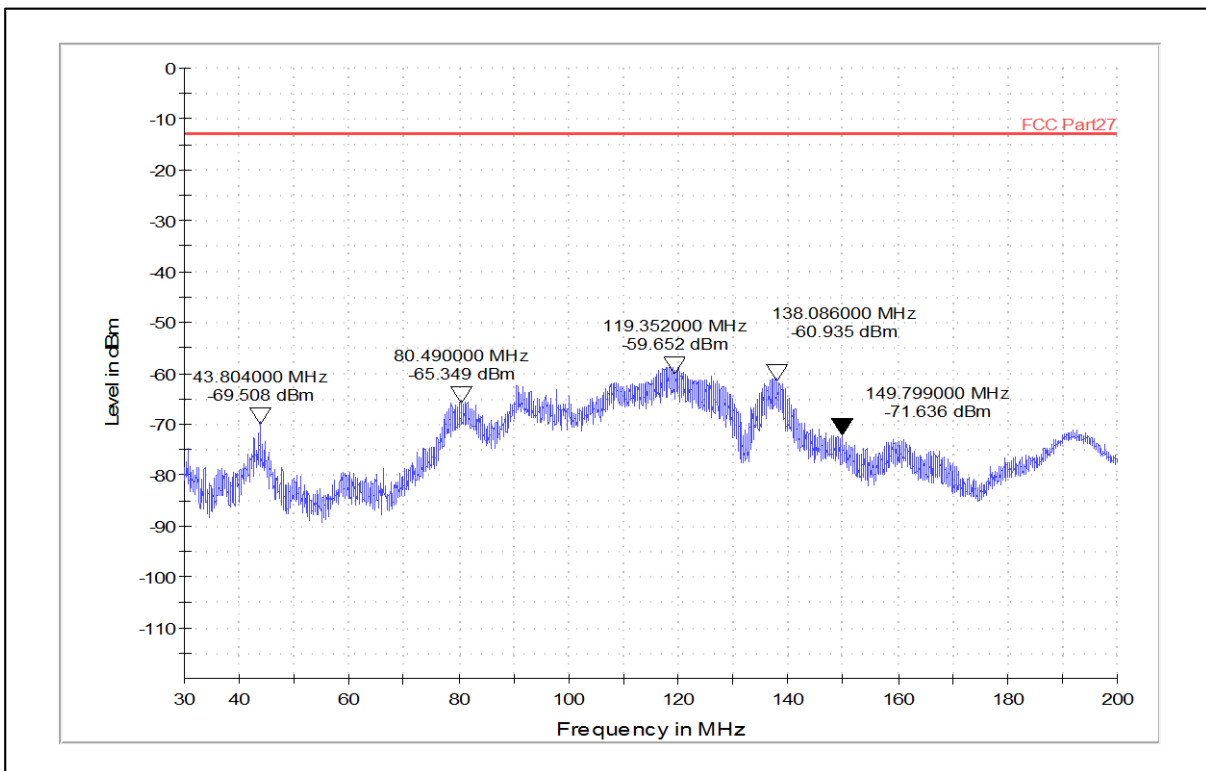
**Test results for frequency range 9kHz – 30MHz**

No emissions found in frequency range 9 kHz to 30 MHz, and measured levels are below 20dB from the limit line, hence not reported

**Test results for frequency range 30MHz – 200MHz**

Antenna polarization	Measured Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)
Vertical	80.49	-65.34	-13	-52.34
	119.35	-59.65	-13	-46.65
	138.08	-60.93	-13	-47.93
Horizontal	90.57	-67.97	-13	-54.97
	117.09	-62.43	-13	-49.43
	160.33	-68.07	-13	-55.07

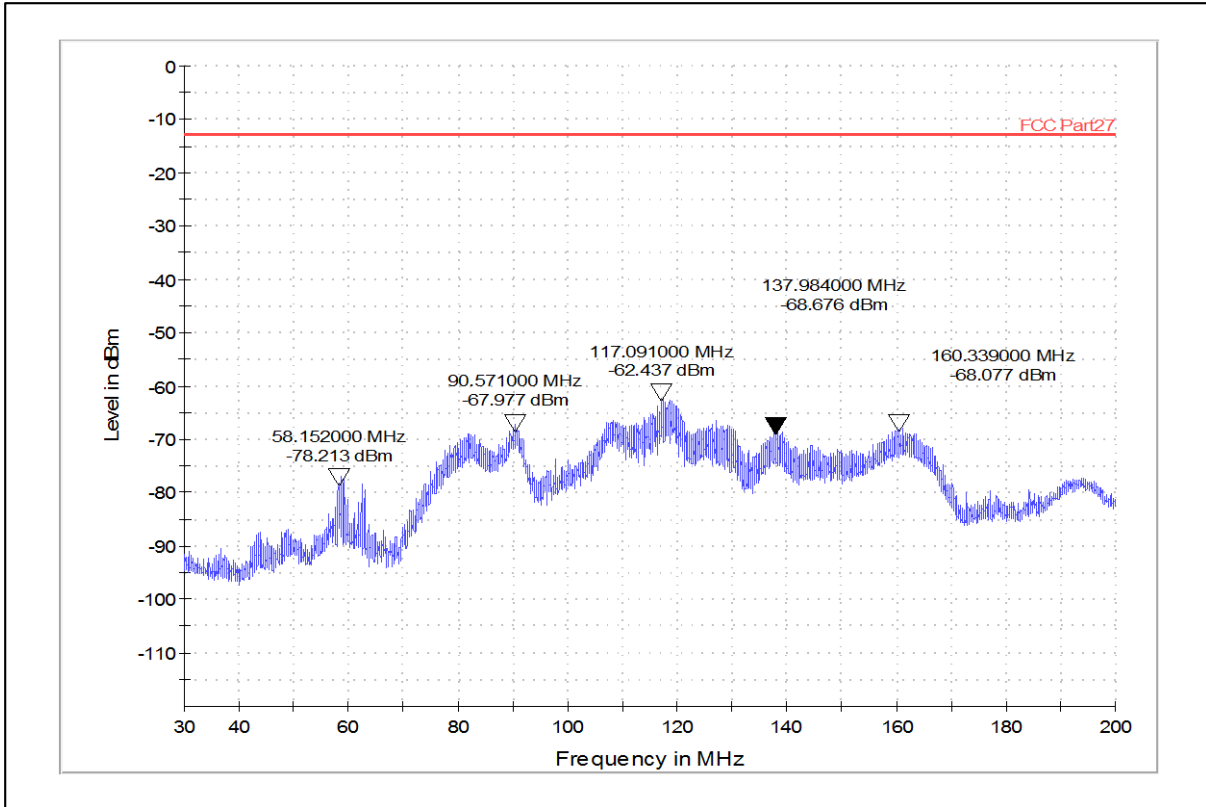
**Plots for frequency range 30MHz to 1GHz**



**Frequency Range: 30MHz-200MHz**

**Polarization:Vertical**



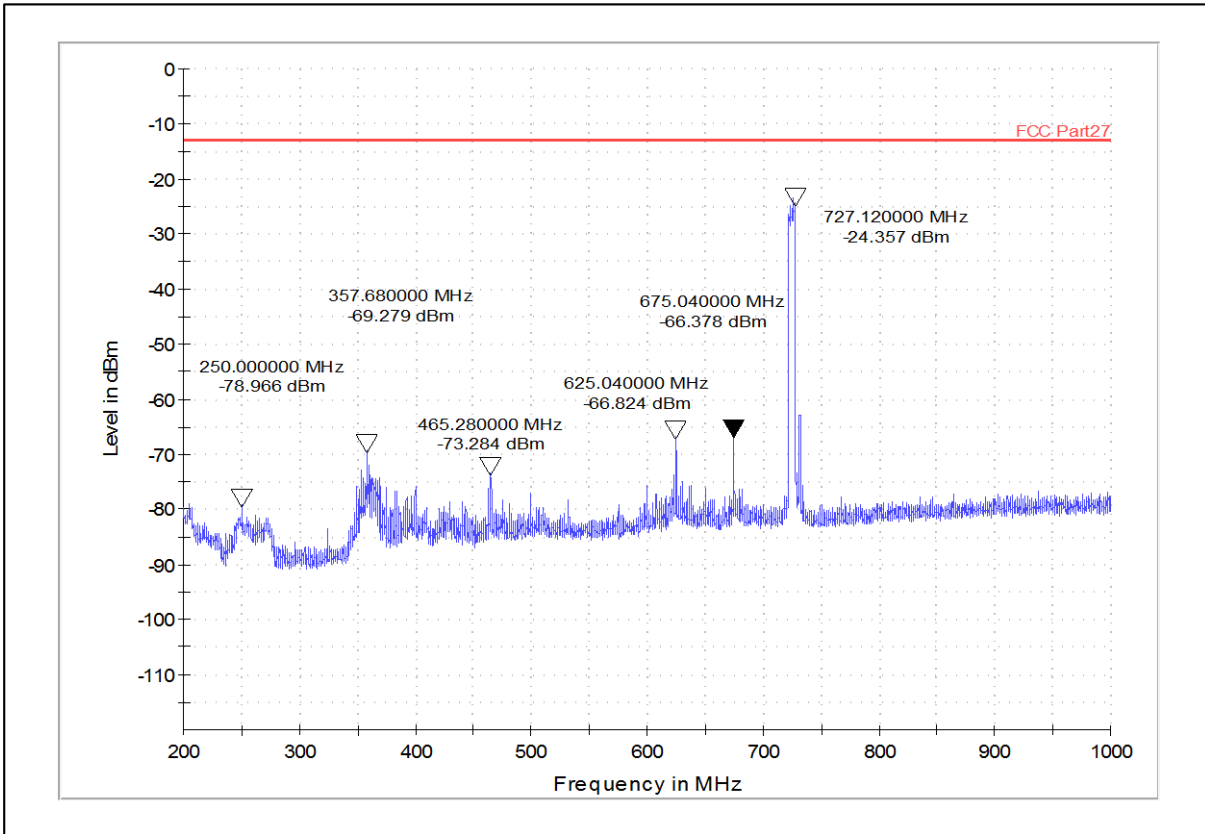


Frequency Range: 30MHz-200MHz

Polarization:Horizontal

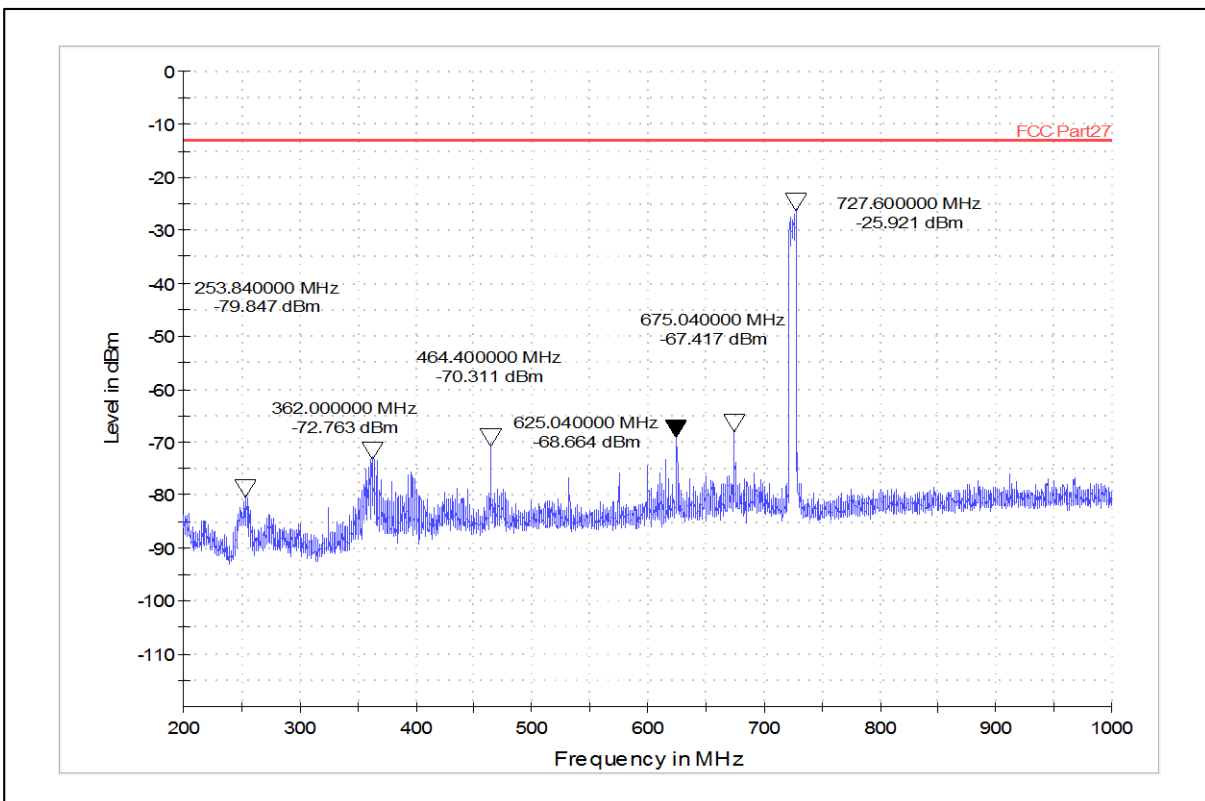
**Test results for frequency range 200MHz – 1GHz**

Antenna polarization	Measured Frequency (MHz)	ERP (dBm)	Limit (dBm)	Margin (dB)
Vertical	357.68	-69.27	-13	-56.27
	625.04	-66.82	-13	-53.82
	675.04	-66.37	-13	-53.37
Horizontal	464.4	-70.31	-13	-57.31
	625.04	-68.66	-13	-55.66
	675.04	-67.41	-13	-54.41



Frequency Range: 200MHz-1GHz

Polarization: Vertical



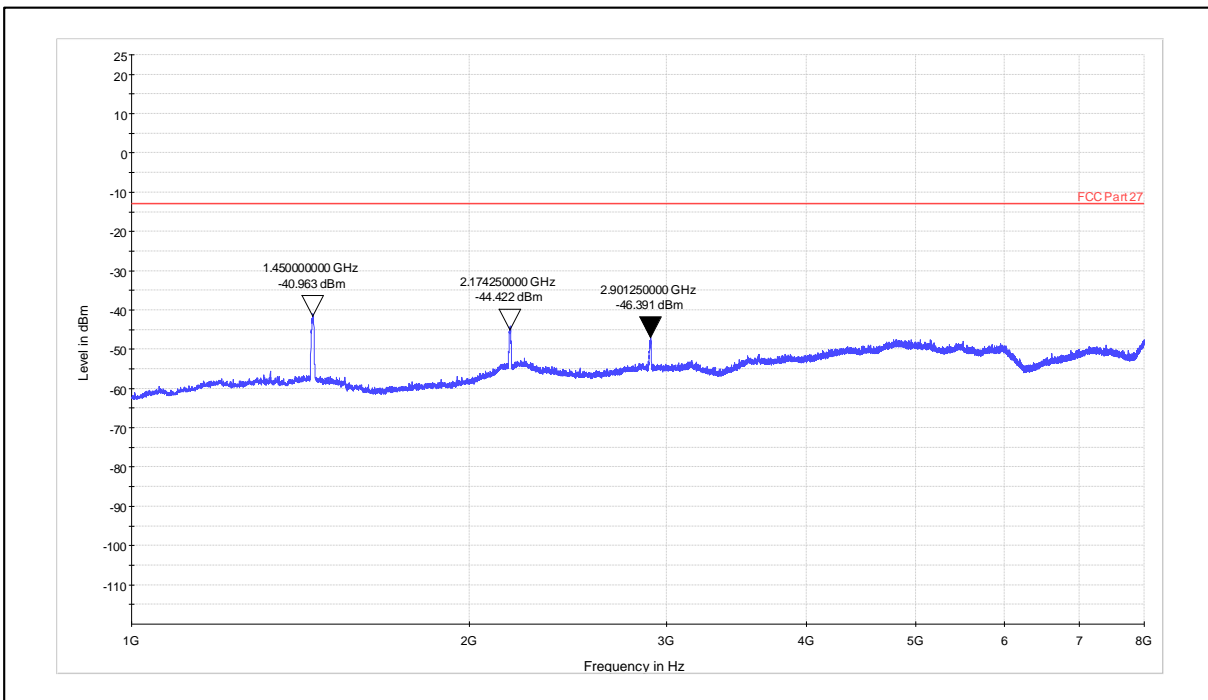
Frequency Range: 200MHz-1GHz

Polarization: Horizontal

**Test results for the frequencies above 1GHz**

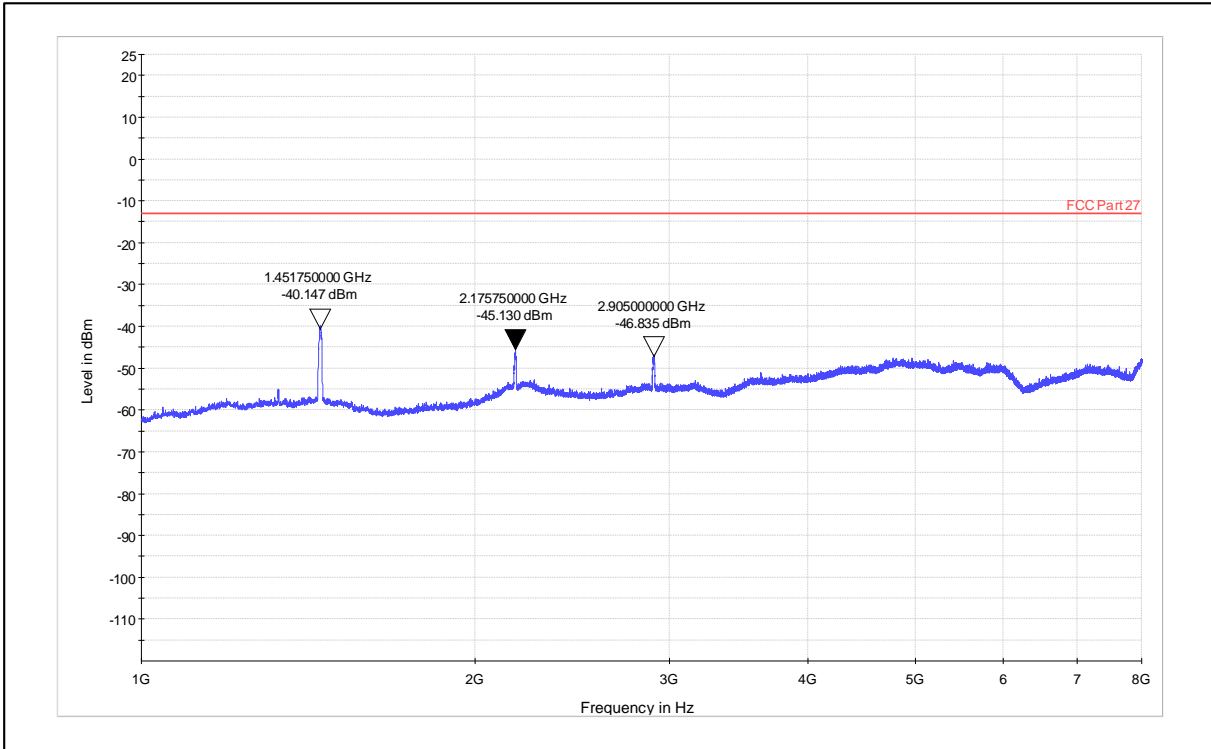
Modulation	Channel Bandwidth (MHz)	Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna polarization	EIRP (dBm)	Limit (dBm)	Margin (dB)
OFDM	6	725	1450	Vertical	-40.56	-13	-27.56
				Horizontal	-39.42	-13	-26.42
			2175	Vertical	-44.42	-13	-31.42
				Horizontal	-41.66	-13	-28.66
			2900	Vertical	-46.39	-13	-33.39
				Horizontal	-45.52	-13	-32.52
			3625	Vertical	-51.43	-13	-38.43
				Horizontal	-51.75	-13	-38.75
			4350	Vertical	No Emissions Found		
				Horizontal			

**Worst Case Plots**



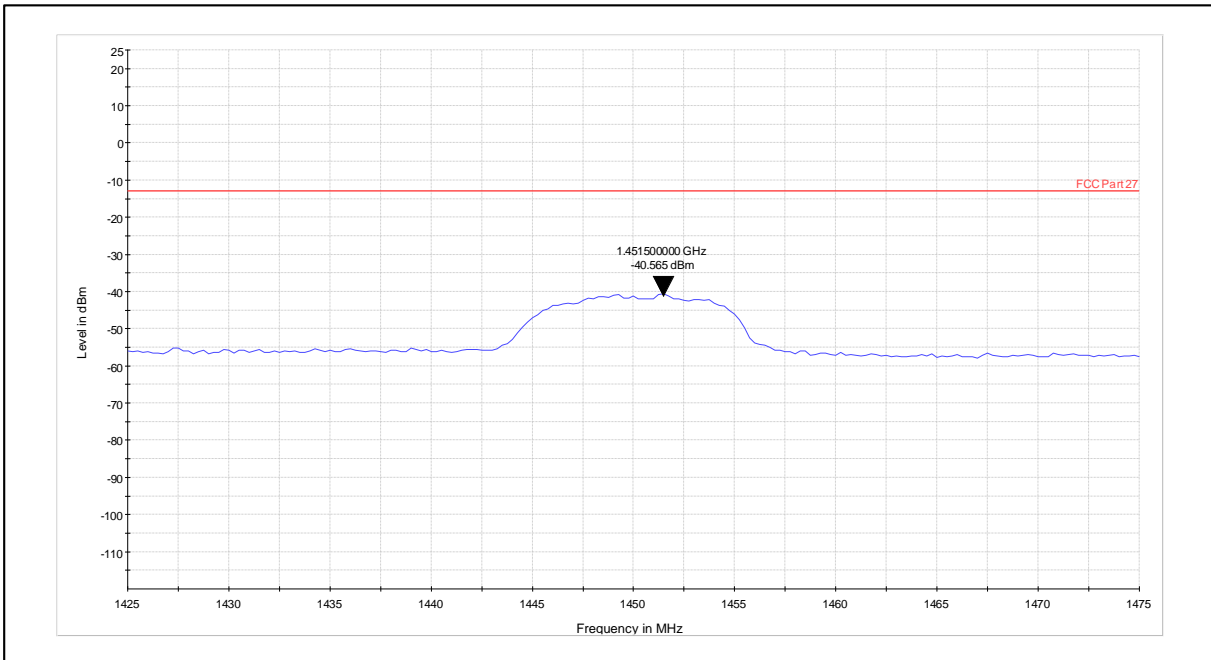
**Frequency Range: 1GHz-8GHz**

**Polarization: Vertical**



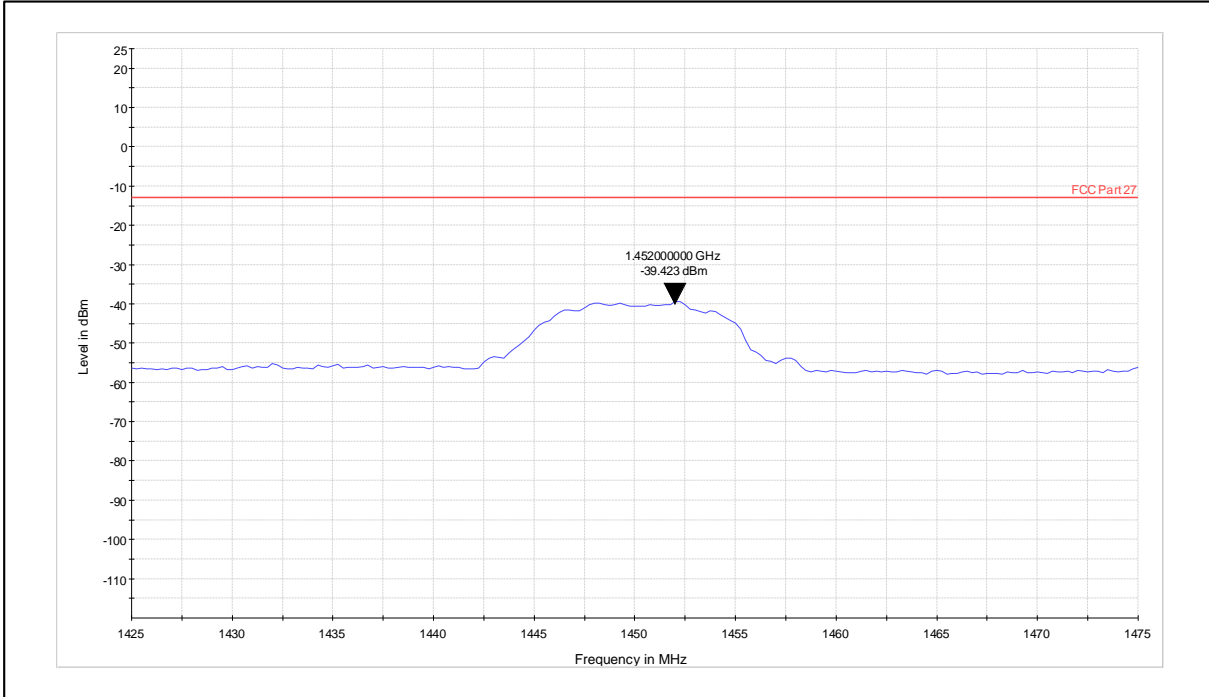
**Frequency Range: 1GHz-8GHz**

**Polarization: Horizontal**



**Channel Frequency: Harmonics2**

**Polarization: Vertical**



**Channel Frequency: Harmonics2**

**Polarization: Horizontal**

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\*\*\*\*\*END OF TEST REPORT\*\*\*\*\*